



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	20-Sep-15	23-Sep-15	27-Sep-15		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.750	4.750	4.750		
Log Start Depth (MD, ft)	633.00	6,995.00	12,151.00		
Log End Depth (MD, ft)	6,995.00	12,151.00	16,149.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	18-Sep-15 22:48	21-Sep-15 09:10	23-Sep-15 21:35		
Drill/Wipe End Date and Time	20-Sep-15 05:27	23-Sep-15 03:46	26-Sep-15 20:42		
Min Inc (deg) @ Depth (MD, ft)	0.06 @ 1,767.00	86.64 @ 12,085.00	88.37 @ 14,262.00		
Max Inc (deg) @ Depth (MD, ft)	84.04 @ 6,939.00	92.19 @ 11,062.00	93.95 @ 15,493.00		
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	589.71	303.50	299.94		
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	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.55 / 42.00	10.00 / 38.00	10.02 / 39.00		
Filtrate CL (ppm)	2,500.00	3,000.00	2,900.00		
pH / Fluid Loss (mptm)	10.00 / 8	9.70 / 7	9.40 / 8		
PV (cP) / YP (lbf2)	9 / 10.00	8 / 9.00	9 / 10.00		
% Solids / % Sand	10.80 / 0.45	8.20 / 0.50	8.40 / 0.25		
% 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		
Mm @ Measured Temp (degF)	174.00 / 20M	204.10 / 20M	240.00 / 20M		

Max Tool Temp (degF) / Source	171.20 / PCM	231.42 / PCM	242.90 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 171.20	N/A @ 231.42	N/A @ 242.90		
Lead MWD Engineer	Robert Barnes	Robert Barnes	Robert Barnes		
Customer Representative	Jeremy Stolz	Jeremy Stolz	Jeremy Stolz		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341335	12310740	12310740		
Insert Serial Number	11400992	11227493	11400992		
Date and Time Initialized	17-Sep-15 14:46	20-Sep-15 08:06	23-Sep-15 06:26		
Date and Time Read	20-Sep-15 11:44	23-Sep-15 12:43	27-Sep-15 09:00		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.00	66.00	66.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341335	12310740	12310740		
Sonde Serial Number	11297516	11637592	11297516		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	32.30	84.20	162.10		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.90	68.73	68.72		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341335	12310740	12310740		
Insert/Sonde Serial Number	12037420	12071509	12037420		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth's from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The following smoothing parameters have been applied to the data:
1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft

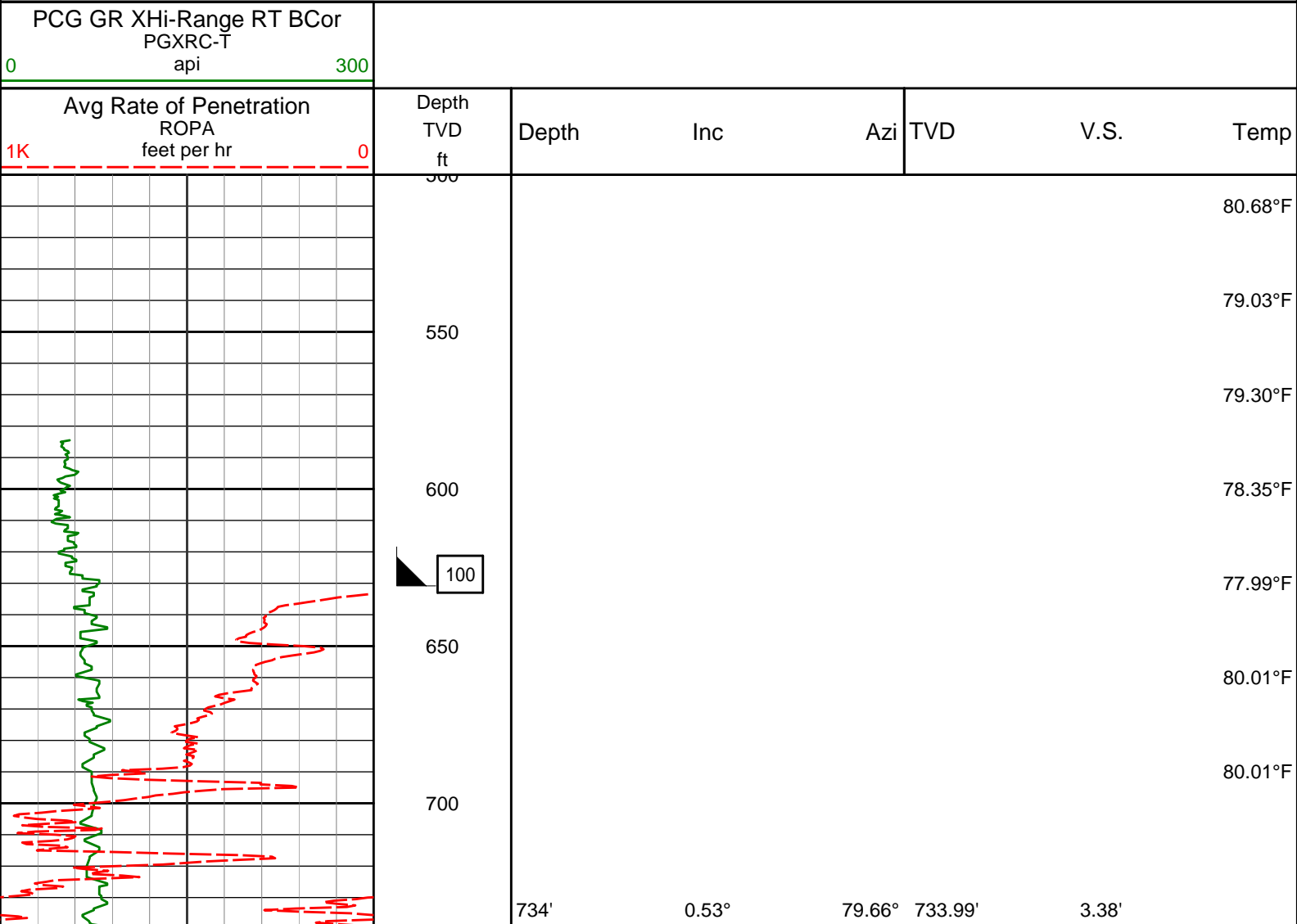
1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft

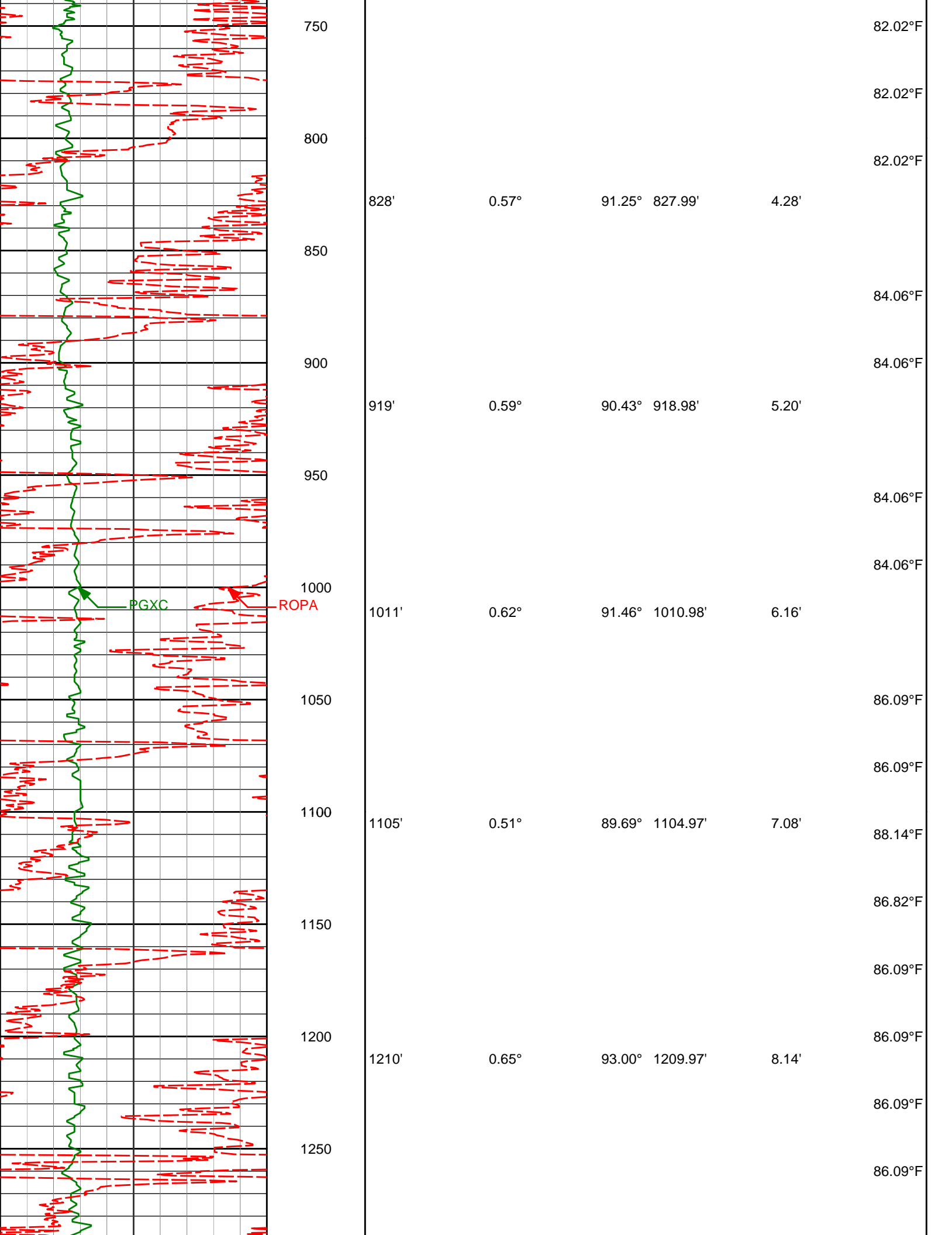
ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft

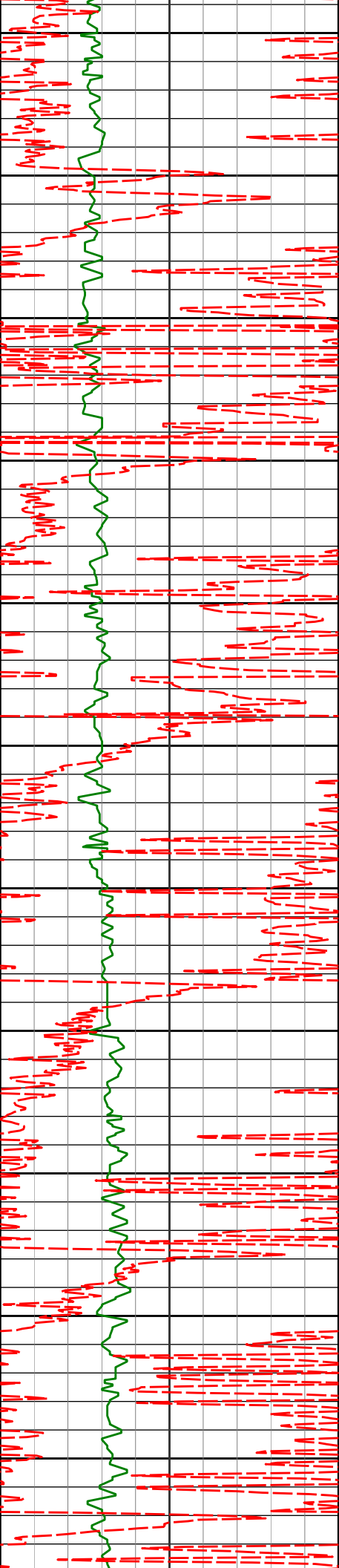
WARRANTY

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TVD Detail 1:600 Scale

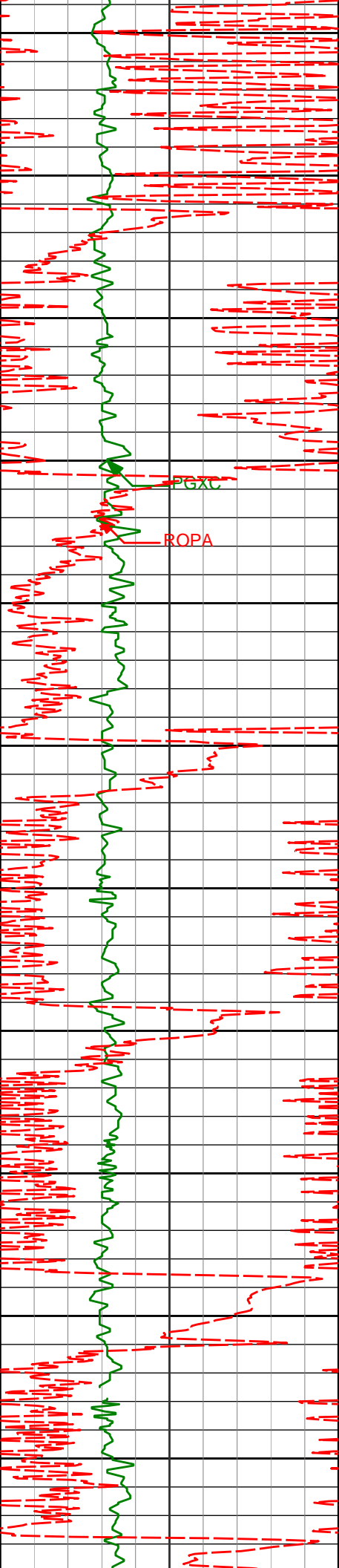




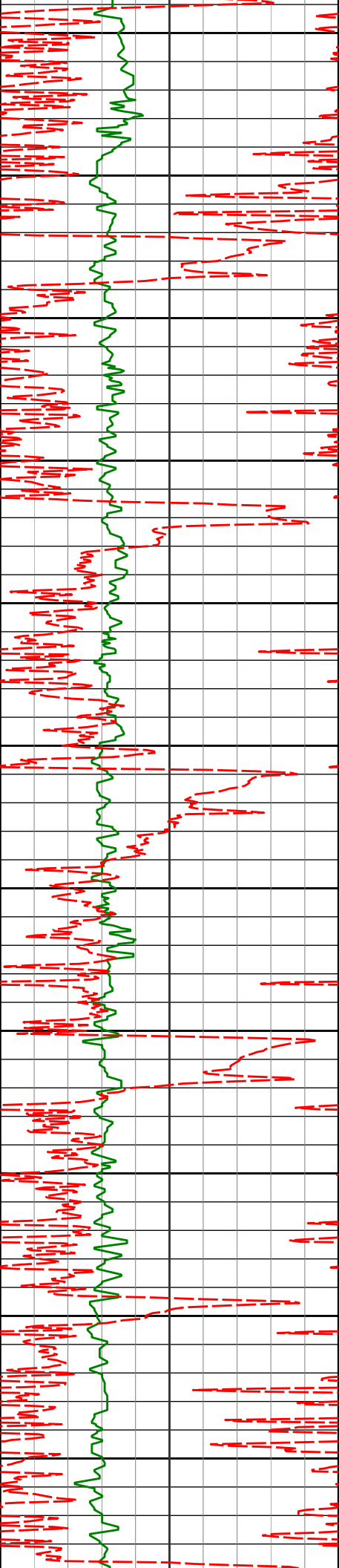


1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800

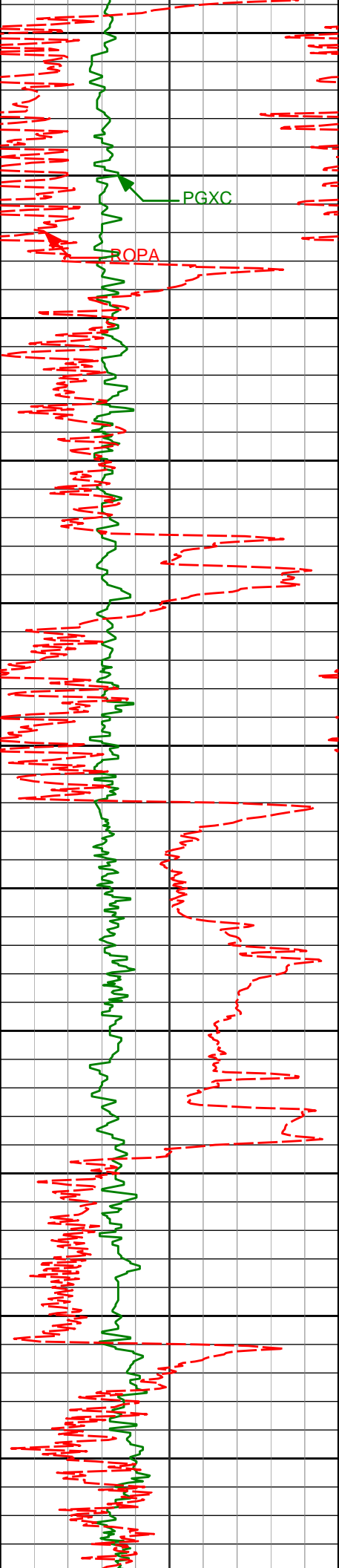
1304'	0.74°	112.77°	1303.96'	9.20'	
					86.09°F
					86.09°F
1397'	0.58°	113.77°	1396.95'	10.14'	
					88.14°F
					88.14°F
1491'	0.62°	127.09°	1490.95'	10.93'	
					88.14°F
					88.14°F
1582'	0.33°	126.34°	1581.94'	11.49'	
					90.19°F
					90.19°F
1674'	0.28°	114.84°	1673.94'	11.88'	
					90.19°F
					90.19°F
1767'	0.06°	227.25°	1766.94'	12.03'	92.26°F
					92.26°F



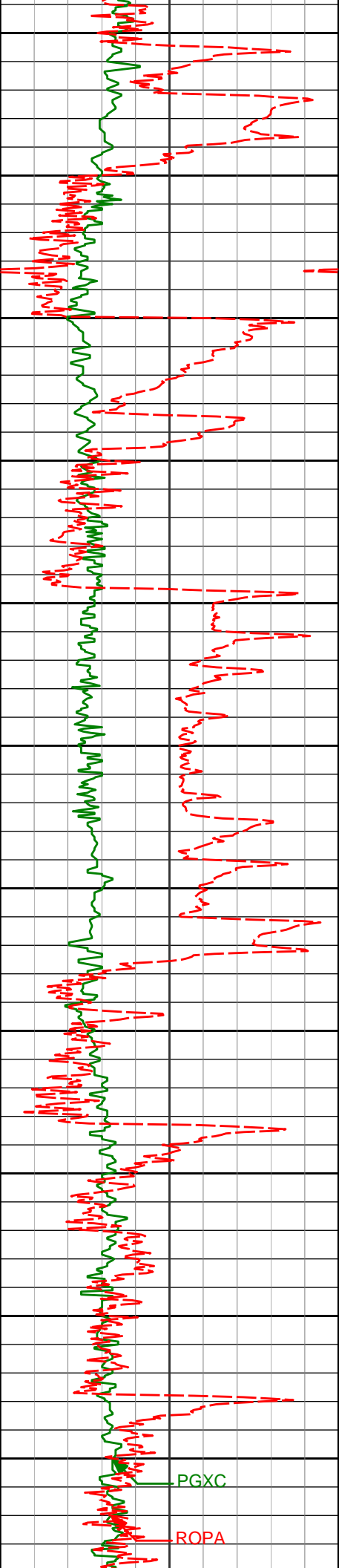
1850	1861'	0.28°	126.04°	1860.94'	12.17'	
						94.33°F
1900						94.33°F
1950	1954'	0.33°	129.18°	1953.94'	12.53'	
						94.33°F
2000						94.33°F
2050	2046'	0.38°	159.21°	2045.94'	12.80'	
						96.42°F
2100						96.42°F
2150	2138'	0.56°	156.04°	2137.94'	13.02'	
						96.42°F
2200						96.42°F
2250	2232'	0.50°	154.78°	2231.93'	13.30'	
						98.51°F
2300						98.51°F
						98.51°F
2350	2324'	3.02°	348.72°	2323.89'	13.20'	
						99.54°F
						100.62°F



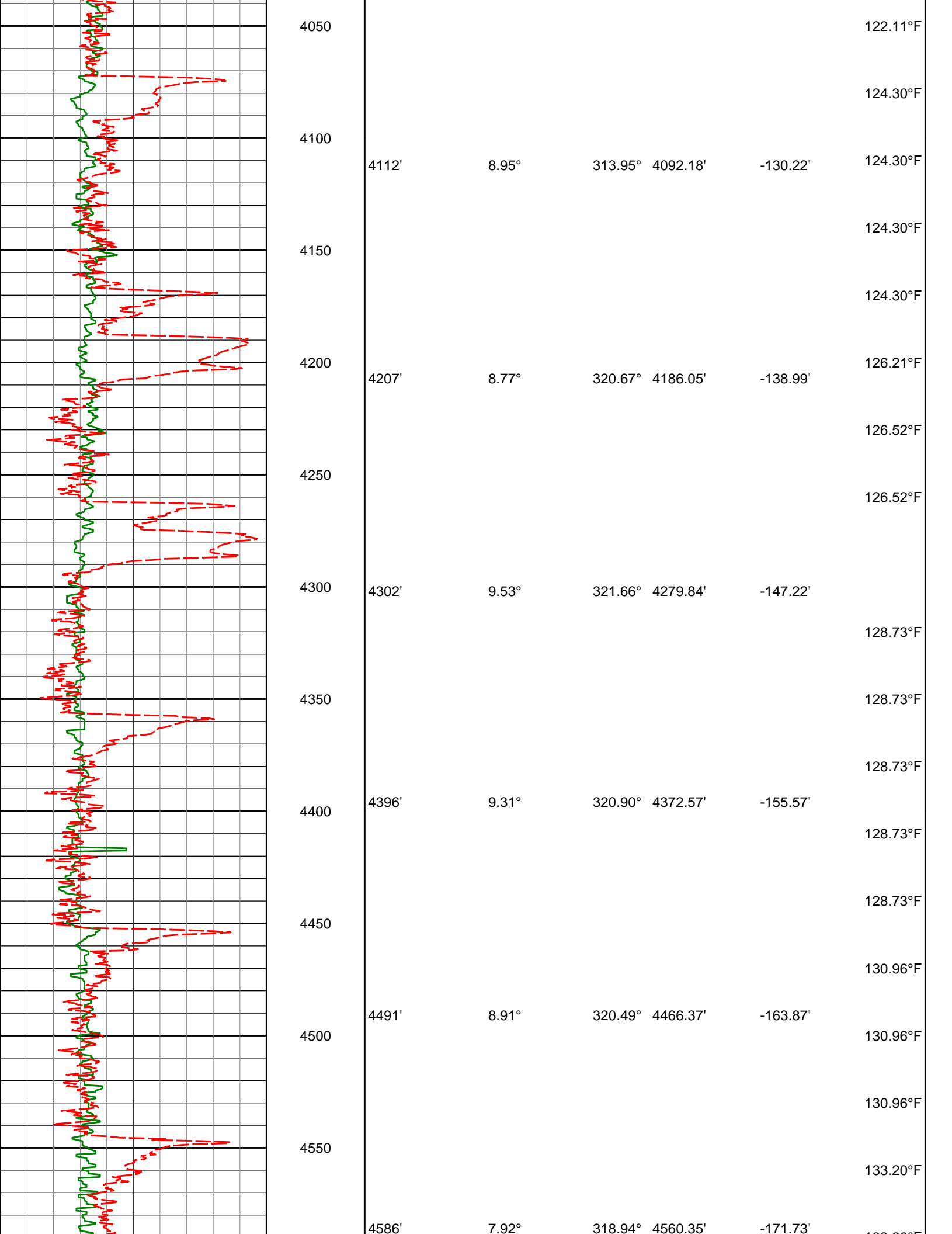
2400						100.62°F
	2418'	4.69°	335.01°	2417.68'	11.70'	100.62°F
						100.62°F
2450						100.62°F
						100.62°F
						100.62°F
2500	2509'	5.94°	332.03°	2508.29'	8.70'	101.21°F
						101.21°F
						101.21°F
2550						102.72°F
						102.72°F
						102.72°F
2600	2602'	6.11°	328.54°	2600.77'	4.74'	102.72°F
						102.72°F
						102.72°F
2650						102.72°F
						102.72°F
						104.83°F
						104.83°F
2700	2695'	7.37°	321.98°	2693.13'	-0.59'	104.83°F
						104.83°F
						104.83°F
2750						104.83°F
						104.83°F
						104.83°F
	2786'	9.03°	321.61°	2783.20'	-7.54'	104.83°F
2800						104.83°F
						104.83°F
						104.83°F
2850						104.83°F
						104.83°F
						104.83°F
2900						106.97°F
						106.97°F
						106.97°F

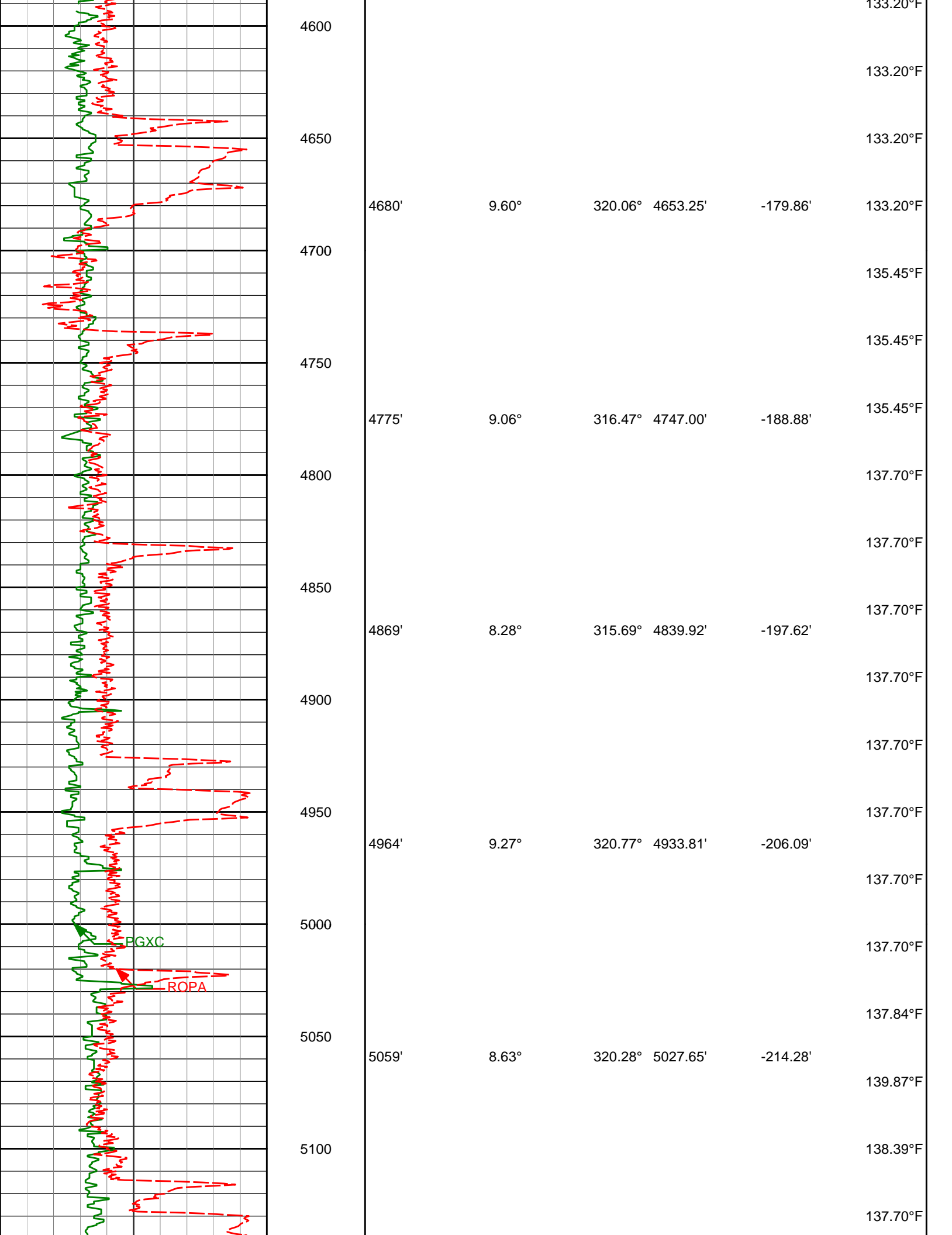


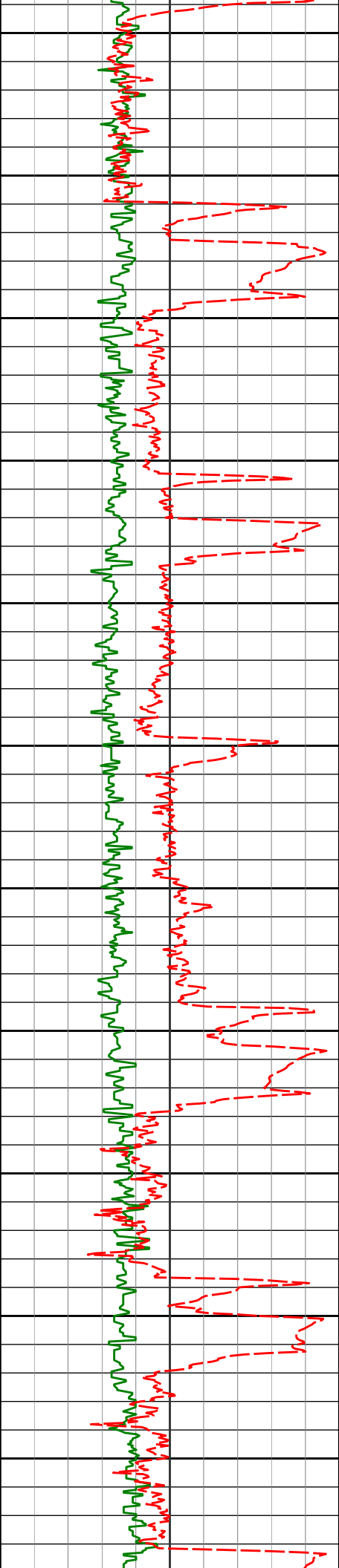
2950					106.97°F
2976'	9.01°	321.57°	2970.85'	-23.59'	109.09°F
3000					109.09°F
					109.09°F
3050					110.36°F
3070'	8.62°	319.48°	3063.74'	-31.57'	111.24°F
3100					111.24°F
					111.24°F
3150					111.24°F
3165'	8.89°	318.14°	3157.63'	-39.94'	111.24°F
3200					111.24°F
					111.24°F
3250					111.24°F
3260'	8.41°	316.12°	3251.55'	-48.54'	111.24°F
3300					111.24°F
					111.24°F
3350	8.81°	318.32°	3345.48'	-57.09'	113.40°F
3400					114.61°F
3450	8.31°	314.67°	3438.43'	-65.63'	115.56°F
					115.56°F



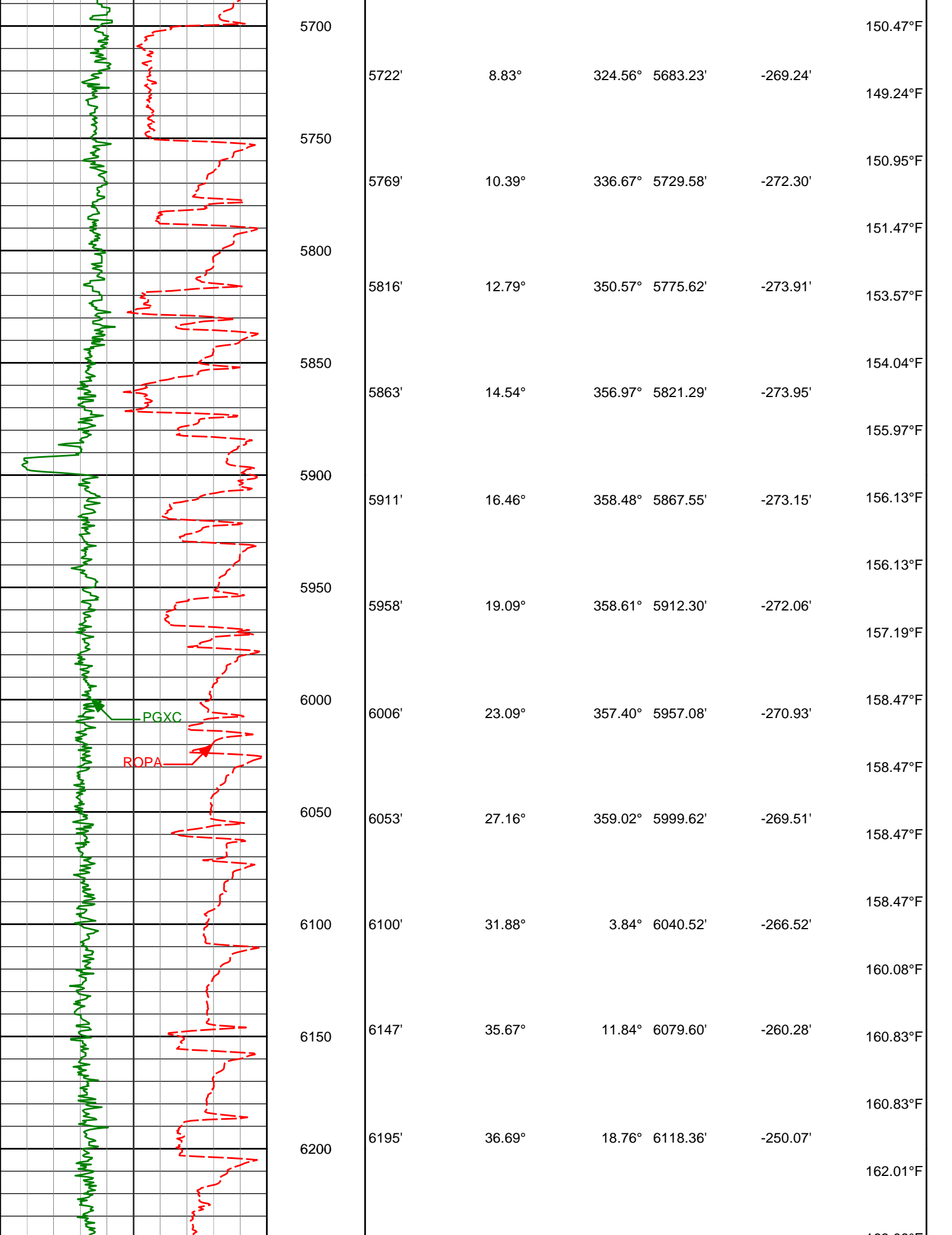
3500						115.56°F
3550	3544'	9.06°	320.99°	3532.34'	-74.09'	115.56°F
						115.56°F
3600						117.73°F
3650	3639'	9.89°	321.42°	3626.05'	-82.61'	117.73°F
						117.73°F
						117.73°F
3700						
						117.73°F
3750	3734'	10.43°	321.01°	3719.56'	-91.73'	117.73°F
						117.73°F
						117.73°F
3800						
	3828'	9.79°	317.34°	3812.10'	-101.18'	117.73°F
3850						
						117.73°F
3900						119.91°F
	3923'	9.64°	316.78°	3905.73'	-110.86'	119.91°F
3950						
						119.91°F
						122.11°F
4000						
	4017'	9.57°	315.57°	3998.42'	-120.52'	122.11°F

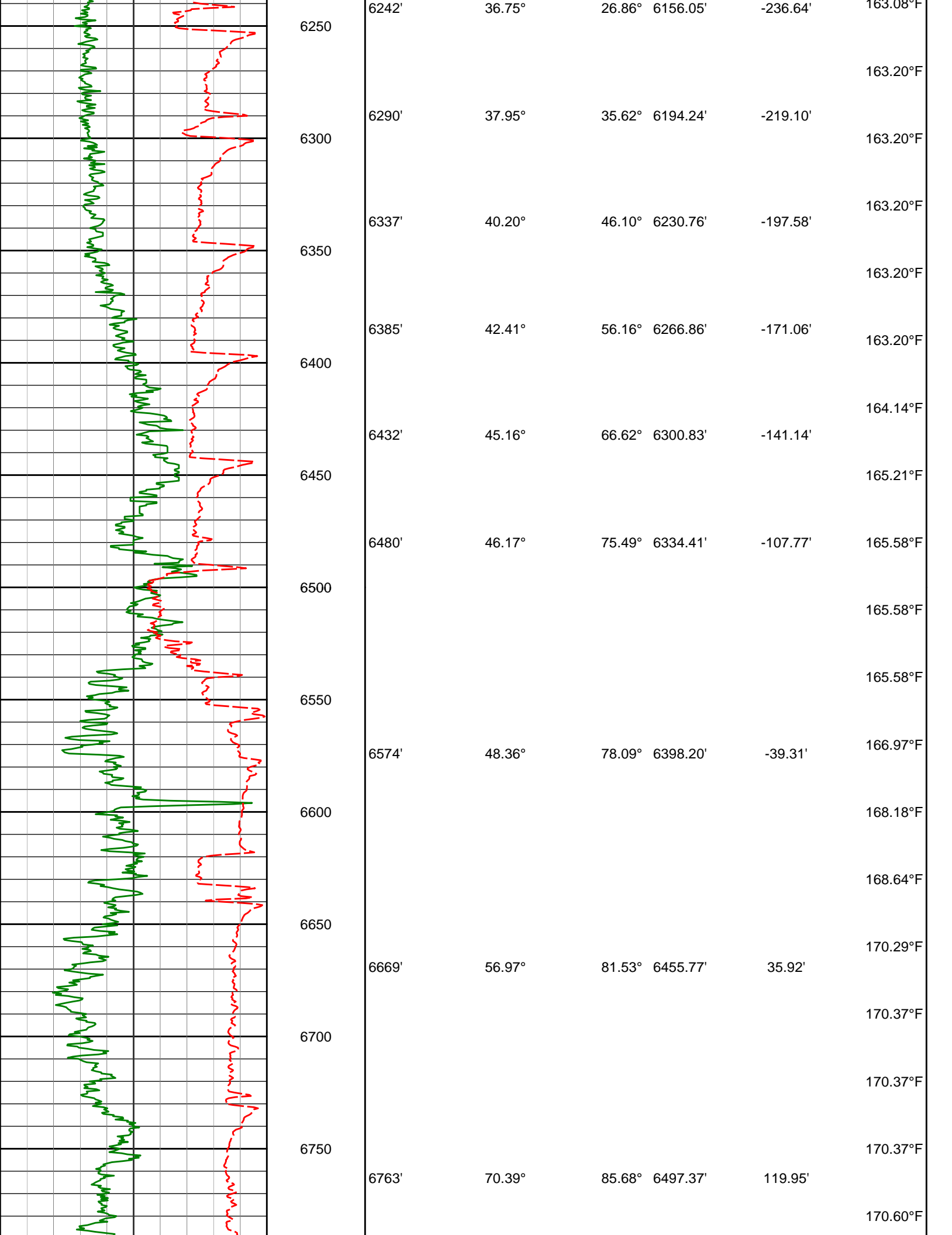


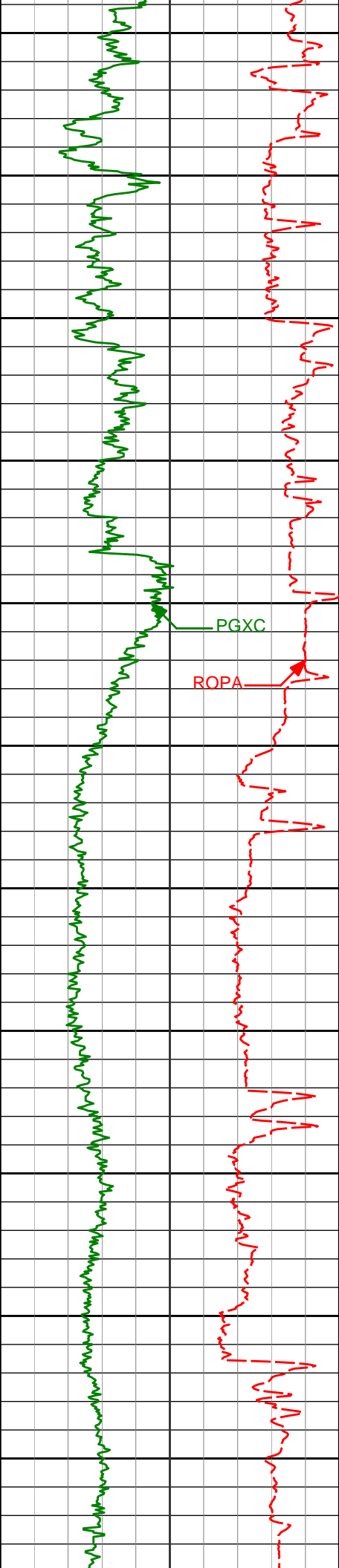




5150	5154'	7.94°	311.02°	5121.66'	-222.75'	139.96°F
						138.20°F
5200						137.70°F
5250	5248'	8.73°	322.92°	5214.68'	-230.89'	139.50°F
						139.96°F
5300						139.96°F
5350	5343'	9.31°	324.09°	5308.50'	-238.48'	139.96°F
						142.25°F
5400						142.25°F
5450	5438'	8.27°	321.80°	5402.39'	-246.00'	144.37°F
						144.54°F
5500						144.54°F
						146.19°F
5550	5532'	8.95°	320.39°	5495.33'	-253.69'	146.84°F
						146.84°F
5600						147.86°F
5650	5627'	8.14°	318.57°	5589.27'	-261.72'	149.14°F
						149.35°F







6800

6810'

76.69°

86.97°

6510.68'

164.97'

172.63°F

6850

6858'

78.15°

87.25°

6521.13'

211.76'

172.78°F

173.45°F

6900

6905'

79.09°

87.25°

6530.41'

257.77'

173.55°F

6950

6939'

84.04°

88.71°

6535.39'

291.31'

173.17°F

171.24°F

200

7000

7014'

89.17°

88.62°

6539.83'

365.93'

168.58°F

167.14°F

7050

167.63°F

167.97°F

7100

7108'

89.41°

89.57°

6541.00'

459.58'

167.97°F

167.97°F

7150

168.15°F

7200

7203'

89.60°

89.62°

6541.82'

554.16'

170.19°F

170.49°F

7250

172.47°F

7300

7297'

91.26°

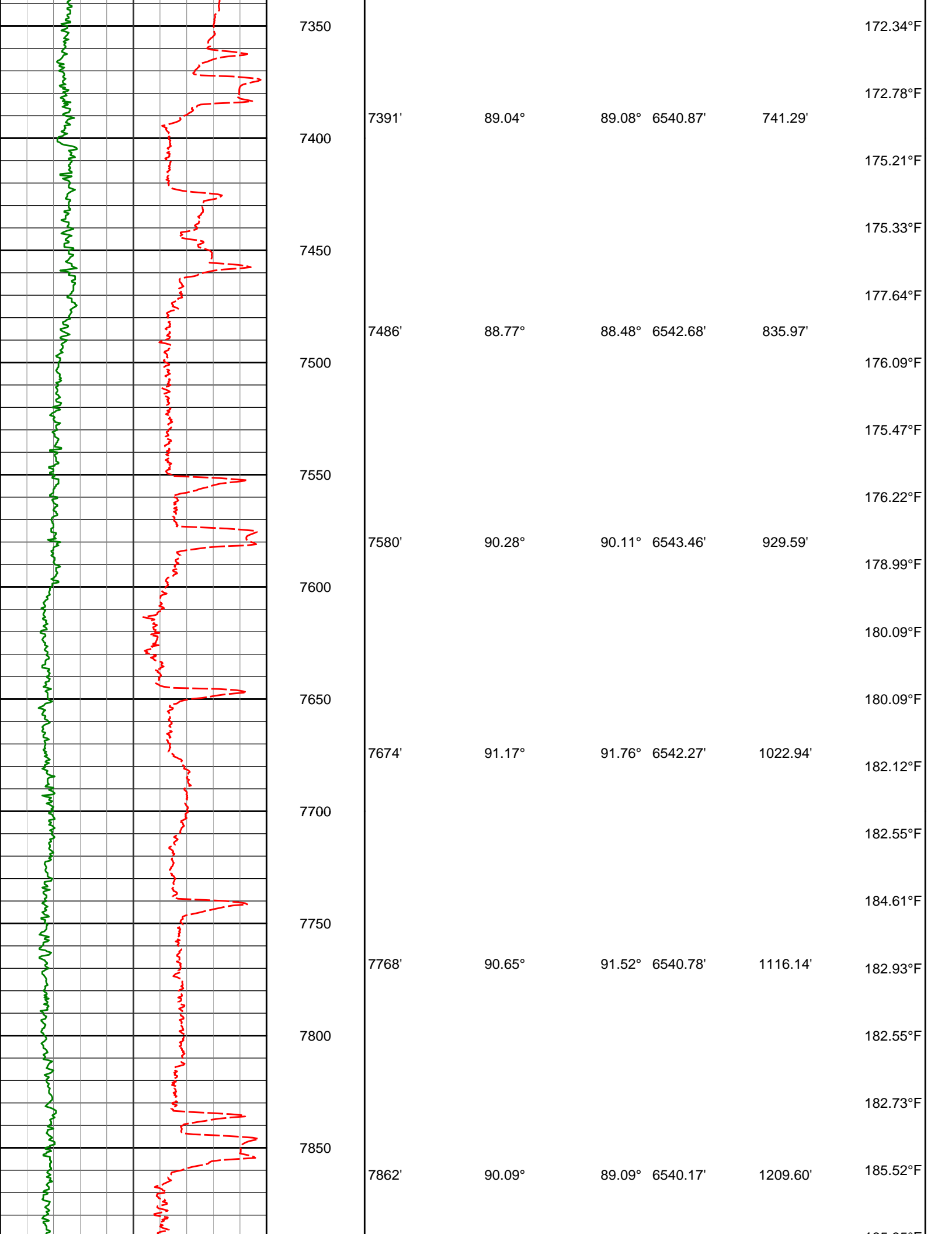
90.10°

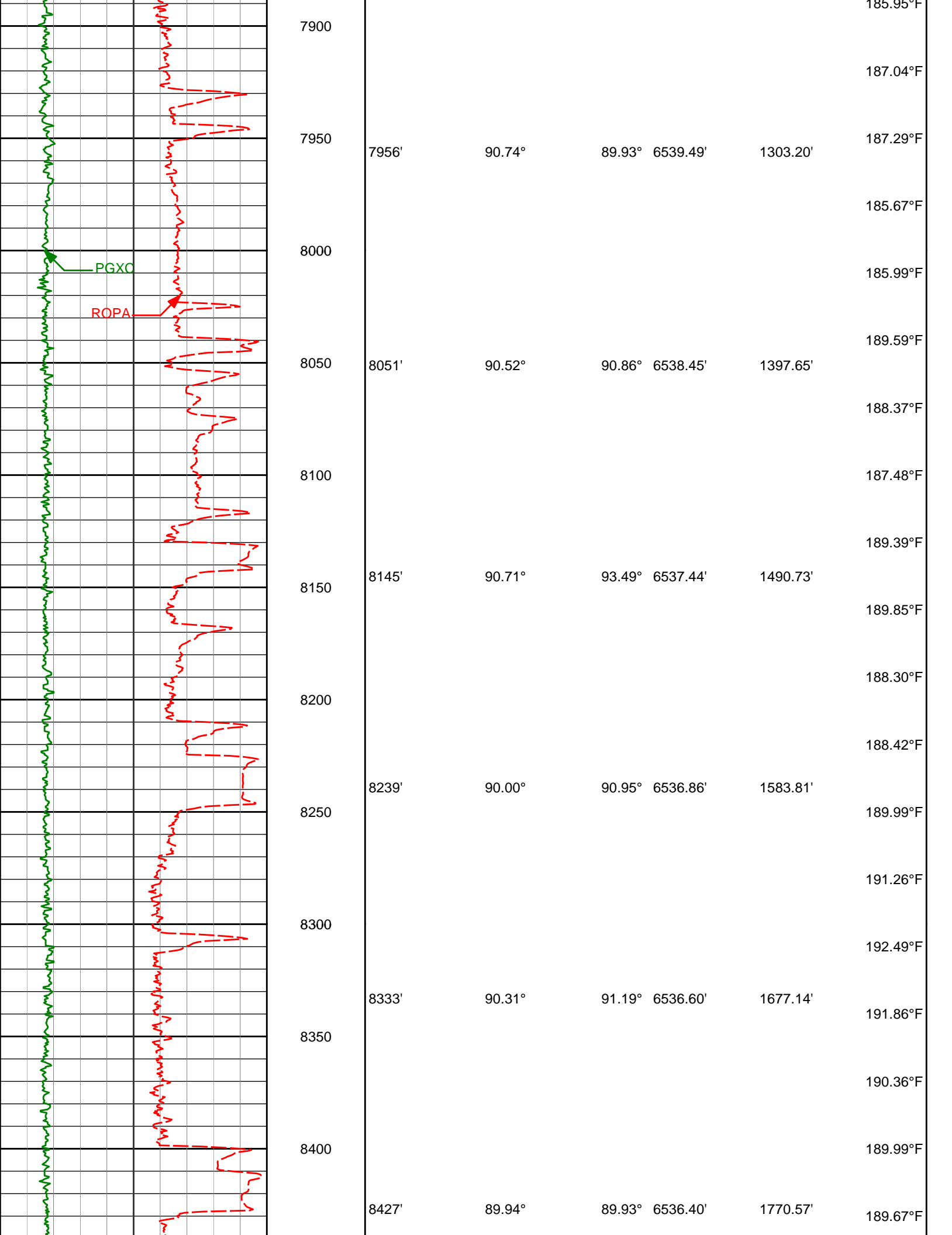
6541.11'

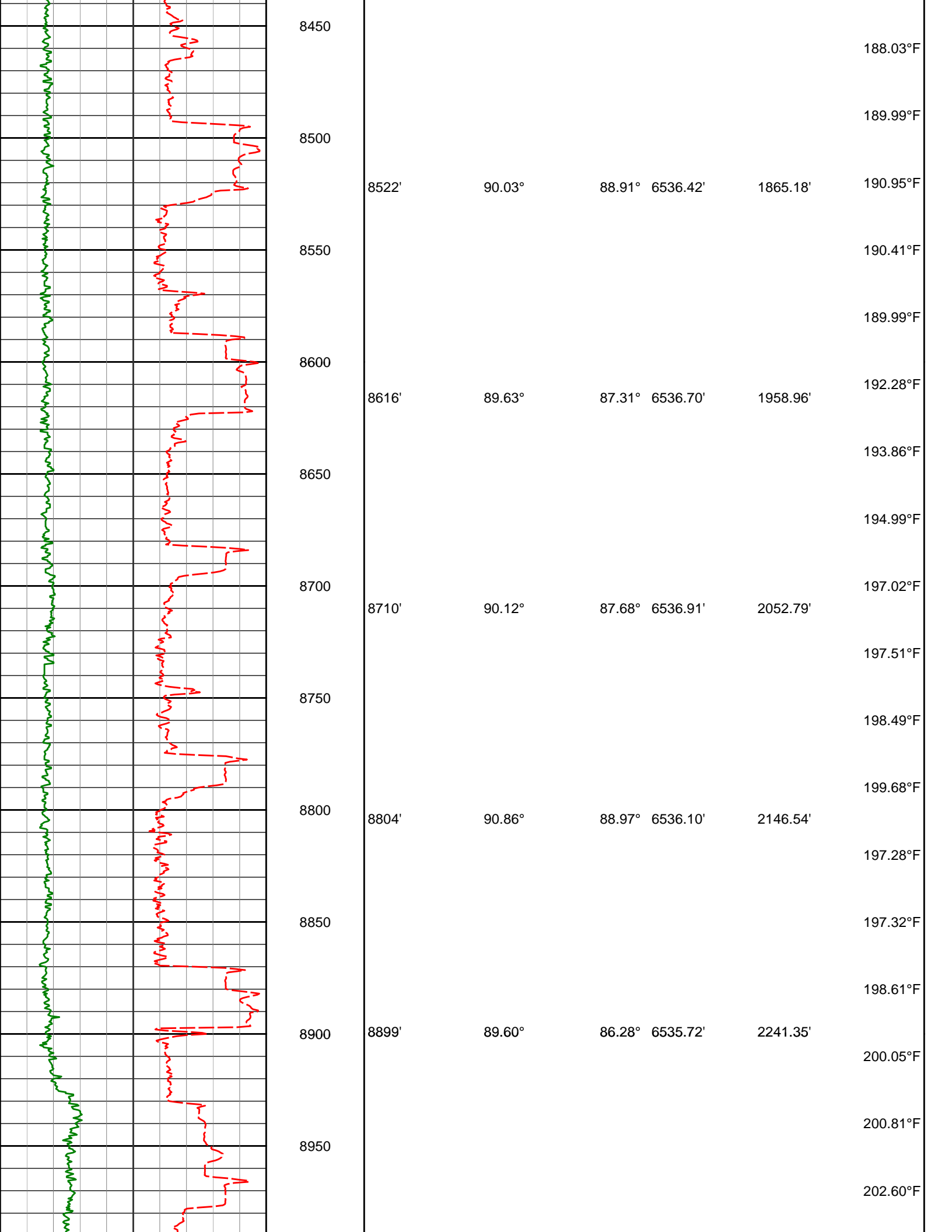
647.71'

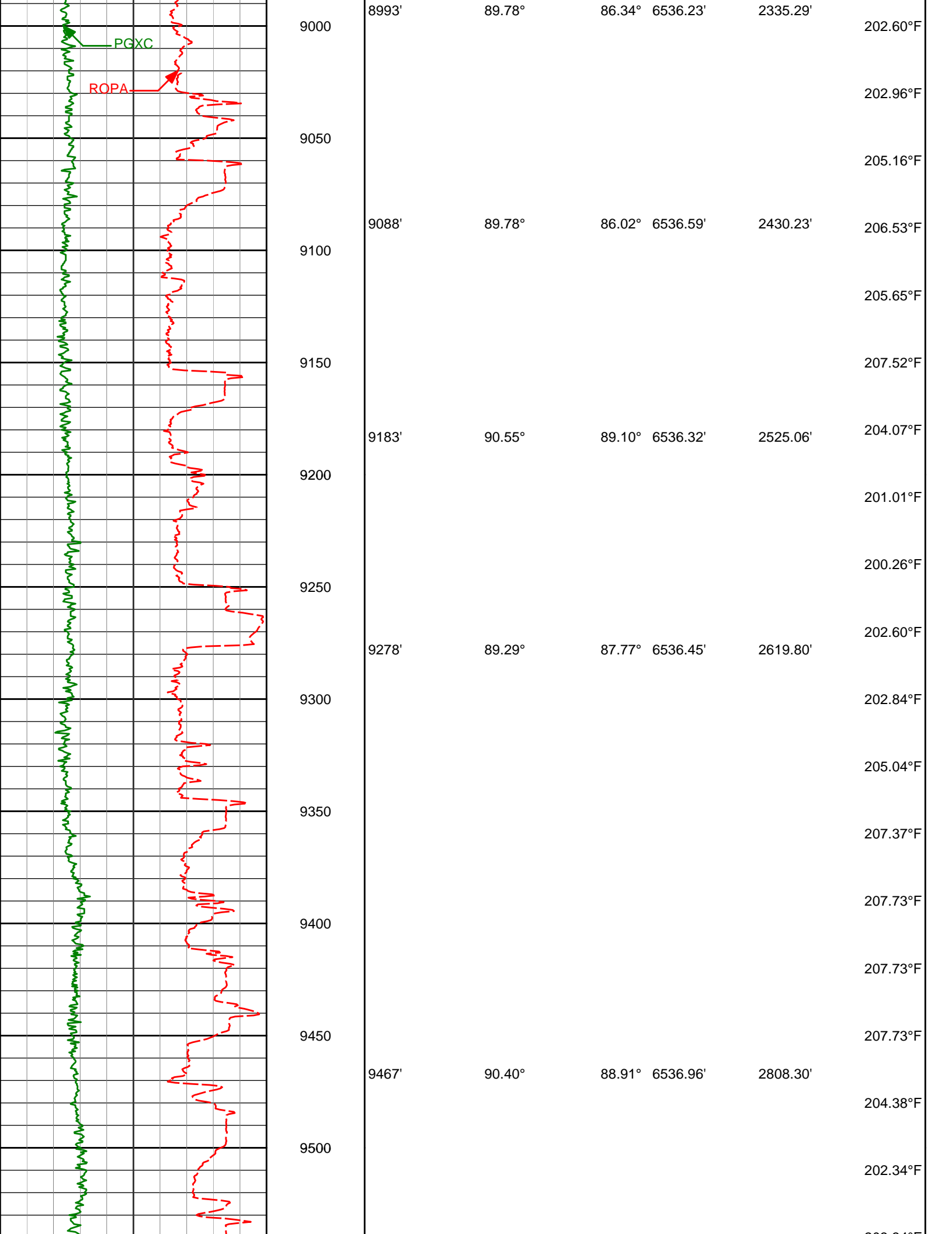
172.44°F

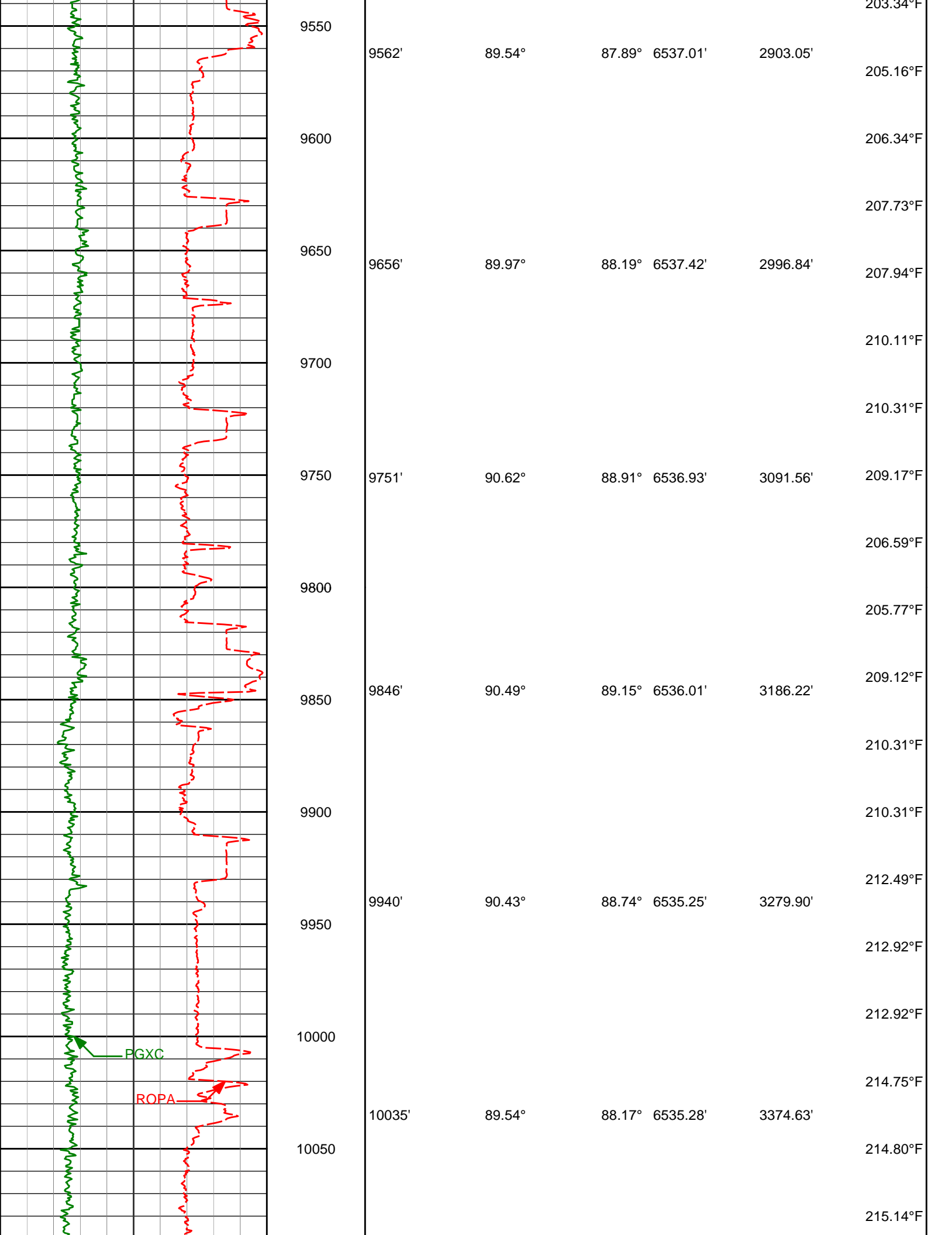
170.37°F

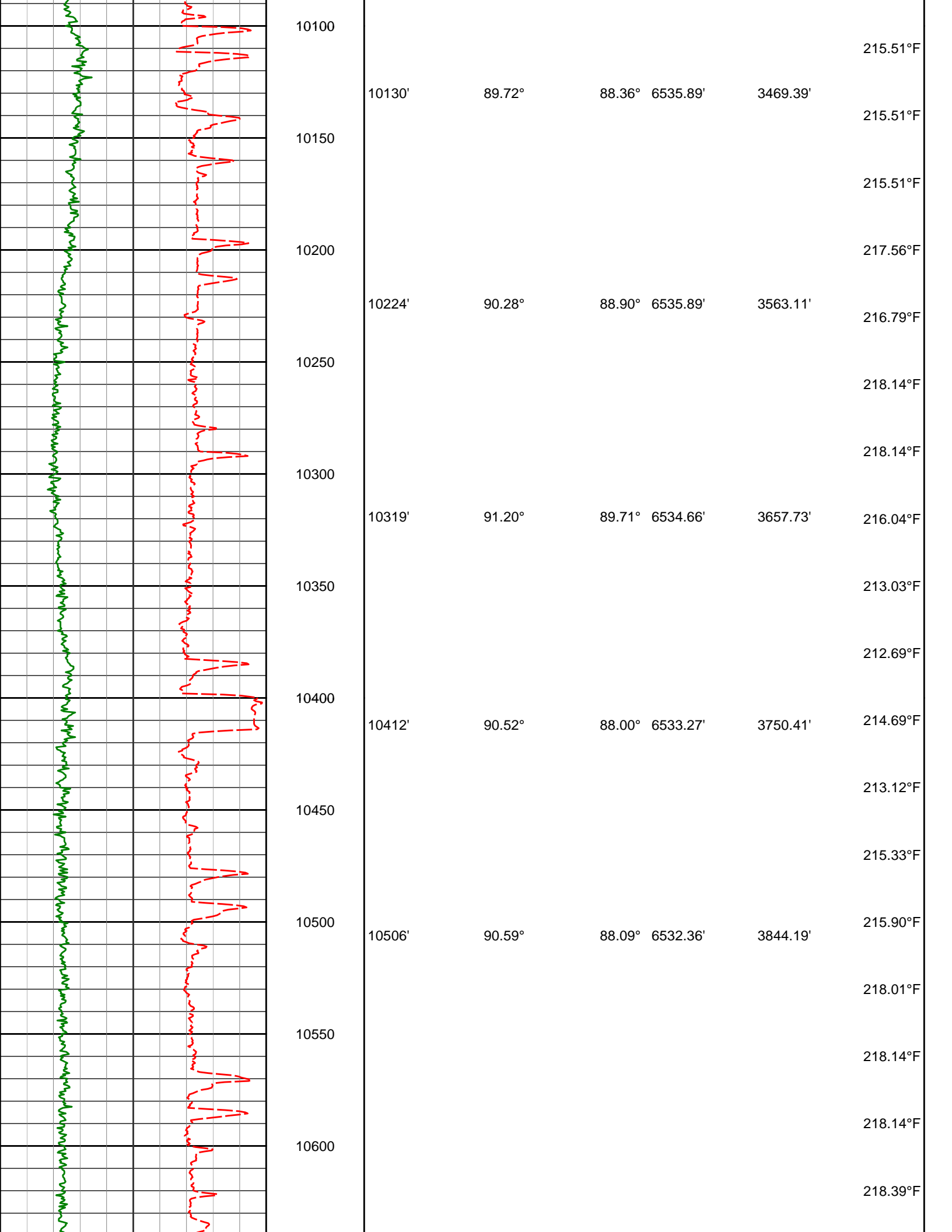


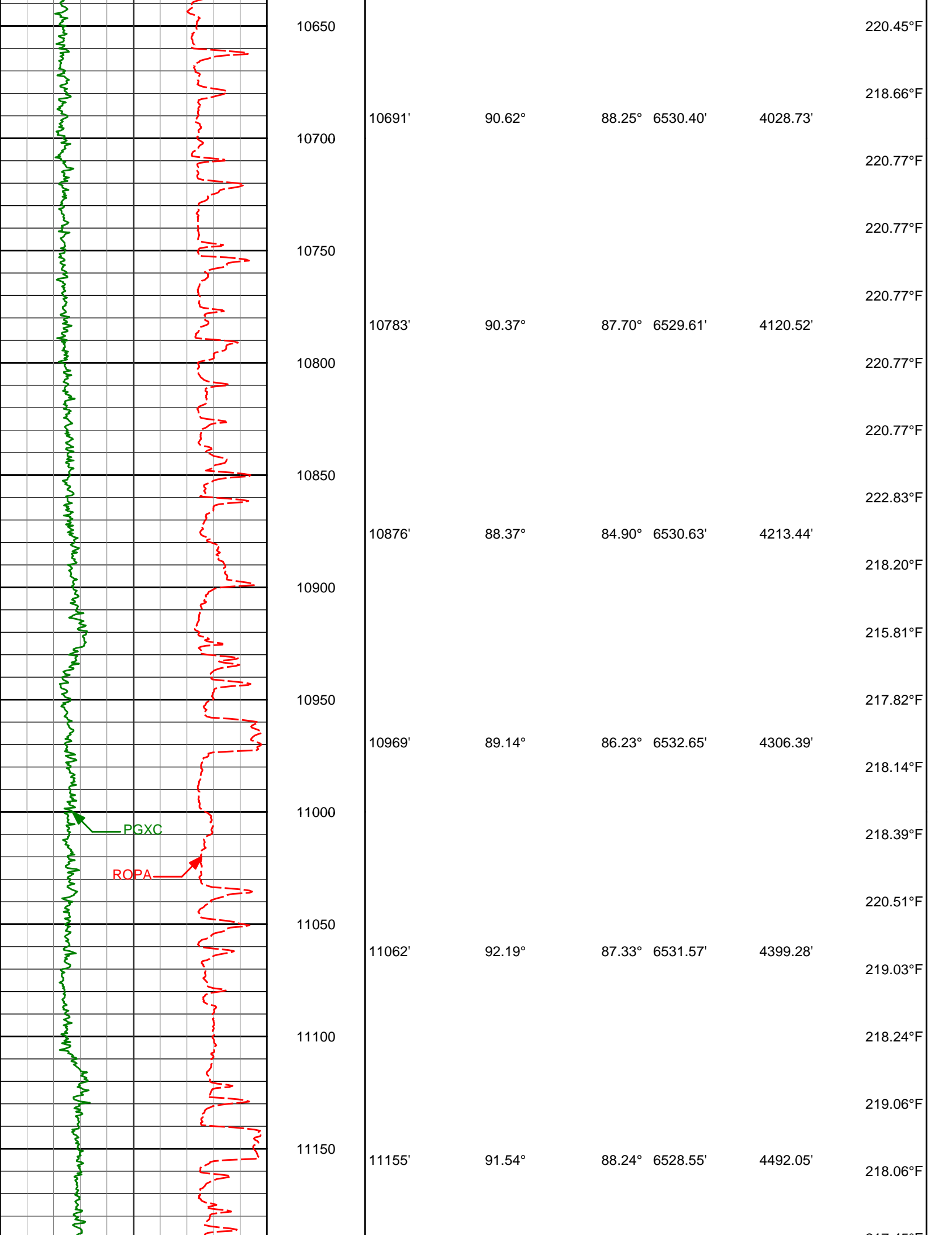


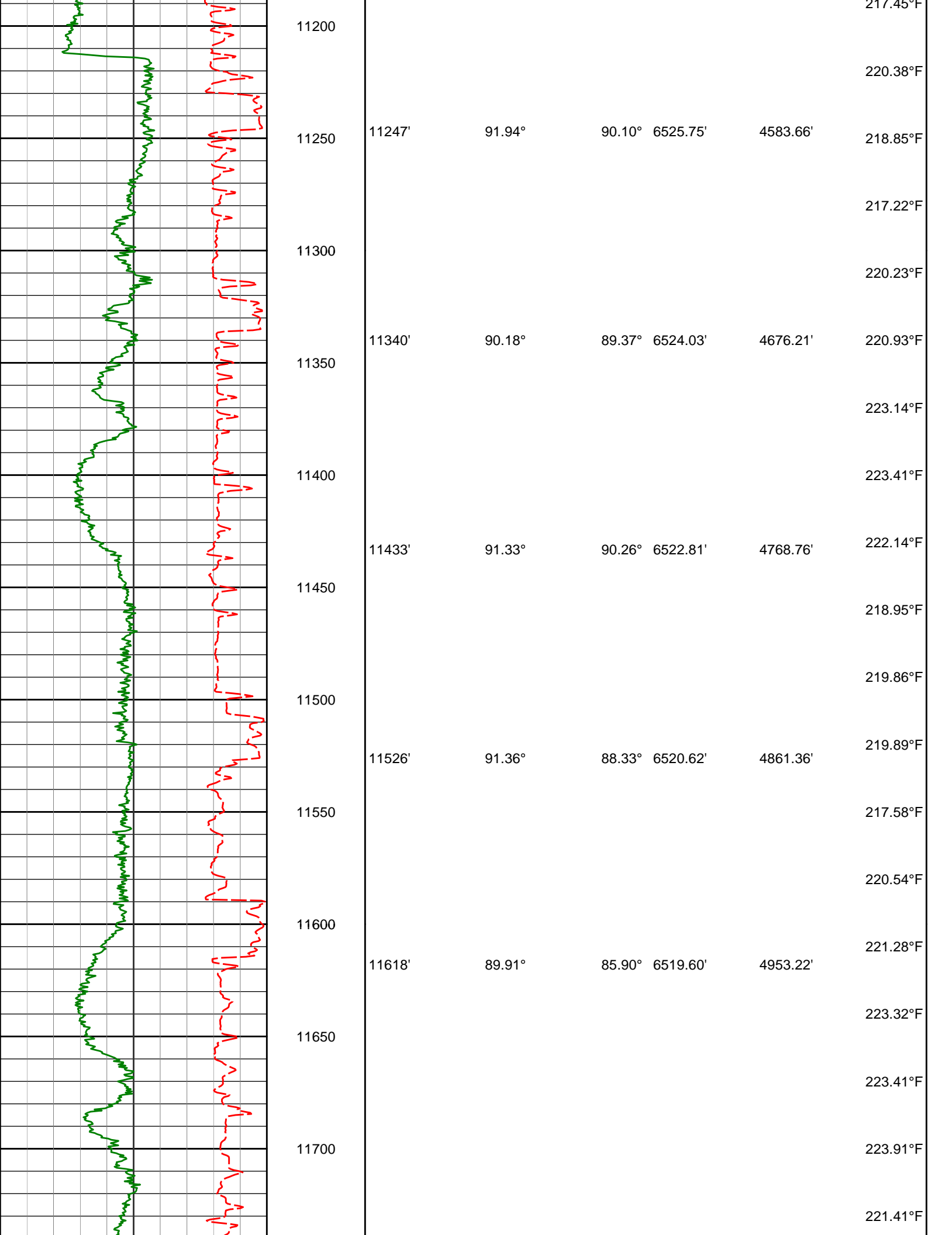


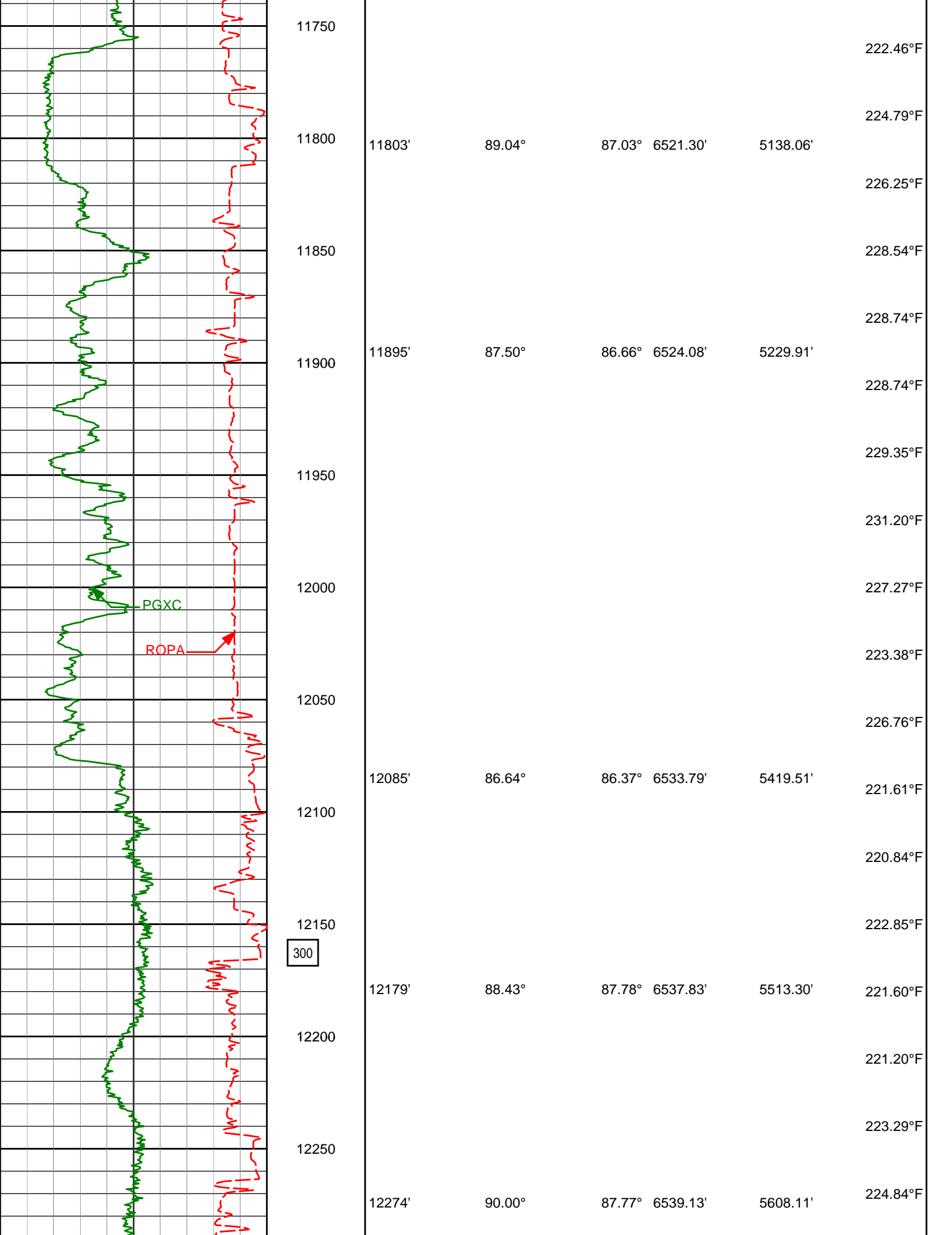


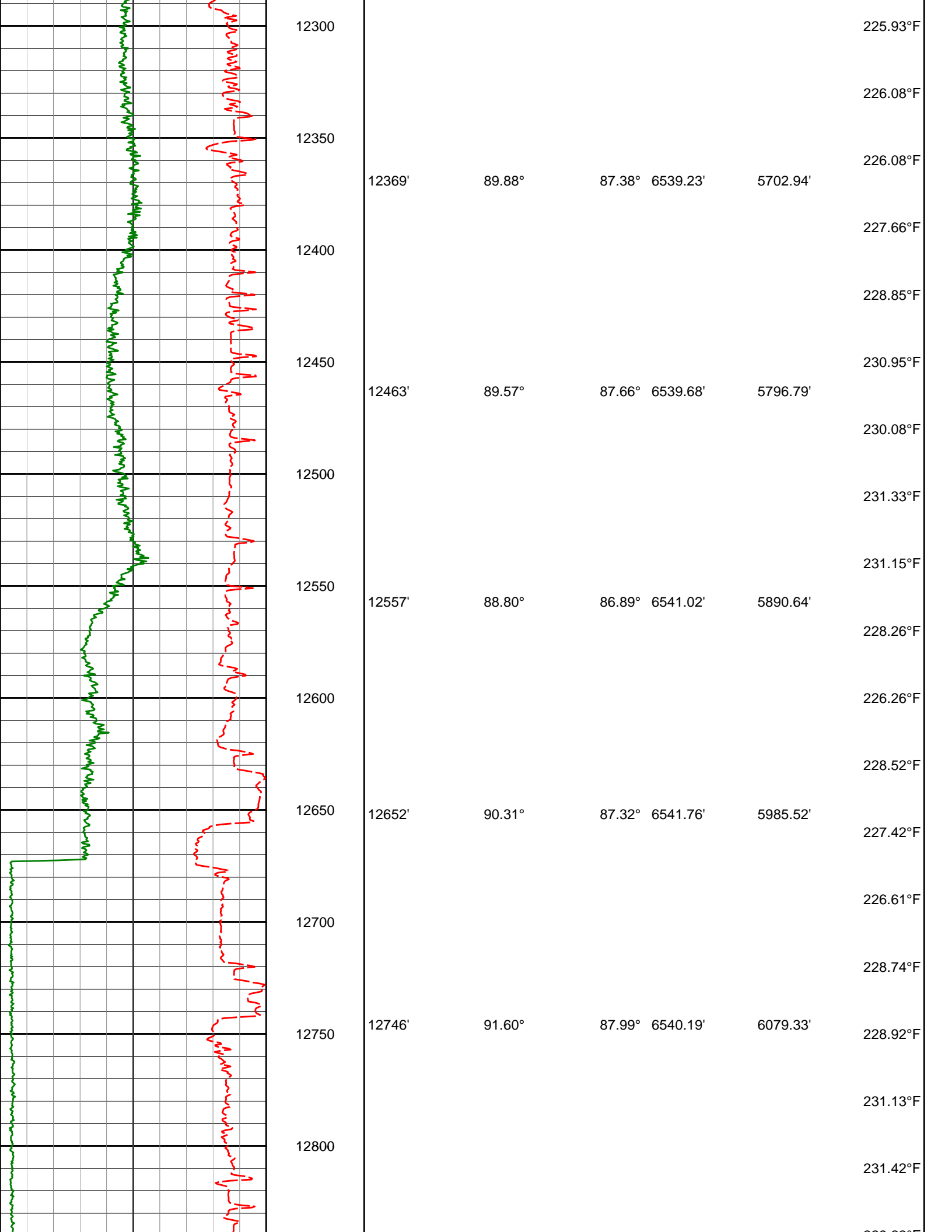


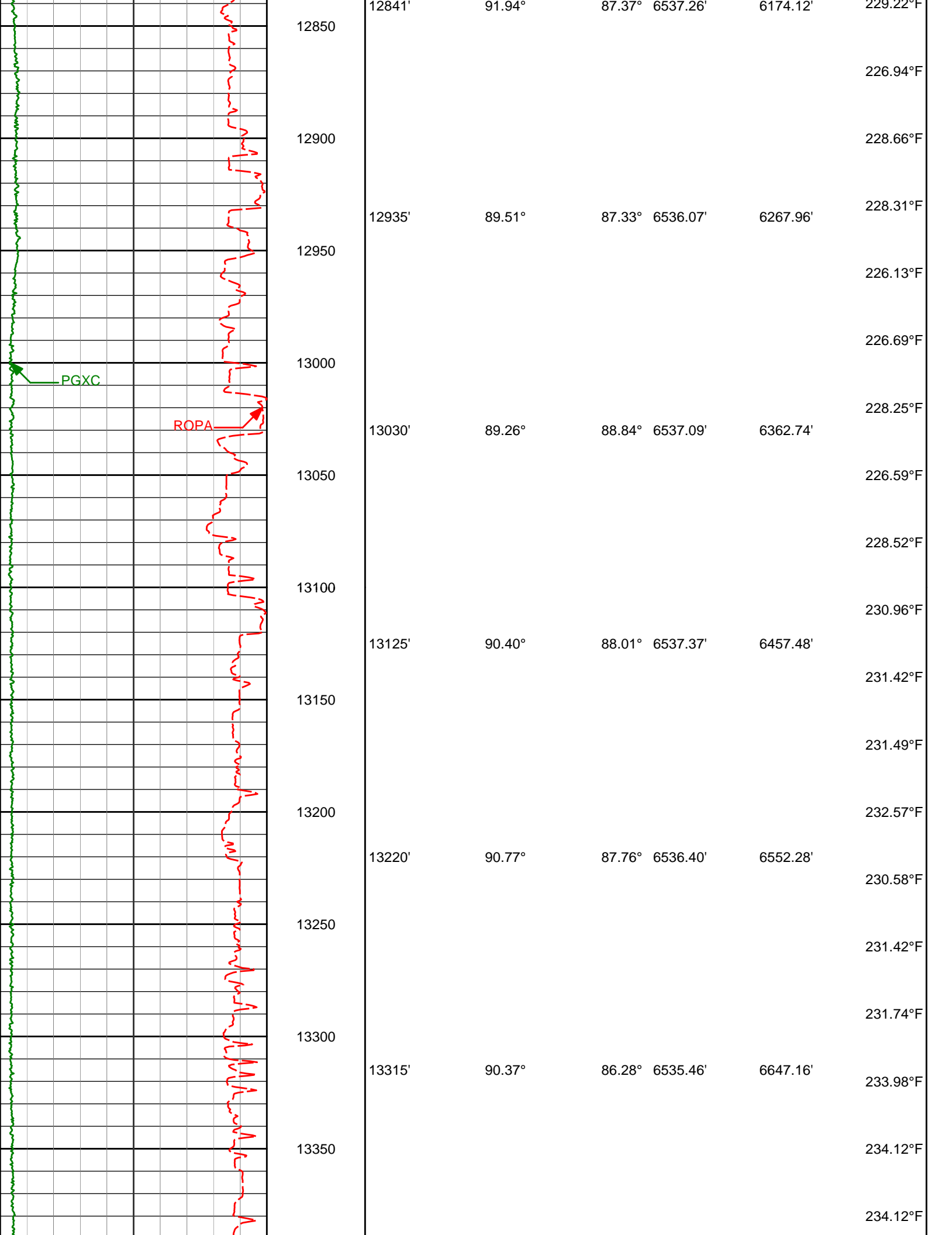


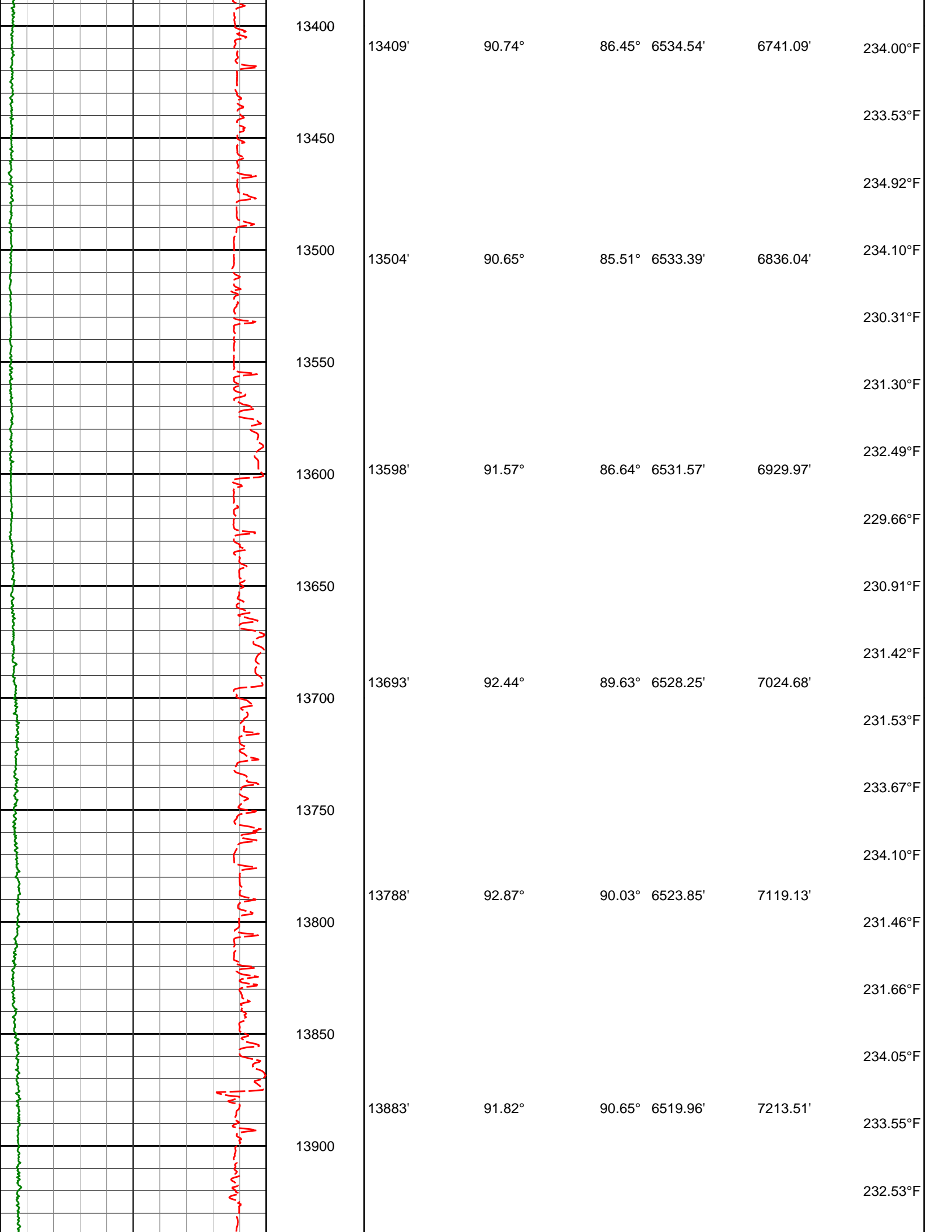


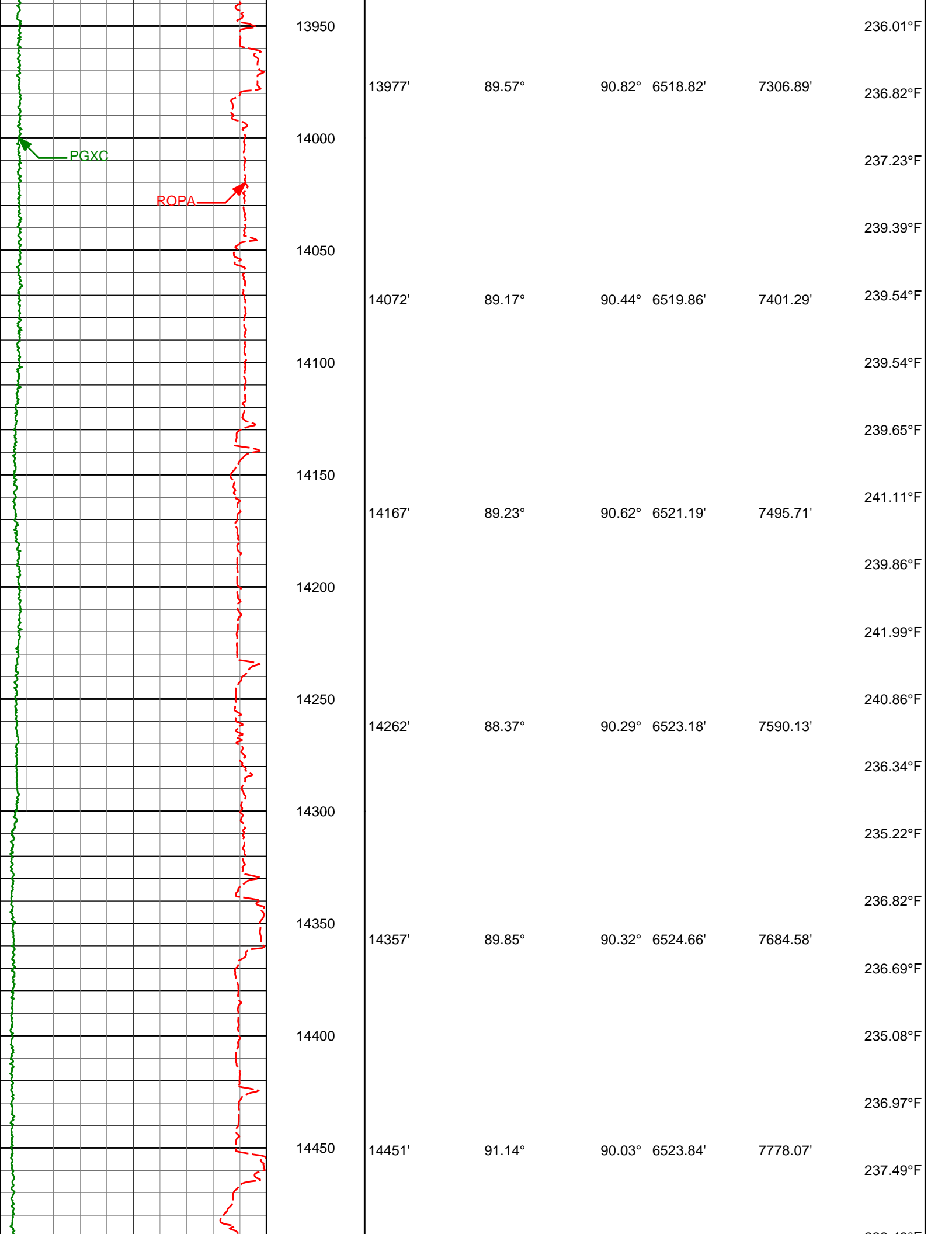


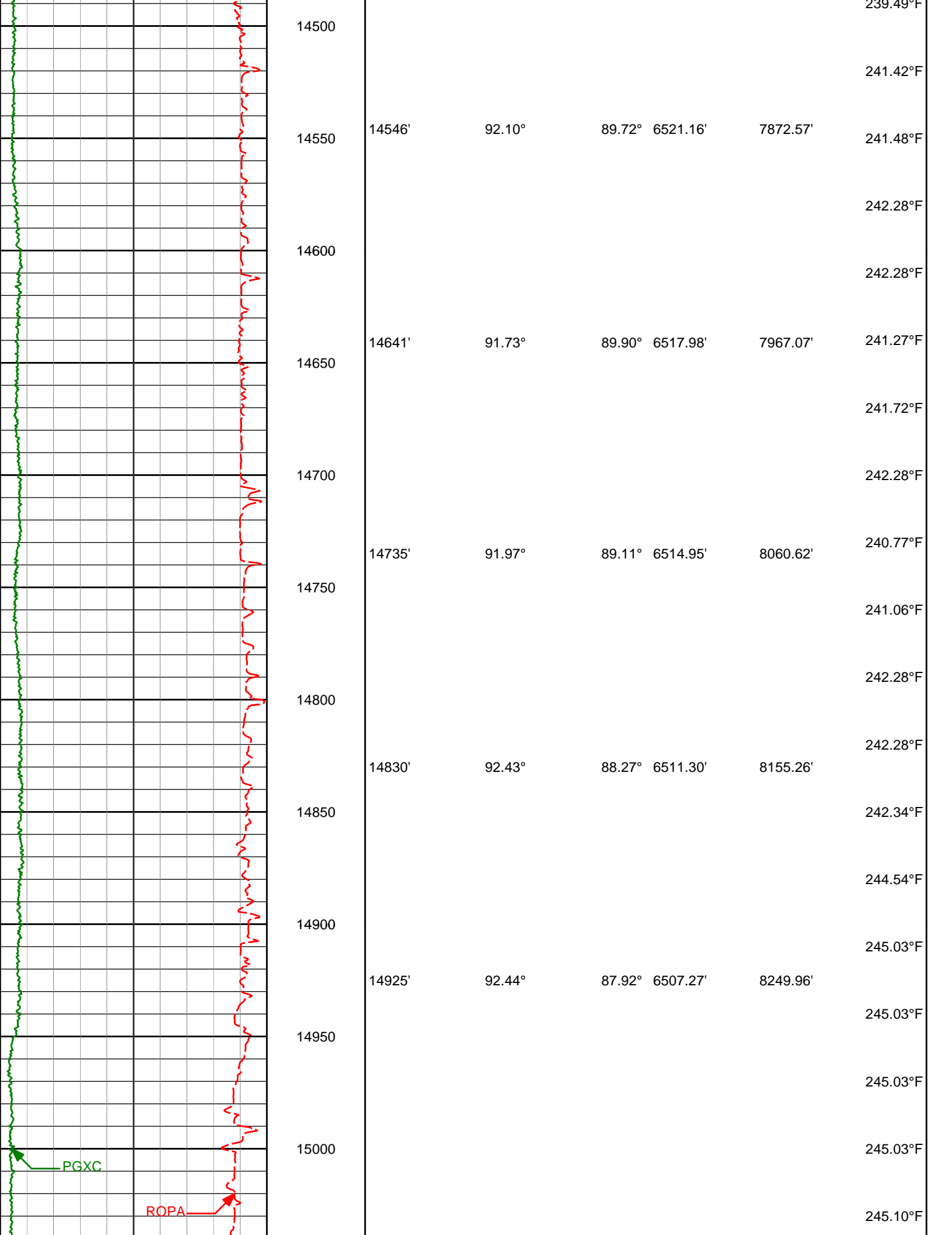


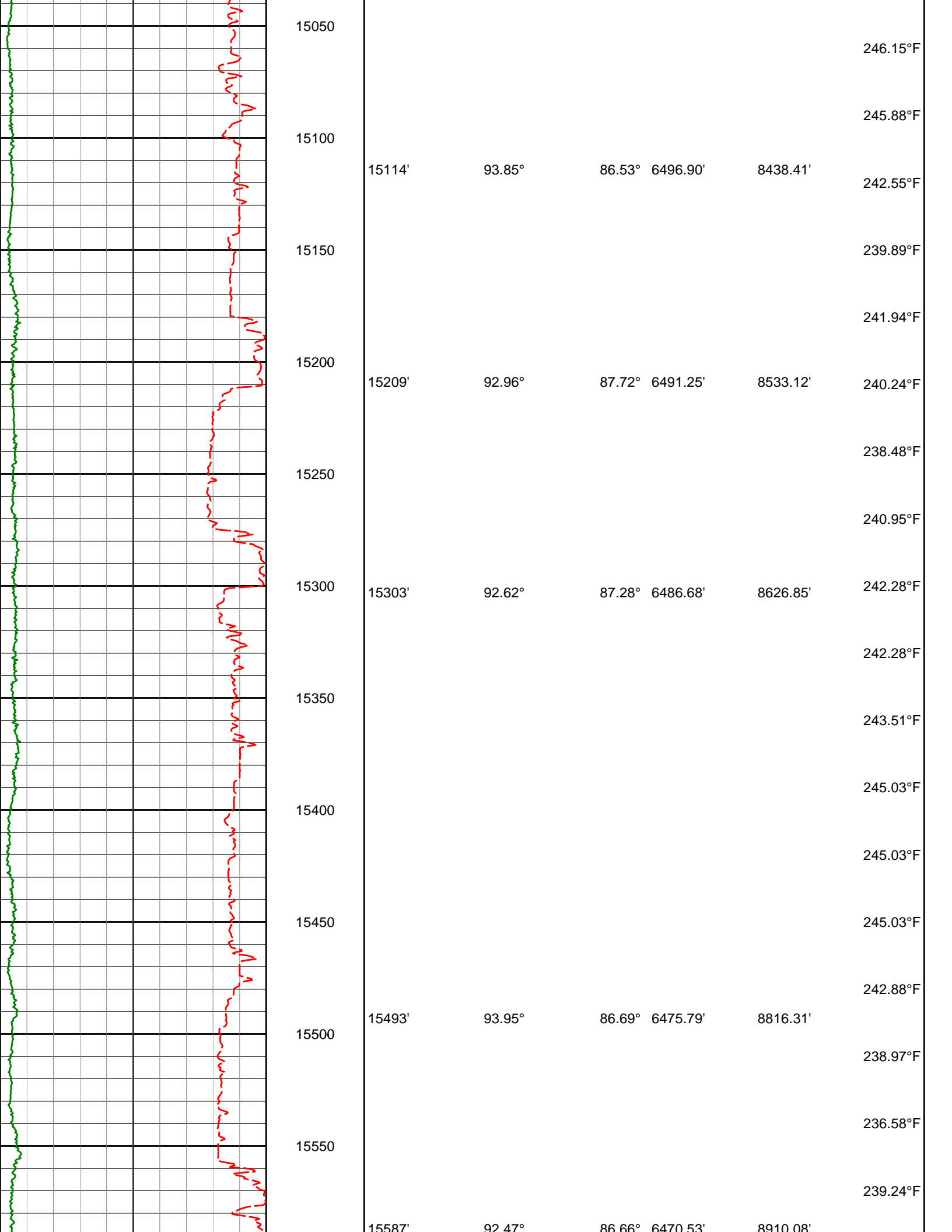


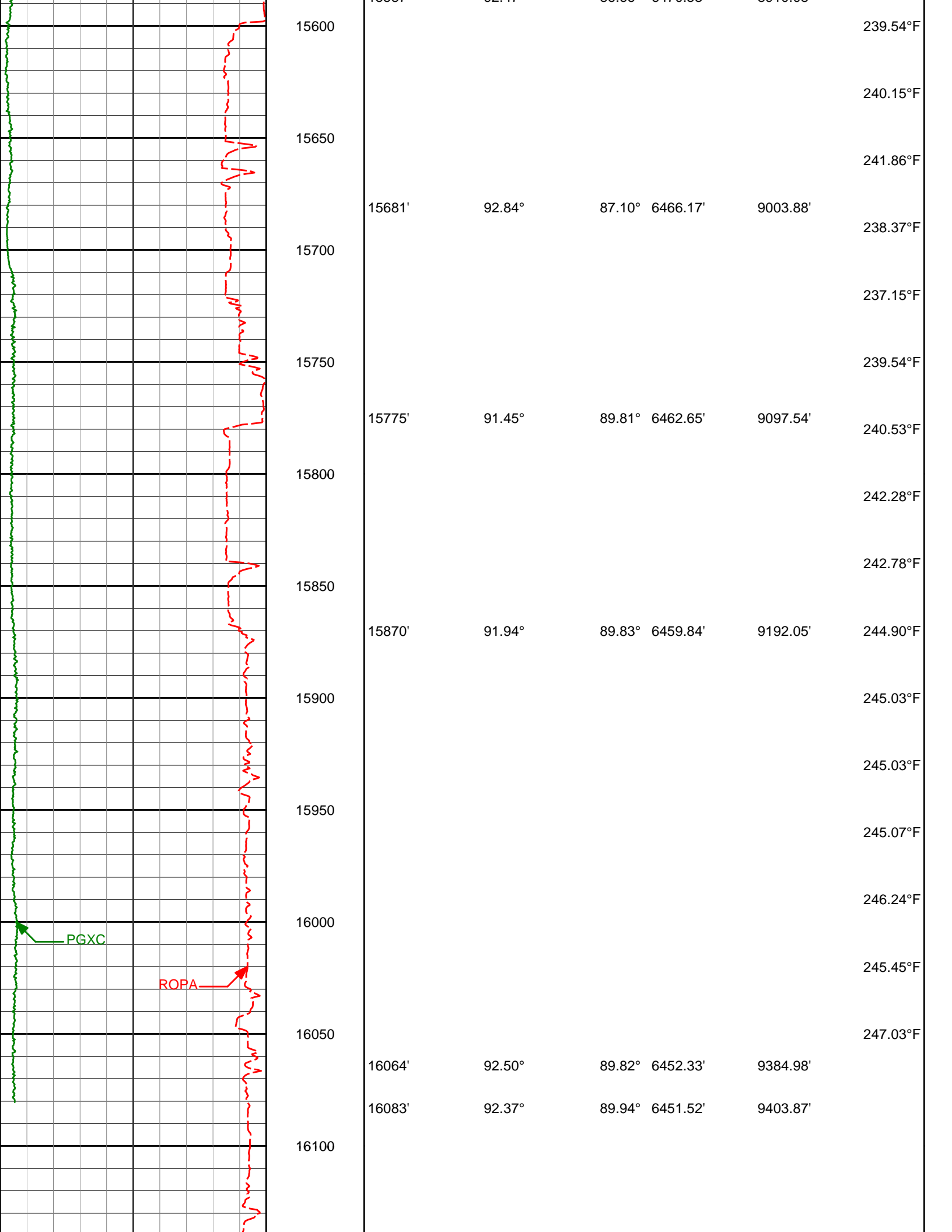




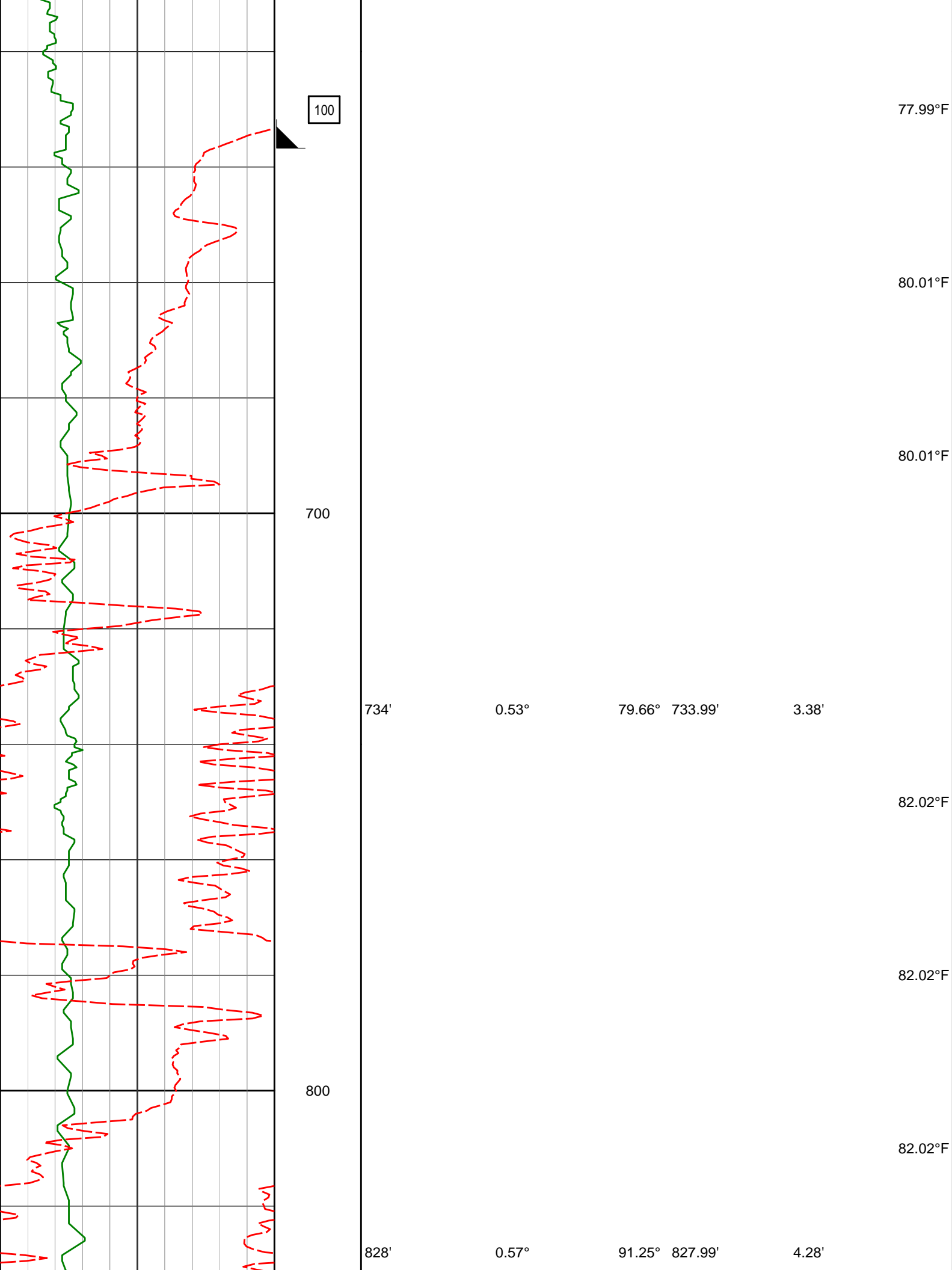


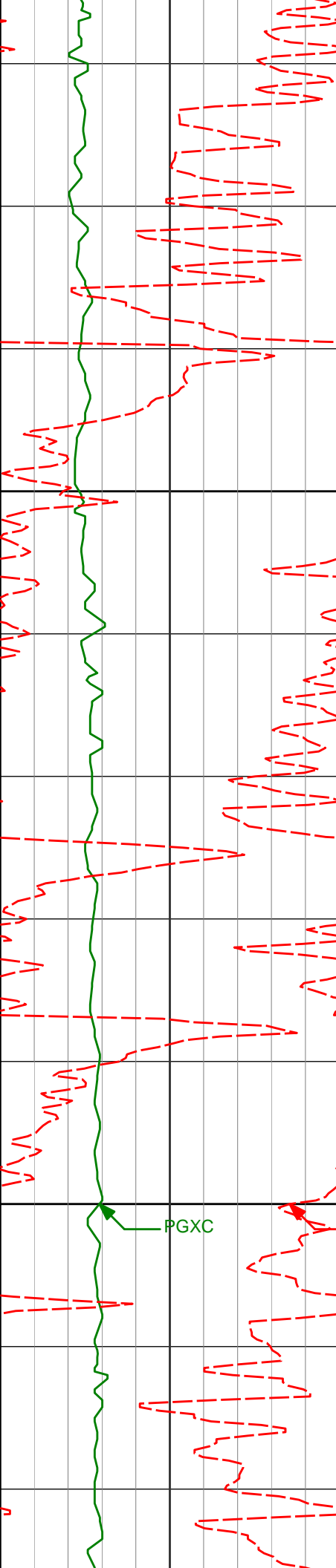






TD well @ 16149 MD		16150						
Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
PCG GR XHi-Range RT BCor PGXRC-T api								
1K 0								
TVD Detail 1:240 Scale								
PCG GR XHi-Range RT BCor PGXRC-T api								
0 300								
Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0		300						
		600	80.68°F					
			79.03°F					
			79.30°F					
			78.35°F					





900

919'

1000

1011'

0.59°

0.62°

90.43°

91.46°

918.98'

1010.98'

5.20'

6.16'

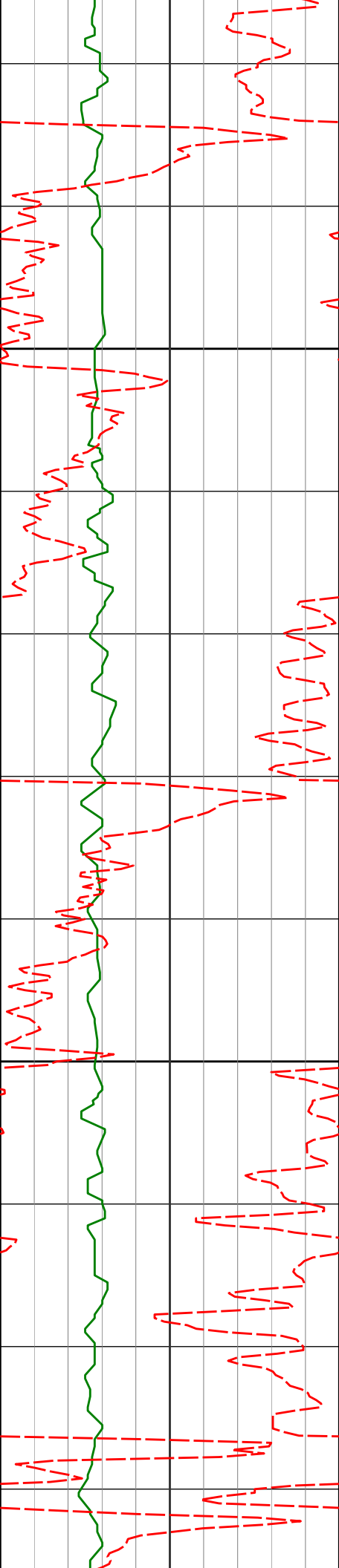
84.06°F

84.06°F

84.06°F

84.06°F

86.09°F



1100

1105'

0.51°

89.69°

1104.97'

7.08'

86.09°F

88.14°F

86.82°F

86.09°F

1200

1210'

0.65°

93.00°

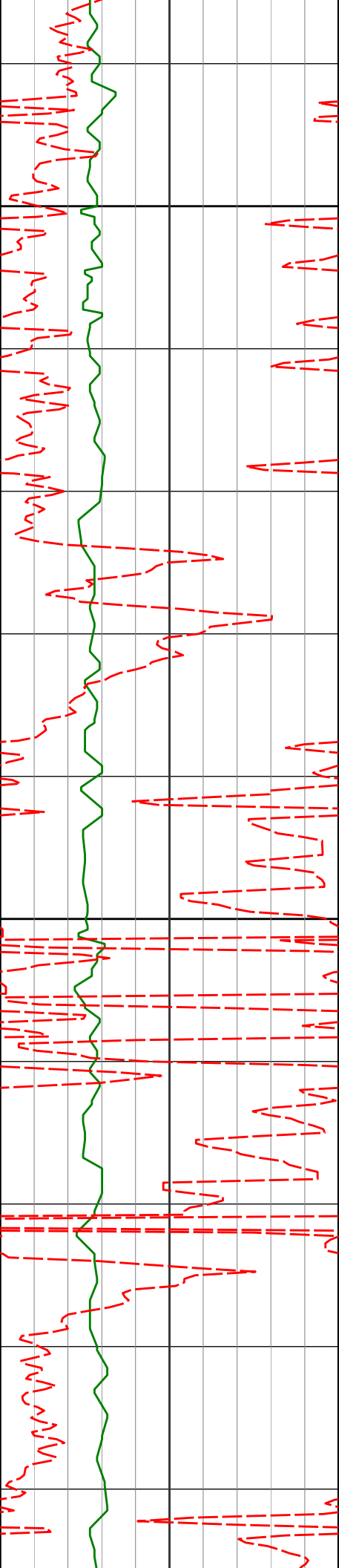
1209.97'

8.14'

86.09°F

86.09°F

86.09°F



1300

1304'

0.74°

112.77°

1303.96'

9.20'

1400

1397'

0.58°

113.77°

1396.95'

10.14'

86.09°F

88.14°F

88.14°F

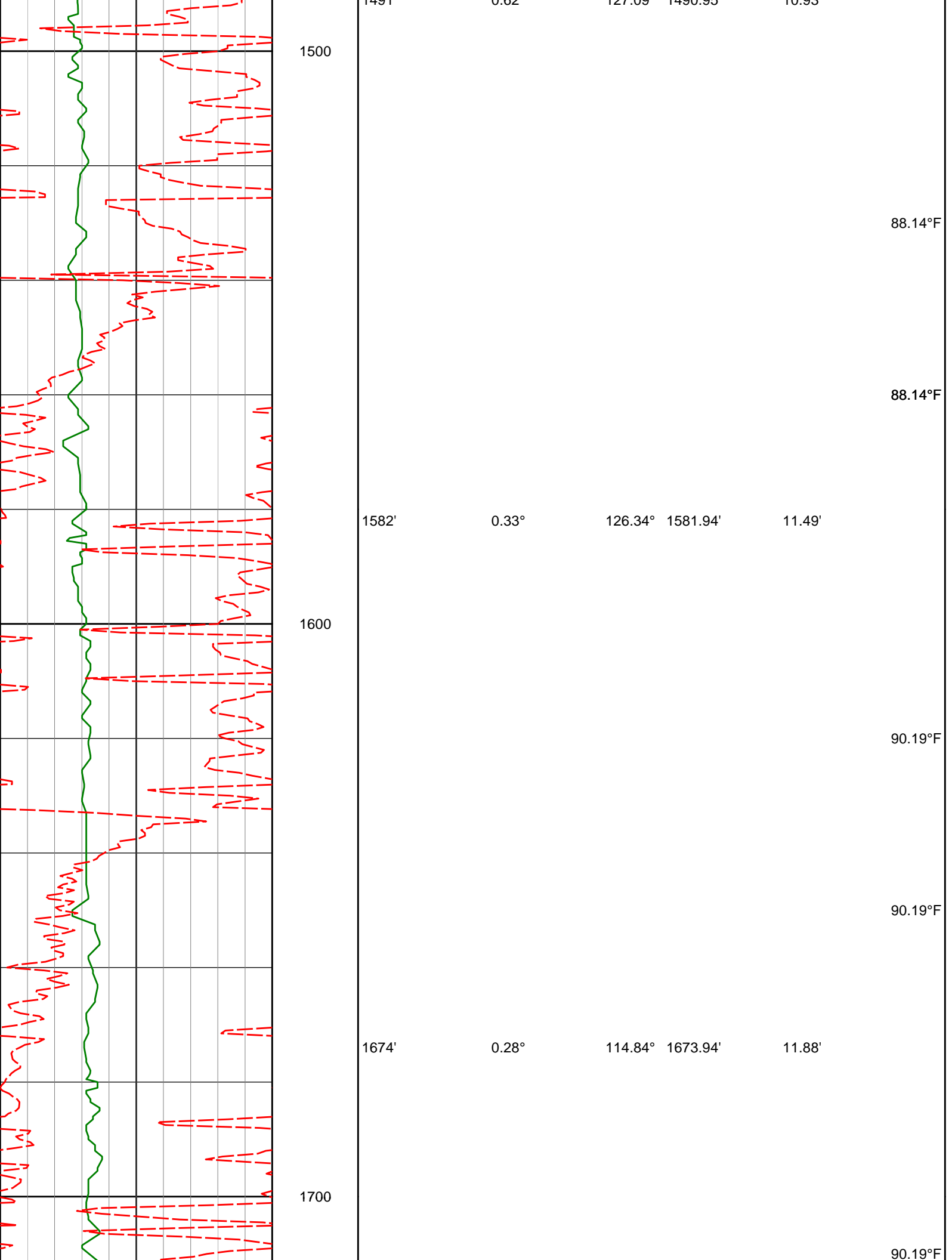
1401'

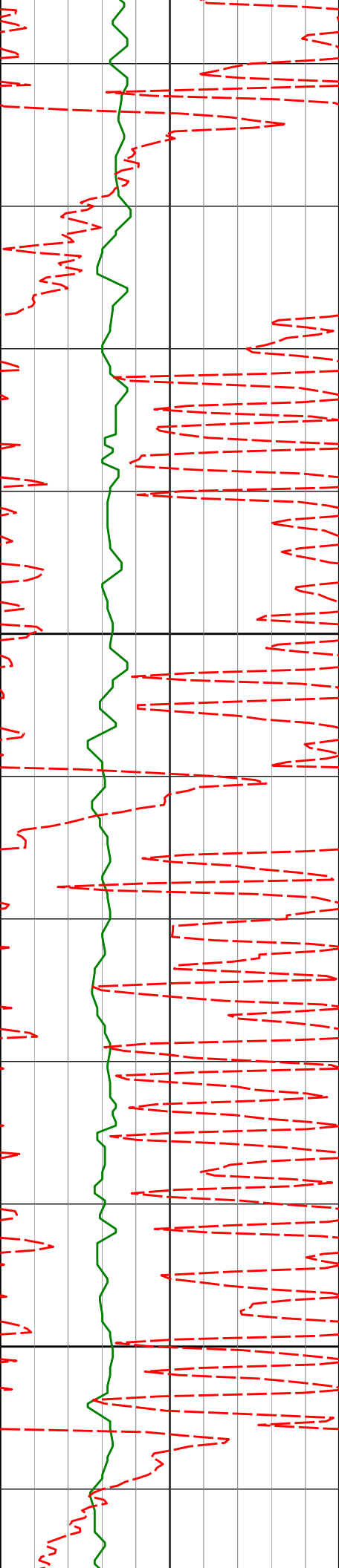
0.62°

127.00°

1400.95'

10.03'





1767'

0.06°

227.25°

1766.94'

12.03'

90.19°F

92.26°F

1800

92.26°F

1861'

0.28°

126.04°

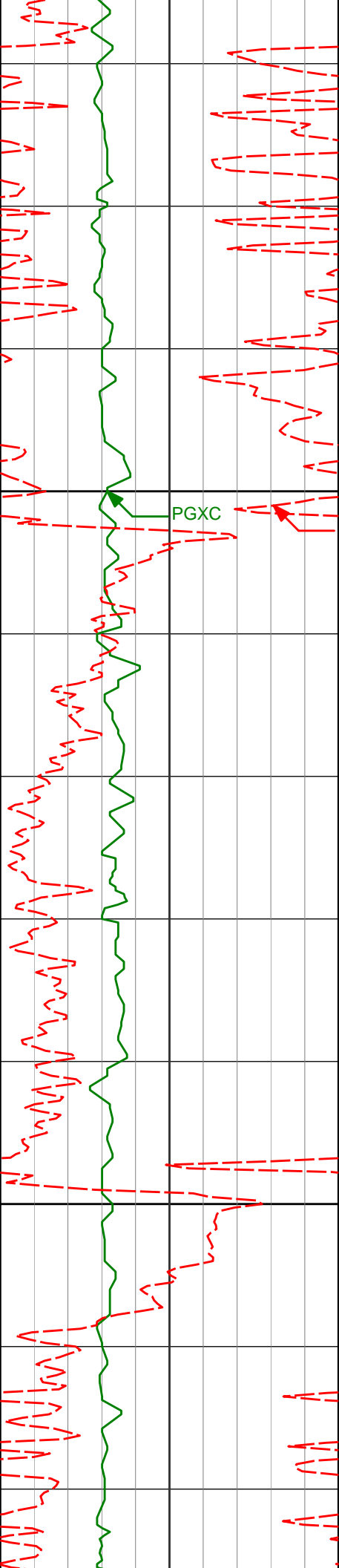
1860.94'

12.17'

94.33°F

1900

94.33°F



1954'

0.33°

129.18°

1953.94'

12.53'

94.33°F

2000

PGXC

ROPA

94.33°F

2046'

0.38°

159.21°

2045.94'

12.80'

96.42°F

2100

96.42°F

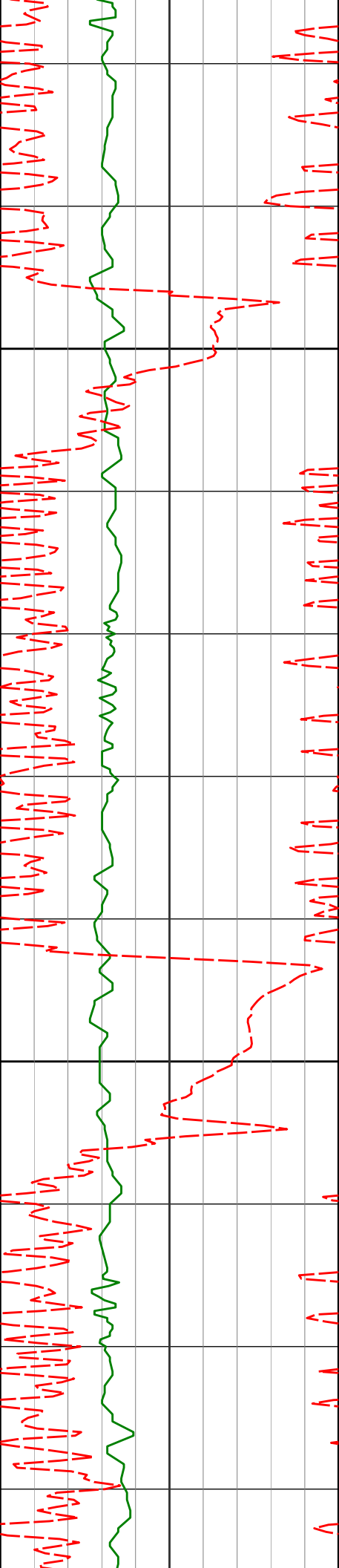
2138'

0.56°

156.04°

2137.94'

13.02'



2200

2232'

0.50°

154.78°

2231.93'

13.30'

2300

2324'

3.02°

348.72°

2323.89'

13.20'

96.42°F

96.42°F

98.51°F

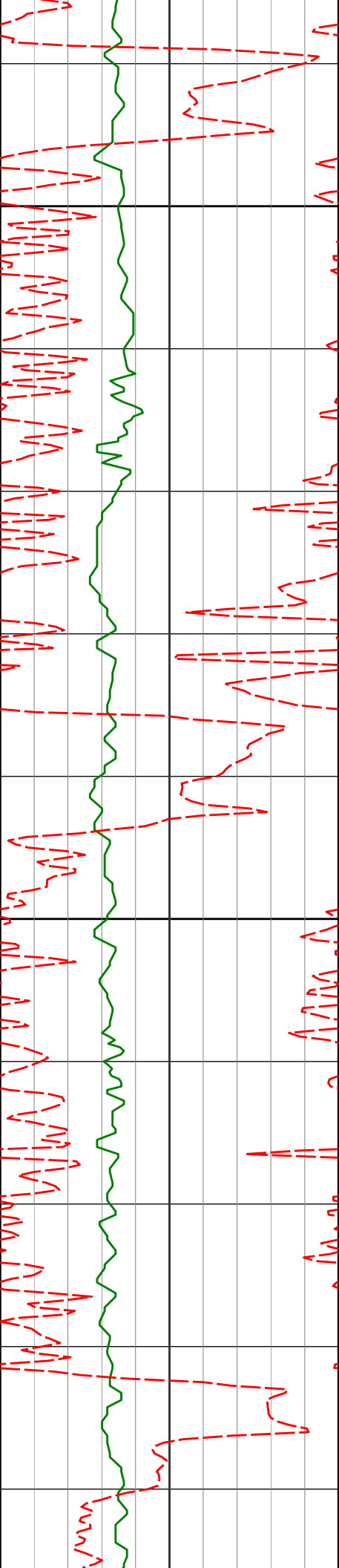
98.51°F

98.51°F

98.51°F

99.54°F

100.62°F



2400

2418'

4.69°

335.01°

2417.68'

11.70'

2500

2509'

5.94°

332.03°

2508.29'

8.70'

100.62°F

100.62°F

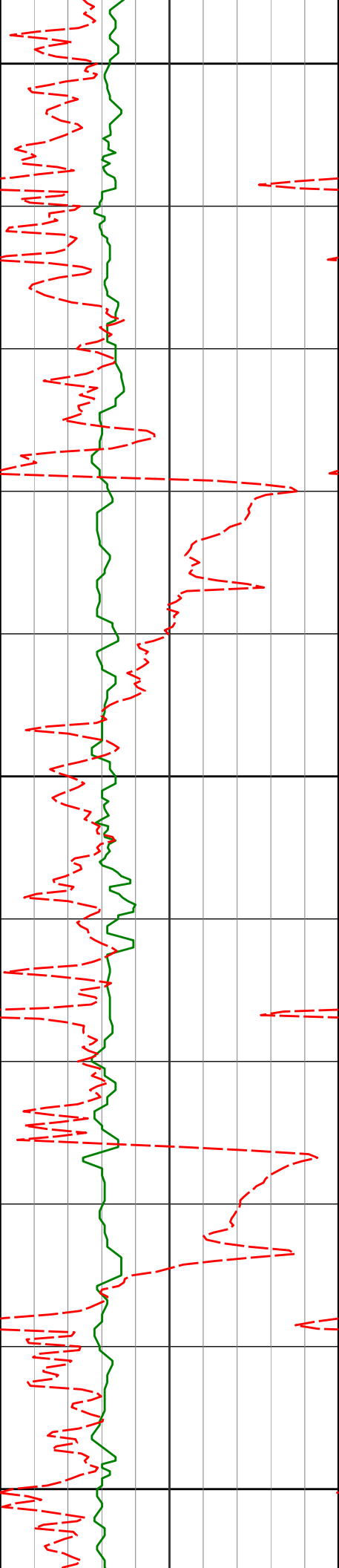
100.62°F

100.62°F

101.21°F

102.72°F

102.72°F



2600

2602'

6.11°

328.54° 2600.77'

4.74'

102.72°F

102.72°F

104.83°F

2700

2695'

7.37°

321.98° 2693.13'

-0.59'

104.83°F

104.83°F

104.83°F

2786'

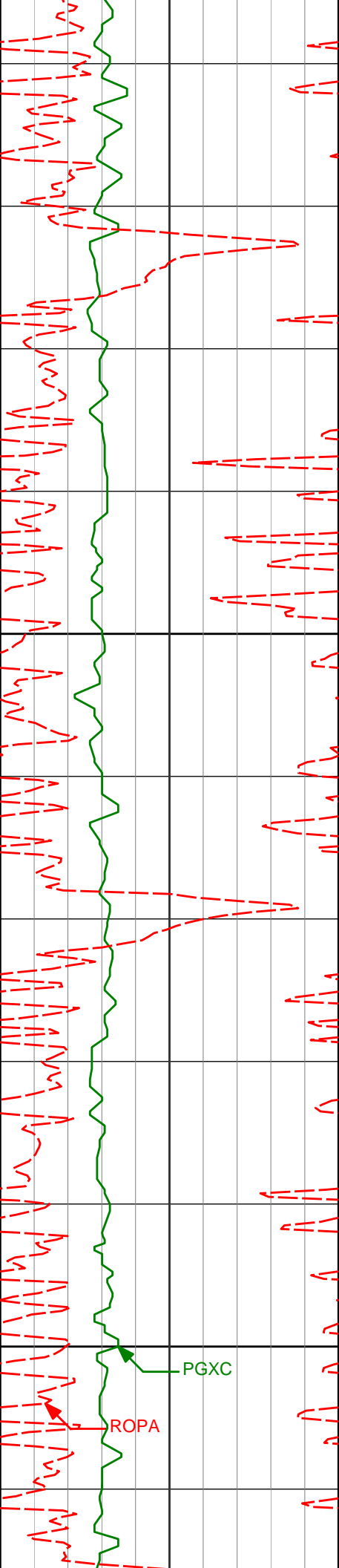
9.03°

321.61° 2783.20'

-7.54'

104.83°F

2800



2900

3000

2976'

9.01°

321.57°

2970.85'

-23.59'

PGXC

ROPA

104.83°F

104.83°F

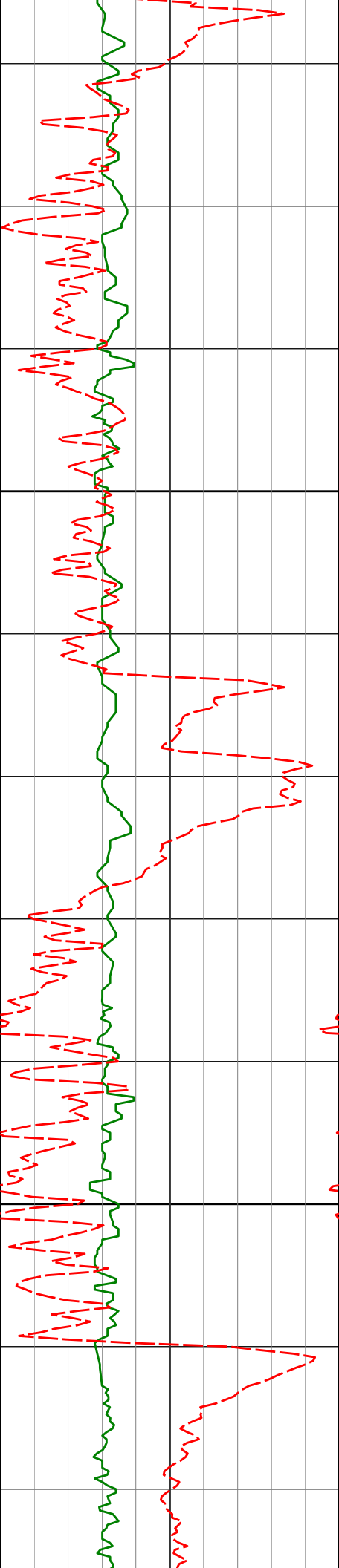
106.97°F

106.97°F

109.09°F

109.09°F

109.09°F



3100

3200

3070'

3165'

8.62°

8.89°

319.48°

318.14°

3063.74'

3157.63'

-31.57'

-39.94'

110.36°F

111.24°F

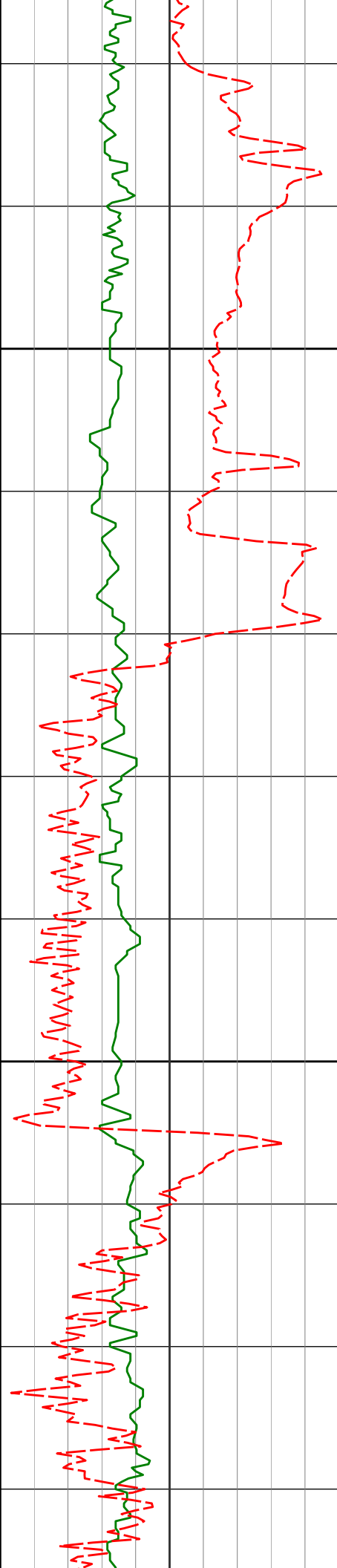
111.24°F

111.24°F

111.24°F

111.24°F

111.24°F



3260'

8.41°

316.12° 3251.55'

-48.54'

111.24°F

3300

111.24°F

111.24°F

3355'

8.81°

318.32° 3345.48'

-57.09'

113.40°F

3400

114.61°F

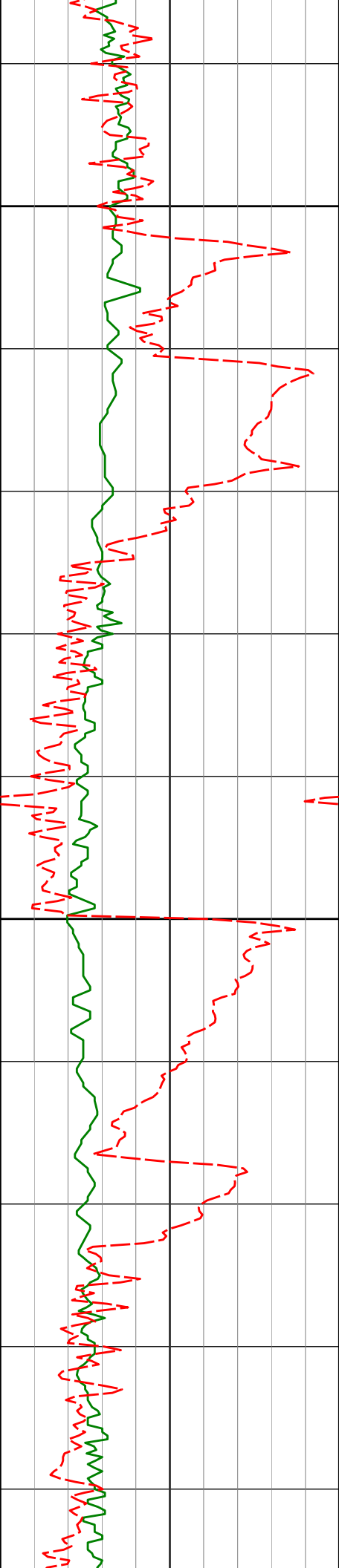
3449'

8.31°

314.67° 3438.43'

-65.63'

115.56°F



3500

3600

3544'

3639'

9.06°

9.89°

320.99°

321.42°

3532.34'

3626.05'

-74.09'

-82.61'

115.56°F

115.56°F

115.56°F

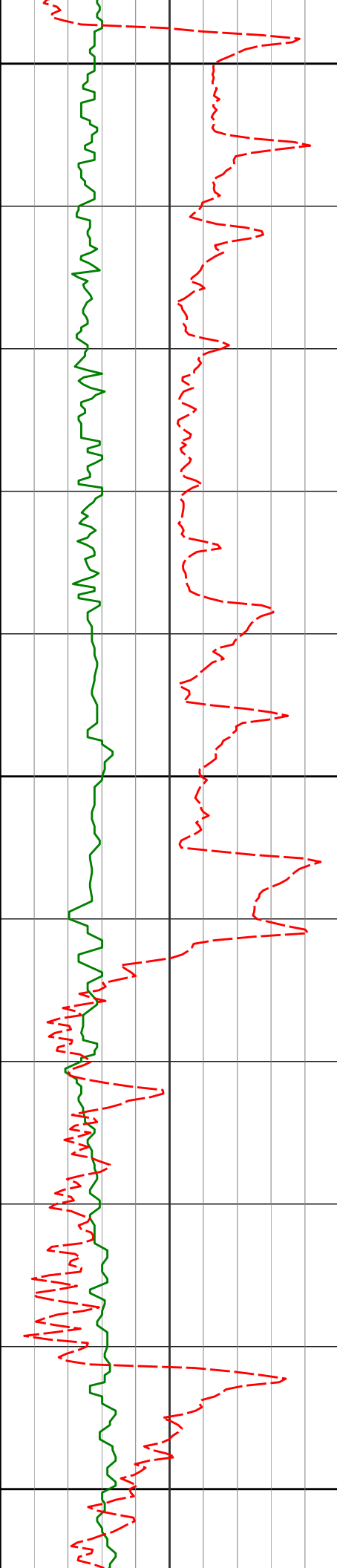
115.56°F

117.73°F

117.73°F

117.73°F

117.73°F



3700

117.73°F

3734'

10.43°

321.01°

3719.56'

-91.73'

117.73°F

117.73°F

3800

117.73°F

3828'

9.79°

317.34°

3812.10'

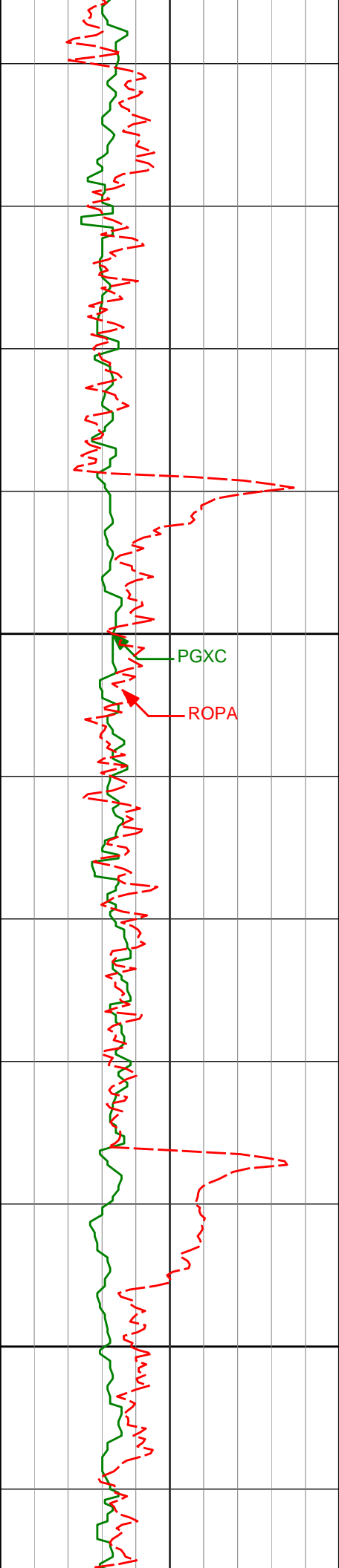
-101.18'

117.73°F

117.73°F

3900

119.91°F



3923'

9.64°

316.78° 3905.73'

-110.86'

119.91°F

119.91°F

122.11°F

4000

PGXC

ROPA

4017'

9.57°

315.57° 3998.42'

-120.52'

122.11°F

122.11°F

124.30°F

4100

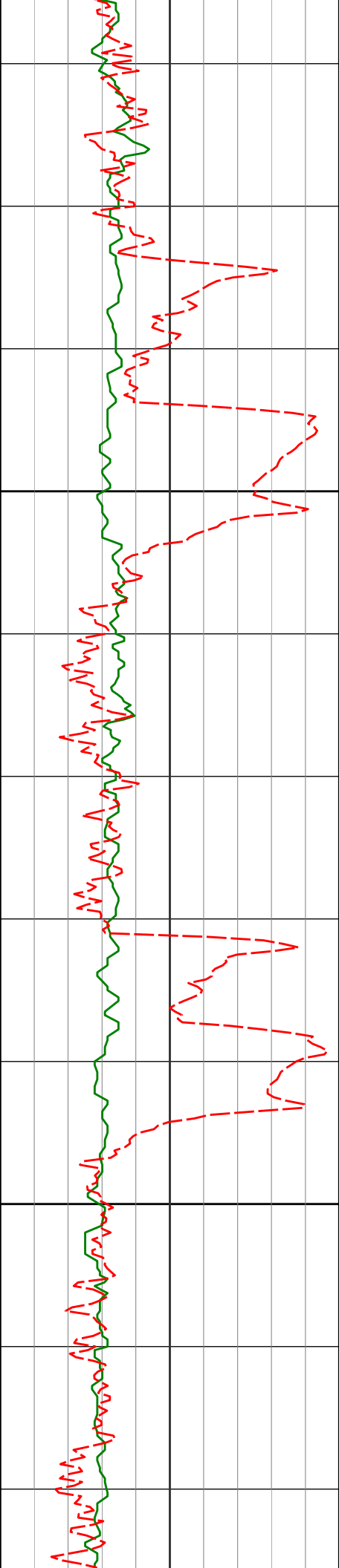
4112'

8.95°

313.95° 4092.18'

-130.22'

124.30°F



4200

4300

4207'

4302'

8.77°

9.53°

320.67°

321.66°

4186.05'

4279.84'

-138.99'

-147.22'

124.30°F

124.30°F

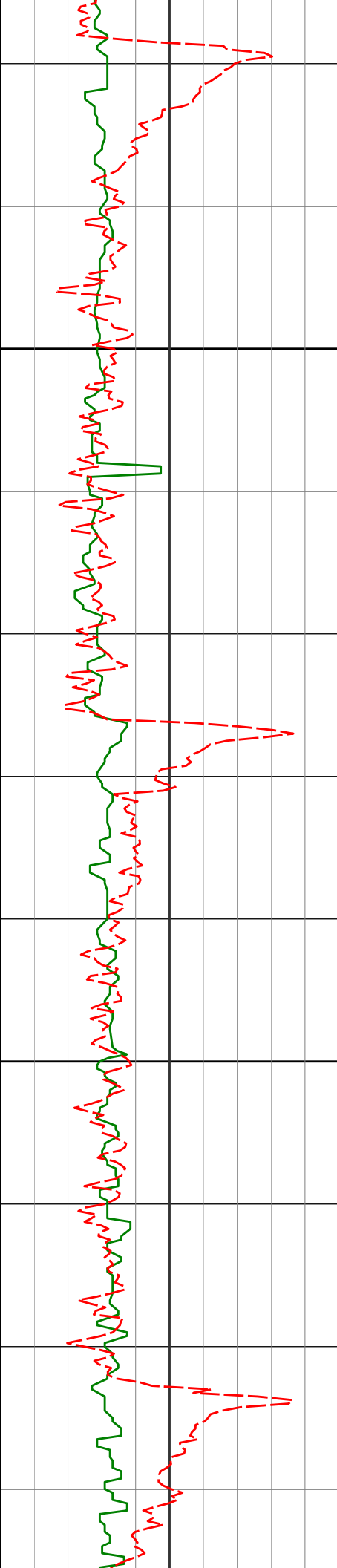
126.21°F

126.52°F

126.52°F

128.73°F

128.73°F



4400

4500

4396'

4491'

9.31°

8.91°

320.90°

320.49°

4372.57'

4466.37'

-155.57'

-163.87'

128.73°F

128.73°F

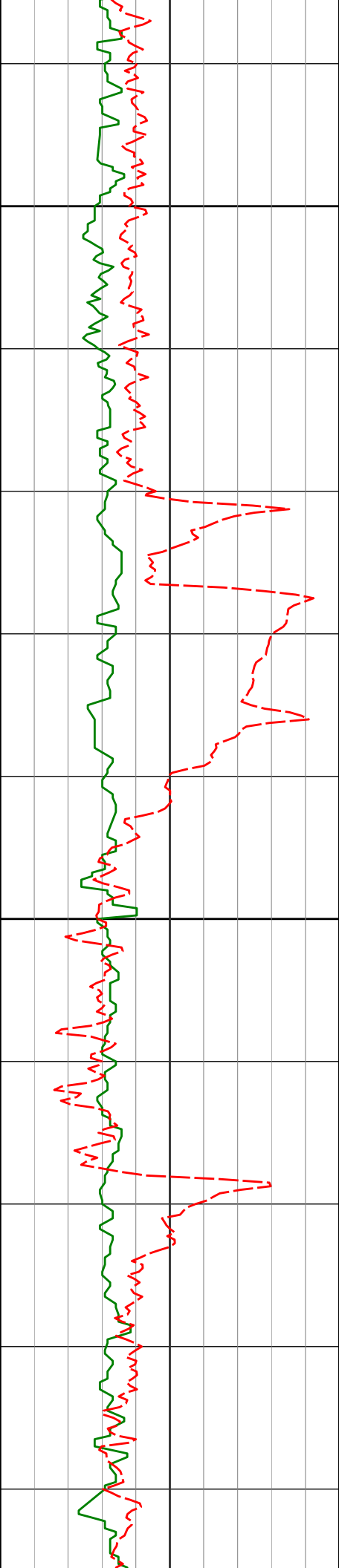
128.73°F

130.96°F

130.96°F

130.96°F

133.20°F



4586'

7.92°

318.94°

4560.35'

-171.73'

133.20°F

4600

133.20°F

133.20°F

4680'

9.60°

320.06°

4653.25'

-179.86'

133.20°F

4700

135.45°F

135.45°F

4775'

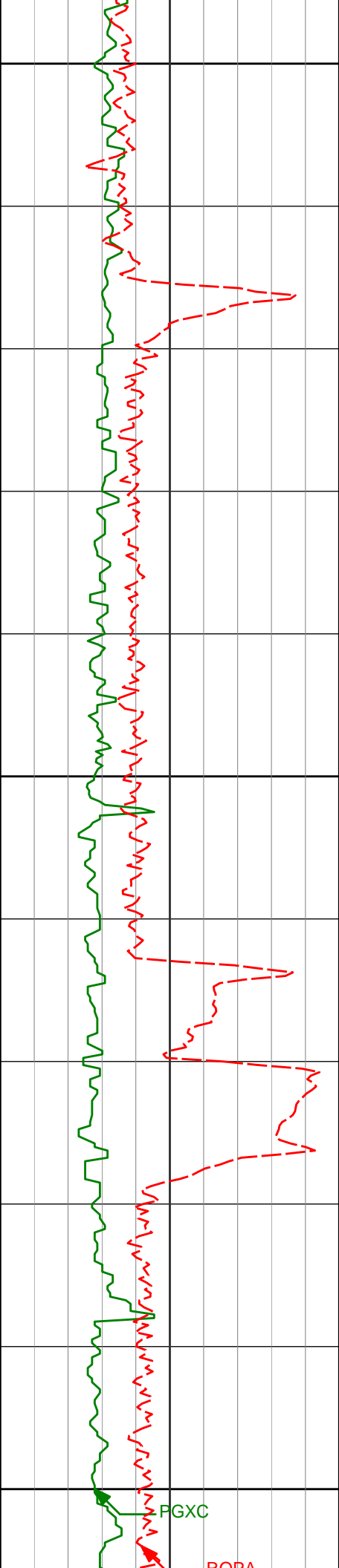
9.06°

316.47°

4747.00'

-188.88'

135.45°F



4800

137.70°F

137.70°F

137.70°F

4869'

8.28°

315.69° 4839.92'

-197.62'

137.70°F

4900

137.70°F

137.70°F

4964'

9.27°

320.77° 4933.81'

-206.09'

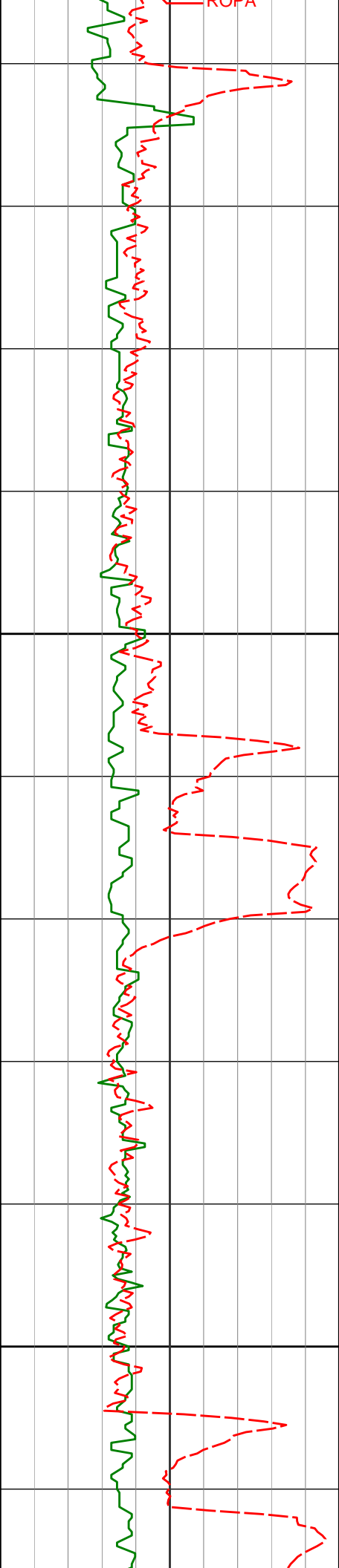
137.70°F

5000

PGXC

POBA

137.70°F



5100

5200

5059'

5154'

8.63°

7.94°

320.28°

311.02°

5027.65'

5121.66'

-214.28'

-222.75'

137.84°F

139.87°F

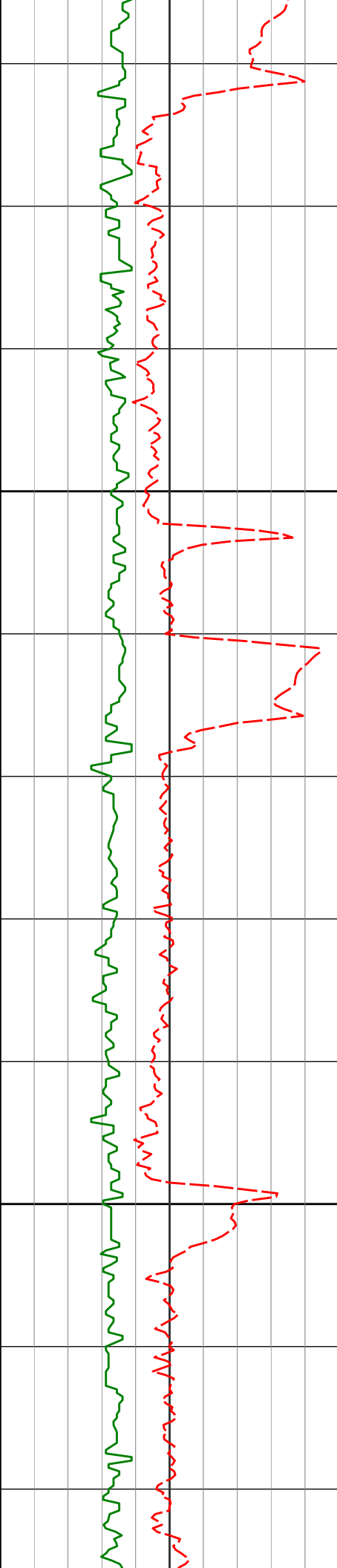
138.39°F

137.70°F

139.96°F

138.20°F

137.70°F



5300

5400

5248'

8.73°

322.92°

5214.68'

-230.89'

139.50°F

139.96°F

139.96°F

139.96°F

5343'

9.31°

324.09°

5308.50'

-238.48'

142.25°F

142.25°F

144.37°F

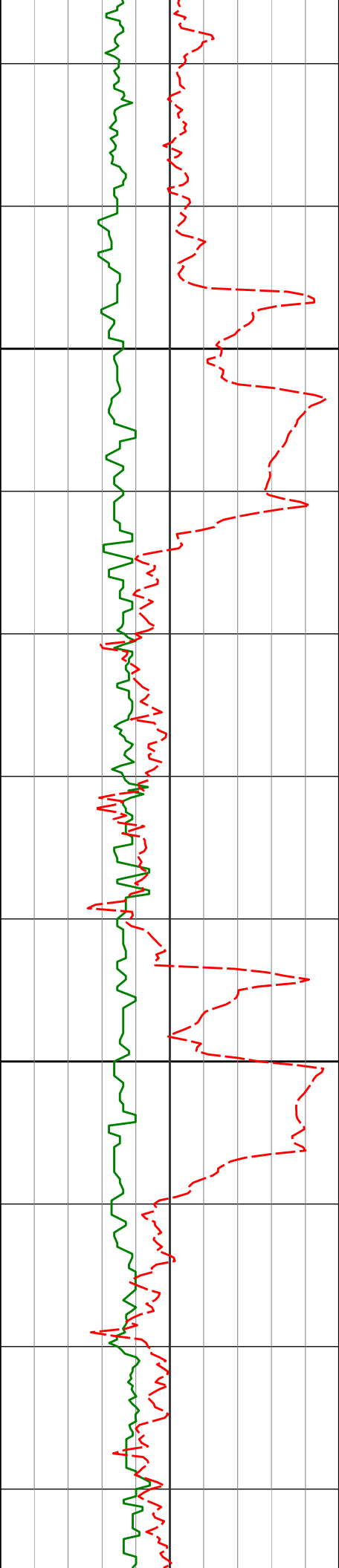
5438'

8.27°

321.80°

5402.39'

-246.00'



5500

5600

5532'

8.95°

320.39°

5495.33'

-253.69'

5627'

8.14°

318.57°

5589.27'

-261.72'

144.54°F

144.54°F

146.19°F

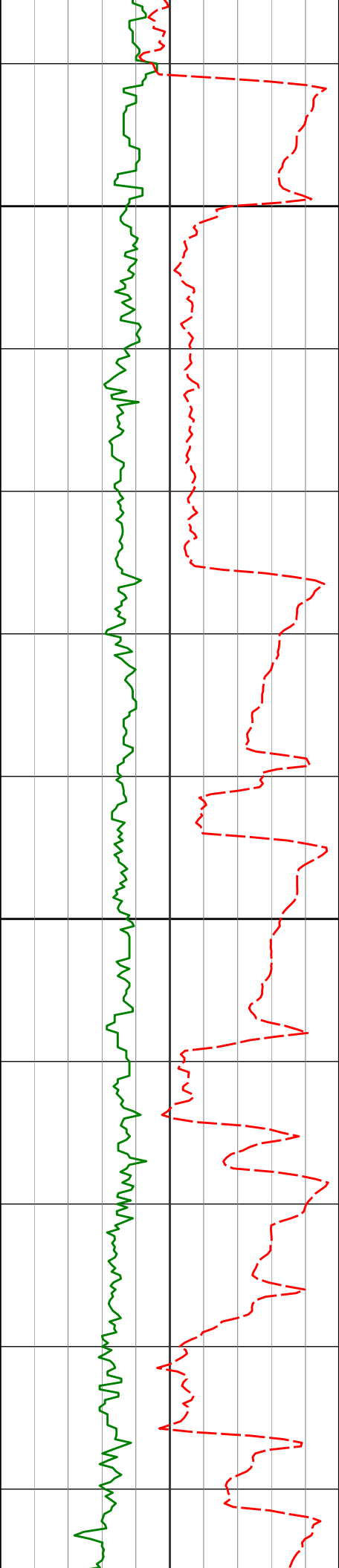
146.84°F

146.84°F

147.86°F

149.14°F

149.35°F



5700

5722'

8.83°

324.56°

5683.23'

-269.24'

150.47°F

149.24°F

5769'

10.39°

336.67°

5729.58'

-272.30'

150.95°F

5800

5816'

12.79°

350.57°

5775.62'

-273.91'

153.57°F

154.04°F

5863'

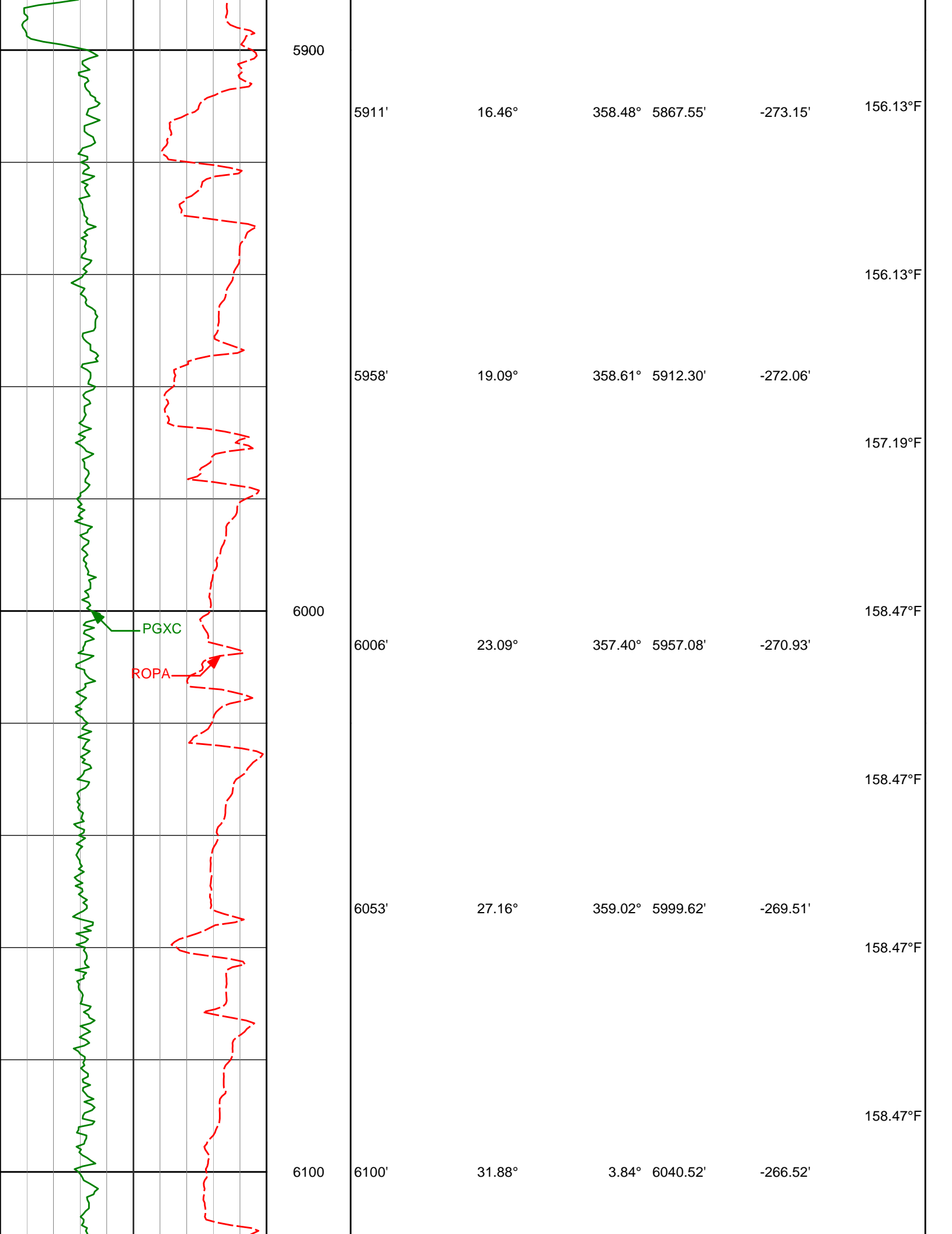
14.54°

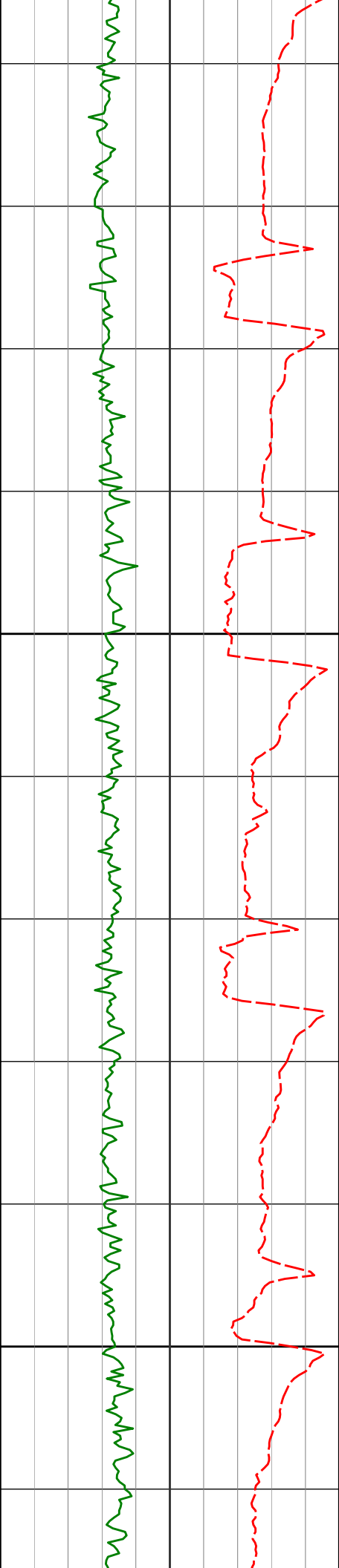
356.97°

5821.29'

-273.95'

155.97°F





6200

6300

6147'

6195'

6242'

6290'

35.67°

36.69°

36.75°

37.95°

11.84°

18.76°

26.86°

35.62°

6079.60'

6118.36'

6156.05'

6194.24'

-260.28'

-250.07'

-236.64'

-219.10'

160.08°F

160.83°F

160.83°F

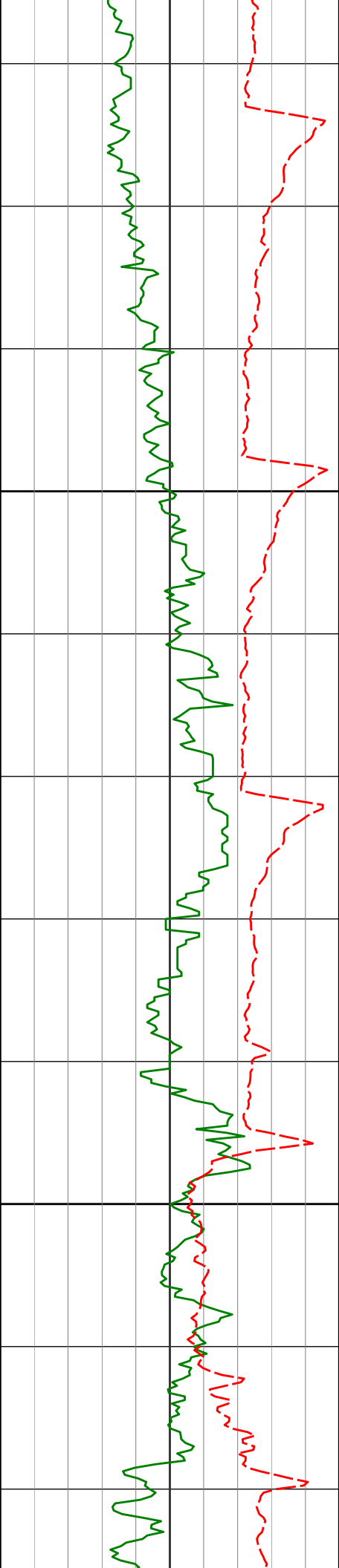
162.01°F

163.08°F

163.20°F

163.20°F

163.20°F



6400

6500

6337'

40.20°

46.10°

6230.76'

-197.58'

163.20°F

6385'

42.41°

56.16°

6266.86'

-171.06'

163.20°F

6432'

45.16°

66.62°

6300.83'

-141.14'

165.21°F

6480'

46.17°

75.49°

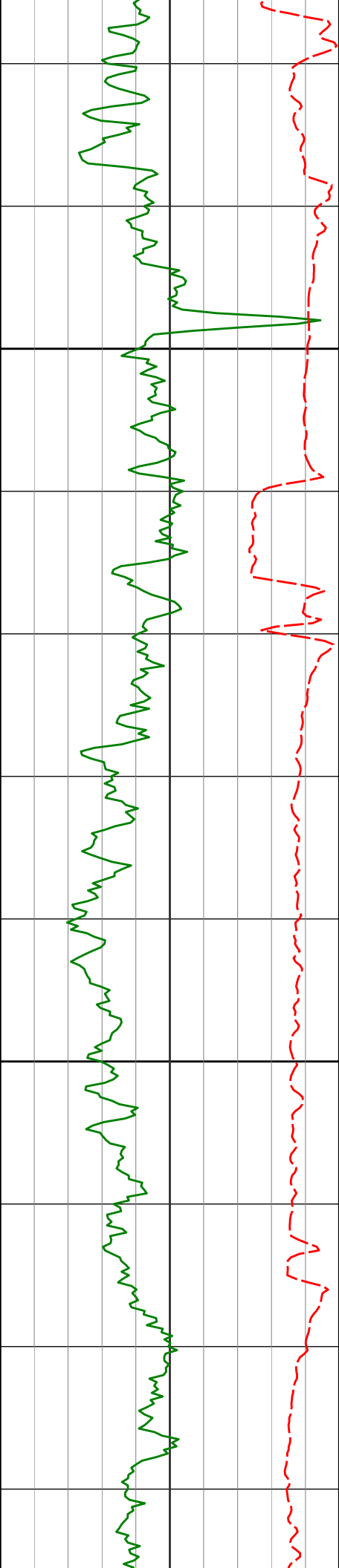
6334.41'

-107.77'

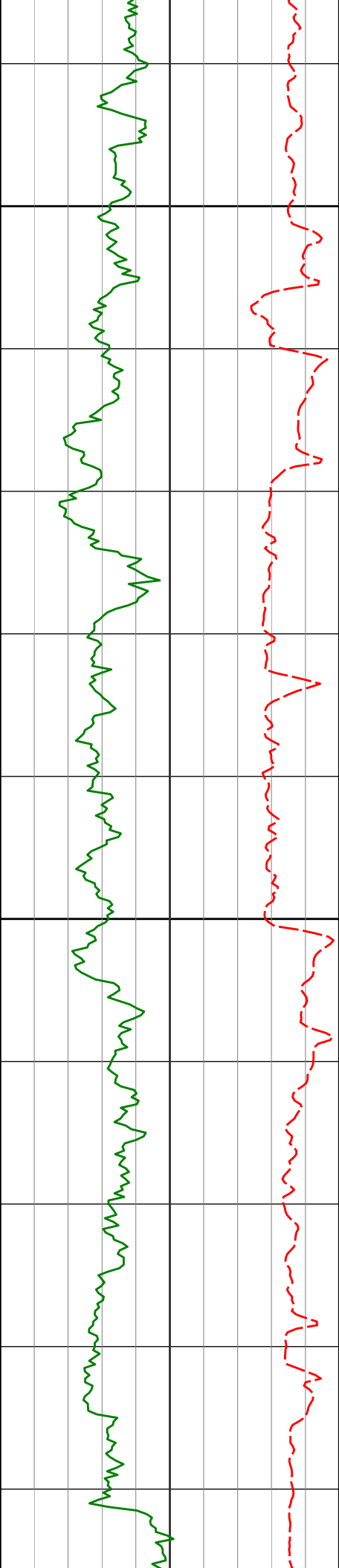
165.58°F

165.58°F

165.58°F



6574'	48.36°	78.09°	6398.20'	-39.31'	166.97°F
6600					
6669'					
6669'					
6700					
6700					
6763'					
6763'	70.39°	85.68°	6497.37'	119.95'	170.37°F



6800

6810'

76.69°

86.97°

6510.68'

164.97'

170.60°F

172.63°F

172.78°F

6858'

78.15°

87.25°

6521.13'

211.76'

173.45°F

6900

6905'

79.09°

87.25°

6530.41'

257.77'

173.55°F

173.17°F

6939'

84.04°

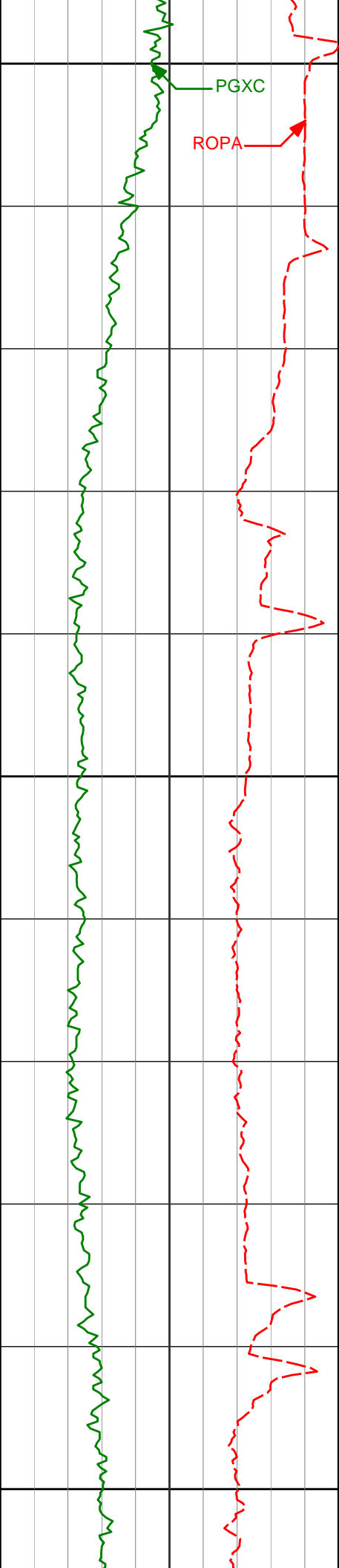
88.71°

6535.39'

291.31'

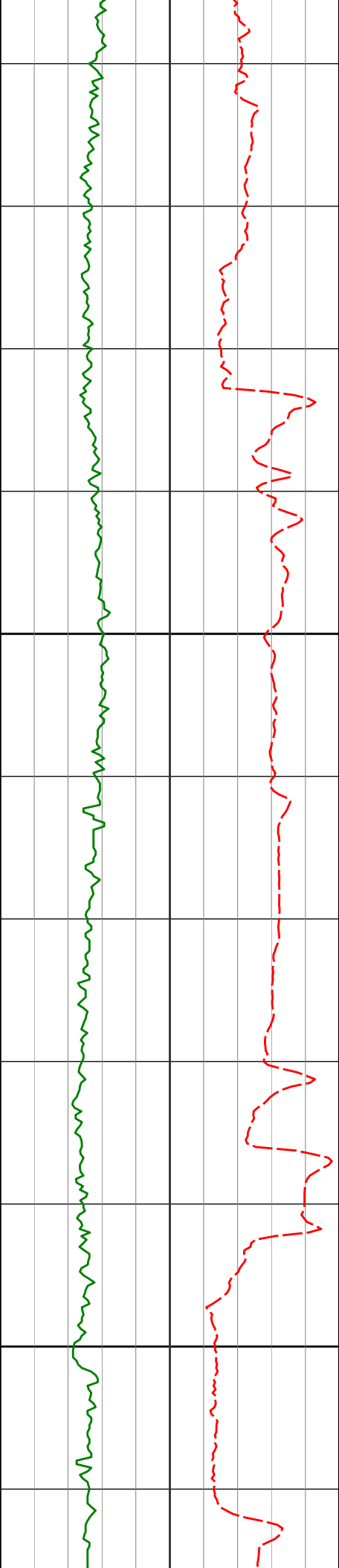
171.24°F

168.58°F



200
7000
7100
7200

7014'	89.17°	88.62°	6539.83'	365.93'	167.14°F
					167.63°F
					167.97°F
7108'	89.41°	89.57°	6541.00'	459.58'	167.97°F
					167.97°F
					168.15°F
7203'	89.60°	89.62°	6541.82'	554.16'	170.19°F



7300

7297'

91.26°

90.10° 6541.11'

647.71'

170.49°F

172.47°F

172.44°F

170.37°F

172.34°F

172.78°F

7400

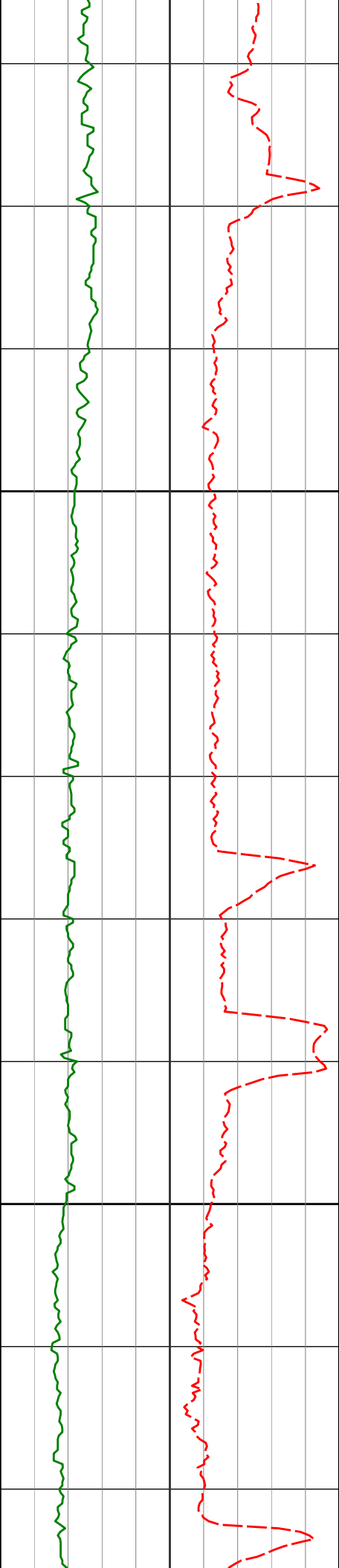
7391'

89.04°

89.08° 6540.87'

741.29'

175.21°F



7500

7600

7486'

88.77°

88.48°

6542.68'

835.97'

7580'

90.28°

90.11°

6543.46'

929.59'

175.33°F

177.64°F

176.09°F

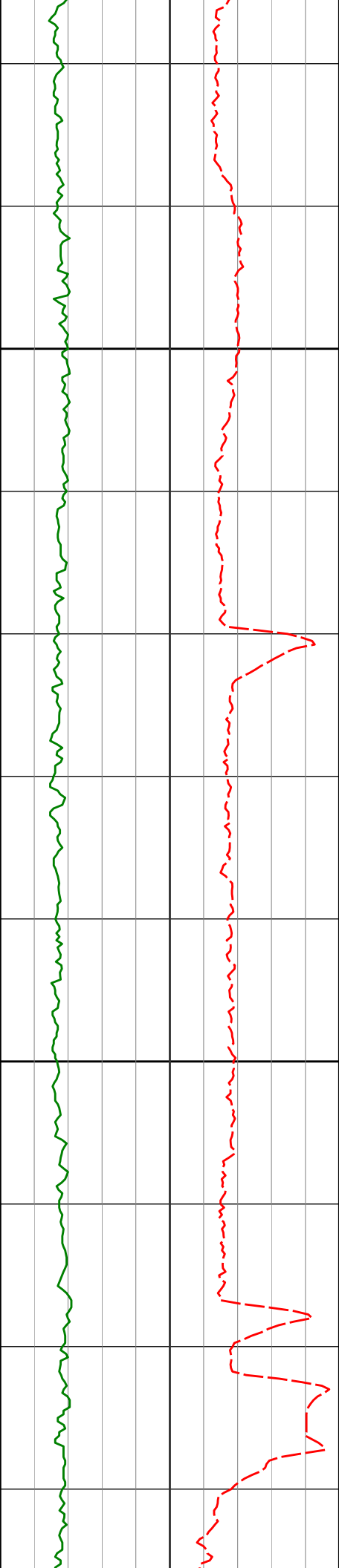
175.47°F

176.22°F

178.99°F

180.09°F

180.09°F



7700

7674'

91.17°

91.76° 6542.27'

1022.94'

182.12°F

182.55°F

184.61°F

7768'

90.65°

91.52° 6540.78'

1116.14'

182.93°F

7800

182.55°F

182.73°F

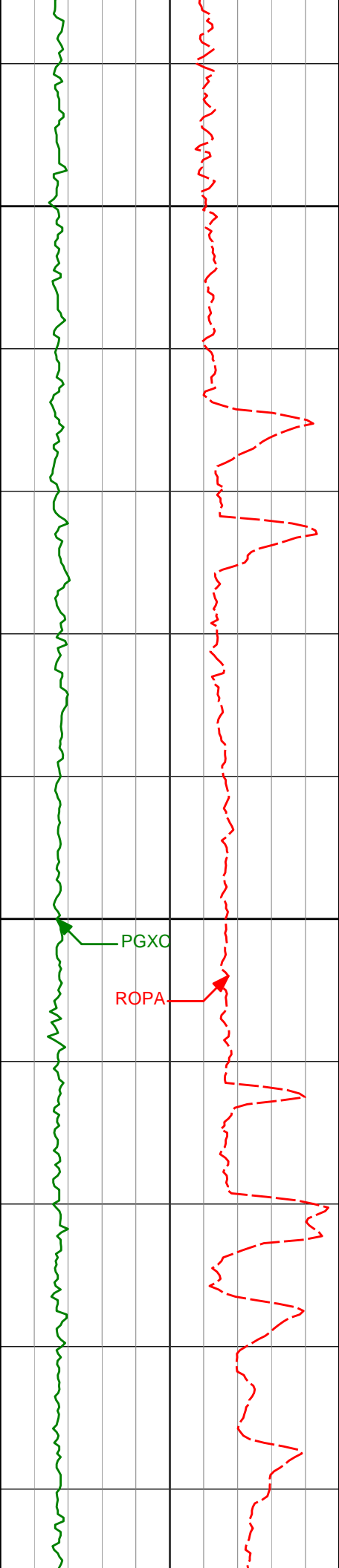
7862'

90.09°

89.09° 6540.17'

1209.60'

185.52°F



7900

7956'

90.74°

89.93°

6539.49'

1303.20'

8000

8051'

90.52°

90.86°

6538.45'

1397.65'

185.95°F

187.04°F

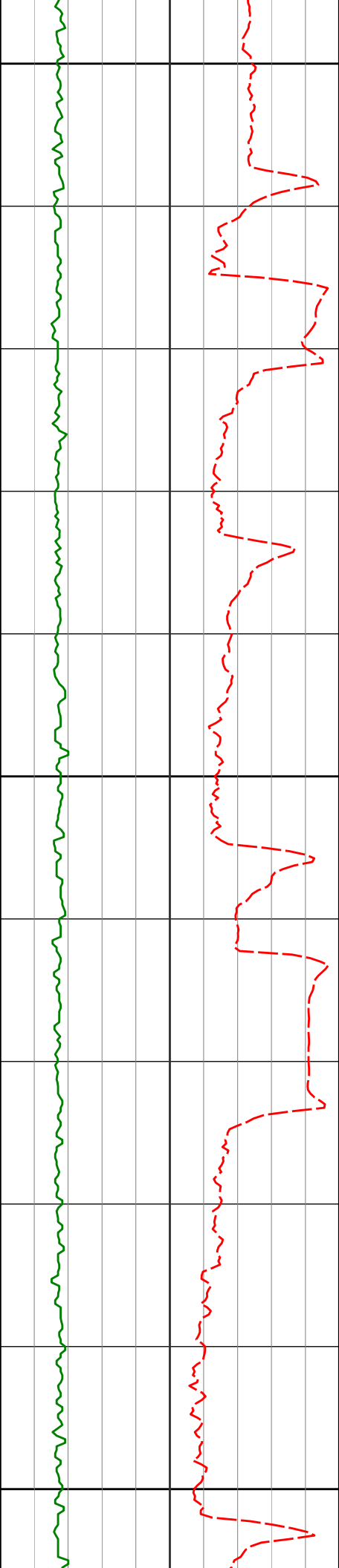
187.29°F

185.67°F

185.99°F

189.59°F

188.37°F



8100

187.48°F

189.39°F

8145'

90.71°

93.49° 6537.44'

1490.73'

189.85°F

188.30°F

8200

188.42°F

8239'

90.00°

90.95° 6536.86'

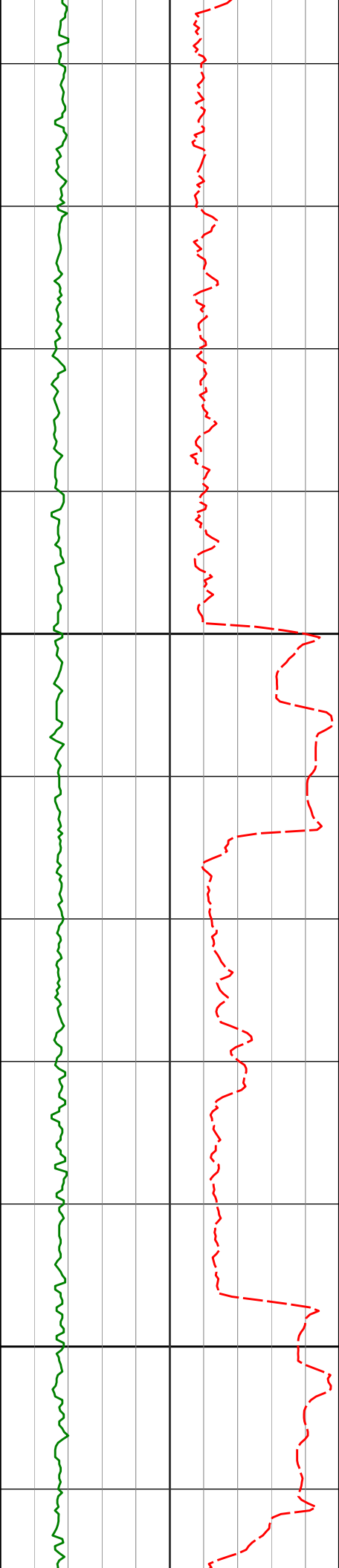
1583.81'

189.99°F

191.26°F

8300

192.49°F



8400

8500

8333'

90.31°

91.19°

6536.60'

1677.14'

191.86°F

190.36°F

189.99°F

8427'

89.94°

89.93°

6536.40'

1770.57'

189.67°F

188.03°F

189.99°F

8522'

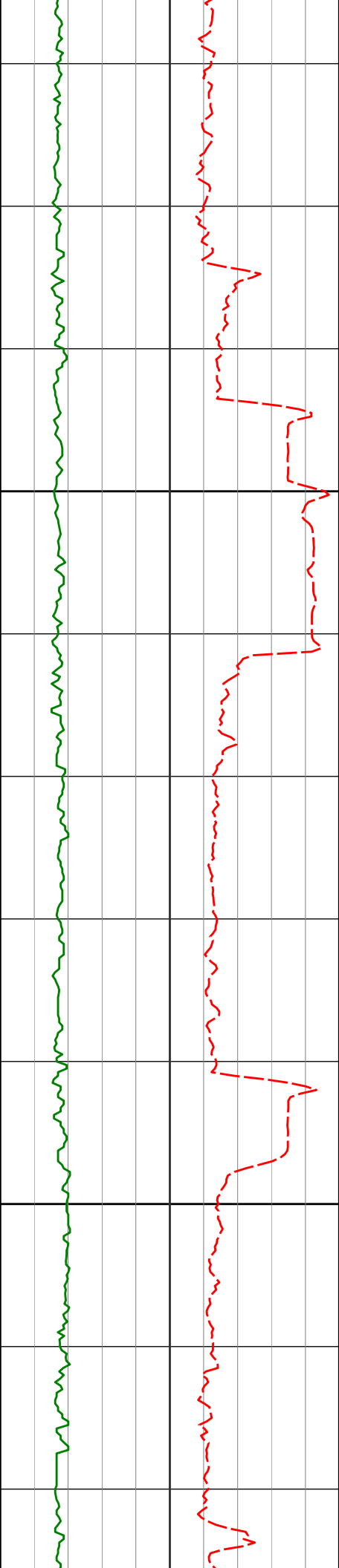
90.03°

88.91°

6536.42'

1865.18'

190.95°F



8600

8616'

89.63°

87.31°

6536.70'

1958.96'

8700

8710'

90.12°

87.68°

6536.91'

2052.79'

190.41°F

189.99°F

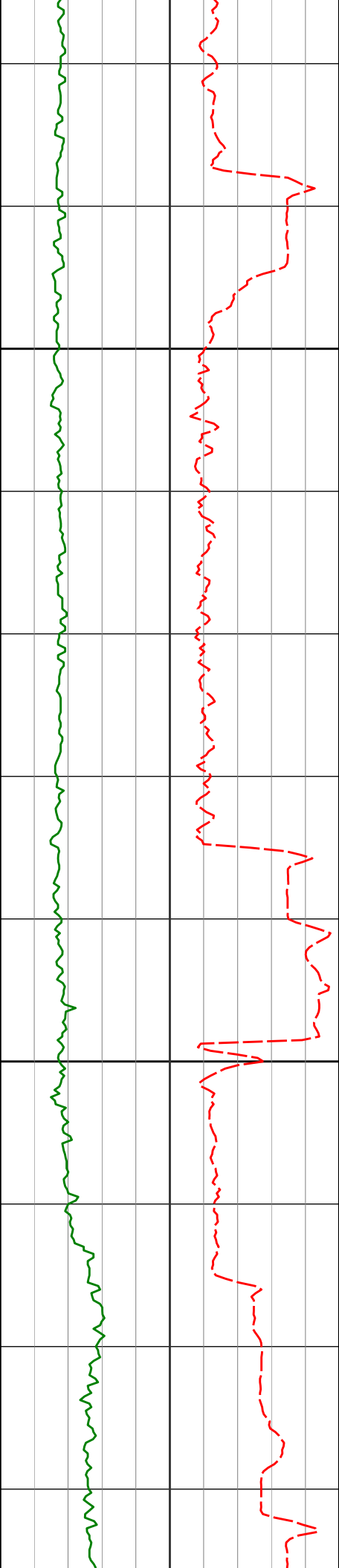
192.28°F

193.86°F

194.99°F

197.02°F

197.51°F



8800

8804'

90.86°

88.97° 6536.10'

2146.54'

198.49°F

199.68°F

197.28°F

197.32°F

198.61°F

8900

8899'

89.60°

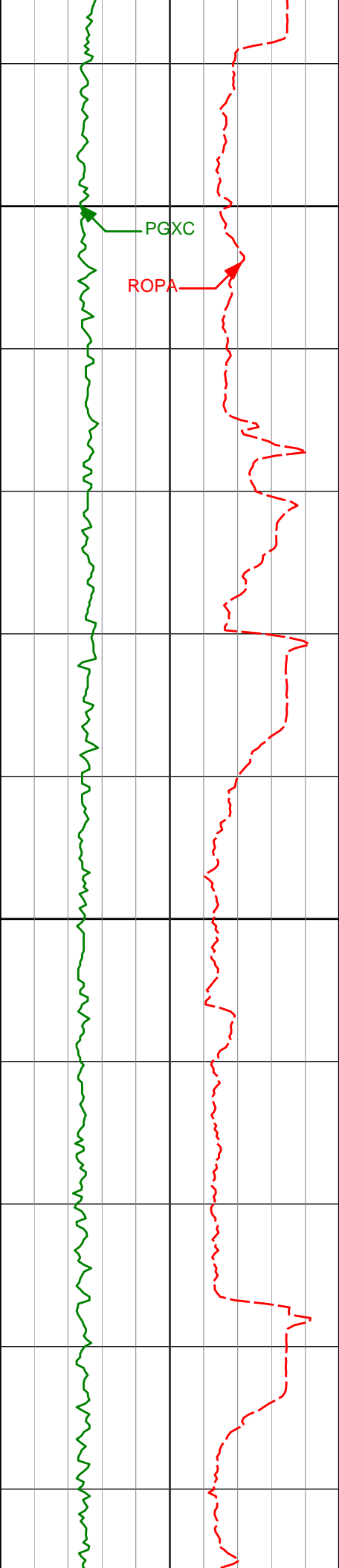
86.28° 6535.72'

2241.35'

200.05°F

200.81°F

202.60°F



9000

8993'

89.78°

86.34°

6536.23'

2335.29'

202.60°F

202.96°F

205.16°F

9100

9088'

89.78°

86.02°

6536.59'

2430.23'

206.53°F

205.65°F

207.52°F

9183'

90.55°

89.10°

6536.32'

2525.06'

204.07°F



9200

201.01°F

200.26°F

202.60°F

9278'

89.29°

87.77°

6536.45'

2619.80'

9300

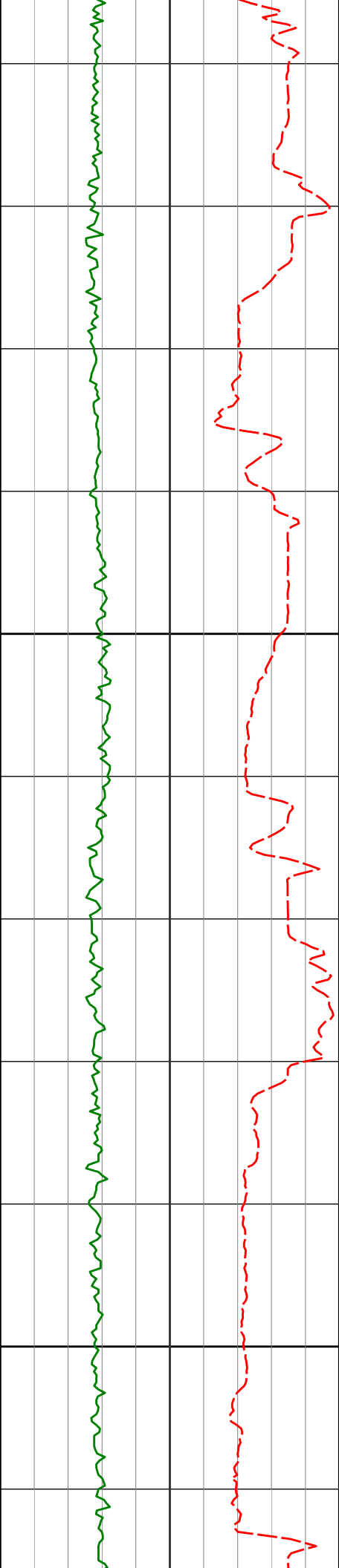
202.84°F

205.04°F

207.37°F

207.73°F

9400



9500

9600

9467'

90.40°

88.91°

6536.96'

2808.30'

9562'

89.54°

87.89°

6537.01'

2903.05'

207.73°F

207.73°F

204.38°F

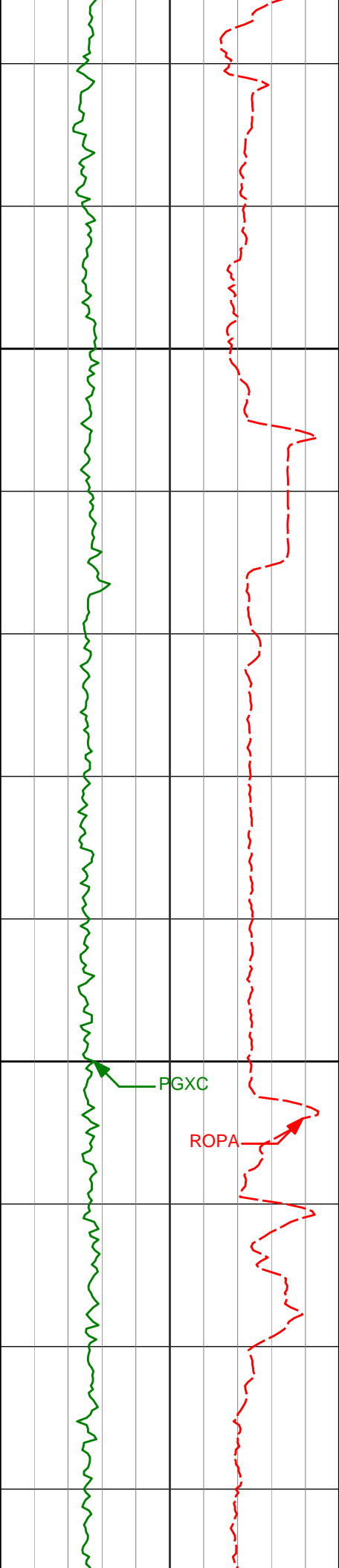
202.34°F

203.34°F

205.16°F

206.34°F

207.73°F



9900

10000

9940'

90.43°

88.74° 6535.25'

3279.90'

10035'

89.54°

88.17° 6535.28'

3374.63'

210.31°F

210.31°F

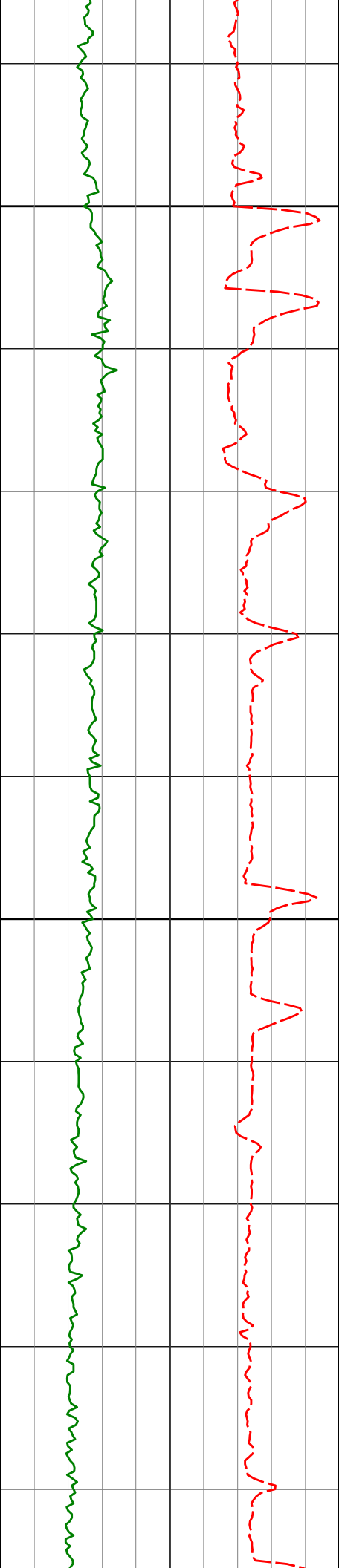
212.49°F

212.92°F

212.92°F

214.75°F

214.80°F



10100

10130'

89.72°

88.36°

6535.89'

3469.39'

10200

10224'

90.28°

88.90°

6535.89'

3563.11'

215.14°F

215.51°F

215.51°F

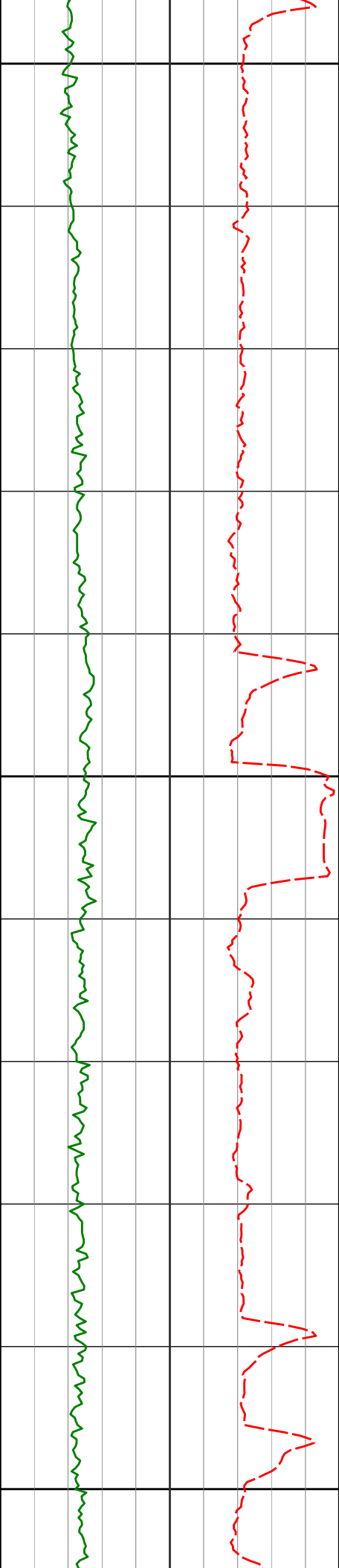
215.51°F

217.56°F

216.79°F

218.14°F

218.14°F



10300

10319'

91.20°

89.71° 6534.66'

3657.73'

216.04°F

213.03°F

212.69°F

10400

10412'

90.52°

88.00° 6533.27'

3750.41'

214.69°F

213.12°F

215.33°F

10500

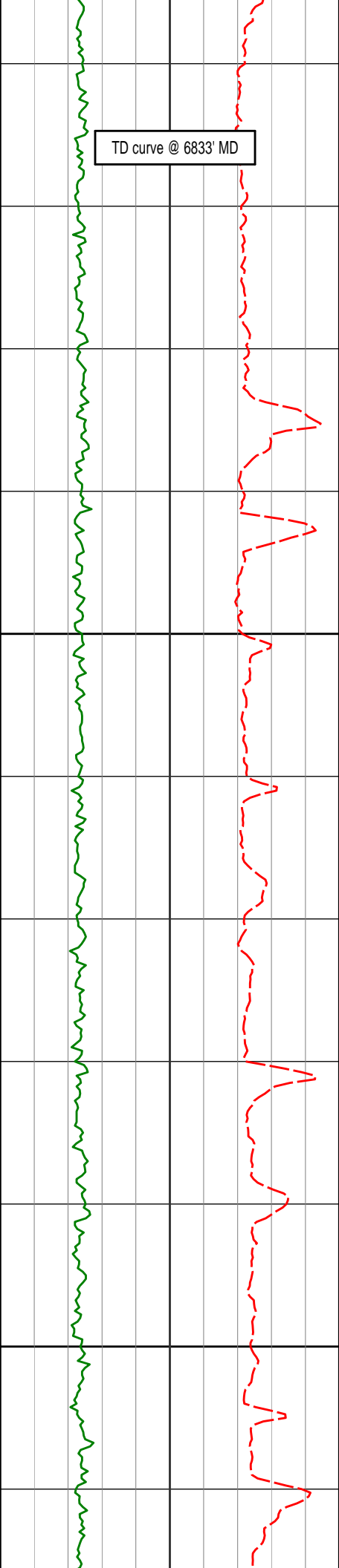
10506'

90.59°

88.09° 6532.36'

3844.19'

215.90°F



TD curve @ 6833' MD

10600

10700

10691'

90.62°

88.25° 6530.40'

4028.73'

218.01°F

218.14°F

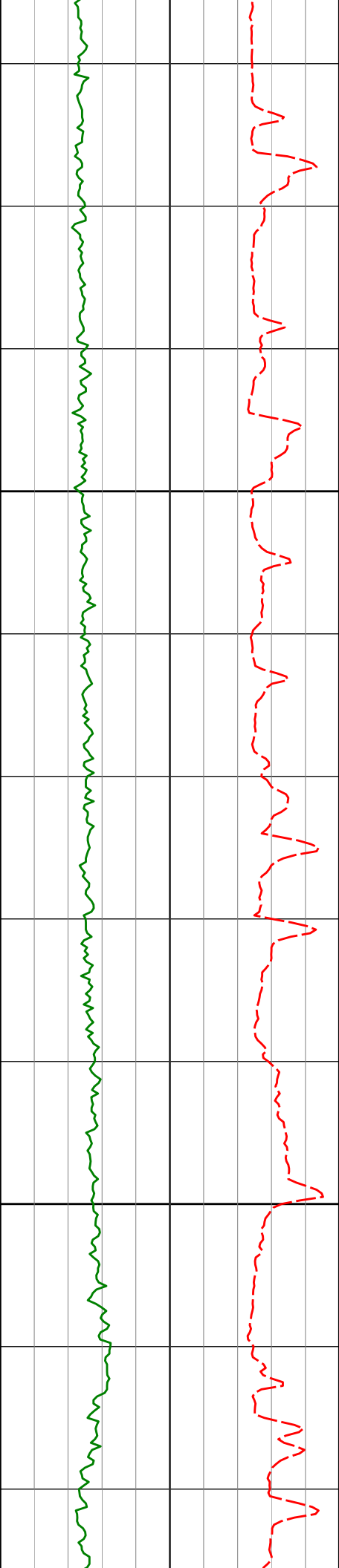
218.14°F

218.39°F

220.45°F

218.66°F

220.77°F



10800

10900

10783'

90.37°

87.70°

6529.61'

4120.52'

10876'

88.37°

84.90°

6530.63'

4213.44'

220.77°F

220.77°F

220.77°F

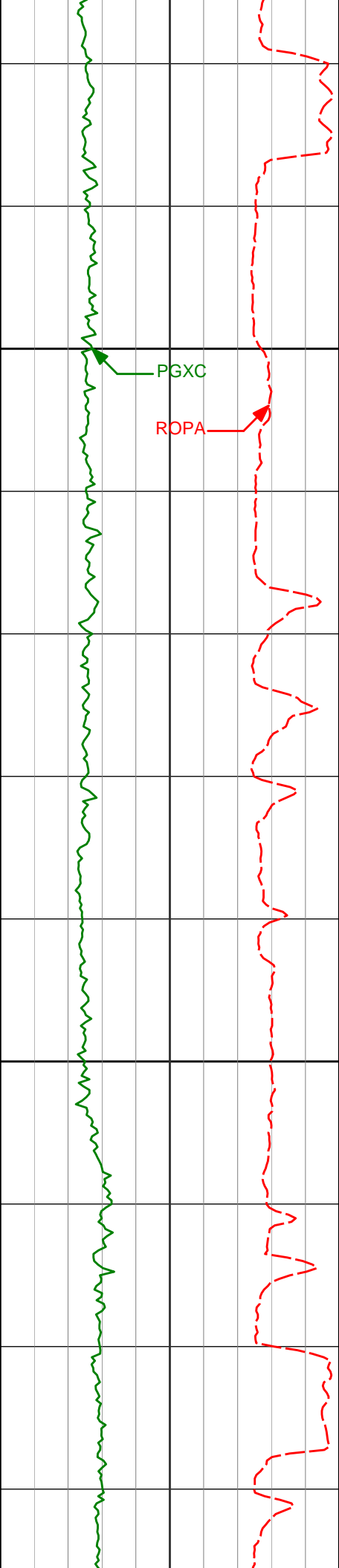
220.77°F

222.83°F

218.20°F

215.81°F

217.82°F



11000

11100

10969'

89.14°

86.23°

6532.65'

4306.39'

11062'

92.19°

87.33°

6531.57'

4399.28'

11155'

91.54°

88.24°

6528.55'

4492.05'

218.14°F

218.39°F

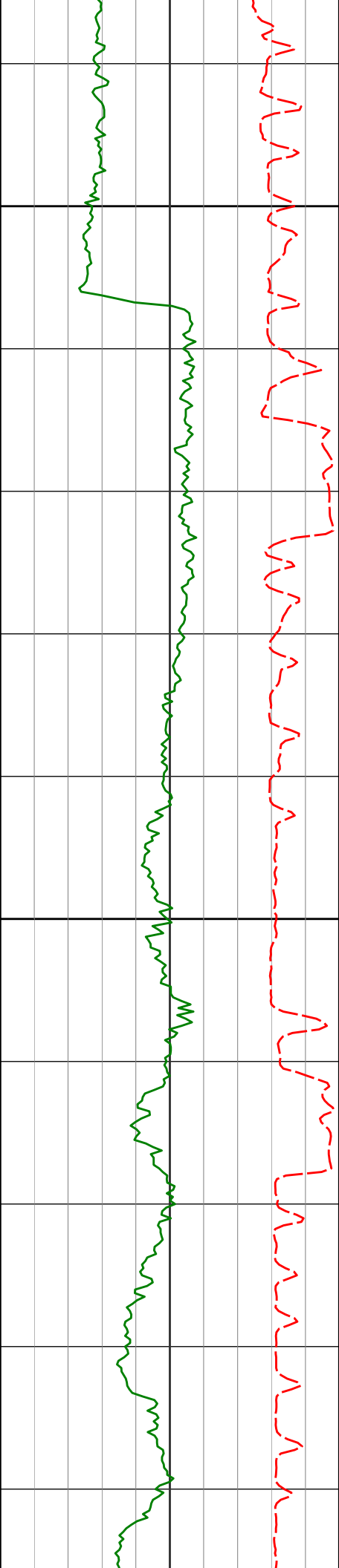
220.51°F

219.03°F

218.24°F

219.06°F

218.06°F



11200

11247'

11300

11340'

91.94°

90.18°

90.10°

89.37°

6525.75'

6524.03'

4583.66'

4676.21'

217.45°F

220.38°F

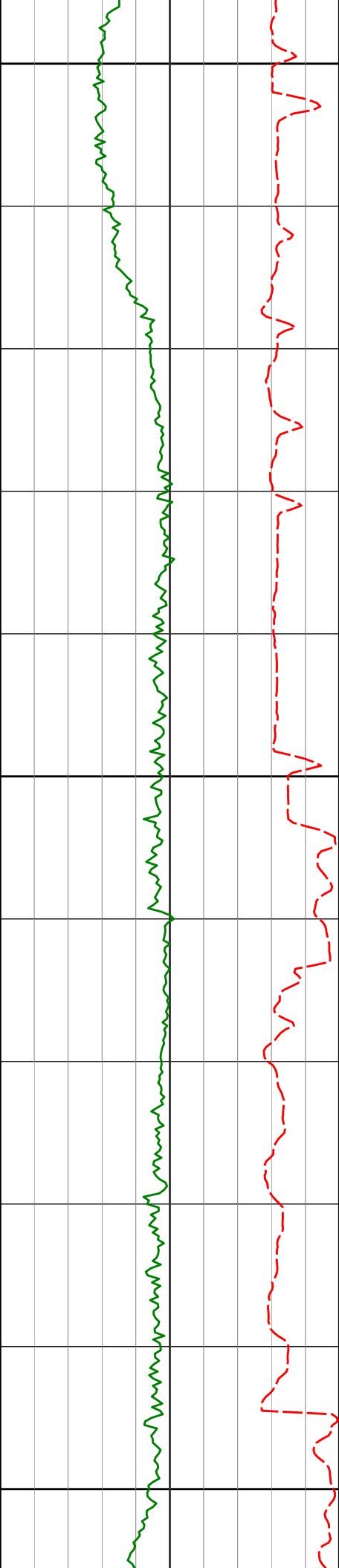
218.85°F

217.22°F

220.23°F

220.93°F

223.14°F



11400

11433'

91.33°

90.26°

6522.81'

4768.76'

11500

11526'

91.36°

88.33°

6520.62'

4861.36'

11600

223.41°F

222.14°F

218.95°F

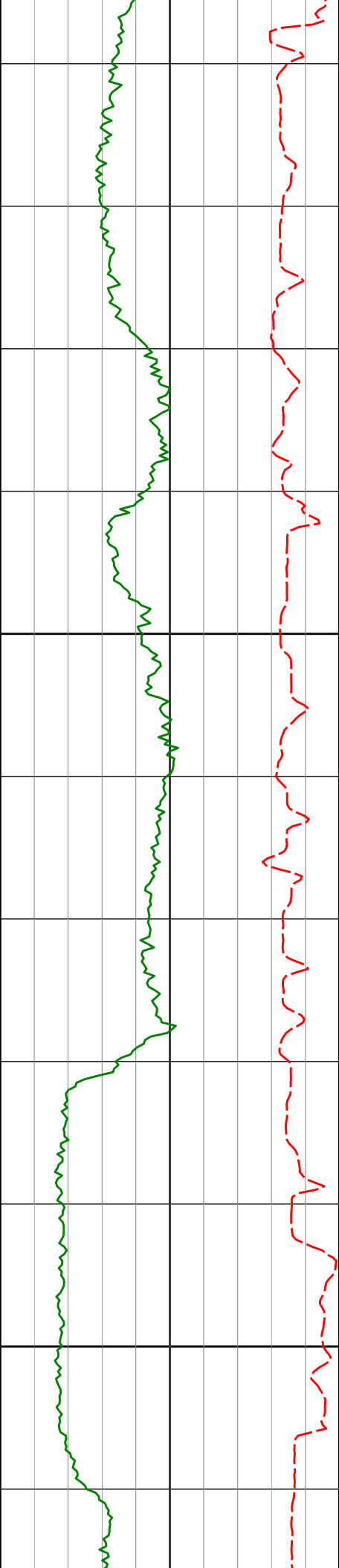
219.86°F

219.89°F

217.58°F

220.54°F

221.28°F



11618'

89.91°

85.90°

6519.60'

4953.22'

223.32°F

223.41°F

11700

223.91°F

221.41°F

222.46°F

224.79°F

11800

11803'

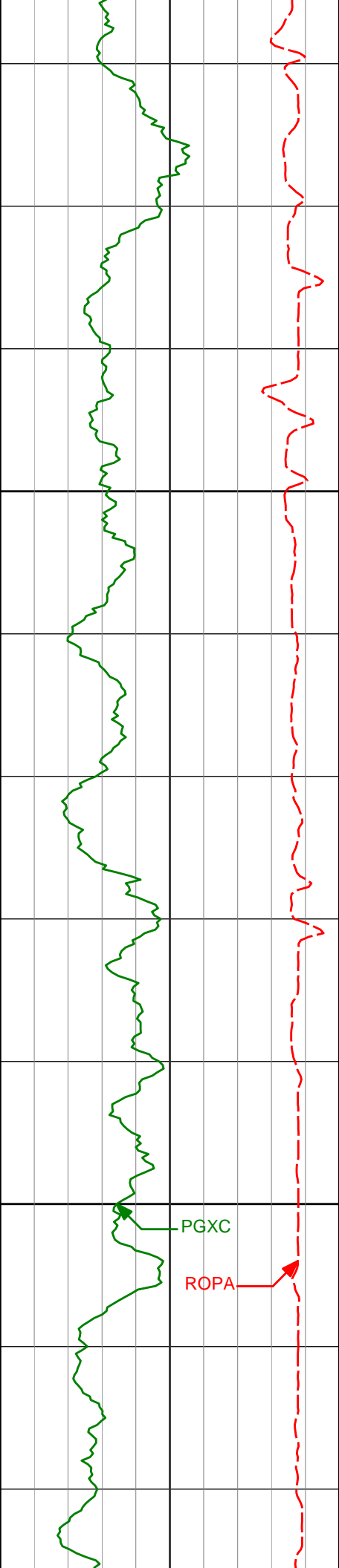
89.04°

87.03°

6521.30'

5138.06'

226.25°F



11900

12000

11895'

87.50°

86.66°

6524.08'

5229.91'

228.54°F

228.74°F

228.74°F

229.35°F

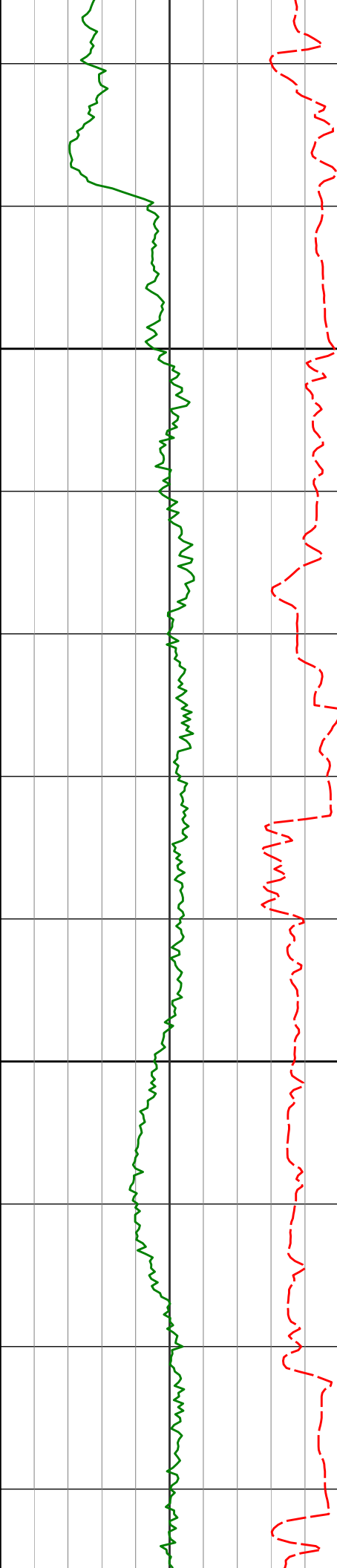
231.20°F

227.27°F

223.38°F

PGXC

ROPA



300

12085'

86.64°

86.37° 6533.79'

5419.51'

12100

12179'

88.43°

87.78° 6537.83'

5513.30'

12200

226.76°F

221.61°F

220.84°F

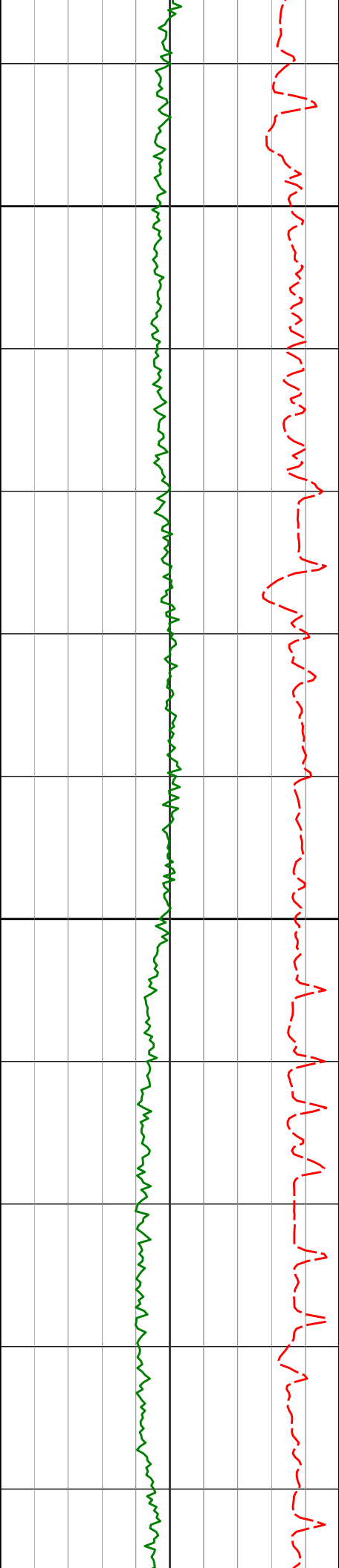
222.85°F

221.60°F

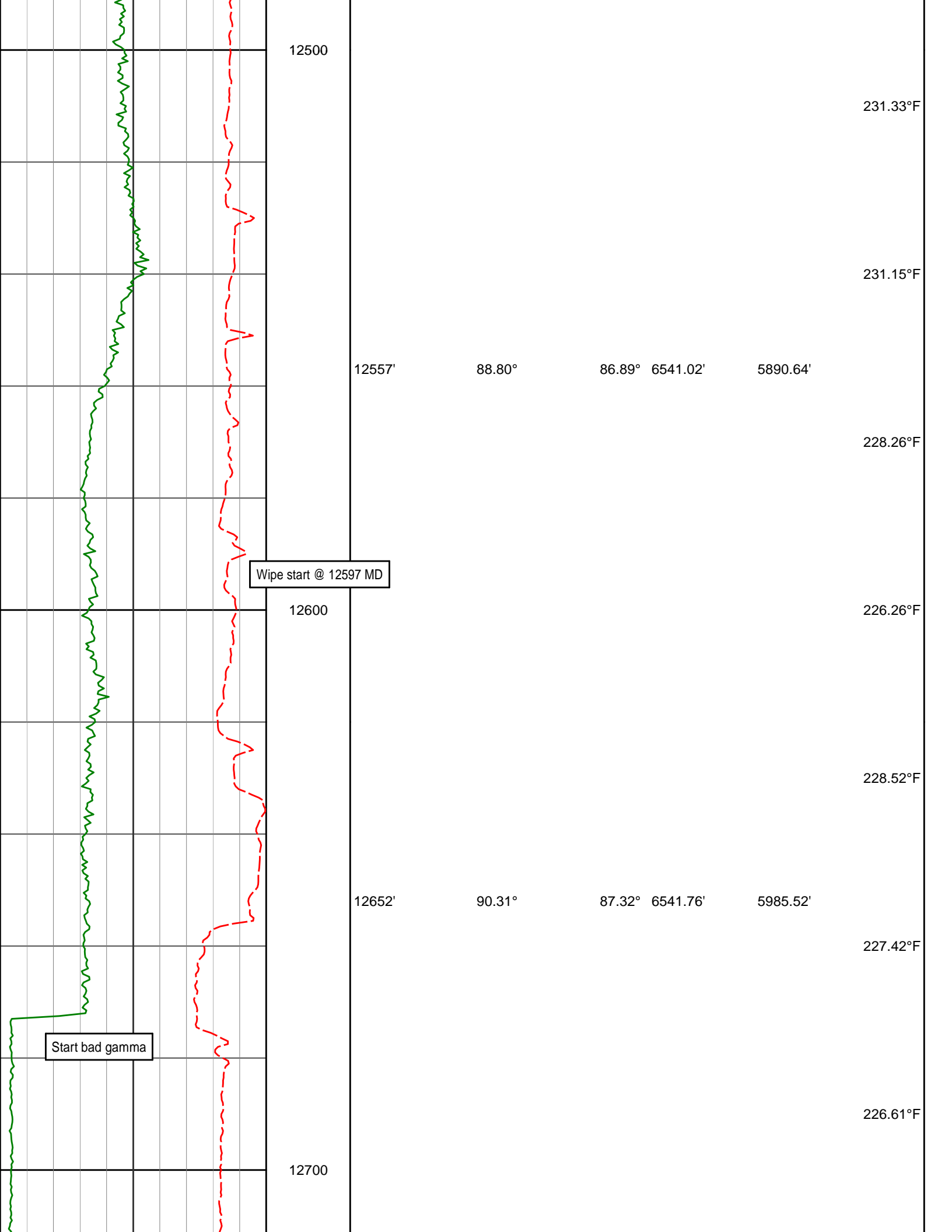
221.20°F

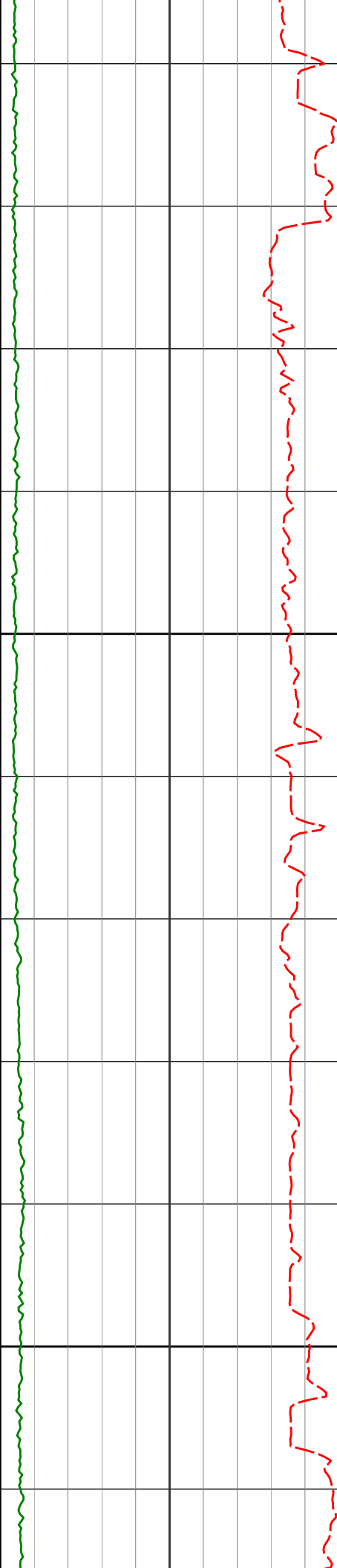
223.29°F

224.84°F



12274'	90.00°	87.77°	6539.13'	5608.11'	
					225.93°F
					226.08°F
					226.08°F
12369'	89.88°	87.38°	6539.23'	5702.94'	
					227.66°F
					228.85°F
					230.95°F
12463'	89.57°	87.66°	6539.68'	5796.79'	
					230.08°F





12800

12900

12746'

91.60°

87.99°

6540.19'

6079.33'

12841'

91.94°

87.37°

6537.26'

6174.12'

228.74°F

228.92°F

231.13°F

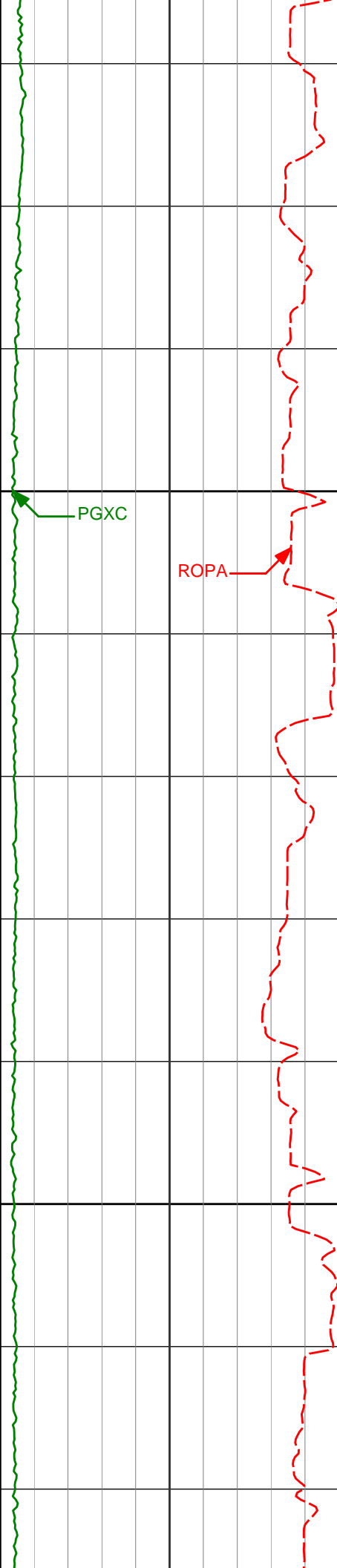
231.42°F

229.22°F

226.94°F

228.66°F

228.31°F



12935'

89.51°

87.33° 6536.07'

6267.96'

226.13°F

226.69°F

13000

PGXC

ROPA

228.25°F

13030'

89.26°

88.84° 6537.09'

6362.74'

226.59°F

228.52°F

13100

230.96°F

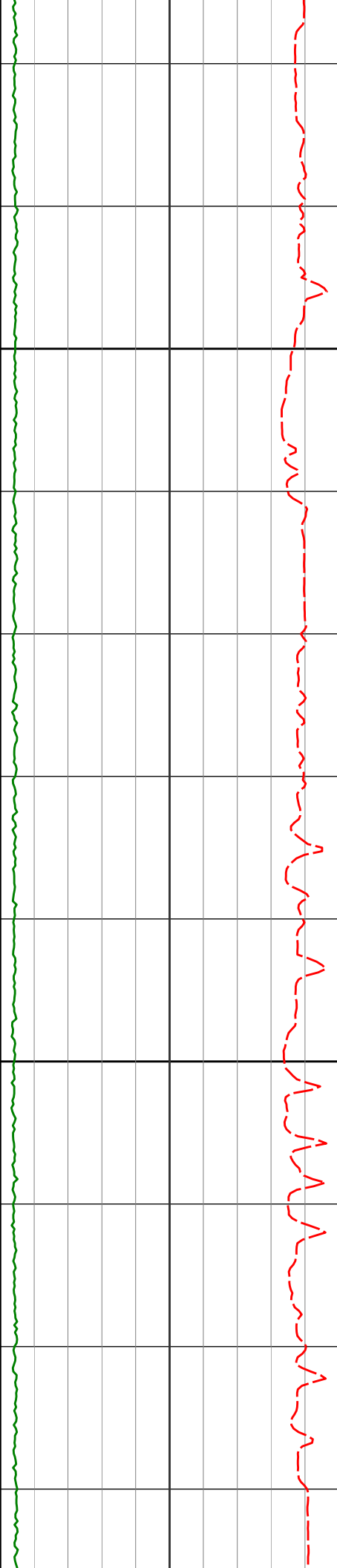
13125'

90.40°

88.01° 6537.37'

6457.48'

231.42°F



13200

13220'

90.77°

87.76°

6536.40'

6552.28'

13300

13315'

90.37°

86.28°

6535.46'

6647.16'

231.49°F

232.57°F

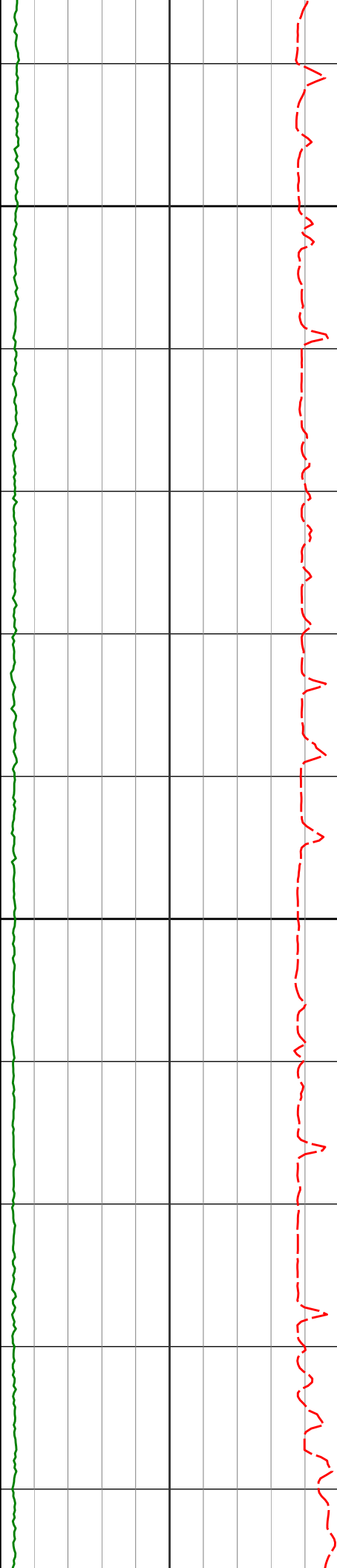
230.58°F

231.42°F

231.74°F

233.98°F

234.12°F



13400

13409'

90.74°

86.45°

6534.54'

6741.09'

234.00°F

233.53°F

234.92°F

13500

13504'

90.65°

85.51°

6533.39'

6836.04'

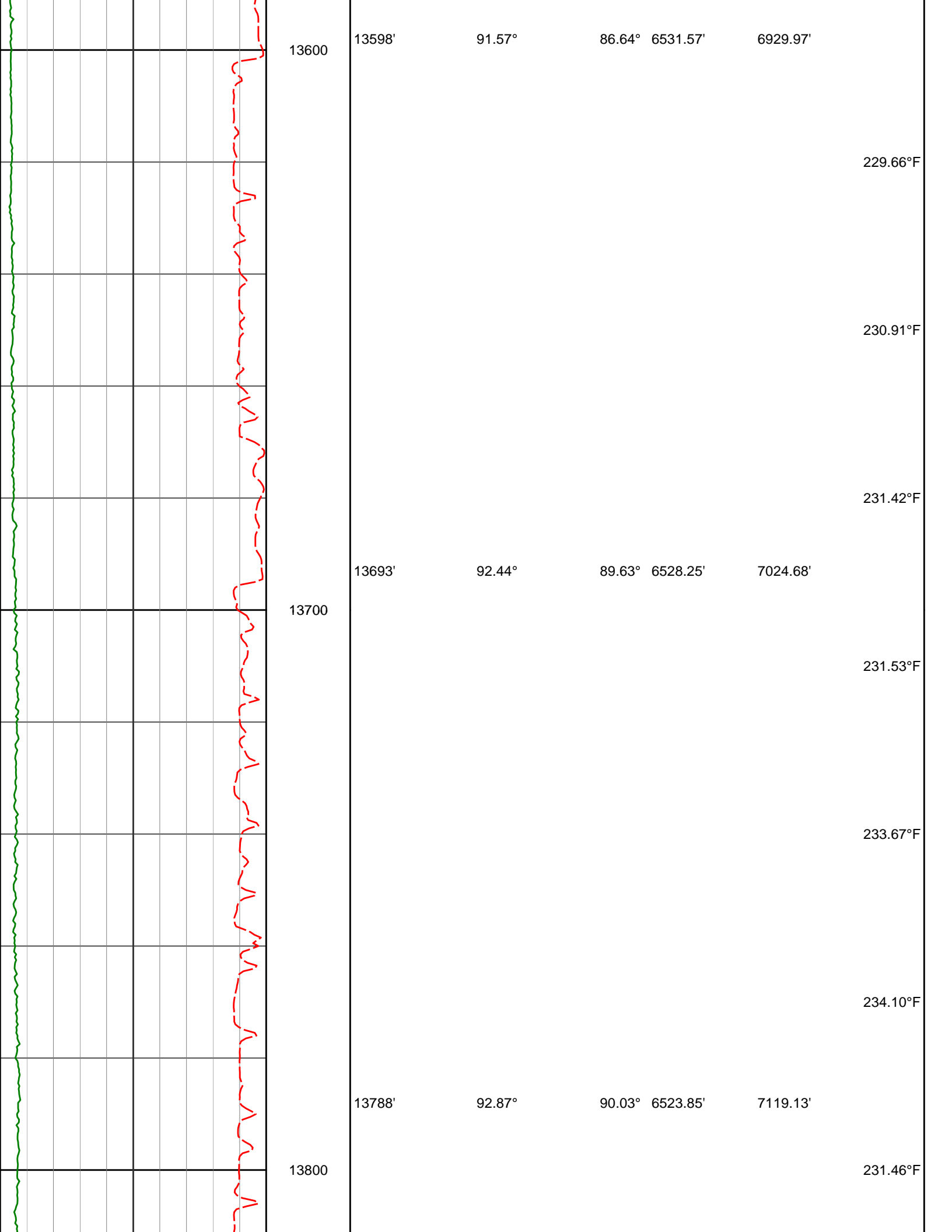
234.10°F

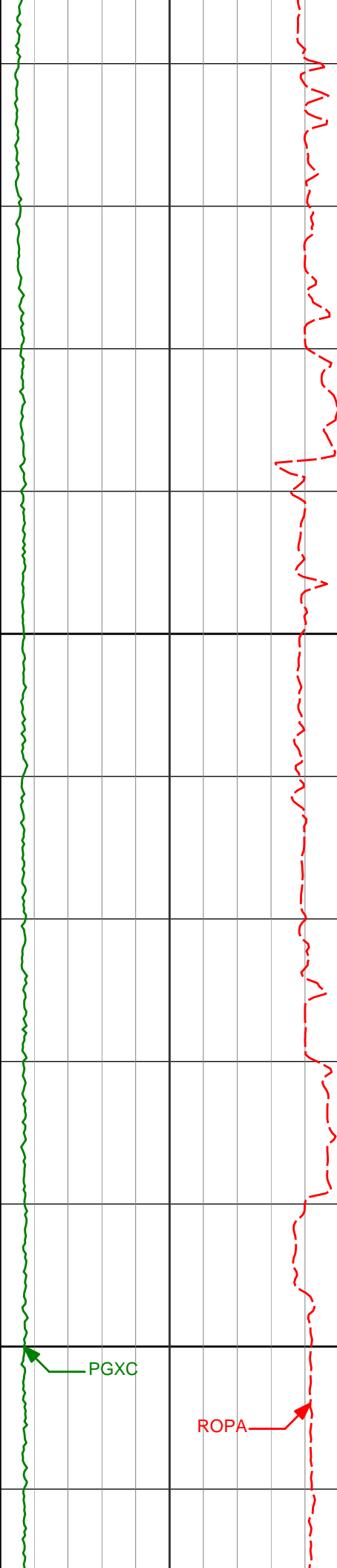
230.31°F

231.30°F

232.49°F

234.12°F





13883'

91.82°

90.65°

6519.96'

7213.51'

13900

13977'

89.57°

90.82°

6518.82'

7306.89'

14000

PGXC

ROPA

231.66°F

234.05°F

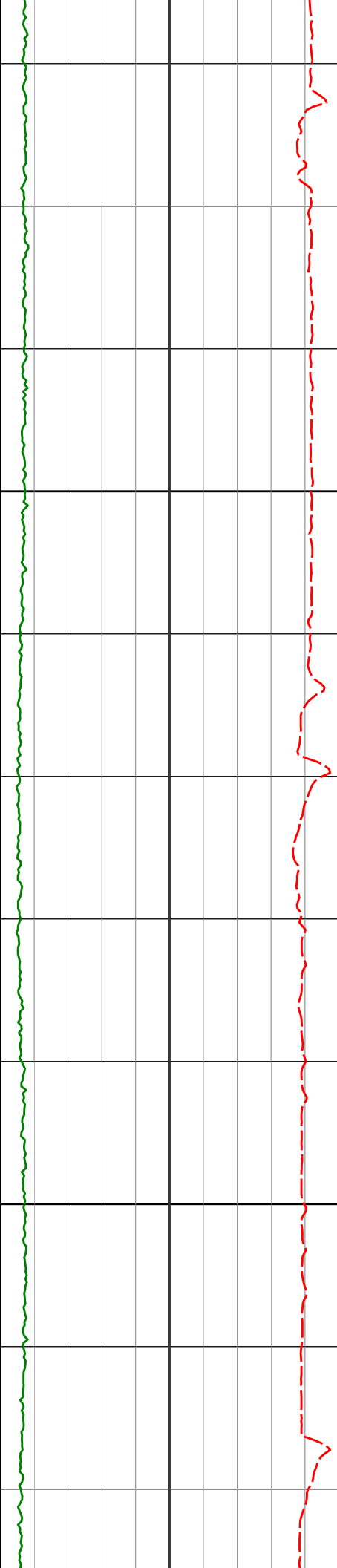
233.55°F

232.53°F

236.01°F

236.82°F

237.23°F



14100

14200

14072'

89.17°

90.44°

6519.86'

7401.29'

14167'

89.23°

90.62°

6521.19'

7495.71'

239.39°F

239.54°F

239.54°F

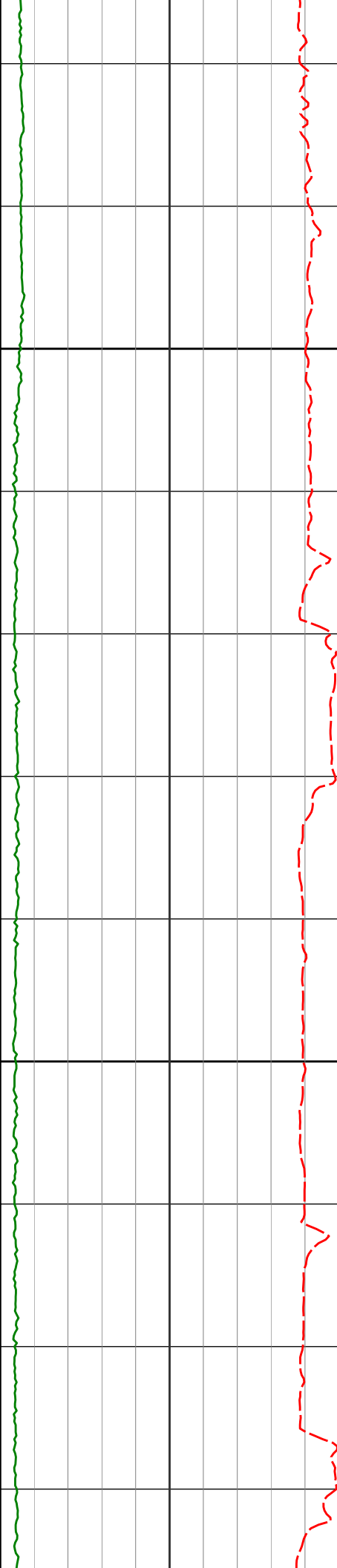
239.65°F

241.11°F

239.86°F

241.99°F

240.86°F



14262'

88.37°

90.29° 6523.18'

7590.13'

236.34°F

14300

235.22°F

14357'

89.85°

90.32° 6524.66'

7684.58'

236.82°F

236.69°F

14400

235.08°F

236.97°F

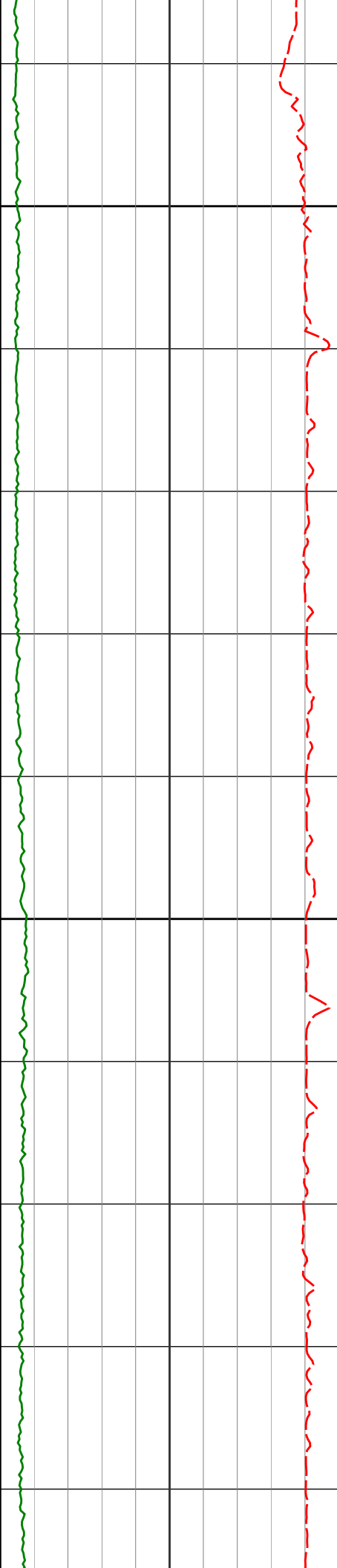
14451'

91.14°

90.03° 6523.84'

7778.07'

237.49°F



14500

14546'

92.10°

89.72°

6521.16'

7872.57'

14600

14641'

91.73°

89.90°

6517.98'

7967.07'

239.49°F

241.42°F

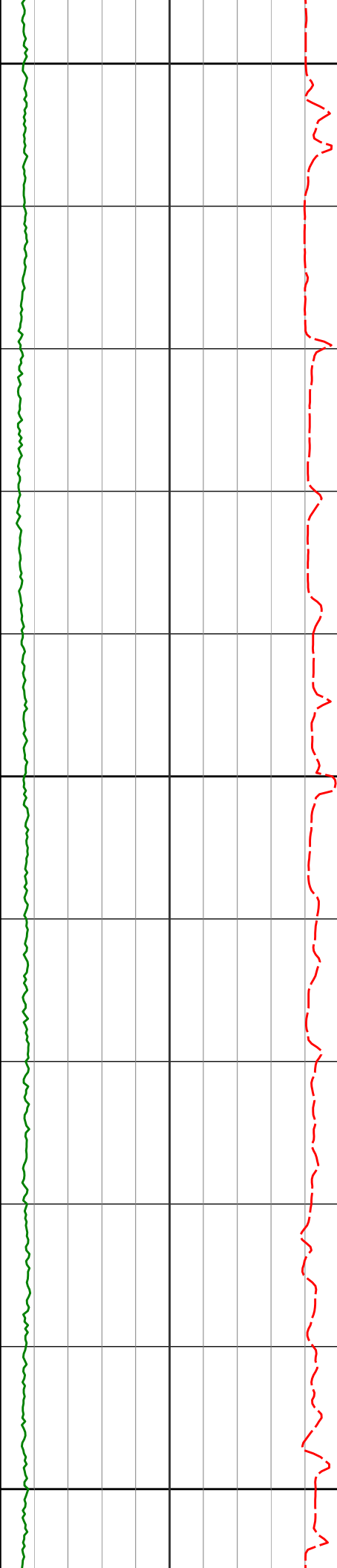
241.48°F

242.28°F

242.28°F

241.27°F

241.72°F



14700

242.28°F

240.77°F

14735'

91.97°

89.11° 6514.95'

8060.62'

241.06°F

242.28°F

14800

242.28°F

14830'

92.43°

88.27° 6511.30'

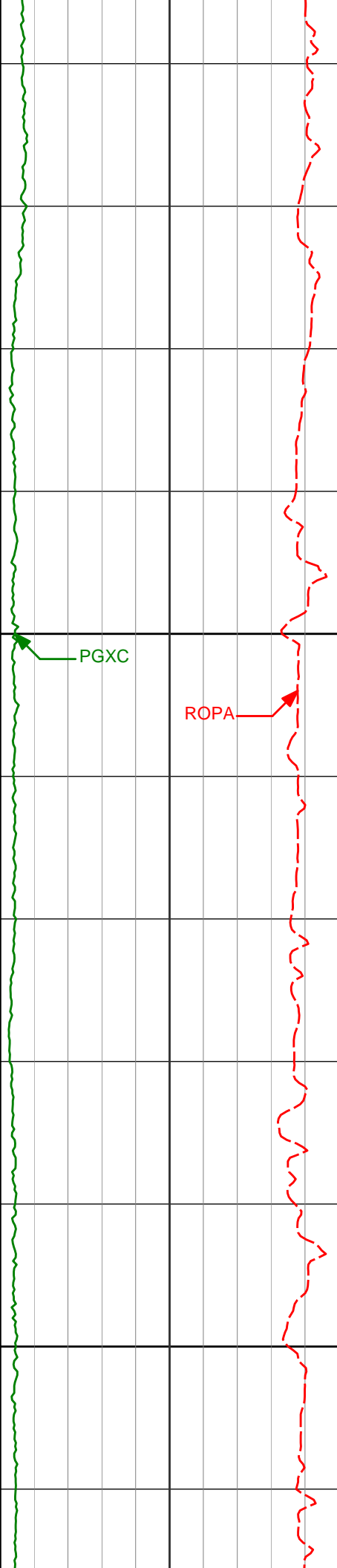
8155.26'

242.34°F

244.54°F

14900

245.03°F



14925'

92.44°

87.92° 6507.27'

8249.96'

245.03°F

245.03°F

15000

245.03°F

245.10°F

246.15°F

245.88°F

15100

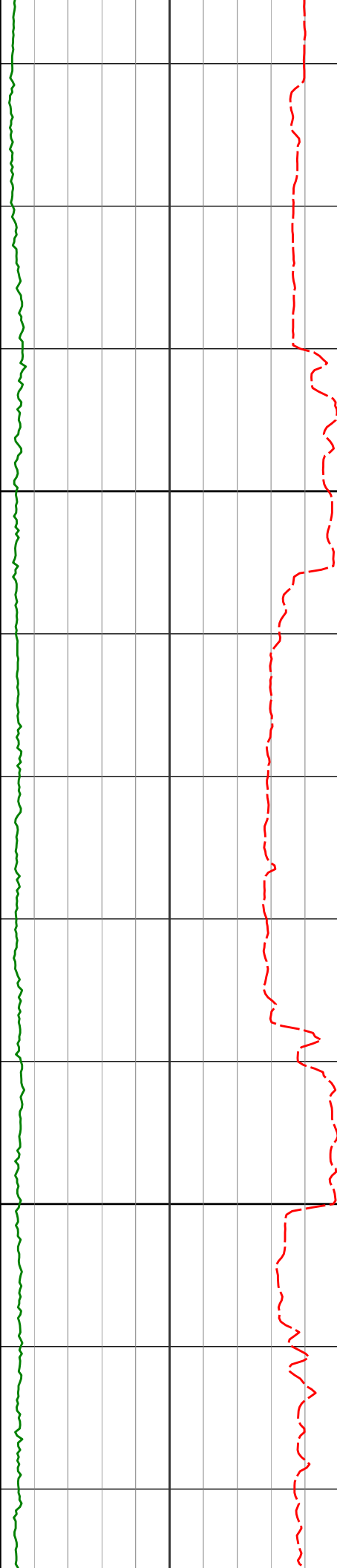
15114'

93.85°

86.53° 6496.90'

8438.41'

242.55°F



15200

15209'

92.96°

87.72°

6491.25'

8533.12'

240.24°F

239.89°F

241.94°F

238.48°F

240.95°F

15300

15303'

92.62°

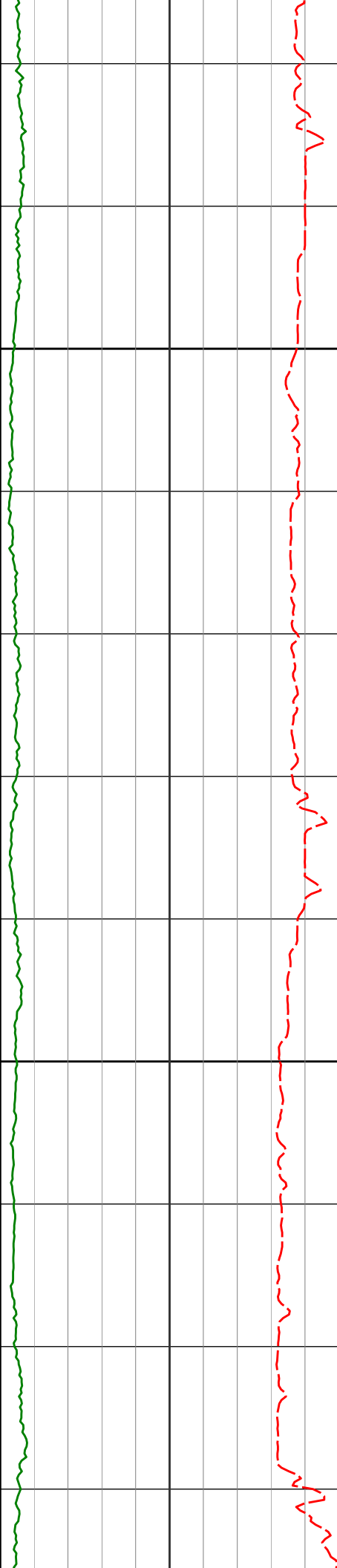
87.28°

6486.68'

8626.85'

242.28°F

242.28°F



15400

15500

15493'

93.95°

86.69°

6475.79'

8816.31'

243.51°F

245.03°F

245.03°F

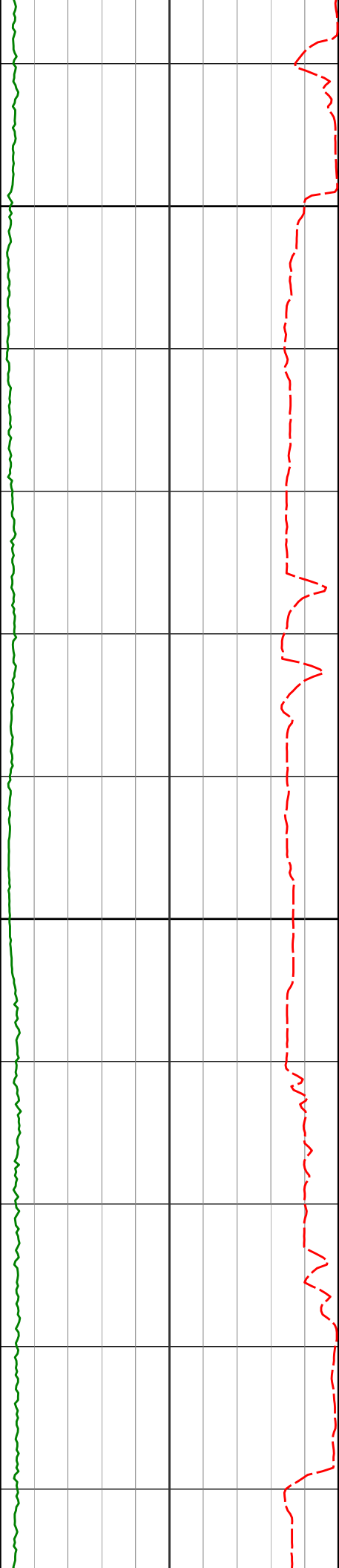
245.03°F

242.88°F

238.97°F

236.58°F

239.24°F



15600

15700

15587'

92.47°

86.66°

6470.53'

8910.08'

15681'

92.84°

87.10°

6466.17'

9003.88'

15775'

91.45°

89.81°

6462.65'

9097.54'

239.54°F

240.15°F

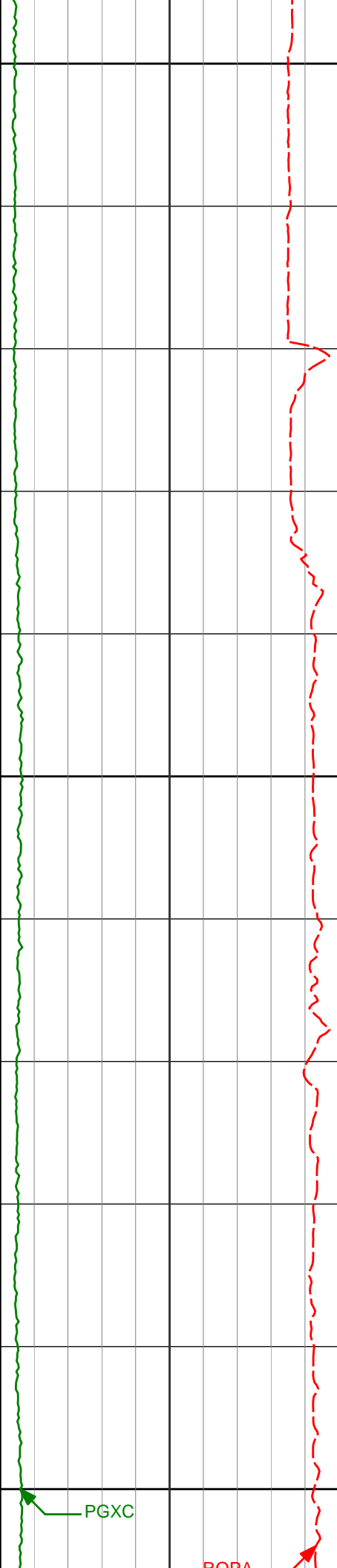
241.86°F

238.37°F

237.15°F

239.54°F

240.53°F



15800

242.28°F

242.78°F

15870'

91.94°

89.83°

6459.84'

9192.05'

244.90°F

15900

245.03°F

245.03°F

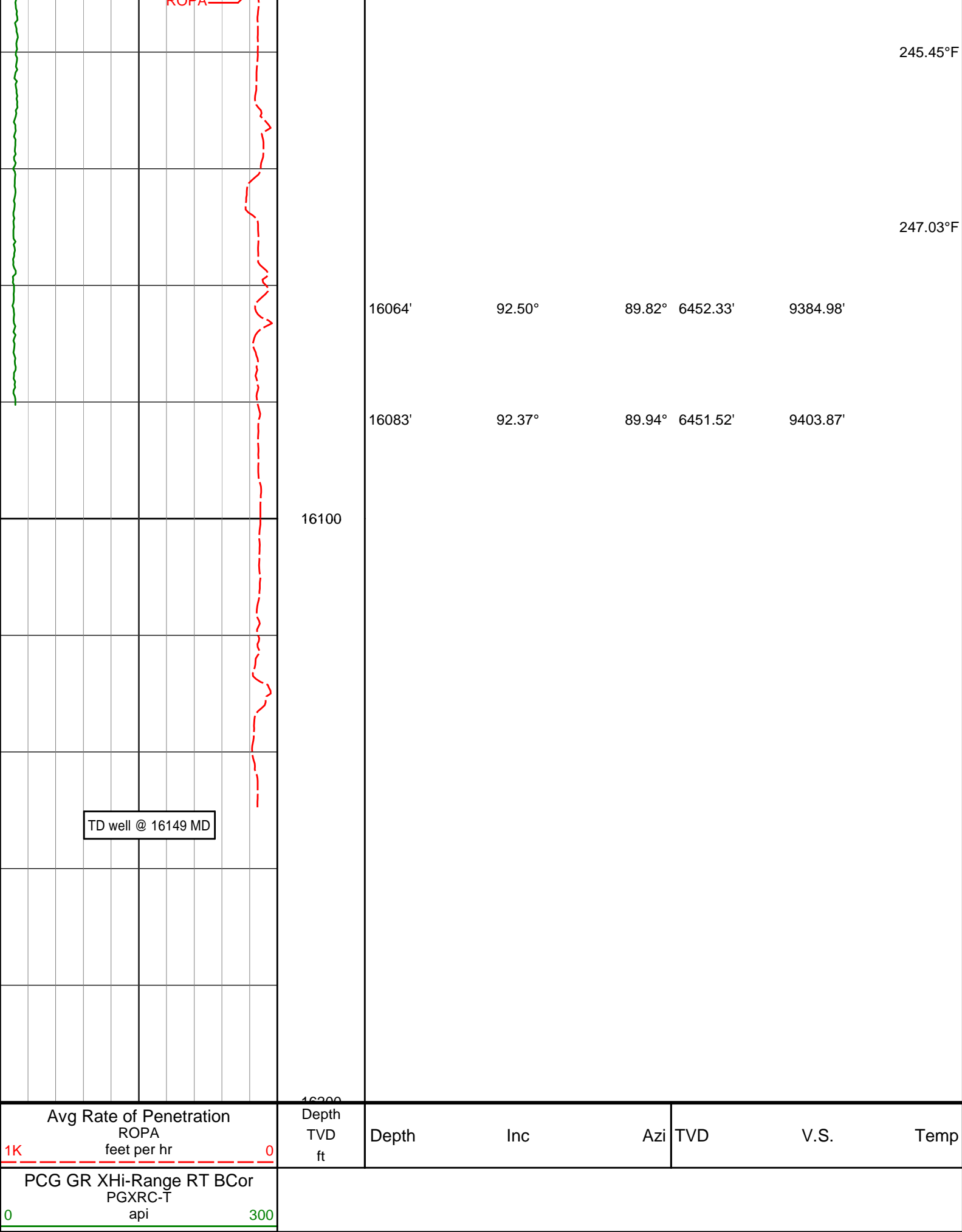
245.07°F

246.24°F

16000

PGXC

BOPA



DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-670
Wattenberg
Weld Colorado
USA
CA-XX-0902678336
Tied in @ Surface

Final survey projected to bit.

During the run the gamma suddenly dropped roughly 90 api. The DD and ROC discussed the gamma and DD informed company man. The gamma stayed within this range for ~375'. At this point the Geologist contacted the ROC for input on the gamma behavior. The decision was made to pull back and wipe the gamma to verify tool functionality. After pulling back and verifying the gamma tool did not repeat and cannot be used for geo-steering, the customer has made the call to go back to bottom and drill ahead without gamma.

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
734.00	0.53	79.66	733.99	0.61 N	3.34 E	3.38	0.07
828.00	0.57	91.25	827.99	0.68 N	4.24 E	4.28	0.13
919.00	0.59	90.43	918.98	0.66 N	5.16 E	5.20	0.02
1011.00	0.62	91.46	1010.98	0.65 N	6.13 E	6.16	0.04
1105.00	0.51	89.69	1104.97	0.64 N	7.06 E	7.08	0.12
1210.00	0.65	93.00	1209.97	0.61 N	8.12 E	8.14	0.14
1304.00	0.74	112.77	1303.96	0.34 N	9.22 E	9.20	0.27
1397.00	0.58	113.77	1396.95	0.08 S	10.20 E	10.14	0.17
1491.00	0.62	127.09	1490.95	0.58 S	11.05 E	10.93	0.16
1582.00	0.33	126.34	1581.94	1.03 S	11.66 E	11.49	0.32
1674.00	0.28	114.84	1673.94	1.29 S	12.07 E	11.88	0.09
1767.00	0.06	227.25	1766.94	1.41 S	12.24 E	12.03	0.33
1861.00	0.28	126.04	1860.94	1.59 S	12.39 E	12.17	0.32
1954.00	0.33	129.18	1953.94	1.89 S	12.79 E	12.53	0.06
2046.00	0.38	159.21	2045.94	2.34 S	13.10 E	12.80	0.20
2138.00	0.56	156.04	2137.94	3.04 S	13.39 E	13.02	0.20
2232.00	0.50	154.78	2231.93	3.83 S	13.75 E	13.30	0.07
2324.00	3.02	348.72	2323.89	1.82 S	13.45 E	13.20	3.82
2418.00	4.69	335.01	2417.68	4.10 N	11.34 E	11.70	2.02
2509.00	5.94	332.03	2508.29	11.63 N	7.56 E	8.70	1.41
2602.00	6.11	328.54	2600.77	20.11 N	2.72 E	4.74	0.43
2695.00	7.37	321.98	2693.13	29.03 N	3.54 W	-0.59	1.59
2786.00	9.03	321.61	2783.20	39.23 N	11.58 W	-7.54	1.82
2976.00	9.01	321.57	2970.85	62.57 N	30.08 W	-23.59	0.01
3070.00	8.62	319.48	3063.74	73.69 N	39.23 W	-31.57	0.54
3165.00	8.89	318.14	3157.63	84.57 N	48.75 W	-39.94	0.35
3260.00	8.41	316.12	3251.55	95.05 N	58.47 W	-48.54	0.60
3355.00	8.81	318.32	3345.48	105.48 N	68.12 W	-57.09	0.55
3449.00	8.31	314.67	3438.43	115.64 N	77.74 W	-65.63	0.79
3544.00	9.06	320.99	3532.34	126.28 N	87.33 W	-74.09	1.28
3639.00	9.89	321.42	3626.05	138.47 N	97.12 W	-82.61	0.88
3734.00	10.43	321.01	3719.56	151.53 N	107.62 W	-91.73	0.57
3828.00	9.79	317.34	3812.10	164.02 N	118.39 W	-101.18	0.96
3923.00	9.64	316.78	3905.73	175.76 N	129.31 W	-110.86	0.19
4017.00	9.57	315.57	3998.42	187.08 N	140.17 W	-120.52	0.23
4112.00	8.95	313.95	4092.18	197.85 N	151.02 W	-130.22	0.71
4207.00	8.77	320.67	4186.05	208.57 N	160.93 W	-138.99	1.11
4302.00	9.53	321.66	4279.84	220.34 N	170.40 W	-147.22	0.82
4396.00	9.31	320.90	4372.57	232.34 N	180.02 W	-155.57	0.27
4491.00	8.91	320.49	4466.37	243.98 N	189.54 W	-163.87	0.43
4586.00	7.92	318.94	4560.35	254.59 N	198.52 W	-171.73	1.06
4680.00	9.60	320.06	4653.25	265.49 N	207.80 W	-179.86	1.79
4775.00	9.06	316.47	4747.00	276.98 N	218.04 W	-188.88	0.83
4869.00	8.28	315.69	4839.92	287.19 N	227.86 W	-197.62	0.84
4964.00	9.27	320.77	4933.81	298.01 N	237.48 W	-206.09	1.32
5059.00	8.63	320.28	5027.65	309.42 N	246.88 W	-214.28	0.68
5154.00	7.94	311.02	5121.66	319.21 N	256.38 W	-222.75	1.58
5248.00	8.73	322.92	5214.68	329.16 N	265.57 W	-230.89	2.01

5248.00	8.75	322.92	5214.88	329.18 N	274.43 W	-250.88	2.01
5343.00	9.31	324.09	5308.50	341.13 N		-238.48	0.65
5438.00	8.27	321.80	5402.39	352.73 N	283.16 W	-246.00	1.15
5532.00	8.95	320.39	5495.33	363.68 N	292.01 W	-253.69	0.75
5627.00	8.14	318.57	5589.27	374.41 N	301.17 W	-261.72	0.89
5722.00	8.83	324.56	5683.23	385.40 N	309.85 W	-269.24	1.18
5769.00	10.39	336.67	5729.58	392.23 N	313.62 W	-272.30	5.42
5816.00	12.79	350.57	5775.62	401.25 N	316.15 W	-273.91	7.80
5863.00	14.54	356.97	5821.29	412.28 N	317.31 W	-273.95	4.92
5911.00	16.46	358.48	5867.55	425.09 N	317.81 W	-273.15	4.09
5958.00	19.09	358.61	5912.30	439.43 N	318.18 W	-272.06	5.59
6006.00	23.09	357.40	5957.08	456.68 N	318.79 W	-270.93	8.39
6053.00	27.16	359.02	5999.62	476.62 N	319.40 W	-269.51	8.77
6100.00	31.88	38.84	6040.52	499.75 N	318.75 W	-266.52	11.24
6147.00	35.67	11.84	6079.60	525.56 N	315.10 W	-260.28	12.42
6195.00	36.69	18.76	6118.36	552.85 N	307.62 W	-250.07	8.77
6242.00	36.75	26.86	6156.05	578.71 N	296.74 W	-236.64	10.30
6290.00	37.95	35.62	6194.24	603.53 N	281.65 W	-219.10	11.34
6337.00	40.20	46.10	6230.76	625.83 N	262.28 W	-197.58	14.84
6385.00	42.41	56.16	6266.86	645.61 N	237.64 W	-171.06	14.56
6432.00	45.16	66.62	6300.83	661.07 N	209.14 W	-141.14	16.47
6480.00	46.17	75.49	6334.41	672.18 N	176.72 W	-107.77	13.38
6574.00	48.36	78.09	6398.20	687.92 N	109.52 W	-39.31	3.09
6669.00	56.97	81.53	6455.77	701.14 N	35.24 W	35.92	9.51
6763.00	70.39	85.68	6497.37	710.33 N	48.30 E	119.95	14.81
6810.00	76.69	86.97	6510.68	713.21 N	93.25 E	164.97	13.66
6858.00	78.15	87.25	6521.13	715.57 N	140.04 E	211.76	3.09
6905.00	79.09	87.25	6530.41	717.78 N	186.06 E	257.77	2.00
6939.00	84.04	88.71	6535.39	718.96 N	219.66 E	291.31	15.17
7014.00	89.17	88.58	6539.83	720.73 N	294.48 E	365.93	6.84
7108.00	89.41	89.53	6541.00	722.28 N	388.46 E	459.58	1.04
7203.00	89.60	89.58	6541.82	723.02 N	483.46 E	554.16	0.21
7297.00	91.26	90.06	6541.11	723.31 N	577.45 E	647.71	1.84
7391.00	89.04	89.04	6540.87	724.05 N	671.44 E	741.29	2.60
7486.00	88.77	88.44	6542.68	726.14 N	766.40 E	835.97	0.69
7580.00	90.28	90.07	6543.46	727.36 N	860.38 E	929.59	2.36
7674.00	91.17	91.72	6542.27	725.89 N	954.36 E	1022.94	1.99
7768.00	90.65	91.48	6540.78	723.27 N	1048.31 E	1116.14	0.61
7862.00	90.09	89.05	6540.17	722.84 N	1142.30 E	1209.60	2.65
7956.00	90.74	89.89	6539.49	723.70 N	1236.29 E	1303.20	1.13
8051.00	90.52	90.81	6538.45	723.12 N	1331.28 E	1397.65	1.00
8145.00	90.71	93.44	6537.44	719.64 N	1425.21 E	1490.73	2.81
8239.00	90.00	90.91	6536.86	716.07 N	1519.13 E	1583.81	2.80
8333.00	90.31	91.15	6536.60	714.38 N	1613.11 E	1677.14	0.42
8427.00	89.94	89.88	6536.40	713.54 N	1707.11 E	1770.57	1.41
8522.00	90.03	88.86	6536.42	714.58 N	1802.10 E	1865.18	1.08
8616.00	89.63	87.36	6536.70	717.68 N	1896.04 E	1958.96	1.65
8710.00	90.12	87.71	6536.91	721.73 N	1989.96 E	2052.79	0.64
8804.00	90.86	89.01	6536.10	724.42 N	2083.91 E	2146.54	1.59
8899.00	89.60	86.34	6535.72	728.27 N	2178.82 E	2241.35	3.11
8993.00	89.78	86.30	6536.23	734.30 N	2272.63 E	2335.29	0.20
9088.00	89.78	86.00	6536.59	740.68 N	2367.41 E	2430.23	0.32
9183.00	90.55	89.05	6536.32	744.78 N	2462.31 E	2525.06	3.31
9278.00	89.29	87.74	6536.45	747.44 N	2557.27 E	2619.80	1.91
9467.00	90.40	88.88	6536.96	753.02 N	2746.18 E	2808.30	0.84
9562.00	89.54	87.86	6537.01	755.72 N	2841.14 E	2903.05	1.40
9656.00	89.97	88.19	6537.42	758.96 N	2935.08 E	2996.84	0.58
9751.00	90.62	88.90	6536.93	761.37 N	3030.05 E	3091.56	1.01
9846.00	90.49	89.11	6536.01	763.02 N	3125.03 E	3186.22	0.26
9940.00	90.43	88.71	6535.25	764.81 N	3219.01 E	3279.90	0.43
10035.00	89.54	88.23	6535.28	767.35 N	3313.98 E	3374.63	1.06
10130.00	89.72	88.34	6535.89	770.19 N	3408.93 E	3469.39	0.22
10224.00	90.28	88.86	6535.89	772.49 N	3502.90 E	3563.11	0.81
10319.00	91.20	89.63	6534.66	773.74 N	3597.88 E	3657.73	1.26
10412.00	90.52	88.03	6533.27	775.64 N	3690.85 E	3750.41	1.87
10506.00	90.59	88.14	6532.36	778.78 N	3784.79 E	3844.19	0.14
10691.00	90.62	88.23	6530.40	784.64 N	3969.69 E	4028.73	0.05
10783.00	90.37	87.75	6529.61	787.86 N	4061.63 E	4120.52	0.59
10876.00	88.37	84.85	6530.63	793.86 N	4154.42 E	4213.44	3.79
10969.00	89.14	86.18	6532.65	801.13 N	4247.11 E	4306.39	1.65
11062.00	92.19	87.29	6531.57	806.43 N	4339.94 E	4399.28	3.49
11155.00	91.54	88.19	6528.55	810.09 N	4432.81 E	4492.05	1.19

11247.00	91.94	90.12	6525.75	811.45 N	4524.76 E	4583.66	2.14
11340.00	90.18	89.29	6524.03	811.93 N	4617.74 E	4676.21	2.09
11433.00	91.33	90.24	6522.81	812.31 N	4710.72 E	4768.76	1.60
11526.00	91.36	88.38	6520.62	813.43 N	4803.69 E	4861.36	2.00
11618.00	89.91	85.91	6519.60	818.01 N	4895.56 E	4953.22	3.11
11803.00	89.04	87.08	6521.30	829.32 N	5080.20 E	5138.06	0.79
11895.00	87.50	86.66	6524.08	834.34 N	5172.02 E	5229.91	1.73
12085.00	86.64	86.31	6533.79	845.98 N	5361.41 E	5419.51	0.49
12179.00	88.43	87.74	6537.83	850.85 N	5455.19 E	5513.30	2.44
12274.00	90.00	87.73	6539.13	854.60 N	5550.10 E	5608.11	1.65
12369.00	89.88	87.34	6539.23	858.69 N	5645.02 E	5702.94	0.43
12463.00	89.57	87.62	6539.68	862.82 N	5738.92 E	5796.79	0.44
12557.00	88.80	86.85	6541.02	867.36 N	5832.80 E	5890.64	1.16
12652.00	90.31	87.28	6541.76	872.22 N	5927.67 E	5985.52	1.65
12746.00	91.60	87.95	6540.19	876.13 N	6021.58 E	6079.33	1.55
12841.00	91.94	87.32	6537.26	880.05 N	6116.45 E	6174.12	0.75
12935.00	89.51	87.29	6536.07	884.47 N	6210.33 E	6267.96	2.59
13030.00	89.26	88.80	6537.09	887.71 N	6305.27 E	6362.74	1.61
13125.00	90.40	87.97	6537.37	890.39 N	6400.23 E	6457.48	1.48
13220.00	90.77	87.72	6536.40	893.96 N	6495.15 E	6552.28	0.47
13315.00	90.37	86.24	6535.46	898.96 N	6590.02 E	6647.16	1.61
13409.00	90.74	86.41	6534.54	904.99 N	6683.82 E	6741.09	0.43
13504.00	90.65	85.47	6533.39	911.71 N	6778.57 E	6836.04	0.99
13598.00	91.57	86.60	6531.57	918.21 N	6872.33 E	6929.97	1.55
13693.00	92.44	89.59	6528.25	921.37 N	6967.20 E	7024.68	3.28
13788.00	92.87	89.99	6523.85	921.72 N	7062.10 E	7119.13	0.62
13883.00	91.82	90.61	6519.96	921.22 N	7157.02 E	7213.51	1.28
13977.00	89.57	90.78	6518.82	920.08 N	7251.00 E	7306.89	2.40
14072.00	89.17	90.40	6519.86	919.10 N	7345.99 E	7401.29	0.58
14167.00	89.23	90.58	6521.19	918.29 N	7440.97 E	7495.71	0.20
14262.00	88.37	90.25	6523.18	917.60 N	7535.95 E	7590.13	0.97
14357.00	89.85	90.28	6524.66	917.16 N	7630.93 E	7684.58	1.56
14451.00	91.14	89.99	6523.84	916.94 N	7724.93 E	7778.07	1.41
14546.00	92.10	89.67	6521.16	917.22 N	7819.89 E	7872.57	1.07
14641.00	91.73	89.86	6517.98	917.61 N	7914.83 E	7967.07	0.44
14735.00	91.97	89.07	6514.95	918.49 N	8008.78 E	8060.62	0.88
14830.00	92.43	88.23	6511.30	920.73 N	8103.68 E	8155.26	1.01
14925.00	92.44	87.88	6507.27	923.95 N	8198.54 E	8249.96	0.37
15114.00	93.85	86.49	6496.90	933.21 N	8387.02 E	8438.41	1.05
15209.00	92.96	87.68	6491.25	938.03 N	8481.73 E	8533.12	1.56
15303.00	92.62	87.24	6486.68	942.20 N	8575.52 E	8626.85	0.59
15493.00	93.95	86.65	6475.79	952.30 N	8764.94 E	8816.31	0.77
15587.00	92.47	86.62	6470.53	957.81 N	8858.63 E	8910.08	1.57
15681.00	92.84	87.06	6466.17	962.99 N	8952.38 E	9003.88	0.61
15775.00	91.45	89.77	6462.65	965.59 N	9046.27 E	9097.54	3.24
15870.00	91.94	89.79	6459.84	965.95 N	9141.23 E	9192.05	0.52
16064.00	92.50	89.78	6452.33	966.68 N	9335.08 E	9384.98	0.29
16083.00	92.37	89.90	6451.52	966.73 N	9354.06 E	9403.87	0.93
16149.00	92.37	89.90	6448.79	966.85 N	9420.00 E	9469.49	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 84.19 DEGREES (GRID)
A TOTAL CORRECTION OF 7.32 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16149.00 FEET
IS 9469.49 FEET ALONG 84.14 DEGREES (GRID)**