



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	22-Jun-16	24-Jun-16	26-Jun-16		
Rig Bit Number	2	3	4		
Bit Size (in)	8.500	8.500	8.500		
Tool Nominal OD (in)	6.750	6.750	6.500		
Log Start Depth (MD, ft)	1,922.00	7,509.00	12,656.00		
Log End Depth (MD, ft)	7,509.00	12,656.00	16,180.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	21-Jun-16 01:00	22-Jun-16 23:45	24-Jun-16 23:45		
Drill/Wipe End Date and Time	22-Jun-16 13:00	24-Jun-16 07:00	26-Jun-16 06:42		
Min Inc (deg) @ Depth (MD, ft)	0.16 @ 1,963.00	89.21 @ 11,163.00	88.54 @ 14,662.00		
Max Inc (deg) @ Depth (MD, ft)	91.47 @ 6,408.00	92.60 @ 12,581.00	93.65 @ 15,986.00		
Bit TFA(in2) / Bit Type	1.24 / PDC	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	597.69	588.43	588.40		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Diesel Mud Base	Diesel Mud Base	Diesel Mud Base		
Density (ppg) / Viscosity (spqt)	10.00 / 63.00	10.00 / 49.00	10.30 / 49.00		
Filtrate CL (ppm)	3,500.00	34,500.00	34,500.00		
pH / Fluid Loss (mptm)	N/A / 4	N/A / 4	N/A / 3		
PV (cP) / YP (Ihf2)	23 / 14.00	15 / 9.00	15 / 9.00		
% Solids / % Sand	13.30 / 0.01	16.7 / 0	16.70 / 0		
% Oil / Oil:Water Ratio	63.00 / 74:25	65.00 / 75:24	65 / 75:24		
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		
Mud Filtrate (in Filtrate)	100.00 / PDC	215.00 / PDC	210.00 / PDC		

Max Tool Temp (degF) / Source	189.99 / PCM	245.03 / PCM	242.28 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Brian Neu	Brian Neu	Brian Neu		
Customer Representative	Charles Culver	Charles Culver	John Druhoda		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341339	11341339	11341339		
Insert Serial Number	11400840	11620293	11400840		
Date and Time Initialized	20-Jun-16 19:19	22-Jun-16 15:59	24-Jun-16 14:09		
Date and Time Read	22-Jun-16 18:32	24-Jun-16 17:46	26-Jun-16 18:19		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	61.00	59.00	59.00		
Software Version	6.33	6.33	6.33		
Sub Serial Number	11341339	11341339	11341339		
Sonde Serial Number	11478012	11062039	11478012		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	331.80	75.20	203.00		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.24	52.26	52.25		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341339	11341339	11341339		
Insert/Sonde Serial Number	11293344	11680919	11293344		

REMARKS

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

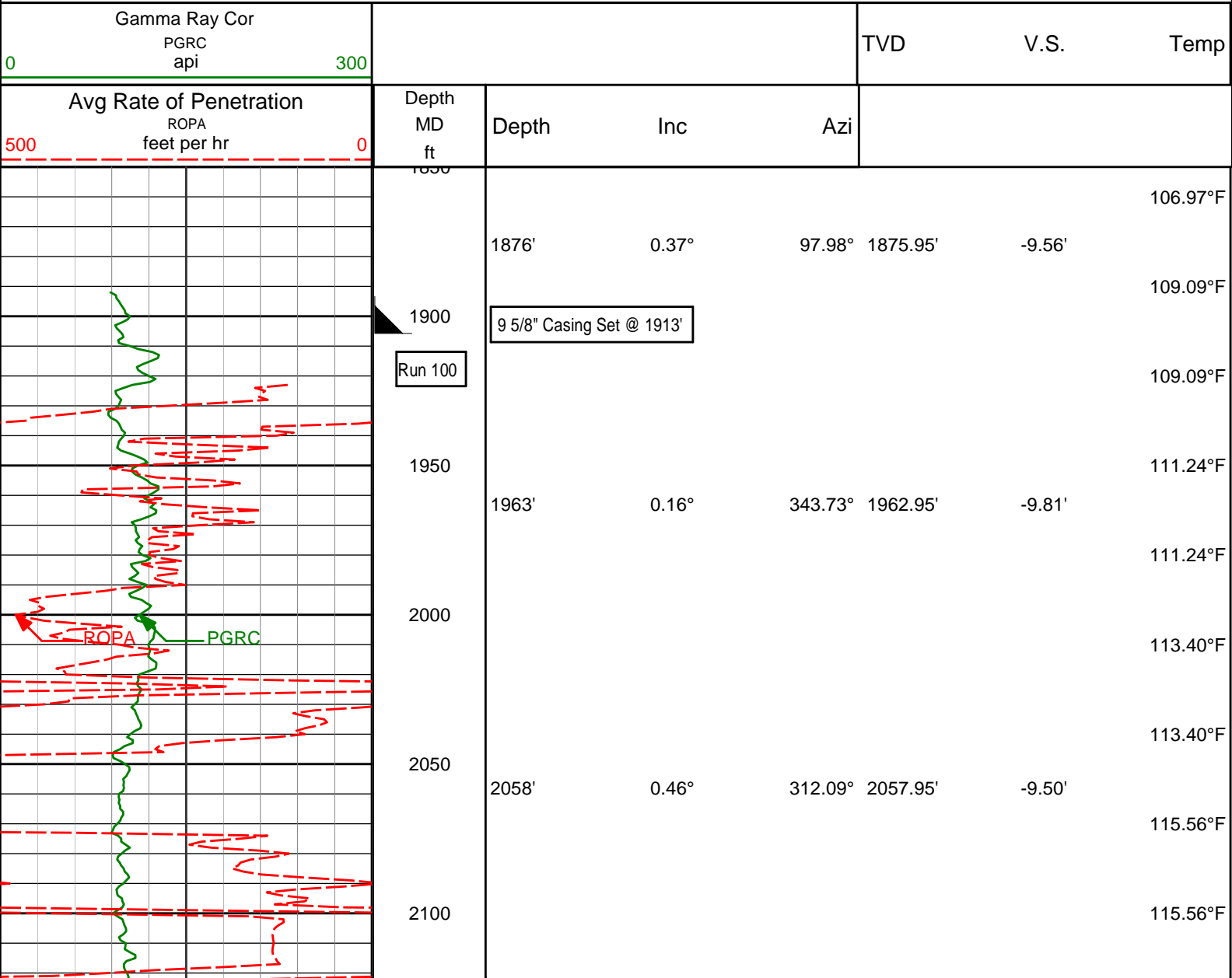
Interval: 0.5 ft, Coercion Distance: 0.6 ft, Gap fill: 3.0 ft

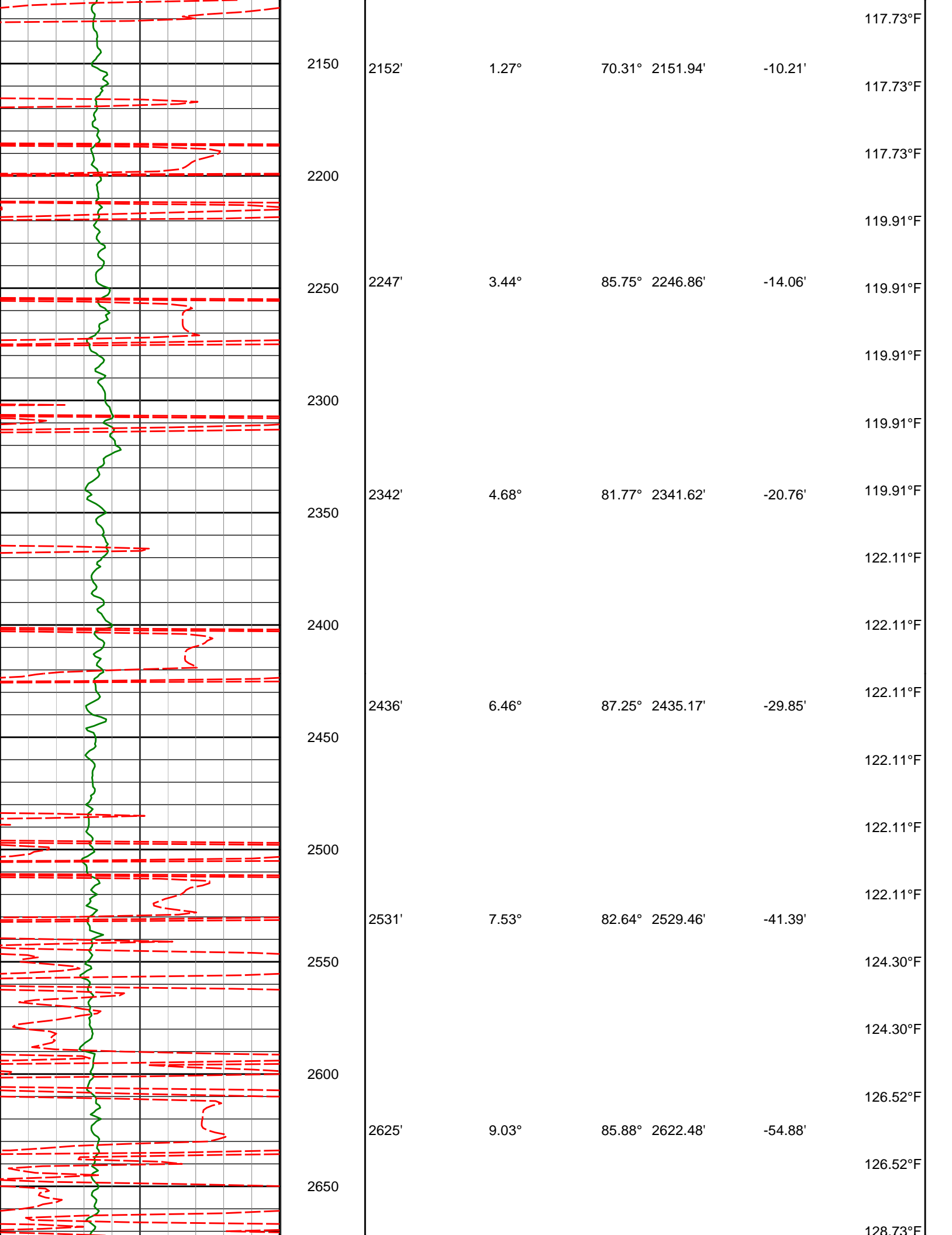
5. Surveys corrected by Surcon starting at 1963 ft.

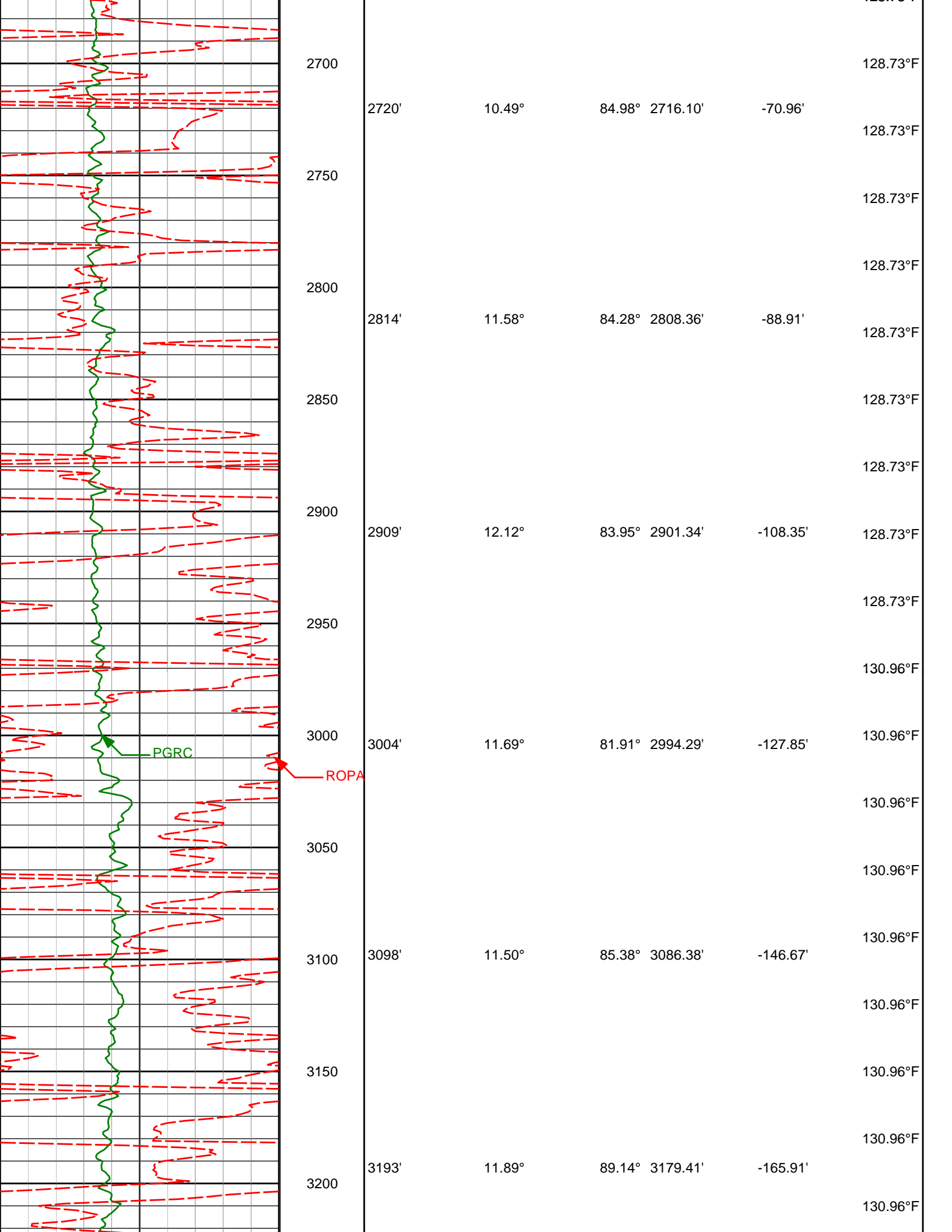
WARRANTY

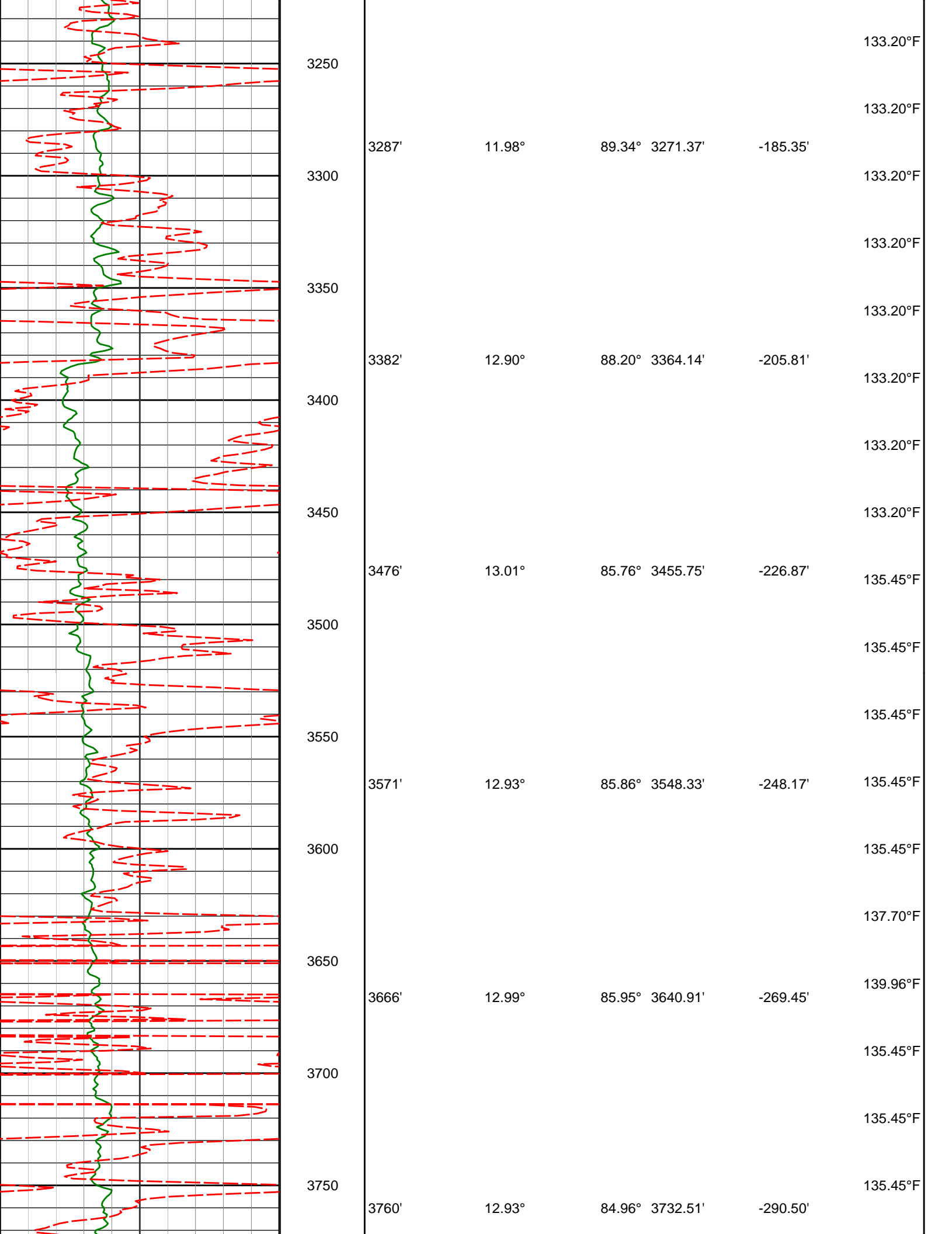
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES 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.

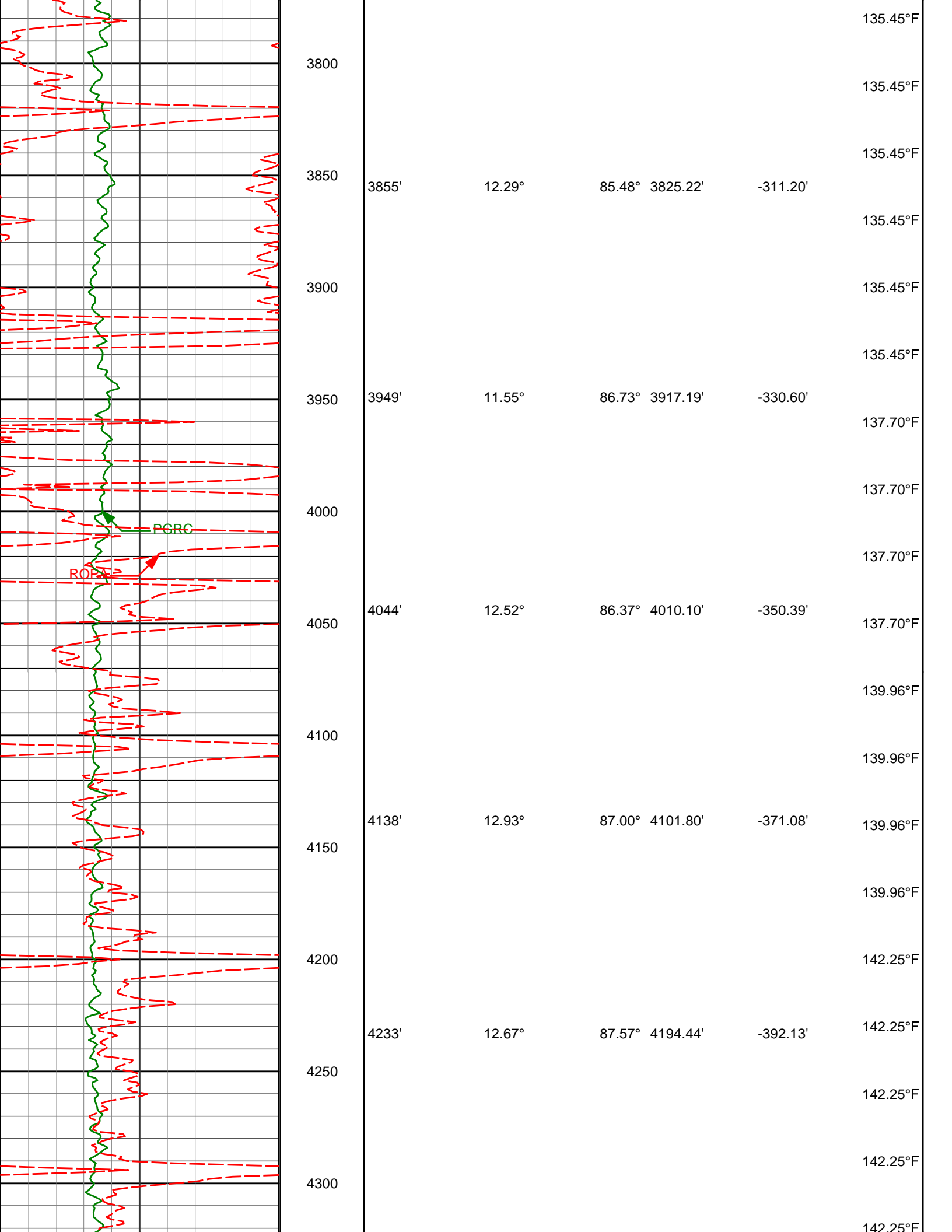
MD Main Log 1:600 Scale

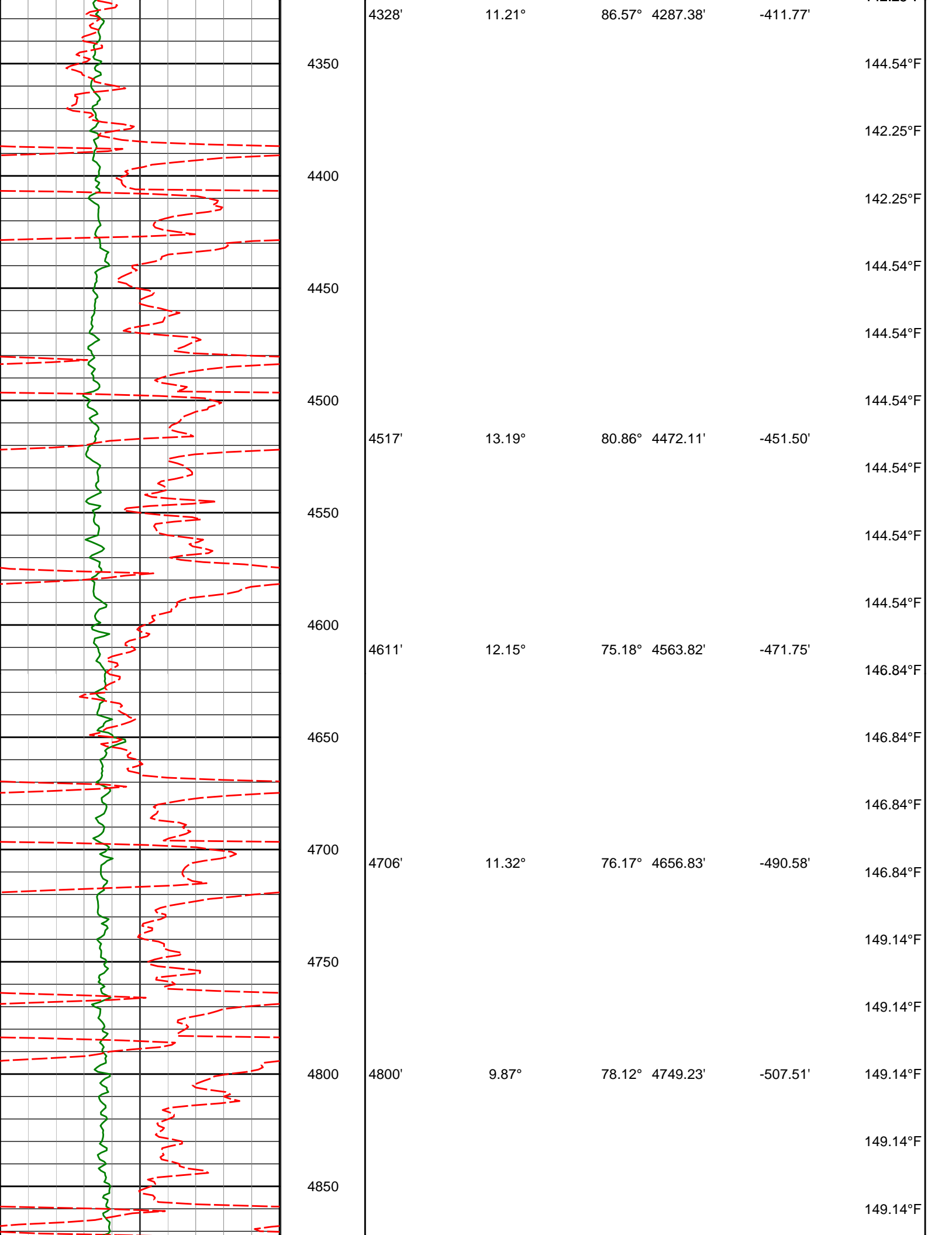


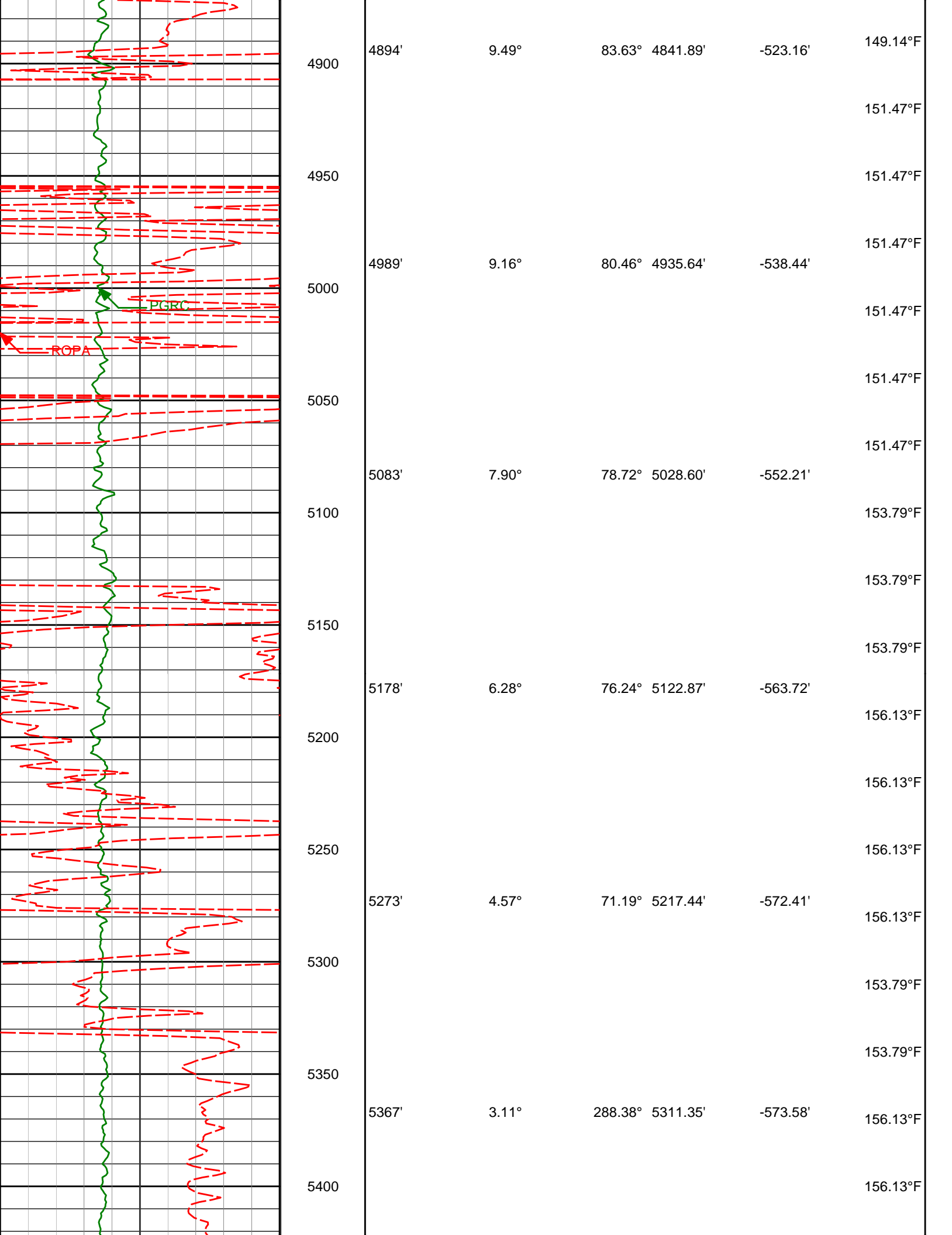


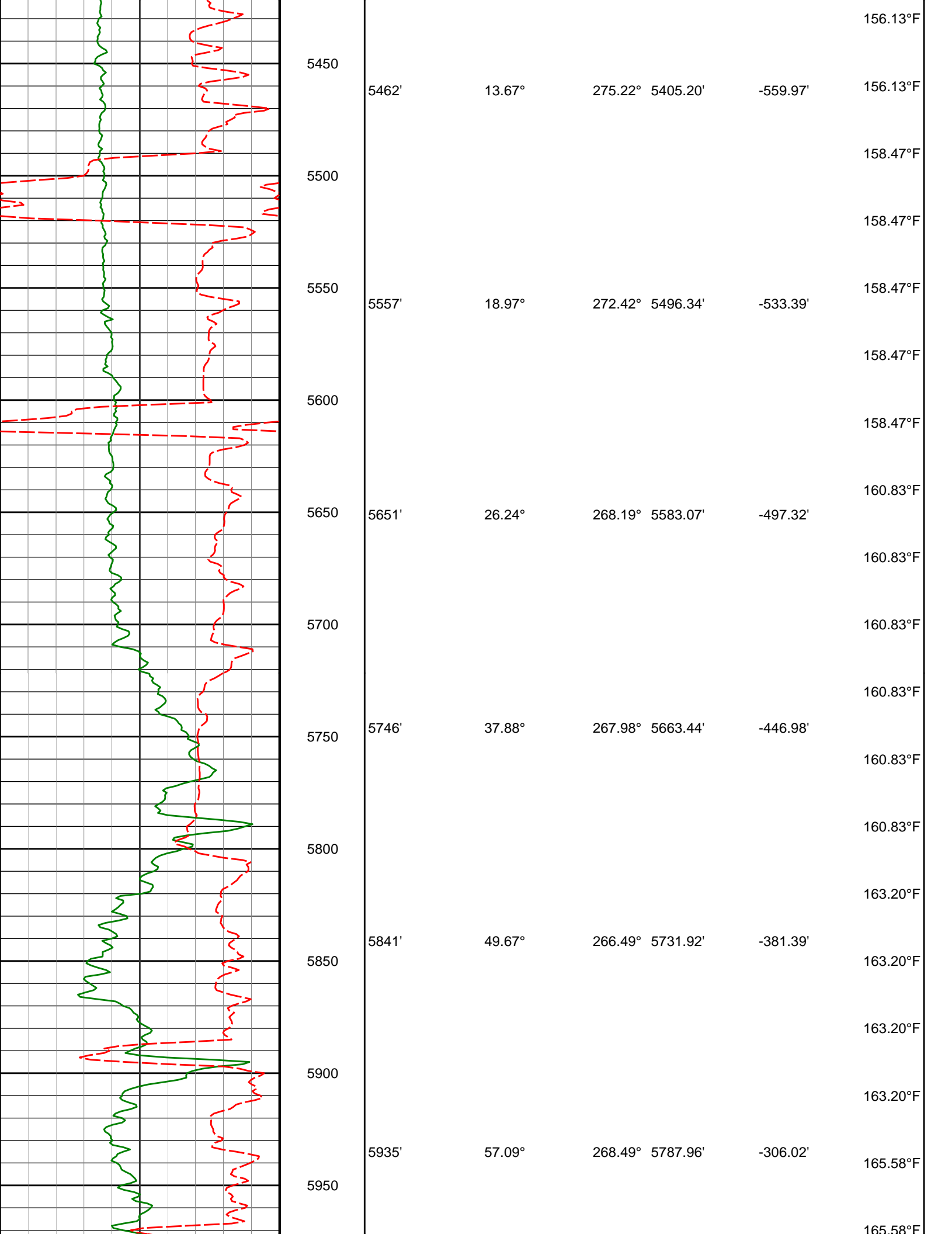


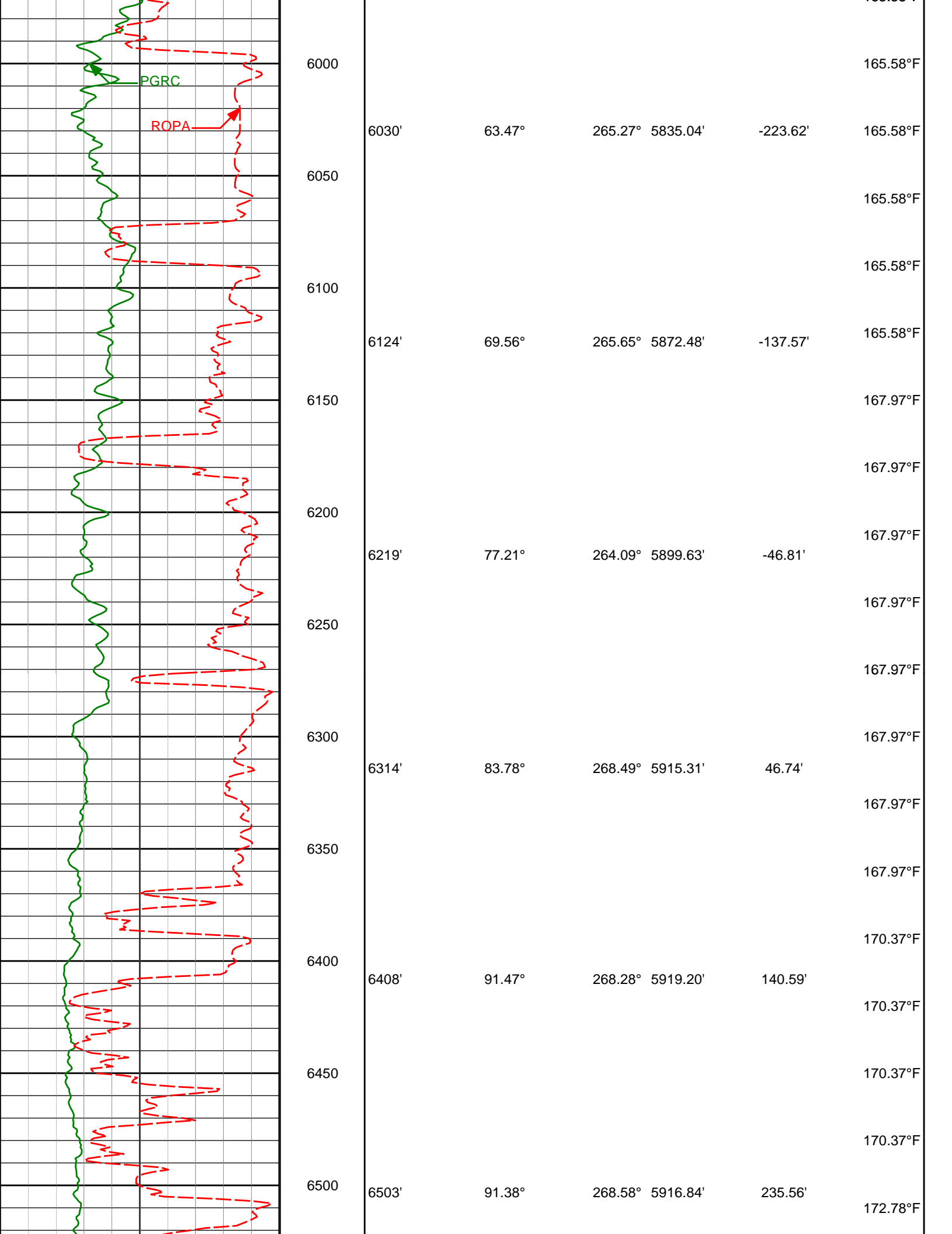


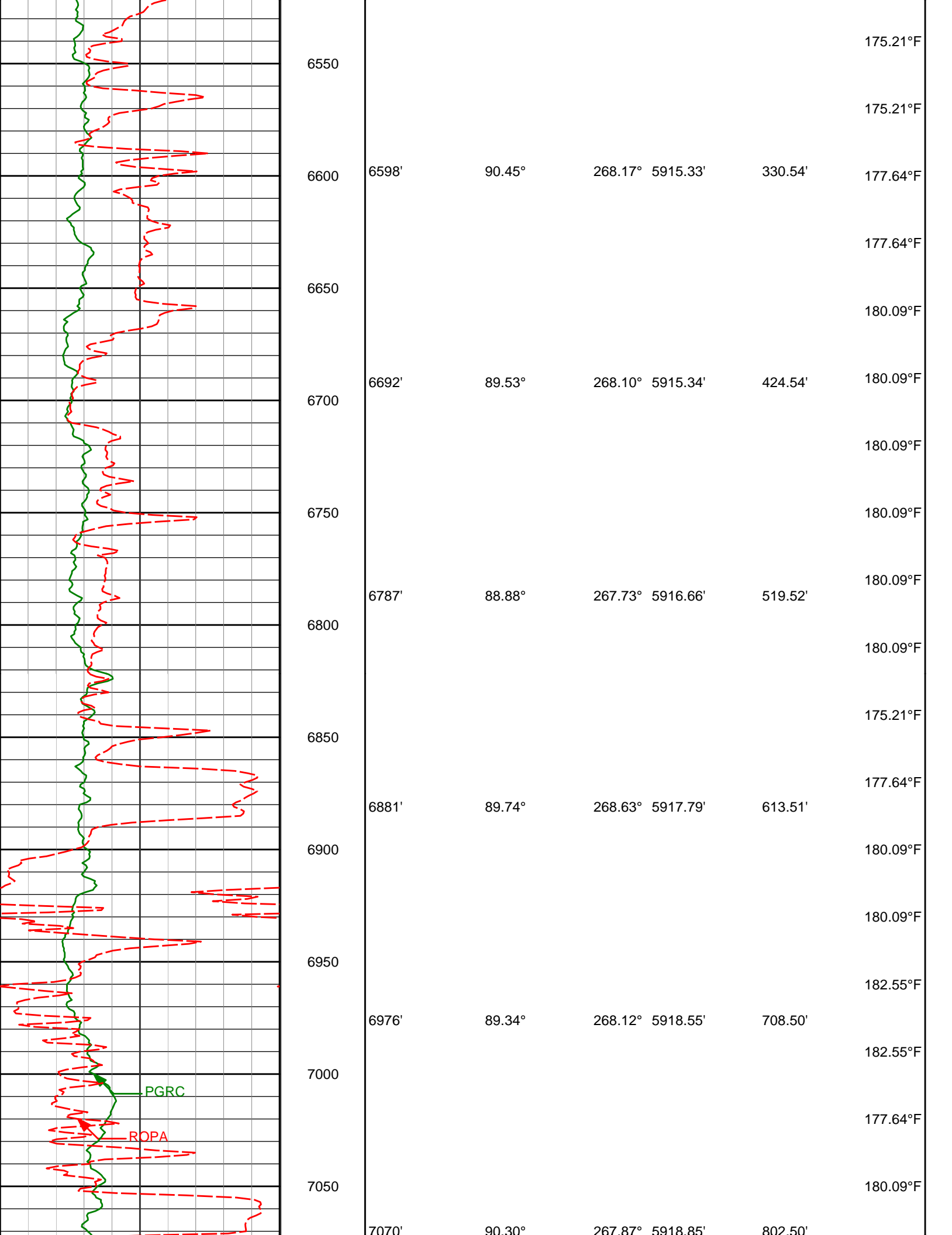


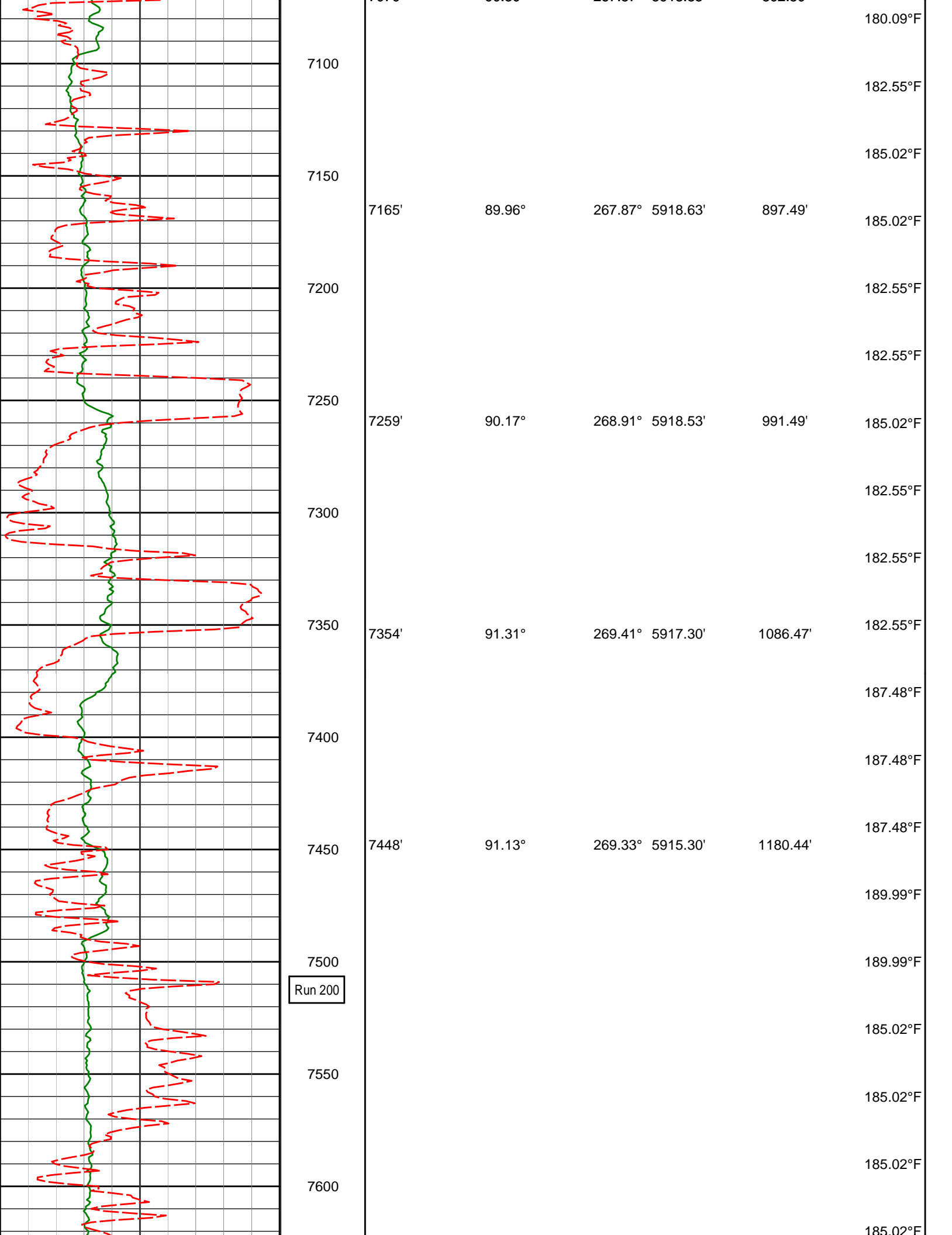


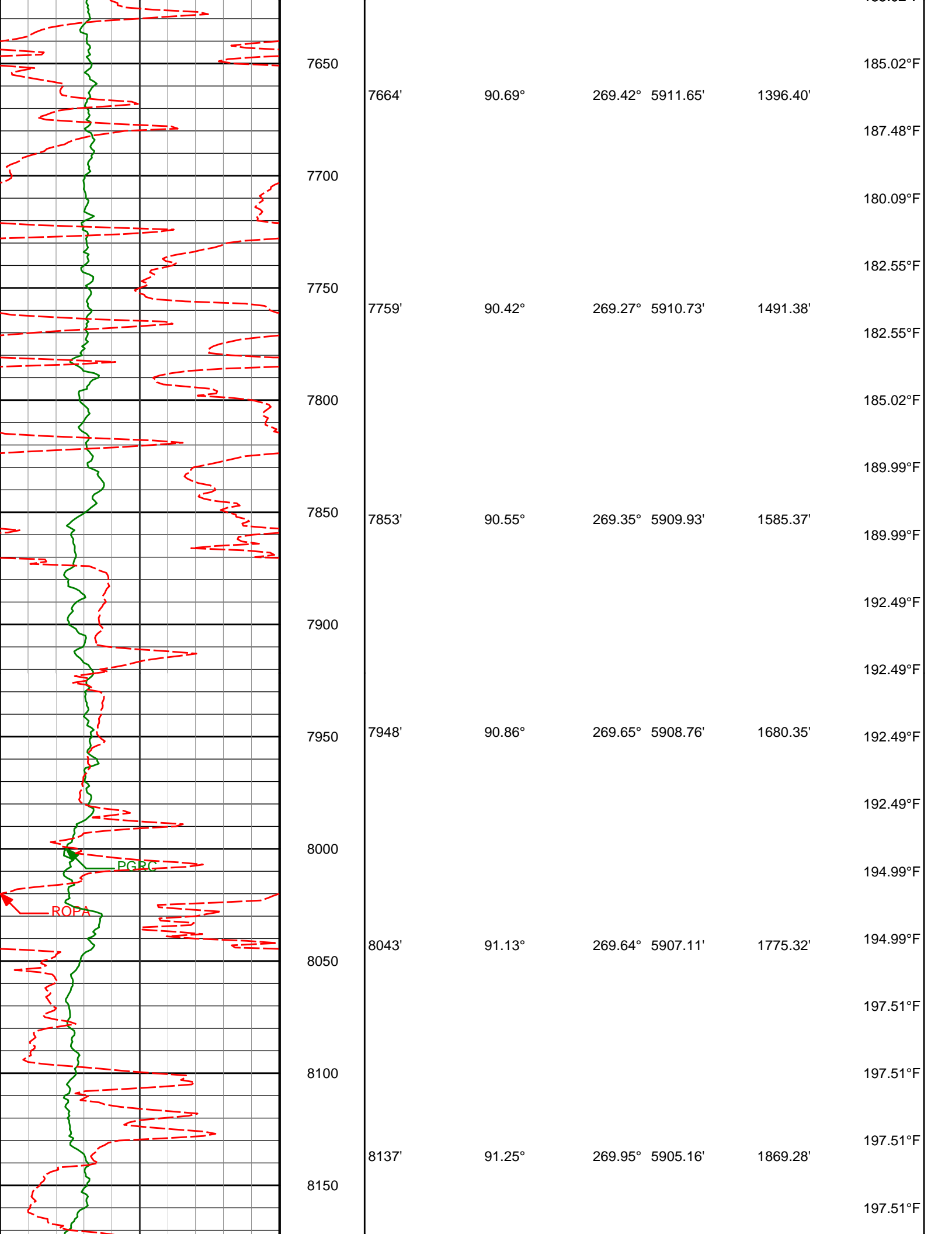


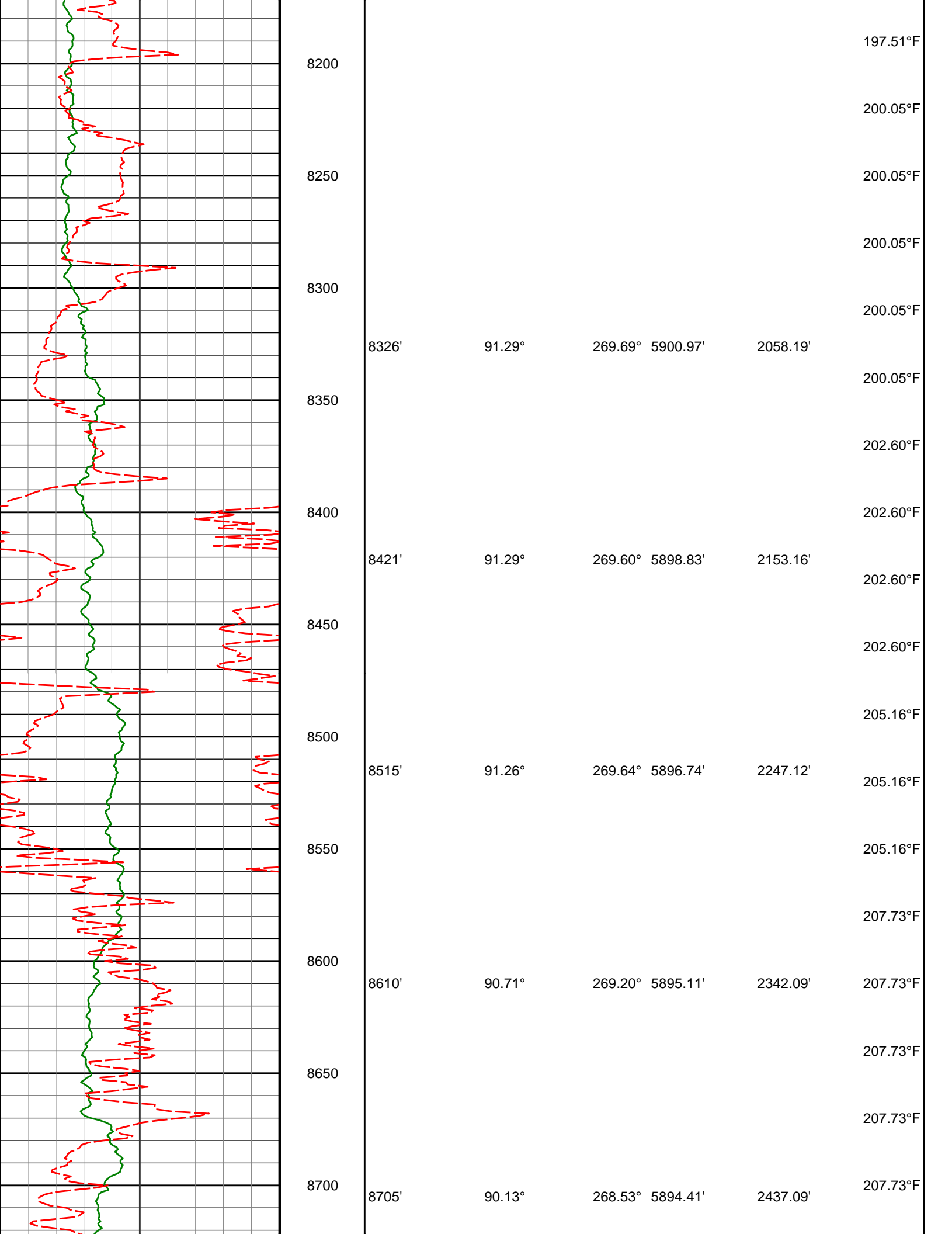


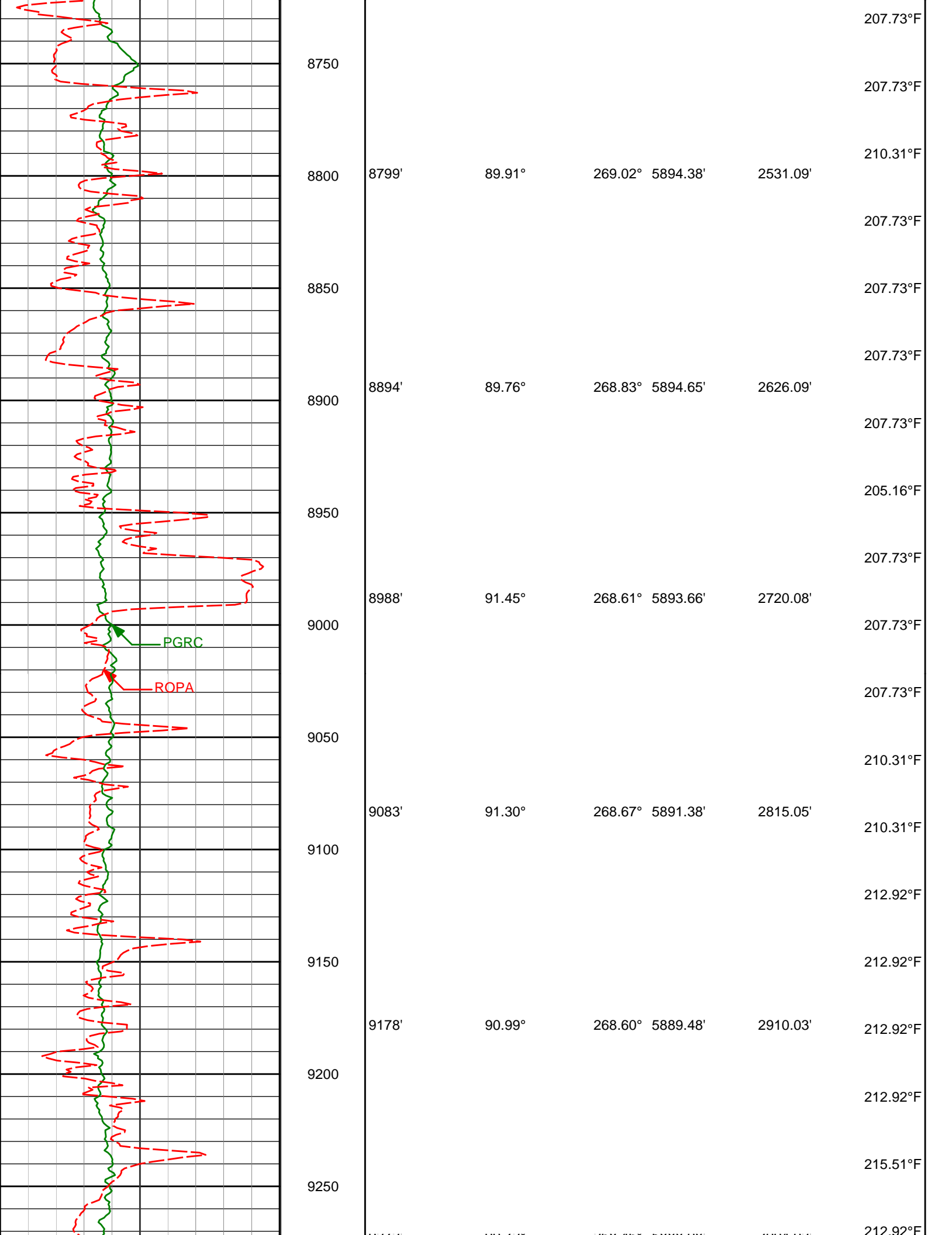


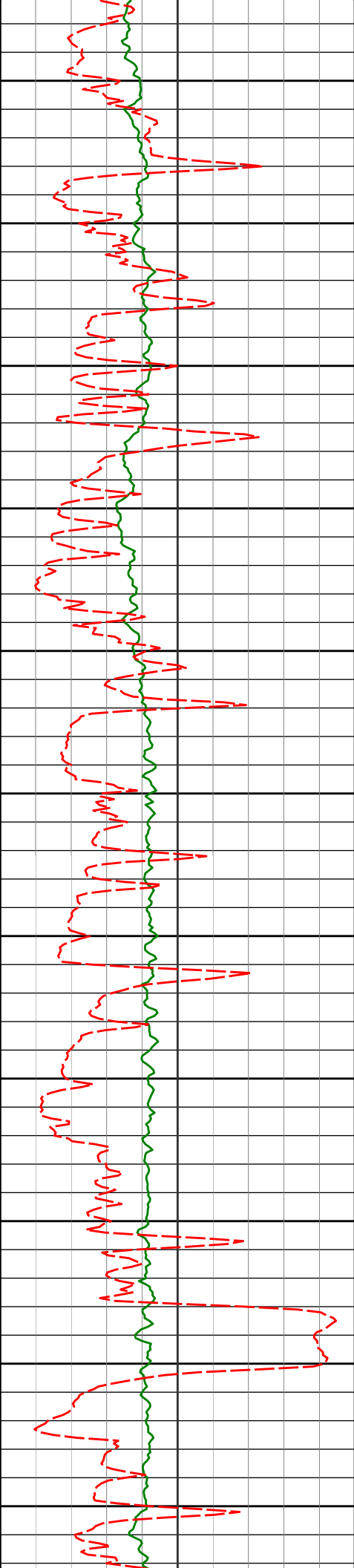




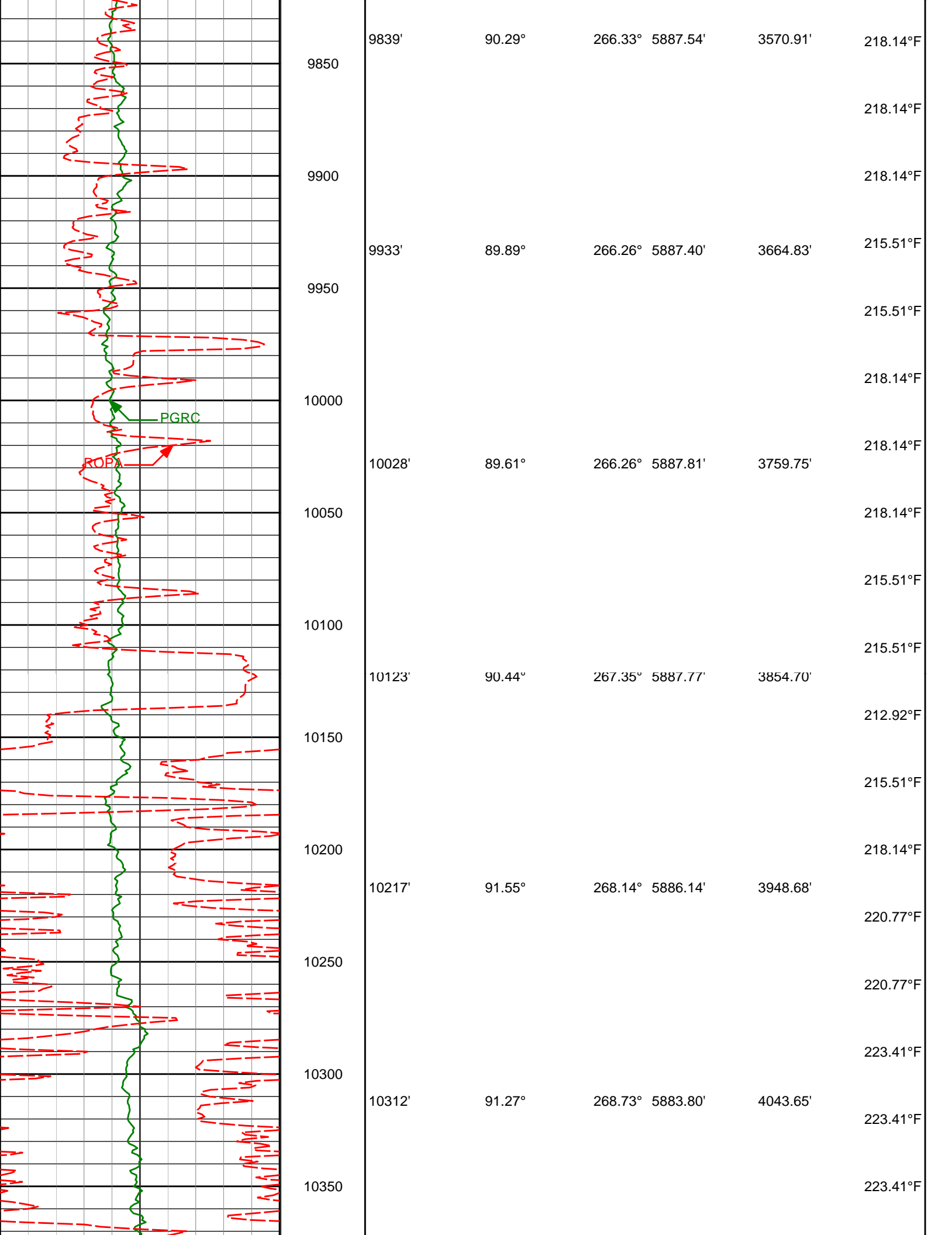


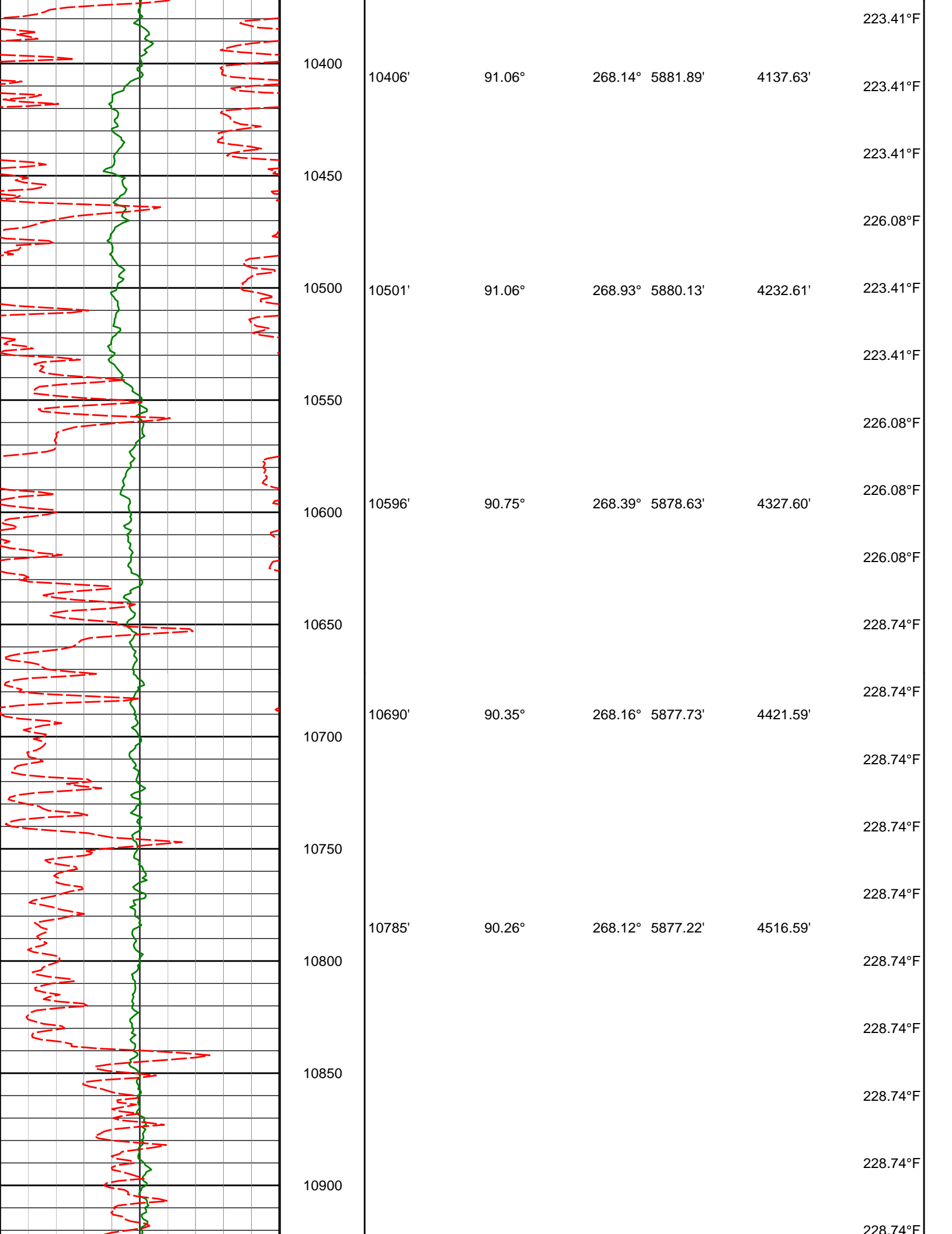


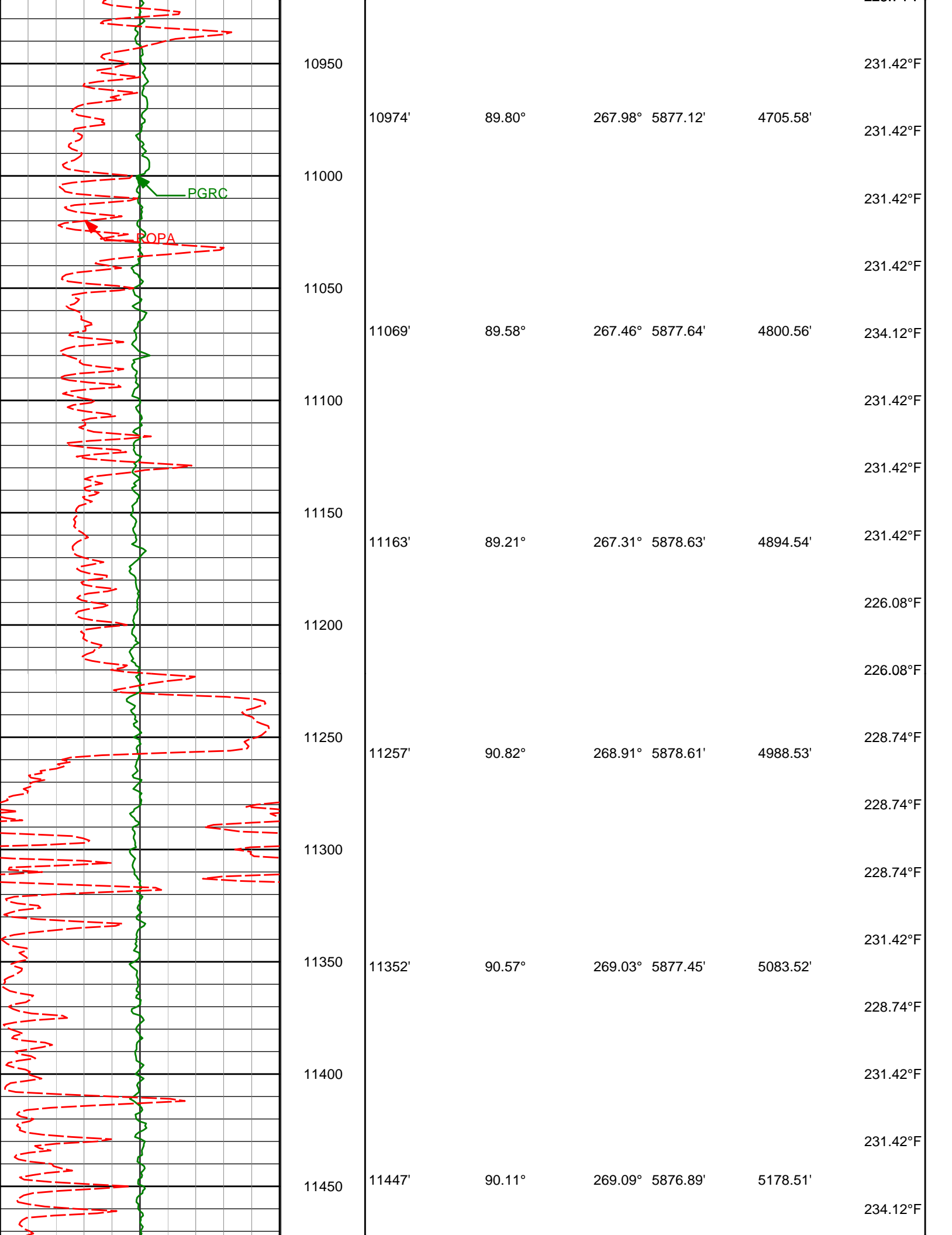


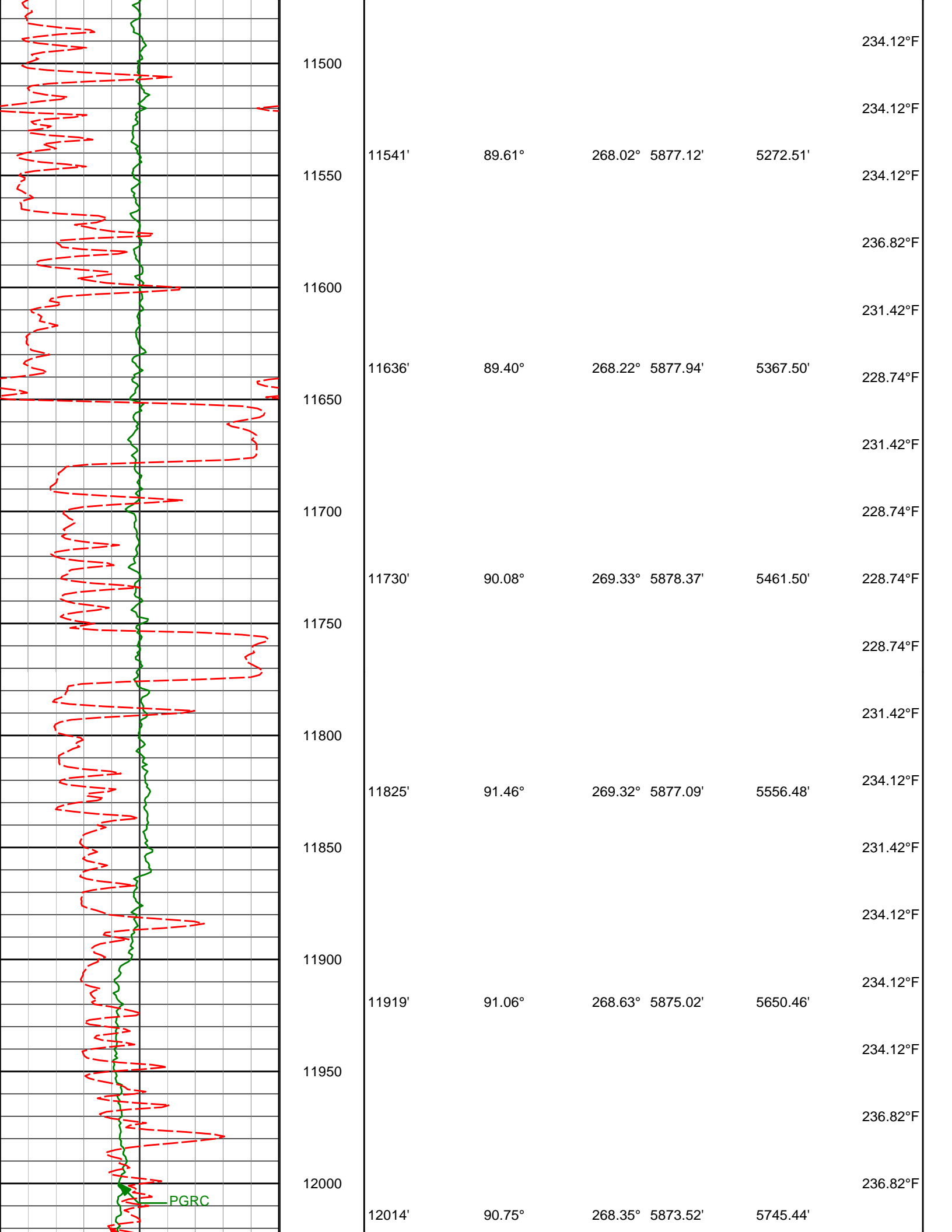


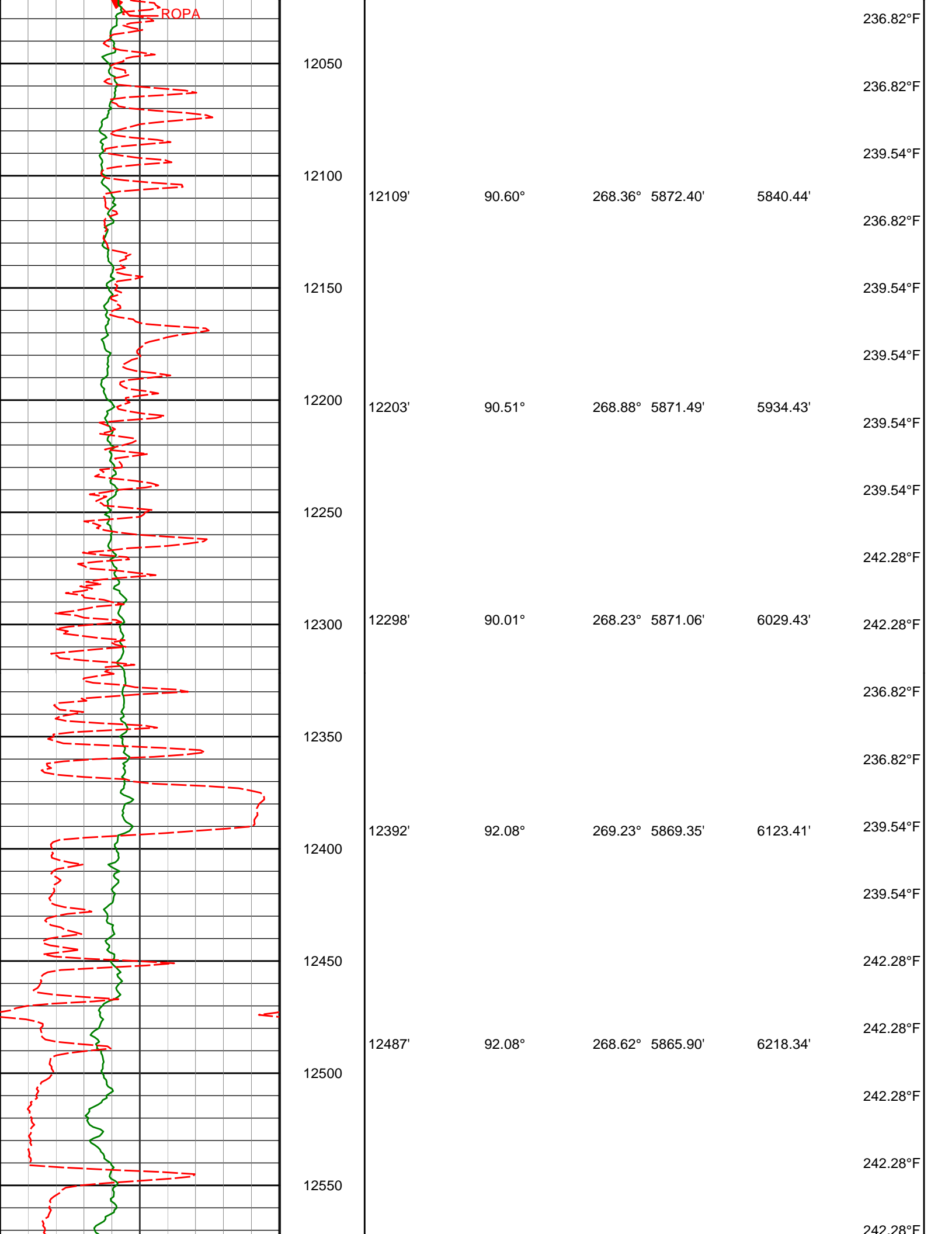
	9272'	90.72°	268.46°	5888.08'	3004.02'	212.92°F
9300						212.92°F
						212.92°F
9350						215.51°F
	9366'	90.28°	267.86°	5887.26'	3098.01'	215.51°F
						215.51°F
9400						215.51°F
						215.51°F
9450						215.51°F
	9461'	90.16°	268.22°	5886.89'	3193.01'	215.51°F
						215.51°F
9500						215.51°F
						215.51°F
9550						218.14°F
	9555'	89.92°	268.36°	5886.83'	3287.01'	215.51°F
						215.51°F
9600						218.14°F
						218.14°F
9650						218.14°F
	9650'	89.27°	268.26°	5887.50'	3382.00'	218.14°F
						218.14°F
9700						212.92°F
						212.92°F
						212.92°F
9750						212.92°F
	9744'	90.19°	266.63°	5887.94'	3475.98'	212.92°F
						215.51°F
						215.51°F
9800						215.51°F
						215.51°F

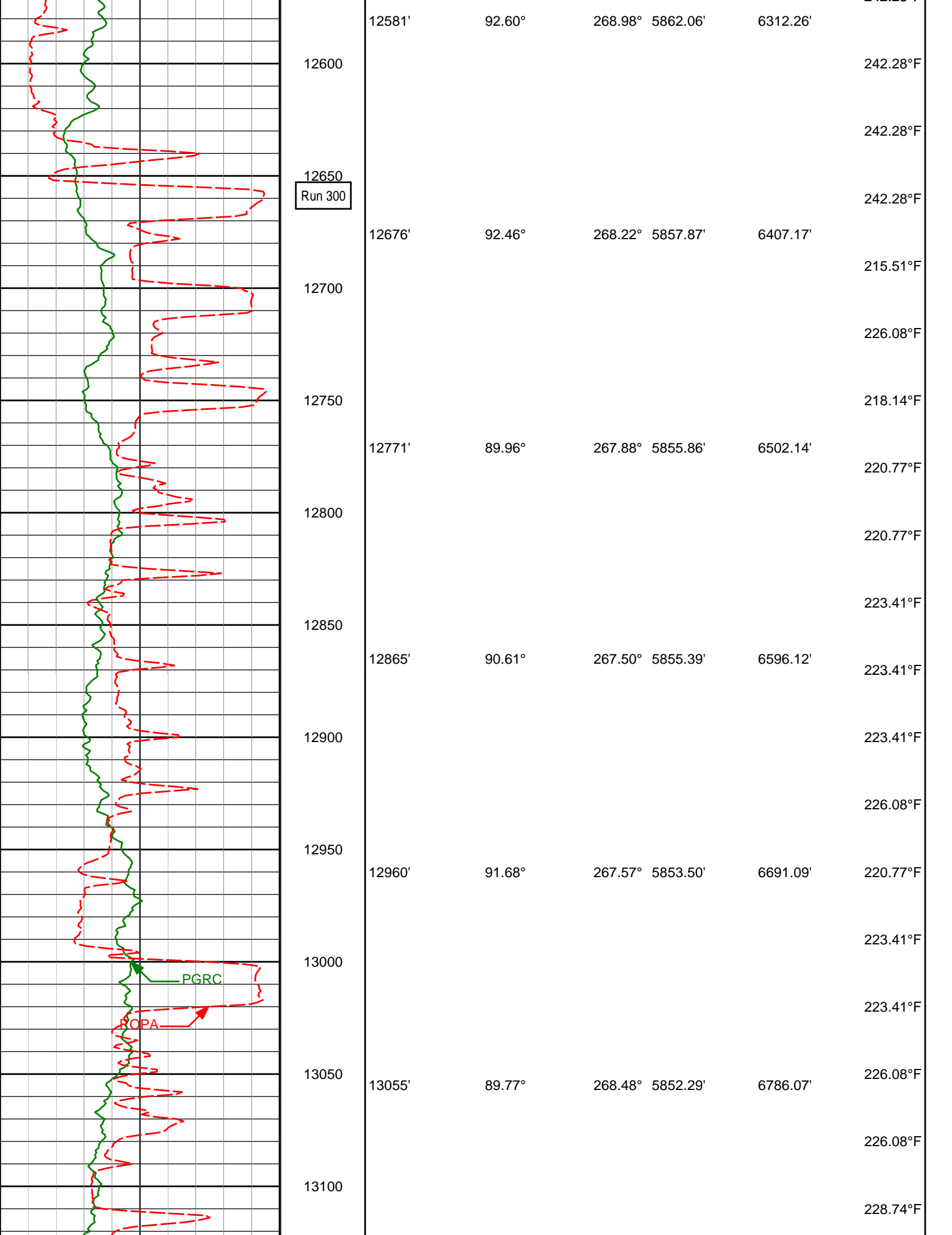


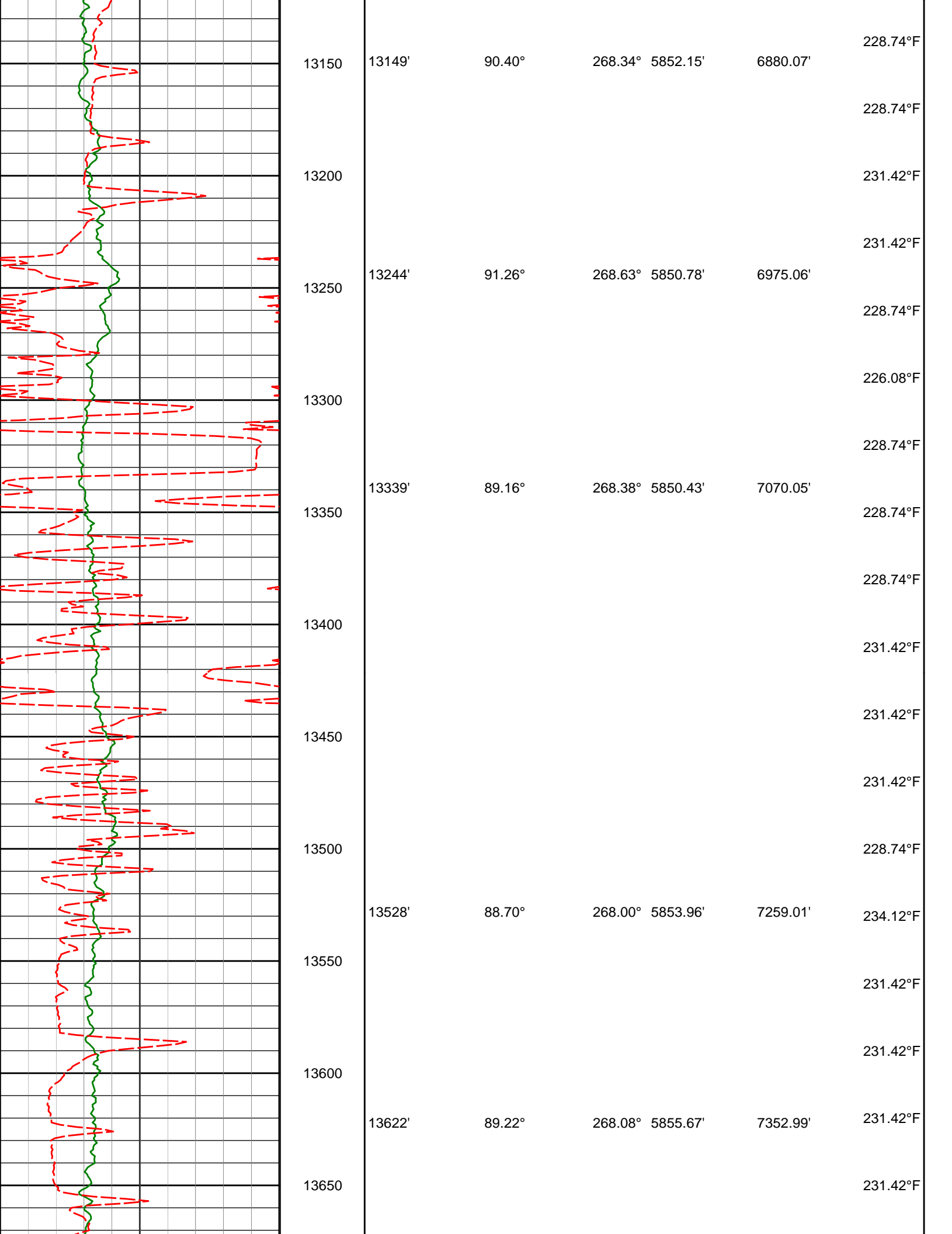


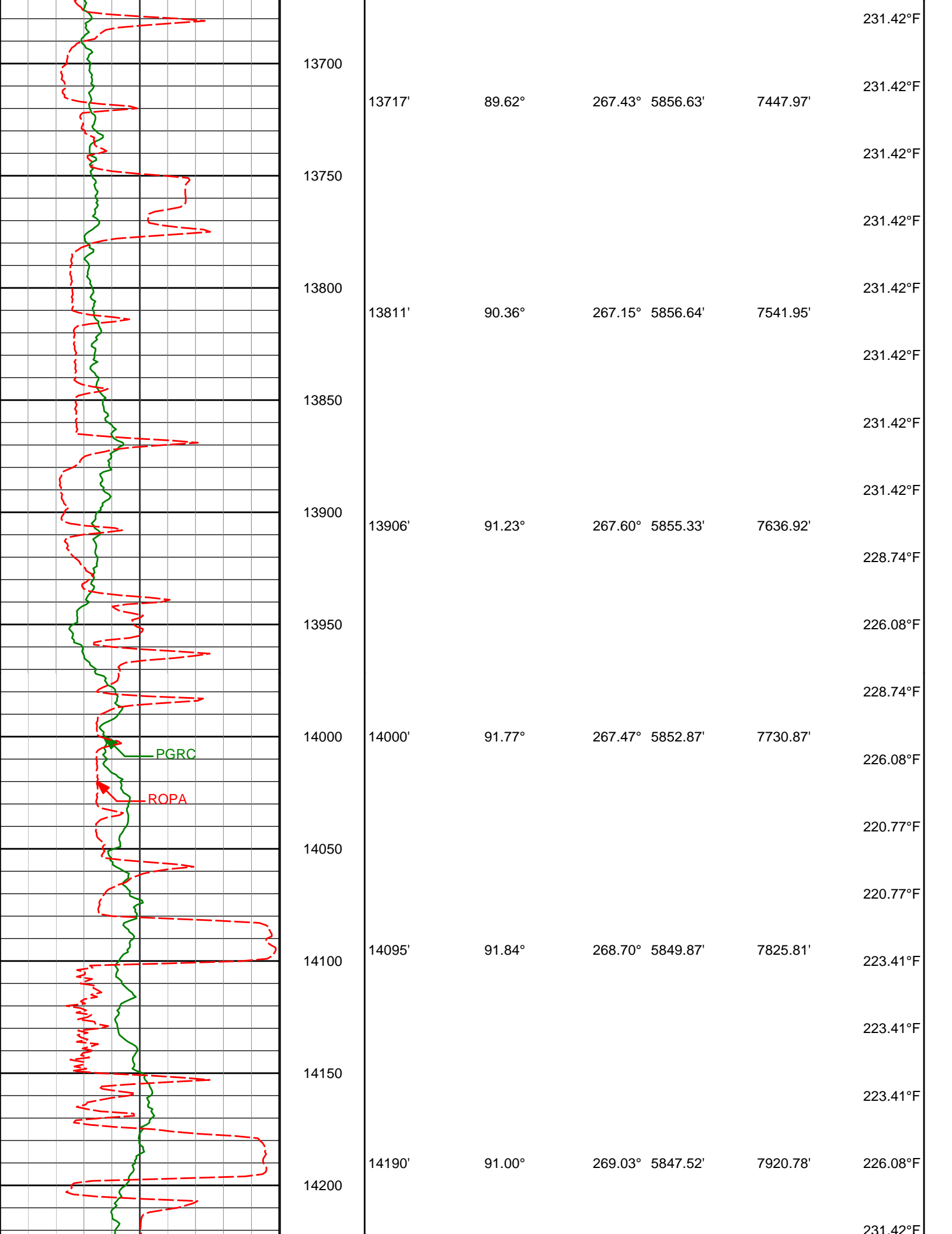


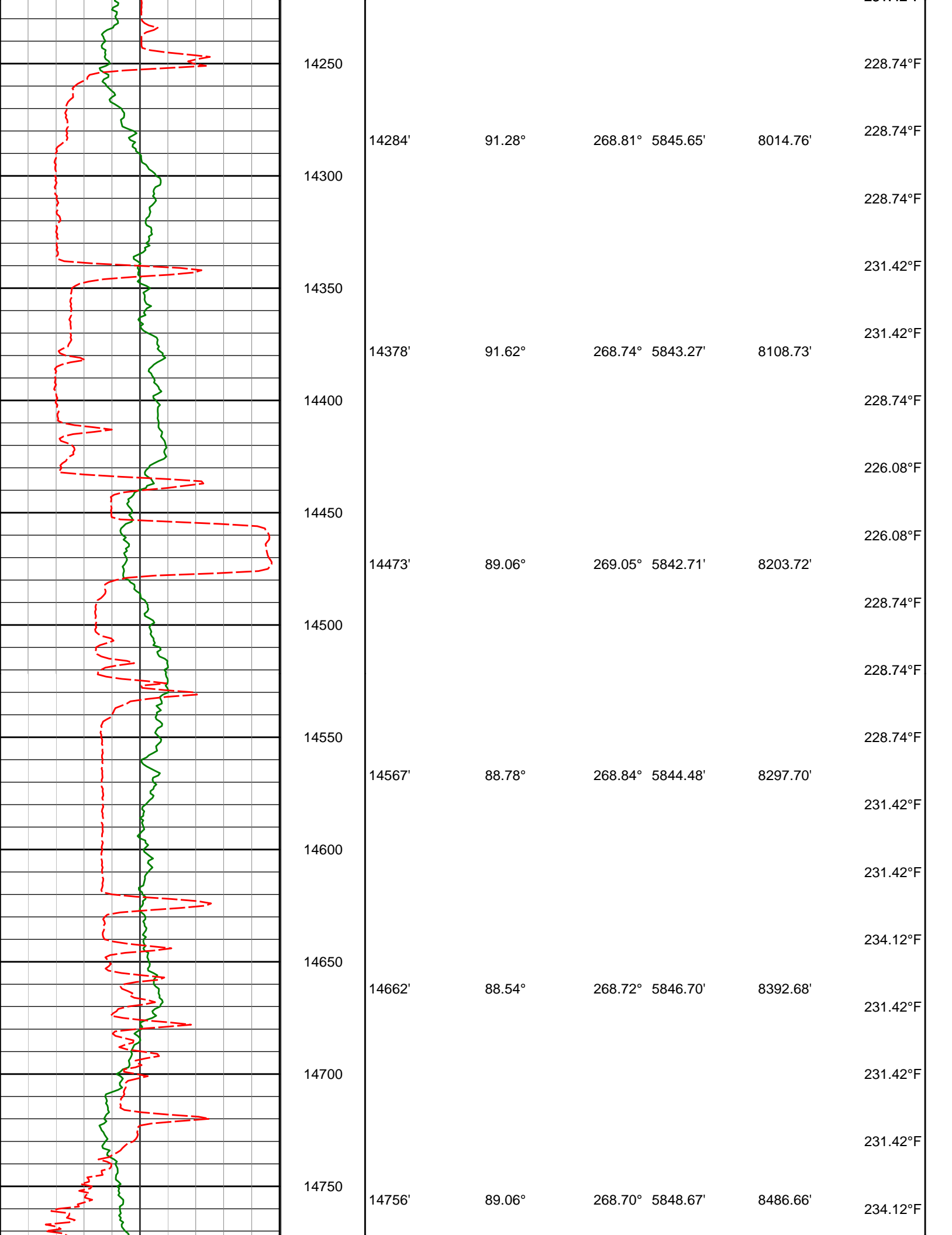


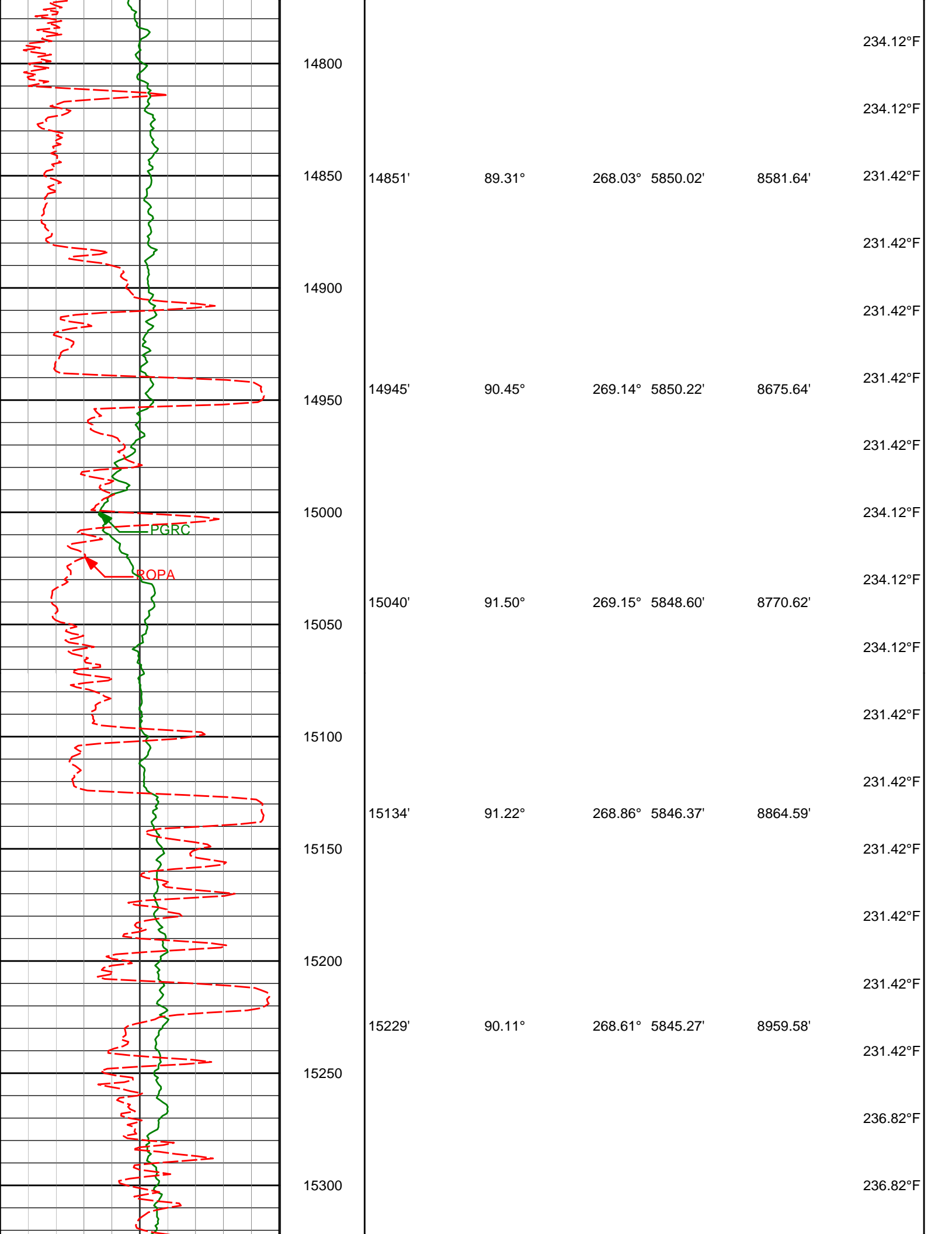


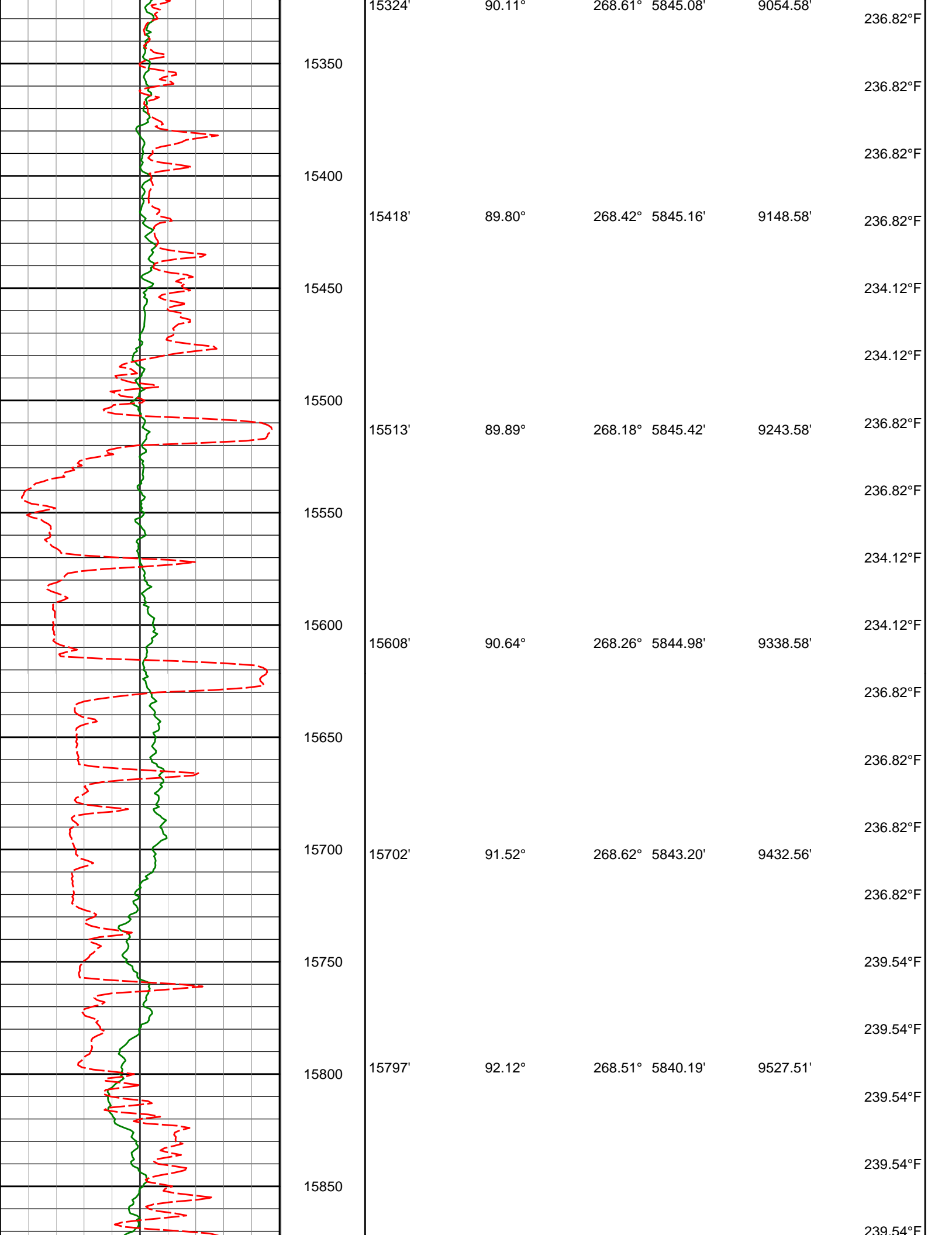


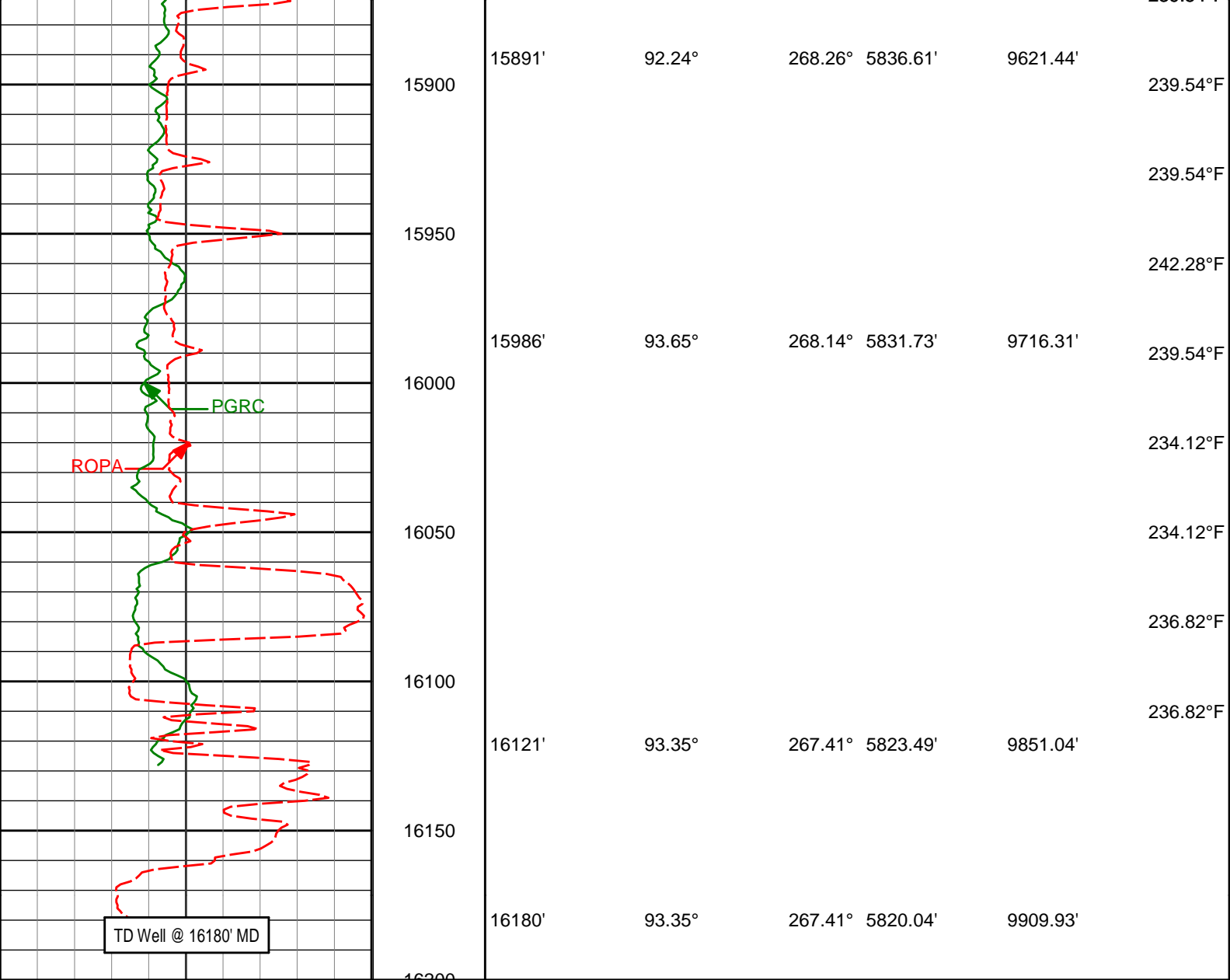








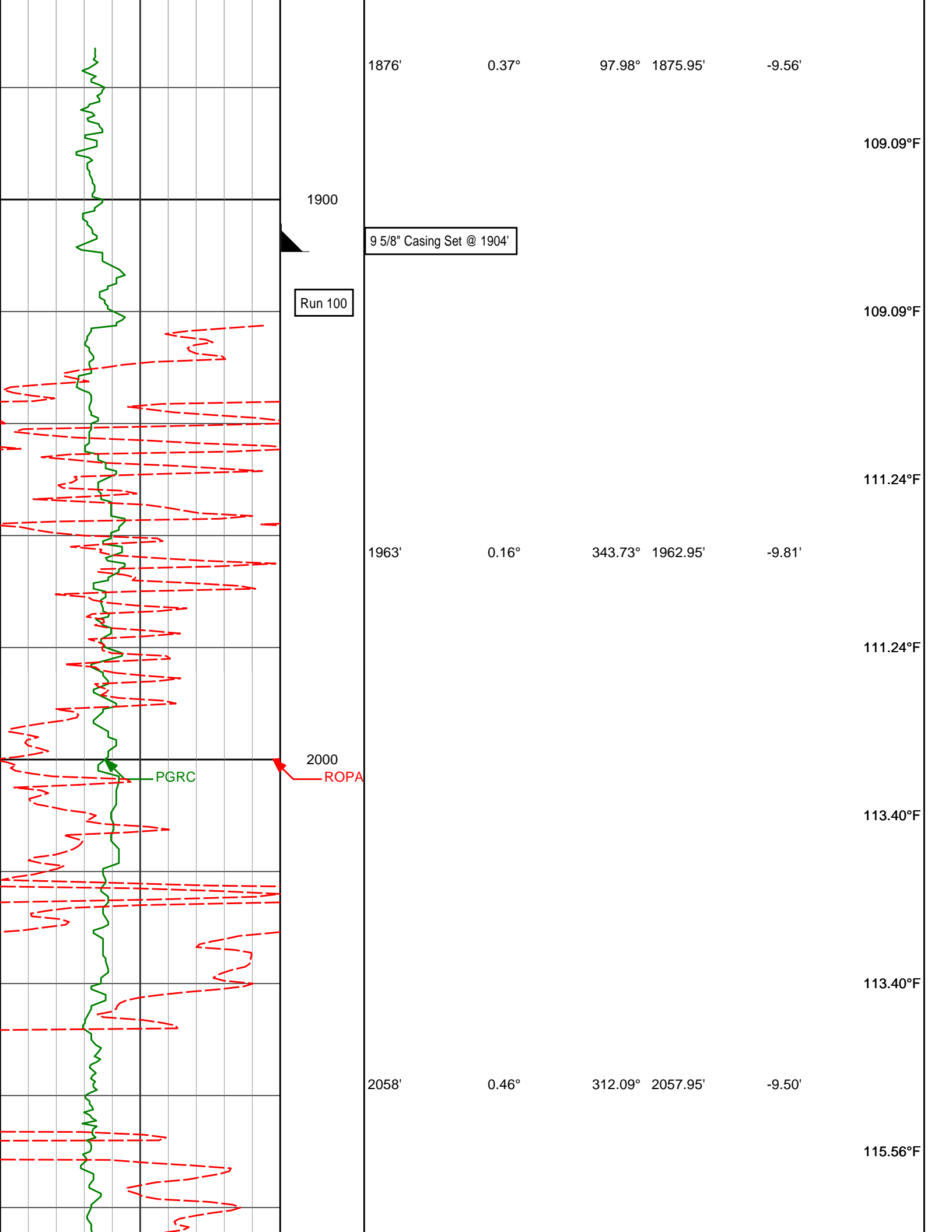


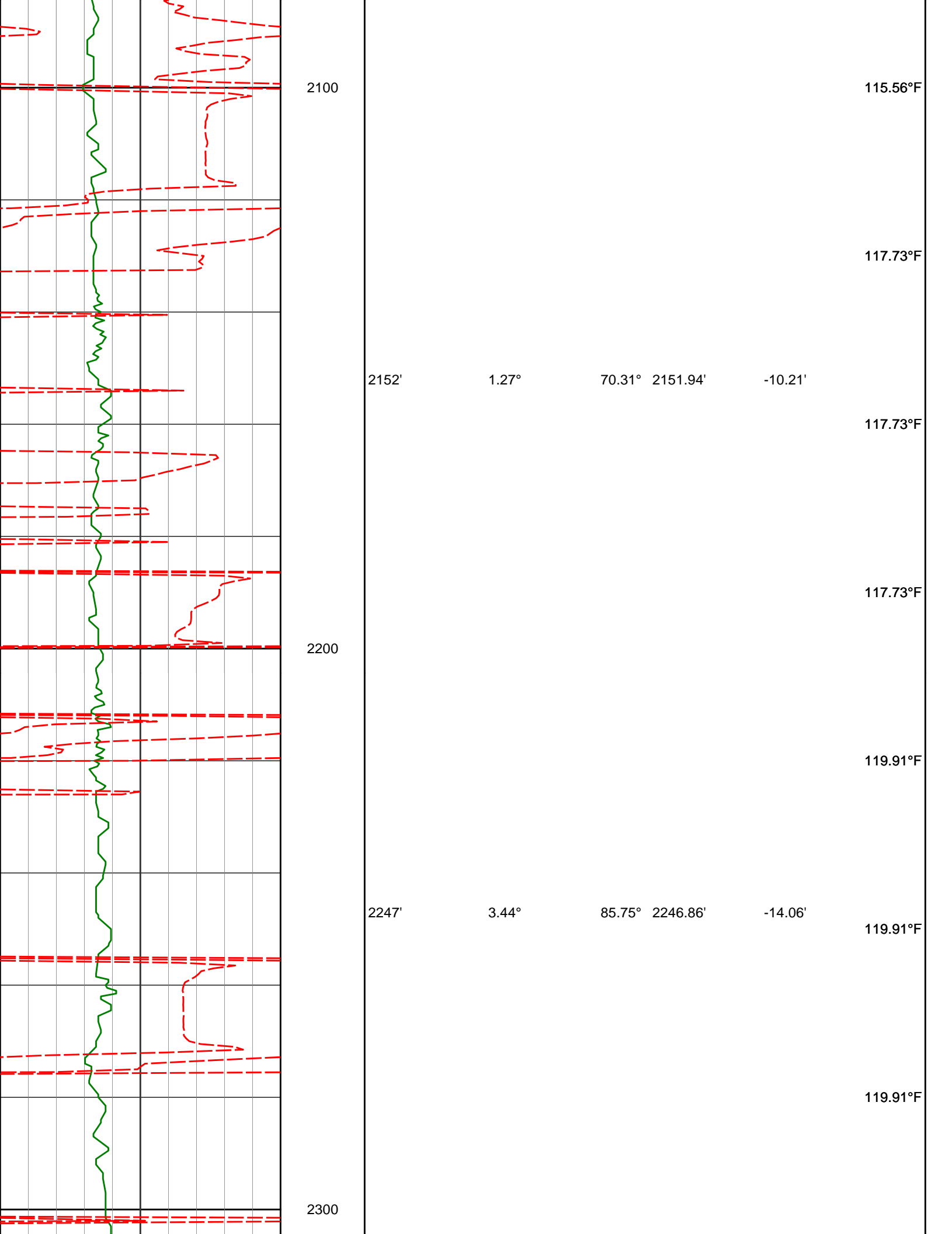


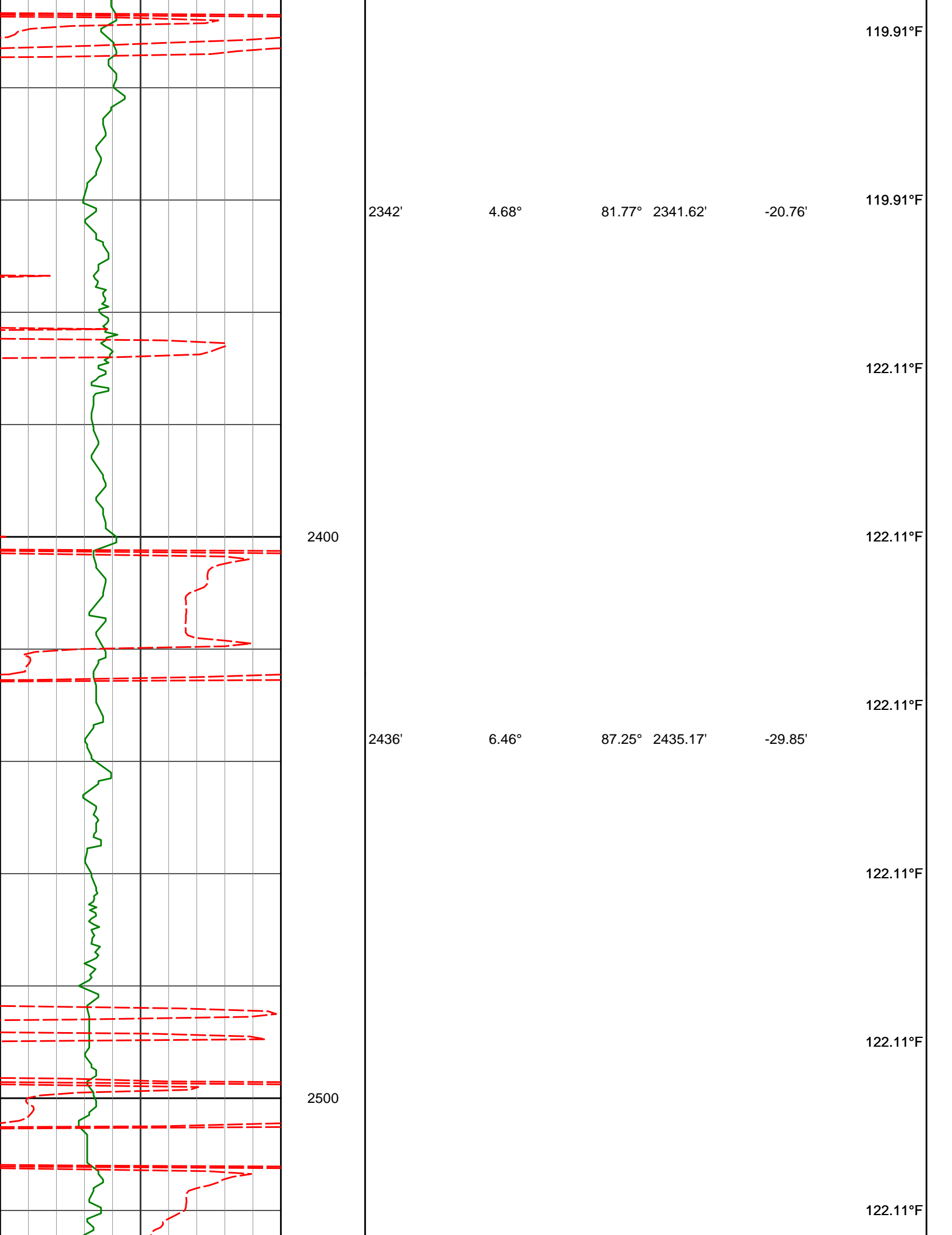
Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi			
500		0				TVD	V.S.	Temp
Gamma Ray Cor PGRC api								
0		300						

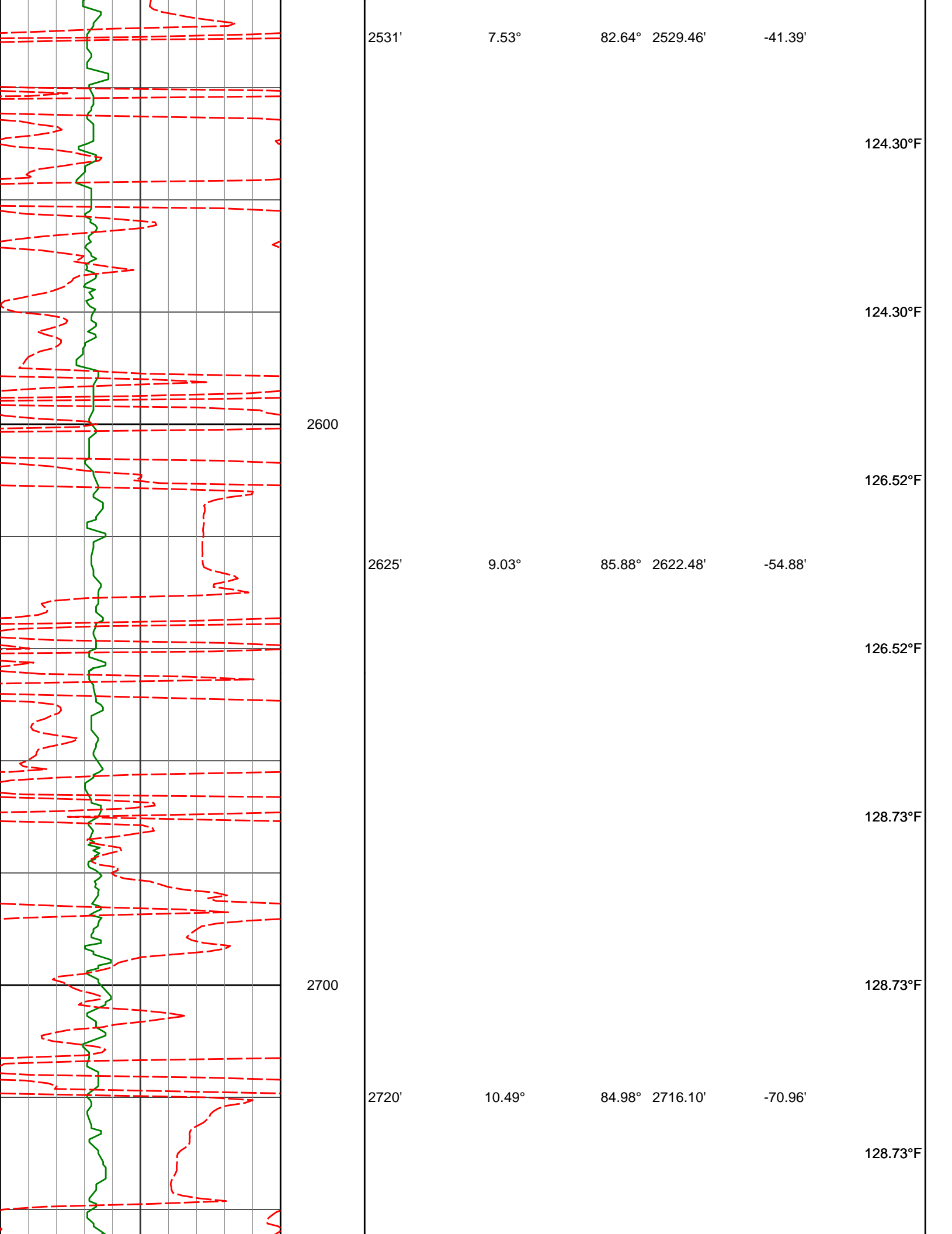
MD Detail Log 1:240 Scale

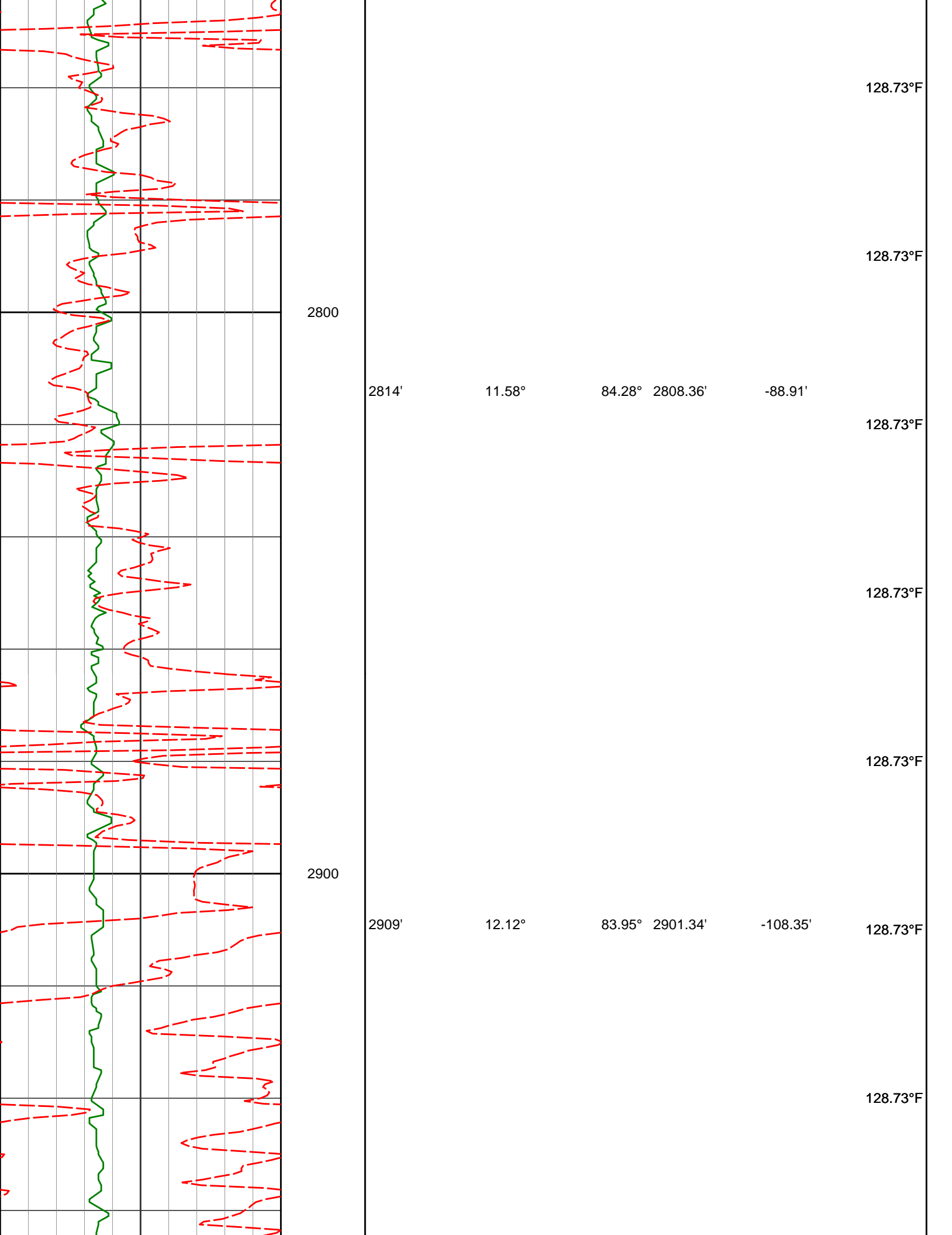
PCG Gamma Ray BCorr PGRC api								
0		300						
Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
500		0						

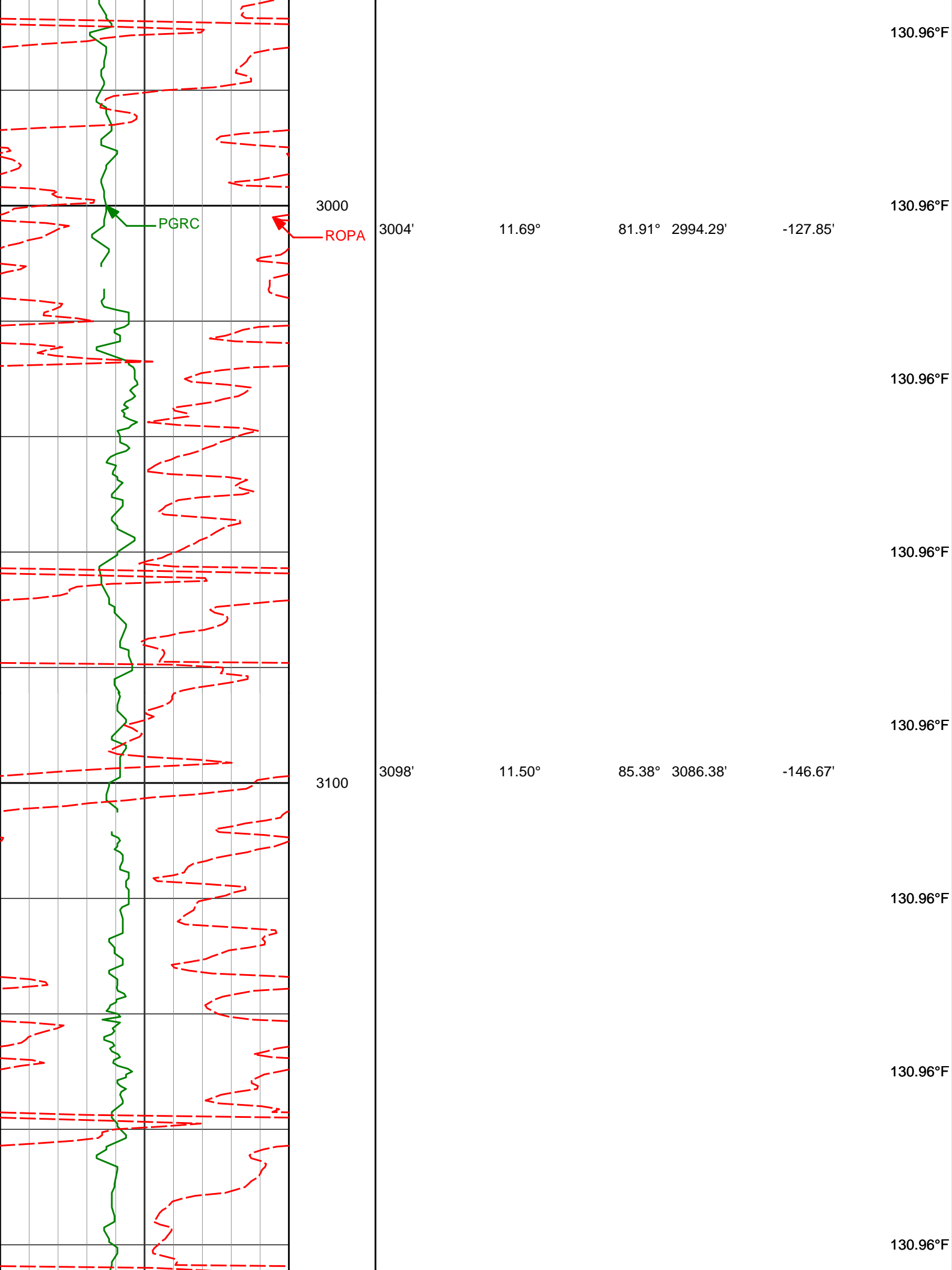


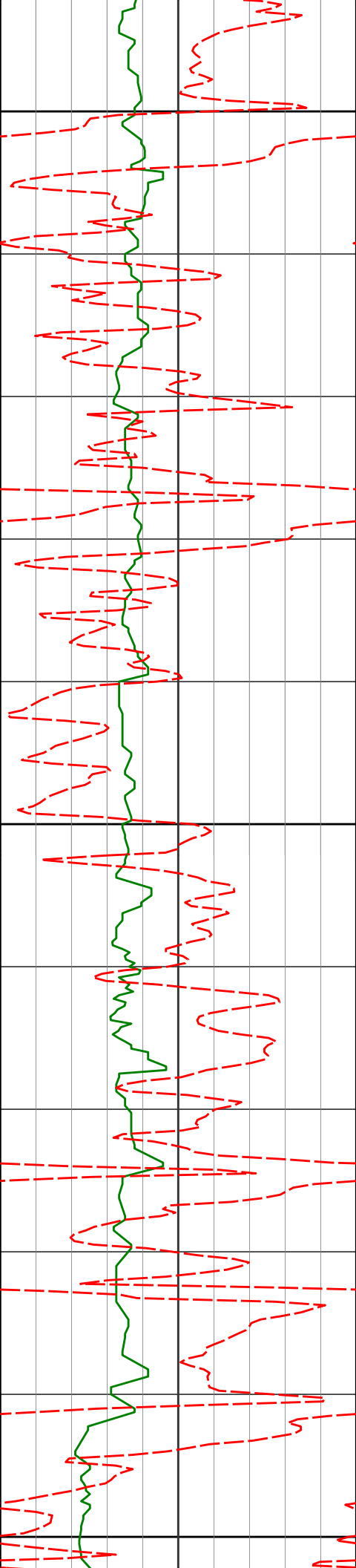












3200

3300

3400

3193'

3287'

3382'

11.89°

11.98°

12.90°

89.14°

89.34°

88.20°

3179.41'

3271.37'

3364.14'

-165.91'

-185.35'

-205.81'

130.96°F

133.20°F

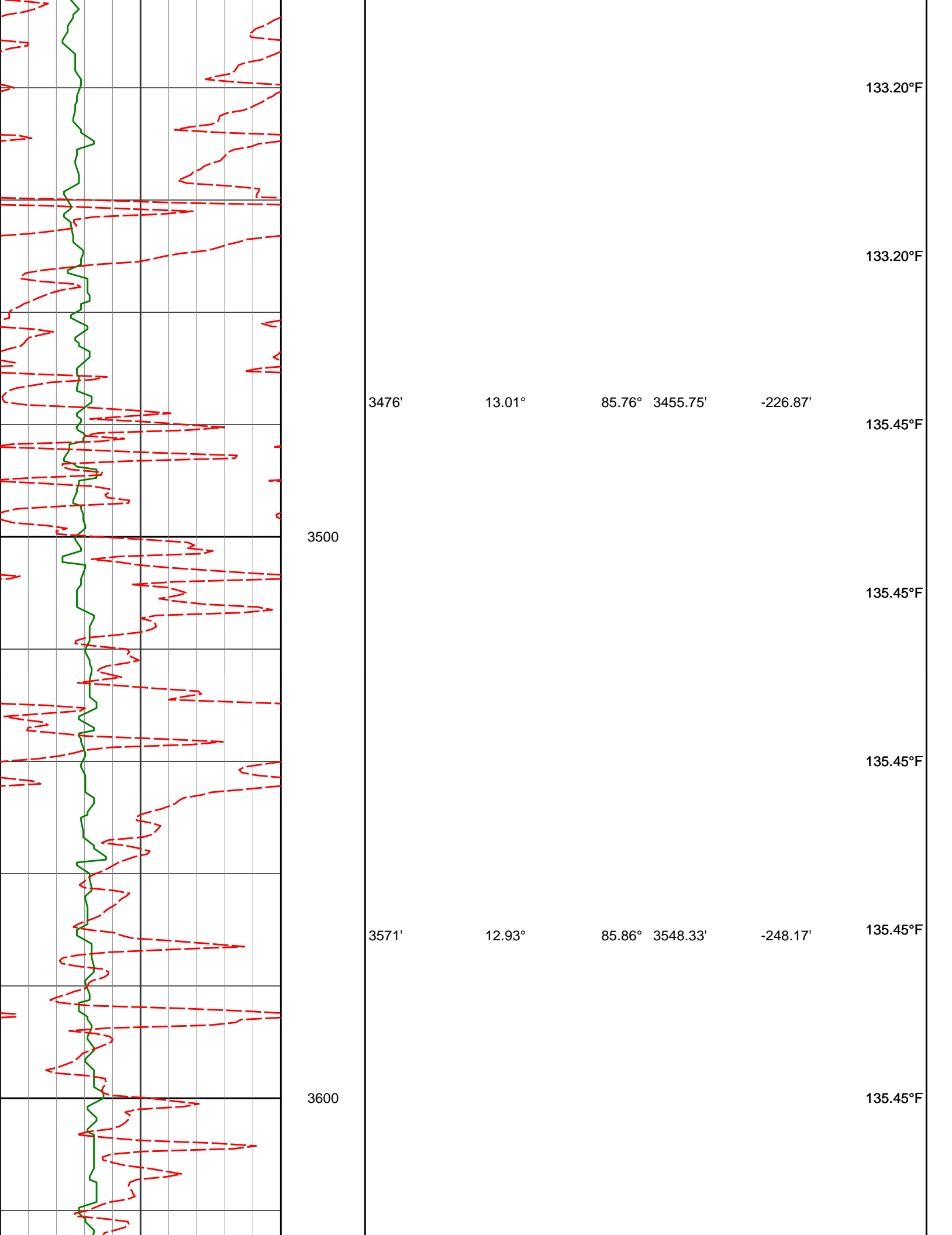
133.20°F

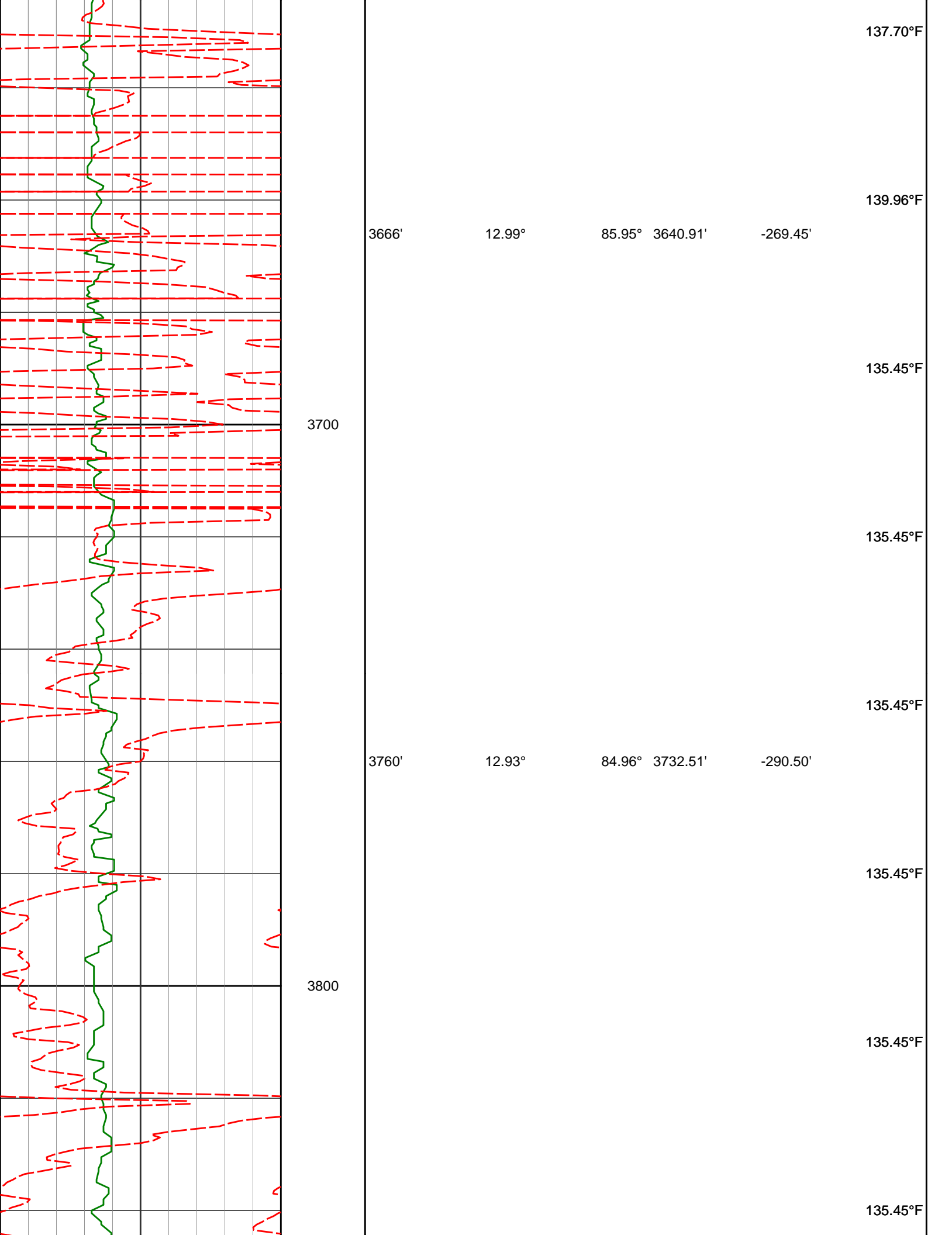
133.20°F

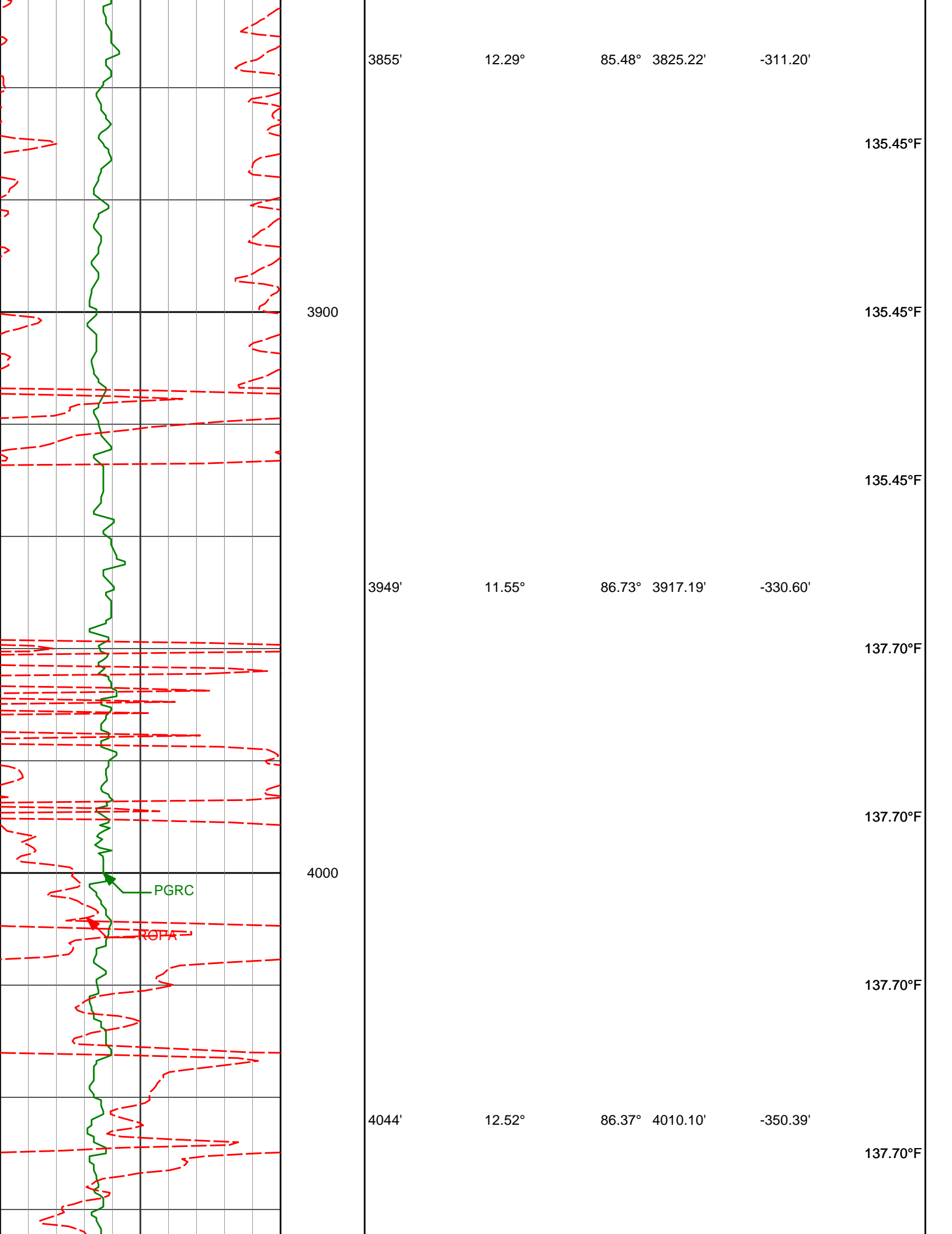
133.20°F

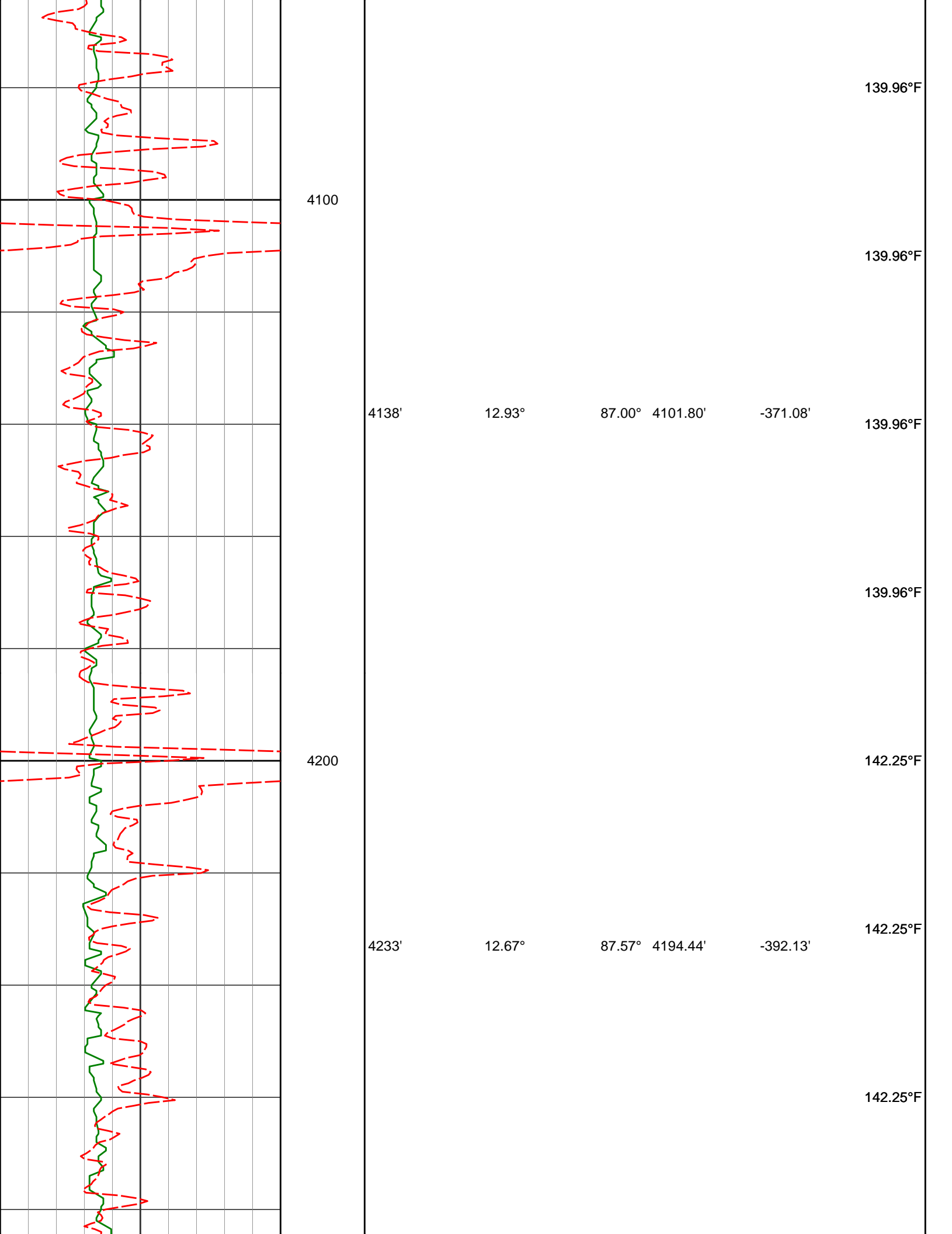
133.20°F

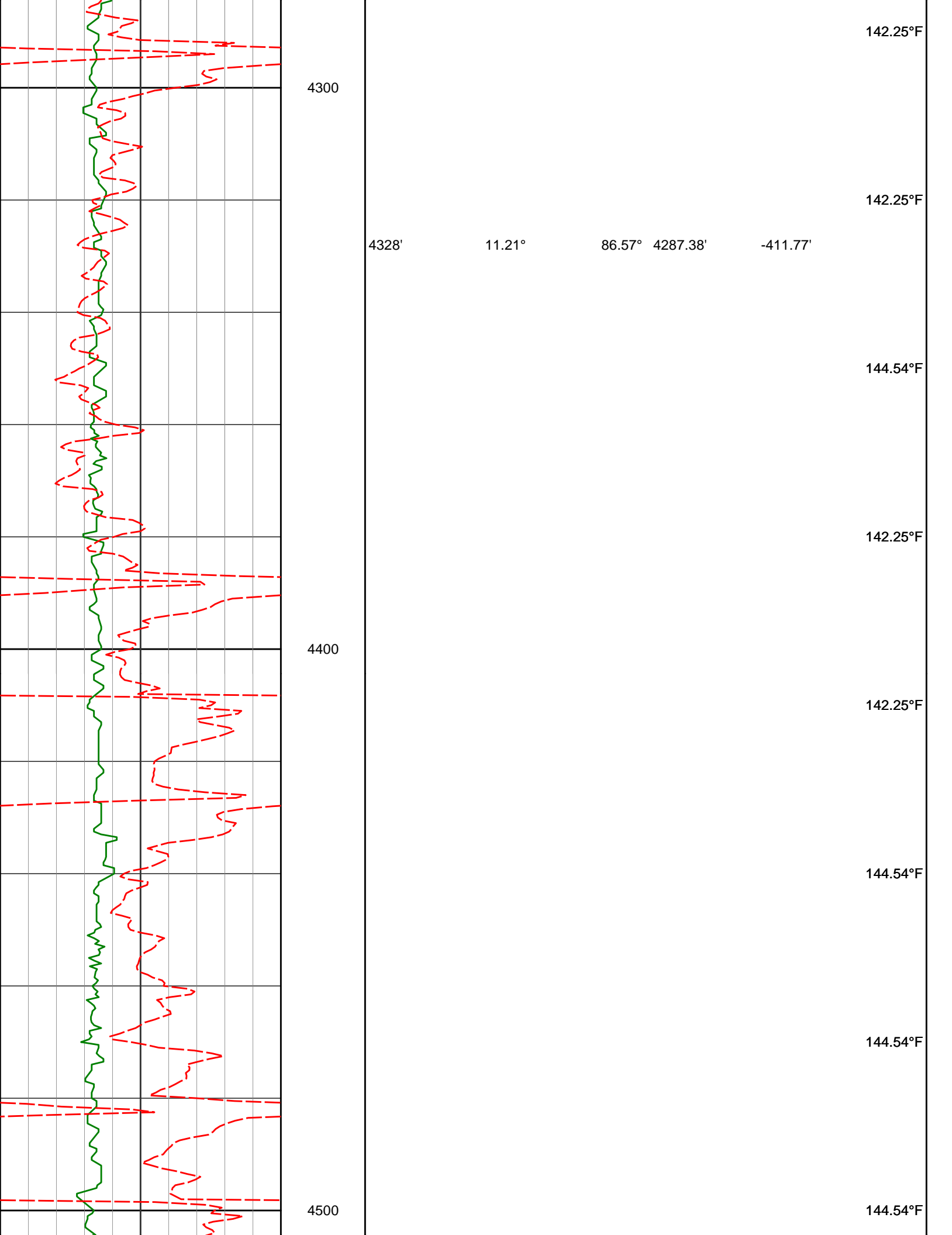
133.20°F

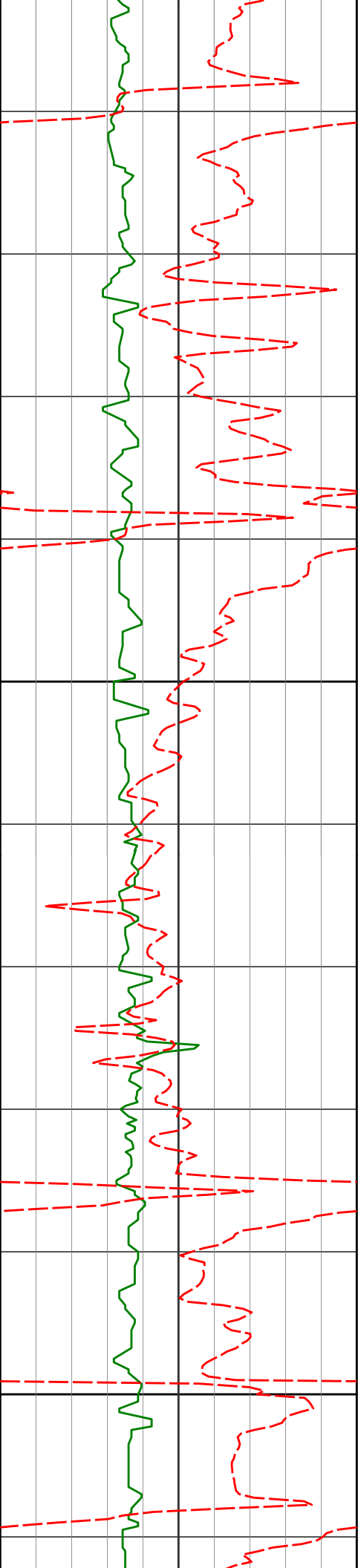




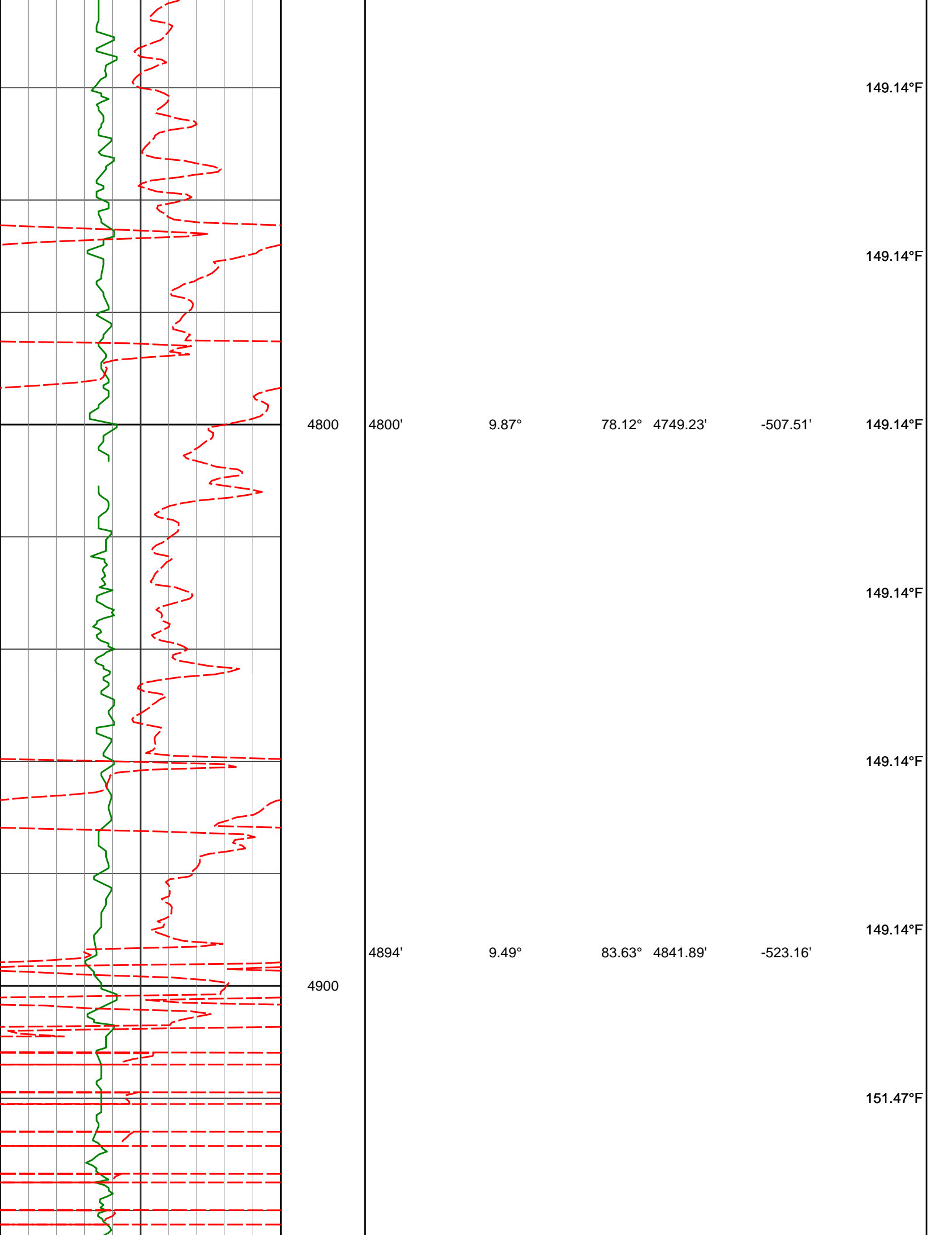


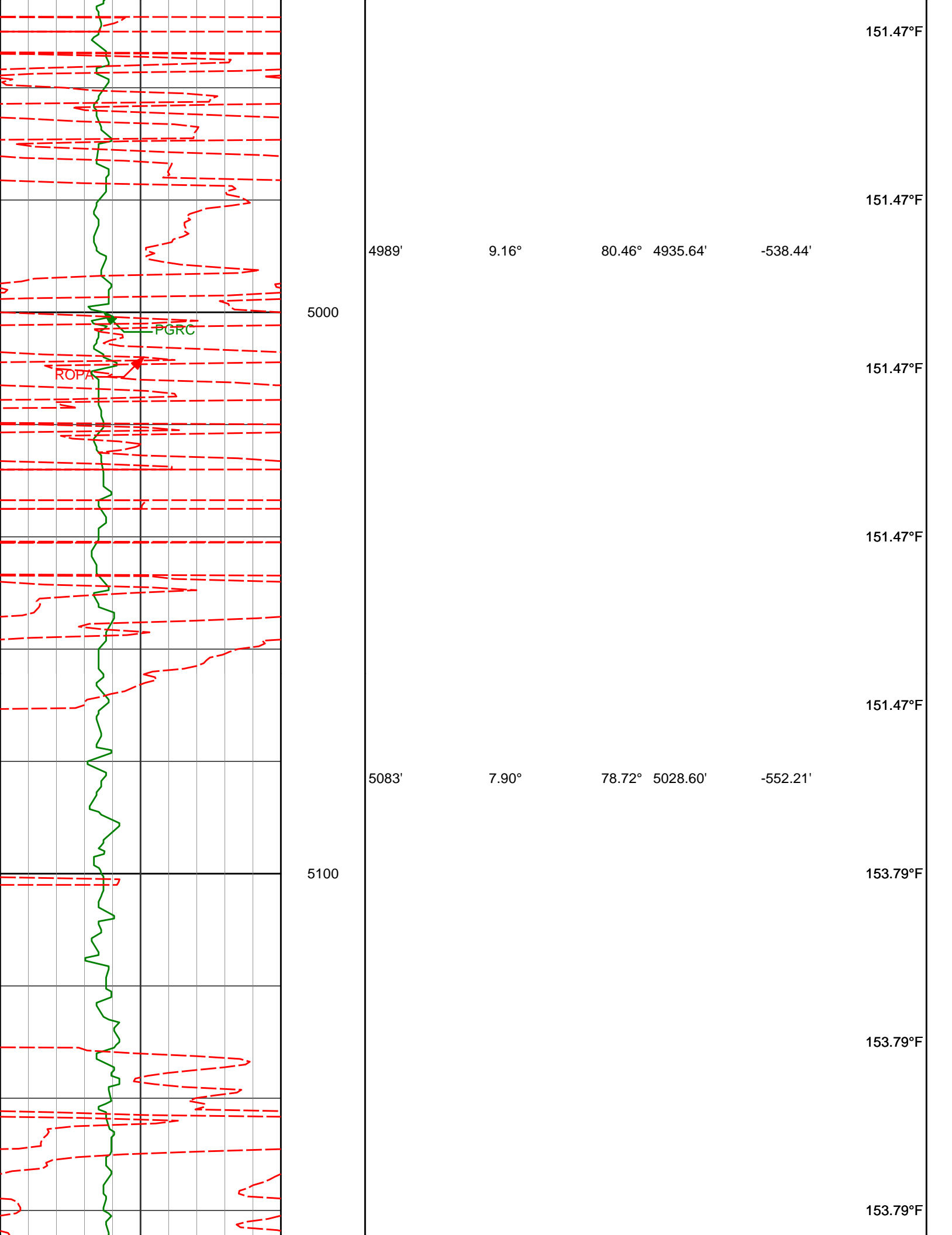


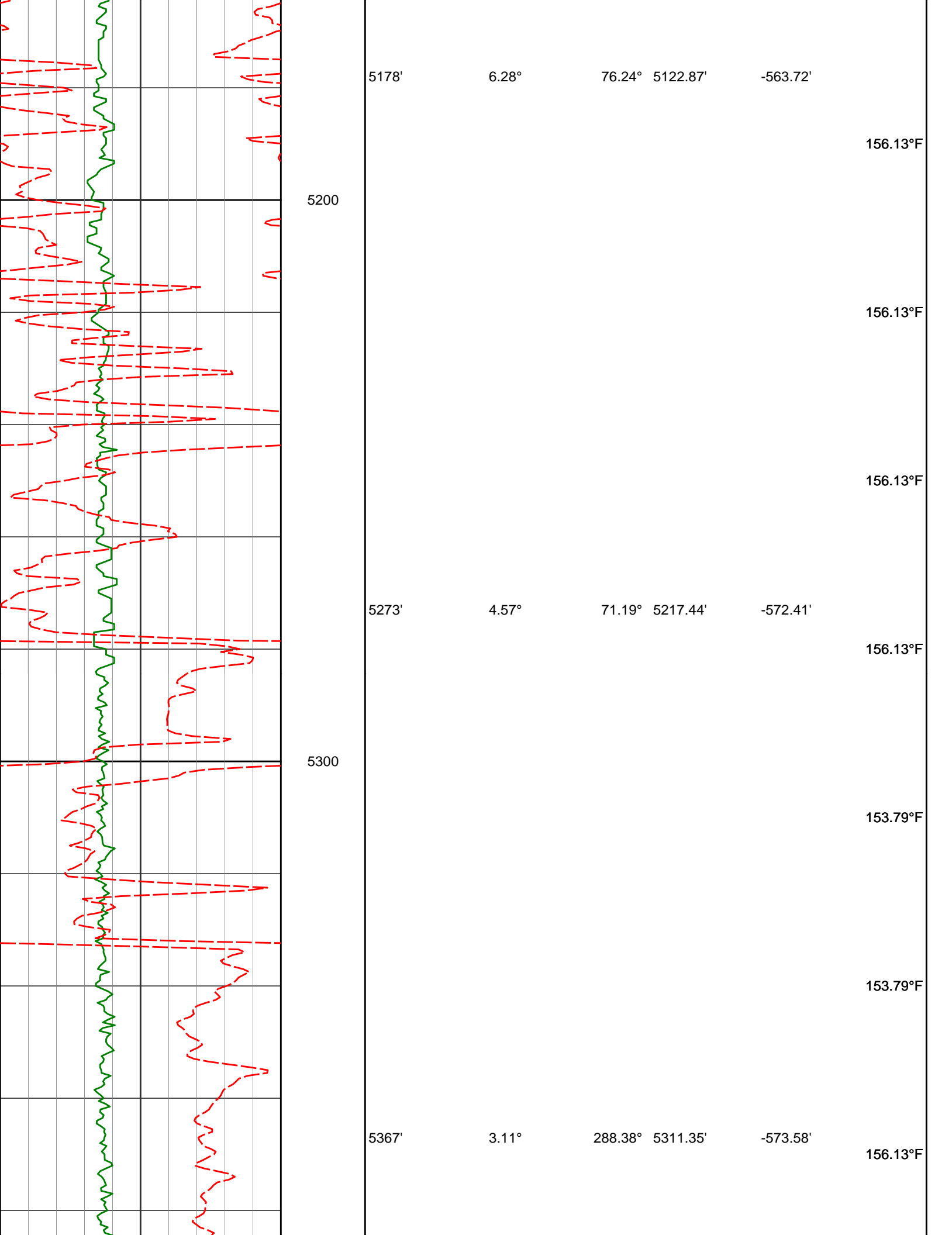


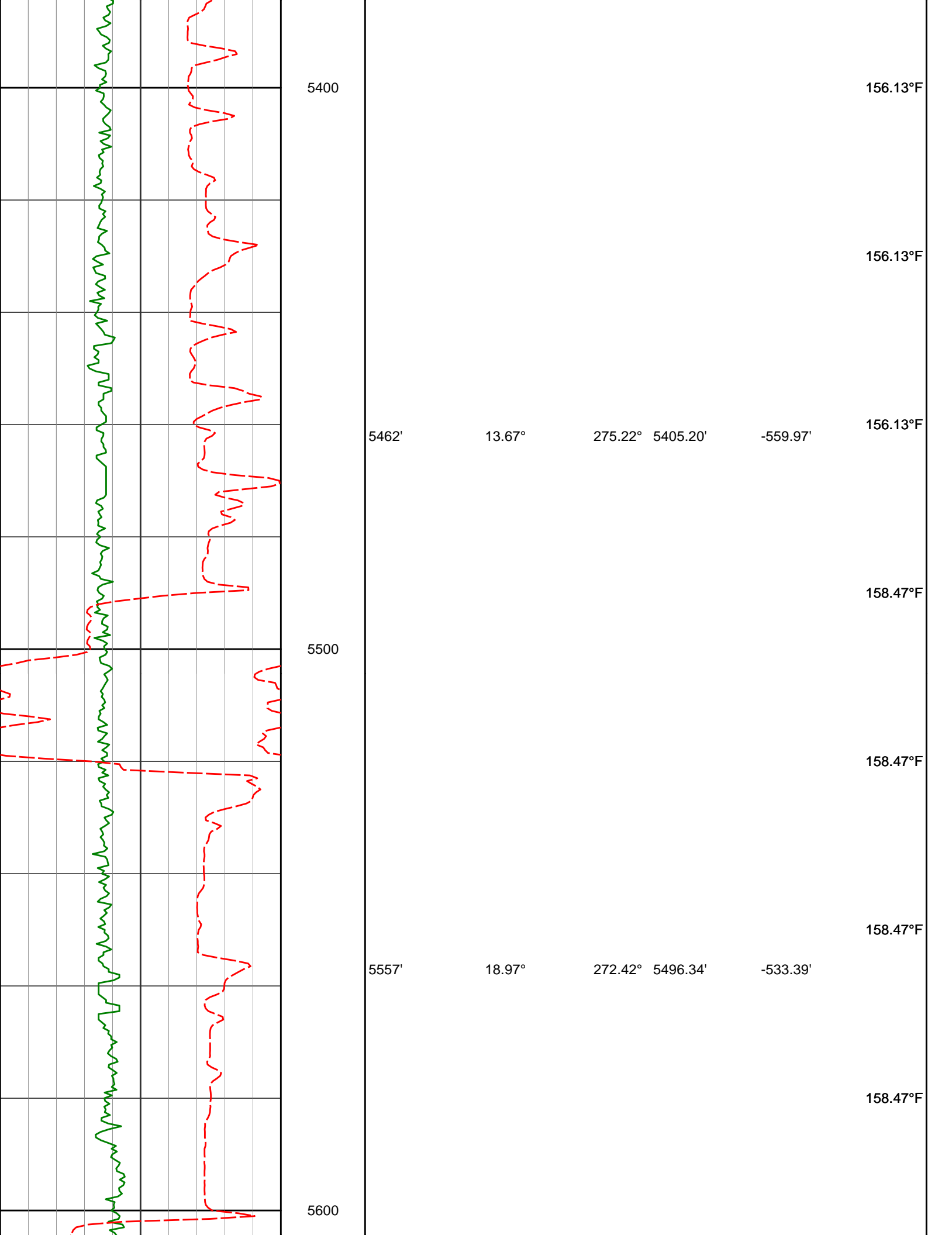


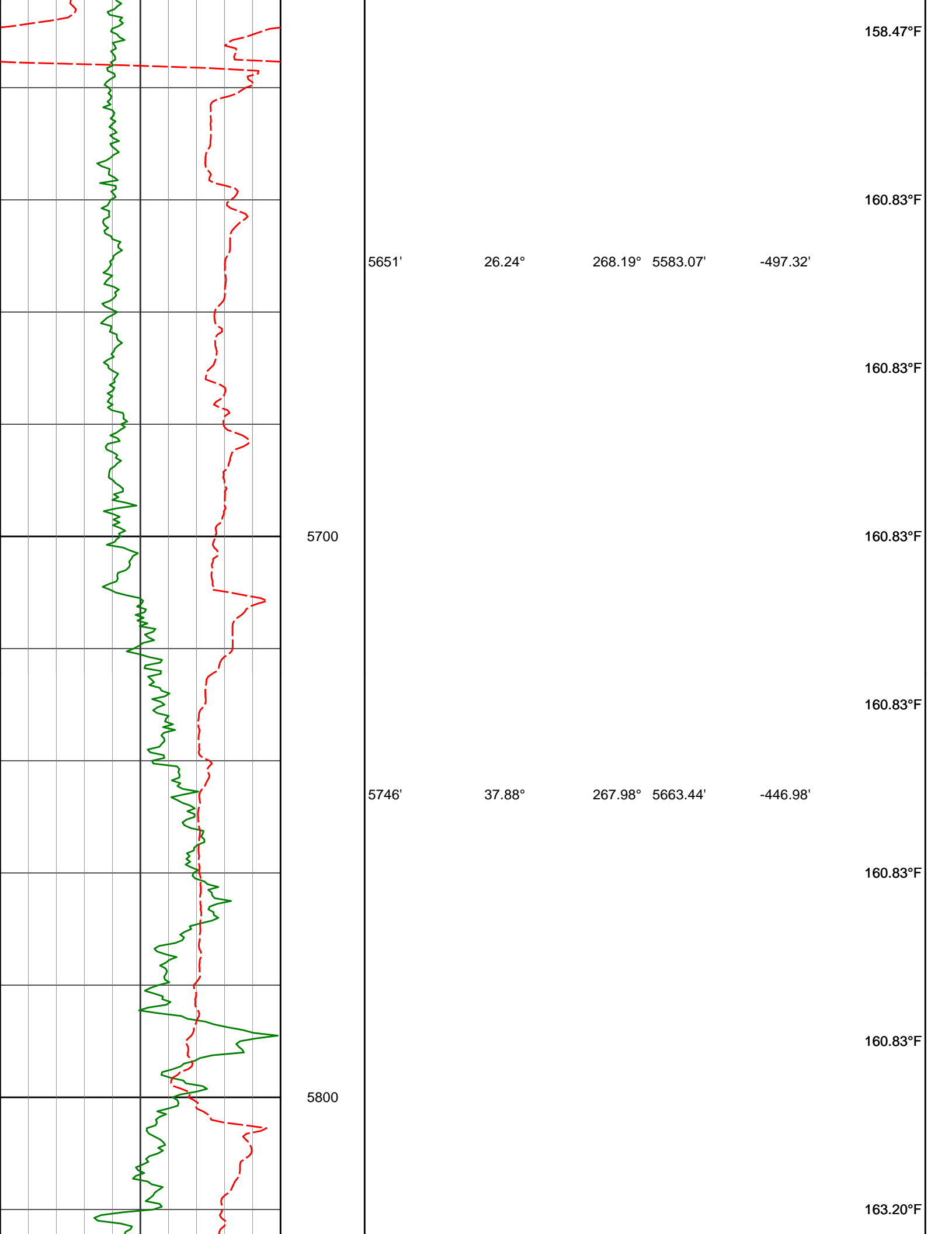
4517'	13.19°	80.86°	4472.11'	-451.50'	
					144.54°F
4600	12.15°	75.18°	4563.82'	-471.75'	144.54°F
4611'	12.15°	75.18°	4563.82'	-471.75'	146.84°F
4700	11.32°	76.17°	4656.83'	-490.58'	146.84°F
4706'	11.32°	76.17°	4656.83'	-490.58'	146.84°F

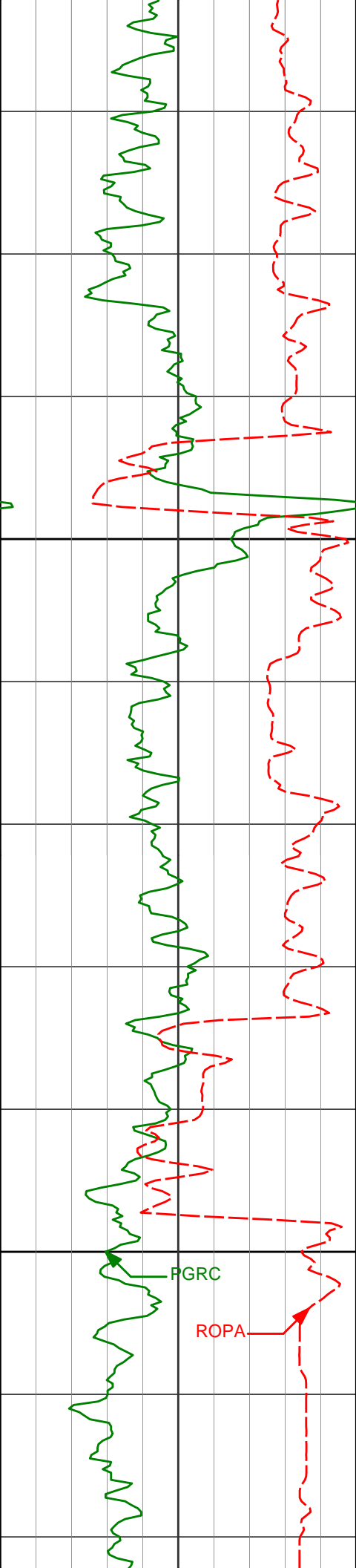












5900

6000

5841'

49.67°

266.49°

5731.92'

-381.39'

163.20°F

163.20°F

163.20°F

5935'

57.09°

268.49°

5787.96'

-306.02'

165.58°F

165.58°F

165.58°F

6030'

63.47°

265.27°

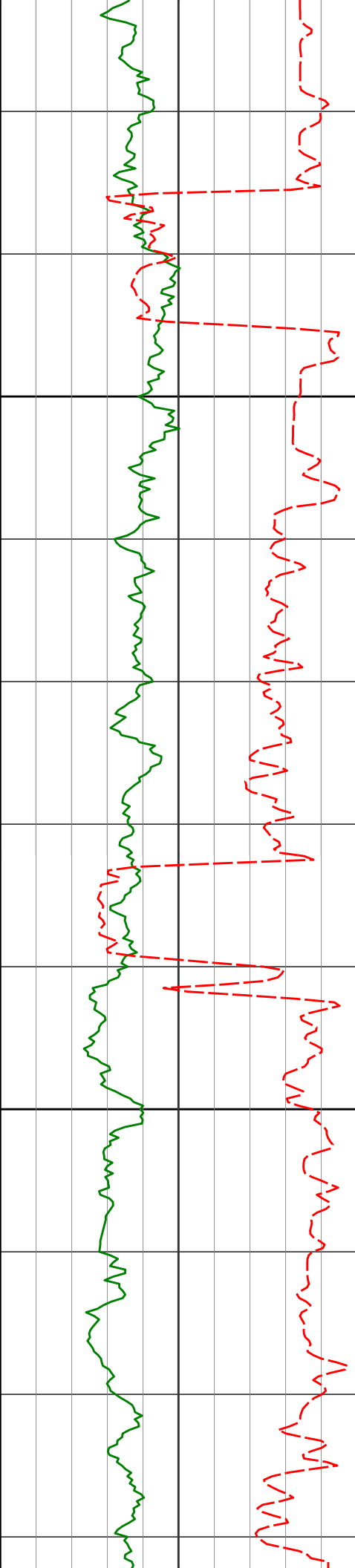
5835.04'

-223.62'

165.58°F

FGRC

ROPA



6100

6200

6124'

6219'

69.56°

77.21°

265.65° 5872.48'

264.09° 5899.63'

-137.57'

-46.81'

165.58°F

165.58°F

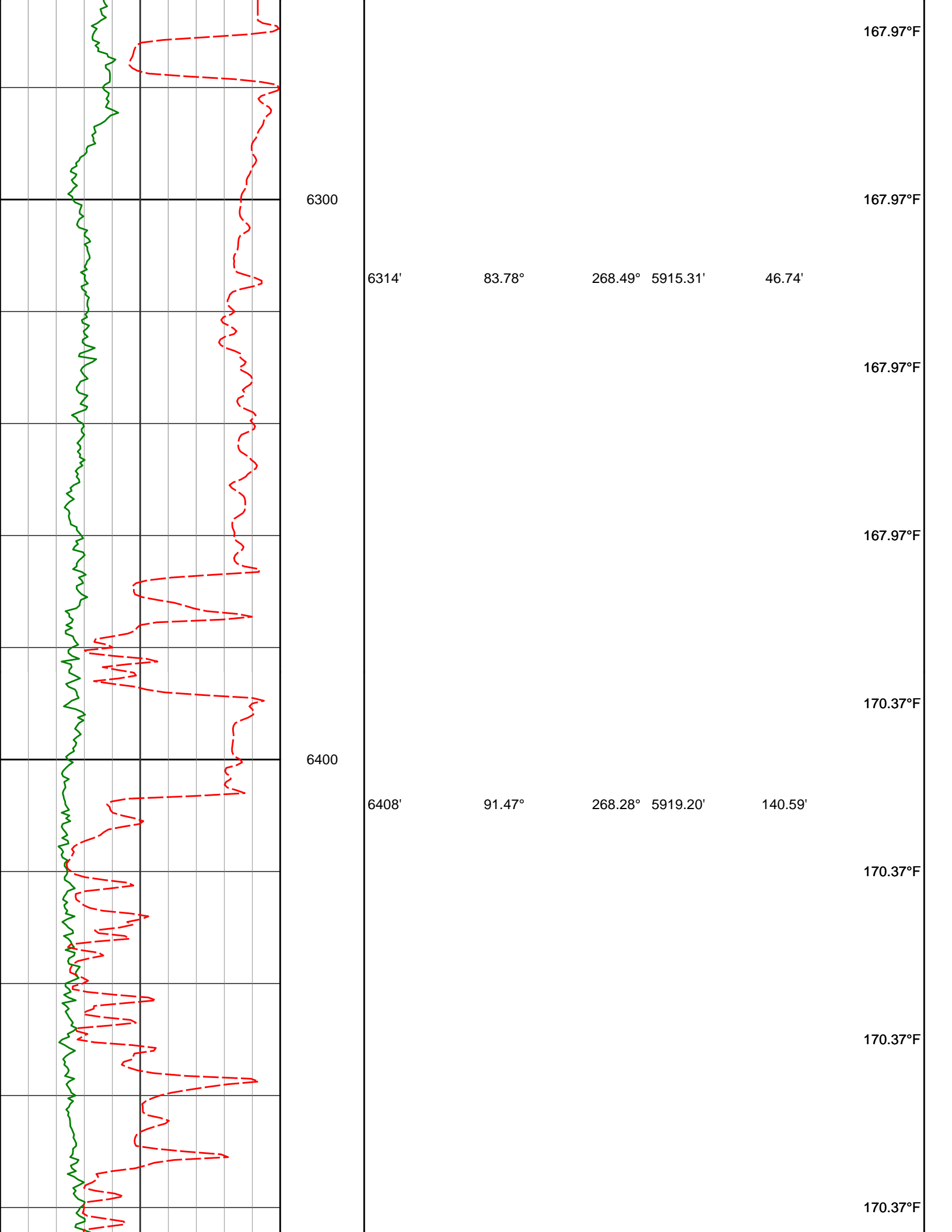
165.58°F

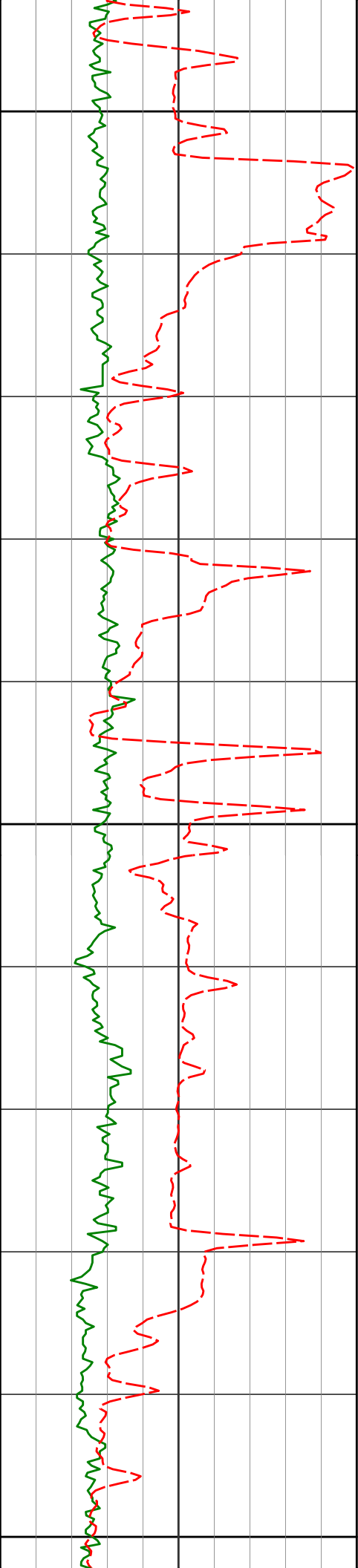
167.97°F

167.97°F

167.97°F

167.97°F





6500

6503'

91.38°

268.58°

5916.84'

235.56'

172.78°F

6600

6598'

90.45°

268.17°

5915.33'

330.54'

177.64°F

6700

6692'

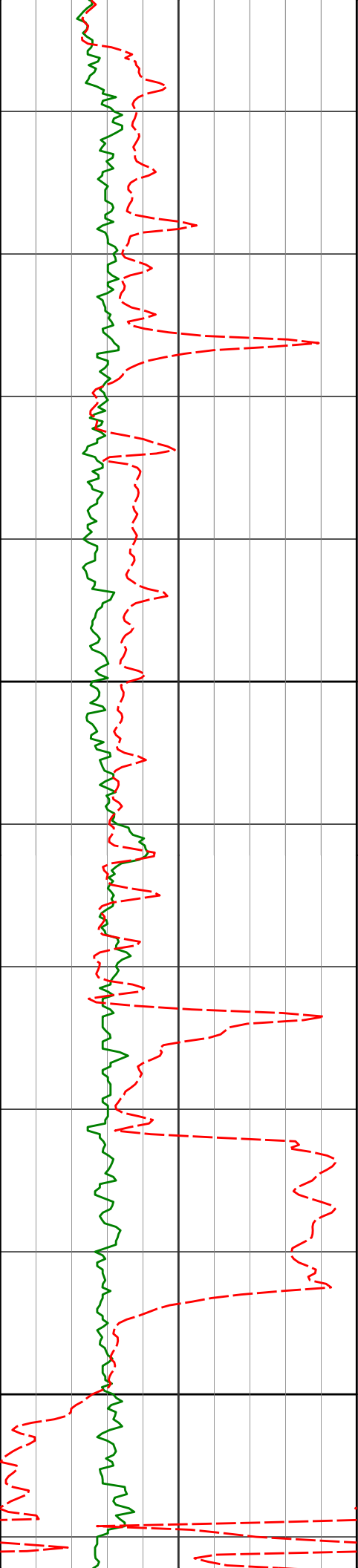
89.53°

268.10°

5915.34'

424.54'

180.09°F



6800

6900

6787'

88.88°

267.73° 5916.66'

519.52'

6881'

89.74°

268.63° 5917.79'

613.51'

180.09°F

180.09°F

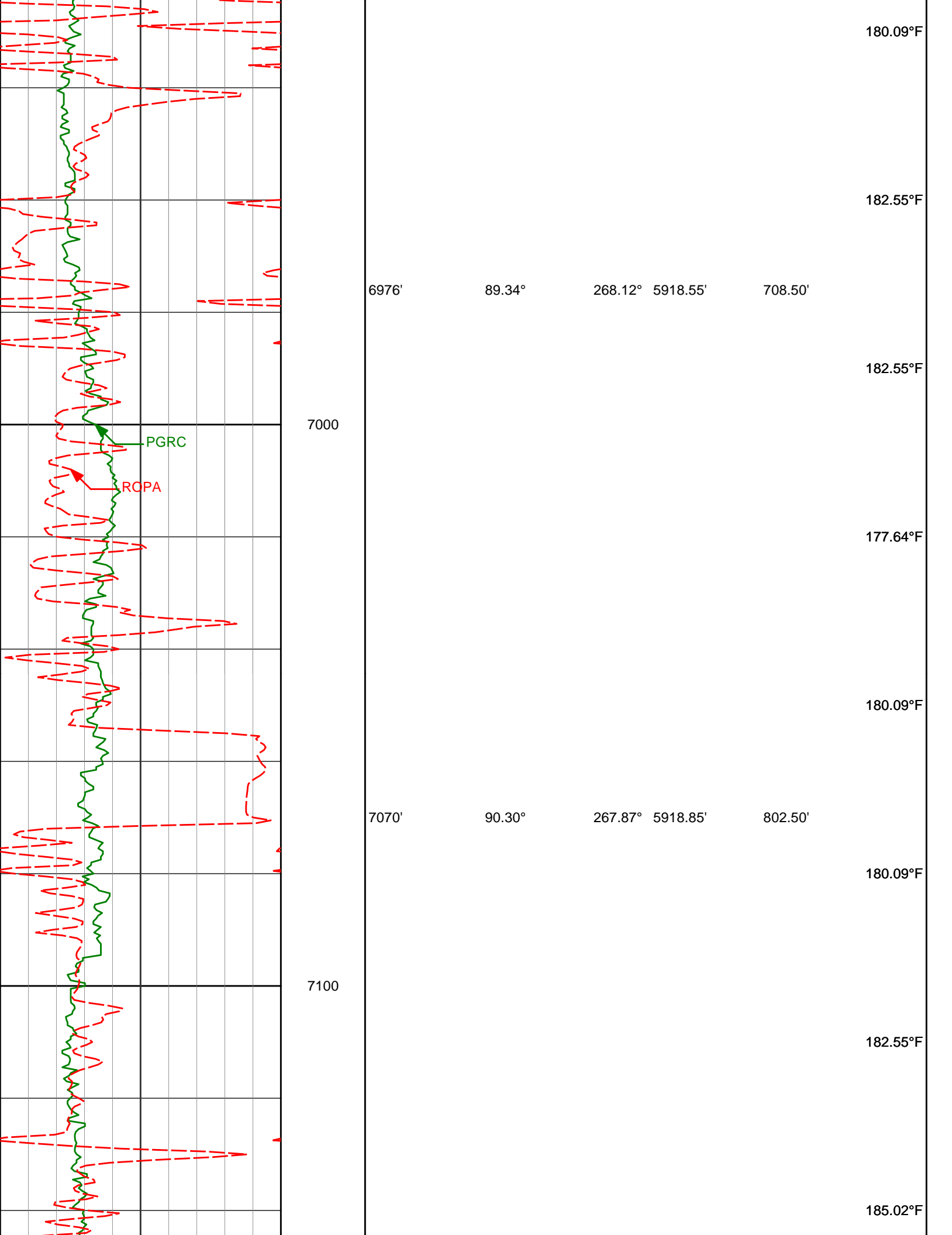
180.09°F

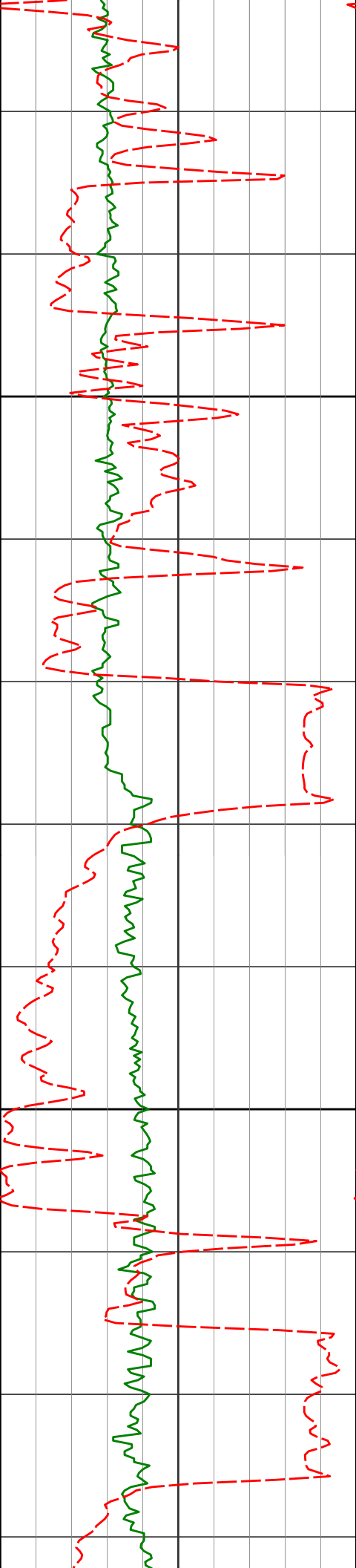
180.09°F

175.21°F

177.64°F

180.09°F





7200

7300

7165'

89.96°

267.87° 5918.63'

897.49'

185.02°F

182.55°F

182.55°F

7259'

90.17°

268.91° 5918.53'

991.49'

185.02°F

182.55°F

182.55°F

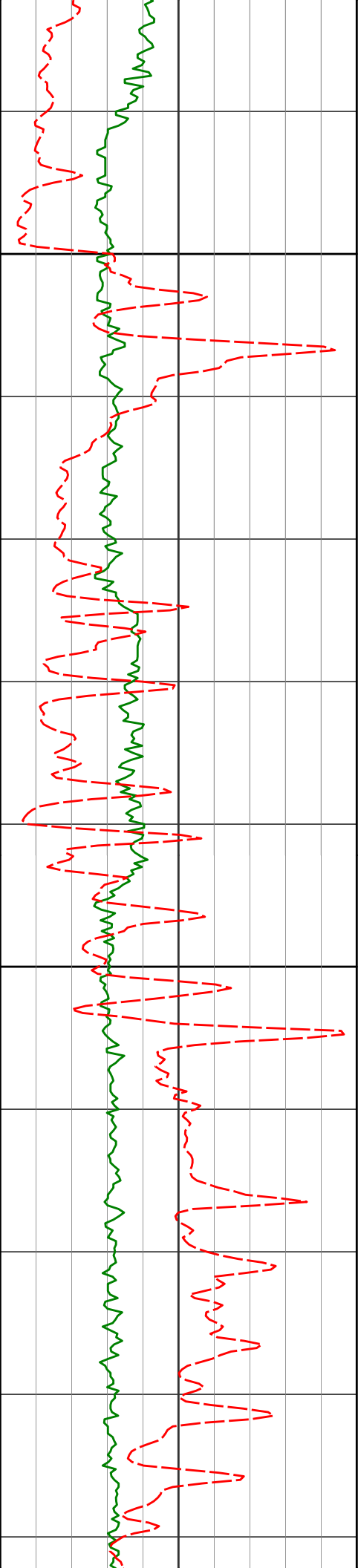
7354'

91.31°

269.41° 5917.30'

1086.47'

182.55°F



7400

7500

Run 200

7448'

91.13°

269.33° 5915.30'

1180.44'

187.48°F

187.48°F

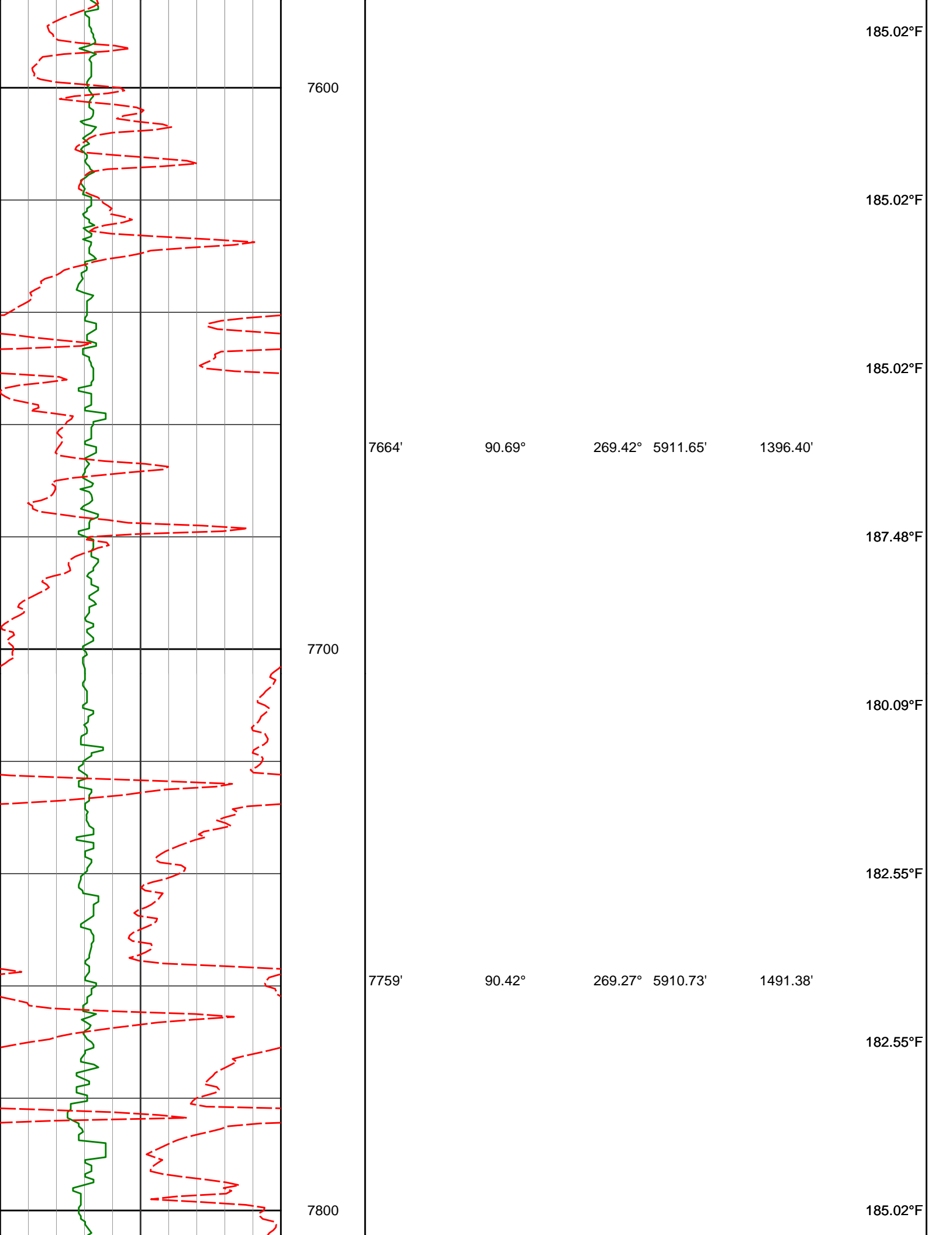
187.48°F

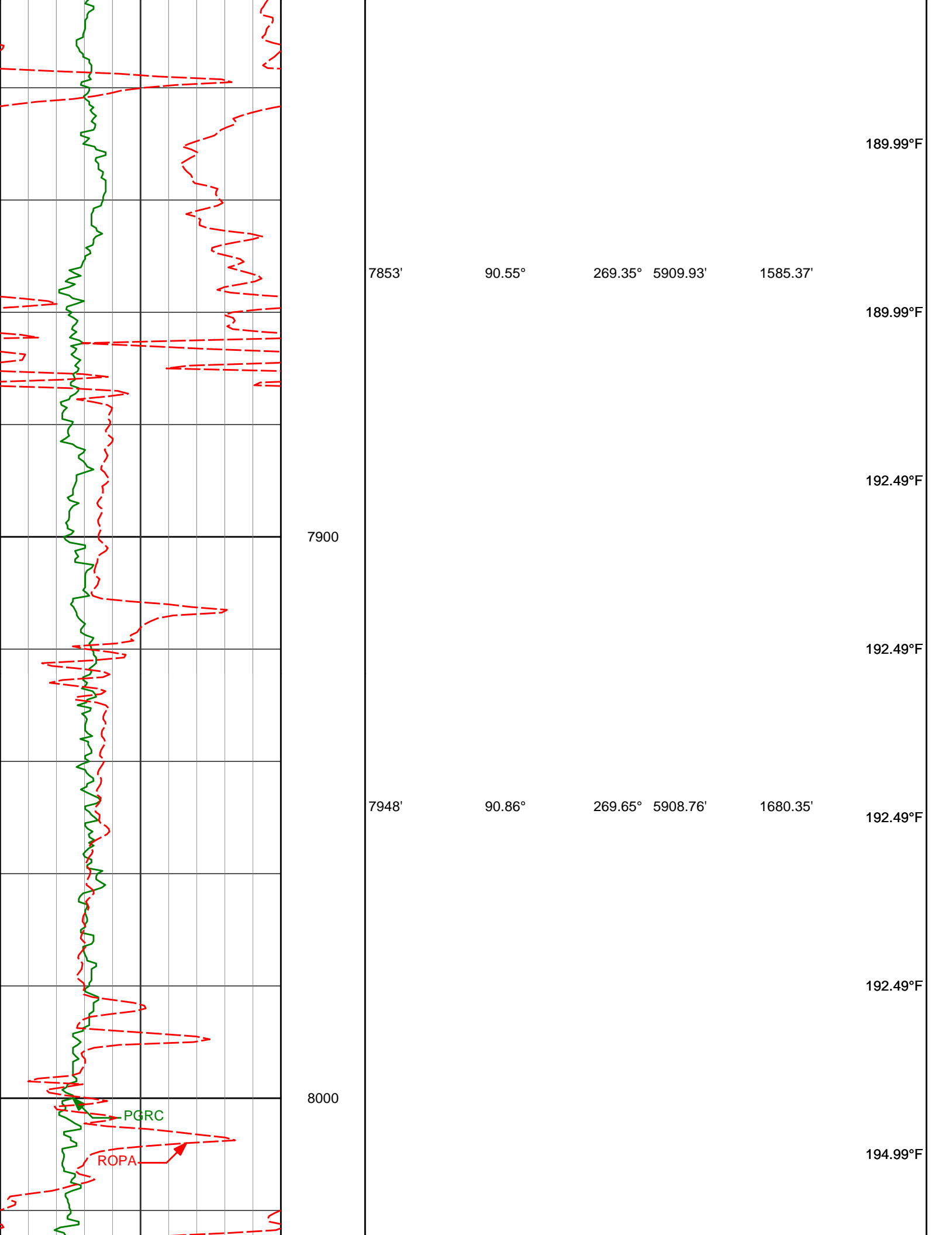
189.99°F

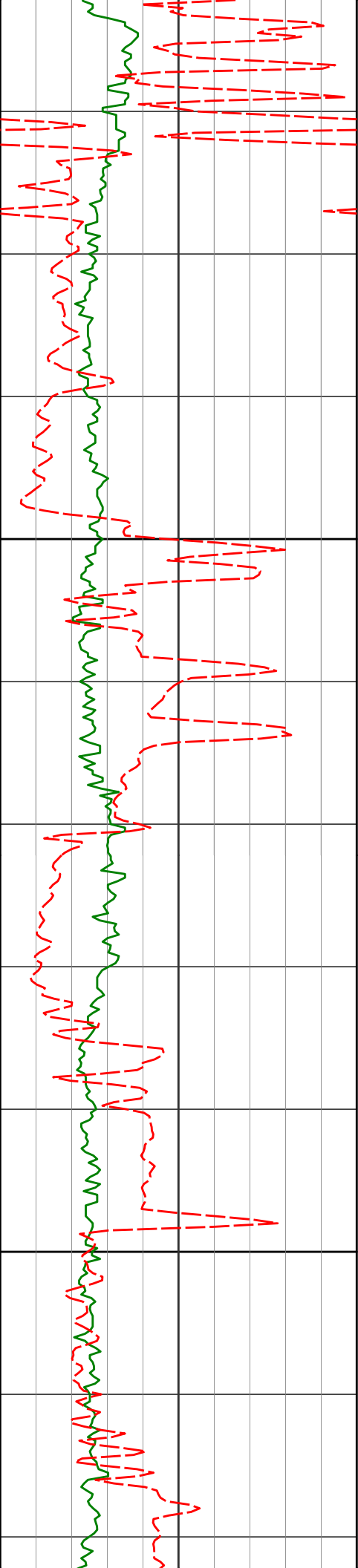
189.99°F

185.02°F

185.02°F







8043'

91.13°

269.64°

5907.11'

1775.32'

194.99°F

197.51°F

8100

197.51°F

8137'

91.25°

269.95°

5905.16'

1869.28'

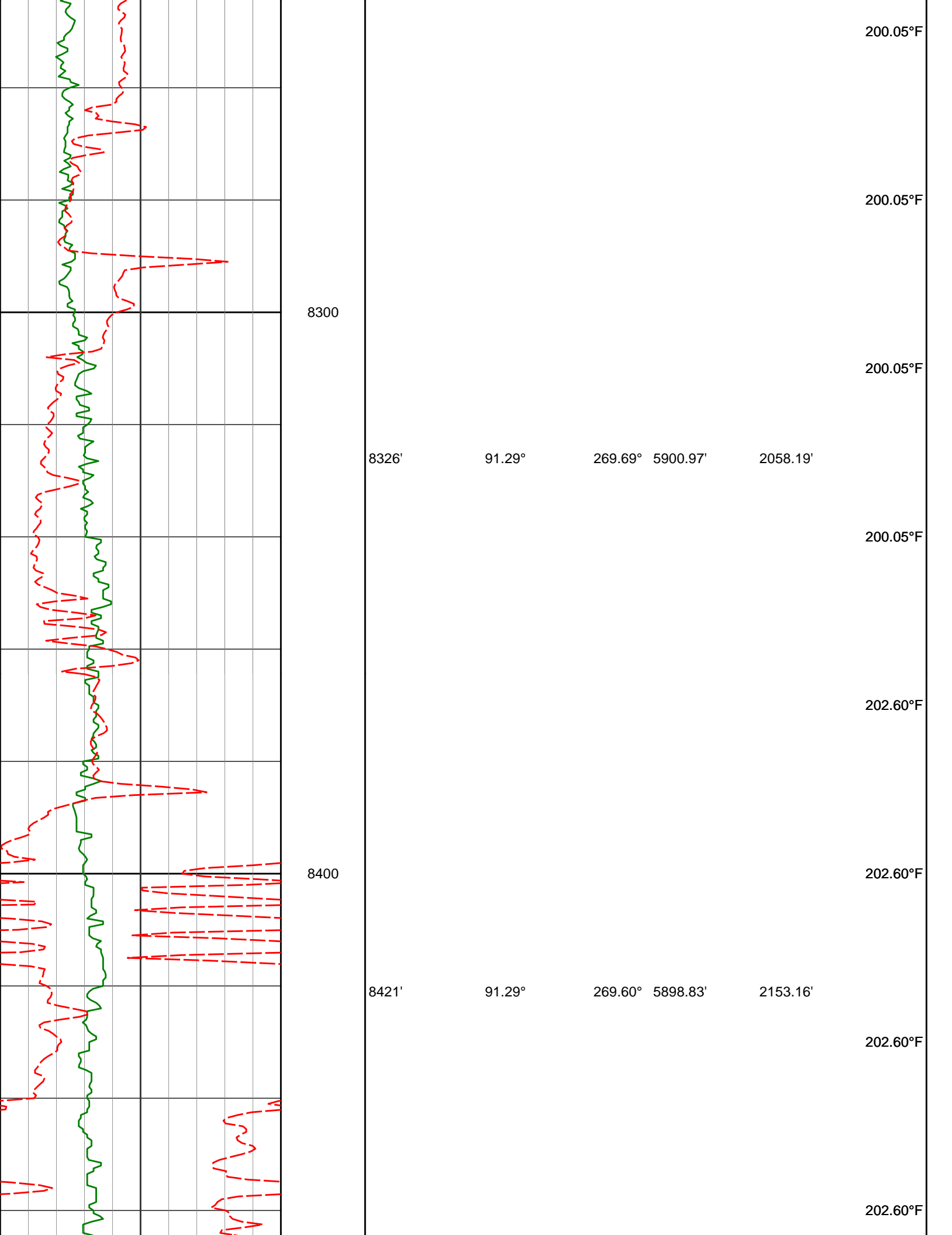
197.51°F

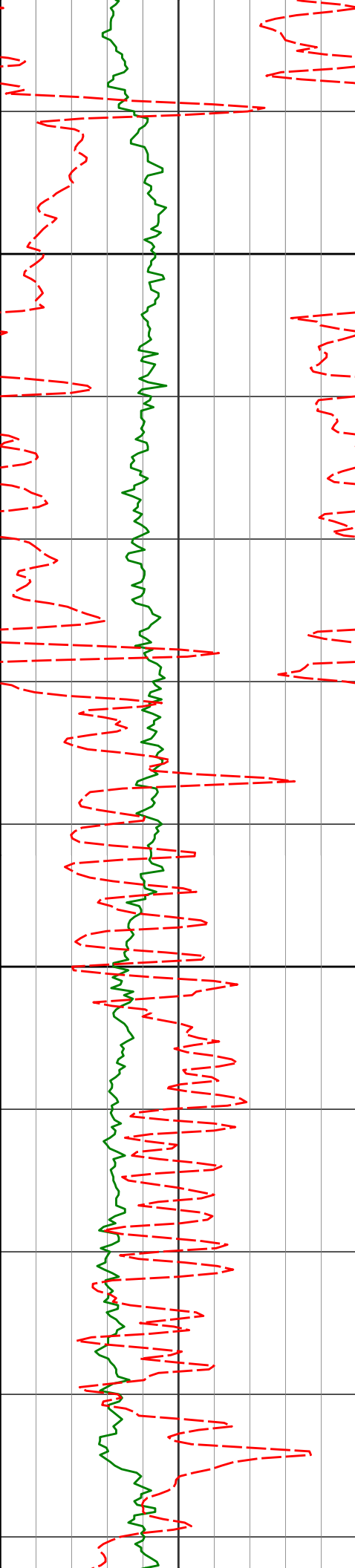
197.51°F

197.51°F

8200

200.05°F





8500

8600

8515'

8610'

91.26°

90.71°

269.64°

269.20°

5896.74'

5895.11'

2247.12'

2342.09'

205.16°F

205.16°F

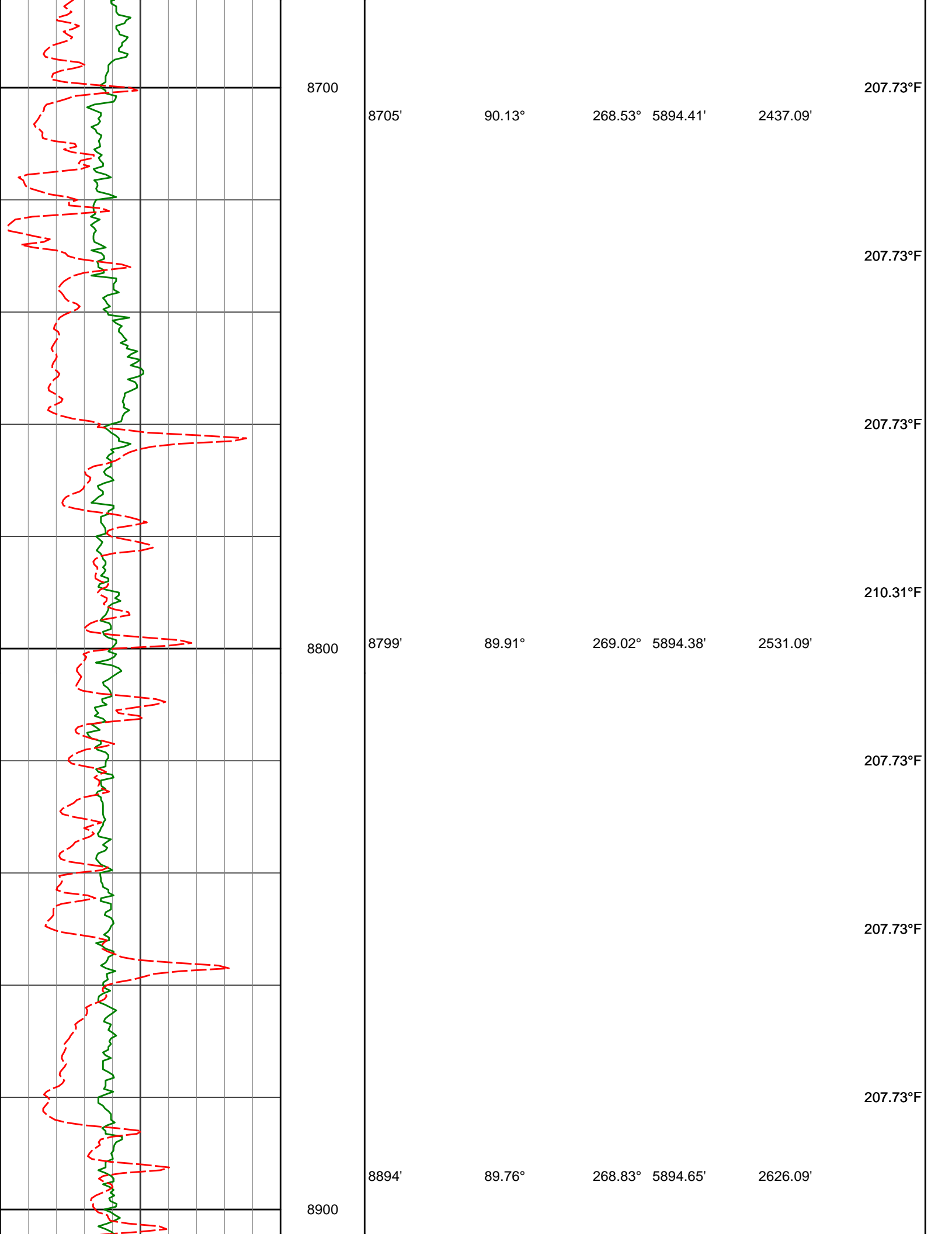
205.16°F

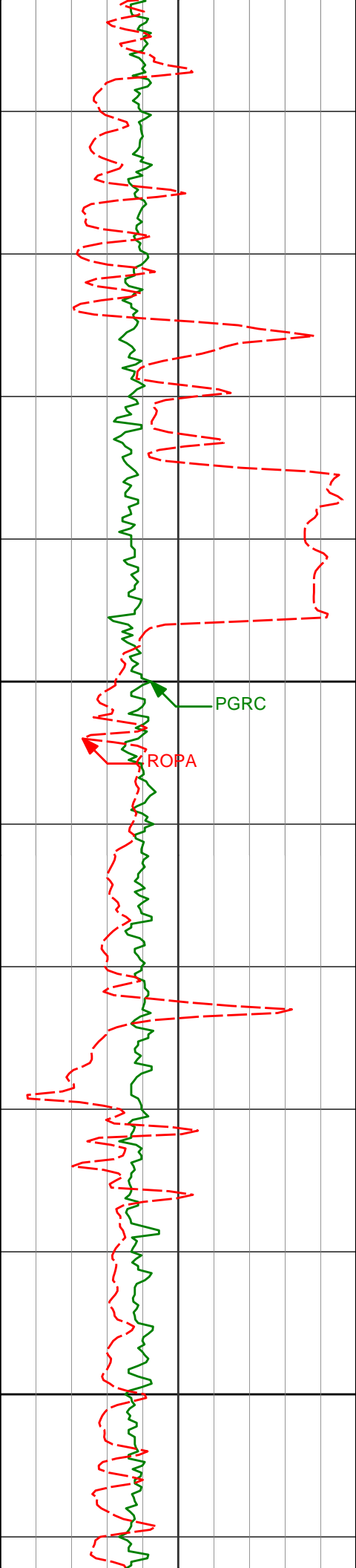
207.73°F

207.73°F

207.73°F

207.73°F





9000

9100

8988'

91.45°

268.61° 5893.66'

2720.08'

9083'

91.30°

268.67° 5891.38'

2815.05'

207.73°F

205.16°F

207.73°F

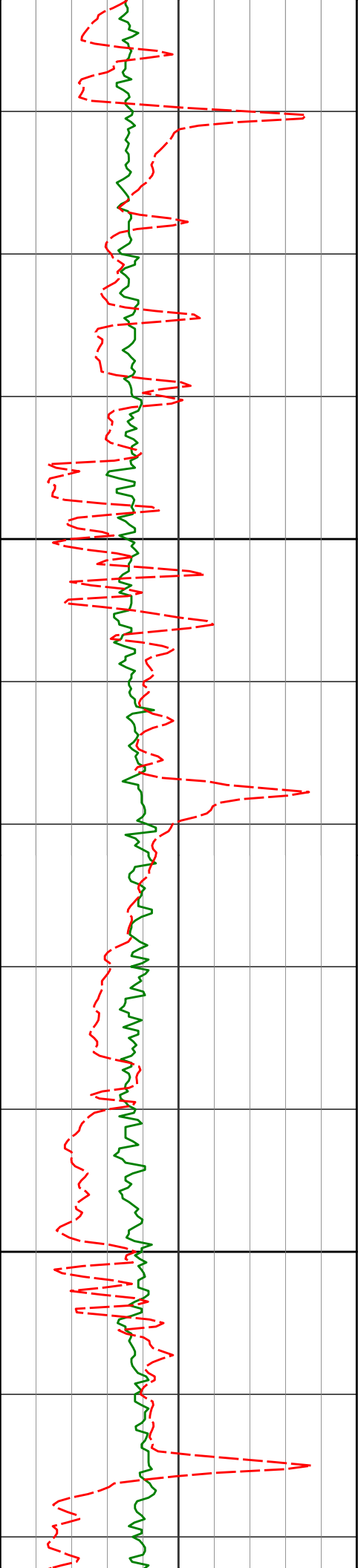
207.73°F

207.73°F

210.31°F

210.31°F

212.92°F



9200

9300

9178'

90.99°

268.60° 5889.48'

2910.03'

9272'

90.72°

268.46° 5888.08'

3004.02'

212.92°F

212.92°F

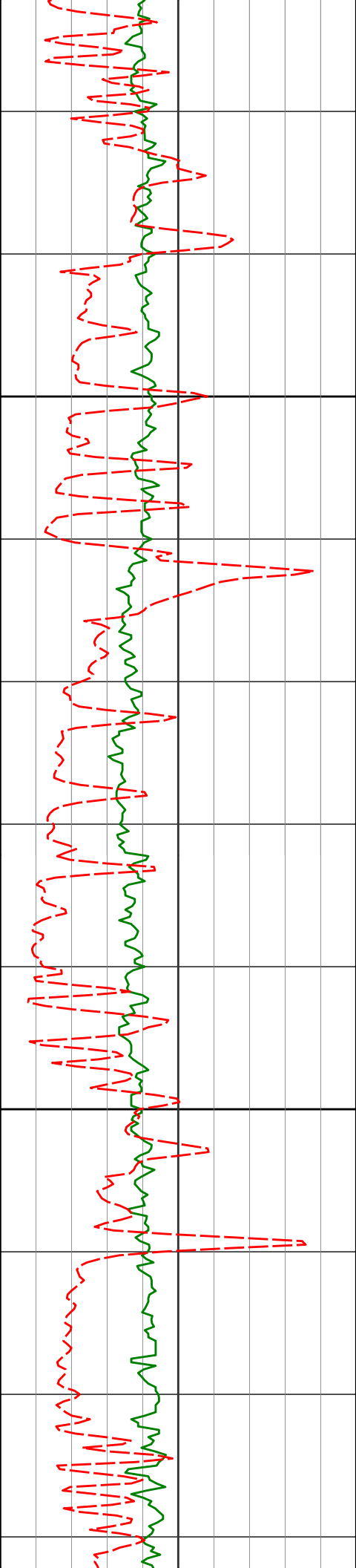
212.92°F

215.51°F

212.92°F

212.92°F

212.92°F



9400

9500

9366'

90.28°

267.86° 5887.26'

3098.01'

9461'

90.16°

268.22° 5886.89'

3193.01'

9555'

89.92°

268.36° 5886.83'

3287.01'

215.51°F

215.51°F

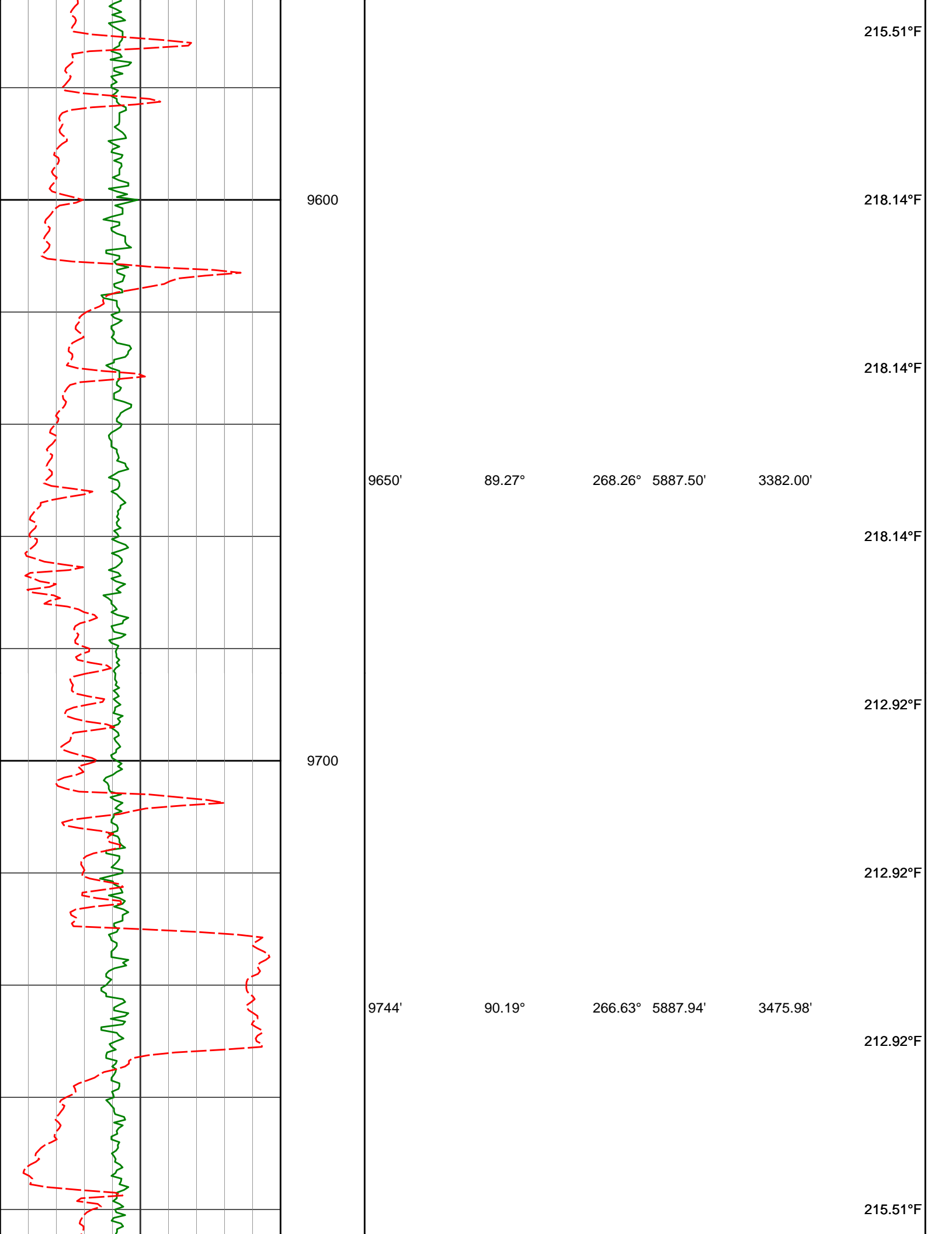
215.51°F

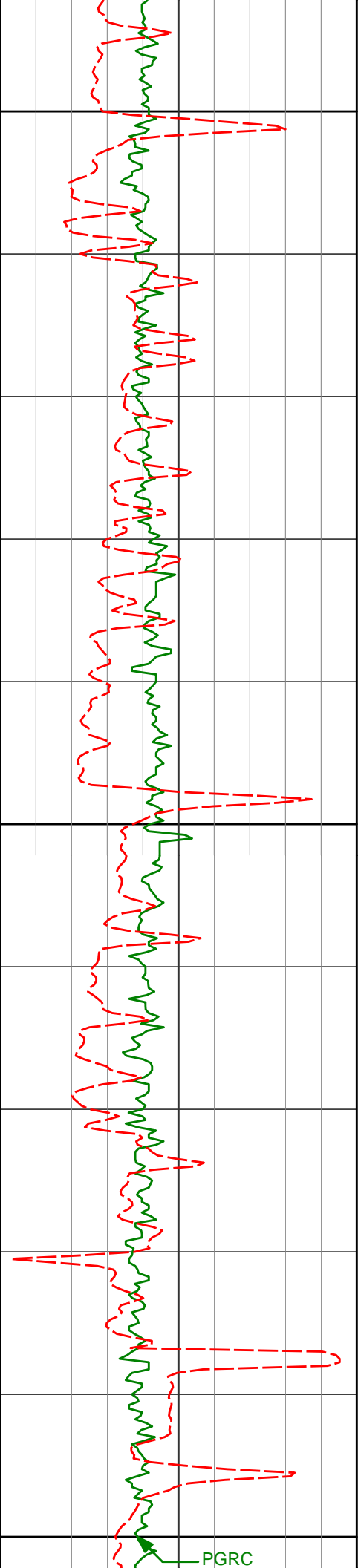
215.51°F

215.51°F

215.51°F

218.14°F





9800

215.51°F

9839'

90.29°

266.33° 5887.54'

3570.91'

218.14°F

218.14°F

9900

218.14°F

9933'

89.89°

266.26° 5887.40'

3664.83'

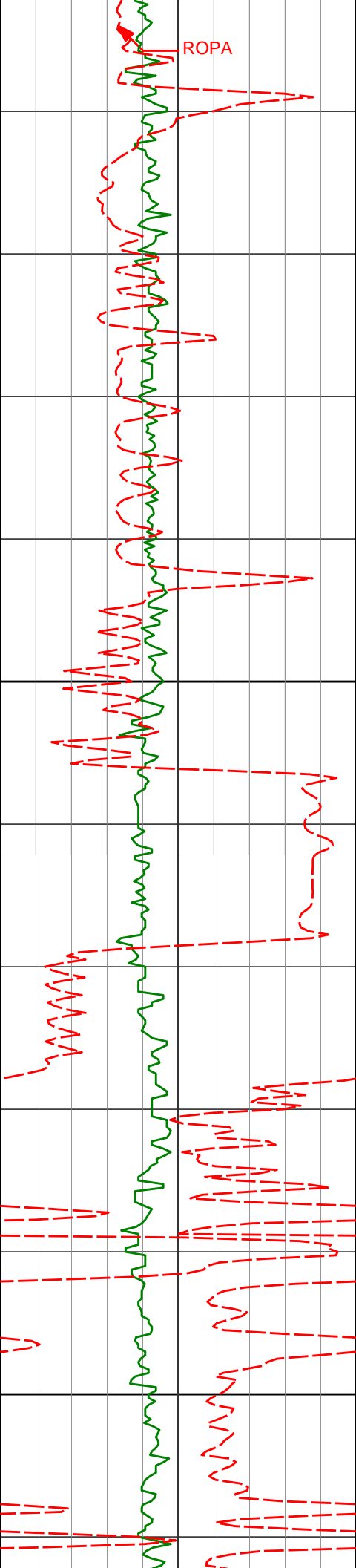
215.51°F

215.51°F

218.14°F

10000

PGRC



10100

10200

10028'

10123'

10217'

89.61°

90.44°

91.55°

266.26°

267.35°

268.14°

5887.81'

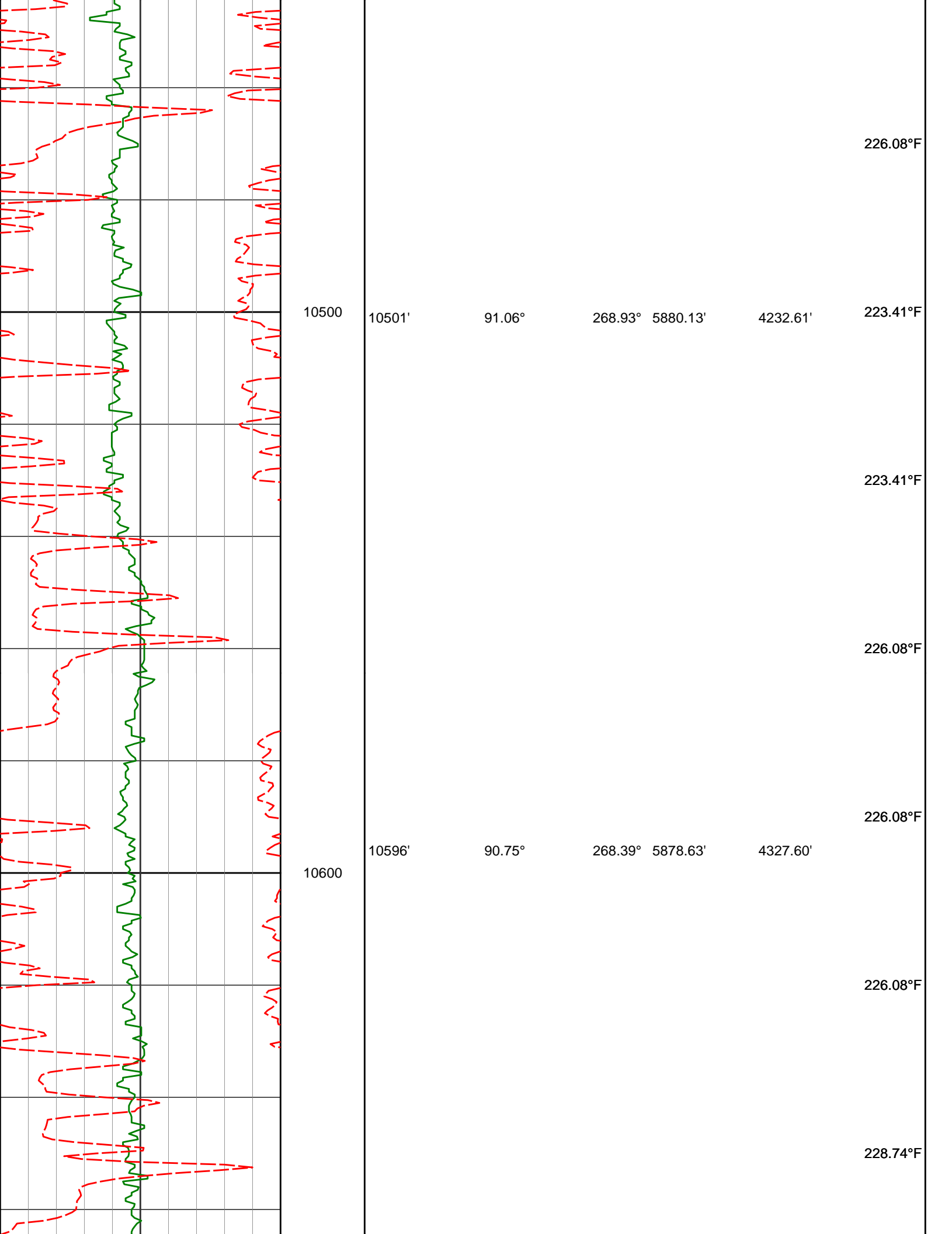
5887.77'

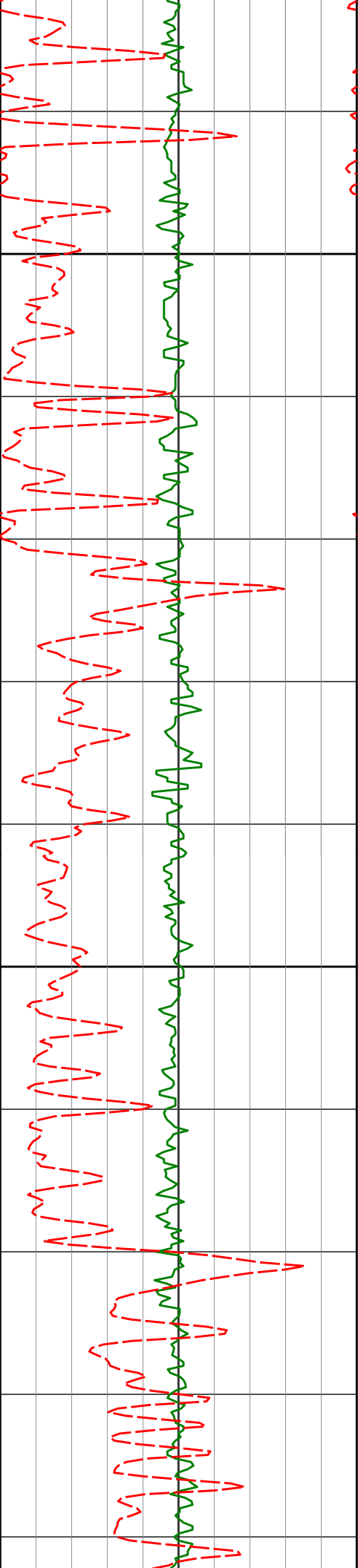
5886.14'

3759.75'

3854.70'

3948.68'





10700

10800

10690'

90.35°

268.16° 5877.73'

4421.59'

10785'

90.26°

268.12° 5877.22'

4516.59'

228.74°F

228.74°F

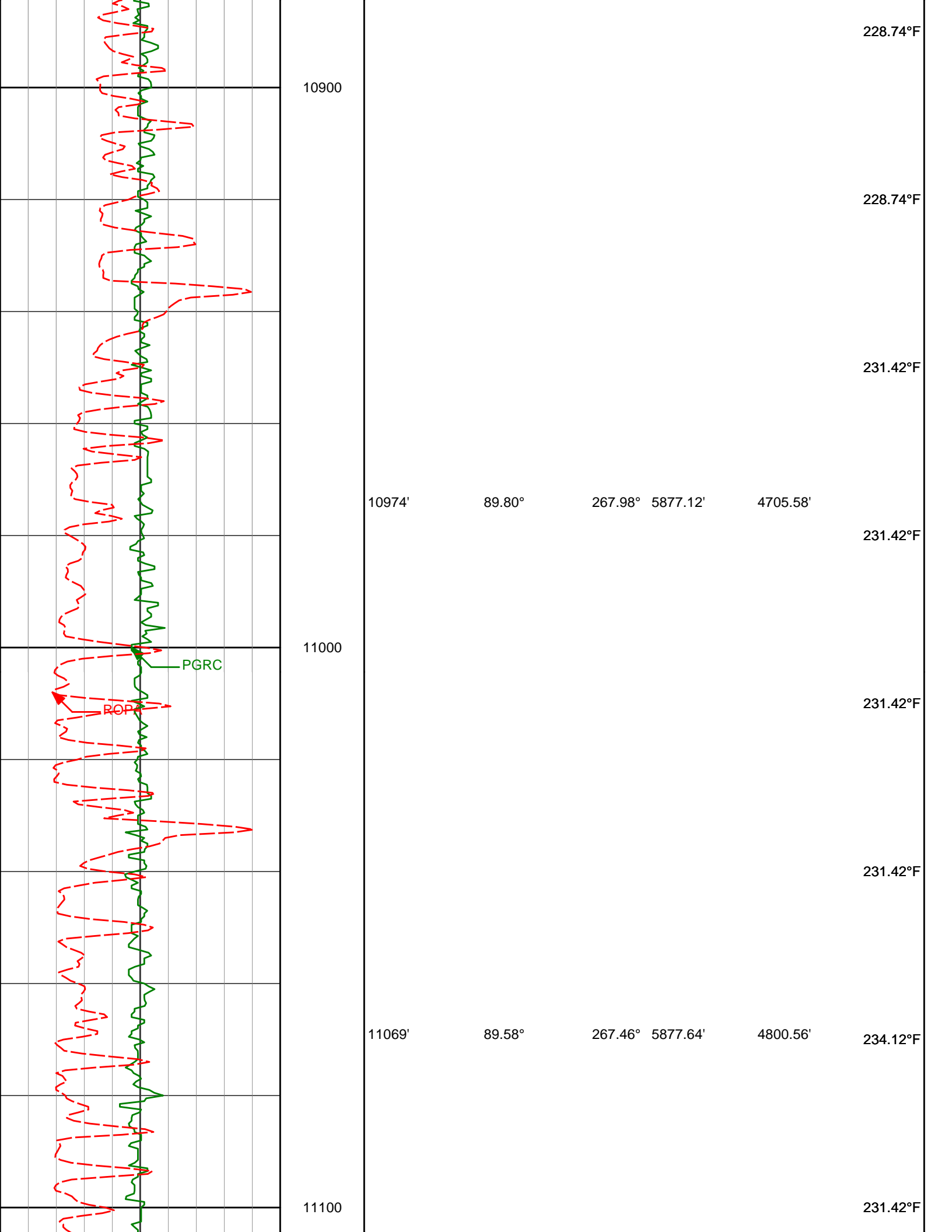
228.74°F

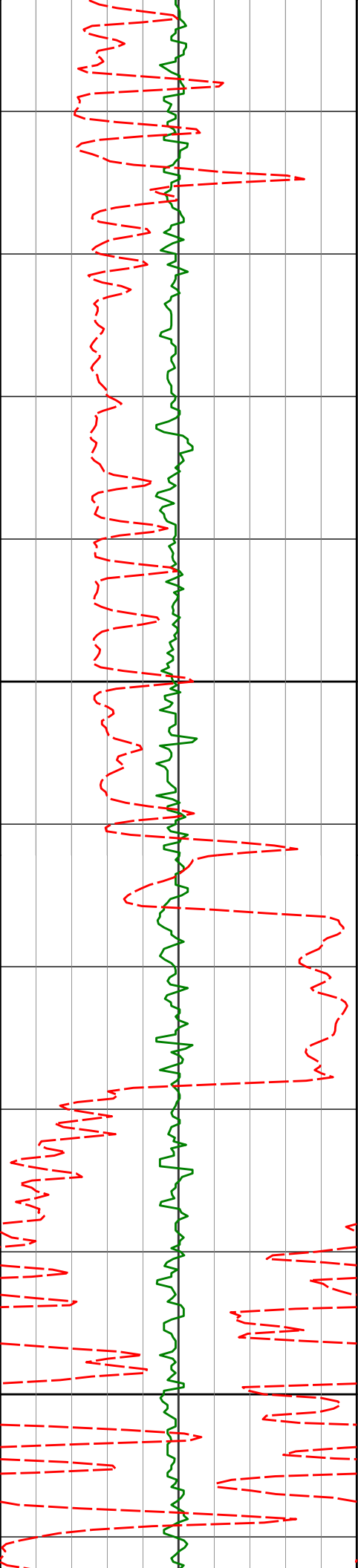
228.74°F

228.74°F

228.74°F

228.74°F





11200

11300

11163'

89.21°

267.31°

5878.63'

4894.54'

11257'

90.82°

268.91°

5878.61'

4988.53'

231.42°F

231.42°F

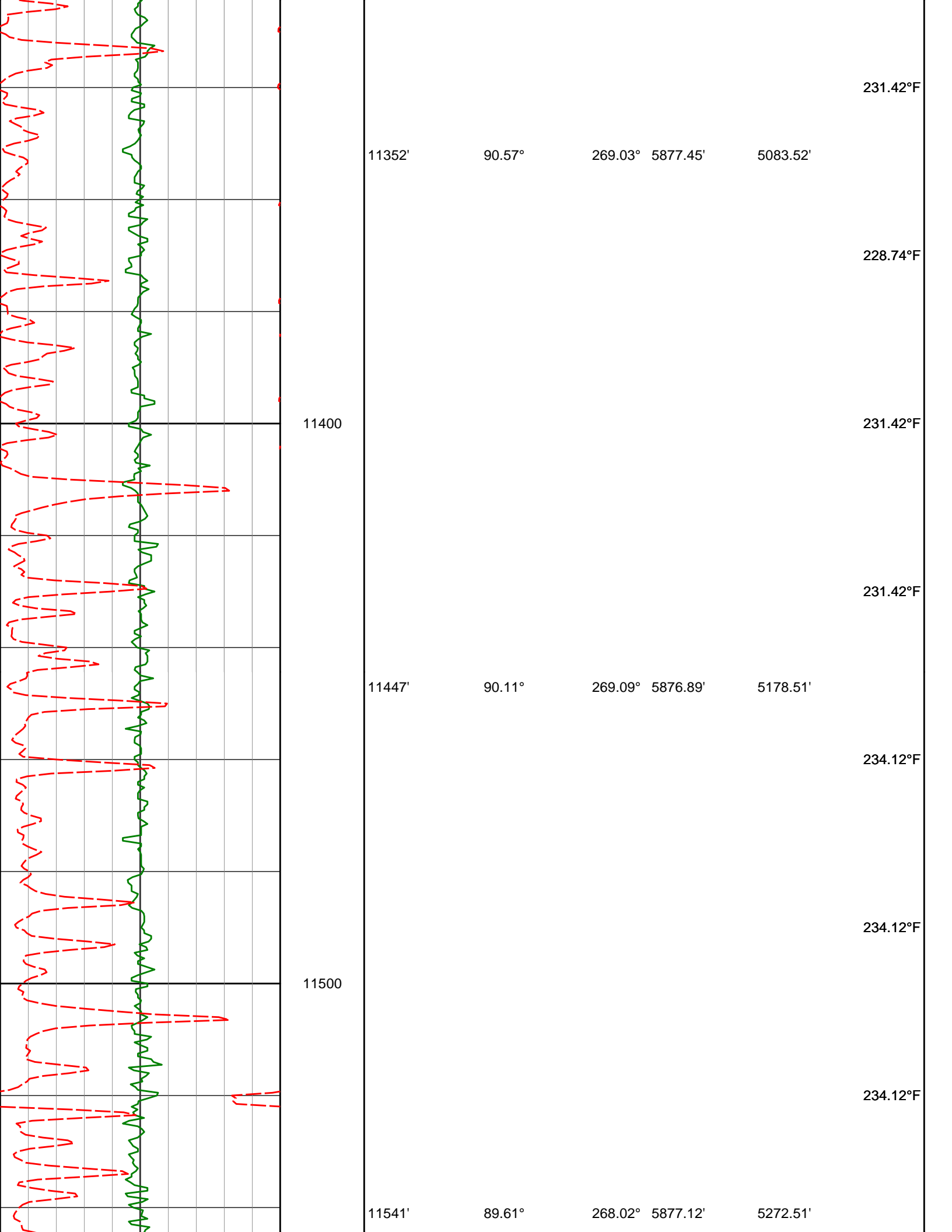
226.08°F

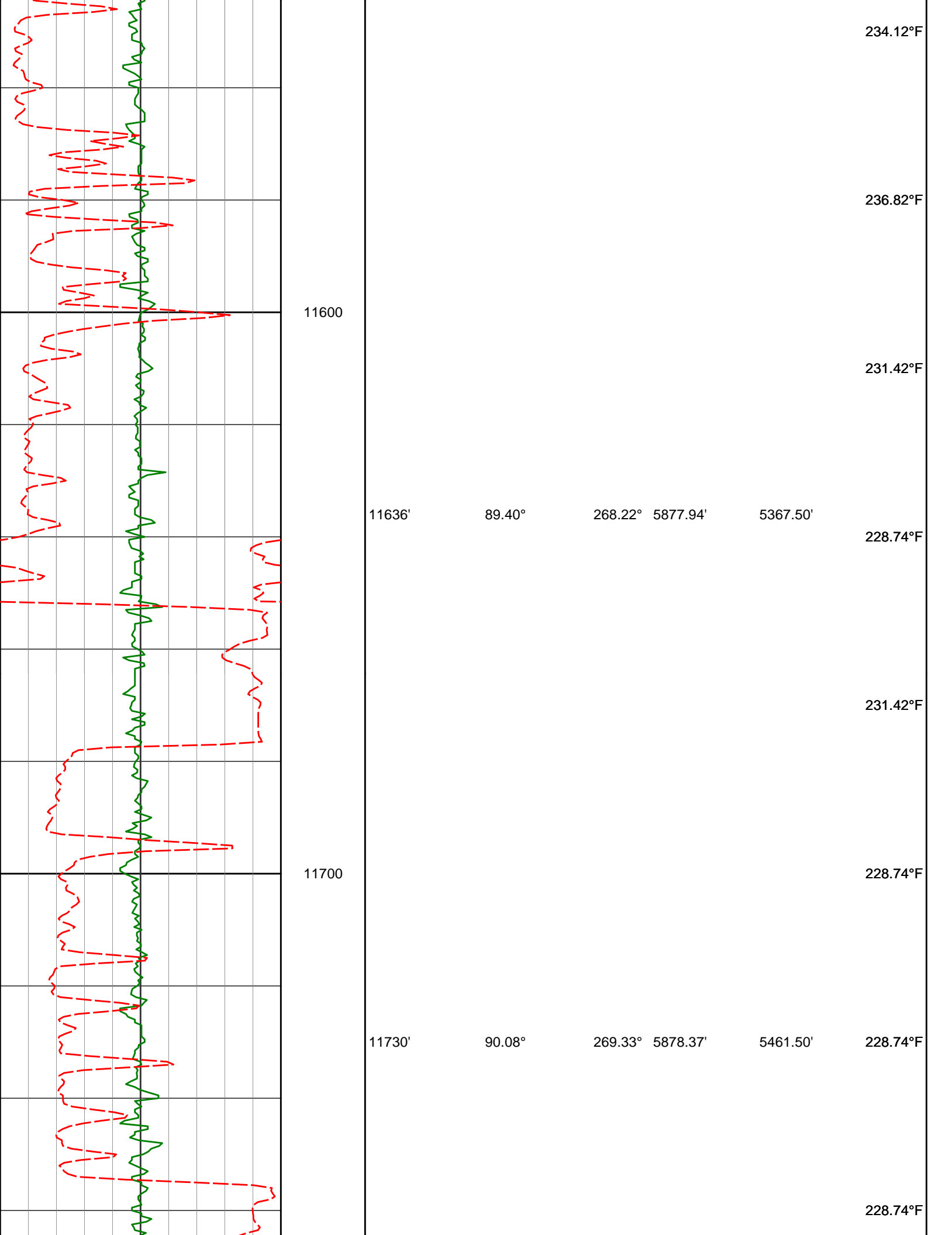
226.08°F

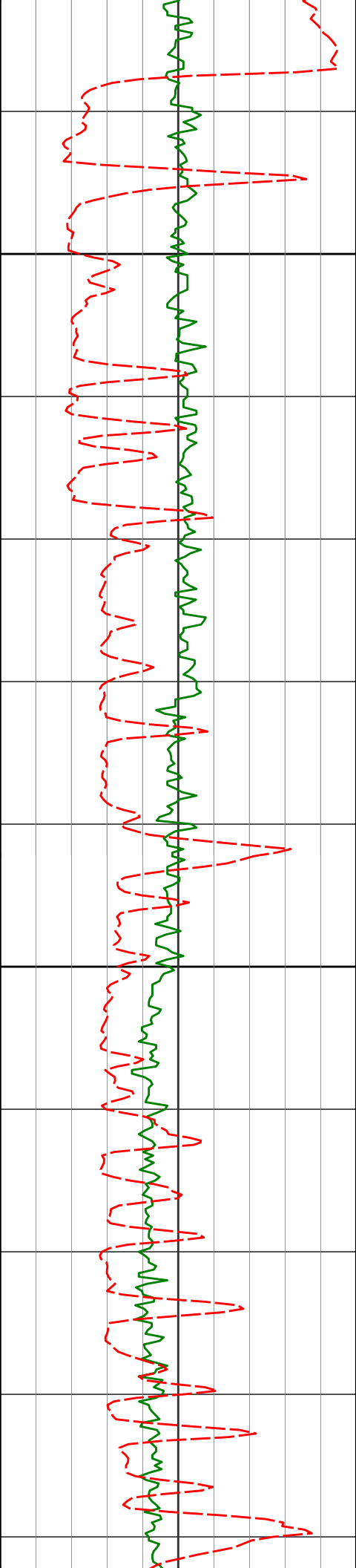
228.74°F

228.74°F

228.74°F







11800

11900

11825'

11919'

91.46°

91.06°

269.32°

268.63°

5877.09'

5875.02'

5556.48'

5650.46'

231.42°F

234.12°F

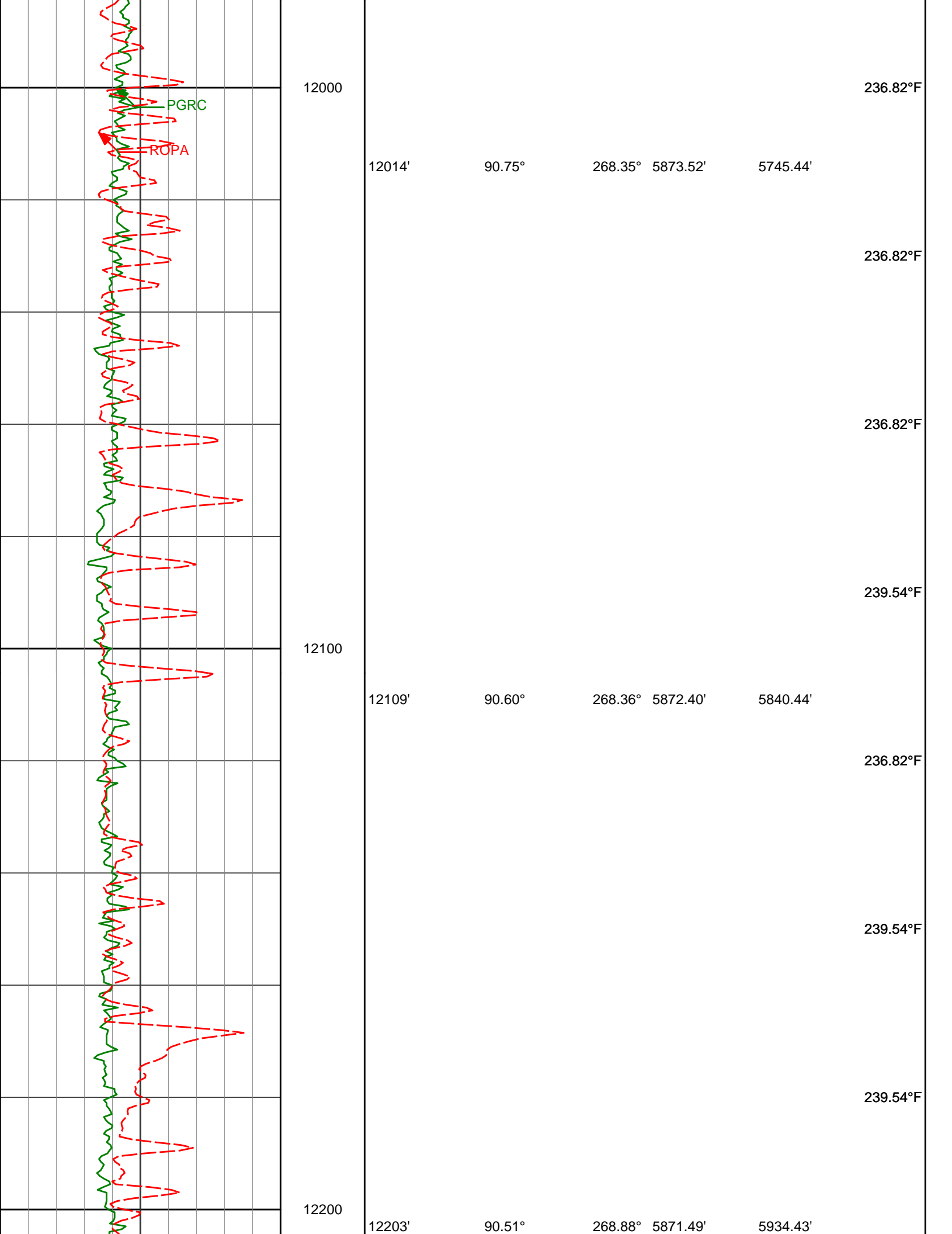
231.42°F

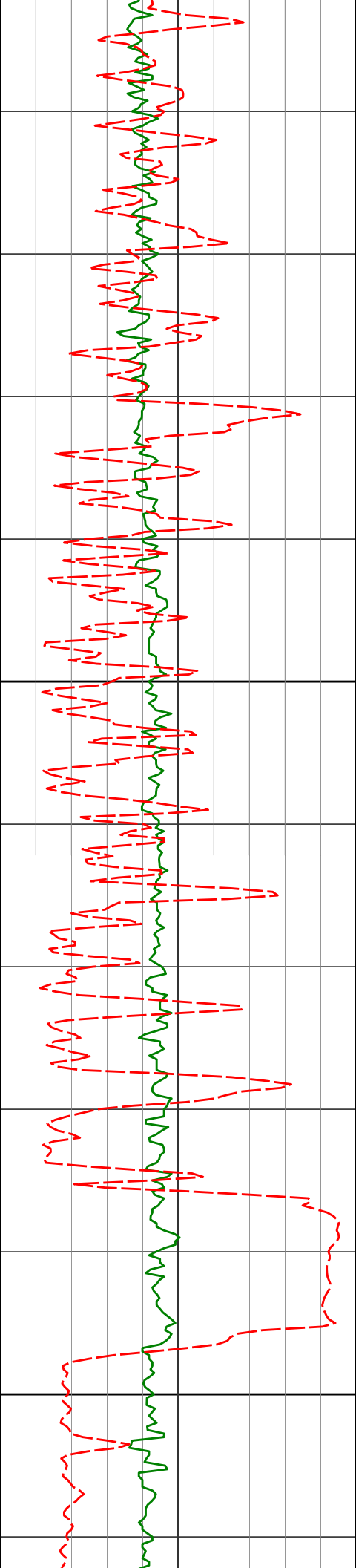
234.12°F

234.12°F

234.12°F

236.82°F





12300

12400

12298'

12392'

90.01°

92.08°

268.23° 5871.06'

269.23° 5869.35'

6029.43'

6123.41'

239.54°F

239.54°F

242.28°F

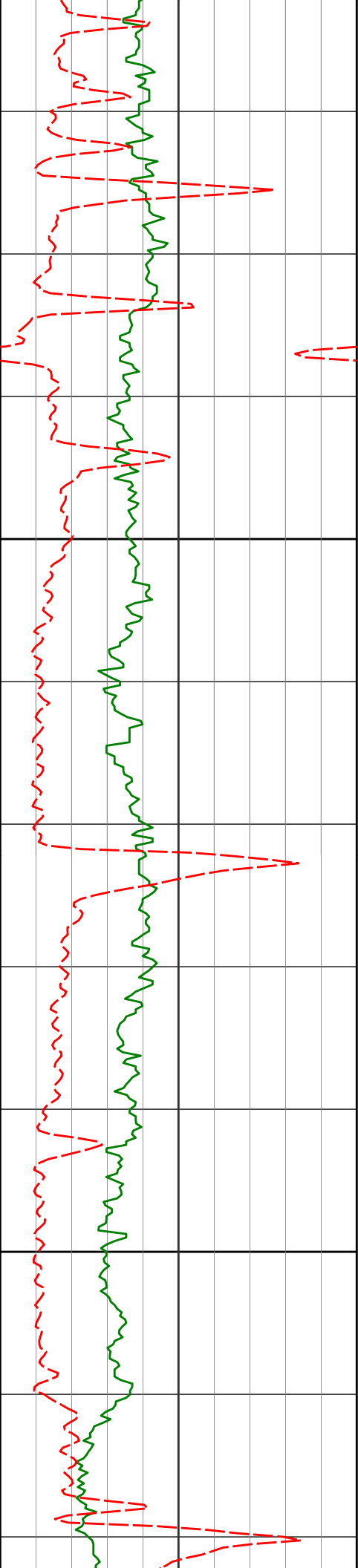
242.28°F

236.82°F

236.82°F

239.54°F

239.54°F



12500

12600

12487'

92.08°

268.62° 5865.90'

6218.34'

12581'

92.60°

268.98° 5862.06'

6312.26'

242.28°F

242.28°F

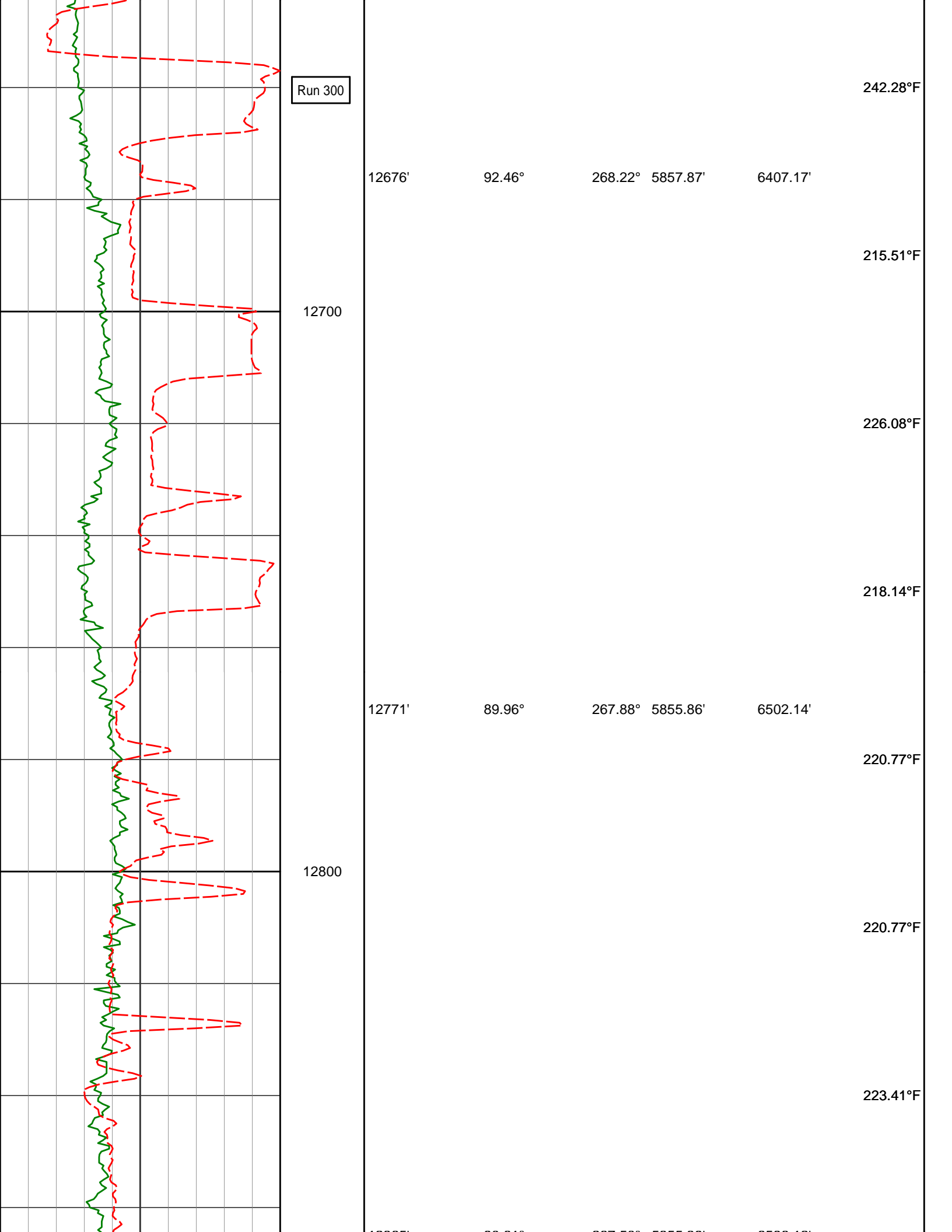
242.28°F

242.28°F

242.28°F

242.28°F

242.28°F



Run 300

12676'

92.46°

268.22°

5857.87'

6407.17'

242.28°F

215.51°F

12700

226.08°F

218.14°F

12771'

89.96°

267.88°

5855.86'

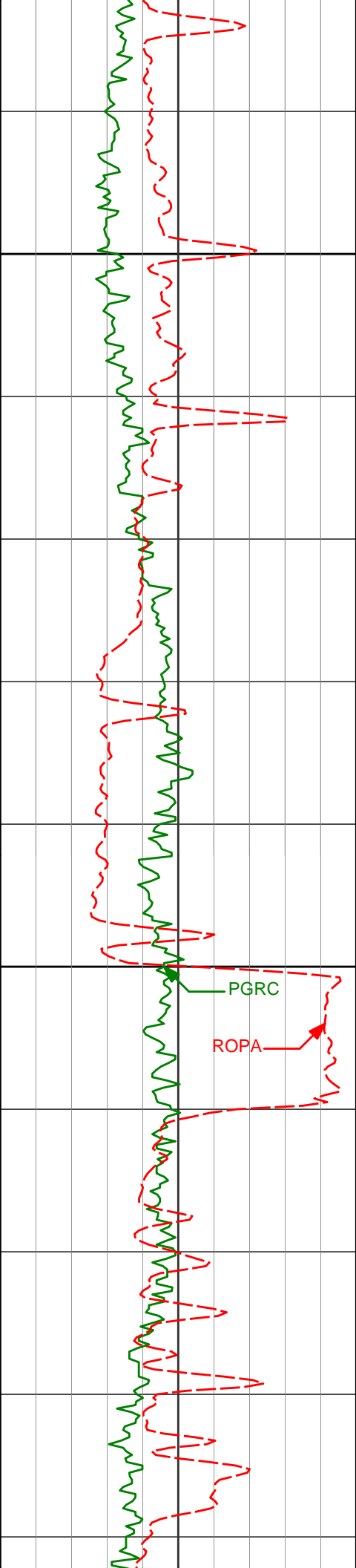
6502.14'

220.77°F

12800

220.77°F

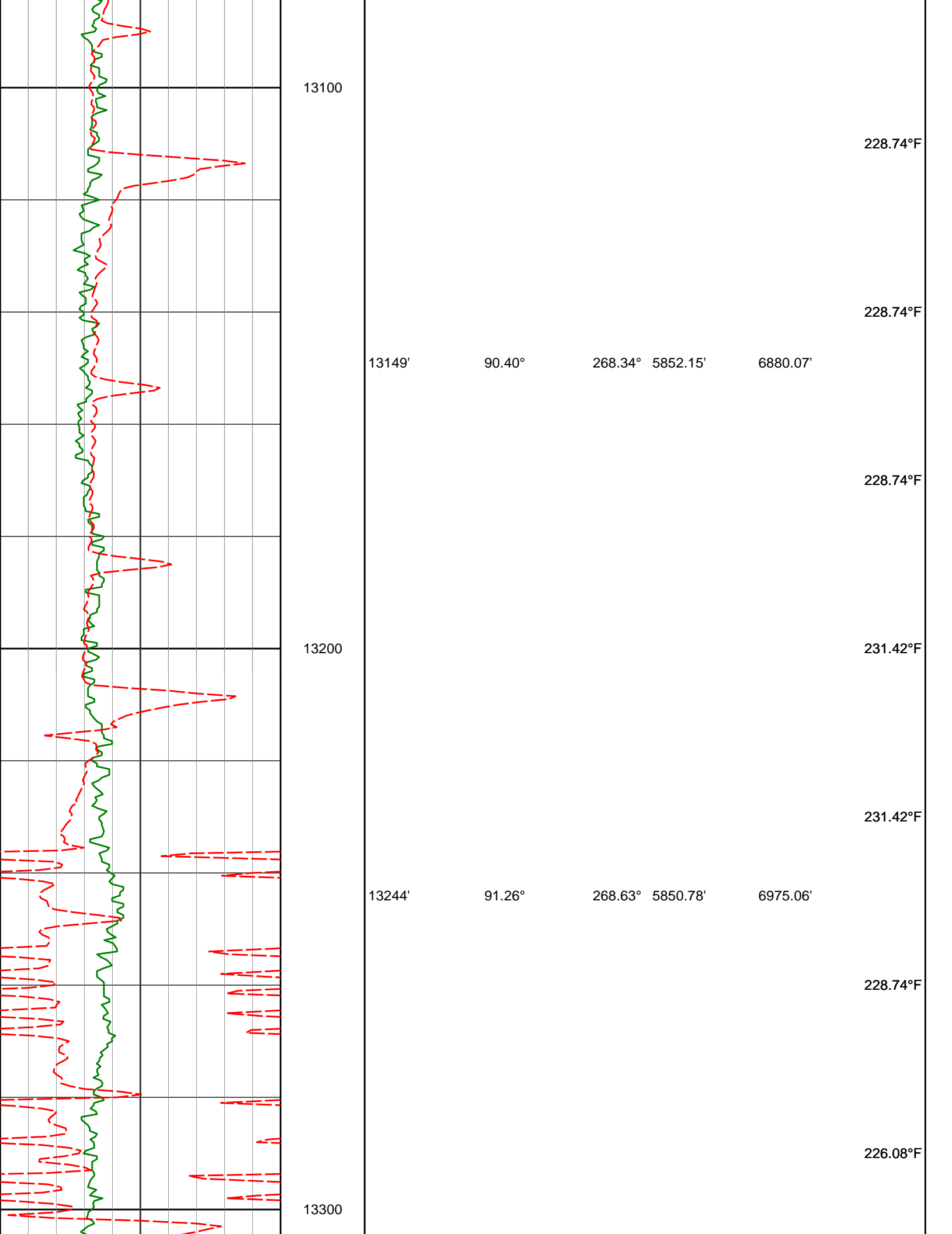
223.41°F

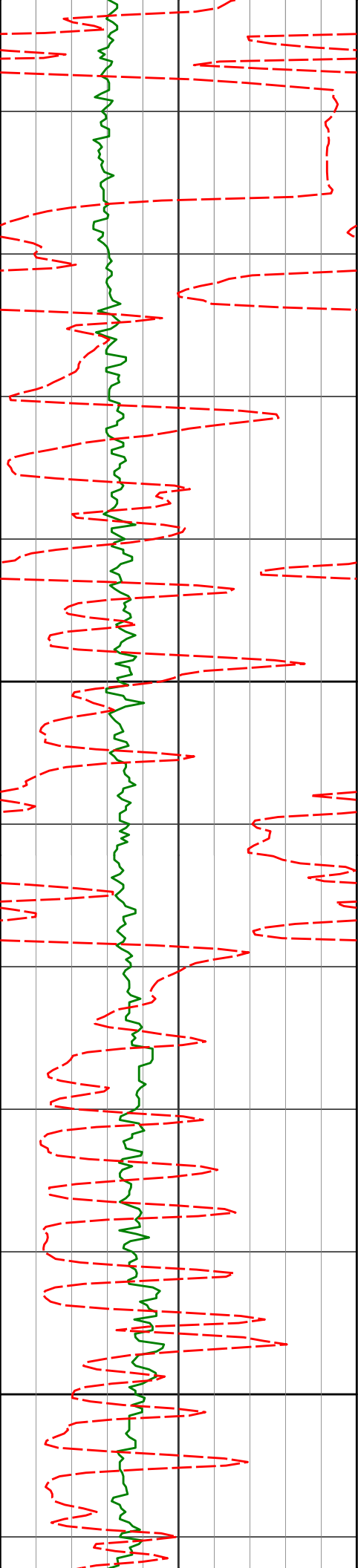


12900

13000

12865'	90.61°	267.50°	5855.39'	6596.12'	223.41°F
					223.41°F
					226.08°F
12960'	91.68°	267.57°	5853.50'	6691.09'	220.77°F
					223.41°F
					223.41°F
					226.08°F
13055'	89.77°	268.48°	5852.29'	6786.07'	226.08°F
					226.08°F





13400

13500

13339'

89.16°

268.38°

5850.43'

7070.05'

228.74°F

228.74°F

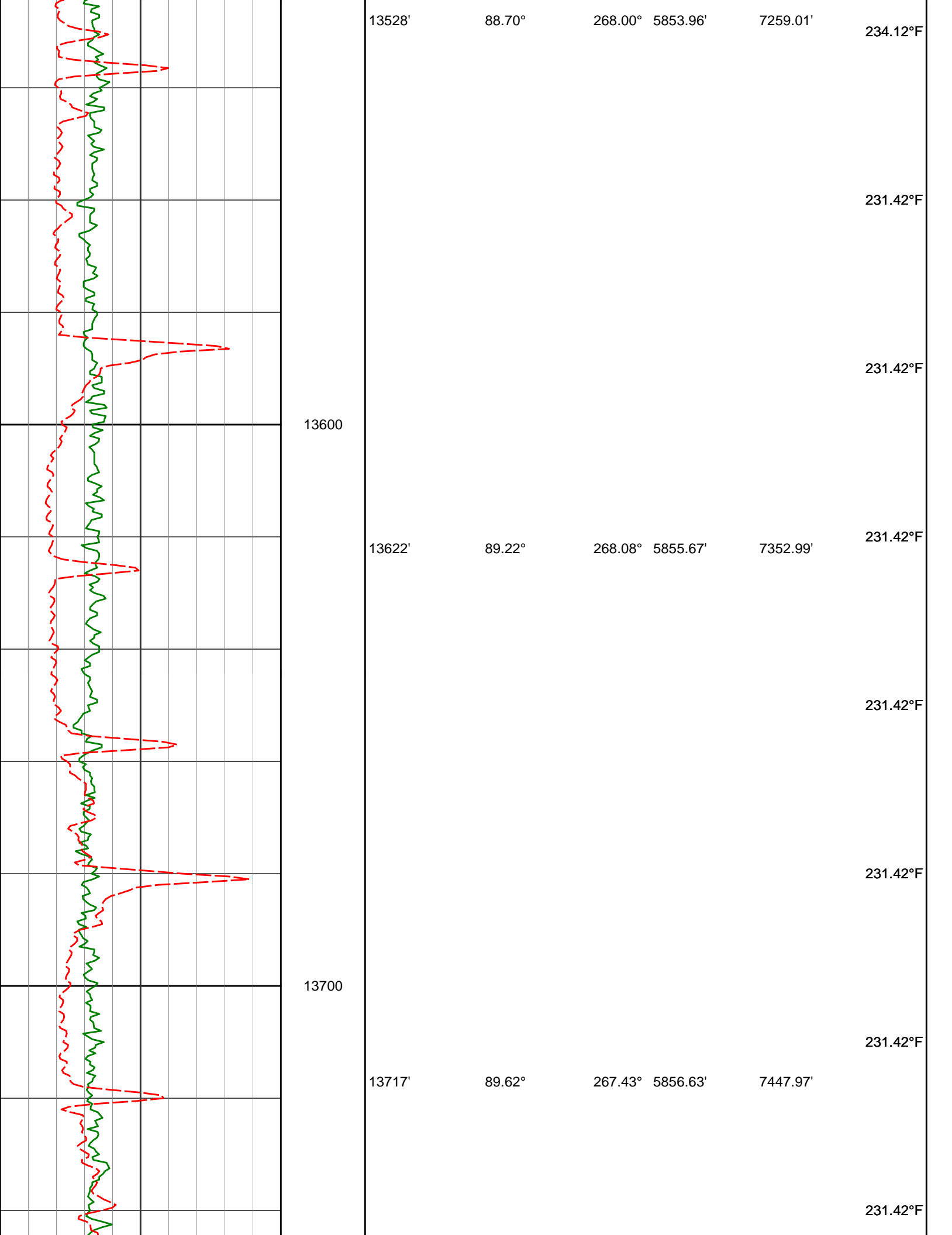
228.74°F

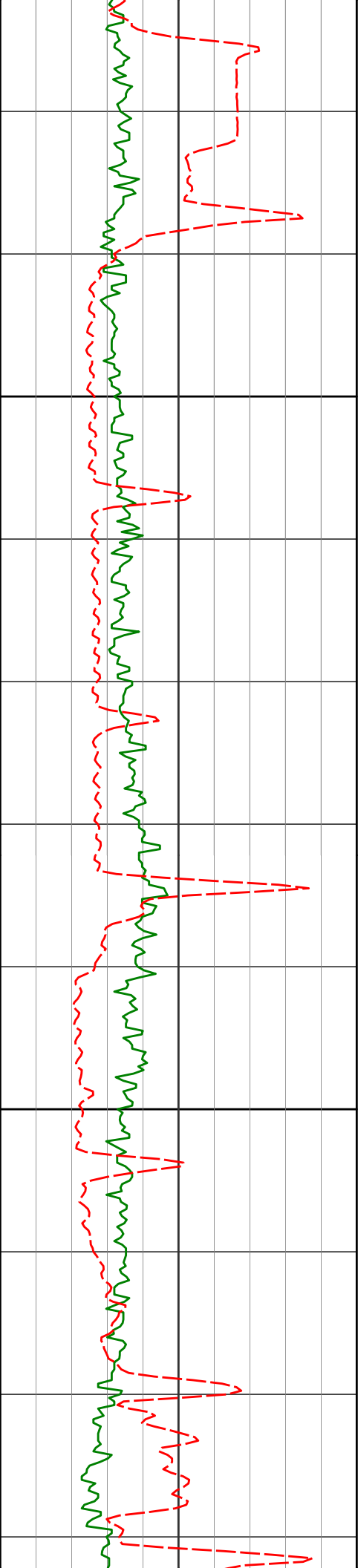
231.42°F

231.42°F

231.42°F

228.74°F





13800

13811'

90.36°

267.15° 5856.64'

7541.95'

13900

13906'

91.23°

267.60° 5855.33'

7636.92'

231.42°F

231.42°F

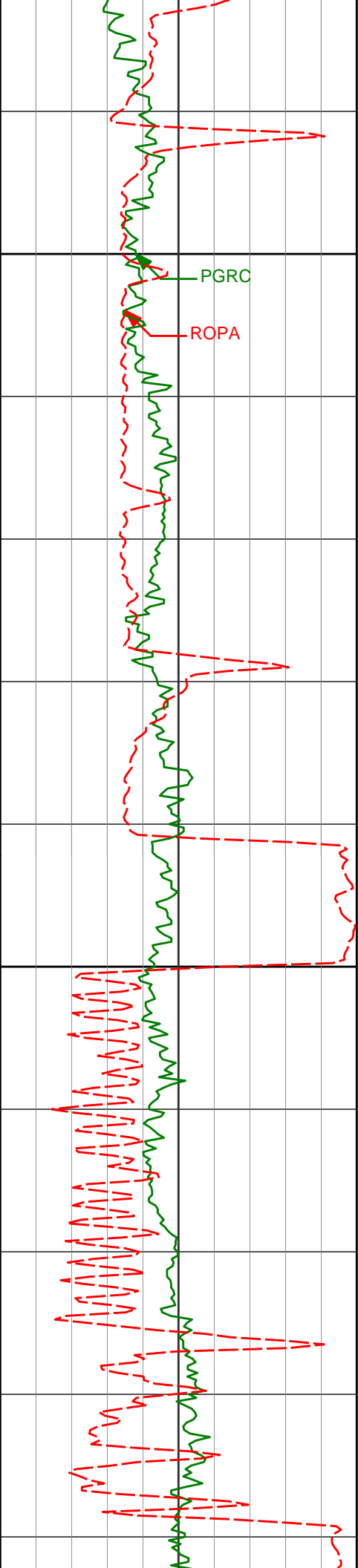
231.42°F

231.42°F

231.42°F

228.74°F

226.08°F



14000

14000'

91.77°

267.47° 5852.87'

7730.87'

PGRC

ROPA

228.74°F

226.08°F

220.77°F

220.77°F

14100

14095'

91.84°

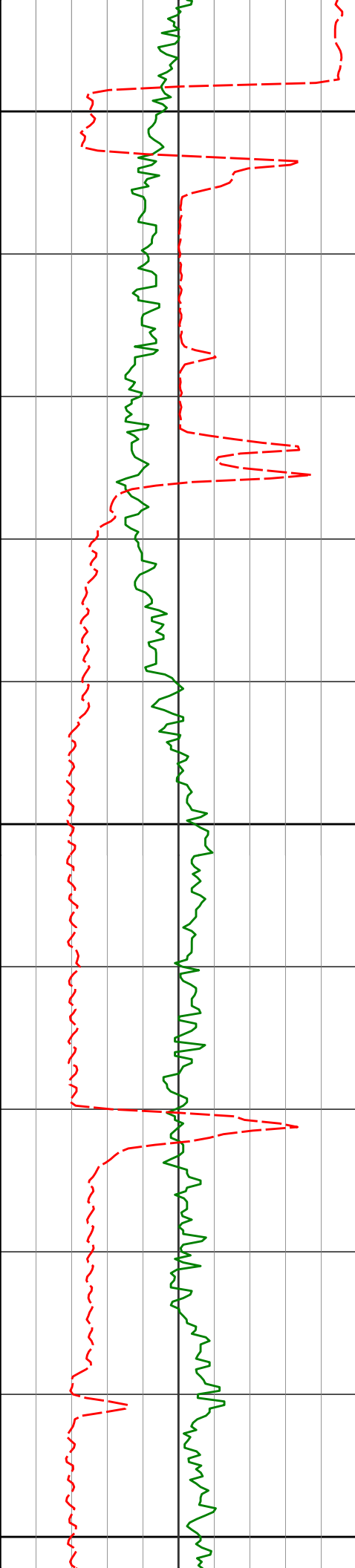
268.70° 5849.87'

7825.81'

223.41°F

223.41°F

223.41°F



14200

14300

14400

14190'

14284'

14378'

91.00°

91.28°

91.62°

269.03° 5847.52'

268.81° 5845.65'

268.74° 5843.27'

7920.78'

8014.76'

8108.73'

226.08°F

231.42°F

228.74°F

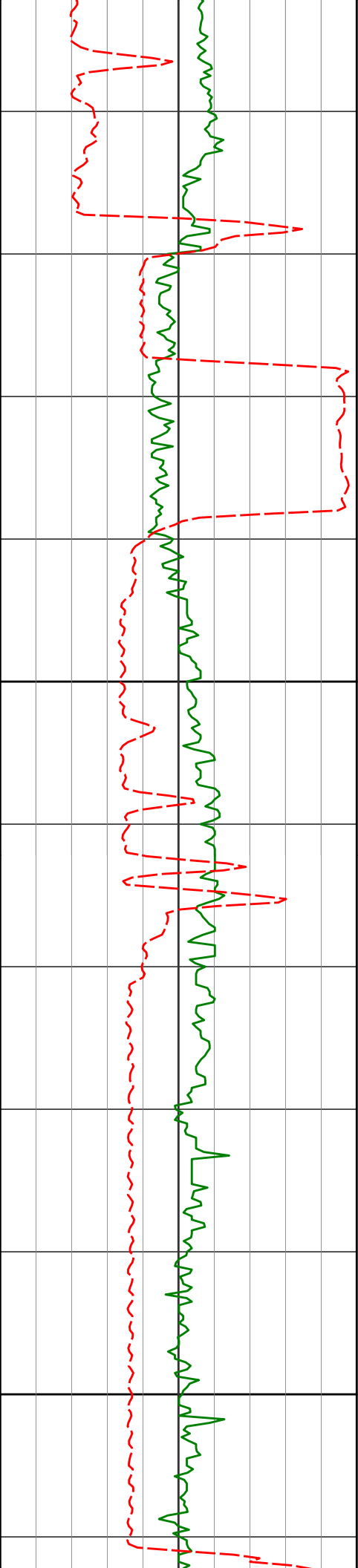
228.74°F

228.74°F

231.42°F

231.42°F

228.74°F



14500

14600

14473'

89.06°

269.05°

5842.71'

8203.72'

14567'

88.78°

268.84°

5844.48'

8297.70'

226.08°F

226.08°F

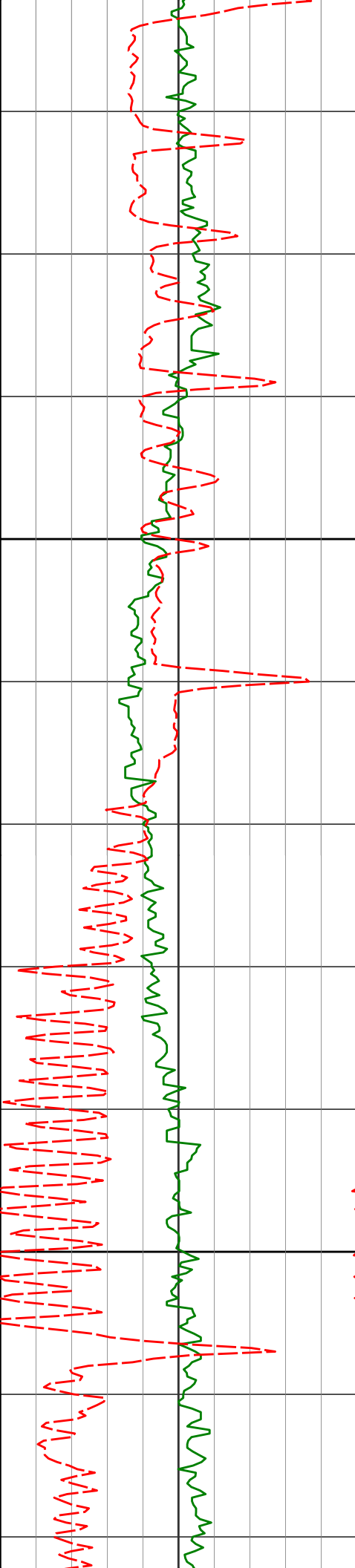
228.74°F

228.74°F

228.74°F

231.42°F

231.42°F



14700

14800

14662'

88.54°

268.72° 5846.70'

8392.68'

14756'

89.06°

268.70° 5848.67'

8486.66'

234.12°F

231.42°F

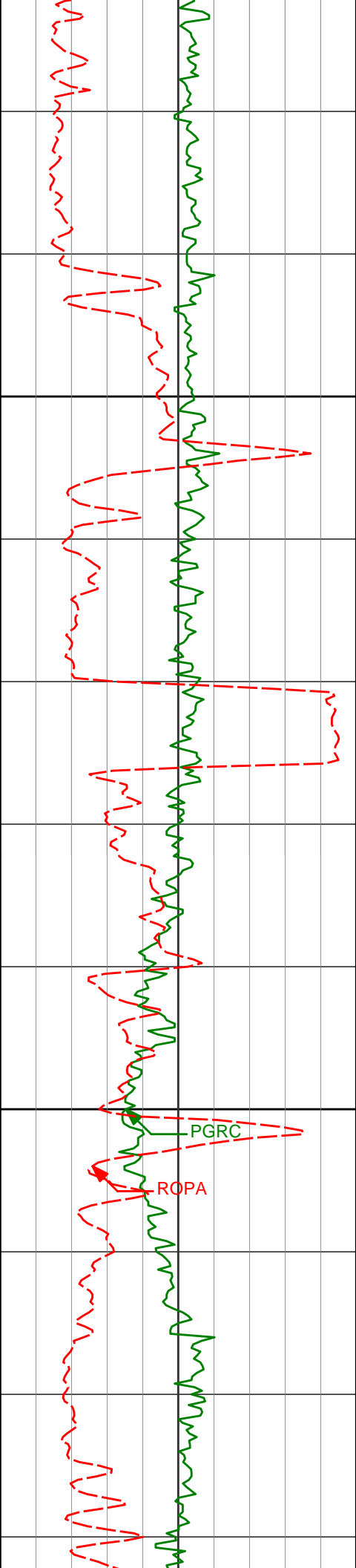
231.42°F

231.42°F

234.12°F

234.12°F

234.12°F



14900

15000

14851'

89.31°

268.03° 5850.02'

8581.64'

231.42°F

231.42°F

231.42°F

231.42°F

14945'

90.45°

269.14° 5850.22'

8675.64'

231.42°F

234.12°F

234.12°F

15040'

91.50°

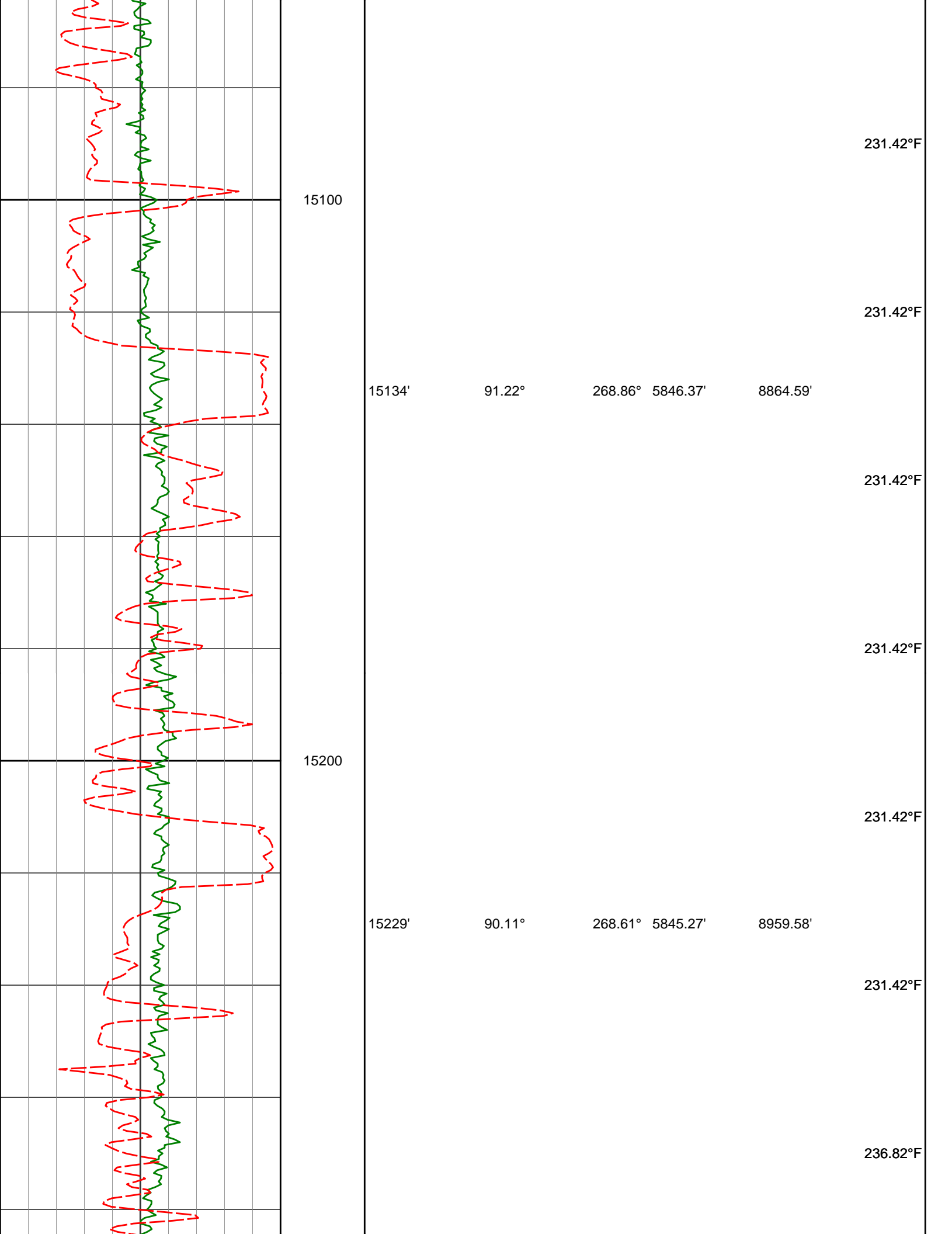
269.15° 5848.60'

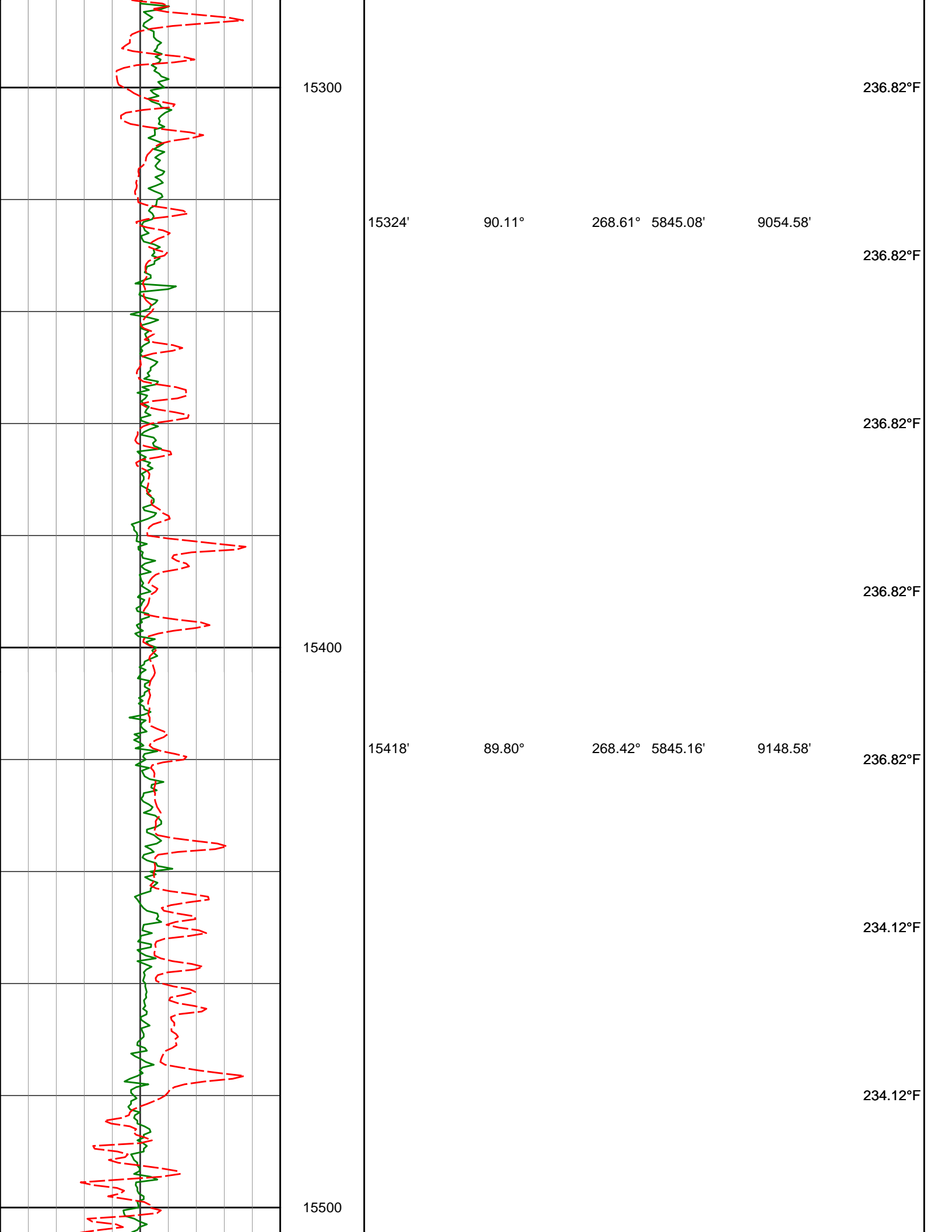
8770.62'

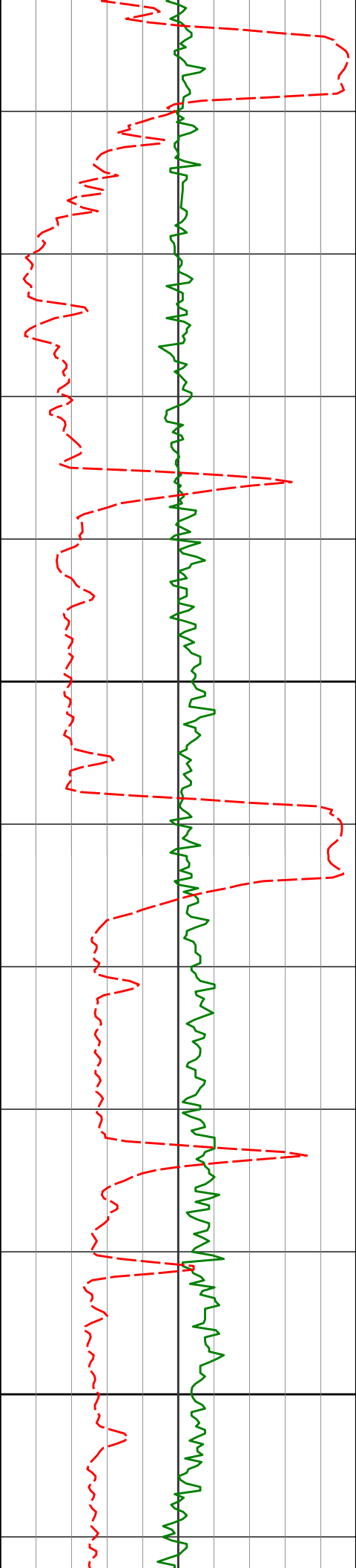
234.12°F

PGRC

ROPA







15600

15700

15513'

15608'

15702'

89.89°

90.64°

91.52°

268.18°

268.26°

268.62°

5845.42'

5844.98'

5843.20'

9243.58'

9338.58'

9432.56'

236.82°F

236.82°F

234.12°F

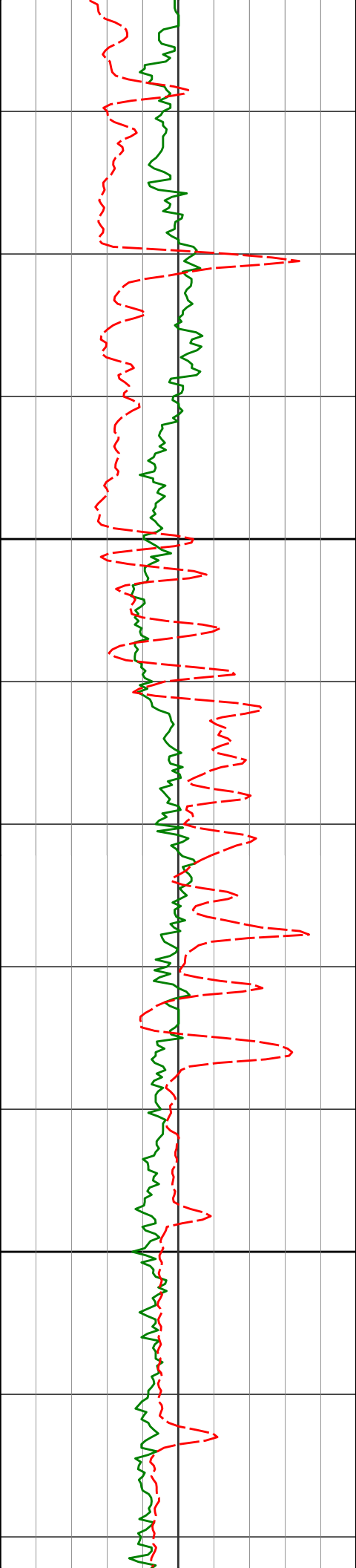
234.12°F

236.82°F

236.82°F

236.82°F

236.82°F



15800

15797'

92.12°

268.51°

5840.19'

9527.51'

15900

15891'

92.24°

268.26°

5836.61'

9621.44'

239.54°F

239.54°F

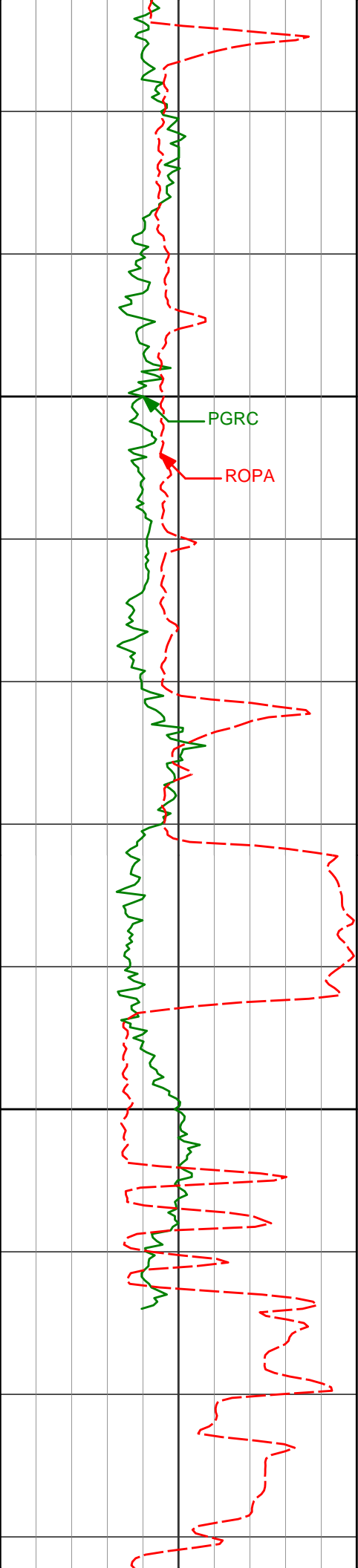
239.54°F

239.54°F

239.54°F

239.54°F

239.54°F



16000

16100

15986'

16121'

93.65°

93.35°

268.14°

267.41°

5831.73'

5823.49'

9716.31'

9851.04'

242.28°F

239.54°F

234.12°F

234.12°F

236.82°F

236.82°F

				16180'				93.35°			
								267.41°			
								5820.04'			
								9909.93'			
TD Well @ 16180' MD											
				16200							
Avg Rate of Penetration ROPA feet per hr				Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp	
500										0	
PCG Gamma Ray BCorr PGRC api										300	
0											

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Heston LD06-625
Wattenberg
Weld Colorado
USA
CA-XX-0903356502

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
84.00	0.63	143.60	84.00	0.37 S	0.27 E	-0.26	0.75
179.00	0.61	126.56	178.99	1.09 S	0.99 E	-0.96	0.19
273.00	0.62	142.74	272.99	1.80 S	1.70 E	-1.66	0.18
367.00	0.65	128.51	366.98	2.53 S	2.43 E	-2.36	0.17
462.00	0.61	124.49	461.98	3.15 S	3.26 E	-3.19	0.06
557.00	0.39	162.85	556.97	3.75 S	3.78 E	-3.68	0.41
651.00	0.39	155.82	650.97	4.35 S	4.00 E	-3.89	0.05
745.00	0.32	139.03	744.97	4.84 S	4.30 E	-4.19	0.13
840.00	0.22	111.80	839.97	5.11 S	4.65 E	-4.52	0.17
934.00	0.33	137.28	933.97	5.37 S	5.00 E	-4.87	0.17
1029.00	0.11	80.98	1028.97	5.56 S	5.27 E	-5.14	0.30
1123.00	0.17	104.55	1122.97	5.58 S	5.50 E	-5.36	0.09
1218.00	0.29	68.59	1217.96	5.53 S	5.86 E	-5.72	0.19
1312.00	0.31	110.96	1311.96	5.53 S	6.32 E	-6.18	0.23
1407.00	0.45	109.61	1406.96	5.75 S	6.91 E	-6.77	0.15
1501.00	0.59	109.95	1500.96	6.04 S	7.71 E	-7.56	0.15
1596.00	0.32	116.51	1595.95	6.32 S	8.41 E	-8.25	0.29
1691.00	0.35	110.18	1690.95	6.54 S	8.92 E	-8.76	0.05
1785.00	0.21	46.14	1784.95	6.52 S	9.31 E	-9.15	0.34
1876.00	0.37	97.98	1875.95	6.45 S	9.72 E	-9.56	0.32
1963.00	0.16	343.73	1962.95	6.37 S	9.97 E	-9.81	0.53
2058.00	0.46	312.09	2057.95	5.99 S	9.65 E	-9.50	0.35
2152.00	1.27	70.31	2151.94	5.38 S	10.35 E	-10.21	1.64
2247.00	3.44	85.75	2246.86	4.82 S	14.18 E	-14.06	2.36
2342.00	4.68	81.77	2341.62	4.05 S	20.86 E	-20.76	1.34
2436.00	6.46	87.25	2435.17	3.25 S	29.94 E	-29.85	1.97
2531.00	7.53	82.64	2529.46	2.19 S	41.45 E	-41.39	1.27
2625.00	9.03	85.88	2622.48	0.87 S	54.92 E	-54.88	1.67
2720.00	10.49	84.98	2716.10	0.42 N	70.97 E	-70.96	1.55
2814.00	11.58	84.28	2808.36	2.11 N	88.88 E	-88.91	1.17
2909.00	12.12	83.95	2901.34	4.11 N	108.29 E	-108.35	0.57
3004.00	11.69	81.91	2994.29	6.51 N	127.73 E	-127.85	0.63
3098.00	11.50	85.38	3086.38	8.61 N	146.50 E	-146.67	0.77
3193.00	11.89	89.14	3179.41	9.52 N	165.73 E	-165.91	0.90

3287.00	11.98	89.34	3271.37	9.78 N	185.16 E	-185.35	0.11
3382.00	12.90	88.20	3364.14	10.22 N	205.62 E	-205.81	1.00
3476.00	13.01	85.76	3455.75	11.34 N	226.66 E	-226.87	0.59
3571.00	12.93	85.86	3548.33	12.89 N	247.93 E	-248.17	0.09
3666.00	12.99	85.95	3640.91	14.42 N	269.18 E	-269.45	0.07
3760.00	12.93	84.96	3732.51	16.09 N	290.19 E	-290.50	0.24
3855.00	12.29	85.48	3825.22	17.82 N	310.86 E	-311.20	0.68
3949.00	11.55	86.73	3917.19	19.14 N	330.23 E	-330.60	0.83
4044.00	12.52	86.37	4010.10	20.34 N	350.00 E	-350.39	1.02
4138.00	12.93	87.00	4101.80	21.53 N	370.67 E	-371.08	0.46
4233.00	12.67	87.57	4194.44	22.53 N	391.69 E	-392.13	0.30
4328.00	11.21	86.57	4287.38	23.52 N	411.32 E	-411.77	1.55
4517.00	13.19	80.86	4472.11	28.05 N	450.96 E	-451.50	1.23
4611.00	12.15	75.18	4563.82	32.28 N	471.11 E	-471.75	1.73
4706.00	11.32	76.17	4656.83	37.07 N	489.83 E	-490.58	0.90
4800.00	9.87	78.12	4749.23	40.93 N	506.67 E	-507.51	1.59
4894.00	9.49	83.63	4841.89	43.45 N	522.25 E	-523.16	1.06
4989.00	9.16	80.46	4935.64	45.57 N	537.50 E	-538.44	0.64
5083.00	7.90	78.72	5028.60	48.08 N	551.21 E	-552.21	1.37
5178.00	6.28	76.24	5122.87	50.59 N	562.66 E	-563.72	1.74
5273.00	4.57	71.19	5217.44	53.05 N	571.29 E	-572.41	1.87
5367.00	3.11	288.38	5311.35	55.06 N	572.42 E	-573.58	7.76
5462.00	13.67	275.22	5405.20	56.90 N	558.75 E	-559.97	11.23
5557.00	18.97	272.42	5496.34	58.57 N	532.13 E	-533.39	5.64
5651.00	26.24	268.19	5583.07	58.56 N	496.04 E	-497.32	7.92
5746.00	37.88	267.98	5663.44	56.87 N	445.73 E	-446.98	12.25
5841.00	49.67	266.49	5731.92	53.61 N	380.21 E	-381.39	12.46
5935.00	57.09	268.49	5787.96	50.37 N	304.89 E	-306.02	8.08
6030.00	63.47	265.27	5835.04	45.81 N	222.57 E	-223.62	7.33
6124.00	69.56	265.65	5872.48	39.00 N	136.67 E	-137.57	6.49
6219.00	77.21	264.09	5899.63	30.84 N	46.07 E	-46.81	8.20
6314.00	83.78	268.49	5915.31	24.81 N	47.35 W	46.74	8.29
6408.00	91.47	268.28	5919.20	22.17 N	141.17 W	140.59	8.18
6503.00	91.38	268.58	5916.84	19.57 N	236.10 W	235.56	0.33
6598.00	90.45	268.17	5915.33	16.87 N	331.05 W	330.54	1.07
6692.00	89.53	268.10	5915.34	13.81 N	425.00 W	424.54	0.98
6787.00	88.88	267.73	5916.66	10.36 N	519.92 W	519.52	0.79
6881.00	89.74	268.63	5917.79	7.37 N	613.87 W	613.51	1.32
6976.00	89.34	268.12	5918.55	4.68 N	708.83 W	708.50	0.68
7070.00	90.30	267.87	5918.85	1.39 N	802.77 W	802.50	1.06
7165.00	89.96	267.87	5918.63	2.14 S	897.70 W	897.49	0.36
7259.00	90.17	268.91	5918.53	4.78 S	991.66 W	991.49	1.13
7354.00	91.31	269.41	5917.30	6.18 S	1086.64 W	1086.47	1.31
7448.00	91.13	269.33	5915.30	7.21 S	1180.62 W	1180.44	0.21
7570.00	91.00	269.28	5913.03	8.69 S	1302.59 W	1302.41	0.11
7664.00	90.69	269.42	5911.65	9.75 S	1396.57 W	1396.40	0.36
7759.00	90.42	269.27	5910.73	10.84 S	1491.56 W	1491.38	0.33
7853.00	90.55	269.35	5909.93	11.97 S	1585.55 W	1585.37	0.16
7948.00	90.86	269.65	5908.76	12.80 S	1680.54 W	1680.35	0.45
8043.00	91.13	269.64	5907.11	13.39 S	1775.52 W	1775.32	0.28
8137.00	91.25	269.95	5905.16	13.73 S	1869.50 W	1869.28	0.35
8326.00	91.29	269.69	5900.97	14.32 S	2058.45 W	2058.19	0.14
8421.00	91.29	269.60	5898.83	14.91 S	2153.43 W	2153.16	0.09
8515.00	91.26	269.64	5896.74	15.53 S	2247.40 W	2247.12	0.05
8610.00	90.71	269.20	5895.11	16.49 S	2342.38 W	2342.09	0.74
8705.00	90.13	268.53	5894.41	18.38 S	2437.36 W	2437.09	0.93
8799.00	89.91	269.02	5894.38	20.39 S	2531.34 W	2531.09	0.57
8894.00	89.76	268.83	5894.65	22.17 S	2626.32 W	2626.09	0.25
8988.00	91.45	268.61	5893.66	24.27 S	2720.29 W	2720.08	1.81
9083.00	91.30	268.67	5891.38	26.52 S	2815.23 W	2815.05	0.17
9178.00	90.99	268.60	5889.48	28.78 S	2910.19 W	2910.03	0.33
9272.00	90.72	268.46	5888.08	31.20 S	3004.15 W	3004.02	0.32
9366.00	90.28	267.86	5887.26	34.21 S	3098.09 W	3098.01	0.79
9461.00	90.16	268.22	5886.89	37.46 S	3193.04 W	3193.01	0.40
9555.00	89.92	268.36	5886.83	40.27 S	3287.00 W	3287.01	0.30
9650.00	89.27	268.26	5887.50	43.07 S	3381.95 W	3382.00	0.69
9744.00	90.19	266.63	5887.94	47.26 S	3475.85 W	3475.98	1.99
9839.00	90.29	266.33	5887.54	53.09 S	3570.67 W	3570.91	0.33
9933.00	89.89	266.26	5887.40	59.17 S	3664.48 W	3664.83	0.43
10028.00	89.61	266.26	5887.81	65.36 S	3759.27 W	3759.75	0.29
10123.00	90.44	267.35	5887.77	70.66 S	3854.12 W	3854.70	1.44

10120.00	88.44	267.33	5881.77	70.33 S	3834.12 W	3834.12	1.44
10217.00	91.55	268.14	5886.14	74.36 S	3948.03 W	3948.68	1.45
10312.00	91.27	268.73	5883.80	76.95 S	4042.97 W	4043.65	0.69
10406.00	91.06	268.14	5881.89	79.52 S	4136.91 W	4137.63	0.67
10501.00	91.06	268.93	5880.13	81.95 S	4231.87 W	4232.61	0.83
10596.00	90.75	268.39	5878.63	84.17 S	4326.83 W	4327.60	0.66
10690.00	90.35	268.16	5877.73	87.00 S	4420.78 W	4421.59	0.49
10785.00	90.26	268.12	5877.22	90.08 S	4515.73 W	4516.59	0.10
10974.00	89.80	267.98	5877.12	96.51 S	4704.62 W	4705.58	0.25
11069.00	89.58	267.46	5877.64	100.29 S	4799.54 W	4800.56	0.59
11163.00	89.21	267.31	5878.63	104.58 S	4893.44 W	4894.54	0.42
11257.00	90.82	268.91	5878.61	107.68 S	4987.38 W	4988.53	2.41
11352.00	90.57	269.03	5877.45	109.39 S	5082.36 W	5083.52	0.29
11447.00	90.11	269.09	5876.89	110.95 S	5177.34 W	5178.51	0.49
11541.00	89.61	268.02	5877.12	113.32 S	5271.31 W	5272.51	1.26
11636.00	89.40	268.22	5877.94	116.43 S	5366.26 W	5367.50	0.31
11730.00	90.08	269.33	5878.37	118.44 S	5460.23 W	5461.50	1.38
11825.00	91.46	269.32	5877.09	119.56 S	5555.22 W	5556.48	1.45
11919.00	91.06	268.63	5875.02	121.24 S	5649.18 W	5650.46	0.85
12014.00	90.75	268.35	5873.52	123.75 S	5744.13 W	5745.44	0.44
12109.00	90.60	268.36	5872.40	126.47 S	5839.09 W	5840.44	0.16
12203.00	90.51	268.88	5871.49	128.74 S	5933.05 W	5934.43	0.56
12298.00	90.01	268.23	5871.06	131.13 S	6028.02 W	6029.43	0.86
12392.00	92.08	269.23	5869.35	133.21 S	6121.98 W	6123.41	2.45
12487.00	92.08	268.62	5865.90	135.00 S	6216.90 W	6218.34	0.64
12581.00	92.60	268.98	5862.06	136.96 S	6310.80 W	6312.26	0.67
12676.00	92.46	268.22	5857.87	139.28 S	6405.68 W	6407.17	0.81
12771.00	89.96	267.88	5855.86	142.51 S	6500.59 W	6502.14	2.66
12865.00	90.61	267.50	5855.39	146.30 S	6594.51 W	6596.12	0.80
12960.00	91.68	267.57	5853.50	150.39 S	6689.41 W	6691.09	1.13
13055.00	89.77	268.48	5852.29	153.66 S	6784.34 W	6786.07	2.23
13149.00	90.40	268.34	5852.15	156.27 S	6878.30 W	6880.07	0.69
13244.00	91.26	268.63	5850.78	158.78 S	6973.26 W	6975.06	0.96
13339.00	89.16	268.38	5850.43	161.26 S	7068.22 W	7070.05	2.23
13528.00	88.70	268.00	5853.96	167.23 S	7257.09 W	7259.01	0.32
13622.00	89.22	268.08	5855.67	170.44 S	7351.02 W	7352.99	0.56
13717.00	89.62	267.43	5856.63	174.16 S	7445.94 W	7447.97	0.80
13811.00	90.36	267.15	5856.64	178.61 S	7539.83 W	7541.95	0.84
13906.00	91.23	267.60	5855.33	182.96 S	7634.72 W	7636.92	1.03
14000.00	91.77	267.47	5852.87	187.00 S	7728.60 W	7730.87	0.59
14095.00	91.84	268.70	5849.87	190.17 S	7823.50 W	7825.81	1.30
14190.00	91.00	269.03	5847.52	192.05 S	7918.45 W	7920.78	0.95
14284.00	91.28	268.81	5845.65	193.83 S	8012.42 W	8014.76	0.38
14378.00	91.62	268.74	5843.27	195.83 S	8106.37 W	8108.73	0.37
14473.00	89.06	269.05	5842.71	197.67 S	8201.34 W	8203.72	2.71
14567.00	88.78	268.84	5844.48	199.40 S	8295.31 W	8297.70	0.37
14662.00	88.54	268.72	5846.70	201.42 S	8390.26 W	8392.68	0.28
14756.00	89.06	268.70	5848.67	203.54 S	8484.21 W	8486.66	0.55
14851.00	89.31	268.03	5850.02	206.25 S	8579.17 W	8581.64	0.75
14945.00	90.45	269.14	5850.22	208.57 S	8673.13 W	8675.64	1.69
15040.00	91.50	269.15	5848.60	209.98 S	8768.11 W	8770.62	1.11
15134.00	91.22	268.86	5846.37	211.62 S	8862.07 W	8864.59	0.43
15229.00	90.11	268.61	5845.27	213.71 S	8957.04 W	8959.58	1.20
15324.00	90.11	268.61	5845.08	216.02 S	9052.01 W	9054.58	0.00
15418.00	89.80	268.42	5845.16	218.45 S	9145.98 W	9148.58	0.39
15513.00	89.89	268.18	5845.42	221.27 S	9240.93 W	9243.58	0.27
15608.00	90.64	268.26	5844.98	224.22 S	9335.89 W	9338.58	0.79
15702.00	91.52	268.62	5843.20	226.78 S	9429.83 W	9432.56	1.01
15797.00	92.12	268.51	5840.19	229.16 S	9524.76 W	9527.51	0.64
15891.00	92.24	268.26	5836.61	231.81 S	9618.65 W	9621.44	0.29
15986.00	93.65	268.14	5831.73	234.79 S	9713.48 W	9716.31	1.49
16121.00	93.35	267.41	5823.49	240.02 S	9848.12 W	9851.04	0.58
16180.00	93.35	267.41	5820.04	242.68 S	9906.96 W	9909.93	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 268.61 DEGREES (GRID)

A TOTAL CORRECTION OF 6.92 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16180.00 FEET
IS 9909.93 FEET ALONG 268.60 DEGREES (GRID)

Survey from 0' to 1892' were Gyro surveys.
Surveys corrected by Surcon starting at 1963 ft.
Last survey is a projection to the bit at TD.

Date Printed:27 June 2016