



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	01-Jun-15	06-Jun-15			
Rig Bit Number	2	3			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.830	4.800			
Log Start Depth (MD, ft)	624.00	7,202.00			
Log End Depth (MD, ft)	7,202.00	13,768.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	30-May-15 10:38	02-Jun-15 01:13			
Drill/Wipe End Date and Time	31-May-15 22:10	05-Jun-15 21:45			
Min Inc (deg) @ Depth (MD, ft)	0.28 @ 1,301.00	87.47 @ 7,295.00			
Max Inc (deg) @ Depth (MD, ft)	82.15 @ 7,202.00	92.72 @ 12,827.00			
Bit TFA(in2) / Bit Type	1.24 / PDC	0.65 / PDC			
Flow Rate (gpm)	596.09	316.02			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	9.57 / 37.00	9.30 / 36.00			
Filtrate CL (ppm)	2,100.00	2,100.00			
pH / Fluid Loss (mptm)	8.80 / N/A	9.20 / N/A			
PV (cP) / YP (lbf2)	9 / 10.00	8 / 13.00			
% Solids / % Sand	11.00 / 0.15	6.00 / 0.10			
% Oil / Oil:Water Ratio	0.50 / N/A	1.00 / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Mud Temp (degF) @ 100 ft	107.00 / 20M	200.00 / 20M			

Max Tool Temp (degF) / Source	167.00 / PCM	230.30 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 167.00	N/A @ 230.30			
Lead MWD Engineer	Ryan Skaarvold	Ryan Skaarvold			
Customer Representative	Stetson Nielsen	Stetson Nielsen			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11342302	12396733			
Insert Serial Number	11680779	11680783			
Date and Time Initialized	29-May-15 18:32	01-Jun-15 13:14			
Date and Time Read	01-Jun-15 03:36	06-Jun-15 15:56			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	56.00	65.00			
Software Version	6.21	6.33			
Sub Serial Number	11342302	12396733			
Sonde Serial Number	11638567	12177532			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	164.50	336.00			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.41	68.36			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342302	12396733			
Insert/Sonde Serial Number	11579806	11681054			

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. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
 - 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

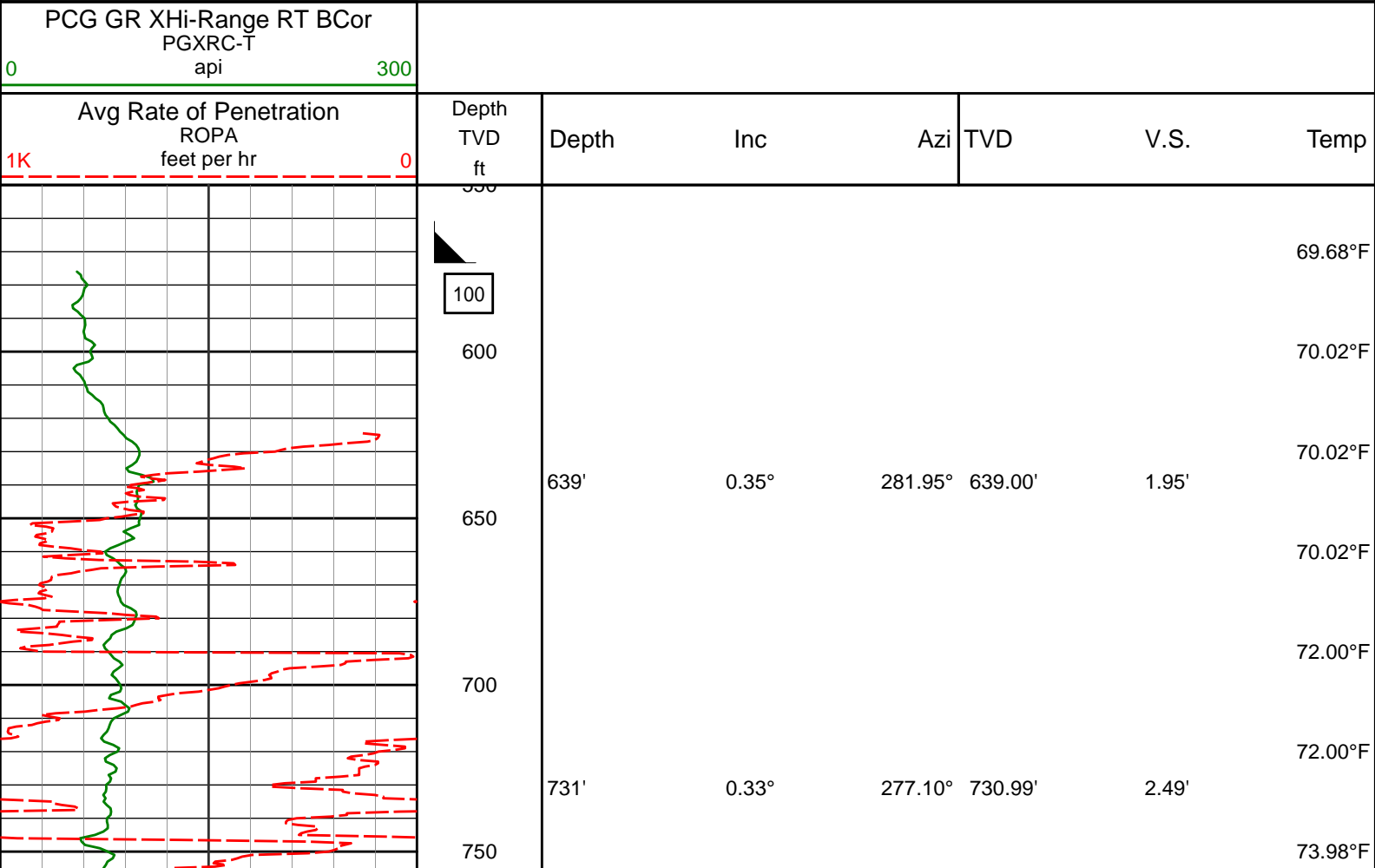
Interval Resolution: 1.2 ft

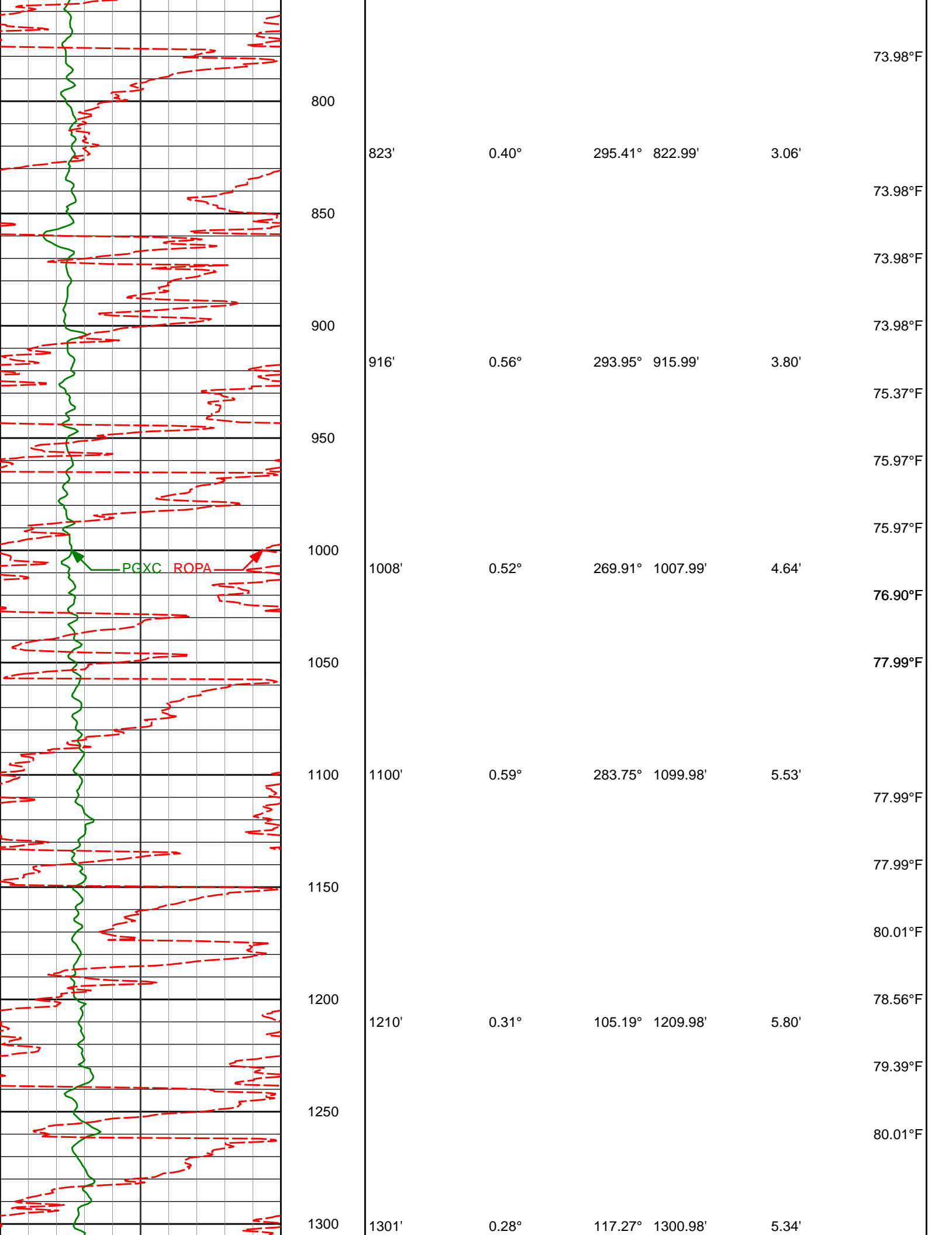
6. Insite Version v8.1.10

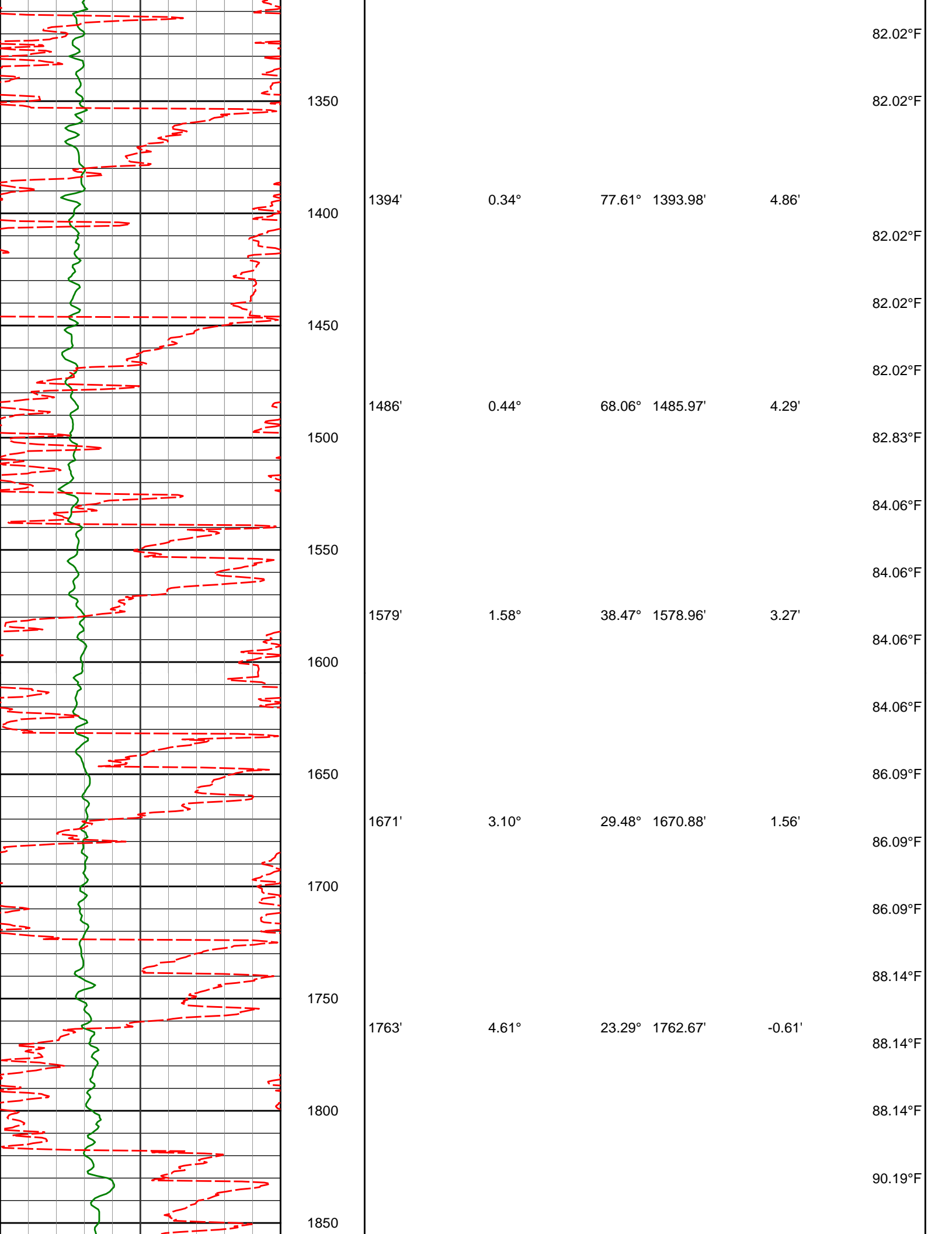
WARRANTY

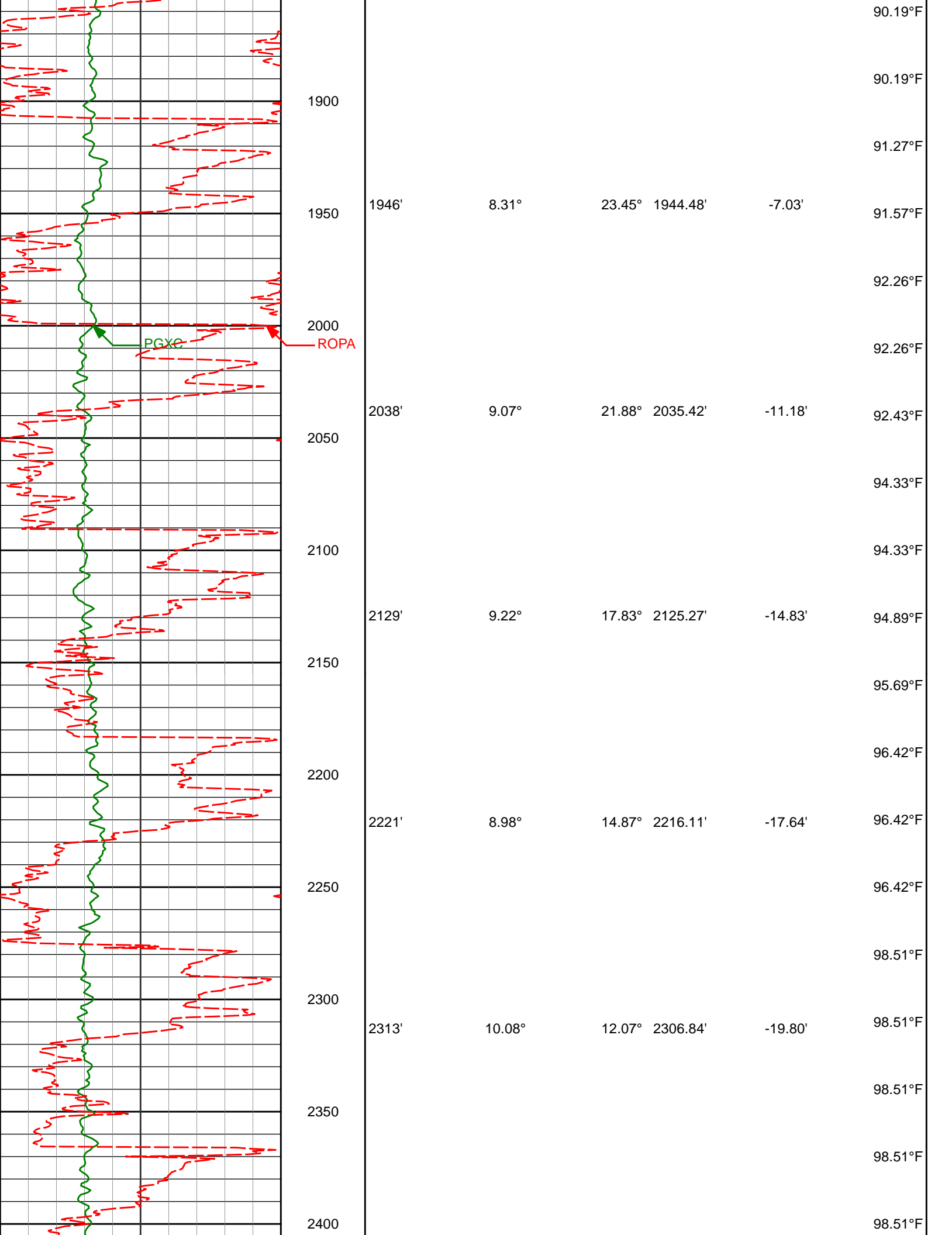
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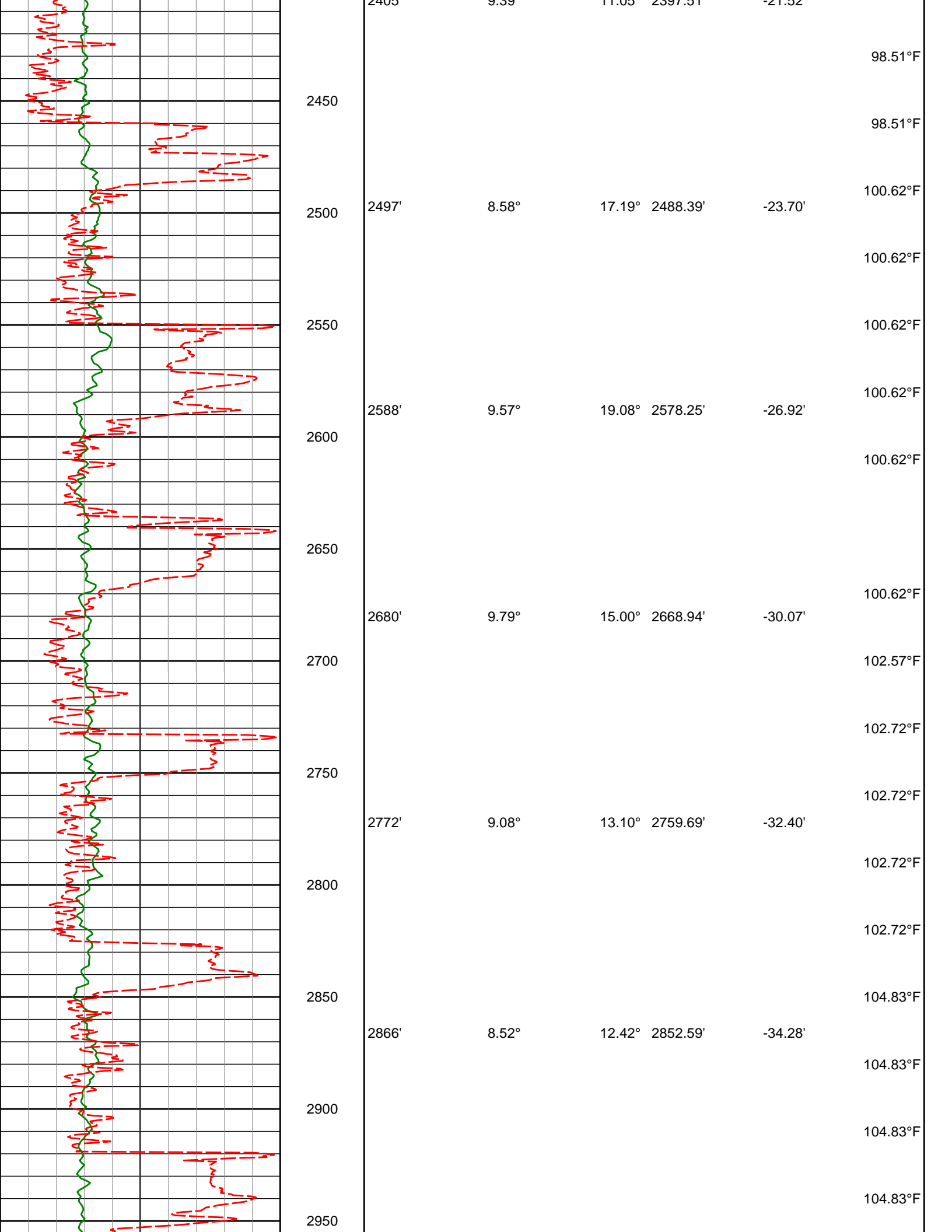
MD Detail 1:600 Scale

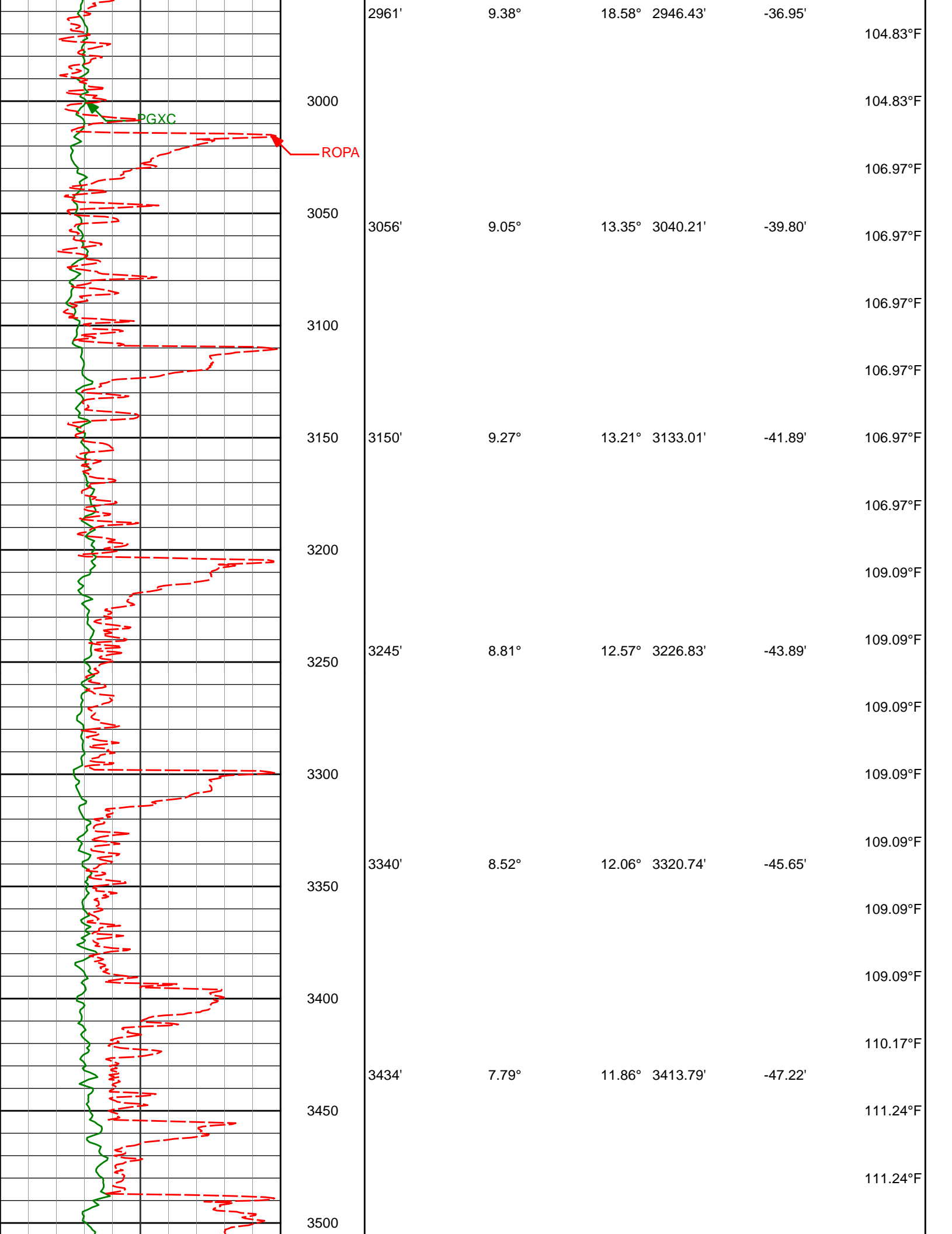


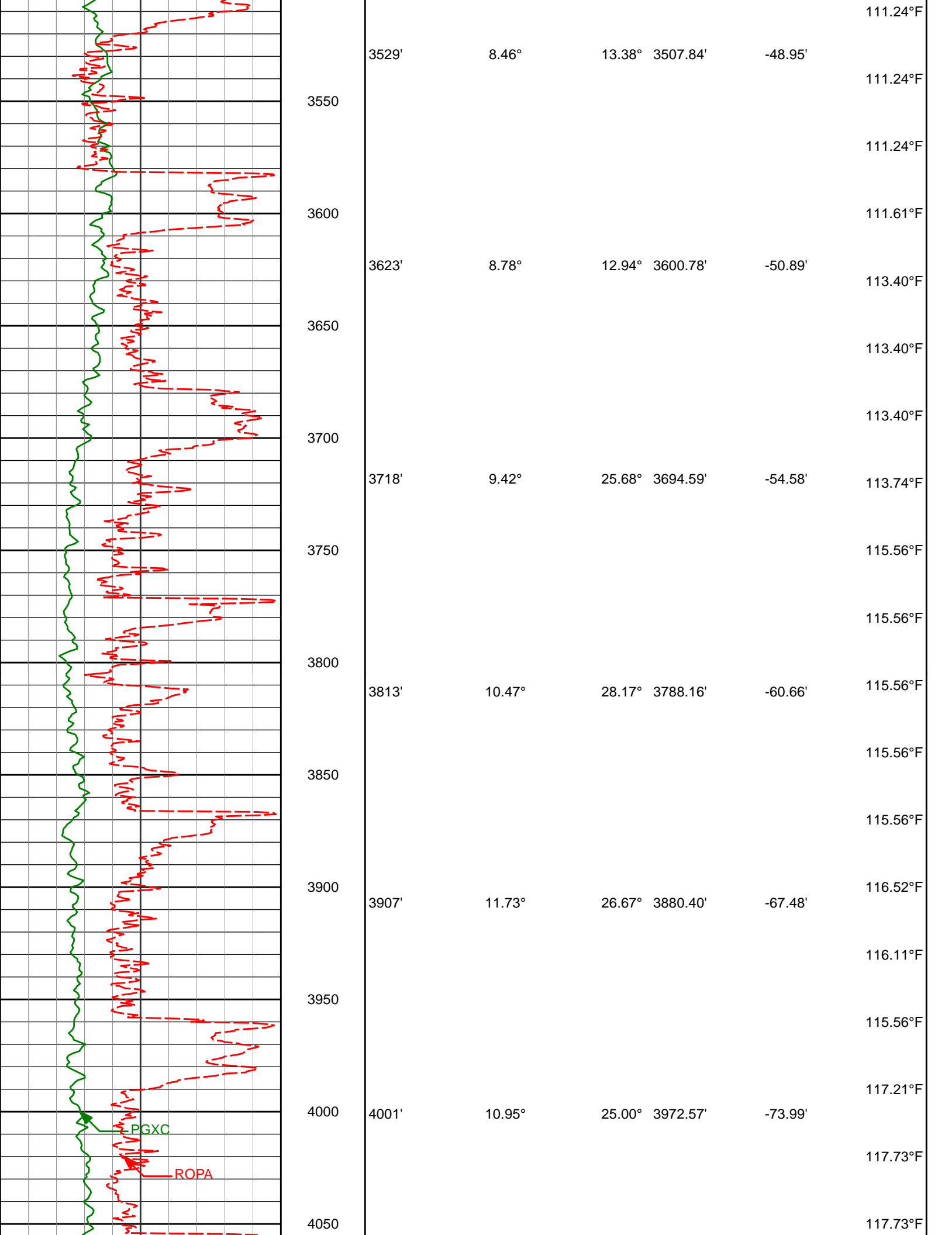


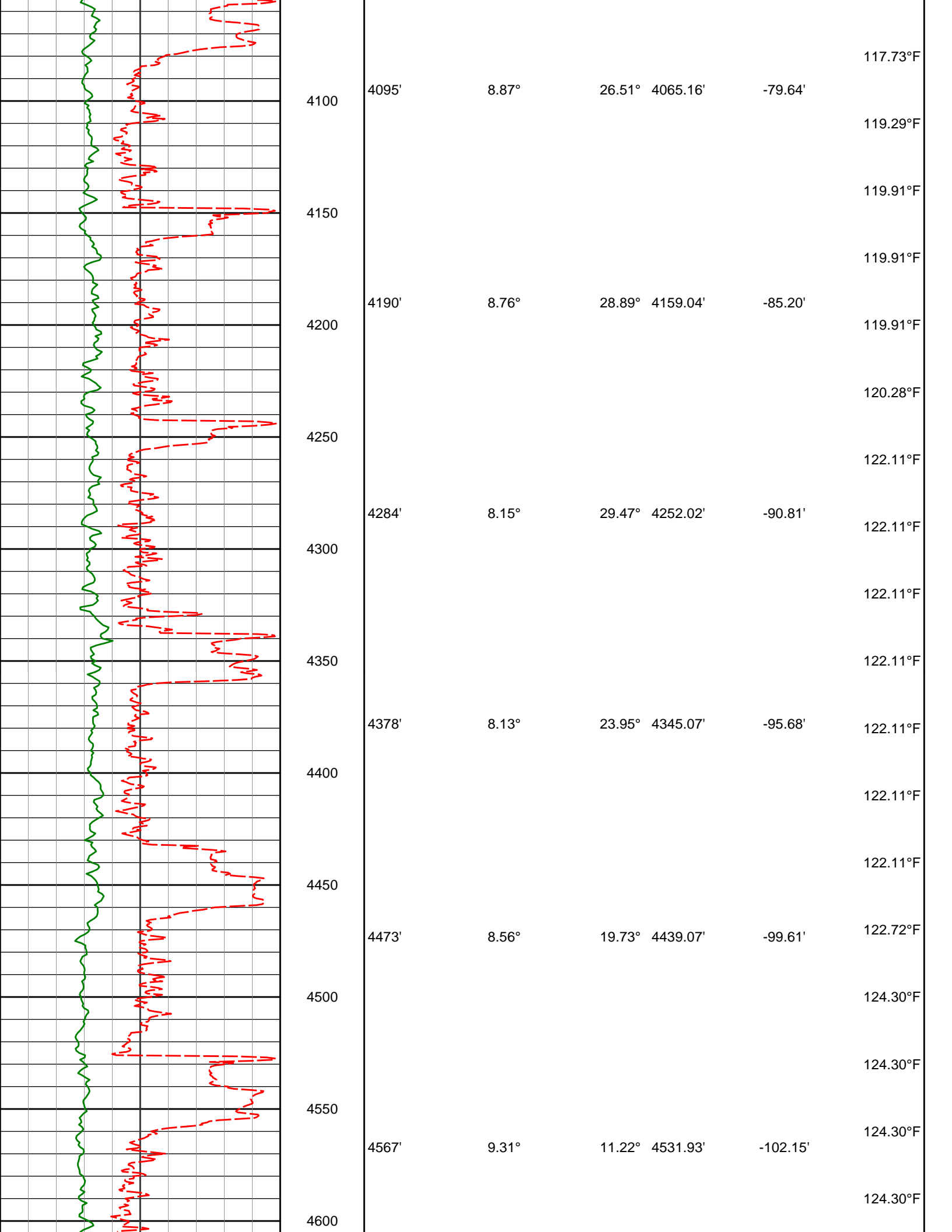


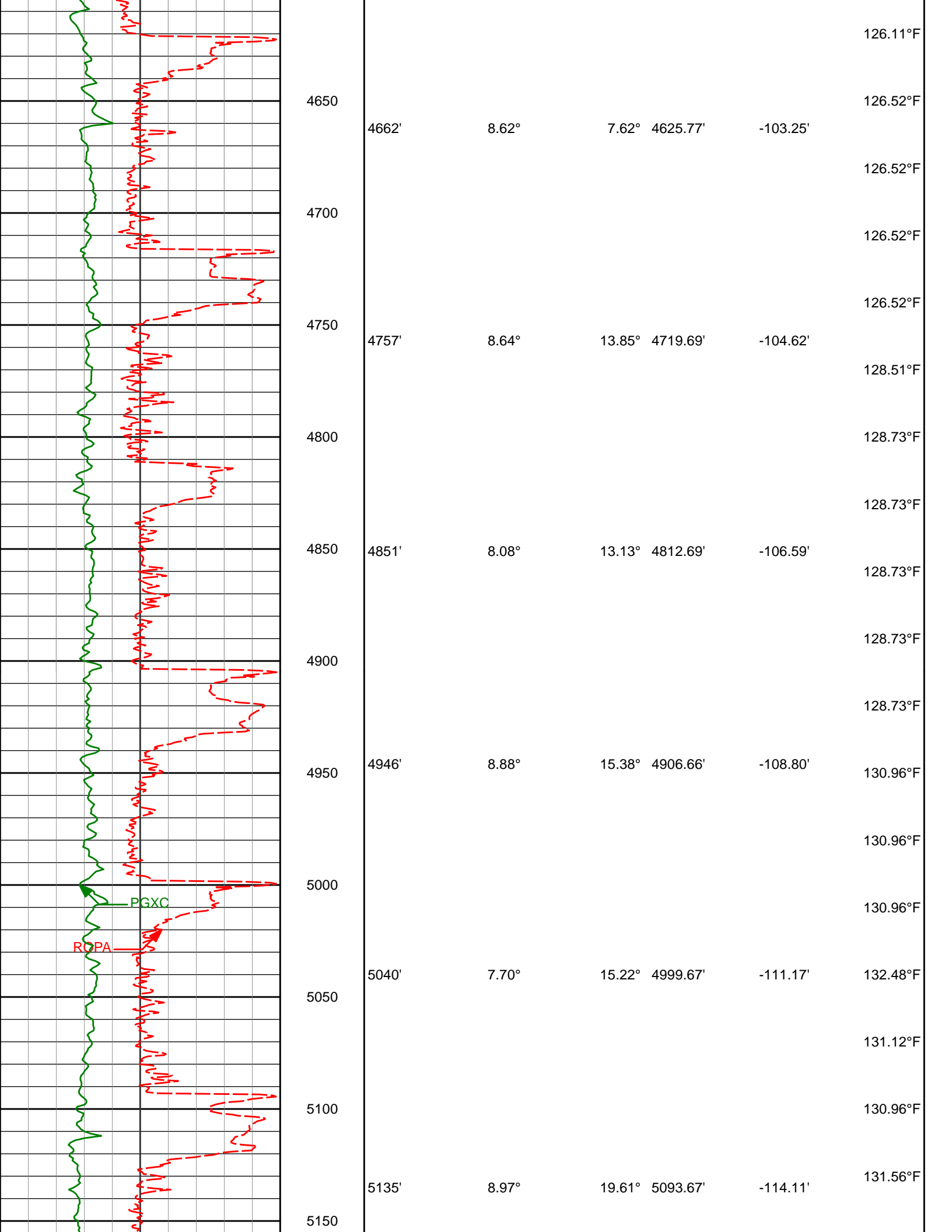


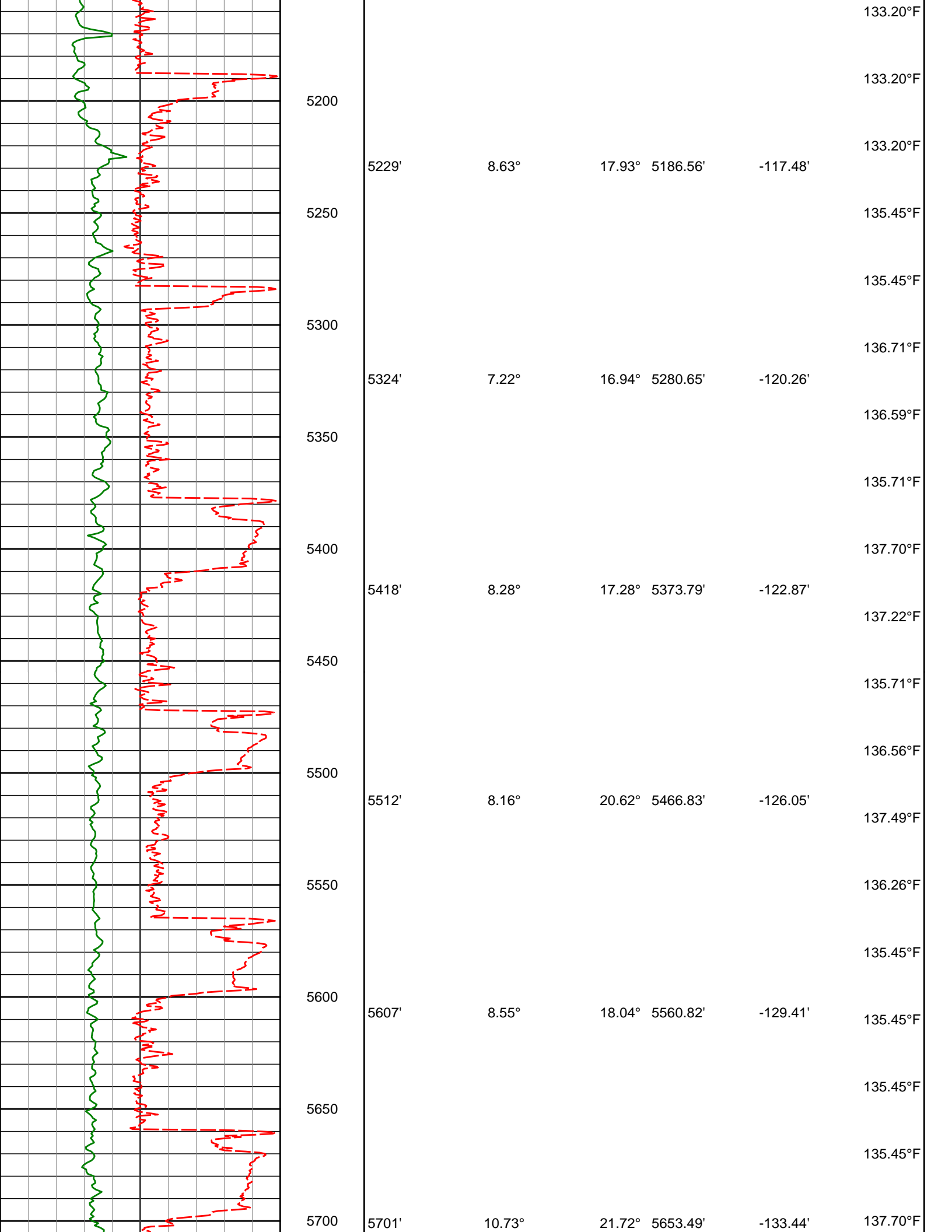


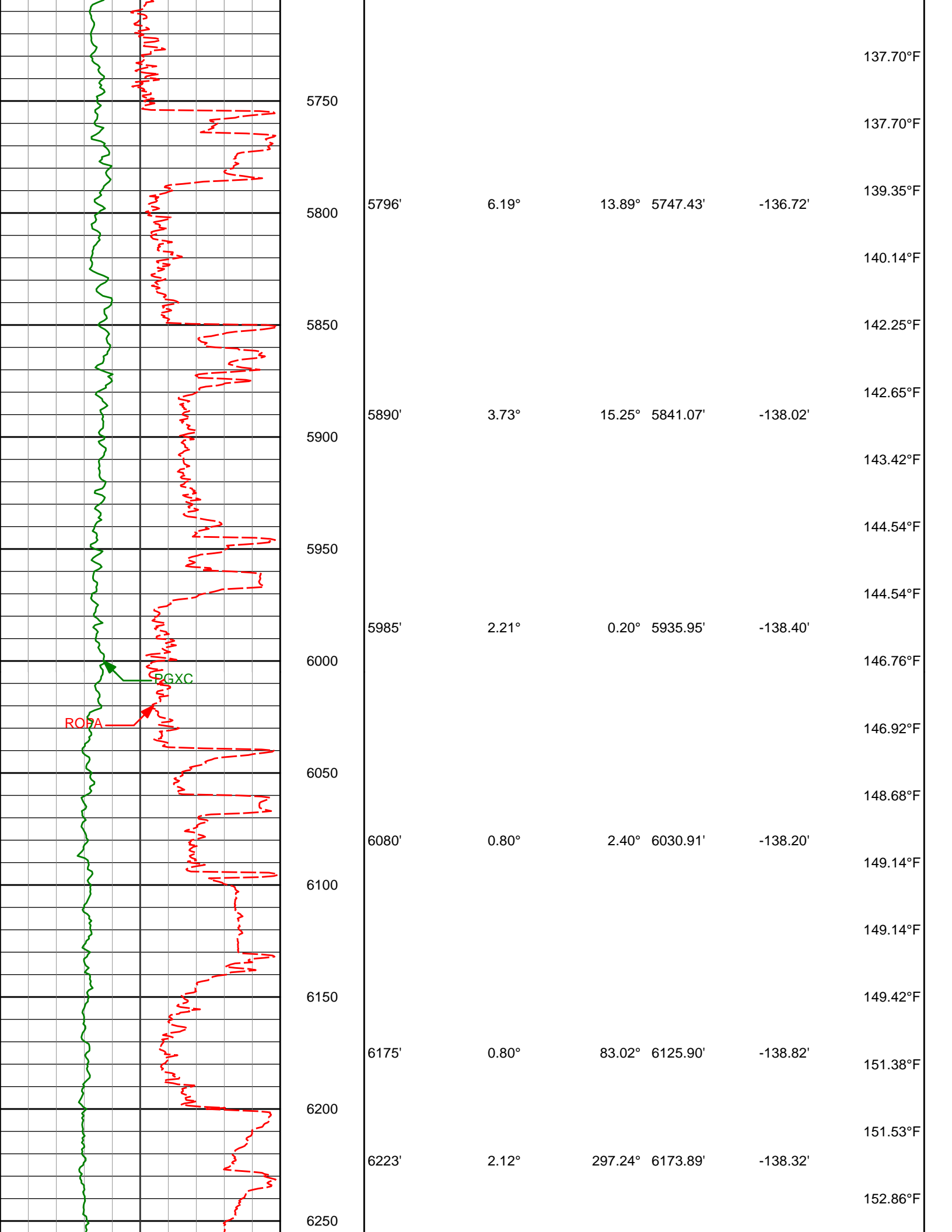


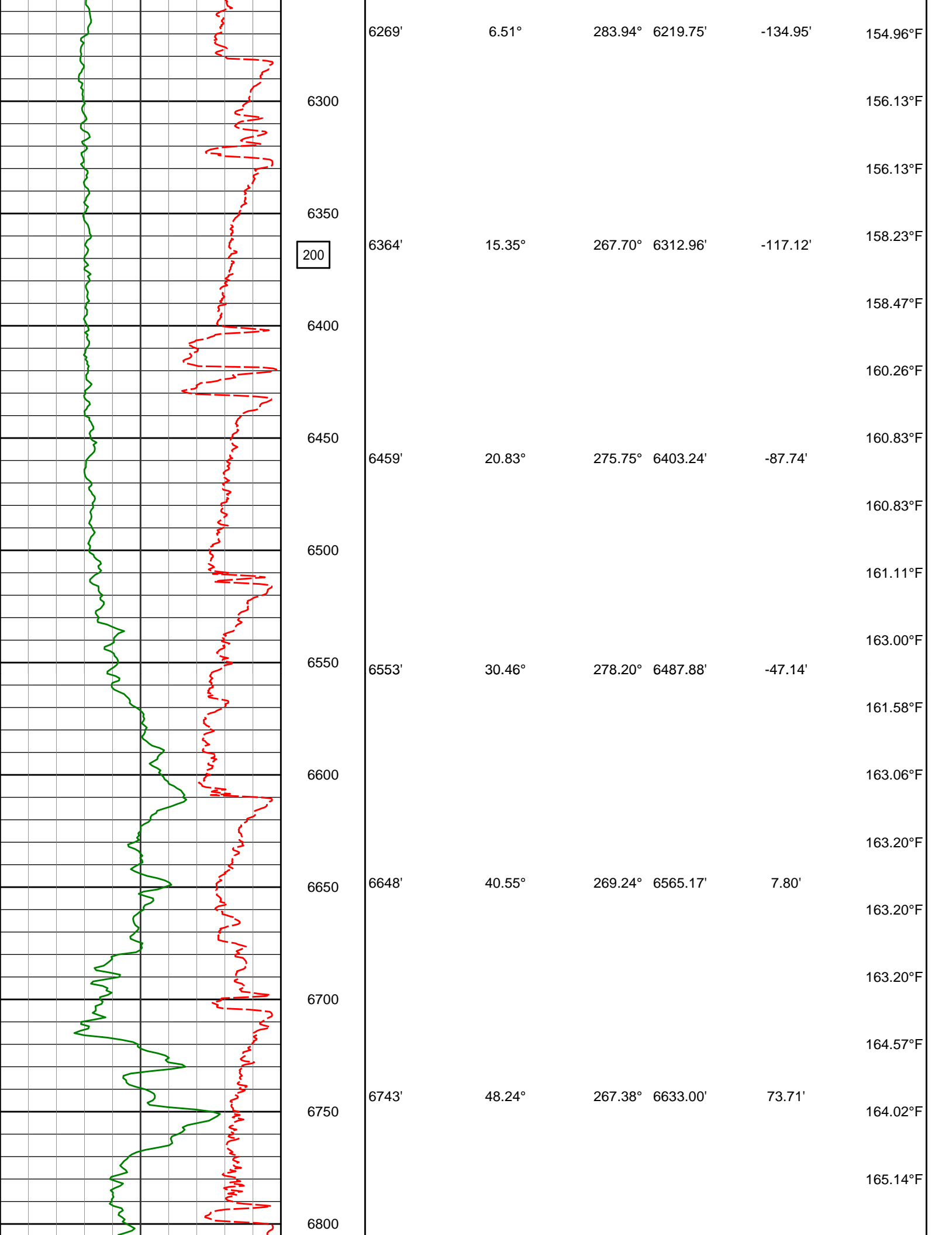


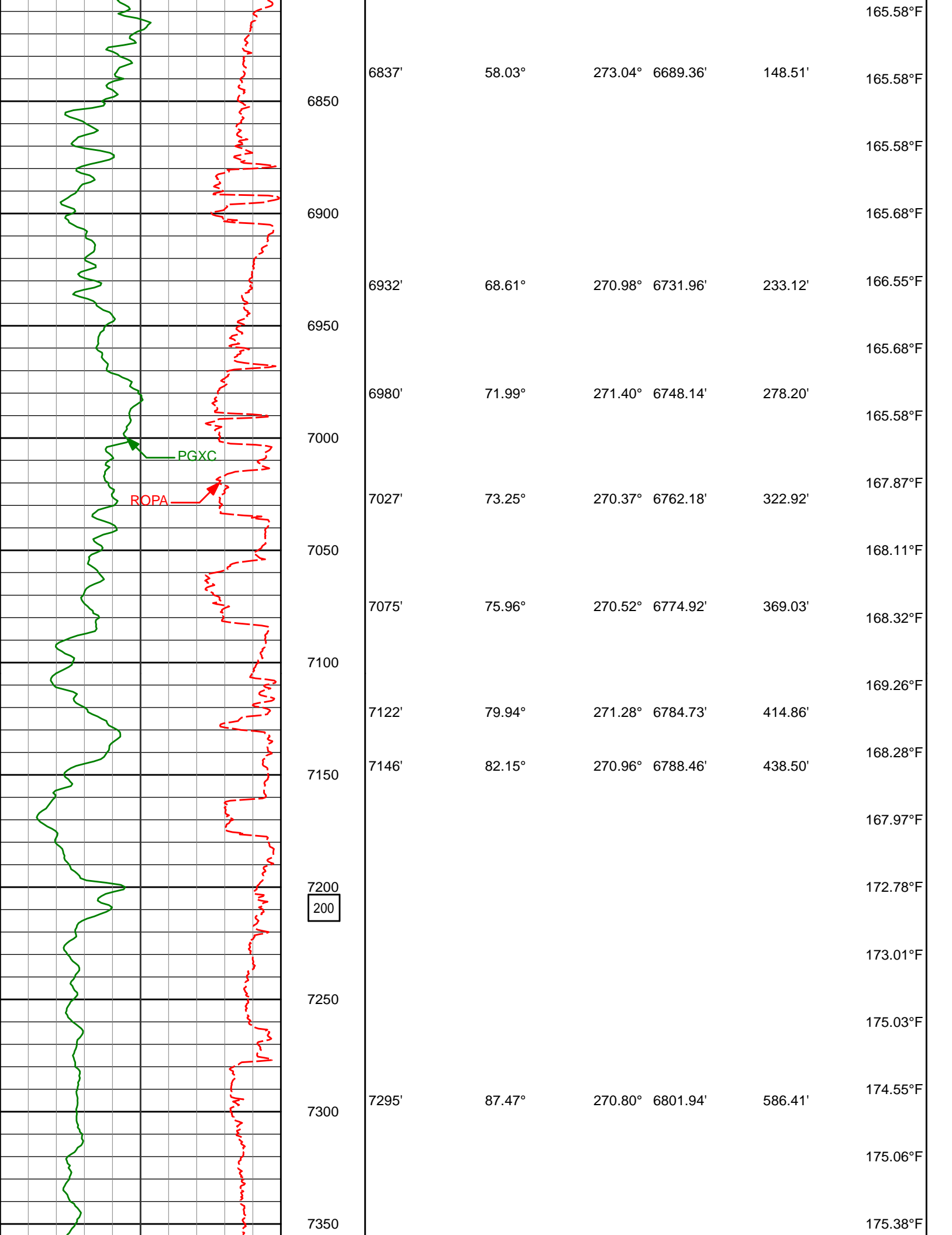


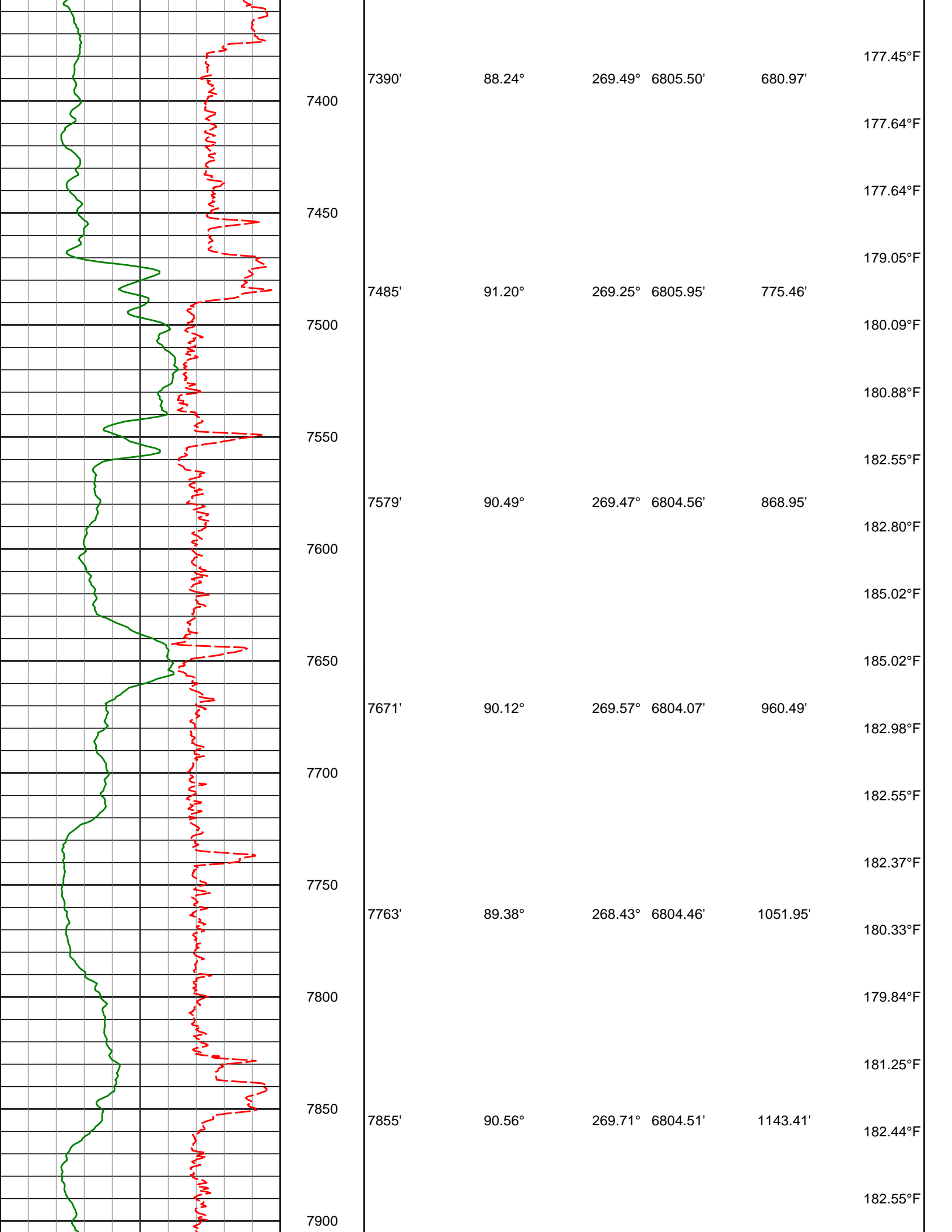


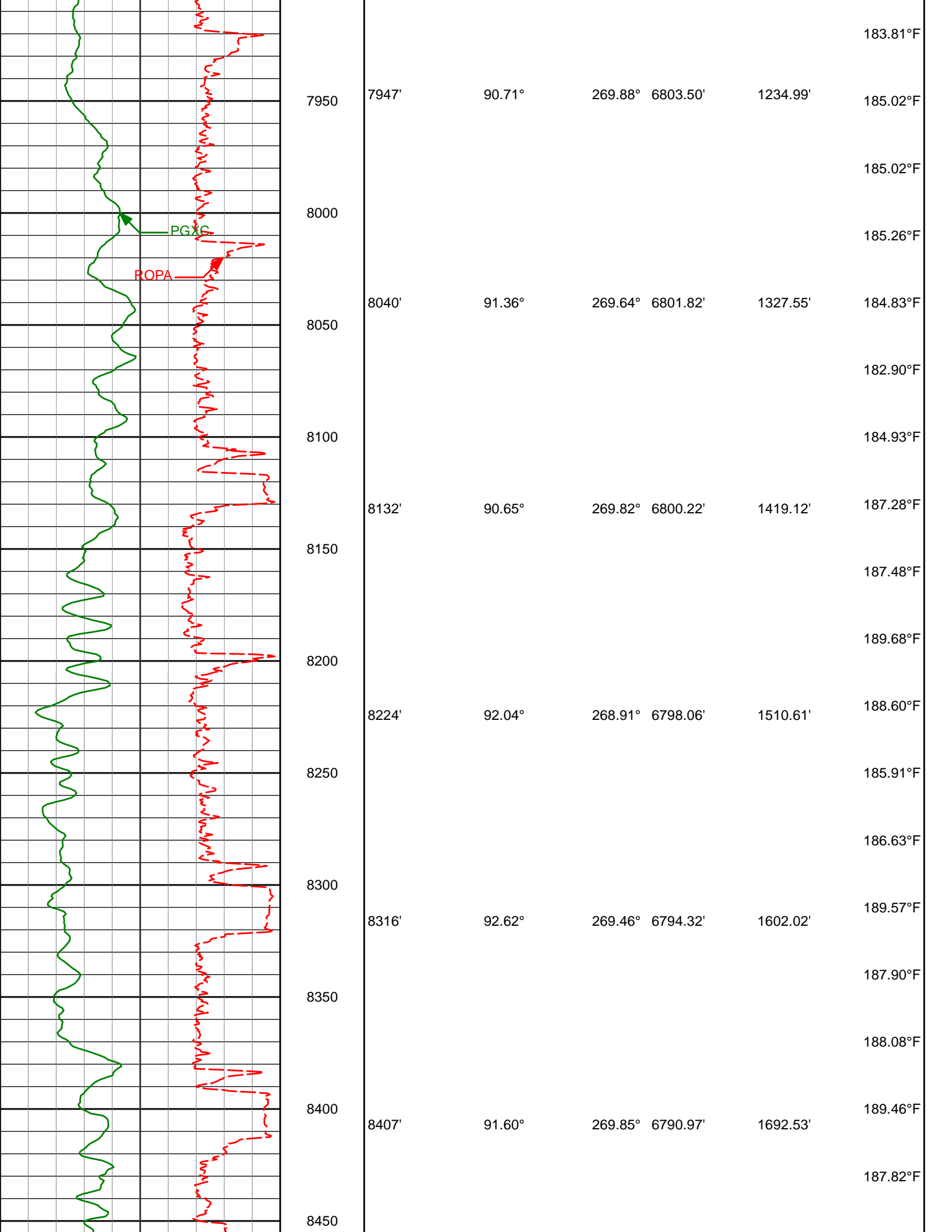


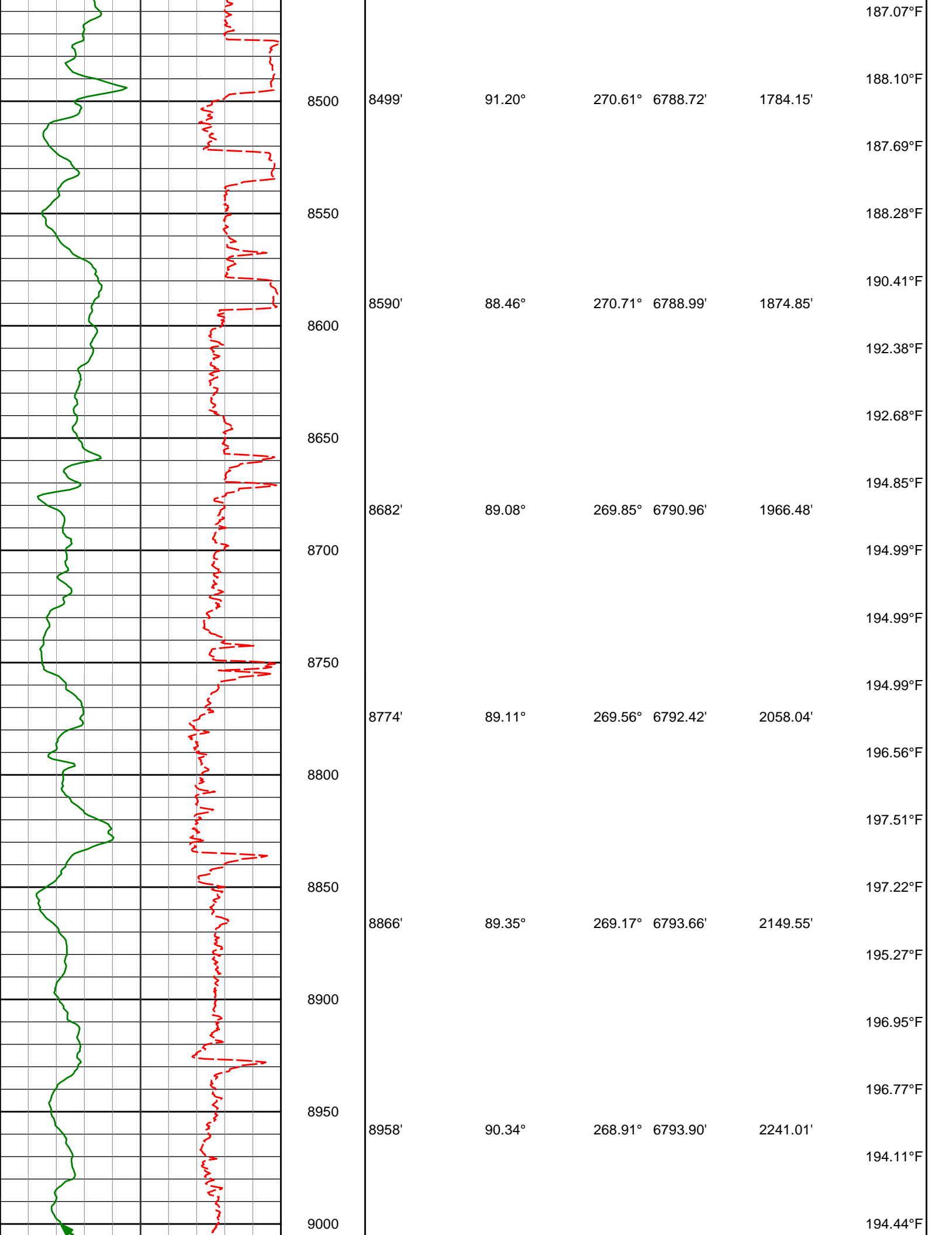


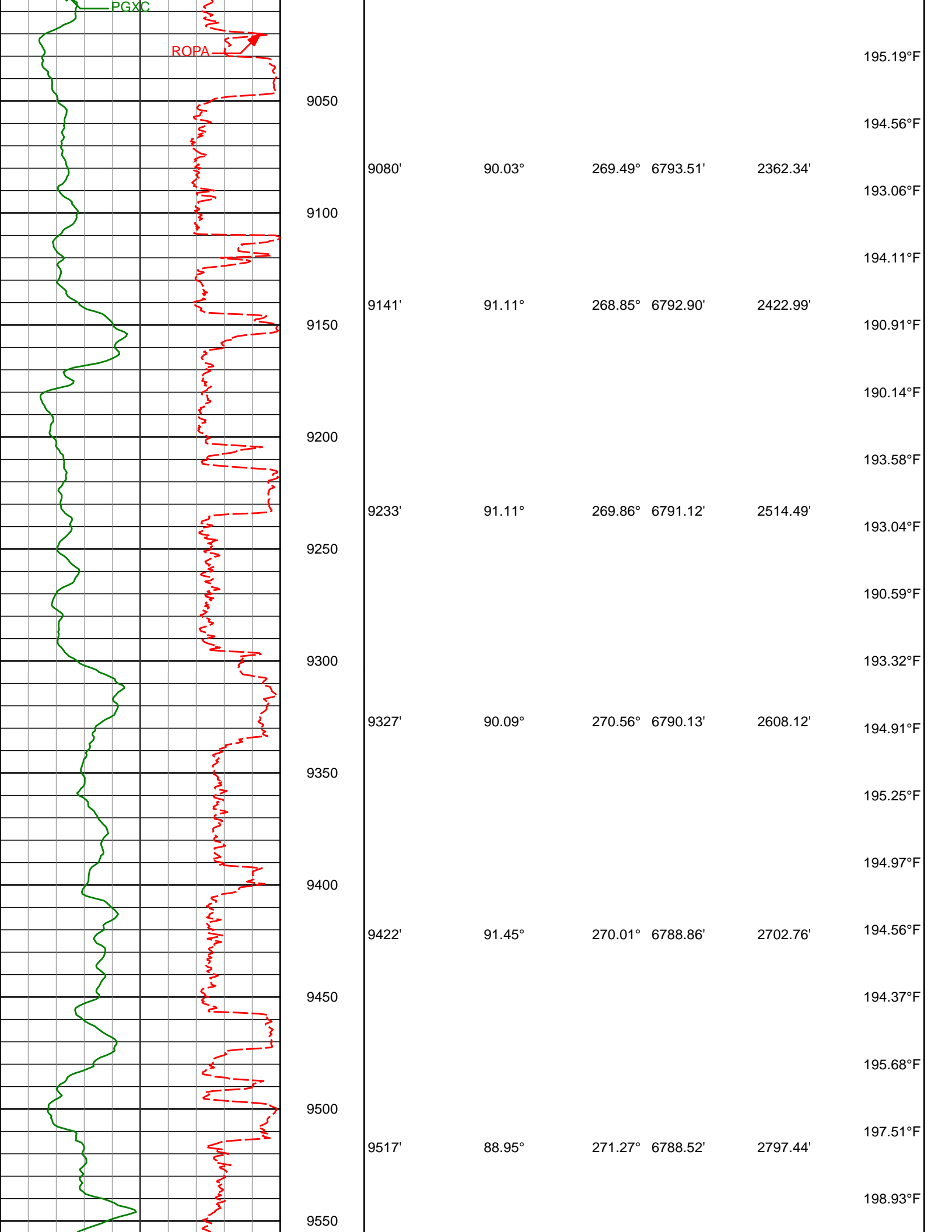


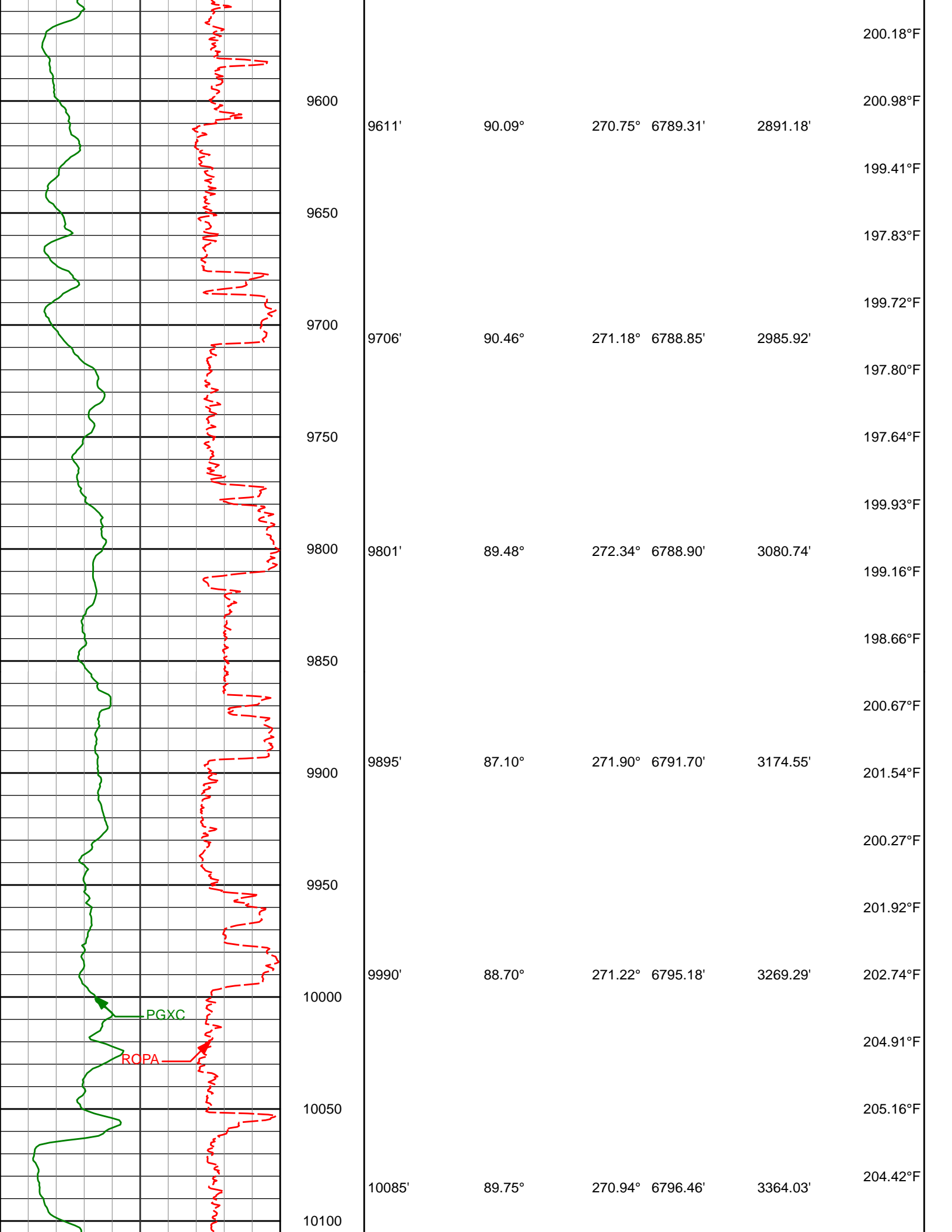


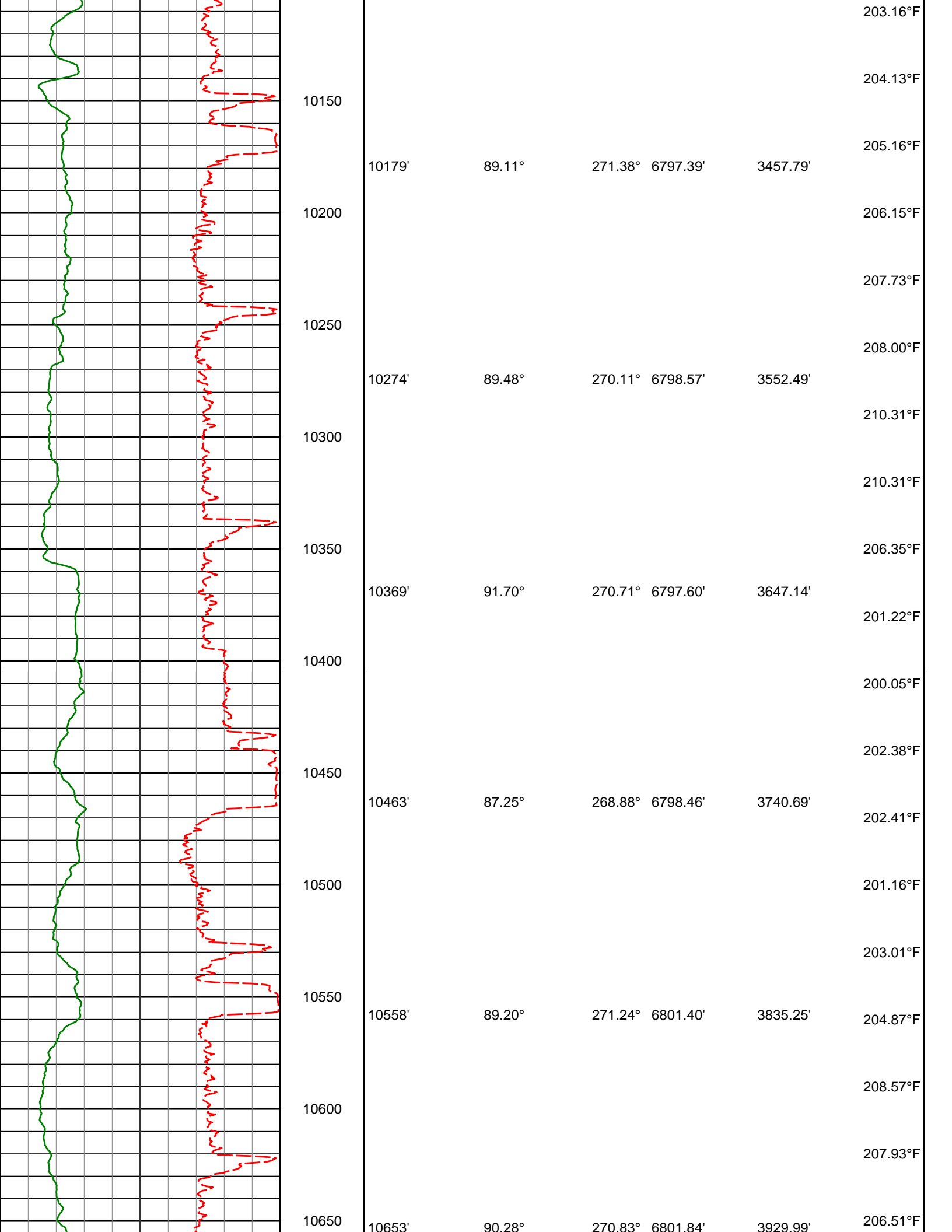


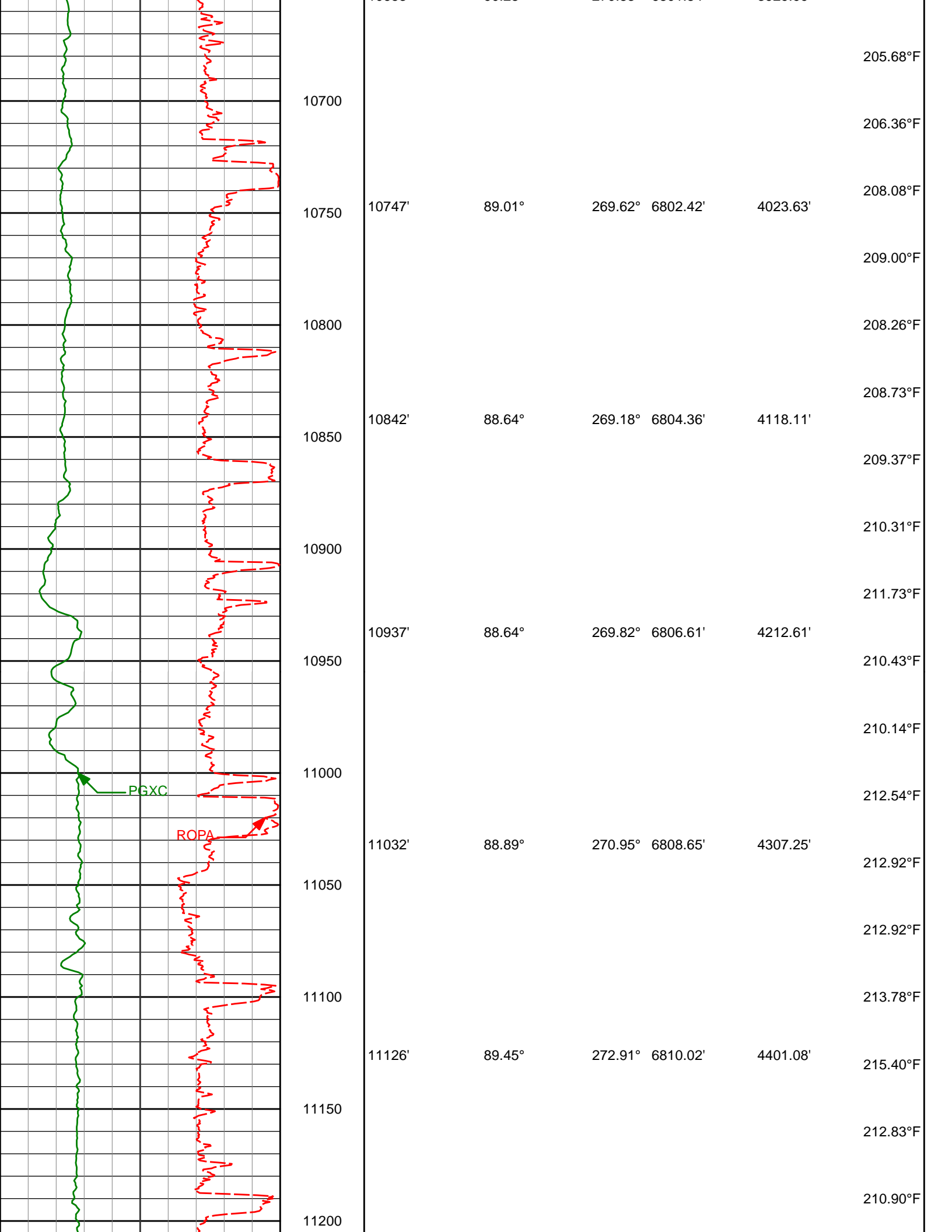


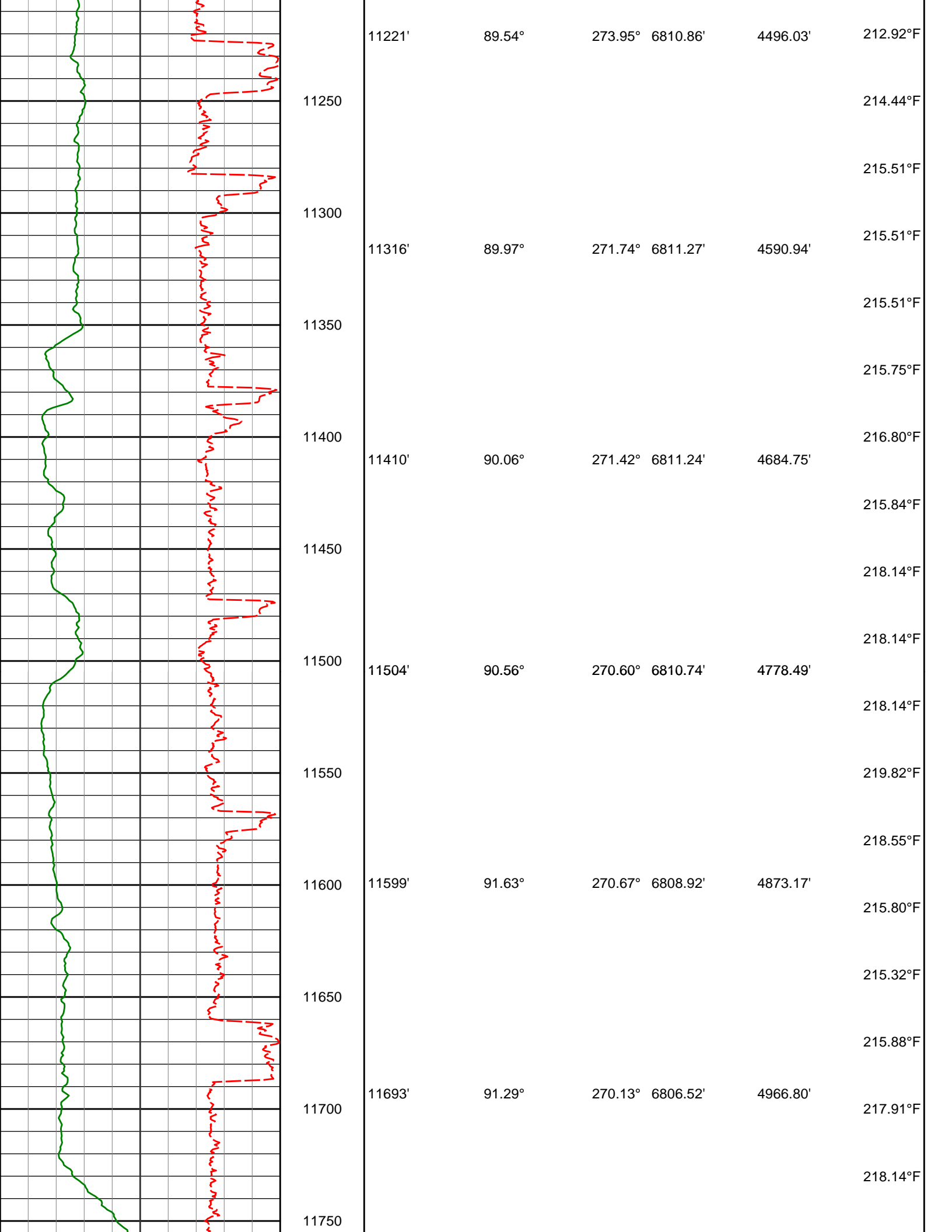


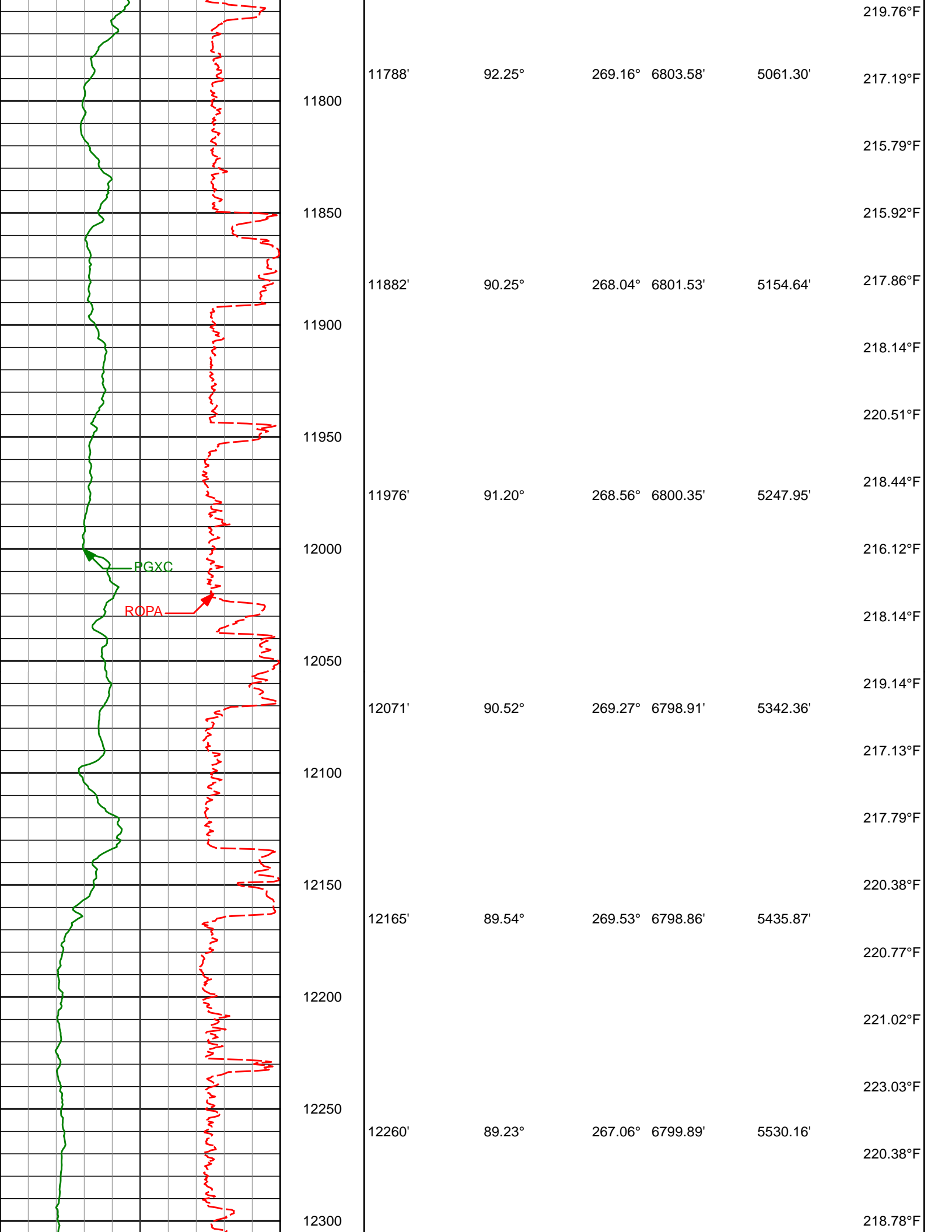


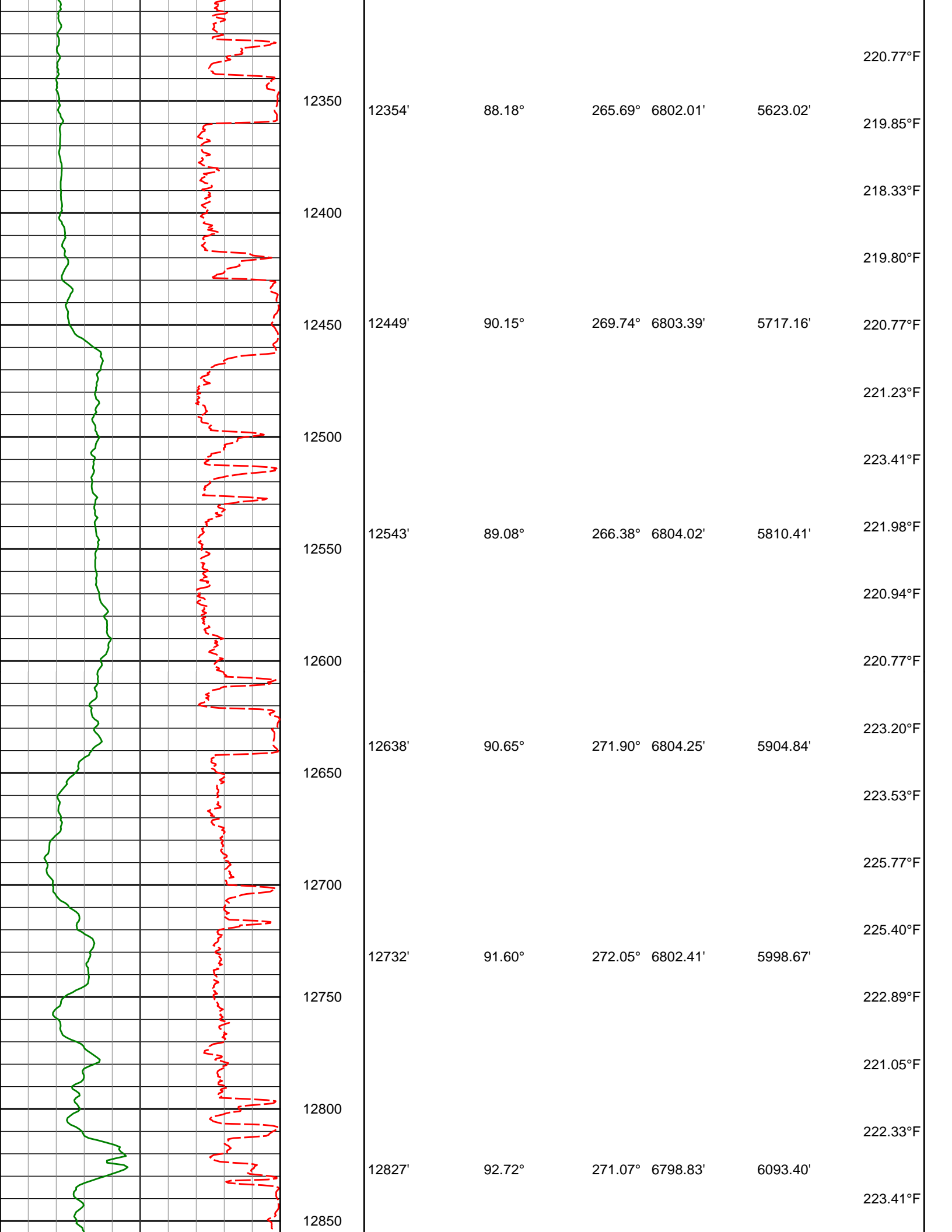


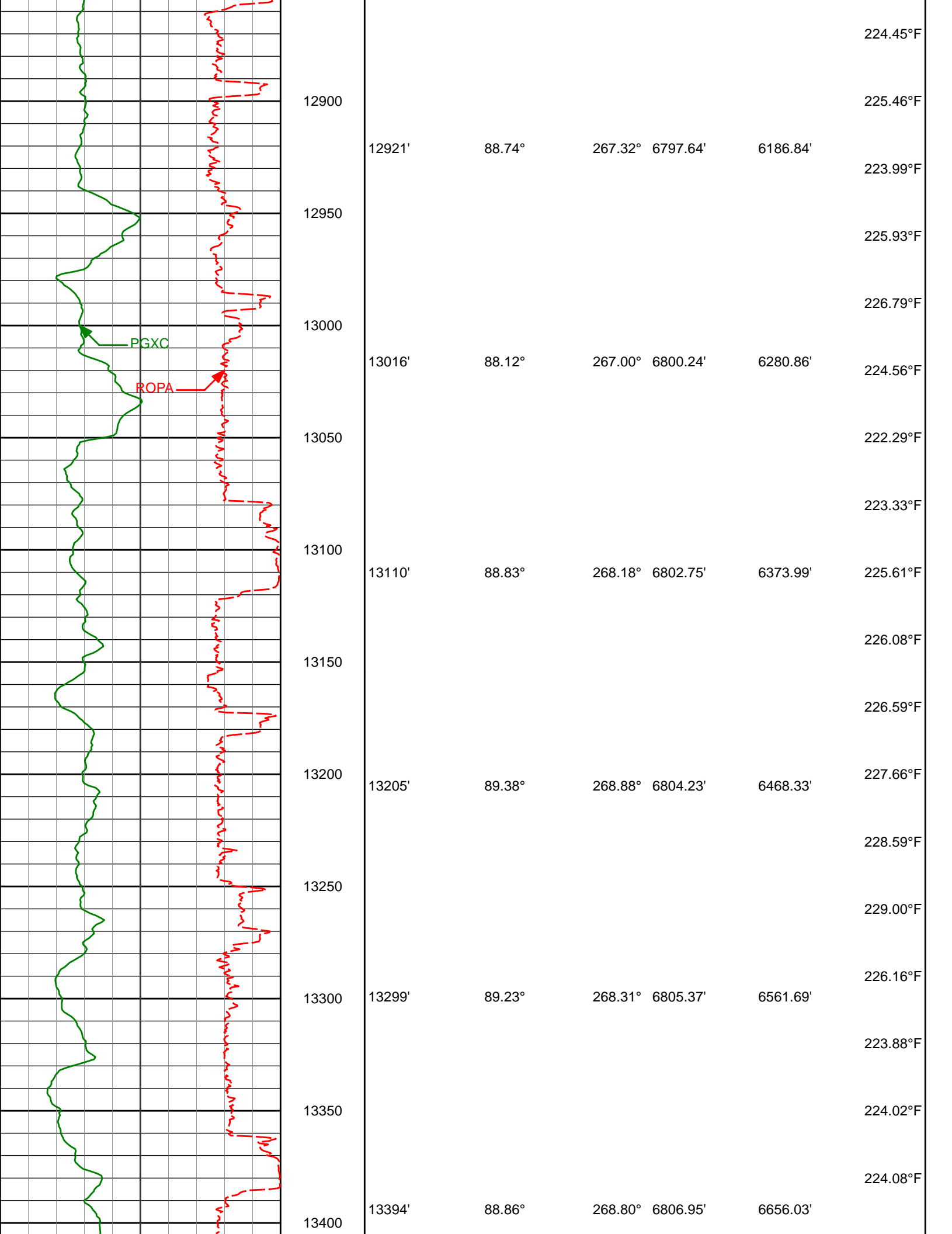


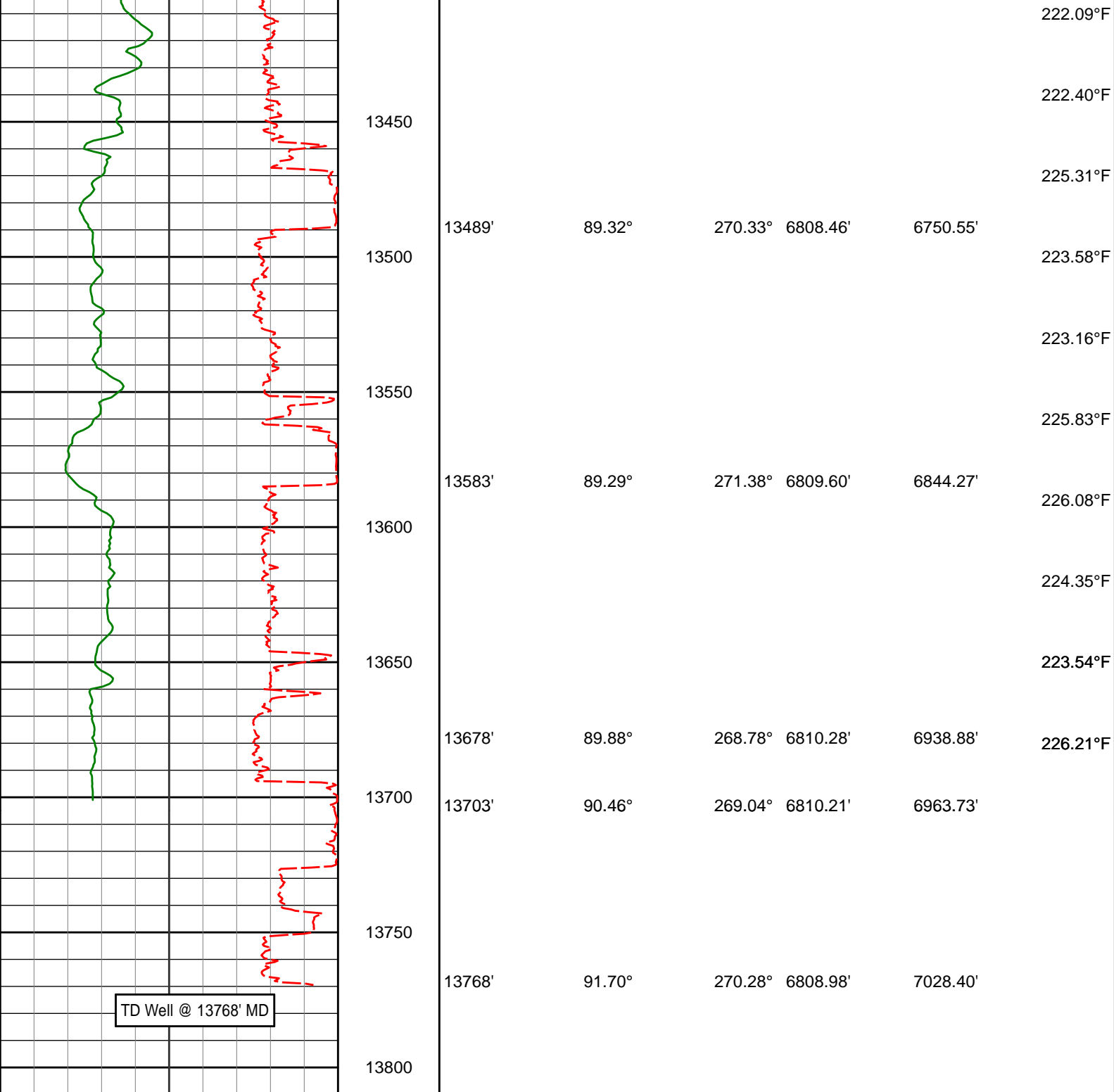






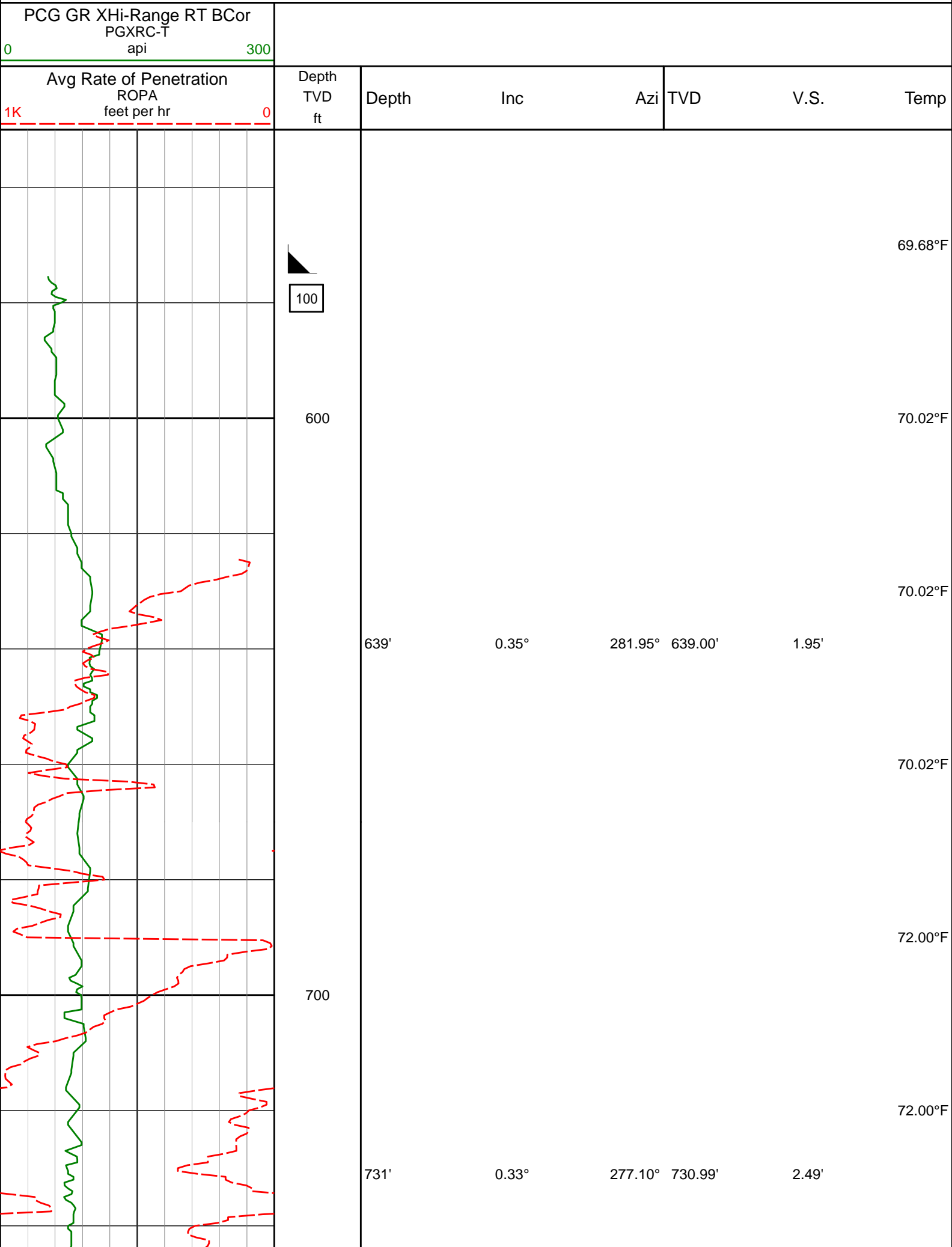


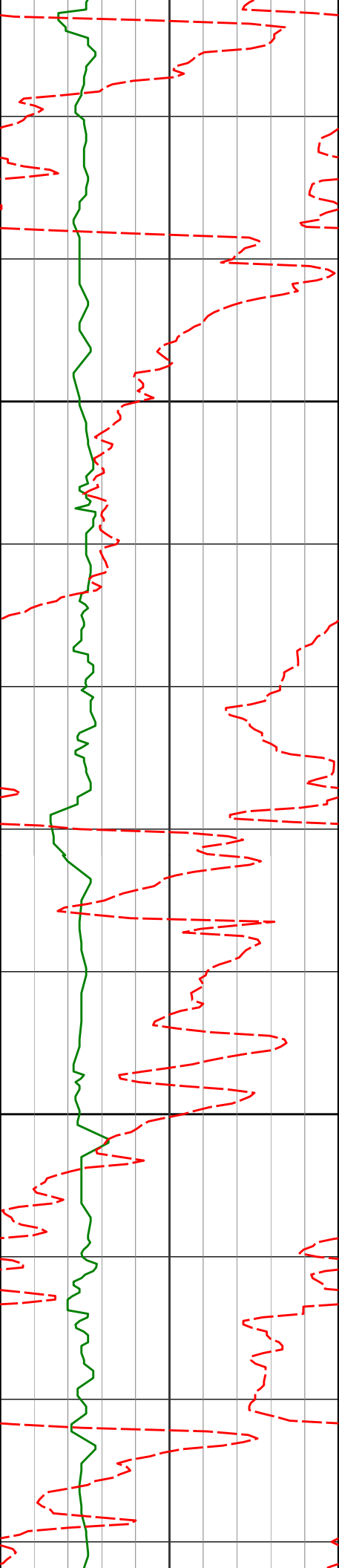




Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0								
PCG GR XHi-Range RT BCor PGXRC-T api								
0 300								

MD Detail 1:240 Scale





800

823'

0.40°

295.41° 822.99'

3.06'

73.98°F

73.98°F

73.98°F

73.98°F

73.98°F

900

916'

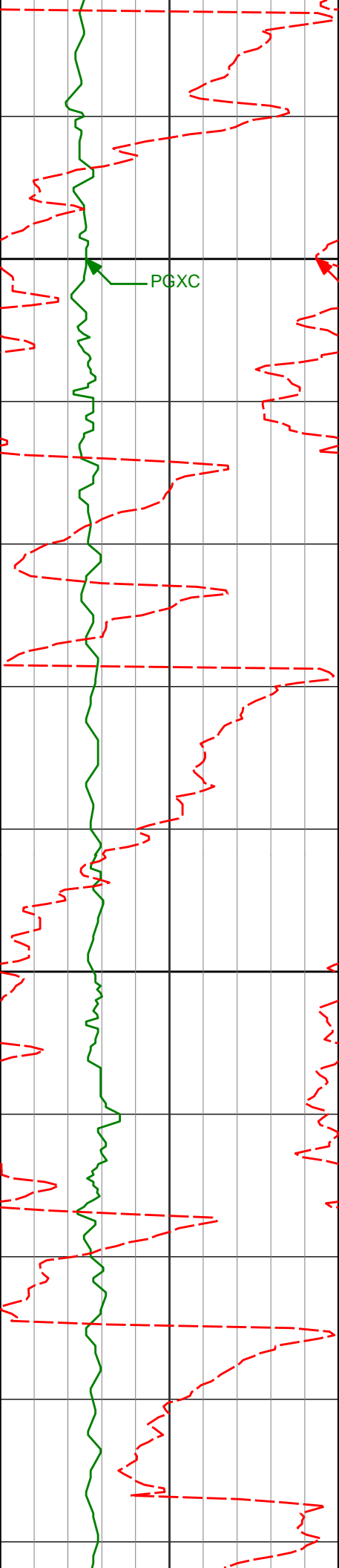
0.56°

293.95° 915.99'

3.80'

75.37°F

75.97°F



1000

PGXC

ROPA

1008'

0.52°

269.91° 1007.99'

4.64'

75.97°F

76.90°F

77.99°F

1100

1100'

0.59°

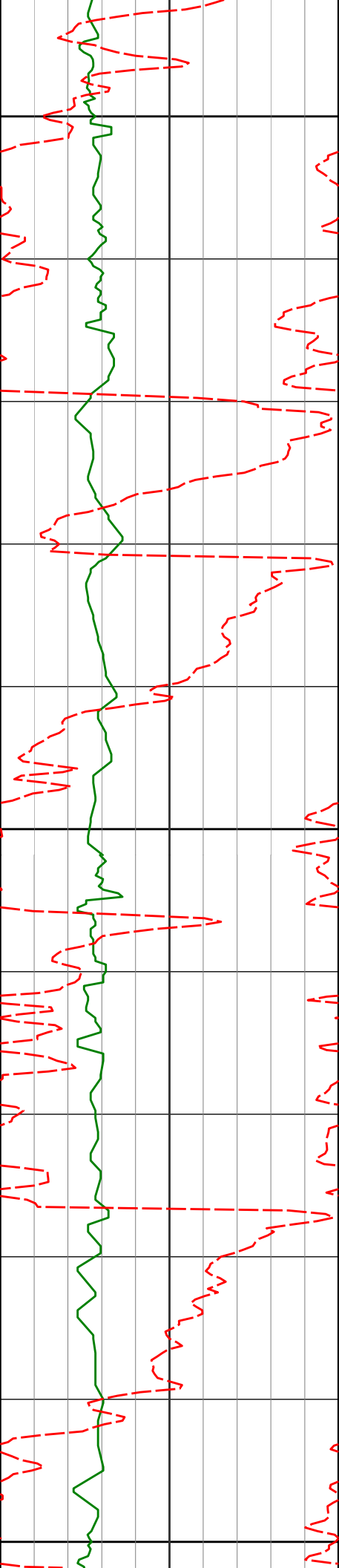
283.75° 1099.98'

5.53'

77.99°F

77.99°F

80.01°F



1200

78.56°F

1210'

0.31°

105.19°

1209.98'

5.80'

79.39°F

80.01°F

1300

1301'

0.28°

117.27°

1300.98'

5.34'

82.02°F

82.02°F

1394'

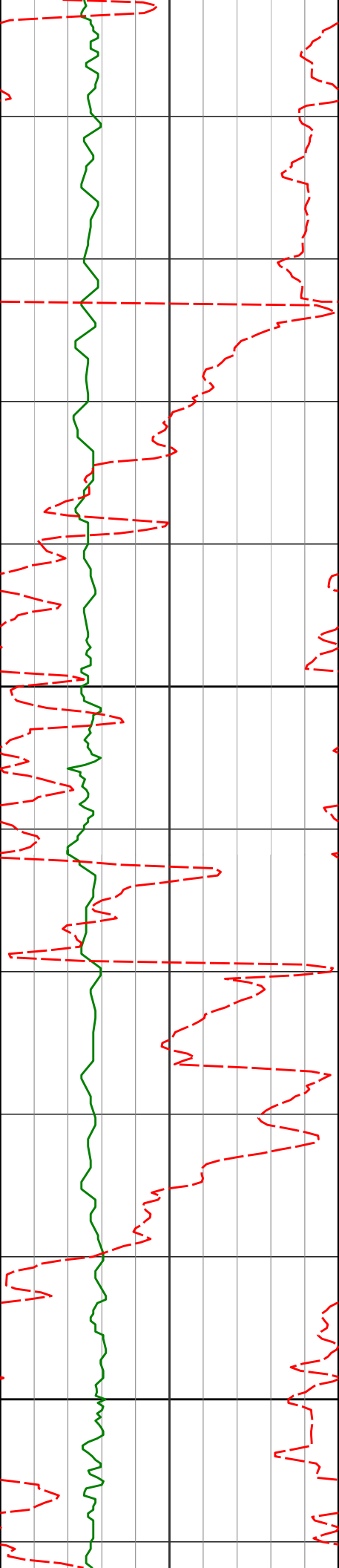
0.34°

77.61°

1393.98'

4.86'

1400



1500

1600

1486'

0.44°

68.06°

1485.97'

4.29'

1579'

1.58°

38.47°

1578.96'

3.27'

82.02°F

82.02°F

82.02°F

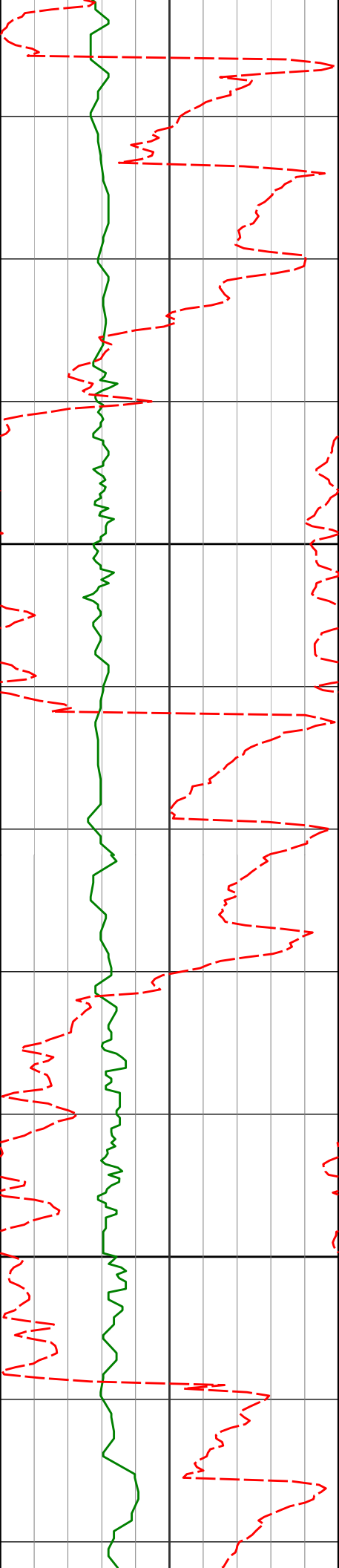
82.83°F

84.06°F

84.06°F

84.06°F

84.06°F



1700

1800

1671'

1763'

3.10°

4.61°

29.48°

23.29°

1670.88'

1762.67'

1.56'

-0.61'

86.09°F

86.09°F

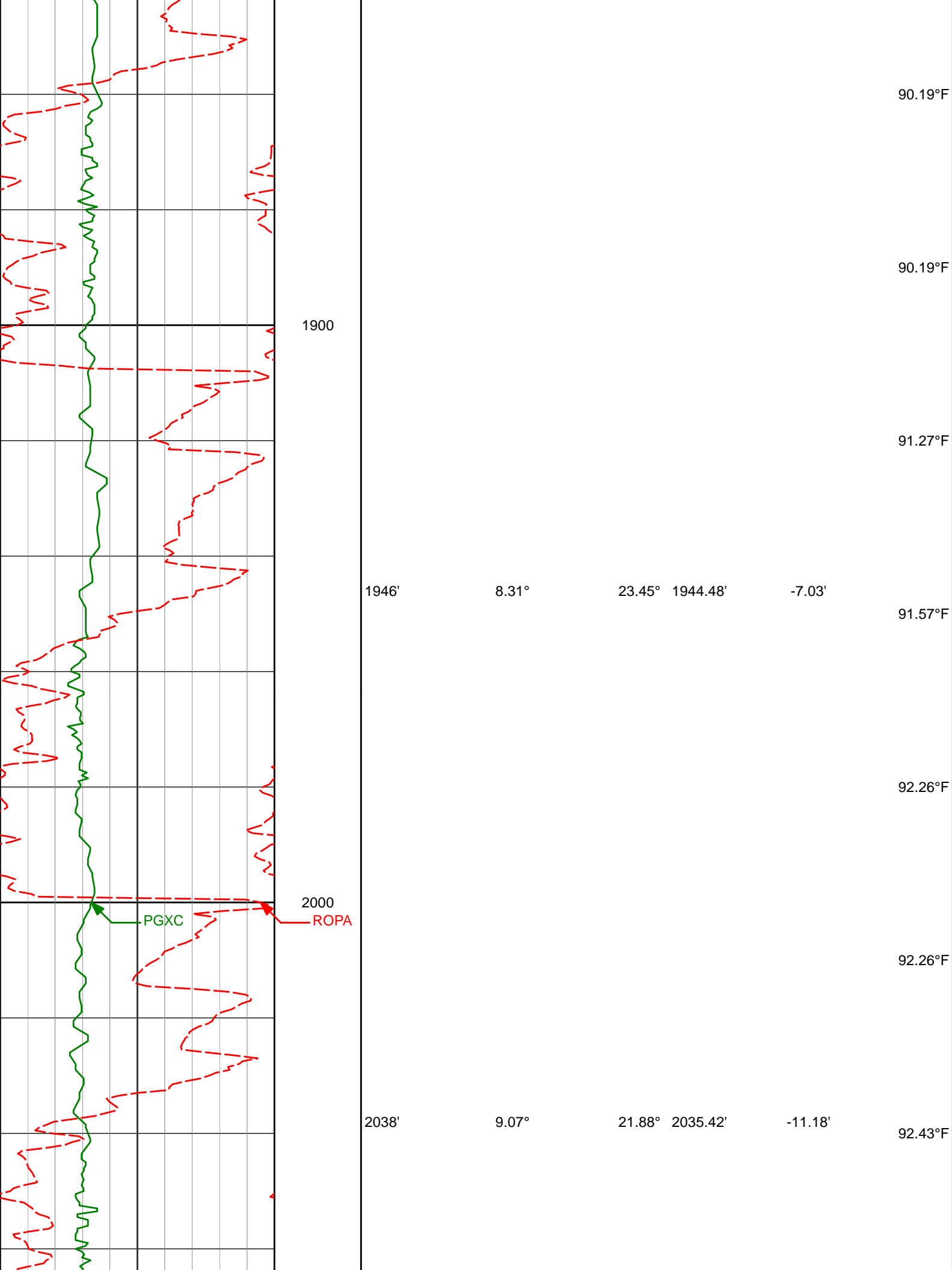
86.09°F

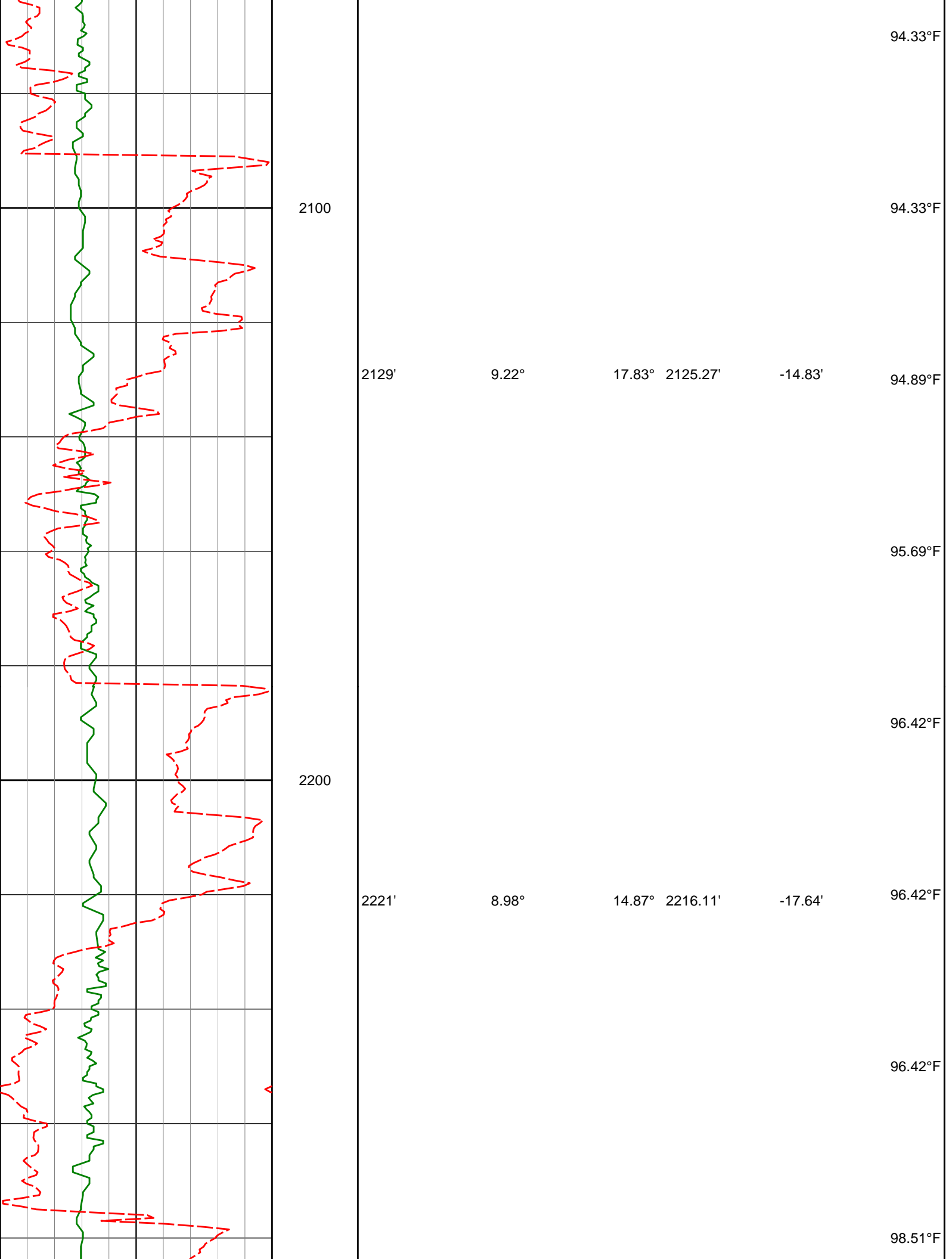
88.14°F

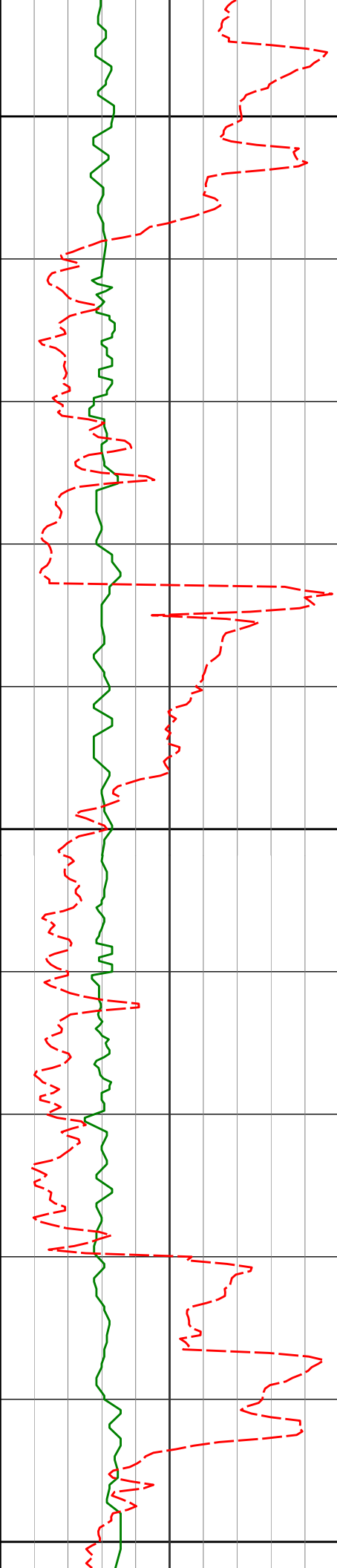
88.14°F

88.14°F

90.19°F







2300

2313'

10.08°

12.07°

2306.84'

-19.80'

98.51°F

98.51°F

98.51°F

2400

2405'

9.39°

11.05°

2397.51'

-21.52'

98.51°F

98.51°F

98.51°F

2500

2497'

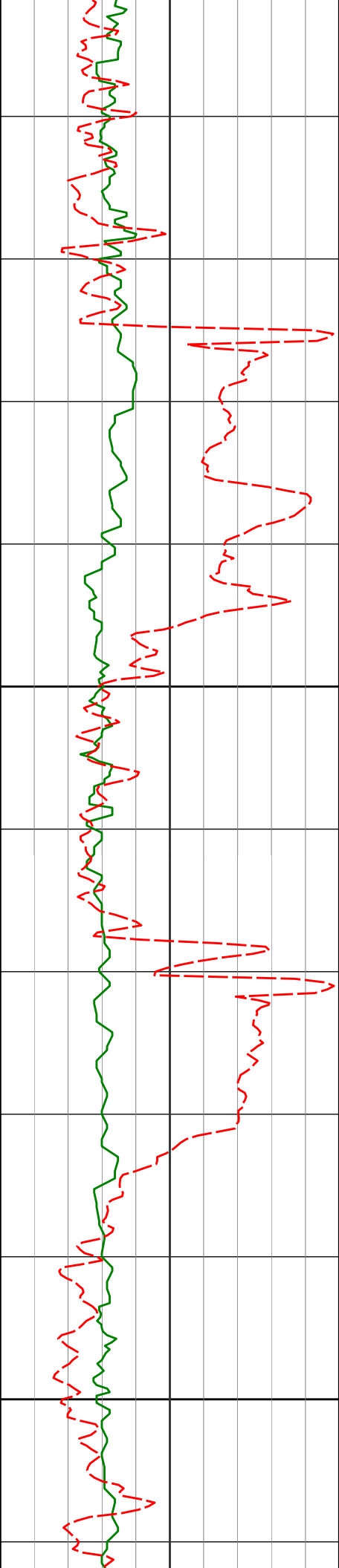
8.58°

17.19°

2488.39'

-23.70'

100.62°F



2600

2700

2588'

2680'

9.57°

9.79°

19.08°

15.00°

2578.25'

2668.94'

-26.92'

-30.07'

100.62°F

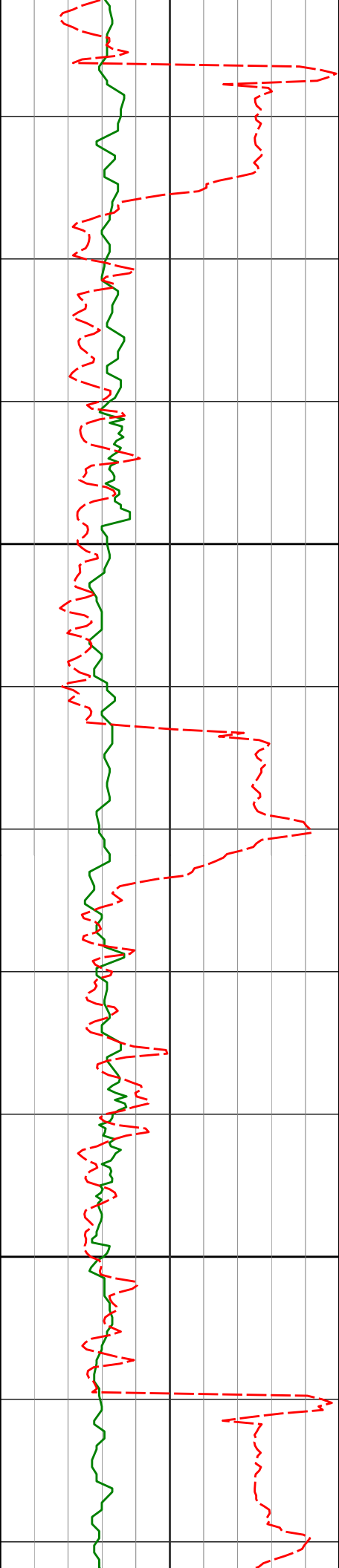
100.62°F

100.62°F

100.62°F

100.62°F

102.57°F



2772'

9.08°

13.10°

2759.69'

-32.40'

2800

2866'

8.52°

12.42°

2852.59'

-34.28'

2900

102.72°F

102.72°F

102.72°F

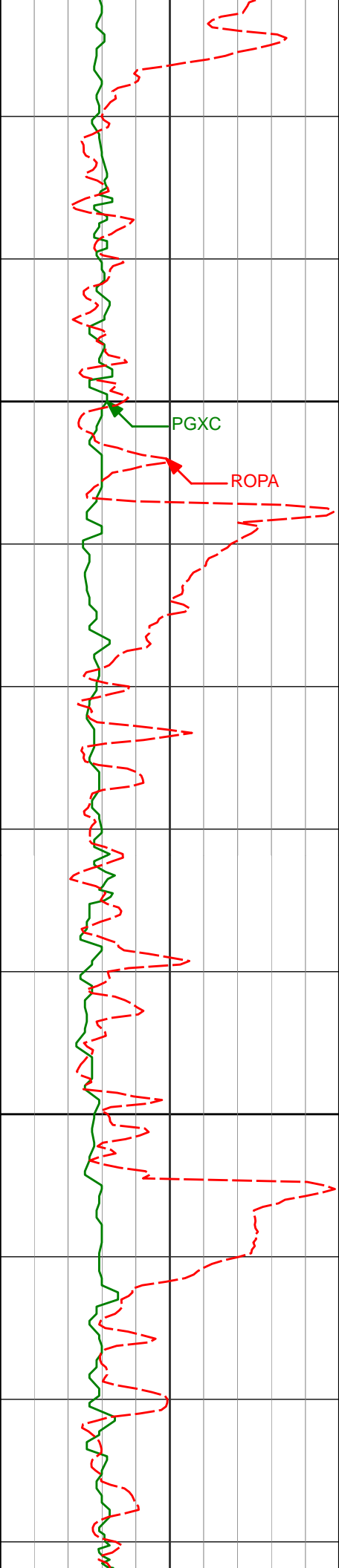
102.72°F

104.83°F

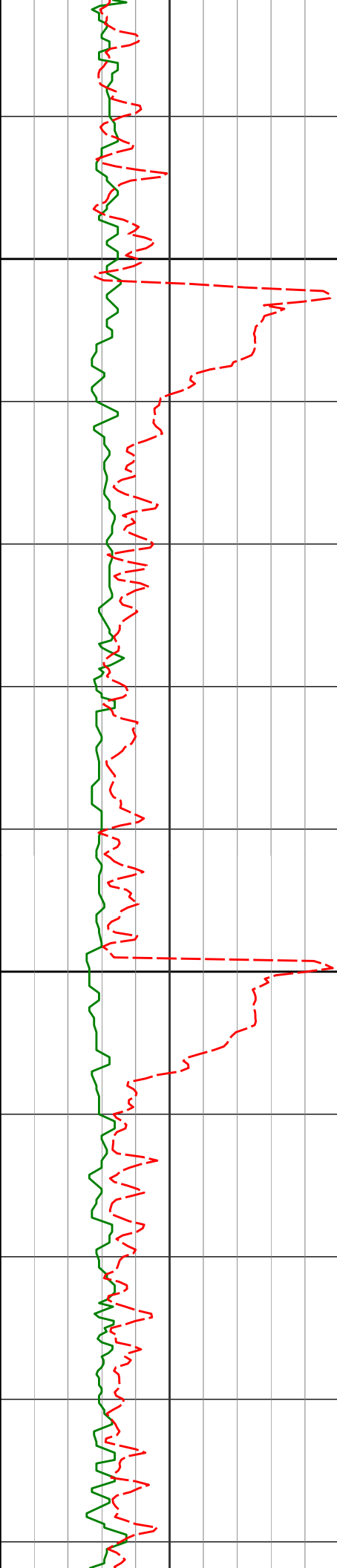
104.83°F

104.83°F

104.83°F



2961'	9.38°	18.58°	2946.43'	-36.95'	104.83°F
3000					
3056'					
3100					
3150'					



3200

3300

3245'

3340'

8.81°

8.52°

12.57°

12.06°

3226.83'

3320.74'

-43.89'

-45.65'

106.97°F

109.09°F

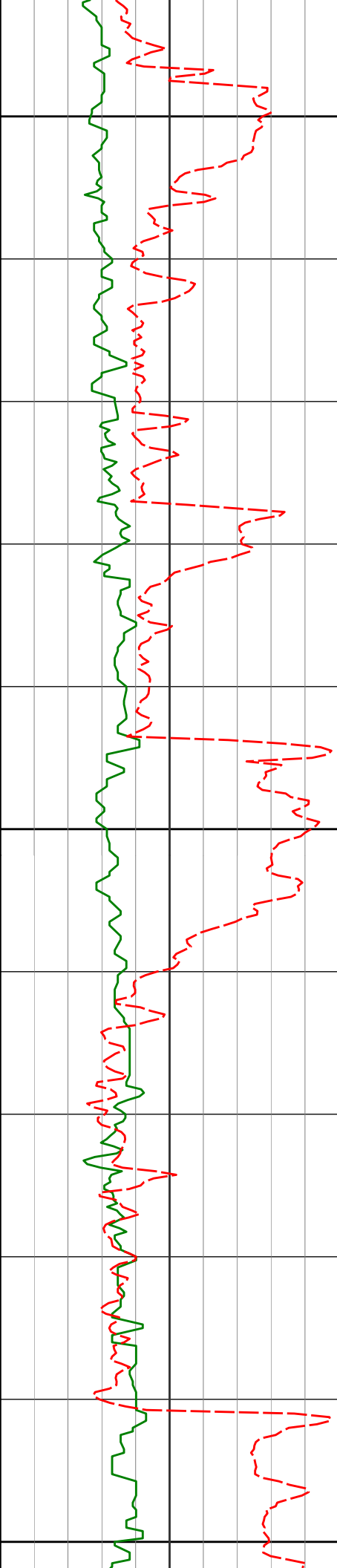
109.09°F

109.09°F

109.09°F

109.09°F

109.09°F



3400

3500

3600

3434'

7.79°

11.86°

3413.79'

-47.22'

3529'

8.46°

13.38°

3507.84'

-48.95'

109.09°F

110.17°F

111.24°F

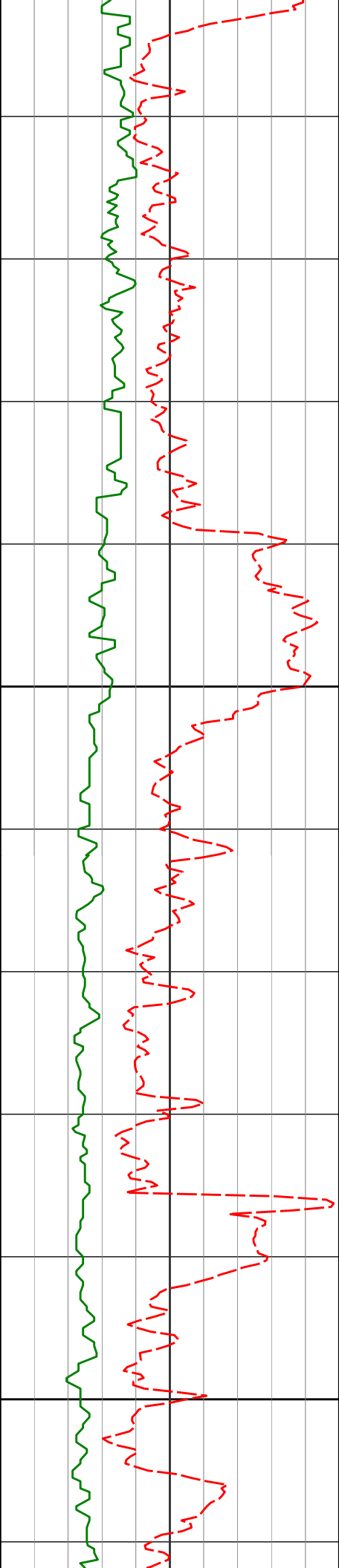
111.24°F

111.24°F

111.24°F

111.24°F

111.61°F



3700

3800

3623'

8.78°

12.94°

3600.78'

-50.89'

113.40°F

113.40°F

113.40°F

3718'

9.42°

25.68°

3694.59'

-54.58'

113.74°F

115.56°F

115.56°F

3813'

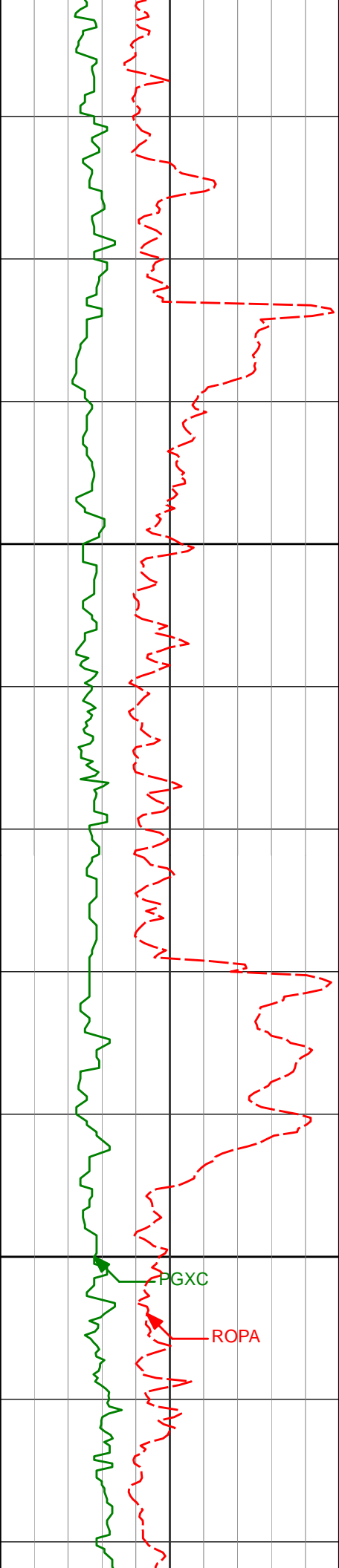
10.47°

28.17°

3788.16'

-60.66'

115.56°F



3900

3907'

11.73°

26.67°

3880.40'

-67.48'

115.56°F

115.56°F

116.52°F

116.11°F

115.56°F

117.21°F

4000

4001'

10.95°

25.00°

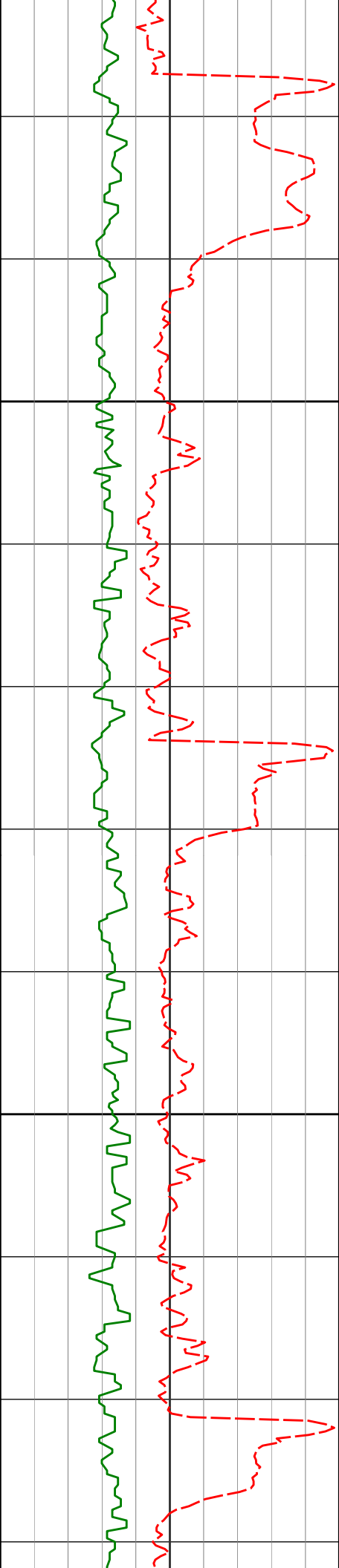
3972.57'

-73.99'

PGXC

ROPA

117.73°F



4100

4095'

8.87°

26.51°

4065.16'

-79.64'

117.73°F

117.73°F

119.29°F

119.91°F

119.91°F

4200

4190'

8.76°

28.89°

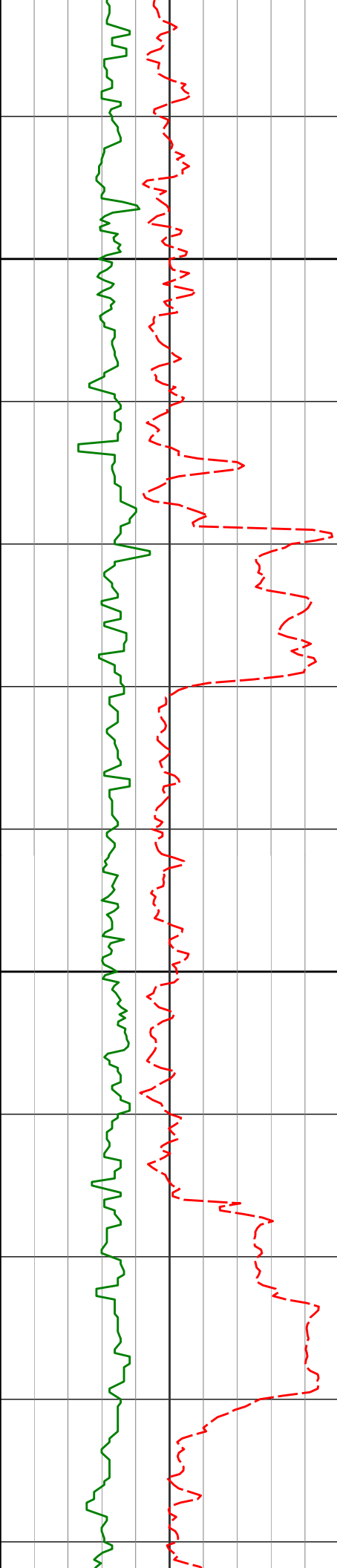
4159.04'

-85.20'

119.91°F

120.28°F

122.11°F



4284'

8.15°

29.47°

4252.02'

-90.81'

4300

122.11°F

122.11°F

122.11°F

4378'

8.13°

23.95°

4345.07'

-95.68'

4400

122.11°F

122.11°F

122.11°F

4473'

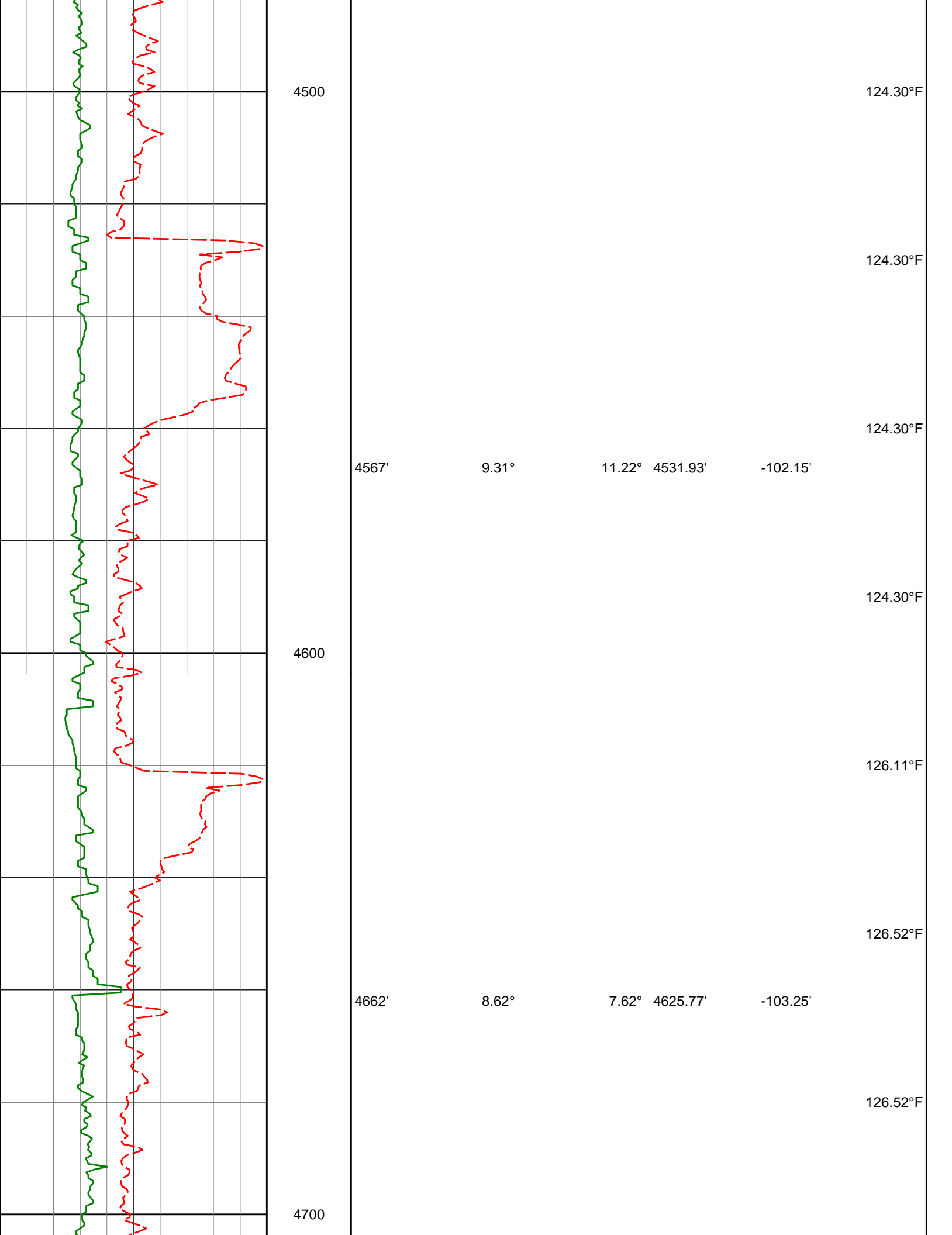
8.56°

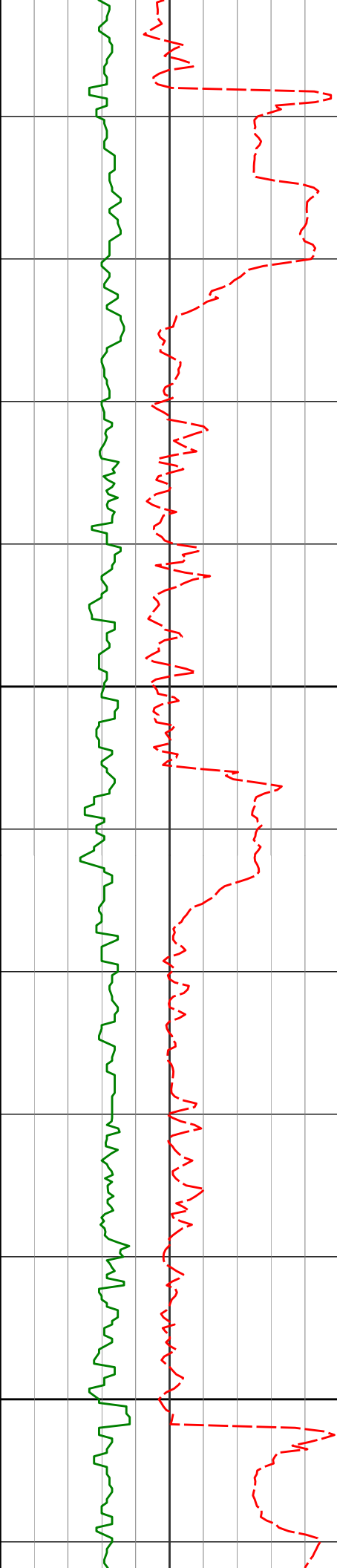
19.73°

4439.07'

-99.61'

122.72°F





4800

4900

4757'

4851'

8.64°

8.08°

13.85°

13.13°

4719.69'

4812.69'

-104.62'

-106.59'

126.52°F

126.52°F

128.51°F

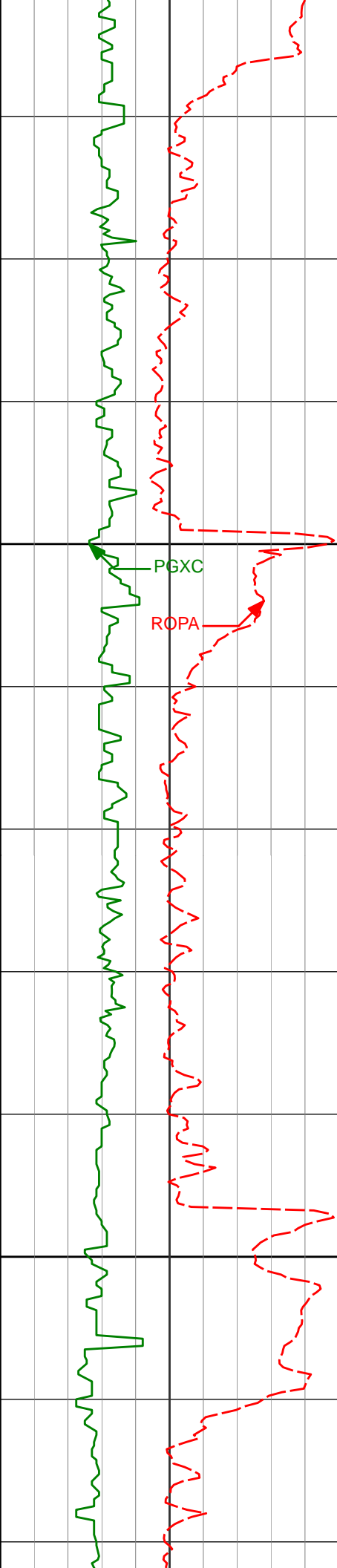
128.73°F

128.73°F

128.73°F

128.73°F

128.73°F



5000

5100

4946'

8.88°

15.38°

4906.66'

-108.80'

130.96°F

130.96°F

130.96°F

5040'

7.70°

15.22°

4999.67'

-111.17'

132.48°F

131.12°F

130.96°F

5135'

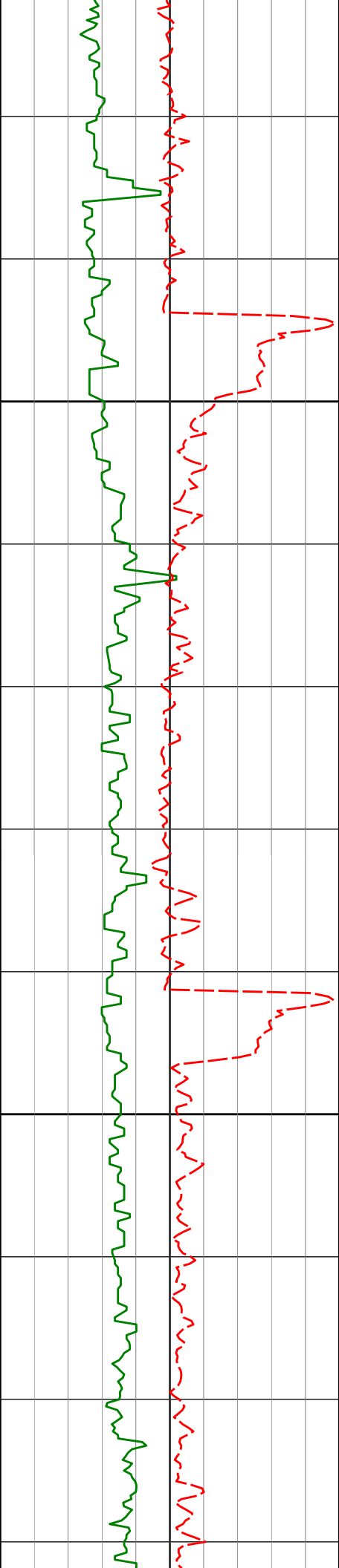
8.97°

19.61°

5093.67'

-114.11'

131.56°F



5200

5229'

8.63°

17.93°

5186.56'

-117.48'

133.20°F

133.20°F

133.20°F

135.45°F

135.45°F

5300

5324'

7.22°

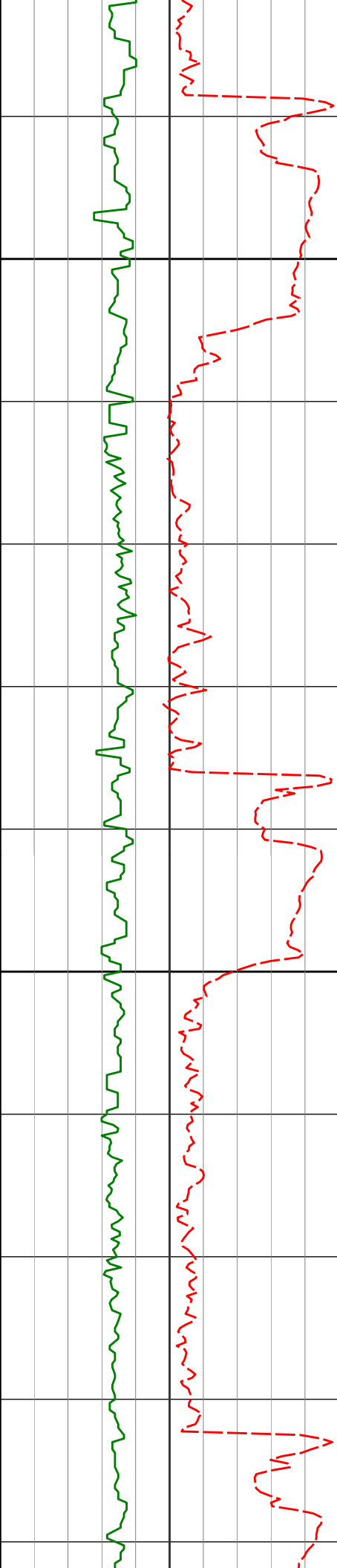
16.94°

5280.65'

-120.26'

136.71°F

136.59°F



5400

5418'

8.28°

17.28°

5373.79'

-122.87'

5500

5512'

8.16°

20.62°

5466.83'

-126.05'

135.71°F

137.70°F

137.22°F

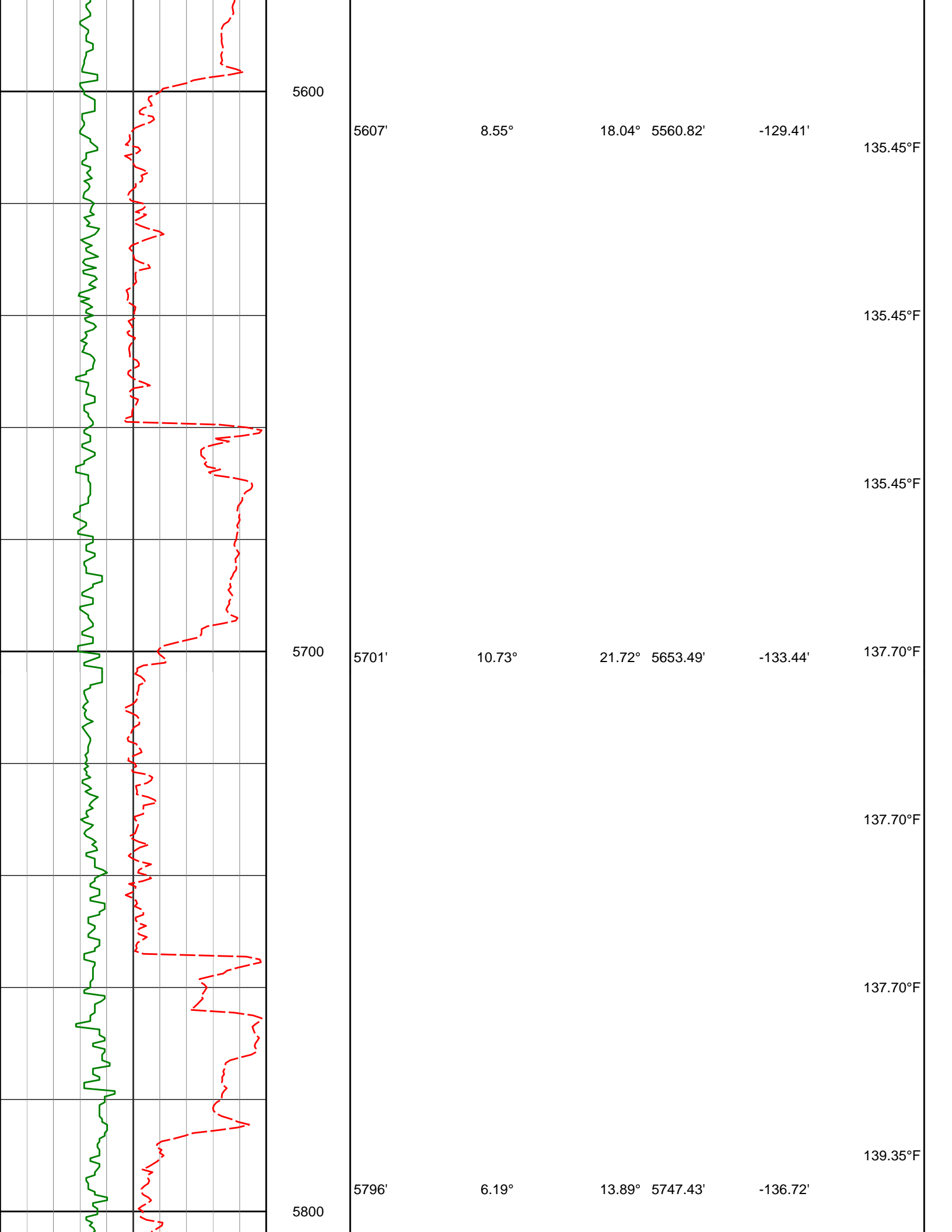
135.71°F

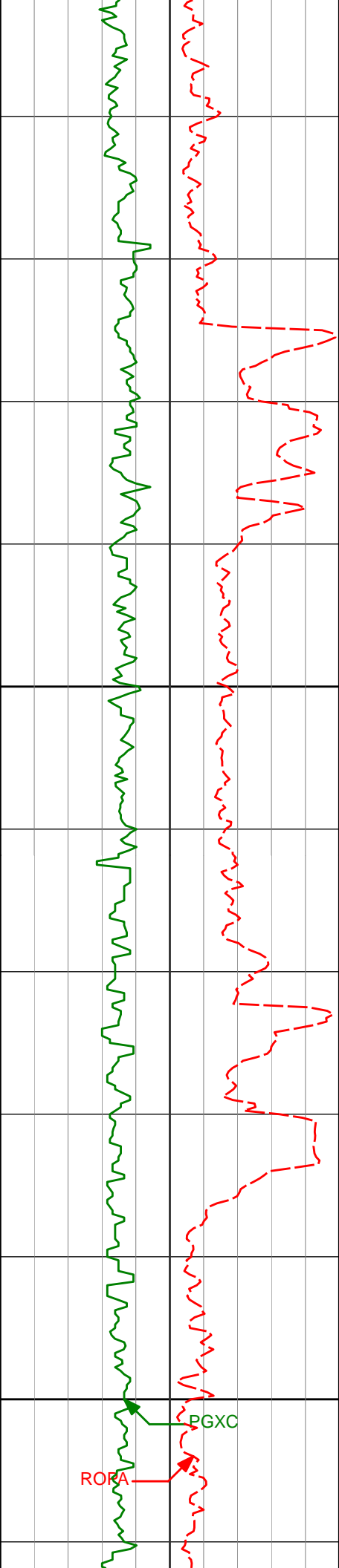
136.56°F

137.49°F

136.26°F

135.45°F





5900

6000

5890'

3.73°

15.25°

5841.07'

-138.02'

5985'

2.21°

0.20°

5935.95'

-138.40'

140.14°F

142.25°F

142.65°F

143.42°F

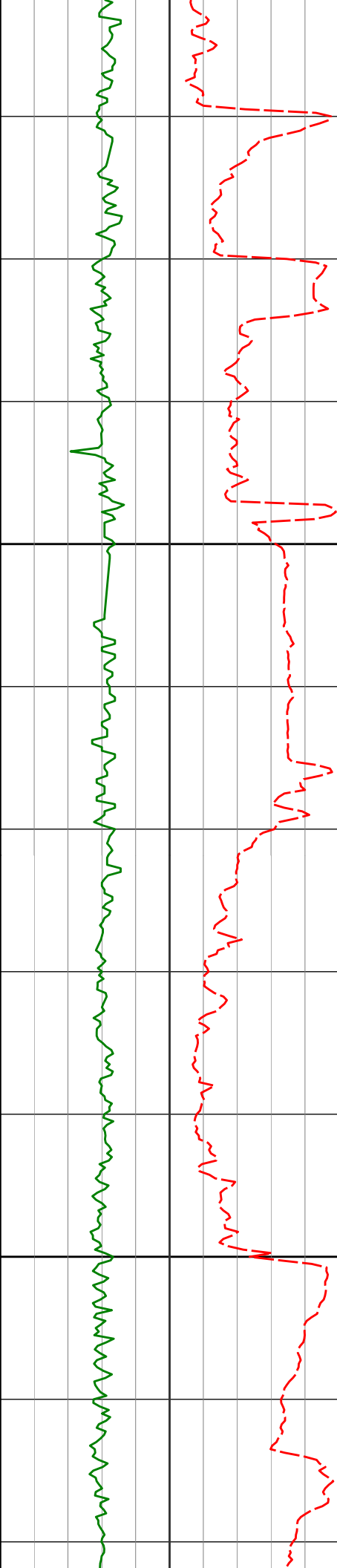
144.54°F

144.54°F

146.76°F

RORA

PGXC



6100

6200

6080'

6175'

6223'

0.80°

0.80°

2.12°

2.40°

83.02°

297.24°

6030.91'

6125.90'

6173.89'

-138.20'

-138.82'

-138.32'

146.92°F

148.68°F

149.14°F

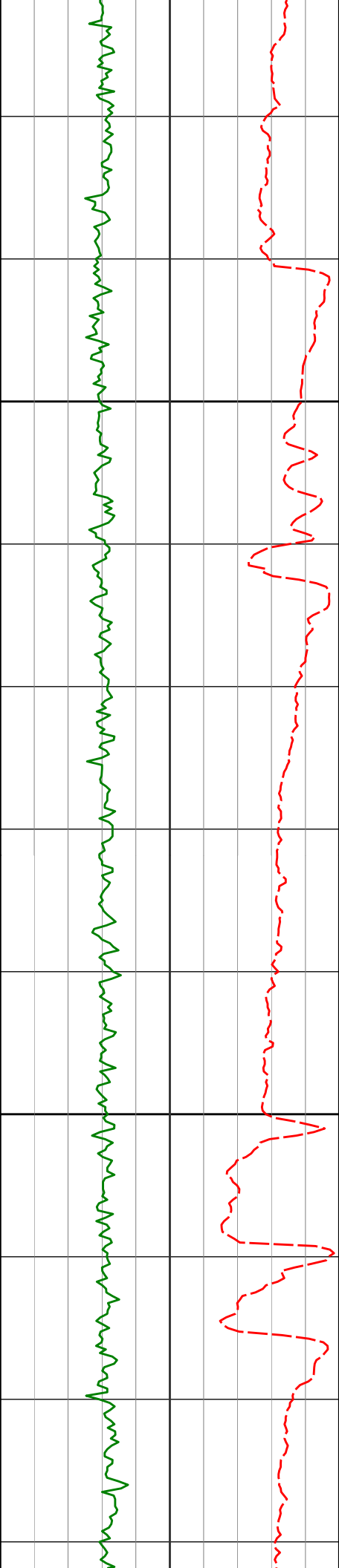
149.14°F

149.42°F

151.38°F

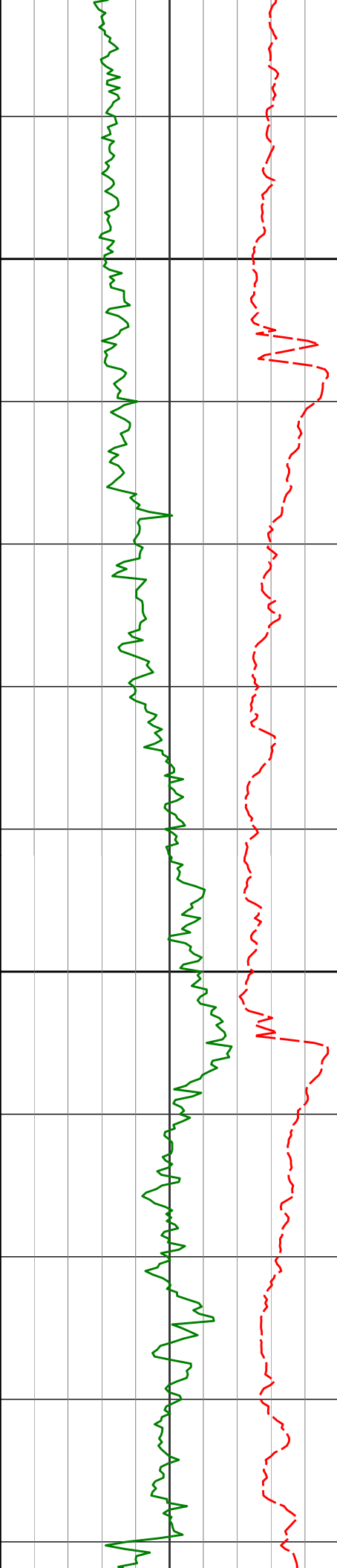
151.53°F

152.86°F



200

6269'	6.51°	283.94°	6219.75'	-134.95'	154.96°F
6300					156.13°F
					156.13°F
					158.23°F
6364'	15.35°	267.70°	6312.96'	-117.12'	158.47°F
6400					160.26°F
					160.83°F
6459'	20.83°	275.75°	6403.24'	-87.74'	



6500

6553'

30.46°

278.20°

6487.88'

-47.14'

6600

6648'

40.55°

269.24°

6565.17'

7.80'

160.83°F

161.11°F

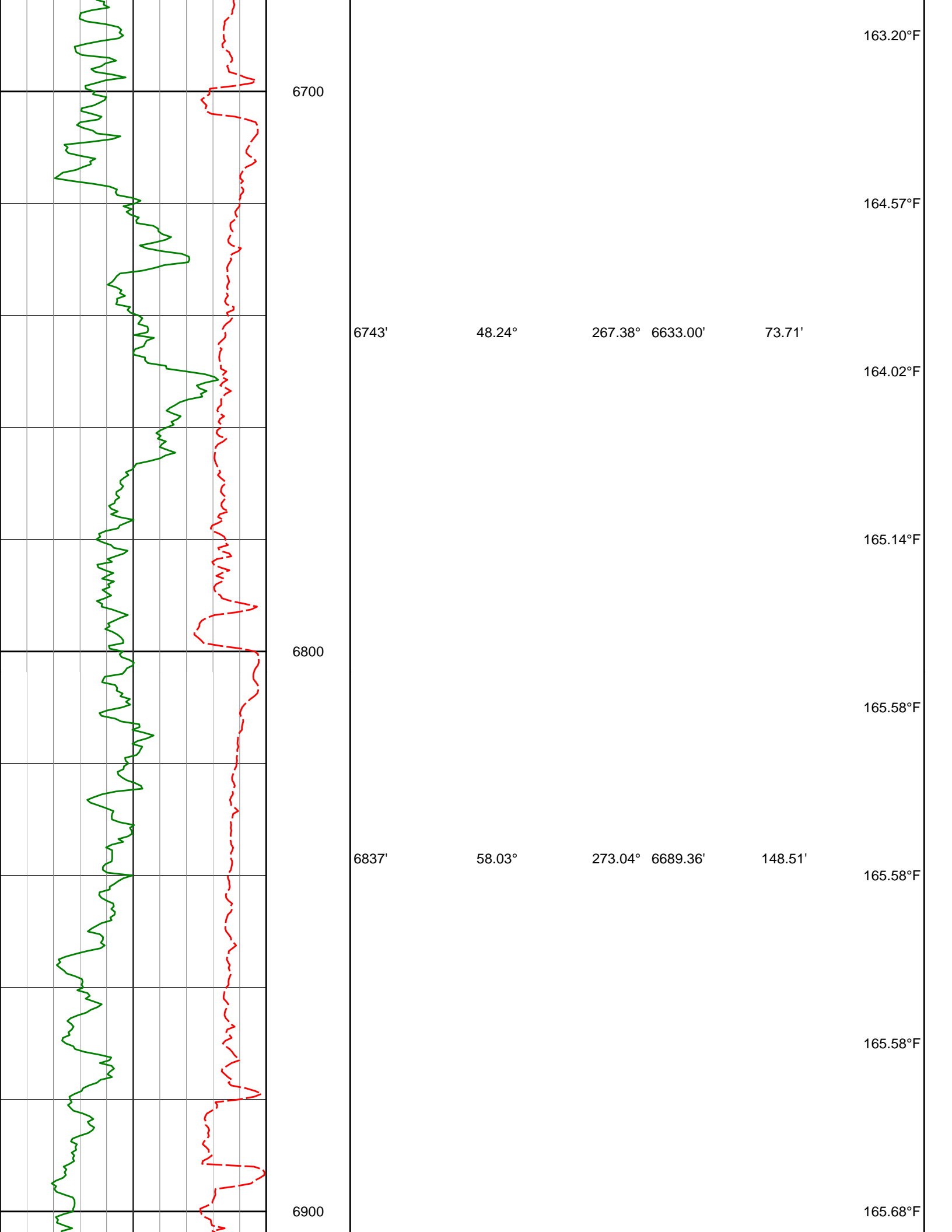
163.00°F

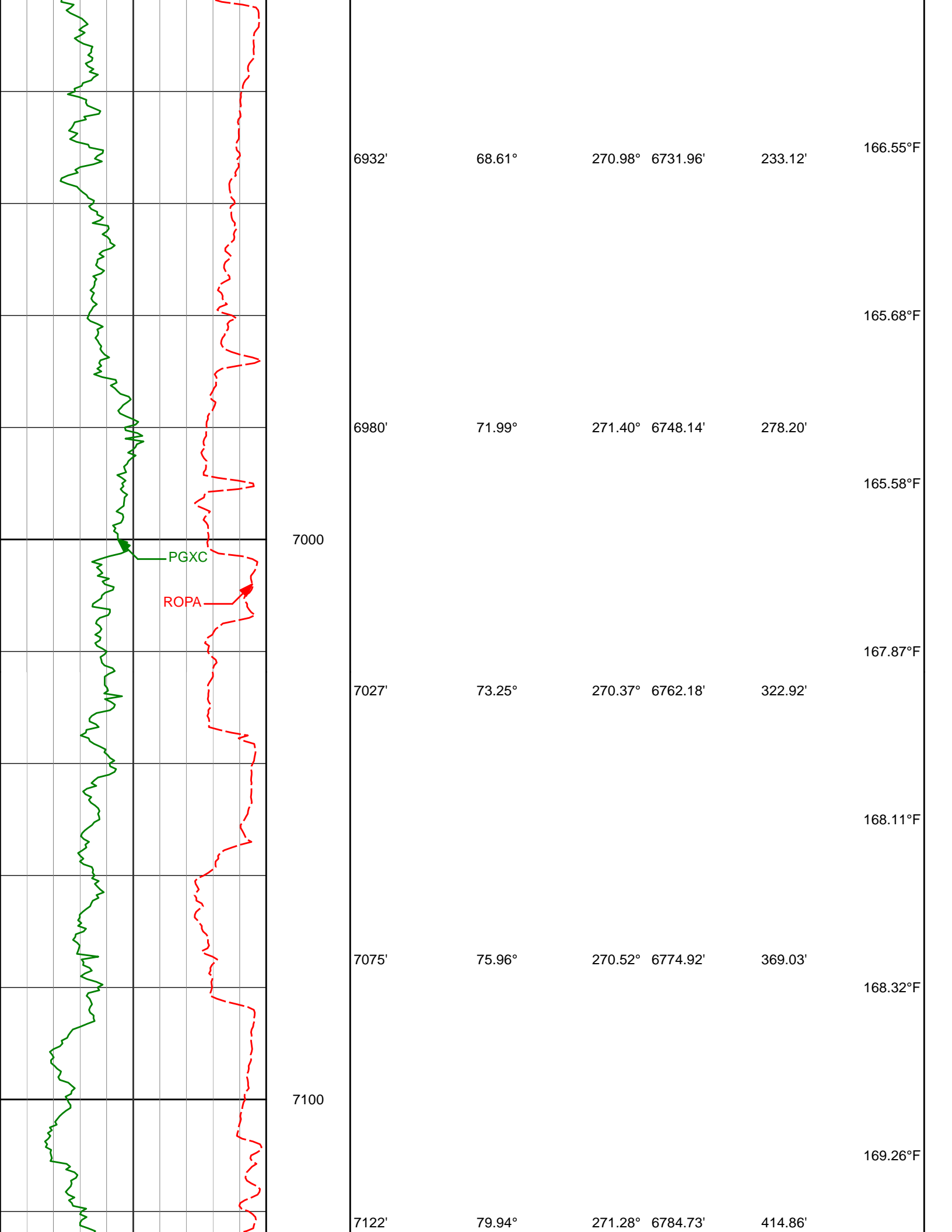
161.58°F

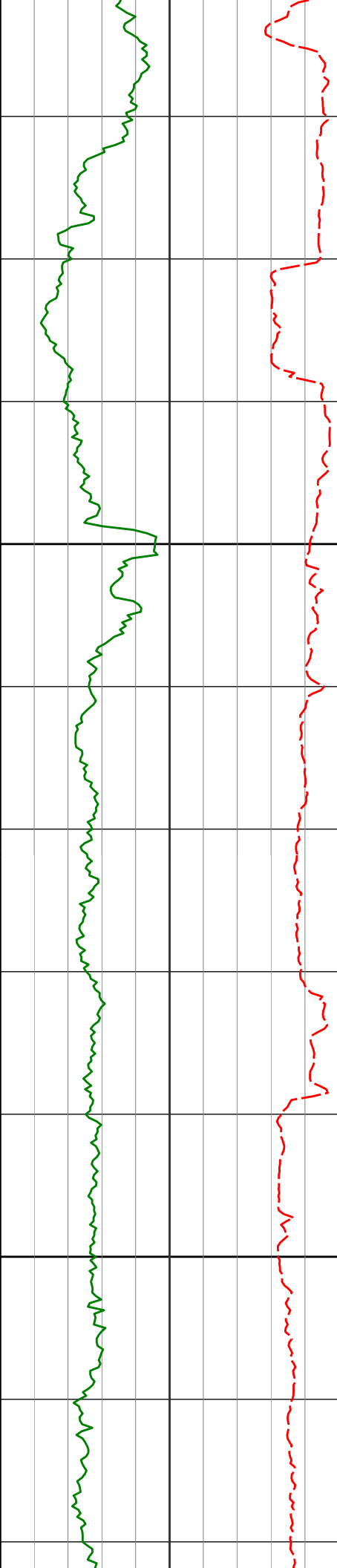
163.06°F

163.20°F

163.20°F







7200
200

7300

7146'

82.15°

270.96°

6788.46'

438.50'

7295'

87.47°

270.80°

6801.94'

586.41'

168.28°F

167.97°F

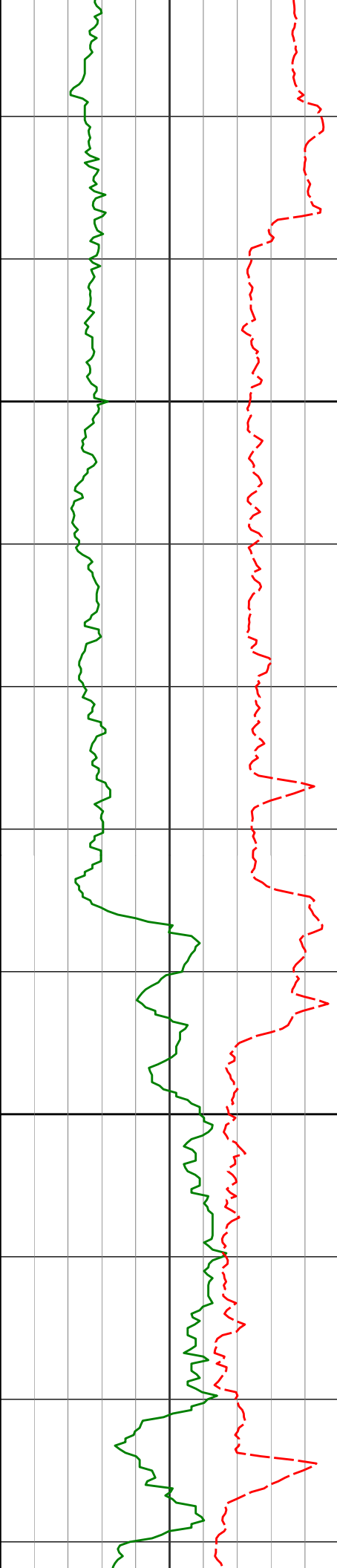
172.78°F

173.01°F

175.03°F

174.55°F

175.06°F



7400

7500

7390'

88.24°

269.49°

6805.50'

680.97'

7485'

91.20°

269.25°

6805.95'

775.46'

175.38°F

177.45°F

177.64°F

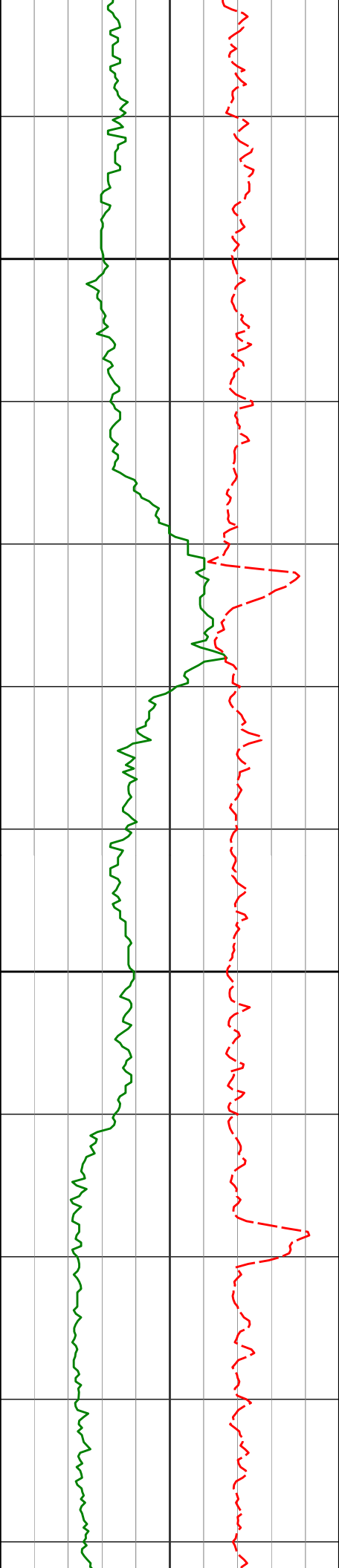
177.64°F

179.05°F

180.09°F

180.88°F

182.55°F



7579'

90.49°

269.47°

6804.56'

868.95'

7600

182.80°F

185.02°F

185.02°F

7671'

90.12°

269.57°

6804.07'

960.49'

7700

182.98°F

182.55°F

182.37°F

7763'

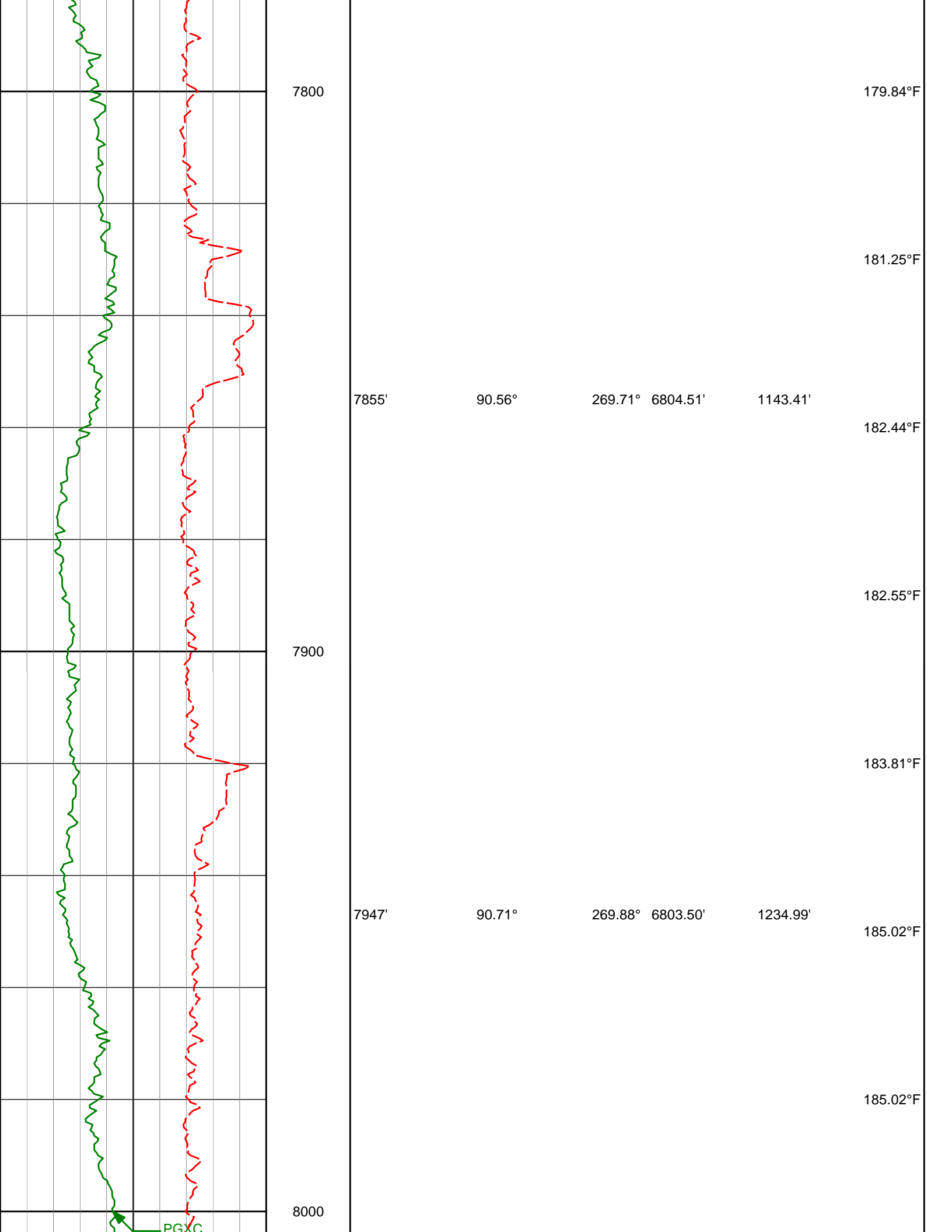
89.38°

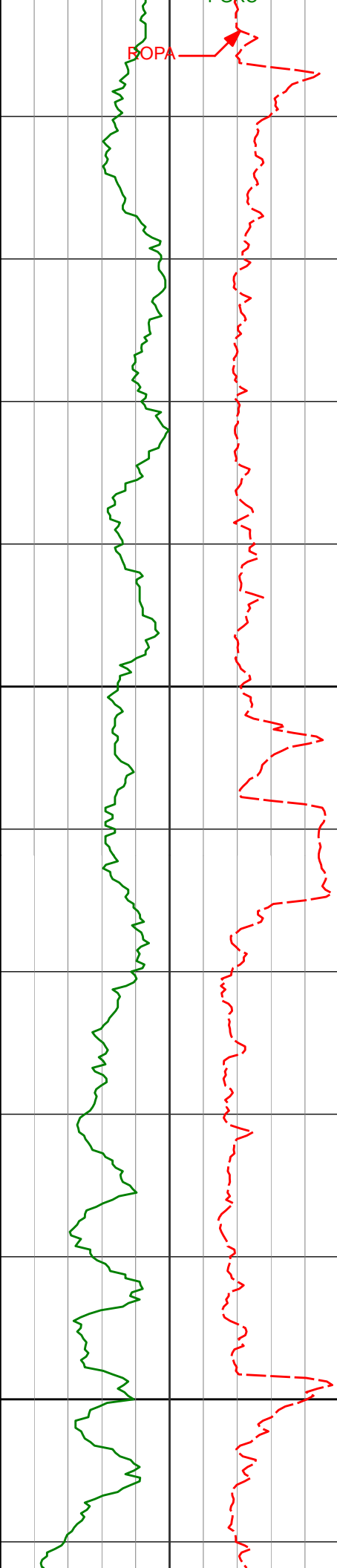
268.43°

6804.46'

1051.95'

180.33°F





8100

8200

8040'

8132'

91.36°

90.65°

269.64°

269.82°

6801.82'

6800.22'

1327.55'

1419.12'

184.83°F

187.28°F

182.90°F

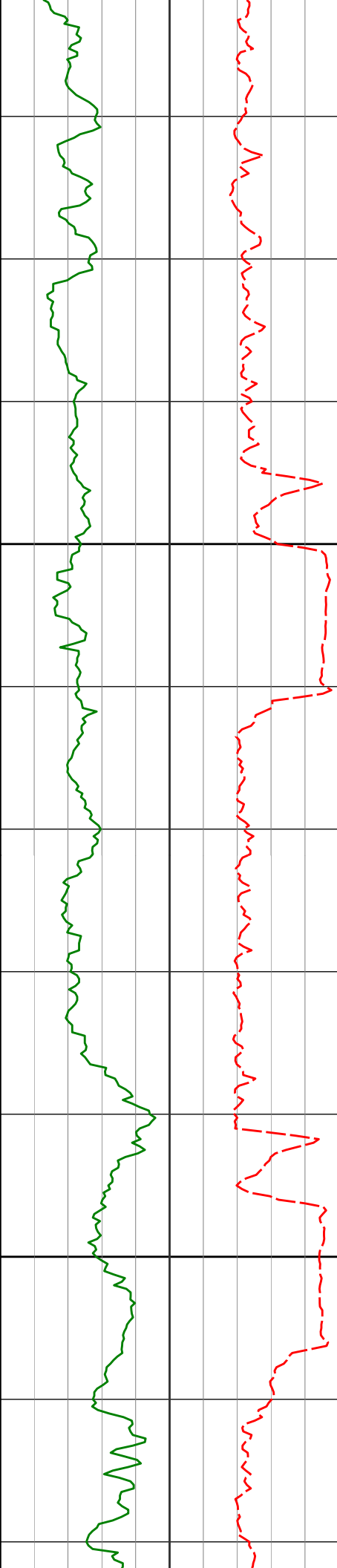
184.93°F

187.48°F

189.68°F

188.60°F

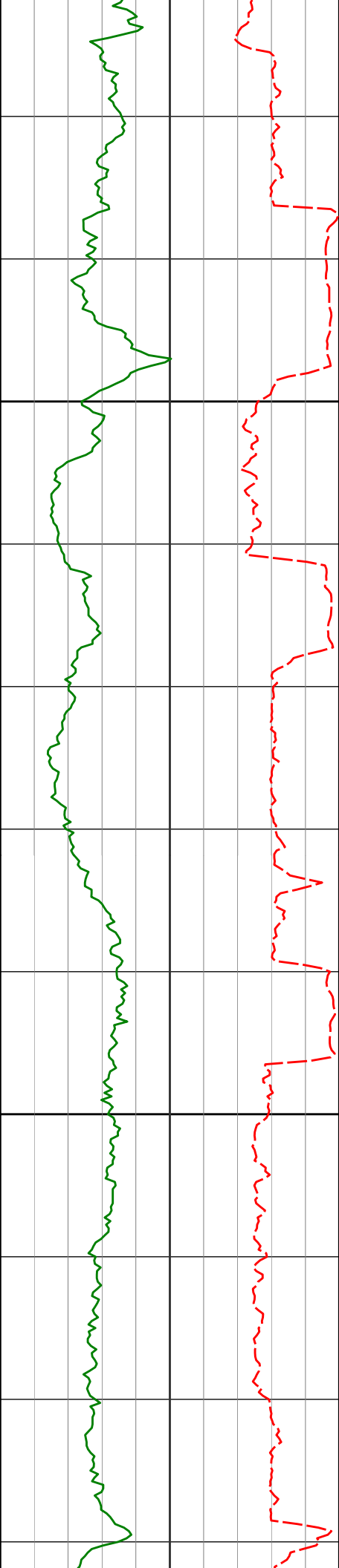
185.26°F



8300

8400

8224'	92.04°	268.91°	6798.06'	1510.61'	
					185.91°F
					186.63°F
					189.57°F
8316'	92.62°	269.46°	6794.32'	1602.02'	
					187.90°F
					188.08°F
					189.46°F
8407'	91.60°	269.85°	6790.97'	1692.53'	
					187.82°F



8500

8499'

91.20°

270.61°

6788.72'

1784.15'

187.07°F

188.10°F

187.69°F

188.28°F

190.41°F

8600

8590'

88.46°

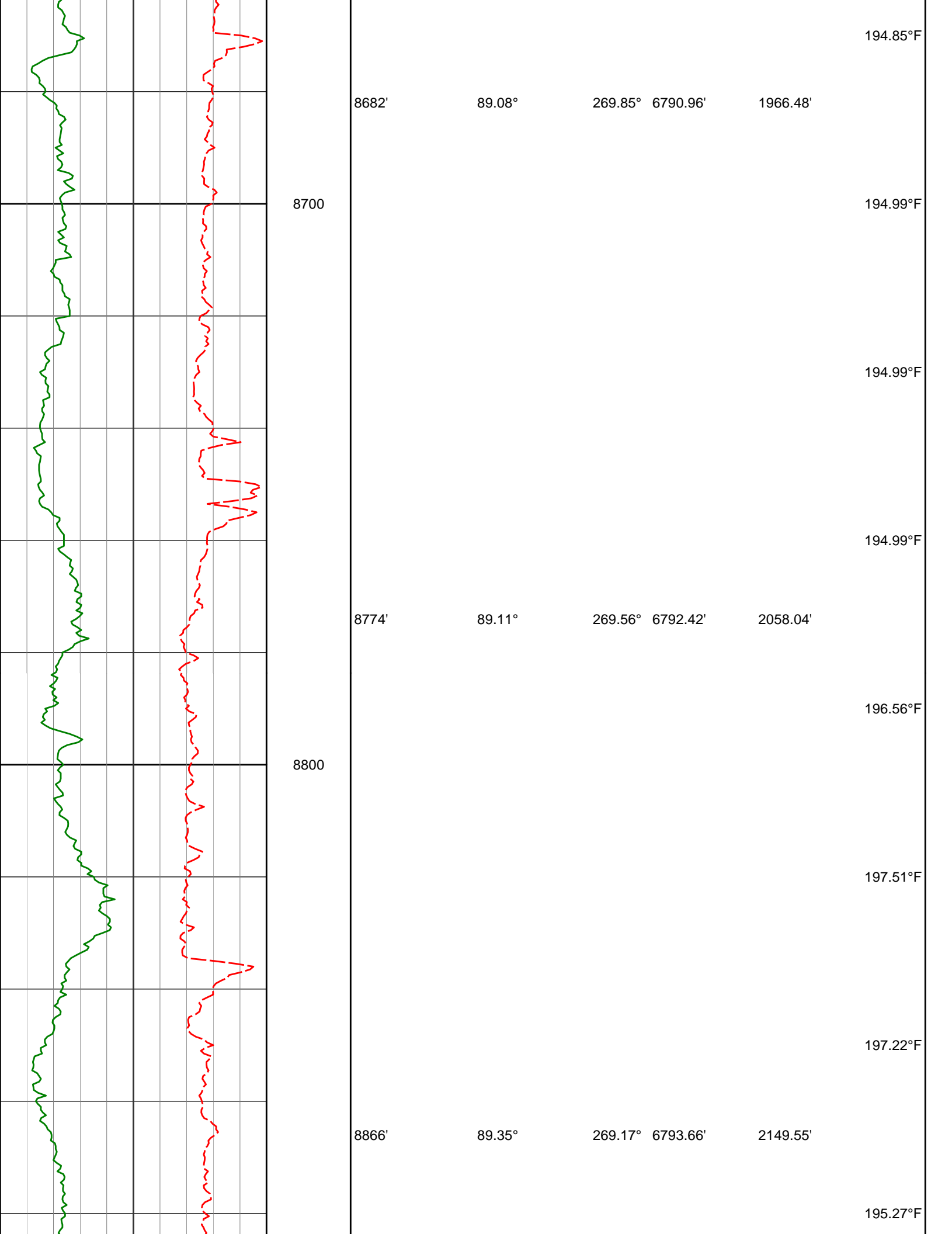
270.71°

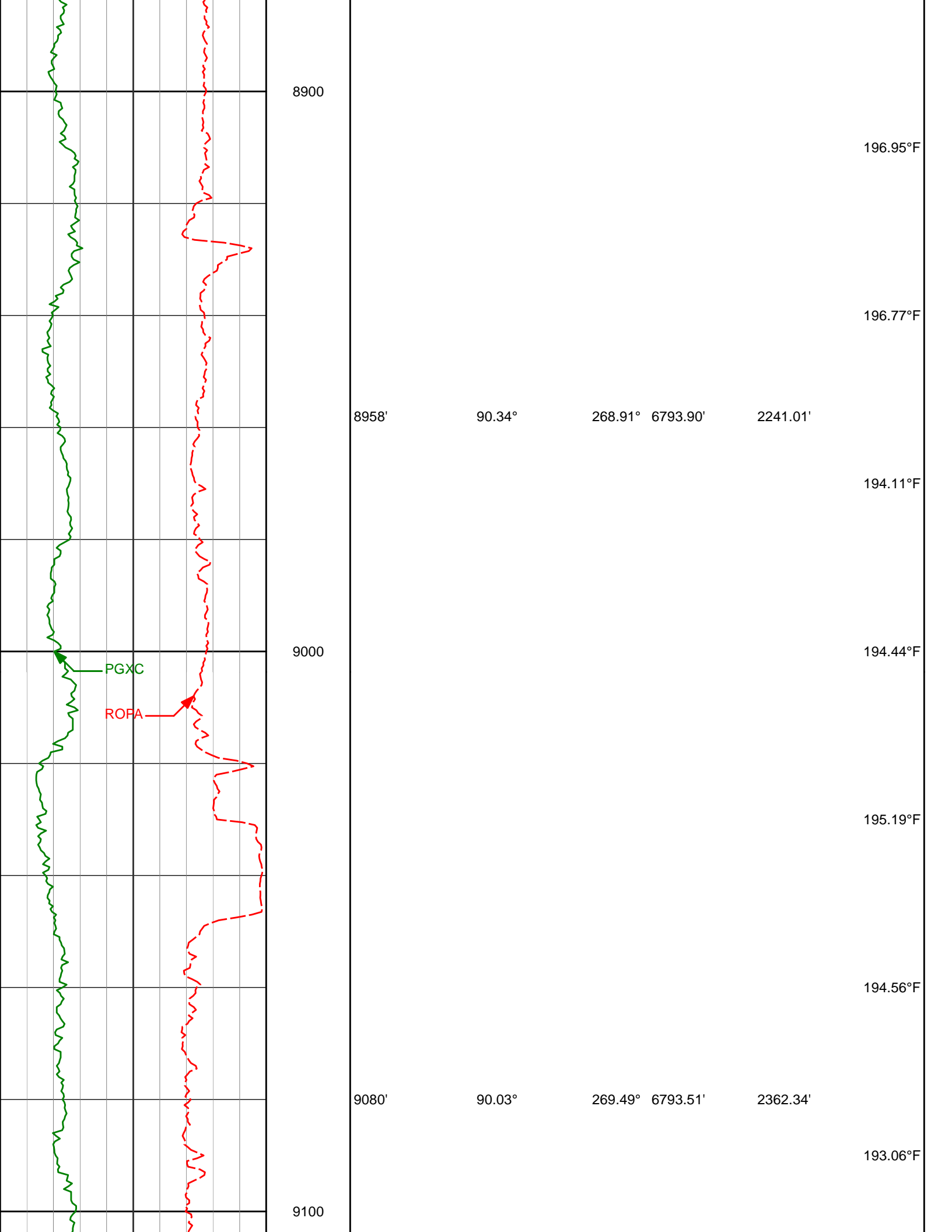
6788.99'

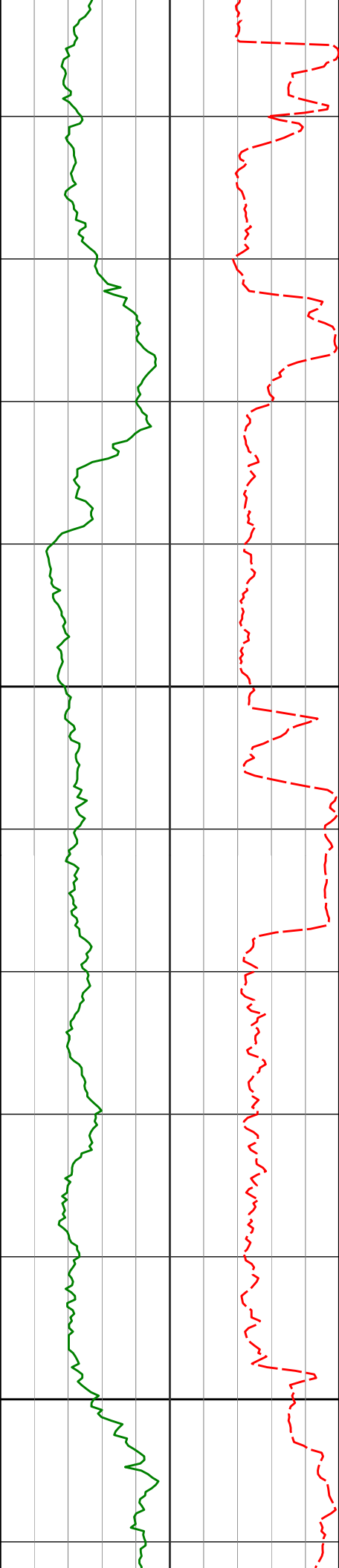
1874.85'

192.38°F

192.68°F







9200

9300

9141'

9233'

91.11°

91.11°

268.85°

269.86°

6792.90'

6791.12'

2422.99'

2514.49'

194.11°F

190.91°F

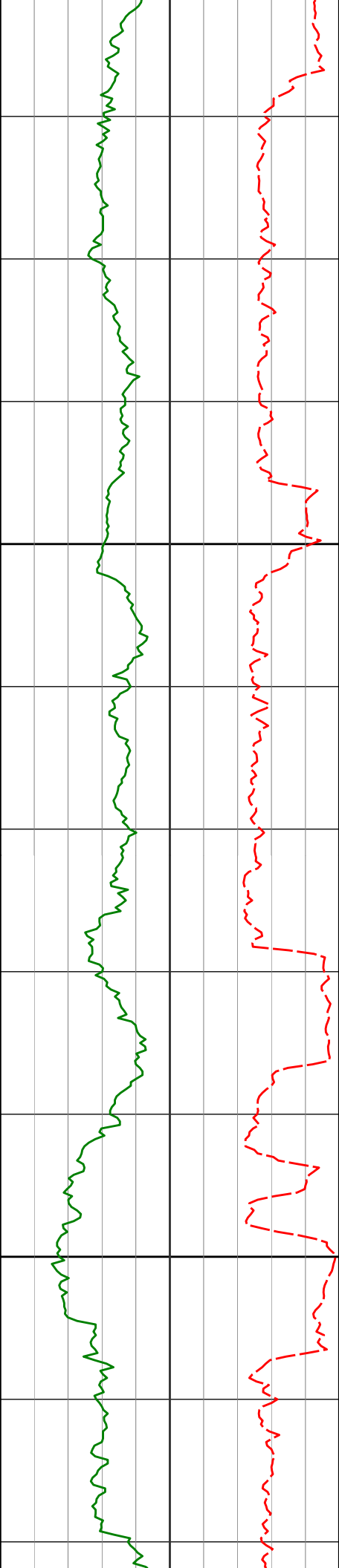
190.14°F

193.58°F

193.04°F

190.59°F

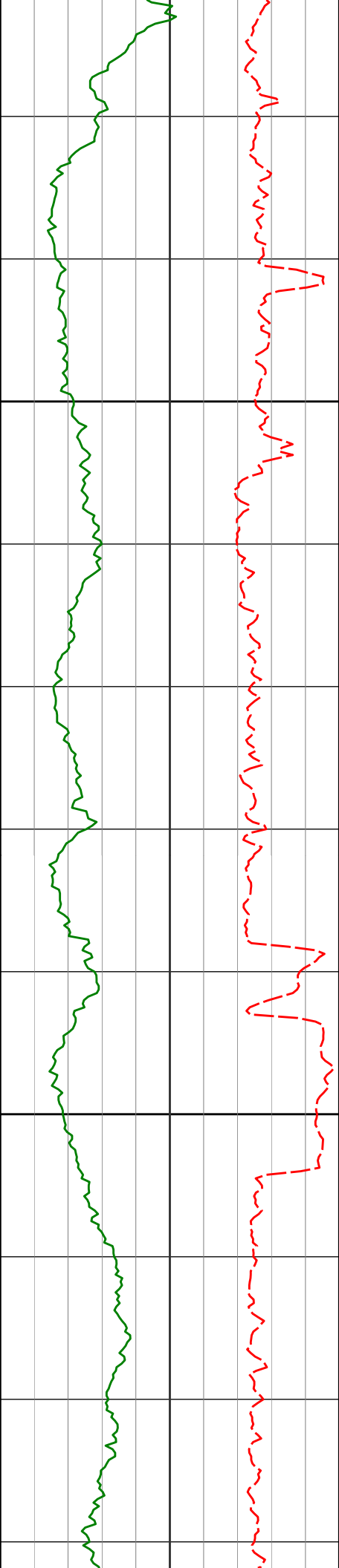
193.32°F



9400

9500

9327'	90.09°	270.56°	6790.13'	2608.12'	194.91°F
					195.25°F
					194.97°F
					194.56°F
9422'	91.45°	270.01°	6788.86'	2702.76'	194.37°F
					195.68°F
					197.51°F
9517'	88.95°	271.27°	6788.52'	2797.44'	198.93°F



9600

9611'

90.09°

270.75°

6789.31'

2891.18'

200.18°F

200.98°F

199.41°F

197.83°F

199.72°F

9700

9706'

90.46°

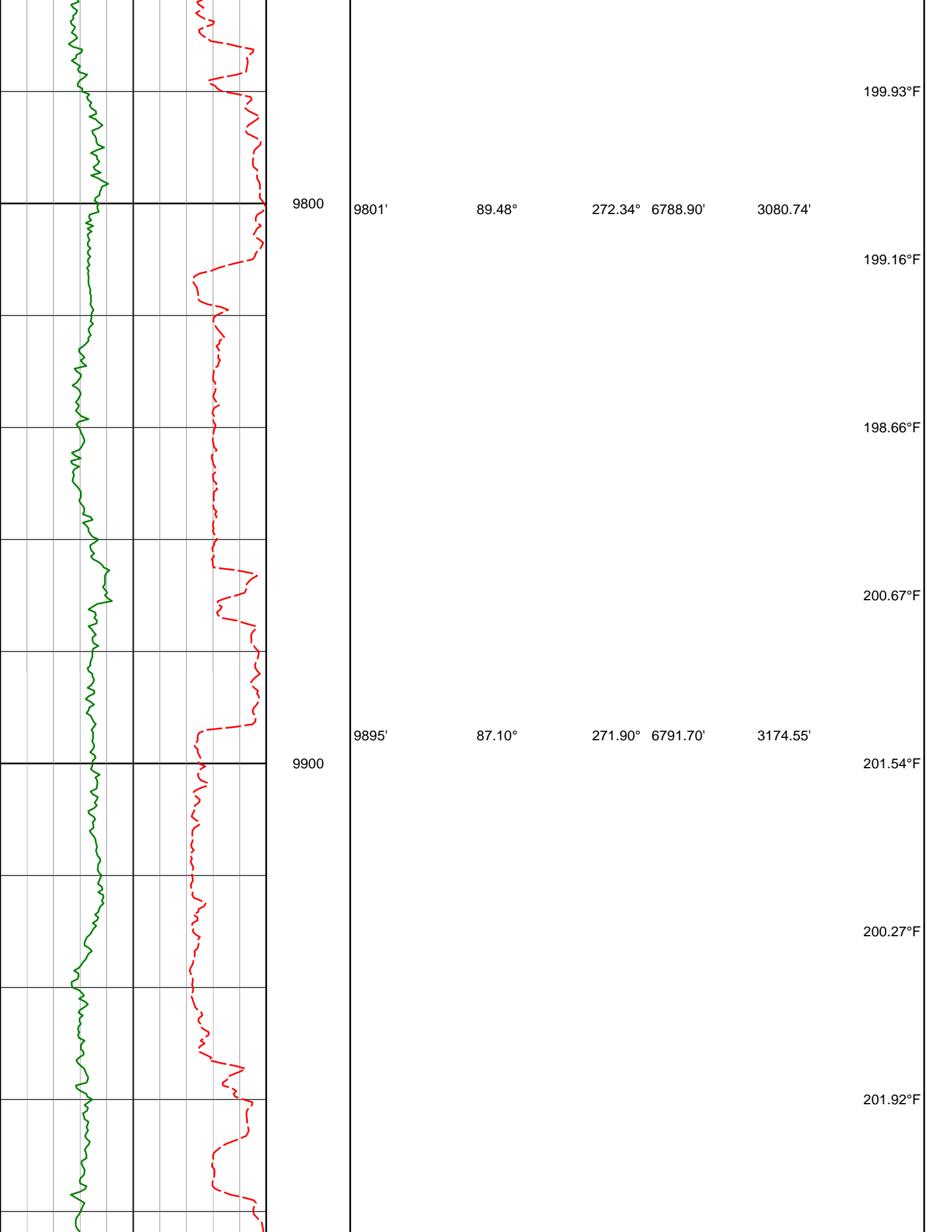
271.18°

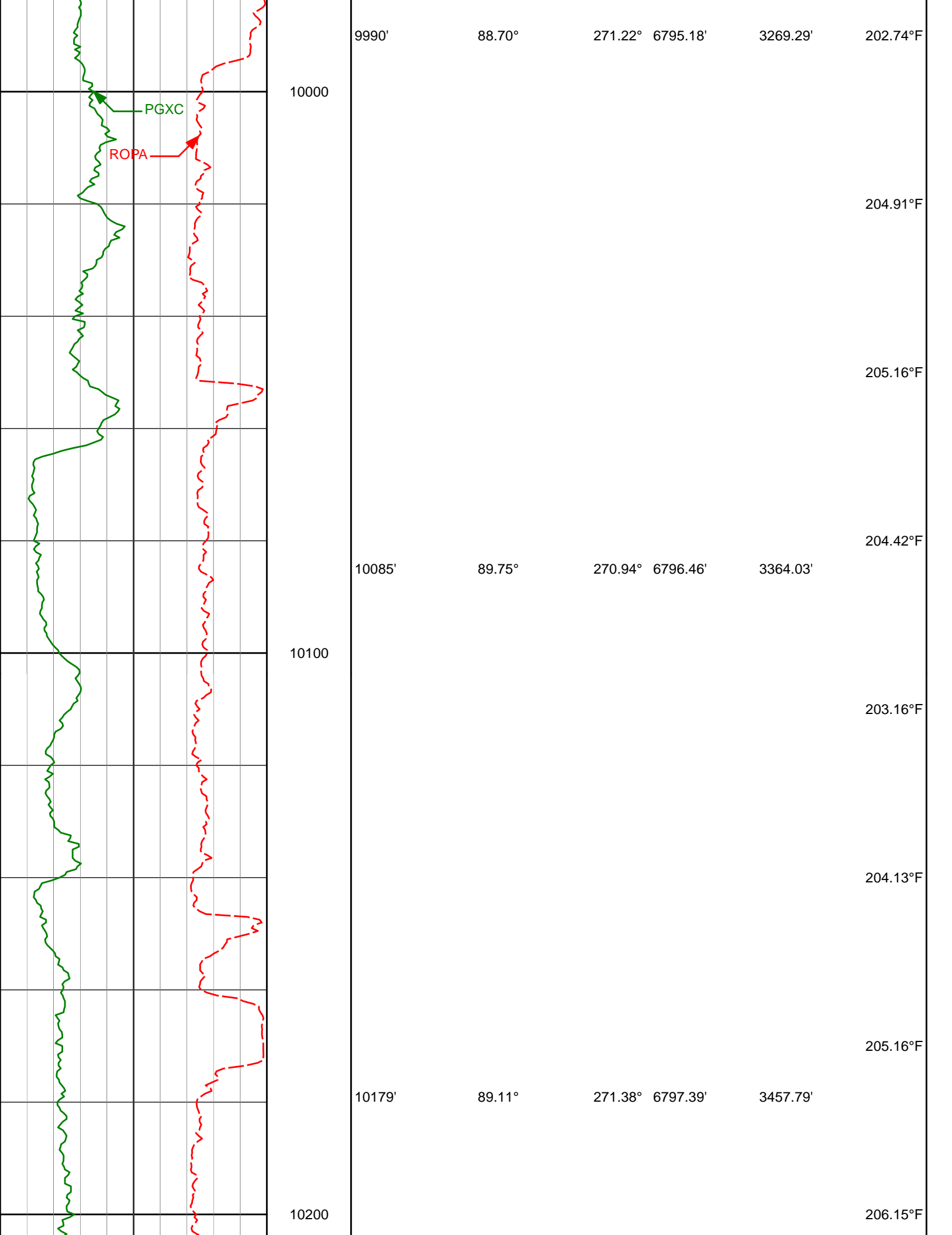
6788.85'

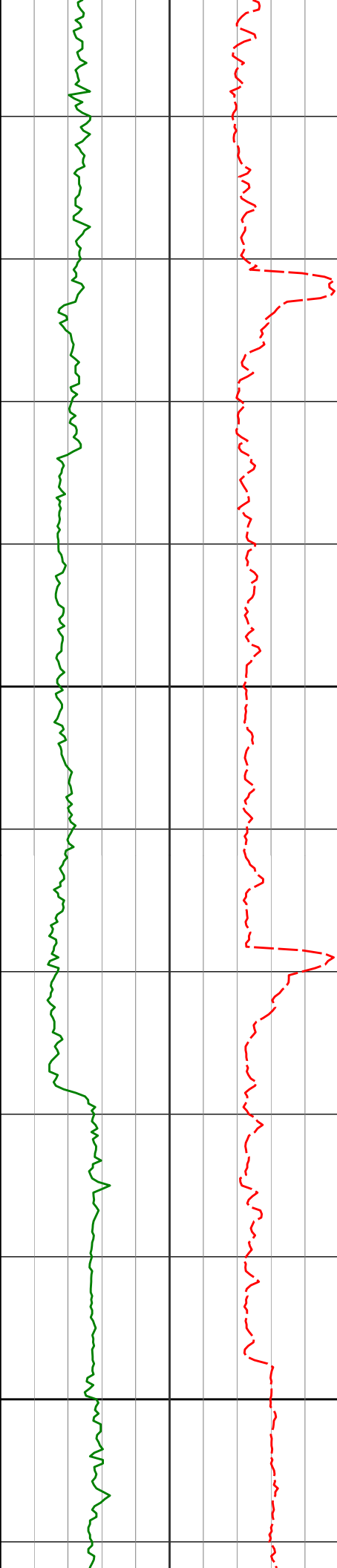
2985.92'

197.80°F

197.64°F







10274'

89.48°

270.11°

6798.57'

3552.49'

10300

10369'

91.70°

270.71°

6797.60'

3647.14'

10400

207.73°F

208.00°F

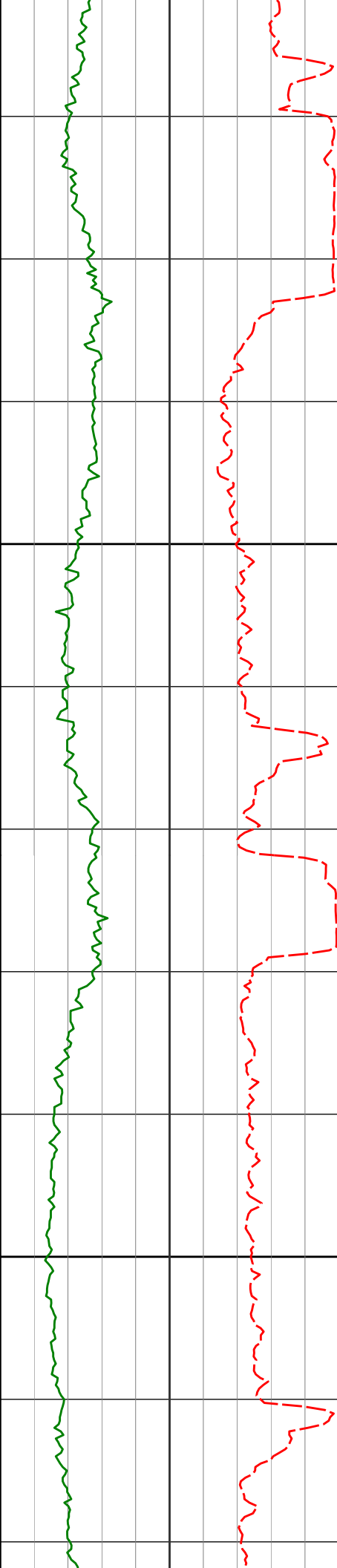
210.31°F

210.31°F

206.35°F

201.22°F

200.05°F



10500

10600

10463'

10558'

87.25°

89.20°

268.88°

271.24°

6798.46'

6801.40'

3740.69'

3835.25'

202.38°F

202.41°F

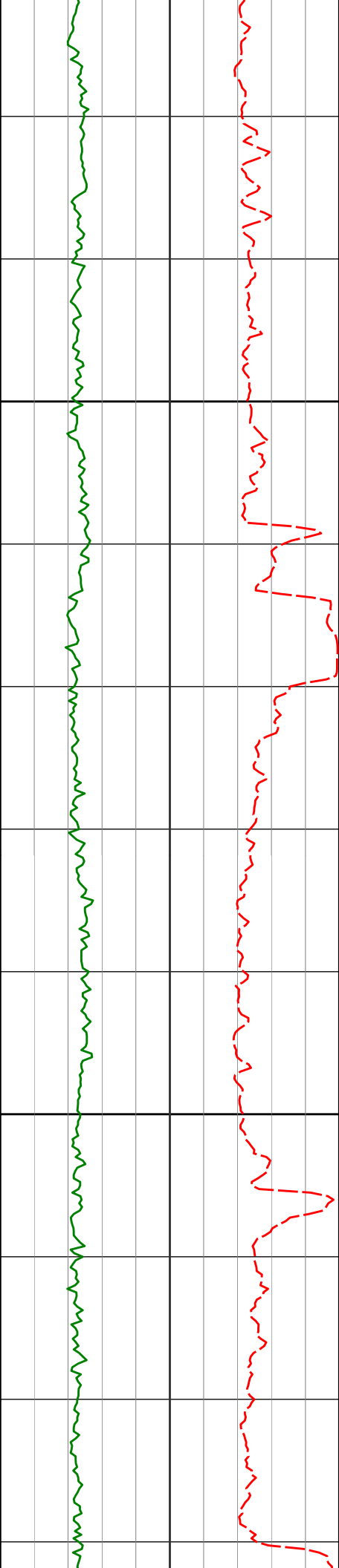
201.16°F

203.01°F

204.87°F

208.57°F

207.93°F



10653'

90.28°

270.83°

6801.84'

3929.99'

206.51°F

10700

205.68°F

206.36°F

10747'

89.01°

269.62°

6802.42'

4023.63'

208.08°F

209.00°F

10800

208.26°F

208.73°F

10842'

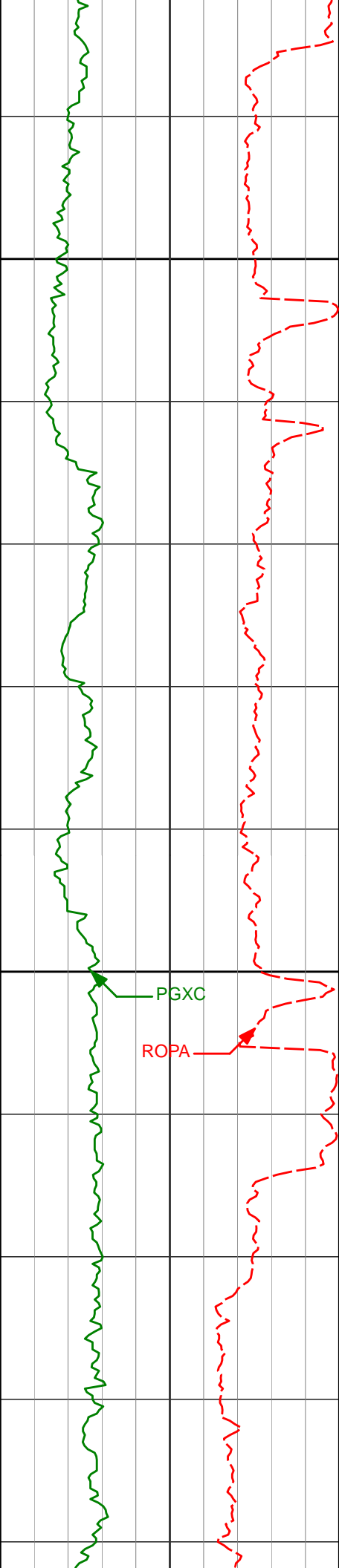
88.64°

269.18°

6804.36'

4118.11'

209.37°F



10900

10937'

88.64°

269.82°

6806.61'

4212.61'

11000

11032'

88.89°

270.95°

6808.65'

4307.25'

210.31°F

211.73°F

210.43°F

210.14°F

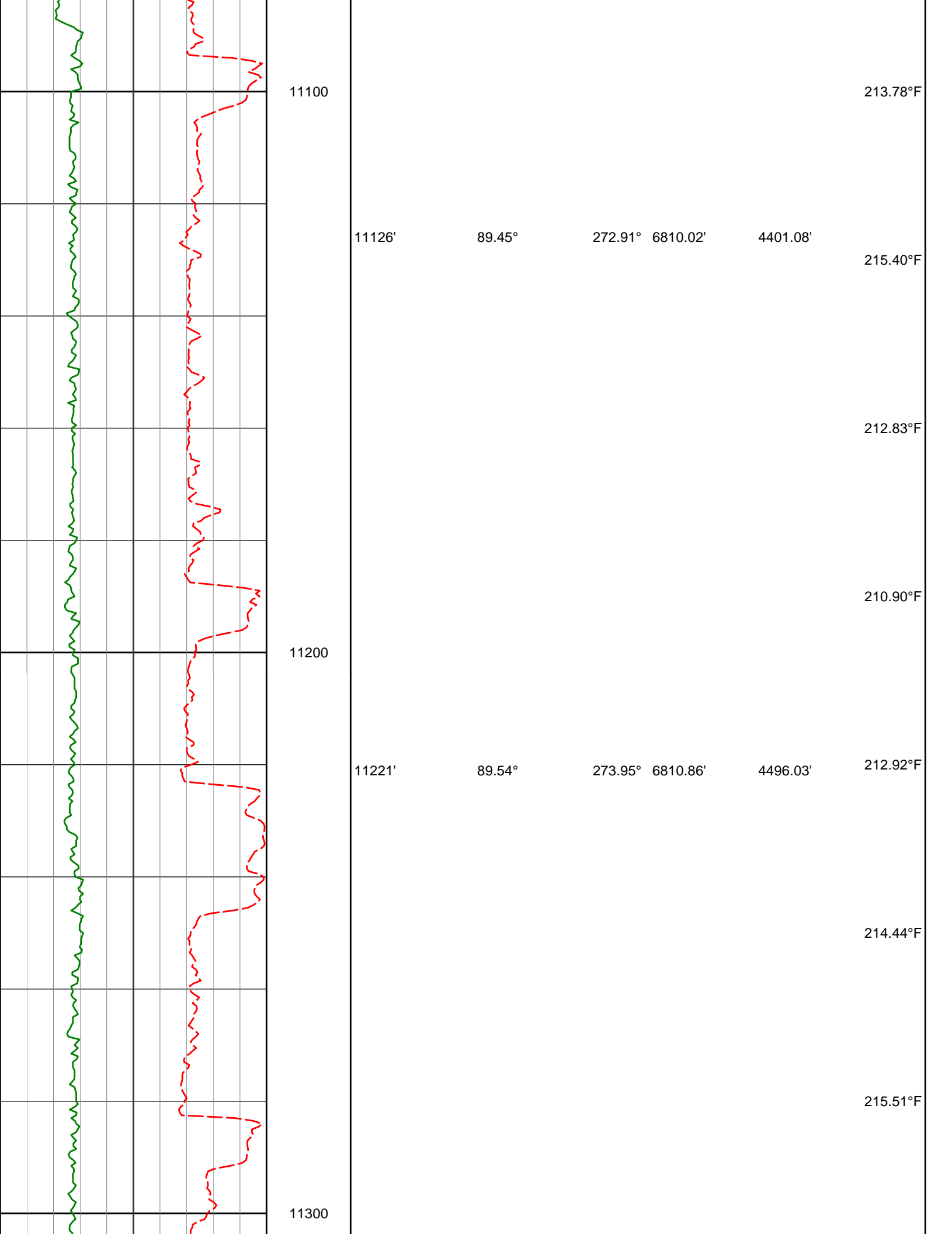
212.54°F

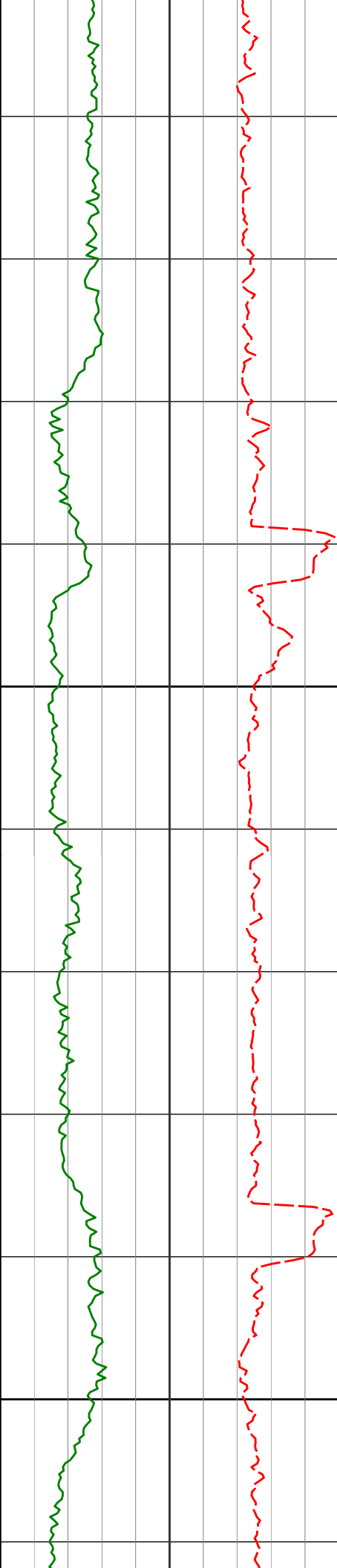
212.92°F

212.92°F

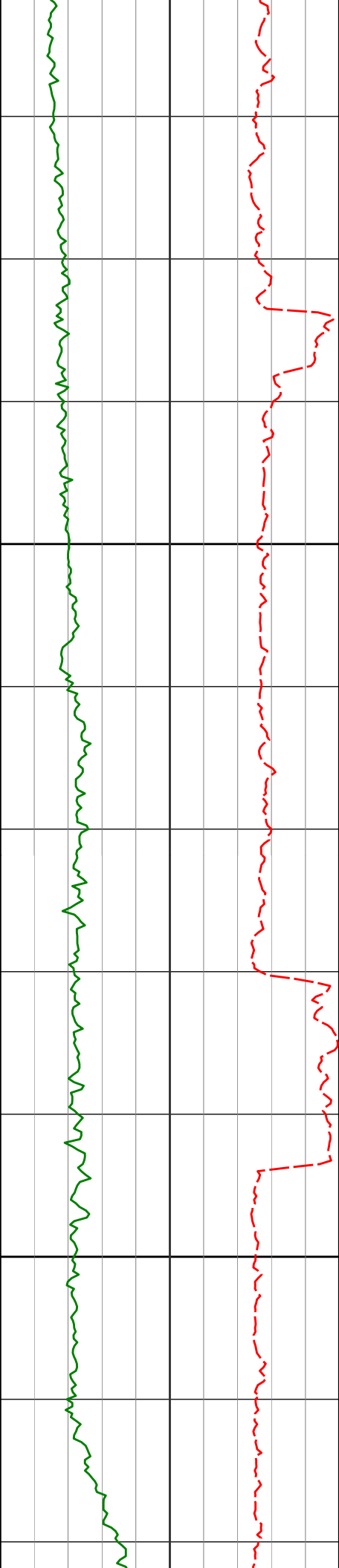
PGXC

ROPA





					215.51°F
11316'	89.97°	271.74°	6811.27'	4590.94'	
					215.51°F
					215.75°F
11400					216.80°F
11410'	90.06°	271.42°	6811.24'	4684.75'	
					215.84°F
					218.14°F
					218.14°F
11500					
11504'	90.56°	270.60°	6810.74'	4778.49'	
					218.14°F



11600

11700

11599'

11693'

91.63°

91.29°

270.67°

270.13°

6808.92'

6806.52'

4873.17'

4966.80'

219.82°F

218.55°F

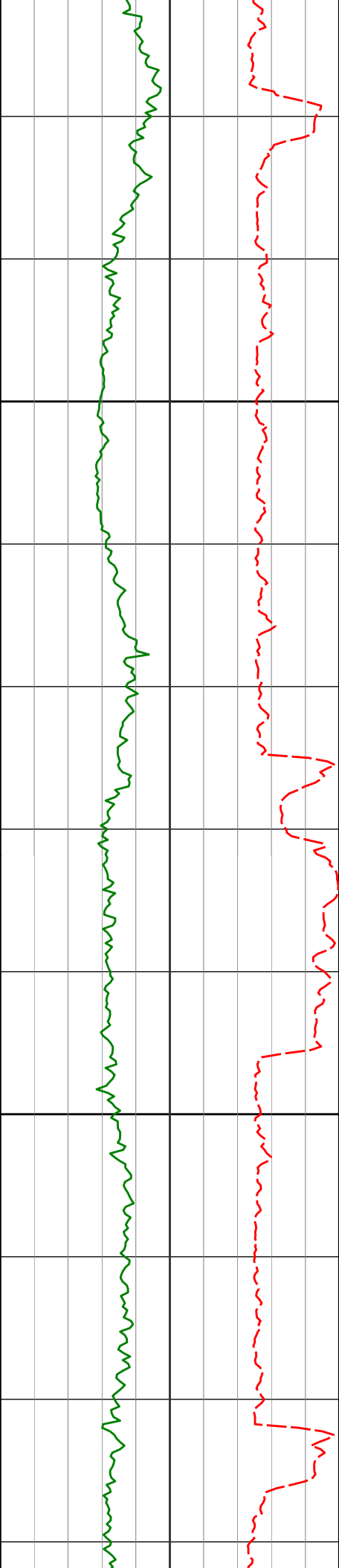
215.80°F

215.32°F

215.88°F

217.91°F

218.14°F



11800

11900

11788'

92.25°

269.16°

6803.58'

5061.30'

219.76°F

217.19°F

215.79°F

215.92°F

11882'

90.25°

268.04°

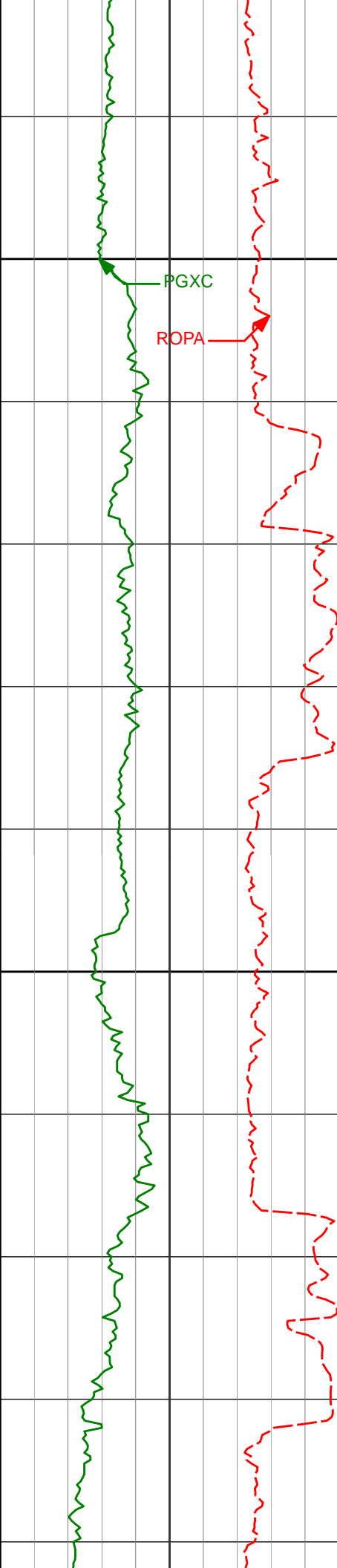
6801.53'

5154.64'

217.86°F

218.14°F

220.51°F



11976'

91.20°

268.56° 6800.35'

5247.95'

218.44°F

12000

216.12°F

PGXC

ROPA

218.14°F

219.14°F

12071'

90.52°

269.27° 6798.91'

5342.36'

217.13°F

12100

217.79°F

220.38°F

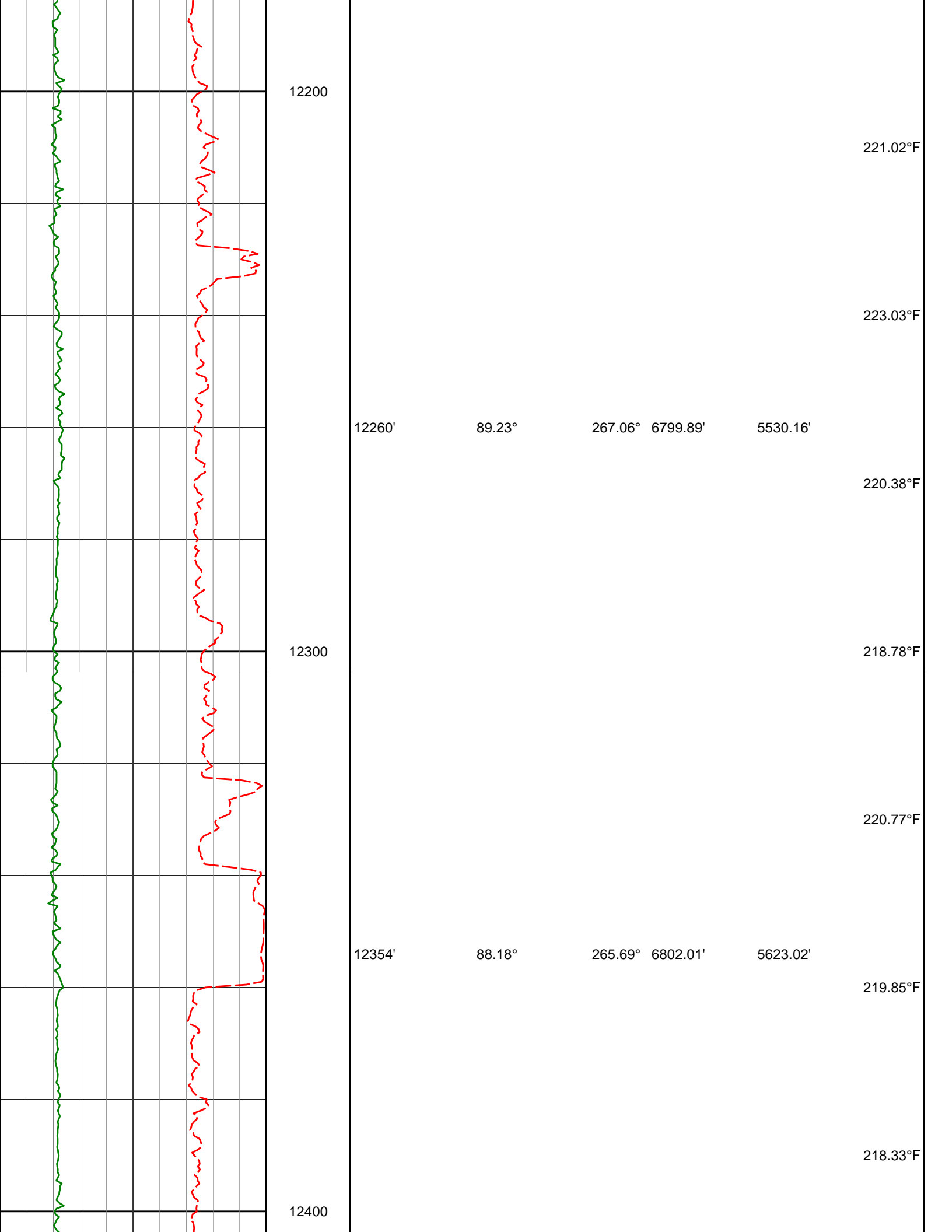
12165'

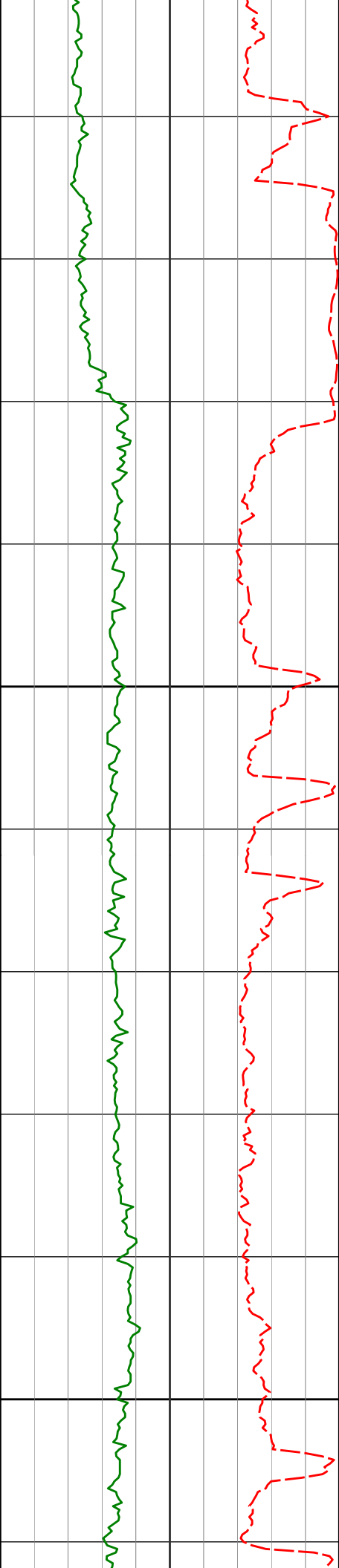
89.54°

269.53° 6798.86'

5435.87'

220.77°F





12449'

90.15°

269.74°

6803.39'

5717.16'

219.80°F

220.77°F

12500

221.23°F

223.41°F

12543'

89.08°

266.38°

6804.02'

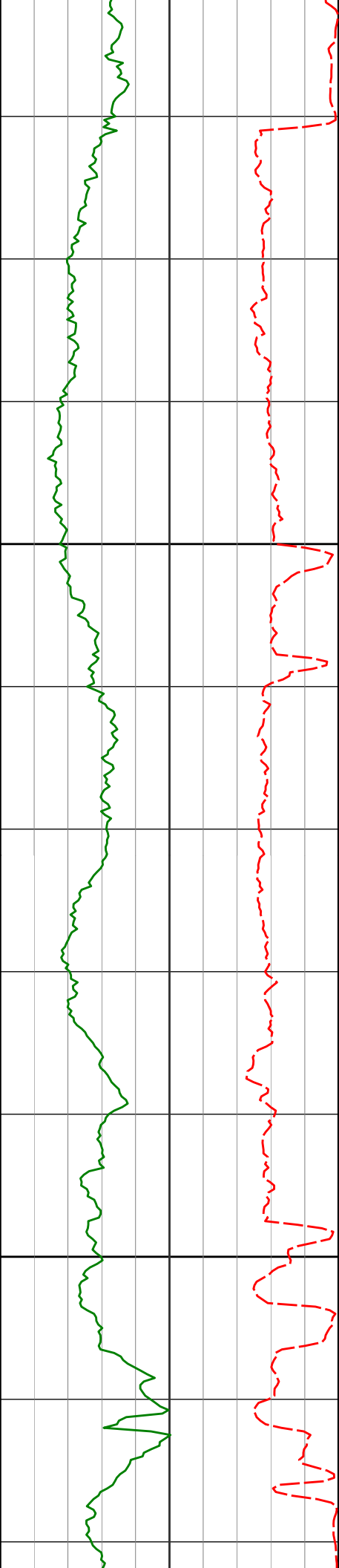
5810.41'

221.98°F

220.94°F

12600

220.77°F



12638'

90.65°

271.90°

6804.25'

5904.84'

223.20°F

223.53°F

225.77°F

12700

225.40°F

12732'

91.60°

272.05°

6802.41'

5998.67'

222.89°F

221.05°F

12800

222.33°F

12827'

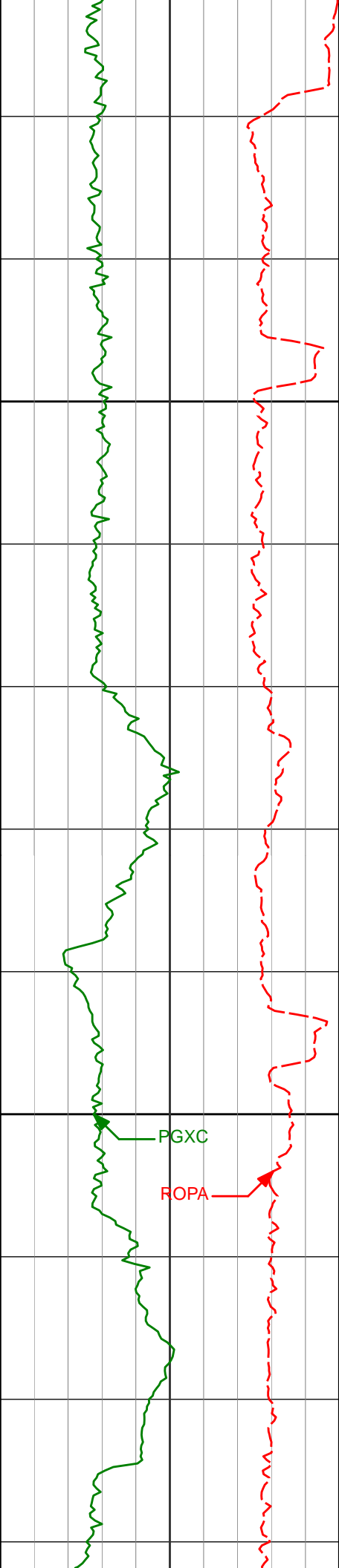
92.72°

271.07°

6798.83'

6093.40'

223.41°F



12900

13000

12921'

13016'

88.74°

88.12°

267.32°

267.00°

6797.64'

6800.24'

6186.84'

6280.86'

224.45°F

225.46°F

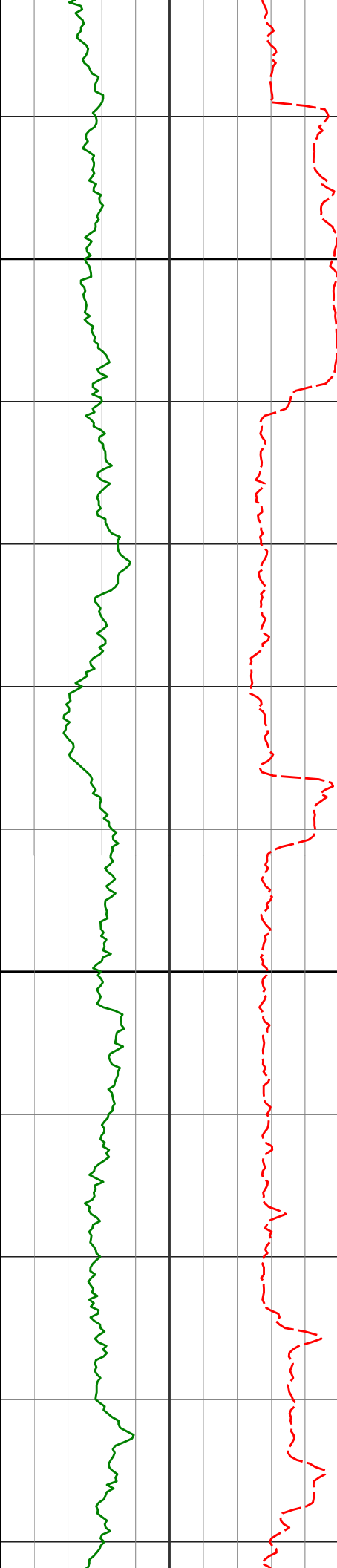
223.99°F

225.93°F

226.79°F

224.56°F

222.29°F



13100

13200

13110'

13205'

88.83°

89.38°

268.18°

268.88°

6802.75'

6804.23'

6373.99'

6468.33'

223.33°F

225.61°F

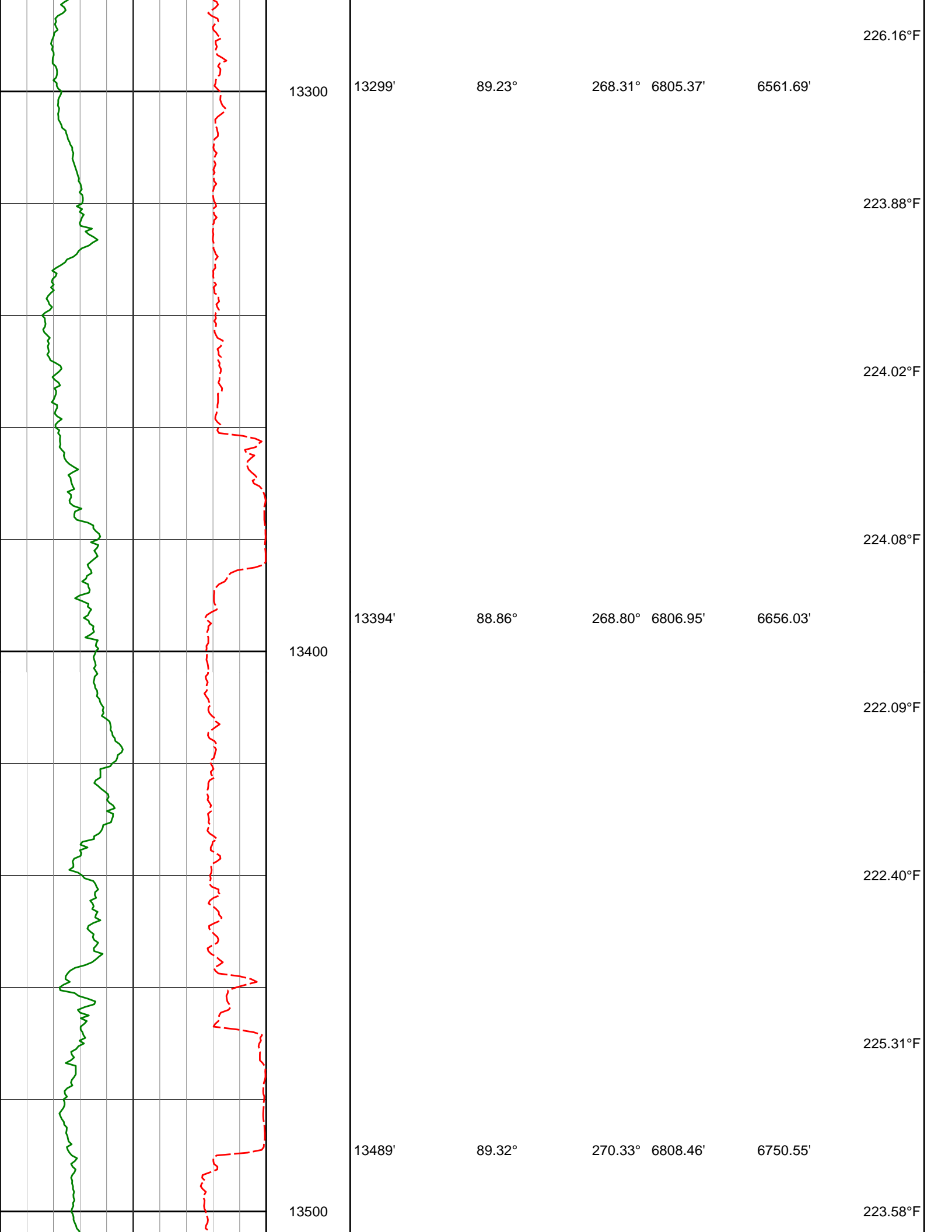
226.08°F

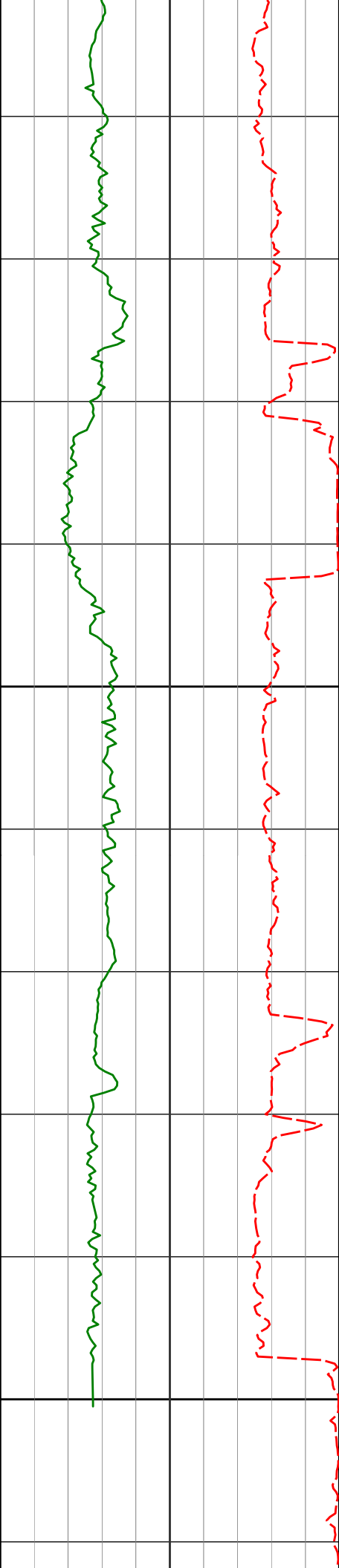
226.59°F

227.66°F

228.59°F

229.00°F





13600

13700

13583'

13678'

13703'

89.29°

89.88°

90.46°

271.38°

268.78°

269.04°

6809.60'

6810.28'

6810.21'

6844.27'

6938.88'

6963.73'

223.16°F

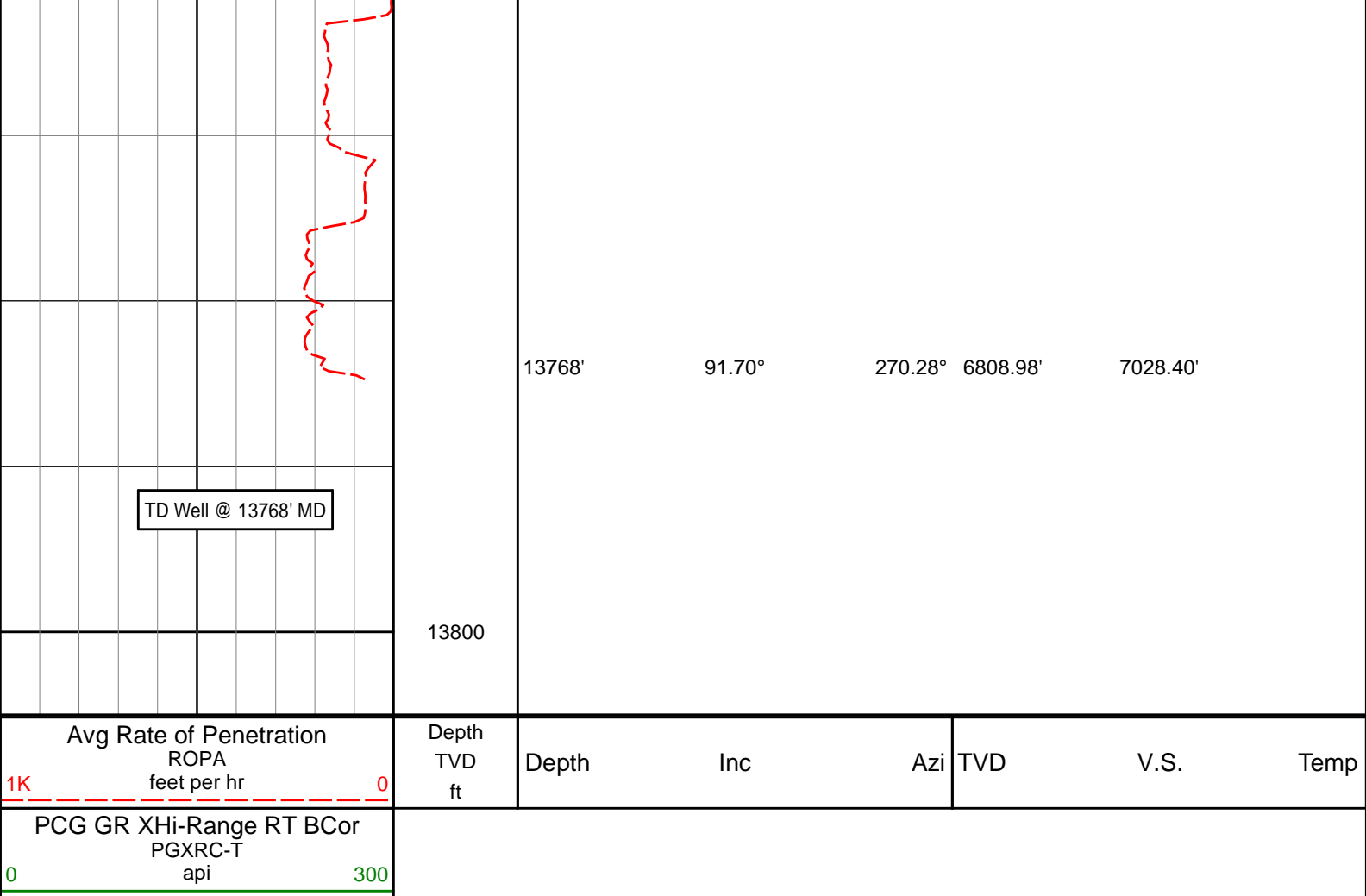
225.83°F

226.08°F

224.35°F

223.54°F

226.21°F



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA11-690
Wattenburg
Weld Colorado
USA
CA-XX-0902422703
Tied in @ Surface
Final survey projected to bit.

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
639.00	0.35	281.95	639.00	0.41 N	1.92 W	1.95	0.05
731.00	0.33	277.10	730.99	0.50 N	2.46 W	2.49	0.04
823.00	0.40	295.41	822.99	0.67 N	3.01 W	3.06	0.15
916.00	0.56	293.95	915.99	0.99 N	3.72 W	3.80	0.17
1008.00	0.52	269.91	1007.99	1.18 N	4.56 W	4.64	0.25
1100.00	0.59	283.75	1099.98	1.29 N	5.44 W	5.53	0.16
1210.00	0.31	105.19	1209.98	1.34 N	5.70 W	5.80	0.82
1301.00	0.28	117.27	1300.98	1.18 N	5.26 W	5.34	0.08
1394.00	0.34	77.61	1393.98	1.13 N	4.78 W	4.86	0.24

Wells Ranch AA11-690

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1486.00	0.44	68.06	1485.97	1.32 N	4.19 W	4.29	0.12
1579.00	1.58	38.47	1578.96	2.46 N	3.06 W	3.27	1.31
1671.00	3.10	29.48	1670.88	5.62 N	1.05 W	1.56	1.70
1763.00	4.61	23.29	1762.67	11.18 N	1.64 E	-0.61	1.70
1946.00	8.31	23.45	1944.48	30.07 N	9.81 E	-7.03	2.02
2038.00	9.07	21.88	2035.42	42.89 N	15.16 E	-11.18	0.86
2129.00	9.22	17.83	2125.27	56.49 N	20.06 E	-14.83	0.73
2221.00	8.98	14.87	2216.11	70.44 N	24.16 E	-17.64	0.57
2313.00	10.08	12.07	2306.84	85.25 N	27.69 E	-19.80	1.29
2405.00	9.39	11.05	2397.51	100.49 N	30.81 E	-21.52	0.77
2497.00	8.58	17.19	2488.39	114.40 N	34.27 E	-23.70	1.36
2588.00	9.57	19.08	2578.25	128.03 N	38.75 E	-26.92	1.14
2680.00	9.79	15.00	2668.94	142.81 N	43.27 E	-30.07	0.78
2772.00	9.08	13.10	2759.69	157.44 N	46.94 E	-32.40	0.83
2866.00	8.52	12.42	2852.59	171.46 N	50.12 E	-34.28	0.62
2961.00	9.38	18.58	2946.43	185.67 N	54.10 E	-36.95	1.36
3056.00	9.05	13.35	3040.21	200.28 N	58.29 E	-39.80	0.95
3150.00	9.27	13.21	3133.01	214.85 N	61.73 E	-41.89	0.24
3245.00	8.81	12.57	3226.83	229.41 N	65.07 E	-43.89	0.50
3340.00	8.52	12.06	3320.74	243.40 N	68.12 E	-45.65	0.31
3434.00	7.79	11.86	3413.79	256.44 N	70.89 E	-47.22	0.79
3529.00	8.46	13.38	3507.84	269.54 N	73.83 E	-48.95	0.74
3623.00	8.78	12.94	3600.78	283.25 N	77.03 E	-50.89	0.35
3718.00	9.42	25.68	3694.59	297.32 N	82.02 E	-54.58	2.22
3813.00	10.47	28.17	3788.16	311.94 N	89.47 E	-60.66	1.19
3907.00	11.73	26.67	3880.40	328.00 N	97.79 E	-67.48	1.38
4001.00	10.95	25.00	3972.57	344.62 N	105.84 E	-73.99	0.90
4095.00	8.87	26.51	4065.16	359.20 N	112.85 E	-79.64	2.23
4190.00	8.76	28.89	4159.04	372.08 N	119.62 E	-85.20	0.40
4284.00	8.15	29.47	4252.02	384.16 N	126.35 E	-90.81	0.65
4378.00	8.13	23.95	4345.07	396.04 N	132.33 E	-95.68	0.83
4473.00	8.56	19.73	4439.07	408.83 N	137.45 E	-99.61	0.78
4567.00	9.31	11.22	4531.93	422.87 N	141.29 E	-102.15	1.62
4662.00	8.62	7.62	4625.77	437.47 N	143.73 E	-103.25	0.93
4757.00	8.64	13.85	4719.69	451.46 N	146.38 E	-104.62	0.98
4851.00	8.08	13.13	4812.69	464.75 N	149.57 E	-106.59	0.60
4946.00	8.88	15.38	4906.66	478.32 N	153.03 E	-108.80	0.91
5040.00	7.70	15.22	4999.67	491.39 N	156.61 E	-111.17	1.26
5135.00	8.97	19.61	5093.67	504.50 N	160.77 E	-114.11	1.50
5229.00	8.63	17.93	5186.56	518.12 N	165.40 E	-117.48	0.46
5324.00	7.22	16.94	5280.65	530.60 N	169.33 E	-120.26	1.49
5418.00	8.28	17.28	5373.79	542.72 N	173.06 E	-122.87	1.13
5512.00	8.16	20.62	5466.83	555.42 N	177.42 E	-126.05	0.52
5607.00	8.55	18.04	5560.82	568.45 N	181.98 E	-129.41	0.57
5701.00	10.73	21.72	5653.49	583.22 N	187.38 E	-133.44	2.41
5796.00	6.19	13.89	5747.43	596.41 N	191.89 E	-136.72	4.92
5890.00	3.73	15.25	5841.07	604.28 N	193.91 E	-138.02	2.61
5985.00	2.21	0.20	5935.95	609.10 N	194.73 E	-138.40	1.79
6080.00	0.80	2.40	6030.91	611.59 N	194.76 E	-138.20	1.49
6175.00	0.80	83.02	6125.90	612.34 N	195.45 E	-138.82	1.09
6223.00	2.12	297.24	6173.89	612.79 N	194.99 E	-138.32	5.87
6269.00	6.51	283.94	6219.75	613.80 N	191.70 E	-134.95	9.73
6364.00	15.35	267.70	6312.96	614.60 N	173.87 E	-117.12	9.76
6459.00	20.83	275.75	6403.24	615.79 N	144.48 E	-87.74	6.32
6553.00	30.46	278.20	6487.88	620.87 N	104.17 E	-47.14	10.31

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Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
6648.00	40.55	269.24	6565.17	623.91 N	49.28 E	7.80	11.92
6743.00	48.24	267.38	6633.00	621.88 N	17.10 W	73.71	8.22
6837.00	58.03	273.04	6689.36	622.39 N	92.16 W	148.51	11.46
6932.00	68.61	270.98	6731.96	625.29 N	176.86 W	233.12	11.31
6980.00	71.99	271.40	6748.14	626.24 N	222.04 W	278.20	7.10
7027.00	73.25	270.37	6762.18	626.93 N	266.88 W	322.92	3.39
7075.00	75.96	270.52	6774.92	627.29 N	313.16 W	369.03	5.66
7122.00	79.94	271.28	6784.73	628.02 N	359.10 W	414.86	8.61
7146.00	82.15	270.96	6788.46	628.48 N	382.81 W	438.50	9.29
7295.00	87.47	270.80	6801.94	630.75 N	531.12 W	586.41	3.57
7390.00	88.24	269.49	6805.50	630.99 N	626.05 W	680.97	1.59
7485.00	91.20	269.25	6805.95	629.95 N	721.04 W	775.46	3.13
7579.00	90.49	269.47	6804.56	628.89 N	815.02 W	868.95	0.79
7671.00	90.12	269.57	6804.07	628.12 N	907.02 W	960.49	0.42
7763.00	89.38	268.43	6804.46	626.51 N	999.00 W	1051.95	1.47
7855.00	90.56	269.71	6804.51	625.01 N	1090.98 W	1143.41	1.89
7947.00	90.71	269.88	6803.50	624.68 N	1182.98 W	1234.99	0.25
8040.00	91.36	269.64	6801.82	624.29 N	1275.96 W	1327.55	0.74
8132.00	90.65	269.82	6800.22	623.86 N	1367.94 W	1419.12	0.80
8224.00	92.04	268.91	6798.06	622.84 N	1459.91 W	1510.61	1.81
8316.00	92.62	269.46	6794.32	621.53 N	1551.82 W	1602.02	0.87
8407.00	91.60	269.85	6790.97	620.98 N	1642.76 W	1692.53	1.20
8499.00	91.20	270.61	6788.72	621.35 N	1734.73 W	1784.15	0.93
8590.00	88.46	270.71	6788.99	622.39 N	1825.72 W	1874.85	3.02
8682.00	89.08	269.85	6790.96	622.83 N	1917.69 W	1966.48	1.15
8774.00	89.11	269.56	6792.42	622.36 N	2009.68 W	2058.04	0.32
8866.00	89.35	269.17	6793.66	621.34 N	2101.66 W	2149.55	0.50
8958.00	90.34	268.91	6793.90	619.79 N	2193.65 W	2241.01	1.11
9080.00	90.03	269.49	6793.51	618.08 N	2315.64 W	2362.34	0.54
9141.00	91.11	268.85	6792.90	617.20 N	2376.63 W	2422.99	2.05
9233.00	91.11	269.86	6791.12	616.17 N	2468.60 W	2514.49	1.09
9327.00	90.09	270.56	6790.13	616.51 N	2562.59 W	2608.12	1.31
9422.00	91.45	270.01	6788.86	616.98 N	2657.58 W	2702.76	1.54
9517.00	88.95	271.27	6788.52	618.05 N	2752.57 W	2797.44	2.95
9611.00	90.09	270.75	6789.31	619.71 N	2846.55 W	2891.18	1.34
9706.00	90.46	271.18	6788.85	621.30 N	2941.53 W	2985.92	0.60
9801.00	89.48	272.34	6788.90	624.22 N	3036.48 W	3080.74	1.60
9895.00	87.10	271.90	6791.70	627.70 N	3130.37 W	3174.55	2.57
9990.00	88.70	271.22	6795.18	630.28 N	3225.27 W	3269.29	1.83
10085.00	89.75	270.94	6796.46	632.07 N	3320.24 W	3364.03	1.14
10179.00	89.11	271.38	6797.39	633.98 N	3414.22 W	3457.79	0.83
10274.00	89.48	270.11	6798.57	635.22 N	3509.20 W	3552.49	1.39
10369.00	91.70	270.71	6797.60	635.90 N	3604.19 W	3647.14	2.42
10463.00	87.25	268.88	6798.46	635.56 N	3698.15 W	3740.69	5.11
10558.00	89.20	271.24	6801.40	635.65 N	3793.10 W	3835.25	3.22
10653.00	90.28	270.83	6801.84	637.36 N	3888.08 W	3929.99	1.21
10747.00	89.01	269.62	6802.42	637.73 N	3982.07 W	4023.63	1.86
10842.00	88.64	269.18	6804.36	636.74 N	4077.05 W	4118.11	0.61
10937.00	88.64	269.82	6806.61	635.91 N	4172.02 W	4212.61	0.67
11032.00	88.89	270.95	6808.65	636.55 N	4266.99 W	4307.25	1.22
11126.00	89.45	272.91	6810.02	639.72 N	4360.92 W	4401.08	2.17
11221.00	89.54	273.95	6810.86	645.40 N	4455.75 W	4496.03	1.09
11316.00	89.97	271.74	6811.27	650.12 N	4550.62 W	4590.94	2.36
11410.00	90.06	271.42	6811.24	652.71 N	4644.59 W	4684.75	0.36
11504.00	90.56	270.60	6810.74	654.36 N	4738.57 W	4778.49	1.02

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<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
11599.00	91.63	270.67	6808.92	655.41 N	4833.55 W	4873.17	1.14
11693.00	91.29	270.13	6806.52	656.06 N	4927.51 W	4966.80	0.68
11788.00	92.25	269.16	6803.58	655.48 N	5022.46 W	5061.30	1.44
11882.00	90.25	268.04	6801.53	653.18 N	5116.41 W	5154.64	2.44
11976.00	91.20	268.56	6800.35	650.38 N	5210.36 W	5247.95	1.16
12071.00	90.52	269.27	6798.91	648.58 N	5305.33 W	5342.36	1.03
12165.00	89.54	269.53	6798.86	647.59 N	5399.32 W	5435.87	1.09
12260.00	89.23	267.06	6799.89	644.76 N	5494.26 W	5530.16	2.63
12354.00	88.18	265.69	6802.01	638.82 N	5588.05 W	5623.02	1.83
12449.00	90.15	269.74	6803.39	635.03 N	5682.94 W	5717.16	4.74
12543.00	89.08	266.38	6804.02	631.84 N	5776.87 W	5810.41	3.75
12638.00	90.65	271.90	6804.25	630.42 N	5871.82 W	5904.84	6.04
12732.00	91.60	272.05	6802.41	633.66 N	5965.74 W	5998.67	1.03
12827.00	92.72	271.07	6798.83	636.25 N	6060.64 W	6093.40	1.56
12921.00	88.74	267.32	6797.64	634.93 N	6154.58 W	6186.84	5.82
13016.00	88.12	267.00	6800.24	630.22 N	6249.43 W	6280.86	0.73
13110.00	88.83	268.18	6802.75	626.26 N	6343.31 W	6373.99	1.46
13205.00	89.38	268.88	6804.23	623.82 N	6438.27 W	6468.33	0.94
13299.00	89.23	268.31	6805.37	621.52 N	6532.23 W	6561.69	0.63
13394.00	88.86	268.80	6806.95	619.12 N	6627.19 W	6656.03	0.64
13489.00	89.32	270.33	6808.46	618.39 N	6722.17 W	6750.55	1.68
13583.00	89.29	271.38	6809.60	619.79 N	6816.15 W	6844.27	1.12
13678.00	89.88	268.78	6810.28	619.93 N	6911.14 W	6938.88	2.81
13703.00	90.46	269.04	6810.21	619.45 N	6936.14 W	6963.73	2.55
13768.00	91.70	270.28	6808.98	619.06 N	7001.12 W	7028.40	2.69

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 275.23 DEGREES (GRID)
A TOTAL CORRECTION OF 7.65 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13768.00 FEET
IS 7028.44 FEET ALONG 275.05 DEGREES (GRID)**