



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	17-May-16	20-May-16			
Rig Bit Number	2	3			
Bit Size (in)	8.500	8.500			
Tool Nominal OD (in)	6.750	6.500			
Log Start Depth (MD, ft)	1,931.00	14,657.00			
Log End Depth (MD, ft)	14,657.00	17,415.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	14-May-16 05:30	18-May-16 02:40			
Drill/Wipe End Date and Time	17-May-16 09:45	18-May-16 21:30			
Min Inc (deg) @ Depth (MD, ft)	0.34 @ 3,231.00	88.16 @ 14,757.00			
Max Inc (deg) @ Depth (MD, ft)	91.99 @ 8,076.00	91.44 @ 16,932.00			
Bit TFA(in2) / Bit Type	2.01 / PDC	2.01 / PDC			
Flow Rate (gpm)	574.21	540.00			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Diesel Mud Base	Diesel Mud Base			
Density (ppg) / Viscosity (spqt)	9.57 / 48.00	9.68 / 45.00			
Filtrate CL (ppm)	30,000.00	25,000.00			
pH / Fluid Loss (mptm)	N/A / N/A	N/A / N/A			
PV (cP) / YP (lbf2)	15 / 8.00	14 / 8.00			
% Solids / % Sand	9.70 / 0.1	11.00 / 0			
% Oil / Oil:Water Ratio	65.00 / 73:27	65.00 / 76:27			
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 (deg F) @ 100 ft	217.50 / 20M	250.05 / 20M			

Max Tool Temp (degF) / Source	247.78 / PCM	253.35 / PCM			
Rm @ Max Tool Temp (degF)	PCM @ 247.78	PCM @ 253.35			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Charles Culver	Charles Culver			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11341332	11341332			
Insert Serial Number	11680783	12001049			
Date and Time Initialized	13-May-16 19:54	17-May-16 15:35			
Date and Time Read	17-May-16 18:46	20-May-16 05:47			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	61.00	61.00			
Software Version	6.33	6.33			
Sub Serial Number	11341332	11341332			
Sonde Serial Number	11181577	11833264			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	96.40	61.20			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	48.95	49.35			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341332	11341332			
Insert/Sonde Serial Number	12037413	11579779			

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

Main Log 1:600 (2"):

(ROPA - Avg Rate of Penetration)

Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft

(PGRC - Gamma Ray Cor)

Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft

Detail Log 1:240 (5"):

(ROPA - Avg Rate of Penetration)

Interval: 0.5 ft, Coercion Distance: 1.2 ft, Gap fill: 3.0 ft

(PGRC - Gamma Ray Cor)

Interval: 0.5 ft, Coercion Distance: 0.6 ft, Gap fill: 3.0 ft

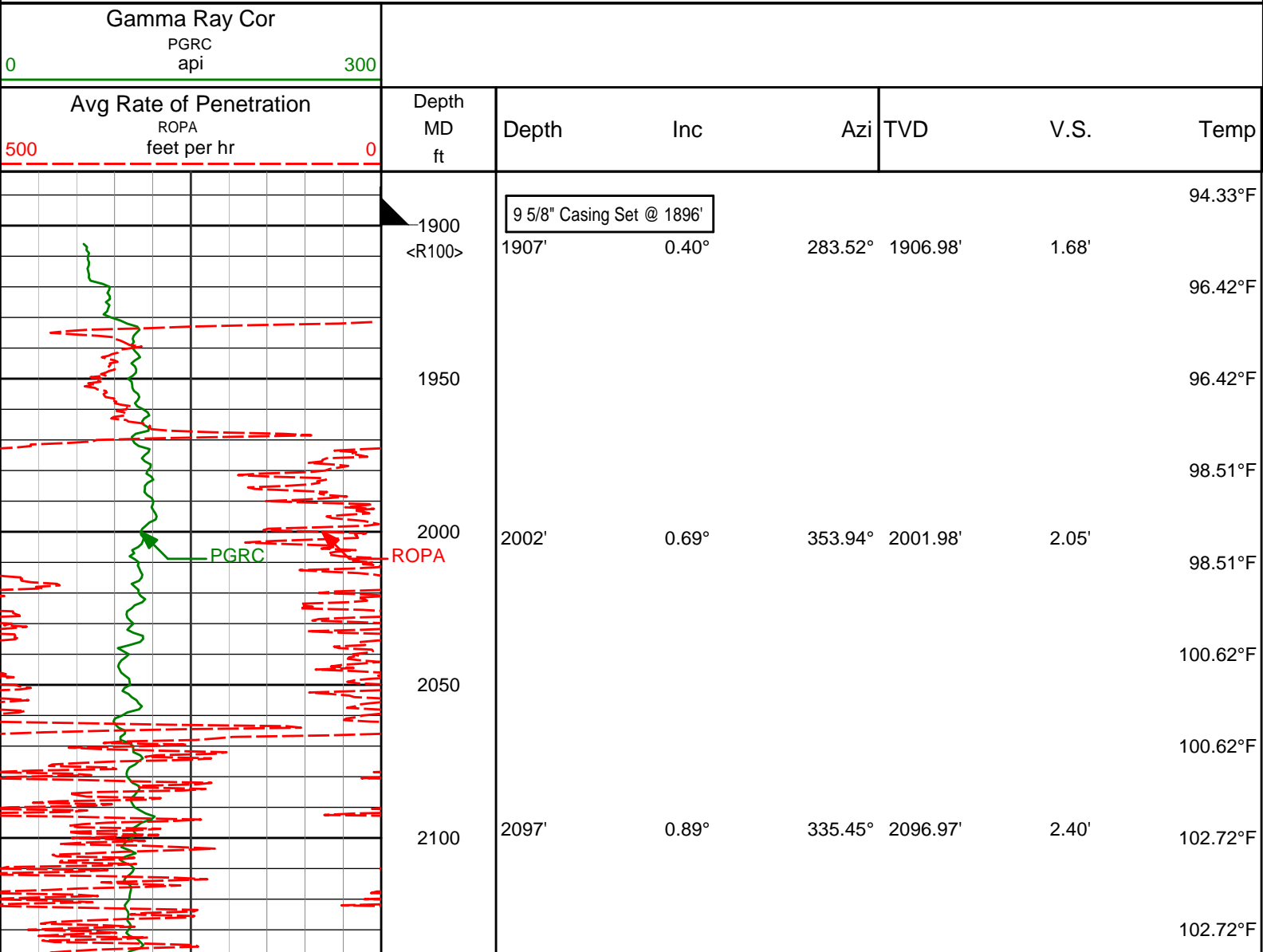
5. Surveys corrected by Surcon starting at 1965 ft.

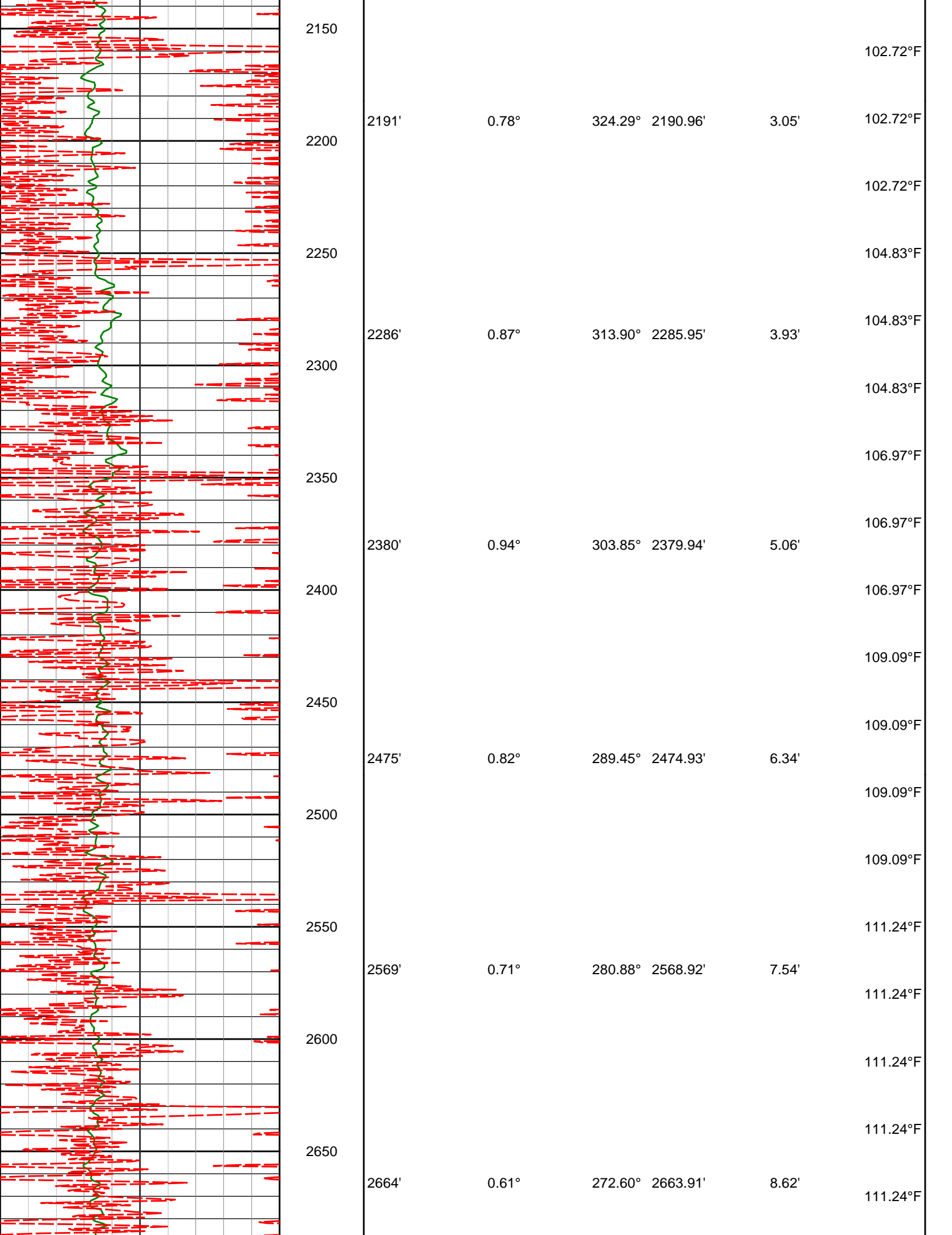
6. Last survey is a projection to the bit at TD.

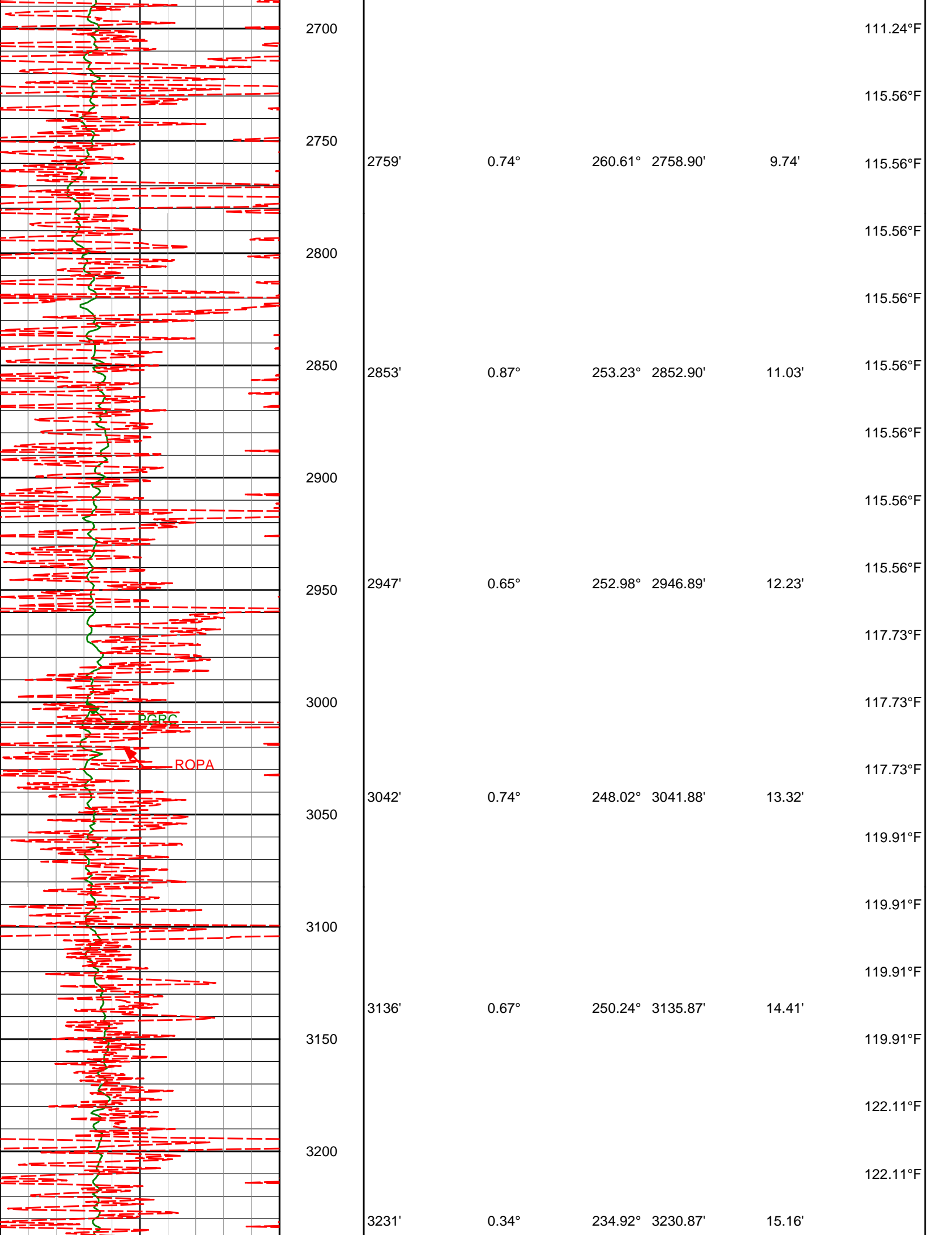
WARRANTY

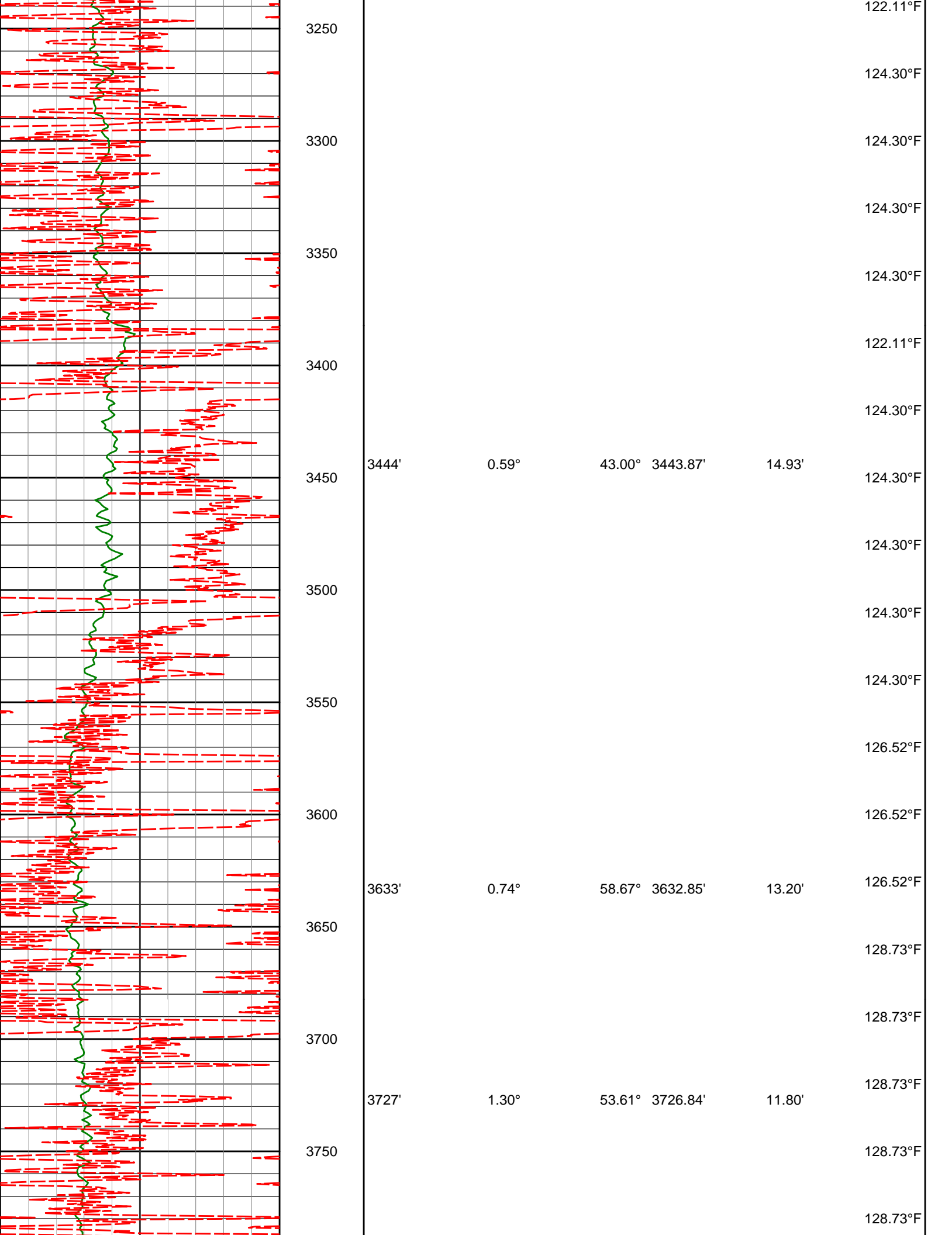
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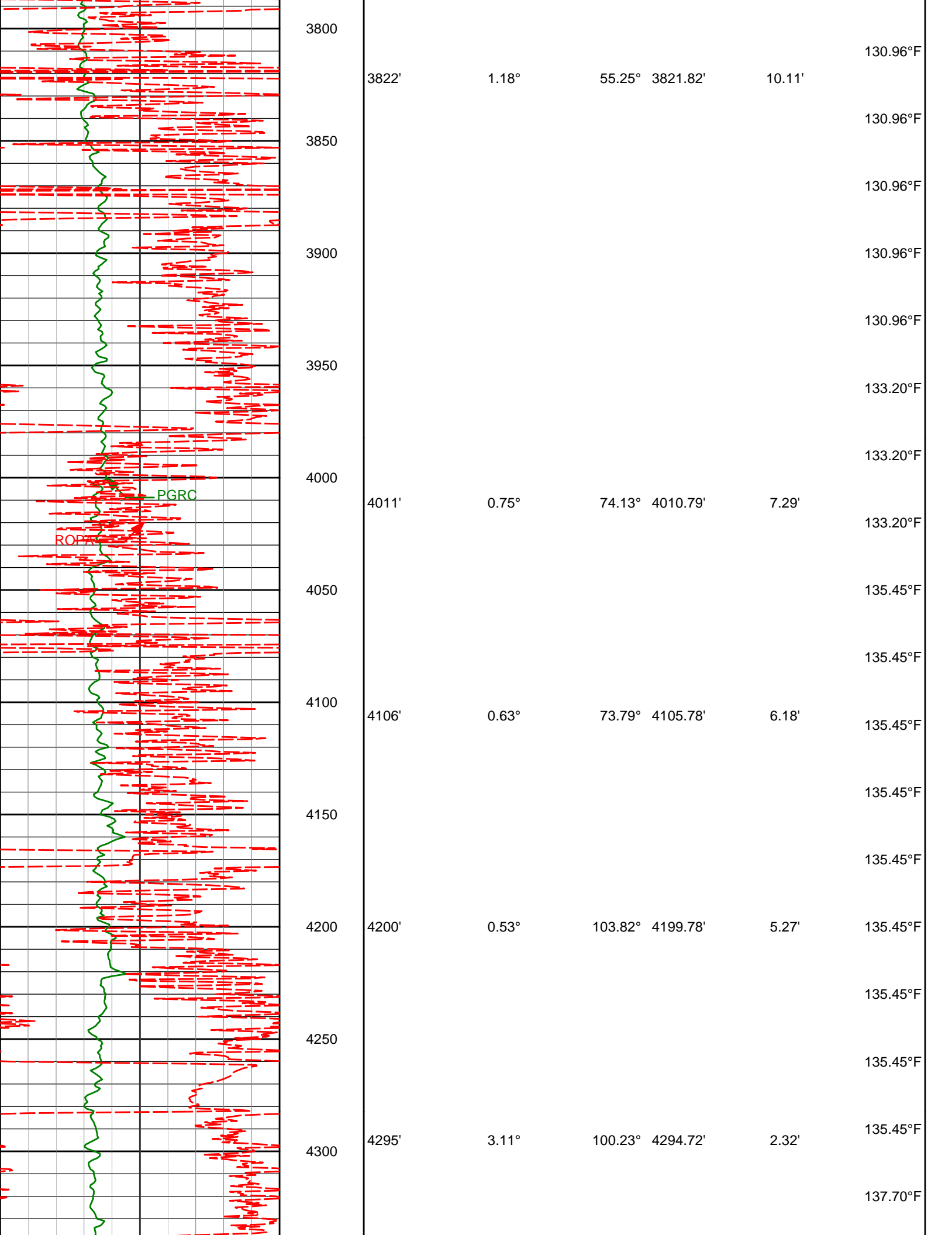
MD Main Log 1:600 Scale

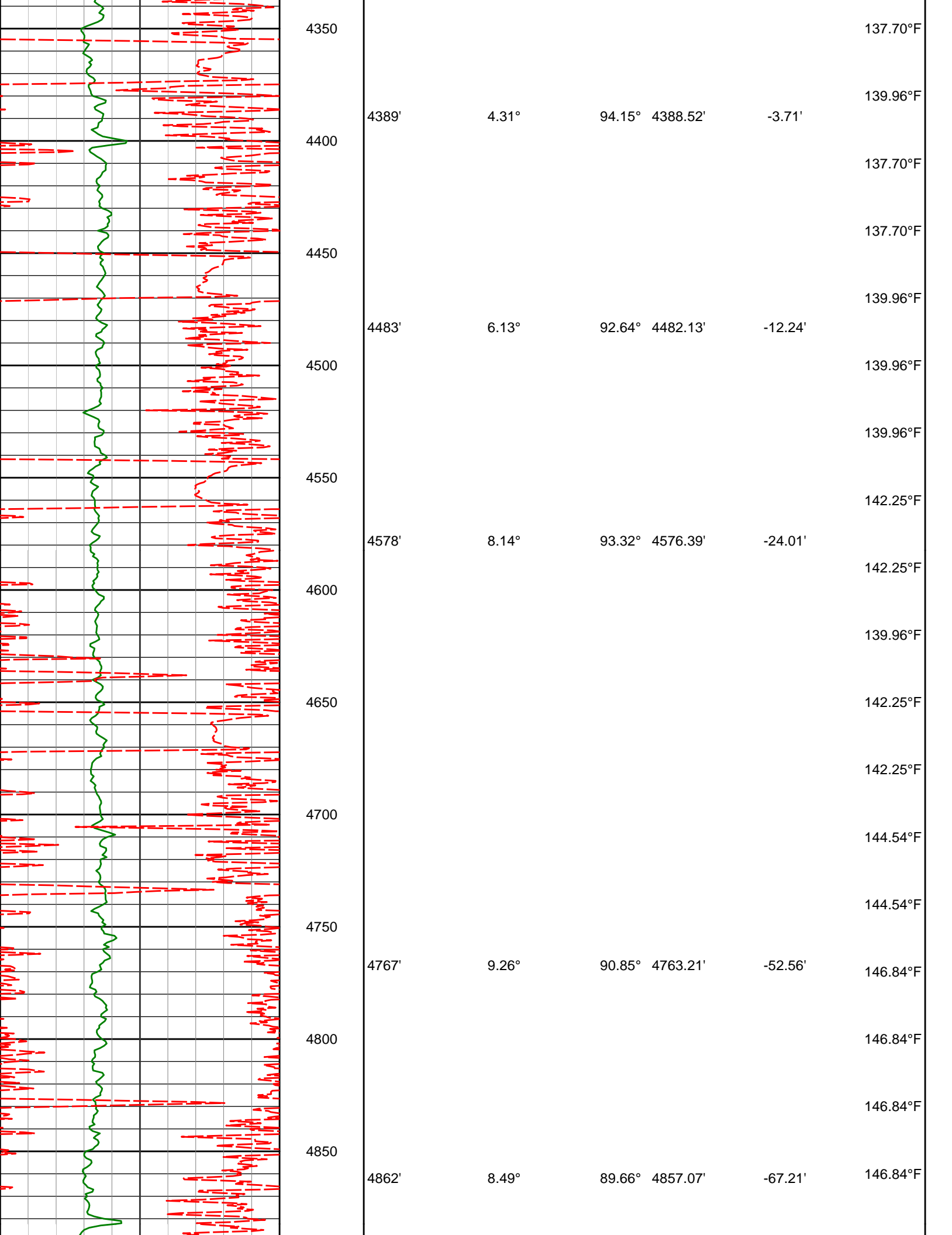


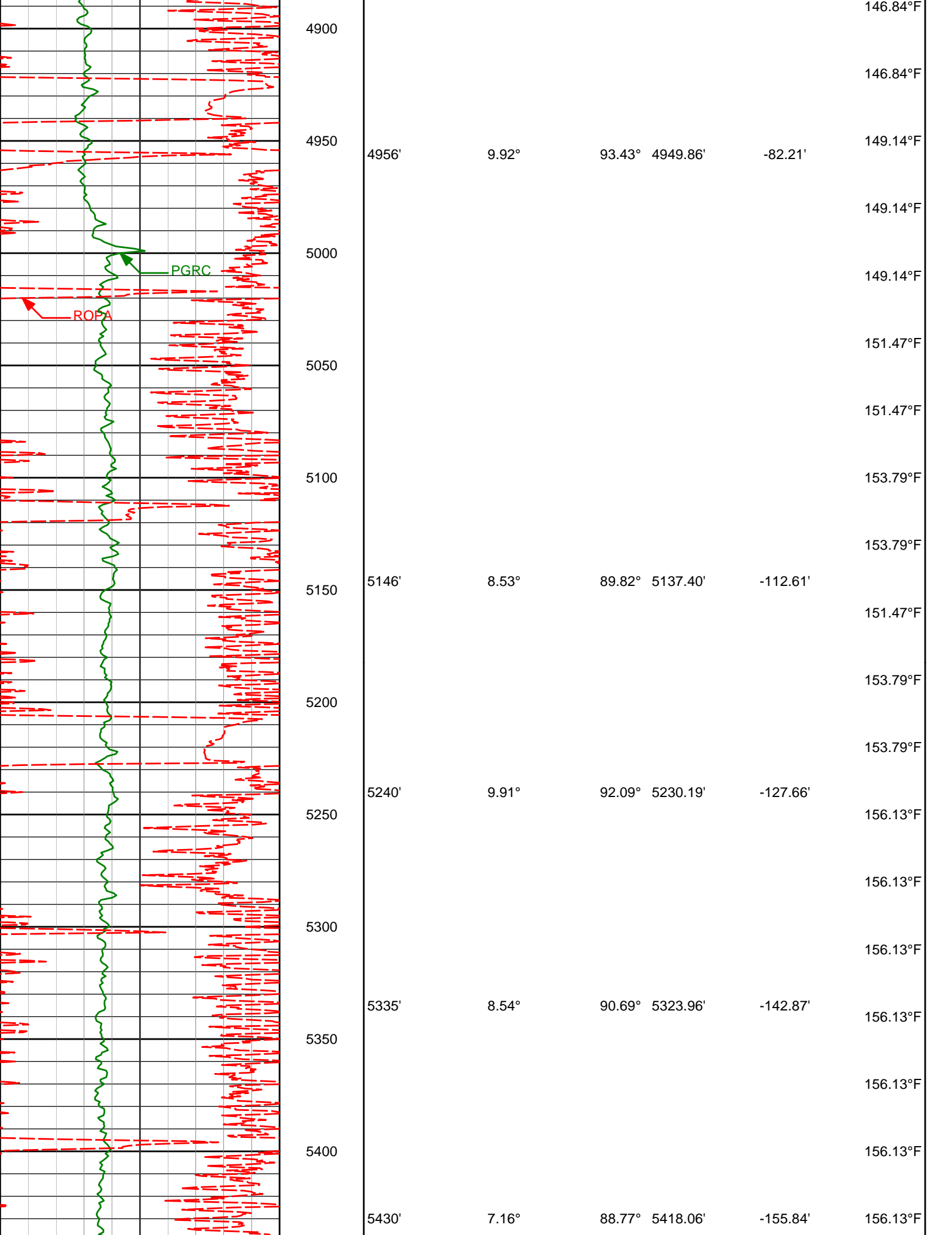


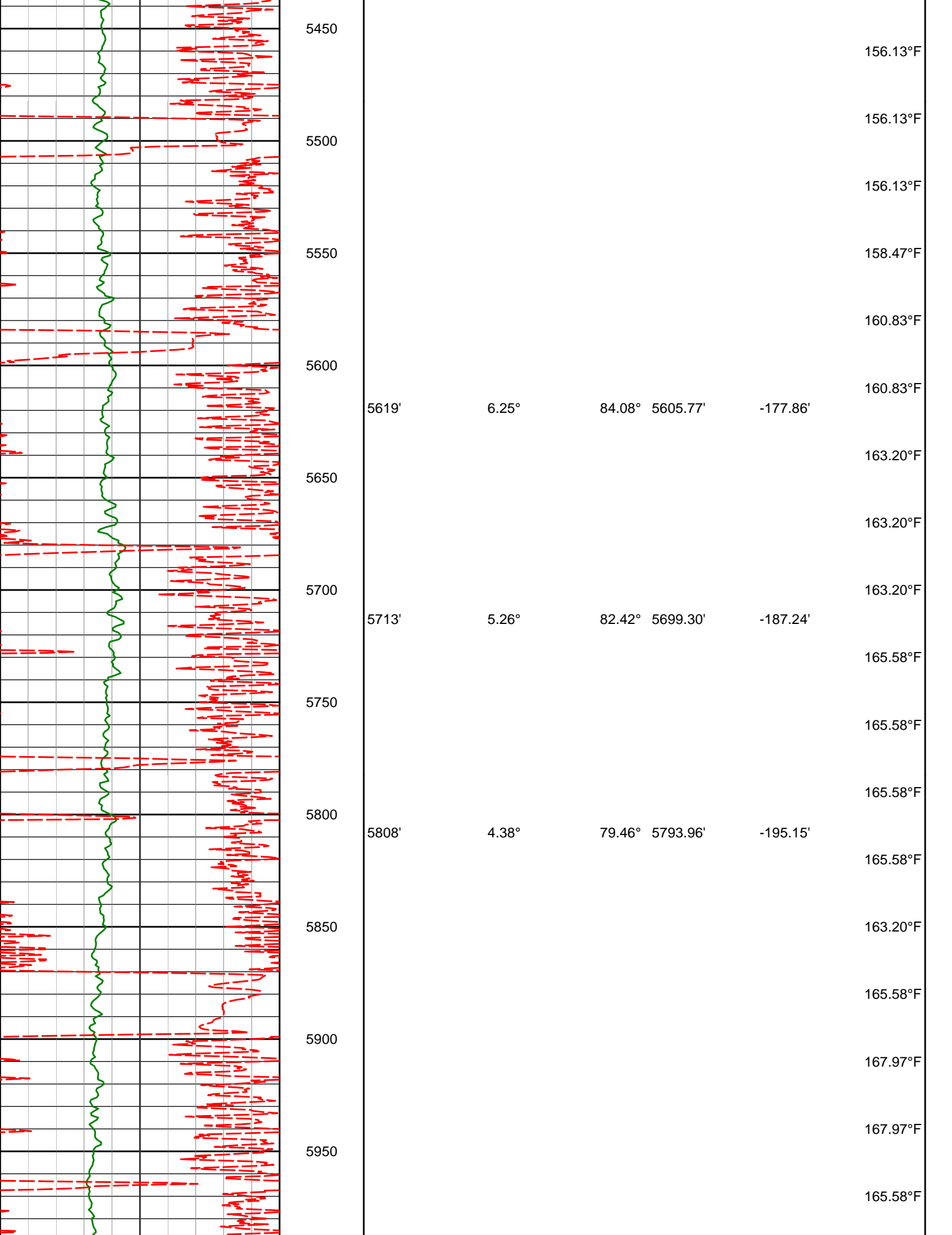


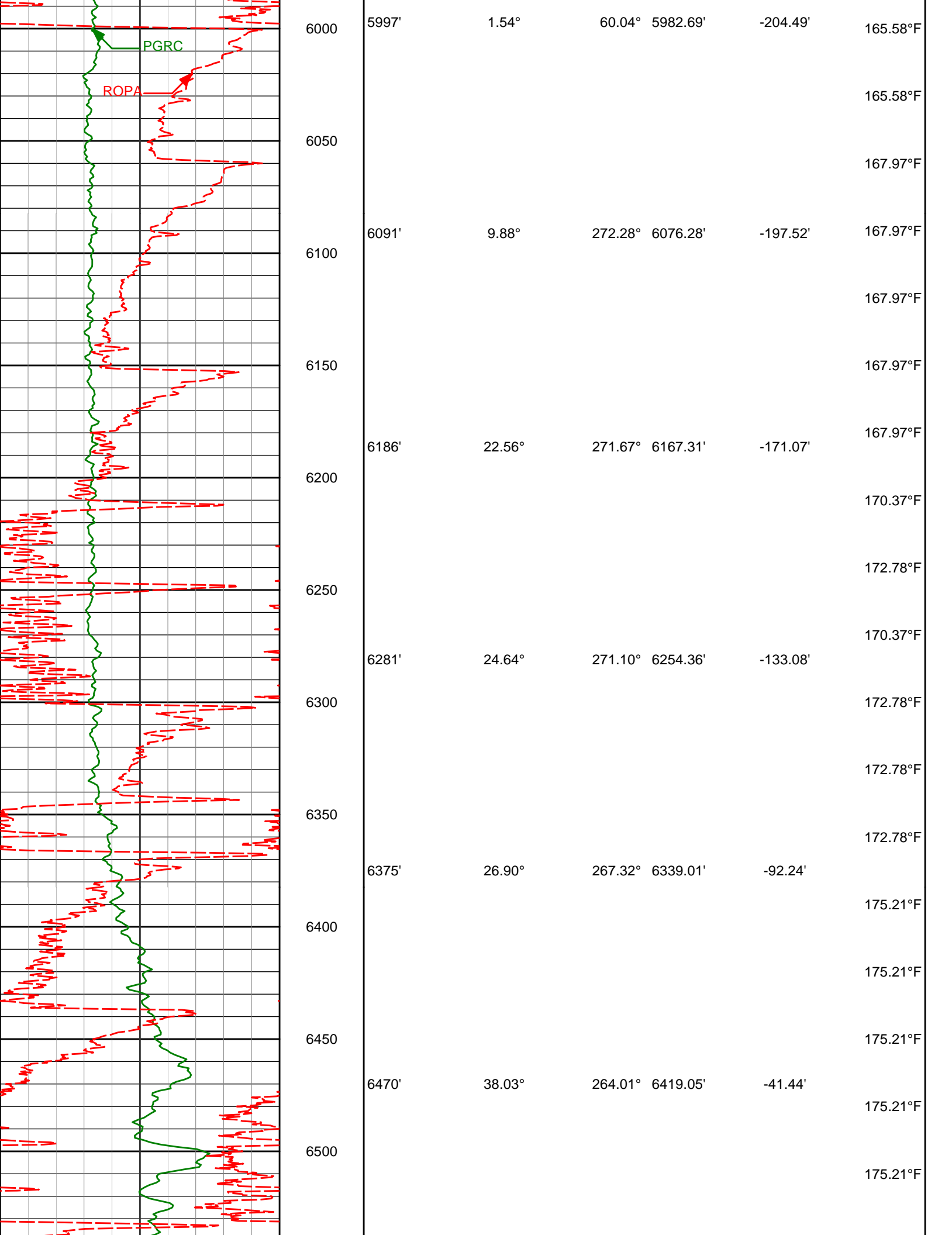


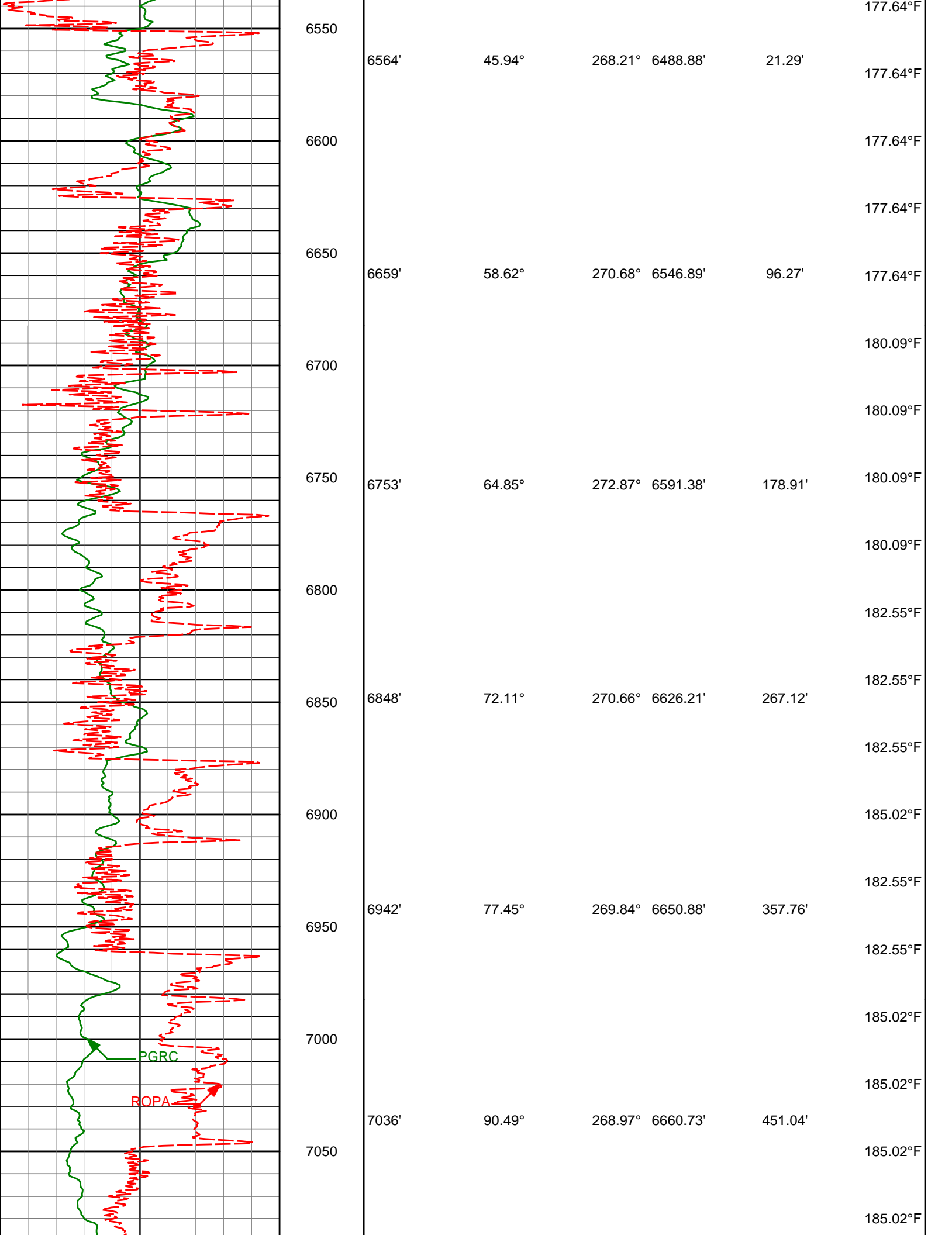


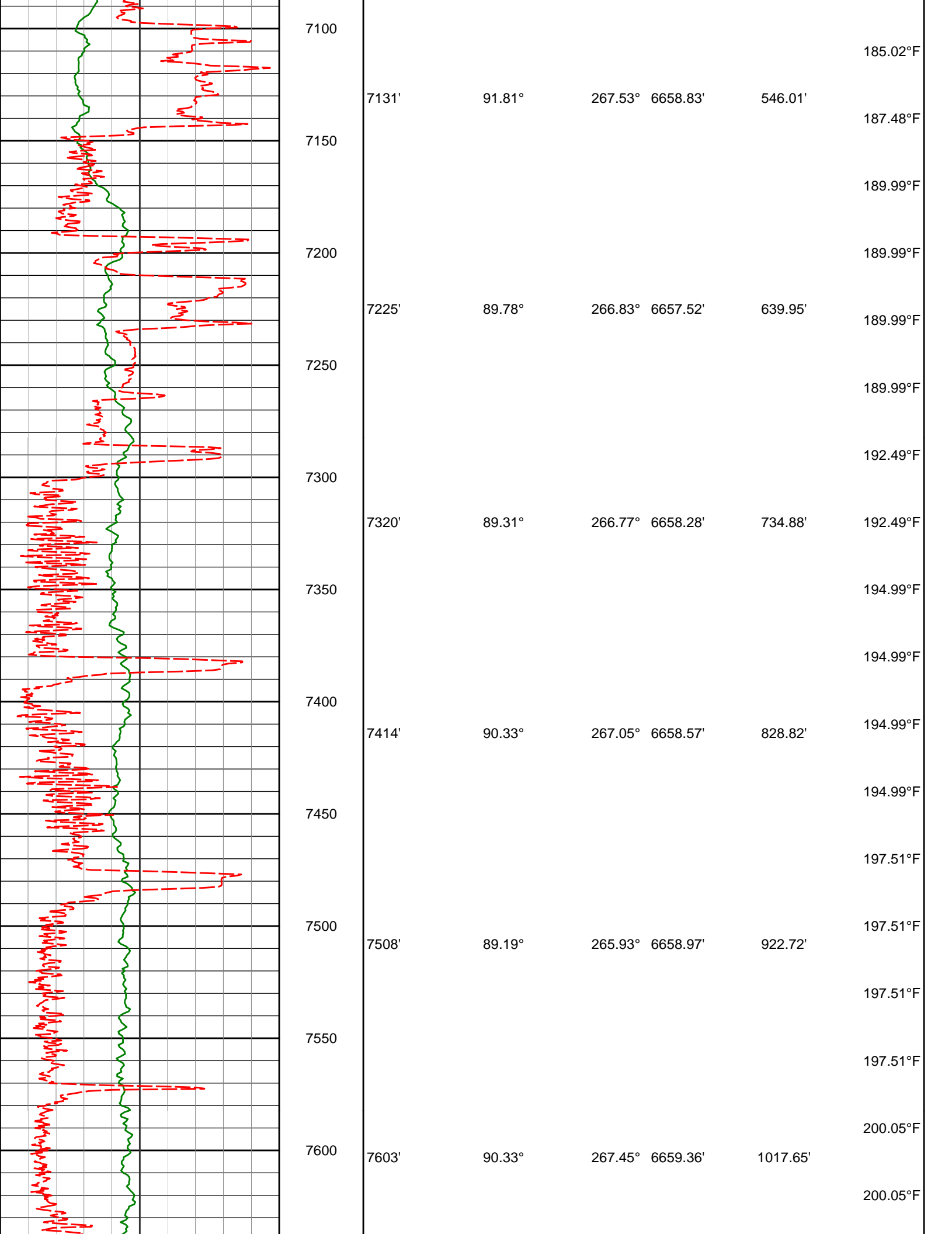


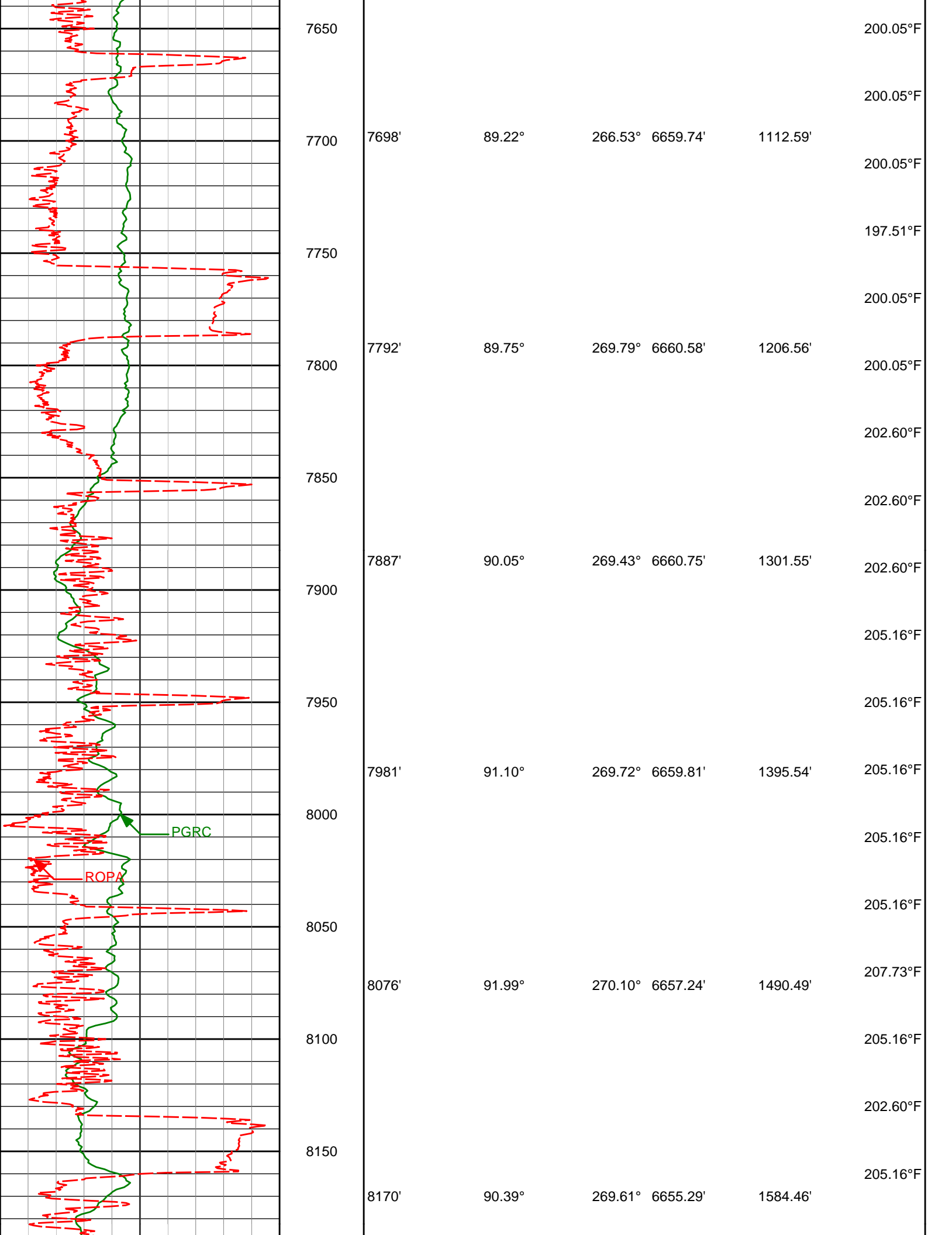


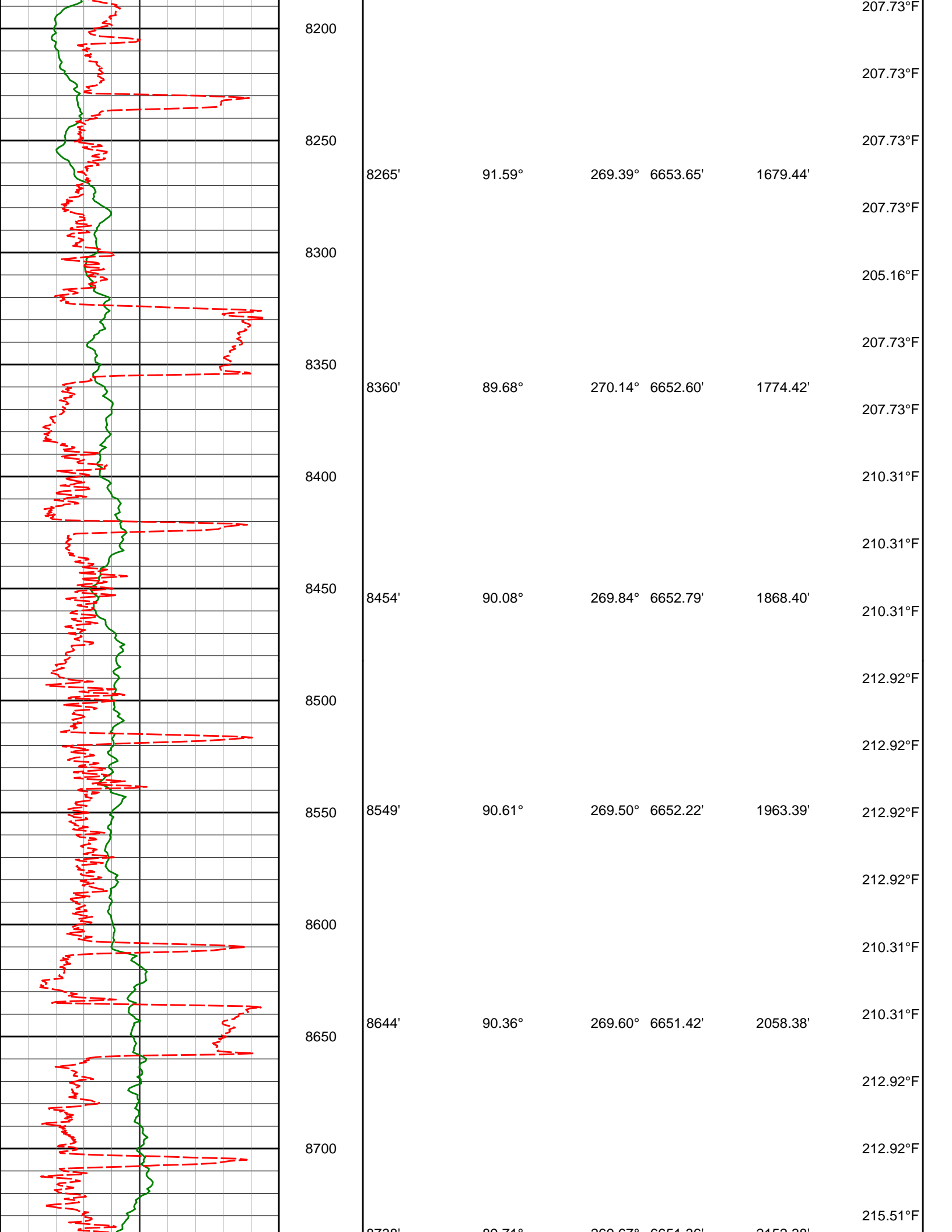


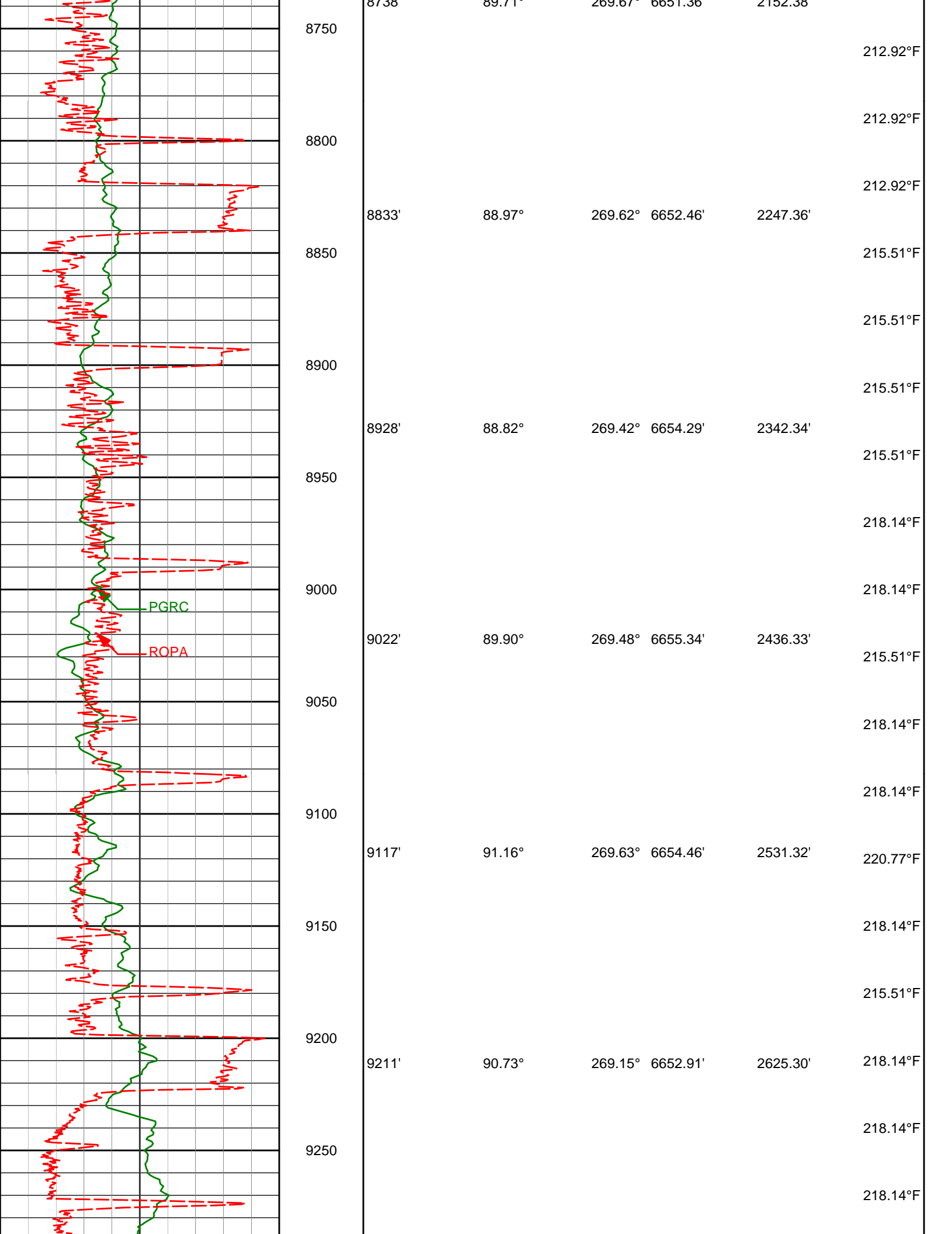


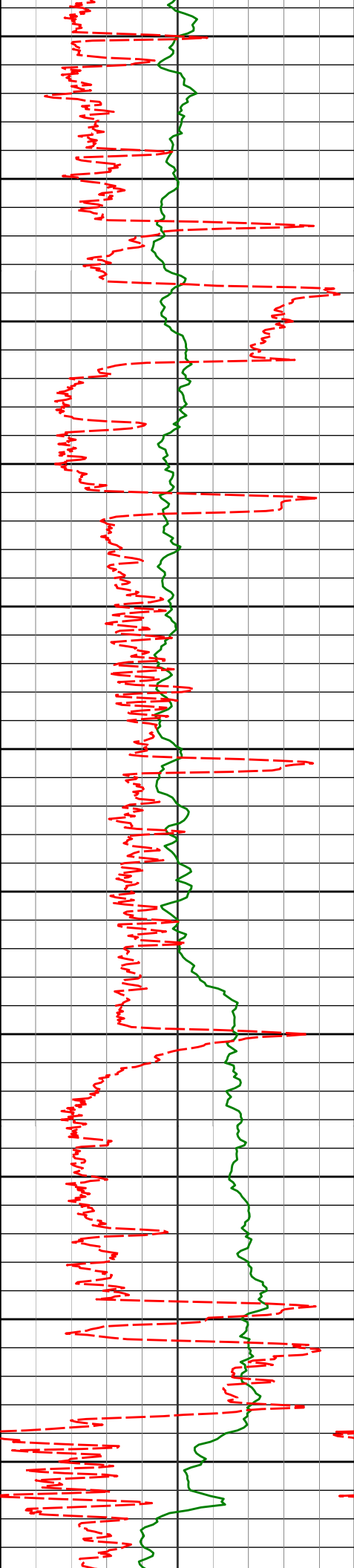




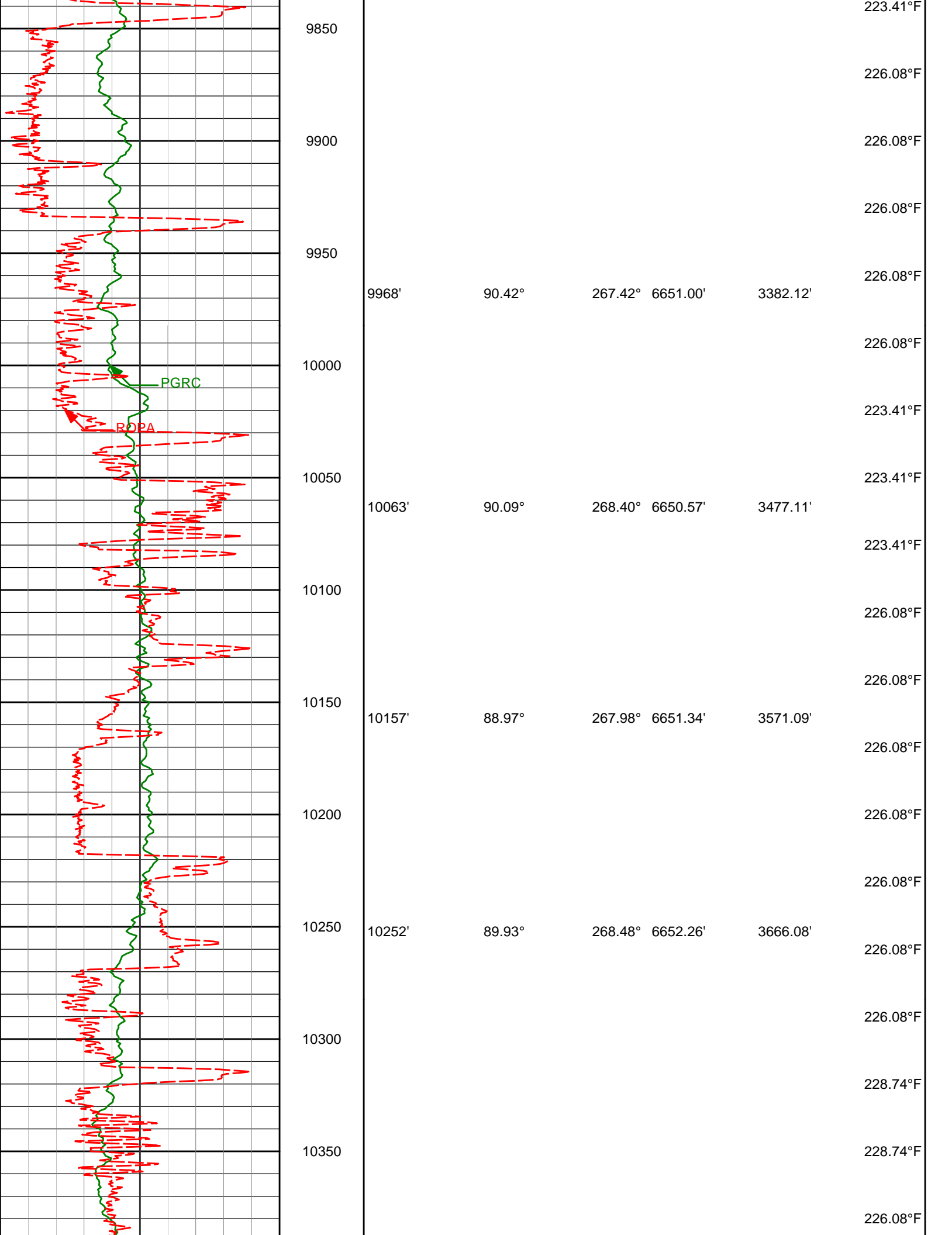


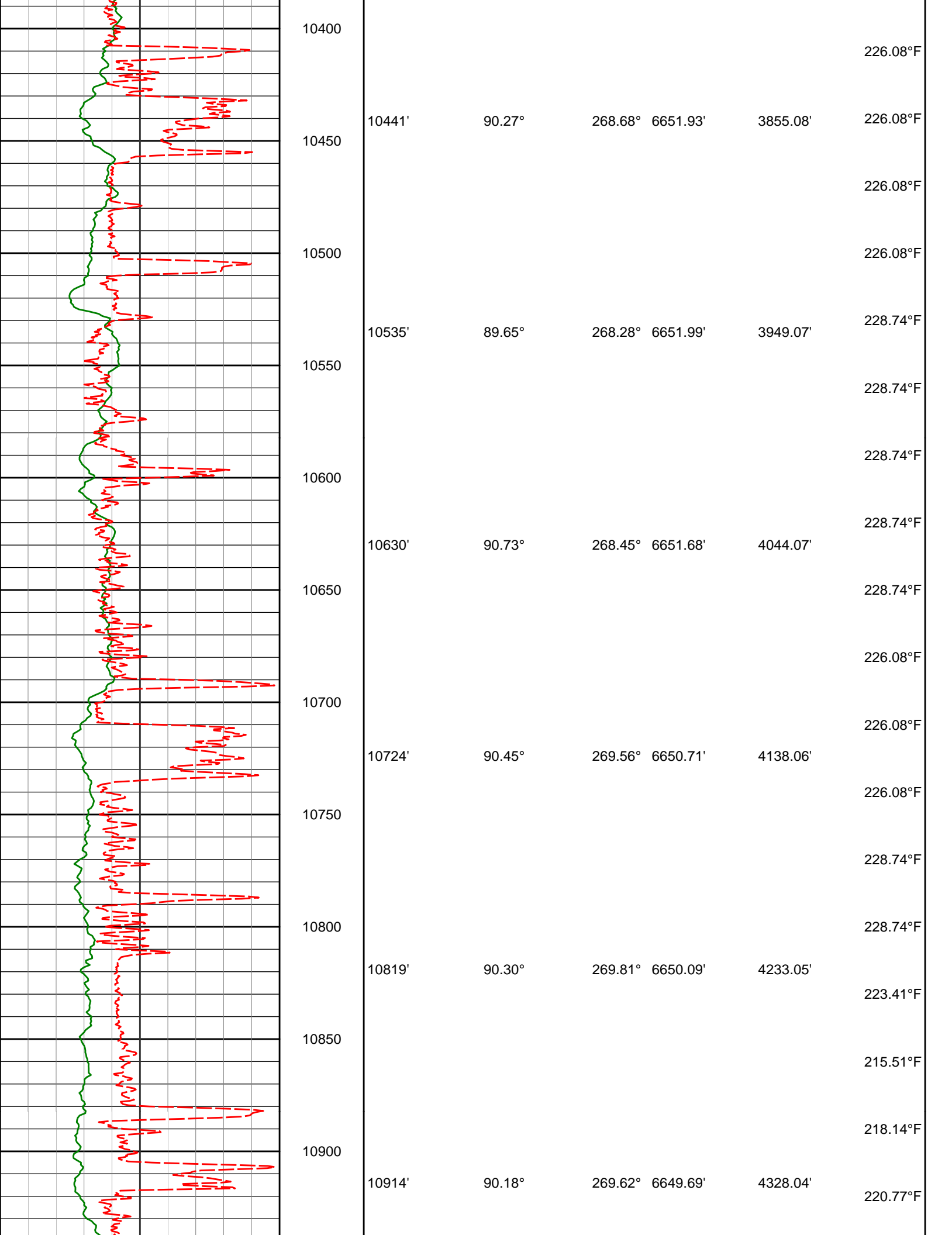


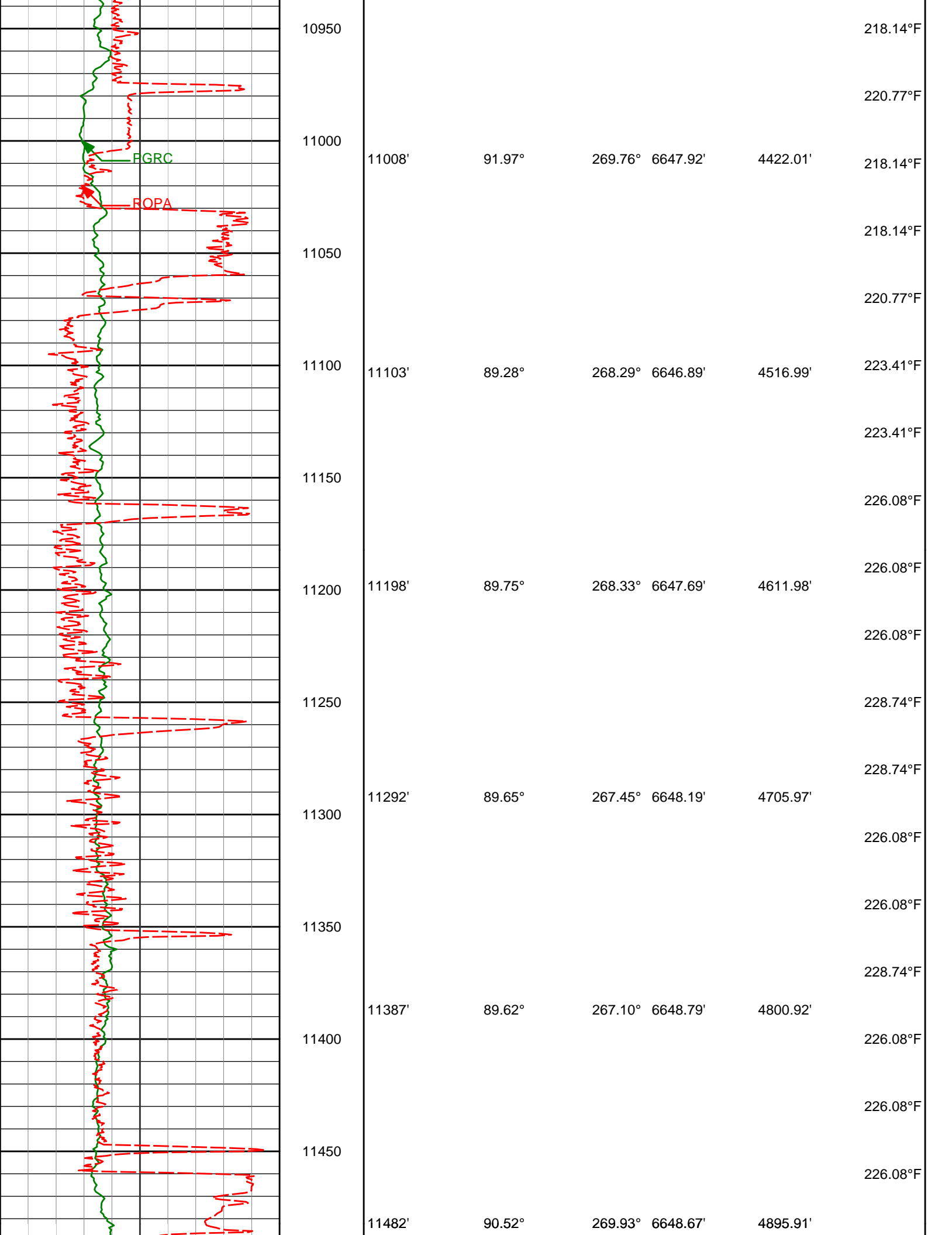


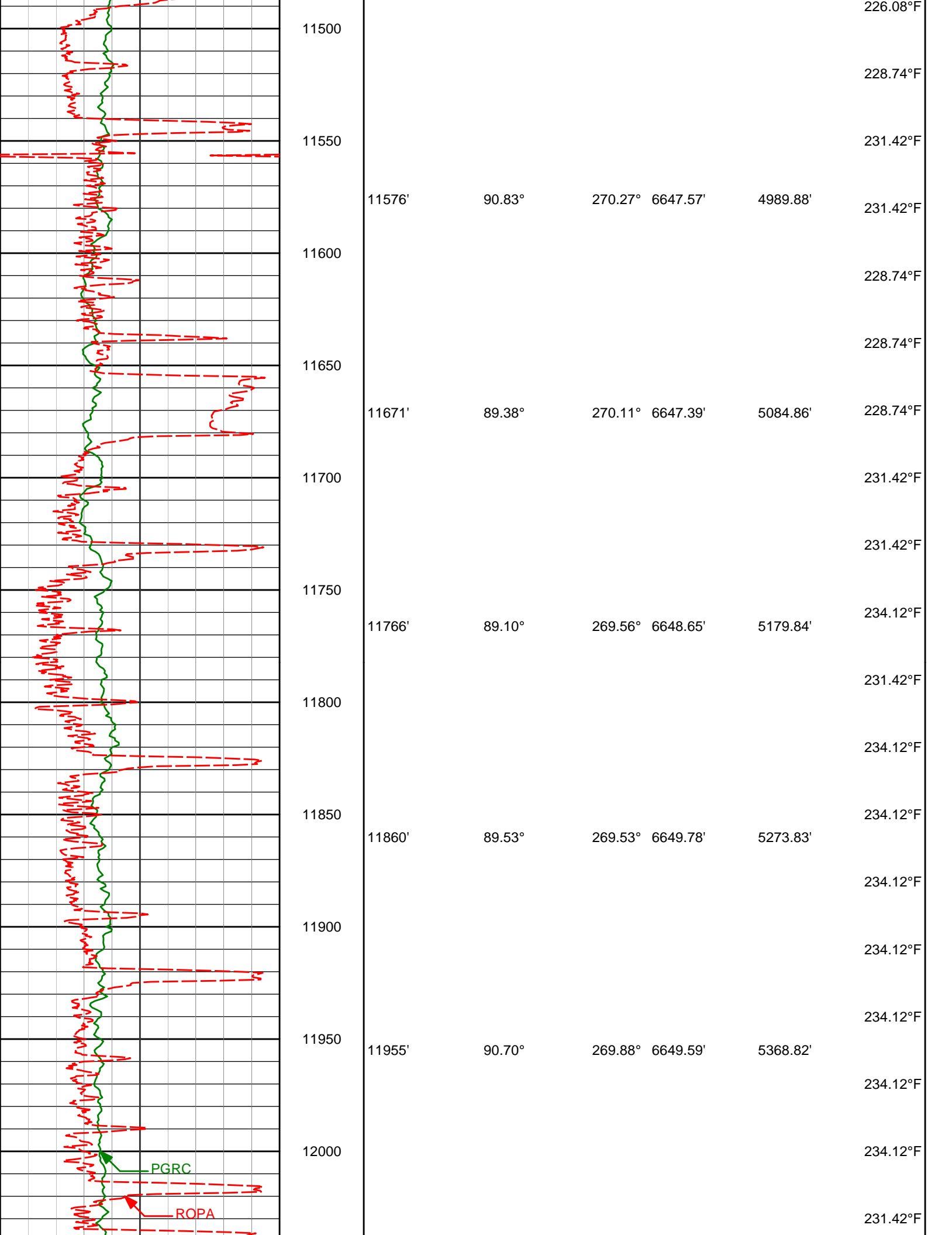


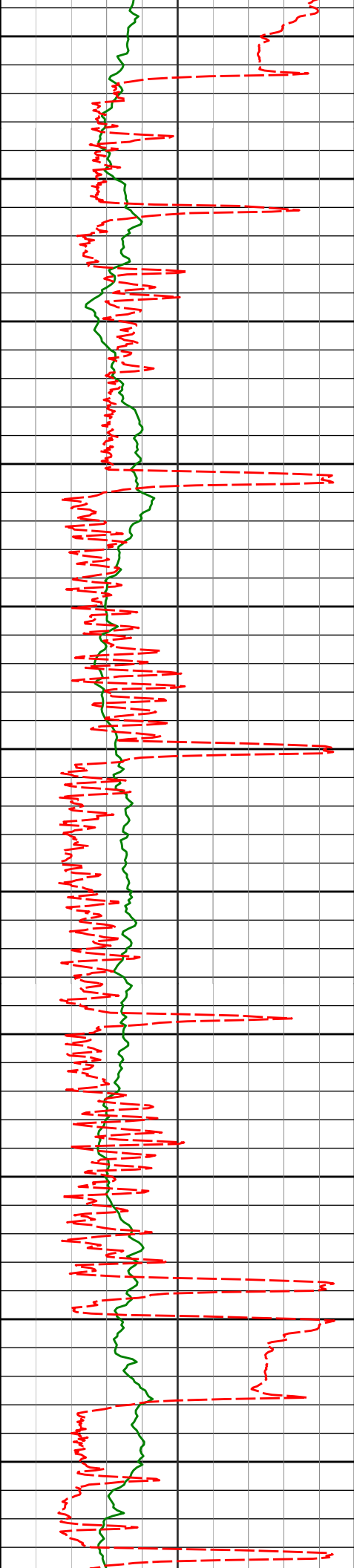
9300	9306'	90.73°	268.08°	6651.70'	2720.29'	220.77°F
						218.14°F
9350						218.14°F
						218.14°F
9400	9400'	90.02°	268.25°	6651.08'	2814.28'	218.14°F
						218.14°F
9450						220.77°F
						220.77°F
9500	9495'	88.95°	267.39°	6651.94'	2909.25'	220.77°F
						223.41°F
9550						223.41°F
						223.41°F
9600	9590'	90.24°	267.97°	6652.61'	3004.23'	223.41°F
						223.41°F
9650						223.41°F
						223.41°F
9700	9684'	91.10°	267.95°	6651.51'	3098.21'	226.08°F
						223.41°F
9750						223.41°F
						223.41°F
9800	9779'	89.56°	267.70°	6650.96'	3193.18'	223.41°F
						223.41°F



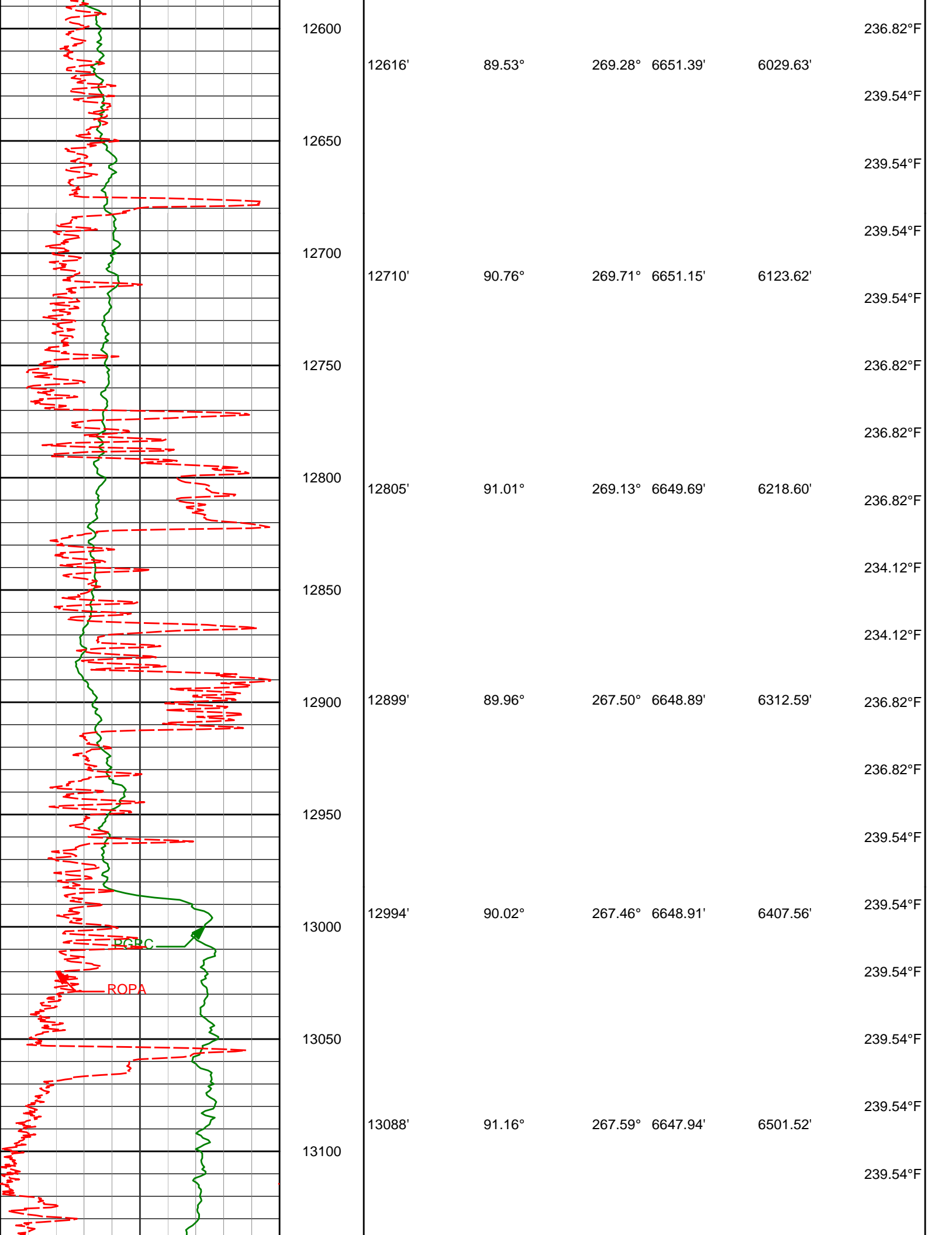


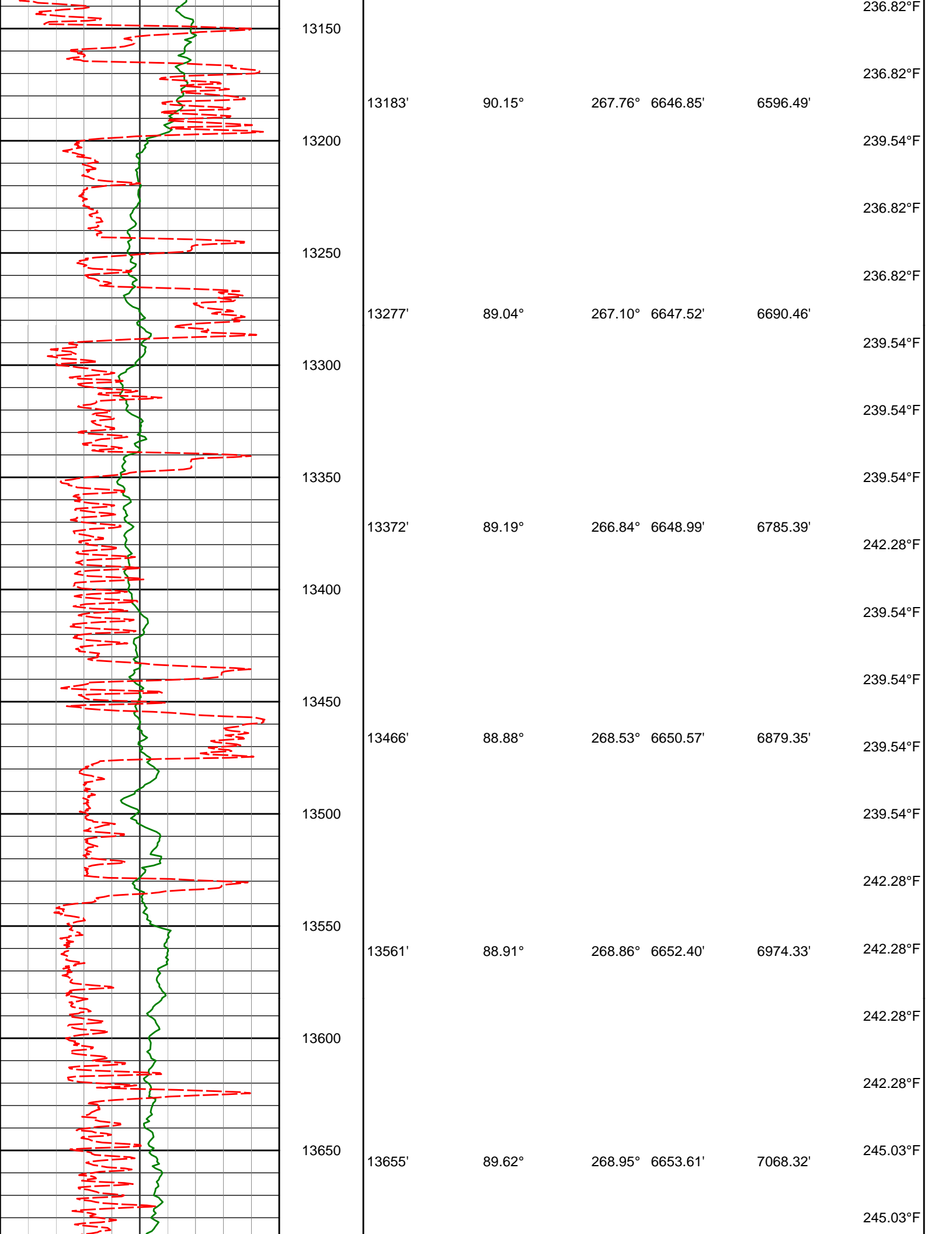


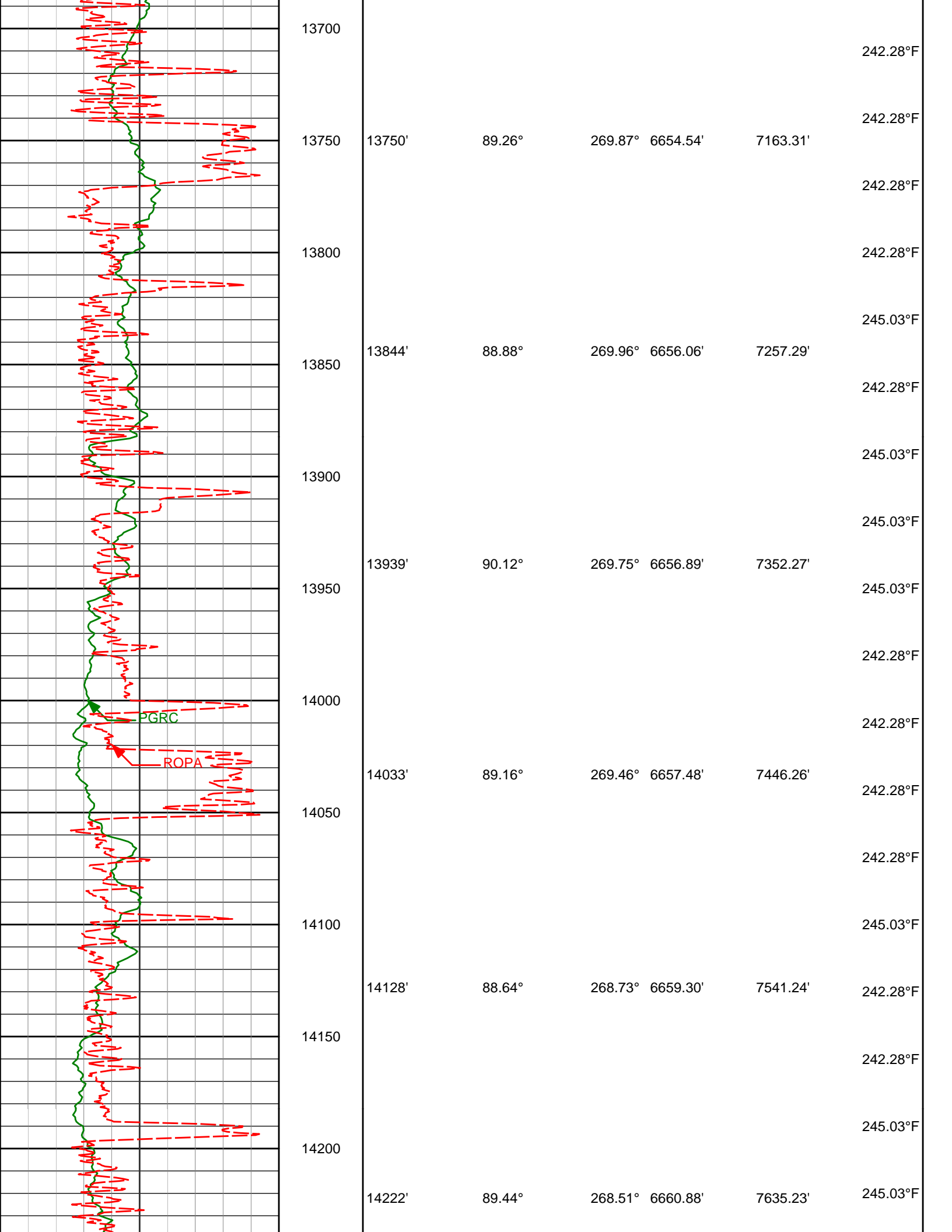


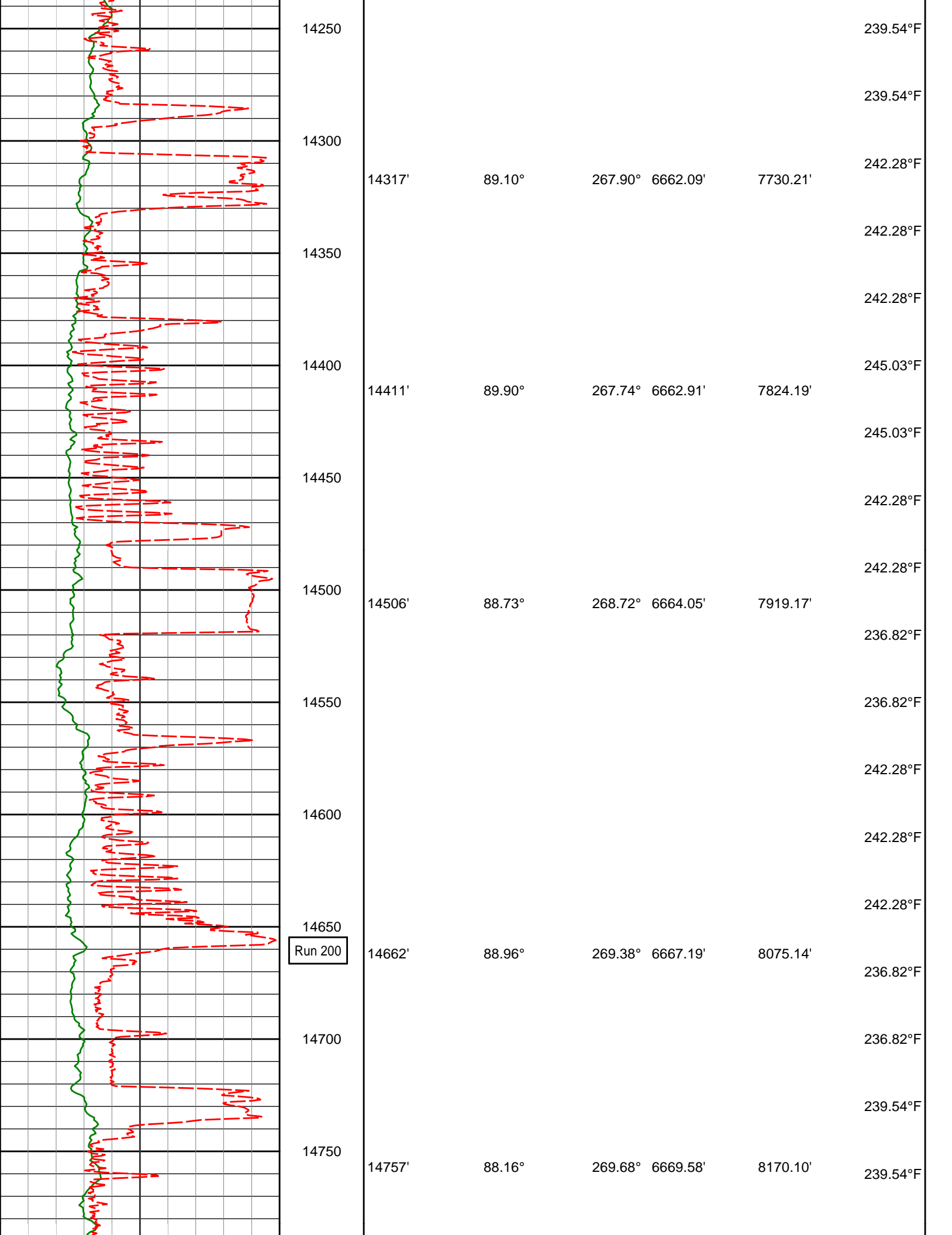


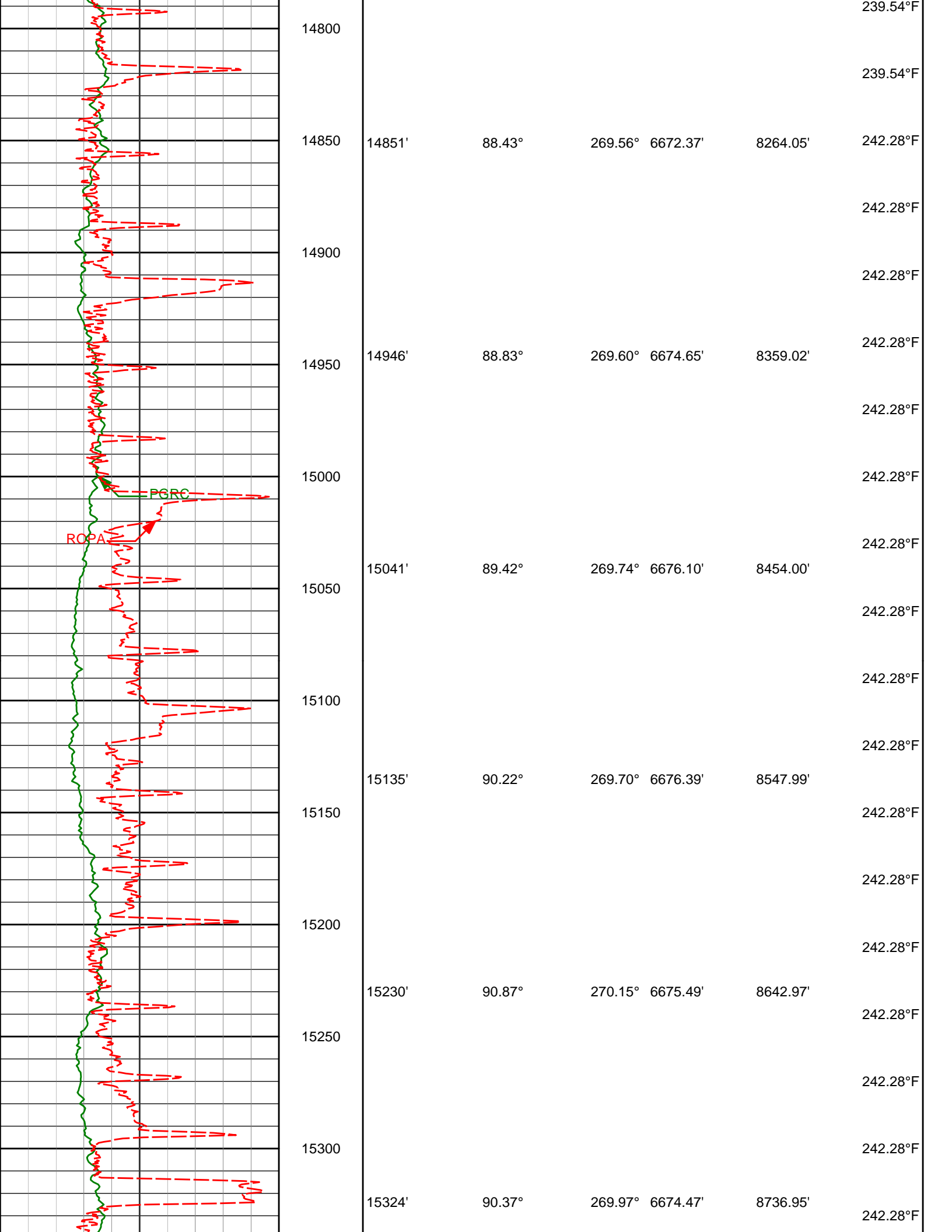
12050	12049'	89.81°	270.63°	6649.17'	5462.79'	234.12°F
						234.12°F
12100						236.82°F
						236.82°F
12150	12144'	88.82°	270.16°	6650.30'	5557.75'	236.82°F
						236.82°F
12200						236.82°F
						236.82°F
12250	12238'	89.38°	270.23°	6651.78'	5651.72'	236.82°F
						236.82°F
12300						236.82°F
						236.82°F
12350	12332'	90.05°	270.15°	6652.25'	5745.69'	236.82°F
						236.82°F
12400						239.54°F
						239.54°F
12450	12427'	91.35°	270.28°	6651.09'	5840.66'	236.82°F
						236.82°F
12500						236.82°F
						236.82°F
12550	12521'	89.38°	269.87°	6650.49'	5934.64'	236.82°F
						236.82°F
						236.82°F

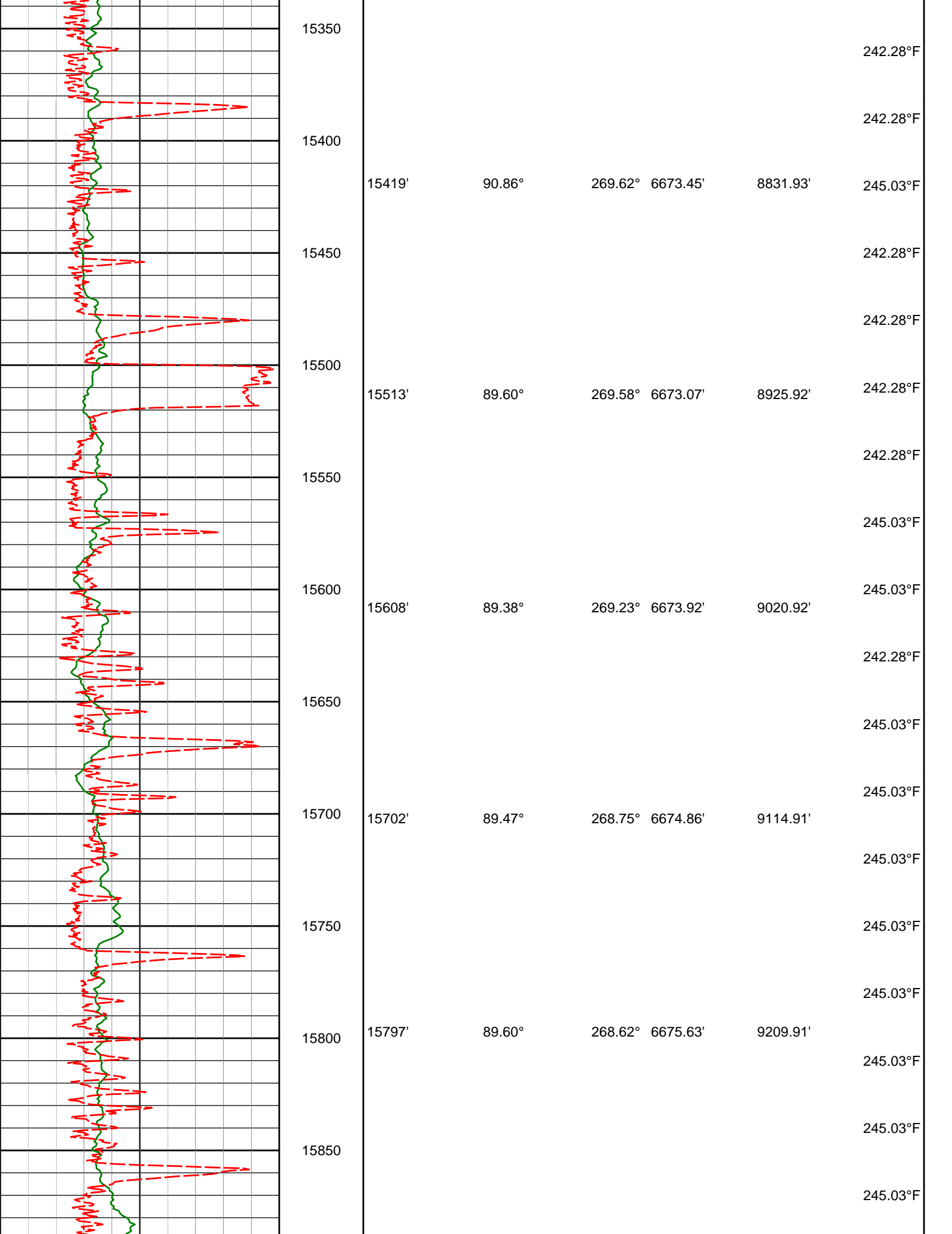


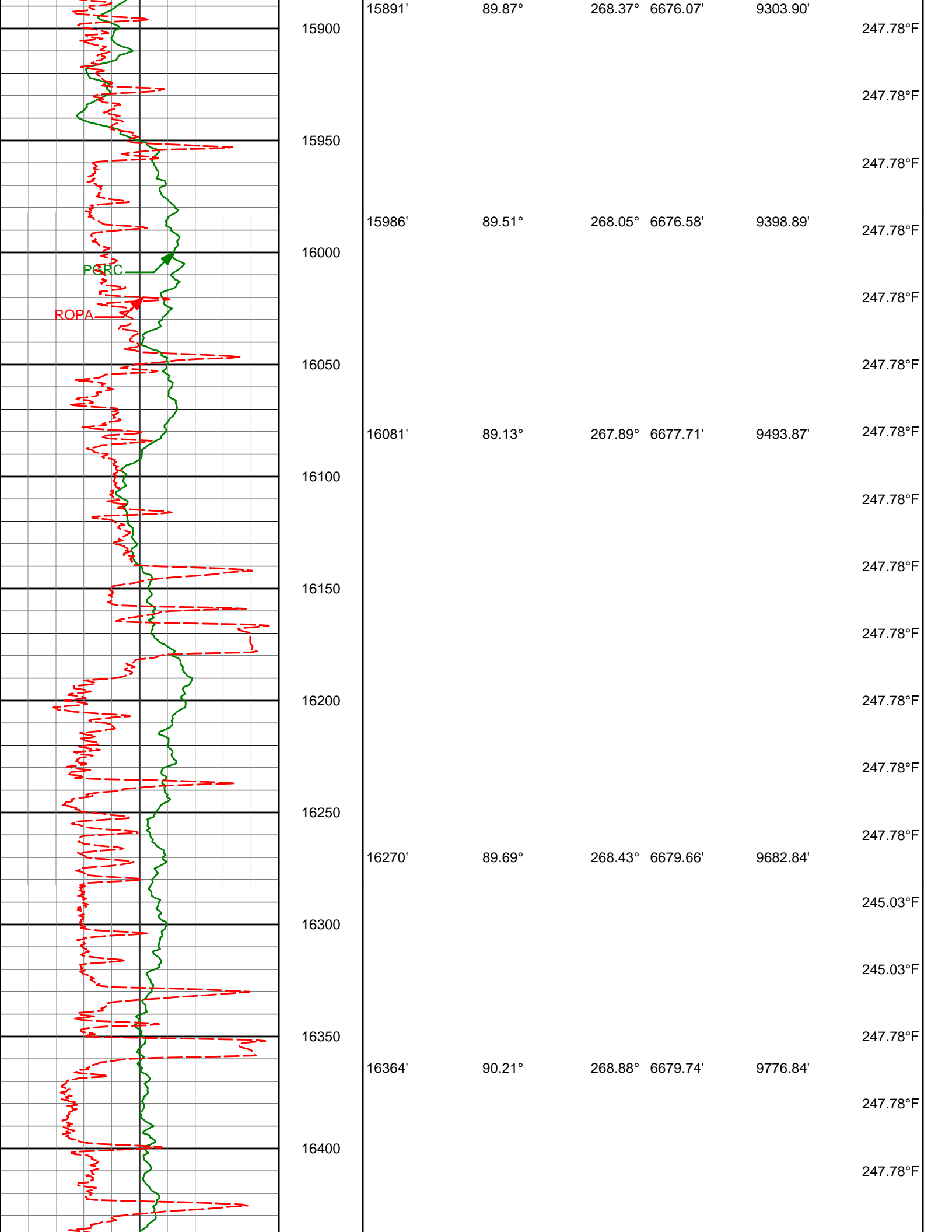


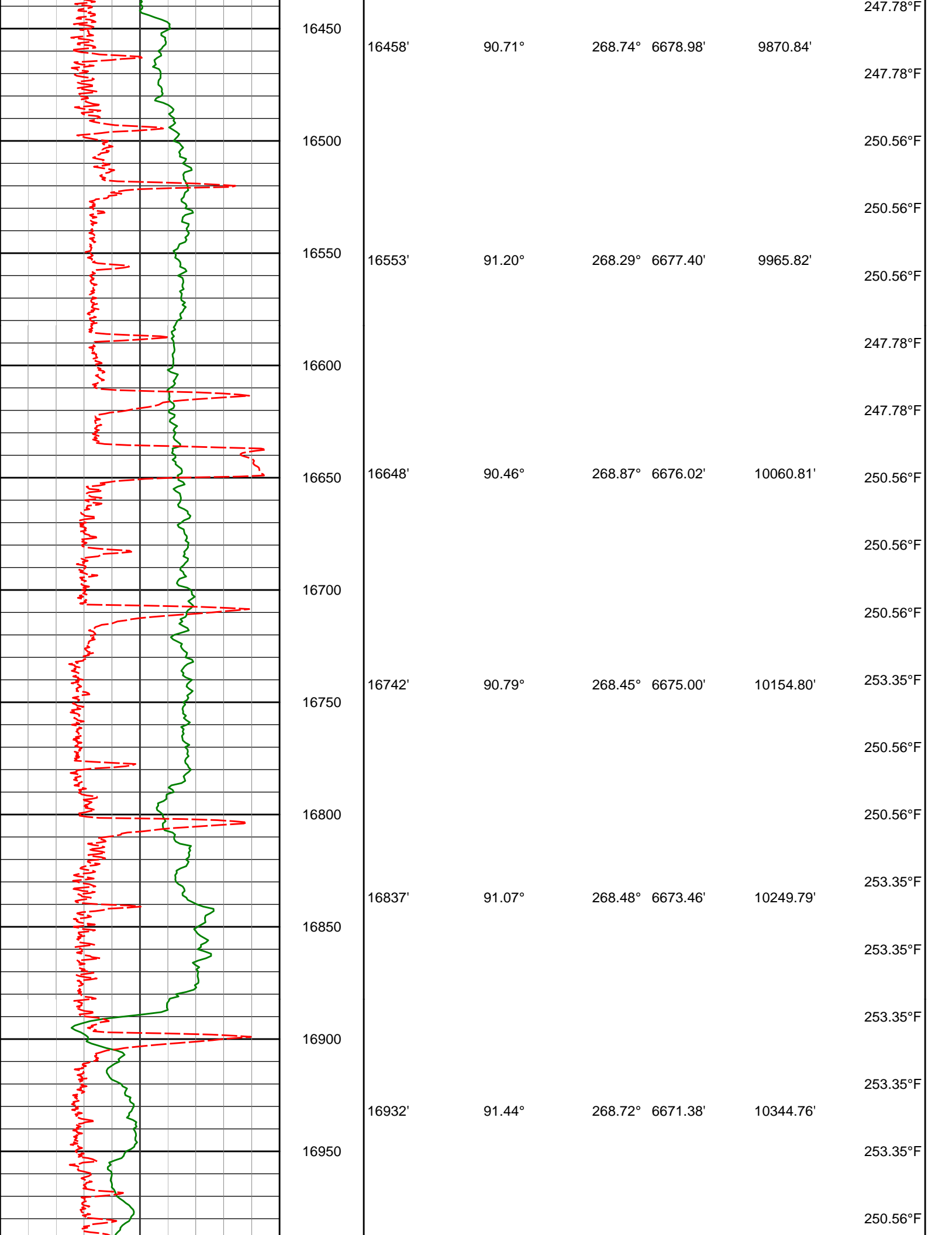


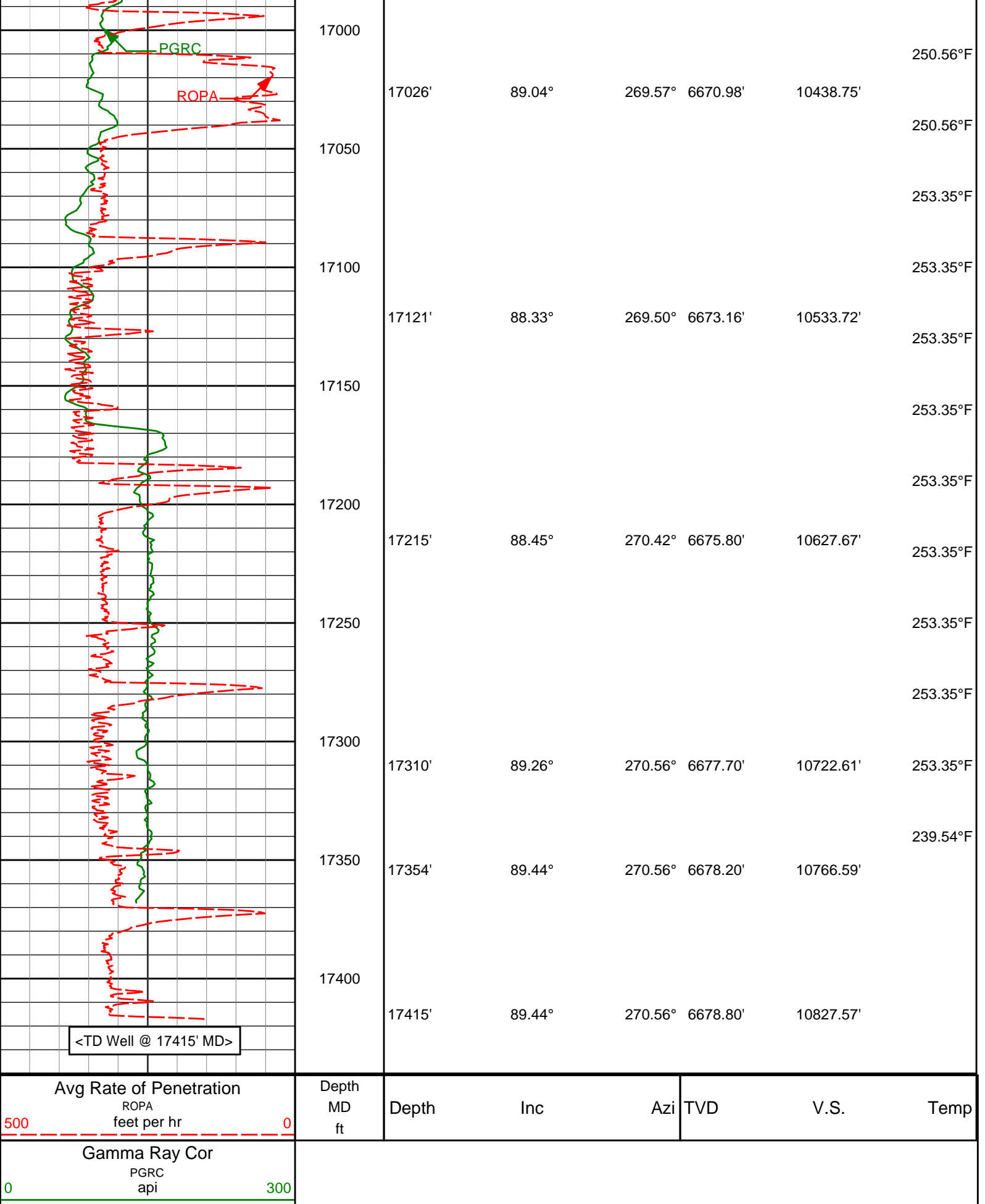




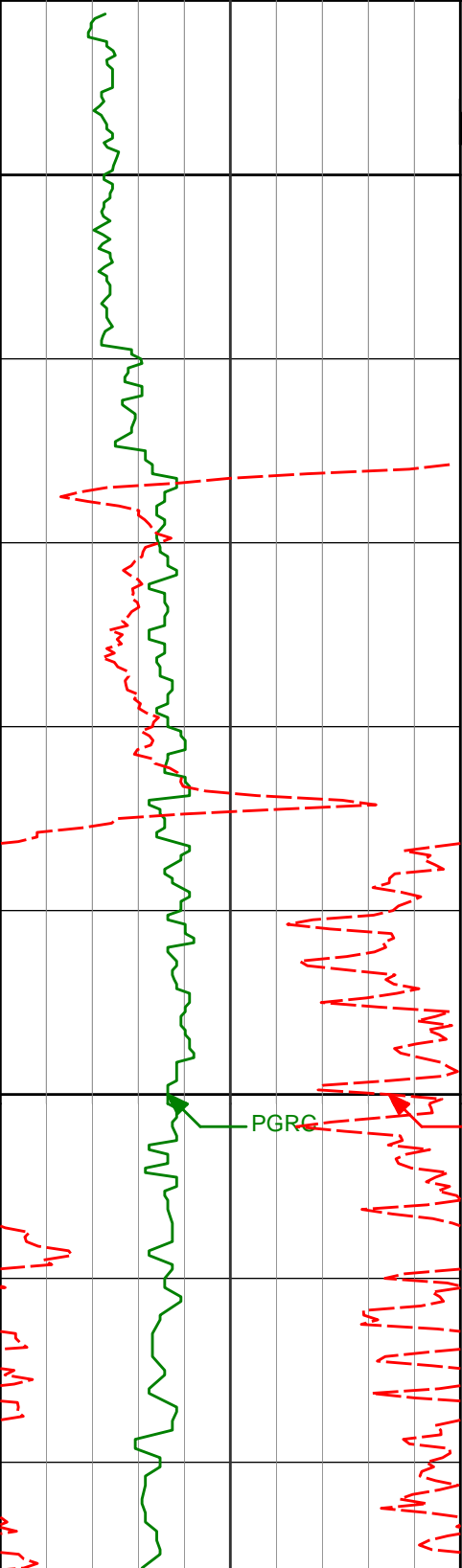


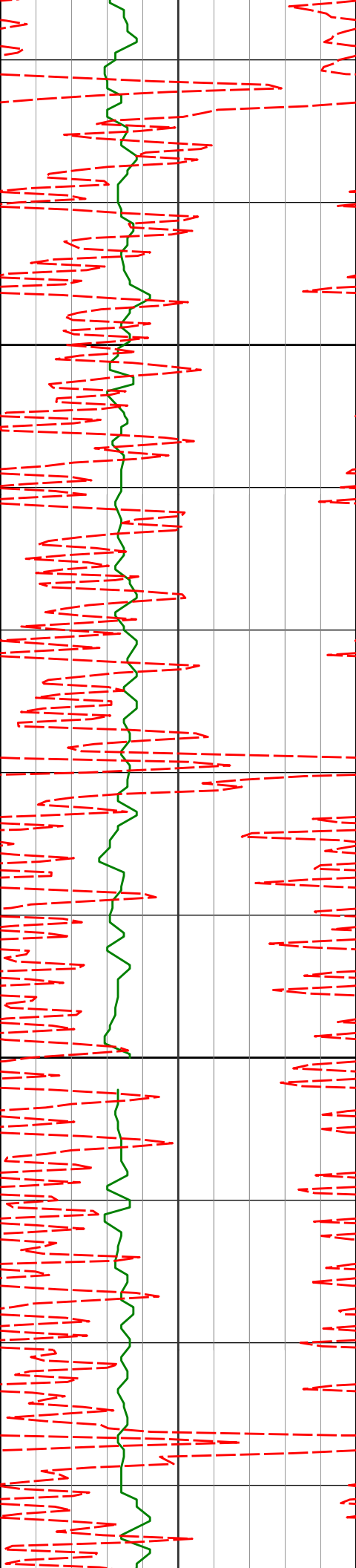






MD Detail Log 1:240 Scale

Gamma Ray Cor PGRC api		Depth MD ft		Depth	Inc	Azi	TVD	V.S.	Temp
0 300									
Avg Rate of Penetration ROPA feet per hr									
500 0									
		1900 <R100>		1907'	0.40°	283.52°	1906.98'	1.68'	94.33°F
									96.42°F
									96.42°F
									98.51°F
PGRC ROPA		2000		2002'	0.69°	353.94°	2001.98'	2.05'	98.51°F
									100.62°F



2100

2200

2097'

2191'

0.89°

0.78°

335.45°

324.29°

2096.97'

2190.96'

2.40'

3.05'

100.62°F

102.72°F

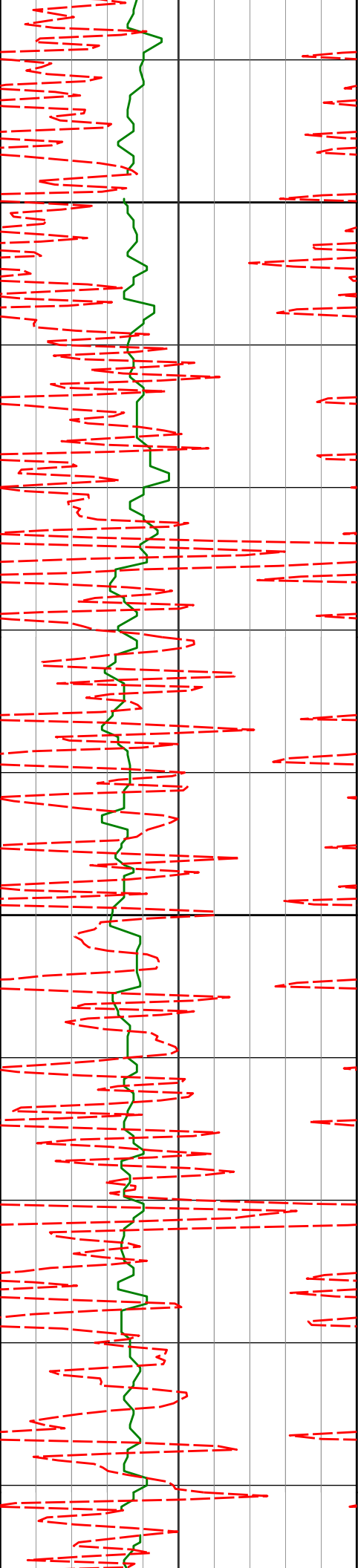
102.72°F

102.72°F

102.72°F

102.72°F

104.83°F



2300

2400

2286'

0.87°

313.90°

2285.95'

3.93'

2380'

0.94°

303.85°

2379.94'

5.06'

2475'

0.82°

289.45°

2474.93'

6.34'

104.83°F

104.83°F

106.97°F

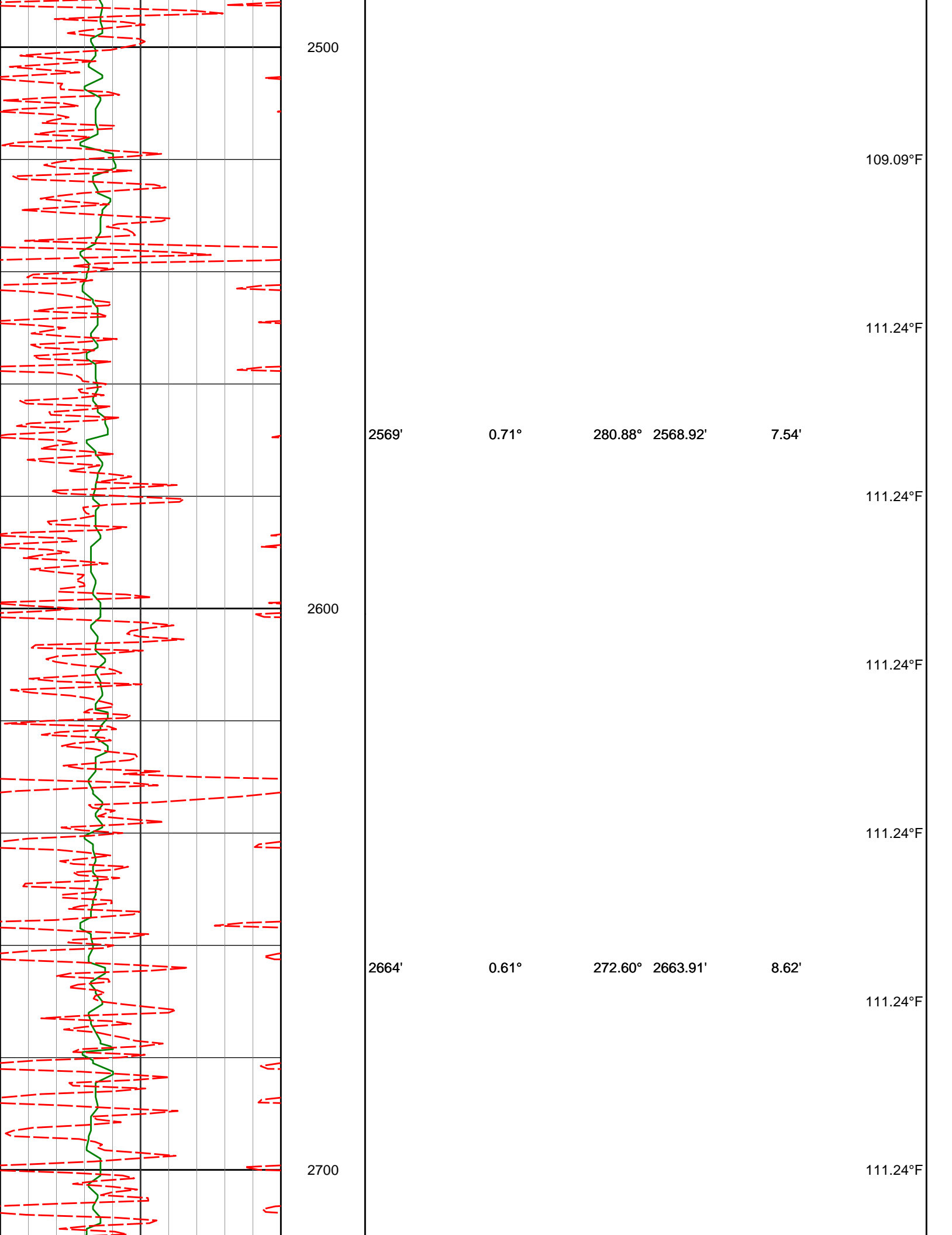
106.97°F

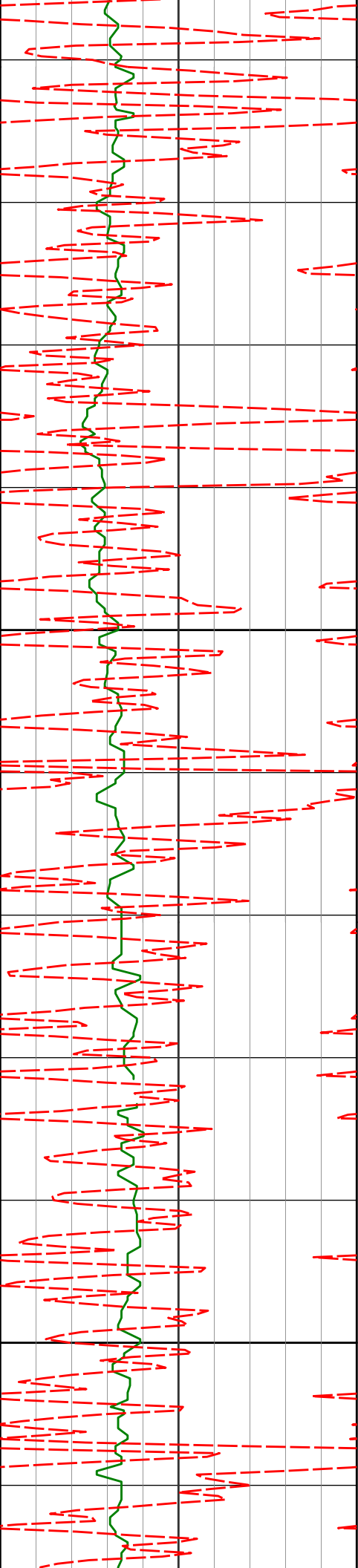
106.97°F

109.09°F

109.09°F

109.09°F





2800

2900

2759'

0.74°

260.61° 2758.90'

9.74'

2853'

0.87°

253.23° 2852.90'

11.03'

115.56°F

115.56°F

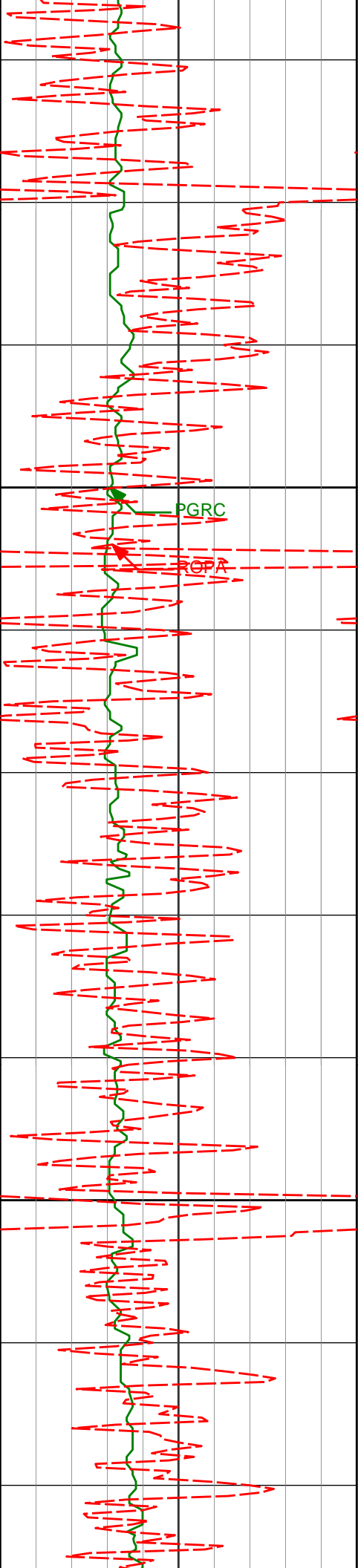
115.56°F

115.56°F

115.56°F

115.56°F

115.56°F



2947'

0.65°

252.98°

2946.89'

12.23'

3000

3042'

0.74°

248.02°

3041.88'

13.32'

3100

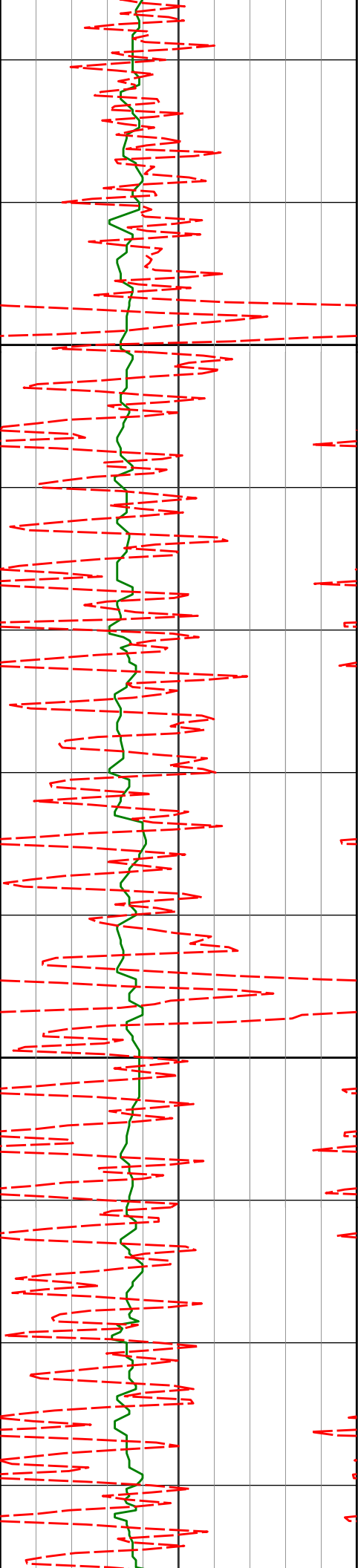
3136'

0.67°

250.24°

3135.87'

14.41'



3200

3300

3231'

0.34°

234.92°

3230.87'

15.16'

122.11°F

122.11°F

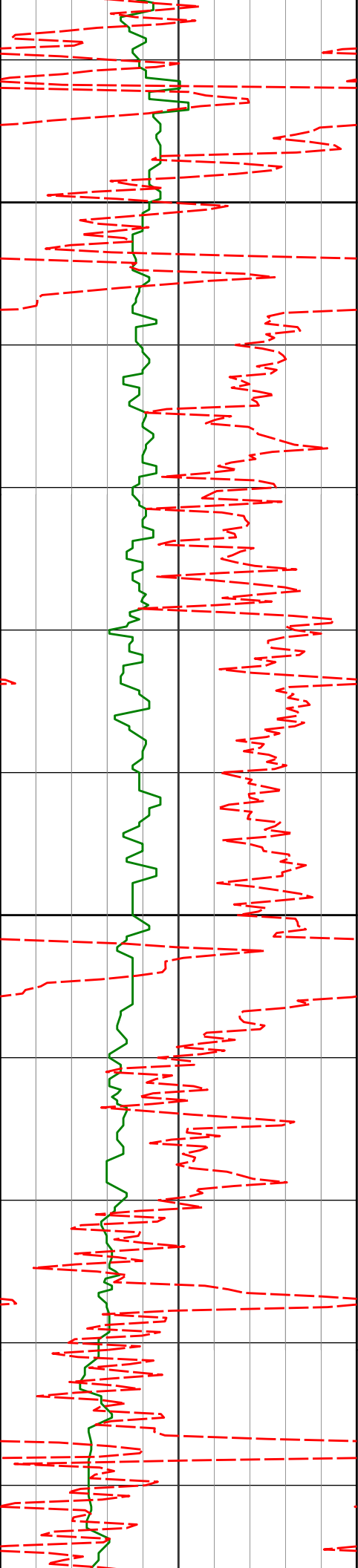
122.11°F

124.30°F

124.30°F

124.30°F

124.30°F



3400

3444'

0.59°

43.00°

3443.87'

14.93'

3500

122.11°F

124.30°F

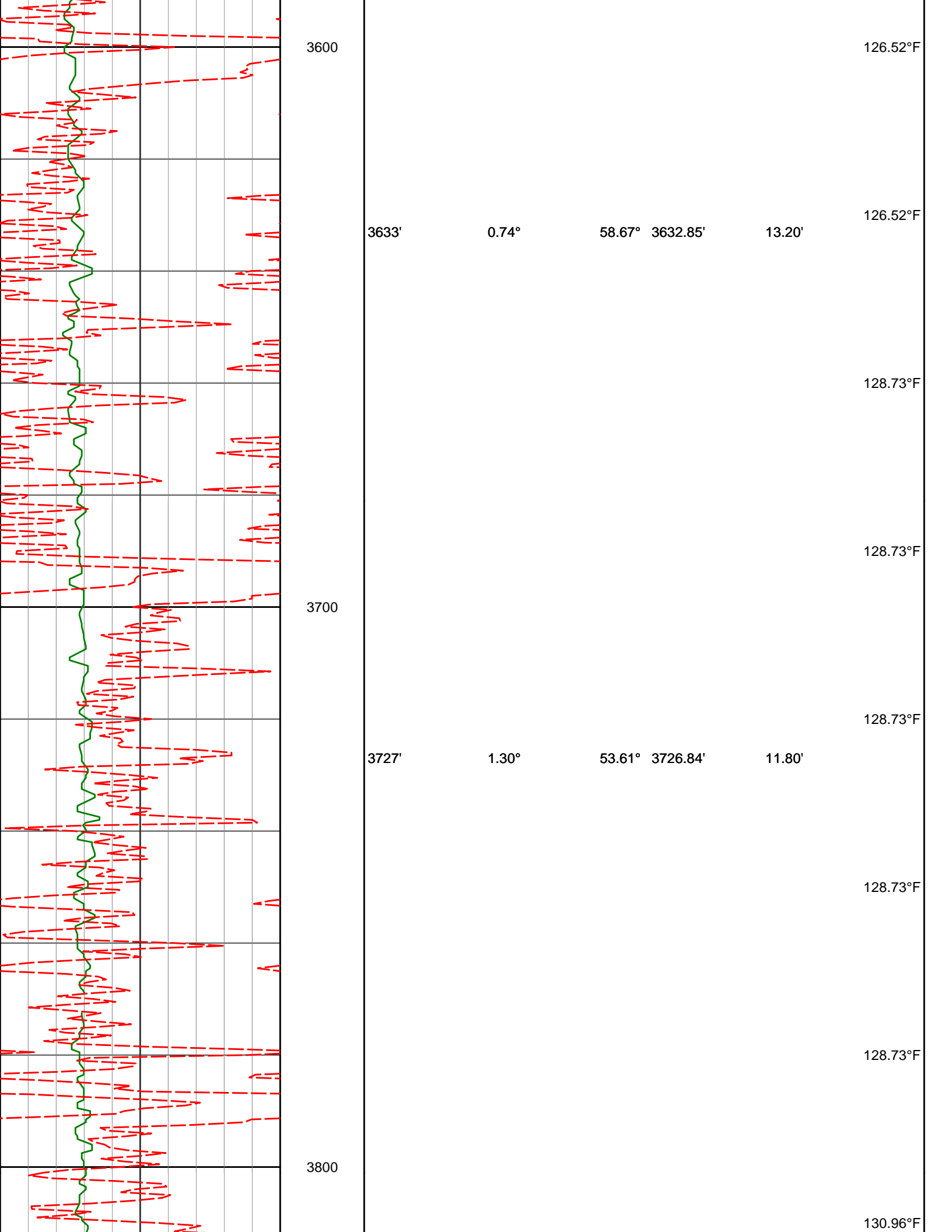
124.30°F

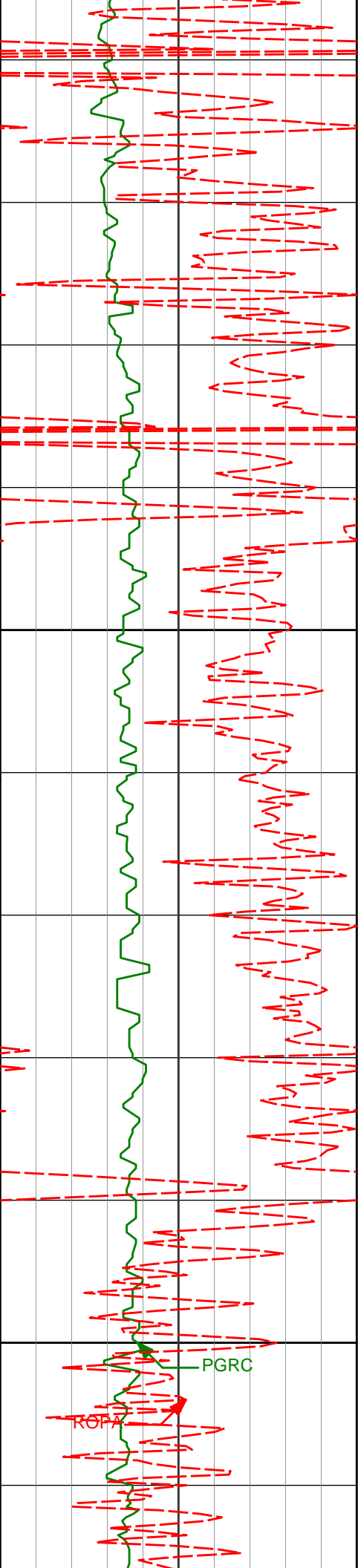
124.30°F

124.30°F

124.30°F

126.52°F





3822'

1.18°

55.25° 3821.82'

10.11'

130.96°F

130.96°F

3900

130.96°F

130.96°F

133.20°F

133.20°F

4000

PGRC

ROPA

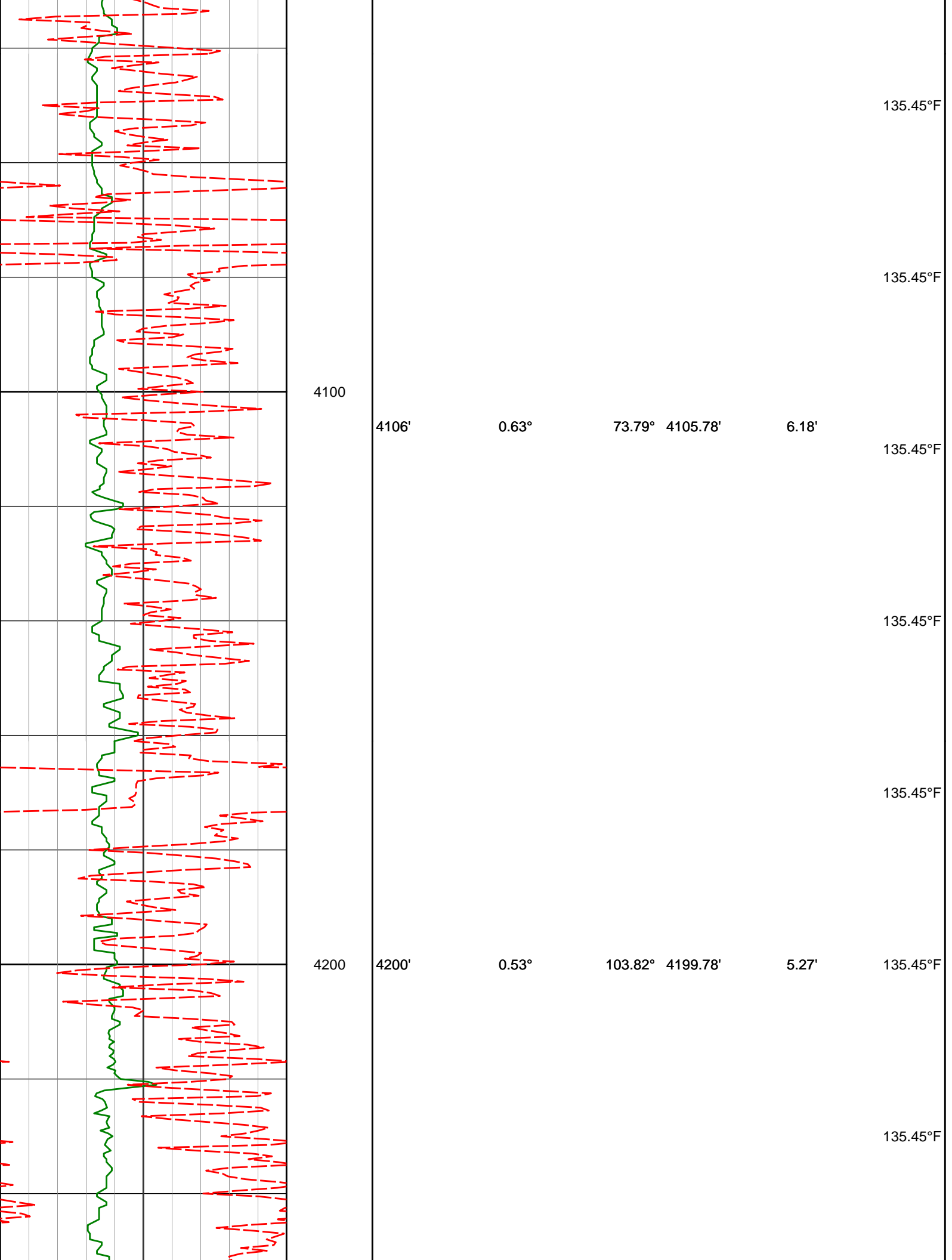
4011'

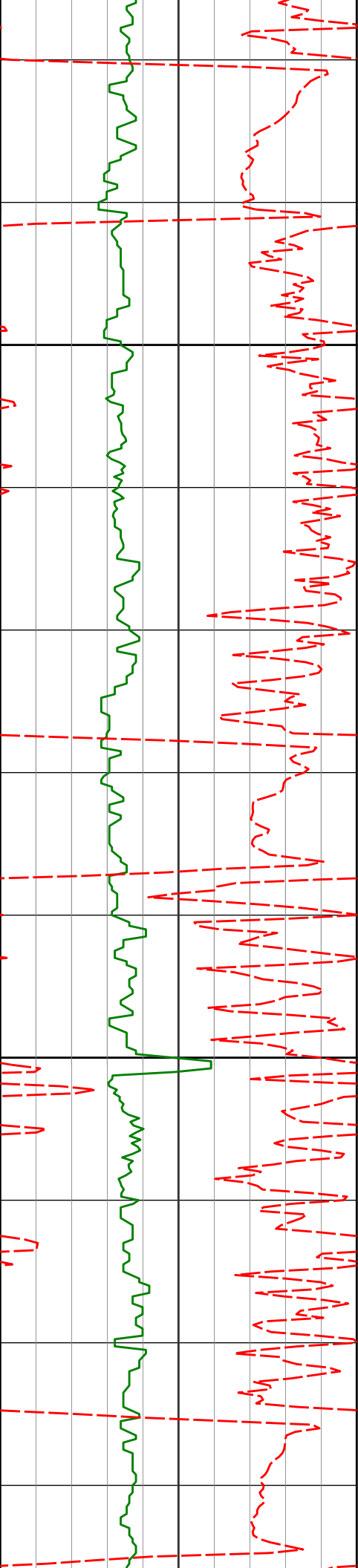
0.75°

74.13° 4010.79'

7.29'

133.20°F





4300

4400

4295'

4389'

3.11°

4.31°

100.23°

94.15°

4294.72'

4388.52'

2.32'

-3.71'

135.45°F

135.45°F

137.70°F

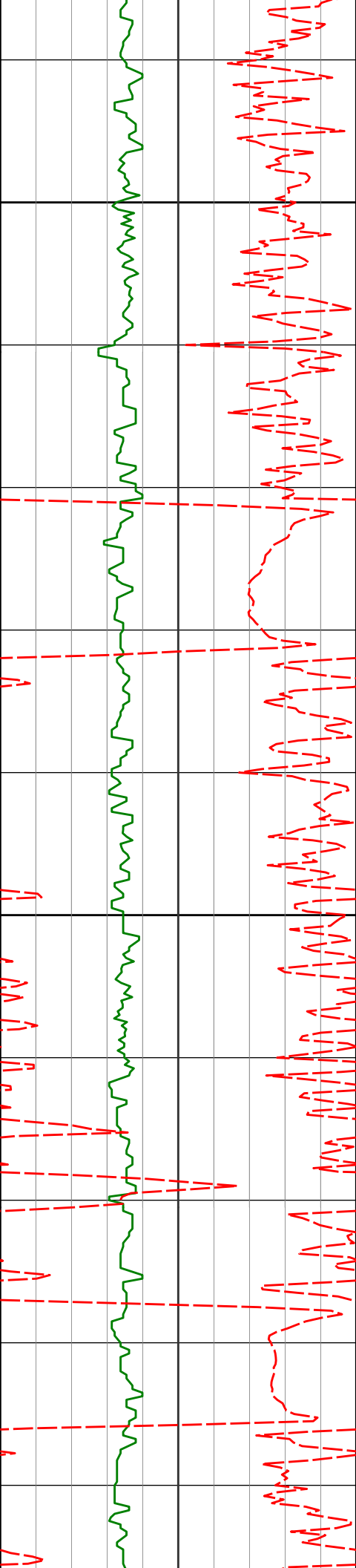
137.70°F

139.96°F

137.70°F

137.70°F

139.96°F



4500

4600

4483'

6.13°

92.64°

4482.13'

-12.24'

139.96°F

139.96°F

142.25°F

4578'

8.14°

93.32°

4576.39'

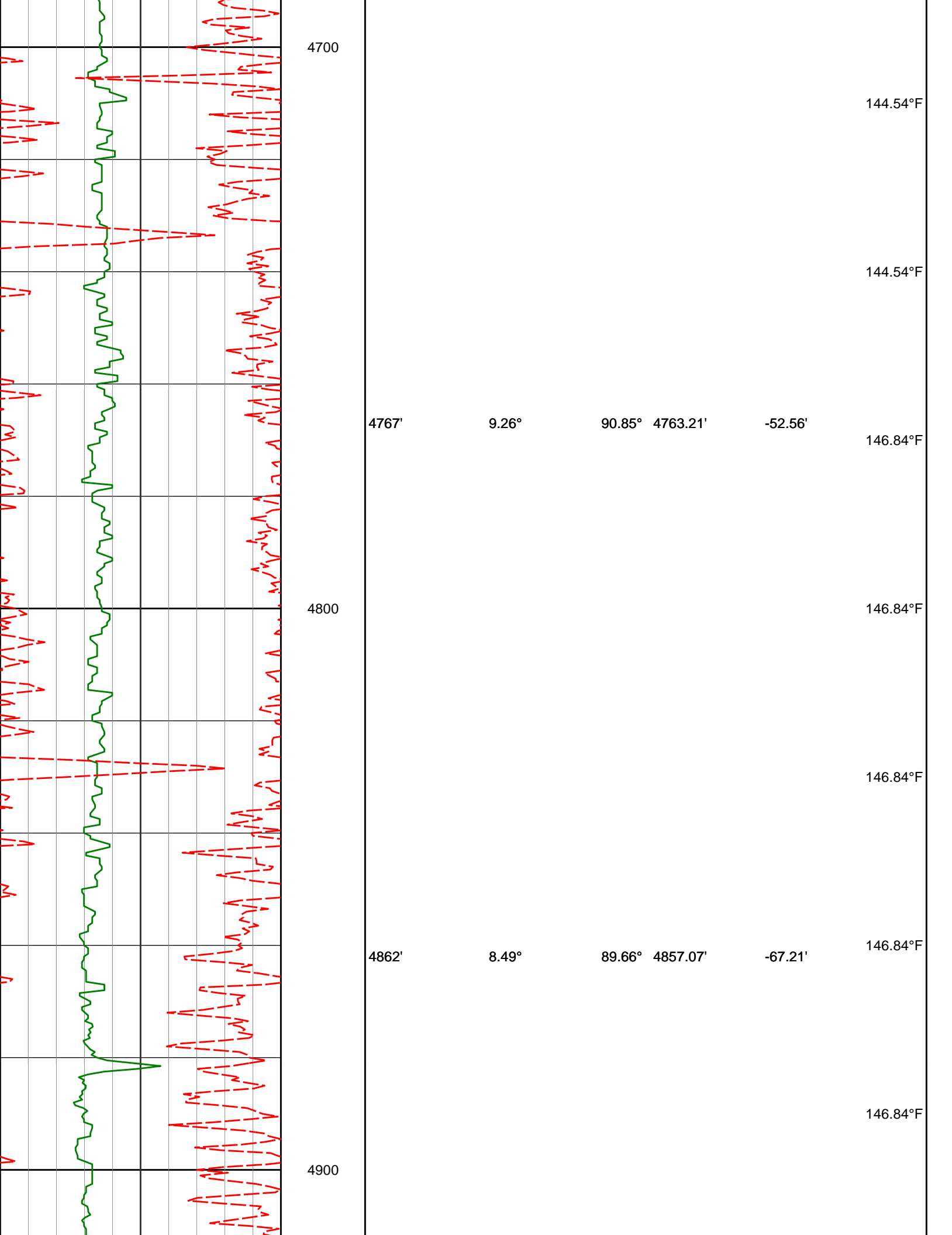
-24.01'

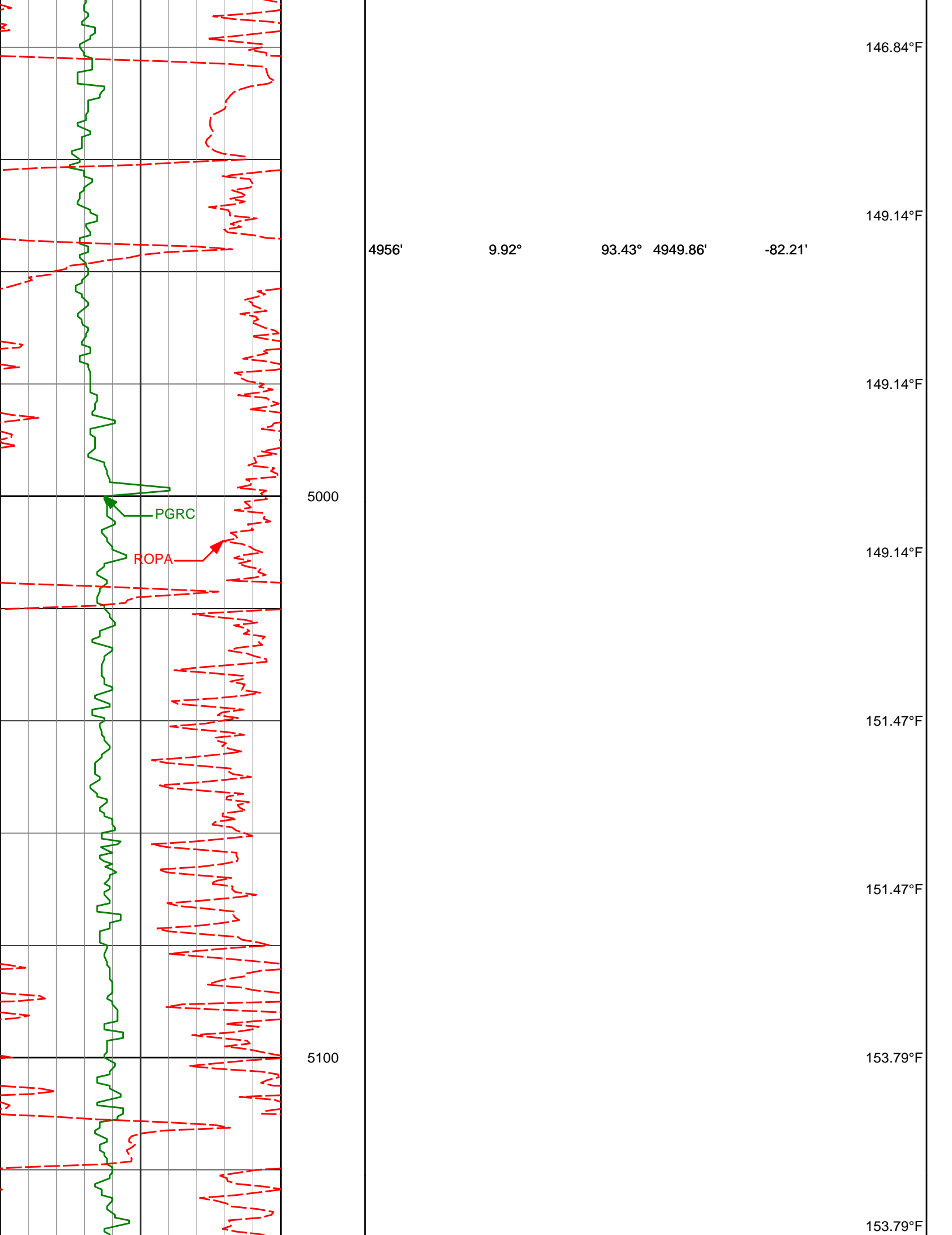
142.25°F

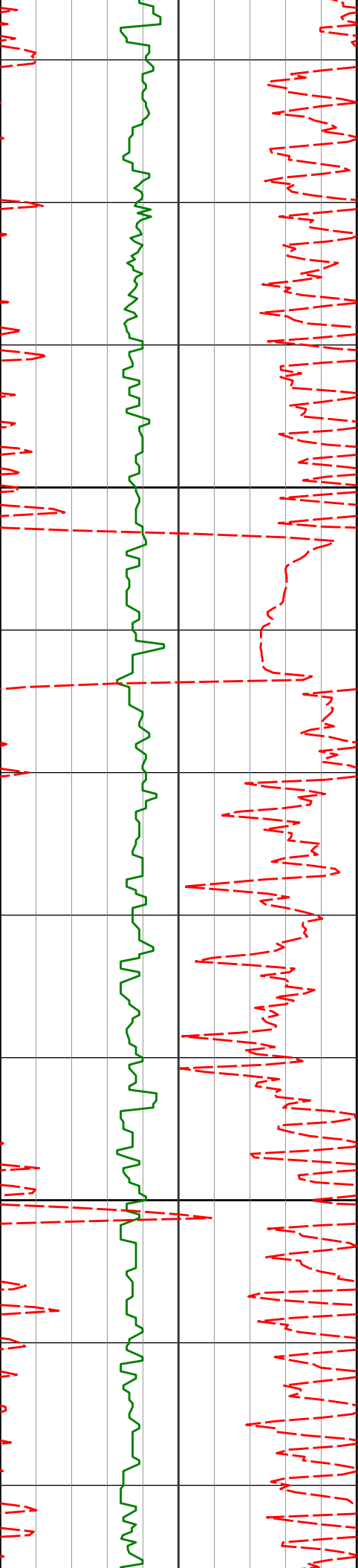
139.96°F

142.25°F

142.25°F







5146'

8.53°

89.82°

5137.40'

-112.61'

151.47°F

153.79°F

5200

153.79°F

5240'

9.91°

92.09°

5230.19'

-127.66'

156.13°F

156.13°F

5300

156.13°F

5335'

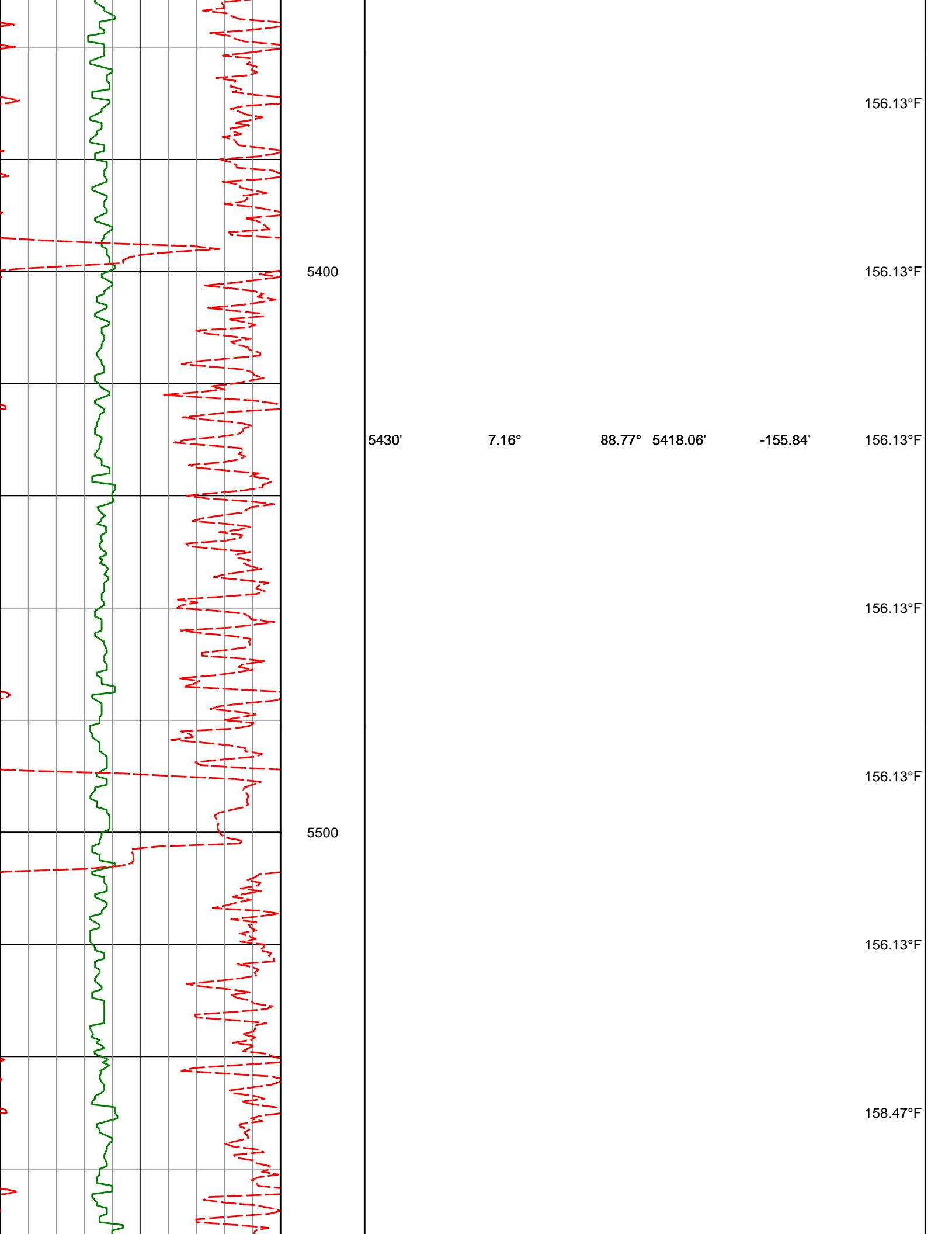
8.54°

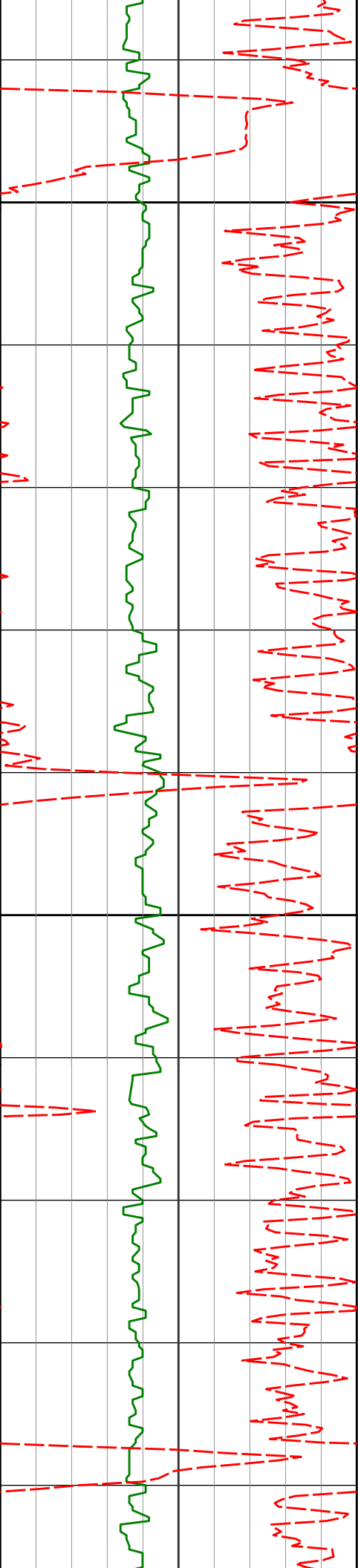
90.69°

5323.96'

-142.87'

156.13°F





5600

5700

5619'

5713'

6.25°

5.26°

84.08°

82.42°

5605.77'

5699.30'

-177.86'

-187.24'

160.83°F

160.83°F

163.20°F

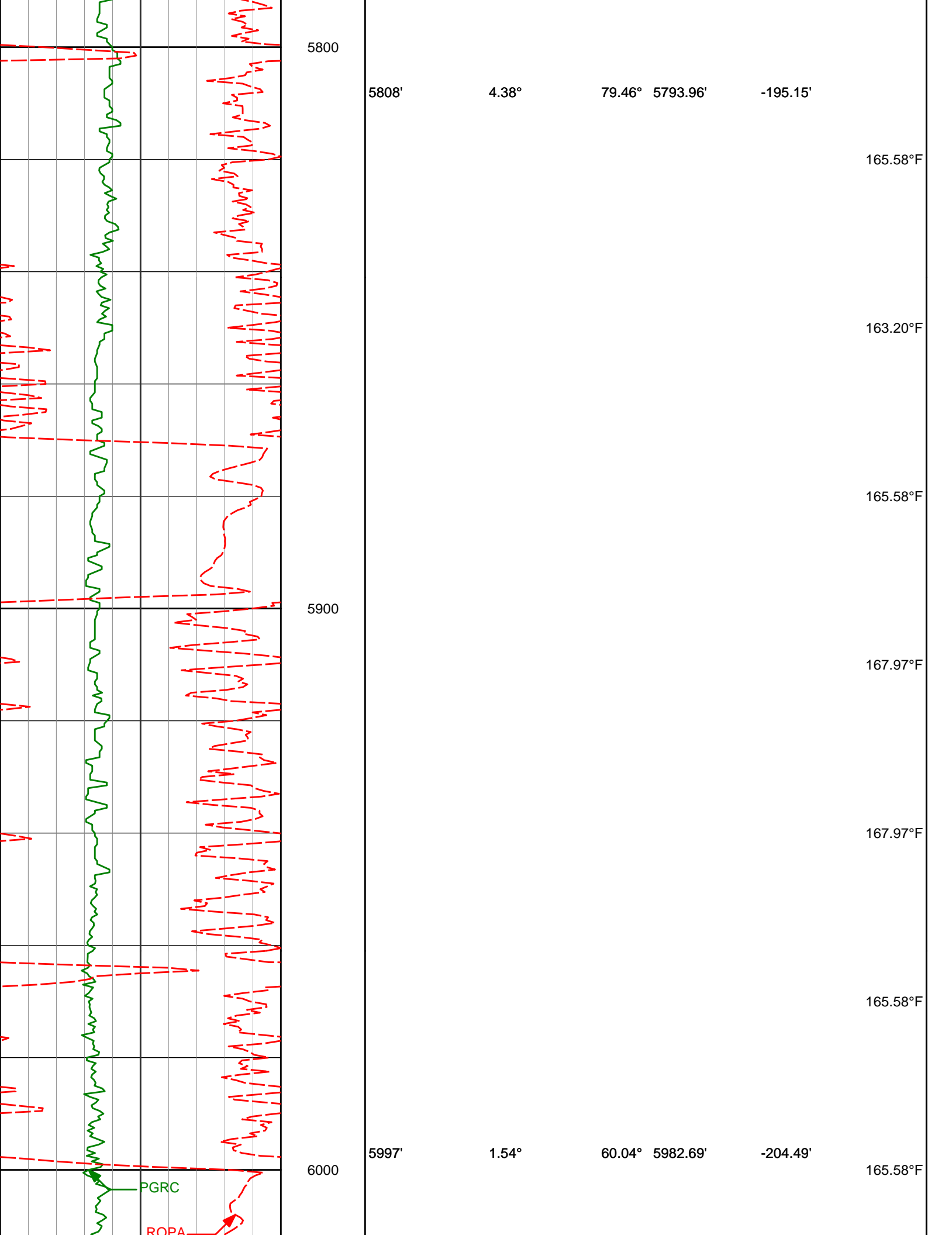
163.20°F

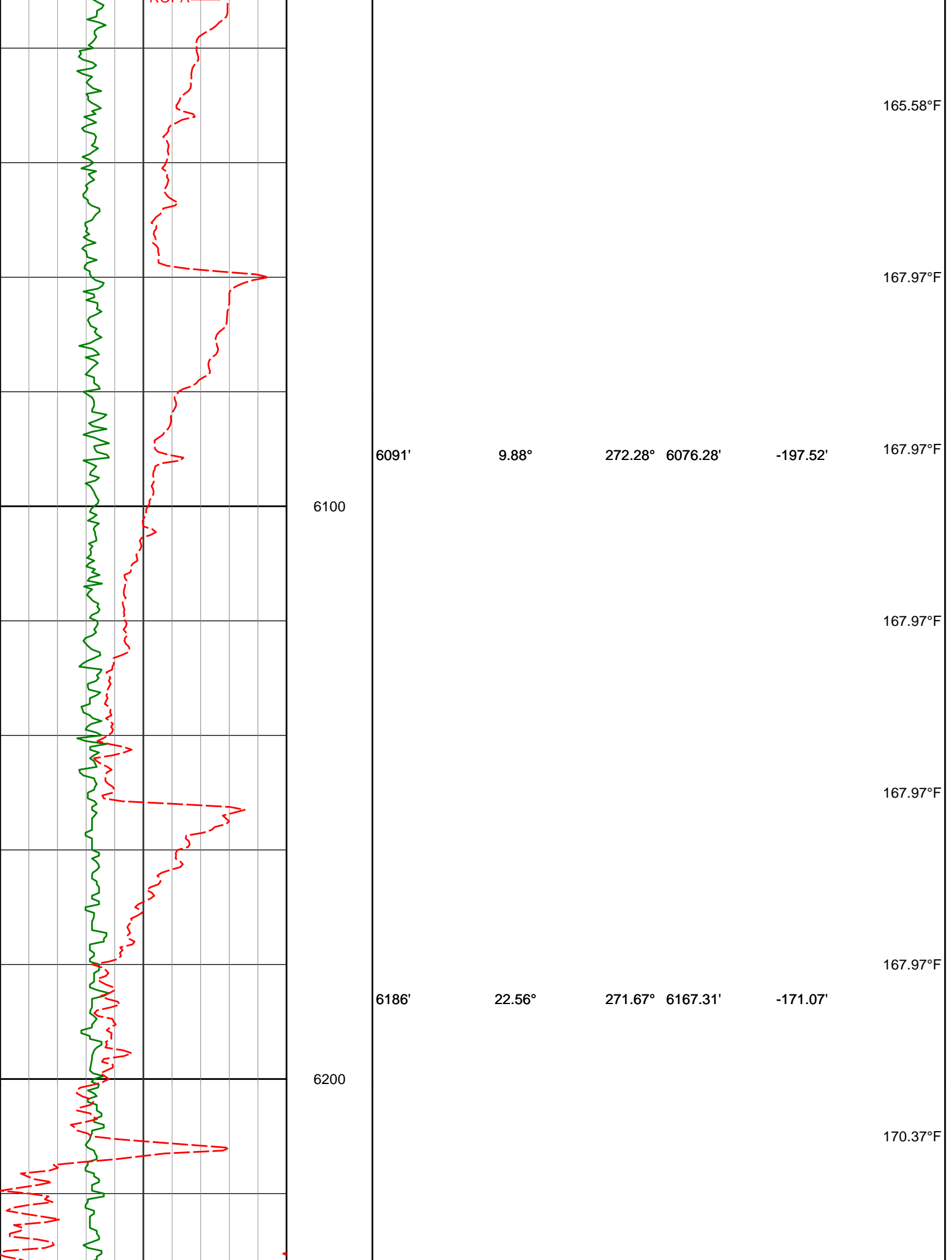
163.20°F

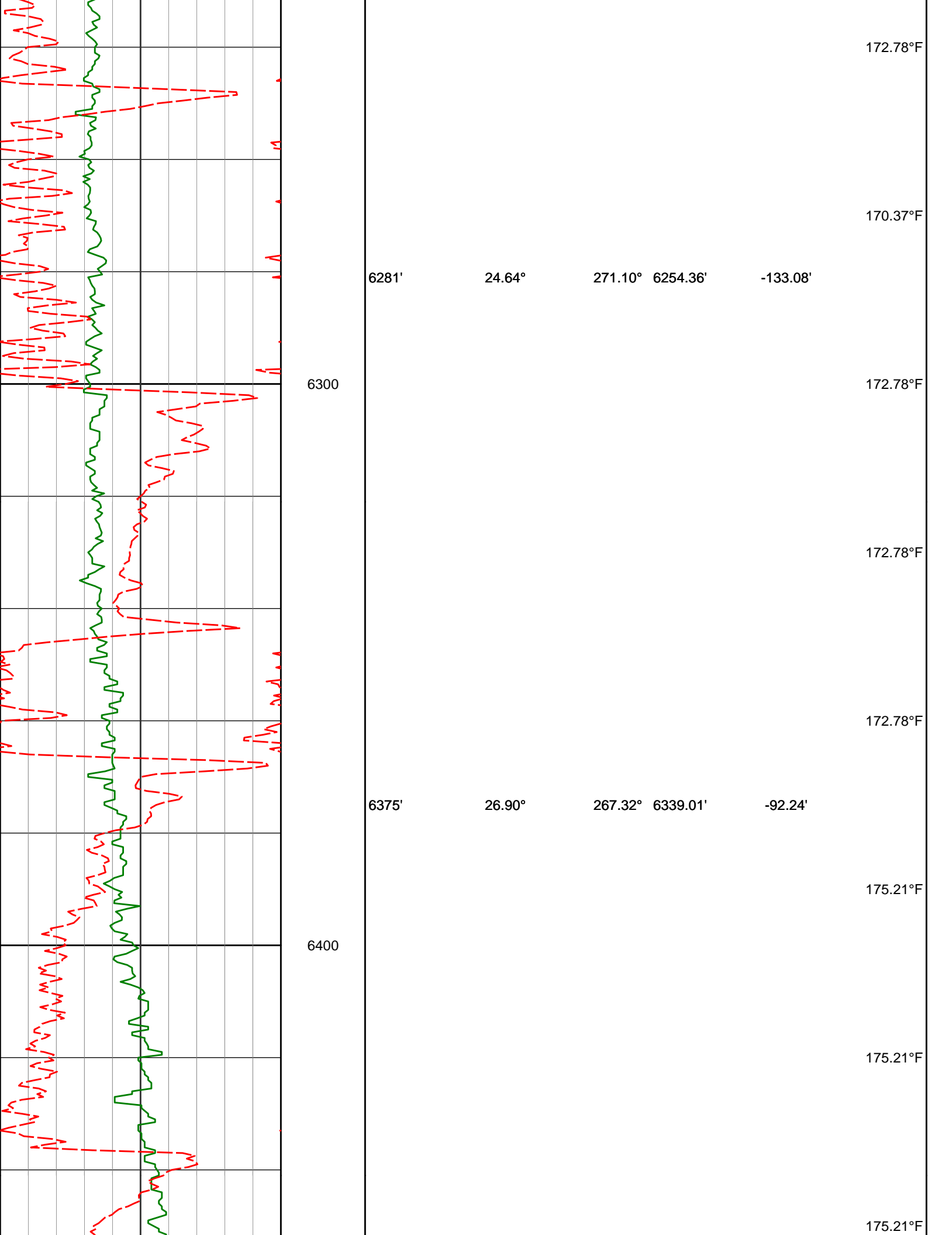
165.58°F

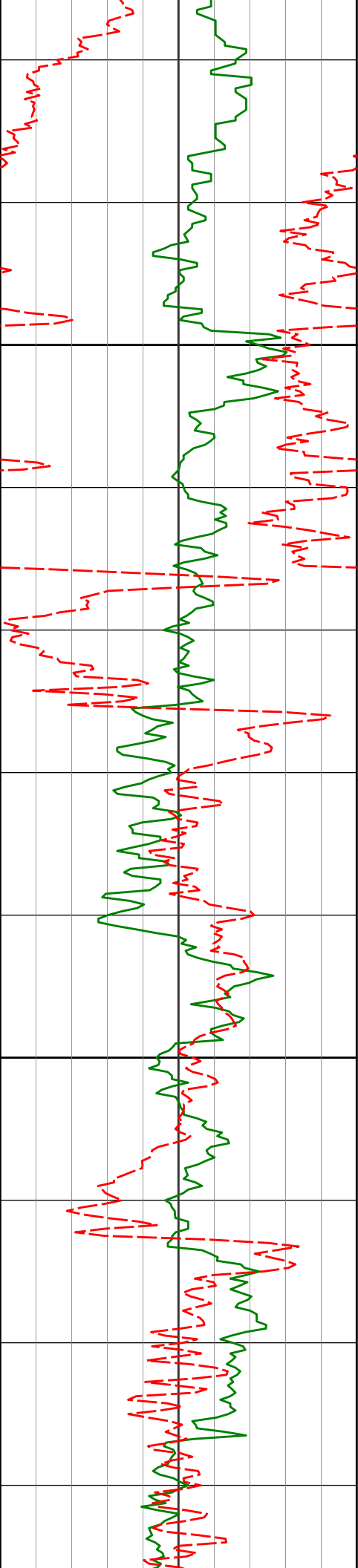
165.58°F

165.58°F









6500

6600

6470'

38.03°

264.01°

6419.05'

-41.44'

175.21°F

175.21°F

177.64°F

6564'

45.94°

268.21°

6488.88'

21.29'

177.64°F

177.64°F

177.64°F

6659'

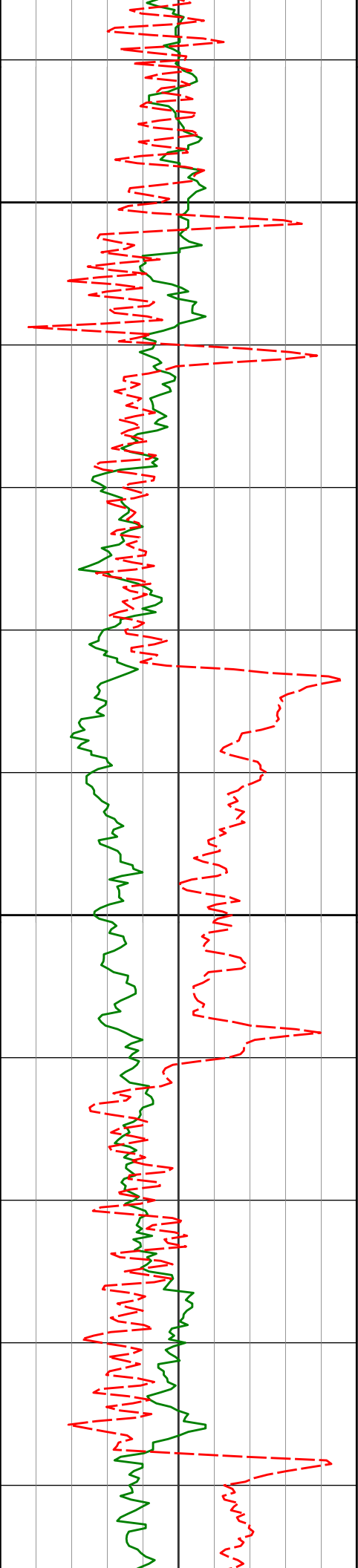
58.62°

270.68°

6546.89'

96.27'

177.64°F



6700

6800

6753'

6848'

64.85°

72.11°

272.87°

270.66°

6591.38'

6626.21'

178.91'

267.12'

180.09°F

180.09°F

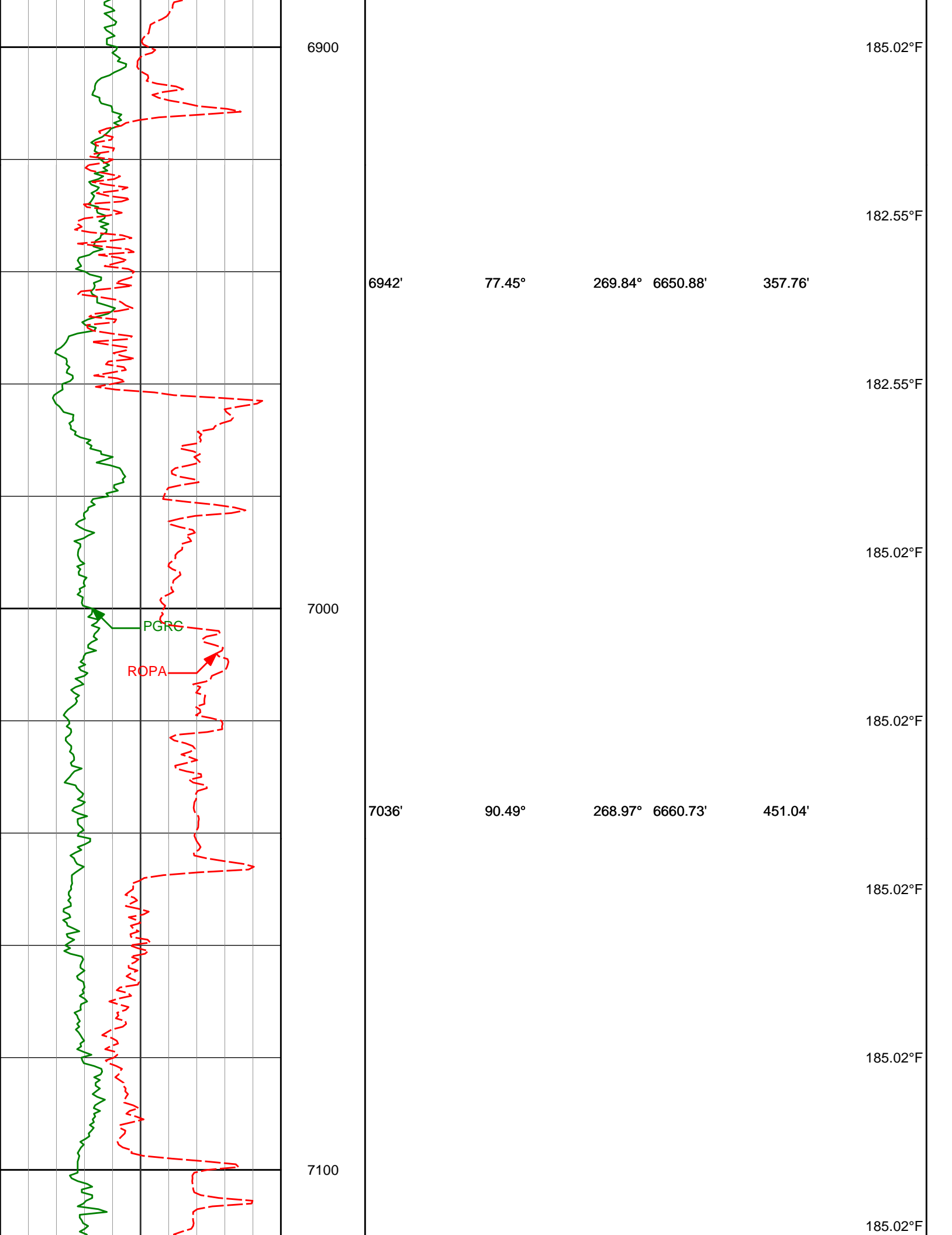
180.09°F

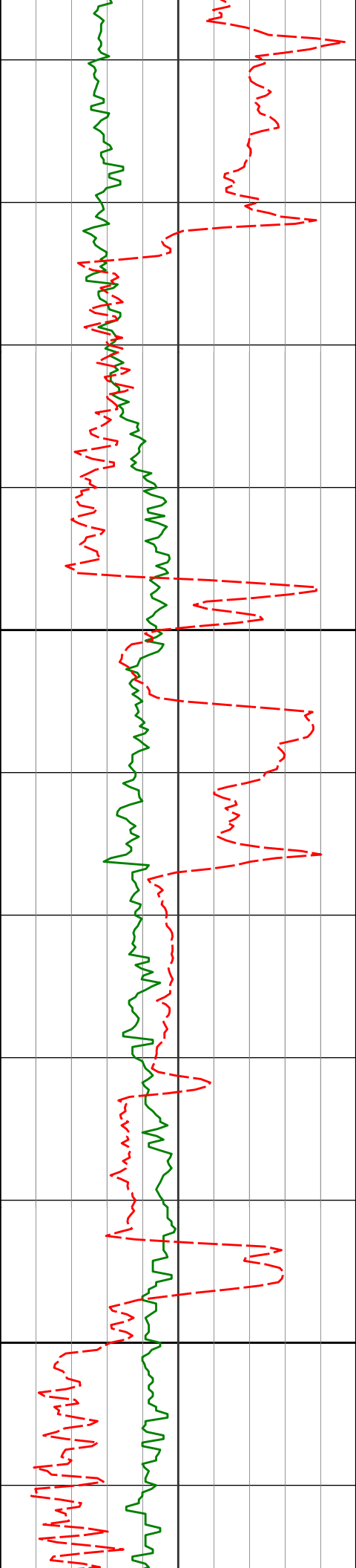
180.09°F

182.55°F

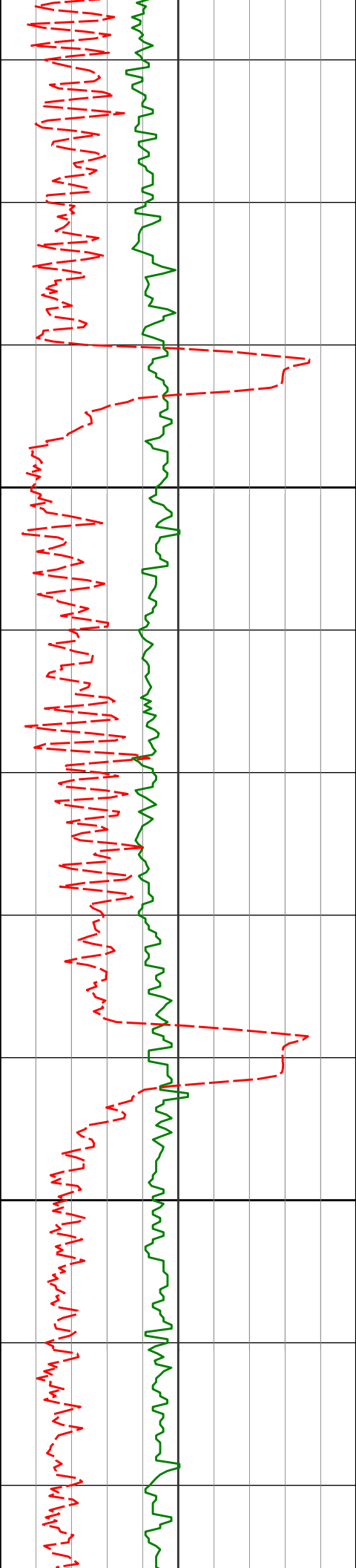
182.55°F

182.55°F





7200	7131'	91.81°	267.53°	6658.83'	546.01'	187.48°F
						189.99°F
7225'						189.99°F
						189.99°F
7300	7320'	89.31°	266.77°	6658.28'	734.88'	192.49°F



7400

7500

7414'

7508'

90.33°

89.19°

267.05° 6658.57'

265.93° 6658.97'

828.82'

922.72'

194.99°F

194.99°F

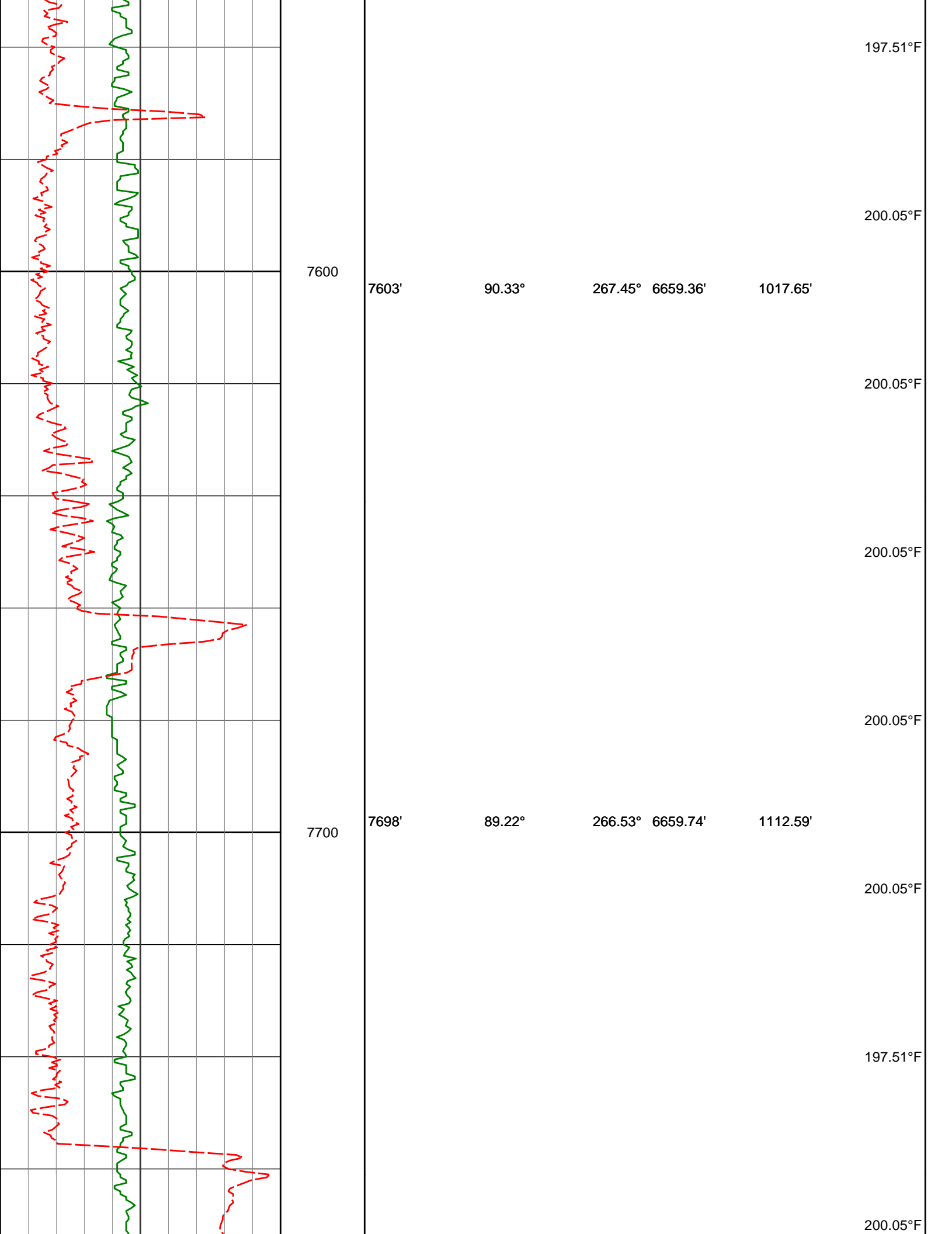
194.99°F

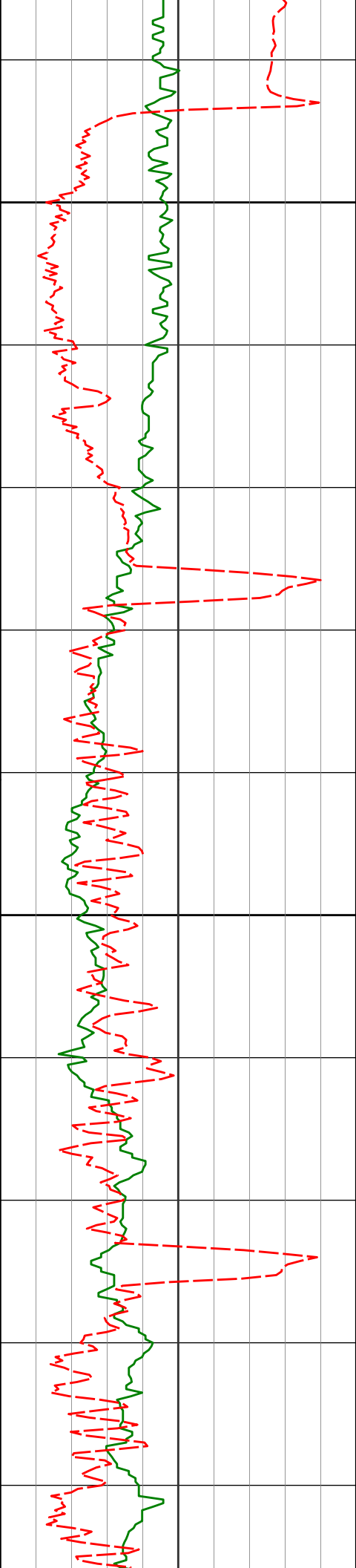
194.99°F

197.51°F

197.51°F

197.51°F





7800

7900

7792'

89.75°

269.79° 6660.58'

1206.56'

200.05°F

202.60°F

202.60°F

7887'

90.05°

269.43° 6660.75'

1301.55'

202.60°F

205.16°F

205.16°F

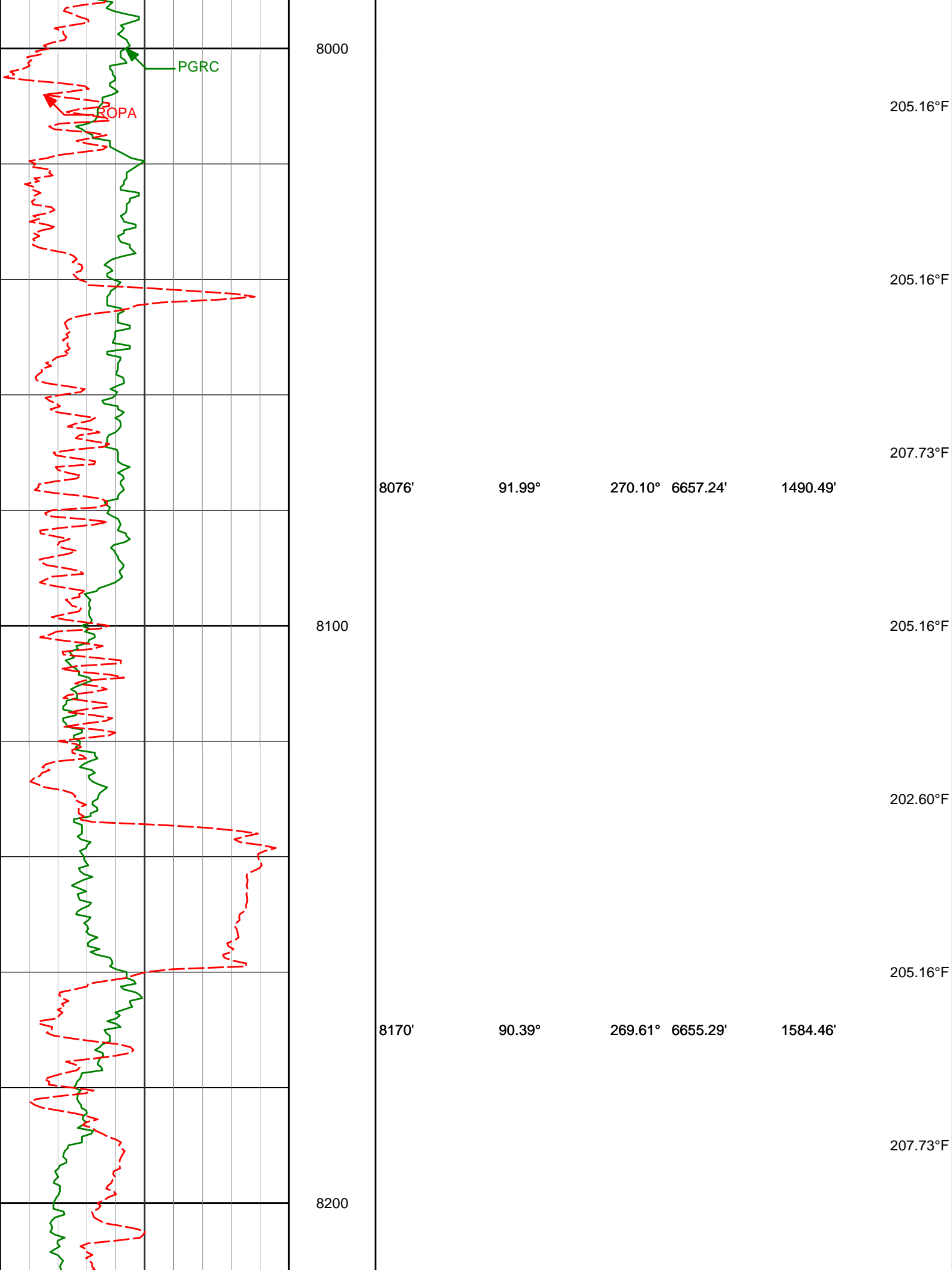
7981'

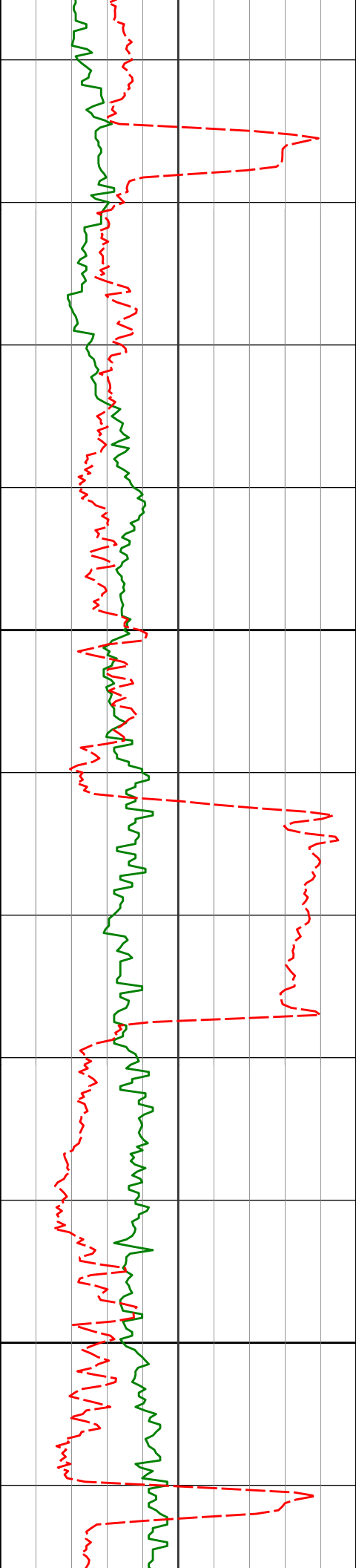
91.10°

269.72° 6659.81'

1395.54'

205.16°F





8300

8400

8265'

91.59°

269.39°

6653.65'

1679.44'

8360'

89.68°

270.14°

6652.60'

1774.42'

207.73°F

207.73°F

207.73°F

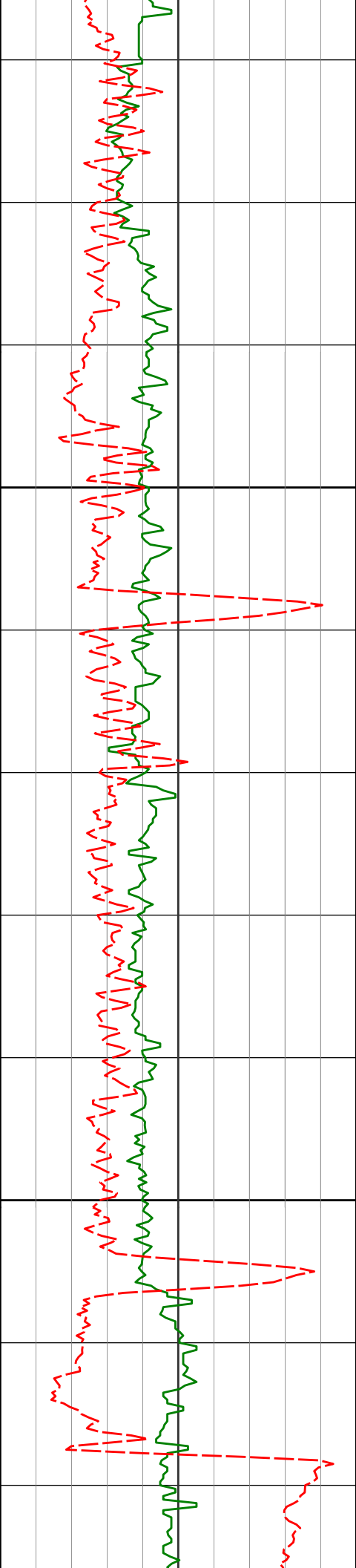
205.16°F

207.73°F

207.73°F

210.31°F

210.31°F



8500

8600

8454'

90.08°

269.84°

6652.79'

1868.40'

210.31°F

212.92°F

212.92°F

8549'

90.61°

269.50°

6652.22'

1963.39'

212.92°F

212.92°F

210.31°F

210.31°F

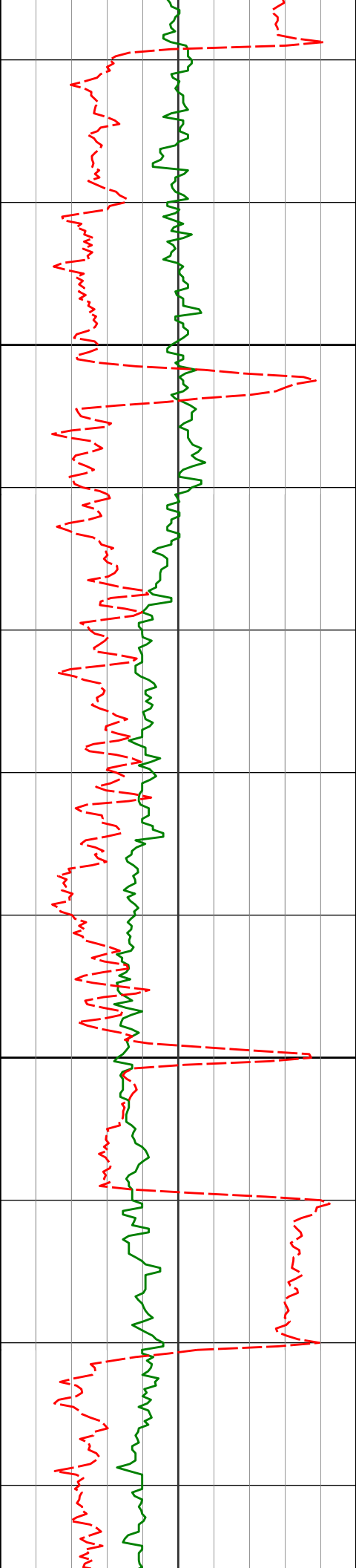
8644'

90.36°

269.60°

6651.42'

2058.38'



8700

8800

8738'

8833'

89.71°

88.97°

269.67°

269.62°

6651.36'

6652.46'

2152.38'

2247.36'

212.92°F

212.92°F

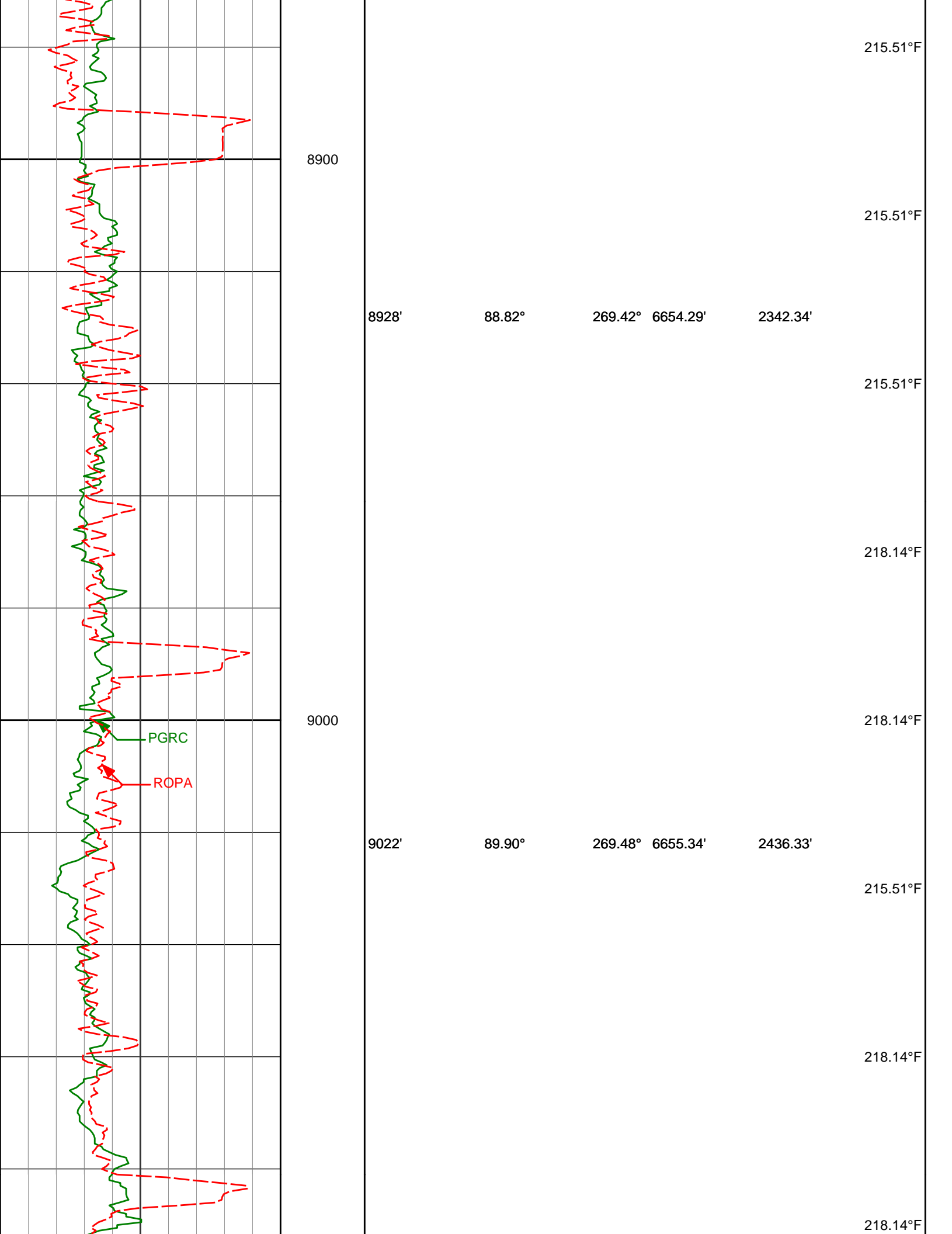
215.51°F

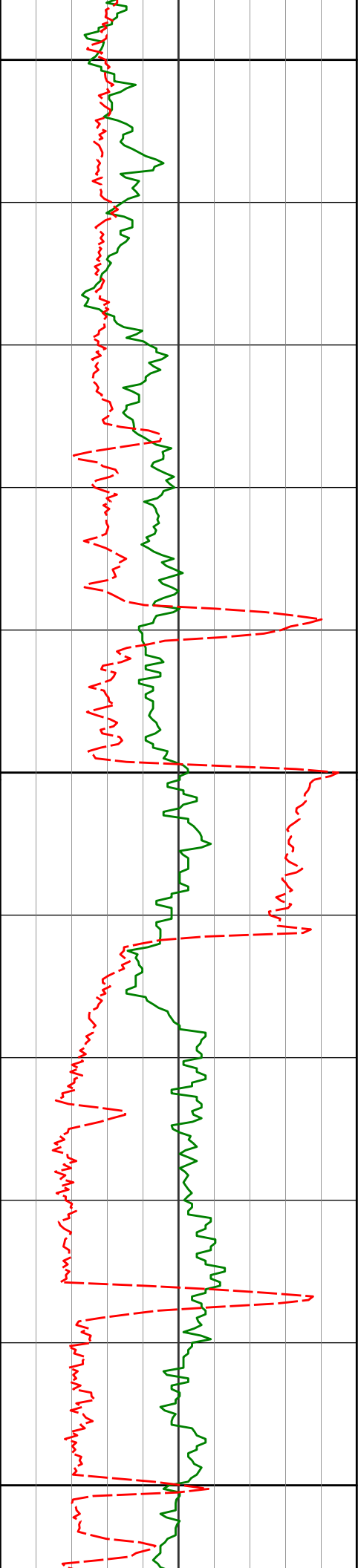
212.92°F

212.92°F

212.92°F

215.51°F





9100

9117'

91.16°

269.63°

6654.46'

2531.32'

220.77°F

218.14°F

215.51°F

9200

9211'

90.73°

269.15°

6652.91'

2625.30'

218.14°F

218.14°F

218.14°F

9300

9306'

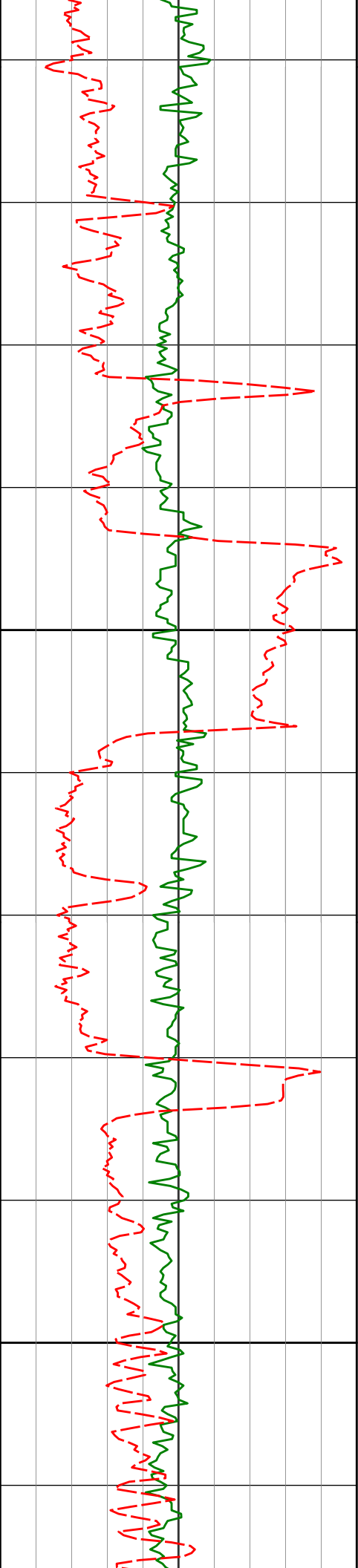
90.73°

268.08°

6651.70'

2720.29'

220.77°F



9400

9400'

90.02°

268.25°

6651.08'

2814.28'

218.14°F

218.14°F

218.14°F

218.14°F

220.77°F

220.77°F

9500

9495'

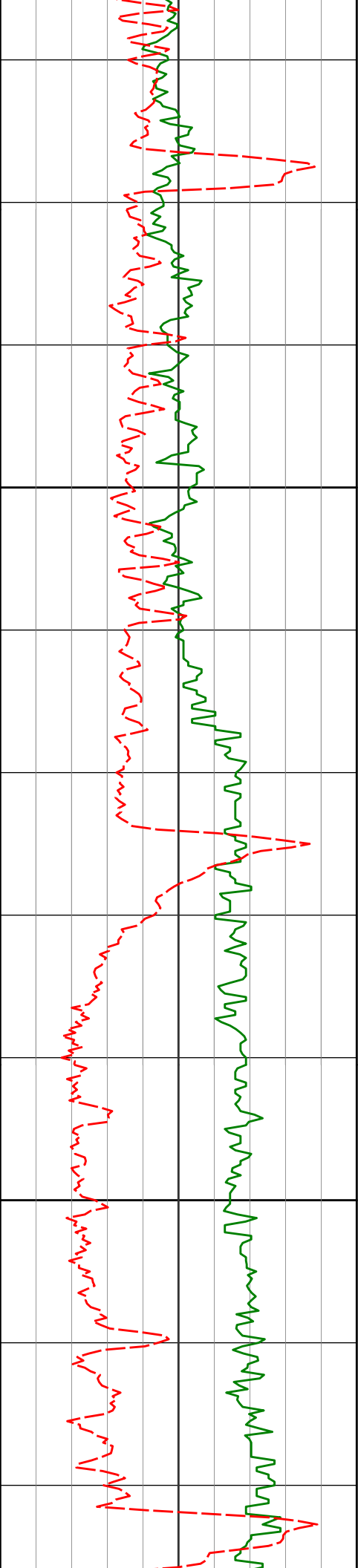
88.95°

267.39°

6651.94'

2909.25'

220.77°F



9600

9700

9590'

90.24°

267.97°

6652.61'

3004.23'

9684'

91.10°

267.95°

6651.51'

3098.21'

223.41°F

223.41°F

223.41°F

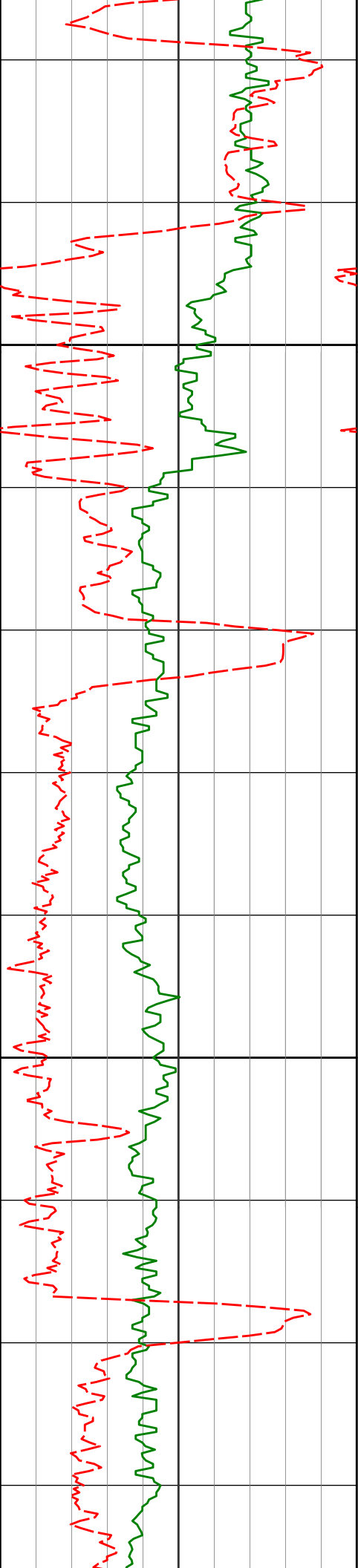
223.41°F

223.41°F

226.08°F

223.41°F

223.41°F



9779'

89.56°

267.70°

6650.96'

3193.18'

223.41°F

9800

223.41°F

223.41°F

226.08°F

9900

226.08°F

226.08°F

226.08°F

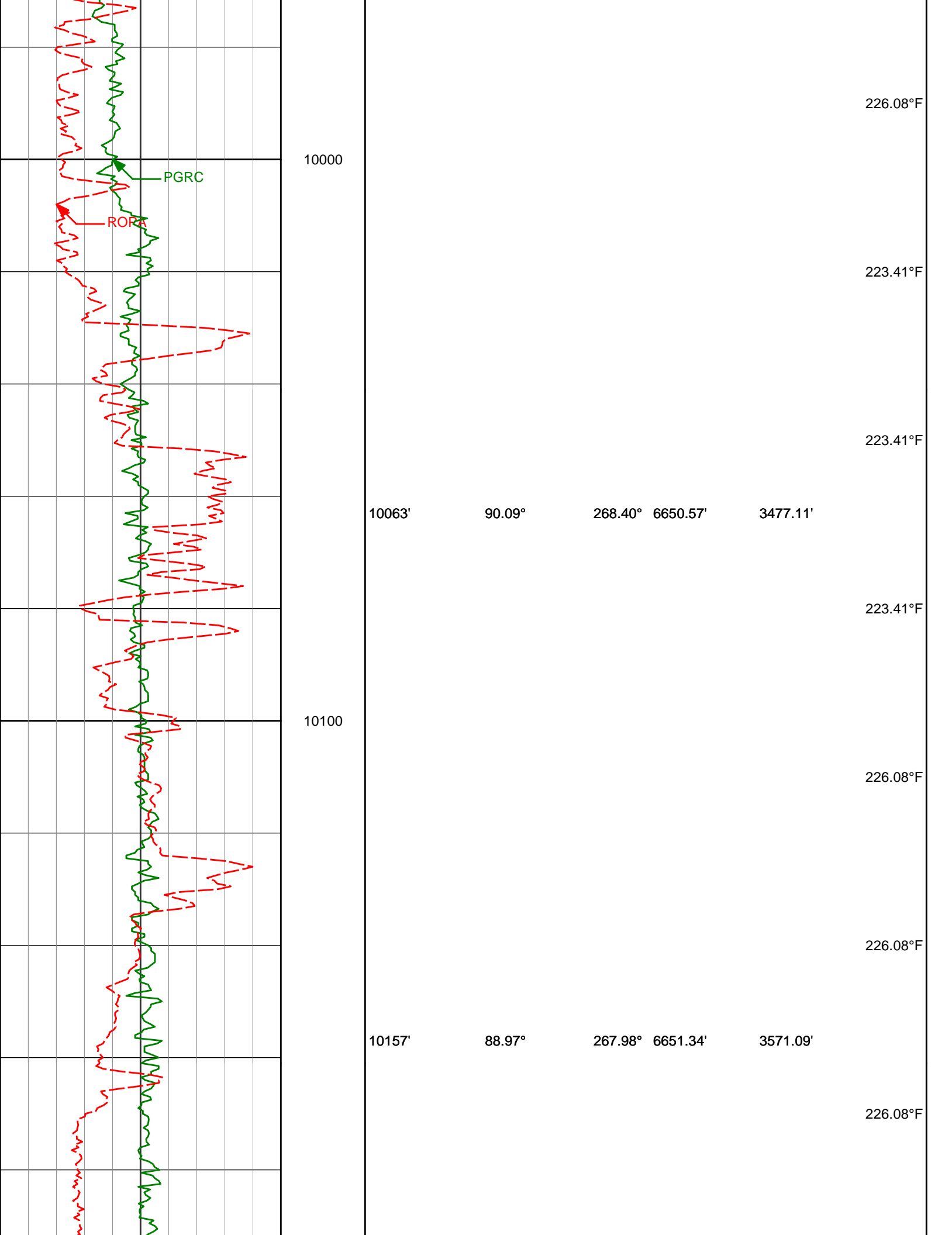
9968'

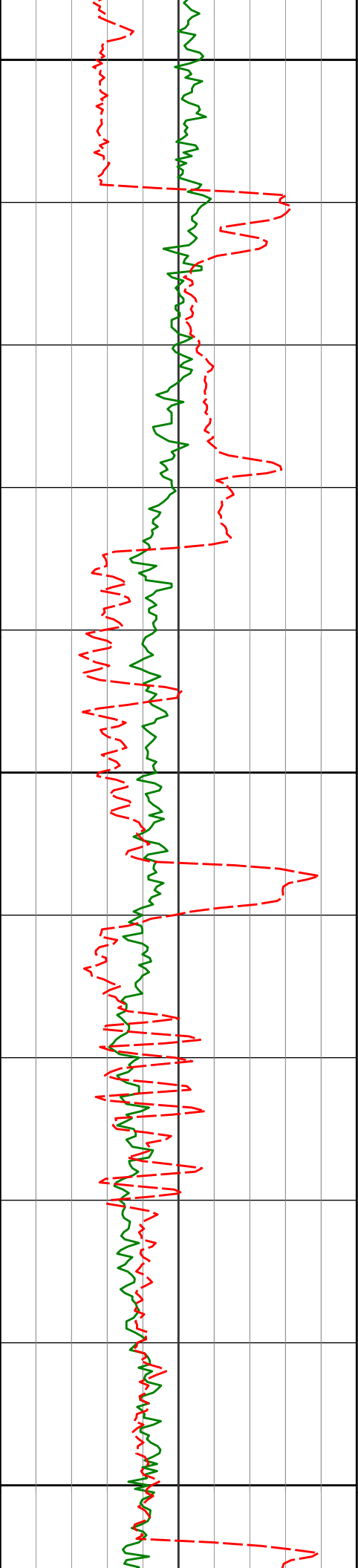
90.42°

267.42°

6651.00'

3382.12'





10200

10300

10400

10252'

89.93°

268.48°

6652.26'

3666.08'

226.08°F

226.08°F

226.08°F

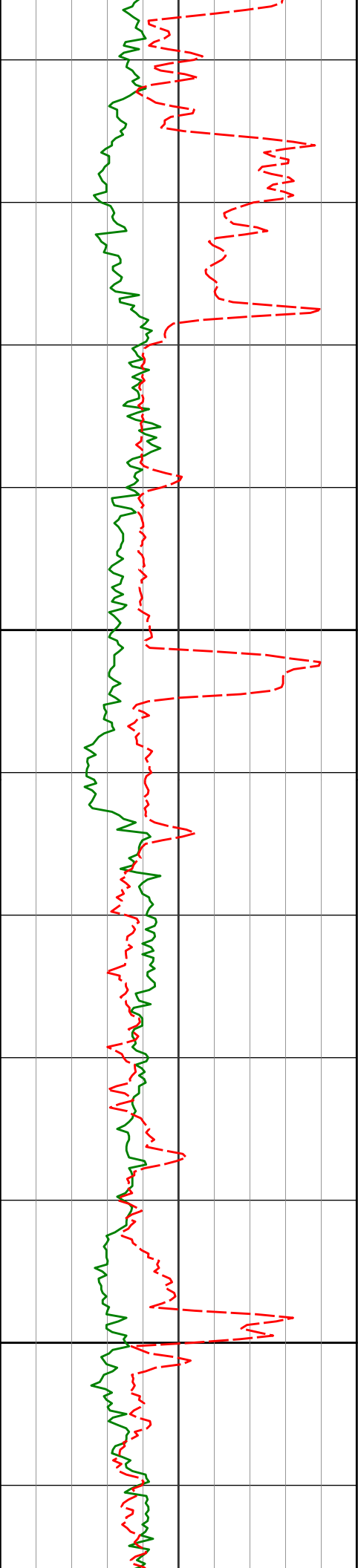
226.08°F

228.74°F

228.74°F

226.08°F

226.08°F



10441'

90.27°

268.68°

6651.93'

3855.08'

226.08°F

226.08°F

10500

226.08°F

10535'

89.65°

268.28°

6651.99'

3949.07'

228.74°F

228.74°F

10600

228.74°F

228.74°F

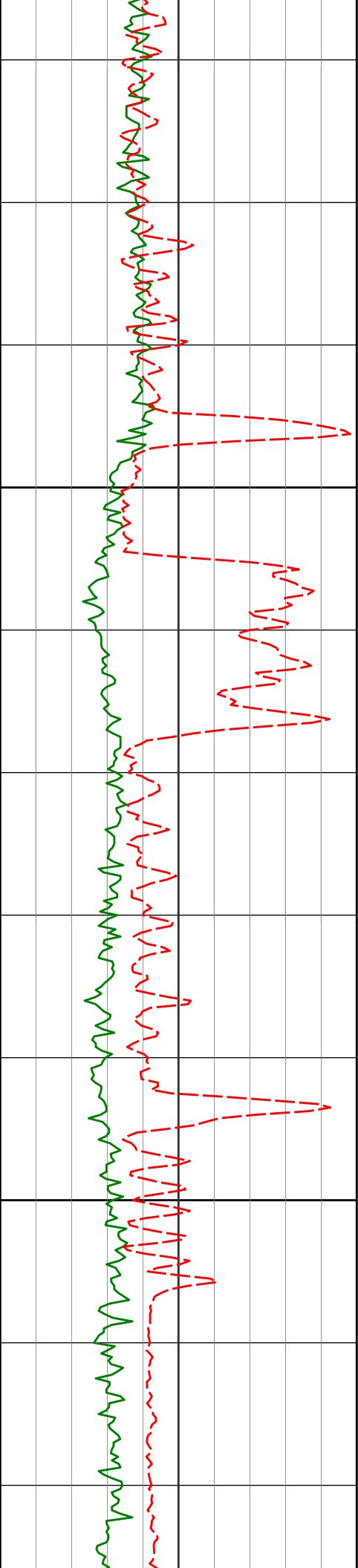
10630'

90.73°

268.45°

6651.68'

4044.07'



10700

10800

10724'

10819'

90.45°

90.30°

269.56°

269.81°

6650.71'

6650.09'

4138.06'

4233.05'

228.74°F

226.08°F

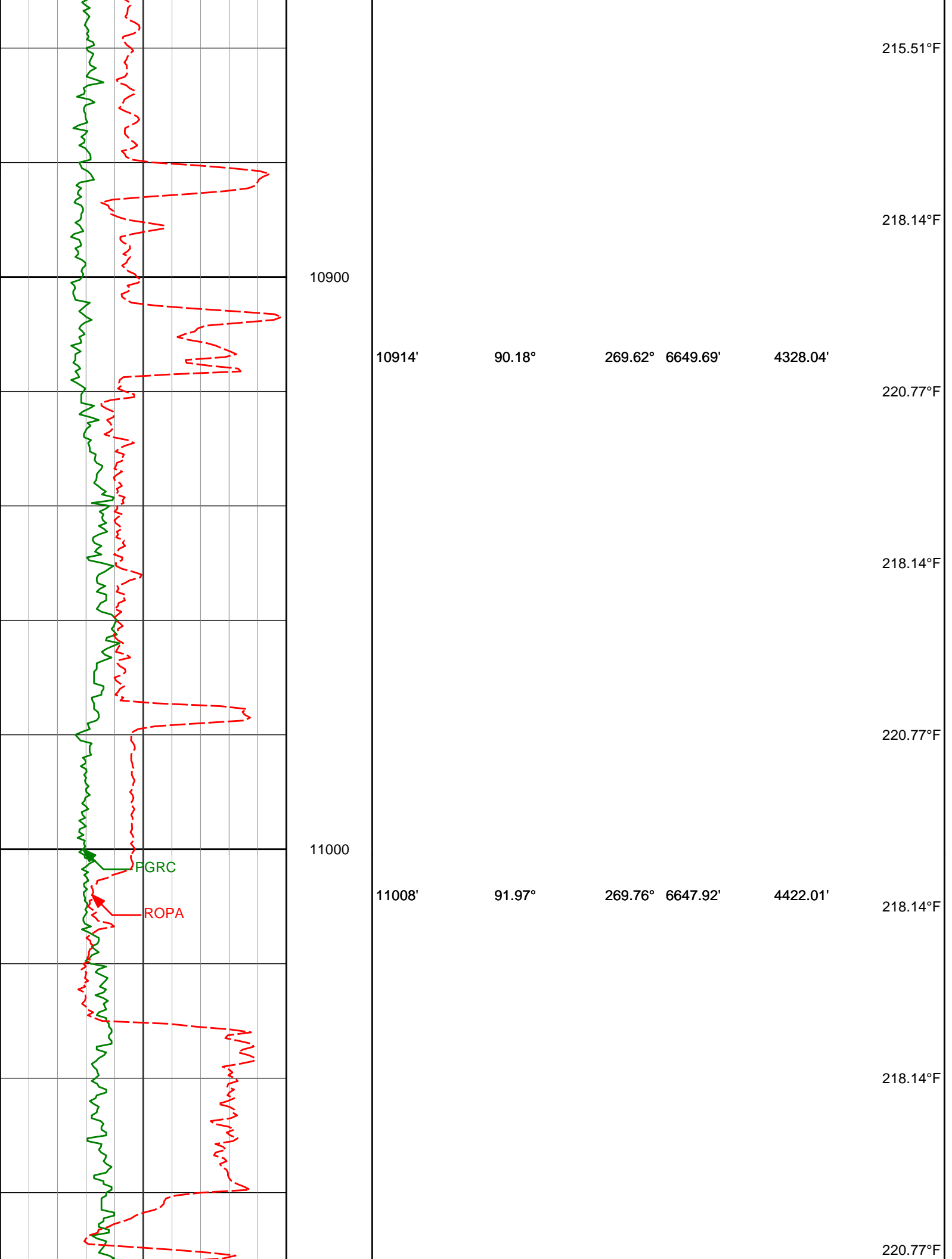
226.08°F

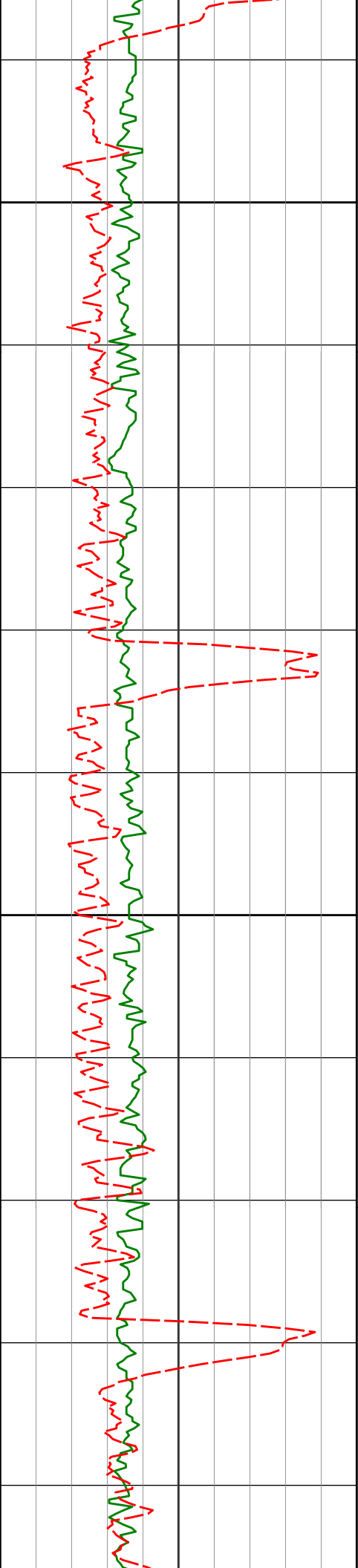
226.08°F

228.74°F

228.74°F

223.41°F





11100

11103'

89.28°

268.29°

6646.89'

4516.99'

223.41°F

223.41°F

226.08°F

226.08°F

11200

11198'

89.75°

268.33°

6647.69'

4611.98'

226.08°F

228.74°F

228.74°F

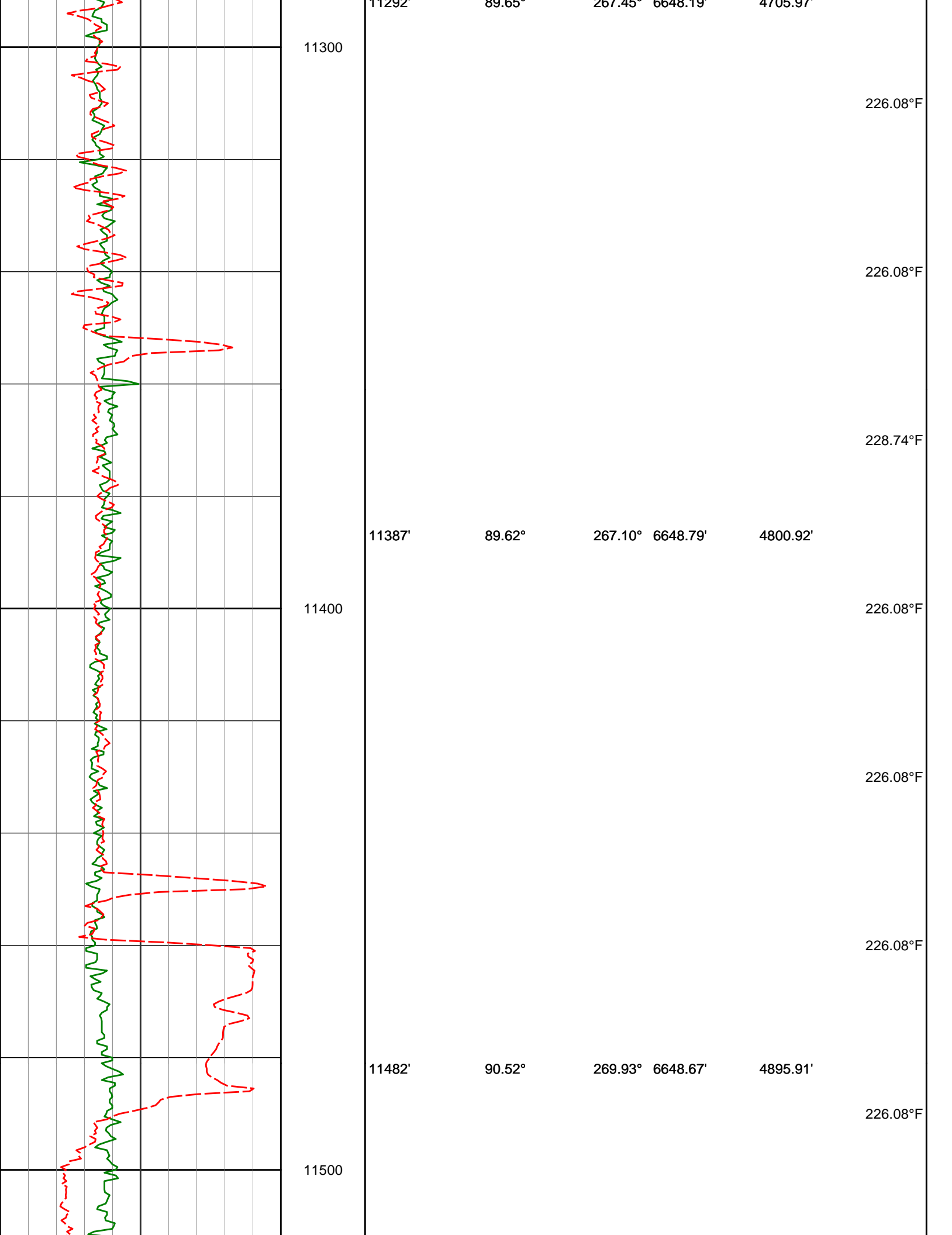
11200'

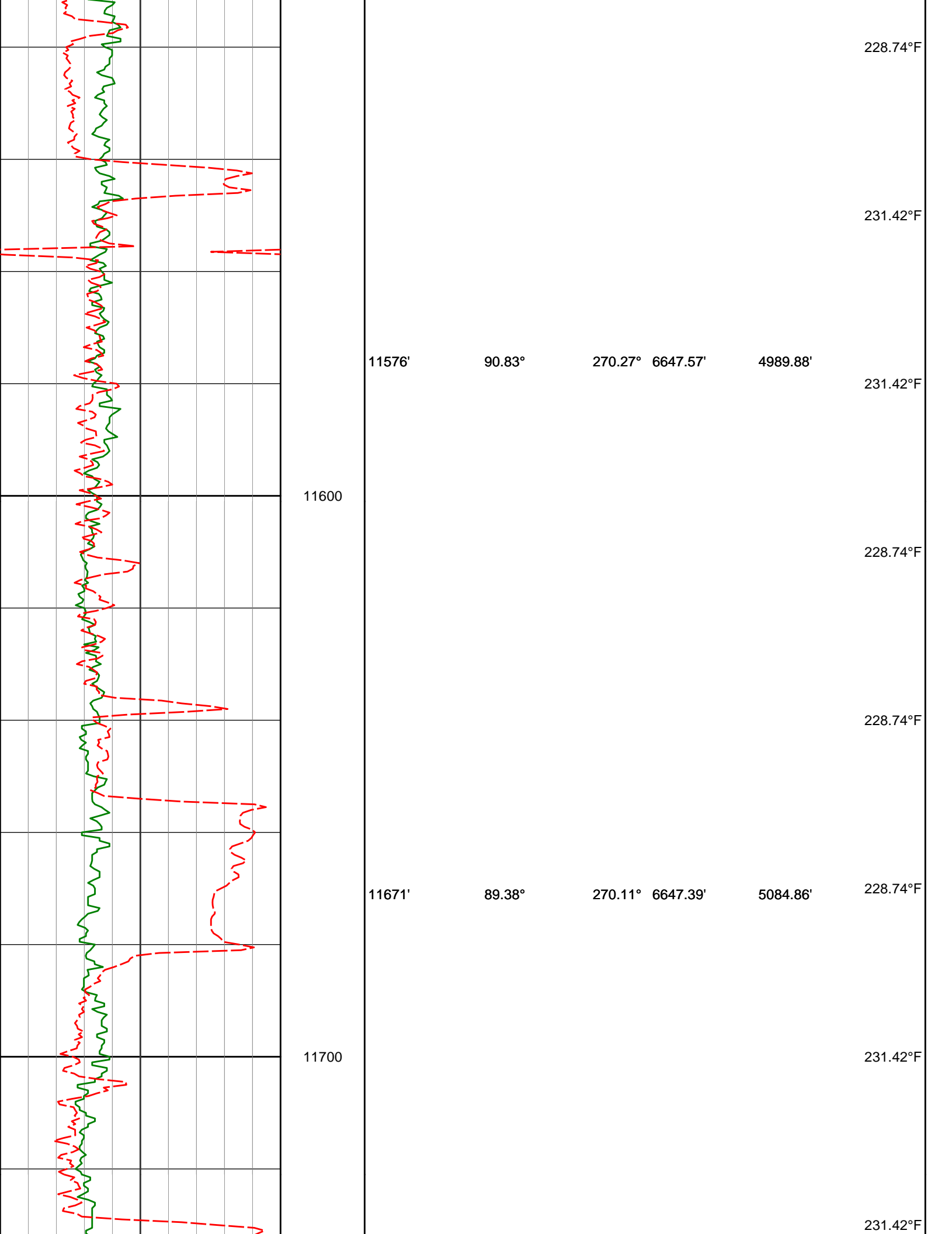
89.25°

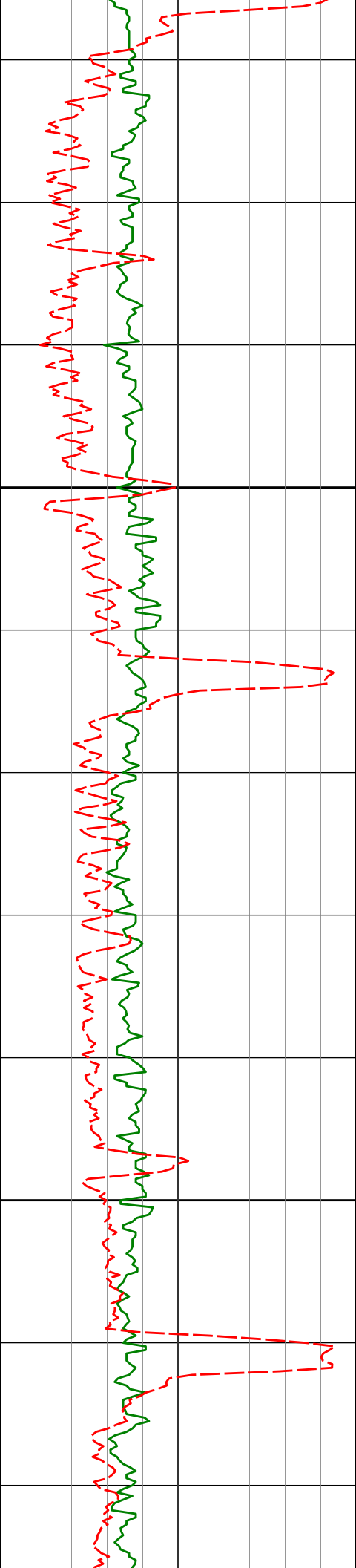
267.45°

6648.40'

4705.07'







11800

11900

11766'

89.10°

269.56°

6648.65'

5179.84'

11860'

89.53°

269.53°

6649.78'

5273.83'

234.12°F

231.42°F

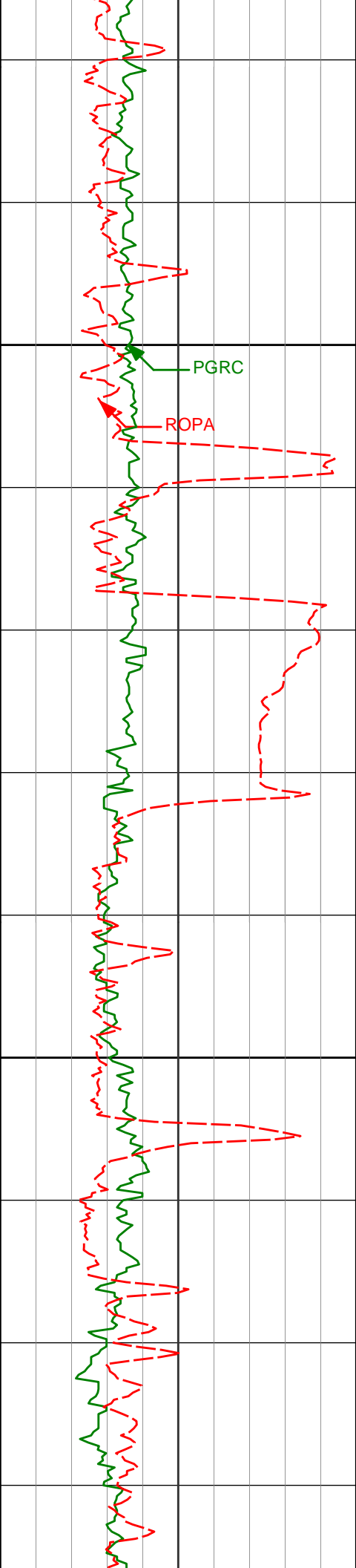
234.12°F

234.12°F

234.12°F

234.12°F

234.12°F



12000

12100

11955'

90.70°

269.88°

6649.59'

5368.82'

234.12°F

234.12°F

231.42°F

12049'

89.81°

270.63°

6649.17'

5462.79'

234.12°F

234.12°F

236.82°F

12144'

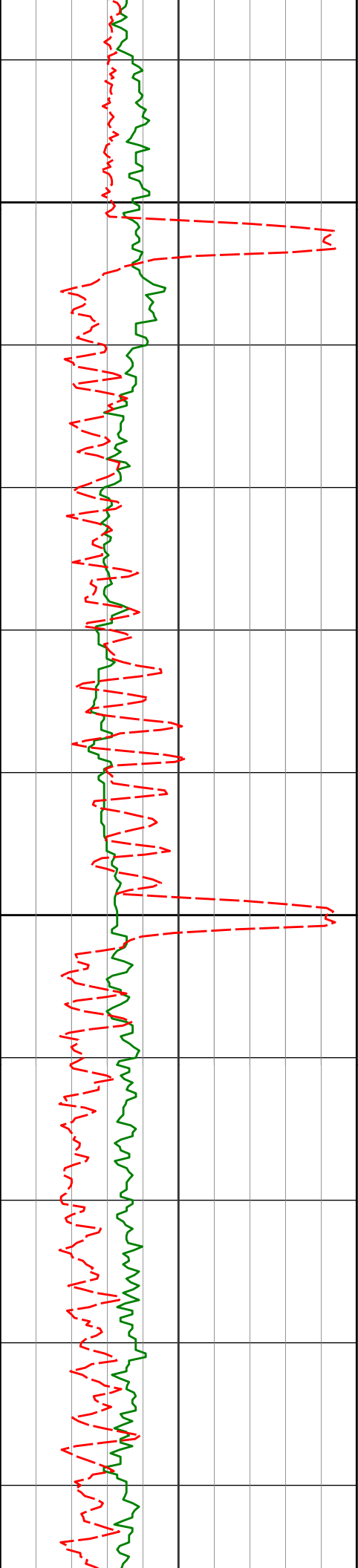
88.82°

270.16°

6650.30'

5557.75'

236.82°F



12200

12300

12238'

12332'

89.38°

90.05°

270.23°

270.15°

6651.78'

6652.25'

5651.72'

5745.69'

236.82°F

236.82°F

236.82°F

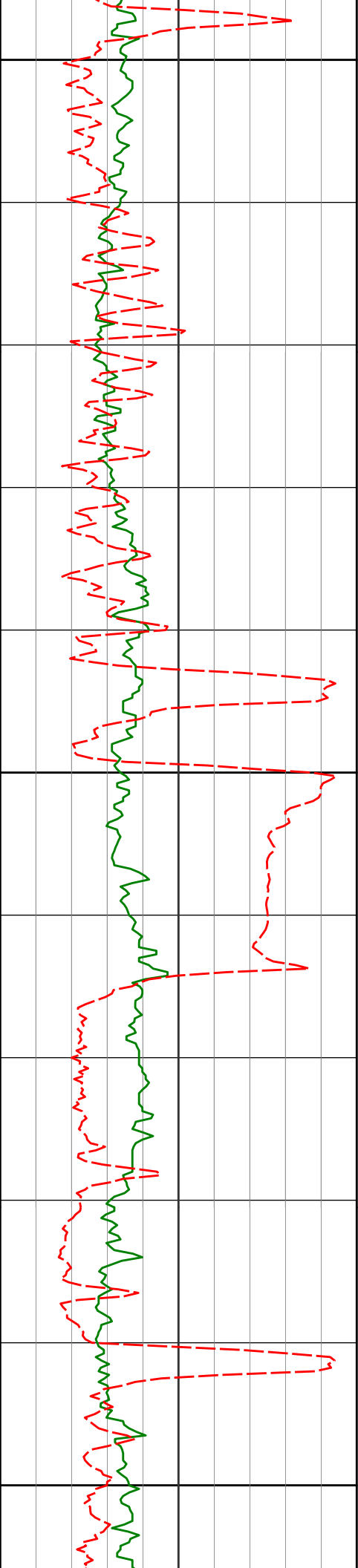
236.82°F

236.82°F

236.82°F

236.82°F

239.54°F



12400

12427'

91.35°

270.28° 6651.09'

5840.66'

12500

12521'

89.38°

269.87° 6650.49'

5934.64'

12600

239.54°F

236.82°F

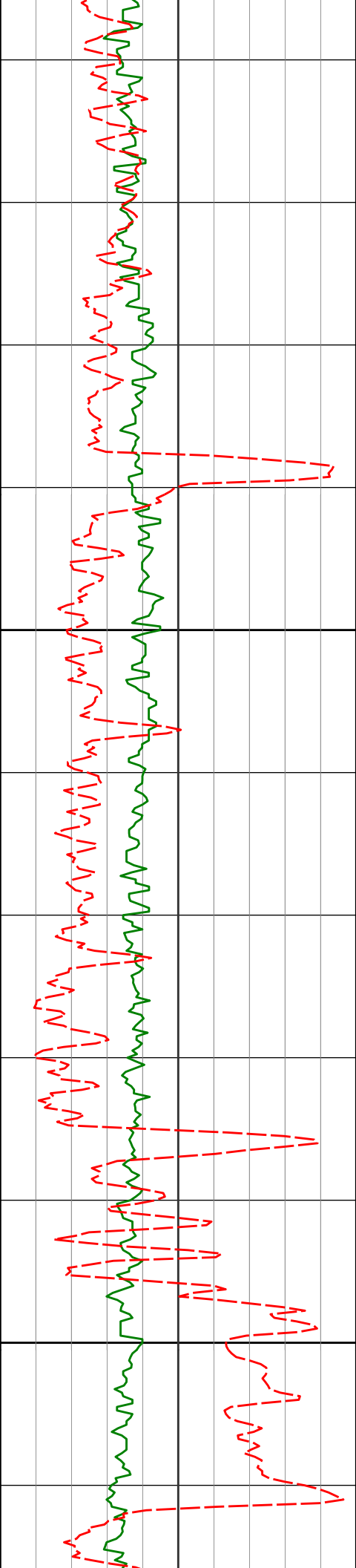
236.82°F

236.82°F

236.82°F

236.82°F

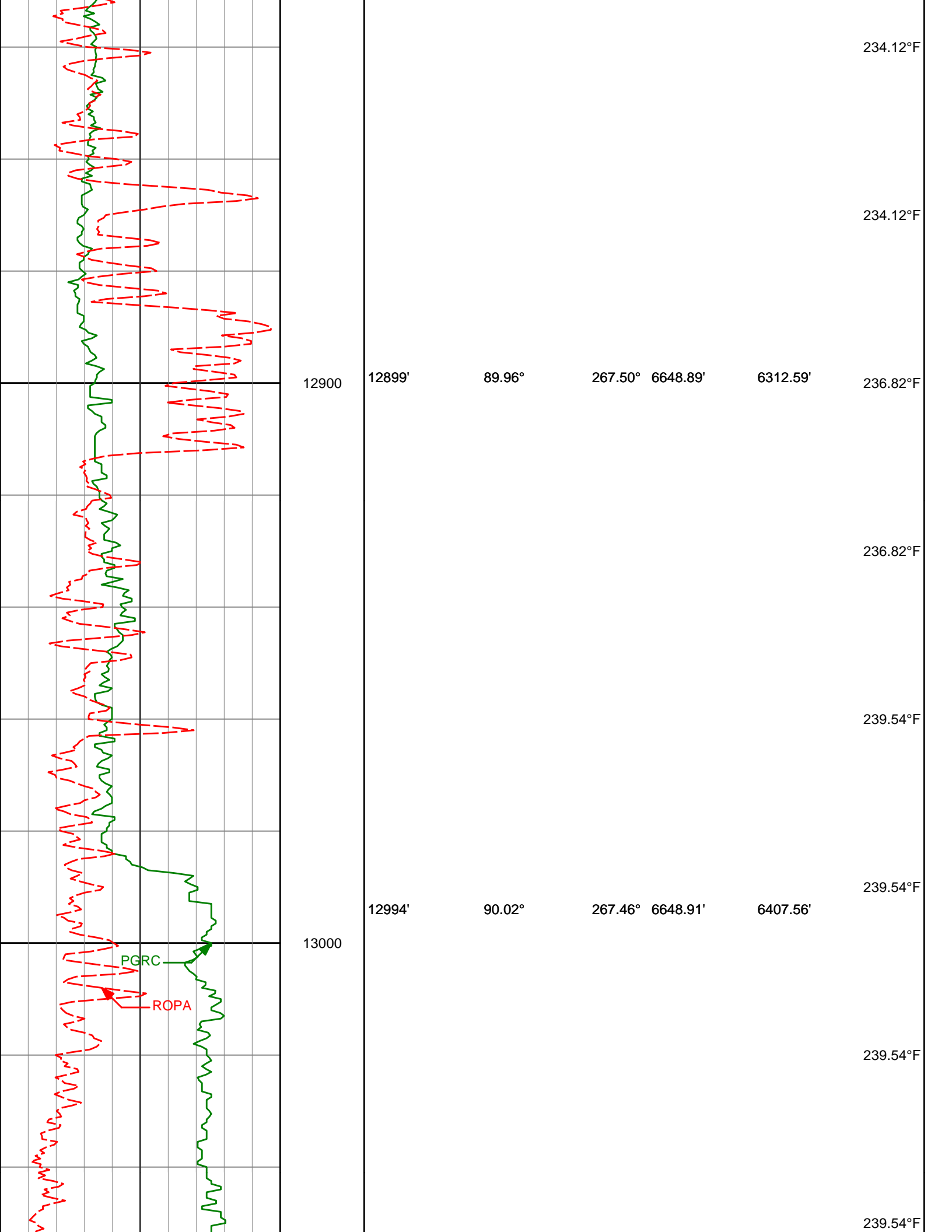
236.82°F

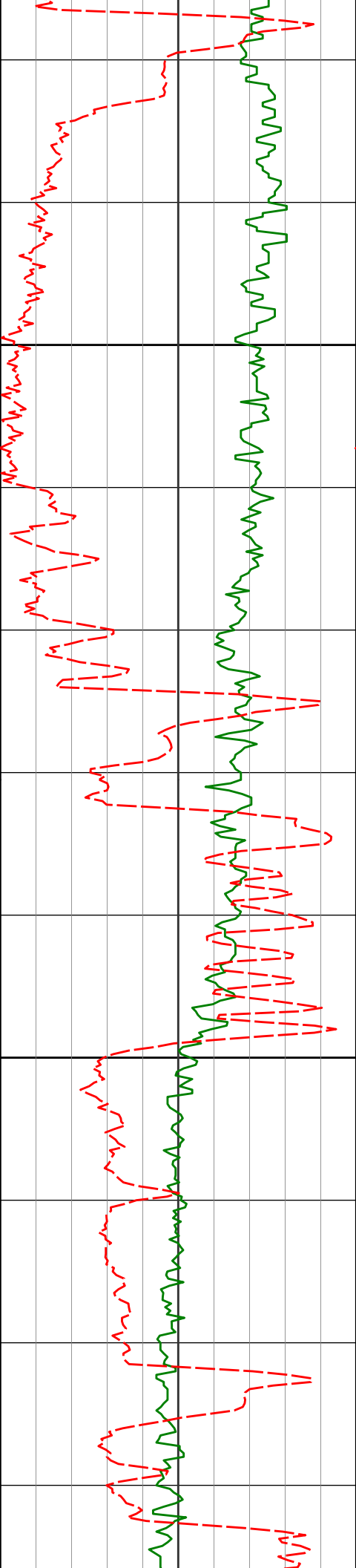


12700

12800

12616'	89.53°	269.28°	6651.39'	6029.63'	239.54°F
12710'	90.76°	269.71°	6651.15'	6123.62'	239.54°F
12805'	91.01°	269.13°	6649.69'	6218.60'	236.82°F





13100

13200

13088'

91.16°

267.59°

6647.94'

6501.52'

13183'

90.15°

267.76°

6646.85'

6596.49'

239.54°F

239.54°F

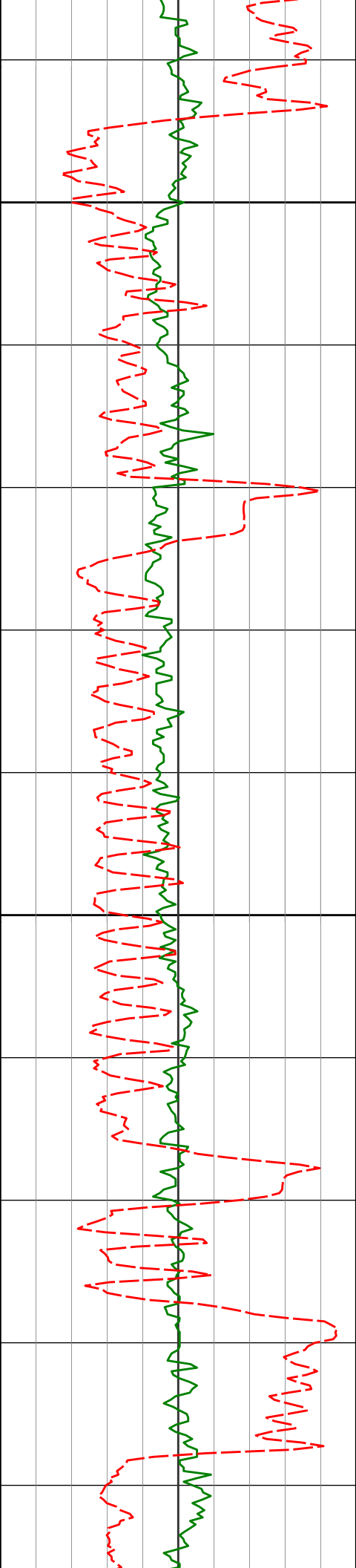
236.82°F

236.82°F

239.54°F

236.82°F

236.82°F



13300

13400

13277'

13372'

13466'

89.04°

89.19°

88.88°

267.10°

266.84°

268.53°

6647.52'

6648.99'

6650.57'

6690.46'

6785.39'

6879.35'

239.54°F

239.54°F

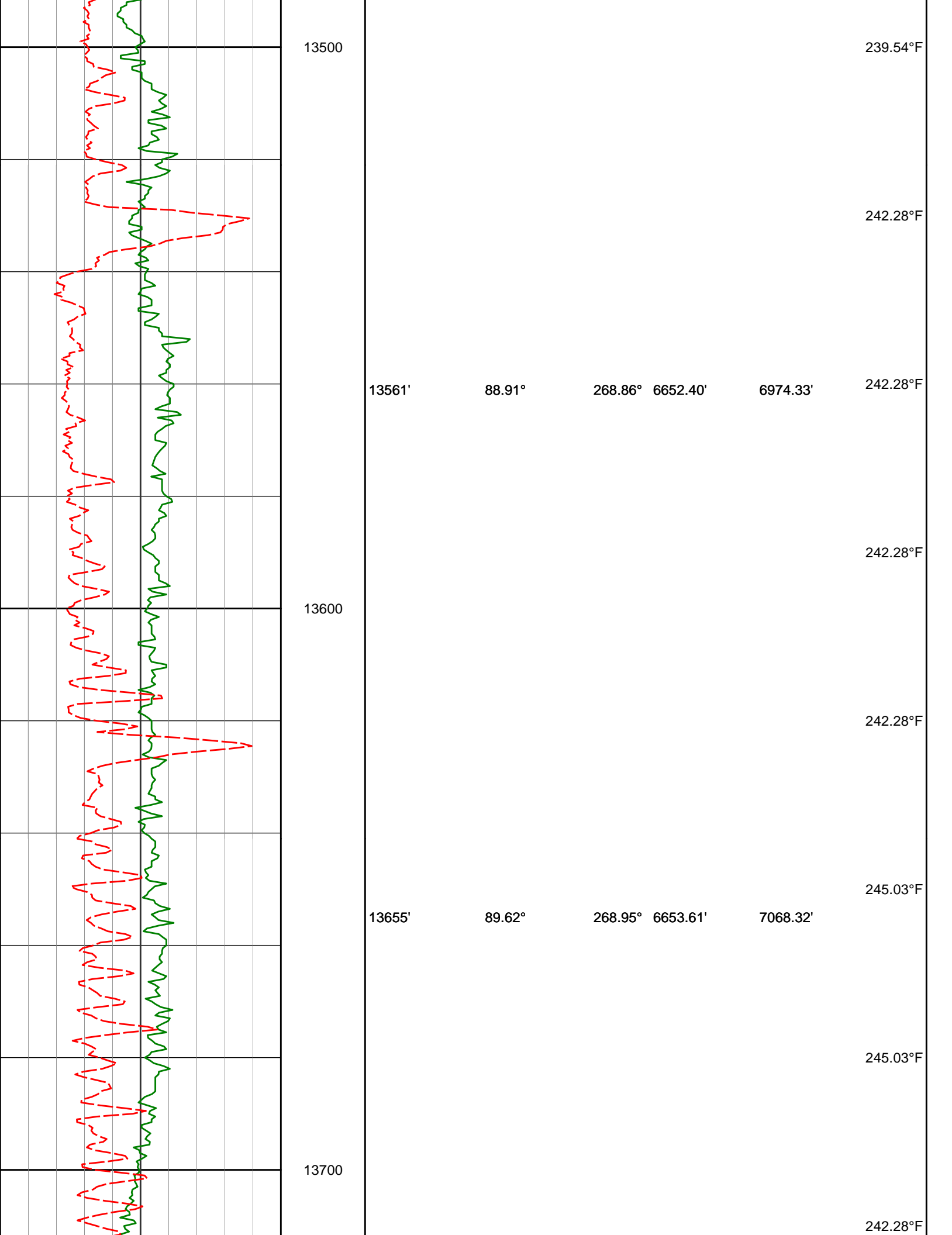
239.54°F

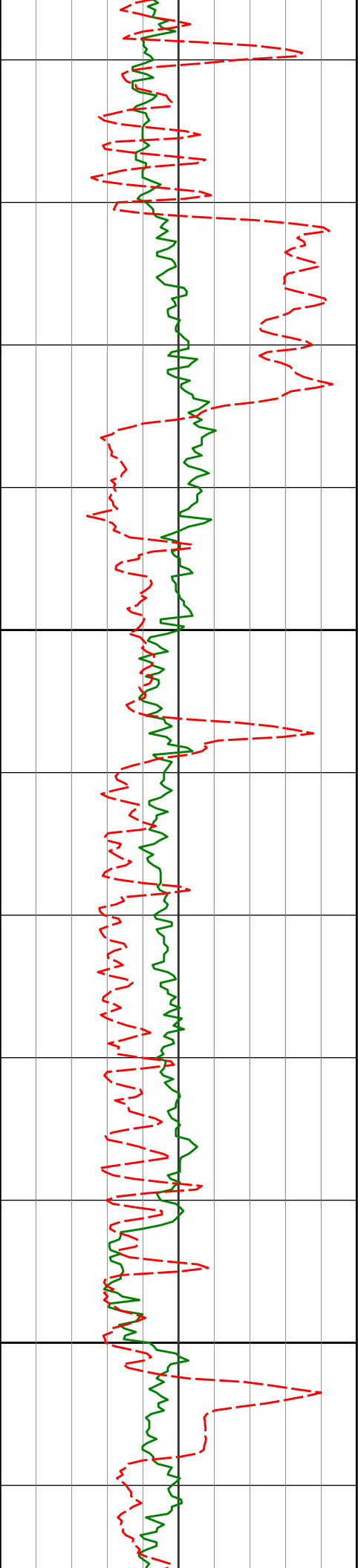
242.28°F

239.54°F

239.54°F

239.54°F





13800

13900

13750'

89.26°

269.87°

6654.54'

7163.31'

13844'

88.88°

269.96°

6656.06'

7257.29'

242.28°F

242.28°F

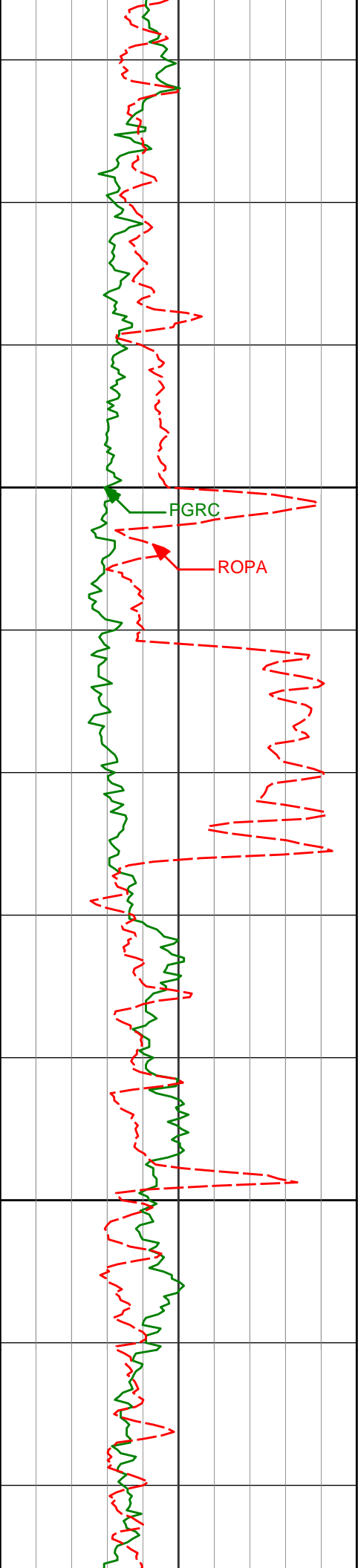
242.28°F

245.03°F

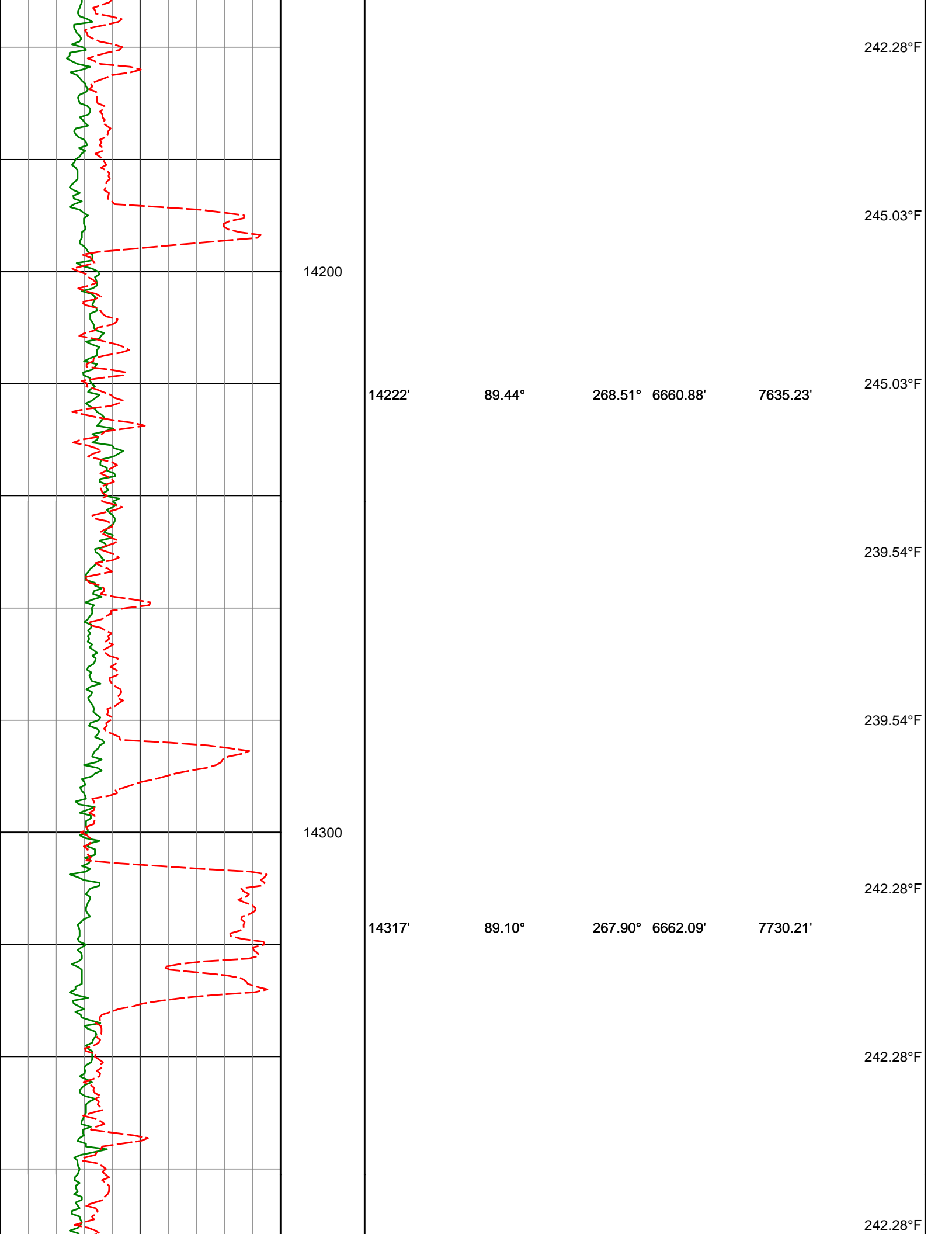
242.28°F

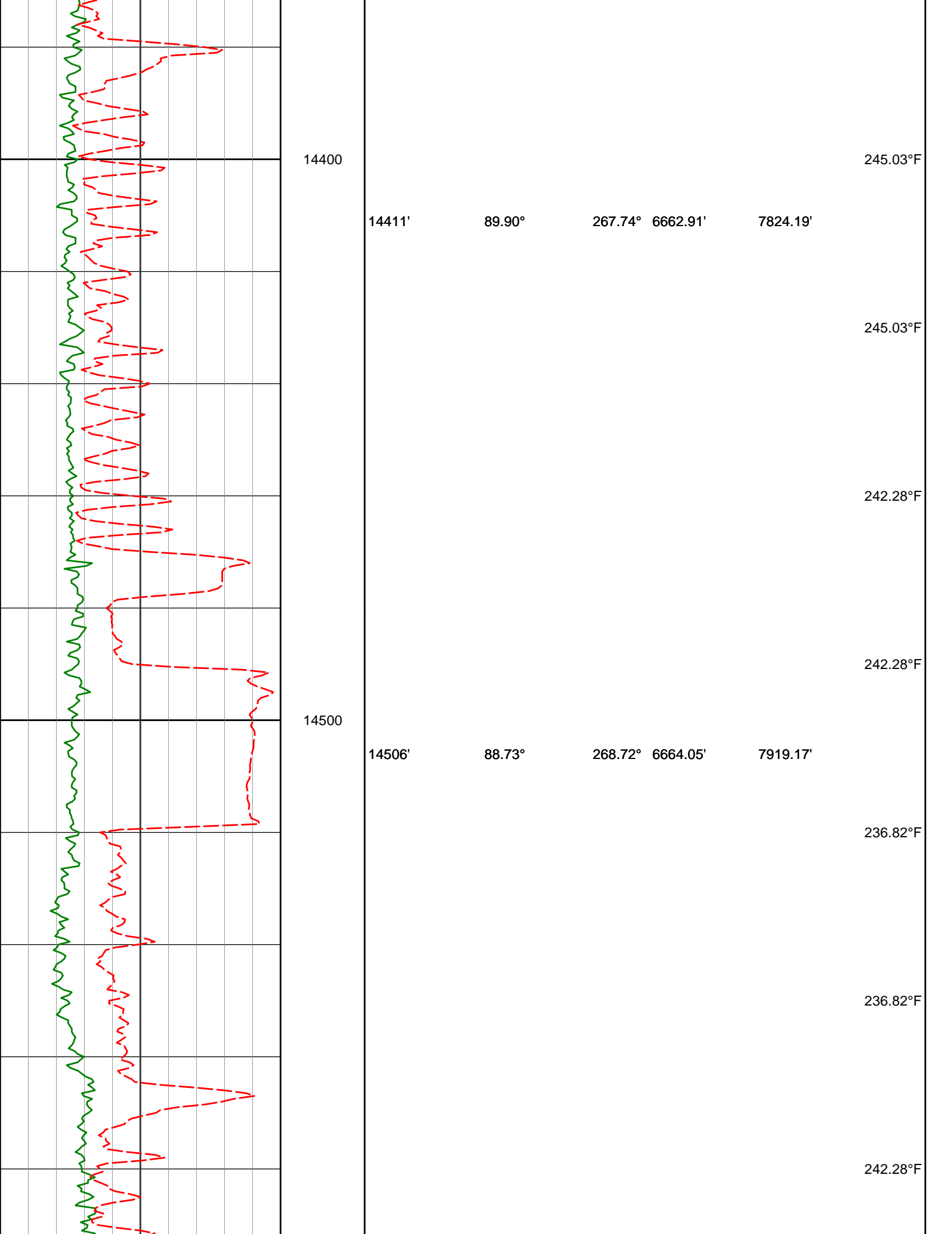
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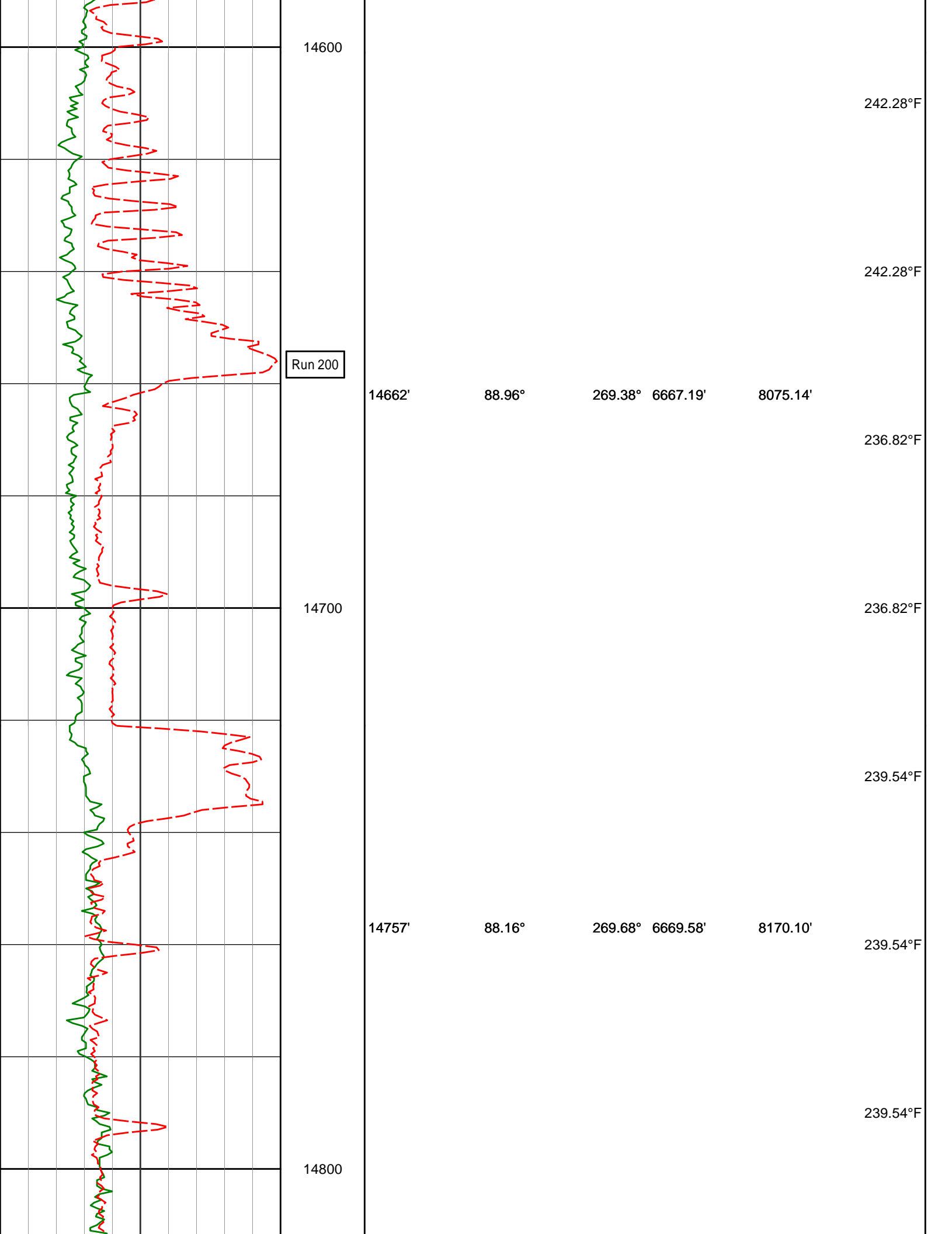
245.03°F

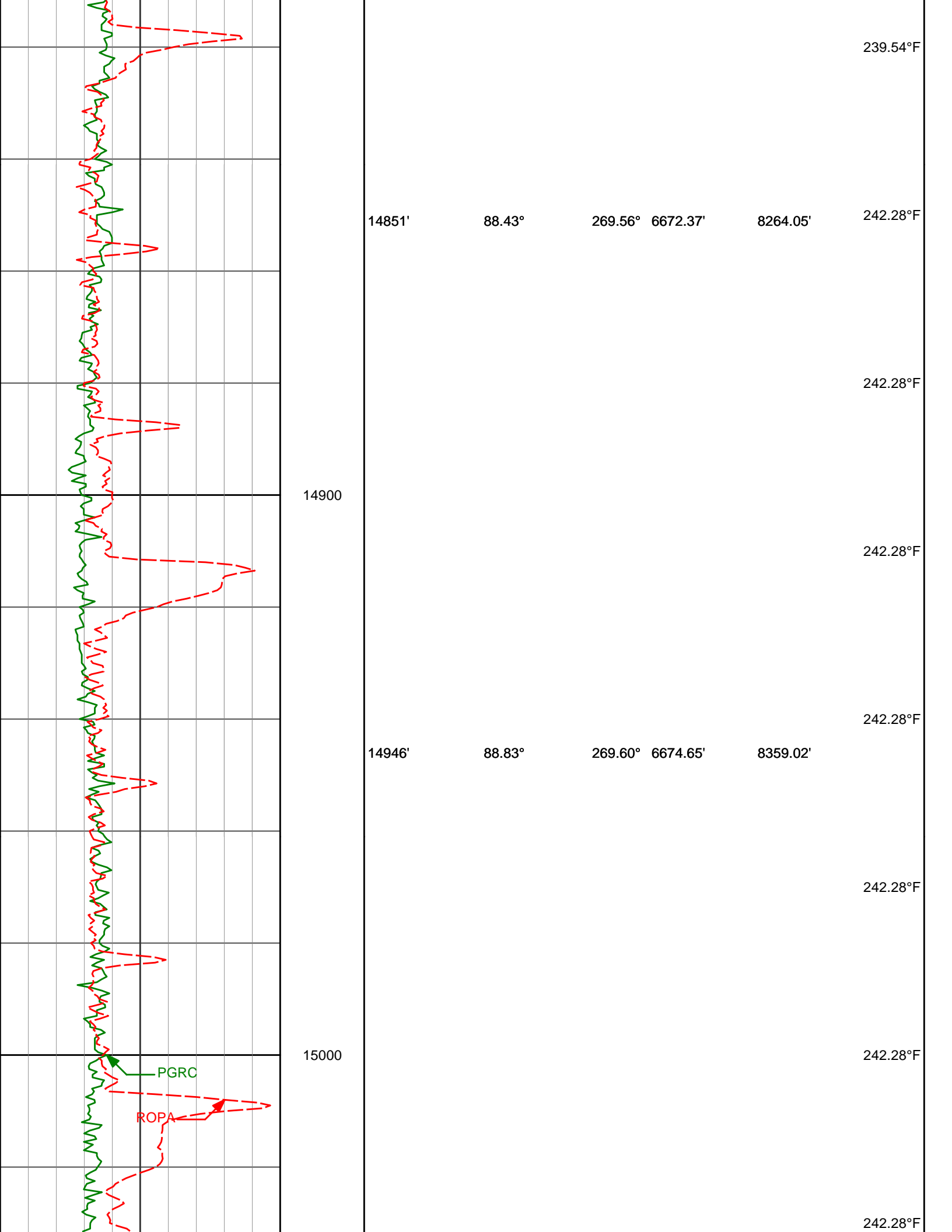


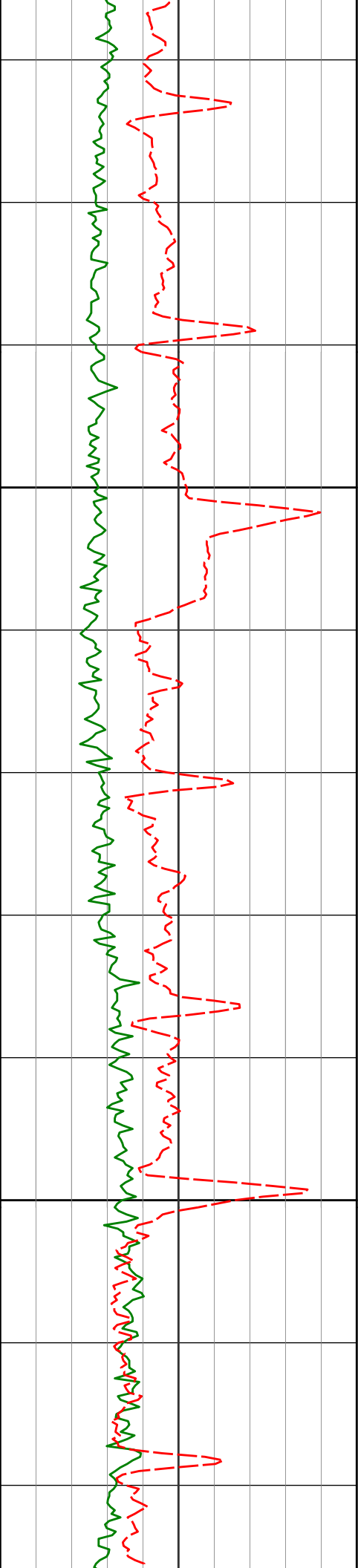
13939'	90.12°	269.75°	6656.89'	7352.27'	245.03°F
					242.28°F
					242.28°F
14033'	89.16°	269.46°	6657.48'	7446.26'	242.28°F
					242.28°F
					242.28°F
14128'	88.64°	268.73°	6659.30'	7541.24'	242.28°F











15100

15200

15041'

89.42°

269.74° 6676.10'

8454.00'

15135'

90.22°

269.70° 6676.39'

8547.99'

15230'

90.87°

270.15° 6675.49'

8642.97'

242.28°F

242.28°F

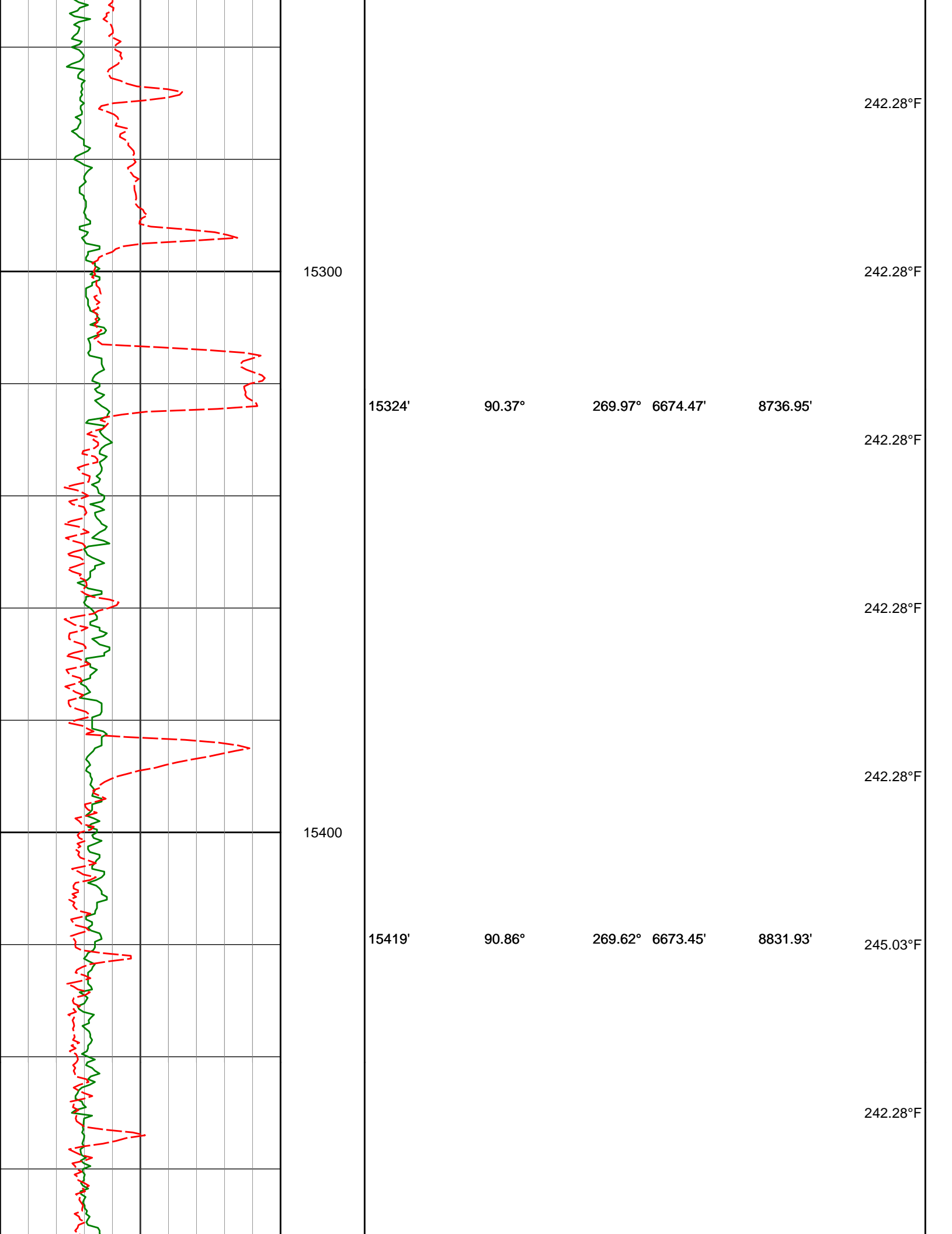
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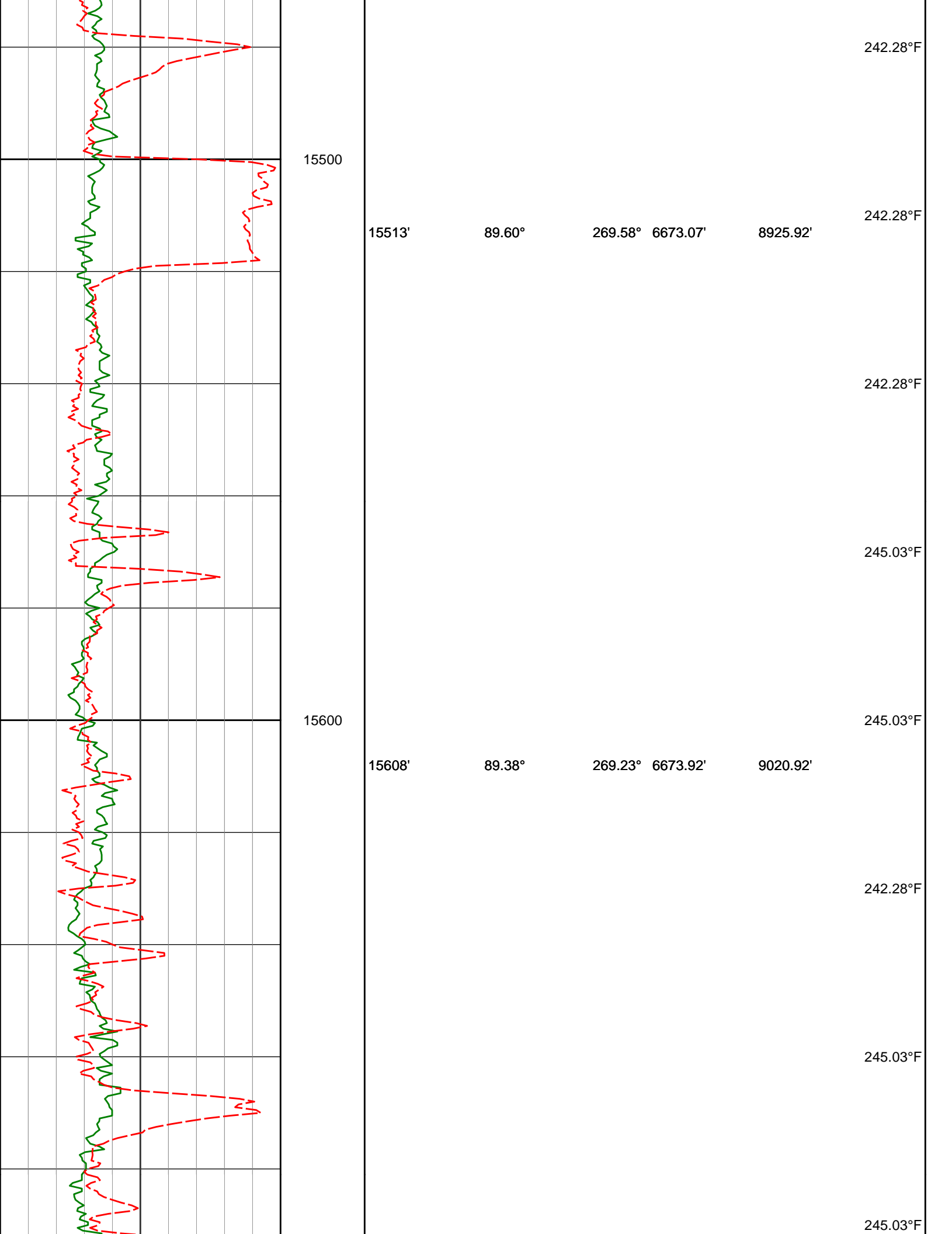
242.28°F

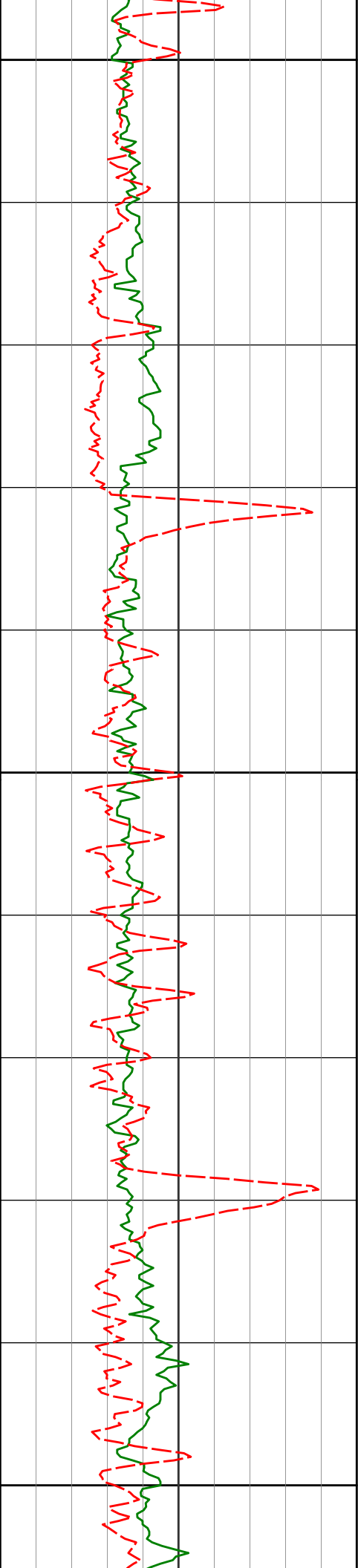
242.28°F

242.28°F

242.28°F







15700

15702'

89.47°

268.75° 6674.86'

9114.91'

245.03°F

245.03°F

245.03°F

15800

15797'

89.60°

268.62° 6675.63'

9209.91'

245.03°F

245.03°F

245.03°F

15900

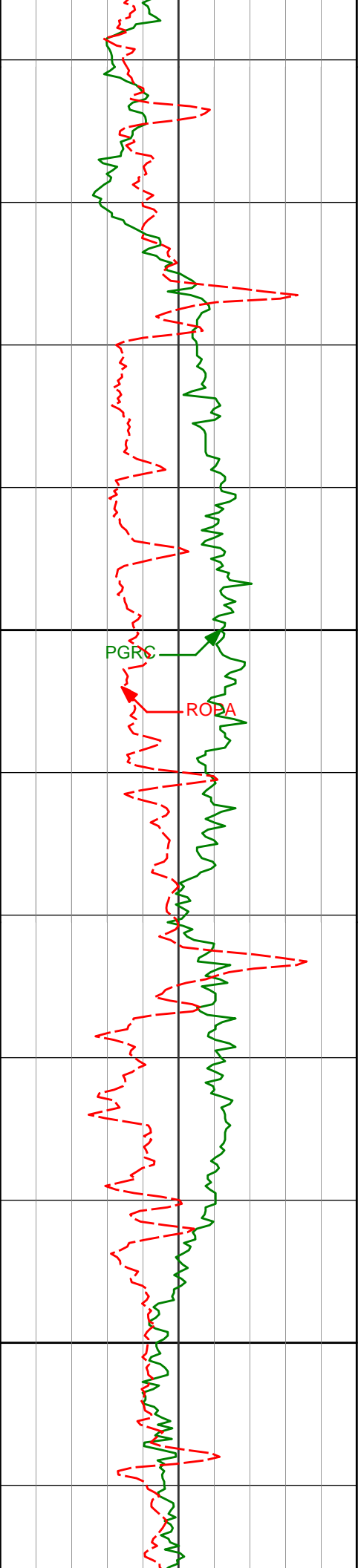
15891'

89.87°

268.37° 6676.07'

9303.90'

247.78°F



16000

16100

15986'

89.51°

268.05°

6676.58'

9398.89'

16081'

89.13°

267.89°

6677.71'

9493.87'

PGRC

RODA

247.78°F

247.78°F

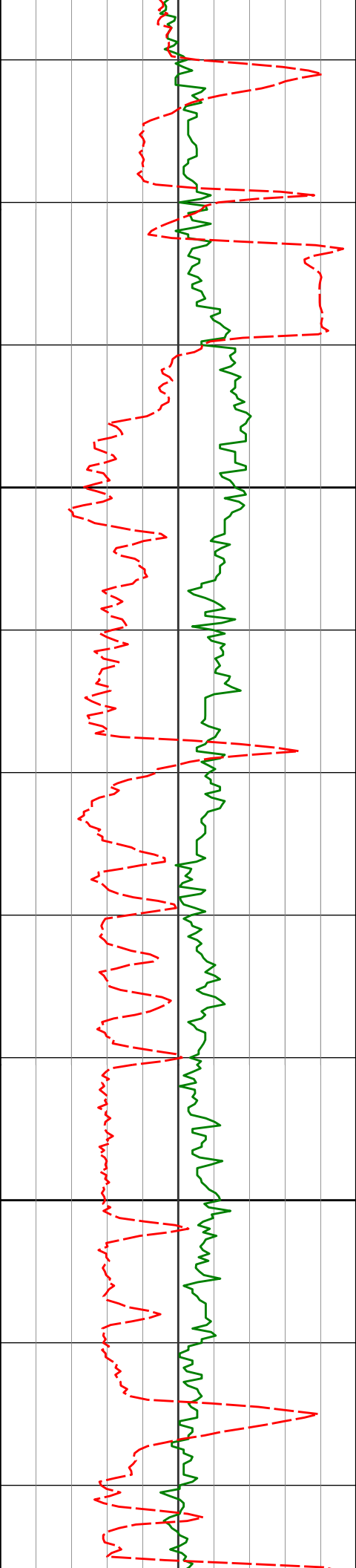
247.78°F

247.78°F

247.78°F

247.78°F

247.78°F



16200

16300

16270'

89.69°

268.43°

6679.66'

9682.84'

247.78°F

247.78°F

247.78°F

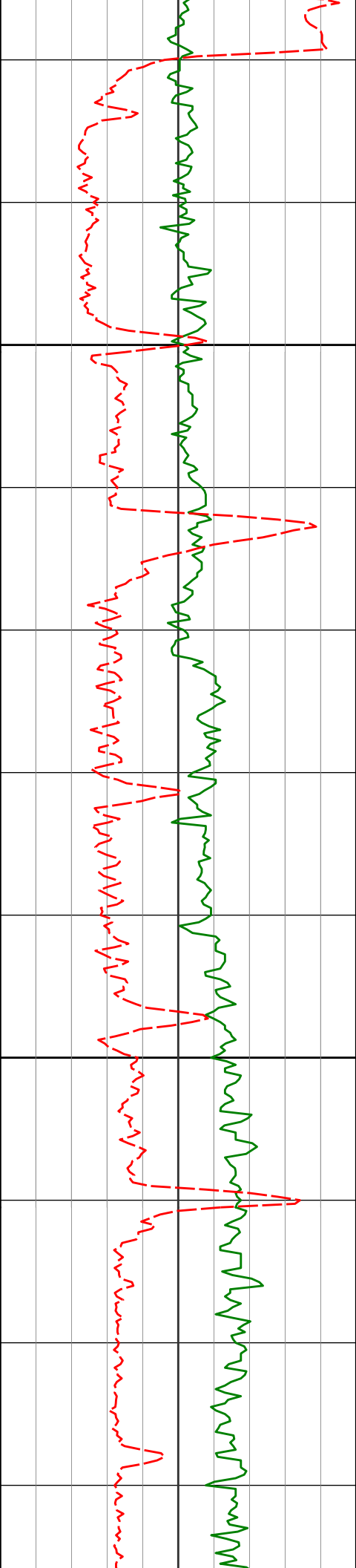
247.78°F

247.78°F

245.03°F

245.03°F

247.78°F



16364'

90.21°

268.88°

6679.74'

9776.84'

16400

16458'

90.71°

268.74°

6678.98'

9870.84'

16500

16553'

91.20°

268.29°

6677.40'

9965.82'

247.78°F

247.78°F

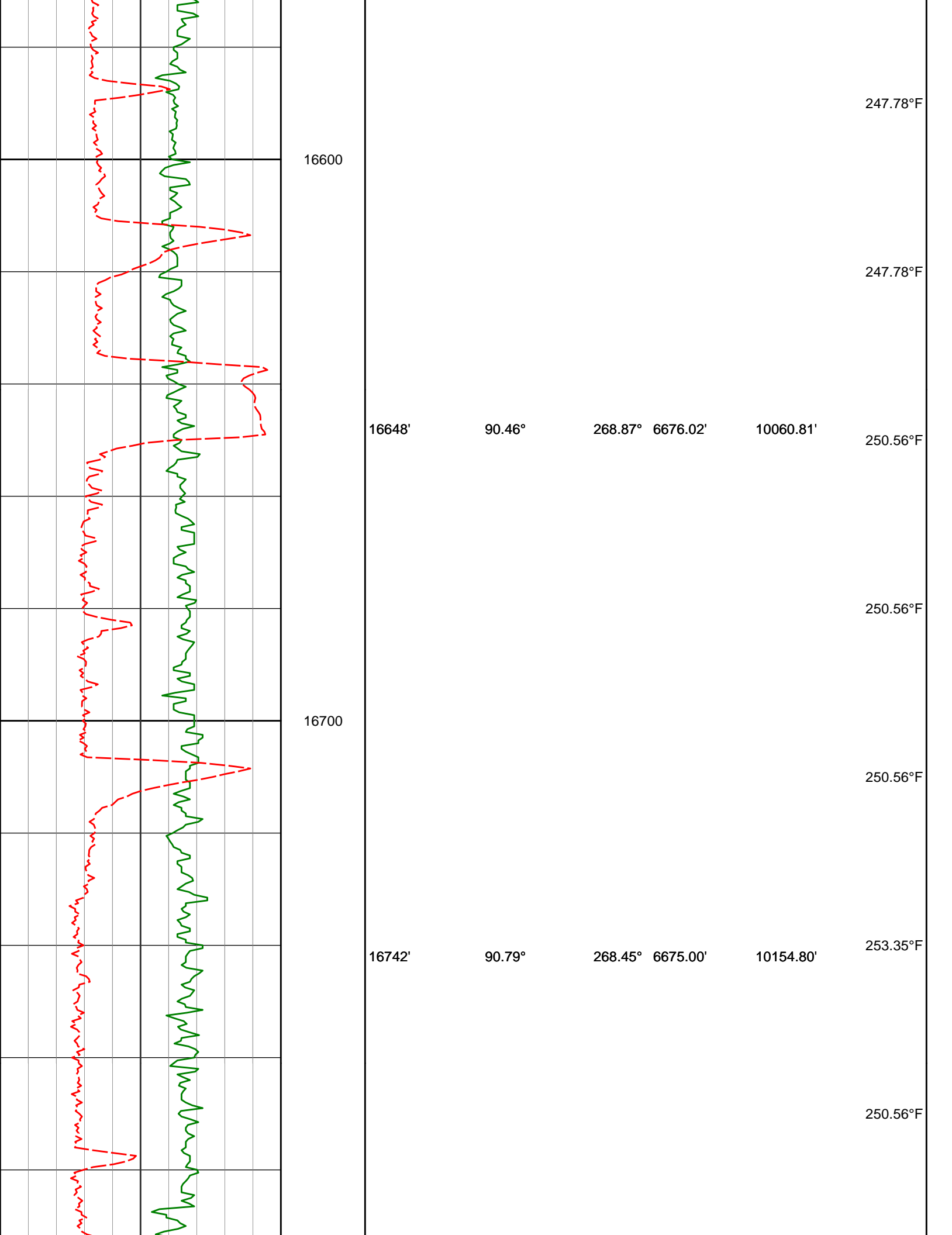
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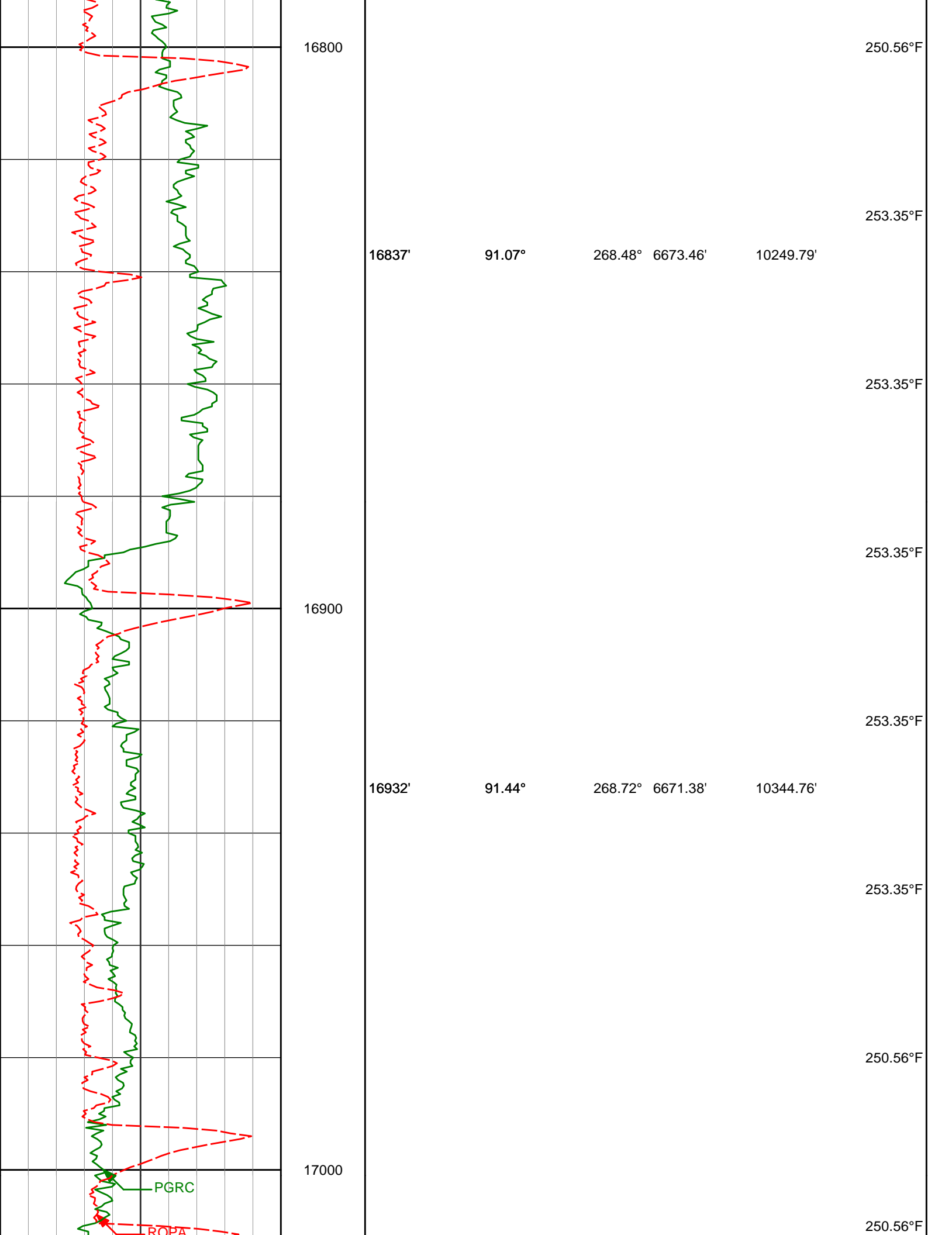
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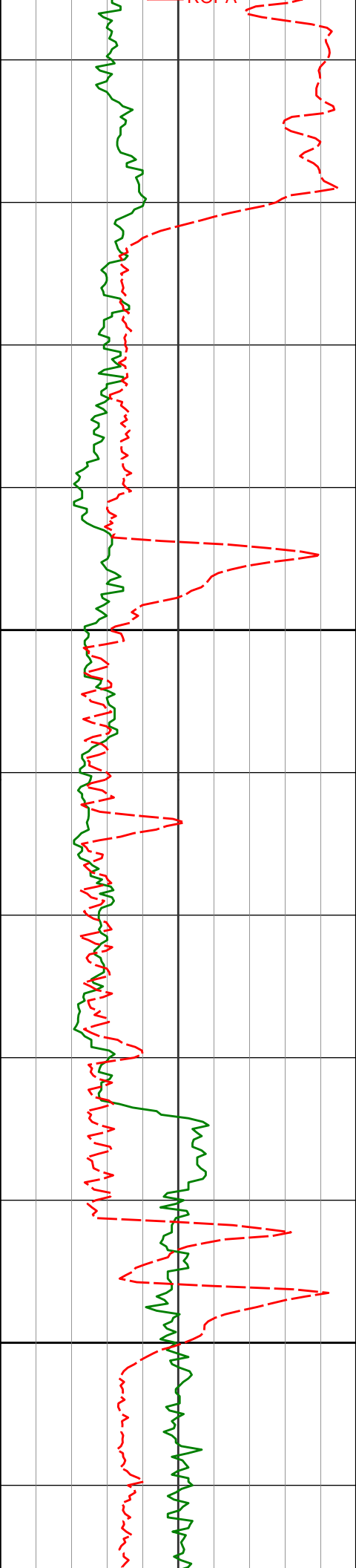
250.56°F

250.56°F

250.56°F







17100

17200

17026'

89.04°

269.57°

6670.98'

10438.75'

17121'

88.33°

269.50°

6673.16'

10533.72'

17215'

88.45°

270.42°

6675.80'

10627.67'

250.56°F

253.35°F

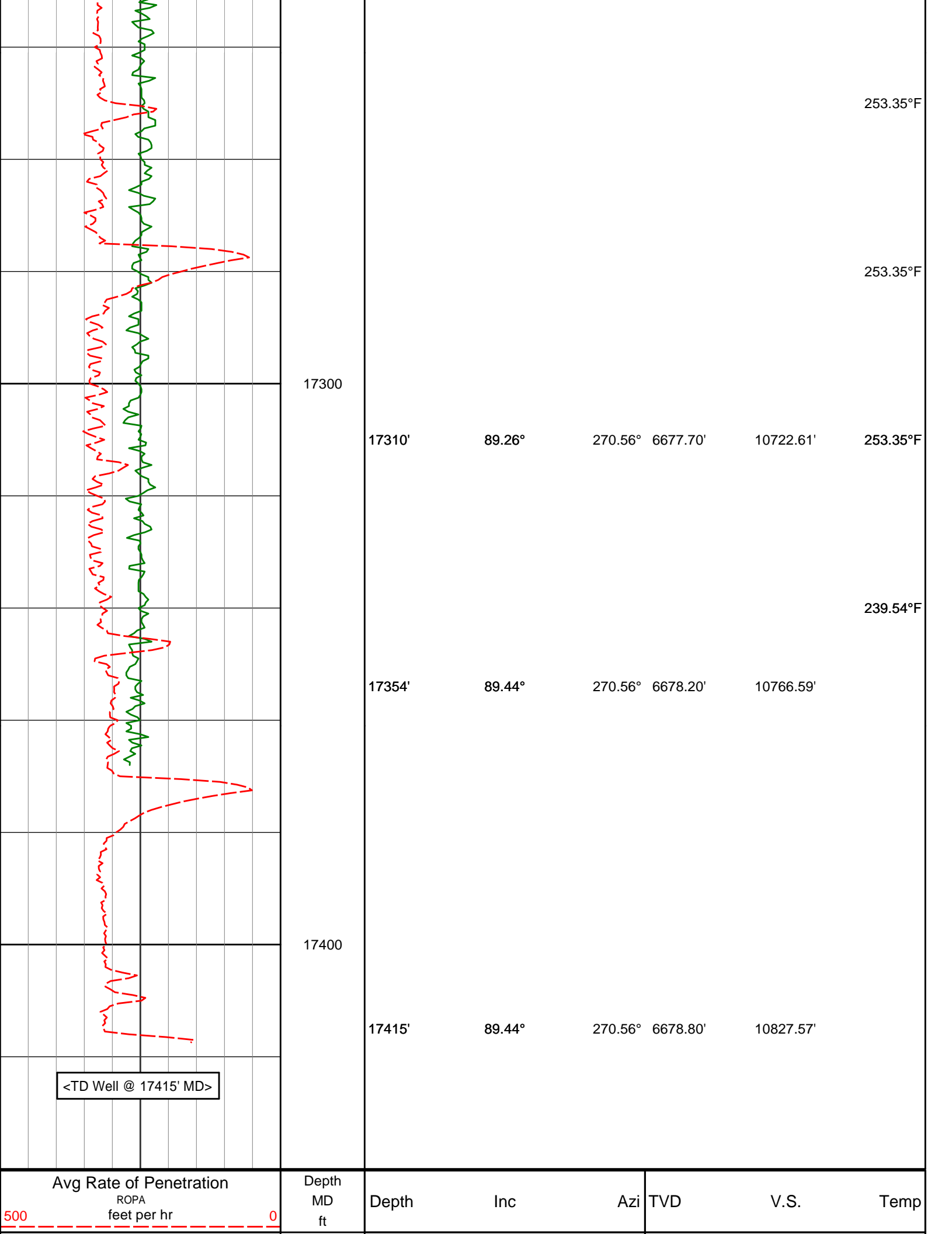
253.35°F

253.35°F

253.35°F

253.35°F

253.35°F



Gamma Ray Cor PGRC api	0	300

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Shadow State A26-618
Wattenburg
Weld Colorado
USA
CA-XX-0903288403

<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
84.00	0.33	230.24	84.00	0.15 S	0.19 W	0.19	0.39
179.00	0.11	181.14	179.00	0.42 S	0.40 W	0.41	0.29
273.00	0.32	198.96	273.00	0.76 S	0.49 W	0.50	0.23
368.00	0.35	203.53	368.00	1.28 S	0.69 W	0.71	0.04
462.00	0.17	207.69	462.00	1.66 S	0.87 W	0.90	0.19
557.00	0.18	136.88	557.00	1.90 S	0.83 W	0.86	0.21
651.00	0.11	333.02	651.00	1.92 S	0.77 W	0.81	0.31
746.00	0.20	331.96	745.99	1.70 S	0.89 W	0.92	0.09
840.00	0.48	344.31	839.99	1.17 S	1.07 W	1.09	0.31
935.00	0.35	298.43	934.99	0.65 S	1.44 W	1.45	0.36
1029.00	0.21	319.00	1028.99	0.38 S	1.80 W	1.81	0.18
1124.00	0.09	75.37	1123.99	0.23 S	1.84 W	1.85	0.28
1218.00	0.05	26.73	1217.99	0.18 S	1.75 W	1.76	0.07
1313.00	0.17	113.72	1312.99	0.20 S	1.61 W	1.61	0.18
1407.00	0.11	120.67	1406.99	0.30 S	1.40 W	1.41	0.07
1502.00	0.17	38.38	1501.99	0.24 S	1.23 W	1.24	0.20
1596.00	0.11	231.29	1595.99	0.18 S	1.22 W	1.22	0.30
1691.00	0.46	179.60	1690.99	0.62 S	1.29 W	1.30	0.42
1785.00	0.56	176.86	1784.98	1.46 S	1.26 W	1.29	0.11
1880.00	0.33	244.25	1879.98	2.04 S	1.48 W	1.52	0.56
1907.00	0.40	283.52	1906.98	2.05 S	1.64 W	1.68	0.94
2002.00	0.69	353.94	2001.98	1.40 S	2.02 W	2.05	0.71
2097.00	0.89	335.45	2096.97	0.16 S	2.39 W	2.40	0.34
2191.00	0.78	324.29	2190.96	1.03 N	3.07 W	3.05	0.21
2286.00	0.87	313.90	2285.95	2.05 N	3.96 W	3.93	0.18
2380.00	0.94	303.85	2379.94	2.97 N	5.12 W	5.06	0.19
2475.00	0.82	289.45	2474.93	3.63 N	6.41 W	6.34	0.27
2569.00	0.71	280.88	2568.92	3.97 N	7.62 W	7.54	0.17
2664.00	0.61	272.60	2663.91	4.10 N	8.70 W	8.62	0.14
2759.00	0.74	260.61	2758.90	4.03 N	9.82 W	9.74	0.20
2853.00	0.87	253.23	2852.90	3.72 N	11.10 W	11.03	0.17
2947.00	0.65	252.98	2946.89	3.36 N	12.29 W	12.23	0.24
3042.00	0.74	248.02	3041.88	2.97 N	13.38 W	13.32	0.12
3136.00	0.67	250.24	3135.87	2.56 N	14.46 W	14.41	0.09
3231.00	0.34	234.92	3230.87	2.21 N	15.21 W	15.16	0.37
3444.00	0.59	43.00	3443.87	2.64 N	14.98 W	14.93	0.43
3633.00	0.74	58.67	3632.85	3.99 N	13.27 W	13.20	0.13
3727.00	1.30	53.61	3726.84	4.94 N	11.89 W	11.80	0.60
3822.00	1.18	55.25	3821.82	6.14 N	10.22 W	10.11	0.13
4011.00	0.75	74.13	4010.79	7.59 N	7.43 W	7.29	0.28
4106.00	0.63	73.79	4105.78	7.90 N	6.33 W	6.18	0.13
4200.00	0.53	103.82	4199.78	7.94 N	5.42 W	5.27	0.33
4295.00	3.11	100.23	4294.72	7.38 N	2.45 W	2.32	2.73
4389.00	4.31	94.15	4388.52	6.67 N	3.58 E	-3.71	1.34
4483.00	6.13	92.64	4482.13	6.18 N	12.13 E	-12.24	1.94
4578.00	8.14	93.32	4576.39	5.56 N	23.92 E	-24.01	2.12
4767.00	9.26	90.85	4763.21	4.56 N	52.48 E	-52.56	0.62
4862.00	8.49	89.66	4857.07	4.48 N	67.13 E	-67.21	0.83

4956.00	9.92	93.43	4949.86	4.04 N	82.15 E	-82.21	1.65
5146.00	8.53	89.82	5137.40	3.11 N	112.58 E	-112.61	0.79
5240.00	9.91	92.09	5230.19	2.83 N	127.63 E	-127.66	1.52
5335.00	8.54	90.69	5323.96	2.45 N	142.85 E	-142.87	1.46
5430.00	7.16	88.77	5418.06	2.49 N	155.82 E	-155.84	1.48
5619.00	6.25	84.08	5605.77	3.81 N	177.82 E	-177.86	0.56
5713.00	5.26	82.42	5699.30	4.90 N	187.18 E	-187.24	1.07
5808.00	4.38	79.46	5793.96	6.14 N	195.07 E	-195.15	0.96
5997.00	1.54	60.04	5982.69	8.73 N	204.37 E	-204.49	1.57
6091.00	9.88	272.28	6076.28	9.69 N	197.38 E	-197.52	11.93
6186.00	22.56	271.67	6167.31	10.54 N	170.91 E	-171.07	13.35
6281.00	24.64	271.10	6254.36	11.46 N	132.89 E	-133.08	2.20
6375.00	26.90	267.32	6339.01	10.84 N	92.06 E	-92.24	2.97
6470.00	38.03	264.01	6419.05	6.76 N	41.33 E	-41.44	11.86
6564.00	45.94	268.21	6488.88	2.68 N	21.34 W	21.29	8.93
6659.00	58.62	270.68	6546.89	2.10 N	96.32 W	96.27	13.50
6753.00	64.85	272.87	6591.38	4.71 N	179.03 W	178.91	6.94
6848.00	72.11	270.66	6626.21	7.39 N	267.30 W	267.12	7.94
6942.00	77.45	269.84	6650.88	7.78 N	357.97 W	357.76	5.74
7036.00	90.49	268.97	6660.73	6.80 N	451.24 W	451.04	13.90
7131.00	91.81	267.53	6658.83	3.90 N	546.17 W	546.01	2.06
7225.00	89.78	266.83	6657.52	0.72 S	640.04 W	639.95	2.28
7320.00	89.31	266.77	6658.28	6.03 S	734.89 W	734.88	0.50
7414.00	90.33	267.05	6658.57	11.09 S	828.75 W	828.82	1.13
7508.00	89.19	265.93	6658.97	16.85 S	922.57 W	922.72	1.70
7603.00	90.33	267.45	6659.36	22.33 S	1017.41 W	1017.65	2.00
7698.00	89.22	266.53	6659.74	27.32 S	1112.27 W	1112.59	1.52
7792.00	89.75	269.79	6660.58	30.34 S	1206.21 W	1206.56	3.51
7887.00	90.05	269.43	6660.75	30.99 S	1301.21 W	1301.55	0.49
7981.00	91.10	269.72	6659.81	31.68 S	1395.20 W	1395.54	1.16
8076.00	91.99	270.10	6657.24	31.83 S	1490.16 W	1490.49	1.02
8170.00	90.39	269.61	6655.29	32.07 S	1584.14 W	1584.46	1.78
8265.00	91.59	269.39	6653.65	32.90 S	1679.12 W	1679.44	1.28
8360.00	89.68	270.14	6652.60	33.29 S	1774.11 W	1774.42	2.16
8454.00	90.08	269.84	6652.79	33.30 S	1868.11 W	1868.40	0.53
8549.00	90.61	269.50	6652.22	33.85 S	1963.10 W	1963.39	0.66
8644.00	90.36	269.60	6651.42	34.60 S	2058.09 W	2058.38	0.28
8738.00	89.71	269.67	6651.36	35.20 S	2152.09 W	2152.38	0.70
8833.00	88.97	269.62	6652.46	35.79 S	2247.08 W	2247.36	0.78
8928.00	88.82	269.42	6654.29	36.58 S	2342.06 W	2342.34	0.26
9022.00	89.90	269.48	6655.34	37.48 S	2436.05 W	2436.33	1.15
9117.00	91.16	269.63	6654.46	38.22 S	2531.04 W	2531.32	1.34
9211.00	90.73	269.15	6652.91	39.22 S	2625.02 W	2625.30	0.69
9306.00	90.73	268.08	6651.70	41.52 S	2719.99 W	2720.29	1.13
9400.00	90.02	268.25	6651.08	44.53 S	2813.94 W	2814.28	0.78
9495.00	88.95	267.39	6651.94	48.14 S	2908.86 W	2909.25	1.44
9590.00	90.24	267.97	6652.61	51.99 S	3003.78 W	3004.23	1.49
9684.00	91.10	267.95	6651.51	55.33 S	3097.71 W	3098.21	0.92
9779.00	89.56	267.70	6650.96	58.94 S	3192.64 W	3193.18	1.64
9968.00	90.42	267.42	6651.00	66.98 S	3381.47 W	3382.12	0.48
10063.00	90.09	268.40	6650.57	70.45 S	3476.40 W	3477.11	1.09
10157.00	88.97	267.98	6651.34	73.42 S	3570.35 W	3571.09	1.27
10252.00	89.93	268.48	6652.26	76.35 S	3665.30 W	3666.08	1.14
10441.00	90.27	268.68	6651.93	81.04 S	3854.24 W	3855.08	0.21
10535.00	89.65	268.28	6651.99	83.53 S	3948.20 W	3949.07	0.78
10630.00	90.73	268.45	6651.68	86.24 S	4043.16 W	4044.07	1.15
10724.00	90.45	269.56	6650.71	87.87 S	4137.14 W	4138.06	1.22
10819.00	90.30	269.81	6650.09	88.39 S	4232.14 W	4233.05	0.31
10914.00	90.18	269.62	6649.69	88.87 S	4327.14 W	4328.04	0.24
11008.00	91.97	269.76	6647.92	89.38 S	4421.12 W	4422.01	1.91
11103.00	89.28	268.29	6646.89	90.99 S	4516.08 W	4516.99	3.23
11198.00	89.75	268.33	6647.69	93.79 S	4611.04 W	4611.98	0.50
11292.00	89.65	267.45	6648.19	97.26 S	4704.97 W	4705.97	0.94
11387.00	89.62	267.10	6648.79	101.77 S	4799.86 W	4800.92	0.37
11482.00	90.52	269.93	6648.67	104.23 S	4894.82 W	4895.91	3.13
11576.00	90.83	270.27	6647.57	104.07 S	4988.81 W	4989.88	0.49
11671.00	89.38	270.11	6647.39	103.75 S	5083.81 W	5084.86	1.54
11766.00	89.10	269.56	6648.65	104.03 S	5178.80 W	5179.84	0.65
11860.00	89.53	269.53	6649.78	104.77 S	5272.79 W	5273.83	0.46
11955.00	90.70	269.88	6649.59	105.26 S	5367.79 W	5368.82	1.29
12049.00	89.81	270.63	6649.17	104.85 S	5461.79 W	5462.79	1.24

12144.00	88.82	270.16	6650.30	104.19 S	5556.78 W	5557.75	1.15
12238.00	89.38	270.23	6651.78	103.87 S	5650.76 W	5651.72	0.60
12332.00	90.05	270.15	6652.25	103.56 S	5744.76 W	5745.69	0.72
12427.00	91.35	270.28	6651.09	103.20 S	5839.75 W	5840.66	1.38
12521.00	89.38	269.87	6650.49	103.08 S	5933.74 W	5934.64	2.14
12616.00	89.53	269.28	6651.39	103.78 S	6028.74 W	6029.63	0.64
12710.00	90.76	269.71	6651.15	104.61 S	6122.73 W	6123.62	1.39
12805.00	91.01	269.13	6649.69	105.57 S	6217.71 W	6218.60	0.66
12899.00	89.96	267.50	6648.89	108.34 S	6311.67 W	6312.59	2.06
12994.00	90.02	267.46	6648.91	112.52 S	6406.57 W	6407.56	0.08
13088.00	91.16	267.59	6647.94	116.57 S	6500.48 W	6501.52	1.22
13183.00	90.15	267.76	6646.85	120.43 S	6595.39 W	6596.49	1.08
13277.00	89.04	267.10	6647.52	124.64 S	6689.29 W	6690.46	1.37
13372.00	89.19	266.84	6648.99	129.66 S	6784.15 W	6785.39	0.32
13466.00	88.88	268.53	6650.57	133.46 S	6878.06 W	6879.35	1.83
13561.00	88.91	268.86	6652.40	135.62 S	6973.01 W	6974.33	0.35
13655.00	89.62	268.95	6653.61	137.42 S	7066.99 W	7068.32	0.76
13750.00	89.26	269.87	6654.54	138.40 S	7161.98 W	7163.31	1.04
13844.00	88.88	269.96	6656.06	138.54 S	7255.97 W	7257.29	0.42
13939.00	90.12	269.75	6656.89	138.78 S	7350.96 W	7352.27	1.32
14033.00	89.16	269.46	6657.48	139.43 S	7444.95 W	7446.26	1.07
14128.00	88.64	268.73	6659.30	140.93 S	7539.92 W	7541.24	0.94
14222.00	89.44	268.51	6660.88	143.19 S	7633.88 W	7635.23	0.88
14317.00	89.10	267.90	6662.09	146.17 S	7728.83 W	7730.21	0.74
14411.00	89.90	267.74	6662.91	149.74 S	7822.76 W	7824.19	0.87
14506.00	88.73	268.72	6664.05	152.68 S	7917.70 W	7919.17	1.61
14662.00	88.96	269.38	6667.19	155.26 S	8073.65 W	8075.14	0.45
14757.00	88.16	269.68	6669.58	156.04 S	8168.61 W	8170.10	0.90
14851.00	88.43	269.56	6672.37	156.66 S	8262.57 W	8264.05	0.31
14946.00	88.83	269.60	6674.65	157.36 S	8357.54 W	8359.02	0.42
15041.00	89.42	269.74	6676.10	157.91 S	8452.53 W	8454.00	0.64
15135.00	90.22	269.70	6676.39	158.37 S	8546.52 W	8547.99	0.85
15230.00	90.87	270.15	6675.49	158.49 S	8641.52 W	8642.97	0.83
15324.00	90.37	269.97	6674.47	158.39 S	8735.51 W	8736.95	0.57
15419.00	90.86	269.62	6673.45	158.73 S	8830.51 W	8831.93	0.63
15513.00	89.60	269.58	6673.07	159.39 S	8924.50 W	8925.92	1.34
15608.00	89.38	269.23	6673.92	160.38 S	9019.49 W	9020.92	0.44
15702.00	89.47	268.75	6674.86	162.03 S	9113.47 W	9114.91	0.52
15797.00	89.60	268.62	6675.63	164.21 S	9208.44 W	9209.91	0.19
15891.00	89.87	268.37	6676.07	166.68 S	9302.41 W	9303.90	0.39
15986.00	89.51	268.05	6676.58	169.65 S	9397.36 W	9398.89	0.51
16081.00	89.13	267.89	6677.71	173.01 S	9492.30 W	9493.87	0.43
16270.00	89.69	268.43	6679.66	179.08 S	9681.19 W	9682.84	0.41
16364.00	90.21	268.88	6679.74	181.29 S	9775.16 W	9776.84	0.73
16458.00	90.71	268.74	6678.98	183.24 S	9869.14 W	9870.84	0.55
16553.00	91.20	268.29	6677.40	185.70 S	9964.09 W	9965.82	0.70
16648.00	90.46	268.87	6676.02	188.06 S	10059.05 W	10060.81	0.99
16742.00	90.79	268.45	6675.00	190.25 S	10153.02 W	10154.80	0.57
16837.00	91.07	268.48	6673.46	192.80 S	10247.97 W	10249.79	0.30
16932.00	91.44	268.72	6671.38	195.12 S	10342.92 W	10344.76	0.46
17026.00	89.04	269.57	6670.98	196.52 S	10436.90 W	10438.75	2.71
17121.00	88.33	269.50	6673.16	197.29 S	10531.87 W	10533.72	0.75
17215.00	88.45	270.42	6675.80	197.36 S	10625.84 W	10627.67	0.99
17310.00	89.26	270.56	6677.70	196.55 S	10720.81 W	10722.61	0.87
17354.00	89.44	270.56	6678.20	196.12 S	10764.81 W	10766.59	0.41
17415.00	89.44	270.56	6678.80	195.52 S	10825.80 W	10827.57	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT

TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD

VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 268.95 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 17415.00 FEET

IS 10827.57 FEET ALONG 268.97 DEGREES (GRID)

Survey from 0 to 1003 were Curve surveys

Survey from 0 to 1907 were Gyro surveys.
Surveys corrected by Surcon starting at 1963 ft.
Last survey is a projection to the bit at TD.

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