

PCGK - Pressure Case Gamma

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	02-Mar-15	03-Mar-15	05-Mar-15		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.870	6.870	4.750		
Log Start Depth (MD, ft)	848.00	6,140.00	7,252.00		
Log End Depth (MD, ft)	6,140.00	7,252.00	11,296.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	01-Mar-15 03:50	02-Mar-15 10:07	04-Mar-15 02:30		
Drill/Wipe End Date and Time	02-Mar-15 02:48	03-Mar-15 00:22	05-Mar-15 03:13		
Min Inc (deg) @ Depth (MD, ft)	0.67 @ 1,545.00	8.29 @ 6,184.00	86.64 @ 9,159.00		
Max Inc (deg) @ Depth (MD, ft)	12.98 @ 3,816.00	83.61 @ 7,198.00	92.47 @ 8,590.00		
Bit TFA(in2) / Bit Type	1.16 / PDC	1.38 / PDC	0.60 / PDC		
Flow Rate (gpm)	596.00	586.92	315.00		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.55 / 36.00	10.30 / 37.00	9.35 / 35.00		
Filtrate CL (ppm)	2,100.00	2,100.00	2,000.00		
pH / Fluid Loss (mptm)	8.40 / 7	8.00 / 8	9.80 / 8		
PV (cP) / YP (lbf2)	9 / 11.00	9 / 13.00	7 / 10.00		
% Solids / % Sand	6.00 / 0.30	9.20 / 0.30	5.00 / 0.30		
% Oil / Oil:Water Ratio	N/A / N/A	1.00 / N/A	1.00 / N/A		
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		
Min Temp (in) / Temp (degF)	111.50 / 230.70	122.00 / 251.60	222.70 / 432.86		

Max Tool Temp (degF) / Source	144.50 / PCM	163.20 / PCM	228.70 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 144.50	N/A @ 163.20	N/A @ 228.70		
Lead MWD Engineer	Kyle Wass	Kyle Wass	Kyle Wass		
Customer Representative	Stetson Nielson	Stetson Nielson	Stetson Nielson		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404302	11404302	11768602		
Insert Serial Number	11680738	11680738	11680738		
Date and Time Initialized	28-Feb-15 17:56	01-Jan-70 00:00	03-Mar-15 11:21		
Date and Time Read	03-Mar-15 06:37	03-Mar-15 06:31	05-Mar-15 11:43		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	54.00	65.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404302	11404302	11768602		
Sonde Serial Number	11478053	11478053	11478053		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	46.00	84.70	72.60		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	47.90	46.82	68.36		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404302	11404302	11768602		
Insert/Sonde Serial Number	11681051	11681051	11681051		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measure depth's from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
 - 1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft
 - 1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
 - ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft

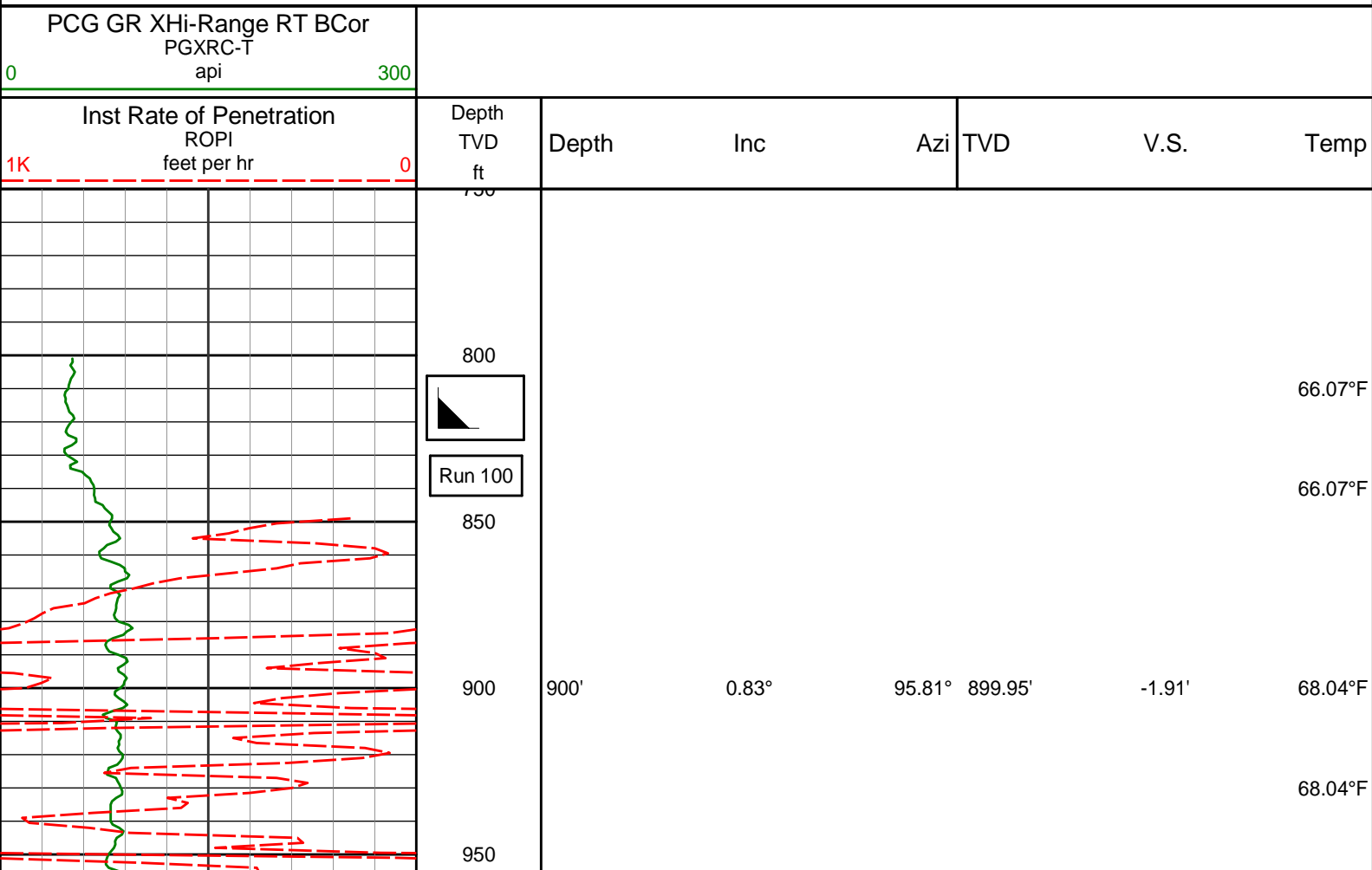
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft

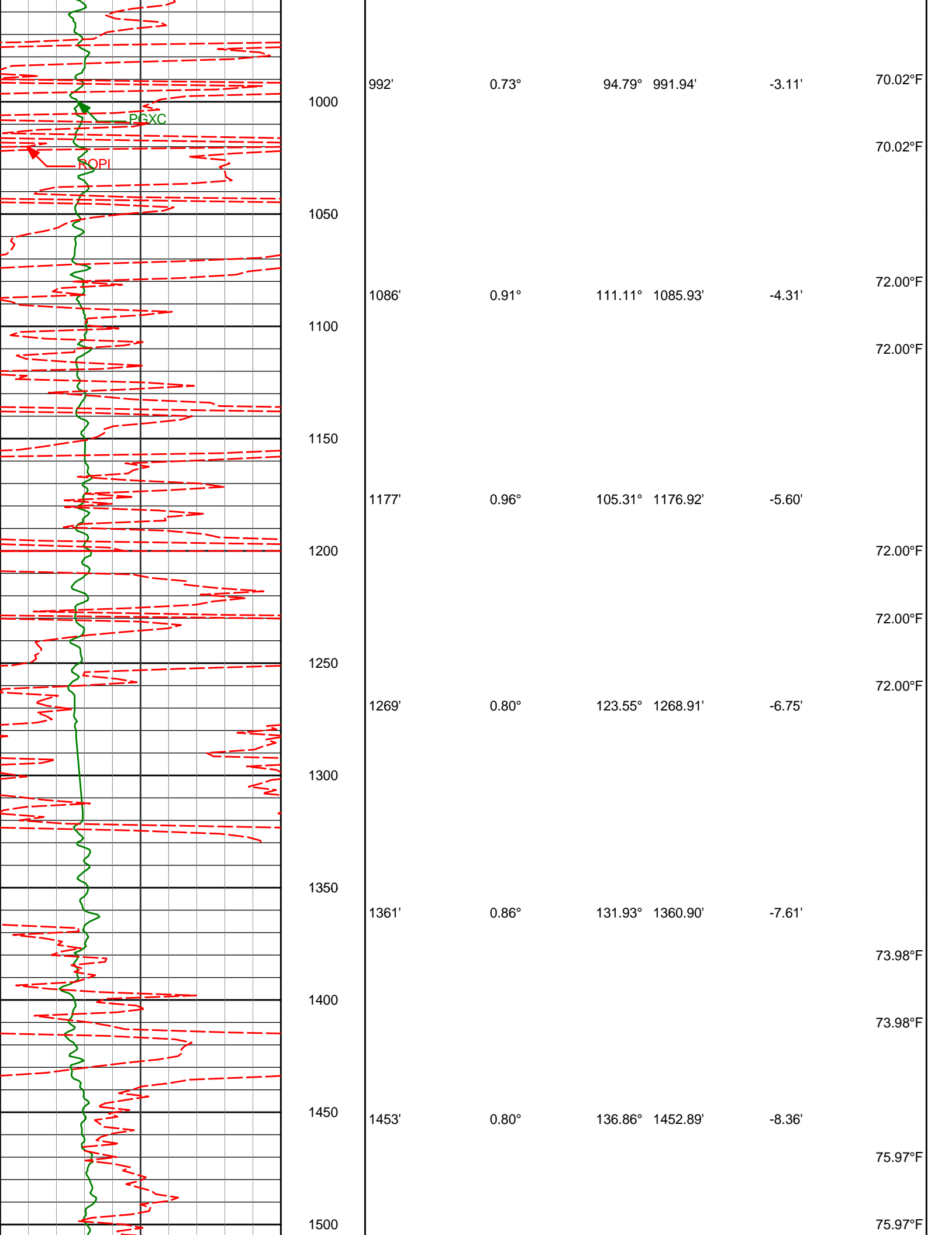
6. Insite Version v8.1.10

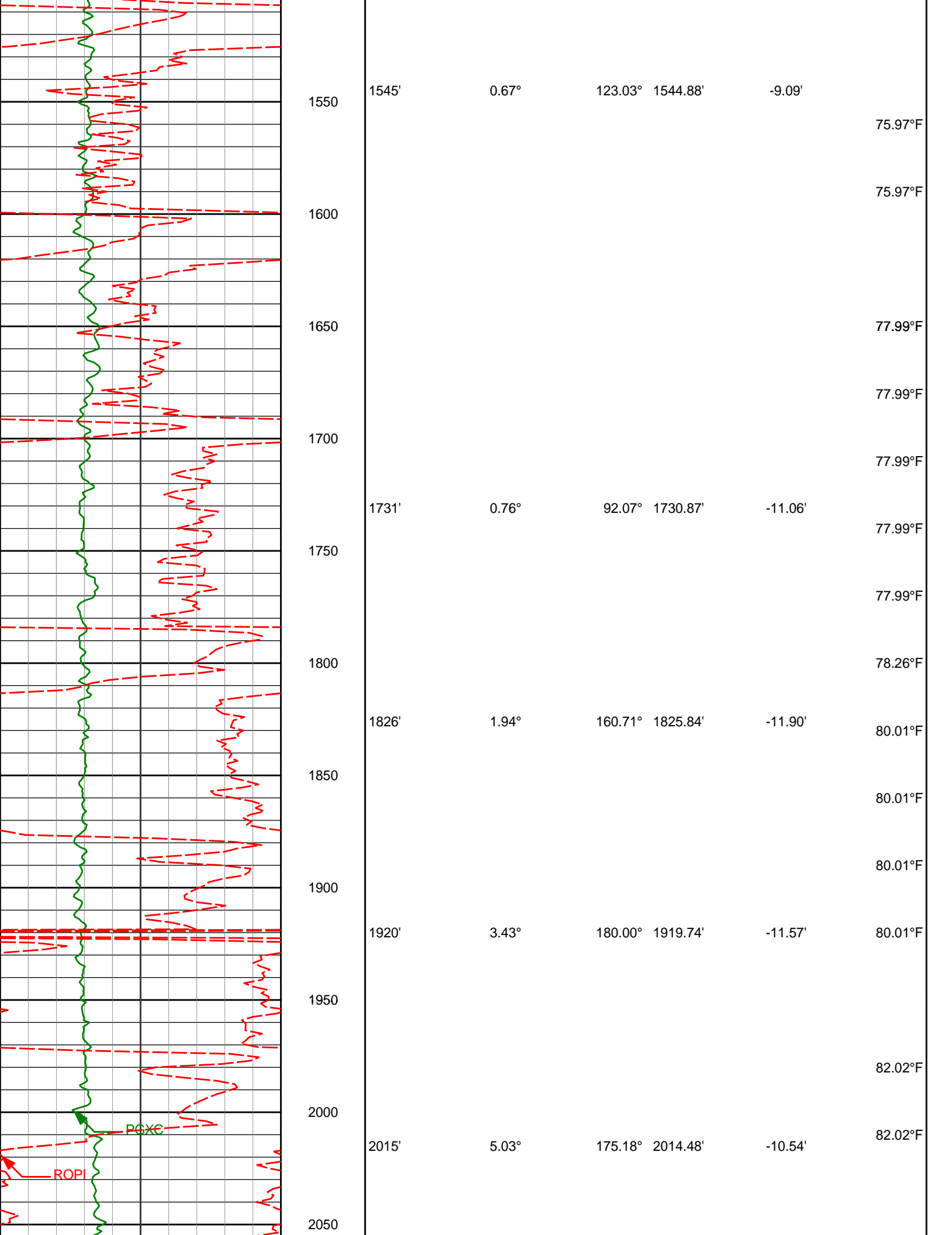
WARRANTY

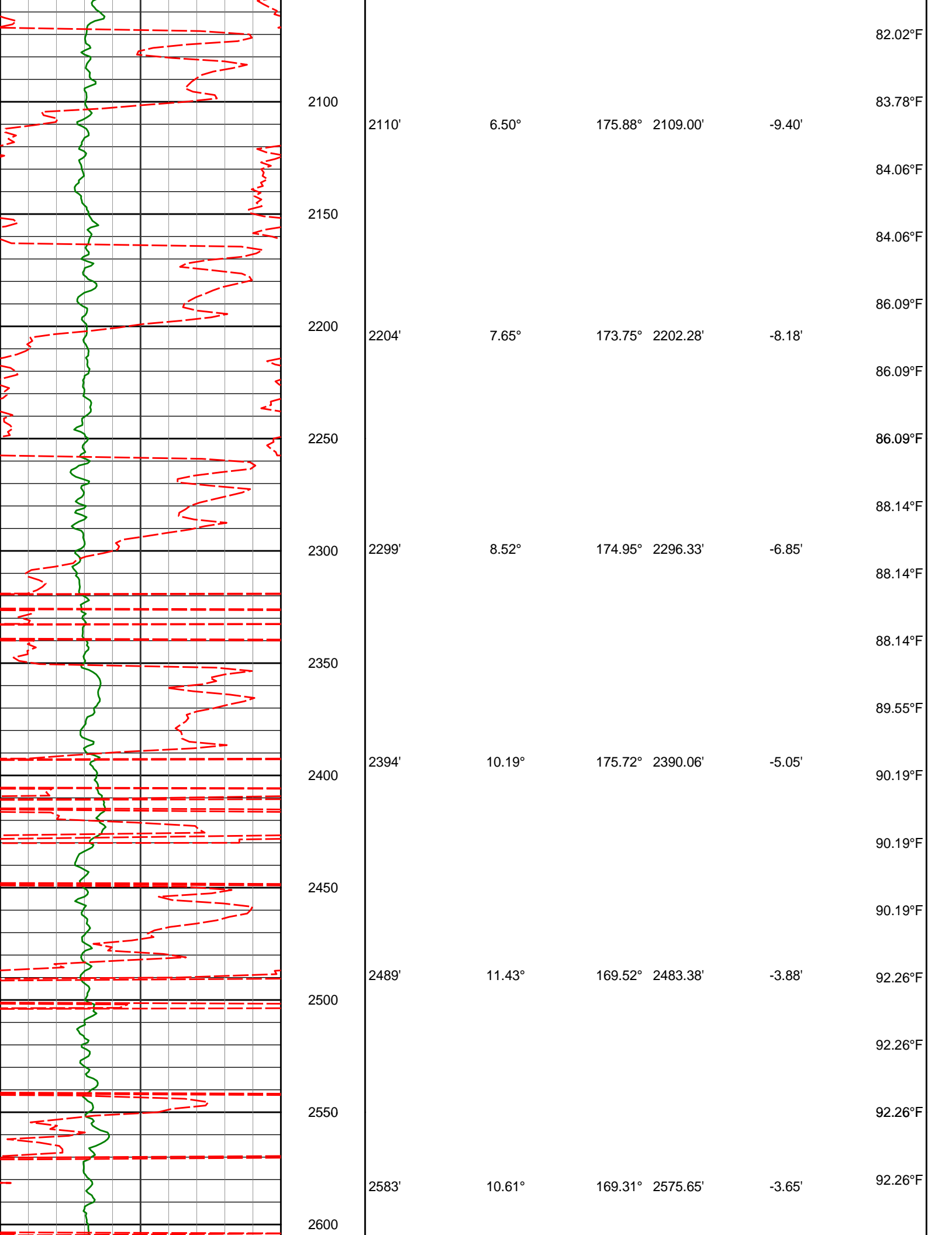
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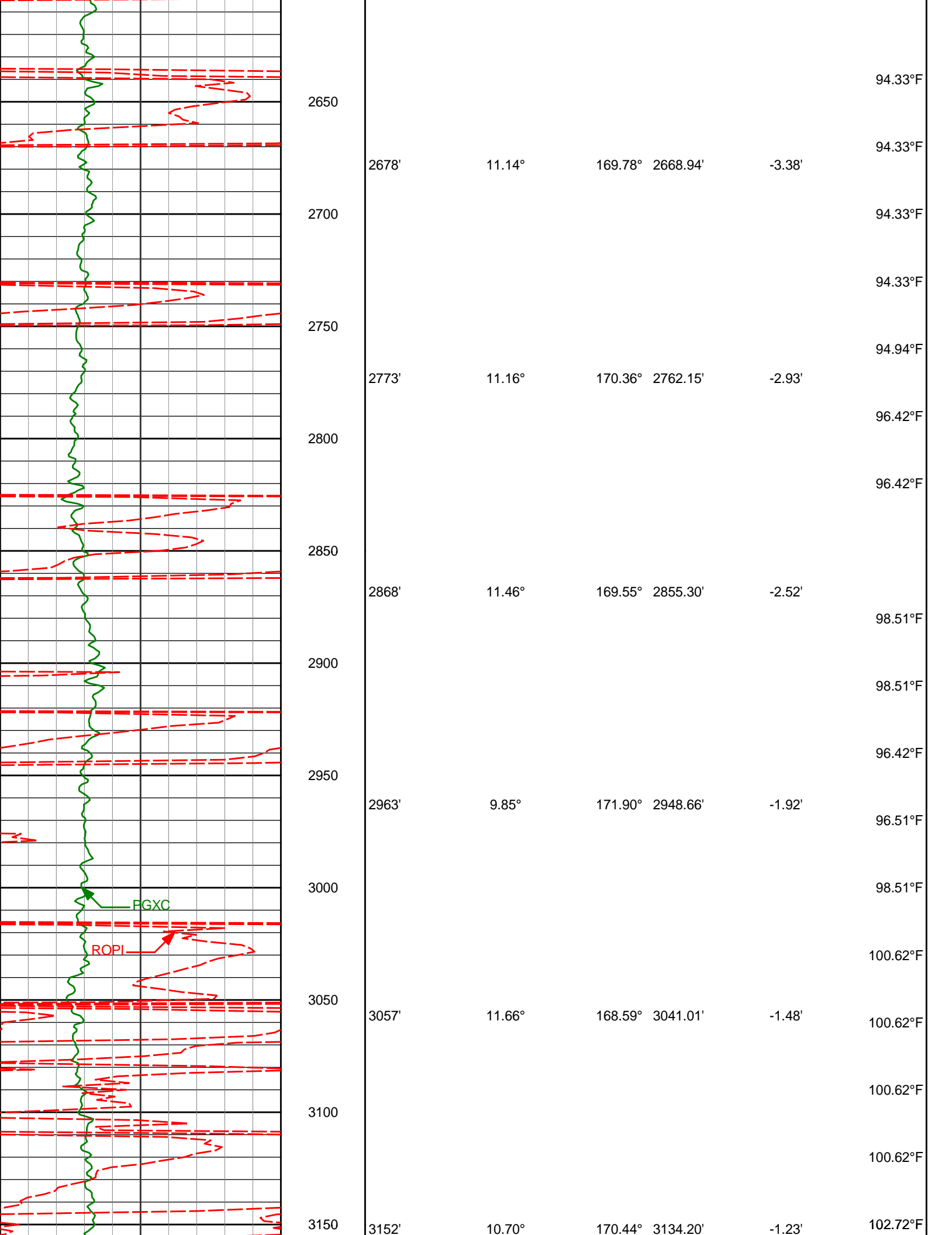
MD Detail 1:600 Scale

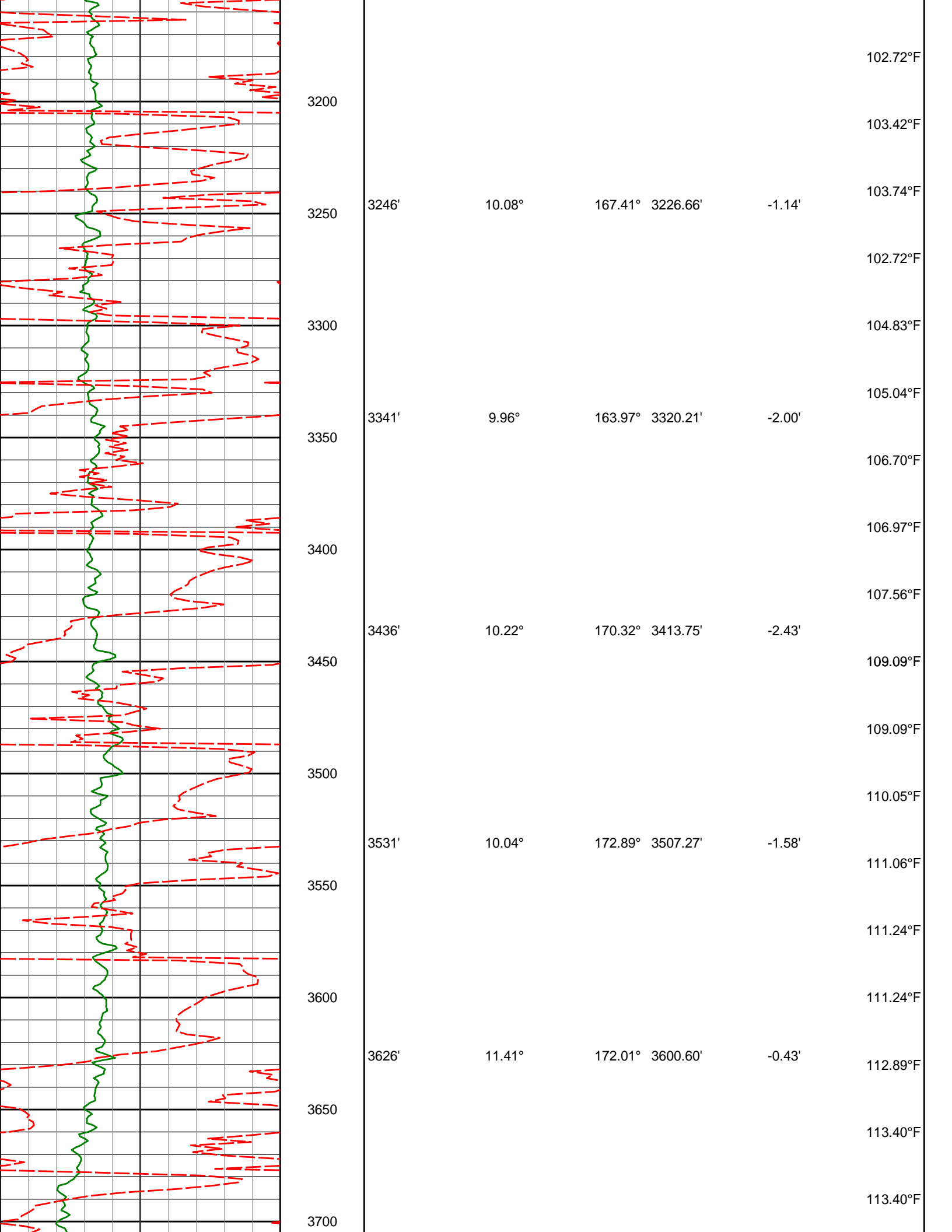


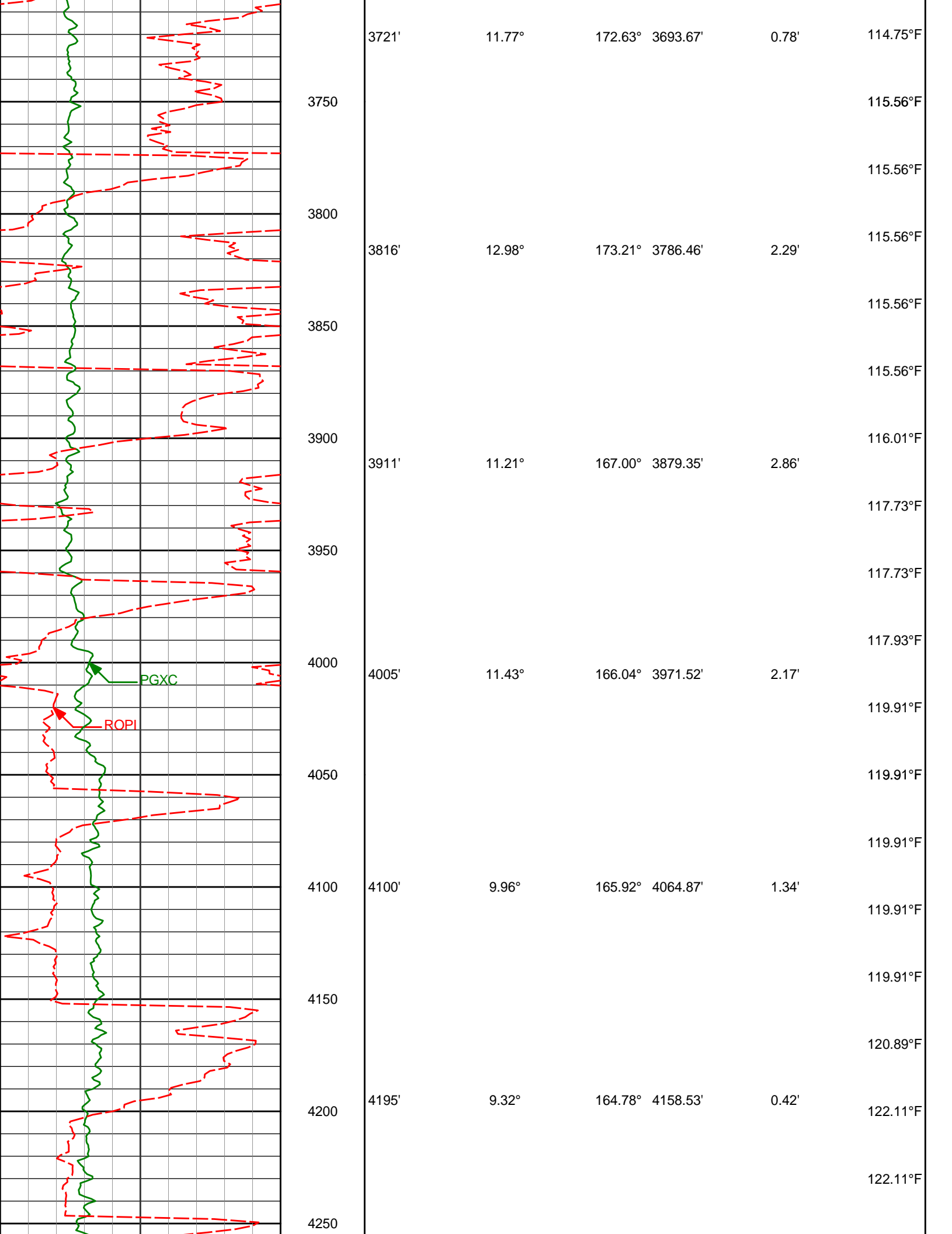


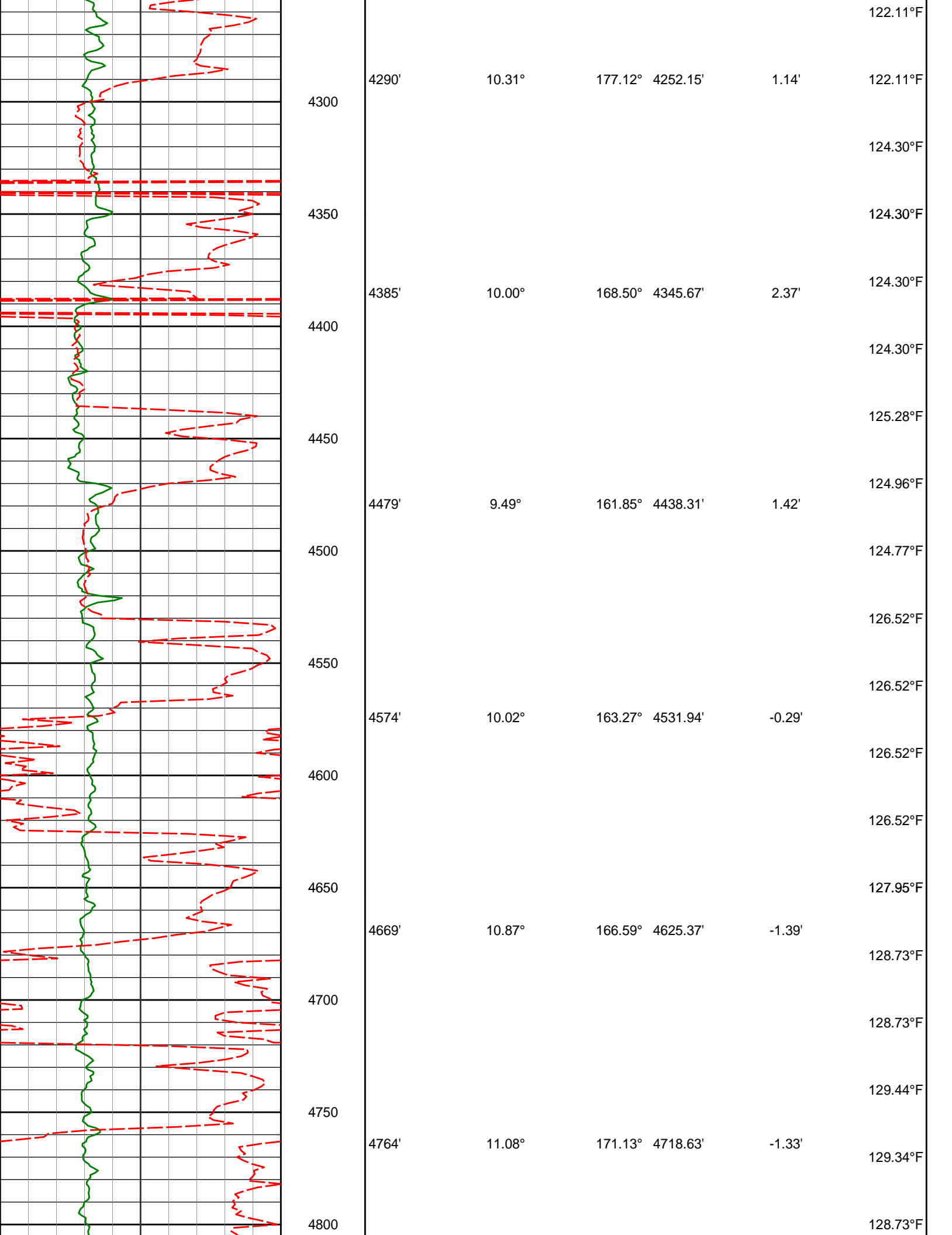


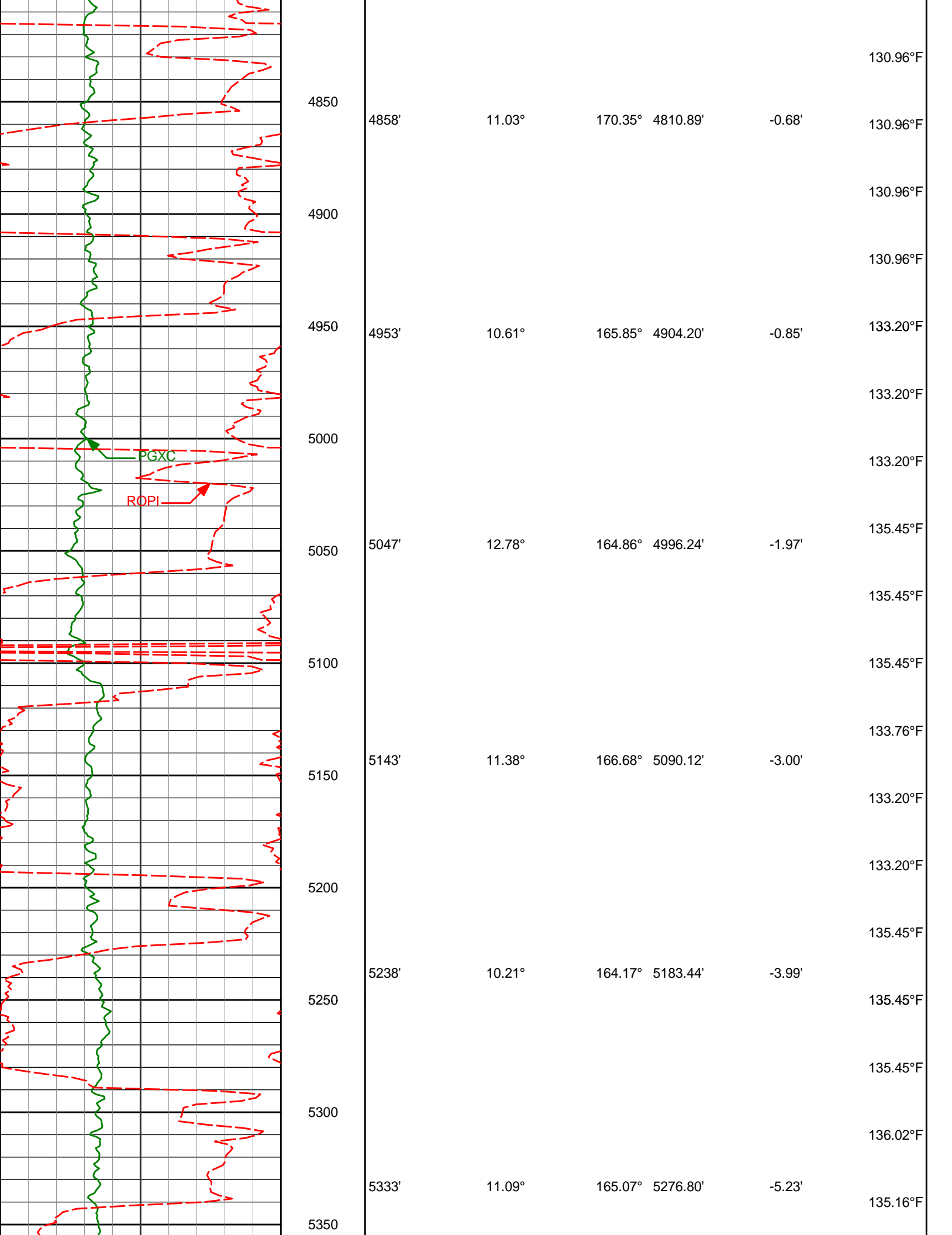


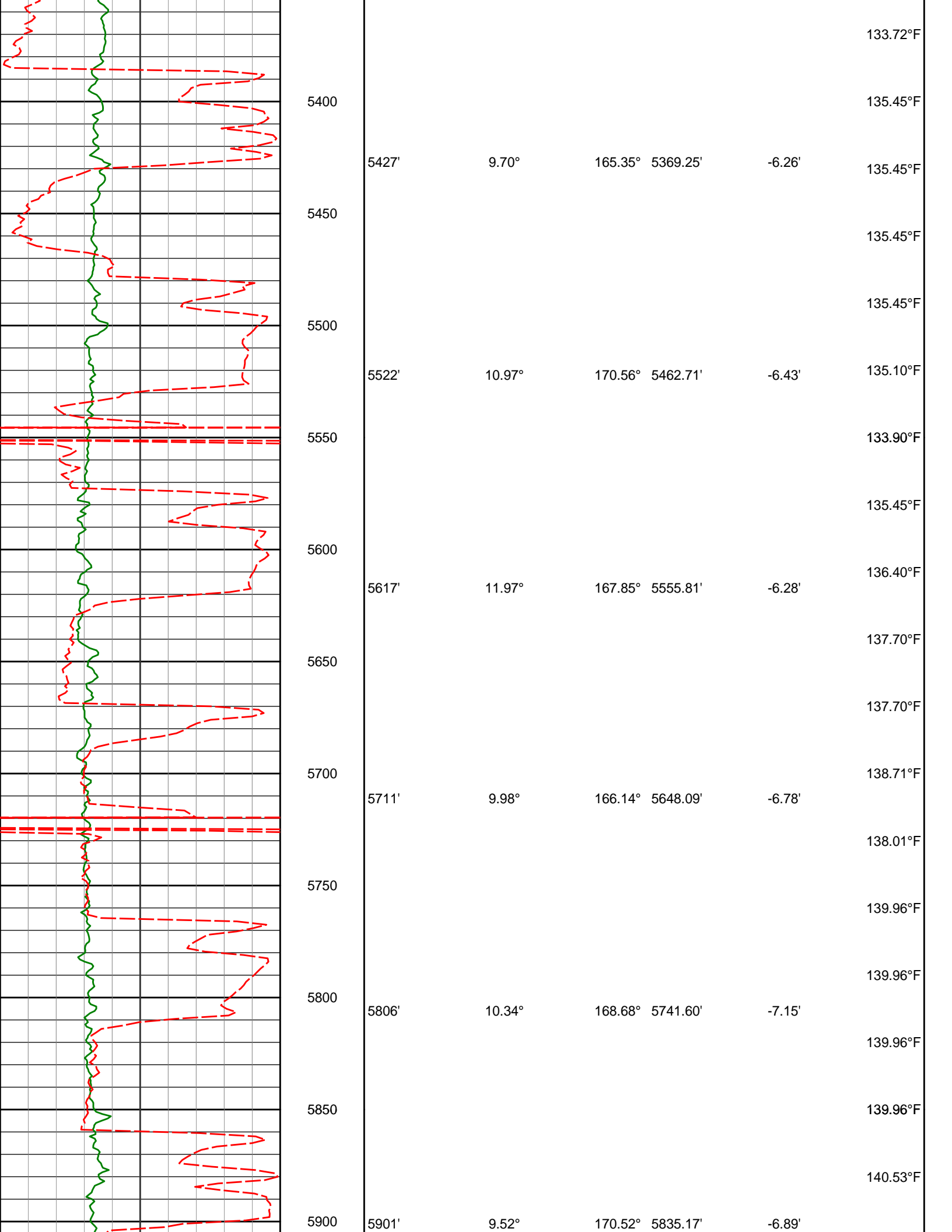


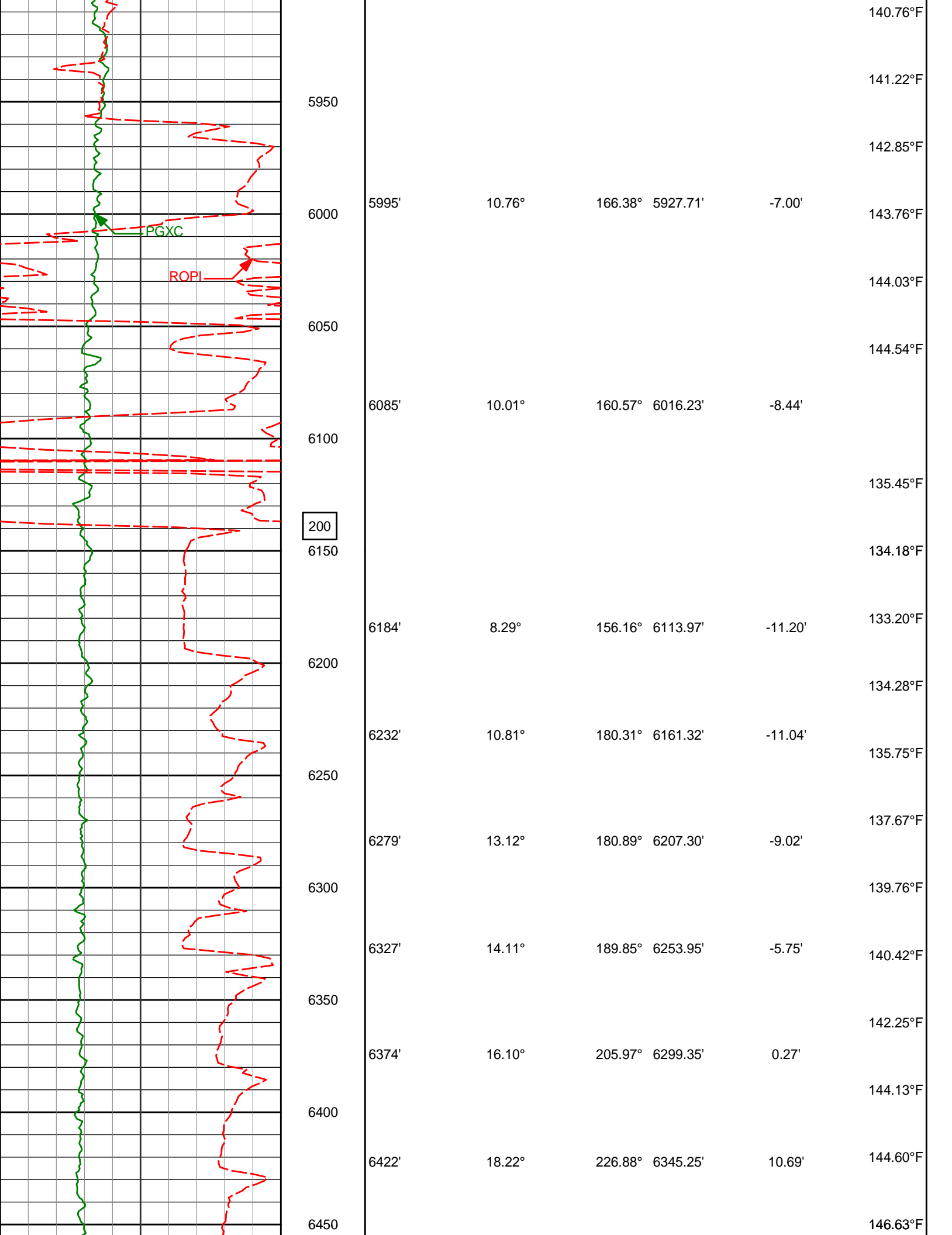


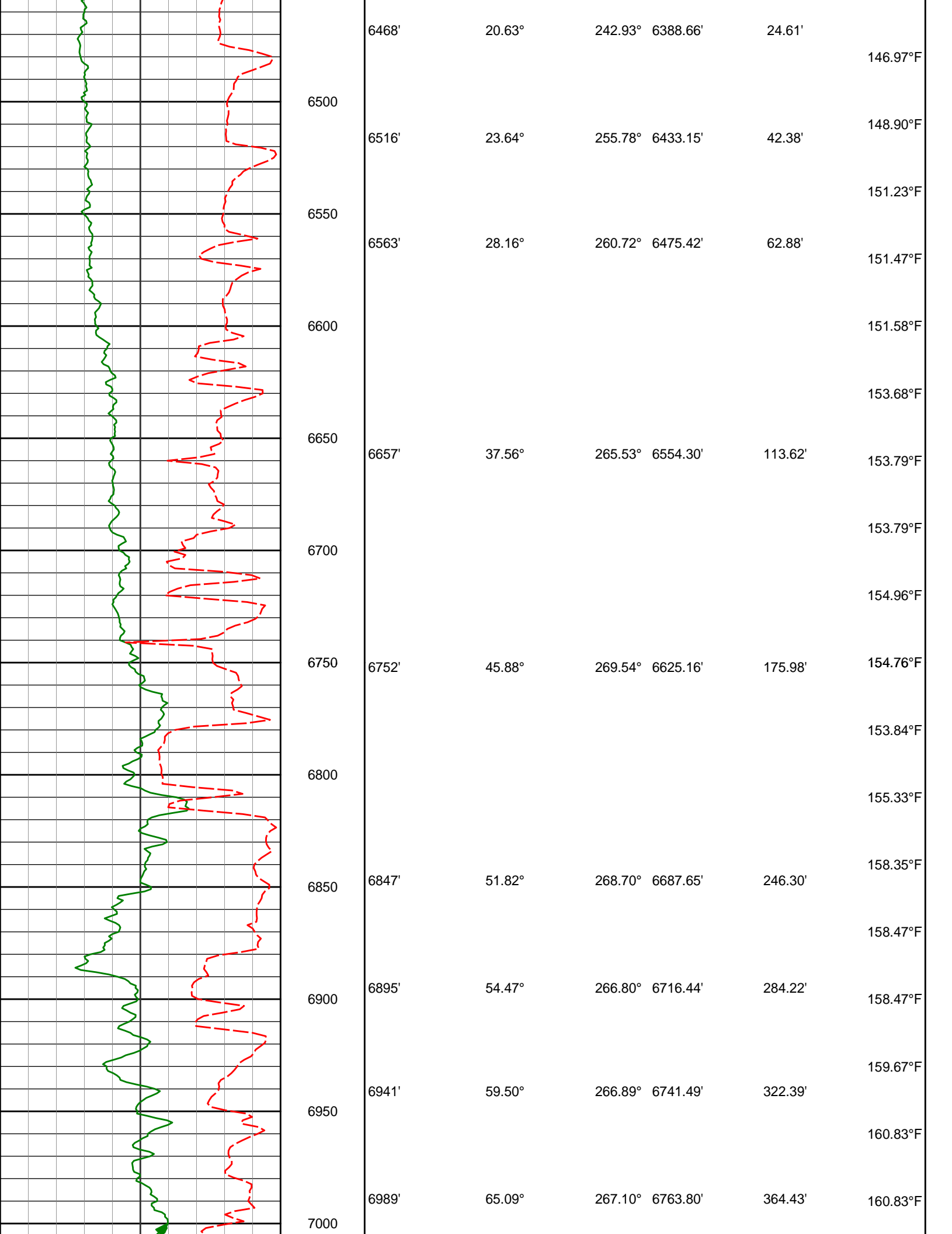


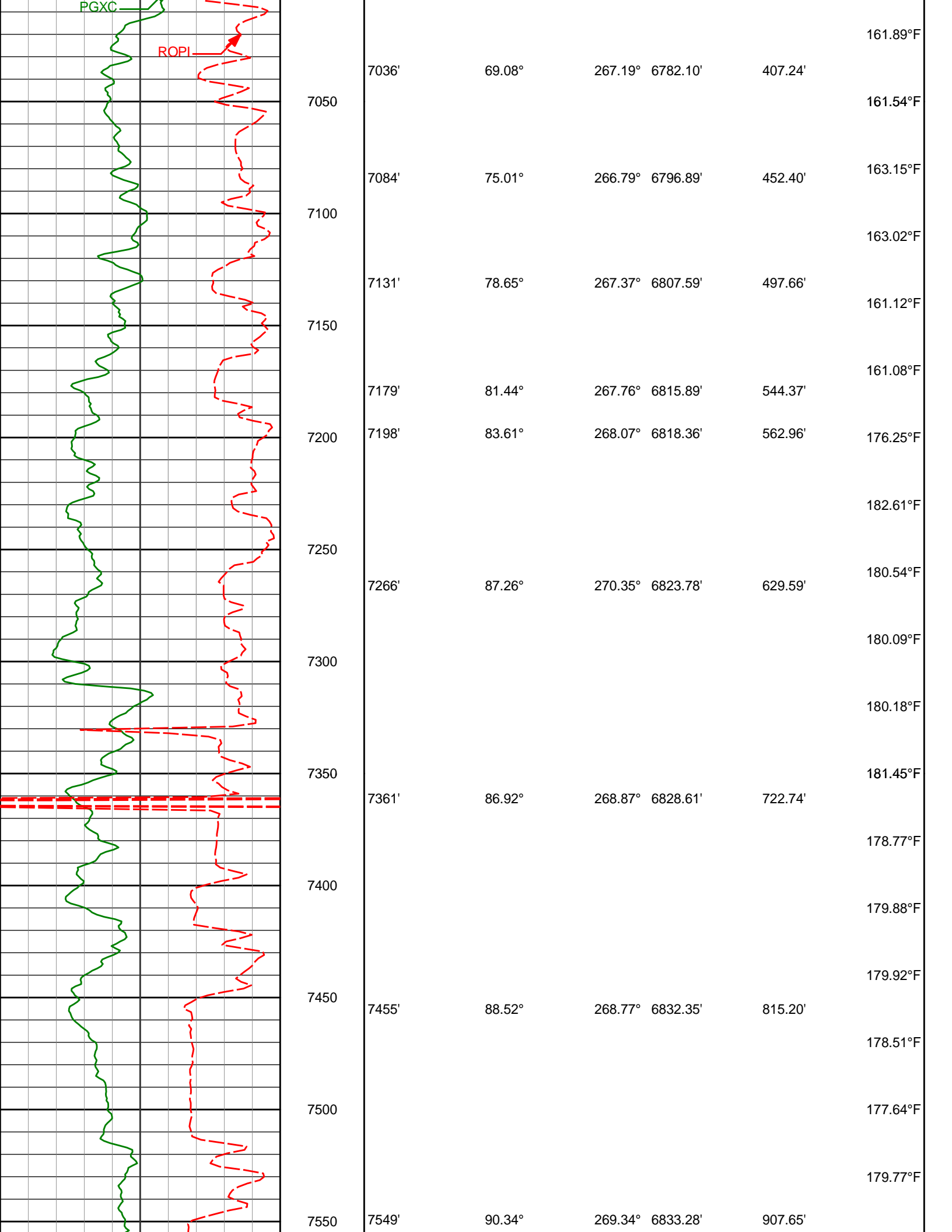


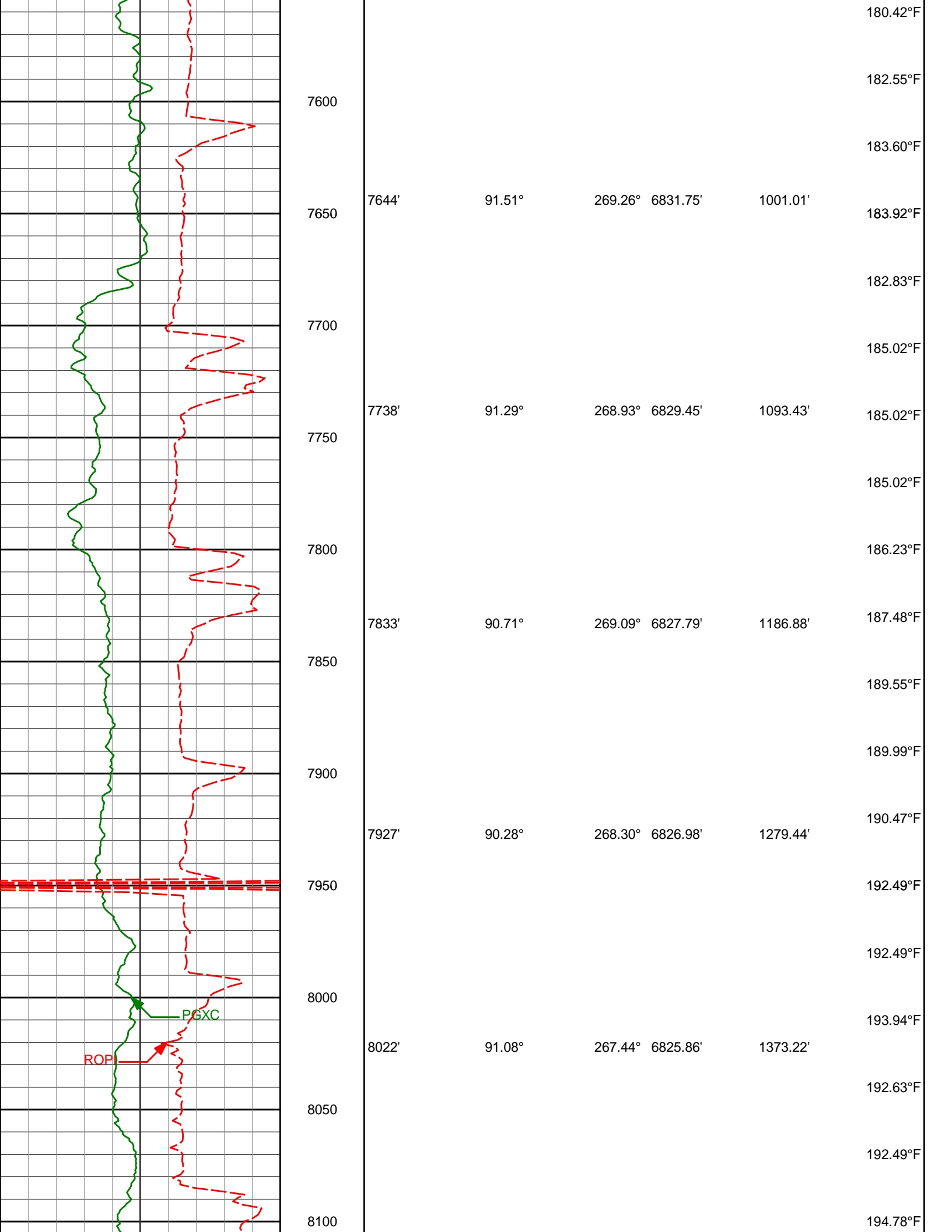


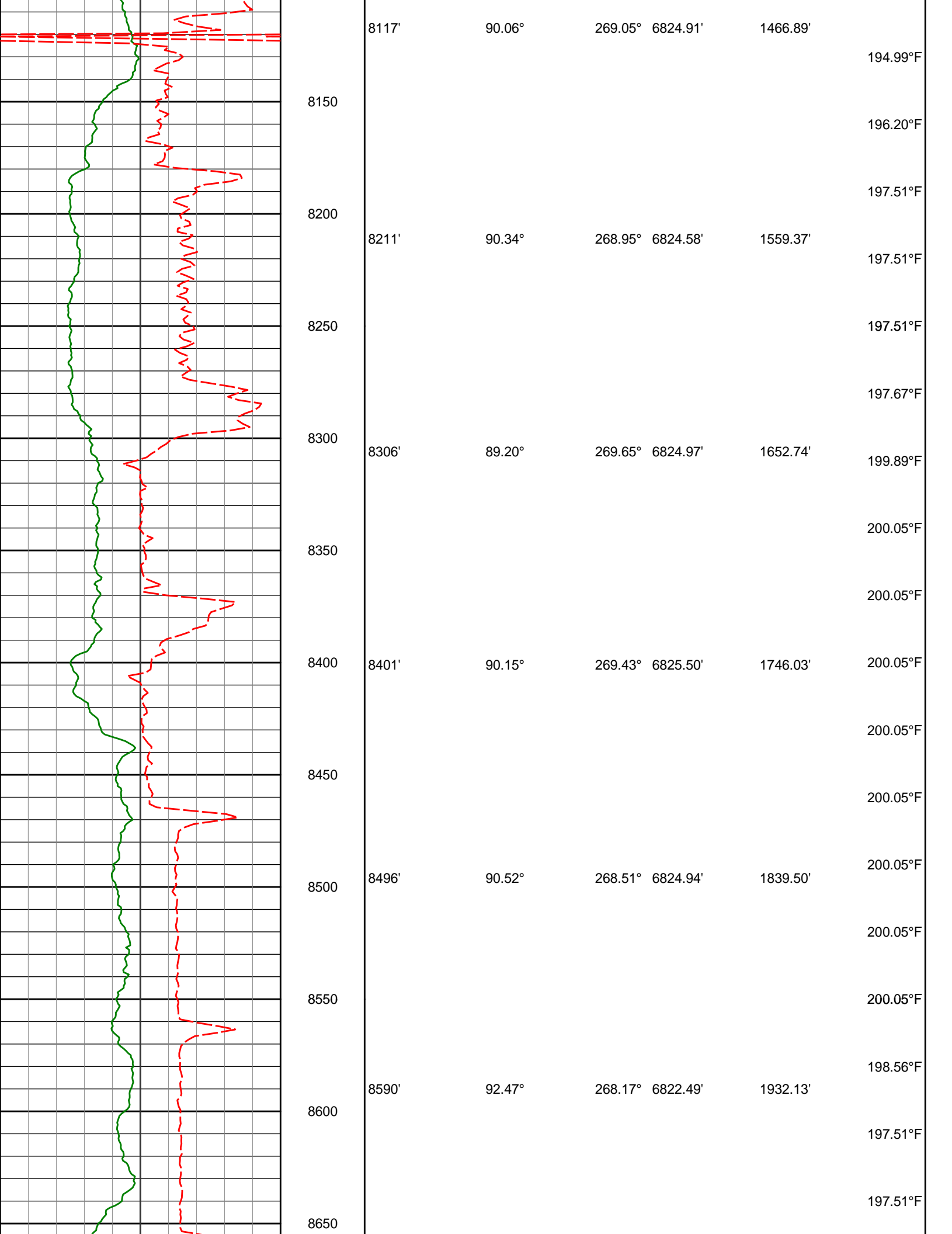


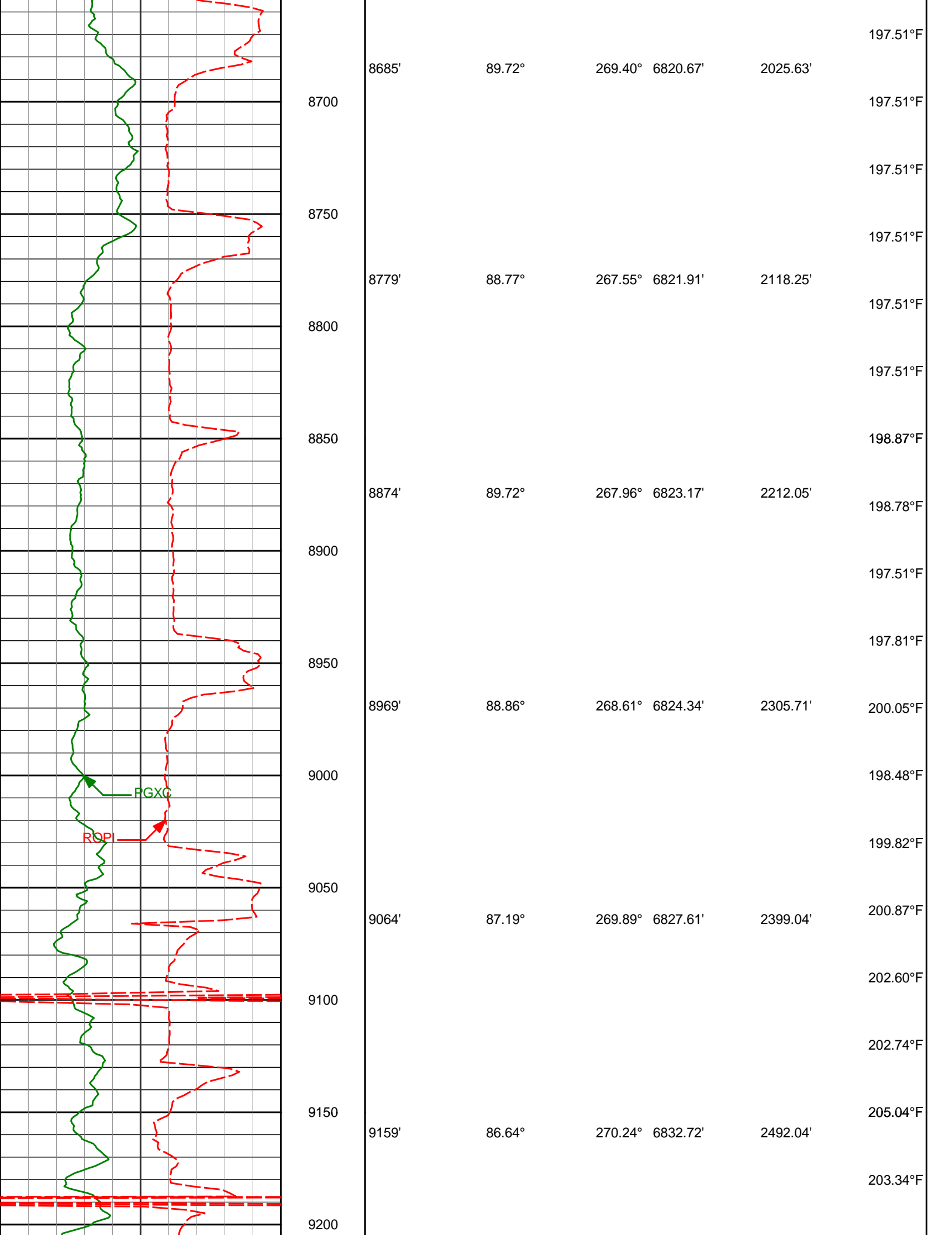


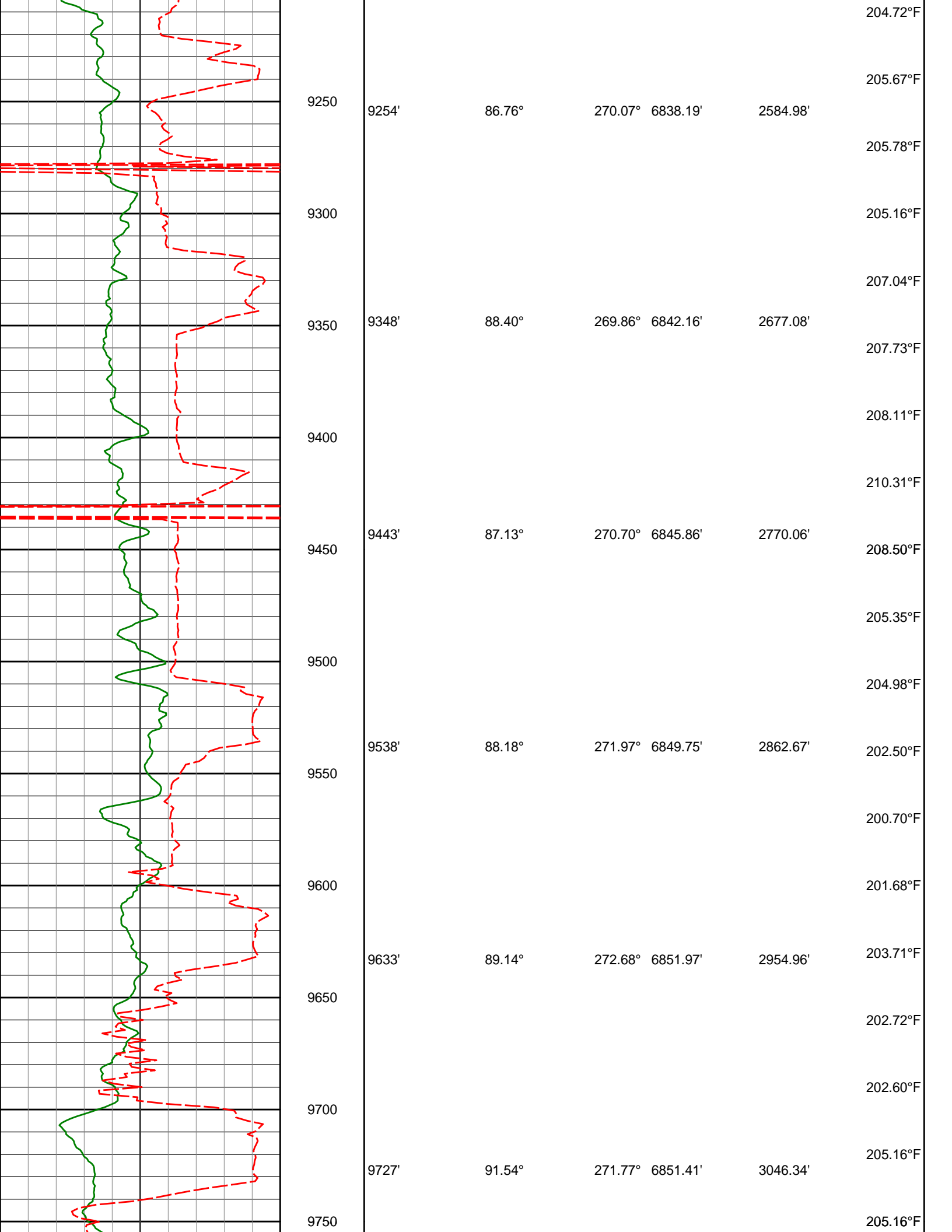


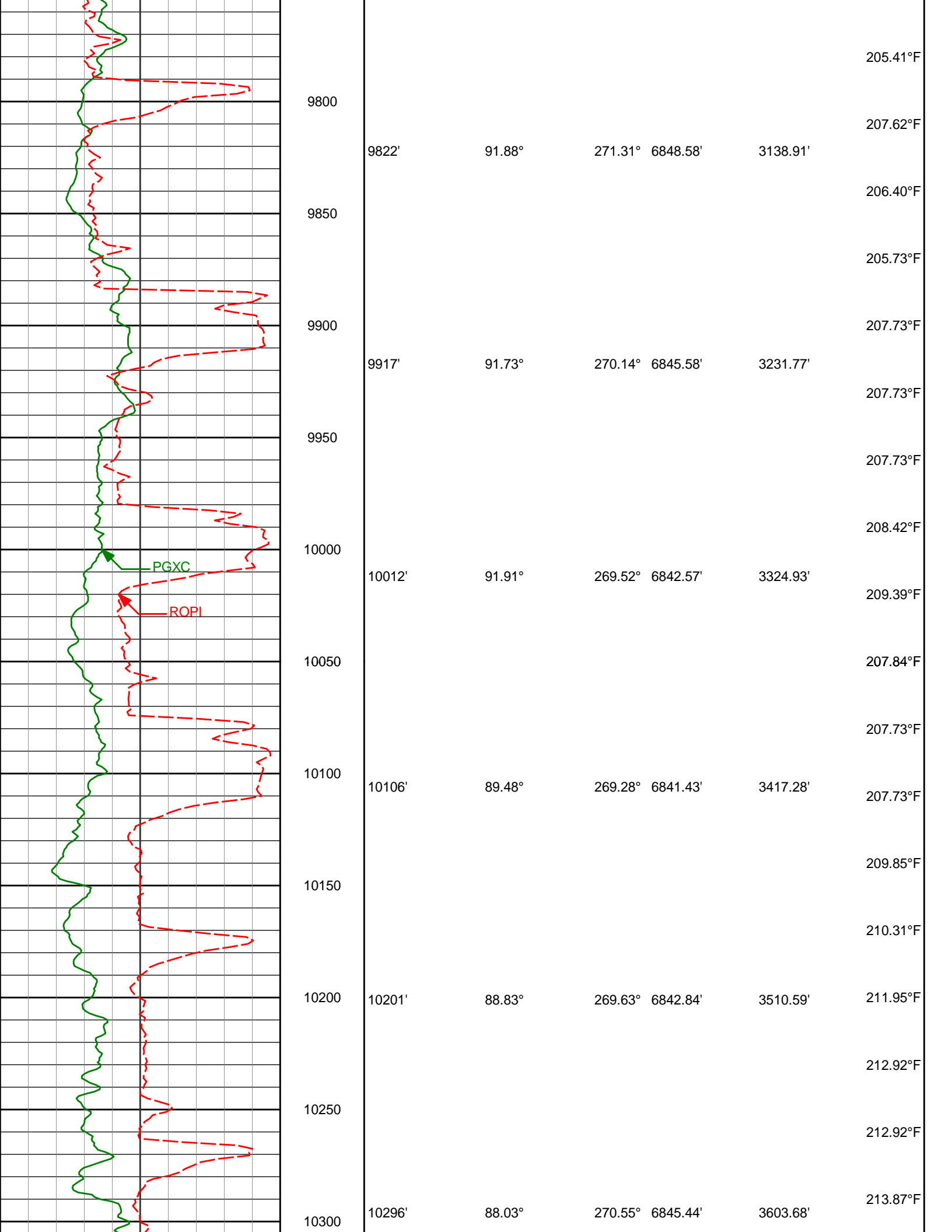


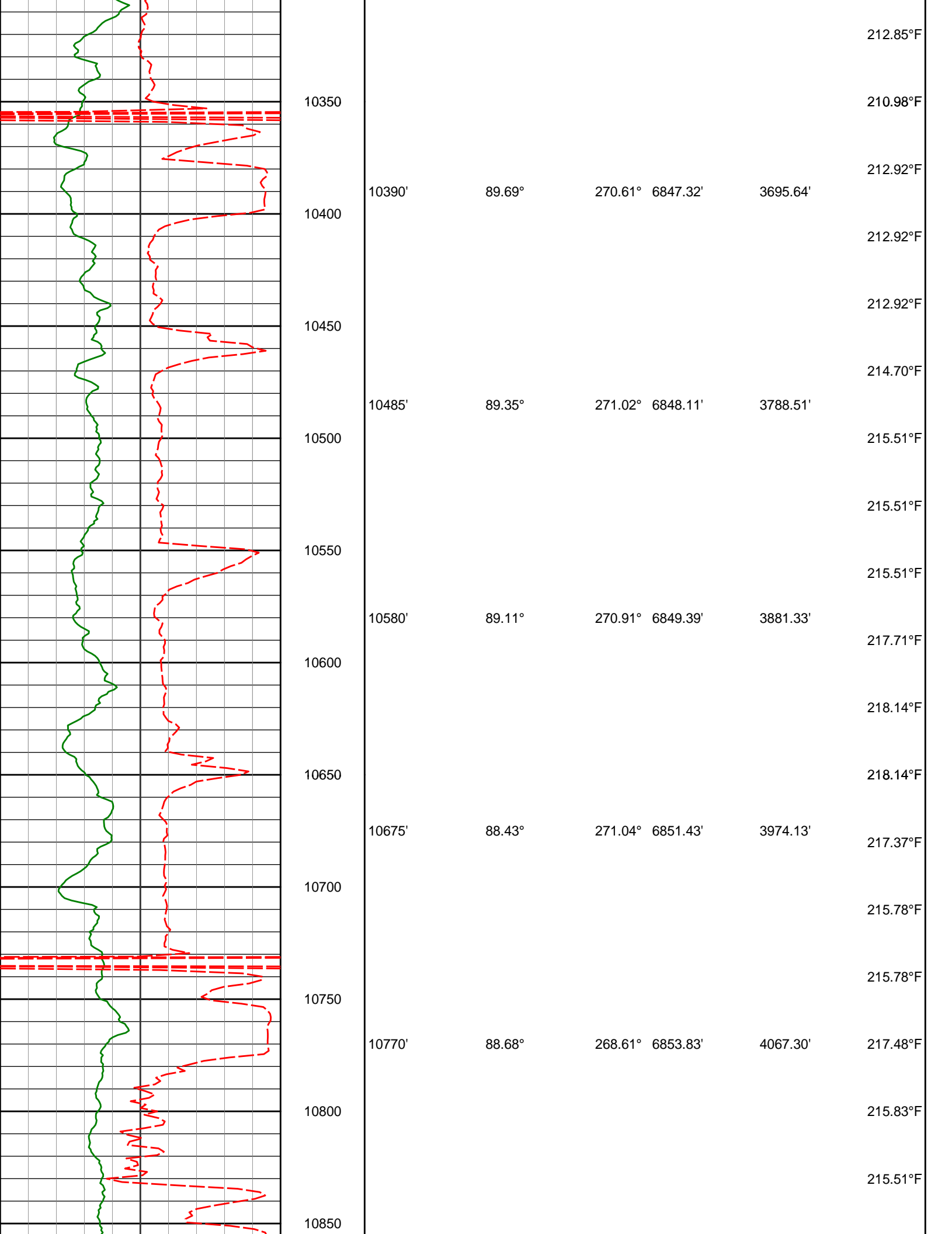


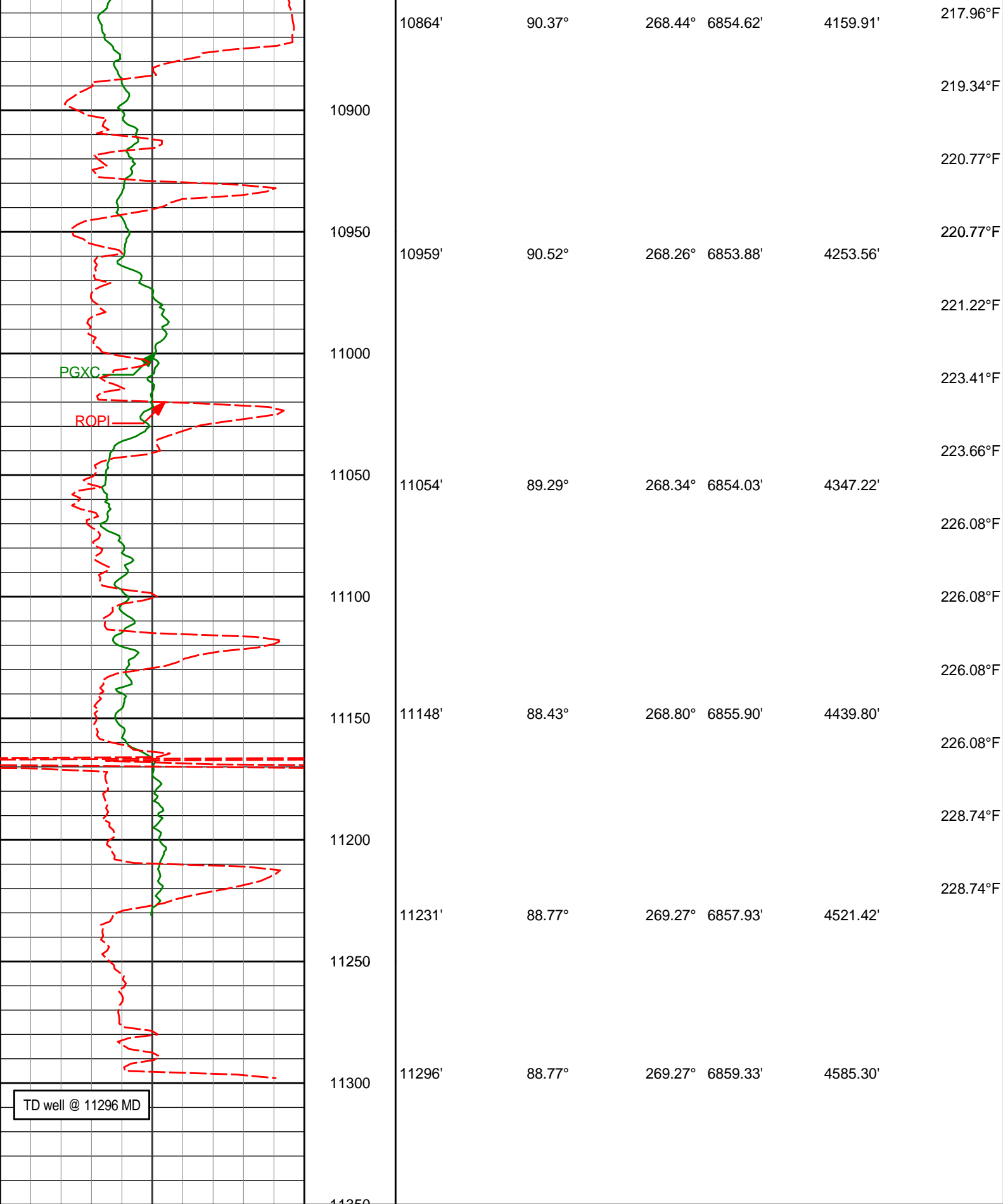






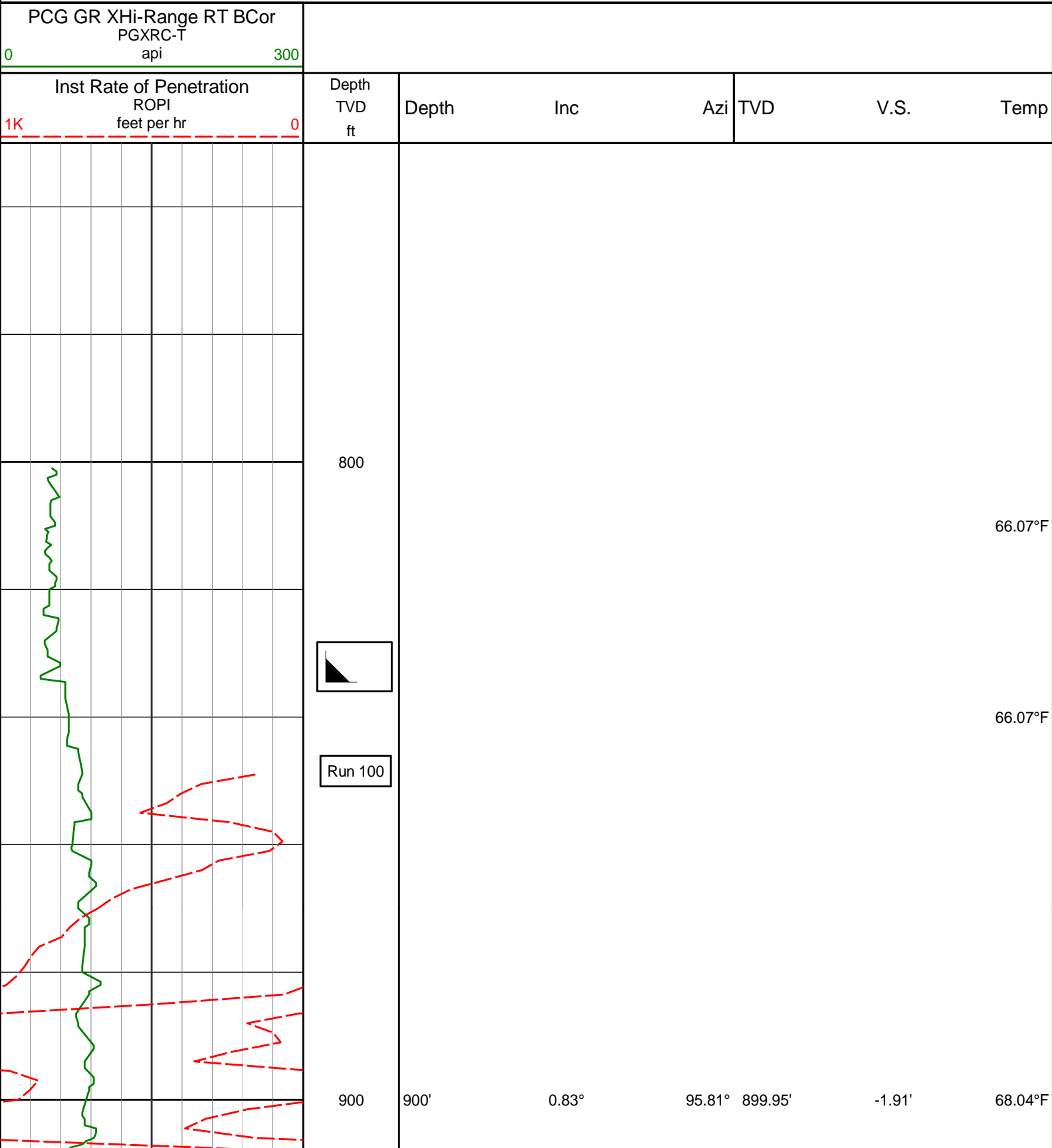


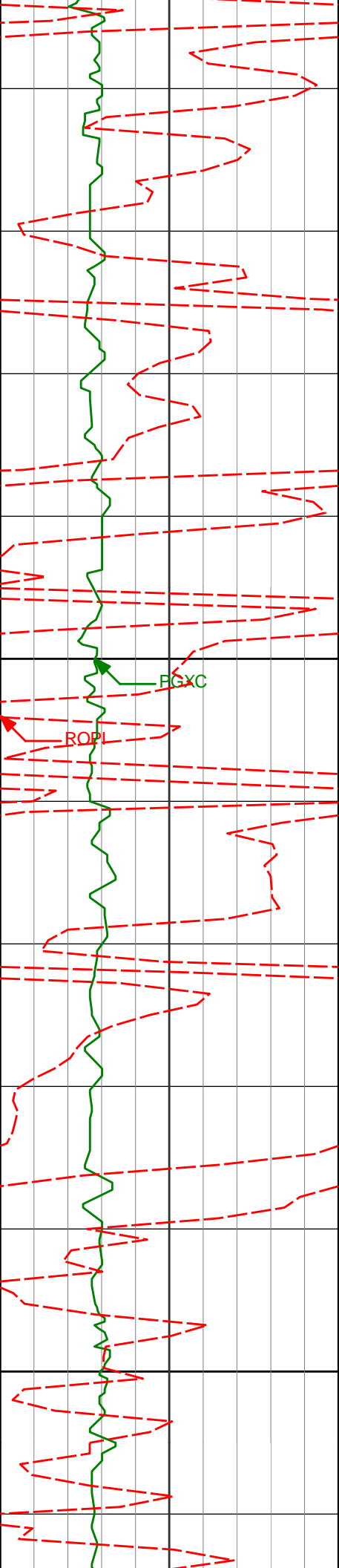




Inst Rate of Penetration ROPI feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0								
PCG GR XHi-Range RT BCor PGXRC-T api 0 300								

MD Detail 1:240 Scale





1000

1100

992'

1086'

0.73°

0.91°

94.79°

111.11°

991.94'

1085.93'

-3.11'

-4.31'

68.04°F

70.02°F

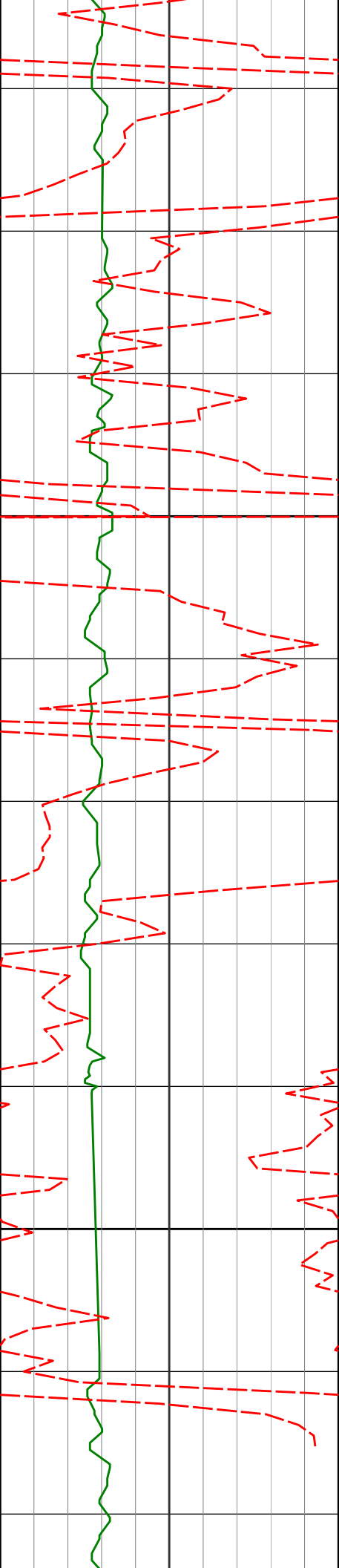
70.02°F

72.00°F

72.00°F

FGXC

ROPI



1200

1300

1177'

0.96°

105.31° 1176.92'

-5.60'

1269'

0.80°

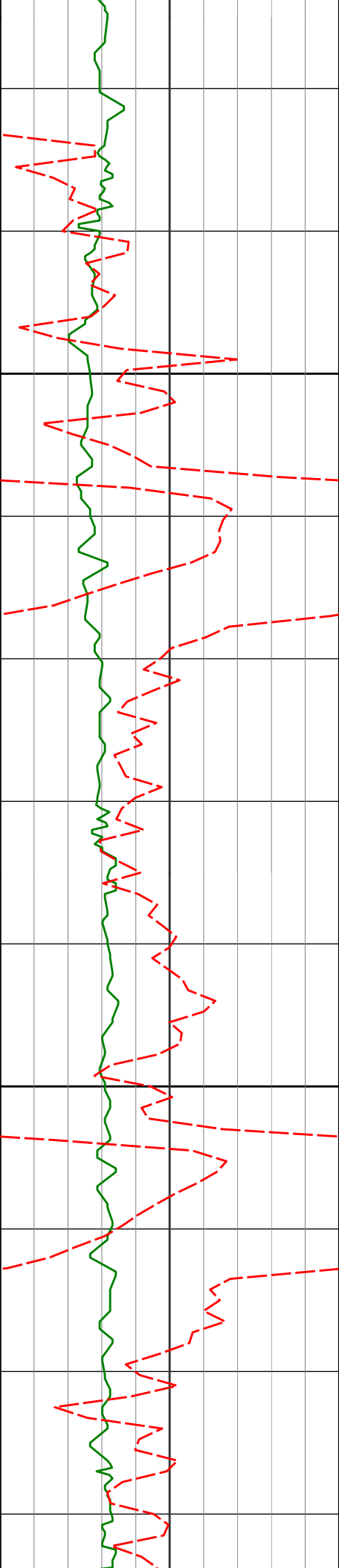
123.55° 1268.91'

-6.75'

72.00°F

72.00°F

72.00°F



1361'

0.86°

131.93°

1360.90'

-7.61'

73.98°F

1400

73.98°F

1453'

0.80°

136.86°

1452.89'

-8.36'

75.97°F

1500

75.97°F

1545'

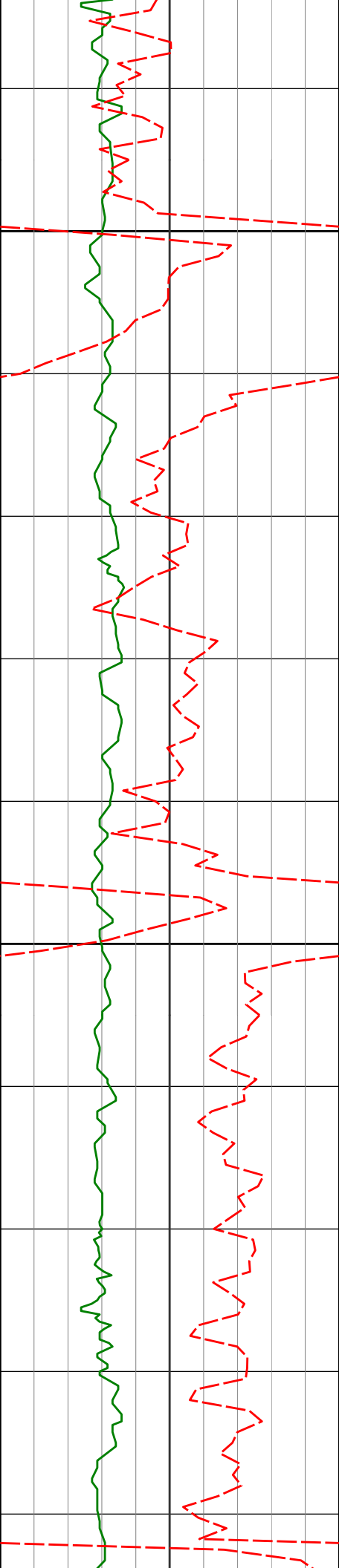
0.67°

123.03°

1544.88'

-9.09'

75.97°F



1600

1700

1731'

0.76°

92.07°

1730.87'

-11.06'

75.97°F

77.99°F

77.99°F

77.99°F

77.99°F

77.99°F



1800

1826'

1.94°

160.71°

1825.84'

-11.90'

78.26°F

80.01°F

80.01°F

1900

1920'

3.43°

180.00°

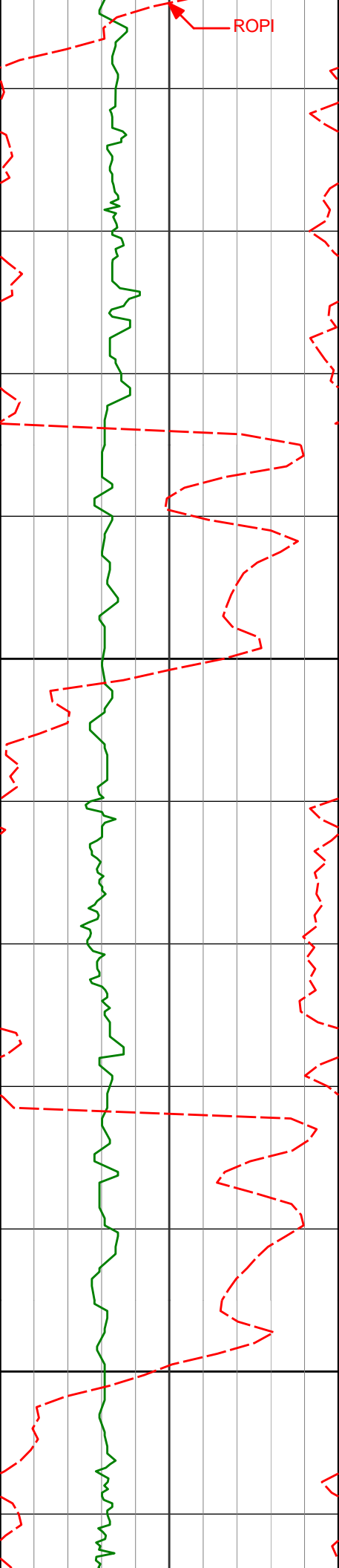
1919.74'

-11.57'

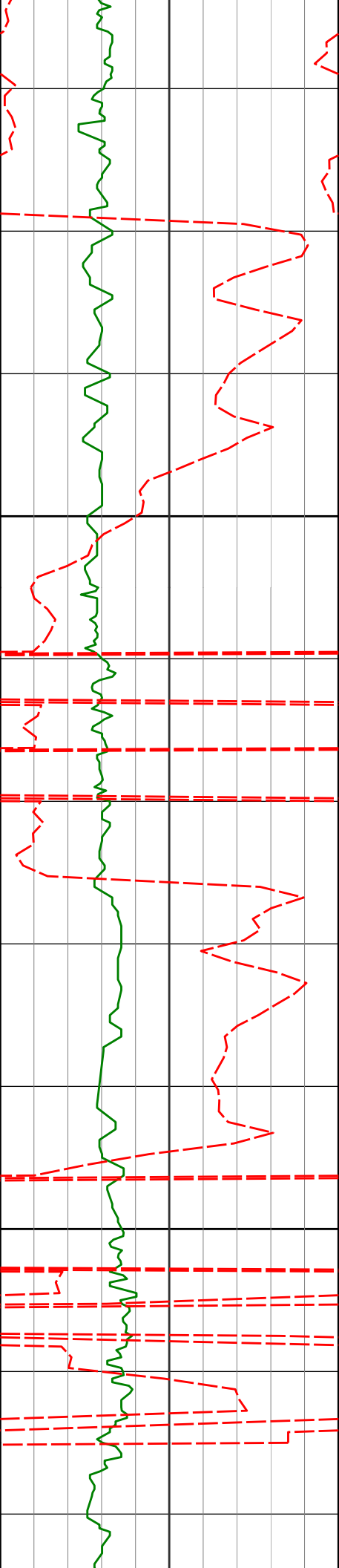
80.01°F

82.02°F

2000



2015'	5.03°	175.18°	2014.48'	-10.54'	82.02°F
					82.02°F
2100					83.78°F
2110'	6.50°	175.88°	2109.00'	-9.40'	
					84.06°F
					84.06°F
					86.09°F
2200					
2204'	7.65°	173.75°	2202.28'	-8.18'	
					86.09°F



2300

2299'

8.52°

174.95°

2296.33'

-6.85'

2400

2394'

10.19°

175.72°

2390.06'

-5.05'

86.09°F

88.14°F

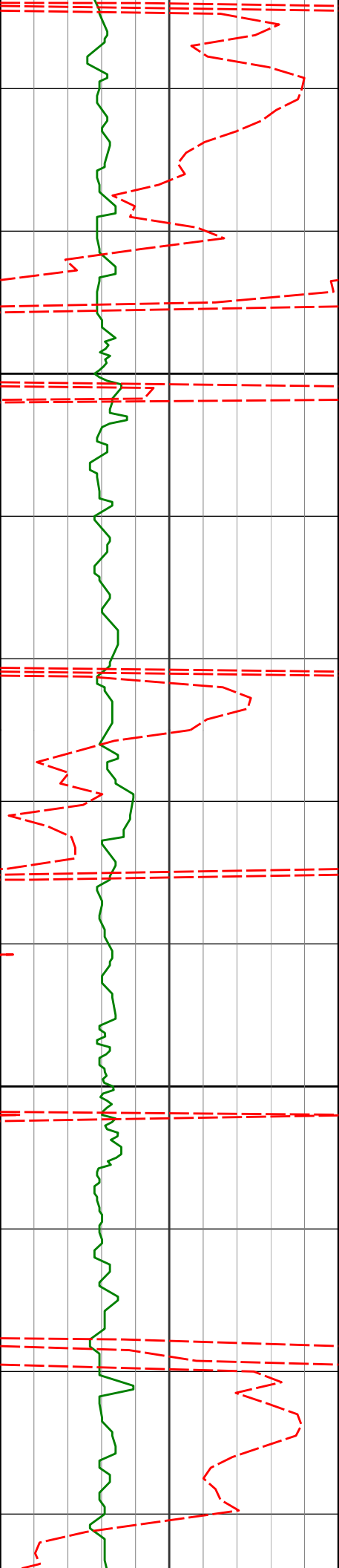
88.14°F

88.14°F

89.55°F

90.19°F

90.19°F



2500

2600

2489'

11.43°

169.52°

2483.38'

-3.88'

92.26°F

92.26°F

92.26°F

2583'

10.61°

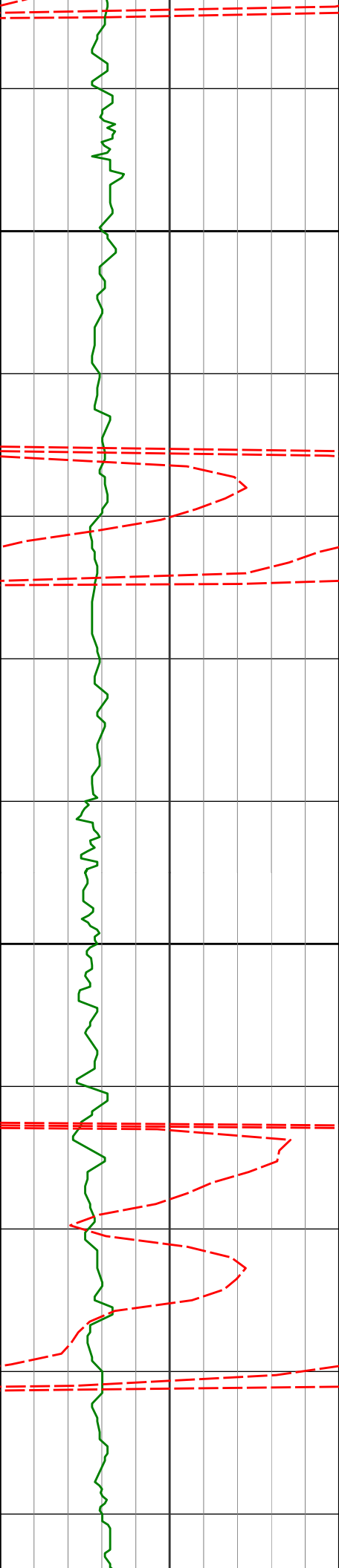
169.31°

2575.65'

-3.65'

92.26°F

94.33°F



2678'

11.14°

169.78°

2668.94'

-3.38'

2700

94.33°F

94.33°F

2773'

11.16°

170.36°

2762.15'

-2.93'

2800

96.42°F

96.42°F

2868'

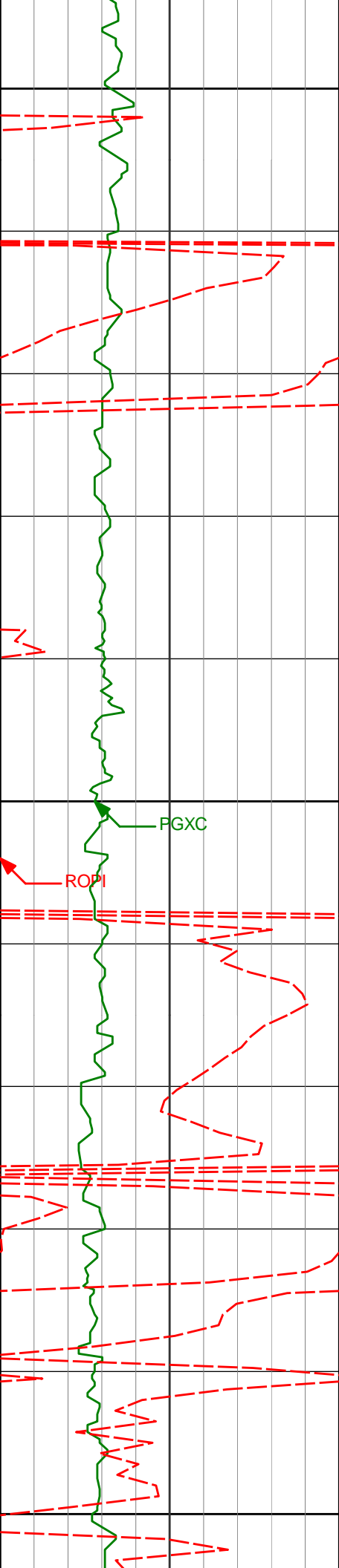
11.46°

169.55°

2855.30'

-2.52'

98.51°F



2900

98.51°F

96.42°F

2963'

9.85°

171.90°

2948.66'

-1.92'

96.51°F

3000

98.51°F

PGXC

ROPI

100.62°F

3057'

11.66°

168.59°

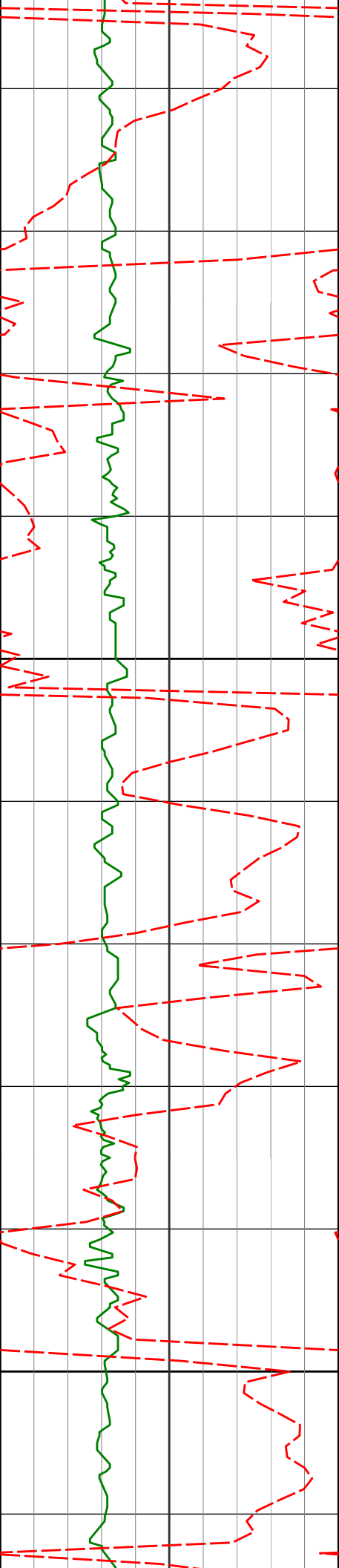
3041.01'

-1.48'

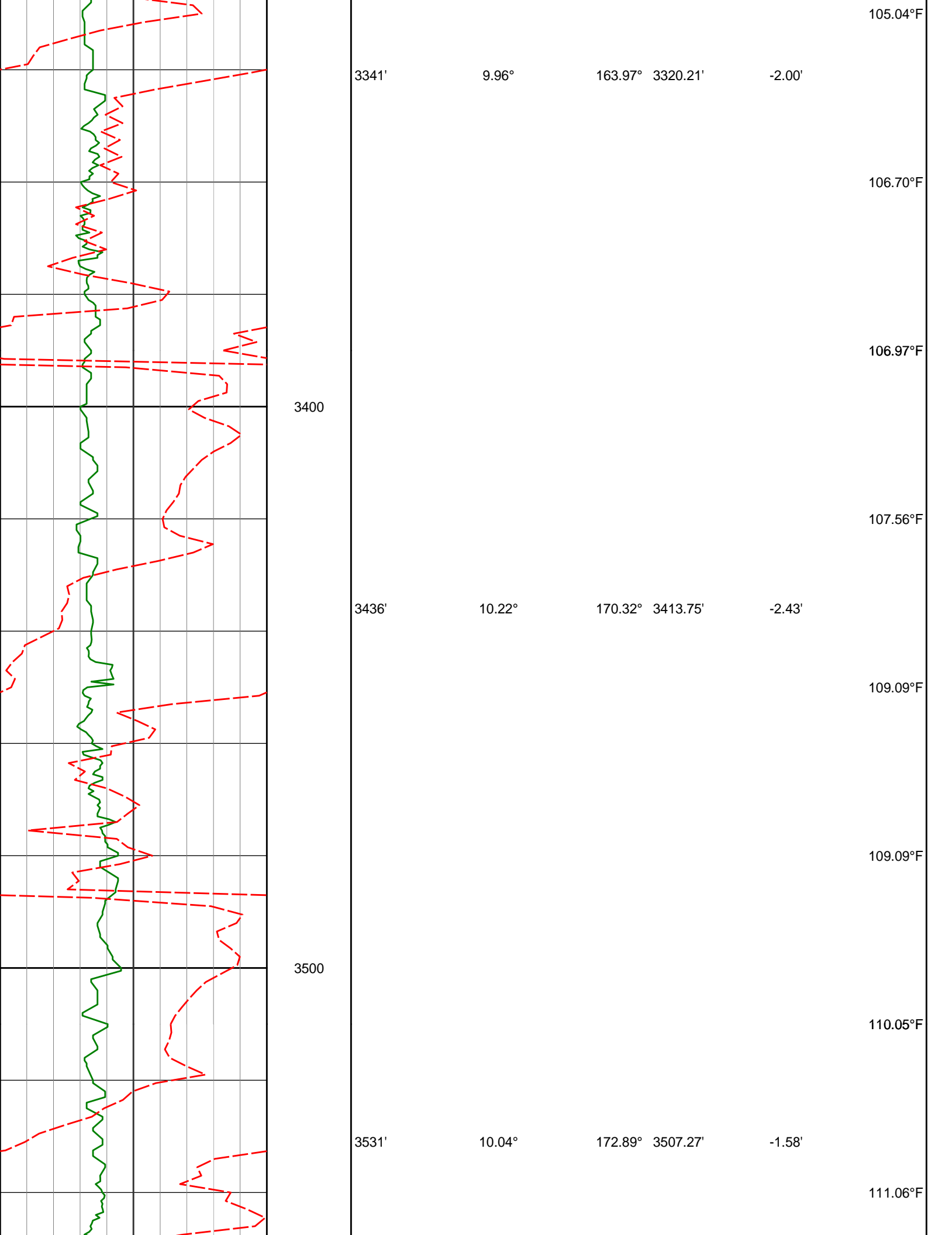
100.62°F

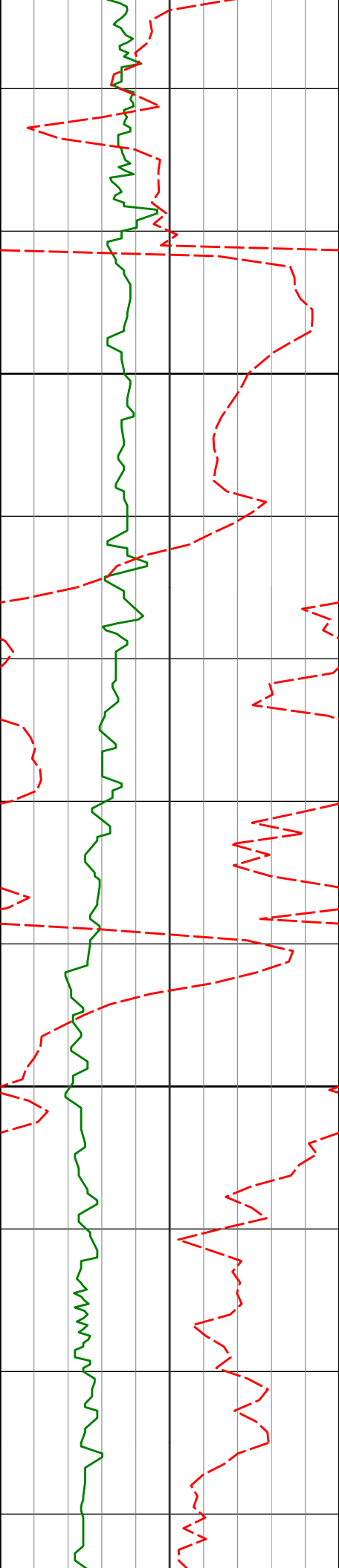
100.62°F

3100



					100.62°F
3152'	10.70°	170.44°	3134.20'	-1.23'	102.72°F
					102.72°F
3200					103.42°F
					103.74°F
3246'	10.08°	167.41°	3226.66'	-1.14'	102.72°F
					104.83°F
3300					





3600

3626'

3700

3721'

11.41°

172.01°

3600.60'

-0.43'

11.77°

172.63°

3693.67'

0.78'

111.24°F

111.24°F

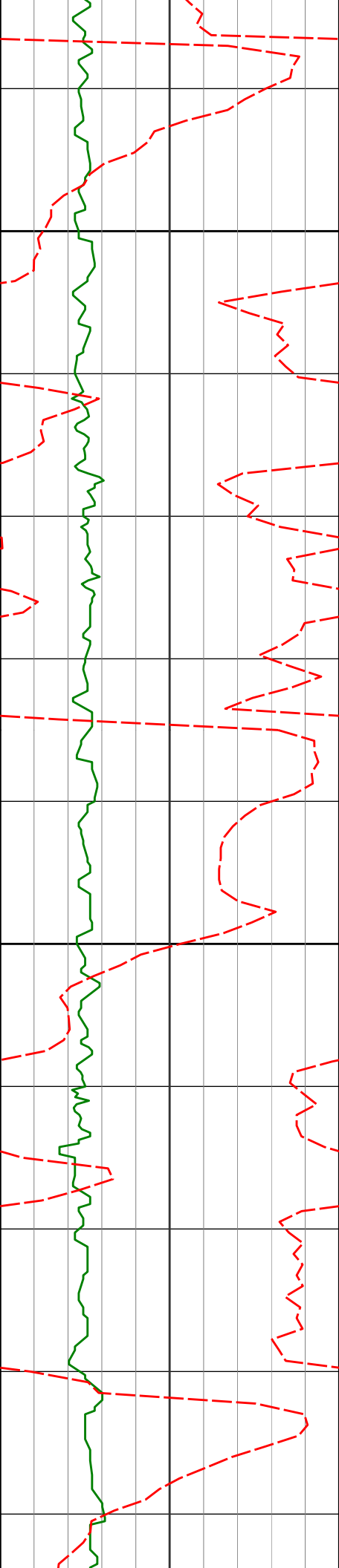
112.89°F

113.40°F

113.40°F

114.75°F

115.56°F



3800

3816'

12.98°

173.21°

3786.46'

2.29'

3900

3911'

11.21°

167.00°

3879.35'

2.86'

115.56°F

115.56°F

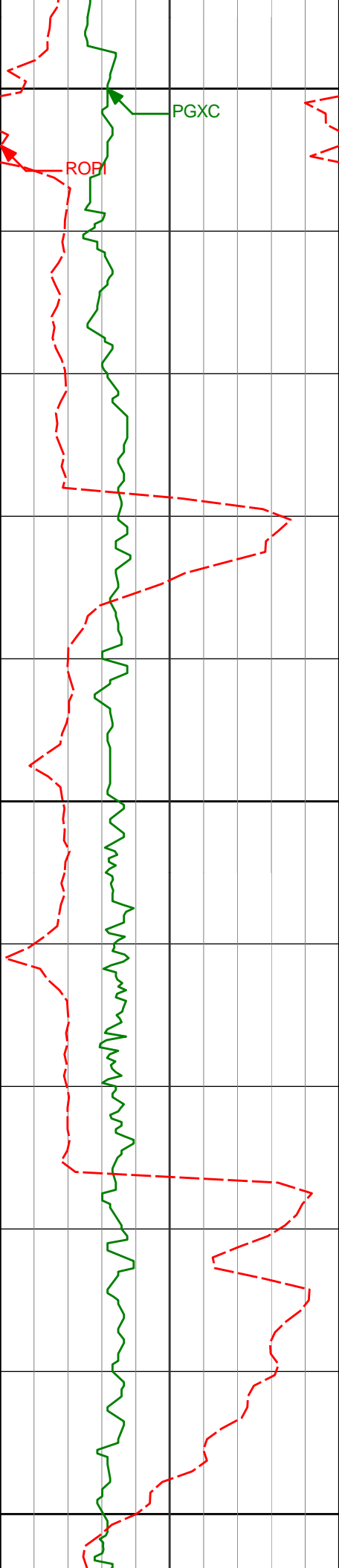
115.56°F

115.56°F

116.01°F

117.73°F

117.73°F



4000

4005'

11.43°

166.04° 3971.52'

2.17'

119.91°F

119.91°F

119.91°F

4100

4100'

9.96°

165.92° 4064.87'

1.34'

119.91°F

119.91°F

120.89°F

4200

4195'

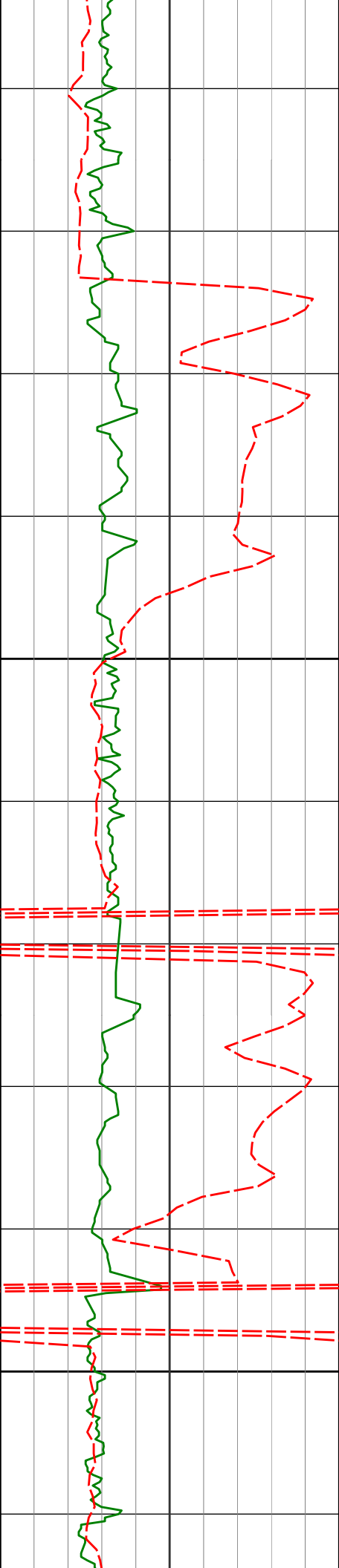
9.32°

164.78° 4158.53'

0.42'

122.11°F

117.93°F



4300

4400

4290'

4385'

10.31°

10.00°

177.12°

168.50°

4252.15'

4345.67'

1.14'

2.37'

122.11°F

122.11°F

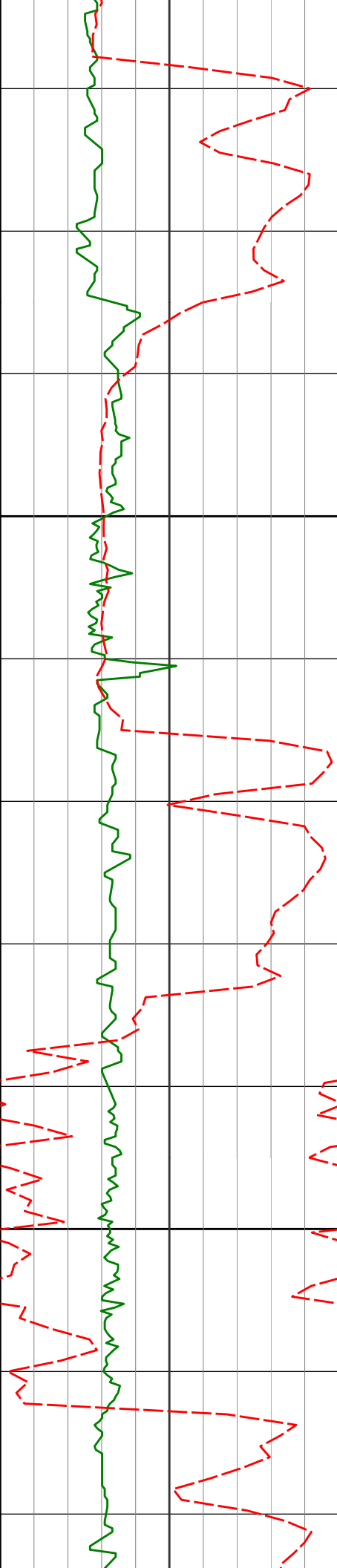
122.11°F

124.30°F

124.30°F

124.30°F

124.30°F



4500

4600

4479'

4574'

9.49°

10.02°

161.85°

163.27°

4438.31'

4531.94'

1.42'

-0.29'

125.28°F

124.96°F

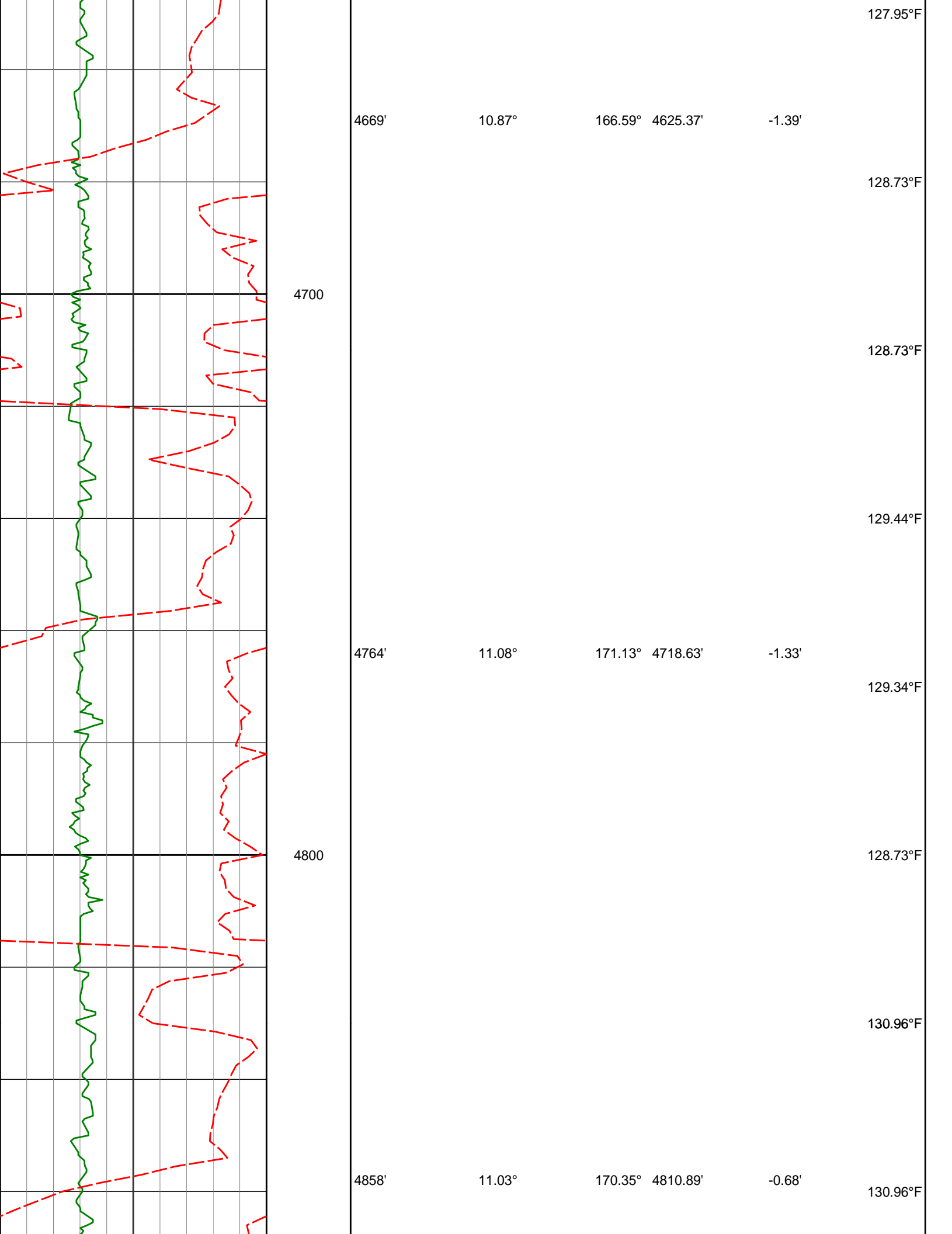
124.77°F

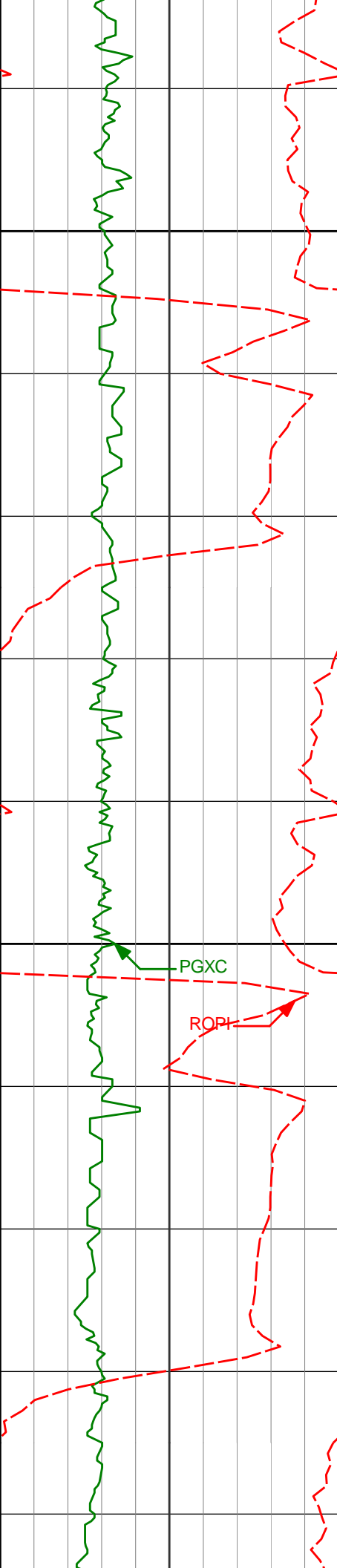
126.52°F

126.52°F

126.52°F

126.52°F





4900

4953'

5000

5047'

10.61°

165.85°

4904.20'

-0.85'

PGXC

ROPI

130.96°F

130.96°F

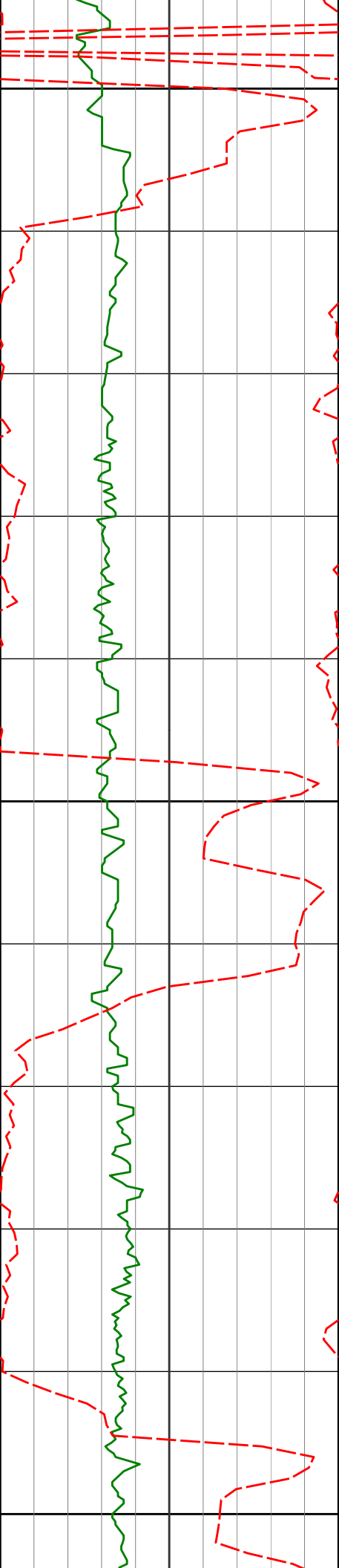
133.20°F

133.20°F

133.20°F

135.45°F

135.45°F



5100

135.45°F

133.76°F

5143'

11.38°

166.68°

5090.12'

-3.00'

133.20°F

133.20°F

5200

135.45°F

5238'

10.21°

164.17°

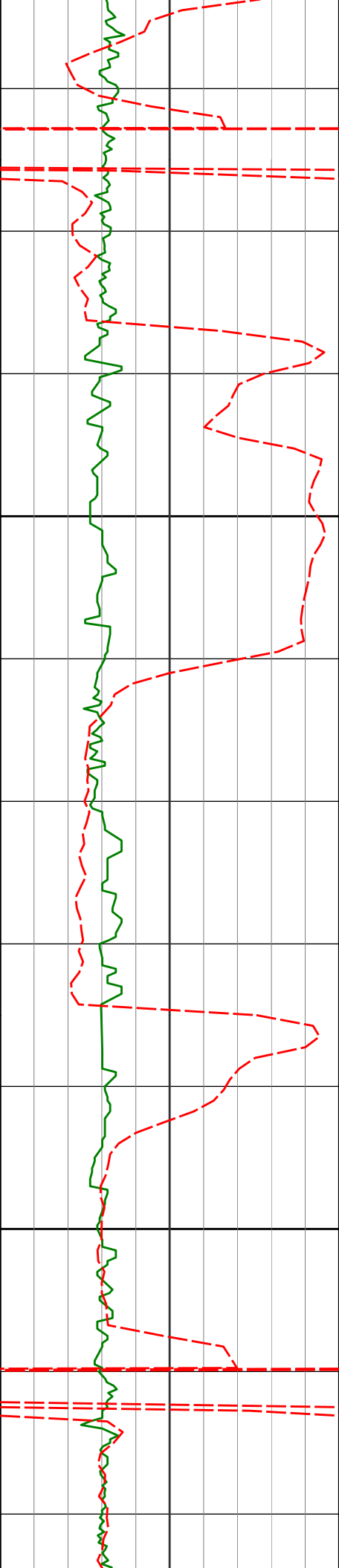
5183.44'

-3.99'

135.45°F

135.45°F

5300



5600

5617'

11.97°

167.85° 5555.81'

-6.28'

5700

5711'

9.98°

166.14° 5648.09'

-6.78'

133.90°F

135.45°F

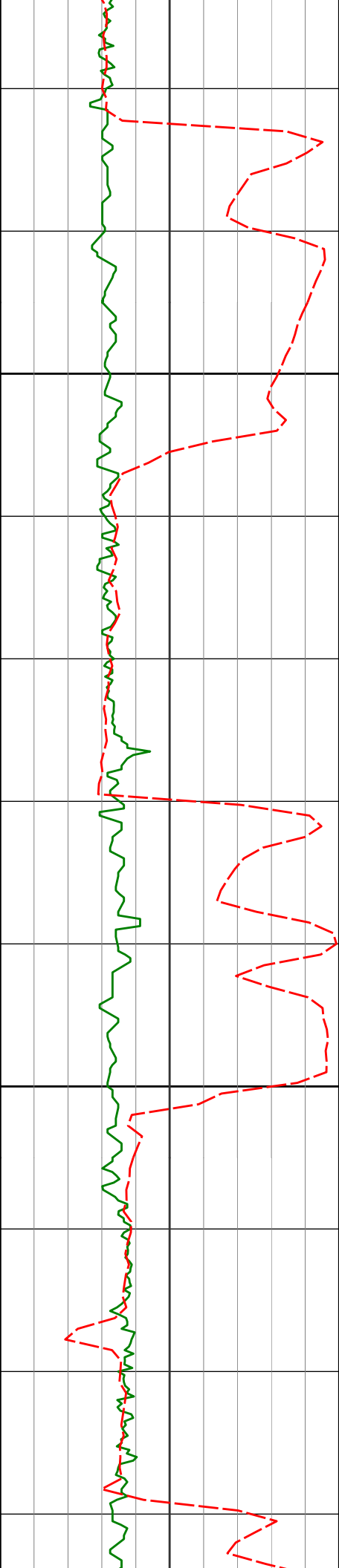
136.40°F

137.70°F

137.70°F

138.71°F

138.01°F



5800

5806'

10.34°

168.68° 5741.60'

-7.15'

5900

5901'

9.52°

170.52° 5835.17'

-6.89'

139.96°F

139.96°F

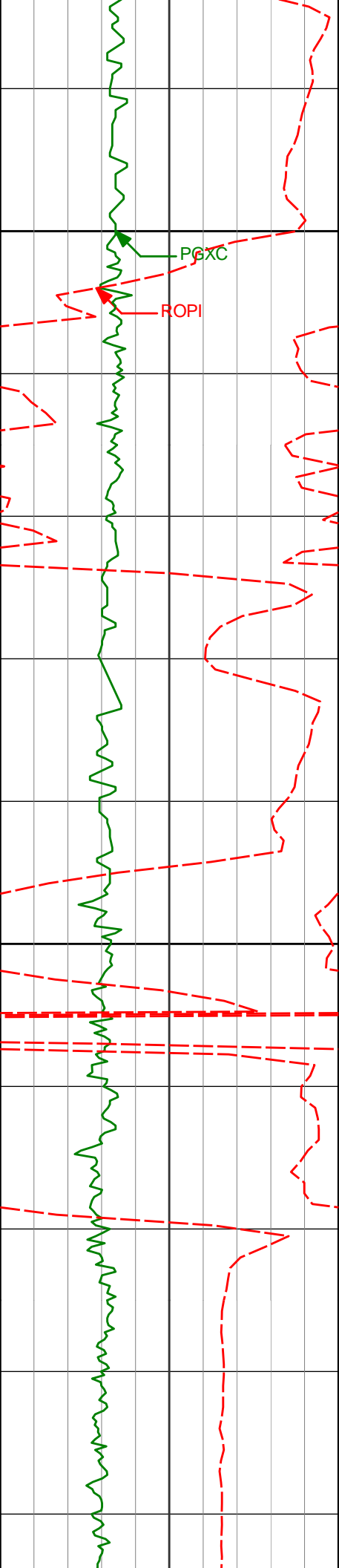
139.96°F

139.96°F

140.53°F

140.76°F

141.22°F



6000

6100

5995'

6085'

6184'

10.76°

10.01°

8.29°

166.38° 5927.71'

160.57° 6016.23'

156.16° 6113.97'

-7.00'

-8.44'

-11.20'

142.85°F

143.76°F

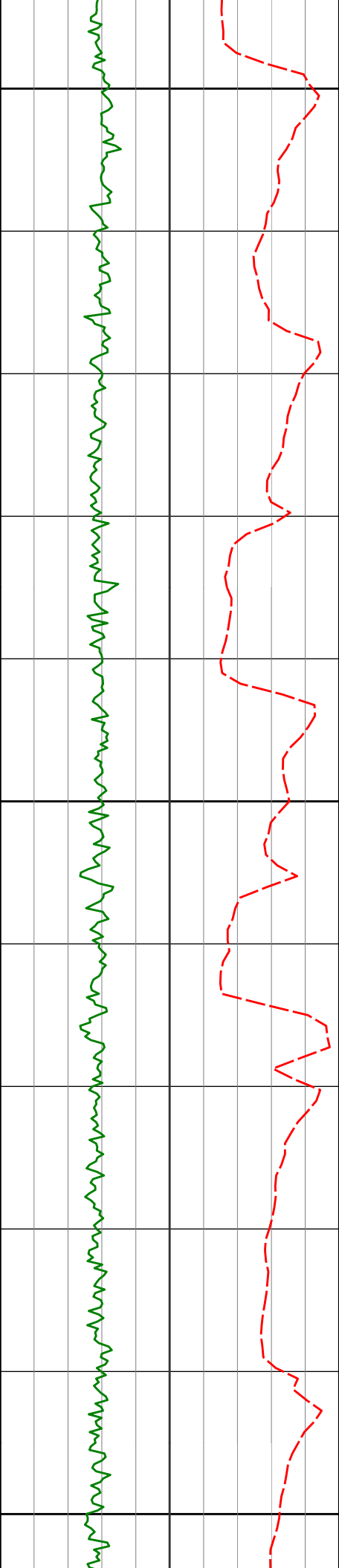
144.03°F

144.54°F

135.45°F

134.18°F

133.20°F



6200

200

134.28°F

6232'

10.81°

180.31°

6161.32'

-11.04'

135.75°F

6279'

13.12°

180.89°

6207.30'

-9.02'

137.67°F

6300

139.76°F

6327'

14.11°

189.85°

6253.95'

-5.75'

140.42°F

142.25°F

6374'

16.10°

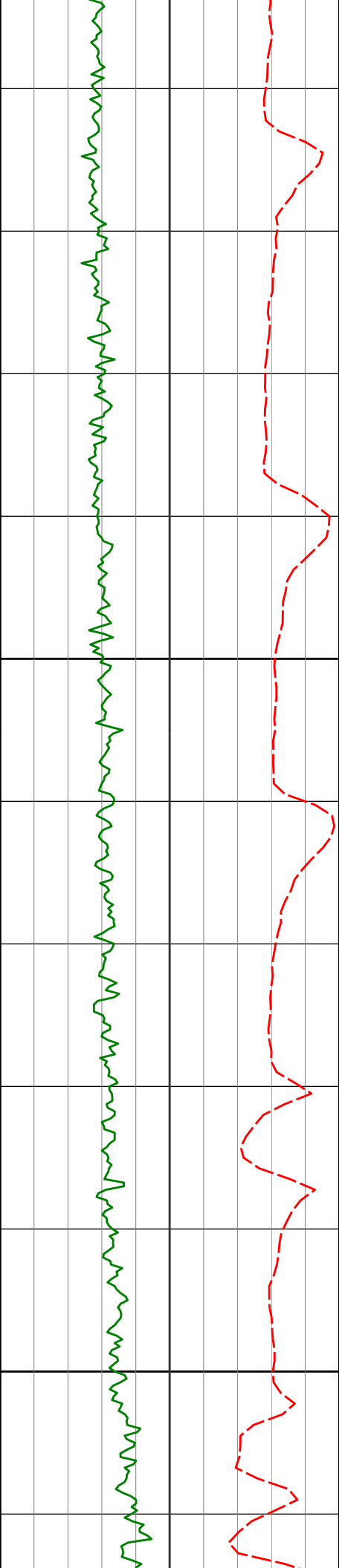
205.97°

6299.35'

0.27'

144.13°F

6400



6500

6600

6422'

18.22°

226.88°

6345.25'

10.69'

144.60°F

6468'

20.63°

242.93°

6388.66'

24.61'

146.63°F

146.97°F

6516'

23.64°

255.78°

6433.15'

42.38'

148.90°F

151.23°F

6563'

28.16°

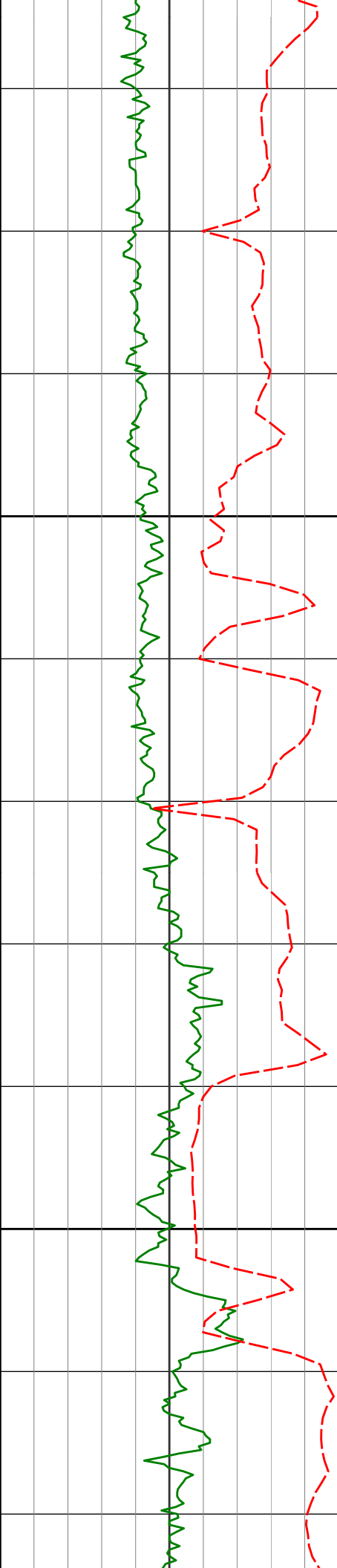
260.72°

6475.42'

62.88'

151.47°F

151.58°F



6700

6800

6657'

37.56°

265.53°

6554.30'

113.62'

6752'

45.88°

269.54°

6625.16'

175.98'

6847'

51.82°

268.70°

6687.65'

246.30'

153.68°F

153.79°F

153.79°F

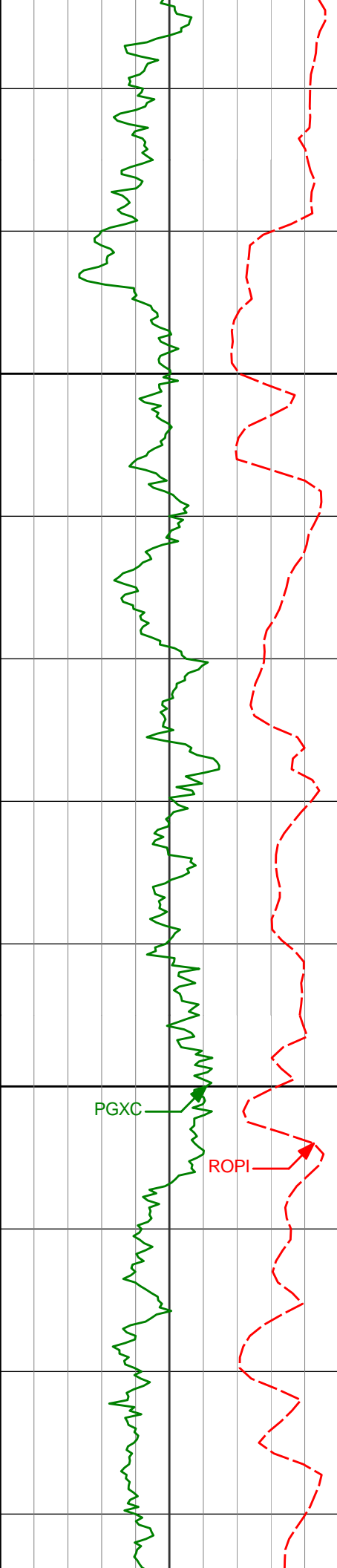
154.96°F

154.76°F

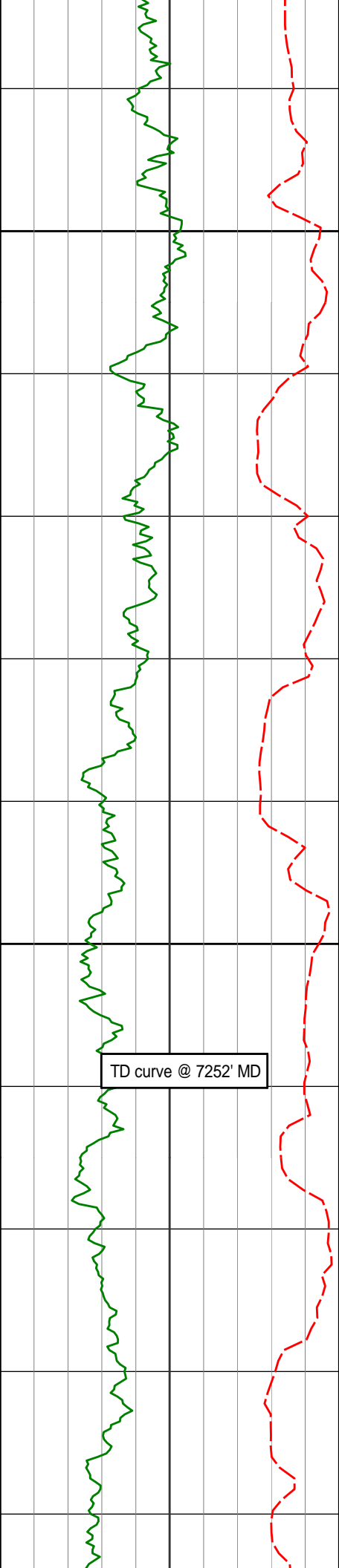
153.84°F

155.33°F

158.35°F



6800	54.12°	266.79°	6707.65'	276.85'	158.47°F
6895'	54.47°	266.80°	6716.44'	284.22'	158.47°F
6900					
6941'	59.50°	266.89°	6741.49'	322.39'	159.67°F
6989'	65.09°	267.10°	6763.80'	364.43'	160.83°F
7000					
7036'	69.08°	267.19°	6782.10'	407.24'	161.54°F



7100

7200

7084'

75.01°

266.79° 6796.89'

452.40'

163.15°F

7131'

78.65°

267.37° 6807.59'

497.66'

161.12°F

7179'

81.44°

267.76° 6815.89'

544.37'

161.08°F

7198'

83.61°

268.07° 6818.36'

562.96'

176.25°F

7266'

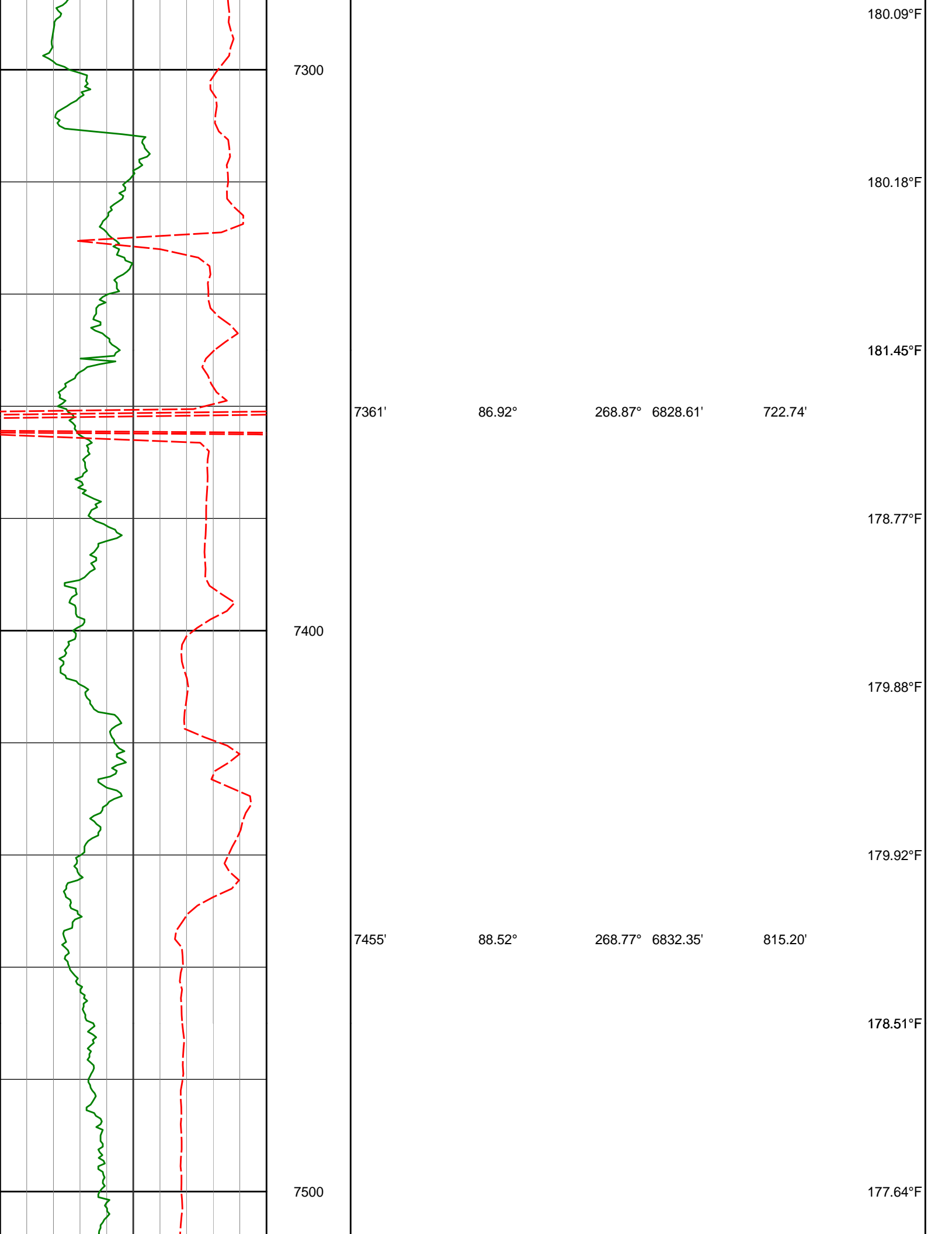
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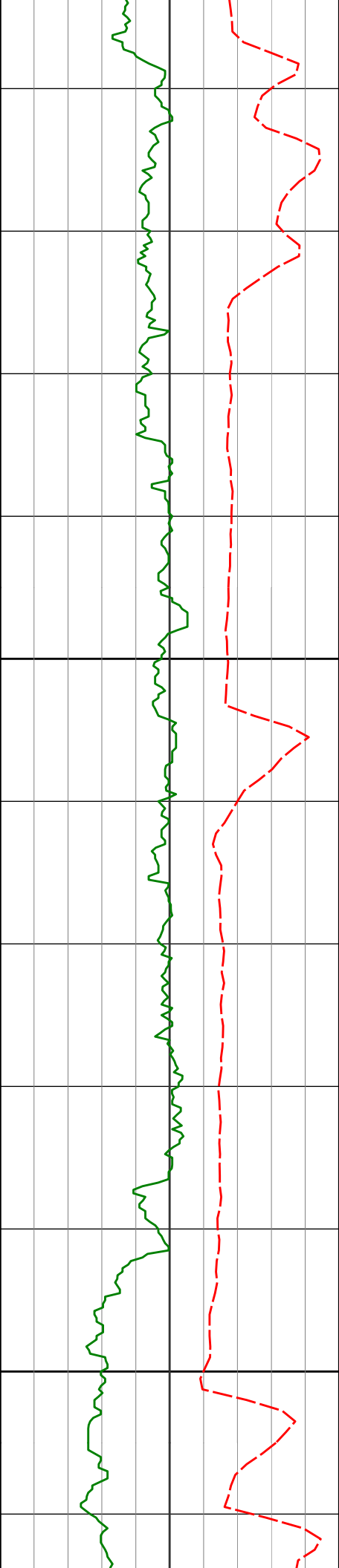
270.35° 6823.78'

629.59'

180.54°F

182.61°F





7600

7700

7549'

7644'

90.34°

91.51°

269.34°

269.26°

6833.28'

6831.75'

907.65'

1001.01'

179.77°F

180.42°F

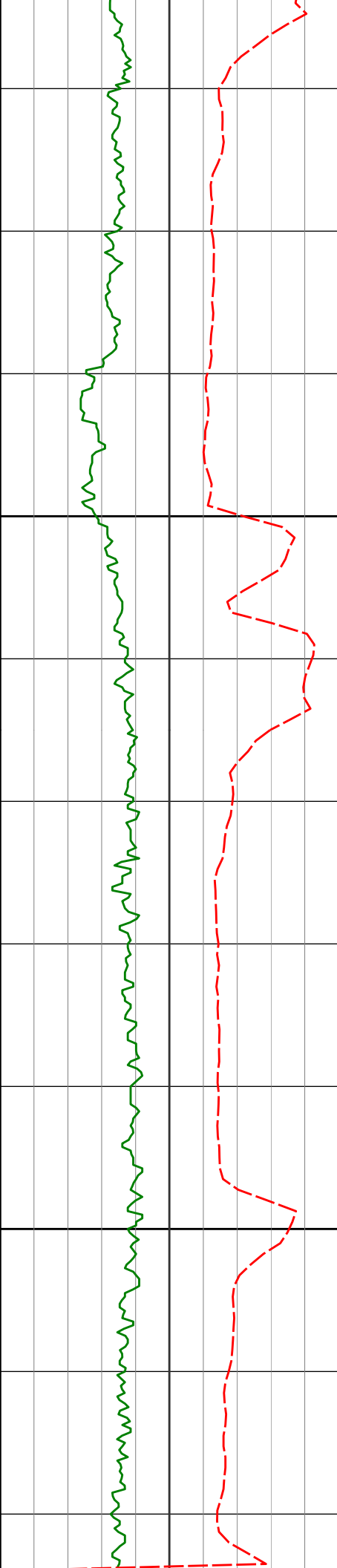
182.55°F

183.60°F

183.92°F

182.83°F

185.02°F



7738'

91.29°

268.93° 6829.45'

1093.43'

185.02°F

185.02°F

7800

186.23°F

7833'

90.71°

269.09° 6827.79'

1186.88'

187.48°F

189.55°F

189.99°F

7900

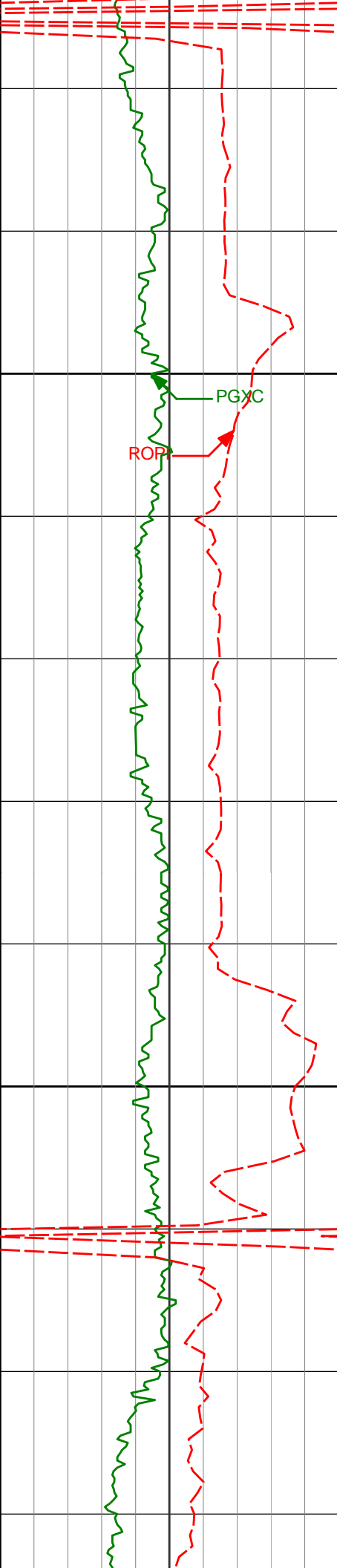
190.47°F

7927'

90.28°

268.30° 6826.98'

1279.44'



8000

8100

PGXC
ROP

8022'

8117'

91.08°

90.06°

267.44°

269.05°

6825.86'

6824.91'

1373.22'

1466.89'

192.49°F

192.49°F

193.94°F

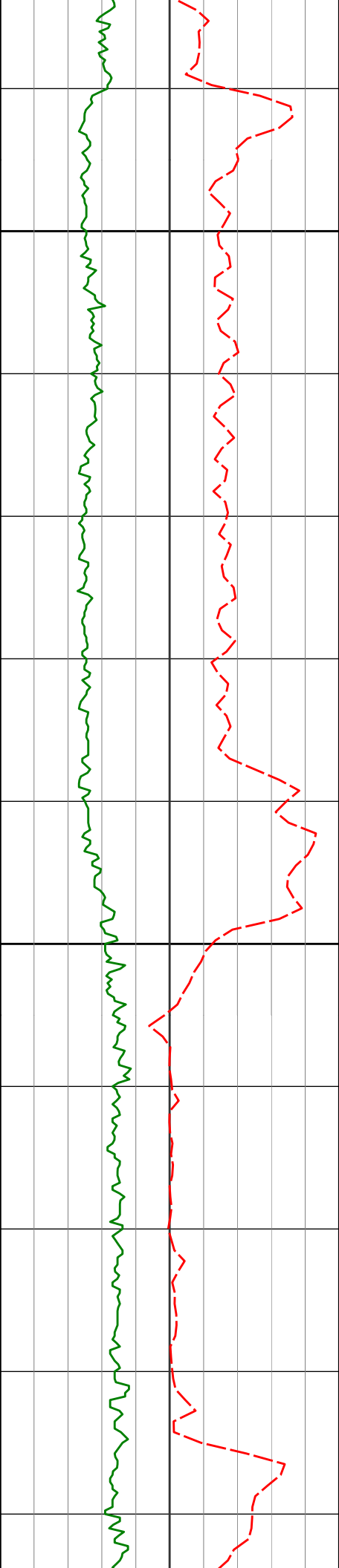
192.63°F

192.49°F

194.78°F

194.99°F

196.20°F



8200

8211'

90.34°

268.95°

6824.58'

1559.37'

197.51°F

197.51°F

197.51°F

197.67°F

8300

8306'

89.20°

269.65°

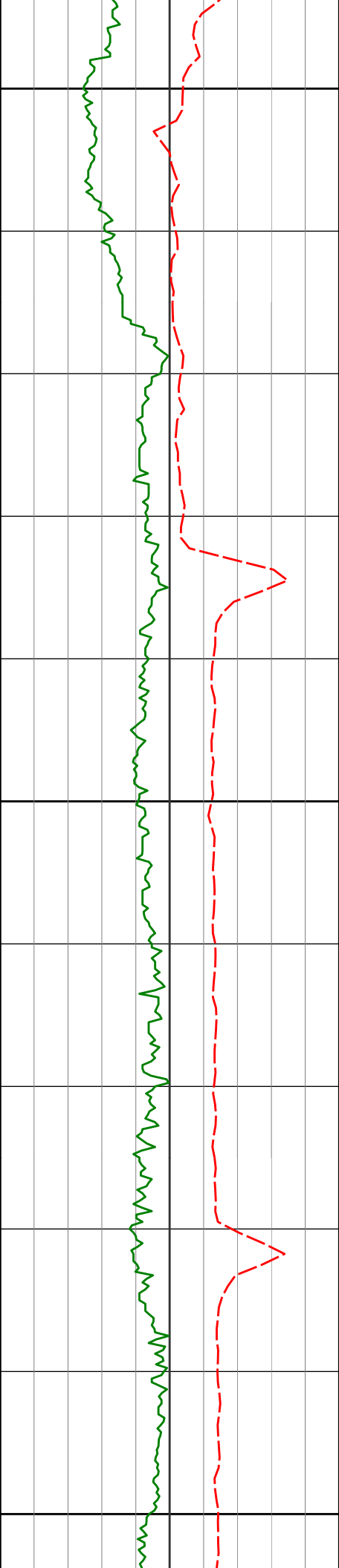
6824.97'

1652.74'

199.89°F

200.05°F

200.05°F



8400

8401'

90.15°

269.43°

6825.50'

1746.03'

200.05°F

200.05°F

200.05°F

200.05°F

8500

8496'

90.52°

268.51°

6824.94'

1839.50'

200.05°F

200.05°F

198.56°F

8600

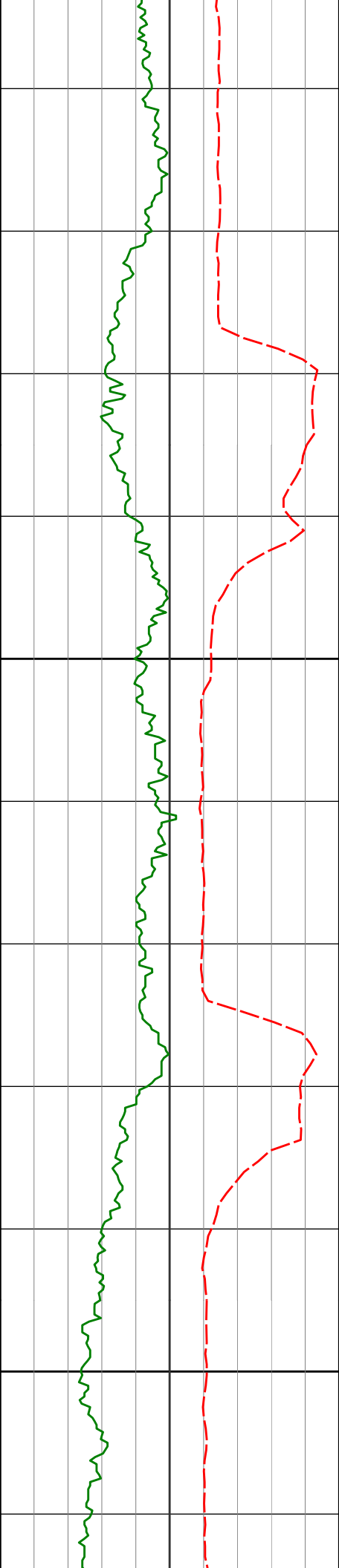
8590'

92.47°

268.17°

6822.49'

1932.13'



8700

8800

8685'

89.72°

269.40°

6820.67'

2025.63'

8779'

88.77°

267.55°

6821.91'

2118.25'

197.51°F

197.51°F

197.51°F

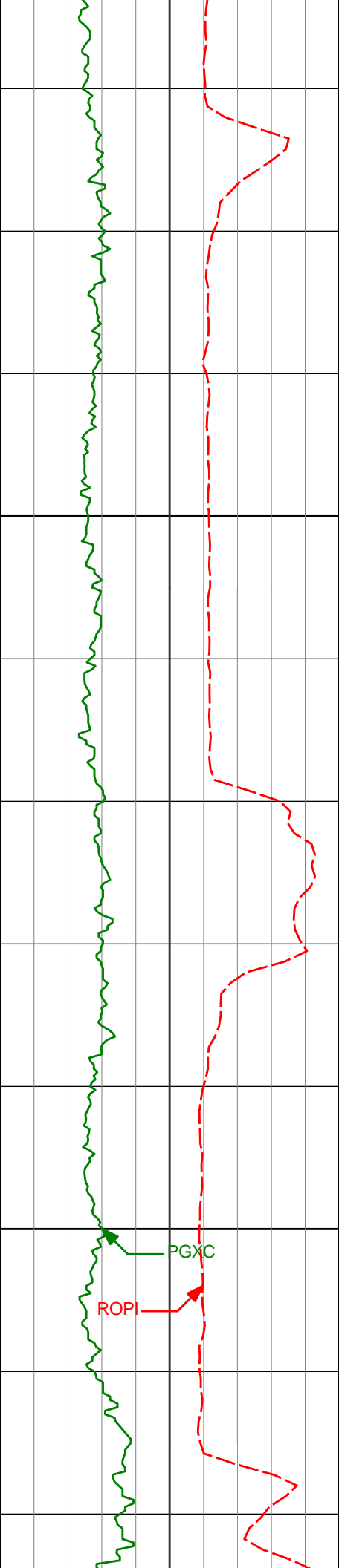
197.51°F

197.51°F

197.51°F

197.51°F

197.51°F



8900

9000

8874'

89.72°

267.96°

6823.17'

2212.05'

198.87°F

198.78°F

197.51°F

197.81°F

8969'

88.86°

268.61°

6824.34'

2305.71'

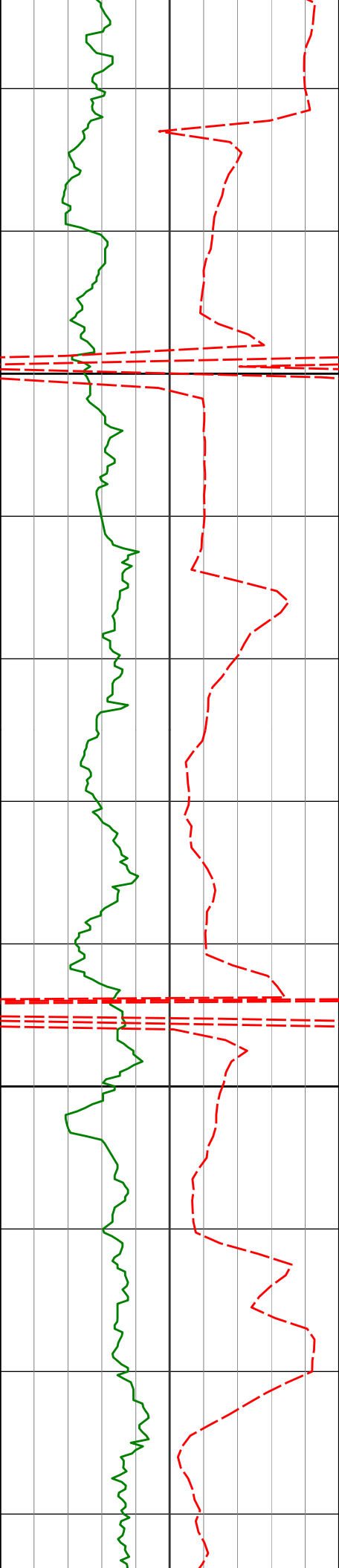
200.05°F

198.48°F

199.82°F

PGXC

ROPI



9100

9200

9064'

87.19°

269.89°

6827.61'

2399.04'

200.87°F

202.60°F

202.74°F

205.04°F

9159'

86.64°

270.24°

6832.72'

2492.04'

203.34°F

204.72°F

205.67°F

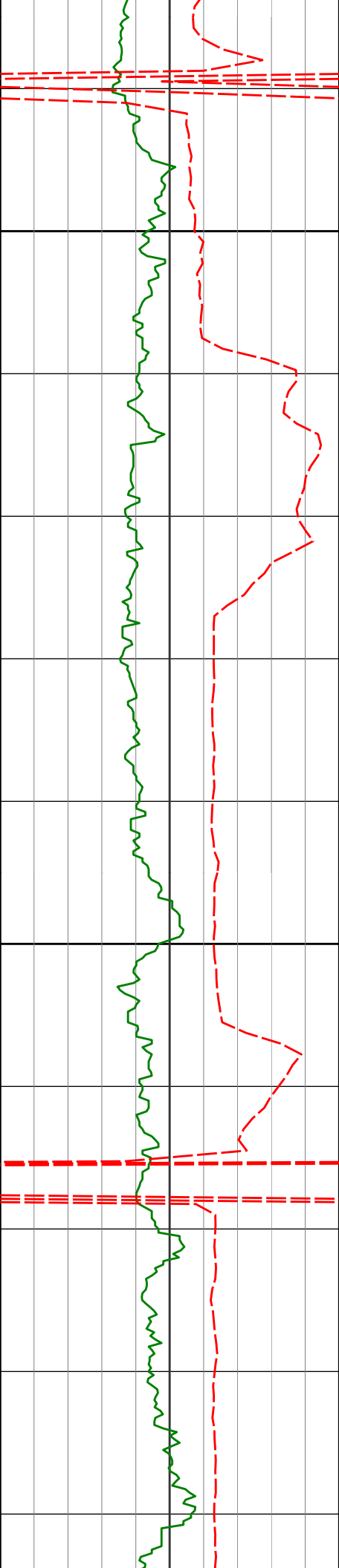
9254'

86.76°

270.07°

6838.19'

2584.98'



9300

9400

9348'

9443'

88.40°

87.13°

269.86°

270.70°

6842.16'

6845.86'

2677.08'

2770.06'

205.78°F

205.16°F

207.04°F

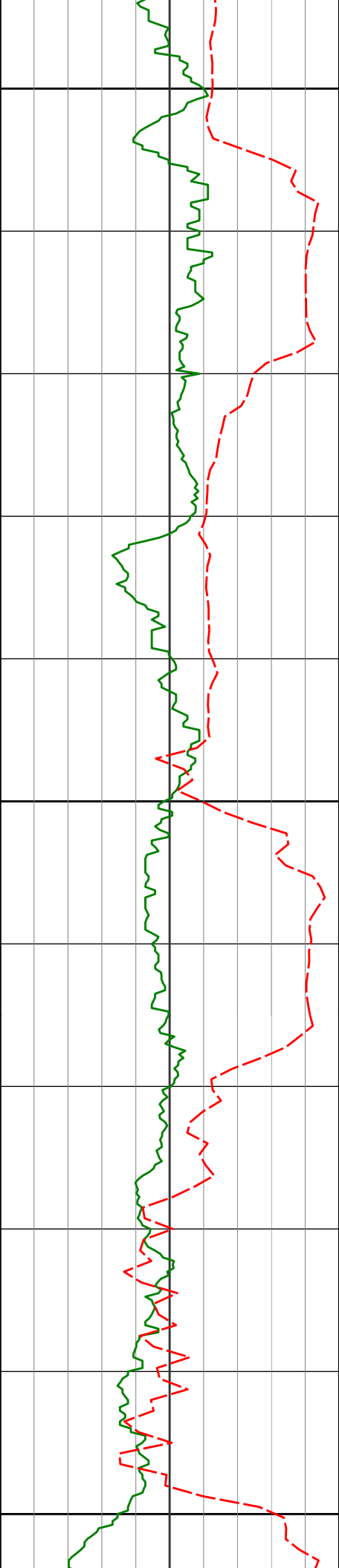
207.73°F

208.11°F

210.31°F

208.50°F

205.35°F



9500

204.98°F

9538'

88.18°

271.97° 6849.75'

2862.67'

202.50°F

200.70°F

9600

201.68°F

9633'

89.14°

272.68° 6851.97'

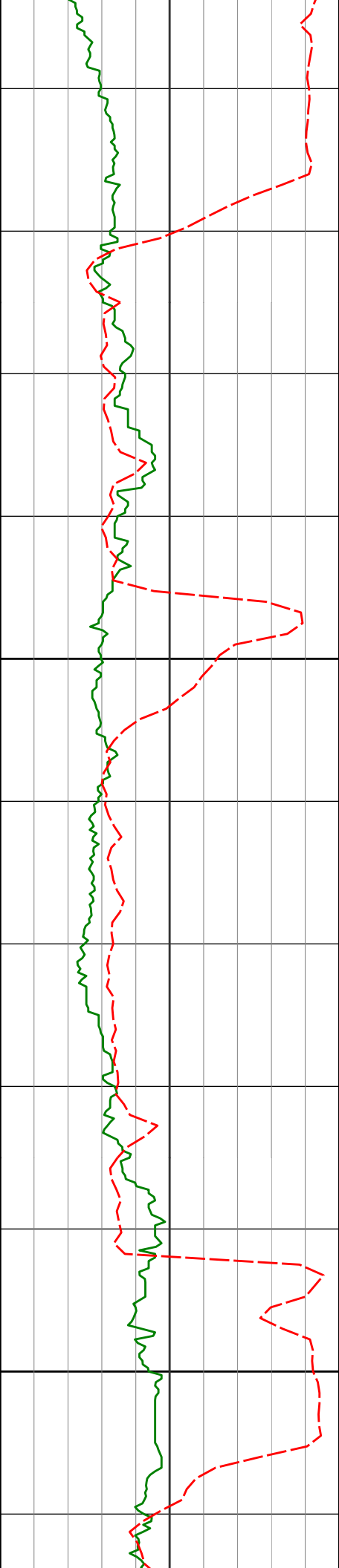
2954.96'

203.71°F

202.72°F

202.60°F

9700



9800

9900

9727'

9822'

9917'

91.54°

91.88°

91.73°

271.77°

271.31°

270.14°

6851.41'

6848.58'

6845.58'

3046.34'

3138.91'

3231.77'

205.16°F

205.16°F

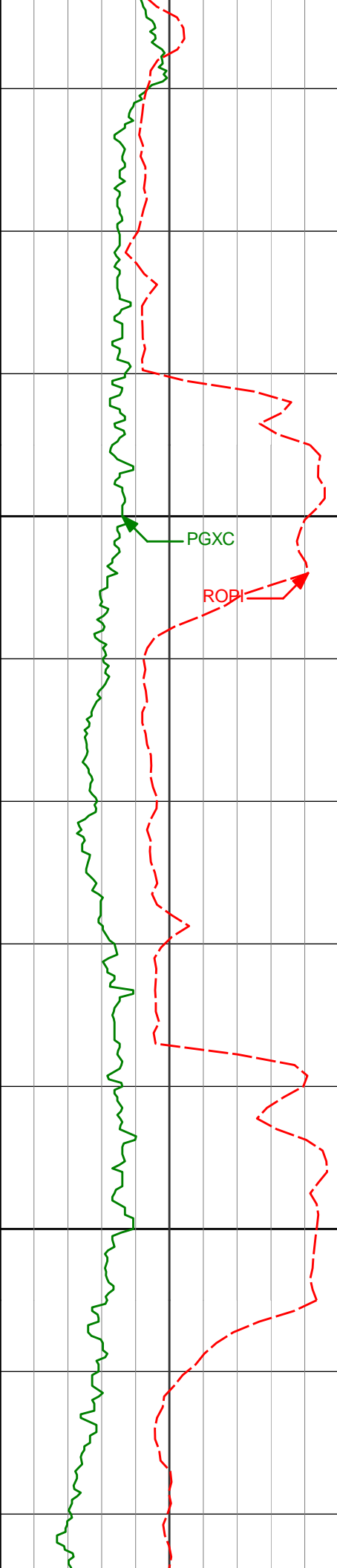
205.41°F

207.62°F

206.40°F

205.73°F

207.73°F



10000

10100

10012'

10106'

91.91°

89.48°

269.52°

269.28°

6842.57'

6841.43'

3324.93'

3417.28'

207.73°F

207.73°F

208.42°F

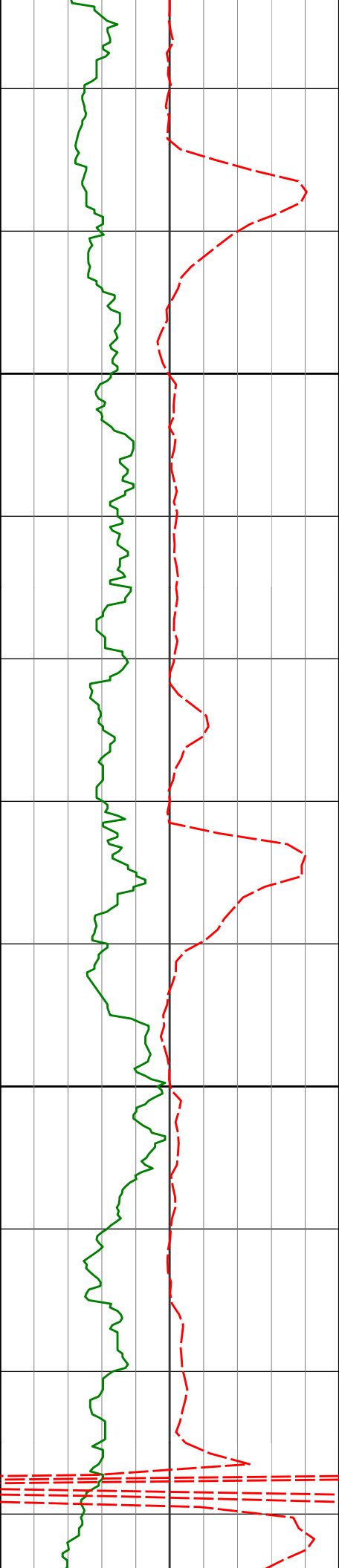
209.39°F

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207.73°F

207.73°F

209.85°F



10200

10201'

88.83°

269.63°

6842.84'

3510.59'

211.95°F

212.92°F

212.92°F

213.87°F

10300

10296'

88.03°

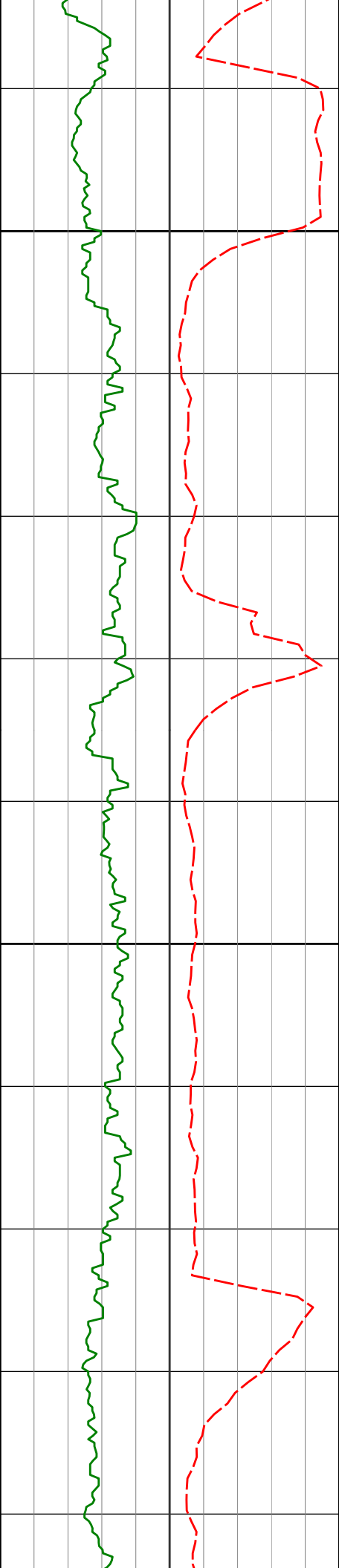
270.55°

6845.44'

3603.68'

212.85°F

210.98°F



10400

10500

10390'

89.69°

270.61° 6847.32'

3695.64'

10485'

89.35°

271.02° 6848.11'

3788.51'

10580'

89.11°

270.91° 6849.39'

3881.33'

212.92°F

212.92°F

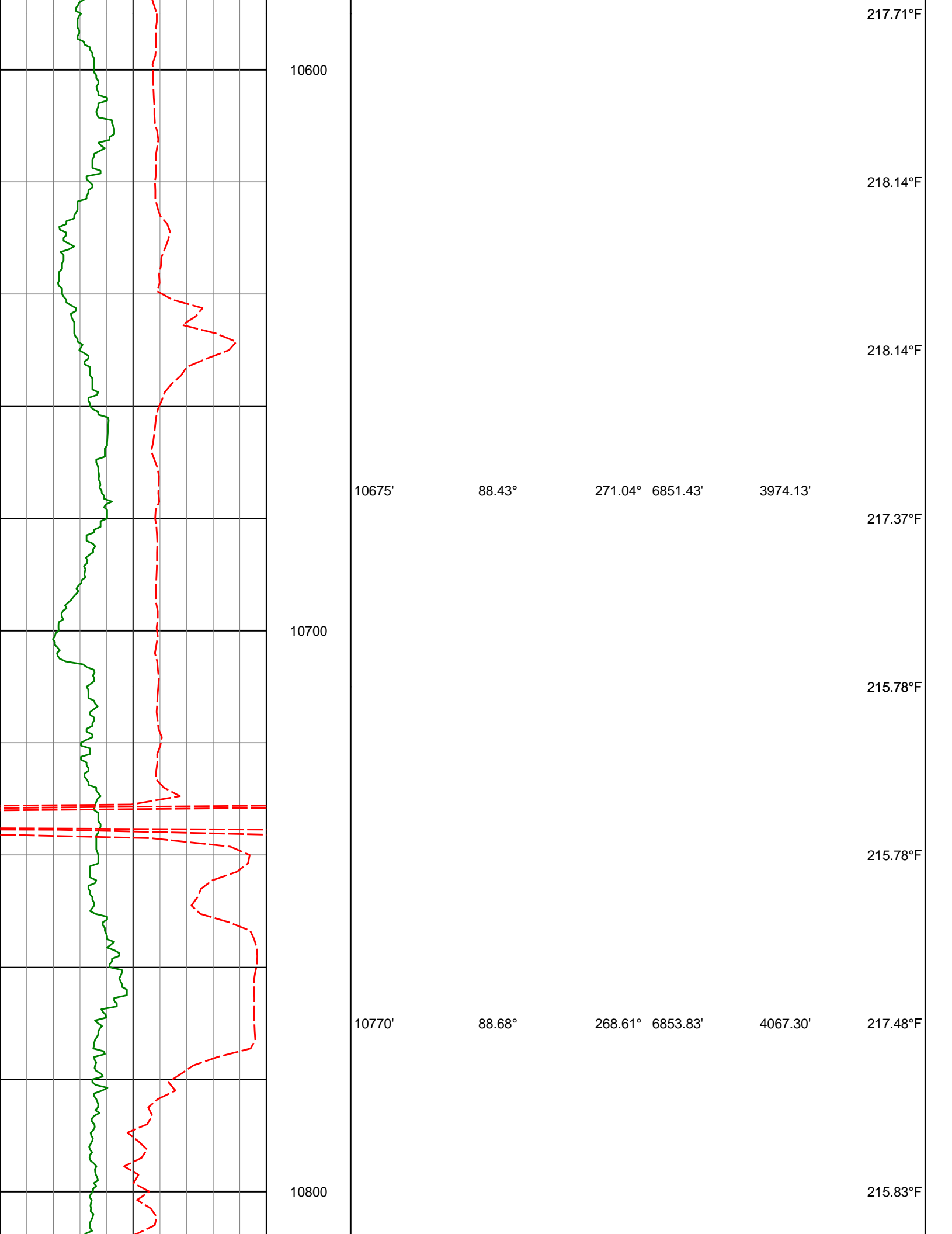
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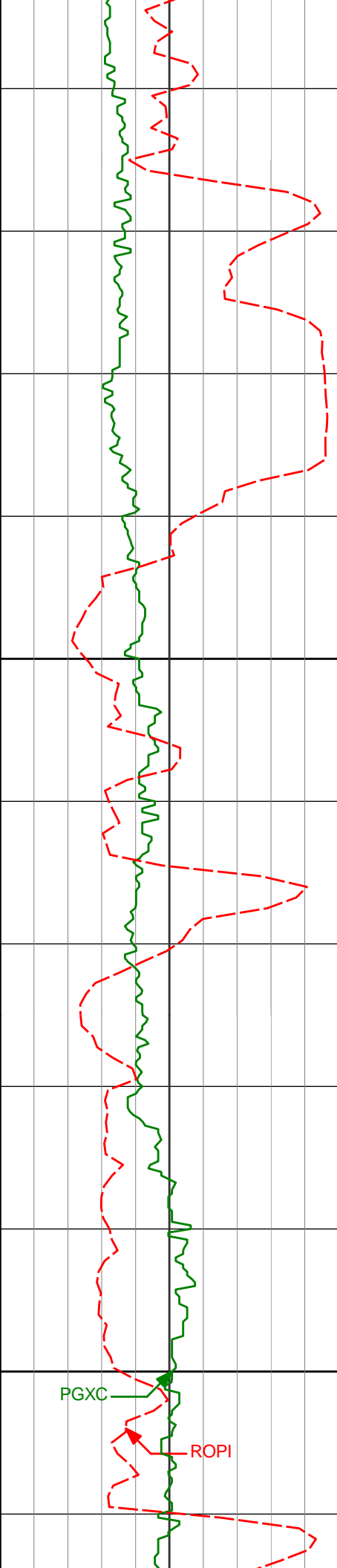
214.70°F

215.51°F

215.51°F

215.51°F





10900

11000

10864'

90.37°

268.44°

6854.62'

4159.91'

10959'

90.52°

268.26°

6853.88'

4253.56'

215.51°F

217.96°F

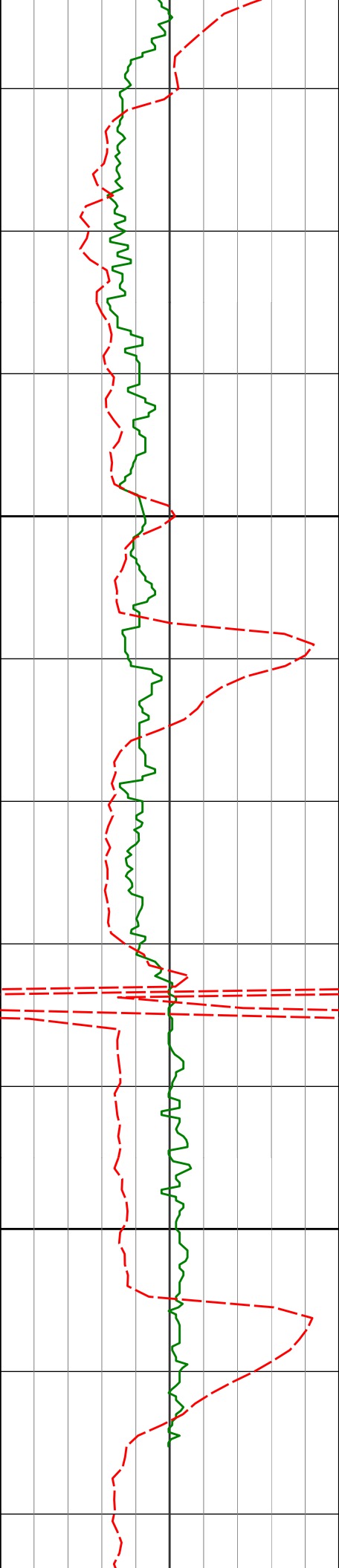
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220.77°F

220.77°F

221.22°F

223.41°F



11100

11200

11054'

11148'

11231'

89.29°

88.43°

88.77°

268.34°

268.80°

269.27°

6854.03'

6855.90'

6857.93'

4347.22'

4439.80'

4521.42'

223.66°F

226.08°F

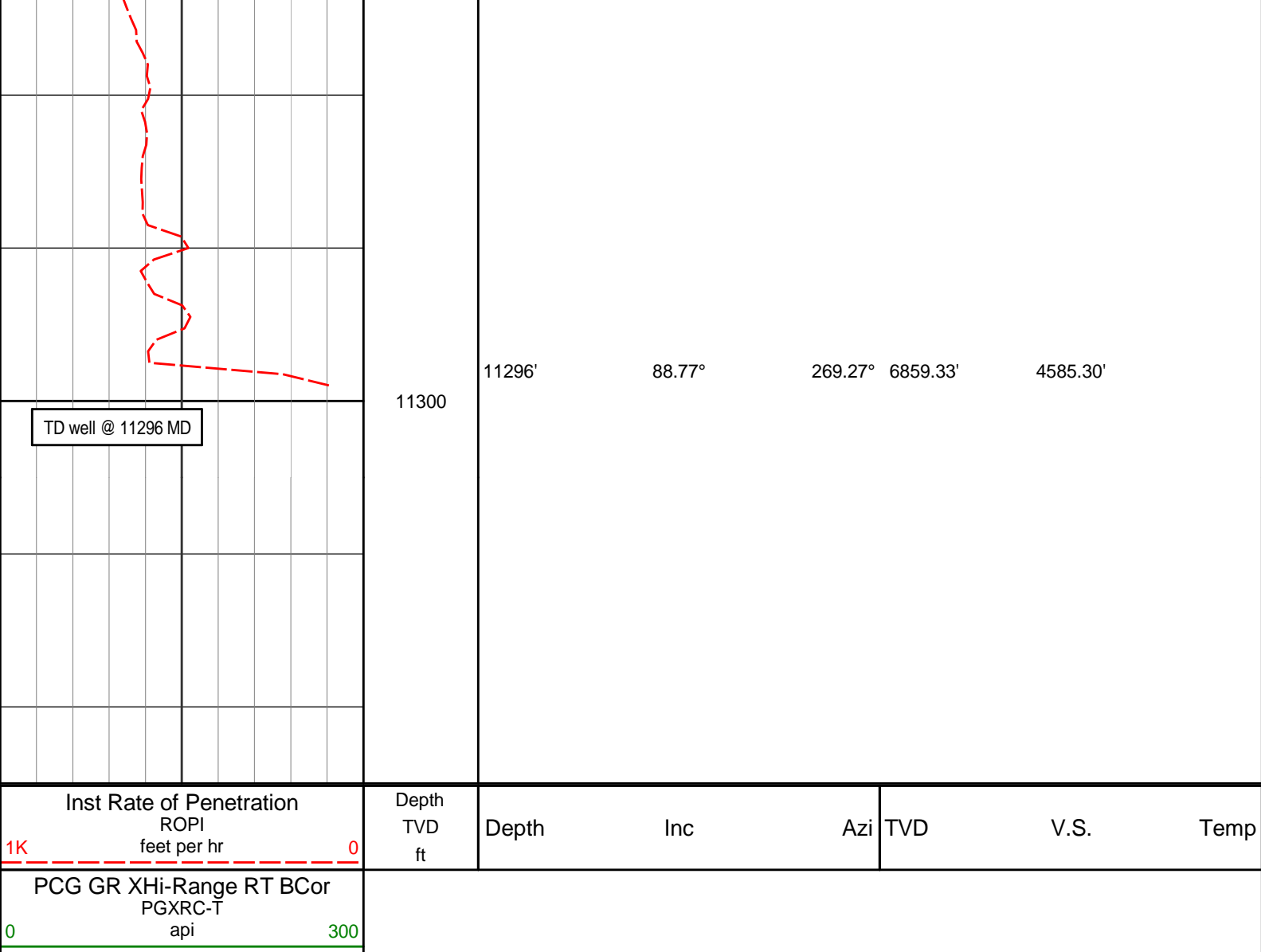
226.08°F

226.08°F

226.08°F

228.74°F

228.74°F



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy Inc
Reliance E23-62-1HN
Watteberg
Weld Colorado
USA
CA-XX-0902136446
Tied in @ Surface
First two Survey's from 3rd party source (Multi Shot EMS)
Final survey projection @ bit

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
285.00	0.60	164.84	284.99	1.44 S	0.39 E	-0.10	0.21
600.00	0.80	173.64	599.97	5.22 S	1.07 E	-0.02	0.07
900.00	0.83	95.81	899.95	7.52 S	3.46 E	-1.91	0.34
992.00	0.73	94.79	991.94	7.63 S	4.70 E	-3.11	0.11
1086.00	0.91	111.11	1085.93	7.95 S	5.99 E	-4.31	0.31
1177.00	0.96	105.31	1176.92	8.42 S	7.40 E	-5.60	0.12
1269.00	0.80	123.55	1268.91	8.97 S	8.68 E	-6.75	0.35
1361.00	0.86	131.93	1360.90	9.79 S	9.72 E	-7.61	0.15
1452.00	0.88	131.93	1452.00	10.79 S	10.72 E	-8.61	0.18

1453.00	0.80	136.86	1452.89	10.72 S	10.68 E	-8.36	0.10
1545.00	0.67	123.03	1544.88	11.48 S	11.56 E	-9.09	0.24
1731.00	0.76	92.07	1730.87	12.11 S	13.71 E	-11.06	0.21
1826.00	1.94	160.71	1825.84	13.66 S	14.87 E	-11.90	1.91
1920.00	3.43	180.00	1919.74	17.97 S	15.40 E	-11.57	1.83
2015.00	5.03	175.18	2014.48	24.96 S	15.75 E	-10.54	1.72
2110.00	6.50	175.88	2109.00	34.47 S	16.48 E	-9.40	1.55
2204.00	7.65	173.75	2202.28	46.00 S	17.55 E	-8.18	1.26
2299.00	8.52	174.95	2296.33	59.30 S	18.86 E	-6.85	0.93
2394.00	10.19	175.72	2390.06	74.70 S	20.11 E	-5.05	1.76
2489.00	11.43	169.52	2483.38	92.34 S	22.44 E	-3.88	1.78
2583.00	10.61	169.31	2575.65	109.99 S	25.74 E	-3.65	0.87
2678.00	11.14	169.78	2668.94	127.62 S	28.99 E	-3.38	0.56
2773.00	11.16	170.36	2762.15	145.71 S	32.16 E	-2.93	0.12
2868.00	11.46	169.55	2855.30	164.05 S	35.41 E	-2.52	0.36
2963.00	9.85	171.90	2948.66	181.38 S	38.27 E	-1.92	1.76
3057.00	11.66	168.59	3041.01	198.65 S	41.28 E	-1.48	2.04
3152.00	10.70	170.44	3134.20	216.76 S	44.64 E	-1.23	1.08
3246.00	10.08	167.41	3226.66	233.40 S	47.89 E	-1.14	0.88
3341.00	9.96	163.97	3320.21	249.42 S	51.97 E	-2.00	0.64
3436.00	10.22	170.32	3413.75	265.62 S	55.65 E	-2.43	1.20
3531.00	10.04	172.89	3507.27	282.15 S	58.10 E	-1.58	0.51
3626.00	11.41	172.01	3600.60	299.68 S	60.43 E	-0.43	1.45
3721.00	11.77	172.63	3693.67	318.60 S	62.98 E	0.78	0.39
3816.00	12.98	173.21	3786.46	338.79 S	65.48 E	2.29	1.28
3911.00	11.21	167.00	3879.35	358.38 S	68.82 E	2.86	2.31
4005.00	11.43	166.04	3971.52	376.32 S	73.12 E	2.17	0.31
4100.00	9.96	165.92	4064.87	393.42 S	77.39 E	1.34	1.55
4195.00	9.32	164.78	4158.53	408.81 S	81.41 E	0.42	0.70
4290.00	10.31	177.12	4252.15	424.72 S	83.86 E	1.14	2.44
4385.00	10.00	168.50	4345.67	441.29 S	85.93 E	2.37	1.63
4479.00	9.49	161.85	4438.31	456.65 S	89.96 E	1.42	1.31
4574.00	10.02	163.27	4531.94	472.01 S	94.78 E	-0.29	0.62
4669.00	10.87	166.59	4625.37	488.64 S	99.24 E	-1.39	1.09
4764.00	11.08	171.13	4718.63	506.37 S	102.72 E	-1.33	0.94
4858.00	11.03	170.35	4810.89	524.16 S	105.62 E	-0.68	0.17
4953.00	10.61	165.85	4904.20	541.60 S	109.28 E	-0.85	0.99
5047.00	12.78	164.86	4996.24	560.02 S	114.11 E	-1.97	2.32
5143.00	11.38	166.68	5090.12	579.48 S	119.07 E	-3.00	1.51
5238.00	10.21	164.17	5183.44	596.70 S	123.52 E	-3.99	1.32
5333.00	11.09	165.07	5276.80	613.63 S	128.17 E	-5.23	0.94
5427.00	9.70	165.35	5369.25	630.03 S	132.51 E	-6.26	1.48
5522.00	10.97	170.56	5462.71	646.70 S	136.02 E	-6.43	1.66
5617.00	11.97	167.85	5555.81	665.25 S	139.58 E	-6.28	1.19
5711.00	9.98	166.14	5648.09	682.69 S	143.58 E	-6.78	2.15
5806.00	10.34	168.68	5741.60	699.04 S	147.22 E	-7.15	0.61
5901.00	9.52	170.52	5835.17	715.15 S	150.19 E	-6.89	0.93
5995.00	10.76	166.38	5927.71	731.34 S	153.54 E	-7.00	1.53
6085.00	10.01	160.57	6016.23	746.88 S	158.12 E	-8.44	1.43
6184.00	8.29	156.16	6113.97	761.52 S	163.86 E	-11.20	1.88
6232.00	10.81	180.31	6161.32	769.19 S	165.24 E	-11.04	9.76
6279.00	13.12	180.89	6207.30	778.93 S	165.13 E	-9.02	4.90
6327.00	14.11	189.85	6253.95	790.15 S	164.04 E	-5.75	4.85
6374.00	16.10	205.97	6299.35	801.66 S	160.21 E	0.27	9.85
6422.00	18.22	226.88	6345.25	812.79 S	151.80 E	10.69	13.51
6468.00	20.63	242.93	6388.66	821.40 S	139.33 E	24.61	12.68
6516.00	23.64	255.78	6433.15	827.61 S	122.46 E	42.38	11.85
6563.00	28.16	260.72	6475.42	831.72 S	102.36 E	62.88	10.66
6657.00	37.56	265.53	6554.30	837.54 S	51.78 E	113.62	10.37
6752.00	45.88	269.54	6625.16	840.07 S	11.31 W	175.98	9.18
6847.00	51.82	268.70	6687.65	841.20 S	82.79 W	246.30	6.29
6895.00	54.47	266.80	6716.44	842.72 S	121.16 W	284.22	6.36
6941.00	59.50	266.89	6741.49	844.84 S	159.67 W	322.39	10.94
6989.00	65.09	267.10	6763.80	847.07 S	202.09 W	364.43	11.65
7036.00	69.08	267.19	6782.10	849.22 S	245.32 W	407.24	8.49
7084.00	75.01	266.79	6796.89	851.62 S	290.89 W	452.40	12.38
7131.00	78.65	267.37	6807.59	853.95 S	336.59 W	497.66	7.84
7179.00	81.44	267.76	6815.89	855.96 S	383.82 W	544.37	5.87
7198.00	83.61	268.07	6818.36	856.64 S	402.65 W	562.96	11.54
7266.00	87.26	270.35	6823.78	857.57 S	470.41 W	629.59	6.32
7361.00	86.92	268.87	6828.61	858.21 S	565.28 W	722.74	1.60
7455.00	88.52	268.77	6832.35	860.15 S	659.18 W	815.20	1.71
7549.00	90.34	269.34	6833.28	861.70 S	753.16 W	907.65	2.02
7644.00	91.51	269.26	6831.75	862.86 S	848.14 W	1001.01	1.24
7738.00	91.29	268.93	6829.45	864.34 S	942.10 W	1093.43	0.41

7833.00	90.71	269.09	6827.79	865.98 S	1037.07 W	1186.88	0.64
7927.00	90.28	268.30	6826.98	868.13 S	1131.04 W	1279.44	0.95
8022.00	91.08	267.44	6825.86	871.66 S	1225.97 W	1373.22	1.24
8117.00	90.06	269.05	6824.91	874.58 S	1320.91 W	1466.89	2.01
8211.00	90.34	268.95	6824.58	876.22 S	1414.90 W	1559.37	0.31
8306.00	89.20	269.65	6824.97	877.39 S	1509.89 W	1652.74	1.41
8401.00	90.15	269.43	6825.50	878.15 S	1604.88 W	1746.03	1.03
8496.00	90.52	268.51	6824.94	879.86 S	1699.86 W	1839.50	1.04
8590.00	92.47	268.17	6822.49	882.58 S	1793.79 W	1932.13	2.10
8685.00	89.72	269.40	6820.67	884.60 S	1888.74 W	2025.63	3.17
8779.00	88.77	267.55	6821.91	887.10 S	1982.69 W	2118.25	2.21
8874.00	89.72	267.96	6823.17	890.83 S	2077.61 W	2212.05	1.09
8969.00	88.86	268.61	6824.34	893.67 S	2172.56 W	2305.71	1.14
9064.00	87.19	269.89	6827.61	894.92 S	2267.49 W	2399.04	2.21
9159.00	86.64	270.24	6832.72	894.81 S	2362.35 W	2492.04	0.69
9254.00	86.76	270.07	6838.19	894.55 S	2457.19 W	2584.98	0.22
9348.00	88.40	269.86	6842.16	894.61 S	2551.11 W	2677.08	1.75
9443.00	87.13	270.70	6845.86	894.14 S	2646.03 W	2770.06	1.60
9538.00	88.18	271.97	6849.75	891.92 S	2740.92 W	2862.67	1.73
9633.00	89.14	272.68	6851.97	888.07 S	2835.81 W	2954.96	1.25
9727.00	91.54	271.77	6851.41	884.41 S	2929.73 W	3046.34	2.73
9822.00	91.88	271.31	6848.58	881.85 S	3024.66 W	3138.91	0.60
9917.00	91.73	270.14	6845.58	880.65 S	3119.60 W	3231.77	1.24
10012.00	91.91	269.52	6842.57	880.93 S	3214.55 W	3324.93	0.67
10106.00	89.48	269.28	6841.43	881.91 S	3308.53 W	3417.28	2.60
10201.00	88.83	269.63	6842.84	882.82 S	3403.52 W	3510.59	0.77
10296.00	88.03	270.55	6845.44	882.67 S	3498.48 W	3603.68	1.29
10390.00	89.69	270.61	6847.32	881.72 S	3592.45 W	3695.64	1.77
10485.00	89.35	271.02	6848.11	880.37 S	3687.44 W	3788.51	0.55
10580.00	89.11	270.91	6849.39	878.77 S	3782.42 W	3881.33	0.28
10675.00	88.43	271.04	6851.43	877.16 S	3877.38 W	3974.13	0.73
10770.00	88.68	268.61	6853.83	877.45 S	3972.34 W	4067.30	2.57
10864.00	90.37	268.44	6854.62	879.87 S	4066.31 W	4159.91	1.81
10959.00	90.52	268.26	6853.88	882.60 S	4161.26 W	4253.56	0.25
11054.00	89.29	268.34	6854.03	885.42 S	4256.22 W	4347.22	1.30
11148.00	88.43	268.80	6855.90	887.76 S	4350.17 W	4439.80	1.04
11231.00	88.77	269.27	6857.93	889.15 S	4433.13 W	4521.42	0.70
11296.00	88.77	269.27	6859.33	889.97 S	4498.11 W	4585.30	0.01

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 258.68 DEGREES (GRID)
A TOTAL CORRECTION OF 7.83 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11296.00 FEET
IS 4585.31 FEET ALONG 258.81 DEGREES (GRID)**