



WELL INFORMATION					
MWD Run Number	100				
Date run completed	10-Sep-15				
Rig Bit Number	0200				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	637.00				
Log End Depth (TVD, ft)	6,448.58				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	09-Sep-15 06:33				
Drill/Wipe End Date and Time	10-Sep-15 05:08				
Min Inc (deg) @ Depth (TVD, ft)	0.00 @ 919.00				
Max Inc (deg) @ Depth (TVD, ft)	90.25 @ 6,449.19				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	576.89				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	9.00 / 32.00				
Filtrate CL (ppm)	2,200.00				
pH / Fluid Loss (mptm)	10.70 / 12				
PV (cP) / YP (lhf2)	5 / 4.00				
% Solids / % Sand	3.00 / 0.35				
% 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) @ Depth	105.50 @ 6,449.19				

Max Tool Temp (degF) / Source	165.58 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Matt Busche				
Customer Representative	Jim Turner				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11341335				
Insert Serial Number	11400992				
Date and Time Initialized	06-Sep-15 20:10				
Date and Time Read	10-Sep-15 12:08				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	56.00				
Software Version	6.21				
Sub Serial Number	11341335				
Sonde Serial Number	11297516				
Sensor ID Number	N/A				
Toolface Offset (deg)	319.00				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	48.95				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11341335				
Insert/Sonde Serial Number	12037420				

REMARKS

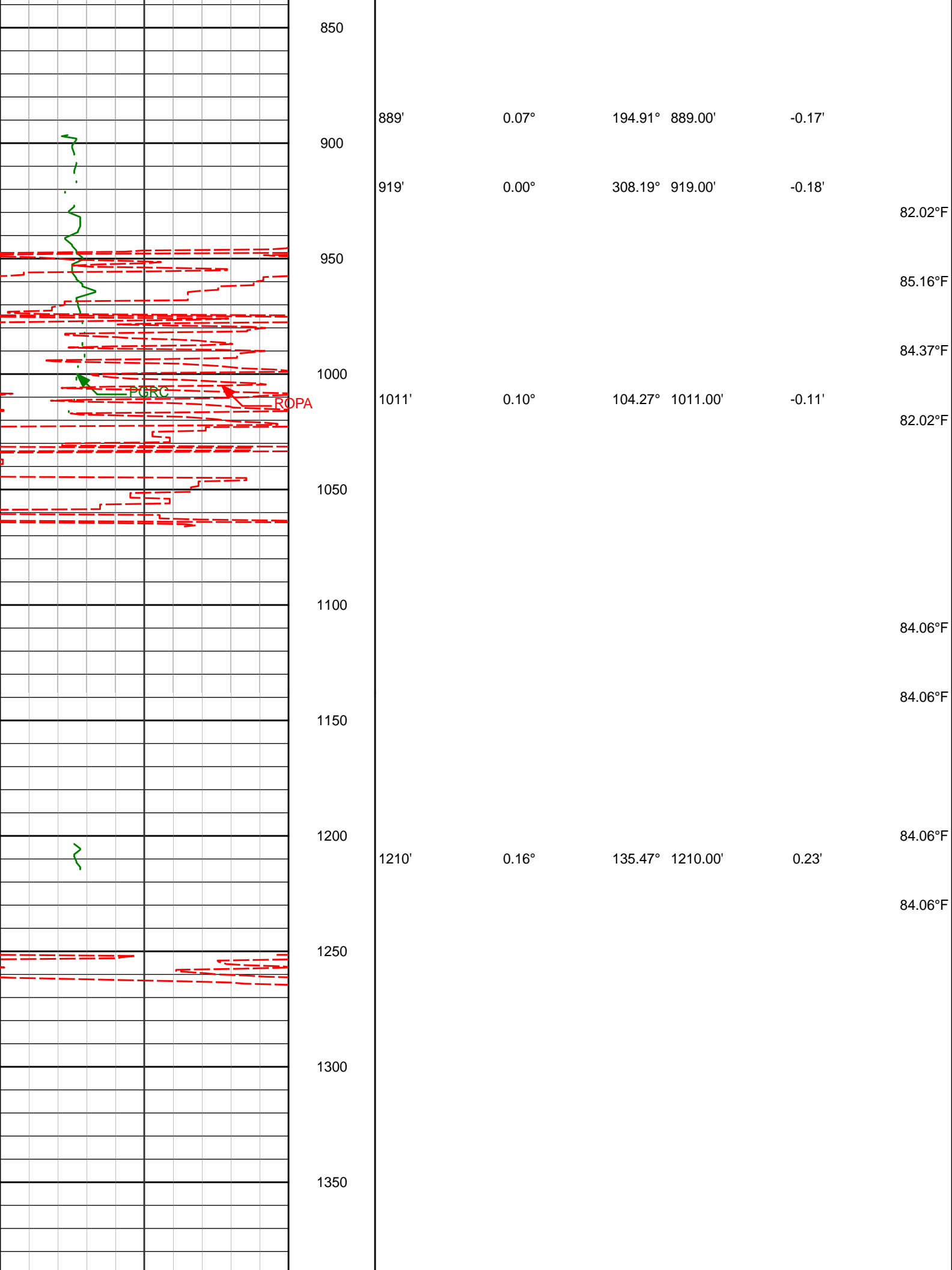
1. All depths are calibrated to driller's pipe tally and are true vertical depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The following smoothing parameters have been applied to the data:
 - 1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft
 - 1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
 - ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft

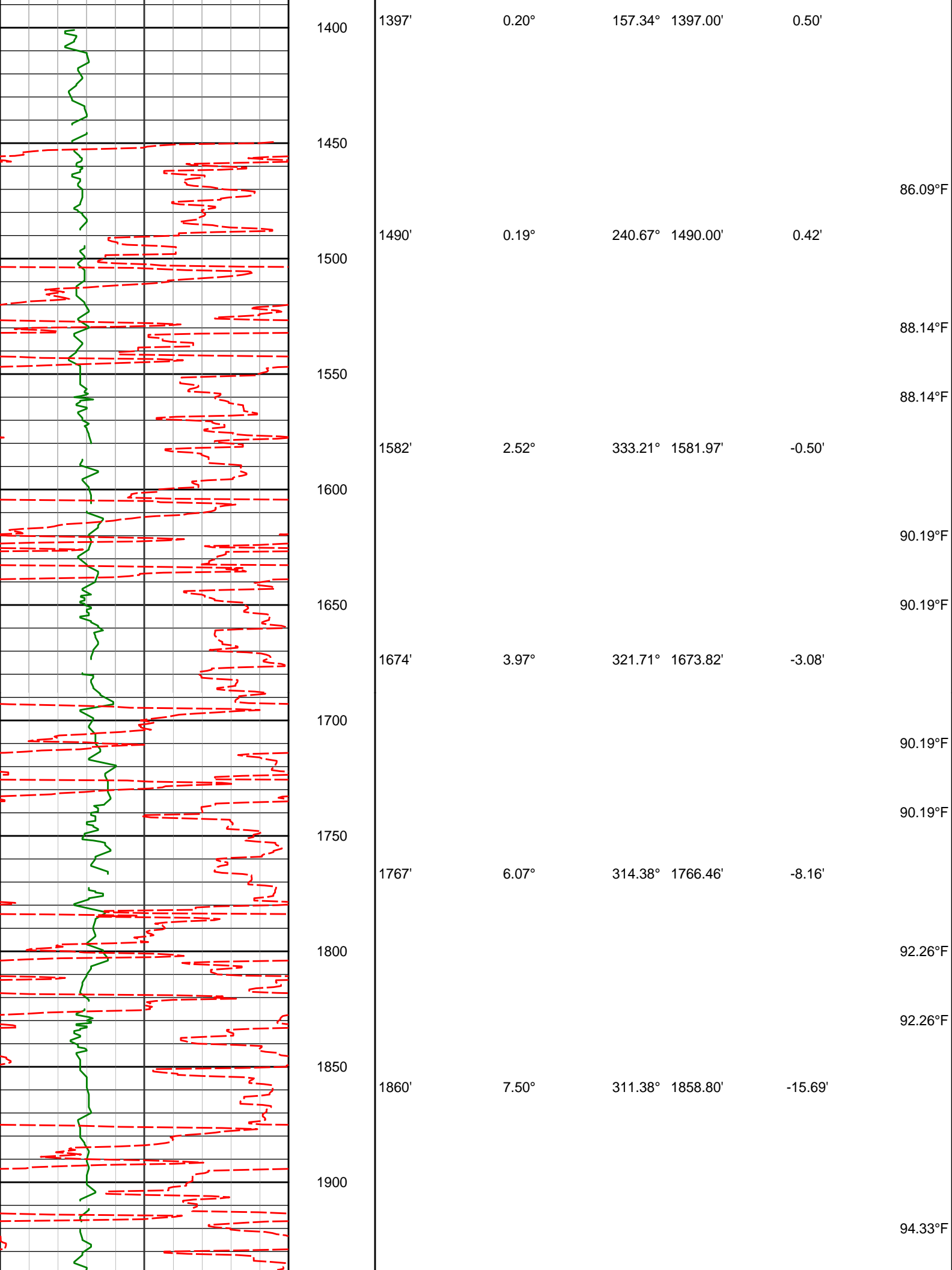
WARRANTY

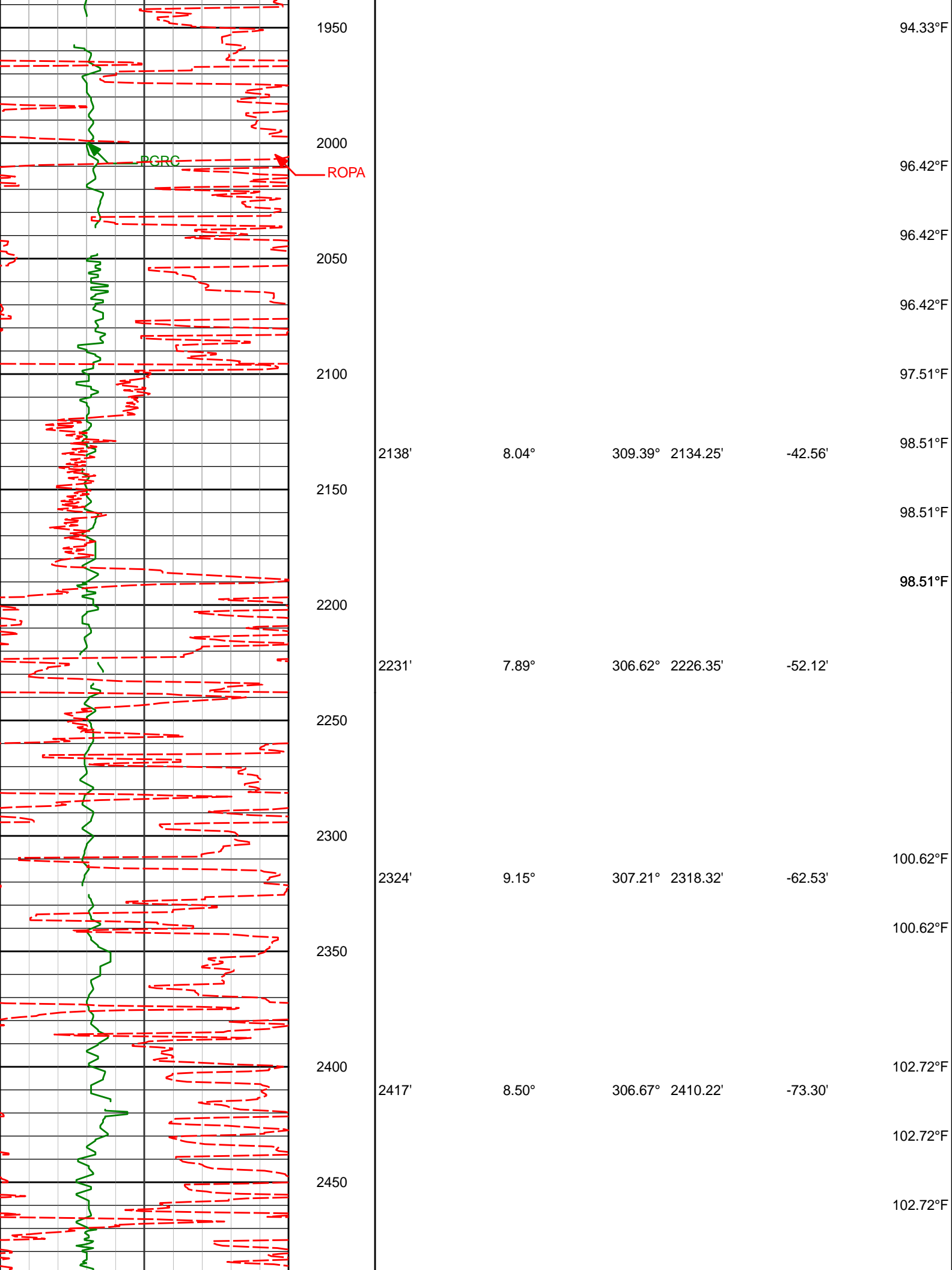
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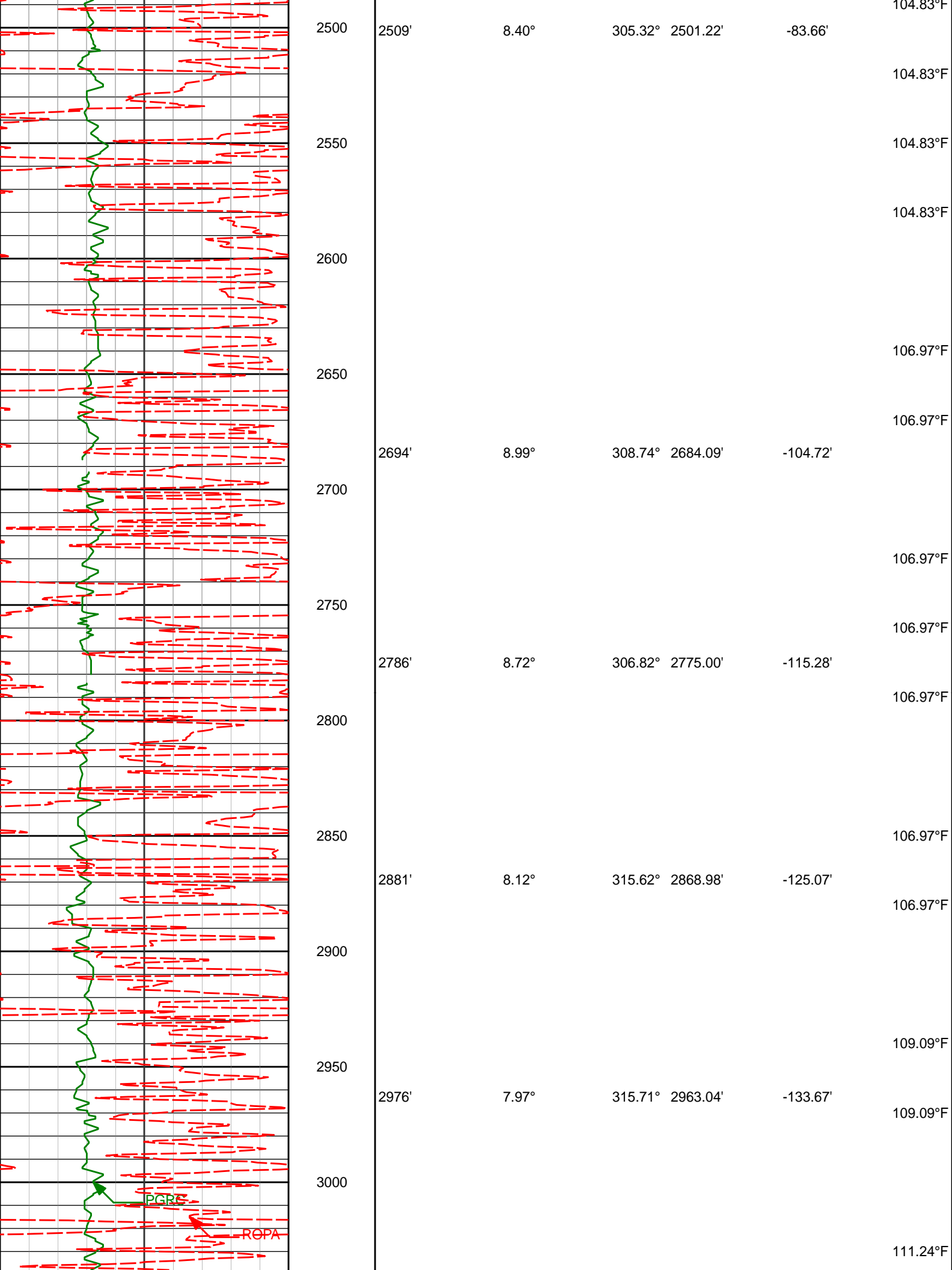
TVD Detail 1:600 Scale

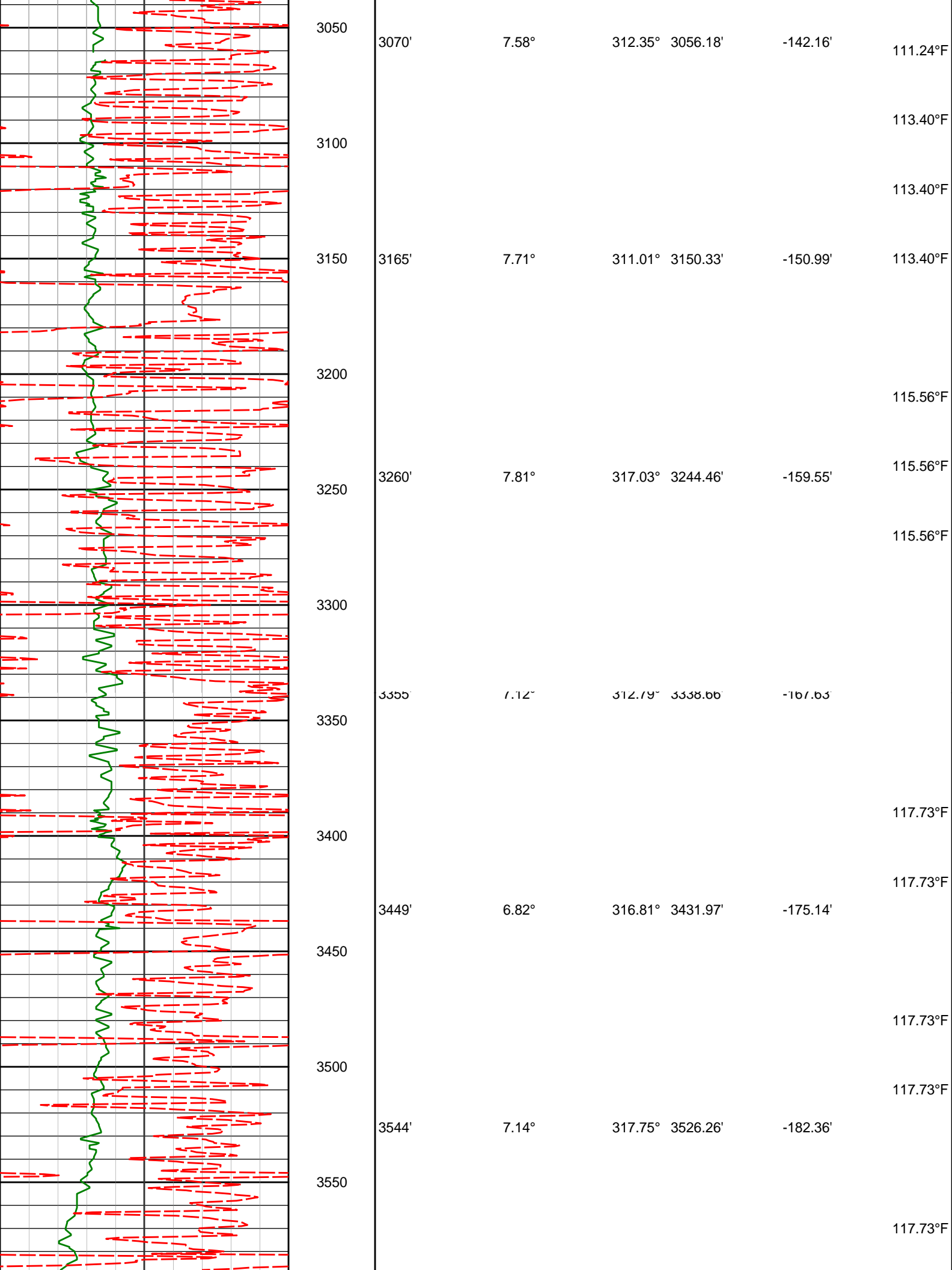


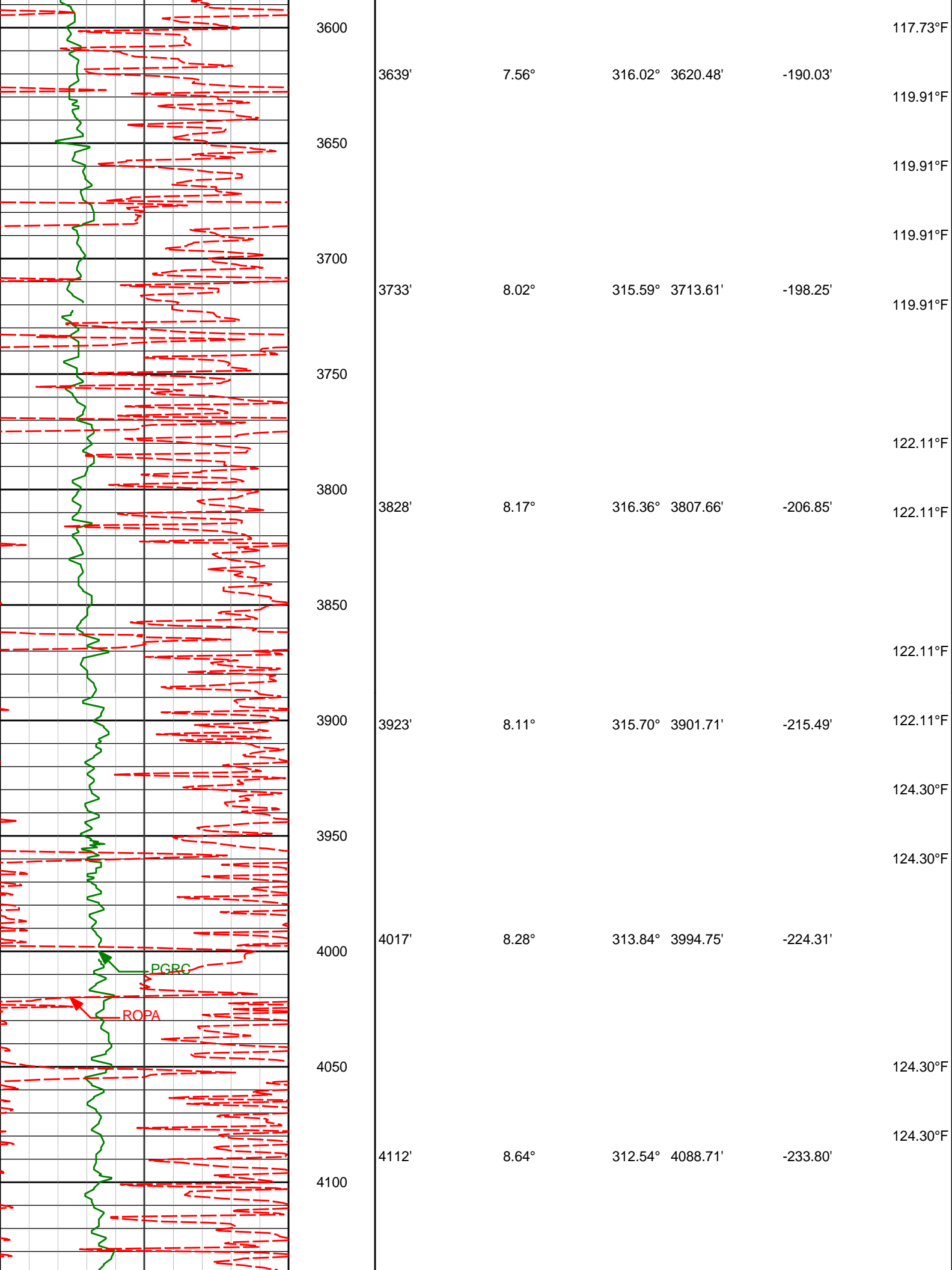


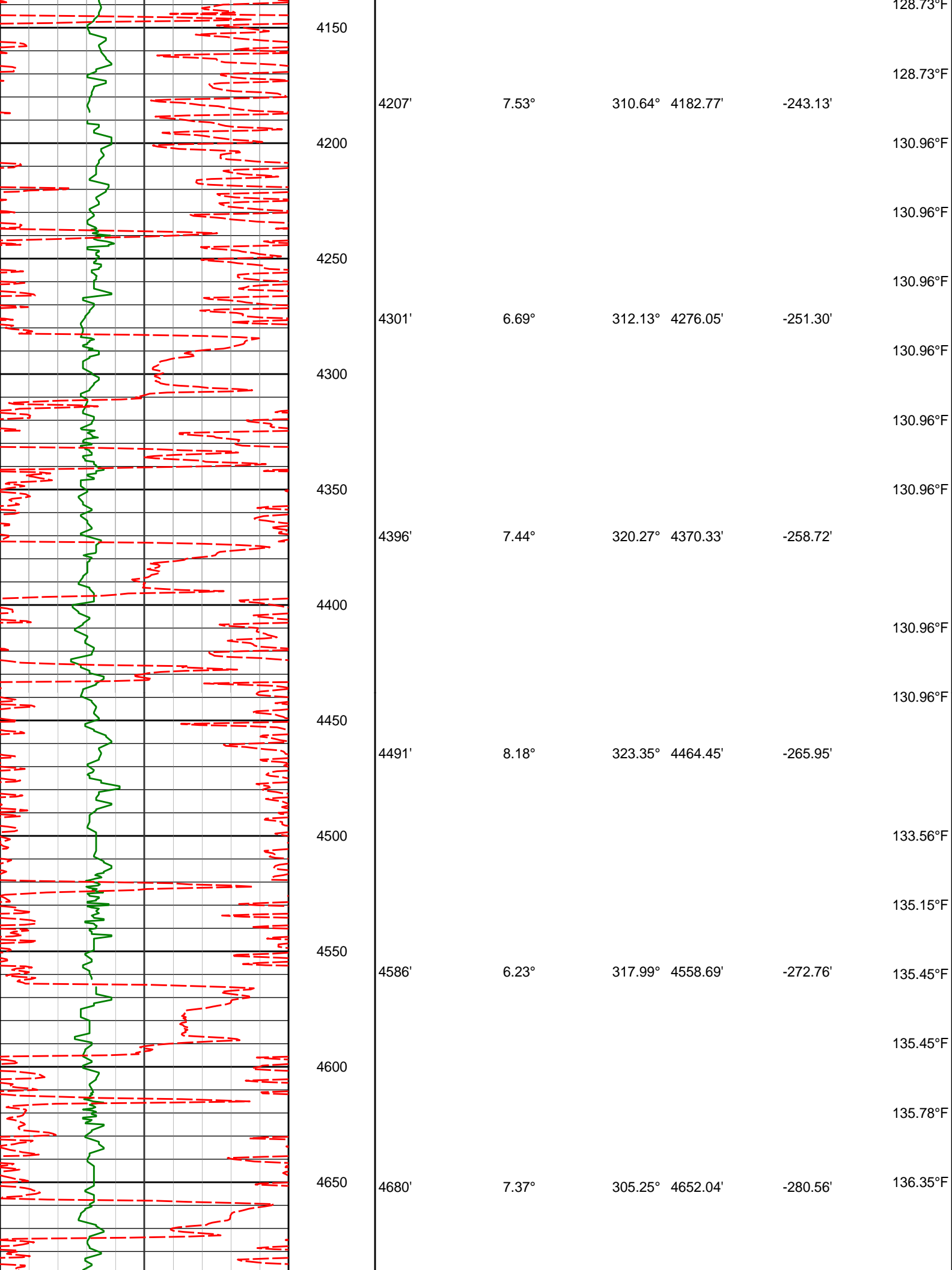


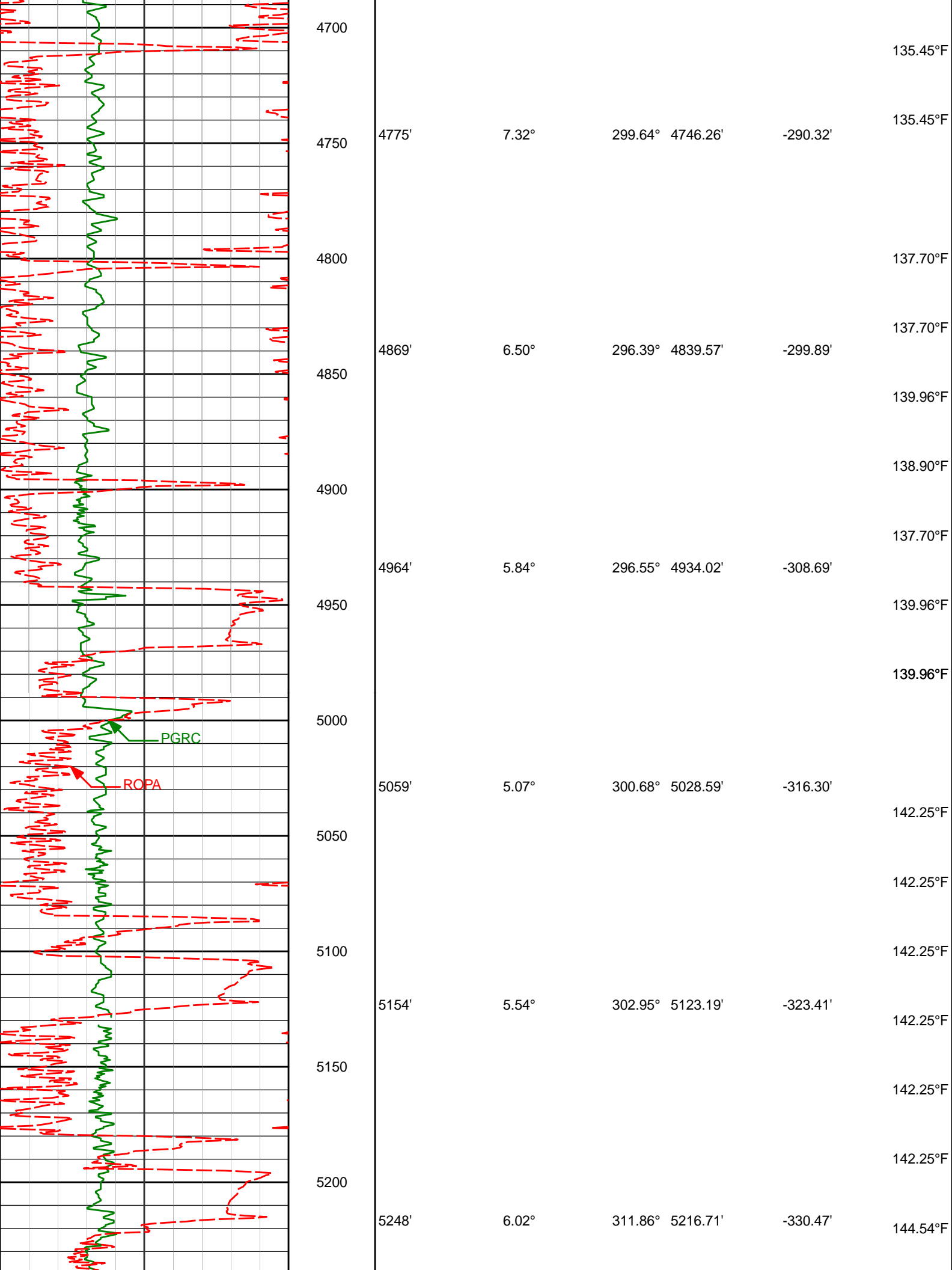


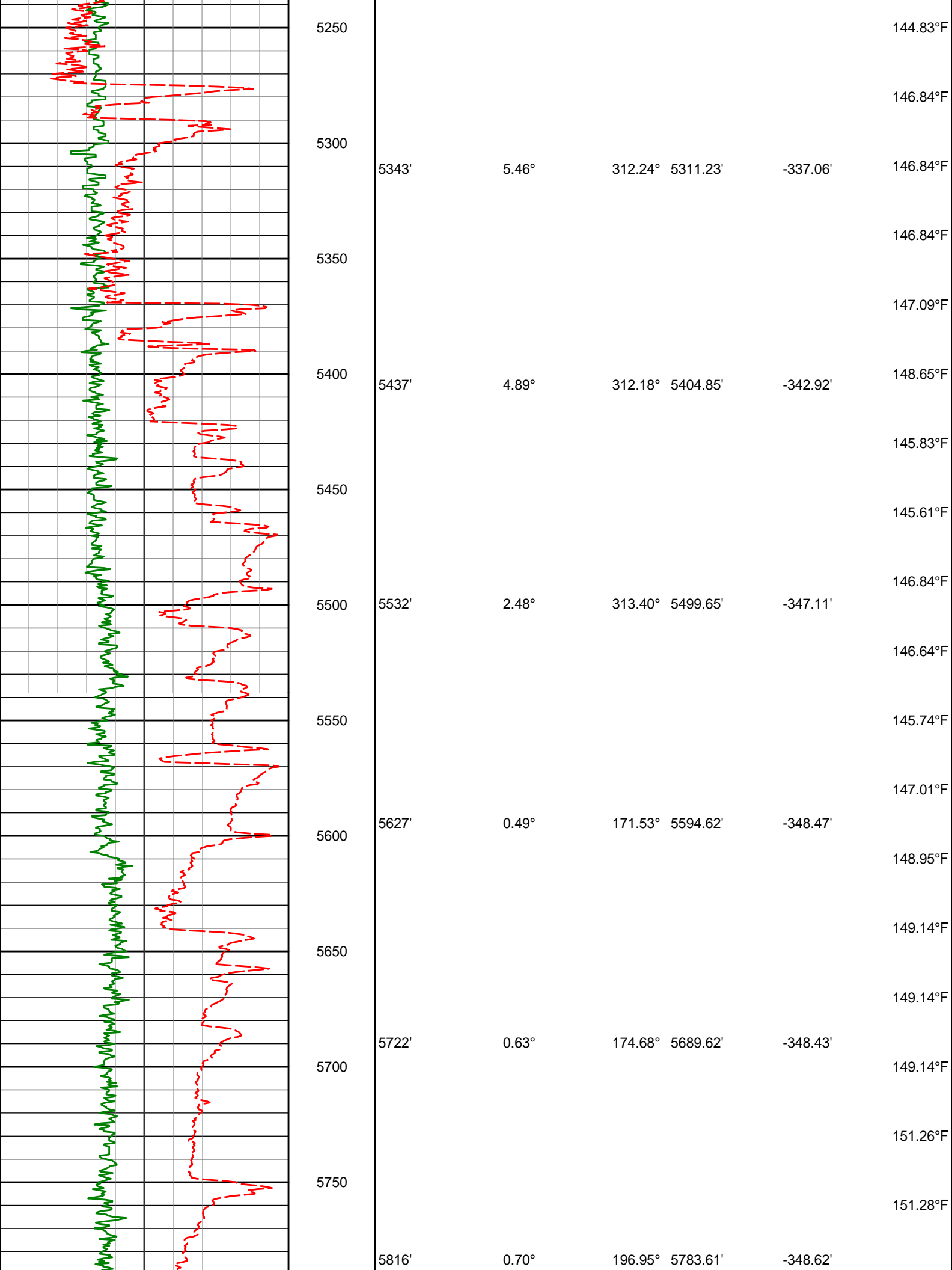


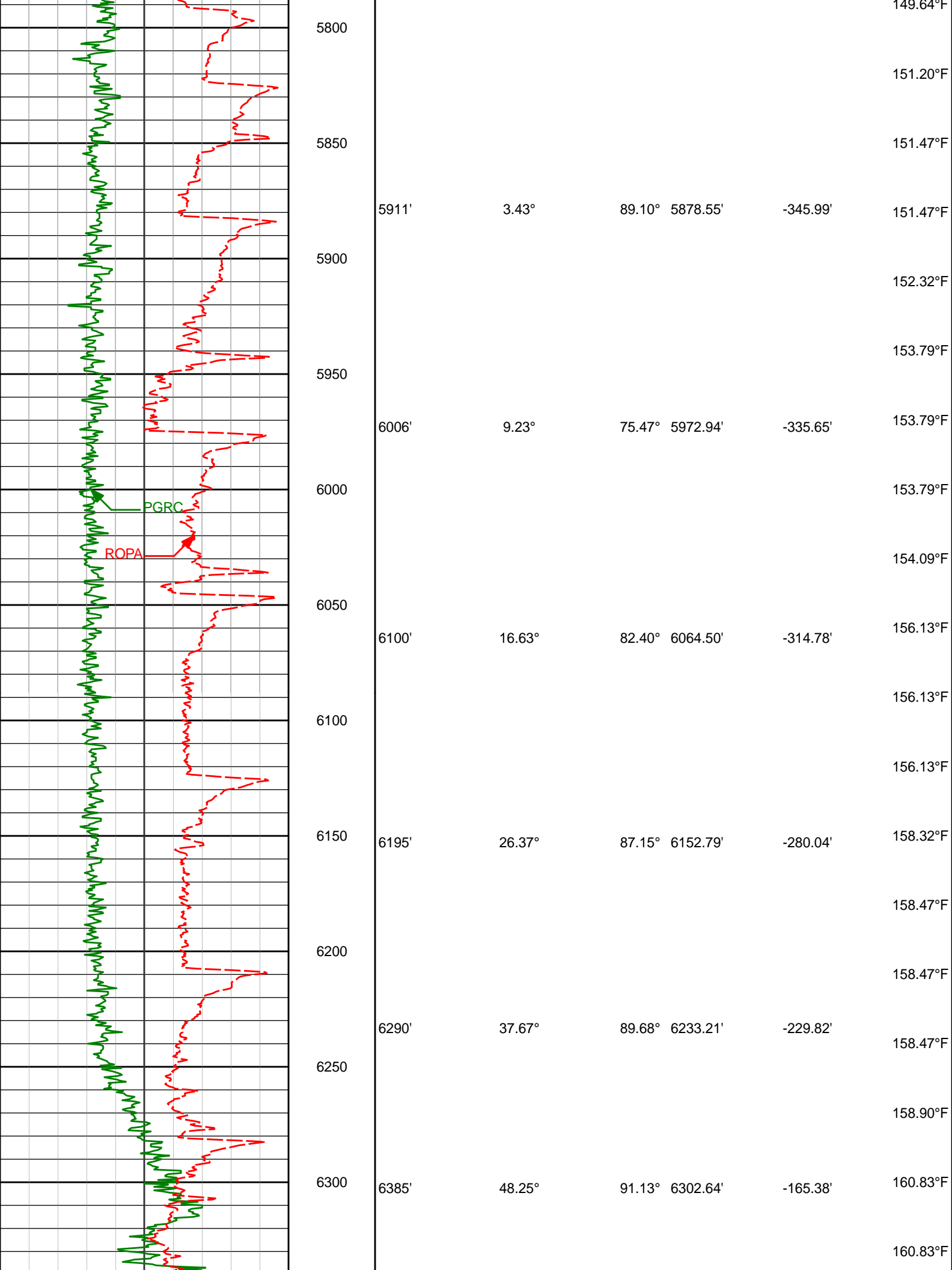


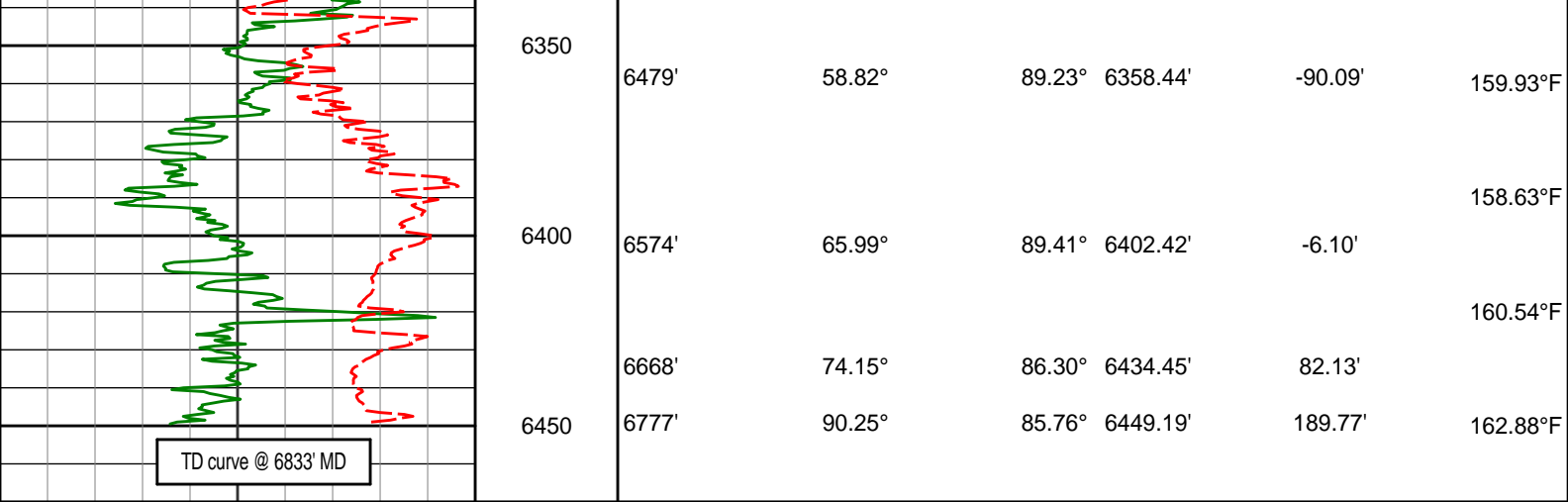






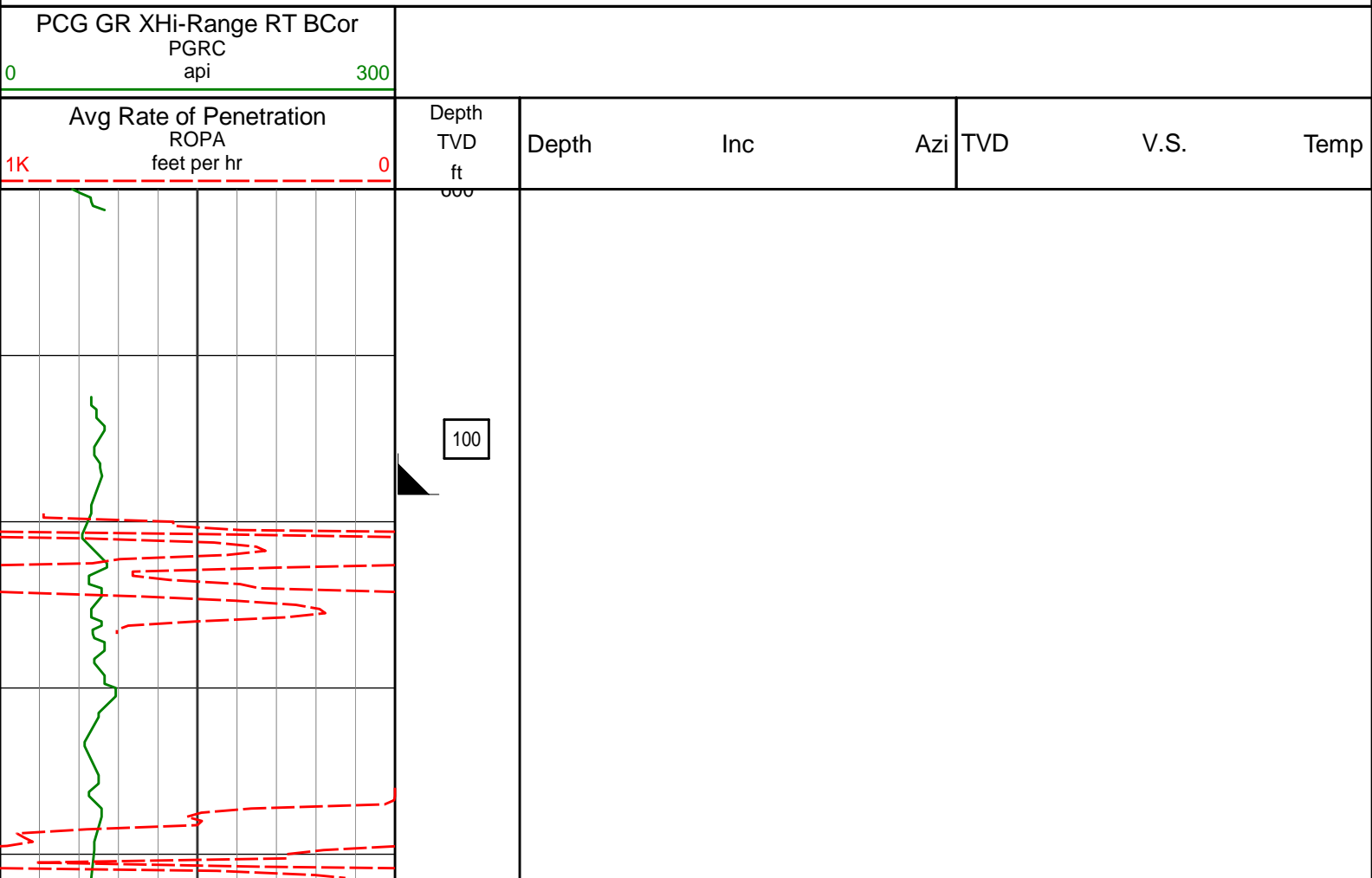


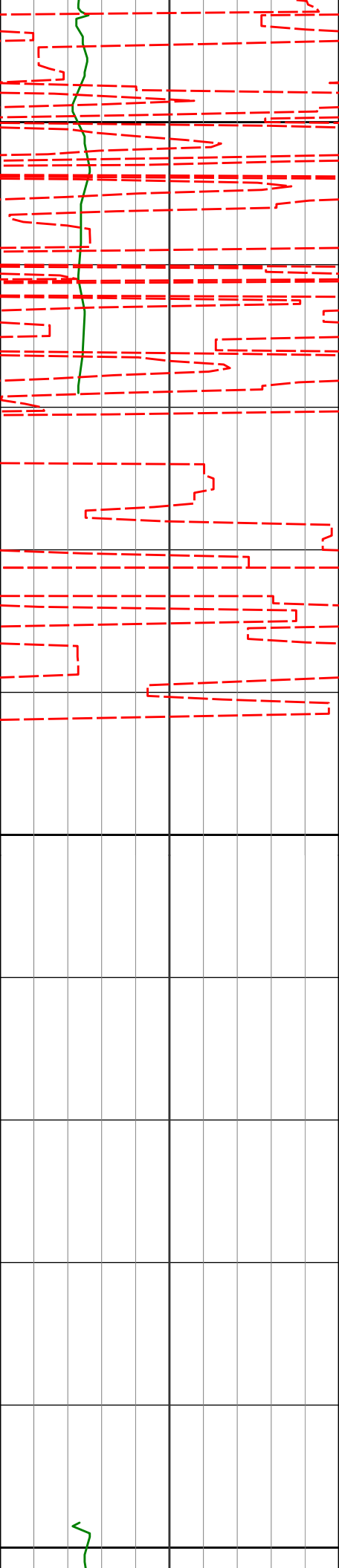




Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K	0							
PCG Gamma Ray BCorr PGRC api								
0	300							

TVD Detail 1:240 Scale





700

800

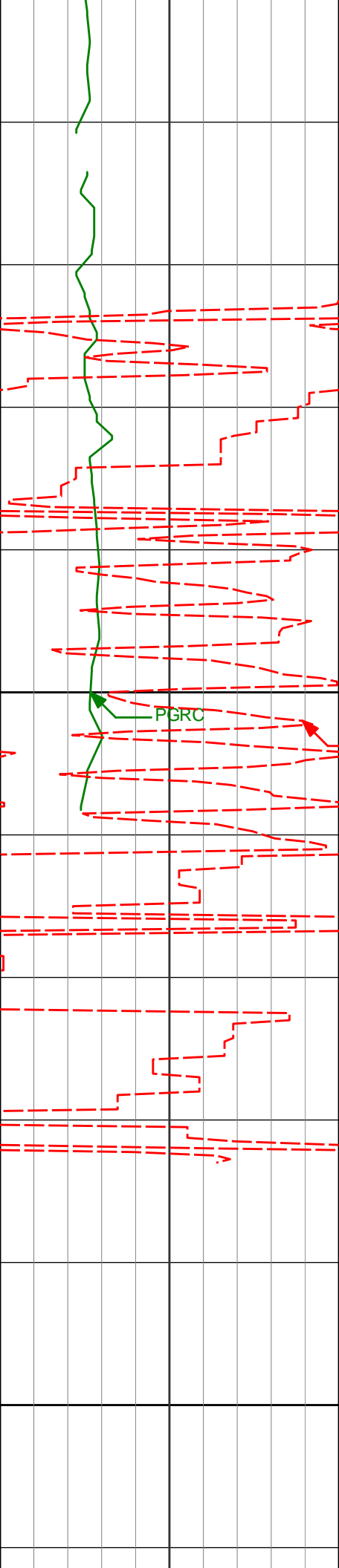
889'

0.07°

194.91° 889.00'

-0.17'

900



919'

0.00°

308.19° 919.00'

-0.18'

82.02°F

85.16°F

84.37°F

1000

PGRC

ROPA

1011'

0.10°

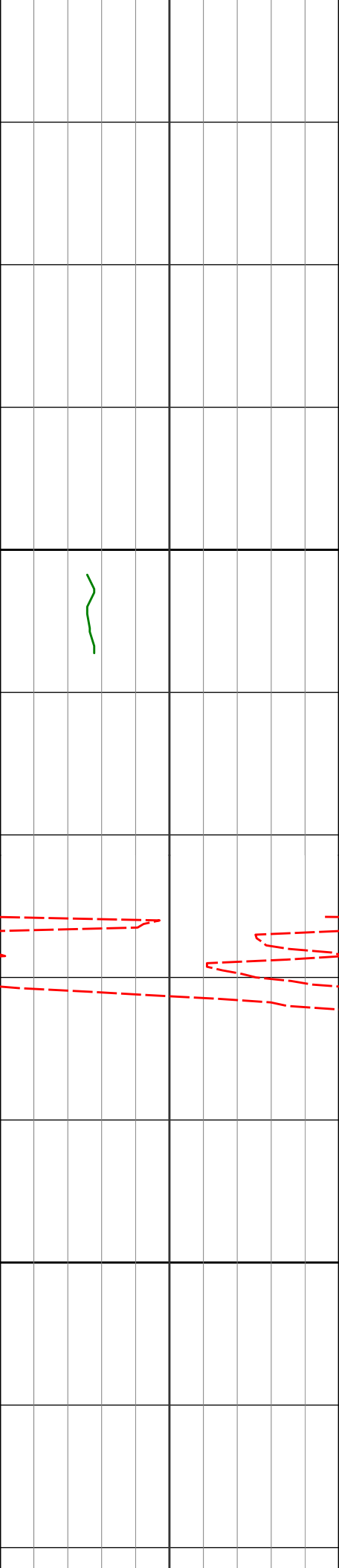
104.27° 1011.00'

-0.11'

82.02°F

1100

84.06°F



1200

1210'

0.16°

135.47° 1210.00'

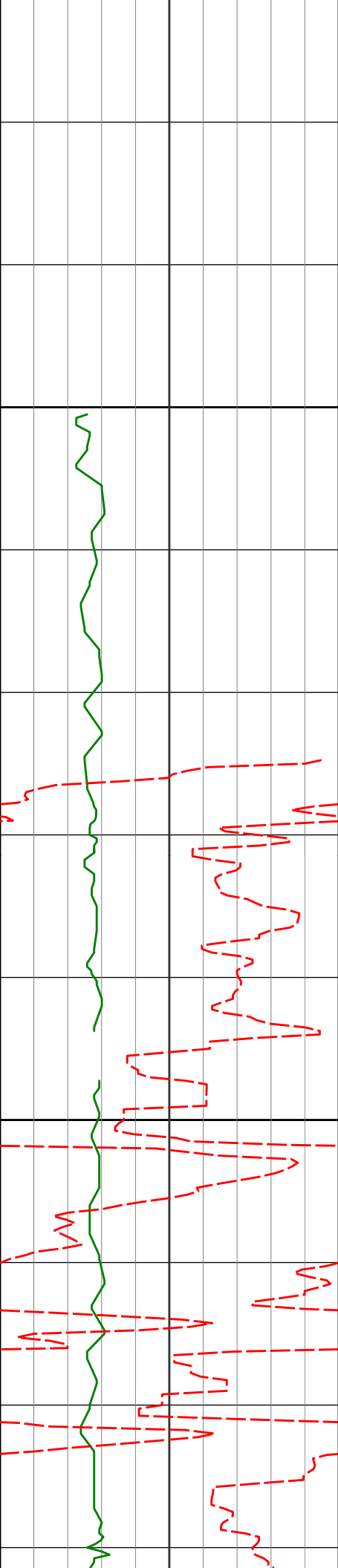
0.23'

1300

84.06°F

84.06°F

84.06°F



1400

1397'

0.20°

157.34° 1397.00'

0.50'

1500

1490'

0.19°

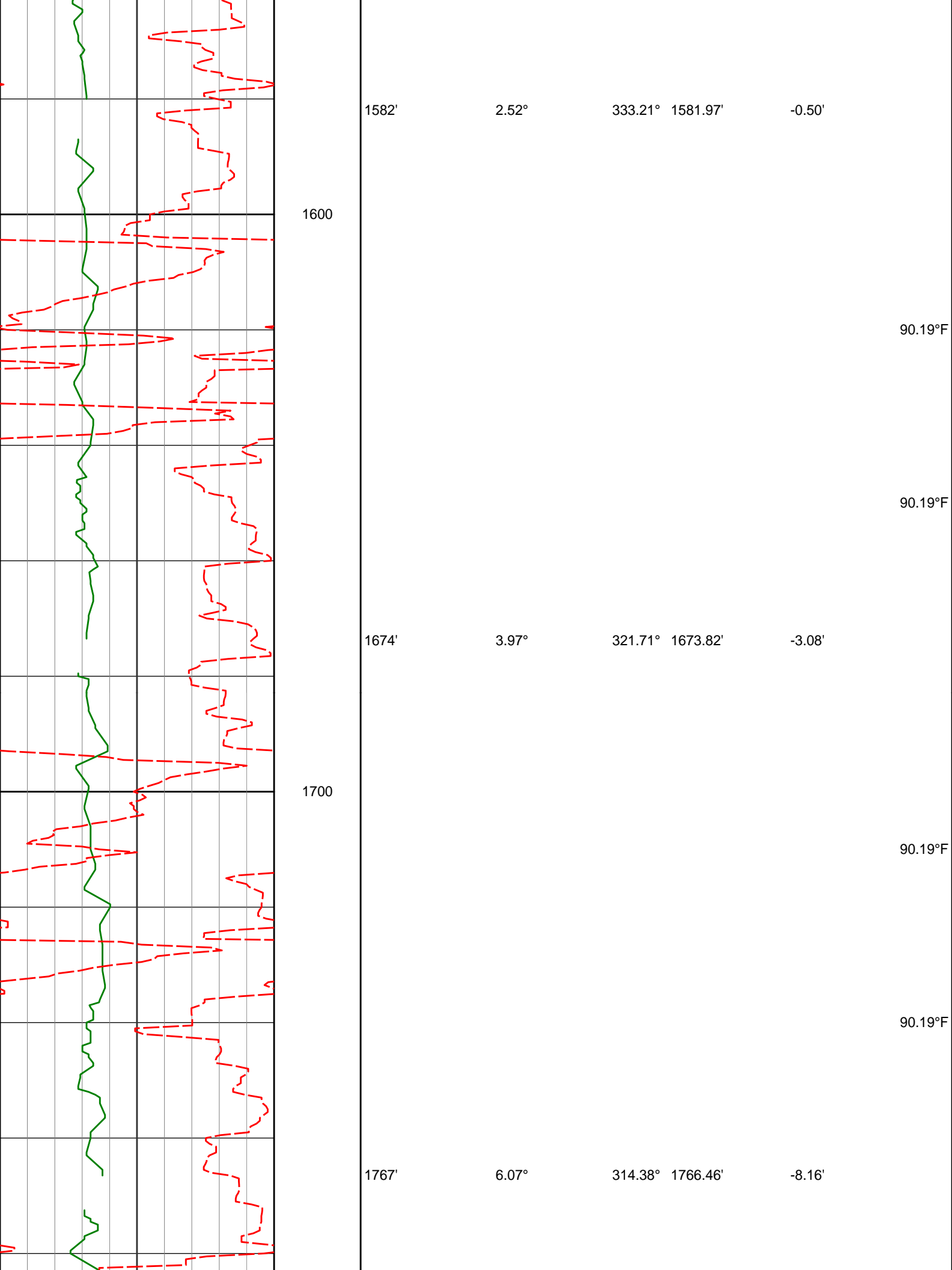
240.67° 1490.00'

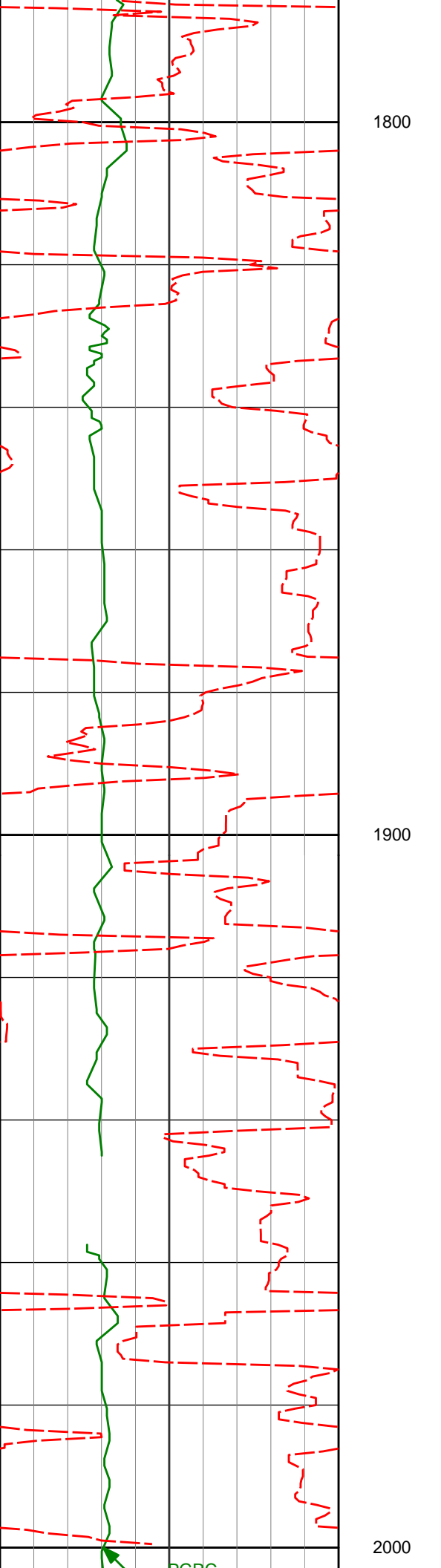
0.42'

86.09°F

88.14°F

88.14°F





1800 92.26°F

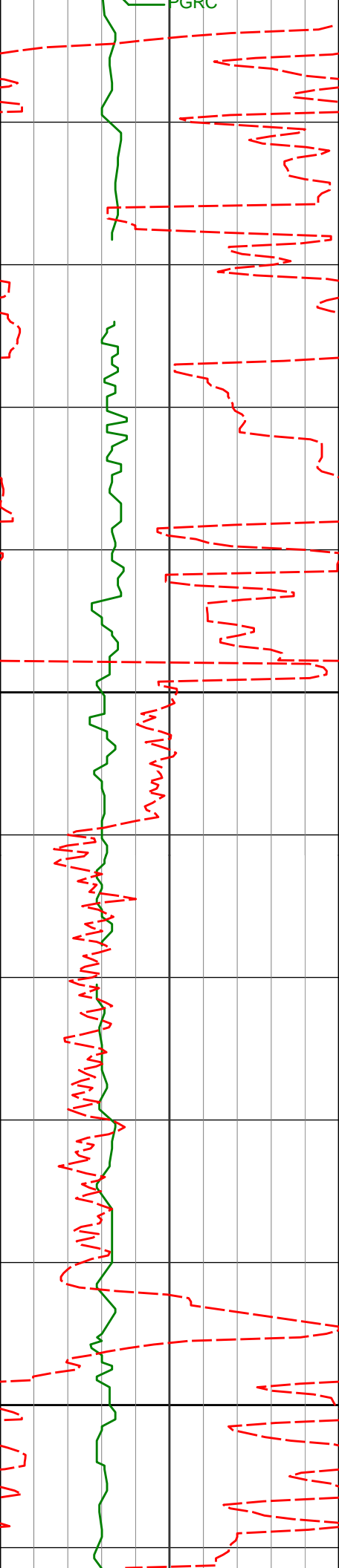
92.26°F

1860' 7.50° 311.38° 1858.80' -15.69'

1900

94.33°F

2000



2100

2138'

8.04°

309.39° 2134.25'

-42.56'

2200

96.42°F

96.42°F

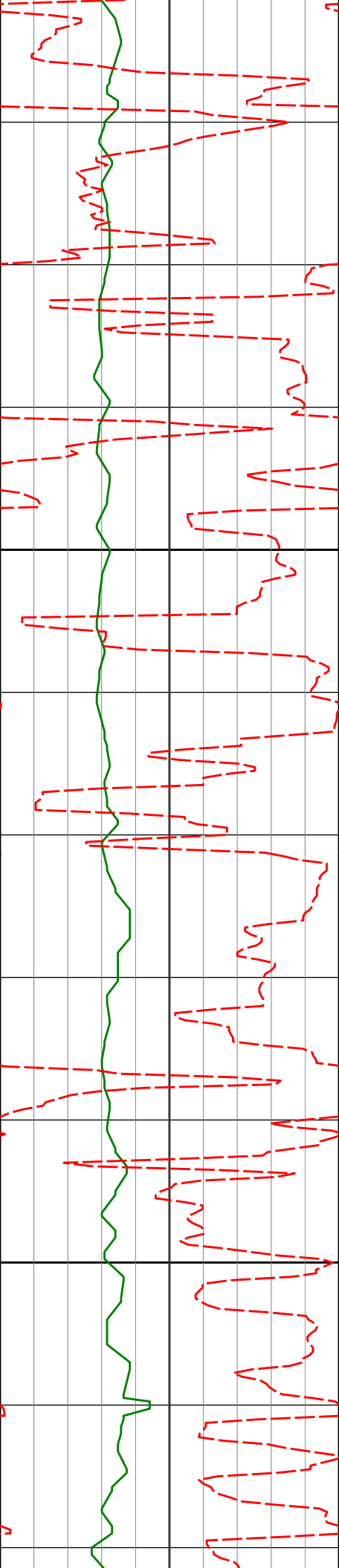
96.42°F

97.51°F

98.51°F

98.51°F

98.51°F



2231'

7.89°

306.62° 2226.35'

-52.12'

2300

100.62°F

2324'

9.15°

307.21° 2318.32'

-62.53'

100.62°F

2400

102.72°F

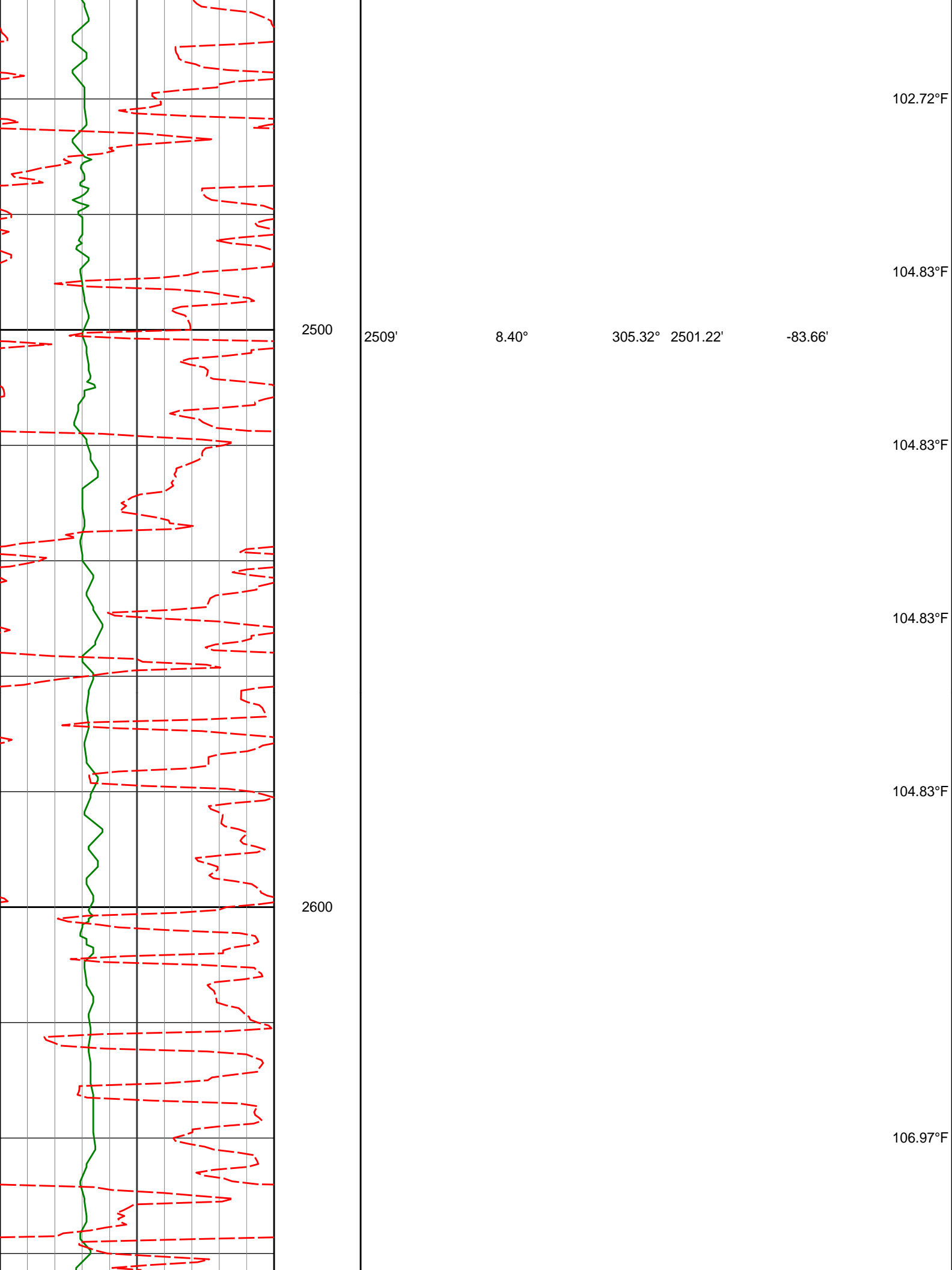
2417'

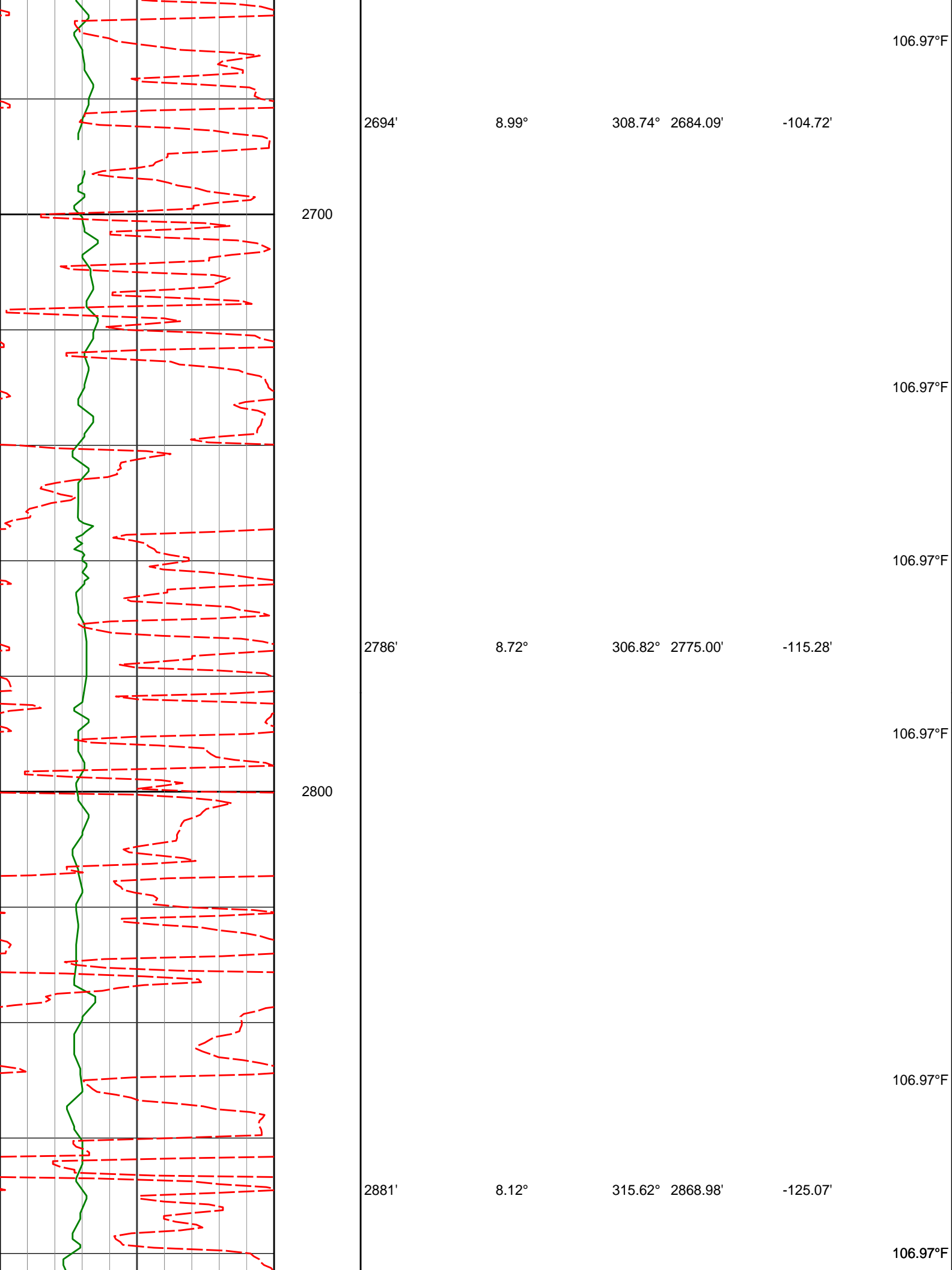
8.50°

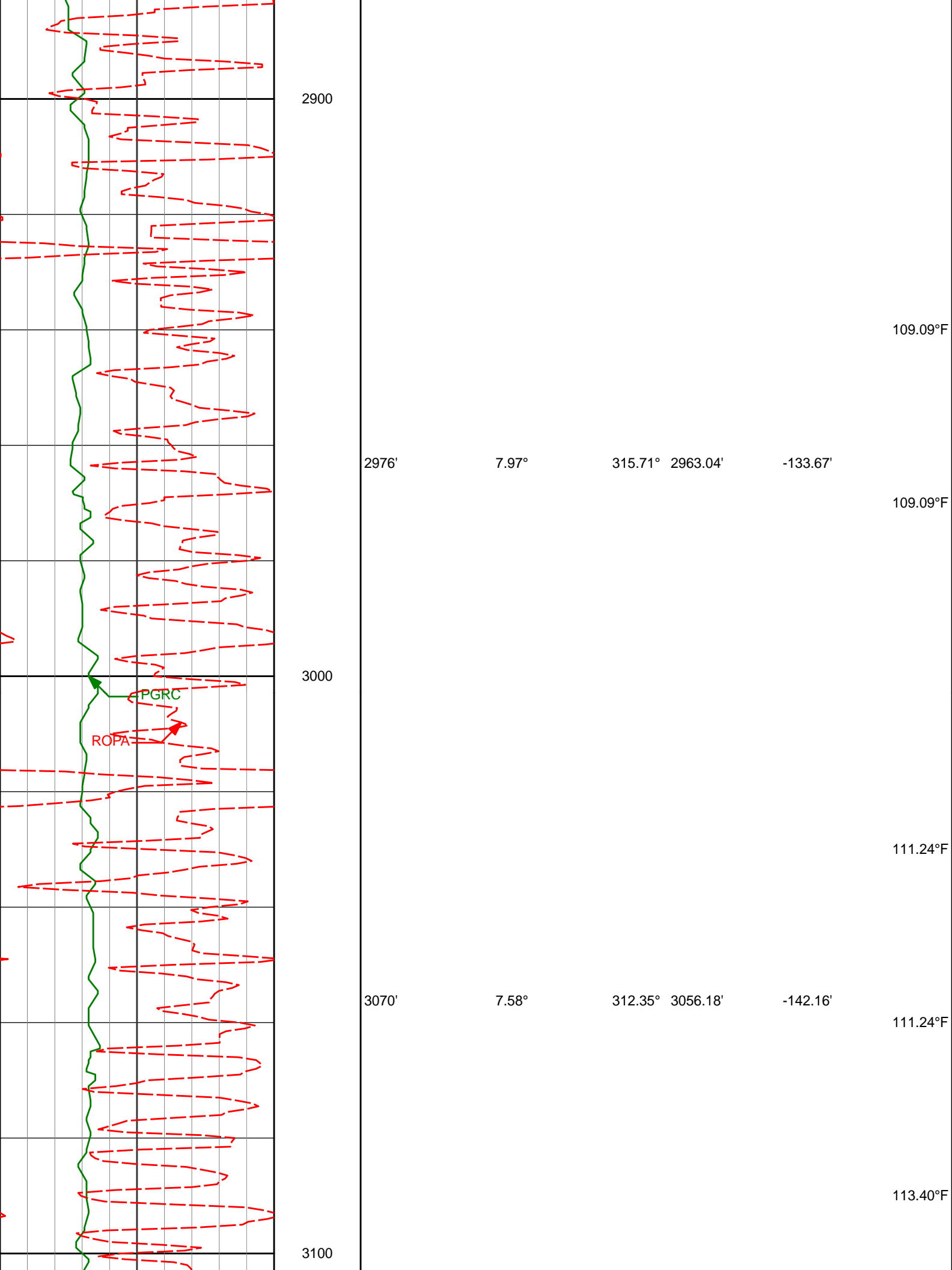
306.67° 2410.22'

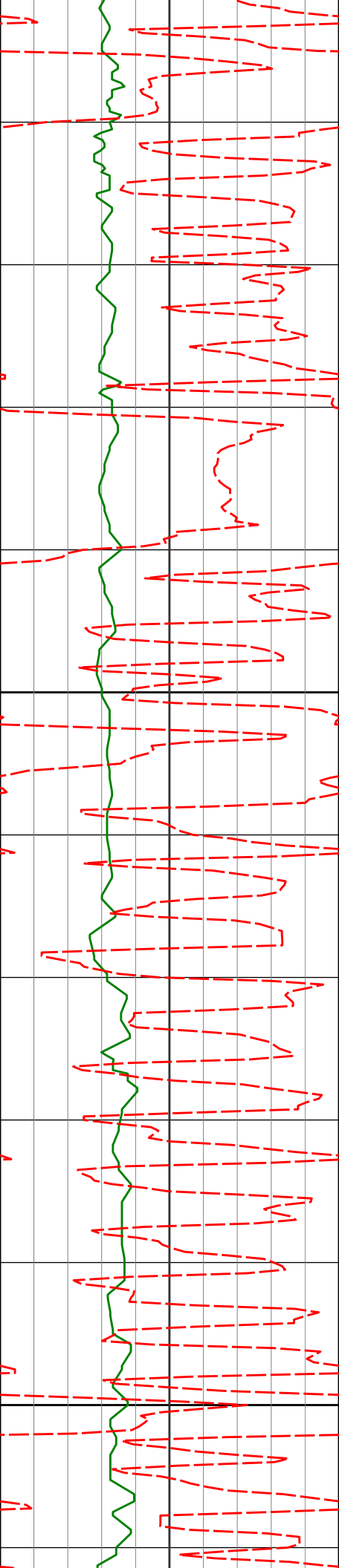
-73.30'

102.72°F









3165'

7.71°

311.01° 3150.33'

-150.99'

113.40°F

113.40°F

3200

115.56°F

3260'

7.81°

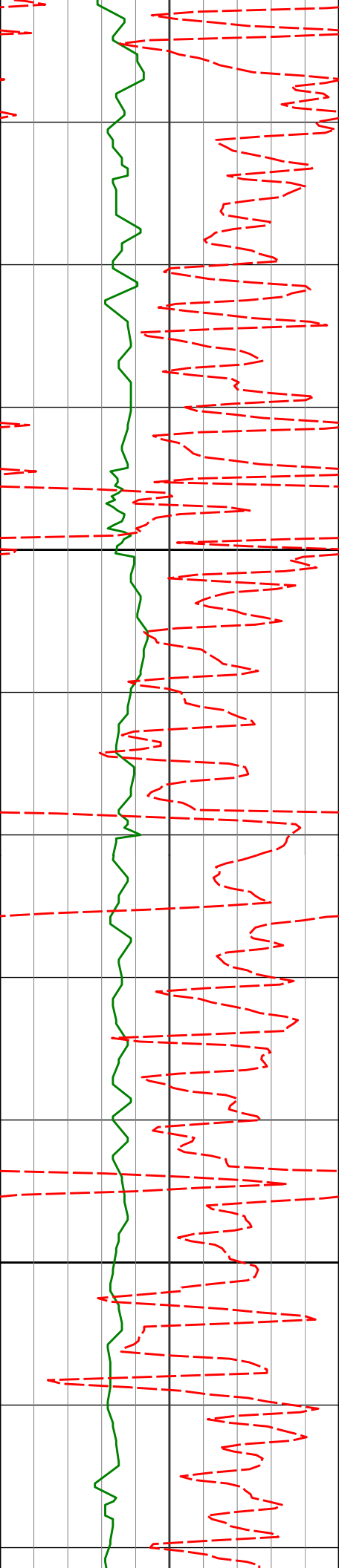
317.03° 3244.46'

-159.55'

115.56°F

115.56°F

3300



3355'

7.12°

312.79° 3338.66'

-167.63'

117.73°F

117.73°F

3400

117.73°F

3449'

6.82°

316.81° 3431.97'

-175.14'

117.73°F

3500

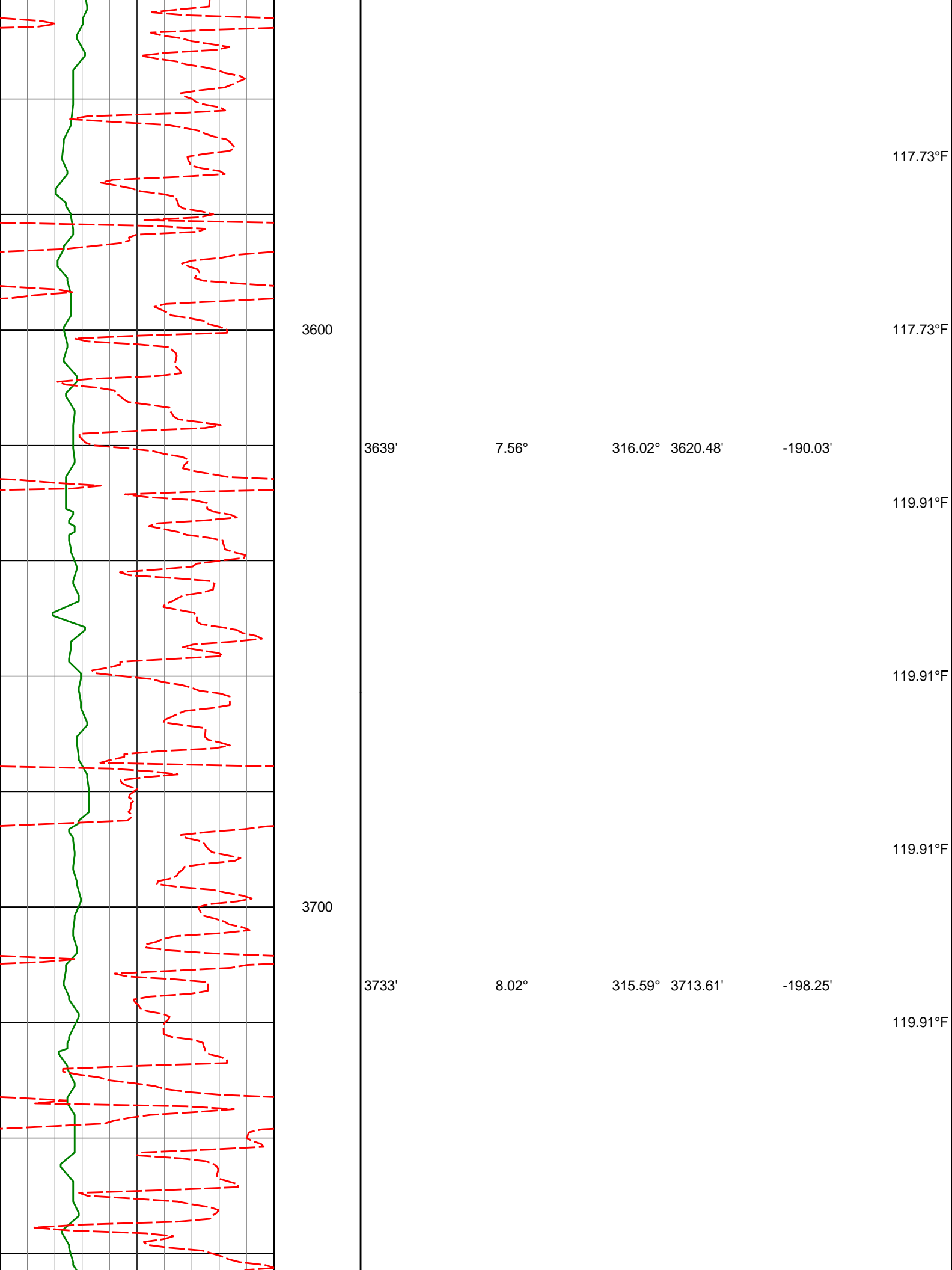
117.73°F

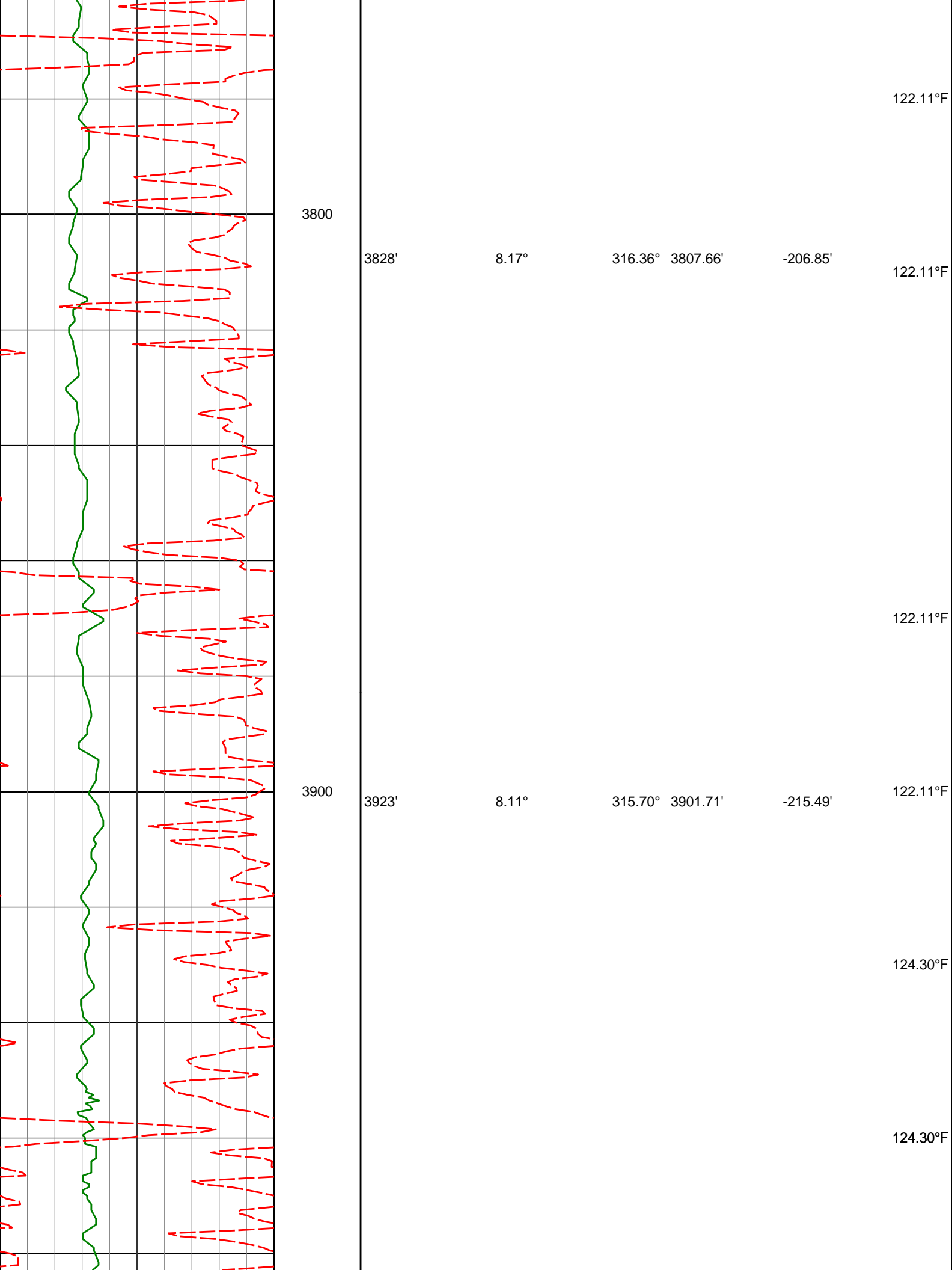
3544'

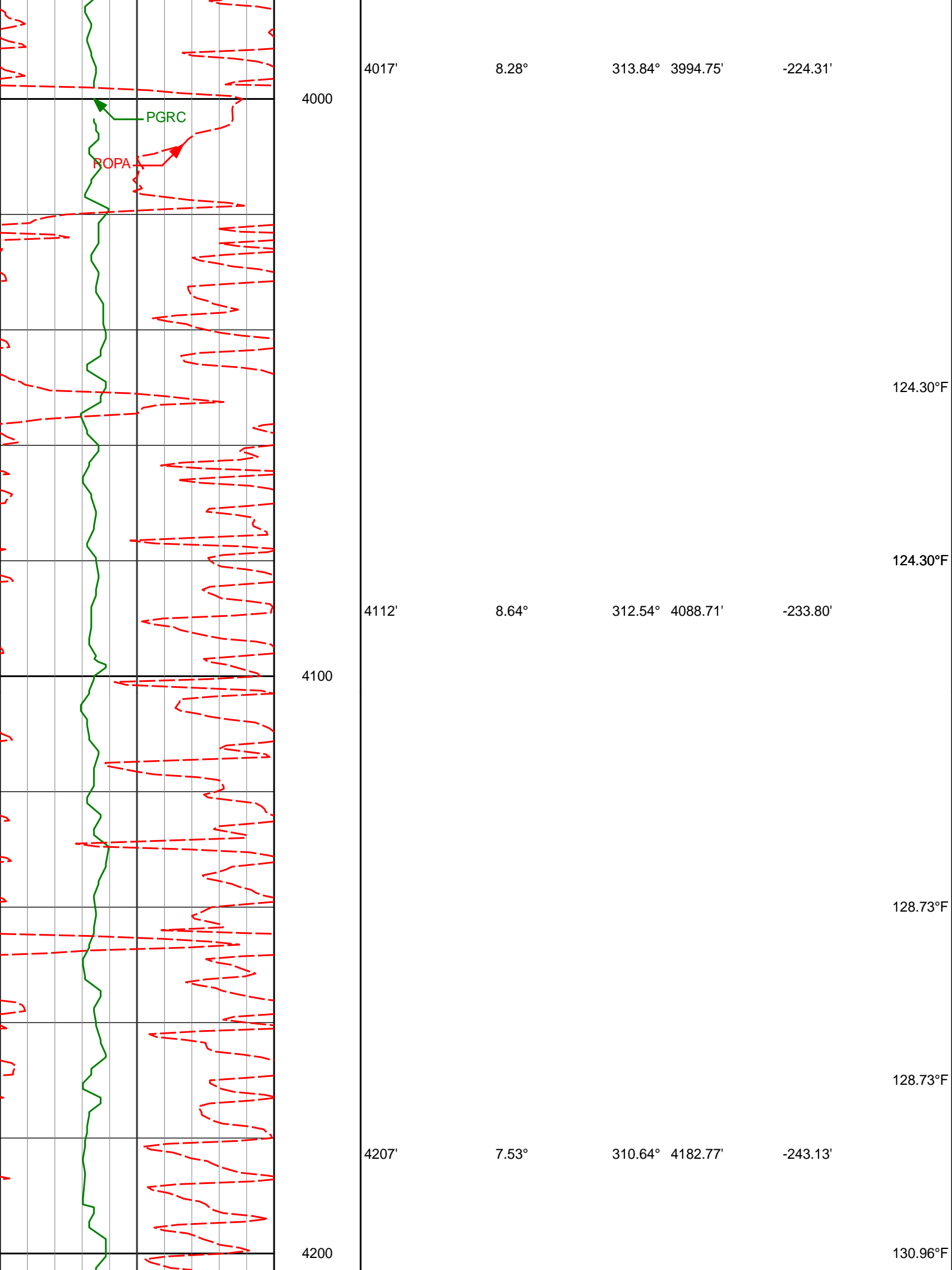
7.14°

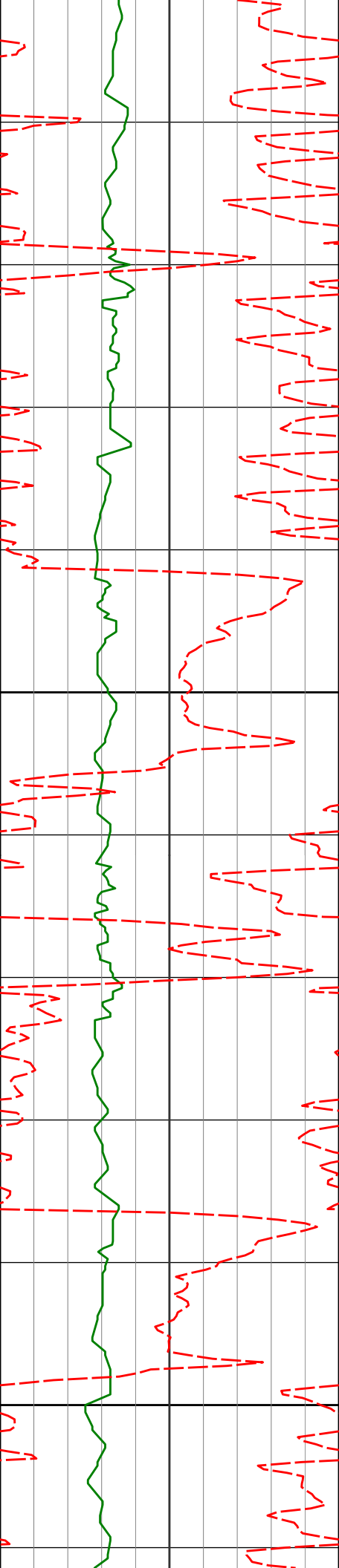
317.75° 3526.26'

-182.36'









4300

4400

4301'

4396'

6.69°

7.44°

312.13° 4276.05'

320.27° 4370.33'

-251.30'

-258.72'

130.96°F

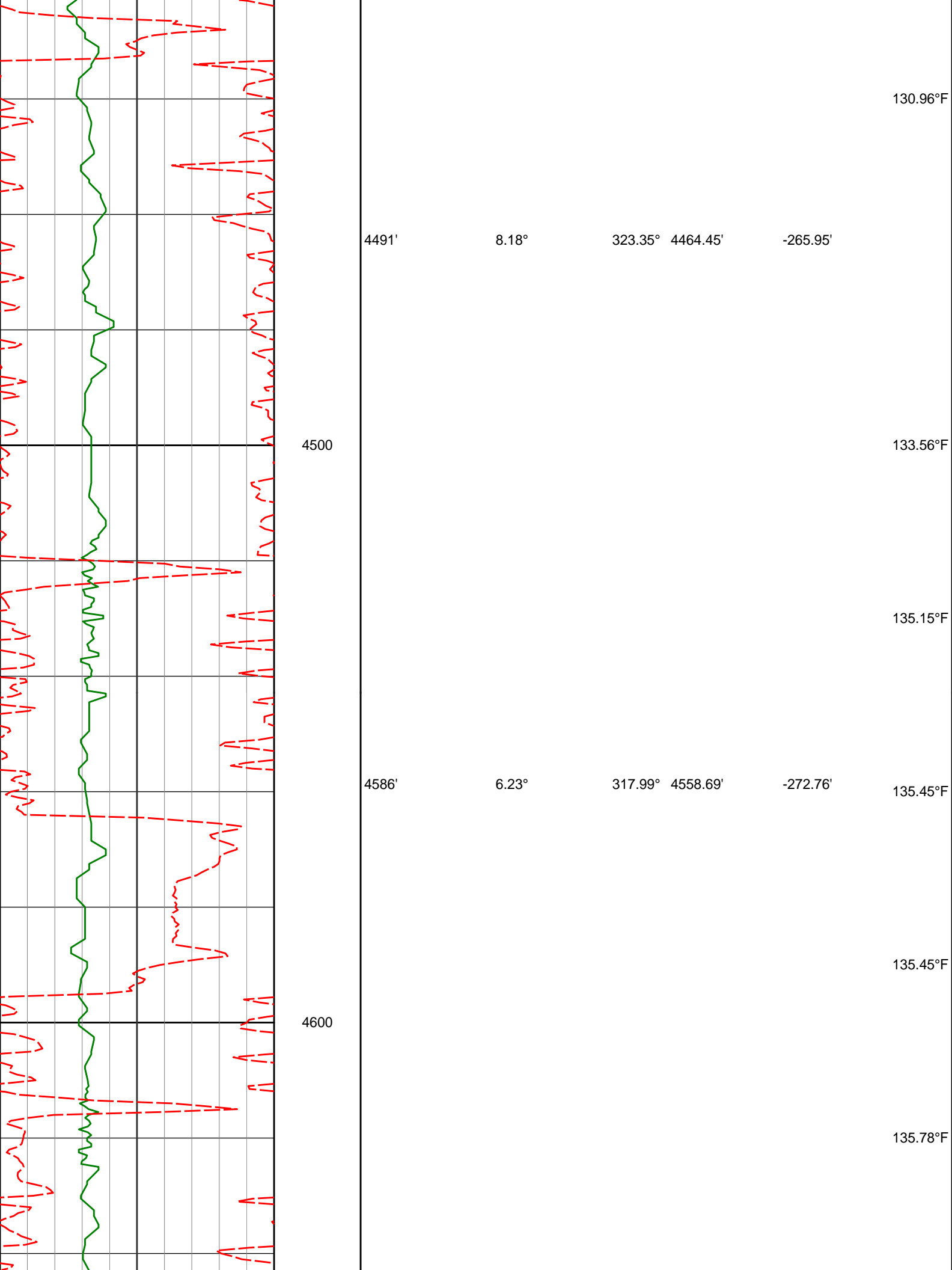
130.96°F

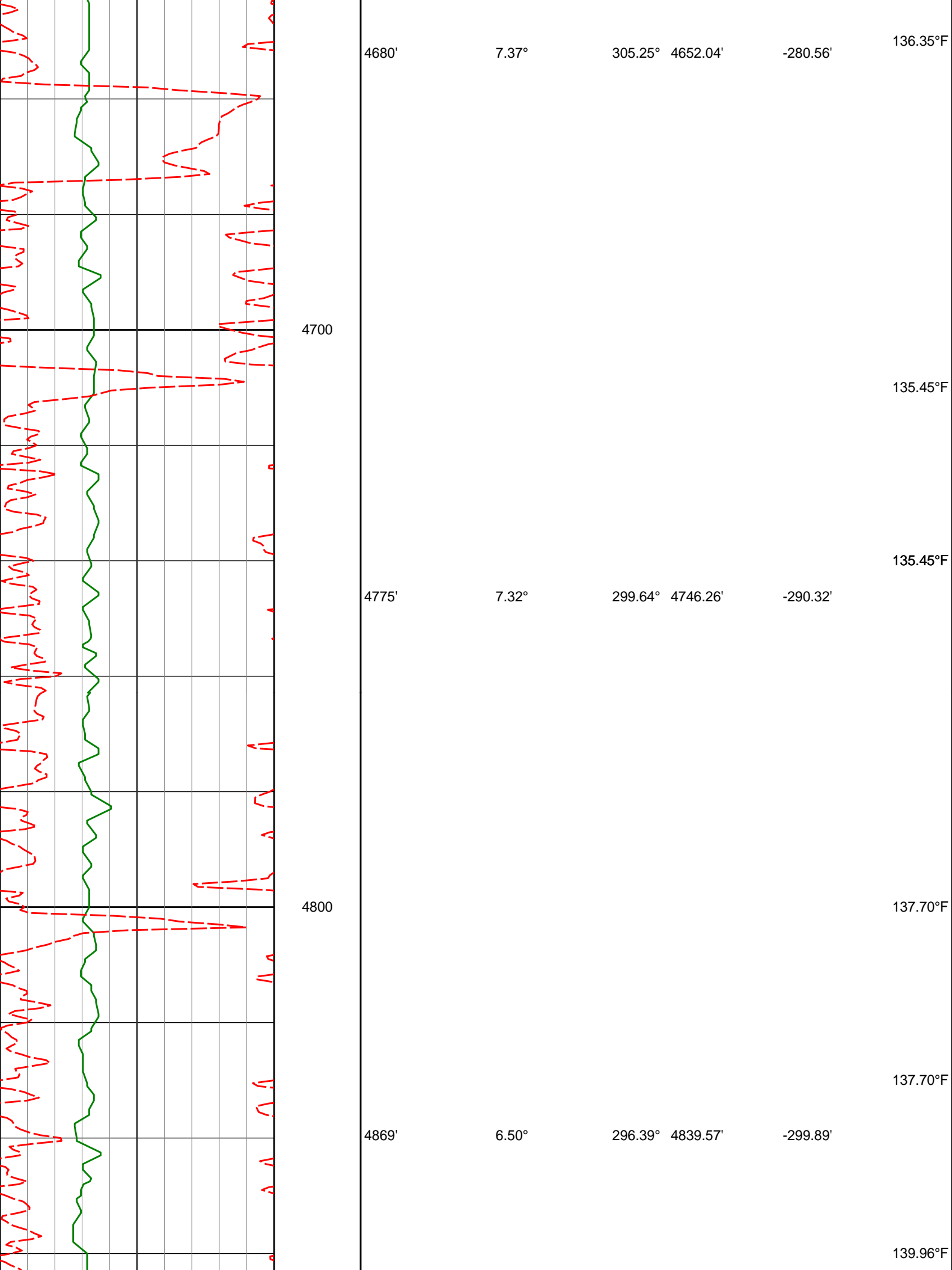
130.96°F

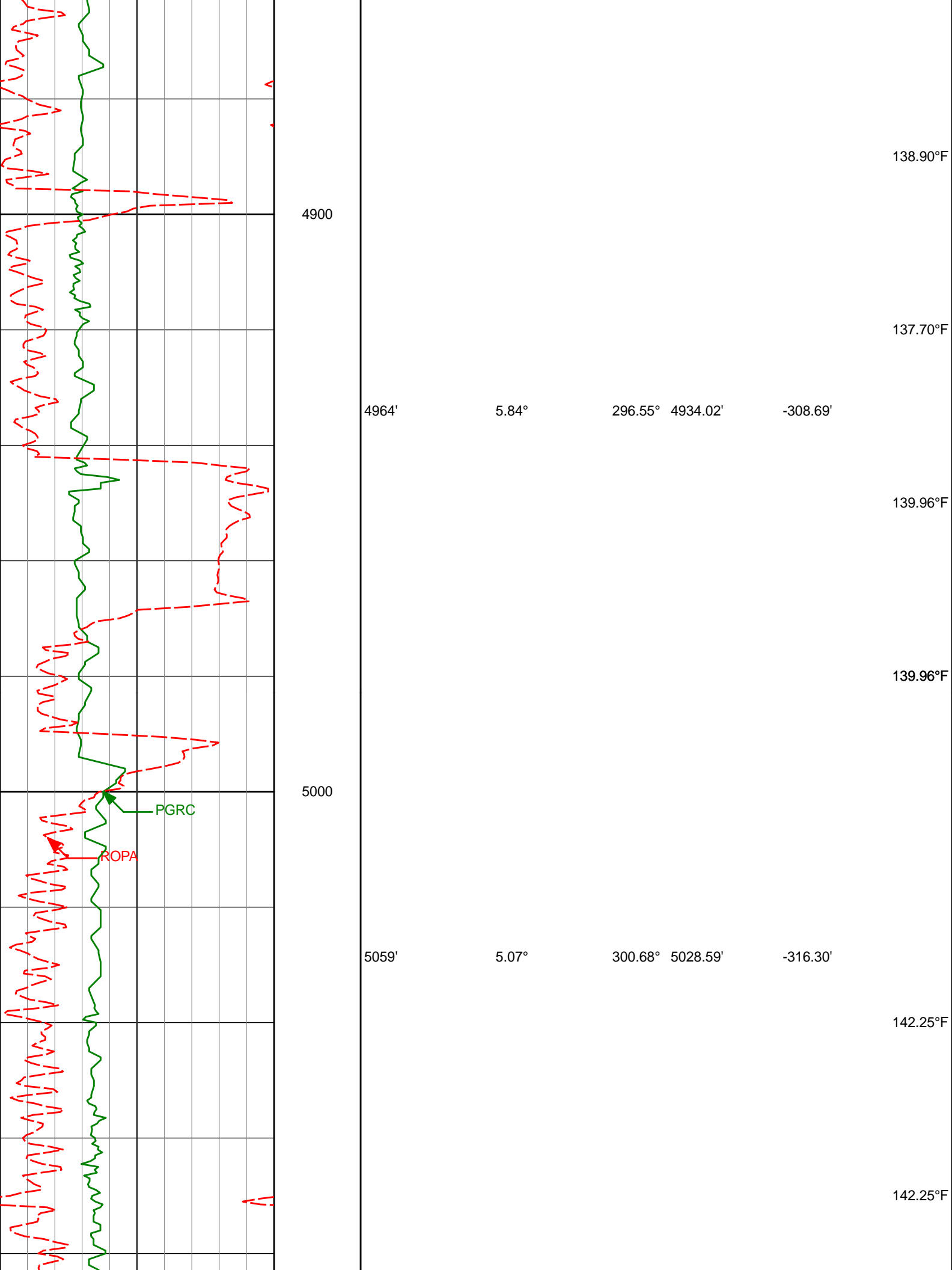
130.96°F

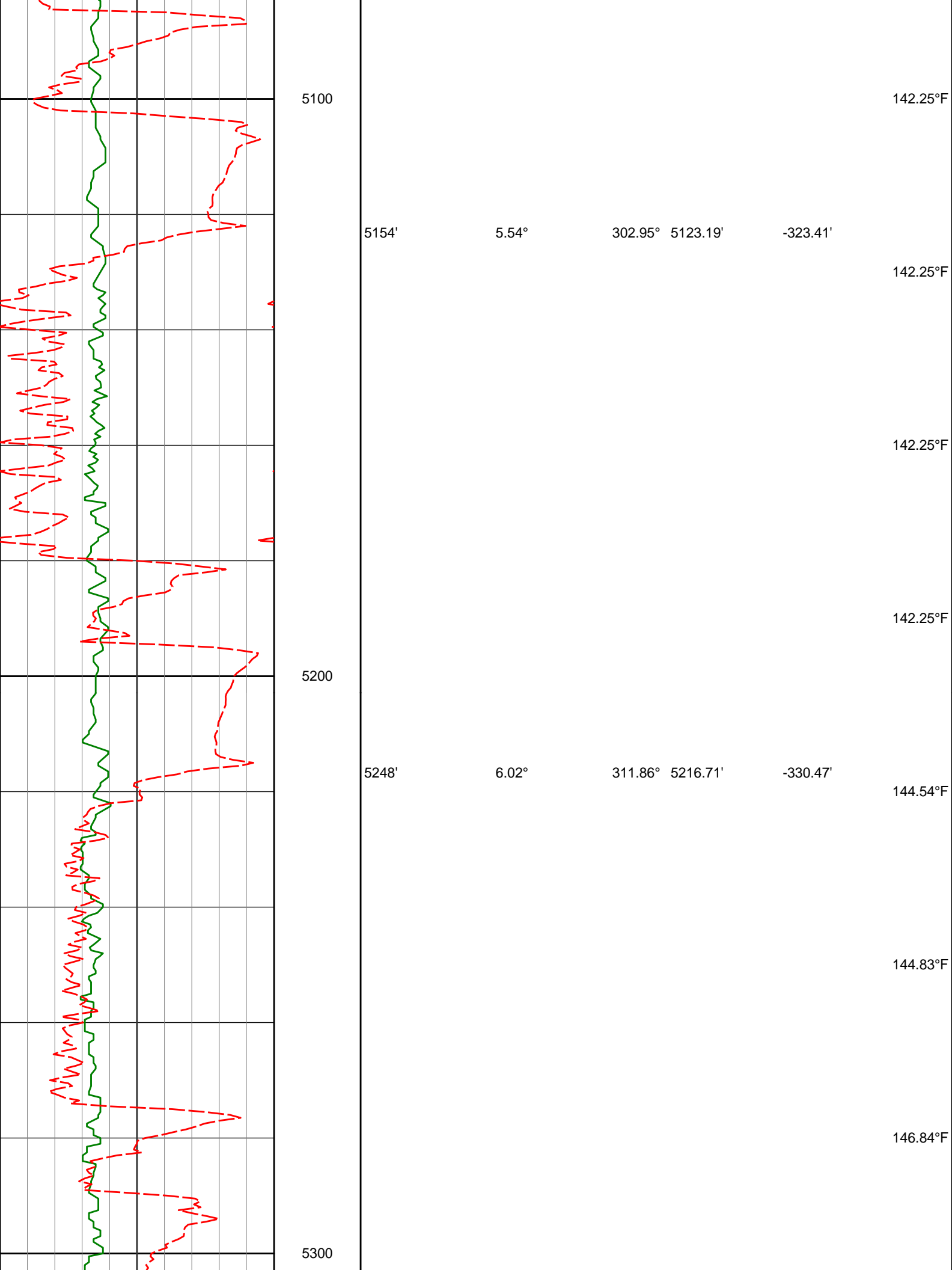
130.96°F

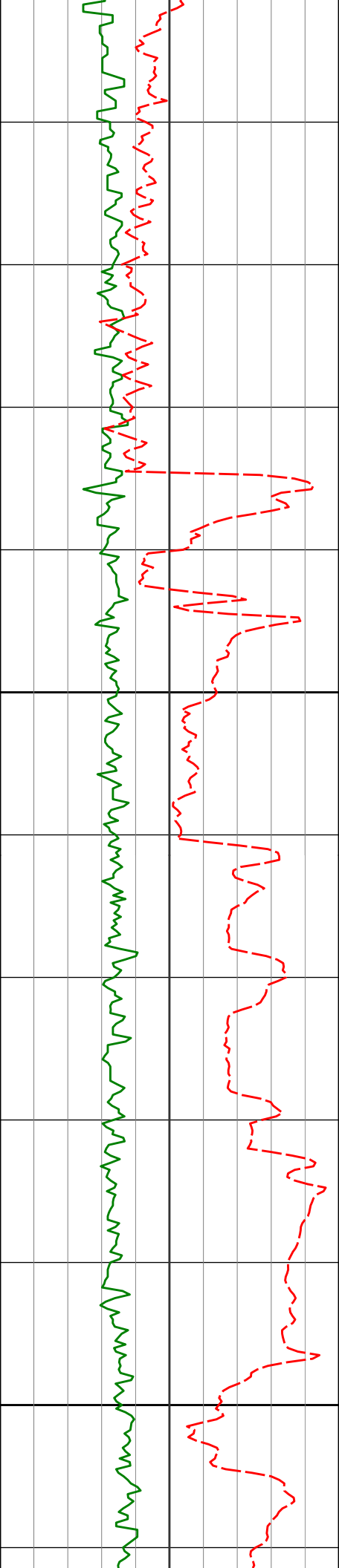
130.96°F



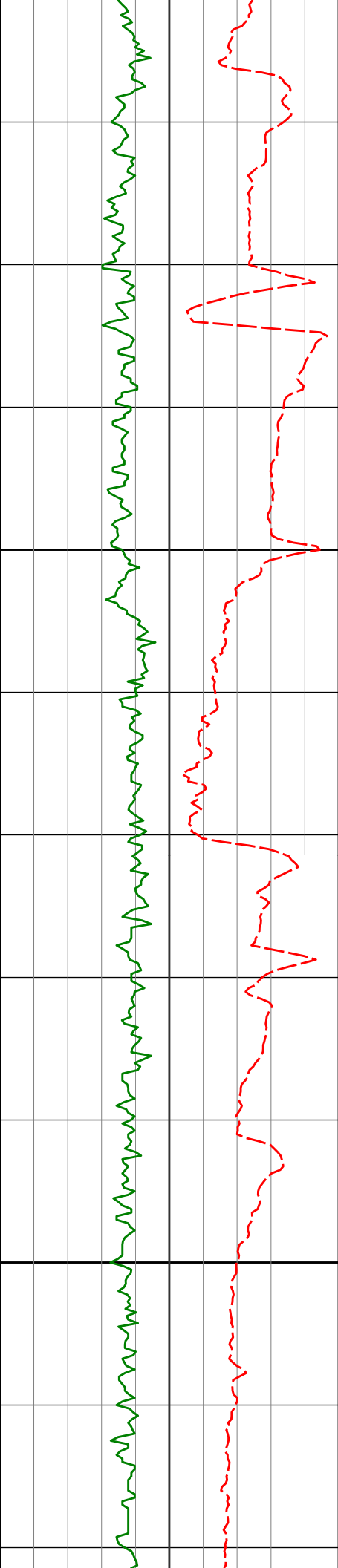








	5343'	5.46°	312.24°	5311.23'	-337.06'	146.84°F
						146.84°F
						146.84°F
						147.09°F
5400	5437'	4.89°	312.18°	5404.85'	-342.92'	148.65°F
						145.83°F
						145.61°F
						146.84°F
5500	5532'	2.48°	313.40°	5499.65'	-347.11'	
						146.64°F



5600

5627'

0.49°

171.53° 5594.62'

-348.47'

145.74°F

147.01°F

148.95°F

149.14°F

149.14°F

5700

5722'

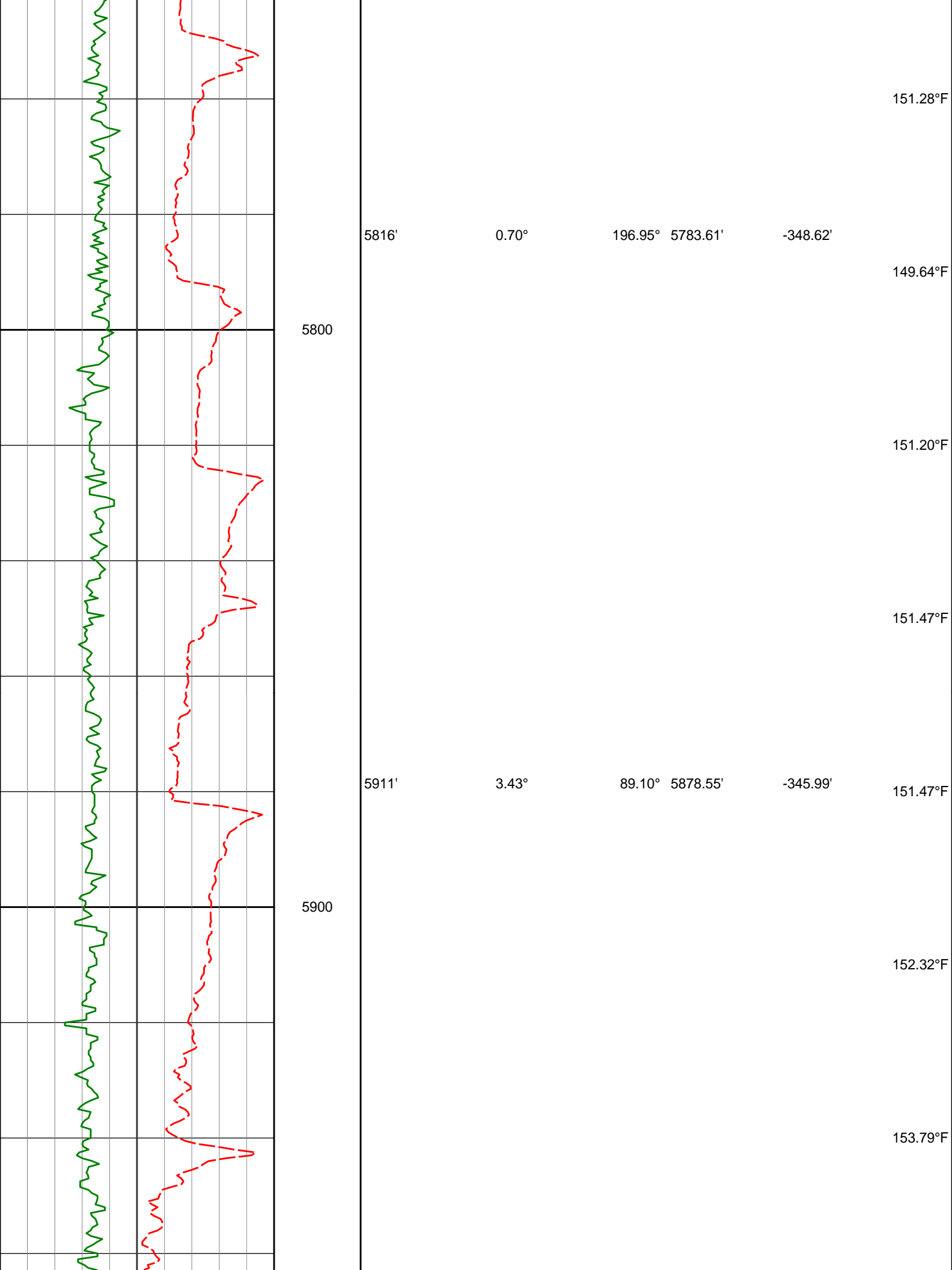
0.63°

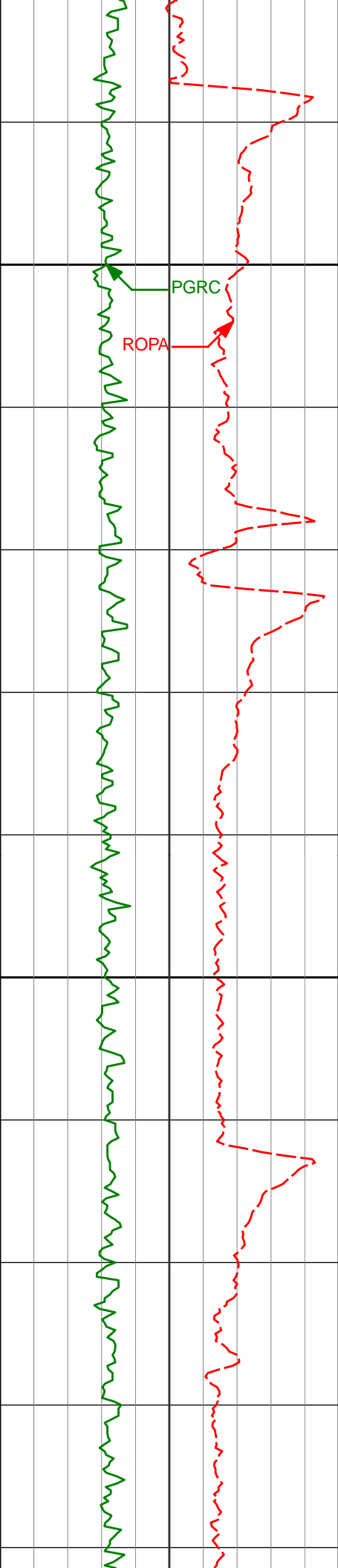
174.68° 5689.62'

-348.43'

149.14°F

151.26°F





6000

6100

6006'

6100'

6195'

9.23°

16.63°

26.37°

75.47° 5972.94'

82.40° 6064.50'

87.15° 6152.79'

-335.65'

-314.78'

-280.04'

153.79°F

153.79°F

154.09°F

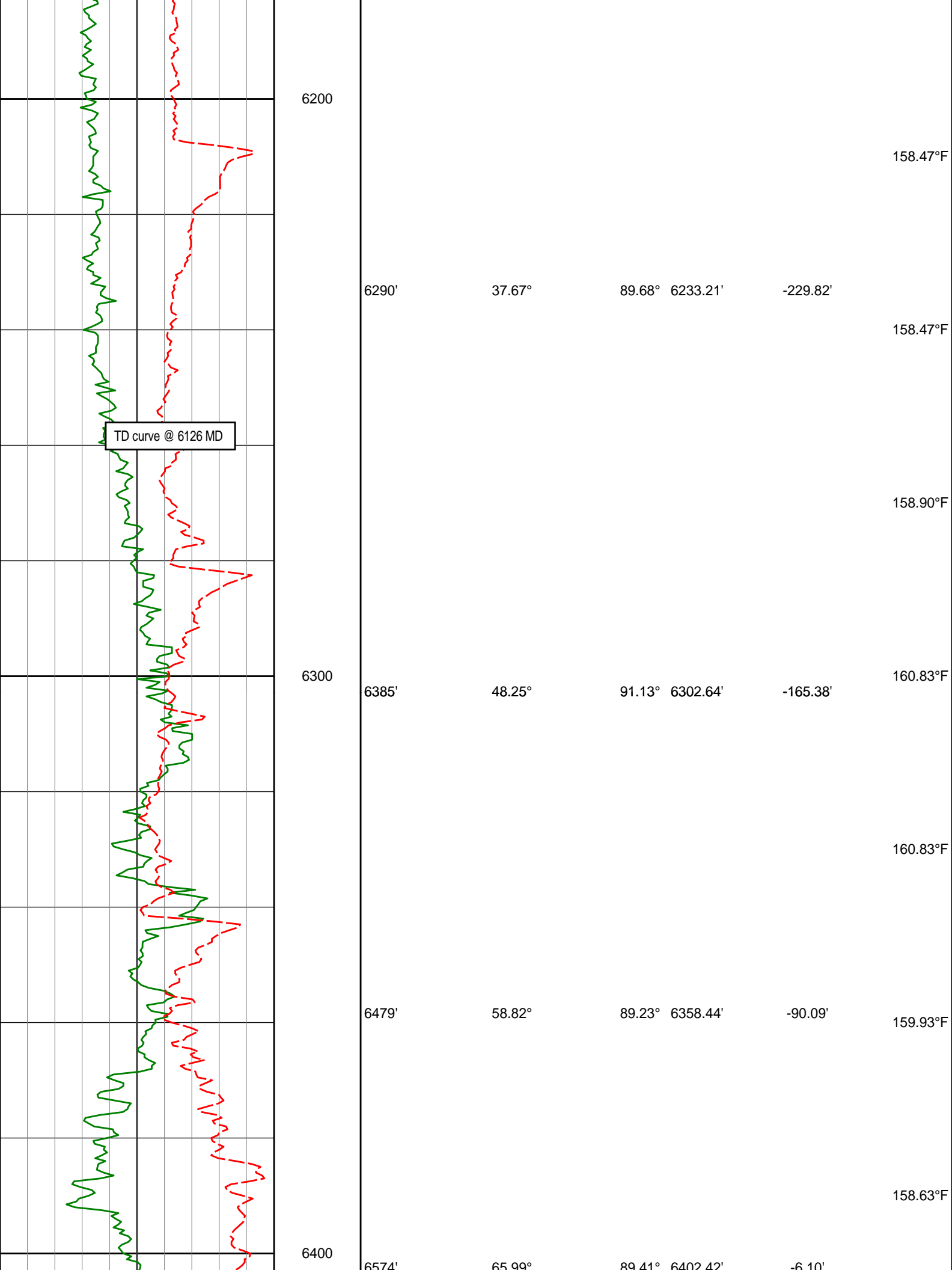
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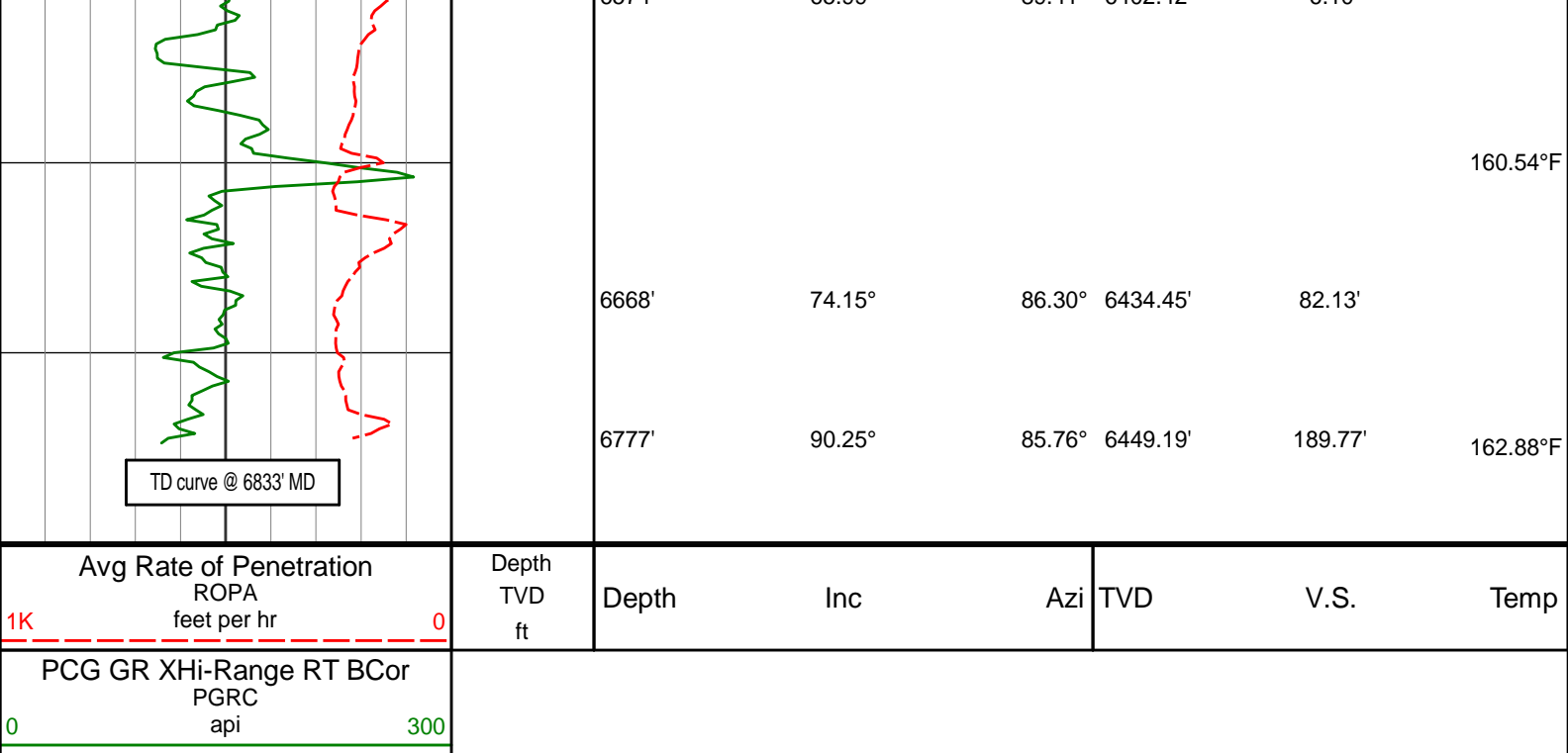
156.13°F

156.13°F

158.32°F

158.47°F





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-665
Wattenberg
Weld Colorado
USA
CA-XX-0902678335
Tied in @ Surface

Final survey projected to bit.

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
889.00	0.07	194.91	889.00	0.52 S	0.14 W	-0.17	0.01
919.00	0.00	308.19	919.00	0.53 S	0.14 W	-0.18	0.23
1011.00	0.10	104.27	1011.00	0.55 S	0.07 W	-0.11	0.11
1210.00	0.16	135.47	1210.00	0.79 S	0.29 E	0.23	0.04
1397.00	0.20	157.34	1397.00	1.27 S	0.59 E	0.50	0.04
1490.00	0.19	240.67	1490.00	1.49 S	0.52 E	0.42	0.28
1582.00	2.52	333.21	1581.97	0.24 N	0.52 W	-0.50	2.75
1674.00	3.97	321.71	1673.82	4.54 N	3.40 W	-3.08	1.73
1767.00	6.07	314.38	1766.46	10.51 N	8.92 W	-8.16	2.36
1860.00	7.50	311.38	1858.80	17.97 N	16.99 W	-15.69	1.58
2138.00	8.04	309.39	2134.25	42.31 N	45.64 W	-42.56	0.22
2231.00	7.89	306.62	2226.35	50.25 N	55.79 W	-52.12	0.45
2324.00	9.15	307.21	2318.32	58.53 N	66.81 W	-62.53	1.37
2417.00	8.50	306.67	2410.22	67.11 N	78.21 W	-73.30	0.70
2509.00	8.40	305.32	2501.22	75.06 N	89.15 W	-83.66	0.24
2694.00	8.99	308.74	2684.09	91.92 N	111.46 W	-104.72	0.42
2786.00	8.72	306.82	2775.00	100.60 N	122.65 W	-115.28	0.43
2881.00	8.12	315.62	2868.98	109.72 N	133.11 W	-125.07	1.49
2976.00	7.97	315.71	2963.04	119.23 N	142.41 W	-133.67	0.16
3070.00	7.58	312.35	3056.18	128.07 N	151.54 W	-142.16	0.63
3165.00	7.71	311.01	3150.33	136.47 N	160.98 W	-150.99	0.23
3260.00	7.81	317.03	3244.46	145.38 N	170.19 W	-159.55	0.86
3355.00	7.12	312.79	3338.66	154.09 N	178.90 W	-167.63	0.93
3449.00	6.82	316.81	3431.97	162.12 N	187.00 W	-175.14	0.61

3544.00	7.14	317.75	3526.26	170.61 N	194.83 W	-182.36	0.36
3639.00	7.56	316.02	3620.48	179.48 N	203.15 W	-190.03	0.50
3733.00	8.02	315.59	3713.61	188.62 N	212.03 W	-198.25	0.49
3828.00	8.17	316.36	3807.66	198.24 N	221.33 W	-206.85	0.19
3923.00	8.11	315.70	3901.71	207.92 N	230.67 W	-215.49	0.11
4017.00	8.28	313.84	3994.75	217.35 N	240.18 W	-224.31	0.33
4112.00	8.64	312.54	4088.71	226.91 N	250.37 W	-233.80	0.43
4207.00	7.53	310.64	4182.77	235.79 N	260.34 W	-243.13	1.20
4301.00	6.69	312.13	4276.05	243.47 N	269.08 W	-251.30	0.92
4396.00	7.44	320.27	4370.33	251.91 N	277.11 W	-258.72	1.32
4491.00	8.18	323.35	4464.45	262.06 N	285.07 W	-265.95	0.89
4586.00	6.23	317.99	4558.69	271.31 N	292.55 W	-272.76	2.17
4680.00	7.37	305.25	4652.04	278.58 N	300.89 W	-280.56	2.00
4775.00	7.32	299.64	4746.26	285.09 N	311.12 W	-290.32	0.76
4869.00	6.50	296.39	4839.57	290.41 N	321.10 W	-299.89	0.96
4964.00	5.84	296.55	4934.02	294.97 N	330.24 W	-308.69	0.70
5059.00	5.07	300.68	5028.59	299.27 N	338.17 W	-316.30	0.91
5154.00	5.54	302.95	5123.19	303.90 N	345.62 W	-323.41	0.55
5248.00	6.02	311.86	5216.71	309.66 N	353.10 W	-330.47	1.08
5343.00	5.46	312.24	5311.23	316.02 N	360.16 W	-337.06	0.59
5437.00	4.89	312.18	5404.85	321.71 N	366.44 W	-342.92	0.61
5532.00	2.48	313.40	5499.65	325.85 N	370.93 W	-347.11	2.53
5627.00	0.49	171.53	5594.62	326.86 N	372.37 W	-348.47	3.04
5722.00	0.63	174.68	5689.62	325.93 N	372.26 W	-348.43	0.15
5816.00	0.70	196.95	5783.61	324.86 N	372.38 W	-348.62	0.28
5911.00	3.43	89.10	5878.55	324.35 N	369.70 W	-345.99	3.90
6006.00	9.23	75.47	5972.94	326.31 N	359.47 W	-335.65	6.26
6100.00	16.63	82.40	6064.50	329.98 N	338.81 W	-314.78	8.03
6195.00	26.37	87.15	6152.79	332.83 N	304.18 W	-280.04	10.40
6290.00	37.67	89.68	6233.21	334.05 N	253.92 W	-229.82	11.97
6385.00	48.25	91.13	6302.64	333.51 N	189.28 W	-165.38	11.18
6479.00	58.82	89.23	6358.44	333.36 N	113.80 W	-90.09	11.36
6574.00	65.99	89.41	6402.42	334.34 N	29.67 W	-6.10	7.55
6668.00	74.15	86.30	6434.45	337.70 N	58.54 E	82.13	9.22
6777.00	90.25	85.76	6449.19	345.16 N	165.92 E	189.77	14.78

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 85.97 DEGREES (GRID)
A TOTAL CORRECTION OF 7.32 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6777.00 FEET
IS 382.97 FEET ALONG 25.67 DEGREES (GRID)**