



**1 : 600 / 1 : 240**

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	22-Jun-15	28-Jun-15	02-Jul-15		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	722.00	5,237.00	6,946.00		
Log End Depth (MD, ft)	6,952.00	6,946.00	16,373.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	20-Jun-15 17:40	27-Jun-15 10:00	28-Jun-15 04:10		
Drill/Wipe End Date and Time	22-Jun-15 15:40	28-Jun-15 00:00	01-Jul-15 14:15		
Min Inc (deg) @ Depth (MD, ft)	0.18 @ 5,425.00	1.25 @ 5,898.00	85.93 @ 6,974.00		
Max Inc (deg) @ Depth (MD, ft)	87.13 @ 6,887.00	83.40 @ 6,881.00	92.99 @ 7,730.00		
Bit TFA(in2) / Bit Type	0.98 /	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	593.91	549.07	324.86		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	10.50 / 34.00	10.30 / 40.00	9.40 / 32.00		
Filtrate CL (ppm)	1,700.00	18,000.00	2,500.00		
pH / Fluid Loss (mptm)	9.40 / 8	9.80 / 5	8.50 / 32		
PV (cP) / YP (lbf2)	11 / 9.00	17 / 14.00	8 / 9.00		
% Solids / % Sand	9.70 / 0.15	9.00 / 0.25	5.7 / .15		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / 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		
Max Tool Temp (in F) / S	178.05 / PDM	178.70 / PDM	217.23 / PDM		

Max Tool Temp (degF) / Source	170.37 / PCM	172.78 / PCM	247.20 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman	Brian Neu		
Customer Representative	Cliff Kester	Cliff Kester	Cliff Kester		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11342292	1	12301677		
Insert Serial Number	11680742	11680771	11680742		
Date and Time Initialized	20-Jun-15 21:55	01-Jan-70 00:00	28-Jun-15 14:51		
Date and Time Read	22-Jun-15 21:07	28-Jun-15 04:38	02-Jul-15 04:51		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	65.00	65.00	68.00		
Software Version	6.33	6.33	6.33		
Sub Serial Number	11342292	11342292	12301677		
Sonde Serial Number	11062074	11477975	11062074		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	144.70	133.60	316.00		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	58.13	58.26	61.16		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11342292	11342292	12301677		
Insert/Sonde Serial Number	11579811	11120592	11579811		

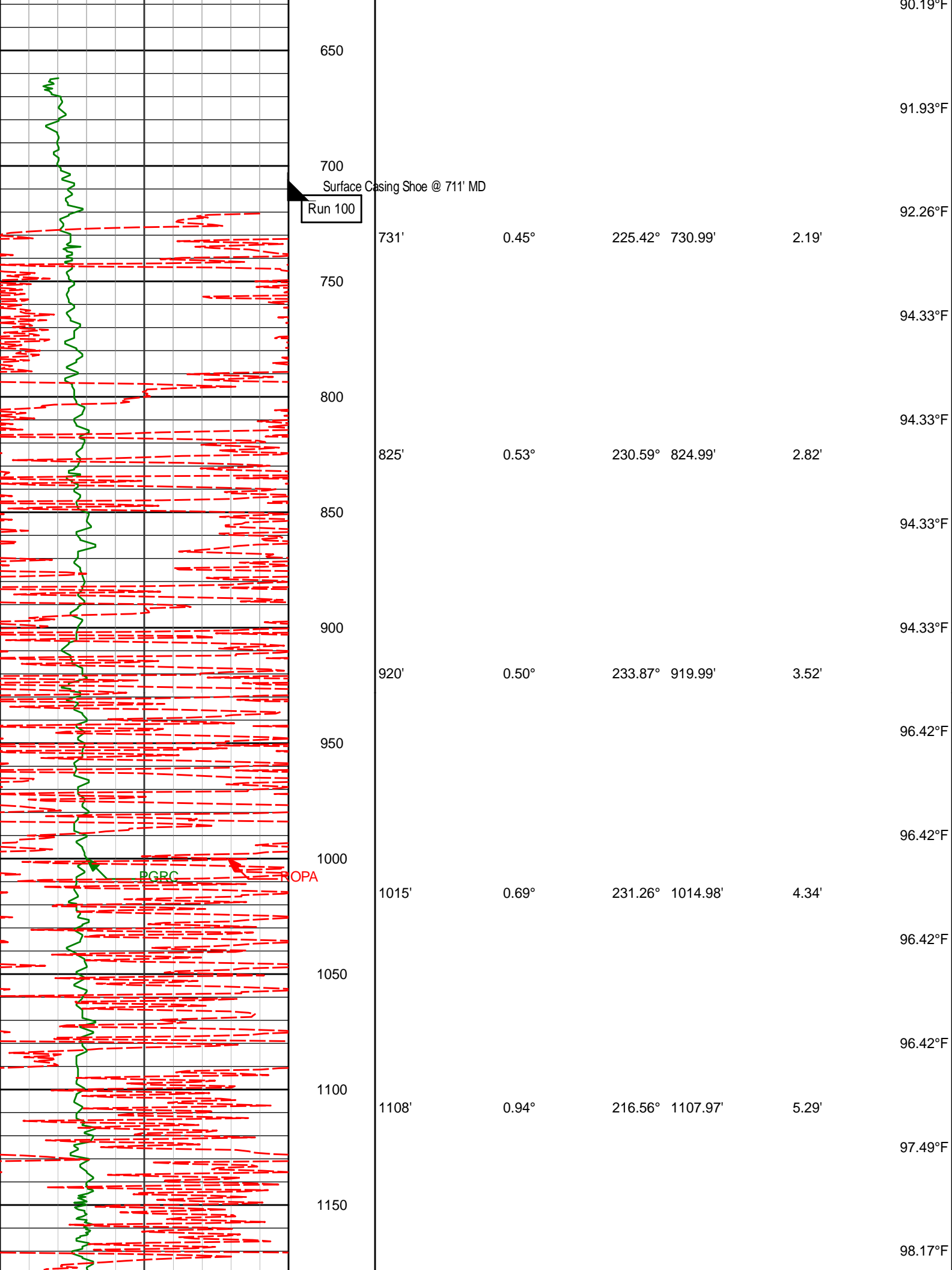
## REMARKS

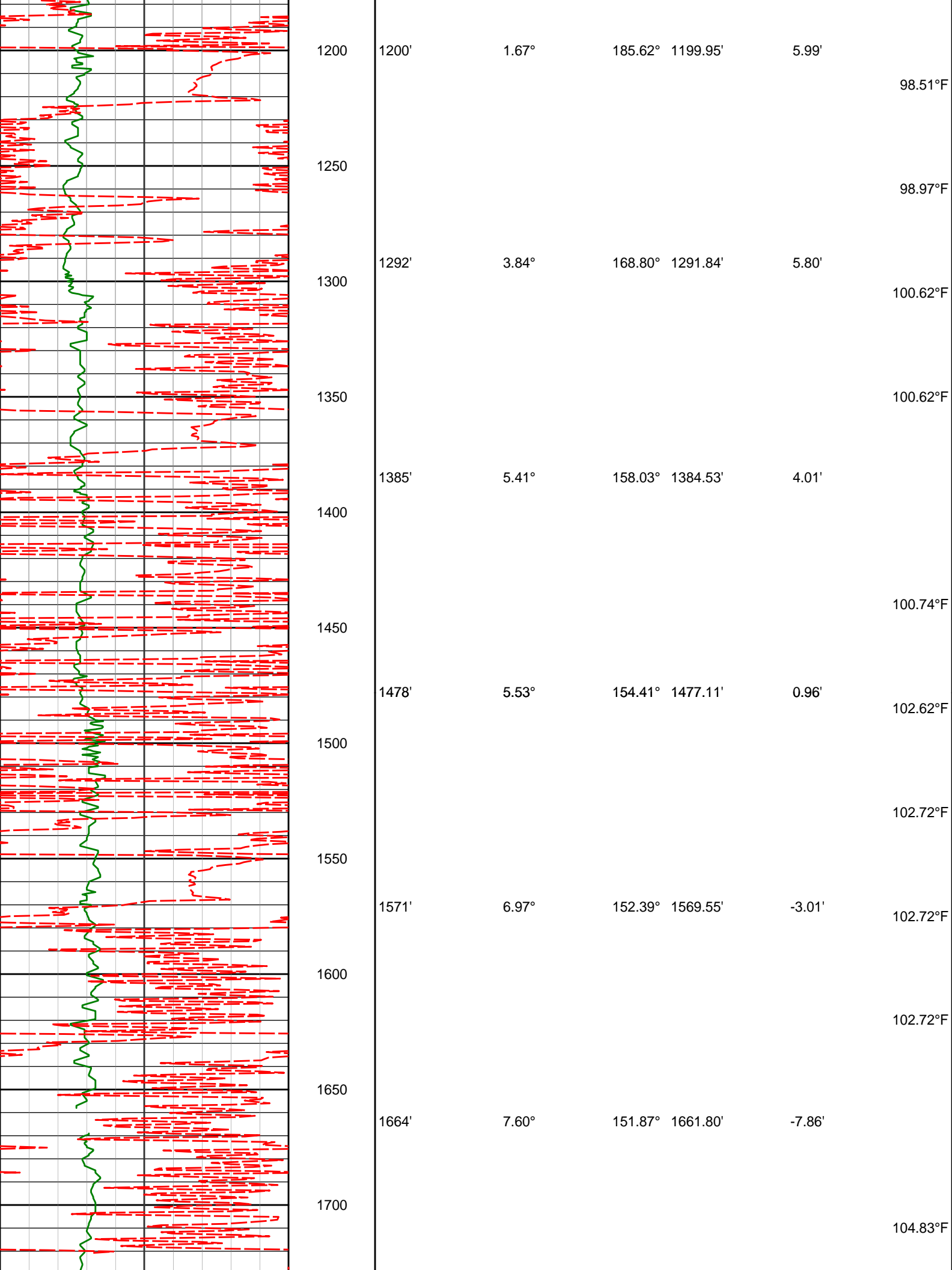
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Any gaps in gamma are due to high ROP.
5. Environmental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

## WARRANTY

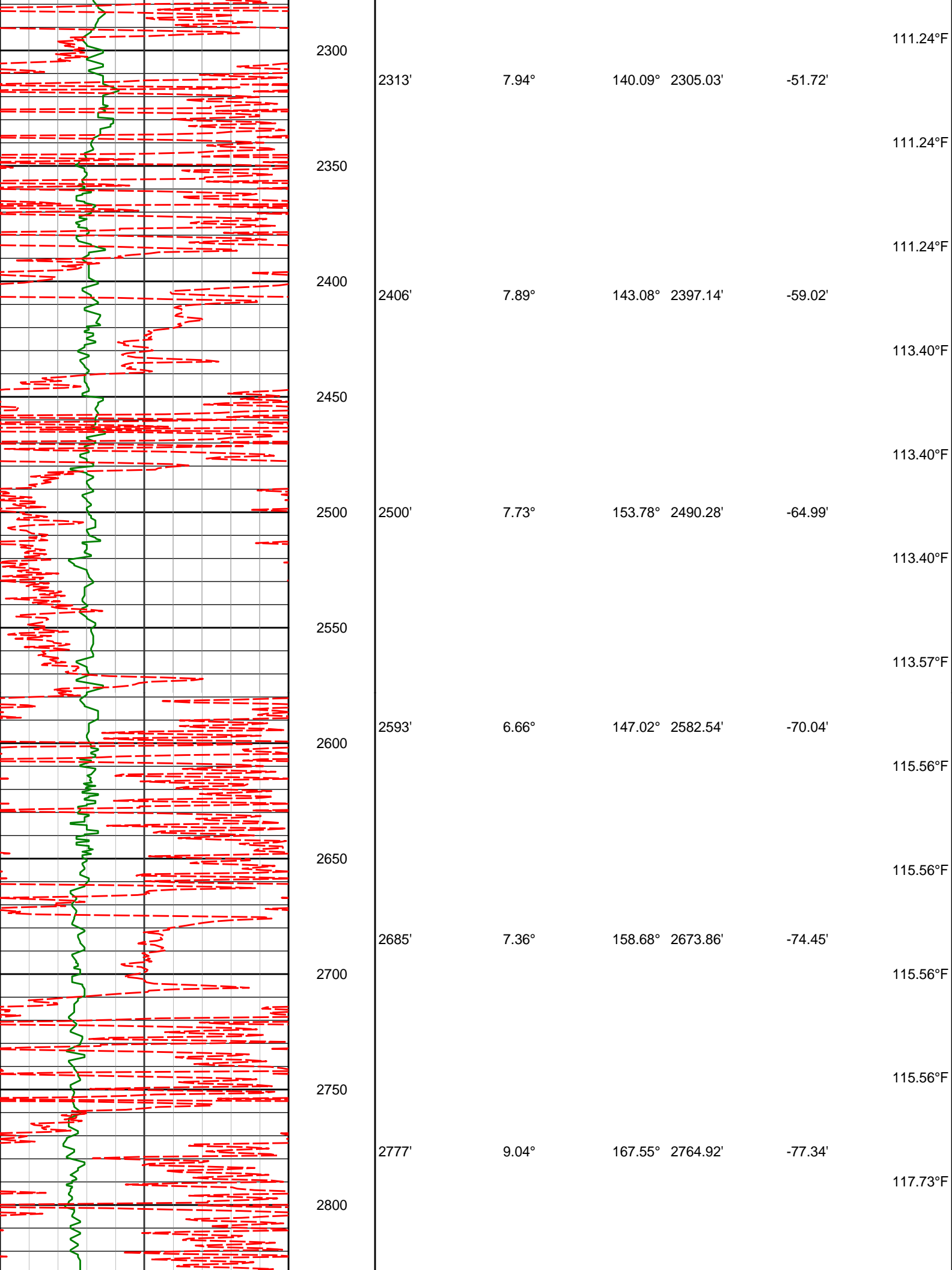
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY

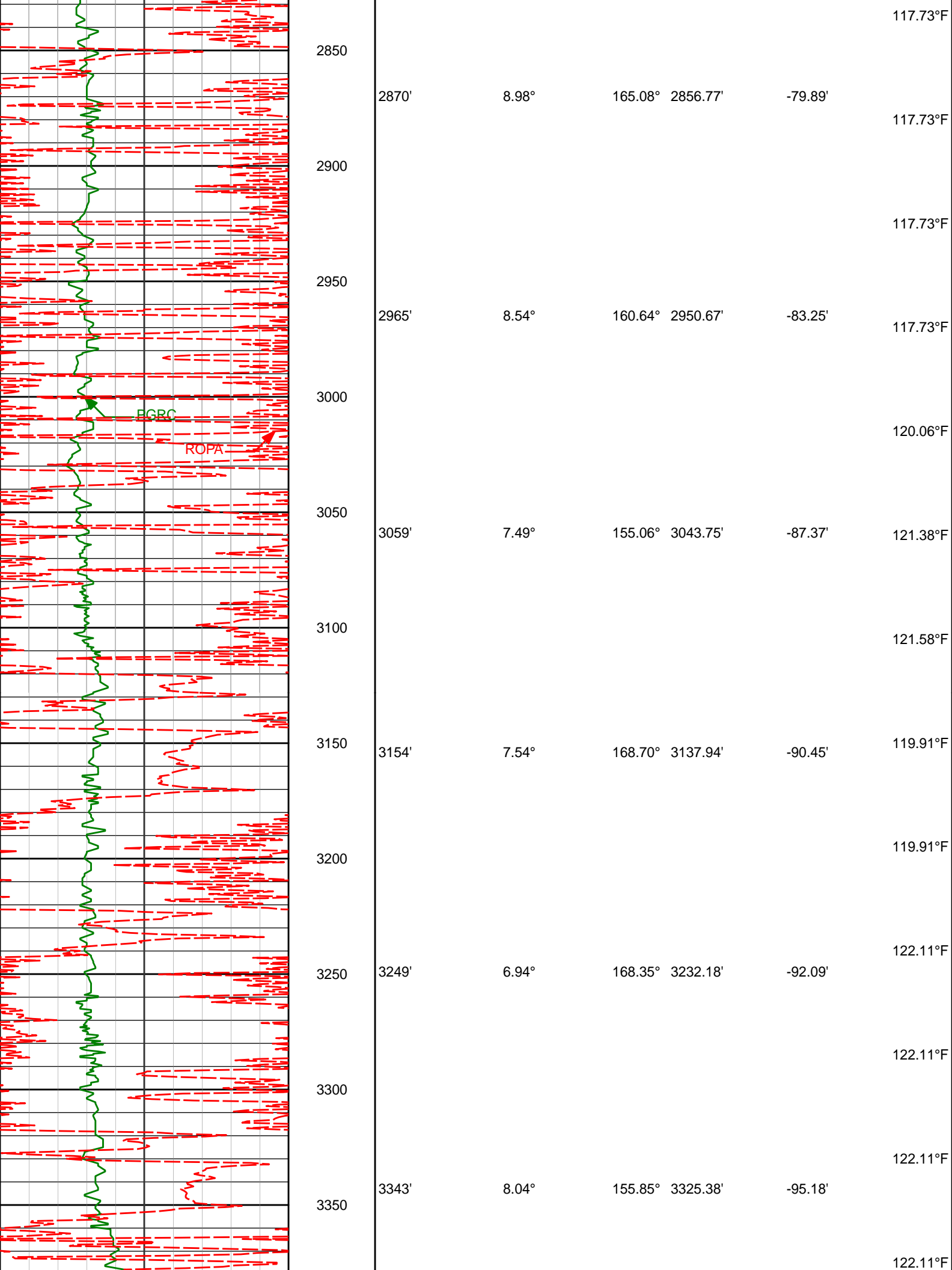
# MD Detail 1:600 Scale



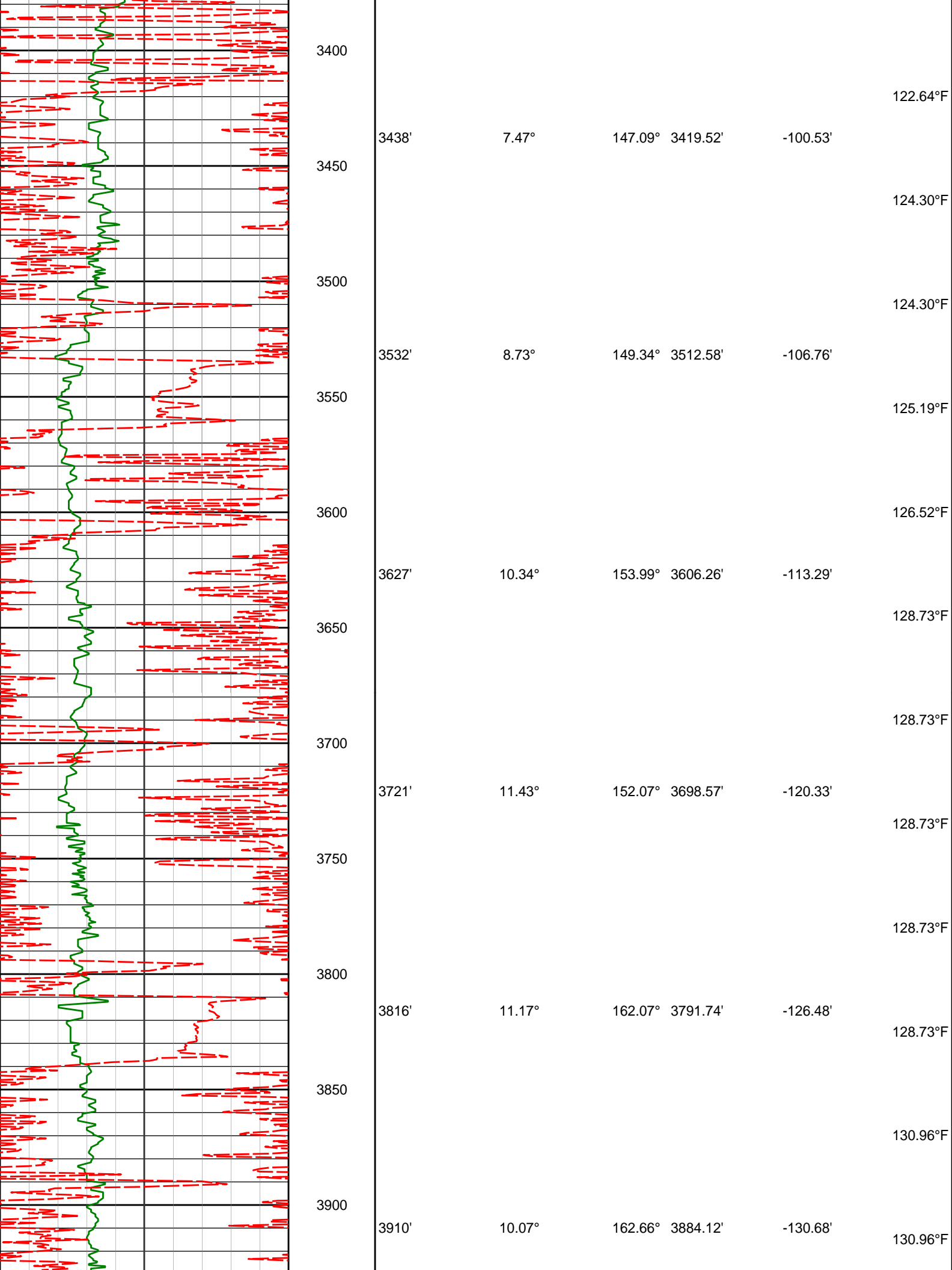


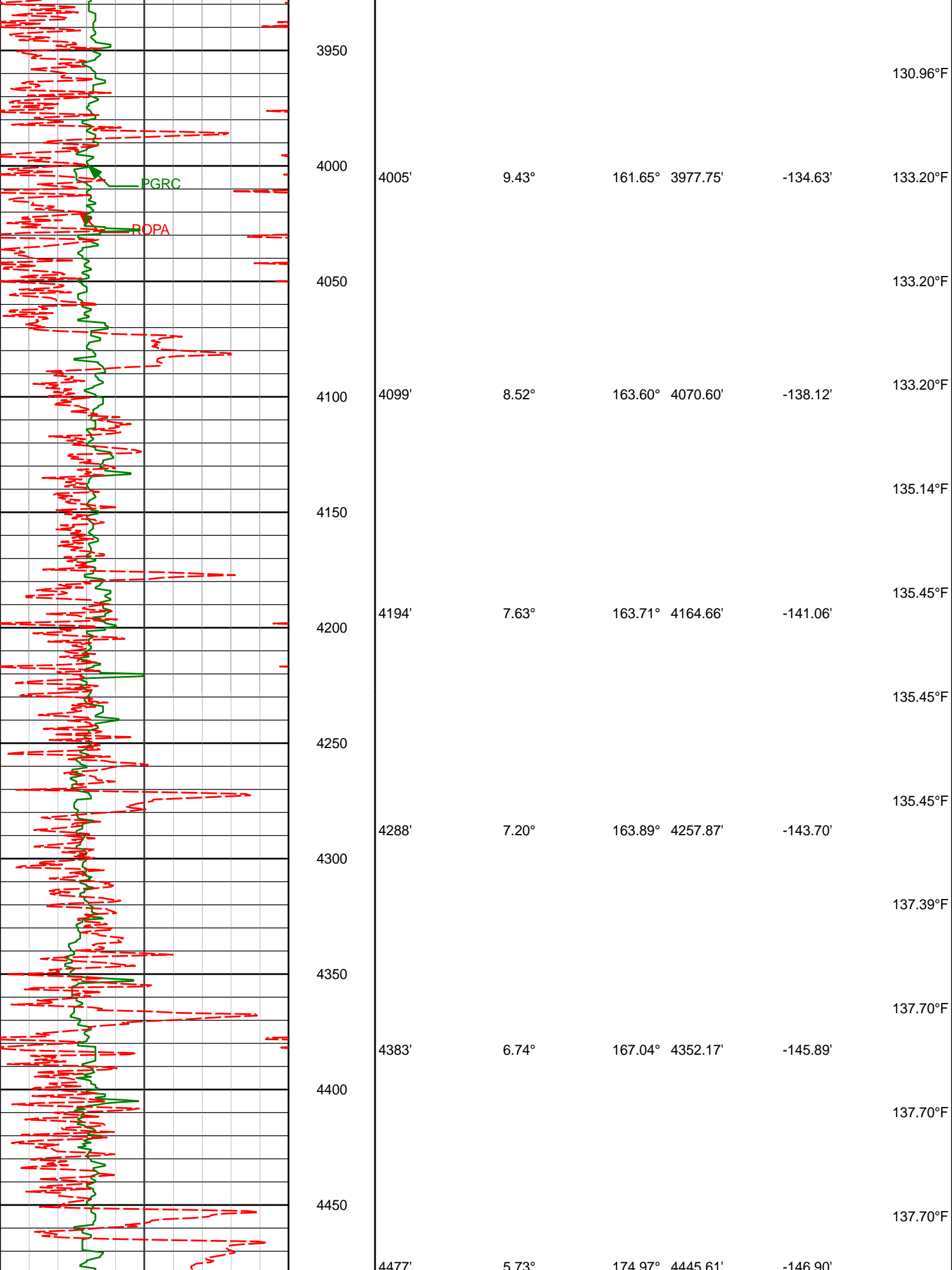


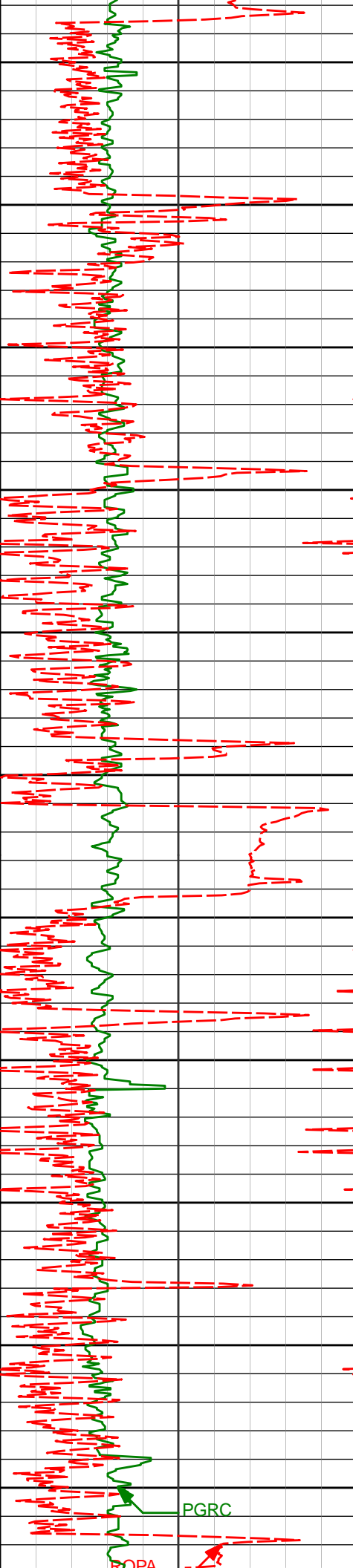












4500

4550

4600

4650

4700

4750

4800

4850

4900

4950

5000

4572'

4667'

4856'

4951'

5.83°

6.17°

6.71°

6.68°

180.55°

181.75°

158.96°

158.76°

4540.13'

4634.61'

4822.45'

4916.80'

-146.66'

-145.83'

-148.18'

-151.52'

137.70°F

139.39°F

139.96°F

139.96°F

141.48°F

142.25°F

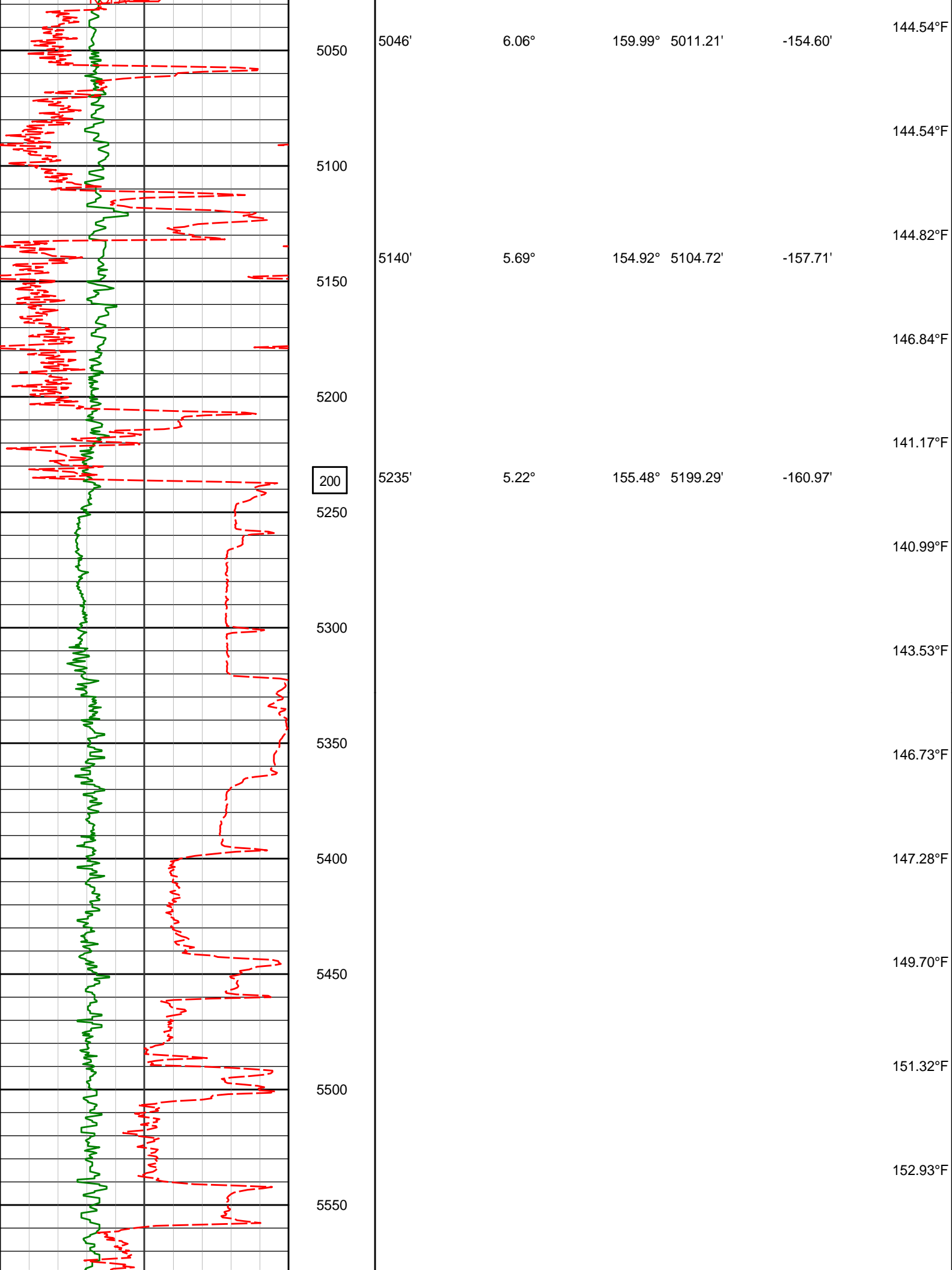
142.25°F

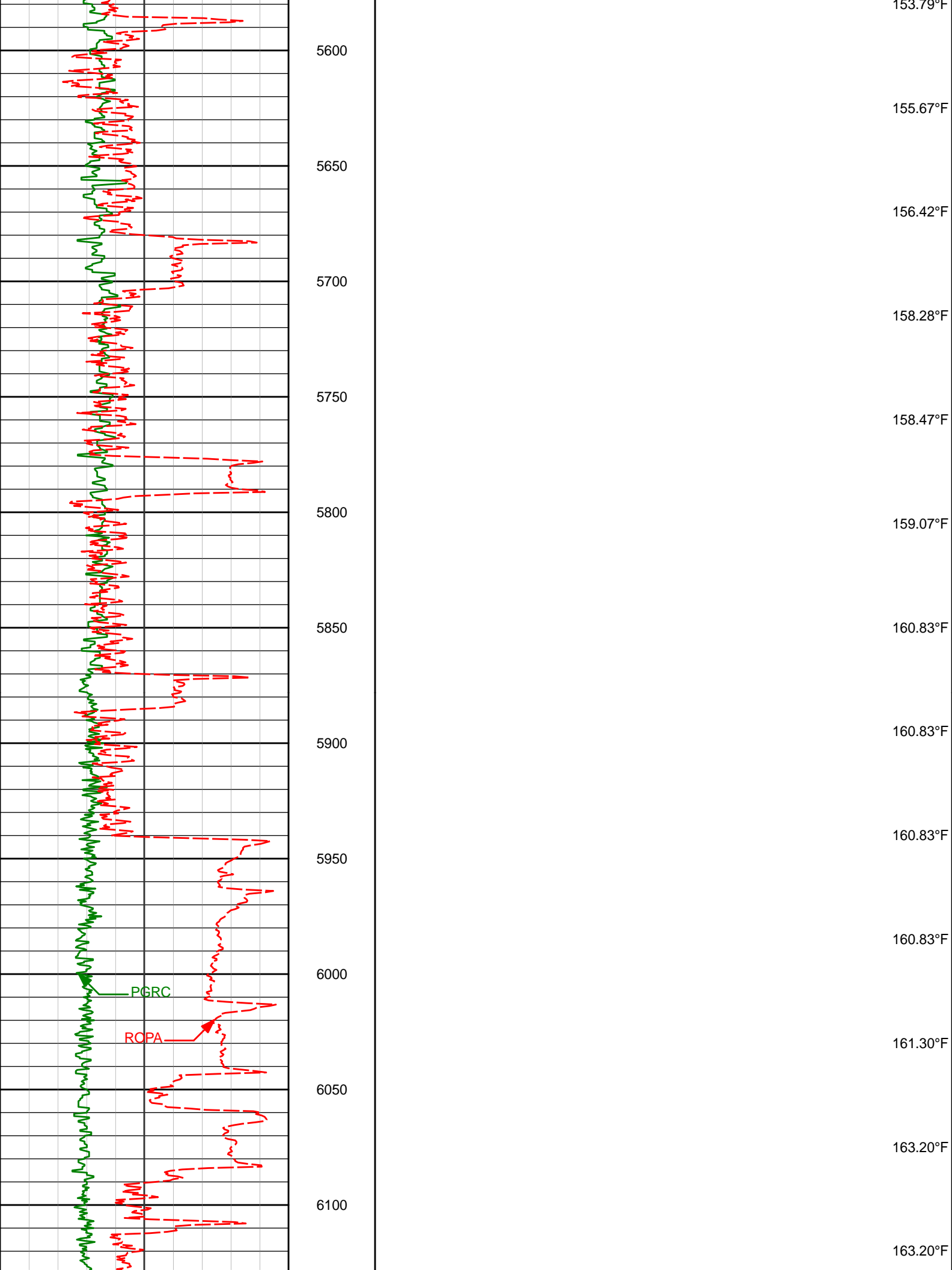
142.25°F

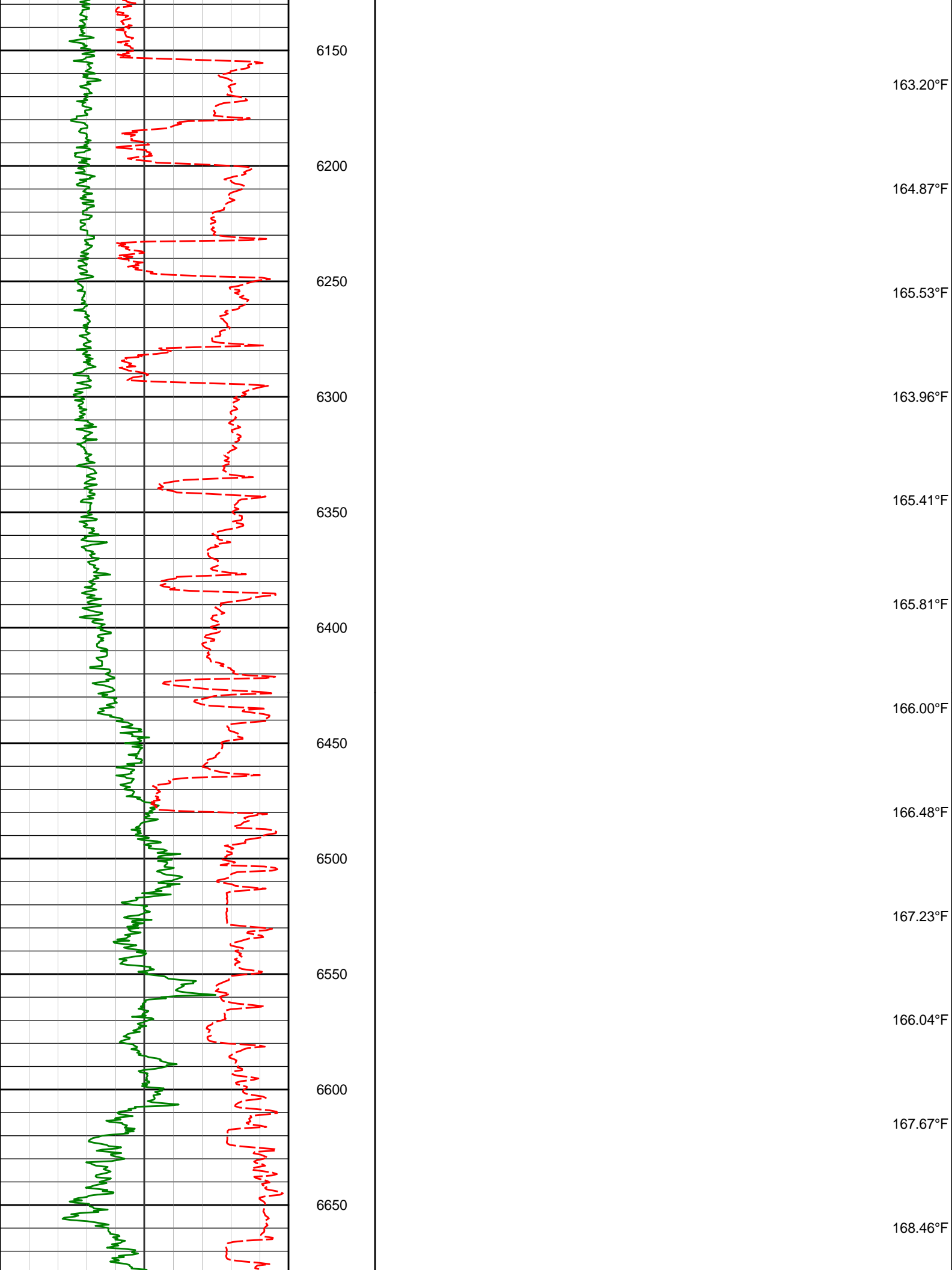
142.25°F

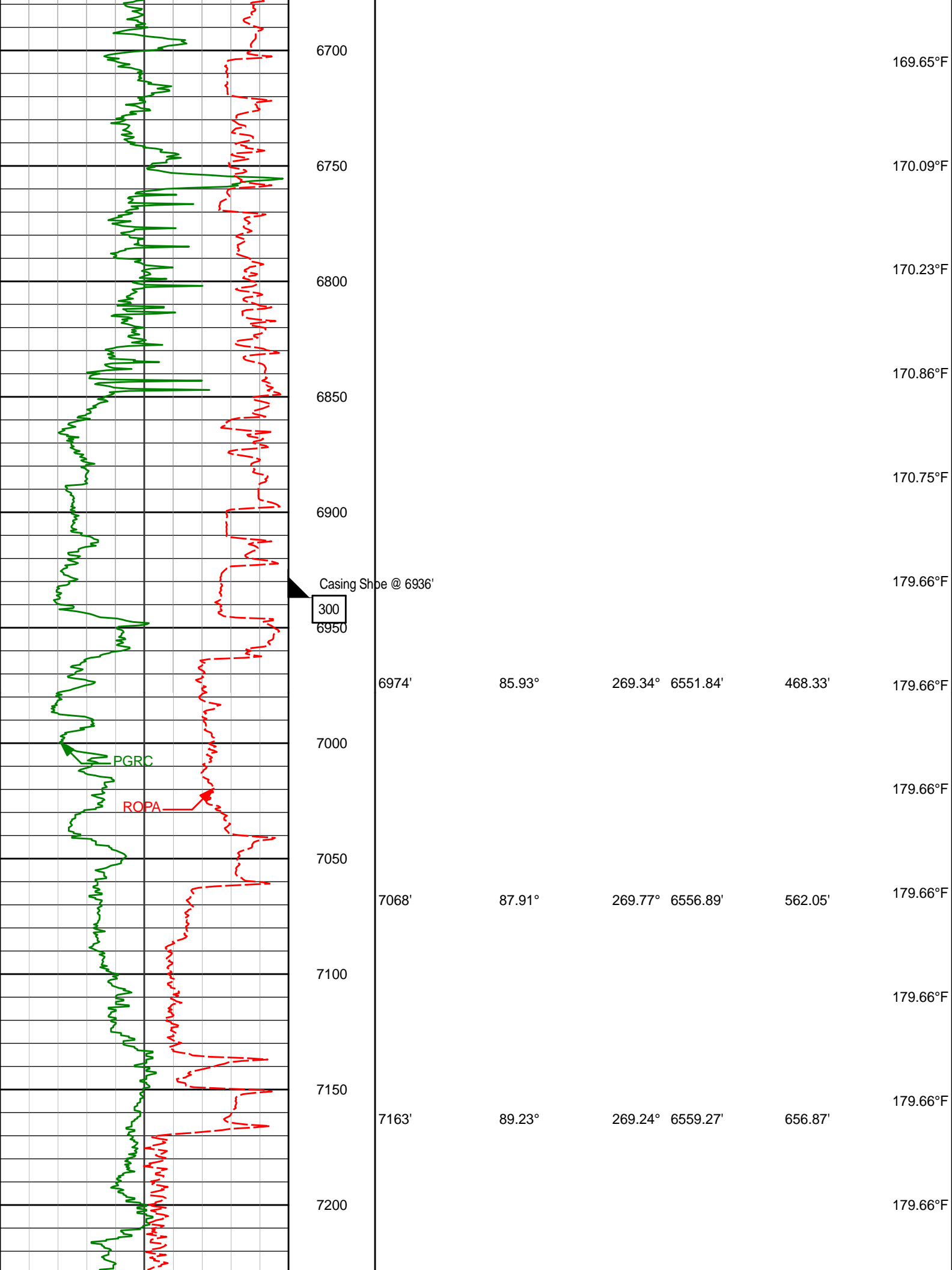
143.48°F

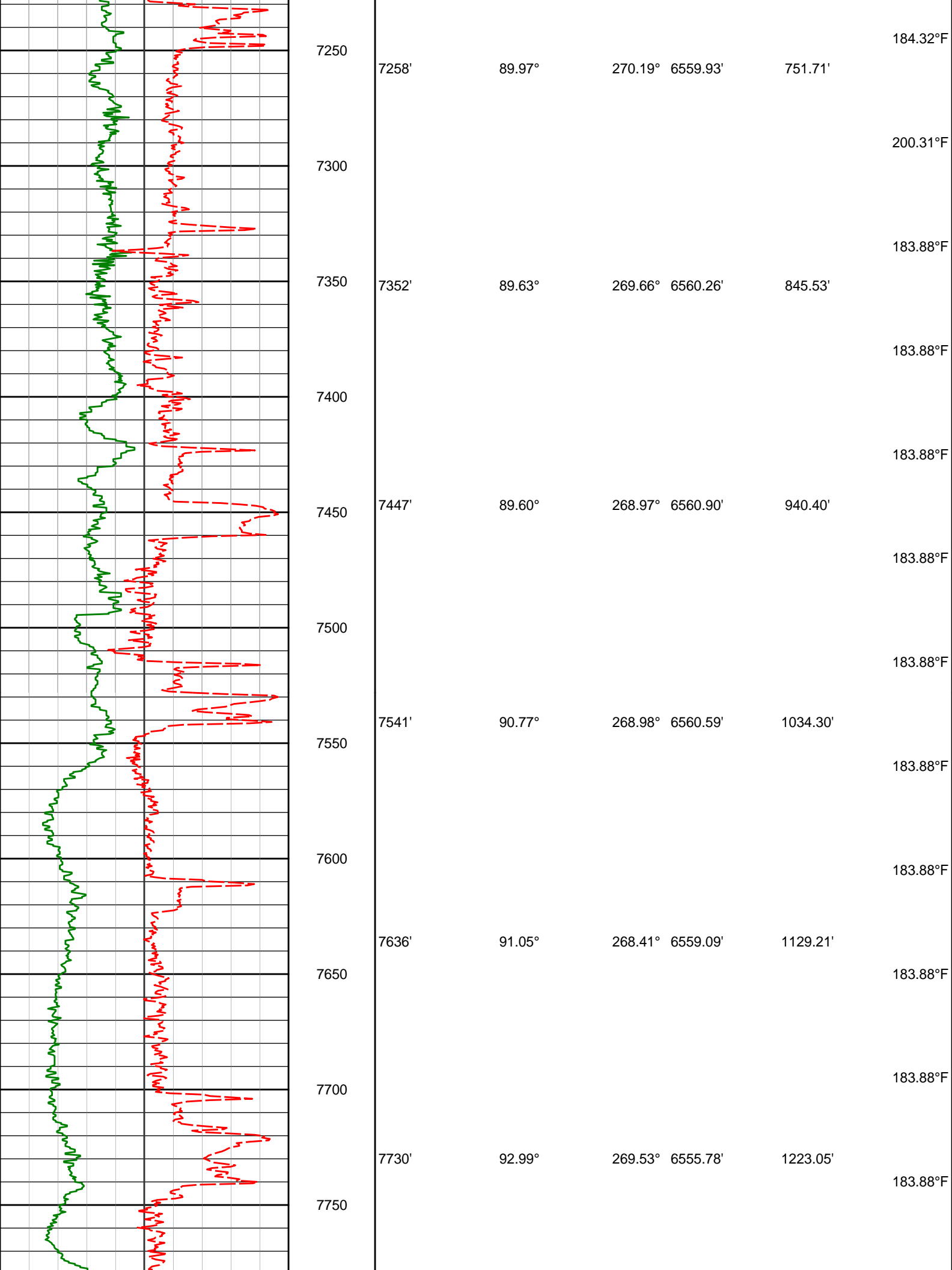
144.54°F



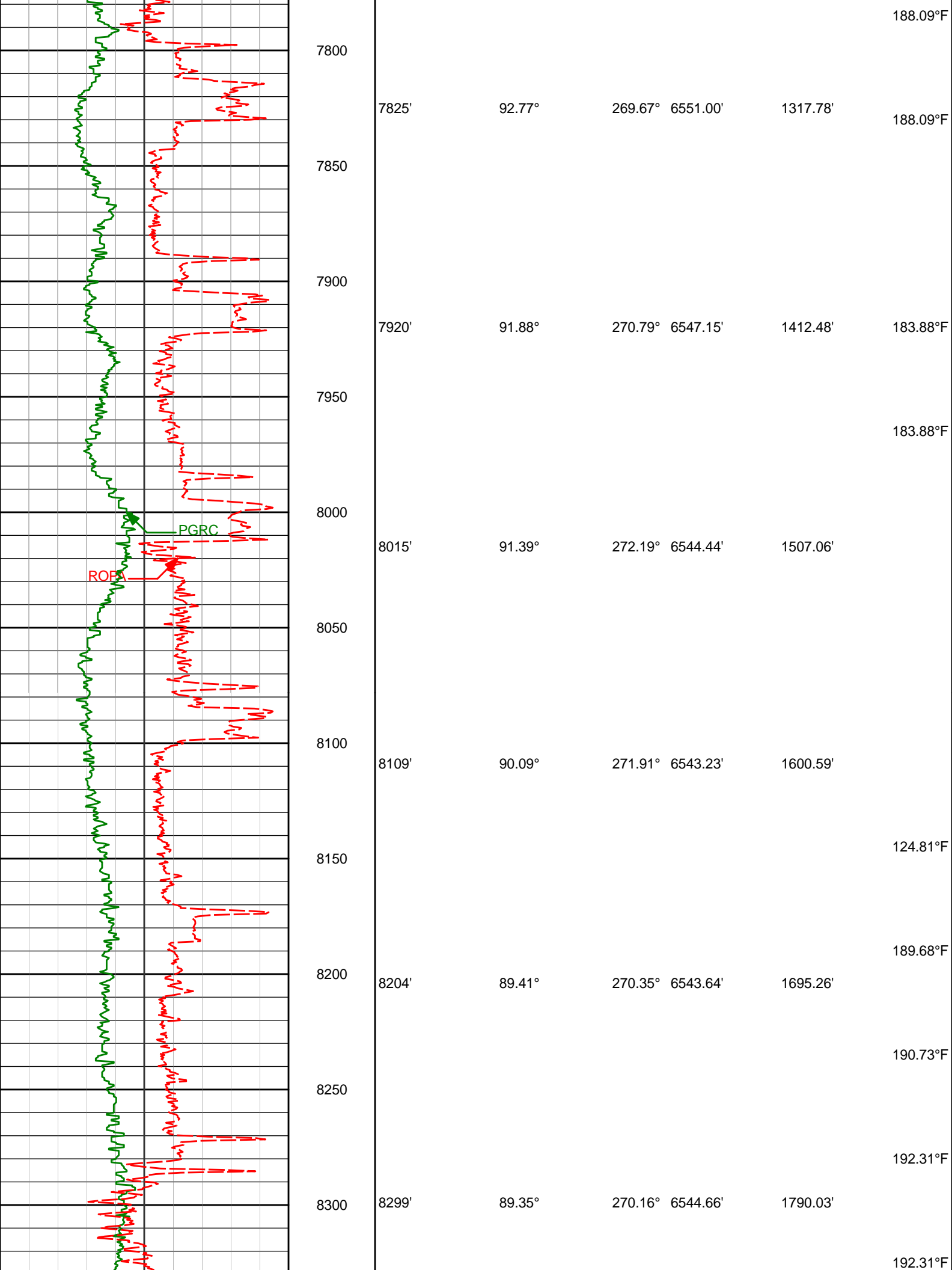


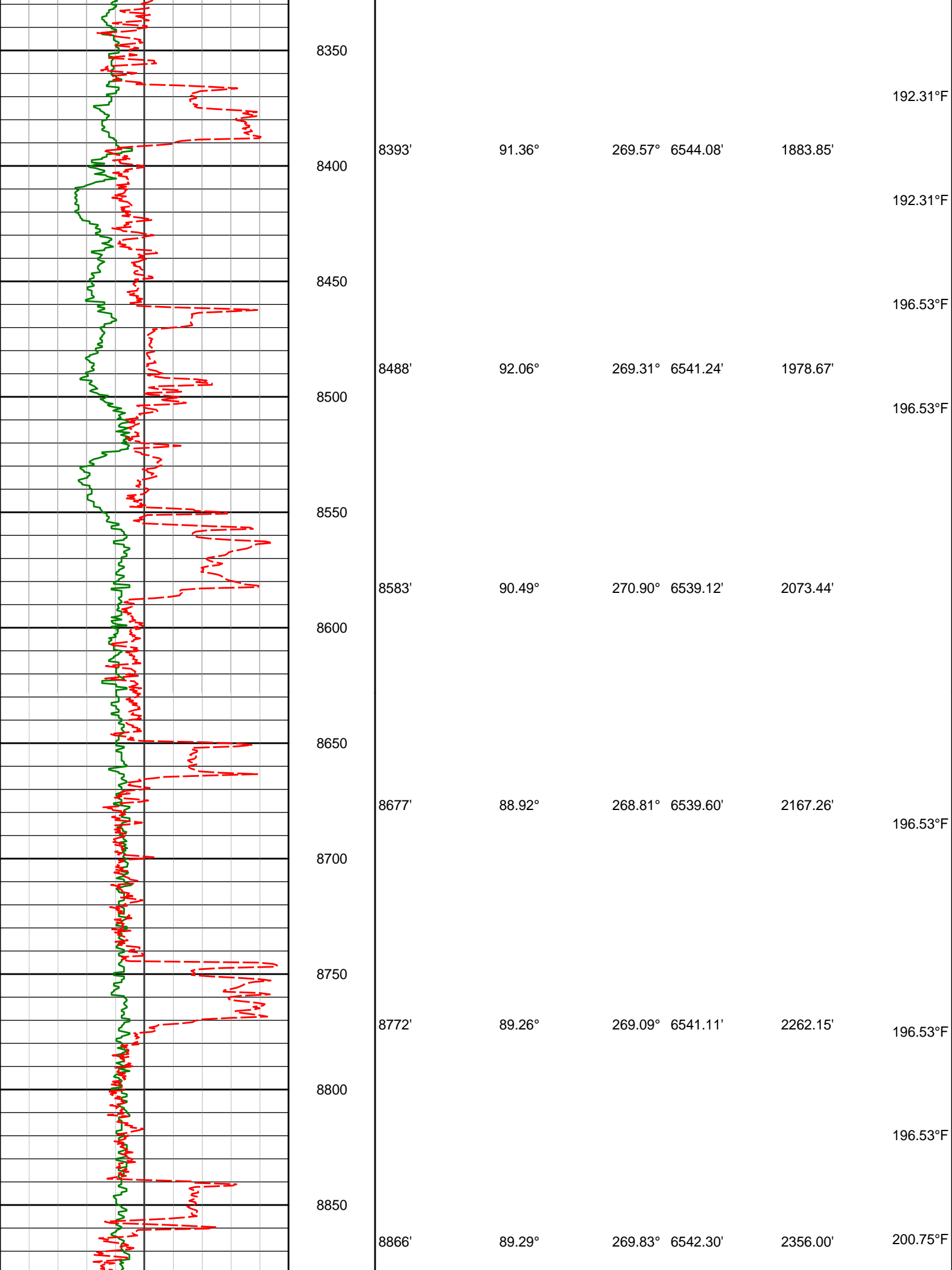


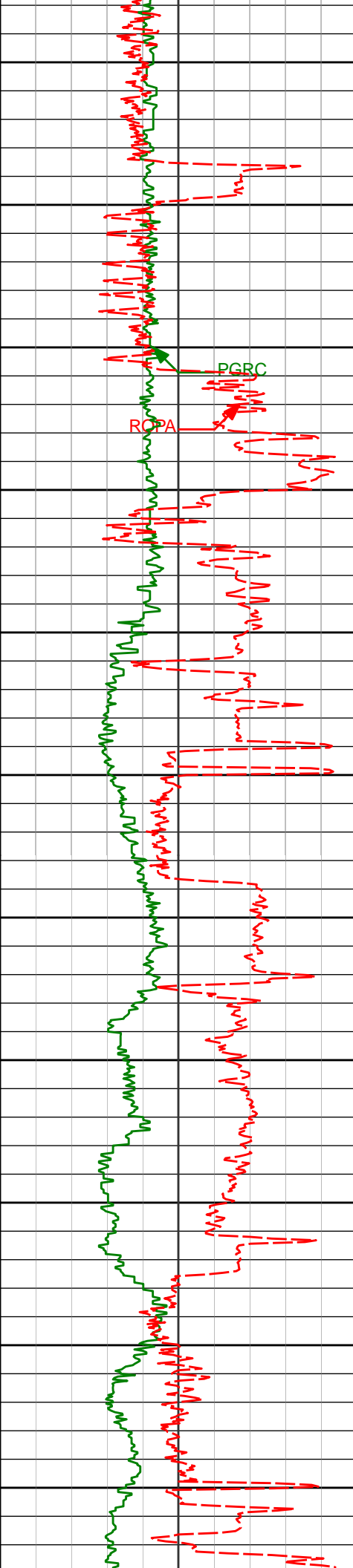












8900

200.75°F

8950

8961'

88.64°

270.87° 6544.01'

2450.76'

200.75°F

9000

200.75°F

PGRC

RORA

9050

9055'

89.97°

271.63° 6545.14'

2544.41'

9100

209.19°F

9150

9150'

89.94°

271.08° 6545.22'

2639.05'

209.19°F

9200

9250

9245'

89.17°

270.42° 6545.96'

2733.77'

9300

209.19°F

9350

9339'

88.83°

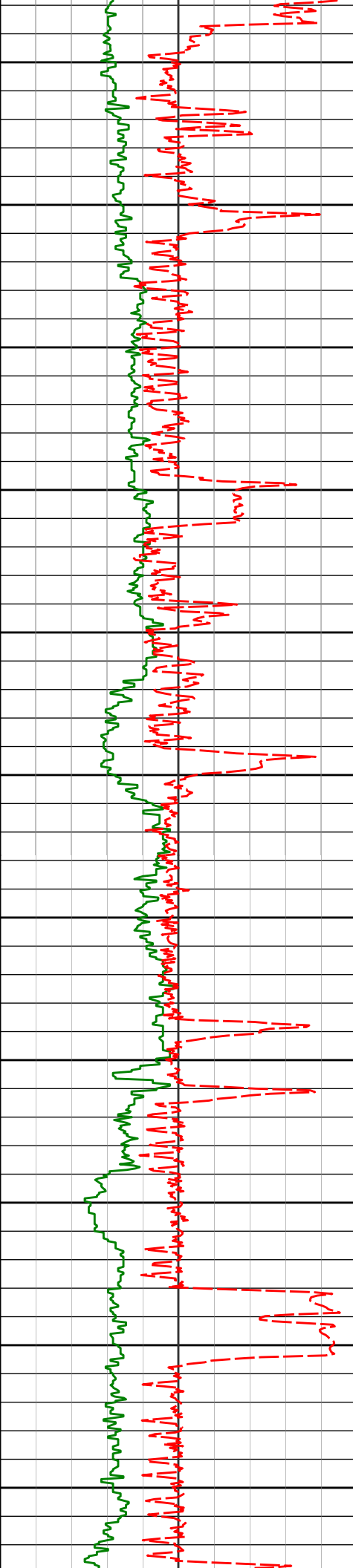
270.00° 6547.60'

2827.54'

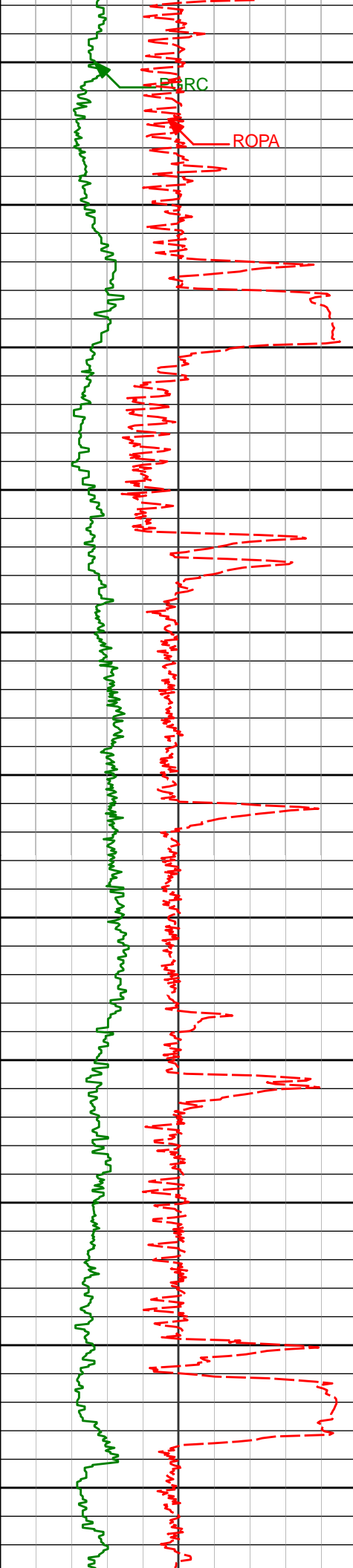
209.19°F

9400

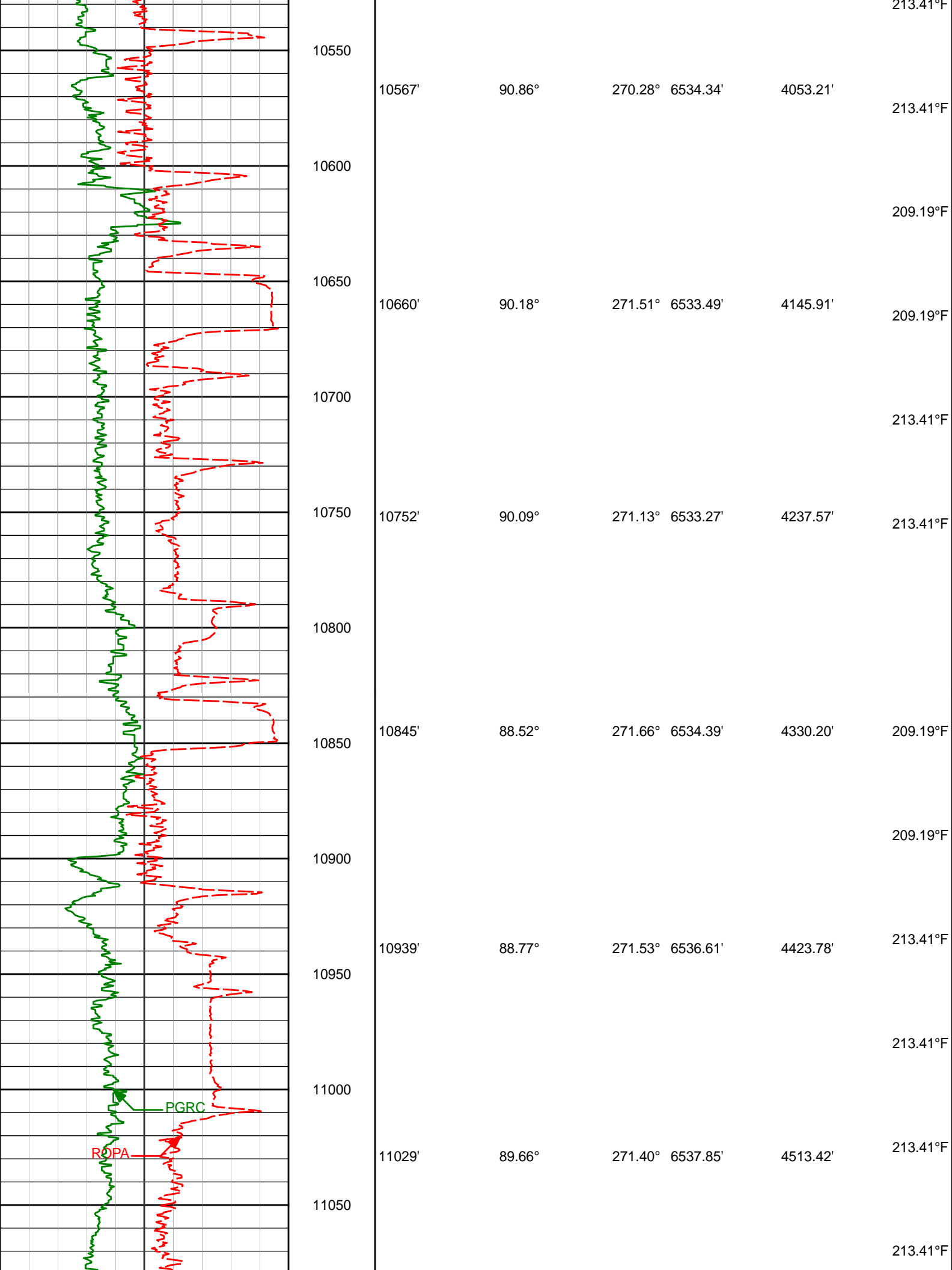
209.19°F

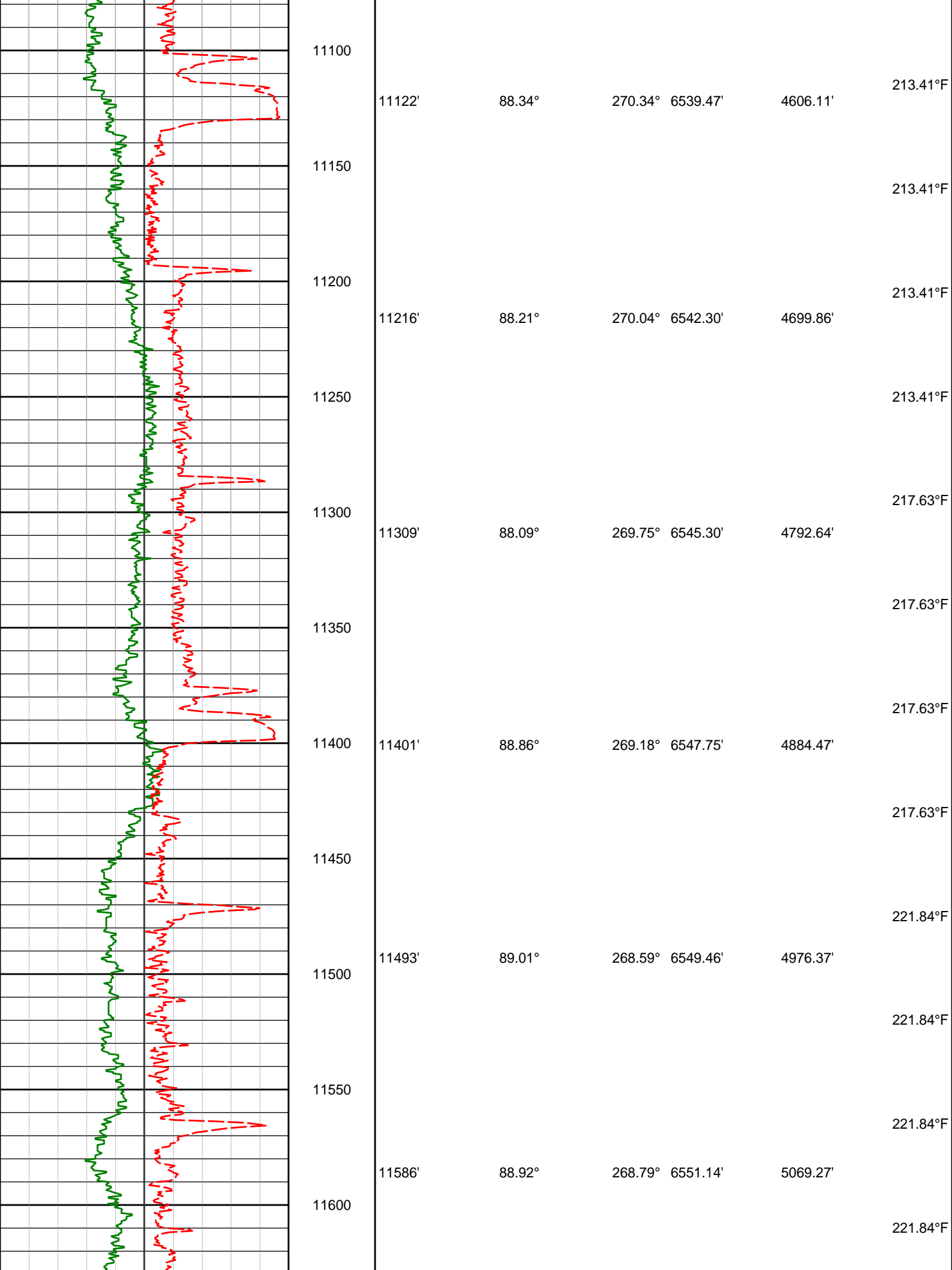


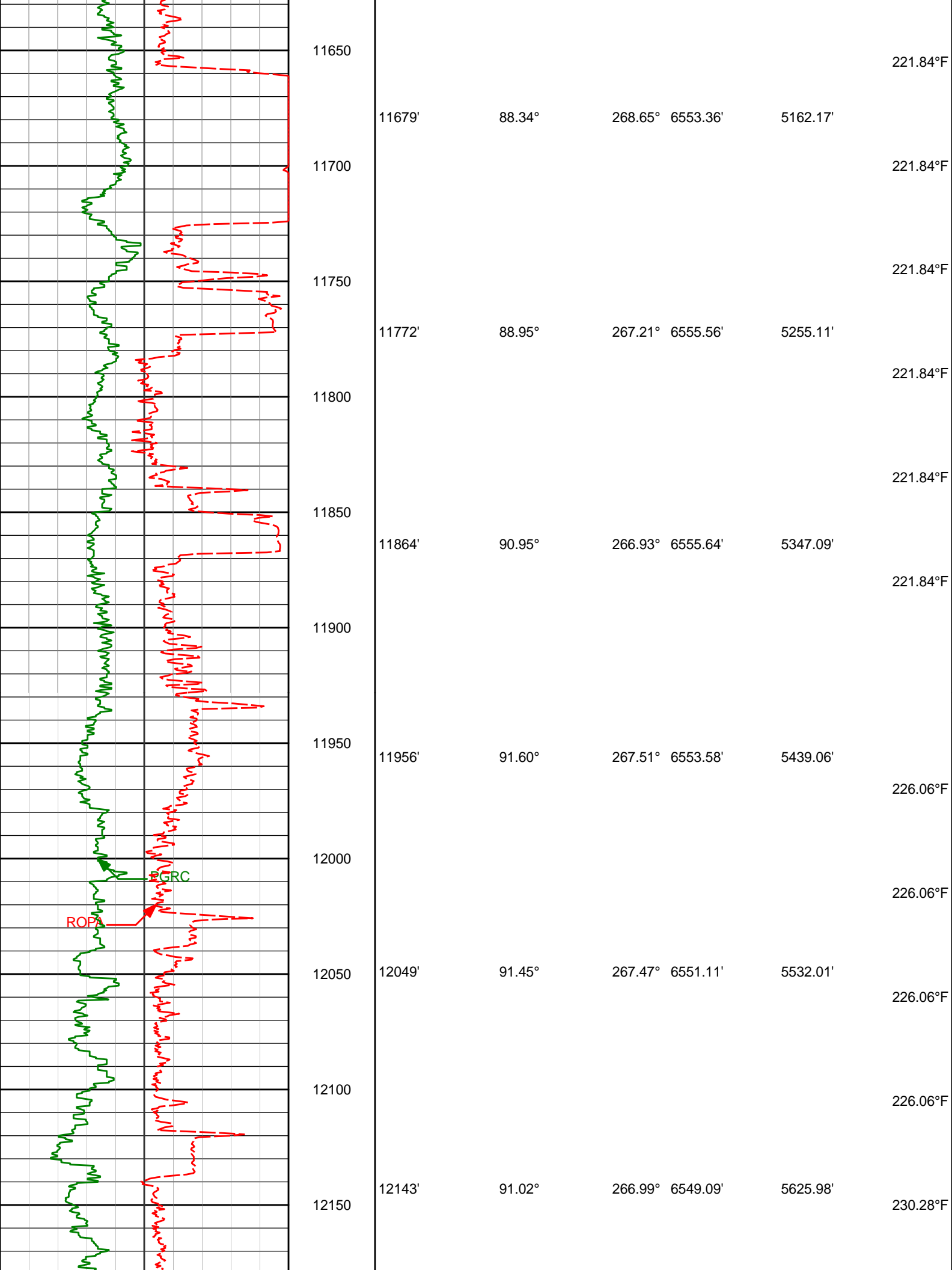
9434'	90.40°	269.44°	6548.24'	2922.37'	
9450					209.19°F
9500					209.19°F
9529'	91.02°	269.47°	6547.07'	3017.23'	
9550					209.19°F
					209.19°F
9600					
9623'	91.17°	269.84°	6545.27'	3111.06'	
9650					209.19°F
					213.41°F
9700					
9718'	90.68°	269.48°	6543.74'	3205.89'	
9750					213.41°F
					213.41°F
9800					
9813'	91.60°	270.38°	6541.85'	3300.68'	
9850					213.41°F
9900					209.19°F
9907'	90.77°	270.42°	6539.91'	3394.43'	
9950					209.19°F



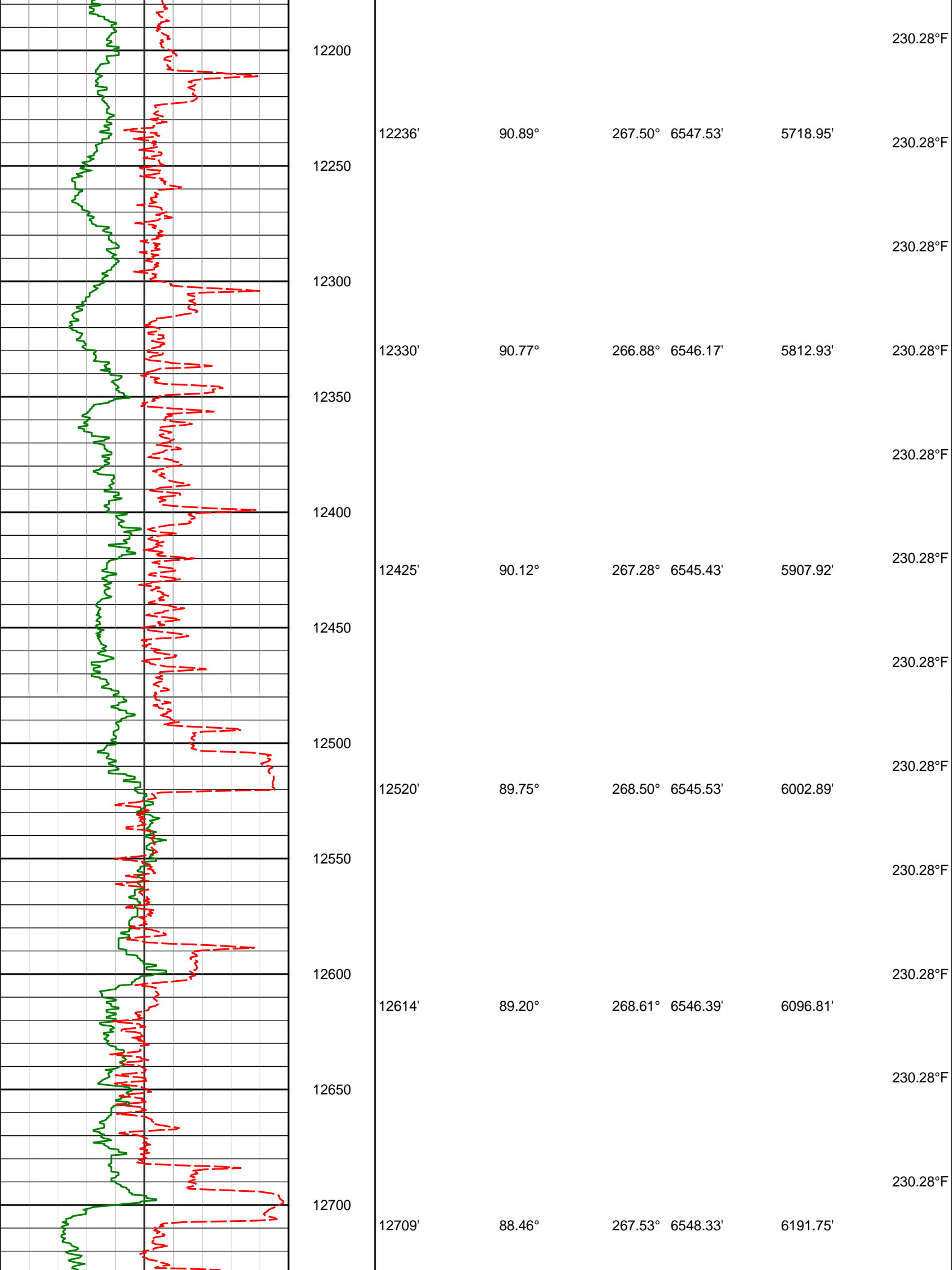
10000	10002'	91.29°	270.05°	6538.19'	3489.20'	209.19°F
10050						209.19°F
10100	10097'	90.03°	270.16°	6537.10'	3583.99'	
10150						213.41°F
10200	10192'	90.25°	269.45°	6536.87'	3678.82'	213.41°F
10250						213.41°F
10300	10286'	90.37°	269.38°	6536.36'	3772.68'	213.41°F
10350						213.41°F
10400	10381'	90.71°	269.28°	6535.47'	3867.55'	213.41°F
10450						211.17°F
10500	10474'	89.91°	269.86°	6534.97'	3960.40'	211.42°F

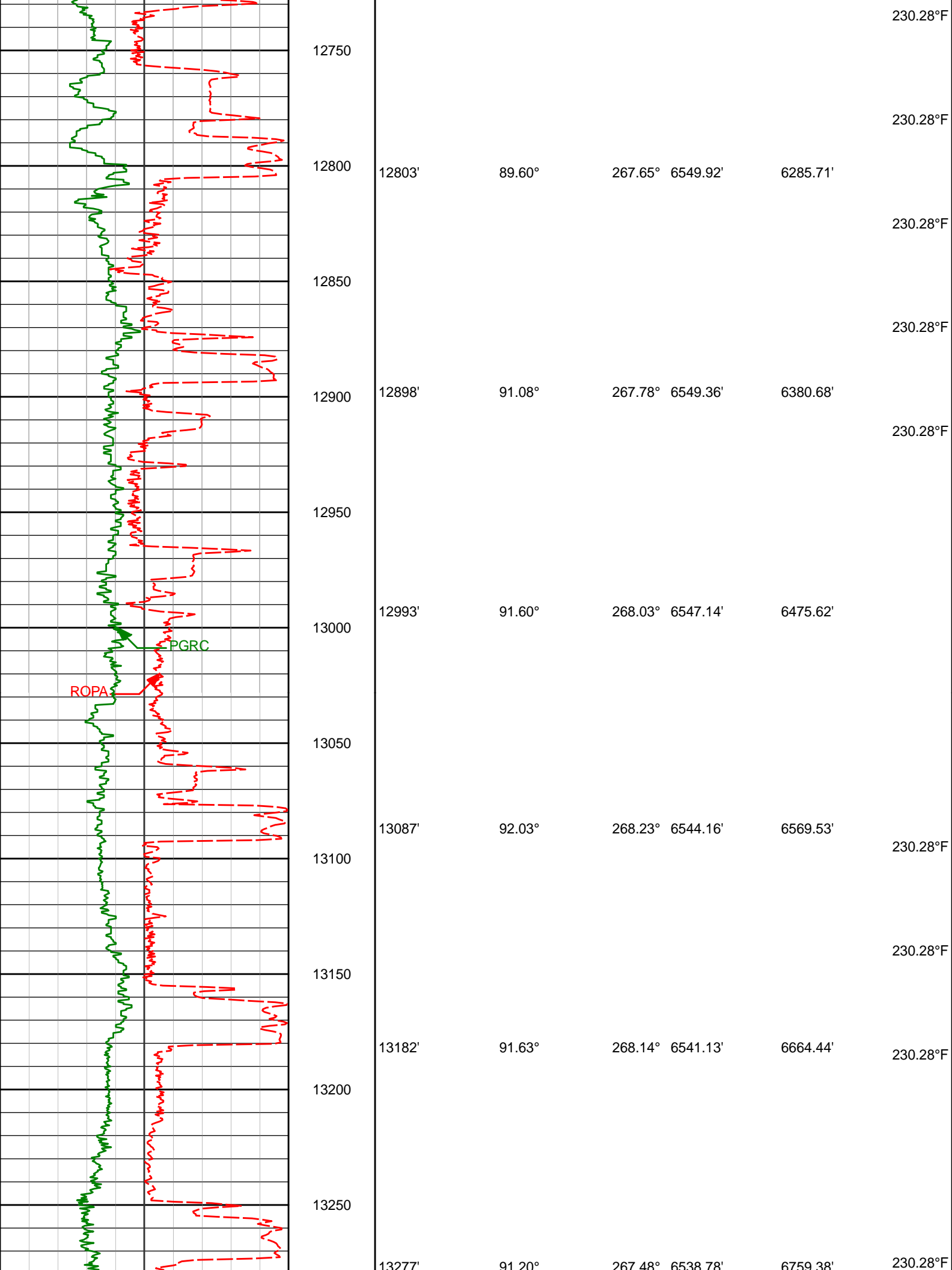


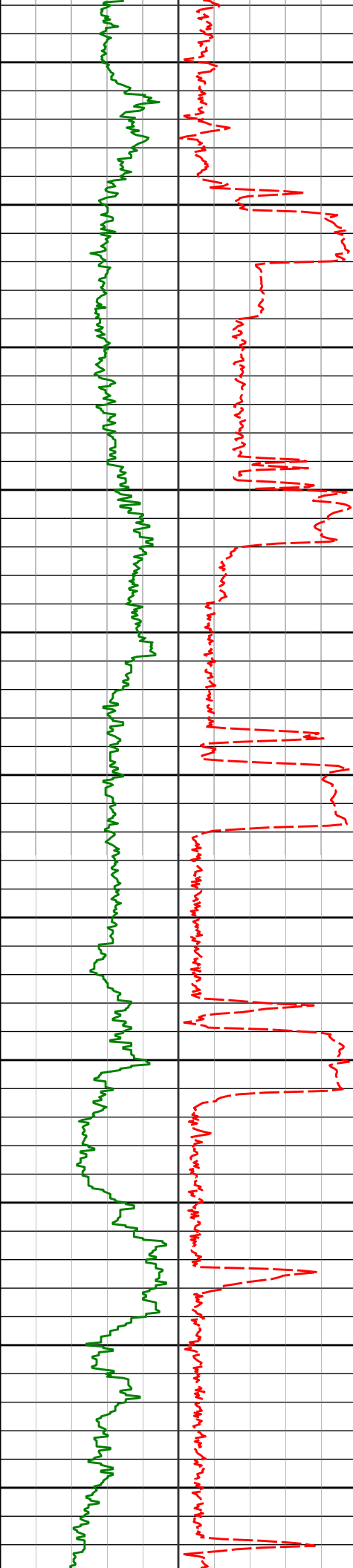






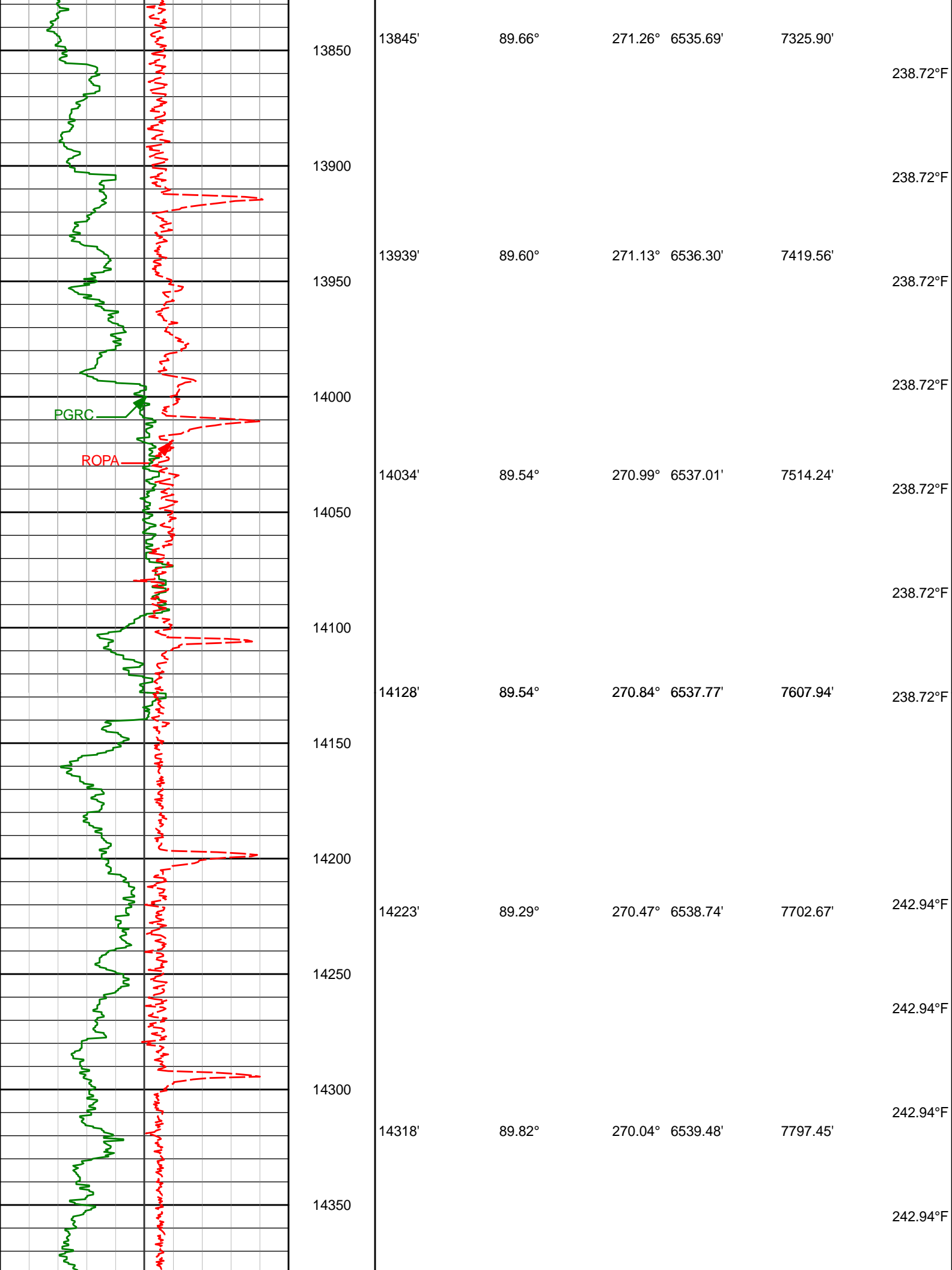


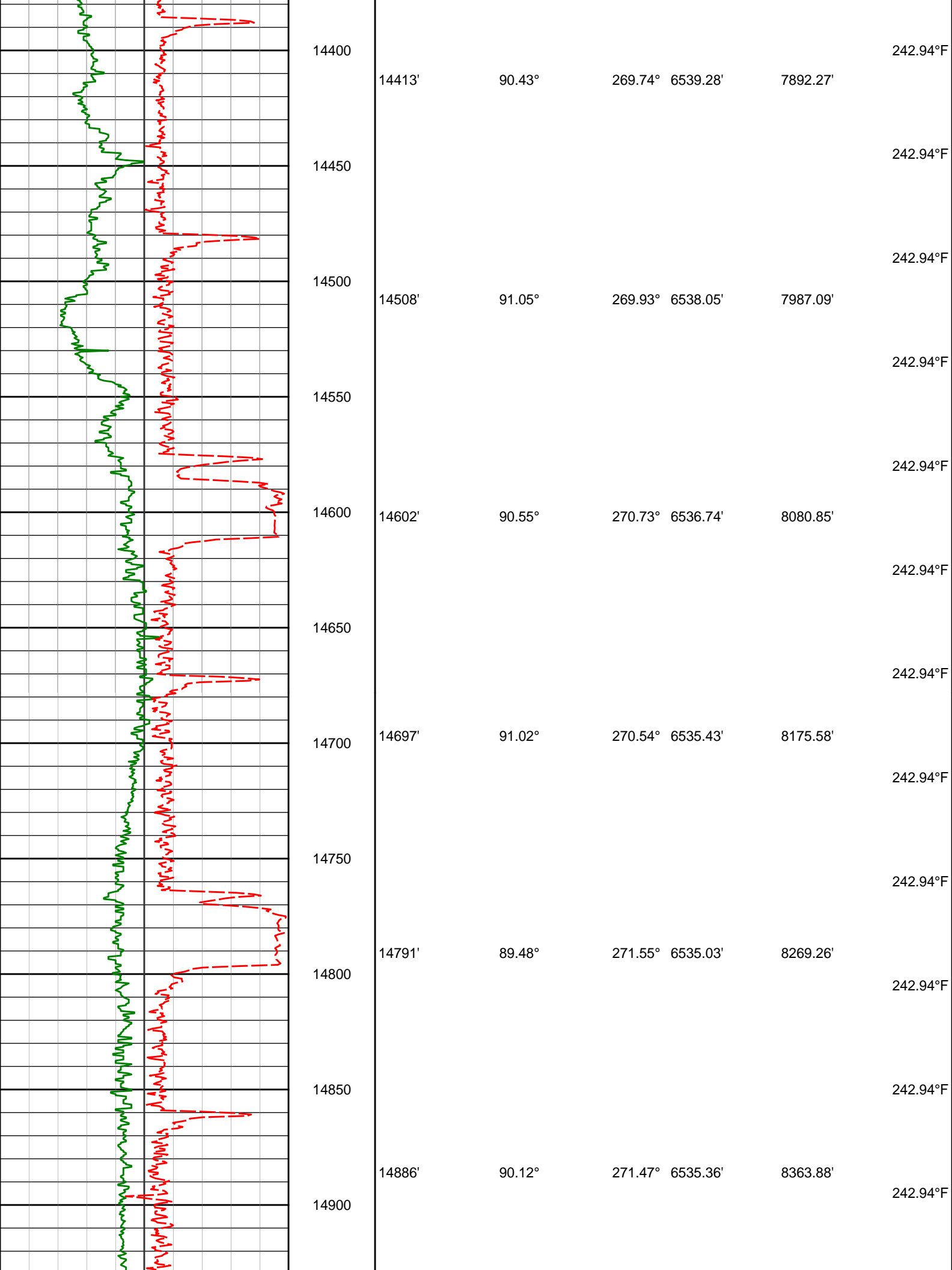


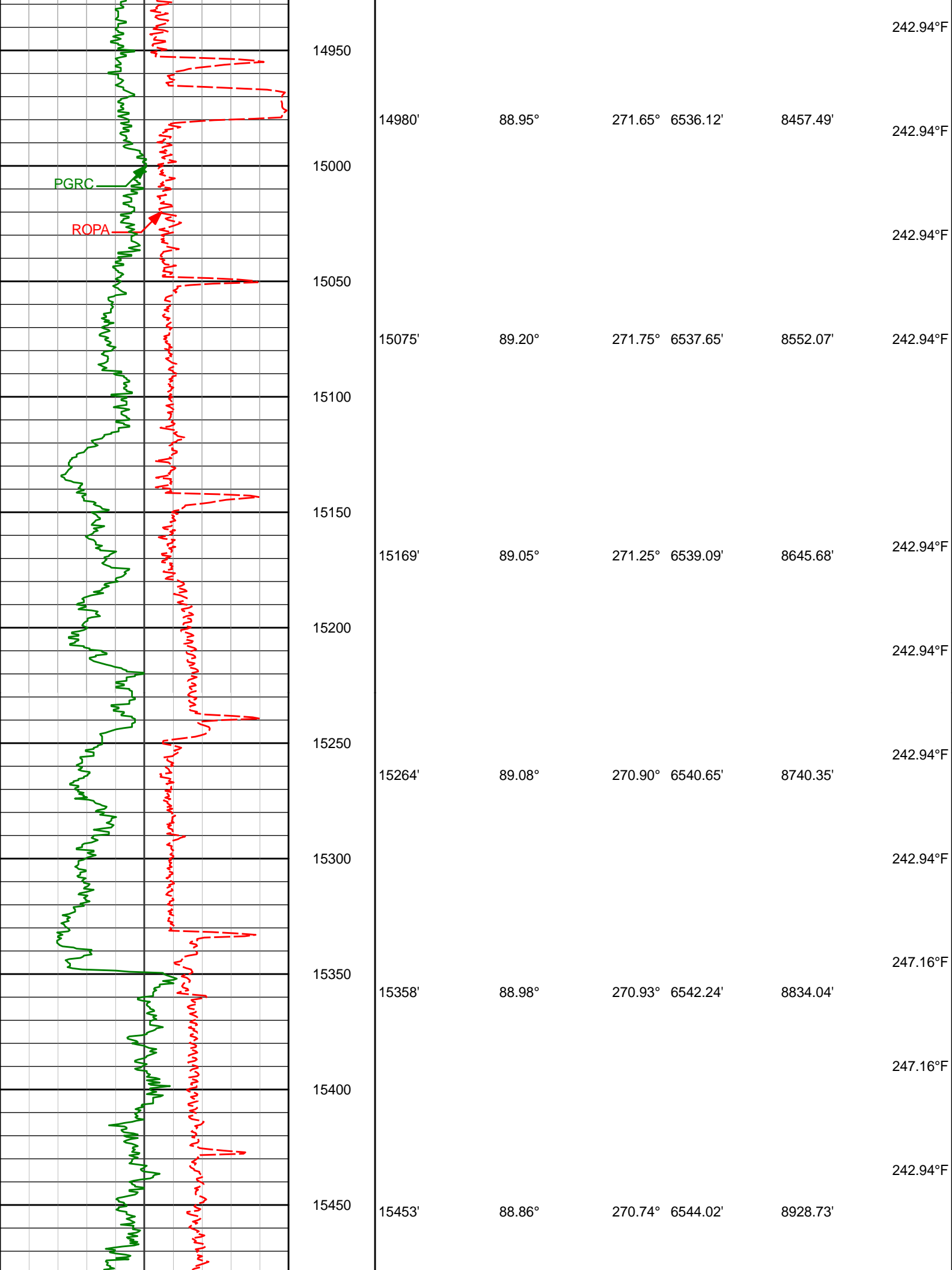


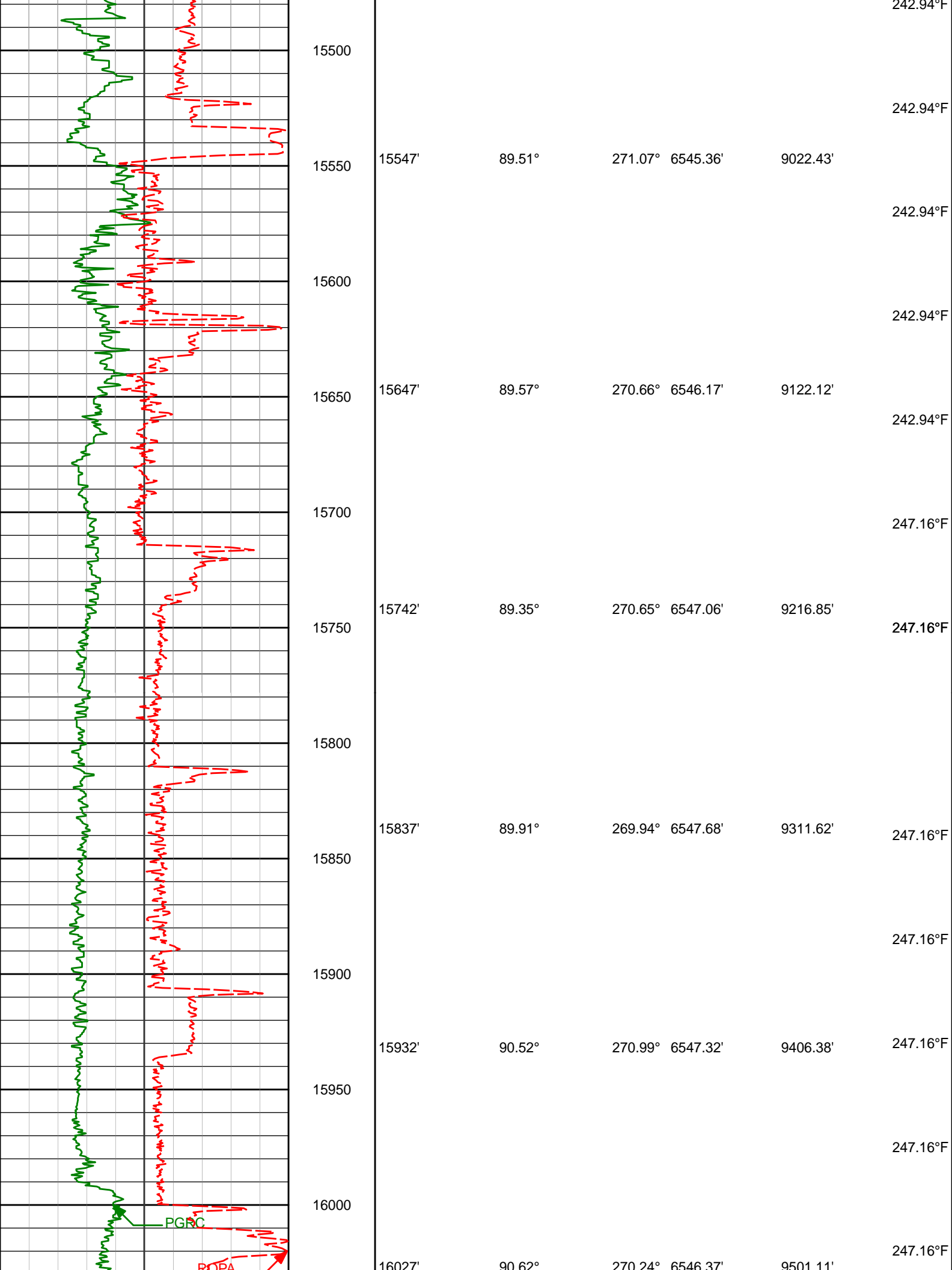
13300  
13350  
13400  
13450  
13500  
13550  
13600  
13650  
13700  
13750  
13800

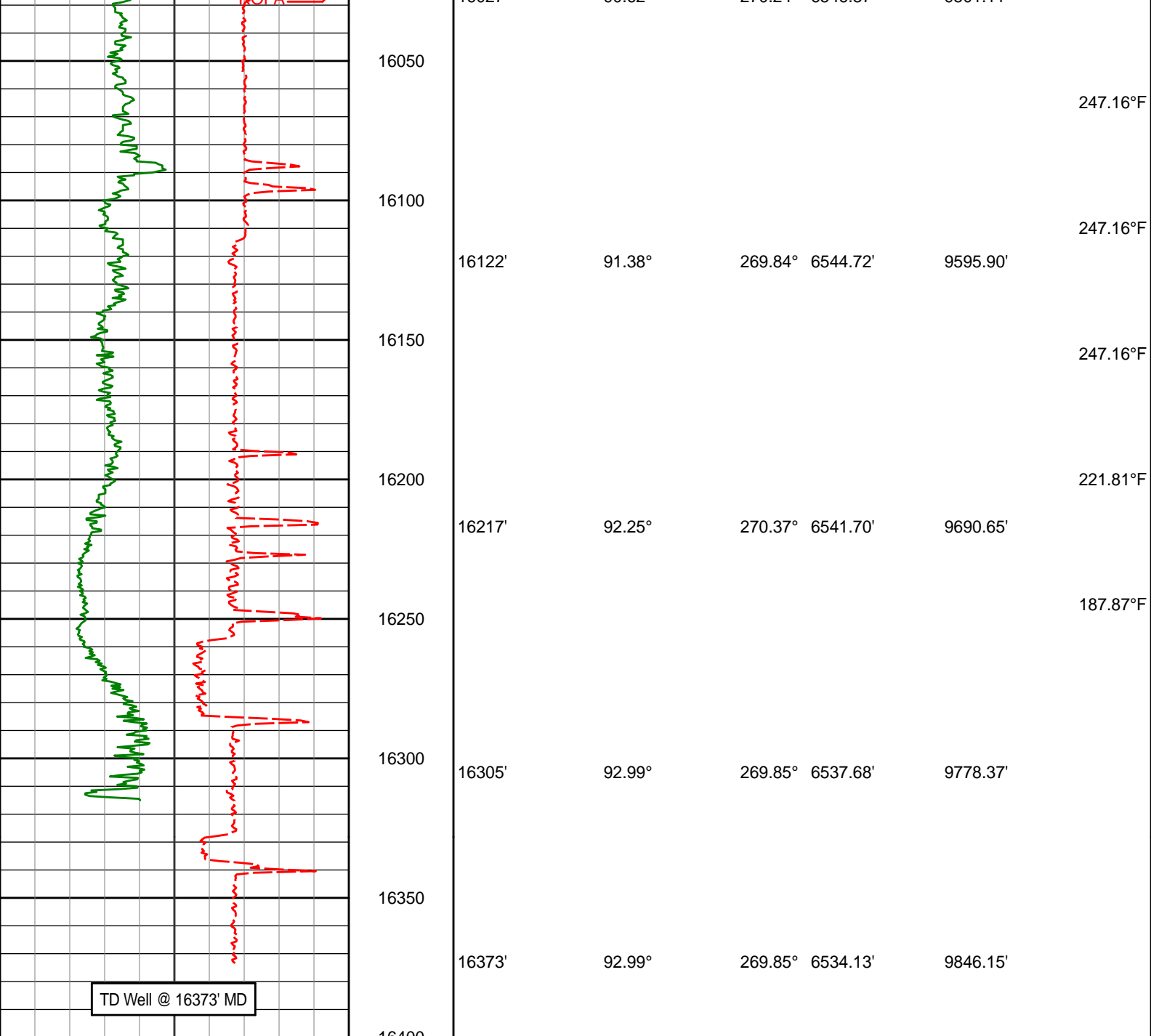
13371'	90.28°	268.54°	6537.56'	6853.33'	230.28°F
13466'	90.59°	269.33°	6536.85'	6948.23'	234.50°F
13560'	91.57°	271.68°	6535.08'	7041.96'	234.50°F
13655'	89.41°	271.28°	6534.26'	7136.57'	234.50°F
13750'	89.60°	271.08°	6535.08'	7231.23'	234.50°F
					238.72°F











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								

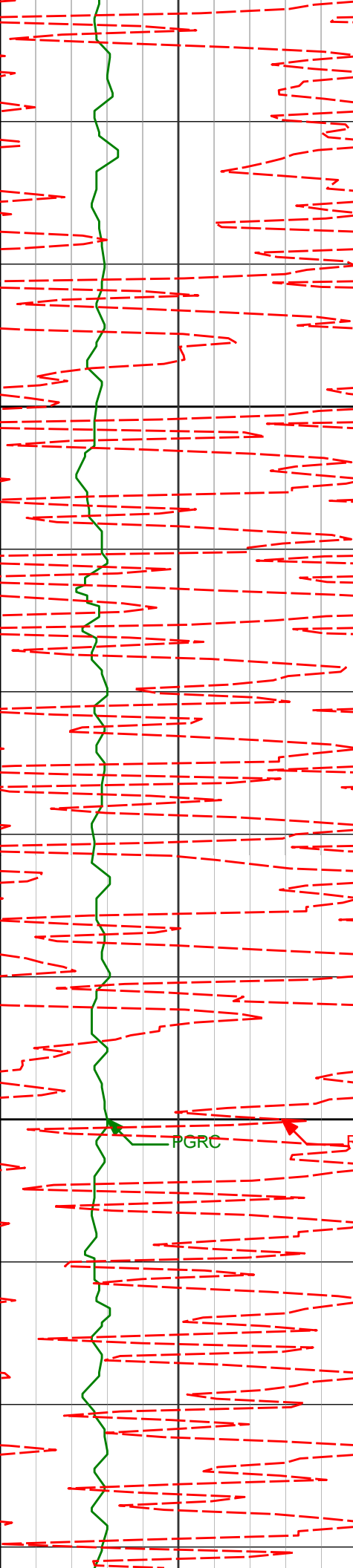
MD Detail 1:240 Scale

PCG Gamma Ray BCorr PGRC
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0	PGRC api	300
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Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K	0							
		700						91.93°F
		Surface Casing Shoe @ 711' MD						
		100						92.26°F
			731'	0.45°	225.42°	730.99'	2.19'	
								94.33°F
		800						94.33°F
			825'	0.53°	230.59°	824.99'	2.82'	



900

920'

0.50°

233.87°

919.99'

3.52'

1000

1015'

0.69°

231.26°

1014.98'

4.34'

94.33°F

94.33°F

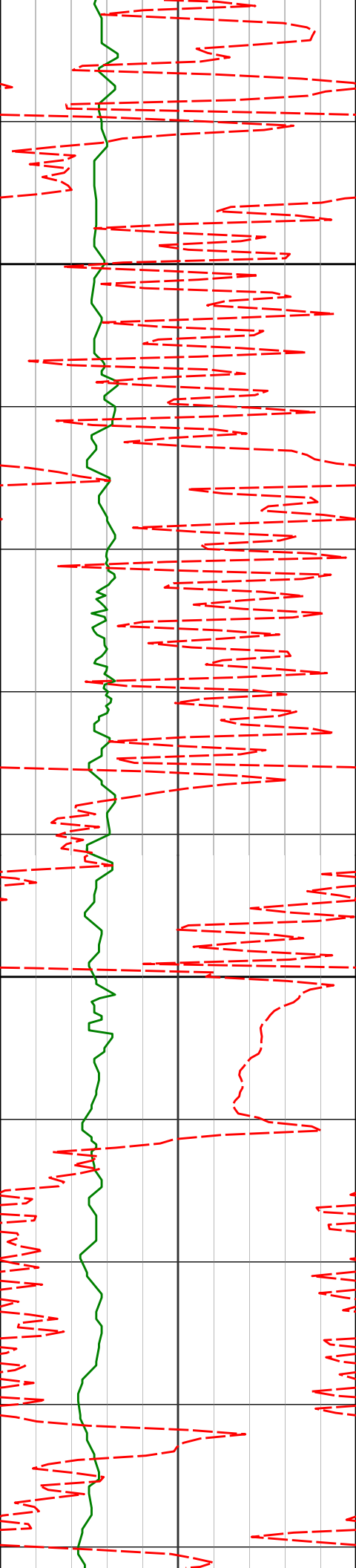
96.42°F

96.42°F

96.42°F

PGRC

ROPA



1100

1108'

0.94°

216.56°

1107.97'

5.29'

1200

1200'

1.67°

185.62°

1199.95'

5.99'

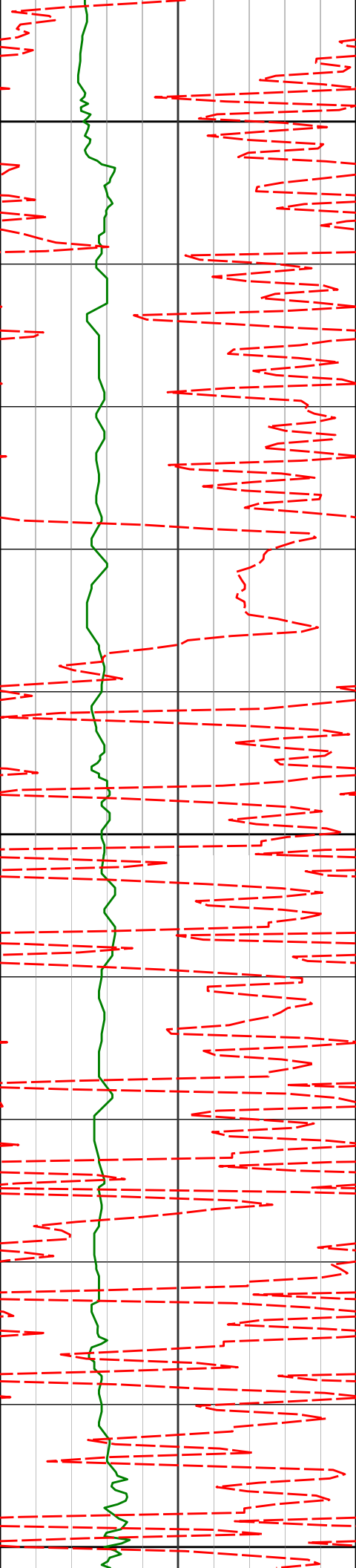
96.42°F

97.49°F

98.17°F

98.51°F

98.97°F



1292'

3.84°

168.80°

1291.84'

5.80'

1300

100.62°F

100.62°F

1385'

5.41°

158.03°

1384.53'

4.01'

1400

100.74°F

1478'

5.53°

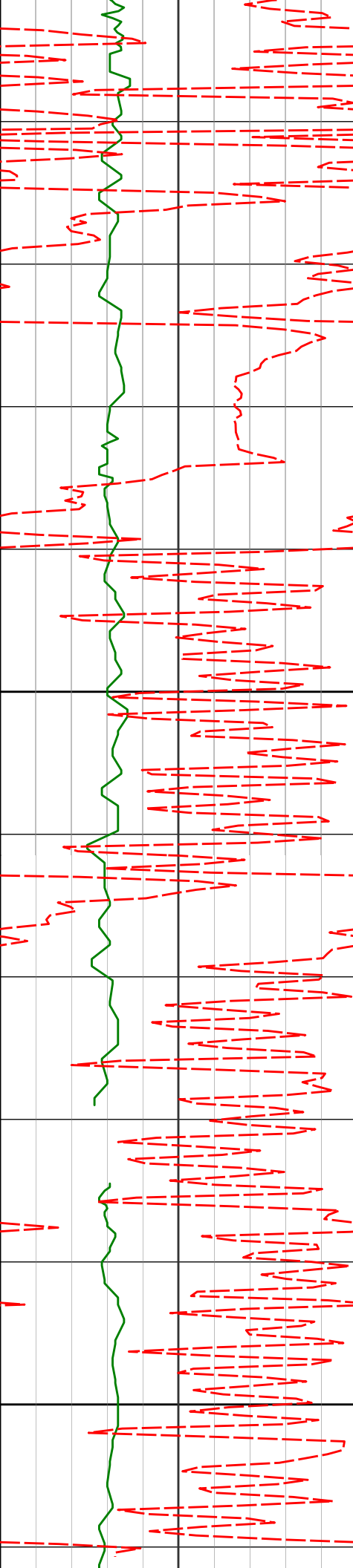
154.41°

1477.11'

0.96'

102.62°F

1500



1600

1700

1571'

6.97°

152.39°

1569.55'

-3.01'

1664'

7.60°

151.87°

1661.80'

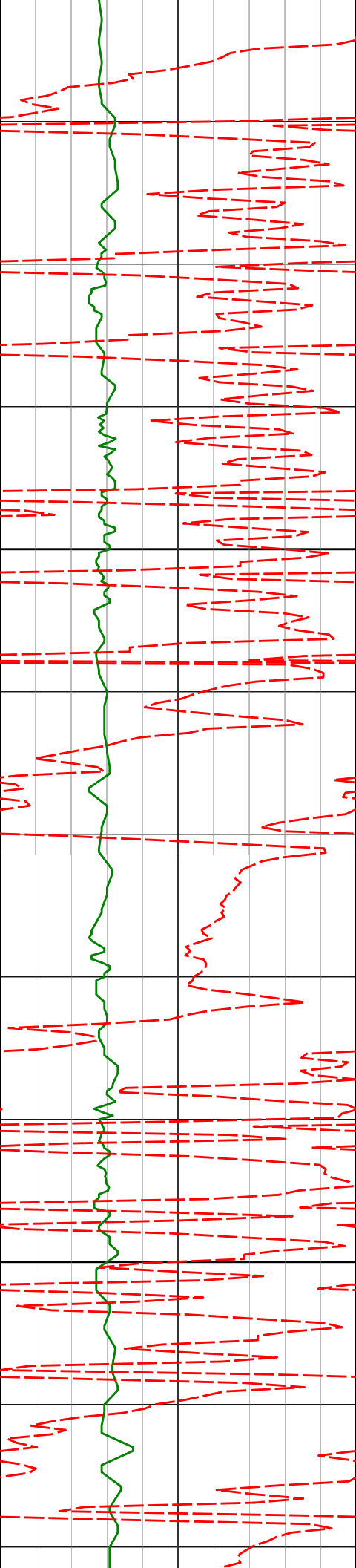
-7.86'

102.72°F

102.72°F

102.72°F

104.83°F



1757'

6.60°

141.05° 1754.09'

-13.50'

104.83°F

1800

104.83°F

1850'

6.33°

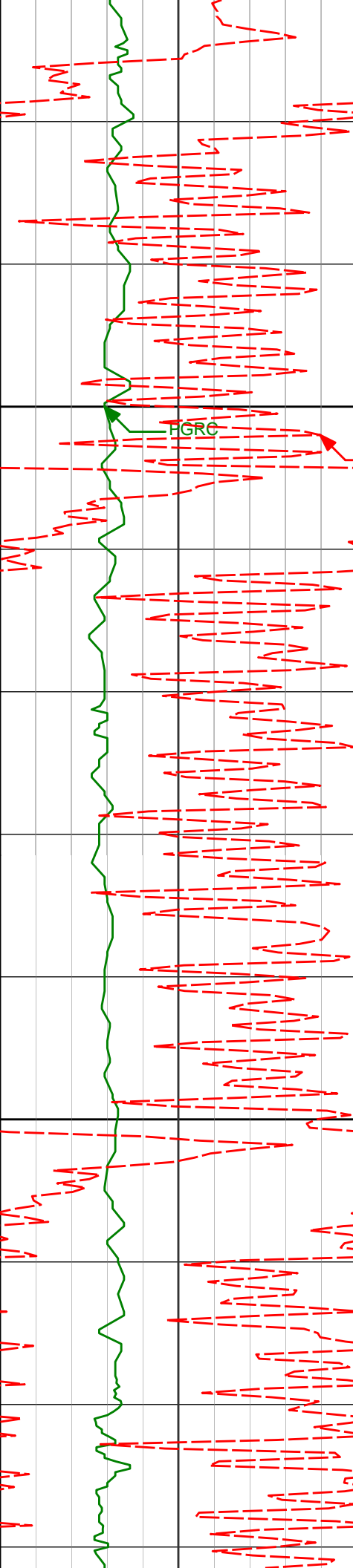
150.24° 1846.50'

-18.85'

106.97°F

1900

106.97°F



2000

HGRC

ROPA

2100

2036'

7.84°

145.83°

2030.77'

-30.12'

2129'

7.67°

135.72°

2122.92'

-37.39'

106.97°F

106.97°F

109.09°F

64.26°F

69.79°F

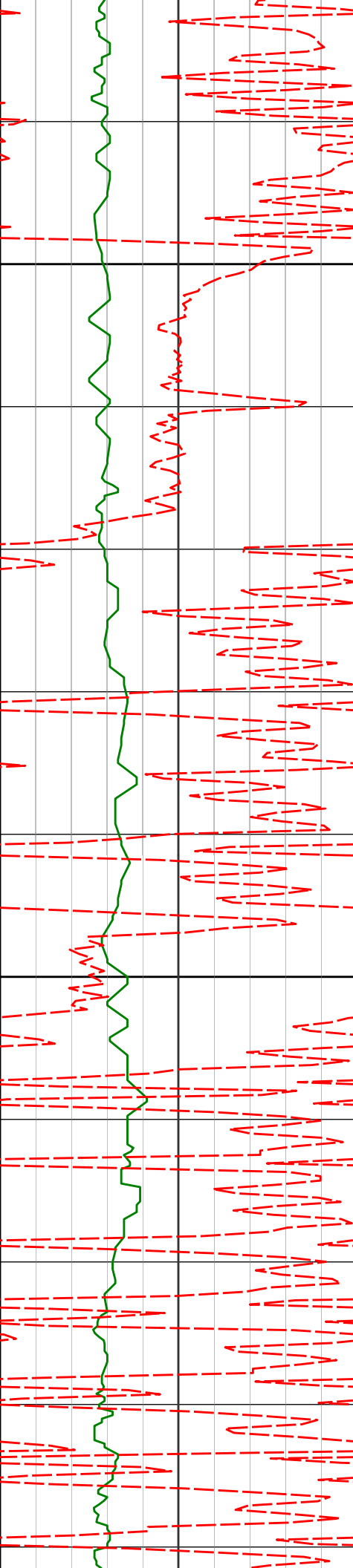
1944'

8.55°

151.58°

1939.71'

-24.06'



2200

111.24°F

2223'

8.68°

148.15° 2215.97'

-44.83'

111.24°F

2300

111.24°F

2313'

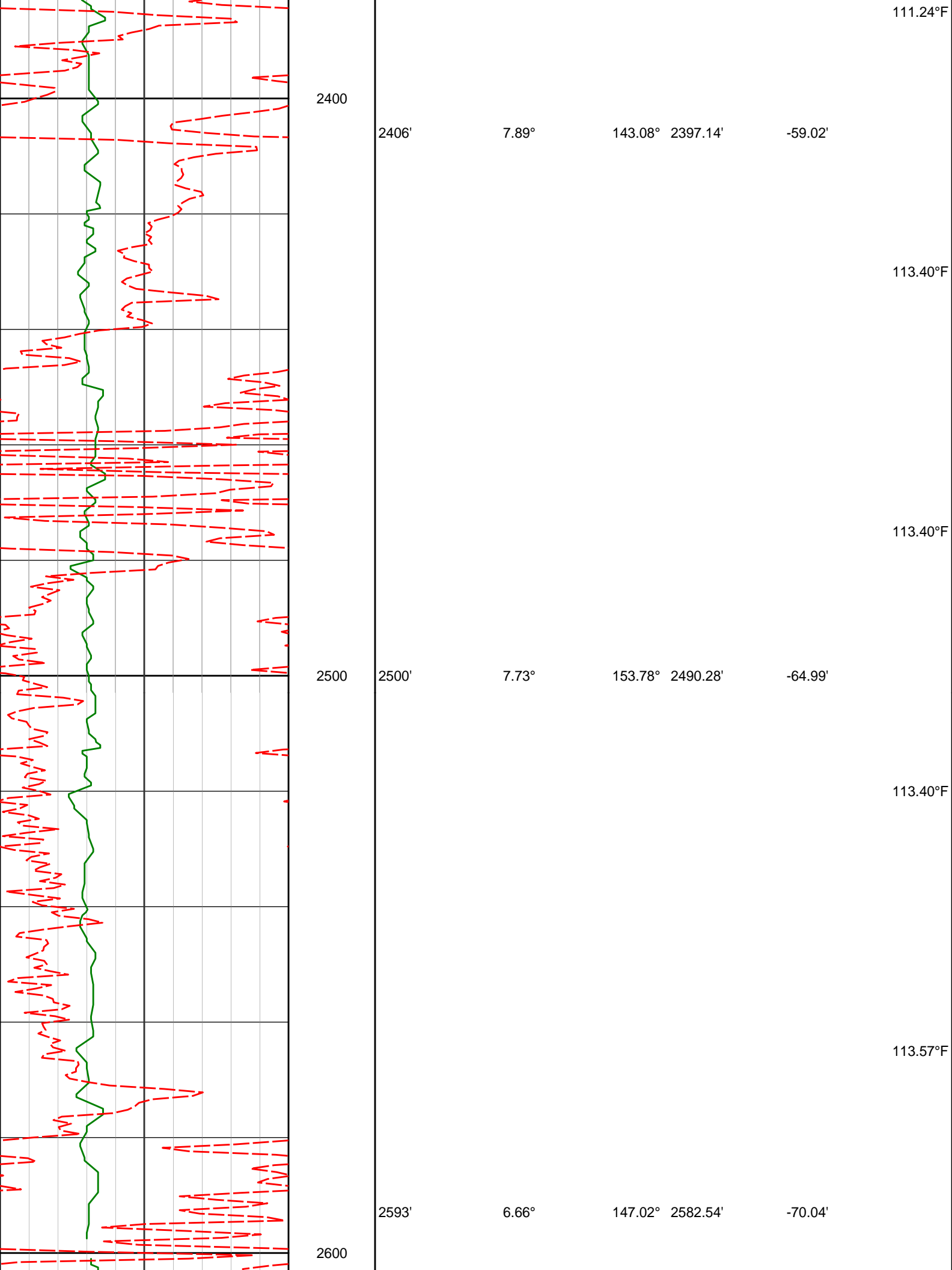
7.94°

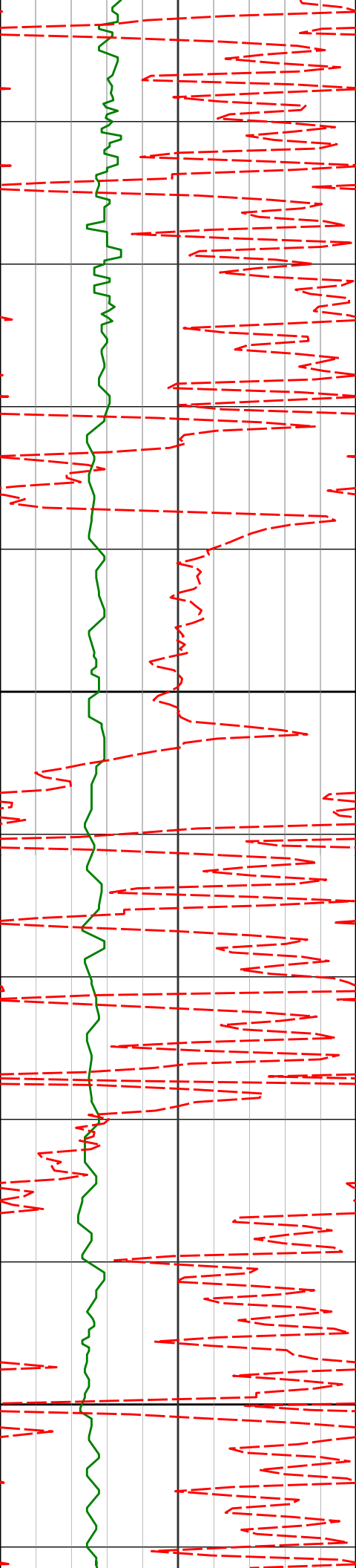
140.09° 2305.03'

-51.72'

111.24°F







2700

2800

2685'

7.36°

158.68° 2673.86'

-74.45'

2777'

9.04°

167.55° 2764.92'

-77.34'

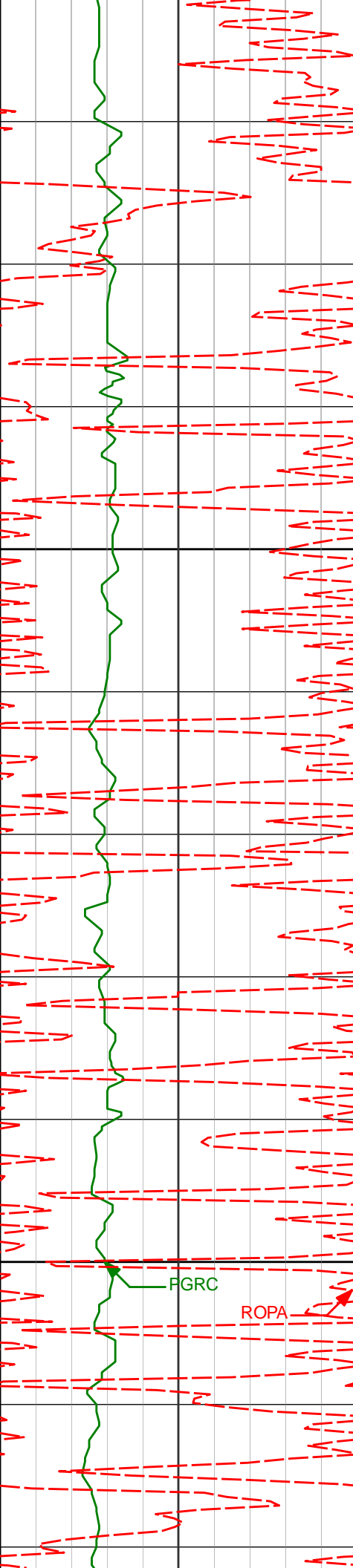
115.56°F

115.56°F

115.56°F

115.56°F

117.73°F



2900

3000

FGRC

ROPA

2870'

8.98°

165.08° 2856.77'

-79.89'

2965'

8.54°

160.64° 2950.67'

-83.25'

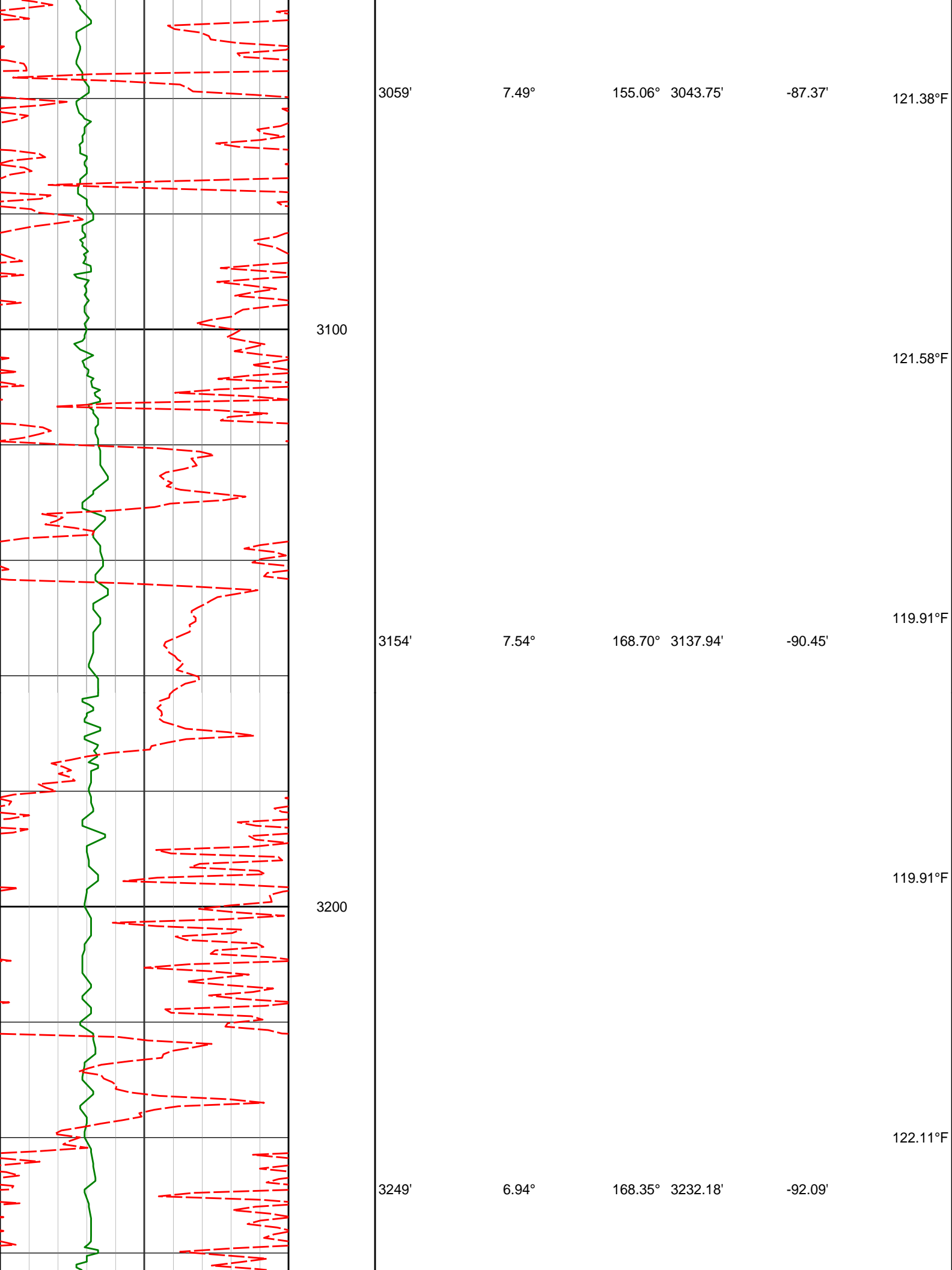
117.73°F

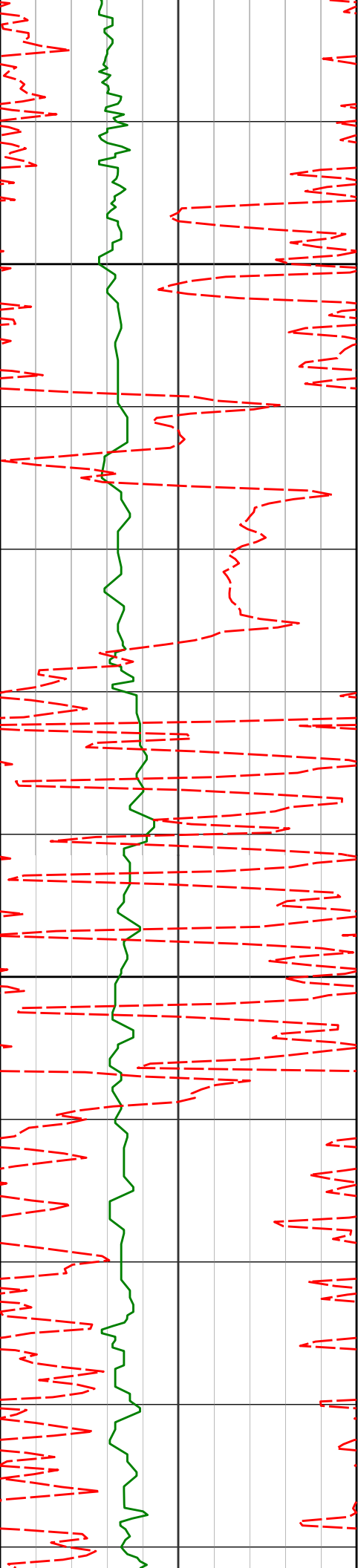
117.73°F

117.73°F

117.73°F

120.06°F





3300

3343'

8.04°

155.85°

3325.38'

-95.18'

3400

3438'

7.47°

147.09°

3419.52'

-100.53'

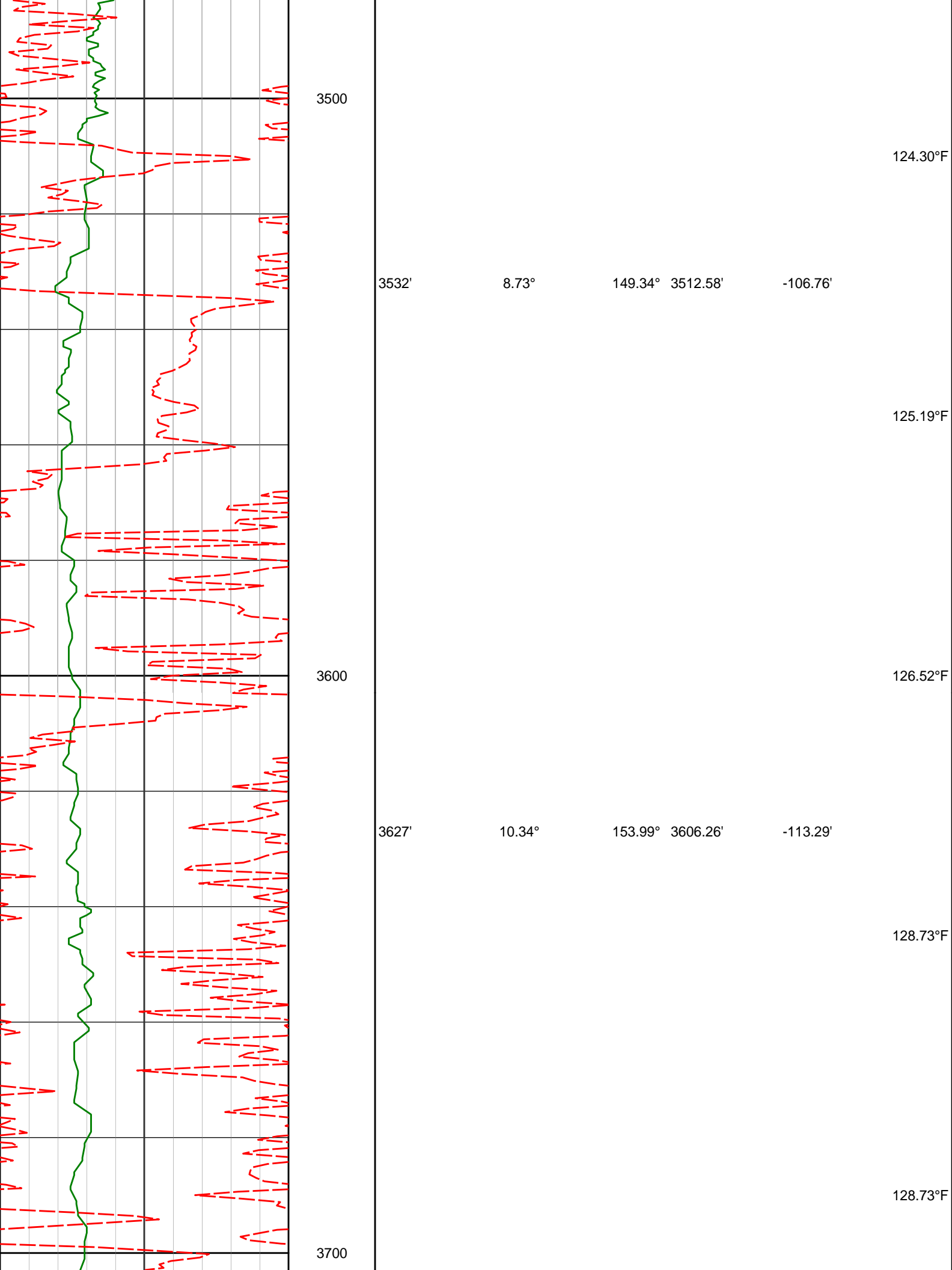
122.11°F

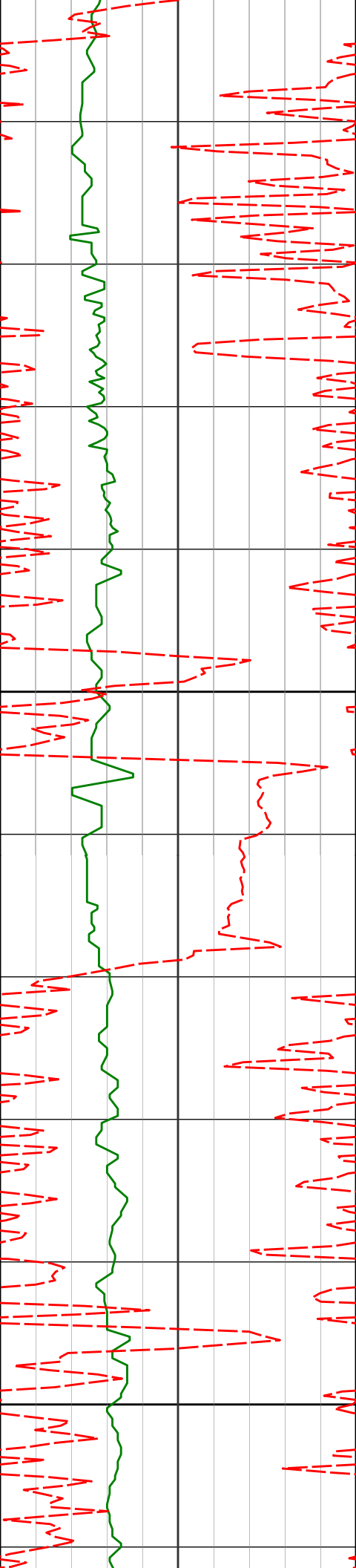
122.11°F

122.11°F

122.64°F

124.30°F





3721'

11.43°

152.07° 3698.57'

-120.33'

128.73°F

128.73°F

3800

3816'

11.17°

162.07° 3791.74'

-126.48'

128.73°F

130.96°F

3900

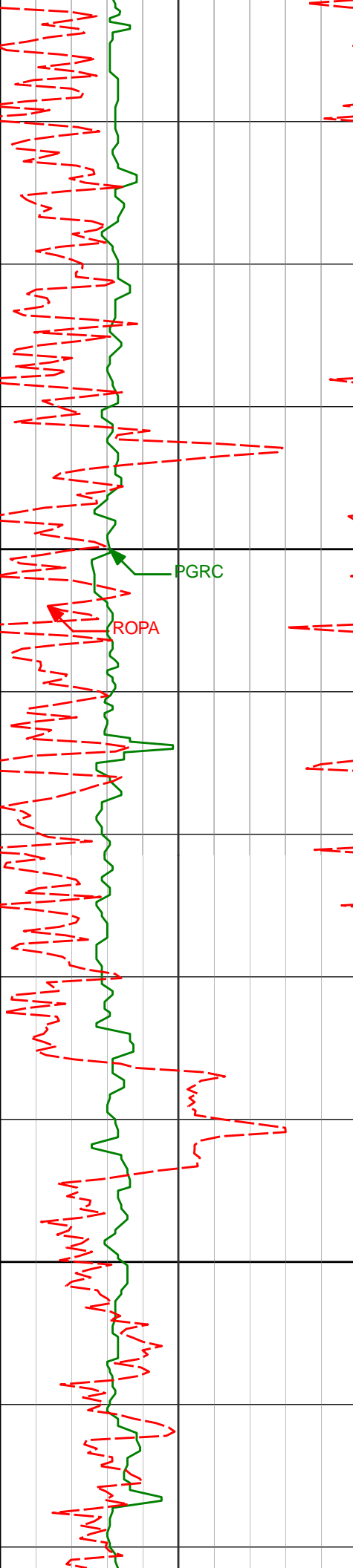
3910'

10.07°

162.66° 3884.12'

-130.68'

130.96°F



4000

4005'

9.43°

161.65° 3977.75'

-134.63'

130.96°F

133.20°F

133.20°F

133.20°F

4100

4099'

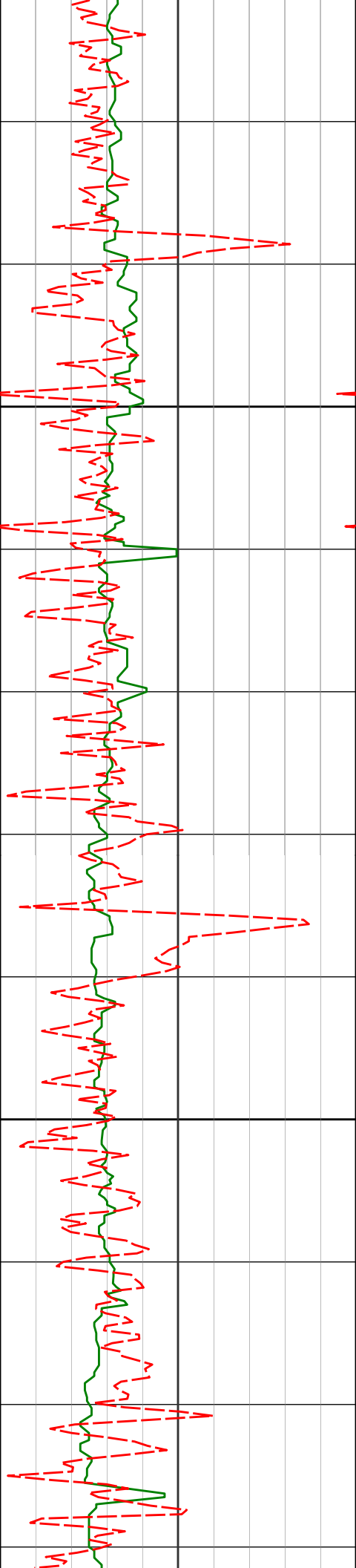
8.52°

163.60° 4070.60'

-138.12'

135.14°F





4200

4300

4194'

7.63°

163.71° 4164.66'

-141.06'

4288'

7.20°

163.89° 4257.87'

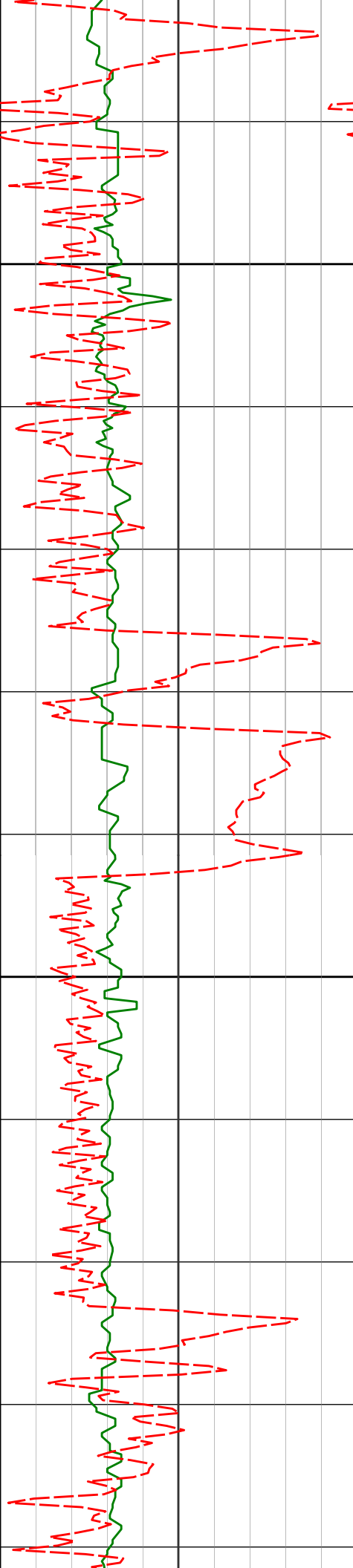
-143.70'

135.45°F

135.45°F

135.45°F

137.39°F



4383' 6.74° 167.04° 4352.17' -145.89'

4400

137.70°F

137.70°F

137.70°F

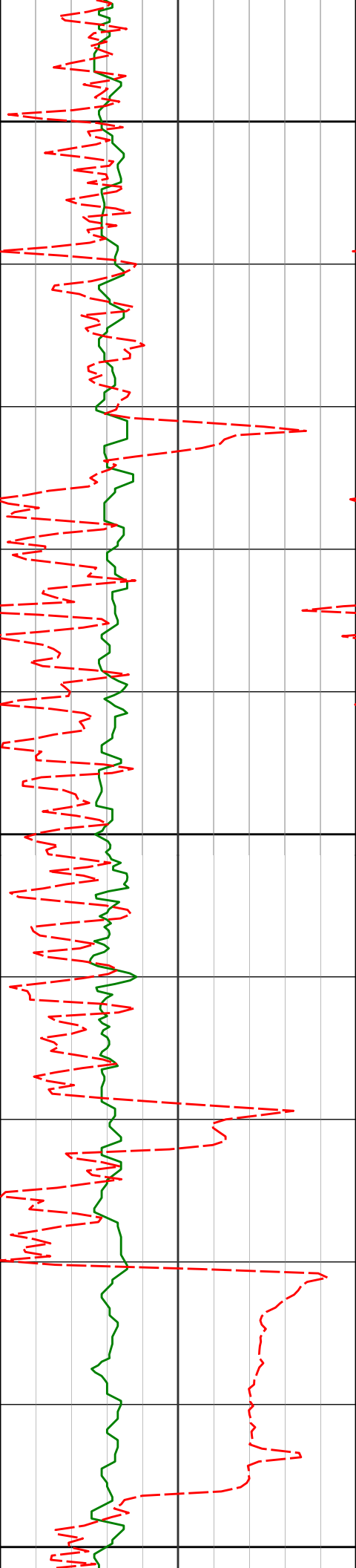
4477' 5.73° 174.97° 4445.61' -146.90'

4500

137.70°F

139.39°F

4572' 5.83° 180.55° 4540.13' -146.66'



4600

4700

4800

4667'

6.17°

181.75° 4634.61'

-145.83'

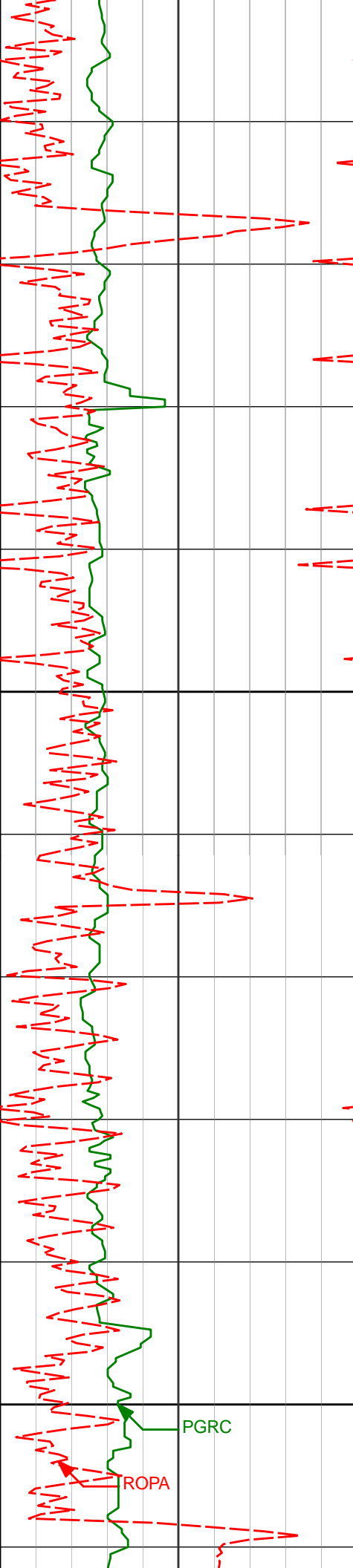
139.96°F

139.96°F

141.48°F

142.25°F

142.25°F



4900

5000

4856'

6.71°

158.96° 4822.45'

-148.18'

4951'

6.68°

158.76° 4916.80'

-151.52'

PGRC

ROPA

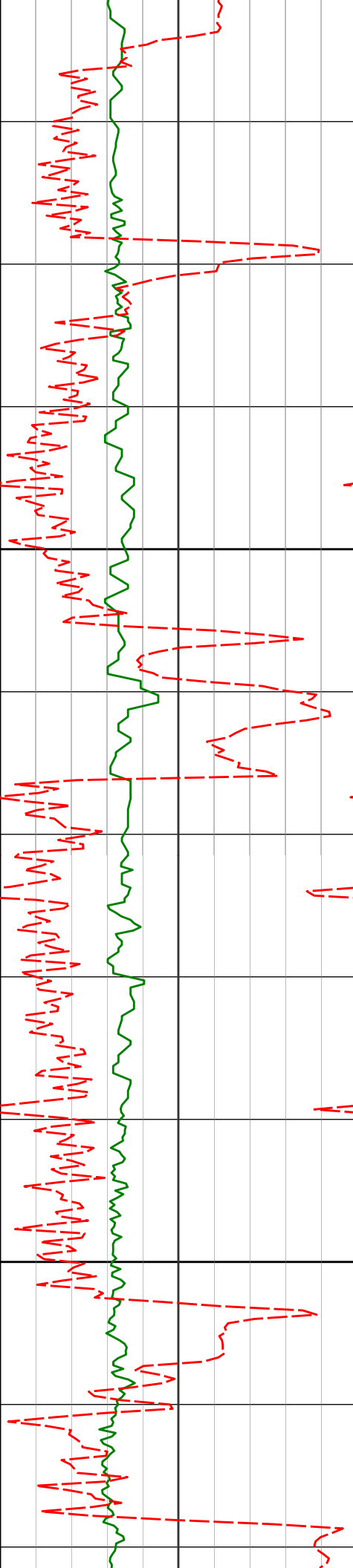
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142.25°F

142.25°F

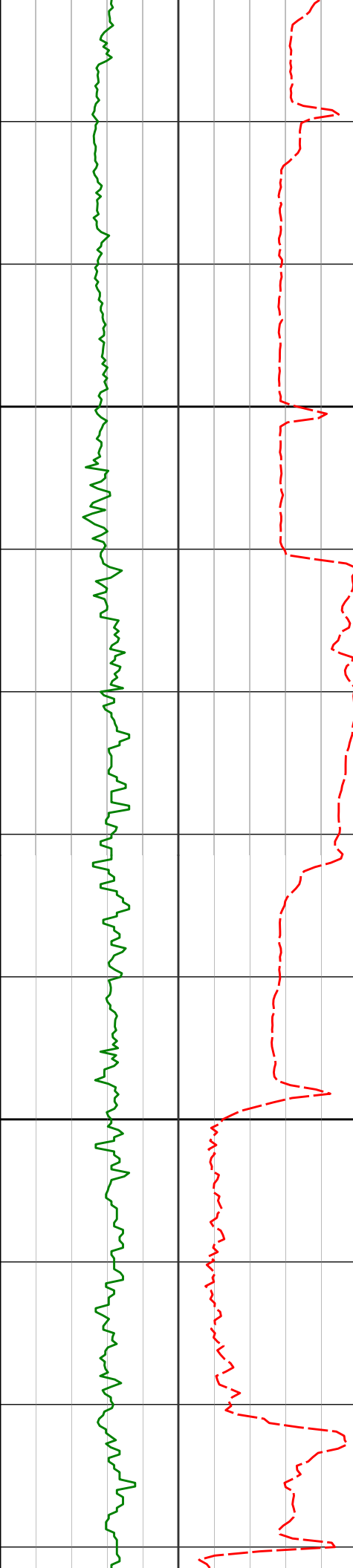
143.48°F

144.54°F



300

				144.54°F
5046'	6.06°	159.99°	5011.21'	-154.60'
				144.54°F
5100				
				144.82°F
5140'	5.69°	154.92°	5104.72'	-157.71'
				146.84°F
5200				
				141.17°F
5235'	5.22°	155.48°	5199.29'	-160.97'



5300

5400

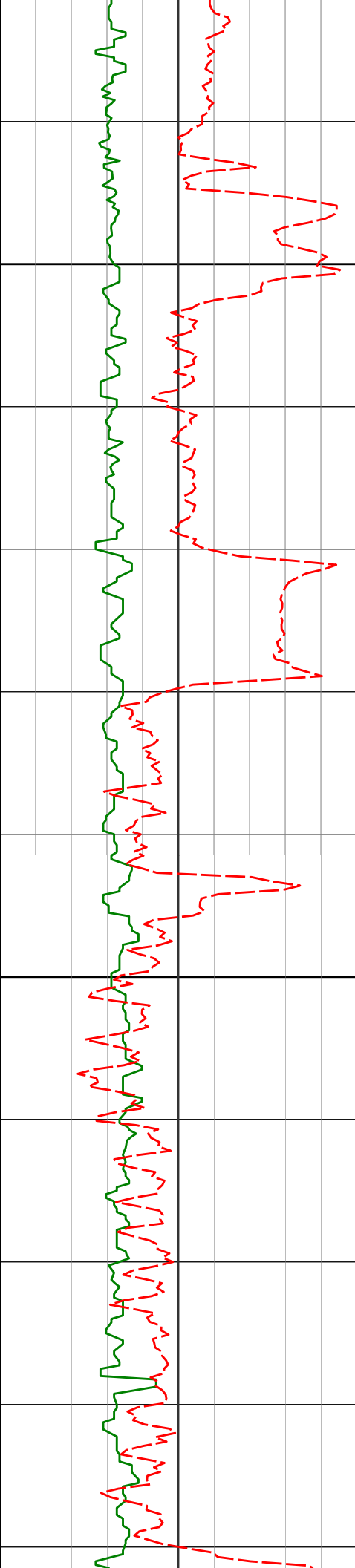
140.99°F

143.53°F

146.73°F

147.28°F

149.70°F



5500

5600

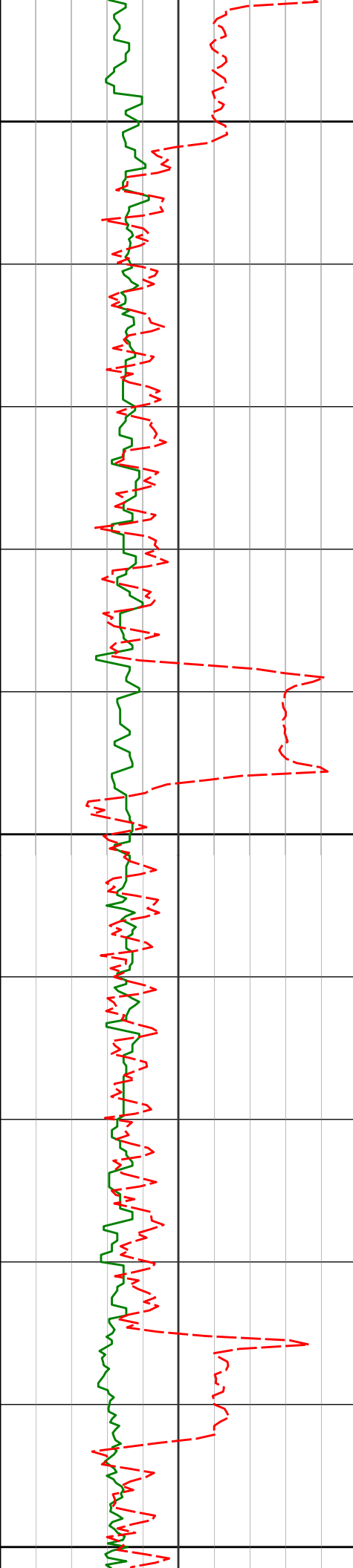
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152.93°F

153.79°F

155.67°F

156.42°F



5700

158.28°F

158.47°F

5800

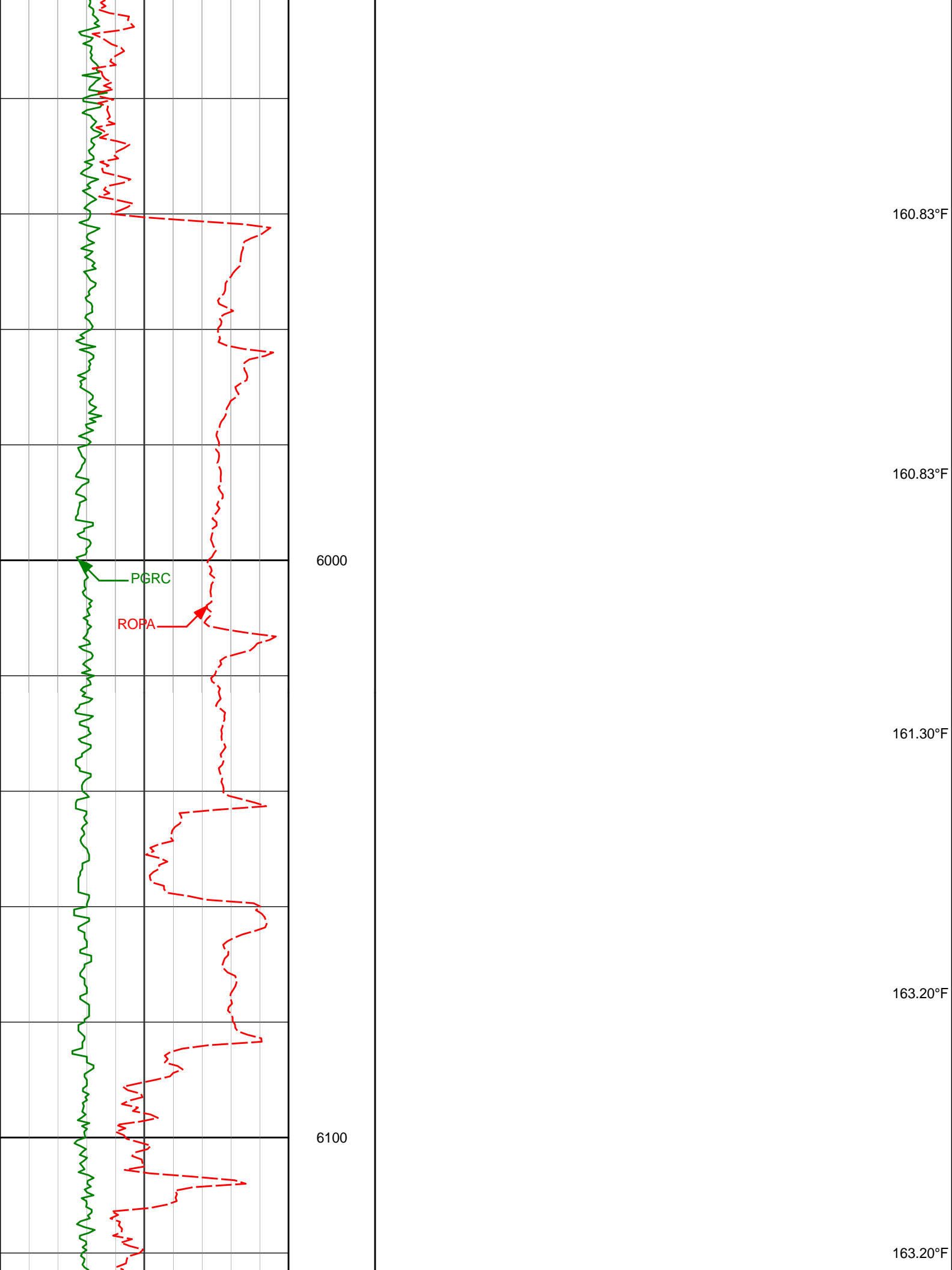
159.07°F

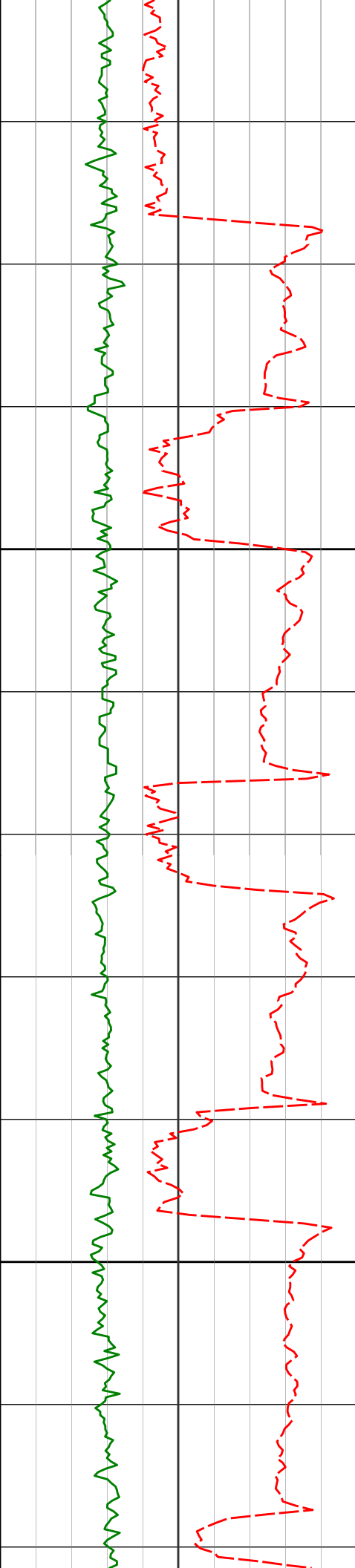
160.83°F

5900

160.83°F







6200

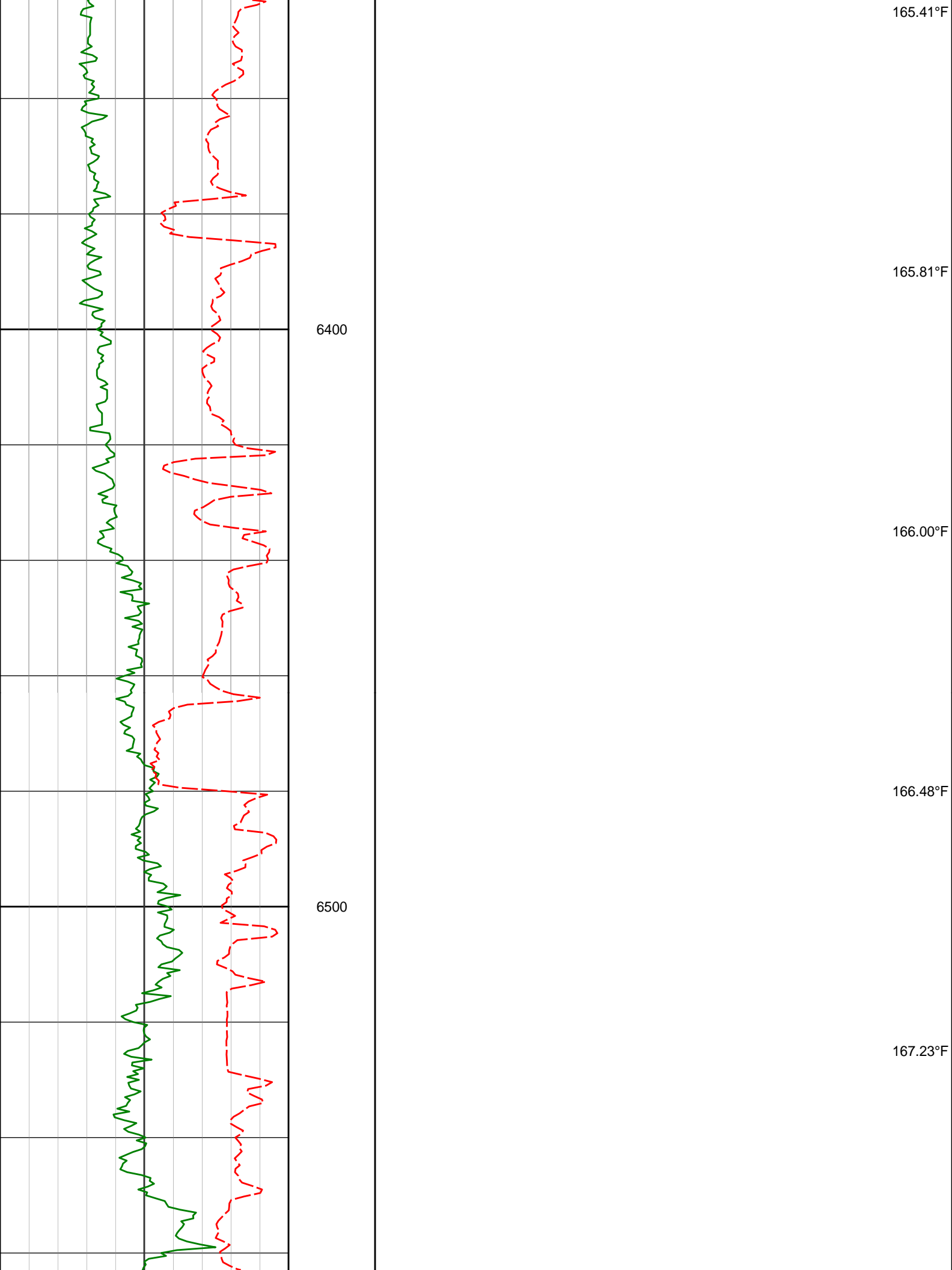
6300

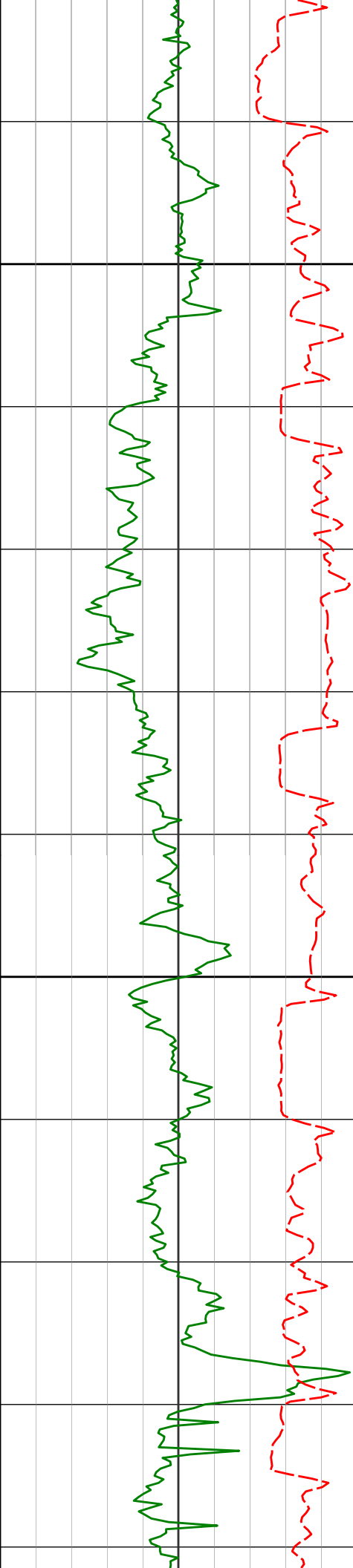
163.20°F

164.87°F

165.53°F

163.96°F





6600

6700

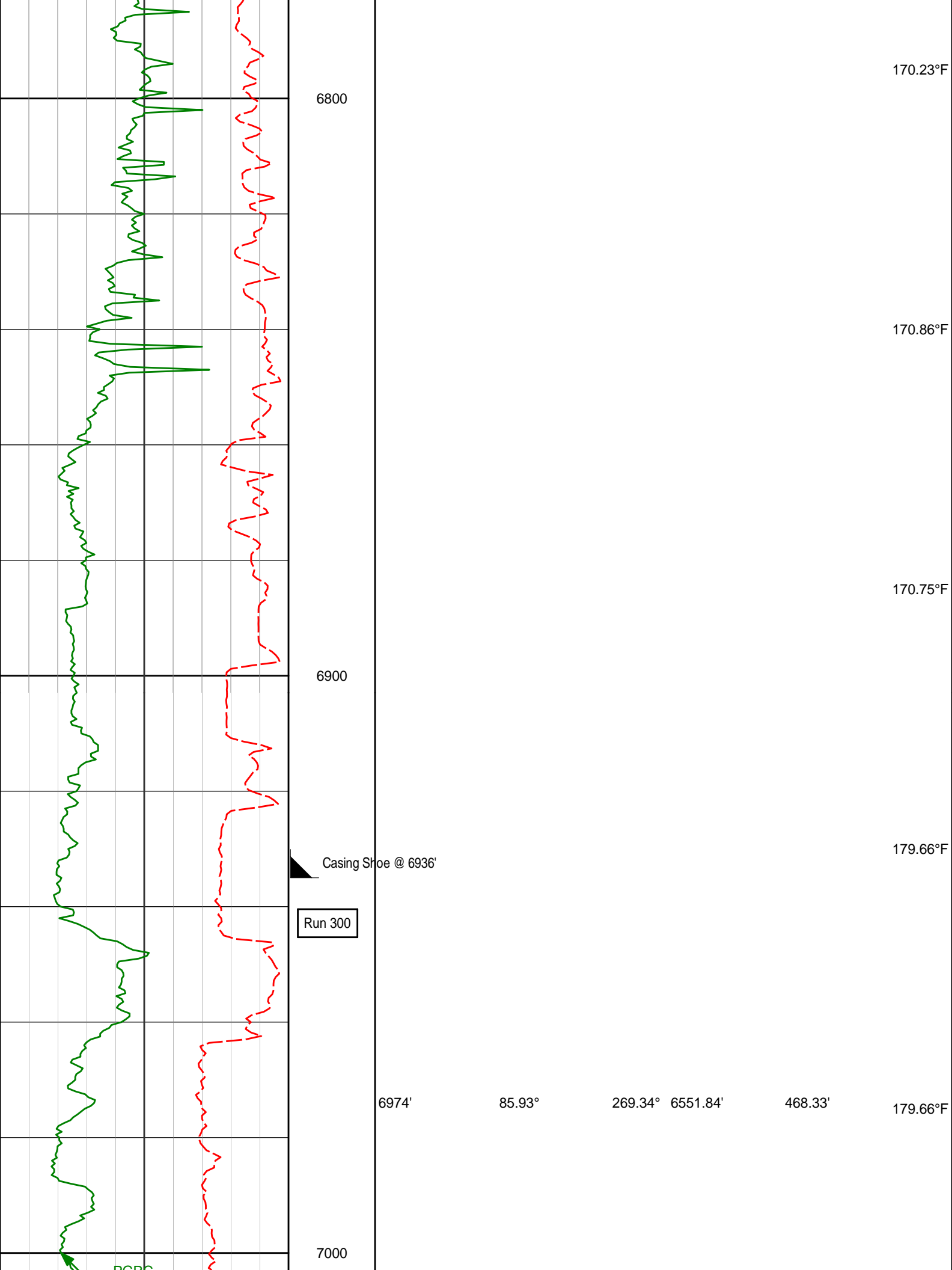
166.04°F

167.67°F

168.46°F

169.65°F

170.09°F



6800

170.23°F

170.86°F

170.75°F

6900

179.66°F

Casing Shoe @ 6936'

Run 300

6974'

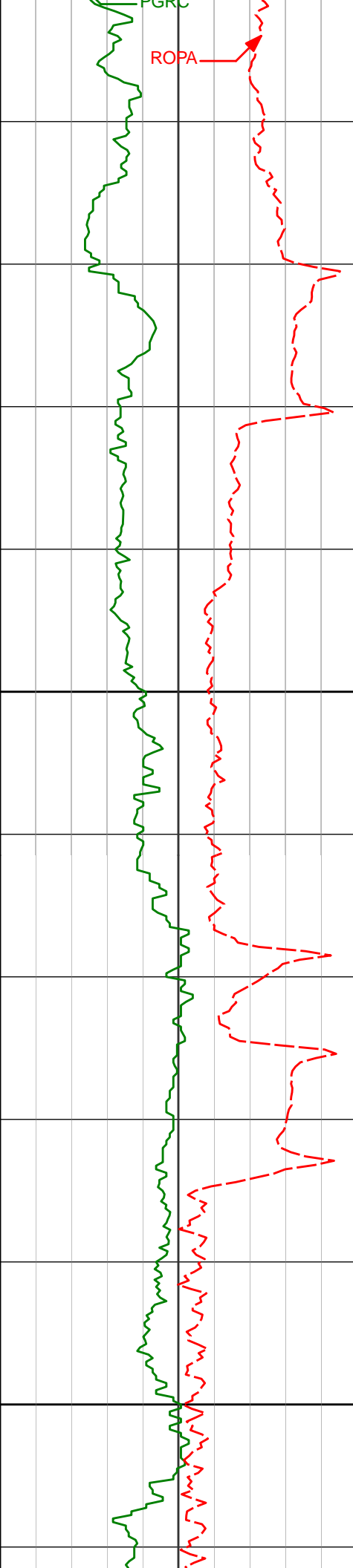
85.93°

269.34° 6951.84'

468.33'

179.66°F

7000



7100

7200

7068'

87.91°

269.77° 6556.89'

562.05'

7163'

89.23°

269.24° 6559.27'

656.87'

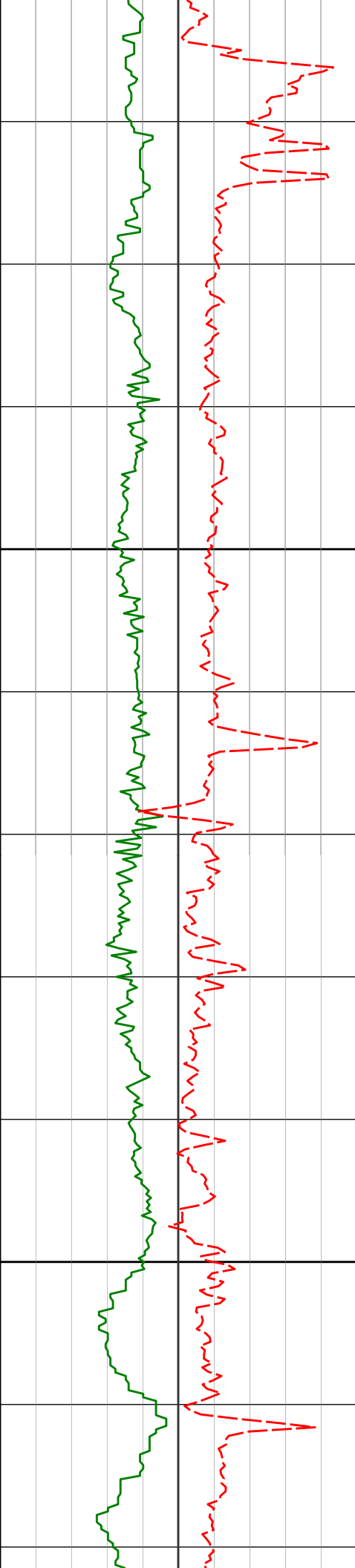
179.66°F

179.66°F

179.66°F

179.66°F

179.66°F



7300

7400

7258'

89.97°

270.19° 6559.93'

751.71'

7352'

89.63°

269.66° 6560.26'

845.53'

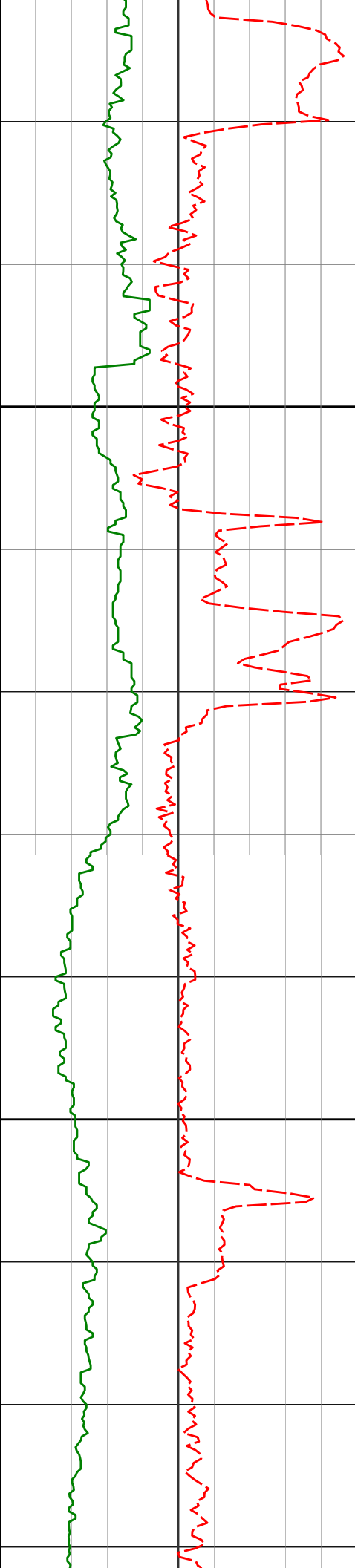
184.32°F

200.31°F

183.88°F

183.88°F

183.88°F



7447'

89.60°

268.97° 6560.90'

940.40'

183.88°F

7500

183.88°F

7541'

90.77°

268.98° 6560.59'

1034.30'

183.88°F

7600

183.88°F

7636'

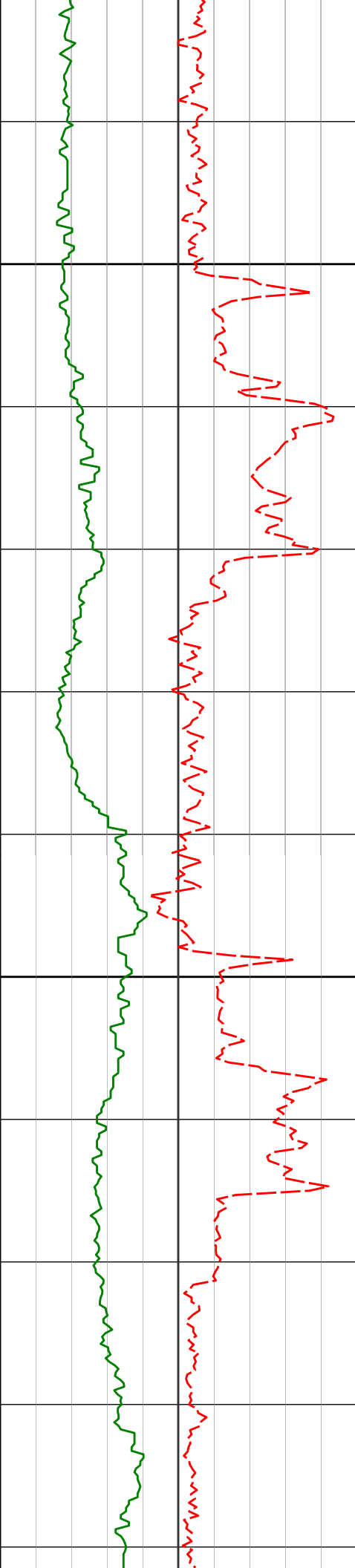
91.05°

268.41° 6559.09'

1129.21'

183.88°F





7700

7730'

92.99°

269.53° 6555.78'

1223.05'

183.88°F

183.88°F

188.09°F

7800

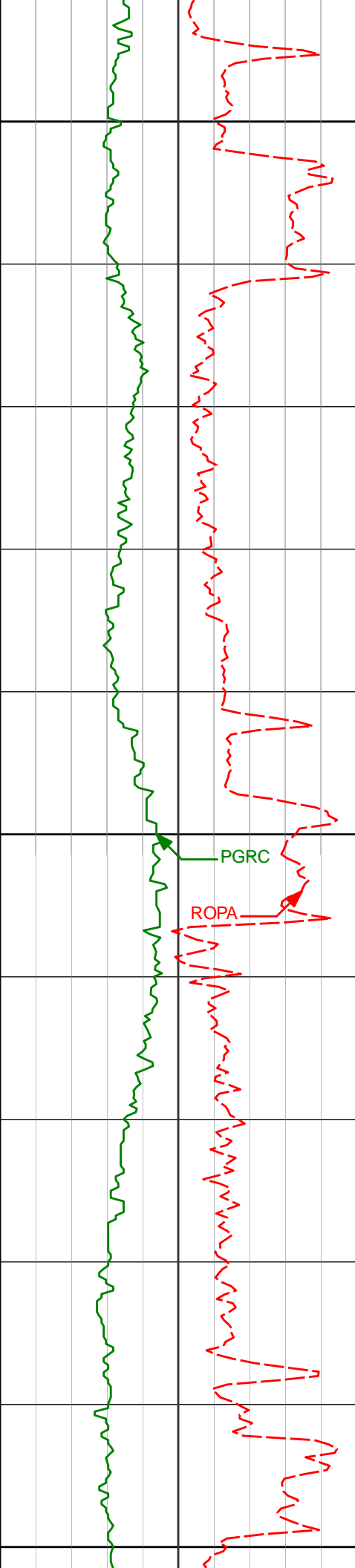
7825'

92.77°

269.67° 6551.00'

1317.78'

188.09°F



7900

7920'

91.88°

270.79° 6547.15'

1412.48'

183.88°F

183.88°F

8000

PGRC

ROPA

8015'

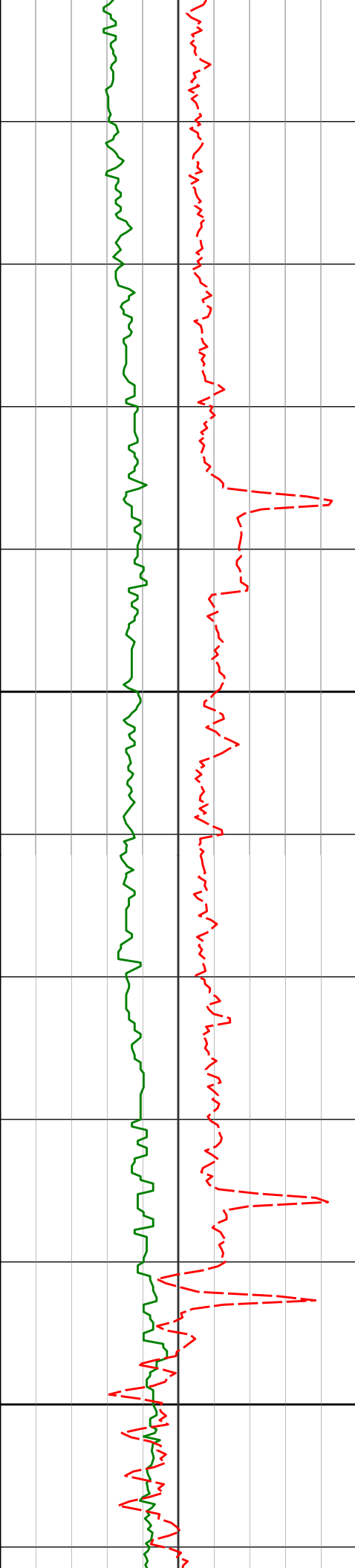
91.39°

272.19° 6544.44'

1507.06'

8100

124.81°F



8200

8300

8109'

8204'

8299'

90.09°

89.41°

89.35°

271.91° 6543.23'

270.35° 6543.64'

270.16° 6544.66'

1600.59'

1695.26'

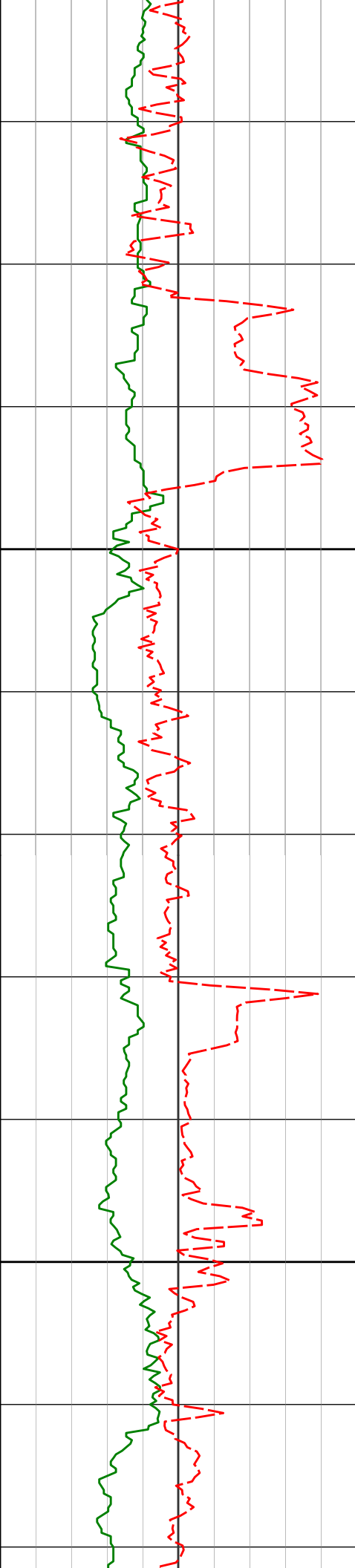
1790.03'

124.81°F

189.68°F

190.73°F

192.31°F



8400

8500

8393'

91.36°

269.57° 6544.08'

1883.85'

8488'

92.06°

269.31° 6541.24'

1978.67'

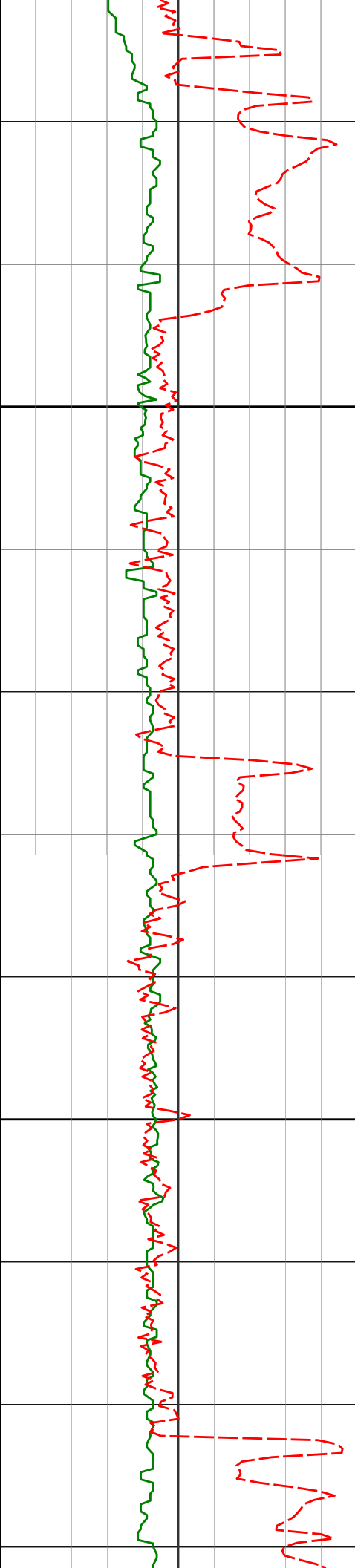
192.31°F

192.31°F

192.31°F

196.53°F

196.53°F



8583'

90.49°

270.90° 6539.12'

2073.44'

8600

196.53°F

8677'

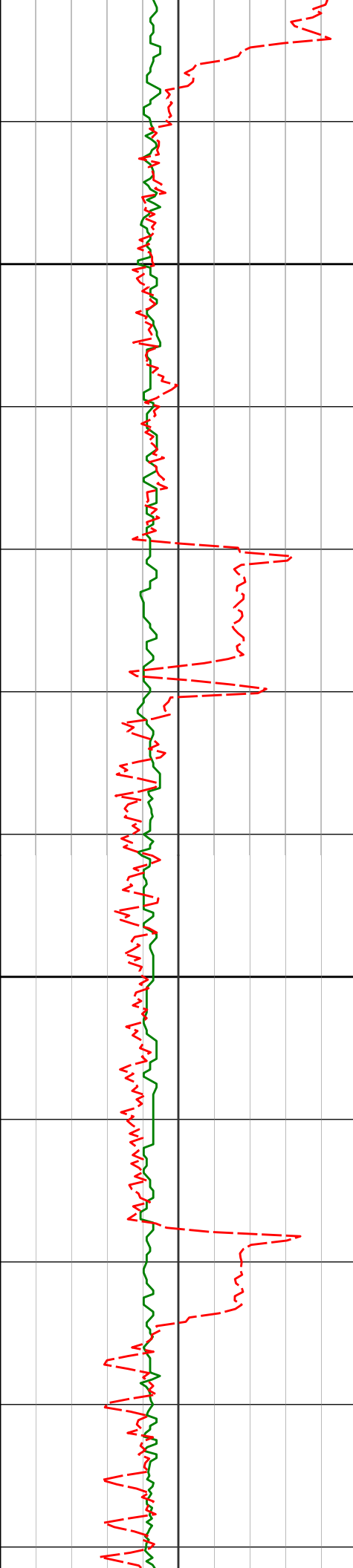
88.92°

268.81° 6539.60'

2167.26'

8700

196.53°F



8800

8900

8772'

89.26°

269.09° 6541.11'

2262.15'

196.53°F

8866'

89.29°

269.83° 6542.30'

2356.00'

200.75°F

8961'

88.64°

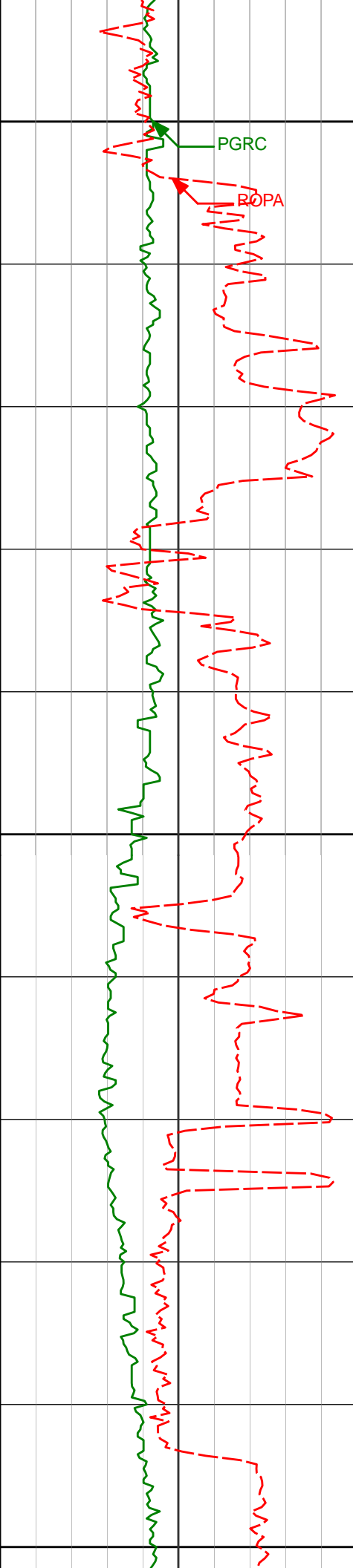
270.87° 6544.01'

2450.76'

200.75°F

200.75°F

196.53°F



9000

200.75°F

9055'

89.97°

271.63° 6545.14'

2544.41'

9100

9150'

89.94°

271.08° 6545.22'

2639.05'

9200

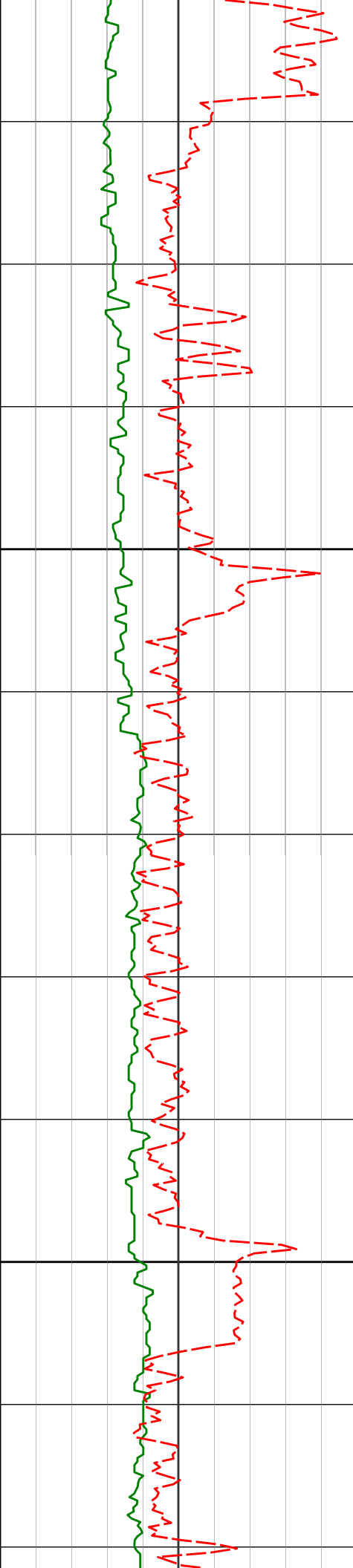
209.19°F



2733.77'

209.19°F





9500

9600

9434'

90.40°

269.44° 6548.24'

2922.37'

9529'

91.02°

269.47° 6547.07'

3017.23'

9623'

91.17°

269.84° 6545.27'

3111.06'

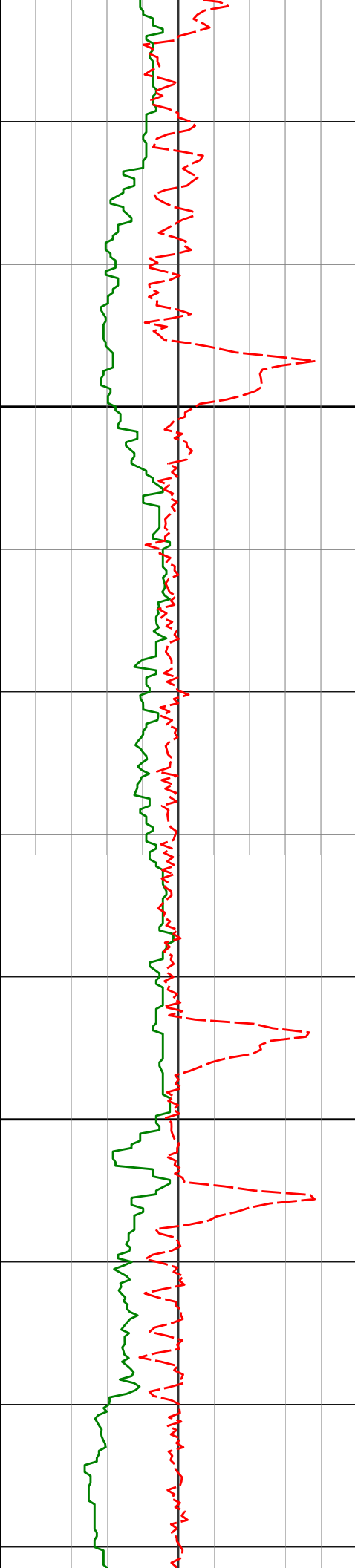
209.19°F

209.19°F

209.19°F

209.19°F

209.19°F



9700

9718'

90.68°

269.48° 6543.74'

3205.89'

213.41°F

213.41°F

213.41°F

9800

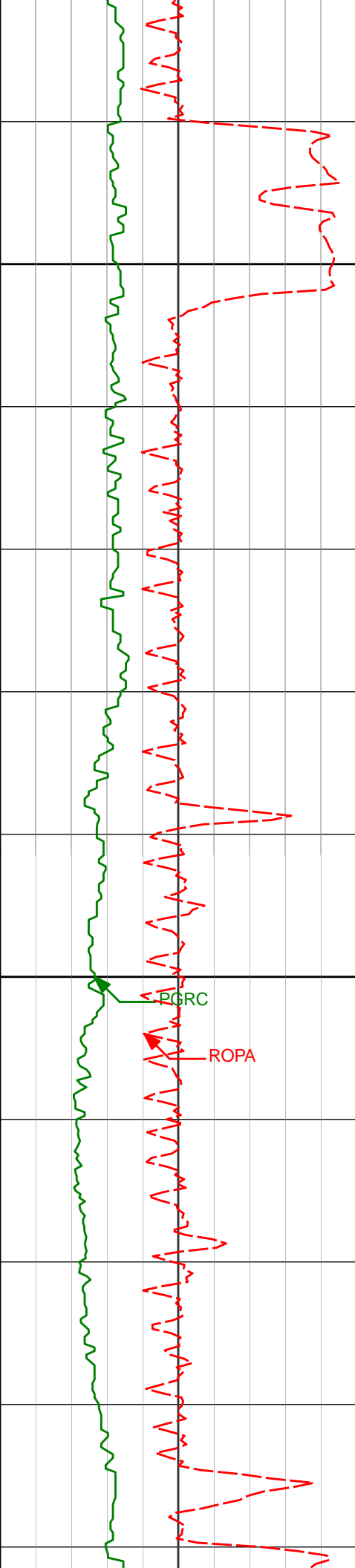
9813'

91.60°

270.38° 6541.85'

3300.68'

213.41°F



9900

10000

9907'

10002'

90.77°

91.29°

270.42° 6539.91'

270.05° 6538.19'

3394.43'

3489.20'

209.19°F

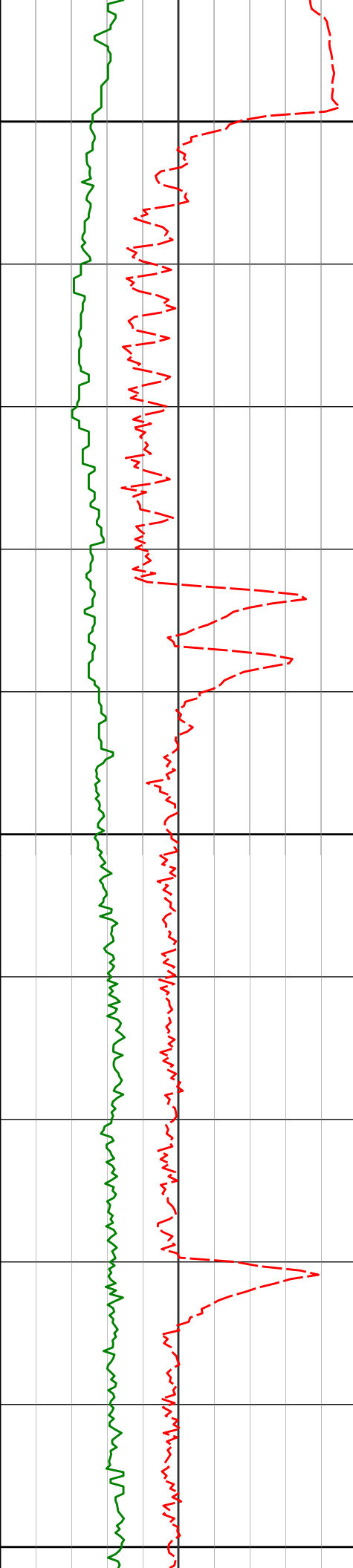
209.19°F

209.19°F

209.19°F

PGRC

ROPA



10100

10097'

90.03°

270.16° 6537.10'

3583.99'

10200

10192'

90.25°

269.45° 6536.87'

3678.82'

10300

10286'

90.37°

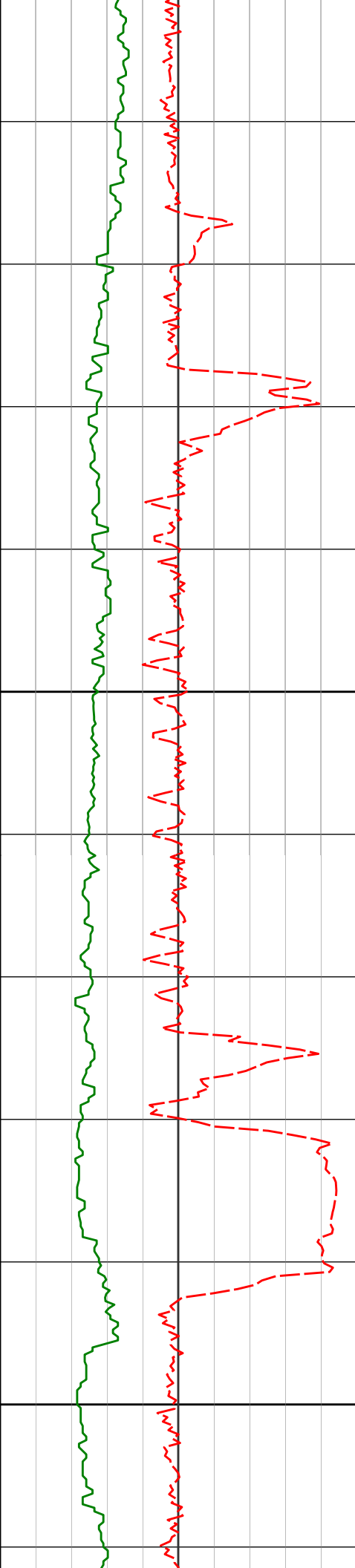
269.38° 6536.36'

3772.68'

213.41°F

213.41°F

213.41°F



10400

10500

10381'

90.71°

269.28° 6535.47'

3867.55'

10474'

89.91°

269.86° 6534.97'

3960.40'

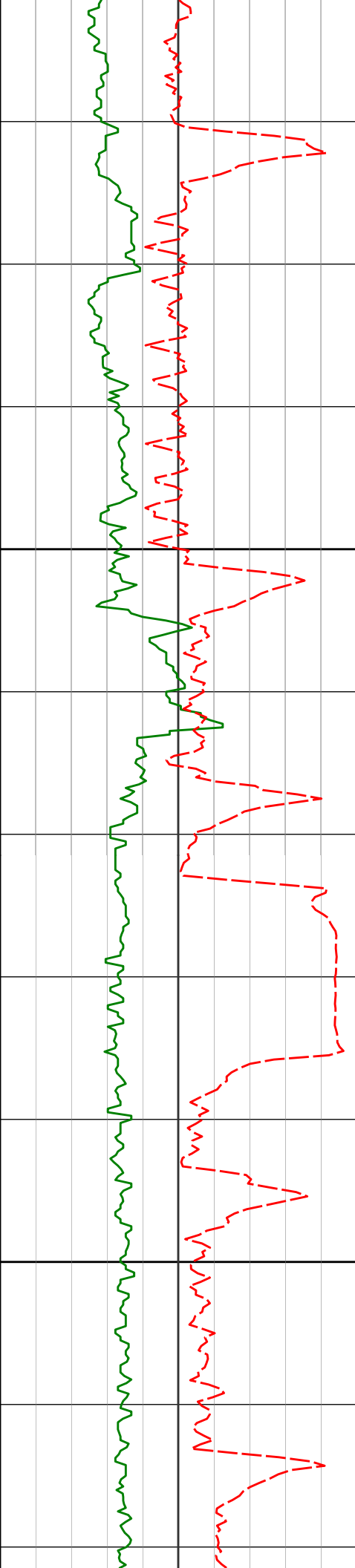
213.41°F

213.41°F

213.41°F

211.17°F

211.42°F



10600

10700

10567'

90.86°

270.28° 6534.34'

4053.21'

10660'

90.18°

271.51° 6533.49'

4145.91'

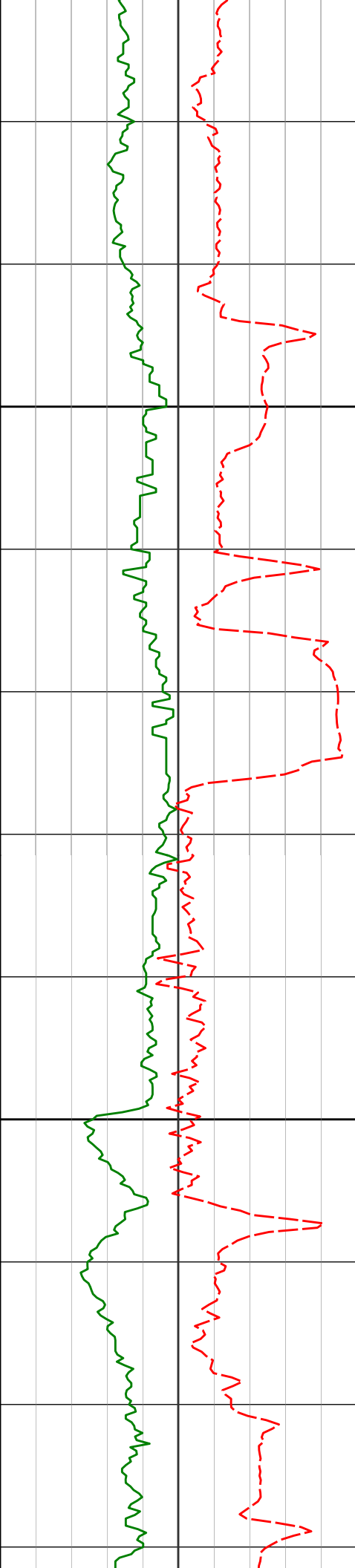
213.41°F

213.41°F

209.19°F

209.19°F

213.41°F



10752'

90.09°

271.13° 6533.27'

4237.57'

213.41°F

10800

10845'

88.52°

271.66° 6534.39'

4330.20'

209.19°F

10900

209.19°F

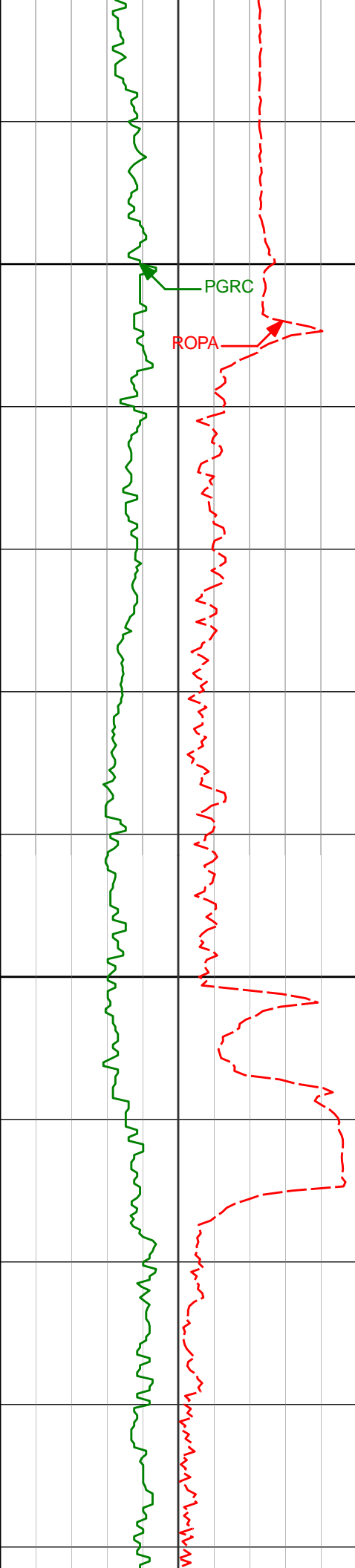
10939'

88.77°

271.53° 6536.61'

4423.78'

213.41°F



11000

PGRC

ROPA

11100

11029'

89.66°

271.40° 6537.85'

4513.42'

213.41°F

213.41°F

213.41°F

213.41°F

11122'

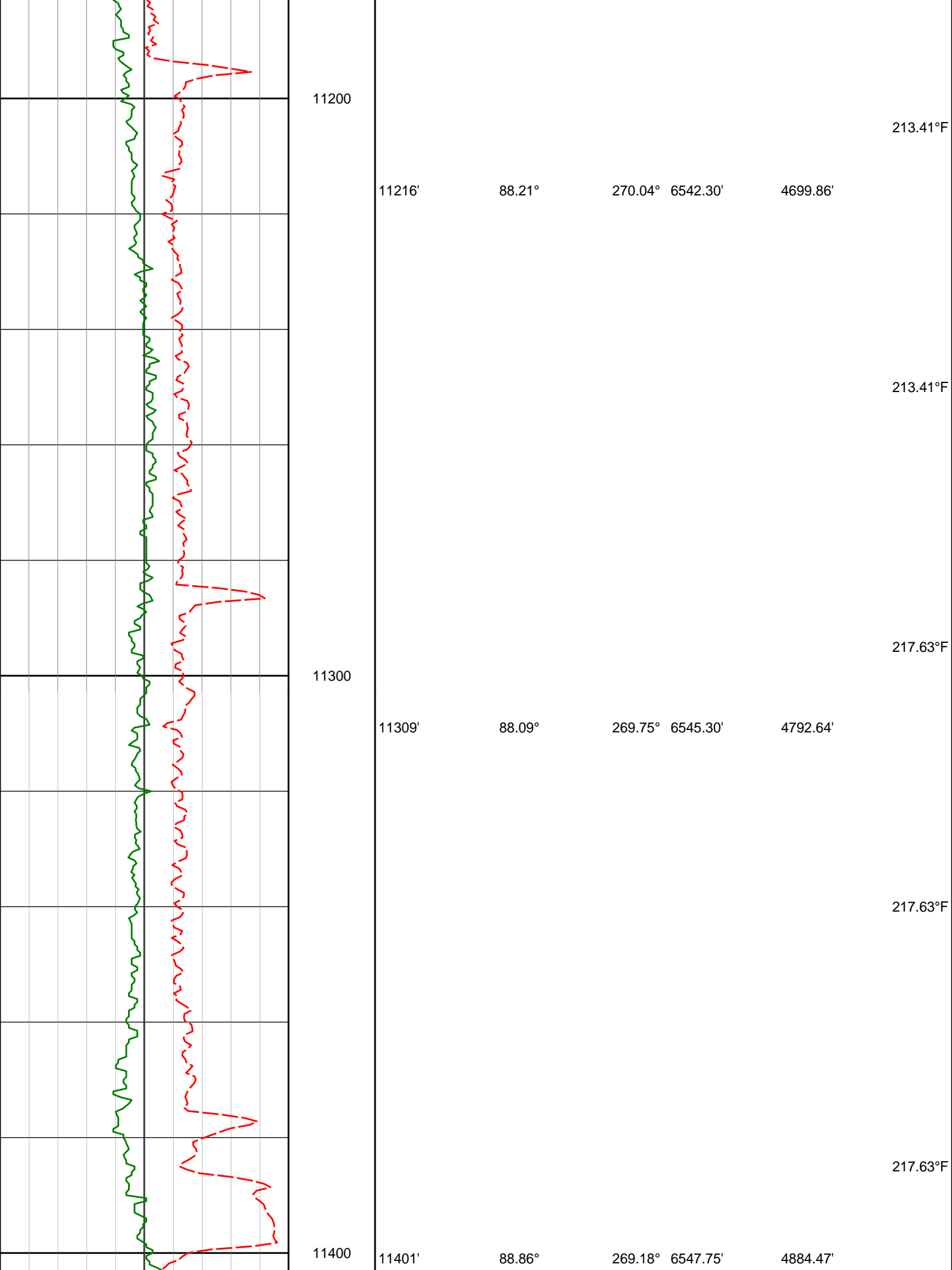
88.34°

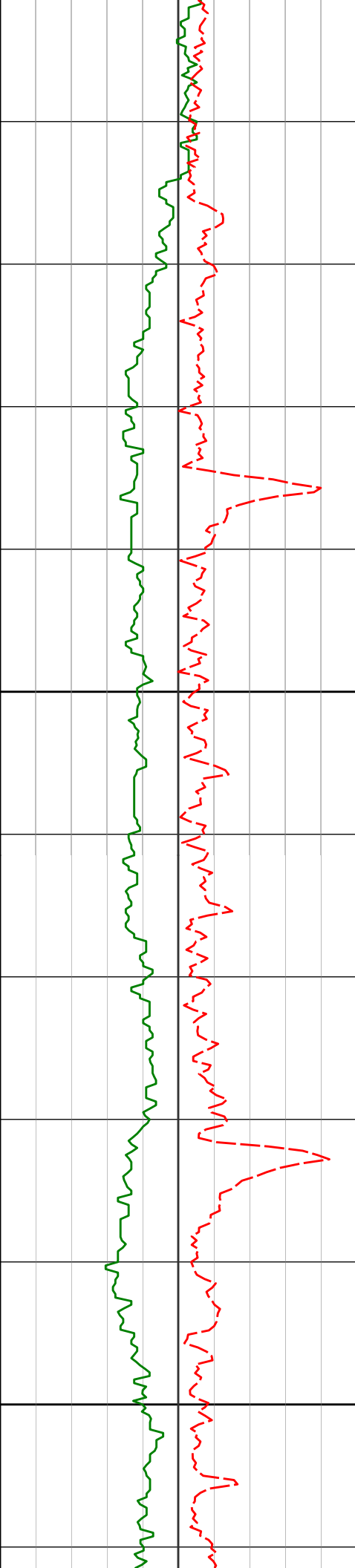
270.34° 6539.47'

4606.11'

213.41°F







11500

11600

11493'

89.01°

268.59° 6549.46'

4976.37'

11586'

88.92°

268.79° 6551.14'

5069.27'

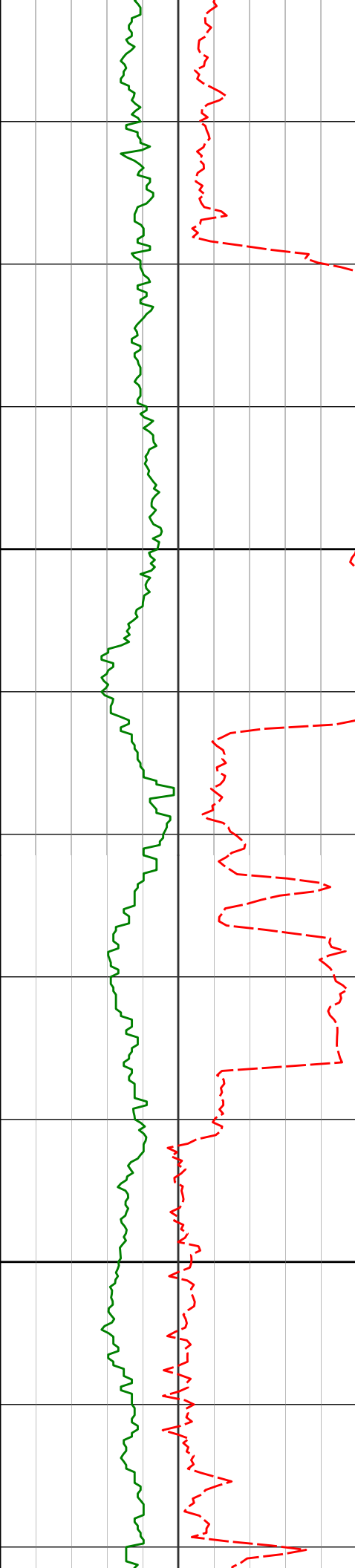
217.63°F

221.84°F

221.84°F

221.84°F

221.84°F



11700

11800

11679'

88.34°

268.65° 6553.36'

5162.17'

11772'

88.95°

267.21° 6555.56'

5255.11'

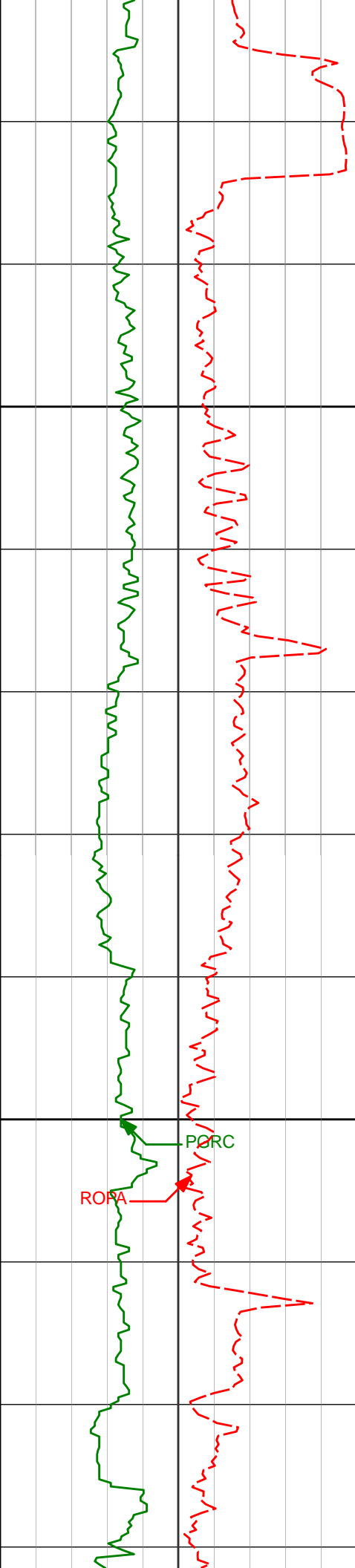
221.84°F

221.84°F

221.84°F

221.84°F

221.84°F



11900

12000

11864'

90.95°

266.93° 6555.64'

5347.09'

221.84°F

11956'

91.60°

267.51° 6553.58'

5439.06'

226.06°F

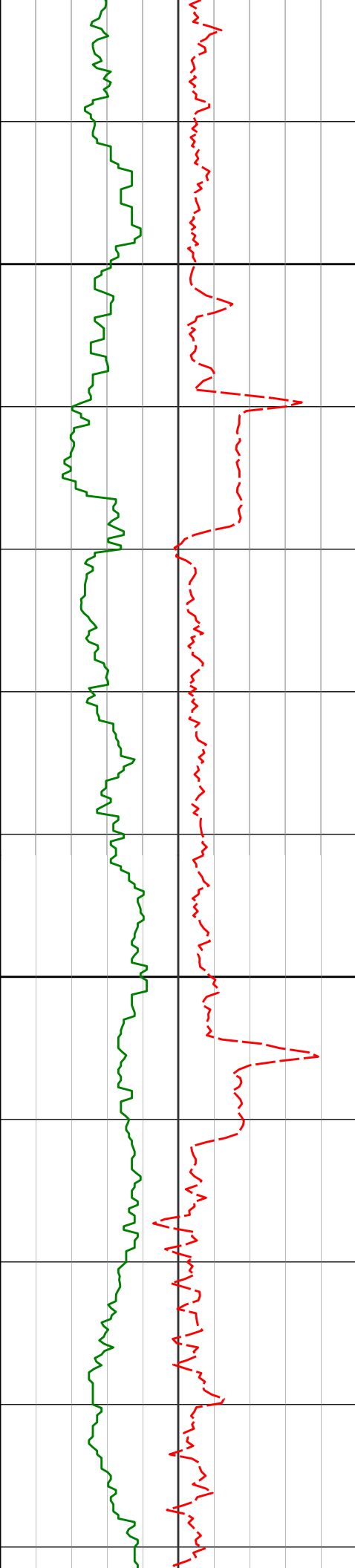
12049'

91.45°

267.47° 6551.11'

5532.01'

226.06°F



12100

226.06°F

12143'

91.02°

266.99° 6549.09'

5625.98'

230.28°F

12200

230.28°F

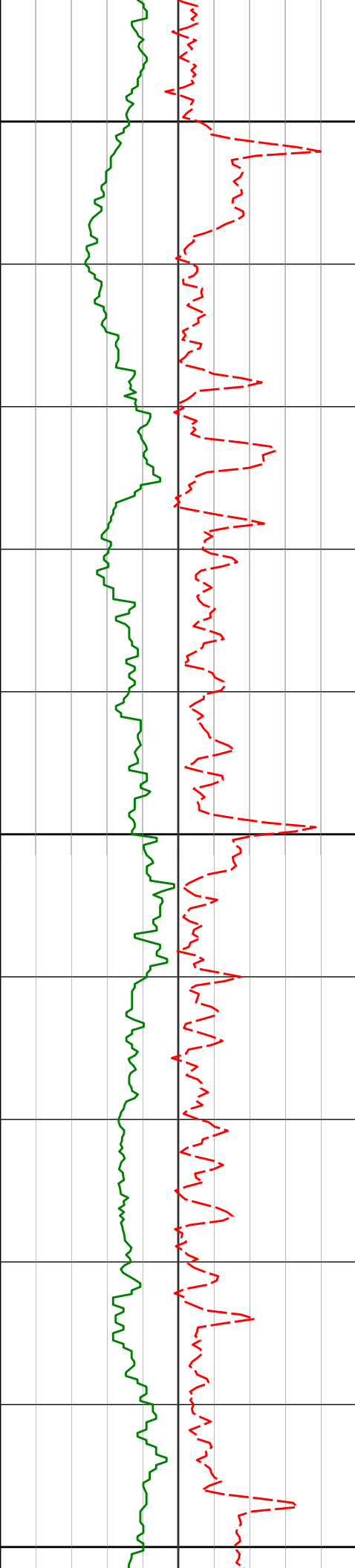
12236'

90.89°

267.50° 6547.53'

5718.95'

230.28°F



12300

12330'

90.77°

266.88° 6546.17'

5812.93'

230.28°F

12400

12425'

90.12°

267.28° 6545.43'

5907.92'

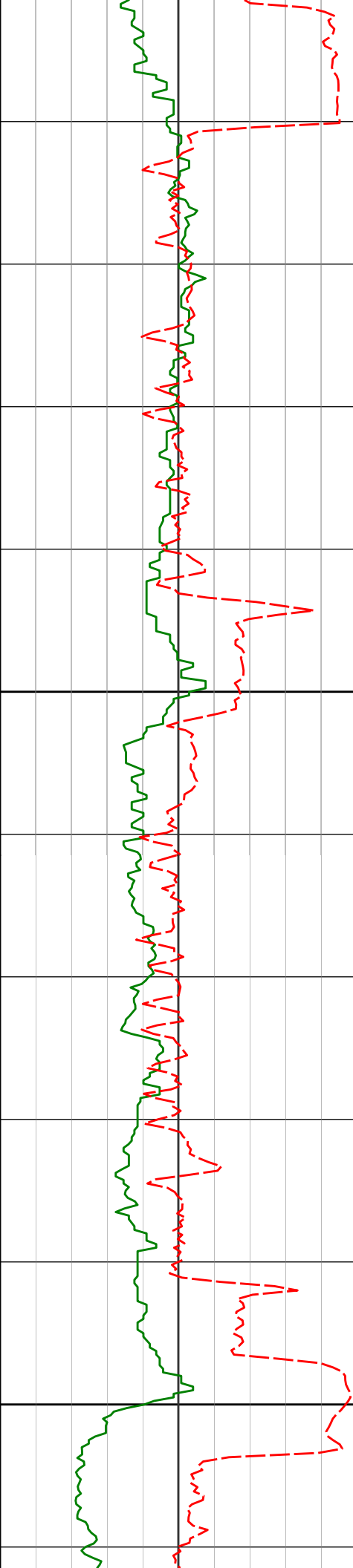
230.28°F

230.28°F

12500

230.28°F

230.28°F



12600

12700

12520'

12614'

12709'

89.75°

89.20°

88.46°

268.50° 6545.53'

268.61° 6546.39'

267.53° 6548.33'

6002.89'

6096.81'

6191.75'

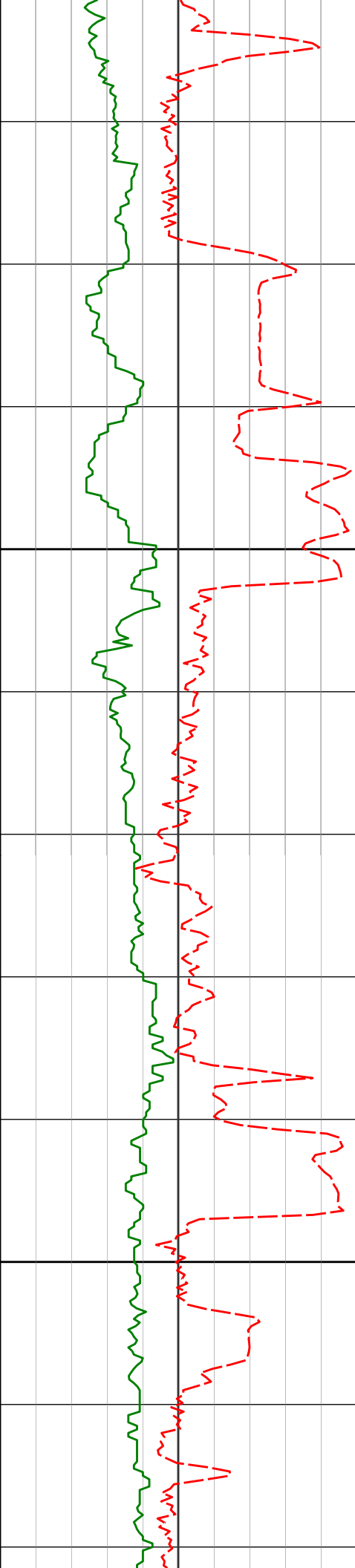
230.28°F

230.28°F

230.28°F

230.28°F

230.28°F



12800

12900

12803'

12898'

89.60°

91.08°

267.65° 6549.92'

267.78° 6549.36'

6285.71'

6380.68'

230.28°F

230.28°F

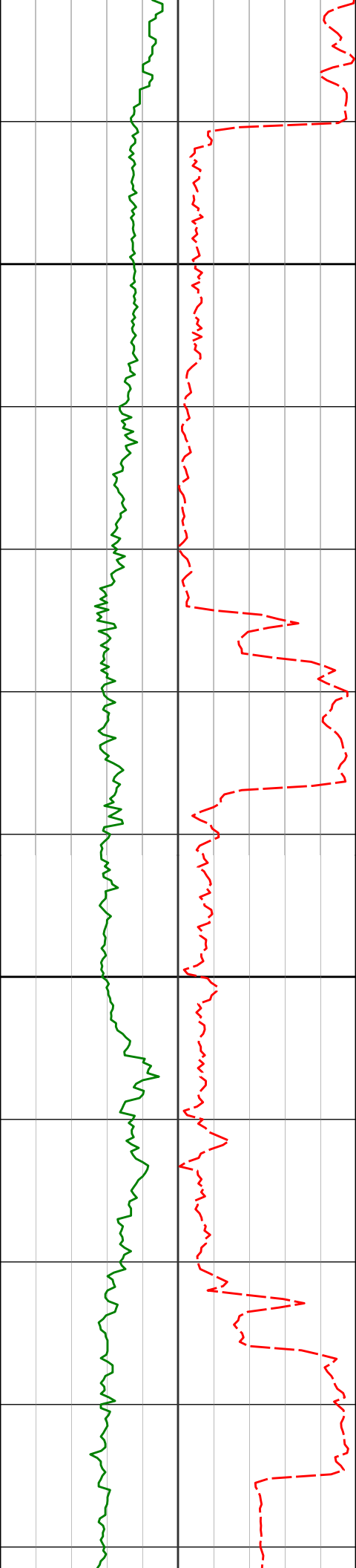
230.28°F

230.28°F

230.28°F







13182'

91.63°

268.14° 6541.13'

6664.44'

230.28°F

13200

13277'

91.20°

267.48° 6538.78'

6759.38'

230.28°F

13300

230.28°F

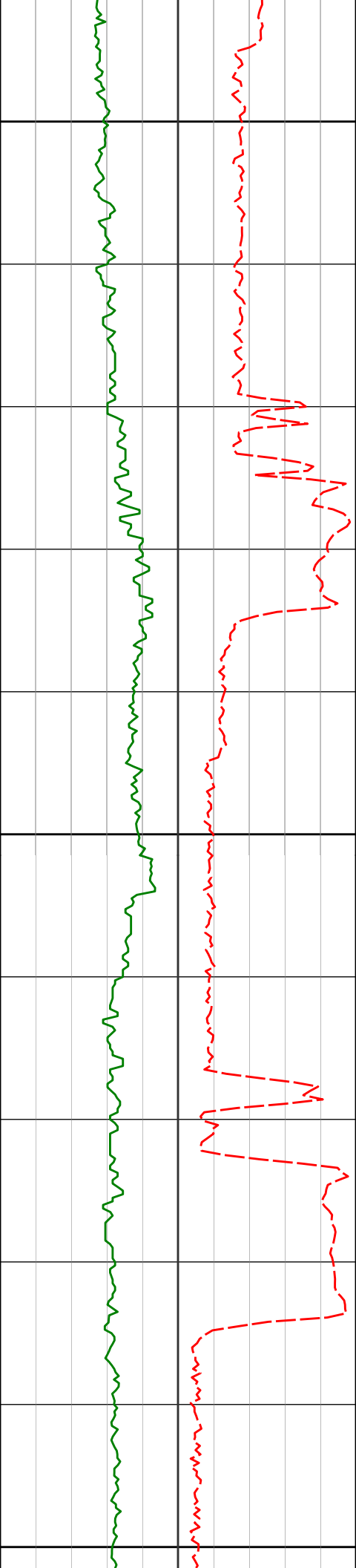
13371'

90.28°

268.54° 6537.56'

6853.33'

230.28°F



13400

230.28°F

234.50°F

13466'

90.59°

269.33° 6536.85'

6948.23'

13500

234.50°F

234.50°F

13560'

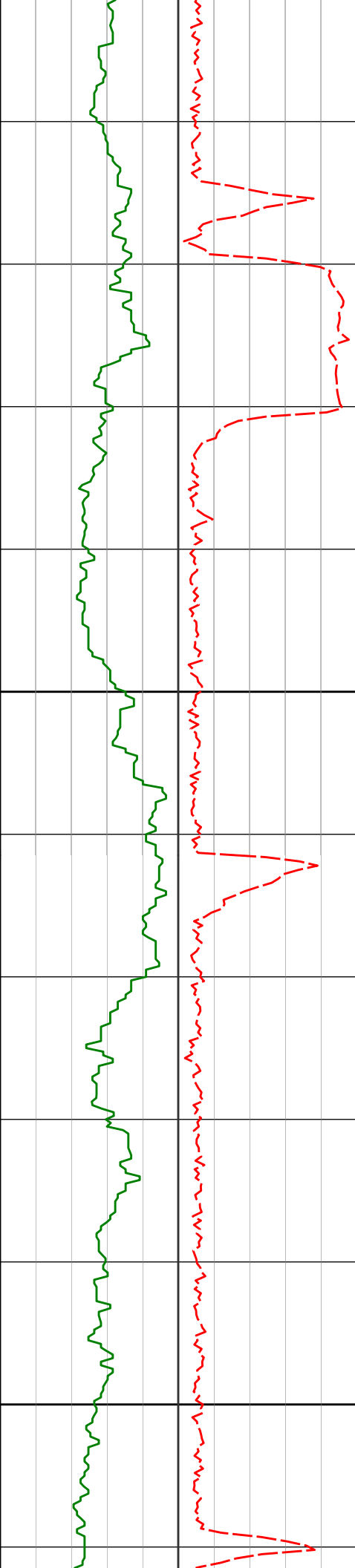
91.57°

271.68° 6535.08'

7041.96'

13600

234.50°F



13700

13800

13655'

89.41°

271.28° 6534.26'

7136.57'

13750'

89.60°

271.08° 6535.08'

7231.23'

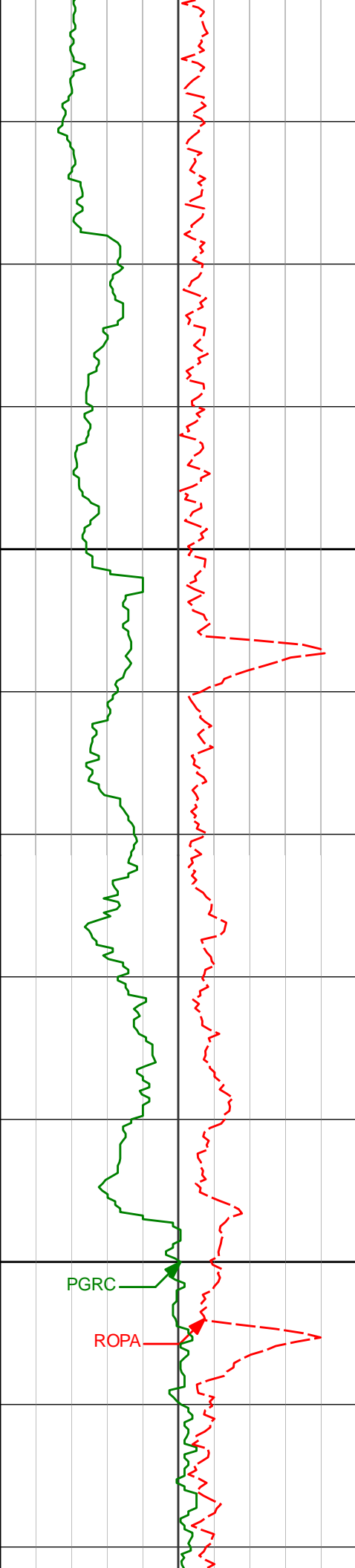
234.50°F

234.50°F

234.50°F

234.50°F

238.72°F



13900

14000

13845'

89.66°

271.26° 6535.69'

7325.90'

238.72°F

238.72°F

13939'

89.60°

271.13° 6536.30'

7419.56'

238.72°F

238.72°F

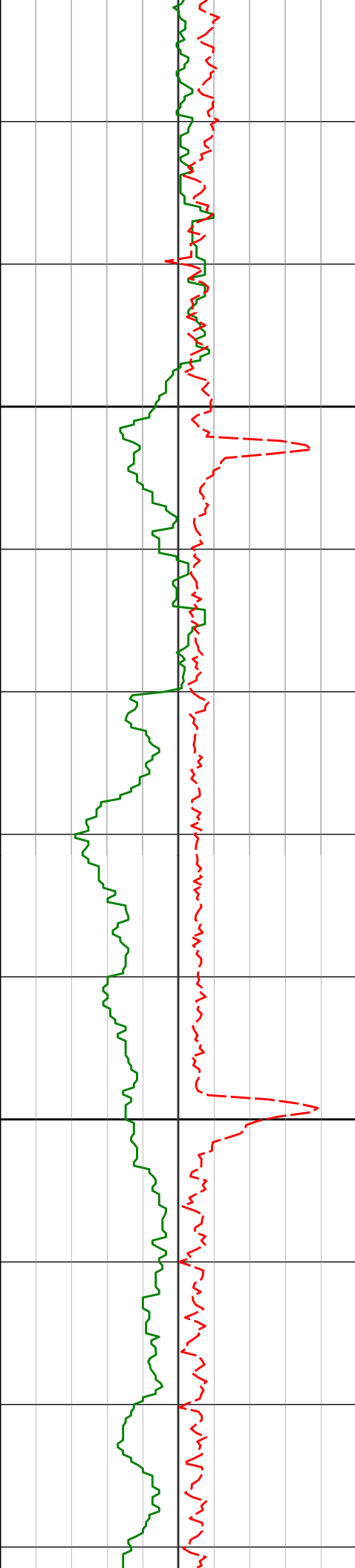
14034'

89.54°

270.99° 6537.01'

7514.24'

238.72°F



14100

14128'

89.54°

270.84° 6537.77'

7607.94'

238.72°F

238.72°F

14200

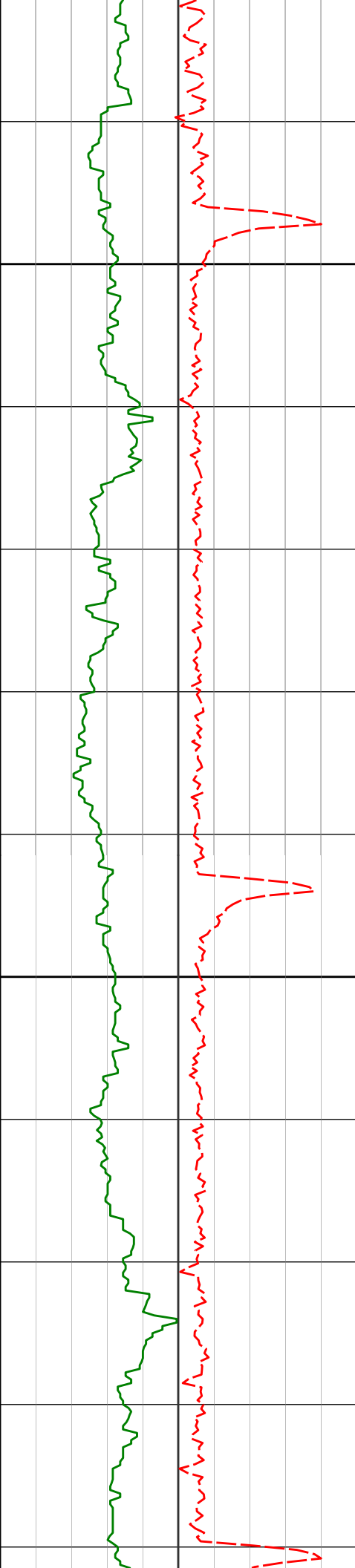
14223'

89.29°

270.47° 6538.74'

7702.67'

242.94°F



14300

14318'

89.82°

270.04° 6539.48'

7797.45'

14400

14413'

90.43°

269.74° 6539.28'

7892.27'

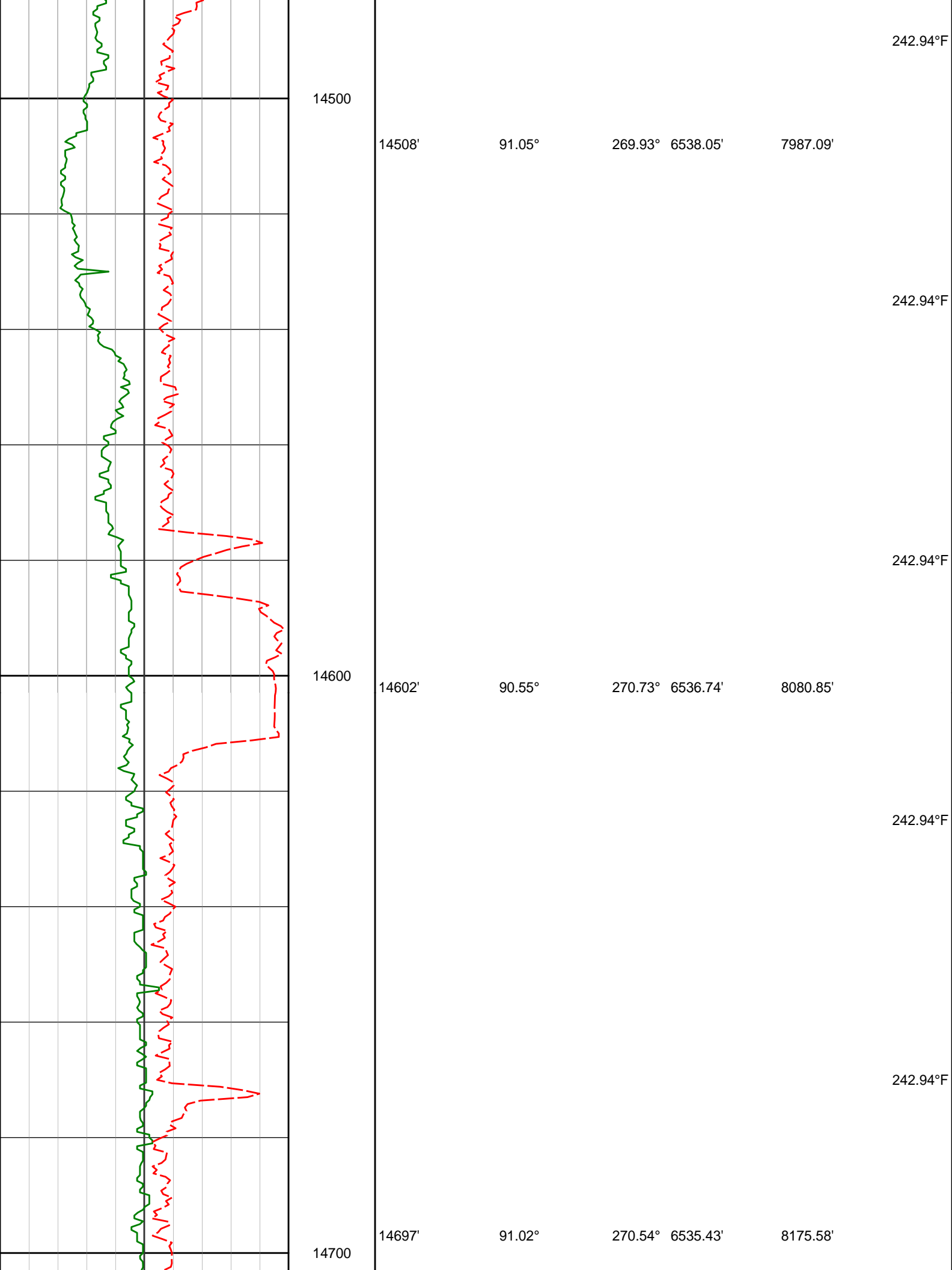
242.94°F

242.94°F

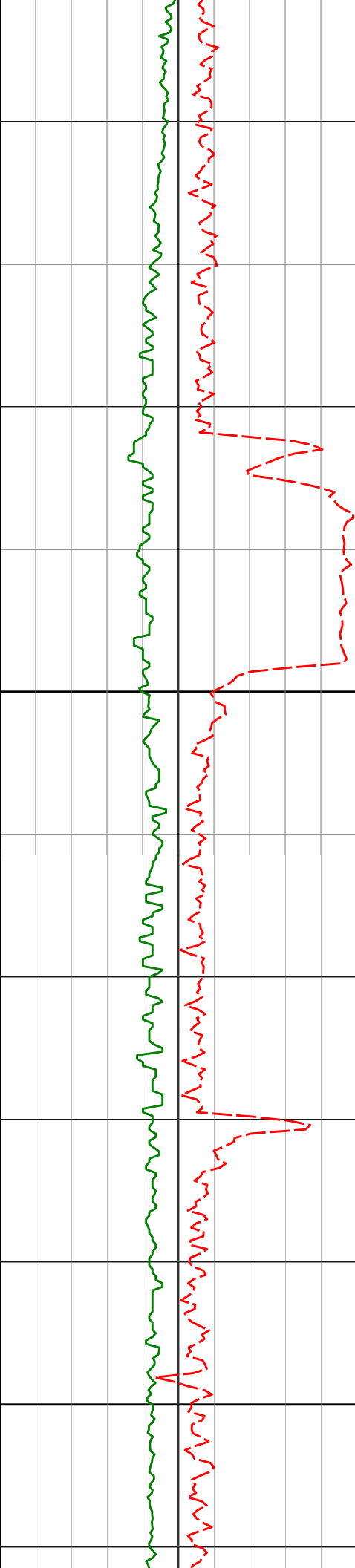
242.94°F

242.94°F

242.94°F







14800

14900

14791'

89.48°

271.55° 6535.03'

8269.26'

14886'

90.12°

271.47° 6535.36'

8363.88'

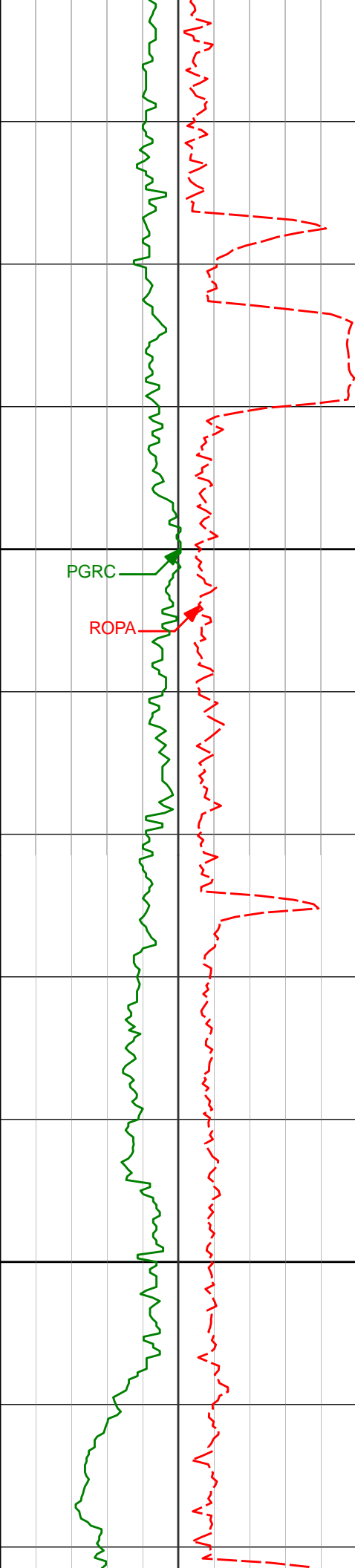
242.94°F

242.94°F

242.94°F

242.94°F

242.94°F



15000

15100

14980'

88.95°

271.65° 6536.12'

8457.49'

15075'

89.20°

271.75° 6537.65'

8552.07'

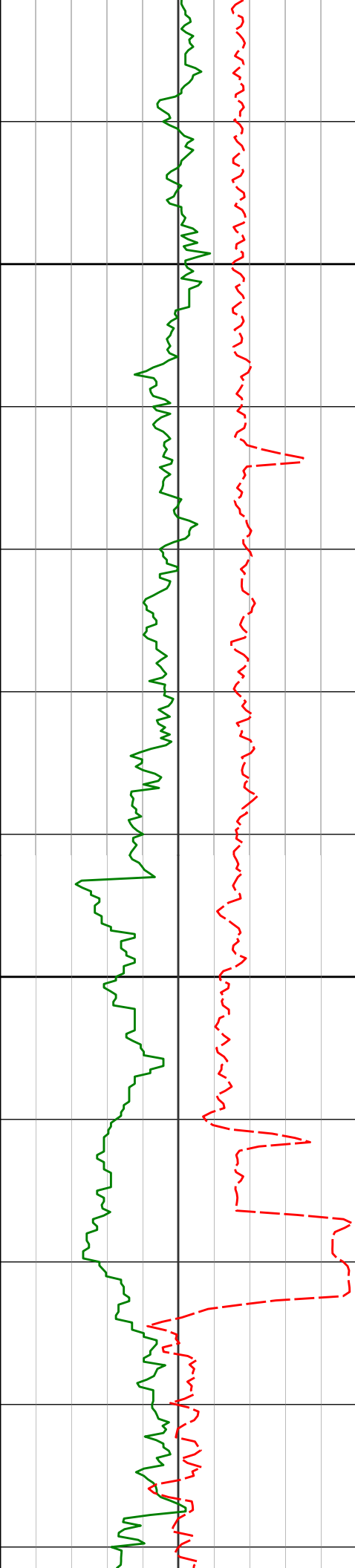
242.94°F

242.94°F

242.94°F

242.94°F





15400

15500

15453'

88.86°

270.74° 6544.02'

8928.73'

15547'

89.51°

271.07° 6545.36'

9022.43'

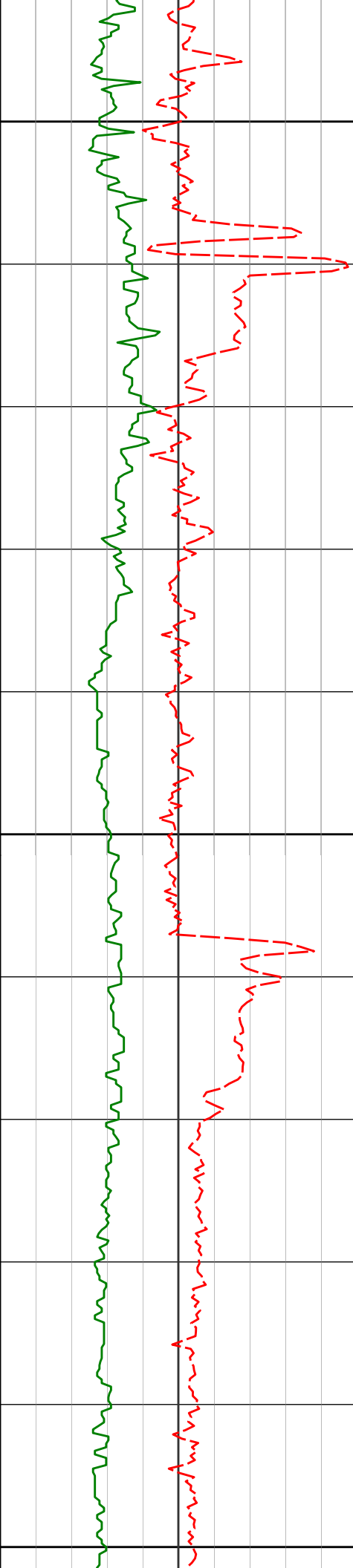
247.16°F

242.94°F

242.94°F

242.94°F

242.94°F



15600

242.94°F

15647'

89.57°

270.66° 6546.17'

9122.12'

242.94°F

15700

247.16°F

15742'

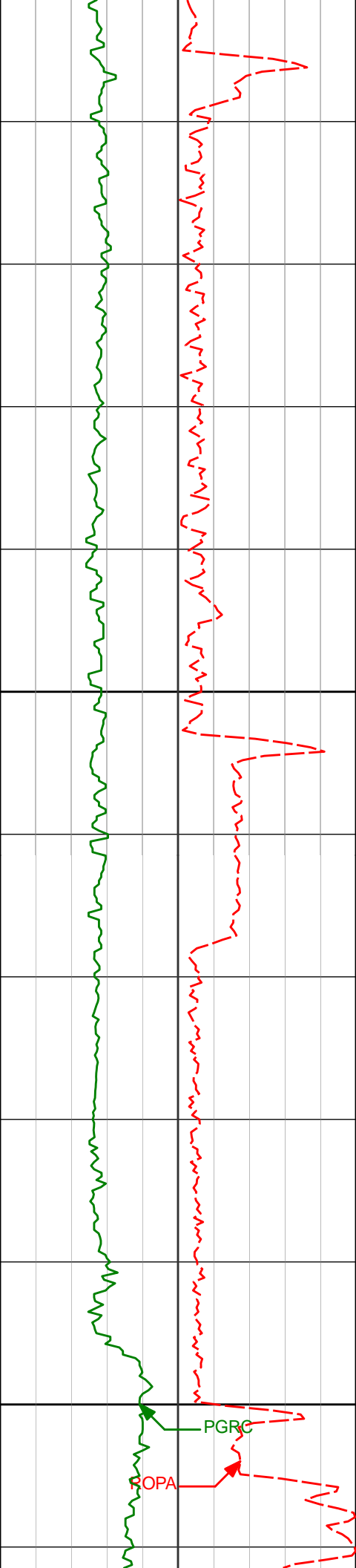
89.35°

270.65° 6547.06'

9216.85'

247.16°F

15800



15900

16000

15837'

89.91°

269.94° 6547.68'

9311.62'

247.16°F

247.16°F

15932'

90.52°

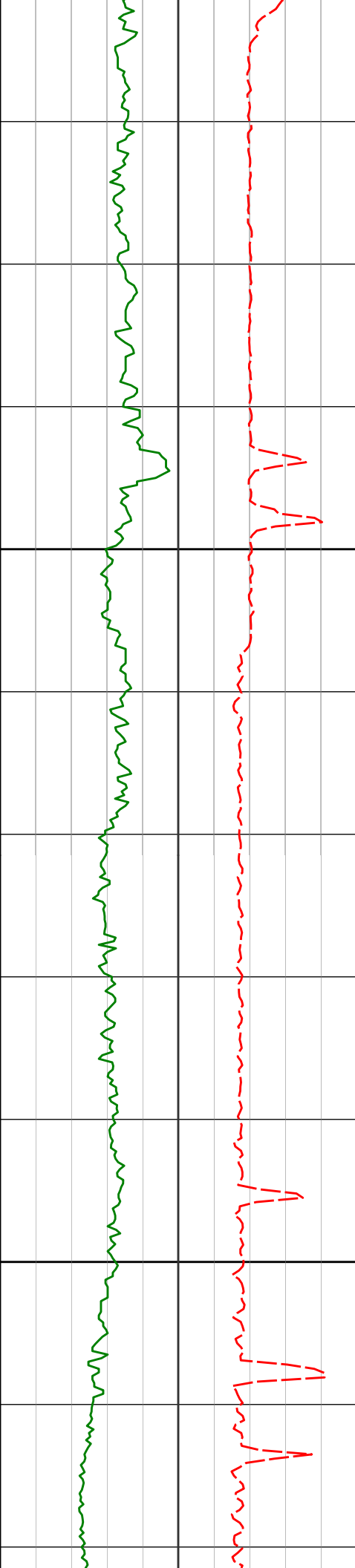
270.99° 6547.32'

9406.38'

247.16°F

247.16°F

247.16°F



16100

16200

16027'

90.62°

270.24° 6546.37'

9501.11'

247.16°F

247.16°F

16122'

91.38°

269.84° 6544.72'

9595.90'

247.16°F

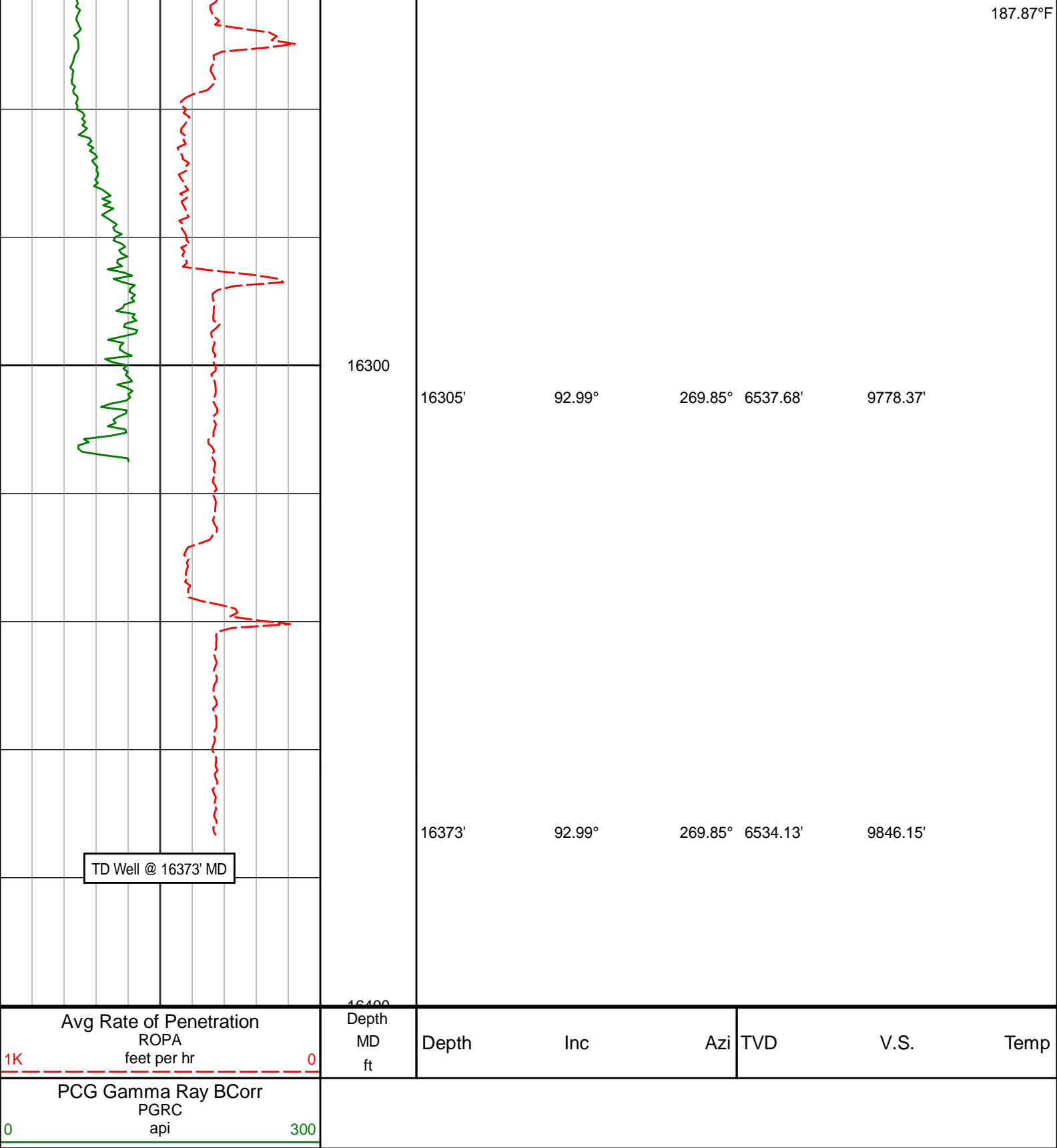
221.81°F

16217'

92.25°

270.37° 6541.70'

9690.65'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy  
70 Ranch State BB18-611  
Wattenburg  
Weld Colorado  
USA  
CA-XX-0902498986



	0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
	731.00	0.45	225.42	730.99	2.04 S	2.07 W	2.19	0.06
	825.00	0.53	230.59	824.99	2.57 S	2.66 W	2.82	0.09
	920.00	0.50	233.87	919.99	3.09 S	3.34 W	3.52	0.04
	1015.00	0.69	231.26	1014.98	3.69 S	4.11 W	4.34	0.20
	1108.00	0.94	216.56	1107.97	4.65 S	5.00 W	5.29	0.35
	1200.00	1.67	185.62	1199.95	6.60 S	5.58 W	5.99	1.08
	1292.00	3.84	168.80	1291.84	10.95 S	5.12 W	5.80	2.49
	1385.00	5.41	158.03	1384.53	18.07 S	2.87 W	4.01	1.92
	1478.00	5.53	154.41	1477.11	26.18 S	0.70 E	0.96	0.39
	1571.00	6.97	152.39	1569.55	35.22 S	5.25 E	-3.01	1.57
	1664.00	7.60	151.87	1661.80	45.65 S	10.77 E	-7.86	0.68
	1757.00	6.60	141.05	1754.09	55.23 S	17.03 E	-13.50	1.79
	1850.00	6.33	150.24	1846.50	63.84 S	22.94 E	-18.85	1.15
	1944.00	8.55	151.58	1939.71	74.49 S	28.84 E	-24.06	2.36
	2036.00	7.84	145.83	2030.77	85.70 S	35.62 E	-30.12	1.17
	2129.00	7.67	135.72	2122.92	95.39 S	43.51 E	-37.39	1.48
	2223.00	8.68	148.15	2215.97	105.91 S	51.64 E	-44.83	2.16
	2313.00	7.94	140.09	2305.03	116.45 S	59.21 E	-51.72	1.53
	2406.00	7.89	143.08	2397.14	126.48 S	67.16 E	-59.02	0.45
	2500.00	7.73	153.78	2490.28	137.31 S	73.84 E	-64.99	1.55
	2593.00	6.66	147.02	2582.54	147.45 S	79.54 E	-70.04	1.47
	2685.00	7.36	158.68	2673.86	157.41 S	84.58 E	-74.45	1.72
	2777.00	9.04	167.55	2764.92	169.96 S	88.28 E	-77.34	2.28
	2870.00	8.98	165.08	2856.77	184.11 S	91.73 E	-79.89	0.42
	2965.00	8.54	160.64	2950.67	197.93 S	95.97 E	-83.25	0.84
	3059.00	7.49	155.06	3043.75	210.07 S	100.87 E	-87.37	1.39
	3154.00	7.54	168.70	3137.94	221.80 S	104.71 E	-90.45	1.87
	3249.00	6.94	168.35	3232.18	233.53 S	107.09 E	-92.09	0.62
	3343.00	8.04	155.85	3325.38	245.10 S	110.92 E	-95.18	2.08
	3438.00	7.47	147.09	3419.52	256.34 S	117.00 E	-100.53	1.38
	3532.00	8.73	149.34	3512.58	267.61 S	123.96 E	-106.76	1.38
	3627.00	10.34	153.99	3606.26	281.48 S	131.37 E	-113.29	1.88
	3721.00	11.43	152.07	3698.57	297.30 S	139.44 E	-120.33	1.22
	3816.00	11.17	162.07	3791.74	314.37 S	146.68 E	-126.48	2.08
	3910.00	10.07	162.66	3884.12	330.88 S	151.93 E	-130.68	1.18
	4005.00	9.43	161.65	3977.75	346.20 S	156.86 E	-134.63	0.70
	4099.00	8.52	163.60	4070.60	360.18 S	161.25 E	-138.12	1.02
	4194.00	7.63	163.71	4164.66	372.98 S	165.00 E	-141.06	0.93
	4288.00	7.20	163.89	4257.87	384.63 S	168.39 E	-143.70	0.46
	4383.00	6.74	167.04	4352.17	395.79 S	171.29 E	-145.89	0.63
	4477.00	5.73	174.97	4445.61	405.84 S	172.94 E	-146.90	1.41
	4572.00	5.83	180.55	4540.13	415.39 S	173.31 E	-146.66	0.60
	4667.00	6.17	181.75	4634.61	425.32 S	173.11 E	-145.83	0.39
	4856.00	6.71	158.96	4822.45	445.78 S	176.76 E	-148.18	1.37
	4951.00	6.68	158.76	4916.80	456.10 S	180.76 E	-151.52	0.04
	5046.00	6.06	159.99	5011.21	465.97 S	184.48 E	-154.60	0.67
	5140.00	5.69	154.92	5104.72	474.85 S	188.15 E	-157.71	0.68
	5235.00	5.22	155.48	5199.29	483.05 S	191.94 E	-160.97	0.50
	5330.00	6.24	153.61	5293.81	491.61 S	196.03 E	-164.51	1.09
	5377.00	7.98	140.37	5340.45	496.41 S	199.25 E	-167.42	5.06
	5425.00	7.46	137.62	5388.02	501.28 S	203.47 E	-171.32	1.33
	5472.00	7.37	125.16	5434.63	505.27 S	207.99 E	-175.59	3.42
	5520.00	6.79	119.02	5482.26	508.42 S	212.99 E	-180.38	1.99
	5614.00	7.11	123.22	5575.57	514.31 S	222.72 E	-189.71	0.64
	5709.00	5.09	126.94	5670.03	520.06 S	231.01 E	-197.62	2.16
	5803.00	2.14	143.77	5763.83	523.98 S	235.37 E	-201.73	3.30
	5898.00	1.25	162.70	5858.79	526.40 S	236.73 E	-202.93	1.09
	5946.00	2.01	260.44	5906.78	527.04 S	236.05 E	-202.21	5.23
	5992.00	8.78	268.19	5952.55	527.29 S	231.74 E	-197.89	14.76
	6040.00	15.64	263.31	5999.44	528.16 S	221.65 E	-187.76	14.43
	6087.00	18.95	259.87	6044.31	530.24 S	207.84 E	-173.85	7.37
	6135.00	18.28	258.28	6089.80	533.14 S	192.80 E	-158.65	1.76
	6182.00	20.27	260.29	6134.16	536.01 S	177.55 E	-143.26	4.47
	6230.00	23.44	260.07	6178.71	539.06 S	159.95 E	-125.50	6.61
	6276.00	26.95	260.12	6220.33	542.43 S	140.67 E	-106.04	7.63
	6324.00	30.34	264.43	6262.45	545.47 S	117.88 E	-83.11	8.27
	6371.00	36.41	269.25	6301.69	546.81 S	92.09 E	-57.28	14.10
	6419.00	41.92	268.85	6338.89	547.32 S	61.79 E	-27.01	11.48
	6466.00	46.90	267.00	6372.45	548.53 S	28.93 E	5.86	10.94

6514.00	51.29	266.64	6403.88	550.55 S	7.28 W	42.12	9.17
6560.00	54.53	266.02	6431.61	552.90 S	43.89 W	78.81	7.12
6608.00	59.83	267.16	6457.62	555.28 S	84.15 W	119.14	11.23
6655.00	64.18	265.85	6479.68	557.82 S	125.56 W	160.62	9.56
6703.00	66.87	267.02	6499.56	560.54 S	169.16 W	204.31	6.04
6750.00	71.80	267.83	6516.14	562.51 S	213.07 W	248.26	10.61
6798.00	76.45	269.93	6529.27	563.40 S	259.22 W	294.37	10.56
6844.00	81.13	270.68	6538.21	563.16 S	304.33 W	339.37	10.28
6881.00	83.40	270.65	6543.19	562.73 S	340.99 W	375.93	6.14
6974.00	85.93	269.34	6551.84	562.75 S	433.57 W	468.33	3.06
7068.00	87.91	269.77	6556.89	563.47 S	527.43 W	562.05	2.15
7163.00	89.23	269.24	6559.27	564.29 S	622.40 W	656.87	1.50
7258.00	89.97	270.19	6559.93	564.76 S	717.39 W	751.71	1.27
7352.00	89.63	269.66	6560.26	564.88 S	811.39 W	845.53	0.67
7447.00	89.60	268.97	6560.90	566.01 S	906.38 W	940.40	0.73
7541.00	90.77	268.98	6560.59	567.70 S	1000.36 W	1034.30	1.25
7636.00	91.05	268.41	6559.09	569.87 S	1095.33 W	1129.21	0.67
7730.00	92.99	269.53	6555.78	571.55 S	1189.25 W	1223.05	2.39
7825.00	92.77	269.67	6551.00	572.21 S	1284.12 W	1317.78	0.27
7920.00	91.88	270.79	6547.15	571.83 S	1379.04 W	1412.48	1.51
8015.00	91.39	272.19	6544.44	569.36 S	1473.97 W	1507.06	1.56
8109.00	90.09	271.91	6543.23	566.00 S	1567.90 W	1600.59	1.41
8204.00	89.41	270.35	6543.64	564.12 S	1662.88 W	1695.26	1.78
8299.00	89.35	270.16	6544.66	563.70 S	1757.87 W	1790.03	0.22
8393.00	91.36	269.57	6544.08	563.92 S	1851.86 W	1883.85	2.22
8488.00	92.06	269.31	6541.24	564.85 S	1946.81 W	1978.67	0.79
8583.00	90.49	270.90	6539.12	564.68 S	2041.78 W	2073.44	2.35
8677.00	88.92	268.81	6539.60	564.92 S	2135.77 W	2167.26	2.78
8772.00	89.26	269.09	6541.11	566.66 S	2230.75 W	2262.15	0.46
8866.00	89.29	269.83	6542.30	567.55 S	2324.73 W	2356.00	0.79
8961.00	88.64	270.87	6544.01	566.97 S	2419.72 W	2450.76	1.29
9055.00	89.97	271.63	6545.14	564.93 S	2513.68 W	2544.41	1.62
9150.00	89.94	271.08	6545.22	562.69 S	2608.66 W	2639.05	0.57
9245.00	89.17	270.42	6545.96	561.44 S	2703.64 W	2733.77	1.07
9339.00	88.83	270.00	6547.60	561.09 S	2797.63 W	2827.54	0.58
9434.00	90.40	269.44	6548.24	561.57 S	2892.62 W	2922.37	1.76
9529.00	91.02	269.47	6547.07	562.48 S	2987.61 W	3017.23	0.65
9623.00	91.17	269.84	6545.27	563.04 S	3081.59 W	3111.06	0.43
9718.00	90.68	269.48	6543.74	563.61 S	3176.58 W	3205.89	0.64
9813.00	91.60	270.38	6541.85	563.73 S	3271.56 W	3300.68	1.36
9907.00	90.77	270.42	6539.91	563.07 S	3365.53 W	3394.43	0.89
10002.00	91.29	270.05	6538.19	562.68 S	3460.52 W	3489.20	0.67
10097.00	90.03	270.16	6537.10	562.50 S	3555.51 W	3583.99	1.34
10192.00	90.25	269.45	6536.87	562.83 S	3650.51 W	3678.82	0.78
10286.00	90.37	269.38	6536.36	563.79 S	3744.50 W	3772.68	0.15
10381.00	90.71	269.28	6535.47	564.90 S	3839.49 W	3867.55	0.37
10474.00	89.91	269.86	6534.97	565.59 S	3932.48 W	3960.40	1.06
10567.00	90.86	270.28	6534.34	565.48 S	4025.48 W	4053.21	1.12
10660.00	90.18	271.51	6533.49	564.04 S	4118.46 W	4145.91	1.51
10752.00	90.09	271.13	6533.27	561.92 S	4210.44 W	4237.57	0.42
10845.00	88.52	271.66	6534.39	559.66 S	4303.40 W	4330.20	1.78
10939.00	88.77	271.53	6536.61	557.04 S	4397.34 W	4423.78	0.30
11029.00	89.66	271.40	6537.85	554.74 S	4487.30 W	4513.42	1.00
11122.00	88.34	270.34	6539.47	553.33 S	4580.27 W	4606.11	1.82
11216.00	88.21	270.04	6542.30	553.02 S	4674.23 W	4699.86	0.35
11309.00	88.09	269.75	6545.30	553.20 S	4767.18 W	4792.64	0.34
11401.00	88.86	269.18	6547.75	554.06 S	4859.14 W	4884.47	1.04
11493.00	89.01	268.59	6549.46	555.84 S	4951.11 W	4976.37	0.66
11586.00	88.92	268.79	6551.14	557.97 S	5044.07 W	5069.27	0.23
11679.00	88.34	268.65	6553.36	560.05 S	5137.02 W	5162.17	0.65
11772.00	88.95	267.21	6555.56	563.41 S	5229.93 W	5255.11	1.69
11864.00	90.95	266.93	6555.64	568.11 S	5321.80 W	5347.09	2.20
11956.00	91.60	267.51	6553.58	572.58 S	5413.67 W	5439.06	0.94
12049.00	91.45	267.47	6551.11	576.65 S	5506.55 W	5532.01	0.17
12143.00	91.02	266.99	6549.09	581.20 S	5600.42 W	5625.98	0.69
12236.00	90.89	267.50	6547.53	585.67 S	5693.29 W	5718.95	0.57
12330.00	90.77	266.88	6546.17	590.28 S	5787.17 W	5812.93	0.67
12425.00	90.12	267.28	6545.43	595.11 S	5882.04 W	5907.92	0.80
12520.00	89.75	268.50	6545.53	598.61 S	5976.98 W	6002.89	1.34
12614.00	89.20	268.61	6546.39	600.98 S	6070.94 W	6096.81	0.60
12709.00	88.46	267.53	6548.33	604.18 S	6165.87 W	6191.75	1.38
12803.00	89.60	267.65	6549.92	608.13 S	6259.77 W	6285.71	1.22
12898.00	91.08	267.78	6549.36	611.92 S	6354.69 W	6380.68	1.56
12993.00	91.60	268.03	6547.14	615.40 S	6449.60 W	6475.62	0.61
13087.00	92.03	268.23	6544.16	618.46 S	6543.50 W	6569.53	0.51

13182.00	91.63	268.14	6541.13	621.47 S	6638.41 W	6664.44	0.43
13277.00	91.20	267.48	6538.78	625.10 S	6733.31 W	6759.38	0.82
13371.00	90.28	268.54	6537.56	628.36 S	6827.24 W	6853.33	1.50
13466.00	90.59	269.33	6536.85	630.13 S	6922.22 W	6948.23	0.89
13560.00	91.57	271.68	6535.08	629.30 S	7016.19 W	7041.96	2.71
13655.00	89.41	271.28	6534.26	626.85 S	7111.15 W	7136.57	2.31
13750.00	89.60	271.08	6535.08	624.89 S	7206.13 W	7231.23	0.28
13845.00	89.66	271.26	6535.69	622.95 S	7301.11 W	7325.90	0.20
13939.00	89.60	271.13	6536.30	620.99 S	7395.08 W	7419.56	0.16
14034.00	89.54	270.99	6537.01	619.23 S	7490.06 W	7514.24	0.15
14128.00	89.54	270.84	6537.77	617.73 S	7584.05 W	7607.94	0.16
14223.00	89.29	270.47	6538.74	616.64 S	7679.04 W	7702.67	0.47
14318.00	89.82	270.04	6539.48	616.22 S	7774.03 W	7797.45	0.71
14413.00	90.43	269.74	6539.28	616.40 S	7869.03 W	7892.27	0.72
14508.00	91.05	269.93	6538.05	616.67 S	7964.02 W	7987.09	0.68
14602.00	90.55	270.73	6536.74	616.13 S	8058.01 W	8080.85	0.99
14697.00	91.02	270.54	6535.43	615.08 S	8153.00 W	8175.58	0.52
14791.00	89.48	271.55	6535.03	613.37 S	8246.98 W	8269.26	1.96
14886.00	90.12	271.47	6535.36	610.86 S	8341.94 W	8363.88	0.69
14980.00	88.95	271.65	6536.12	608.30 S	8435.90 W	8457.49	1.26
15075.00	89.20	271.75	6537.65	605.49 S	8530.85 W	8552.07	0.28
15169.00	89.05	271.25	6539.09	603.03 S	8624.80 W	8645.68	0.56
15264.00	89.08	270.90	6540.65	601.25 S	8719.78 W	8740.35	0.37
15358.00	88.98	270.93	6542.24	599.75 S	8813.75 W	8834.04	0.10
15453.00	88.86	270.74	6544.02	598.36 S	8908.72 W	8928.73	0.23
15547.00	89.51	271.07	6545.36	596.87 S	9002.70 W	9022.43	0.77
15647.00	89.57	270.66	6546.17	595.35 S	9102.69 W	9122.12	0.41
15742.00	89.35	270.65	6547.06	594.27 S	9197.68 W	9216.85	0.23
15837.00	89.91	269.94	6547.68	593.78 S	9292.67 W	9311.62	0.94
15932.00	90.52	270.99	6547.32	593.01 S	9387.67 W	9406.38	1.28
16027.00	90.62	270.24	6546.37	591.98 S	9482.65 W	9501.11	0.79
16122.00	91.38	269.84	6544.72	591.91 S	9577.64 W	9595.90	0.91
16217.00	92.25	270.37	6541.70	591.74 S	9672.59 W	9690.65	1.07
16305.00	92.99	269.85	6537.68	591.57 S	9760.50 W	9778.37	1.02
16373.00	92.99	269.85	6534.13	591.75 S	9828.40 W	9846.15	0.01

# **CALCULATION BASED ON MINIMUM CURVATURE METHOD**

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT  
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 266.37 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.71 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16373.00 FEET  
IS 9846.20 FEET ALONG 266.55 DEGREES (GRID)**

**Final survey is a straight line projection to TD.**