



**1 : 600 / 1 : 240**

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	16-Nov-15	20-Nov-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	883.00	7,294.00			
Log End Depth (MD, ft)	7,294.00	16,342.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	15-Nov-15 02:30	17-Nov-15 12:30			
Drill/Wipe End Date and Time	16-Nov-15 10:00	19-Nov-15 21:45			
Min Inc (deg) @ Depth (MD, ft)	0.09 @ 2,115.00	82.86 @ 7,344.00			
Max Inc (deg) @ Depth (MD, ft)	88.00 @ 7,294.00	92.22 @ 10,634.00			
Bit TFA(in2) / Bit Type	1.04 / PDC	0.9817 / PDC			
Flow Rate (gpm)	590.19	310.43			
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)	10.80 / 37.00	10.00 / 37.00			
Filtrate CL (ppm)	2,500.00	3,100.00			
pH / Fluid Loss (mptm)	9.90 / 23	9.70 / 36			
PV (cP) / YP (lbf2)	12 / 11.00	11 / 14.00			
% Solids / % Sand	13.2 / .1	9.2 / .15			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	105.00 / 0.00	204.00 / 0.00			

Max Tool Temp (degF) / Source	185.02 / PCM	264.63 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ 264.63			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Cliff Kessler	Cliff Kessler			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11341333	12463929			
Insert Serial Number	11620295	11145577			
Date and Time Initialized	14-Nov-15 17:02	17-Nov-15 06:41			
Date and Time Read	16-Nov-15 14:12	20-Nov-15 10:38			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	66.00	65.00			
Software Version	6.33	6.33			
Sub Serial Number	11341333	12463929			
Sonde Serial Number	11062040	11902176			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	126.10	271.60			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	59.40	58.69			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341333	12463929			
Insert/Sonde Serial Number	11680938	11681003			

## REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depths from the drill floor.

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

3. All data presented is recorded (memory data) unless otherwise stated.

4. Environmental parameters used in gamma and resistance processing:

Hole Size: 6.125"

Mud Density: 9.7-10.5ppg

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

1: 600 (2"):

Interval: 1.0 ft

Coercion Distance: 3.0 ft (ROPA)

Interval: 1.0 ft

Coercion Distance: 3.0 ft (Gamma Ray)

1: 240 (5")

Interval: 0.5 ft

Coercion Distance: 1.2 ft (ROPA)

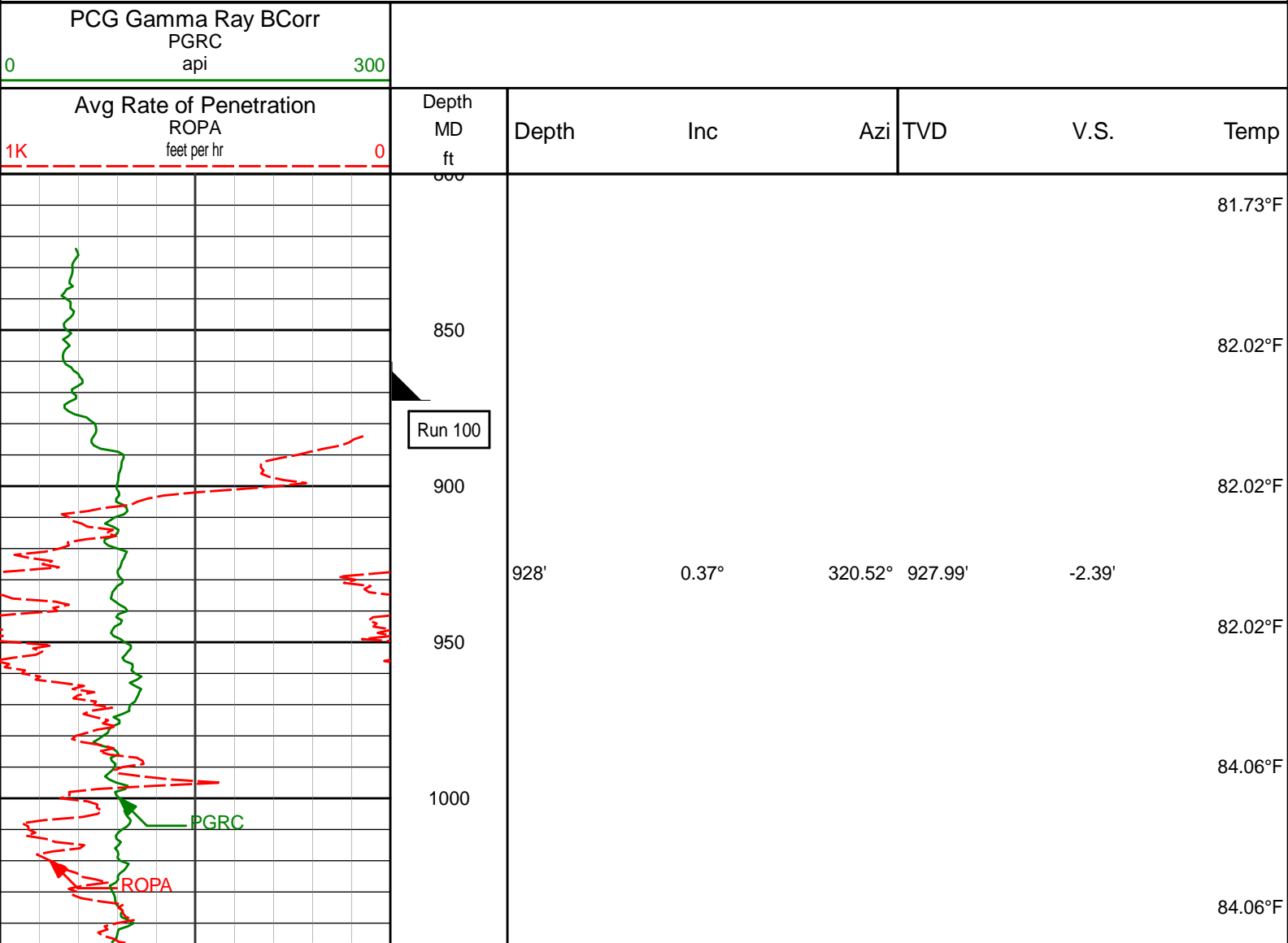
Interval: 0.5 ft

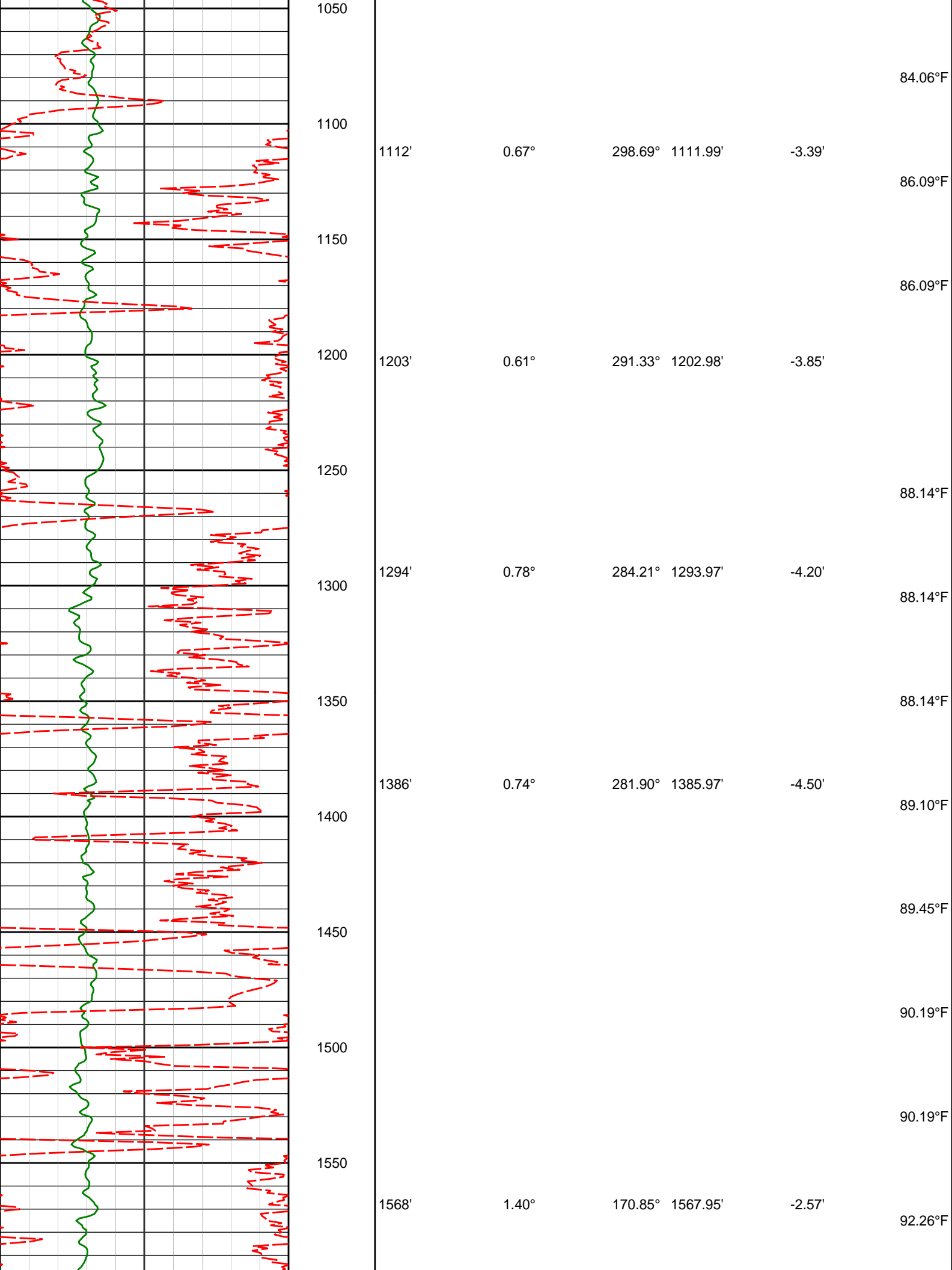
Coercion Distance: 0.6 ft (Gamma Ray)

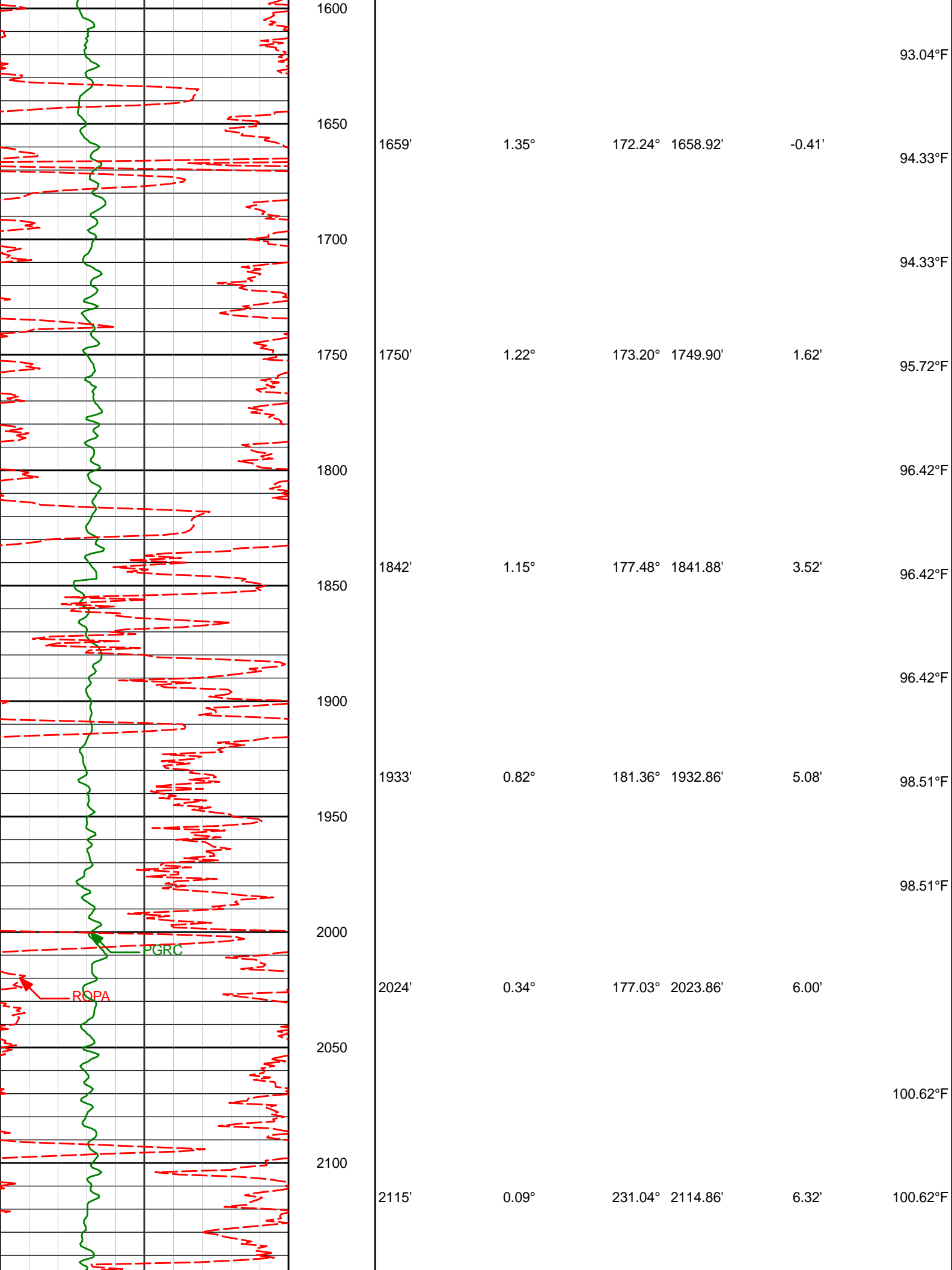
WARRANTY

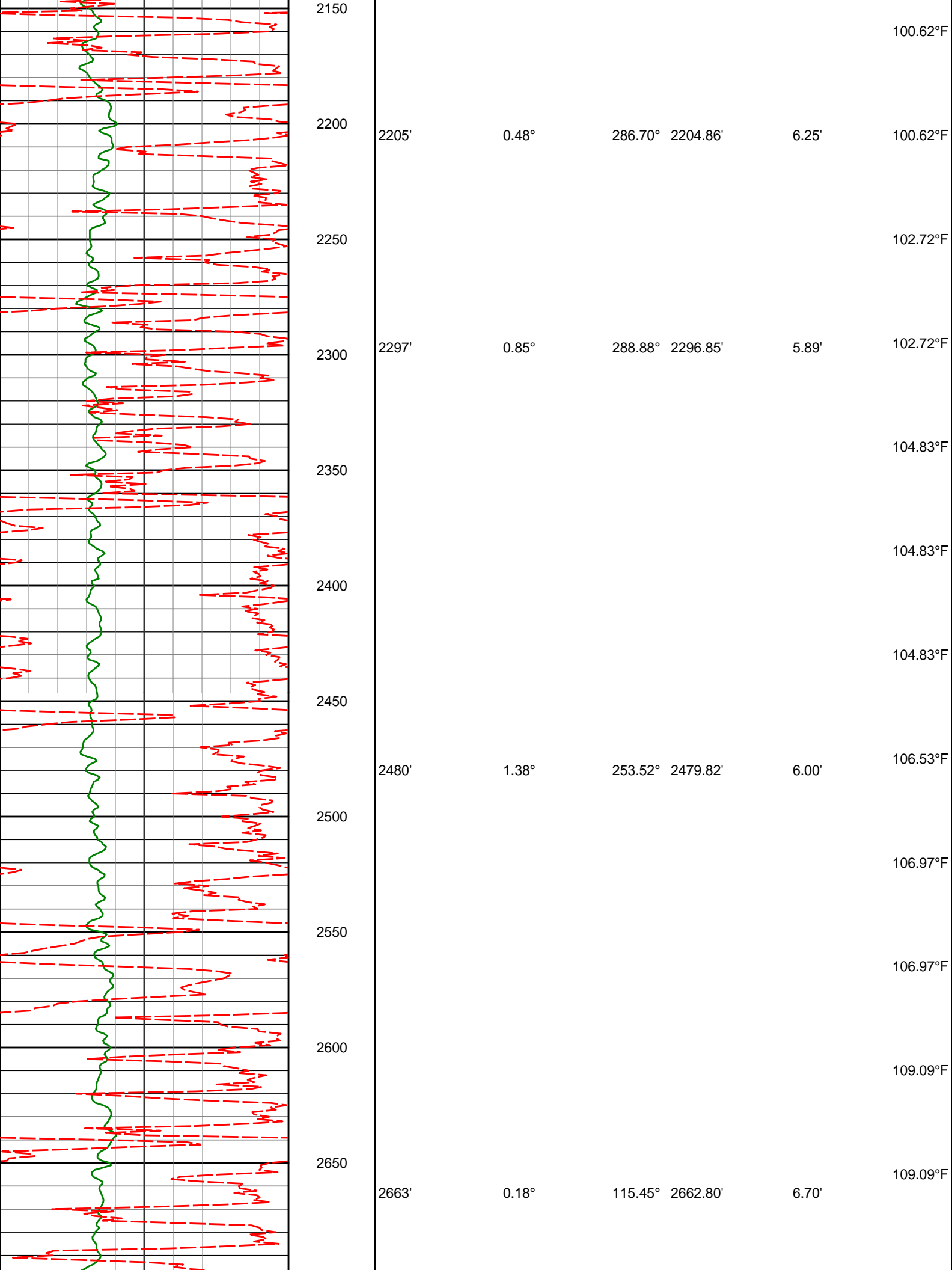
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

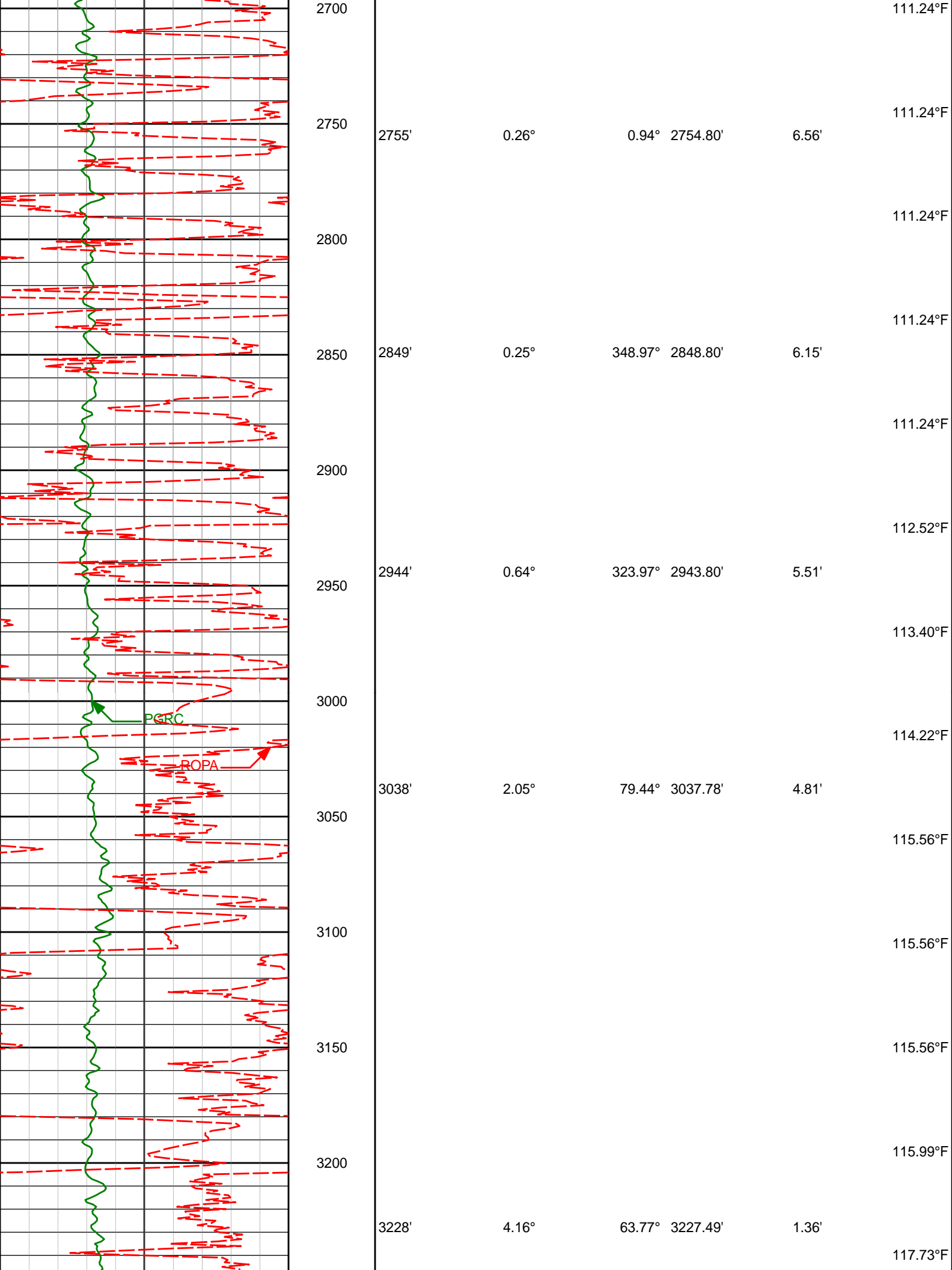
MD Detail 1:600 Scale

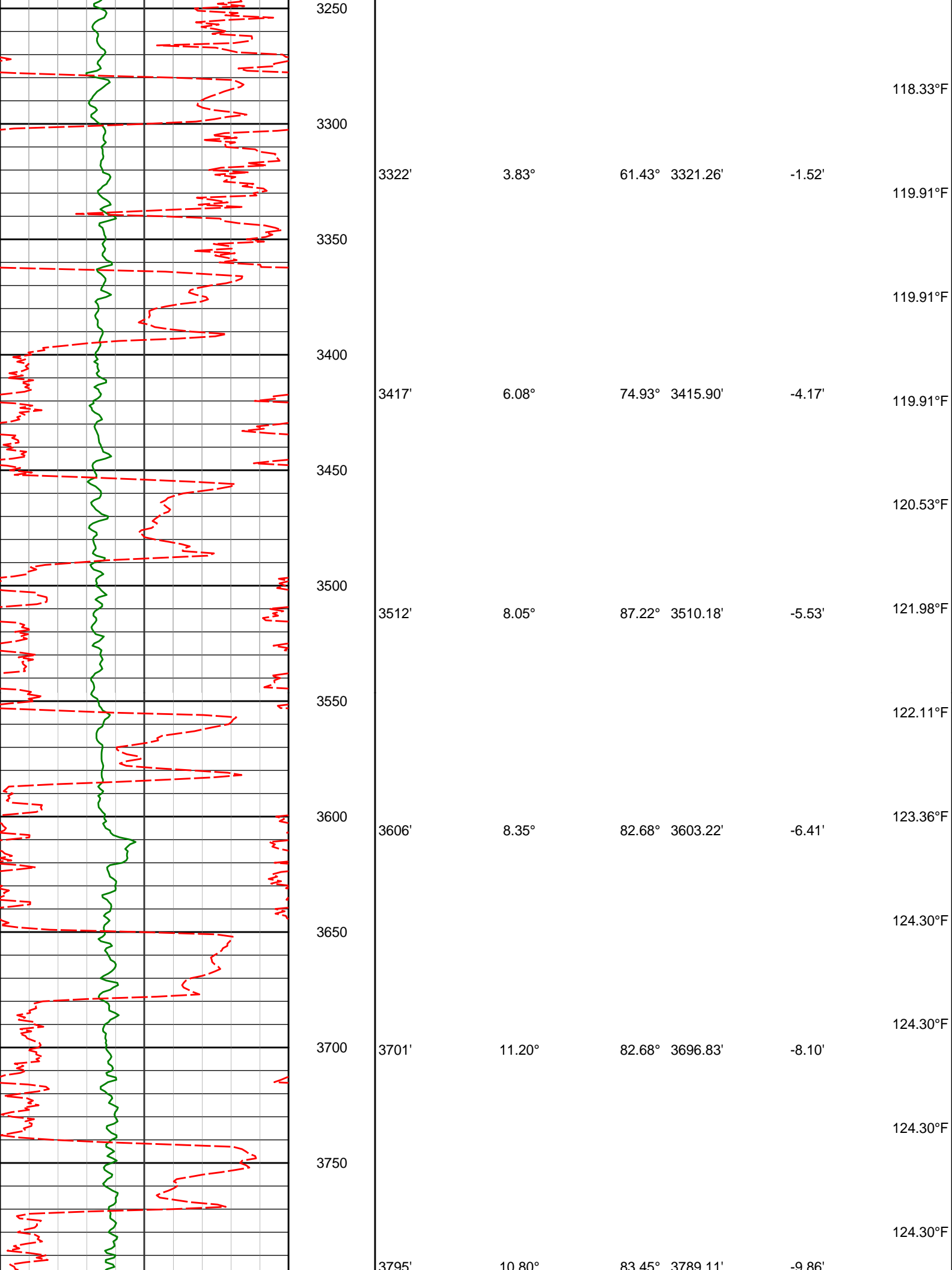




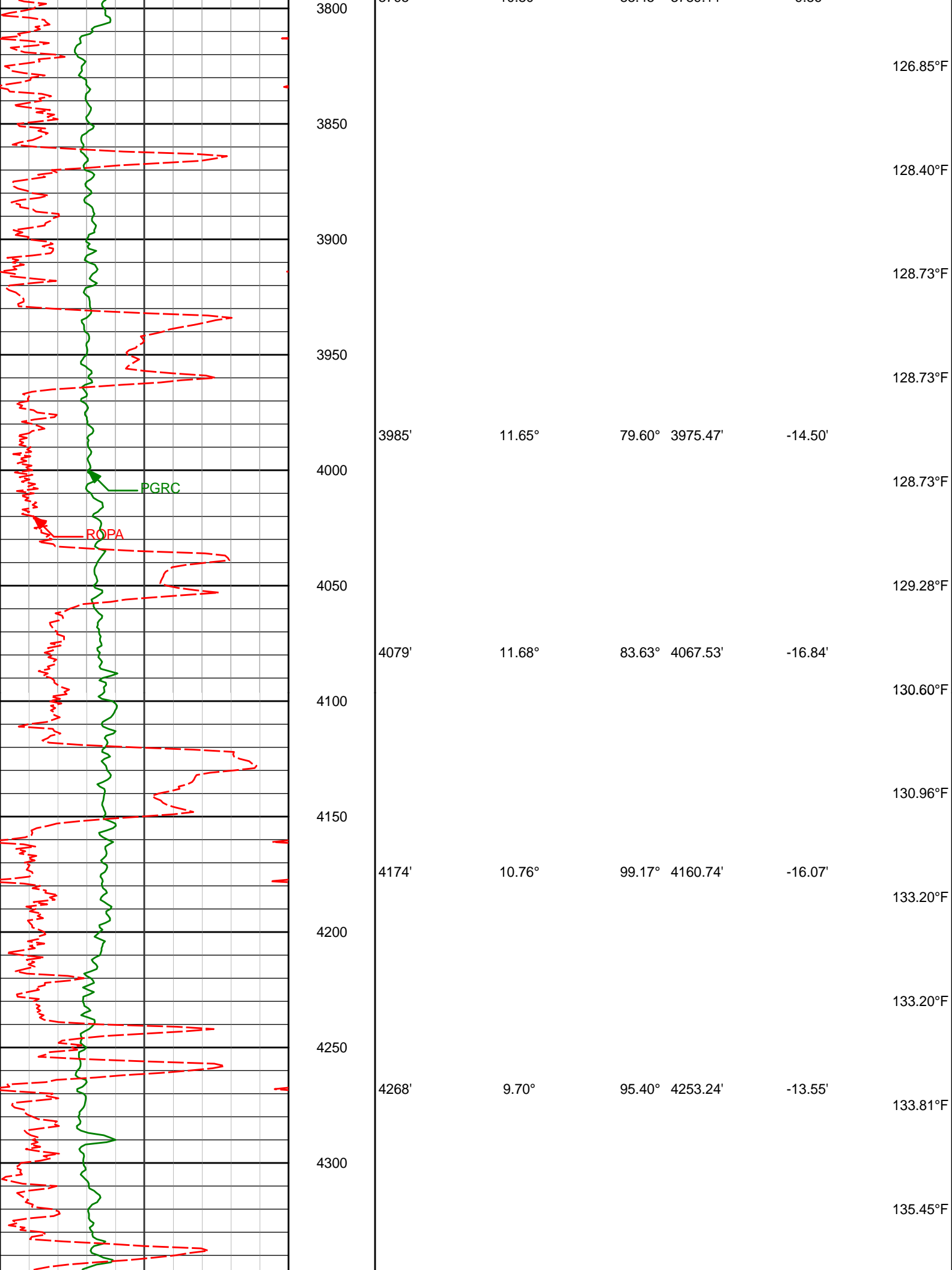


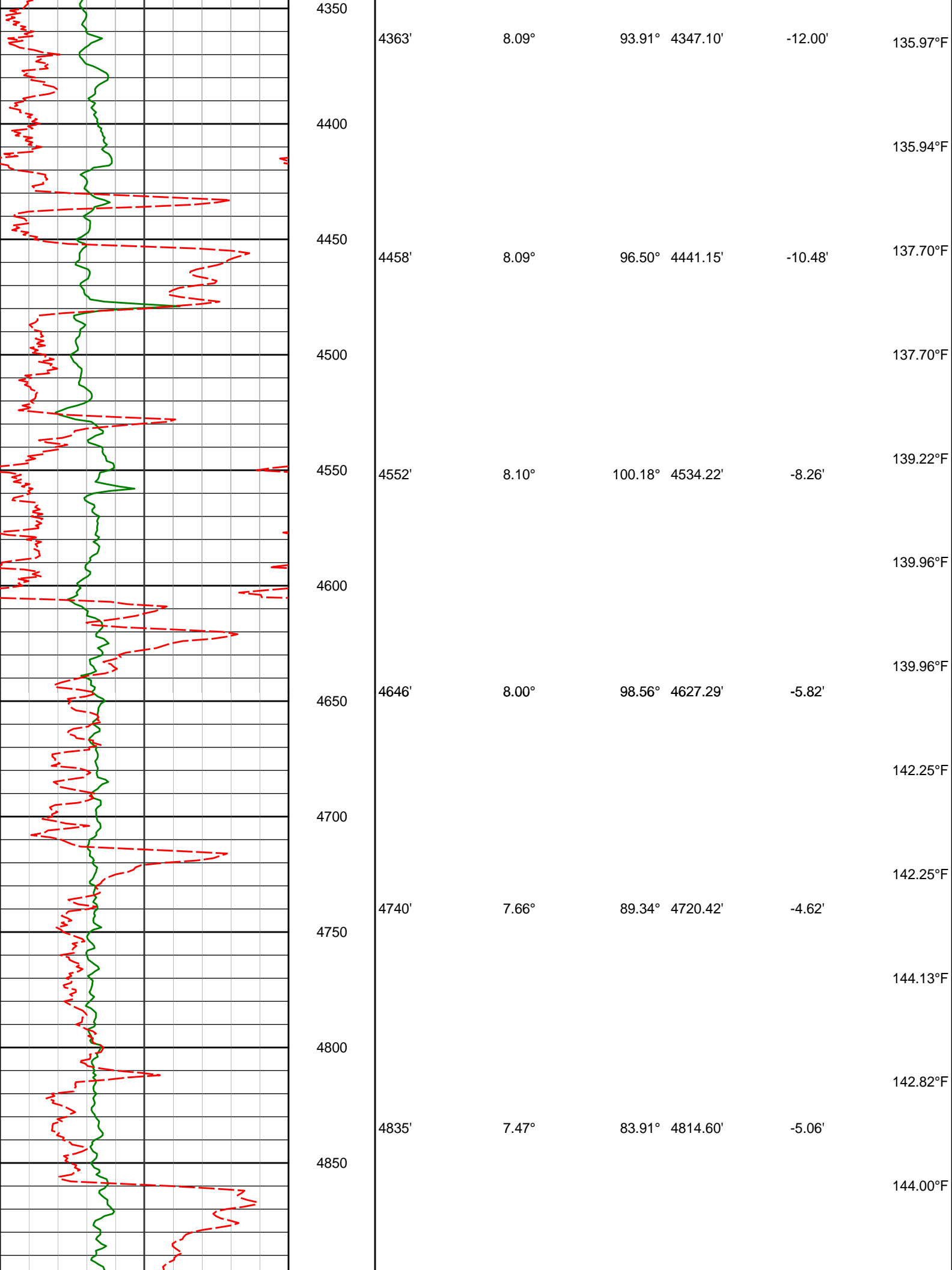


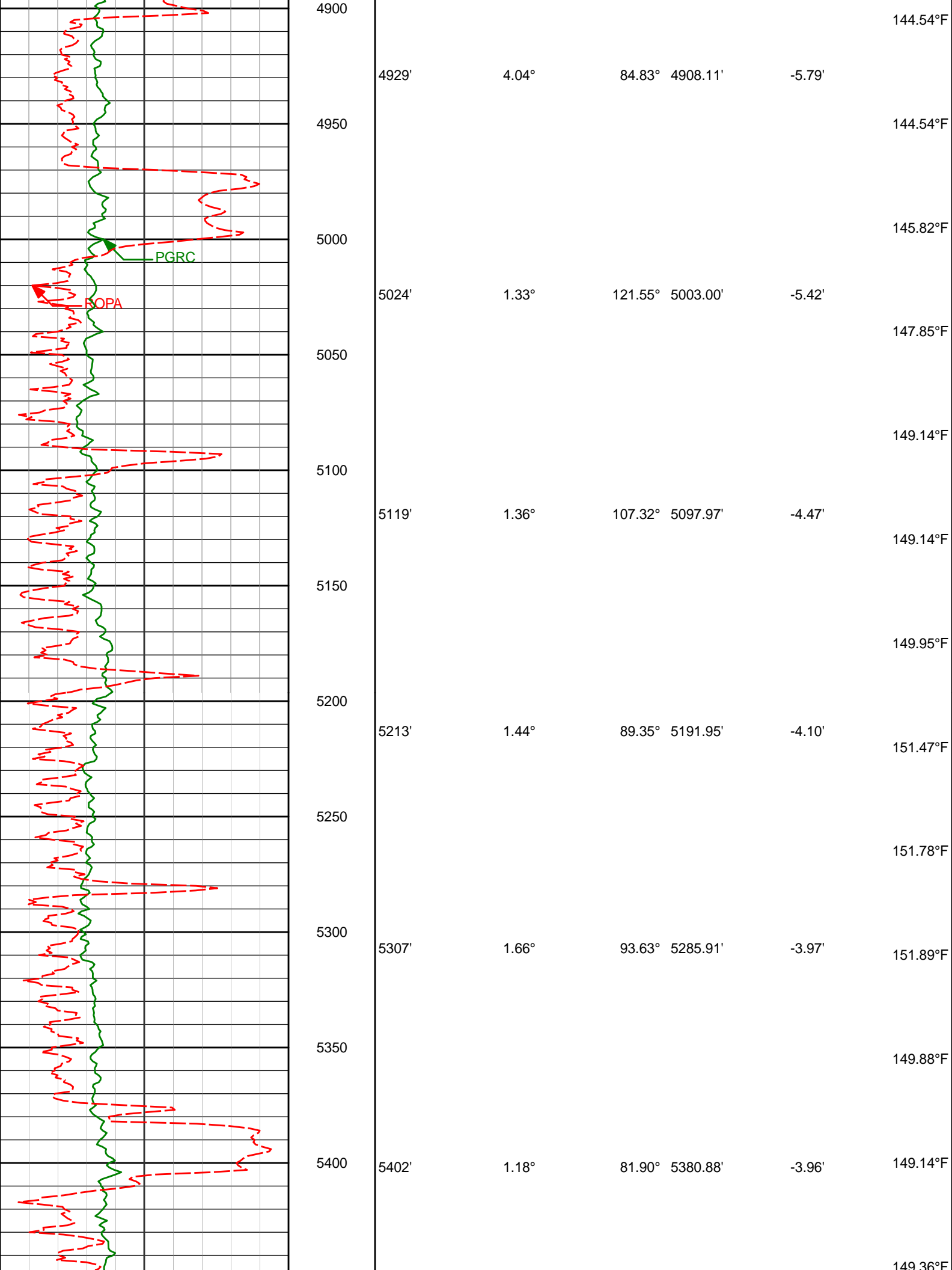


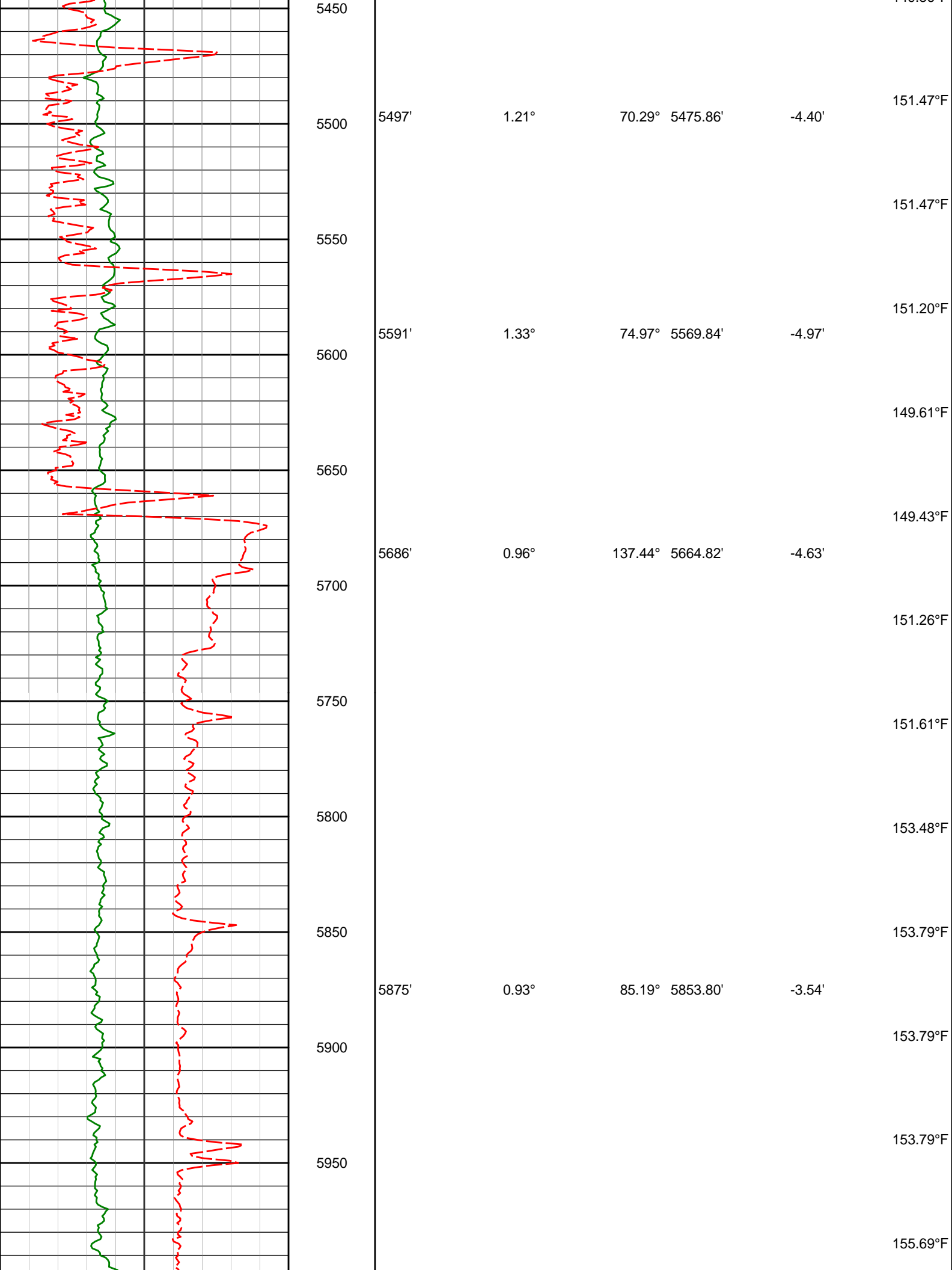


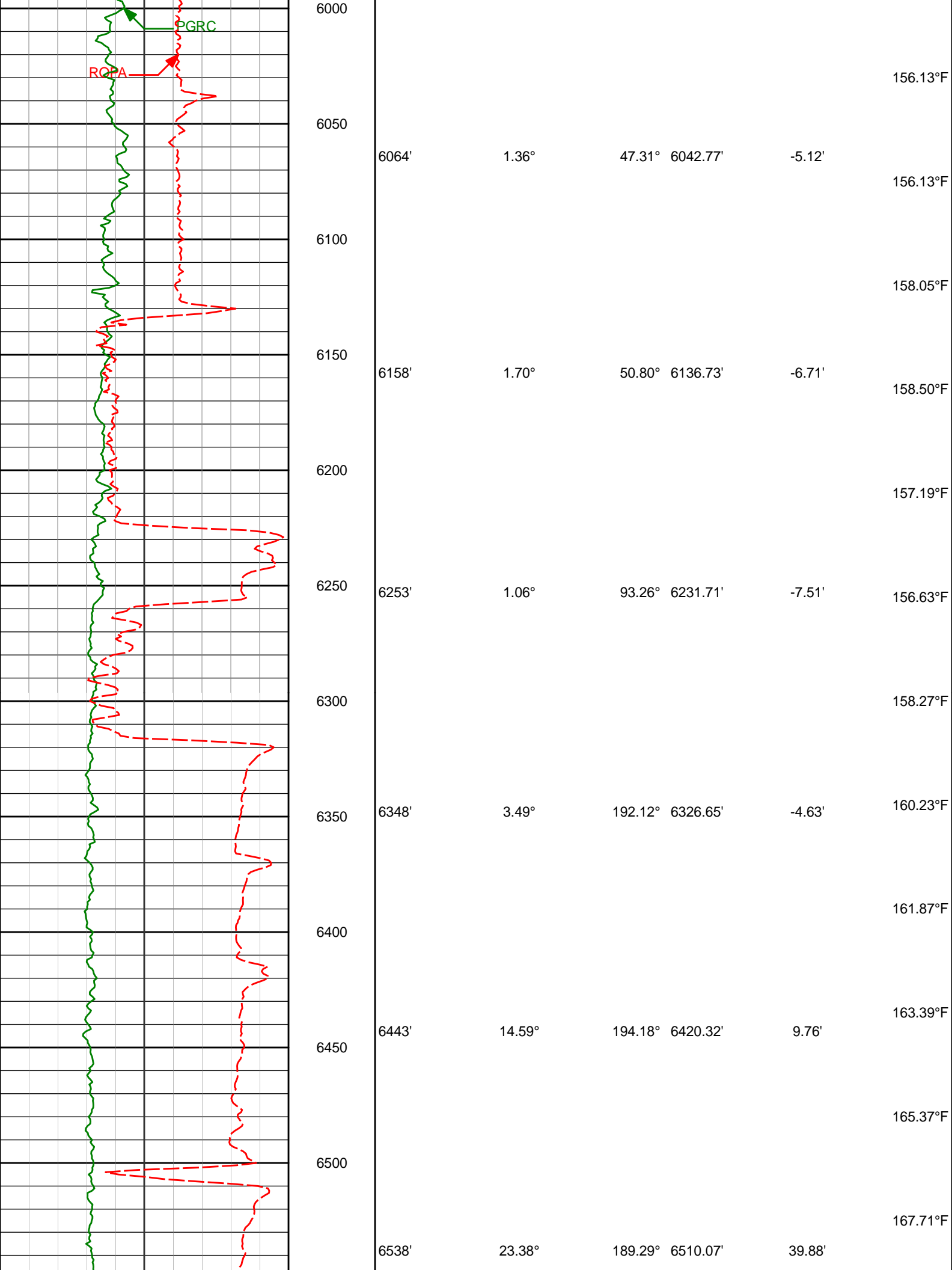


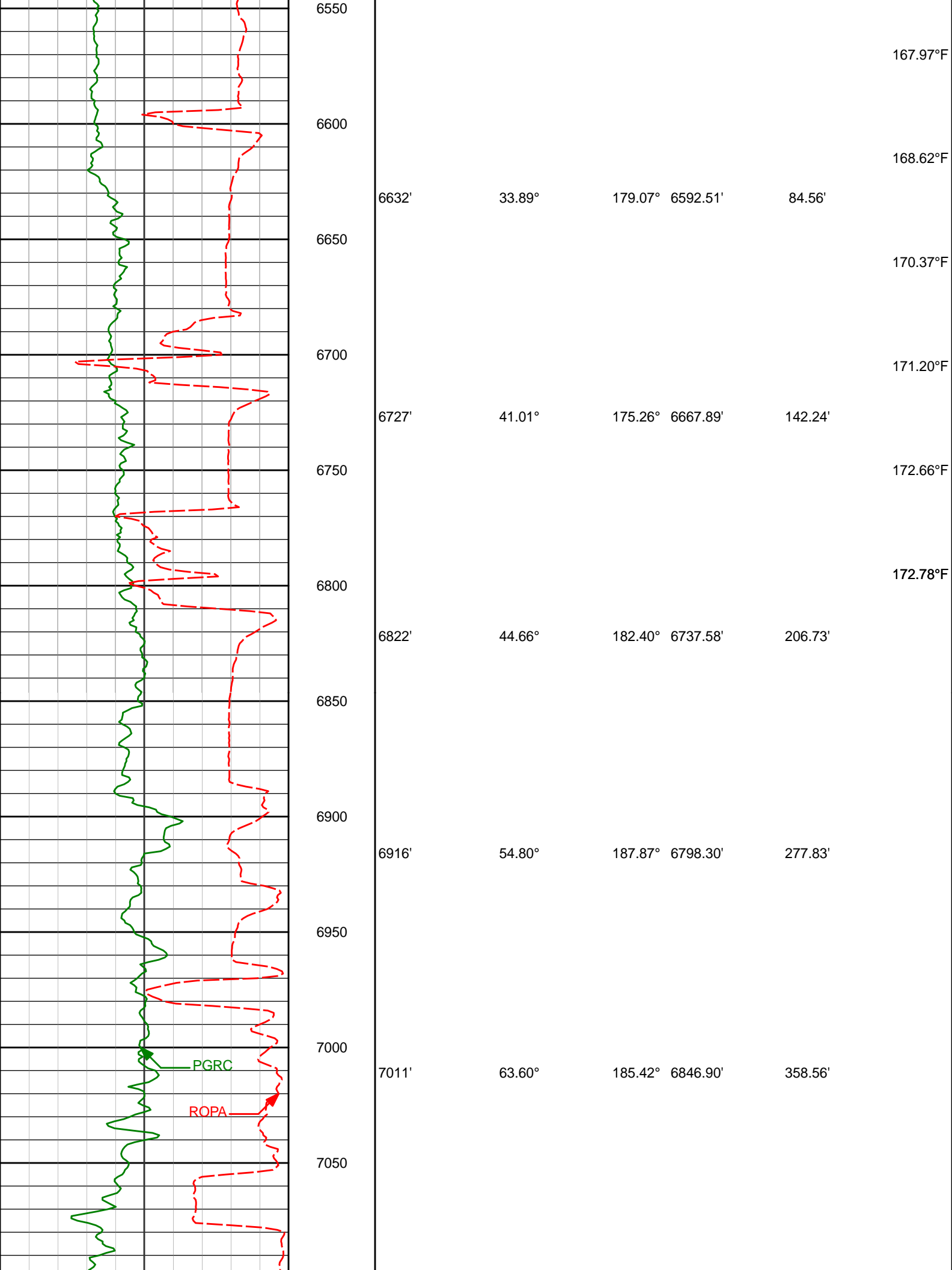


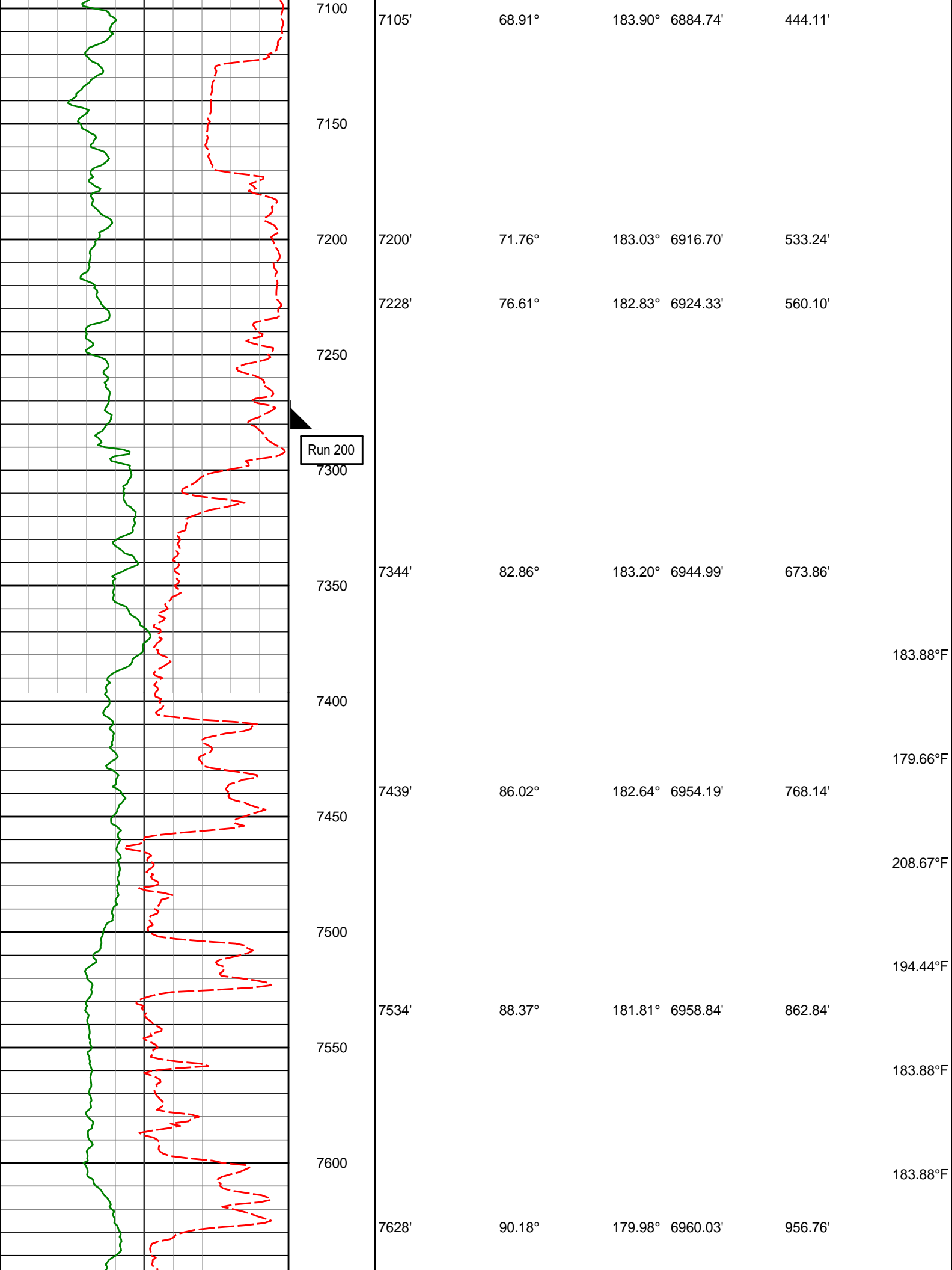


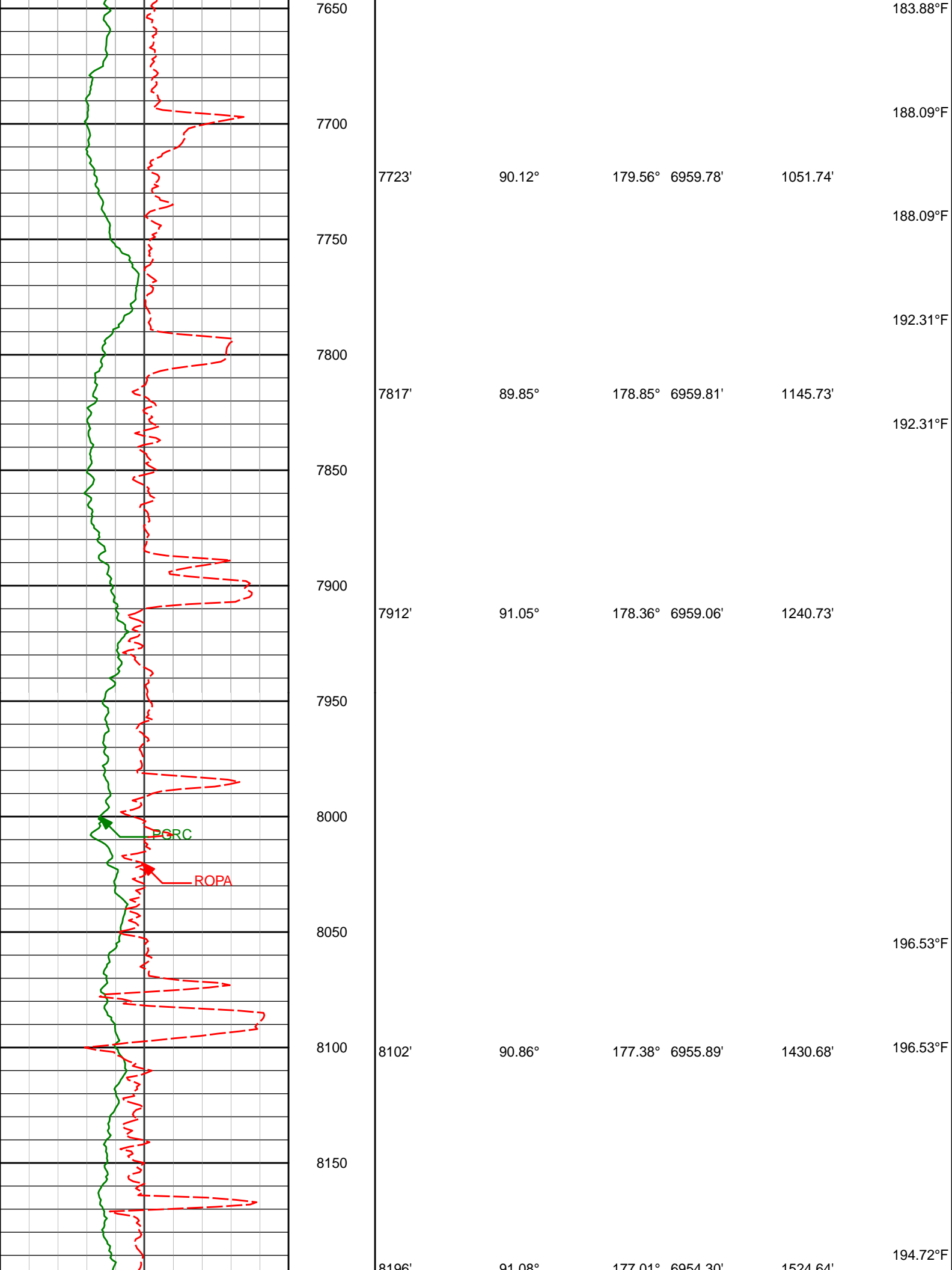




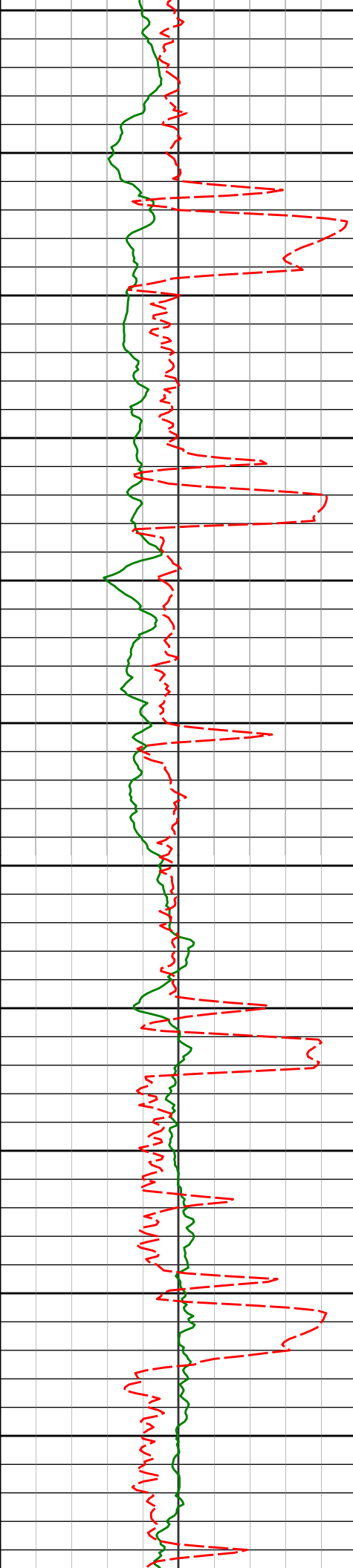












8200

8250

8300

8350

8400

8450

8500

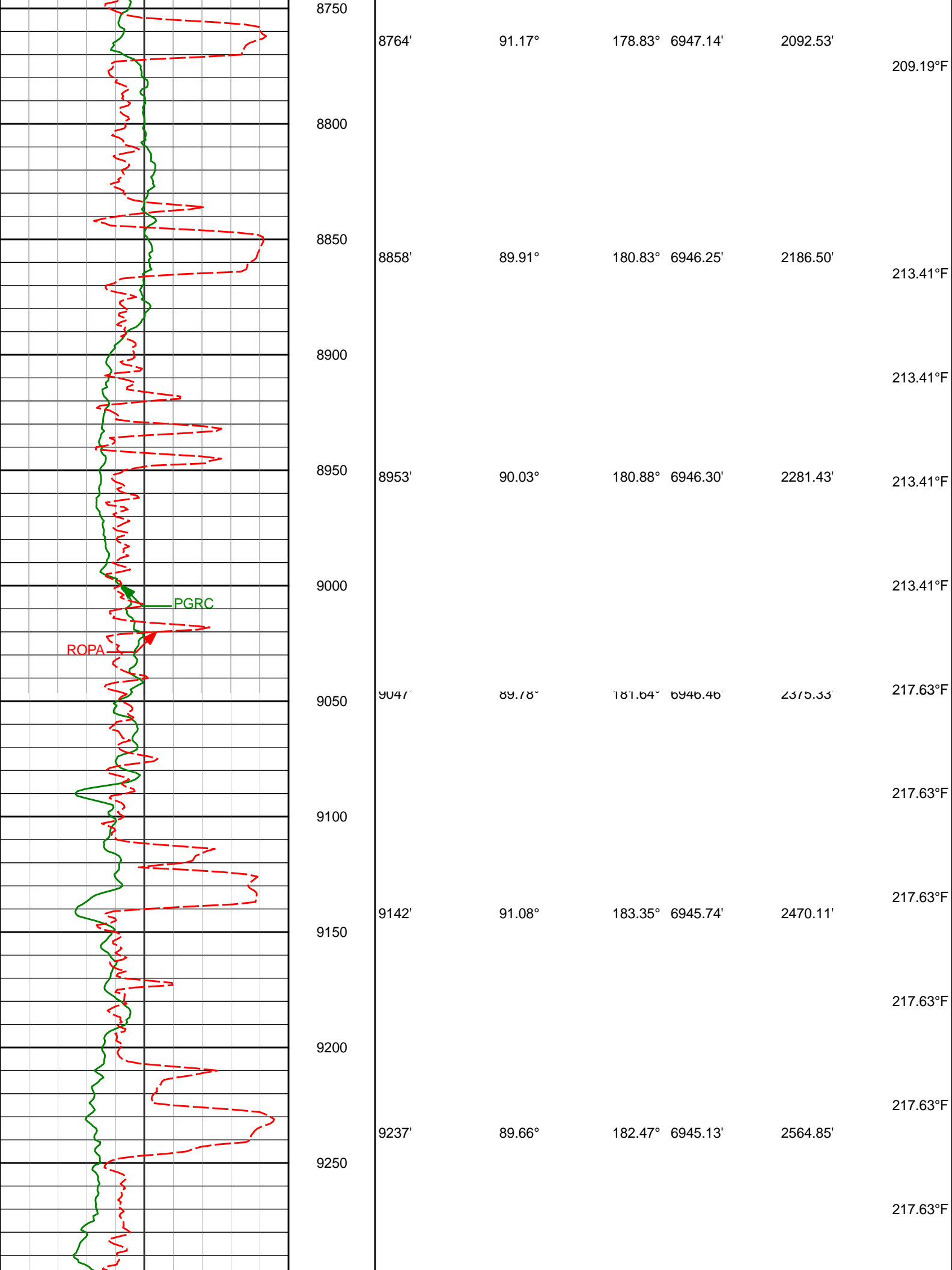
8550

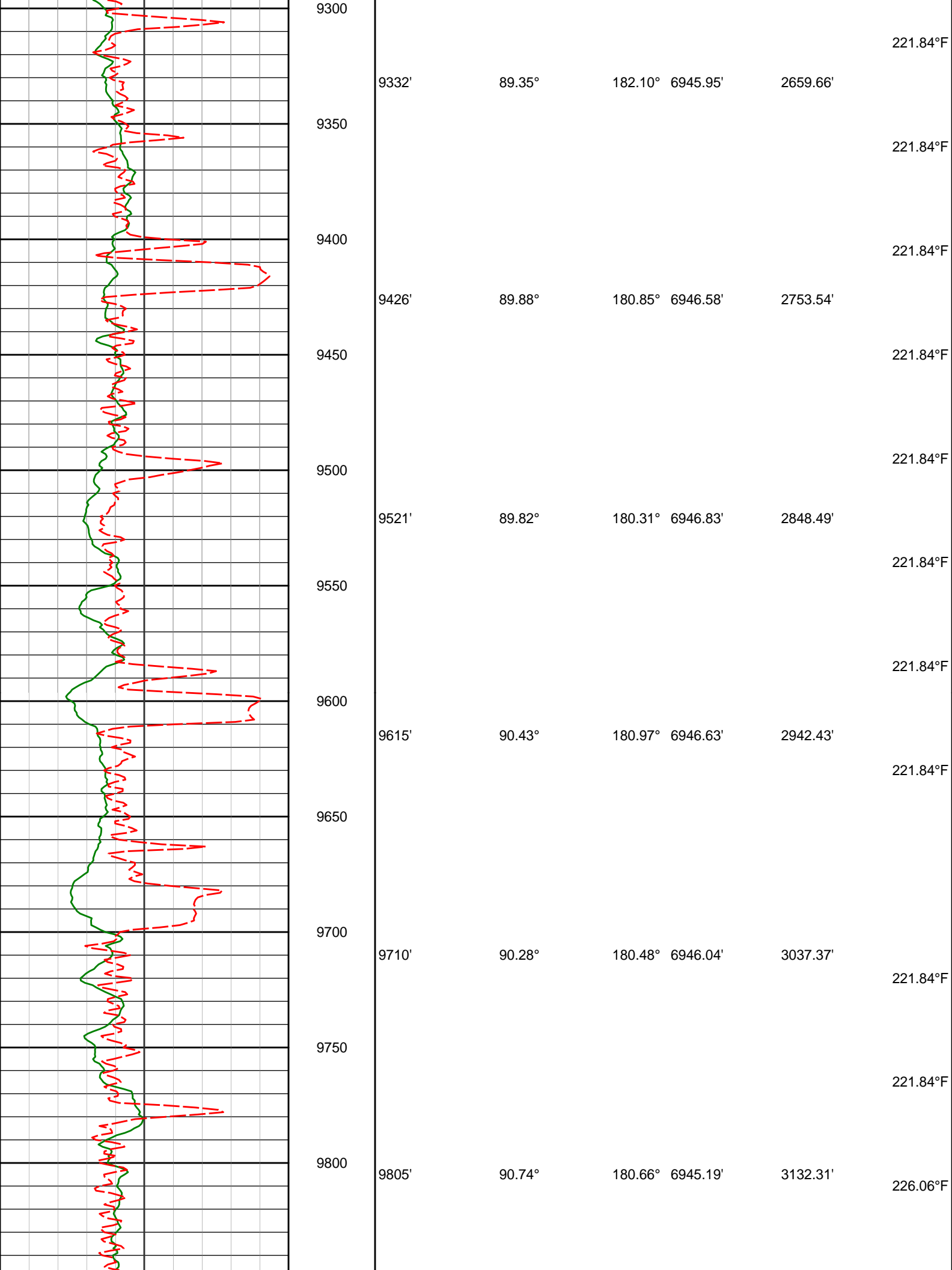
8600

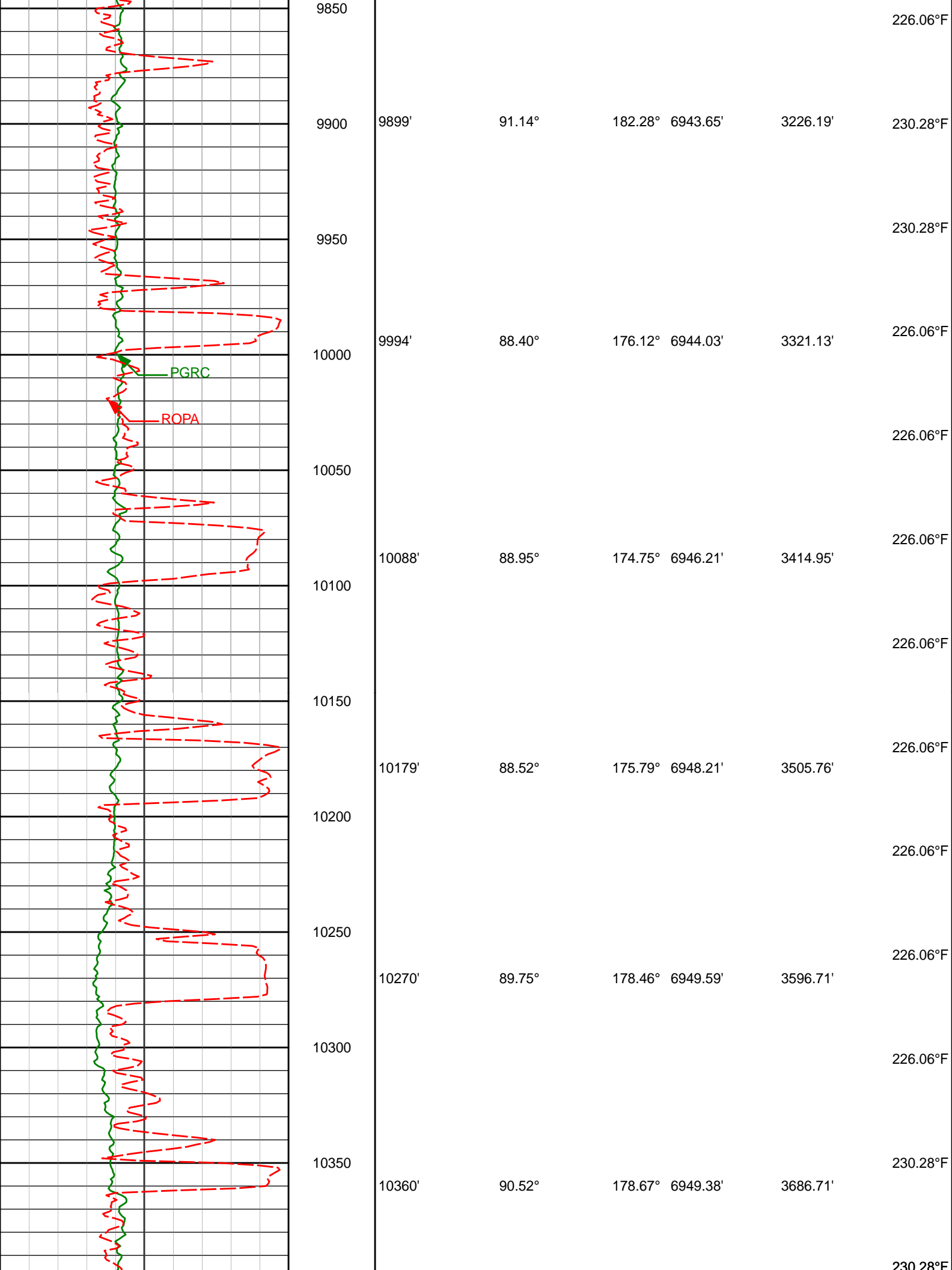
8650

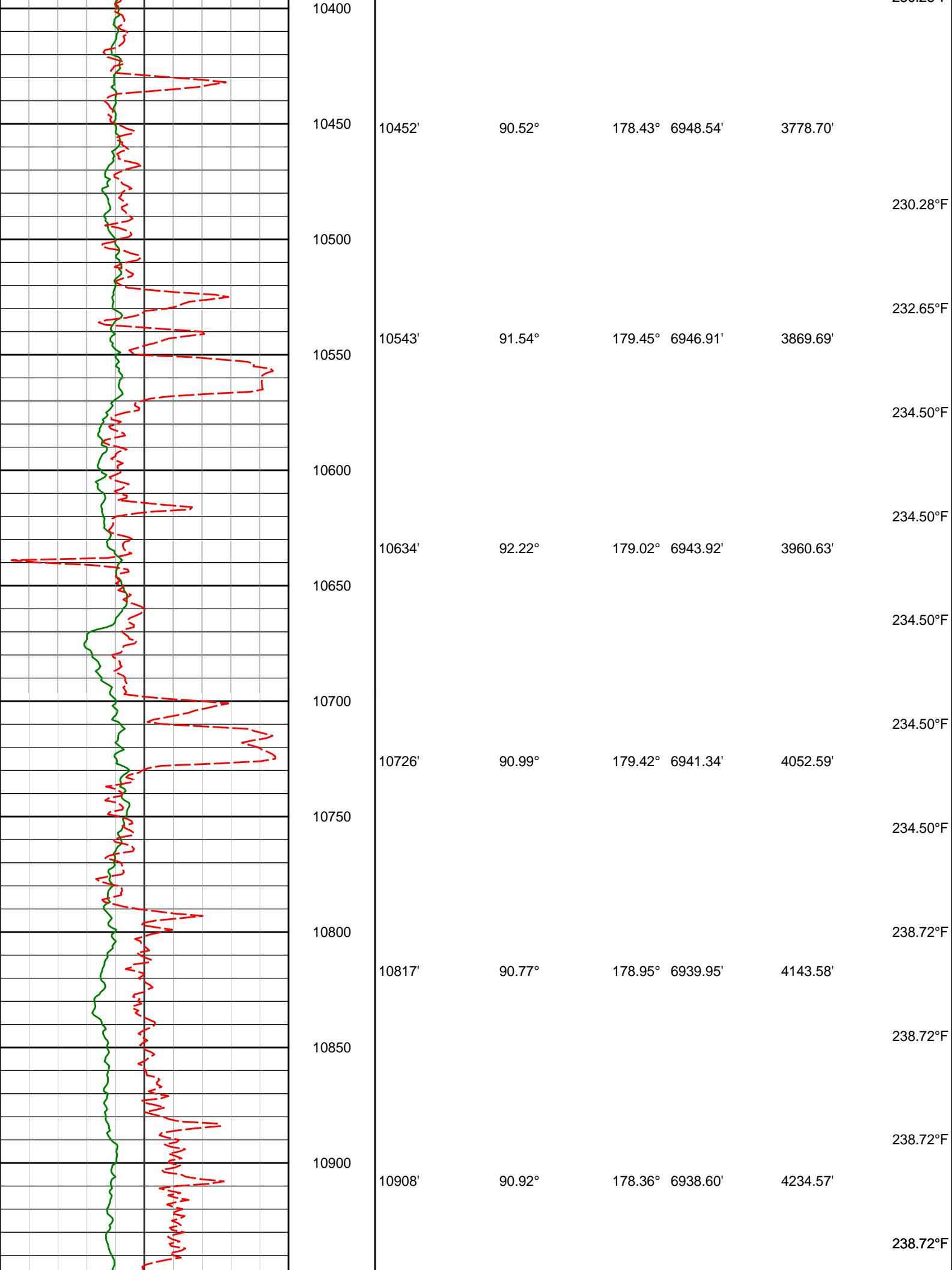
8700

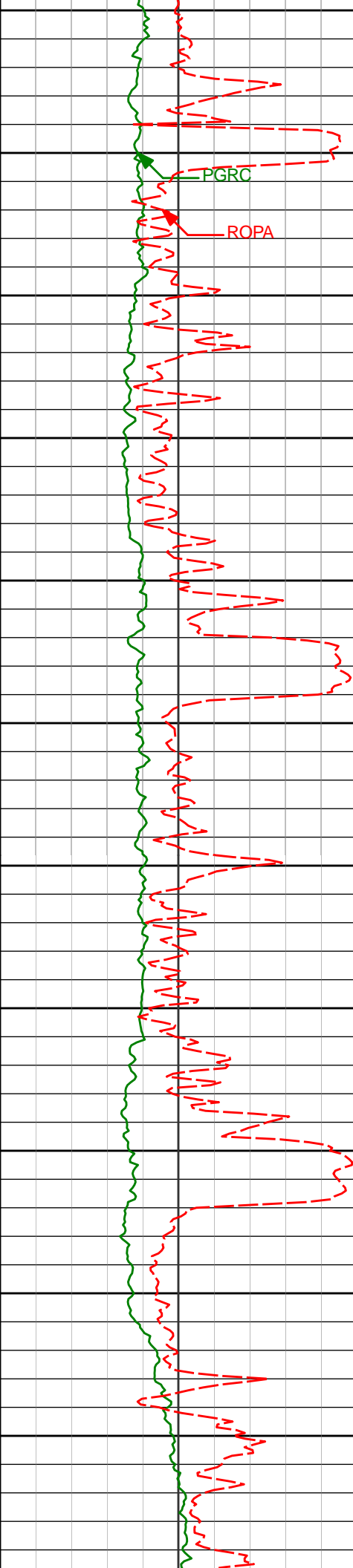
	8190'	91.00°	177.01°	6954.30'	1524.04'	189.91°F
						200.75°F
	8291'	90.65°	177.89°	6952.87'	1619.60'	200.75°F
						200.75°F
	8385'	90.80°	178.67°	6951.68'	1713.59'	200.75°F
						200.75°F
	8480'	91.11°	178.66°	6950.10'	1808.58'	
	8574'	89.91°	177.25°	6949.26'	1902.56'	209.19°F
						209.19°F
	8669'	90.74°	177.91°	6948.72'	1997.54'	209.19°F
						209.19°F











10950

11000

11050

11100

11150

11200

11250

11300

11350

11400

11450

10999'

11090'

11181'

11272'

11363'

90.22°

90.03°

89.78°

89.97°

91.11°

179.17° 6937.70'

178.98° 6937.50'

179.43° 6937.65'

179.15° 6937.85'

181.02° 6936.99'

4325.56'

4416.56'

4507.55'

4598.55'

4689.51'

238.72°F

238.72°F

238.72°F

238.72°F

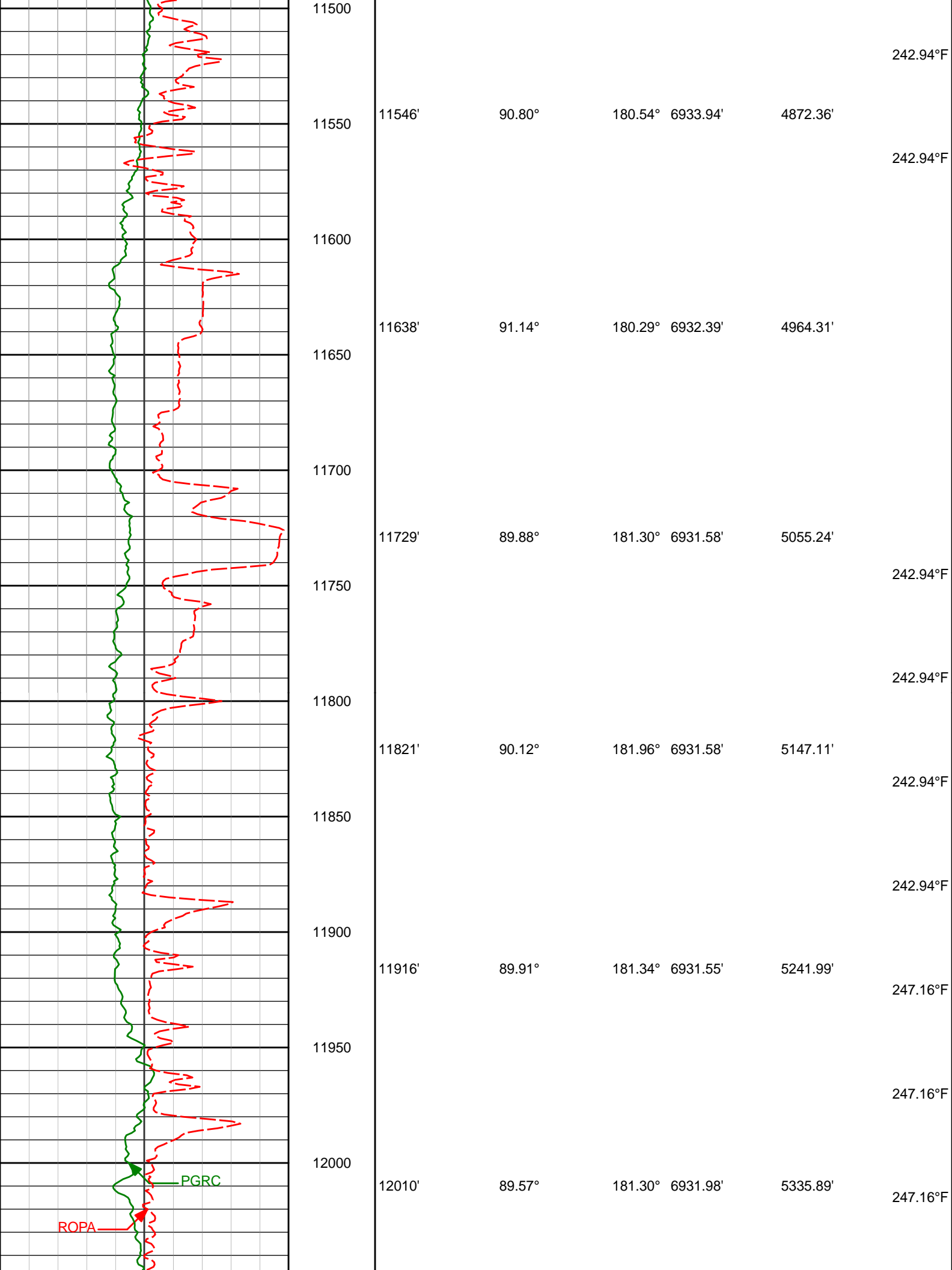
238.72°F

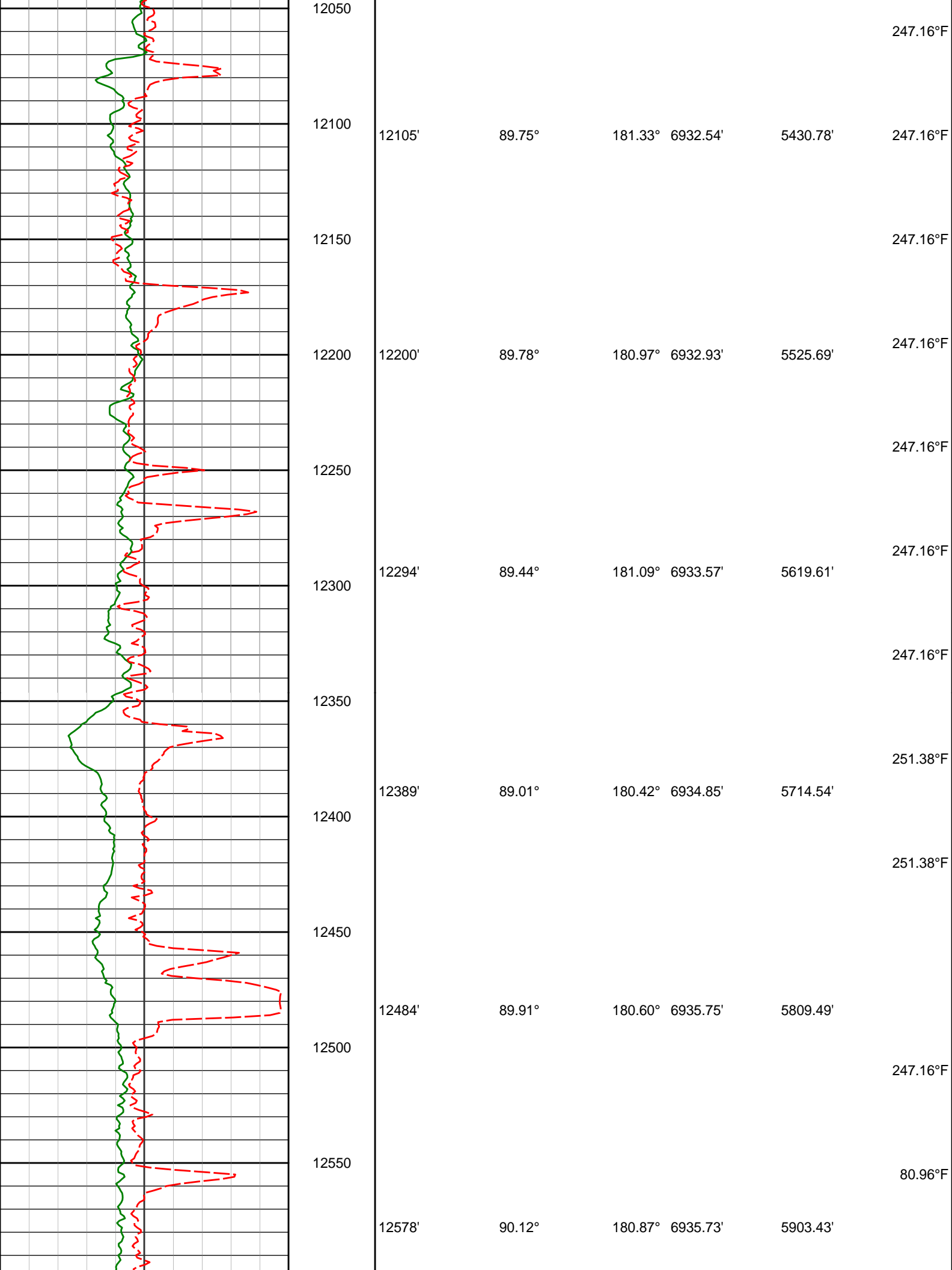
242.94°F

242.94°F

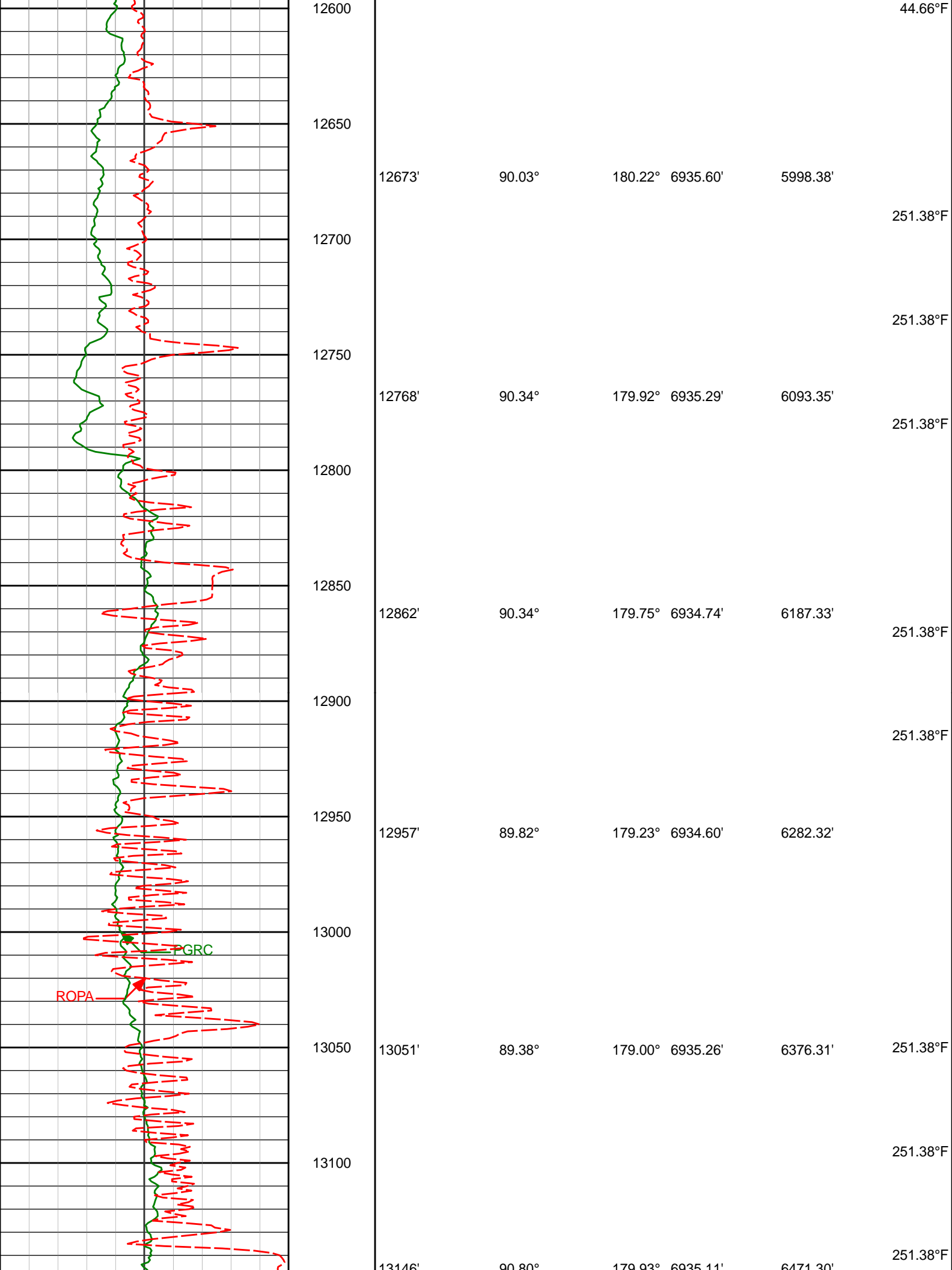
238.72°F

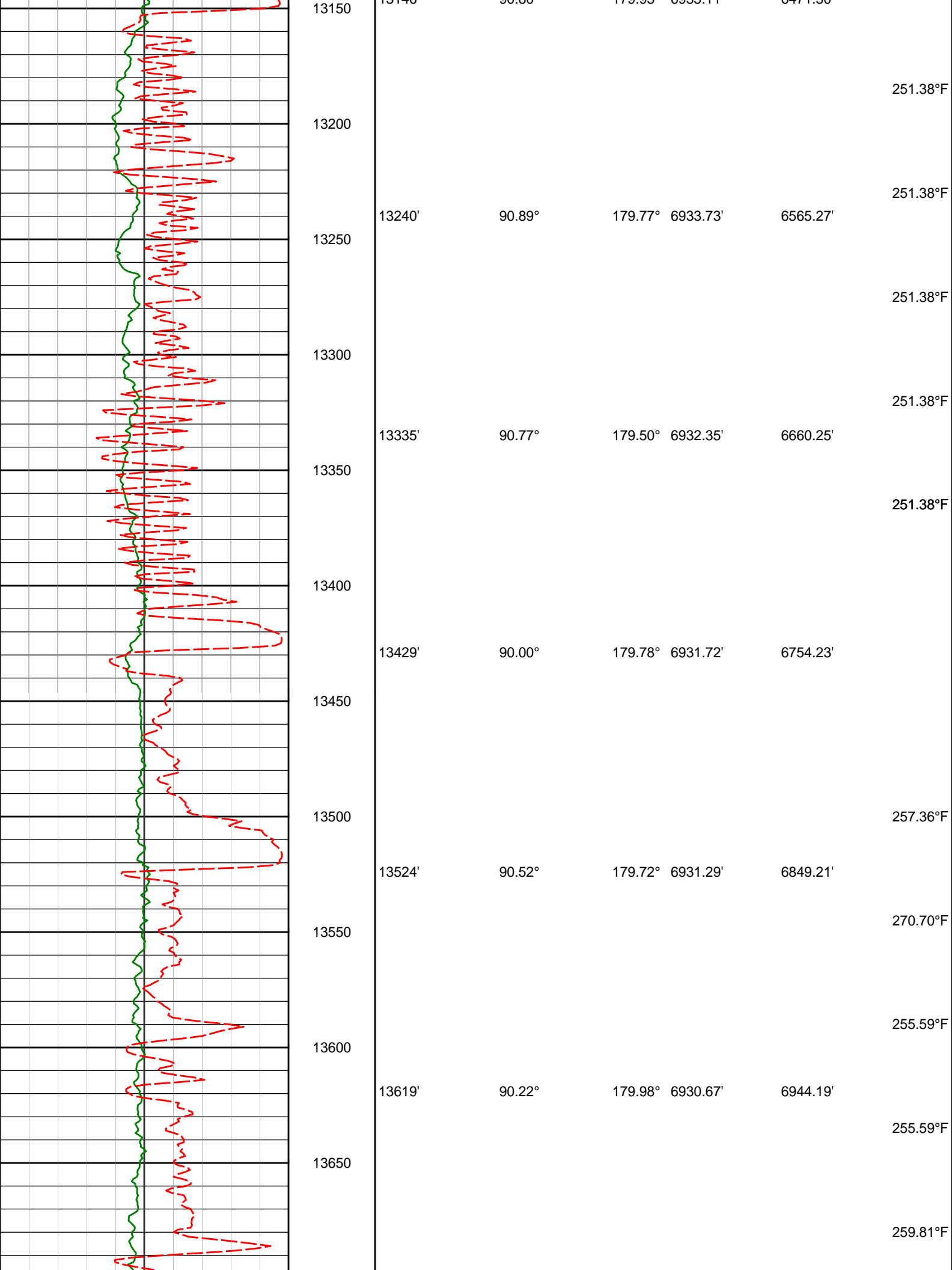
238.72°F

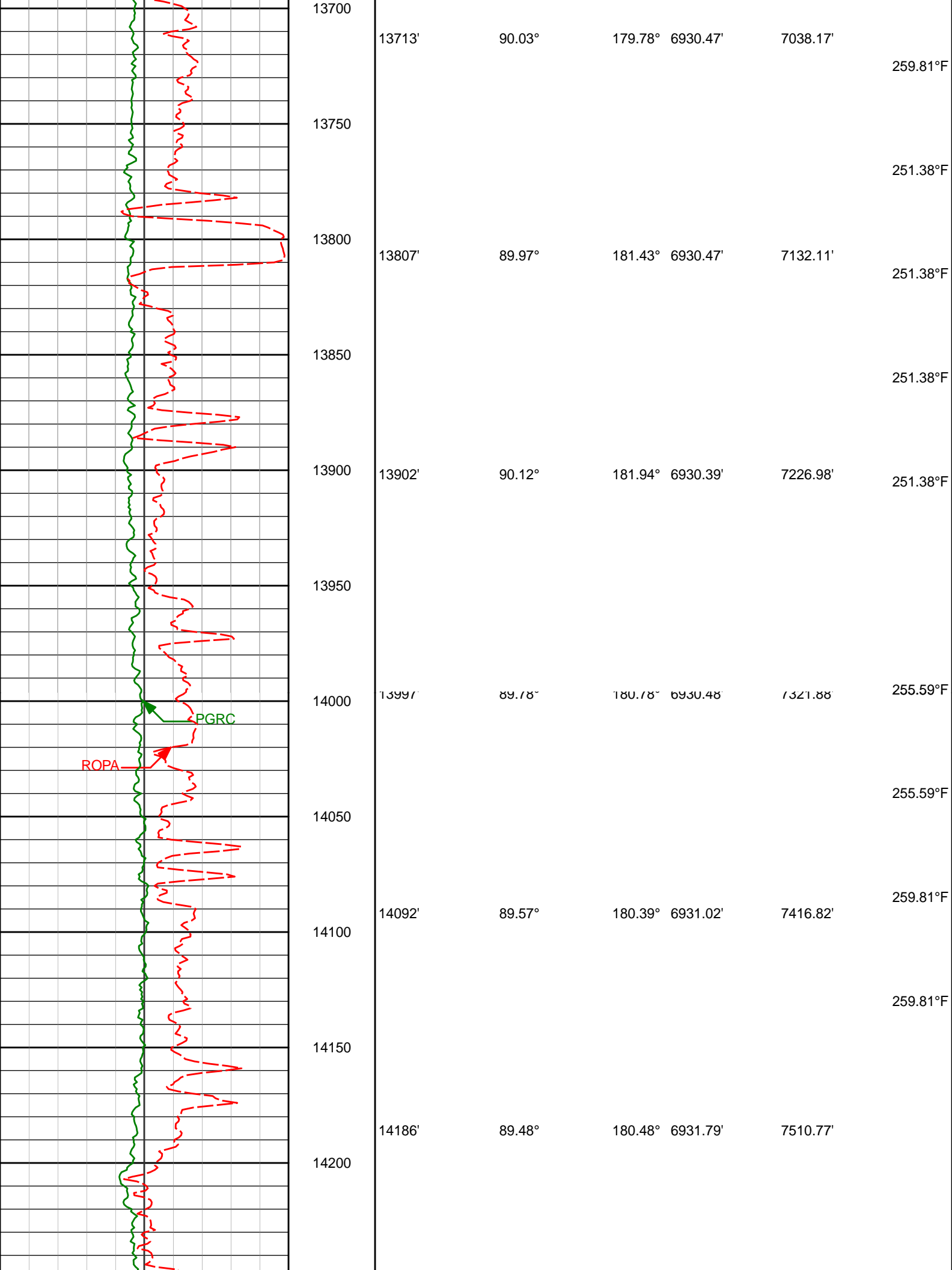


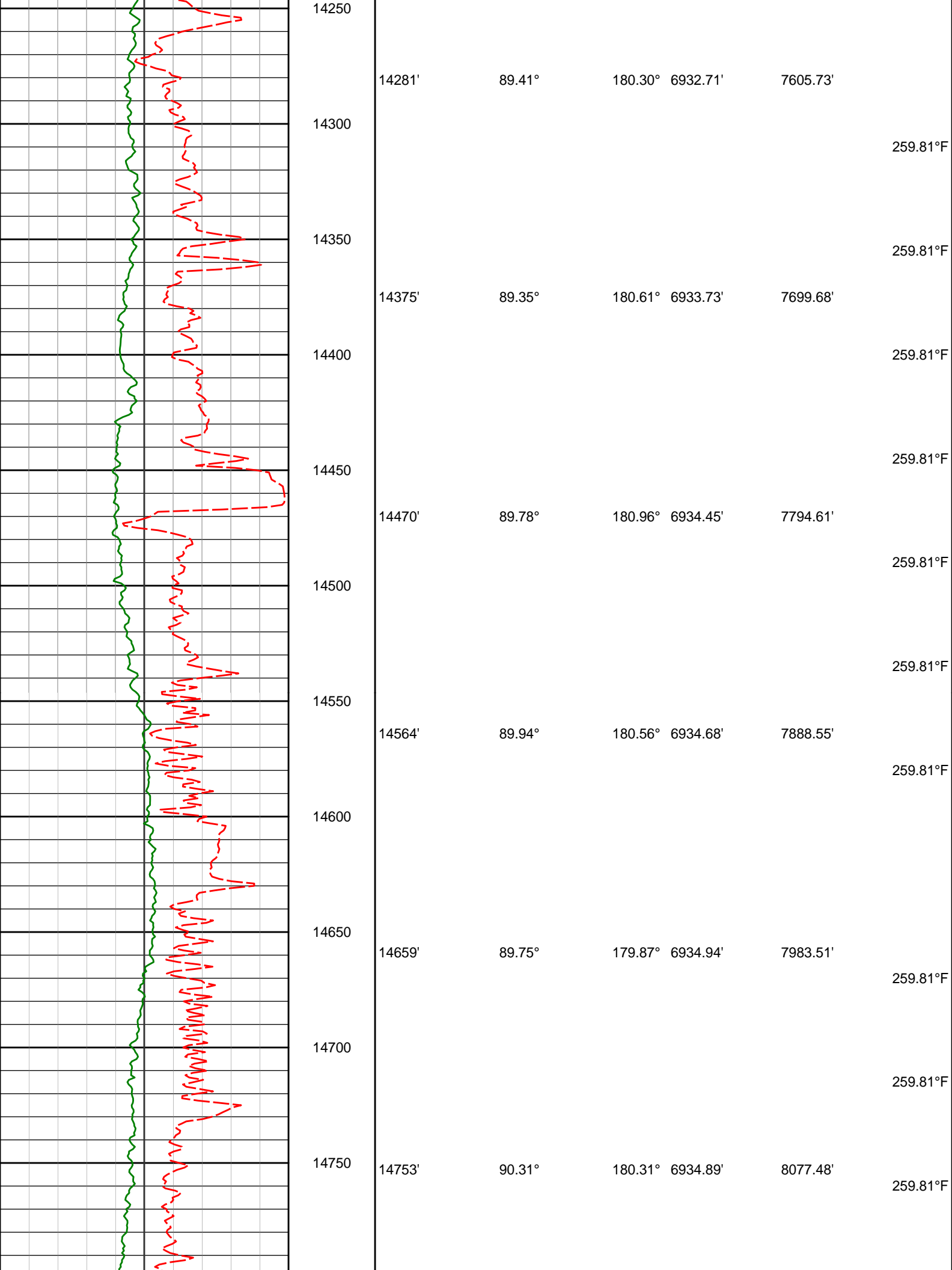


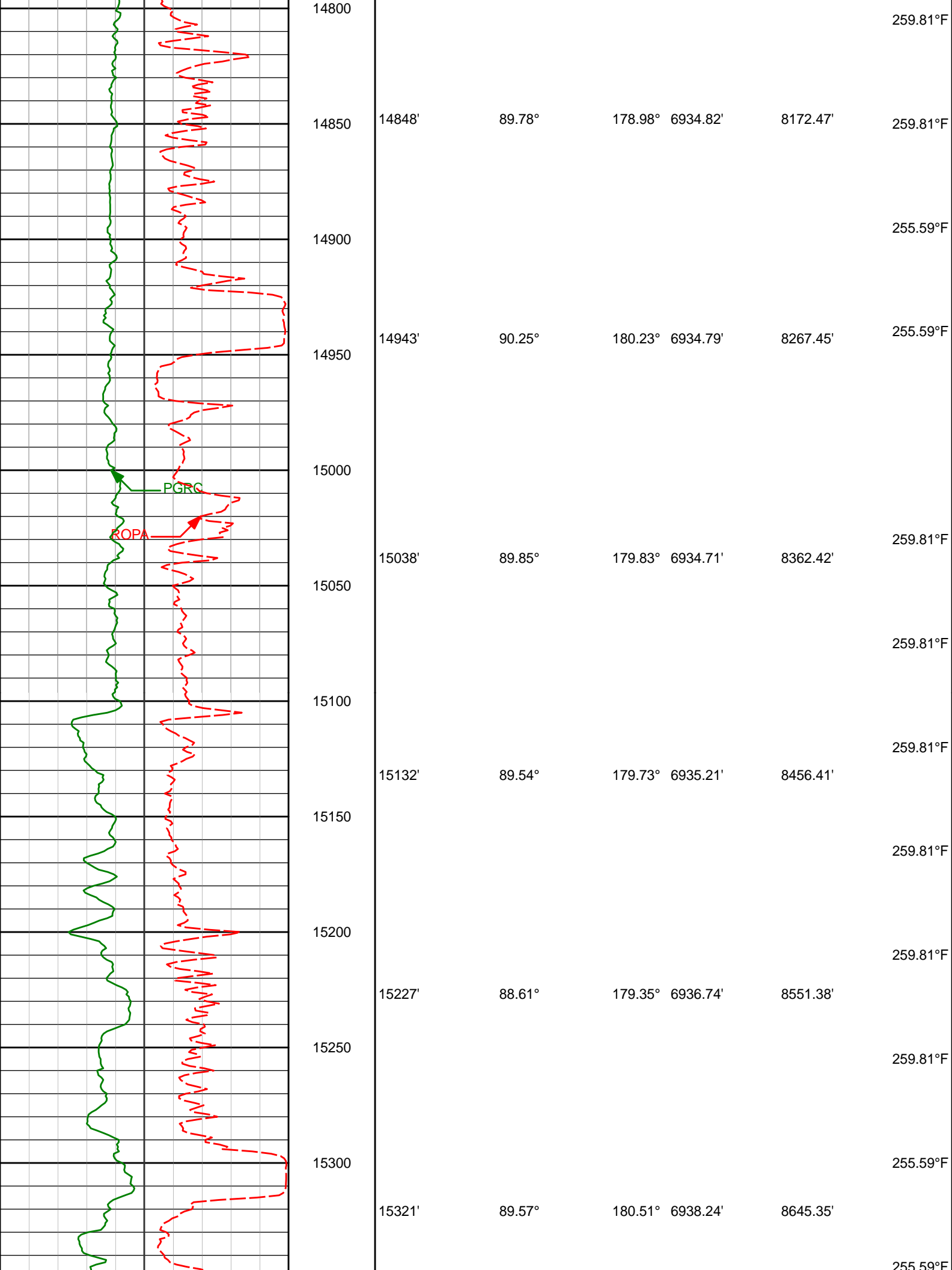


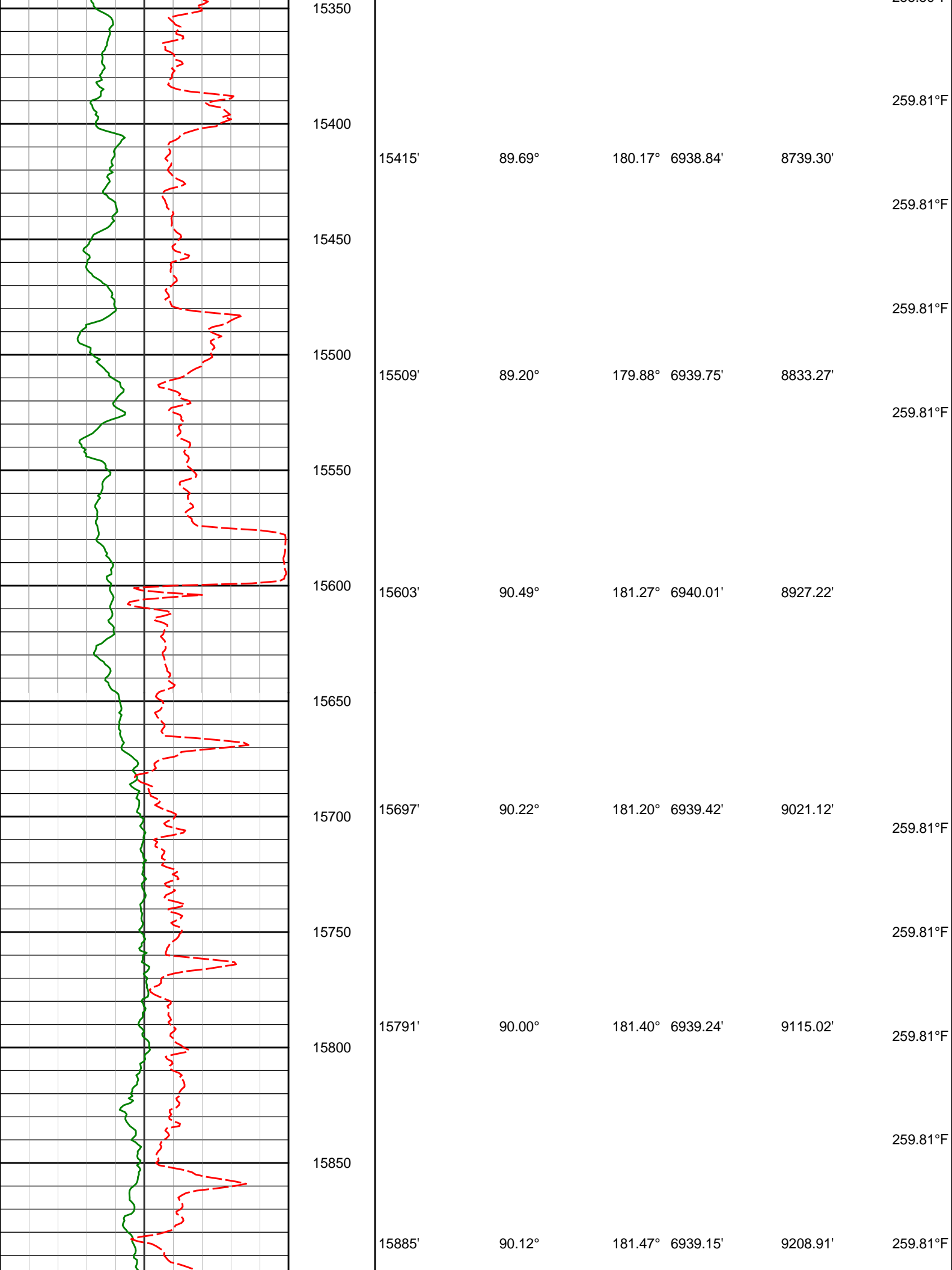


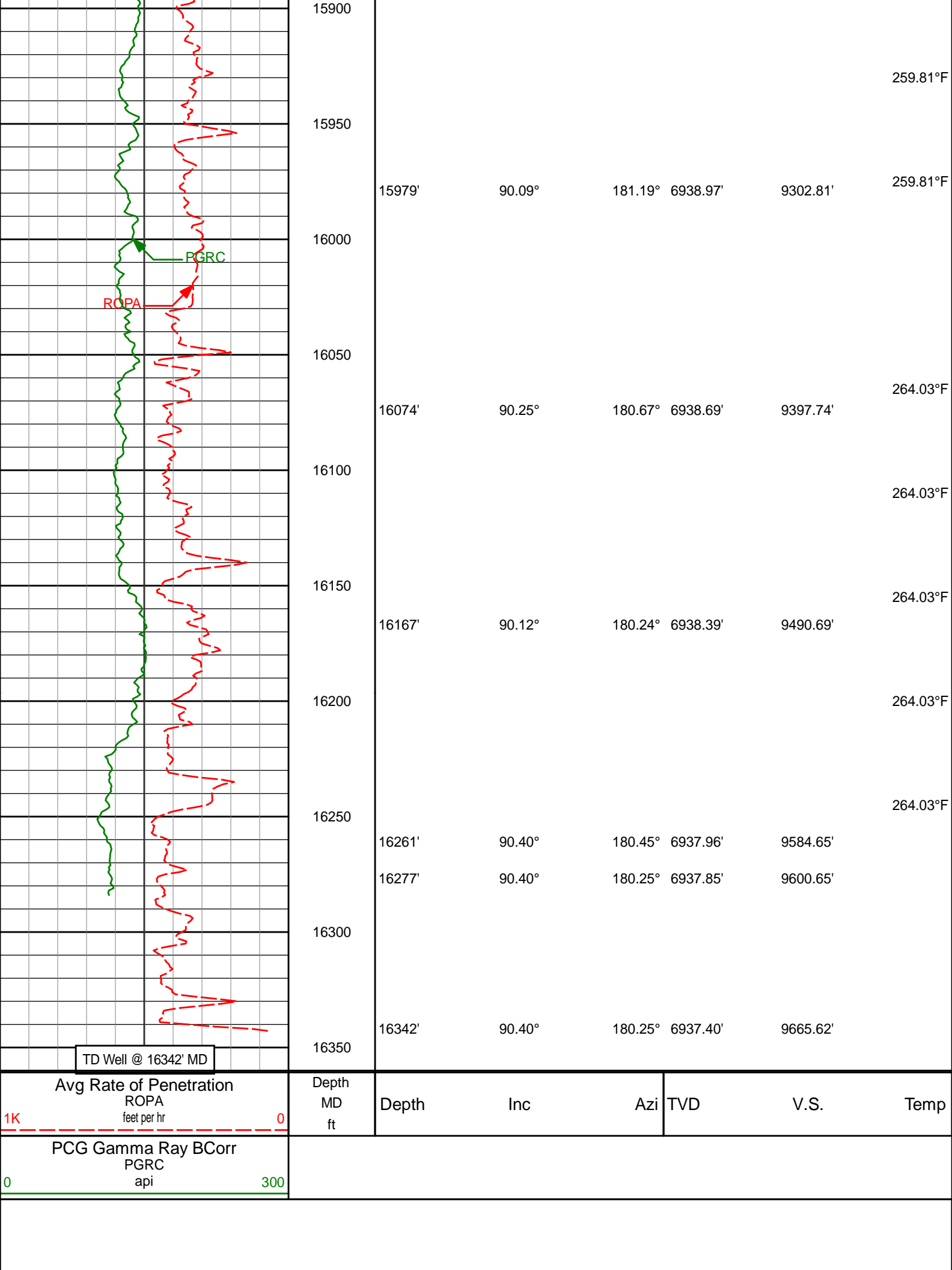












TD Well @ 16342' MD

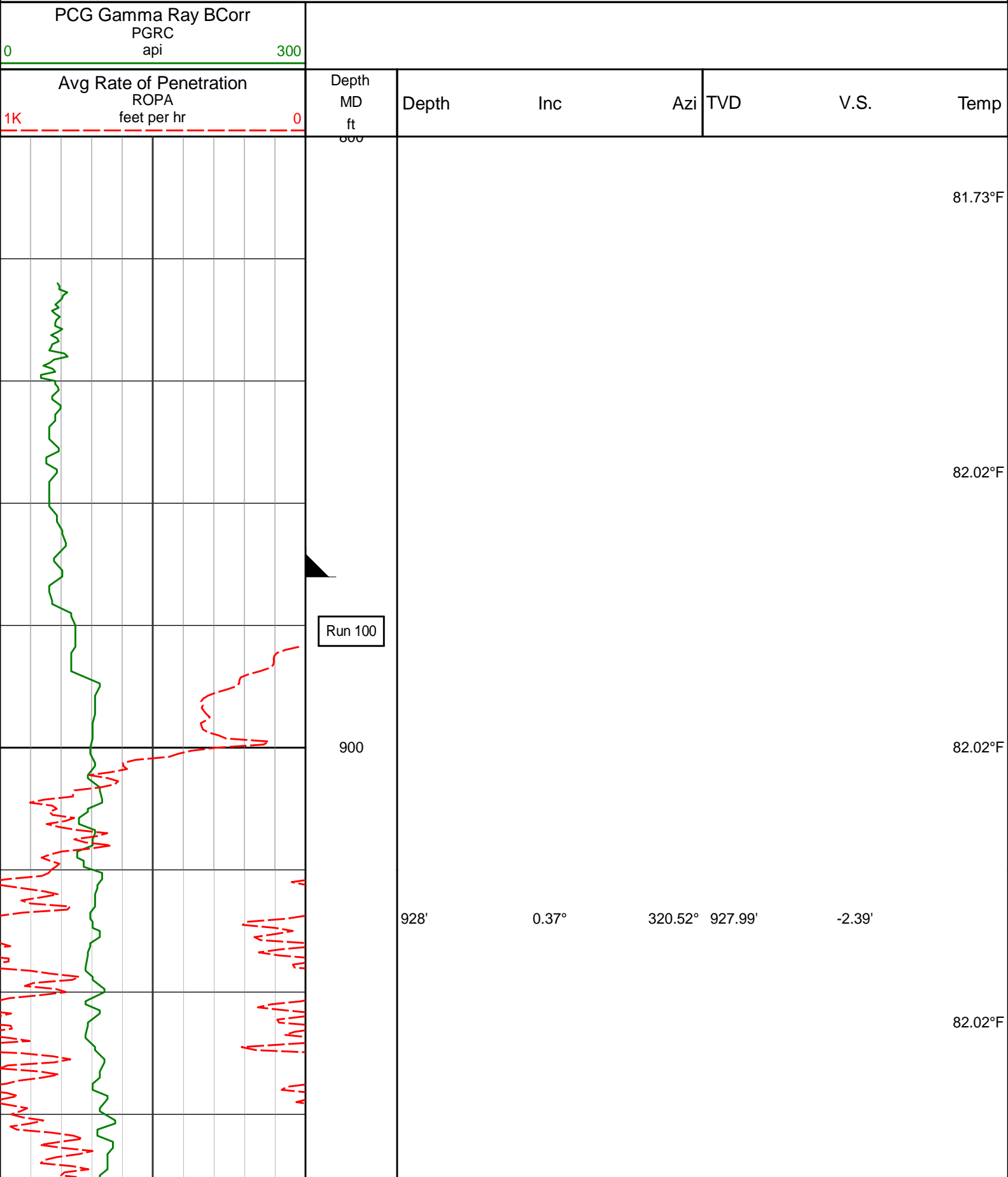
Avg Rate of Penetration  
ROPA  
feet per hr

Depth  
MD  
ft

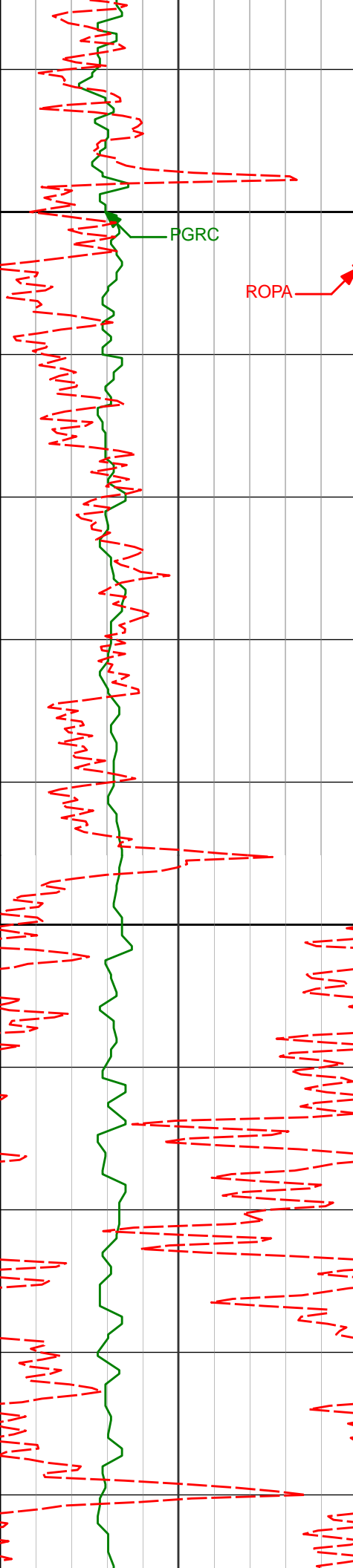
Depth Inc Azi TVD V.S. Temp

PCG Gamma Ray BCorr  
PGRC  
api

# MD Detail 1:240 Scale







1000

1100

1112'

0.67°

298.69°

1111.99'

-3.39'

84.06°F

84.06°F

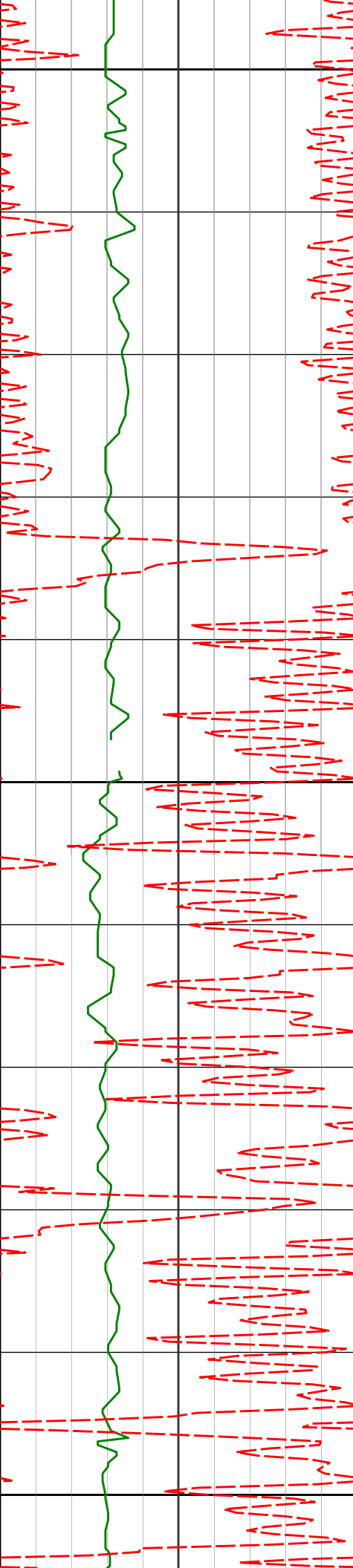
84.06°F

86.09°F

86.09°F

PGRC

ROPA



1200

1203'

0.61°

291.33° 1202.98'

-3.85'

88.14°F

1300

1294'

0.78°

284.21° 1293.97'

-4.20'

88.14°F

88.14°F

1400

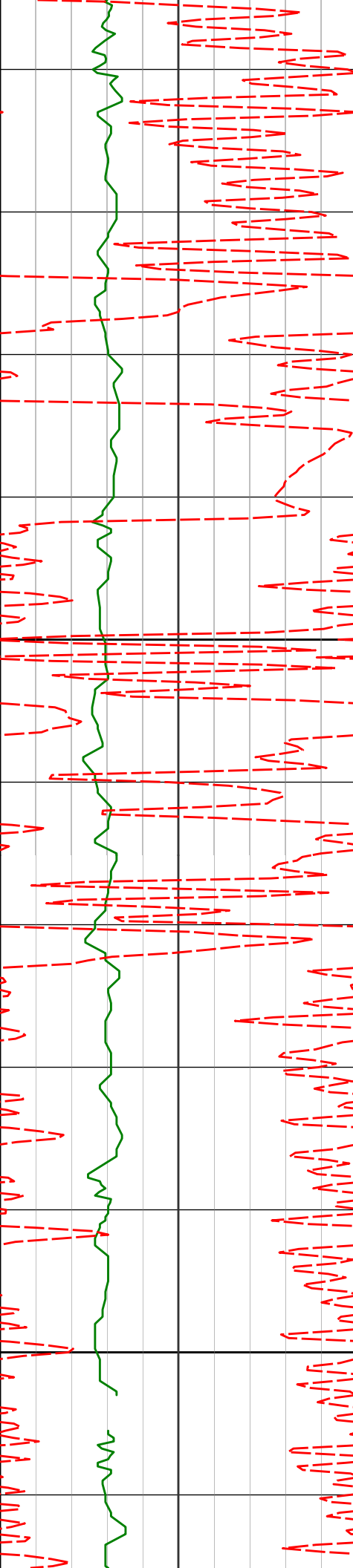
1386'

0.74°

281.90° 1385.97'

-4.50'

89.10°F



1500

1600

1568'

1.40°

170.85°

1567.95'

-2.57'

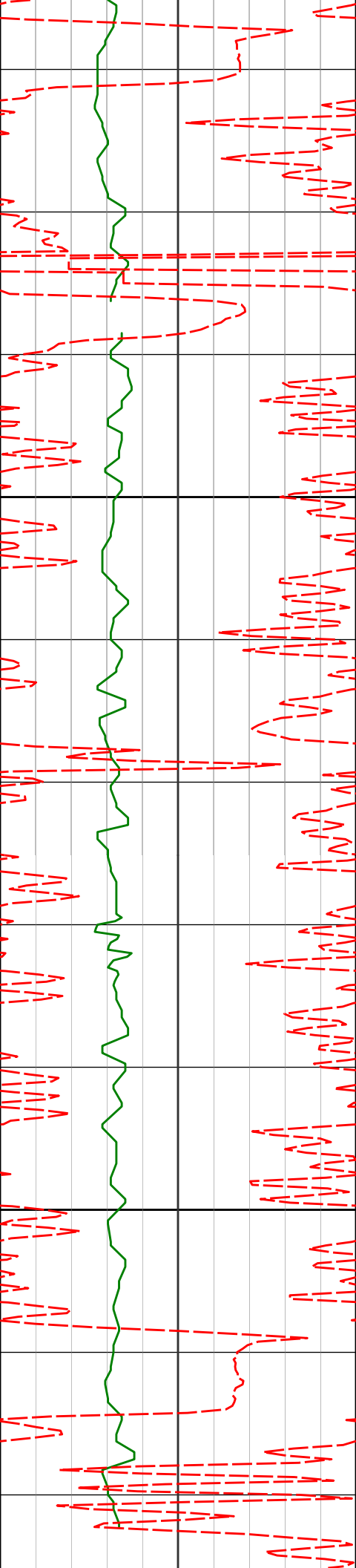
89.45°F

90.19°F

90.19°F

92.26°F

93.04°F



1659'

1.35°

172.24°

1658.92'

-0.41'

94.33°F

1700

94.33°F

1750'

1.22°

173.20°

1749.90'

1.62'

95.72°F

1800

96.42°F

1842'

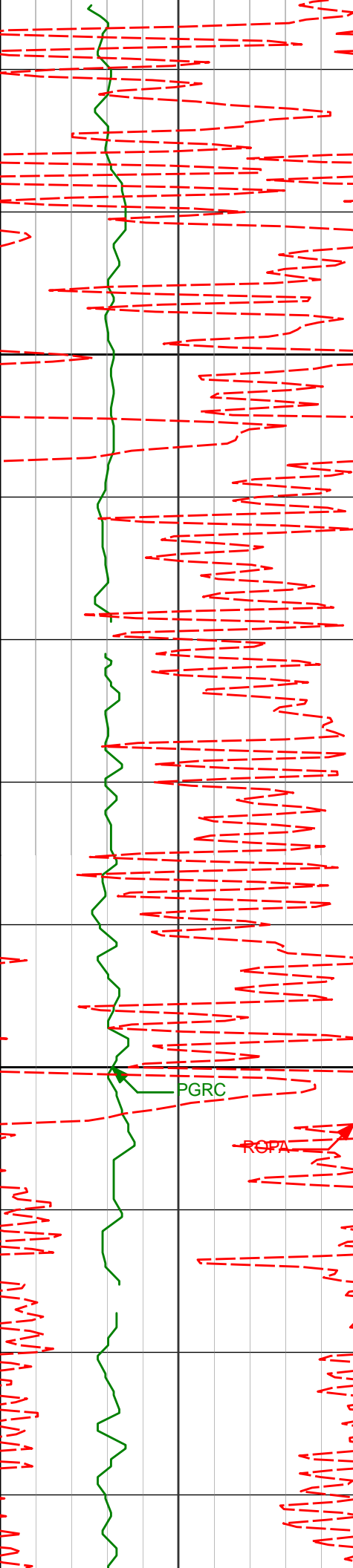
1.15°

177.48°

1841.88'

3.52'

96.42°F



1900

1933'

0.82°

181.36°

1932.86'

5.08'

96.42°F

98.51°F

2000

2024'

0.34°

177.03°

2023.86'

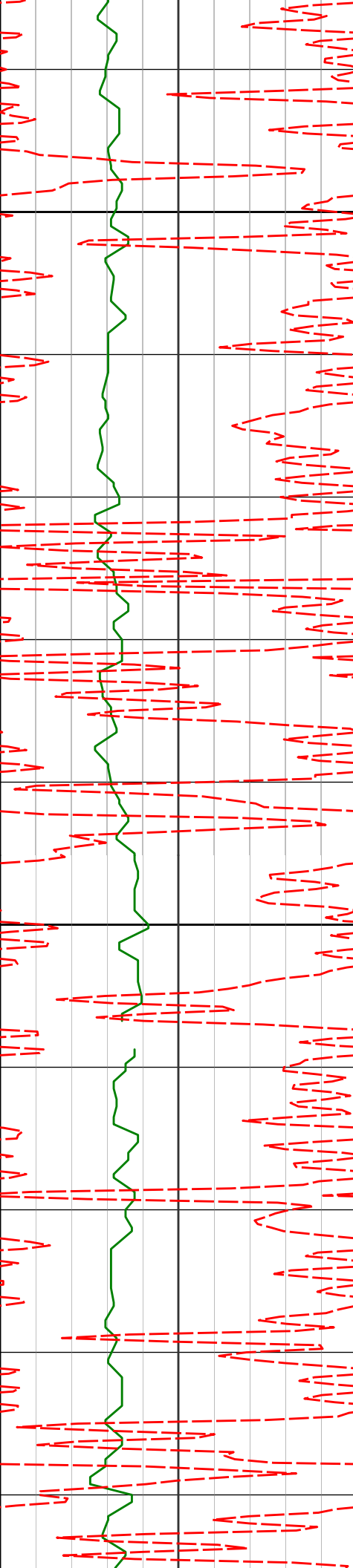
6.00'

98.51°F

100.62°F

PGRC

ROPA



2100

2115'

0.09°

231.04°

2114.86'

6.32'

100.62°F

2200

2205'

0.48°

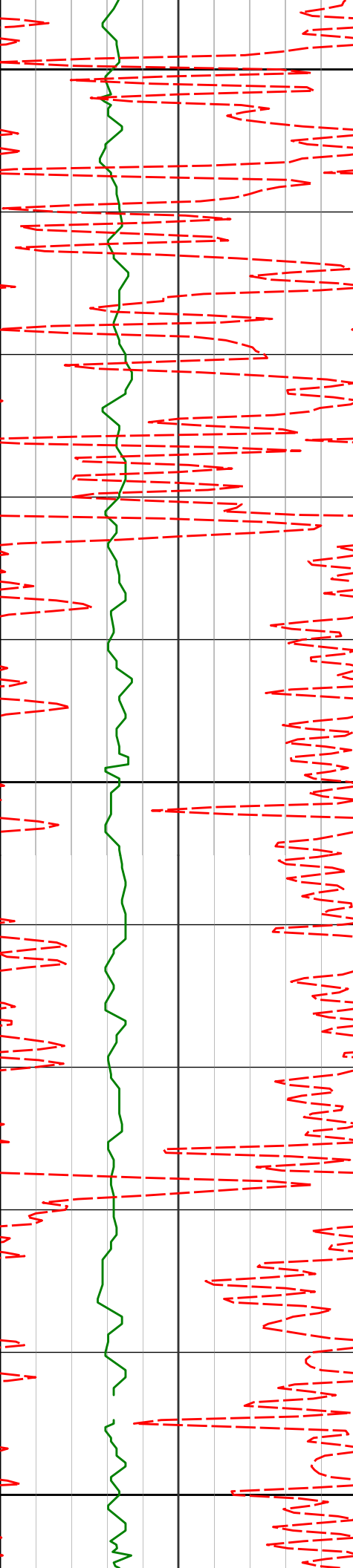
286.70°

2204.86'

6.25'

100.62°F

102.72°F



2300

2400

2500

2297'

0.85°

288.88° 2296.85'

5.89'

102.72°F

104.83°F

104.83°F

104.83°F

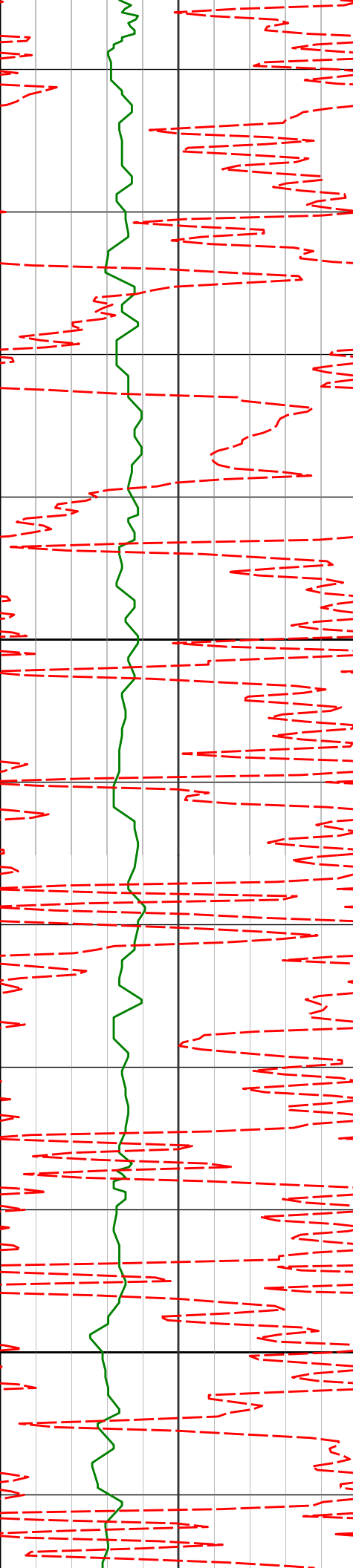
106.53°F

2480'

1.38°

253.52° 2479.82'

6.00'



2600

2700

2663'

0.18°

115.45° 2662.80'

6.70'

106.97°F

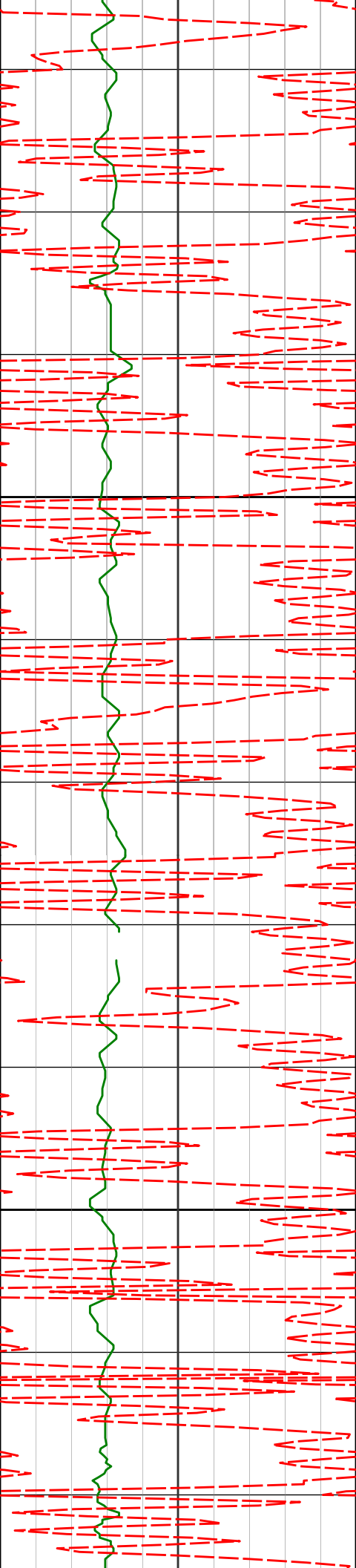
106.97°F

109.09°F

109.09°F

111.24°F





2800

2900

2755'

0.26°

0.94° 2754.80'

6.56'

2849'

0.25°

348.97° 2848.80'

6.15'

2944'

0.64°

323.97° 2943.80'

5.51'

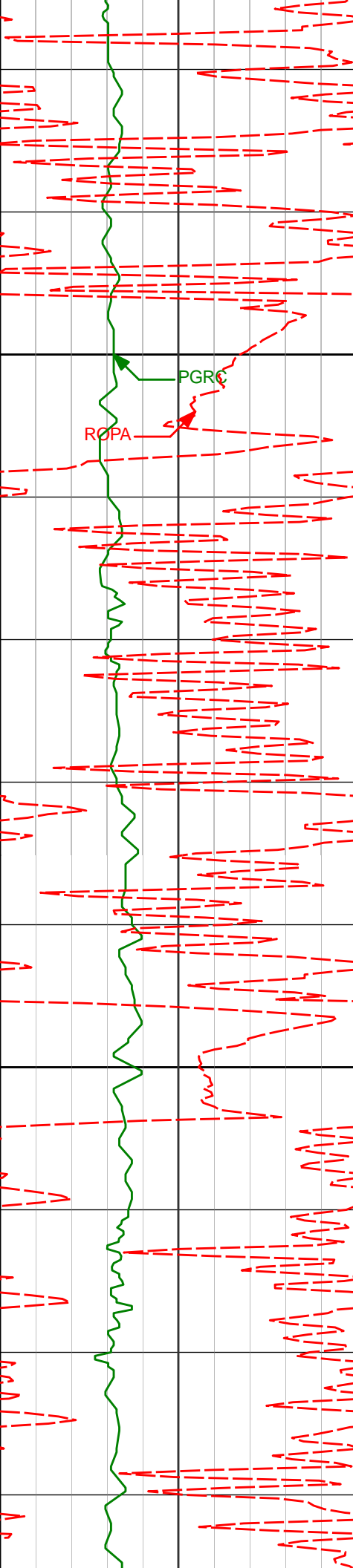
111.24°F

111.24°F

111.24°F

111.24°F

112.52°F



3000

3100

3038'

2.05°

79.44°

3037.78'

4.81'

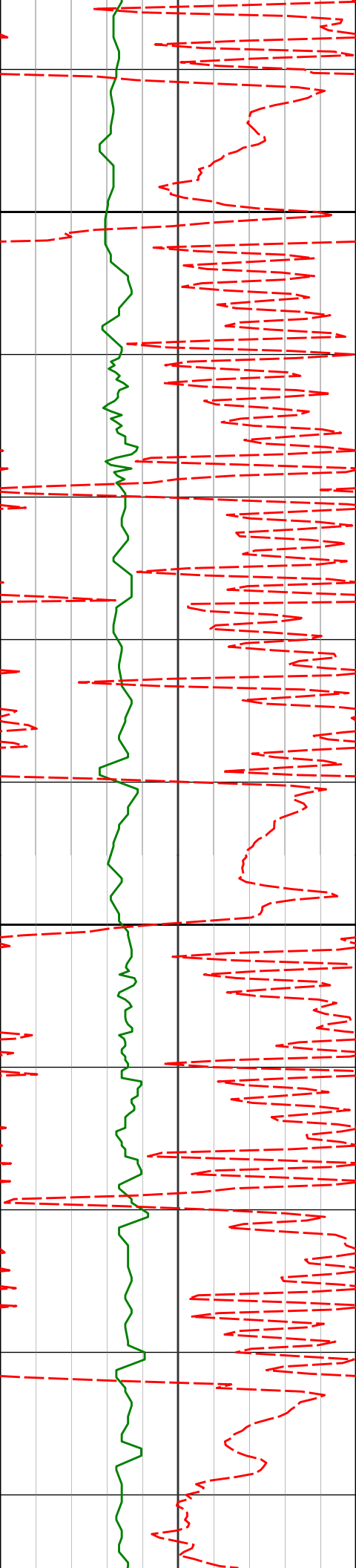
113.40°F

114.22°F

115.56°F

115.56°F

115.56°F



3200

3228'

4.16°

63.77° 3227.49'

1.36'

115.99°F

117.73°F

118.33°F

3300

3322'

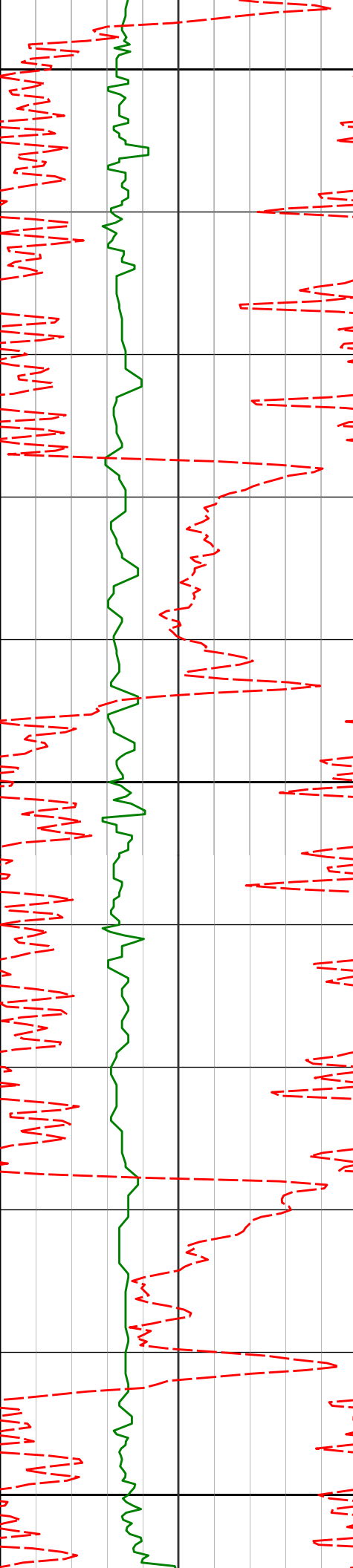
3.83°

61.43° 3321.26'

-1.52'

119.91°F

119.91°F



3400

3417'

6.08°

74.93° 3415.90'

-4.17'

119.91°F

3500

3512'

8.05°

87.22° 3510.18'

-5.53'

121.98°F

3600

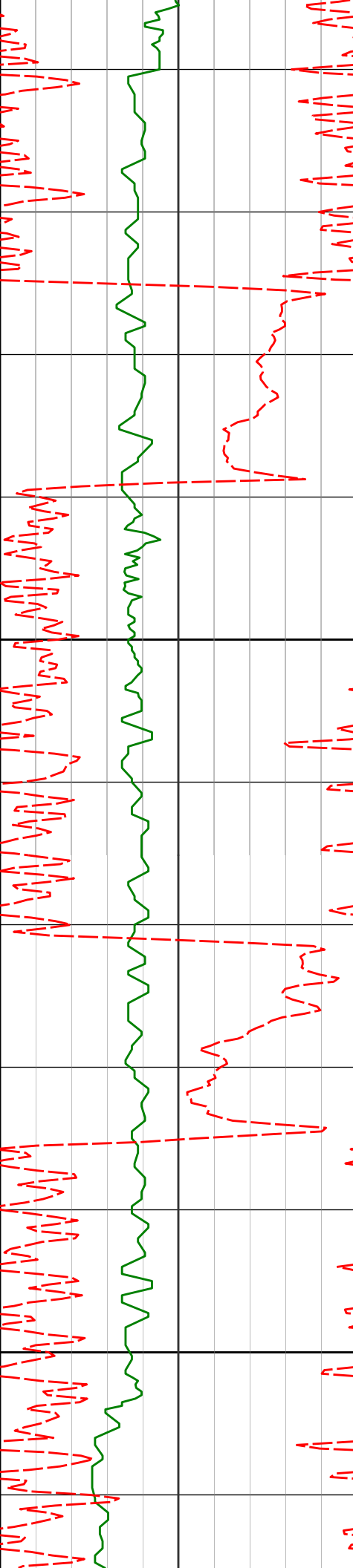
3606'

8.35°

82.68° 3603.22'

-6.41'

123.36°F



3700

3701'

11.20°

82.68° 3696.83'

-8.10'

124.30°F

124.30°F

124.30°F

124.30°F

3800

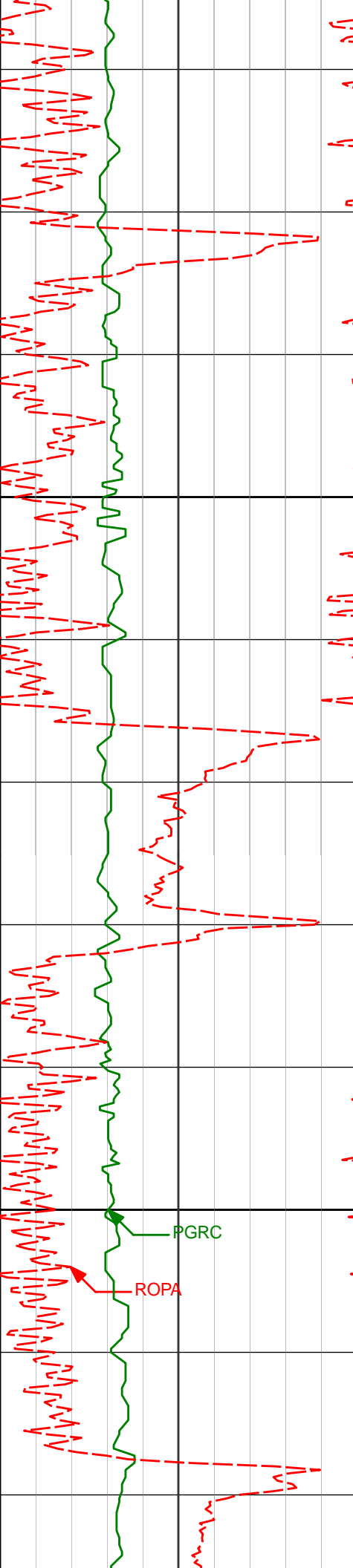
3795'

10.80°

83.45° 3789.11'

-9.86'

126.85°F



3900

4000

3985'

11.65°

79.60°

3975.47'

-14.50'

PGRC

ROPA

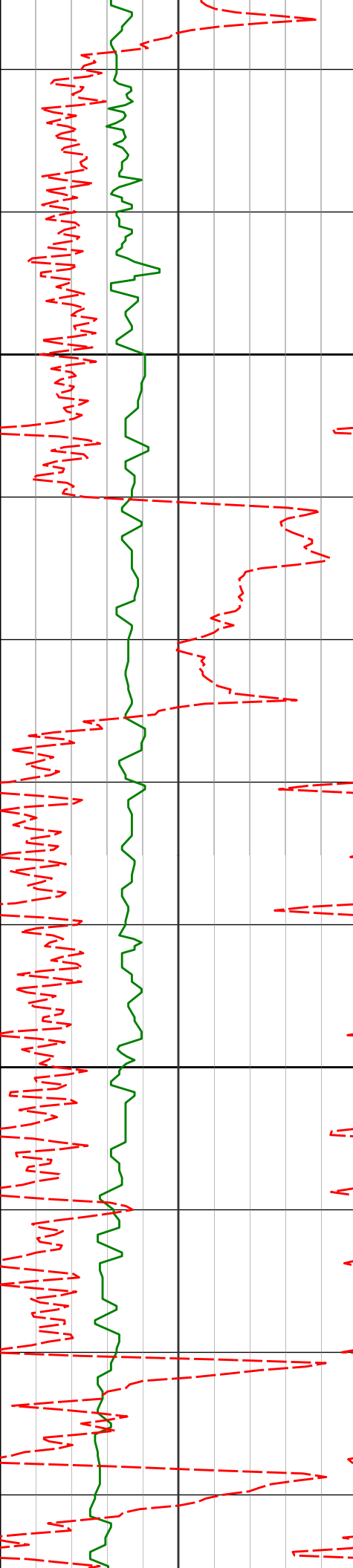
128.40°F

128.73°F

128.73°F

128.73°F

129.28°F



4100

4200

4079'

4174'

4268'

11.68°

10.76°

9.70°

83.63°

99.17°

95.40°

4067.53'

4160.74'

4253.24'

-16.84'

-16.07'

-13.55'

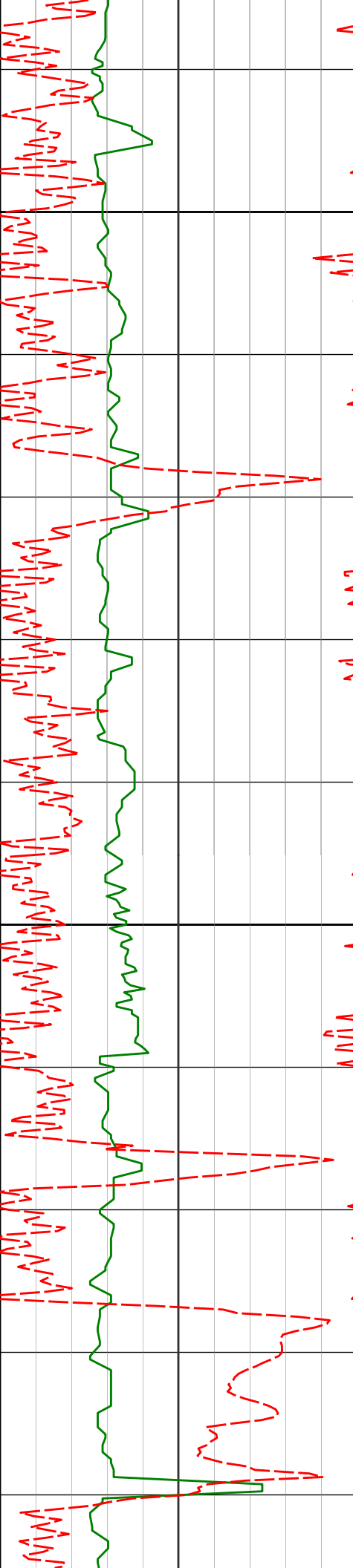
130.60°F

130.96°F

133.20°F

133.20°F

123.20°F



4300

133.81°F

135.45°F

4363'

8.09°

93.91° 4347.10'

-12.00'

135.97°F

4400

135.94°F

4458'

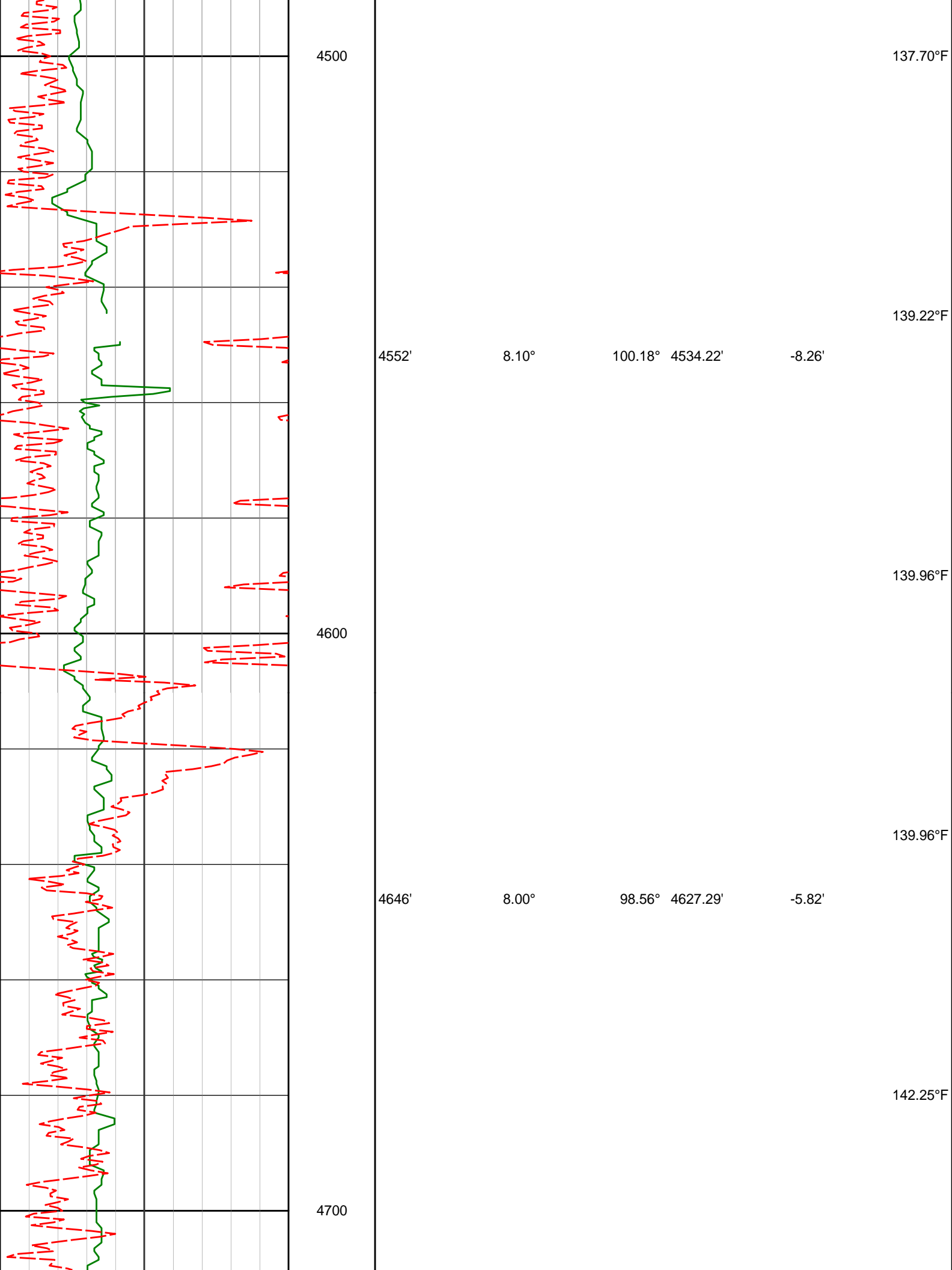
8.09°

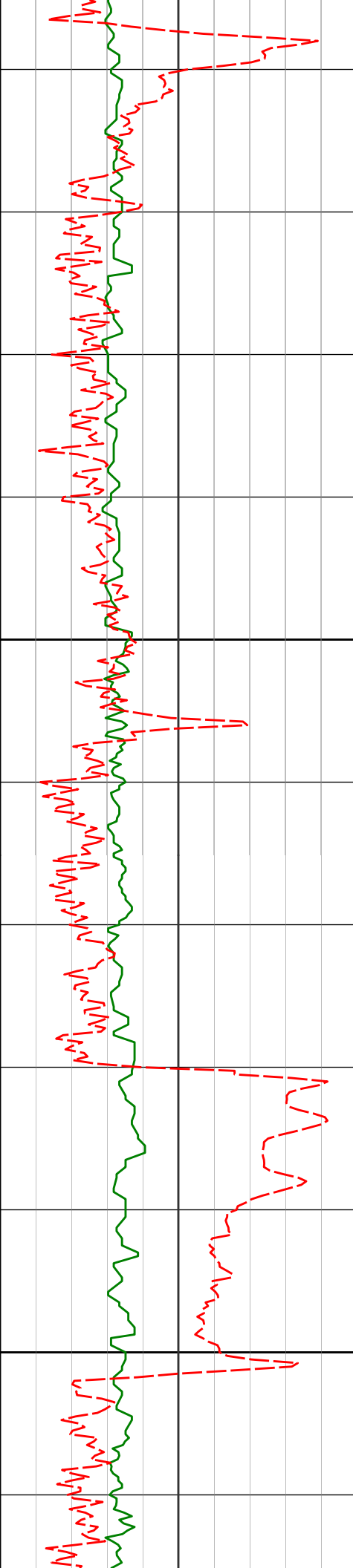
96.50° 4441.15'

-10.48'

137.70°F







4800

4900

4740'

4835'

4929'

7.66°

7.47°

4.04°

89.34°

83.91°

84.83°

4720.42'

4814.60'

4908.11'

-4.62'

-5.06'

-5.79'

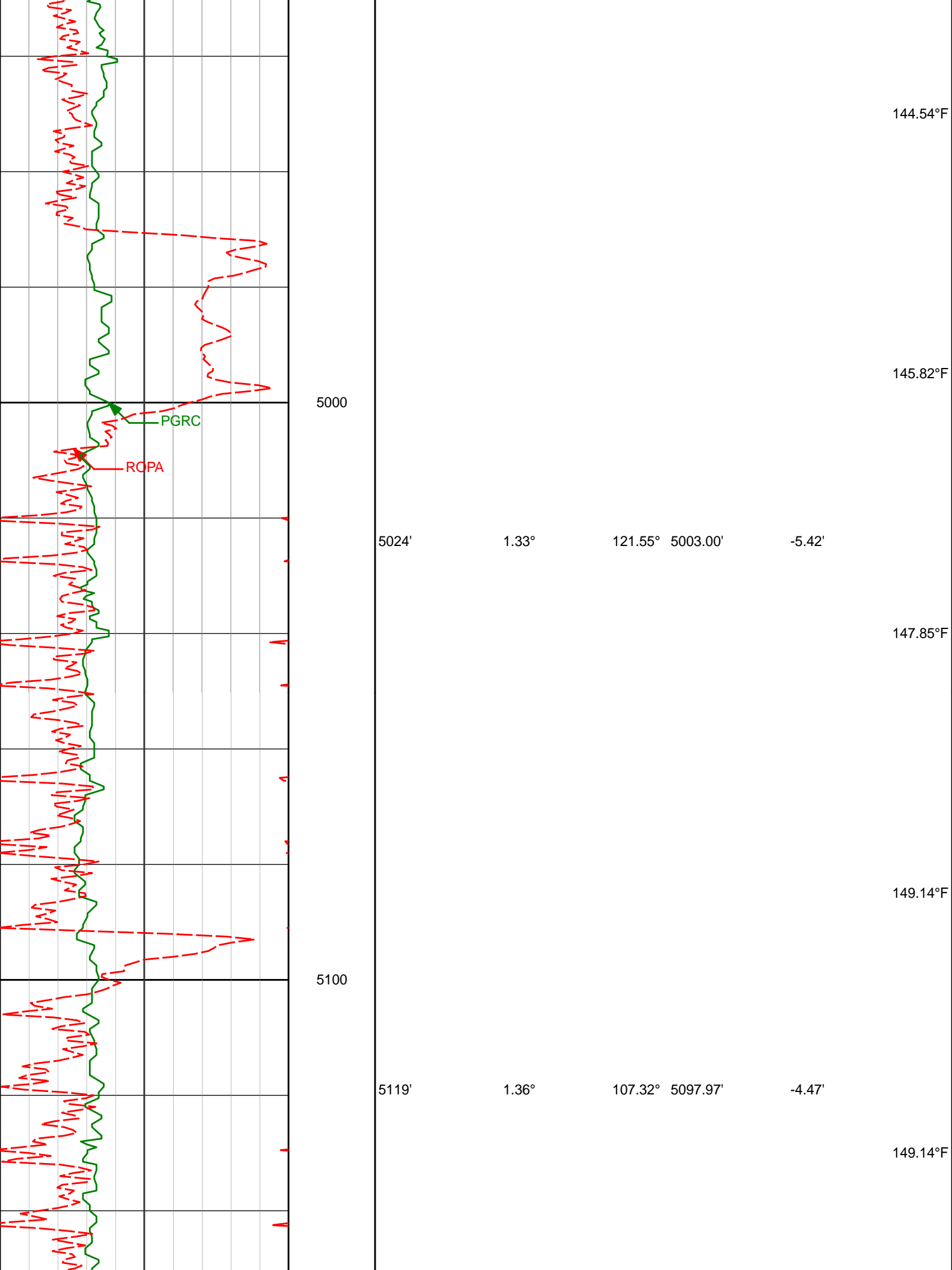
142.25°F

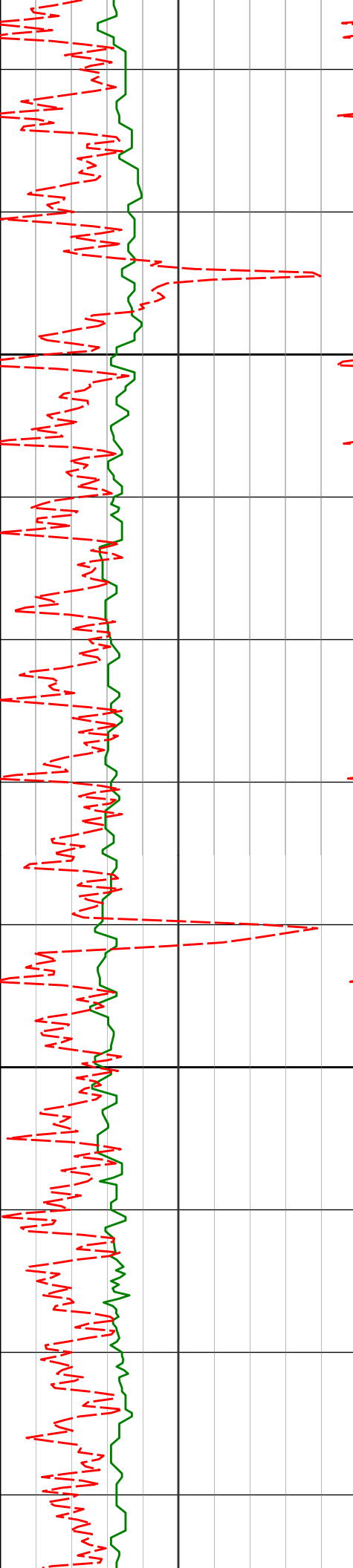
144.13°F

142.82°F

144.00°F

144.54°F





5200

5213'

1.44°

89.35° 5191.95'

-4.10'

149.95°F

151.47°F

151.78°F

5300

5307'

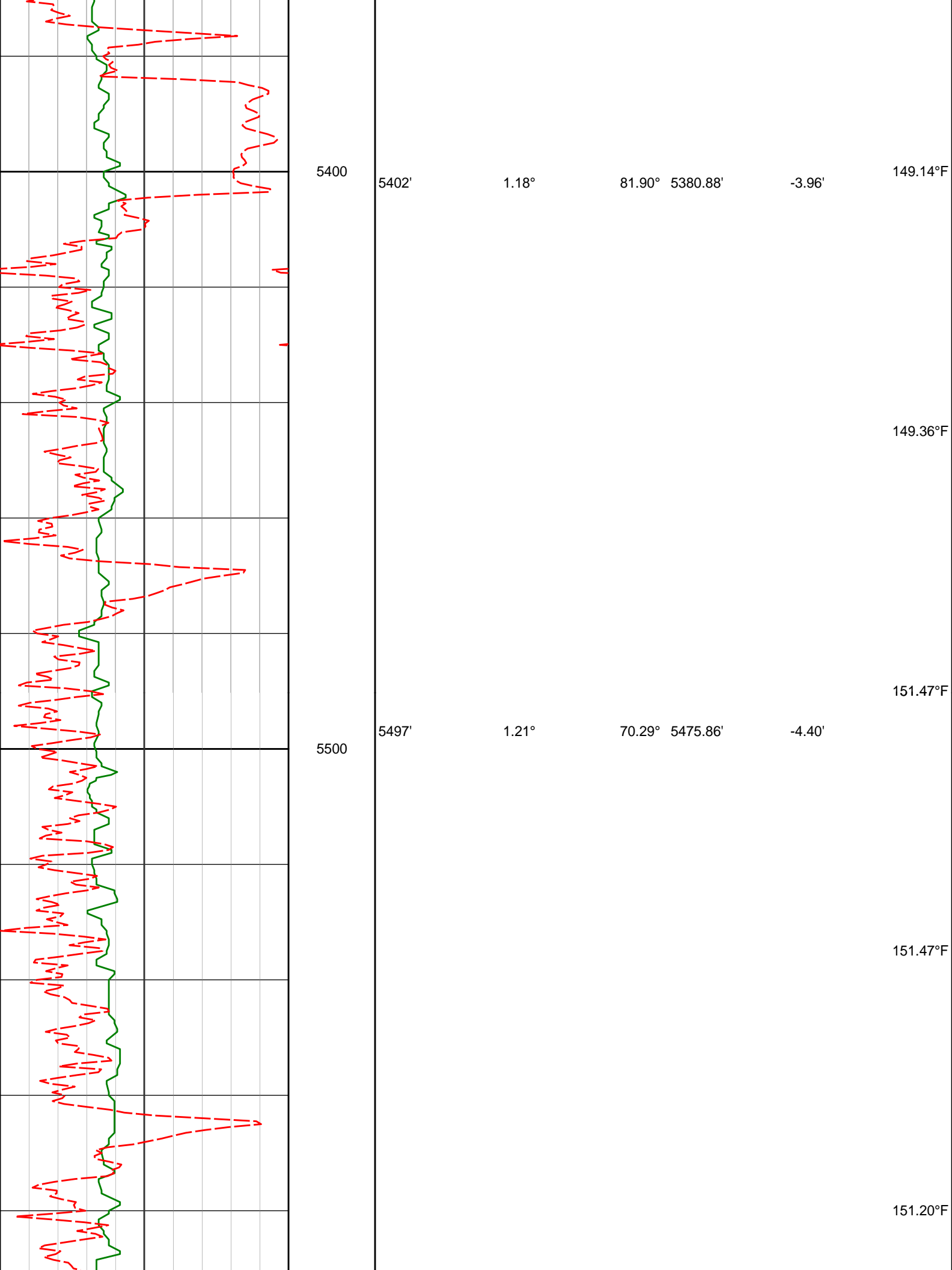
1.66°

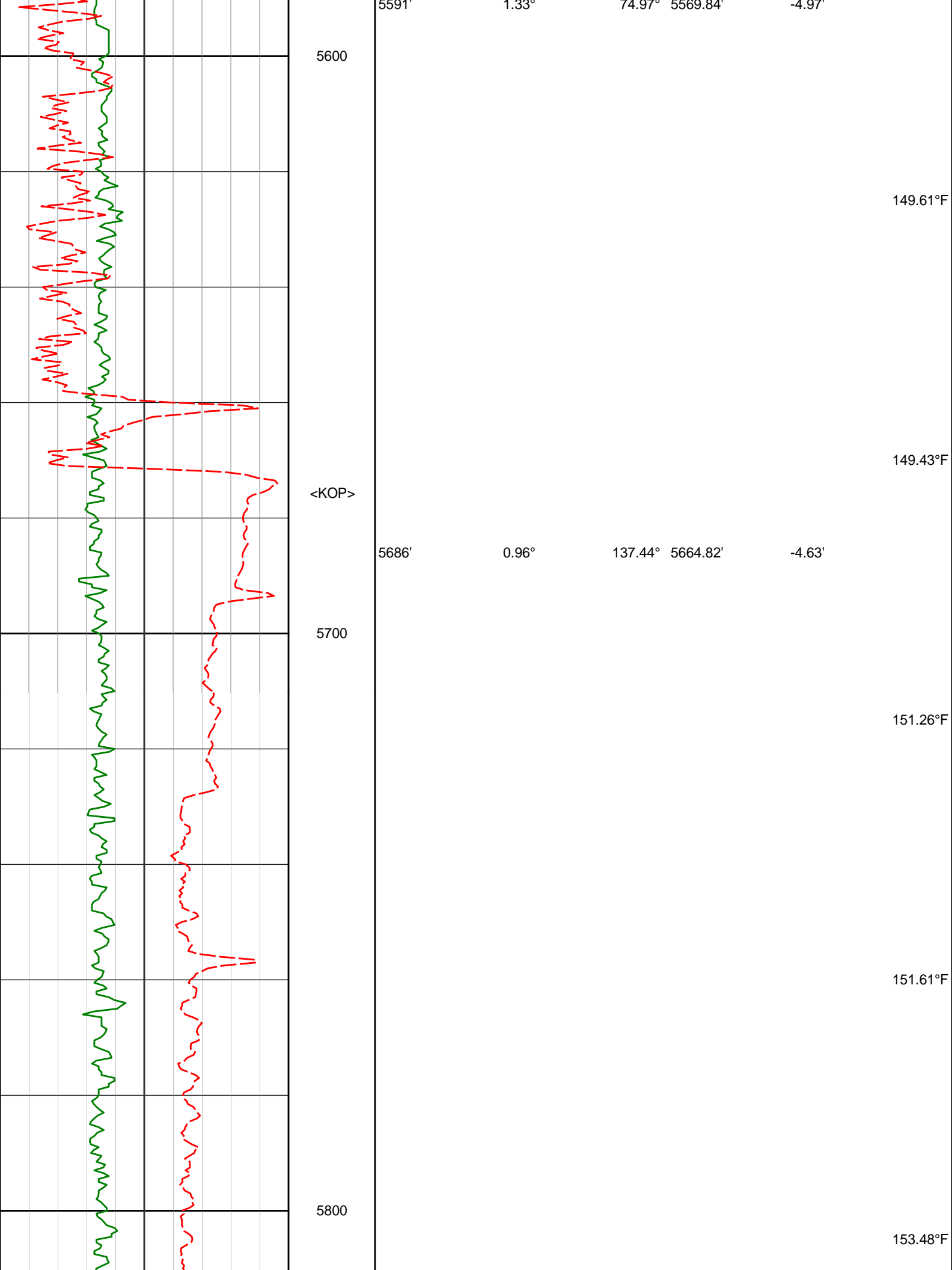
93.63° 5285.91'

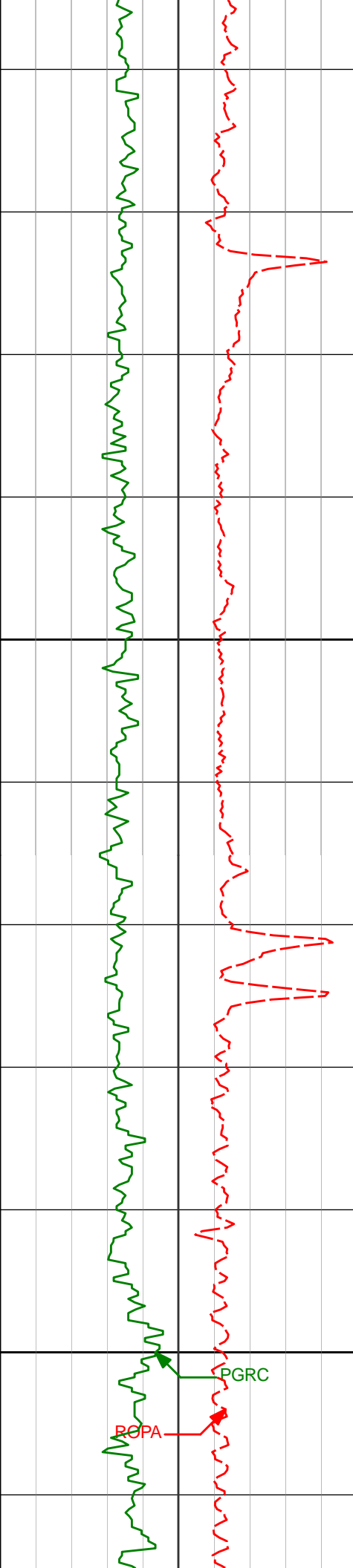
-3.97'

151.89°F

149.88°F







5900

6000

5875'

0.93°

85.19°

5853.80'

-3.54'

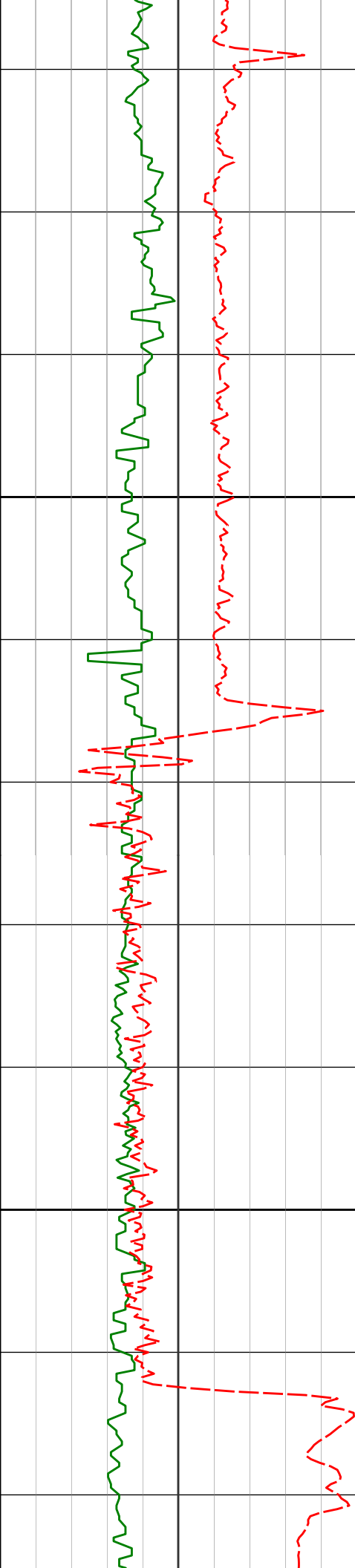
153.79°F

153.79°F

153.79°F

155.69°F

156.13°F



6100

6200

6064'

1.36°

47.31° 6042.77'

-5.12'

156.13°F

158.05°F

6158'

1.70°

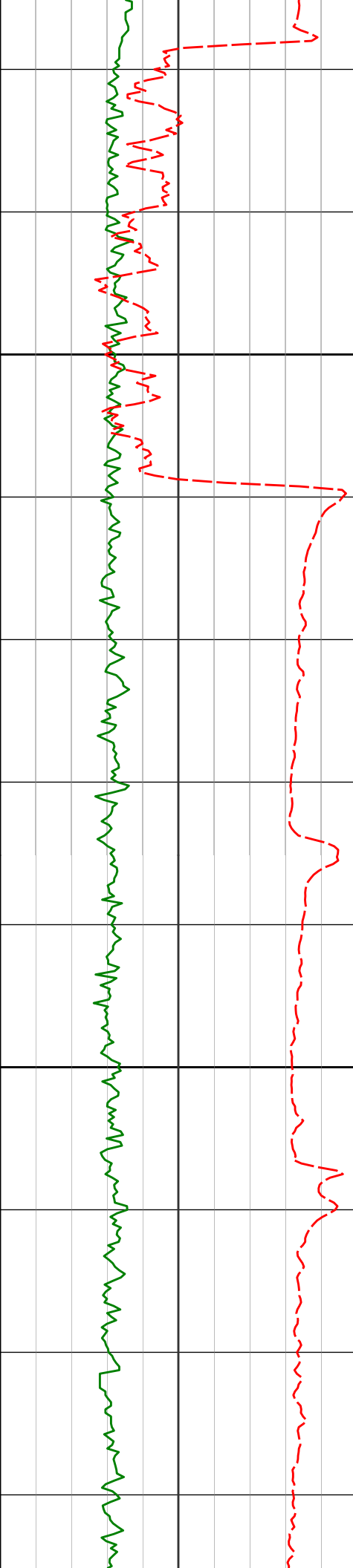
50.80° 6136.73'

-6.71'

158.50°F

157.19°F

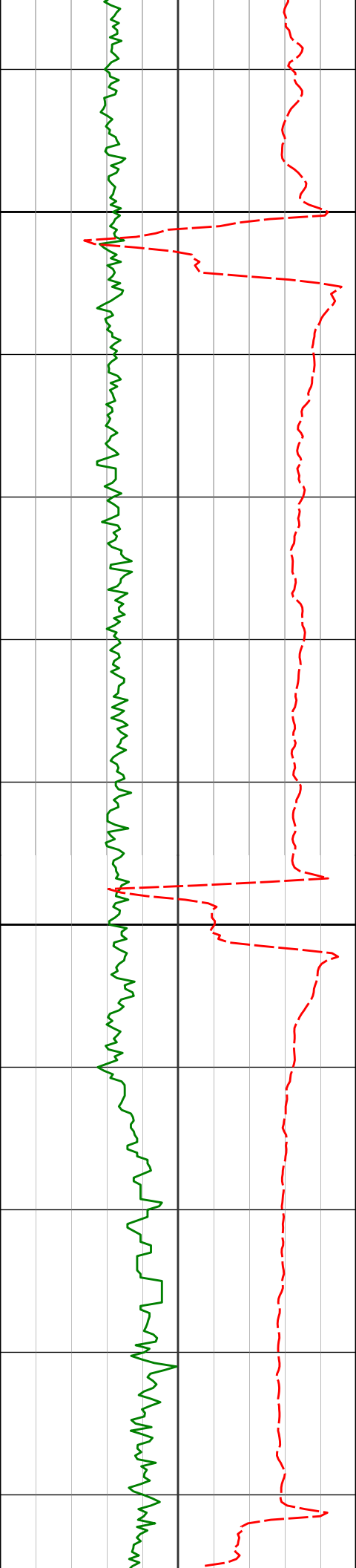




6300

6400

6253'	1.06°	93.26°	6231.71'	-7.51'	156.63°F
6348'	3.49°	192.12°	6326.65'	-4.63'	160.23°F
6443'	14.59°	194.18°	6420.32'	9.76'	163.39°F



6500

6600

6538'

23.38°

189.29° 6510.07'

39.88'

6632'

33.89°

179.07° 6592.51'

84.56'

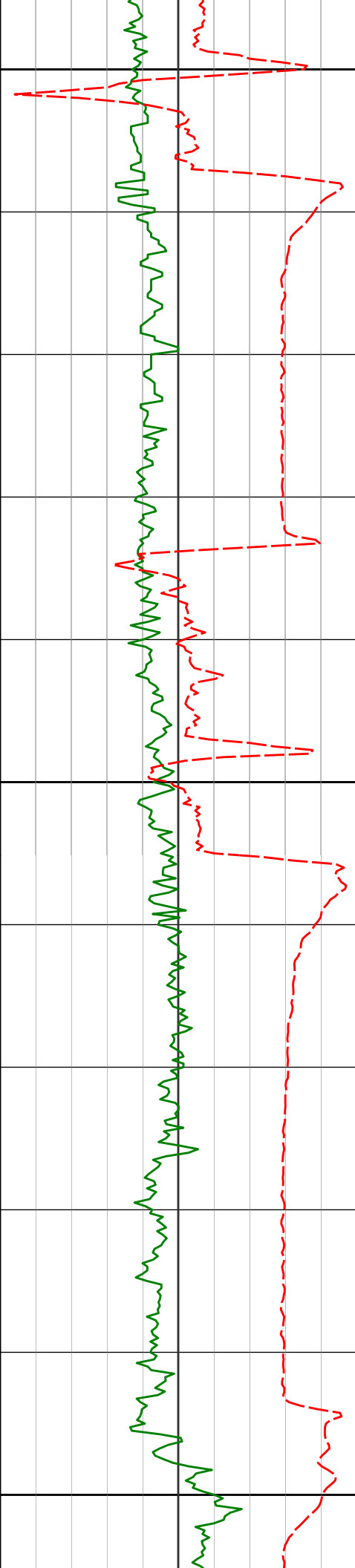
165.37°F

167.71°F

167.97°F

168.62°F

170.37°F



6700

6727'

6800

6822'

6900

41.01°

175.26° 6667.89'

142.24'

44.66°

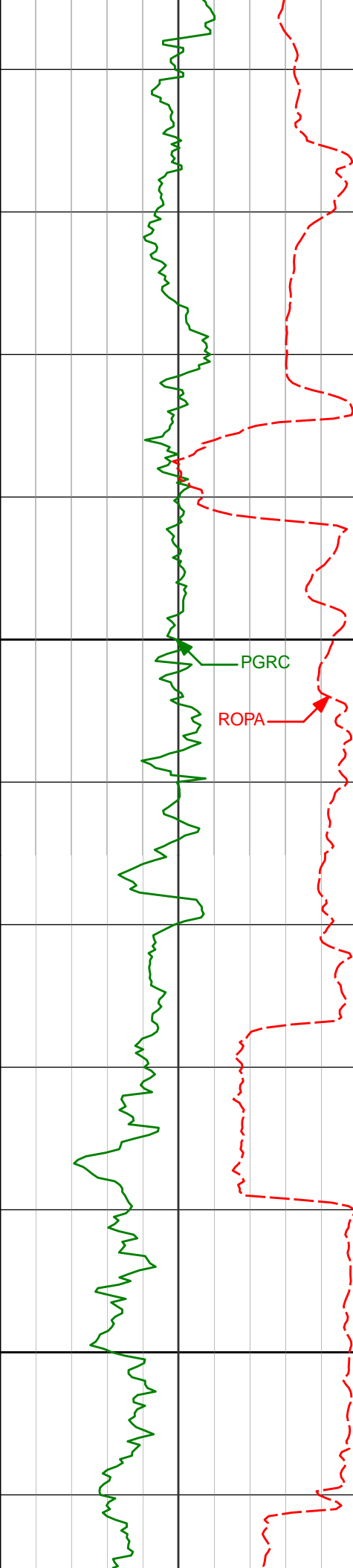
182.40° 6737.58'

206.73'

171.20°F

172.66°F

172.78°F



7000

7100

6916'

54.80°

187.87° 6798.30'

277.83'

7011'

63.60°

185.42° 6846.90'

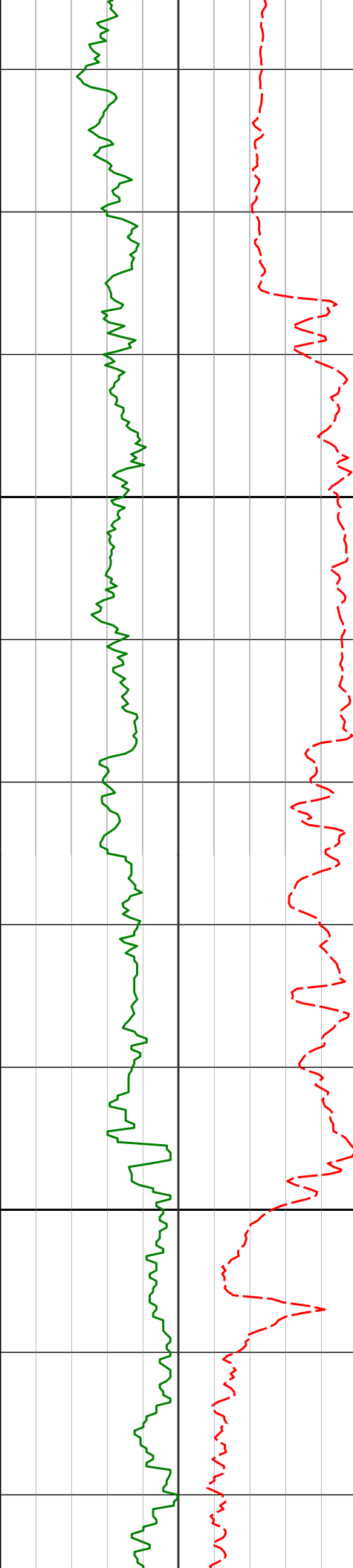
358.56'

7105'

68.91°

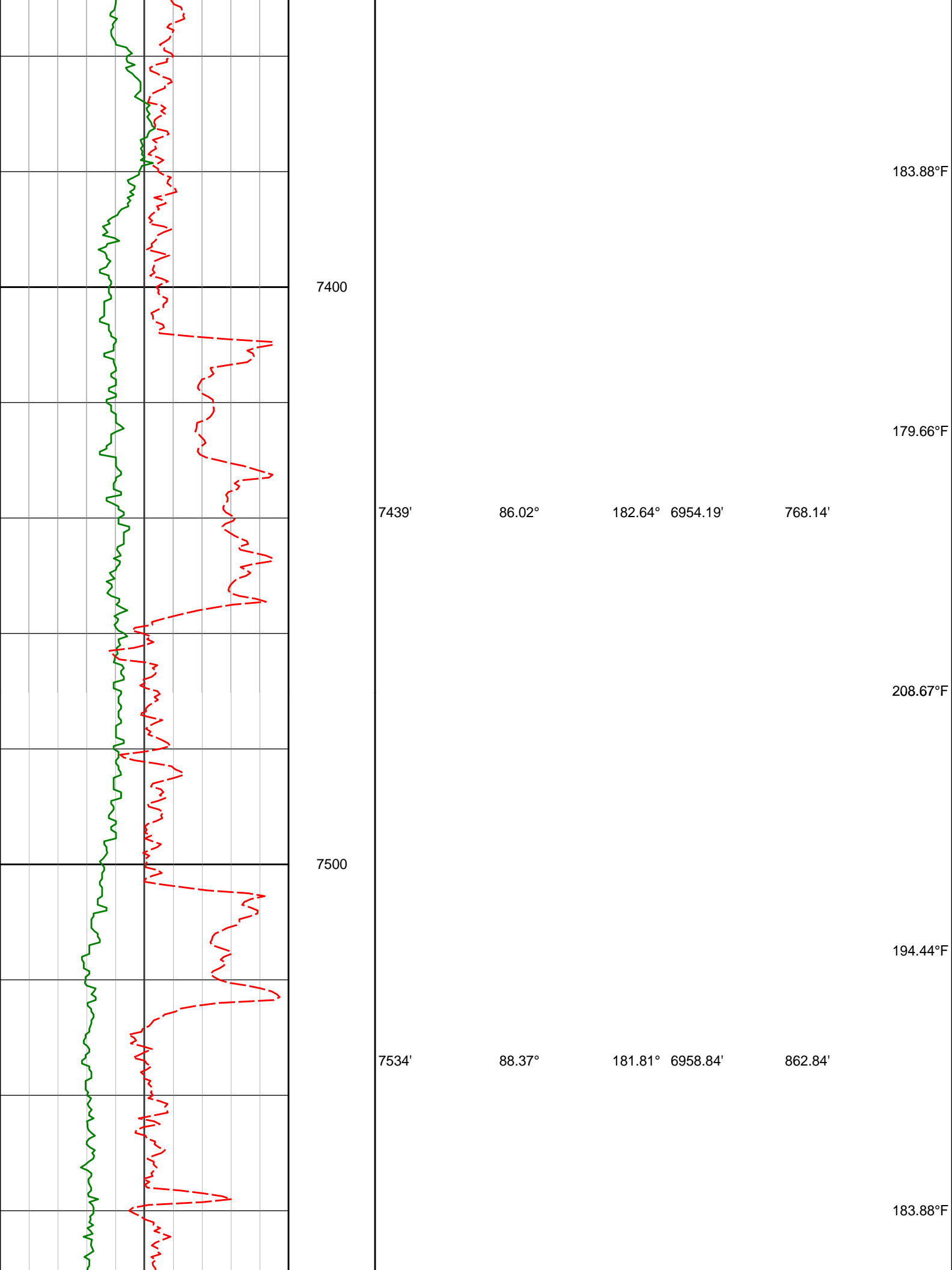
183.90° 6884.74'

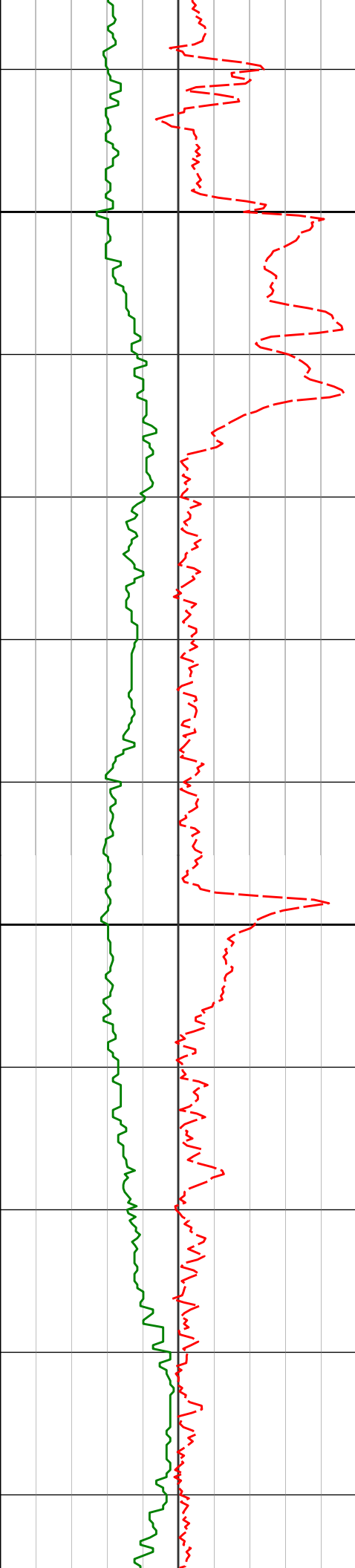
444.11'



Run 200

7200	7200'	71.76°	183.03°	6916.70'	533.24'
	7228'	76.61°	182.83°	6924.33'	560.10'
7300					
	7344'	82.86°	183.20°	6944.99'	673.86'





7600

183.88°F

7628'

90.18°

179.98° 6960.03'

956.76'

183.88°F

7700

188.09°F

7723'

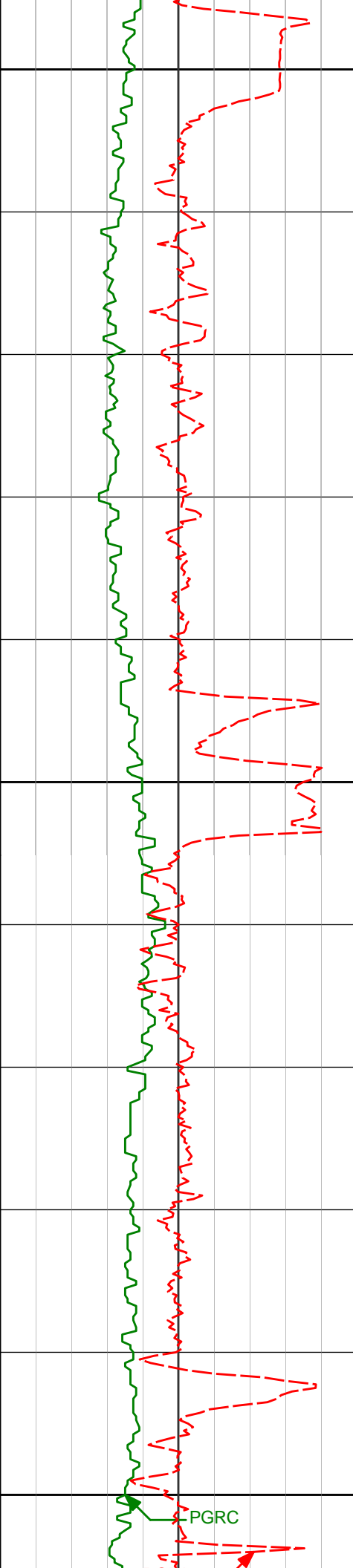
90.12°

179.56° 6959.78'

1051.74'

188.09°F

192.31°F



7800

7817'

89.85°

178.85° 6959.81'

1145.73'

192.31°F

7900

7912'

91.05°

178.36° 6959.06'

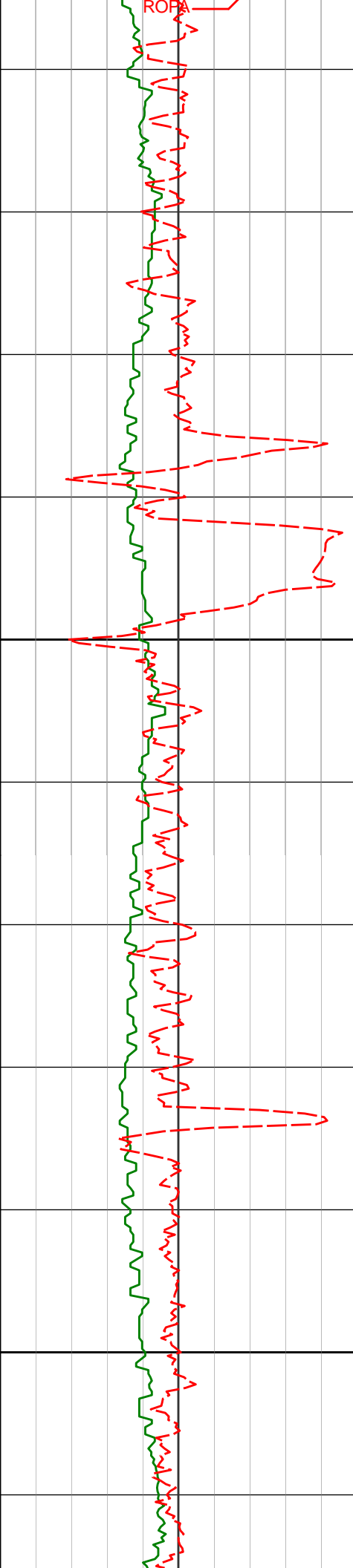
1240.73'

8000

PGRC

196.53°F





8100

8102'

90.86°

177.38° 6955.89'

1430.68'

196.53°F

8200

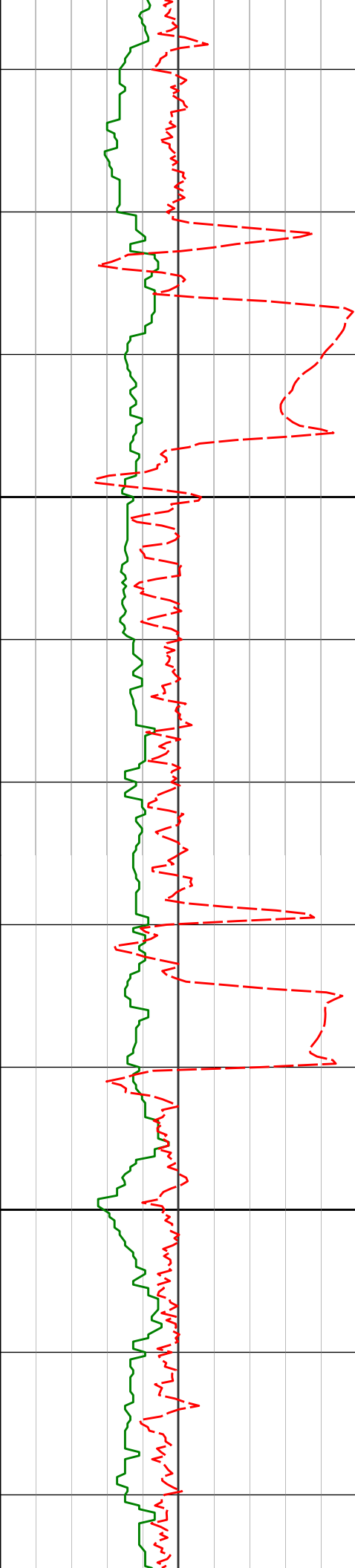
8196'

91.08°

177.01° 6954.30'

1524.64'

194.72°F



8300

8400

8291'

90.65°

177.89° 6952.87'

1619.60'

8385'

90.80°

178.67° 6951.68'

1713.59'

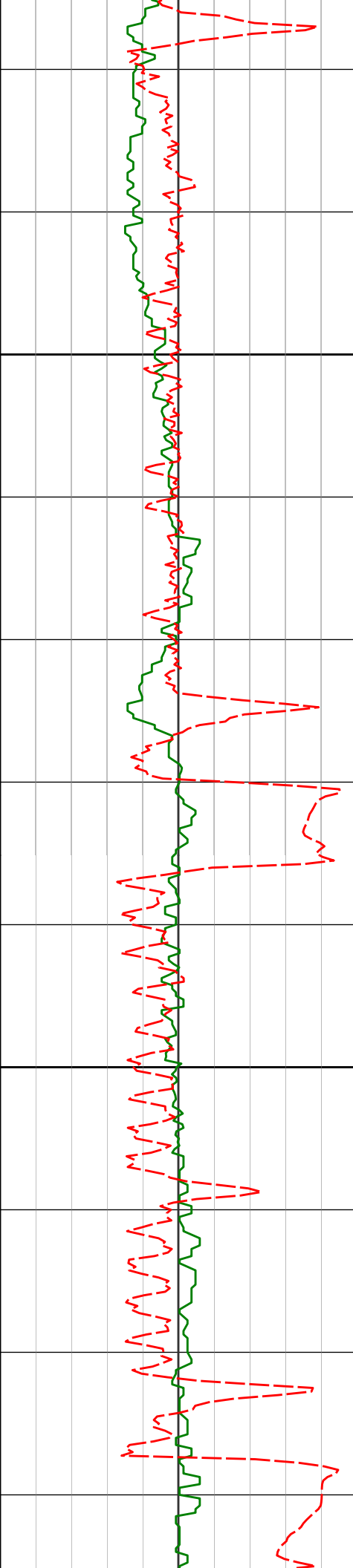
189.91°F

200.75°F

200.75°F

200.75°F

200.75°F



8500

8600

8480'

91.11°

178.66° 6950.10'

1808.58'

8574'

89.91°

177.25° 6949.26'

1902.56'

8669'

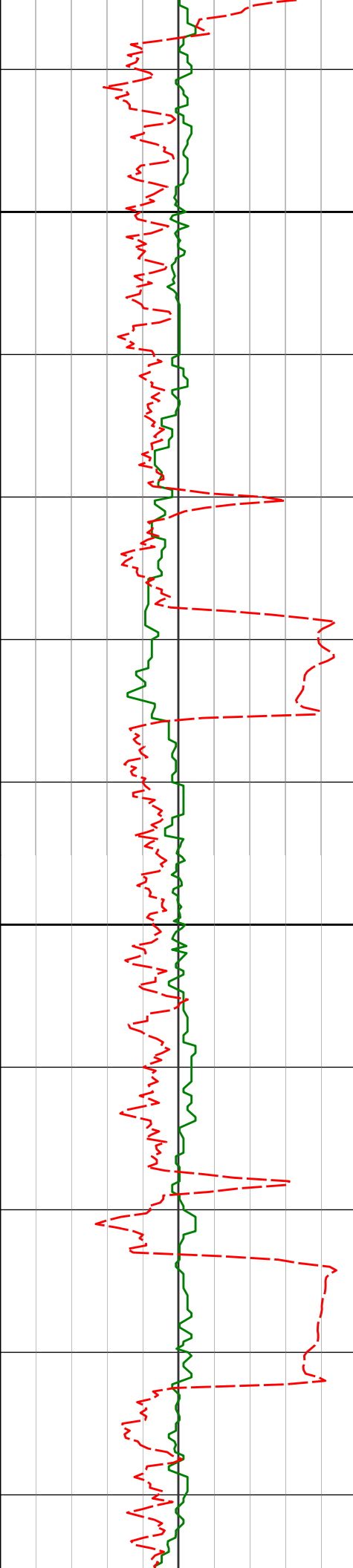
90.74°

177.91° 6948.72'

1997.54'

209.19°F

209.19°F



8700

8800

8764'

8858'

91.17°

89.91°

178.83° 6947.14'

180.83° 6946.25'

2092.53'

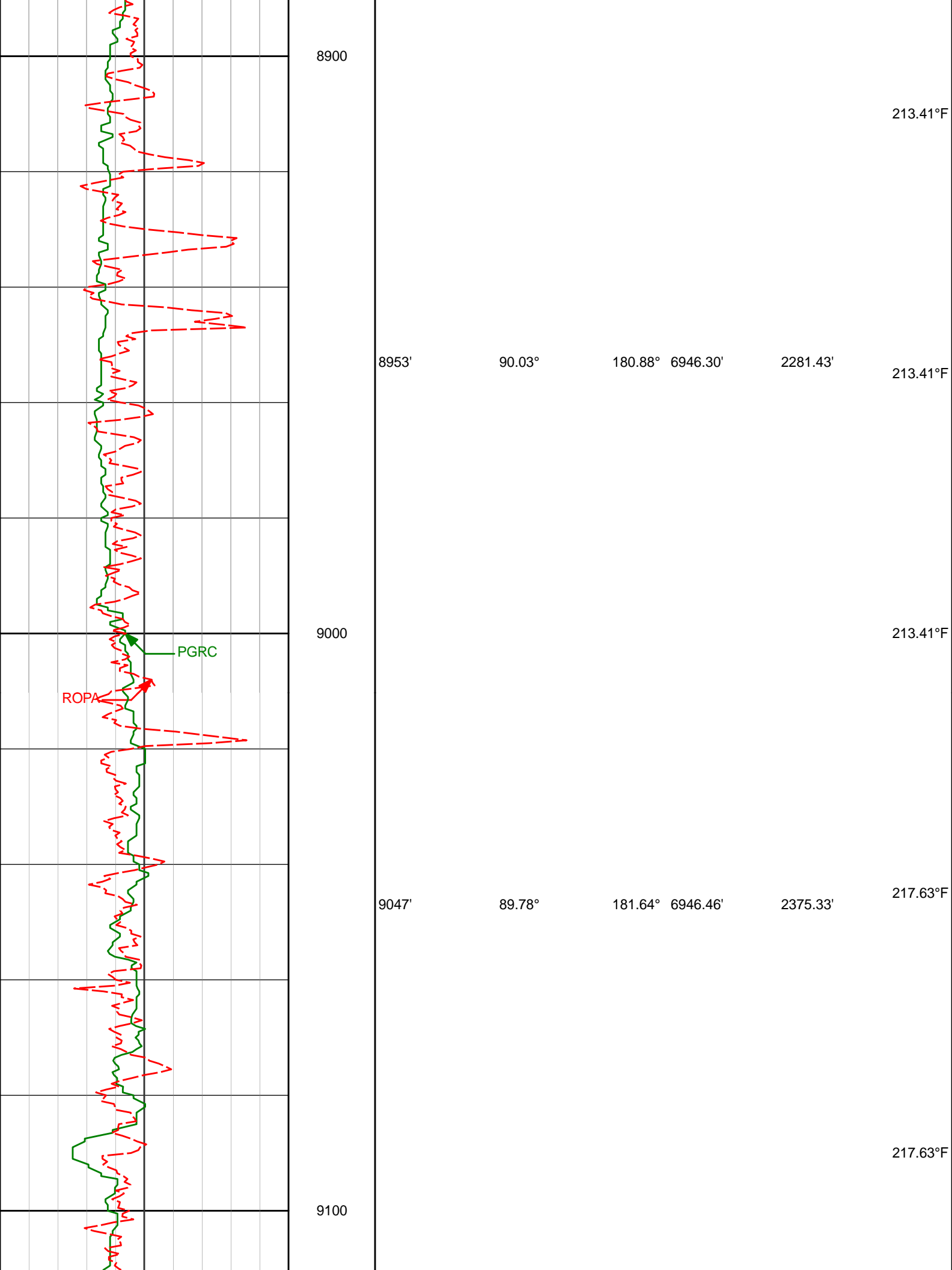
2186.50'

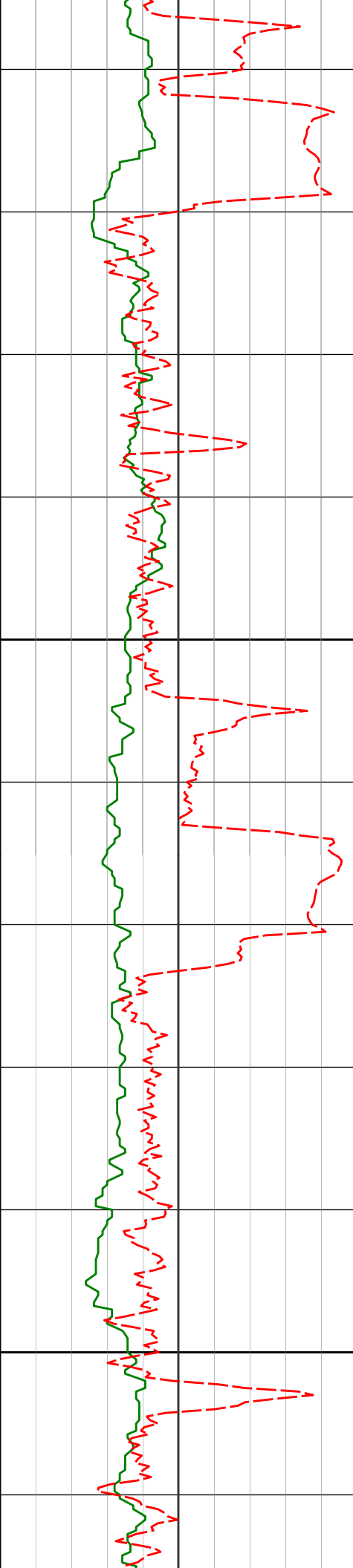
209.19°F

209.19°F

209.19°F

213.41°F





9200

9300

9142'

91.08°

183.35° 6945.74'

2470.11'

9237'

89.66°

182.47° 6945.13'

2564.85'

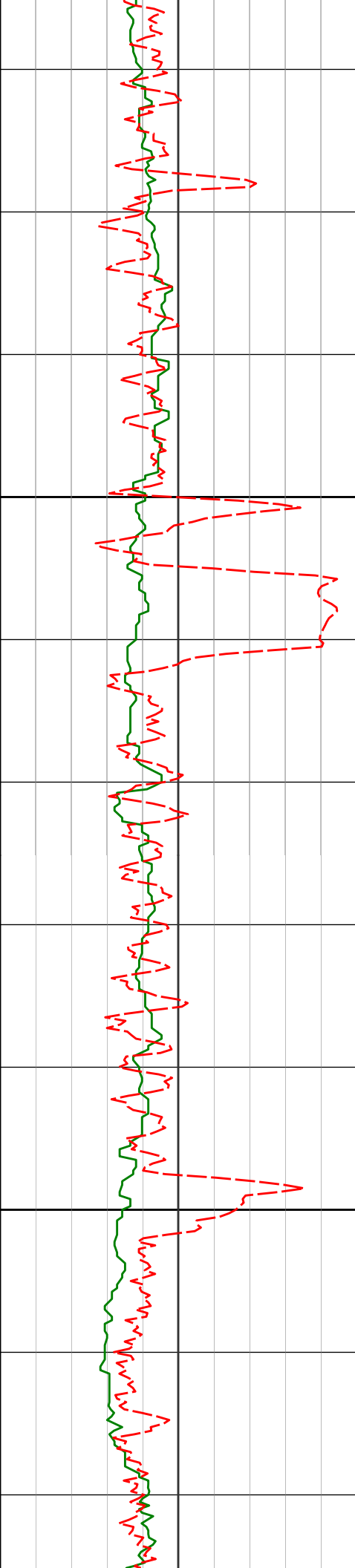
217.63°F

217.63°F

217.63°F

217.63°F

221.84°F



9400

9500

9332'

9426'

9521'

89.35°

89.88°

89.82°

182.10° 6945.95'

180.85° 6946.58'

180.31° 6946.83'

2659.66'

2753.54'

2848.49'

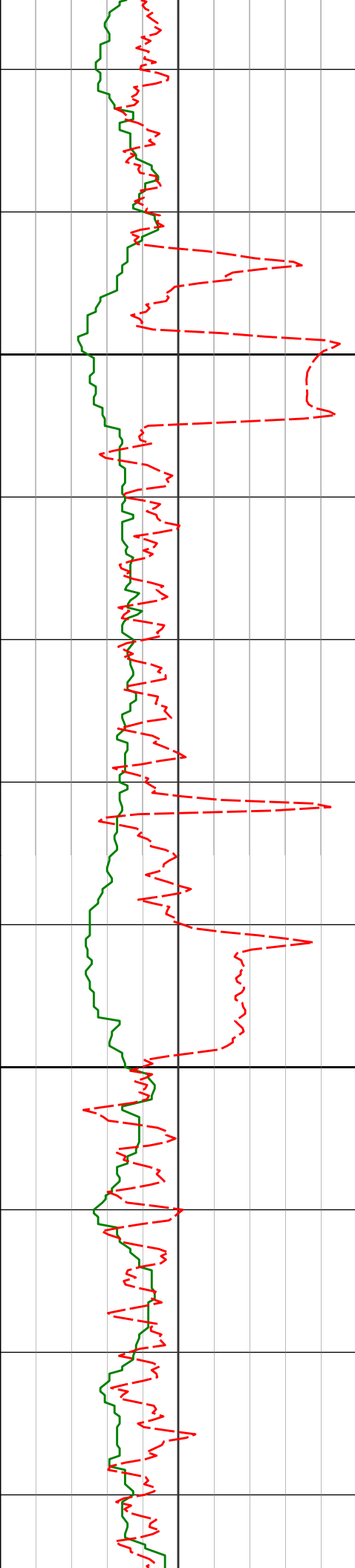
221.84°F

221.84°F

221.84°F

221.84°F

221.84°F



9600

9615'

90.43°

180.97° 6946.63'

2942.43'

221.84°F

221.84°F

9700

9710'

90.28°

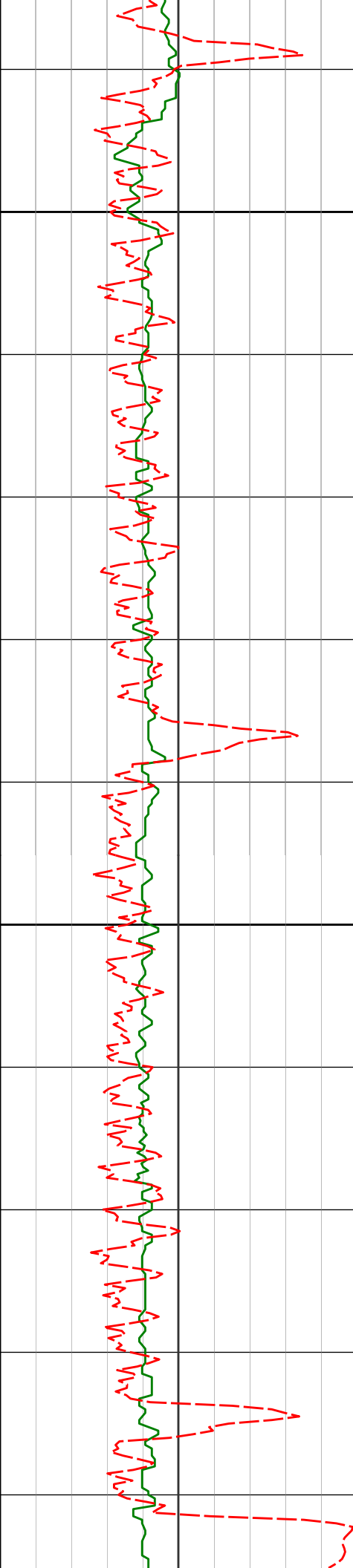
180.48° 6946.04'

3037.37'

221.84°F

221.84°F





9800

9805'

90.74°

180.66° 6945.19'

3132.31'

226.06°F

226.06°F

9900

9899'

91.14°

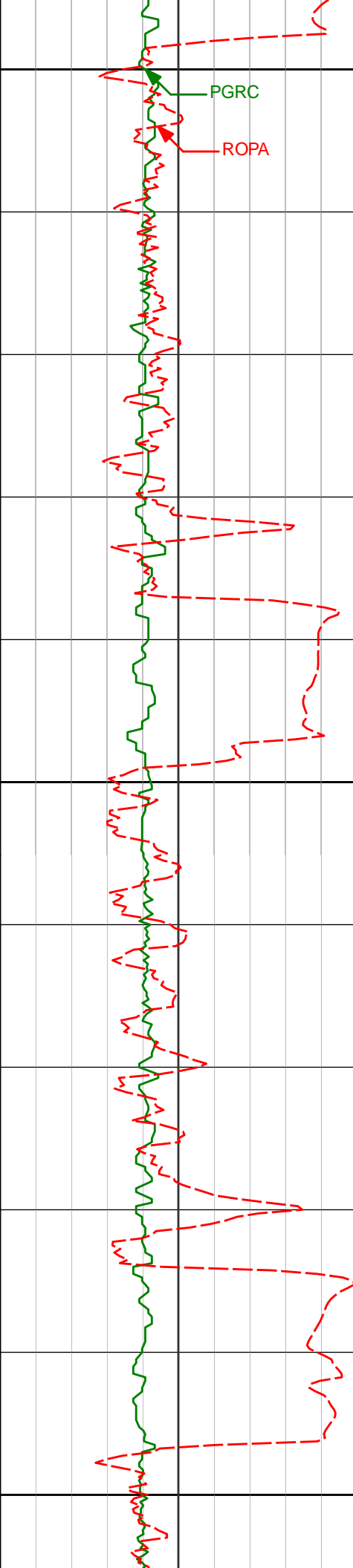
182.28° 6943.65'

3226.19'

230.28°F

230.28°F

226.06°F



10000

10100

10200

9994' 88.40° 176.12° 6944.03' 3321.13'

10088' 88.95° 174.75° 6946.21' 3414.95'

10179' 88.52° 175.79° 6948.21' 3505.76'

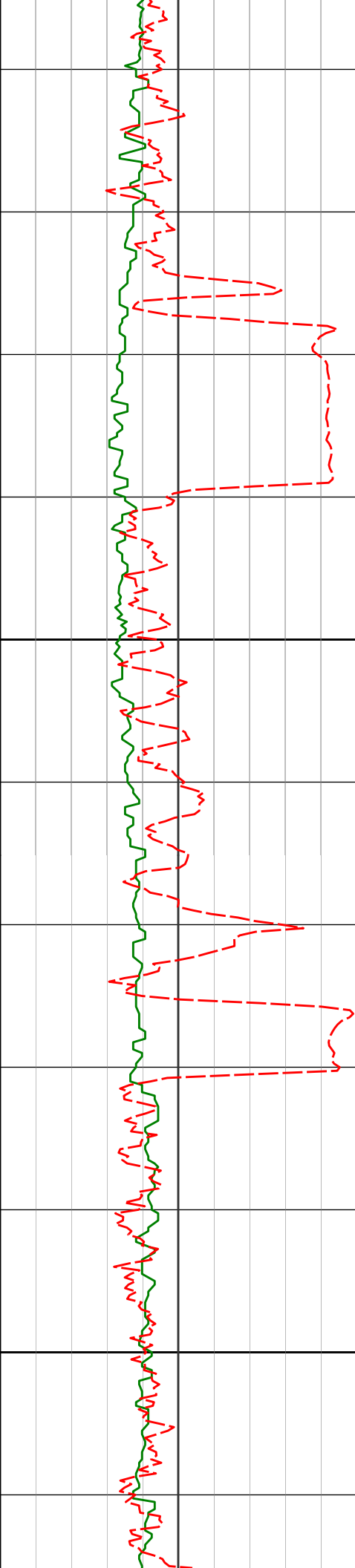
226.06°F

226.06°F

226.06°F

226.06°F

226.06°F



10300

10400

10270'

89.75°

178.46° 6949.59'

3596.71'

10360'

90.52°

178.67° 6949.38'

3686.71'

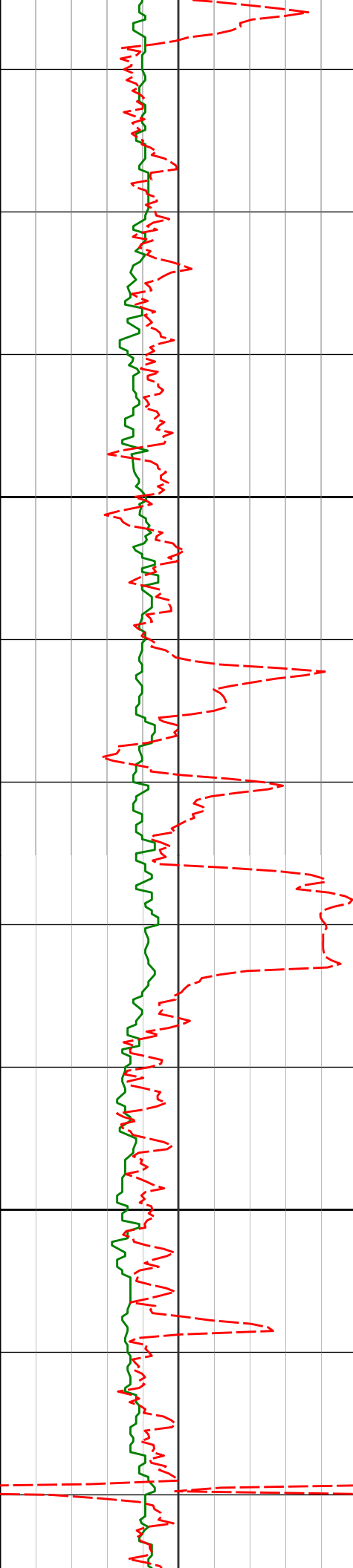
226.06°F

226.06°F

226.06°F

230.28°F

230.28°F



10500

10600

10452'

90.52°

178.43° 6948.54'

3778.70'

10543'

91.54°

179.45° 6946.91'

3869.69'

10634'

92.22°

179.02° 6943.92'

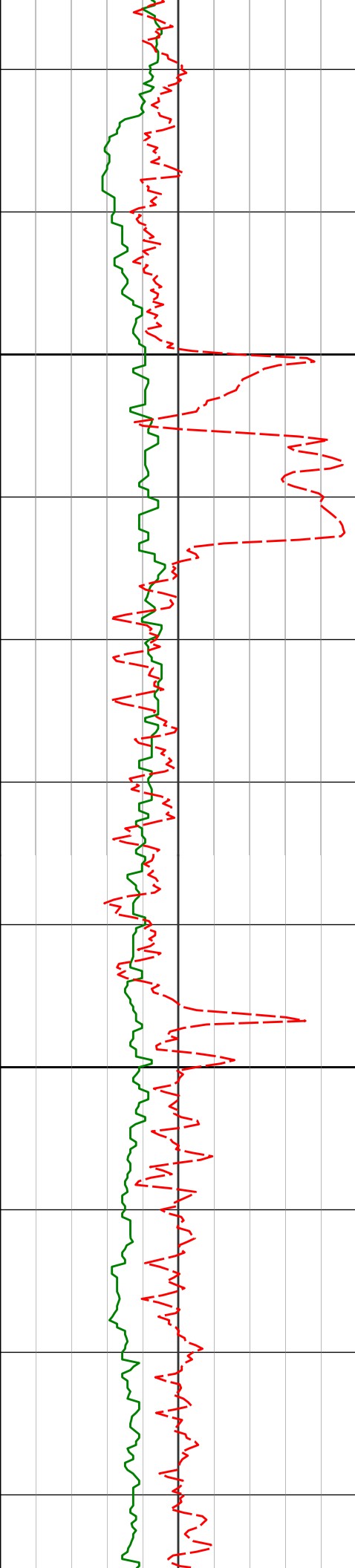
3960.63'

230.28°F

232.65°F

234.50°F

234.50°F



10700

10726'

90.99°

179.42° 6941.34'

4052.59'

10800

10817'

90.77°

178.95° 6939.95'

4143.58'

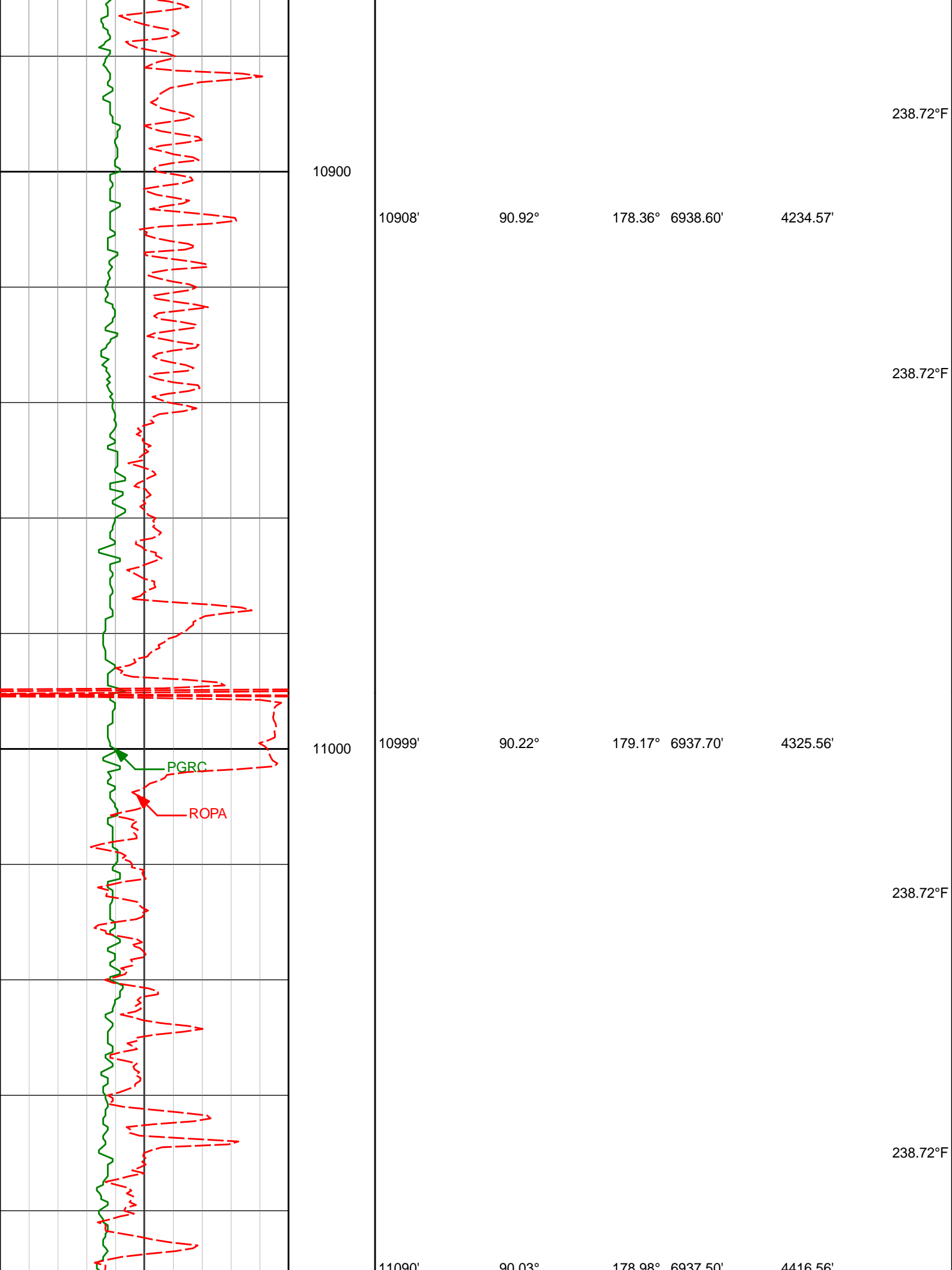
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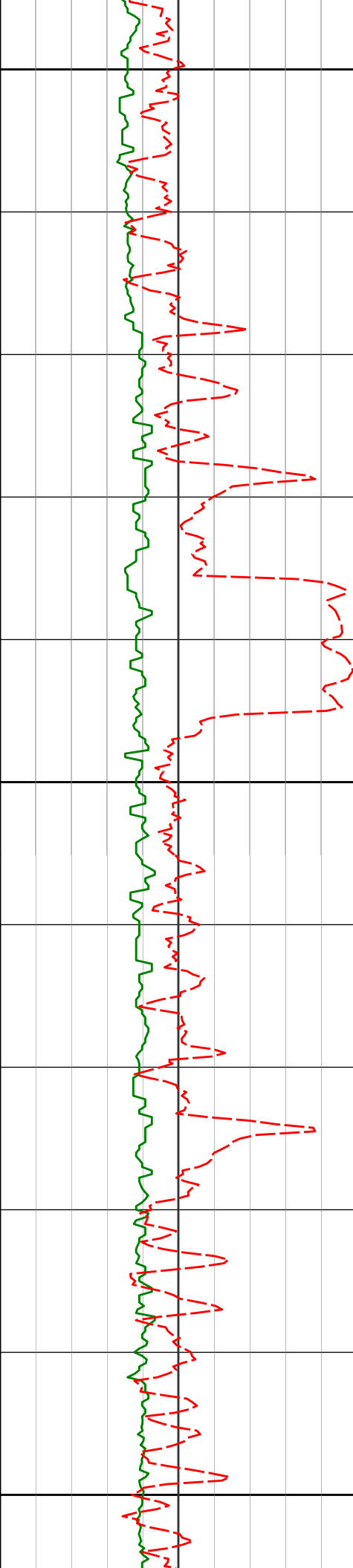
234.50°F

234.50°F

238.72°F

238.72°F





11100

238.72°F

238.72°F

11181'

89.78°

179.43° 6937.65'

4507.55'

11200

238.72°F

242.94°F

11272'

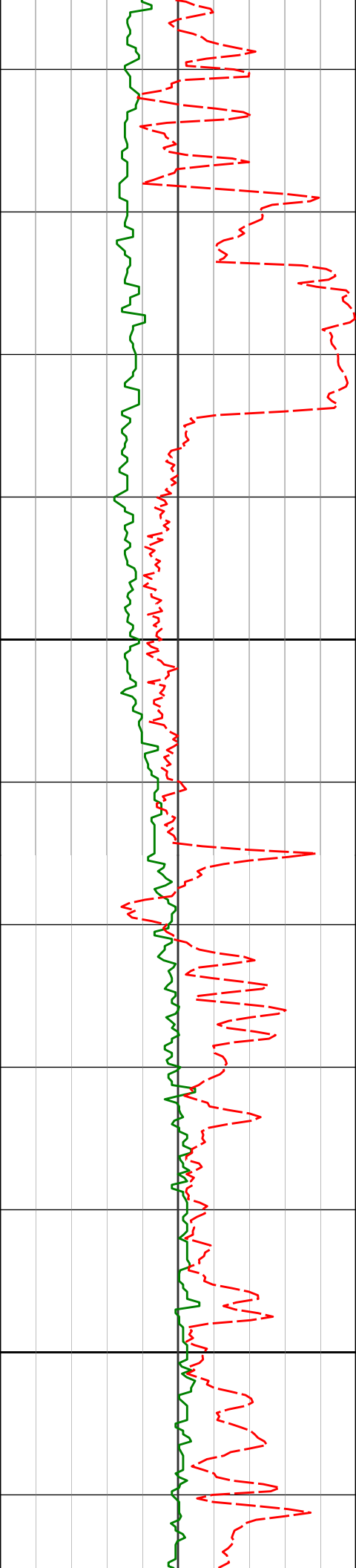
89.97°

179.15° 6937.85'

4598.55'

11300

242.94°F



11363'

91.11°

181.02° 6936.99'

4689.51'

238.72°F

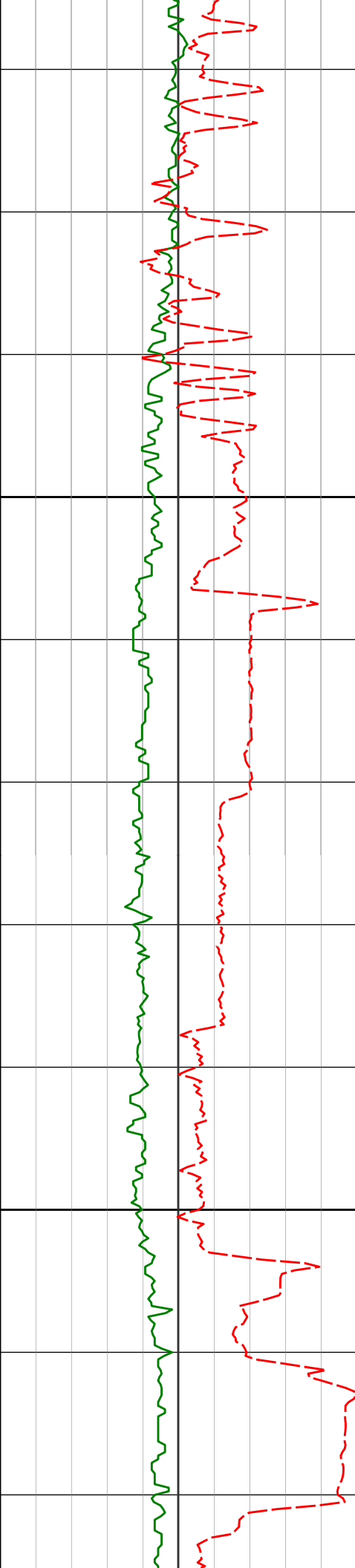
11400

238.72°F

11500

242.94°F





11600

11700

11546'

90.80°

180.54° 6933.94'

4872.36'

11638'

91.14°

180.29° 6932.39'

4964.31'

11729'

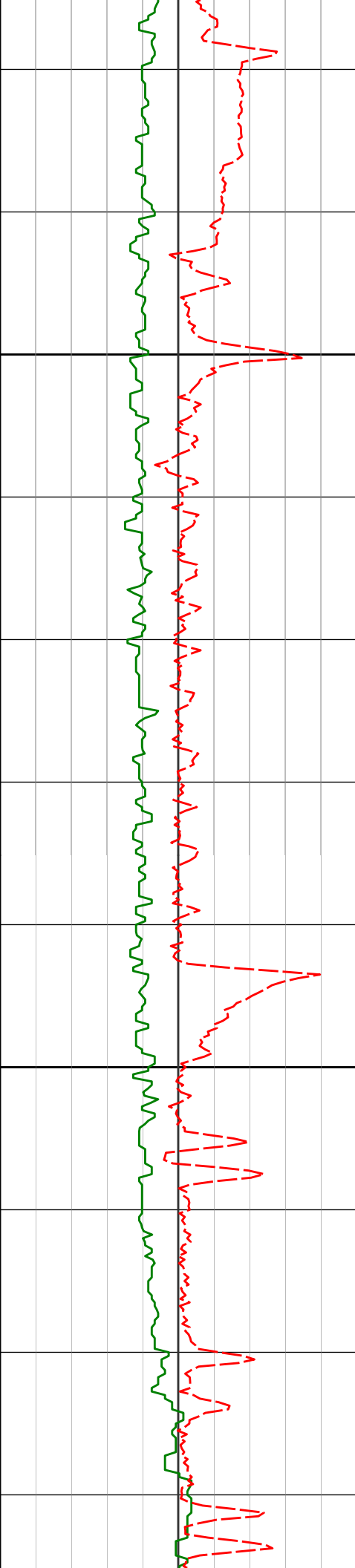
89.88°

181.30° 6931.58'

5055.24'

242.94°F

242.94°F



11800

11821'

90.12°

181.96° 6931.58'

5147.11'

242.94°F

242.94°F

242.94°F

11900

11916'

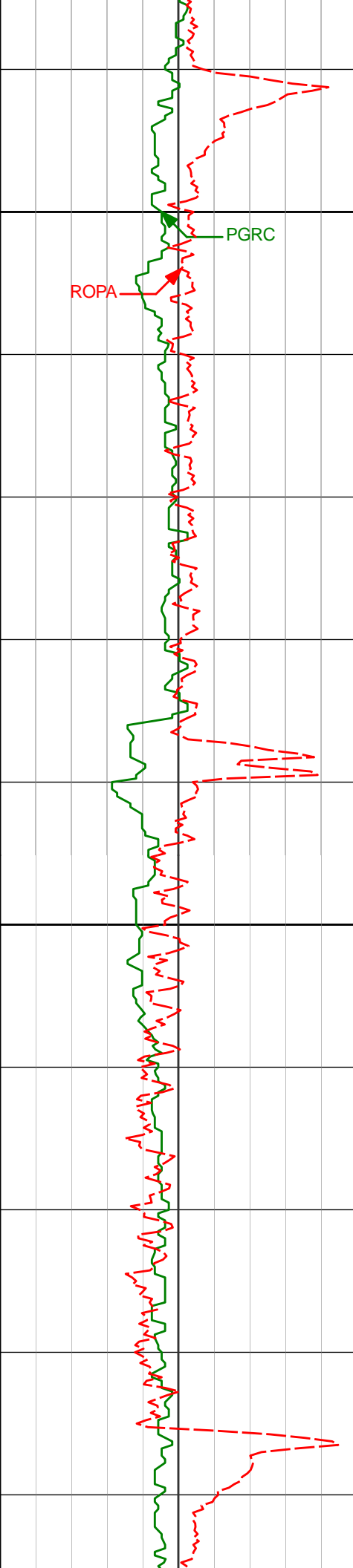
89.91°

181.34° 6931.55'

5241.99'

247.16°F

247.16°F



12000

ROPA

PGRC

12100

12010'

89.57°

181.30° 6931.98'

5335.89'

247.16°F

247.16°F

12105'

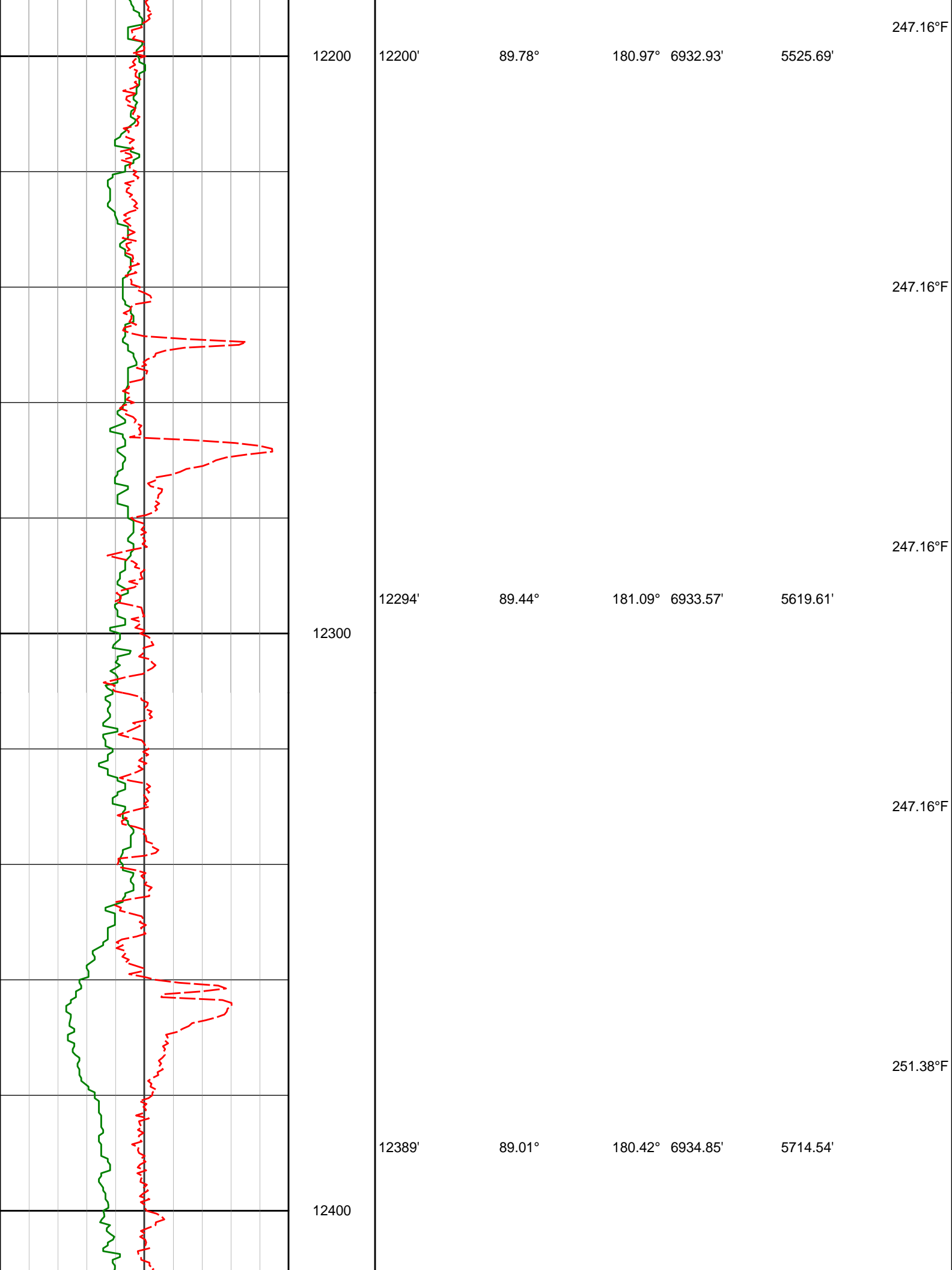
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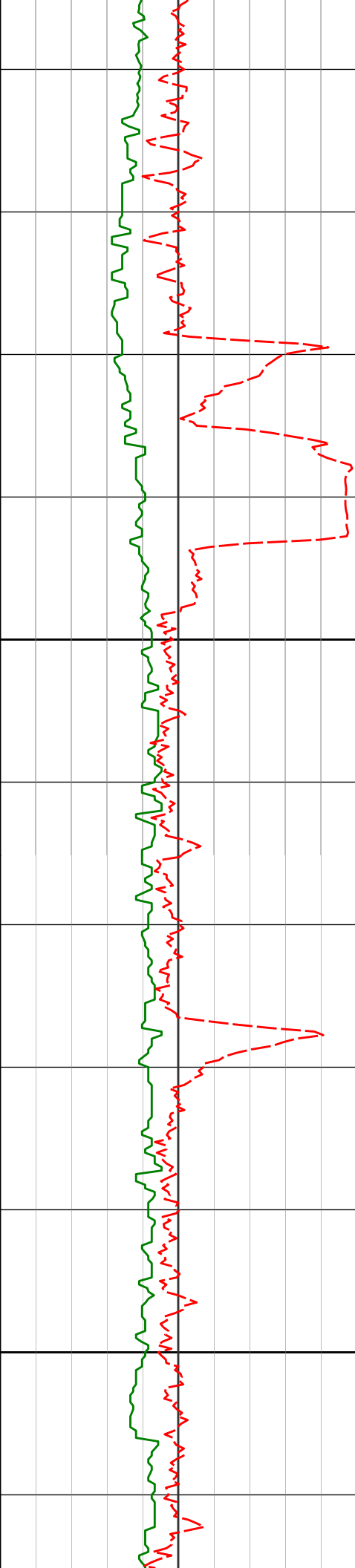
181.33° 6932.54'

5430.78'

247.16°F

247.16°F





12500

12600

12484'

89.91°

180.60° 6935.75'

5809.49'

12578'

90.12°

180.87° 6935.73'

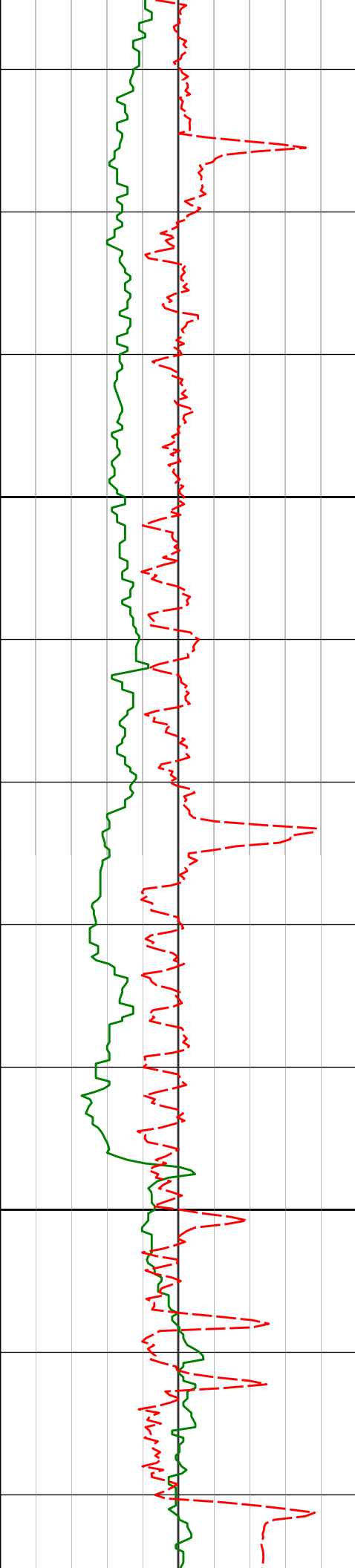
5903.43'

251.38°F

247.16°F

80.96°F

44.66°F



12700

12800

12673'

90.03°

180.22° 6935.60'

5998.38'

251.38°F

251.38°F

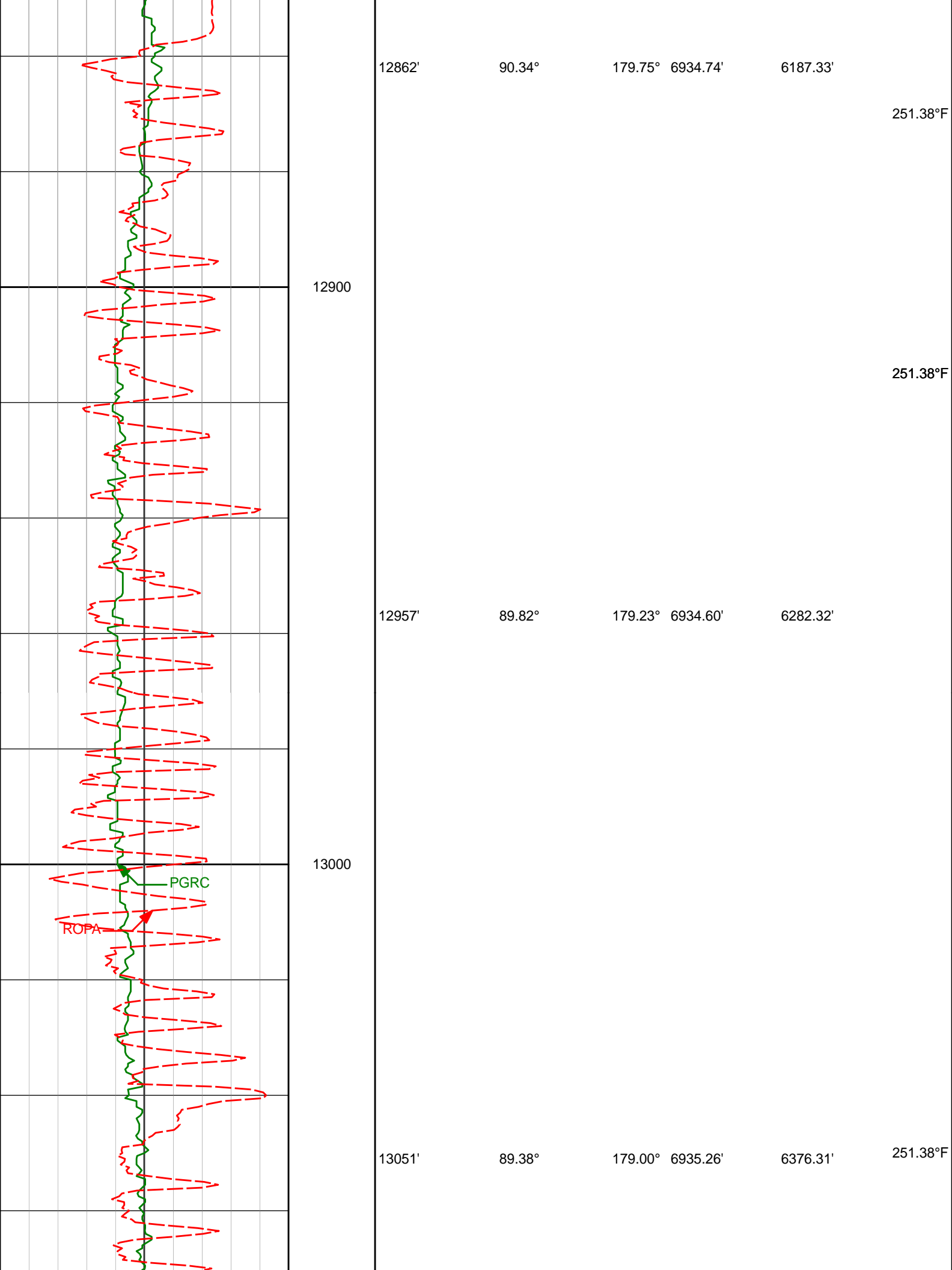
12768'

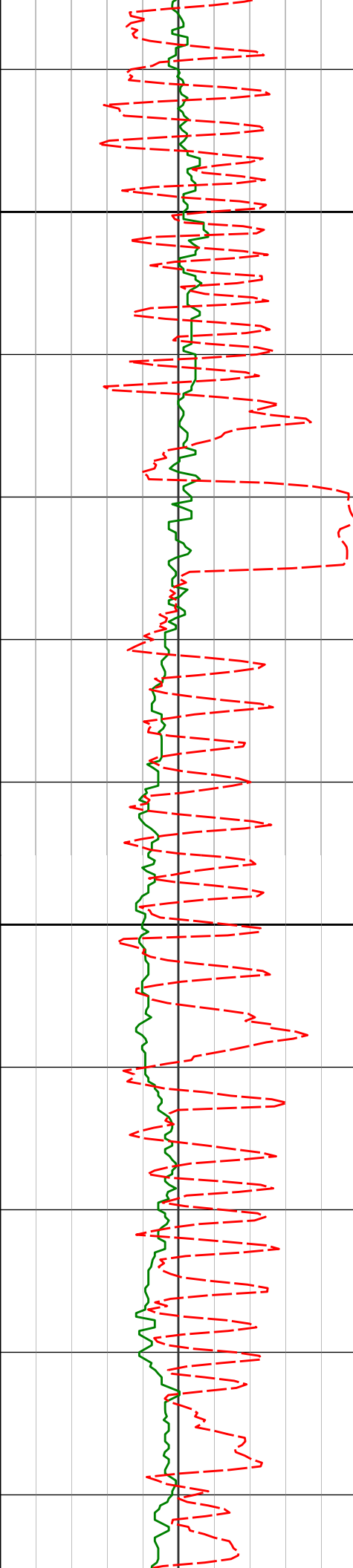
90.34°

179.92° 6935.29'

6093.35'

251.38°F





13100

251.38°F

251.38°F

13146'

90.80°

179.93° 6935.11'

6471.30'

13200

251.38°F

251.38°F

13240'

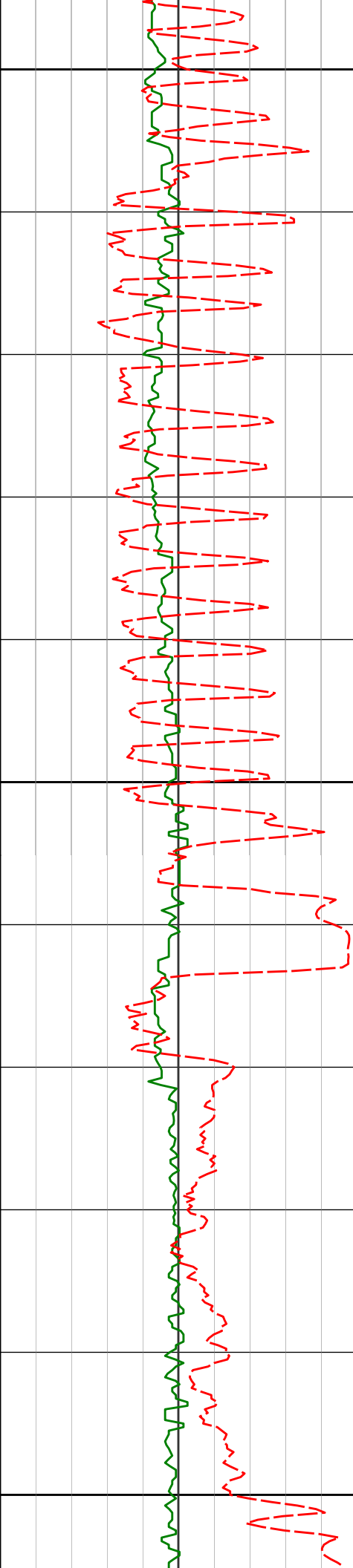
90.89°

179.77° 6933.73'

6565.27'

251.38°F





13300

13335'

90.77°

179.50° 6932.35'

6660.25'

13400

13429'

90.00°

179.78° 6931.72'

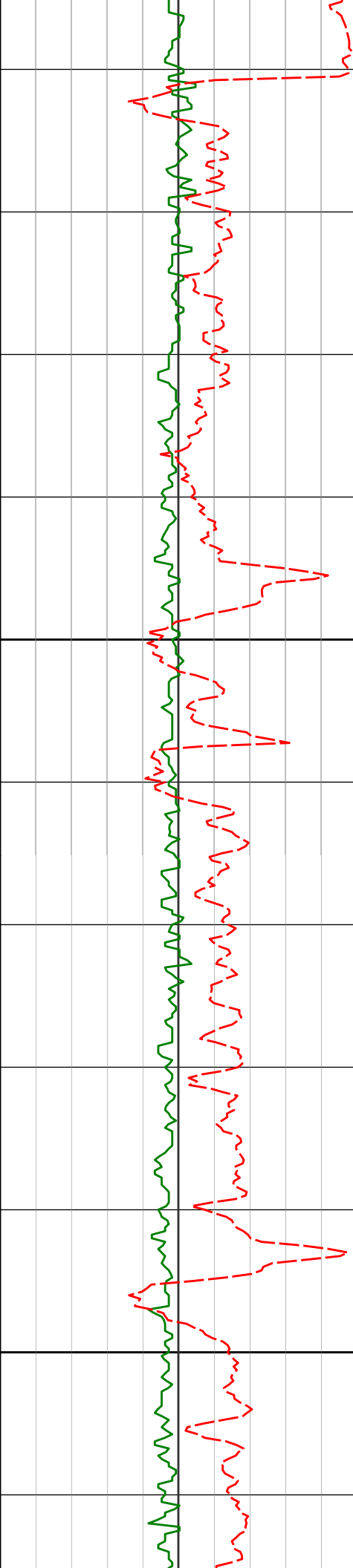
6754.23'

13500

251.38°F

251.38°F

257.36°F



13600

13700

13524'

13619'

13713'

90.52°

90.22°

90.03°

179.72° 6931.29'

179.98° 6930.67'

179.78° 6930.47'

6849.21'

6944.19'

7038.17'

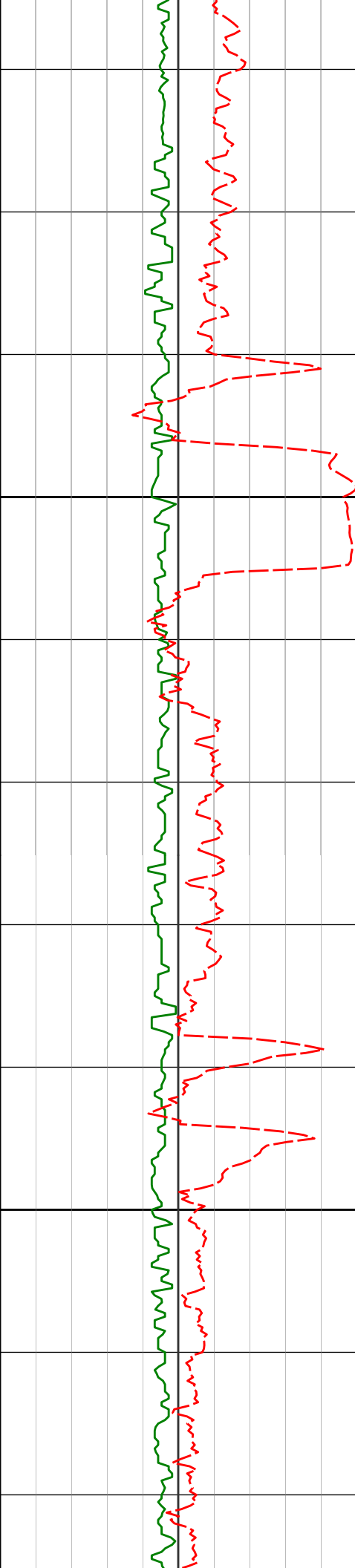
270.70°F

255.59°F

255.59°F

259.81°F

259.81°F



13800

13807'

89.97°

181.43° 6930.47'

7132.11'

251.38°F

251.38°F

251.38°F

13900

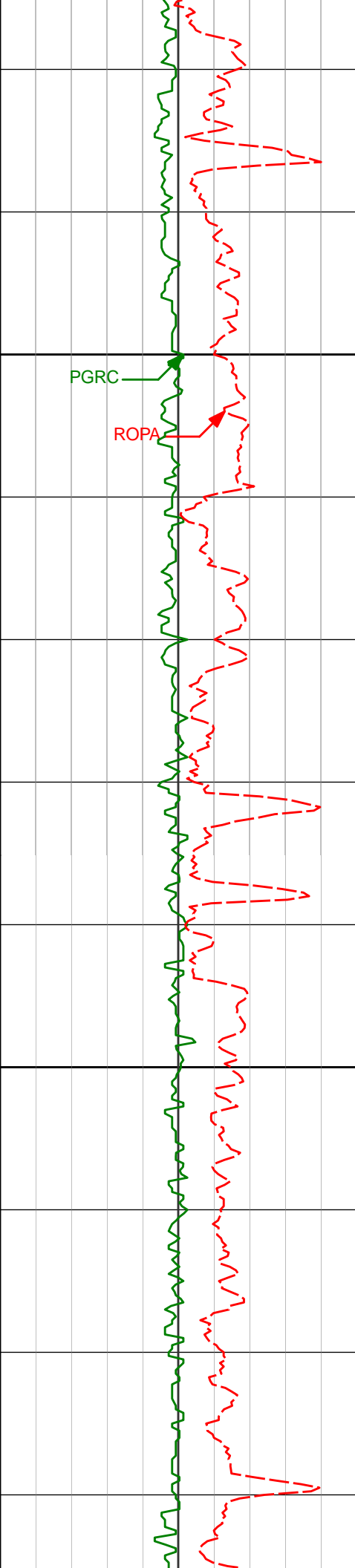
13902'

90.12°

181.94° 6930.39'

7226.98'

251.38°F



14000

PGRC

ROPA

14100

13997'

89.78°

180.78° 6930.48'

7321.88'

255.59°F

255.59°F

259.81°F

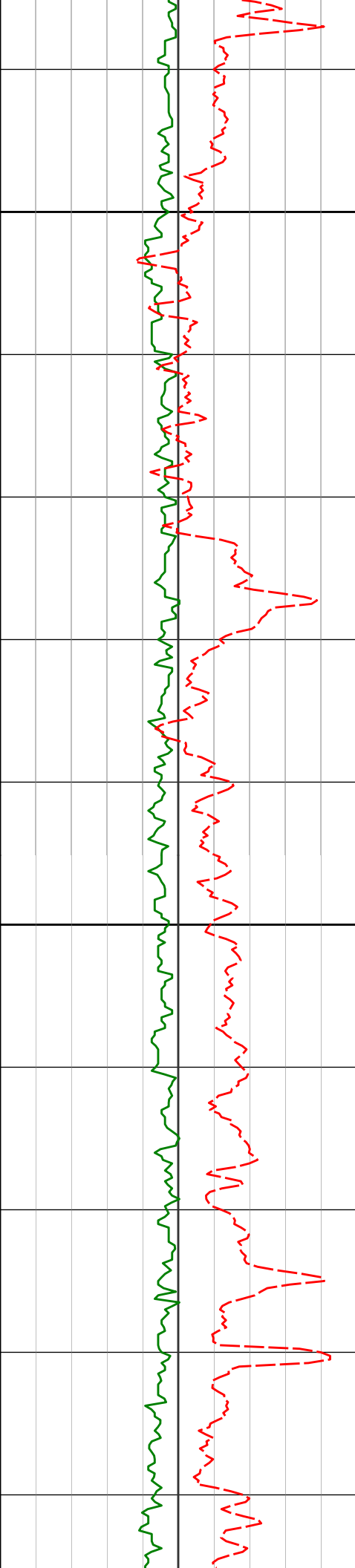
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89.57°

180.39° 6931.02'

7416.82'

259.81°F



14200

14300

14186'

89.48°

180.48° 6931.79'

7510.77'

14281'

89.41°

180.30° 6932.71'

7605.73'

14375'

89.35°

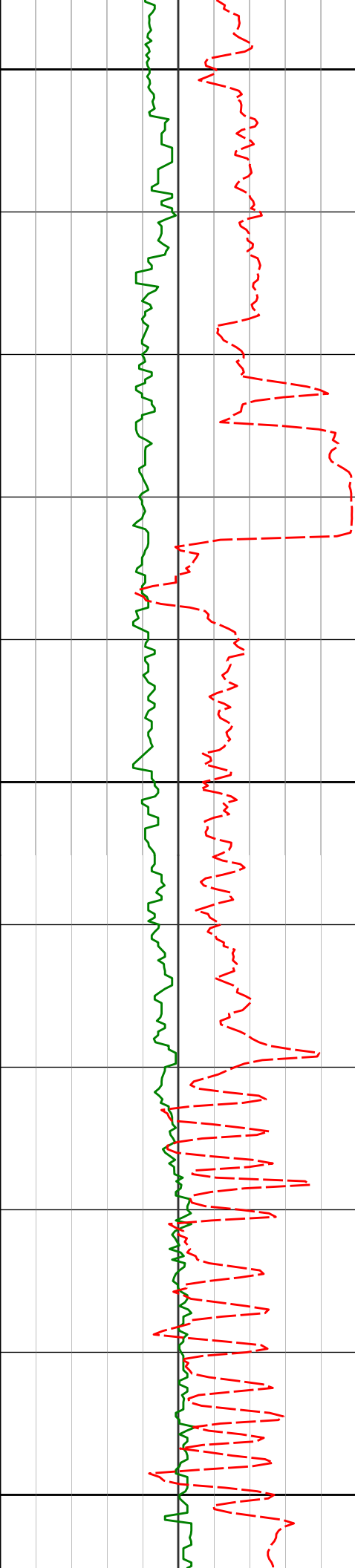
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7699.68'

259.81°F

259.81°F

259.81°F



14400

259.81°F

259.81°F

14470'

89.78°

180.96° 6934.45'

7794.61'

259.81°F

14500

259.81°F

14564'

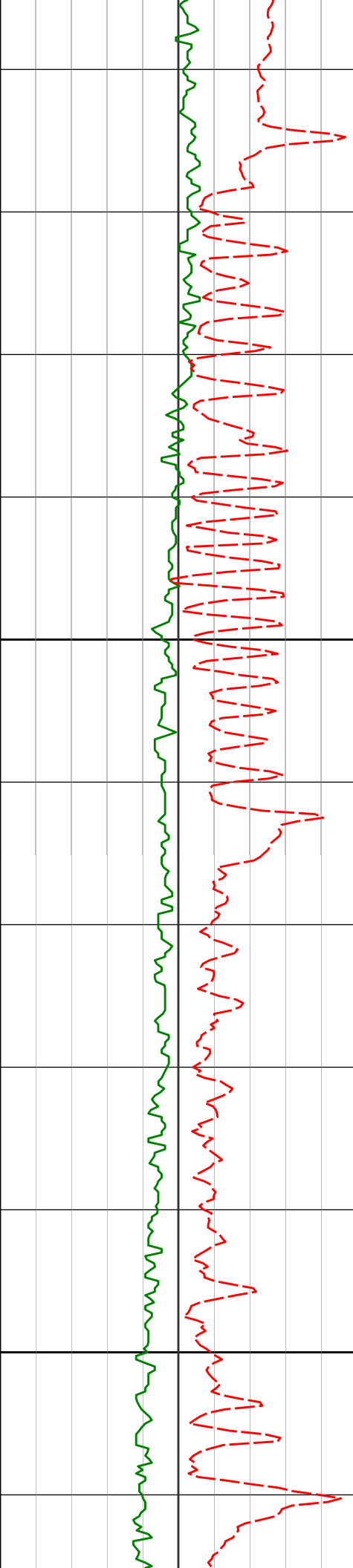
89.94°

180.56° 6934.68'

7888.55'

259.81°F

14600



14700

14800

14659'

89.75°

179.87° 6934.94'

7983.51'

259.81°F

259.81°F

14753'

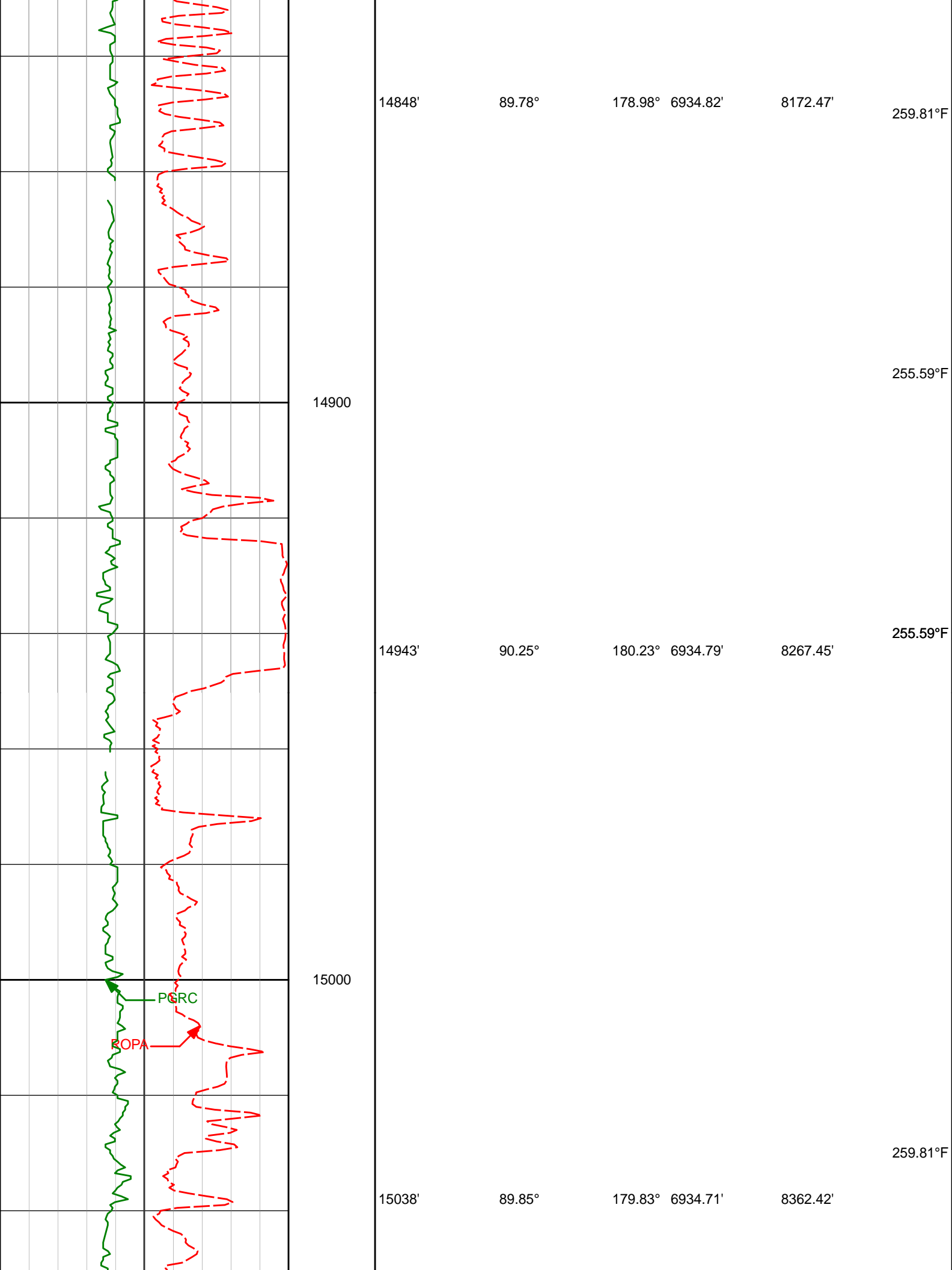
90.31°

180.31° 6934.89'

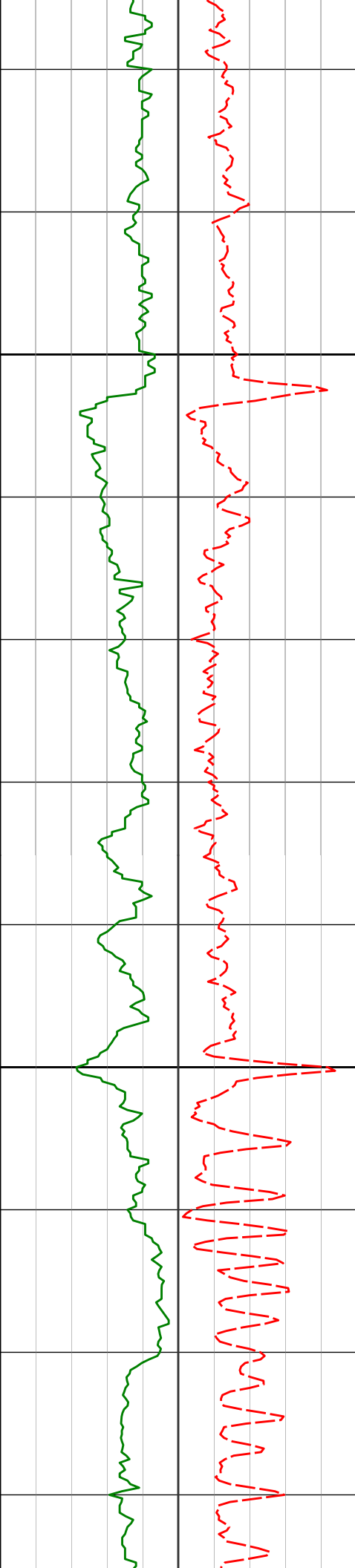
8077.48'

259.81°F

259.81°F







15100

15200

15132'

15227'

89.54°

88.61°

179.73° 6935.21'

179.35° 6936.74'

8456.41'

8551.38'

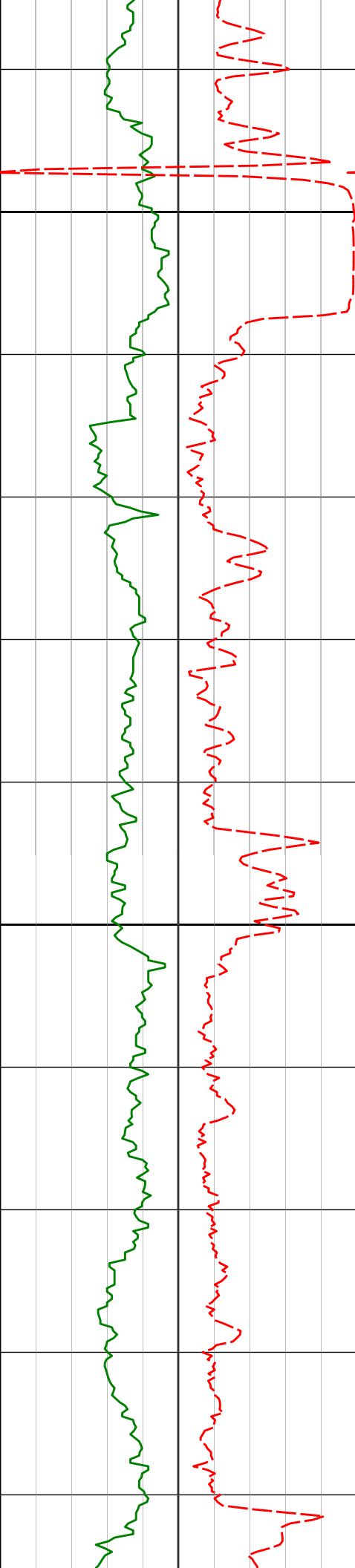
259.81°F

259.81°F

259.81°F

259.81°F

259.81°F



15300

15321'

89.57°

180.51° 6938.24'

8645.35'

255.59°F

255.59°F

259.81°F

15400

15415'

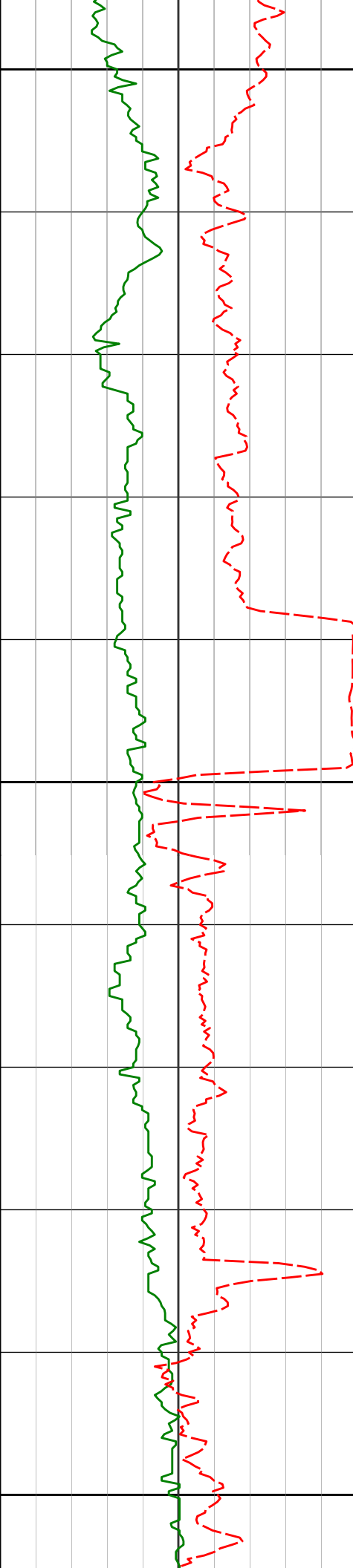
89.69°

180.17° 6938.84'

8739.30'

259.81°F

259.81°F



15500

15509'

89.20°

179.88° 6939.75'

8833.27'

259.81°F

15600

15603'

90.49°

181.27° 6940.01'

8927.22'

259.81°F

15700

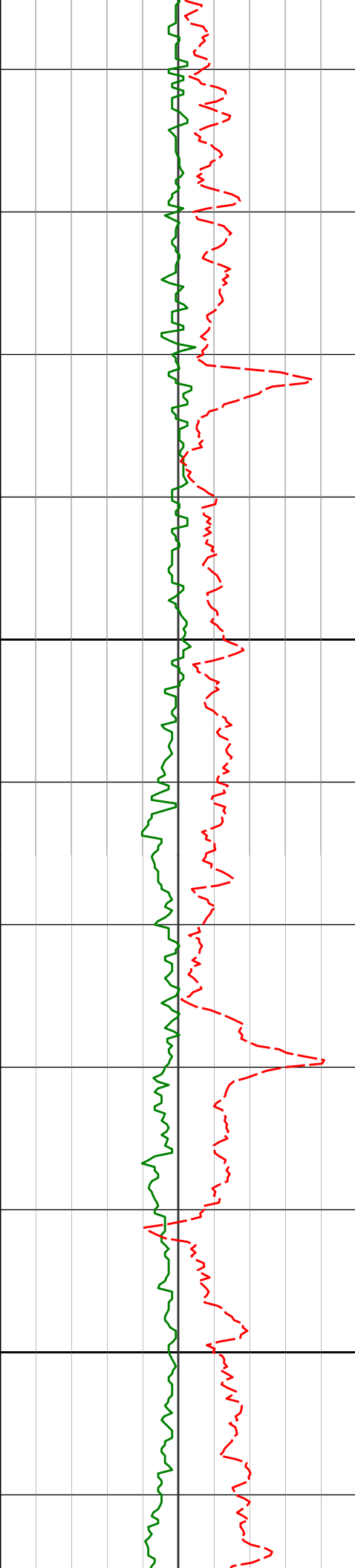
15697'

90.22°

181.20° 6939.42'

9021.12'

259.81°F



15800

15900

15791'

90.00°

181.40° 6939.24'

9115.02'

15885'

90.12°

181.47° 6939.15'

9208.91'

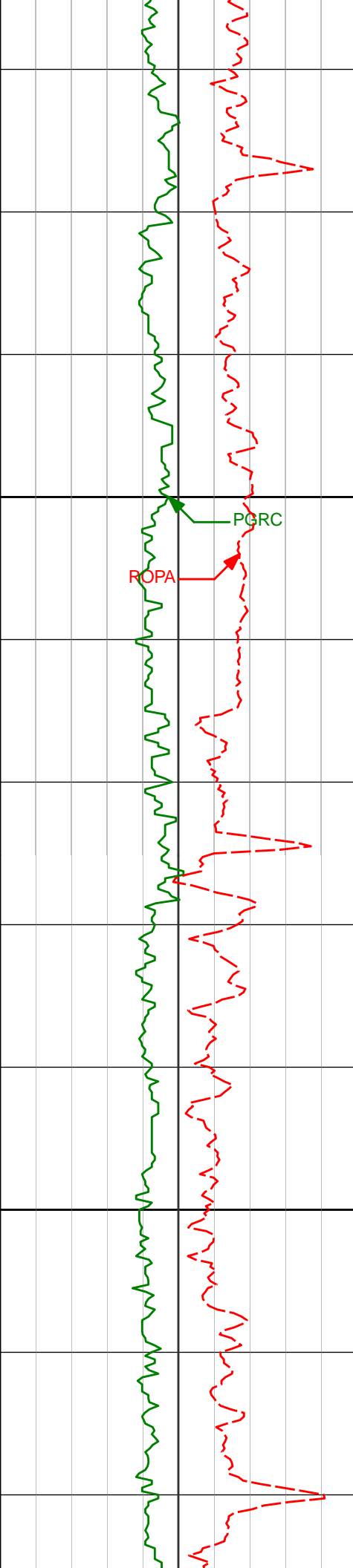
259.81°F

259.81°F

259.81°F

259.81°F

259.81°F



16000

16100

15979'

90.09°

181.19° 6938.97'

9302.81'

259.81°F

16074'

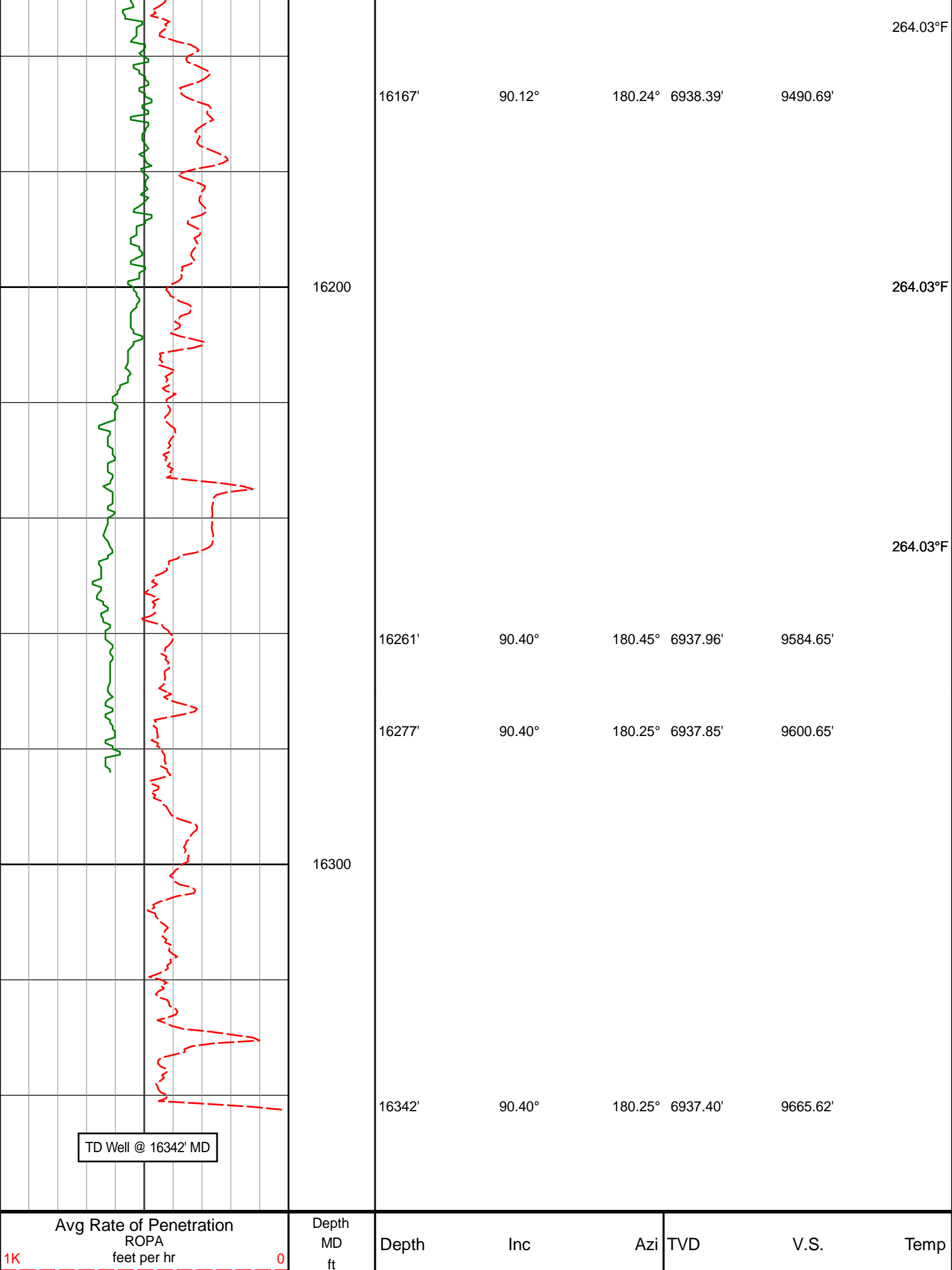
90.25°

180.67° 6938.69'

9397.74'

264.03°F

264.03°F



PCG Gamma Ray BCorr PGRC api	300
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HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy  
Moser H34-717  
Wattenberg  
Weld Colorado  
USA

CA-XX-0902863035

Surveys in the Lateral Section have had IFR/MSA Corrections applied.

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
928.00	0.37	320.52	927.99	2.34 N	1.93 W	-2.39	0.04
1112.00	0.67	298.69	1111.99	3.32 N	3.25 W	-3.39	0.19
1203.00	0.61	291.33	1202.98	3.75 N	4.17 W	-3.85	0.11
1294.00	0.78	284.21	1293.97	4.08 N	5.22 W	-4.20	0.21
1386.00	0.74	281.90	1385.97	4.36 N	6.41 W	-4.50	0.05
1568.00	1.40	170.85	1567.95	2.41 N	7.21 W	-2.57	0.99
1659.00	1.35	172.24	1658.92	0.25 N	6.89 W	-0.41	0.06
1750.00	1.22	173.20	1749.90	1.78 S	6.63 W	1.62	0.15
1842.00	1.15	177.48	1841.88	3.67 S	6.47 W	3.52	0.12
1933.00	0.82	181.36	1932.86	5.23 S	6.45 W	5.08	0.37
2024.00	0.34	177.03	2023.86	6.15 S	6.45 W	6.00	0.52
2115.00	0.09	231.04	2114.86	6.47 S	6.49 W	6.32	0.33
2205.00	0.48	286.70	2204.86	6.41 S	6.91 W	6.25	0.48
2297.00	0.85	288.88	2296.85	6.08 S	7.93 W	5.89	0.40
2480.00	1.38	253.52	2479.82	6.26 S	11.32 W	6.00	0.46
2663.00	0.18	115.45	2662.80	7.01 S	13.17 W	6.70	0.83
2755.00	0.26	0.94	2754.80	6.86 S	13.04 W	6.56	0.41
2849.00	0.25	348.97	2848.80	6.45 S	13.07 W	6.15	0.06
2944.00	0.64	323.97	2943.80	5.82 S	13.42 W	5.51	0.45
3038.00	2.05	79.44	3037.78	5.09 S	12.07 W	4.81	2.55
3228.00	4.16	63.77	3227.49	1.42 S	2.54 W	1.36	1.19
3322.00	3.83	61.43	3321.26	1.59 N	3.28 E	-1.52	0.39
3417.00	6.08	74.93	3415.90	4.42 N	10.93 E	-4.17	2.65
3512.00	8.05	87.22	3510.18	6.05 N	22.43 E	-5.53	2.60
3606.00	8.35	82.68	3603.22	7.24 N	35.78 E	-6.41	0.76
3701.00	11.20	82.68	3696.83	9.29 N	51.78 E	-8.10	3.00
3795.00	10.80	83.45	3789.11	11.46 N	69.58 E	-9.86	0.46
3985.00	11.65	79.60	3975.47	16.95 N	106.13 E	-14.50	0.60
4079.00	11.68	83.63	4067.53	19.72 N	124.92 E	-16.84	0.87
4174.00	10.76	99.17	4160.74	19.37 N	143.23 E	-16.07	3.31
4268.00	9.70	95.40	4253.24	17.23 N	159.78 E	-13.55	1.34
4363.00	8.09	93.91	4347.10	16.02 N	174.41 E	-12.00	1.70
4458.00	8.09	96.50	4441.15	14.81 N	187.72 E	-10.48	0.38
4552.00	8.10	100.18	4534.22	12.89 N	200.81 E	-8.26	0.55
4646.00	8.00	98.56	4627.29	10.75 N	213.80 E	-5.82	0.26
4740.00	7.66	89.34	4720.42	9.85 N	226.53 E	-4.62	1.38
4835.00	7.47	83.91	4814.60	10.57 N	239.00 E	-5.06	0.78
4929.00	4.04	84.83	4908.11	11.52 N	248.37 E	-5.79	3.65
5024.00	1.33	121.55	5003.00	11.25 N	252.64 E	-5.42	3.24
5119.00	1.36	107.32	5097.97	10.34 N	254.65 E	-4.47	0.35
5213.00	1.44	89.35	5191.95	10.02 N	256.89 E	-4.10	0.47
5307.00	1.66	93.63	5285.91	9.95 N	259.42 E	-3.97	0.26
5402.00	1.18	81.90	5380.88	10.00 N	261.76 E	-3.96	0.59
5497.00	1.21	70.29	5475.86	10.47 N	263.67 E	-4.40	0.26
5591.00	1.33	74.97	5569.84	11.09 N	265.66 E	-4.97	0.16
5686.00	0.96	137.44	5664.82	10.79 N	267.25 E	-4.63	1.29
5875.00	0.93	85.19	5853.80	9.76 N	269.84 E	-3.54	0.44
6064.00	1.36	47.31	6042.77	11.41 N	273.02 E	-5.12	0.45
6158.00	1.70	50.80	6136.73	13.05 N	274.92 E	-6.71	0.37
6253.00	1.06	93.26	6231.71	13.89 N	276.89 E	-7.51	1.23

6348.00	3.49	192.12	6326.65	11.01 N	277.16 E	-4.63	4.00
6443.00	14.59	194.18	6420.32	3.46 S	273.61 E	9.76	11.69
6538.00	23.38	189.29	6510.07	33.72 S	267.63 E	39.88	9.40
6632.00	33.89	179.07	6592.51	78.48 S	265.04 E	84.56	12.29
6727.00	41.01	175.26	6667.89	136.11 S	268.04 E	142.24	7.89
6822.00	44.66	182.40	6737.58	200.59 S	269.22 E	206.73	6.38
6916.00	54.80	187.87	6798.30	271.85 S	262.56 E	277.83	11.66
7011.00	63.60	185.42	6846.90	352.82 S	253.21 E	358.56	9.52
7105.00	68.91	183.90	6884.74	438.55 S	246.24 E	444.11	5.85
7200.00	71.76	183.03	6916.70	527.84 S	240.84 E	533.24	3.12
7228.00	76.61	182.83	6924.33	554.73 S	239.47 E	560.10	17.35
7344.00	82.86	183.20	6944.99	668.66 S	233.46 E	673.86	5.39
7439.00	86.02	182.64	6954.19	763.08 S	228.65 E	768.14	3.38
7534.00	88.37	181.81	6958.84	857.89 S	224.97 E	862.84	2.62
7628.00	90.18	179.98	6960.03	951.86 S	223.50 E	956.76	2.74
7723.00	90.12	179.56	6959.78	1046.86 S	223.88 E	1051.74	0.45
7817.00	89.85	178.85	6959.81	1140.85 S	225.18 E	1145.73	0.81
7912.00	91.05	178.36	6959.06	1235.82 S	227.50 E	1240.73	1.36
8102.00	90.86	177.38	6955.89	1425.66 S	234.56 E	1430.68	0.53
8196.00	91.08	177.01	6954.30	1519.53 S	239.16 E	1524.64	0.46
8291.00	90.65	177.89	6952.87	1614.42 S	243.38 E	1619.60	1.03
8385.00	90.80	178.67	6951.68	1708.37 S	246.20 E	1713.59	0.84
8480.00	91.11	178.66	6950.10	1803.33 S	248.42 E	1808.58	0.33
8574.00	89.91	177.25	6949.26	1897.27 S	251.77 E	1902.56	1.97
8669.00	90.74	177.91	6948.72	1992.18 S	255.78 E	1997.54	1.12
8764.00	91.17	178.83	6947.14	2087.13 S	258.48 E	2092.53	1.07
8858.00	89.91	180.83	6946.25	2181.11 S	258.76 E	2186.50	2.51
8953.00	90.03	180.88	6946.30	2276.10 S	257.35 E	2281.43	0.14
9047.00	89.78	181.64	6946.46	2370.08 S	255.28 E	2375.33	0.85
9142.00	91.08	183.35	6945.74	2464.98 S	251.14 E	2470.11	2.26
9237.00	89.66	182.47	6945.13	2559.85 S	246.32 E	2564.85	1.76
9332.00	89.35	182.10	6945.95	2654.77 S	242.53 E	2659.66	0.51
9426.00	89.88	180.85	6946.58	2748.74 S	240.11 E	2753.54	1.44
9521.00	89.82	180.31	6946.83	2843.73 S	239.15 E	2848.49	0.57
9615.00	90.43	180.97	6946.63	2937.73 S	238.10 E	2942.43	0.96
9710.00	90.28	180.48	6946.04	3032.72 S	236.90 E	3037.37	0.54
9805.00	90.74	180.66	6945.19	3127.71 S	235.96 E	3132.31	0.52
9899.00	91.14	182.28	6943.65	3221.66 S	233.54 E	3226.19	1.77
9994.00	88.40	176.12	6944.03	3316.60 S	234.87 E	3321.13	7.10
10088.00	88.95	174.75	6946.21	3410.27 S	242.35 E	3414.95	1.57
10179.00	88.52	175.79	6948.21	3500.94 S	249.85 E	3505.76	1.24
10270.00	89.75	178.46	6949.59	3591.80 S	254.41 E	3596.71	3.23
10360.00	90.52	178.67	6949.38	3681.77 S	256.67 E	3686.71	0.89
10452.00	90.52	178.43	6948.54	3773.74 S	259.00 E	3778.70	0.26
10543.00	91.54	179.45	6946.91	3864.71 S	260.68 E	3869.69	1.59
10634.00	92.22	179.02	6943.92	3955.65 S	261.89 E	3960.63	0.88
10726.00	90.99	179.42	6941.34	4047.60 S	263.15 E	4052.59	1.41
10817.00	90.77	178.95	6939.95	4138.58 S	264.44 E	4143.58	0.57
10908.00	90.92	178.36	6938.60	4229.55 S	266.58 E	4234.57	0.67
10999.00	90.22	179.17	6937.70	4320.52 S	268.54 E	4325.56	1.18
11090.00	90.03	178.98	6937.50	4411.51 S	270.01 E	4416.56	0.30
11181.00	89.78	179.43	6937.65	4502.50 S	271.27 E	4507.55	0.57
11272.00	89.97	179.15	6937.85	4593.49 S	272.40 E	4598.55	0.37
11363.00	91.11	181.02	6936.99	4684.48 S	272.26 E	4689.51	2.41
11546.00	90.80	180.54	6933.94	4867.44 S	269.77 E	4872.36	0.31
11638.00	91.14	180.29	6932.39	4959.42 S	269.10 E	4964.31	0.46
11729.00	89.88	181.30	6931.58	5050.41 S	267.84 E	5055.24	1.77
11821.00	90.12	181.96	6931.58	5142.37 S	265.23 E	5147.11	0.76
11916.00	89.91	181.34	6931.55	5237.33 S	262.49 E	5241.99	0.69
12010.00	89.57	181.30	6931.98	5331.30 S	260.32 E	5335.89	0.36
12105.00	89.75	181.33	6932.54	5426.28 S	258.14 E	5430.78	0.19
12200.00	89.78	180.97	6932.93	5521.26 S	256.24 E	5525.69	0.38
12294.00	89.44	181.09	6933.57	5615.24 S	254.55 E	5619.61	0.38
12389.00	89.01	180.42	6934.85	5710.22 S	253.30 E	5714.54	0.84
12484.00	89.91	180.60	6935.75	5805.21 S	252.45 E	5809.49	0.97
12578.00	90.12	180.87	6935.73	5899.20 S	251.25 E	5903.43	0.36
12673.00	90.03	180.22	6935.60	5994.20 S	250.34 E	5998.38	0.69
12768.00	90.34	179.92	6935.29	6089.20 S	250.23 E	6093.35	0.45
12862.00	90.34	179.75	6934.74	6183.20 S	250.50 E	6187.33	0.18
12957.00	89.82	179.23	6934.60	6278.19 S	251.34 E	6282.32	0.77
13051.00	89.38	179.00	6935.26	6372.18 S	252.79 E	6376.31	0.53
13146.00	90.80	179.93	6935.11	6467.17 S	253.68 E	6471.30	1.79
13240.00	90.89	179.77	6933.73	6561.16 S	253.93 E	6565.27	0.20
13335.00	90.77	179.50	6932.35	6656.15 S	254.53 E	6660.25	0.31
13430.00	90.77	179.50	6932.35	6751.14 S	255.13 E	6756.24	0.31



13429.00	90.00	179.78	6931.72	6750.14 S	255.12 E	6754.23	0.87
13524.00	90.52	179.72	6931.29	6845.14 S	255.54 E	6849.21	0.55
13619.00	90.22	179.98	6930.67	6940.14 S	255.79 E	6944.19	0.42
13713.00	90.03	179.78	6930.47	7034.14 S	255.98 E	7038.17	0.29
13807.00	89.97	181.43	6930.47	7128.13 S	254.99 E	7132.11	1.76
13902.00	90.12	181.94	6930.39	7223.09 S	252.20 E	7226.98	0.56
13997.00	89.78	180.78	6930.48	7318.06 S	249.94 E	7321.88	1.27
14092.00	89.57	180.39	6931.02	7413.05 S	248.97 E	7416.82	0.47
14186.00	89.48	180.48	6931.79	7507.05 S	248.26 E	7510.77	0.14
14281.00	89.41	180.30	6932.71	7602.04 S	247.61 E	7605.73	0.20
14375.00	89.35	180.61	6933.73	7696.03 S	246.87 E	7699.68	0.34
14470.00	89.78	180.96	6934.45	7791.02 S	245.56 E	7794.61	0.58
14564.00	89.94	180.56	6934.68	7885.01 S	244.32 E	7888.55	0.46
14659.00	89.75	179.87	6934.94	7980.01 S	243.96 E	7983.51	0.75
14753.00	90.31	180.31	6934.89	8074.01 S	243.81 E	8077.48	0.76
14848.00	89.78	178.98	6934.82	8169.00 S	244.40 E	8172.47	1.51
14943.00	90.25	180.23	6934.79	8264.00 S	245.06 E	8267.45	1.41
15038.00	89.85	179.83	6934.71	8359.00 S	245.01 E	8362.42	0.60
15132.00	89.54	179.73	6935.21	8453.00 S	245.37 E	8456.41	0.35
15227.00	88.61	179.35	6936.74	8547.98 S	246.13 E	8551.38	1.06
15321.00	89.57	180.51	6938.24	8641.97 S	246.25 E	8645.35	1.60
15415.00	89.69	180.17	6938.84	8735.96 S	245.69 E	8739.30	0.38
15509.00	89.20	179.88	6939.75	8829.96 S	245.65 E	8833.27	0.61
15603.00	90.49	181.27	6940.01	8923.95 S	244.70 E	8927.22	2.02
15697.00	90.22	181.20	6939.42	9017.92 S	242.68 E	9021.12	0.30
15791.00	90.00	181.40	6939.24	9111.90 S	240.55 E	9115.02	0.32
15885.00	90.12	181.47	6939.15	9205.87 S	238.19 E	9208.91	0.15
15979.00	90.09	181.19	6938.97	9299.84 S	236.01 E	9302.81	0.30
16074.00	90.25	180.67	6938.69	9394.83 S	234.47 E	9397.74	0.57
16167.00	90.12	180.24	6938.39	9487.83 S	233.73 E	9490.69	0.48
16261.00	90.40	180.45	6937.96	9581.82 S	233.16 E	9584.65	0.37
16277.00	90.40	180.25	6937.85	9597.82 S	233.07 E	9600.65	1.25
16342.00	90.40	180.25	6937.40	9662.82 S	232.78 E	9665.62	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 178.68 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.80 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16342.00 FEET  
IS 9665.63 FEET ALONG 178.62 DEGREES (GRID)**

**Final survey is a straight line projection to TD.**