



1 : 600 / 1 : 240

| WELL INFORMATION | | | | | |
|----------------------------------|------------------|------------------|--|--|--|
| MWD Run Number | 100 | 200 | | | |
| Date run completed | 25-Dec-15 | 28-Dec-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) | 624.00 | 6,367.00 | | | |
| Log End Depth (MD, ft) | 6,367.00 | 10,283.00 | | | |
| Drill or Wipe | Drill | Drill | | | |
| Drill/Wipe Start Date and Time | 24-Dec-15 21:45 | 27-Dec-15 03:00 | | | |
| Drill/Wipe End Date and Time | 25-Dec-15 17:00 | 28-Dec-15 02:00 | | | |
| Min Inc (deg) @ Depth (MD, ft) | 0.07 @ 948.00 | 86.55 @ 6,437.00 | | | |
| Max Inc (deg) @ Depth (MD, ft) | 84.32 @ 6,311.00 | 93.21 @ 9,832.00 | | | |
| Bit TFA(in2) / Bit Type | 1.04 / PDC | 0.65 / PDC | | | |
| Flow Rate (gpm) | 590.84 | 313.38 | | | |
| 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) | 10.20 / 34.00 | 10.20 / 37.00 | | | |
| Filtrate CL (ppm) | 1,200.00 | 1,600.00 | | | |
| pH / Fluid Loss (mptm) | 6.00 / 22 | 10.60 / 87 | | | |
| PV (cP) / YP (lbf2) | 12 / 7.00 | 8 / 11.00 | | | |
| % Solids / % Sand | 11 / .01 | 7.7 / .10 | | | |
| % 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 | 125.50 / PCM | 210.44 / PCM | | | |

| | | | | | |
|-------------------------------|--------------|--------------|--|--|--|
| Max Tool Temp (degF) / Source | 165.58 / PCM | 218.14 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Lead MWD Engineer | Brian Neu | Brian Neu | | | |
| Customer Representative | Bryant Dear | Bryant Dear | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.93 | 5.93 | | | |
| Sub Serial Number | 11404299 | 12310753 | | | |
| Insert Serial Number | 11145577 | 11400950 | | | |
| Date and Time Initialized | 24-Dec-15 10:45 | 26-Dec-15 17:09 | | | |
| Date and Time Read | 25-Dec-15 20:47 | 28-Dec-15 08:55 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 56.00 | 67.00 | | | |
| Software Version | 6.33 | 6.33 | | | |
| Sub Serial Number | 11404299 | 12310753 | | | |
| Sonde Serial Number | 11902176 | 12174582 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 65.80 | 72.00 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 49.20 | 60.12 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11404299 | 12310753 | | | |
| Insert/Sonde Serial Number | 11681003 | 11579843 | | | |

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depths 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. Environmental parameters used in gamma and resistance processing:

Hole Size:

8.750" 644ft -6452ft

6.125" 6452ft-10680ft

Mud Density:

8.7-10.6ppg

5. The following smoothing parameters have been applied to the data:

1:600 (2"):

Interval: 1.0 ft

Coercion Distance: 3.0 ft (ROPA)

Interval: 1.0 ft

Coercion Distance: 3.0 ft (Gamma Ray)

1:240 (5")

Interval: 0.5 ft

Coercion Distance: 1.2 ft (ROPA)

Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

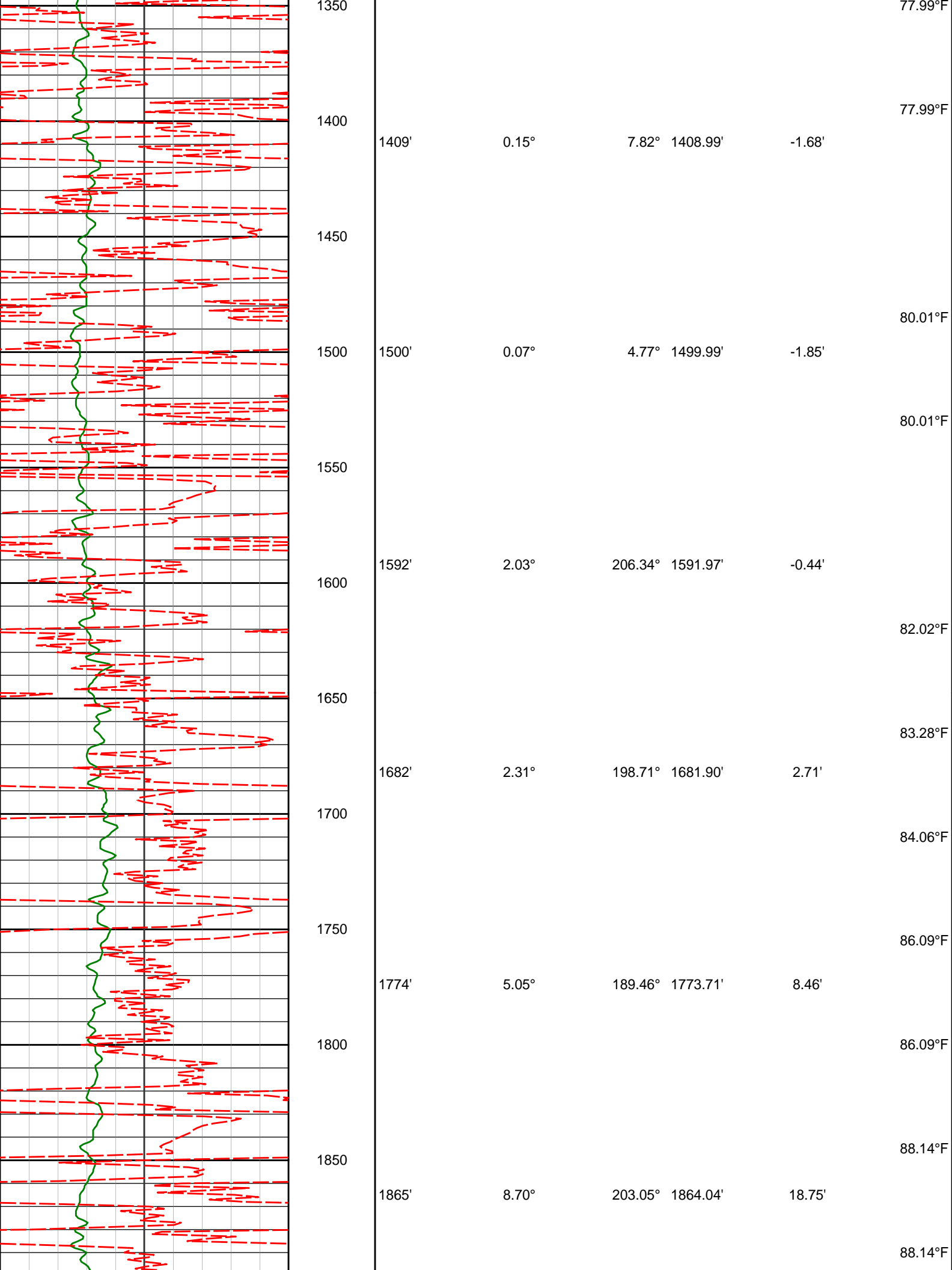
WARRANTY

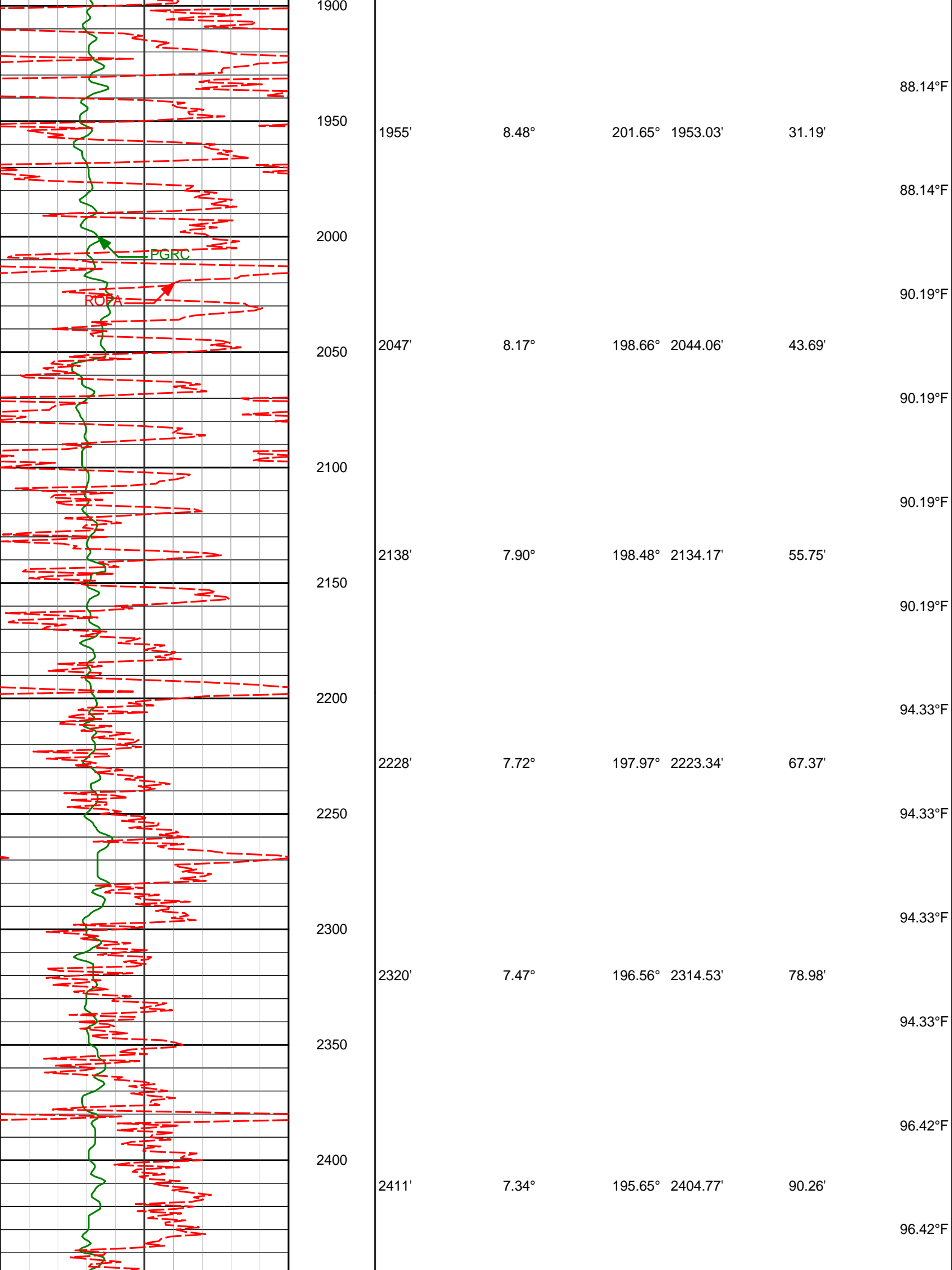
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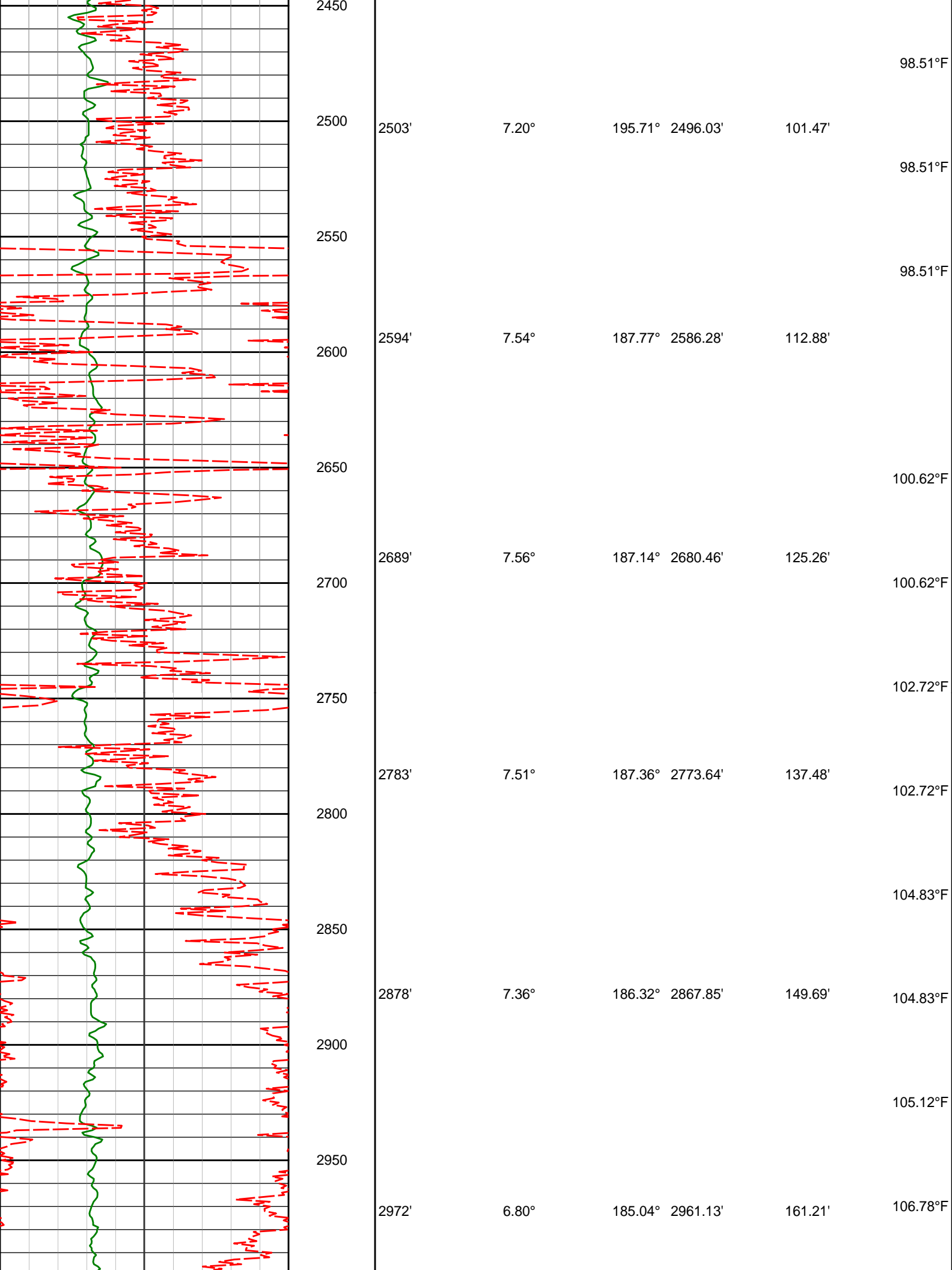
MD Detail 1:600 Scale

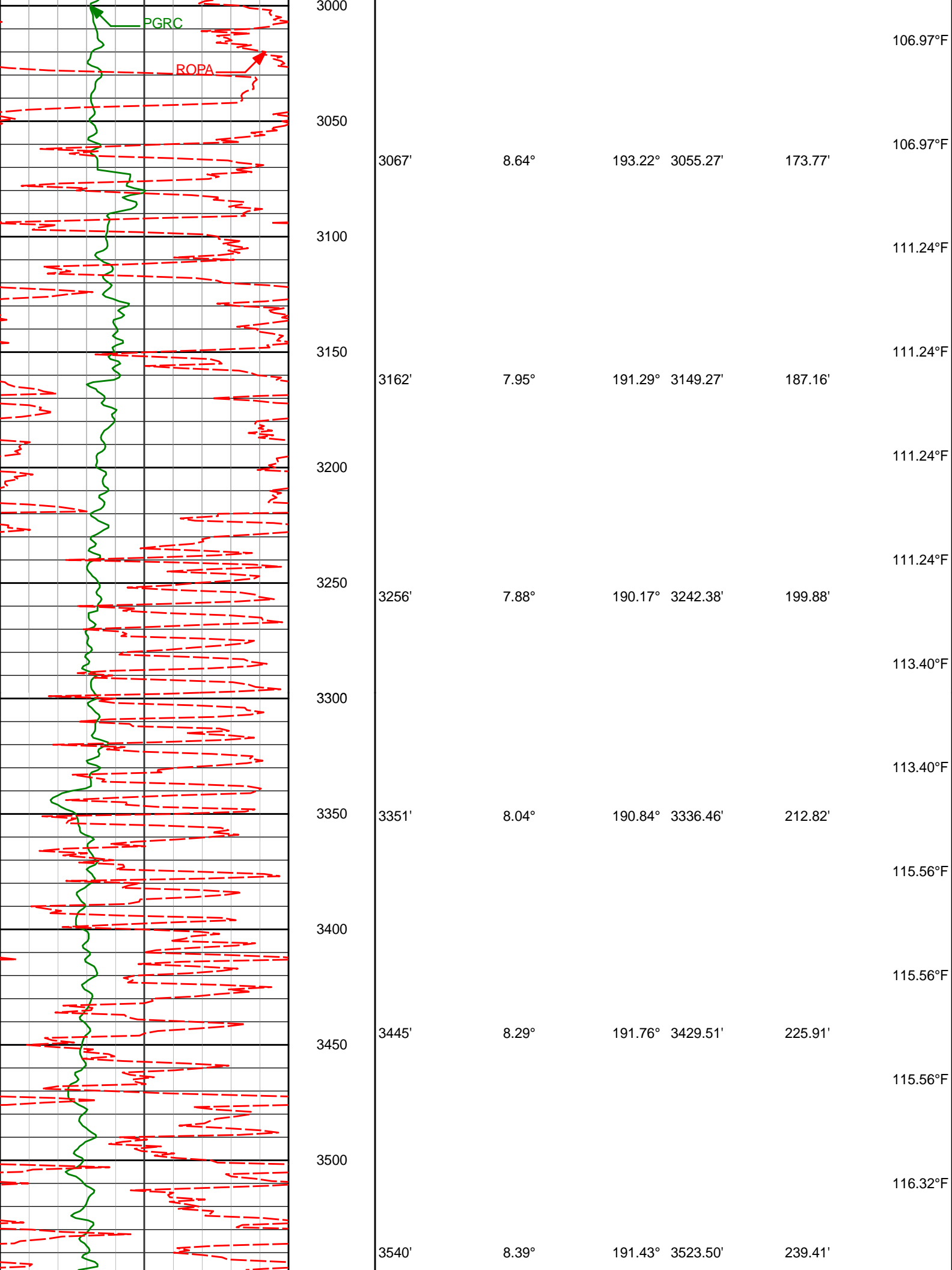


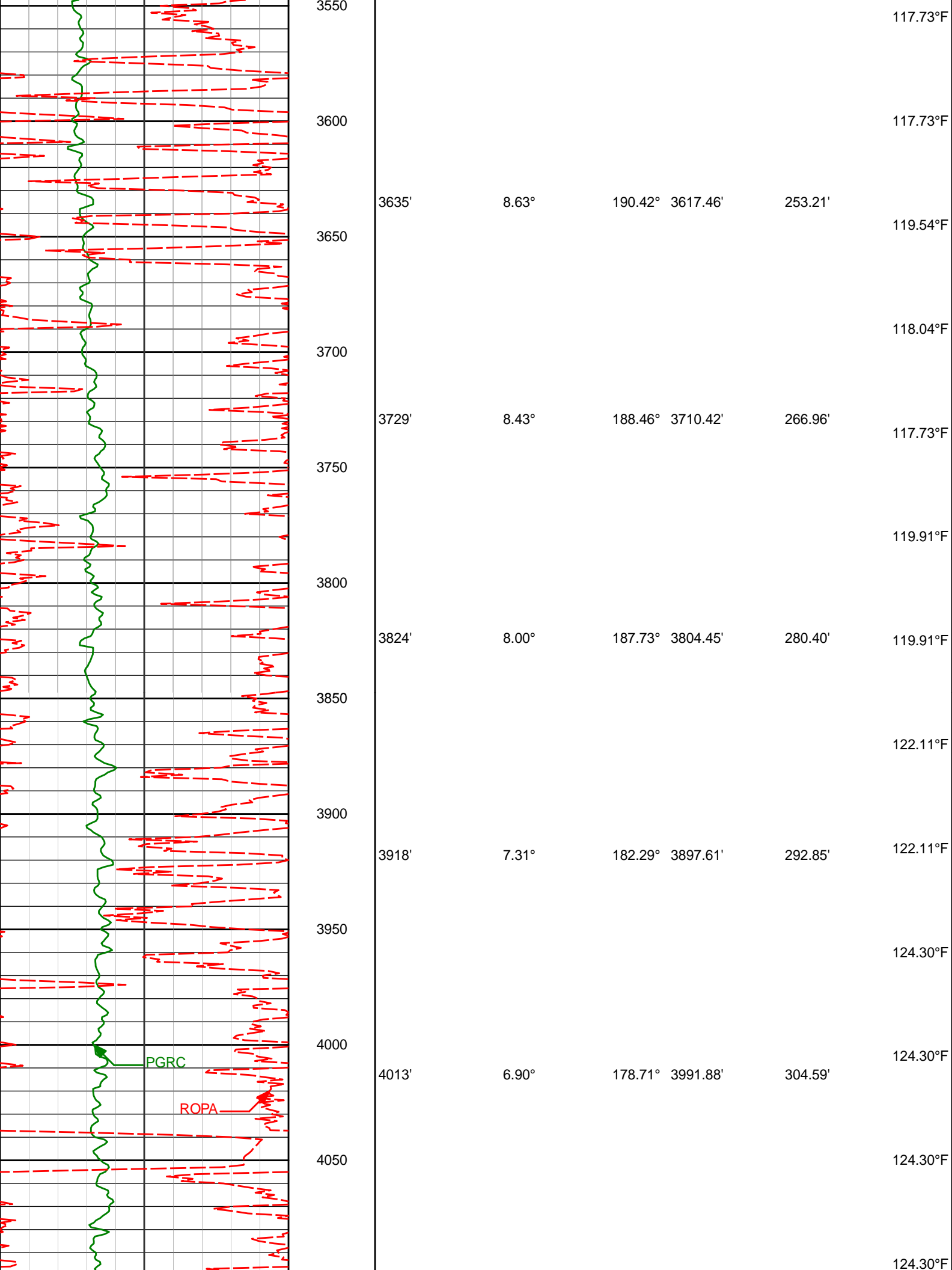


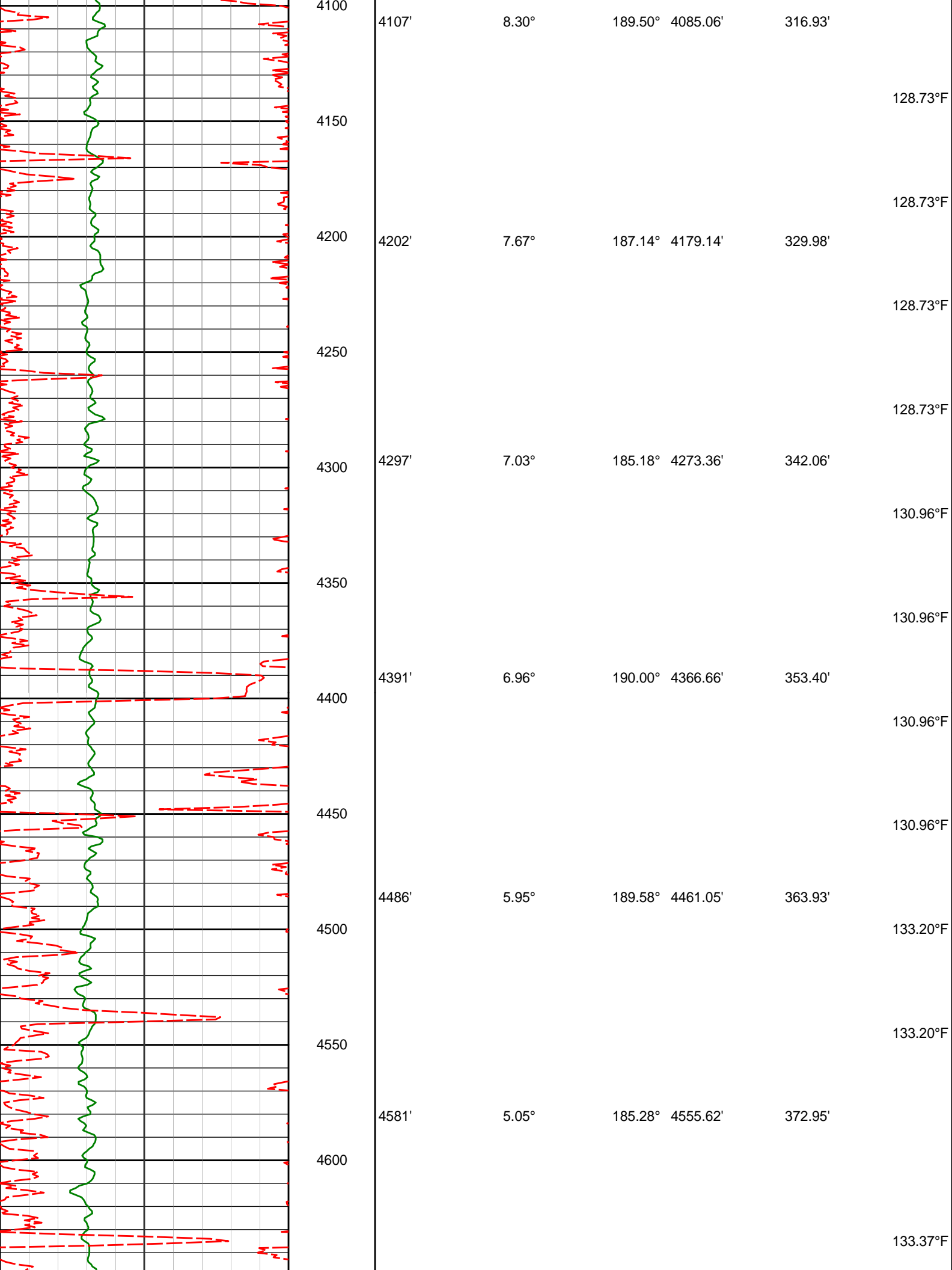


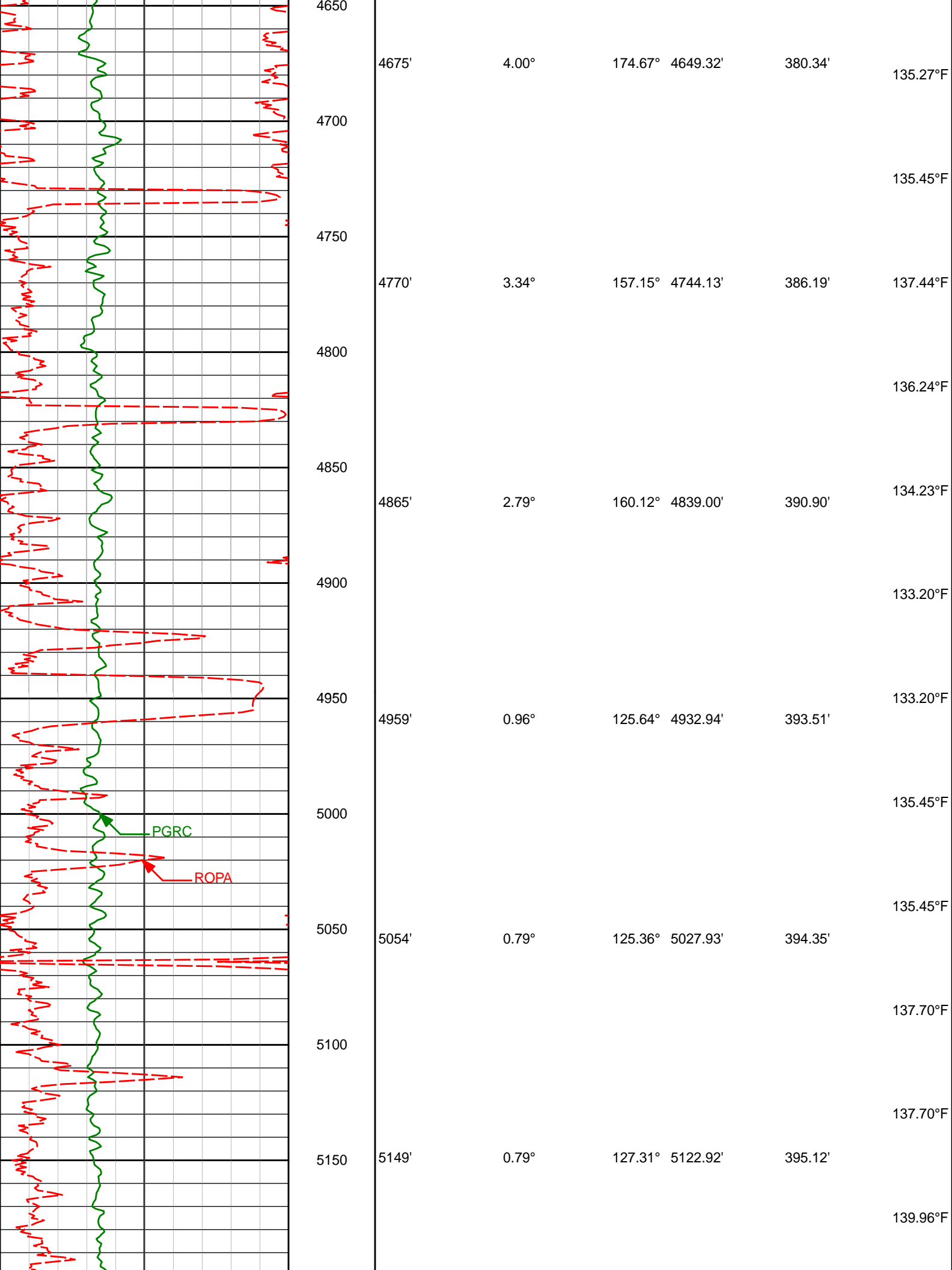


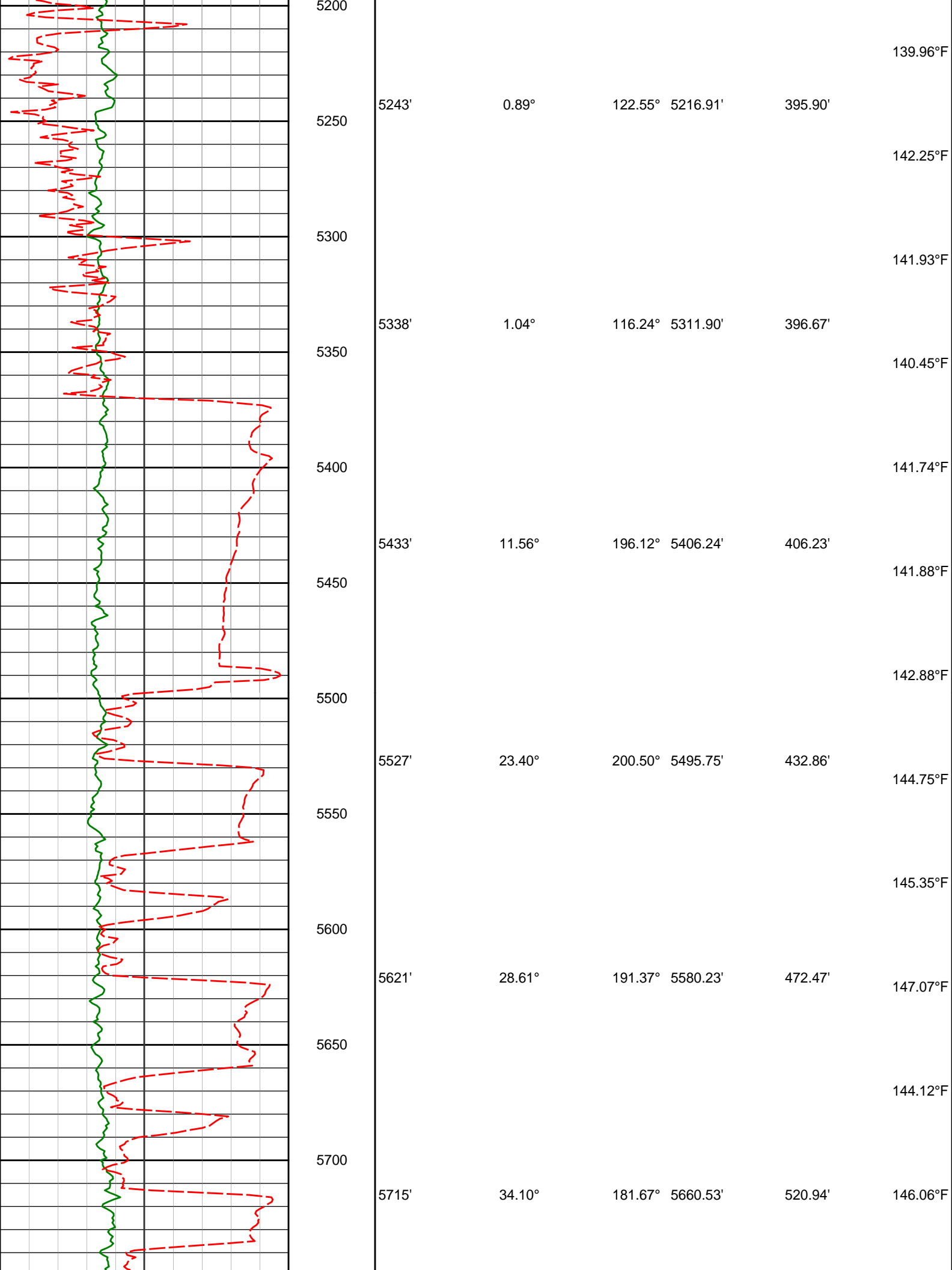


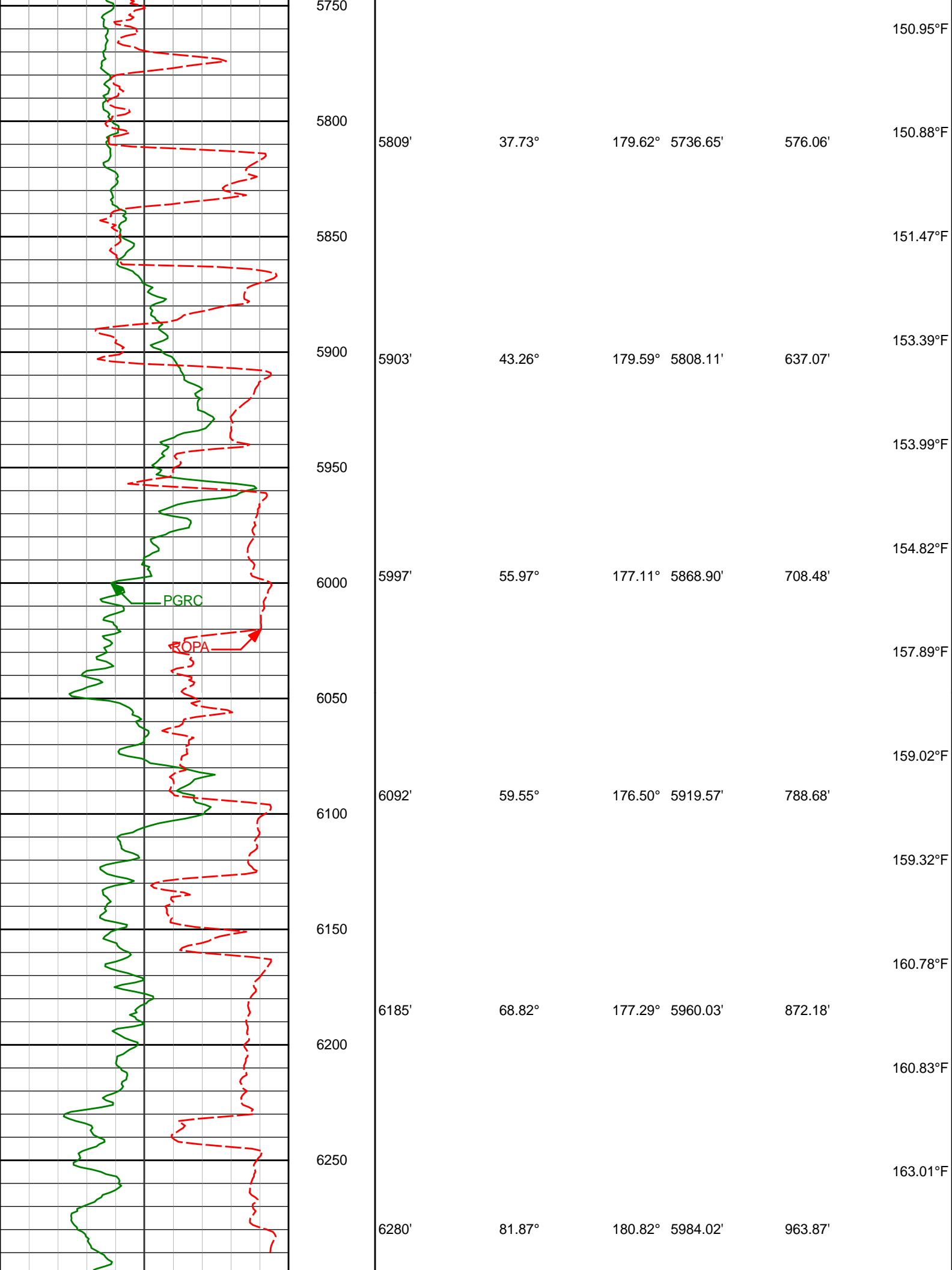


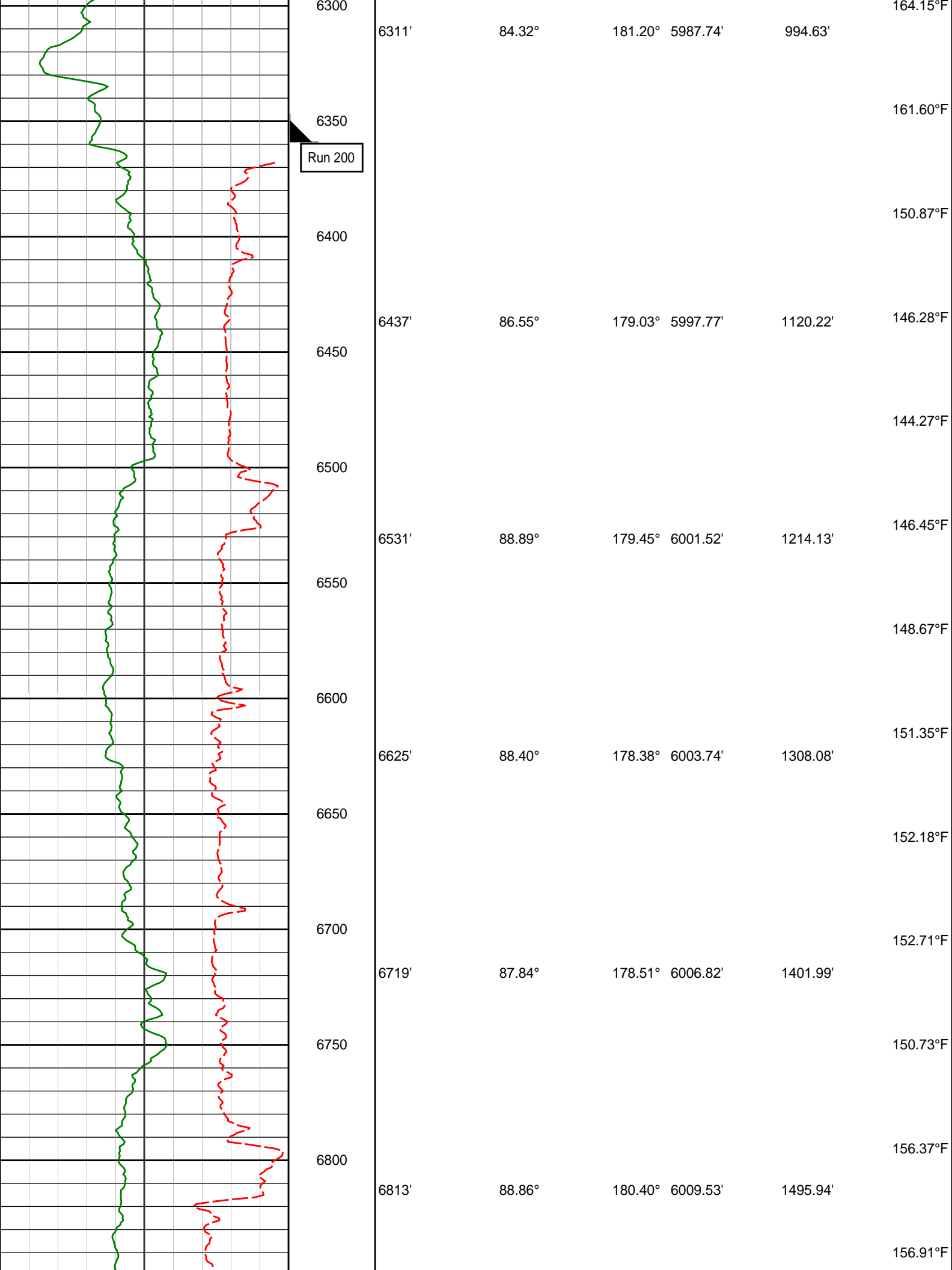


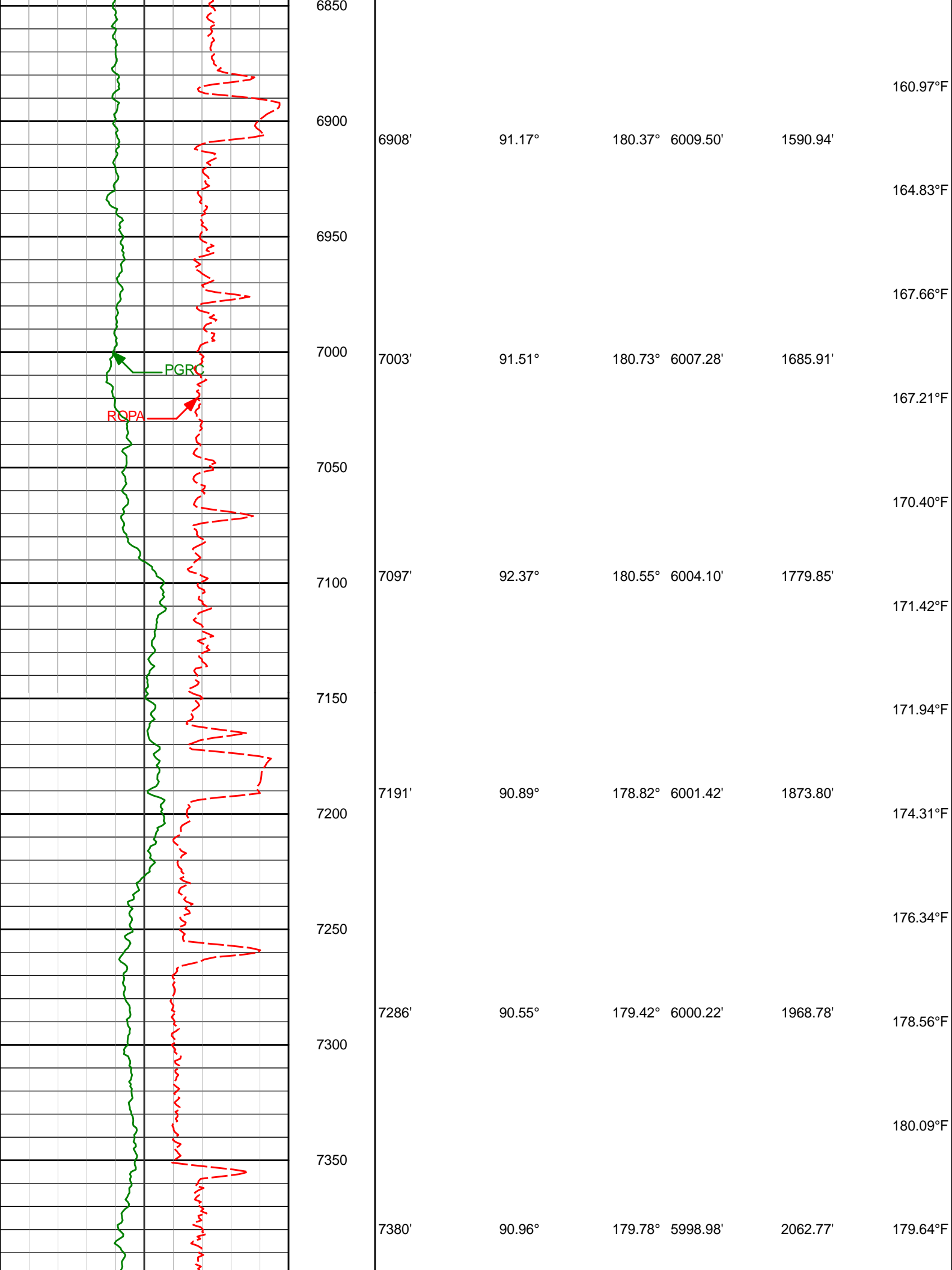


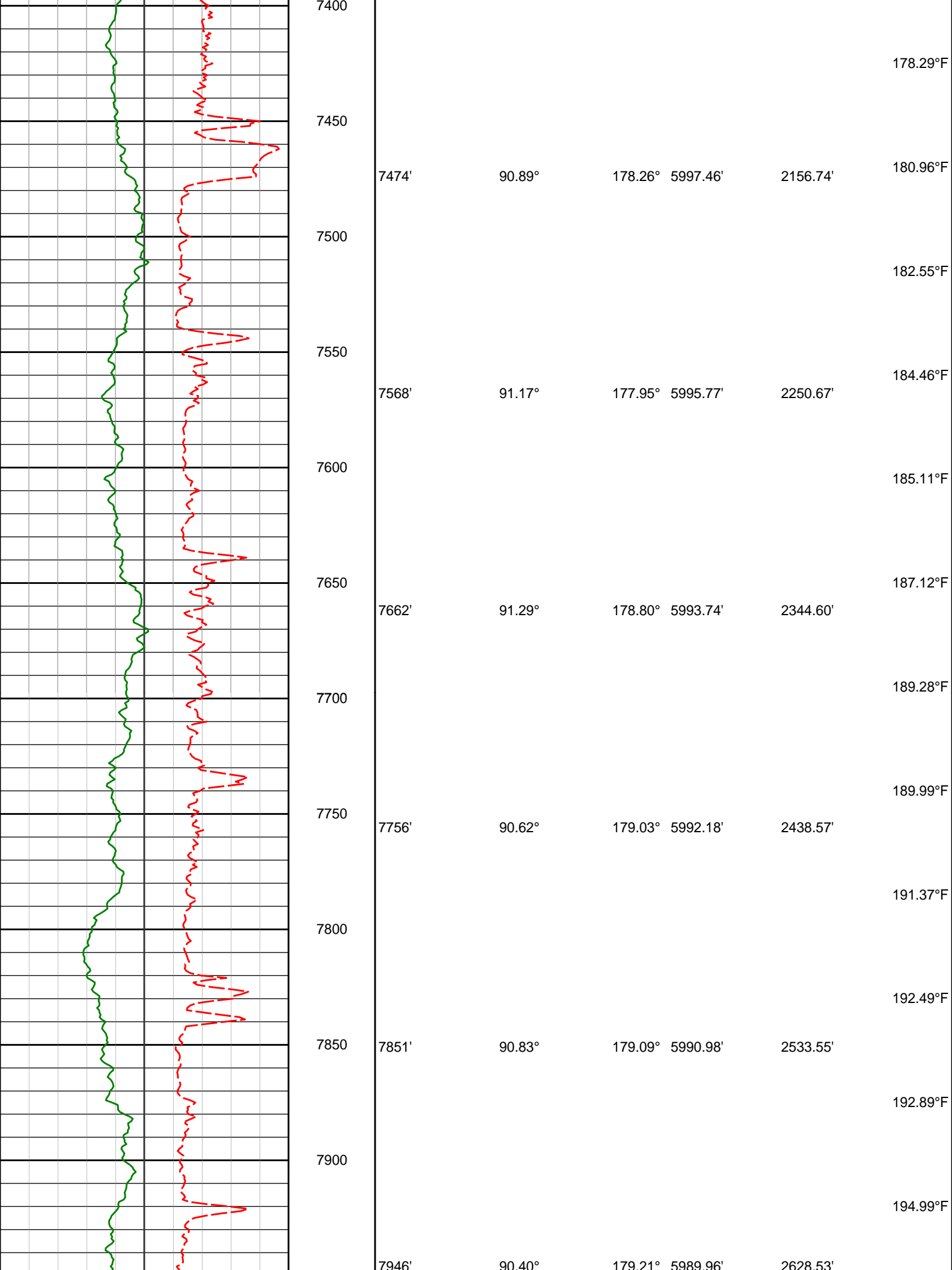


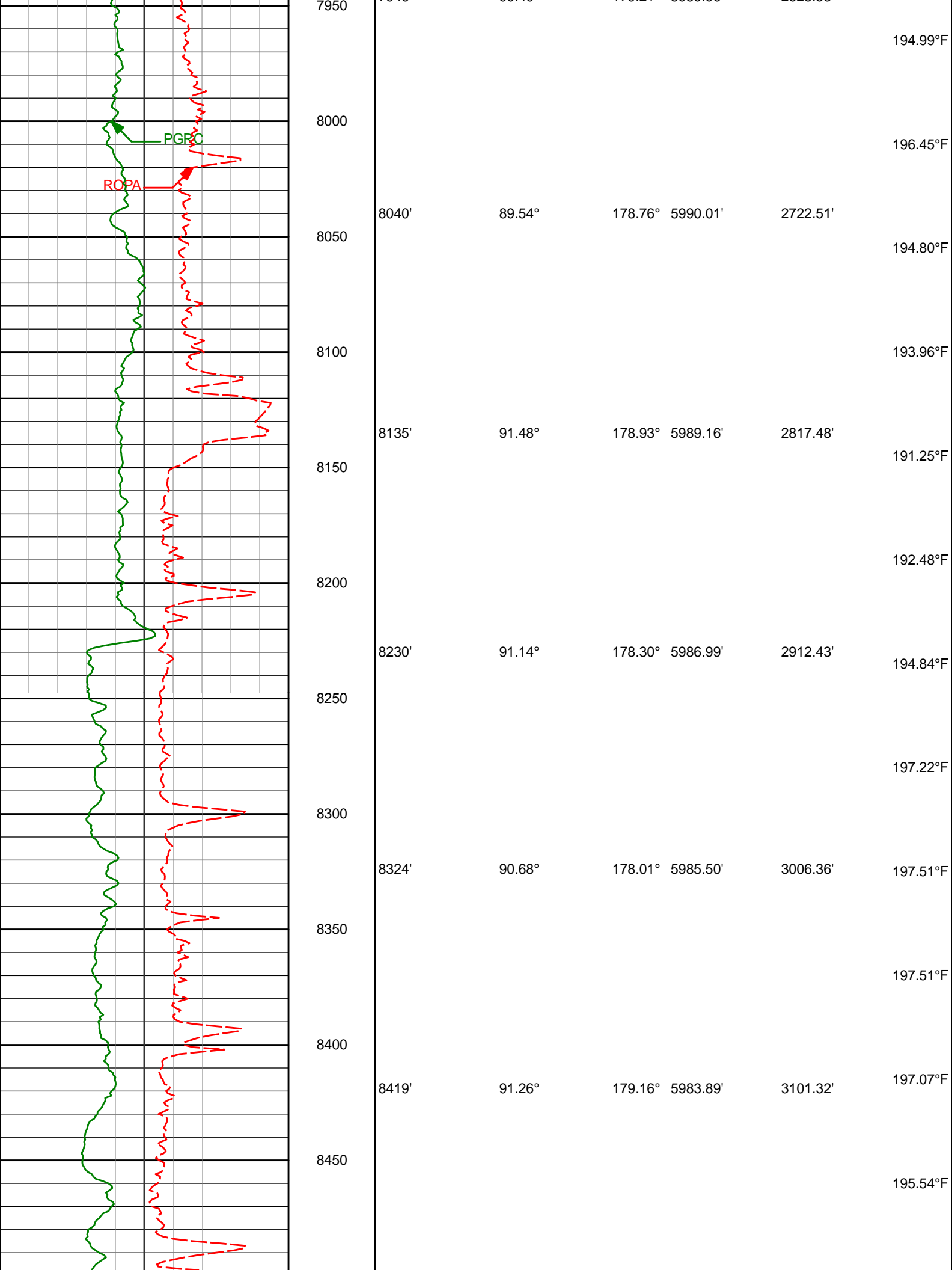


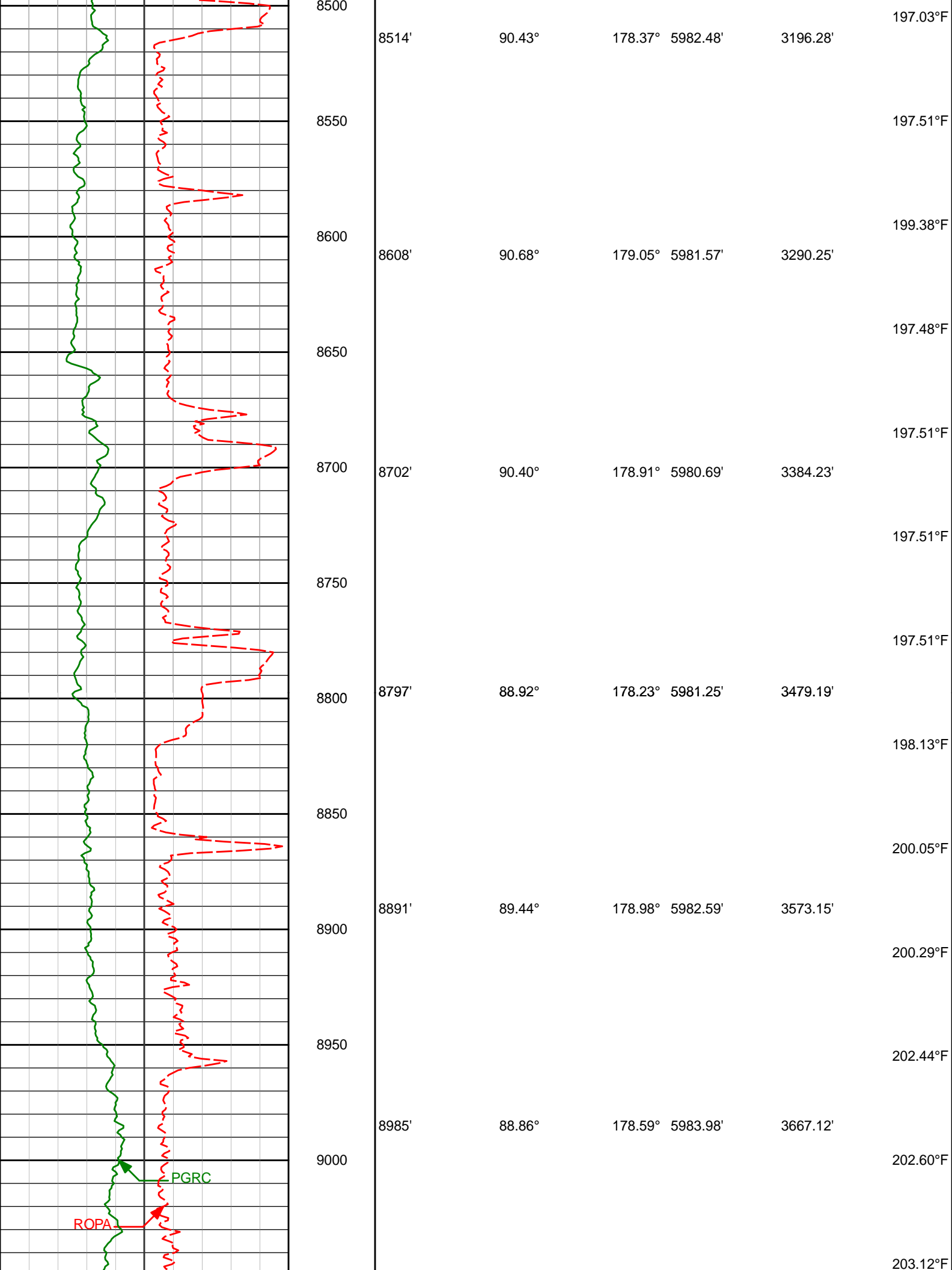


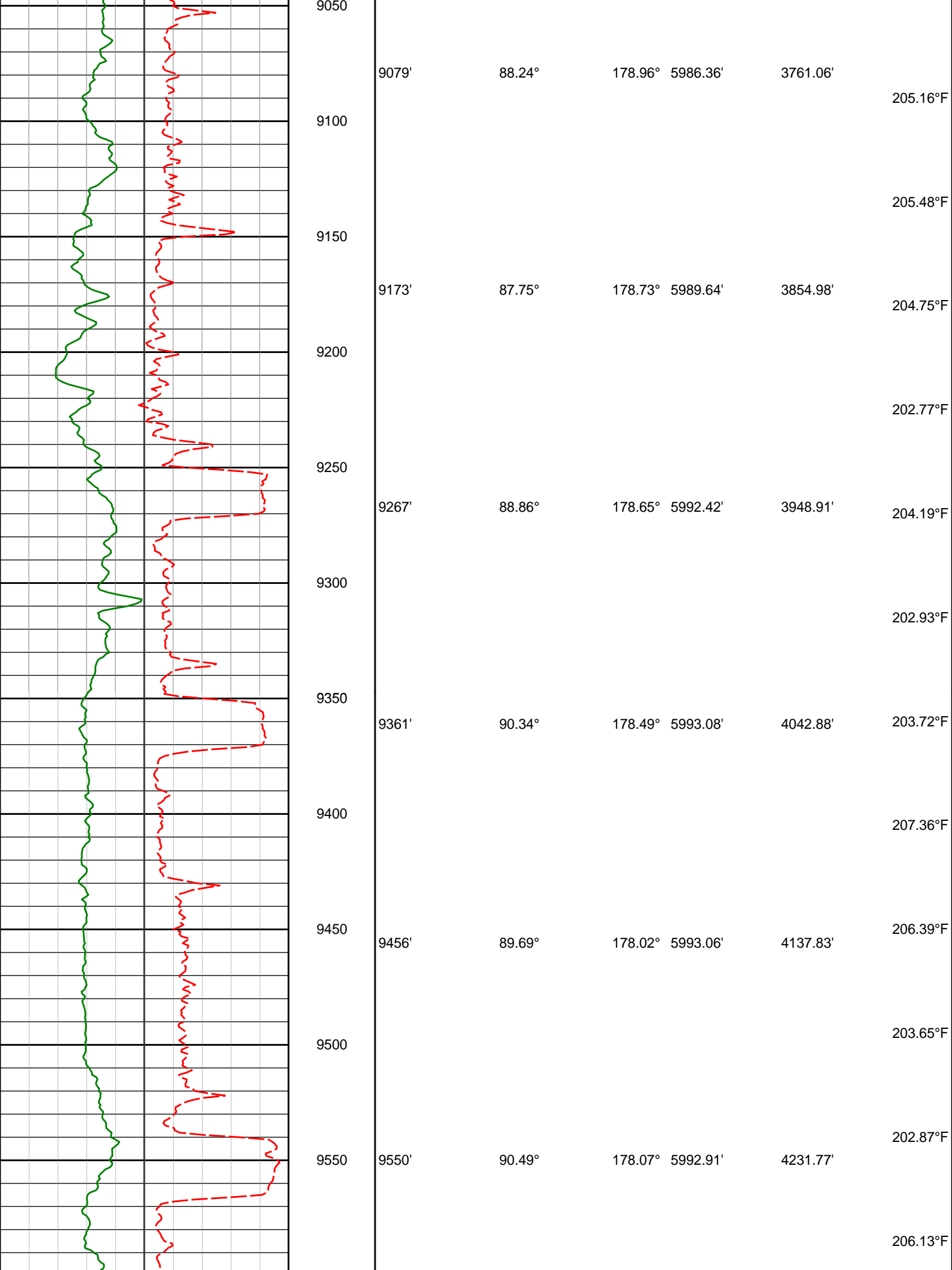


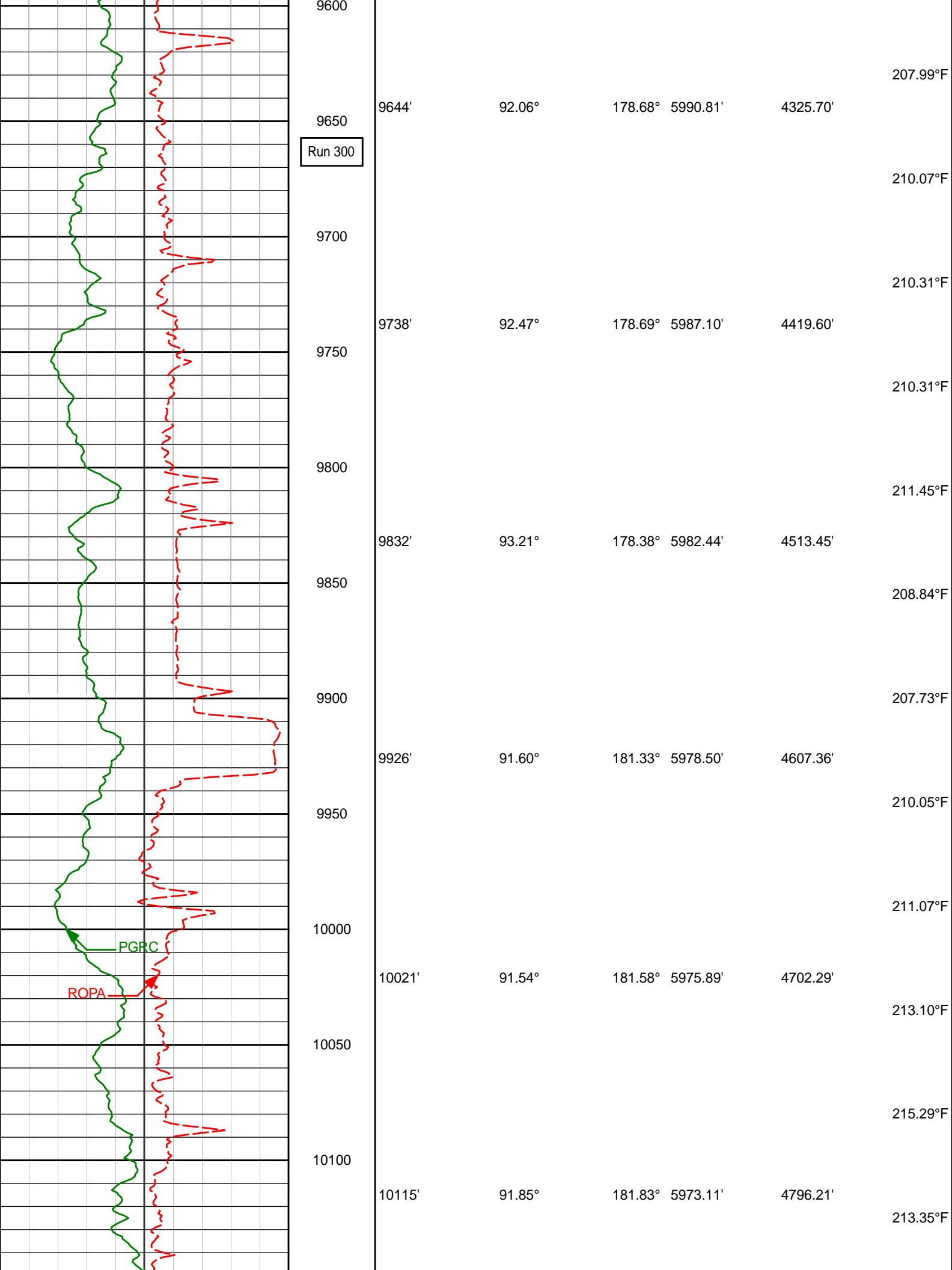


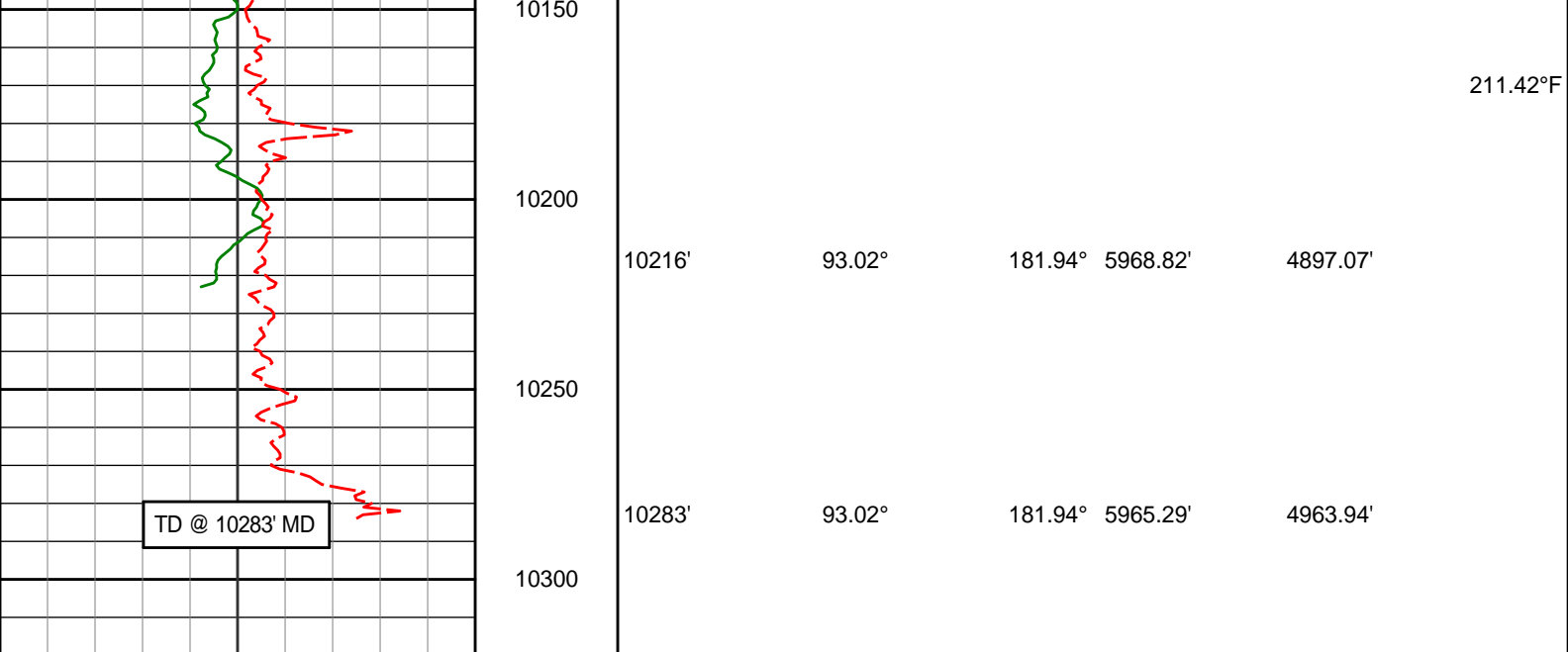






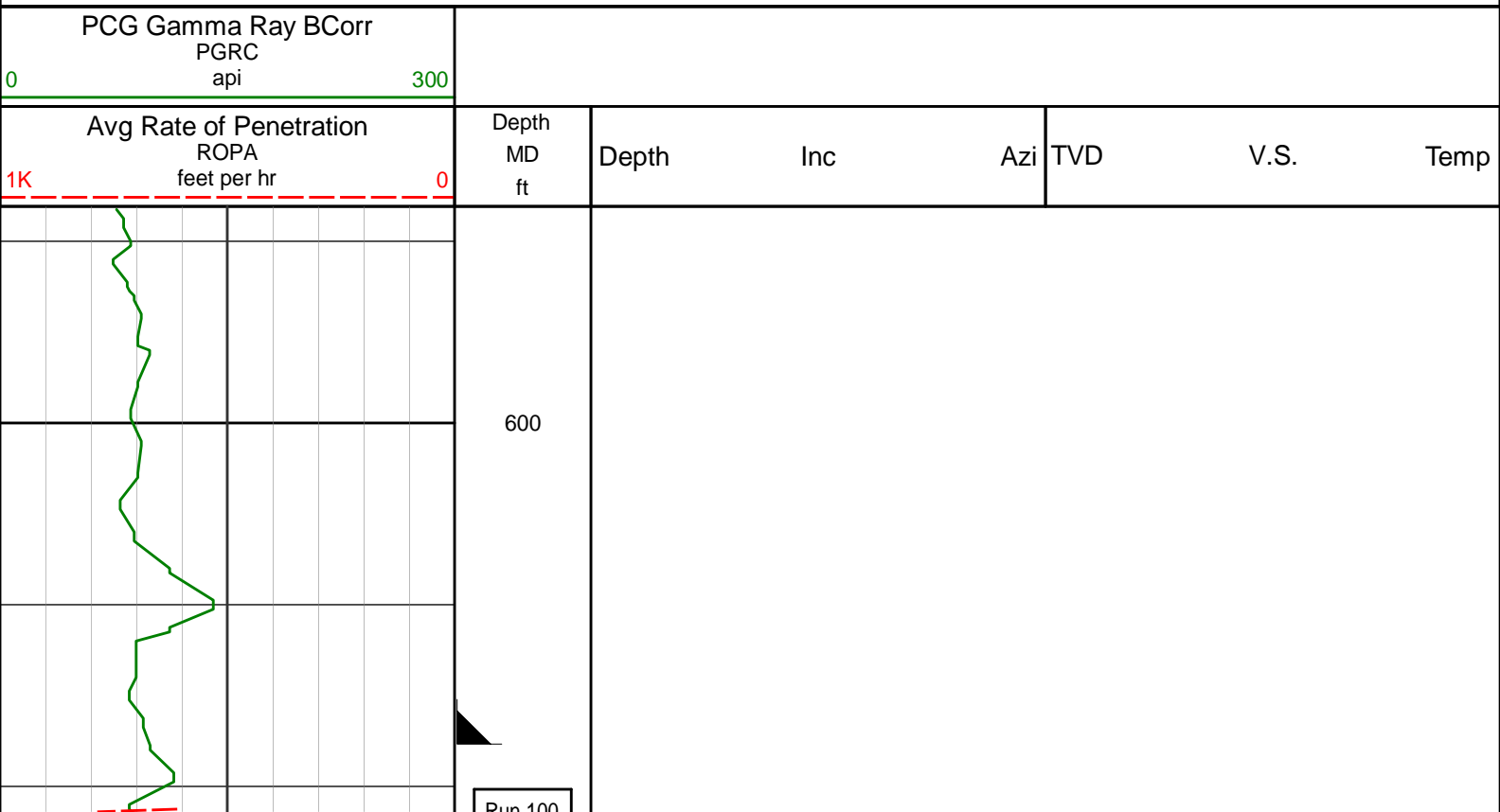


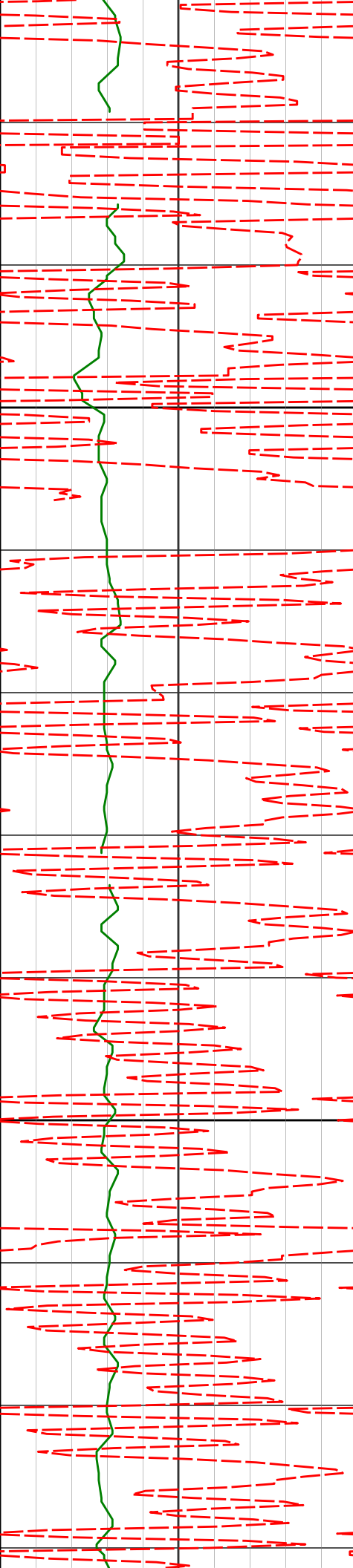




| | | | | | | | |
|--|-------------------|-------|-----|-----|-----|------|------|
| Avg Rate of Penetration ROPA feet per hr | Depth MD ft | Depth | Inc | Azi | TVD | V.S. | Temp |
| 1K 0 | | | | | | | |
| PCG Gamma Ray BCorr PGRC api | | | | | | | |
| 0 300 | | | | | | | |

MD Detail 1:240 Scale





Run 100

664' 0.44° 71.73° 663.99' -0.80'

700

72.00°F

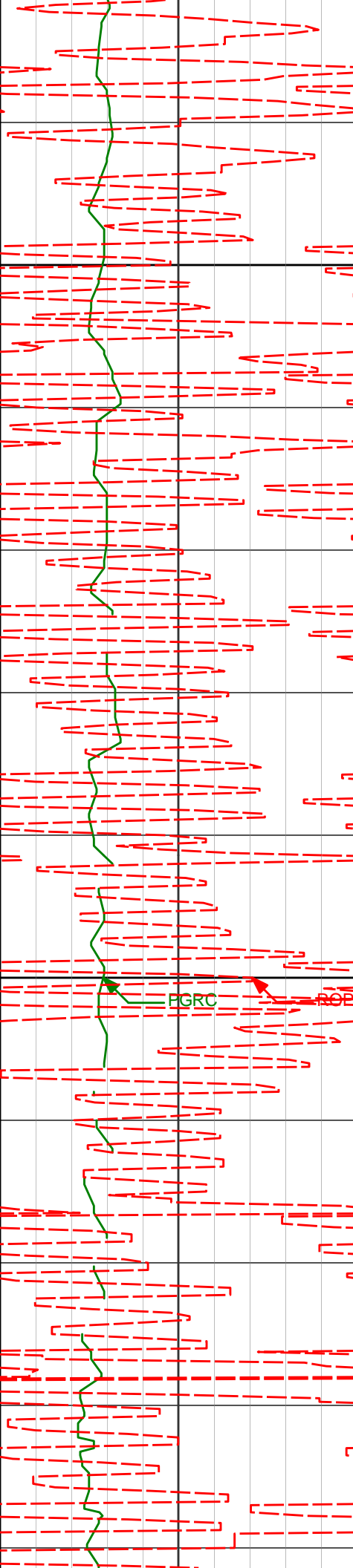
759' 0.35° 96.71° 758.99' -0.88'

800

72.00°F

853' 0.22° 76.72° 852.99' -0.89'

72.00°F



900

73.98°F

948'

0.07°

346.76° 947.99'

-0.98'

73.98°F

1000

FGRC

ROBA

74.11°F

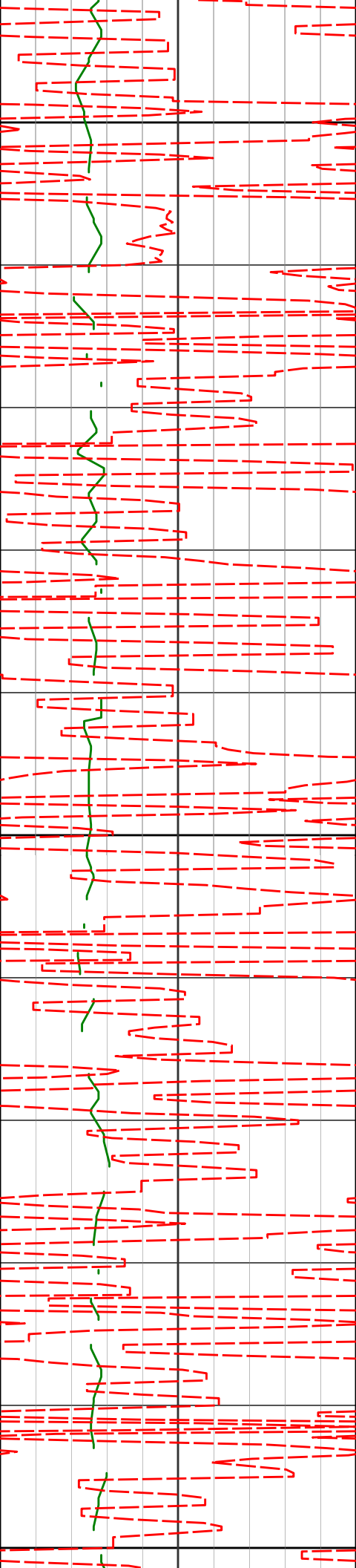
1042'

0.14°

272.99° 1041.99'

-1.04'

75.27°F



1100

76.12°F

1134'

0.24°

308.44° 1133.99'

-1.17'

77.85°F

1200

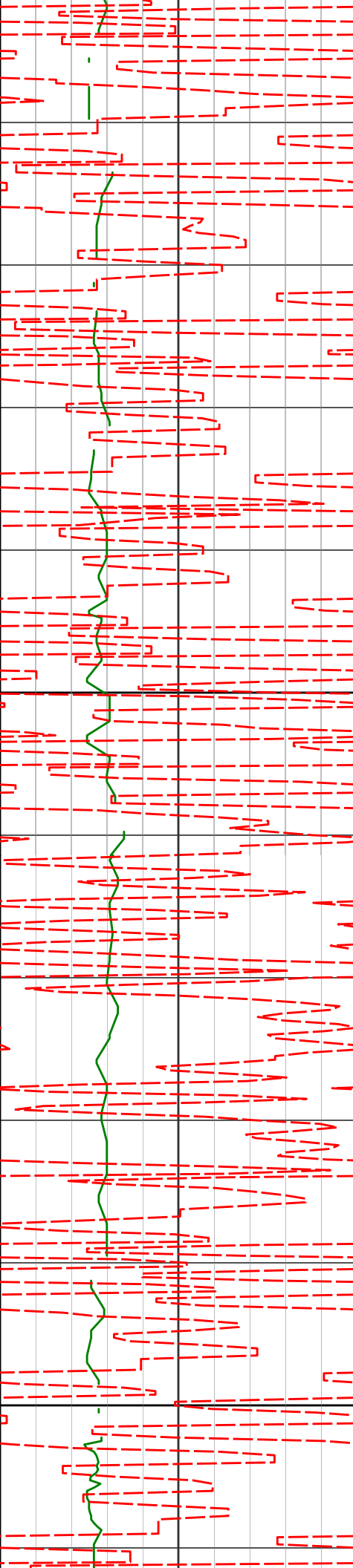
1225'

0.28°

289.64° 1224.99'

-1.36'

1300



1400

1500

1317'

1409'

1500'

0.17°

0.15°

0.07°

296.80°

7.82°

4.77°

1316.99'

1408.99'

1499.99'

-1.50'

-1.68'

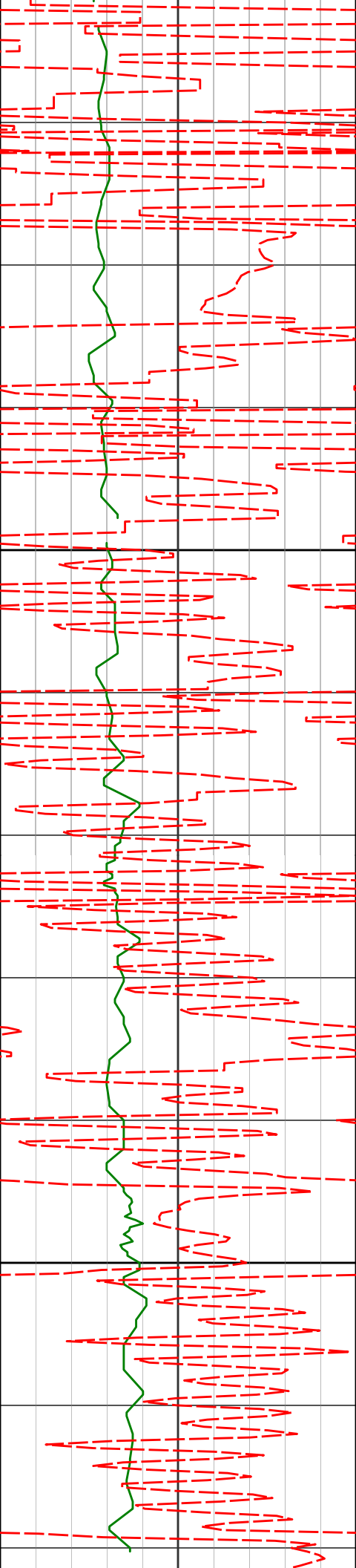
-1.85'

77.99°F

77.99°F

77.99°F

80.01°F



1600

1700

1592'

2.03°

206.34°

1591.97'

-0.44'

1682'

2.31°

198.71°

1681.90'

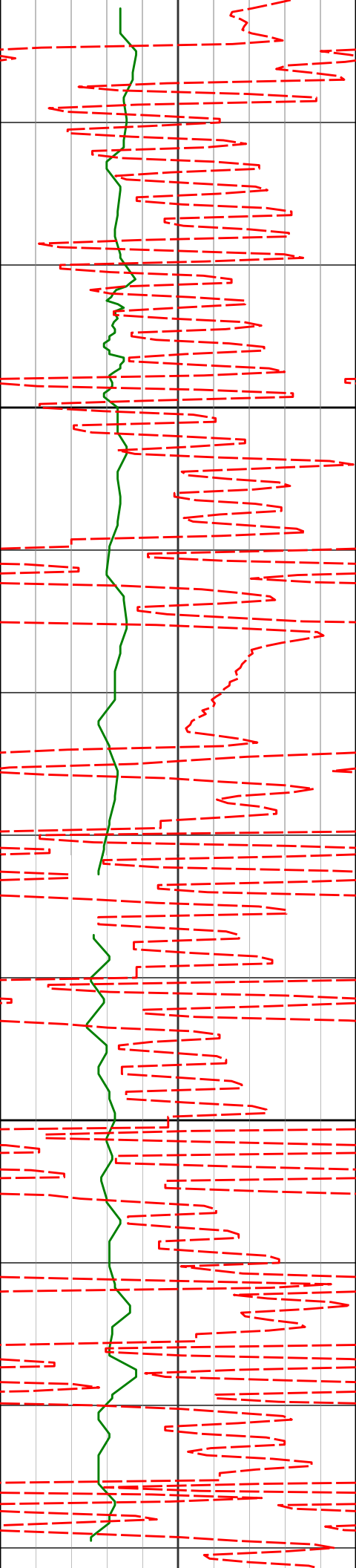
2.71'

80.01°F

82.02°F

83.28°F

84.06°F



1800

1900

1774'

1865'

1955'

5.05°

8.70°

8.48°

189.46° 1773.71'

203.05° 1864.04'

201.65° 1953.03'

8.46'

18.75'

31.19'

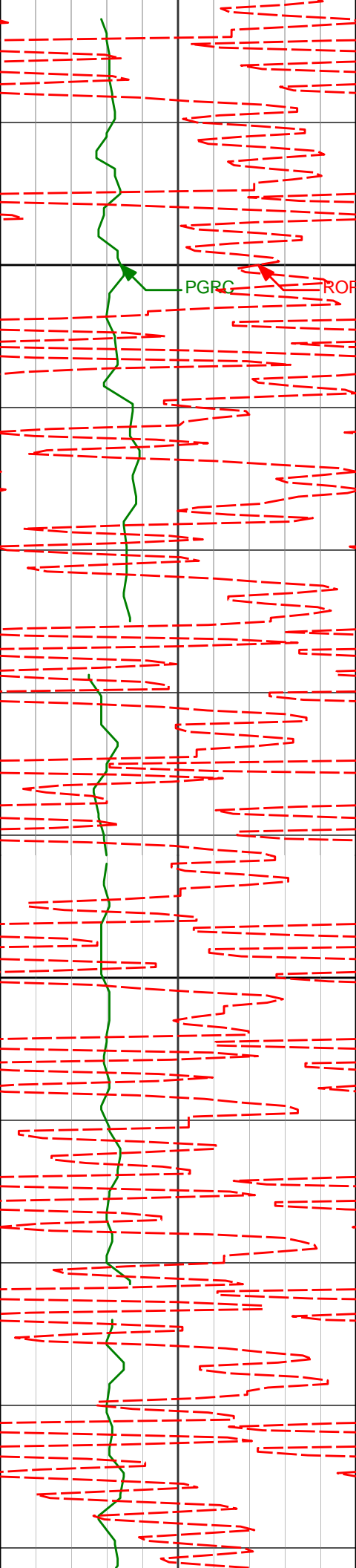
86.09°F

86.09°F

88.14°F

88.14°F

88.14°F



2000

2047'

8.17°

198.66°

2044.06'

43.69'

2100

2138'

7.90°

198.48°

2134.17'

55.75'

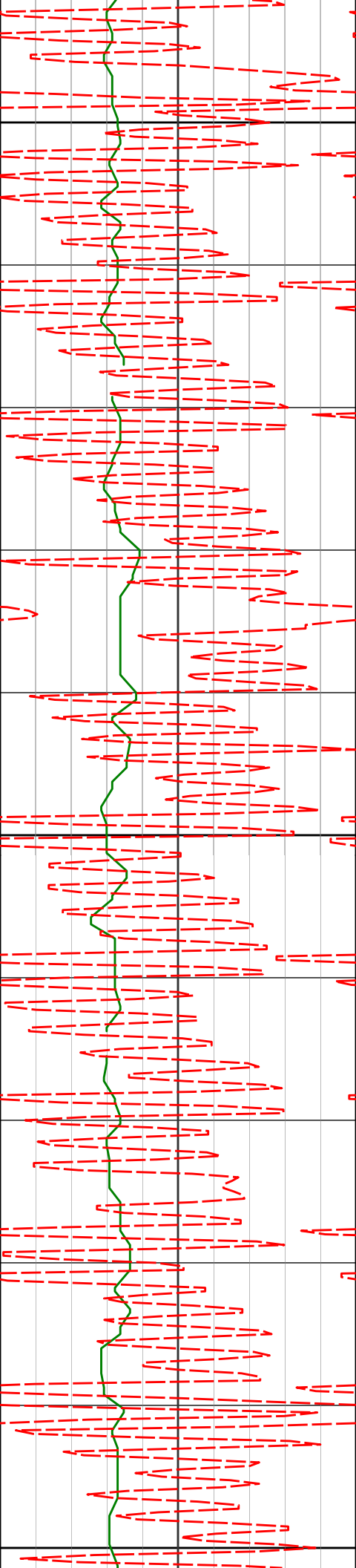
88.14°F

90.19°F

90.19°F

90.19°F

90.19°F



2200

94.33°F

2228'

7.72°

197.97° 2223.34'

67.37'

94.33°F

2300

94.33°F

2320'

7.47°

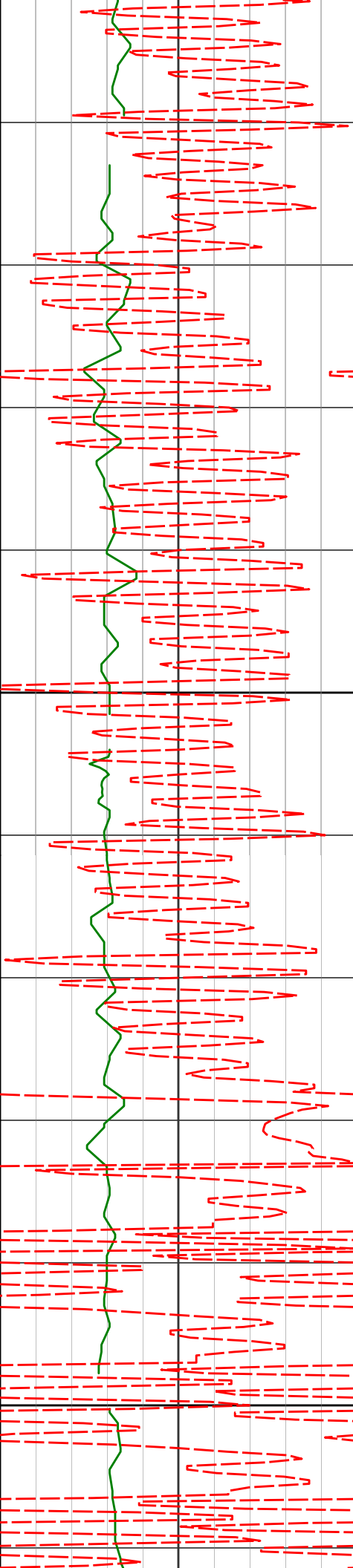
196.56° 2314.53'

78.98'

94.33°F

96.42°F

2400



2500

2600

2411'

7.34°

195.65° 2404.77'

90.26'

2503'

7.20°

195.71° 2496.03'

101.47'

2594'

7.54°

187.77° 2586.28'

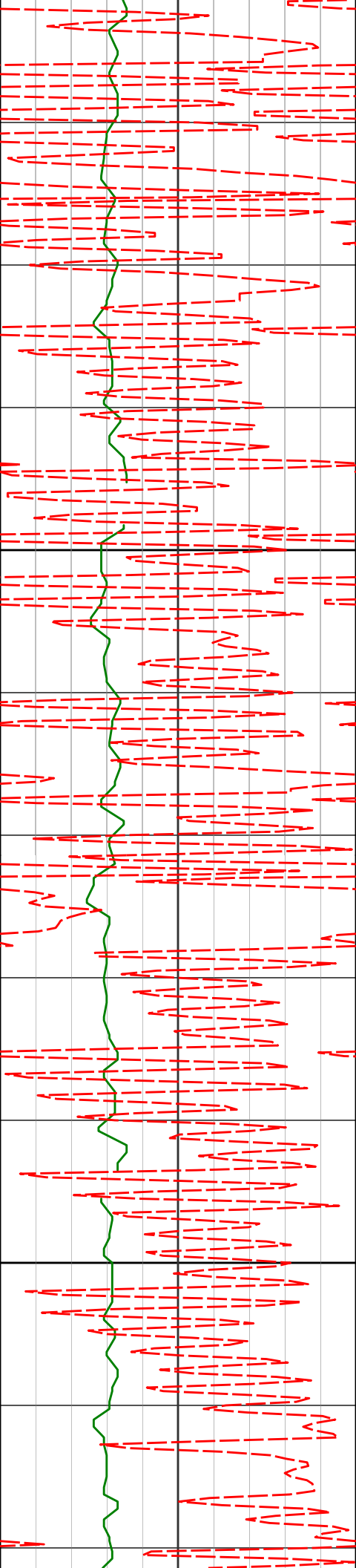
112.88'

96.42°F

98.51°F

98.51°F

98.51°F



2700

2800

2689'

7.56°

187.14°

2680.46'

125.26'

2783'

7.51°

187.36°

2773.64'

137.48'

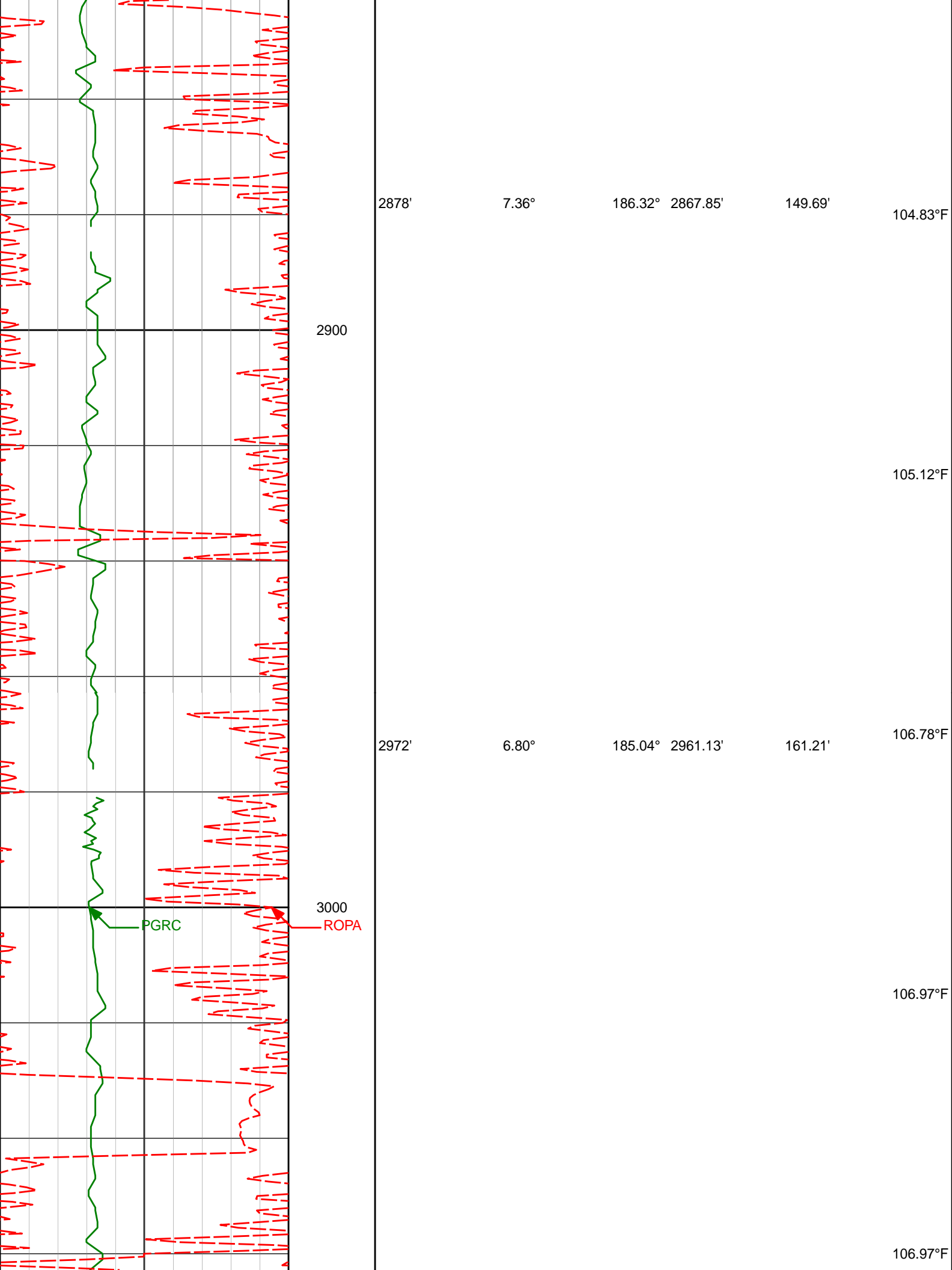
100.62°F

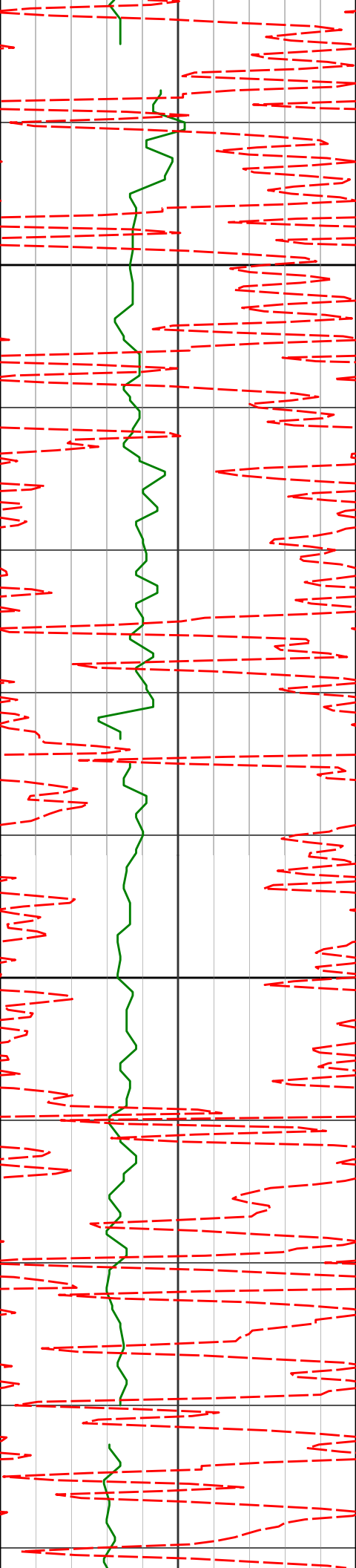
100.62°F

102.72°F

102.72°F

104.83°F





3067'

8.64°

193.22° 3055.27'

173.77'

3100

111.24°F

111.24°F

3162'

7.95°

191.29° 3149.27'

187.16'

111.24°F

3200

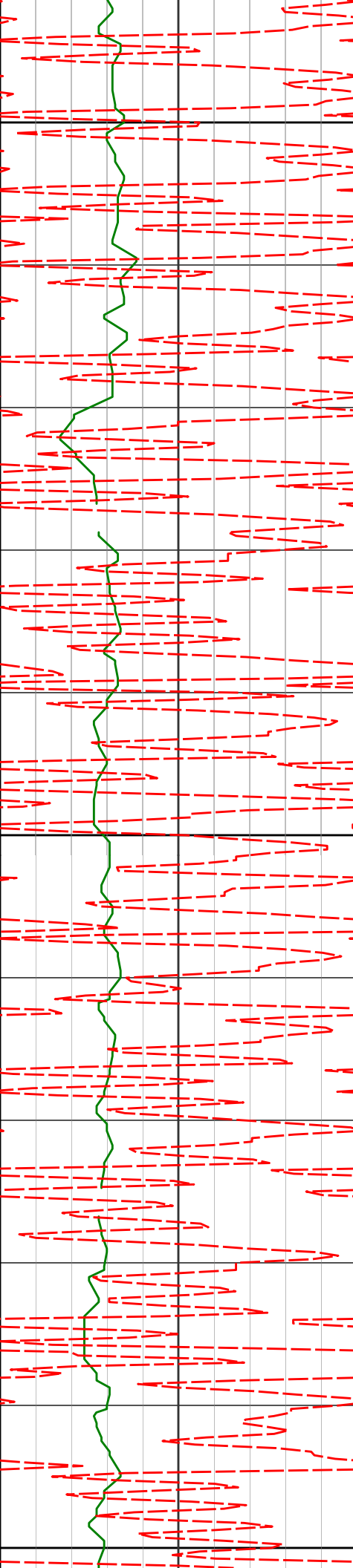
111.24°F

3256'

7.88°

190.17° 3242.38'

199.88'



3300

3400

3500

3351'

8.04°

190.84°

3336.46'

212.82'

3445'

8.29°

191.76°

3429.51'

225.91'

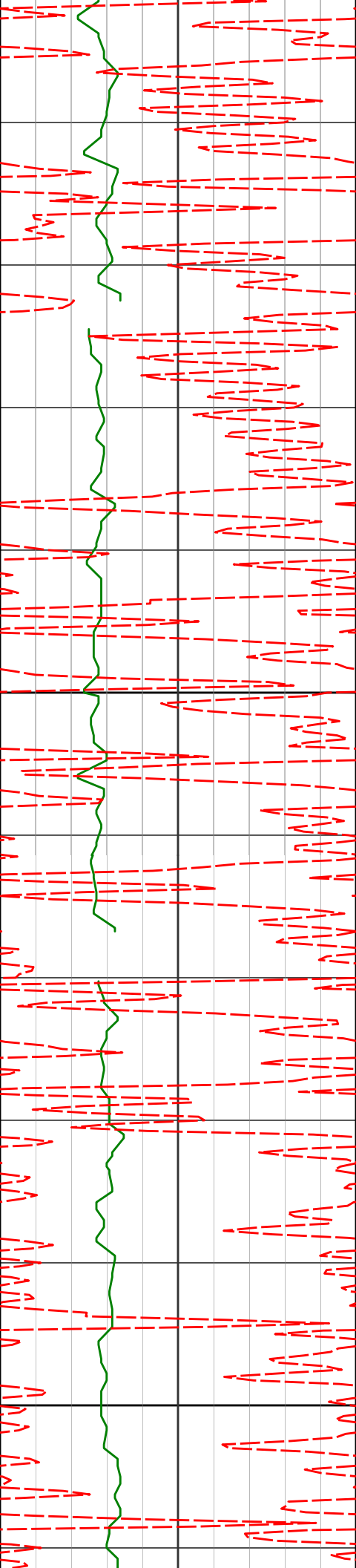
113.40°F

113.40°F

115.56°F

115.56°F

115.56°F



3540'

8.39°

191.43° 3523.50'

239.41'

3600

3635'

8.63°

190.42° 3617.46'

253.21'

3700

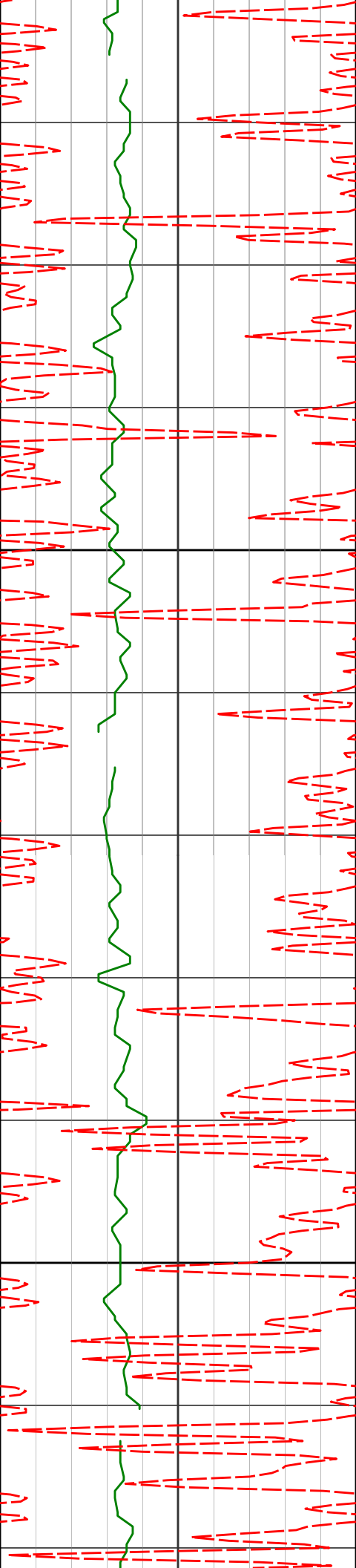
116.32°F

117.73°F

117.73°F

119.54°F

118.04°F



3800

3900

3729'

8.43°

188.46° 3710.42'

266.96'

117.73°F

3824'

8.00°

187.73° 3804.45'

280.40'

119.91°F

3918'

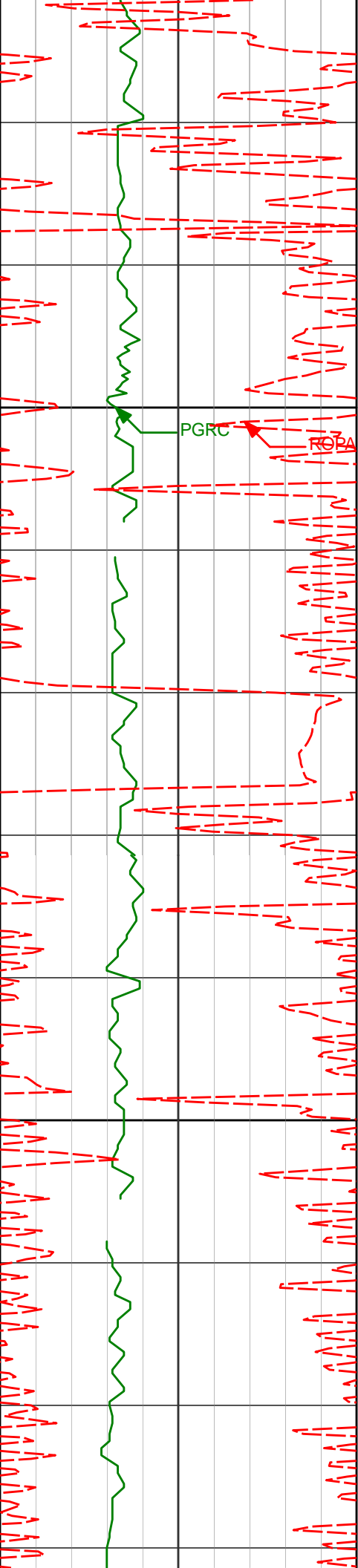
7.31°

182.29° 3897.61'

292.85'

122.11°F

122.11°F



4000

PGRC

RO/P

4013'

6.90°

178.71° 3991.88'

304.59'

124.30°F

124.30°F

124.30°F

124.30°F

4100

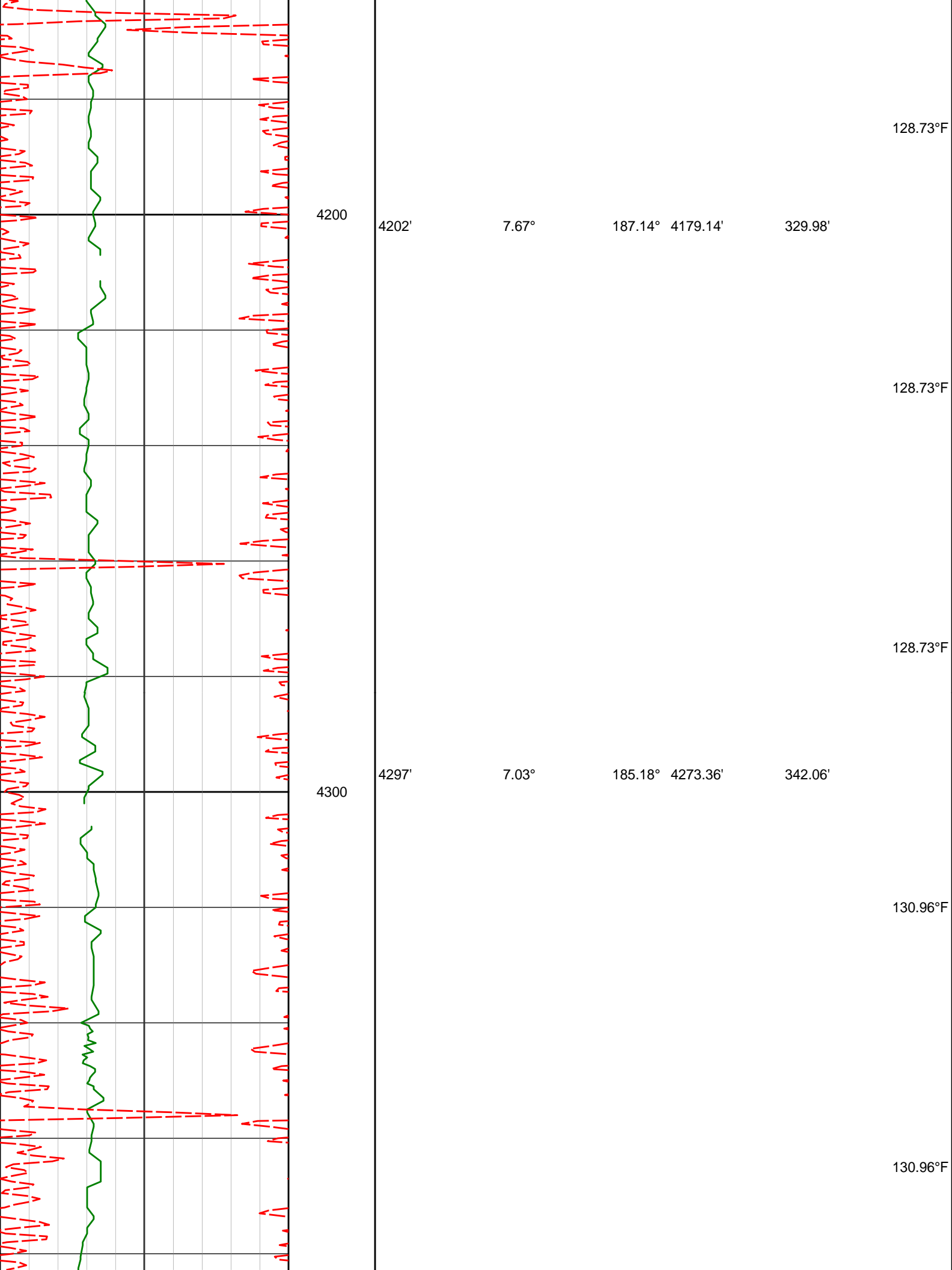
4107'

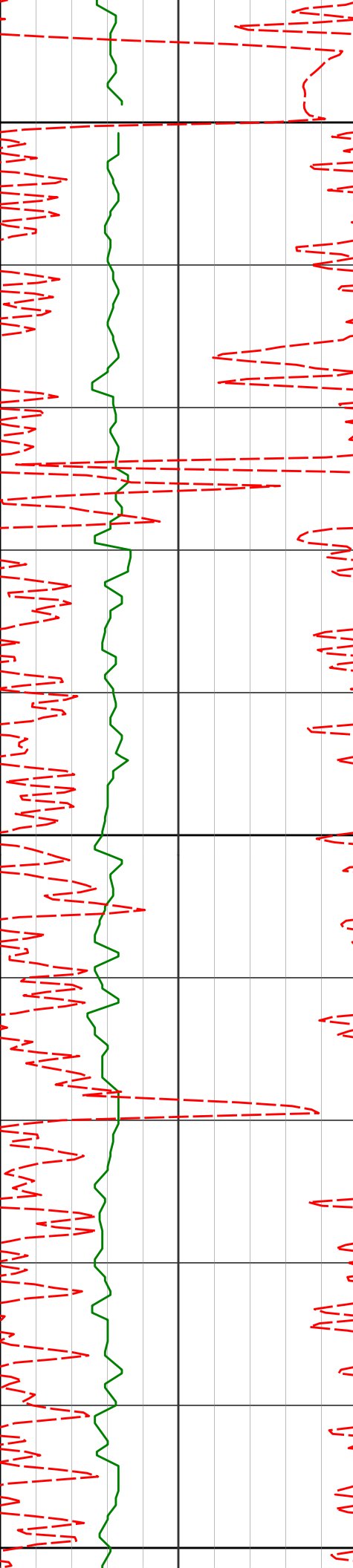
8.30°

189.50° 4085.06'

316.93'

128.73°F





4400

4500

4600

4391'

6.96°

190.00° 4366.66'

353.40'

4486'

5.95°

189.58° 4461.05'

363.93'

4581'

5.05°

185.28° 4555.62'

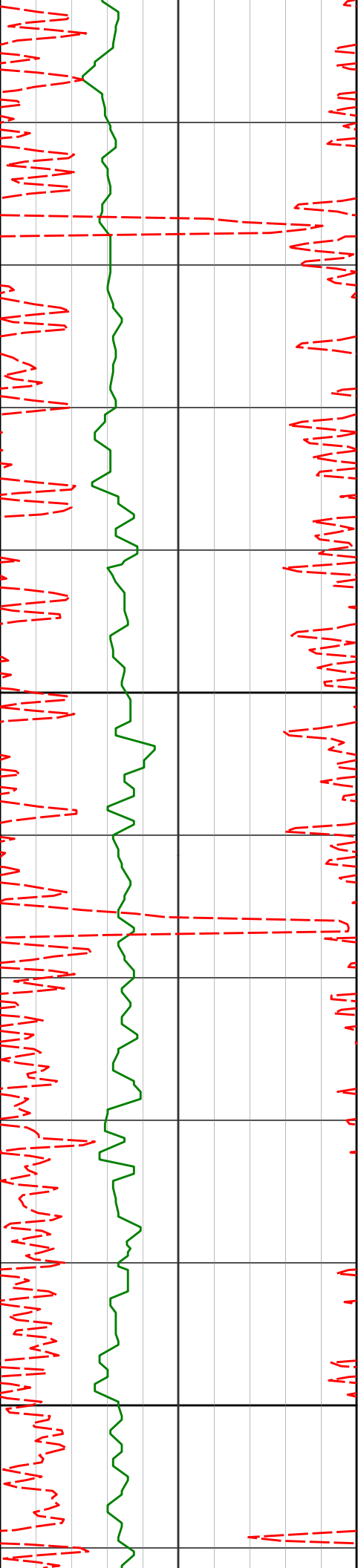
372.95'

130.96°F

130.96°F

133.20°F

133.20°F



4700

4800

4675'

4.00°

174.67°

4649.32'

380.34'

133.37°F

135.27°F

135.45°F

4770'

3.34°

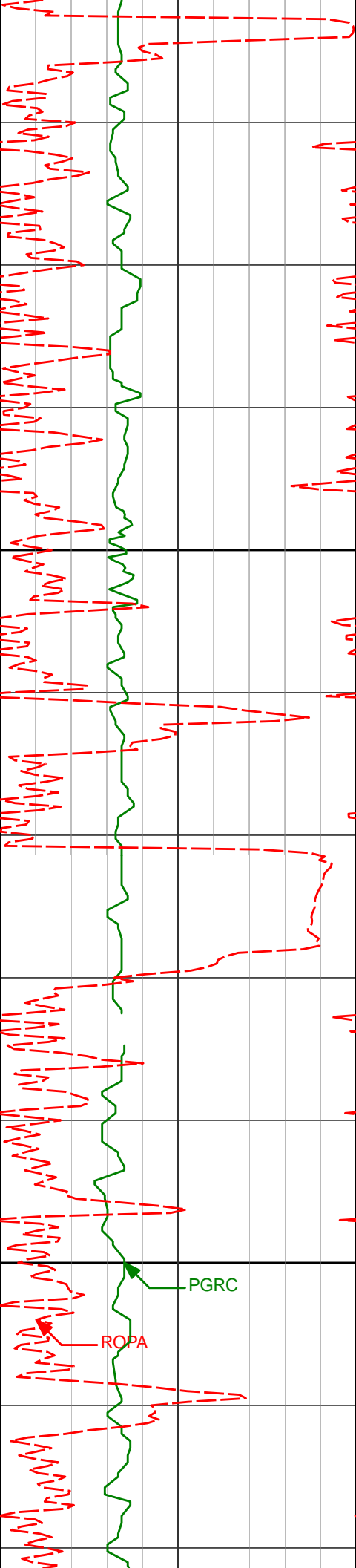
157.15°

4744.13'

386.19'

137.44°F

136.24°F



4900

5000

4865'

2.79°

160.12° 4839.00'

390.90'

134.23°F

133.20°F

133.20°F

4959'

0.96°

125.64° 4932.94'

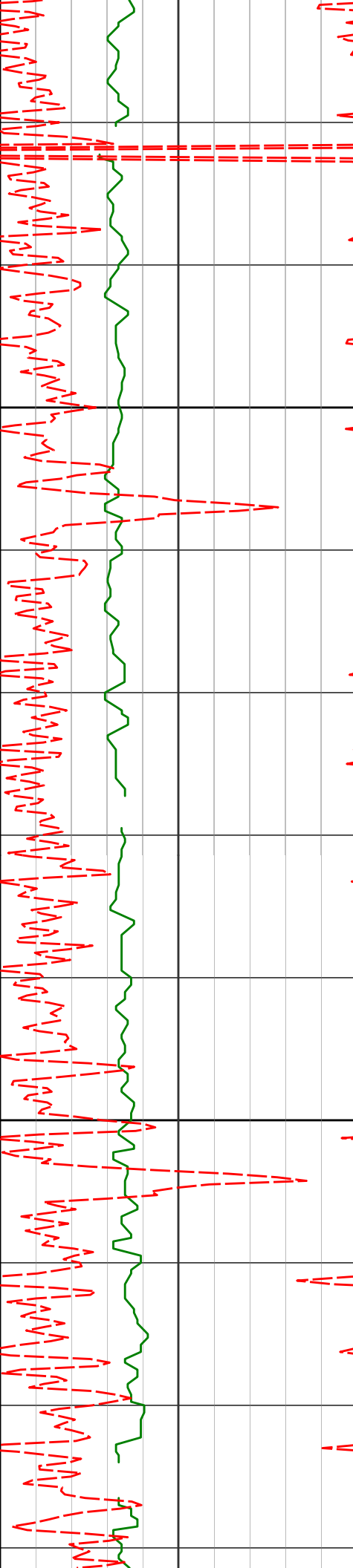
393.51'

135.45°F

135.45°F

PGRC

ROPA



5100

5200

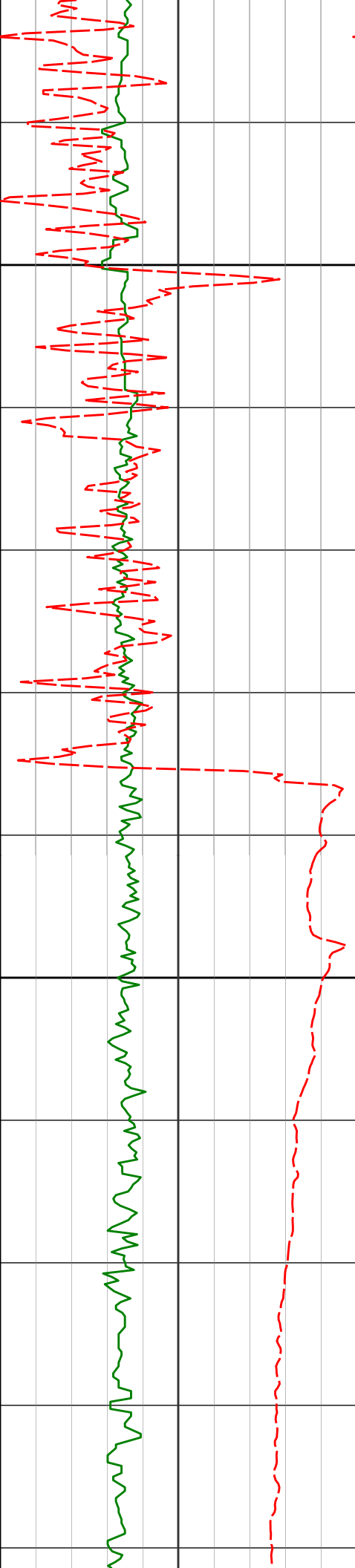
| | | | | |
|-------|-------|---------|----------|---------|
| 5054' | 0.79° | 125.36° | 5027.93' | 394.35' |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 5149' | 0.79° | 127.31° | 5122.92' | 395.12' |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 5243' | 0.89° | 122.55° | 5216.91' | 395.90' |

137.70°F

137.70°F

139.96°F

139.96°F



5300

5400

5338'

5433'

1.04°

11.56°

116.24° 5311.90'

196.12° 5406.24'

396.67'

406.23'

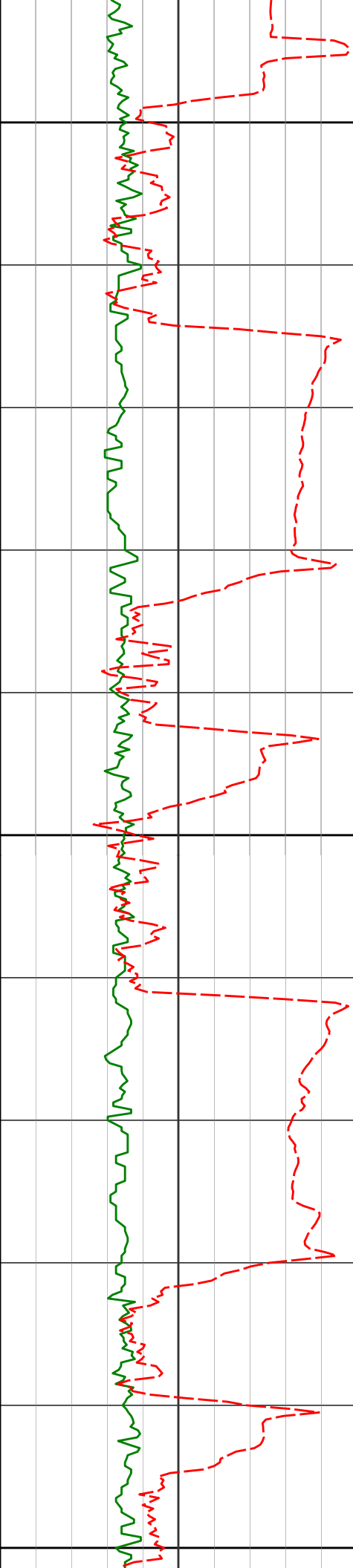
142.25°F

141.93°F

140.45°F

141.74°F

141.88°F



5500

5527'

23.40°

200.50° 5495.75'

432.86'

144.75°F

5600

5621'

28.61°

191.37° 5580.23'

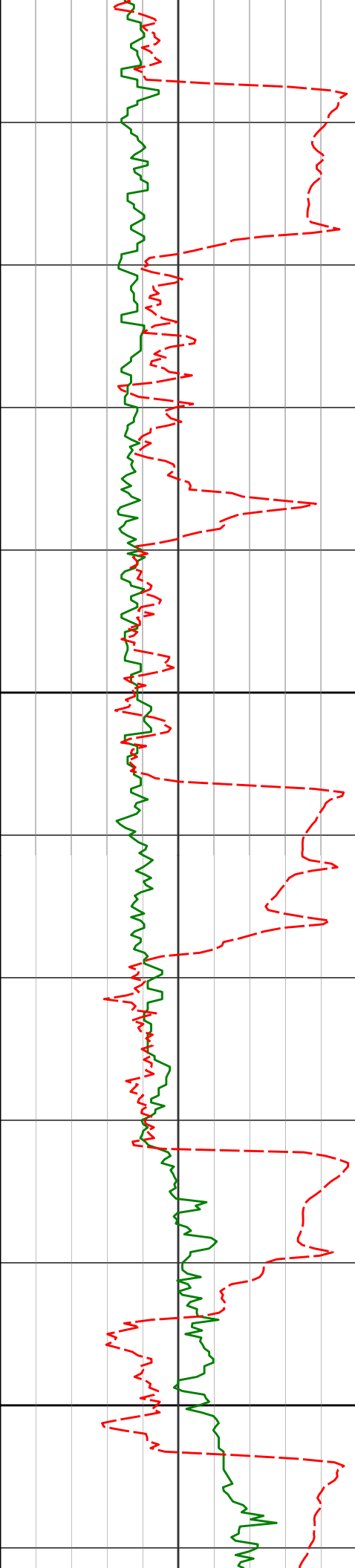
472.47'

147.07°F

5700

144.12°F

142.88°F



5715'

34.10°

181.67° 5660.53'

520.94'

146.06°F

5800

5809'

37.73°

179.62° 5736.65'

576.06'

150.88°F

5900

5903'

43.26°

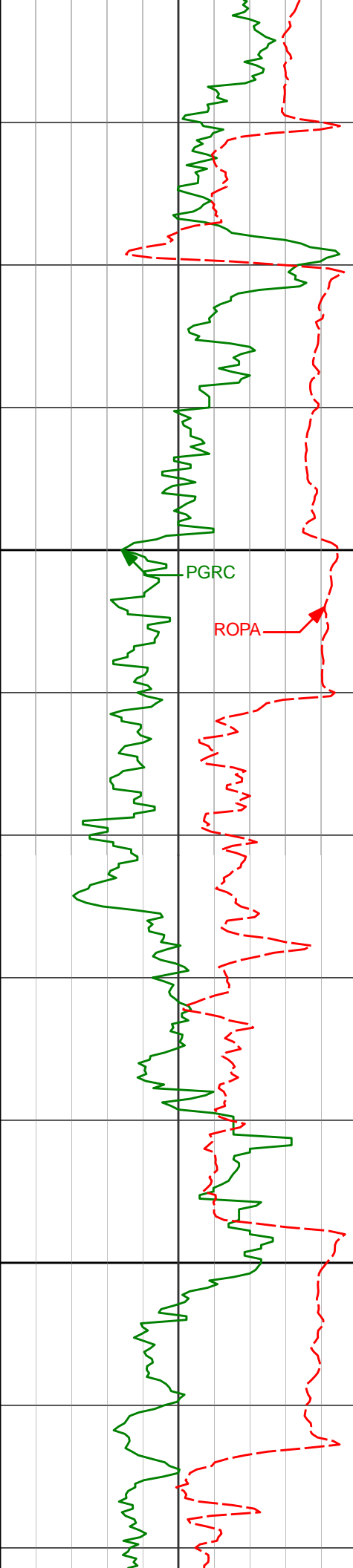
179.59° 5808.11'

637.07'

153.39°F

150.95°F

151.47°F



6000

6100

5997'

6092'

55.97°

59.55°

177.11° 5868.90'

176.50° 5919.57'

708.48'

788.68'

153.99°F

154.82°F

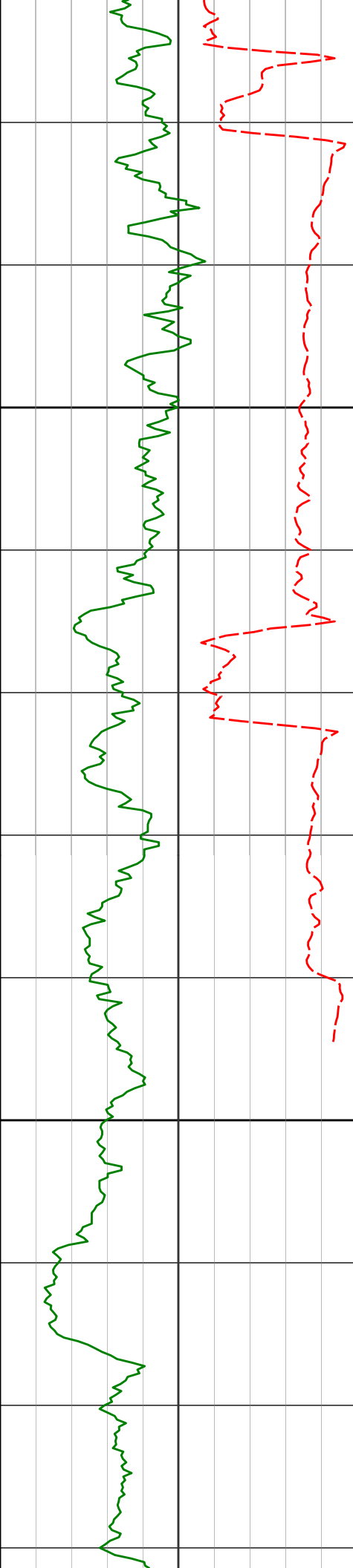
157.89°F

159.02°F

159.32°F

PGRC

ROPA



6200

6185'

68.82°

177.29° 5960.03'

872.18'

160.78°F

160.83°F

163.01°F

6300

6280'

81.87°

180.82° 5984.02'

963.87'

164.15°F

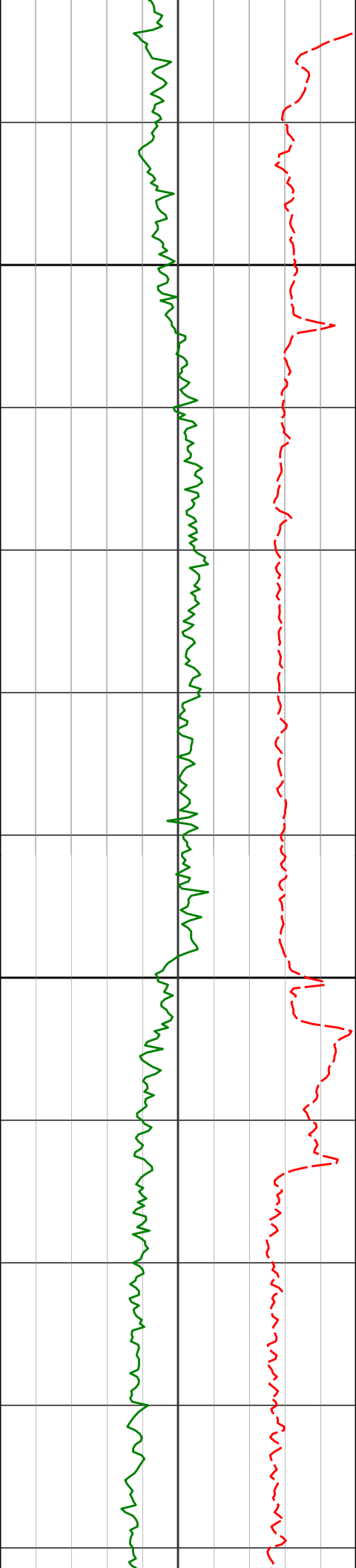
6311'

84.32°

181.20° 5987.74'

994.63'

161.60°F



Run 200

6400

6437'

86.55°

179.03° 5997.77'

1120.22'

150.87°F

146.28°F

144.27°F

6500

6531'

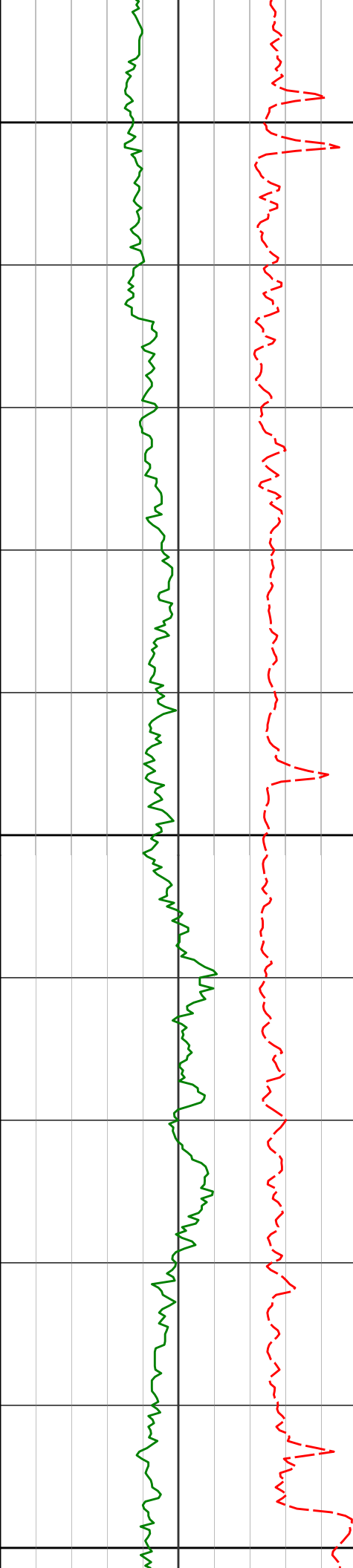
88.89°

179.45° 6001.52'

1214.13'

146.45°F

148.67°F



6600

6625'

88.40°

178.38° 6003.74'

1308.08'

151.35°F

6700

6719'

87.84°

178.51° 6006.82'

1401.99'

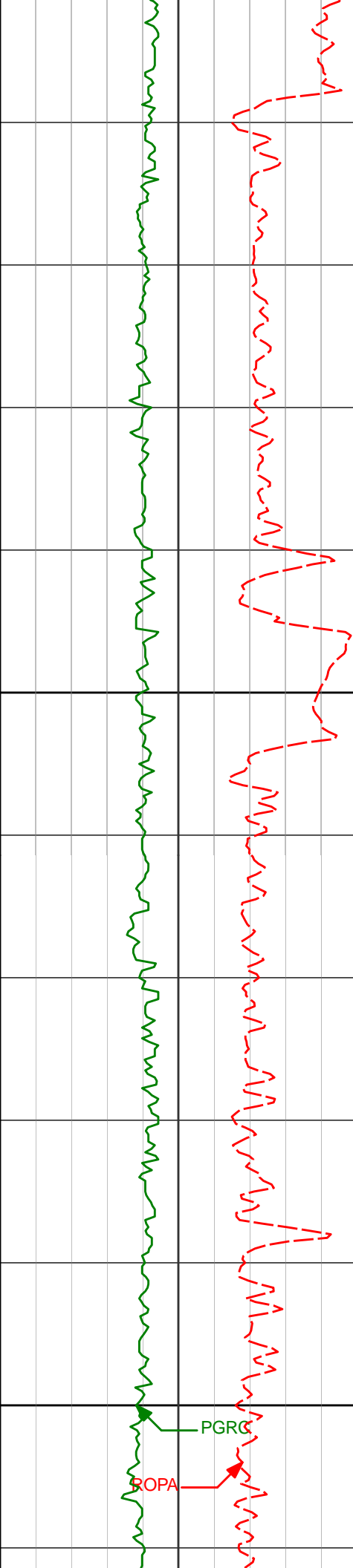
152.18°F

152.71°F

150.73°F

6800

156.37°F



6900

7000

6813'

6908'

7003'

88.86°

91.17°

91.51°

180.40°

180.37°

180.73°

6009.53'

6009.50'

6007.28'

1495.94'

1590.94'

1685.91'

156.91°F

160.97°F

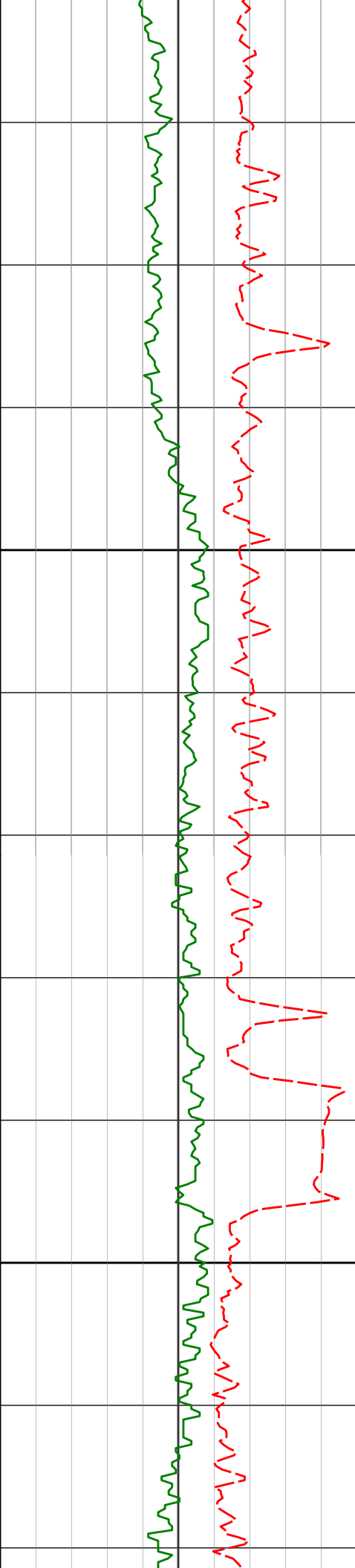
164.83°F

167.66°F

167.21°F

PGRC

ROPA



7100

7097'

92.37°

180.55° 6004.10'

1779.85'

170.40°F

171.42°F

171.94°F

7200

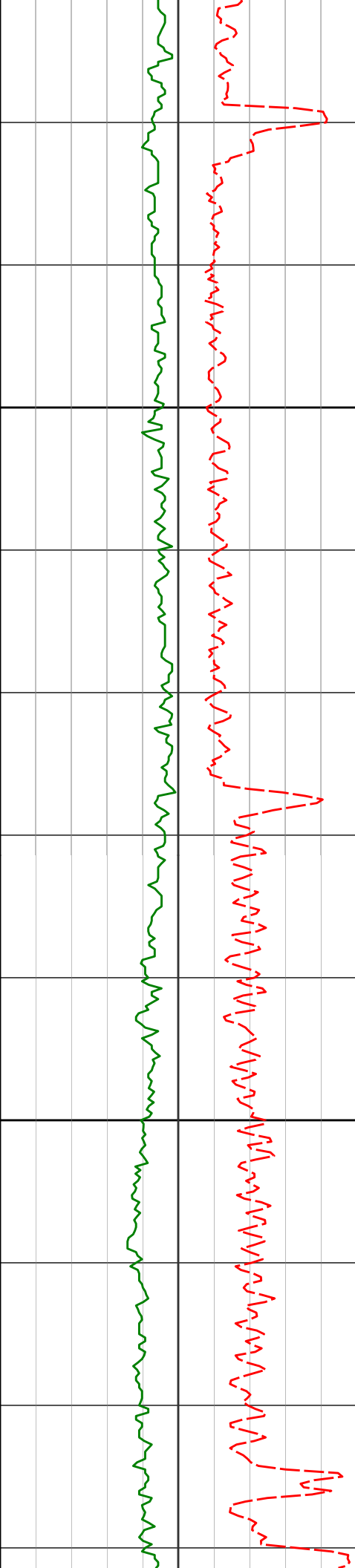
7191'

90.89°

178.82° 6001.42'

1873.80'

174.31°F



7300

7400

7286'

90.55°

179.42°

6000.22'

1968.78'

178.56°F

180.09°F

7380'

90.96°

179.78°

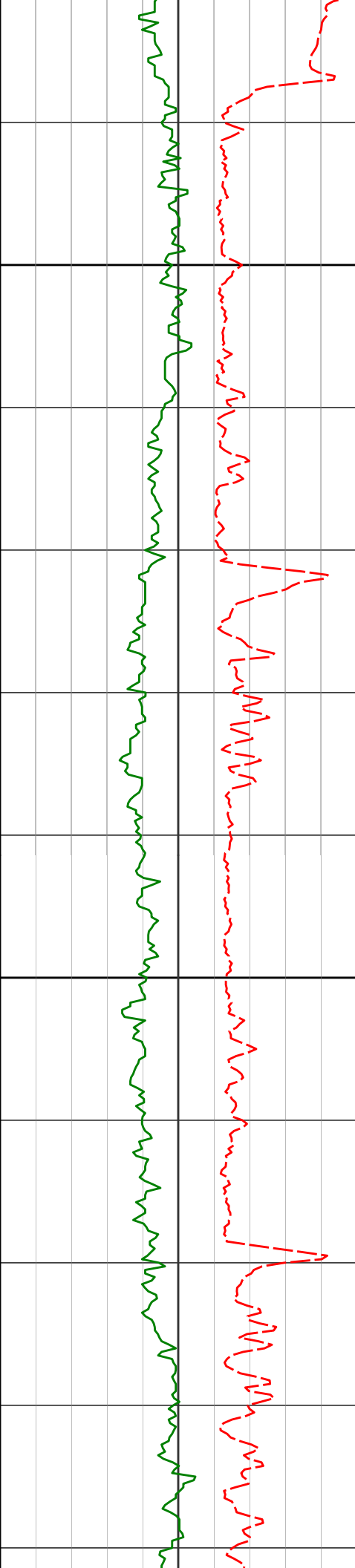
5998.98'

2062.77'

179.64°F

178.29°F

176.34°F



7500

7600

7474'

90.89°

178.26° 5997.46'

2156.74'

180.96°F

7568'

91.17°

177.95° 5995.77'

2250.67'

182.55°F

184.46°F

185.11°F

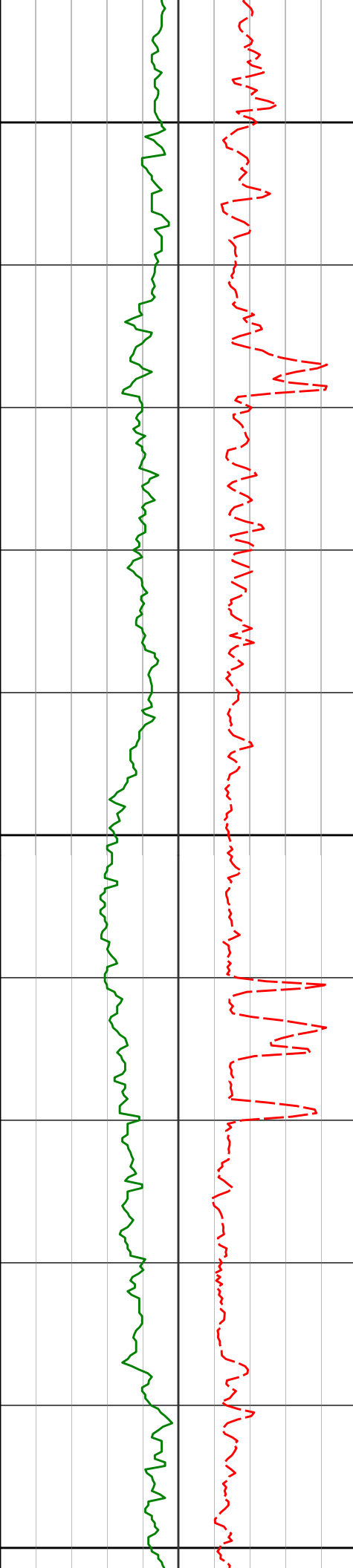
187.12°F

7662'

91.29°

178.80° 5993.74'

2344.60'



7700

7800

7900

7756'

90.62°

179.03° 5992.18'

2438.57'

7851'

90.83°

179.09° 5990.98'

2533.55'

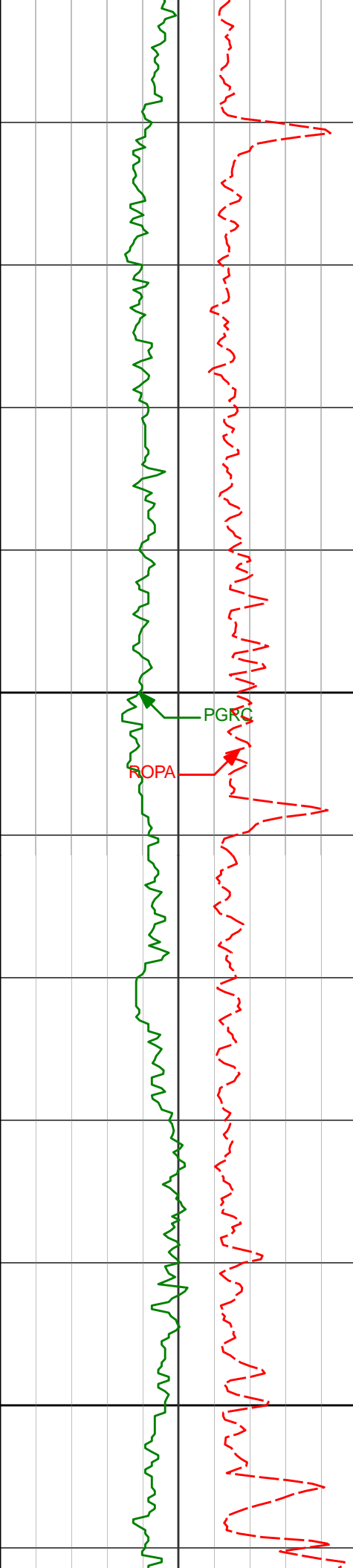
189.28°F

189.99°F

191.37°F

192.49°F

192.89°F



8000

8100

7946'

90.40°

179.21° 5989.96'

2628.53'

8040'

89.54°

178.76° 5990.01'

2722.51'

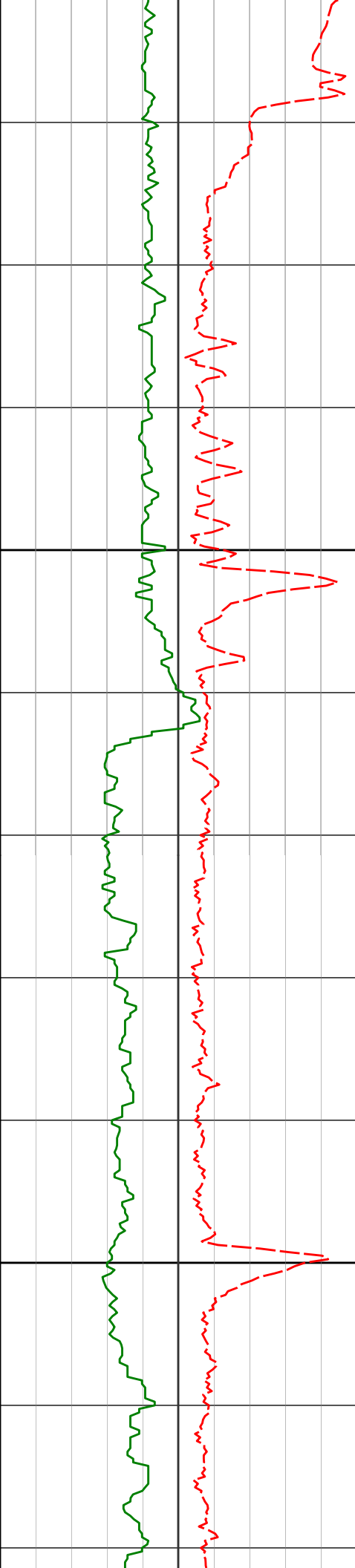
194.99°F

194.99°F

196.45°F

194.80°F

193.96°F



8200

8300

8135'

91.48°

178.93° 5989.16'

2817.48'

191.25°F

192.48°F

8230'

91.14°

178.30° 5986.99'

2912.43'

194.84°F

197.22°F

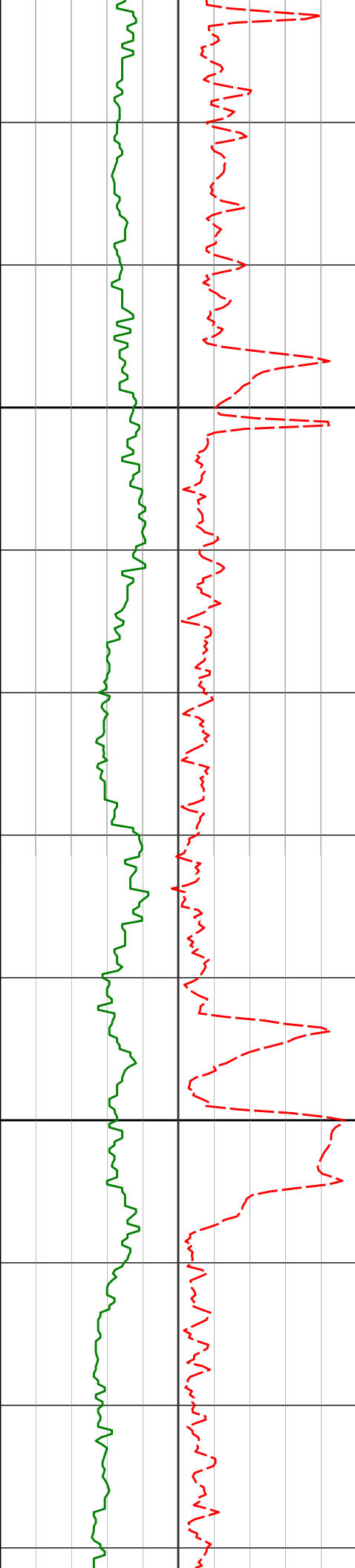
8324'

90.68°

178.01° 5985.50'

3006.36'

197.51°F



8400

8500

8419'

8514'

91.26°

90.43°

179.16°

178.37°

5983.89'

5982.48'

3101.32'

3196.28'

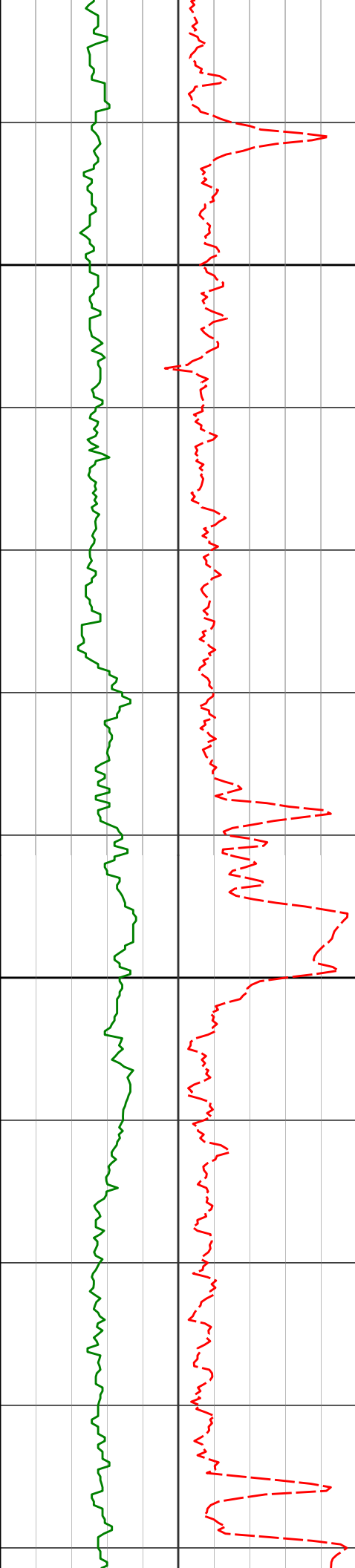
197.51°F

197.07°F

195.54°F

197.03°F

197.51°F



8600

8608'

90.68°

179.05° 5981.57'

3290.25'

199.38°F

197.48°F

197.51°F

8700

8702'

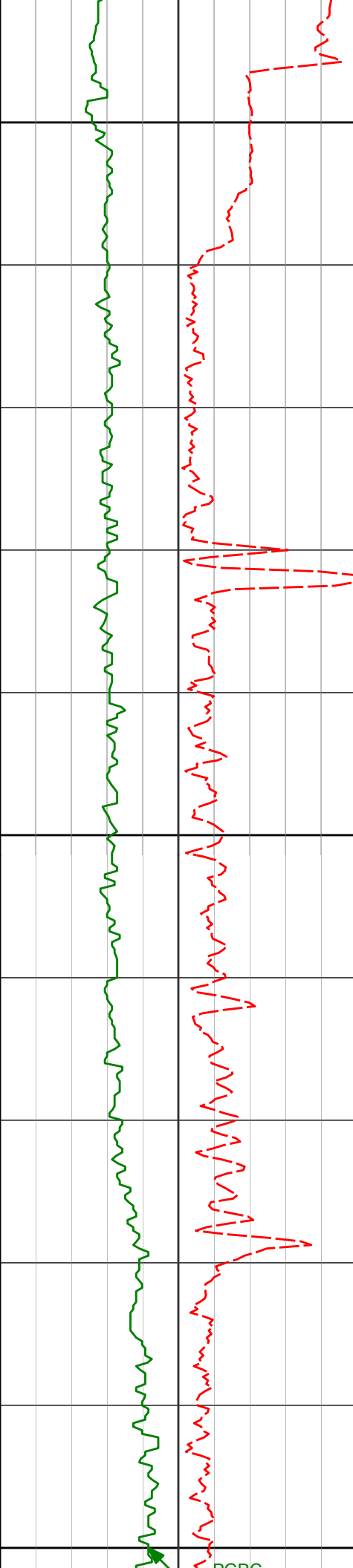
90.40°

178.91° 5980.69'

3384.23'

197.51°F

197.51°F



8800

8900

9000

8797'

8891'

8985'

88.92°

89.44°

88.86°

178.23° 5981.25'

178.98° 5982.59'

178.59° 5983.98'

3479.19'

3573.15'

3667.12'

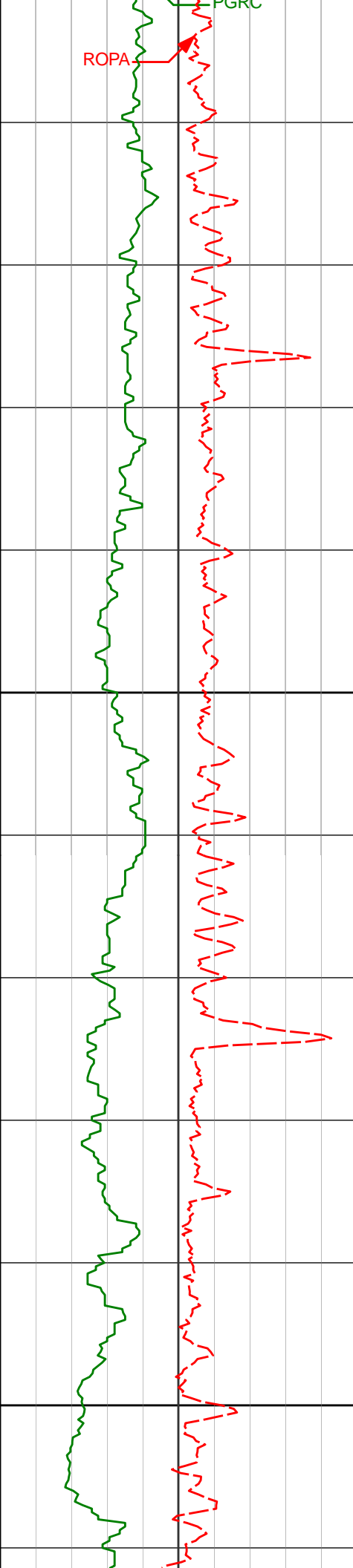
198.13°F

200.05°F

200.29°F

202.44°F

202.60°F



9100

9079'

88.24°

178.96° 5986.36'

3761.06'

203.12°F

205.16°F

205.48°F

9173'

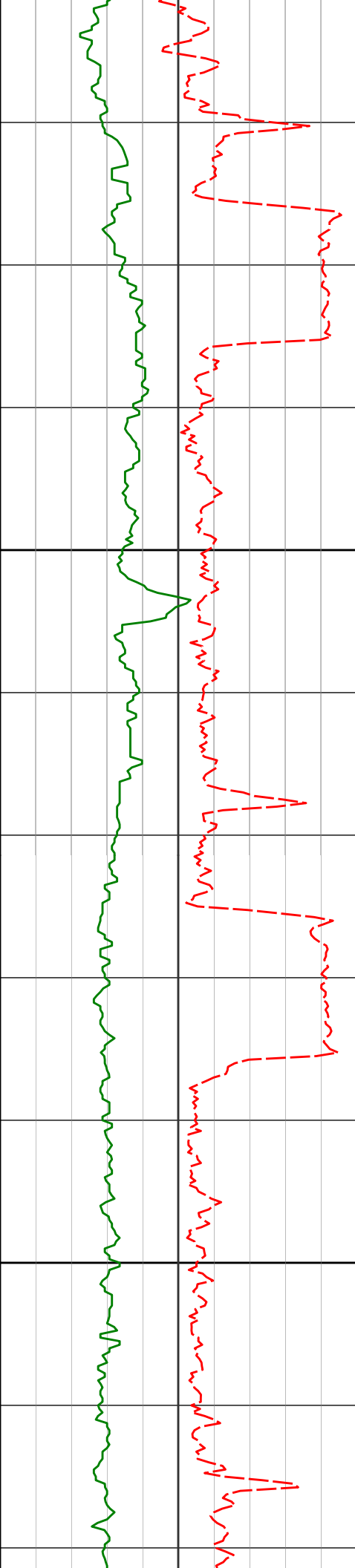
87.75°

178.73° 5989.64'

3854.98'

204.75°F

9200



9300

9400

9267'

88.86°

178.65° 5992.42'

3948.91'

204.19°F

202.93°F

9361'

90.34°

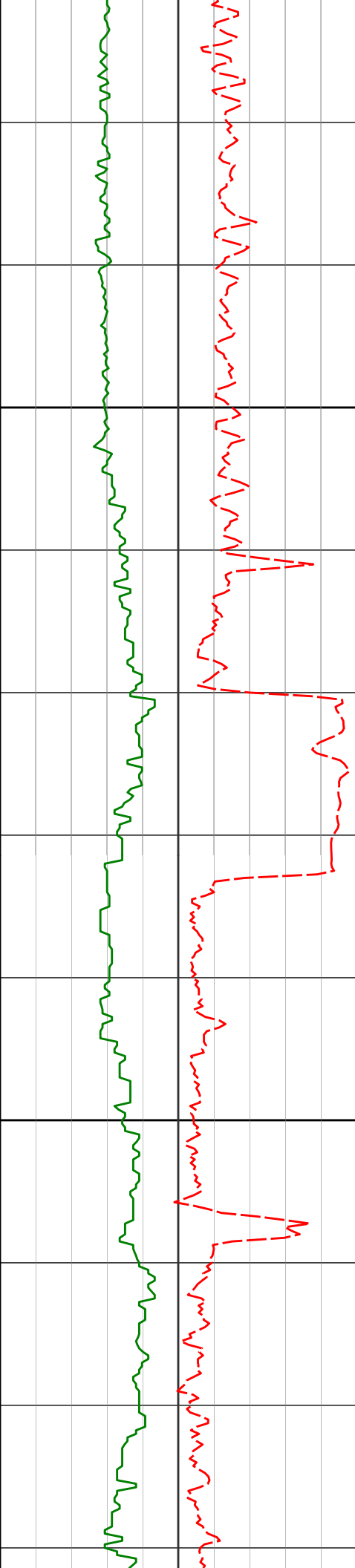
178.49° 5993.08'

4042.88'

203.72°F

207.36°F

202.77°F



9500

9600

9456'

89.69°

178.02° 5993.06'

4137.83'

206.39°F

203.65°F

202.87°F

9550'

90.49°

178.07° 5992.91'

4231.77'

206.13°F

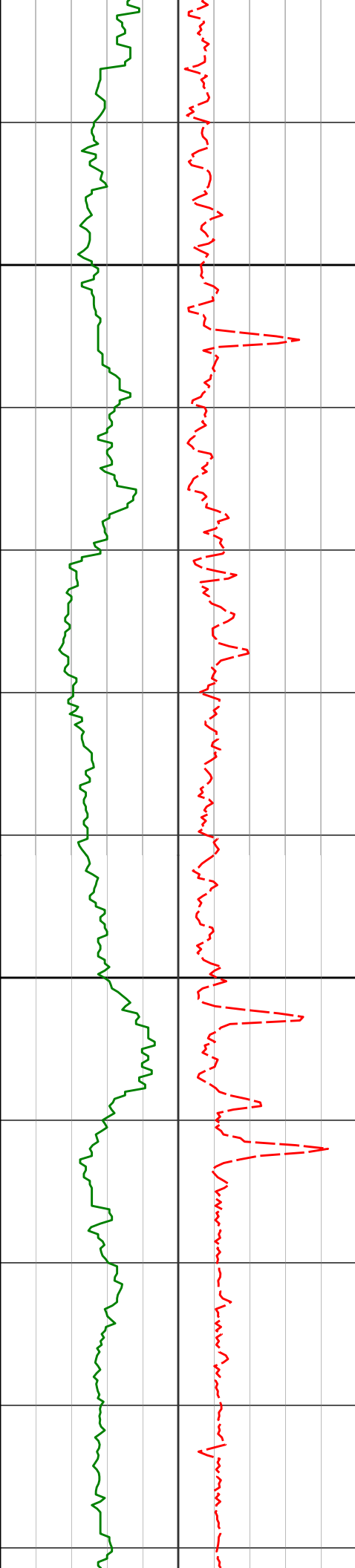
207.99°F

9644'

92.06°

178.68° 5990.81'

4325.70'



9700

9800

210.07°F

210.31°F

210.31°F

211.45°F

208.84°F

9738'

92.47°

178.69° 5987.10'

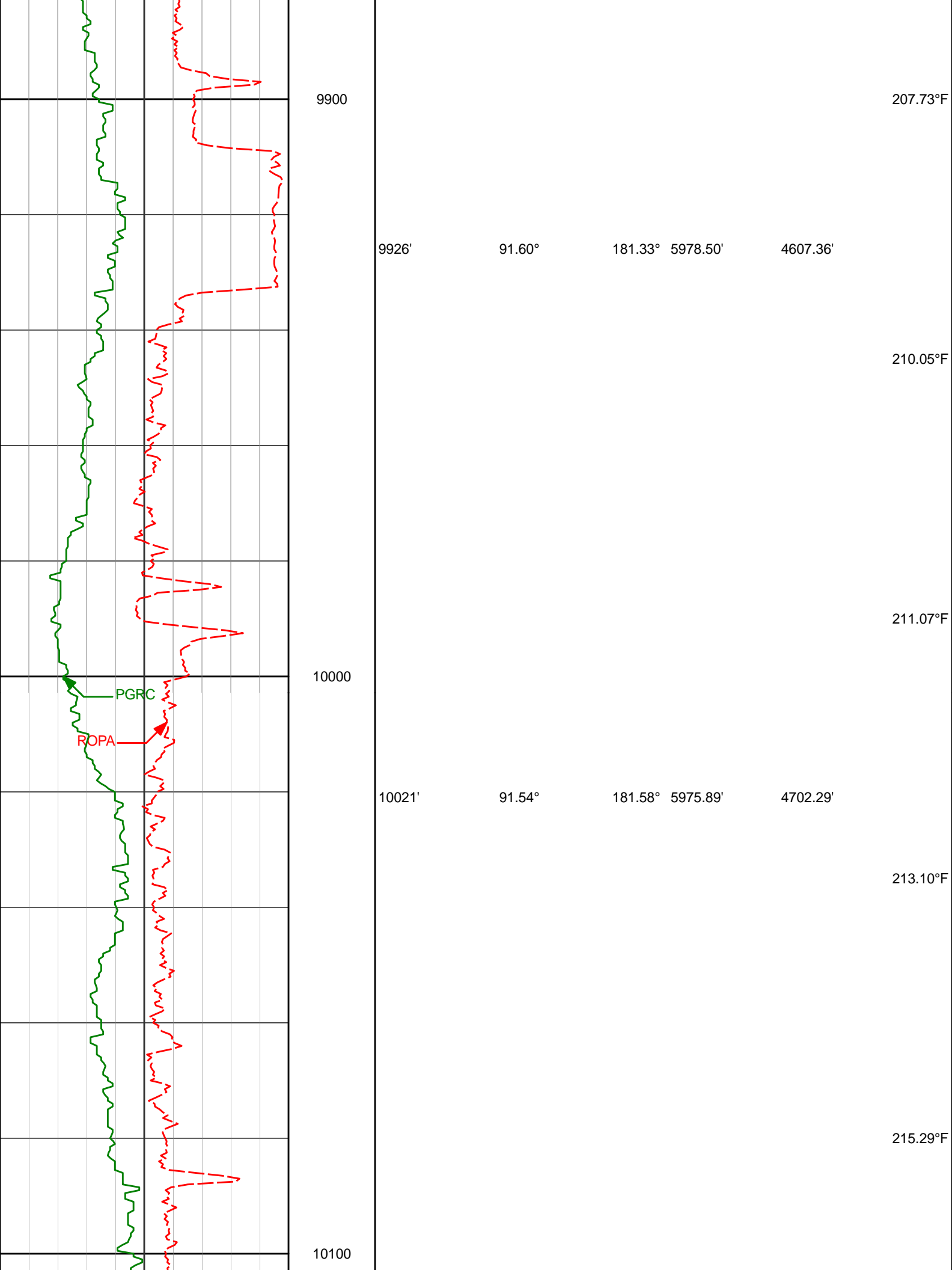
4419.60'

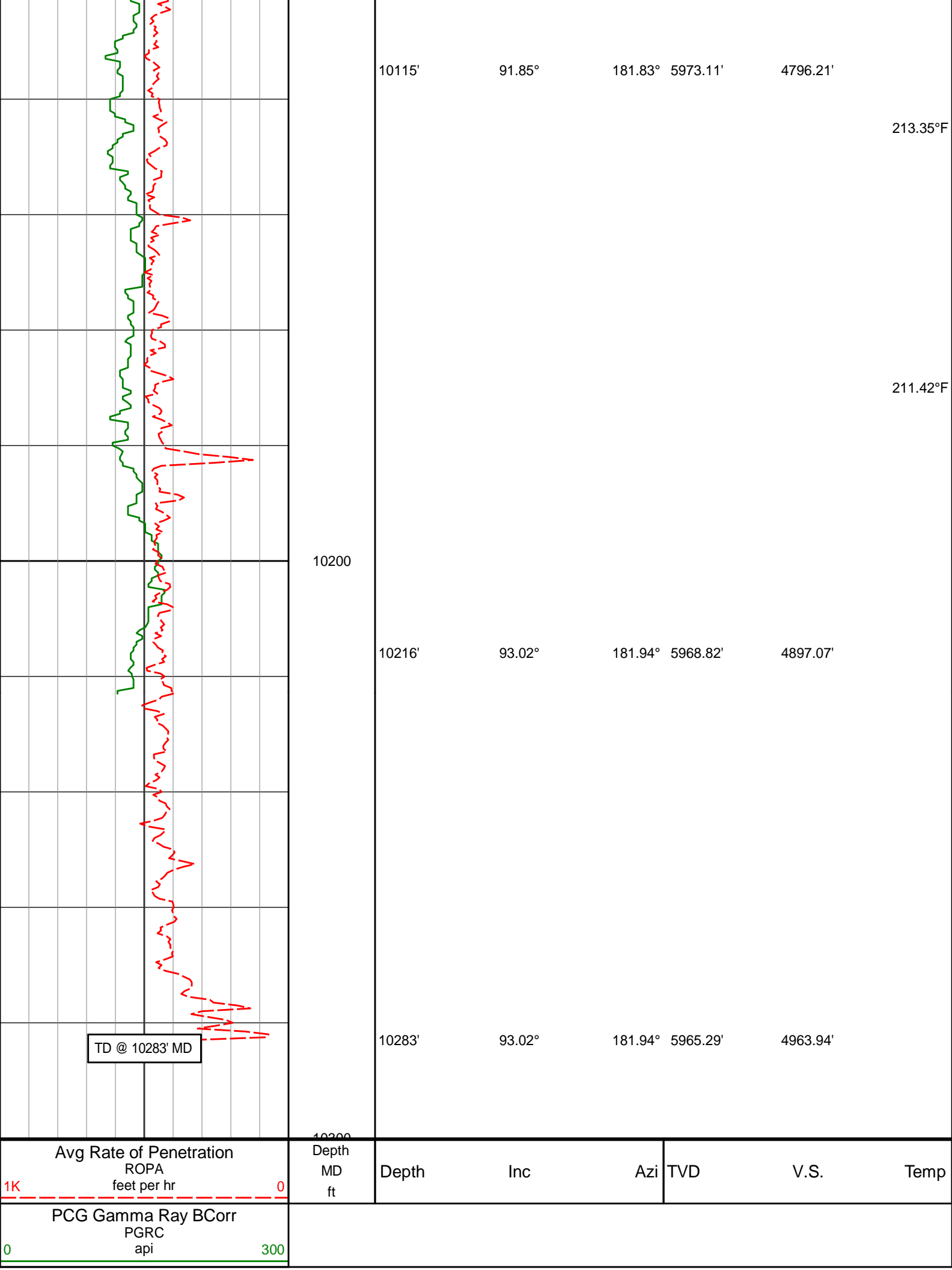
9832'

93.21°

178.38° 5982.44'

4513.45'





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Douglas LC35-780
Wattenburg
Weld Colorado
USA
CA-XX-0902973209

| <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 |
| 664.00 | 0.44 | 71.73 | 663.99 | 0.80 N | 2.41 E | -0.80 | 0.07 |
| 759.00 | 0.35 | 96.71 | 758.99 | 0.88 N | 3.04 E | -0.88 | 0.20 |
| 853.00 | 0.22 | 76.72 | 852.99 | 0.88 N | 3.50 E | -0.89 | 0.17 |
| 948.00 | 0.07 | 346.76 | 947.99 | 0.98 N | 3.66 E | -0.98 | 0.24 |
| 1042.00 | 0.14 | 272.99 | 1041.99 | 1.04 N | 3.54 E | -1.04 | 0.14 |
| 1134.00 | 0.24 | 308.44 | 1133.99 | 1.17 N | 3.27 E | -1.17 | 0.16 |
| 1225.00 | 0.28 | 289.64 | 1224.99 | 1.36 N | 2.92 E | -1.36 | 0.10 |
| 1317.00 | 0.17 | 296.80 | 1316.99 | 1.50 N | 2.59 E | -1.50 | 0.13 |
| 1409.00 | 0.15 | 7.82 | 1408.99 | 1.67 N | 2.48 E | -1.68 | 0.20 |
| 1500.00 | 0.07 | 4.77 | 1499.99 | 1.85 N | 2.50 E | -1.85 | 0.09 |
| 1592.00 | 2.03 | 206.34 | 1591.97 | 0.44 N | 1.78 E | -0.44 | 2.28 |
| 1682.00 | 2.31 | 198.71 | 1681.90 | 2.71 S | 0.49 E | 2.71 | 0.44 |
| 1774.00 | 5.05 | 189.46 | 1773.71 | 8.46 S | 0.77 W | 8.46 | 3.04 |
| 1865.00 | 8.70 | 203.05 | 1864.04 | 18.75 S | 4.12 W | 18.75 | 4.37 |
| 1955.00 | 8.48 | 201.65 | 1953.03 | 31.18 S | 9.23 W | 31.19 | 0.34 |
| 2047.00 | 8.17 | 198.66 | 2044.06 | 43.68 S | 13.83 W | 43.69 | 0.57 |
| 2138.00 | 7.90 | 198.48 | 2134.17 | 55.73 S | 17.88 W | 55.75 | 0.30 |
| 2228.00 | 7.72 | 197.97 | 2223.34 | 67.35 S | 21.70 W | 67.37 | 0.22 |
| 2320.00 | 7.47 | 196.56 | 2314.53 | 78.96 S | 25.31 W | 78.98 | 0.33 |
| 2411.00 | 7.34 | 195.65 | 2404.77 | 90.23 S | 28.57 W | 90.26 | 0.19 |
| 2503.00 | 7.20 | 195.71 | 2496.03 | 101.44 S | 31.72 W | 101.47 | 0.16 |
| 2594.00 | 7.54 | 187.77 | 2586.28 | 112.85 S | 34.07 W | 112.88 | 1.18 |
| 2689.00 | 7.56 | 187.14 | 2680.46 | 125.22 S | 35.69 W | 125.26 | 0.09 |
| 2783.00 | 7.51 | 187.36 | 2773.64 | 137.45 S | 37.24 W | 137.48 | 0.06 |
| 2878.00 | 7.36 | 186.32 | 2867.85 | 149.65 S | 38.71 W | 149.69 | 0.21 |
| 2972.00 | 6.80 | 185.04 | 2961.13 | 161.17 S | 39.86 W | 161.21 | 0.61 |
| 3067.00 | 8.64 | 193.22 | 3055.27 | 173.73 S | 41.99 W | 173.77 | 2.25 |
| 3162.00 | 7.95 | 191.29 | 3149.27 | 187.12 S | 44.90 W | 187.16 | 0.79 |
| 3256.00 | 7.88 | 190.17 | 3242.38 | 199.83 S | 47.31 W | 199.88 | 0.18 |
| 3351.00 | 8.04 | 190.84 | 3336.46 | 212.77 S | 49.71 W | 212.82 | 0.20 |
| 3445.00 | 8.29 | 191.76 | 3429.51 | 225.86 S | 52.33 W | 225.91 | 0.29 |
| 3540.00 | 8.39 | 191.43 | 3523.50 | 239.36 S | 55.10 W | 239.41 | 0.12 |
| 3635.00 | 8.63 | 190.42 | 3617.46 | 253.15 S | 57.76 W | 253.21 | 0.29 |
| 3729.00 | 8.43 | 188.46 | 3710.42 | 266.90 S | 60.05 W | 266.96 | 0.38 |
| 3824.00 | 8.00 | 187.73 | 3804.45 | 280.33 S | 61.96 W | 280.40 | 0.46 |
| 3918.00 | 7.31 | 182.29 | 3897.61 | 292.78 S | 63.08 W | 292.85 | 1.06 |
| 4013.00 | 6.90 | 178.71 | 3991.88 | 304.53 S | 63.20 W | 304.59 | 0.63 |
| 4107.00 | 8.30 | 189.50 | 4085.06 | 316.86 S | 64.19 W | 316.93 | 2.12 |
| 4202.00 | 7.67 | 187.14 | 4179.14 | 329.91 S | 66.11 W | 329.98 | 0.75 |
| 4297.00 | 7.03 | 185.18 | 4273.36 | 341.99 S | 67.42 W | 342.06 | 0.73 |
| 4391.00 | 6.96 | 190.00 | 4366.66 | 353.32 S | 68.93 W | 353.40 | 0.63 |
| 4486.00 | 5.95 | 189.58 | 4461.05 | 363.85 S | 70.75 W | 363.93 | 1.06 |
| 4581.00 | 5.05 | 185.28 | 4555.62 | 372.88 S | 71.95 W | 372.95 | 1.04 |
| 4675.00 | 4.00 | 174.67 | 4649.32 | 380.27 S | 72.03 W | 380.34 | 1.43 |
| 4770.00 | 3.34 | 157.15 | 4744.13 | 386.11 S | 70.65 W | 386.19 | 1.36 |
| 4865.00 | 2.79 | 160.12 | 4839.00 | 390.83 S | 68.79 W | 390.90 | 0.60 |
| 4959.00 | 0.96 | 125.64 | 4932.94 | 393.44 S | 67.37 W | 393.51 | 2.20 |
| 5054.00 | 0.79 | 125.36 | 5027.93 | 394.28 S | 66.20 W | 394.35 | 0.18 |
| 5149.00 | 0.79 | 127.31 | 5122.92 | 395.05 S | 65.15 W | 395.12 | 0.03 |
| 5243.00 | 0.89 | 122.55 | 5216.91 | 395.83 S | 64.02 W | 395.90 | 0.13 |
| 5338.00 | 1.04 | 116.24 | 5311.90 | 396.61 S | 62.63 W | 396.67 | 0.19 |
| 5433.00 | 11.56 | 196.12 | 5406.24 | 406.16 S | 64.51 W | 406.23 | 12.02 |
| 5527.00 | 23.40 | 200.50 | 5495.75 | 432.79 S | 73.69 W | 432.86 | 12.67 |

| | | | | | | | |
|----------|-------|--------|---------|-----------|---------|---------|-------|
| 5621.00 | 28.61 | 191.37 | 5580.23 | 472.38 S | 84.68 W | 472.47 | 6.98 |
| 5715.00 | 34.10 | 181.67 | 5660.53 | 520.85 S | 89.89 W | 520.94 | 7.92 |
| 5809.00 | 37.73 | 179.62 | 5736.65 | 575.96 S | 90.46 W | 576.06 | 4.07 |
| 5903.00 | 43.26 | 179.59 | 5808.11 | 636.98 S | 90.04 W | 637.07 | 5.89 |
| 5997.00 | 55.97 | 177.11 | 5868.90 | 708.38 S | 87.84 W | 708.48 | 13.66 |
| 6092.00 | 59.55 | 176.50 | 5919.57 | 788.60 S | 83.35 W | 788.68 | 3.81 |
| 6185.00 | 68.82 | 177.29 | 5960.03 | 872.10 S | 78.85 W | 872.18 | 10.00 |
| 6280.00 | 81.87 | 180.82 | 5984.02 | 963.79 S | 77.42 W | 963.87 | 14.20 |
| 6311.00 | 84.32 | 181.20 | 5987.74 | 994.55 S | 77.96 W | 994.63 | 7.99 |
| 6437.00 | 86.55 | 179.03 | 5997.77 | 1120.14 S | 78.20 W | 1120.22 | 2.46 |
| 6531.00 | 88.89 | 179.45 | 6001.52 | 1214.05 S | 76.95 W | 1214.13 | 2.53 |
| 6625.00 | 88.40 | 178.38 | 6003.74 | 1308.00 S | 75.17 W | 1308.08 | 1.25 |
| 6719.00 | 87.84 | 178.51 | 6006.82 | 1401.92 S | 72.62 W | 1401.99 | 0.61 |
| 6813.00 | 88.86 | 180.40 | 6009.53 | 1495.87 S | 71.73 W | 1495.94 | 2.28 |
| 6908.00 | 91.17 | 180.37 | 6009.50 | 1590.86 S | 72.37 W | 1590.94 | 2.43 |
| 7003.00 | 91.51 | 180.73 | 6007.28 | 1685.83 S | 73.28 W | 1685.91 | 0.52 |
| 7097.00 | 92.37 | 180.55 | 6004.10 | 1779.77 S | 74.33 W | 1779.85 | 0.94 |
| 7191.00 | 90.89 | 178.82 | 6001.42 | 1873.72 S | 73.81 W | 1873.80 | 2.42 |
| 7286.00 | 90.55 | 179.42 | 6000.22 | 1968.70 S | 72.34 W | 1968.78 | 0.73 |
| 7380.00 | 90.96 | 179.78 | 5998.98 | 2062.69 S | 71.69 W | 2062.77 | 0.58 |
| 7474.00 | 90.89 | 178.26 | 5997.46 | 2156.66 S | 70.08 W | 2156.74 | 1.62 |
| 7568.00 | 91.17 | 177.95 | 5995.77 | 2250.60 S | 66.97 W | 2250.67 | 0.45 |
| 7662.00 | 91.29 | 178.80 | 5993.74 | 2344.54 S | 64.31 W | 2344.60 | 0.92 |
| 7756.00 | 90.62 | 179.03 | 5992.18 | 2438.51 S | 62.54 W | 2438.57 | 0.76 |
| 7851.00 | 90.83 | 179.09 | 5990.98 | 2533.49 S | 60.98 W | 2533.55 | 0.24 |
| 7946.00 | 90.40 | 179.21 | 5989.96 | 2628.47 S | 59.58 W | 2628.53 | 0.47 |
| 8040.00 | 89.54 | 178.76 | 5990.01 | 2722.45 S | 57.91 W | 2722.51 | 1.04 |
| 8135.00 | 91.48 | 178.93 | 5989.16 | 2817.43 S | 55.99 W | 2817.48 | 2.05 |
| 8230.00 | 91.14 | 178.30 | 5986.99 | 2912.37 S | 53.70 W | 2912.43 | 0.76 |
| 8324.00 | 90.68 | 178.01 | 5985.50 | 3006.31 S | 50.66 W | 3006.36 | 0.58 |
| 8419.00 | 91.26 | 179.16 | 5983.89 | 3101.27 S | 48.31 W | 3101.32 | 1.36 |
| 8514.00 | 90.43 | 178.37 | 5982.48 | 3196.23 S | 46.26 W | 3196.28 | 1.21 |
| 8608.00 | 90.68 | 179.05 | 5981.57 | 3290.20 S | 44.14 W | 3290.25 | 0.77 |
| 8702.00 | 90.40 | 178.91 | 5980.69 | 3384.19 S | 42.47 W | 3384.23 | 0.33 |
| 8797.00 | 88.92 | 178.23 | 5981.25 | 3479.15 S | 40.10 W | 3479.19 | 1.71 |
| 8891.00 | 89.44 | 178.98 | 5982.59 | 3573.11 S | 37.80 W | 3573.15 | 0.97 |
| 8985.00 | 88.86 | 178.59 | 5983.98 | 3667.08 S | 35.81 W | 3667.12 | 0.74 |
| 9079.00 | 88.24 | 178.96 | 5986.36 | 3761.03 S | 33.81 W | 3761.06 | 0.76 |
| 9173.00 | 87.75 | 178.73 | 5989.64 | 3854.95 S | 31.92 W | 3854.98 | 0.58 |
| 9267.00 | 88.86 | 178.65 | 5992.42 | 3948.88 S | 29.78 W | 3948.91 | 1.18 |
| 9361.00 | 90.34 | 178.49 | 5993.08 | 4042.85 S | 27.43 W | 4042.88 | 1.58 |
| 9456.00 | 89.69 | 178.02 | 5993.06 | 4137.81 S | 24.53 W | 4137.83 | 0.84 |
| 9550.00 | 90.49 | 178.07 | 5992.91 | 4231.75 S | 21.33 W | 4231.77 | 0.86 |
| 9644.00 | 92.06 | 178.68 | 5990.81 | 4325.69 S | 18.67 W | 4325.70 | 1.79 |
| 9738.00 | 92.47 | 178.69 | 5987.10 | 4419.59 S | 16.51 W | 4419.60 | 0.43 |
| 9832.00 | 93.21 | 178.38 | 5982.44 | 4513.44 S | 14.12 W | 4513.45 | 0.86 |
| 9926.00 | 91.60 | 181.33 | 5978.50 | 4607.34 S | 13.88 W | 4607.36 | 3.57 |
| 10021.00 | 91.54 | 181.58 | 5975.89 | 4702.28 S | 16.29 W | 4702.29 | 0.27 |
| 10115.00 | 91.85 | 181.83 | 5973.11 | 4796.19 S | 19.09 W | 4796.21 | 0.42 |
| 10216.00 | 93.02 | 181.94 | 5968.82 | 4897.05 S | 22.41 W | 4897.07 | 1.17 |
| 10283.00 | 93.02 | 181.94 | 5965.29 | 4963.92 S | 24.67 W | 4963.94 | 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 180.06 DEGREES (GRID)
A TOTAL CORRECTION OF 7.03 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 10283.00 FEET
IS 4963.98 FEET ALONG 180.28 DEGREES (GRID)**

Final survey is a straight line projection to TD.