



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	13-Jun-15	15-Jun-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	600.00	7,053.00			
Log End Depth (MD, ft)	7,053.00	13,844.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	11-Jun-15 17:15	13-Jun-15 22:15			
Drill/Wipe End Date and Time	12-Jun-15 18:30	15-Jun-15 10:00			
Min Inc (deg) @ Depth (MD, ft)	0.22 @ 733.00	88.46 @ 10,626.00			
Max Inc (deg) @ Depth (MD, ft)	89.17 @ 6,990.00	91.60 @ 10,436.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC			
Flow Rate (gpm)	593.76	326.56			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	8.70 / 27.00	9.50 / 33.00			
Filtrate CL (ppm)	21.00	2,900.00			
pH / Fluid Loss (mptm)	8.40 / 44	9.60 / 9			
PV (cP) / YP (lbf2)	3 / 2.00	8 / 10.00			
% Solids / % Sand	2.40 / 0.25	6.20 / 0.20			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	176.76 / PDM	221.50 / PDM			

Max Tool Temp (degF) / Source	172.78 / PCM	234.50 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404299	11675316			
Insert Serial Number	11680771	11680742			
Date and Time Initialized	11-Jun-15 10:51	12-Jun-15 21:33			
Date and Time Read	13-Jun-15 00:06	16-Jun-15 00:13			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	63.00	68.00			
Software Version	6.33	6.33			
Sub Serial Number	11404299	11675316			
Sonde Serial Number	11477975	11062074			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	135.10	147.60			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	56.14	61.43			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404299	11675316			
Insert/Sonde Serial Number	11120592	11579811			

REMARKS

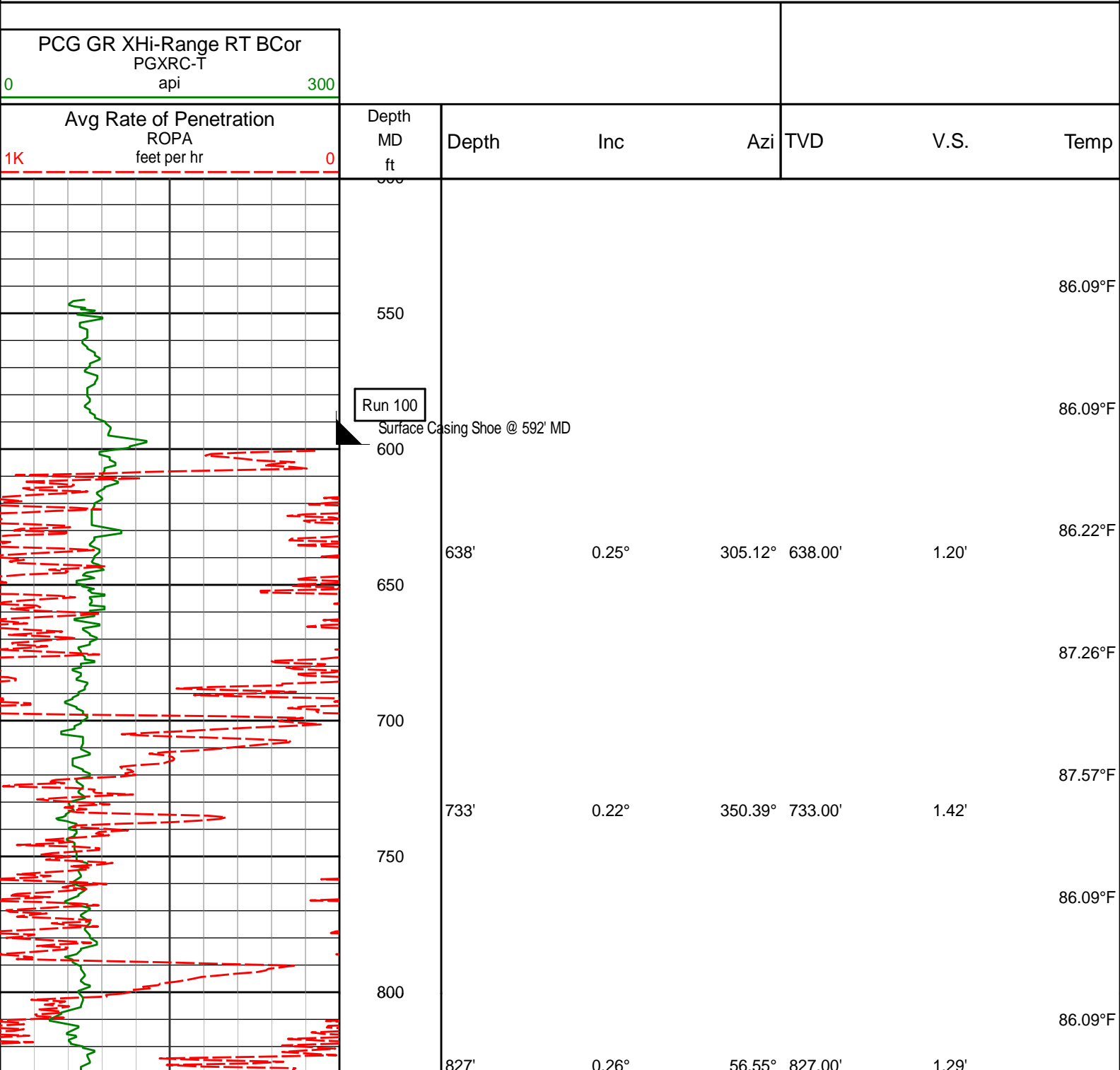
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Any gaps in gamma are due to high ROP.
5. Environmental parameters used in gamma and resistance processing:
Hole Size: 6.125"
Mud Density: 9.9-10.3
6. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

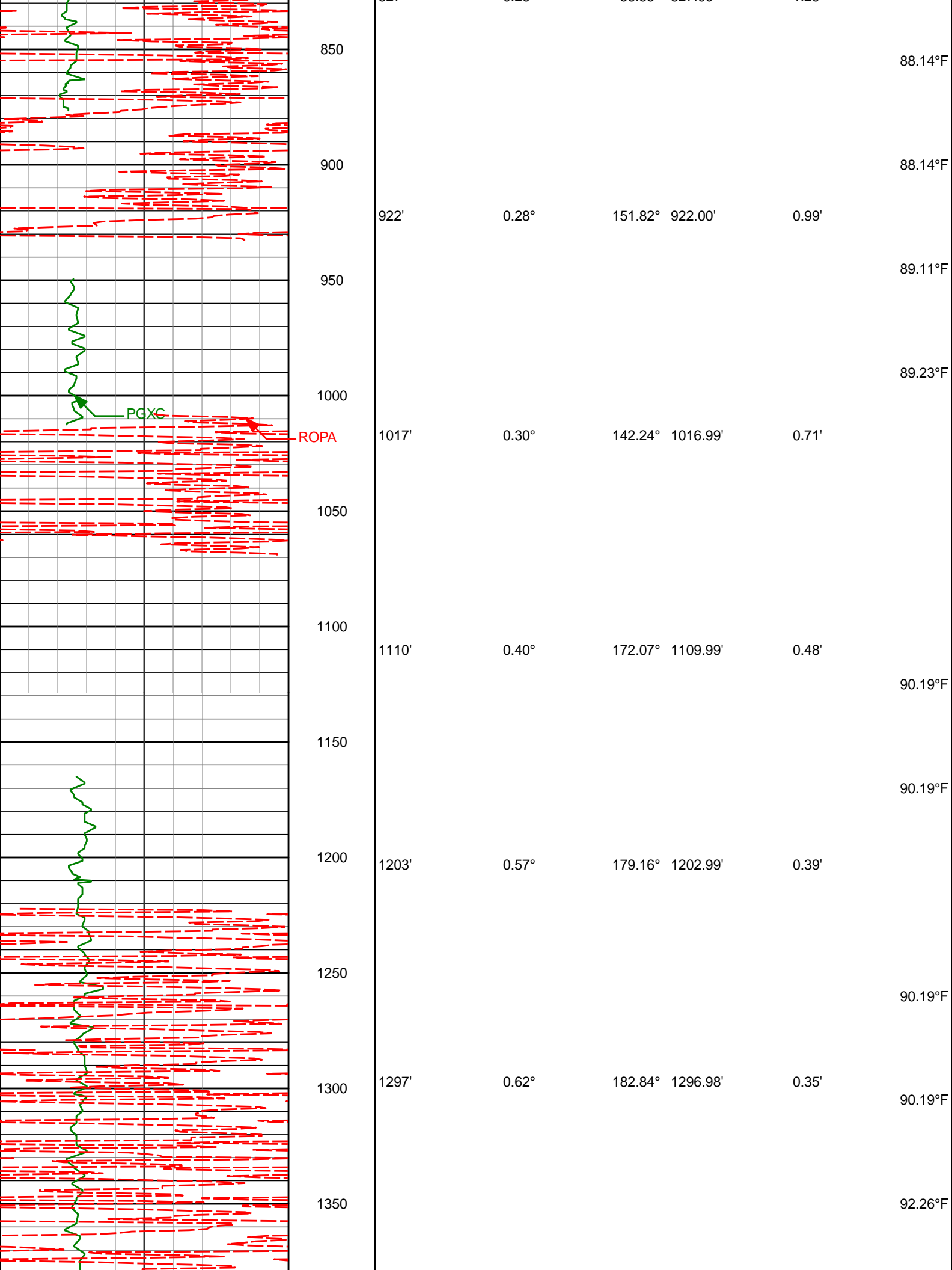
WARRANTY

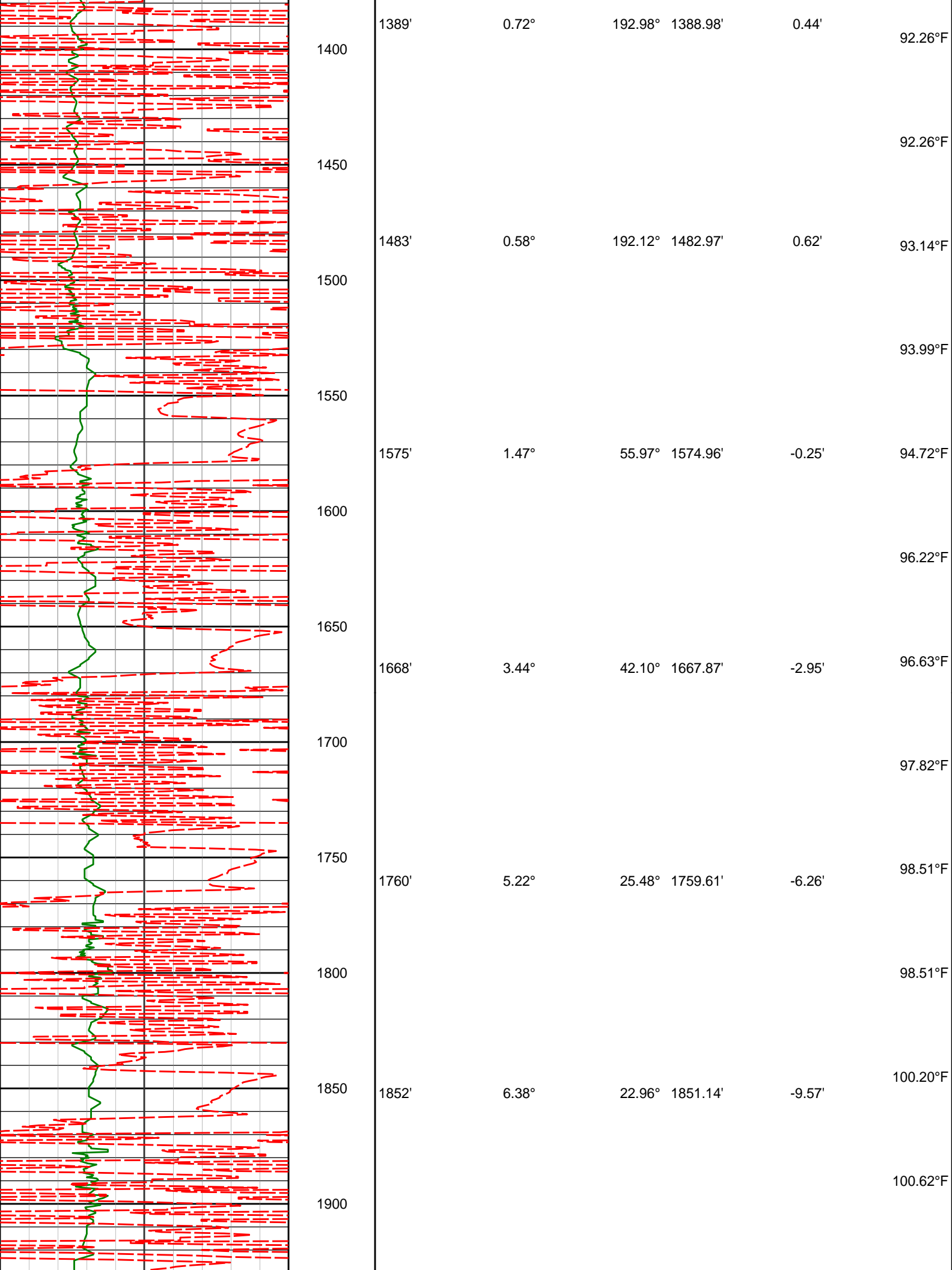
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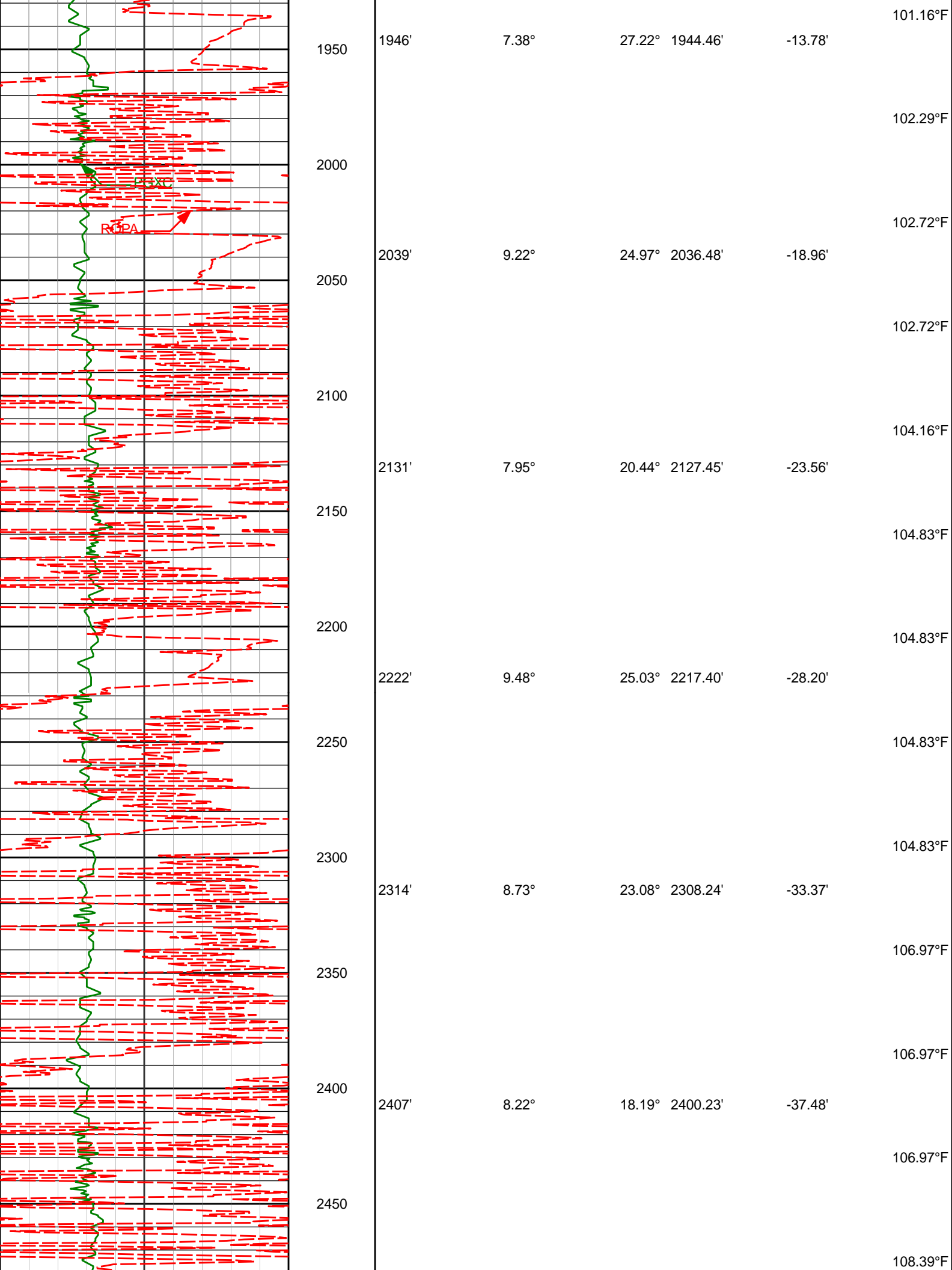
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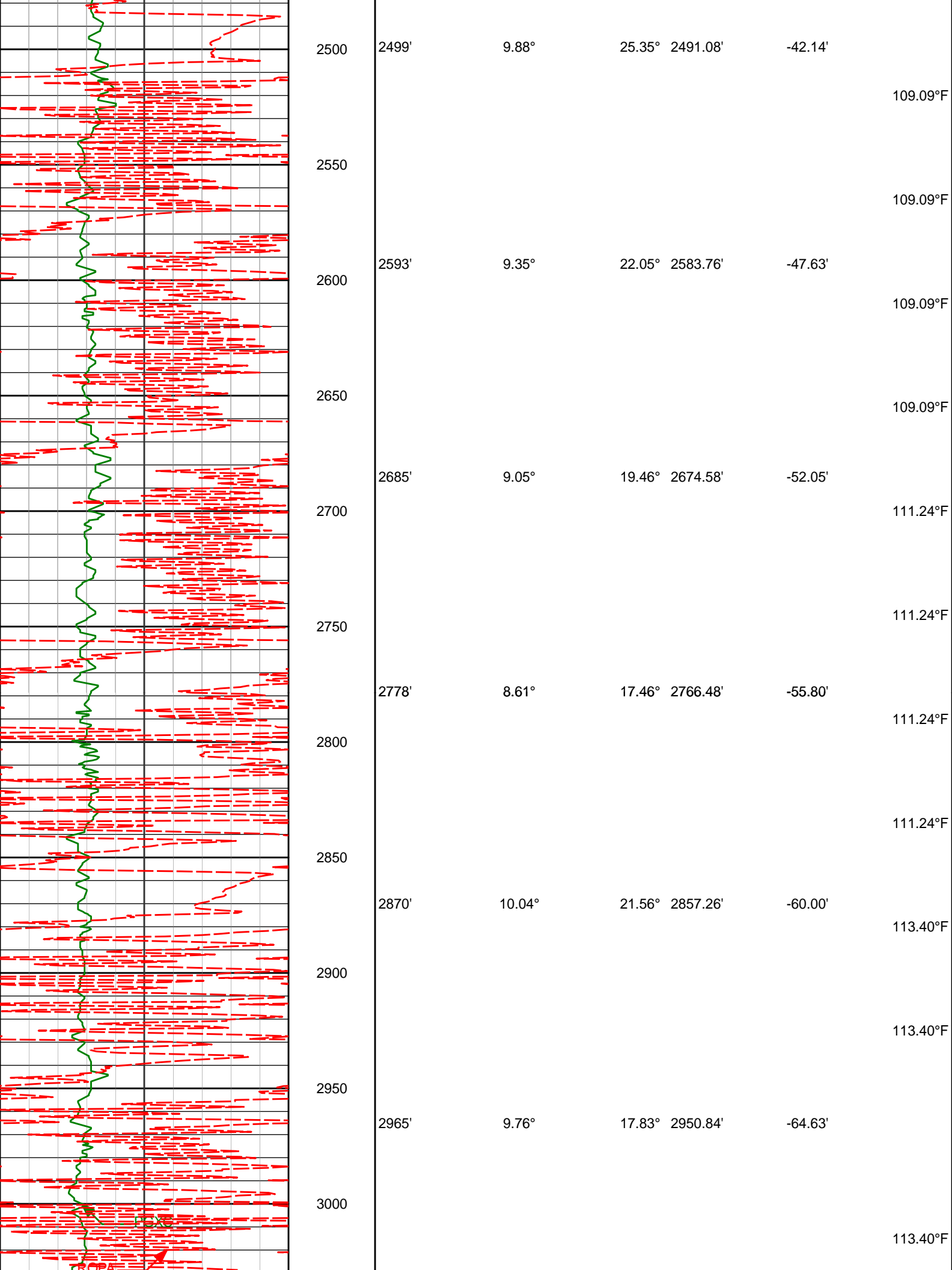
MD Detail 1:600 Scale

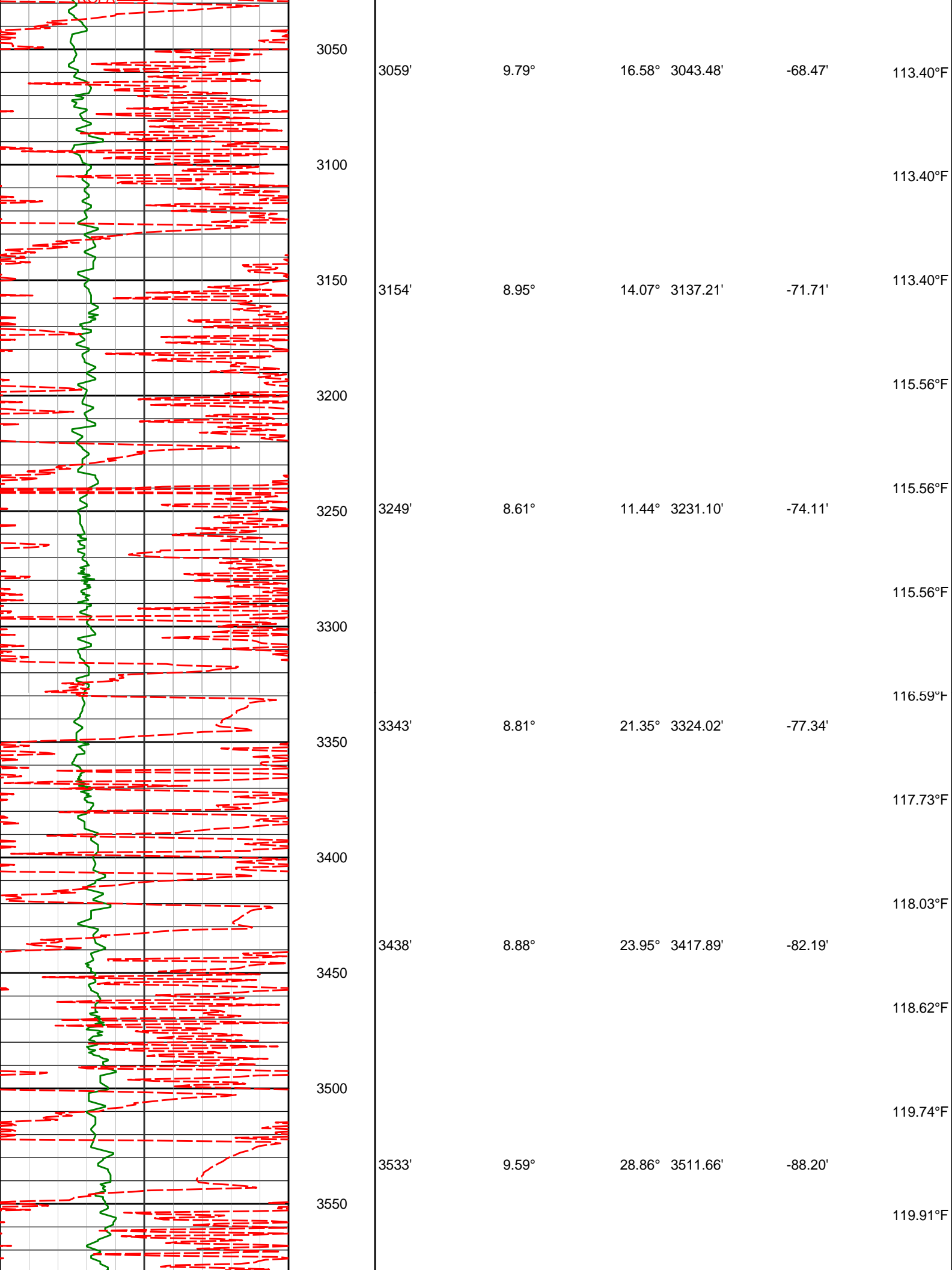


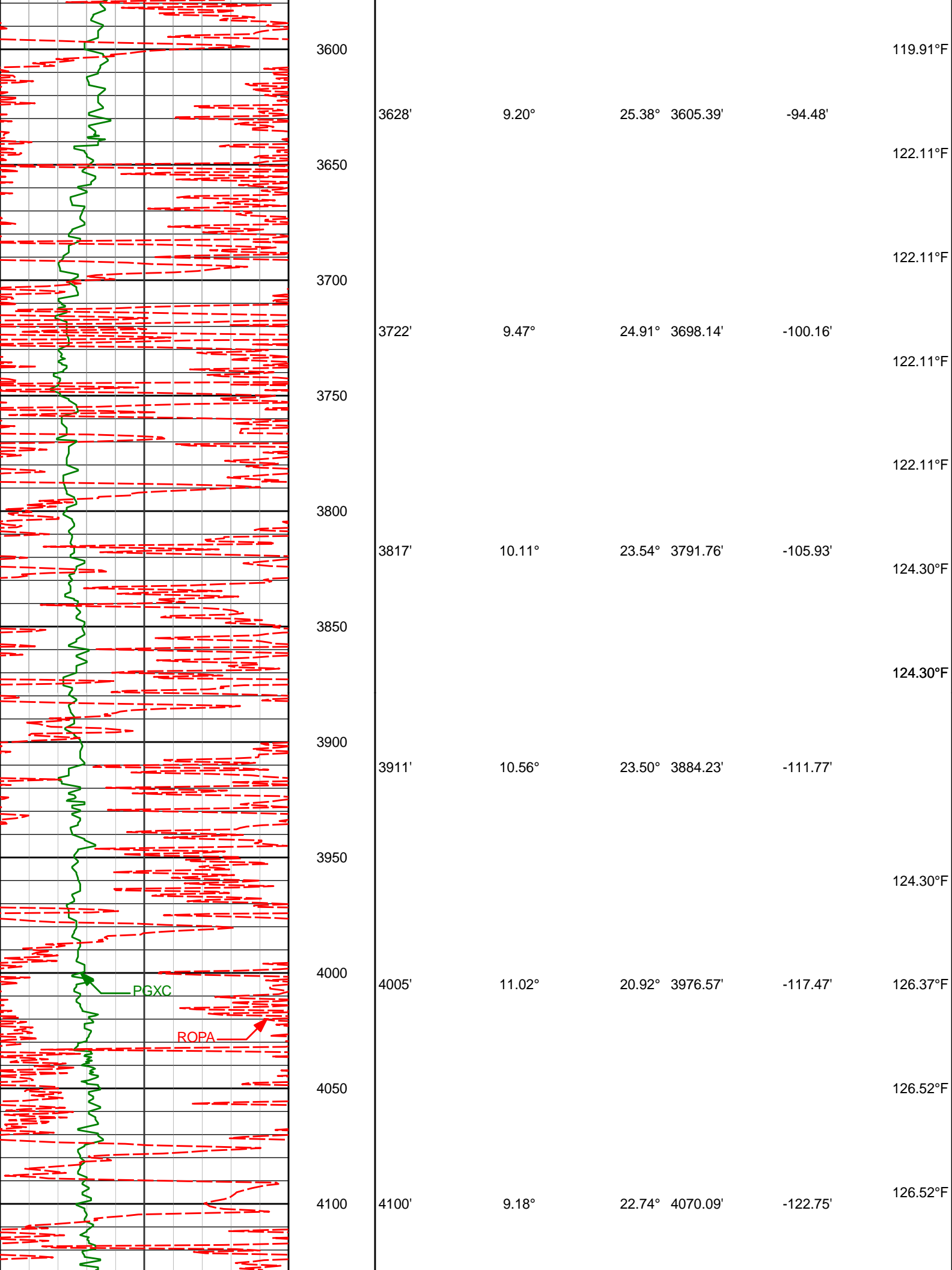


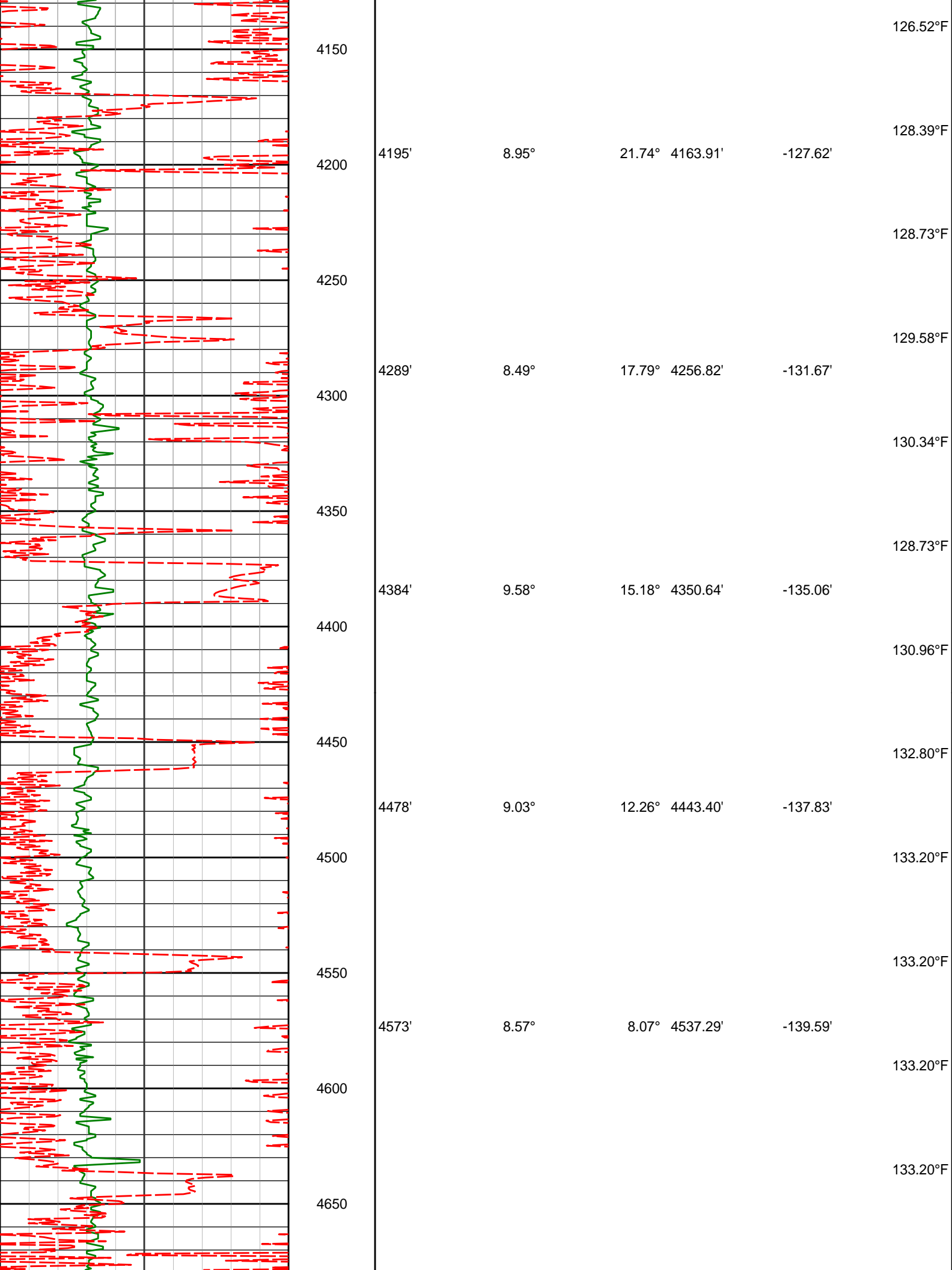


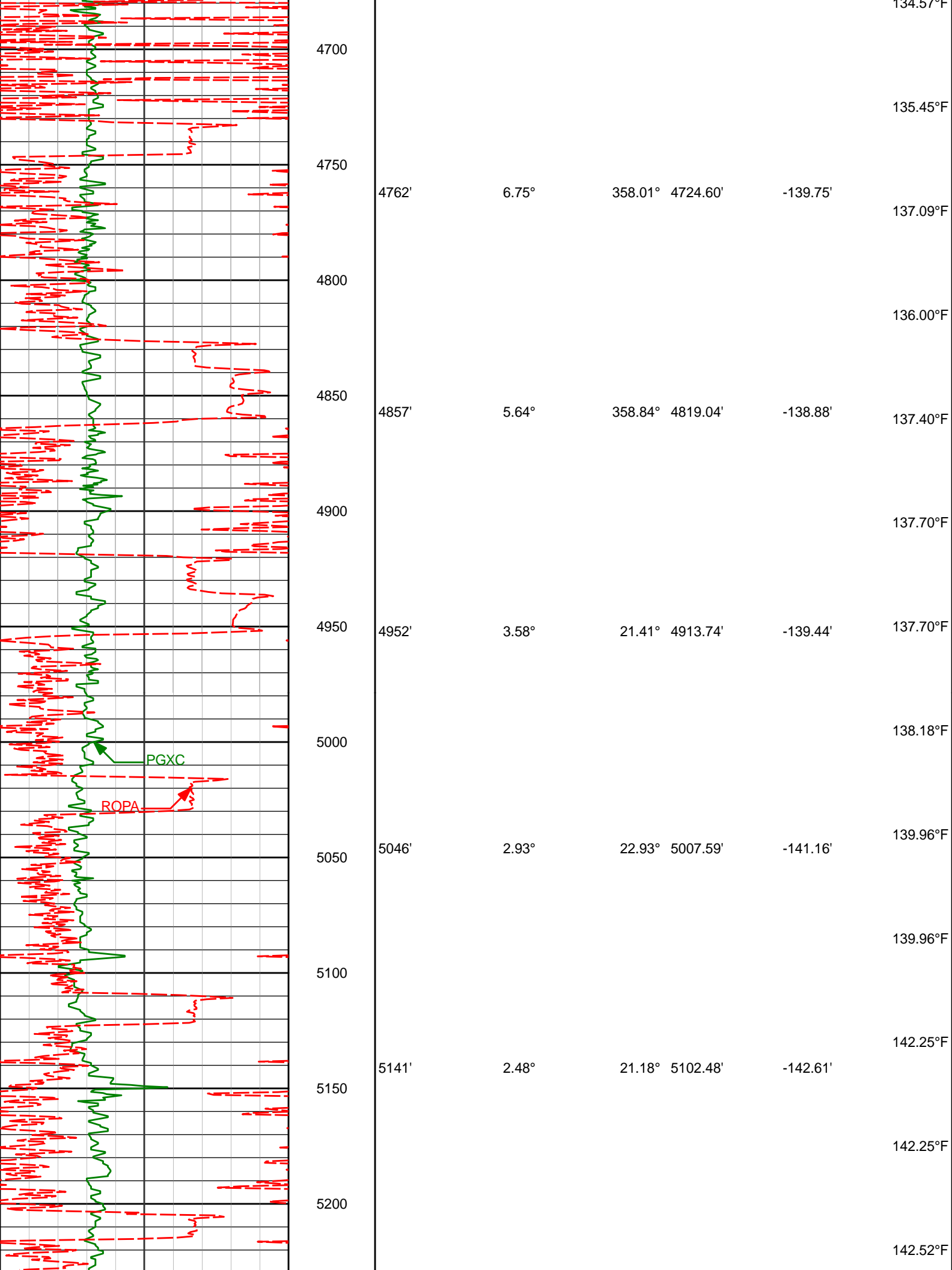


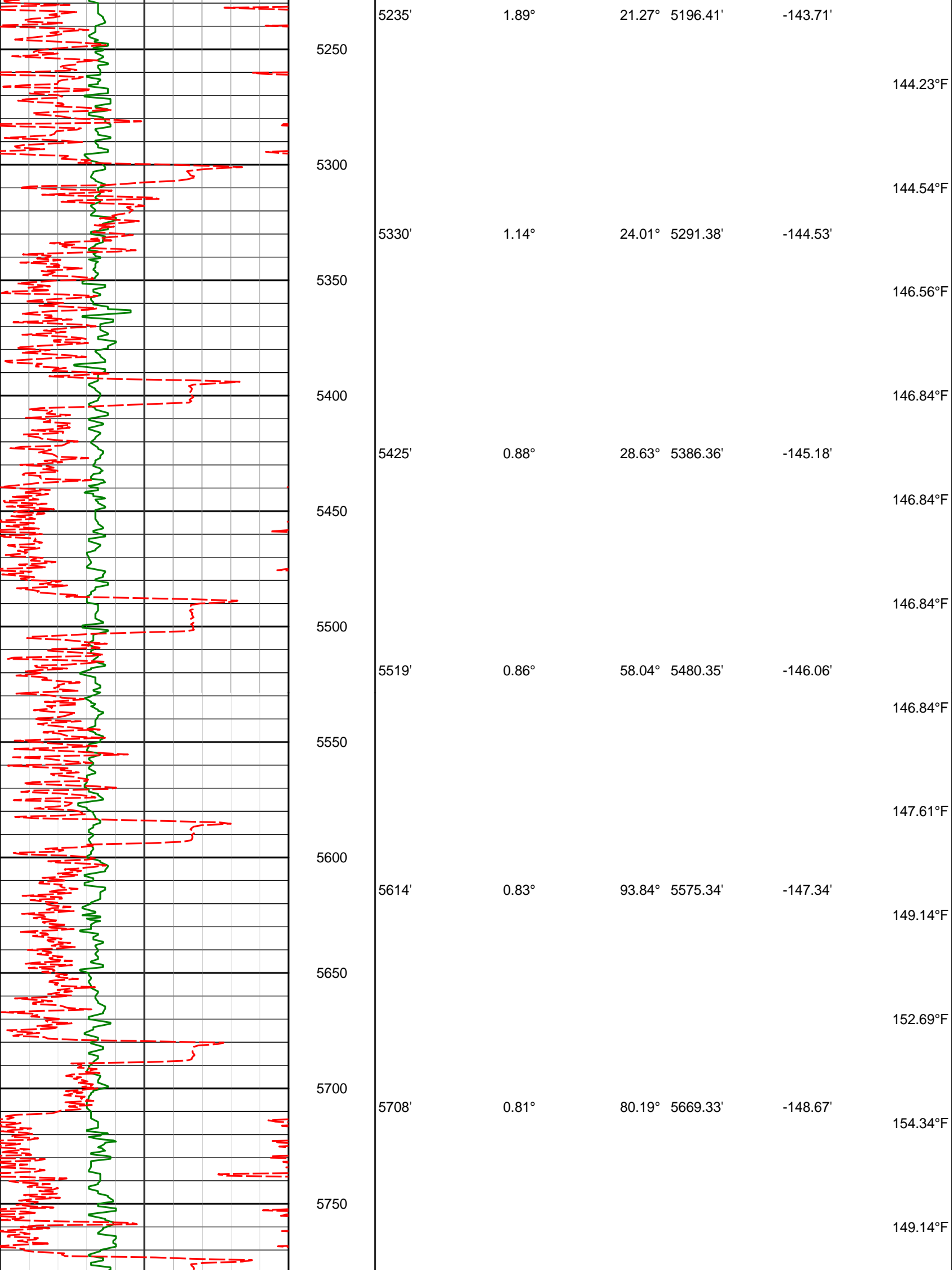


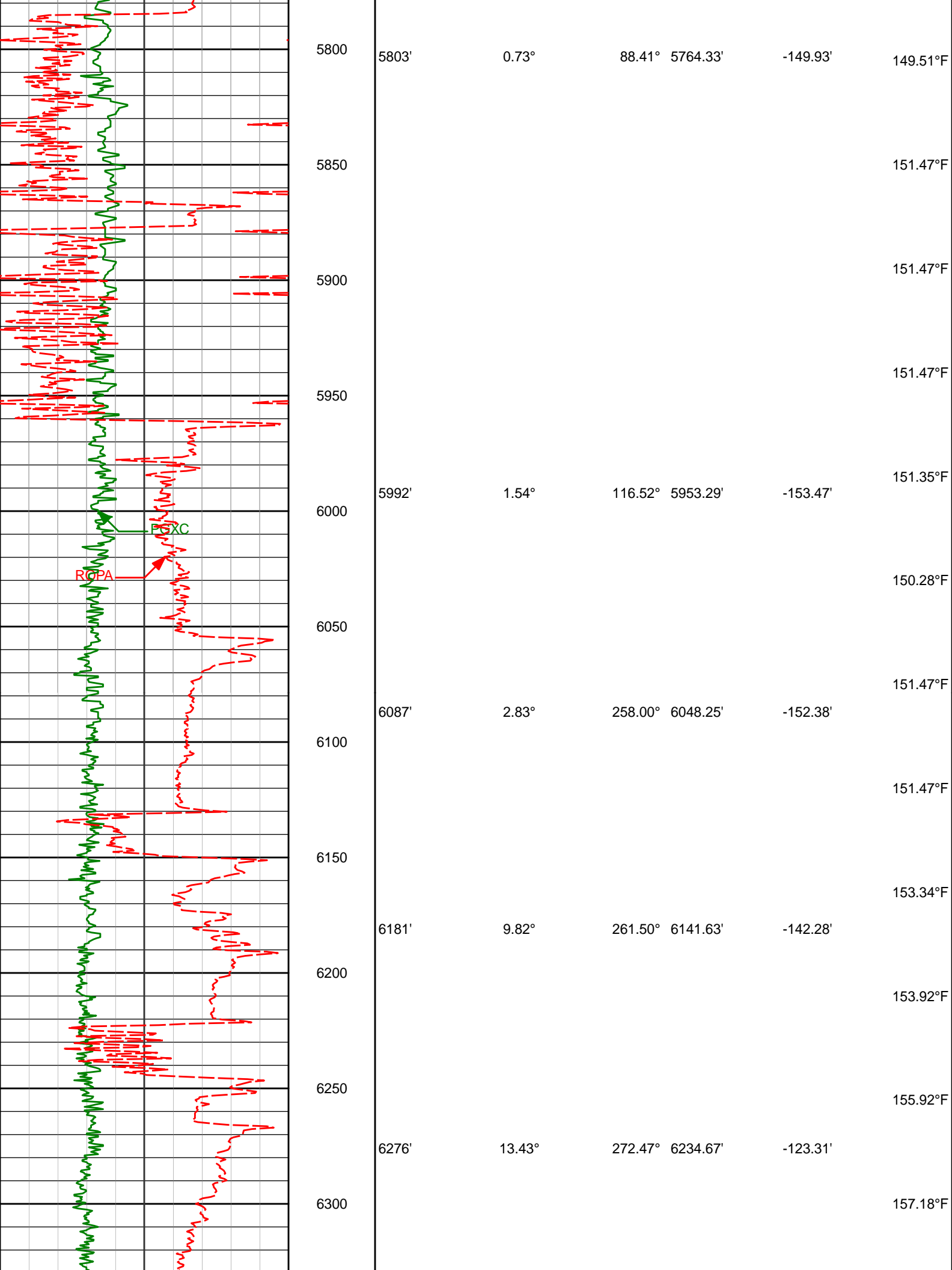


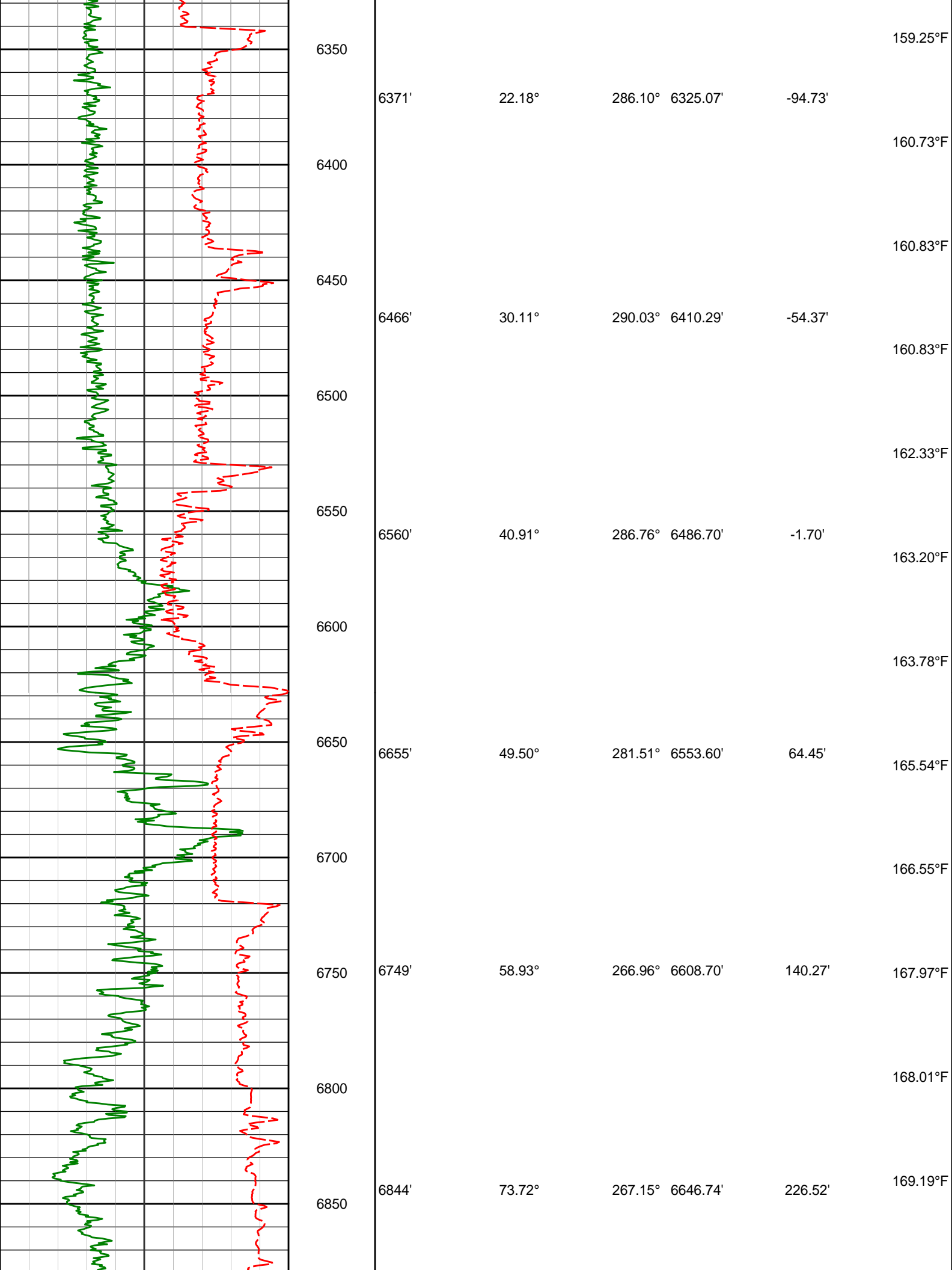


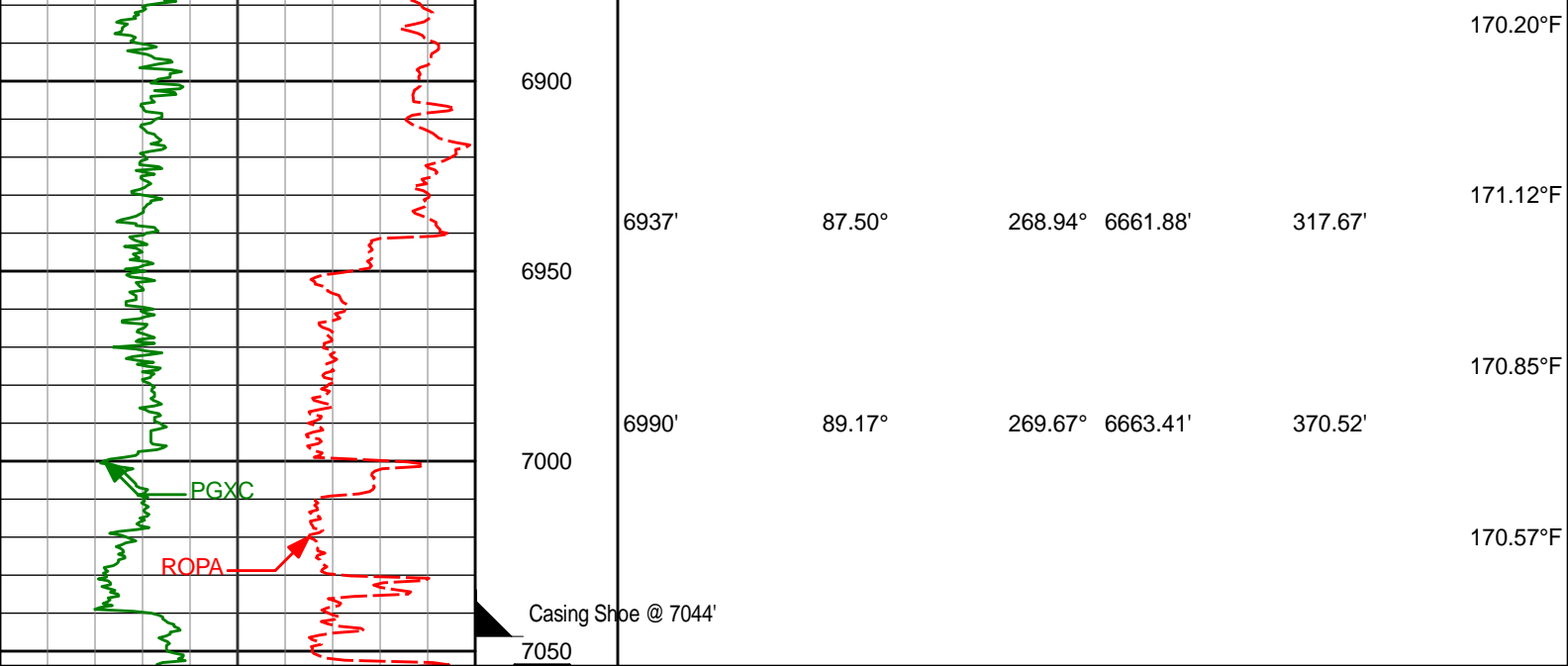








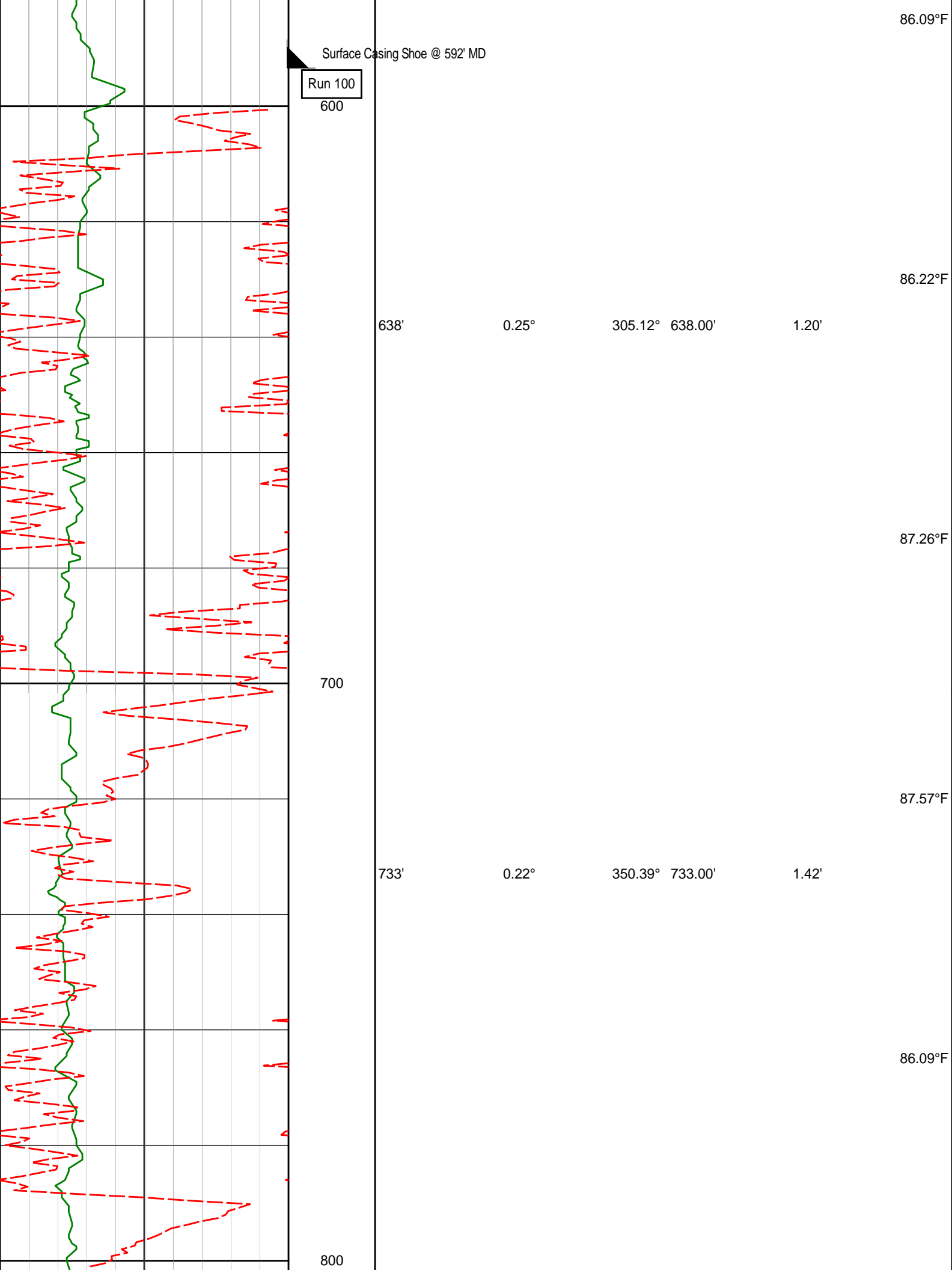


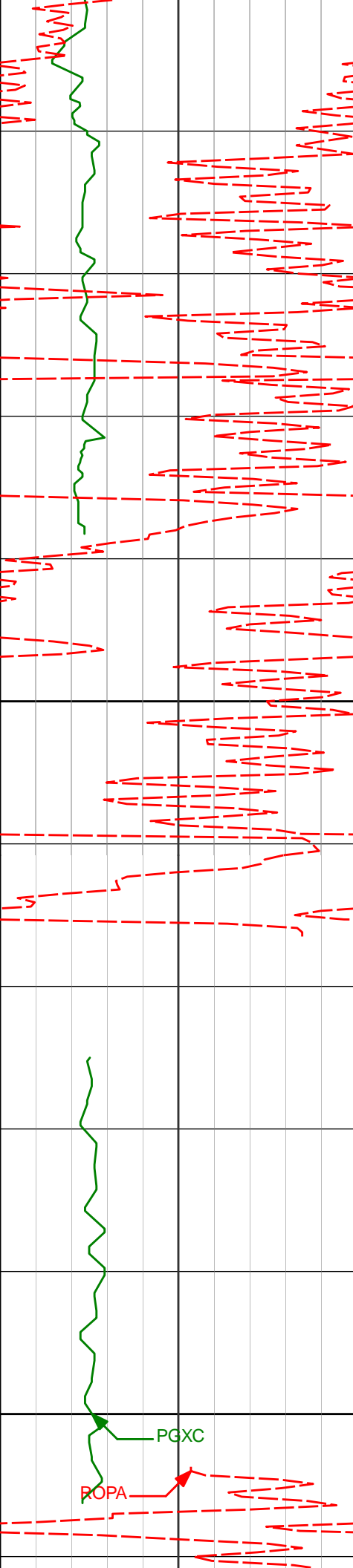


Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0								
PCG GR XHi-Range RT BCor PGXRC-T api								
0 300								

MD Detail 1:240 Scale

PCG GR XHi-Range RT BCor PGXRC-T api								
0 300								
Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0								
								86.09°F





900

1000

827'

0.26°

56.55° 827.00'

1.29'

922'

0.28°

151.82° 922.00'

0.99'

1017'

0.30°

142.24° 1016.99'

0.71'

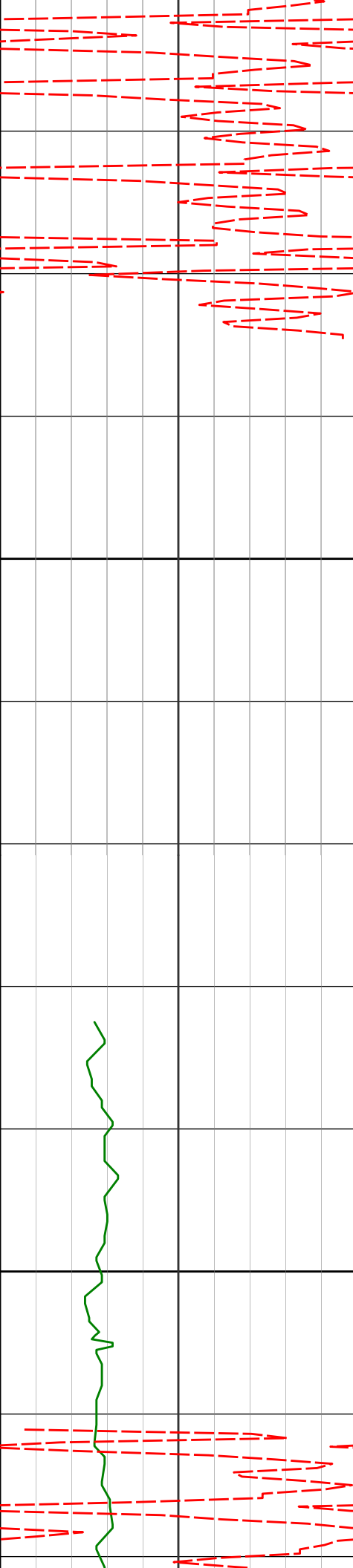
86.09°F

88.14°F

88.14°F

89.11°F

89.23°F



1100

1110'

0.40°

172.07° 1109.99'

0.48'

90.19°F

90.19°F

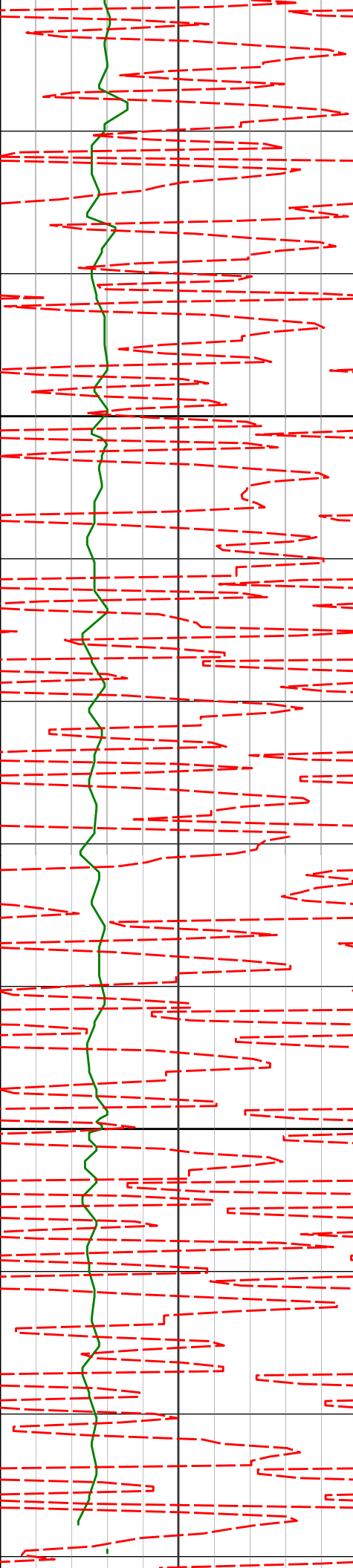
1200

1203'

0.57°

179.16° 1202.99'

0.39'



1300

1297'

0.62°

182.84° 1296.98'

0.35'

90.19°F

90.19°F

92.26°F

1400

1389'

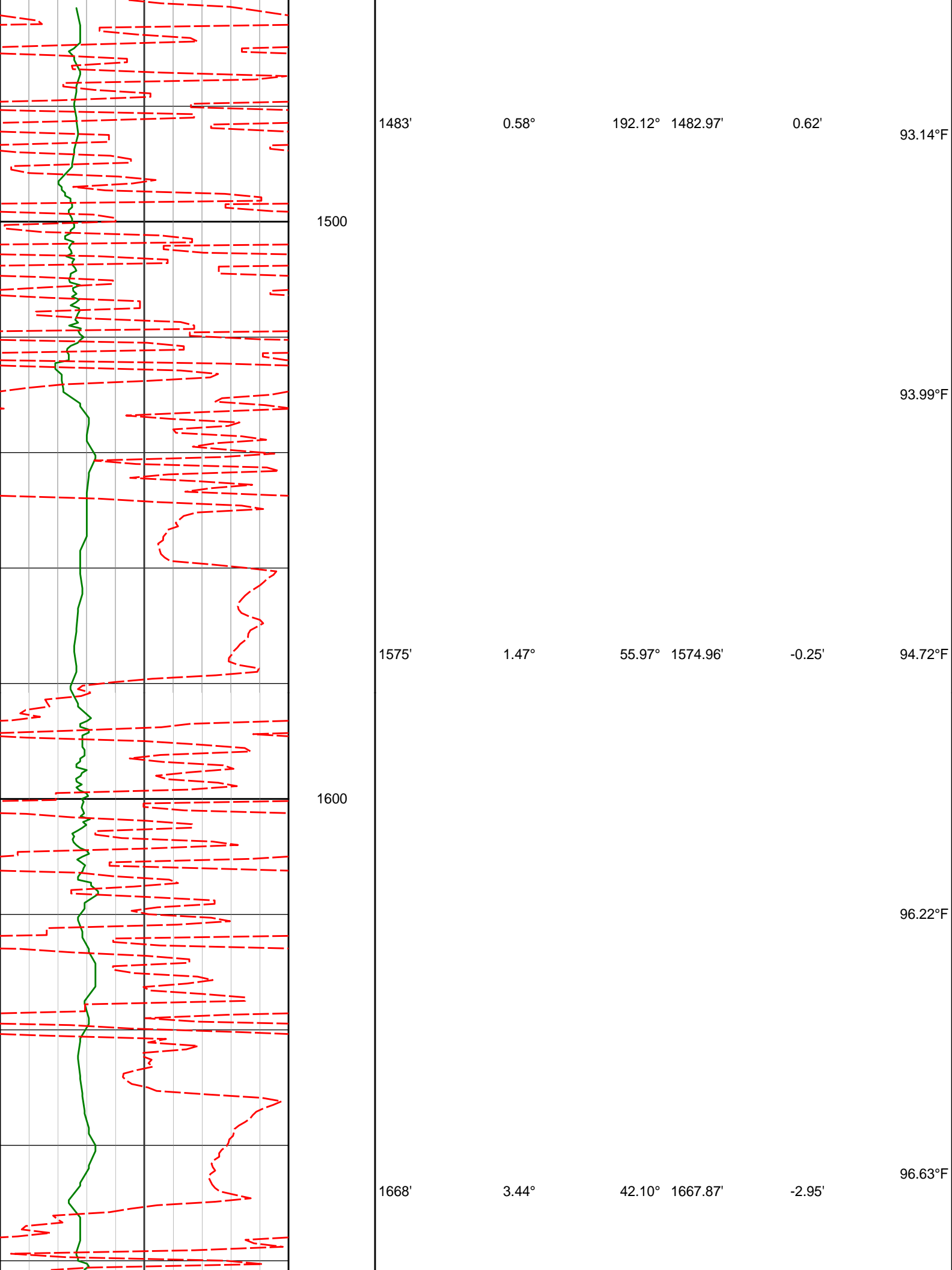
0.72°

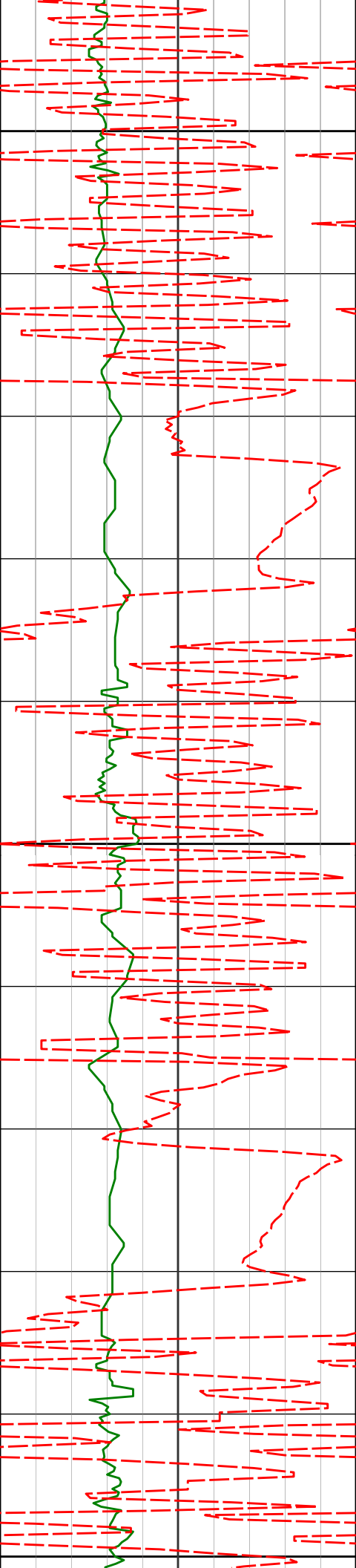
192.98° 1388.98'

0.44'

92.26°F

92.26°F





1700

97.82°F

98.51°F

1760'

5.22°

25.48°

1759.61'

-6.26'

1800

98.51°F

100.20°F

1852'

6.38°

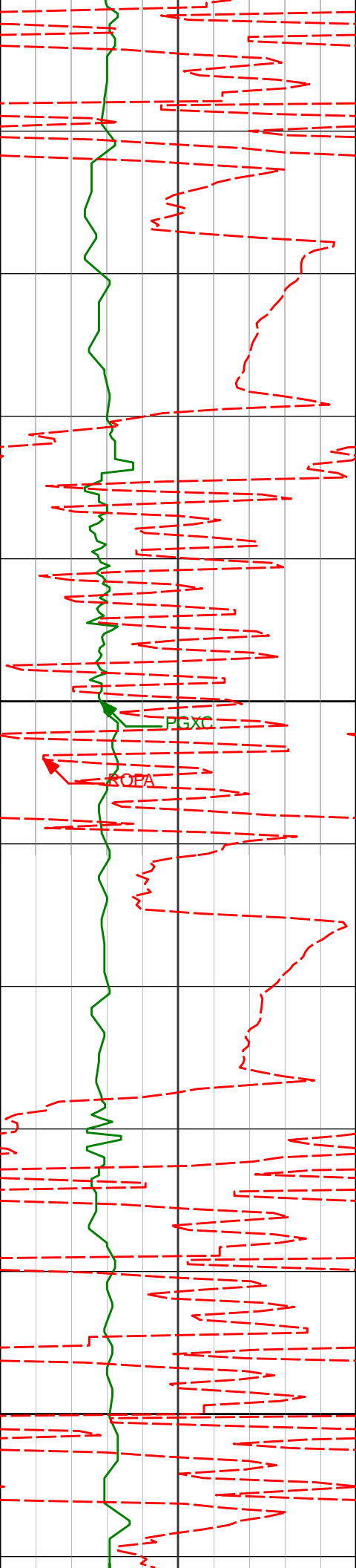
22.96°

1851.14'

-9.57'

1900

100.62°F



2000

2100

1946'

7.38°

27.22°

1944.46'

-13.78'

2039'

9.22°

24.97°

2036.48'

-18.96'

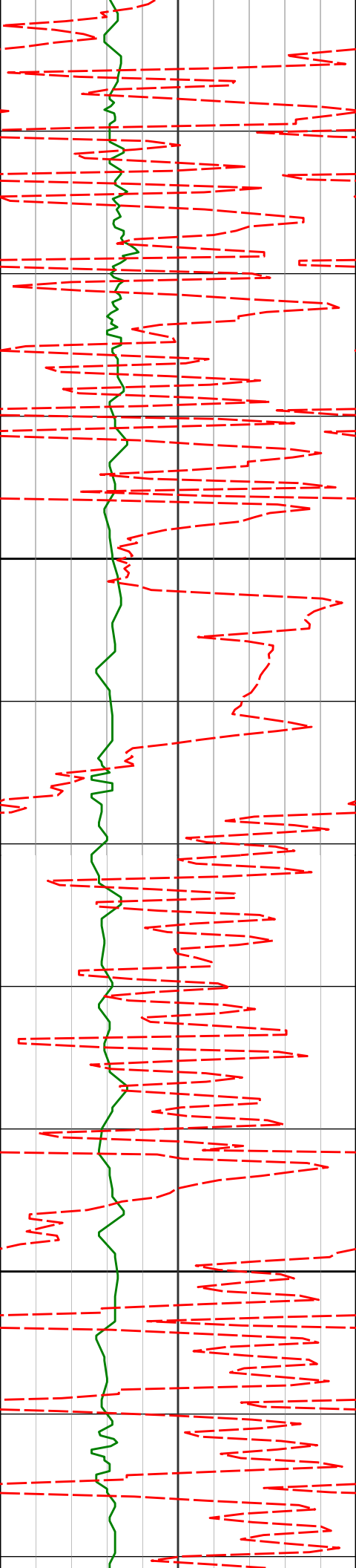
101.16°F

102.29°F

102.72°F

102.72°F

104.16°F



2131'

7.95°

20.44° 2127.45'

-23.56'

104.83°F

2200

104.83°F

2222'

9.48°

25.03° 2217.40'

-28.20'

104.83°F

2300

104.83°F

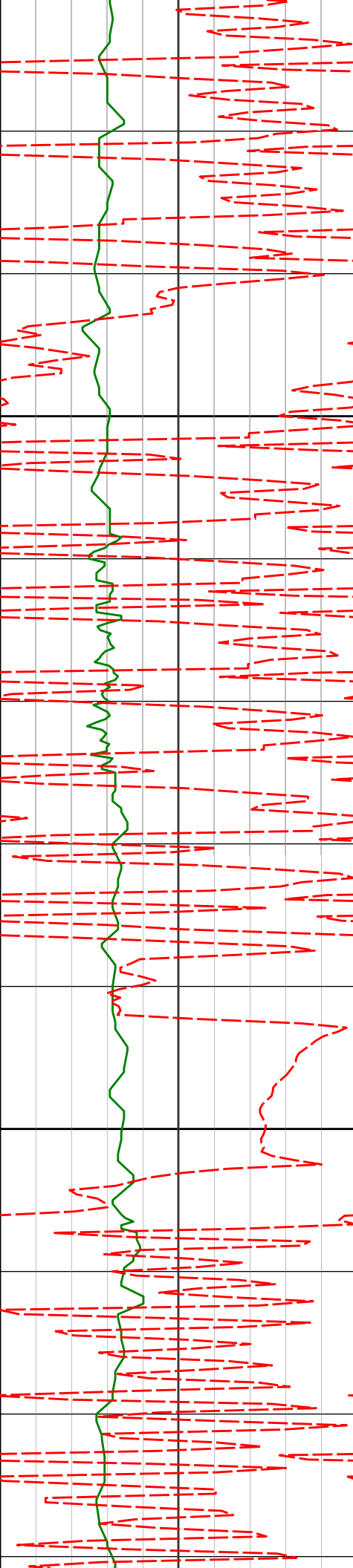
2314'

8.73°

23.08° 2308.24'

-33.37'

106.97°F



2400

2407'

8.22°

18.19°

2400.23'

-37.48'

106.97°F

106.97°F

108.39°F

2500

2499'

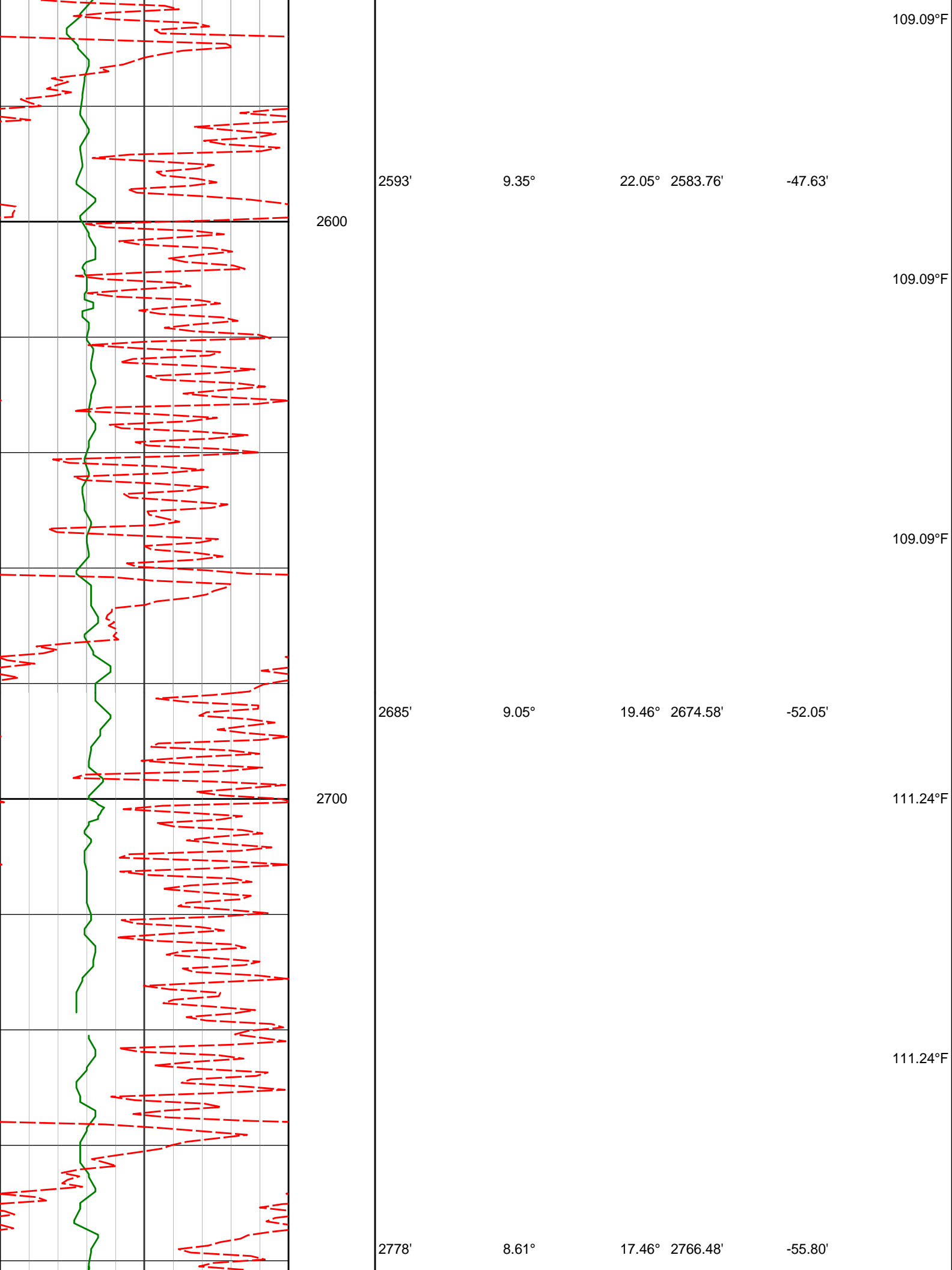
9.88°

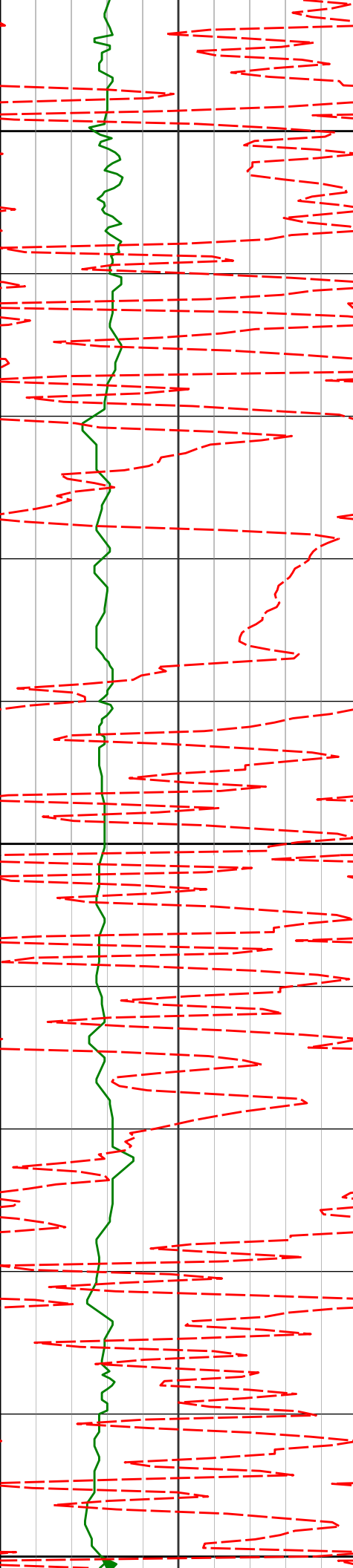
25.35°

2491.08'

-42.14'

109.09°F





2800

2900

3000

2870'

2965'

10.04°

9.76°

21.56°

17.83°

2857.26'

2950.84'

-60.00'

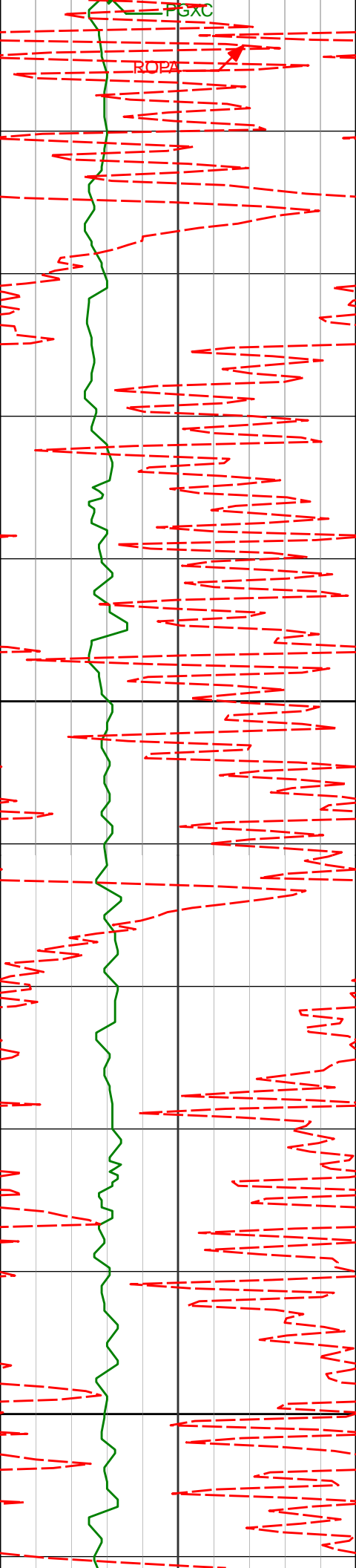
-64.63'

111.24°F

111.24°F

113.40°F

113.40°F



3100

3200

3059'

3154'

9.79°

8.95°

16.58°

14.07°

3043.48'

3137.21'

-68.47'

-71.71'

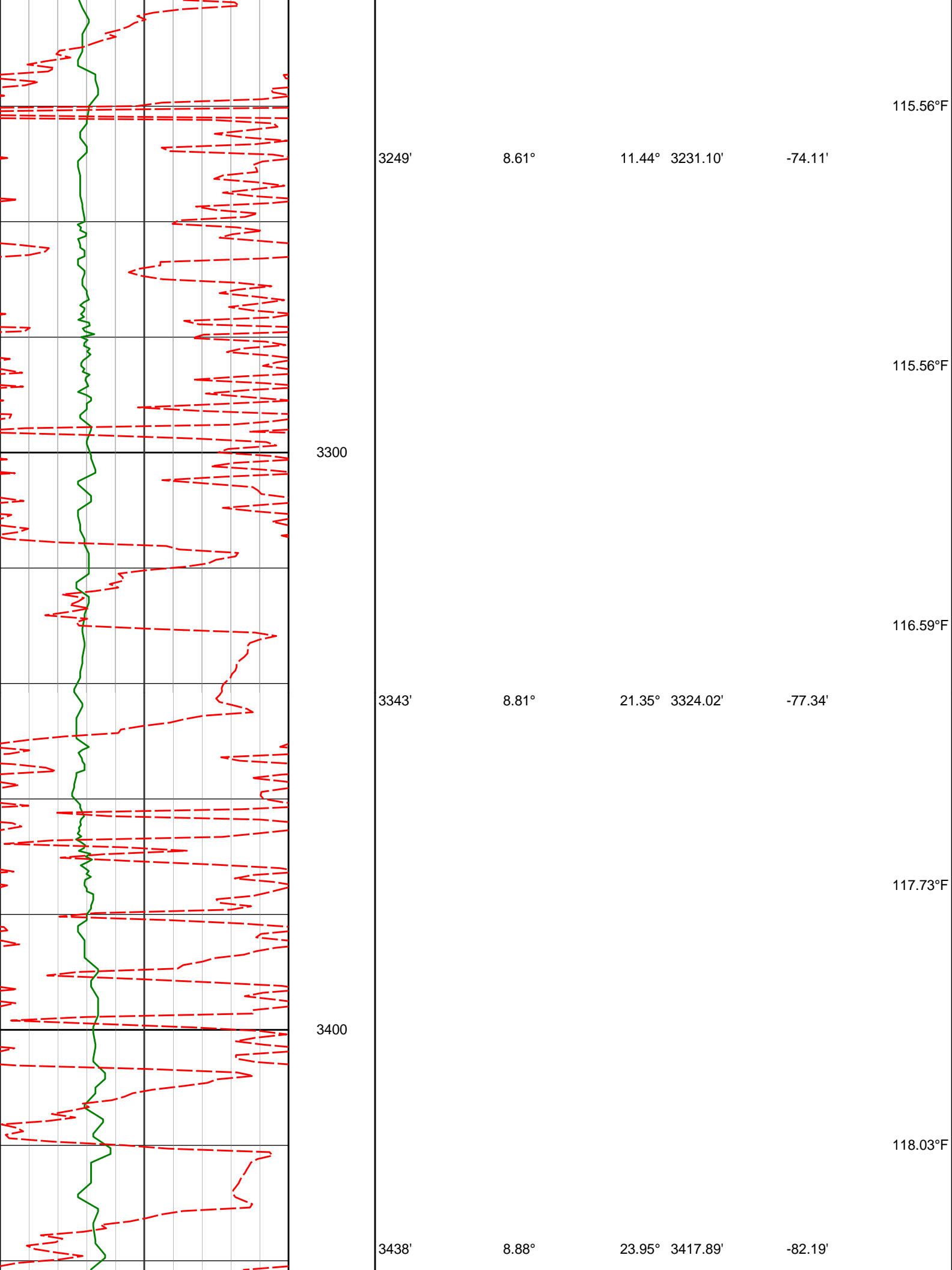
113.40°F

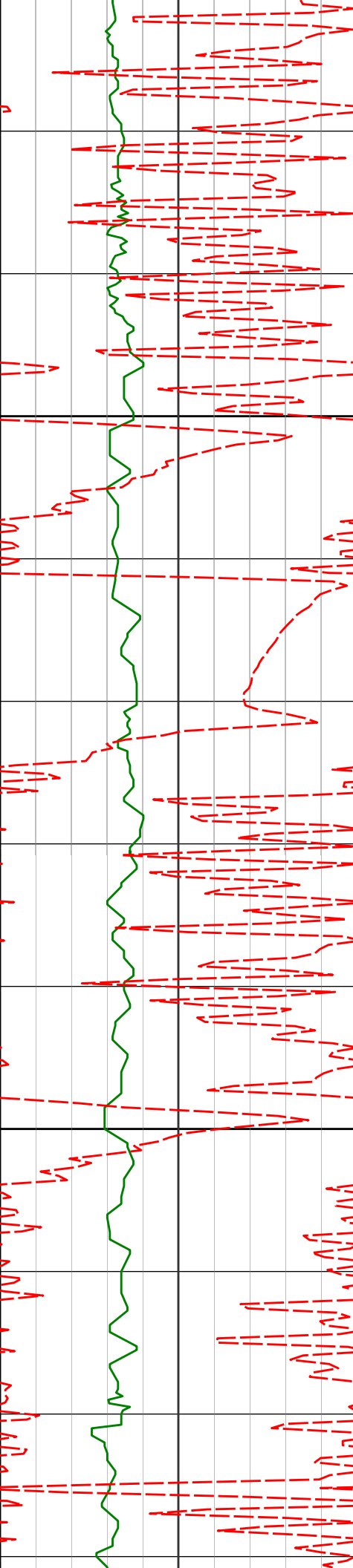
113.40°F

113.40°F

113.40°F

115.56°F





3500

3533'

9.59°

28.86°

3511.66'

-88.20'

3600

3628'

9.20°

25.38°

3605.39'

-94.48'

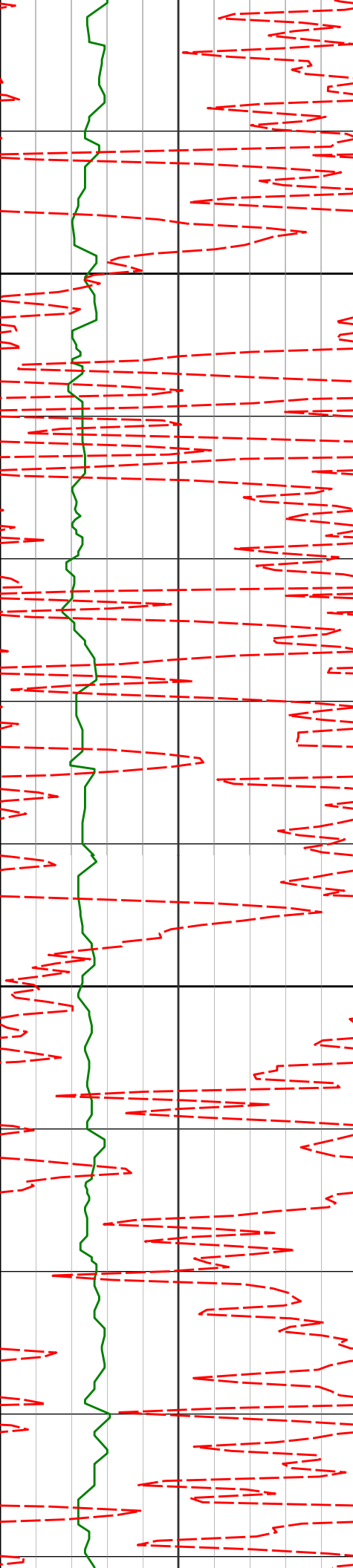
118.62°F

119.74°F

119.91°F

119.91°F

122.11°F



3700

3722'

9.47°

24.91° 3698.14'

-100.16'

122.11°F

122.11°F

122.11°F

3800

3817'

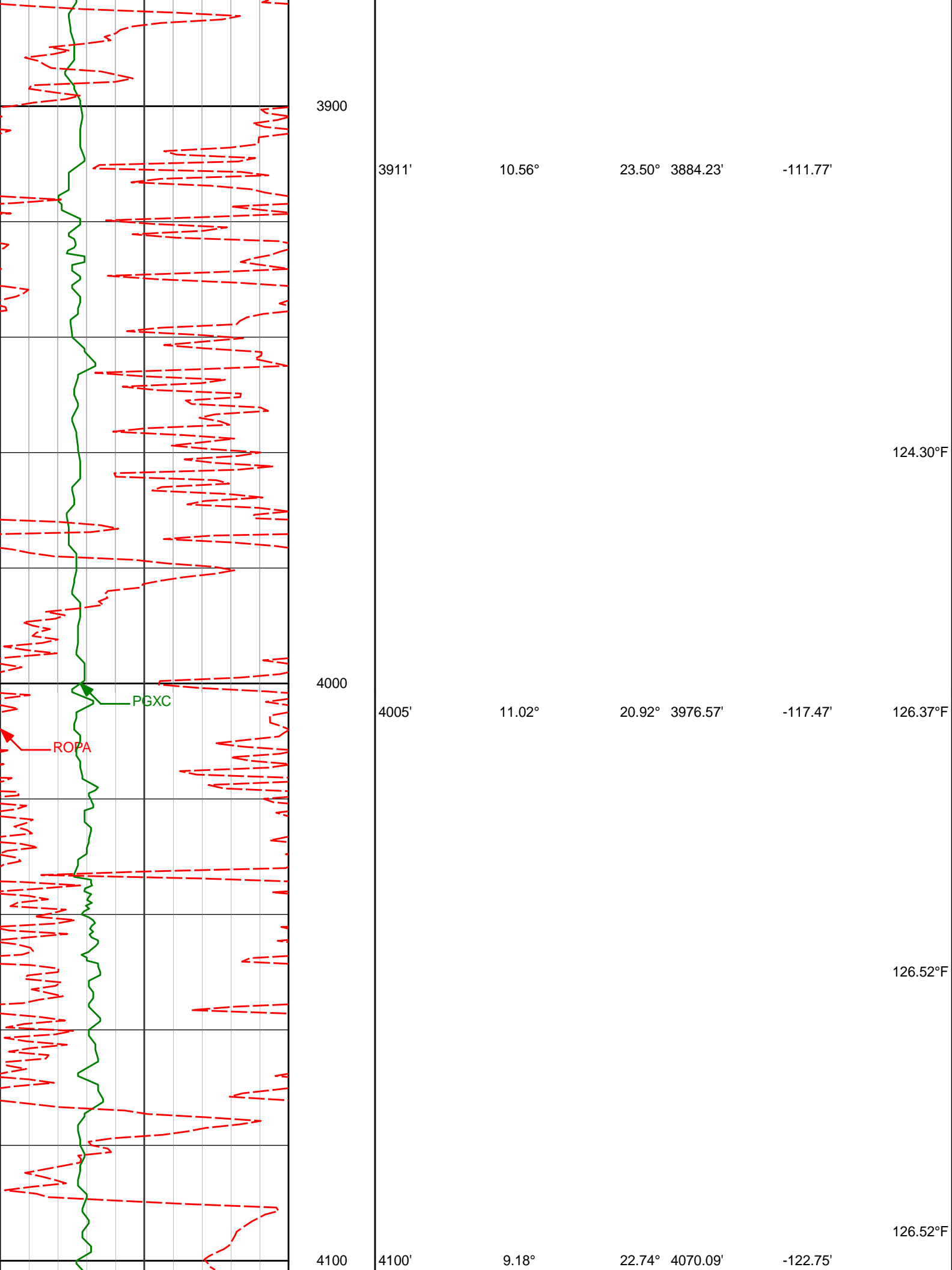
10.11°

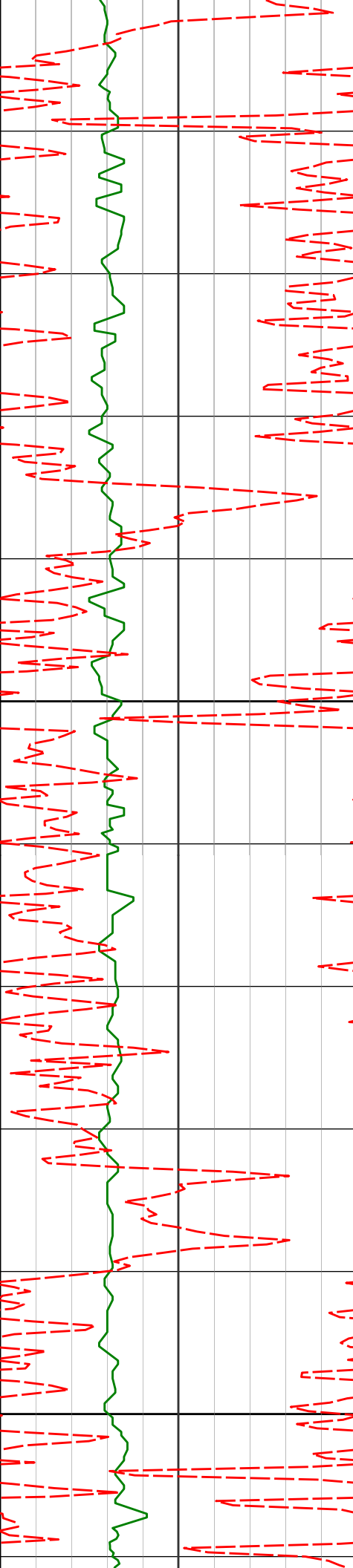
23.54° 3791.76'

-105.93'

124.30°F

124.30°F





4200

4300

4195'

4289'

8.95°

8.49°

21.74°

17.79°

4163.91'

4256.82'

-127.62'

-131.67'

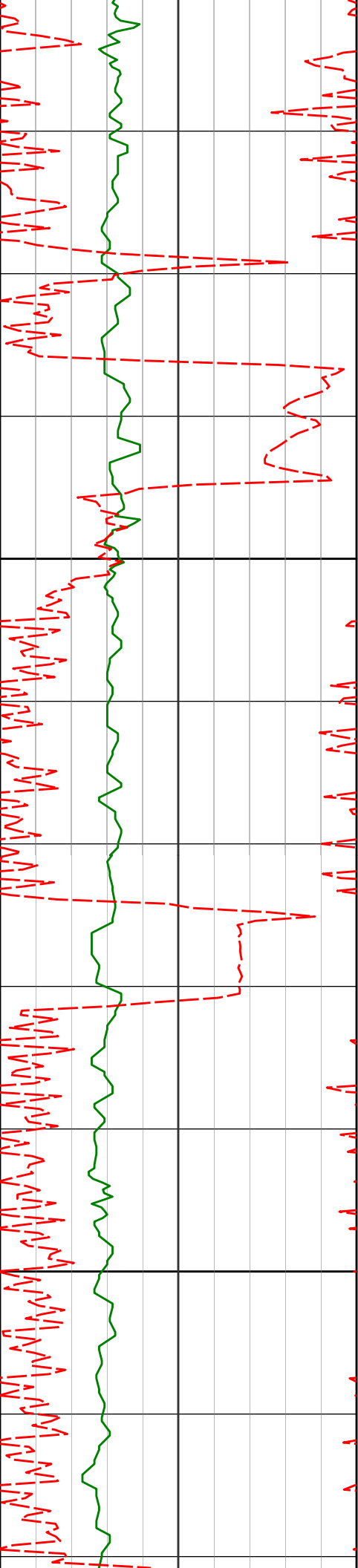
126.52°F

128.39°F

128.73°F

129.58°F

130.34°F



4400

4500

4384'

9.58°

15.18°

4350.64'

-135.06'

4478'

9.03°

12.26°

4443.40'

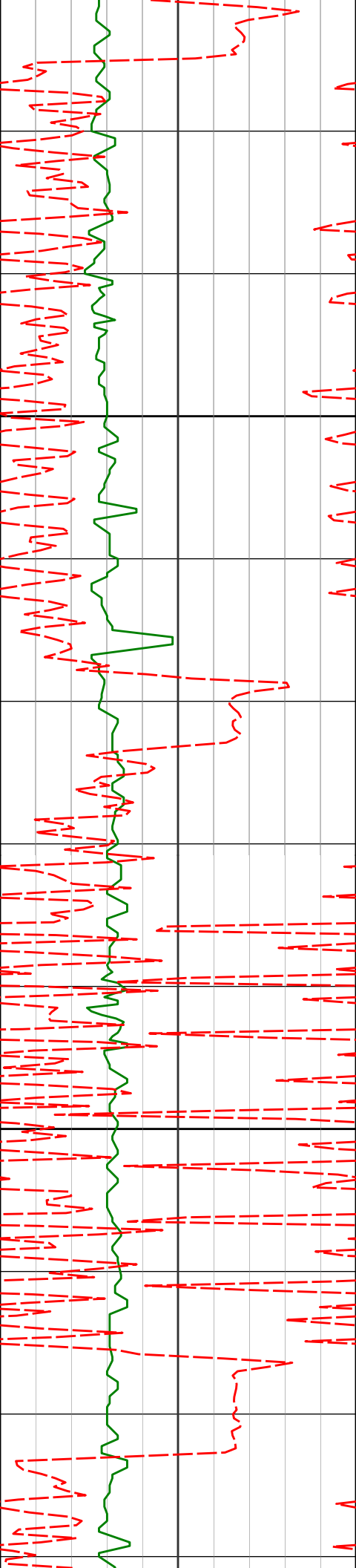
-137.83'

128.73°F

130.96°F

132.80°F

133.20°F



4600

4700

4573'

8.57°

8.07°

4537.29'

-139.59'

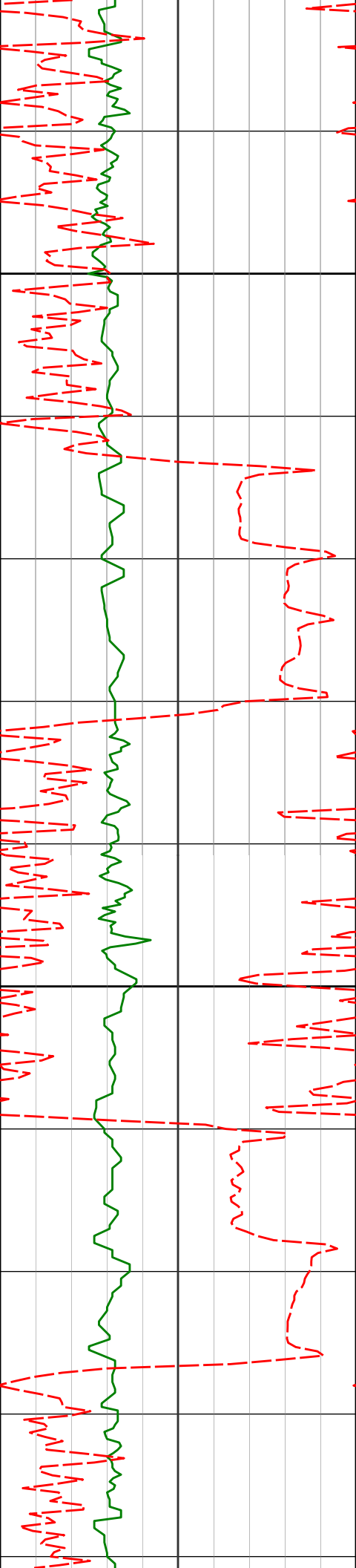
133.20°F

133.20°F

133.20°F

134.57°F

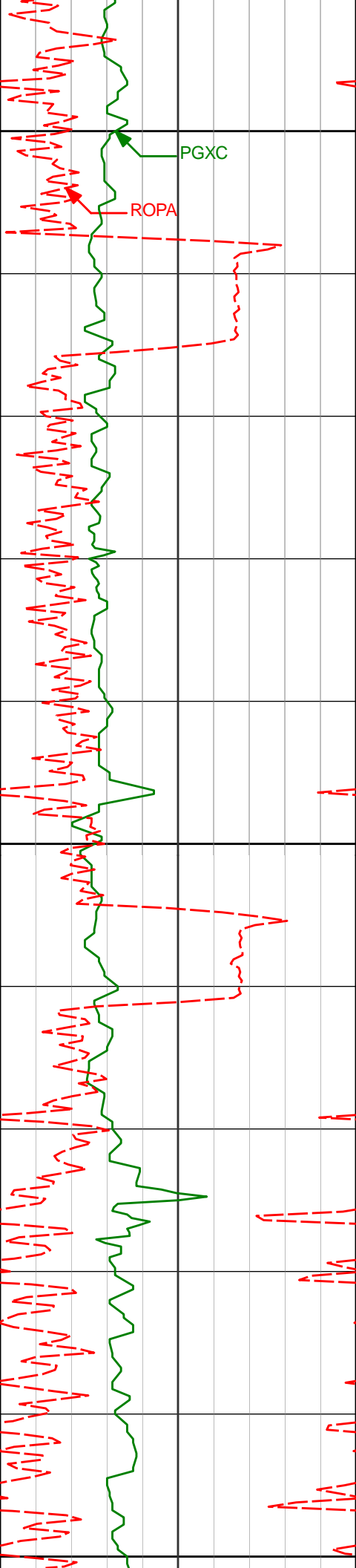
135.45°F



4800

4900

4762'	6.75°	358.01°	4724.60'	-139.75'	137.09°F
4857'	5.64°	358.84°	4819.04'	-138.88'	137.40°F
4952'	3.58°	21.41°	4913.74'	-139.44'	137.70°F



5000

PGXC

ROPA

5100

5200

138.18°F

139.96°F

139.96°F

142.25°F

142.25°F

5046'

2.93°

22.93°

5007.59'

-141.16'

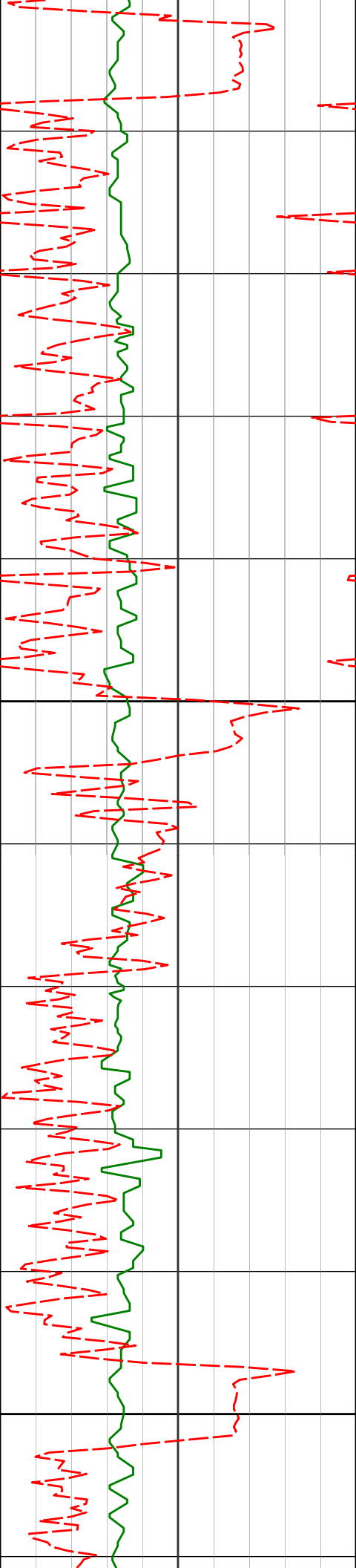
5141'

2.48°

21.18°

5102.48'

-142.61'



5235'

1.89°

21.27° 5196.41'

-143.71'

142.52°F

144.23°F

5300

144.54°F

5330'

1.14°

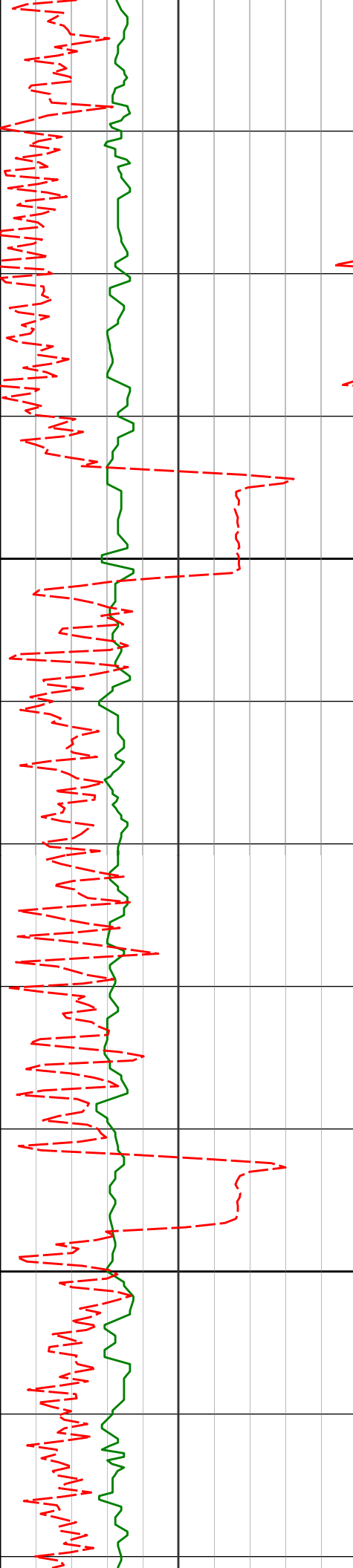
24.01° 5291.38'

-144.53'

146.56°F

5400

146.84°F



5500

5600

5425'

0.88°

28.63° 5386.36'

-145.18'

146.84°F

146.84°F

5519'

0.86°

58.04° 5480.35'

-146.06'

146.84°F

147.61°F

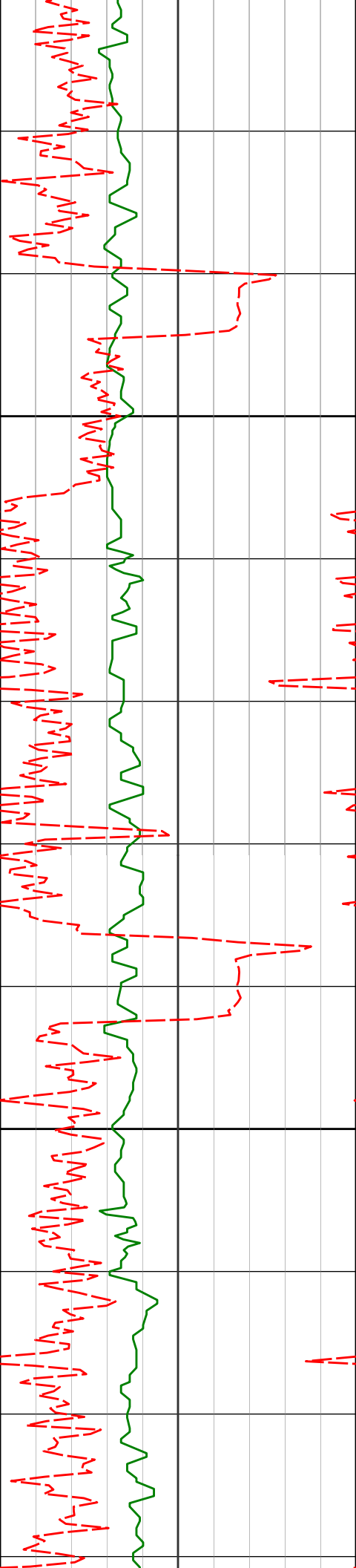
5614'

0.83°

93.84° 5575.34'

-147.34'

149.14°F



5700

5800

5708'

5803'

0.81°

0.73°

80.19° 5669.33'

88.41° 5764.33'

-148.67'

-149.93'

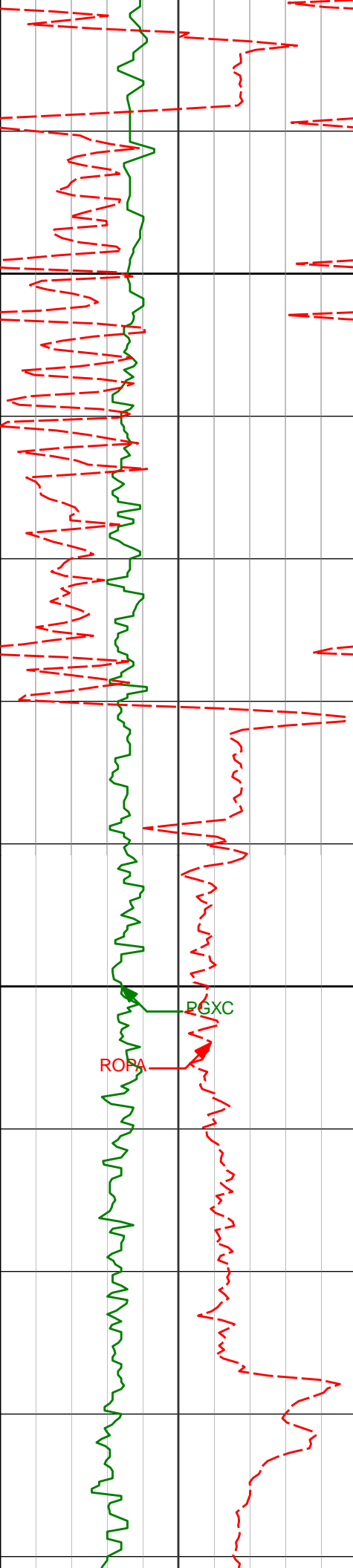
152.69°F

154.34°F

149.14°F

149.51°F

151.47°F



5900

6000

5992'

1.54°

116.52° 5953.29'

-153.47'

PGXC

ROPA

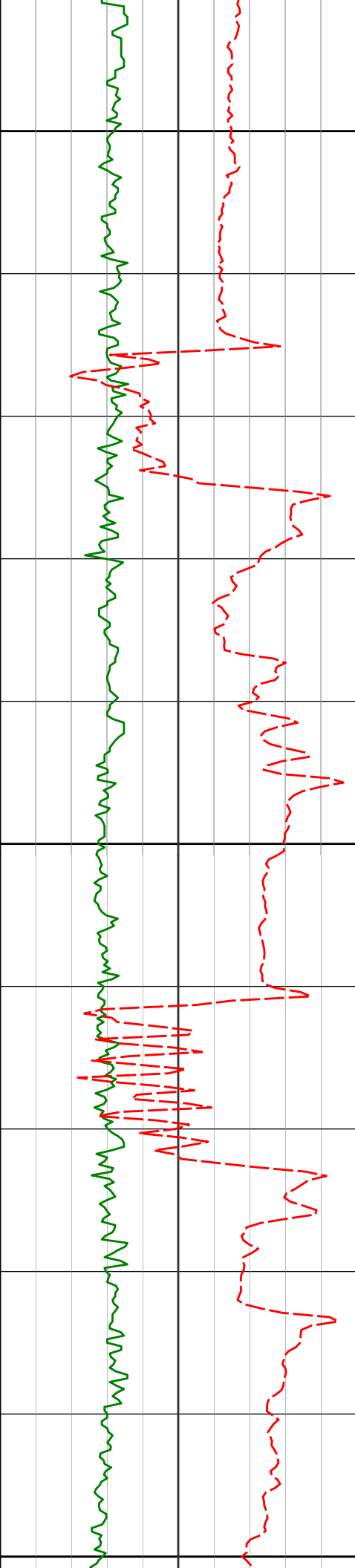
151.47°F

151.47°F

151.35°F

150.28°F

151.47°F



6100

6200

6300

6087'

2.83°

258.00° 6048.25'

-152.38'

6181'

9.82°

261.50° 6141.63'

-142.28'

6276'

13.43°

272.47° 6234.67'

-123.31'

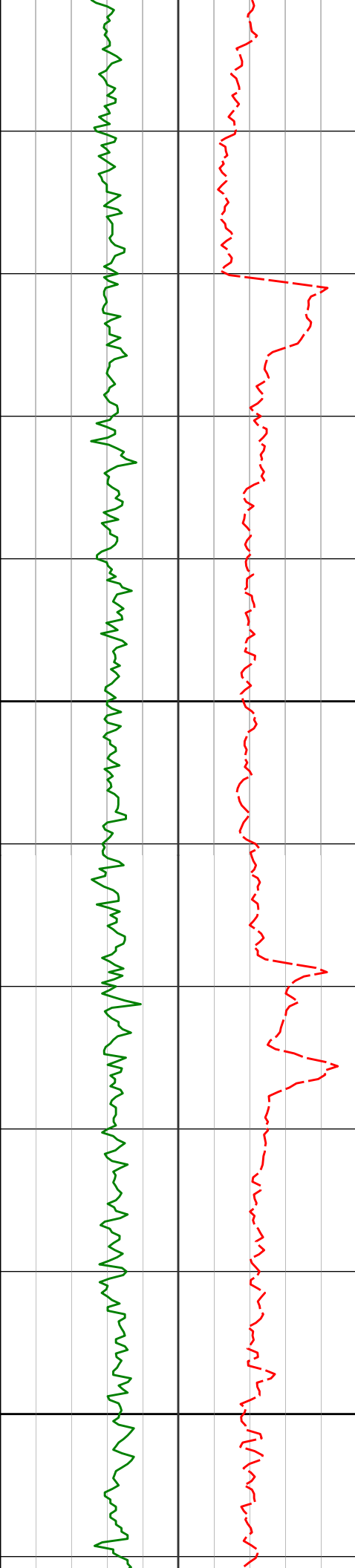
151.47°F

153.34°F

153.92°F

155.92°F

157.18°F



6400

6500

6371'

22.18°

286.10° 6325.07'

-94.73'

6466'

30.11°

290.03° 6410.29'

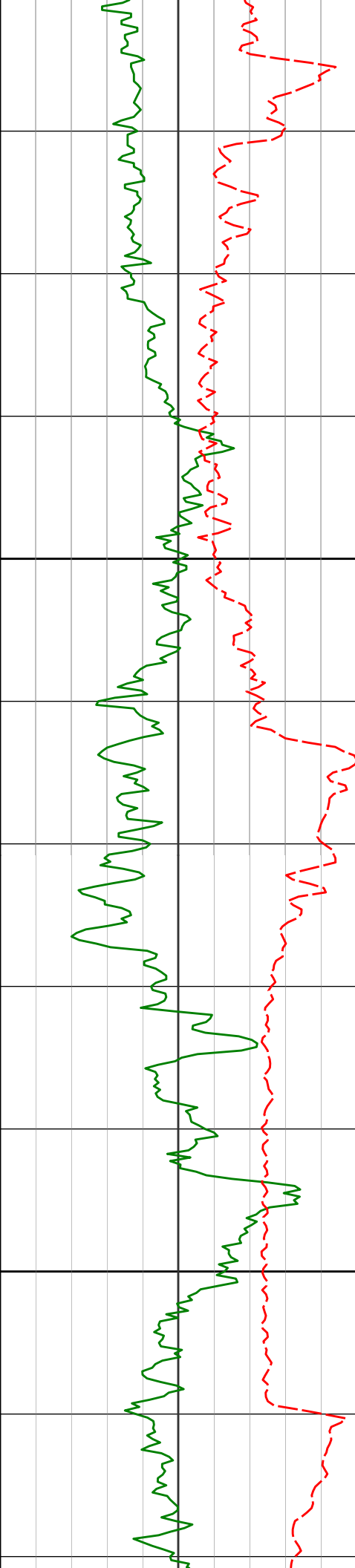
-54.37'

159.25°F

160.73°F

160.83°F

160.83°F



6600

6700

6560'

40.91°

286.76° 6486.70'

-1.70'

6655'

49.50°

281.51° 6553.60'

64.45'

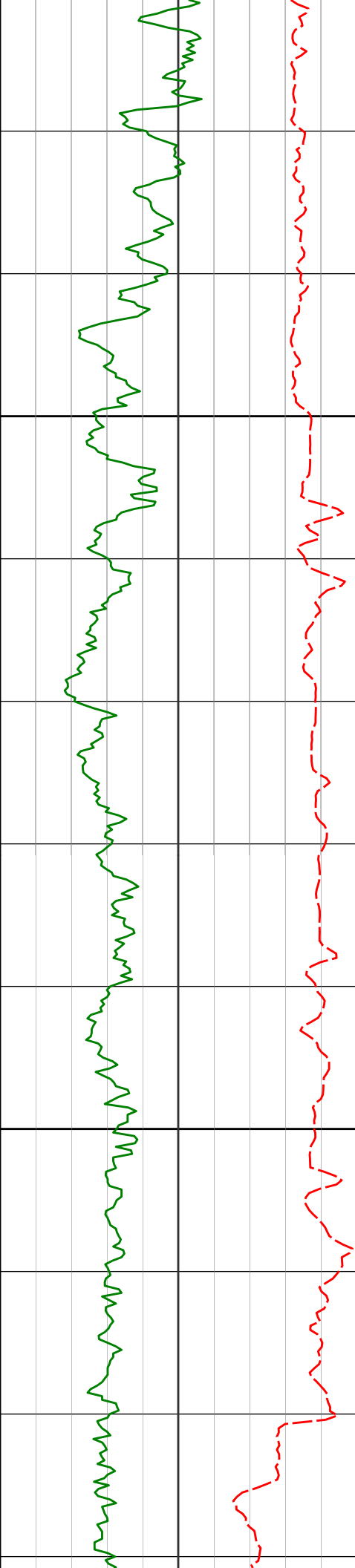
162.33°F

163.20°F

163.78°F

165.54°F

166.55°F



6800

6900

6749'

58.93°

266.96° 6608.70'

140.27'

167.97°F

168.01°F

6844'

73.72°

267.15° 6646.74'

226.52'

169.19°F

170.20°F

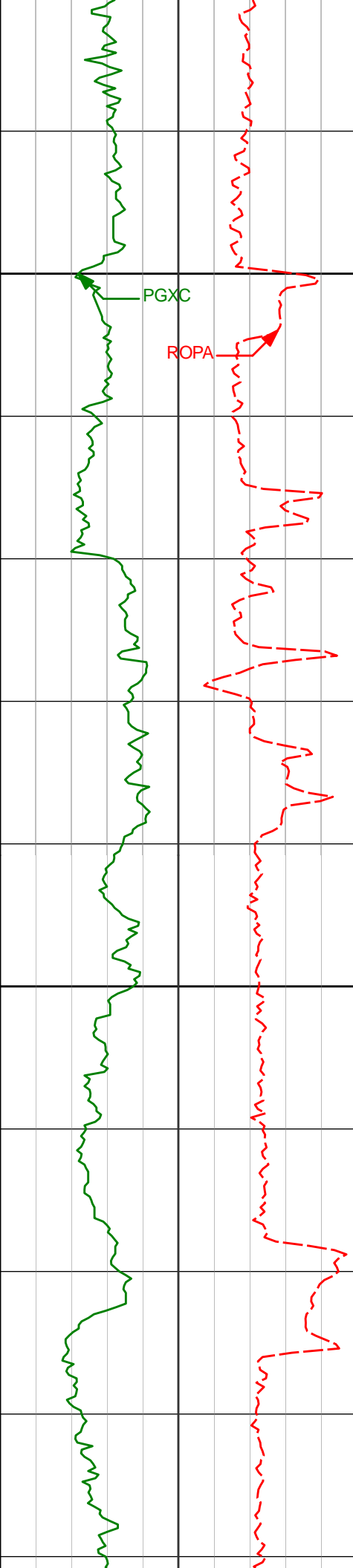
6937'

87.50°

268.94° 6661.88'

317.67'

171.12°F



Run 200

Casing Shoe @ 7044'

6990' 89.17° 269.67° 6663.41' 370.52'

7000

170.85°F

170.57°F

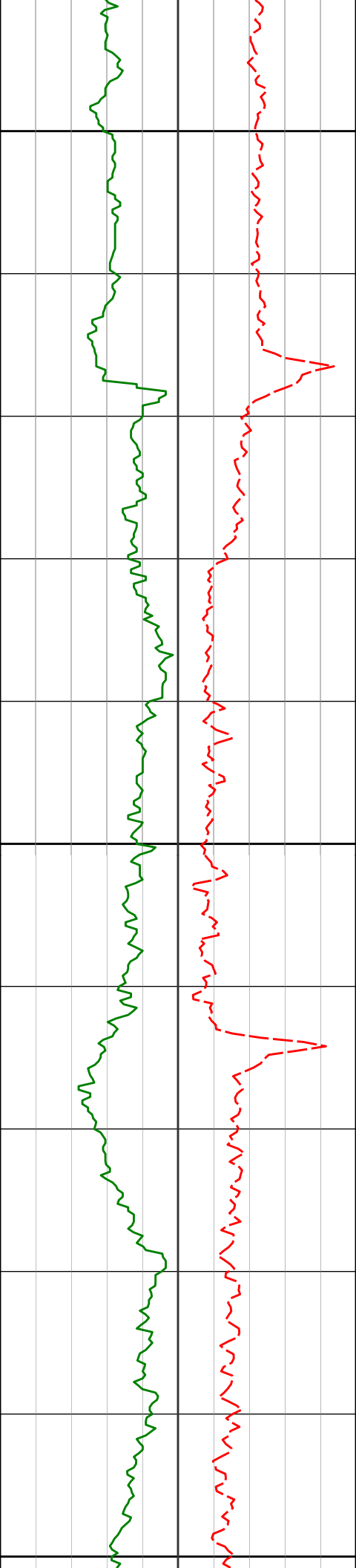
7070' 90.49° 270.45° 6663.65' 450.39'

171.22°F

7100

7164' 89.20° 267.95° 6663.91' 544.14'

171.22°F



7200

171.22°F

7300

175.44°F

7400

179.66°F

7259'

89.57°

267.89° 6664.93'

638.72'

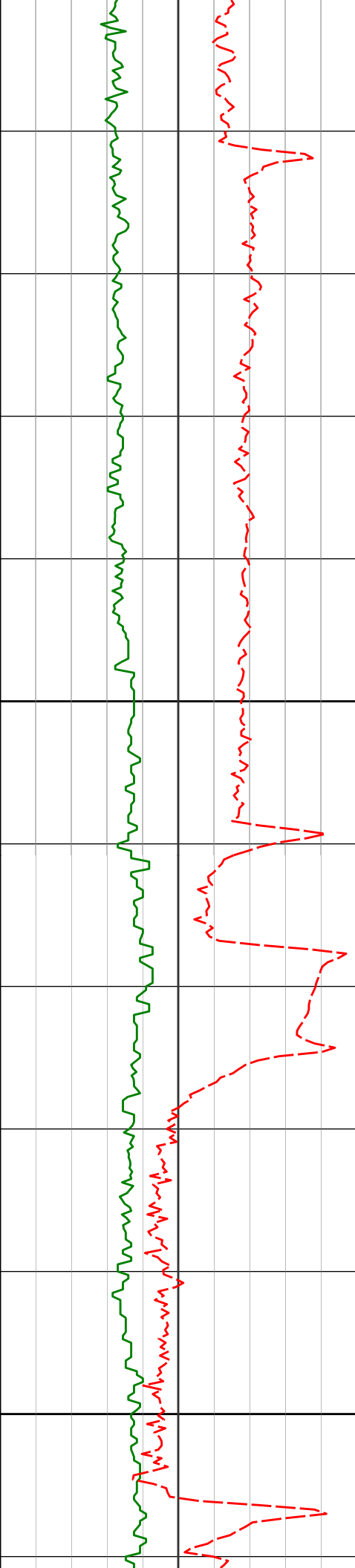
7353'

89.91°

268.10° 6665.35'

732.31'

179.66°F



7500

7600

7448'

88.49°

267.24° 6666.68'

826.84'

7542'

88.98°

266.90° 6668.76'

920.26'

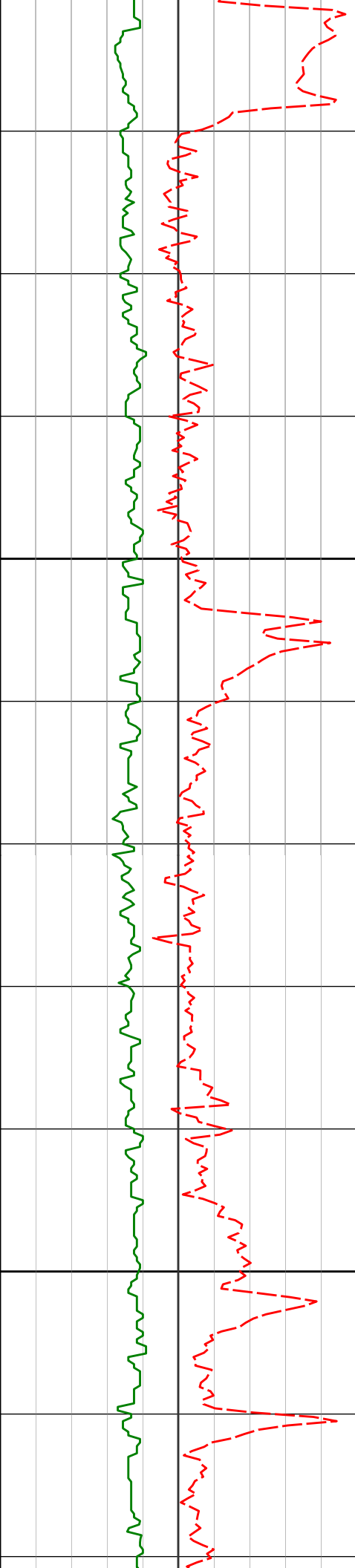
179.66°F

179.66°F

179.66°F

179.66°F

179.66°F



7700

7800

7637'

90.00°

267.89° 6669.60'

1014.76'

179.66°F

179.66°F

7731'

90.25°

268.03° 6669.40'

1108.35'

179.66°F

183.88°F

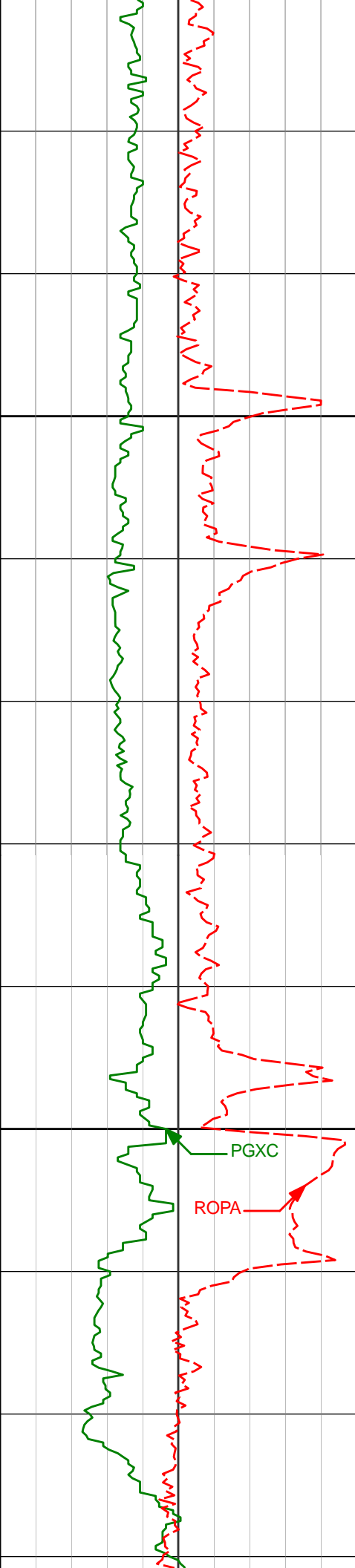
7825'

90.62°

267.84° 6668.68'

1201.93'

183.88°F



7900

7918'

91.17°

268.10° 6667.23'

1294.52'

182.51°F

8000

PGXC

ROPA

8011'

88.89°

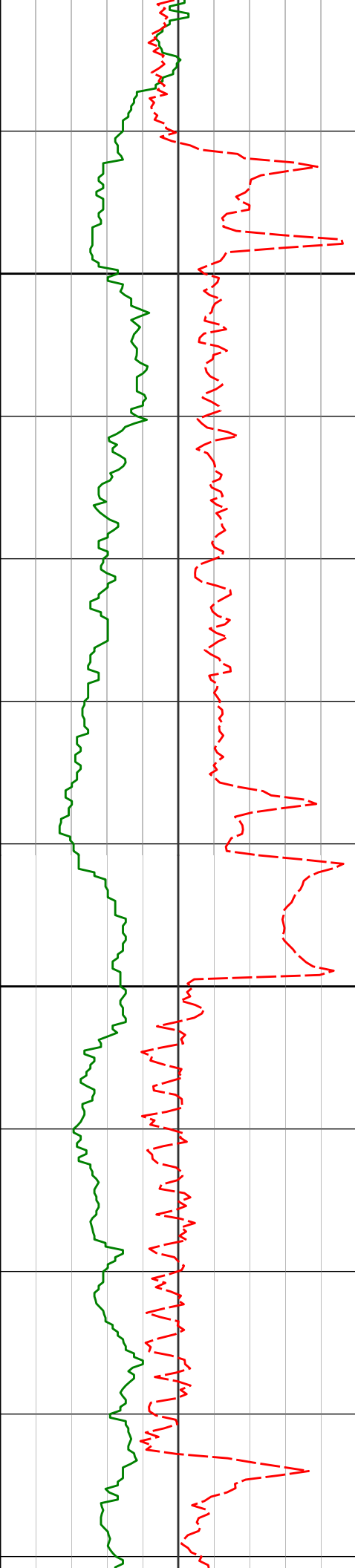
268.56° 6667.18'

1387.16'

179.66°F

179.66°F

182.90°F



8100

8104'

88.58°

268.40° 6669.23'

1479.81'

179.66°F

179.66°F

183.88°F

8200

8198'

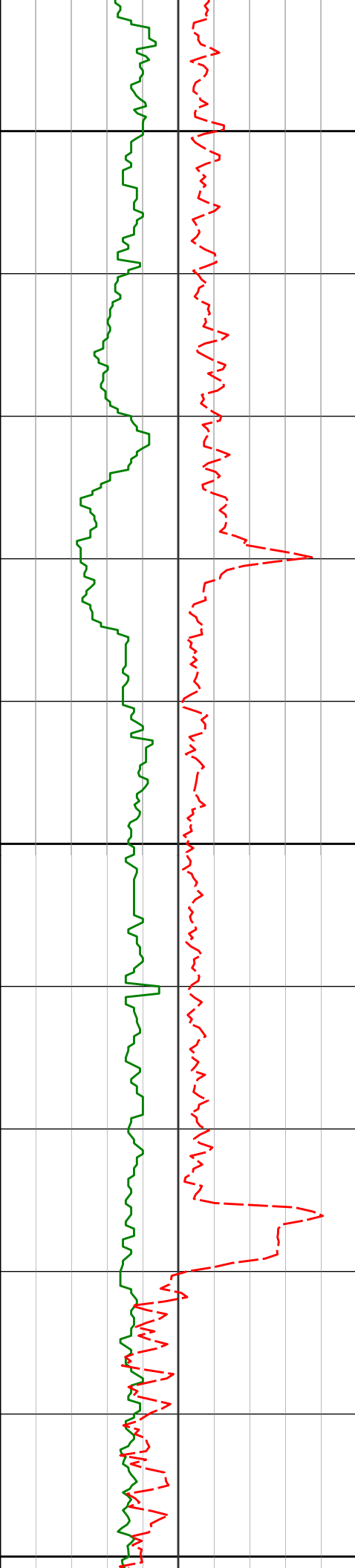
90.15°

267.79° 6670.28'

1573.42'

183.88°F

188.09°F



8300

8400

8500

8289'

90.15°

266.97° 6670.04'

1663.93'

8382'

90.25°

266.85° 6669.71'

1756.35'

8474'

91.39°

266.65° 6668.40'

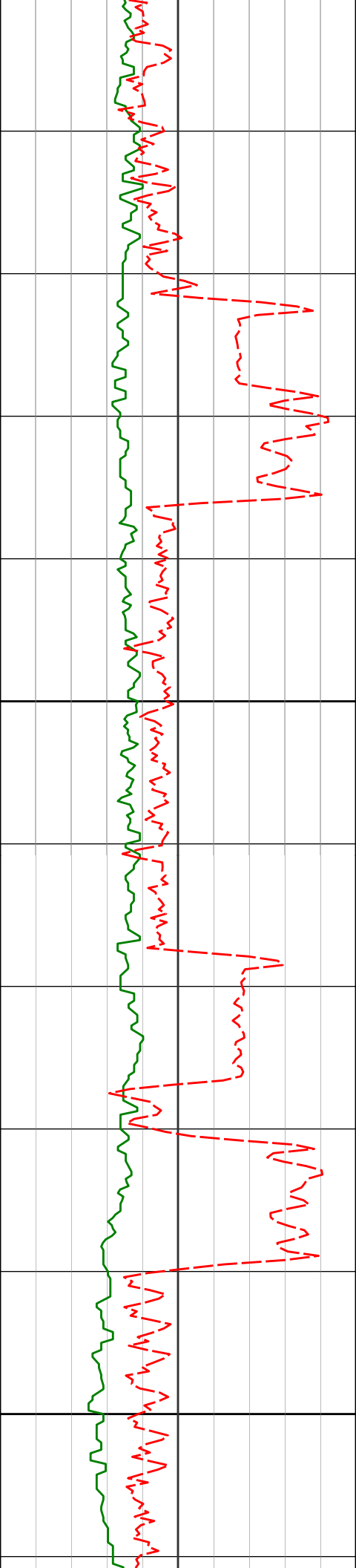
1847.74'

188.09°F

188.09°F

188.09°F

188.09°F



8600

8700

8567'

8661'

90.34°

90.62°

267.26°

267.75°

6666.99'

6666.21'

1940.16'

2033.68'

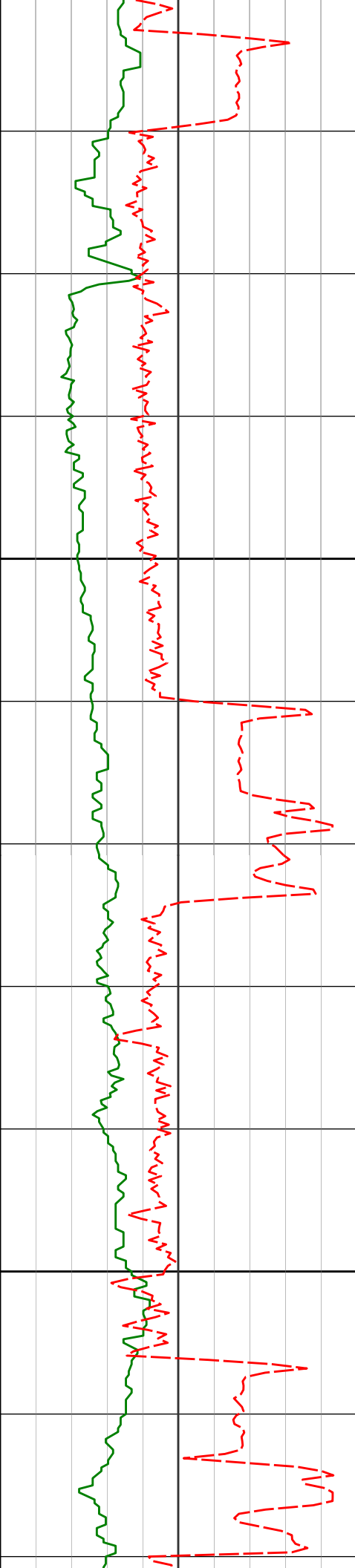
188.09°F

188.09°F

188.09°F

188.09°F

188.09°F



8800

8900

8753'

90.86°

269.42° 6665.02'

2125.36'

8845'

90.49°

269.57° 6663.93'

2217.15'

8936'

90.12°

269.28° 6663.45'

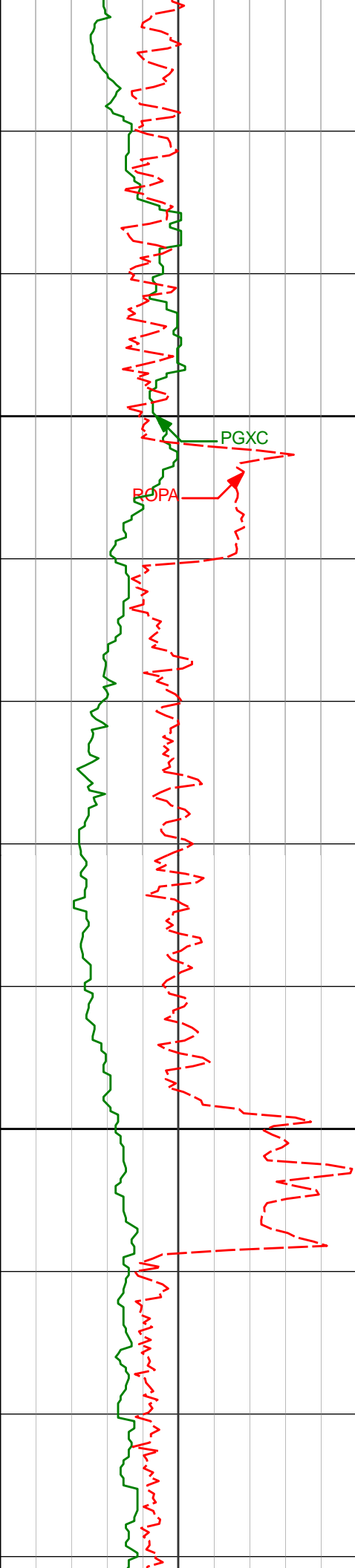
2307.94'

192.31°F

192.31°F

196.53°F

196.53°F



9000

9100

9028'

90.65°

268.93° 6662.83'

2399.69'

9121'

89.57°

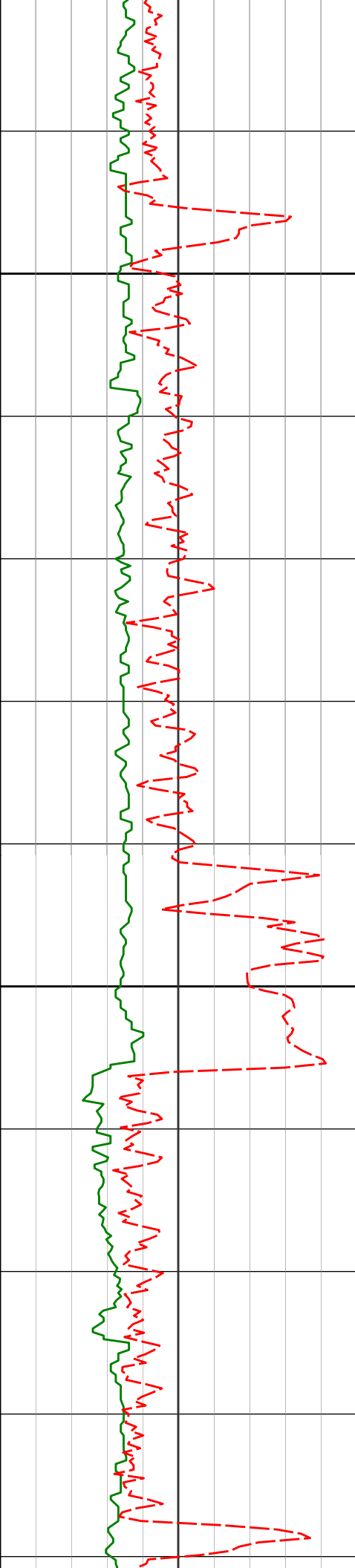
268.66° 6662.65'

2492.40'

192.31°F

195.43°F

196.53°F



9200

9214'

88.86°

267.58° 6663.93'

2585.01'

196.53°F

9300

9307'

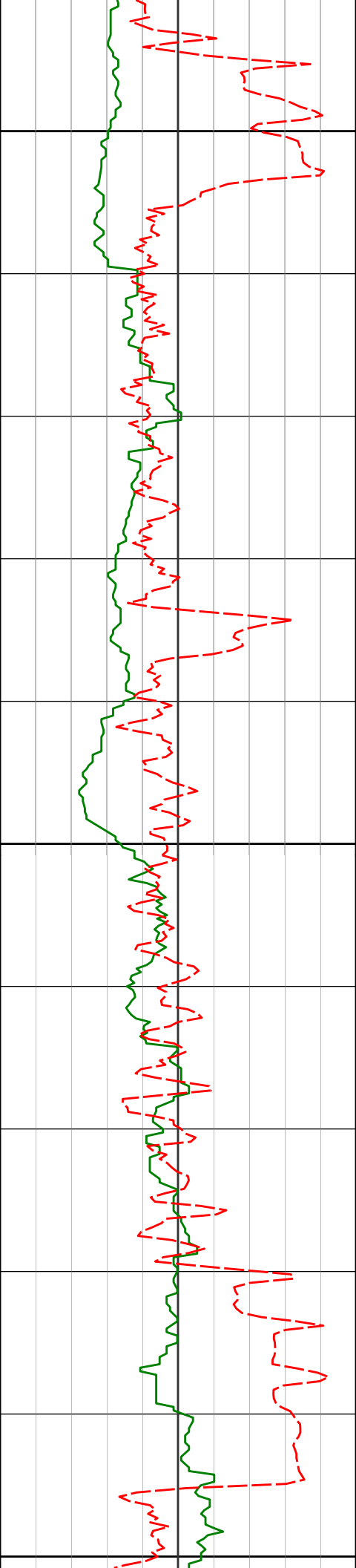
88.61°

268.52° 6665.98'

2677.60'

196.53°F

196.53°F



9400

200.75°F

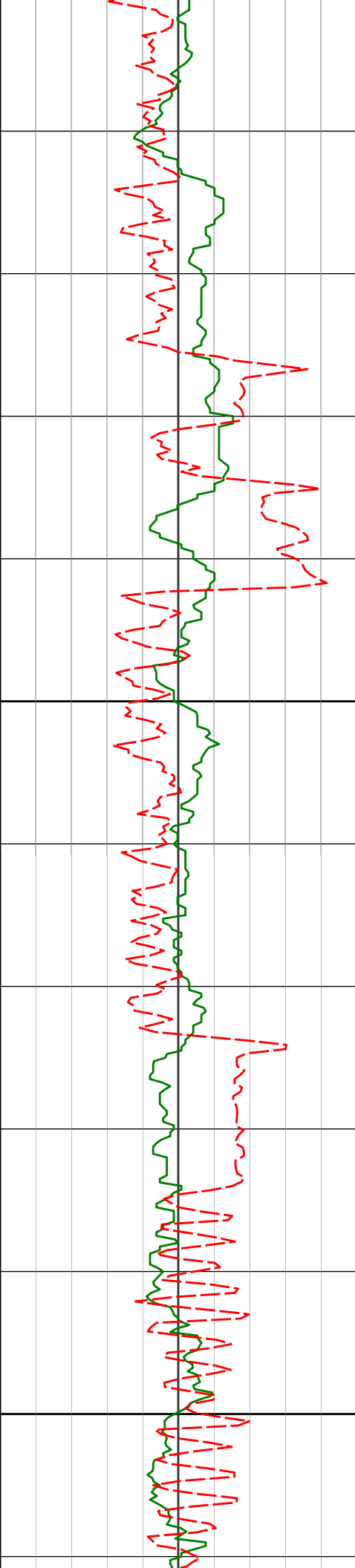
200.75°F

9500

200.75°F

9600

207.15°F



9700

9800

9679'

9774'

90.18°

91.54°

270.04°

270.47°

6664.32'

6662.89'

3048.54'

3143.40'

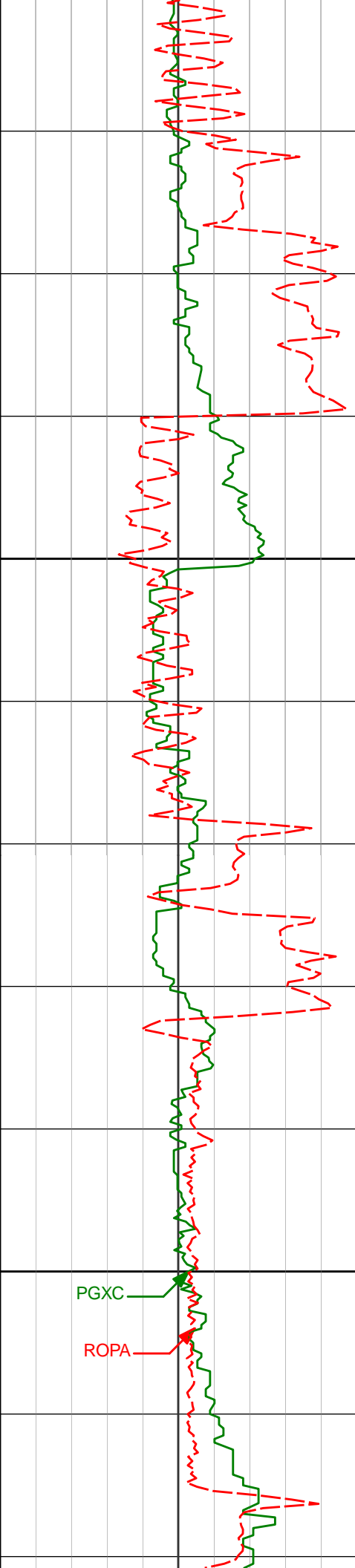
211.22°F

200.75°F

200.75°F

209.19°F

209.19°F



9900

10000

PGXC

ROPA

9868'

90.43°

271.07° 6661.28'

3237.29'

9963'

90.00°

271.21° 6660.92'

3332.22'

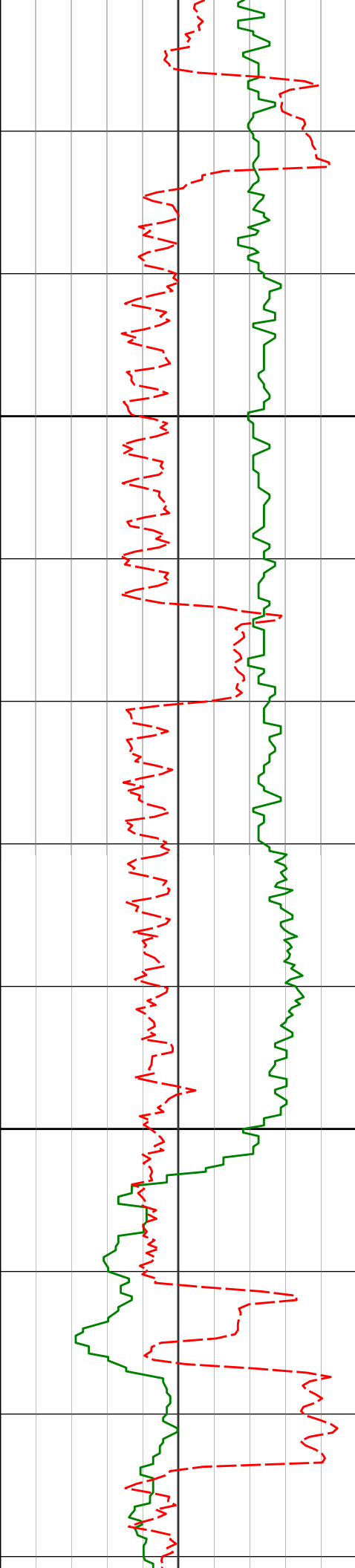
209.19°F

209.19°F

209.19°F

209.19°F

209.19°F



10058'

89.85°

270.76° 6661.04'

3427.14'

10100

209.19°F

209.19°F

10152'

90.12°

269.82° 6661.07'

3521.01'

209.19°F

10200

209.19°F

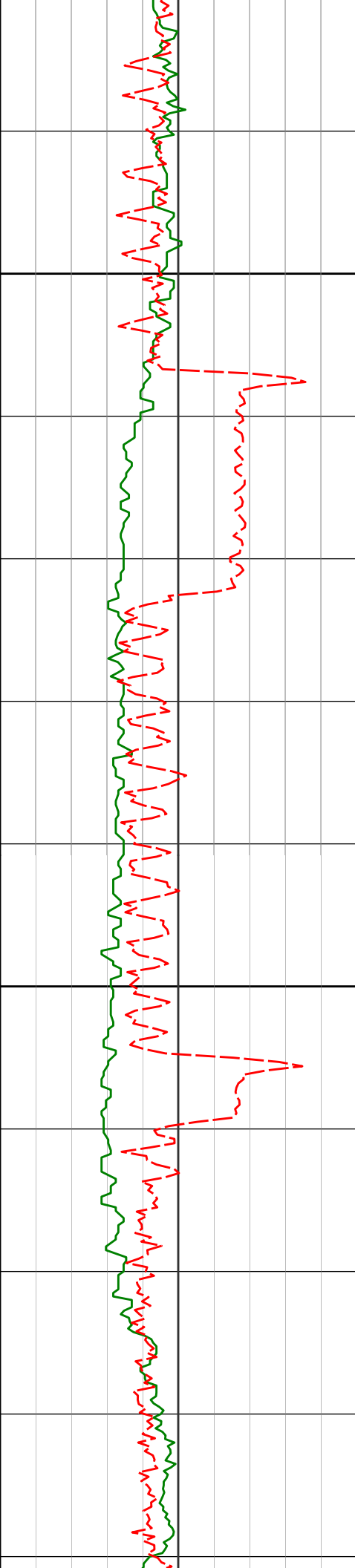
10247'

88.86°

270.46° 6661.92'

3615.86'

209.19°F



10300

213.41°F

10341'

89.01°

270.20° 6663.66'

3709.72'

213.41°F

10400

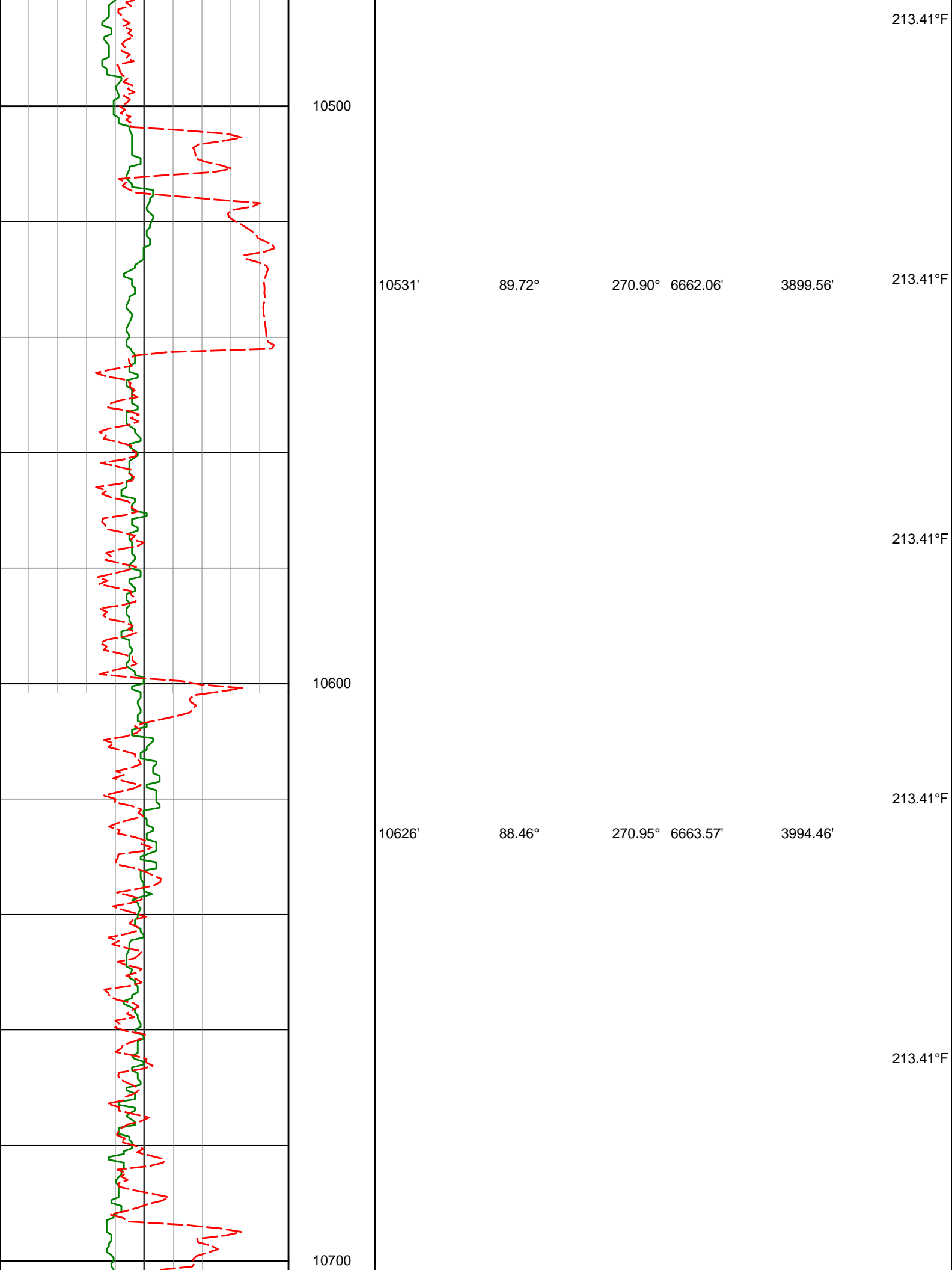
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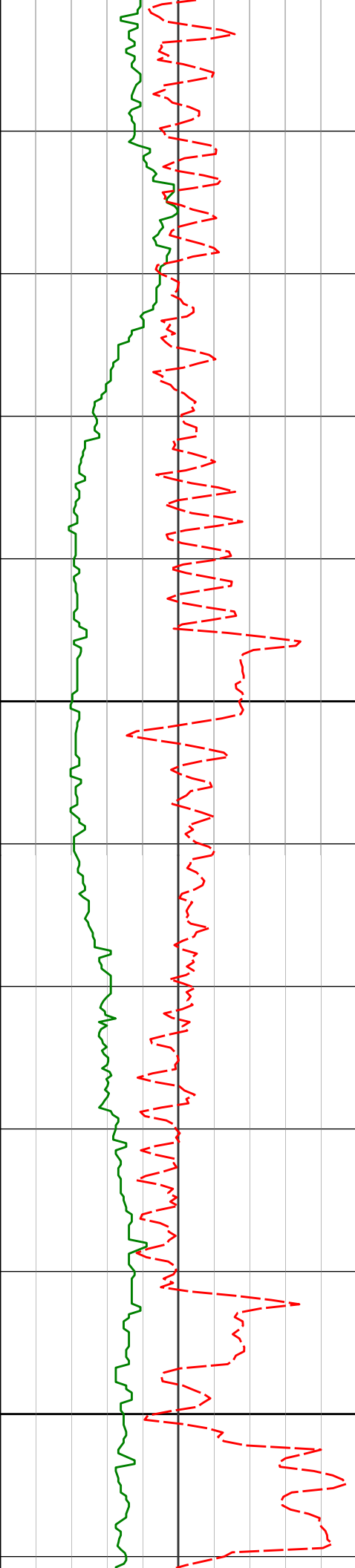
91.60°

271.72° 6663.16'

3804.63'

213.41°F





10800

10900

10720'

10815'

10910'

88.65°

88.89°

88.92°

270.88°

270.91°

269.16°

6665.94'

6667.98'

6669.80'

4088.35'

4183.25'

4278.07'

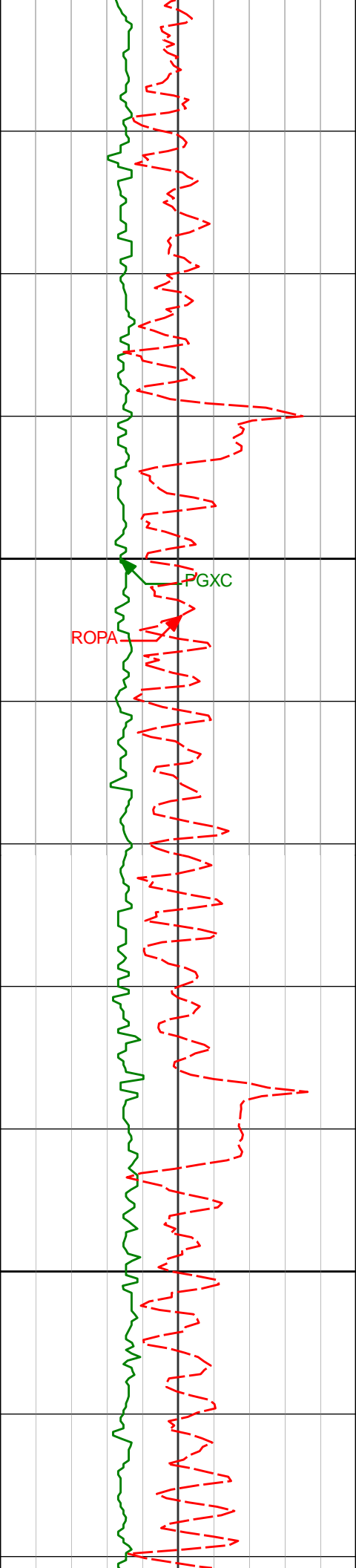
217.63°F

217.63°F

217.63°F

217.63°F

217.63°F



11000

11100

11004'

11099'

89.48°

89.11°

268.96° 6671.11'

267.92° 6672.28'

4371.81'

4466.46'

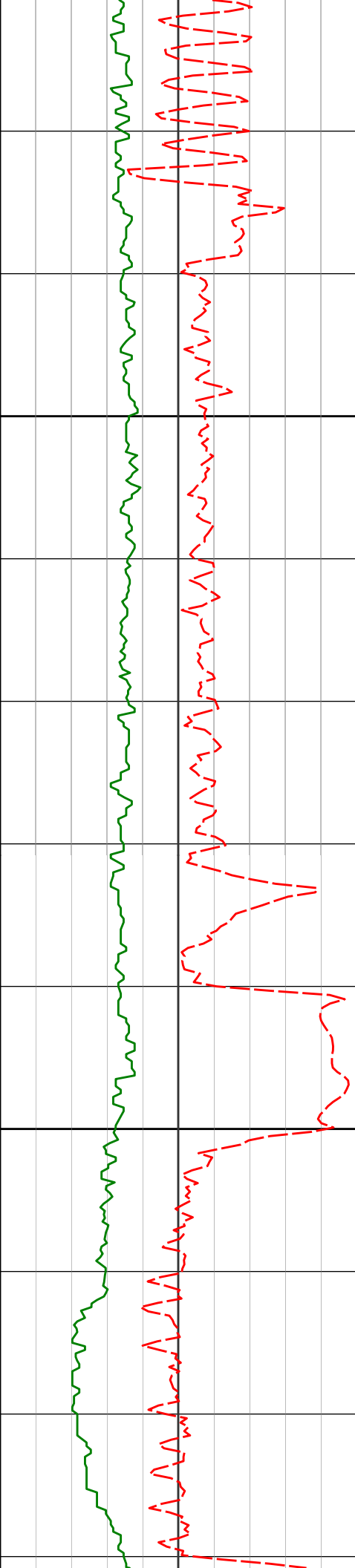
217.63°F

221.84°F

221.84°F

221.84°F

221.84°F



11200

11300

11193'

88.98°

266.50° 6673.84'

4559.91'

11288'

89.85°

266.33° 6674.81'

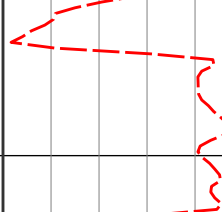
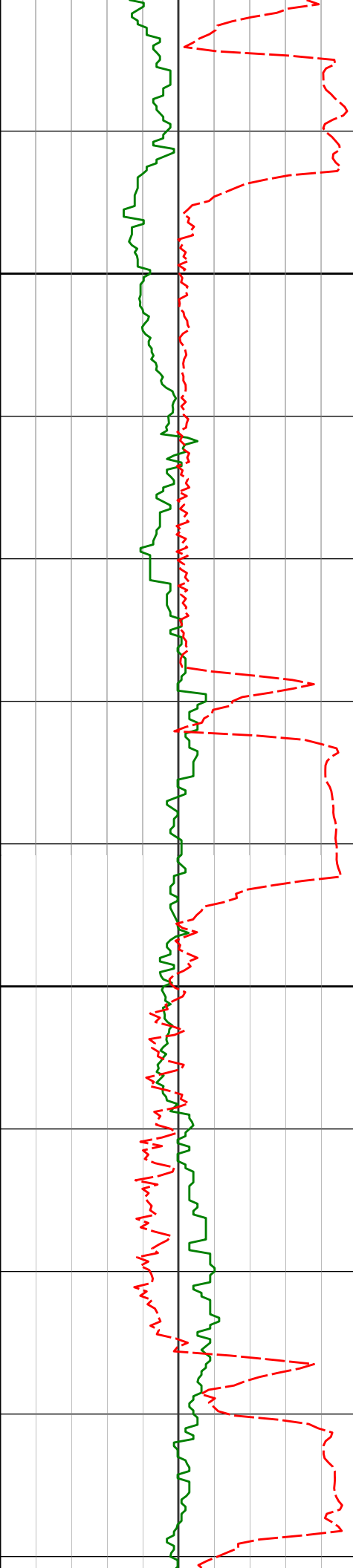
4654.22'

221.84°F

221.84°F

221.84°F

221.84°F



11400

11500

11383'

91.60°

267.65° 6673.61'

4748.63'

221.84°F

221.84°F

221.84°F

11478'

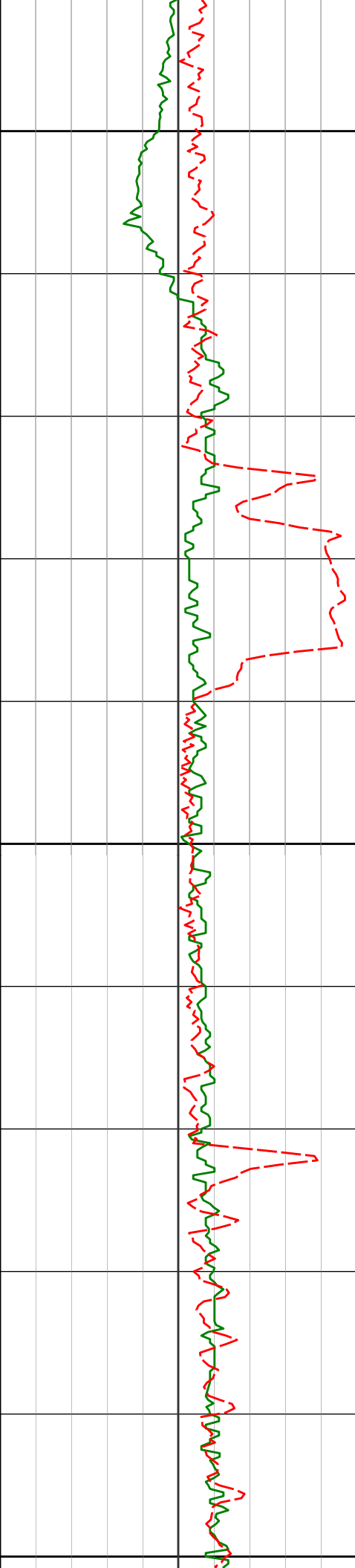
91.29°

269.52° 6671.22'

4843.28'

221.84°F

221.84°F



11600

221.84°F

221.84°F

11667'

90.15°

269.54° 6668.06'

5031.89'

11700

221.84°F

221.84°F

11762'

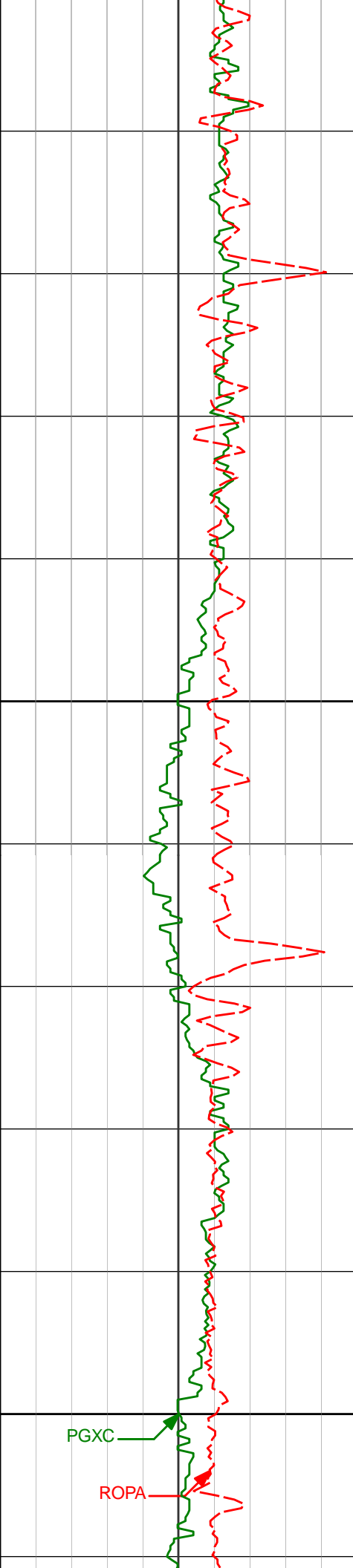
90.55°

269.55° 6667.47'

5126.69'

11800

221.84°F



11900

11951'

90.89°

268.61° 6665.43'

5315.13'

12000

PGXC

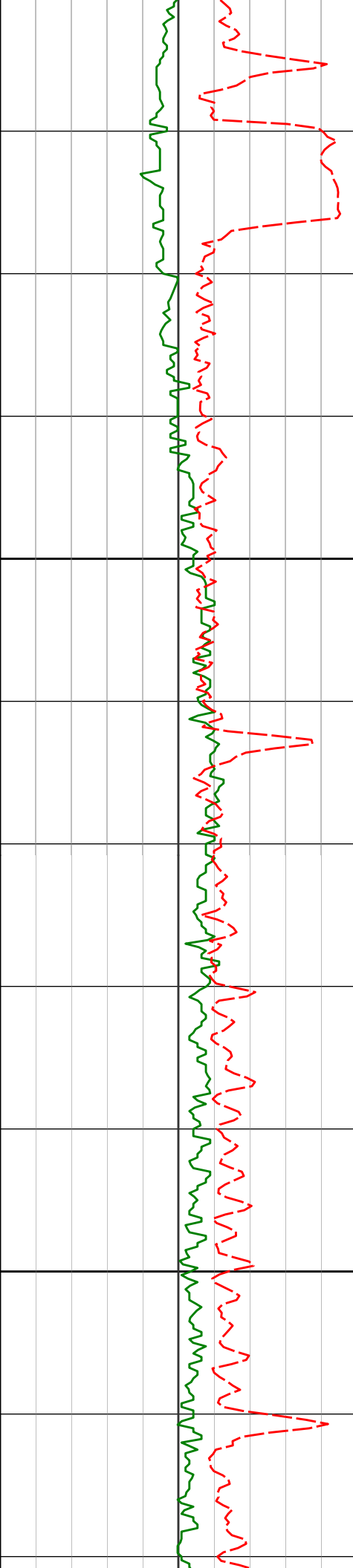
ROPA

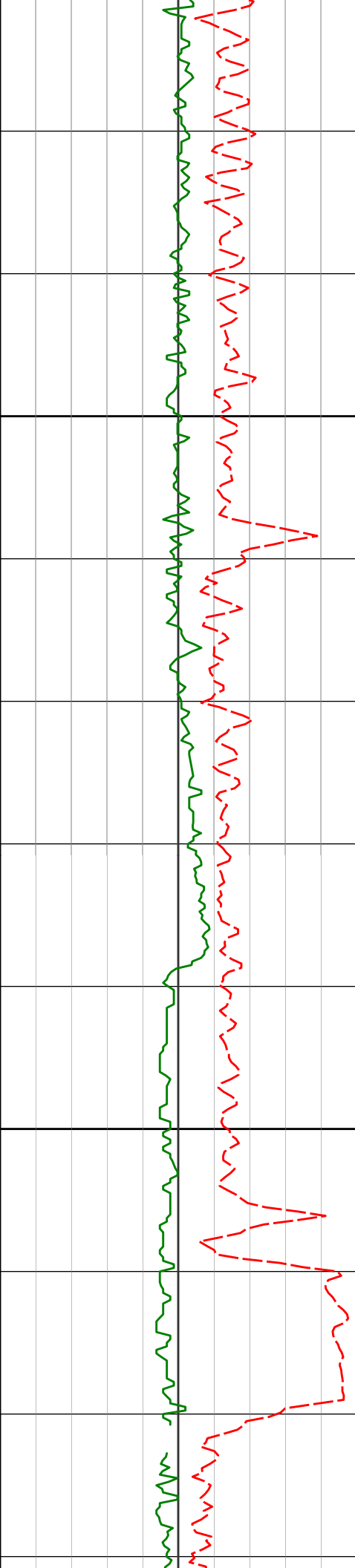
226.06°F

226.06°F

226.06°F

226.06°F





12300

12329'

90.95°

268.14° 6662.48'

5692.01'

230.28°F

12400

12424'

89.94°

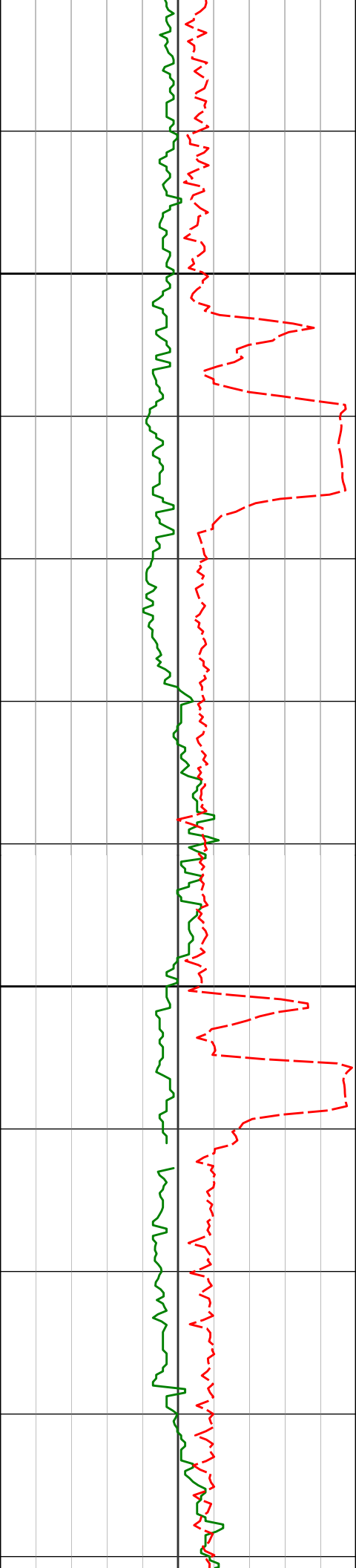
266.97° 6661.74'

5786.53'

230.28°F

230.28°F

230.28°F



12500

12600

12518'

12613'

90.15°

89.94°

267.67°

268.75°

6661.66'

6661.59'

5880.01'

5974.64'

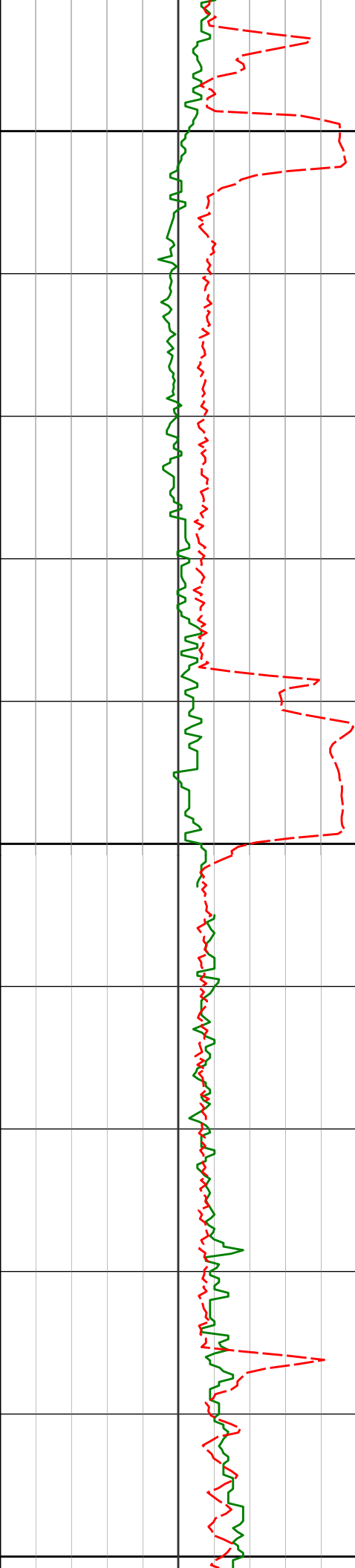
230.28°F

226.06°F

226.06°F

226.06°F

226.06°F



12700

12708'

90.22°

269.69° 6661.46'

6069.40'

230.28°F

230.28°F

226.06°F

12800

12802'

89.01°

270.02° 6662.09'

6163.23'

226.06°F

230.28°F

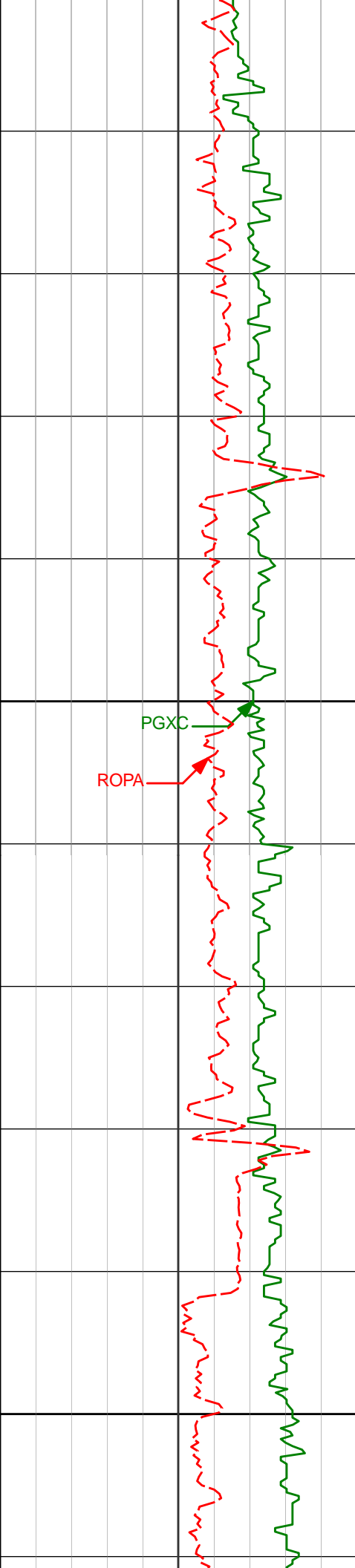
12900

12897'

89.32°

269.90° 6663.47'

6258.06'



13000

13100

12992'

89.38°

269.93° 6664.55'

6352.88'

13086'

89.23°

269.28° 6665.69'

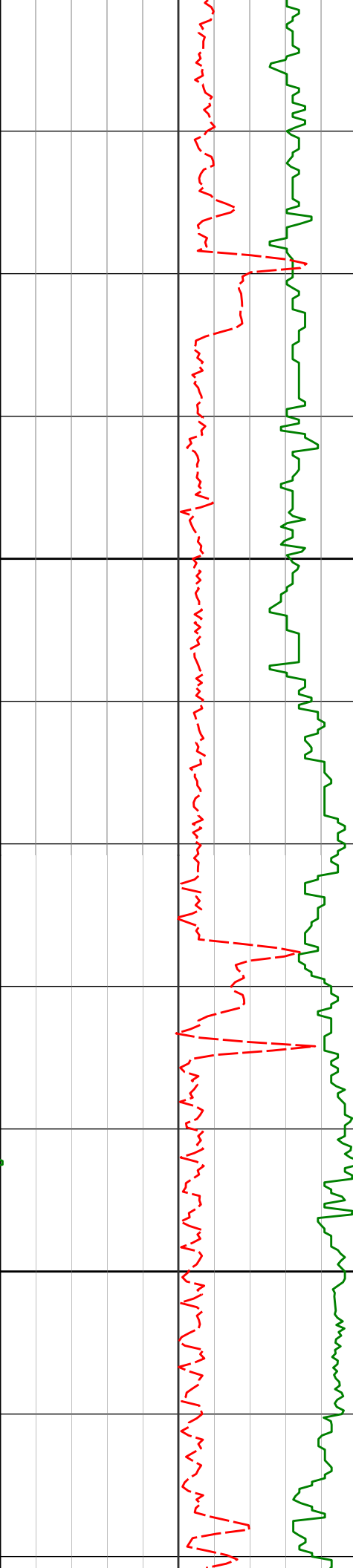
6446.68'

230.28°F

230.28°F

230.28°F

230.28°F



13200

13300

13181'

89.35°

269.13° 6666.87'

6541.43'

13275'

90.25°

268.82° 6667.20'

6635.16'

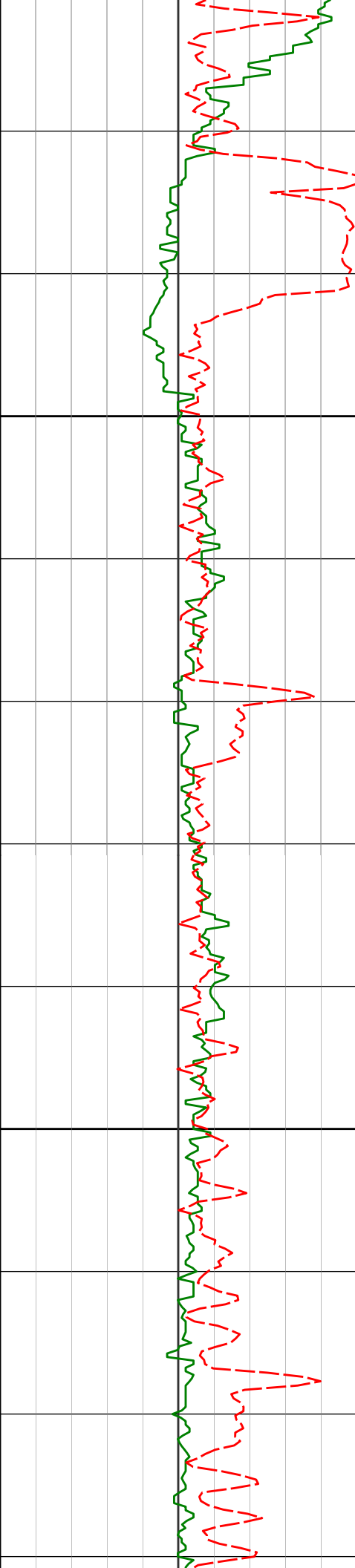
230.28°F

234.50°F

234.50°F

234.50°F

234.50°F



13370'

89.17°

270.63° 6667.68'

6729.97'

230.28°F

13400

230.28°F

234.50°F

13500

234.50°F

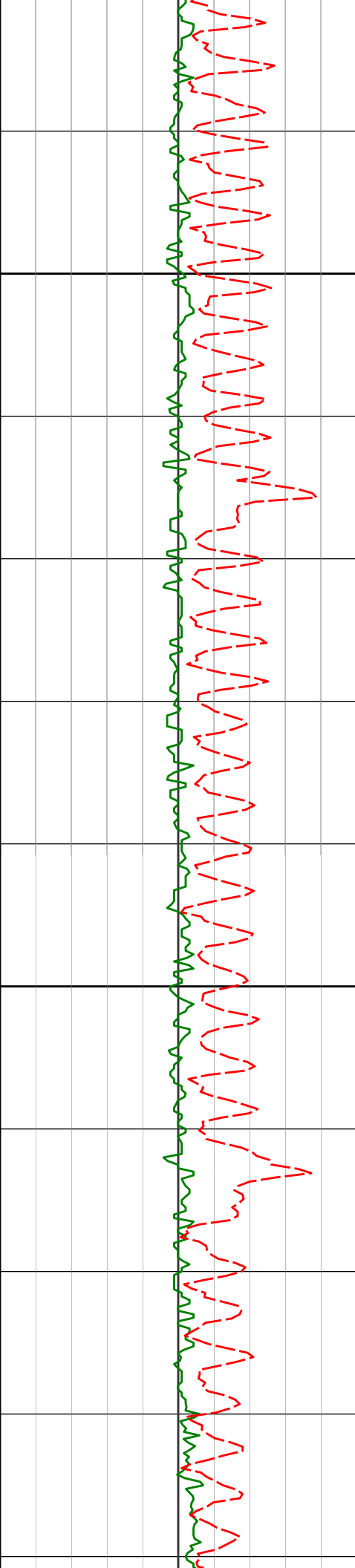
234.50°F

13559'

89.51°

271.10° 6669.85'

6918.78'



13600

13700

13654'

13776'

89.75°

90.71°

270.80° 6670.47'

270.33° 6669.98'

7013.70'

7135.56'

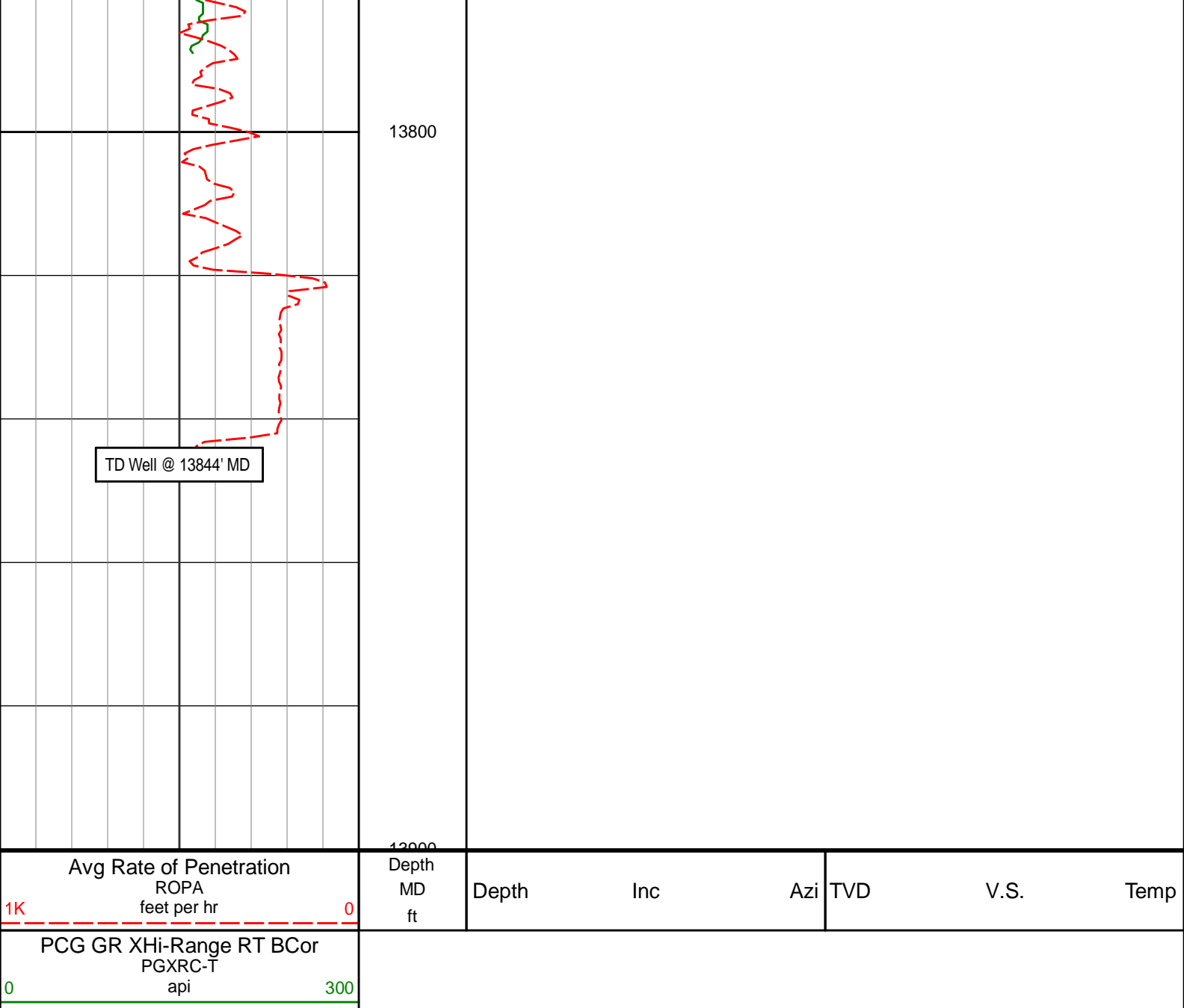
234.50°F

234.50°F

234.50°F

238.72°F

235.91°F



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy Inc.
Wells Ranch AA11-628
Wattenburg
Weld Colorado
USA
CA-XX-0902258970

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
638.00	0.25	305.12	638.00	0.81 N	1.16 W	1.20	0.04
733.00	0.22	350.39	733.00	1.12 N	1.36 W	1.42	0.20
827.00	0.26	56.55	827.00	1.42 N	1.21 W	1.29	0.29
922.00	0.28	151.82	922.00	1.34 N	0.92 W	0.99	0.42
1017.00	0.30	142.24	1016.99	0.94 N	0.66 W	0.71	0.06
1110.00	0.40	172.07	1109.99	0.42 N	0.46 W	0.48	0.22
1203.00	0.57	179.16	1202.99	0.36 S	0.41 W	0.39	0.19
1297.00	0.62	182.84	1296.98	1.33 S	0.43 W	0.35	0.07

1389.00	0.72	192.98	1388.98	2.39 S	0.58 W	0.44	0.17
1483.00	0.58	192.12	1482.97	3.43 S	0.81 W	0.62	0.15
1575.00	1.47	55.97	1574.96	3.22 S	0.07 E	-0.25	2.09
1668.00	3.44	42.10	1667.87	0.48 S	2.93 E	-2.95	2.20
1760.00	5.22	25.48	1759.61	5.35 N	6.58 E	-6.26	2.34
1852.00	6.38	22.96	1851.14	13.83 N	10.37 E	-9.57	1.30
1946.00	7.38	27.22	1944.46	24.01 N	15.17 E	-13.78	1.19
2039.00	9.22	24.97	2036.48	36.08 N	21.05 E	-18.96	2.01
2131.00	7.95	20.44	2127.45	48.72 N	26.38 E	-23.56	1.57
2222.00	9.48	25.03	2217.40	61.40 N	31.75 E	-28.20	1.85
2314.00	8.73	23.08	2308.24	74.69 N	37.69 E	-33.37	0.88
2407.00	8.22	18.19	2400.23	87.50 N	42.54 E	-37.48	0.95
2499.00	9.88	25.35	2491.08	100.88 N	47.97 E	-42.14	2.18
2593.00	9.35	22.05	2583.76	115.25 N	54.29 E	-47.63	0.82
2685.00	9.05	19.46	2674.58	128.99 N	59.50 E	-52.05	0.55
2778.00	8.61	17.46	2766.48	142.53 N	64.03 E	-55.80	0.58
2870.00	10.04	21.56	2857.26	156.56 N	69.05 E	-60.00	1.72
2965.00	9.76	17.83	2950.84	171.93 N	74.56 E	-64.63	0.74
3059.00	9.79	16.58	3043.48	187.17 N	79.28 E	-68.47	0.23
3154.00	8.95	14.07	3137.21	202.08 N	83.38 E	-71.71	0.98
3249.00	8.61	11.44	3231.10	216.21 N	86.58 E	-74.11	0.55
3343.00	8.81	21.35	3324.02	229.81 N	90.60 E	-77.34	1.61
3438.00	8.88	23.95	3417.89	243.29 N	96.22 E	-82.19	0.43
3533.00	9.59	28.86	3511.66	256.93 N	103.02 E	-88.20	1.11
3628.00	9.20	25.38	3605.39	270.72 N	110.10 E	-94.48	0.72
3722.00	9.47	24.91	3698.14	284.53 N	116.58 E	-100.16	0.30
3817.00	10.11	23.54	3791.76	299.26 N	123.20 E	-105.93	0.71
3911.00	10.56	23.50	3884.23	314.72 N	129.93 E	-111.77	0.48
4005.00	11.02	20.92	3976.57	331.02 N	136.57 E	-117.47	0.72
4100.00	9.18	22.74	4070.09	346.49 N	142.75 E	-122.75	1.97
4195.00	8.95	21.74	4163.91	360.34 N	148.41 E	-127.62	0.29
4289.00	8.49	17.79	4256.82	373.74 N	153.24 E	-131.67	0.80
4384.00	9.58	15.18	4350.64	388.05 N	157.45 E	-135.06	1.23
4478.00	9.03	12.26	4443.40	402.82 N	161.07 E	-137.83	0.77
4573.00	8.57	8.07	4537.29	417.11 N	163.65 E	-139.59	0.83
4762.00	6.75	358.01	4724.60	442.15 N	165.24 E	-139.75	1.19
4857.00	5.64	358.84	4819.04	452.40 N	164.95 E	-138.88	1.17
4952.00	3.58	21.41	4913.74	459.83 N	165.94 E	-139.44	2.85
5046.00	2.93	22.93	5007.59	464.77 N	167.94 E	-141.16	0.70
5141.00	2.48	21.18	5102.48	468.92 N	169.63 E	-142.61	0.48
5235.00	1.89	21.27	5196.41	472.25 N	170.93 E	-143.71	0.63
5330.00	1.14	24.01	5291.38	474.58 N	171.88 E	-144.53	0.79
5425.00	0.88	28.63	5386.36	476.08 N	172.61 E	-145.18	0.29
5519.00	0.86	58.04	5480.35	477.09 N	173.56 E	-146.06	0.47
5614.00	0.83	93.84	5575.34	477.42 N	174.85 E	-147.34	0.55
5708.00	0.81	80.19	5669.33	477.49 N	176.19 E	-148.67	0.21
5803.00	0.73	88.41	5764.33	477.62 N	177.46 E	-149.93	0.14
5992.00	1.54	116.52	5953.29	476.52 N	180.94 E	-153.47	0.51
6087.00	2.83	258.00	6048.25	475.46 N	179.79 E	-152.38	4.36
6181.00	9.82	261.50	6141.63	473.79 N	169.58 E	-142.28	7.45
6276.00	13.43	272.47	6234.67	473.07 N	150.54 E	-123.31	4.44
6371.00	22.18	286.10	6325.07	478.53 N	122.23 E	-94.73	10.14
6466.00	30.11	290.03	6410.29	491.69 N	82.55 E	-54.37	8.54
6560.00	40.91	286.76	6486.70	508.69 N	30.76 E	-1.70	11.66
6655.00	49.50	281.51	6553.60	524.90 N	34.56 W	64.45	9.85
6749.00	58.93	266.96	6608.70	529.93 N	110.22 W	140.27	16.03
6844.00	73.72	267.15	6646.74	525.48 N	196.86 W	226.52	15.57
6937.00	87.50	268.94	6661.88	522.40 N	288.34 W	317.67	14.94
6990.00	89.17	269.67	6663.41	521.76 N	341.31 W	370.52	3.43
7070.00	90.49	270.42	6663.65	521.82 N	421.31 W	450.39	1.90
7164.00	89.20	267.92	6663.91	520.46 N	515.29 W	544.14	2.99
7259.00	89.57	267.87	6664.93	516.97 N	610.22 W	638.72	0.39
7353.00	89.91	268.07	6665.35	513.64 N	704.16 W	732.31	0.42
7448.00	88.49	267.21	6666.68	509.73 N	799.07 W	826.84	1.75
7542.00	88.98	266.88	6668.76	504.88 N	892.92 W	920.26	0.63
7637.00	90.00	267.86	6669.60	500.52 N	987.81 W	1014.76	1.49
7731.00	90.25	268.00	6669.40	497.13 N	1081.75 W	1108.35	0.30
7825.00	90.62	267.81	6668.68	493.69 N	1175.69 W	1201.93	0.44
7918.00	91.17	268.07	6667.23	490.35 N	1268.61 W	1294.52	0.65
8011.00	88.89	268.53	6667.18	487.59 N	1361.57 W	1387.16	2.50
8104.00	88.58	268.38	6669.23	485.08 N	1454.51 W	1479.81	0.37
8198.00	90.15	267.76	6670.28	481.92 N	1548.45 W	1573.42	1.80
8289.00	90.15	266.94	6670.04	477.71 N	1639.35 W	1663.93	0.90
8382.00	90.25	266.83	6669.71	472.66 N	1732.21 W	1756.35	0.16

8474.00	91.39	266.63	6668.40	467.41 N	1824.05 W	1847.74	1.26
8567.00	90.34	267.24	6666.99	462.44 N	1916.91 W	1940.16	1.31
8661.00	90.62	267.73	6666.21	458.31 N	2010.81 W	2033.68	0.60
8753.00	90.86	269.39	6665.02	456.00 N	2102.77 W	2125.36	1.82
8845.00	90.49	269.54	6663.93	455.14 N	2194.76 W	2217.15	0.43
8936.00	90.12	269.25	6663.45	454.18 N	2285.75 W	2307.94	0.52
9028.00	90.65	268.91	6662.83	452.71 N	2377.74 W	2399.69	0.68
9121.00	89.57	268.63	6662.65	450.71 N	2470.72 W	2492.40	1.20
9214.00	88.86	267.55	6663.93	447.61 N	2563.65 W	2585.01	1.39
9307.00	88.61	268.50	6665.98	444.40 N	2656.58 W	2677.60	1.06
9492.00	91.32	268.44	6666.09	439.47 N	2841.49 W	2861.93	1.47
9585.00	90.34	270.09	6664.75	438.27 N	2934.47 W	2954.69	2.06
9679.00	90.18	270.02	6664.32	438.36 N	3028.47 W	3048.54	0.19
9774.00	91.54	270.44	6662.89	438.74 N	3123.46 W	3143.40	1.50
9868.00	90.43	271.04	6661.28	439.96 N	3217.43 W	3237.29	1.34
9963.00	90.00	271.19	6660.92	441.81 N	3312.41 W	3332.22	0.48
10058.00	89.85	270.72	6661.04	443.39 N	3407.40 W	3427.14	0.52
10152.00	90.12	269.79	6661.07	443.81 N	3501.40 W	3521.01	1.03
10247.00	88.86	270.42	6661.92	443.98 N	3596.39 W	3615.86	1.48
10341.00	89.01	270.18	6663.66	444.47 N	3690.37 W	3709.72	0.30
10436.00	91.60	271.70	6663.16	446.03 N	3785.35 W	3804.63	3.16
10531.00	89.72	270.89	6662.06	448.18 N	3880.31 W	3899.56	2.15
10626.00	88.46	270.93	6663.57	449.69 N	3975.29 W	3994.46	1.33
10720.00	88.65	270.85	6665.94	451.15 N	4069.25 W	4088.35	0.22
10815.00	88.89	270.89	6667.98	452.59 N	4164.21 W	4183.25	0.26
10910.00	88.92	269.15	6669.80	452.62 N	4259.19 W	4278.07	1.83
11004.00	89.48	268.92	6671.11	451.04 N	4353.17 W	4371.81	0.64
11099.00	89.11	267.91	6672.28	448.41 N	4448.12 W	4466.46	1.13
11193.00	88.98	266.45	6673.84	443.79 N	4541.99 W	4559.91	1.56
11288.00	89.85	266.28	6674.81	437.77 N	4636.80 W	4654.22	0.93
11383.00	91.60	267.64	6673.61	432.73 N	4731.65 W	4748.63	2.33
11478.00	91.29	269.51	6671.22	430.37 N	4826.59 W	4843.28	1.99
11572.00	91.20	270.03	6669.17	429.99 N	4920.56 W	4937.08	0.56
11667.00	90.15	269.51	6668.06	429.61 N	5015.55 W	5031.89	1.23
11762.00	90.55	269.54	6667.47	428.82 N	5110.55 W	5126.69	0.42
11856.00	90.52	268.76	6666.60	427.43 N	5204.53 W	5220.44	0.83
11951.00	90.89	268.57	6665.43	425.21 N	5299.50 W	5315.13	0.44
12046.00	90.22	269.70	6664.51	423.78 N	5394.48 W	5409.87	1.38
12140.00	90.28	268.91	6664.10	422.64 N	5488.47 W	5503.65	0.84
12235.00	90.37	268.71	6663.56	420.66 N	5583.45 W	5598.36	0.23
12329.00	90.95	268.11	6662.48	418.06 N	5677.41 W	5692.01	0.89
12424.00	89.94	266.93	6661.74	413.95 N	5772.31 W	5786.53	1.63
12518.00	90.15	267.64	6661.66	409.49 N	5866.21 W	5880.01	0.79
12613.00	89.94	268.74	6661.59	406.49 N	5961.16 W	5974.64	1.18
12708.00	90.22	269.66	6661.46	405.17 N	6056.15 W	6069.40	1.01
12802.00	89.01	270.01	6662.09	404.90 N	6150.14 W	6163.23	1.34
12897.00	89.32	269.86	6663.47	404.79 N	6245.13 W	6258.06	0.36
12992.00	89.38	269.88	6664.55	404.57 N	6340.13 W	6352.88	0.07
13086.00	89.23	269.23	6665.69	403.84 N	6434.12 W	6446.68	0.71
13181.00	89.35	269.09	6666.87	402.45 N	6529.10 W	6541.43	0.19
13275.00	90.25	268.81	6667.20	400.73 N	6623.08 W	6635.16	1.00
13370.00	89.17	270.62	6667.68	400.25 N	6718.07 W	6729.97	2.22
13559.00	89.51	271.06	6669.85	403.02 N	6907.04 W	6918.78	0.29
13654.00	89.75	270.76	6670.47	404.53 N	7002.03 W	7013.70	0.40
13776.00	90.71	270.32	6669.98	405.68 N	7124.02 W	7135.56	0.87
13844.00	90.71	270.32	6669.14	406.06 N	7192.01 W	7203.46	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 273.27 DEGREES (GRID)
A TOTAL CORRECTION OF 7.38 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13844.00 FEET
IS 7203.47 FEET ALONG 273.23 DEGREES (GRID)

Surveys from 7070' to TD are IFR corrected.
Final survey is a straight line projection to TD.