



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	27-May-16	28-May-16	30-May-16		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.500	8.500	8.500		
Tool Nominal OD (in)	6.750	6.750	6.750		
Log Start Depth (MD, ft)	1,904.00	12,670.00	16,340.00		
Log End Depth (MD, ft)	12,670.00	16,340.00	17,520.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	24-May-16 01:30	27-May-16 14:05	29-May-16 10:00		
Drill/Wipe End Date and Time	27-May-16 00:10	28-May-16 14:00	29-May-16 20:30		
Min Inc (deg) @ Depth (MD, ft)	0.05 @ 366.00	88.33 @ 12,859.00	88.93 @ 16,640.00		
Max Inc (deg) @ Depth (MD, ft)	91.78 @ 8,793.00	91.16 @ 16,262.00	91.83 @ 16,357.00		
Bit TFA(in2) / Bit Type	1.86 / PDC	1.86 / PDC	1.86 / PDC		
Flow Rate (gpm)	596.00	579.00	563.00		
Max AV (fpm) / CV (fpm) @ MWD	494.1 / N/A	494.1 / N/A	471.9 / N/A		
Fluid Type	Mineral Oil Bas	Mineral Oil Bas	Mineral Oil Bas		
Density (ppg) / Viscosity (spqt)	9.30 / 40.00	9.70 / 76.00	9.70 / 41.00		
Filtrate CL (ppm)	39,500.00	30,000.00	30,000.00		
pH / Fluid Loss (mptm)	N/A / N/A	N/A / N/A	N/A / N/A		
PV (cP) / YP (lhf2)	14 / 6.00	12 / 10.00	14 / 8.00		
% Solids / % Sand	10.3 / 0.1	11.7 / 0	9.7 / 0		
% Oil / Oil:Water Ratio	66 / 75:25	66 / 76:24	66 / 75:25		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (degF) / Source	245.03 / PCM	258.96 / PCM	258.96 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Mason Smith	Mason Smith	Mason Smith		
Customer Representative	John Drahota	John Drahota	John Drahota		

Sensor Information					
Downhole Processor Information					
Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341332	11341332	11341332		
Insert Serial Number	12001049	11145600	11145600		
Date and Time Initialized	23-May-16 14:06	23-May-16 21:14	01-Jan-70 00:00		
Date and Time Read	27-May-16 05:12	30-May-16 06:29	30-May-16 05:01		
ECMB SW Version	N/A	N/A	N/A		
Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	61.00	61.00	61.00		
Software Version	6.33	6.33	6.33		
Sub Serial Number	11341332	11341332	11341332		
Sonde Serial Number	11833264	11478196	11478196		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	18.70	216.00	301.30		
Gamma Ray Sensor Information					
Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.00	49.35	49.34		
Recorded Sample Period (sec)	15	15	15		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341332	11341332	11341332		
Insert/Sonde Serial Number	11579779	12071507	12071507		
DDSr-Sonde Sensor Information					
Tool Type	DDSr-Sonde	DDSr-Sonde	DDSr-Sonde		
Distance From Bit (ft)	44.91	45.26	45.25		
Recorded Sample Period (sec)	80	80	80		
Software Version	80.88	80.88	80.88		
Sub Serial Number	12384241	12384241	12384241		
Insert Serial Number	12664615	11631534	11631534		
Sensor ID Number	12482	8223	8223		
REMARKS					
<p>1. All depths are calibrated to driller's pipe tally and are measured depths from the drill floor.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. All data presented is recorded (memory data) unless otherwise stated.</p> <p>4. The following smoothing parameters have been applied to the data:</p> <p>Main Log 1:600 (2"):</p> <p>(ROPA - Avg Rate of Penetration) Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft</p> <p>(PGRC - Gamma Ray Cor) Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft</p> <p>Detail Log 1:240 (5"):</p> <p>(ROPA - Avg Rate of Penetration) Interval: 0.5 ft, Coercion Distance: 1.2 ft, Gap fill: 3.0 ft</p> <p>(PGRC - Gamma Ray Cor)</p>					

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

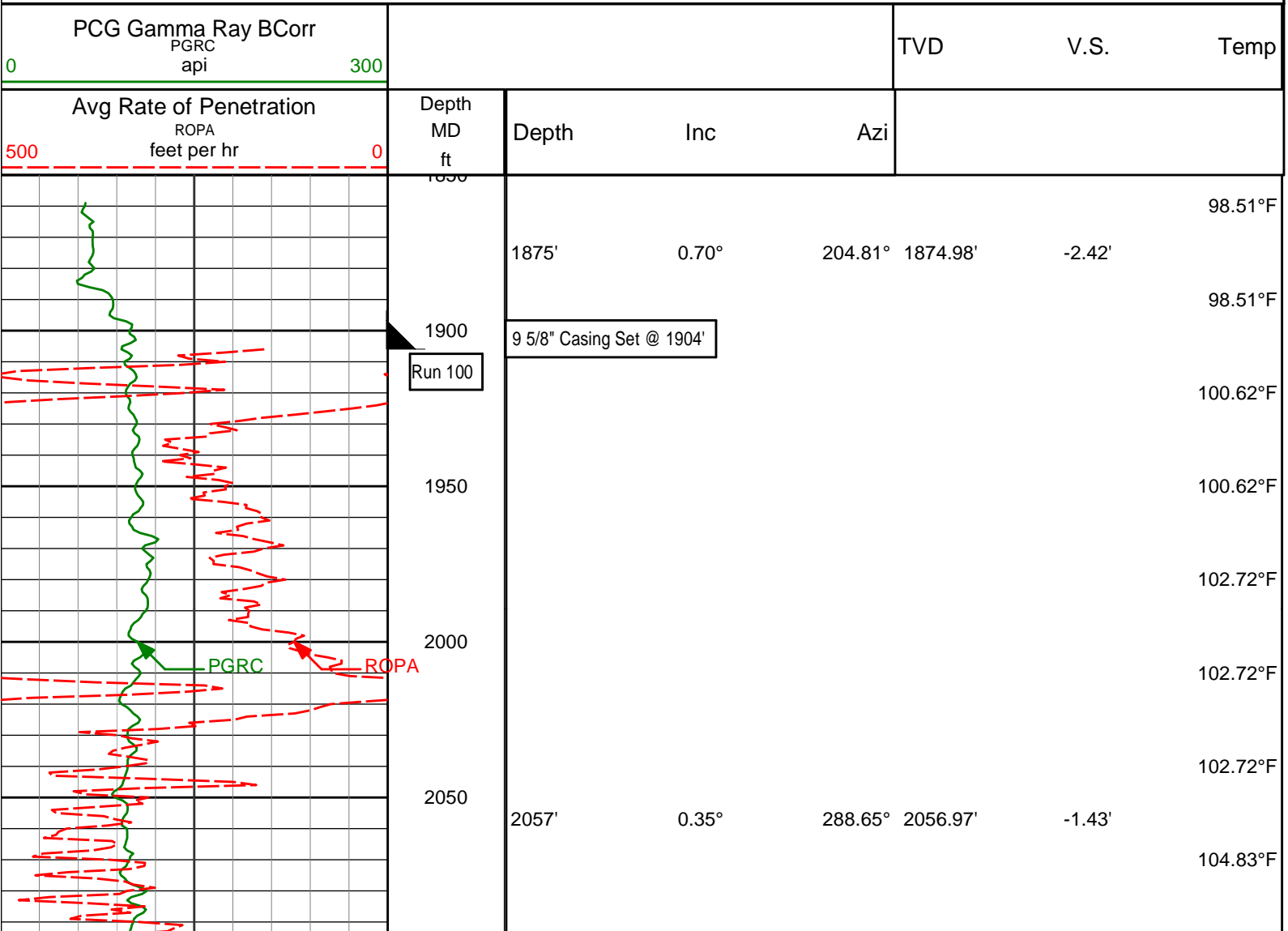
5. Surveys corrected by Surcon starting at 2057 ft.

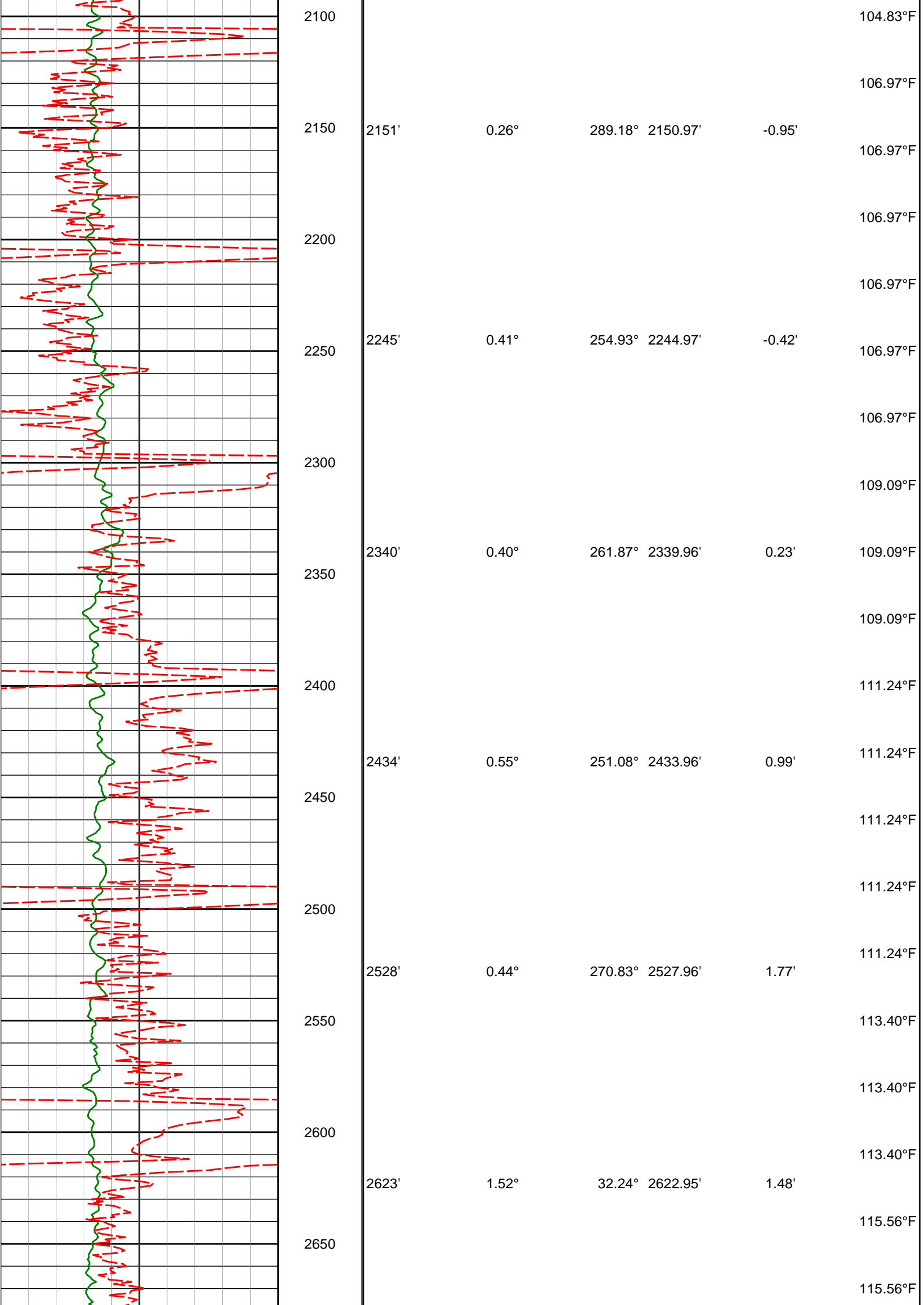
WARRANTY

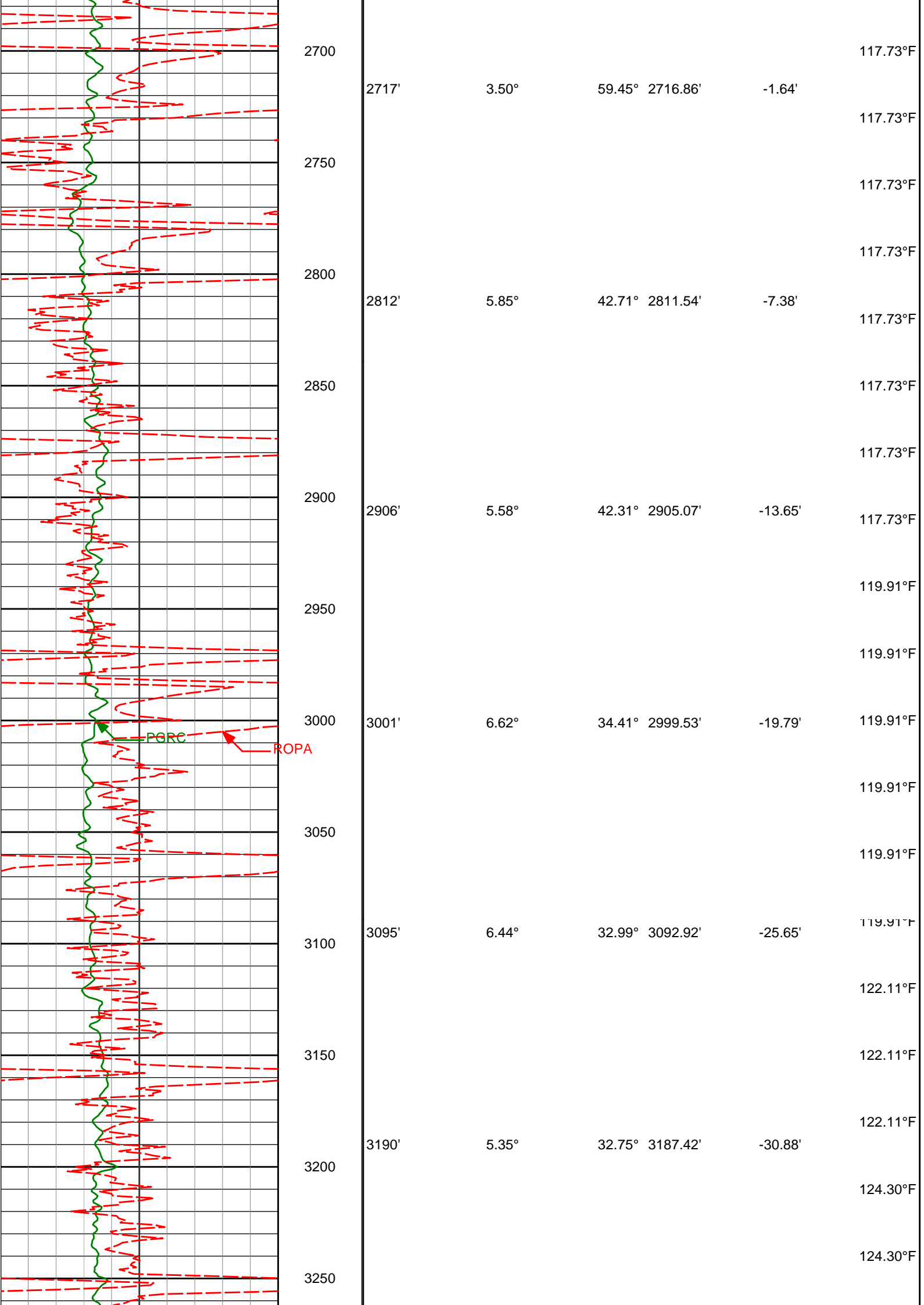
WARRANTY

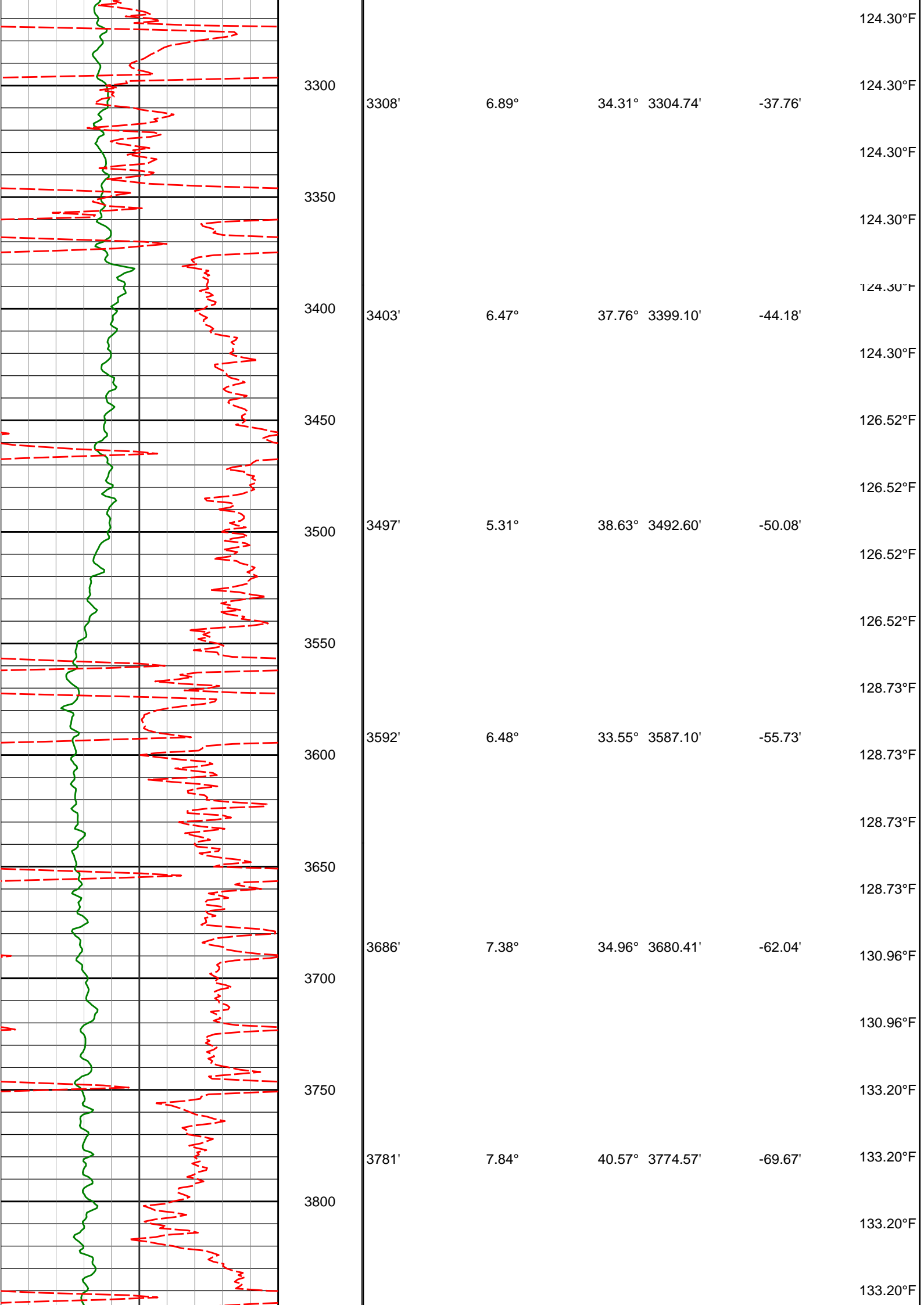
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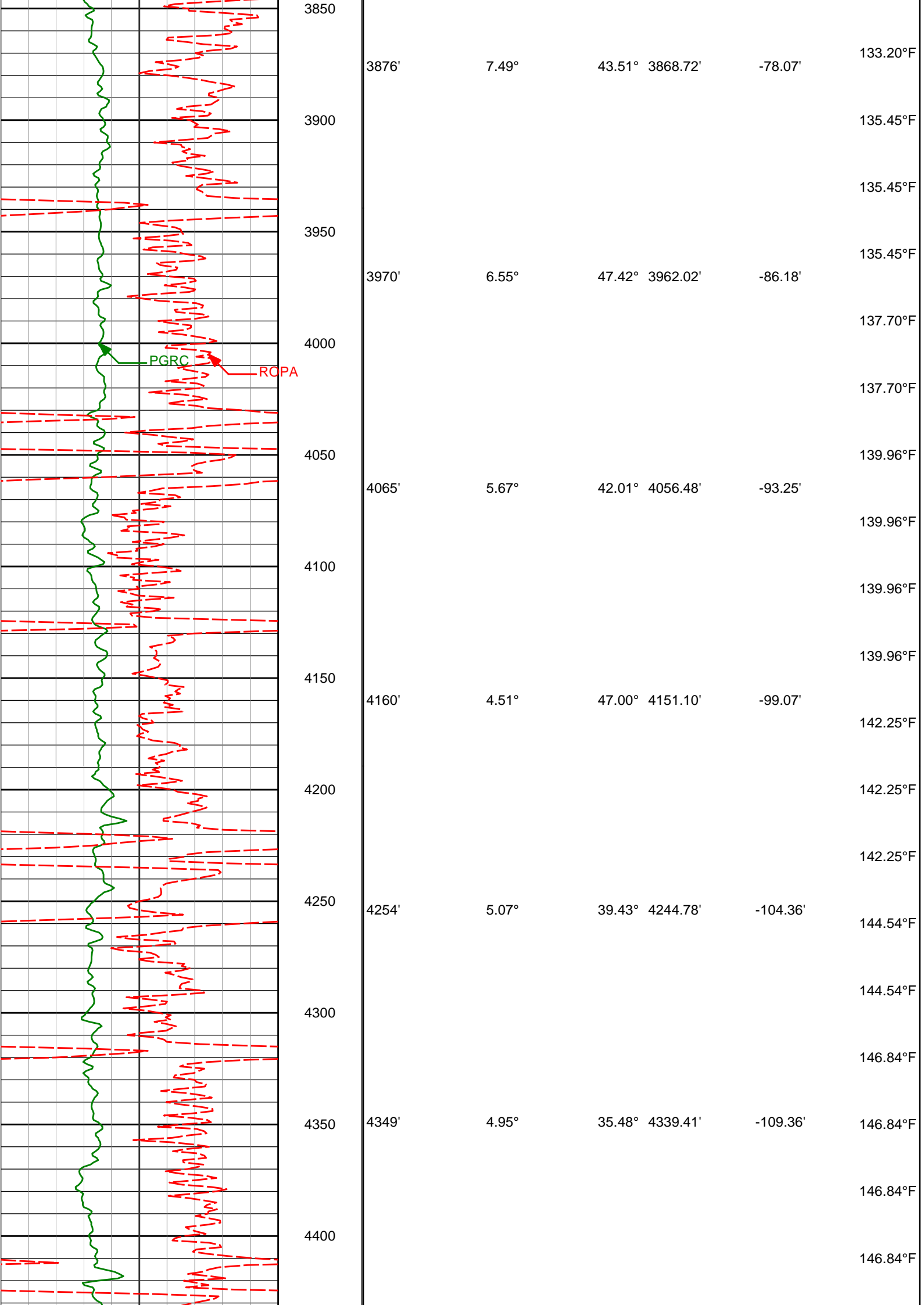
MD Main Log 1:600 Scale

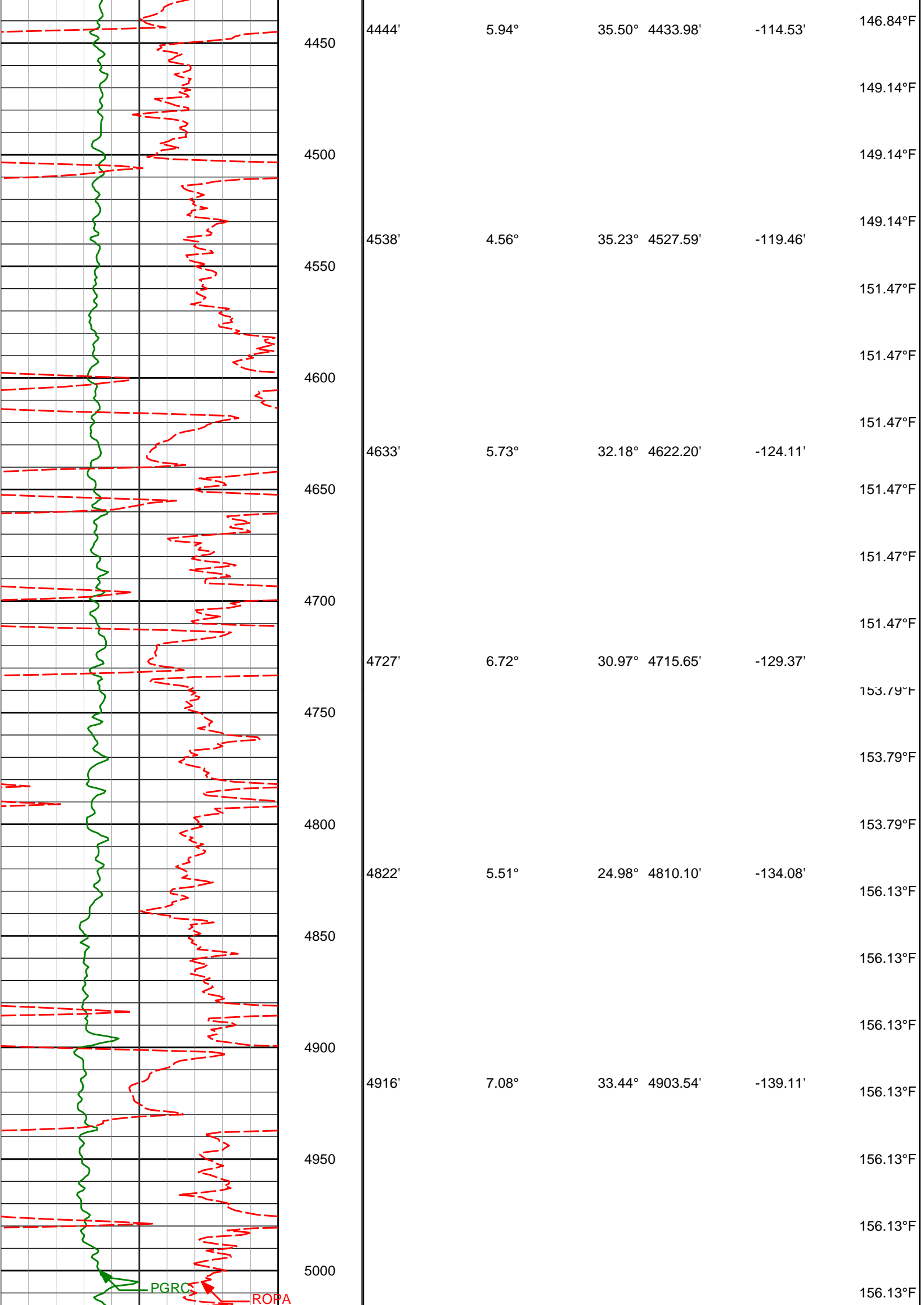


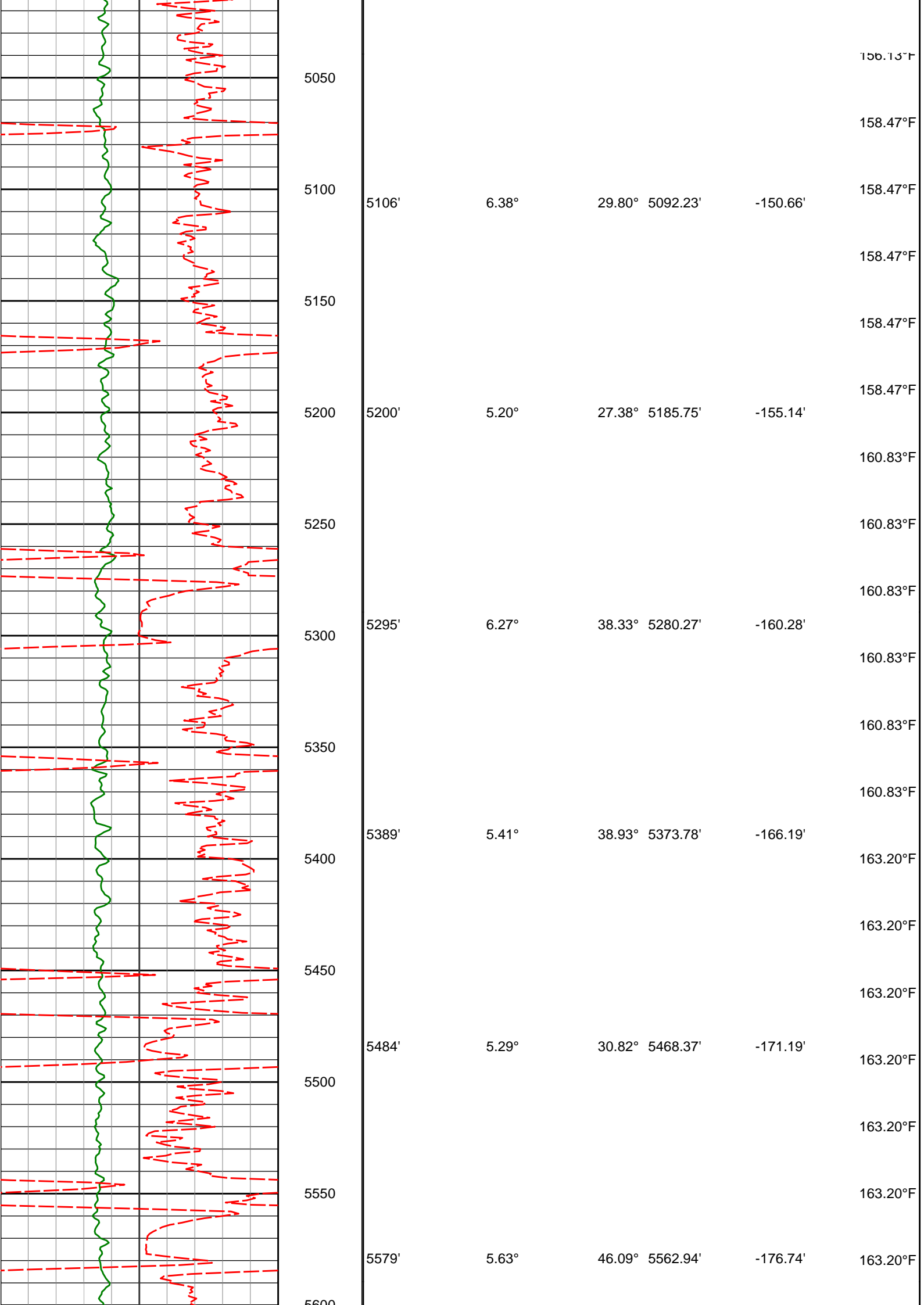


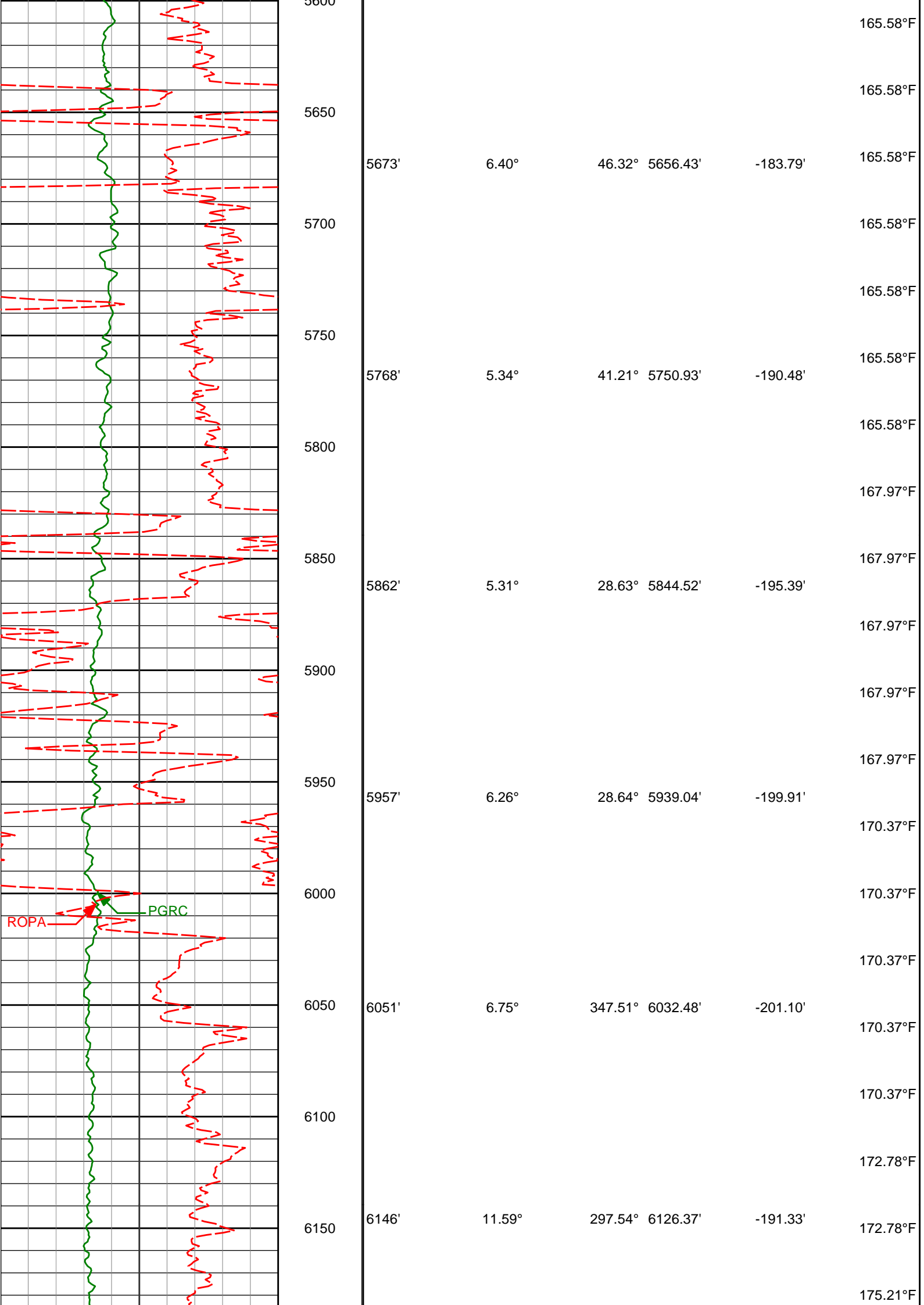


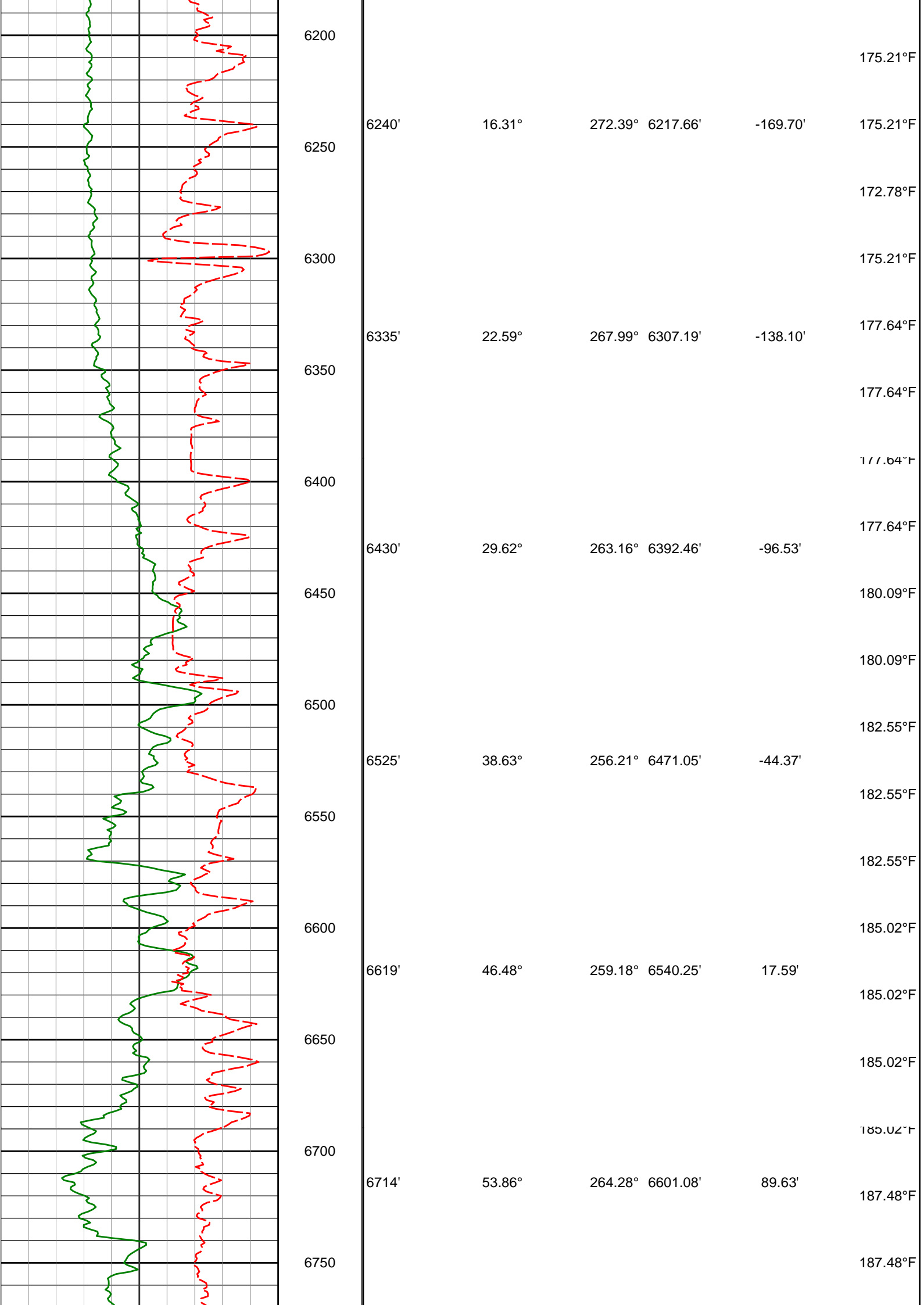


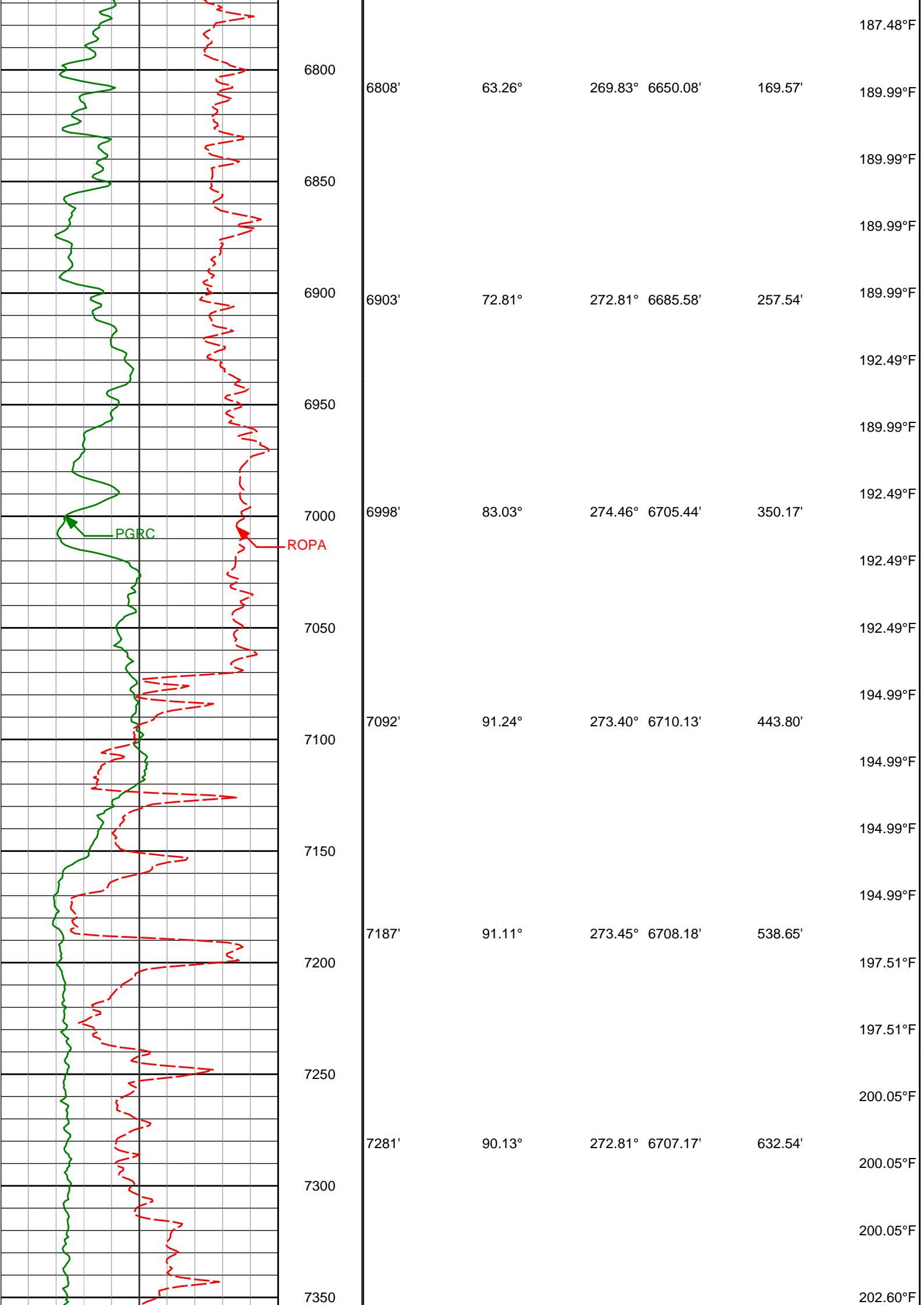


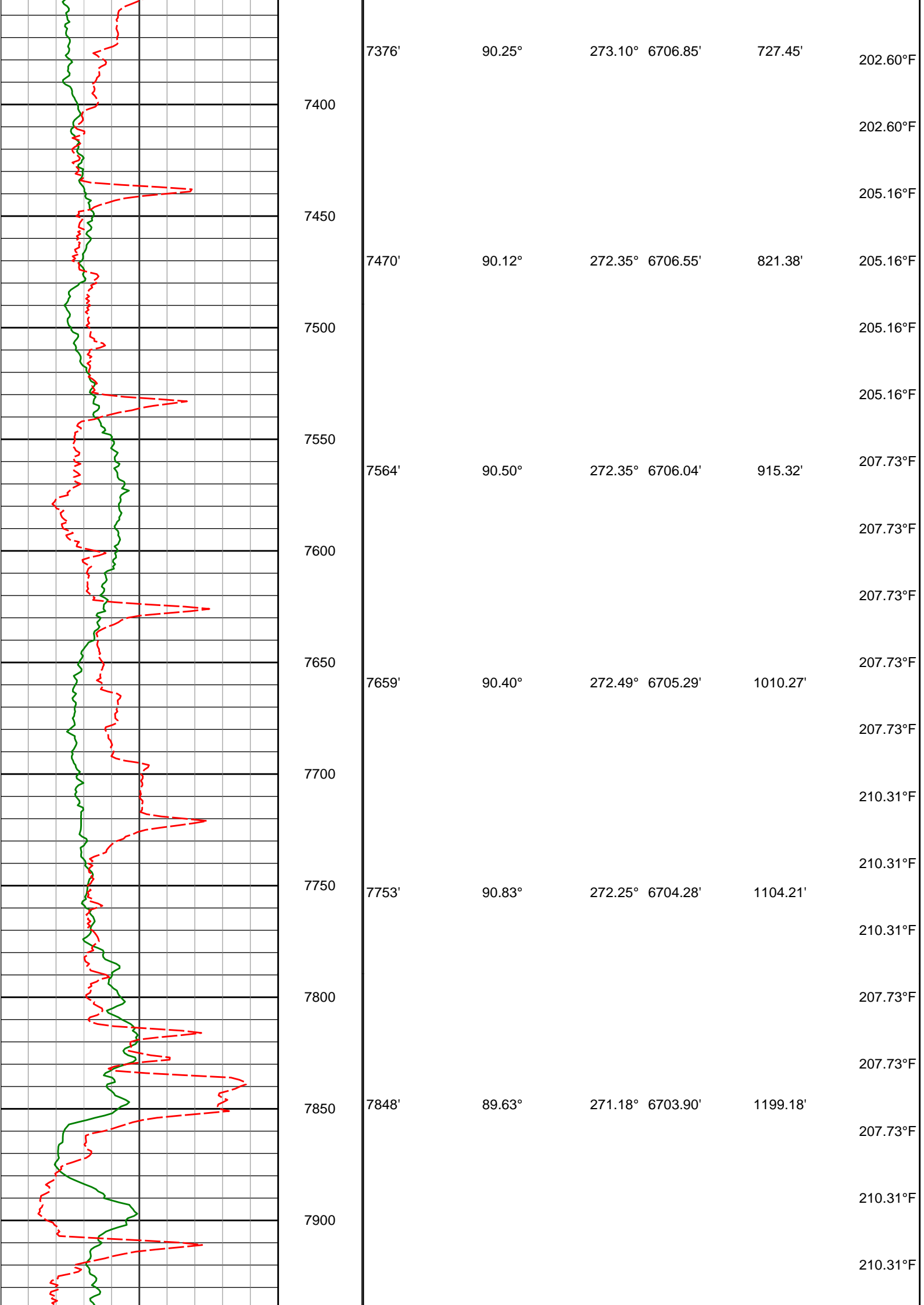


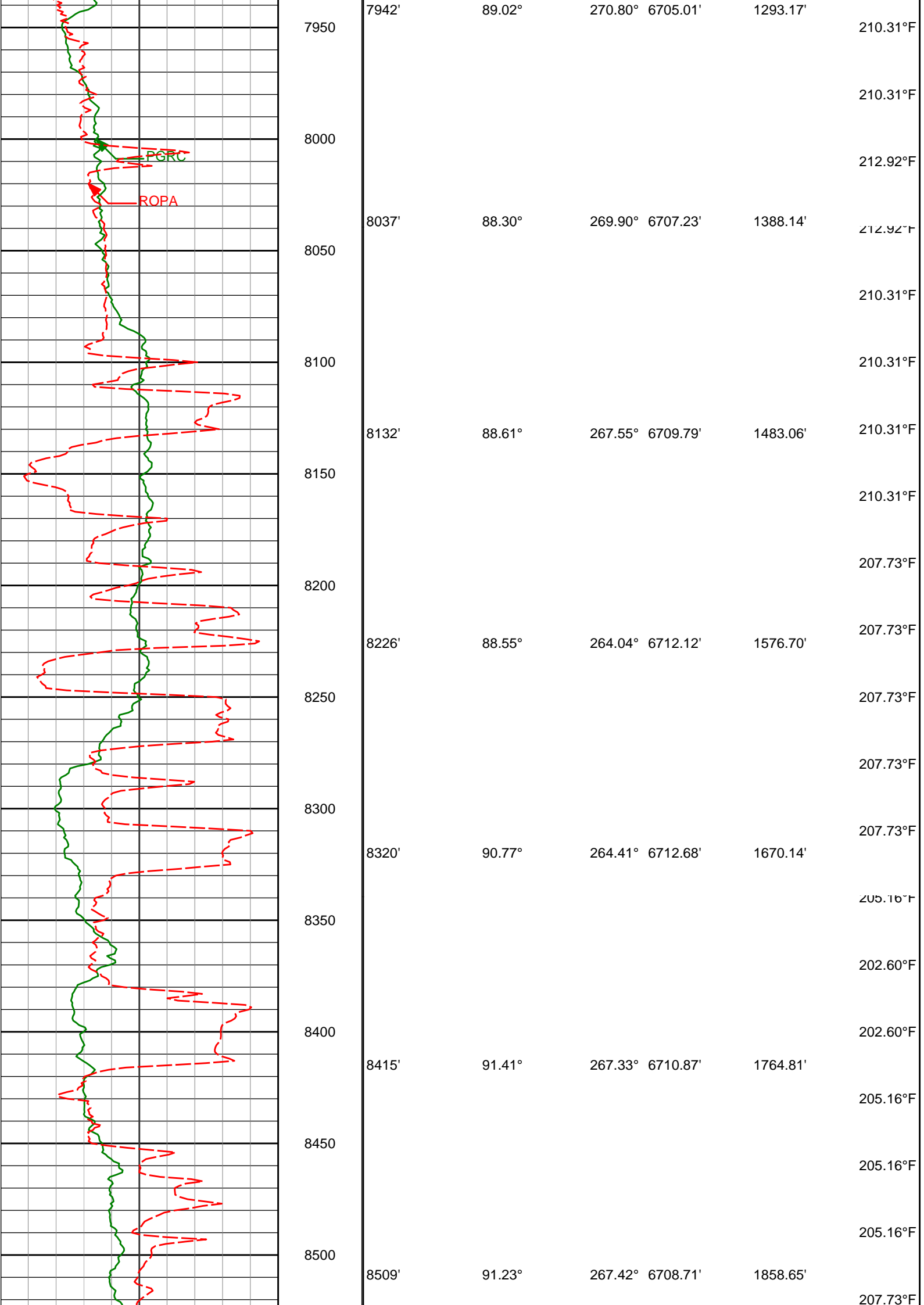


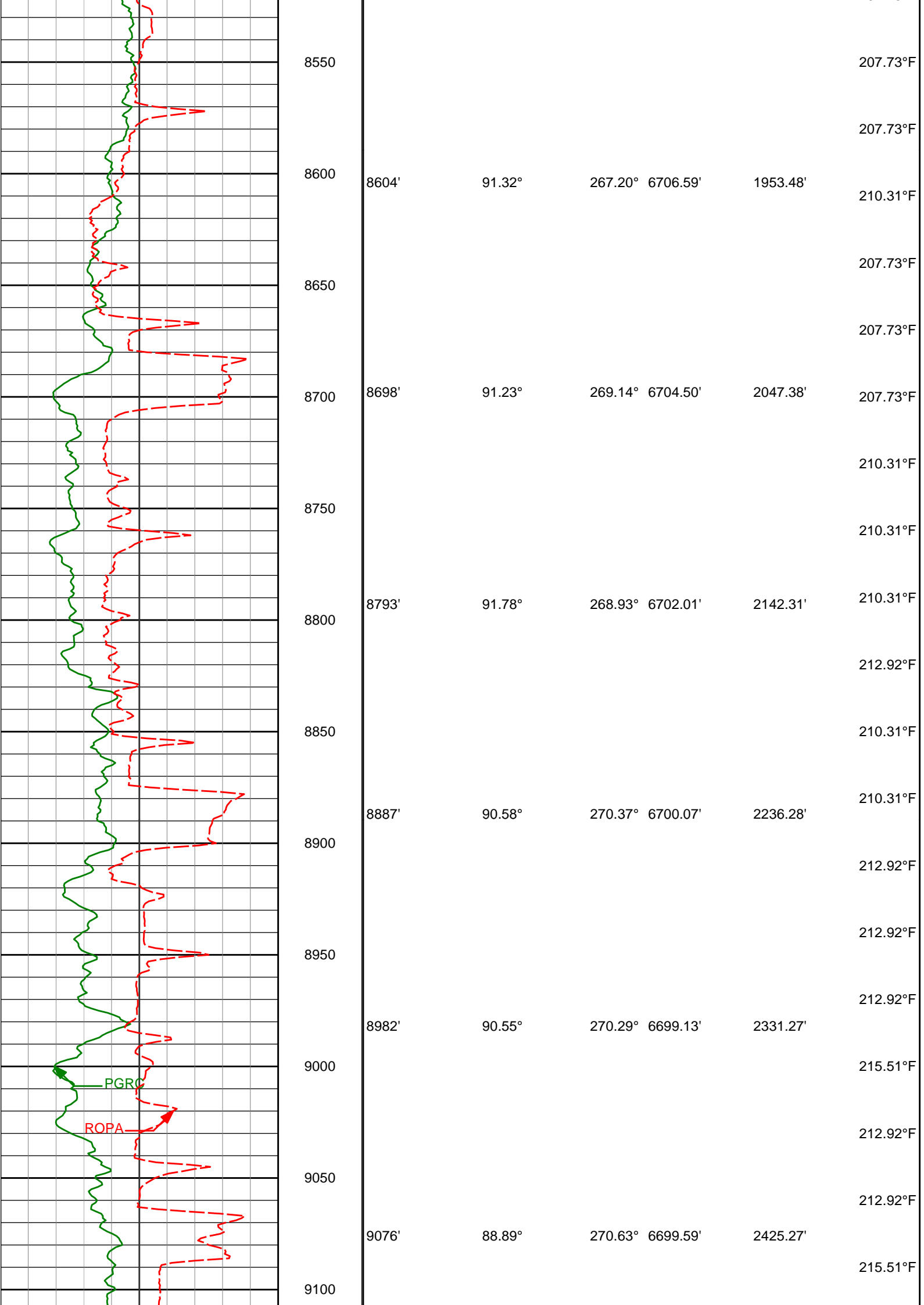


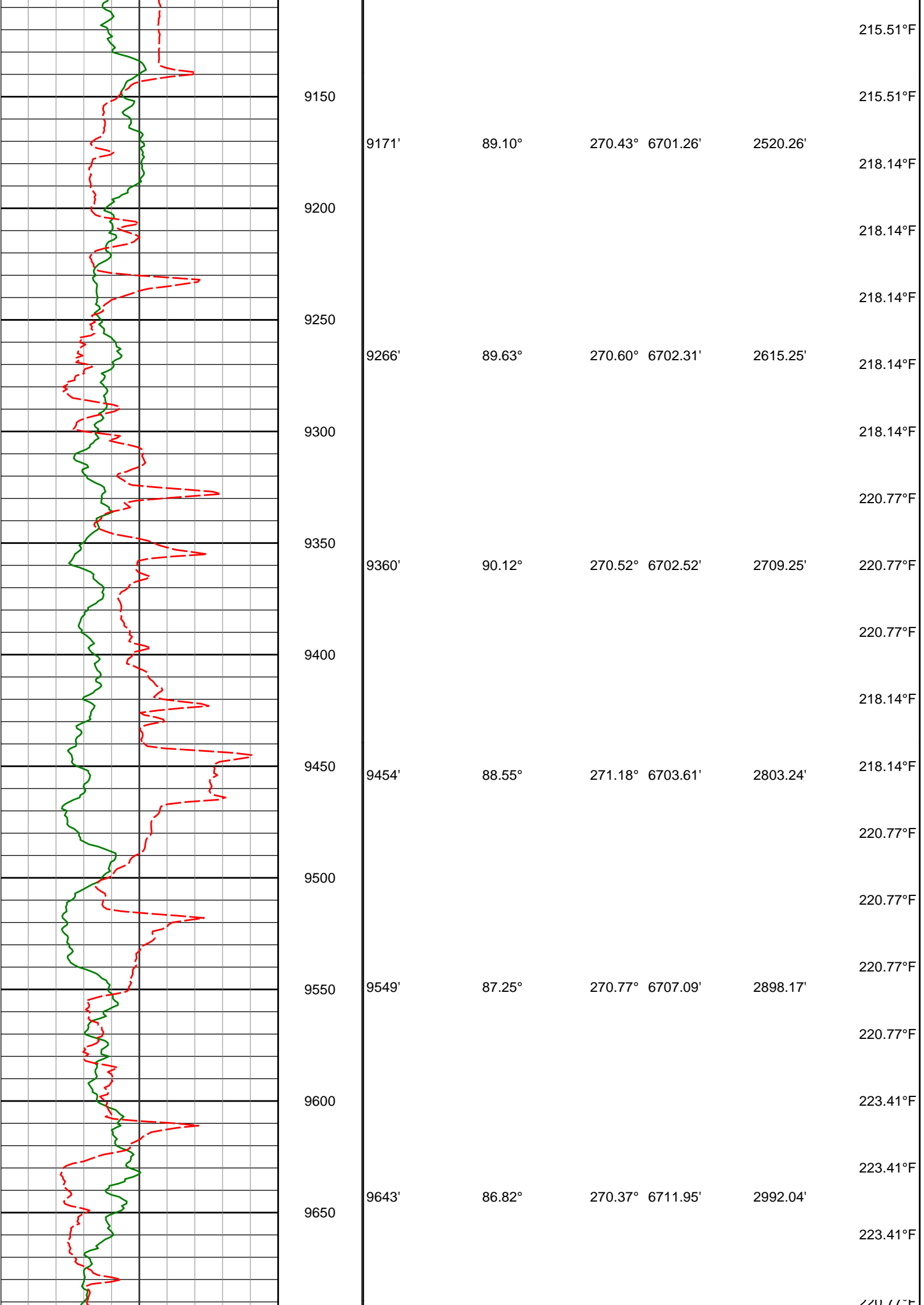


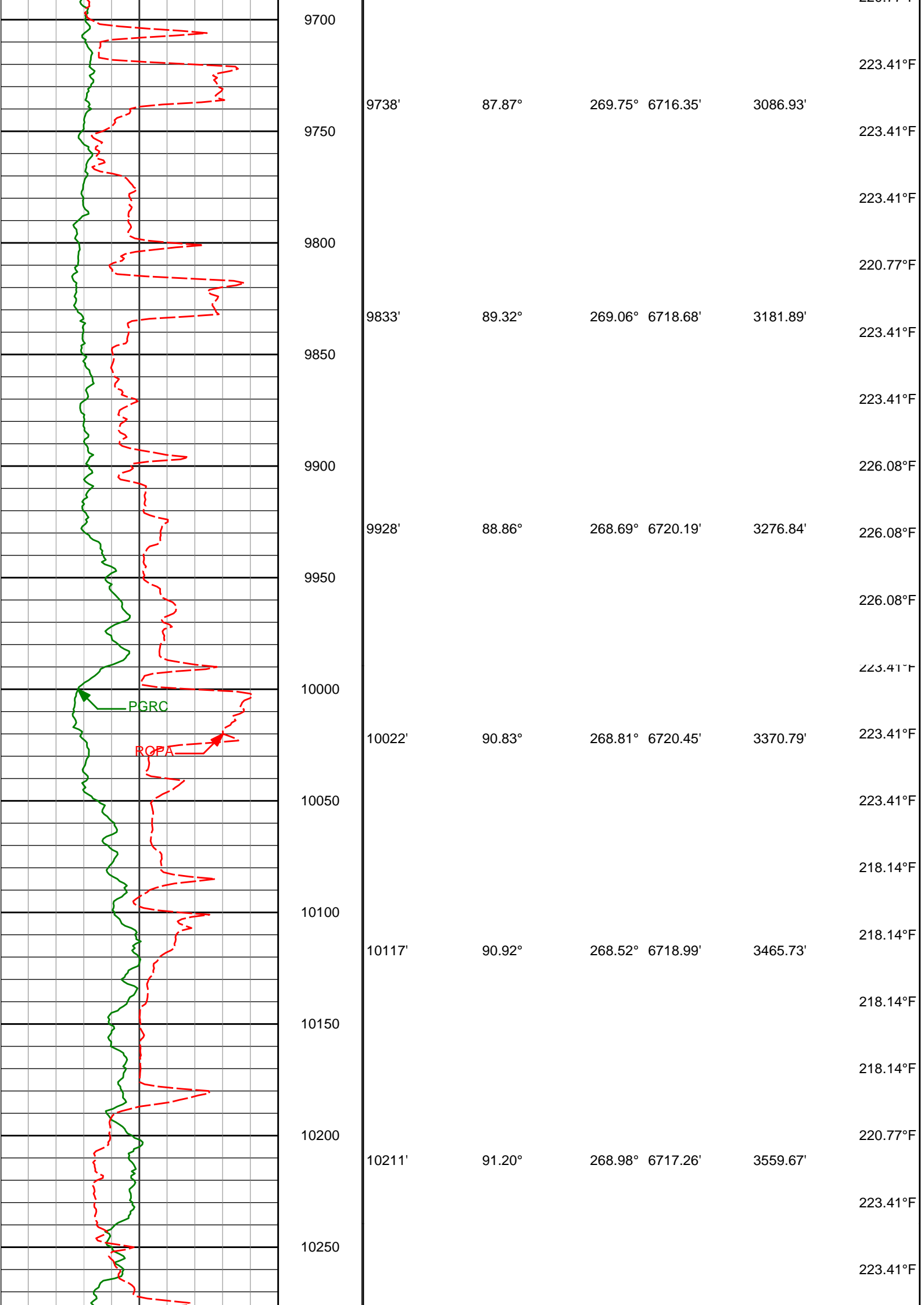


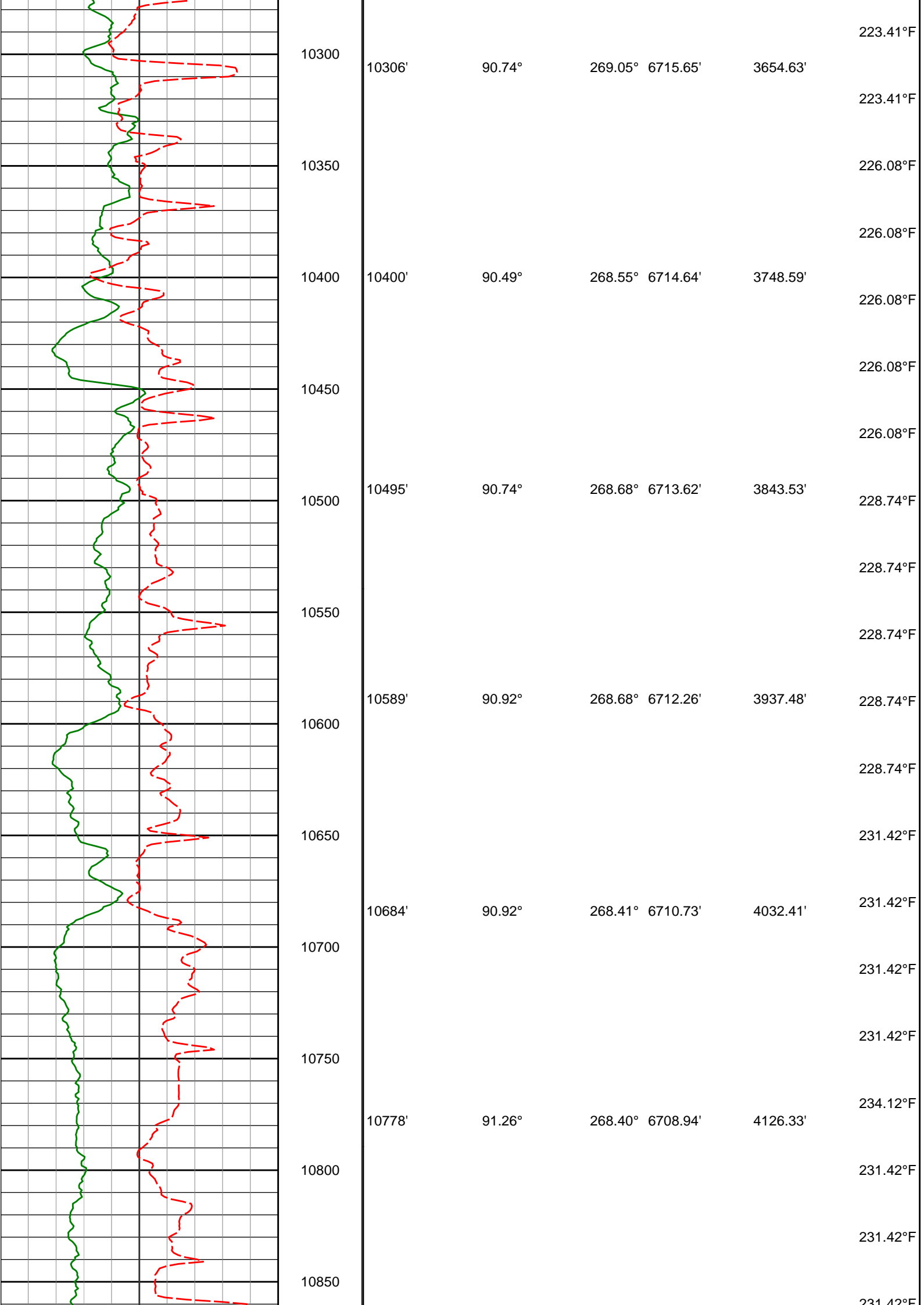


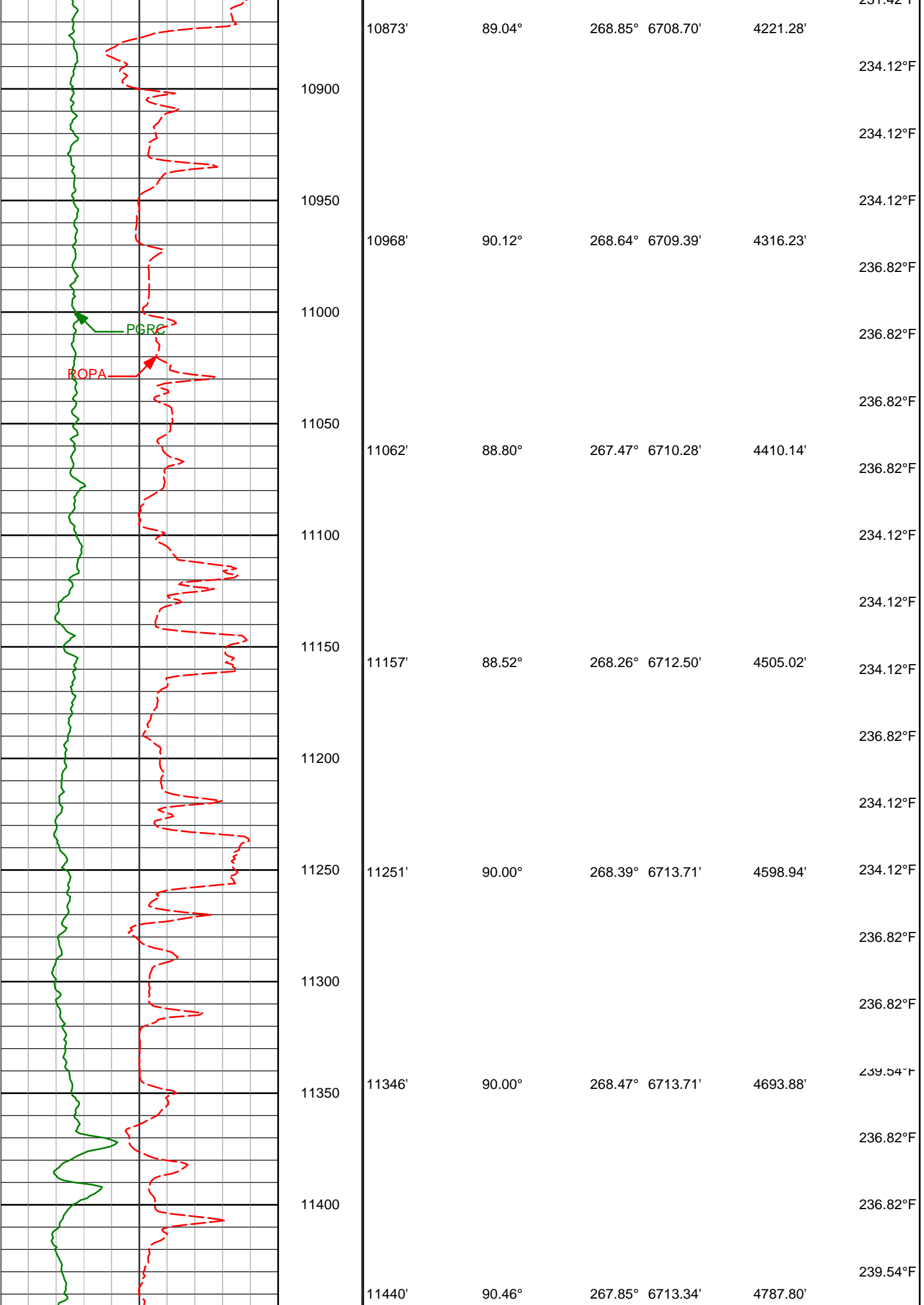


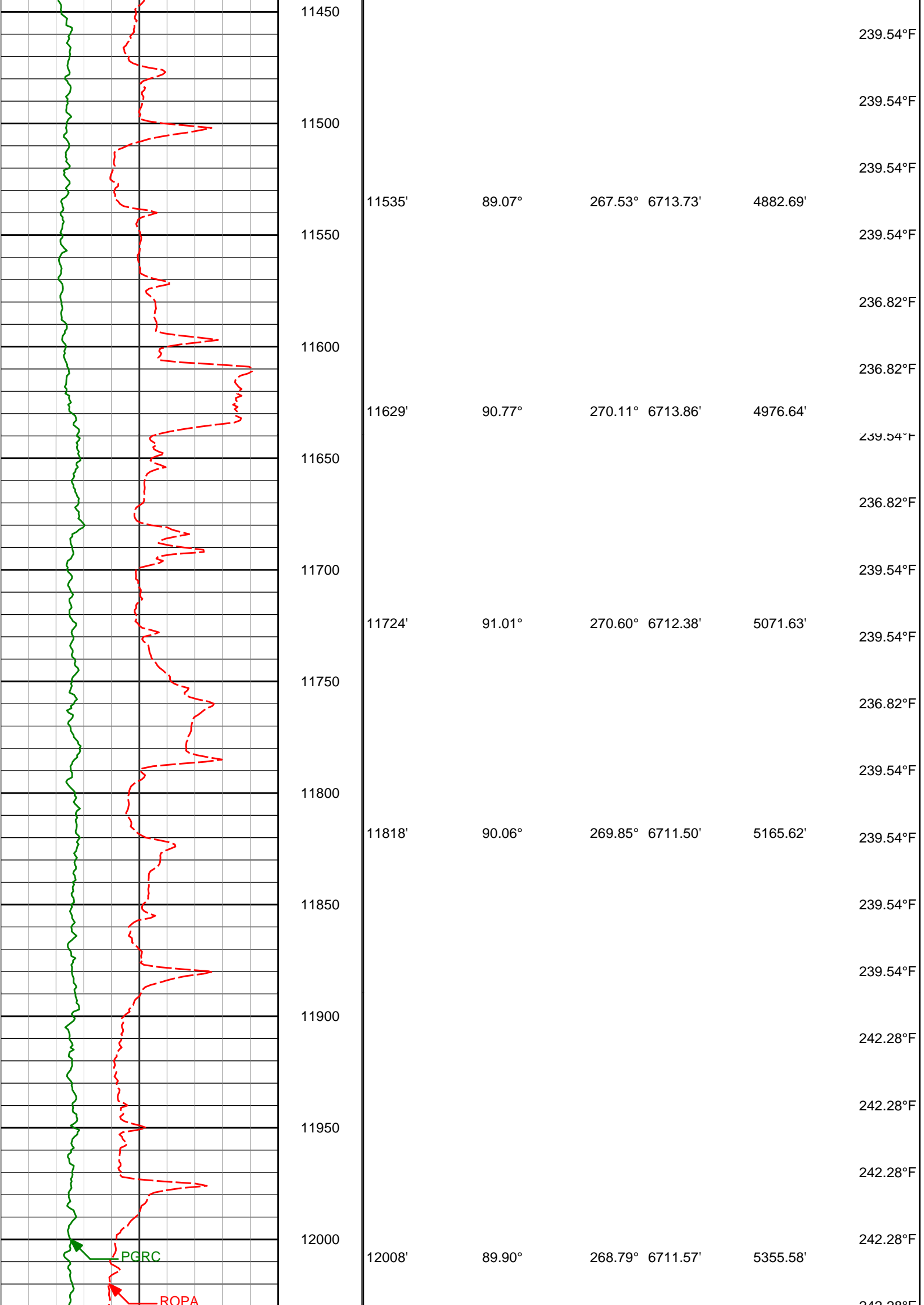


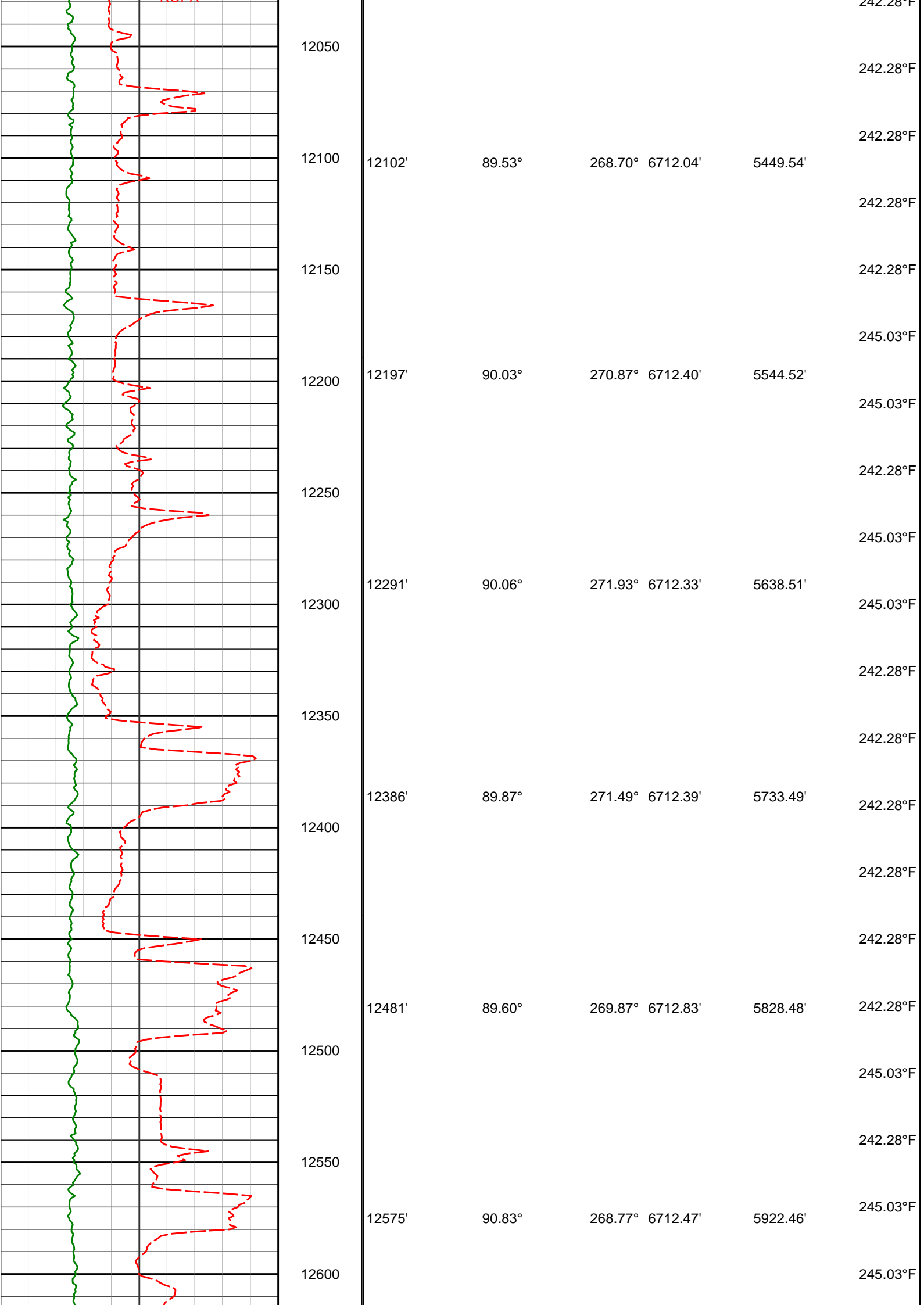


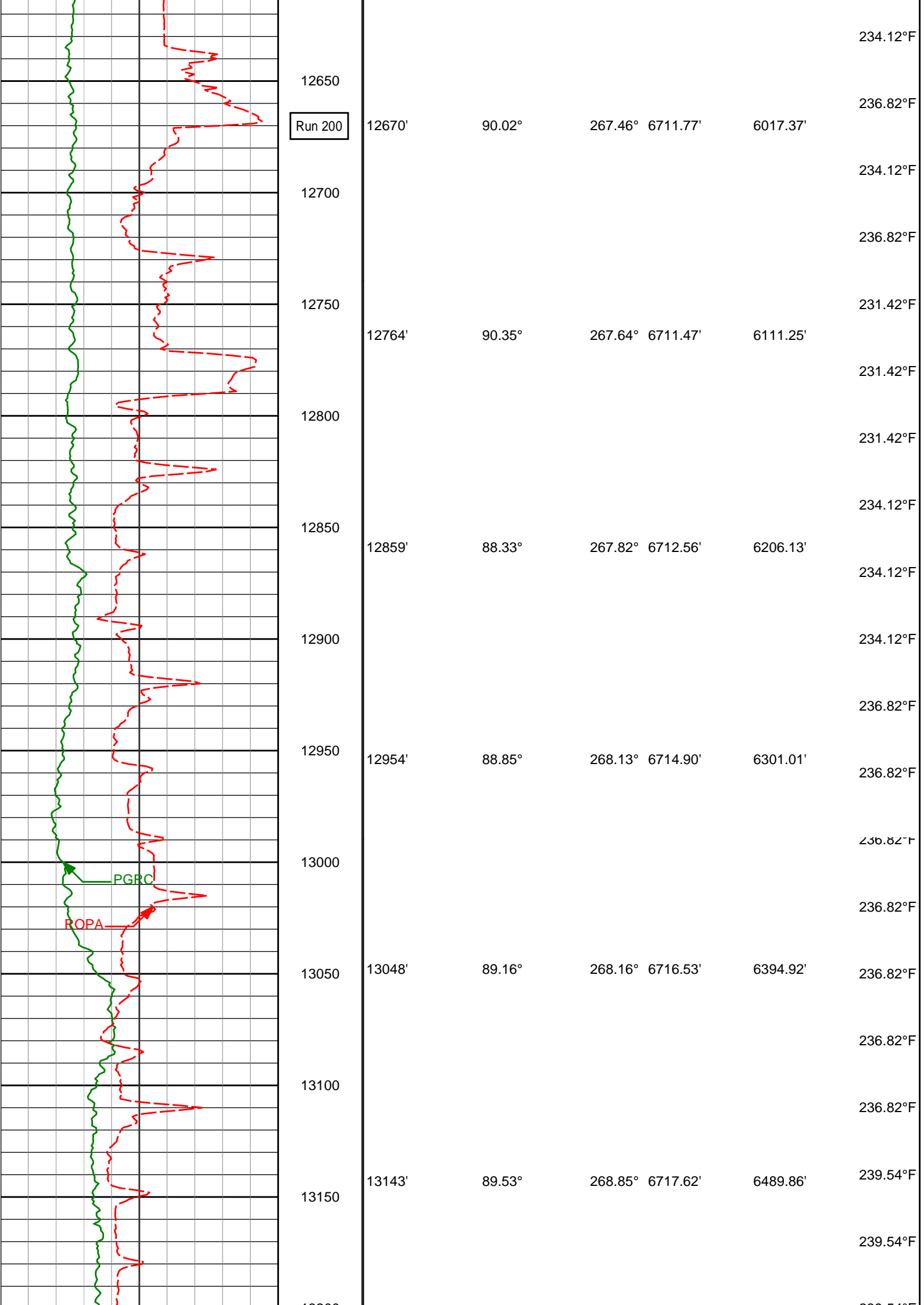


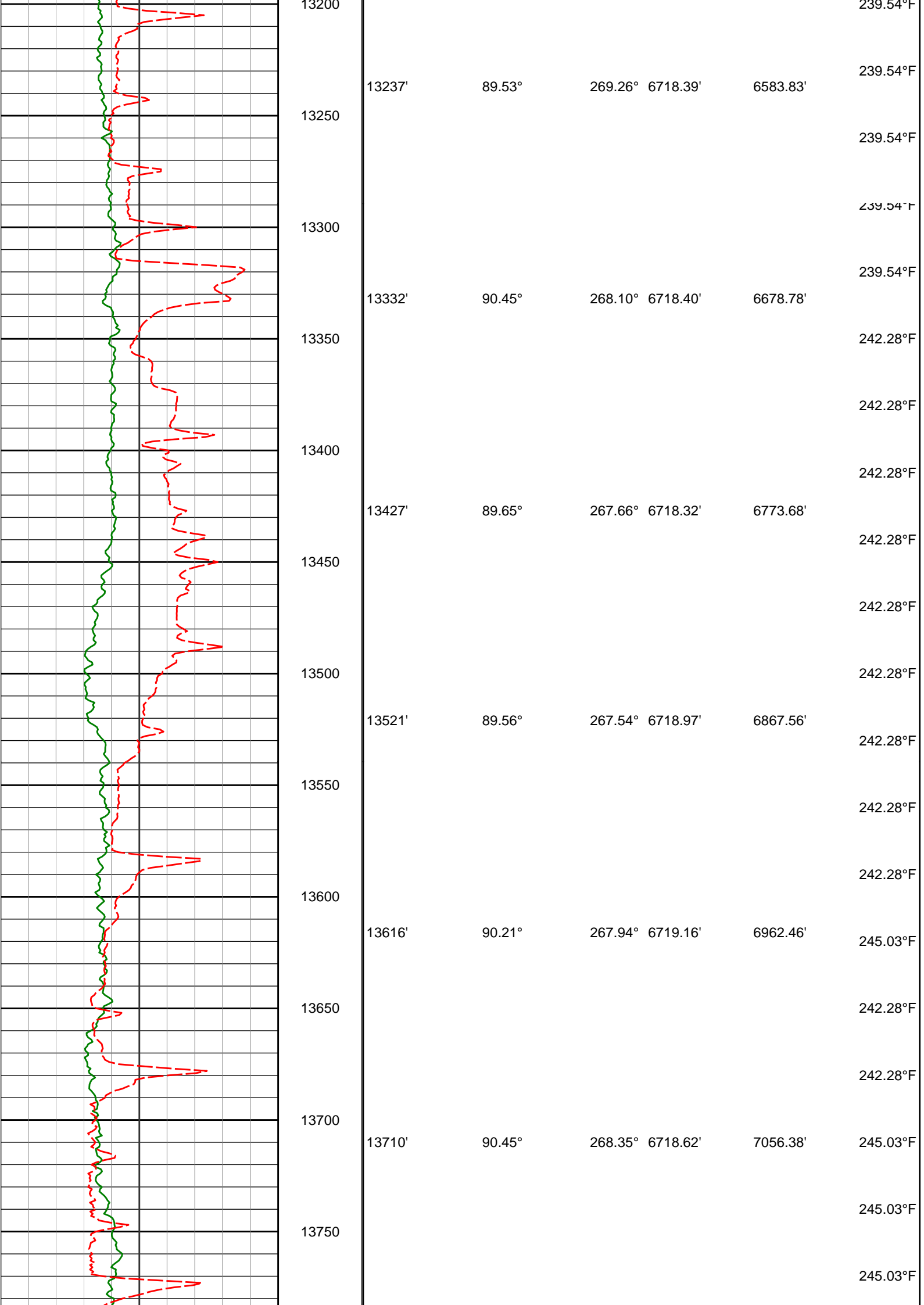


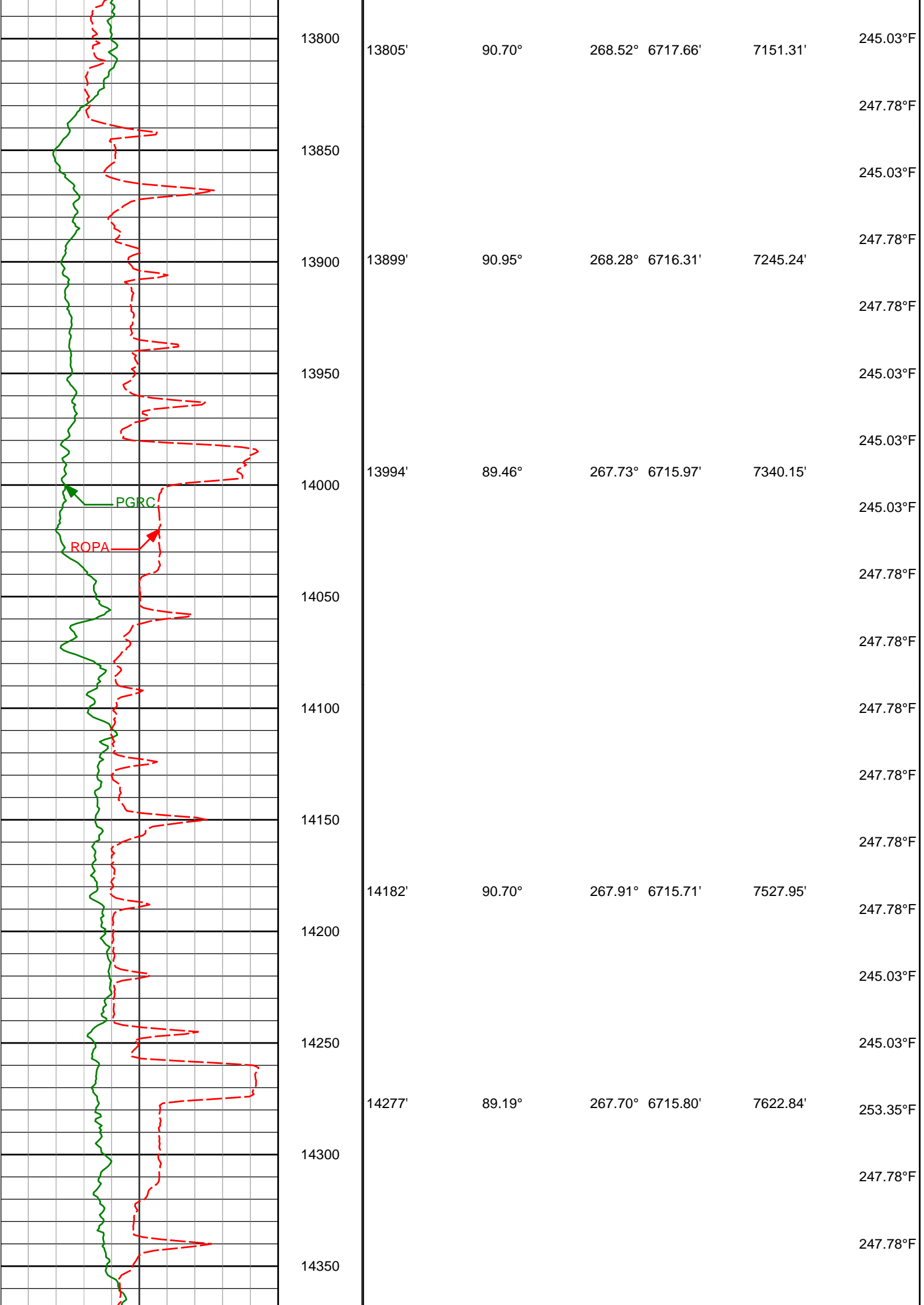


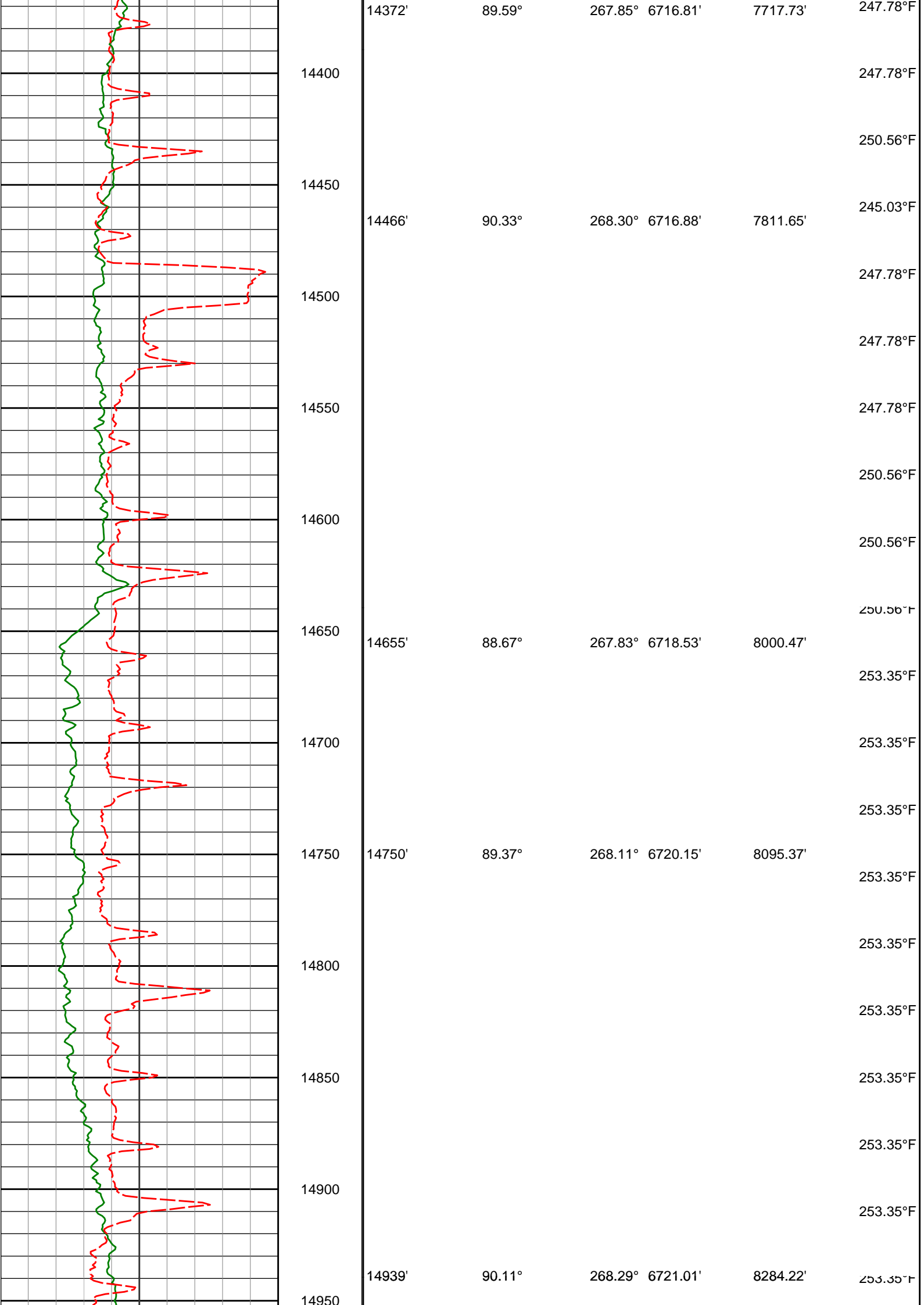


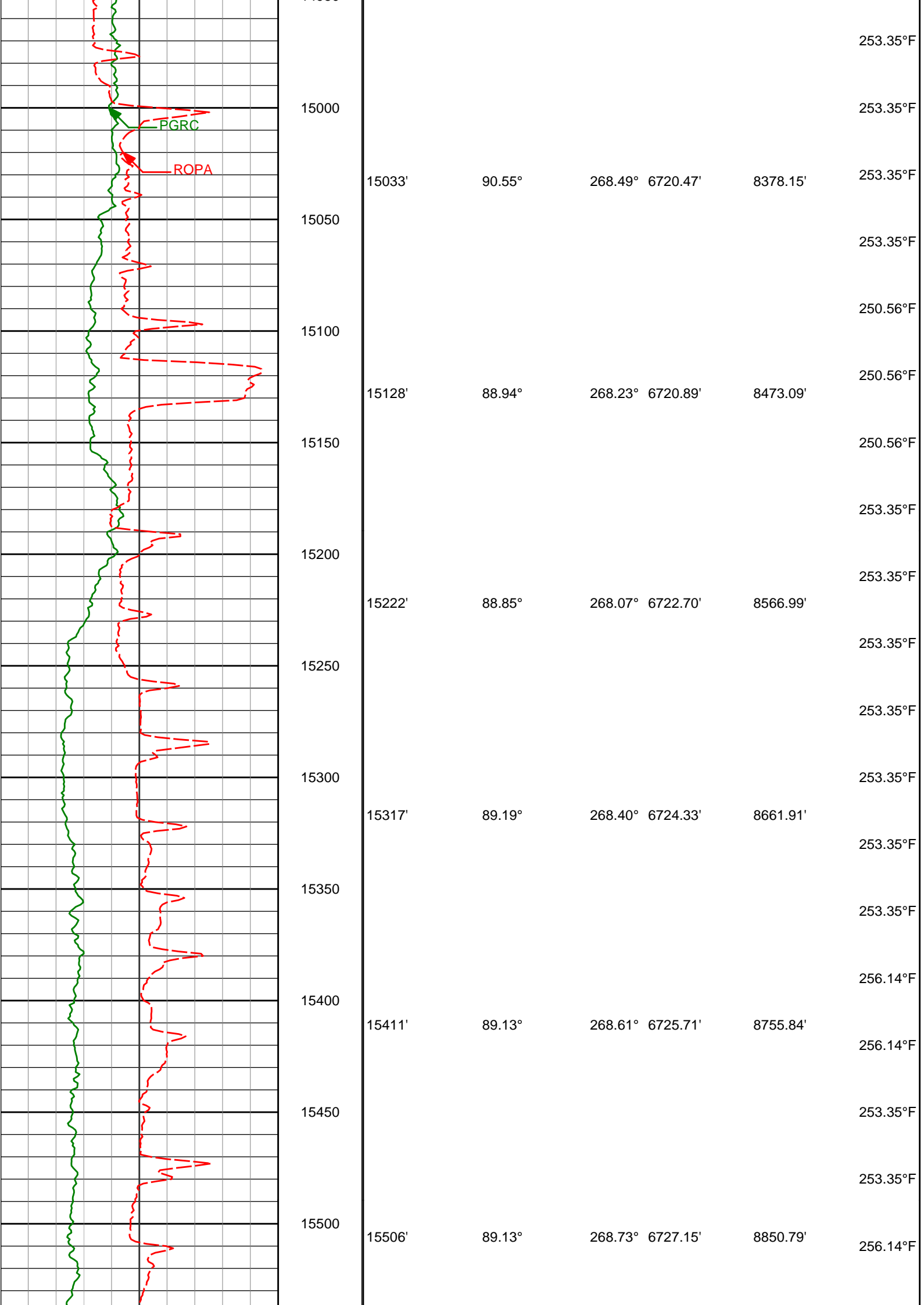


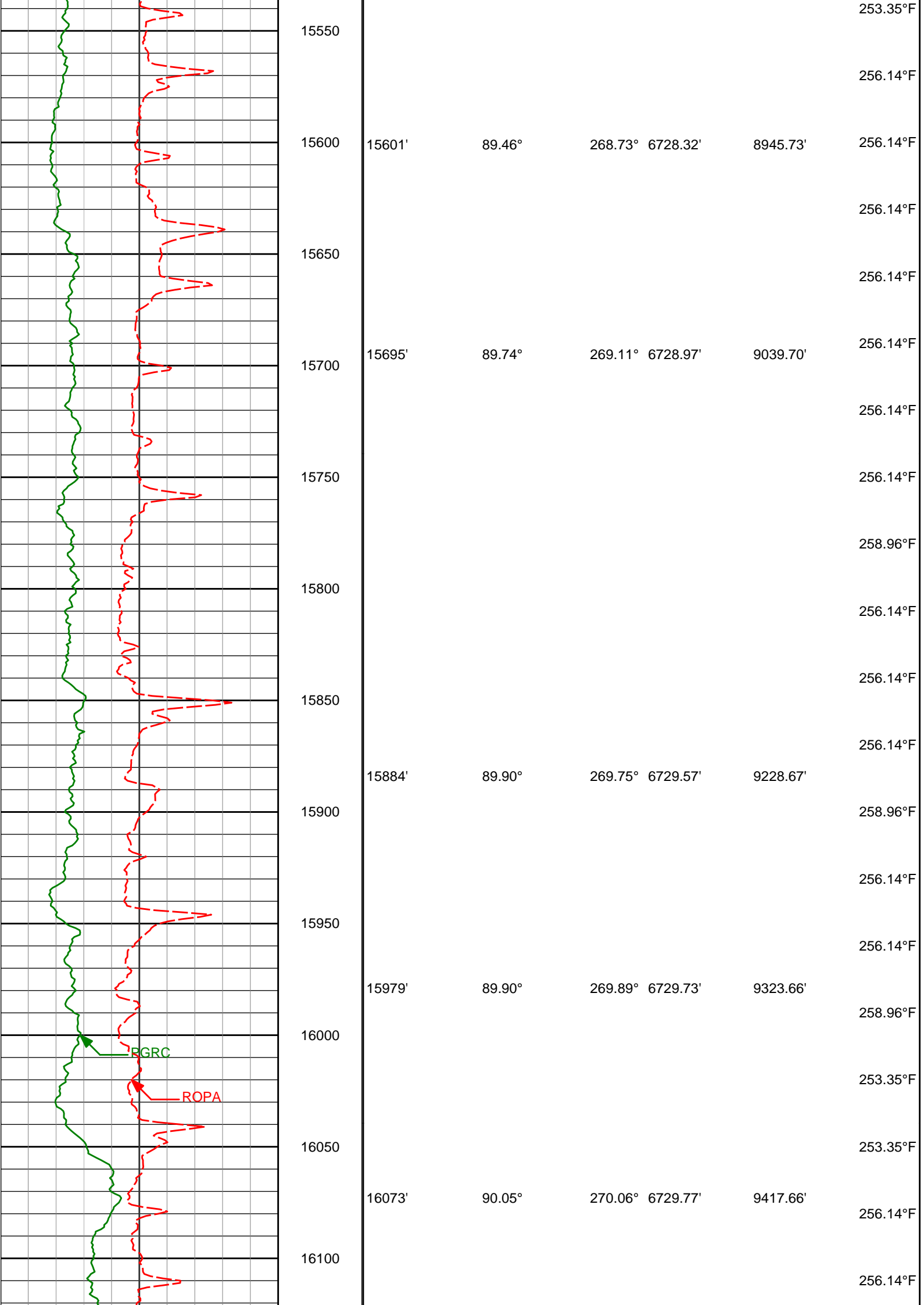


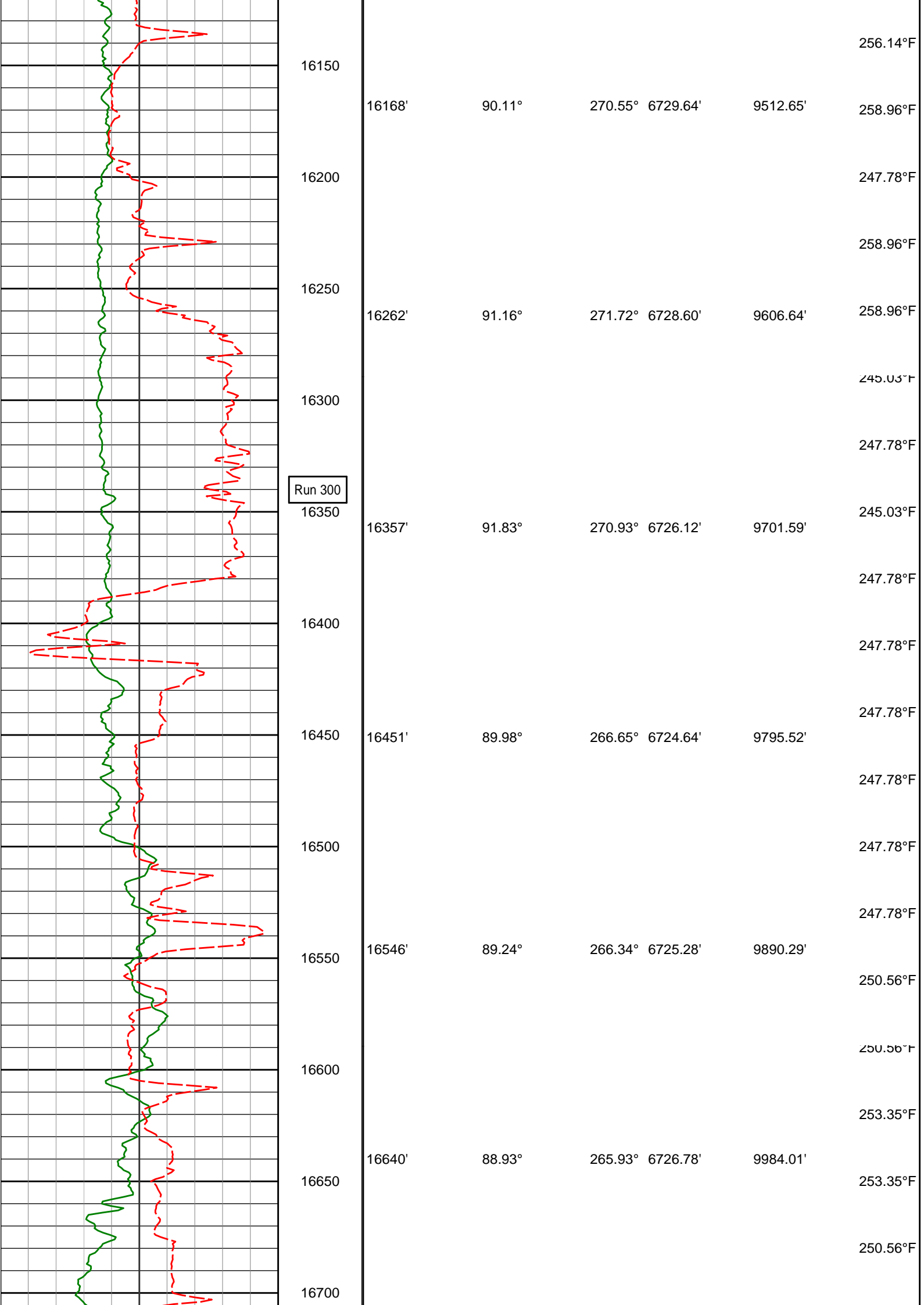


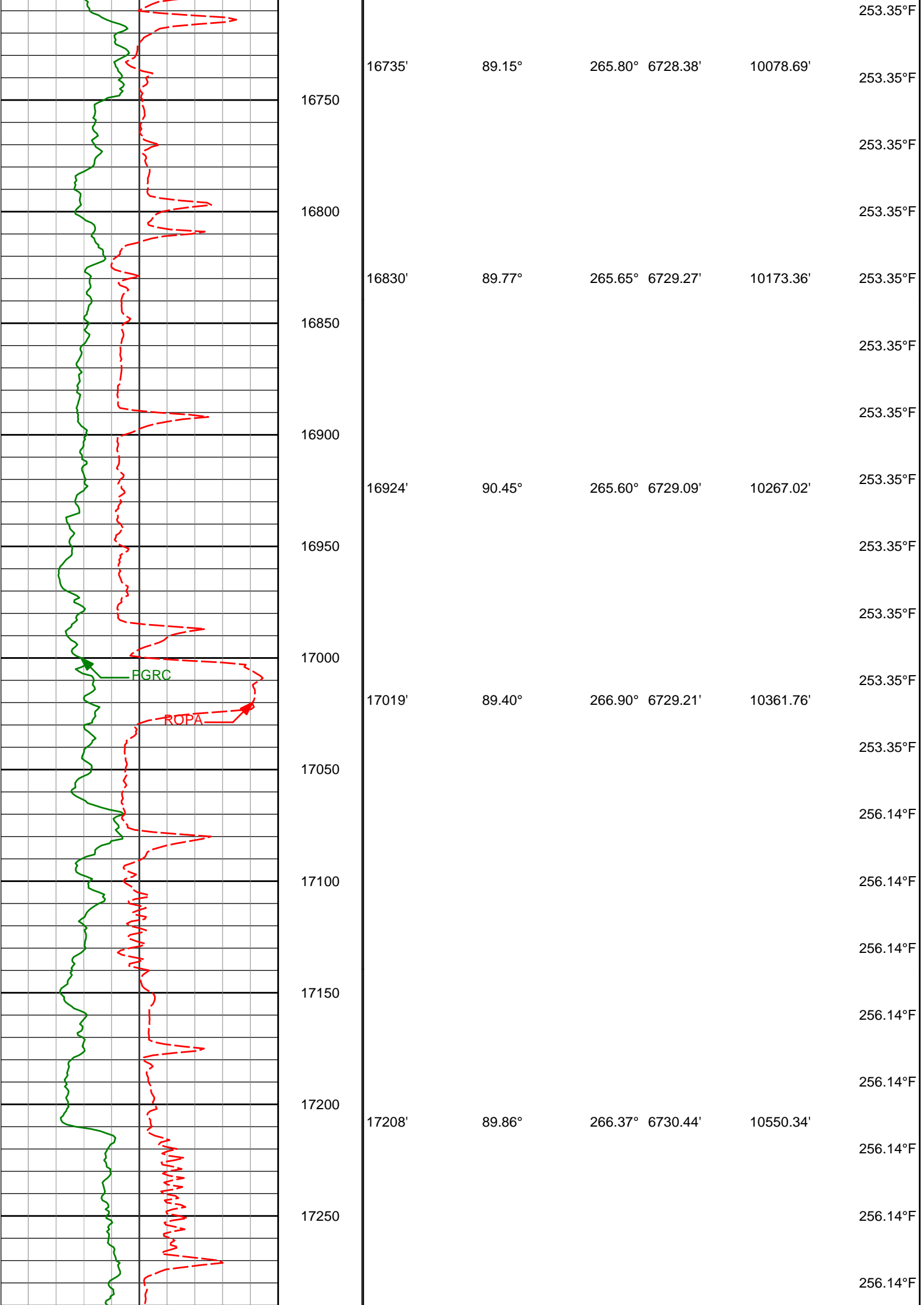


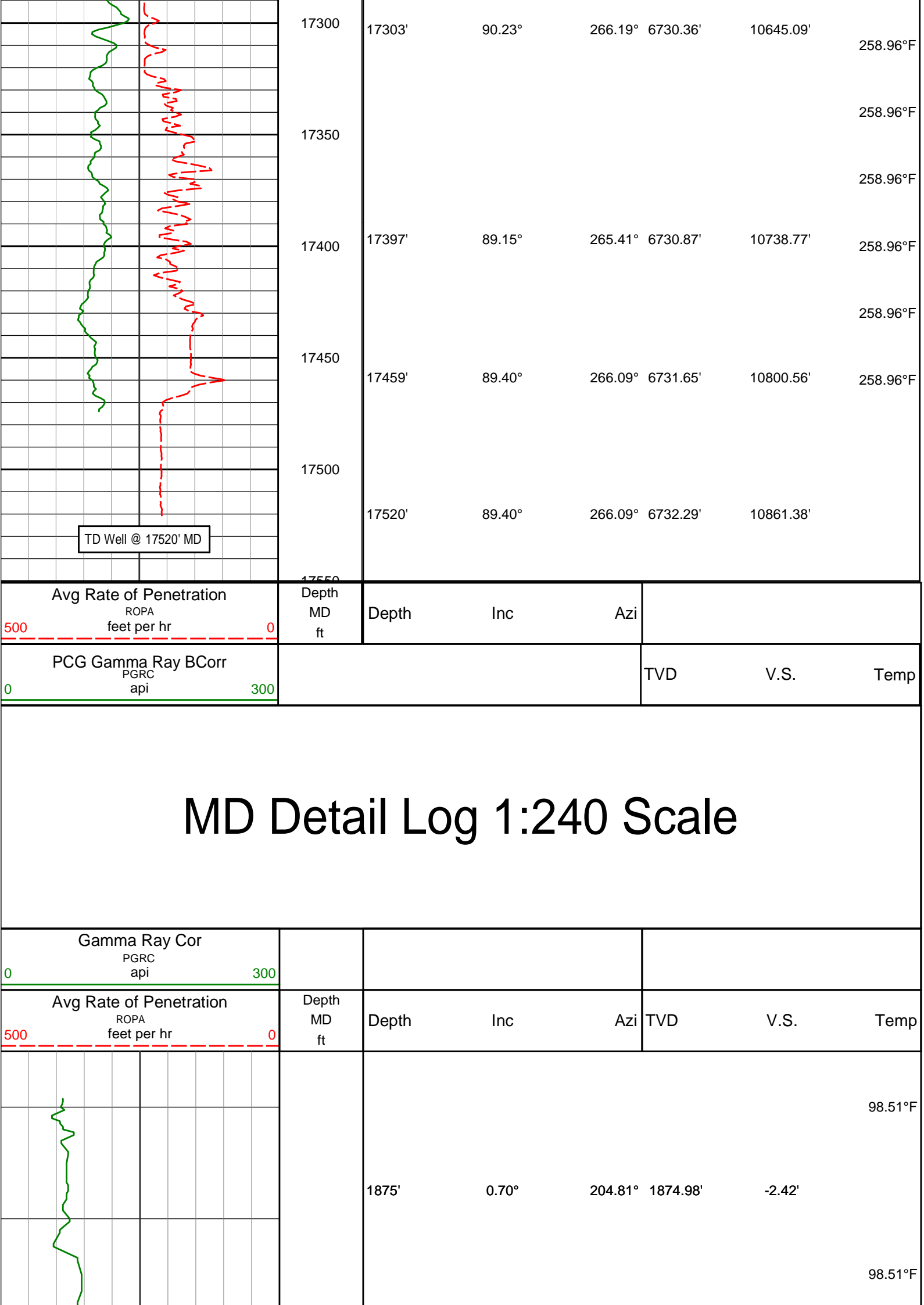


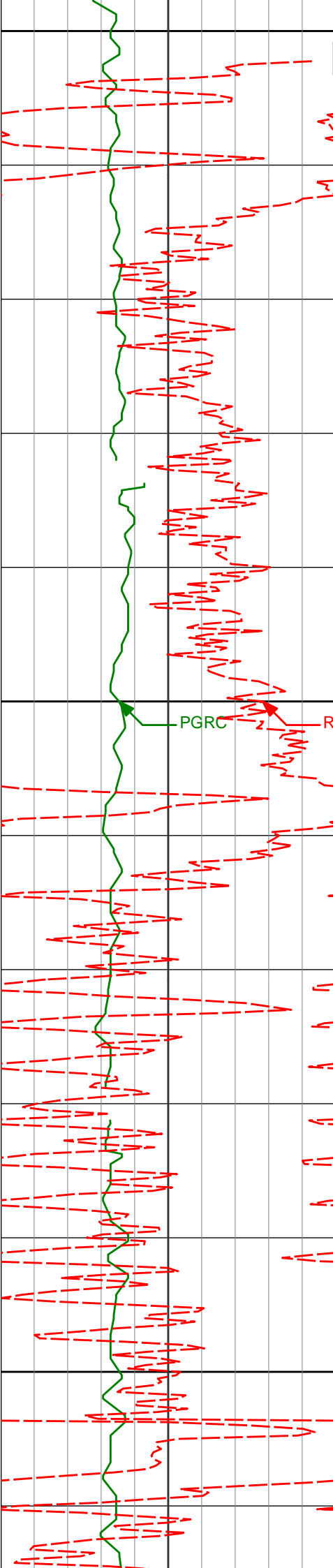












1900

Run 100

9 5/8" Casing Set @ 1904'

100.62°F

100.62°F

102.72°F

2000

PGRC

ROPA

102.72°F

102.72°F

2057'

0.35°

288.65°

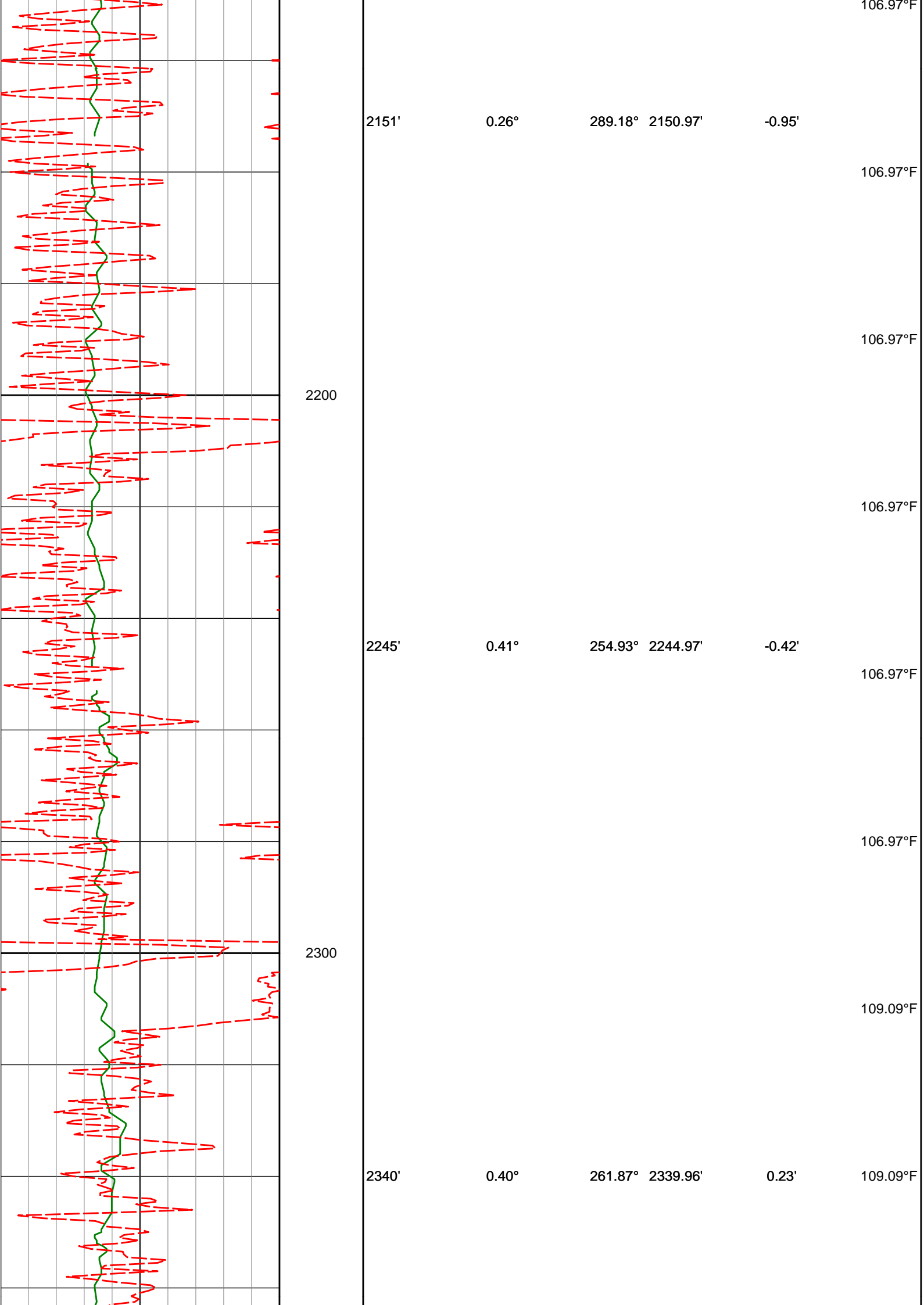
2056.97'

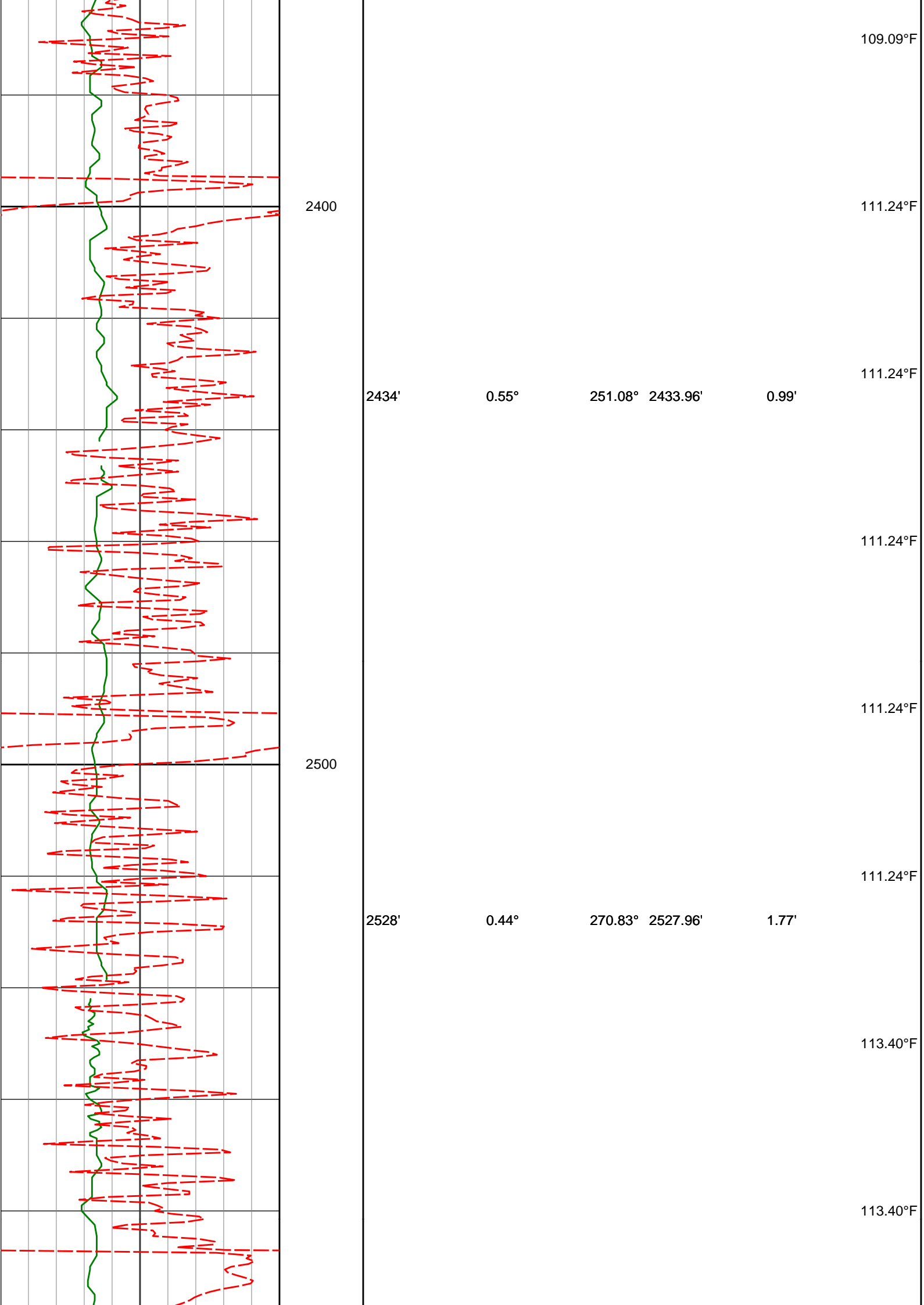
-1.43'

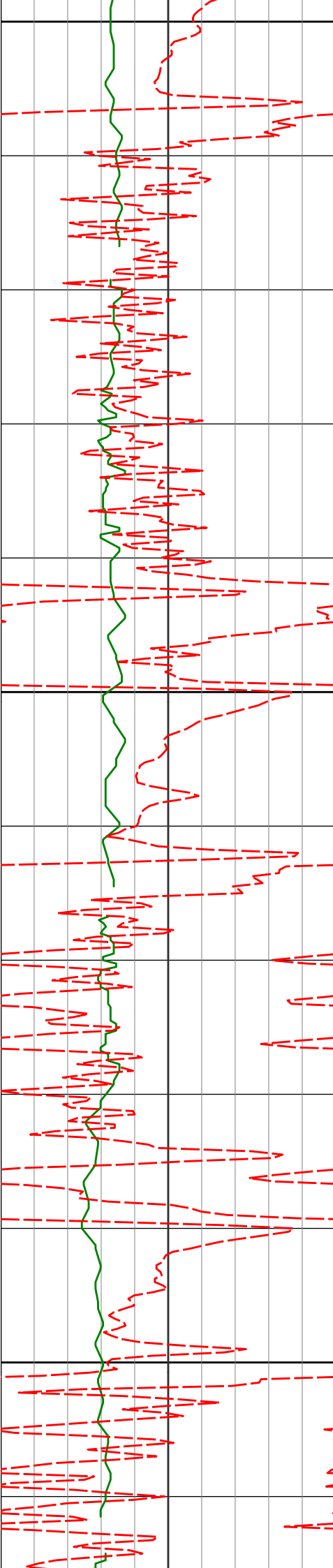
104.83°F

2100

104.83°F







2600

113.40°F

2623'

1.52°

32.24° 2622.95'

1.48'

115.56°F

115.56°F

2700

117.73°F

2717'

3.50°

59.45° 2716.86'

-1.64'

117.73°F

117.73°F

117.73°F

2800

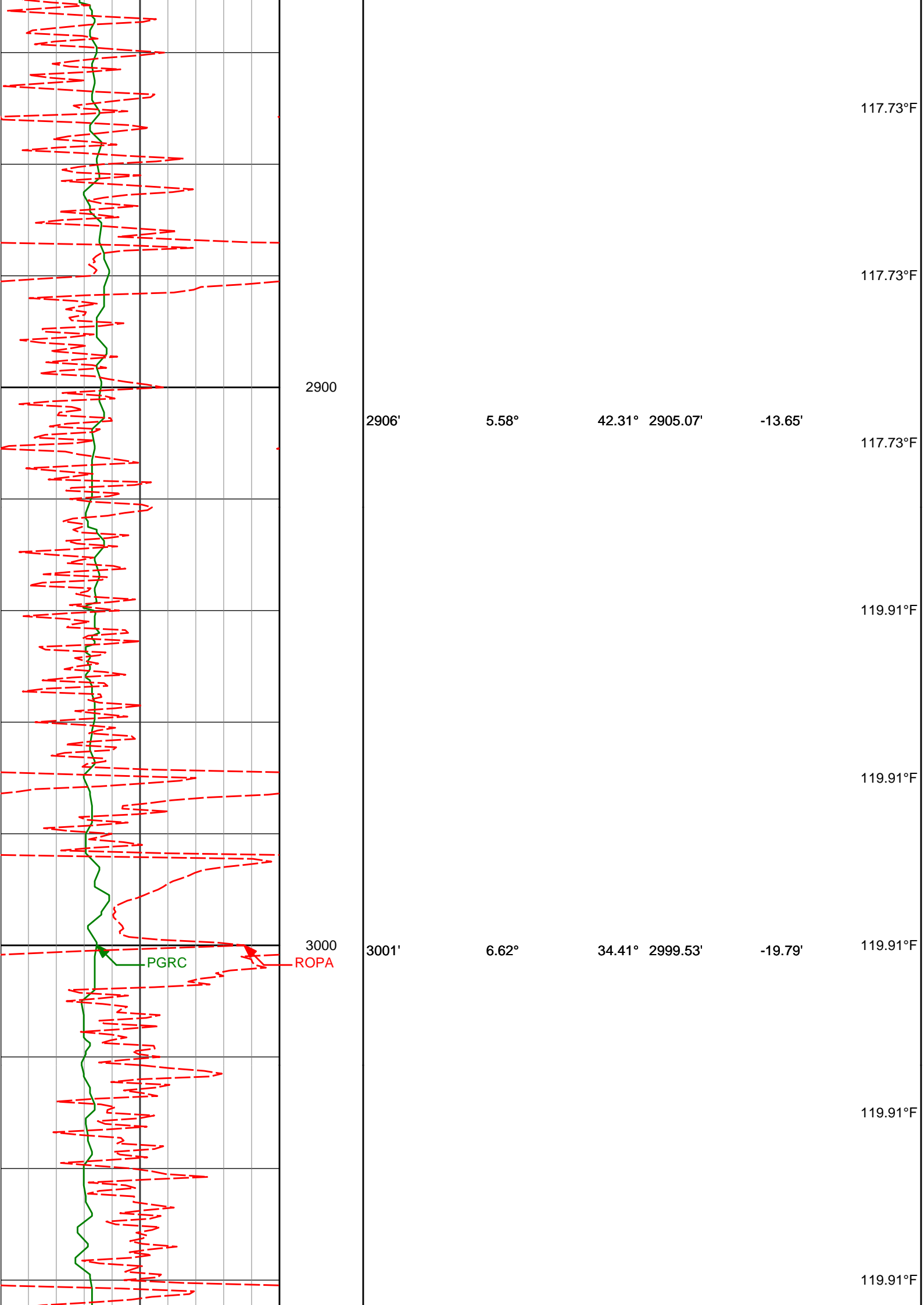
2812'

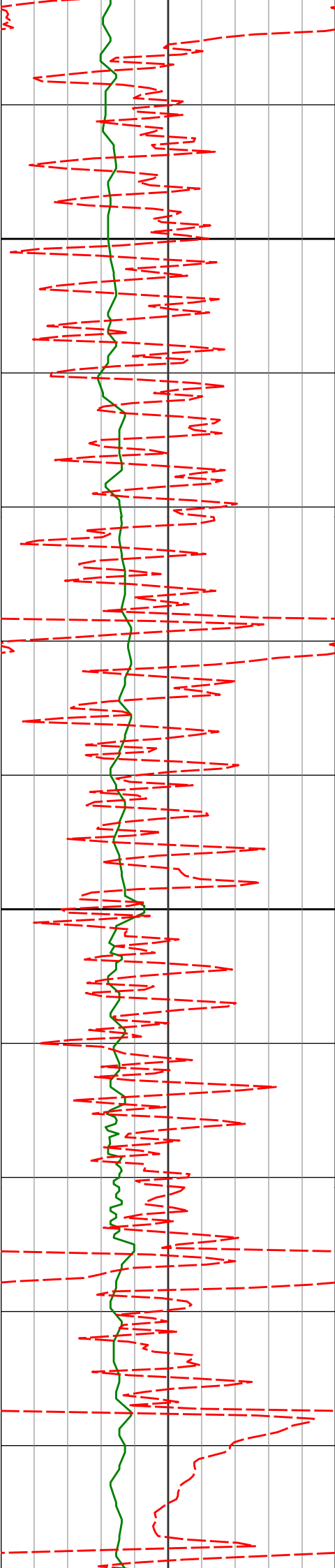
5.85°

42.71° 2811.54'

-7.38'

117.73°F





3100

3200

3095'

6.44°

32.99°

3092.92'

-25.65'

119.91°F

122.11°F

122.11°F

122.11°F

3190'

5.35°

32.75°

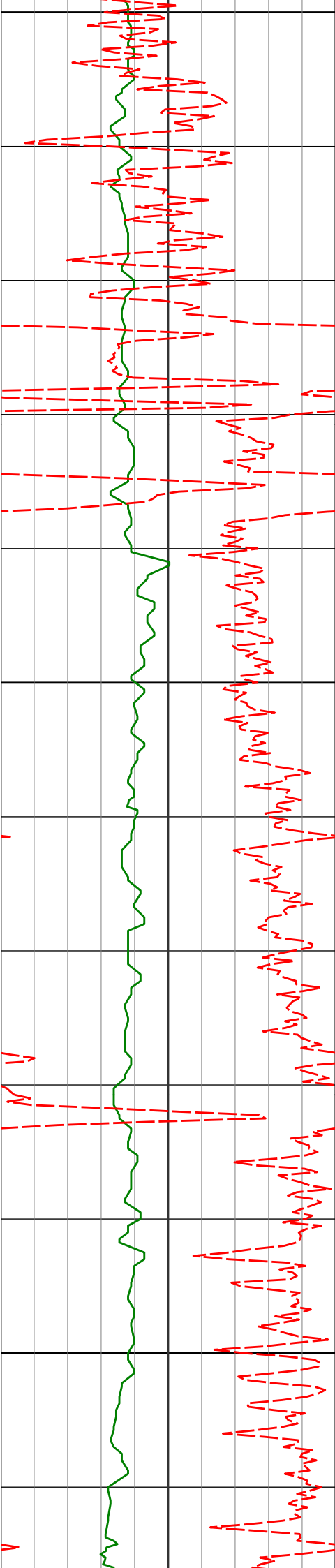
3187.42'

-30.88'

124.30°F

124.30°F

124.30°F



3300

3308'

6.89°

34.31°

3304.74'

-37.76'

124.30°F

124.30°F

124.30°F

124.30°F

3400

3403'

6.47°

37.76°

3399.10'

-44.18'

124.30°F

126.52°F

126.52°F

3500

3497'

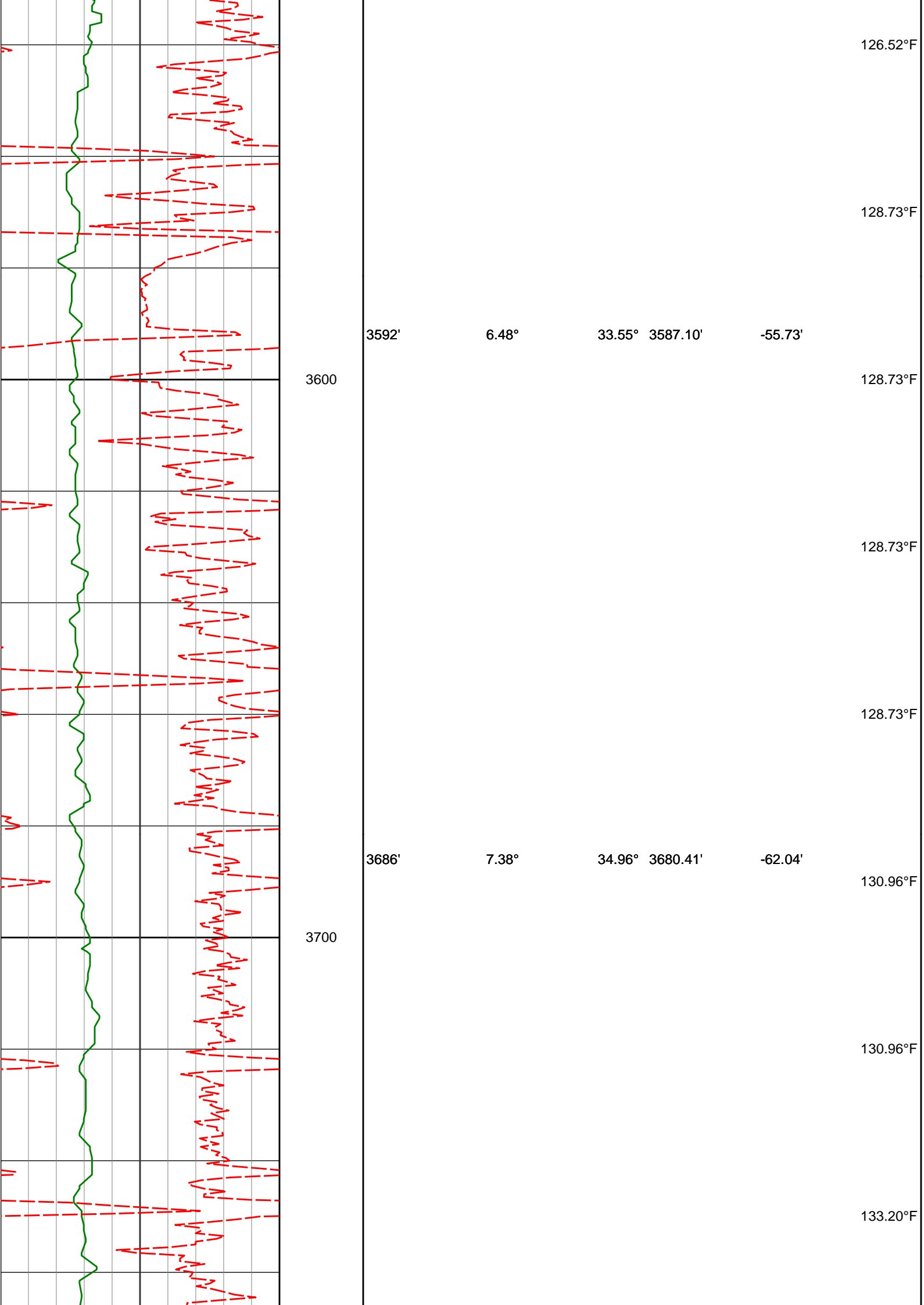
5.31°

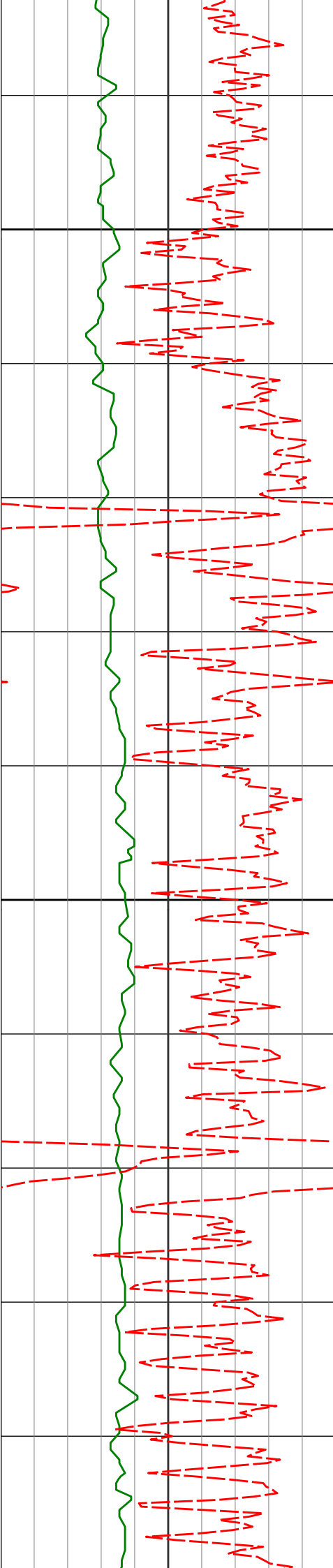
38.63°

3492.60'

-50.08'

126.52°F





3800

3900

4000

3781'

7.84°

40.57° 3774.57'

-69.67'

133.20°F

133.20°F

133.20°F

133.20°F

3876'

7.49°

43.51° 3868.72'

-78.07'

135.45°F

135.45°F

135.45°F

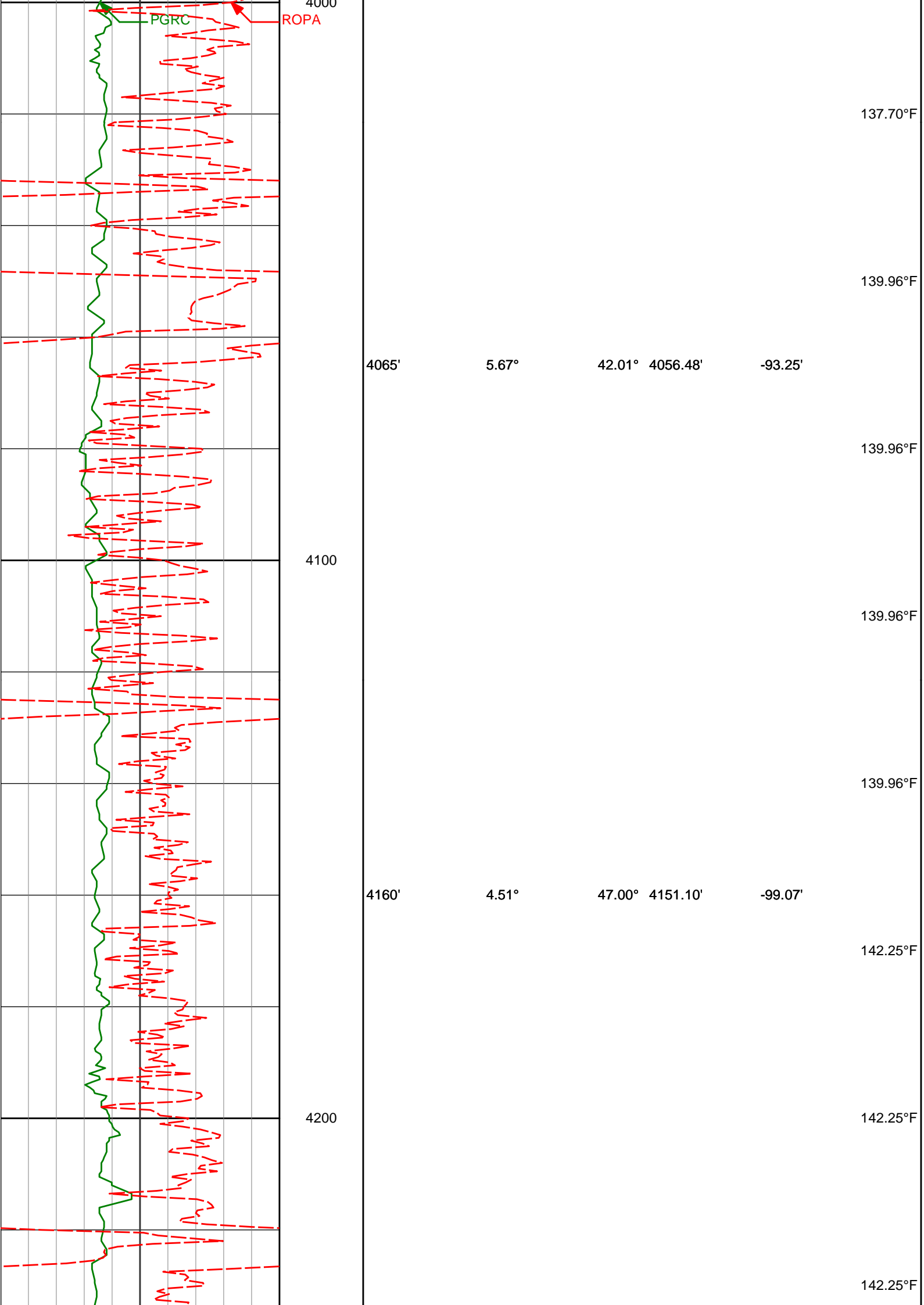
3970'

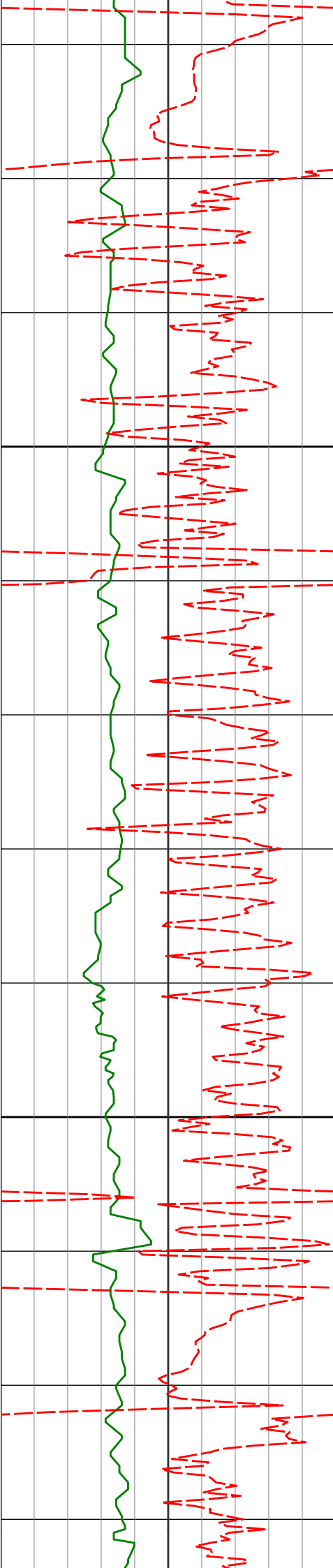
6.55°

47.42° 3962.02'

-86.18'

137.70°F





4300

4400

4254'

5.07°

39.43° 4244.78'

-104.36'

144.54°F

144.54°F

146.84°F

4349'

4.95°

35.48° 4339.41'

-109.36'

146.84°F

146.84°F

146.84°F

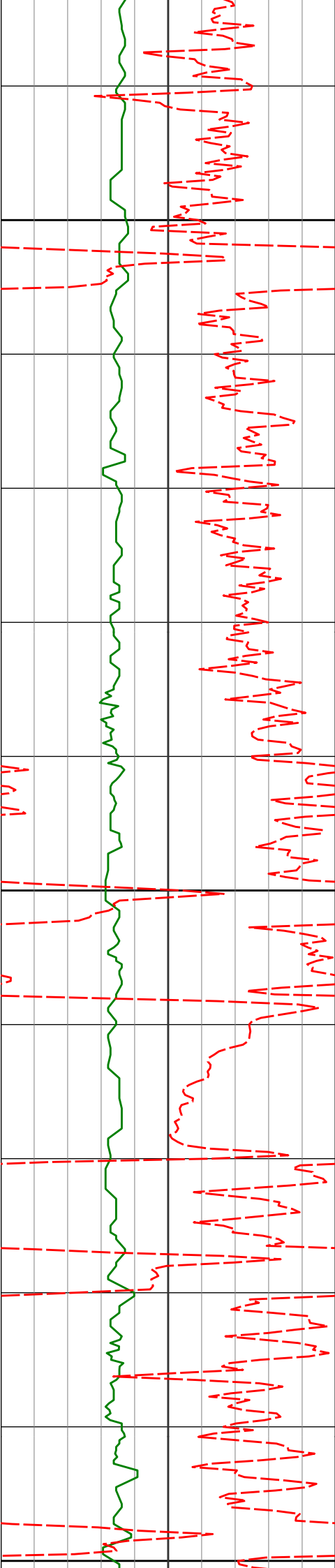
4444'

5.94°

35.50° 4433.98'

-114.53'

146.84°F



4500

4600

4700

4538'

4.56°

35.23°

4527.59'

-119.46'

4633'

5.73°

32.18°

4622.20'

-124.11'

149.14°F

149.14°F

149.14°F

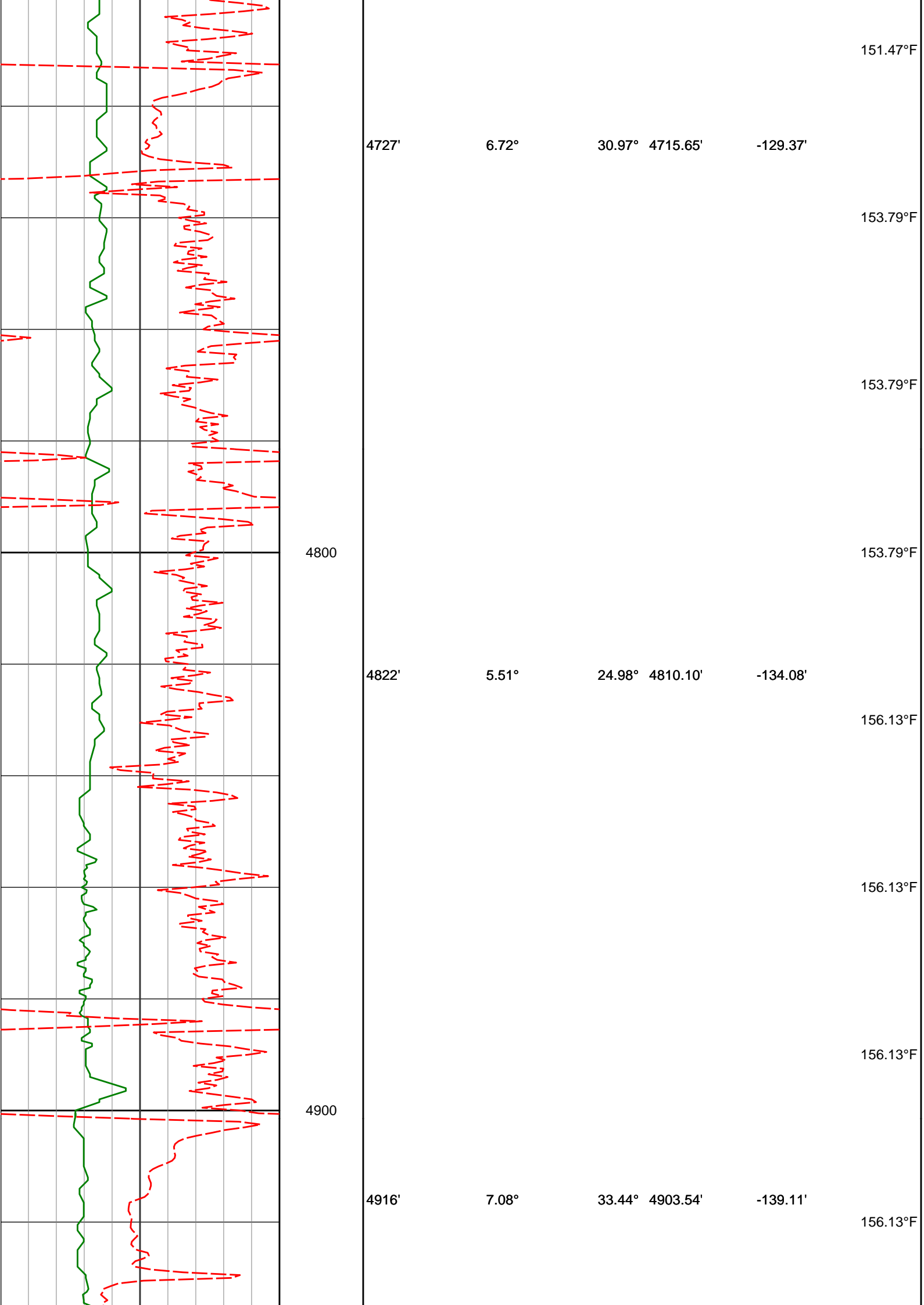
151.47°F

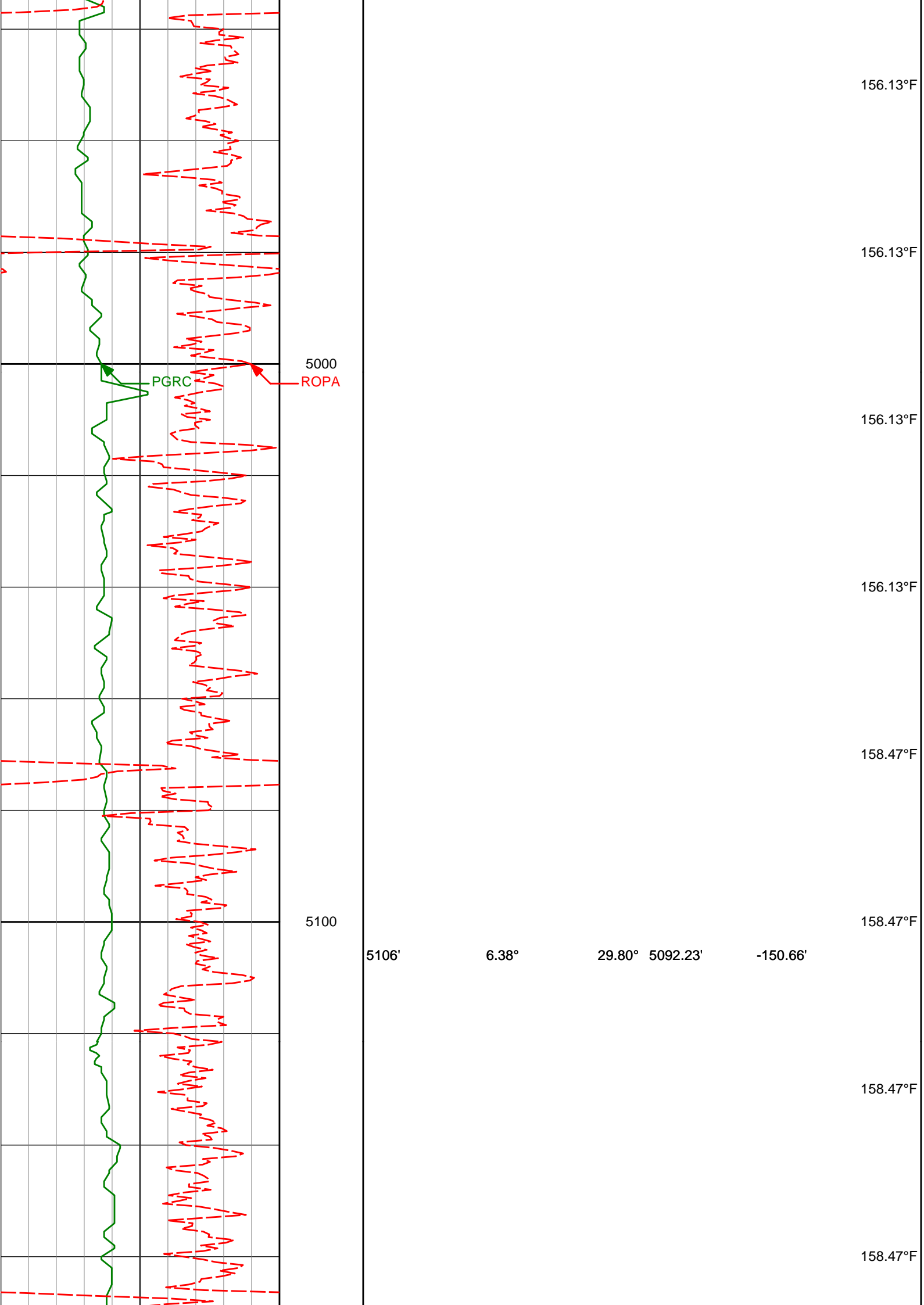
151.47°F

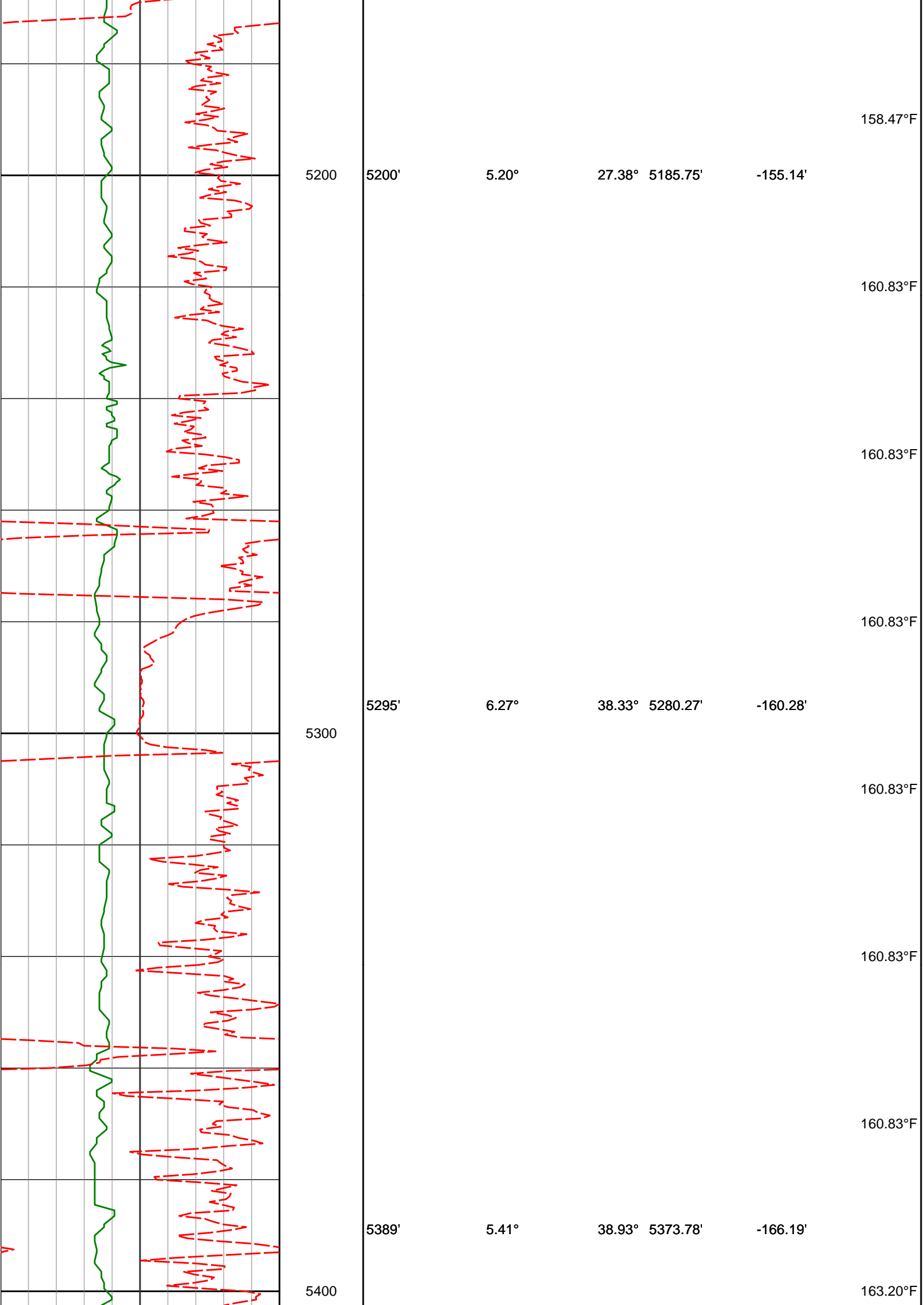
151.47°F

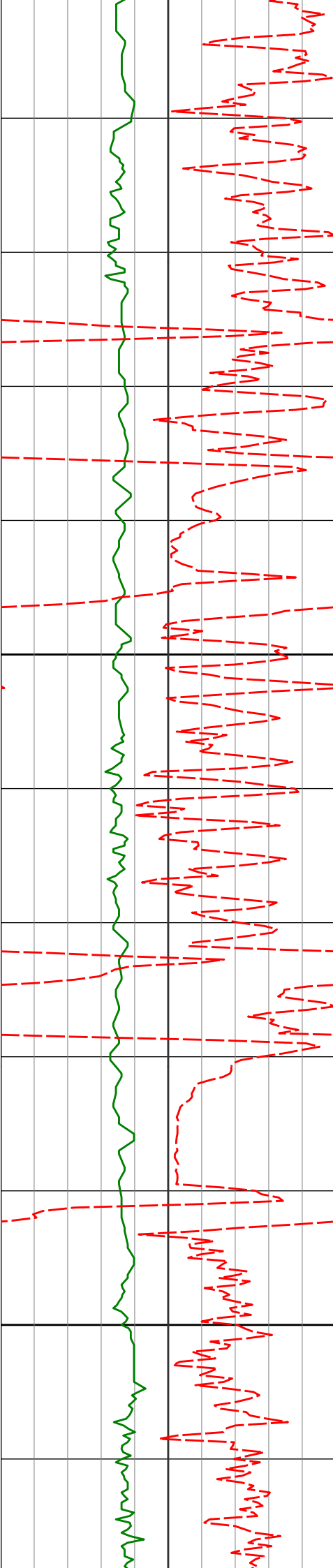
151.47°F

151.47°F









5500

5600

5484'

5.29°

30.82°

5468.37'

-171.19'

5579'

5.63°

46.09°

5562.94'

-176.74'

163.20°F

163.20°F

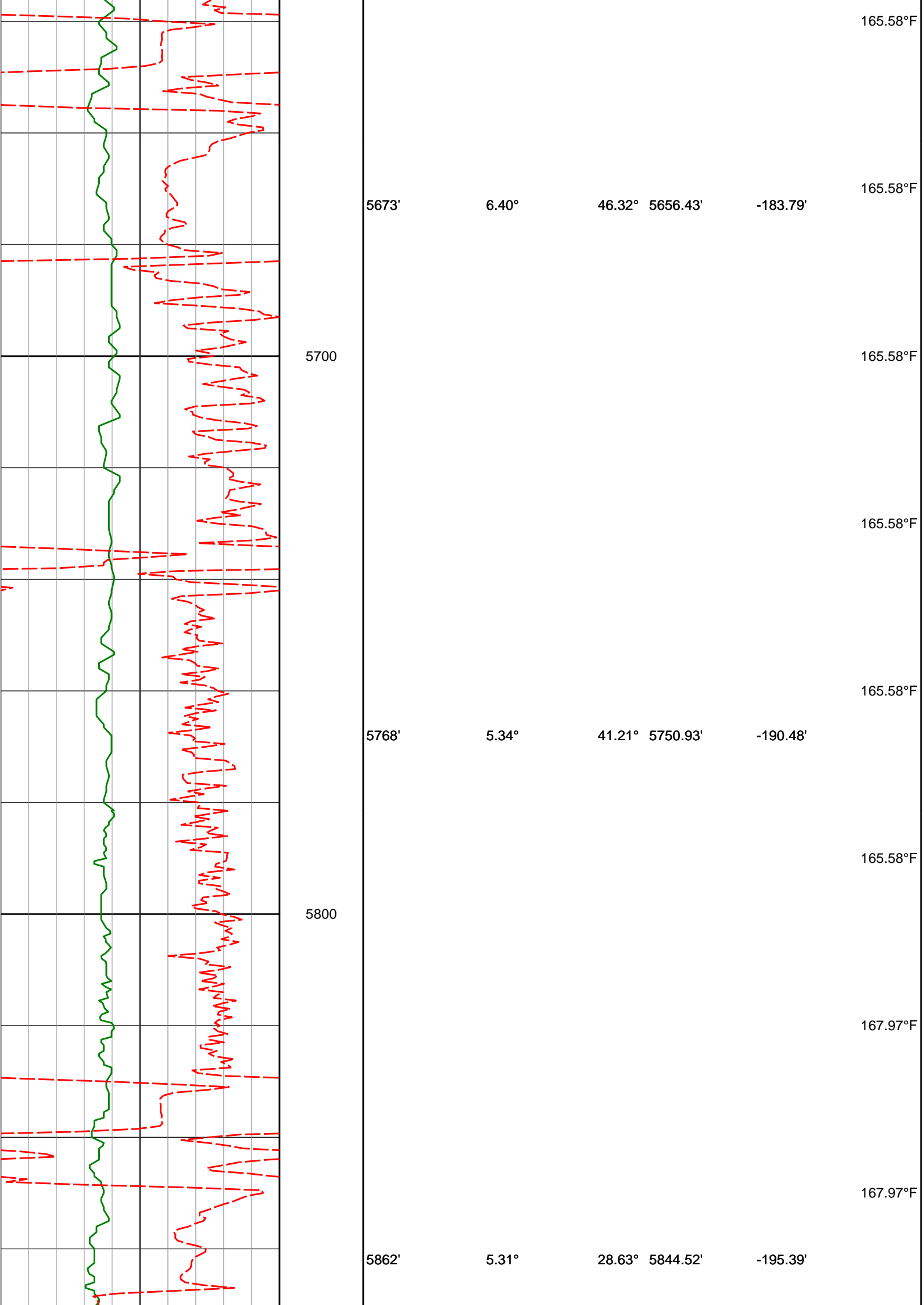
163.20°F

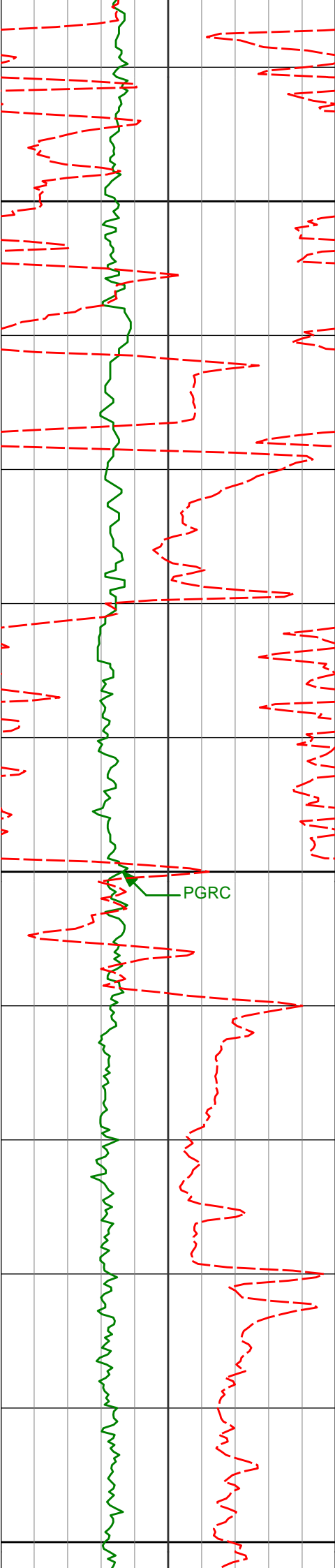
163.20°F

163.20°F

163.20°F

165.58°F





5900

6000

6100

5957'

6051'

6.26°

6.75°

28.64°

347.51°

5939.04'

6032.48'

-199.91'

-201.10'

167.97°F

167.97°F

167.97°F

170.37°F

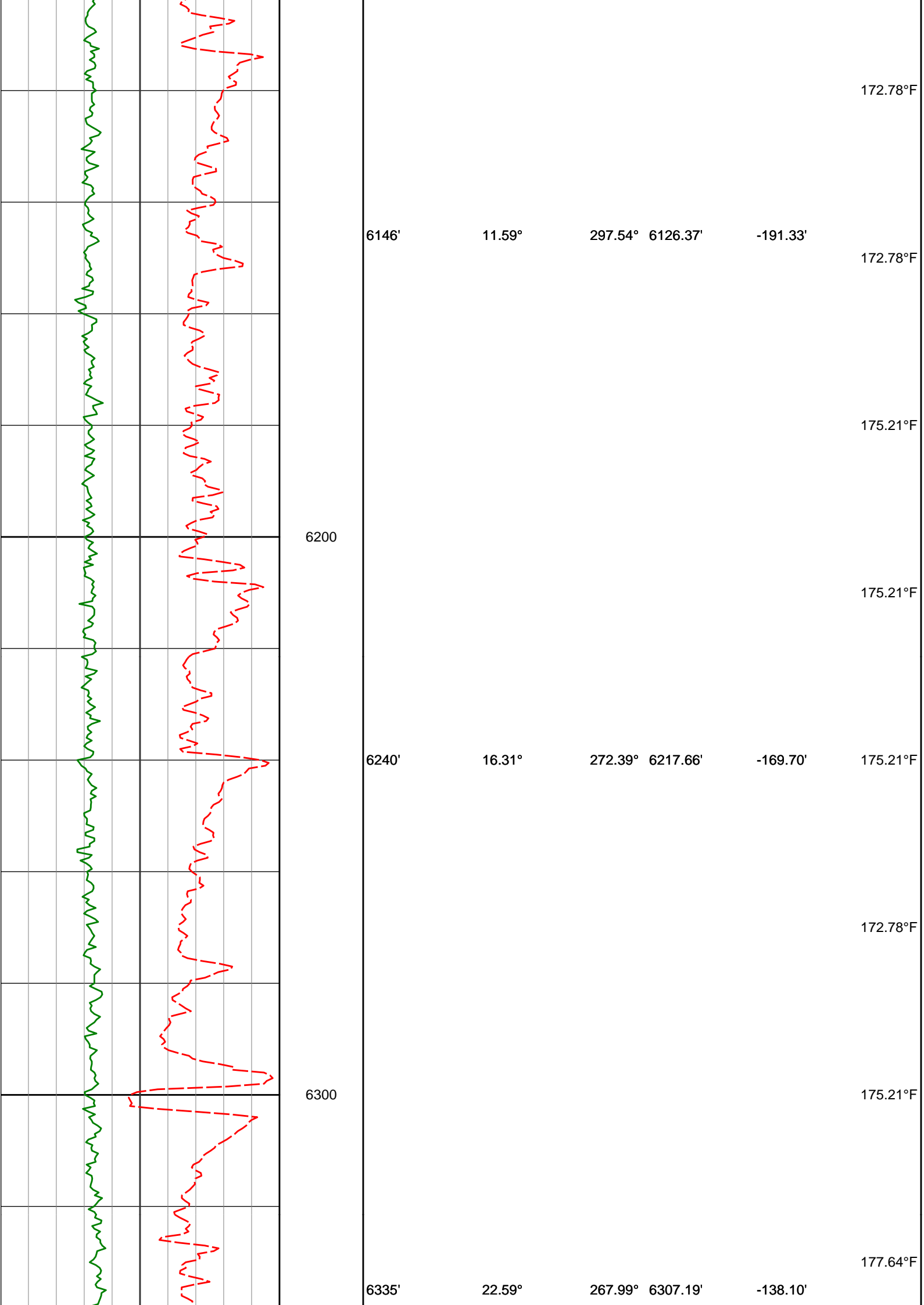
170.37°F

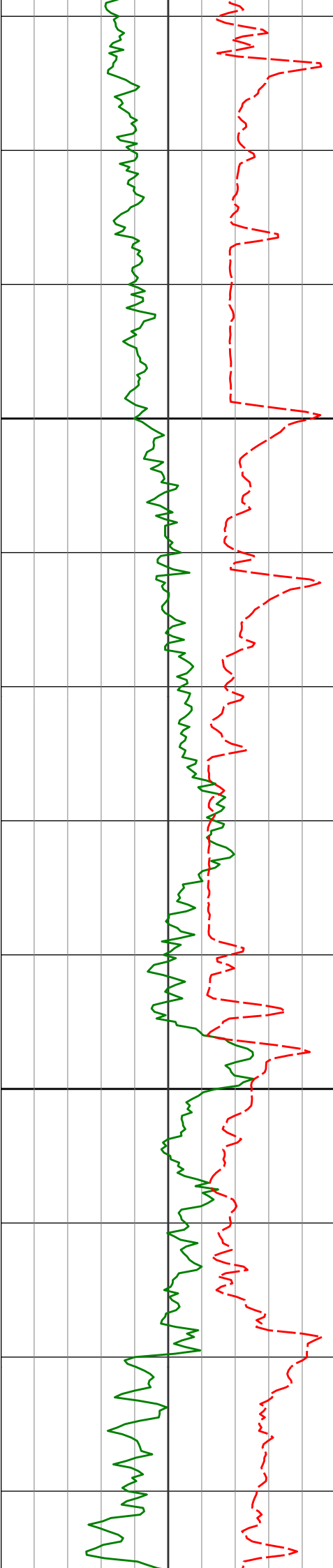
170.37°F

170.37°F

170.37°F

PGRC





6400

6500

6430'

6525'

29.62°

38.63°

263.16°

256.21°

6392.46'

6471.05'

-96.53'

-44.37'

177.64°F

177.64°F

177.64°F

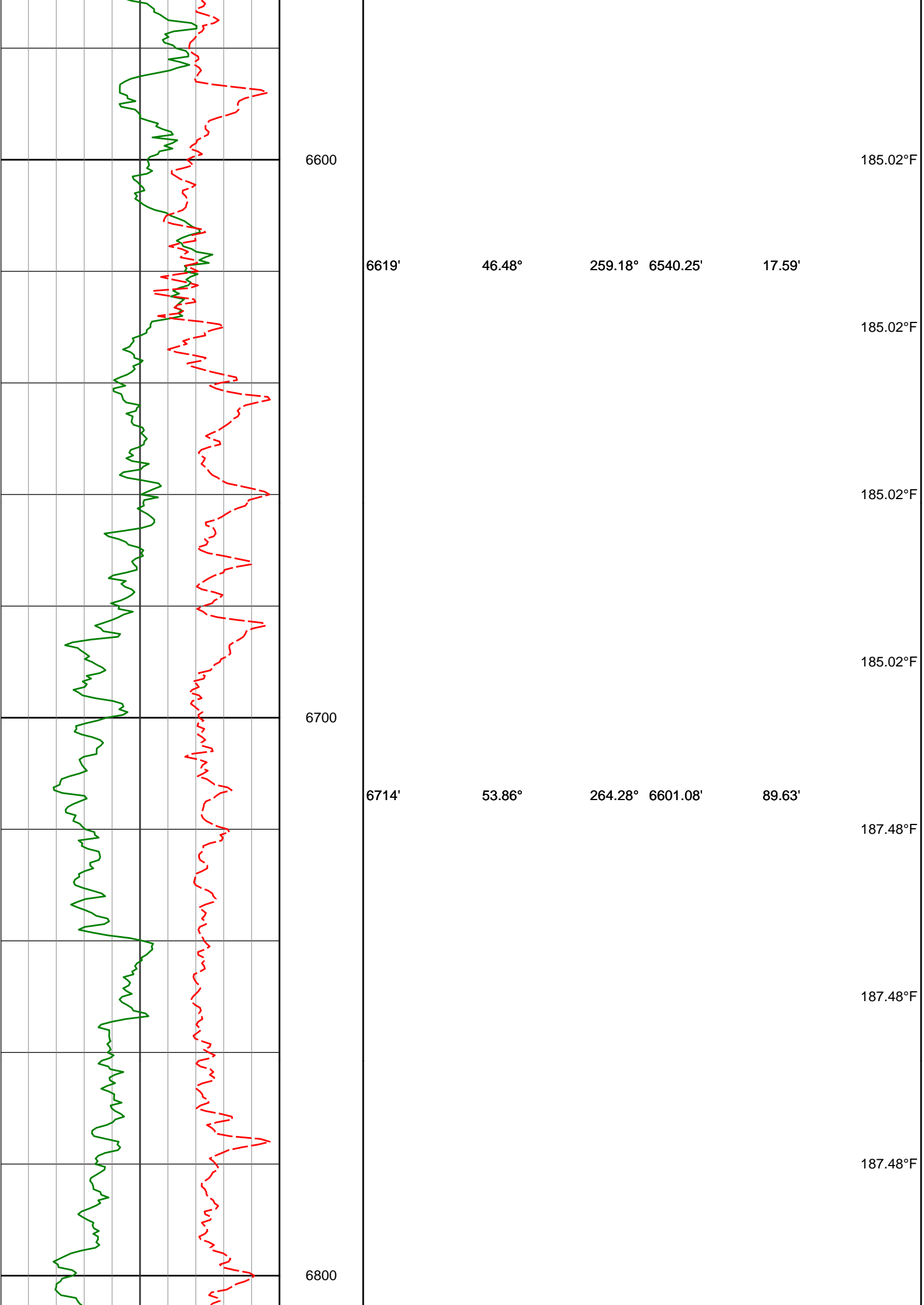
180.09°F

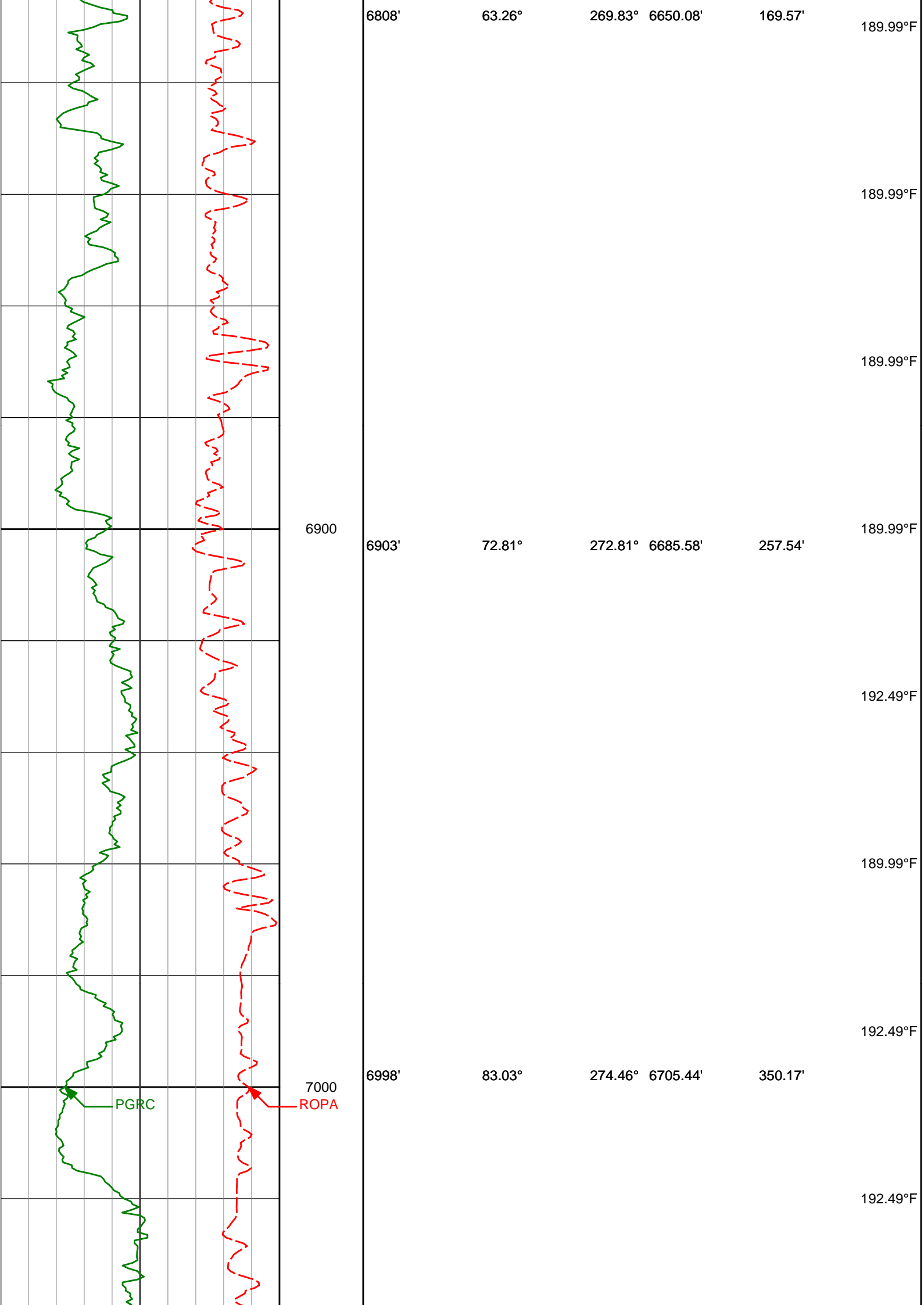
180.09°F

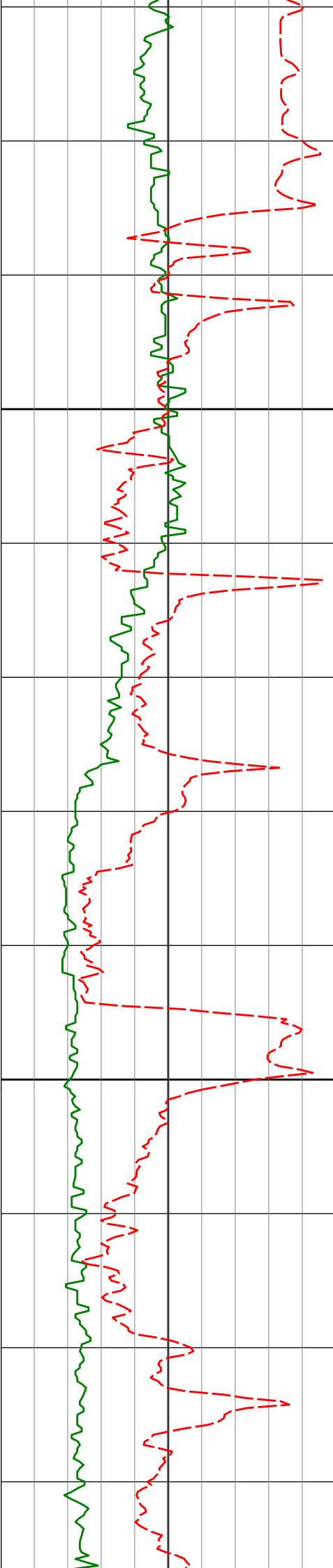
182.55°F

182.55°F

182.55°F







7100

7200

7092'

91.24°

273.40°

6710.13'

443.80'

7187'

91.11°

273.45°

6708.18'

538.65'

192.49°F

194.99°F

194.99°F

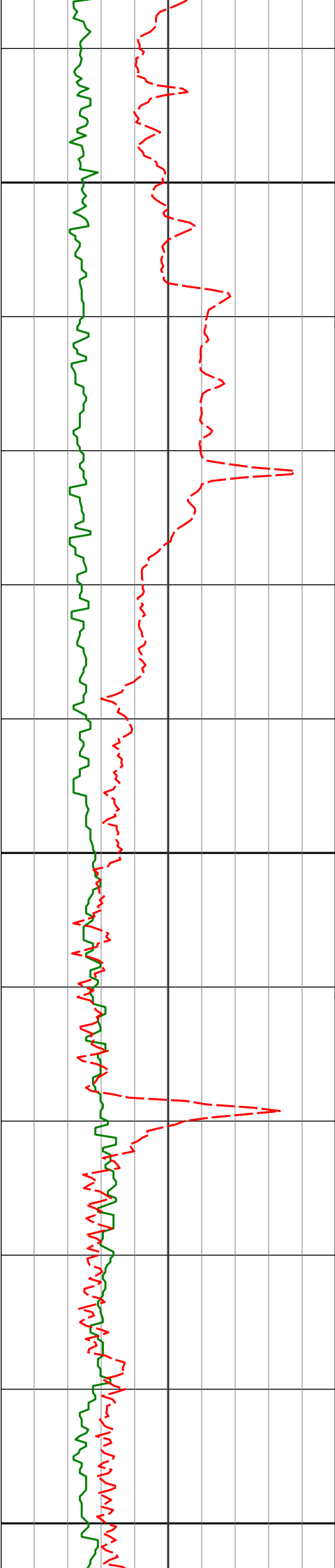
194.99°F

194.99°F

197.51°F

197.51°F

200.05°F



7300

7400

7500

7281'

90.13°

272.81° 6707.17'

632.54'

200.05°F

200.05°F

202.60°F

7376'

90.25°

273.10° 6706.85'

727.45'

202.60°F

202.60°F

205.16°F

7470'

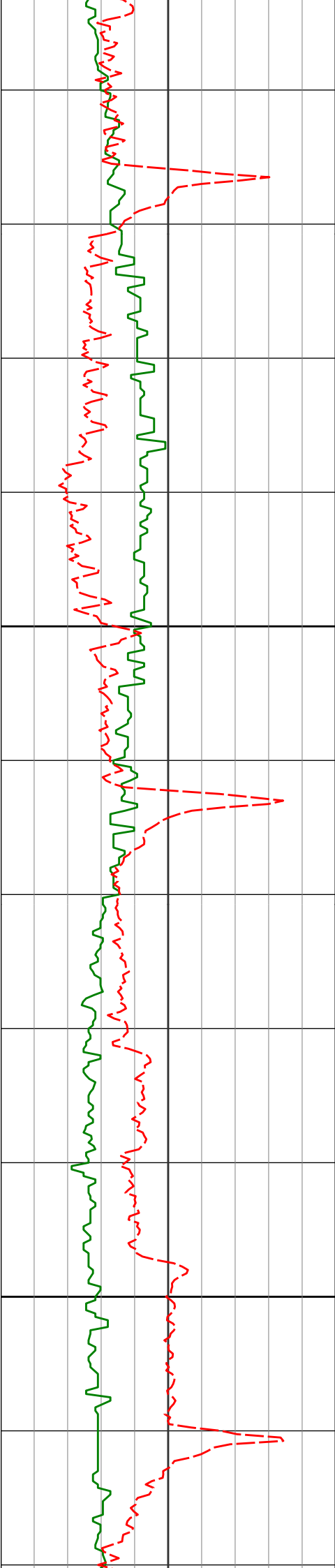
90.12°

272.35° 6706.55'

821.38'

205.16°F

205.16°F



7600

7700

7564'

90.50°

272.35° 6706.04'

915.32'

7659'

90.40°

272.49° 6705.29'

1010.27'

205.16°F

207.73°F

207.73°F

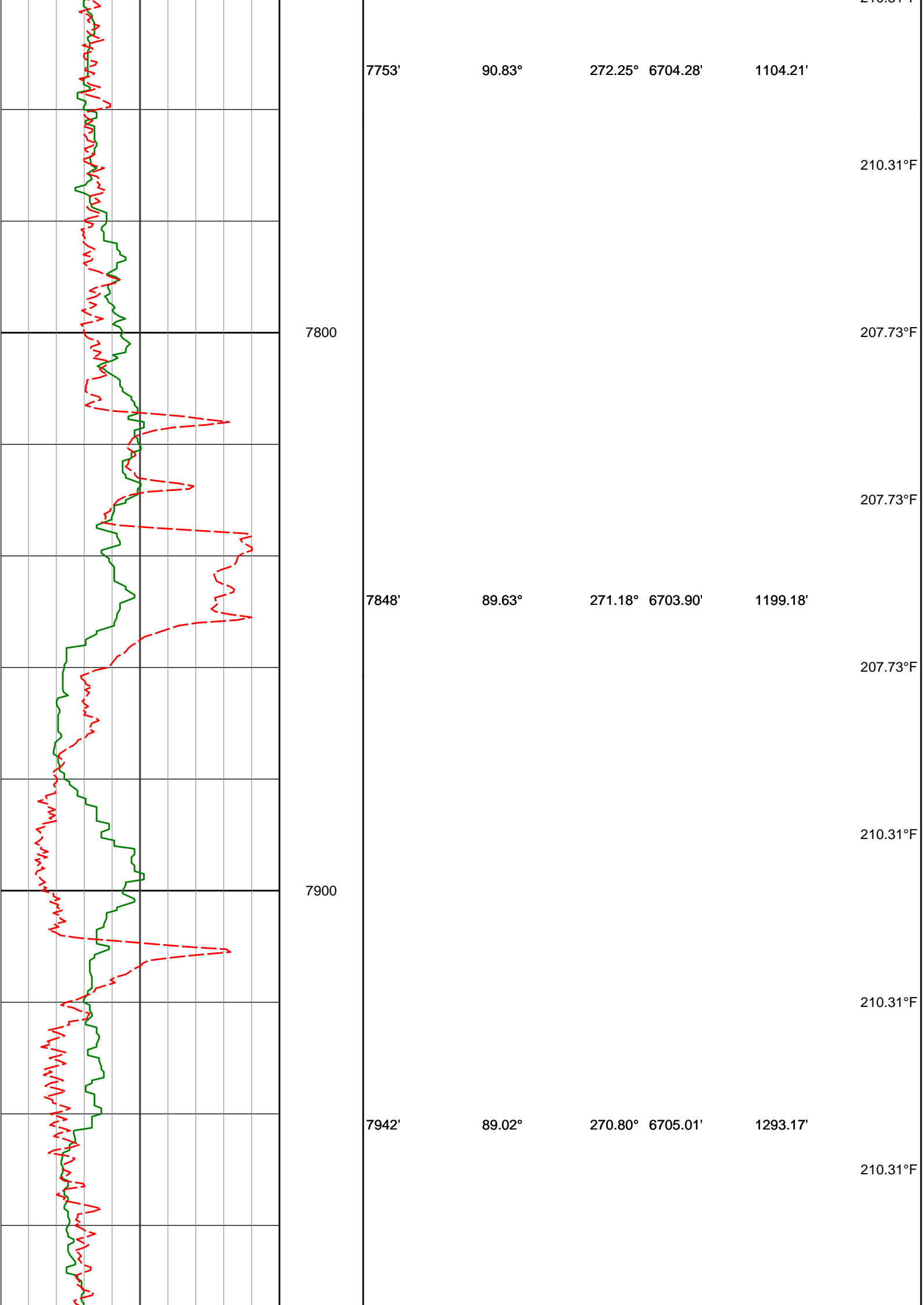
207.73°F

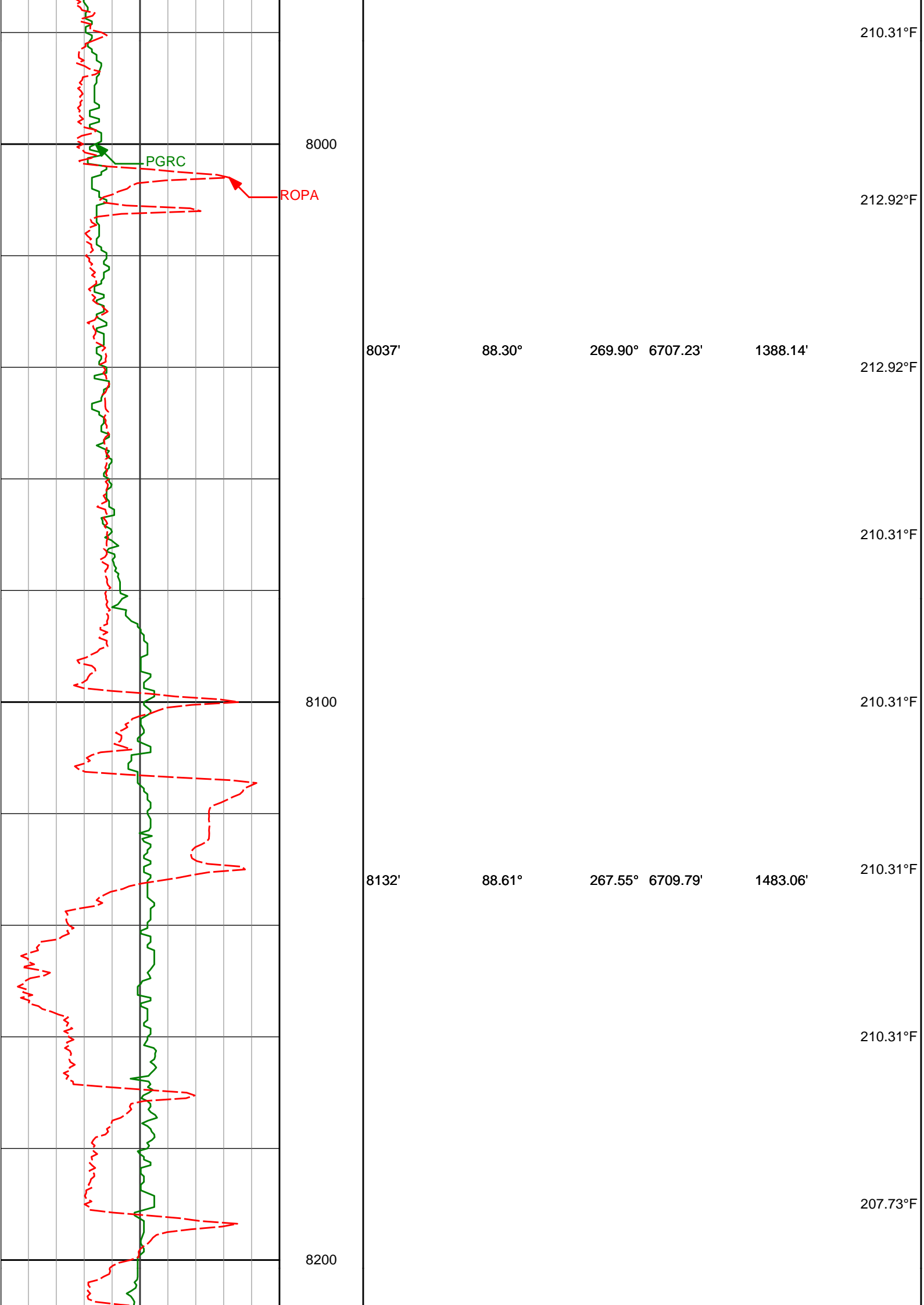
207.73°F

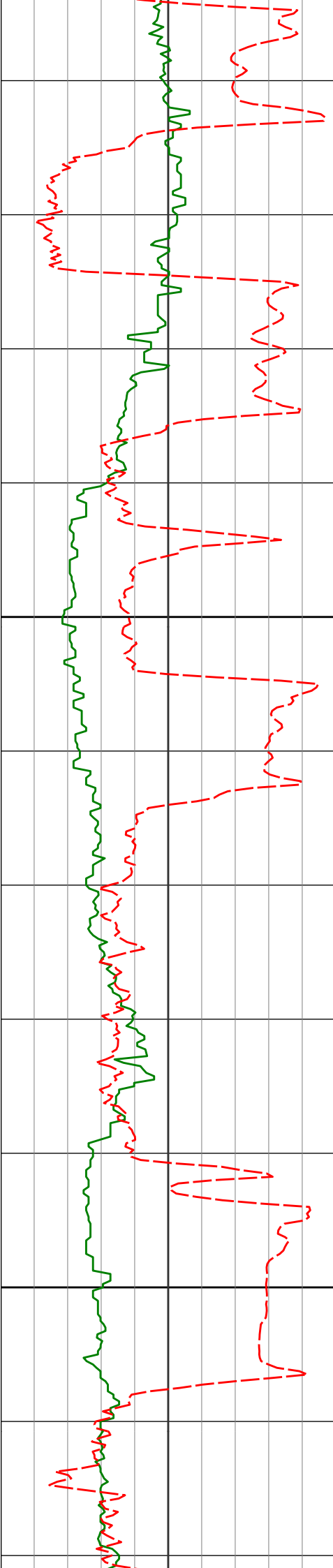
207.73°F

210.31°F

210.31°F







8300

8400

8226'

88.55°

264.04° 6712.12'

1576.70'

8320'

90.77°

264.41° 6712.68'

1670.14'

8415'

91.41°

267.33° 6710.87'

1764.81'

207.73°F

207.73°F

207.73°F

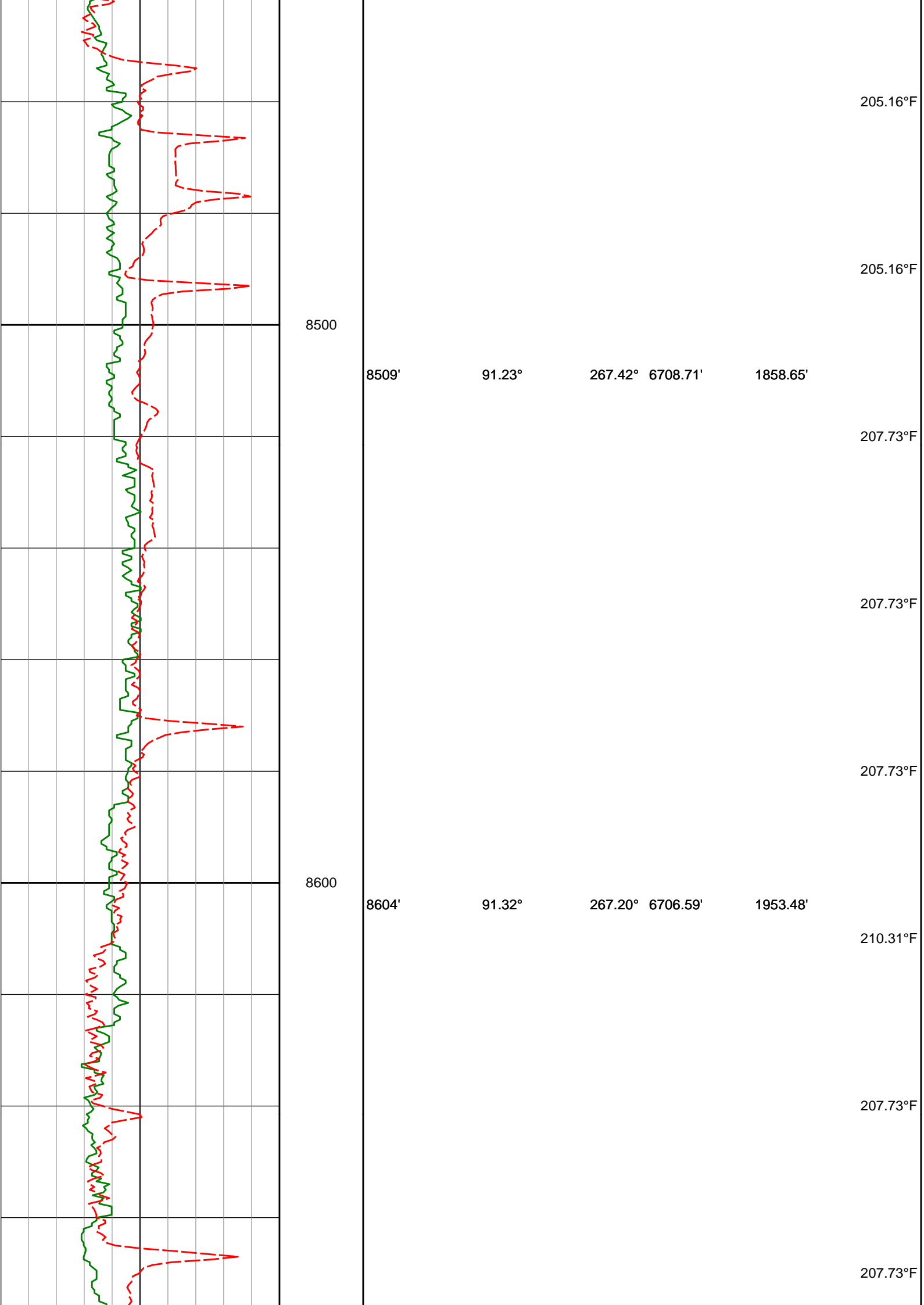
207.73°F

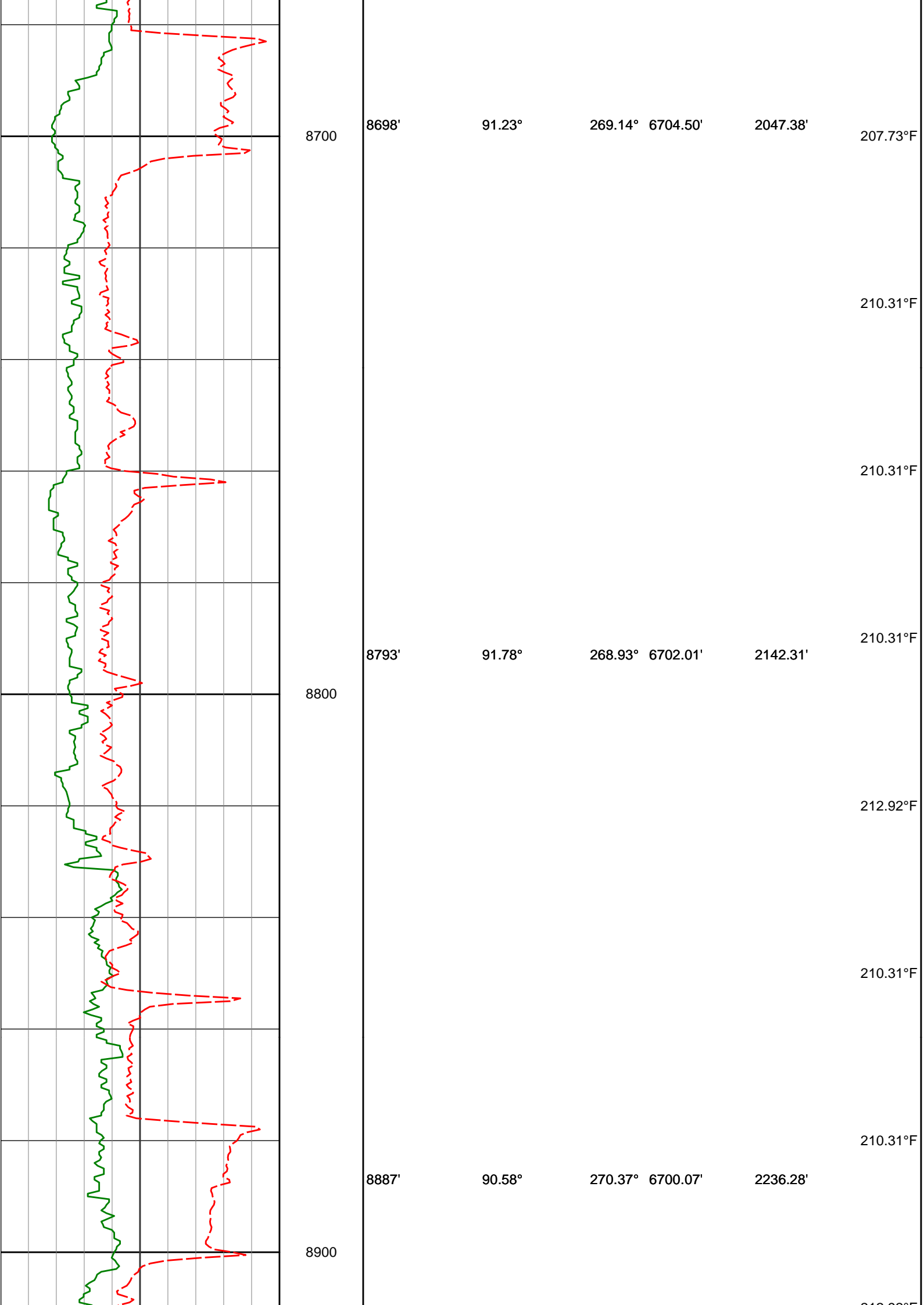
205.16°F

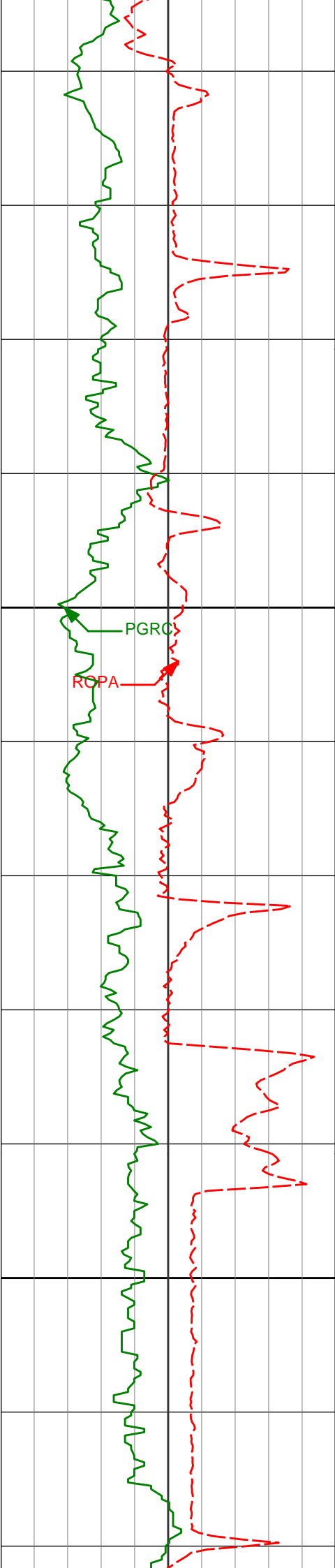
202.60°F

202.60°F

205.16°F







9000

9100

8982'

90.55°

270.29°

6699.13'

2331.27'

9076'

88.89°

270.63°

6699.59'

2425.27'

212.92°F

212.92°F

212.92°F

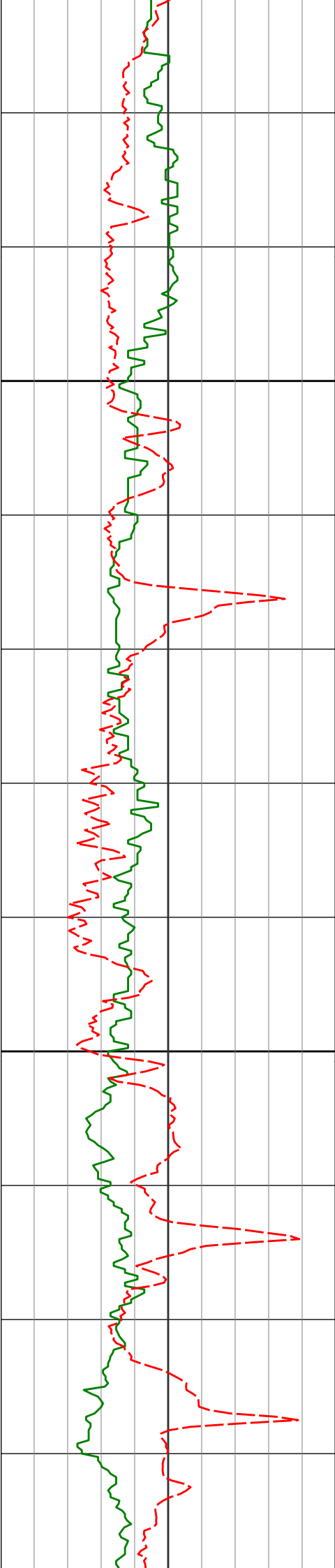
215.51°F

212.92°F

212.92°F

215.51°F

215.51°F



9200

9300

9171'

89.10°

270.43°

6701.26'

2520.26'

9266'

89.63°

270.60°

6702.31'

2615.25'

9360'

90.12°

270.52°

6702.52'

2709.25'

215.51°F

218.14°F

218.14°F

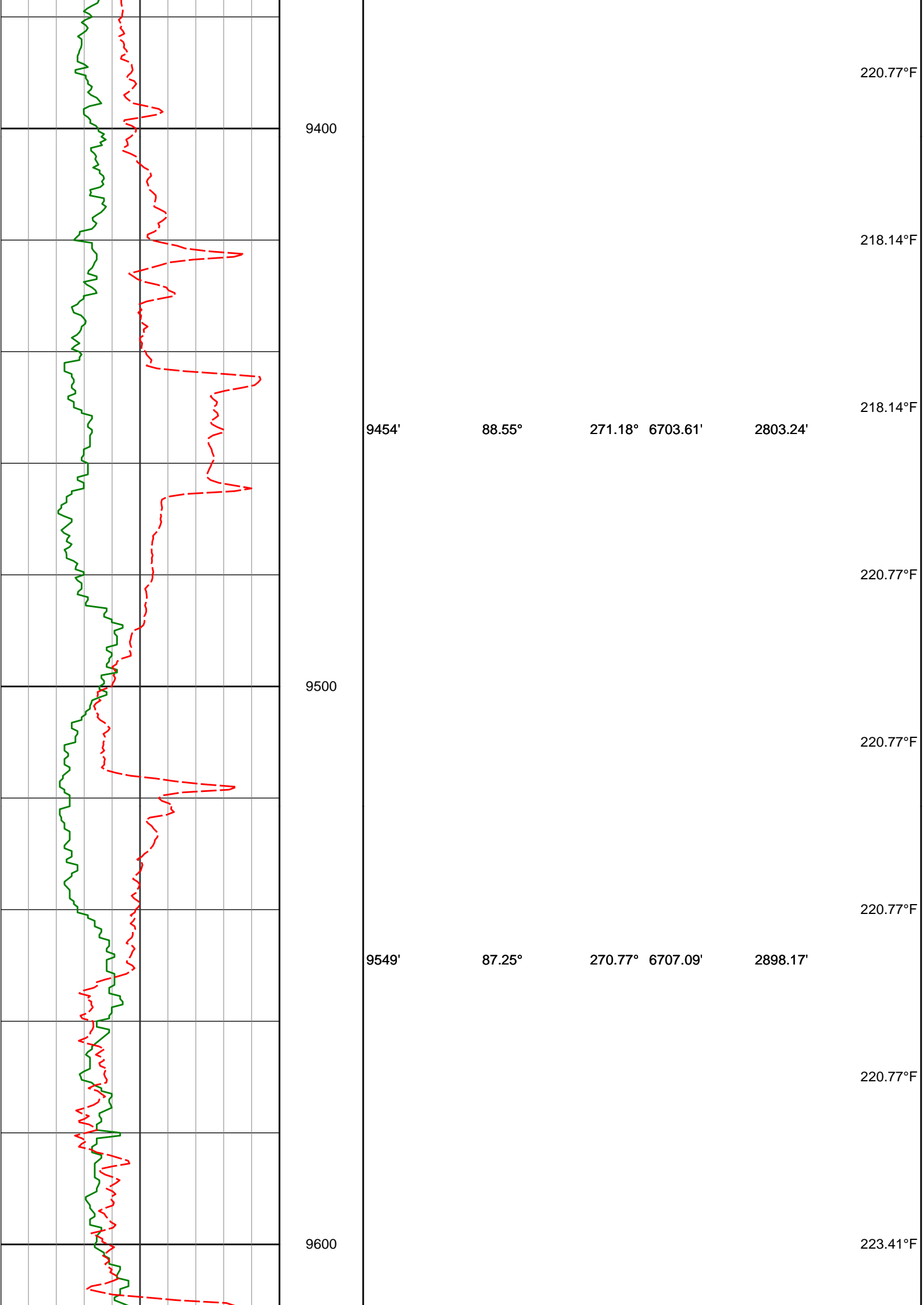
218.14°F

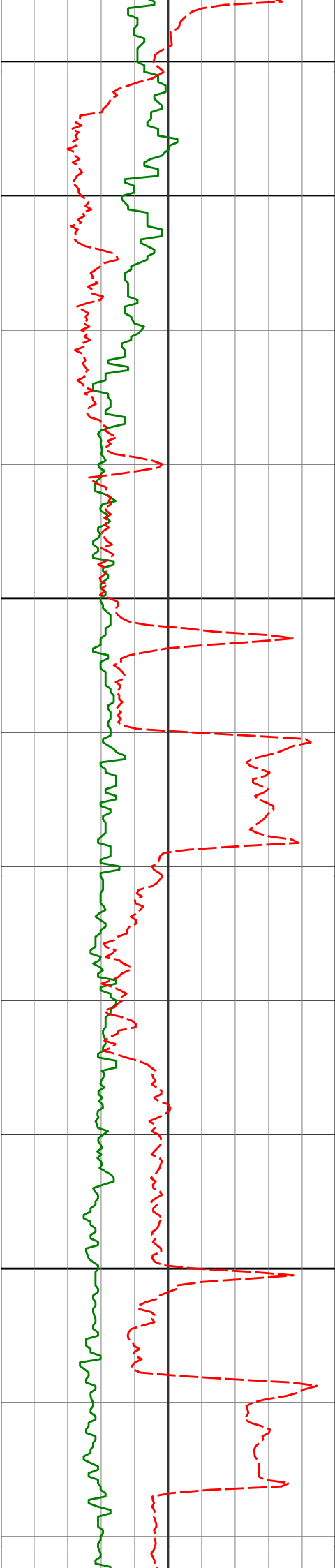
218.14°F

218.14°F

220.77°F

220.77°F





9700

9800

9643'

9738'

9833'

86.82°

87.87°

89.32°

270.37°

269.75°

269.06°

6711.95'

6716.35'

6718.68'

2992.04'

3086.93'

3181.89'

223.41°F

223.41°F

220.77°F

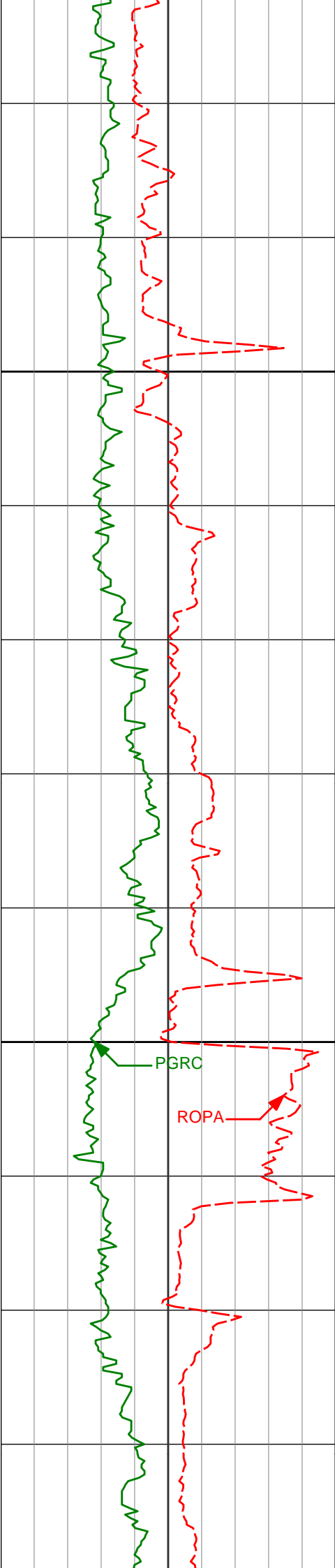
223.41°F

223.41°F

223.41°F

220.77°F

223.41°F



9900

9928'

88.86°

268.69°

6720.19'

3276.84'

226.08°F

226.08°F

223.41°F

10000

10022'

90.83°

268.81°

6720.45'

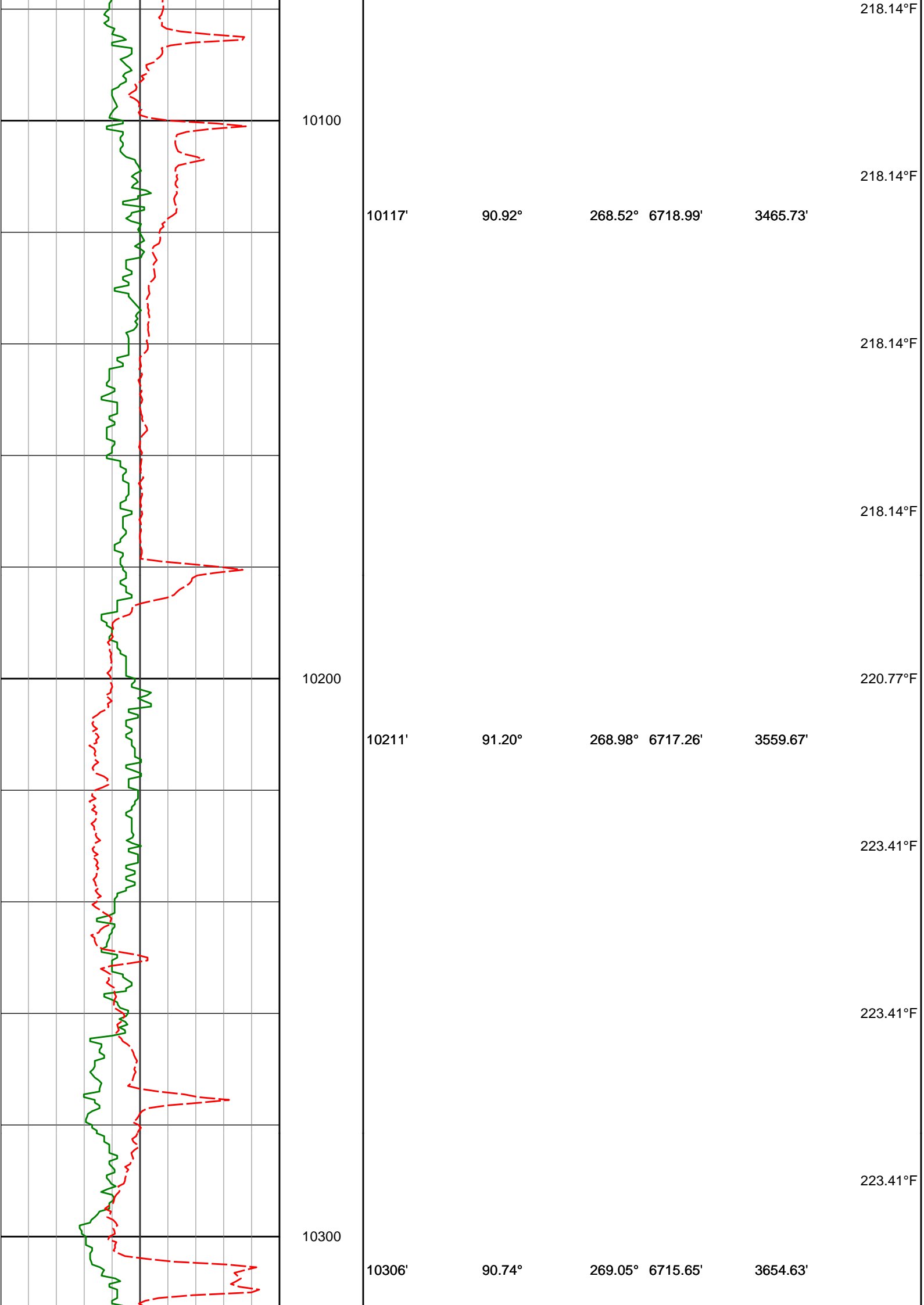
3370.79'

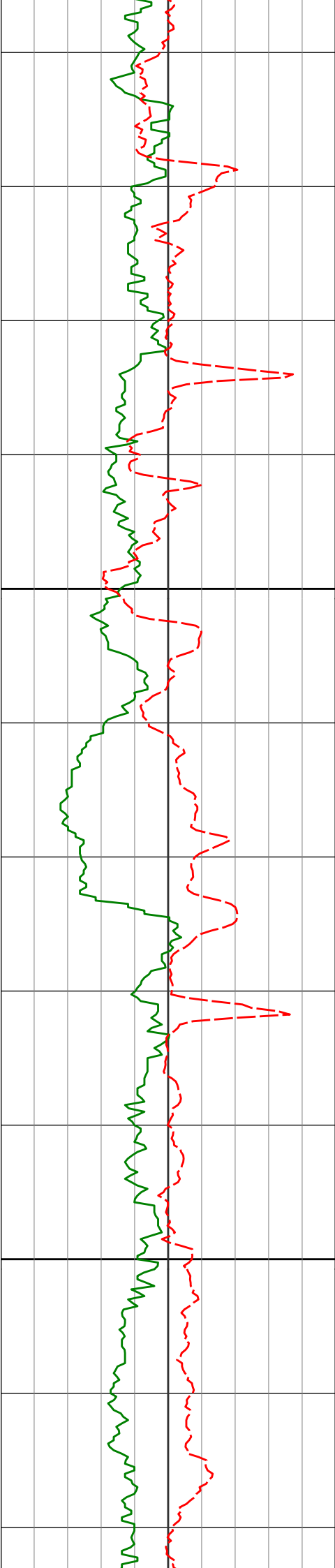
223.41°F

223.41°F

223.41°F

226.08°F





10400

10400'

90.49°

268.55°

6714.64'

3748.59'

10500

10495'

90.74°

268.68°

6713.62'

3843.53'

223.41°F

226.08°F

226.08°F

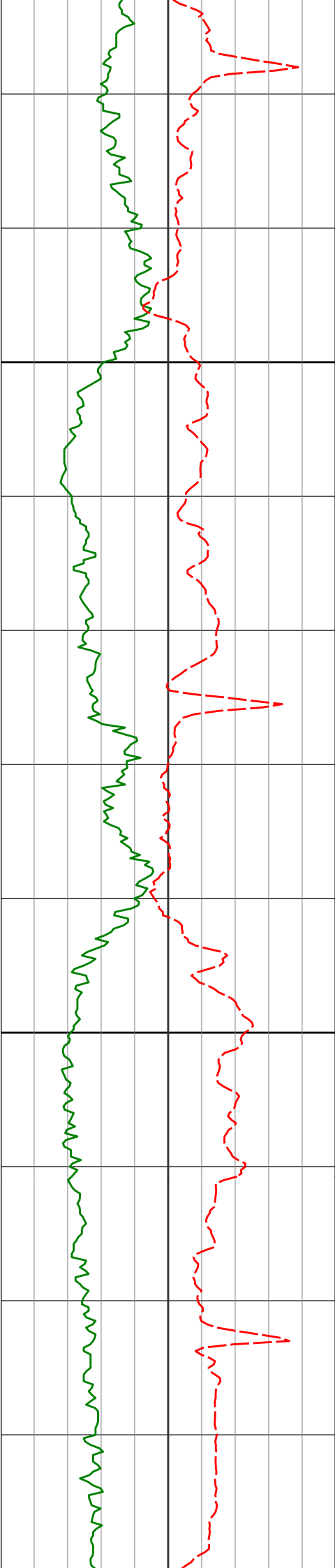
226.08°F

226.08°F

226.08°F

228.74°F

228.74°F



10600

10700

10589'

90.92°

268.68°

6712.26'

3937.48'

228.74°F

10684'

90.92°

268.41°

6710.73'

4032.41'

231.42°F

10778'

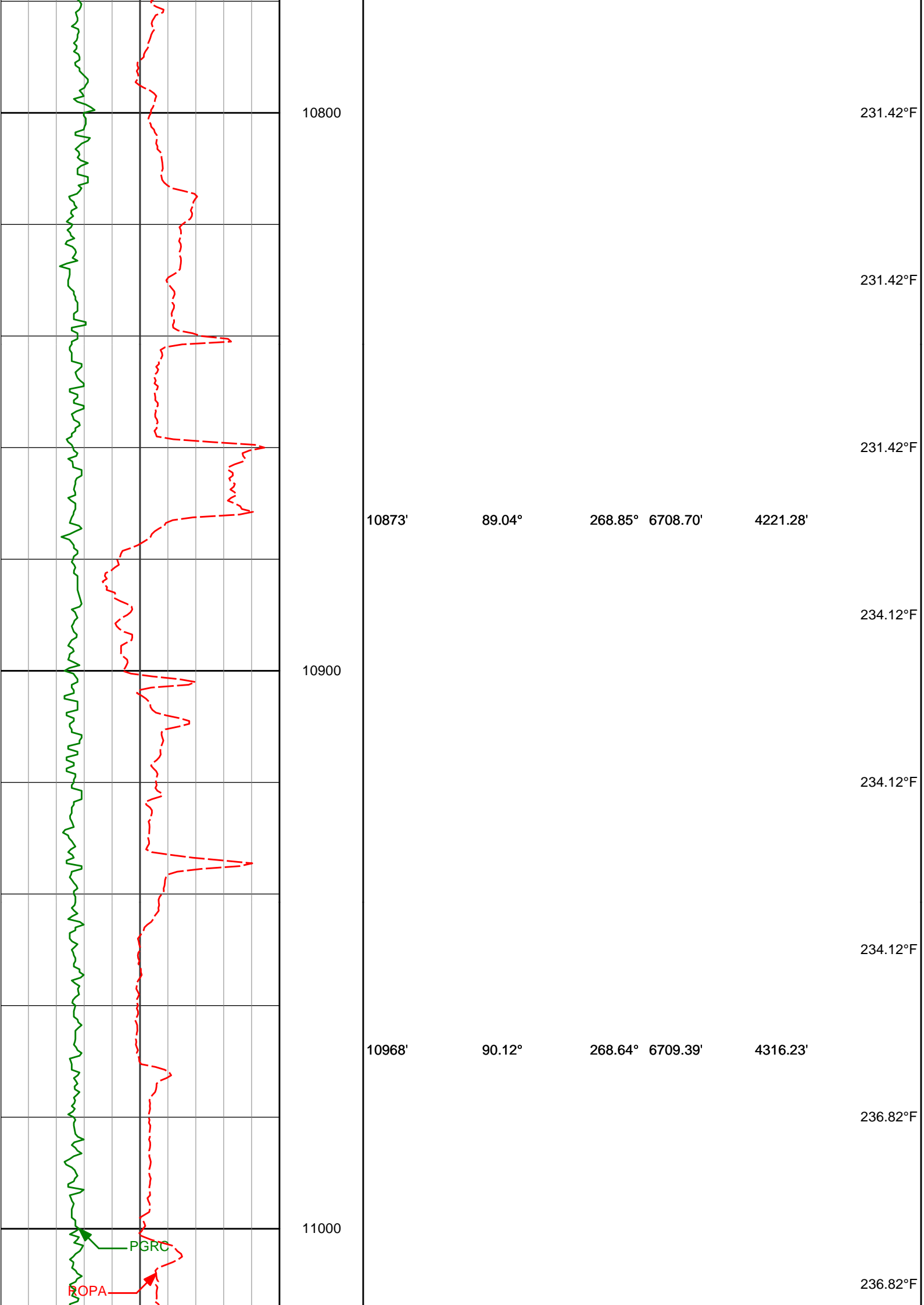
91.26°

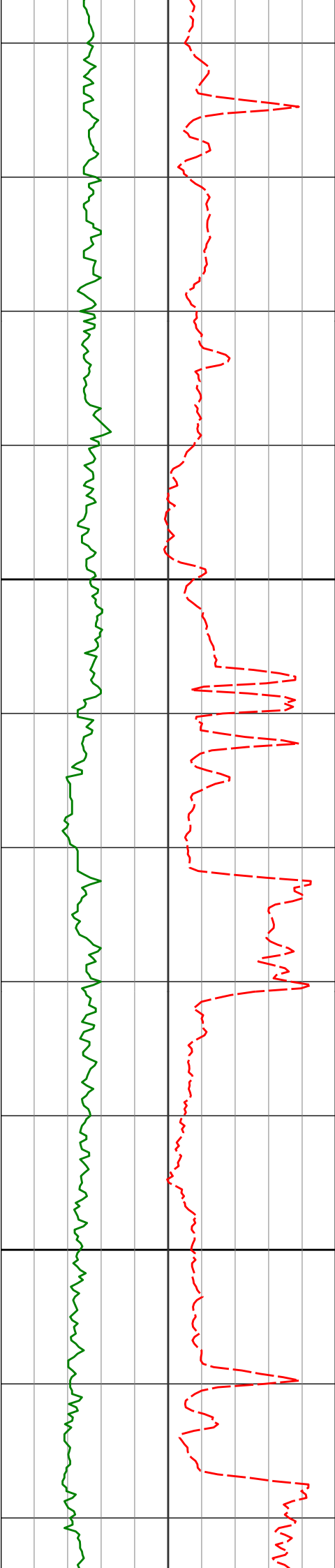
268.40°

6708.94'

4126.33'

234.12°F





11100

11062'

88.80°

267.47°

6710.28'

4410.14'

236.82°F

236.82°F

234.12°F

234.12°F

11200

11157'

88.52°

268.26°

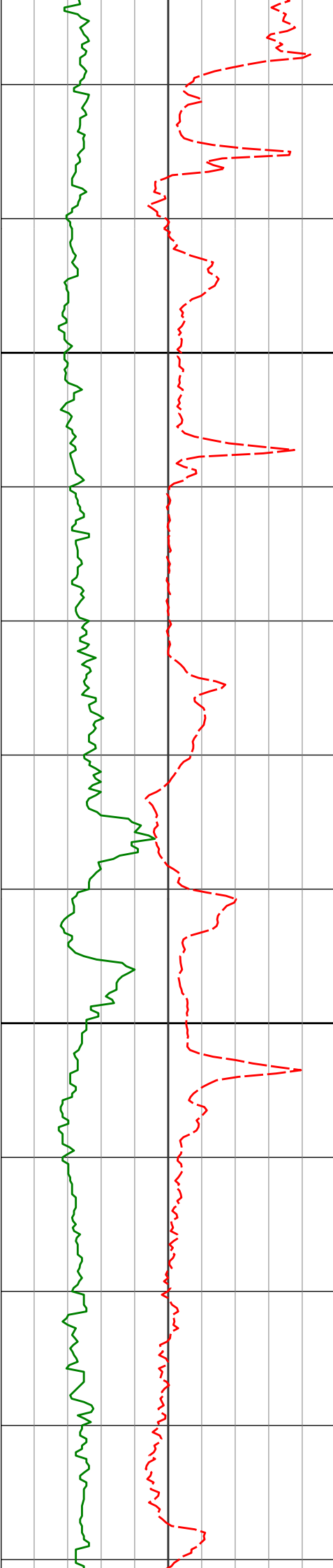
6712.50'

4505.02'

234.12°F

236.82°F

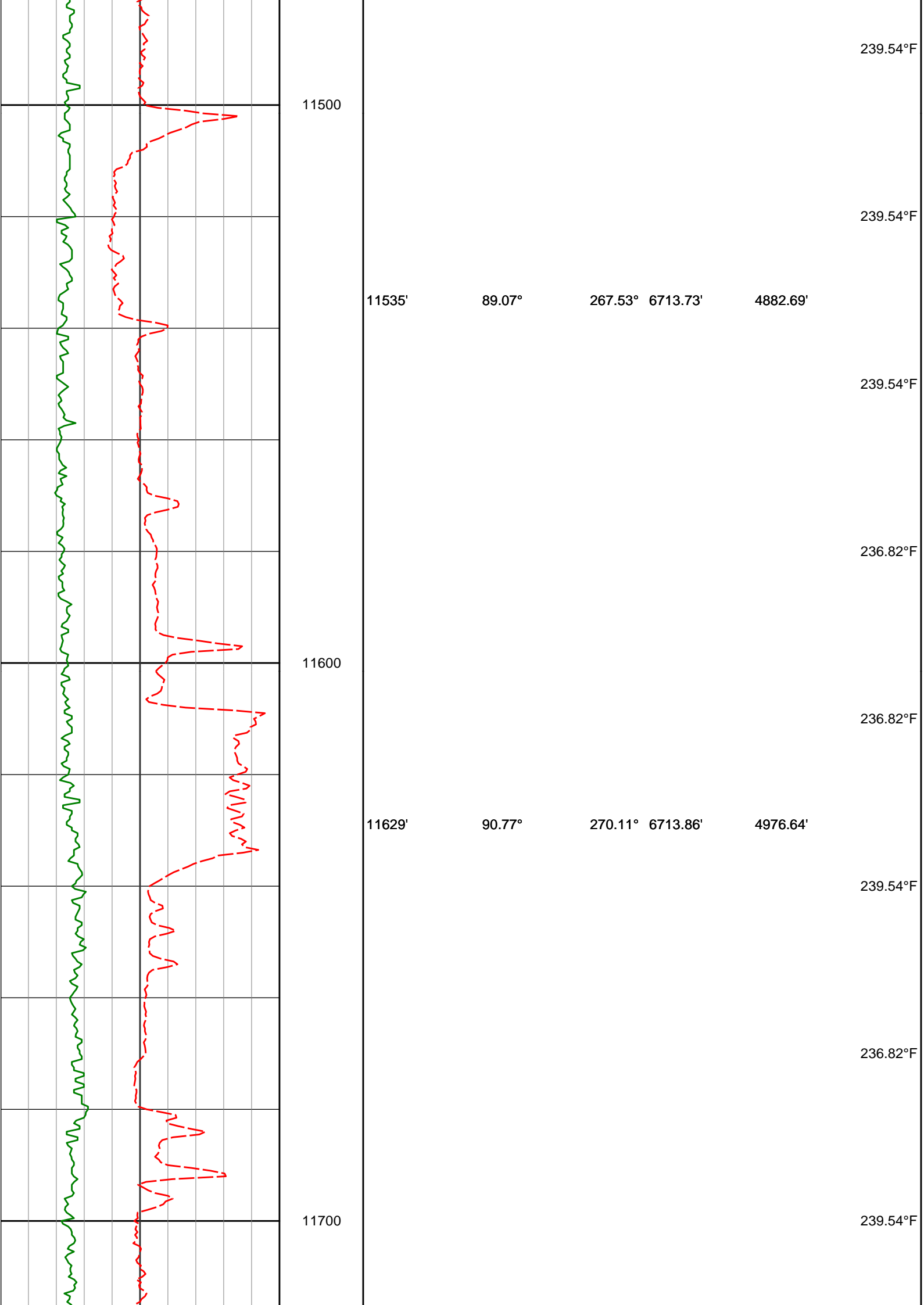
234.12°F

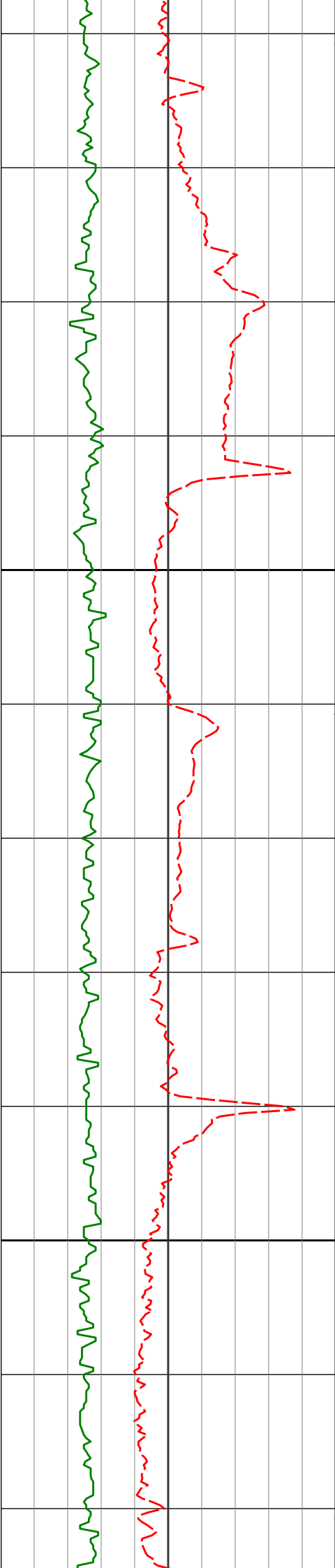


11300

11400

11251'	90.00°	268.39°	6713.71'	4598.94'	234.12°F
					236.82°F
					236.82°F
					239.54°F
11346'	90.00°	268.47°	6713.71'	4693.88'	236.82°F
					236.82°F
					239.54°F
					236.82°F
11440'	90.46°	267.85°	6713.34'	4787.80'	239.54°F
					239.54°F





11800

11900

11724'

91.01°

270.60°

6712.38'

5071.63'

239.54°F

236.82°F

239.54°F

11818'

90.06°

269.85°

6711.50'

5165.62'

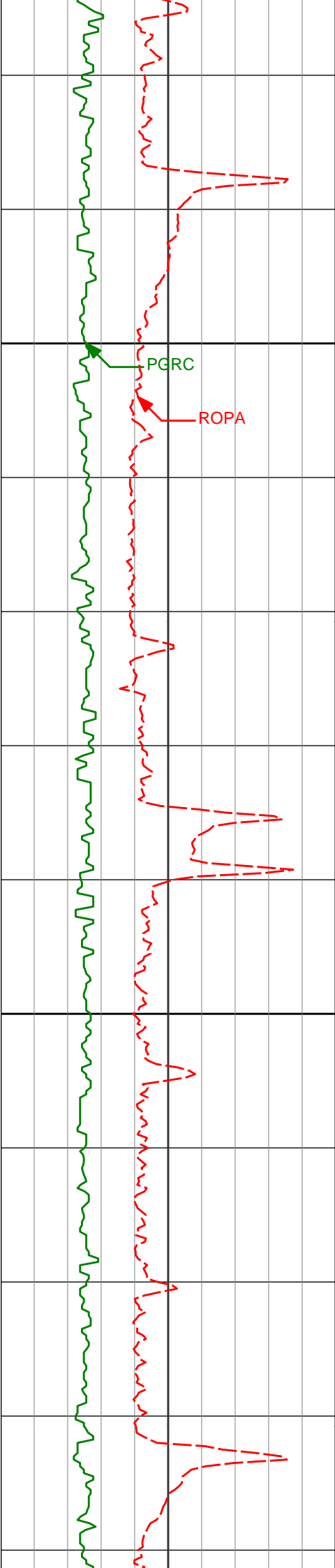
239.54°F

239.54°F

239.54°F

242.28°F

242.28°F



12000

12008'

89.90°

268.79°

6711.57'

5355.58'

12100

12102'

89.53°

268.70°

6712.04'

5449.54'

242.28°F

242.28°F

242.28°F

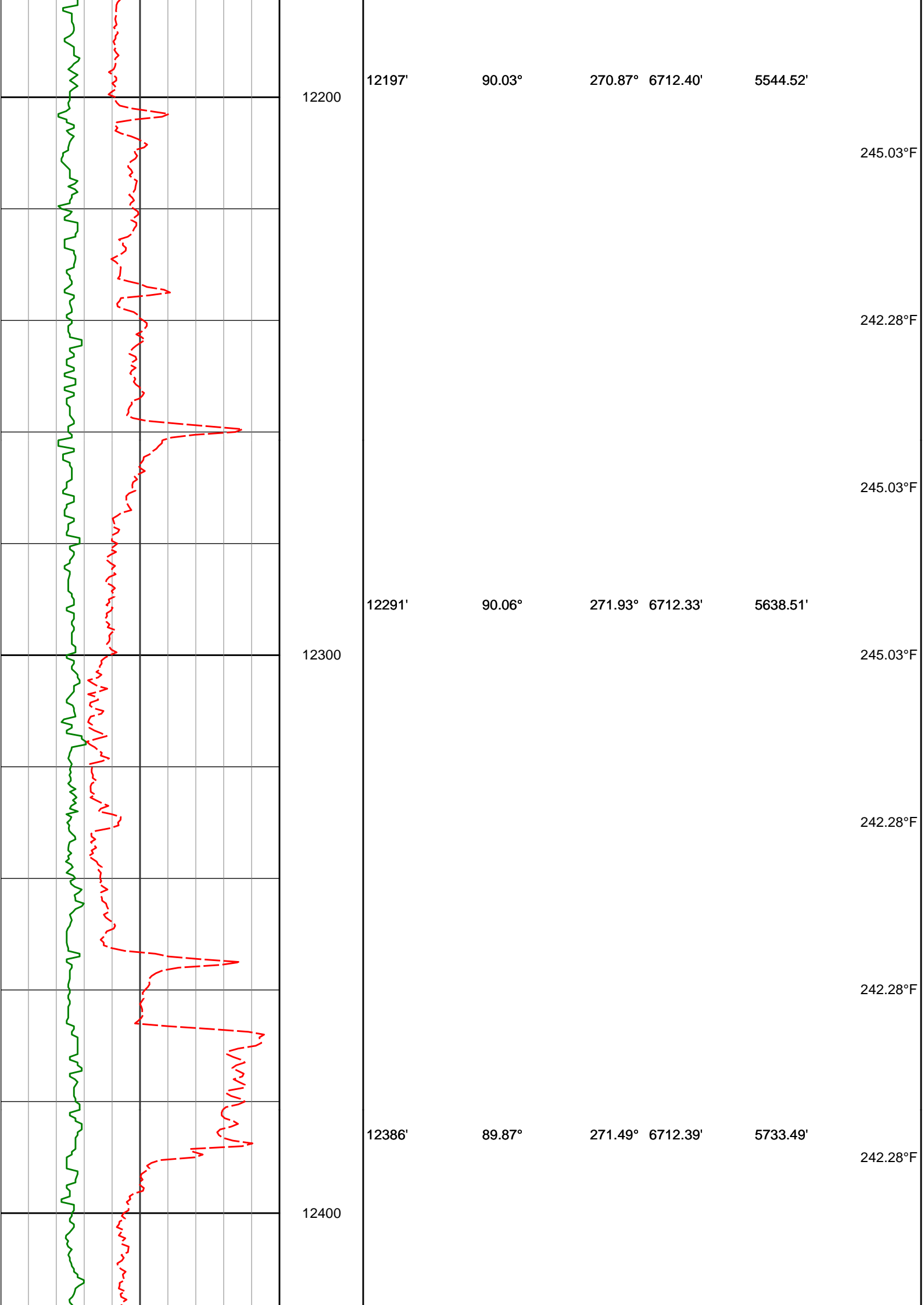
242.28°F

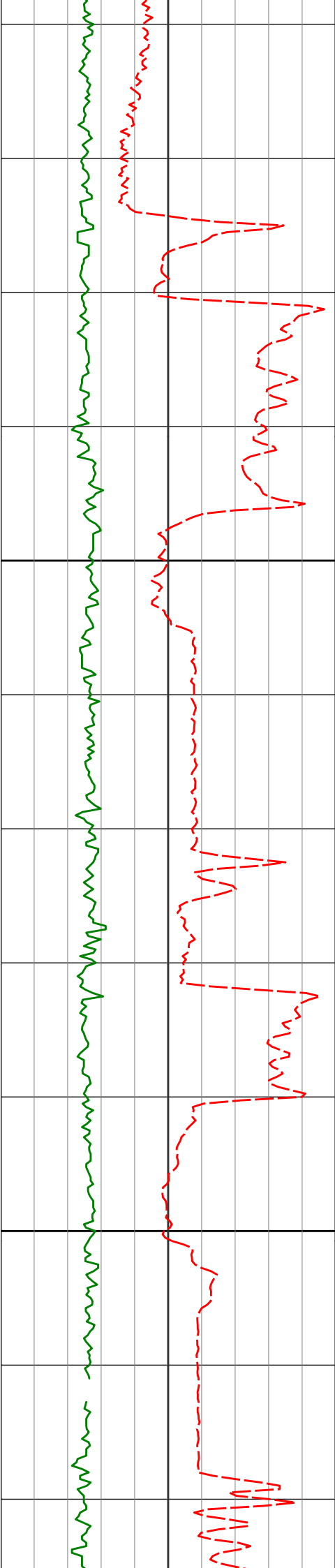
242.28°F

242.28°F

242.28°F

245.03°F





12500

12600

12481'

89.60°

269.87°

6712.83'

5828.48'

242.28°F

242.28°F

245.03°F

242.28°F

245.03°F

12575'

90.83°

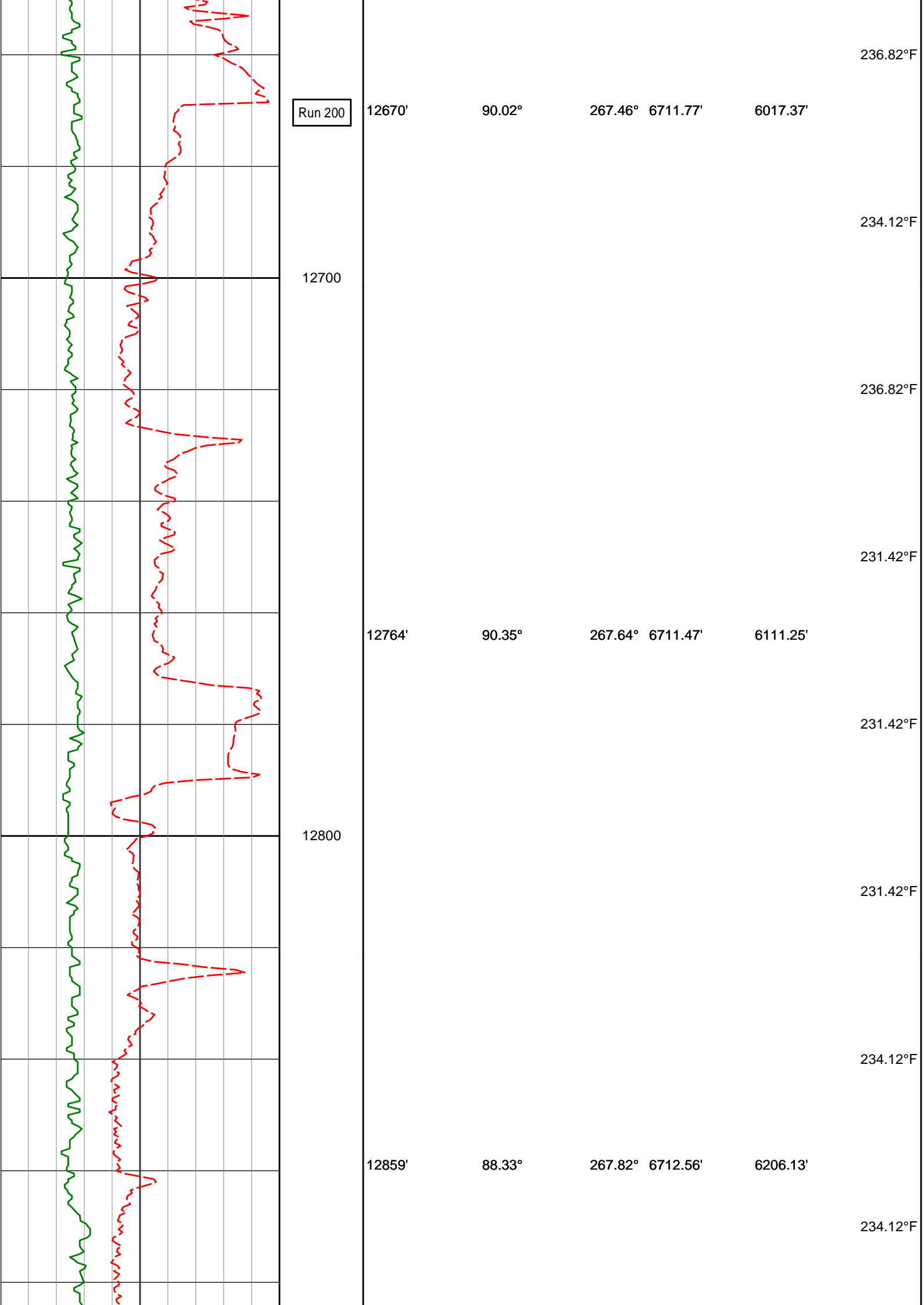
268.77°

6712.47'

5922.46'

245.03°F

234.12°F



Run 200

12670'

90.02°

267.46°

6711.77'

6017.37'

236.82°F

234.12°F

12700

236.82°F

231.42°F

12764'

90.35°

267.64°

6711.47'

6111.25'

231.42°F

12800

231.42°F

234.12°F

12859'

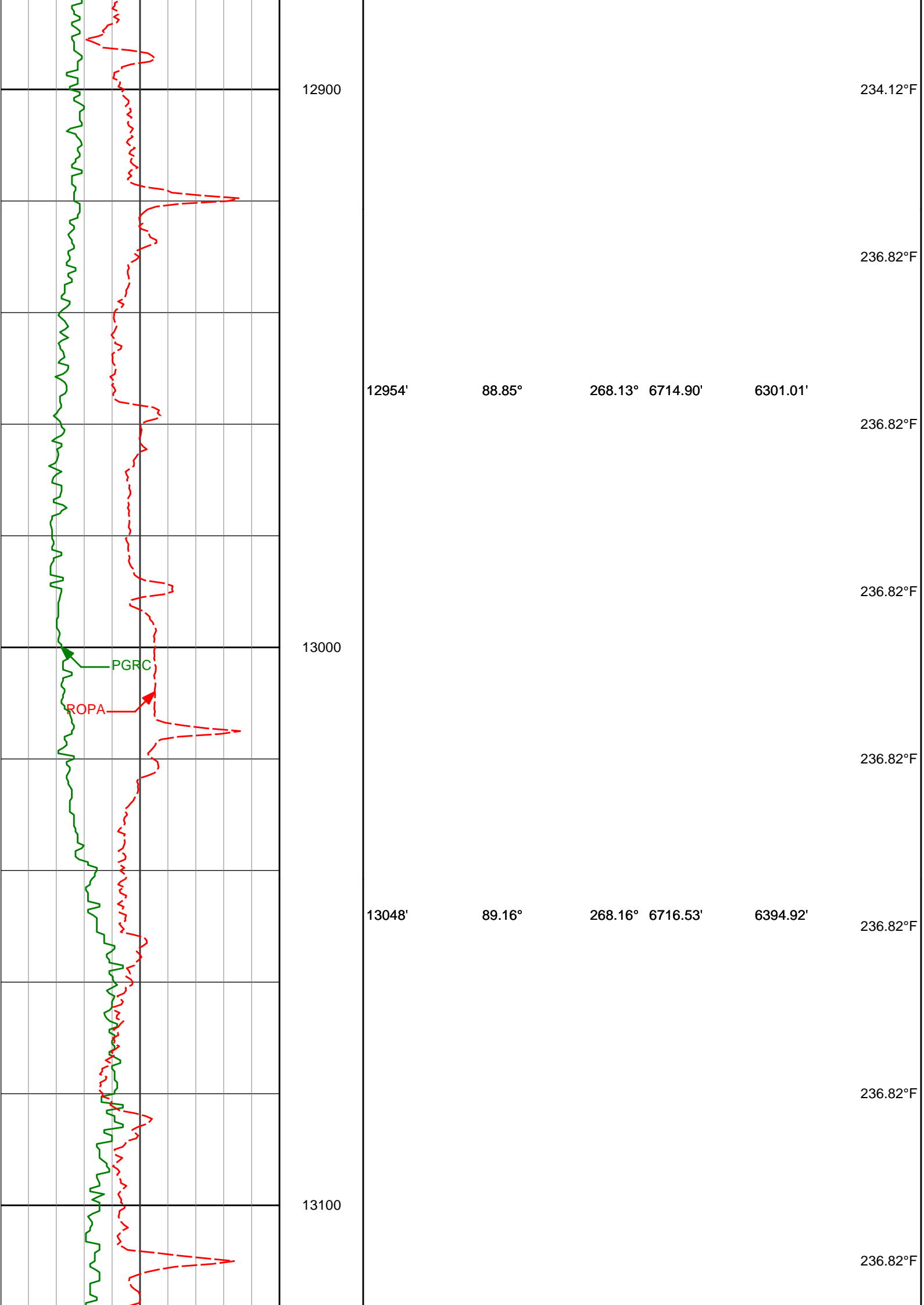
88.33°

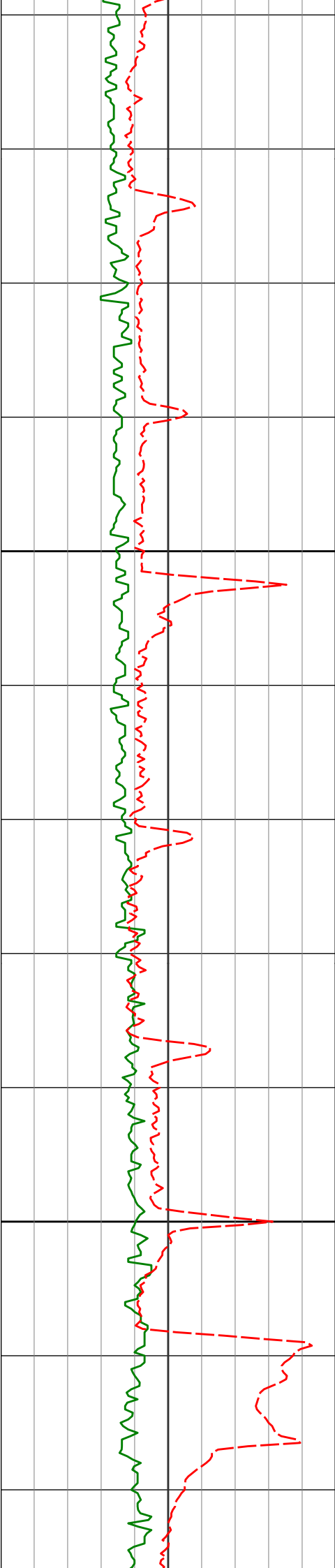
267.82°

6712.56'

6206.13'

234.12°F





13200

13300

13143' 89.53° 268.85° 6717.62' 6489.86' 239.54°F

239.54°F

239.54°F

13237' 89.53° 269.26° 6718.39' 6583.83'

239.54°F

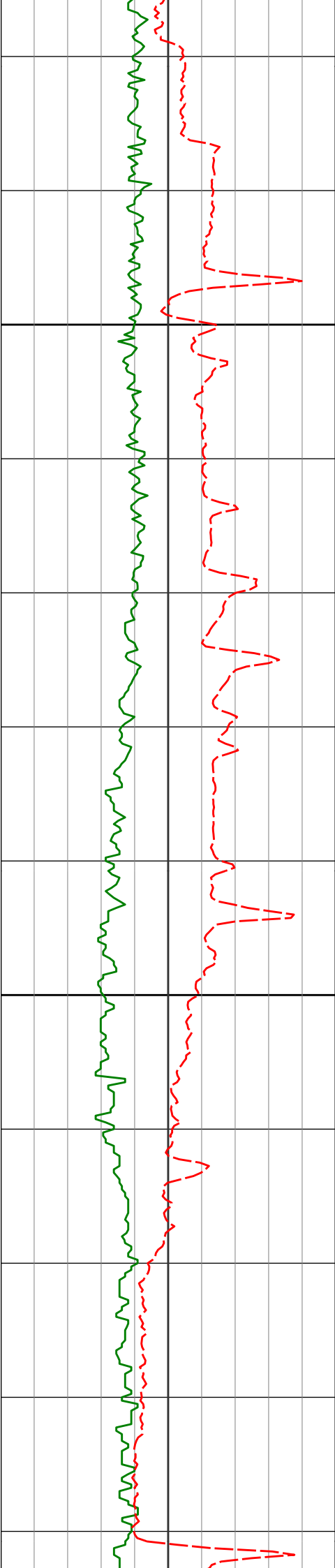
239.54°F

239.54°F

239.54°F

13332' 90.45° 268.10° 6718.40' 6678.78'

242.28°F



13400

13500

13427'

13521'

89.65°

89.56°

267.66°

267.54°

6718.32'

6718.97'

6773.68'

6867.56'

242.28°F

242.28°F

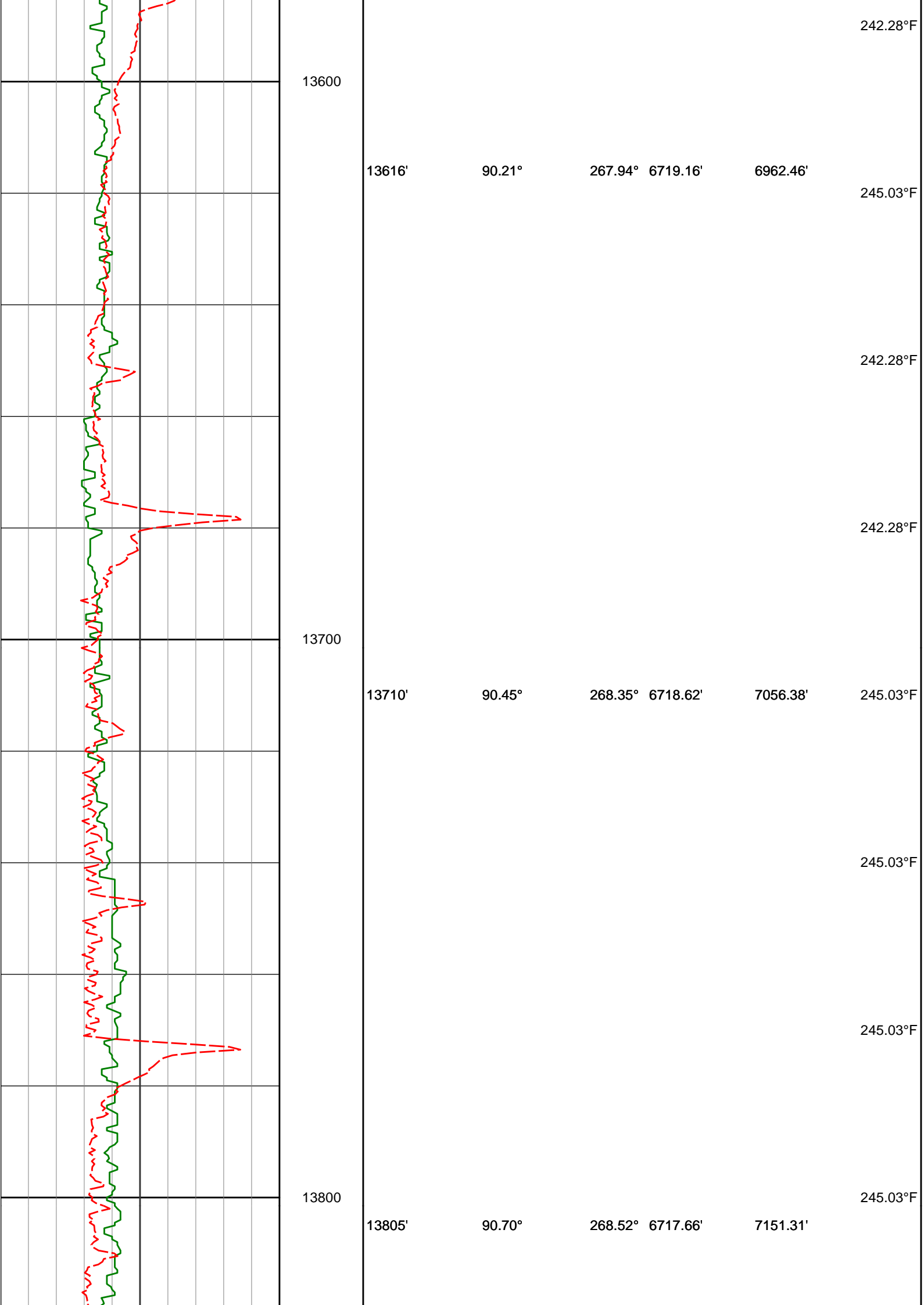
242.28°F

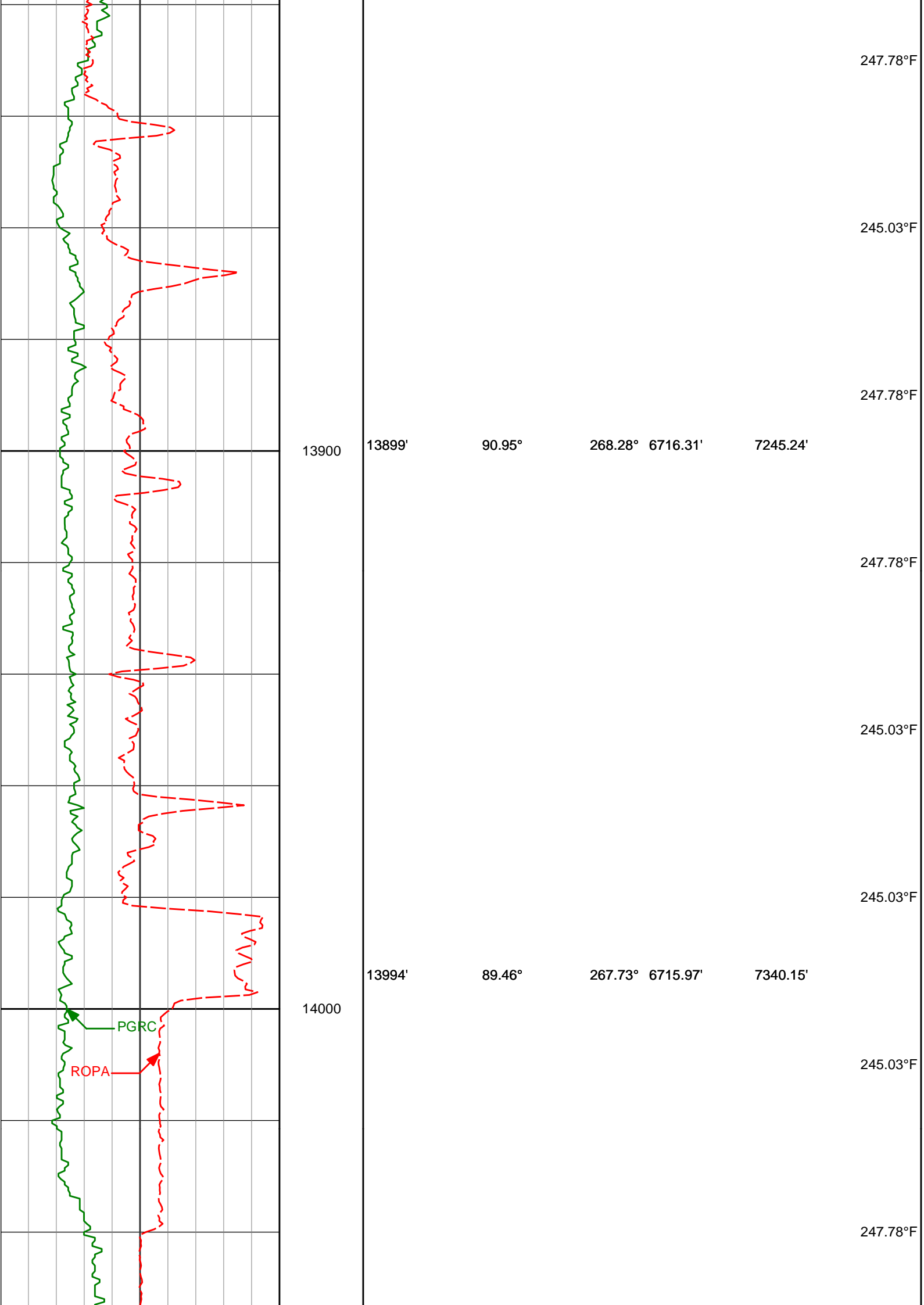
242.28°F

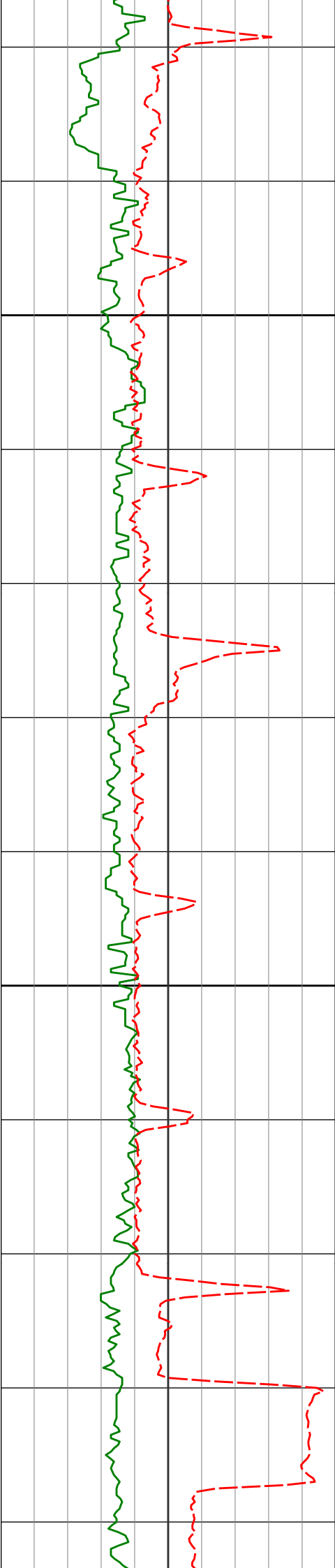
242.28°F

242.28°F

242.28°F







14100

14200

14182'

14277'

90.70°

89.19°

267.91°

267.70°

6715.71'

6715.80'

7527.95'

7622.84'

247.78°F

247.78°F

247.78°F

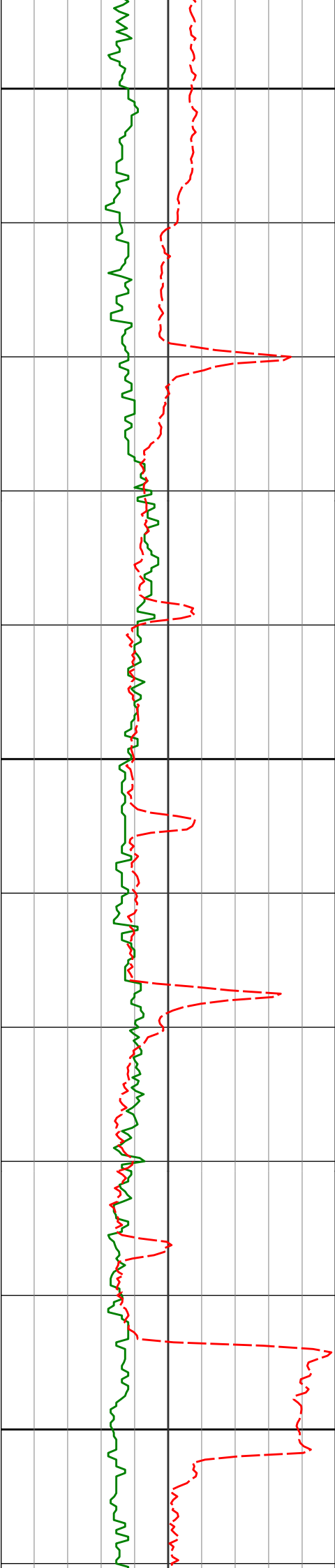
247.78°F

247.78°F

245.03°F

245.03°F

253.35°F



14300

247.78°F

247.78°F

14372'

89.59°

267.85°

6716.81'

7717.73'

247.78°F

14400

247.78°F

250.56°F

14466'

90.33°

268.30°

6716.88'

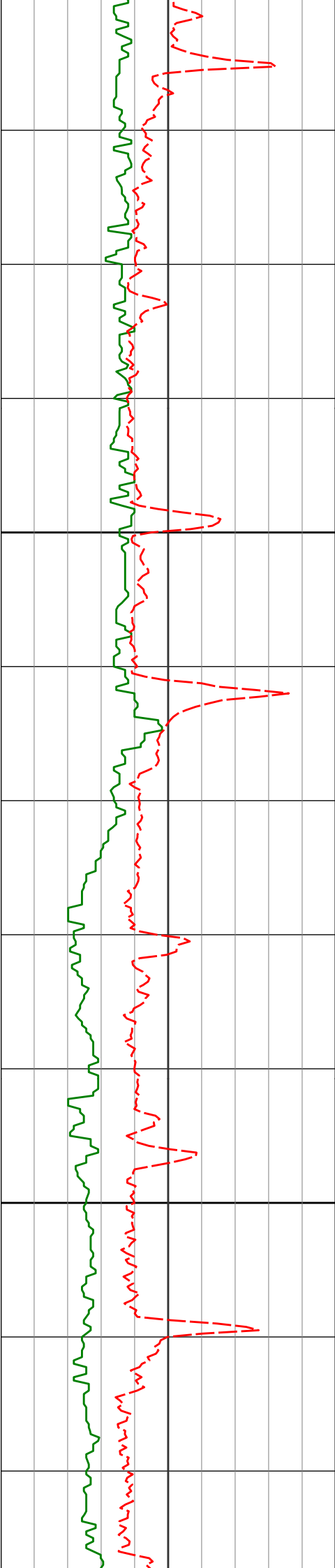
7811.65'

245.03°F

247.78°F

14500

247.78°F



14600

14700

14655'

14750'

88.67°

89.37°

267.83°

268.11°

6718.53'

6720.15'

8000.47'

8095.37'

247.78°F

250.56°F

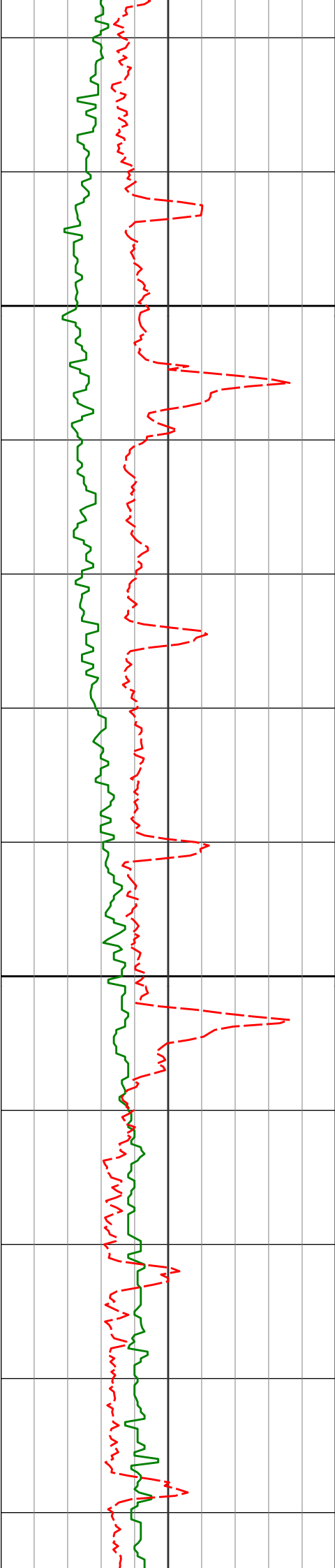
250.56°F

250.56°F

253.35°F

253.35°F

253.35°F



14800

14900

14939'

90.11°

268.29° 6721.01'

8284.22'

253.35°F

253.35°F

253.35°F

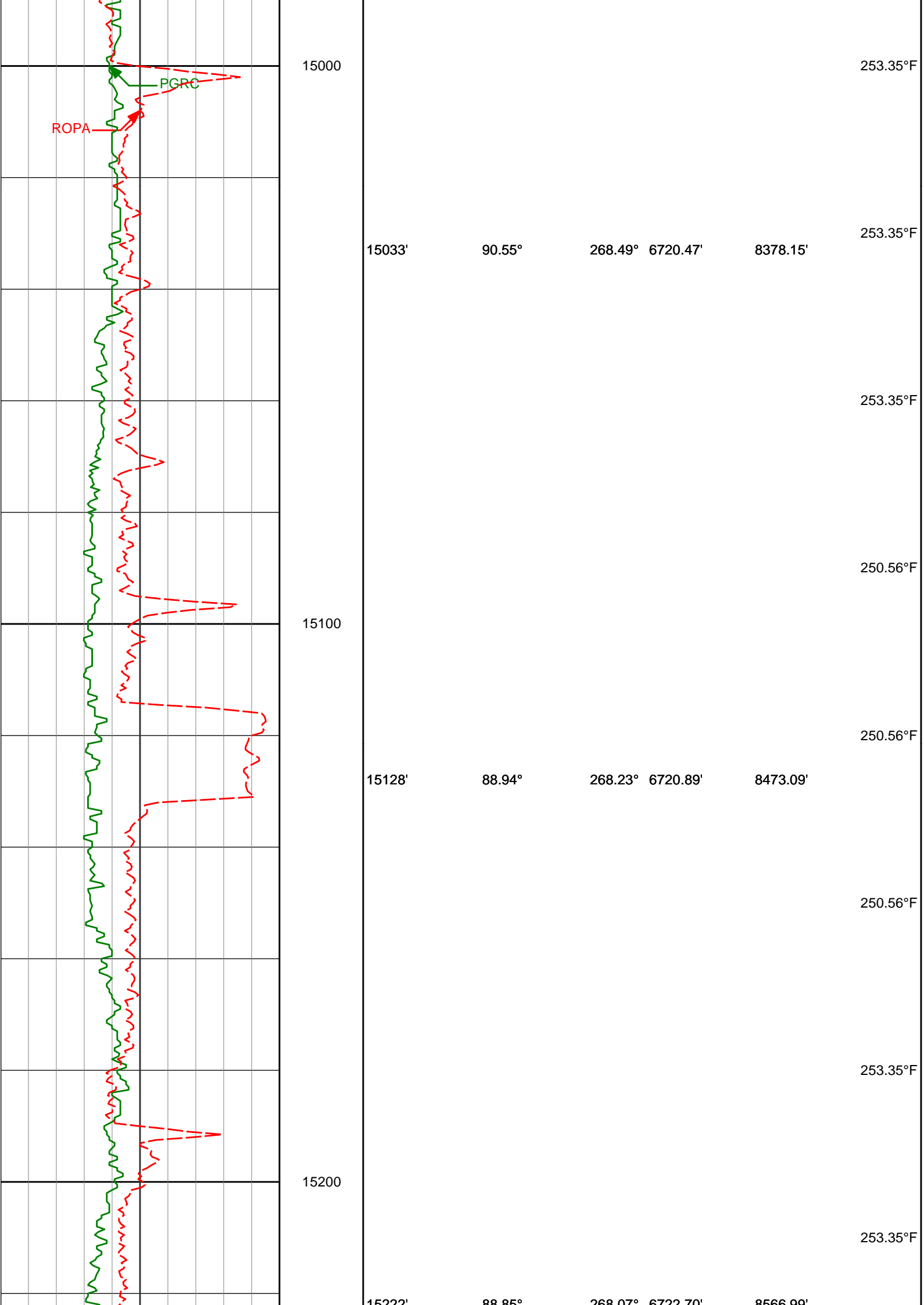
253.35°F

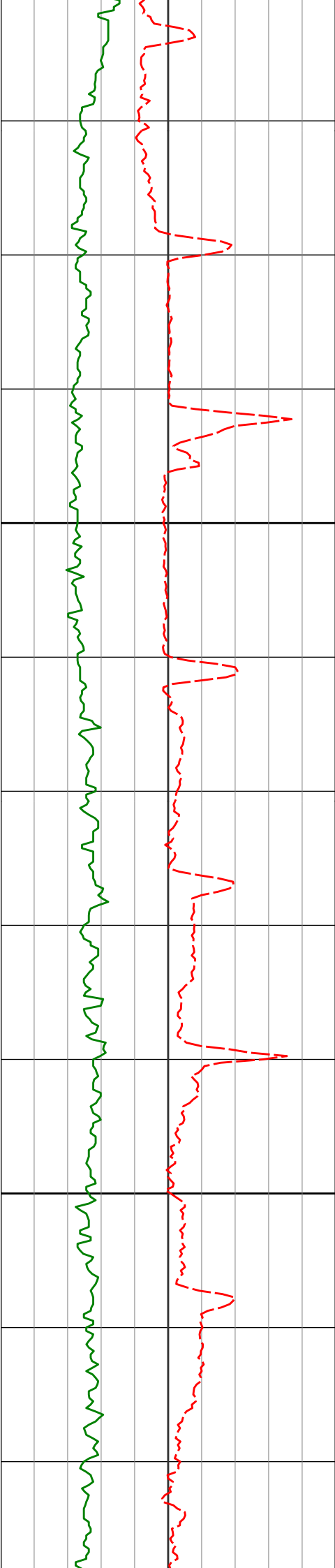
253.35°F

253.35°F

253.35°F

253.35°F

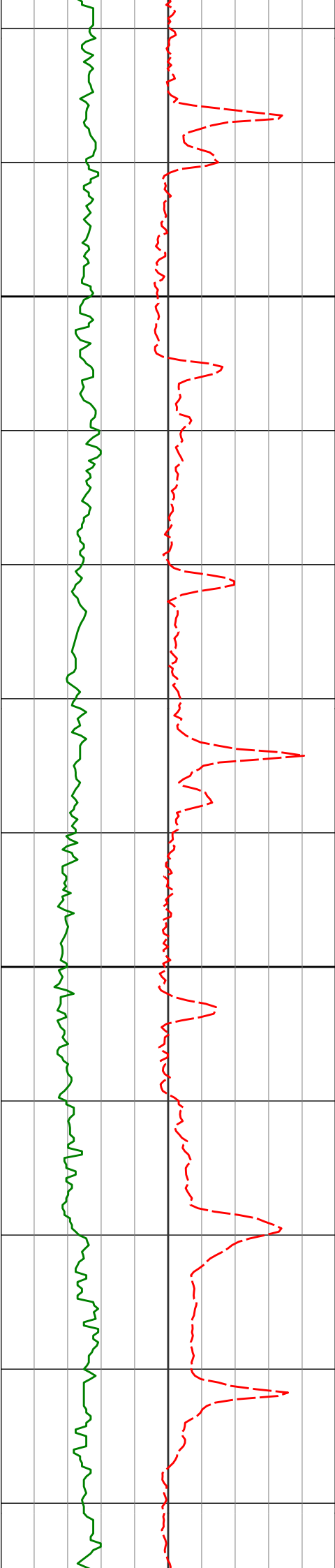




15300

15400

15222	88.85°	268.07°	6722.70'	8566.99'	253.35°F
					253.35°F
					253.35°F
					253.35°F
15317'	89.19°	268.40°	6724.33'	8661.91'	253.35°F
					253.35°F
					253.35°F
					256.14°F
15411'	89.13°	268.61°	6725.71'	8755.84'	256.14°F
					256.14°F
					253.35°F



15500

15600

15506'

15601'

89.13°

89.46°

268.73° 6727.15'

268.73° 6728.32'

8850.79'

8945.73'

253.35°F

256.14°F

253.35°F

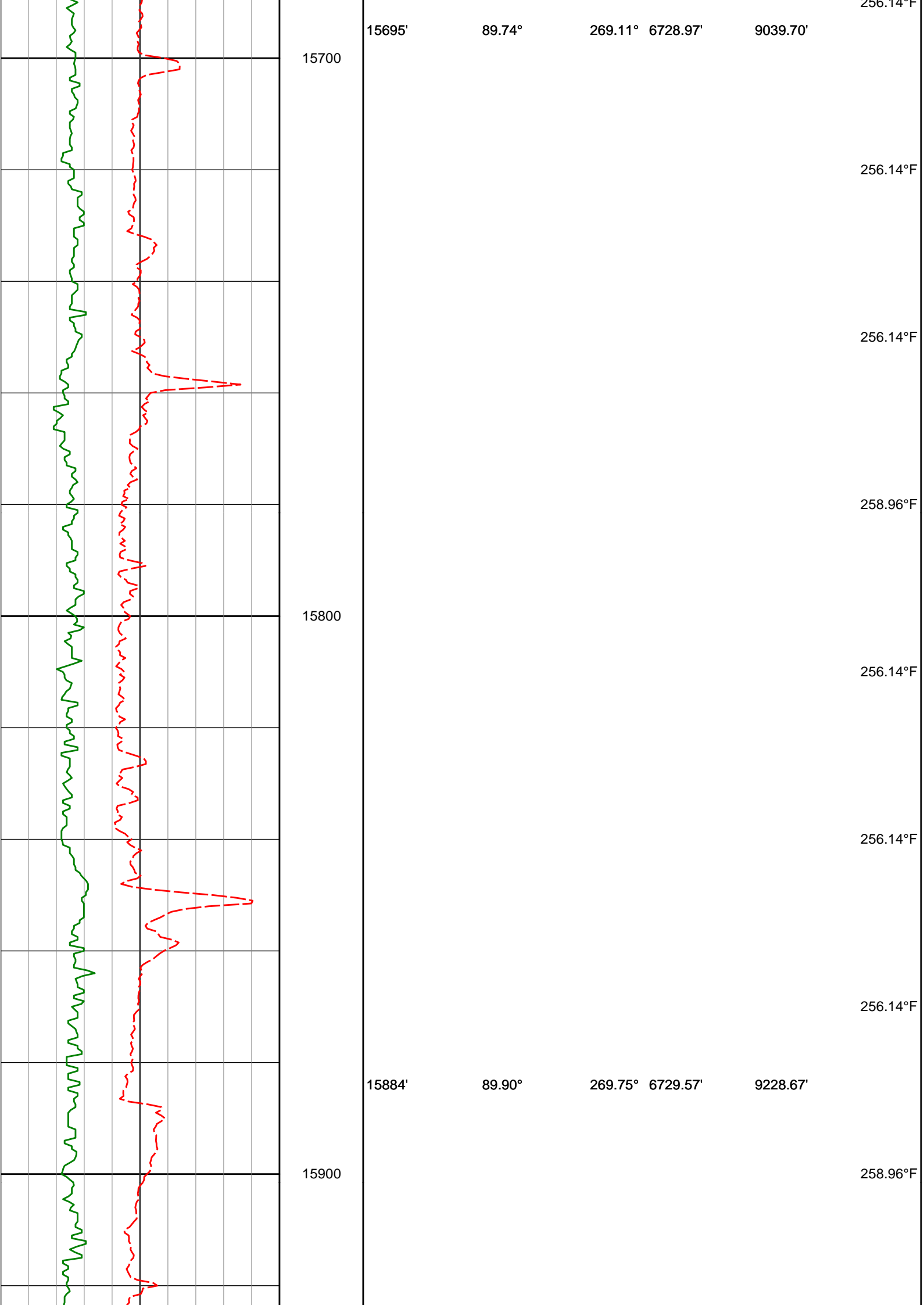
256.14°F

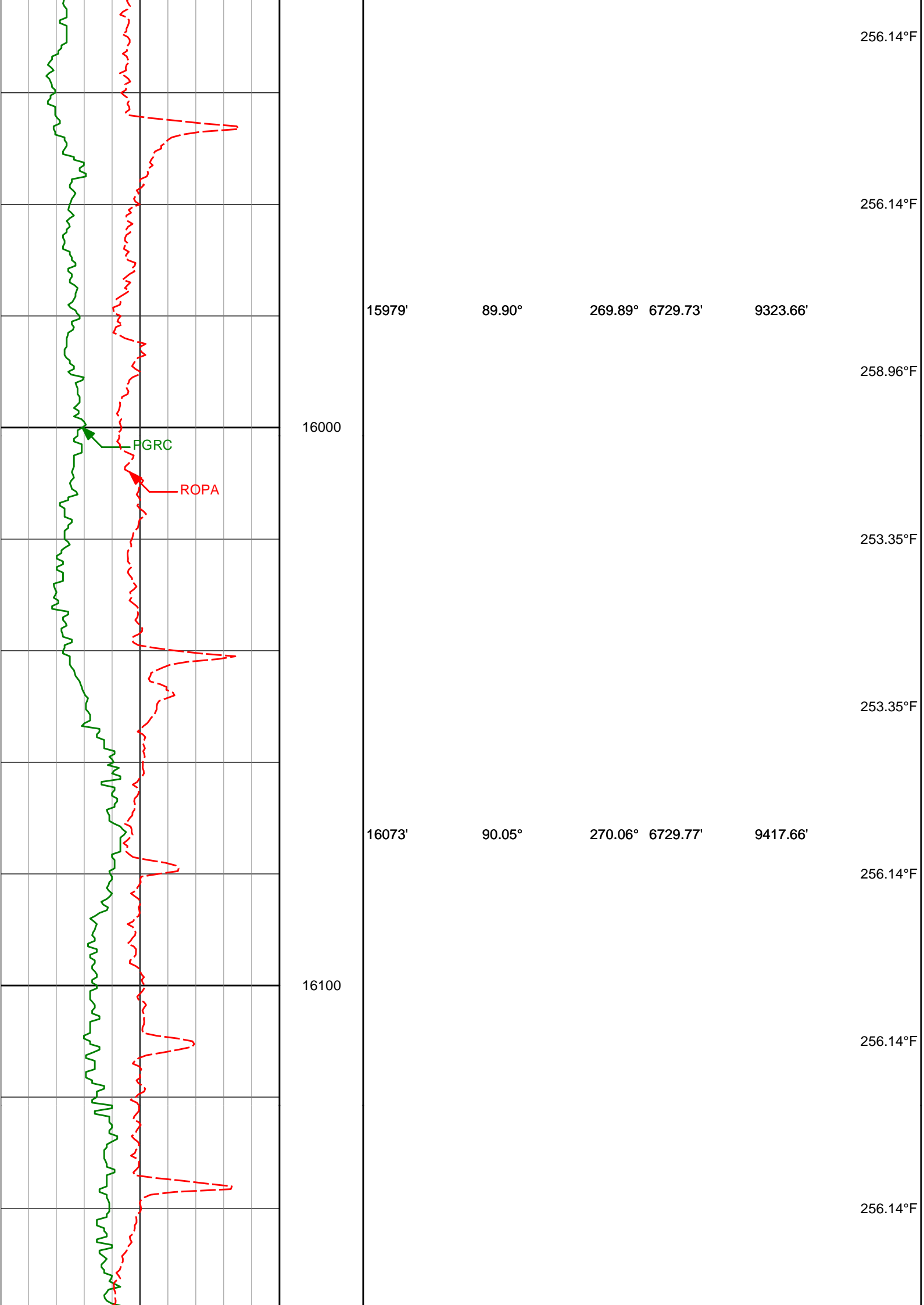
256.14°F

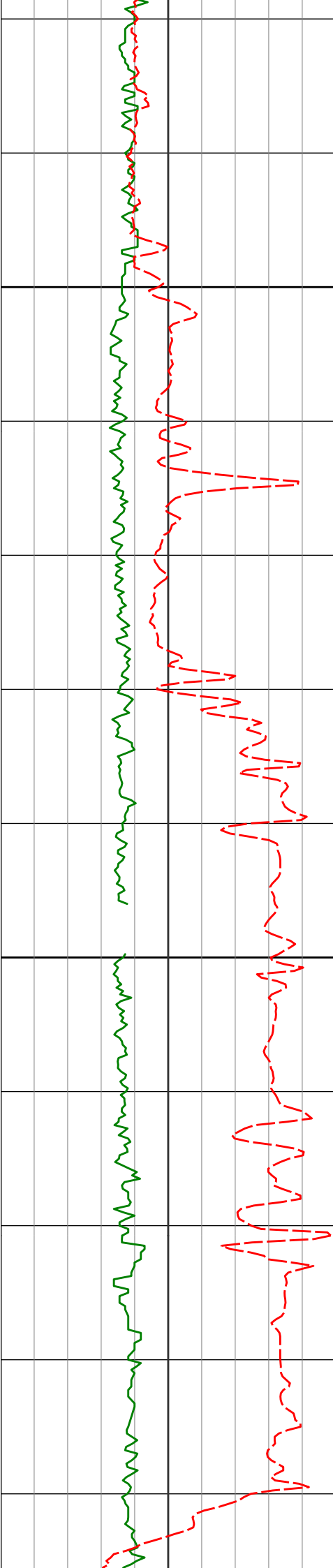
256.14°F

256.14°F

256.14°F

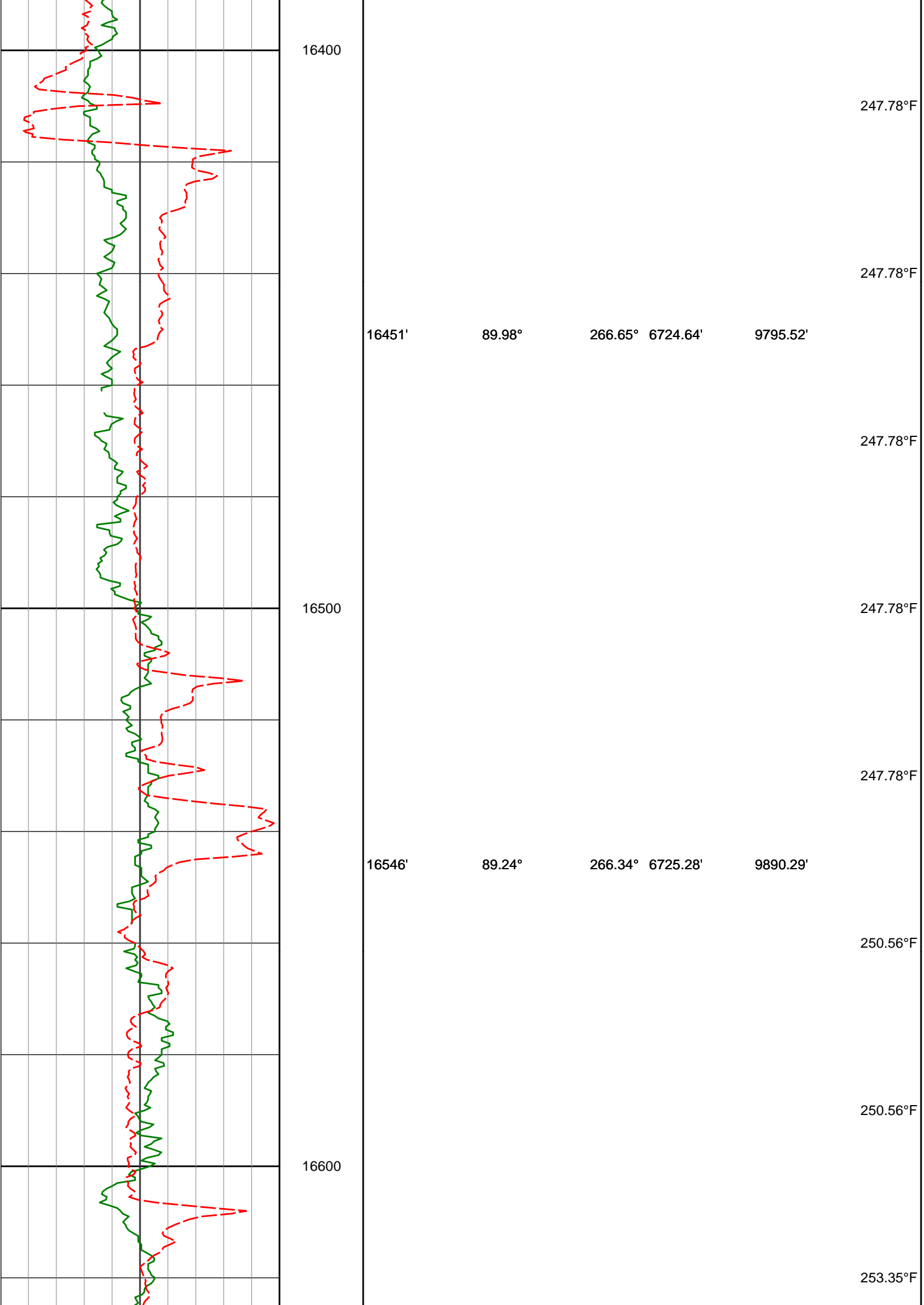


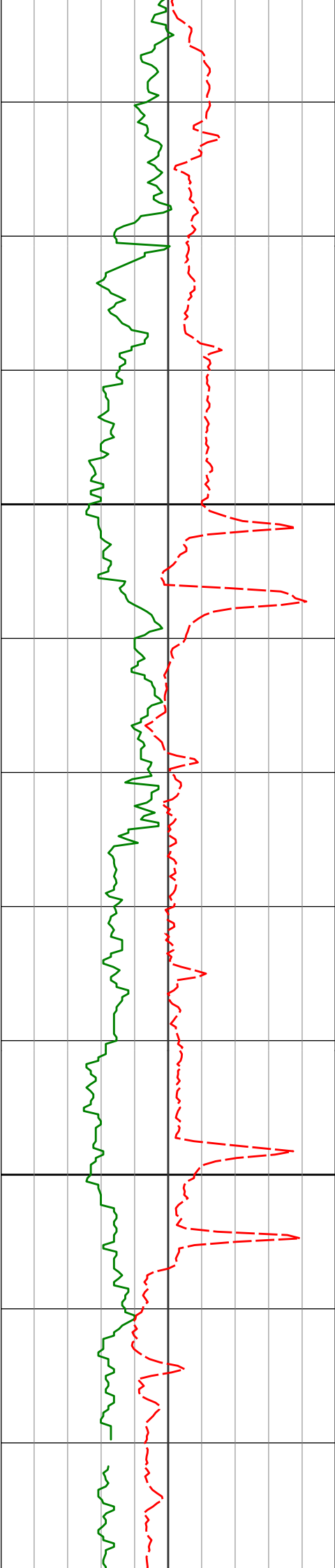




Run 300

16168'	90.11°	270.55°	6729.64'	9512.65'	258.96°F
16200					
247.78°F					
258.96°F					
16262'	91.16°	271.72°	6728.60'	9606.64'	258.96°F
16300					
245.03°F					
247.78°F					
245.03°F					
16357'	91.83°	270.93°	6726.12'	9701.59'	247.78°F





16700

16800

16640'

88.93°

265.93° 6726.78'

9984.01'

253.35°F

250.56°F

253.35°F

16735'

89.15°

265.80° 6728.38'

10078.69'

253.35°F

253.35°F

253.35°F

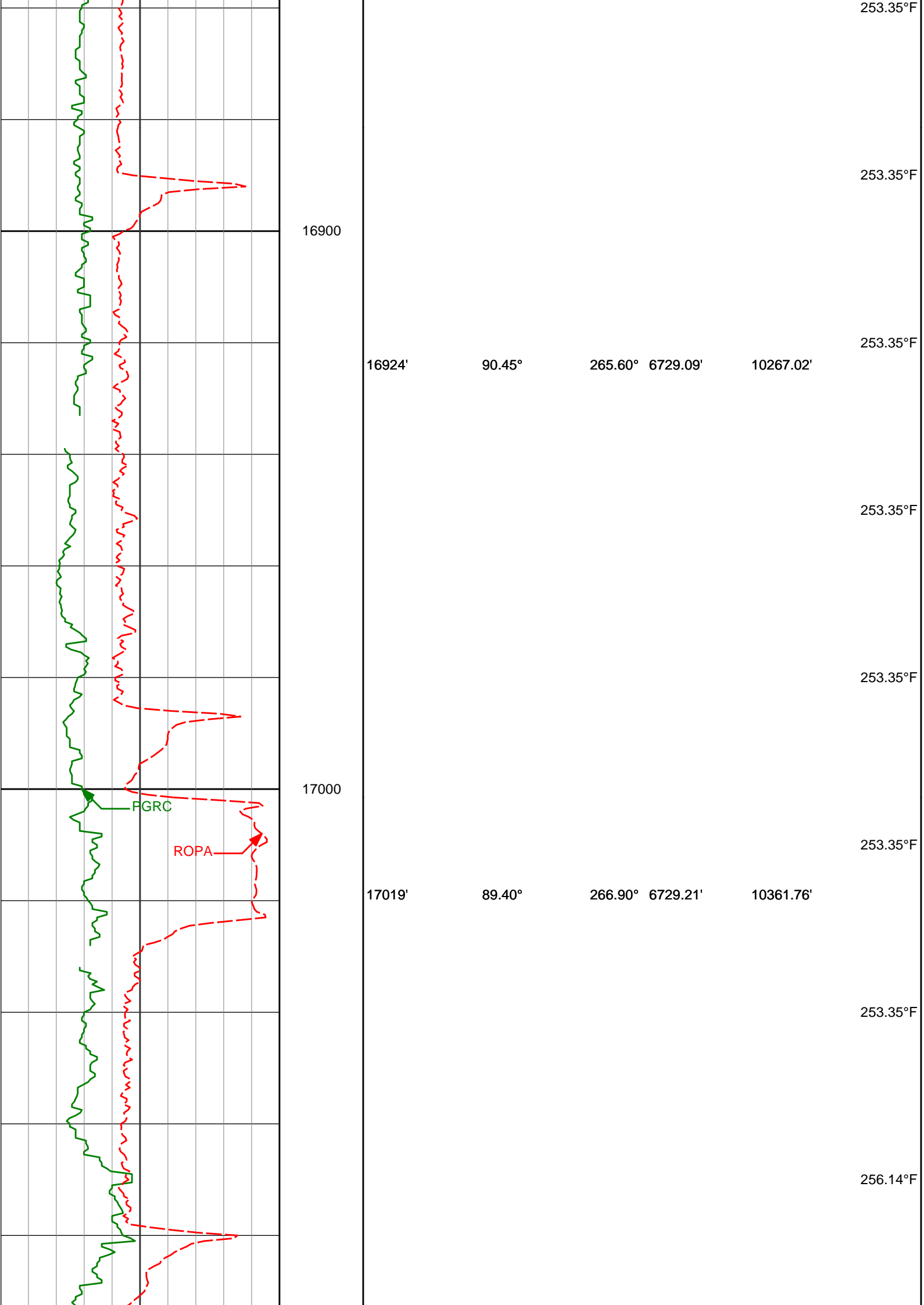
16830'

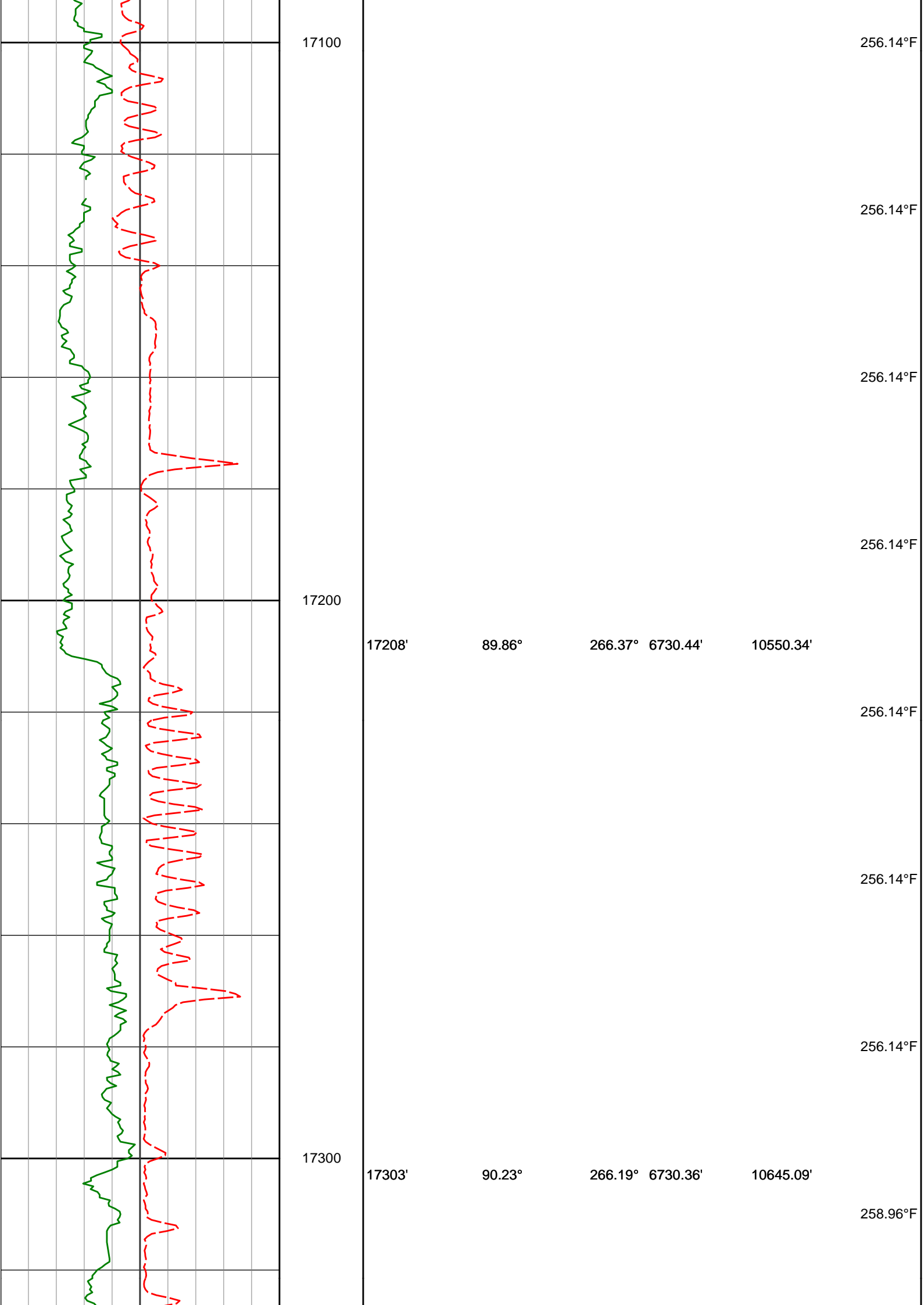
89.77°

265.65° 6729.27'

10173.36'

253.35°F





Gamma Ray Cor			
PGRC			
api	300		

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Shadow State A26-622
Wattenburg
Weld Colorado
USA
CA-XX-0903288405

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
81.00	0.28	138.94	81.00	0.15 S	0.13 E	-0.13	0.35
177.00	0.21	149.71	177.00	0.48 S	0.37 E	-0.38	0.09
272.00	0.36	109.33	272.00	0.73 S	0.74 E	-0.75	0.25
366.00	0.05	31.44	366.00	0.79 S	1.04 E	-1.05	0.38
461.00	0.11	155.03	461.00	0.84 S	1.10 E	-1.11	0.15
555.00	0.25	194.42	555.00	1.12 S	1.09 E	-1.10	0.19
650.00	0.12	342.21	650.00	1.22 S	1.01 E	-1.02	0.38
744.00	0.10	73.47	744.00	1.11 S	1.06 E	-1.06	0.17
838.00	0.21	205.74	838.00	1.24 S	1.06 E	-1.07	0.31
933.00	0.13	218.95	933.00	1.48 S	0.92 E	-0.93	0.09
1027.00	0.17	209.49	1027.00	1.68 S	0.78 E	-0.79	0.05
1122.00	0.13	97.62	1121.99	1.82 S	0.82 E	-0.83	0.26
1216.00	0.13	90.46	1215.99	1.84 S	1.03 E	-1.05	0.02
1311.00	0.09	55.84	1310.99	1.79 S	1.20 E	-1.21	0.08
1406.00	0.07	56.53	1405.99	1.72 S	1.31 E	-1.32	0.02
1500.00	0.38	19.37	1499.99	1.39 S	1.46 E	-1.47	0.35
1595.00	0.23	77.00	1594.99	1.05 S	1.75 E	-1.76	0.34
1689.00	0.40	132.00	1688.99	1.23 S	2.18 E	-2.19	0.35
1784.00	0.95	172.46	1783.98	2.23 S	2.53 E	-2.55	0.73
1875.00	0.70	204.81	1874.98	3.49 S	2.40 E	-2.42	0.57
2057.00	0.35	288.65	2056.97	4.32 S	1.40 E	-1.43	0.41
2151.00	0.26	289.18	2150.97	4.15 S	0.92 E	-0.95	0.09
2245.00	0.41	254.93	2244.97	4.17 S	0.39 E	-0.42	0.26
2340.00	0.40	261.87	2339.96	4.30 S	0.27 W	0.23	0.05
2434.00	0.55	251.08	2433.96	4.50 S	1.02 W	0.99	0.19
2528.00	0.44	270.83	2527.96	4.64 S	1.81 W	1.77	0.22
2623.00	1.52	32.24	2622.95	3.57 S	1.51 W	1.48	1.88
2717.00	3.50	59.45	2716.86	1.06 S	1.63 E	-1.64	2.40
2812.00	5.85	42.71	2811.54	3.97 N	7.41 E	-7.38	2.84
2906.00	5.58	42.31	2905.07	10.87 N	13.74 E	-13.65	0.29
3001.00	6.62	34.41	2999.53	18.81 N	19.94 E	-19.79	1.40
3095.00	6.44	32.99	3092.92	27.70 N	25.87 E	-25.65	0.26
3190.00	5.35	32.75	3187.42	35.90 N	31.17 E	-30.88	1.15
3308.00	6.89	34.31	3304.74	46.37 N	38.14 E	-37.76	1.32
3403.00	6.47	37.76	3399.10	55.31 N	44.63 E	-44.18	0.61
3497.00	5.31	38.63	3492.60	62.90 N	50.59 E	-50.08	1.24
3592.00	6.48	33.55	3587.10	70.80 N	56.30 E	-55.73	1.34
3686.00	7.38	34.96	3680.41	80.16 N	62.69 E	-62.04	0.98
3781.00	7.84	40.57	3774.57	90.09 N	70.40 E	-69.67	0.92
3876.00	7.49	43.51	3868.72	99.50 N	78.87 E	-78.07	0.55
3970.00	6.55	47.42	3962.02	107.57 N	87.04 E	-86.18	1.12
4065.00	5.67	42.01	4056.48	114.73 N	94.17 E	-93.25	1.11
4160.00	4.51	47.00	4151.10	120.76 N	100.04 E	-99.07	1.30
4254.00	5.07	39.43	4244.78	126.49 N	105.38 E	-104.36	0.90
4349.00	4.95	35.48	4339.41	133.07 N	110.43 E	-109.36	0.38
4444.00	5.94	35.50	4433.98	140.41 N	115.66 E	-114.53	1.04
4538.00	4.56	35.23	4527.59	147.42 N	120.64 E	-119.46	1.46
4633.00	5.73	32.18	4622.20	154.52 N	125.35 E	-124.11	1.27
4727.00	6.72	30.97	4715.65	163.21 N	130.68 E	-129.37	1.06
4822.00	5.51	24.98	4810.10	172.12 N	135.47 E	-134.08	1.43
4916.00	7.08	33.44	4903.54	181.05 N	140.57 E	-139.11	1.94
5106.00	6.38	29.80	5092.23	199.98 N	152.27 E	-150.66	0.43
5200.00	5.20	27.38	5185.75	208.29 N	156.82 E	-155.14	1.28
5295.00	6.27	28.22	5289.27	216.18 N	162.02 E	-160.28	1.61

5295.00	6.27	38.33	5280.27	216.18 N	162.02 E	-160.28	1.61
5389.00	5.41	38.93	5373.78	223.66 N	167.99 E	-166.19	0.92
5484.00	5.29	30.82	5468.37	230.91 N	173.05 E	-171.19	0.81
5579.00	5.63	46.09	5562.94	237.90 N	178.65 E	-176.74	1.57
5673.00	6.40	46.32	5656.43	244.72 N	185.76 E	-183.79	0.82
5768.00	5.34	41.21	5750.93	251.70 N	192.51 E	-190.48	1.24
5862.00	5.31	28.63	5844.52	258.81 N	197.47 E	-195.39	1.24
5957.00	6.26	28.64	5939.04	267.21 N	202.06 E	-199.91	1.00
6051.00	6.75	347.51	6032.48	277.11 N	203.33 E	-201.10	4.88
6146.00	11.59	297.54	6126.37	286.99 N	193.64 E	-191.33	9.35
6240.00	16.31	272.39	6217.66	291.91 N	172.05 E	-169.70	8.07
6335.00	22.59	267.99	6307.19	291.83 N	140.45 E	-138.10	6.78
6430.00	29.62	263.16	6392.46	288.39 N	98.85 E	-96.53	7.72
6525.00	38.63	256.21	6471.05	278.50 N	46.61 E	-44.37	10.33
6619.00	46.48	259.18	6540.25	265.08 N	15.46 W	17.59	8.61
6714.00	53.86	264.28	6601.08	254.77 N	87.59 W	89.63	8.80
6808.00	63.26	269.83	6650.08	250.85 N	167.56 W	169.57	11.19
6903.00	72.81	272.81	6685.58	252.96 N	255.52 W	257.54	10.46
6998.00	83.03	274.46	6705.44	258.87 N	348.10 W	350.17	10.89
7092.00	91.24	273.40	6710.13	265.29 N	441.68 W	443.80	8.81
7187.00	91.11	273.45	6708.18	270.97 N	536.49 W	538.65	0.15
7281.00	90.13	272.81	6707.17	276.10 N	630.35 W	632.54	1.25
7376.00	90.25	273.10	6706.85	280.99 N	725.22 W	727.45	0.33
7470.00	90.12	272.35	6706.55	285.46 N	819.11 W	821.38	0.81
7564.00	90.50	272.35	6706.04	289.32 N	913.03 W	915.32	0.40
7659.00	90.40	272.49	6705.29	293.33 N	1007.94 W	1010.27	0.18
7753.00	90.83	272.25	6704.28	297.22 N	1101.86 W	1104.21	0.52
7848.00	89.63	271.18	6703.90	300.06 N	1196.81 W	1199.18	1.69
7942.00	89.02	270.80	6705.01	301.68 N	1290.79 W	1293.17	0.76
8037.00	88.30	269.90	6707.23	302.26 N	1385.76 W	1388.14	1.21
8132.00	88.61	267.55	6709.79	300.15 N	1480.70 W	1483.06	2.49
8226.00	88.55	264.04	6712.12	293.26 N	1574.40 W	1576.70	3.73
8320.00	90.77	264.41	6712.68	283.80 N	1667.91 W	1670.14	2.39
8415.00	91.41	267.33	6710.87	276.96 N	1762.64 W	1764.81	3.15
8509.00	91.23	267.42	6708.71	272.66 N	1856.52 W	1858.65	0.21
8604.00	91.32	267.20	6706.59	268.20 N	1951.39 W	1953.48	0.25
8698.00	91.23	269.14	6704.50	265.20 N	2045.31 W	2047.38	2.07
8793.00	91.78	268.93	6702.01	263.60 N	2140.27 W	2142.31	0.62
8887.00	90.58	270.37	6700.07	263.03 N	2234.24 W	2236.28	1.99
8982.00	90.55	270.29	6699.13	263.57 N	2329.23 W	2331.27	0.09
9076.00	88.89	270.63	6699.59	264.33 N	2423.23 W	2425.27	1.80
9171.00	89.10	270.43	6701.26	265.21 N	2518.21 W	2520.26	0.31
9266.00	89.63	270.60	6702.31	266.06 N	2613.20 W	2615.25	0.59
9360.00	90.12	270.52	6702.52	266.98 N	2707.19 W	2709.25	0.53
9454.00	88.55	271.18	6703.61	268.37 N	2801.17 W	2803.24	1.81
9549.00	87.25	270.77	6707.09	269.99 N	2896.09 W	2898.17	1.43
9643.00	86.82	270.37	6711.95	270.92 N	2989.96 W	2992.04	0.62
9738.00	87.87	269.75	6716.35	271.02 N	3084.86 W	3086.93	1.28
9833.00	89.32	269.06	6718.68	270.04 N	3179.82 W	3181.89	1.69
9928.00	88.86	268.69	6720.19	268.17 N	3274.79 W	3276.84	0.62
10022.00	90.83	268.81	6720.45	266.12 N	3368.76 W	3370.79	2.10
10117.00	90.92	268.52	6718.99	263.91 N	3463.73 W	3465.73	0.32
10211.00	91.20	268.98	6717.26	261.86 N	3557.69 W	3559.67	0.57
10306.00	90.74	269.05	6715.65	260.22 N	3652.66 W	3654.63	0.49
10400.00	90.49	268.55	6714.64	258.25 N	3746.63 W	3748.59	0.59
10495.00	90.74	268.68	6713.62	255.96 N	3841.60 W	3843.53	0.30
10589.00	90.92	268.68	6712.26	253.79 N	3935.56 W	3937.48	0.19
10684.00	90.92	268.41	6710.73	251.38 N	4030.52 W	4032.41	0.28
10778.00	91.26	268.40	6708.94	248.77 N	4124.47 W	4126.33	0.36
10873.00	89.04	268.85	6708.70	246.49 N	4219.43 W	4221.28	2.38
10968.00	90.12	268.64	6709.39	244.41 N	4314.41 W	4316.23	1.16
11062.00	88.80	267.47	6710.28	241.22 N	4408.35 W	4410.14	1.88
11157.00	88.52	268.26	6712.50	237.68 N	4503.25 W	4505.02	0.88
11251.00	90.00	268.39	6713.71	234.93 N	4597.20 W	4598.94	1.58
11346.00	90.00	268.47	6713.71	232.33 N	4692.17 W	4693.88	0.08
11440.00	90.46	267.85	6713.34	229.31 N	4786.12 W	4787.80	0.82
11535.00	89.07	267.53	6713.73	225.48 N	4881.04 W	4882.69	1.50
11629.00	90.77	270.11	6713.86	223.54 N	4975.00 W	4976.64	3.29
11724.00	91.01	270.60	6712.38	224.13 N	5069.99 W	5071.63	0.57
11818.00	90.06	269.85	6711.50	224.50 N	5163.98 W	5165.62	1.29
12008.00	89.90	268.79	6711.57	222.25 N	5353.97 W	5355.58	0.56
12102.00	89.53	268.70	6712.04	220.19 N	5447.94 W	5449.54	0.41
12197.00	90.03	270.87	6712.40	219.83 N	5542.94 W	5544.52	2.34
12291.00	90.06	271.93	6712.33	222.13 N	5636.91 W	5638.51	1.13
12386.00	89.87	271.49	6712.39	224.96 N	5731.87 W	5733.49	0.50
12481.00	89.60	269.87	6712.83	226.09 N	5826.85 W	5828.48	1.73

12575.00	90.83	268.77	6712.47	224.97 N	5920.84 W	5922.46	1.76
12670.00	90.02	267.46	6711.77	221.85 N	6015.79 W	6017.37	1.62
12764.00	90.35	267.64	6711.47	217.83 N	6109.70 W	6111.25	0.40
12859.00	88.33	267.82	6712.56	214.07 N	6204.61 W	6206.13	2.13
12954.00	88.85	268.13	6714.90	210.71 N	6299.53 W	6301.01	0.64
13048.00	89.16	268.16	6716.53	207.67 N	6393.46 W	6394.92	0.33
13143.00	89.53	268.85	6717.62	205.19 N	6488.42 W	6489.86	0.82
13237.00	89.53	269.26	6718.39	203.64 N	6582.41 W	6583.83	0.44
13332.00	90.45	268.10	6718.40	201.45 N	6677.38 W	6678.78	1.56
13427.00	89.65	267.66	6718.32	197.94 N	6772.31 W	6773.68	0.96
13521.00	89.56	267.54	6718.97	194.00 N	6866.23 W	6867.56	0.16
13616.00	90.21	267.94	6719.16	190.26 N	6961.15 W	6962.46	0.80
13710.00	90.45	268.35	6718.62	187.21 N	7055.10 W	7056.38	0.51
13805.00	90.70	268.52	6717.66	184.62 N	7150.06 W	7151.31	0.32
13899.00	90.95	268.28	6716.31	181.99 N	7244.02 W	7245.24	0.37
13994.00	89.46	267.73	6715.97	178.69 N	7338.95 W	7340.15	1.67
14182.00	90.70	267.91	6715.71	171.54 N	7526.81 W	7527.95	0.67
14277.00	89.19	267.70	6715.80	167.90 N	7621.74 W	7622.84	1.60
14372.00	89.59	267.85	6716.81	164.21 N	7716.66 W	7717.73	0.45
14466.00	90.33	268.30	6716.88	161.05 N	7810.61 W	7811.65	0.92
14655.00	88.67	267.83	6718.53	154.67 N	7999.49 W	8000.47	0.91
14750.00	89.37	268.11	6720.15	151.31 N	8094.41 W	8095.37	0.79
14939.00	90.11	268.29	6721.01	145.37 N	8283.32 W	8284.22	0.40
15033.00	90.55	268.49	6720.47	142.73 N	8377.28 W	8378.15	0.51
15128.00	88.94	268.23	6720.89	140.01 N	8472.24 W	8473.09	1.72
15222.00	88.85	268.07	6722.70	136.98 N	8566.17 W	8566.99	0.20
15317.00	89.19	268.40	6724.33	134.05 N	8661.11 W	8661.91	0.50
15411.00	89.13	268.61	6725.71	131.60 N	8755.07 W	8755.84	0.23
15506.00	89.13	268.73	6727.15	129.39 N	8850.03 W	8850.79	0.13
15601.00	89.46	268.73	6728.32	127.29 N	8945.00 W	8945.73	0.35
15695.00	89.74	269.11	6728.97	125.52 N	9038.98 W	9039.70	0.50
15884.00	89.90	269.75	6729.57	123.64 N	9227.97 W	9228.67	0.35
15979.00	89.90	269.89	6729.73	123.34 N	9322.97 W	9323.66	0.15
16073.00	90.05	270.06	6729.77	123.30 N	9416.97 W	9417.66	0.24
16168.00	90.11	270.55	6729.64	123.80 N	9511.97 W	9512.65	0.52
16262.00	91.16	271.72	6728.60	125.66 N	9605.94 W	9606.64	1.67
16357.00	91.83	270.93	6726.12	127.86 N	9700.88 W	9701.59	1.09
16451.00	89.98	266.65	6724.64	125.87 N	9794.82 W	9795.52	4.96
16546.00	89.24	266.34	6725.28	120.07 N	9889.64 W	9890.29	0.84
16640.00	88.93	265.93	6726.78	113.73 N	9983.42 W	9984.01	0.55
16735.00	89.15	265.80	6728.38	106.88 N	10078.16 W	10078.69	0.27
16830.00	89.77	265.65	6729.27	99.80 N	10172.89 W	10173.36	0.67
16924.00	90.45	265.60	6729.09	92.63 N	10266.61 W	10267.02	0.73
17019.00	89.40	266.90	6729.21	86.42 N	10361.40 W	10361.76	1.76
17208.00	89.86	266.37	6730.44	75.32 N	10550.07 W	10550.34	0.37
17303.00	90.23	266.19	6730.36	69.16 N	10644.87 W	10645.09	0.43
17397.00	89.15	265.41	6730.87	62.27 N	10738.62 W	10738.77	1.42
17459.00	89.40	266.09	6731.65	57.68 N	10800.44 W	10800.56	1.17
17520.00	89.40	266.09	6732.29	53.52 N	10861.30 W	10861.38	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 270.46 DEGREES (GRID)
A TOTAL CORRECTION OF 7.64 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17520.00 FEET
IS 10861.43 FEET ALONG 270.28 DEGREES (GRID)

Survey from 0 to 1875 were Gyro surveys.
Surveys corrected by Surcon starting at 2057 ft.
Last survey is a projection to the bit at TD.