



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	11-Mar-15	12-Mar-15	16-Mar-15		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.790	6.790	4.750		
Log Start Depth (MD, ft)	932.00	6,617.00	7,045.00		
Log End Depth (MD, ft)	6,617.00	7,045.00	16,323.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	10-Mar-15 11:20	11-Mar-15 17:45	13-Mar-15 03:00		
Drill/Wipe End Date and Time	11-Mar-15 08:35	11-Mar-15 23:00	15-Mar-15 21:33		
Min Inc (deg) @ Depth (MD, ft)	0.37 @ 1,016.00	42.28 @ 6,610.00	87.07 @ 7,121.00		
Max Inc (deg) @ Depth (MD, ft)	37.19 @ 6,562.00	88.00 @ 7,045.00	92.13 @ 16,258.00		
Bit TFA(in2) / Bit Type	1.37 / PDC	1.49 / PDC	0.98 / PDC		
Flow Rate (gpm)	610.79	574.77	311.31		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	473.0 / N/A	/ N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	8.70 / 29.00	10.65 / 36.00	9.30 / 32.00		
Filtrate CL (ppm)	1,900.00	2,100.00	2,200.00		
pH / Fluid Loss (mptm)	11.90 / 39	9.00 / 8	8.20 / 10		
PV (cP) / YP (lbf2)	1 / 3.00	8 / 8.00	5 / 6.00		
% Solids / % Sand	3.70 / 0.40	10.90 / 0.25	5.20 / 0.50		
% Oil / Oil:Water Ratio	N/A / N/A	0.50 / 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		
Rm @ 150 degF (degF)	154.00 / DCM	122.00 / DCM	254.10 / DCM		

Max Tool Temp (degF) / Source	154.30 / PCM	162.80 / PCM	251.40 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 154.30	N/A @ 162.80	N/A @ 251.40		
Lead MWD Engineer	Robert Barnes	Robert Barnes	Robert Barnes		
Customer Representative	Jeremy Stolz	Jeremy Stolz	Jeremy Stolz		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11342274	11342274	11342274		
Insert Serial Number	11680766	11680766	12334786		
Date and Time Initialized	09-Mar-15 23:06	01-Jan-70 00:00	12-Mar-15 10:20		
Date and Time Read	12-Mar-15 05:12	01-Jan-70 00:00	16-Mar-15 13:39		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	53.00	65.00		
Software Version	6.33	6.33	6.21		
Sub Serial Number	11342274	11342274	12334786		
Sonde Serial Number	11145674	11145674	11478053		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	46.61	121.95	198.50		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	47.76	45.48	68.22		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342274	11342274	12334786		
Insert/Sonde Serial Number	11293410	11293410	11293410		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth 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

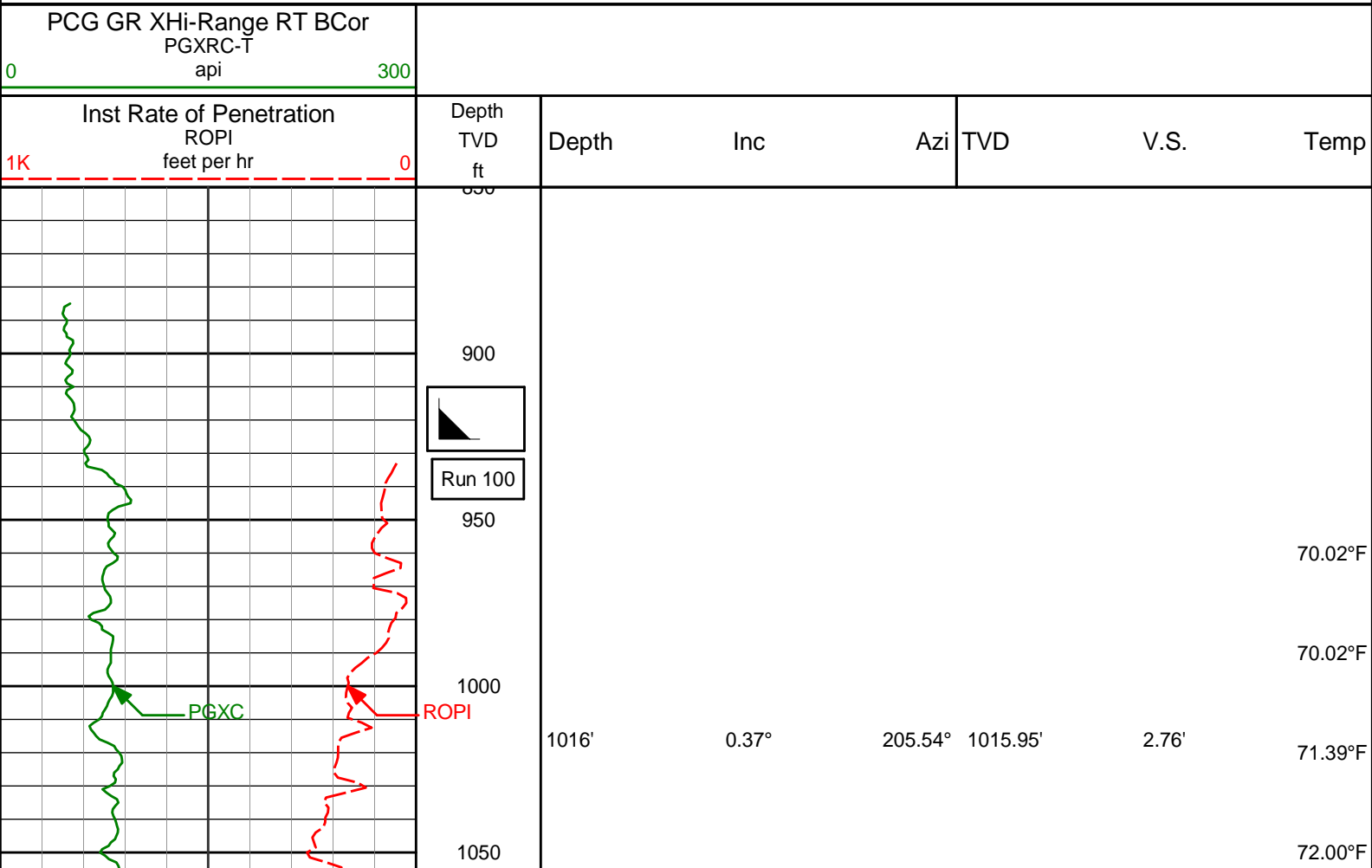
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft

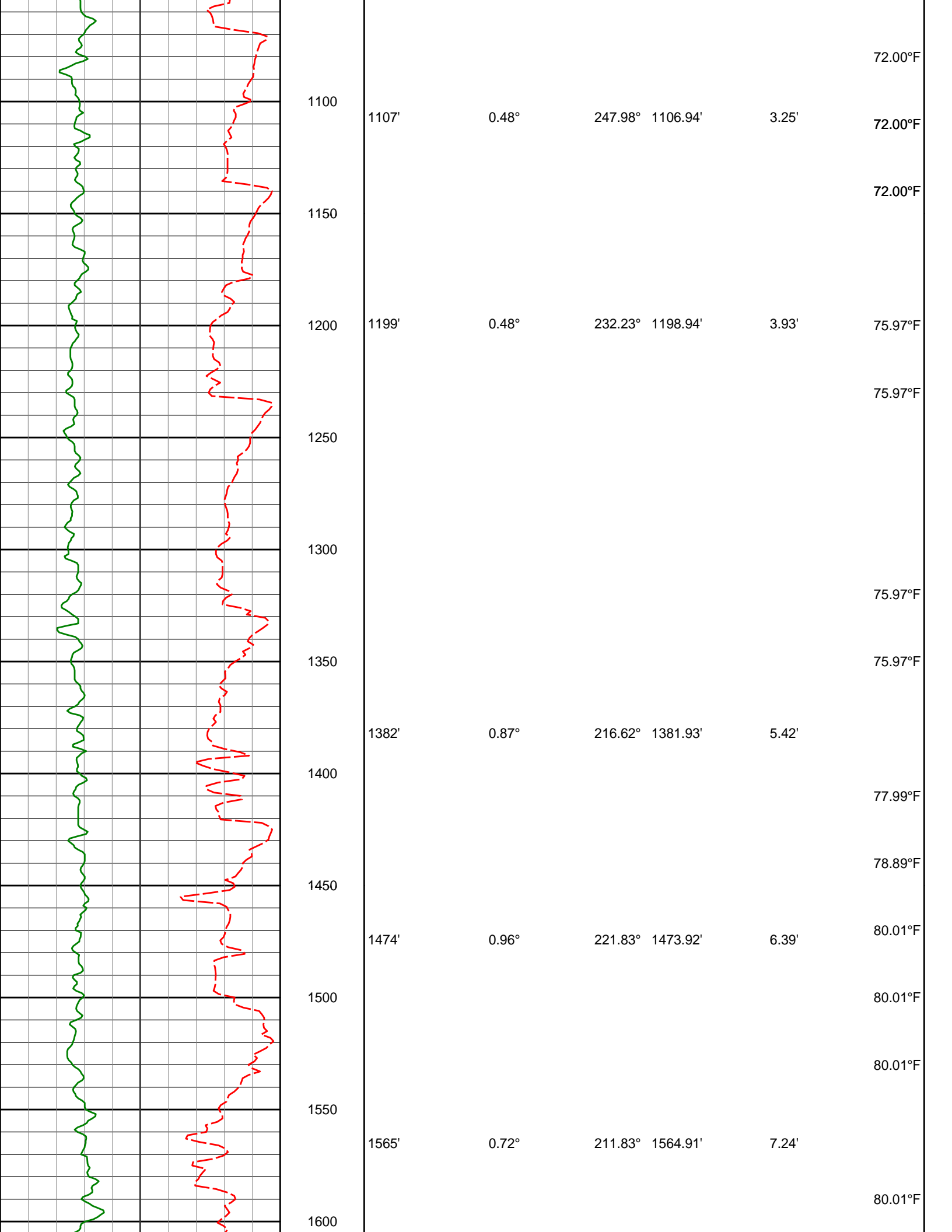
6. Insite Version v8.1.10

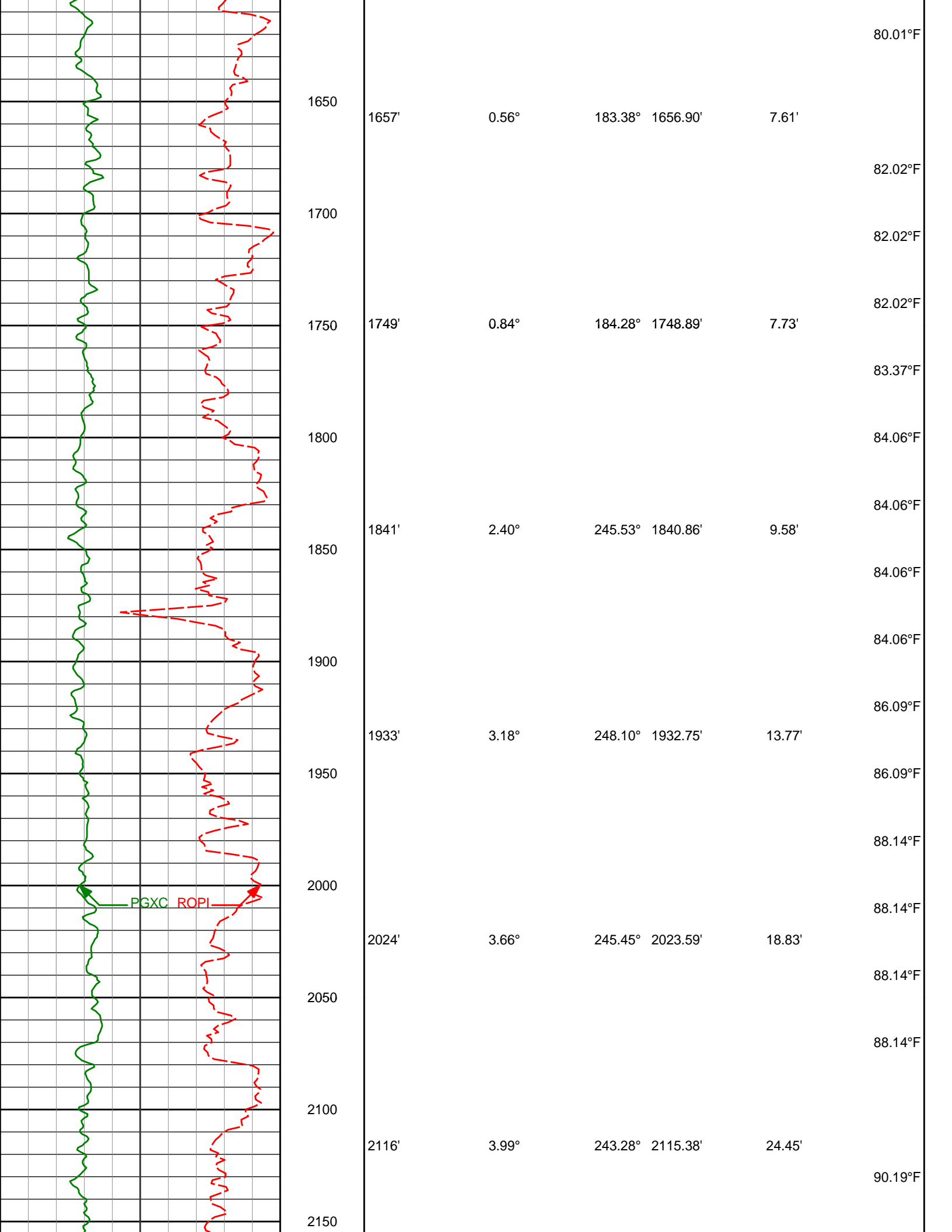
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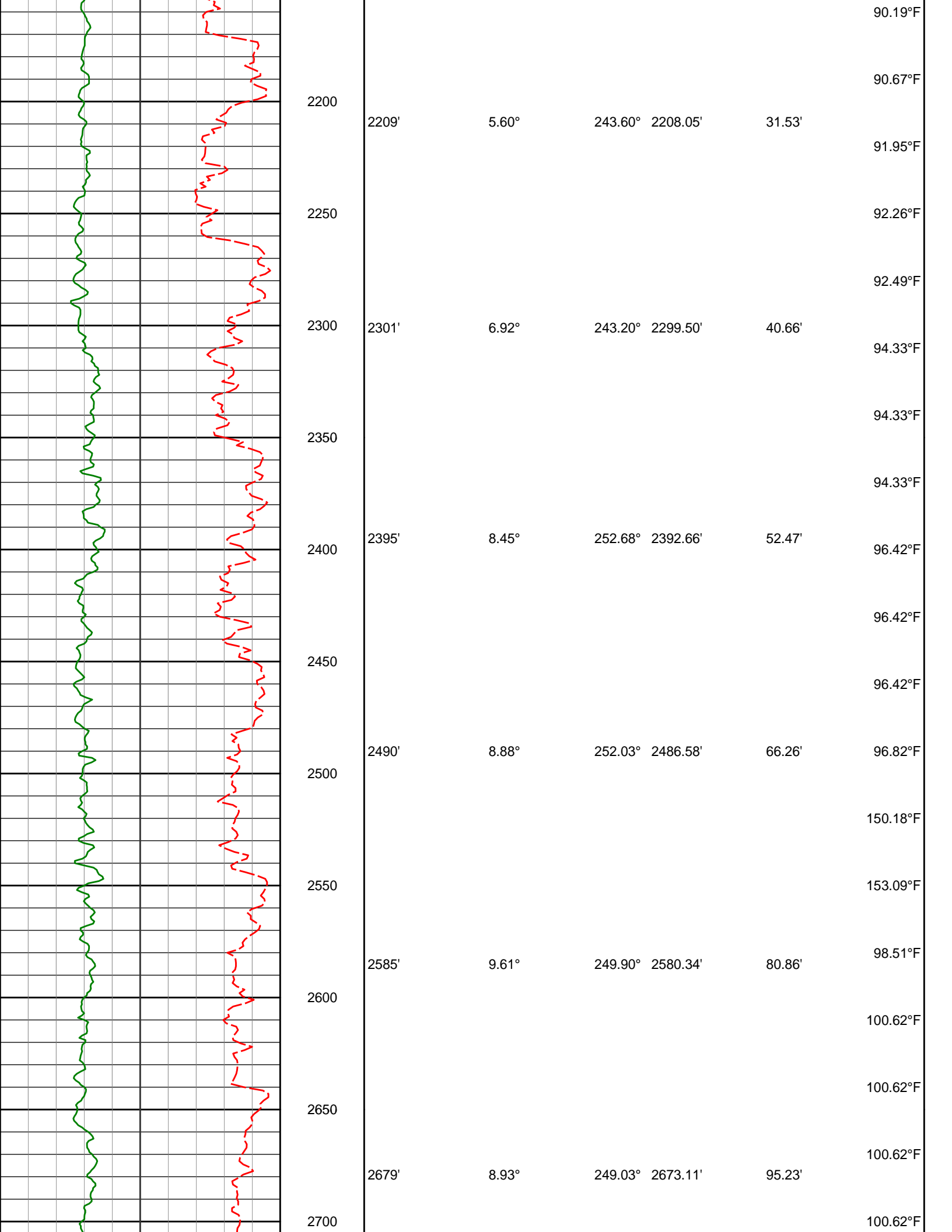
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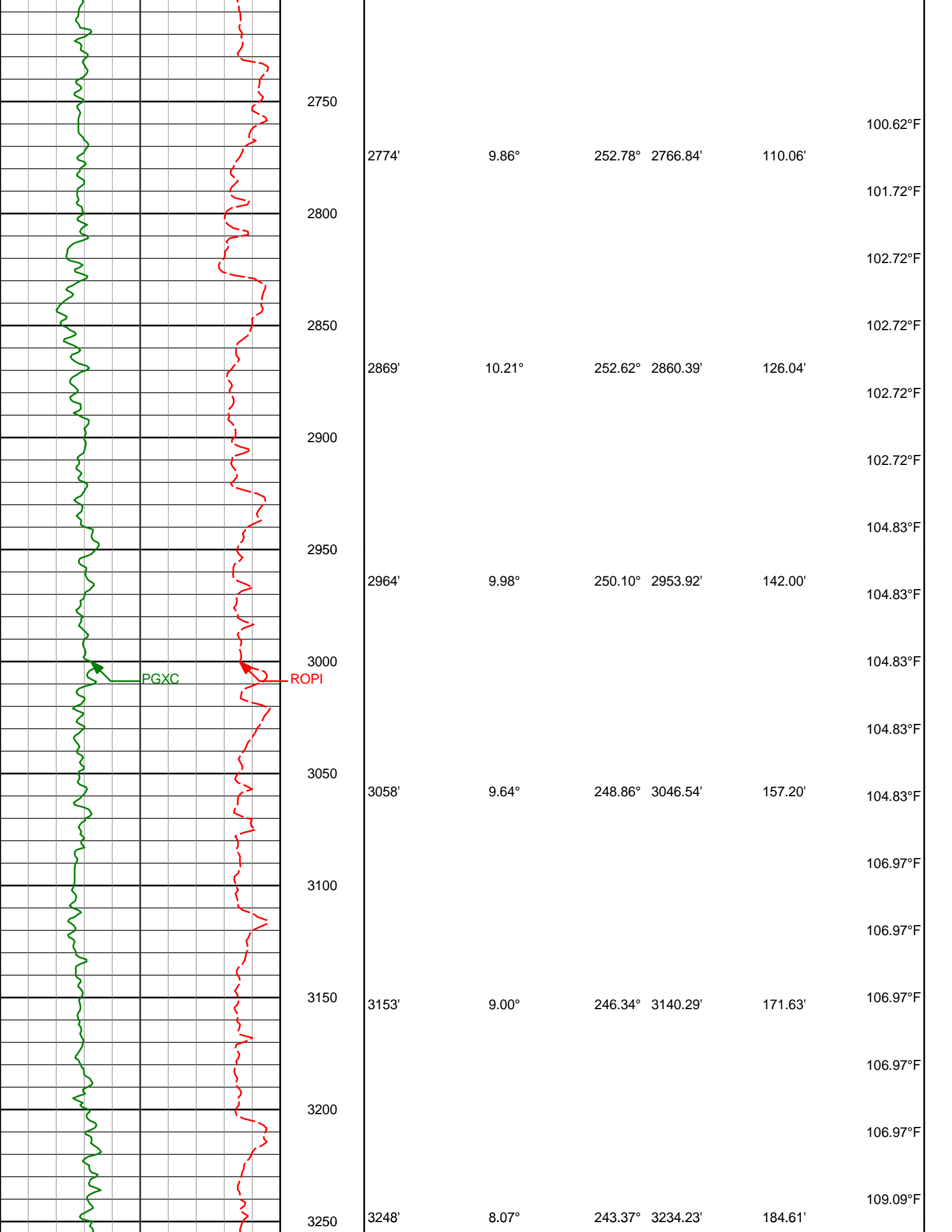
MD Detail 1:600 Scale

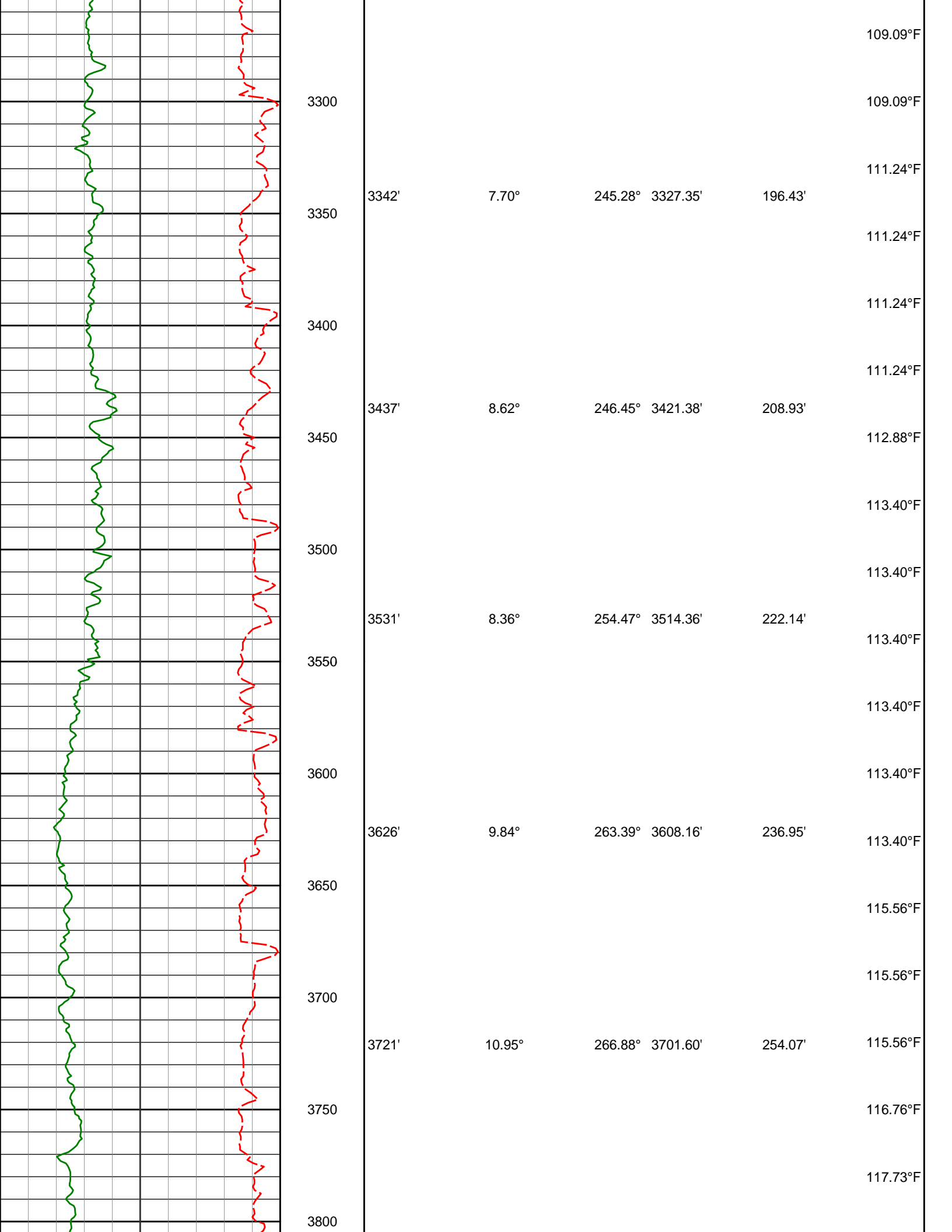


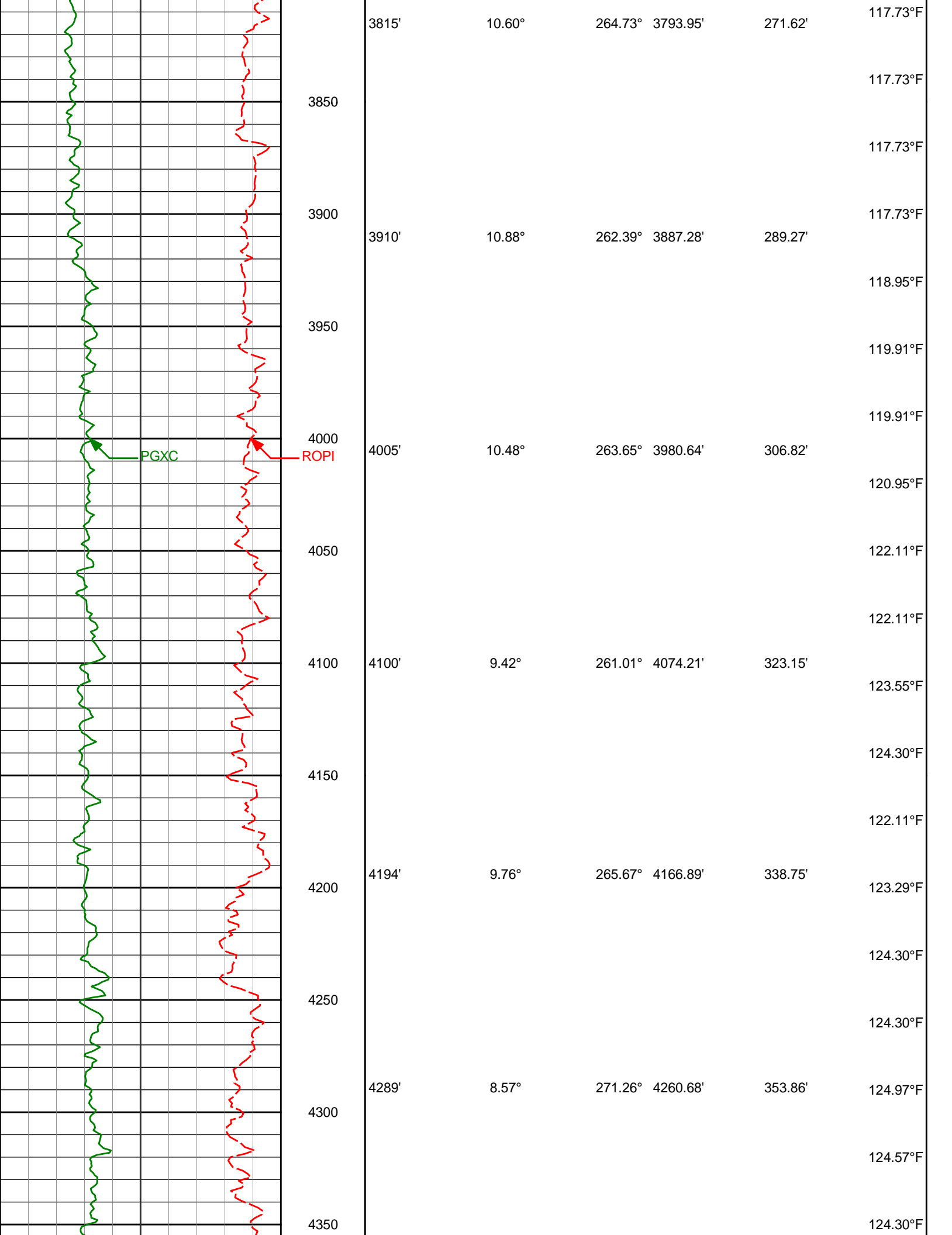


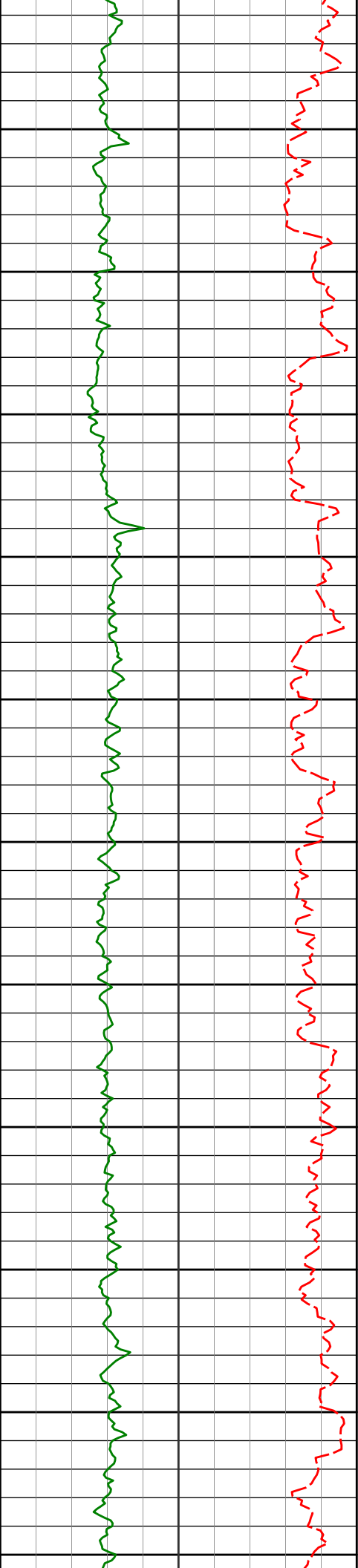




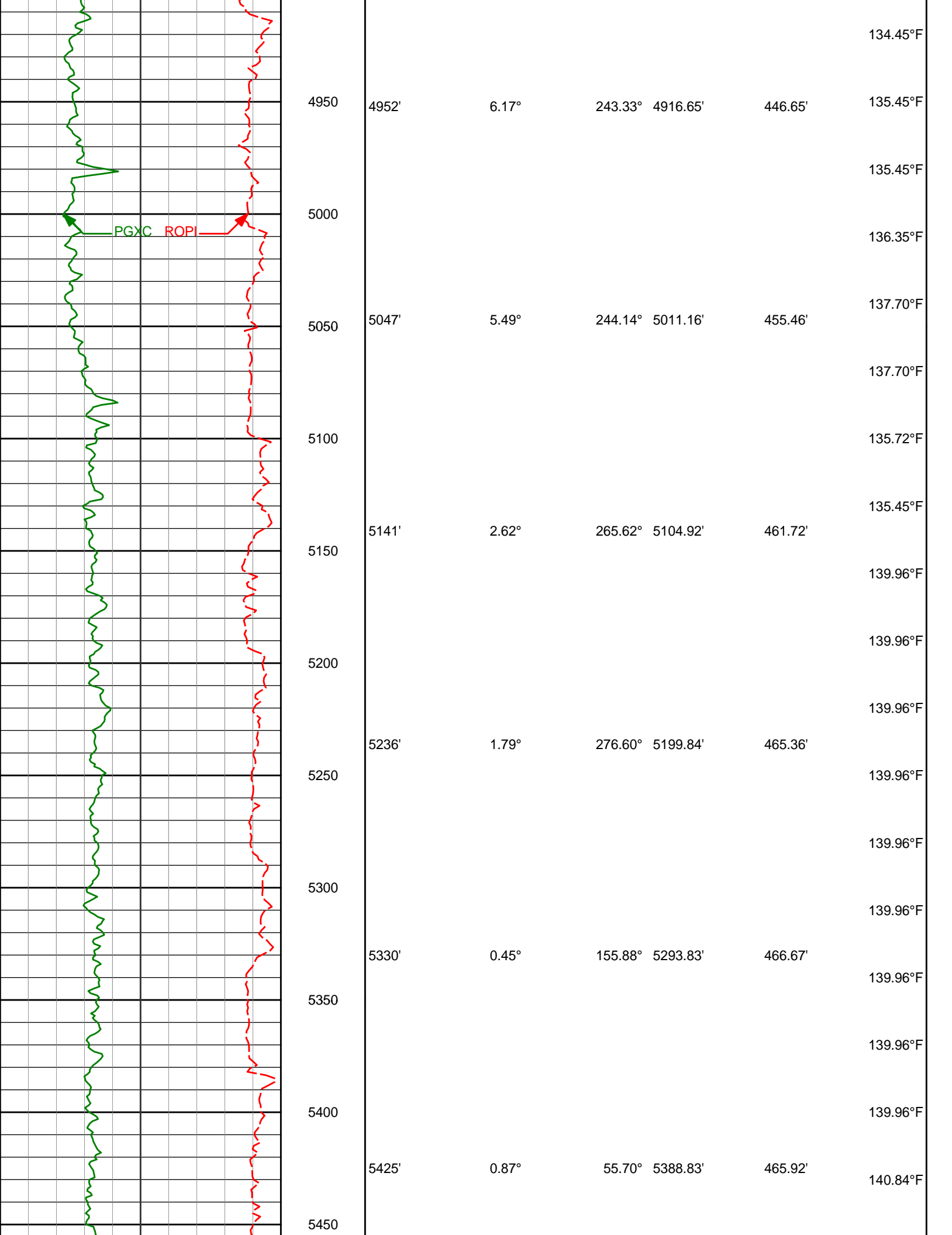


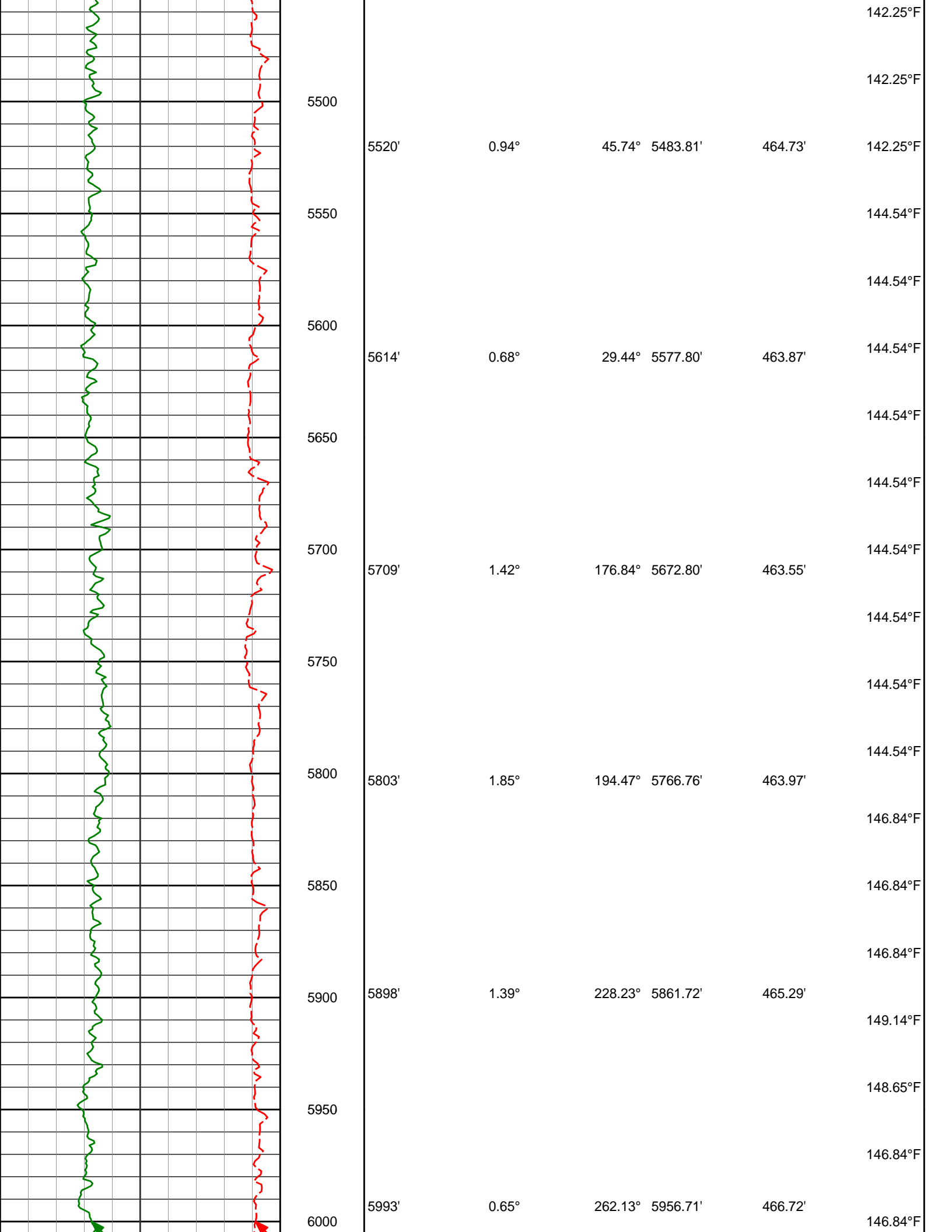


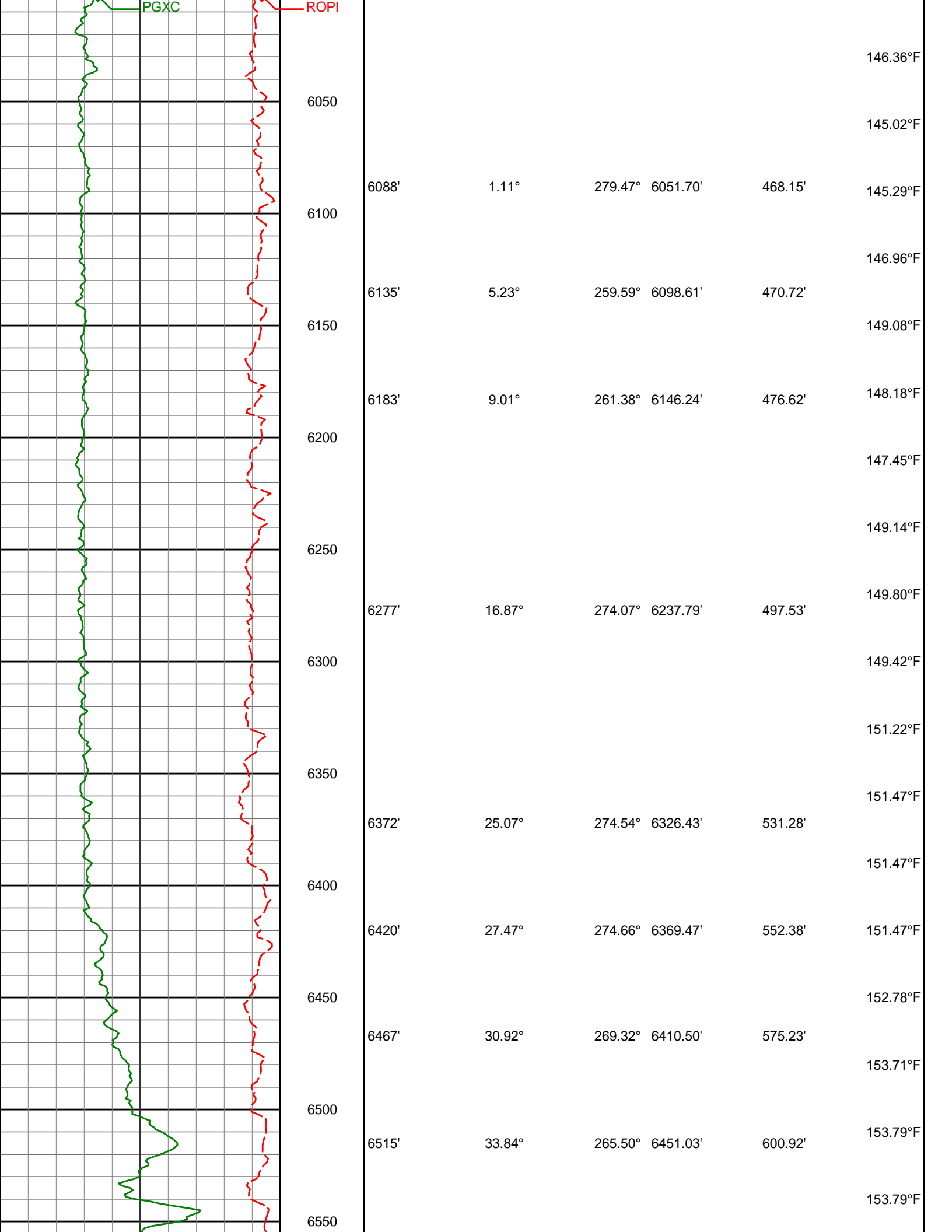


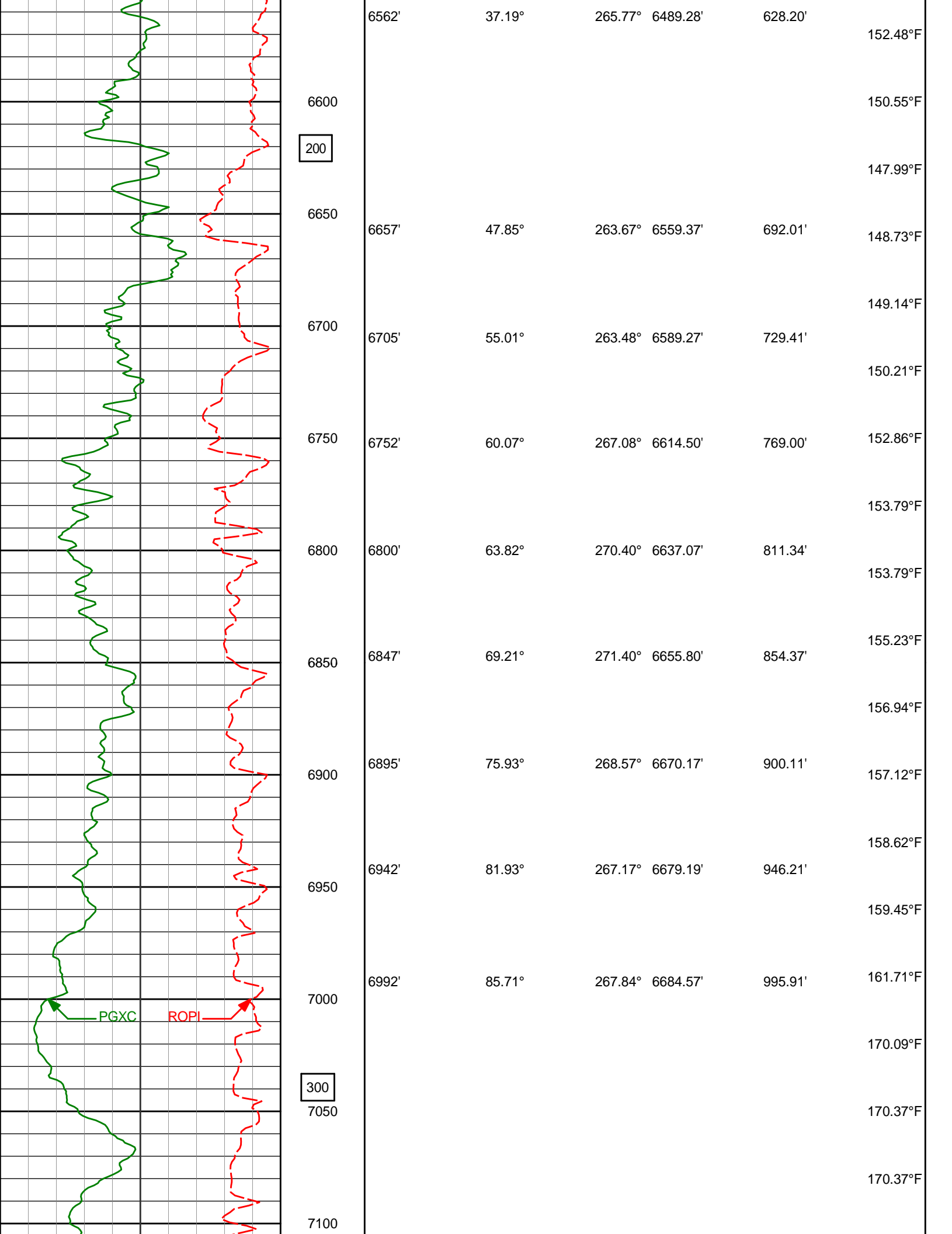


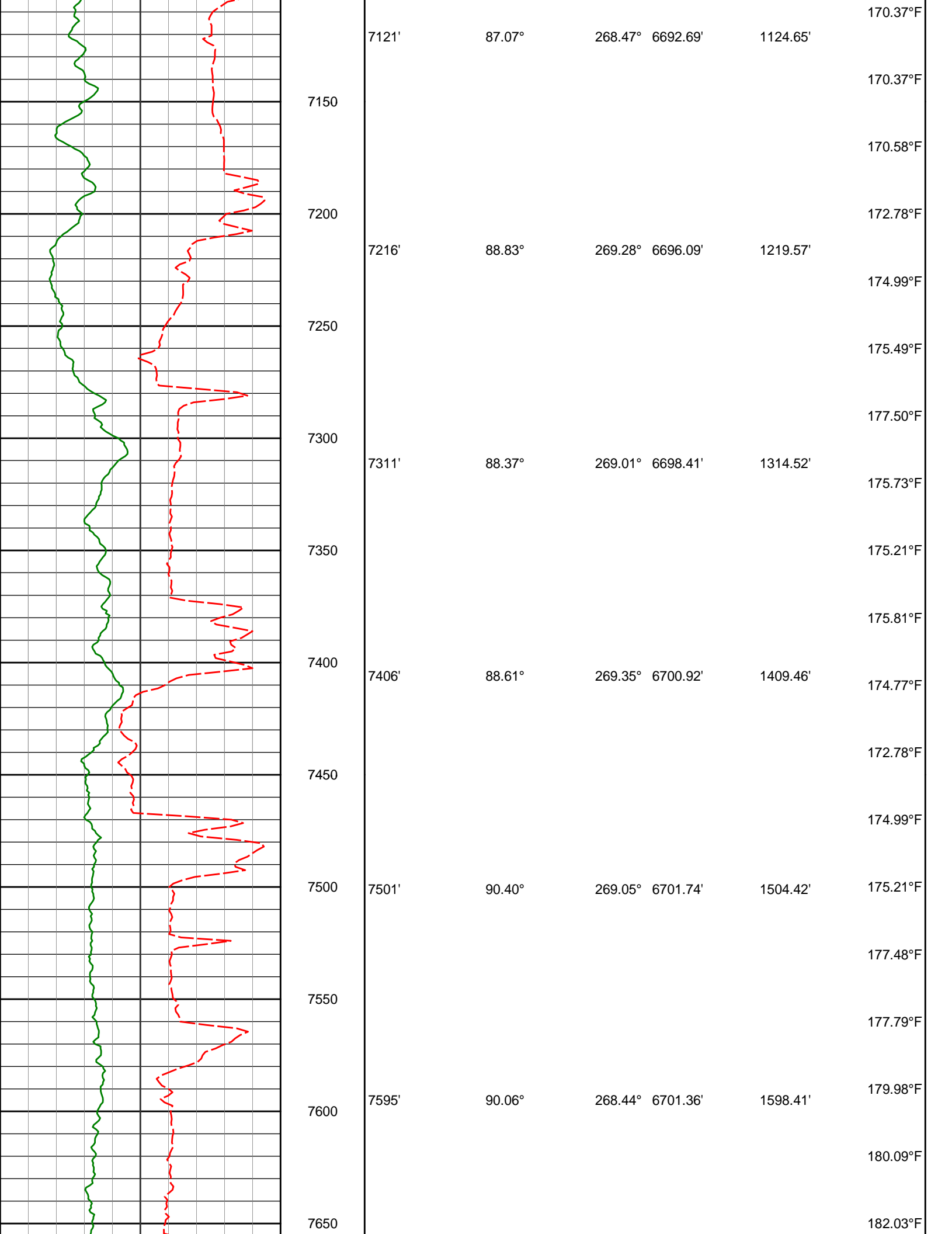
	4384'	8.25°	265.19°	4354.66'	367.74'
4400					125.27°F
					126.52°F
					126.52°F
4450					126.75°F
	4479'	9.17°	263.88°	4448.56'	382.10'
4500					128.57°F
					128.73°F
4550					128.73°F
	4574'	10.44°	255.60°	4542.18'	398.06'
4600					128.73°F
					128.73°F
4650					130.96°F
	4668'	8.89°	254.10°	4634.84'	413.44'
4700					130.96°F
					130.96°F
4750					133.20°F
	4763'	6.94°	258.10°	4728.93'	426.23'
4800					133.20°F
					133.20°F
4850					133.20°F
	4858'	6.86°	242.23°	4823.25'	437.00'
4900					133.20°F

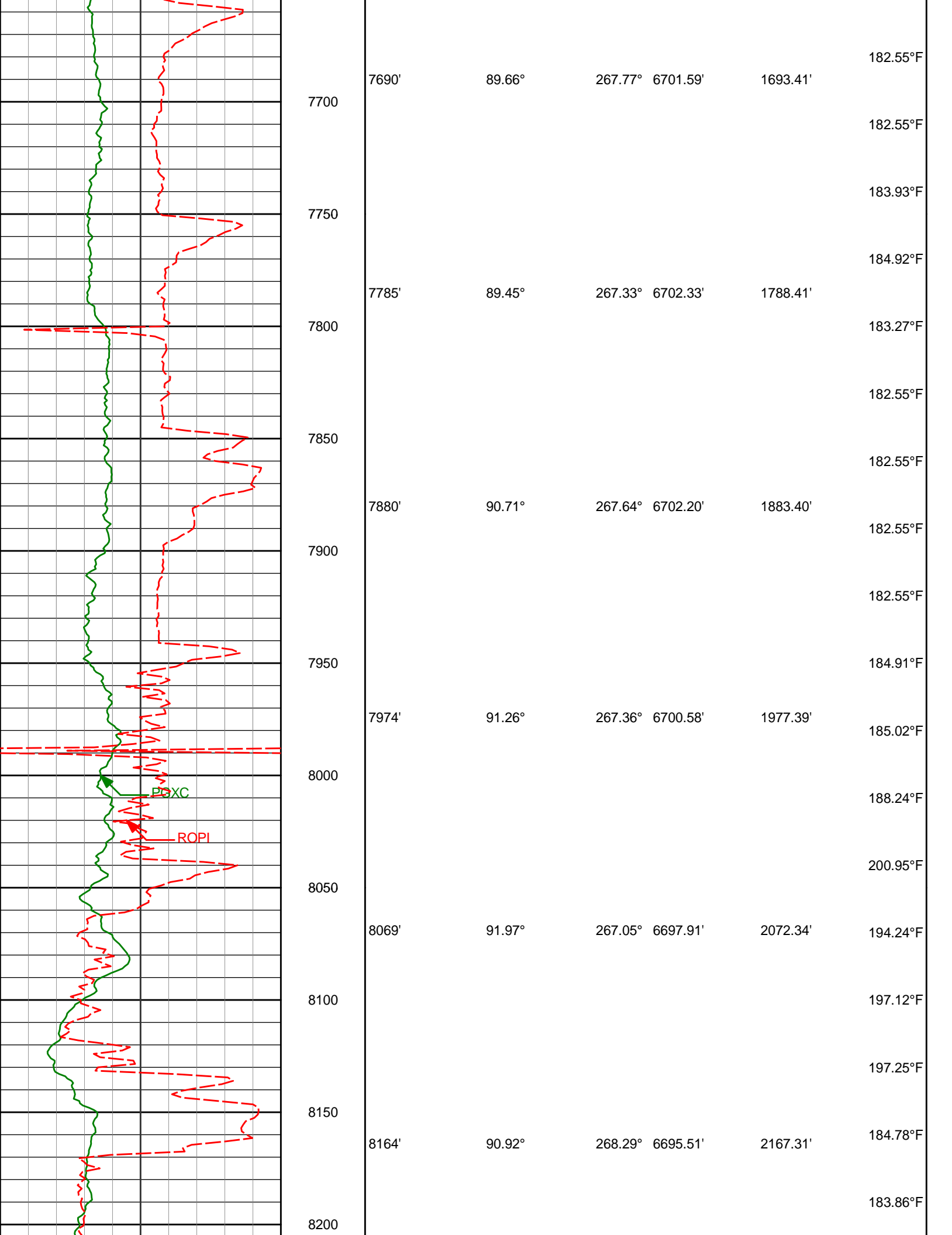


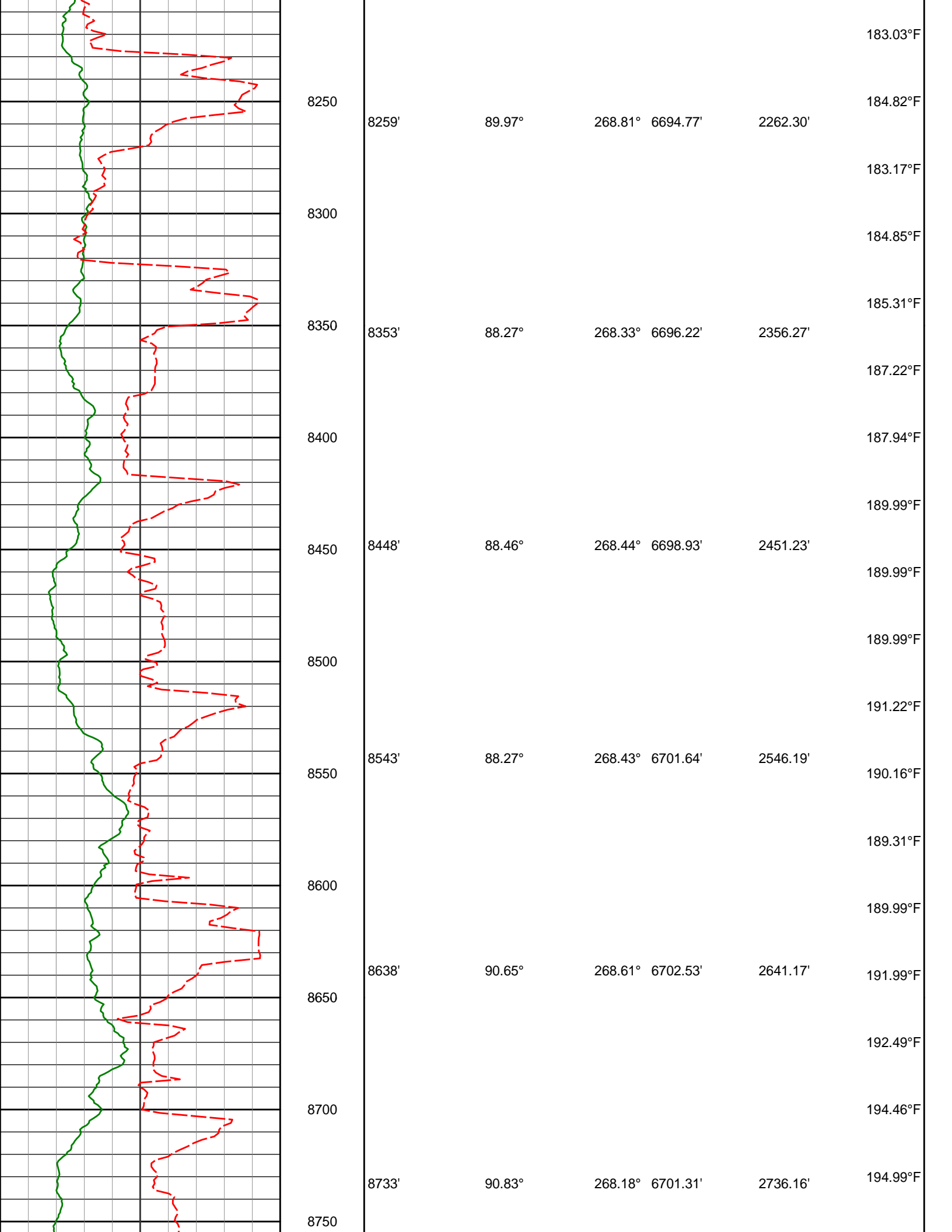


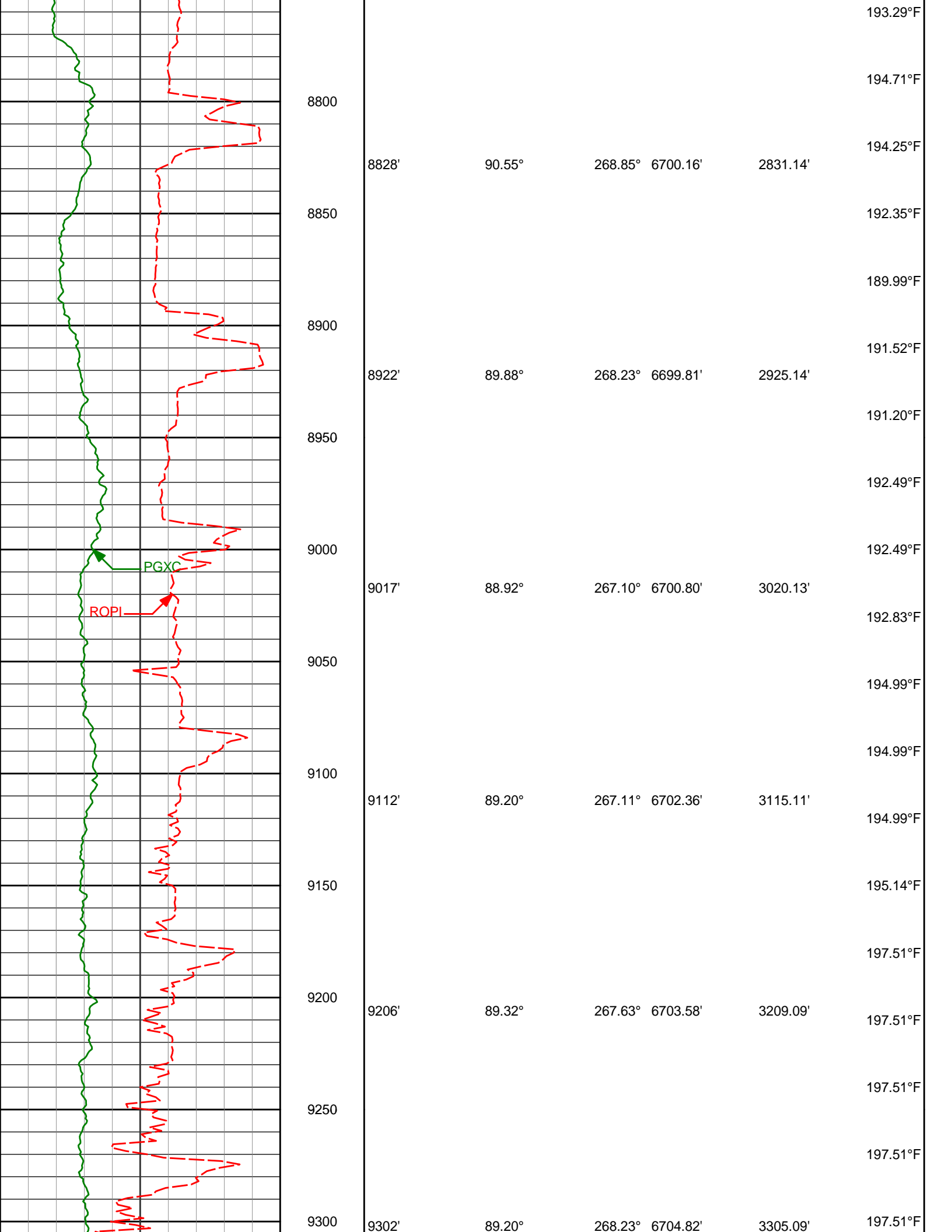


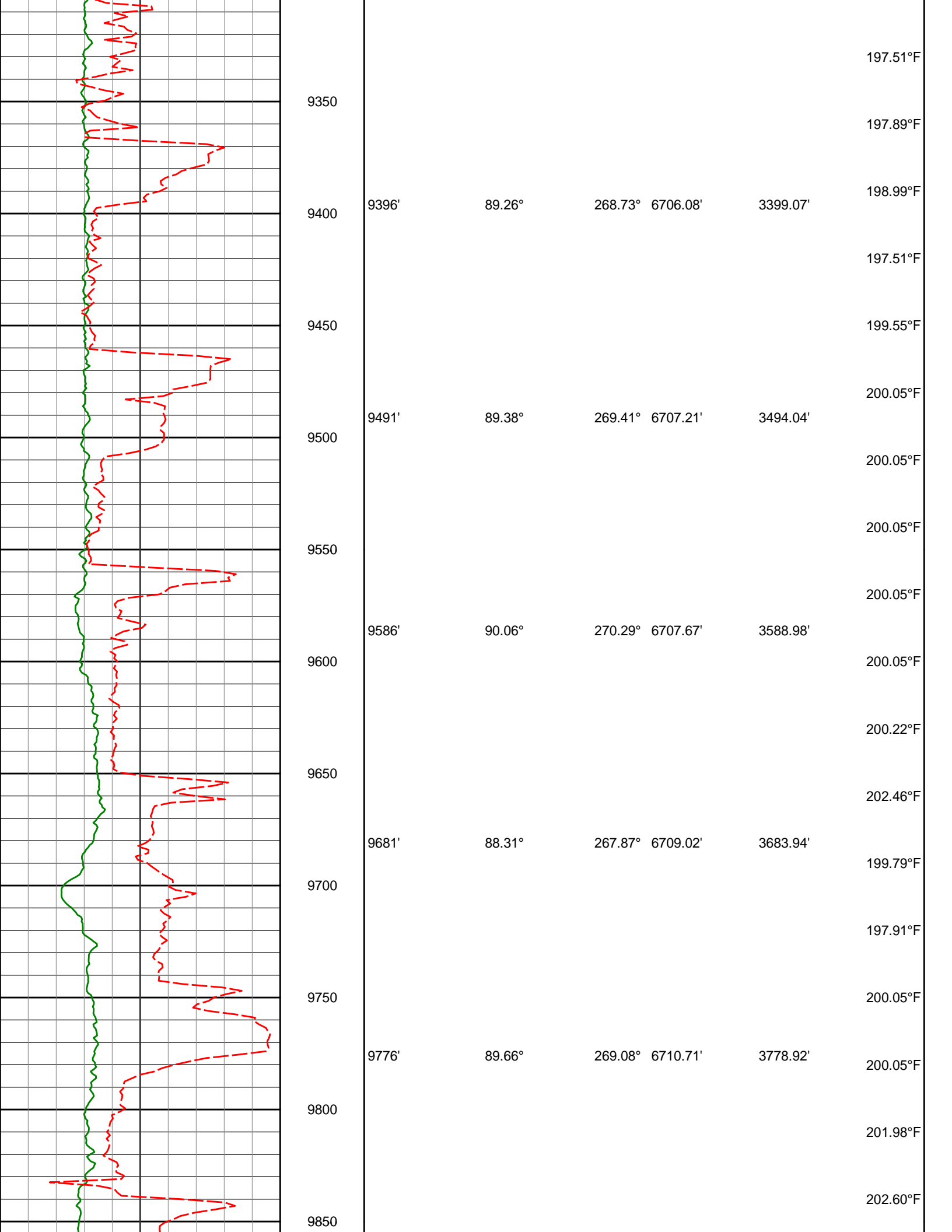


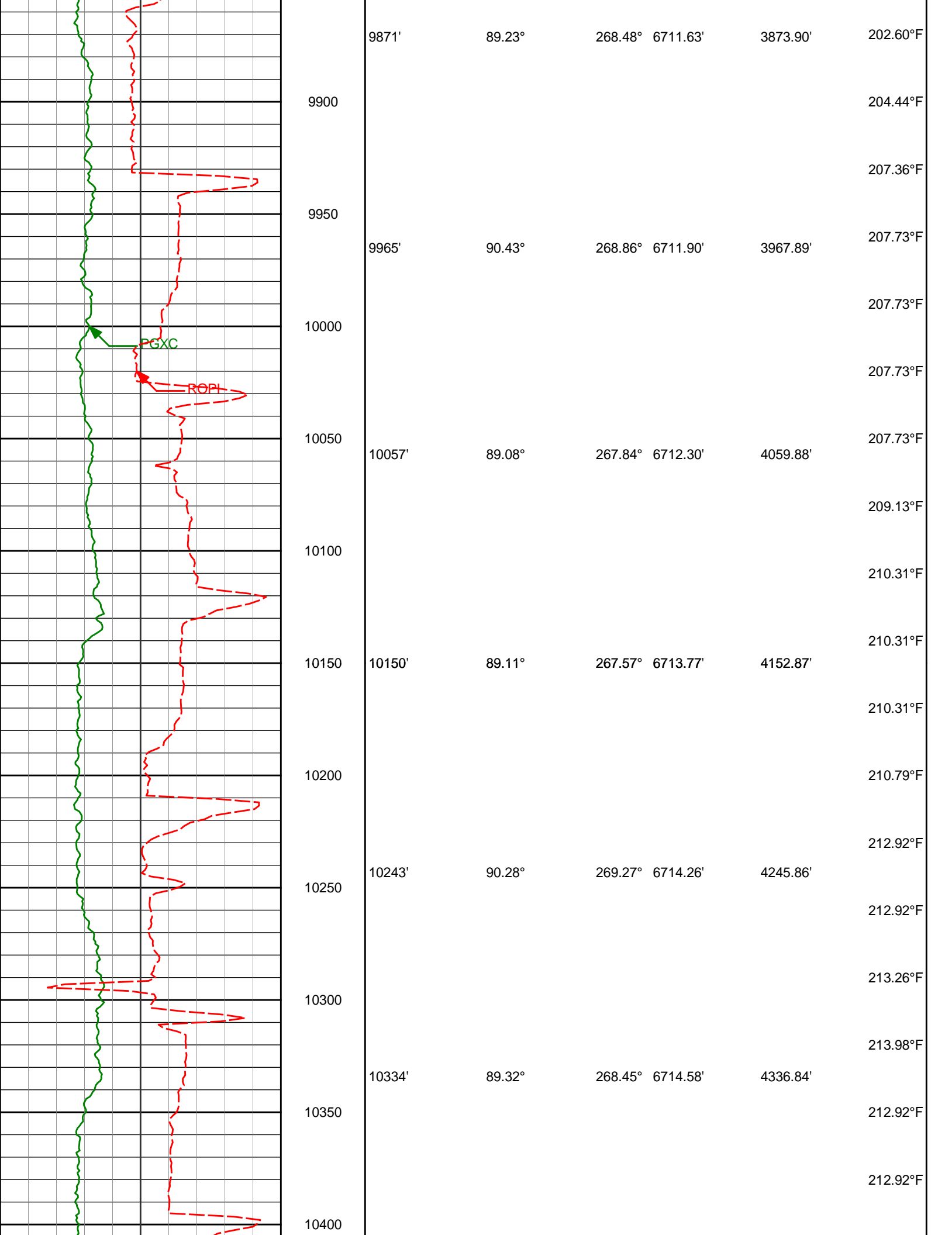


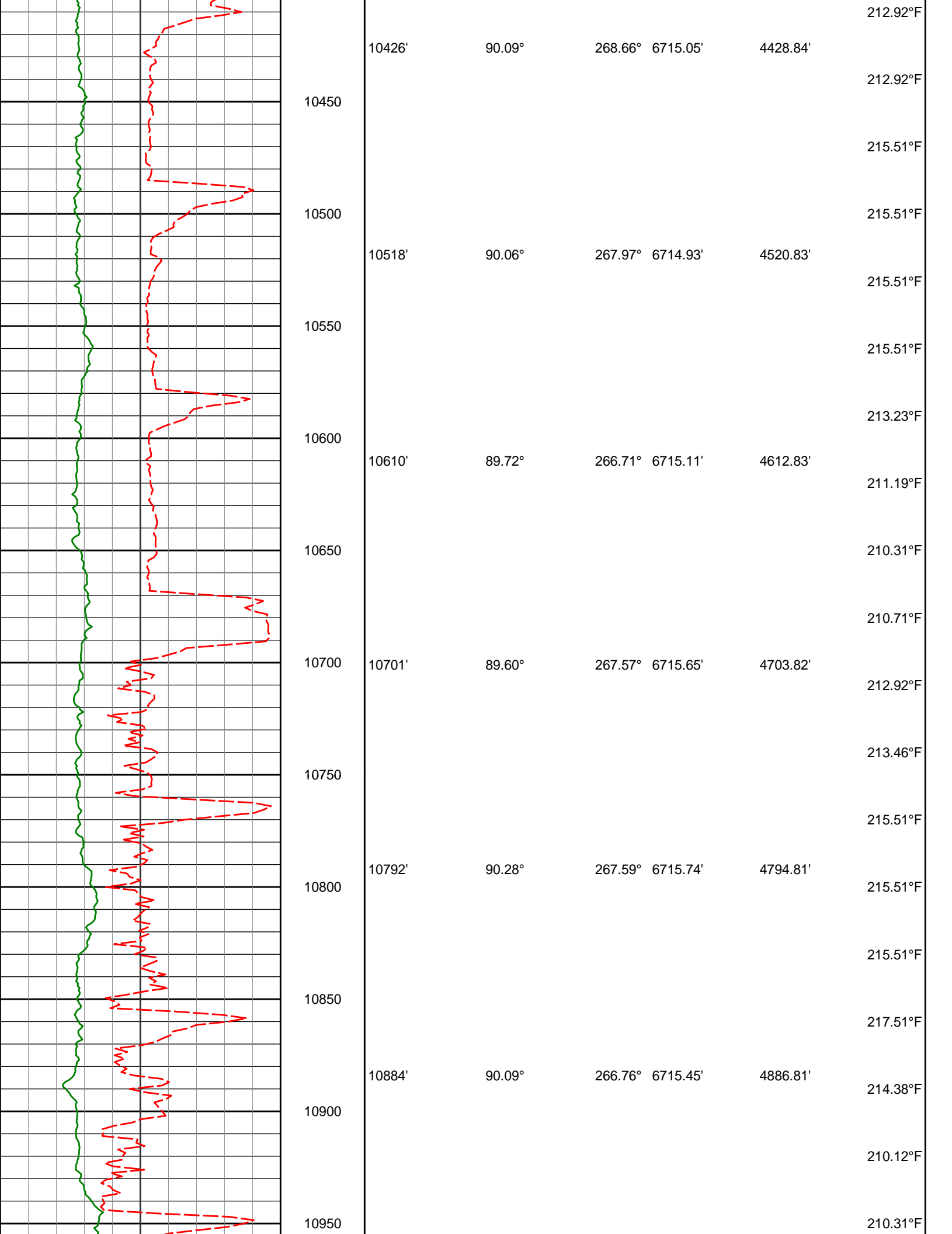


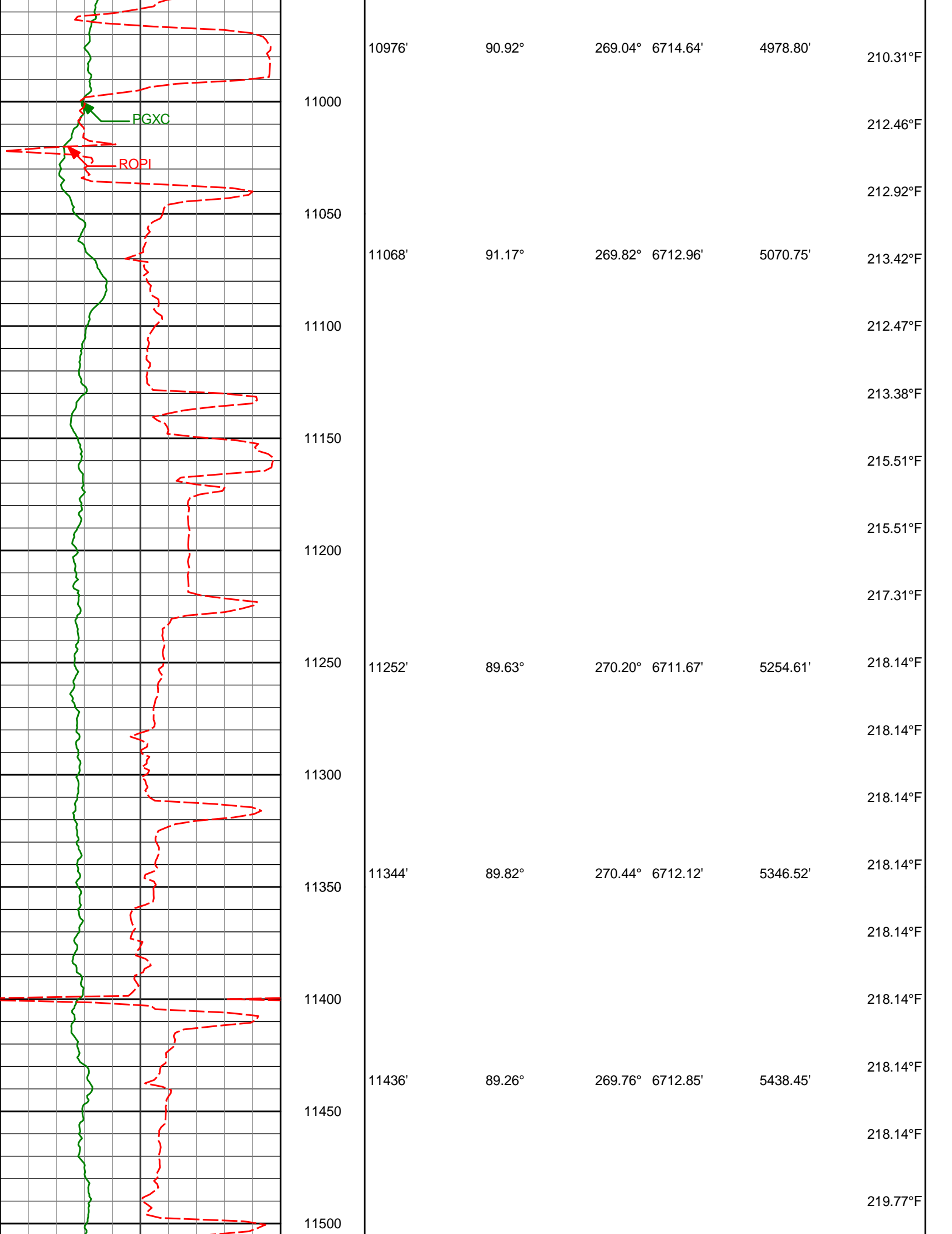


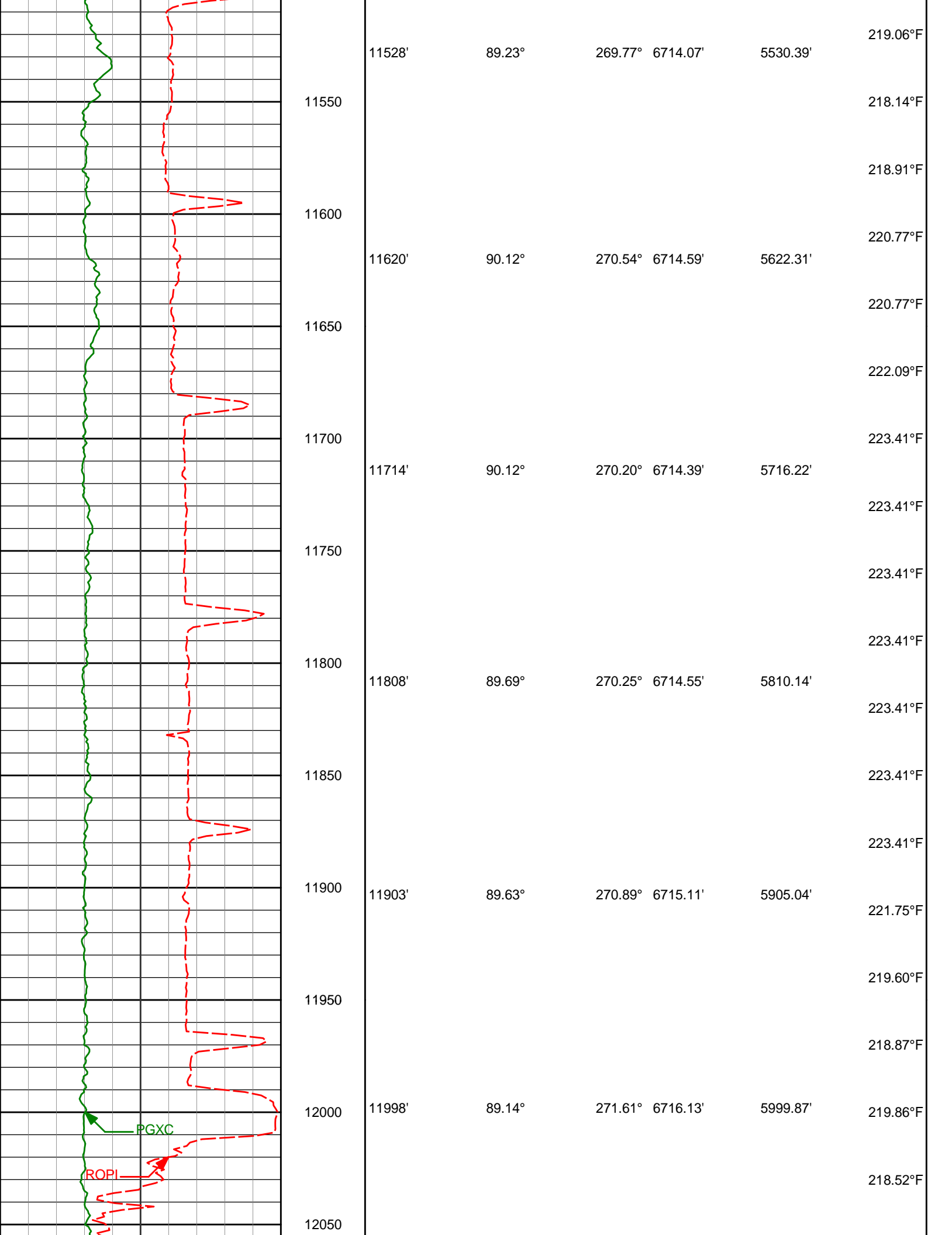


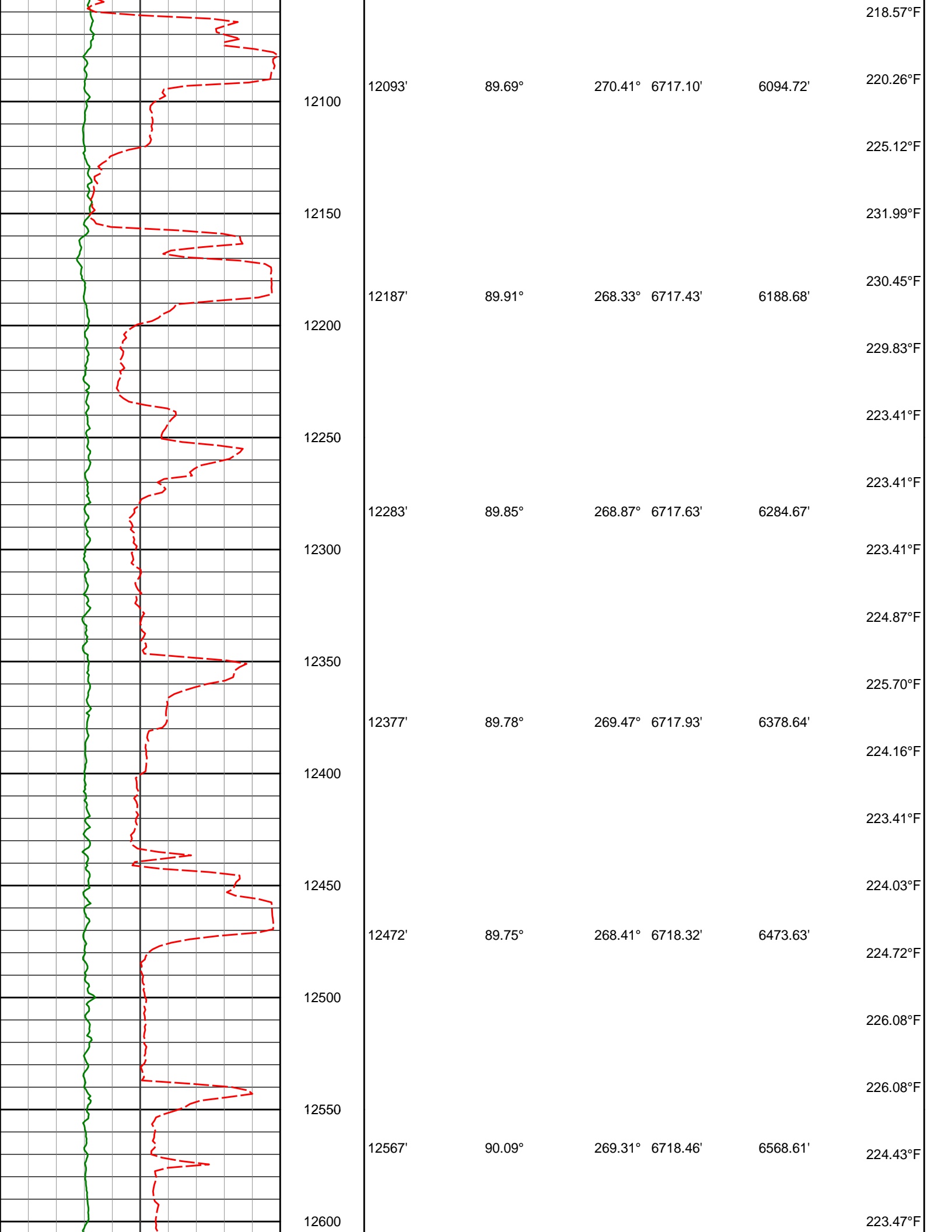


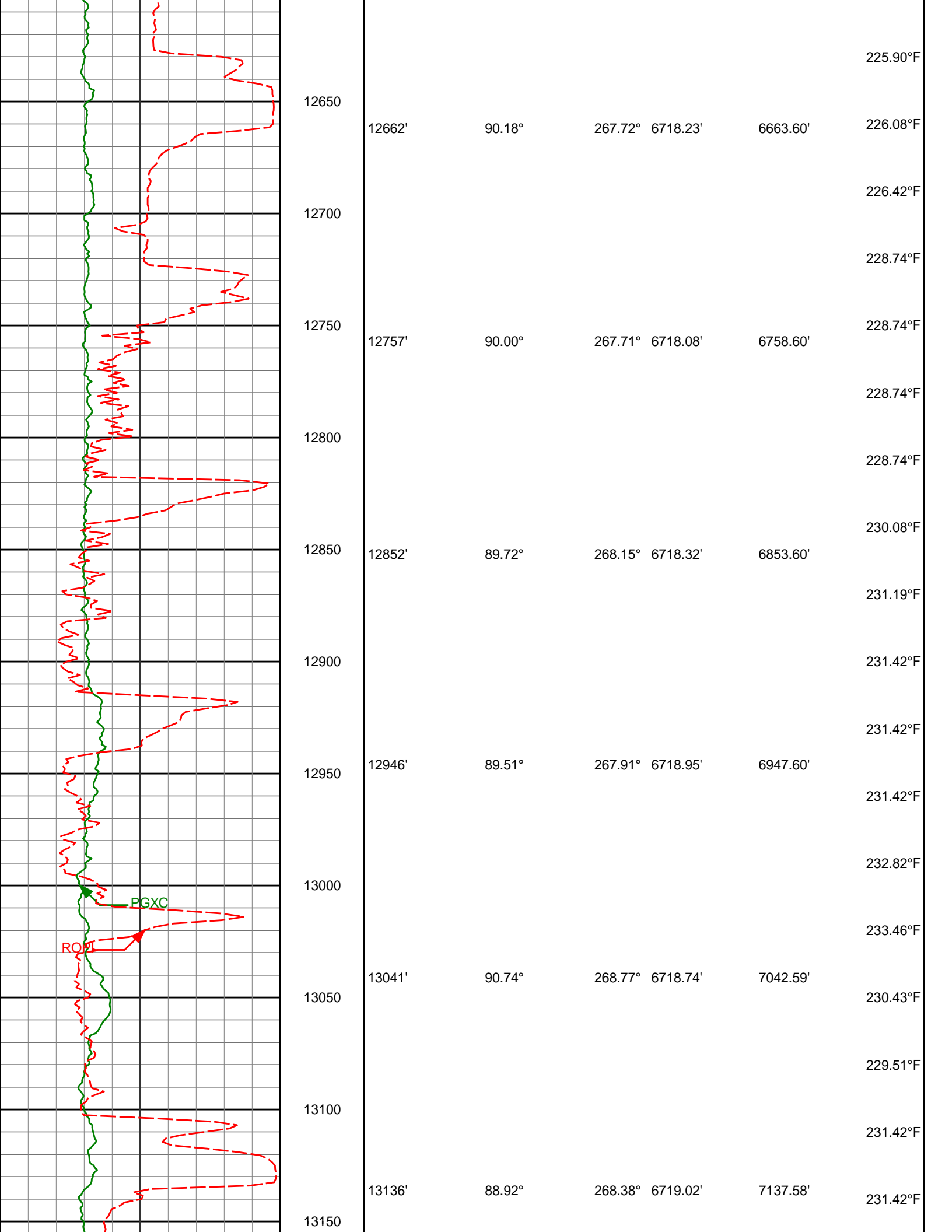


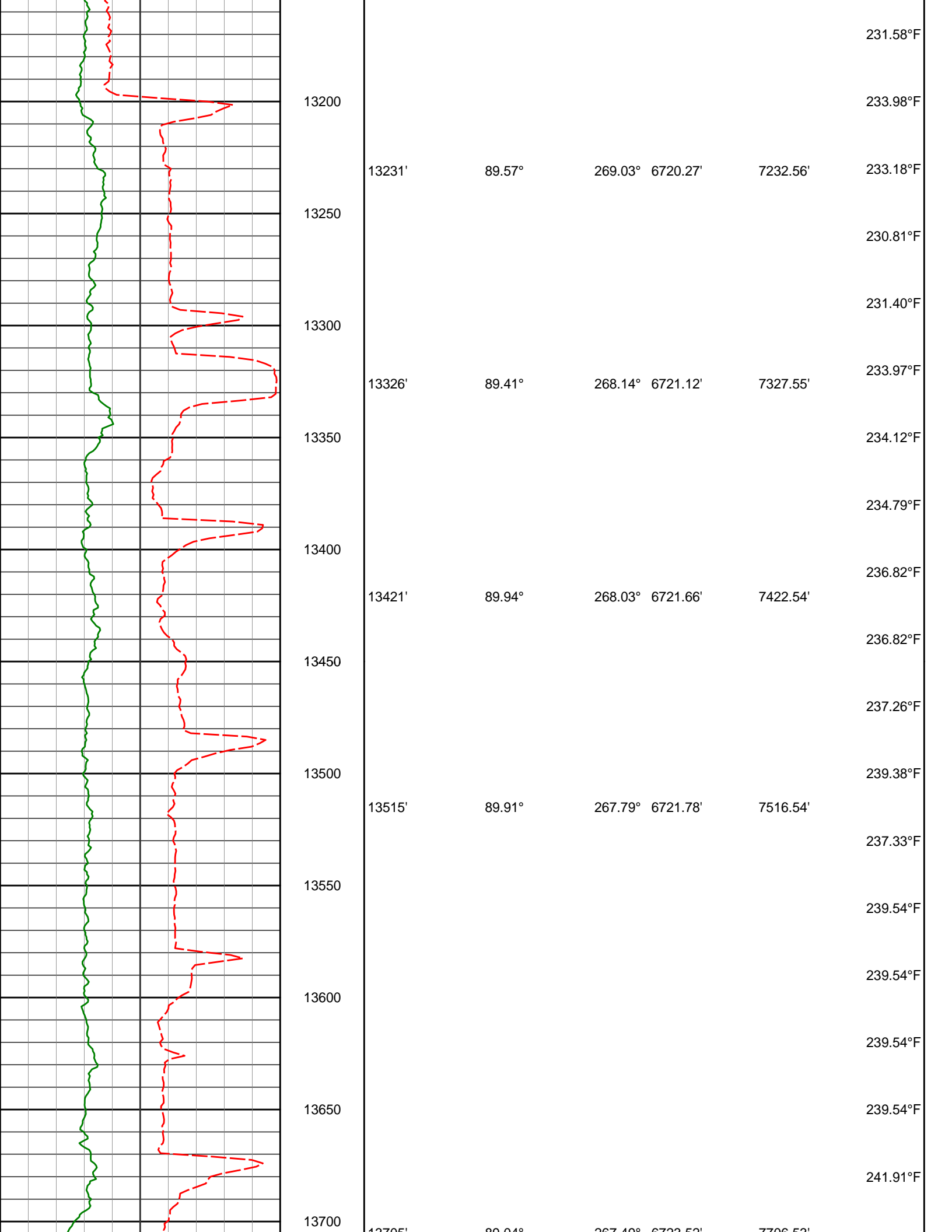


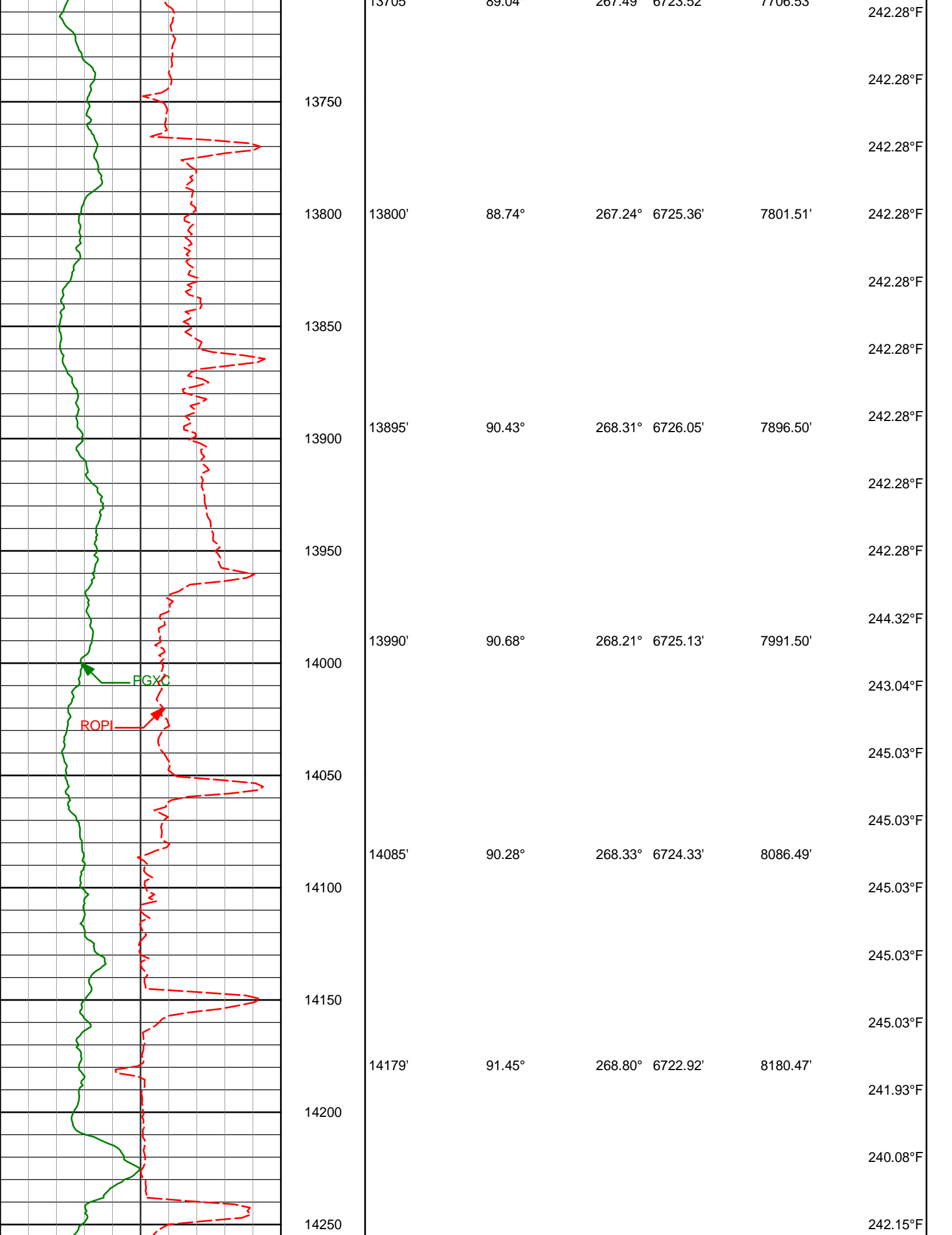


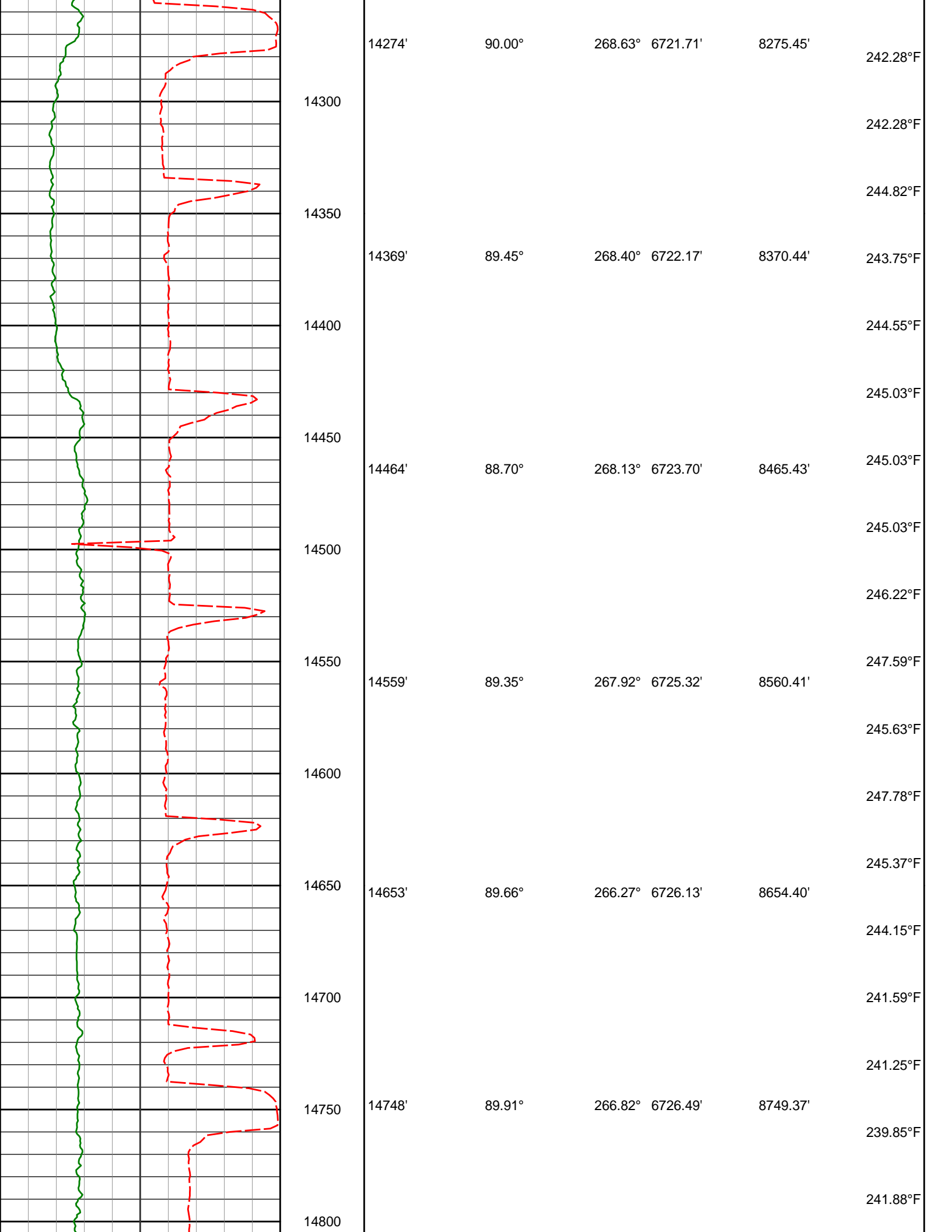


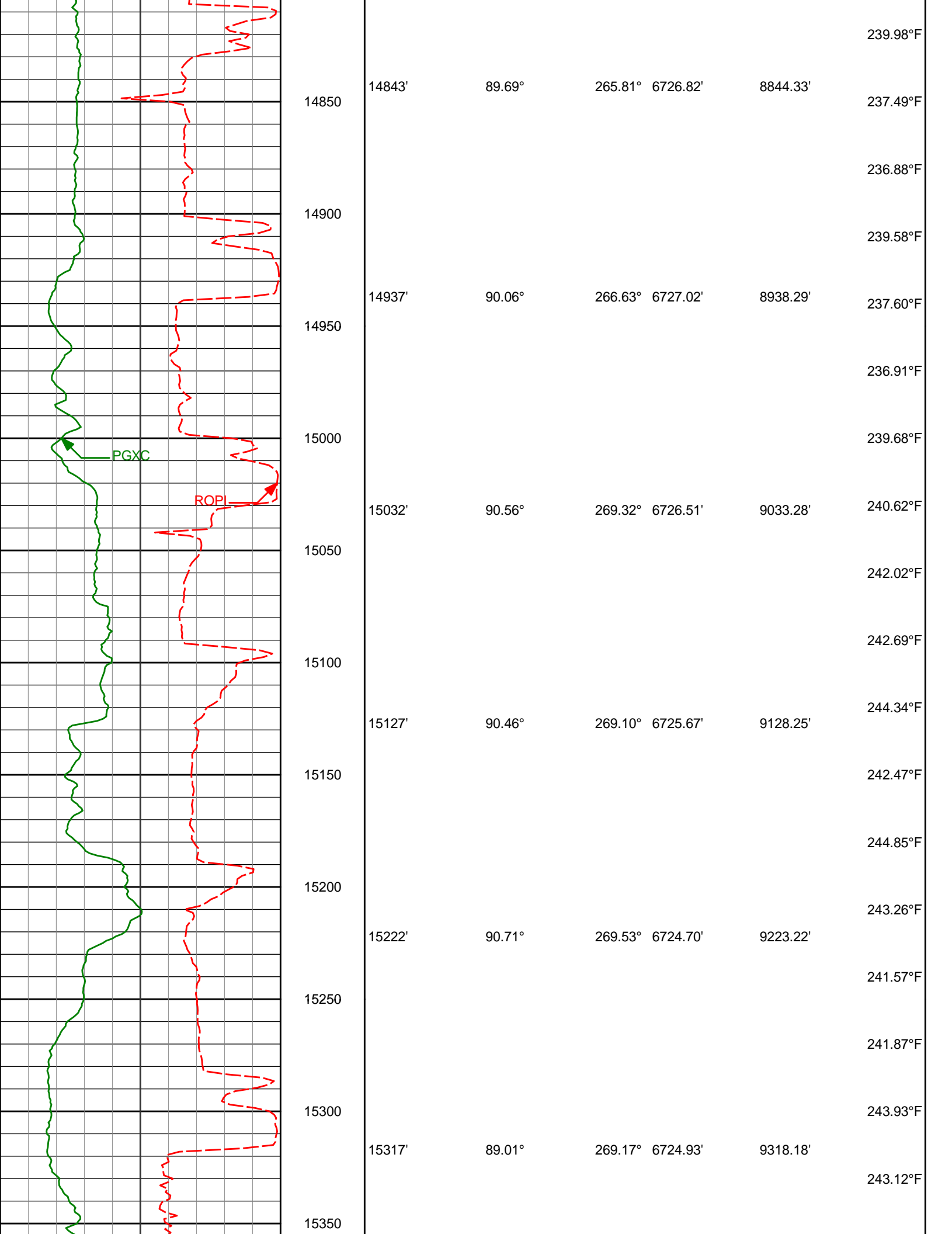


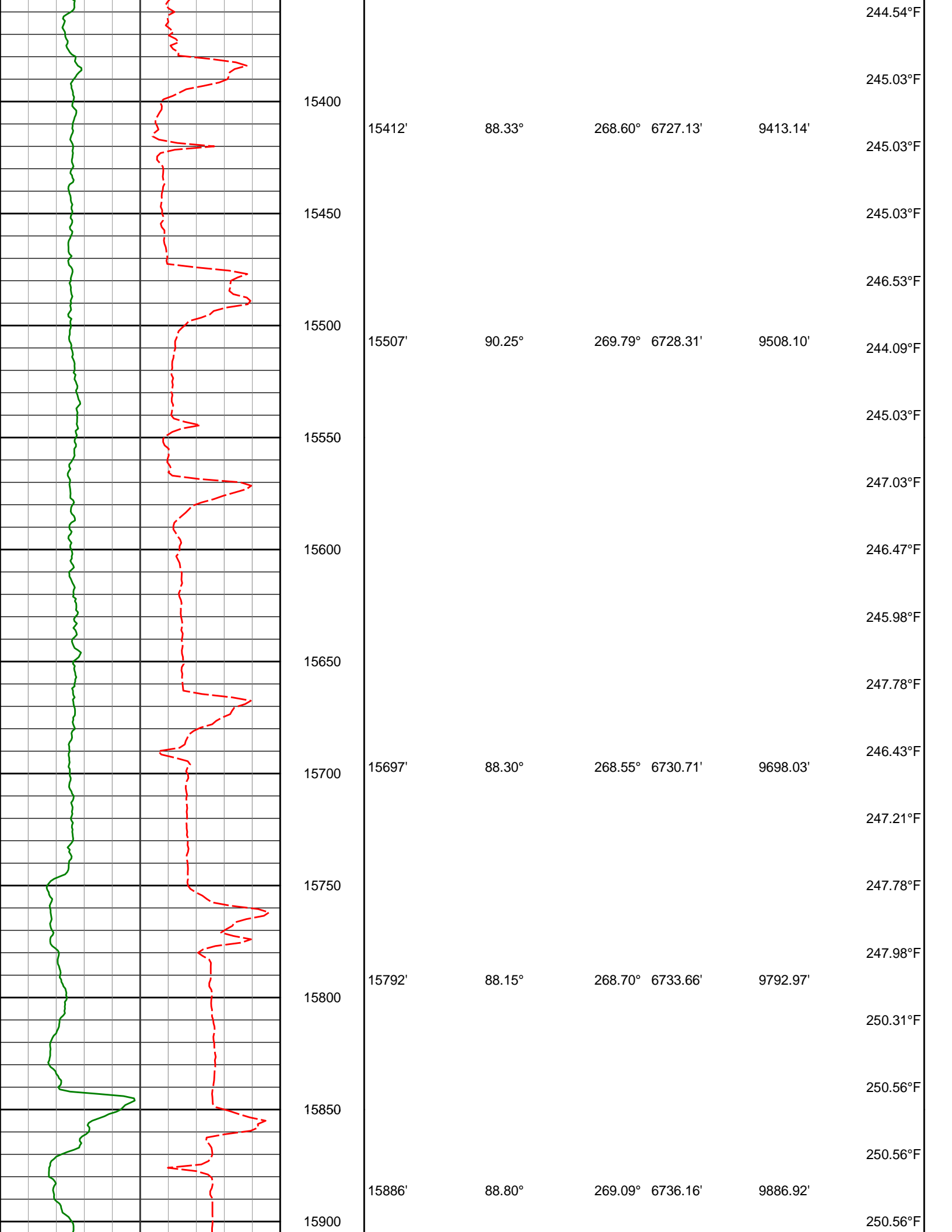


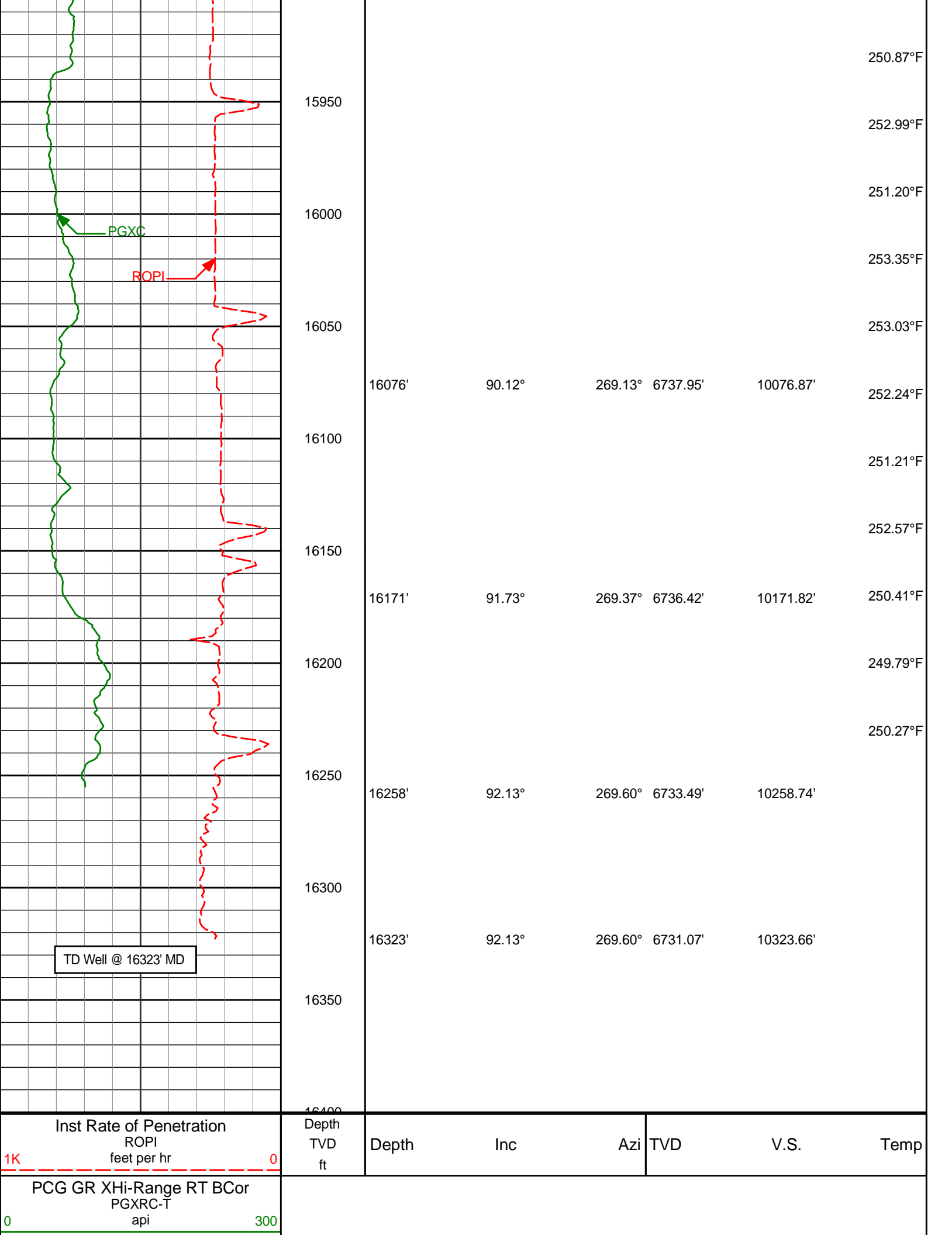




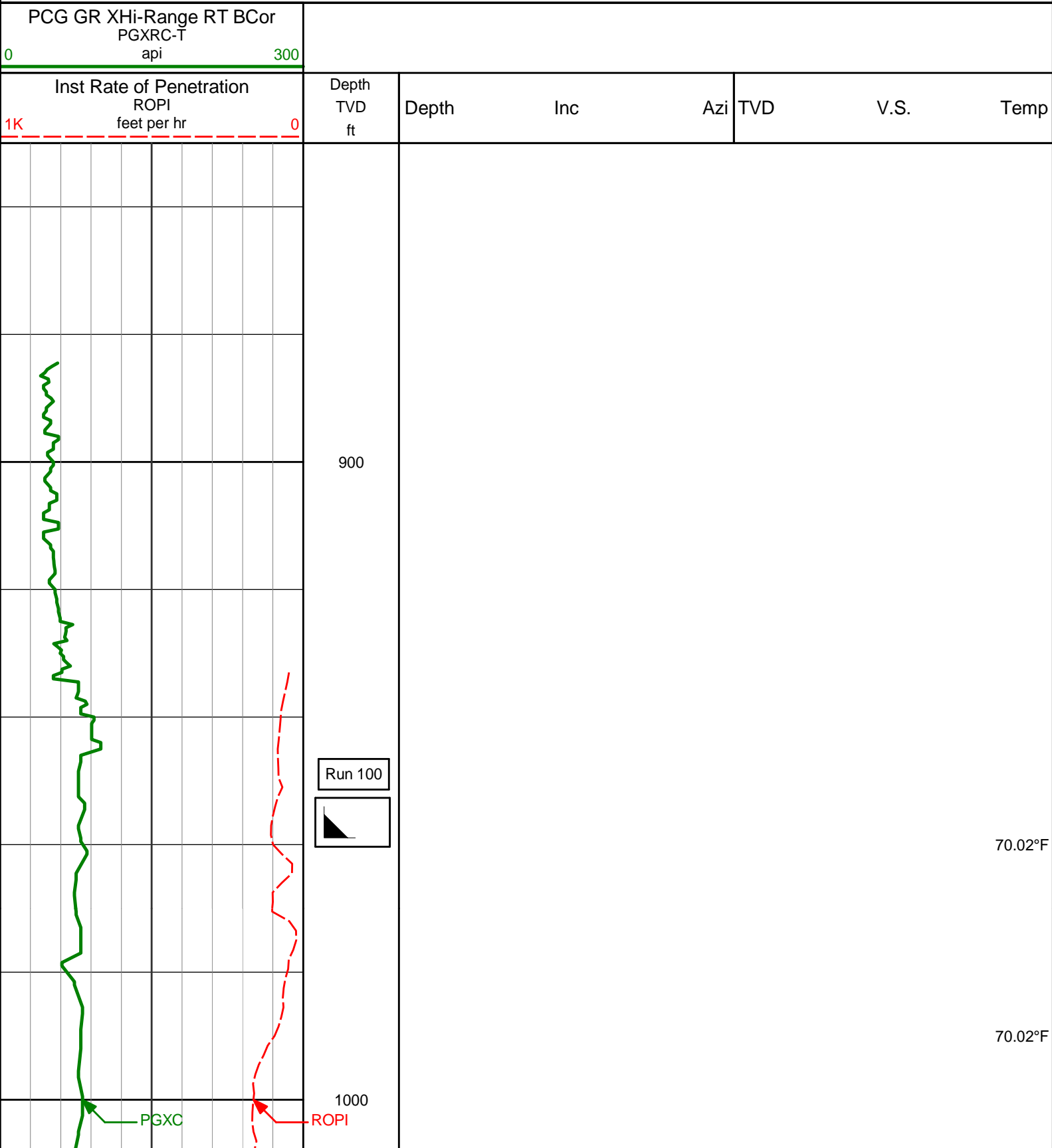


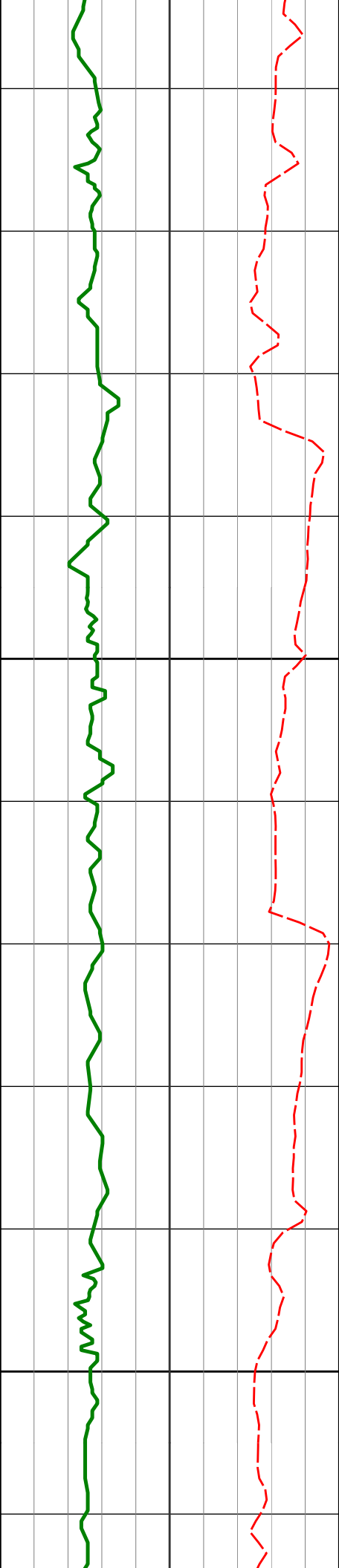






MD Detail 1:240 Scale





1100

1200

1016'

1107'

1199'

0.37°

0.48°

0.48°

205.54°

247.98°

232.23°

1015.95'

1106.94'

1198.94'

2.76'

3.25'

3.93'

71.39°F

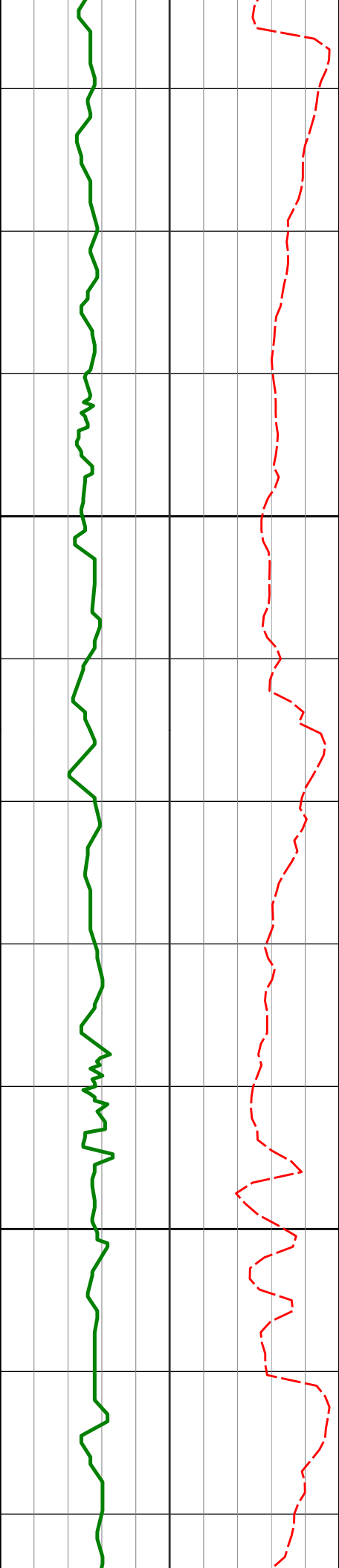
72.00°F

72.00°F

72.00°F

72.00°F

75.97°F



1300

1400

1382'

0.87°

216.62°

1381.93'

5.42'

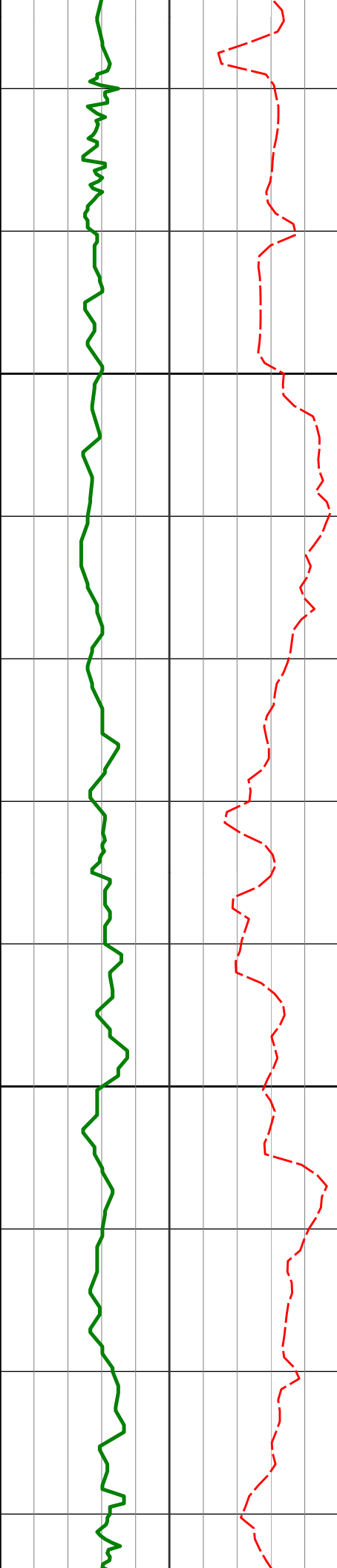
75.97°F

75.97°F

75.97°F

77.99°F

78.89°F



1500

1600

1474'

0.96°

221.83°

1473.92'

6.39'

80.01°F

1565'

0.72°

211.83°

1564.91'

7.24'

80.01°F

80.01°F

80.01°F

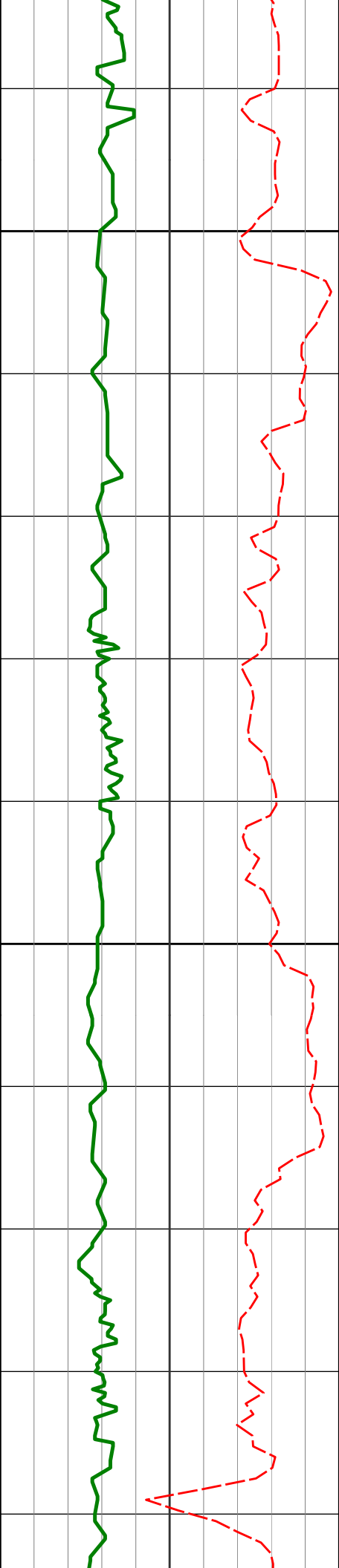
1657'

0.56°

183.38°

1656.90'

7.61'



1700

1800

1749'

0.84°

184.28°

1748.89'

7.73'

1841'

2.40°

245.53°

1840.86'

9.58'

82.02°F

82.02°F

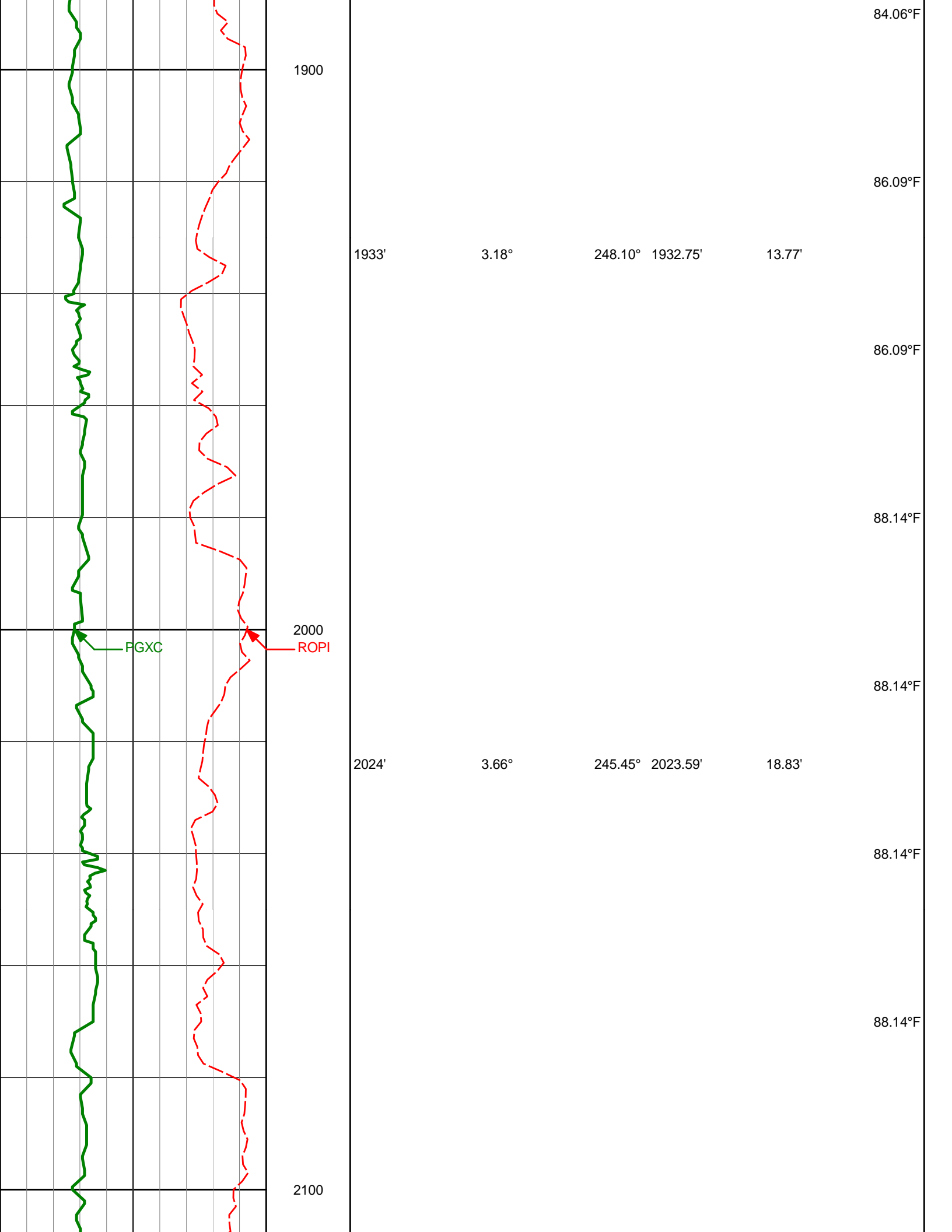
82.02°F

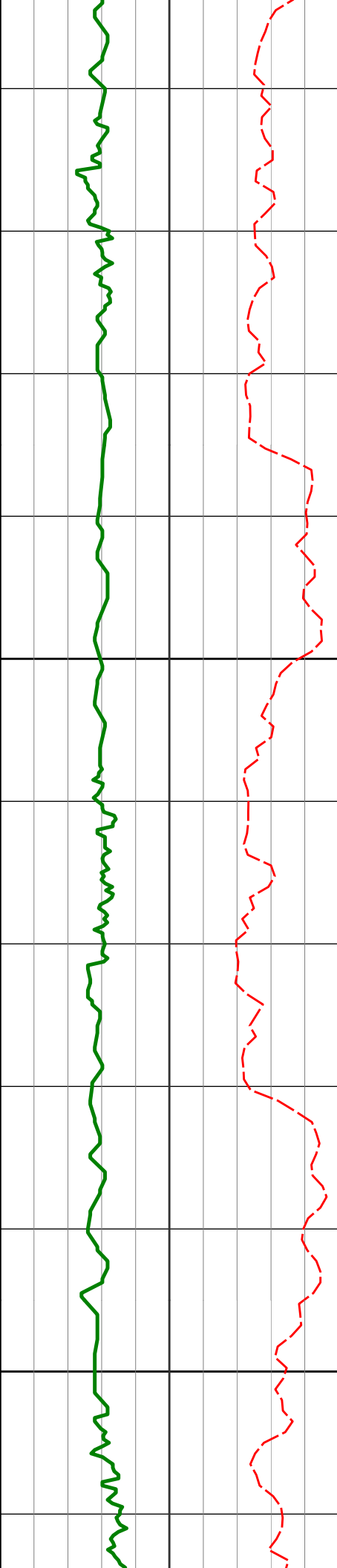
83.37°F

84.06°F

84.06°F

84.06°F





2200

2300

2116'

3.99°

243.28°

2115.38'

24.45'

90.19°F

90.19°F

90.67°F

2209'

5.60°

243.60°

2208.05'

31.53'

91.95°F

92.26°F

92.49°F

2301'

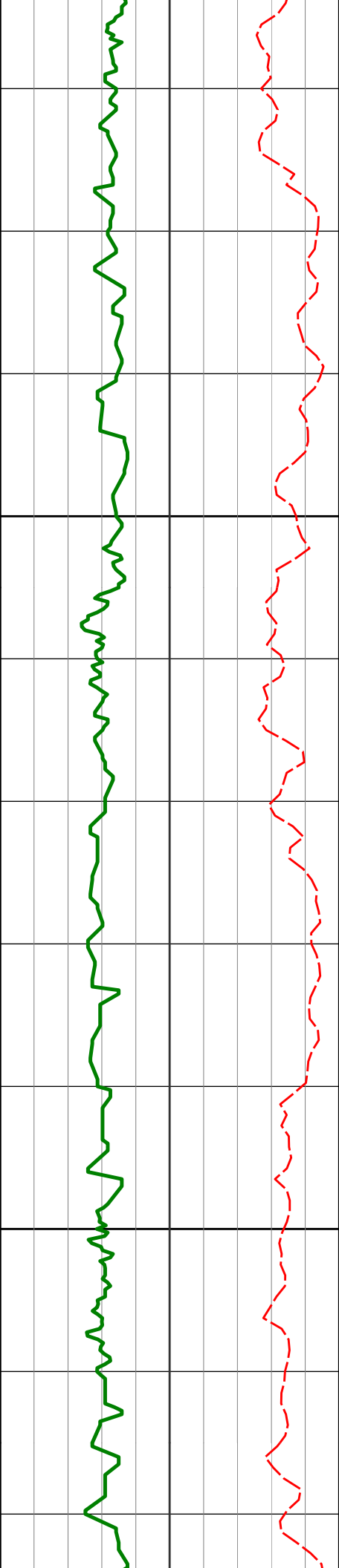
6.92°

243.20°

2299.50'

40.66'

94.33°F



2400

2500

2395'

8.45°

252.68°

2392.66'

52.47'

94.33°F

94.33°F

96.42°F

96.42°F

96.42°F

2490'

8.88°

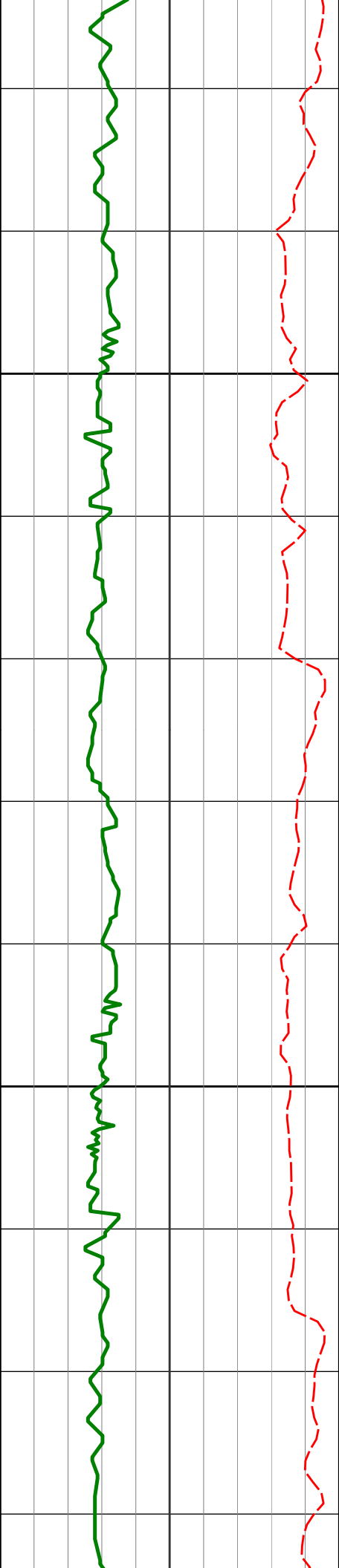
252.03°

2486.58'

66.26'

96.82°F

150.18°F



2600

2700

2585'

9.61°

249.90°

2580.34'

80.86'

2679'

8.93°

249.03°

2673.11'

95.23'

153.09°F

98.51°F

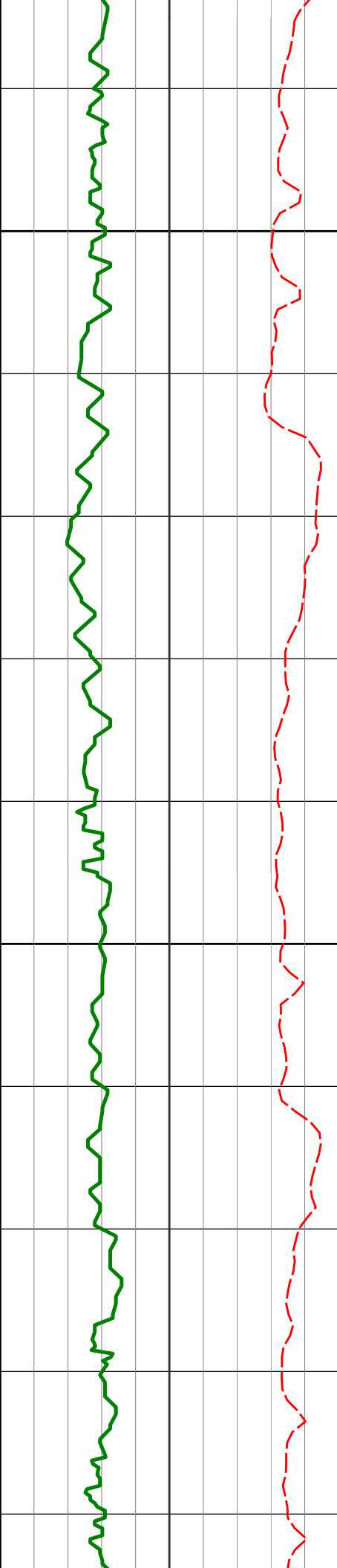
100.62°F

100.62°F

100.62°F

100.62°F

100.62°F



2800

2900

2774'

9.86°

252.78° 2766.84'

110.06'

101.72°F

102.72°F

102.72°F

2869'

10.21°

252.62° 2860.39'

126.04'

102.72°F

102.72°F

104.83°F

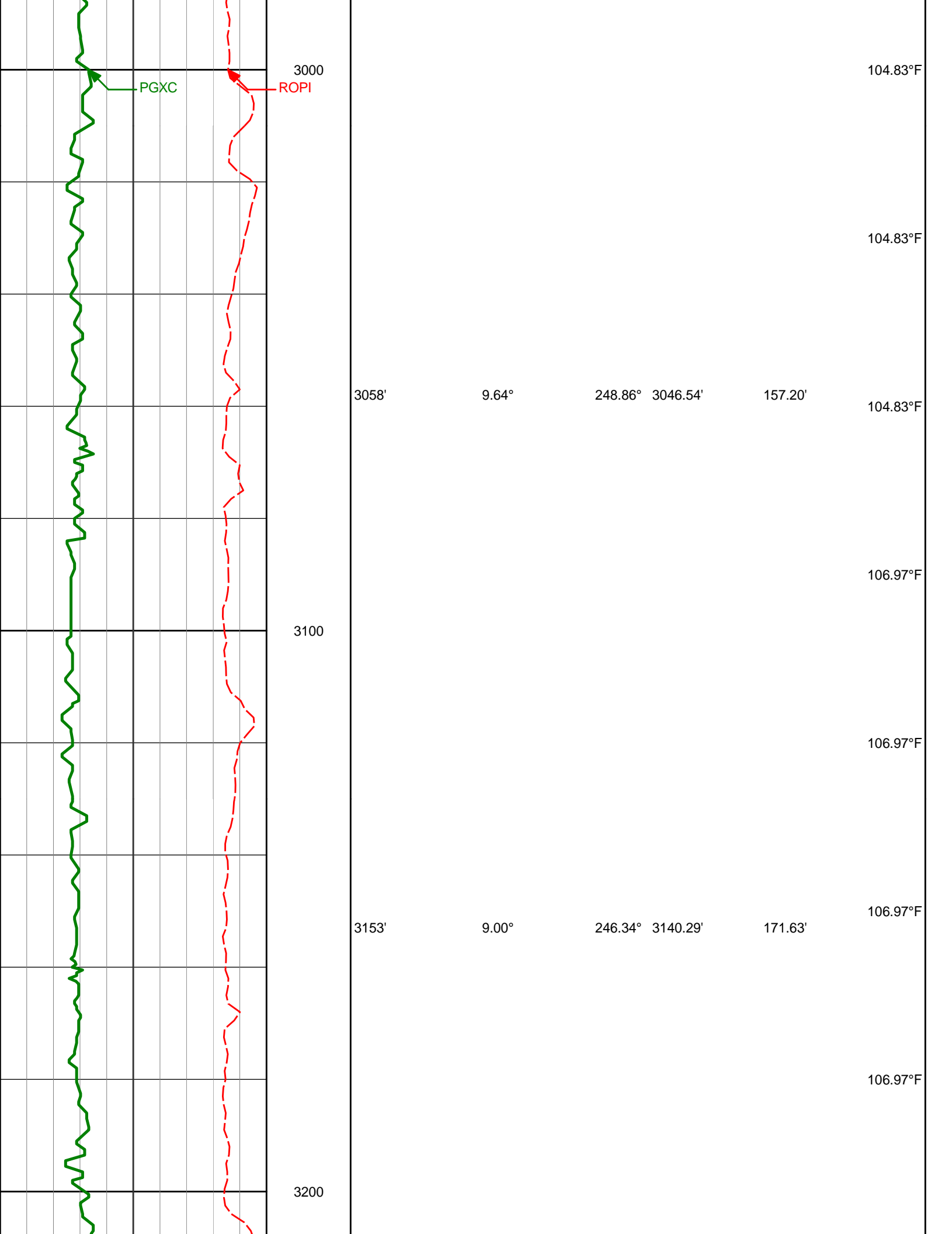
2964'

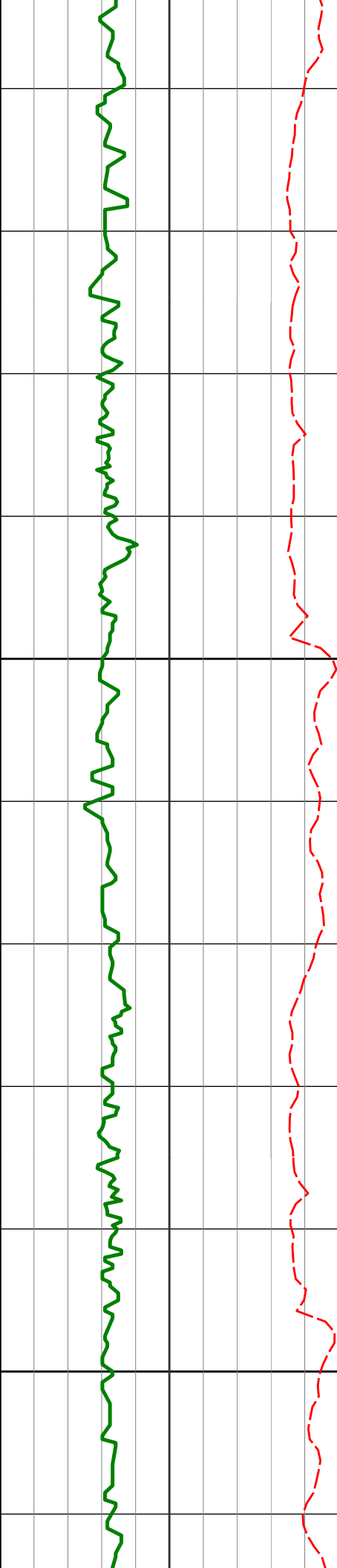
9.98°

250.10° 2953.92'

142.00'

104.83°F





3300

3400

3248'

8.07°

243.37°

3234.23'

184.61'

3342'

7.70°

245.28°

3327.35'

196.43'

106.97°F

109.09°F

109.09°F

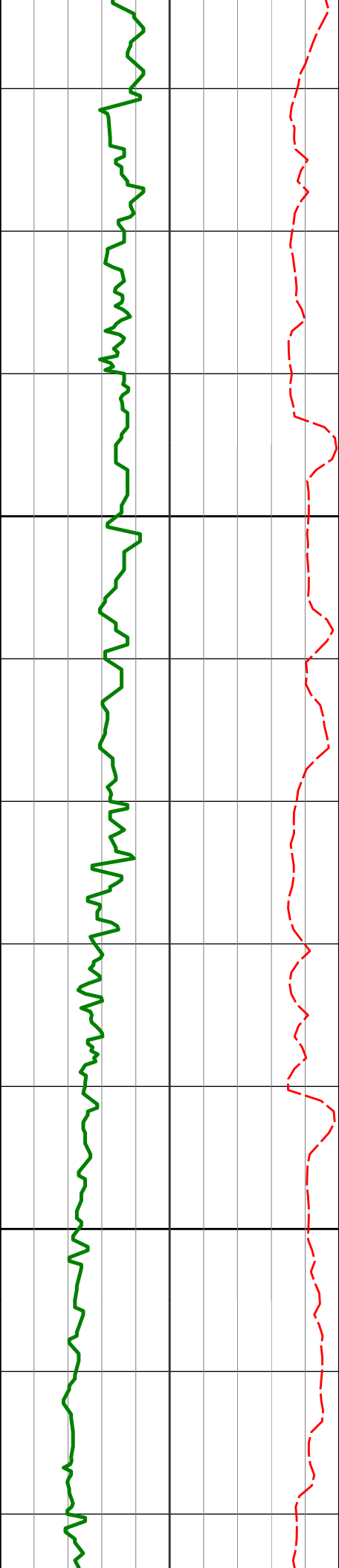
109.09°F

111.24°F

111.24°F

111.24°F

111.24°F



3437'

8.62°

246.45°

3421.38'

208.93'

112.88°F

113.40°F

3500

113.40°F

3531'

8.36°

254.47°

3514.36'

222.14'

113.40°F

113.40°F

3600

113.40°F

3626'

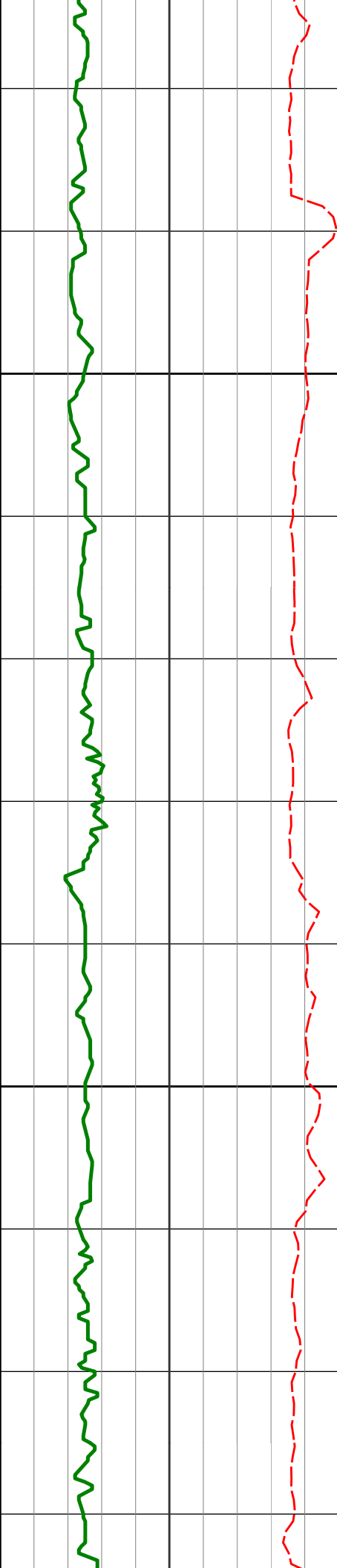
9.84°

263.39°

3608.16'

236.95'

113.40°F



3700

3721'

10.95°

266.88°

3701.60'

254.07'

115.56°F

115.56°F

115.56°F

116.76°F

117.73°F

3800

3815'

10.60°

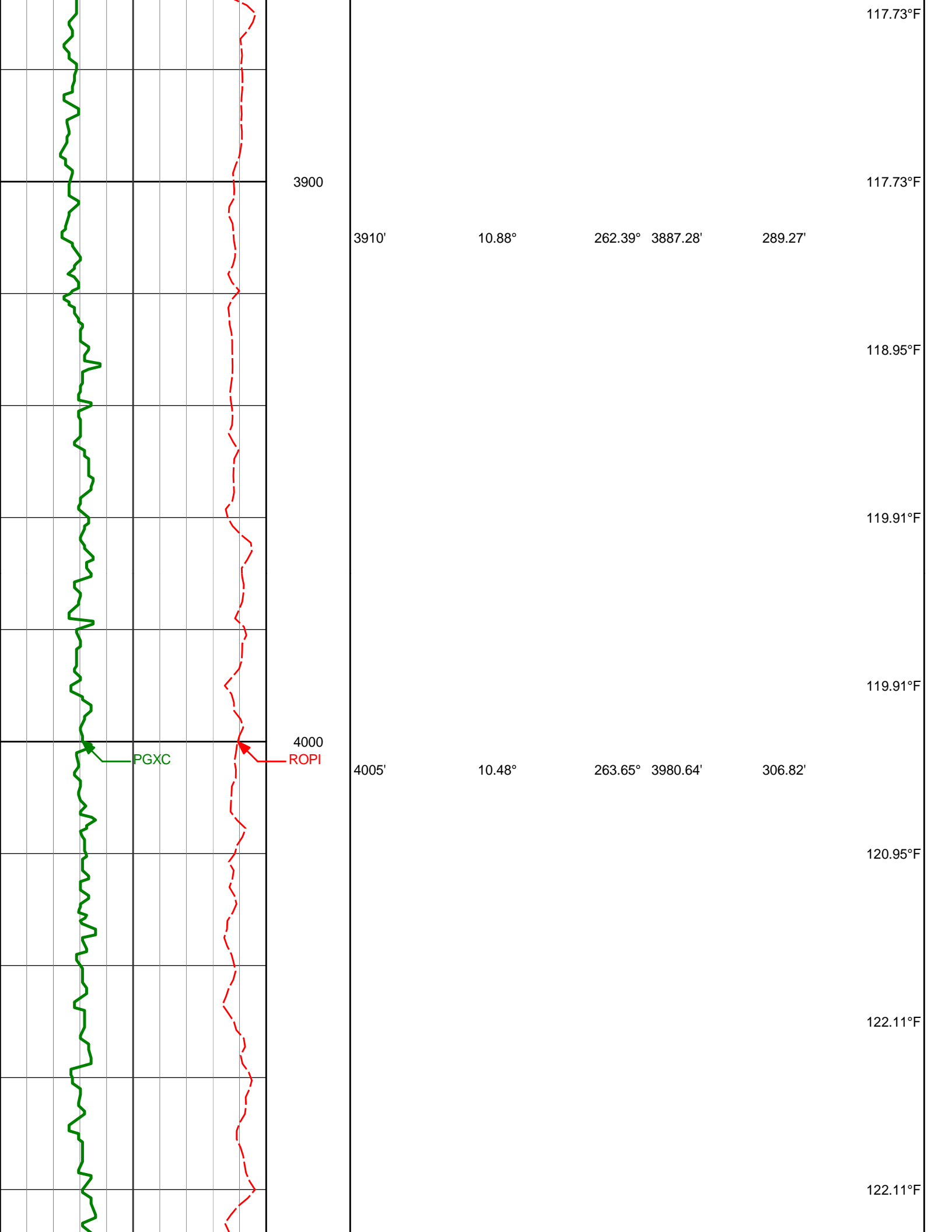
264.73°

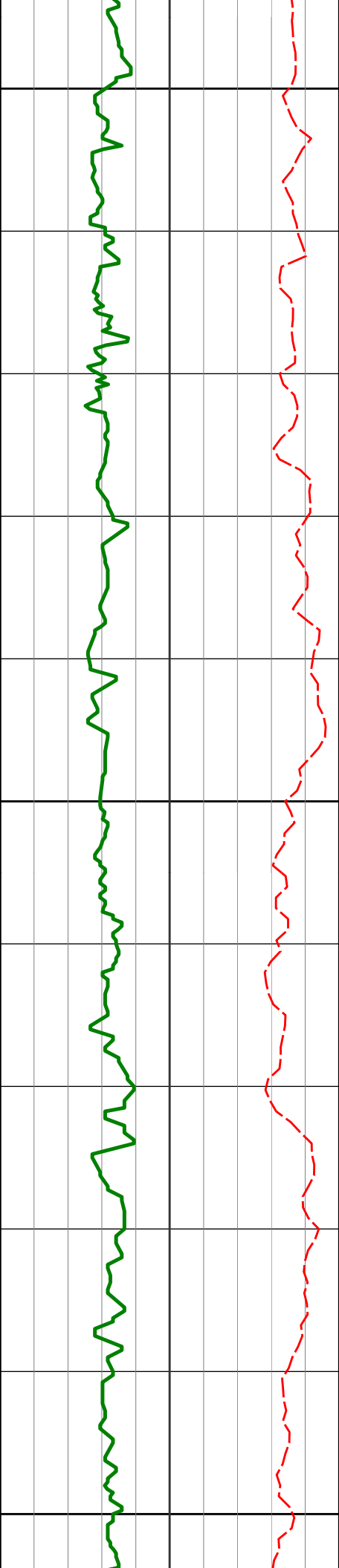
3793.95'

271.62'

117.73°F

117.73°F





4100

4100'

9.42°

261.01° 4074.21'

323.15'

123.55°F

124.30°F

122.11°F

4200

4194'

9.76°

265.67° 4166.89'

338.75'

123.29°F

124.30°F

124.30°F

4289'

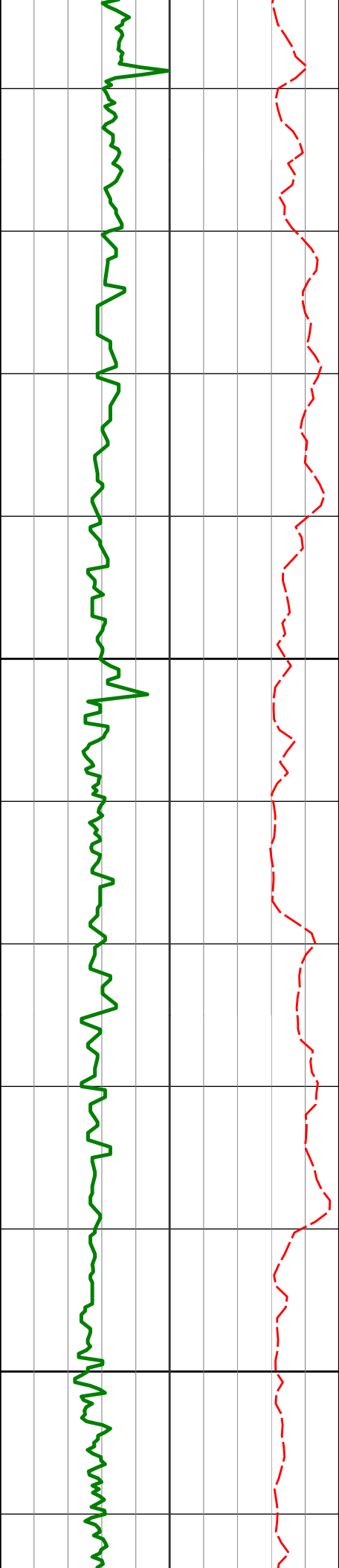
8.57°

271.26° 4260.68'

353.86'

124.97°F

4300



4400

4500

4384'

8.25°

265.19°

4354.66'

367.74'

125.27°F

126.52°F

126.52°F

126.75°F

128.57°F

4479'

9.17°

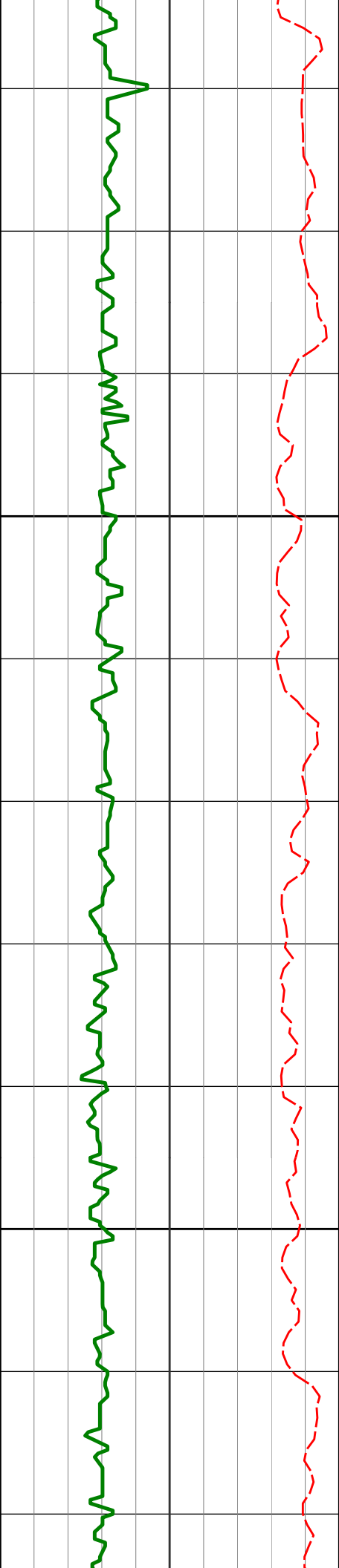
263.88°

4448.56'

382.10'

124.57°F

124.30°F



4600

4700

4574'

10.44°

255.60°

4542.18'

398.06'

4668'

8.89°

254.10°

4634.84'

413.44'

128.73°F

128.73°F

128.73°F

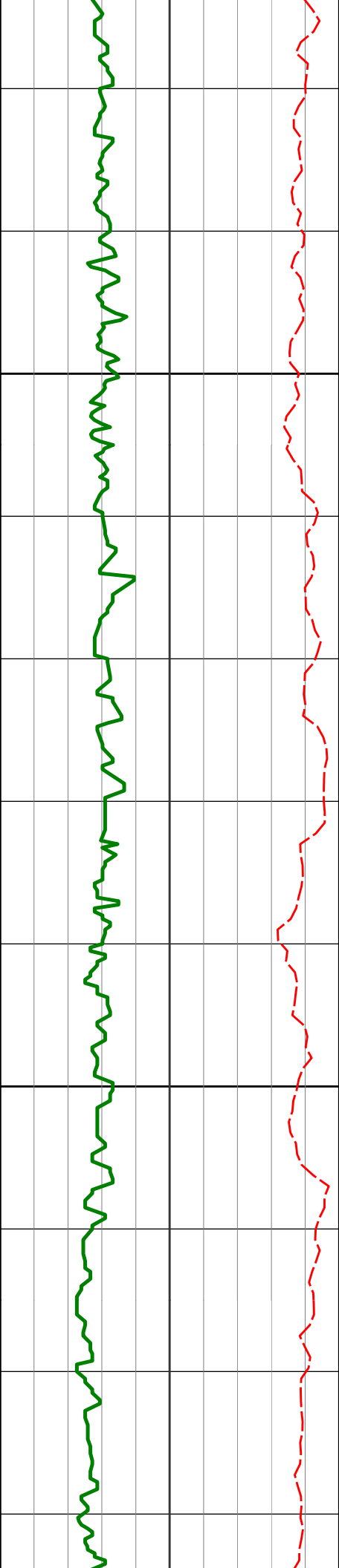
128.73°F

130.96°F

130.96°F

130.96°F

133.20°F



4763'

6.94°

258.10° 4728.93'

426.23'

133.20°F

4800

133.20°F

133.20°F

4858'

6.86°

242.23° 4823.25'

437.00'

133.20°F

4900

134.45°F

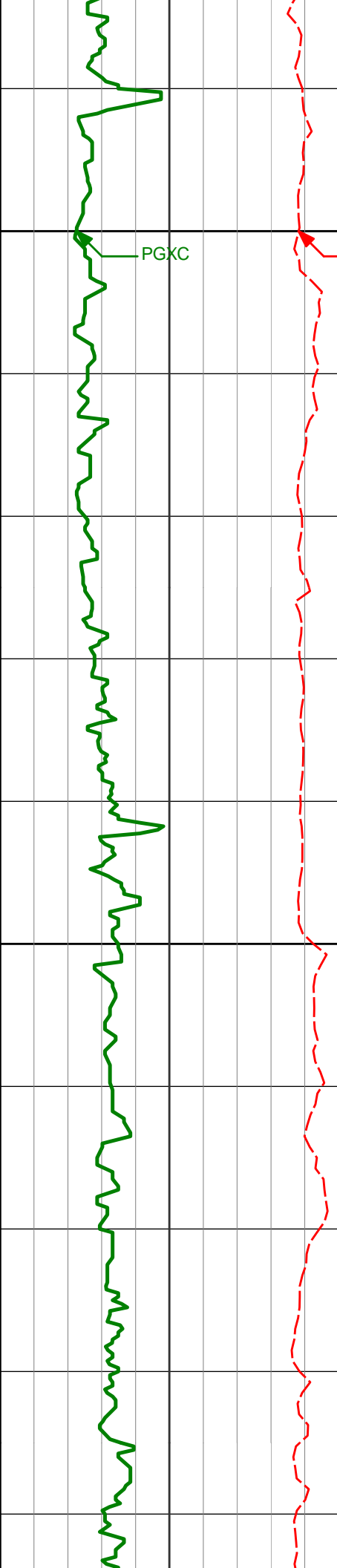
4952'

6.17°

243.33° 4916.65'

446.65'

135.45°F



5000
ROPI

5047'

5.49°

244.14°

5011.16'

455.46'

5100

5141'

2.62°

265.62°

5104.92'

461.72'

135.45°F

136.35°F

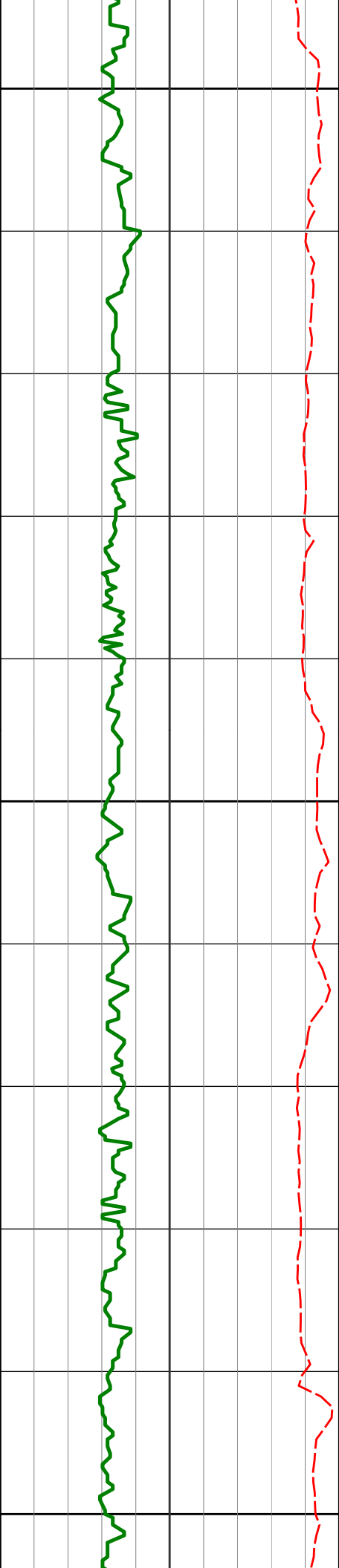
137.70°F

137.70°F

135.72°F

135.45°F

139.96°F



5200

5236'

1.79°

276.60°

5199.84'

465.36'

5300

5330'

0.45°

155.88°

5293.83'

466.67'

5400

139.96°F

139.96°F

139.96°F

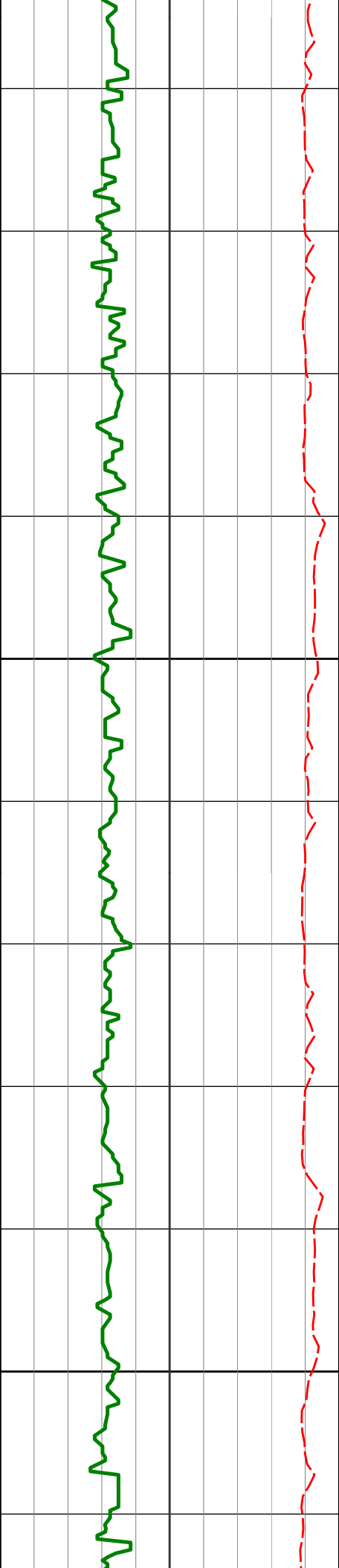
139.96°F

139.96°F

139.96°F

139.96°F

139.96°F



5500

5600

5425'

0.87°

55.70° 5388.83'

465.92'

140.84°F

142.25°F

142.25°F

5520'

0.94°

45.74° 5483.81'

464.73'

142.25°F

144.54°F

144.54°F

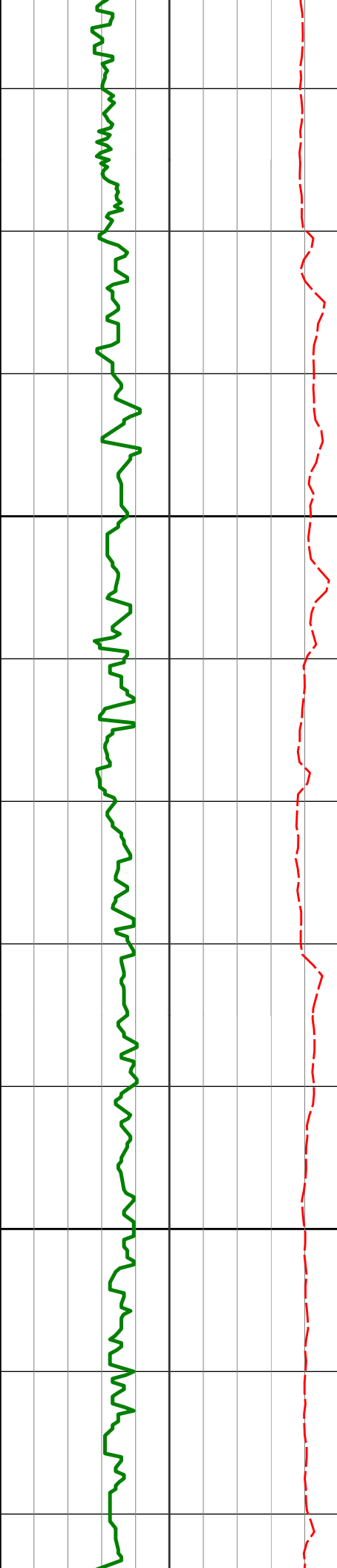
5614'

0.68°

29.44° 5577.80'

463.87'

144.54°F



5700

5709'

1.42°

176.84°

5672.80'

463.55'

144.54°F

144.54°F

144.54°F

144.54°F

144.54°F

144.54°F

5800

5803'

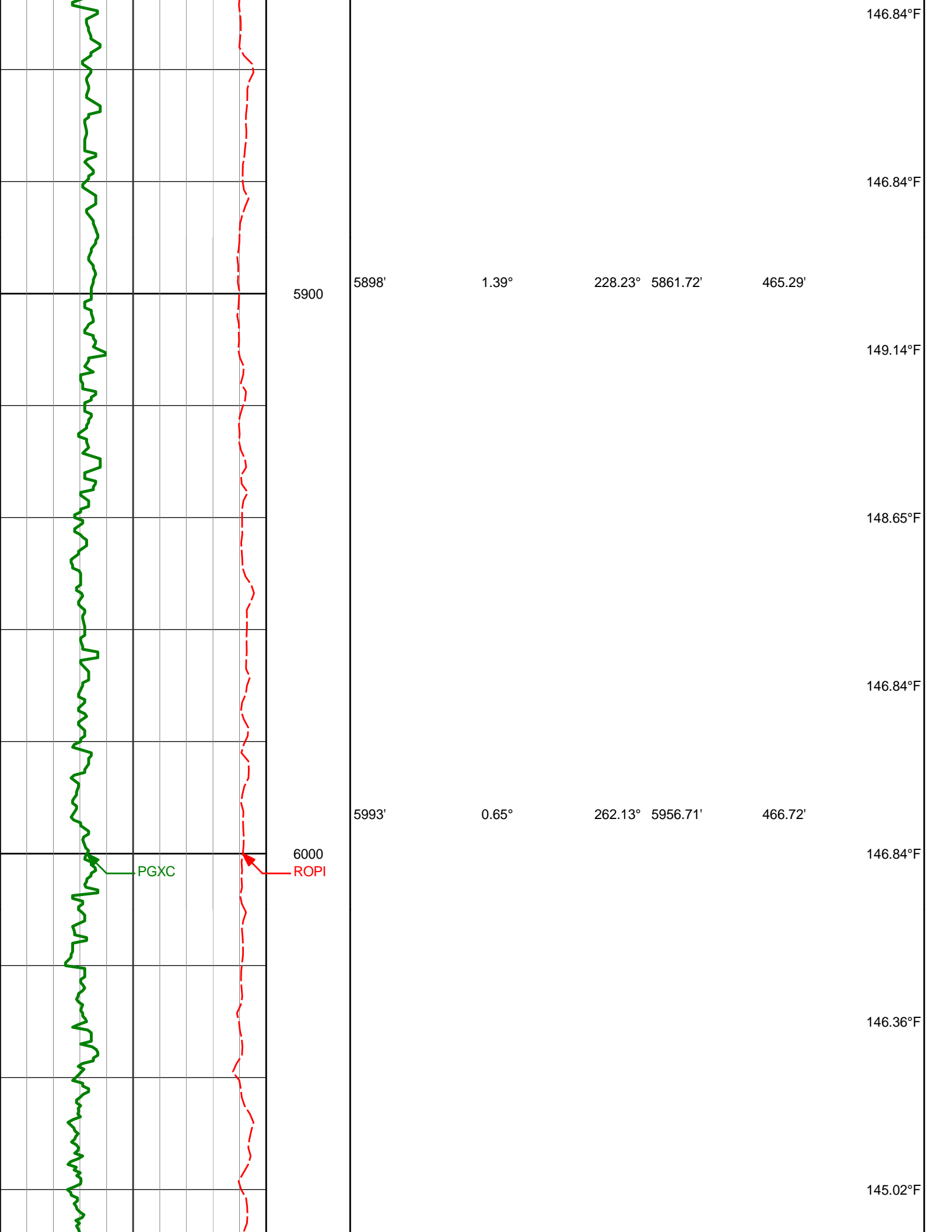
1.85°

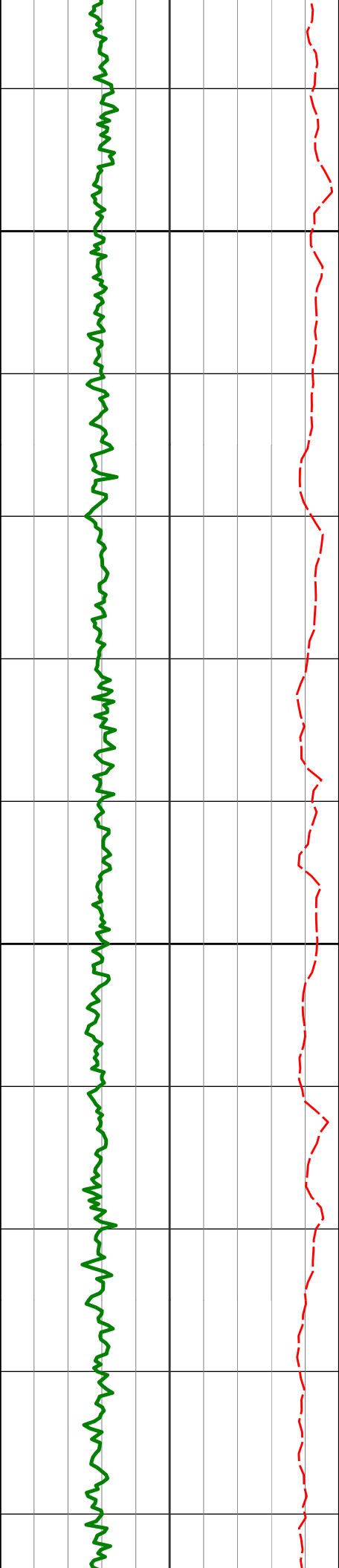
194.47°

5766.76'

463.97'

146.84°F





6100

6088'

1.11°

279.47°

6051.70'

468.15'

145.29°F

6135'

5.23°

259.59°

6098.61'

470.72'

146.96°F

149.08°F

6183'

9.01°

261.38°

6146.24'

476.62'

148.18°F

6200

147.45°F

149.14°F

149.80°F

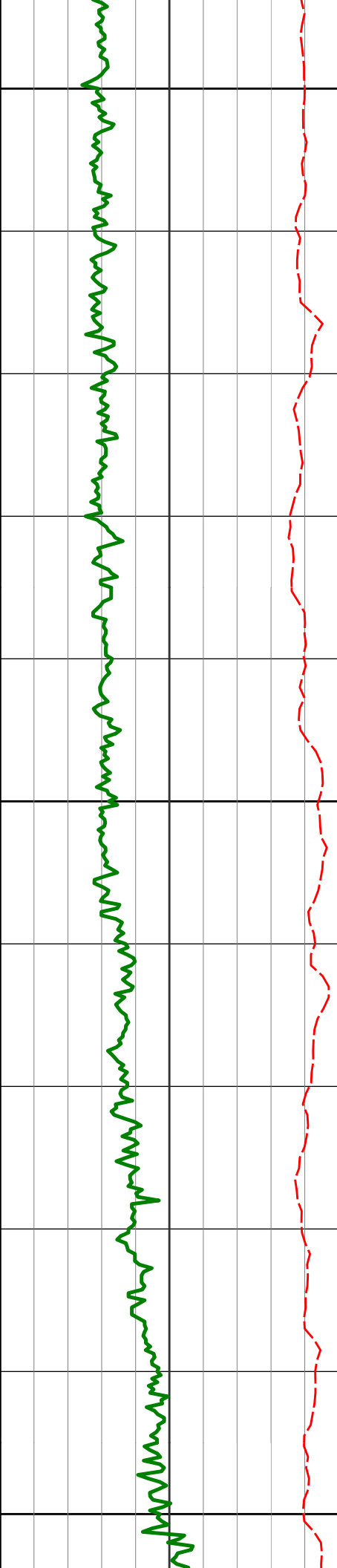
6277'

16.87°

274.07°

6237.79'

497.53'



6300

149.42°F

151.22°F

151.47°F

6372'

25.07°

274.54°

6326.43'

531.28'

151.47°F

6400

151.47°F

6420'

27.47°

274.66°

6369.47'

552.38'

152.78°F

6467'

30.92°

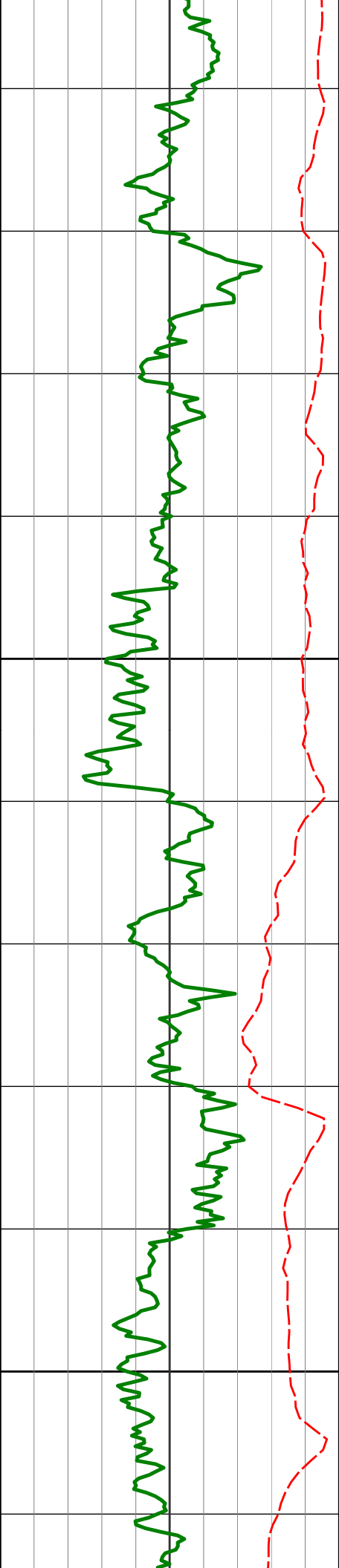
269.32°

6410.50'

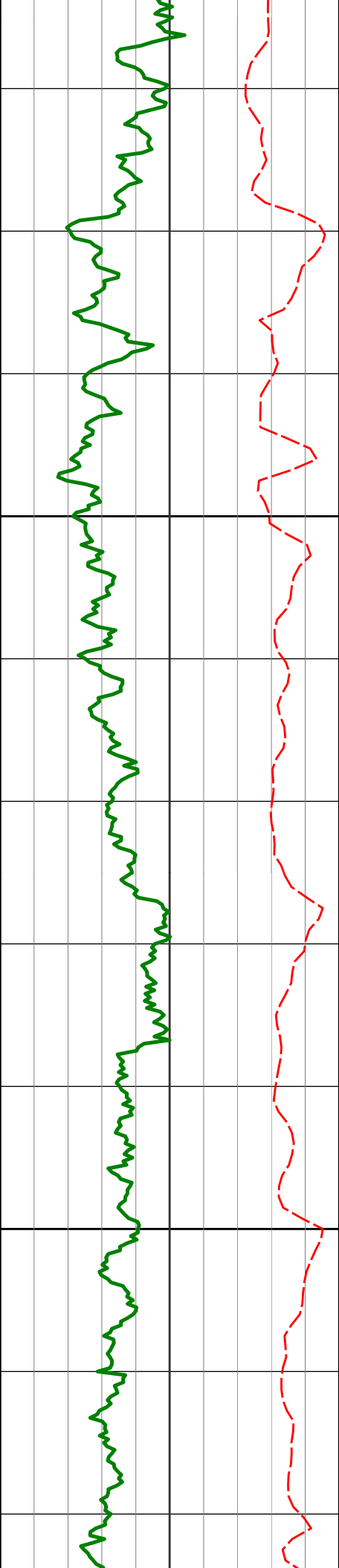
575.23'

153.71°F

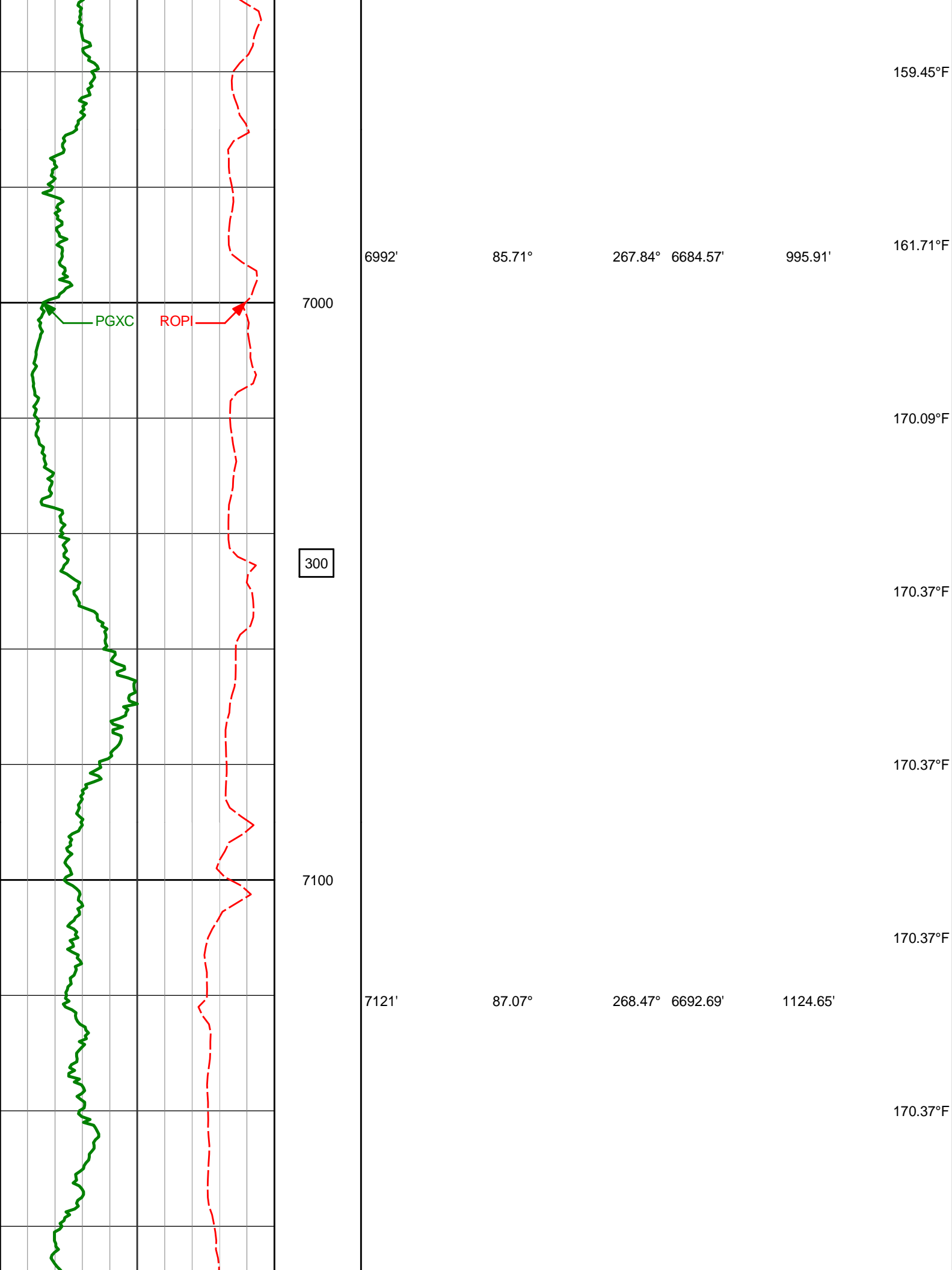
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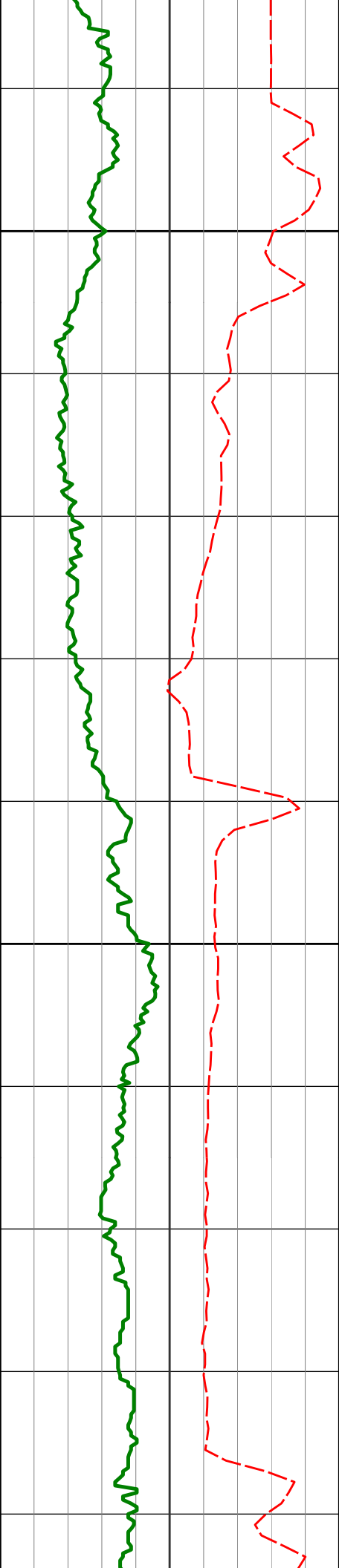


6515'	33.84°	265.50°	6451.03'	600.92'	153.79°F
6562'	37.19°	265.77°	6489.28'	628.20'	152.48°F
6600					150.55°F
					147.99°F
6657'	47.85°	263.67°	6559.37'	692.01'	148.73°F
					149.14°F
6700					
6705'	55.01°	263.48°	6589.27'	729.41'	150.21°F



6800	6752'	60.07°	267.08°	6614.50'	769.00'	152.86°F
6800	6800'	63.82°	270.40°	6637.07'	811.34'	153.79°F
6800						153.79°F
6800						155.23°F
6800	6847'	69.21°	271.40°	6655.80'	854.37'	155.23°F
6800						156.94°F
6900	6895'	75.93°	268.57°	6670.17'	900.11'	157.12°F
6900						157.12°F
6900						158.62°F
6900	6942'	81.93°	267.17°	6679.19'	946.21'	158.62°F





7200

7216'

88.83°

269.28°

6696.09'

1219.57'

7300

7311'

88.37°

269.01°

6698.41'

1314.52'

170.58°F

172.78°F

174.99°F

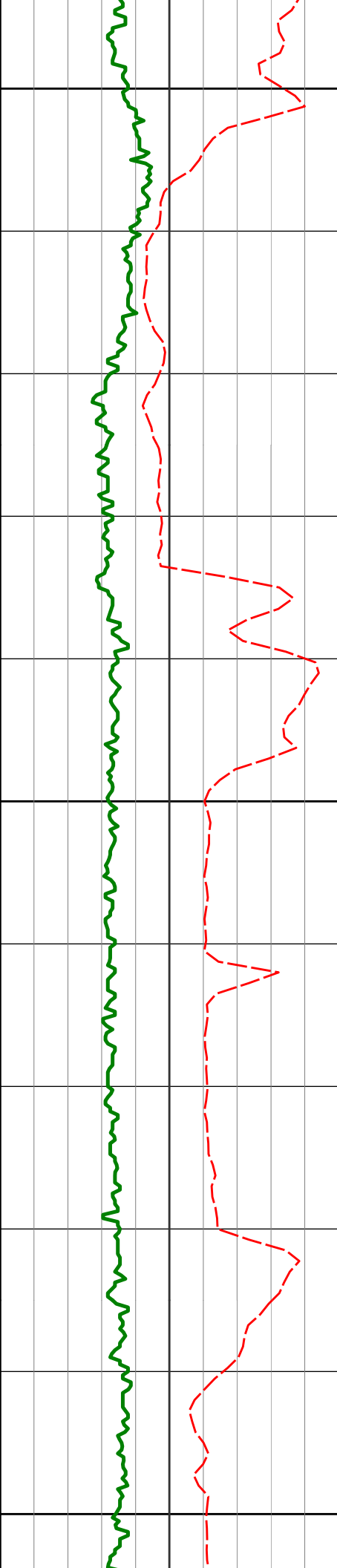
175.49°F

177.50°F

175.73°F

175.21°F

175.81°F



7400

7406'

88.61°

269.35°

6700.92'

1409.46'

174.77°F

172.78°F

174.99°F

7500

7501'

90.40°

269.05°

6701.74'

1504.42'

175.21°F

177.48°F

177.79°F

179.98°F

7600

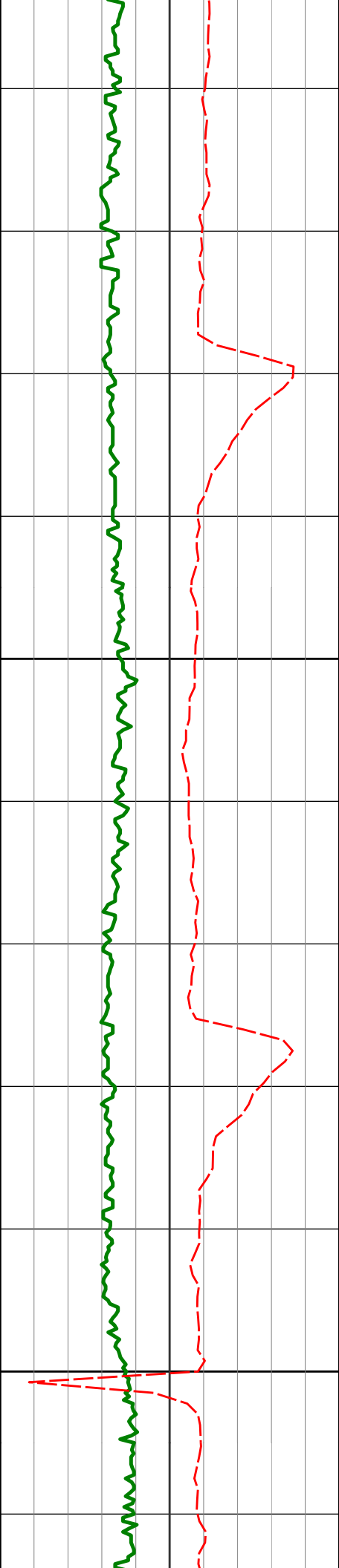
7595'

90.06°

268.44°

6701.36'

1598.41'



7700

7690'

89.66°

267.77°

6701.59'

1693.41'

180.09°F

182.03°F

182.55°F

182.55°F

183.93°F

184.92°F

7785'

89.45°

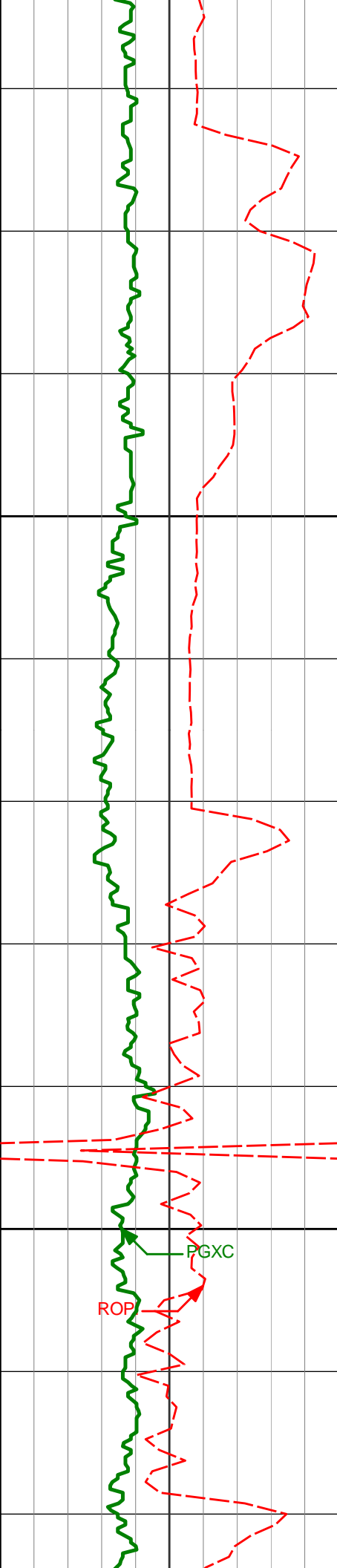
267.33°

6702.33'

1788.41'

7800

183.27°F



7900

8000

7880'

90.71°

267.64° 6702.20'

1883.40'

7974'

91.26°

267.36° 6700.58'

1977.39'

182.55°F

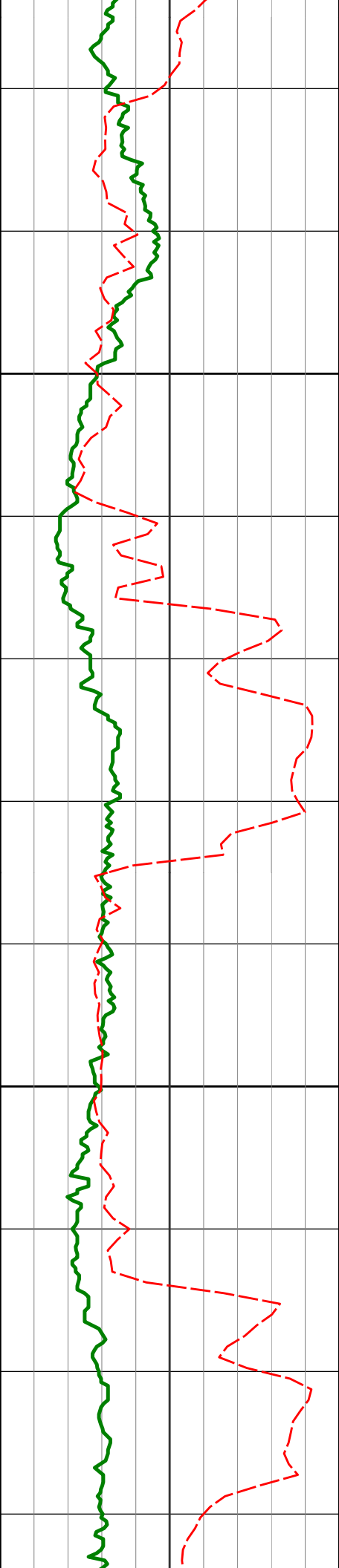
182.55°F

182.55°F

182.55°F

184.91°F

185.02°F



8100

8069'

91.97°

267.05° 6697.91'

2072.34'

8164'

90.92°

268.29° 6695.51'

2167.31'

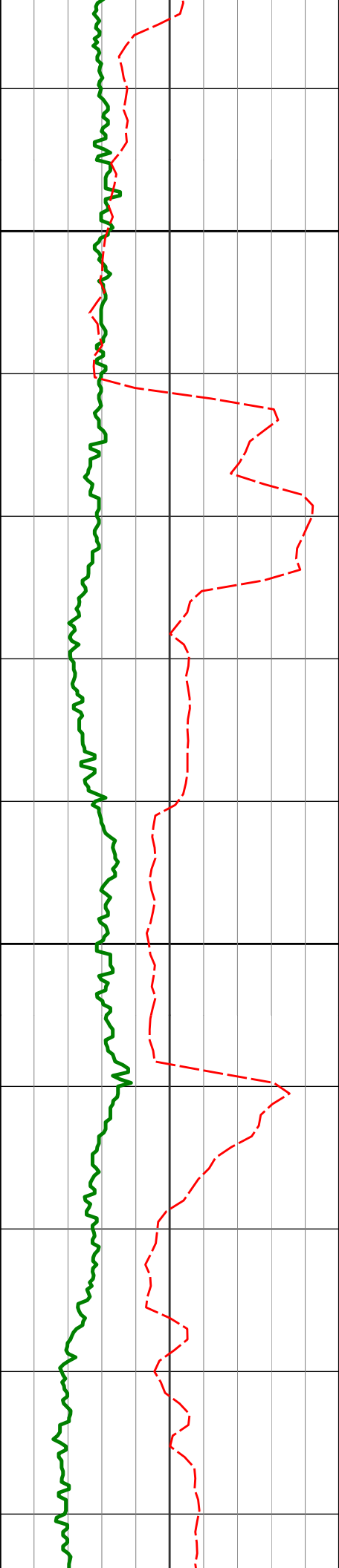
8200

8259'

89.97°

268.81° 6694.77'

2262.30'



8300

8353'

88.27°

268.33° 6696.22'

2356.27'

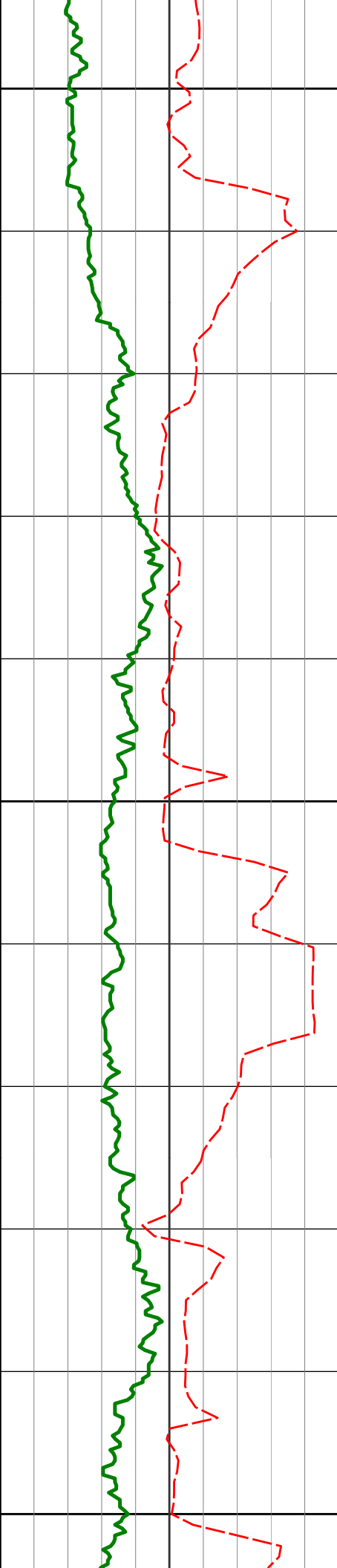
8400

8448'

88.46°

268.44° 6698.93'

2451.23'



8500

8543'

88.27°

268.43° 6701.64'

2546.19'

8600

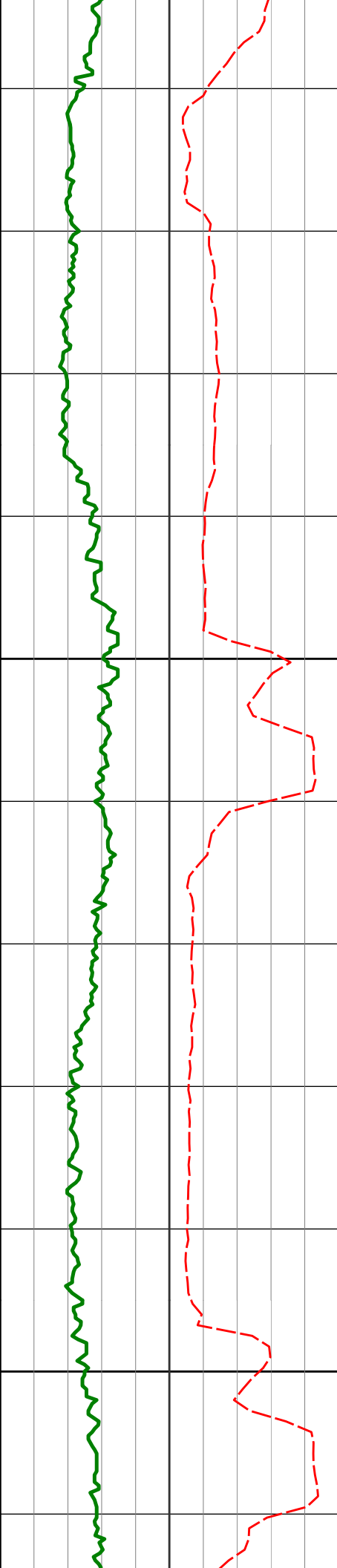
8638'

90.65°

268.61° 6702.53'

2641.17'

8700



8800

8900

8733'

90.83°

268.18° 6701.31'

2736.16'

8828'

90.55°

268.85° 6700.16'

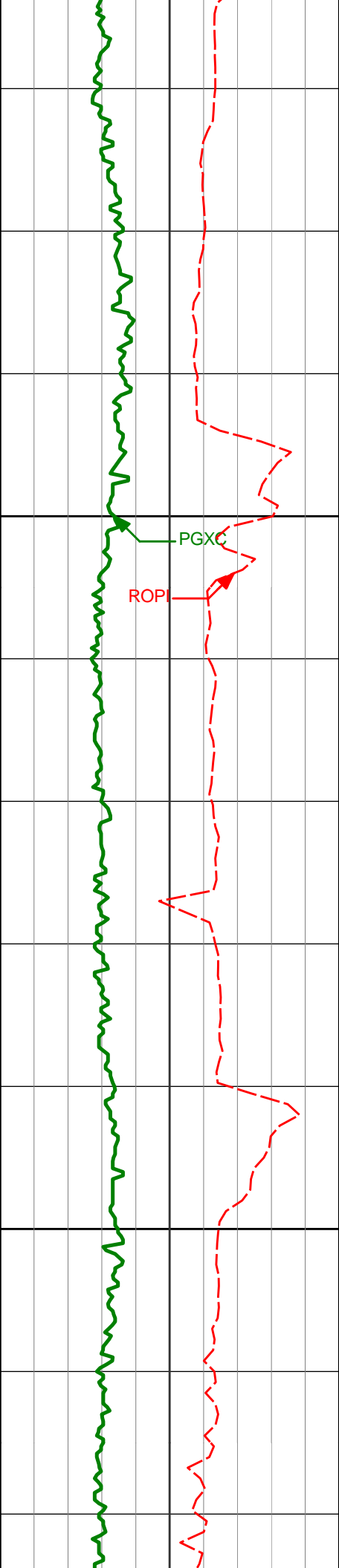
2831.14'

8922'

89.88°

268.23° 6699.81'

2925.14'



9000

9017'

88.92°

267.10° 6700.80'

3020.13'

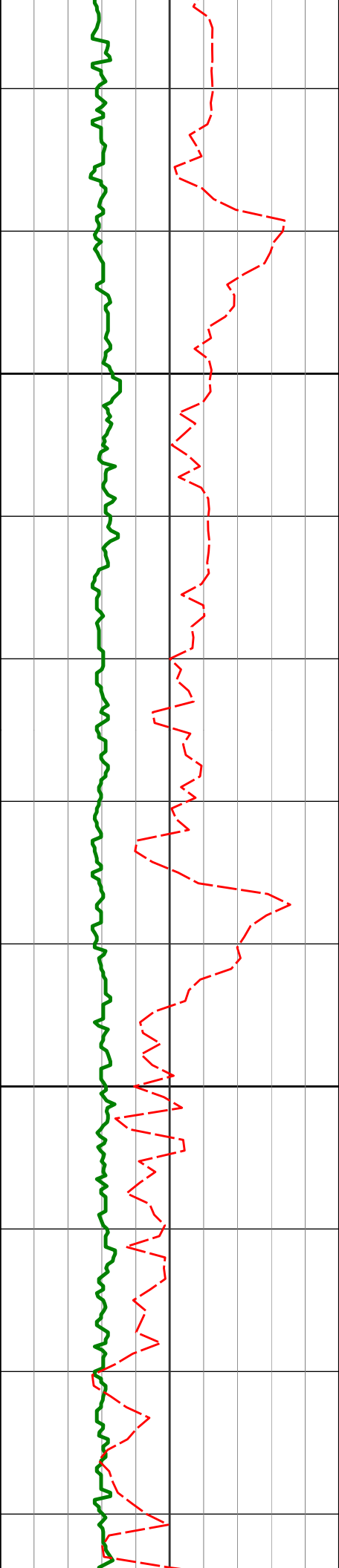
9100

9112'

89.20°

267.11° 6702.36'

3115.11'



9200

9206'

89.32°

267.63° 6703.58'

3209.09'

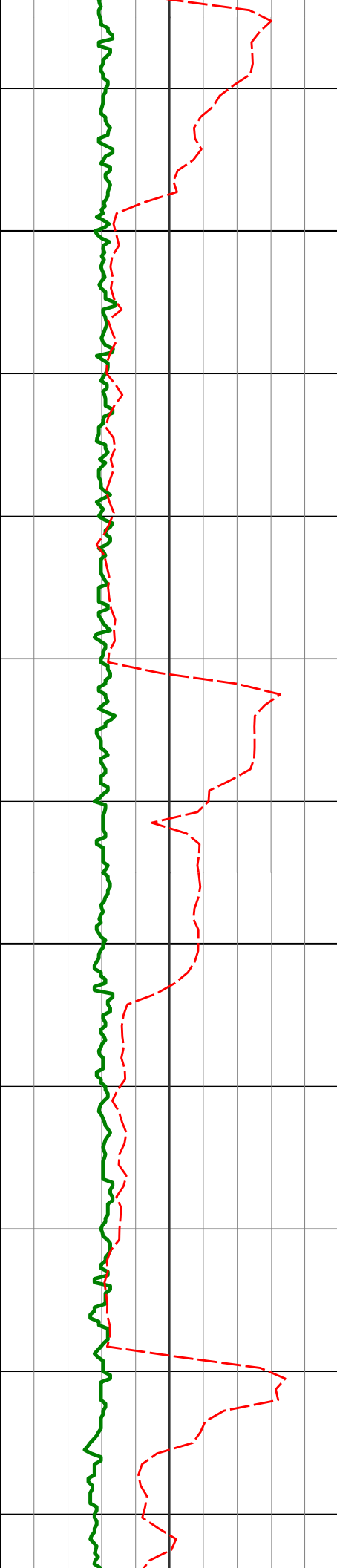
9300

9302'

89.20°

268.23° 6704.82'

3305.09'



9400

9500

9396'

89.26°

268.73°

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9491'

89.38°

269.41°

6707.21'

3494.04'

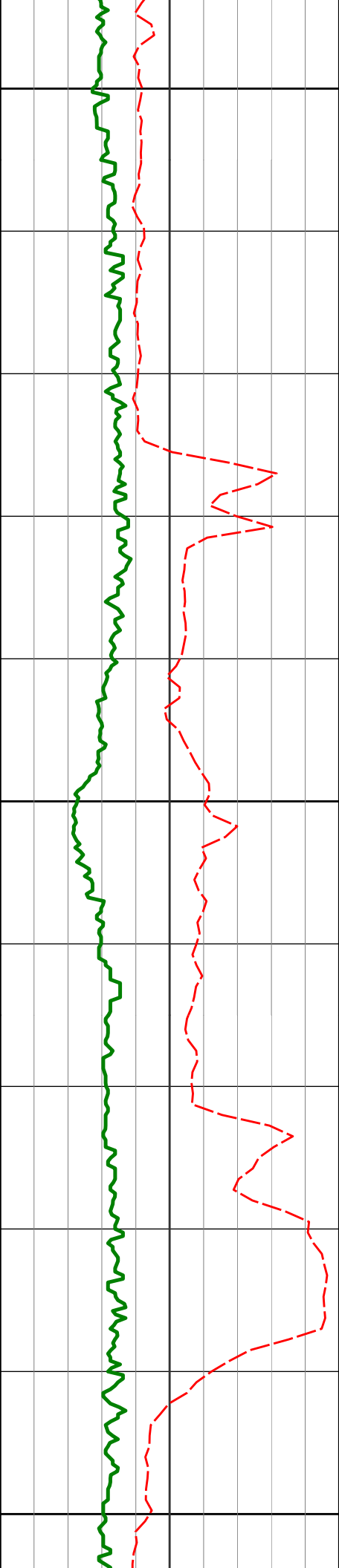
9586'

90.06°

270.29°

6707.67'

3588.98'



9600

9681'

88.31°

267.87° 6709.02'

3683.94'

9700

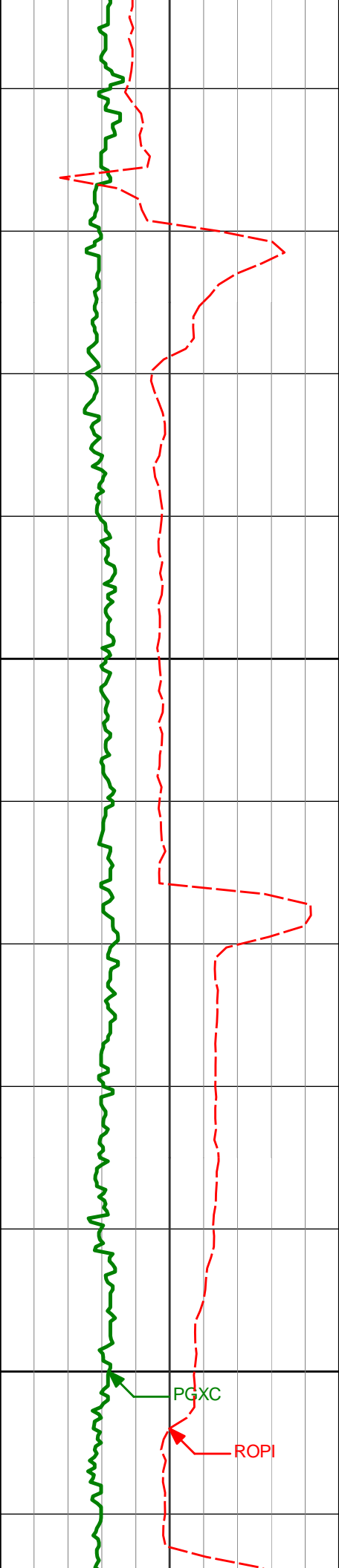
9776'

89.66°

269.08° 6710.71'

3778.92'

9800



9900

9871'

89.23°

268.48° 6711.63'

3873.90'

9965'

90.43°

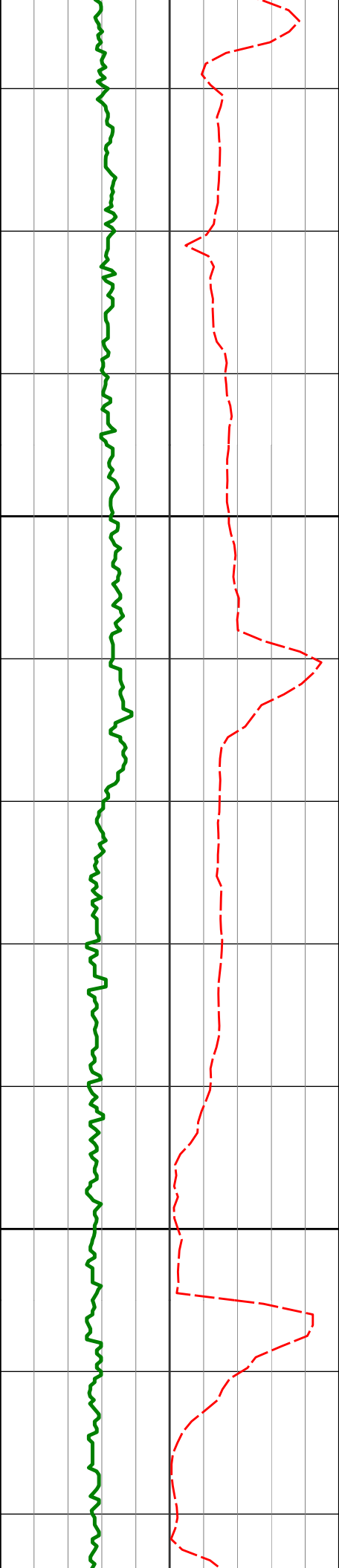
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3967.89'

10000

PGXC

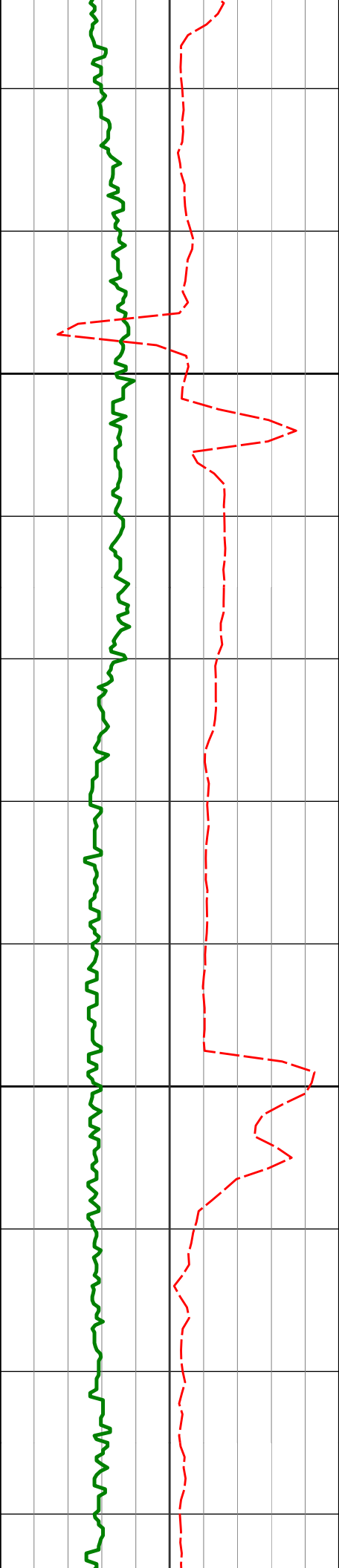
ROPI



10100

10200

10057'	89.08°	267.84°	6712.30'	4059.88'
10150'	89.11°	267.57°	6713.77'	4152.87'
10243'	90.28°	269.27°	6714.26'	4245.86'

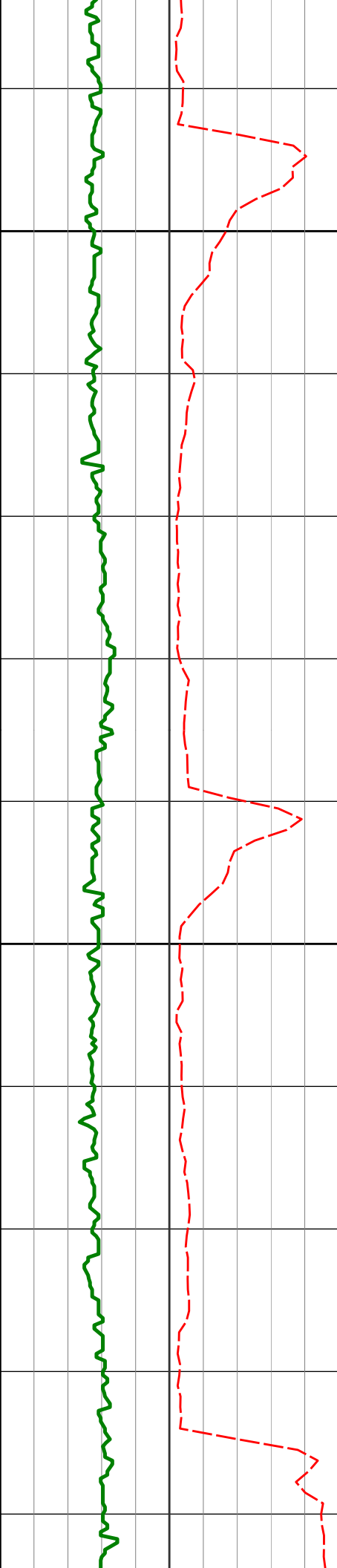


10300

10334'	89.32°	268.45°	6714.58'	4336.84'
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10400

10426'	90.09°	268.66°	6715.05'	4428.84'
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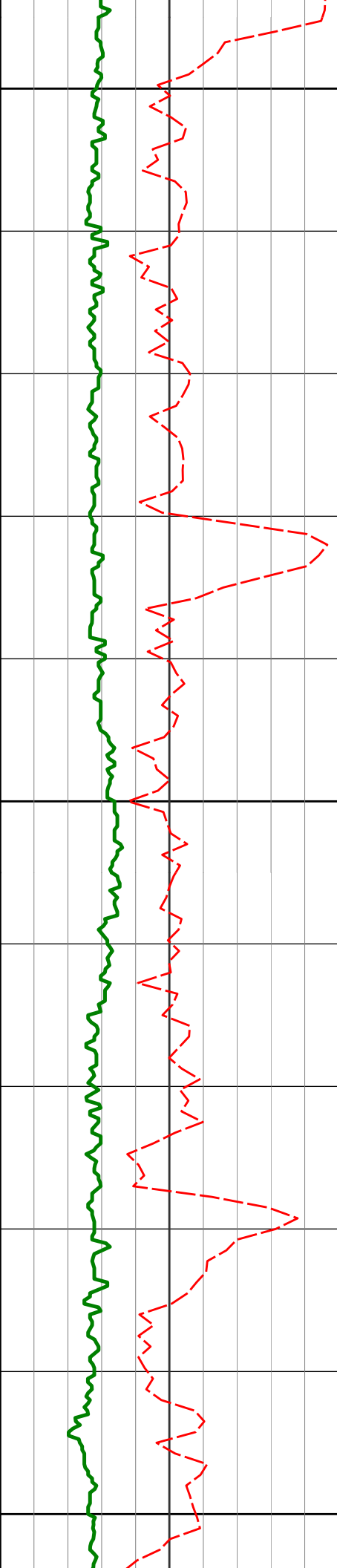


10500

10518' 90.06° 267.97° 6714.93' 4520.83'

10600

10610' 89.72° 266.71° 6715.11' 4612.83'



10700

10701'

89.60°

267.57° 6715.65'

4703.82'

10792'

90.28°

267.59° 6715.74'

4794.81'

10800

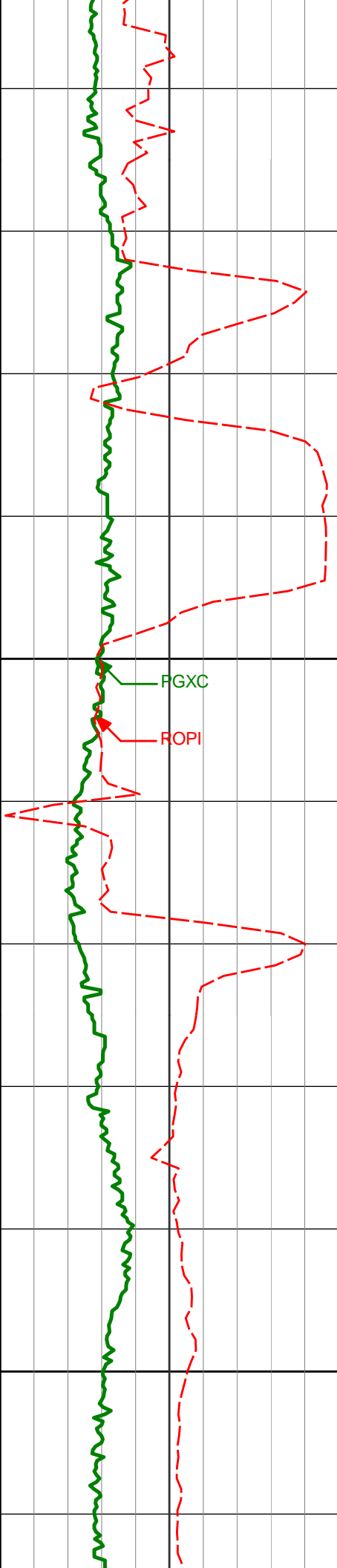
10884'

90.09°

266.76° 6715.45'

4886.81'

10900



11000

10976'

90.92°

269.04° 6714.64'

4978.80'

FGXC

ROPI

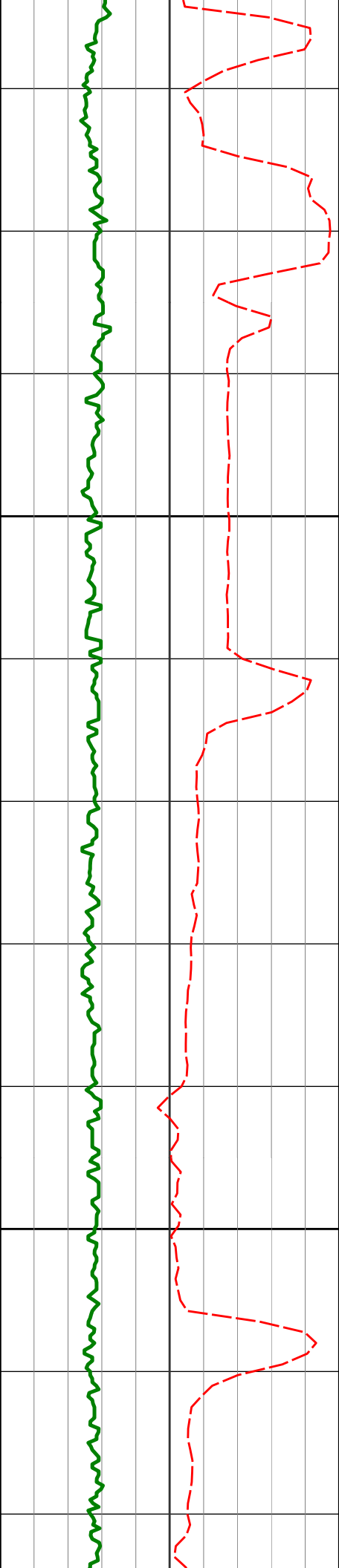
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91.17°

269.82° 6712.96'

5070.75'

11100

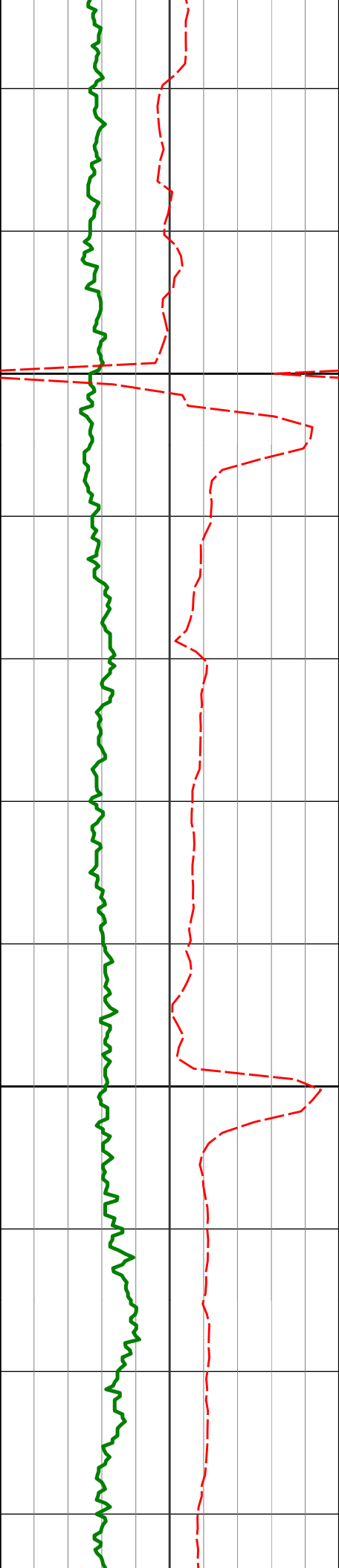


11200

11252' 89.63° 270.20° 6711.67' 5254.61'

11300

11344' 89.82° 270.44° 6712.12' 5346.52'



11400

11436'

89.26°

269.76° 6712.85'

5438.45'

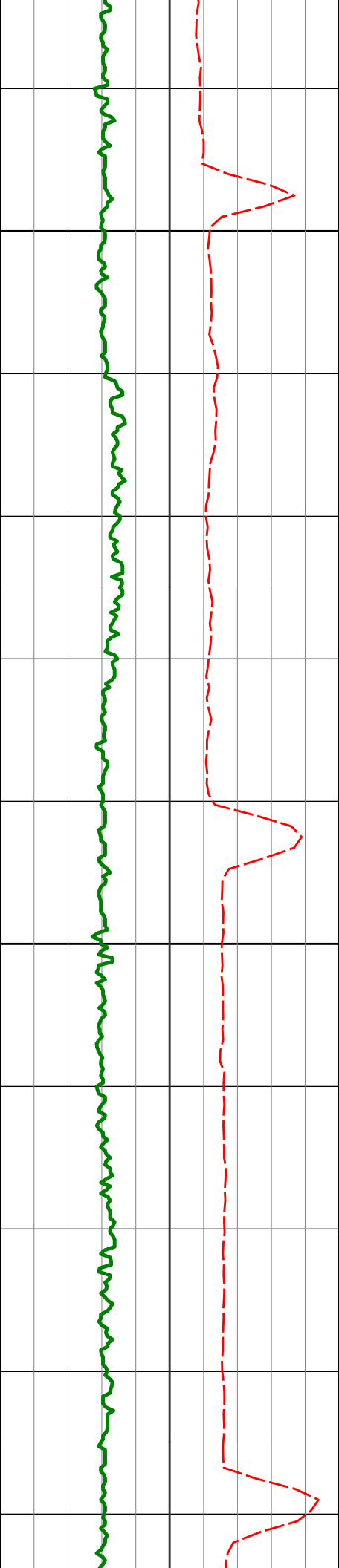
11500

11528'

89.23°

269.77° 6714.07'

5530.39'



11600

11620'

90.12°

270.54° 6714.59'

5622.31'

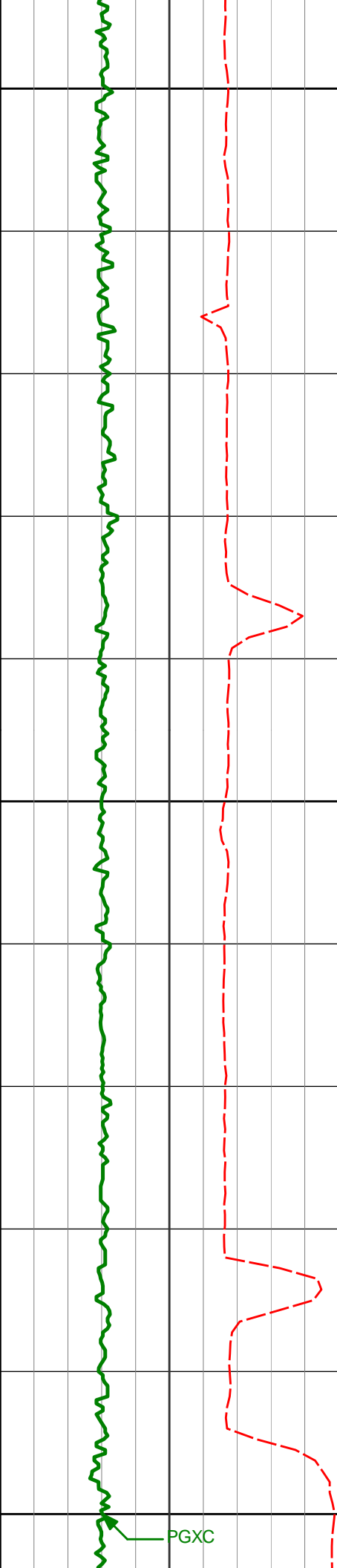
11700

11714'

90.12°

270.20° 6714.39'

5716.22'



11800

11808' 89.69° 270.25° 6714.55' 5810.14'

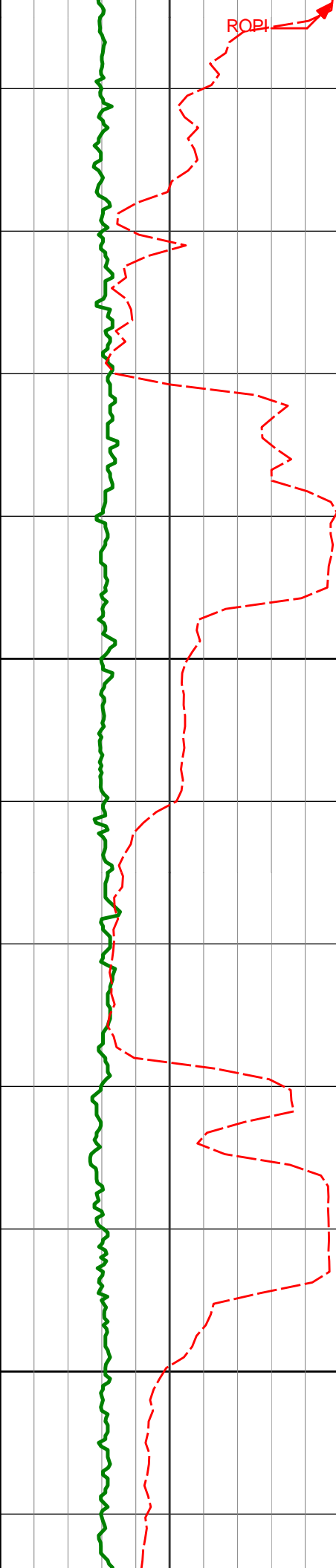
11900

11903' 89.63° 270.89° 6715.11' 5905.04'

12000

11998' 89.14° 271.61° 6716.13' 5999.87'

PGXC



12100

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89.69°

270.41° 6717.10'

6094.72'

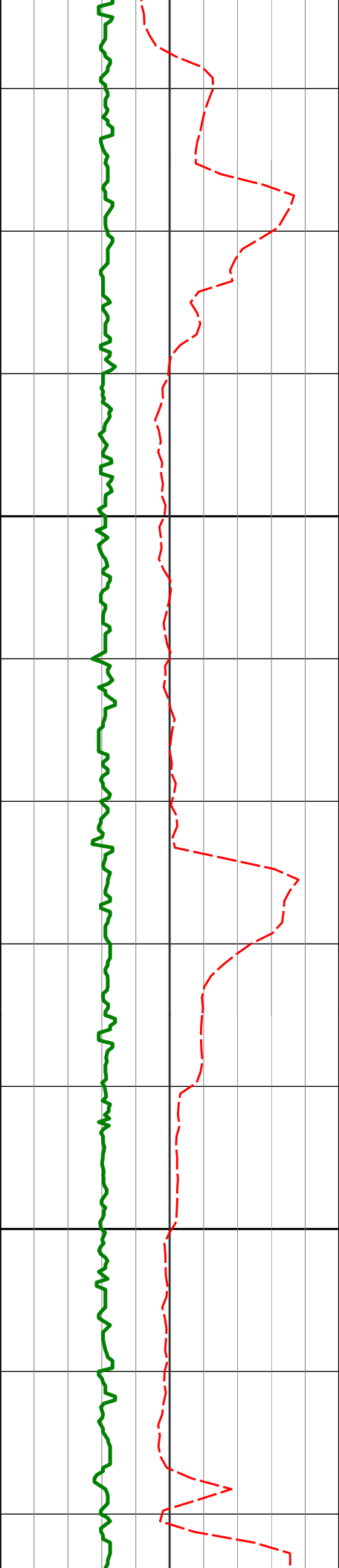
12200

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89.91°

268.33° 6717.43'

6188.68'



12300

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89.85°

268.87° 6717.63'

6284.67'

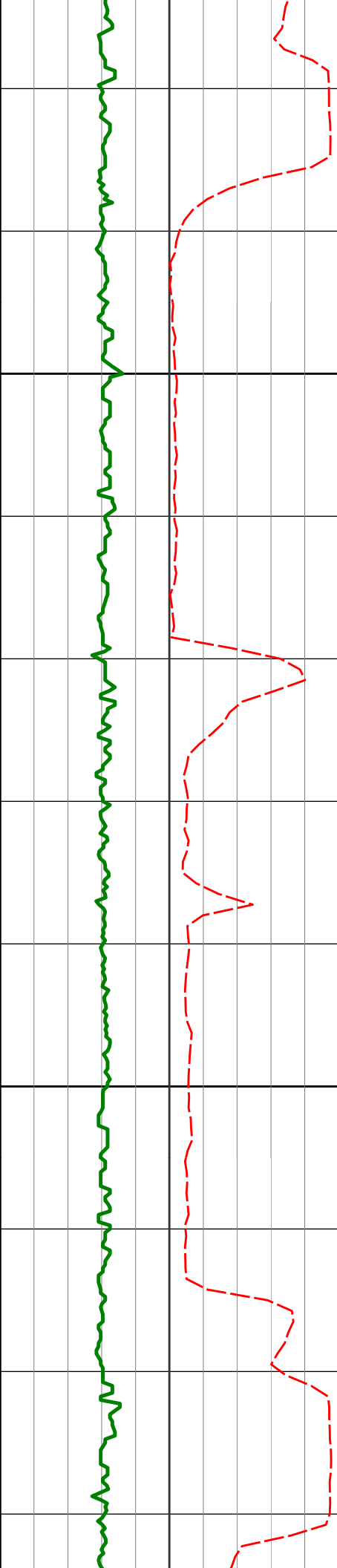
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269.47° 6717.93'

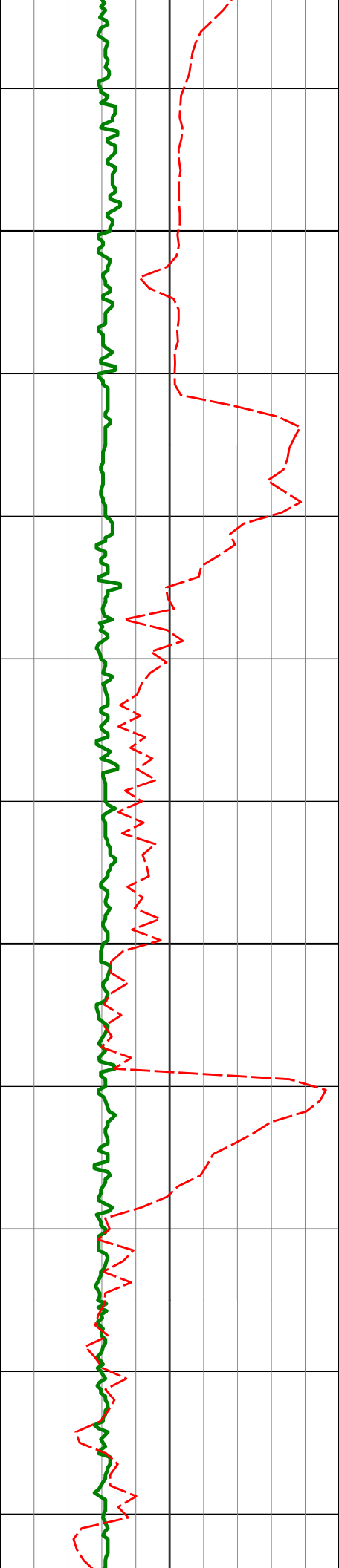
6378.64'

12400



12500

12600



12700

12757'

90.00°

267.71° 6718.08'

6758.60'

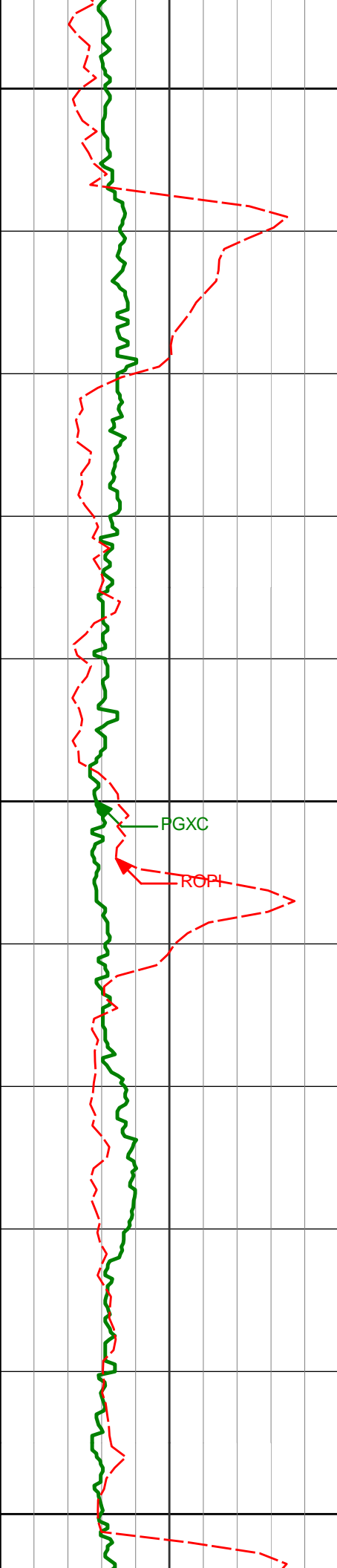
12800

12852'

89.72°

268.15° 6718.32'

6853.60'



12900

12946'

89.51°

267.91° 6718.95'

6947.60'

13000

FGXC

ROPI

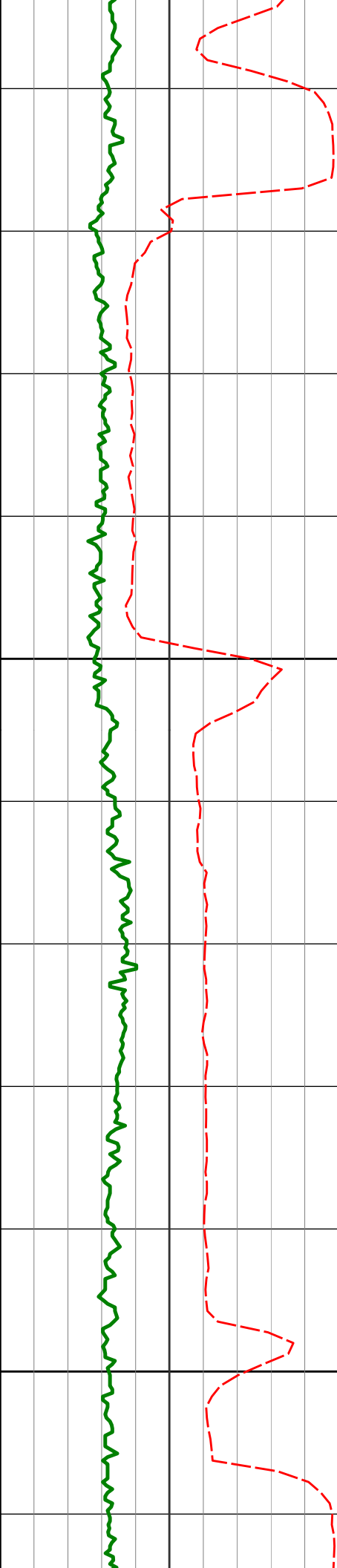
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268.77° 6718.74'

7042.59'

13100



13200

13300

13136'

88.92°

268.38° 6719.02'

7137.58'

13231'

89.57°

269.03° 6720.27'

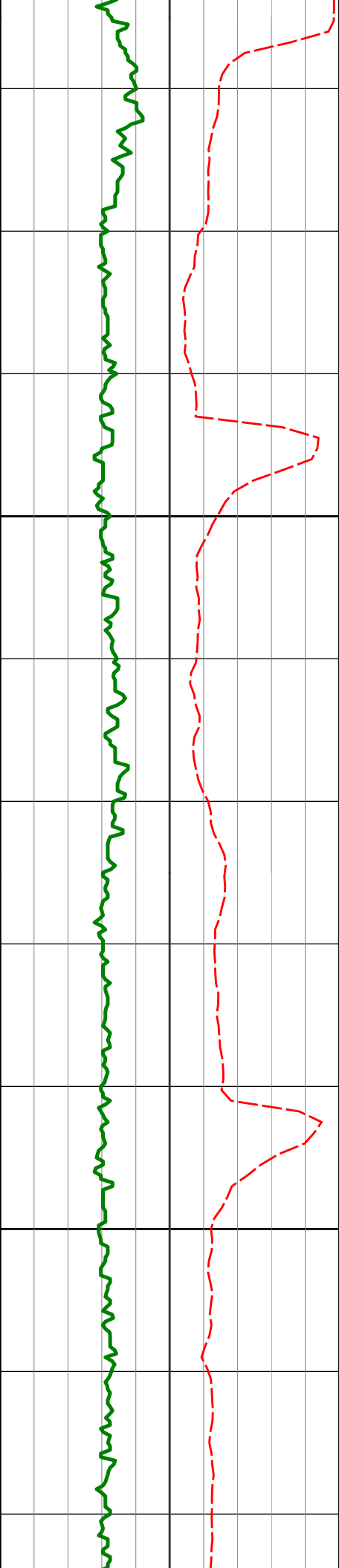
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89.41°

268.14° 6721.12'

7327.55'

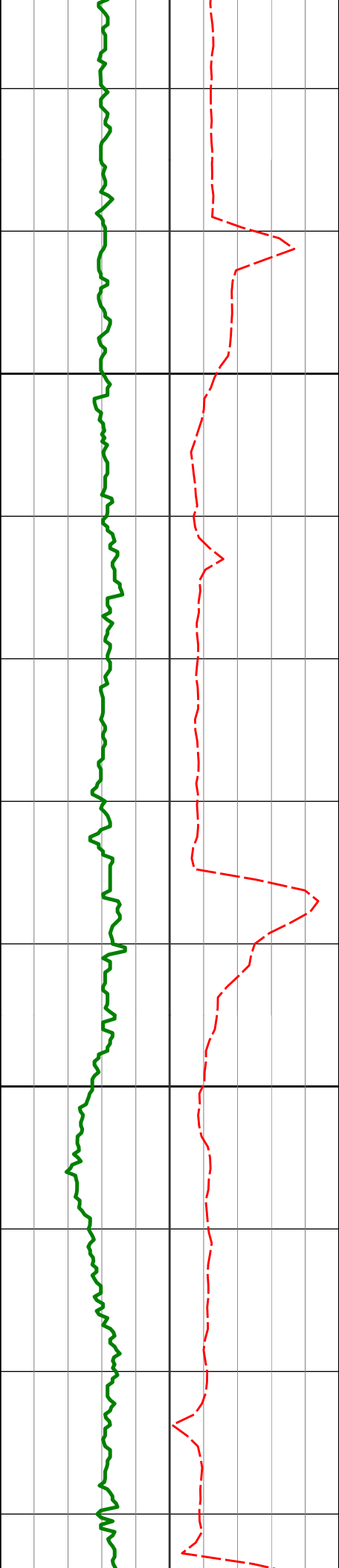


13400

13421' 89.94° 268.03° 6721.66' 7422.54'

13500

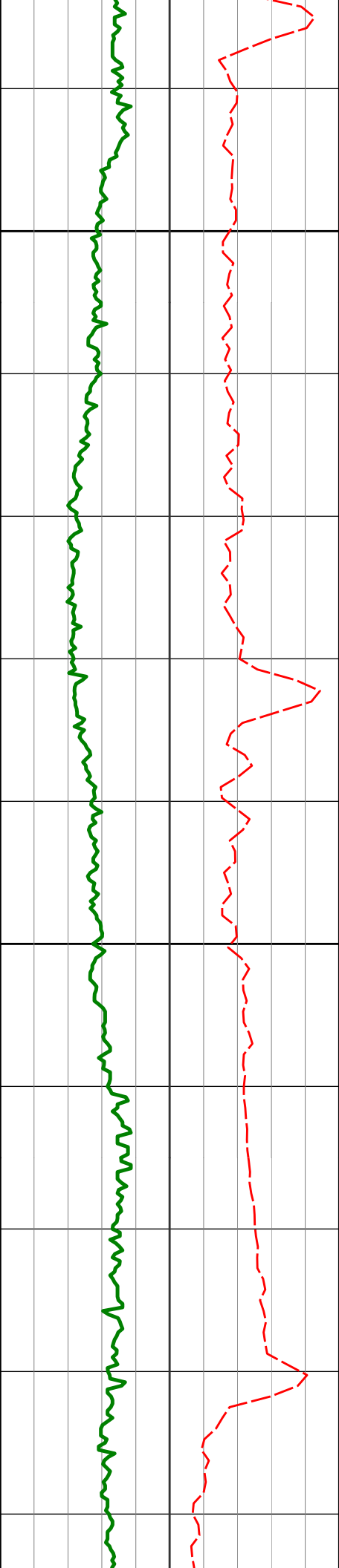
13515' 89.91° 267.79° 6721.78' 7516.54'



13600

13700

13705' 89.04° 267.49° 6723.52' 7706.53'



13800

13800'

88.74°

267.24° 6725.36'

7801.51'

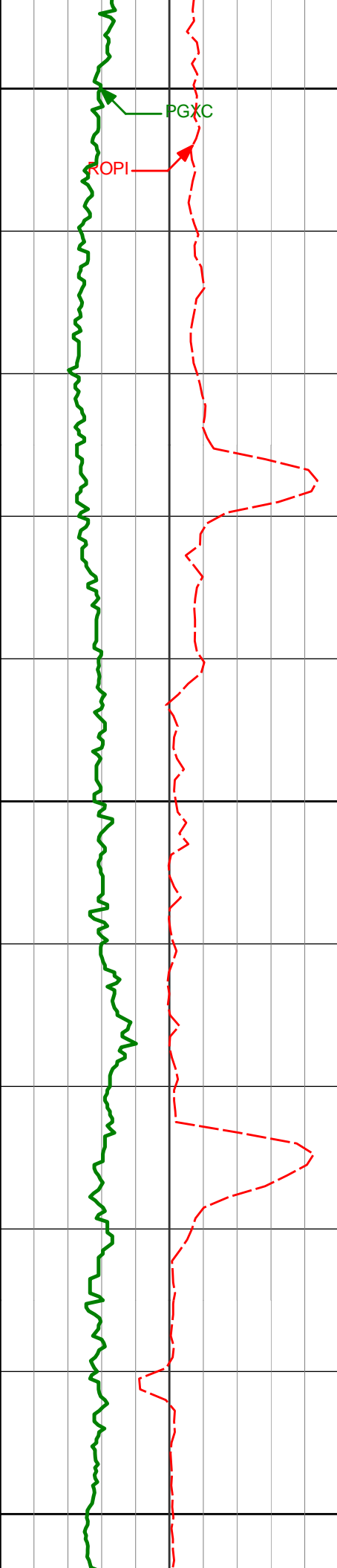
13900

13895'

90.43°

268.31° 6726.05'

7896.50'

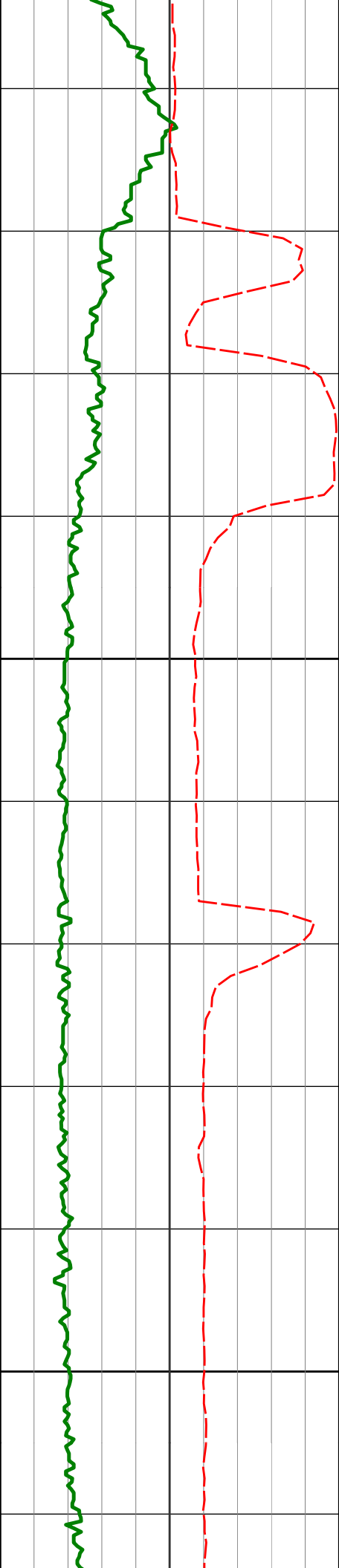


14000

14100

14200

13990'	90.68°	268.21°	6725.13'	7991.50'
14085'	90.28°	268.33°	6724.33'	8086.49'
14179'	91.45°	268.80°	6722.92'	8180.47'



14274'

90.00°

268.63° 6721.71'

8275.45'

14300

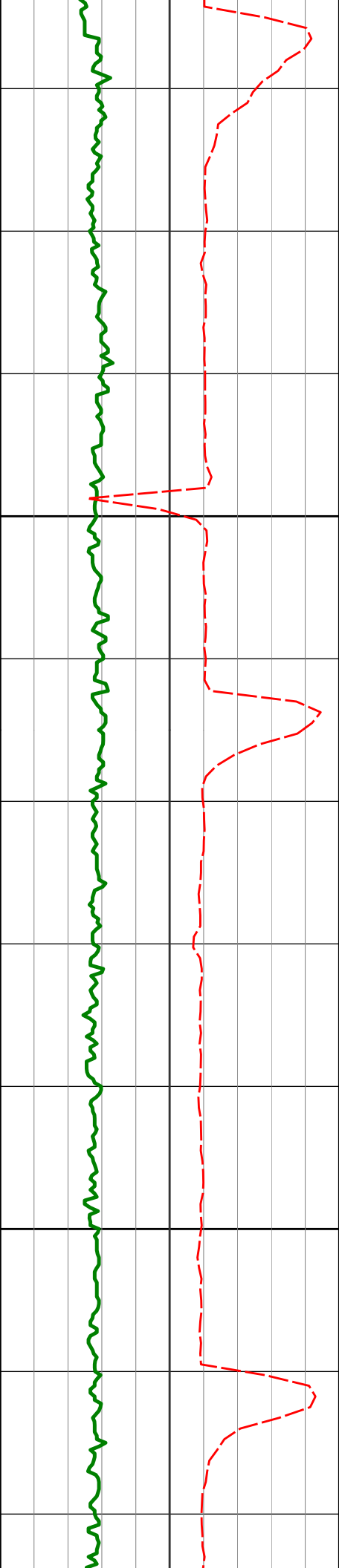
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89.45°

268.40° 6722.17'

8370.44'

14400



14500

14600

14464'

88.70°

268.13° 6723.70'

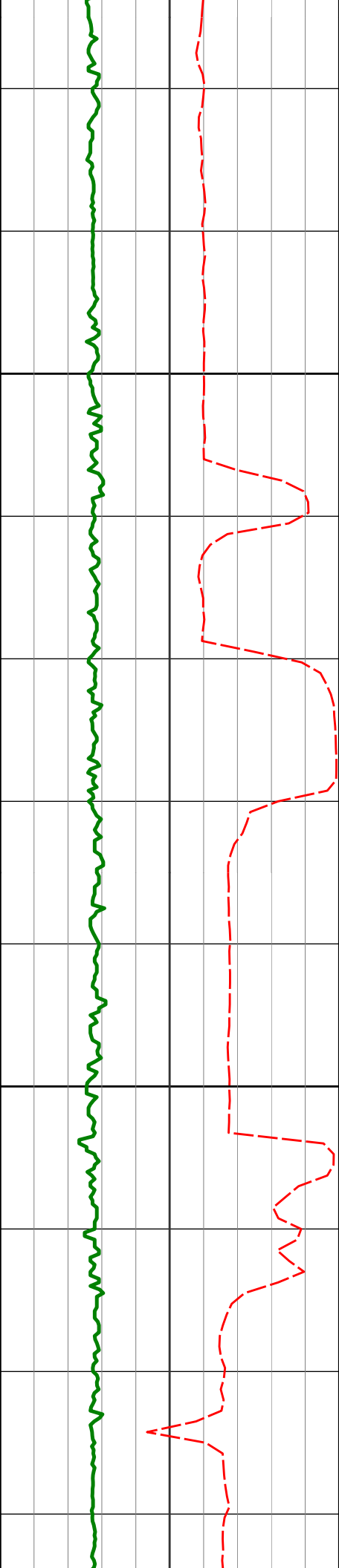
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89.35°

267.92° 6725.32'

8560.41'



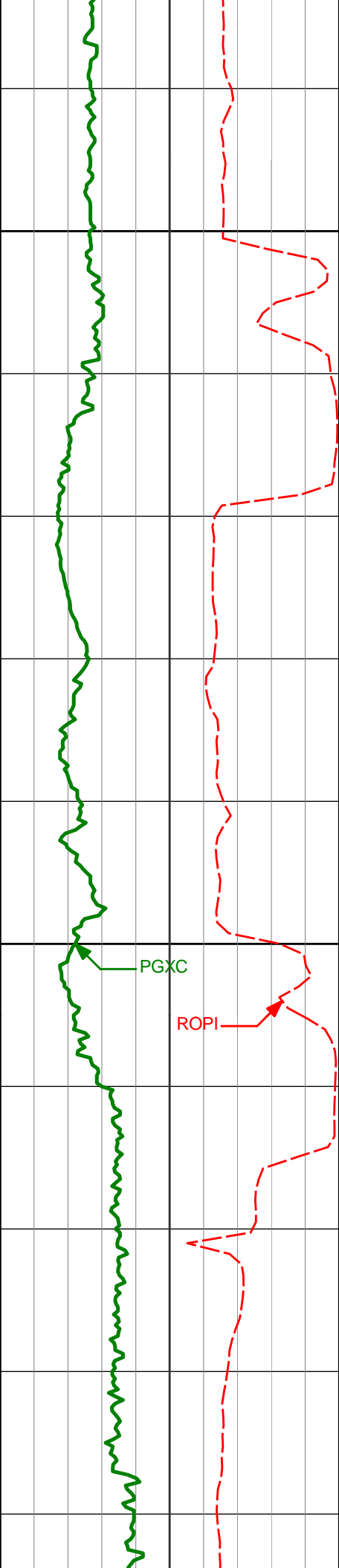
14700

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14748' 89.91° 266.82° 6726.49' 8749.37'

14800

14843' 89.69° 265.81° 6726.82' 8844.33'



14900

14937'

90.06°

266.63° 6727.02'

8938.29'

15000

PGXC

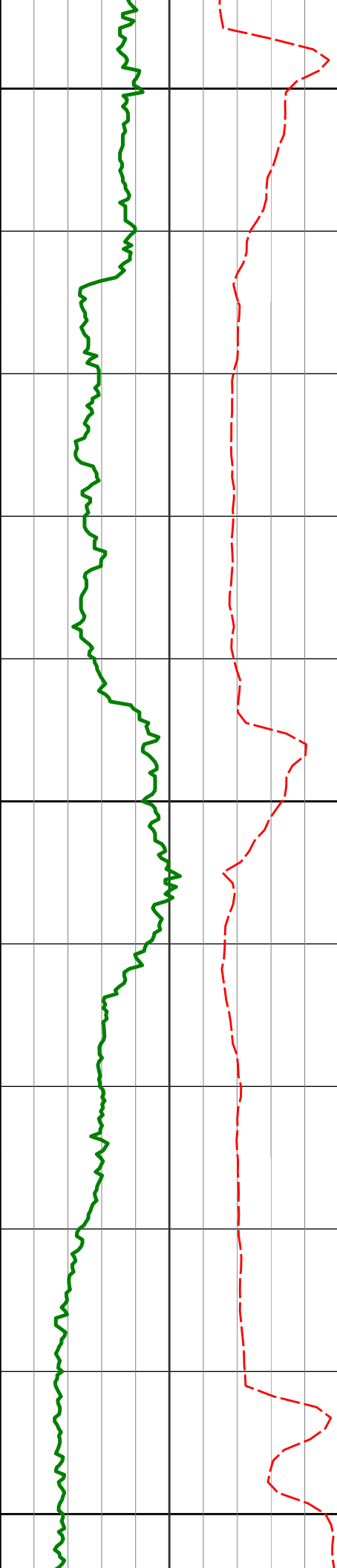
ROPI

15032'

90.56°

269.32° 6726.51'

9033.28'



15100

15127'

90.46°

269.10° 6725.67'

9128.25'

15200

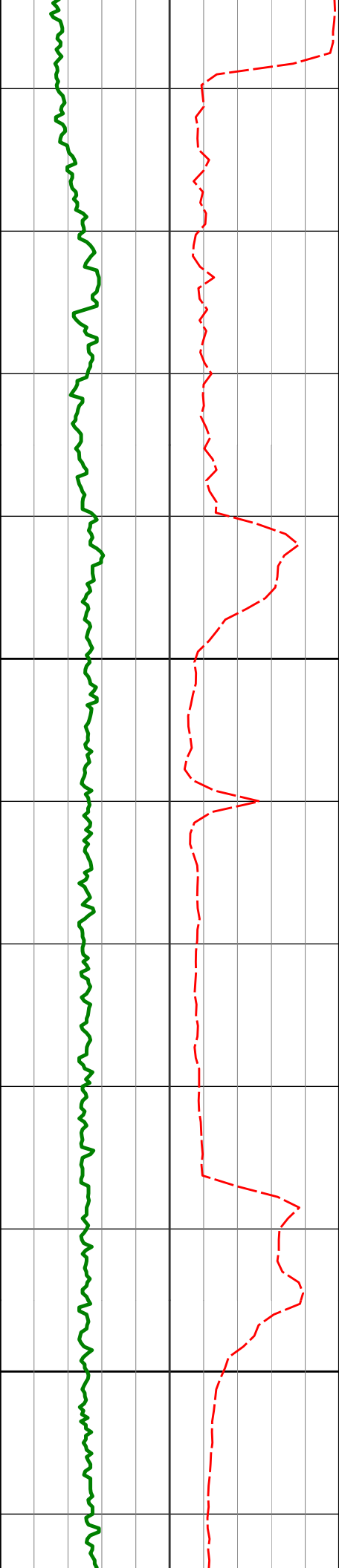
15222'

90.71°

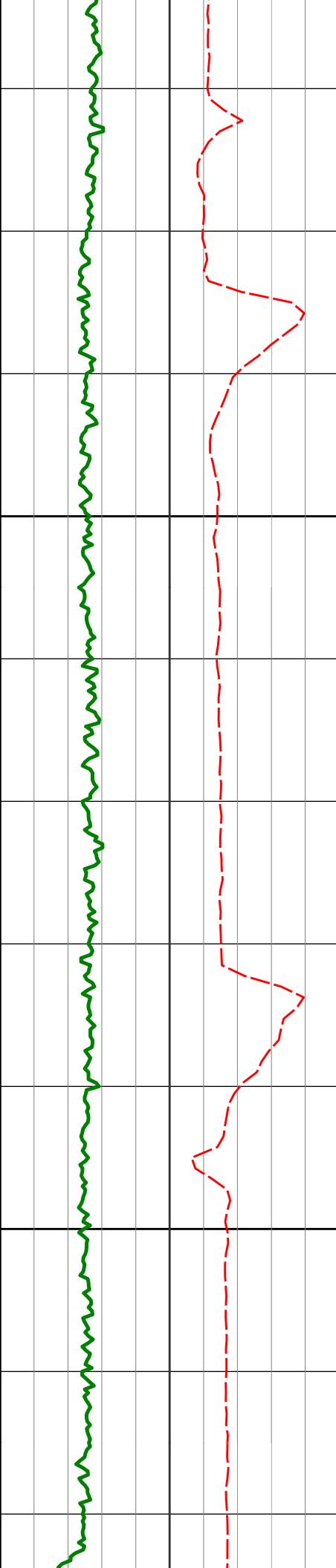
269.53° 6724.70'

9223.22'

15300



15317'	89.01°	269.17°	6724.93'	9318.18'
15400				
15412'	88.33°	268.60°	6727.13'	9413.14'
15500				
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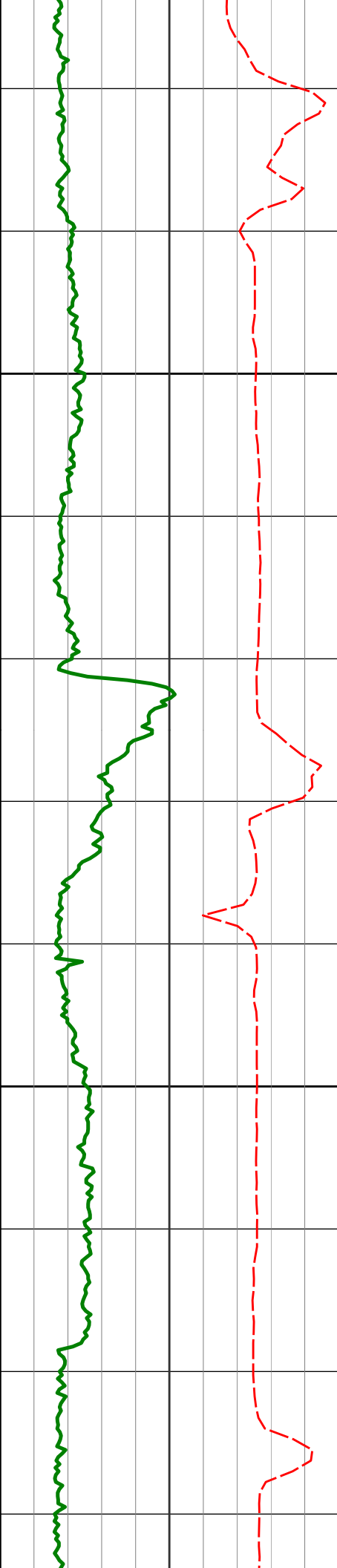


15697'

88.30°

268.55° 6730.71'

9698.03'

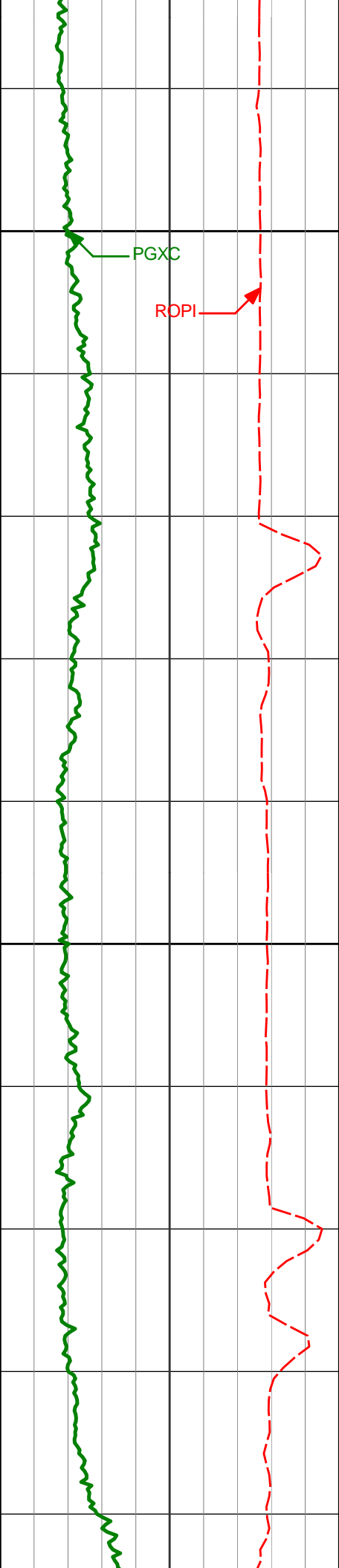


15800

15792' 88.15° 268.70° 6733.66' 9792.97'

15900

15886' 88.80° 269.09° 6736.16' 9886.92'



16000

PGXC

ROPI

16076'

90.12°

269.13° 6737.95'

10076.87'

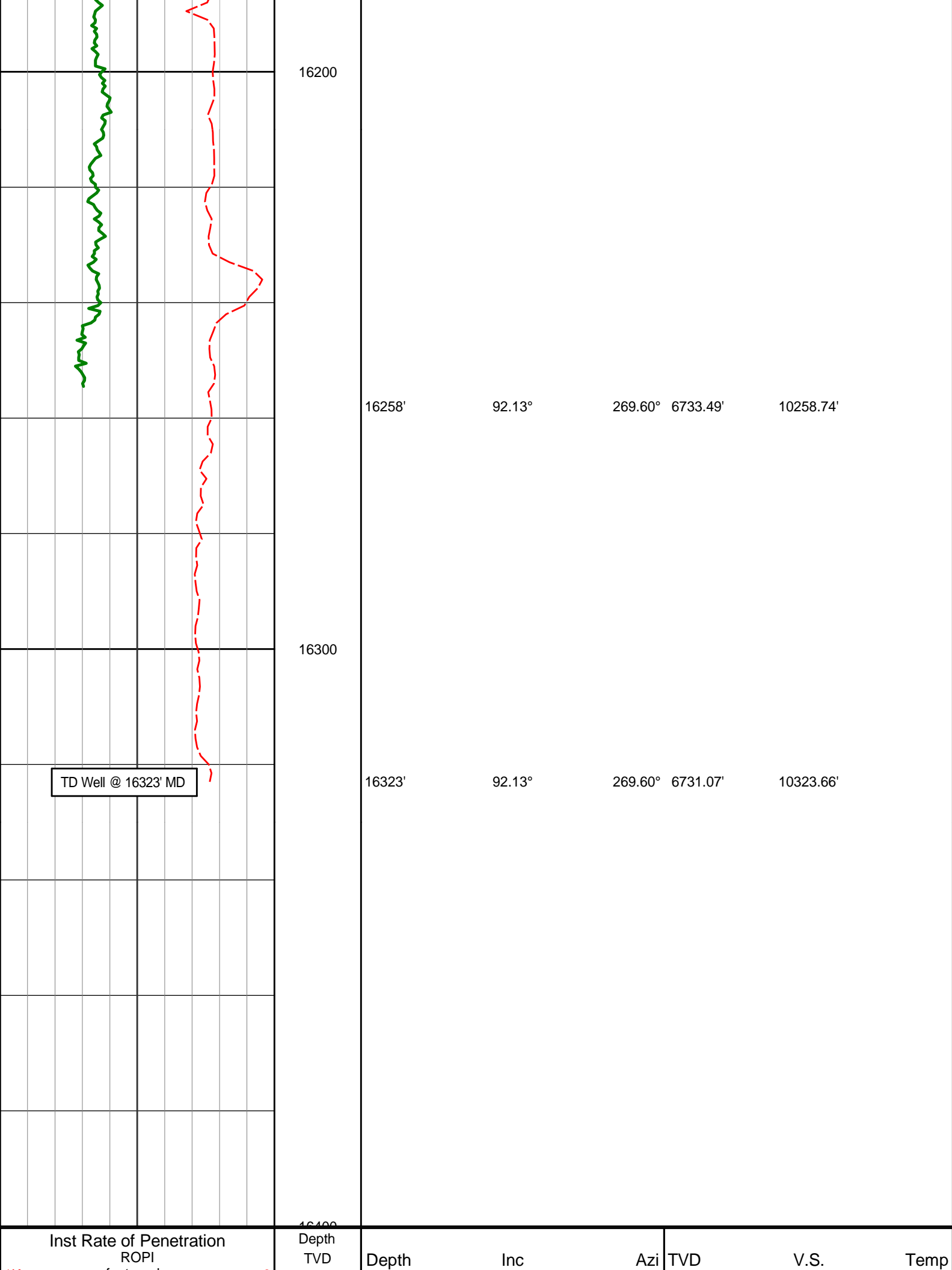
16100

16171'

91.73°

269.37° 6736.42'

10171.82'



TD Well @ 16323' MD

feet per hr	0	ft	
PCG GR XHi-Range RT BCor PGXRC-T api	300		

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
 Colt A13-645
 Wattenberg
 Weld Colorado
 USA
 CA-XX-0902175509
 Tied in @ Surface
 First Three Survey's from 3rd party source (Muulti Shot EMS)
 Final survey projected to bit.

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
268.00	0.40	154.83	268.00	0.85 S	0.40 E	-0.37	0.15
575.00	0.40	95.43	574.99	1.92 S	1.92 E	-1.85	0.13
820.00	1.40	251.13	819.97	2.97 S	0.06 W	0.17	0.72
1016.00	0.37	205.54	1015.95	4.31 S	2.60 W	2.76	0.60
1107.00	0.48	247.98	1106.94	4.72 S	3.08 W	3.25	0.36
1199.00	0.48	232.23	1198.94	5.10 S	3.74 W	3.93	0.14
1382.00	0.87	216.62	1381.93	6.69 S	5.18 W	5.42	0.23
1474.00	0.96	221.83	1473.92	7.82 S	6.11 W	6.39	0.13
1565.00	0.72	211.83	1564.91	8.87 S	6.92 W	7.24	0.31
1657.00	0.56	183.38	1656.90	9.81 S	7.25 W	7.61	0.38
1749.00	0.84	184.28	1748.89	10.94 S	7.32 W	7.73	0.30
1841.00	2.40	245.53	1840.86	12.41 S	9.13 W	9.58	2.31
1933.00	3.18	248.10	1932.75	14.16 S	13.25 W	13.77	0.86
2024.00	3.66	245.45	2023.59	16.30 S	18.23 W	18.83	0.56
2116.00	3.99	243.28	2115.38	18.96 S	23.76 W	24.45	0.39
2209.00	5.60	243.60	2208.05	22.44 S	30.72 W	31.53	1.73
2301.00	6.92	243.20	2299.50	26.93 S	39.69 W	40.66	1.44
2395.00	8.45	252.68	2392.66	31.54 S	51.33 W	52.47	2.11
2490.00	8.88	252.03	2486.58	35.88 S	64.97 W	66.26	0.46
2585.00	9.61	249.90	2580.34	40.87 S	79.39 W	80.86	0.85
2679.00	8.93	249.03	2673.11	46.18 S	93.58 W	95.23	0.74
2774.00	9.86	252.78	2766.84	51.22 S	108.23 W	110.06	1.17
2869.00	10.21	252.62	2860.39	56.15 S	124.04 W	126.04	0.37
2964.00	9.98	250.10	2953.92	61.46 S	139.81 W	142.00	0.52
3058.00	9.64	248.86	3046.54	67.07 S	154.81 W	157.20	0.43
3153.00	9.00	246.34	3140.29	72.92 S	169.04 W	171.63	0.80
3248.00	8.07	243.37	3234.23	78.90 S	181.80 W	184.61	1.08
3342.00	7.70	245.28	3327.35	84.49 S	193.42 W	196.43	0.48
3437.00	8.62	246.45	3421.38	89.99 S	205.73 W	208.93	0.98
3531.00	8.36	254.47	3514.36	94.64 S	218.77 W	222.14	1.29
3626.00	9.84	263.39	3608.16	97.42 S	233.49 W	236.95	2.15
3721.00	10.95	266.88	3701.60	98.85 S	250.56 W	254.07	1.34
3815.00	10.60	264.73	3793.95	100.13 S	268.09 W	271.62	0.57
3910.00	10.88	262.39	3887.28	102.12 S	285.68 W	289.27	0.55
4005.00	10.48	263.65	3980.64	104.26 S	303.15 W	306.82	0.49
4100.00	9.42	261.01	4074.21	106.43 S	319.42 W	323.15	1.21
4194.00	9.76	265.67	4166.89	108.23 S	334.96 W	338.75	0.90
4289.00	8.57	271.26	4260.68	108.69 S	350.07 W	353.86	1.56
4384.00	8.25	265.19	4354.66	109.10 S	363.93 W	367.74	0.99
4479.00	9.17	263.88	4448.56	110.48 S	378.25 W	382.10	0.99
4574.00	10.44	255.60	4542.18	113.43 S	394.12 W	398.06	1.99
4668.00	8.89	254.10	4634.84	117.54 S	409.35 W	413.44	1.67
4763.00	6.94	258.10	4728.93	120.73 S	422.03 W	426.23	2.13
4858.00	6.86	242.23	4823.25	124.56 S	432.67 W	437.00	2.00
4952.00	6.17	243.33	4916.65	129.44 S	442.15 W	446.65	0.75

5047.00	5.49	244.14	5011.16	133.71 S	450.80 W	455.46	0.72
5141.00	2.62	265.62	5104.92	135.84 S	456.99 W	461.72	3.40
5236.00	1.79	276.60	5199.84	135.84 S	460.63 W	465.36	0.98
5330.00	0.45	155.88	5293.83	136.00 S	461.94 W	466.67	2.19
5425.00	0.87	55.70	5388.83	135.94 S	461.19 W	465.92	1.10
5520.00	0.94	45.74	5483.81	134.99 S	460.04 W	464.73	0.18
5614.00	0.68	29.44	5577.80	133.96 S	459.21 W	463.87	0.37
5709.00	1.42	176.84	5672.80	134.65 S	458.87 W	463.55	2.13
5803.00	1.85	194.47	5766.76	137.28 S	459.18 W	463.97	0.70
5898.00	1.39	228.23	5861.72	139.53 S	460.42 W	465.29	1.09
5993.00	0.65	262.13	5956.71	140.37 S	461.82 W	466.72	0.97
6088.00	1.11	279.47	6051.70	140.30 S	463.26 W	468.15	0.55
6135.00	5.23	259.59	6098.61	140.61 S	465.82 W	470.72	8.94
6183.00	9.01	261.38	6146.24	141.57 S	471.69 W	476.62	7.89
6277.00	16.87	274.07	6237.79	141.70 S	492.61 W	497.53	8.84
6372.00	25.07	274.54	6326.43	139.13 S	526.48 W	531.28	8.63
6420.00	27.47	274.66	6369.47	137.42 S	547.65 W	552.38	5.00
6467.00	30.92	269.32	6410.50	136.69 S	570.54 W	575.23	9.19
6515.00	33.84	265.50	6451.03	137.88 S	596.20 W	600.92	7.43
6562.00	37.19	265.77	6489.28	139.96 S	623.42 W	628.20	7.14
6610.00	42.28	264.34	6526.18	142.62 S	653.98 W	658.83	10.77
6657.00	47.85	263.67	6559.37	146.10 S	687.06 W	692.01	11.89
6705.00	55.01	263.48	6589.27	150.30 S	724.32 W	729.41	14.92
6752.00	60.07	267.08	6614.50	153.53 S	763.83 W	769.00	12.55
6800.00	63.82	270.40	6637.07	154.44 S	806.16 W	811.34	9.91
6847.00	69.21	271.40	6655.80	153.75 S	849.24 W	854.37	11.63
6895.00	75.93	268.57	6670.17	153.79 S	895.01 W	900.11	15.09
6942.00	81.93	267.17	6679.19	155.51 S	941.08 W	946.21	13.10
6992.00	85.71	267.84	6684.57	157.67 S	990.73 W	995.91	7.68
7121.00	87.07	268.47	6692.69	161.81 S	1119.41 W	1124.65	1.16
7216.00	88.83	269.28	6696.09	163.68 S	1214.32 W	1219.57	2.04
7311.00	88.37	269.01	6698.41	165.09 S	1309.28 W	1314.52	0.56
7406.00	88.61	269.35	6700.92	166.45 S	1404.24 W	1409.46	0.44
7501.00	90.40	269.05	6701.74	167.78 S	1499.22 W	1504.42	1.91
7595.00	90.06	268.44	6701.36	169.84 S	1593.20 W	1598.41	0.74
7690.00	89.66	267.77	6701.59	172.98 S	1688.15 W	1693.41	0.82
7785.00	89.45	267.33	6702.33	177.04 S	1783.06 W	1788.41	0.51
7880.00	90.71	267.64	6702.20	181.21 S	1877.96 W	1883.40	1.37
7974.00	91.26	267.36	6700.58	185.31 S	1971.86 W	1977.39	0.66
8069.00	91.97	267.05	6697.91	189.94 S	2066.71 W	2072.34	0.82
8164.00	90.92	268.29	6695.51	193.80 S	2161.60 W	2167.31	1.71
8259.00	89.97	268.81	6694.77	196.20 S	2256.56 W	2262.30	1.14
8353.00	88.27	268.33	6696.22	198.55 S	2350.52 W	2356.27	1.88
8448.00	88.46	268.44	6698.93	201.23 S	2445.44 W	2451.23	0.23
8543.00	88.27	268.43	6701.64	203.82 S	2540.37 W	2546.19	0.20
8638.00	90.65	268.61	6702.53	206.27 S	2635.32 W	2641.17	2.51
8733.00	90.83	268.18	6701.31	208.93 S	2730.28 W	2736.16	0.49
8828.00	90.55	268.85	6700.16	211.40 S	2825.24 W	2831.14	0.76
8922.00	89.88	268.23	6699.81	213.79 S	2919.21 W	2925.14	0.97
9017.00	88.92	267.10	6700.80	217.66 S	3014.12 W	3020.13	1.56
9112.00	89.20	267.11	6702.36	222.46 S	3108.99 W	3115.11	0.29
9206.00	89.32	267.63	6703.58	226.77 S	3202.88 W	3209.09	0.57
9302.00	89.20	268.23	6704.82	230.24 S	3298.81 W	3305.09	0.64
9396.00	89.26	268.73	6706.08	232.73 S	3392.77 W	3399.07	0.54
9491.00	89.38	269.41	6707.21	234.27 S	3487.75 W	3494.04	0.73
9586.00	90.06	270.29	6707.67	234.52 S	3582.74 W	3588.98	1.17
9681.00	88.31	267.87	6709.02	236.05 S	3677.71 W	3683.94	3.14
9776.00	89.66	269.08	6710.71	238.58 S	3772.66 W	3778.92	1.91
9871.00	89.23	268.48	6711.63	240.60 S	3867.63 W	3873.90	0.78
9965.00	90.43	268.86	6711.90	242.78 S	3961.60 W	3967.89	1.34
10057.00	89.08	267.84	6712.30	245.43 S	4053.56 W	4059.88	1.84
10150.00	89.11	267.57	6713.77	249.15 S	4146.48 W	4152.87	0.29
10243.00	90.28	269.27	6714.26	251.72 S	4239.43 W	4245.86	2.22
10334.00	89.32	268.45	6714.58	253.53 S	4330.41 W	4336.84	1.39
10426.00	90.09	268.66	6715.05	255.85 S	4422.38 W	4428.84	0.87
10518.00	90.06	267.97	6714.93	258.55 S	4514.34 W	4520.83	0.75
10610.00	89.72	266.71	6715.11	262.82 S	4606.24 W	4612.83	1.42
10701.00	89.60	267.57	6715.65	267.36 S	4697.12 W	4703.82	0.95
10792.00	90.28	267.59	6715.74	271.20 S	4788.04 W	4794.81	0.75
10884.00	90.09	266.76	6715.45	275.74 S	4879.93 W	4886.81	0.93
10976.00	90.92	269.04	6714.64	279.11 S	4971.86 W	4978.80	2.64
11068.00	91.17	269.82	6712.96	280.03 S	5063.84 W	5070.75	0.89
11252.00	89.63	270.20	6711.67	279.99 S	5247.83 W	5254.61	0.86
11344.00	89.82	270.44	6712.12	279.48 S	5339.82 W	5346.52	0.33
11436.00	89.26	269.76	6712.85	279.22 S	5431.82 W	5438.45	0.86

11436.00	89.26	269.76	6712.83	279.32 S	5431.82 W	5436.43	0.96
11528.00	89.23	269.77	6714.07	279.70 S	5523.81 W	5530.39	0.03
11620.00	90.12	270.54	6714.59	279.45 S	5615.81 W	5622.31	1.28
11714.00	90.12	270.20	6714.39	278.84 S	5709.81 W	5716.22	0.36
11808.00	89.69	270.25	6714.55	278.47 S	5803.80 W	5810.14	0.46
11903.00	89.63	270.89	6715.11	277.53 S	5898.80 W	5905.04	0.68
11998.00	89.14	271.61	6716.13	275.45 S	5993.77 W	5999.87	0.92
12093.00	89.69	270.41	6717.10	273.78 S	6088.75 W	6094.72	1.39
12187.00	89.91	268.33	6717.43	274.81 S	6182.74 W	6188.68	2.23
12283.00	89.85	268.87	6717.63	277.16 S	6278.71 W	6284.67	0.57
12377.00	89.78	269.47	6717.93	278.52 S	6372.70 W	6378.64	0.64
12472.00	89.75	268.41	6718.32	280.28 S	6467.68 W	6473.63	1.12
12567.00	90.09	269.31	6718.46	282.17 S	6562.66 W	6568.61	1.01
12662.00	90.18	267.72	6718.23	284.63 S	6657.62 W	6663.60	1.68
12757.00	90.00	267.71	6718.08	288.42 S	6752.55 W	6758.60	0.19
12852.00	89.72	268.15	6718.32	291.85 S	6847.48 W	6853.60	0.55
12946.00	89.51	267.91	6718.95	295.08 S	6941.43 W	6947.60	0.34
13041.00	90.74	268.77	6718.74	297.83 S	7036.38 W	7042.59	1.58
13136.00	88.92	268.38	6719.02	300.20 S	7131.35 W	7137.58	1.96
13231.00	89.57	269.03	6720.27	302.34 S	7226.32 W	7232.56	0.97
13326.00	89.41	268.14	6721.12	304.69 S	7321.28 W	7327.55	0.95
13421.00	89.94	268.03	6721.66	307.86 S	7416.23 W	7422.54	0.57
13515.00	89.91	267.79	6721.78	311.29 S	7510.16 W	7516.54	0.26
13705.00	89.04	267.49	6723.52	319.11 S	7699.99 W	7706.53	0.48
13800.00	88.74	267.24	6725.36	323.48 S	7794.87 W	7801.51	0.41
13895.00	90.43	268.31	6726.05	327.17 S	7889.80 W	7896.50	2.11
13990.00	90.68	268.21	6725.13	330.05 S	7984.75 W	7991.50	0.28
14085.00	90.28	268.33	6724.33	332.92 S	8079.70 W	8086.49	0.44
14179.00	91.45	268.80	6722.92	335.28 S	8173.66 W	8180.47	1.34
14274.00	90.00	268.63	6721.71	337.41 S	8268.62 W	8275.45	1.54
14369.00	89.45	268.40	6722.17	339.87 S	8363.59 W	8370.44	0.63
14464.00	88.70	268.13	6723.70	342.74 S	8458.53 W	8465.43	0.84
14559.00	89.35	267.92	6725.32	346.02 S	8553.46 W	8560.41	0.72
14653.00	89.66	266.27	6726.13	350.78 S	8647.34 W	8654.40	1.79
14748.00	89.91	266.82	6726.49	356.51 S	8742.16 W	8749.37	0.64
14843.00	89.69	265.81	6726.82	362.61 S	8836.96 W	8844.33	1.09
14937.00	90.06	266.63	6727.02	368.81 S	8930.76 W	8938.29	0.96
15032.00	90.56	269.32	6726.51	372.16 S	9025.69 W	9033.28	2.88
15127.00	90.46	269.10	6725.67	373.47 S	9120.68 W	9128.25	0.25
15222.00	90.71	269.53	6724.70	374.61 S	9215.66 W	9223.22	0.52
15317.00	89.01	269.17	6724.93	375.69 S	9310.65 W	9318.18	1.83
15412.00	88.33	268.60	6727.13	377.54 S	9405.61 W	9413.14	0.93
15507.00	90.25	269.79	6728.31	378.87 S	9500.59 W	9508.10	2.38
15697.00	88.30	268.55	6730.71	381.62 S	9690.54 W	9698.03	1.22
15792.00	88.15	268.70	6733.66	383.90 S	9785.46 W	9792.97	0.22
15886.00	88.80	269.09	6736.16	385.71 S	9879.41 W	9886.92	0.81
16076.00	90.12	269.13	6737.95	388.66 S	10069.38 W	10076.87	0.70
16171.00	91.73	269.37	6736.42	389.91 S	10164.35 W	10171.82	1.71
16258.00	92.13	269.60	6733.49	390.69 S	10251.30 W	10258.74	0.53
16323.00	92.13	269.60	6731.07	391.14 S	10316.25 W	10323.66	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 267.87 DEGREES (GRID)
A TOTAL CORRECTION OF 7.43 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16323.00 FEET
IS 10323.67 FEET ALONG 267.83 DEGREES (GRID)**