



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100				
Date run completed	13-Aug-15				
Rig Bit Number	0100				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	1,135.00				
Log End Depth (MD, ft)	6,278.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	11-Aug-15 23:30				
Drill/Wipe End Date and Time	12-Aug-15 19:50				
Min Inc (deg) @ Depth (MD, ft)	0.38 @ 1,202.00				
Max Inc (deg) @ Depth (MD, ft)	87.04 @ 6,213.00				
Bit TFA(in2) / Bit Type	0.98 /				
Flow Rate (gpm)	592.65				
Max AV (fpm) / CV (fpm) @ MWD	225.70 / 414				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	8.85 / 27.00				
Filtrate CL (ppm)	16.00				
pH / Fluid Loss (mptm)	9.30 / 88				
PV (cP) / YP (lhf2)	2 / 2.00				
% Solids / % Sand	3.20 / 0.30				
% Oil / Oil:Water Ratio	N/A / N/A				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) / S	178.78 / 80.1				

Max Tool Temp (degF) / Source	172.78 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 172.78				
Lead MWD Engineer	Cody Wurdeman				
Customer Representative	Johnny Sanchez				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11303511				
Insert Serial Number	11400870				
Date and Time Initialized	11-Aug-15 09:37				
Date and Time Read	13-Aug-15 00:18				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	65.00				
Software Version	6.21				
Sub Serial Number	11303511				
Sonde Serial Number	11478016				
Sensor ID Number	N/A				
Toolface Offset (deg)	6.40				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	57.90				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11303511				
Insert/Sonde Serial Number	12037418				

REMARKS

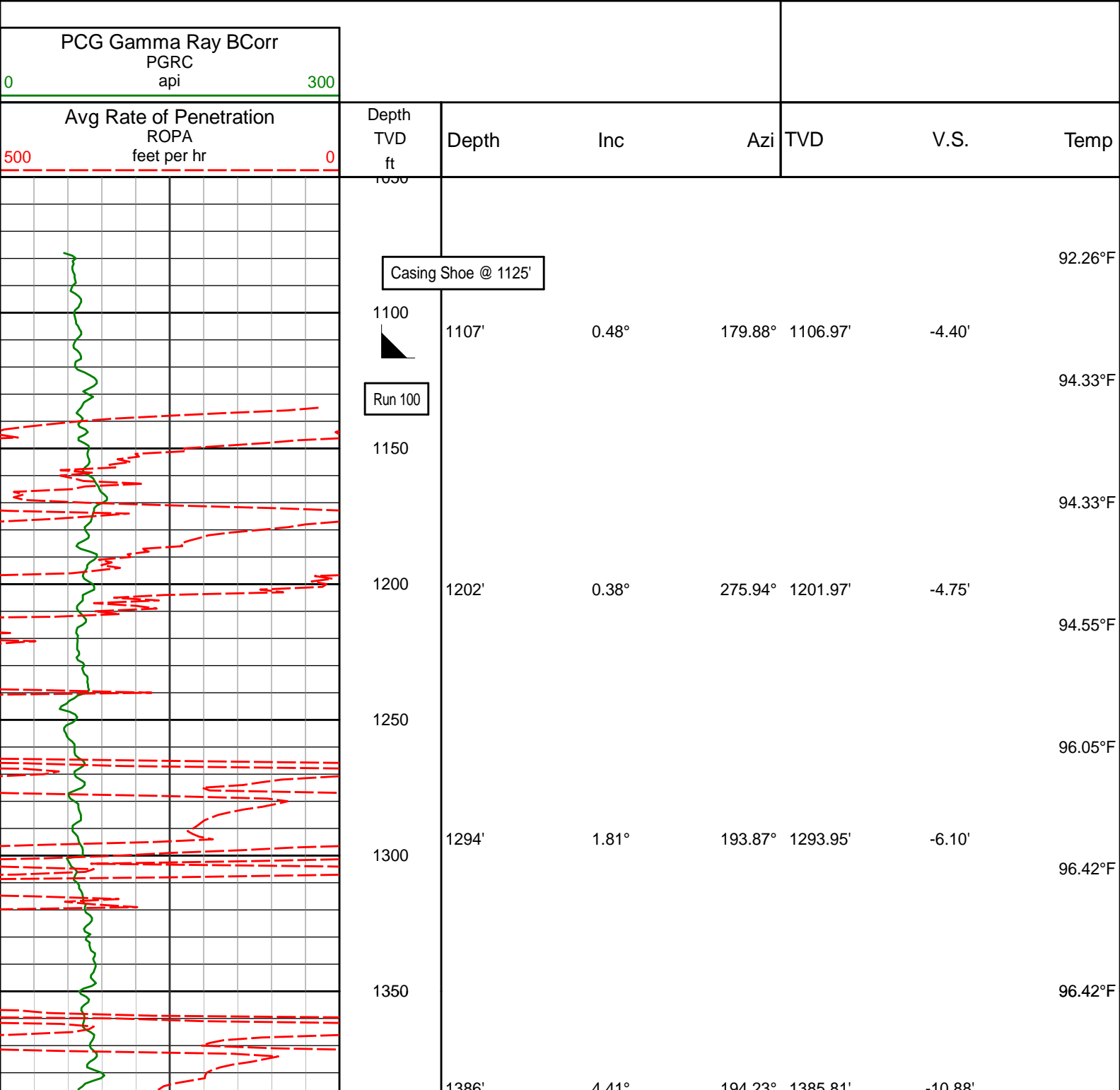
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 8.75"
Mud Density: 9.9-11.0
5. 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)

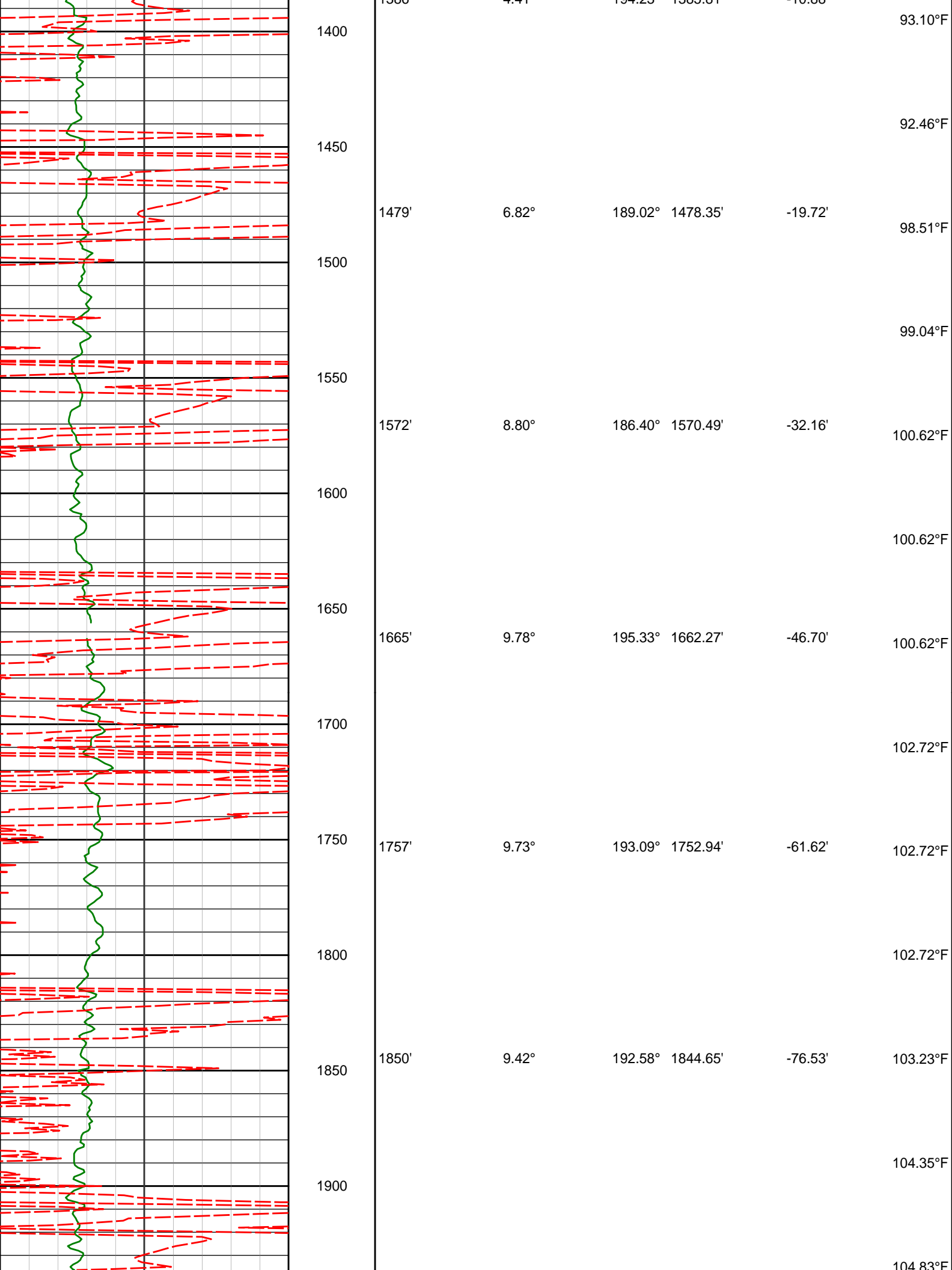
WARRANTY

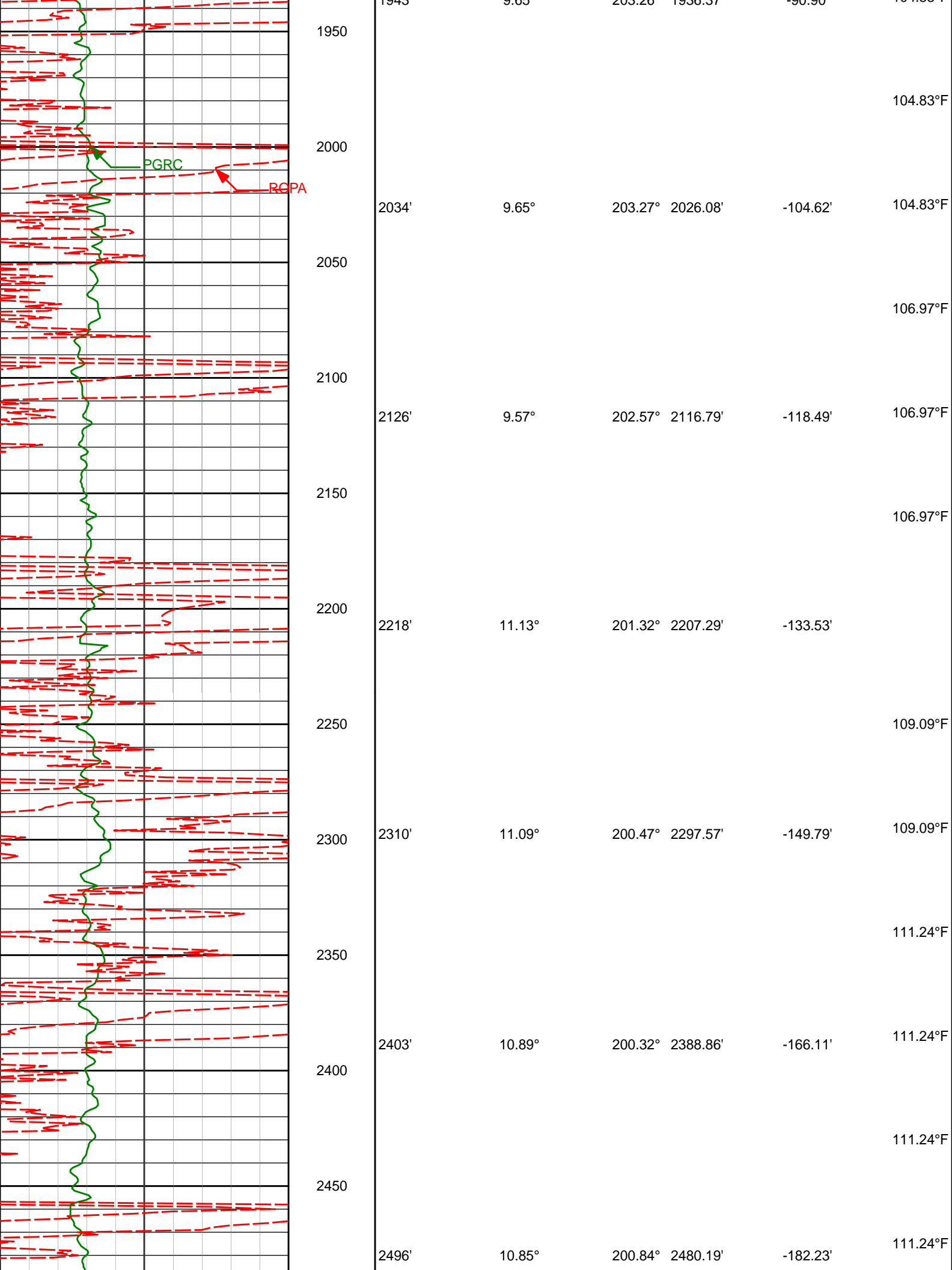
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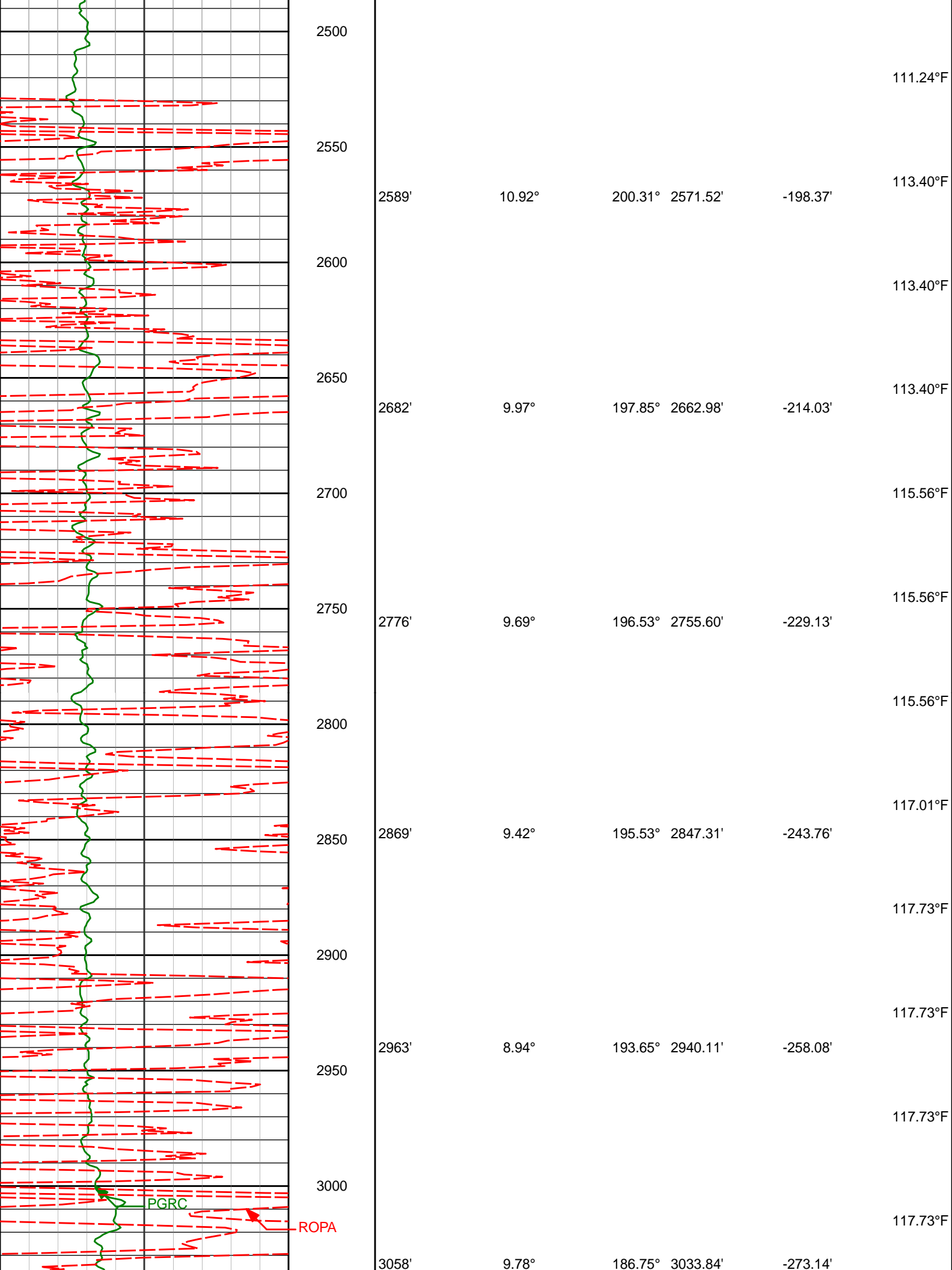
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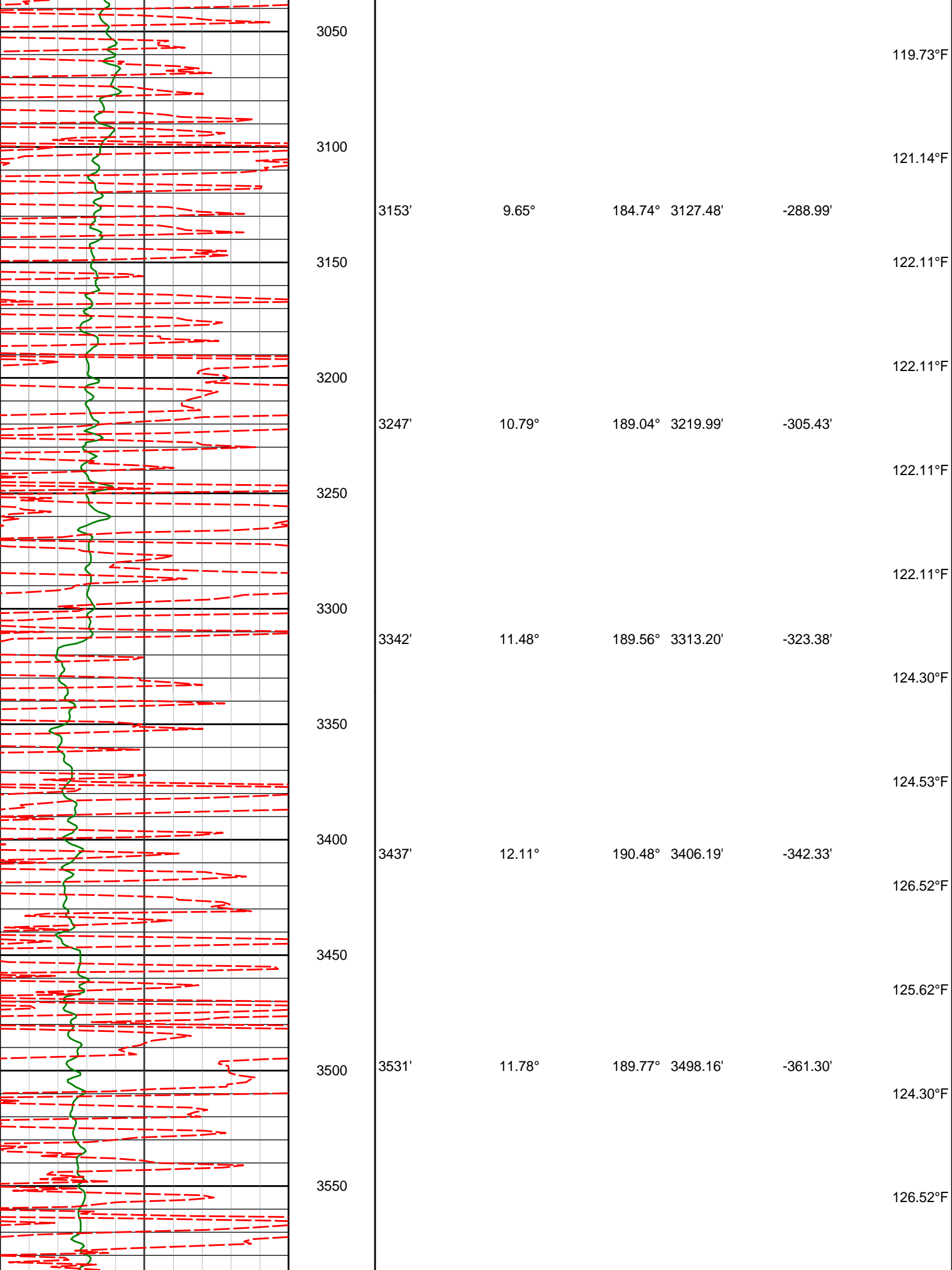
TVD Detail 1:600 Scale

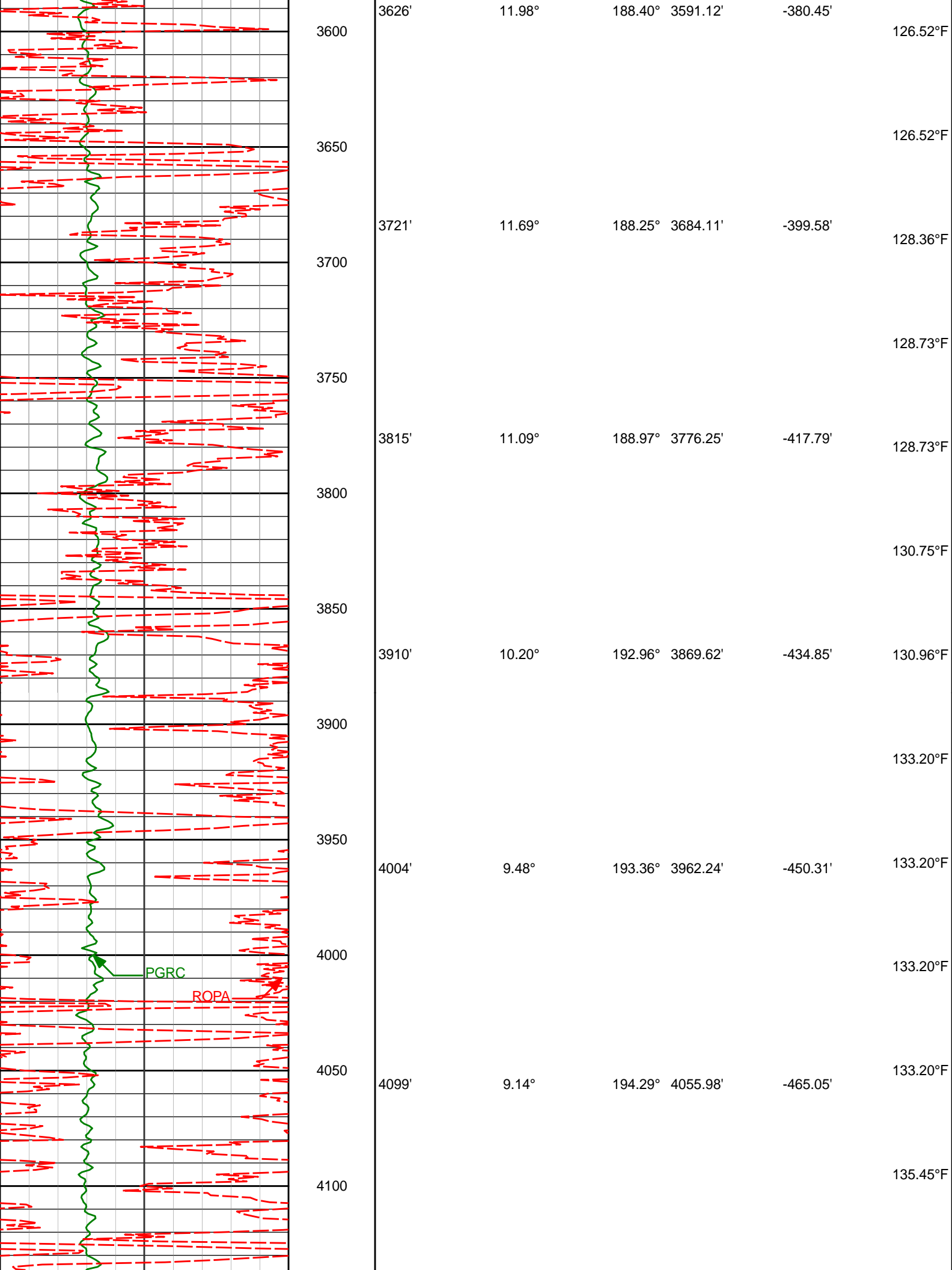


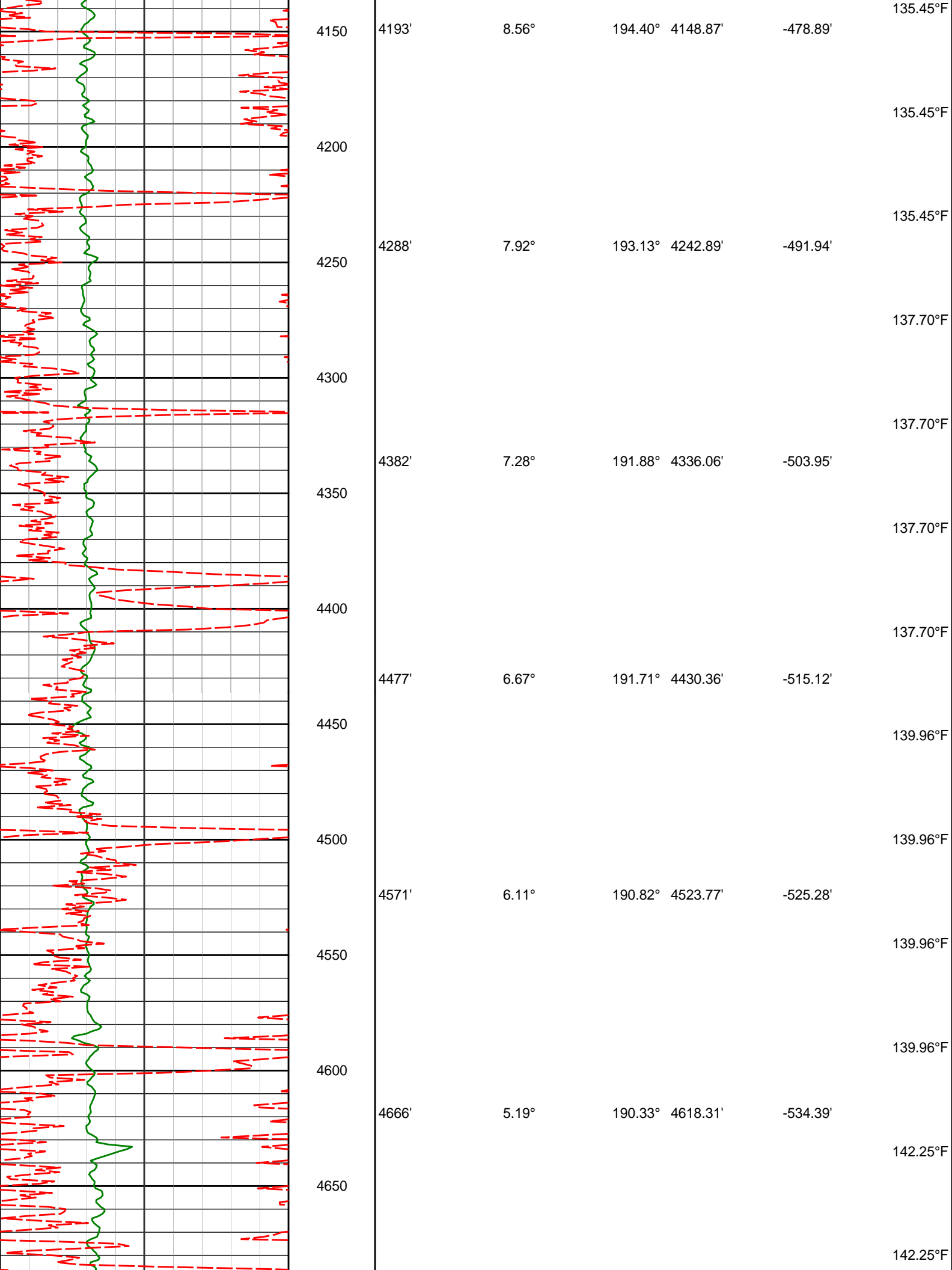


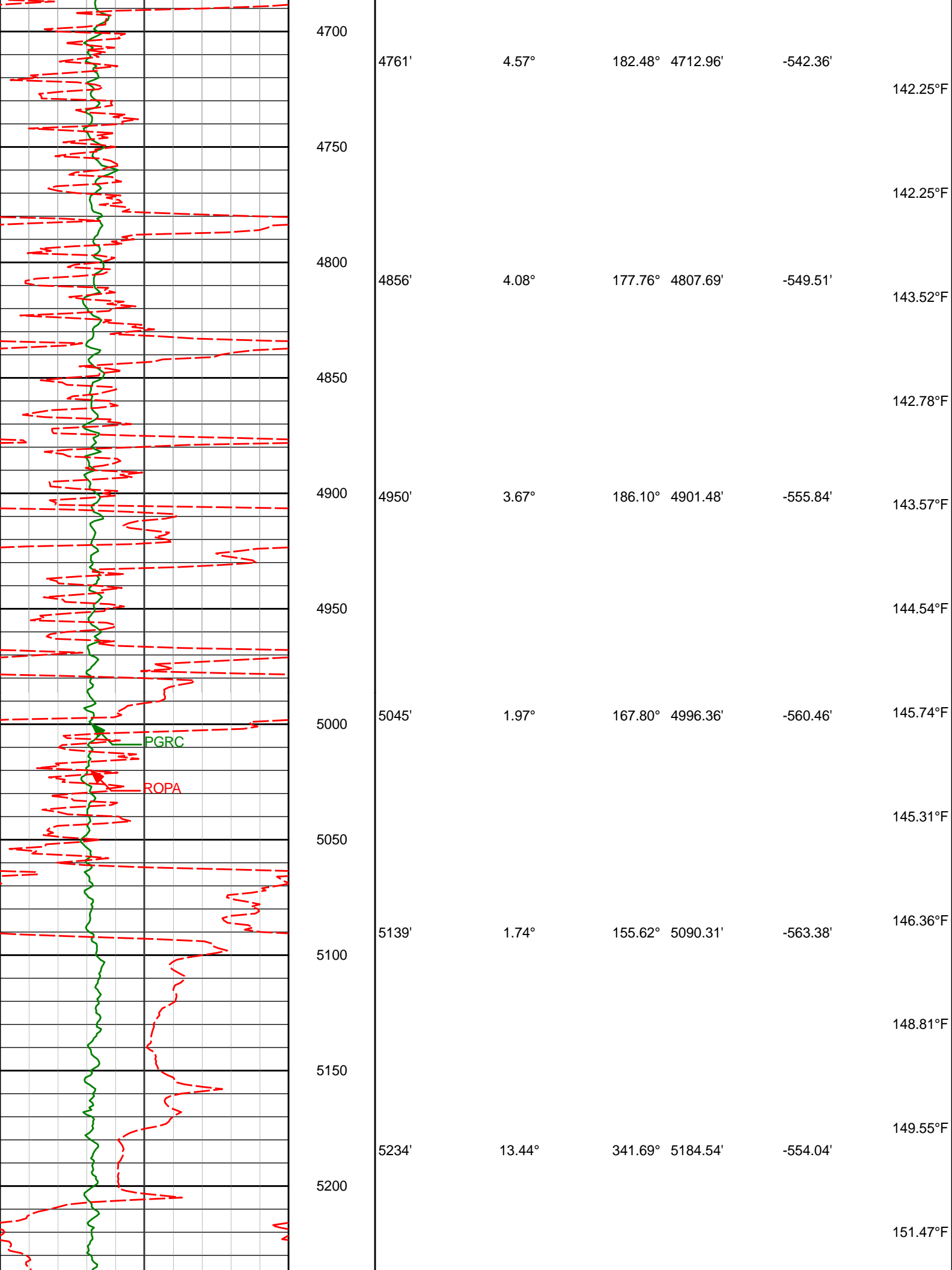


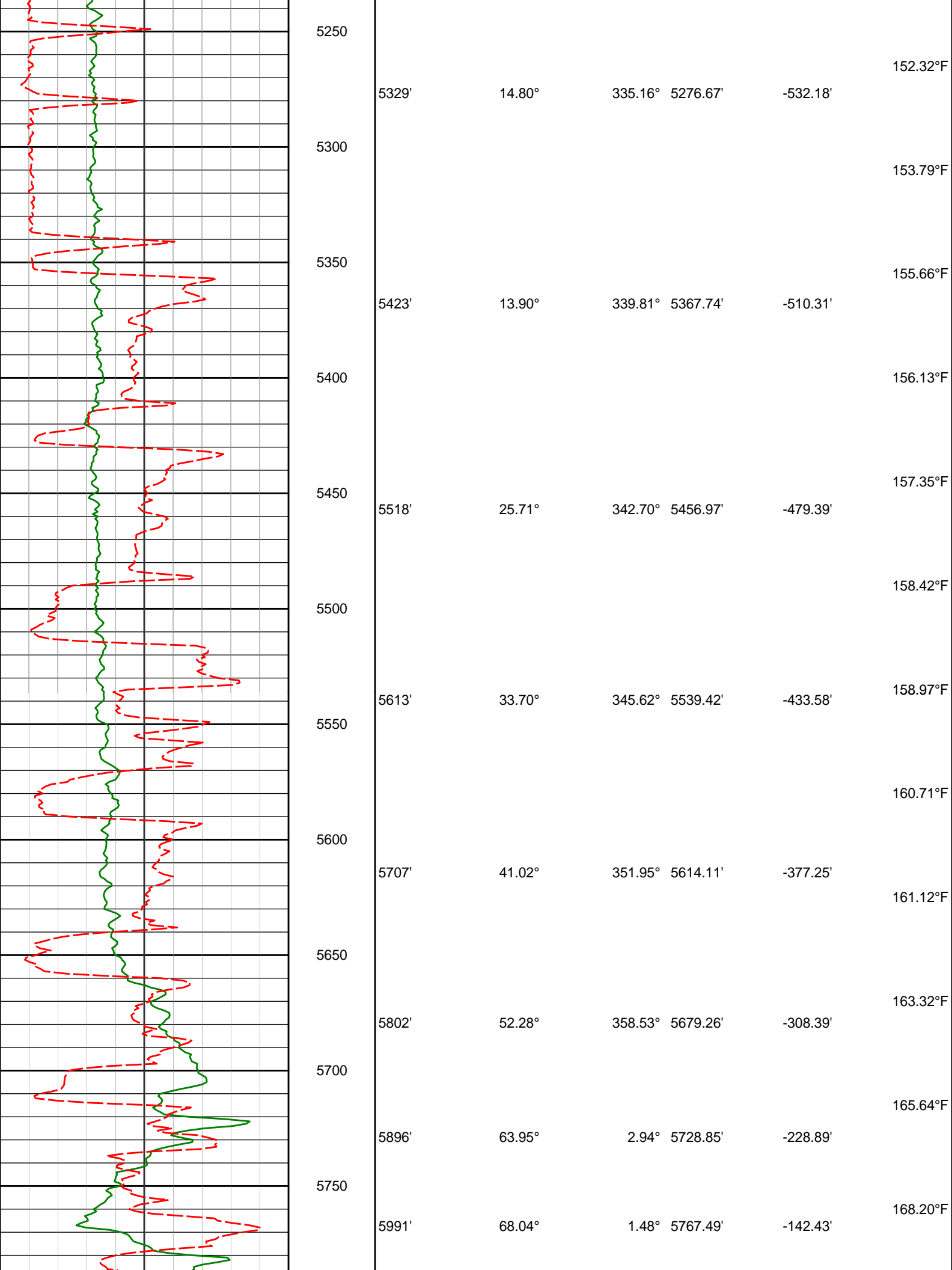


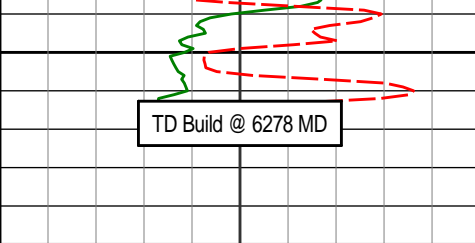







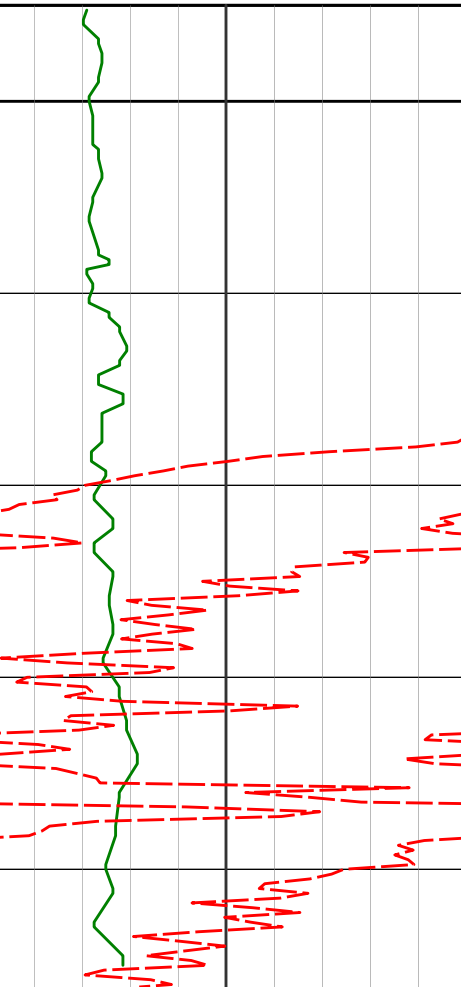


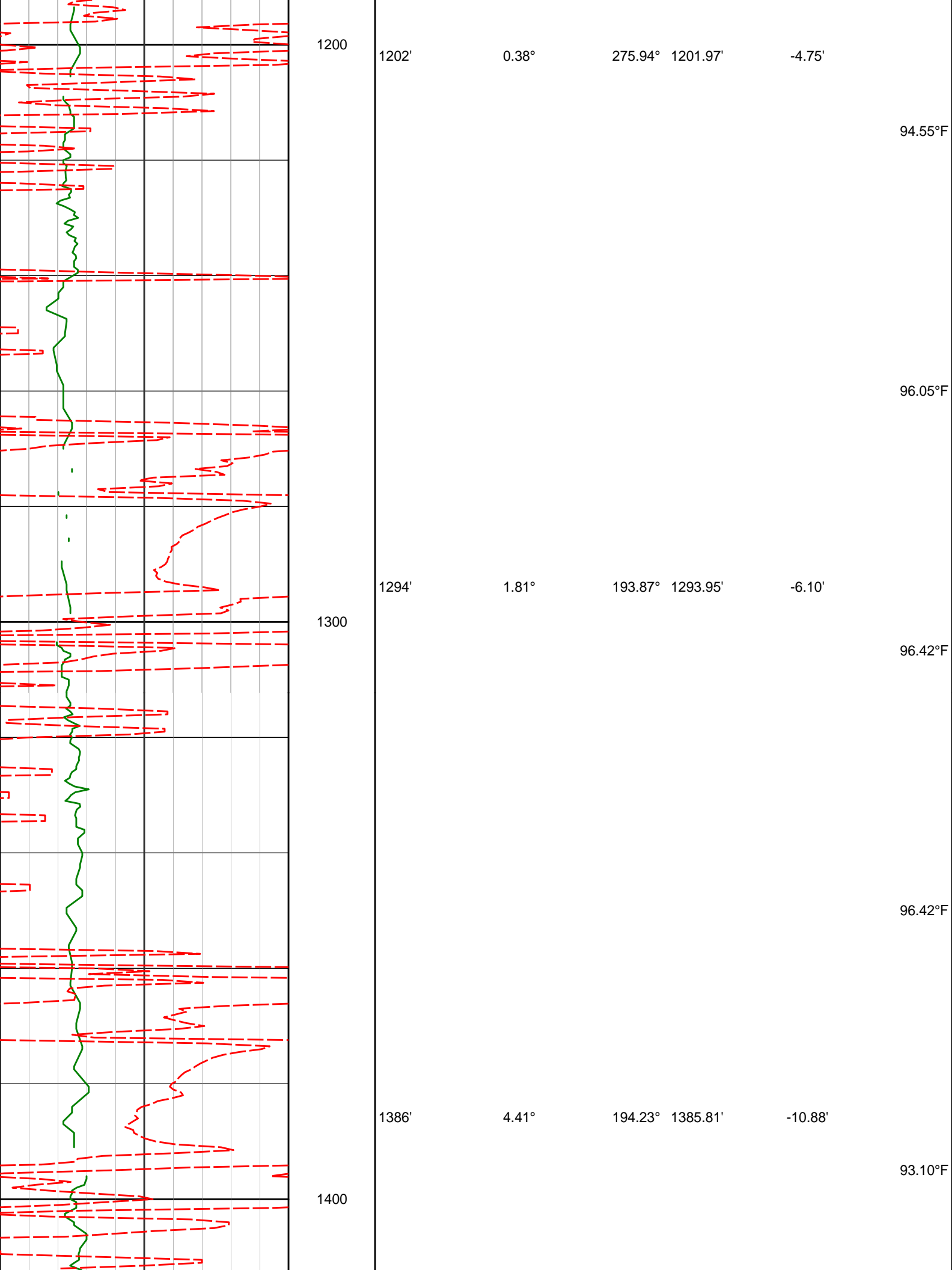


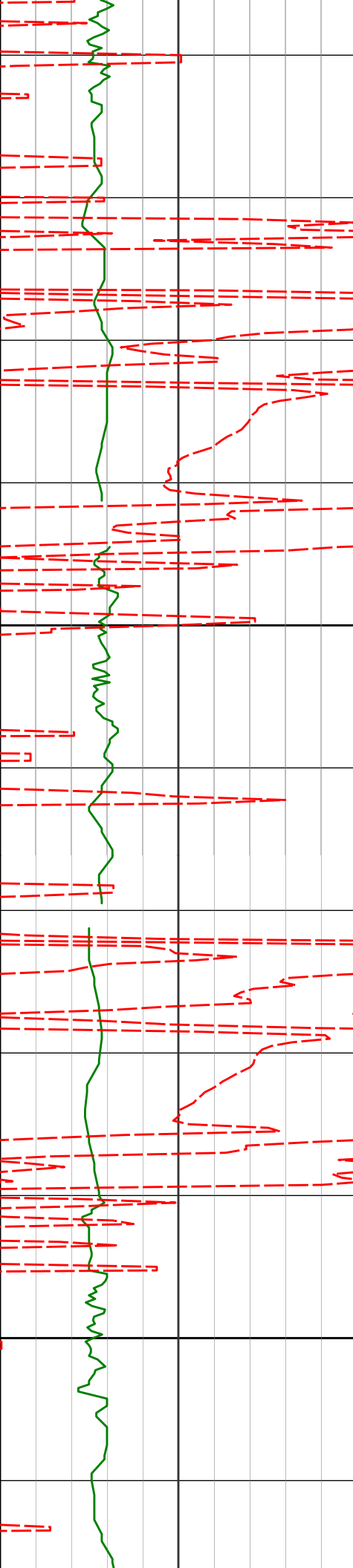
			5800	6085'	76.91°	359.14°	5795.77'	-53.01'	165.41°F
				6180'	84.88°	358.26°	5813.89'	49.70'	
				6278'	87.04°	358.06°	5813.42'	49.64'	

<div> <div>Avg Rate of Penetration</div> <div>ROPA</div> <div>feet per hr</div> <div>500</div> <div>0</div> </div>			Depth	Inc	Azi	TVD	V.S.	Temp
<div> <div>PCG Gamma Ray BCorr</div> <div>PGRC</div> <div>api</div> <div>0</div> <div>300</div> </div>								

TVD Detail 1:240 Scale

PCG Gamma Ray BCorr PGRC api								
0300								
Avg Rate of Penetration ROPA feet per hr			Depth TVD ft	Inc	Azi	TVD	V.S.	Temp
5000								
			1100					
			1107'	0.48°	179.88°	1106.97'	-4.40'	
			Casing Shoe @ 1125'					
			Run 100					
			94.33°F					
			94.33°F					





1500

1600

1479'

6.82°

189.02° 1478.35'

-19.72'

1572'

8.80°

186.40° 1570.49'

-32.16'

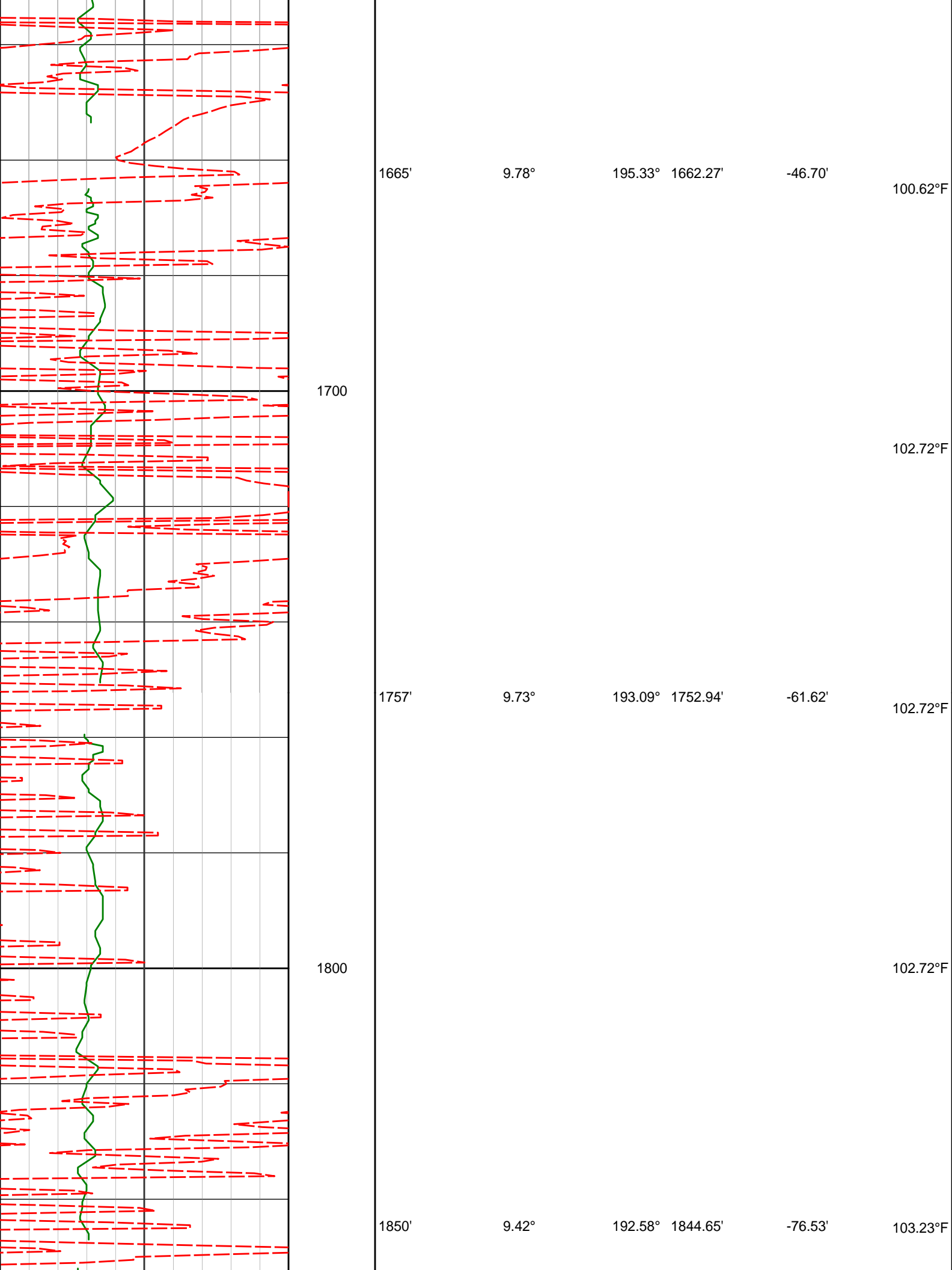
92.46°F

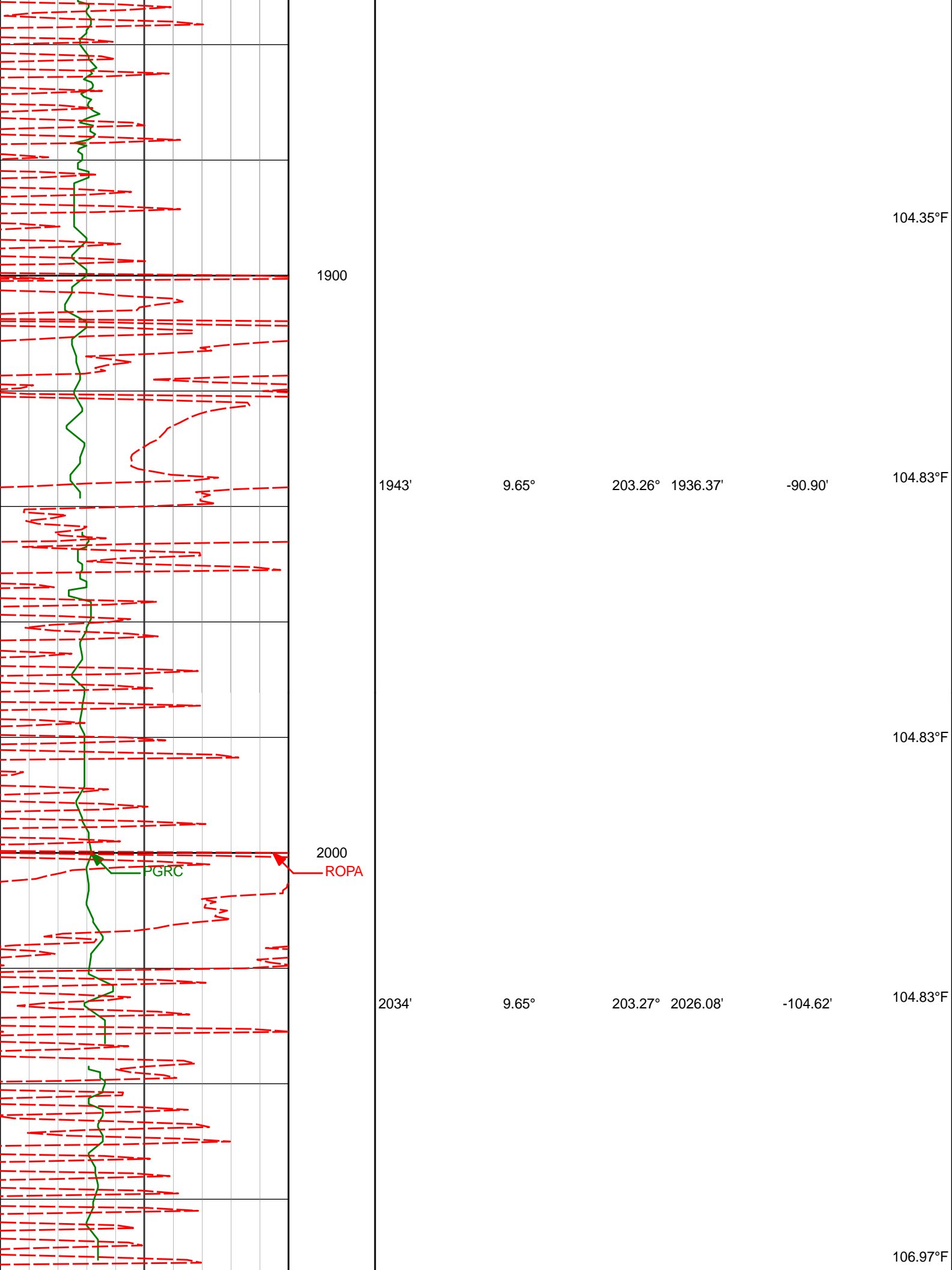
98.51°F

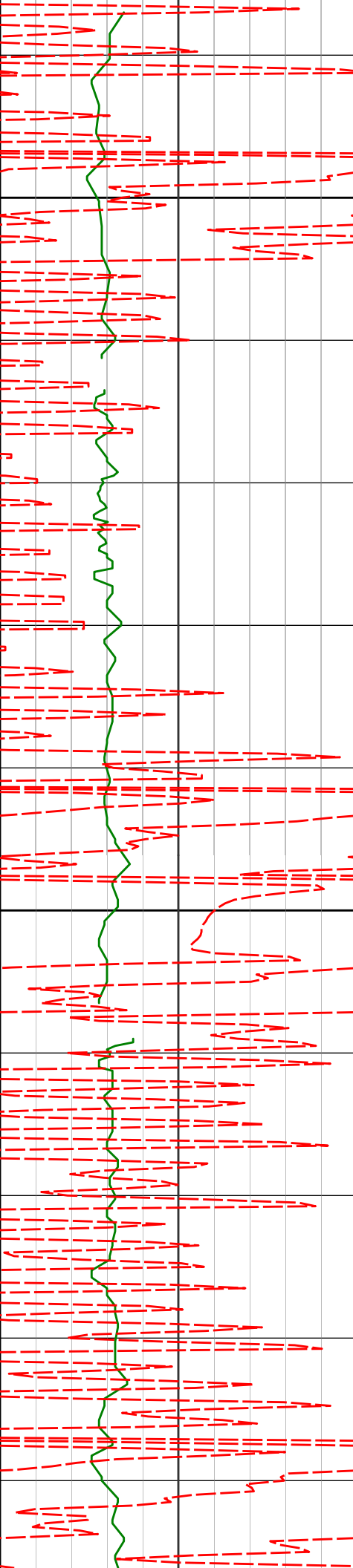
99.04°F

100.62°F

100.62°F







2100

2126'

9.57°

202.57°

2116.79'

-118.49'

106.97°F

106.97°F

2200

2218'

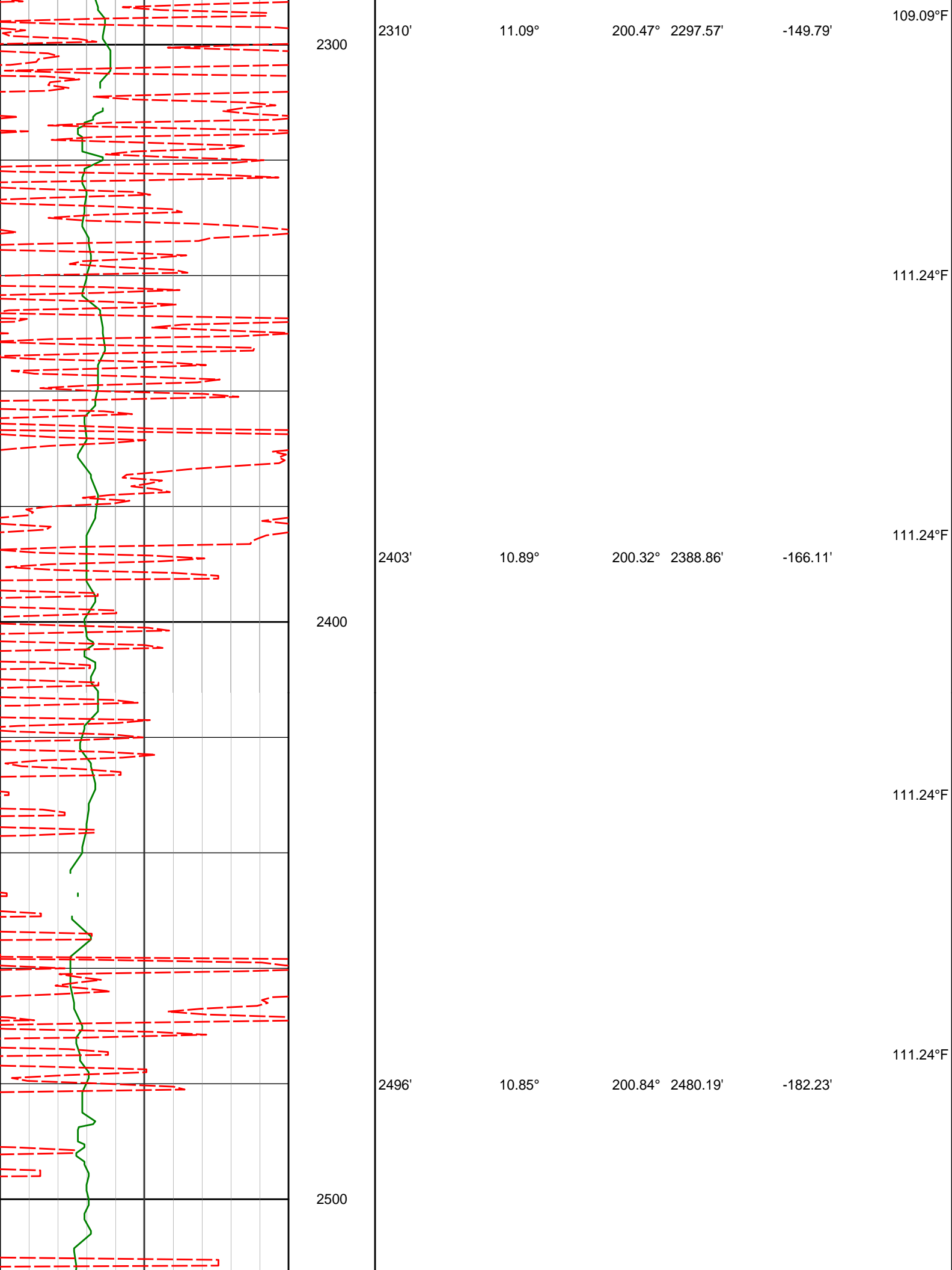
11.13°

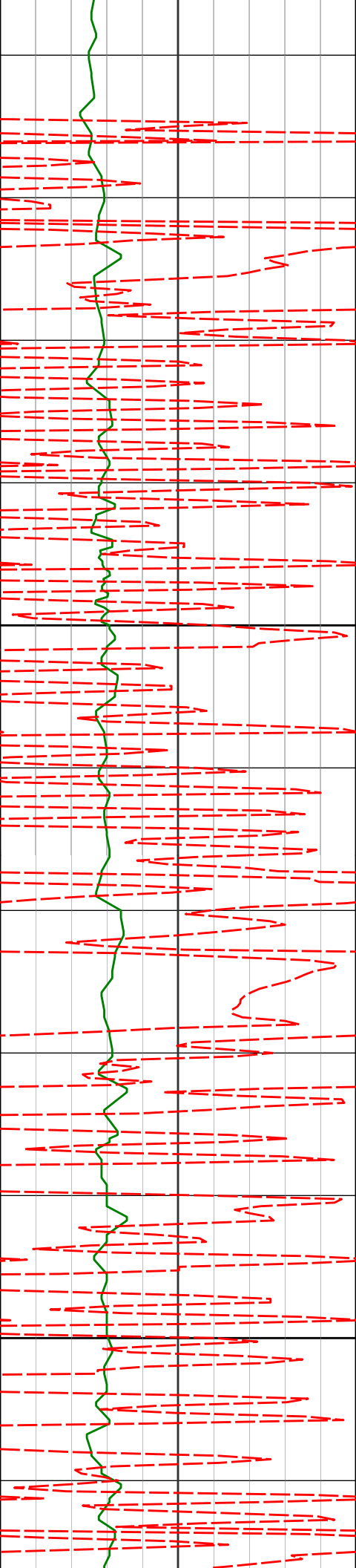
201.32°

2207.29'

-133.53'

109.09°F





2600

2700

2589'

10.92°

200.31° 2571.52'

-198.37'

2682'

9.97°

197.85° 2662.98'

-214.03'

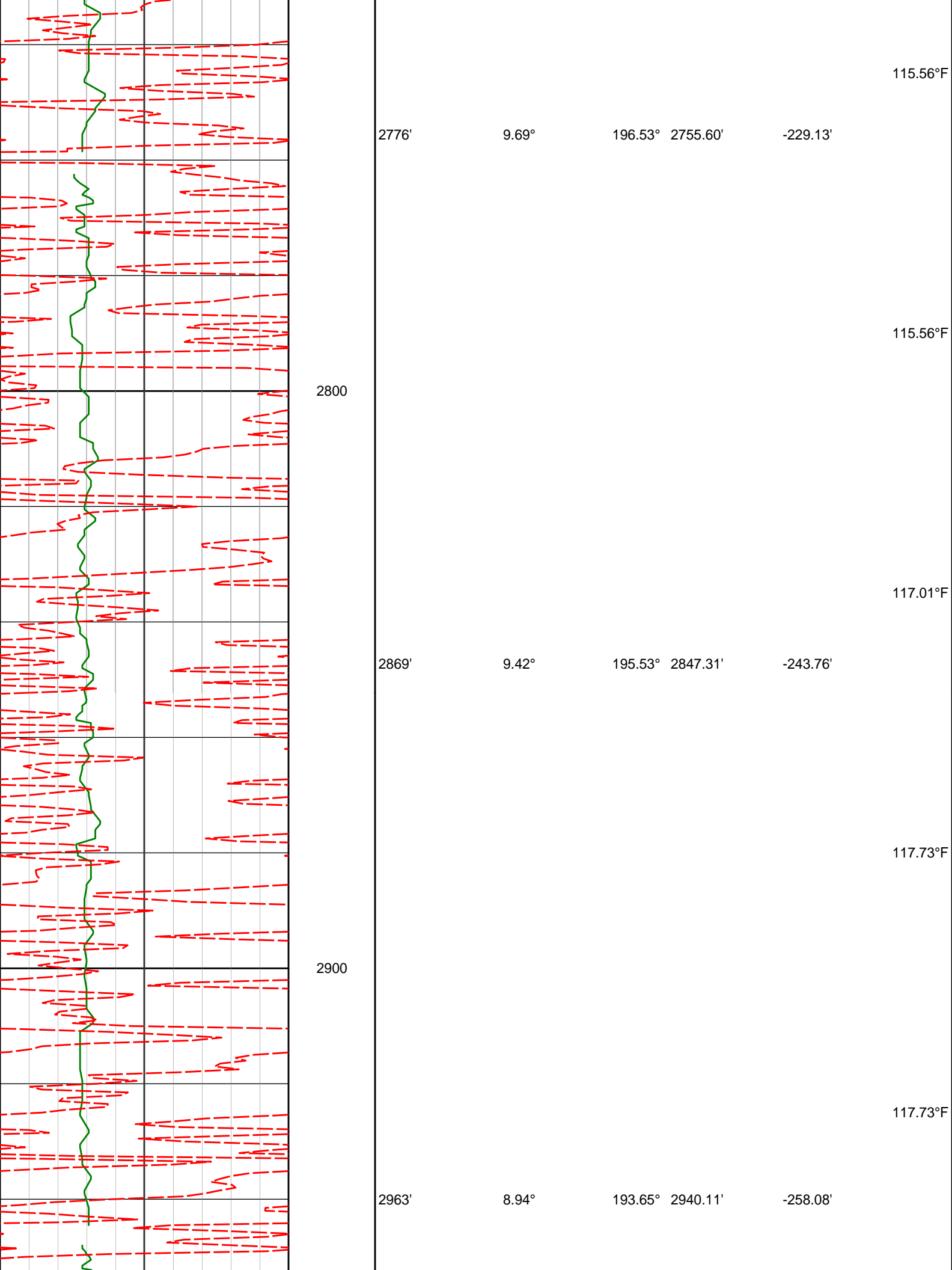
111.24°F

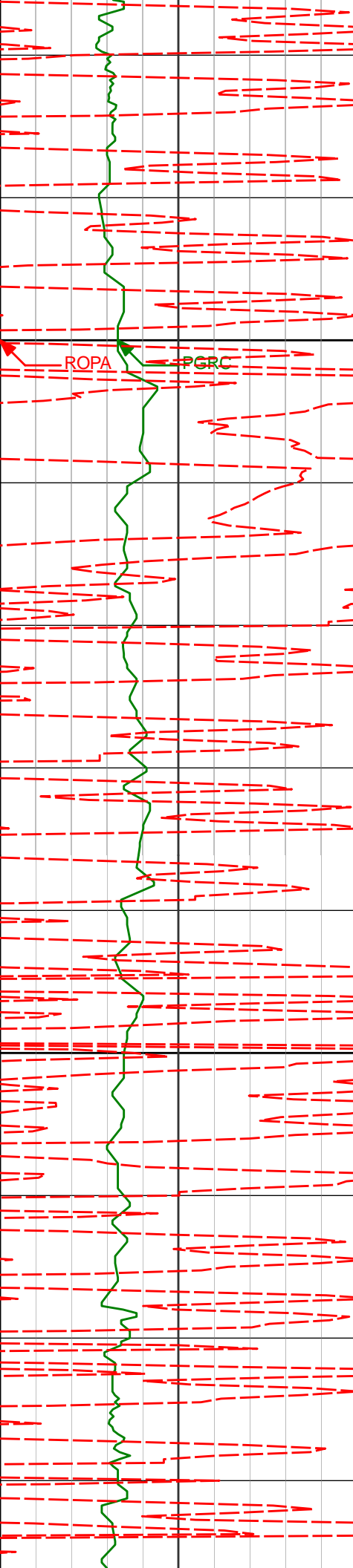
113.40°F

113.40°F

113.40°F

115.56°F





3000

ROPA

PGRC

3058'

9.78°

186.75°

3033.84'

-273.14'

3100

3153'

9.65°

184.74°

3127.48'

-288.99'

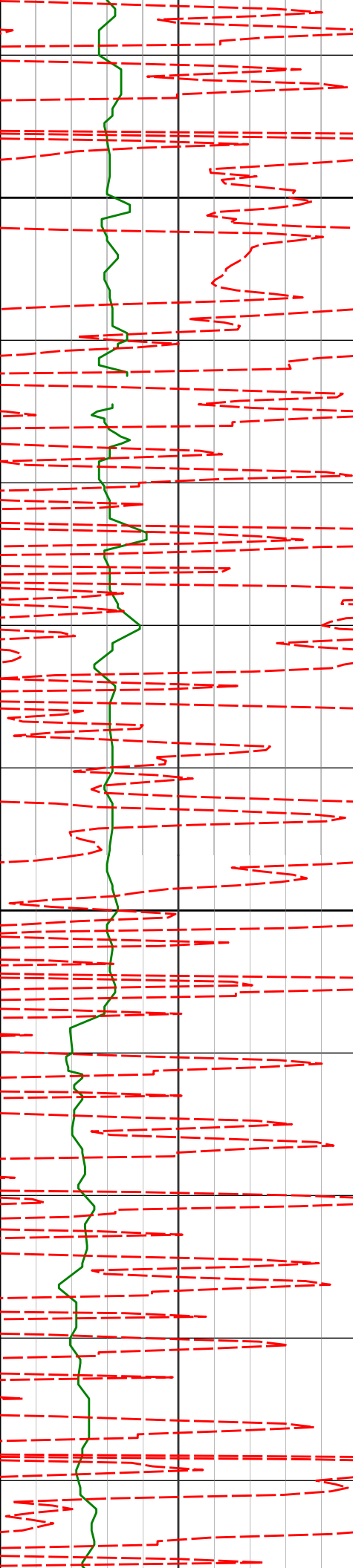
117.73°F

117.73°F

119.73°F

121.14°F

122.11°F



3200

3247'

10.79°

189.04°

3219.99'

-305.43'

122.11°F

122.11°F

122.11°F

3300

3342'

11.48°

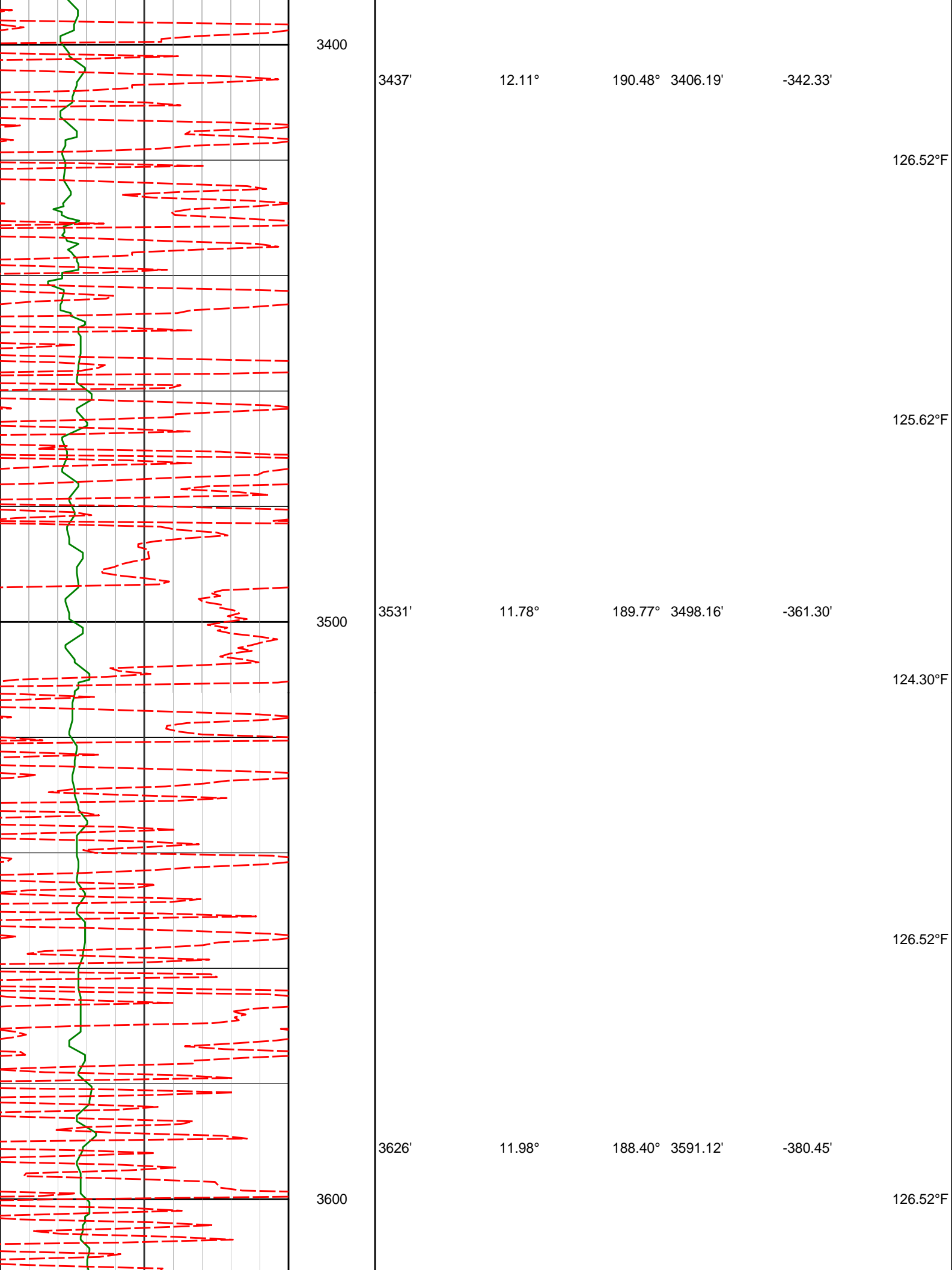
189.56°

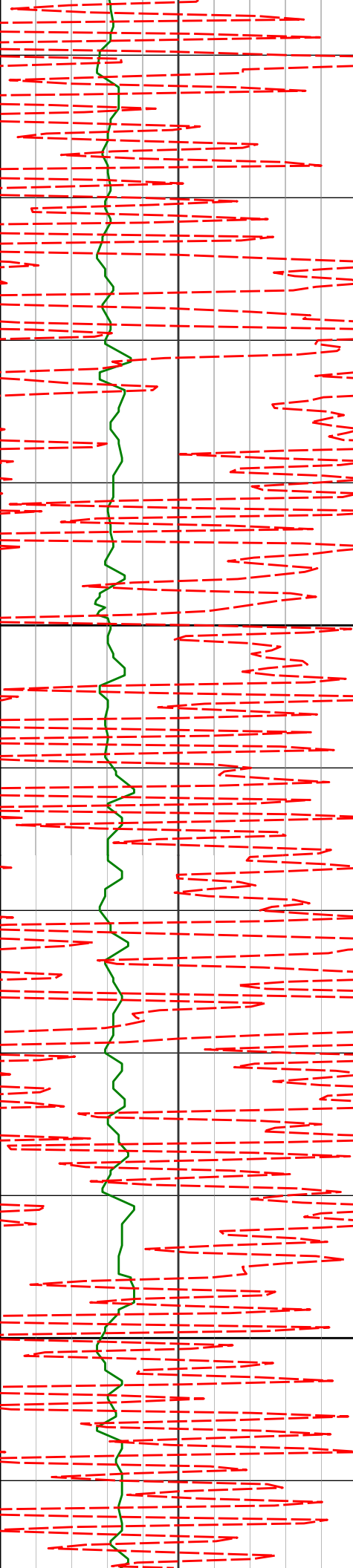
3313.20'

-323.38'

124.30°F

124.53°F





3700

3800

3721'

11.69°

188.25° 3684.11'

-399.58'

3815'

11.09°

188.97° 3776.25'

-417.79'

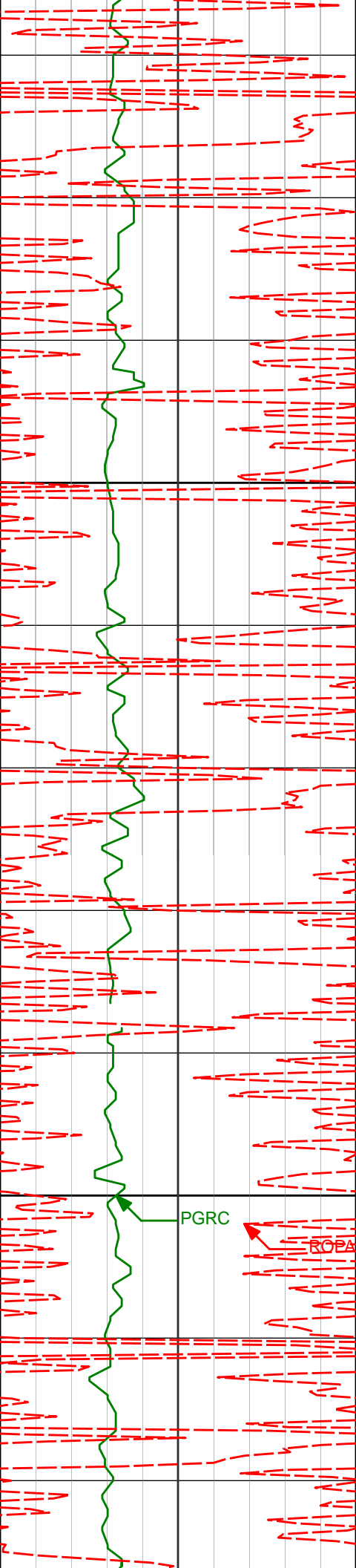
126.52°F

128.36°F

128.73°F

128.73°F

130.75°F



3910'

10.20°

192.96° 3869.62'

-434.85'

130.96°F

3900

133.20°F

4004'

9.48°

193.36° 3962.24'

-450.31'

133.20°F

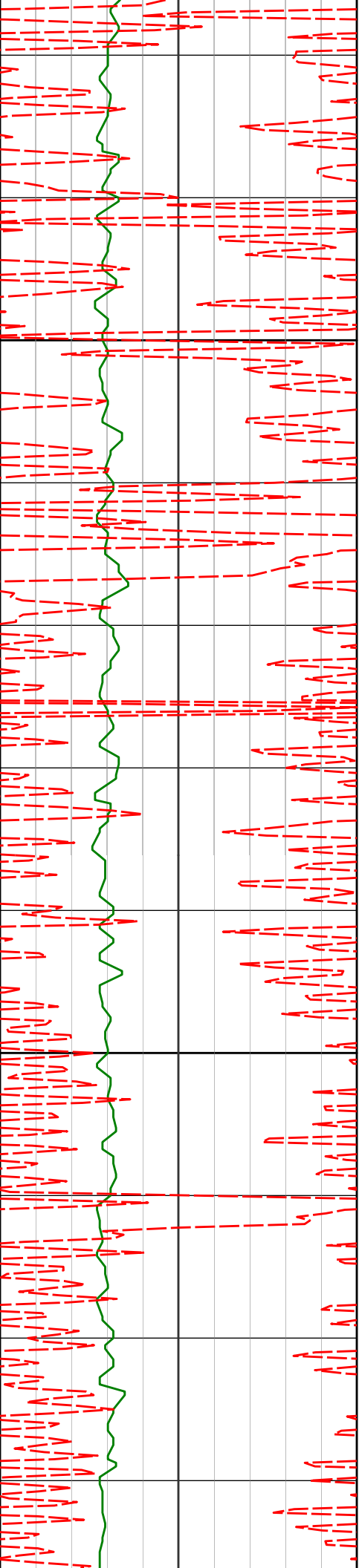
4000

PGRC

ROPA

133.20°F

133.20°F



4099'

9.14°

194.29° 4055.98'

-465.05'

4100

135.45°F

4193'

8.56°

194.40° 4148.87'

-478.89'

4200

135.45°F

135.45°F

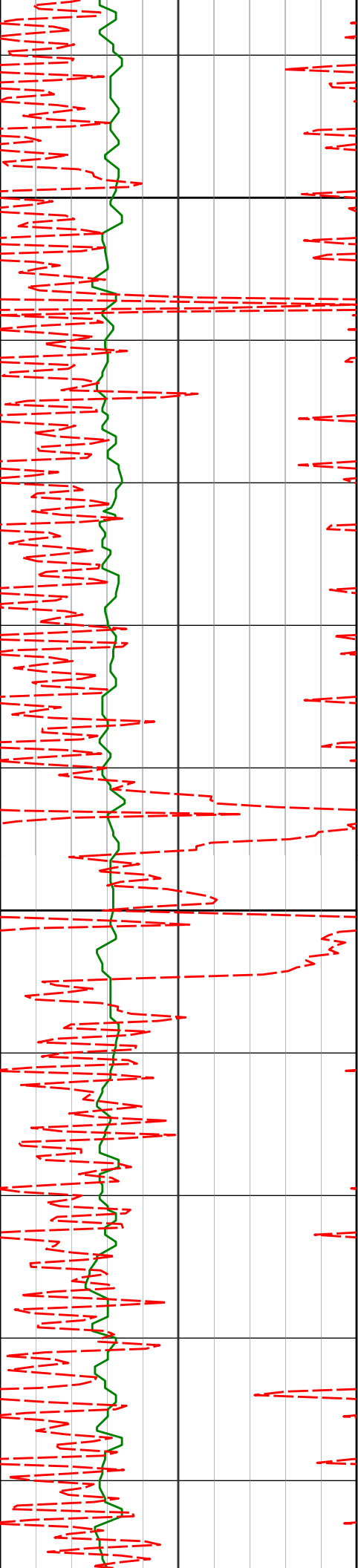
135.45°F

4288'

7.92°

193.13° 4242.89'

-491.94'



4300

4400

4382'

4477'

7.28°

6.67°

191.88°

191.71°

4336.06'

4430.36'

-503.95'

-515.12'

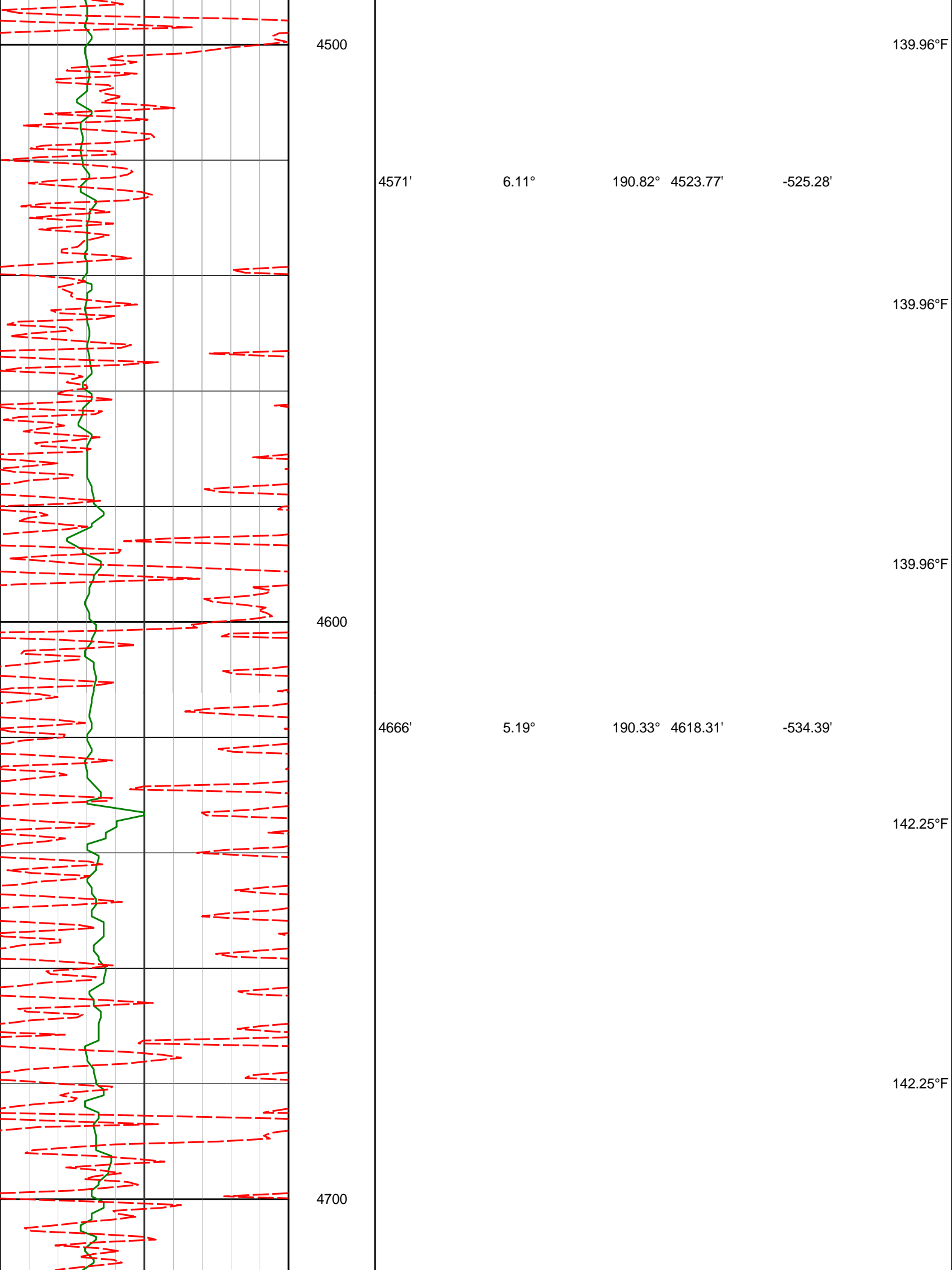
137.70°F

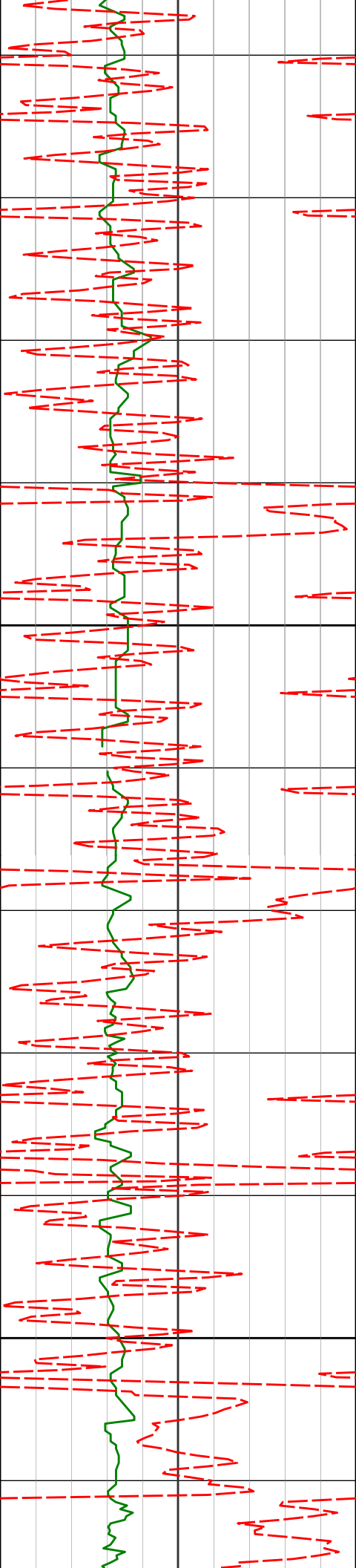
137.70°F

137.70°F

137.70°F

139.96°F

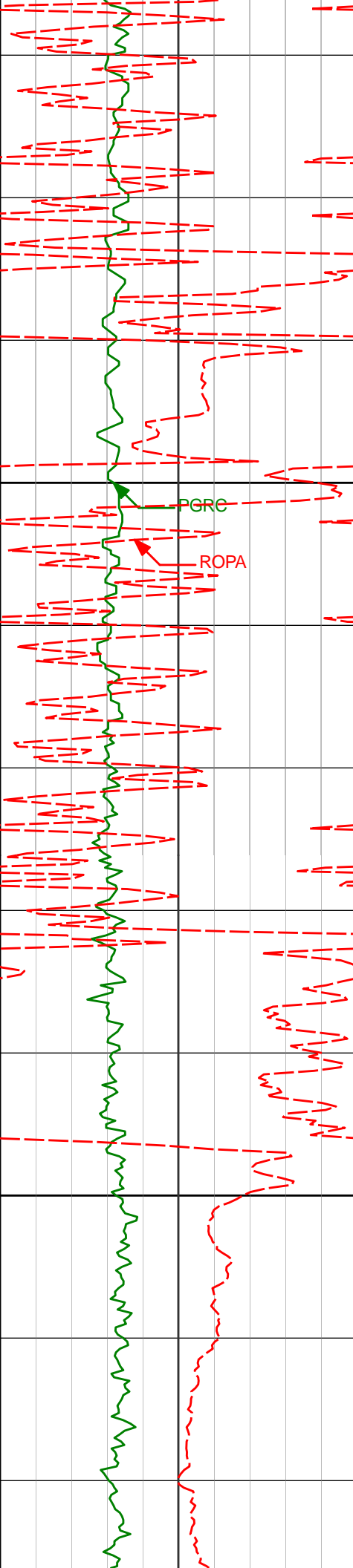




4800

4900

4761'	4.57°	182.48°	4712.96'	-542.36'	
					142.25°F
					142.25°F
4856'	4.08°	177.76°	4807.69'	-549.51'	
					143.52°F
					142.78°F
4950'	3.67°	186.10°	4901.48'	-555.84'	
					143.57°F



5000

5100

5045'

5139'

1.97°

1.74°

167.80° 4996.36'

155.62° 5090.31'

-560.46'

-563.38'

144.54°F

145.74°F

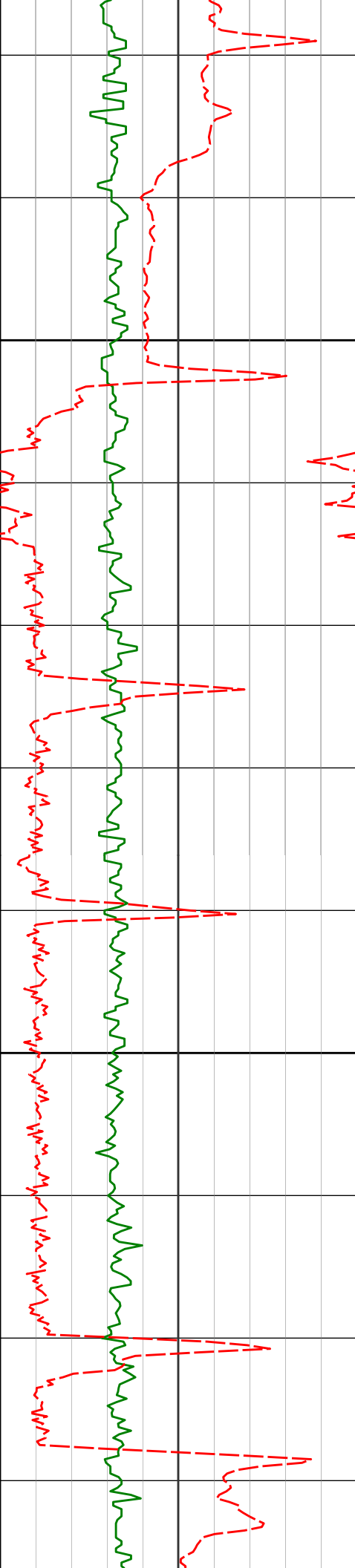
145.31°F

146.36°F

148.81°F

GRE

ROPA



5200

5300

5234'

13.44°

341.69° 5184.54'

-554.04'

149.55°F

151.47°F

152.32°F

5329'

14.80°

335.16° 5276.67'

-532.18'

153.79°F

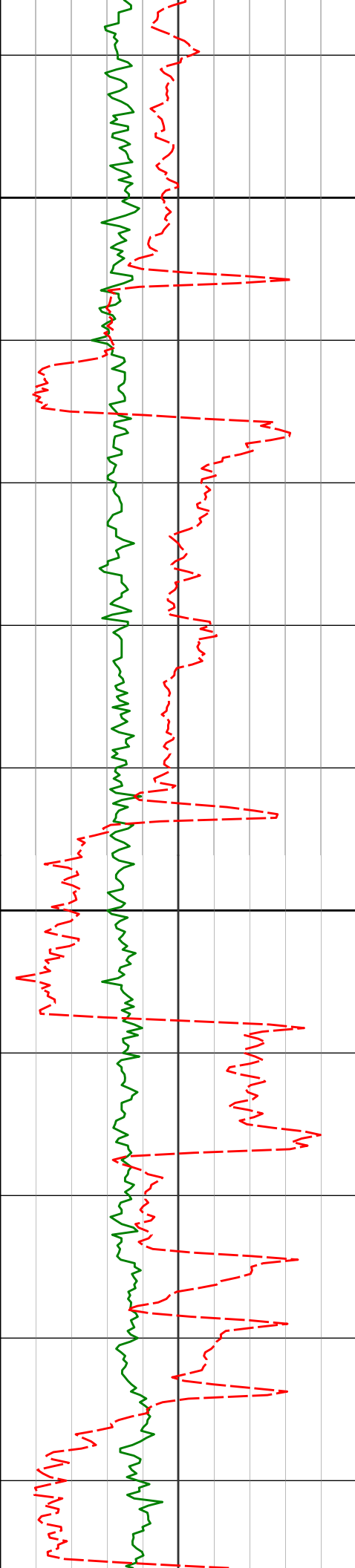
155.66°F

5423'

13.90°

339.81° 5367.74'

-510.31'



5400

156.13°F

5518'

25.71°

342.70° 5456.97'

-479.39'

157.35°F

5500

158.42°F

5613'

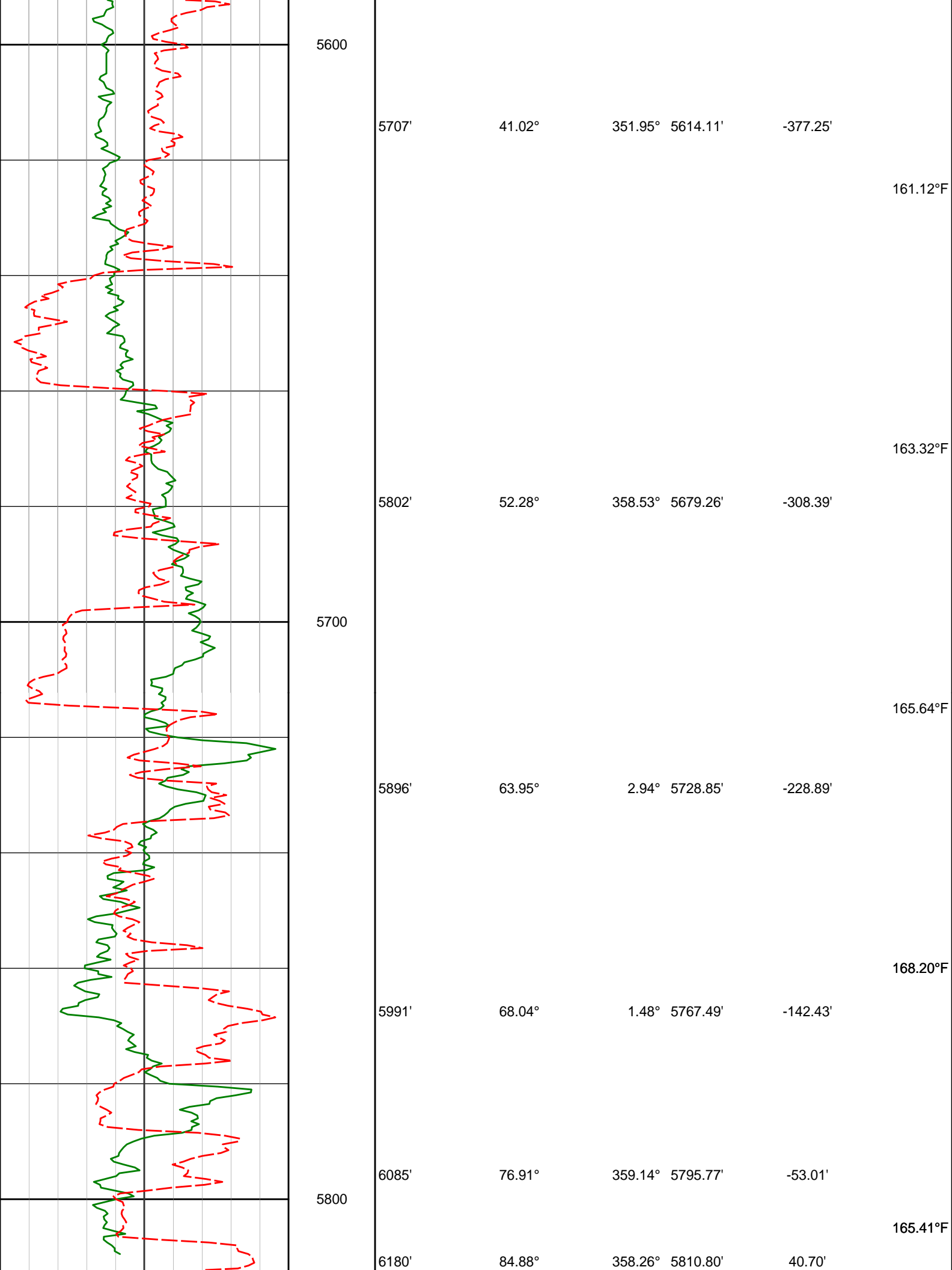
33.70°

345.62° 5539.42'

-433.58'

158.97°F

160.71°F



<div><div>TD Build @ 6278 MD</div><div></div></div>										6213'	87.04°	358.06°	5813.12'	73.61'				
<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div><div>5000</div></div>										Depth	TVD	ft	Depth	Inc	Azi	TVD	V.S.	Temp
<div><div>PCG Gamma Ray BCorr</div><div>PGRC</div><div>api</div><div>0300</div></div>																		

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Greyson LD28-767
Wattenburg
Weld Colorado
USA
CA-XX-0902594949

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
11.76	0.22	168.49	11.76	0.02 S	0.00 E	-0.02	1.87
103.03	0.60	185.44	103.03	0.67 S	0.01 W	-0.67	0.43
194.30	0.43	212.41	194.29	1.44 S	0.24 W	-1.43	0.32
285.57	0.57	211.05	285.56	2.12 S	0.65 W	-2.08	0.15
376.84	0.50	160.37	376.83	2.87 S	0.75 W	-2.84	0.50
468.11	0.09	318.27	468.10	3.20 S	0.67 W	-3.16	0.64
559.38	0.81	322.76	559.36	2.63 S	1.11 W	-2.58	0.79
650.65	0.37	247.11	650.63	2.23 S	1.76 W	-2.15	0.88
741.92	0.34	250.99	741.90	2.43 S	2.29 W	-2.32	0.04
833.19	0.26	160.71	833.17	2.72 S	2.47 W	-2.60	0.47
924.46	0.55	180.33	924.43	3.35 S	2.41 W	-3.24	0.35
1015.73	0.28	136.12	1015.70	3.95 S	2.26 W	-3.85	0.44
1107.00	0.48	179.88	1106.97	4.50 S	2.10 W	-4.40	0.38
1202.00	0.38	275.94	1201.97	4.86 S	2.42 W	-4.75	0.68
1294.00	1.81	193.87	1293.95	6.24 S	3.07 W	-6.10	1.95
1386.00	4.41	194.23	1385.81	11.08 S	4.29 W	-10.88	2.83
1479.00	6.82	189.02	1478.35	20.01 S	6.03 W	-19.72	2.65
1572.00	8.80	186.40	1570.49	32.54 S	7.69 W	-32.16	2.16
1665.00	9.78	195.33	1662.27	47.23 S	10.58 W	-46.70	1.87
1757.00	9.73	193.09	1752.94	62.33 S	14.40 W	-61.62	0.42
1850.00	9.42	192.58	1844.65	77.41 S	17.84 W	-76.53	0.34
1943.00	9.65	203.26	1936.37	92.01 S	22.58 W	-90.90	1.92
2034.00	9.65	203.27	2026.08	106.02 S	28.60 W	-104.62	0.00
2126.00	9.57	202.57	2116.79	120.17 S	34.59 W	-118.49	0.15
2218.00	11.13	201.32	2207.29	135.50 S	40.75 W	-133.53	1.70
2310.00	11.09	200.47	2297.57	152.06 S	47.07 W	-149.79	0.18
2403.00	10.89	200.32	2388.86	168.67 S	53.25 W	-166.11	0.21
2496.00	10.85	200.84	2480.19	185.09 S	59.41 W	-182.23	0.12
2589.00	10.92	200.31	2571.52	201.53 S	65.58 W	-198.37	0.13
2682.00	9.97	197.85	2662.98	217.45 S	71.10 W	-214.03	1.13
2776.00	9.69	196.53	2755.60	232.78 S	75.85 W	-229.13	0.38
2869.00	9.42	195.53	2847.31	247.61 S	80.11 W	-243.76	0.34
2963.00	8.94	193.65	2940.11	262.13 S	83.90 W	-258.08	0.60
3058.00	9.78	186.75	3033.84	277.31 S	86.59 W	-273.14	1.47
3153.00	9.65	184.74	3127.48	293.26 S	88.19 W	-288.99	0.38
3247.00	10.79	189.04	3219.99	309.80 S	90.23 W	-305.43	1.46
3342.00	11.48	189.56	3313.20	327.91 S	93.20 W	-323.38	0.73

3437.00	12.11	190.48	3406.19	347.02 S	96.58 W	-342.33	0.69
3531.00	11.78	189.77	3498.16	366.17 S	100.00 W	-361.30	0.38
3626.00	11.98	188.40	3591.12	385.49 S	103.09 W	-380.45	0.36
3721.00	11.69	188.25	3684.11	404.76 S	105.91 W	-399.58	0.31
3815.00	11.09	188.97	3776.25	423.12 S	108.69 W	-417.79	0.65
3910.00	10.20	192.96	3869.62	440.34 S	112.00 W	-434.85	1.22
4004.00	9.48	193.36	3962.24	455.98 S	115.65 W	-450.31	0.77
4099.00	9.14	194.29	4055.98	470.90 S	119.32 W	-465.05	0.39
4193.00	8.56	194.40	4148.87	484.91 S	122.91 W	-478.89	0.62
4288.00	7.92	193.13	4242.89	498.13 S	126.15 W	-491.94	0.70
4382.00	7.28	191.88	4336.06	510.26 S	128.85 W	-503.95	0.70
4477.00	6.67	191.71	4430.36	521.56 S	131.21 W	-515.12	0.65
4571.00	6.11	190.82	4523.77	531.82 S	133.26 W	-525.28	0.60
4666.00	5.19	190.33	4618.31	541.02 S	134.98 W	-534.39	0.97
4761.00	4.57	182.48	4712.96	549.03 S	135.91 W	-542.36	0.96
4856.00	4.08	177.76	4807.69	556.20 S	135.94 W	-549.51	0.64
4950.00	3.67	186.10	4901.48	562.53 S	136.13 W	-555.84	0.74
5045.00	1.97	167.80	4996.36	567.16 S	136.11 W	-560.46	2.00
5139.00	1.74	155.62	5090.31	570.04 S	135.18 W	-563.38	0.49
5234.00	13.44	341.69	5184.54	560.82 S	138.07 W	-554.04	15.97
5329.00	14.80	335.16	5276.67	539.33 S	146.64 W	-532.18	2.21
5423.00	13.90	339.81	5367.74	517.83 S	155.58 W	-510.31	1.56
5518.00	25.71	342.70	5456.97	487.34 S	165.68 W	-479.39	12.48
5613.00	33.70	345.62	5539.42	442.06 S	178.38 W	-433.58	8.54
5707.00	41.02	351.95	5614.11	386.16 S	189.19 W	-377.25	8.78
5802.00	52.28	358.53	5679.26	317.47 S	194.54 W	-308.39	12.87
5896.00	63.95	2.94	5728.85	237.84 S	193.33 W	-228.89	13.04
5991.00	68.04	1.48	5767.49	151.14 S	190.00 W	-142.43	4.53
6085.00	76.91	359.14	5795.77	61.60 S	189.57 W	-53.01	9.73
6180.00	84.88	358.26	5810.80	32.10 N	191.70 W	40.70	8.44
6213.00	87.04	358.06	5813.12	65.00 N	192.75 W	73.61	6.58

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 357.42 DEGREES (GRID)
A TOTAL CORRECTION OF 6.97 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6213.00 FEET
IS 203.42 FEET ALONG 288.63 DEGREES (GRID)**

Final survey is a straight line projection to TD.