



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	08-May-16	09-May-16	11-May-16		
Rig Bit Number	2	3	4		
Bit Size (in)	8.500	8.500	8.500		
Tool Nominal OD (in)	6.750	6.750	6.750		
Log Start Depth (MD, ft)	1,934.00	11,697.00	14,624.00		
Log End Depth (MD, ft)	11,697.00	14,624.00	17,675.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	05-May-16 15:00	08-May-16 13:00	10-May-16 06:00		
Drill/Wipe End Date and Time	07-May-16 22:00	09-May-16 12:45	11-May-16 04:30		
Min Inc (deg) @ Depth (MD, ft)	0.38 @ 2,624.00	87.97 @ 13,239.00	87.66 @ 17,614.00		
Max Inc (deg) @ Depth (MD, ft)	92.23 @ 10,780.00	91.88 @ 13,900.00	90.92 @ 14,657.00		
Bit TFA(in2) / Bit Type	2.00 / PDC	2.00 / PDC	1.86 / PDC		
Flow Rate (gpm)	599.71	574.82	549.84		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Diesel Mud Base	Linear Paraffin	Linear Paraffin		
Density (ppg) / Viscosity (spqt)	9.18 / 40.00	9.52 / 42.00	9.70 / 48.00		
Filtrate CL (ppm)	32,500.00	35,000.00	36,500.00		
pH / Fluid Loss (mptm)	N/A / 0	N/A / 0	N/A / 0		
PV (cP) / YP (lbf/ft2)	9 / 6.00	11 / 8.00	13 / 7.00		
% Solids / % Sand	7.30 / 0	8.50 / 0.00	9.50 / 0		
% Oil / Oil:Water Ratio	68.00 / 71:29	66.00 / 76:27	65.00 / 73:27		
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		
Max Tool Temp (in) / F / C	222.78 / 433.00 / 223.22	224.22 / 433.60 / 224.22	224.22 / 433.60 / 224.22		

Max Tool Temp (degF) / Source	238.70 / PCM	264.63 / PCM	264.63 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Brian Neu	Brian Neu	Brian Neu		
Customer Representative	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341332	11341332	11341332		
Insert Serial Number	11680783	12001049	12001049		
Date and Time Initialized	05-May-16 09:54	08-May-16 01:48	08-May-16 01:48		
Date and Time Read	08-May-16 06:48	11-May-16 17:45	11-May-16 17:54		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	61.00	61.00	61.00		
Software Version	6.33	6.33	6.33		
Sub Serial Number	11341332	11341332	11341332		
Sonde Serial Number	11181577	11833264	11833264		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	16.00	90.70	4.30		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.27	49.03	48.95		
Recorded Sample Period (sec)	15	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341332	11341332	11341332		
Insert/Sonde Serial Number	12037413	11579779	11579779		

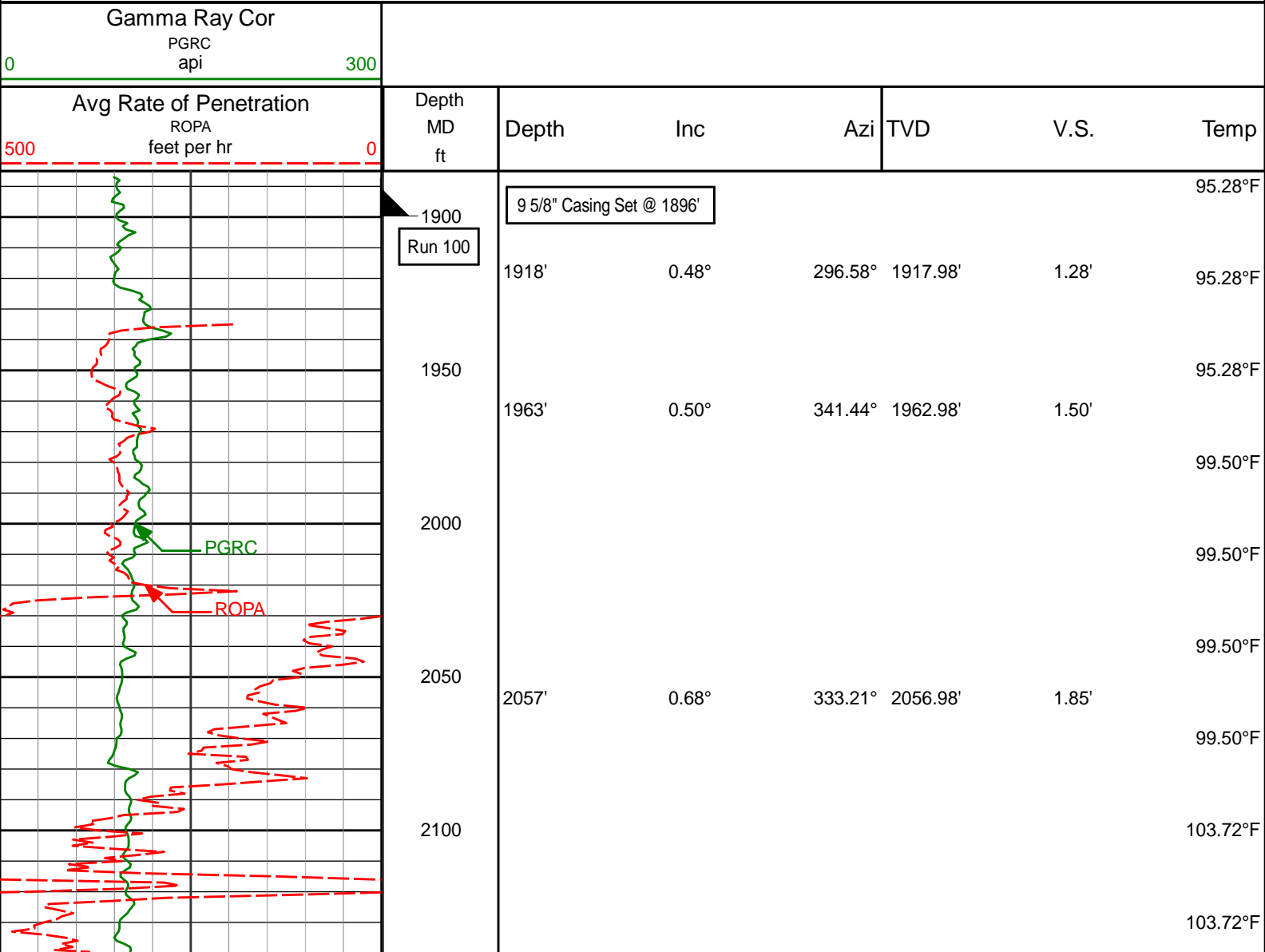
REMARKS

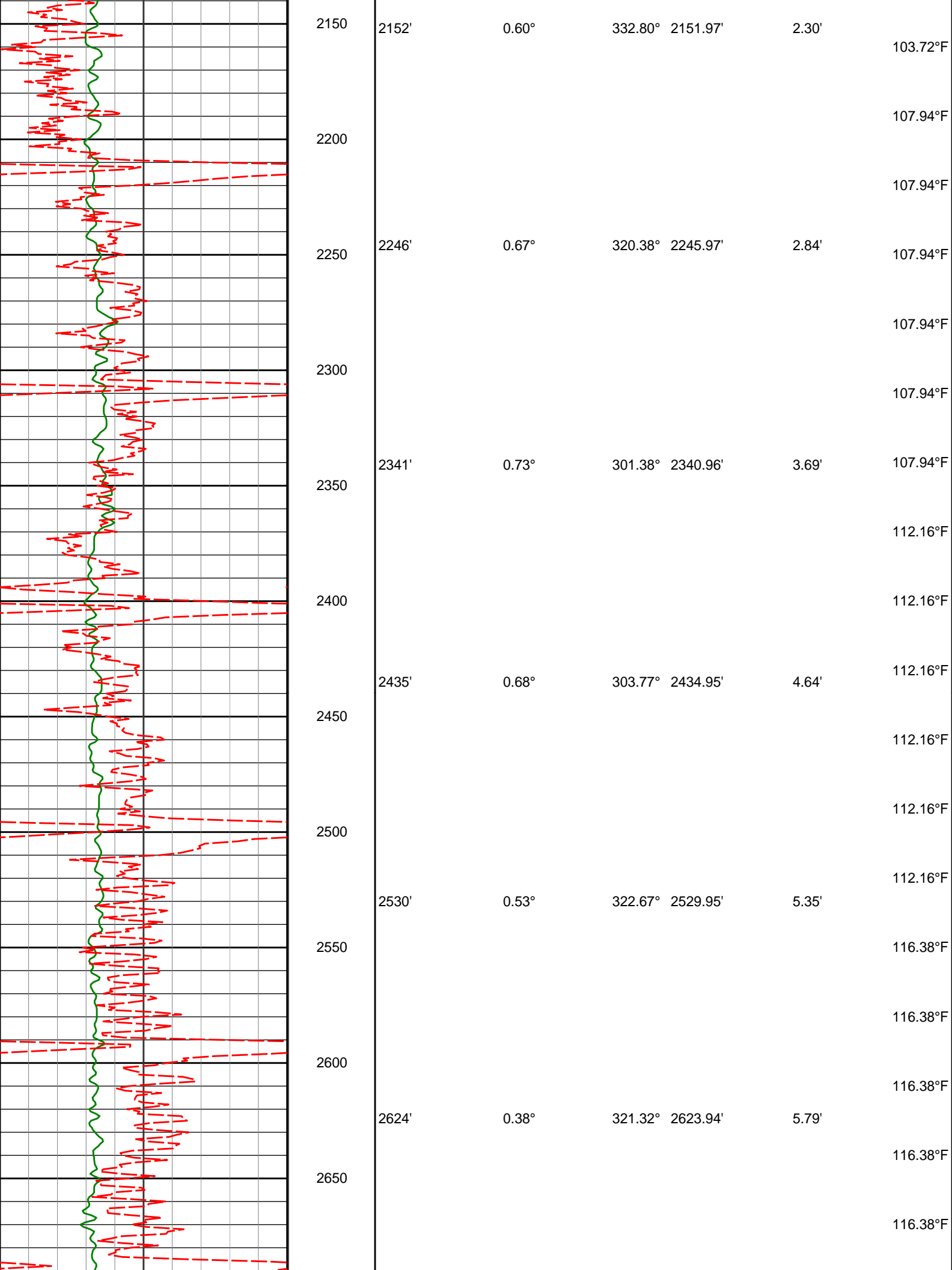
1. All depths are calibrated to driller's pipe tally and are measured depths from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. The following smoothing parameters have been applied to the data:
 Main Log 1:600 (2"):
 (ROPA - Avg Rate of Penetration)
 Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft
 (PGRC - Gamma Ray Cor)
 Interval: 1.0 ft, Coercion Distance: 3.0 ft, Gap fill: 5.0 ft
 Detail Log 1:240 (5"):
 (ROPA - Avg Rate of Penetration)
 Interval: 0.5 ft, Coercion Distance: 1.2 ft, Gap fill: 3.0 ft
 (PGRC - Gamma Ray Cor)
 Interval: 0.5 ft, Coercion Distance: 0.6 ft, Gap fill: 3.0 ft
5. Surveys corrected by Surcon starting at 1963 ft.
6. Last survey is a projection to the bit at TD.

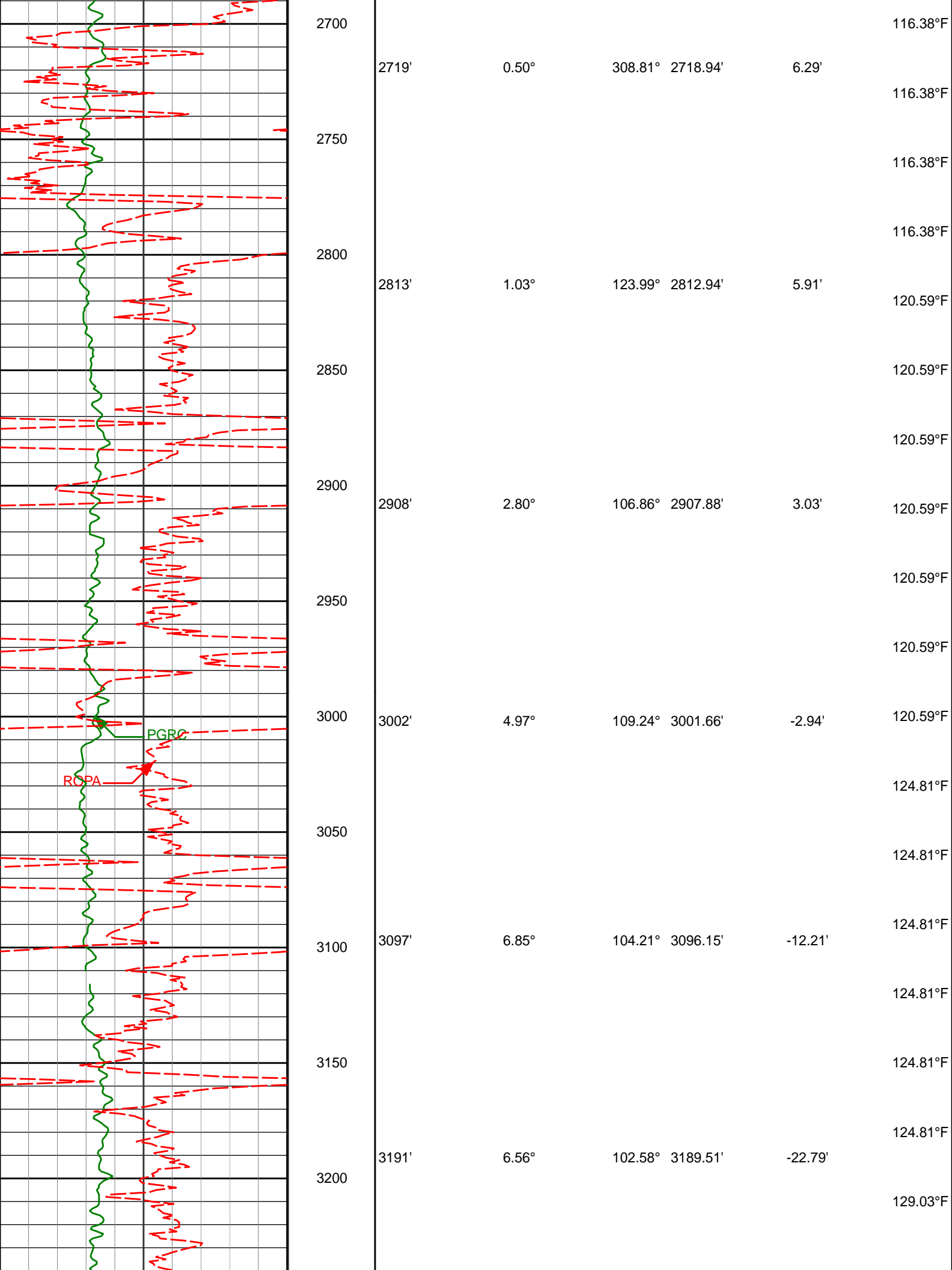
WARRANTY

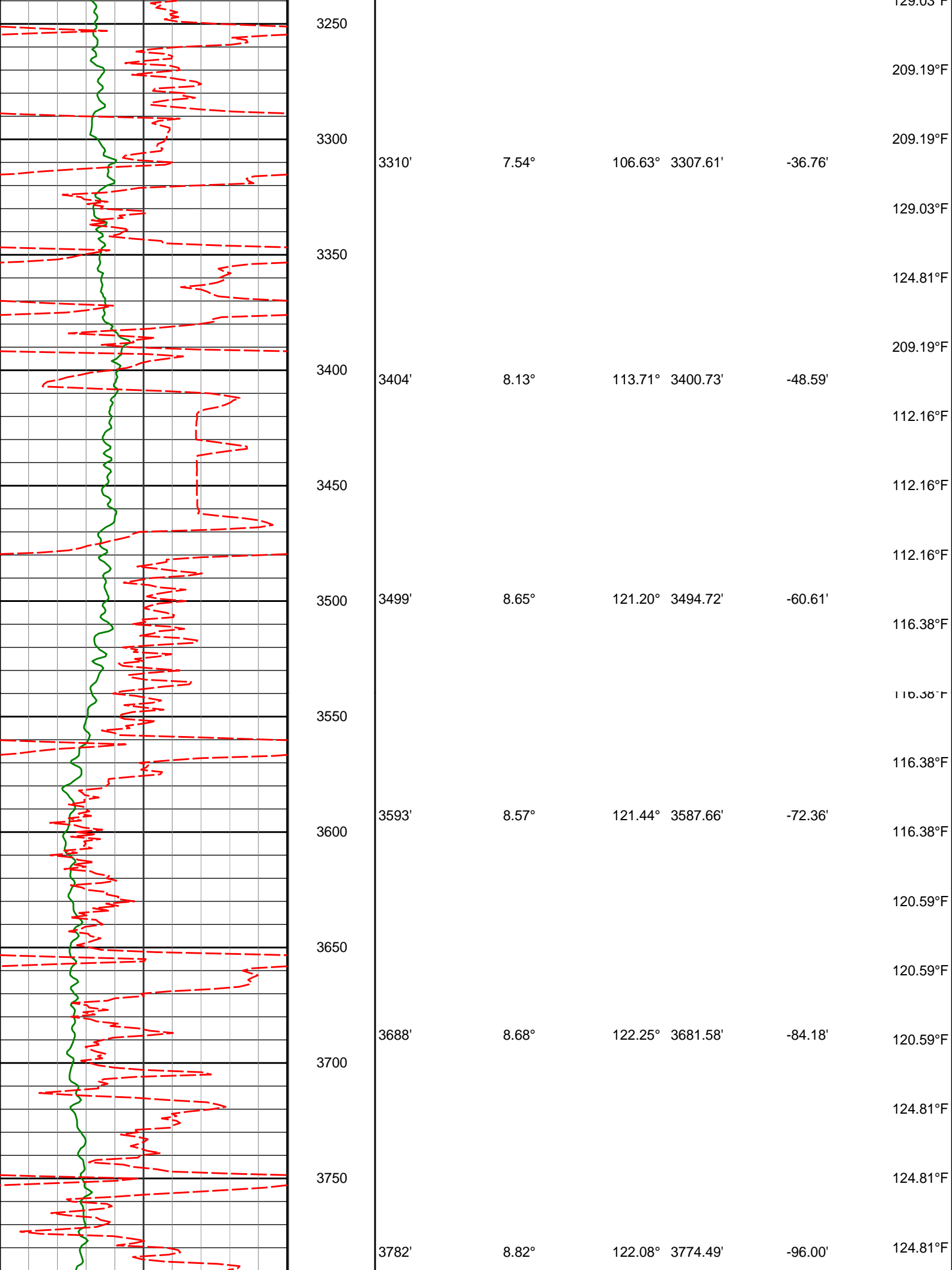
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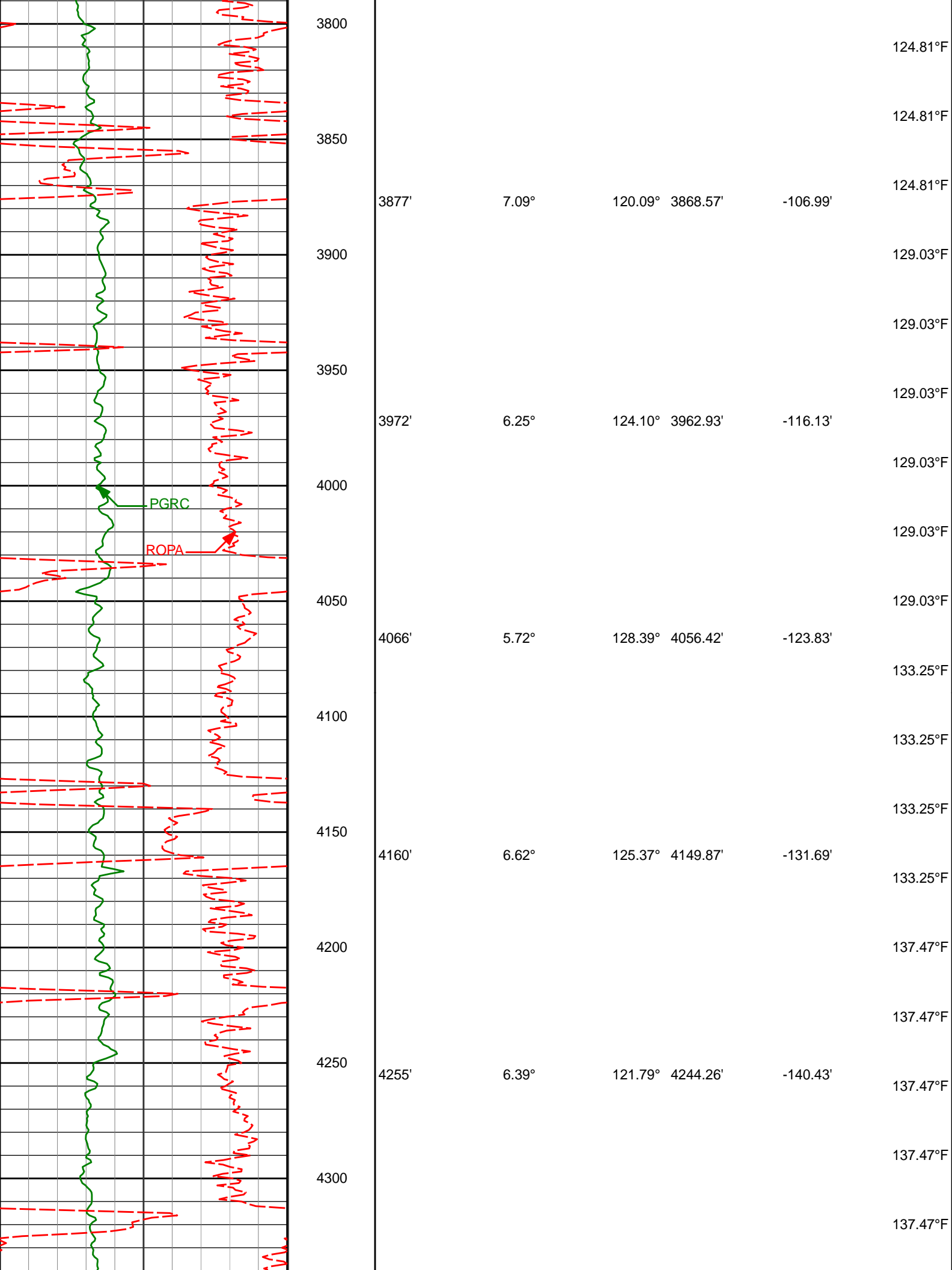
MD Main Log 1:600 Scale

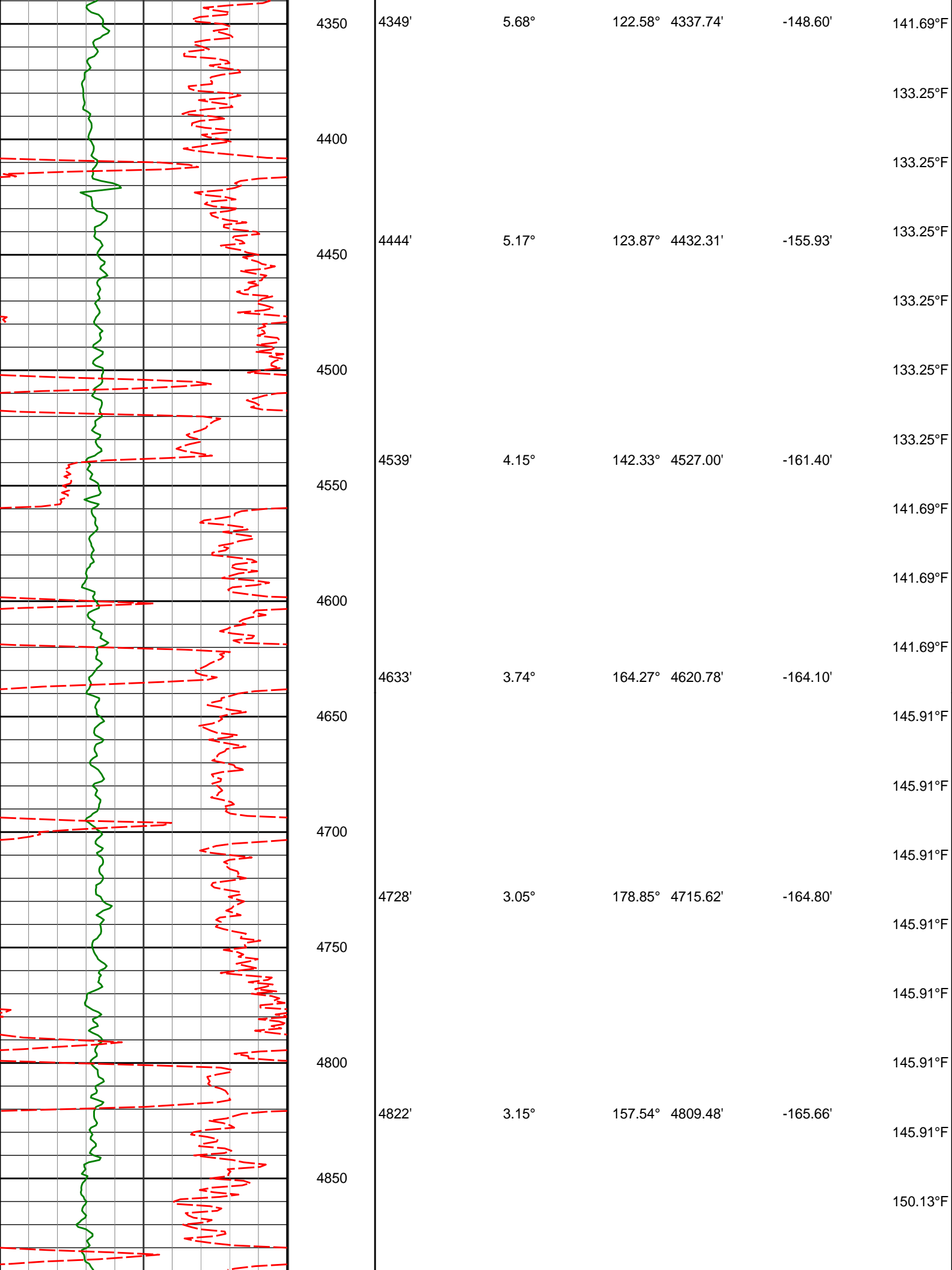


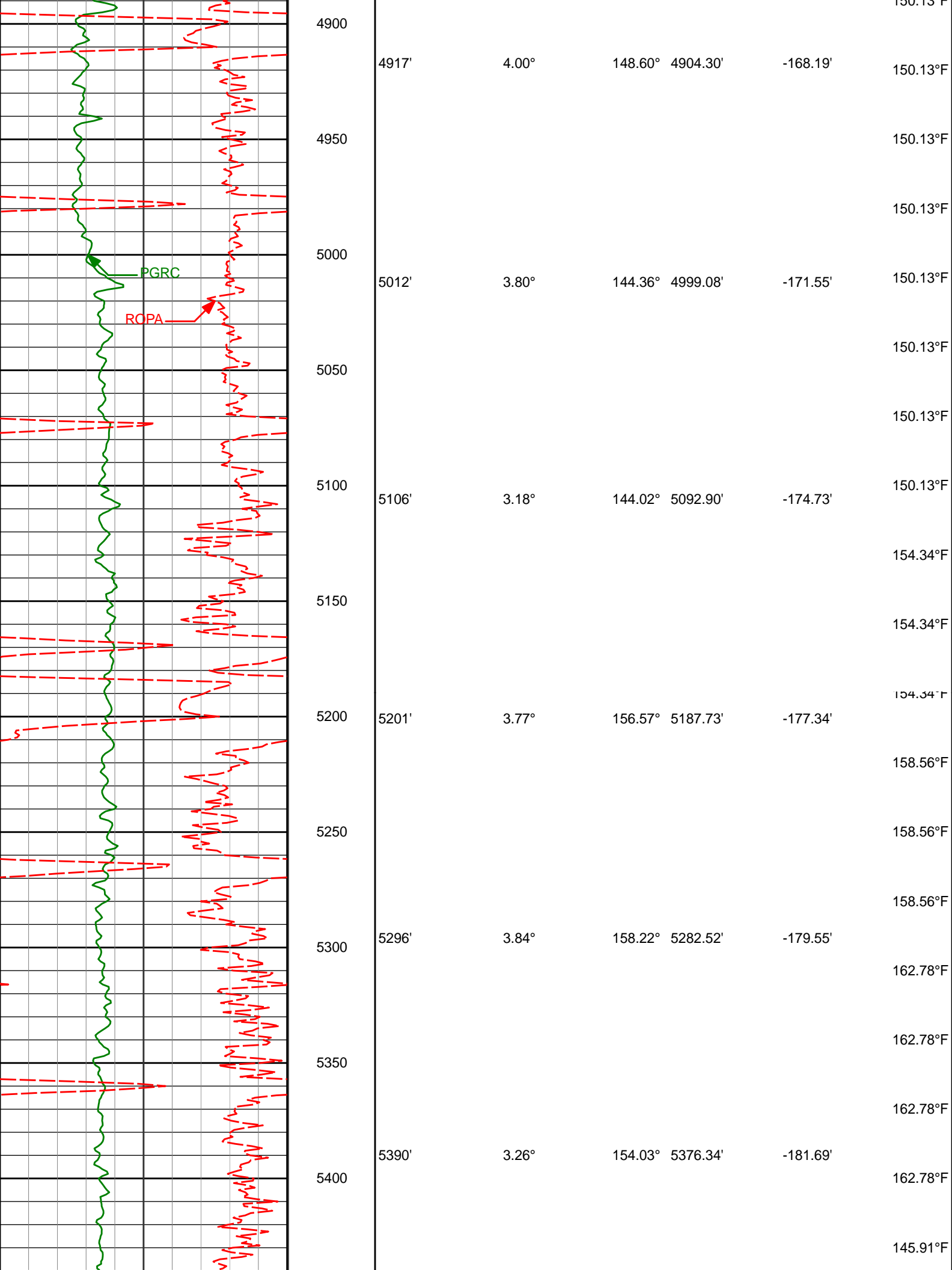


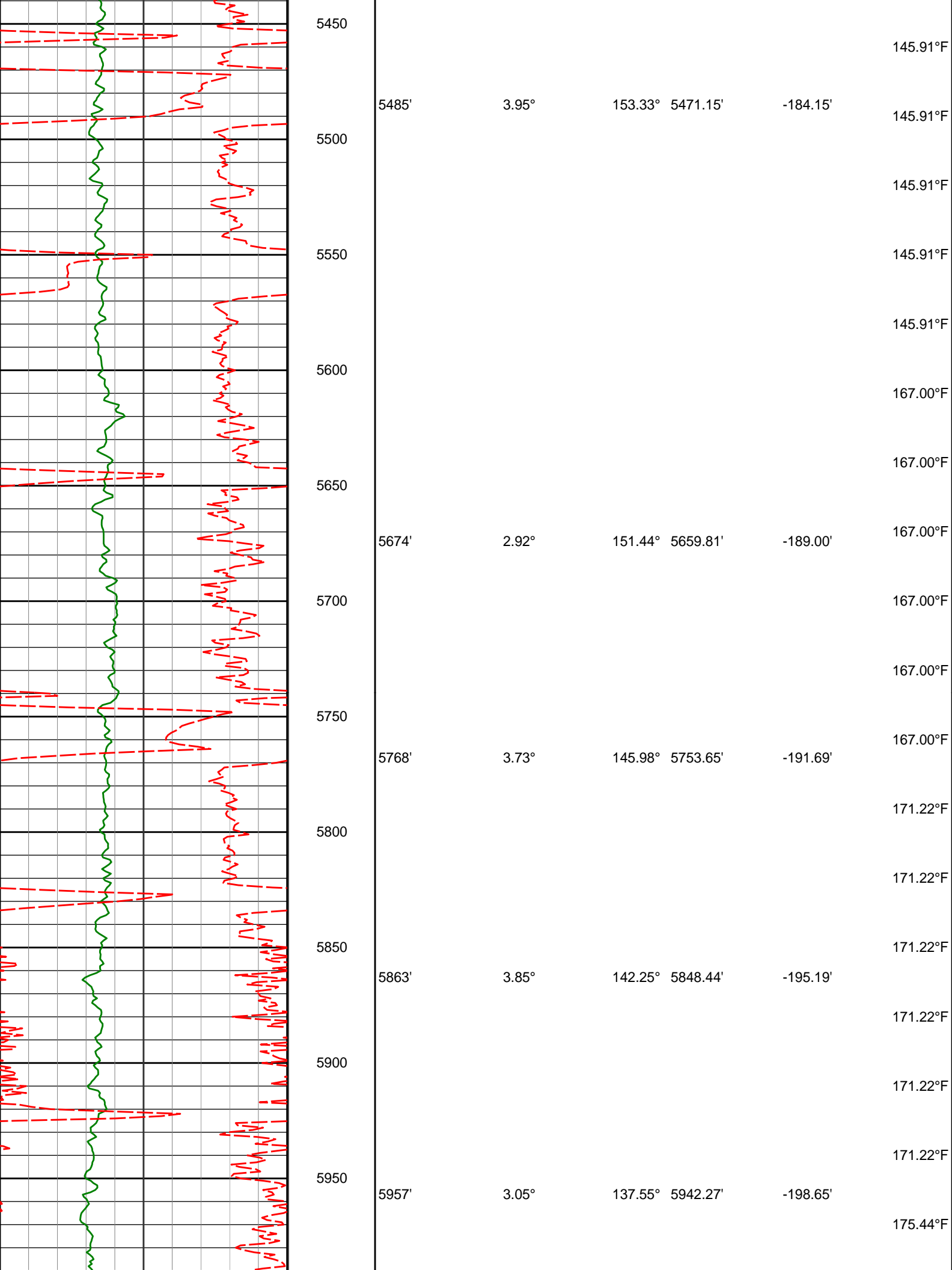


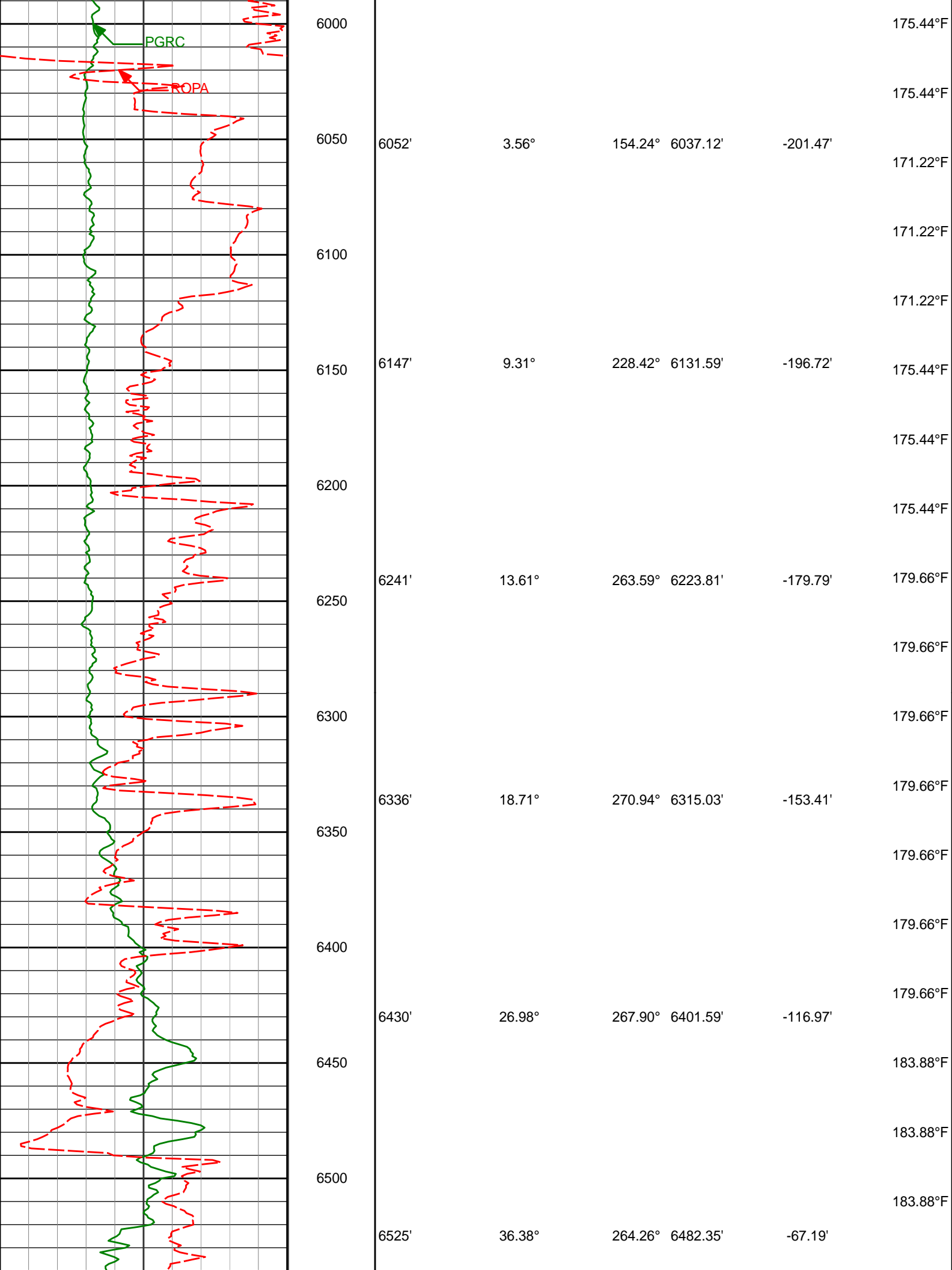


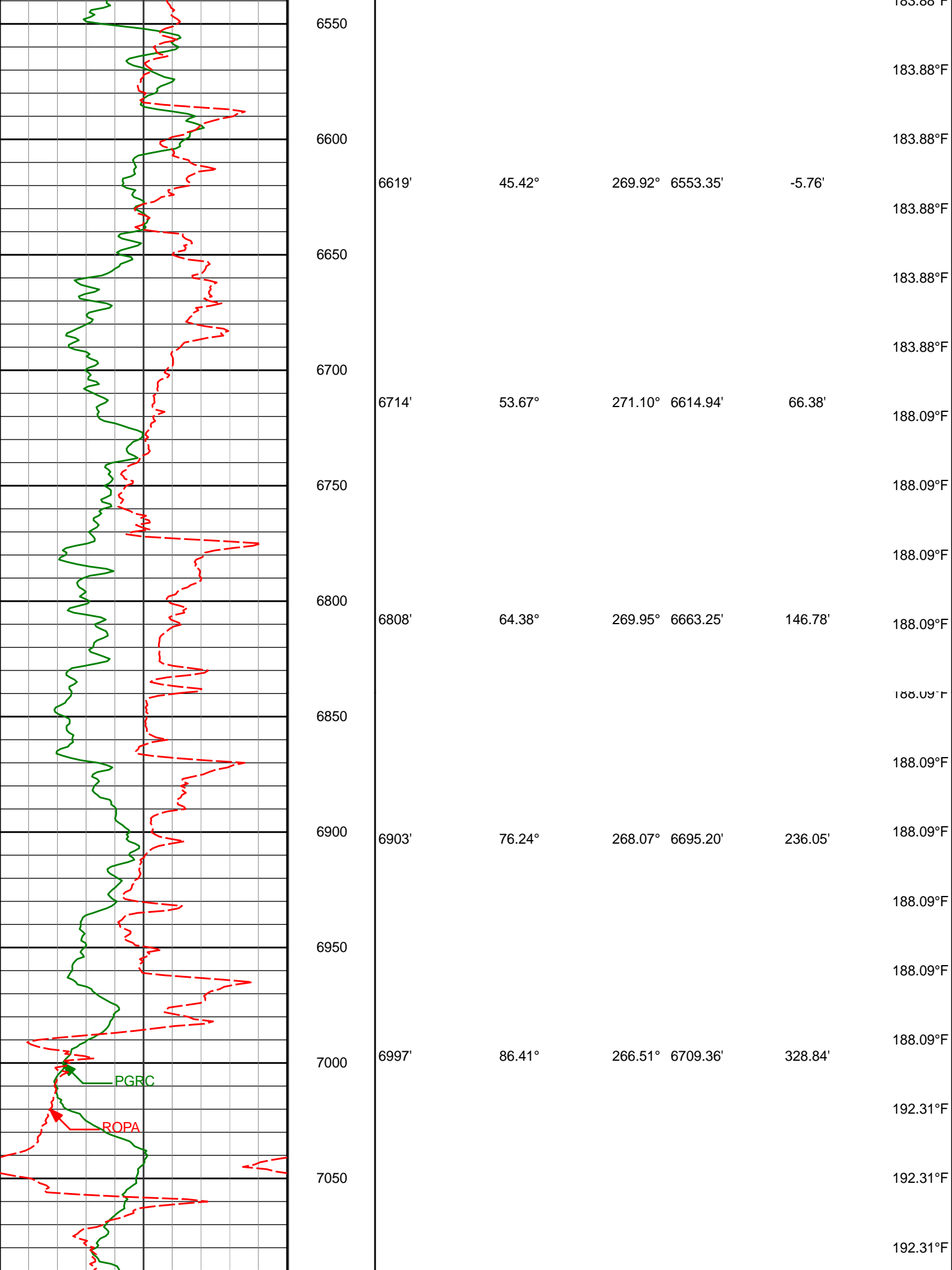


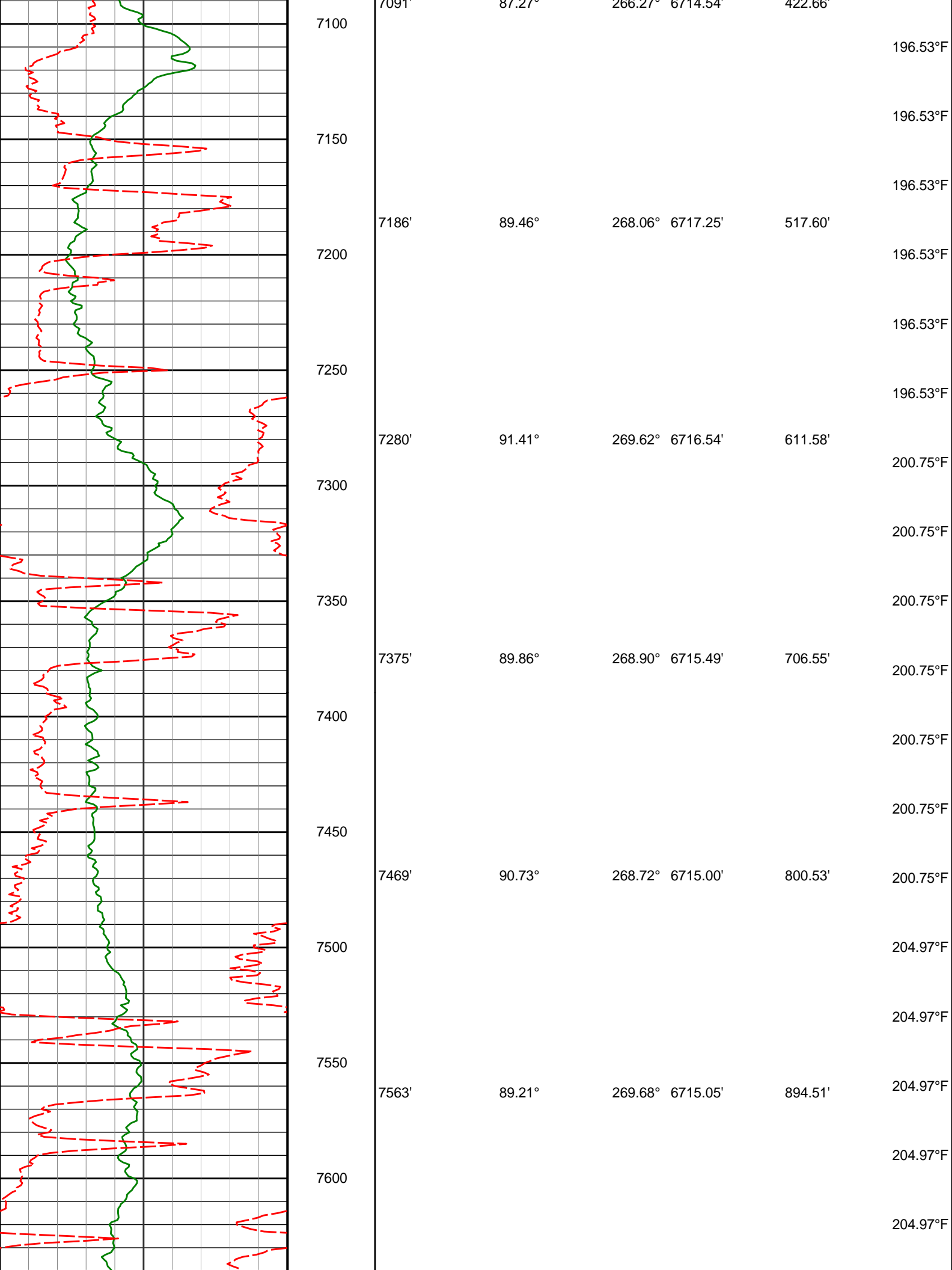


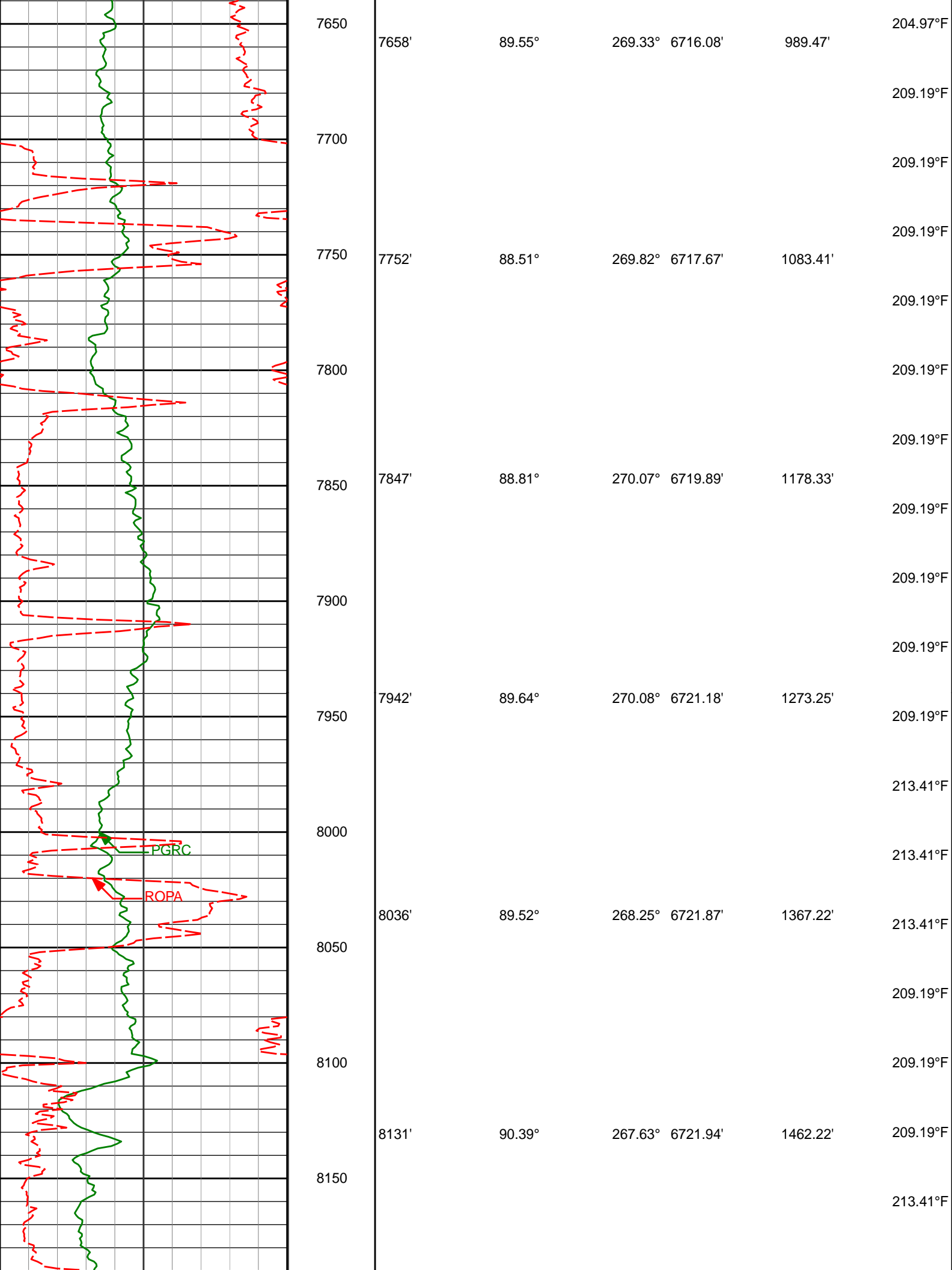


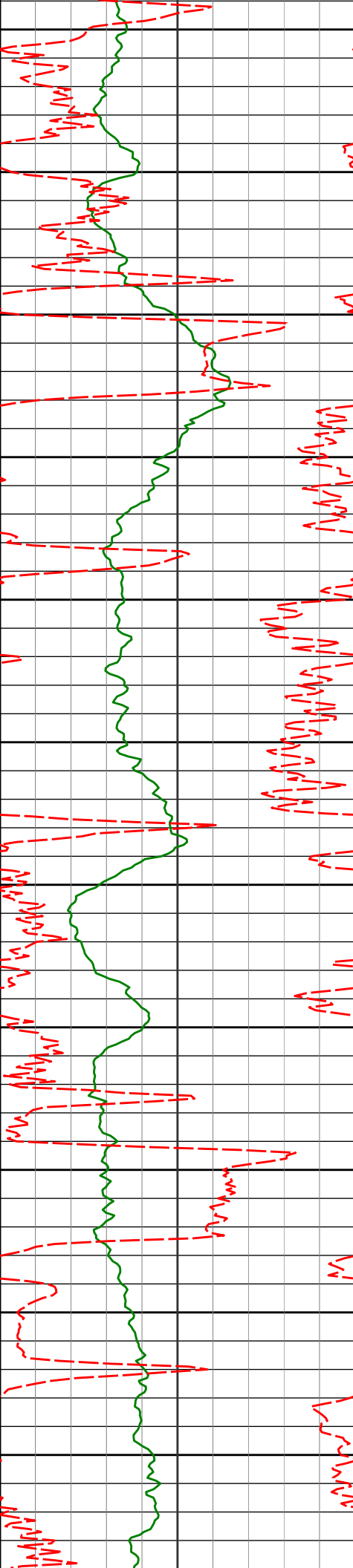




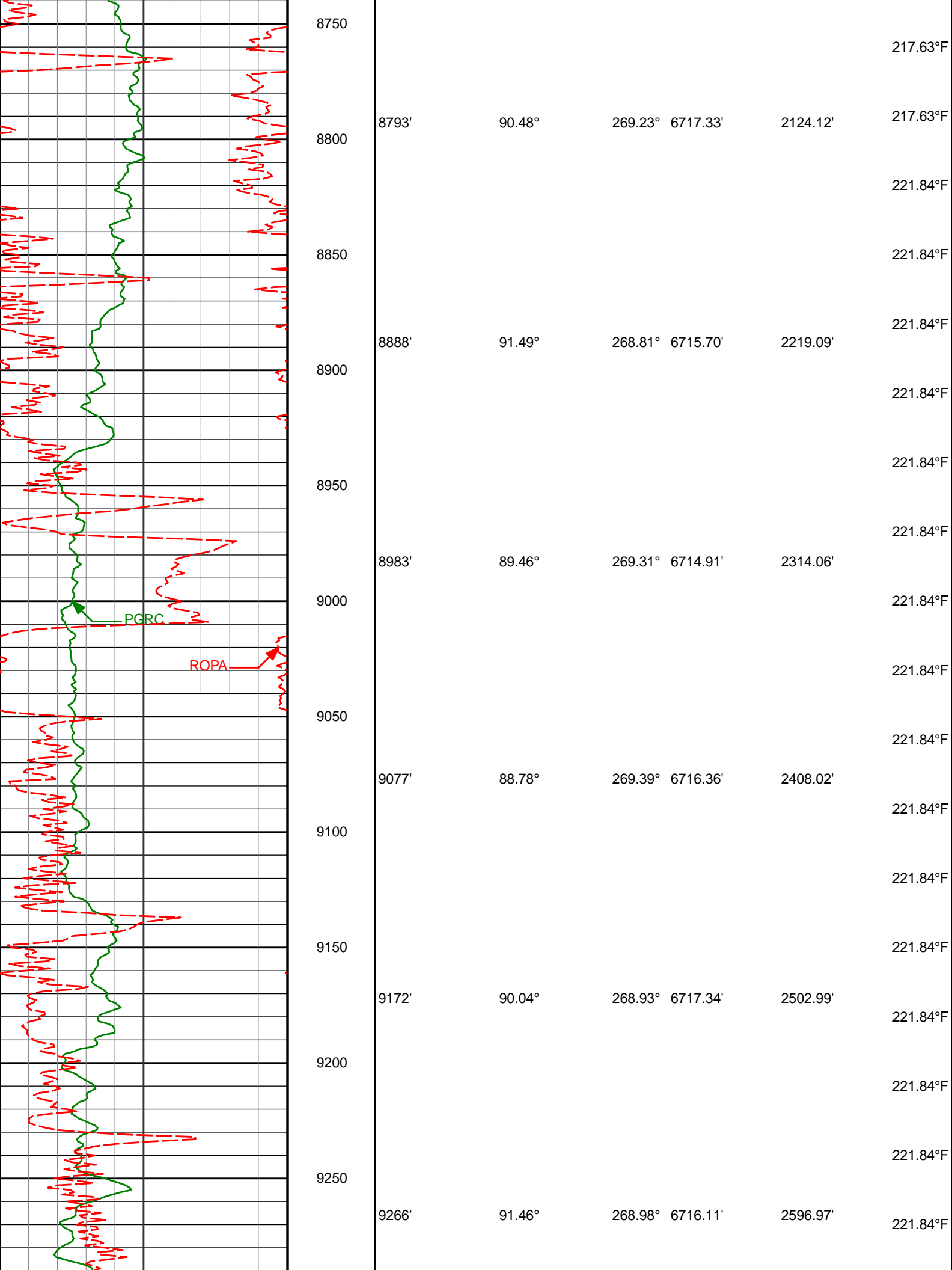


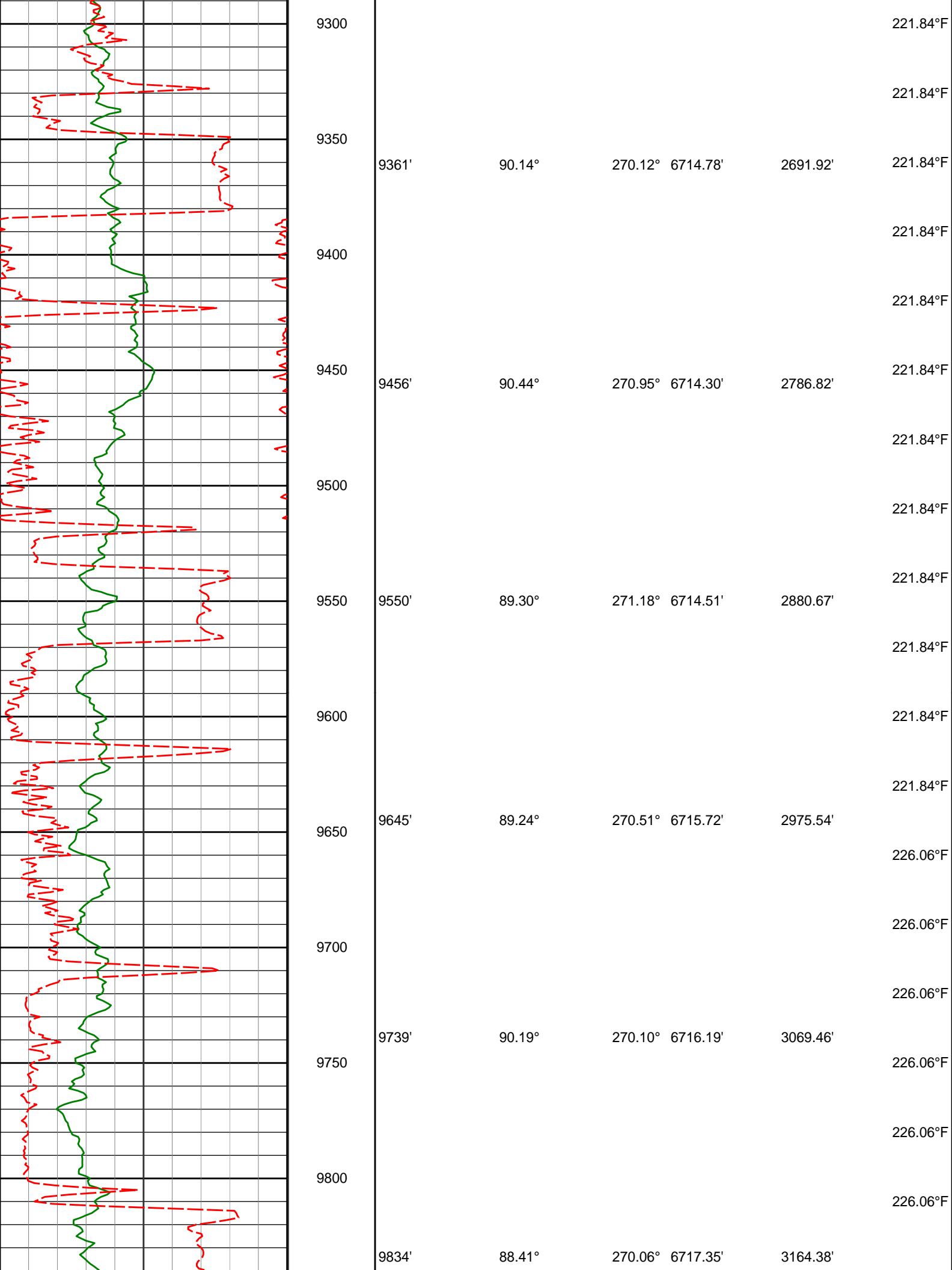


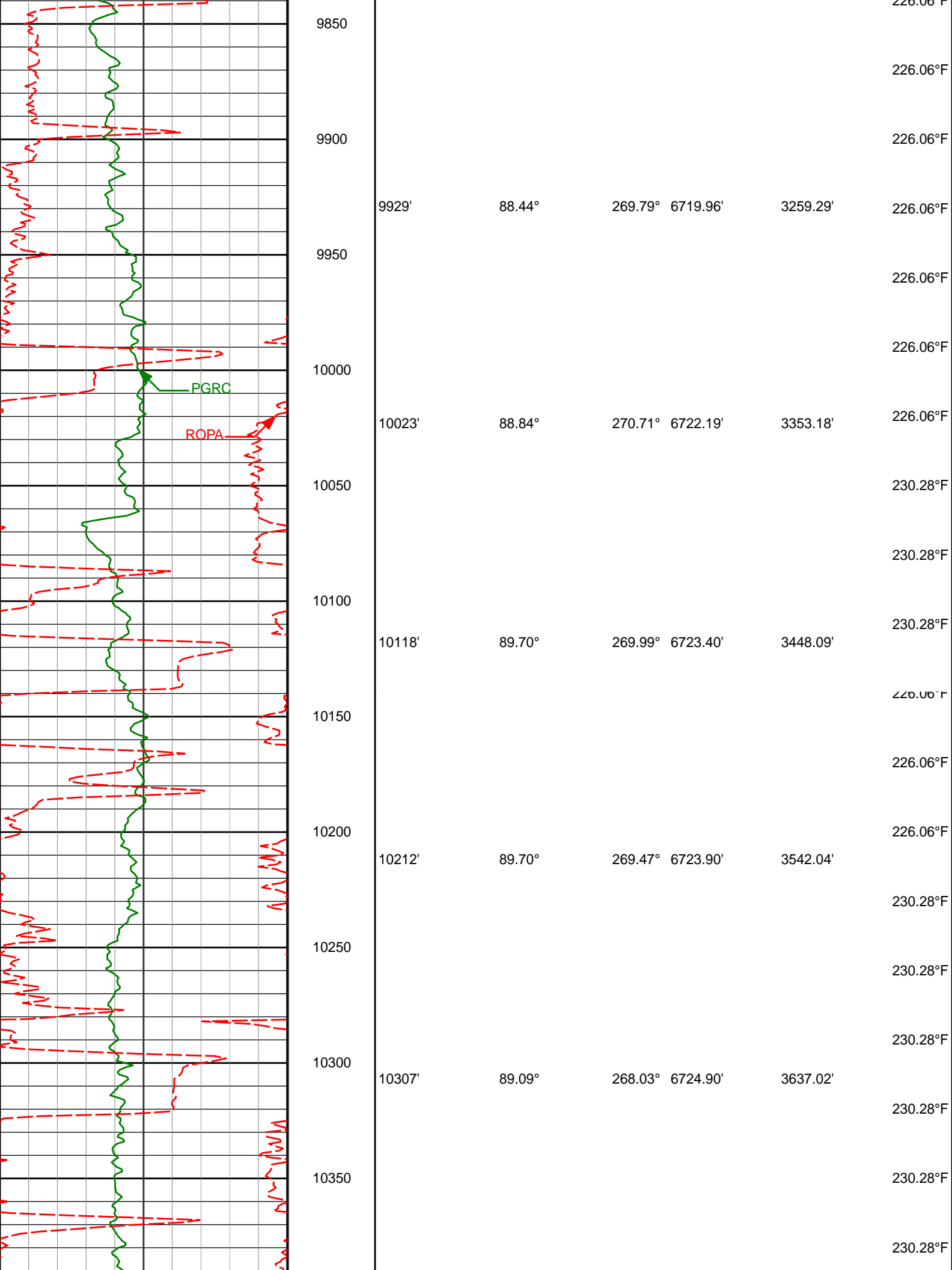


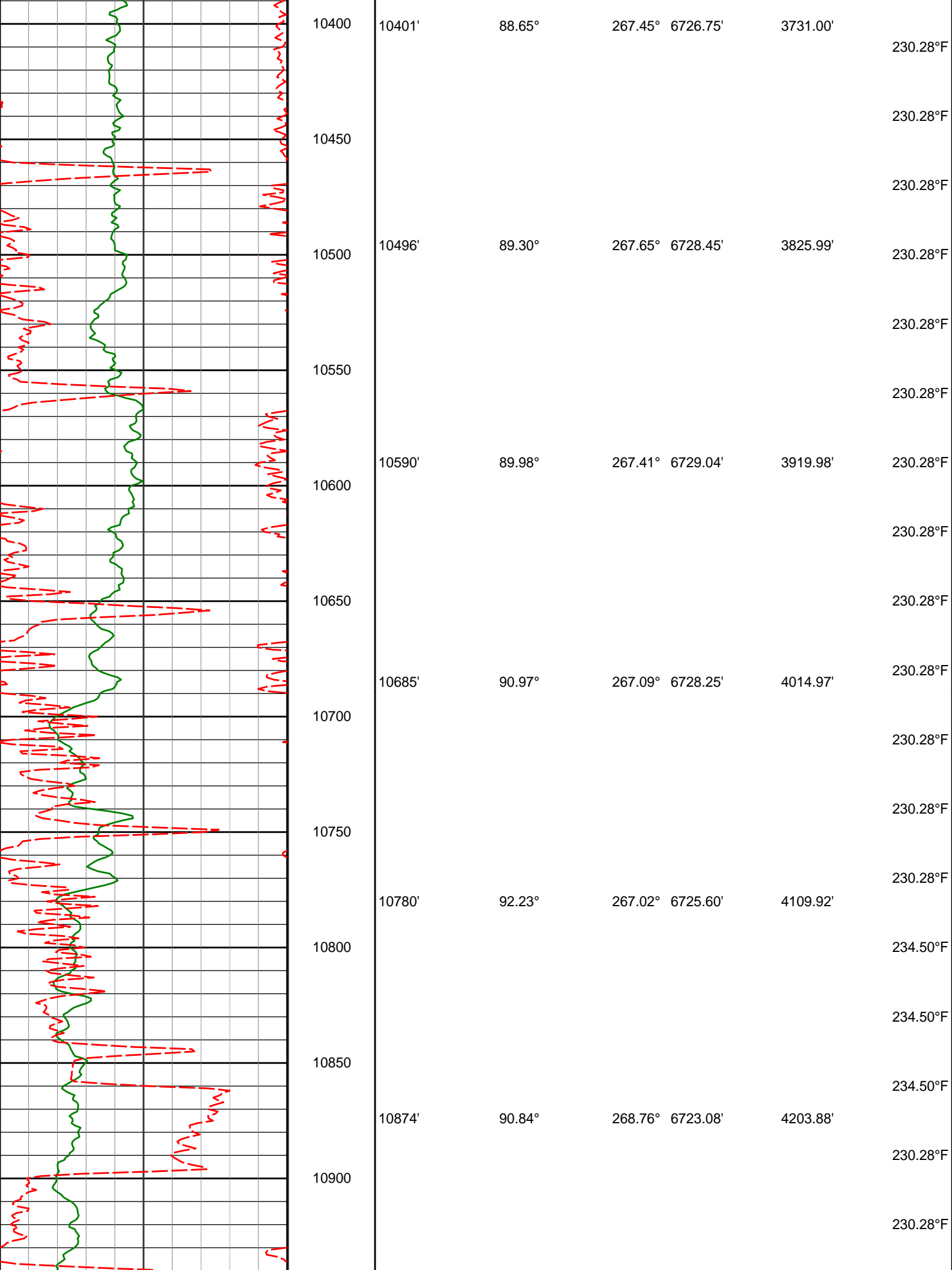


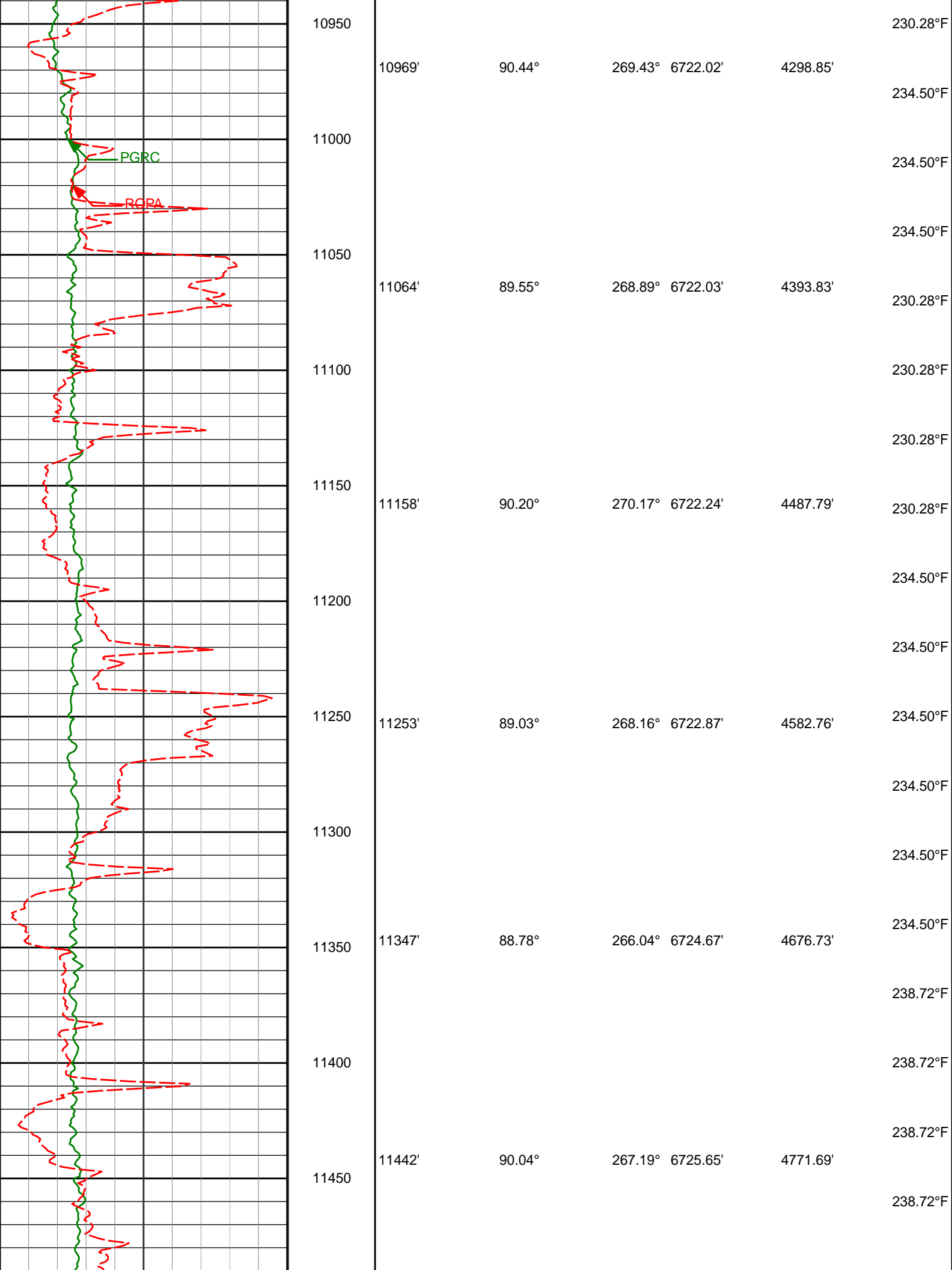
8200					213.41°F
8226'	91.37°	267.29°	6720.48'	1557.21'	213.41°F
8250					213.41°F
					213.41°F
8300					213.41°F
8320'	89.83°	268.28°	6719.50'	1651.20'	213.41°F
					213.41°F
8350					213.41°F
					213.41°F
8400					213.41°F
8415'	90.41°	268.05°	6719.30'	1746.19'	213.41°F
					213.41°F
8450					213.41°F
					213.41°F
8500					213.41°F
8509'	91.34°	268.04°	6717.86'	1840.18'	213.41°F
					213.41°F
8550					217.63°F
					217.63°F
8600					217.63°F
8604'	89.74°	268.64°	6716.97'	1935.17'	217.63°F
					213.41°F
8650					213.41°F
					213.41°F
8700					213.41°F
8699'	89.67°	269.47°	6717.46'	2030.15'	213.41°F
					217.63°F

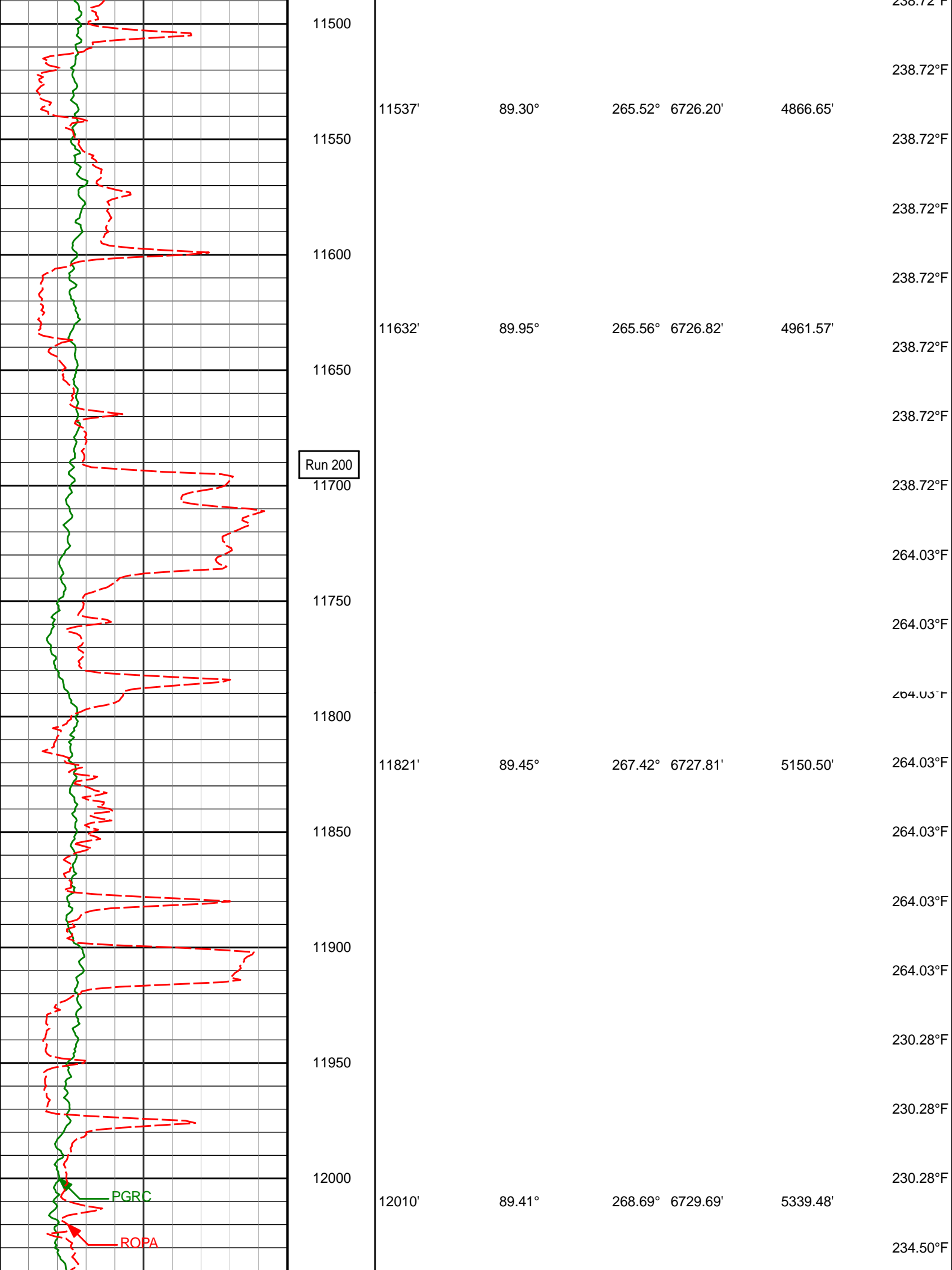


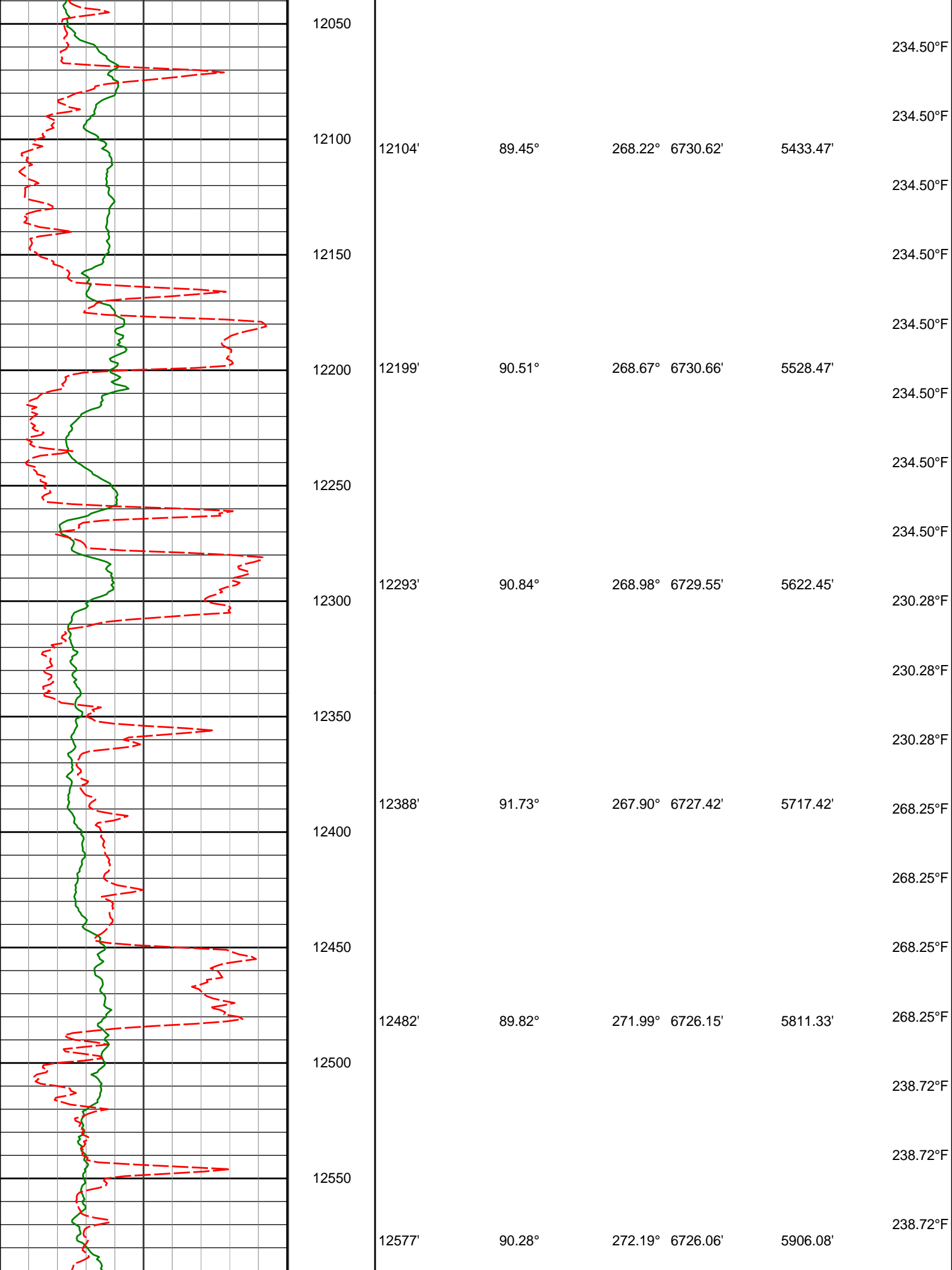


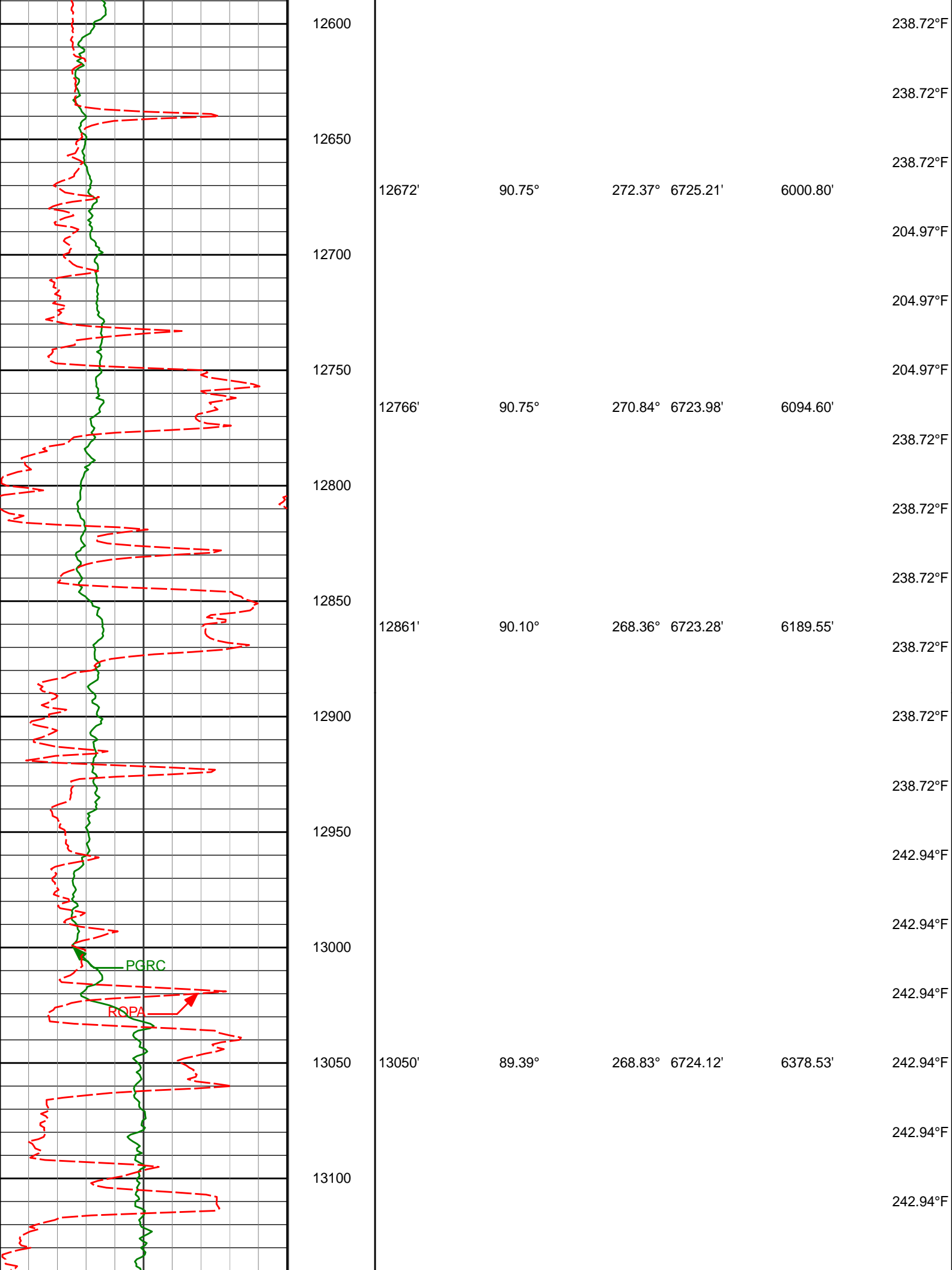


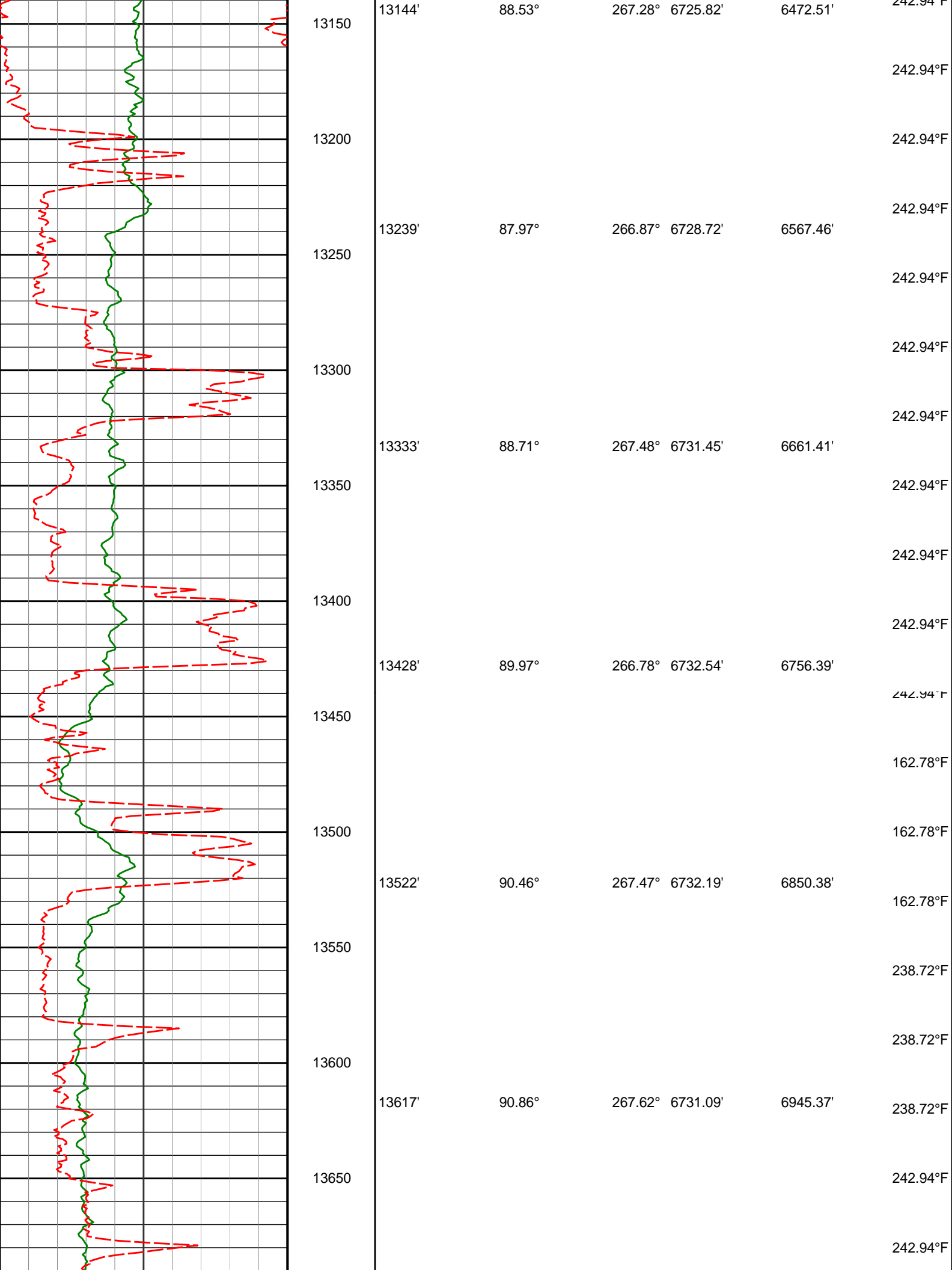


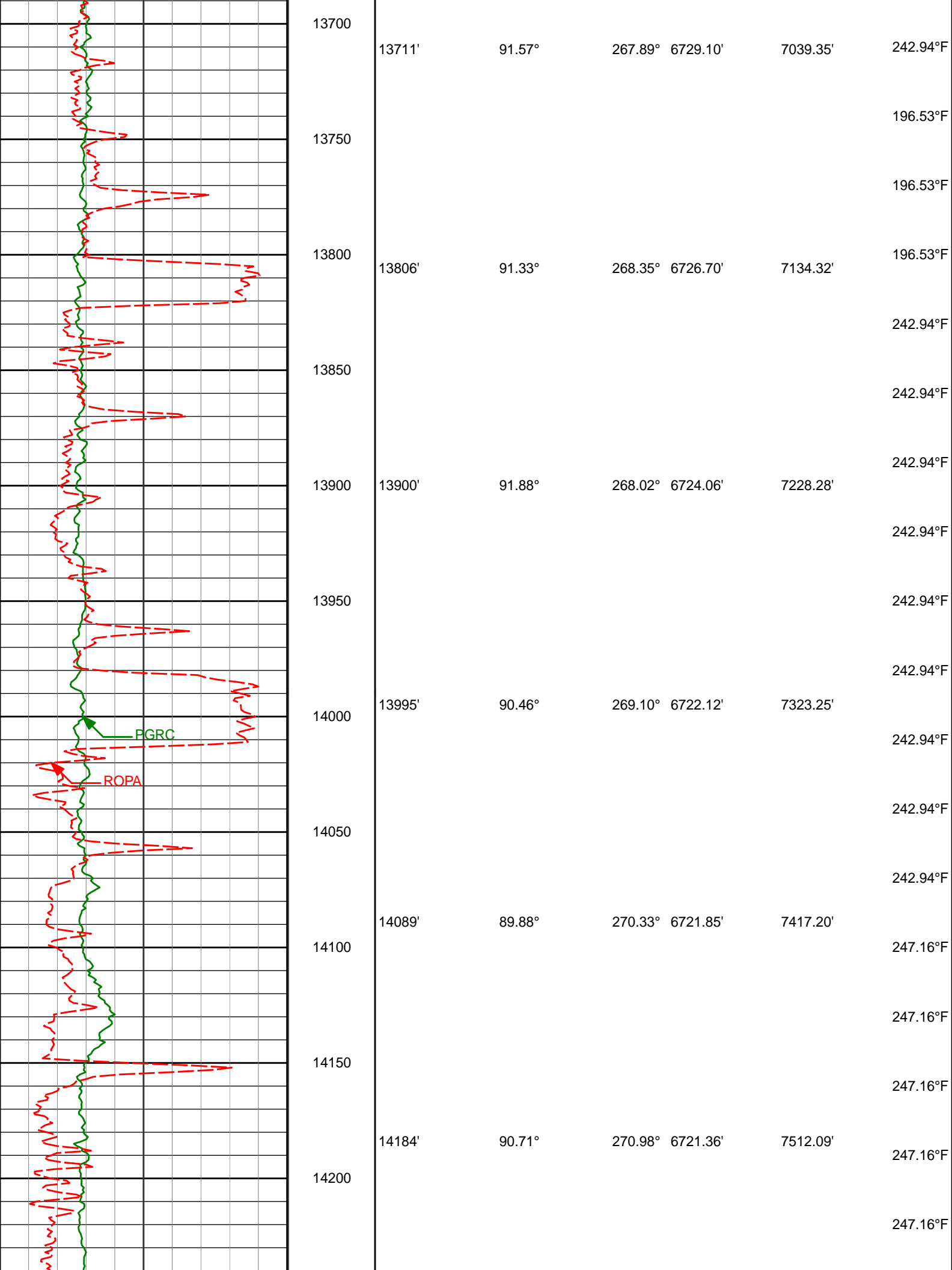


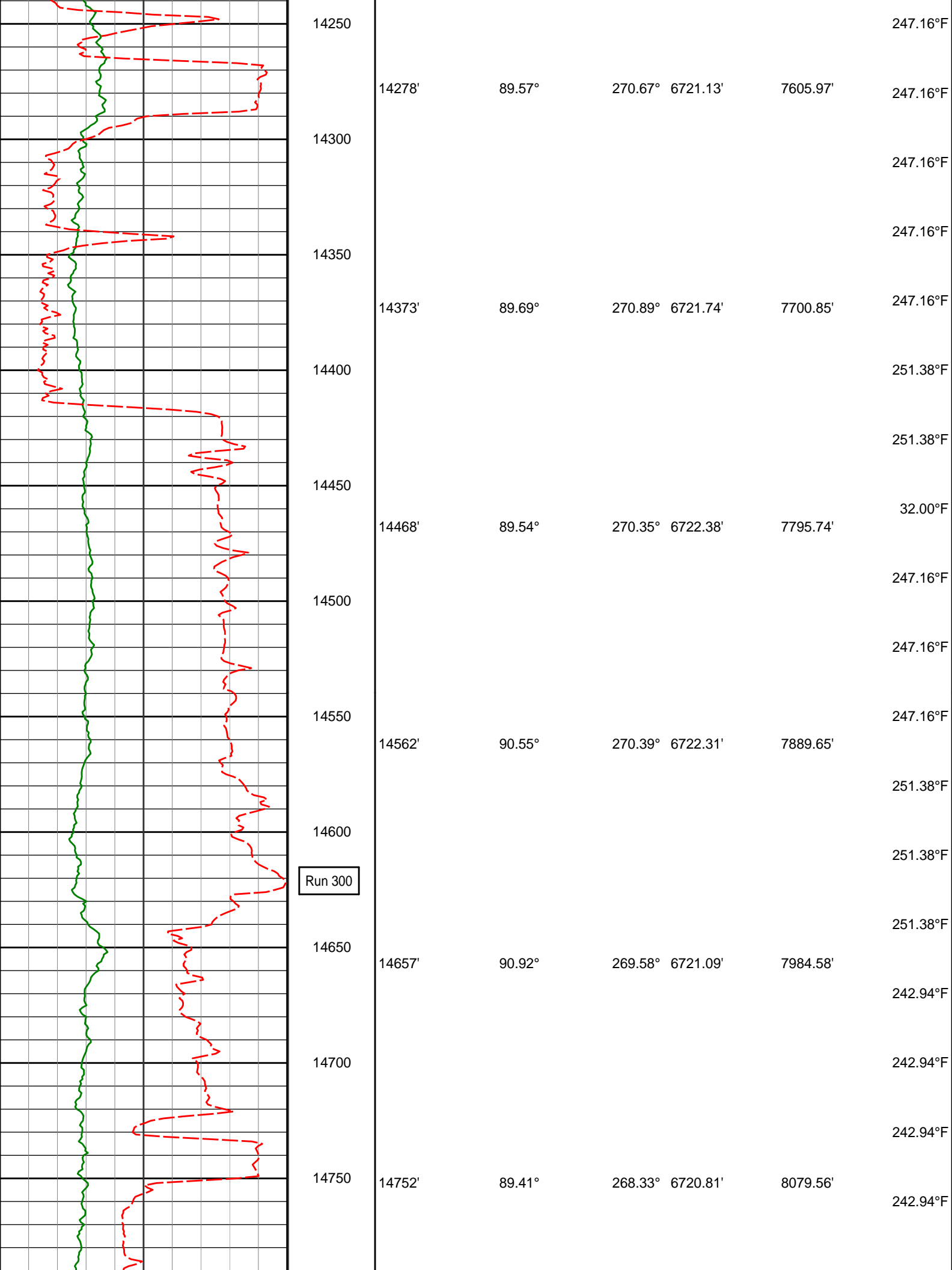


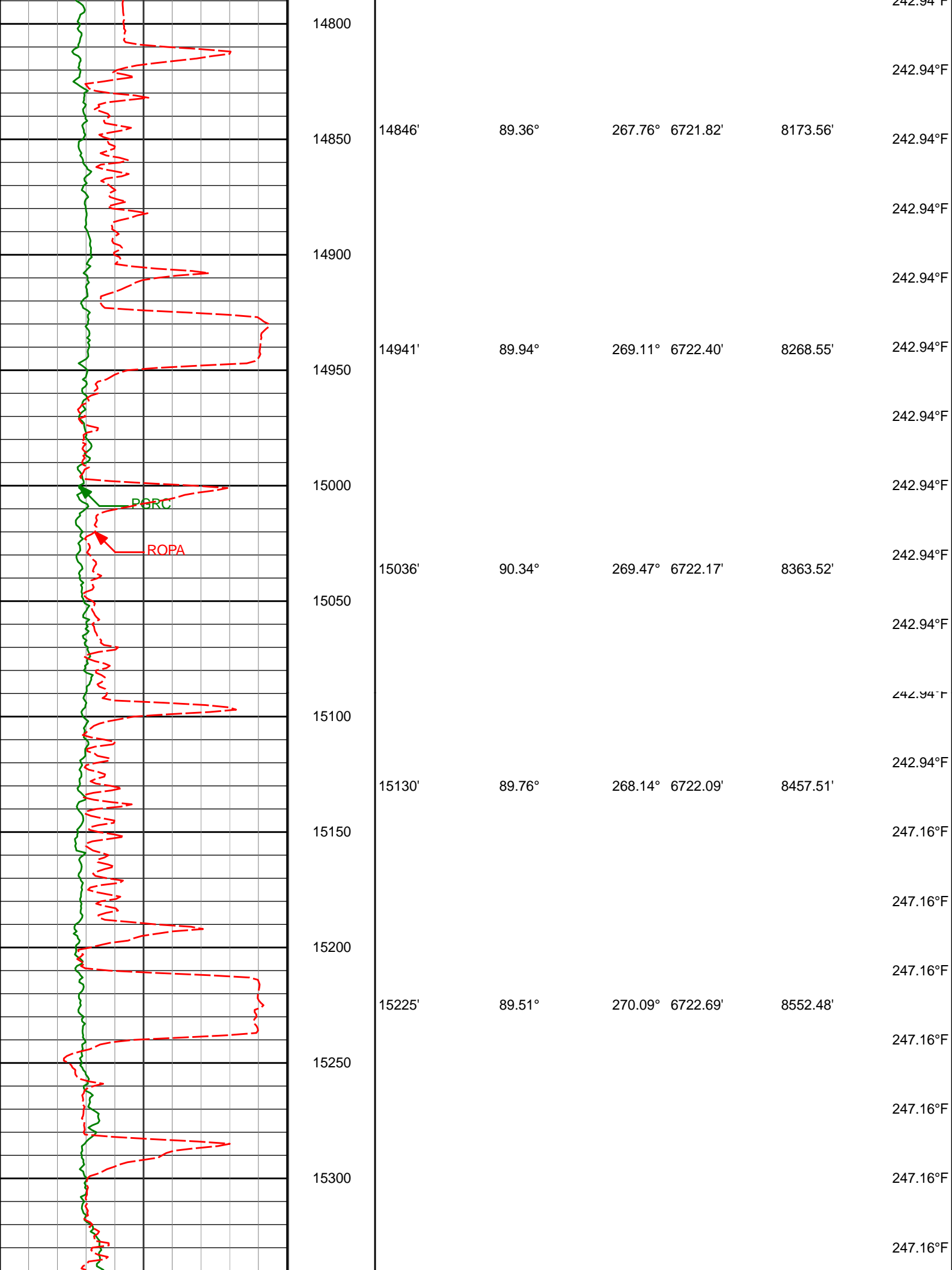


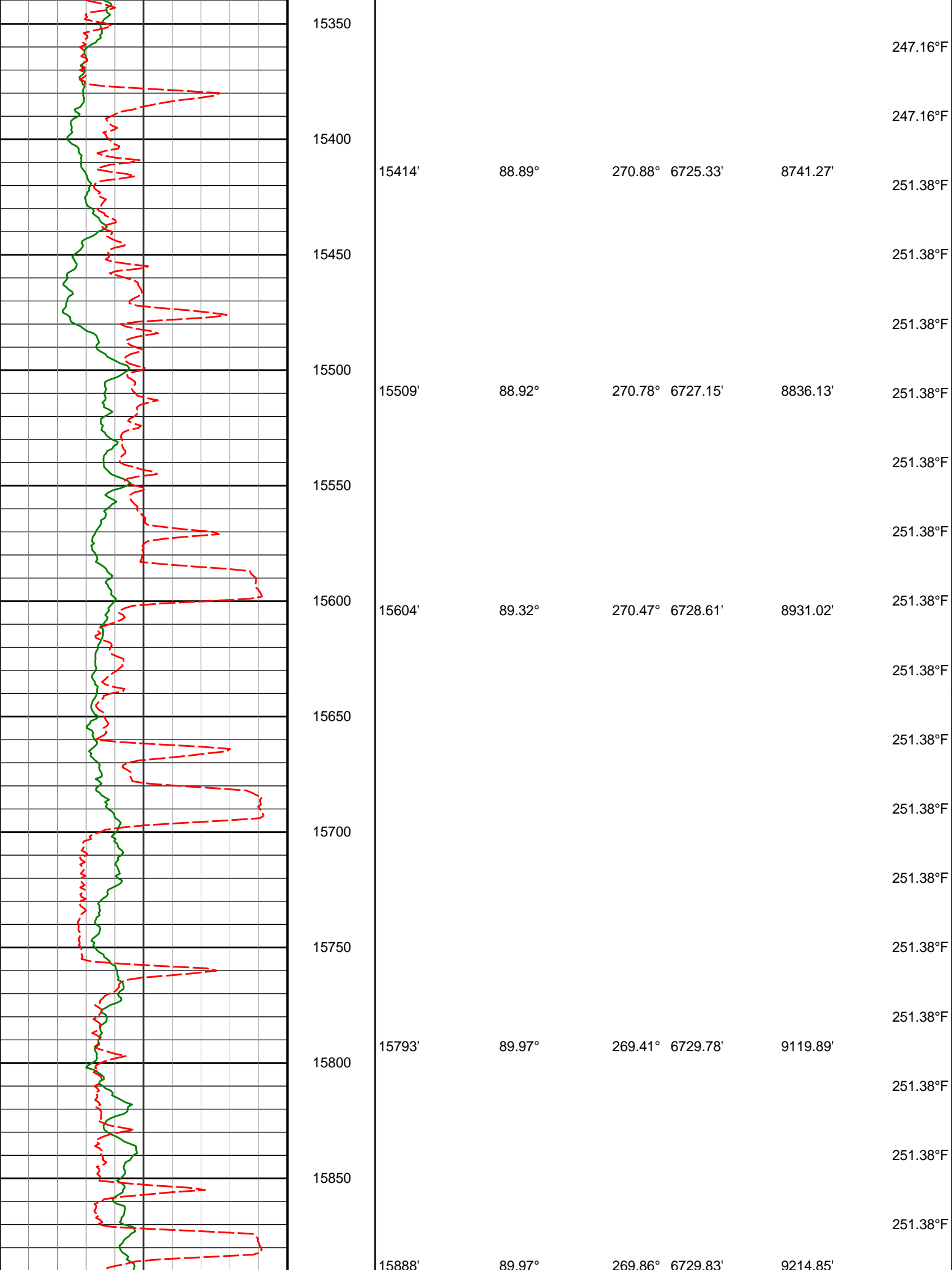


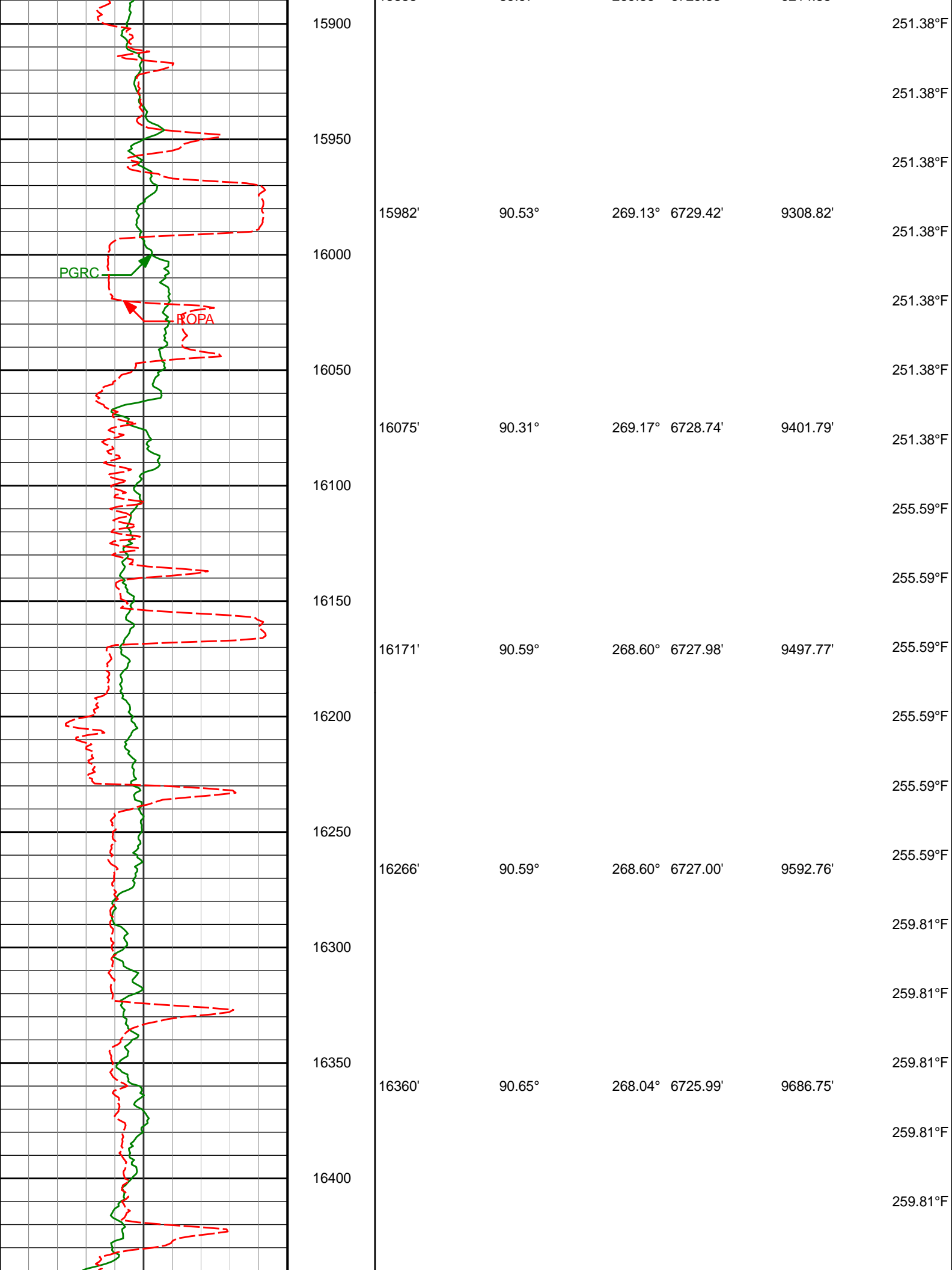


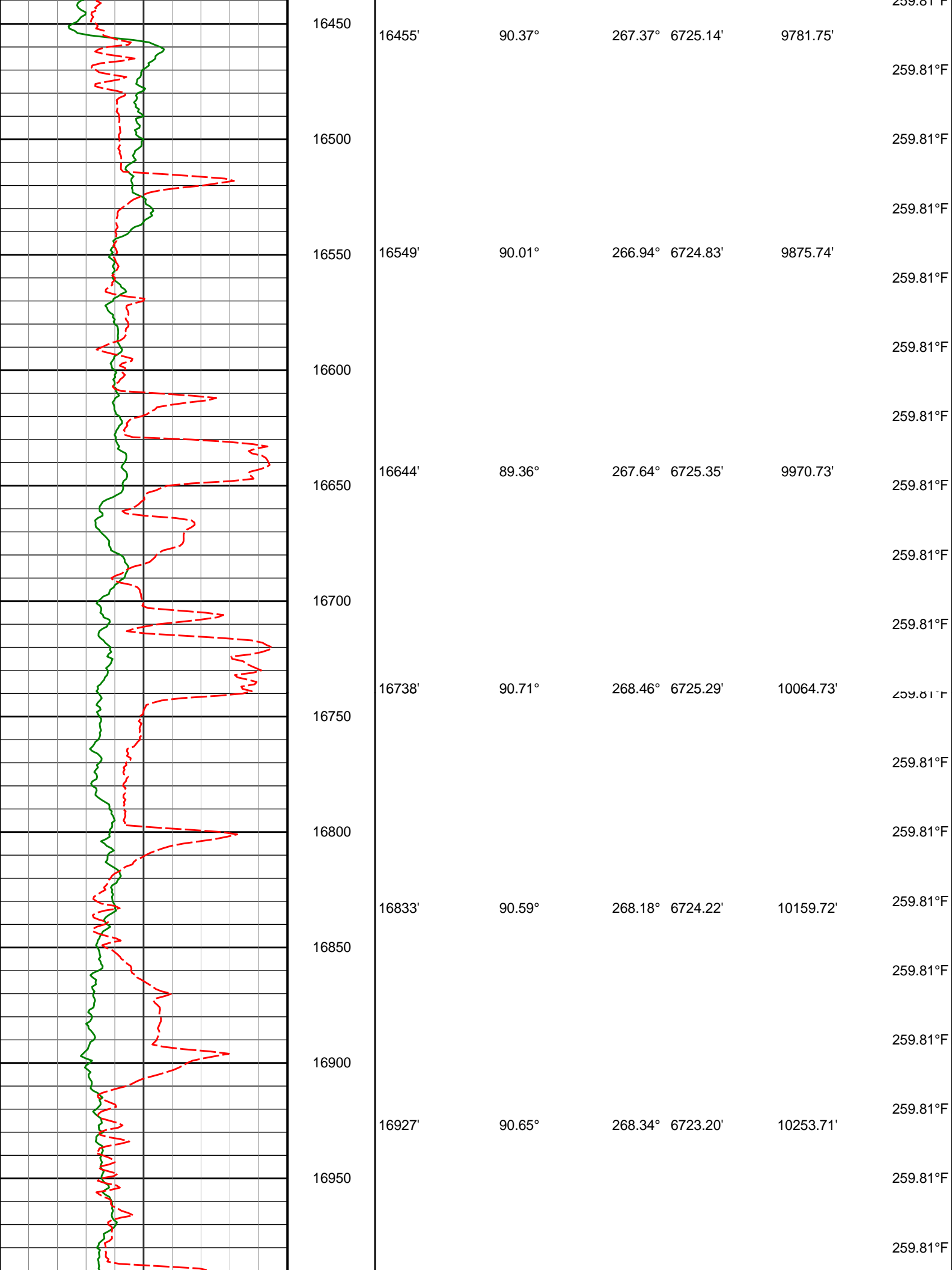


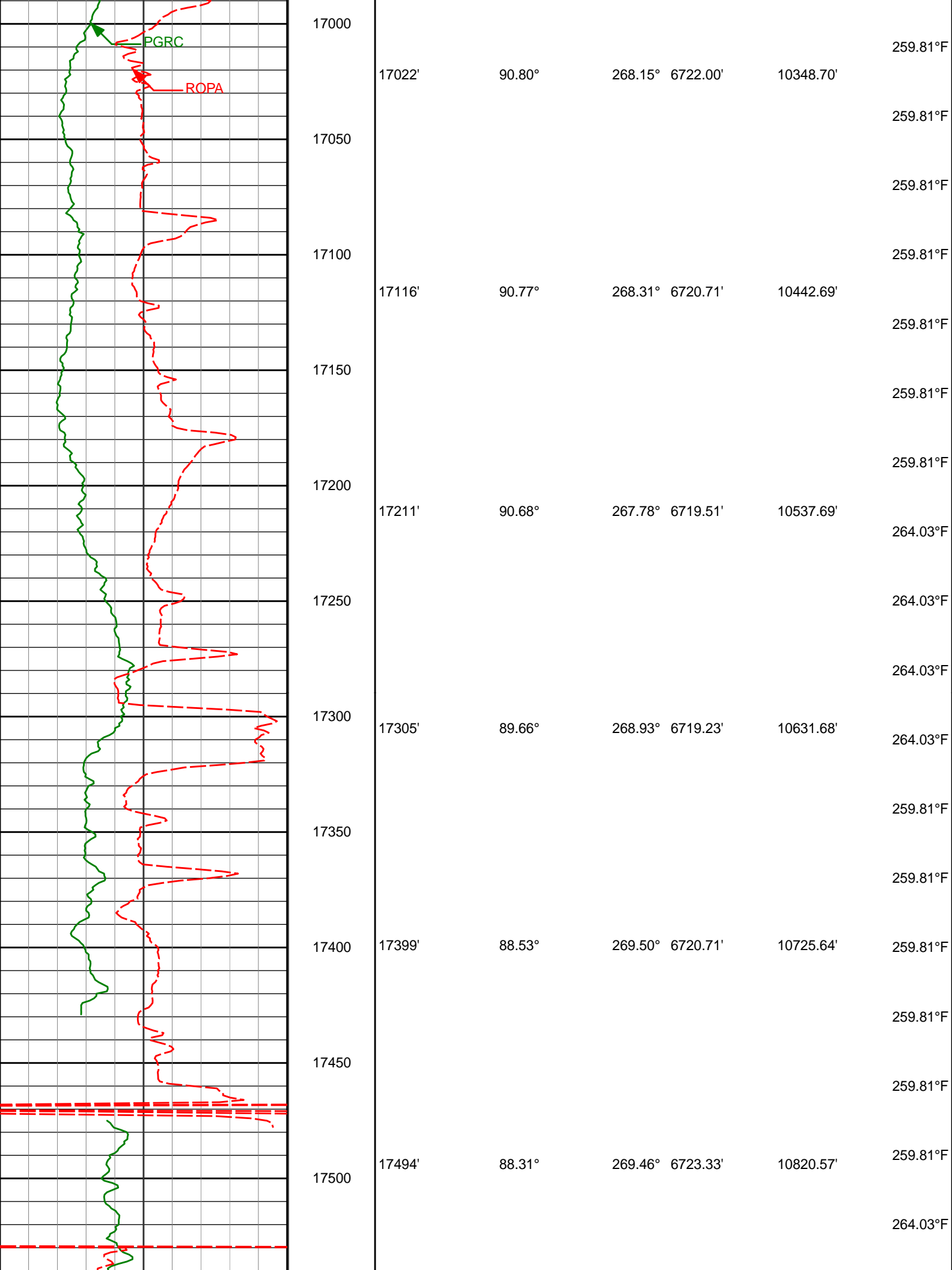


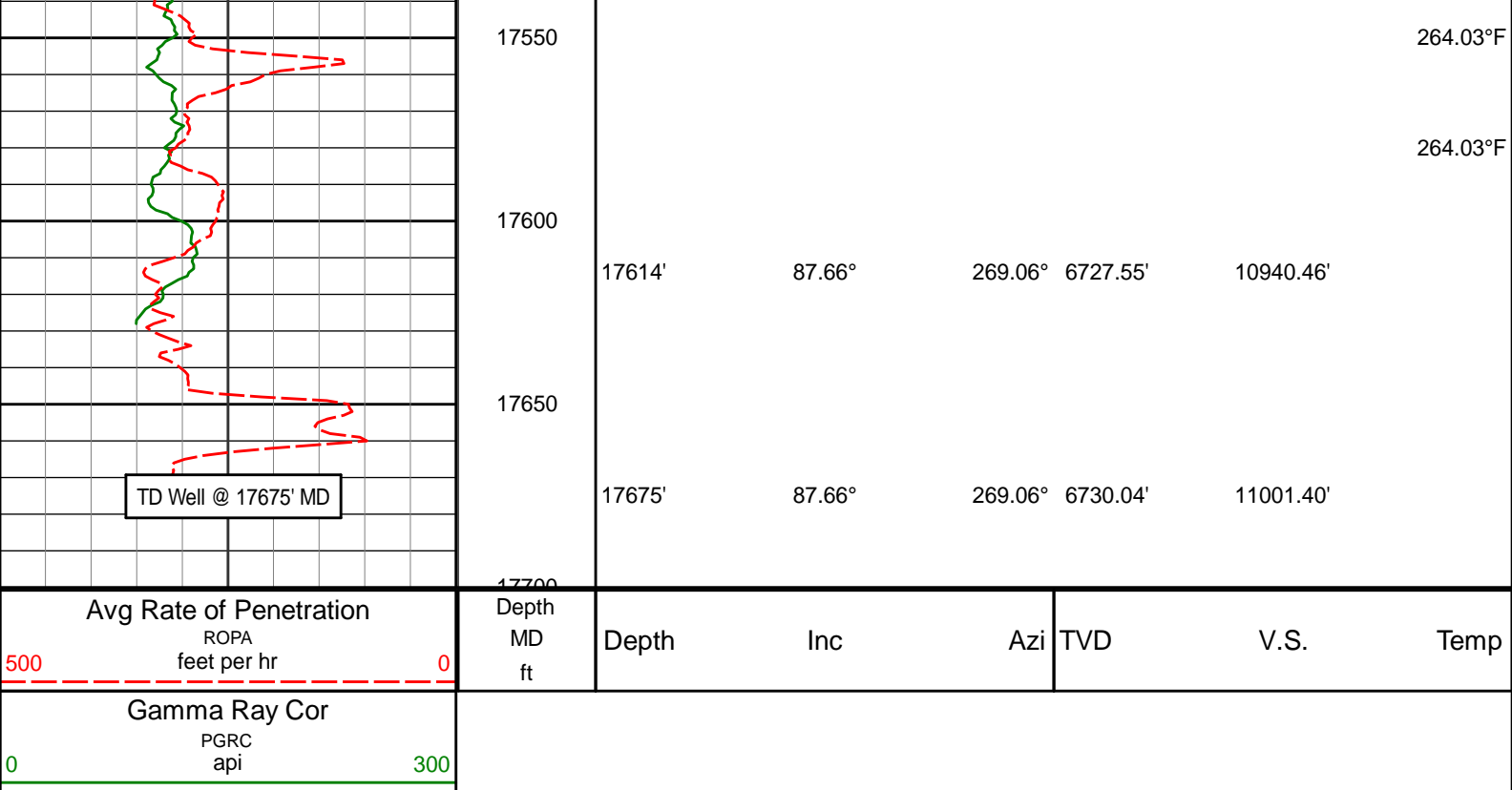




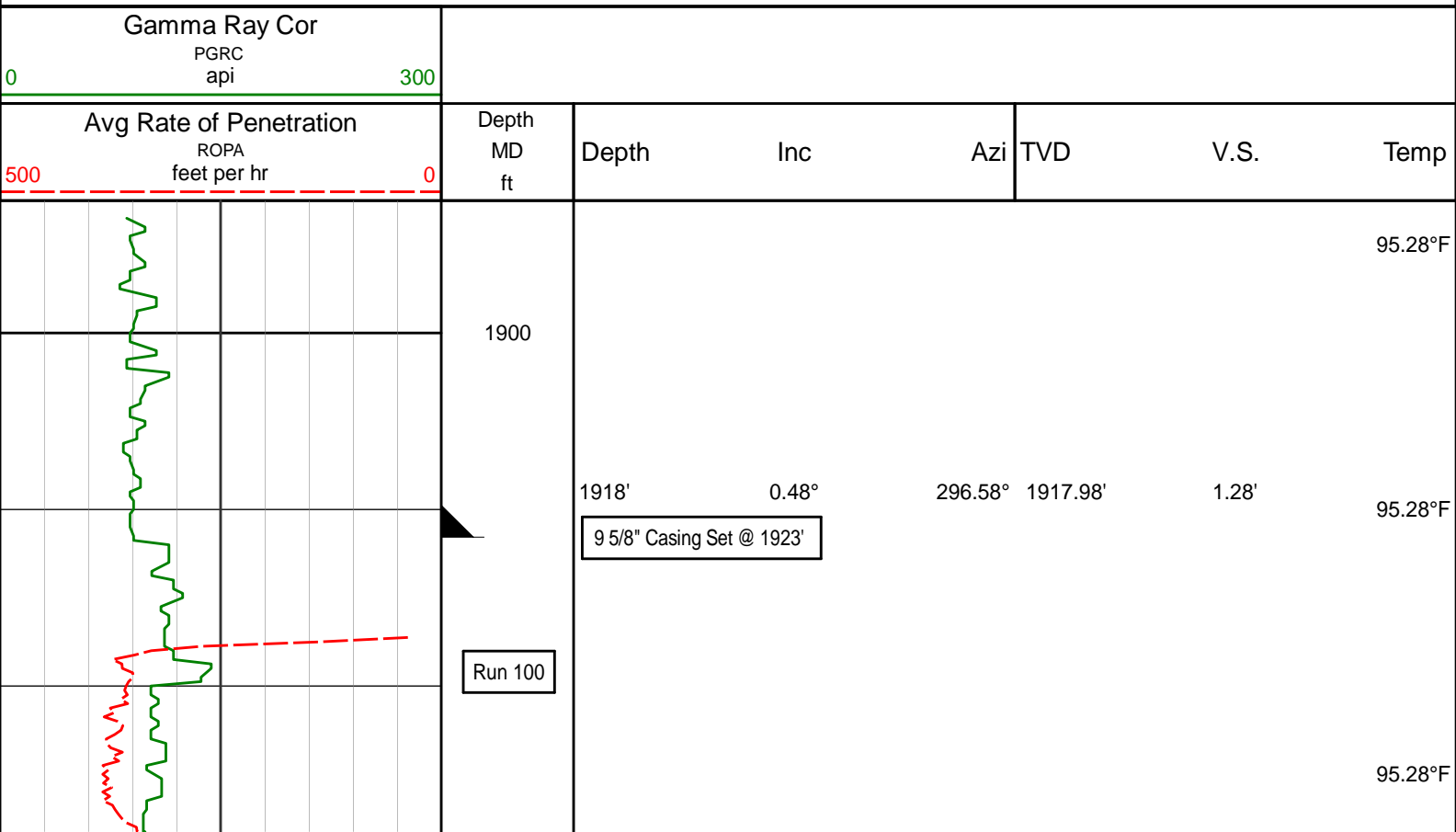


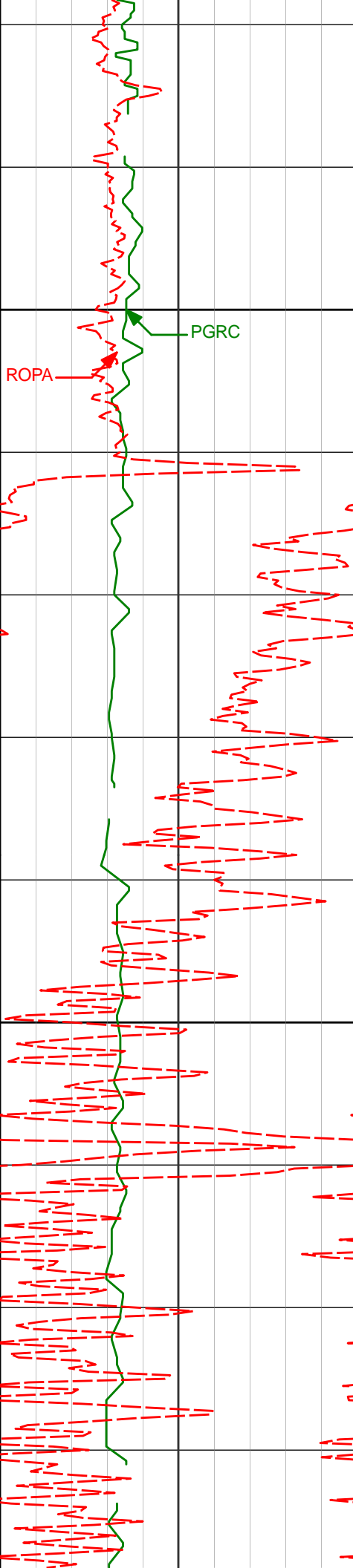






MD Detail Log 1:240 Scale





2000

2100

1963'

0.50°

341.44° 1962.98'

1.50'

99.50°F

99.50°F

99.50°F

2057'

0.68°

333.21° 2056.98'

1.85'

99.50°F

103.72°F

103.72°F

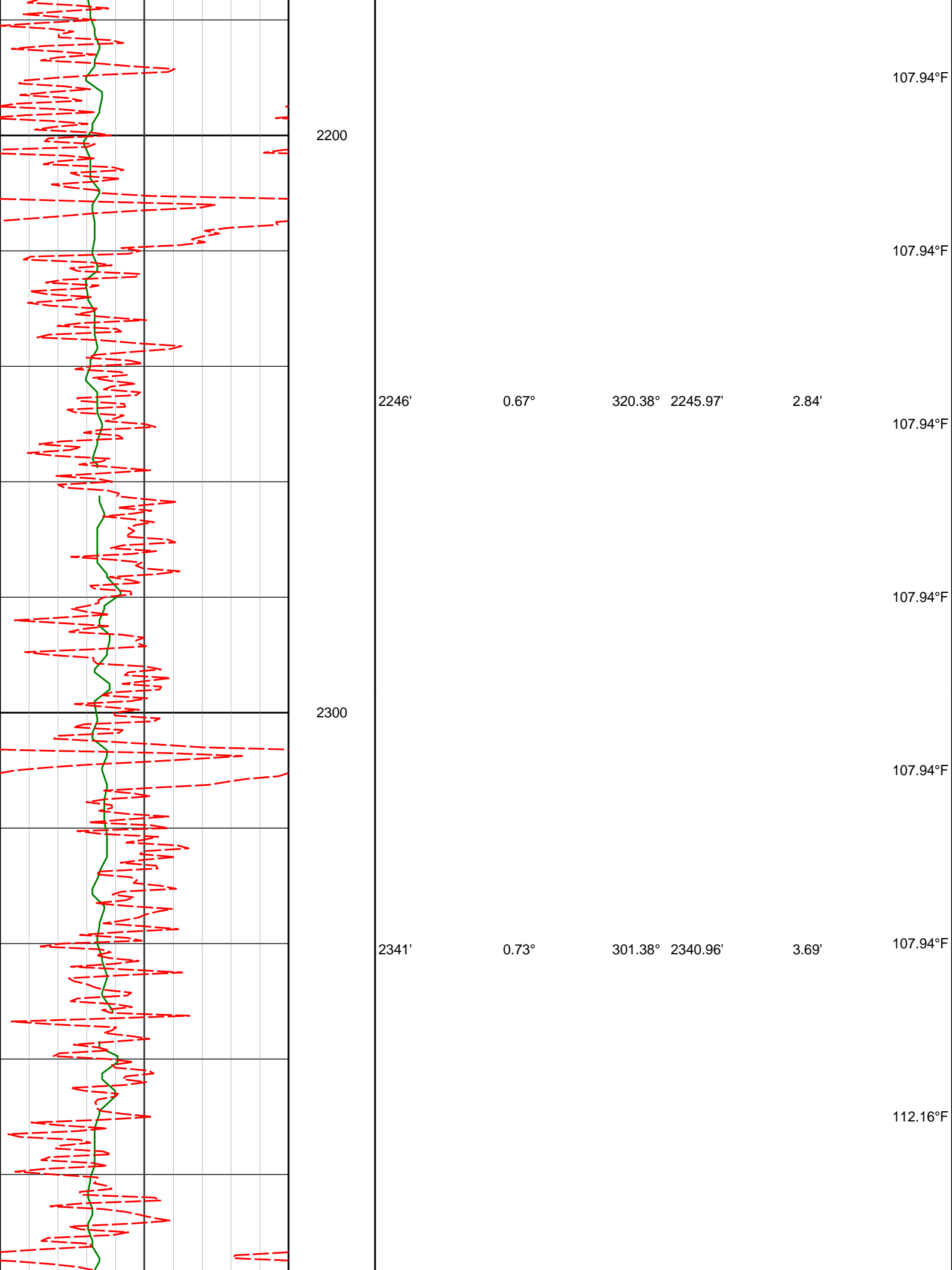
2152'

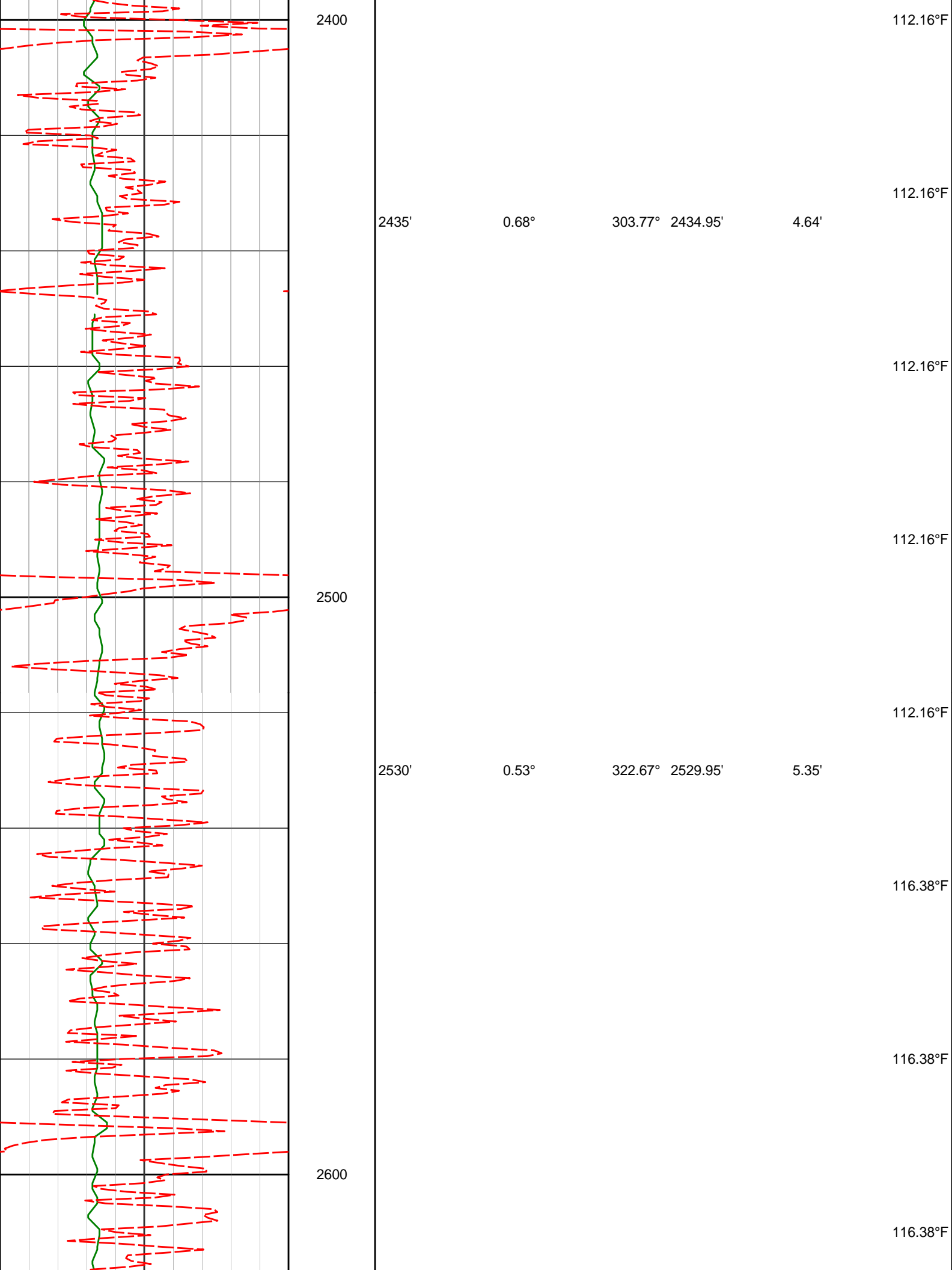
0.60°

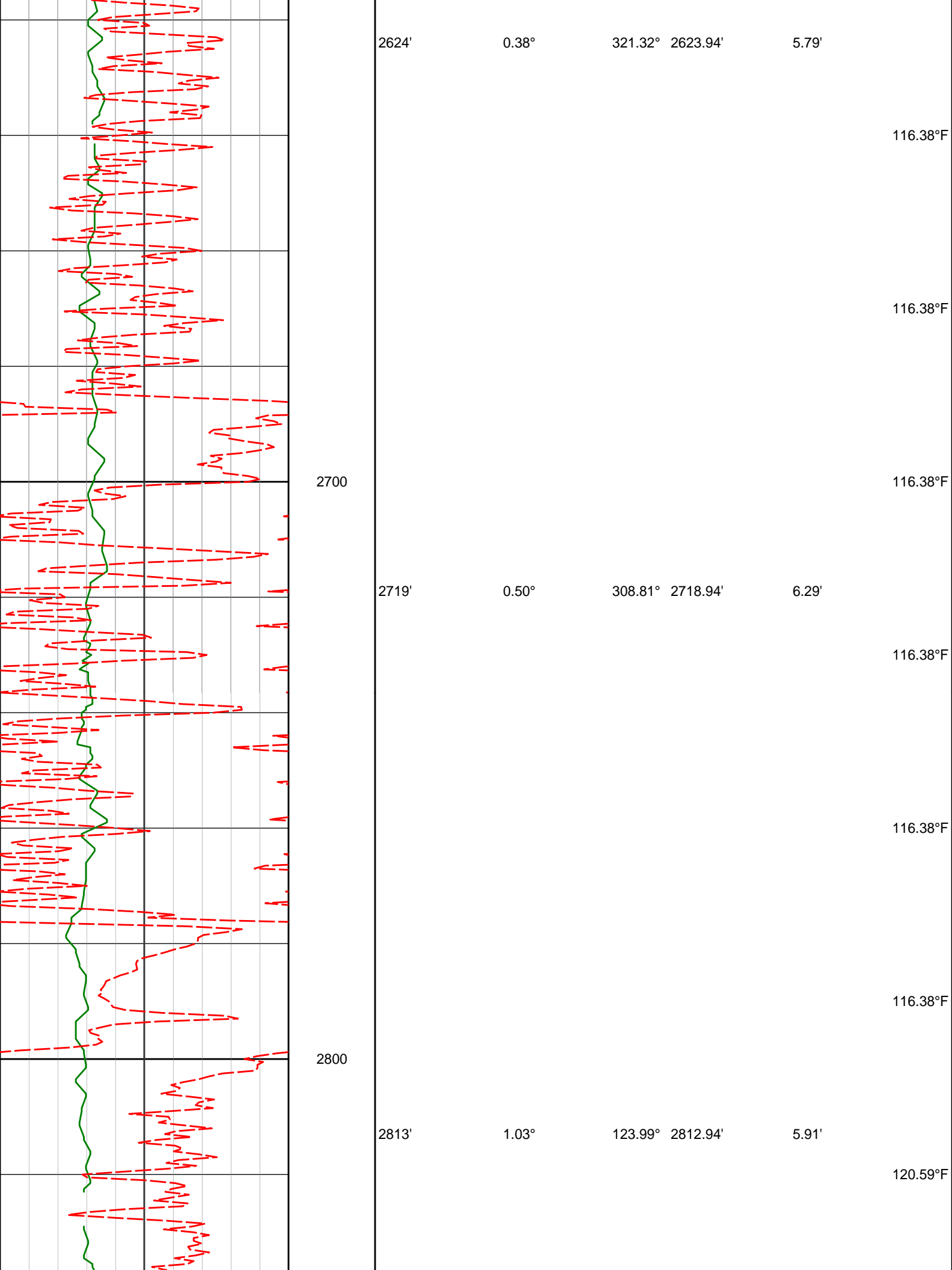
332.80° 2151.97'

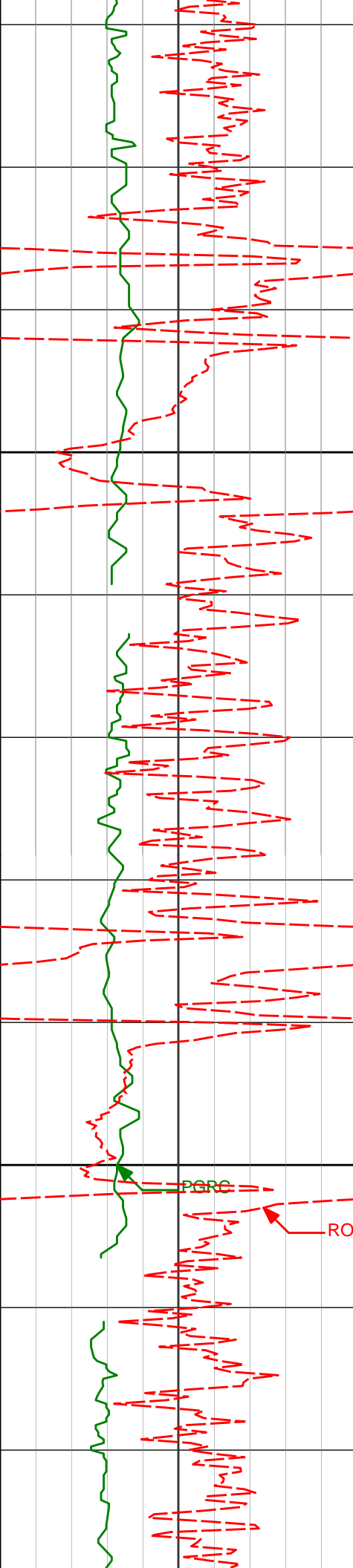
2.30'

103.72°F









2900

3000

2908'

3002'

2.80°

4.97°

106.86°

109.24°

2907.88'

3001.66'

3.03'

-2.94'

120.59°F

120.59°F

120.59°F

120.59°F

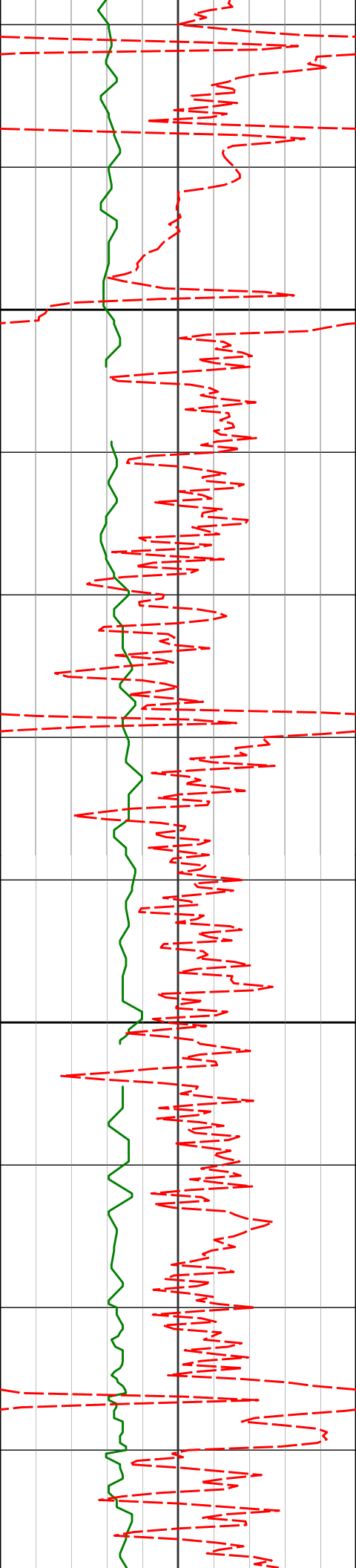
120.59°F

120.59°F

124.81°F

PORE

ROPA



3100

3200

3097'

6.85°

104.21° 3096.15'

-12.21'

3191'

6.56°

102.58° 3189.51'

-22.79'

124.81°F

124.81°F

124.81°F

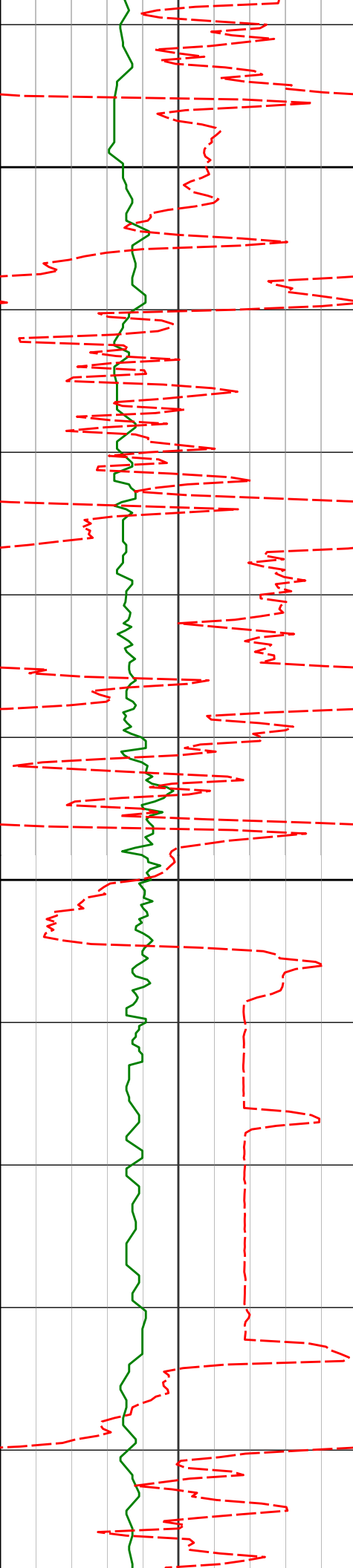
124.81°F

124.81°F

129.03°F

129.03°F

209.19°F



3300

209.19°F

3310'

7.54°

106.63° 3307.61'

-36.76'

129.03°F

124.81°F

209.19°F

3400

3404'

8.13°

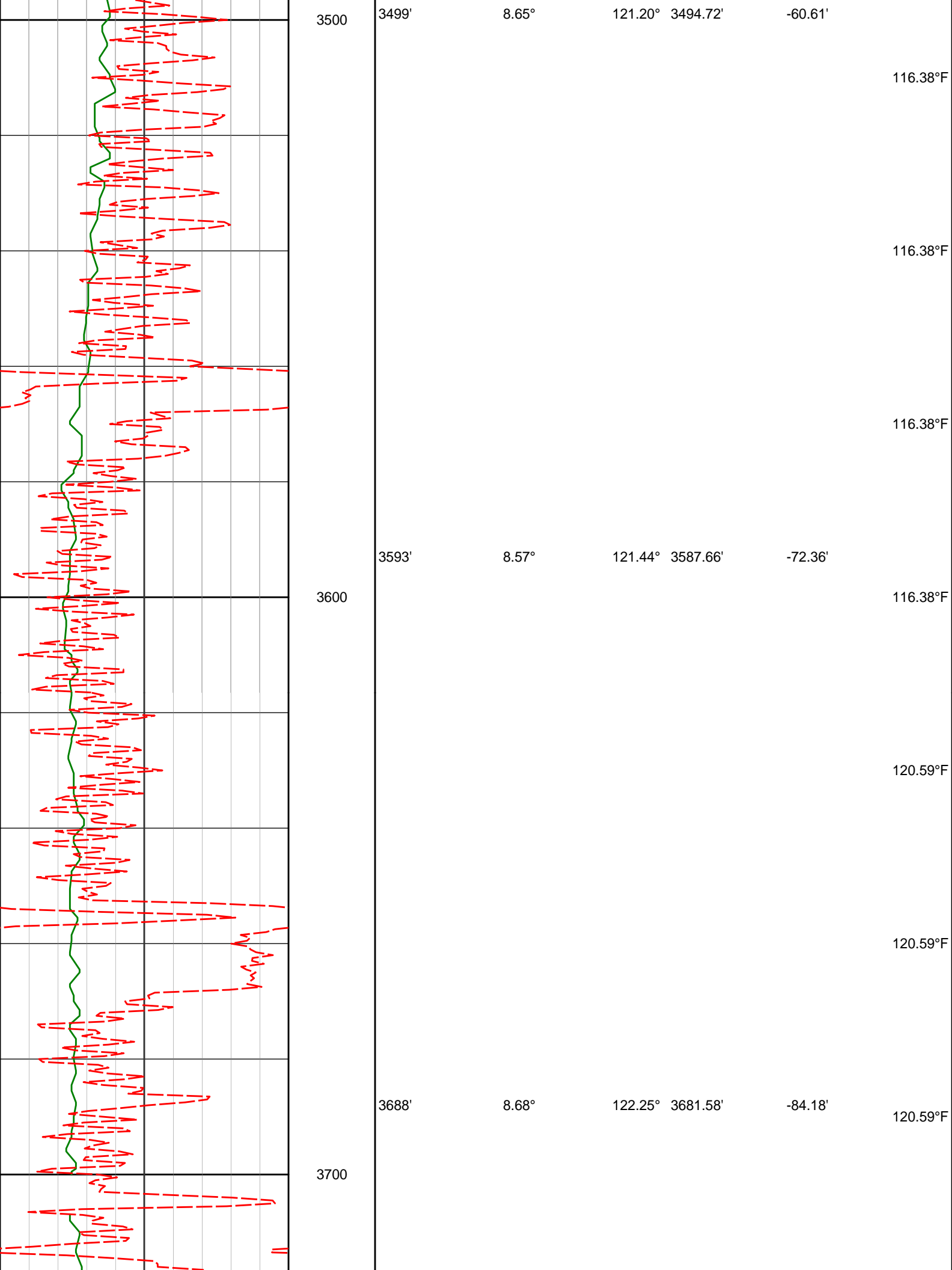
113.71° 3400.73'

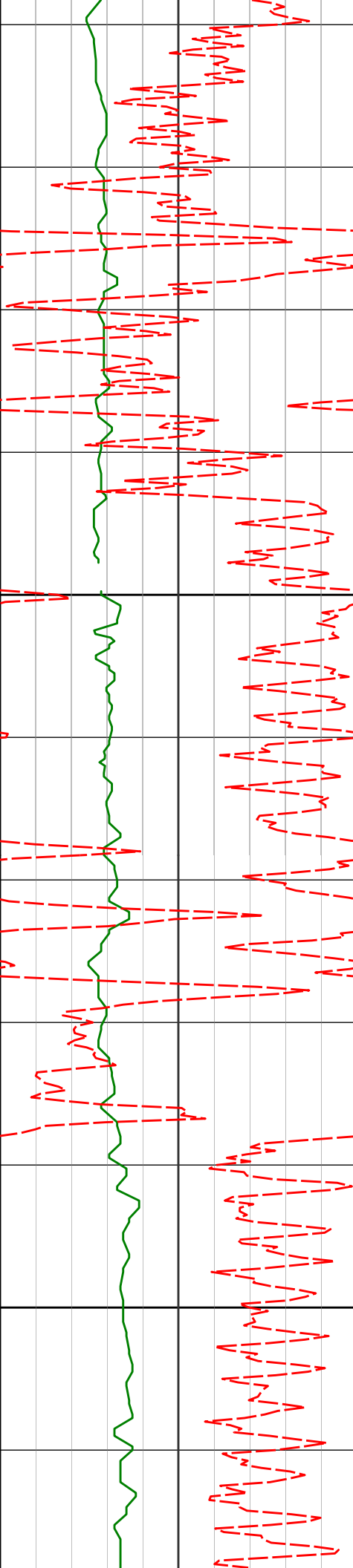
-48.59'

112.16°F

112.16°F

112.16°F





3800

3900

3782'

8.82°

122.08° 3774.49'

-96.00'

3877'

7.09°

120.09° 3868.57'

-106.99'

124.81°F

124.81°F

124.81°F

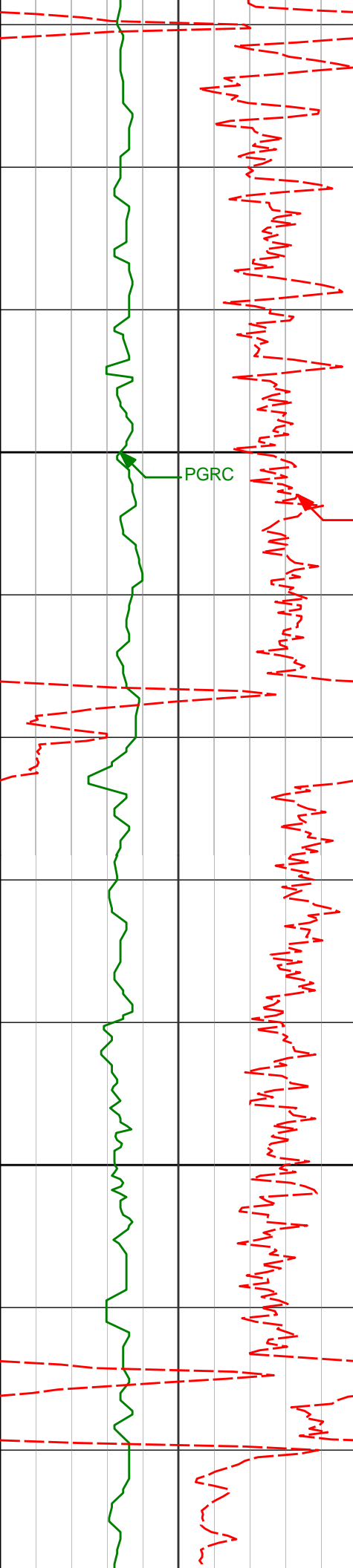
124.81°F

124.81°F

124.81°F

129.03°F

129.03°F



4000

PGRC

ROPA

4100

3972'

6.25°

124.10° 3962.93'

-116.13'

129.03°F

129.03°F

129.03°F

129.03°F

4066'

5.72°

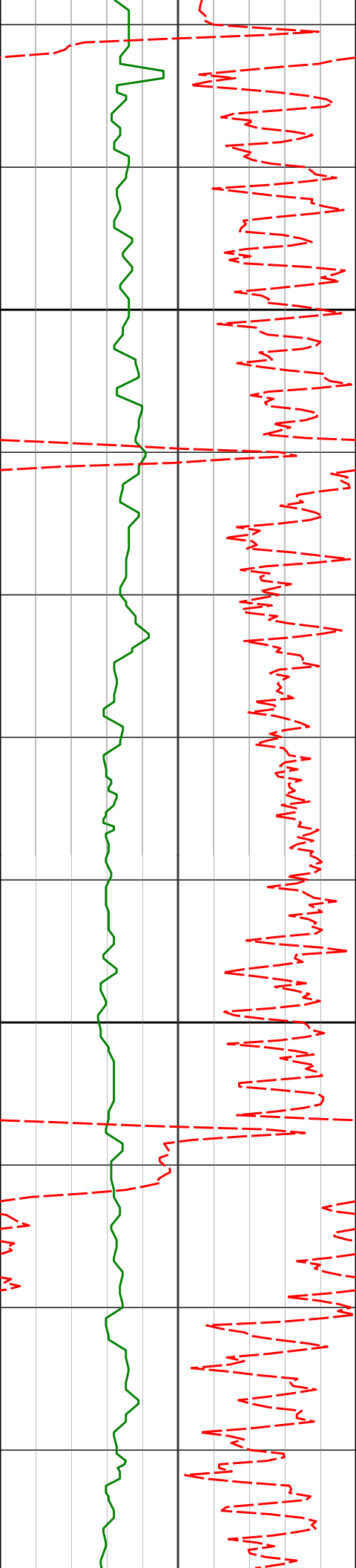
128.39° 4056.42'

-123.83'

133.25°F

133.25°F

133.25°F



4160'

6.62°

125.37° 4149.87'

-131.69'

133.25°F

4200

137.47°F

137.47°F

4255'

6.39°

121.79° 4244.26'

-140.43'

137.47°F

137.47°F

4300

137.47°F

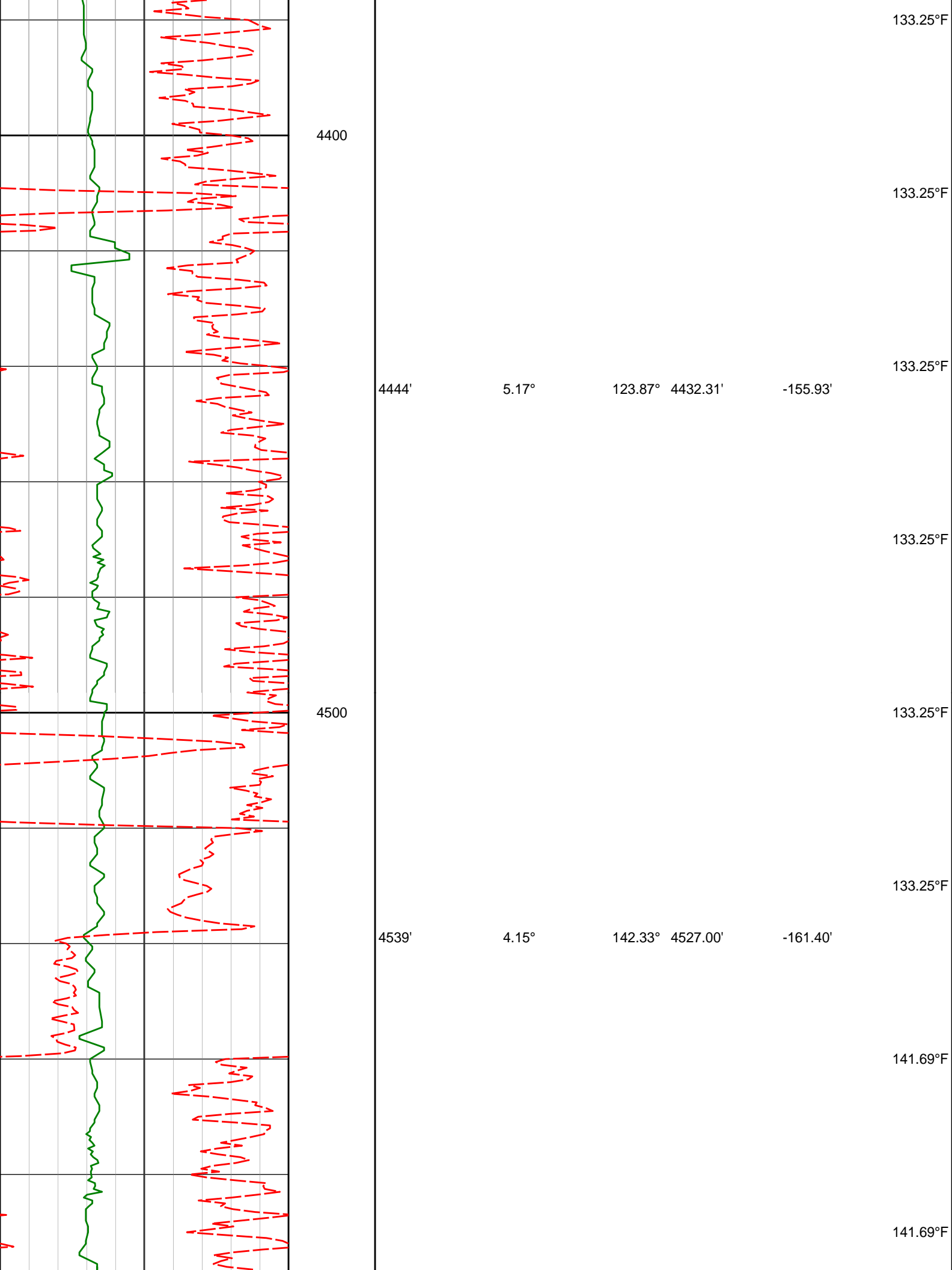
4349'

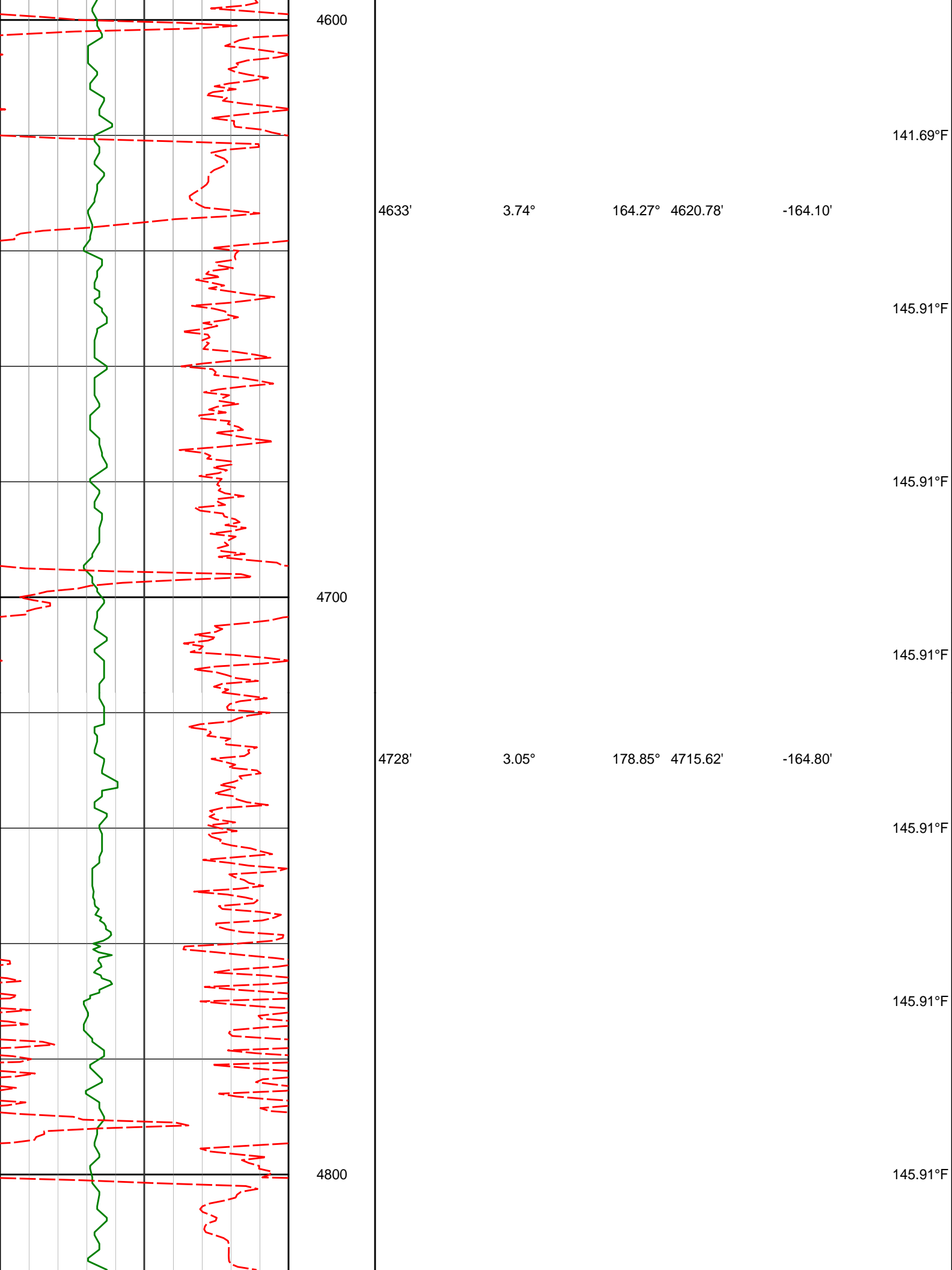
5.68°

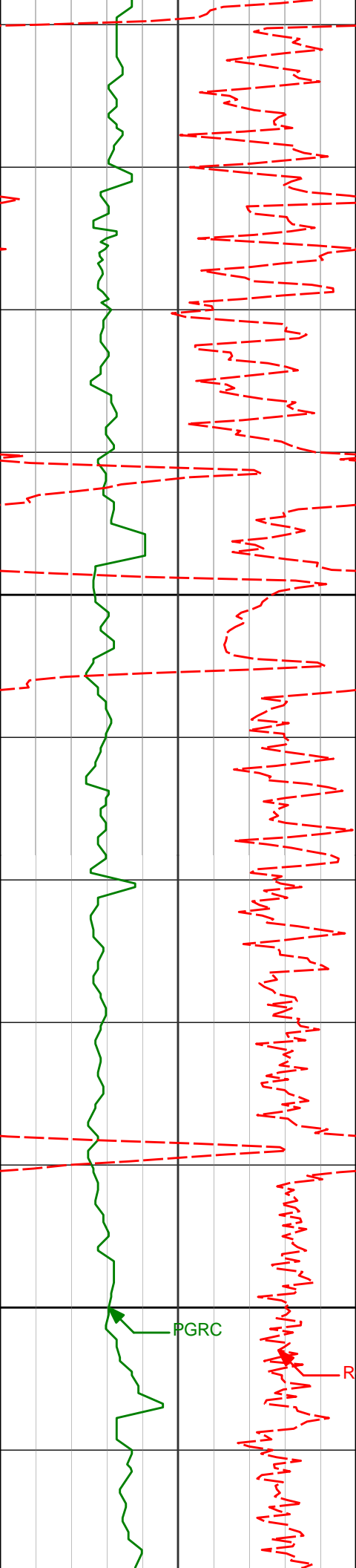
122.58° 4337.74'

-148.60'

141.69°F







4822'

3.15°

157.54° 4809.48'

-165.66'

145.91°F

150.13°F

150.13°F

4900

4917'

4.00°

148.60° 4904.30'

-168.19'

150.13°F

150.13°F

150.13°F

5000

PGRC

ROPA

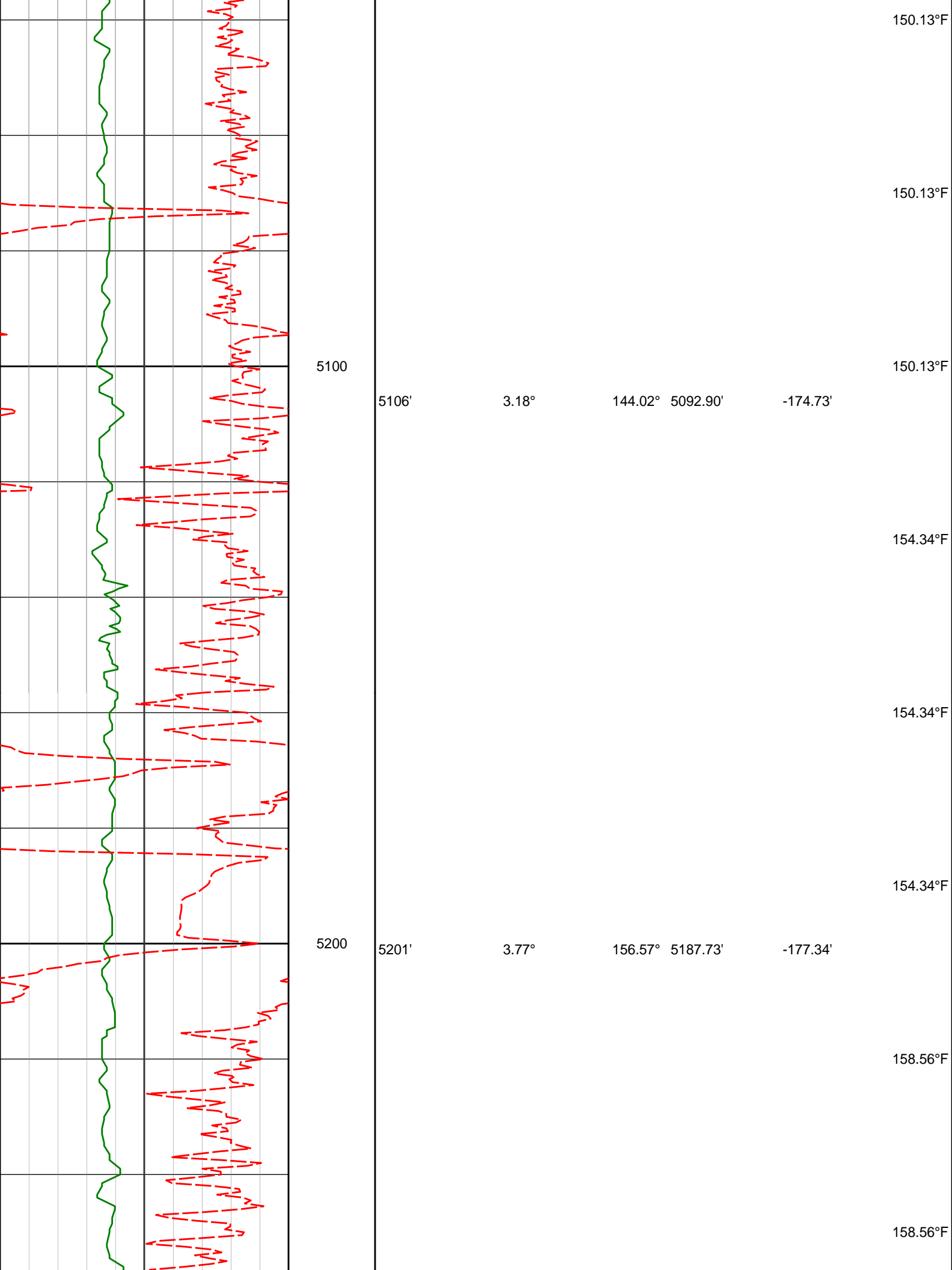
5012'

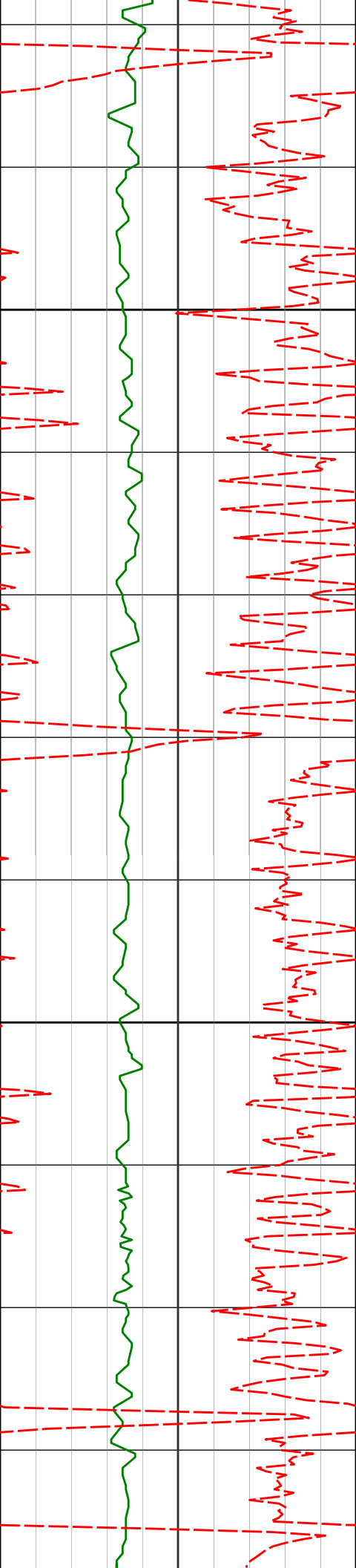
3.80°

144.36° 4999.08'

-171.55'

150.13°F





5300

5400

5296'

3.84°

158.22° 5282.52'

-179.55'

158.56°F

162.78°F

162.78°F

162.78°F

5390'

3.26°

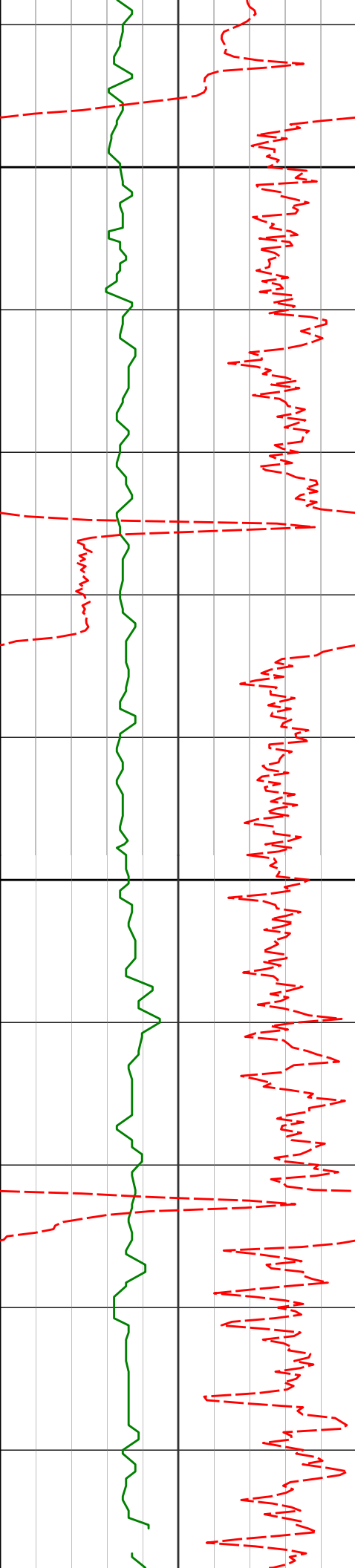
154.03° 5376.34'

-181.69'

162.78°F

145.91°F

145.91°F



5500

5600

5485'

3.95°

153.33° 5471.15'

-184.15'

145.91°F

145.91°F

145.91°F

145.91°F

167.00°F

167.00°F

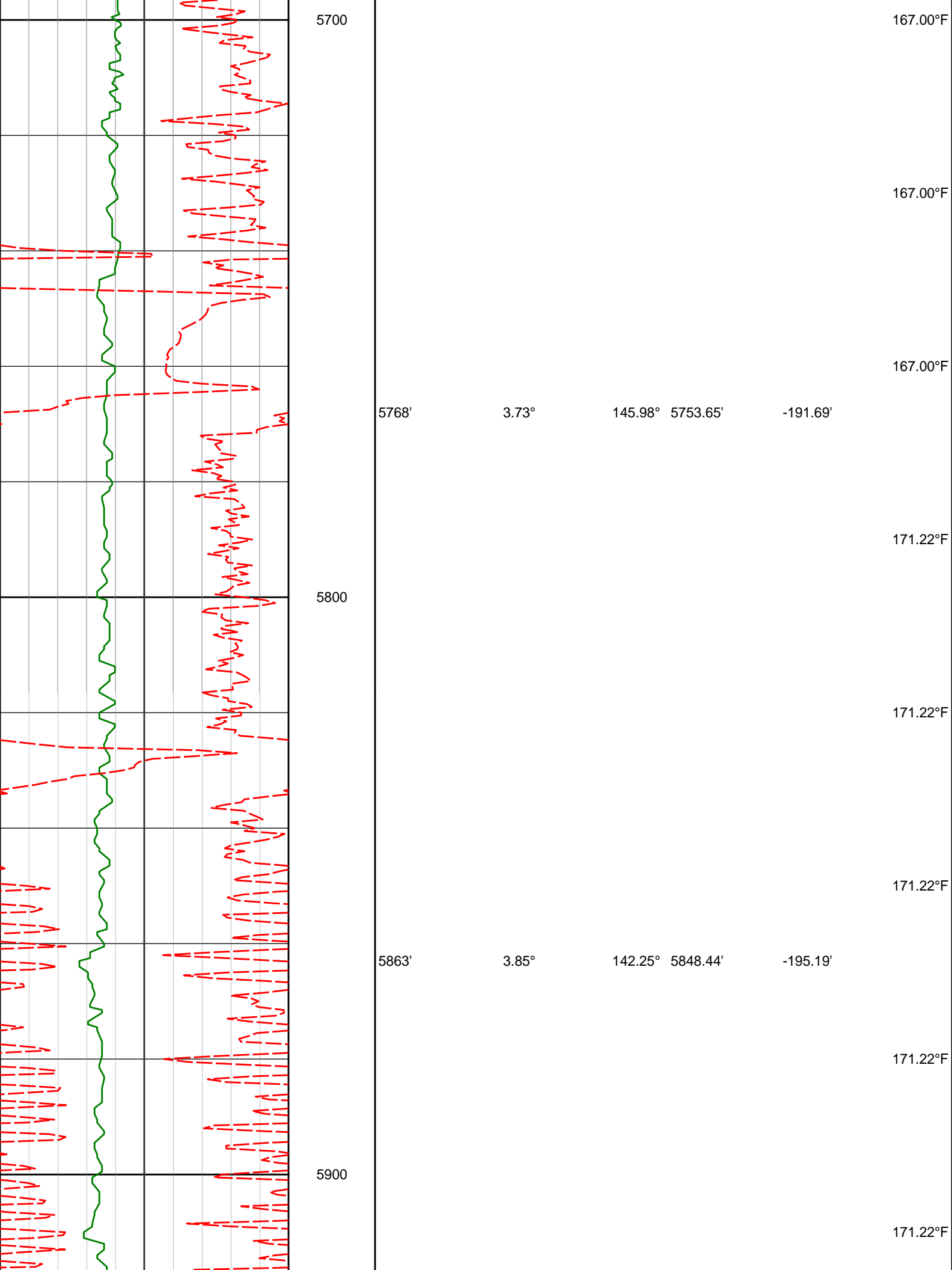
167.00°F

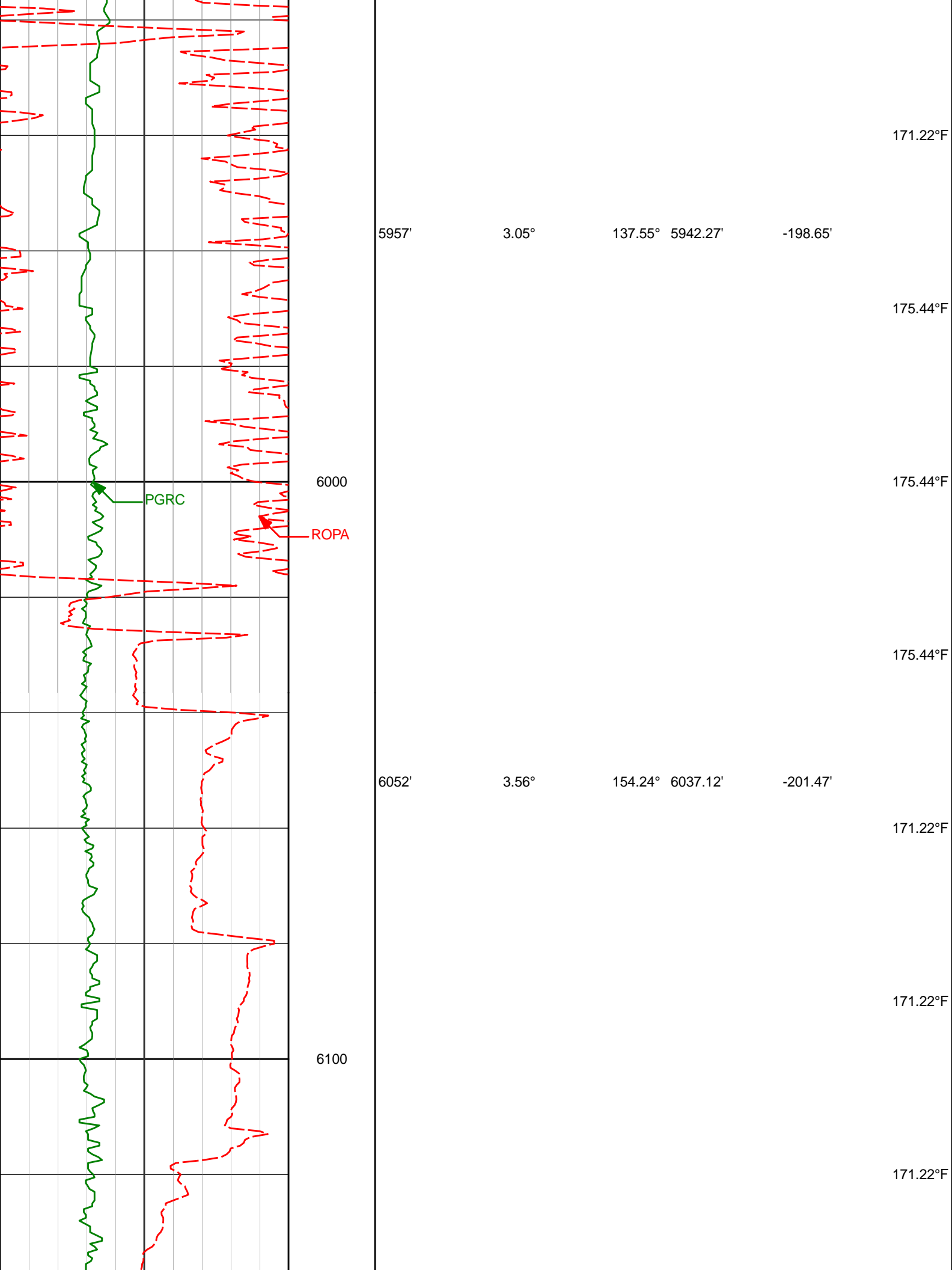
5674'

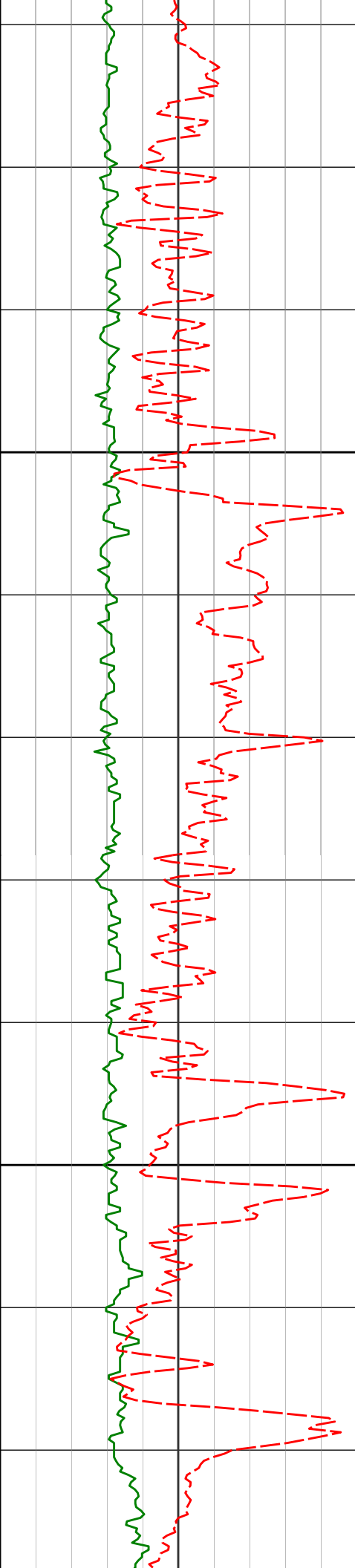
2.92°

151.44° 5659.81'

-189.00'







6200

6300

6147'

9.31°

228.42° 6131.59'

-196.72'

175.44°F

175.44°F

175.44°F

6241'

13.61°

263.59° 6223.81'

-179.79'

179.66°F

179.66°F

179.66°F

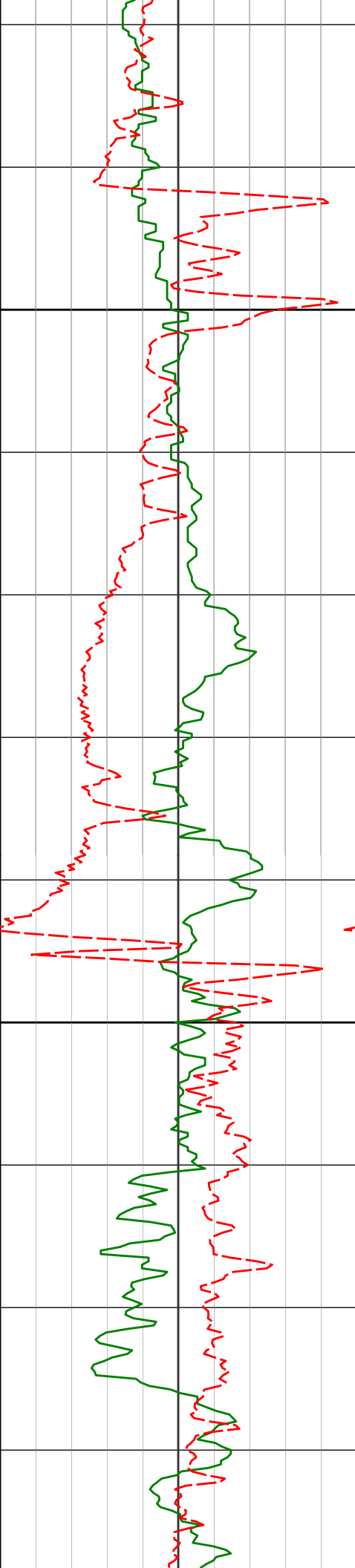
6336'

18.71°

270.94° 6315.03'

-153.41'

179.66°F



6400

6500

6430'

26.98°

267.90°

6401.59'

-116.97'

6525'

36.38°

264.26°

6482.35'

-67.19'

179.66°F

179.66°F

179.66°F

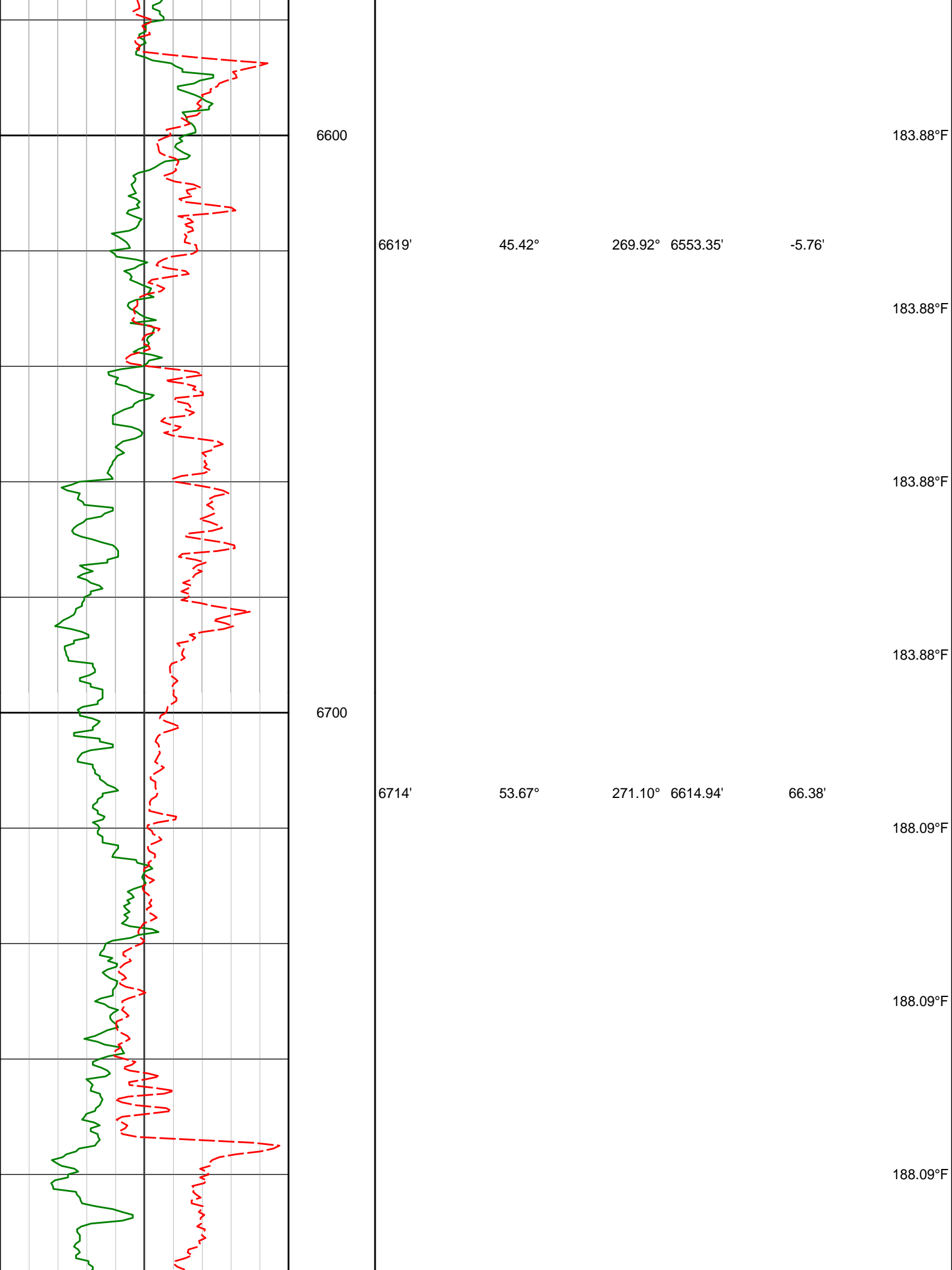
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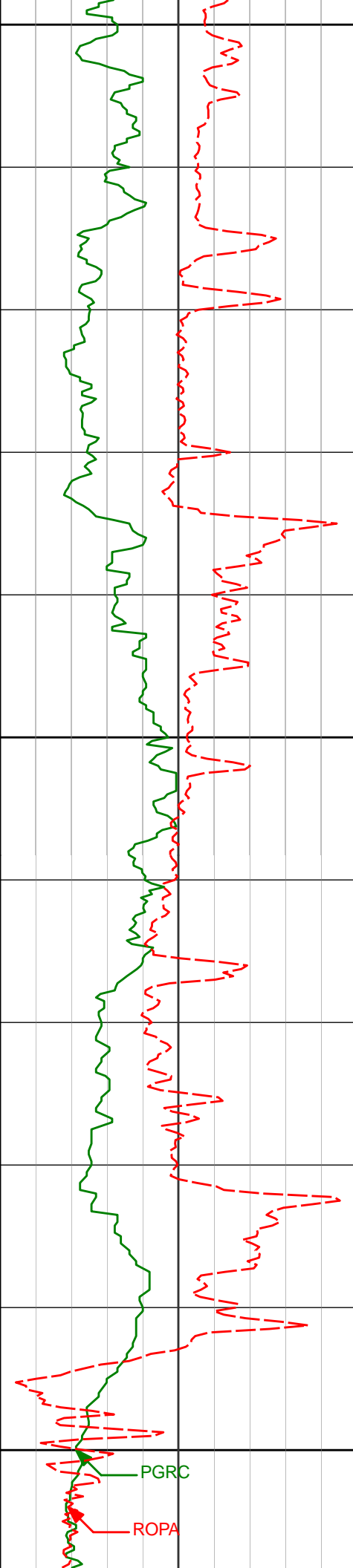
183.88°F

183.88°F

183.88°F

183.88°F





6800

6808'

64.38°

269.95° 6663.25'

146.78'

188.09°F

188.09°F

188.09°F

6900

6903'

76.24°

268.07° 6695.20'

236.05'

188.09°F

188.09°F

188.09°F

7000

6997'

86.41°

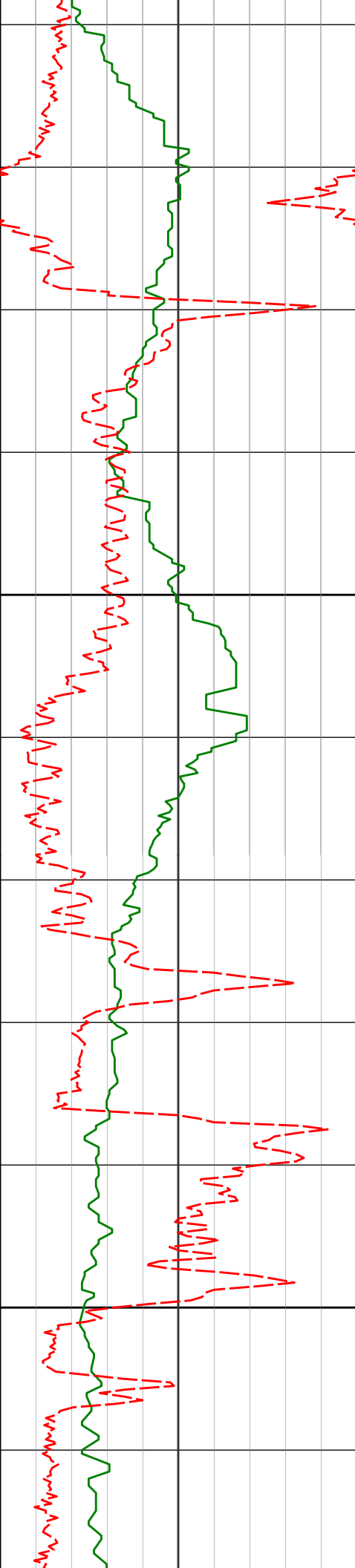
266.51° 6709.36'

328.84'

188.09°F

PGRC

ROPA



7100

7200

7091'

87.27°

266.27° 6714.54'

422.66'

7186'

89.46°

268.06° 6717.25'

517.60'

192.31°F

192.31°F

192.31°F

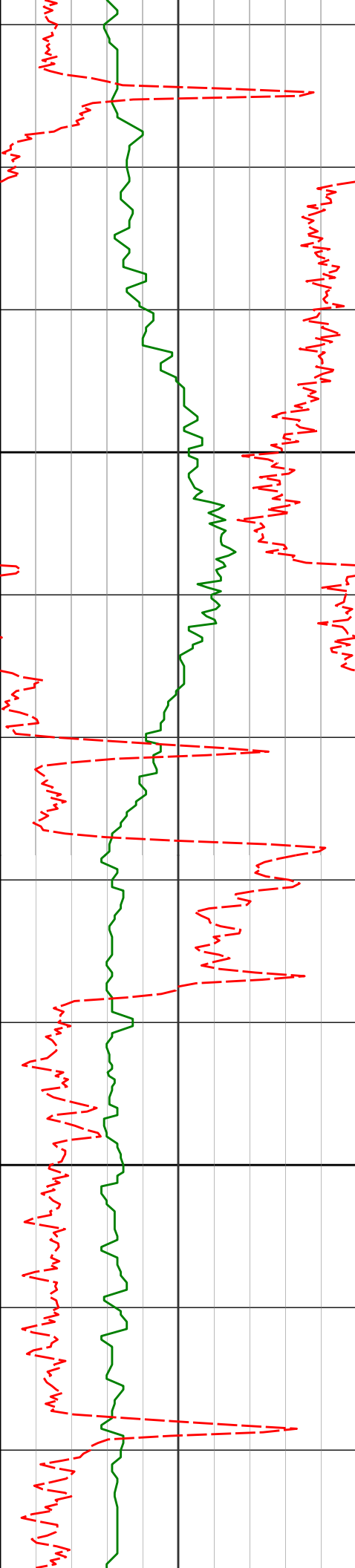
196.53°F

196.53°F

196.53°F

196.53°F

196.53°F



7300

7400

7280'

91.41°

269.62° 6716.54'

611.58'

7375'

89.86°

268.90° 6715.49'

706.55'

196.53°F

200.75°F

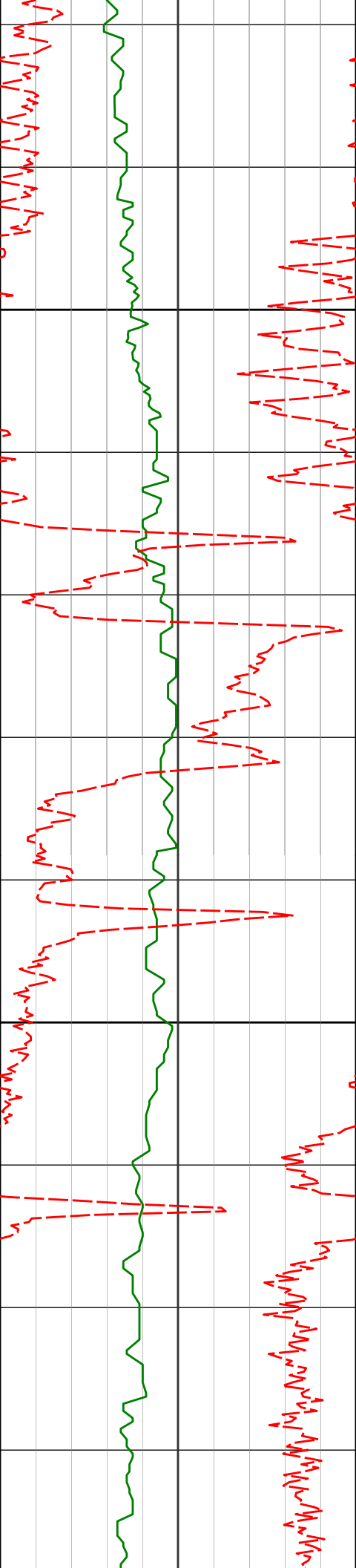
200.75°F

200.75°F

200.75°F

200.75°F

200.75°F



7500

7600

7469'

90.73°

268.72° 6715.00'

800.53'

200.75°F

7563'

89.21°

269.68° 6715.05'

894.51'

204.97°F

204.97°F

204.97°F

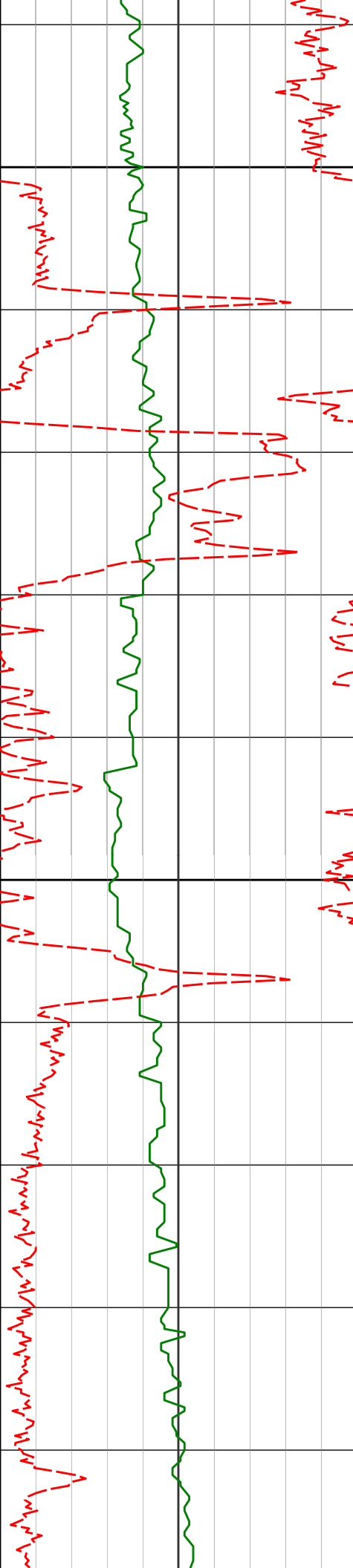
204.97°F

7658'

89.55°

269.33° 6716.08'

989.47'



7700

7752'

88.51°

269.82° 6717.67'

1083.41'

7800

7847'

88.81°

270.07° 6719.89'

1178.33'

209.19°F

209.19°F

209.19°F

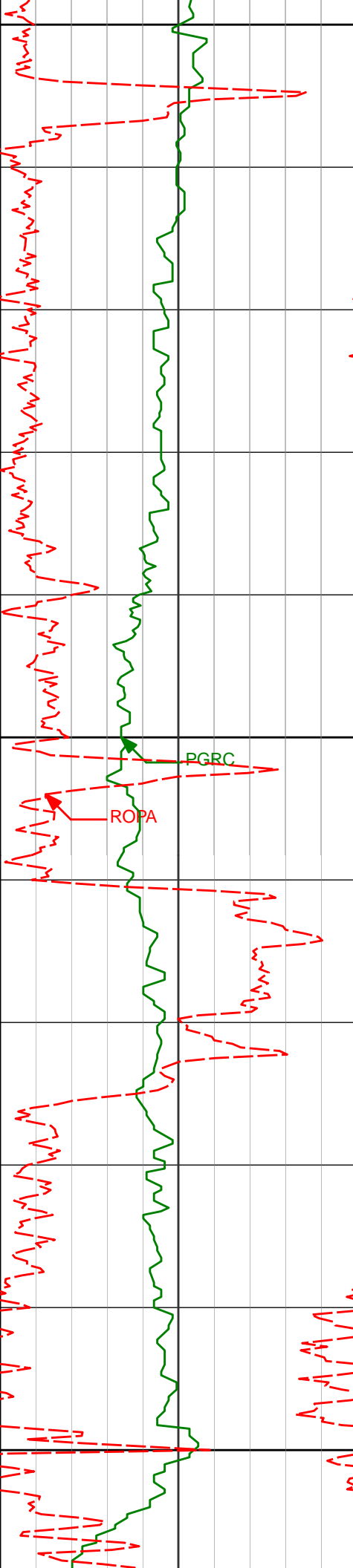
209.19°F

209.19°F

209.19°F

209.19°F

209.19°F



7900

7942'

89.64°

270.08° 6721.18'

1273.25'

8000

8036'

89.52°

268.25° 6721.87'

1367.22'

8100

209.19°F

209.19°F

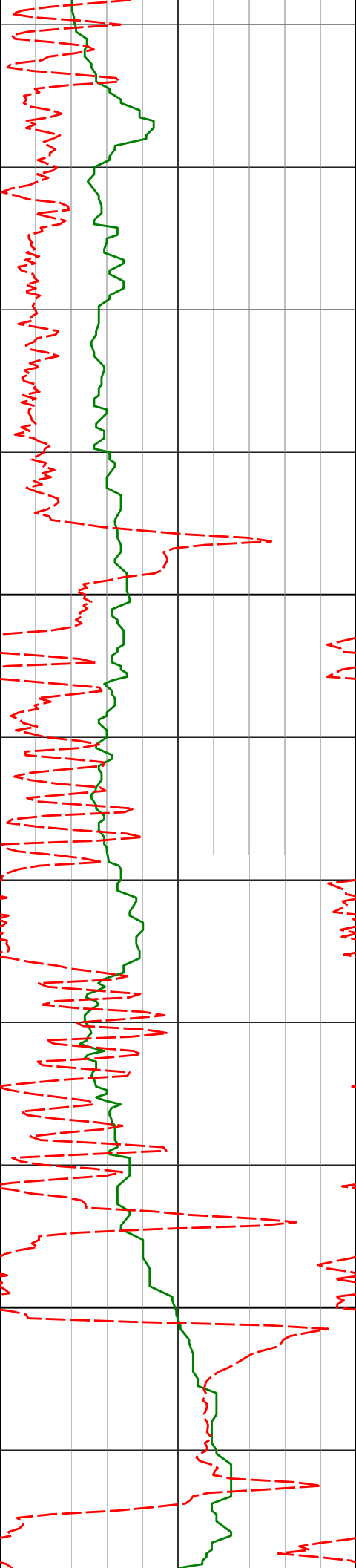
213.41°F

213.41°F

213.41°F

209.19°F

209.19°F



8200

8300

8131'

90.39°

267.63° 6721.94'

1462.22'

209.19°F

8226'

91.37°

267.29° 6720.48'

1557.21'

213.41°F

213.41°F

213.41°F

213.41°F

213.41°F

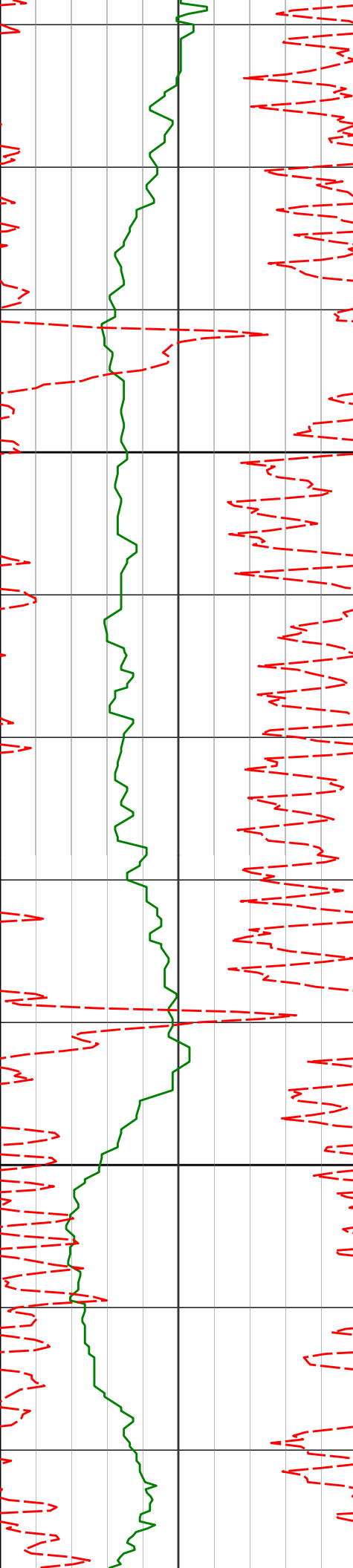
213.41°F

8320'

89.83°

268.28° 6719.50'

1651.20'



8400

8500

8415'

8509'

90.41°

91.34°

268.05°

268.04°

6719.30'

6717.86'

1746.19'

1840.18'

213.41°F

213.41°F

213.41°F

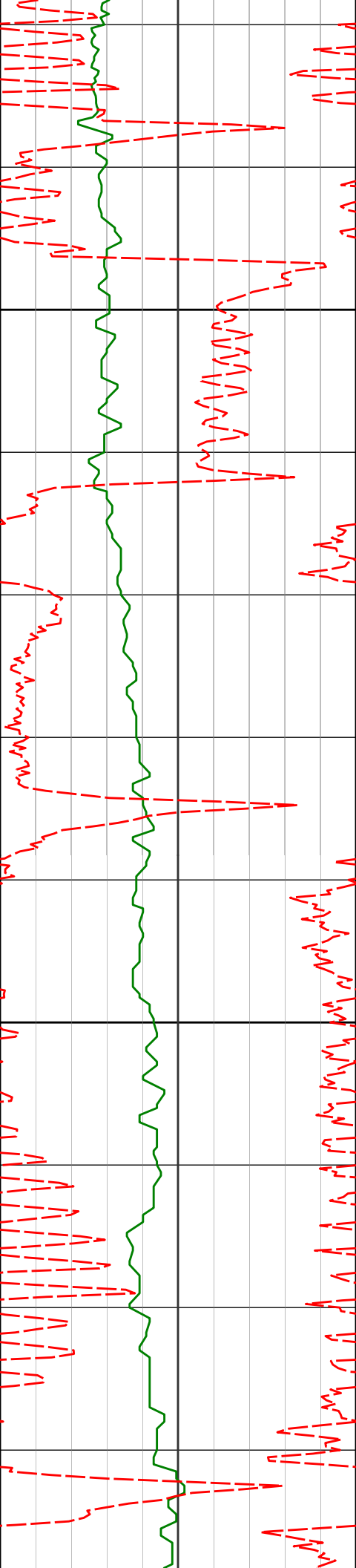
213.41°F

213.41°F

213.41°F

213.41°F

217.63°F



8600

8700

8604'

8699'

89.74°

89.67°

268.64° 6716.97'

269.47° 6717.46'

1935.17'

2030.15'

217.63°F

217.63°F

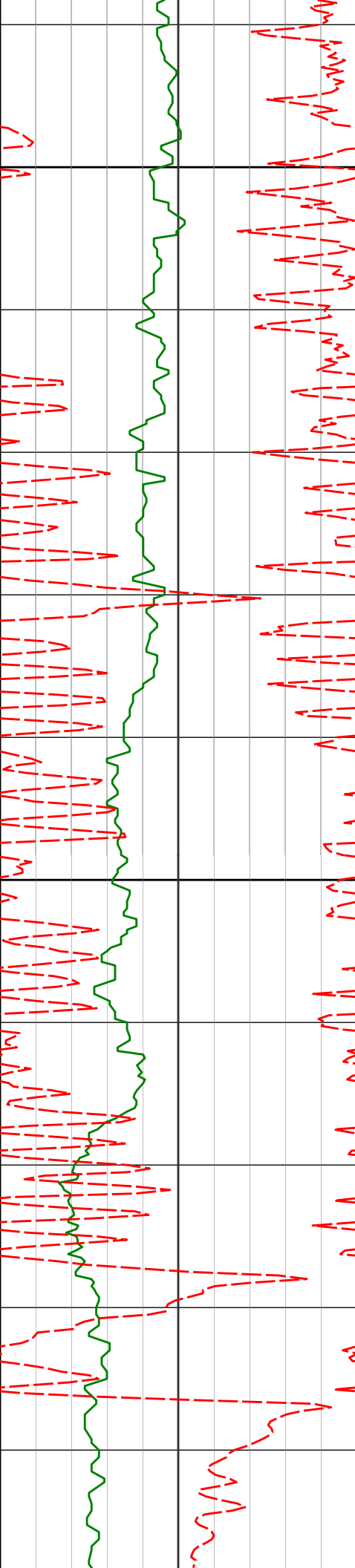
213.41°F

213.41°F

213.41°F

217.63°F

217.63°F



8800

8900

8793'

90.48°

269.23° 6717.33'

2124.12'

217.63°F

221.84°F

221.84°F

221.84°F

8888'

91.49°

268.81° 6715.70'

2219.09'

221.84°F

221.84°F

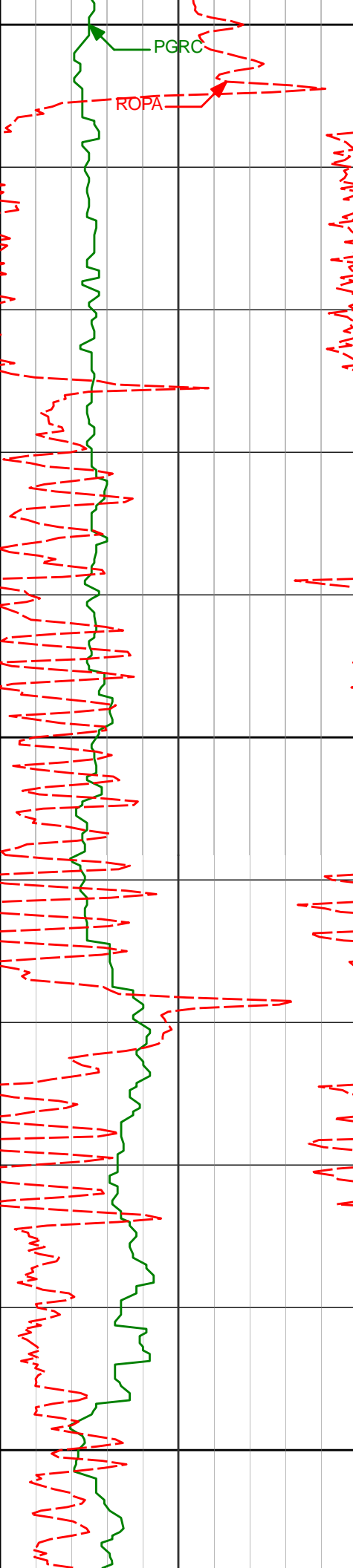
221.84°F

8983'

89.46°

269.31° 6714.91'

2314.06'



9000

221.84°F

PGRC

ROPA

221.84°F

221.84°F

9077'

88.78°

269.39° 6716.36'

2408.02'

221.84°F

9100

221.84°F

221.84°F

9172'

90.04°

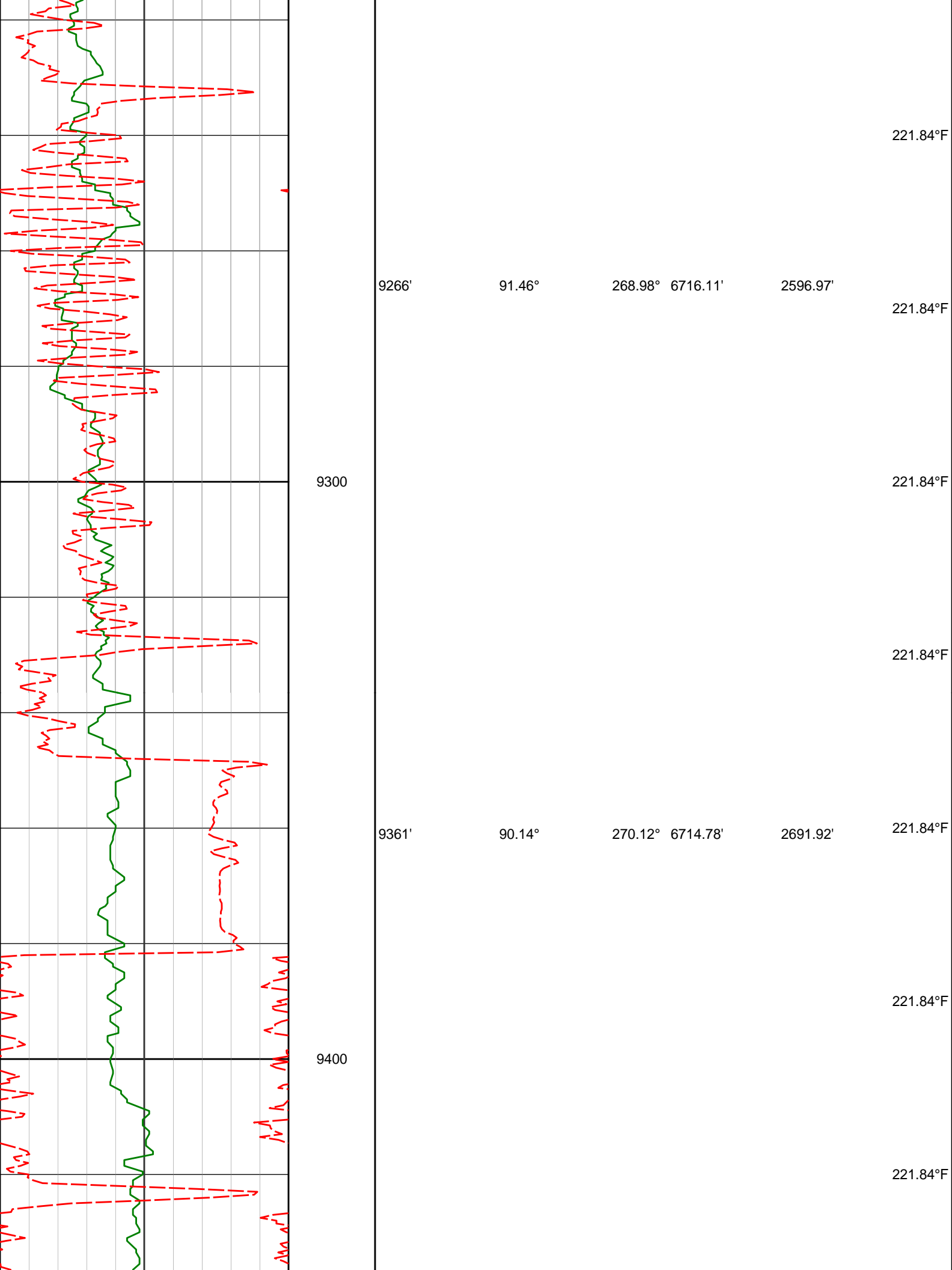
268.93° 6717.34'

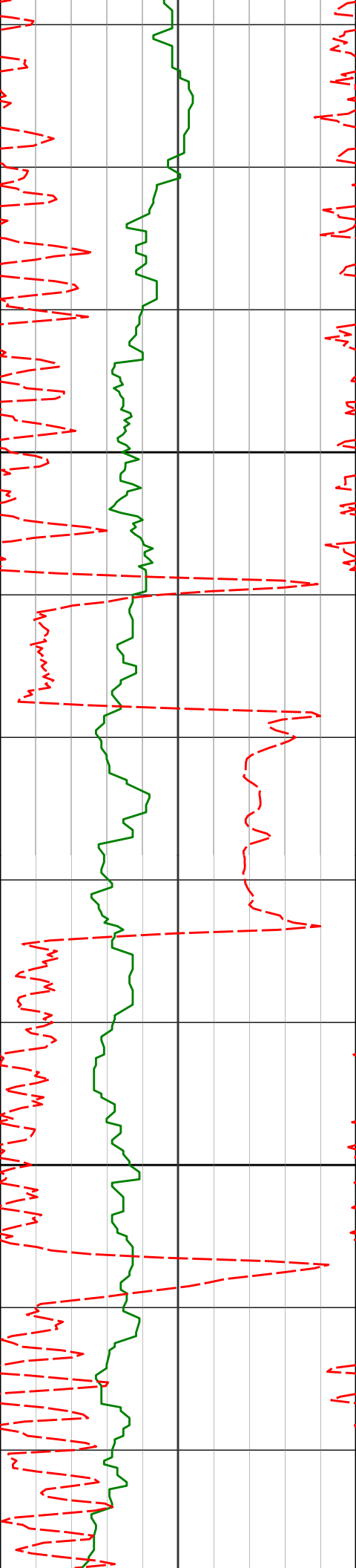
2502.99'

221.84°F

9200

221.84°F





9500

9600

9456'

90.44°

270.95° 6714.30'

2786.82'

221.84°F

221.84°F

221.84°F

221.84°F

9550'

89.30°

271.18° 6714.51'

2880.67'

221.84°F

221.84°F

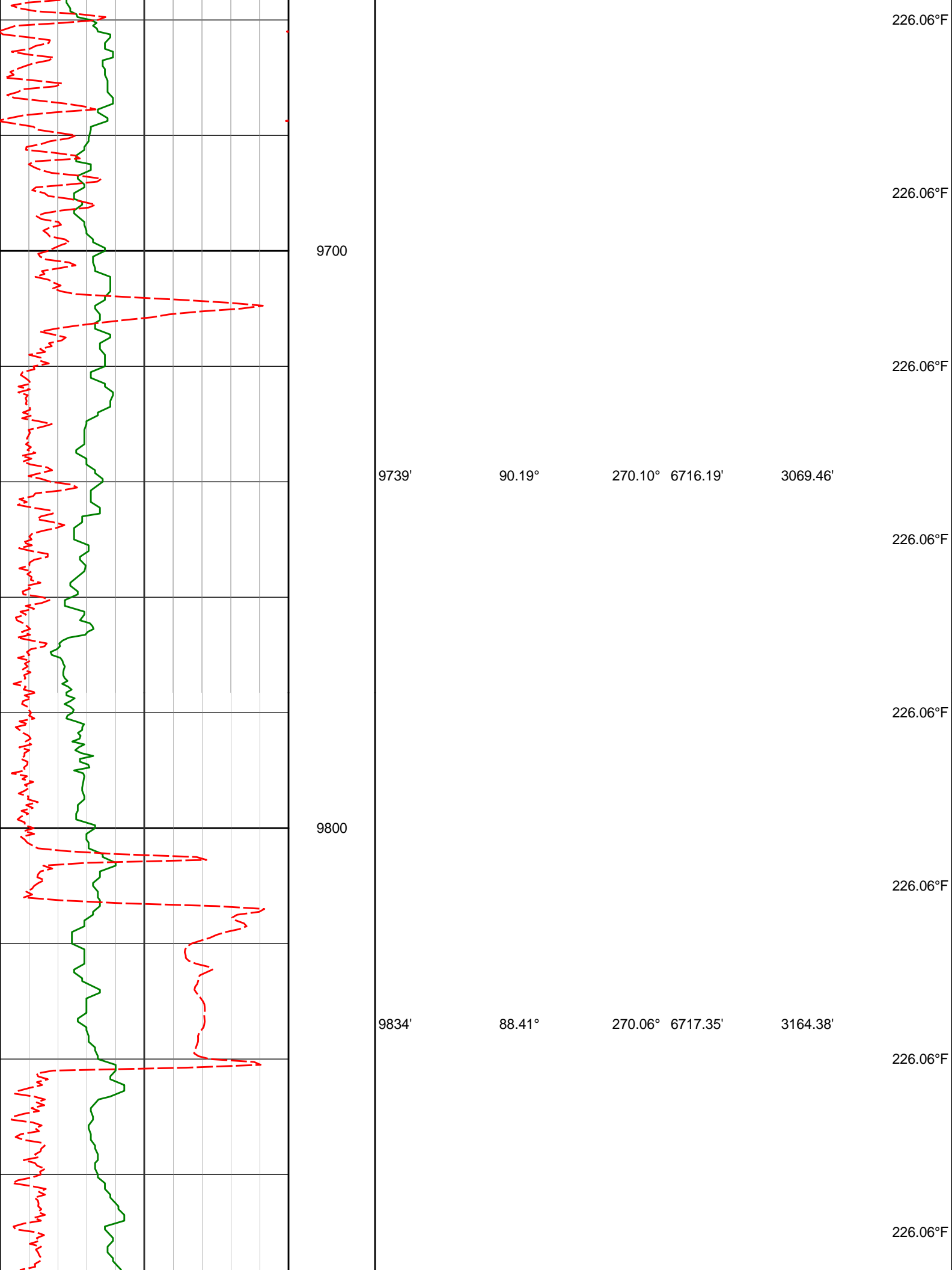
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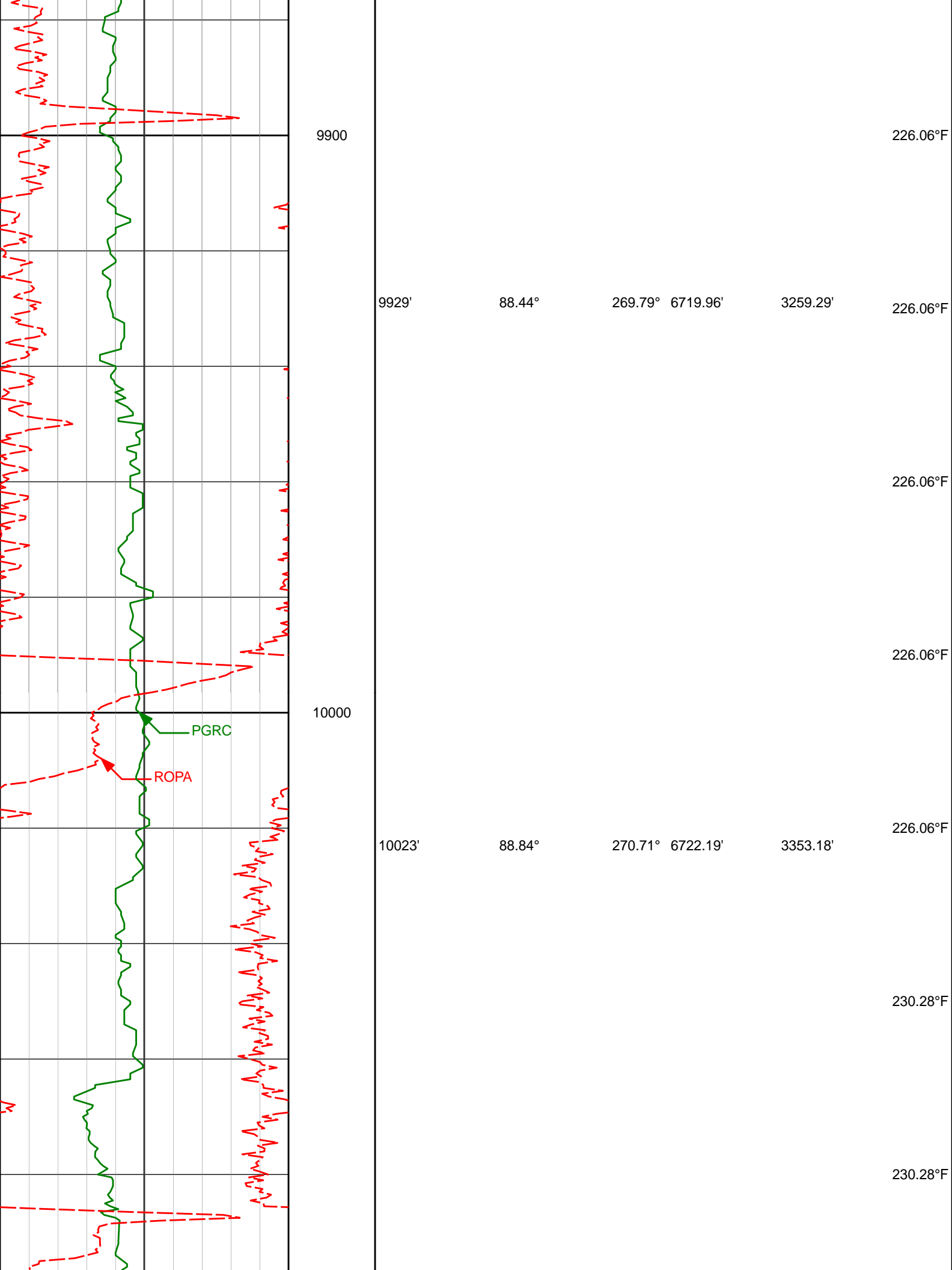
9645'

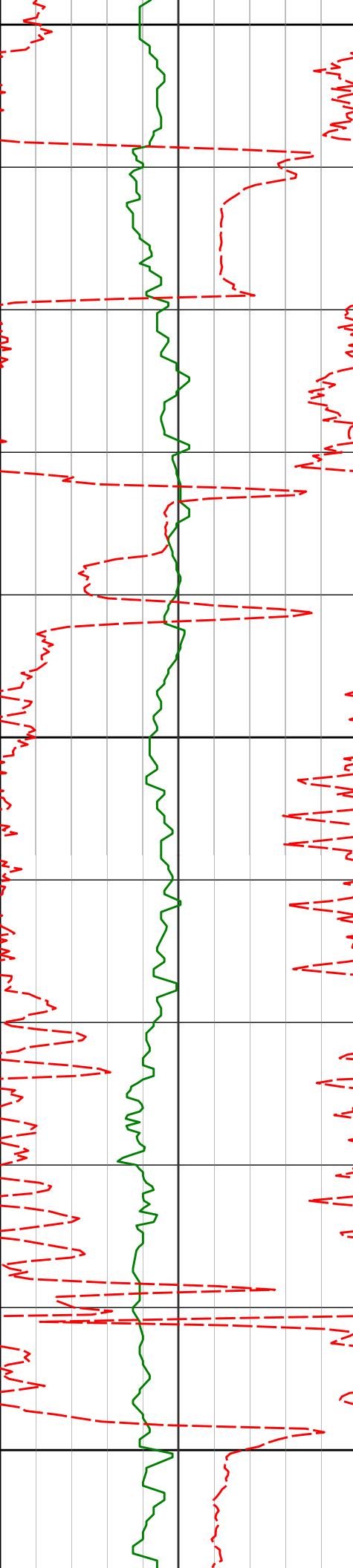
89.24°

270.51° 6715.72'

2975.54'







10100

230.28°F

10118'

89.70°

269.99° 6723.40'

3448.09'

226.06°F

226.06°F

10200

226.06°F

10212'

89.70°

269.47° 6723.90'

3542.04'

230.28°F

230.28°F

230.28°F

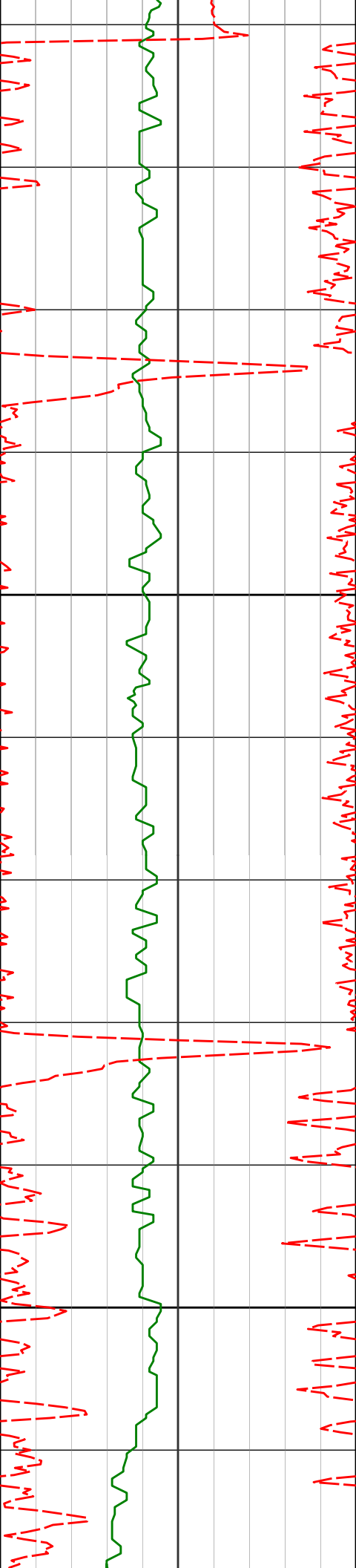
10300

10307'

89.09°

268.03° 6724.90'

3637.02'



10400

10500

10401'

10496'

88.65°

89.30°

267.45° 6726.75'

267.65° 6728.45'

3731.00'

3825.99'

230.28°F

230.28°F

230.28°F

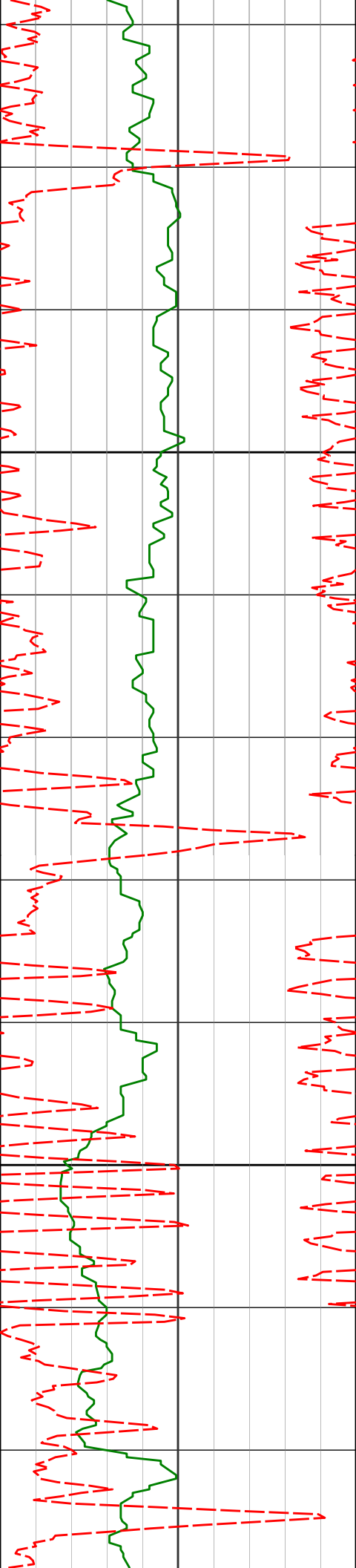
230.28°F

230.28°F

230.28°F

230.28°F

230.28°F



10600

10700

10590'

89.98°

267.41° 6729.04'

3919.98'

230.28°F

230.28°F

230.28°F

230.28°F

230.28°F

10685'

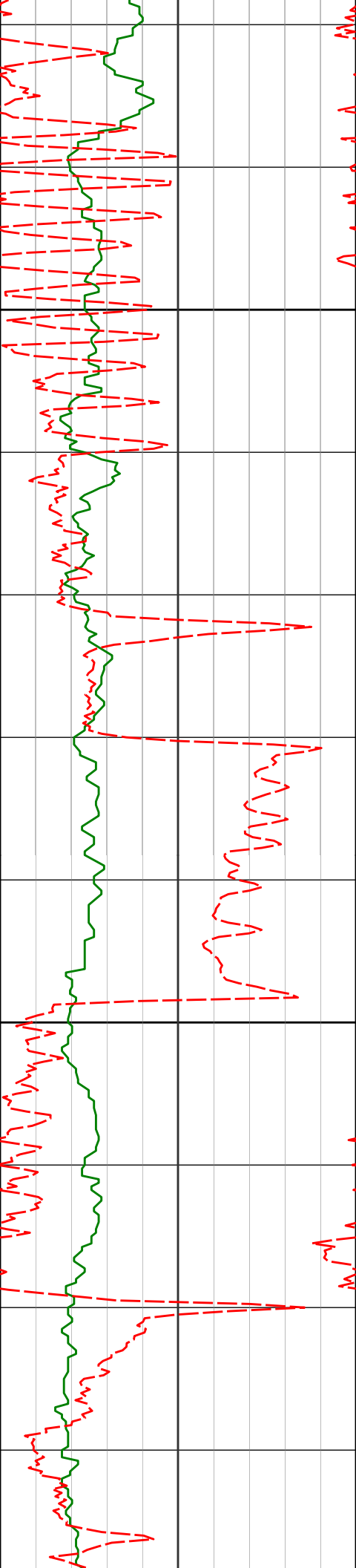
90.97°

267.09° 6728.25'

4014.97'

230.28°F

230.28°F



10800

10900

10780'

10874'

10969'

92.23°

90.84°

90.44°

267.02° 6725.60'

268.76° 6723.08'

269.43° 6722.02'

4109.92'

4203.88'

4298.85'

230.28°F

234.50°F

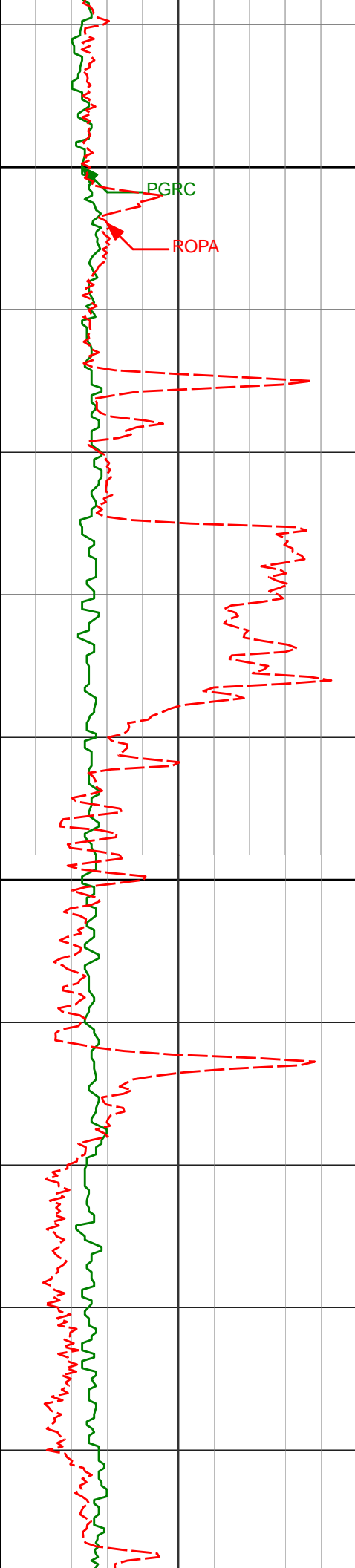
234.50°F

234.50°F

230.28°F

230.28°F

230.28°F



11000

PGRC

ROPA

11100

11064'

89.55°

268.89° 6722.03'

4393.83'

11158'

90.20°

270.17° 6722.24'

4487.79'

234.50°F

234.50°F

234.50°F

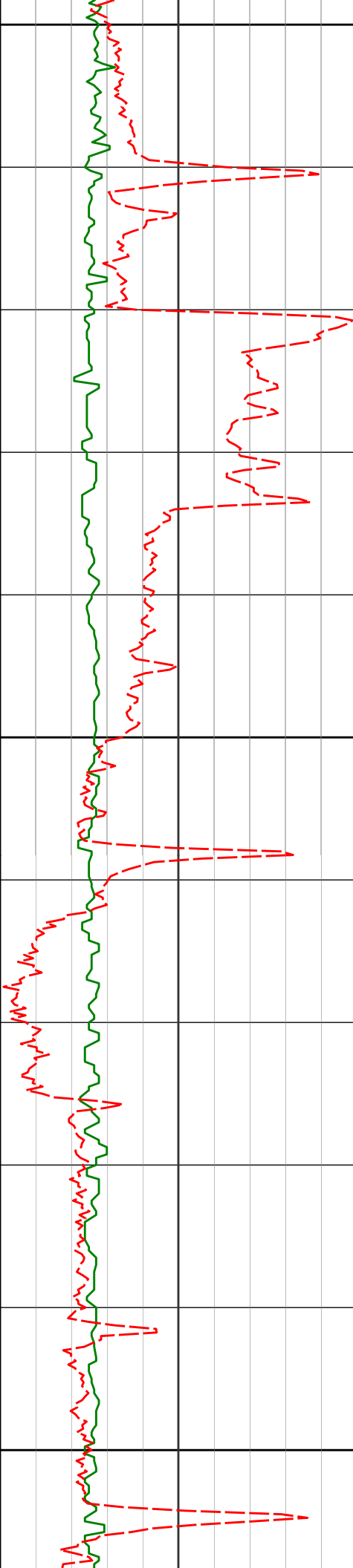
230.28°F

230.28°F

230.28°F

230.28°F

234.50°F



11200

234.50°F

11253'

89.03°

268.16° 6722.87'

4582.76'

234.50°F

234.50°F

11300

234.50°F

234.50°F

11347'

88.78°

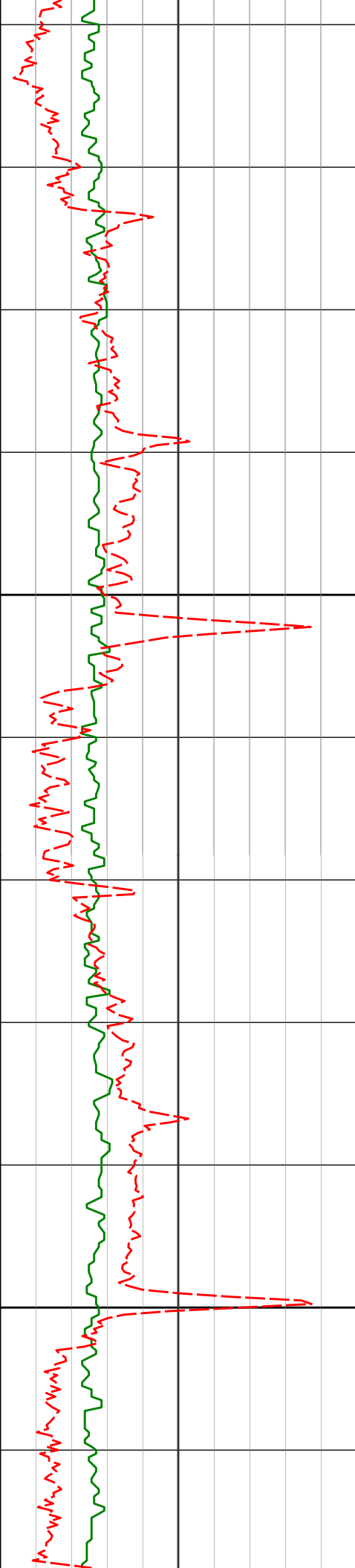
266.04° 6724.67'

4676.73'

238.72°F

11400

238.72°F



11500

11600

11442'

90.04°

267.19° 6725.65'

4771.69'

11537'

89.30°

265.52° 6726.20'

4866.65'

11632'

89.95°

265.56° 6726.82'

4961.57'

238.72°F

238.72°F

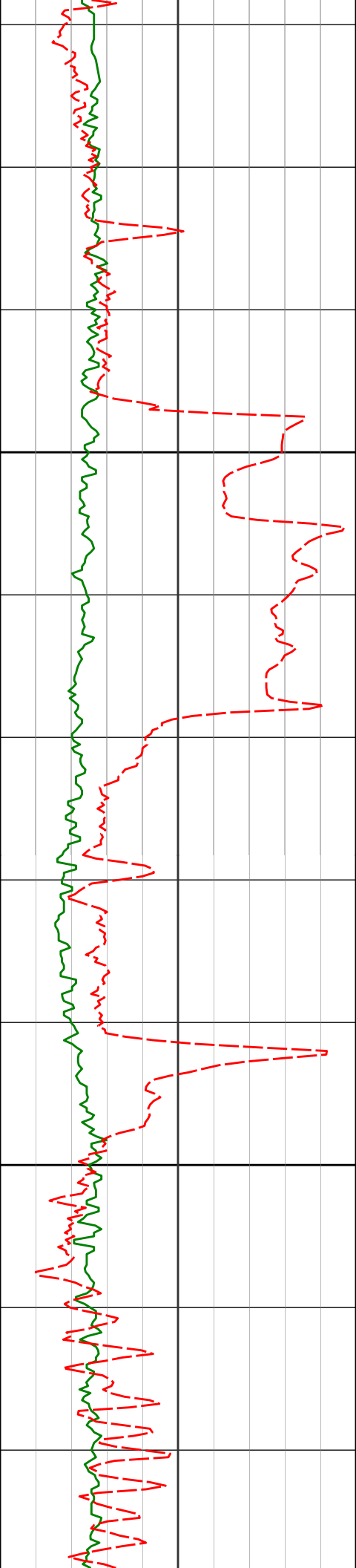
238.72°F

238.72°F

238.72°F

238.72°F

238.72°F



Run 200

11700

11800

11821'

89.45°

267.42° 6727.81'

5150.50'

264.03°F

264.03°F

238.72°F

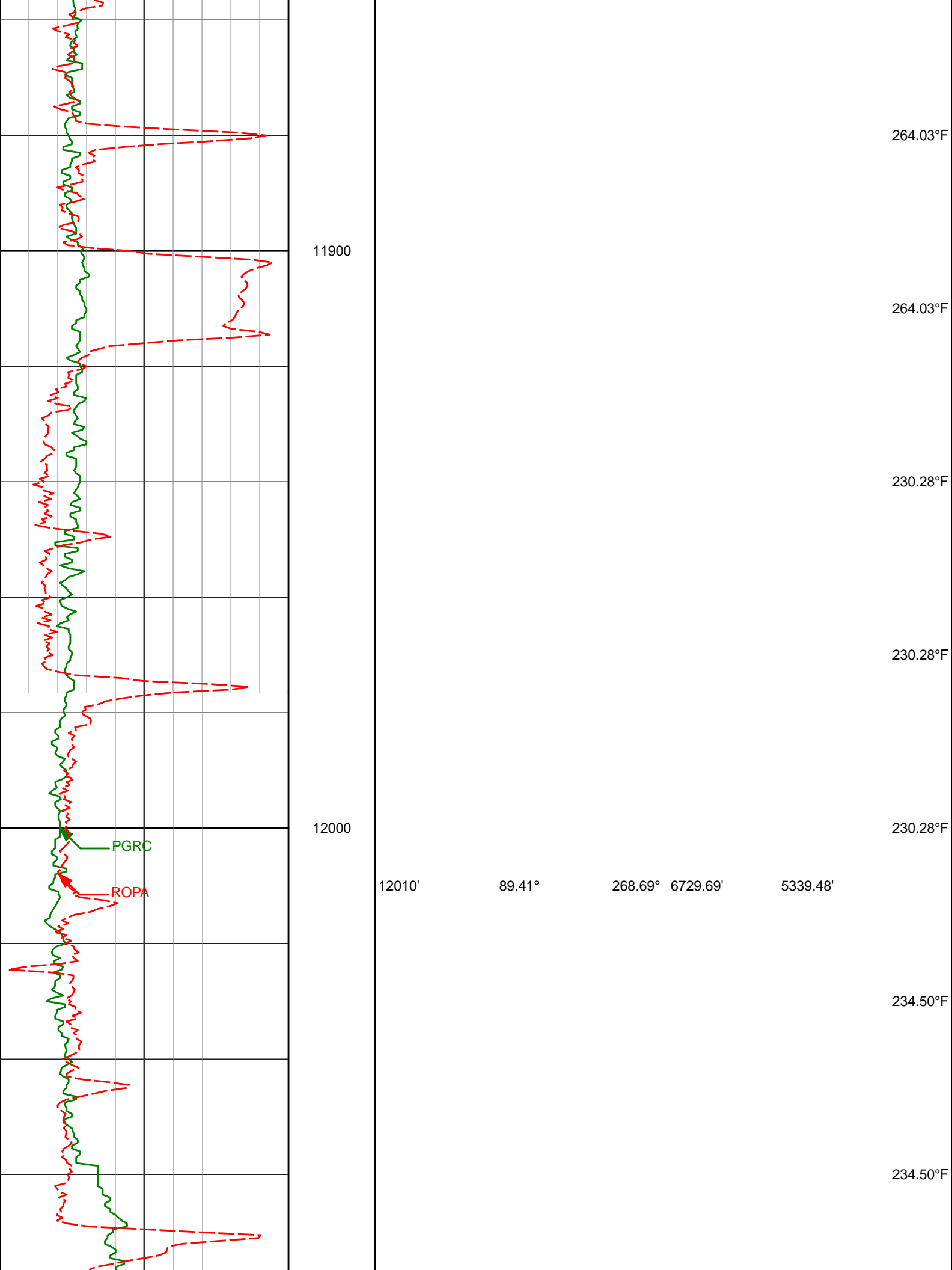
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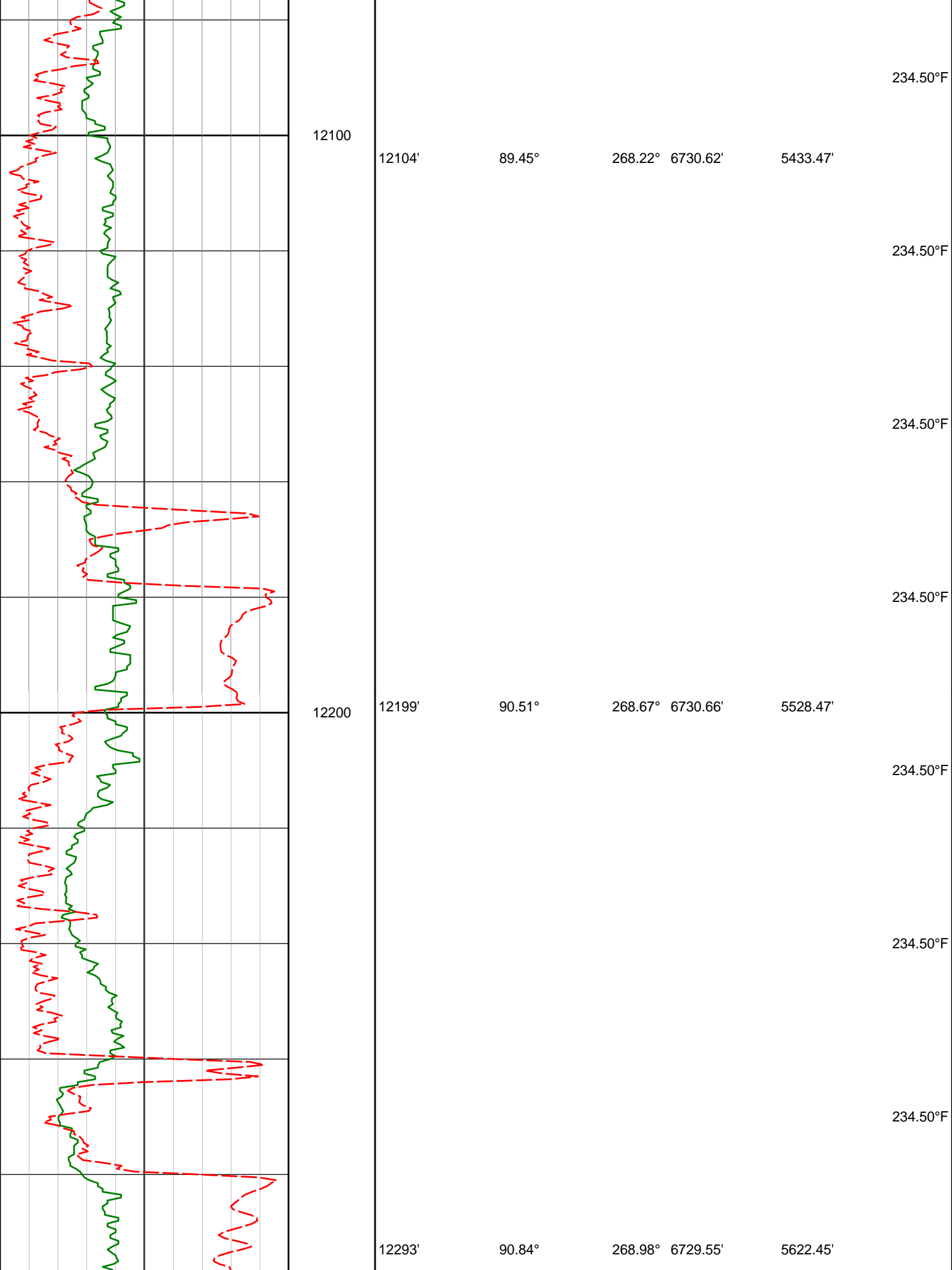
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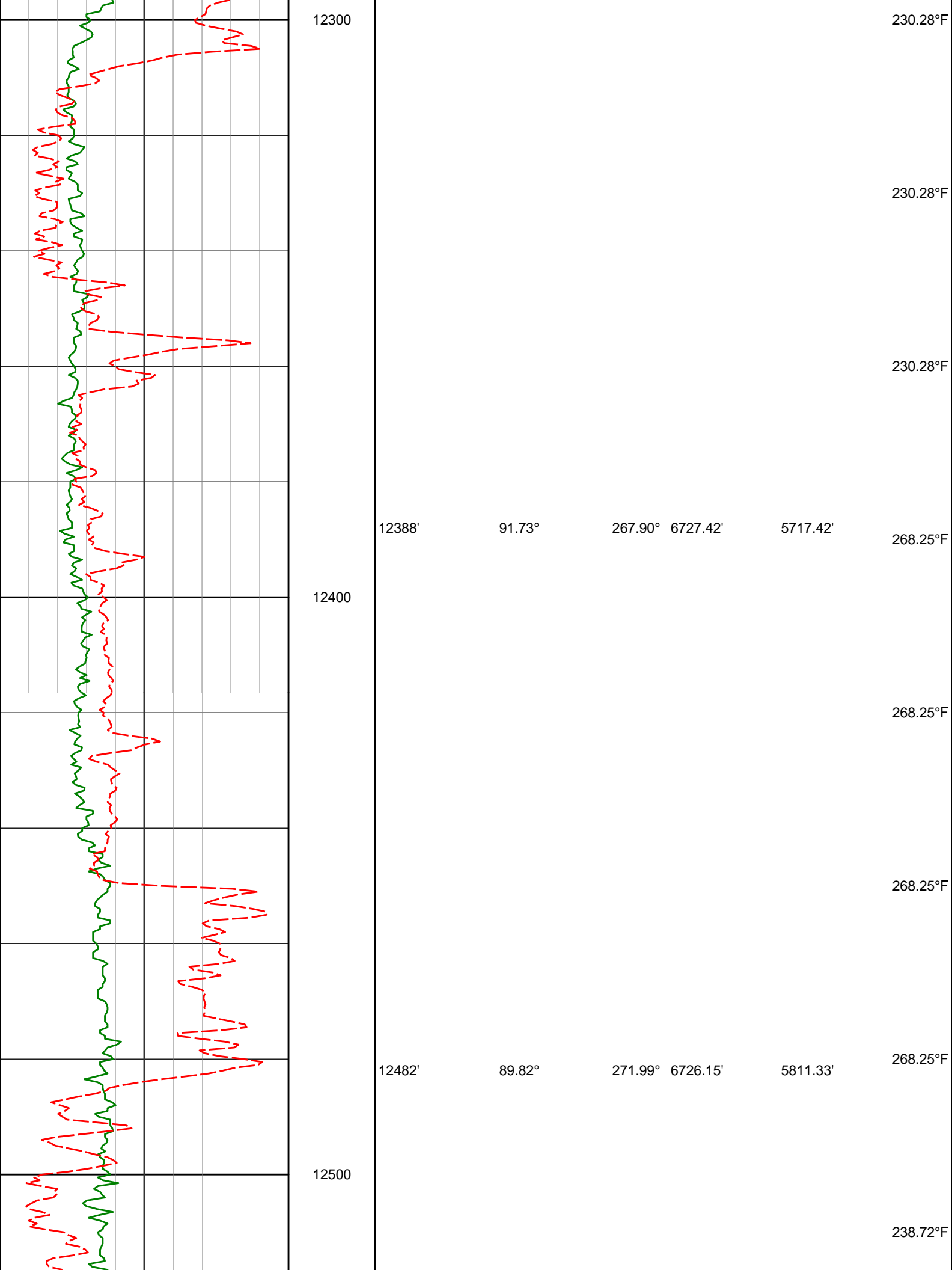
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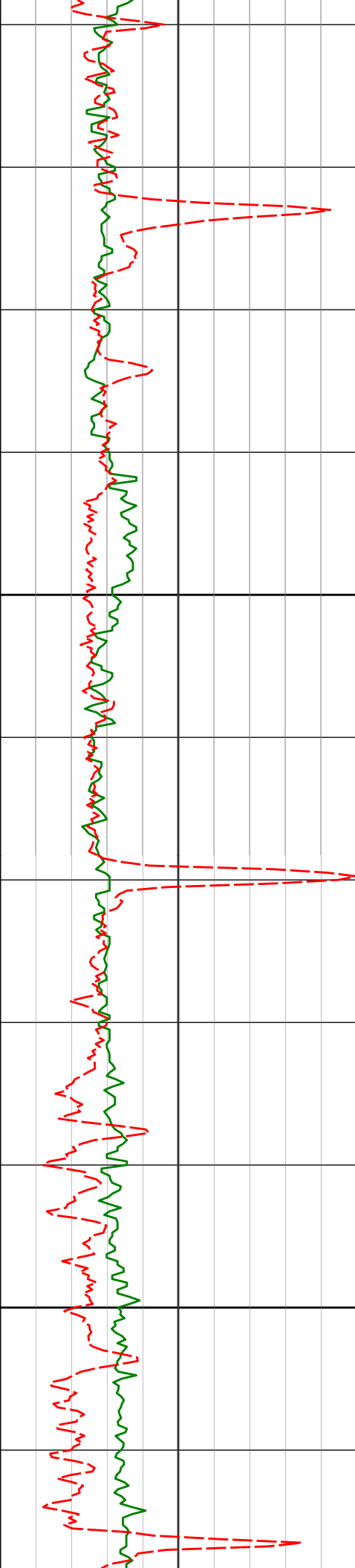
264.03°F

264.03°F









12600

12700

12577'

90.28°

272.19° 6726.06'

5906.08'

12672'

90.75°

272.37° 6725.21'

6000.80'

238.72°F

238.72°F

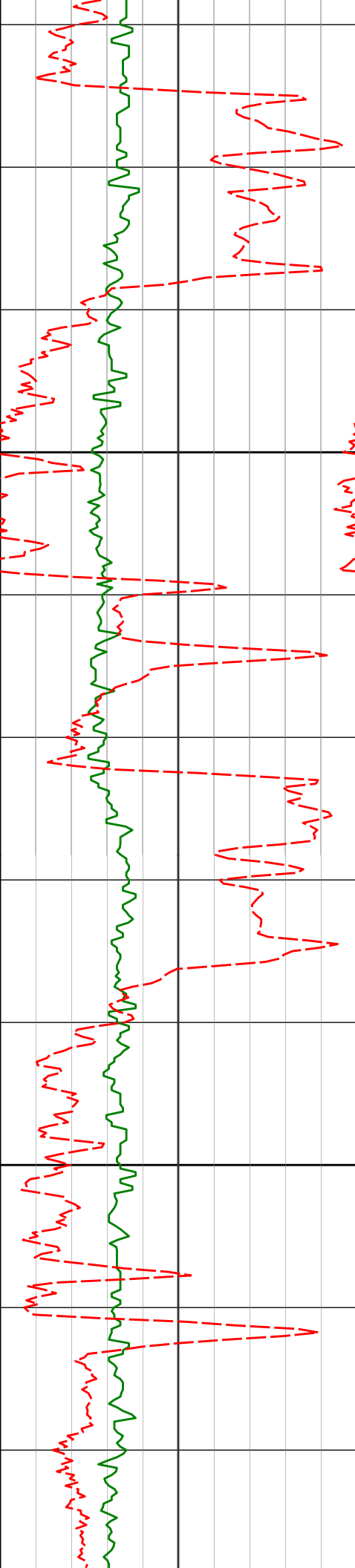
238.72°F

238.72°F

238.72°F

204.97°F

204.97°F



12800

12900

12766'

12861'

90.75°

90.10°

270.84° 6723.98'

268.36° 6723.28'

6094.60'

6189.55'

204.97°F

238.72°F

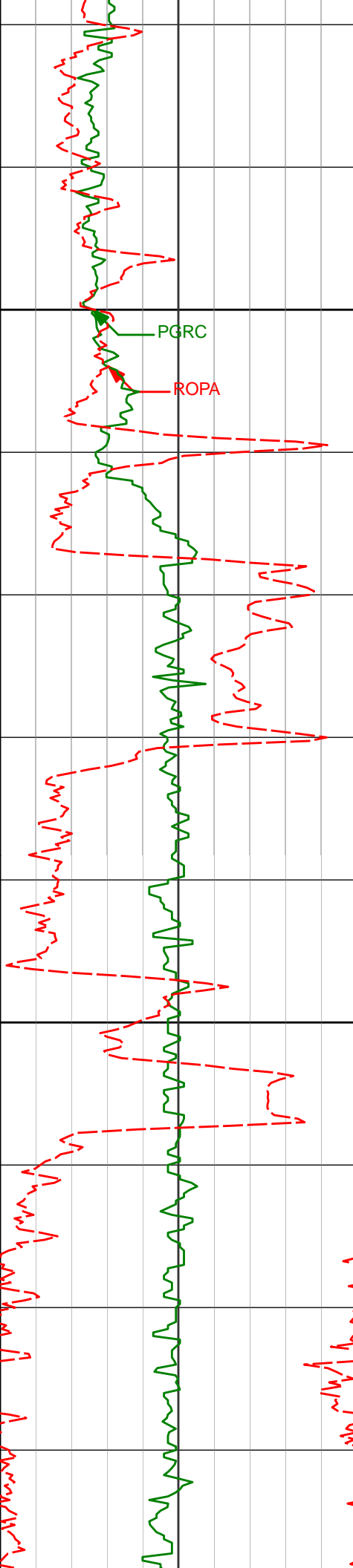
238.72°F

238.72°F

238.72°F

238.72°F

238.72°F



13000

13100

13050'

13144'

89.39°

88.53°

268.83°

267.28°

6724.12'

6725.82'

6378.53'

6472.51'

242.94°F

242.94°F

242.94°F

242.94°F

242.94°F

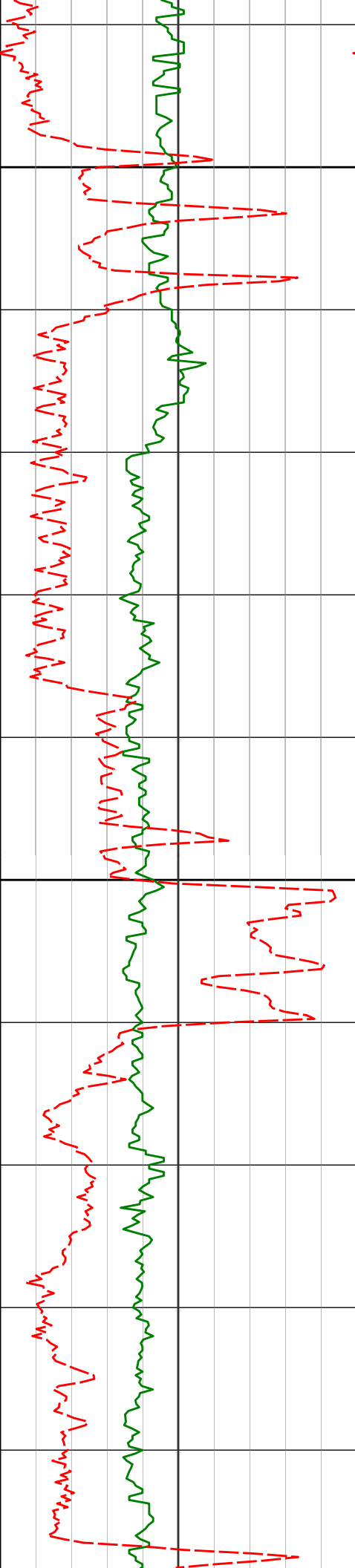
242.94°F

242.94°F

242.94°F

PGRC

ROPA



13200

242.94°F

13239'

87.97°

266.87° 6728.72'

6567.46'

242.94°F

242.94°F

242.94°F

13300

242.94°F

13333'

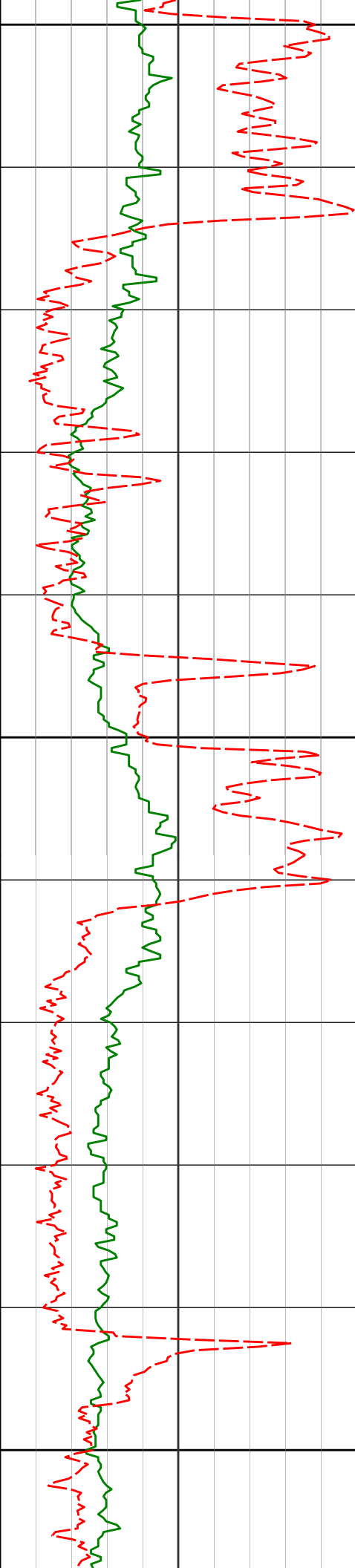
88.71°

267.48° 6731.45'

6661.41'

242.94°F

242.94°F



13400

13428'

89.97°

266.78° 6732.54'

6756.39'

13500

13522'

90.46°

267.47° 6732.19'

6850.38'

13600

242.94°F

242.94°F

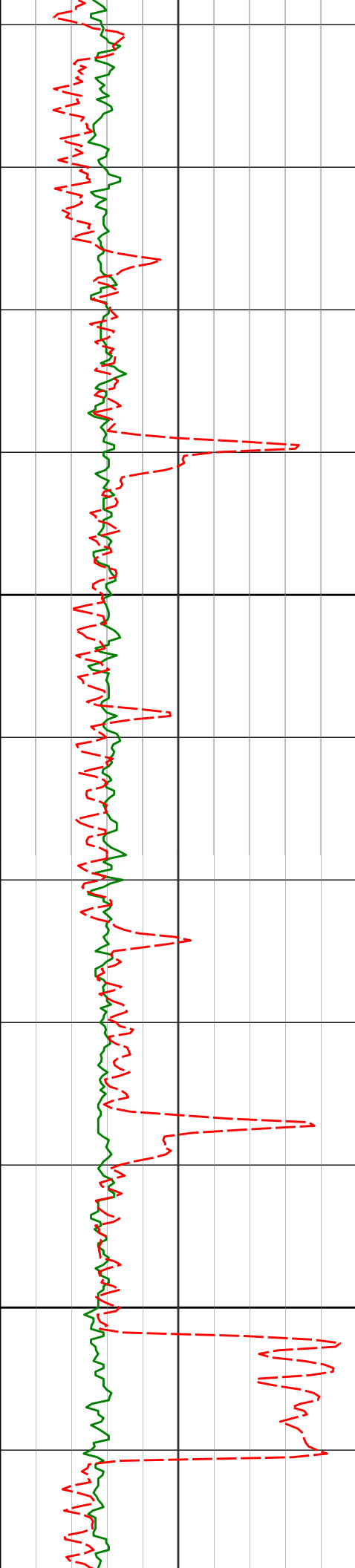
162.78°F

162.78°F

162.78°F

238.72°F

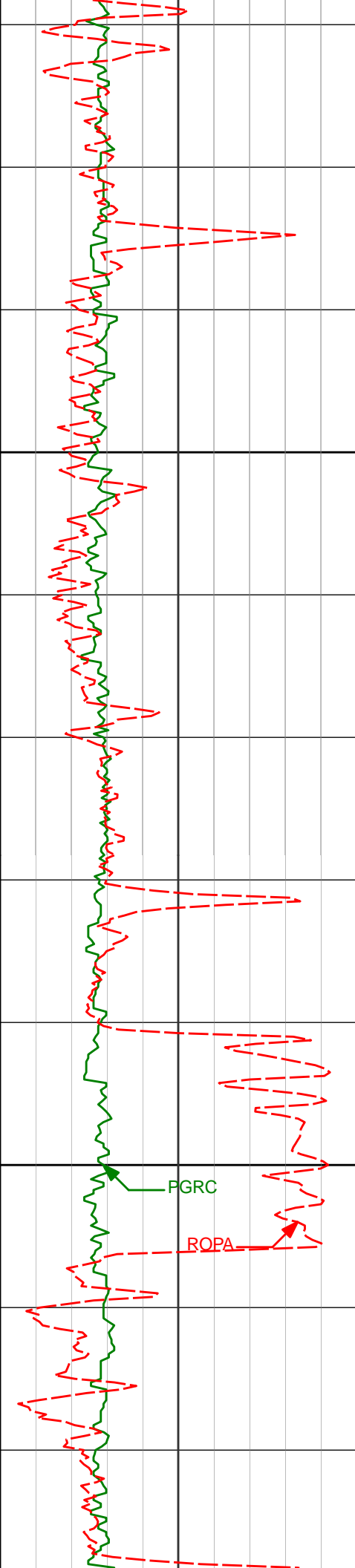
238.72°F



13700

13800

13617'	90.86°	267.62°	6731.09'	6945.37'	238.72°F
					242.94°F
					242.94°F
					242.94°F
13711'	91.57°	267.89°	6729.10'	7039.35'	242.94°F
					196.53°F
					196.53°F
13806'	91.33°	268.35°	6726.70'	7134.32'	196.53°F
					242.94°F



13900

13900'

91.88°

268.02° 6724.06'

7228.28'

14000

13995'

90.46°

269.10° 6722.12'

7323.25'

FGRC

ROPA

242.94°F

242.94°F

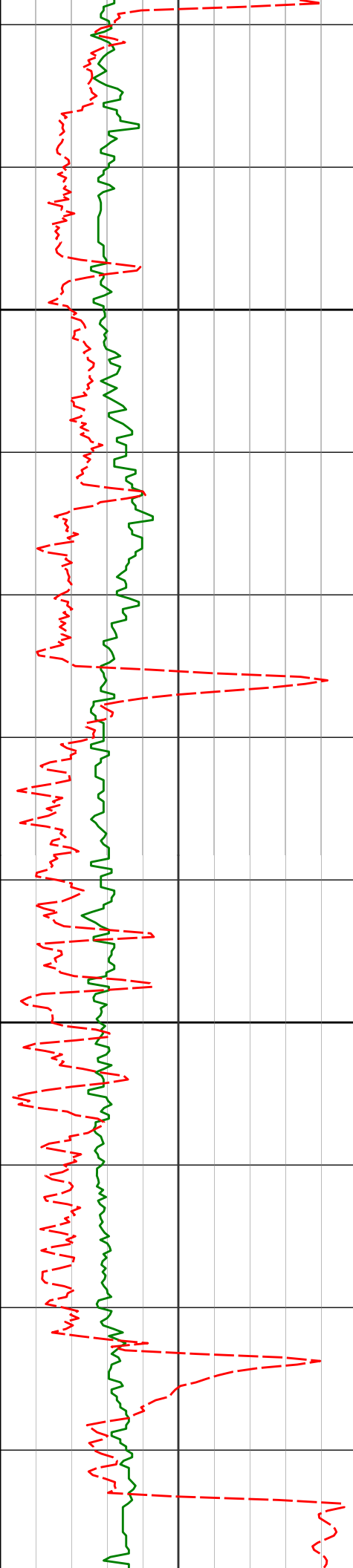
242.94°F

242.94°F

242.94°F

242.94°F

242.94°F



14100

14200

14089'

89.88°

270.33° 6721.85'

7417.20'

14184'

90.71°

270.98° 6721.36'

7512.09'

242.94°F

247.16°F

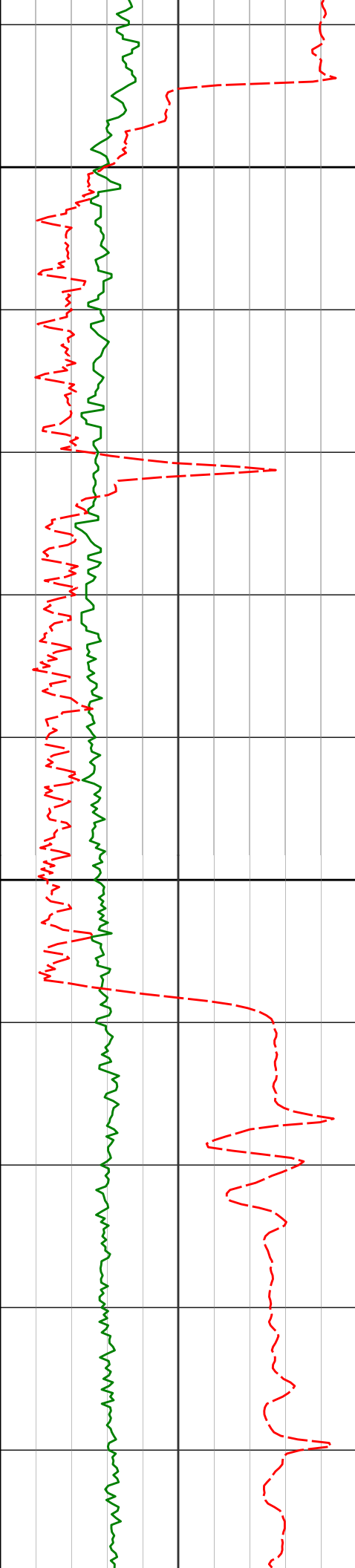
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247.16°F

247.16°F

247.16°F

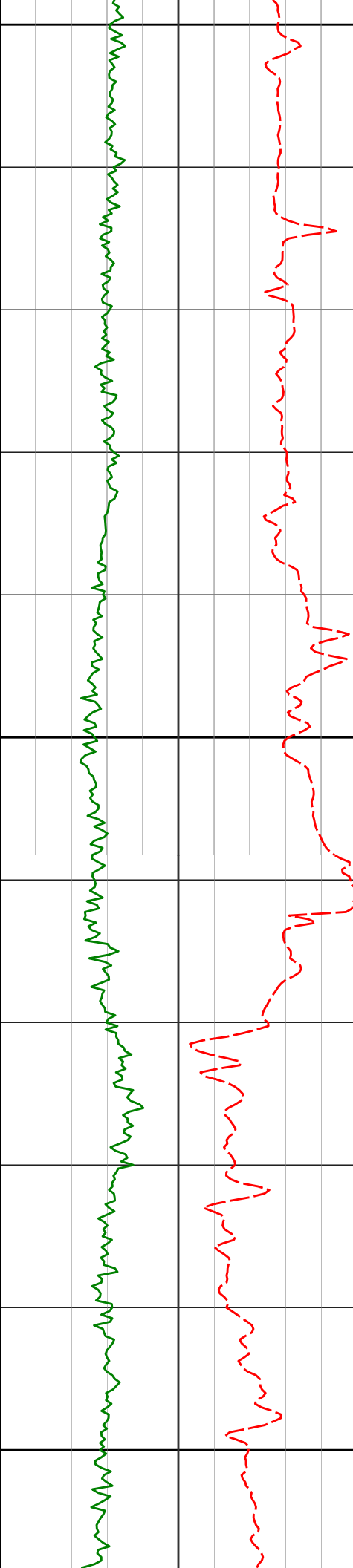
247.16°F



14300

14400

14278'	89.57°	270.67°	6721.13'	7605.97'	247.16°F
					247.16°F
					247.16°F
					247.16°F
14373'	89.69°	270.89°	6721.74'	7700.85'	247.16°F
					251.38°F
					251.38°F
					32.00°F
14468'	89.54°	270.35°	6722.38'	7795.74'	
					247.16°F



14500

247.16°F

247.16°F

14562'

90.55°

270.39° 6722.31'

7889.65'

251.38°F

14600

251.38°F

Run 300

251.38°F

14657'

90.92°

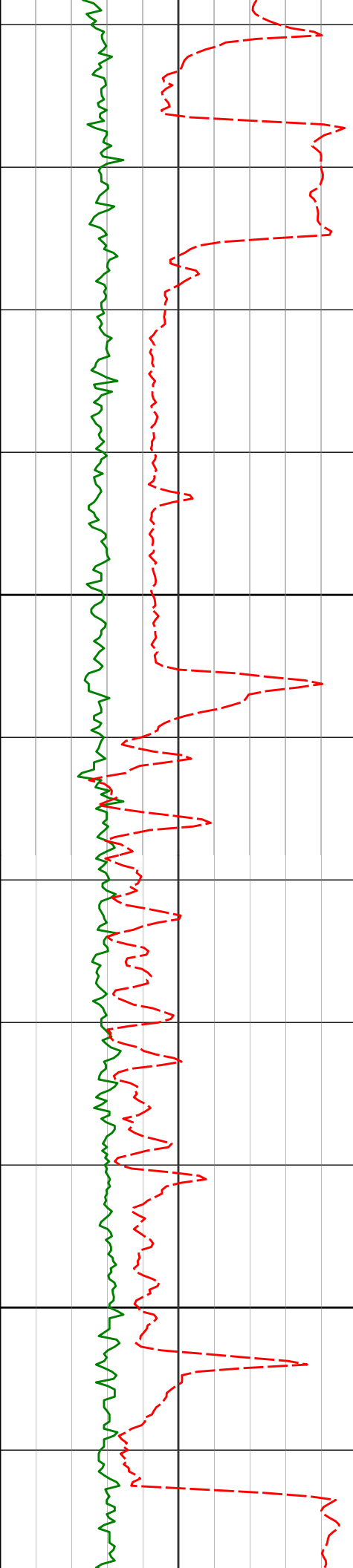
269.58° 6721.09'

7984.58'

242.94°F

14700

242.94°F



14800

14900

14752'

89.41°

268.33° 6720.81'

8079.56'

14846'

89.36°

267.76° 6721.82'

8173.56'

242.94°F

242.94°F

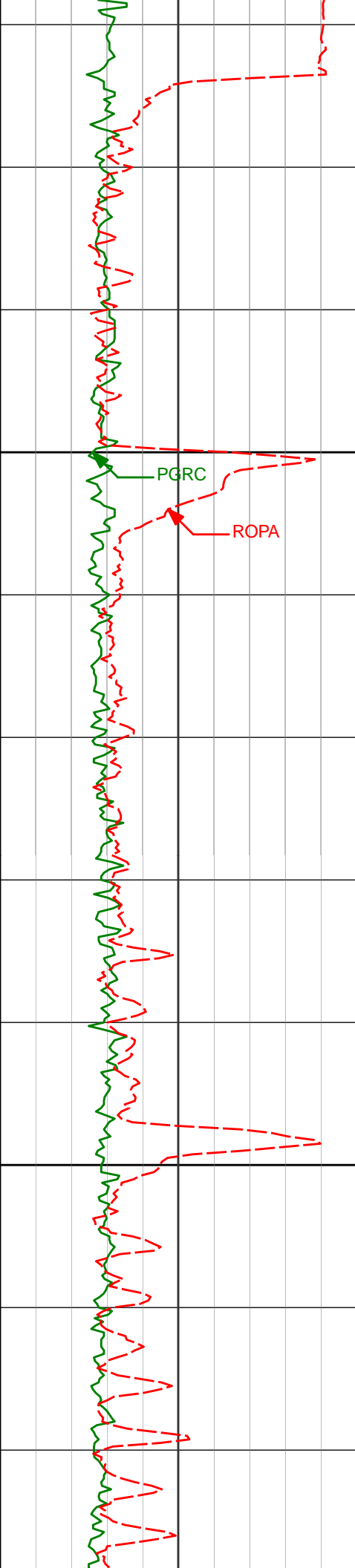
242.94°F

242.94°F

242.94°F

242.94°F

242.94°F



15000

PGRC

ROPA

15100

14941'

89.94°

269.11° 6722.40'

8268.55'

242.94°F

242.94°F

242.94°F

242.94°F

15036'

90.34°

269.47° 6722.17'

8363.52'

242.94°F

242.94°F

15130'

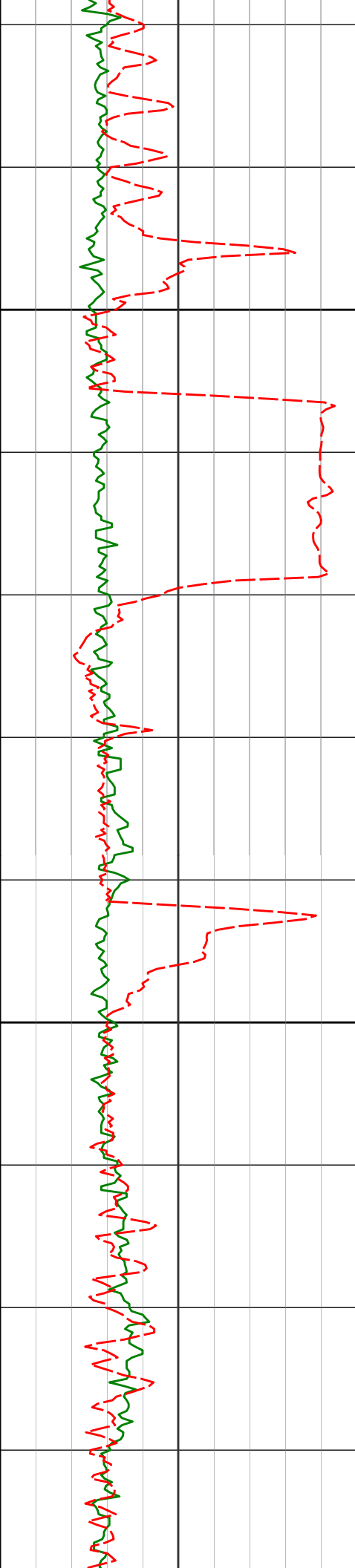
89.76°

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8457.51'

242.94°F

247.16°F



15200

15300

15225'

89.51°

270.09° 6722.69'

8552.48'

247.16°F

247.16°F

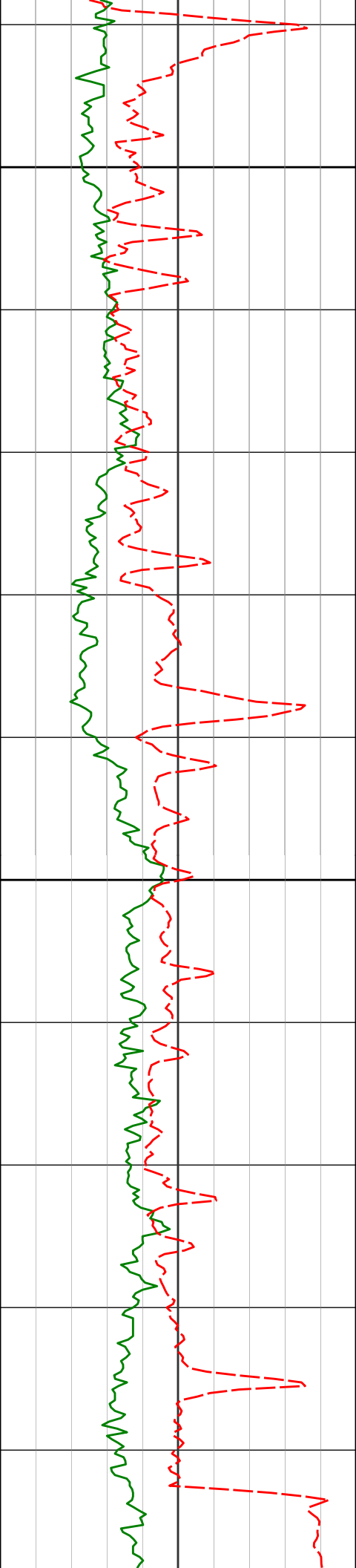
247.16°F

247.16°F

247.16°F

247.16°F

247.16°F



15400

15500

15414'

88.89°

270.88° 6725.33'

8741.27'

15509'

88.92°

270.78° 6727.15'

8836.13'

247.16°F

251.38°F

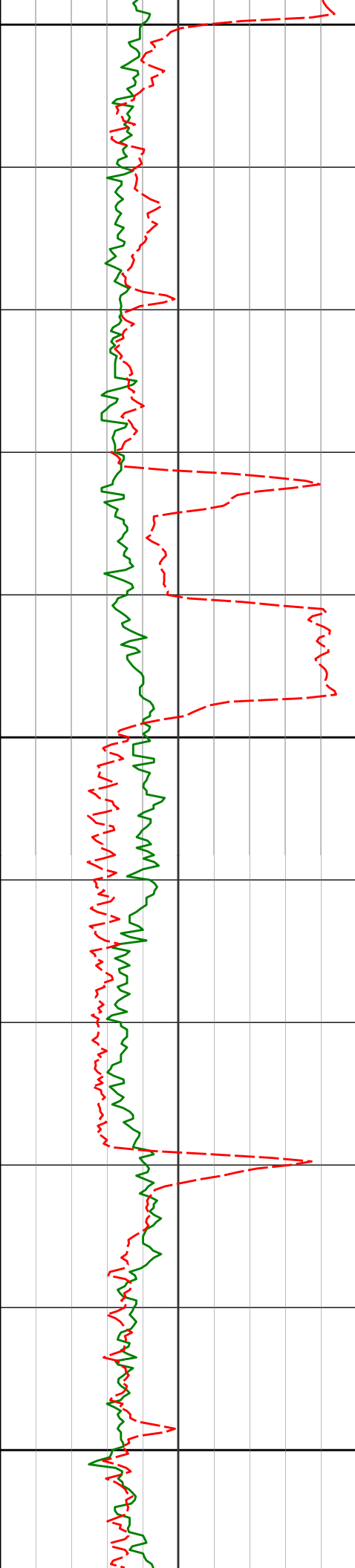
251.38°F

251.38°F

251.38°F

251.38°F

251.38°F



15600

15604'

89.32°

270.47° 6728.61'

8931.02'

251.38°F

251.38°F

251.38°F

251.38°F

15700

251.38°F

251.38°F

251.38°F

15793'

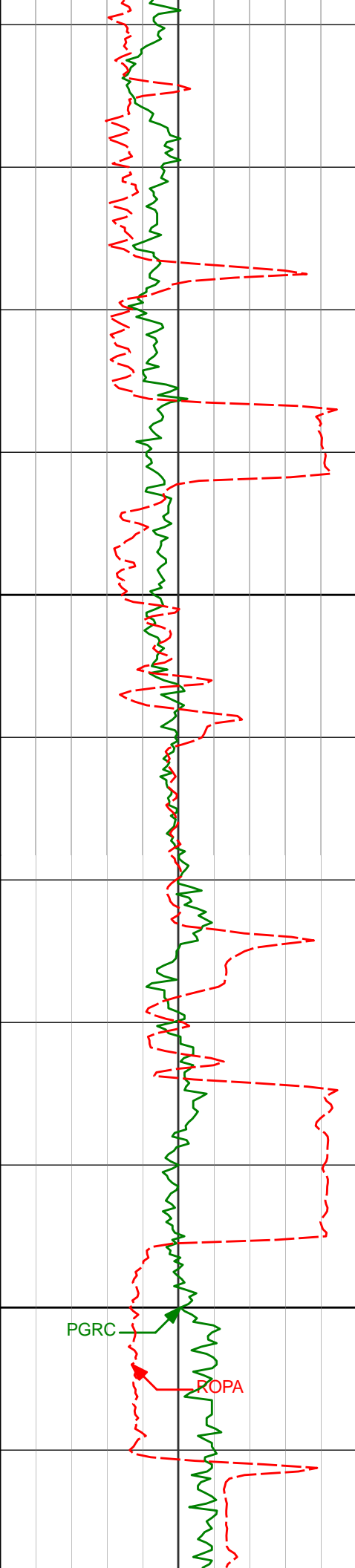
89.97°

269.41° 6729.78'

9119.89'

15800

251.38°F



15900

16000

15888'

89.97°

269.86°

6729.83'

9214.85'

15982'

90.53°

269.13°

6729.42'

9308.82'

251.38°F

251.38°F

251.38°F

251.38°F

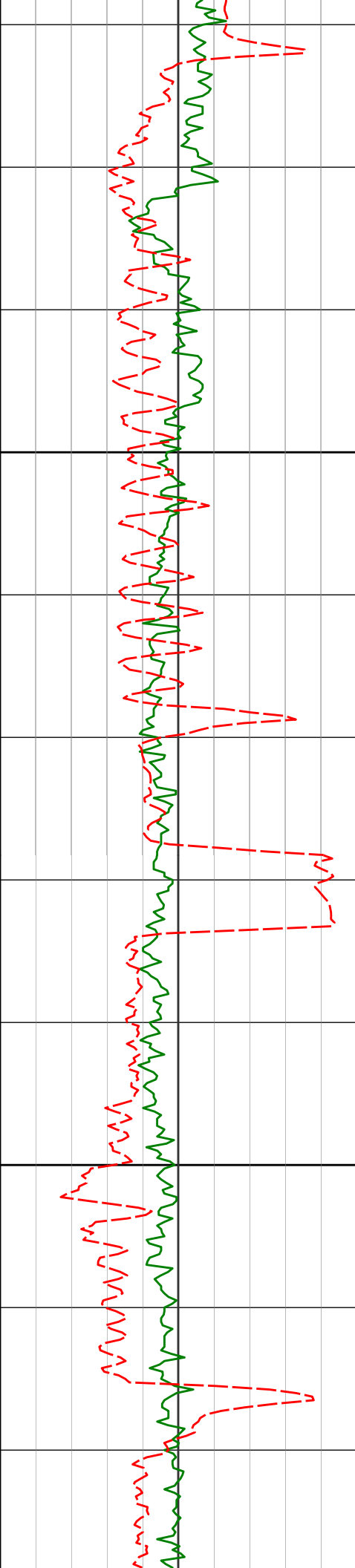
251.38°F

251.38°F

251.38°F

PGRC

ROPA



16100

16200

16075'

90.31°

269.17° 6728.74'

9401.79'

16171'

90.59°

268.60° 6727.98'

9497.77'

251.38°F

251.38°F

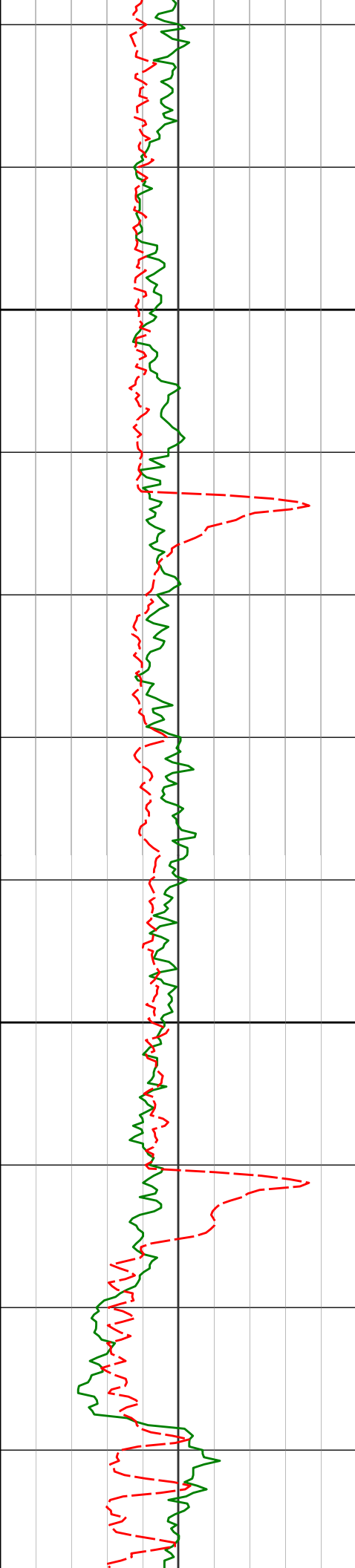
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255.59°F

255.59°F

255.59°F

255.59°F



16300

16400

16266'

90.59°

268.60° 6727.00'

9592.76'

16360'

90.65°

268.04° 6725.99'

9686.75'

16455'

90.37°

267.37° 6725.14'

9781.75'

255.59°F

259.81°F

259.81°F

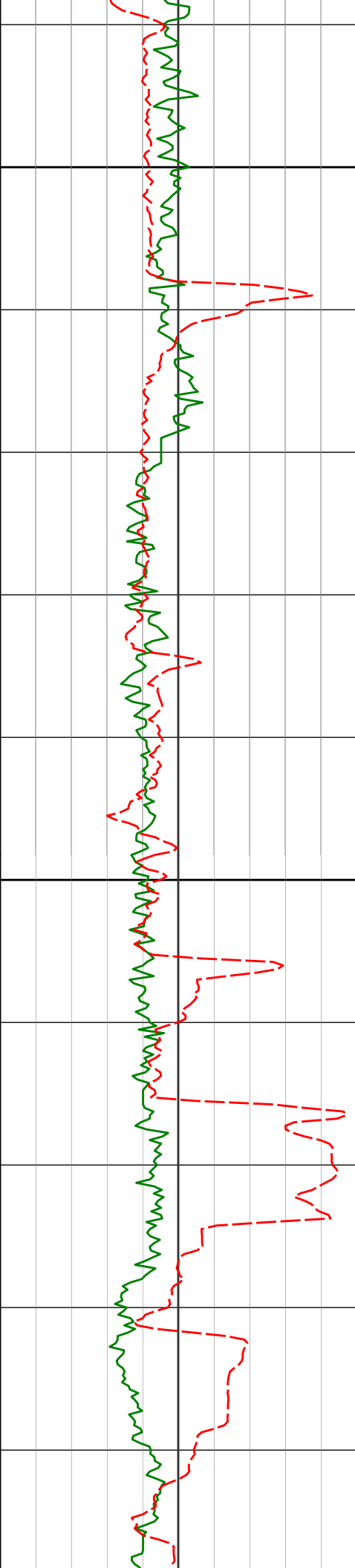
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259.81°F

259.81°F

259.81°F

259.81°F



16500

259.81°F

259.81°F

16549'

90.01°

266.94° 6724.83'

9875.74'

259.81°F

259.81°F

16600

259.81°F

16644'

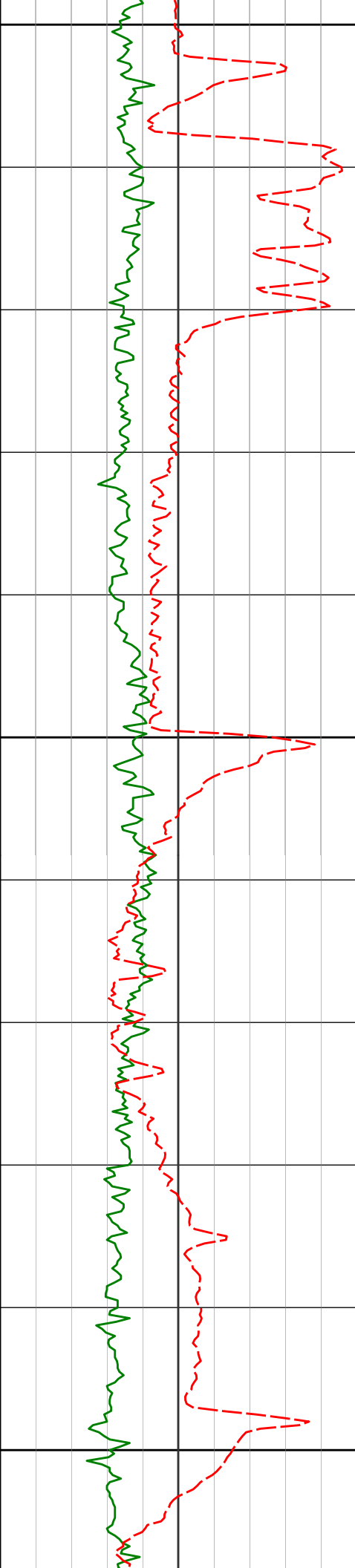
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267.64° 6725.35'

9970.73'

259.81°F

259.81°F



16700

259.81°F

16738'

90.71°

268.46° 6725.29'

10064.73'

259.81°F

259.81°F

16800

259.81°F

16833'

90.59°

268.18° 6724.22'

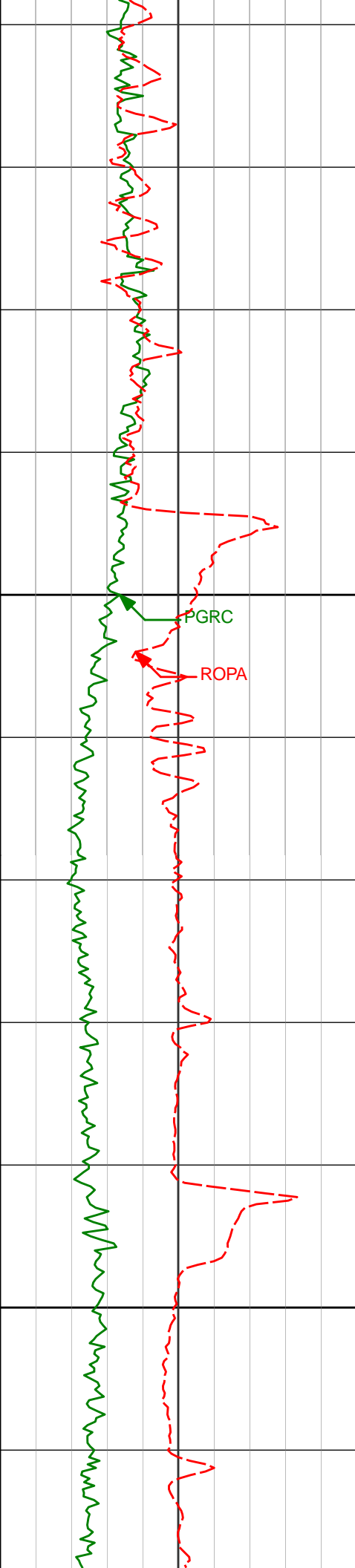
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259.81°F

16900

259.81°F



17000

17100

16927'

90.65°

268.34° 6723.20'

10253.71'

259.81°F

259.81°F

259.81°F

259.81°F

17022'

90.80°

268.15° 6722.00'

10348.70'

259.81°F

259.81°F

259.81°F

17116'

90.77°

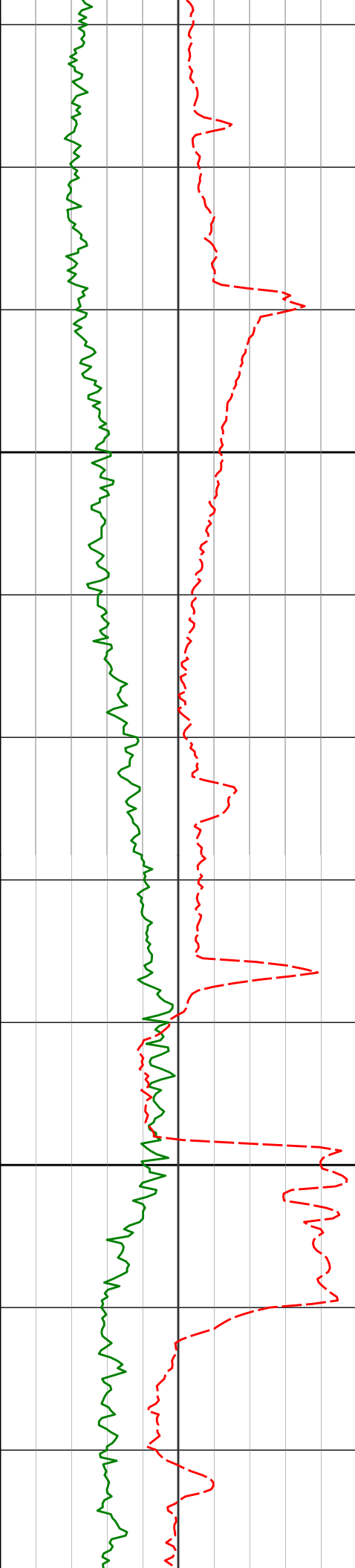
268.31° 6720.71'

10442.69'

259.81°F

PGRC

ROPA



17200

17300

17211'

17305'

90.68°

89.66°

267.78°

268.93°

6719.51'

6719.23'

10537.69'

10631.68'

259.81°F

259.81°F

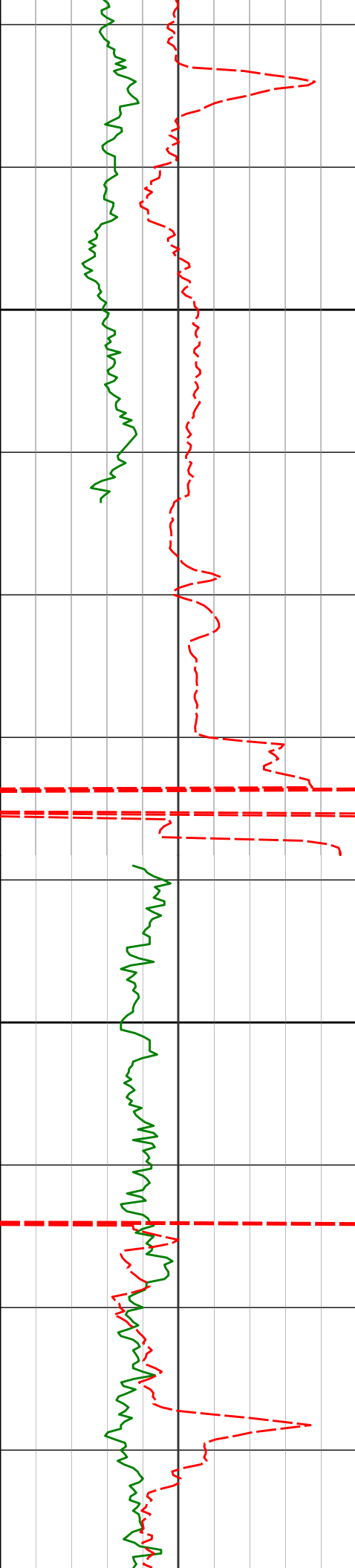
264.03°F

264.03°F

264.03°F

264.03°F

259.81°F



17400

17500

17399'

17494'

88.53°

88.31°

269.50° 6720.71'

269.46° 6723.33'

10725.64'

10820.57'

259.81°F

259.81°F

259.81°F

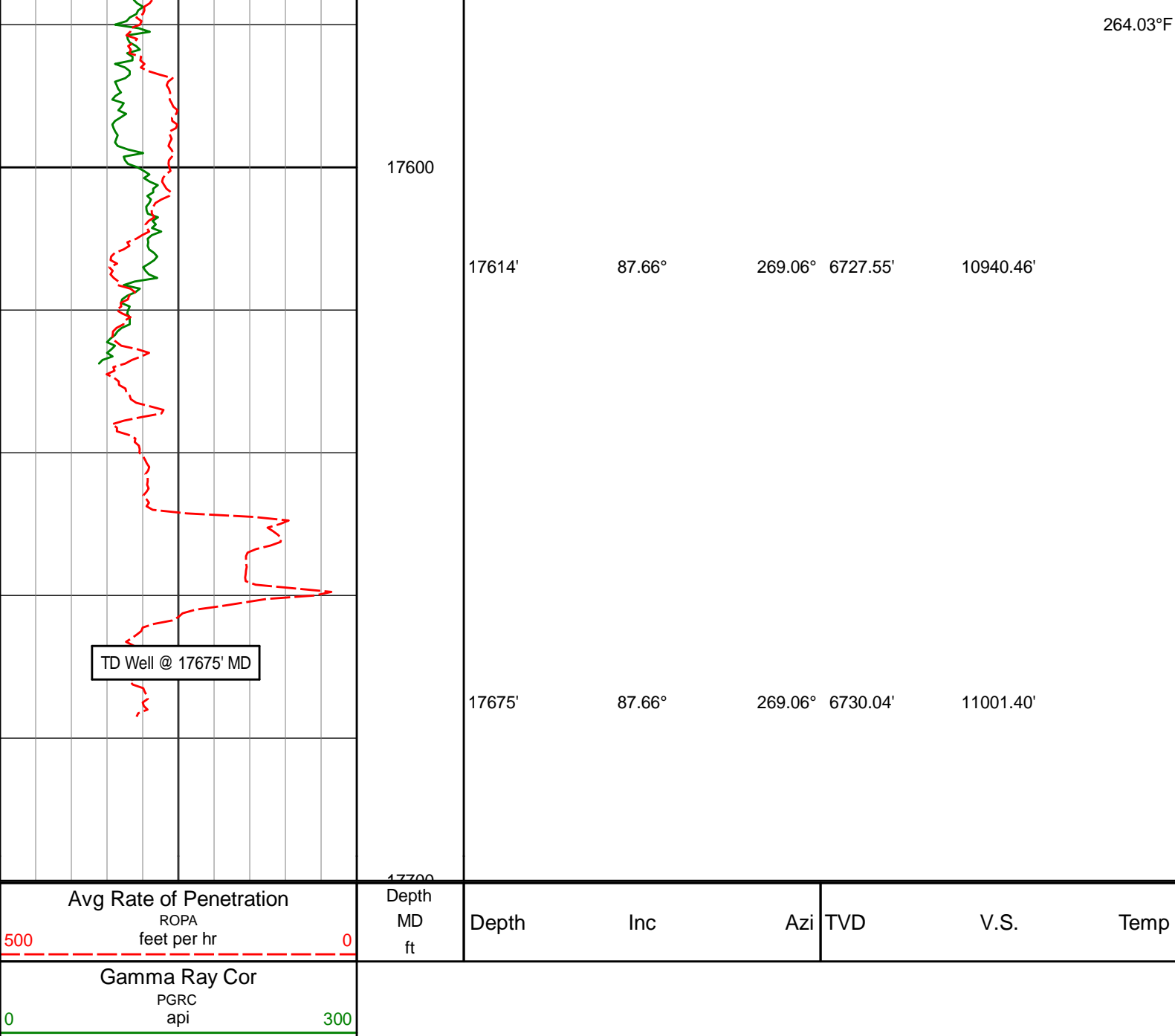
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264.03°F

264.03°F

264.03°F



HALLIBURTON

DIRECTIONAL SURVEY REPORT

**Noble Energy
Shadow State A26-614
Wattenberg
Weld Colorado
USA
CA-XX-0903288401**

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
78.00	0.03	330.60	78.00	0.02 N	0.01 W	0.01	0.04
172.00	0.37	16.96	172.00	0.33 N	0.07 E	-0.08	0.37
270.00	0.46	22.75	270.00	0.99 N	0.31 E	-0.35	0.10
365.00	0.19	193.16	365.00	1.19 N	0.42 E	-0.47	0.68
459.00	0.13	73.91	459.00	1.07 N	0.49 E	-0.53	0.30
554.00	0.33	62.52	553.99	1.23 N	0.84 E	-0.88	0.21

534.00	0.33	62.32	533.99	1.23 N	0.84 E	-0.88	0.21
648.00	0.37	87.49	647.99	1.37 N	1.38 E	-1.43	0.17
743.00	0.14	323.31	742.99	1.47 N	1.62 E	-1.67	0.49
837.00	0.29	338.53	836.99	1.79 N	1.46 E	-1.52	0.17
932.00	0.03	235.28	931.99	1.99 N	1.35 E	-1.42	0.31
1026.00	0.08	234.67	1025.99	1.94 N	1.28 E	-1.35	0.05
1121.00	0.15	216.62	1120.99	1.80 N	1.15 E	-1.21	0.08
1215.00	0.09	278.68	1214.99	1.72 N	1.00 E	-1.07	0.14
1310.00	0.09	216.97	1309.99	1.67 N	0.89 E	-0.94	0.10
1404.00	0.44	295.12	1403.99	1.76 N	0.51 E	-0.58	0.46
1499.00	0.21	324.63	1498.99	2.06 N	0.08 E	-0.16	0.29
1593.00	0.07	329.94	1592.99	2.25 N	0.05 W	-0.04	0.15
1688.00	0.21	209.42	1687.99	2.15 N	0.16 W	0.08	0.27
1782.00	0.40	232.54	1781.99	1.80 N	0.51 W	0.44	0.24
1877.00	0.37	251.15	1876.98	1.50 N	1.06 W	1.00	0.13
1918.00	0.48	296.58	1917.98	1.53 N	1.34 W	1.28	0.84
1963.00	0.50	341.44	1962.98	1.80 N	1.57 W	1.50	0.83
2057.00	0.68	333.21	2056.98	2.69 N	1.95 W	1.85	0.21
2152.00	0.60	332.80	2151.97	3.64 N	2.43 W	2.30	0.08
2246.00	0.67	320.38	2245.97	4.50 N	3.01 W	2.84	0.16
2341.00	0.73	301.38	2340.96	5.24 N	3.88 W	3.69	0.25
2435.00	0.68	303.77	2434.95	5.86 N	4.85 W	4.64	0.06
2530.00	0.53	322.67	2529.95	6.52 N	5.59 W	5.35	0.26
2624.00	0.38	321.32	2623.94	7.11 N	6.05 W	5.79	0.16
2719.00	0.50	308.81	2718.94	7.62 N	6.57 W	6.29	0.16
2813.00	1.03	123.99	2812.94	7.40 N	6.19 W	5.91	1.63
2908.00	2.80	106.86	2907.88	6.25 N	3.26 W	3.03	1.94
3002.00	4.97	109.24	3001.66	4.24 N	2.79 E	-2.94	2.31
3097.00	6.85	104.21	3096.15	1.50 N	12.16 E	-12.21	2.05
3191.00	6.56	102.58	3189.51	1.05 S	22.84 E	-22.79	0.37
3310.00	7.54	106.63	3307.61	4.76 S	36.95 E	-36.76	0.92
3404.00	8.13	113.71	3400.73	9.20 S	48.95 E	-48.59	1.20
3499.00	8.65	121.20	3494.72	15.60 S	61.21 E	-60.61	1.27
3593.00	8.57	121.44	3587.66	22.92 S	73.23 E	-72.36	0.09
3688.00	8.68	122.25	3681.58	30.43 S	85.33 E	-84.18	0.17
3782.00	8.82	122.08	3774.49	38.05 S	97.44 E	-96.00	0.15
3877.00	7.09	120.09	3868.57	44.86 S	108.68 E	-106.99	1.84
3972.00	6.25	124.10	3962.93	50.69 S	118.04 E	-116.13	1.01
4066.00	5.72	128.39	4056.42	56.47 S	125.95 E	-123.83	0.74
4160.00	6.62	125.37	4149.87	62.52 S	134.04 E	-131.69	1.02
4255.00	6.39	121.79	4244.26	68.47 S	143.00 E	-140.43	0.49
4349.00	5.68	122.58	4337.74	73.73 S	151.36 E	-148.60	0.76
4444.00	5.17	123.87	4432.31	78.65 S	158.88 E	-155.93	0.55
4539.00	4.15	142.33	4527.00	83.76 S	164.53 E	-161.40	1.90
4633.00	3.74	164.27	4620.78	89.40 S	167.44 E	-164.10	1.65
4728.00	3.05	178.85	4715.62	94.91 S	168.33 E	-164.80	1.16
4822.00	3.15	157.54	4809.48	99.80 S	169.37 E	-165.66	1.22
4917.00	4.00	148.60	4904.30	105.04 S	172.09 E	-168.19	1.07
5012.00	3.80	144.36	4999.08	110.42 S	175.66 E	-171.55	0.37
5106.00	3.18	144.02	5092.90	115.06 S	179.00 E	-174.73	0.66
5201.00	3.77	156.57	5187.73	120.06 S	181.79 E	-177.34	1.01
5296.00	3.84	158.22	5282.52	125.88 S	184.21 E	-179.55	0.14
5390.00	3.26	154.03	5376.34	131.21 S	186.55 E	-181.69	0.68
5485.00	3.95	153.33	5471.15	136.56 S	189.20 E	-184.15	0.73
5674.00	2.92	151.44	5659.81	146.61 S	194.43 E	-189.00	0.55
5768.00	3.73	145.98	5753.65	151.24 S	197.28 E	-191.69	0.92
5863.00	3.85	142.25	5848.44	156.33 S	200.96 E	-195.19	0.29
5957.00	3.05	137.55	5942.27	160.67 S	204.58 E	-198.65	0.90
6052.00	3.56	154.24	6037.12	165.19 S	207.57 E	-201.47	1.14
6147.00	9.31	228.42	6131.59	172.96 S	203.10 E	-196.72	9.48
6241.00	13.61	263.59	6223.81	179.25 S	186.39 E	-179.79	8.52
6336.00	18.71	270.94	6315.03	180.25 S	160.03 E	-153.41	5.77
6430.00	26.98	267.90	6401.59	180.79 S	123.58 E	-116.97	8.88
6525.00	36.38	264.26	6482.35	184.40 S	73.90 E	-67.19	10.09
6619.00	45.42	269.92	6553.35	187.24 S	12.53 E	-5.76	10.39
6714.00	53.67	271.10	6614.94	186.55 S	59.69 W	66.38	8.74
6808.00	64.38	269.95	6663.25	185.86 S	140.16 W	146.78	11.44
6903.00	76.24	268.07	6695.20	187.46 S	229.42 W	236.05	12.62
6997.00	86.41	266.51	6709.36	191.86 S	322.12 W	328.84	10.94
7091.00	87.27	266.27	6714.54	197.77 S	415.79 W	422.66	0.95
7186.00	89.46	268.06	6717.25	202.47 S	510.62 W	517.60	2.98
7280.00	91.41	269.62	6716.54	204.37 S	604.60 W	611.58	2.66
7375.00	89.86	268.90	6715.49	205.60 S	699.58 W	706.55	1.80
7469.00	90.73	268.72	6715.00	207.55 S	793.56 W	800.53	0.95
7563.00	89.21	269.68	6715.05	208.86 S	887.54 W	894.51	1.91

7658.00	89.55	269.33	6716.08	209.69 S	982.53 W	989.47	0.51
7752.00	88.51	269.82	6717.67	210.38 S	1076.52 W	1083.41	1.22
7847.00	88.81	270.07	6719.89	210.47 S	1171.49 W	1178.33	0.41
7942.00	89.64	270.08	6721.18	210.35 S	1266.48 W	1273.25	0.87
8036.00	89.52	268.25	6721.87	211.72 S	1360.46 W	1367.22	1.95
8131.00	90.39	267.63	6721.94	215.13 S	1455.40 W	1462.22	1.12
8226.00	91.37	267.29	6720.48	219.34 S	1550.29 W	1557.21	1.09
8320.00	89.83	268.28	6719.50	222.98 S	1644.22 W	1651.20	1.95
8415.00	90.41	268.05	6719.30	226.02 S	1739.17 W	1746.19	0.66
8509.00	91.34	268.04	6717.86	229.23 S	1833.10 W	1840.18	0.99
8604.00	89.74	268.64	6716.97	231.98 S	1928.05 W	1935.17	1.80
8699.00	89.67	269.47	6717.46	233.54 S	2023.04 W	2030.15	0.88
8793.00	90.48	269.23	6717.33	234.61 S	2117.03 W	2124.12	0.90
8888.00	91.49	268.81	6715.70	236.23 S	2212.00 W	2219.09	1.15
8983.00	89.46	269.31	6714.91	237.79 S	2306.98 W	2314.06	2.20
9077.00	88.78	269.39	6716.36	238.86 S	2400.96 W	2408.02	0.73
9172.00	90.04	268.93	6717.34	240.25 S	2495.94 W	2502.99	1.41
9266.00	91.46	268.98	6716.11	241.97 S	2589.92 W	2596.97	1.51
9361.00	90.14	270.12	6714.78	242.71 S	2684.90 W	2691.92	1.84
9456.00	90.44	270.95	6714.30	241.83 S	2779.90 W	2786.82	0.93
9550.00	89.30	271.18	6714.51	240.08 S	2873.88 W	2880.67	1.24
9645.00	89.24	270.51	6715.72	238.68 S	2968.86 W	2975.54	0.71
9739.00	90.19	270.10	6716.19	238.18 S	3062.85 W	3069.46	1.10
9834.00	88.41	270.06	6717.35	238.04 S	3157.84 W	3164.38	1.87
9929.00	88.44	269.79	6719.96	238.17 S	3252.81 W	3259.29	0.29
10023.00	88.84	270.71	6722.19	237.76 S	3346.78 W	3353.18	1.07
10118.00	89.70	269.99	6723.40	237.18 S	3441.77 W	3448.09	1.18
10212.00	89.70	269.47	6723.90	237.62 S	3535.77 W	3542.04	0.55
10307.00	89.09	268.03	6724.90	239.69 S	3630.73 W	3637.02	1.65
10401.00	88.65	267.45	6726.75	243.40 S	3724.64 W	3731.00	0.77
10496.00	89.30	267.65	6728.45	247.46 S	3819.54 W	3825.99	0.72
10590.00	89.98	267.41	6729.04	251.51 S	3913.45 W	3919.98	0.77
10685.00	90.97	267.09	6728.25	256.07 S	4008.34 W	4014.97	1.10
10780.00	92.23	267.02	6725.60	260.95 S	4103.17 W	4109.92	1.33
10874.00	90.84	268.76	6723.08	264.41 S	4197.07 W	4203.88	2.37
10969.00	90.44	269.43	6722.02	265.91 S	4292.05 W	4298.85	0.82
11064.00	89.55	268.89	6722.03	267.30 S	4387.04 W	4393.83	1.10
11158.00	90.20	270.17	6722.24	268.07 S	4481.03 W	4487.79	1.53
11253.00	89.03	268.16	6722.87	269.46 S	4576.01 W	4582.76	2.45
11347.00	88.78	266.04	6724.67	274.21 S	4669.87 W	4676.73	2.27
11442.00	90.04	267.19	6725.65	279.82 S	4764.70 W	4771.69	1.80
11537.00	89.30	265.52	6726.20	285.86 S	4859.50 W	4866.65	1.92
11632.00	89.95	265.56	6726.82	293.25 S	4954.21 W	4961.57	0.69
11821.00	89.45	267.42	6727.81	304.82 S	5142.84 W	5150.50	1.02
12010.00	89.41	268.69	6729.69	311.23 S	5331.72 W	5339.48	0.67
12104.00	89.45	268.22	6730.62	313.76 S	5425.68 W	5433.47	0.50
12199.00	90.51	268.67	6730.66	316.34 S	5520.64 W	5528.47	1.21
12293.00	90.84	268.98	6729.55	318.27 S	5614.62 W	5622.45	0.48
12388.00	91.73	267.90	6727.42	320.86 S	5709.56 W	5717.42	1.47
12482.00	89.82	271.99	6726.15	320.95 S	5803.52 W	5811.33	4.80
12577.00	90.28	272.19	6726.06	317.48 S	5898.46 W	5906.08	0.53
12672.00	90.75	272.37	6725.21	313.70 S	5993.38 W	6000.80	0.53
12766.00	90.75	270.84	6723.98	311.07 S	6087.33 W	6094.60	1.63
12861.00	90.10	268.36	6723.28	311.73 S	6182.32 W	6189.55	2.70
13050.00	89.39	268.83	6724.12	316.37 S	6371.26 W	6378.53	0.45
13144.00	88.53	267.28	6725.82	319.56 S	6465.19 W	6472.51	1.89
13239.00	87.97	266.87	6728.72	324.40 S	6560.02 W	6567.46	0.73
13333.00	88.71	267.48	6731.45	329.03 S	6653.86 W	6661.41	1.02
13428.00	89.97	266.78	6732.54	333.79 S	6748.74 W	6756.39	1.52
13522.00	90.46	267.47	6732.19	338.50 S	6842.62 W	6850.38	0.90
13617.00	90.86	267.62	6731.09	342.57 S	6937.52 W	6945.37	0.45
13711.00	91.57	267.89	6729.10	346.25 S	7031.43 W	7039.35	0.81
13806.00	91.33	268.35	6726.70	349.37 S	7126.35 W	7134.32	0.55
13900.00	91.88	268.02	6724.06	352.35 S	7220.26 W	7228.28	0.68
13995.00	90.46	269.10	6722.12	354.73 S	7315.21 W	7323.25	1.88
14089.00	89.88	270.33	6721.85	355.20 S	7409.20 W	7417.20	1.45
14184.00	90.71	270.98	6721.36	354.11 S	7504.20 W	7512.09	1.11
14278.00	89.57	270.67	6721.13	352.76 S	7598.18 W	7605.97	1.26
14373.00	89.69	270.89	6721.74	351.47 S	7693.17 W	7700.85	0.26
14468.00	89.54	270.35	6722.38	350.44 S	7788.16 W	7795.74	0.59
14562.00	90.55	270.39	6722.31	349.83 S	7882.16 W	7889.65	1.08
14657.00	90.92	269.58	6721.09	349.86 S	7977.15 W	7984.58	0.94
14752.00	89.41	268.33	6720.81	351.59 S	8072.13 W	8079.56	2.06
14846.00	89.36	267.76	6721.82	354.80 S	8166.07 W	8173.56	0.61
14941.00	89.94	269.44	6722.49	357.39 S	8261.93 W	8269.55	1.55

14941.00	89.94	269.11	6722.40	357.39 S	8261.03 W	8268.35	1.35
15036.00	90.34	269.47	6722.17	358.57 S	8356.02 W	8363.52	0.57
15130.00	89.76	268.14	6722.09	360.53 S	8450.00 W	8457.51	1.54
15225.00	89.51	270.09	6722.69	362.00 S	8544.98 W	8552.48	2.07
15414.00	88.89	270.88	6725.33	360.40 S	8733.96 W	8741.27	0.53
15509.00	88.92	270.78	6727.15	359.02 S	8828.93 W	8836.13	0.11
15604.00	89.32	270.47	6728.61	357.99 S	8923.91 W	8931.02	0.53
15793.00	89.97	269.41	6729.78	358.18 S	9112.90 W	9119.89	0.66
15888.00	89.97	269.86	6729.83	358.79 S	9207.90 W	9214.85	0.47
15982.00	90.53	269.13	6729.42	359.62 S	9301.90 W	9308.82	0.98
16075.00	90.31	269.17	6728.74	361.00 S	9394.88 W	9401.79	0.24
16171.00	90.59	268.60	6727.98	362.86 S	9490.86 W	9497.77	0.66
16266.00	90.59	268.60	6727.00	365.19 S	9585.83 W	9592.76	0.00
16360.00	90.65	268.04	6725.99	367.94 S	9679.78 W	9686.75	0.60
16455.00	90.37	267.37	6725.14	371.75 S	9774.70 W	9781.75	0.76
16549.00	90.01	266.94	6724.83	376.41 S	9868.58 W	9875.74	0.60
16644.00	89.36	267.64	6725.35	380.90 S	9963.48 W	9970.73	1.01
16738.00	90.71	268.46	6725.29	384.10 S	10057.42 W	10064.73	1.68
16833.00	90.59	268.18	6724.22	386.89 S	10152.37 W	10159.72	0.32
16927.00	90.65	268.34	6723.20	389.74 S	10246.32 W	10253.71	0.18
17022.00	90.80	268.15	6722.00	392.65 S	10341.27 W	10348.70	0.25
17116.00	90.77	268.31	6720.71	395.55 S	10435.22 W	10442.69	0.17
17211.00	90.68	267.78	6719.51	398.79 S	10530.15 W	10537.69	0.57
17305.00	89.66	268.93	6719.23	401.49 S	10624.11 W	10631.68	1.64
17399.00	88.53	269.50	6720.71	402.78 S	10718.09 W	10725.64	1.35
17494.00	88.31	269.46	6723.33	403.64 S	10813.05 W	10820.57	0.24
17614.00	87.66	269.06	6727.55	405.19 S	10932.96 W	10940.46	0.64
17675.00	87.66	269.06	6730.04	406.19 S	10993.90 W	11001.40	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 267.93 DEGREES (GRID)
A TOTAL CORRECTION OF 7.65 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17675.00 FEET
IS 11001.41 FEET ALONG 267.88 DEGREES (GRID)

Surveys corrected by Surcon starting at 1963 ft.

Last survey is a projection to the bit at TD.