



WELL INFORMATION					
MWD Run Number	100				
Date run completed	03-Sep-15				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	636.00				
Log End Depth (TVD, ft)	6,810.28				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	01-Sep-15 22:58				
Drill/Wipe End Date and Time	03-Sep-15 06:13				
Min Inc (deg) @ Depth (TVD, ft)	0.15 @ 825.00				
Max Inc (deg) @ Depth (TVD, ft)	83.42 @ 6,754.33				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	585.96				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	10.65 / 43.00				
Filtrate CL (ppm)	2,400.00				
pH / Fluid Loss (mptm)	8.60 / 9				
PV (cP) / YP (lhf2)	10 / 12.00				
% Solids / % Sand	11.70 / 0.20				
% Oil / Oil:Water Ratio	0.00 / 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 (ft)	176.05 / 825.00				

Max Tool Temp (degF) / Source	170.37 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Matt Busche				
Customer Representative	Stetson Nielsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11341335				
Insert Serial Number	11400992				
Date and Time Initialized	01-Sep-15 17:09				
Date and Time Read	03-Sep-15 13:44				
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)	312.80				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	48.92				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11341335				
Insert/Sonde Serial Number	12037420				

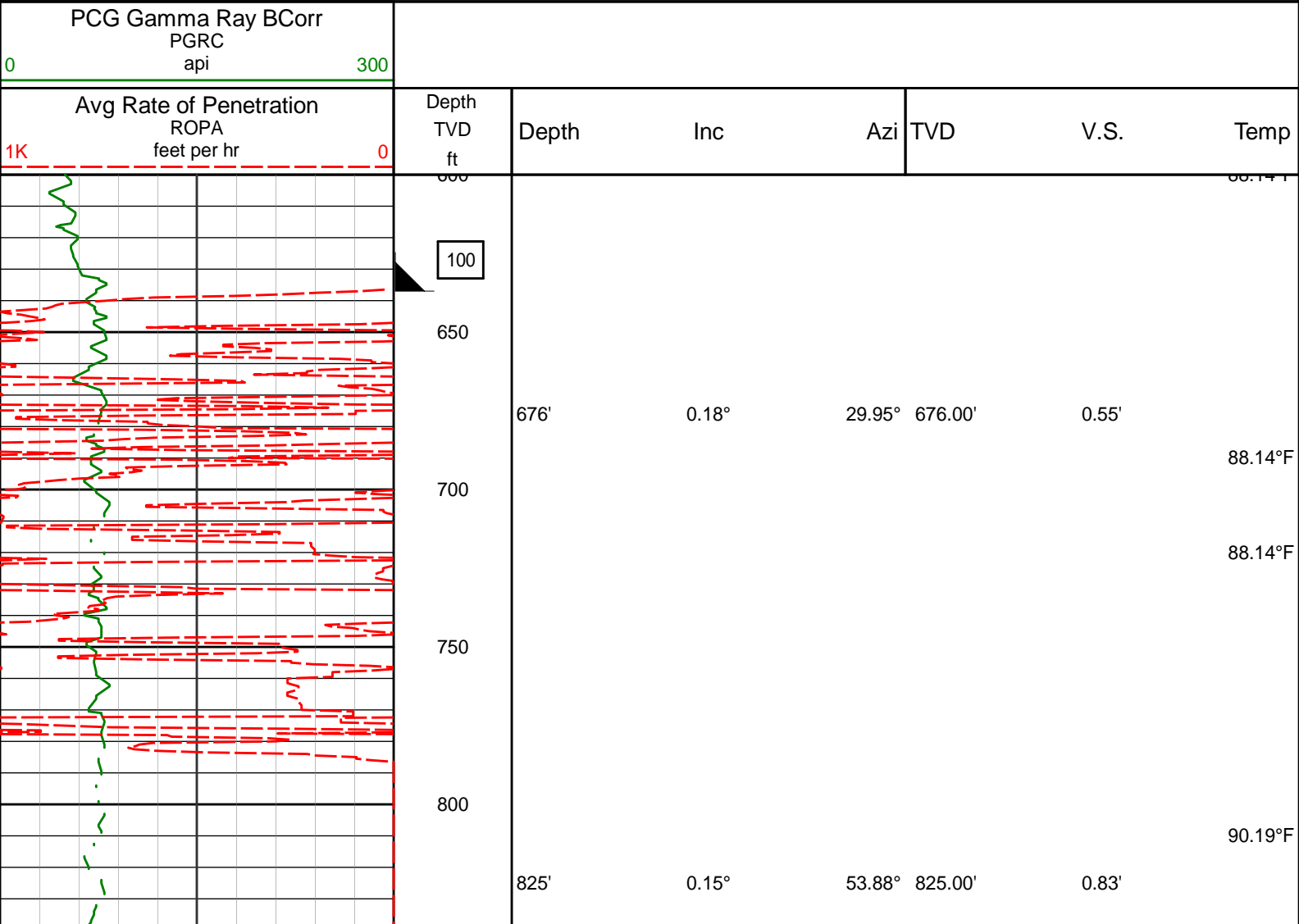
REMARKS

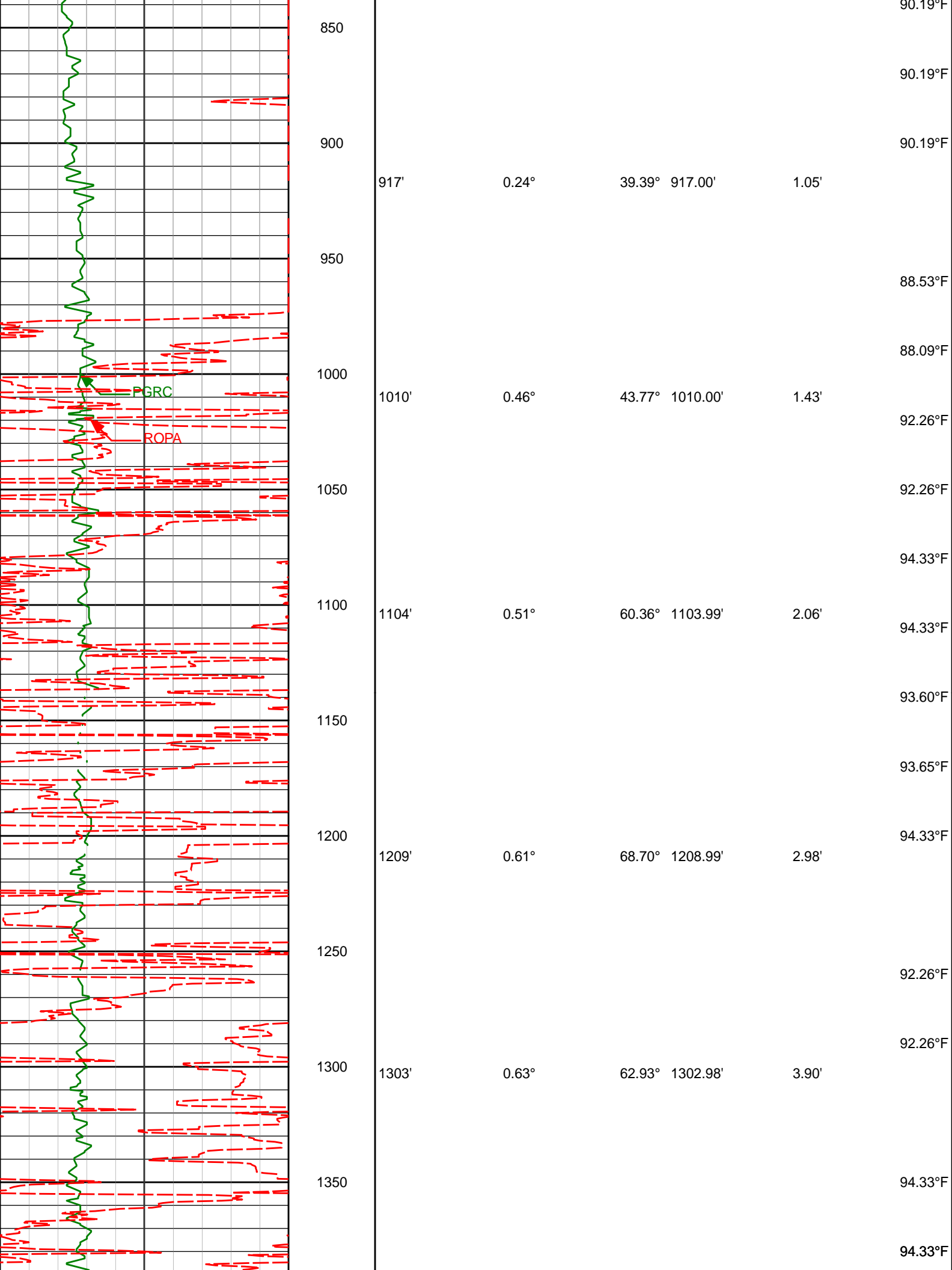
1. All depths are calibrated to driller's pipe tally and are true vertical depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The following smoothing parameters have been applied to 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

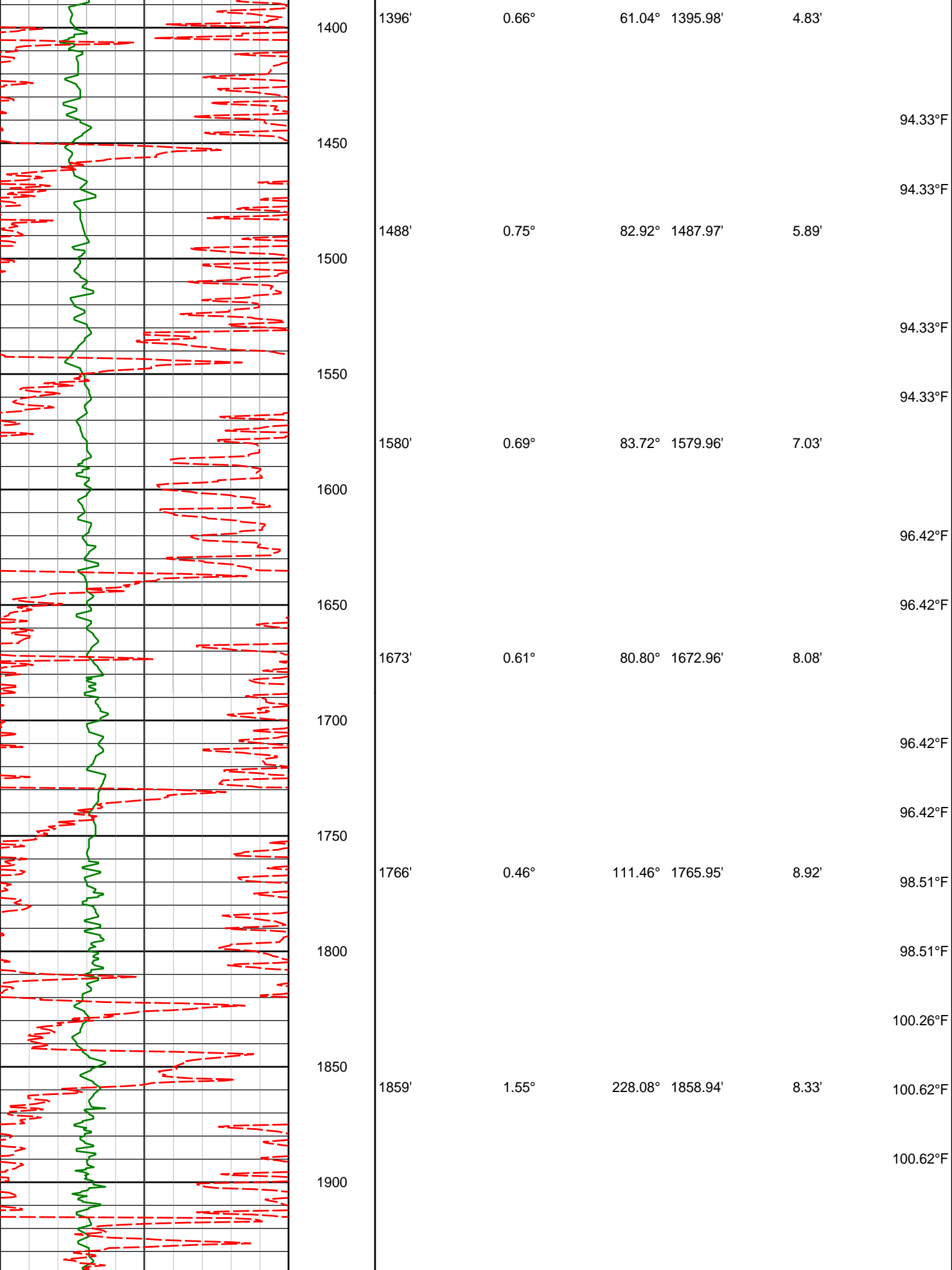
WARRANTY

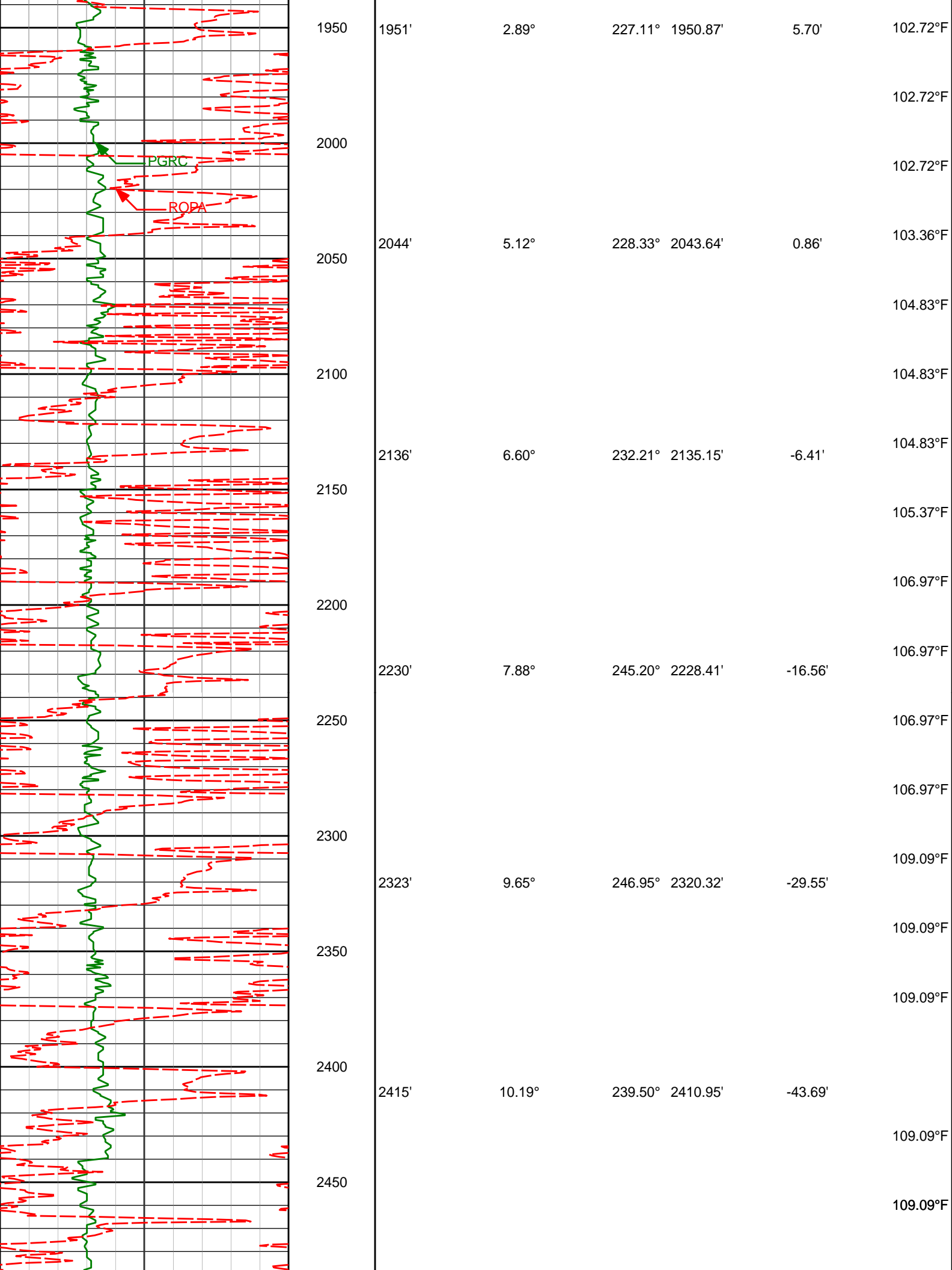
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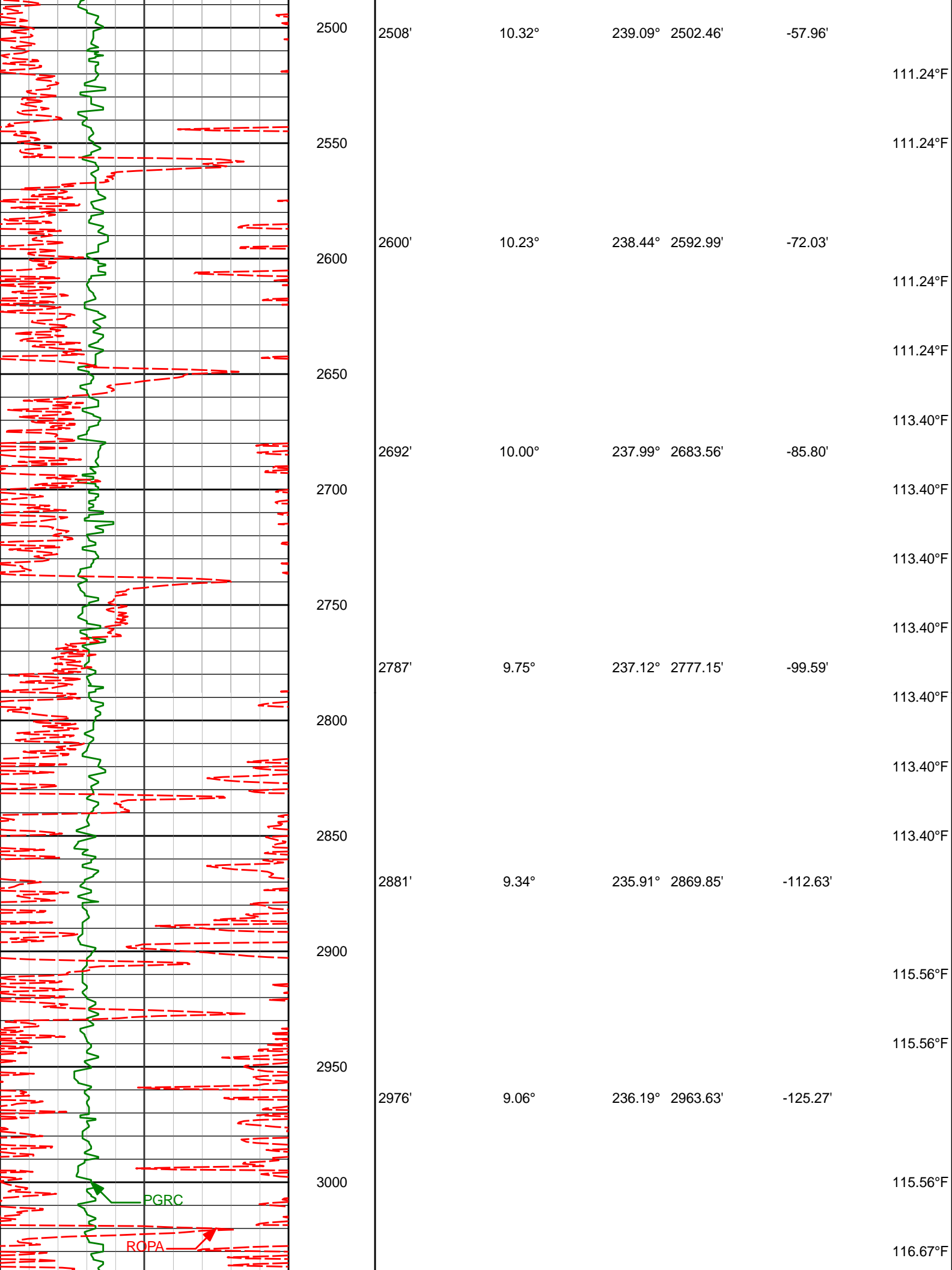
TVD Detail 1:600 Scale

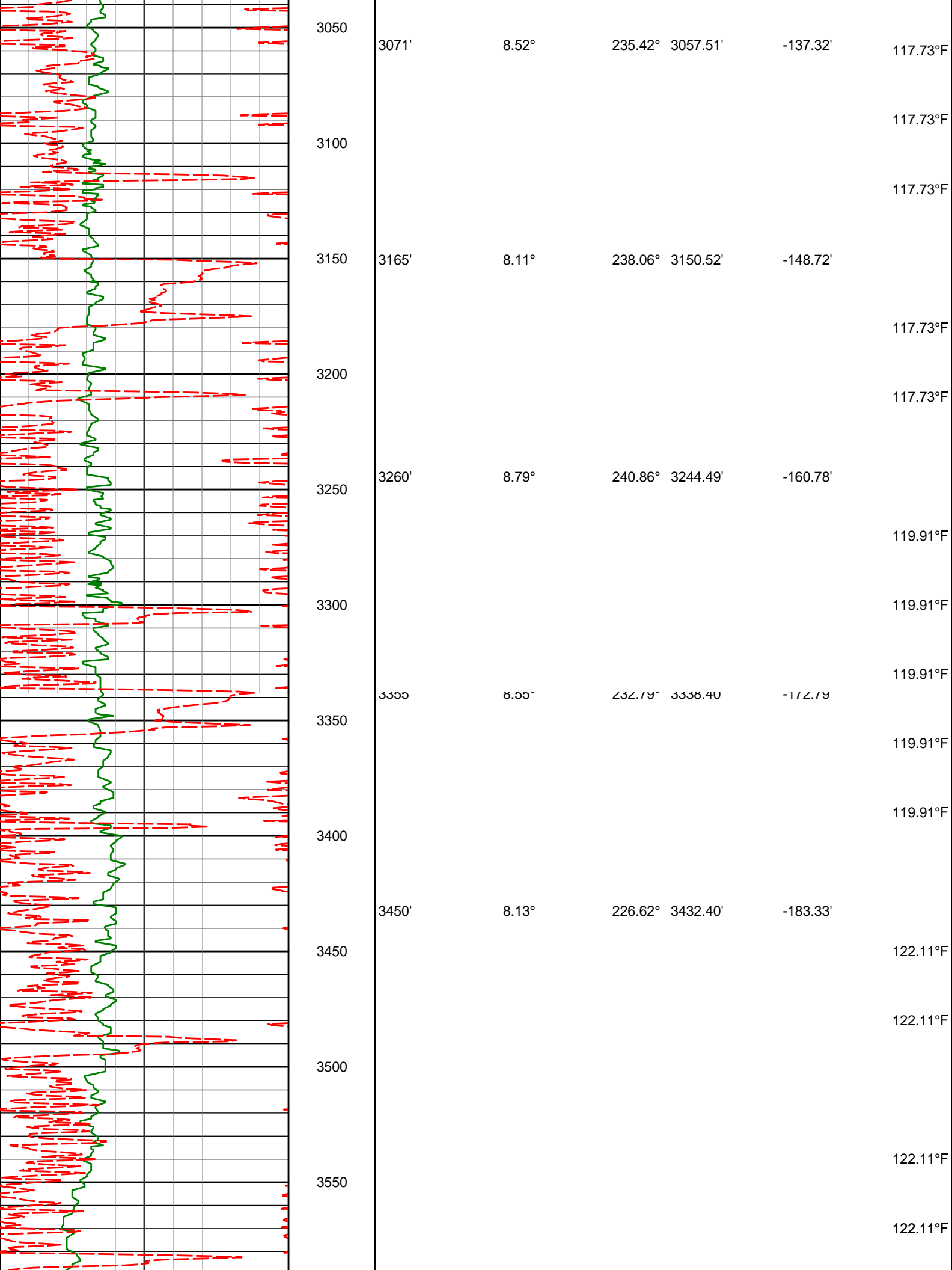


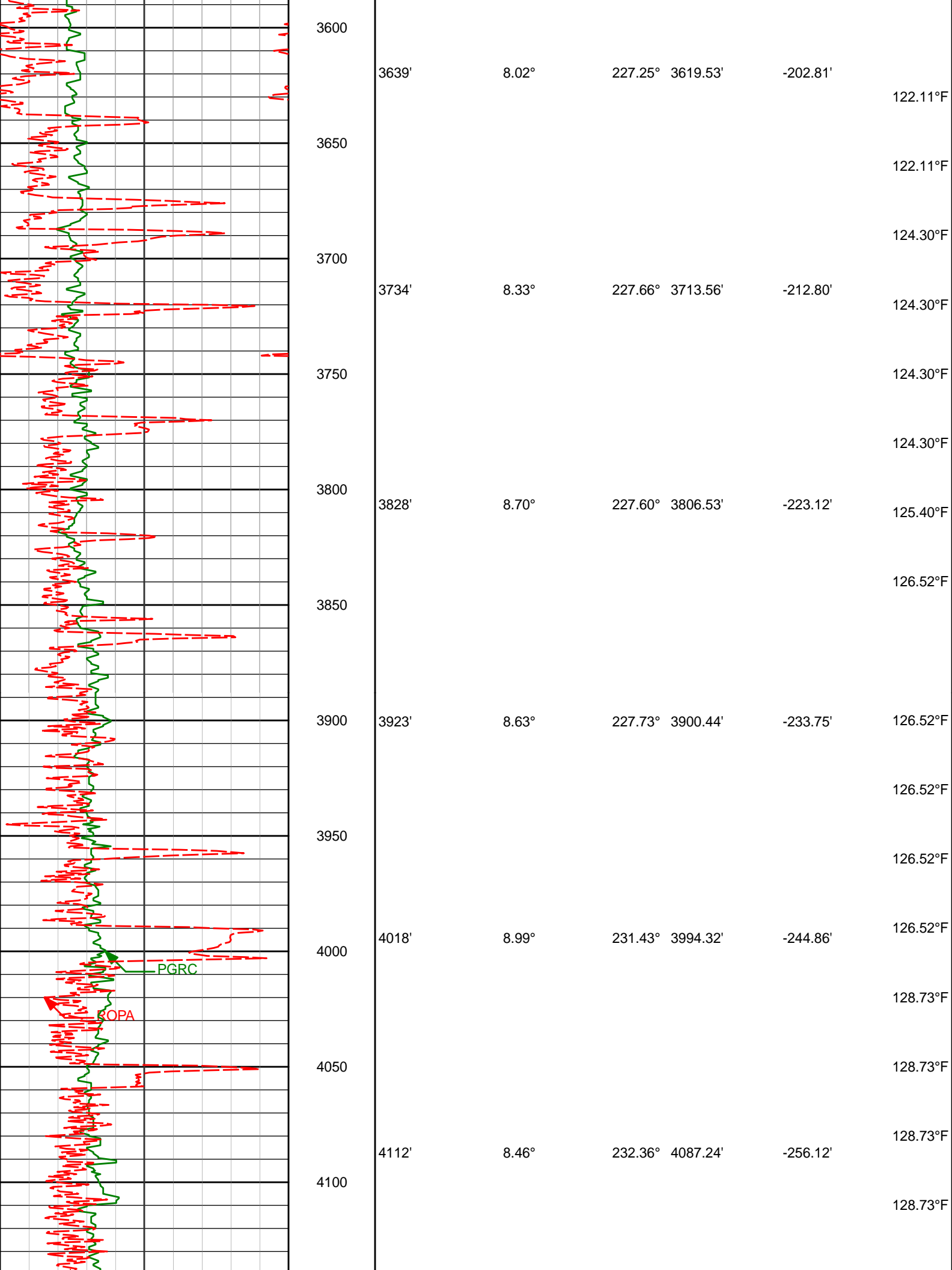


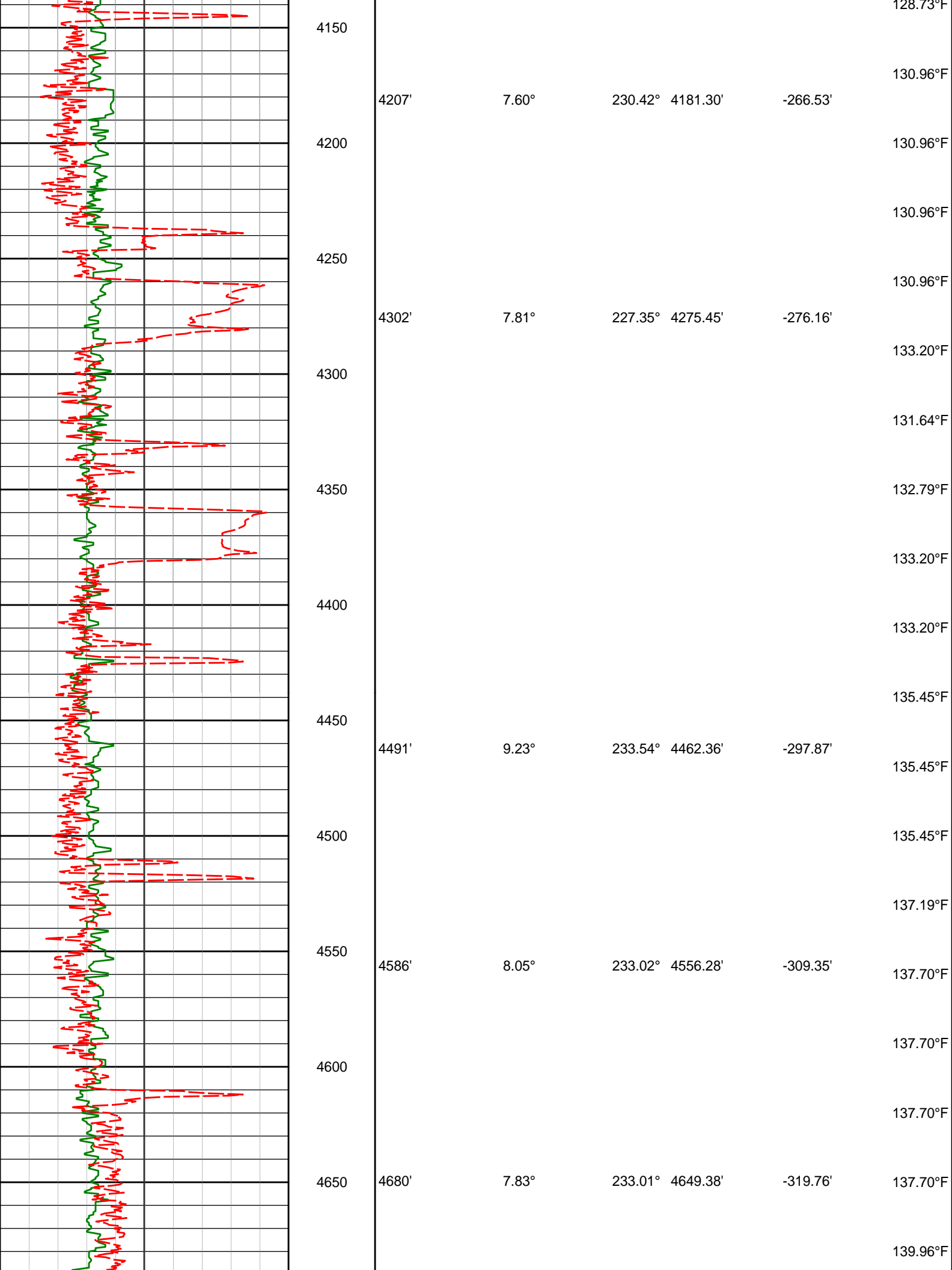


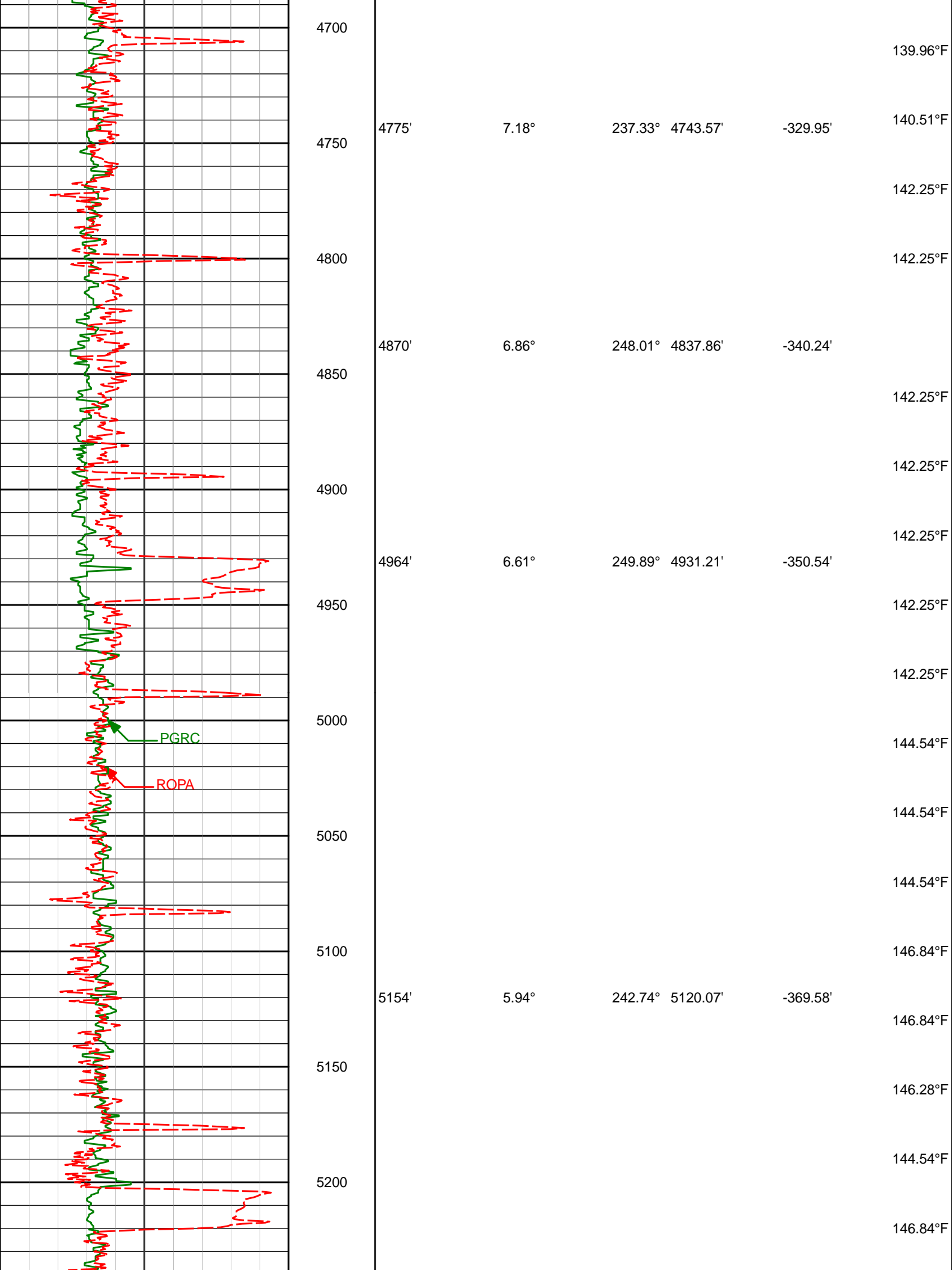


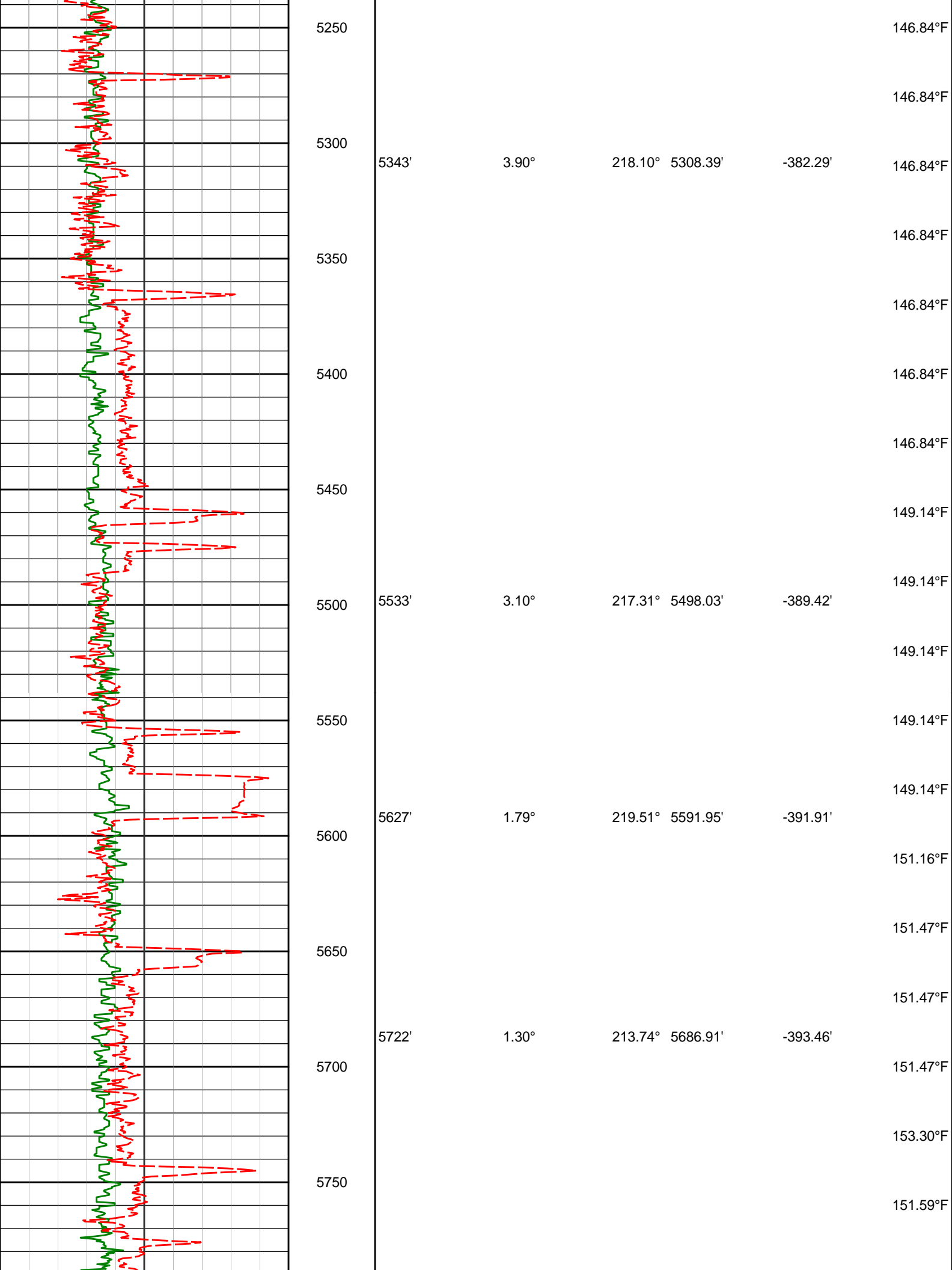


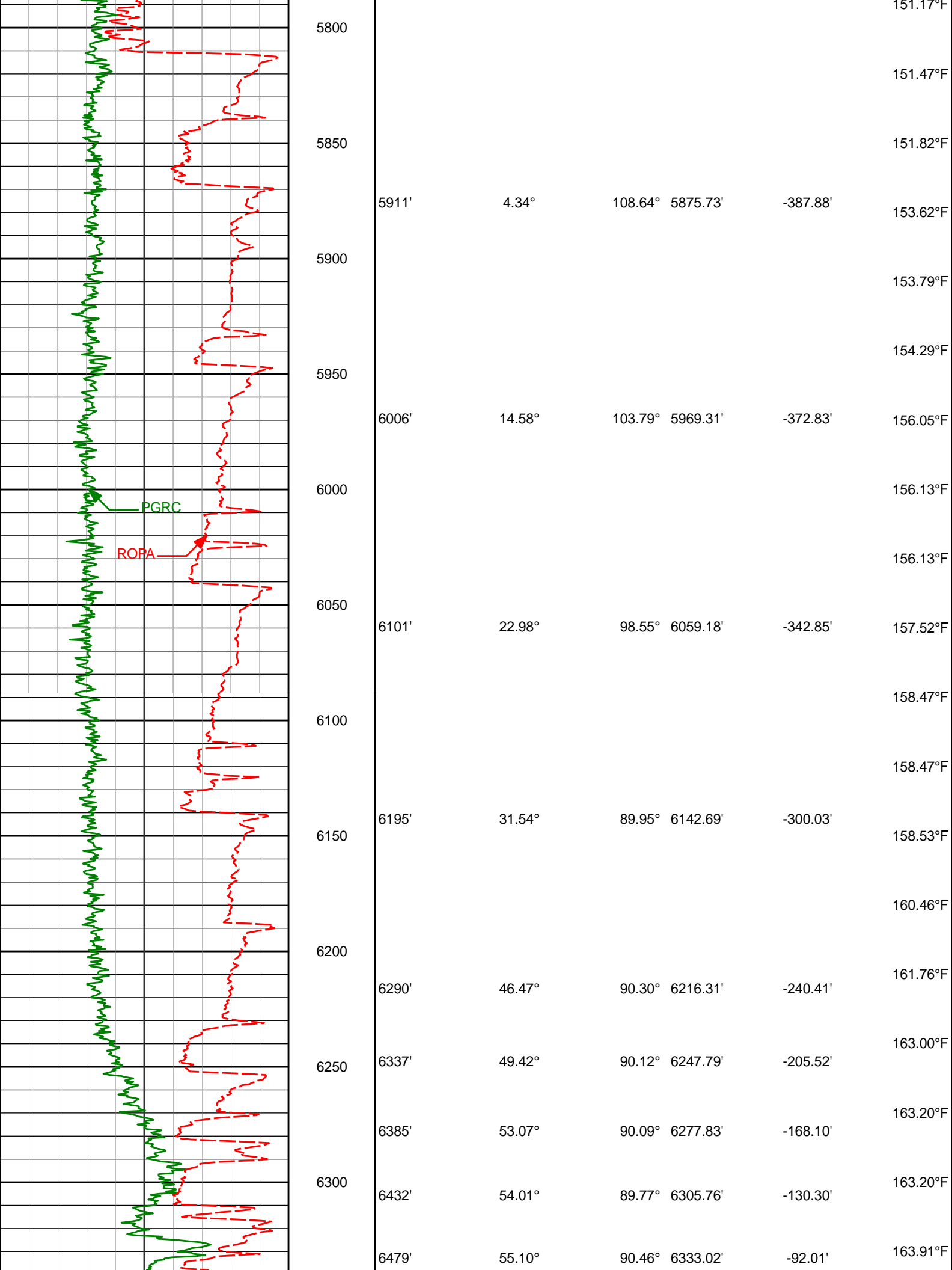


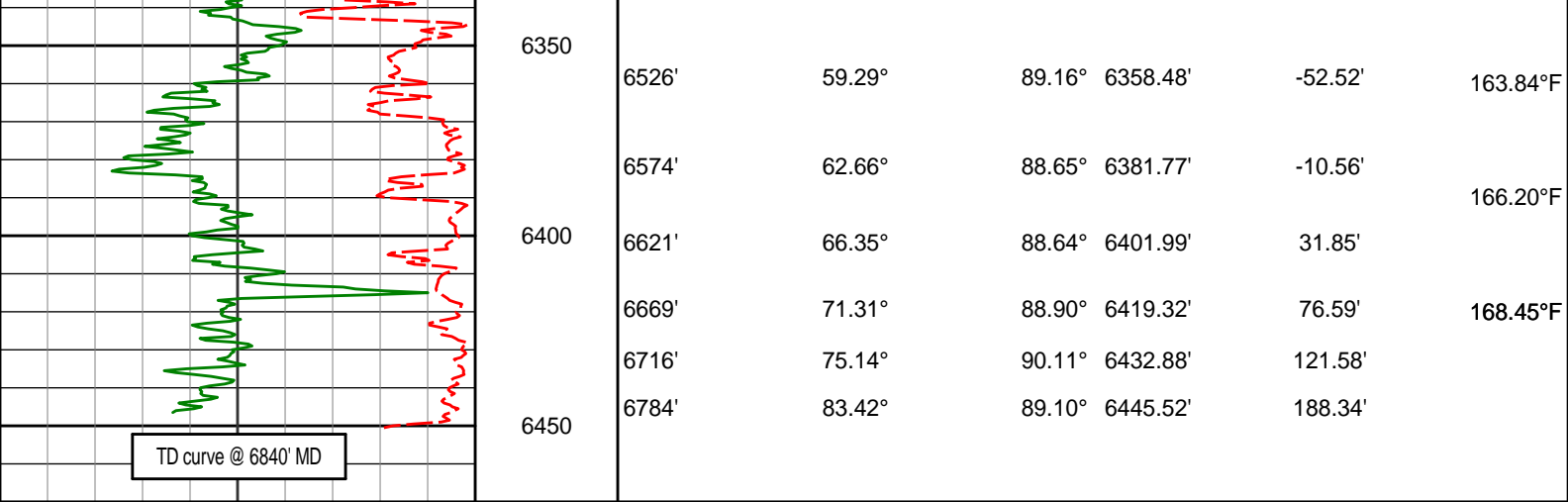






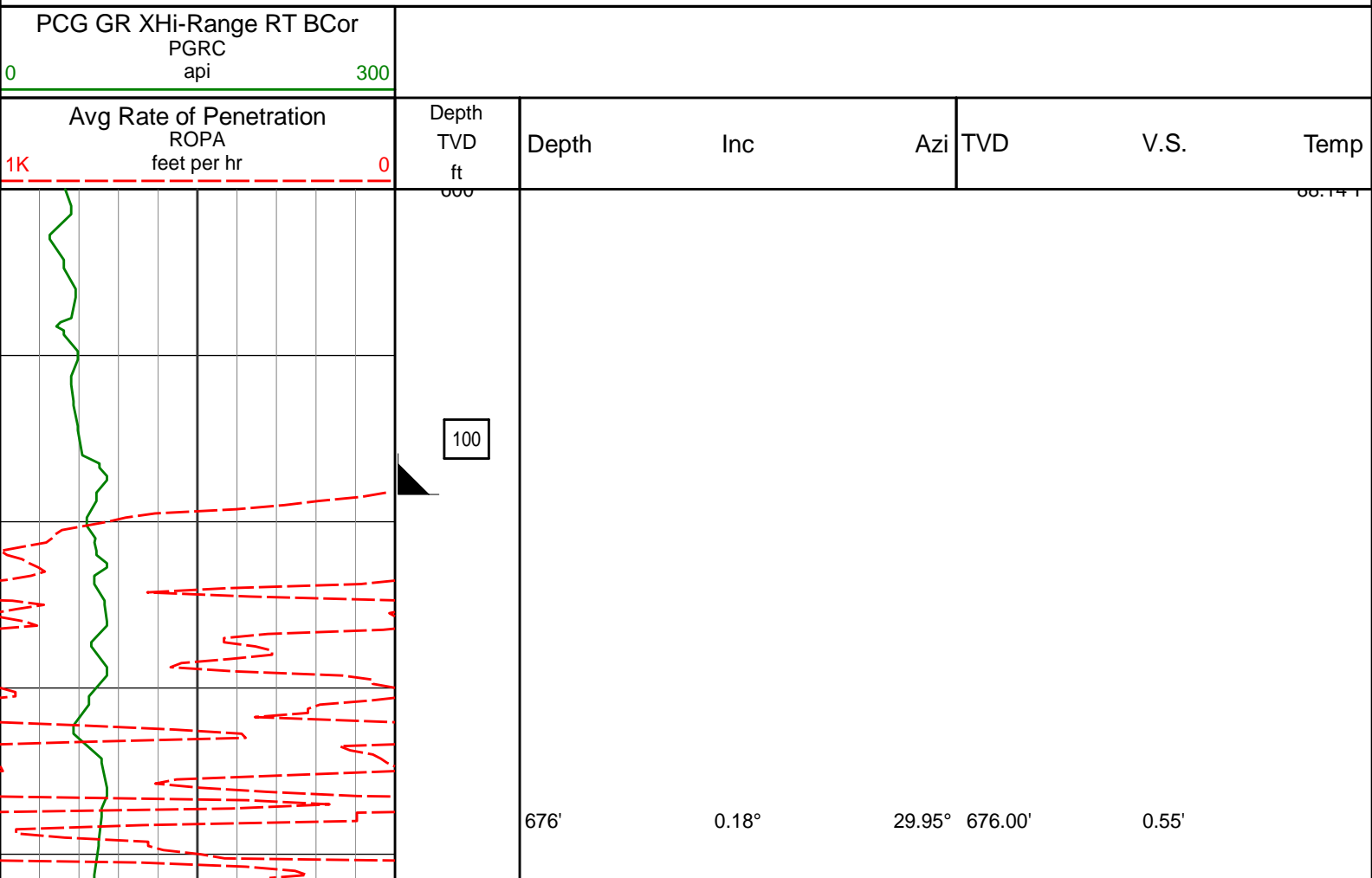


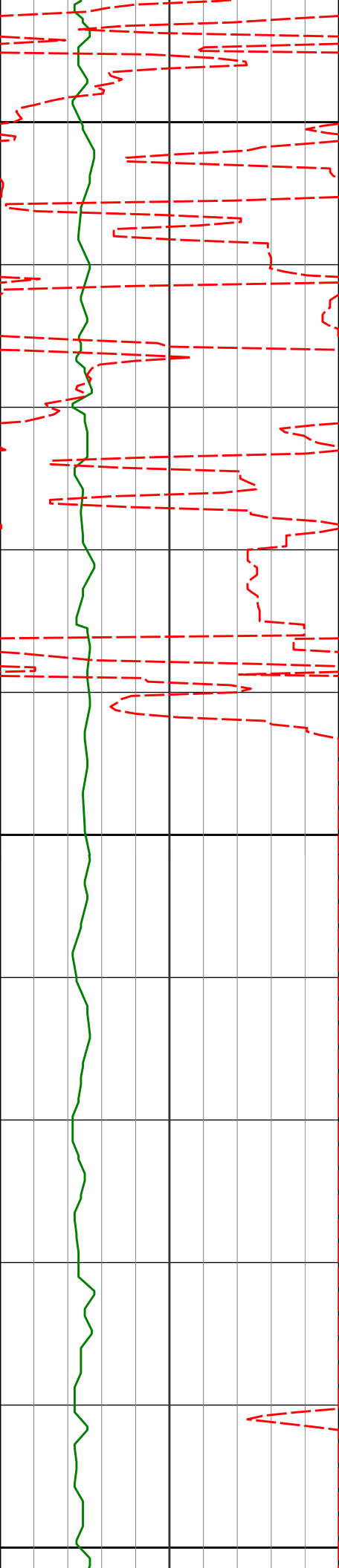




Avg Rate of Penetration ROPA feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp						
1K	0													
PCG Gamma Ray BCorr PGRC api														
0	300													

TVD Detail 1:240 Scale





700

800

900

825'

0.15°

53.88° 825.00'

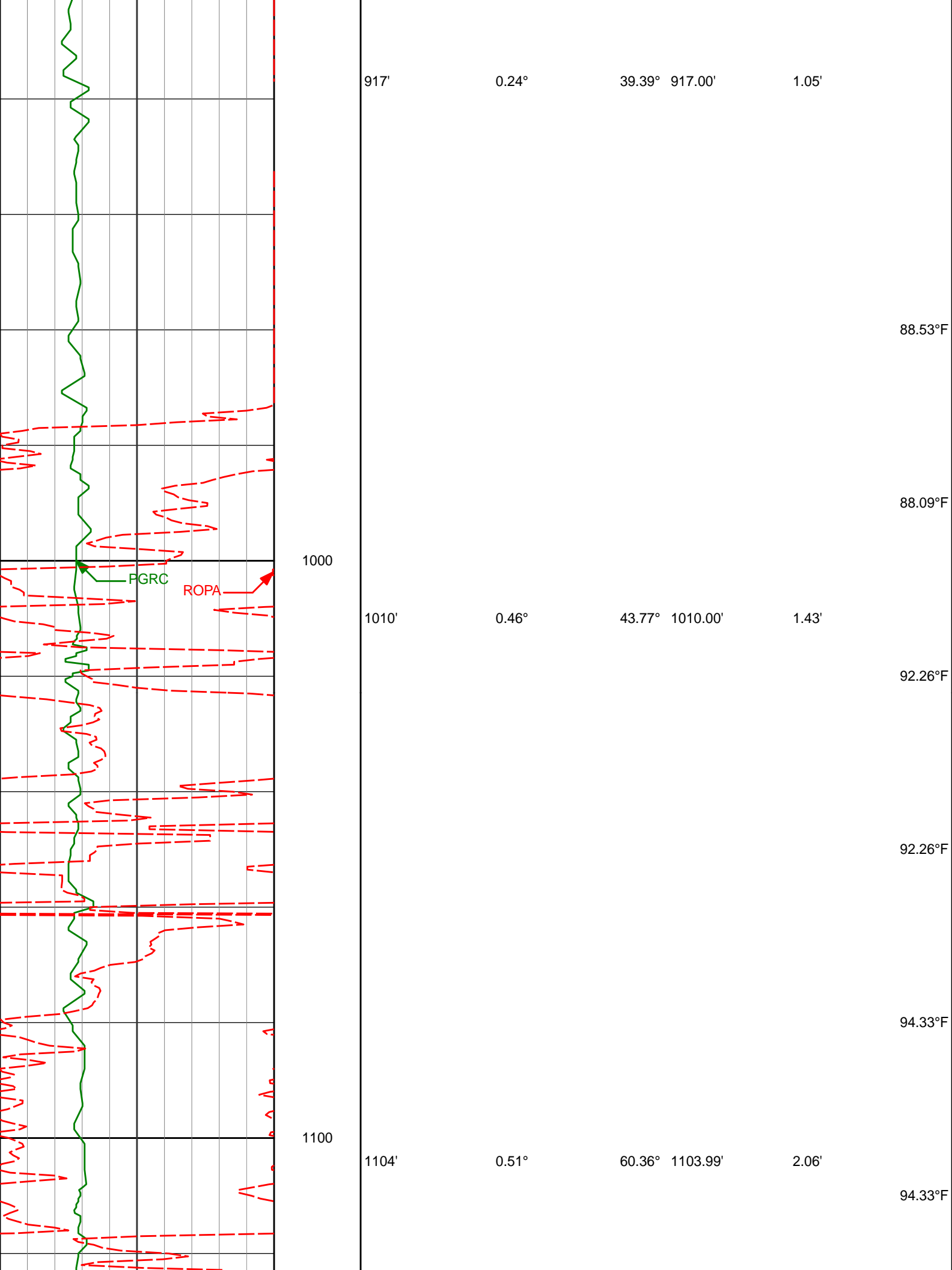
0.83'

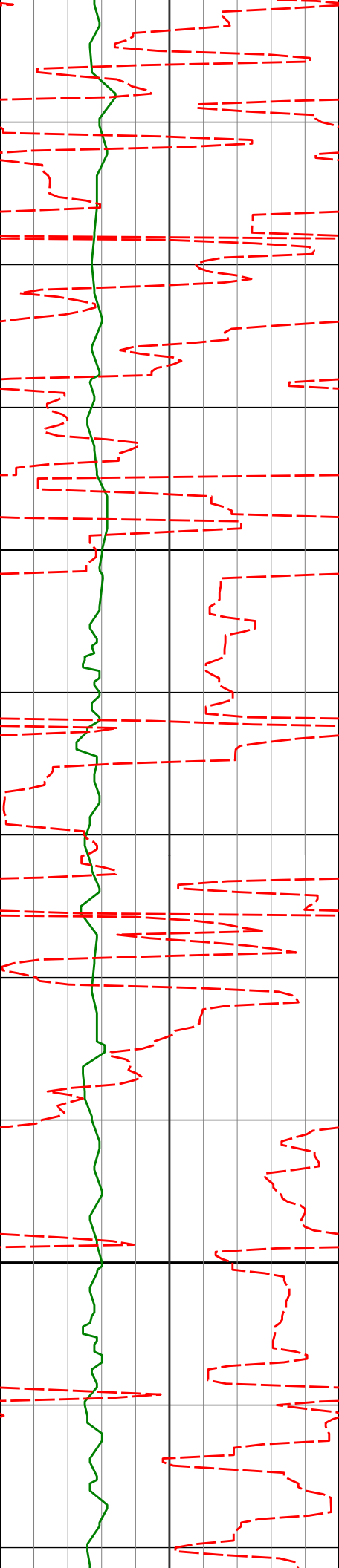
88.14°F

90.19°F

90.19°F

90.19°F





1200

1209'

0.61°

68.70° 1208.99'

2.98'

93.60°F

93.65°F

94.33°F

92.26°F

92.26°F

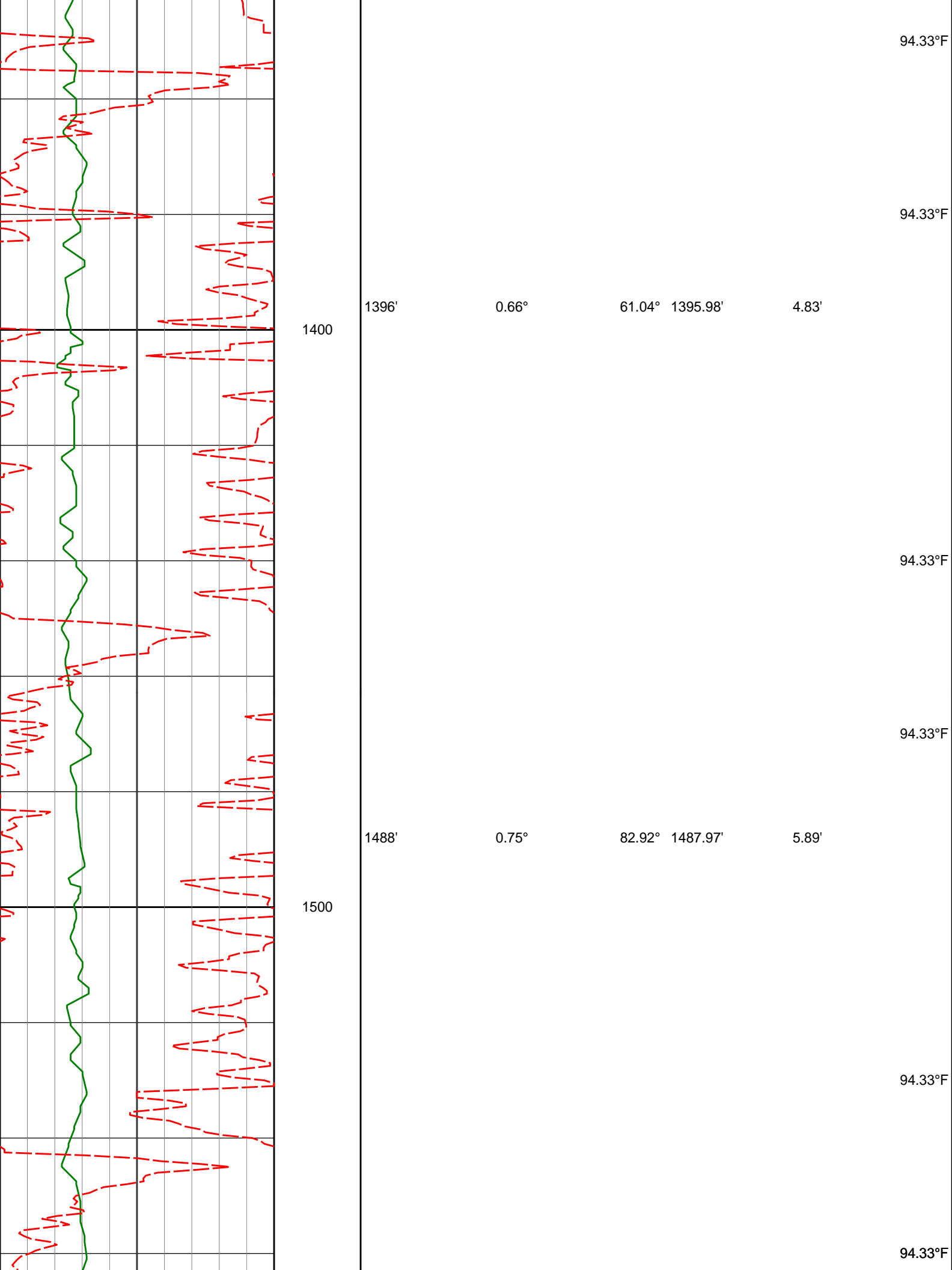
1300

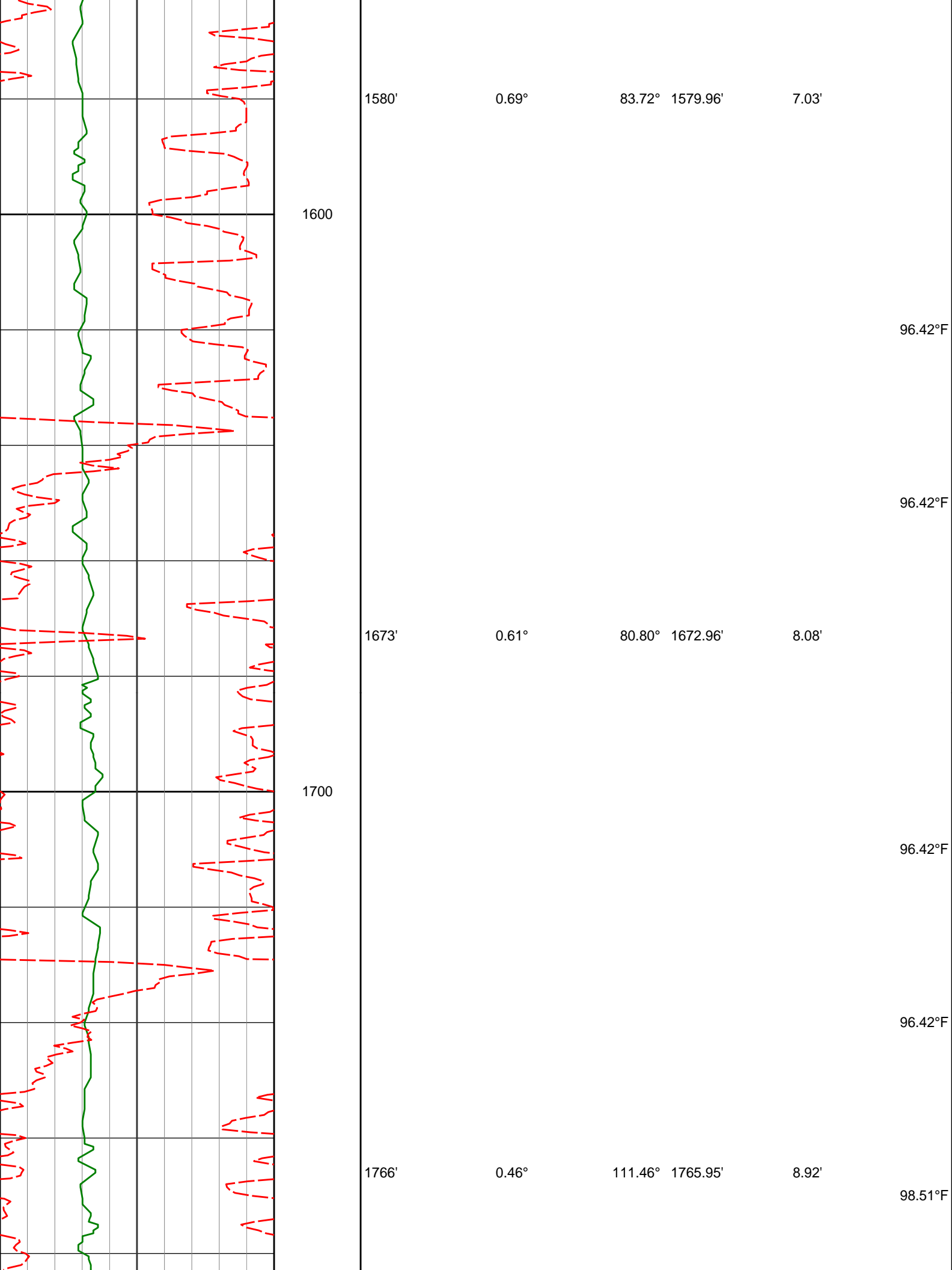
1303'

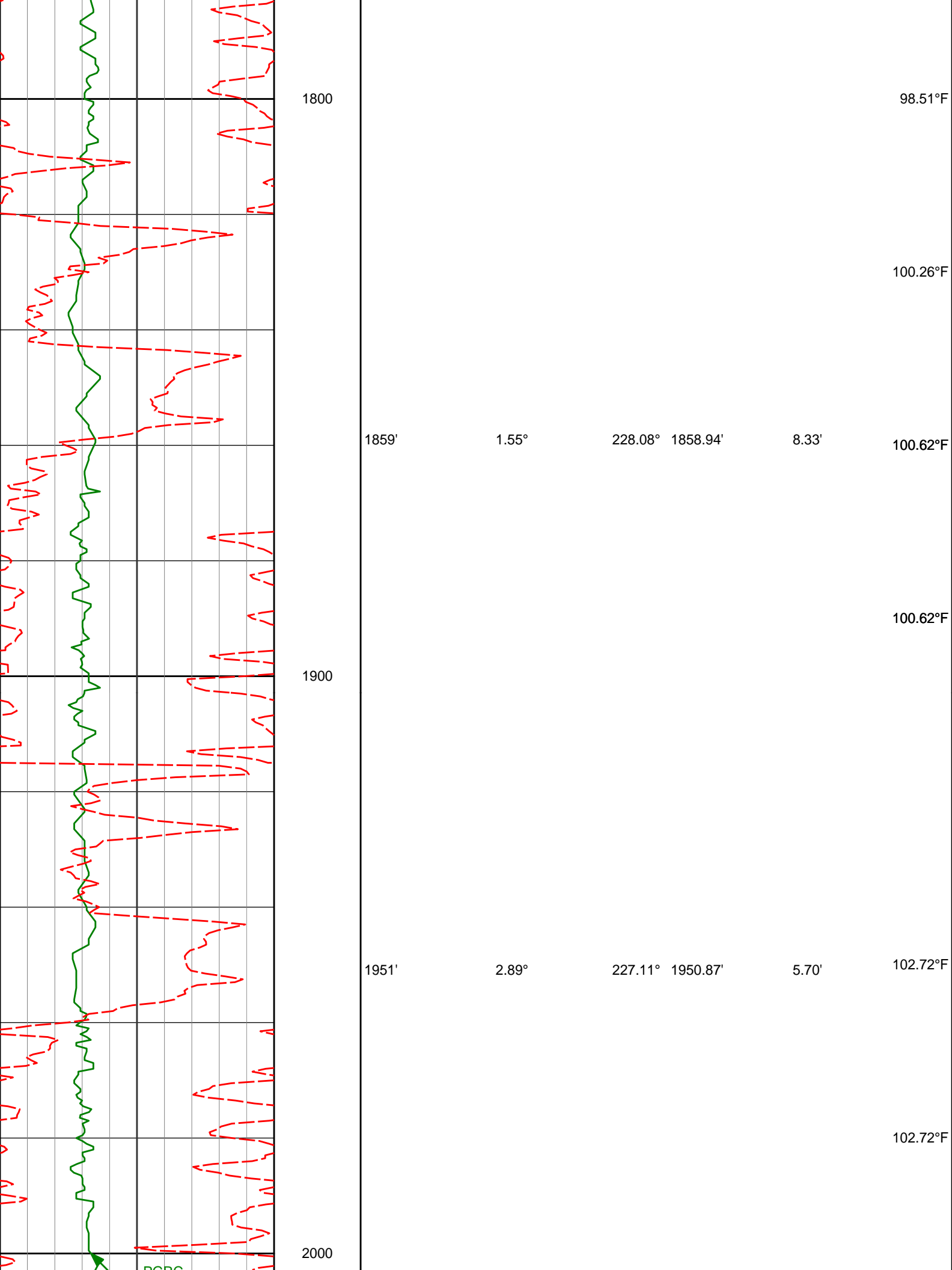
0.63°

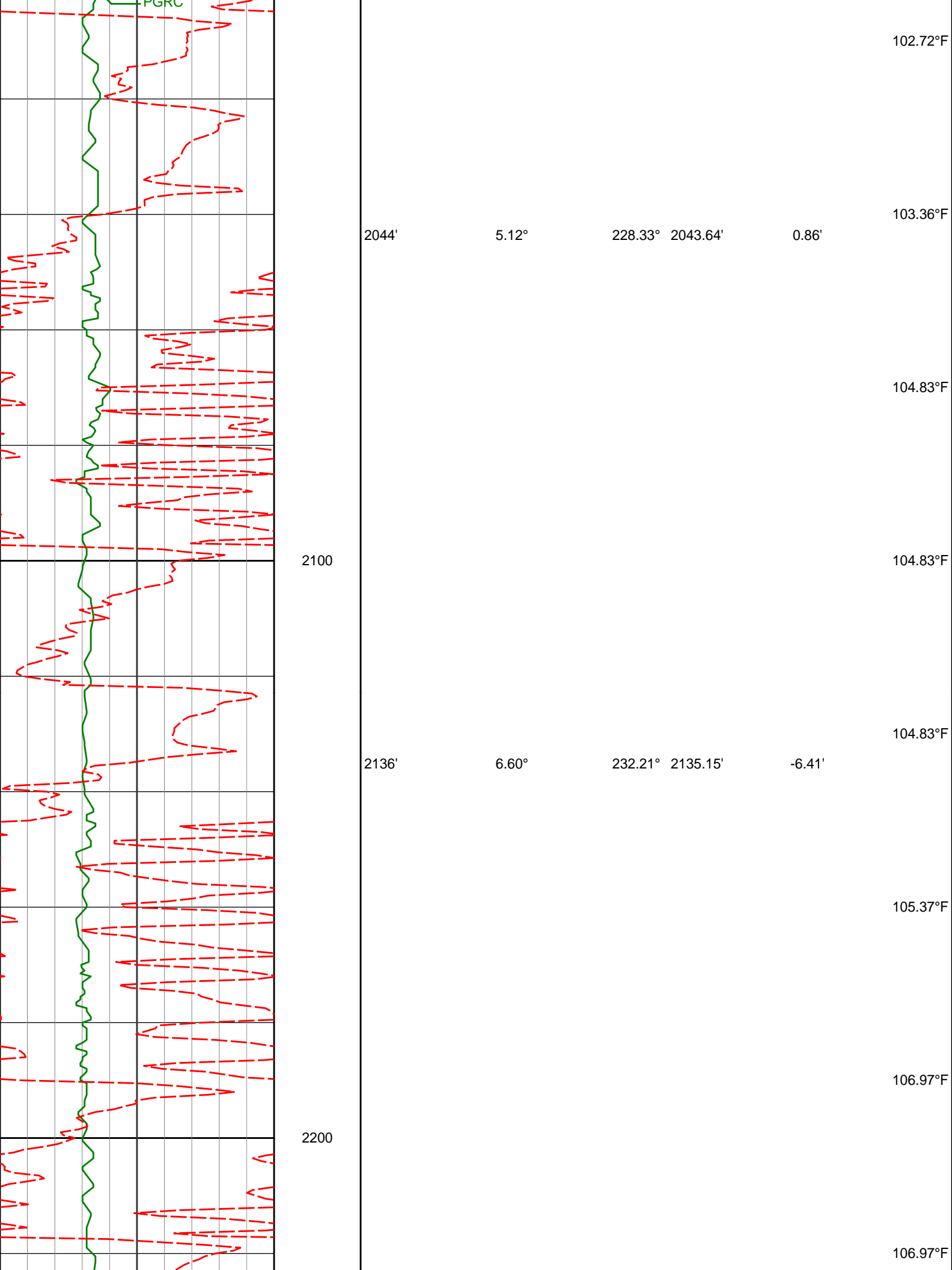
62.93° 1302.98'

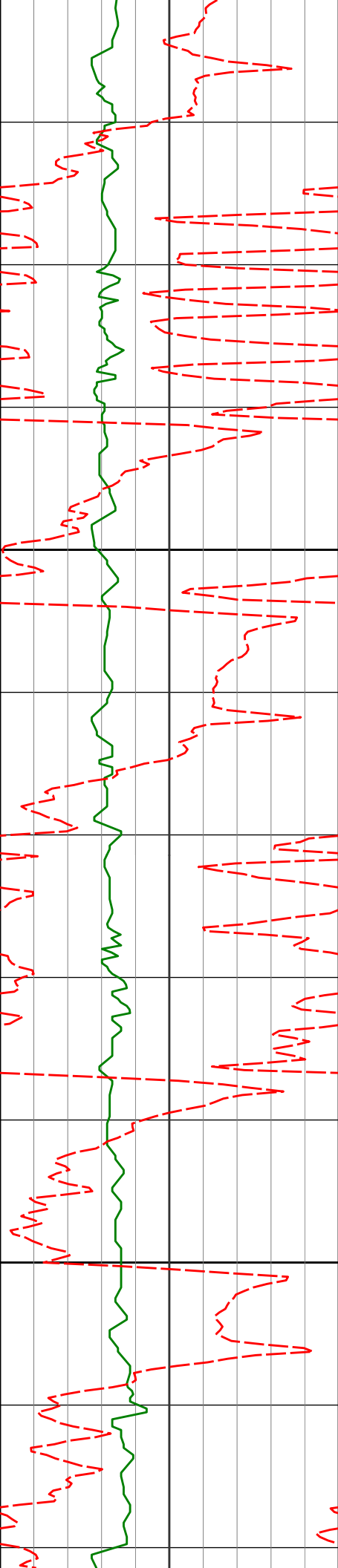
3.90'











2230'

7.88°

245.20° 2228.41'

-16.56'

106.97°F

106.97°F

2300

109.09°F

2323'

9.65°

246.95° 2320.32'

-29.55'

109.09°F

109.09°F

2400

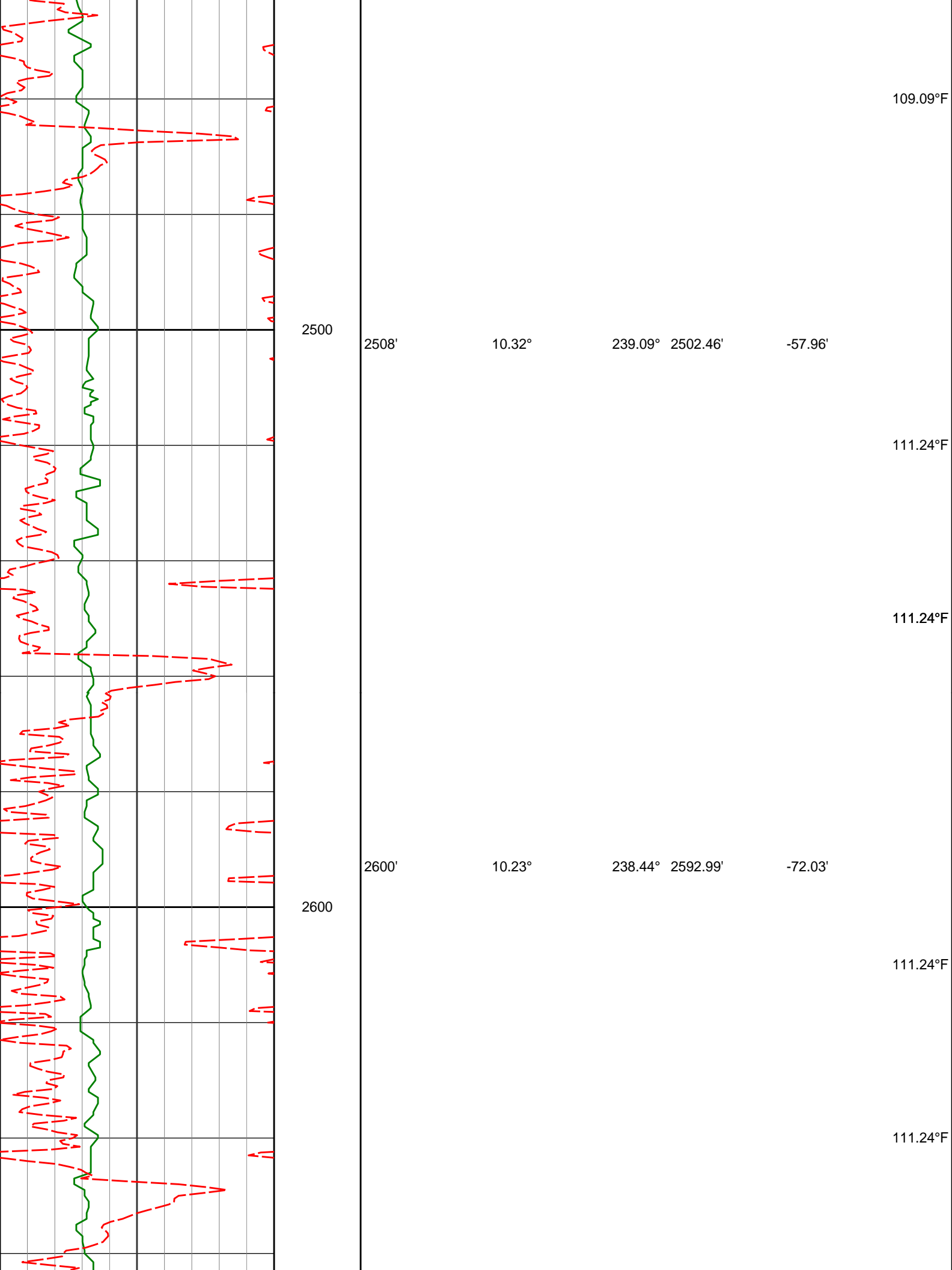
2415'

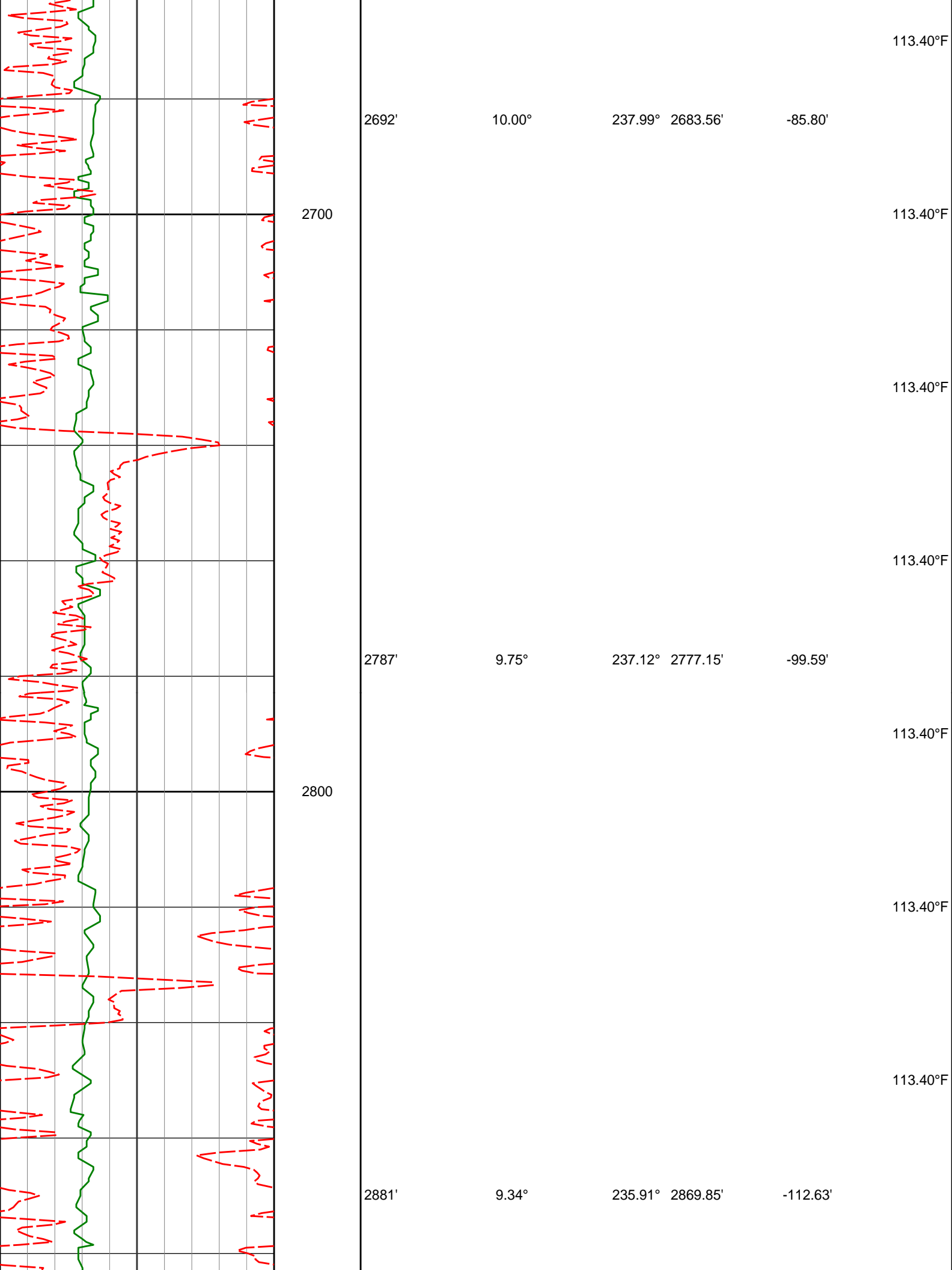
10.19°

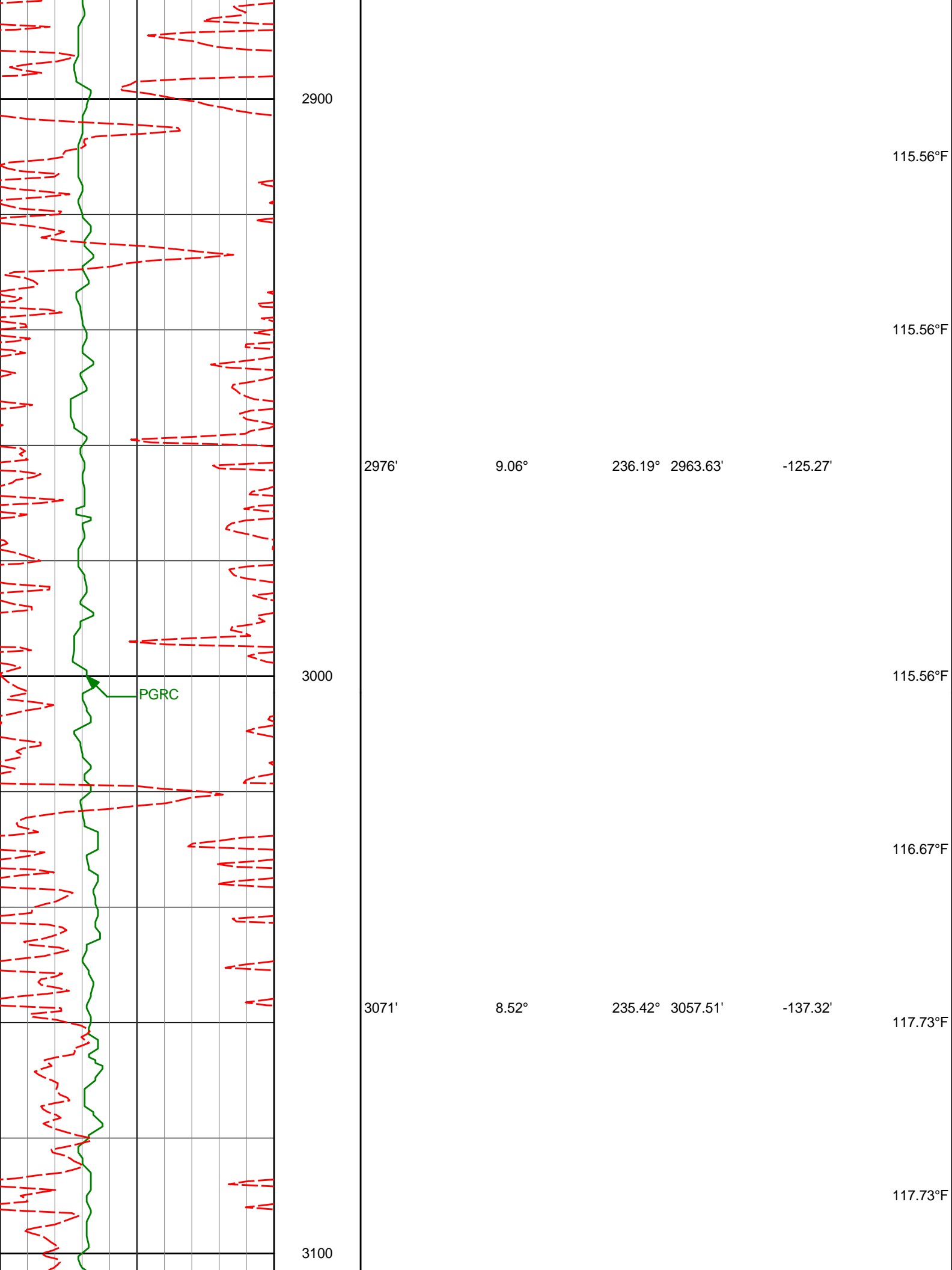
239.50° 2410.95'

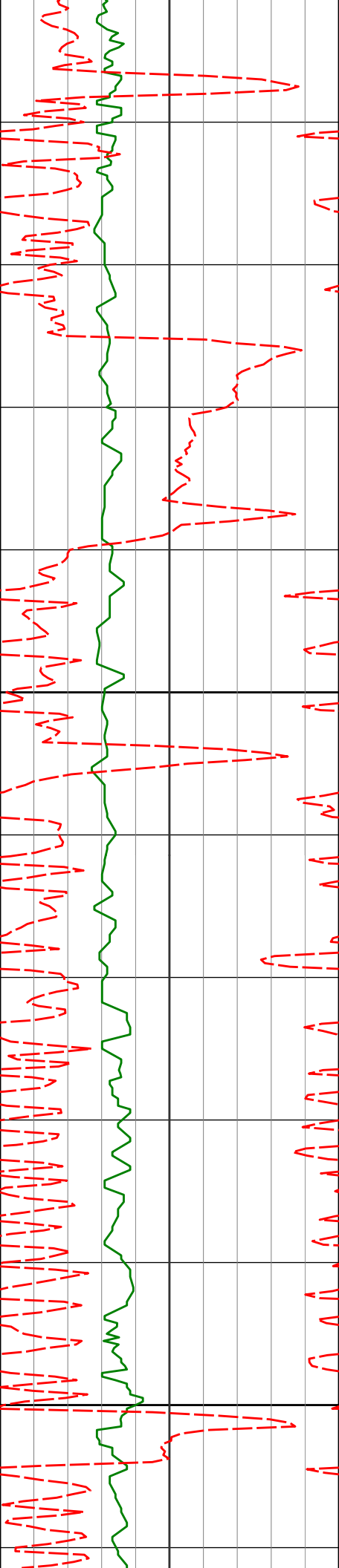
-43.69'

109.09°F









3200

3300

3165'

3260'

8.11°

8.79°

238.06°

240.86°

3150.52'

3244.49'

-148.72'

-160.78'

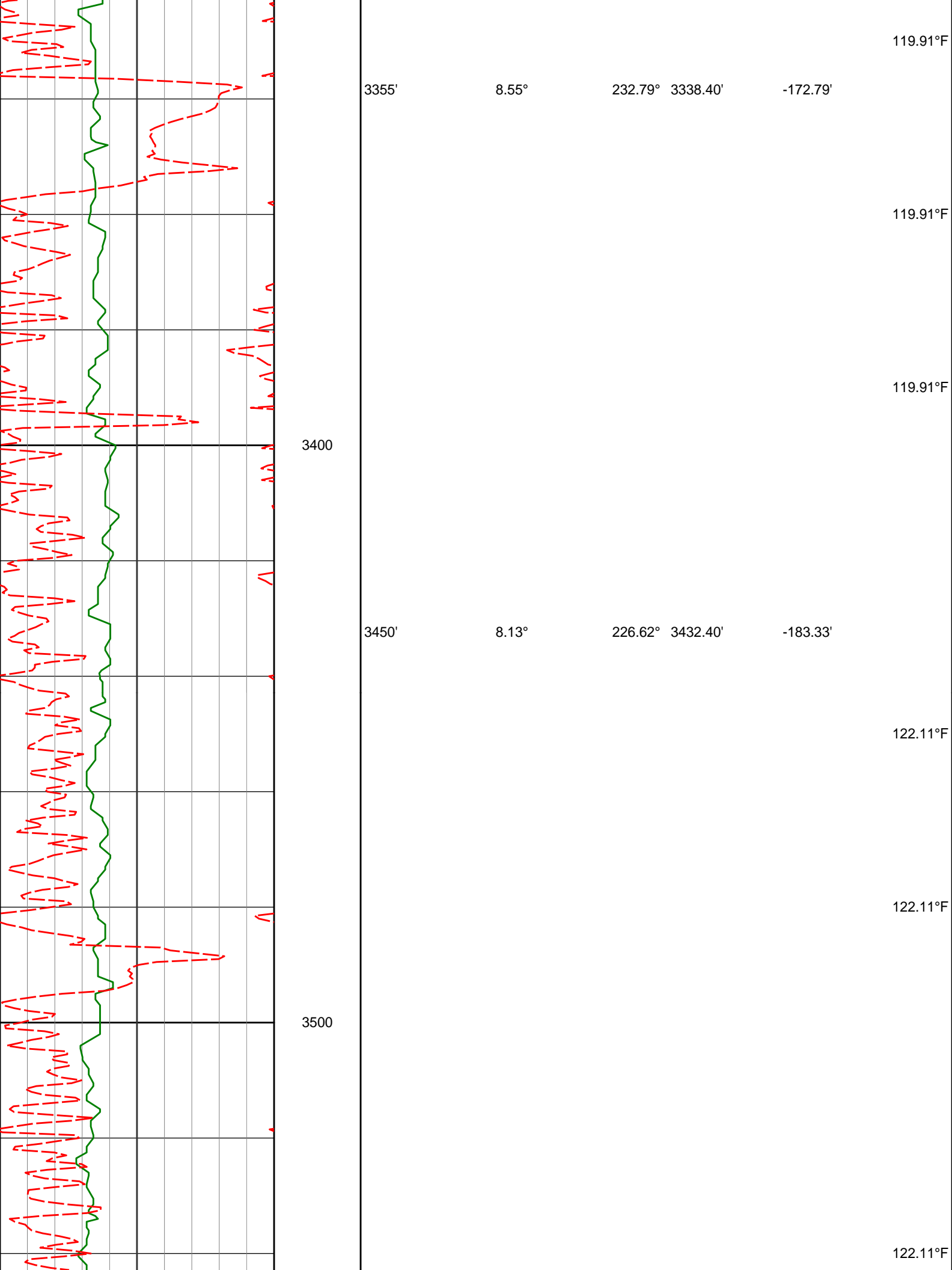
117.73°F

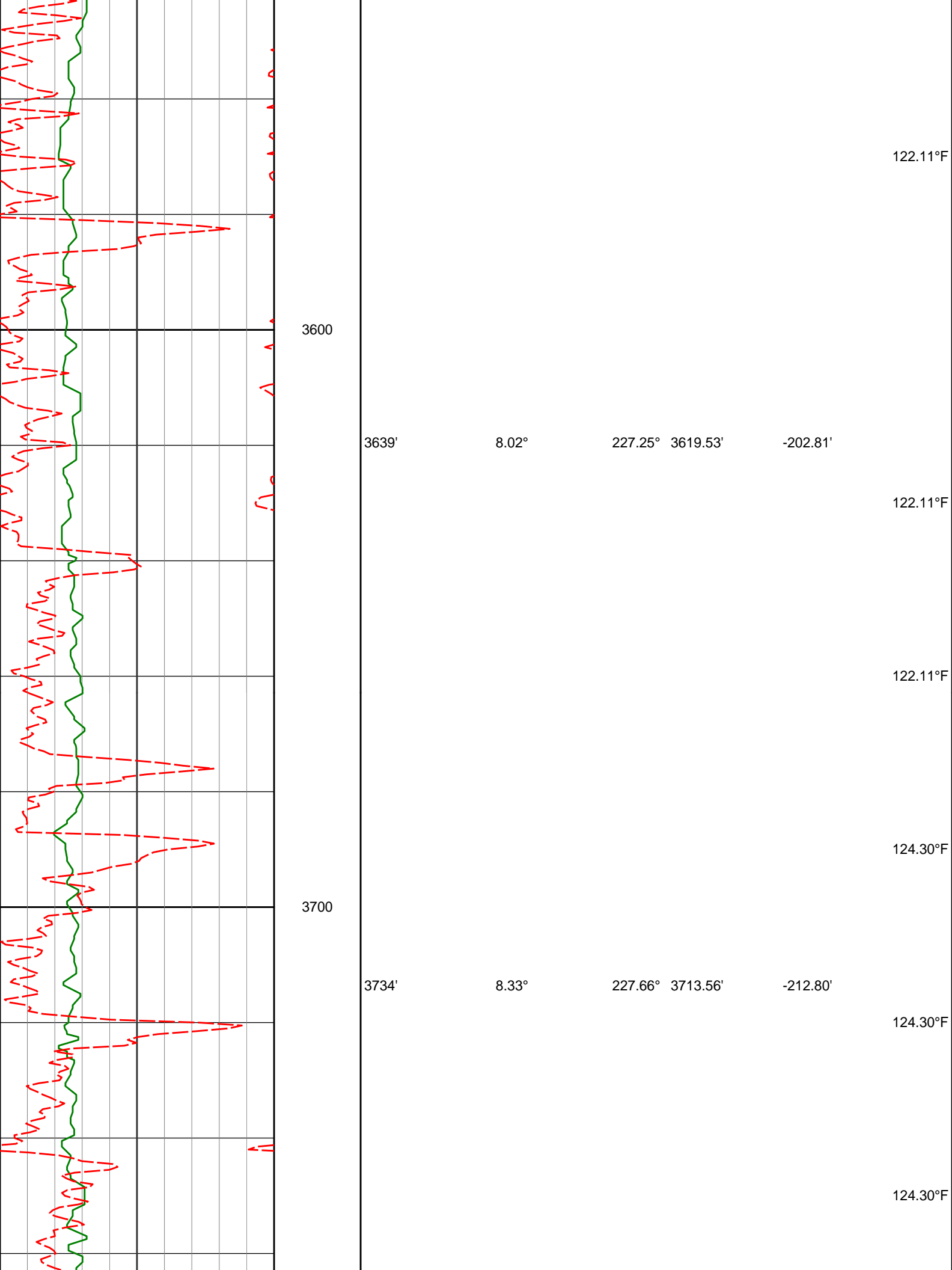
117.73°F

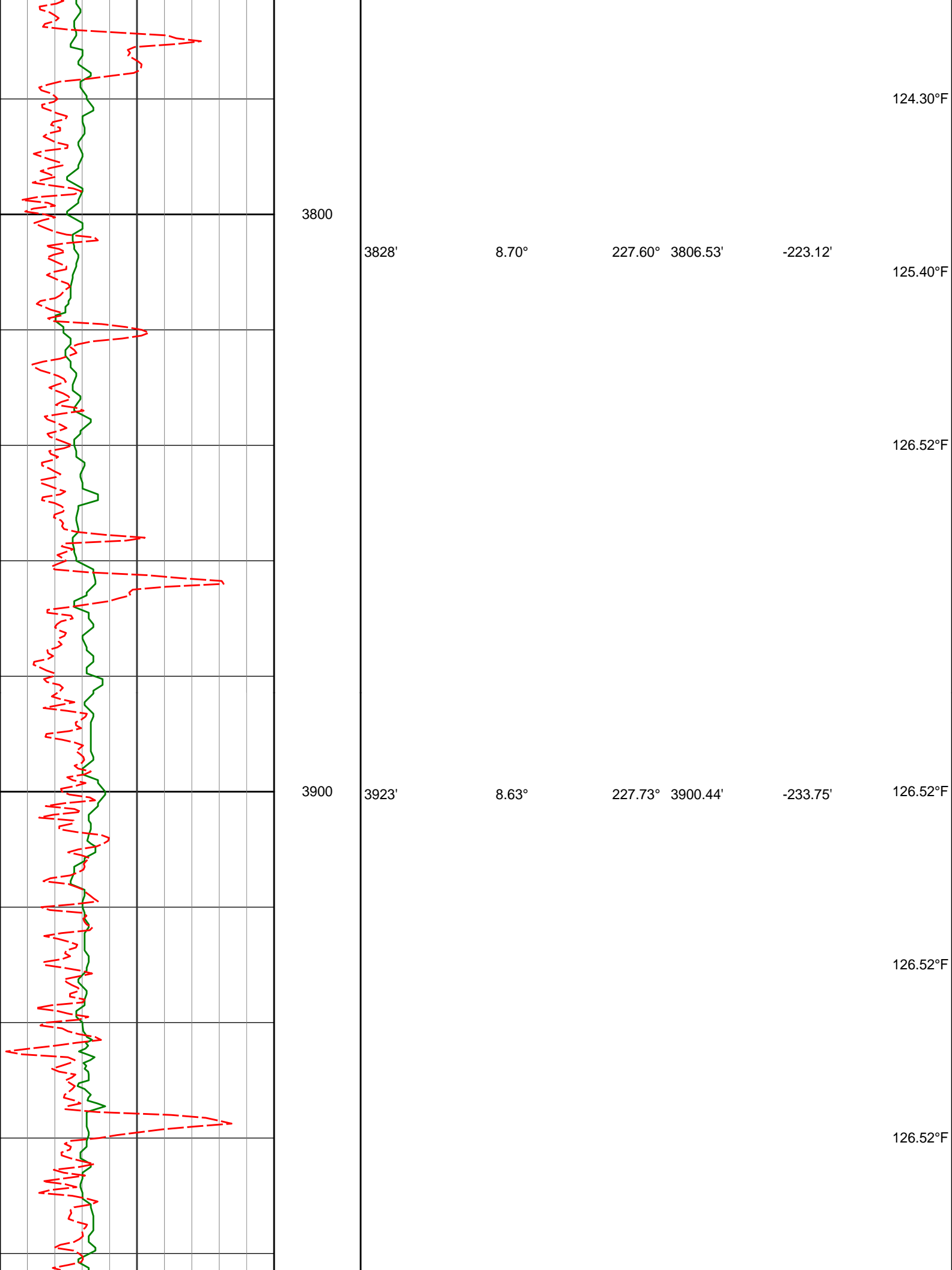
117.73°F

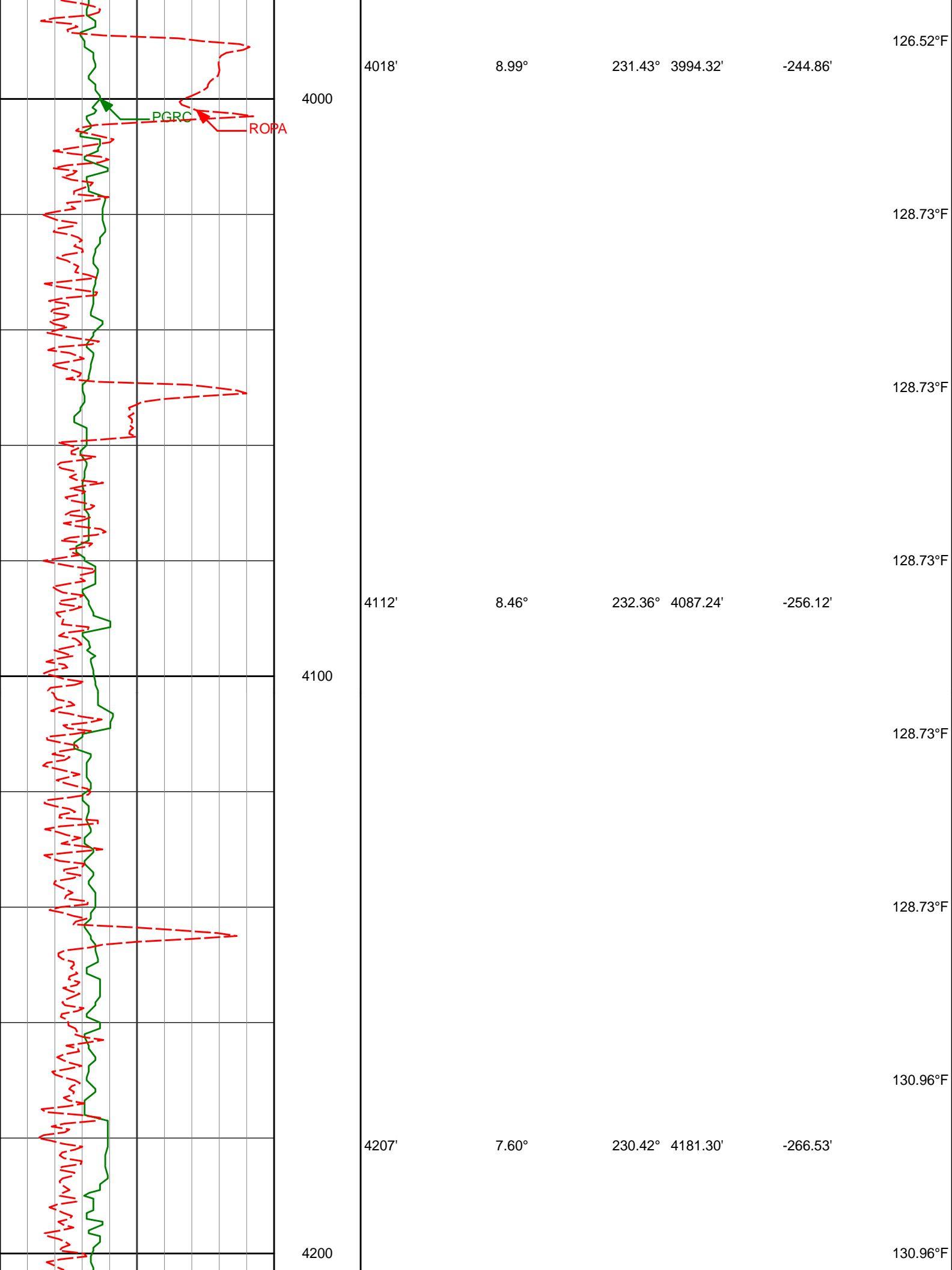
119.91°F

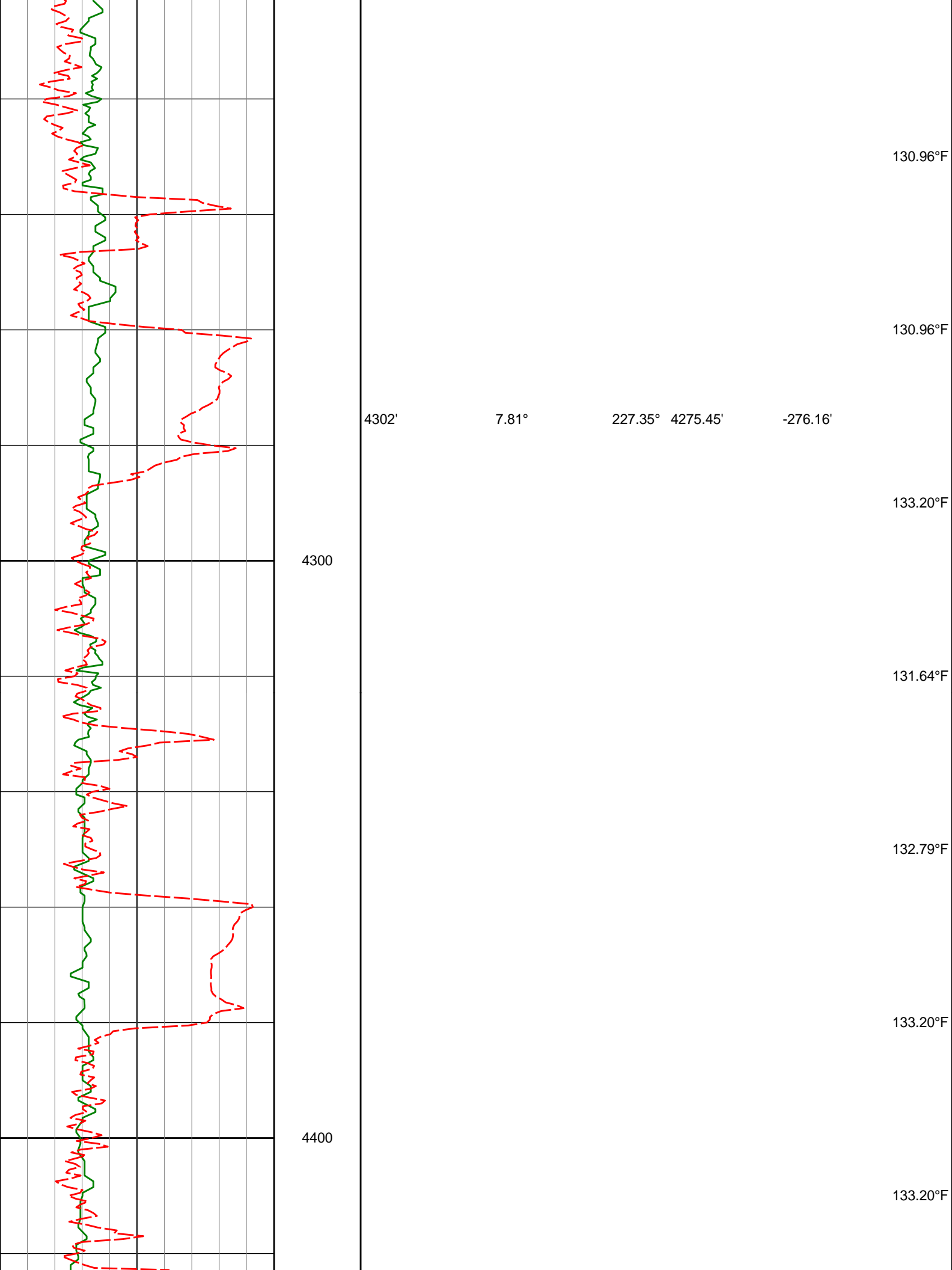
119.91°F

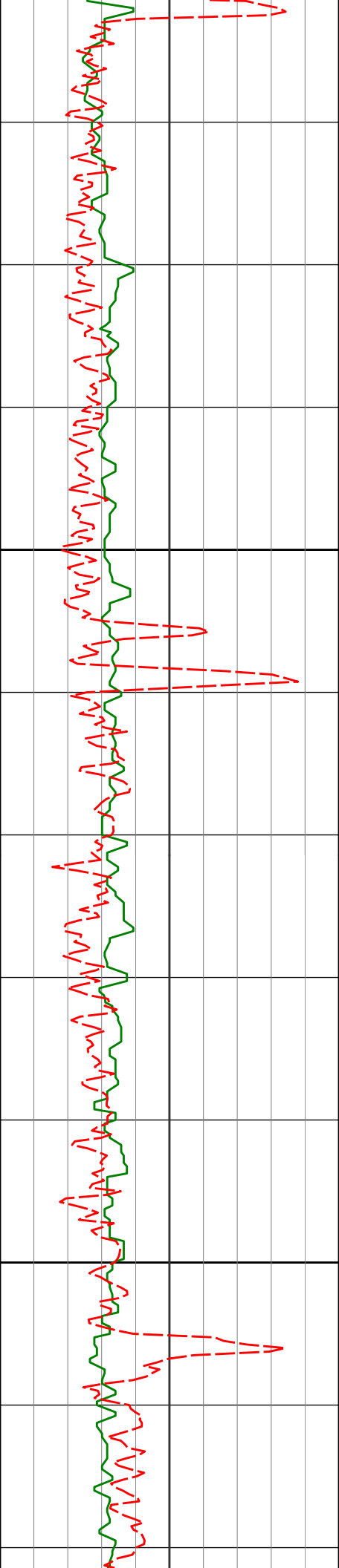












4500

4600

4491'

4586'

9.23°

8.05°

233.54° 4462.36'

233.02° 4556.28'

-297.87'

-309.35'

135.45°F

135.45°F

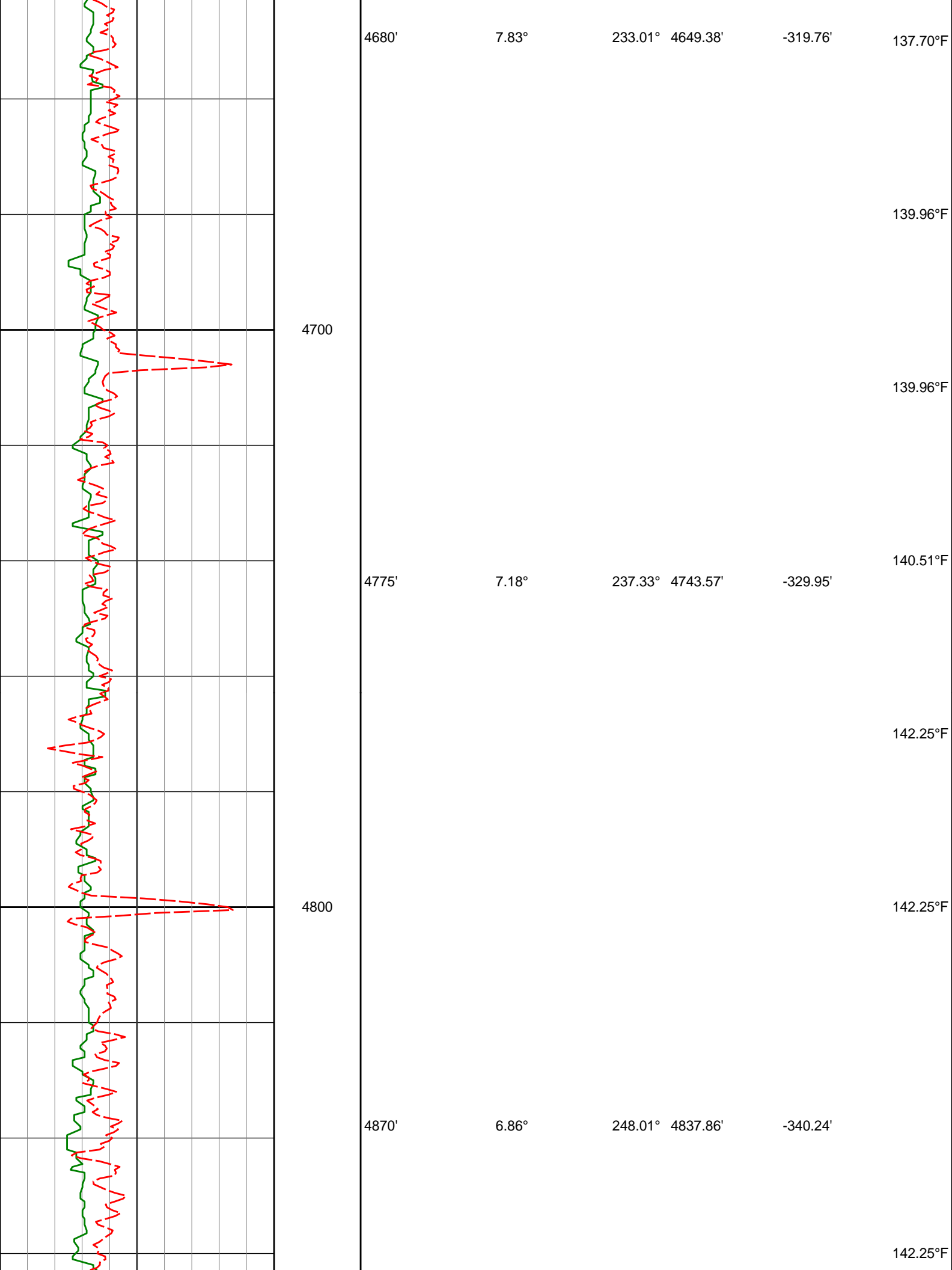
135.45°F

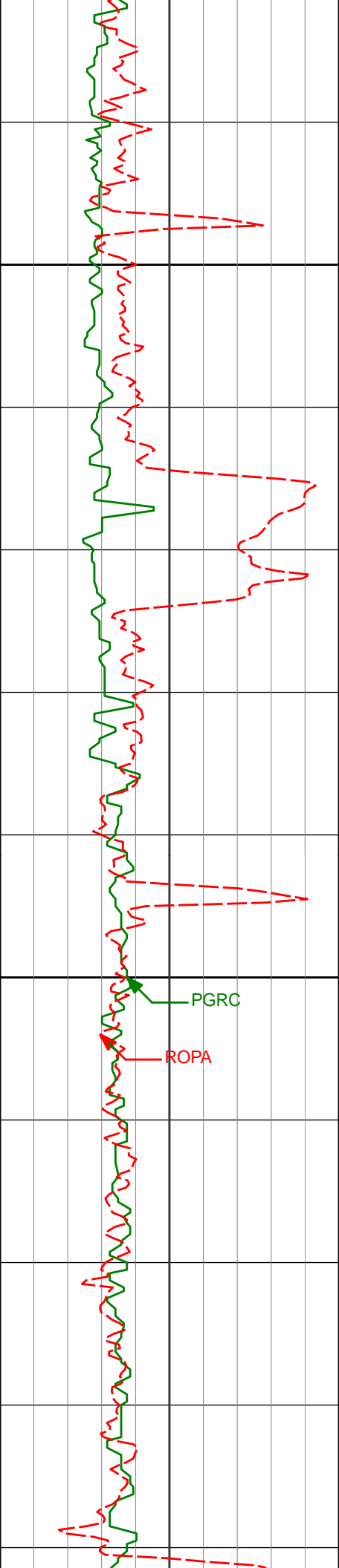
137.19°F

137.70°F

137.70°F

137.70°F





4900

4964'

6.61°

249.89° 4931.21'

-350.54'

5000

PGRC

ROPA

142.25°F

142.25°F

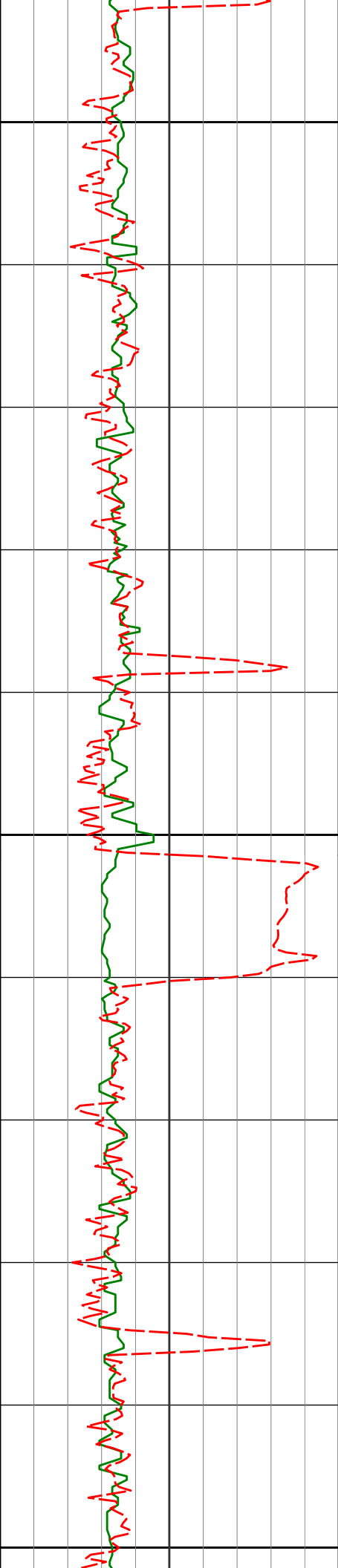
142.25°F

142.25°F

144.54°F

144.54°F

144.54°F



5100

146.84°F

5154'

5.94°

242.74° 5120.07'

-369.58'

146.84°F

146.28°F

5200

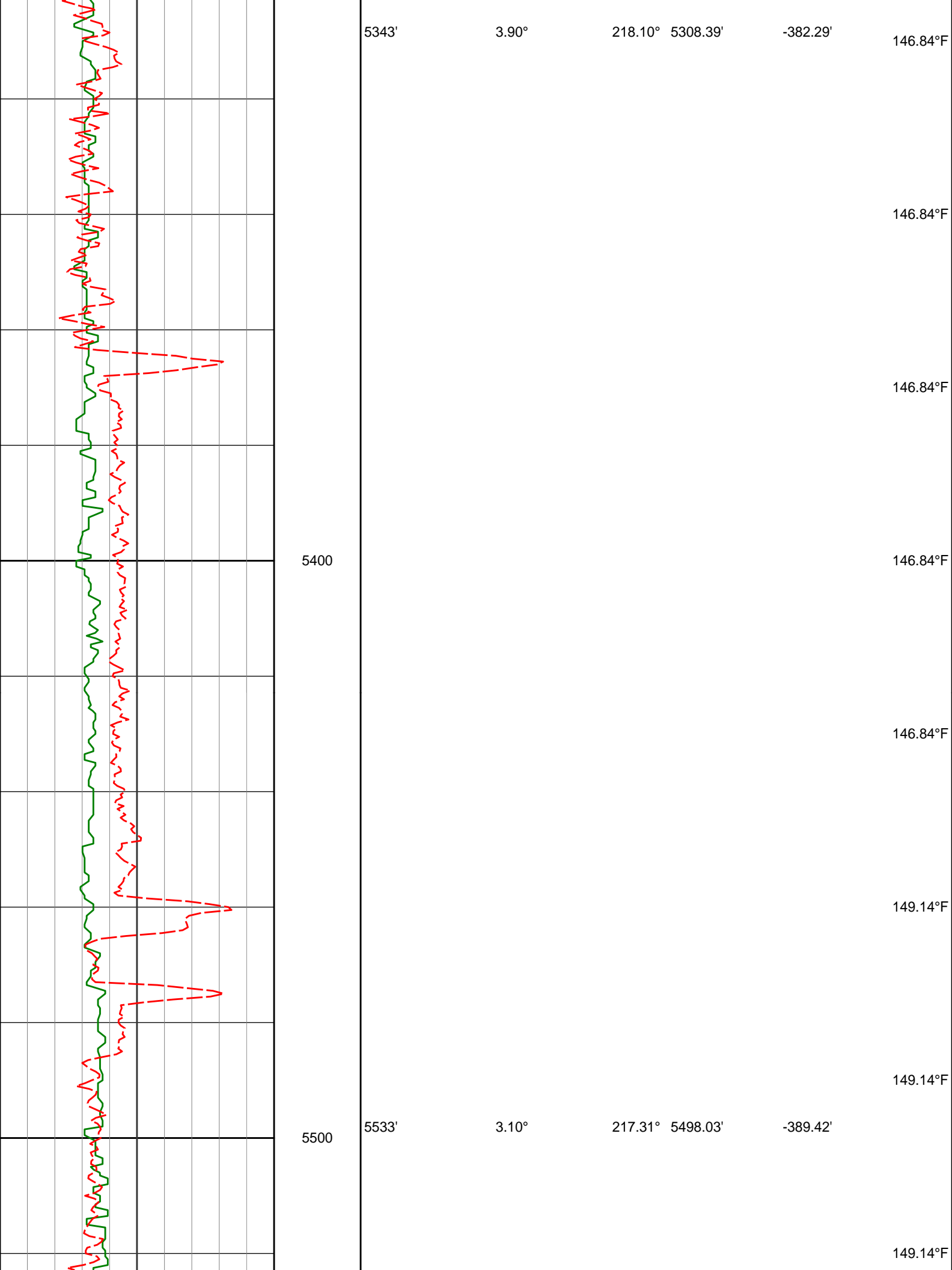
144.54°F

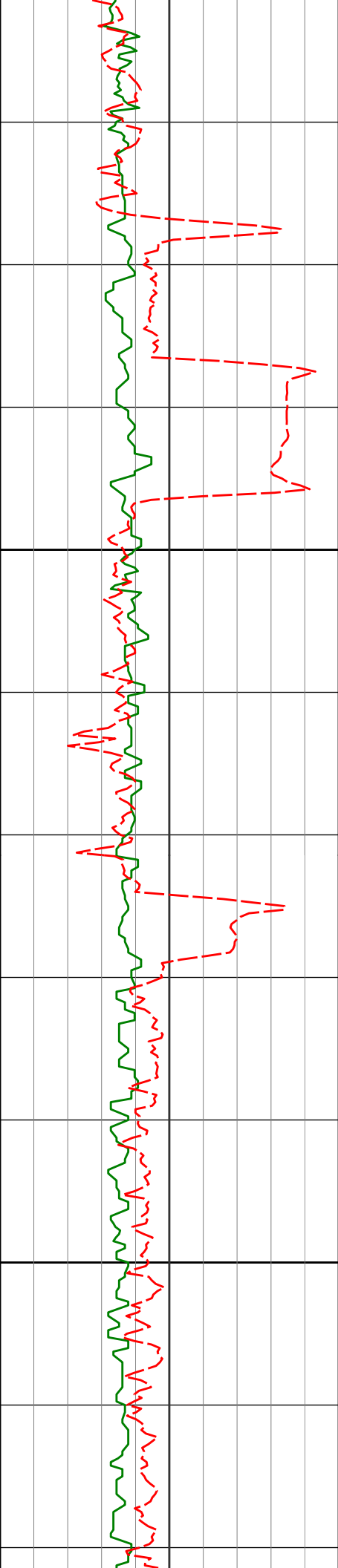
146.84°F

146.84°F

146.84°F

5300





5600

5700

5627'

5722'

1.79°

1.30°

219.51° 5591.95'

213.74° 5686.91'

-391.91'

-393.46'

149.14°F

149.14°F

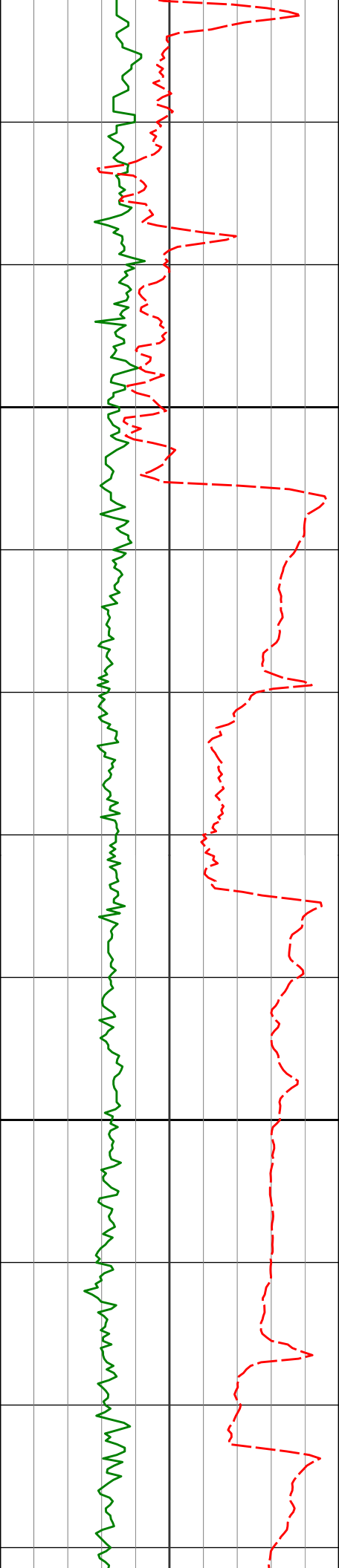
151.16°F

151.47°F

151.47°F

151.47°F

153.30°F



5800

5911'

5900

4.34°

108.64° 5875.73'

-387.88'

151.59°F

151.17°F

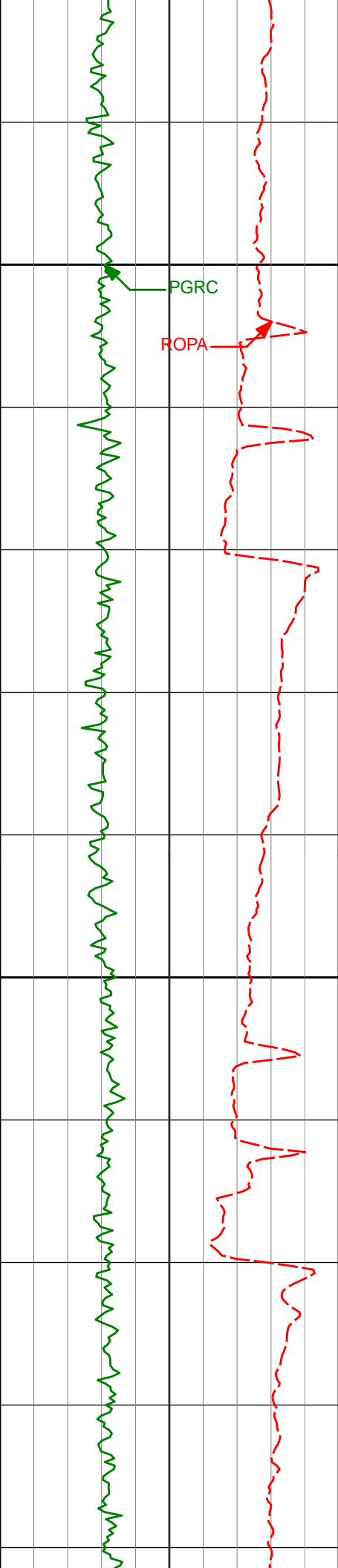
151.47°F

151.82°F

153.62°F

153.79°F

154.29°F



6000

6100

6006'

14.58°

103.79° 5969.31'

-372.83'

156.05°F

156.13°F

156.13°F

6101'

22.98°

98.55° 6059.18'

-342.85'

157.52°F

158.47°F

158.47°F

6195'

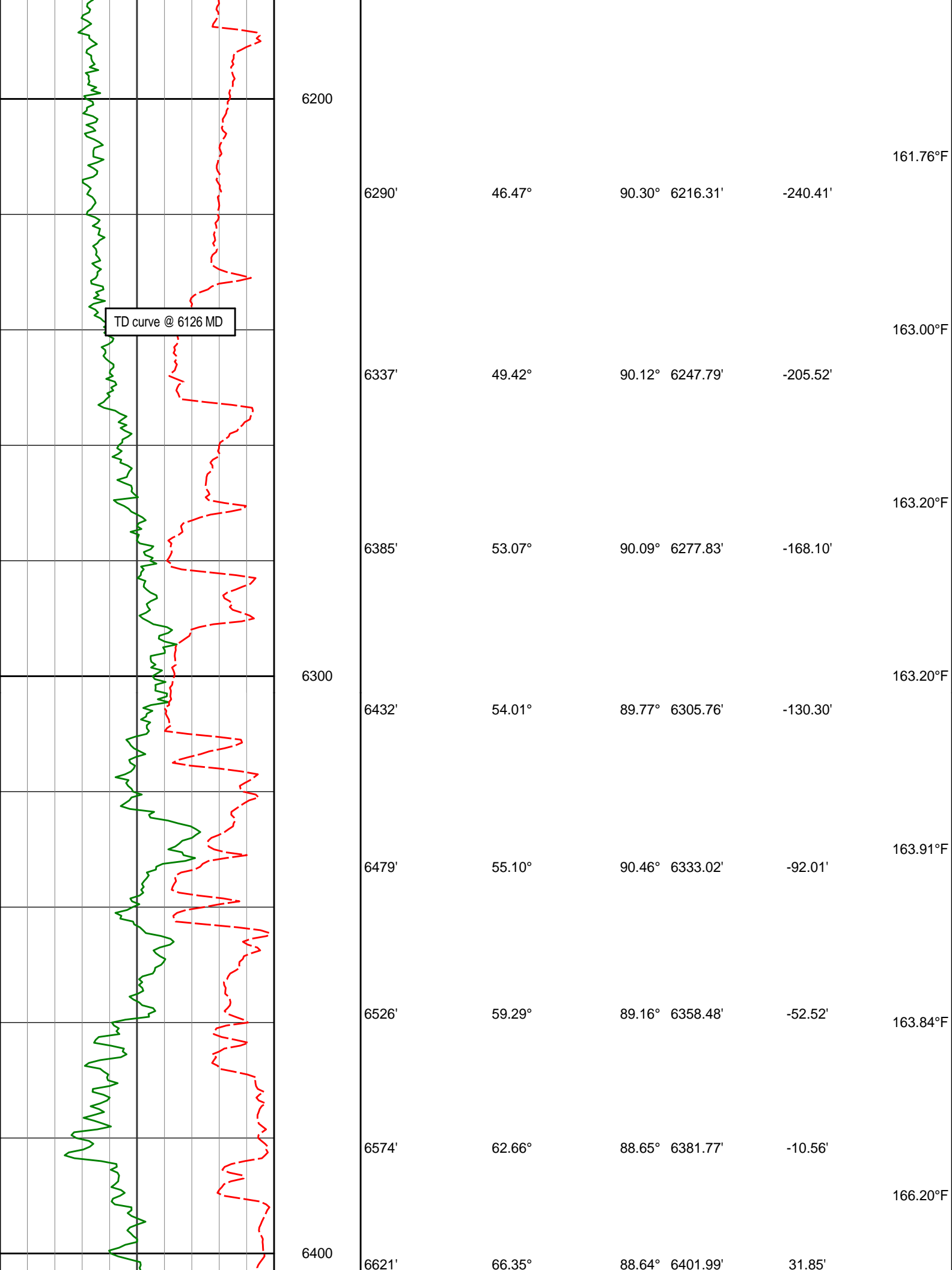
31.54°

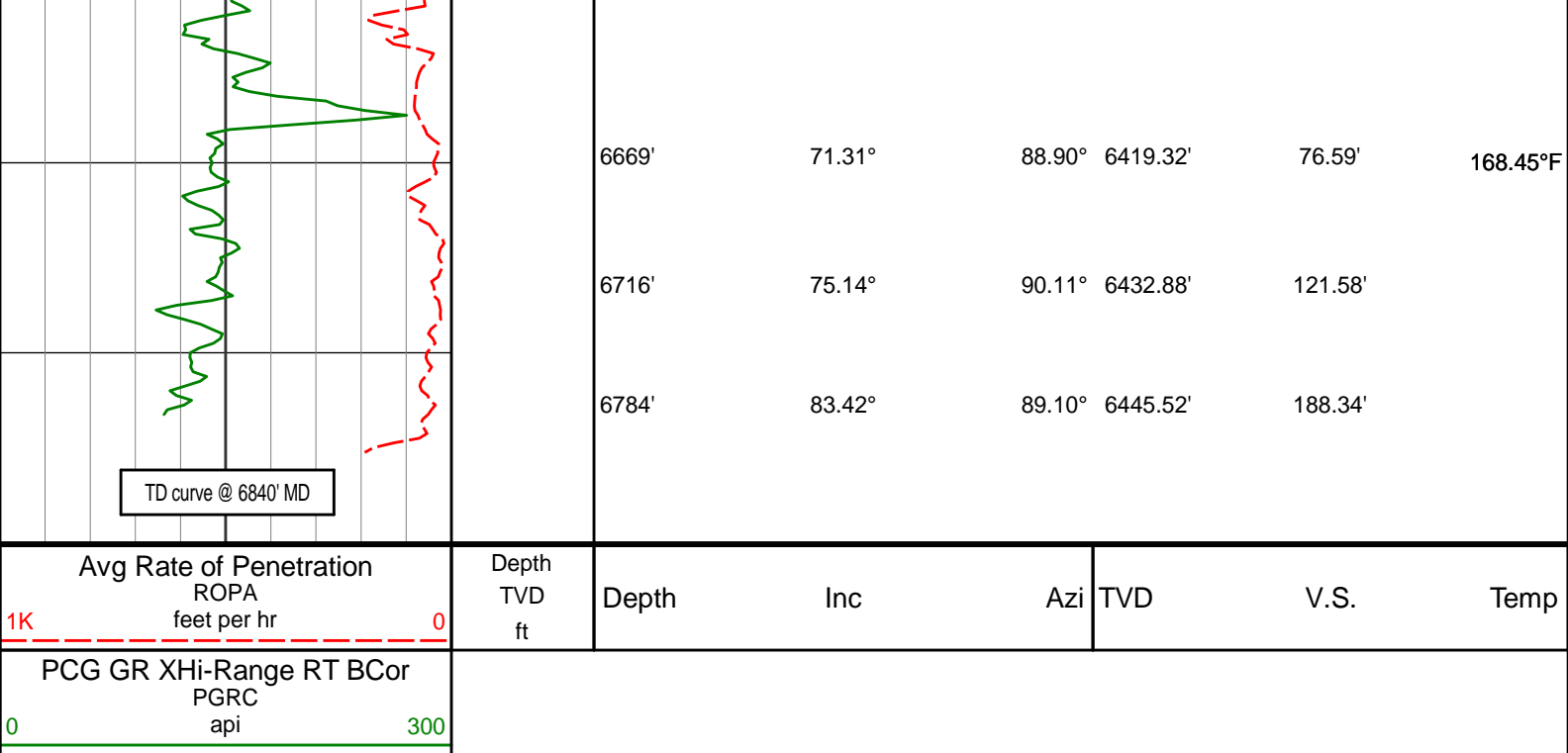
89.95° 6142.69'

-300.03'

158.53°F

160.46°F





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-655
Wattenburg
Weld Colorado
USA
CA-XX-0902678333
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
676.00	0.18	29.95	676.00	0.94 N	0.54 E	0.55	0.03
825.00	0.15	53.88	825.00	1.27 N	0.82 E	0.83	0.05
917.00	0.24	39.39	917.00	1.49 N	1.04 E	1.05	0.11
1010.00	0.46	43.77	1010.00	1.91 N	1.42 E	1.43	0.24
1104.00	0.51	60.36	1103.99	2.38 N	2.04 E	2.06	0.16
1209.00	0.61	68.70	1208.99	2.82 N	2.97 E	2.98	0.12
1303.00	0.63	62.93	1302.98	3.23 N	3.89 E	3.90	0.07
1396.00	0.66	61.04	1395.98	3.72 N	4.81 E	4.83	0.04
1488.00	0.75	82.92	1487.97	4.05 N	5.87 E	5.89	0.30
1580.00	0.69	83.72	1579.96	4.19 N	7.01 E	7.03	0.06
1673.00	0.61	80.80	1672.96	4.33 N	8.06 E	8.08	0.09
1766.00	0.46	111.46	1765.95	4.27 N	8.90 E	8.92	0.34
1859.00	1.55	228.08	1858.94	3.29 N	8.31 E	8.33	1.94
1951.00	2.89	227.11	1950.87	0.89 N	5.69 E	5.70	1.45
2044.00	5.12	228.33	2043.64	3.47 S	0.88 E	0.86	2.40
2136.00	6.60	232.21	2135.15	9.44 S	6.37 W	-6.41	1.67
2230.00	7.88	245.20	2228.41	15.45 S	16.49 W	-16.56	2.20
2323.00	9.65	246.95	2320.32	21.18 S	29.45 W	-29.55	1.93
2415.00	10.19	239.50	2410.95	28.33 S	43.56 W	-43.69	1.51
2508.00	10.32	239.09	2502.46	36.78 S	57.80 W	-57.96	0.16
2600.00	10.23	238.44	2592.99	45.29 S	71.83 W	-72.03	0.16
2692.00	10.00	237.99	2683.56	53.80 S	85.56 W	-85.80	0.26
2787.00	9.75	237.12	2777.15	62.54 S	99.31 W	-99.59	0.31
2881.00	9.34	235.91	2869.85	71.14 S	112.31 W	-112.63	0.49

2976.00	9.06	236.19	2963.63	79.62 S	124.91 W	-125.27	0.29
3071.00	8.52	235.42	3057.51	87.78 S	136.93 W	-137.32	0.58
3165.00	8.11	238.06	3150.52	95.24 S	148.29 W	-148.72	0.60
3260.00	8.79	240.86	3244.49	102.33 S	160.32 W	-160.78	0.84
3355.00	8.55	232.79	3338.40	110.13 S	172.29 W	-172.79	1.30
3450.00	8.13	226.62	3432.40	119.02 S	182.80 W	-183.33	1.04
3639.00	8.02	227.25	3619.53	137.14 S	202.19 W	-202.81	0.07
3734.00	8.33	227.66	3713.56	146.27 S	212.13 W	-212.80	0.33
3828.00	8.70	227.60	3806.53	155.65 S	222.42 W	-223.12	0.40
3923.00	8.63	227.73	3900.44	165.29 S	233.00 W	-233.75	0.08
4018.00	8.99	231.43	3994.32	174.71 S	244.07 W	-244.86	0.70
4112.00	8.46	232.36	4087.24	183.51 S	255.29 W	-256.12	0.58
4207.00	7.60	230.42	4181.30	191.78 S	265.66 W	-266.53	0.95
4302.00	7.81	227.35	4275.45	200.15 S	275.25 W	-276.16	0.49
4491.00	9.23	233.54	4462.36	217.87 S	296.89 W	-297.87	0.89
4586.00	8.05	233.02	4556.28	226.39 S	308.33 W	-309.35	1.25
4680.00	7.83	233.01	4649.38	234.20 S	318.70 W	-319.76	0.23
4775.00	7.18	237.33	4743.57	241.30 S	328.86 W	-329.95	0.90
4870.00	6.86	248.01	4837.86	246.63 S	339.12 W	-340.24	1.41
4964.00	6.61	249.89	4931.21	250.59 S	349.40 W	-350.54	0.35
5154.00	5.94	242.74	5120.07	258.85 S	368.41 W	-369.58	0.54
5343.00	3.90	218.10	5308.39	268.39 S	381.07 W	-382.29	1.53
5533.00	3.10	217.31	5498.03	277.55 S	388.17 W	-389.42	0.42
5627.00	1.79	219.51	5591.95	280.70 S	390.64 W	-391.91	1.40
5722.00	1.30	213.74	5686.91	282.74 S	392.18 W	-393.46	0.54
5911.00	4.34	108.64	5875.73	286.81 S	386.58 W	-387.88	2.56
6006.00	14.58	103.79	5969.31	290.82 S	371.52 W	-372.83	10.80
6101.00	22.98	98.55	6059.18	296.44 S	341.51 W	-342.85	9.01
6195.00	31.54	89.95	6142.69	299.15 S	298.68 W	-300.03	10.00
6290.00	46.47	90.30	6216.31	299.31 S	239.06 W	-240.41	15.72
6337.00	49.42	90.12	6247.79	299.44 S	204.16 W	-205.52	6.28
6385.00	53.07	90.09	6277.83	299.51 S	166.74 W	-168.10	7.60
6432.00	54.01	89.77	6305.76	299.46 S	128.94 W	-130.30	2.07
6479.00	55.10	90.46	6333.02	299.54 S	90.65 W	-92.01	2.61
6526.00	59.29	89.16	6358.48	299.40 S	51.16 W	-52.52	9.21
6574.00	62.66	88.65	6381.77	298.59 S	9.20 W	-10.56	7.10
6621.00	66.35	88.64	6401.99	297.59 S	33.20 E	31.85	7.84
6669.00	71.31	88.90	6419.32	296.63 S	77.94 E	76.59	10.35
6716.00	75.14	90.11	6432.88	296.24 S	122.93 E	121.58	8.51
6784.00	83.42	89.10	6445.52	295.78 S	189.68 E	188.34	12.27

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 89.74 DEGREES (GRID)
A TOTAL CORRECTION OF 7.57 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6784.00 FEET
IS 351.37 FEET ALONG 147.33 DEGREES (GRID)**