

Max Tool Temp (degF) / Source	167.00 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ 167.00				
Lead MWD Engineer	Ryan Skaarvold				
Customer Representative	Stetson Nielsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11342302				
Insert Serial Number	11680779				
Date and Time Initialized	29-May-15 18:32				
Date and Time Read	01-Jun-15 03:36				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	56.00				
Software Version	6.21				
Sub Serial Number	11342302				
Sonde Serial Number	11638567				
Sensor ID Number	N/A				
Toolface Offset (deg)	164.50				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	49.41				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11342302				
Insert/Sonde Serial Number	11579806				

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. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. 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

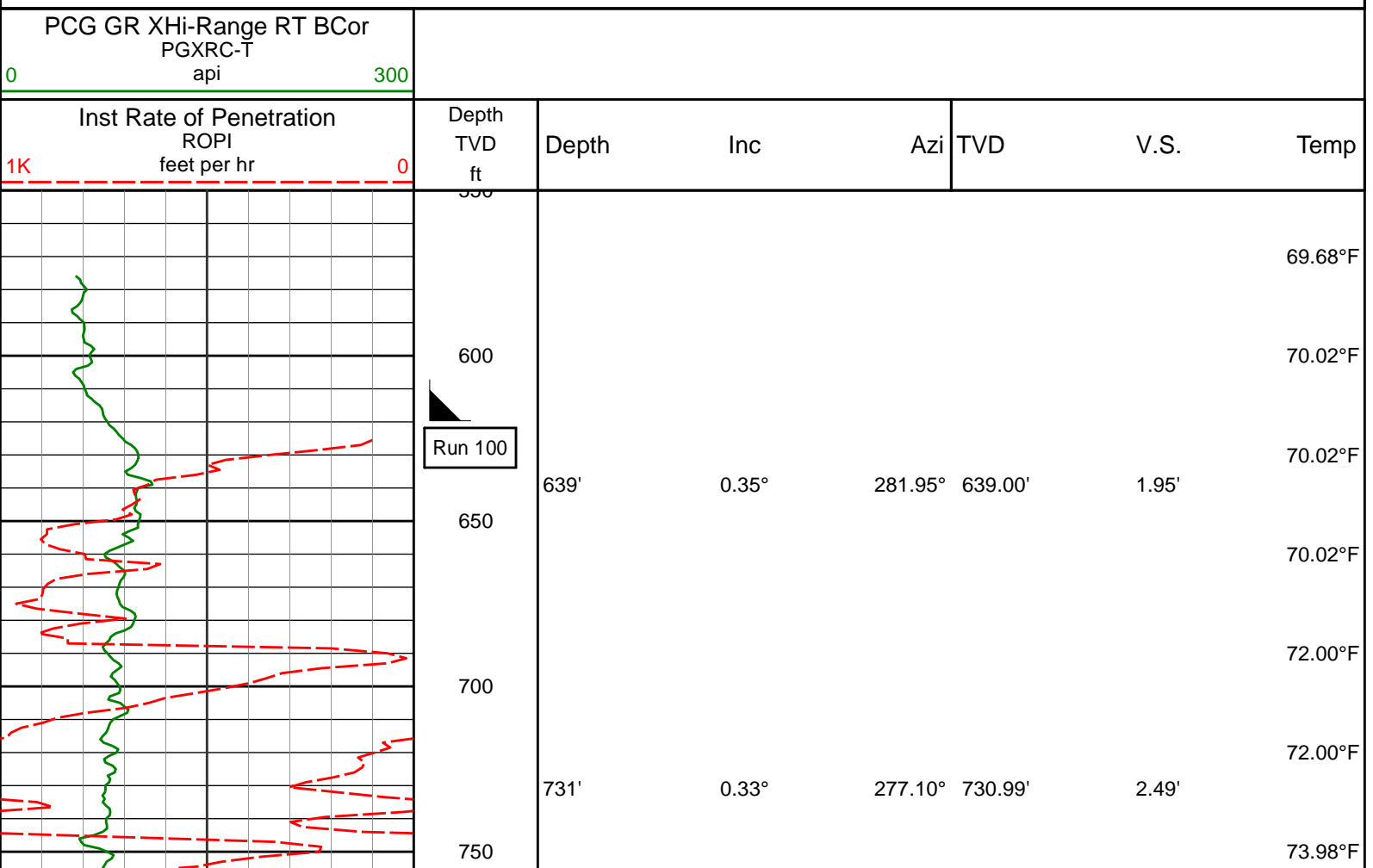
Interval Resolution: 1.2 ft

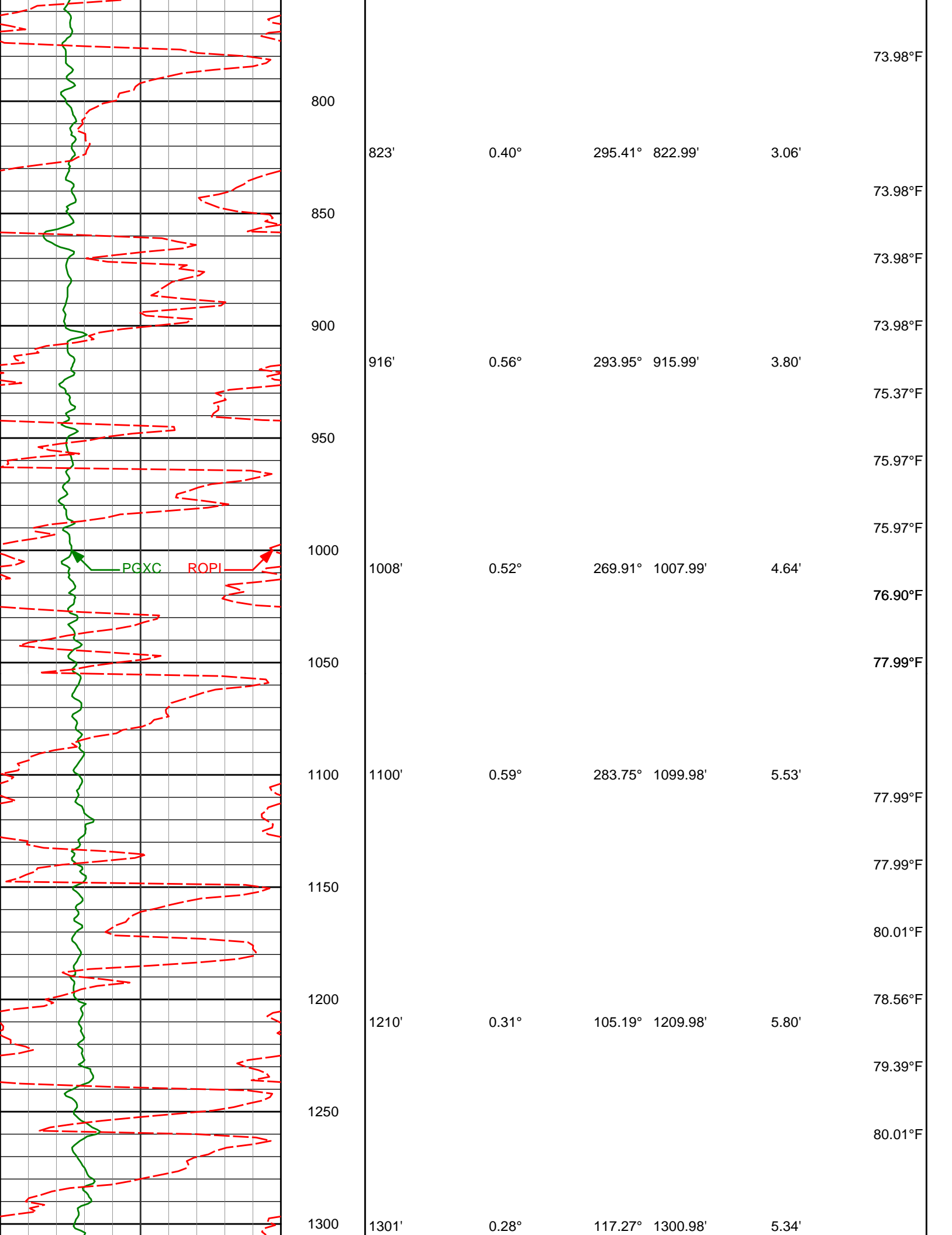
6. Insite Version v8.1.10

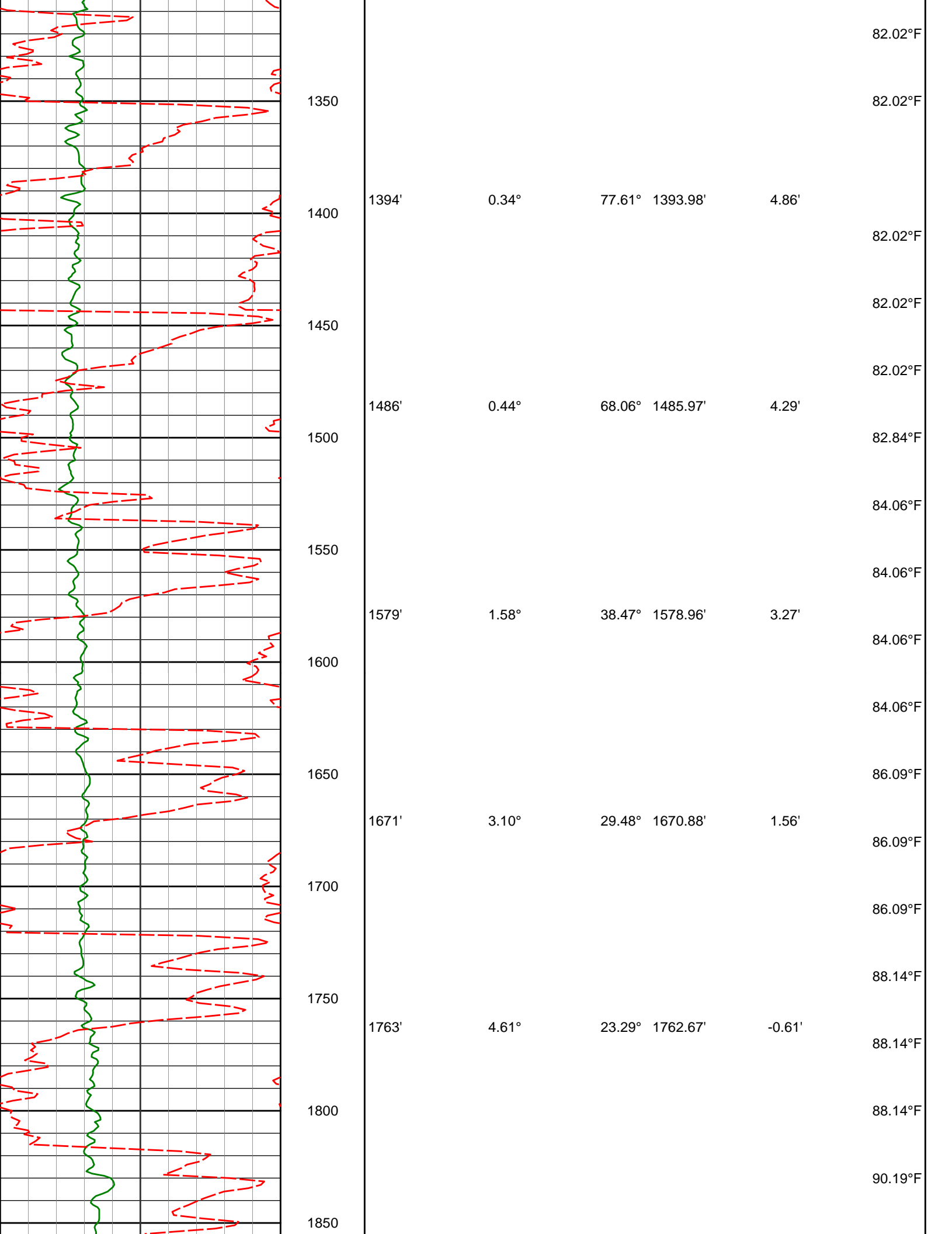
WARRANTY

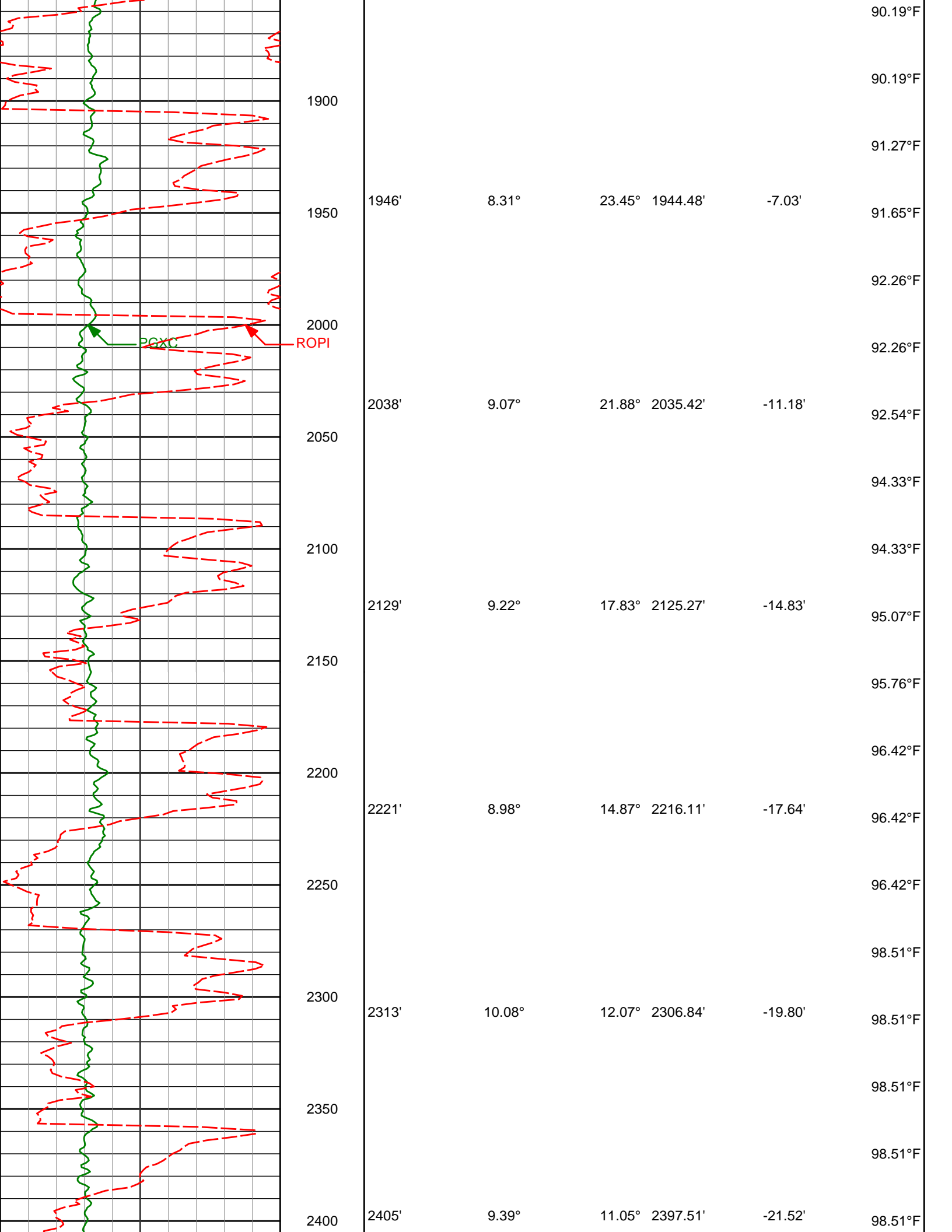
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATION; THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES 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 DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

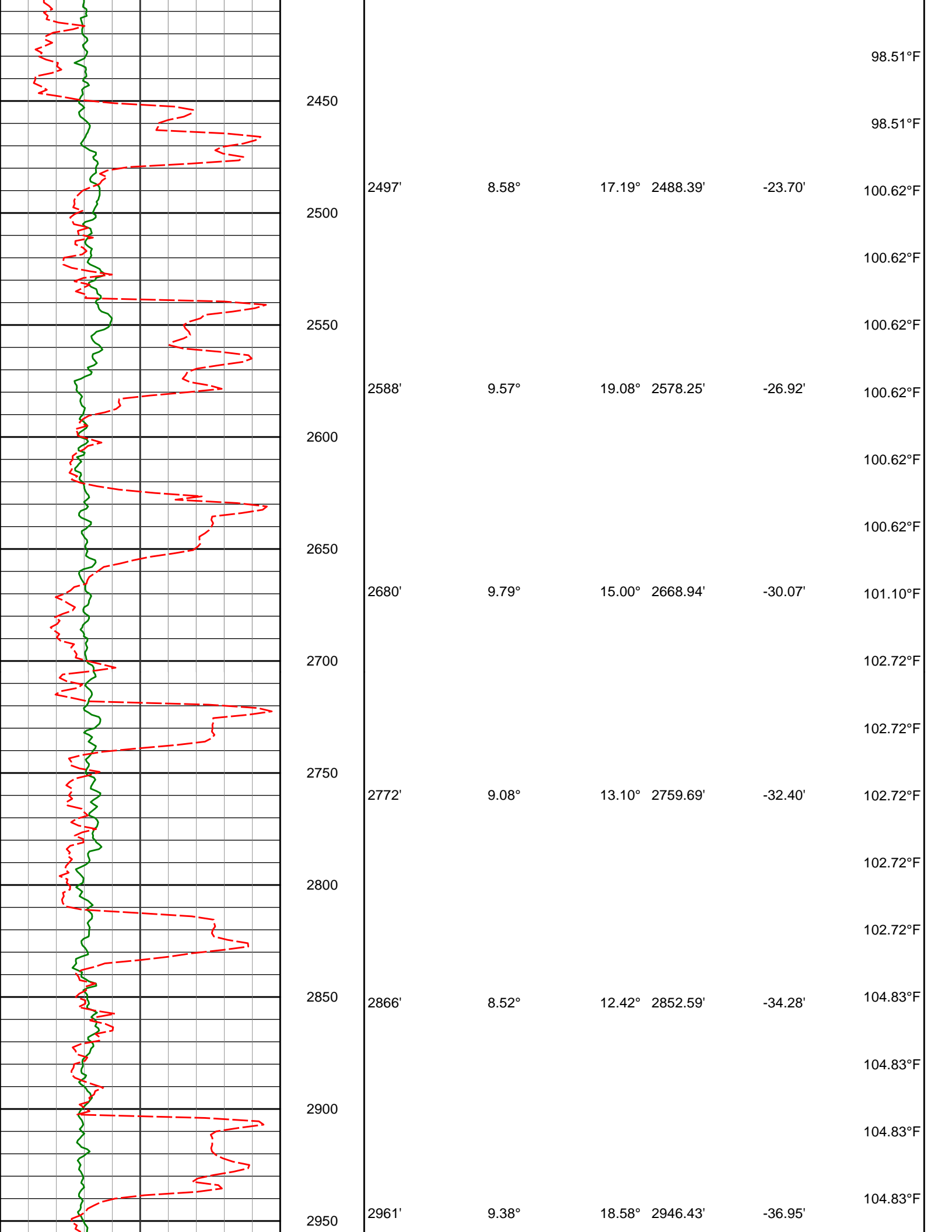
TVD Detail 1:600 Scale

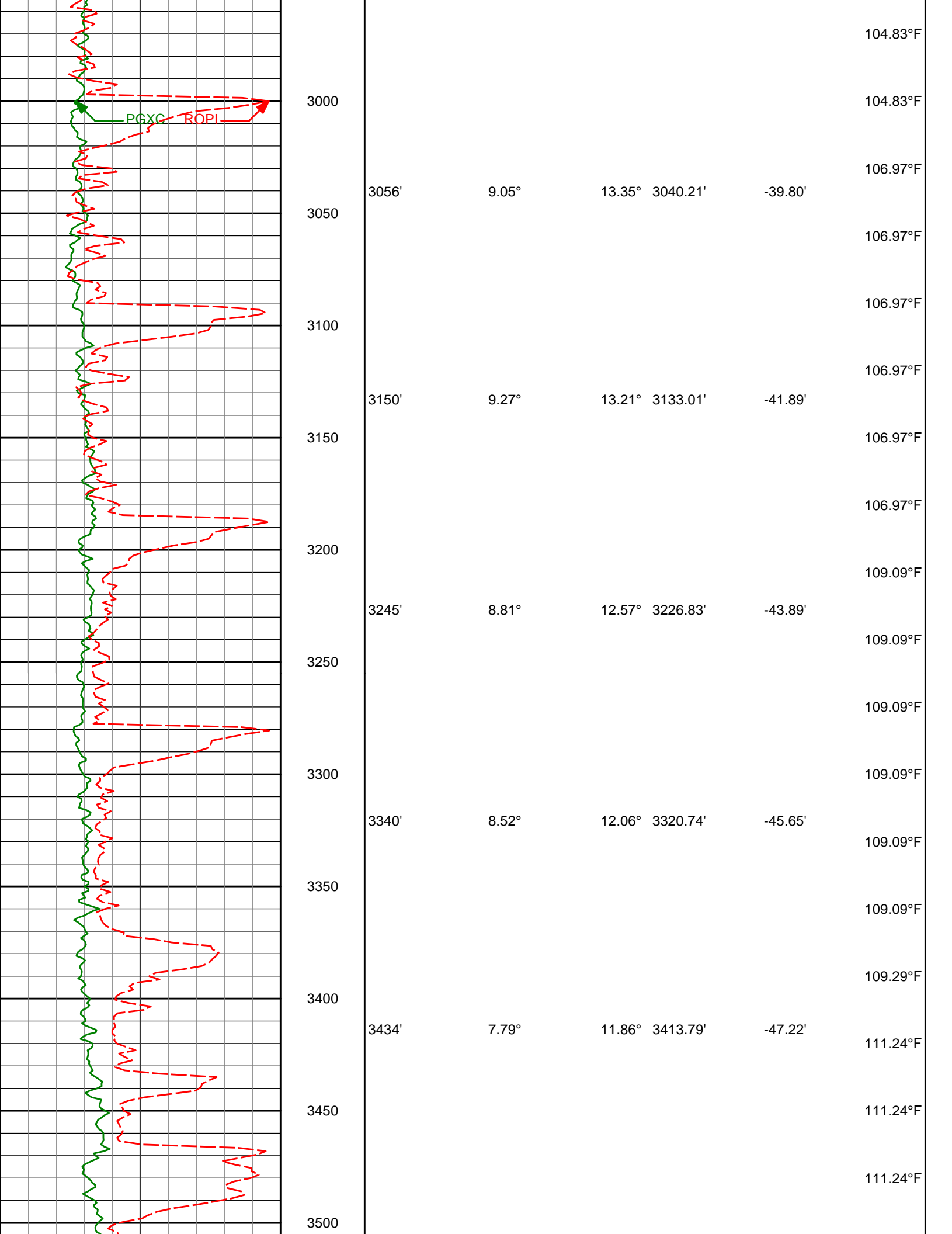


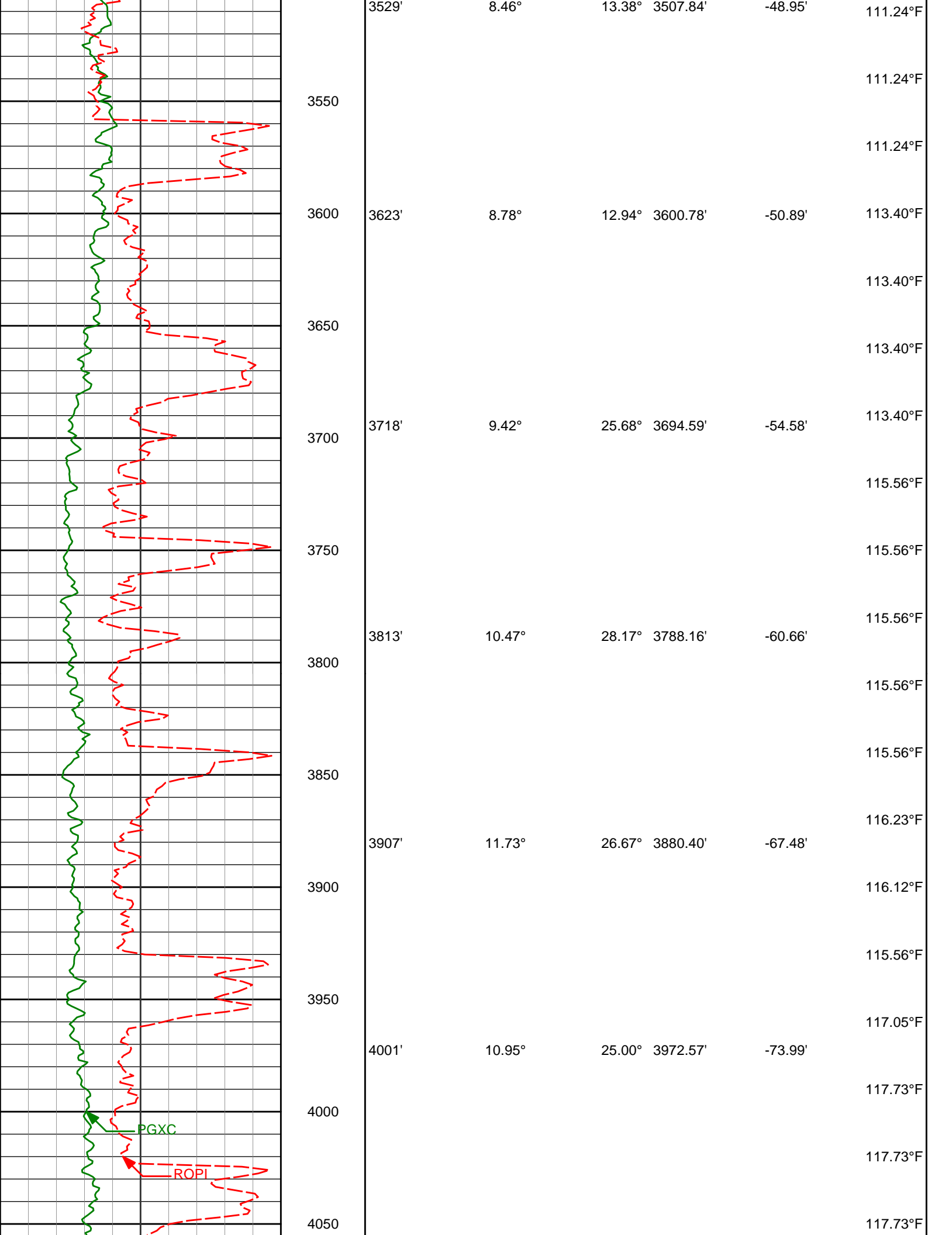


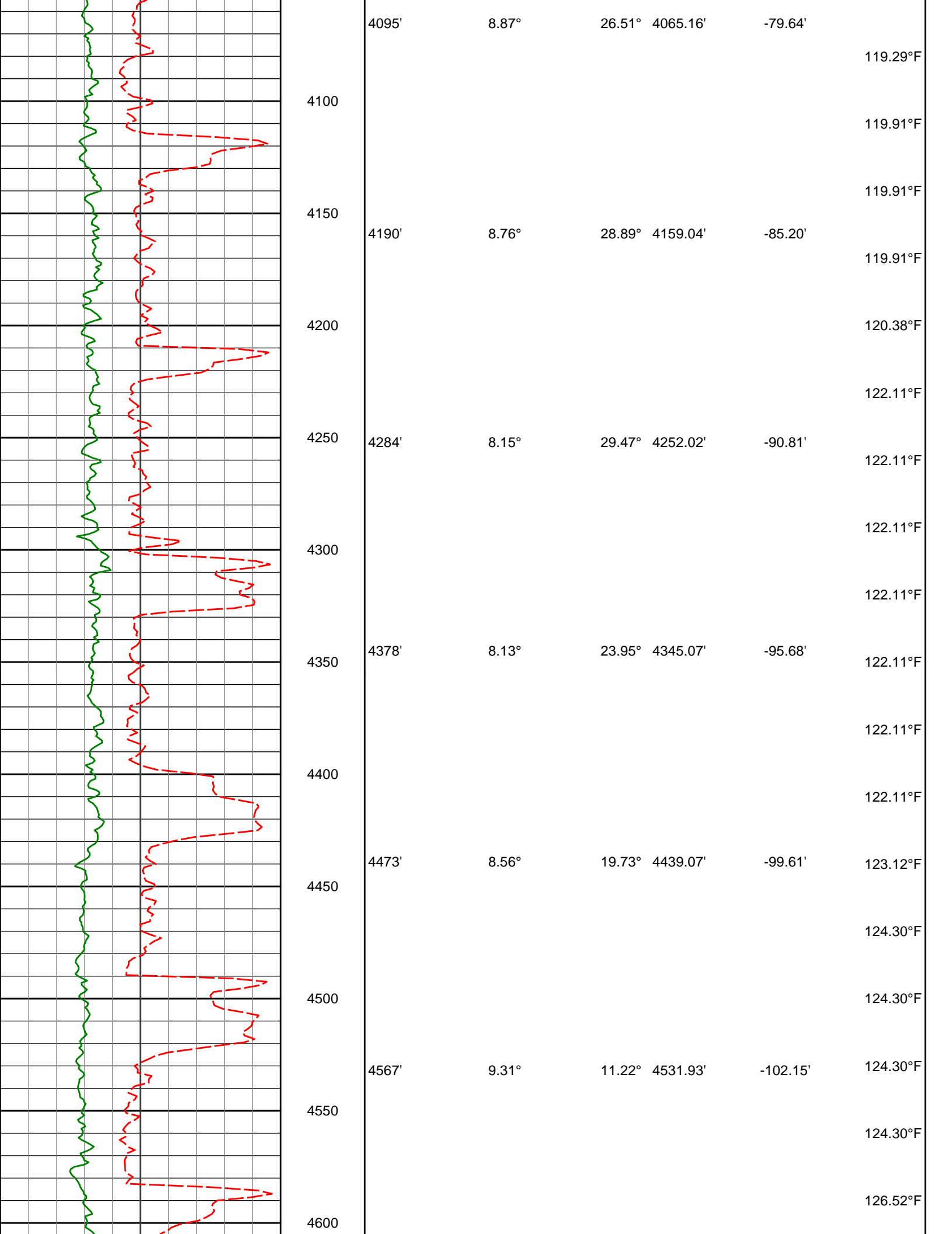


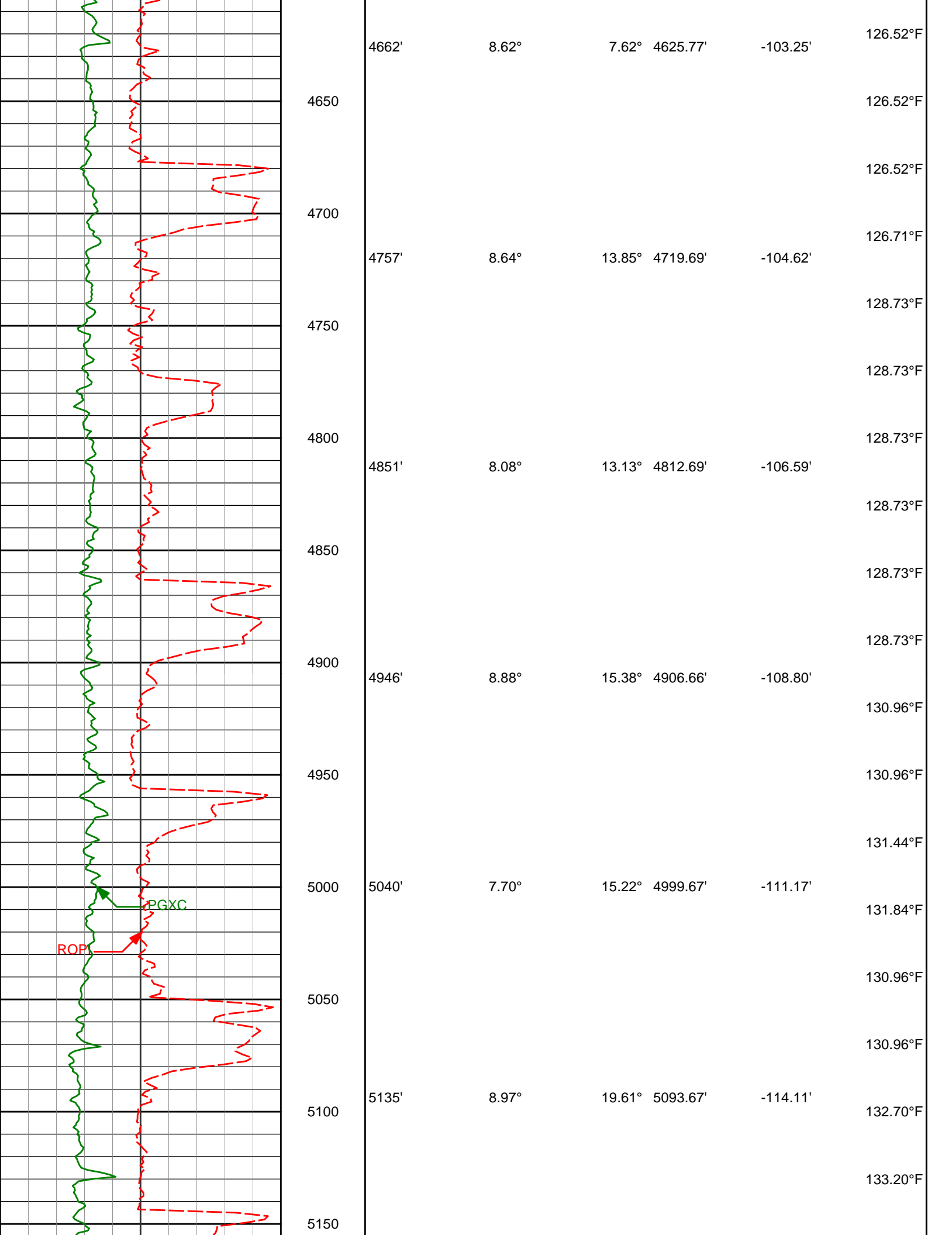


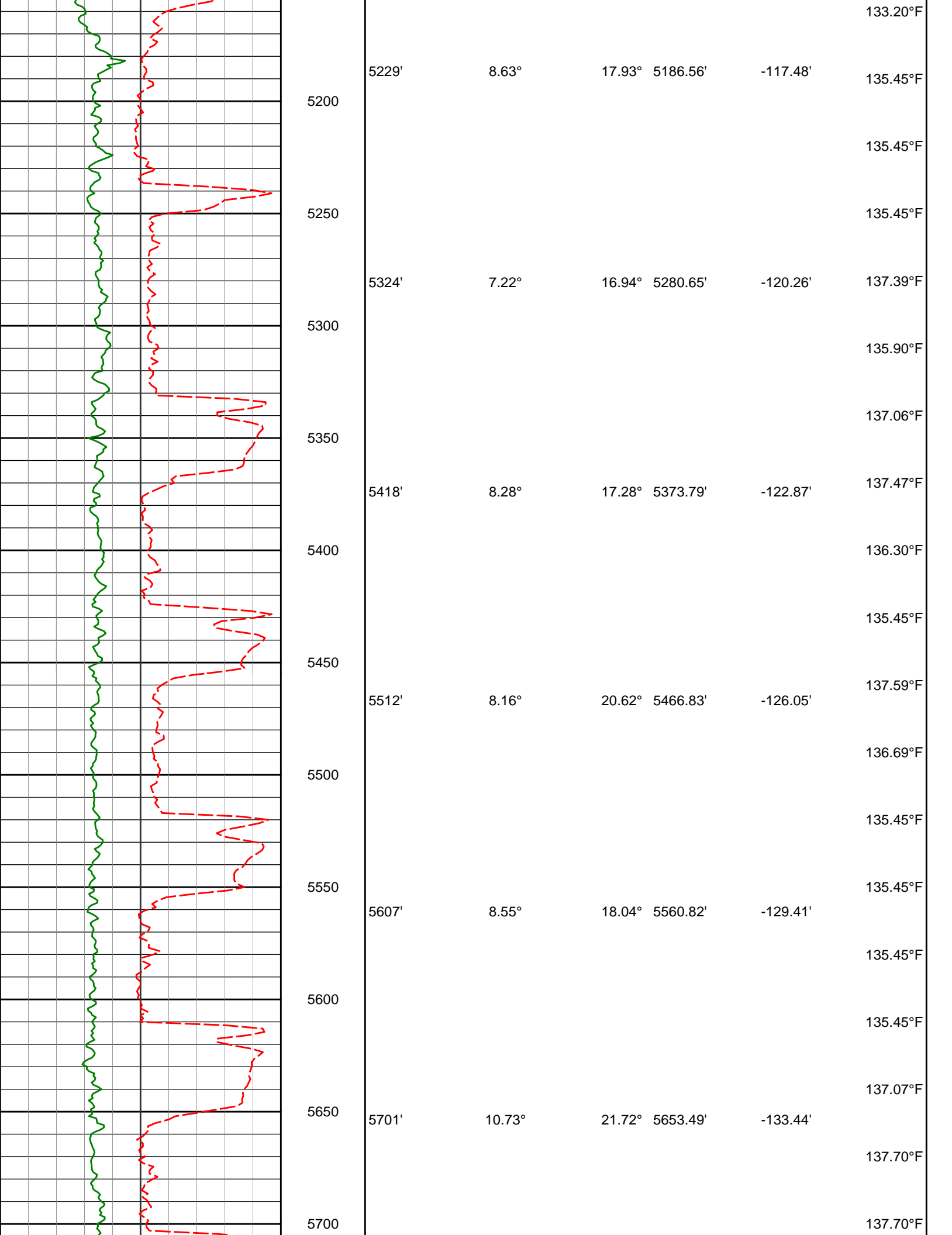


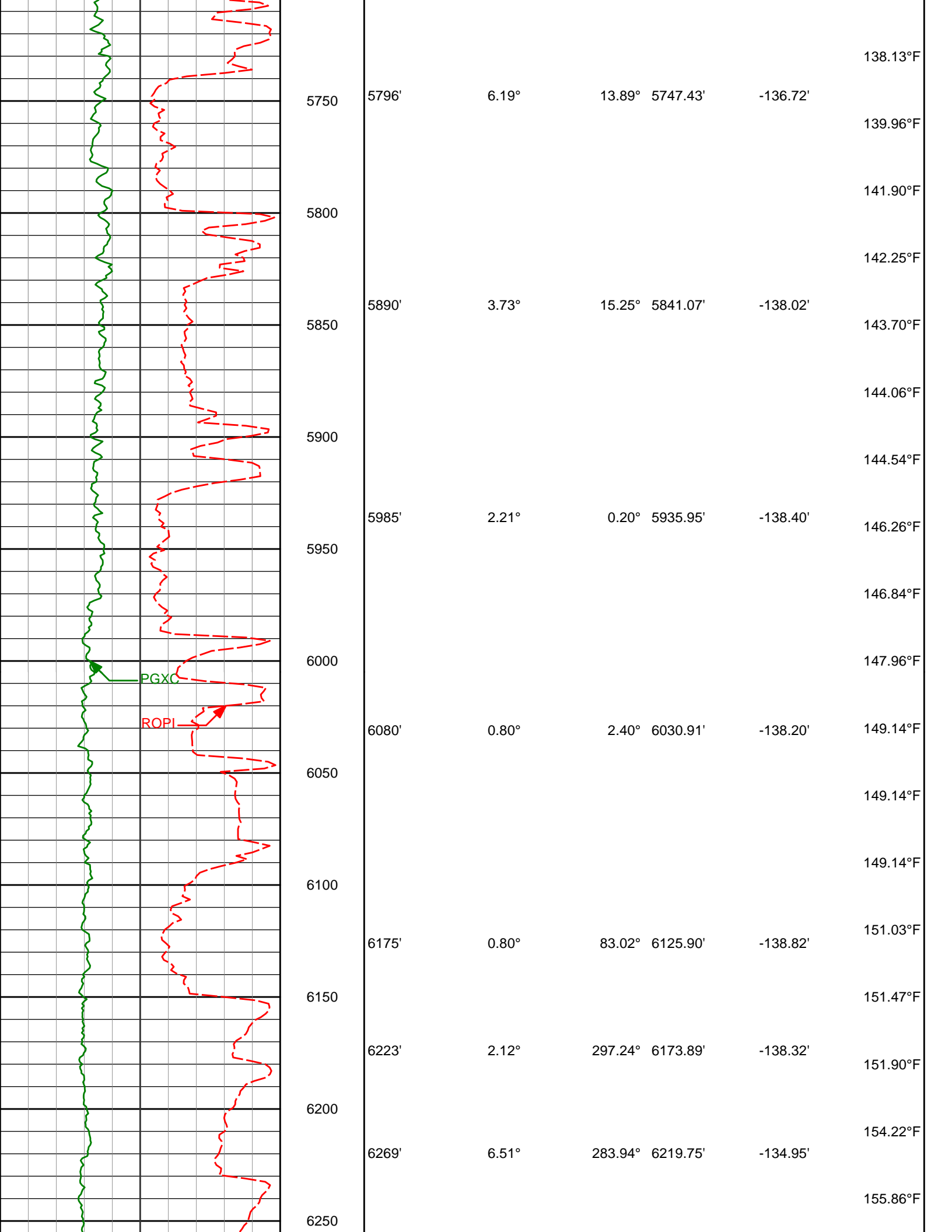


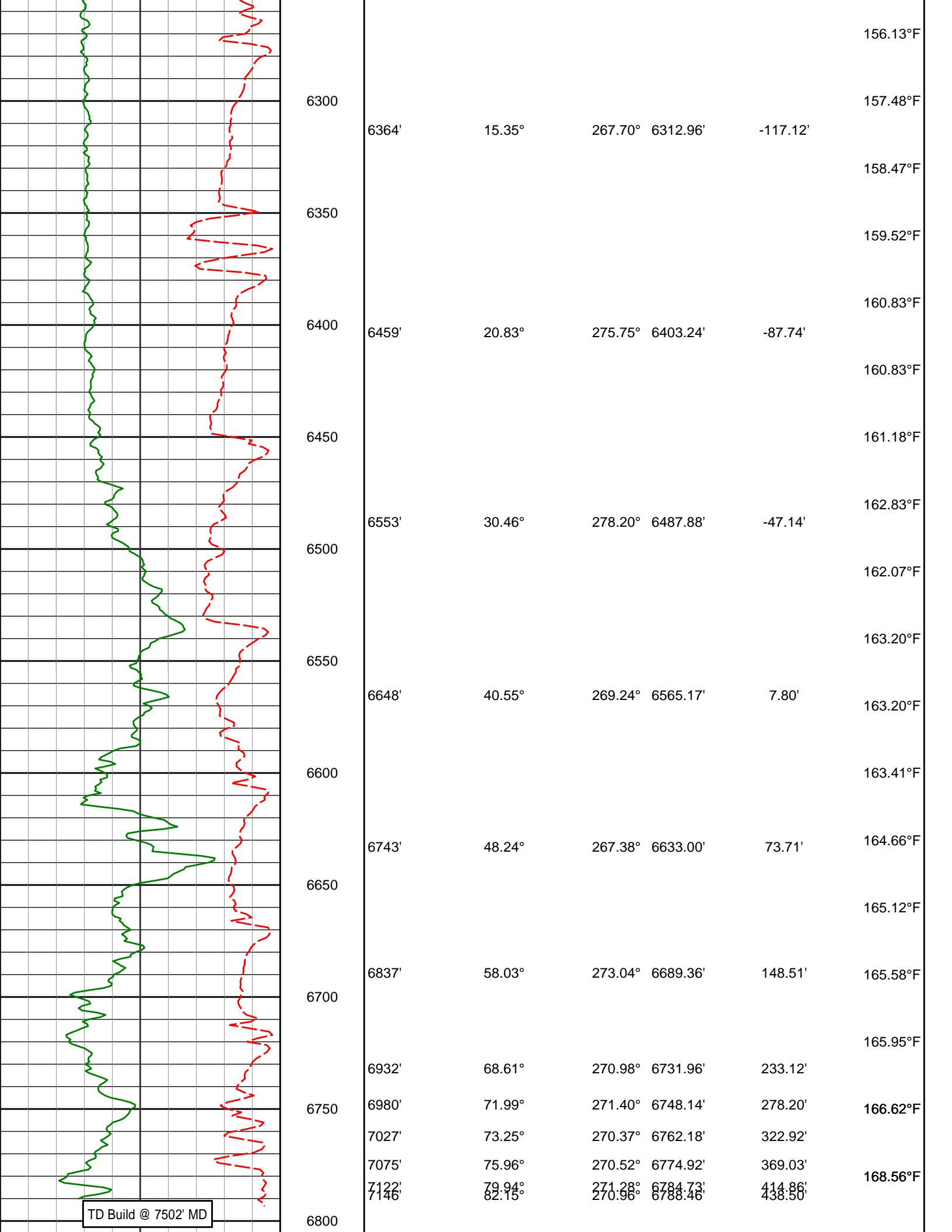


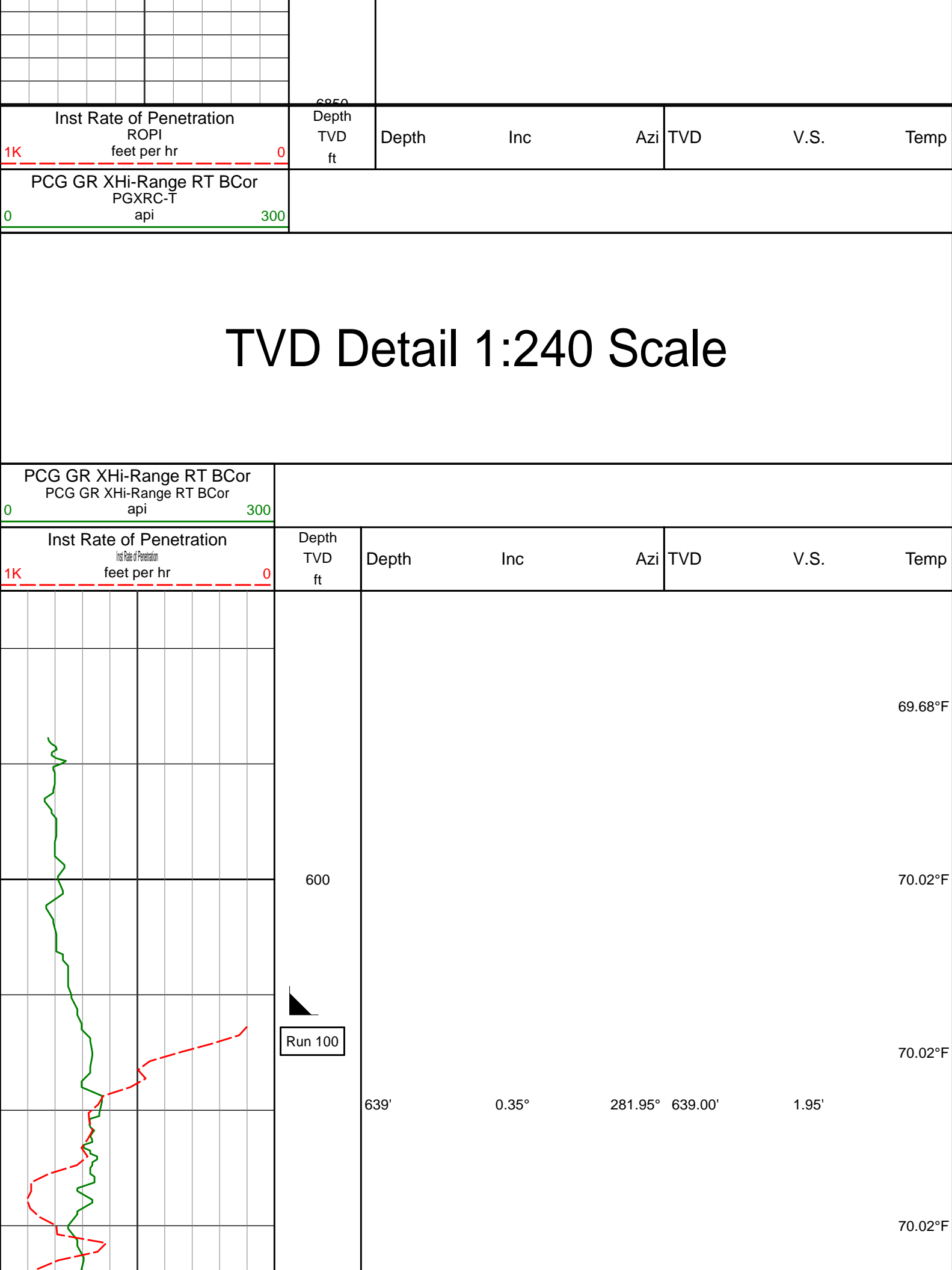


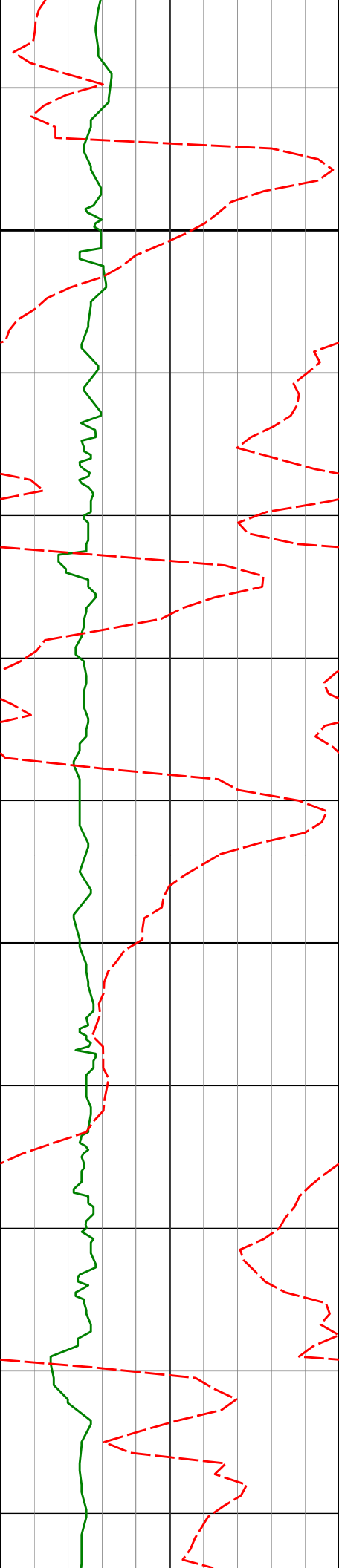












700

731'

800

823'

0.33°

277.10°

730.99'

2.49'

0.40°

295.41°

822.99'

3.06'

72.00°F

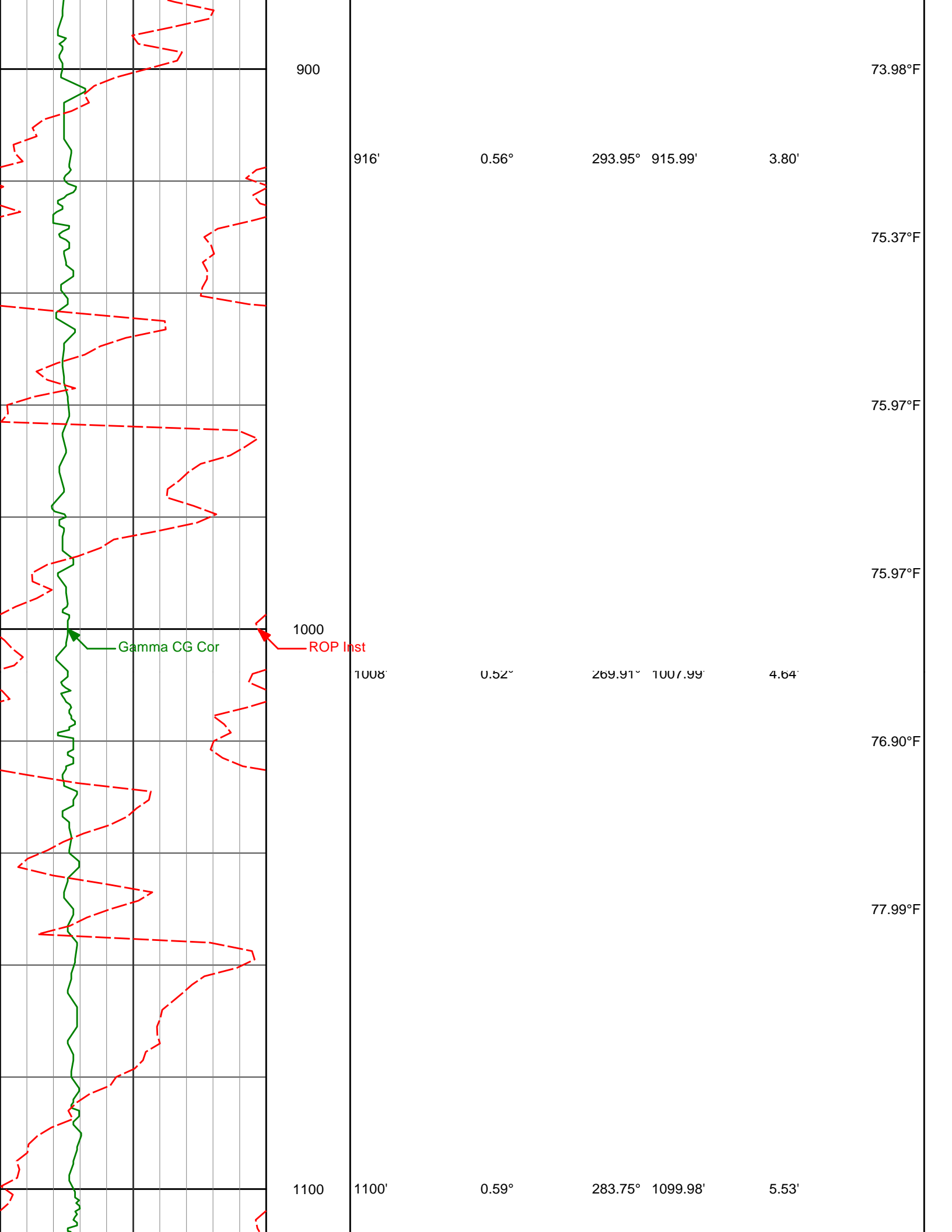
72.00°F

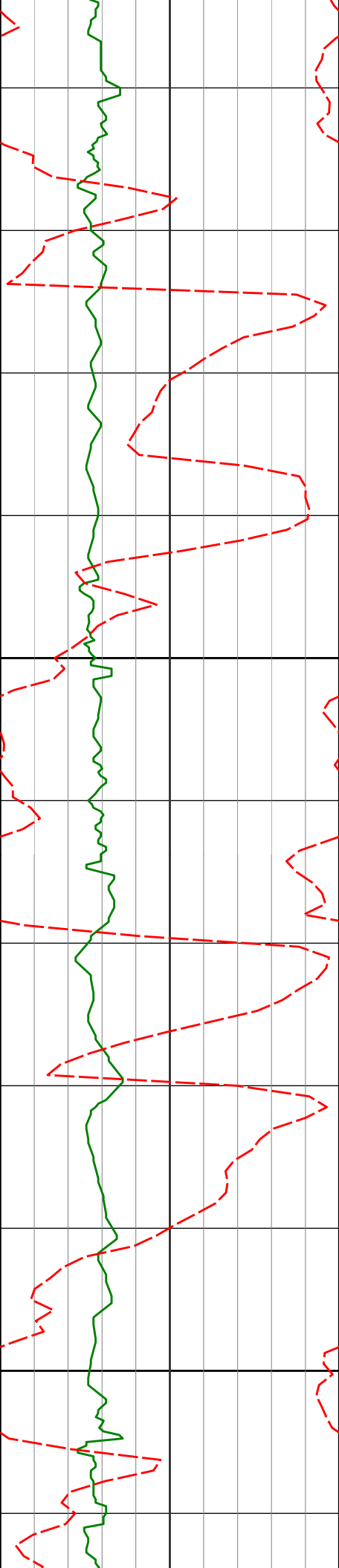
73.98°F

73.98°F

73.98°F

73.98°F





1200

1210'

0.31°

105.19°

1209.98'

5.80'

1300

1301'

0.28°

117.27°

1300.98'

5.34'

77.99°F

77.99°F

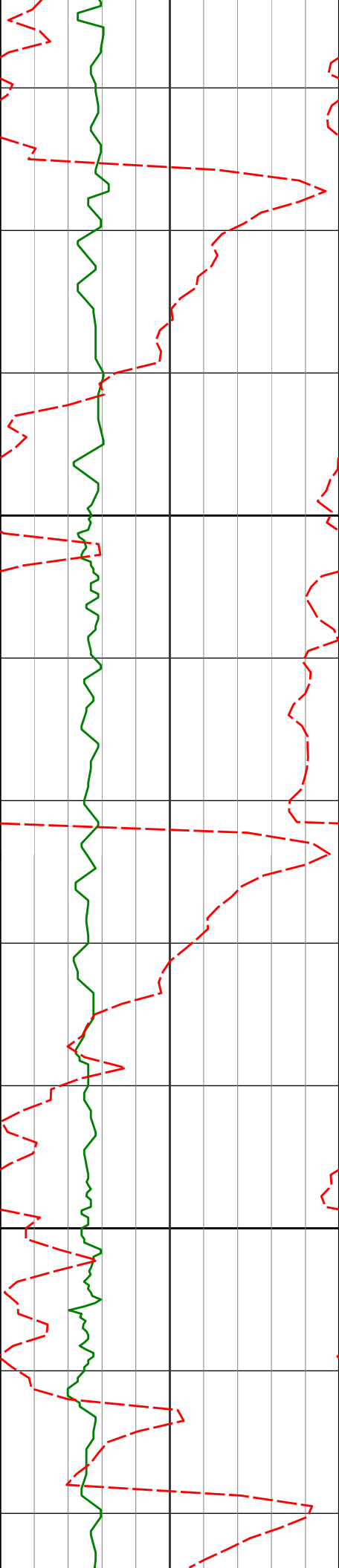
80.01°F

78.56°F

79.39°F

80.01°F

82.02°F



1400

1500

1394'

1486'

0.34°

0.44°

77.61°

68.06°

1393.98'

1485.97'

4.86'

4.29'

82.02°F

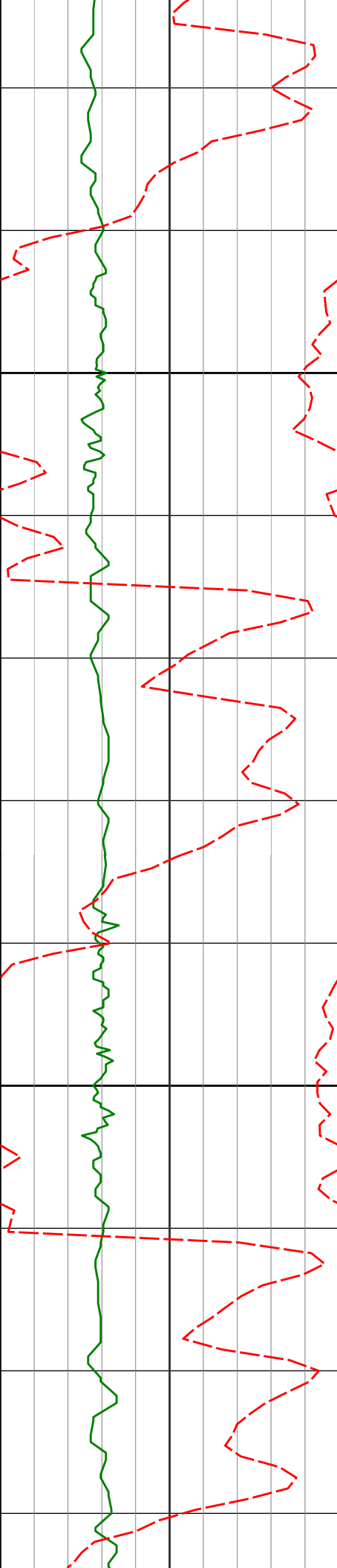
82.02°F

82.02°F

82.02°F

82.84°F

84.06°F



1579'

1.58°

38.47°

1578.96'

3.27'

1600

1671'

3.10°

29.48°

1670.88'

1.56'

1700

1763'

4.61°

23.29°

1762.67'

-0.61'

84.06°F

84.06°F

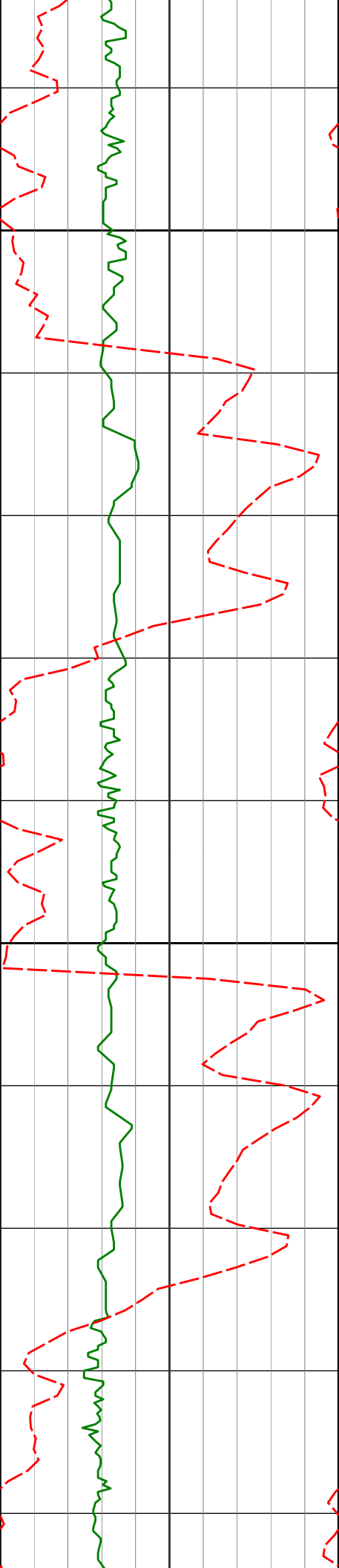
84.06°F

86.09°F

86.09°F

86.09°F

88.14°F



1800

1900

1946'

8.31°

23.45°

1944.48'

-7.03'

88.14°F

88.14°F

90.19°F

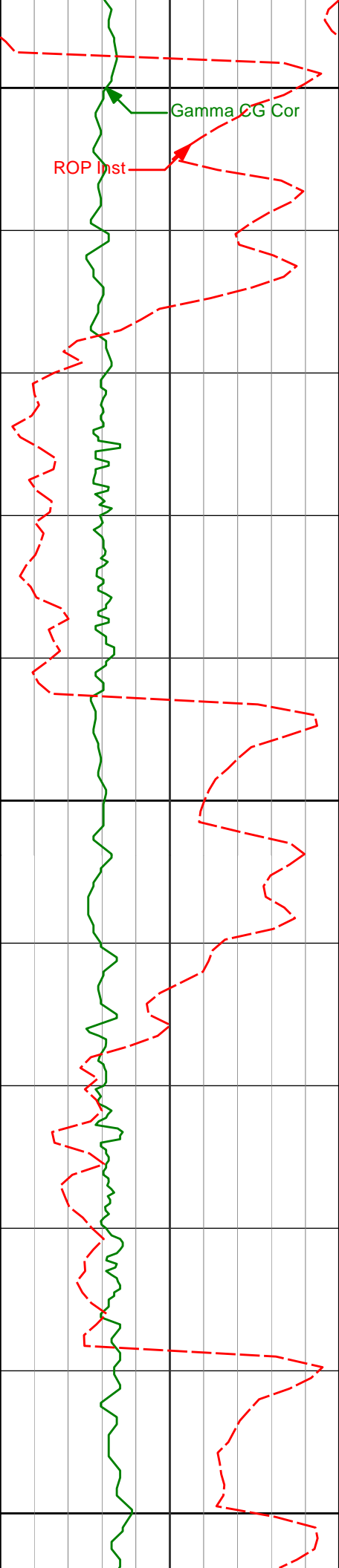
90.19°F

90.19°F

91.27°F

91.65°F

92.26°F



2000

Gamma CG Cor

ROP Inst

92.26°F

2038'

9.07°

21.88°

2035.42'

-11.18'

92.54°F

94.33°F

2100

94.33°F

2129'

9.22°

17.83°

2125.27'

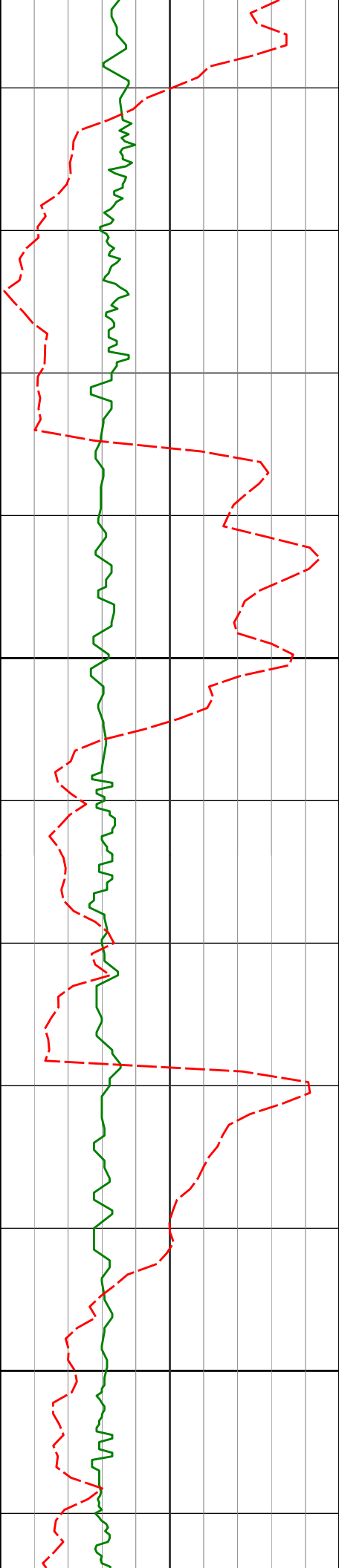
-14.83'

95.07°F

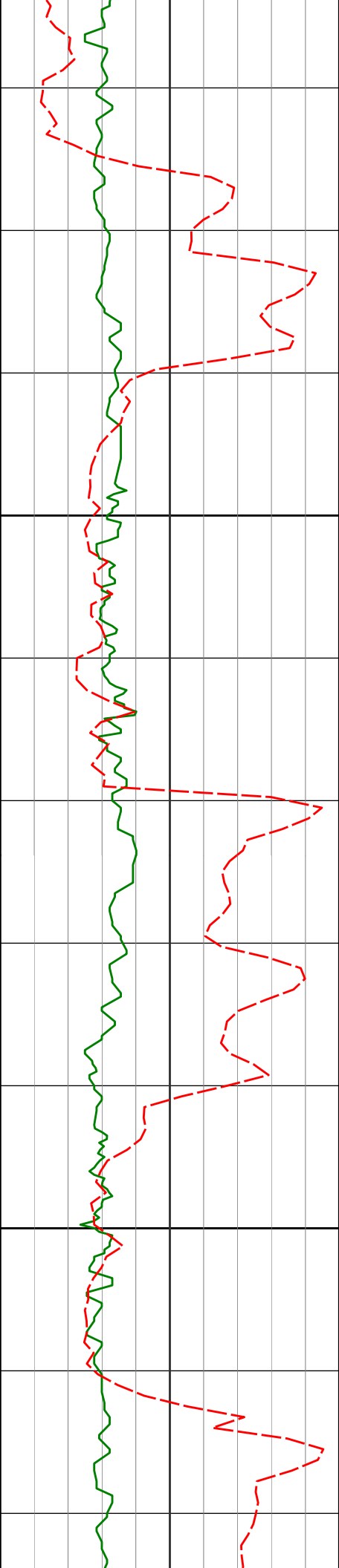
95.76°F

96.42°F

2200



2300	2221'	8.98°	14.87°	2216.11'	-17.64'	96.42°F
						96.42°F
2313'	10.08°	12.07°	2306.84'	-19.80'	98.51°F	
					98.51°F	
2400	2405'	9.39°	11.05°	2397.51'	-21.52'	98.51°F
					98.51°F	



2500

2600

2497'

8.58°

17.19°

2488.39'

-23.70'

2588'

9.57°

19.08°

2578.25'

-26.92'

98.51°F

98.51°F

100.62°F

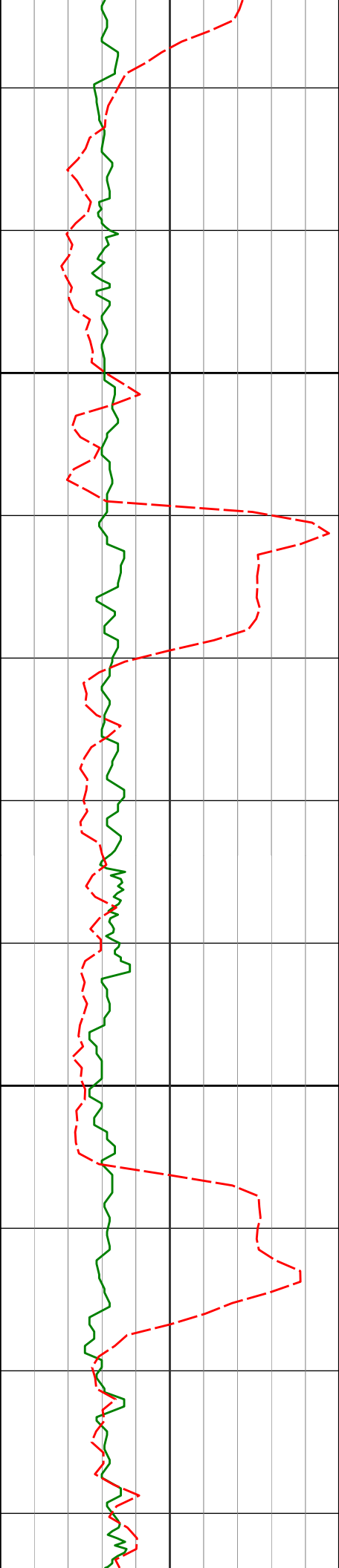
100.62°F

100.62°F

100.62°F

100.62°F

100.62°F



2700

2800

2680'

9.79°

15.00°

2668.94'

-30.07'

101.10°F

2772'

9.08°

13.10°

2759.69'

-32.40'

102.72°F

2866'

8.52°

12.42°

2852.59'

-34.28'

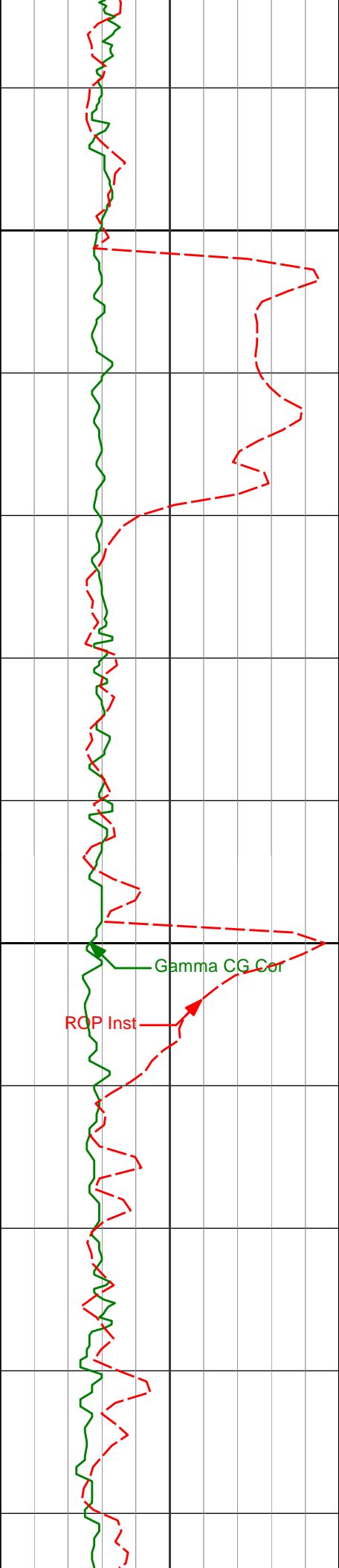
104.83°F

102.72°F

102.72°F

102.72°F

102.72°F



2900

2961'

9.38°

18.58°

2946.43'

-36.95'

3000

ROP Inst

Gamma CG Cor

3056'

9.05°

13.35°

3040.21'

-39.80'

104.83°F

104.83°F

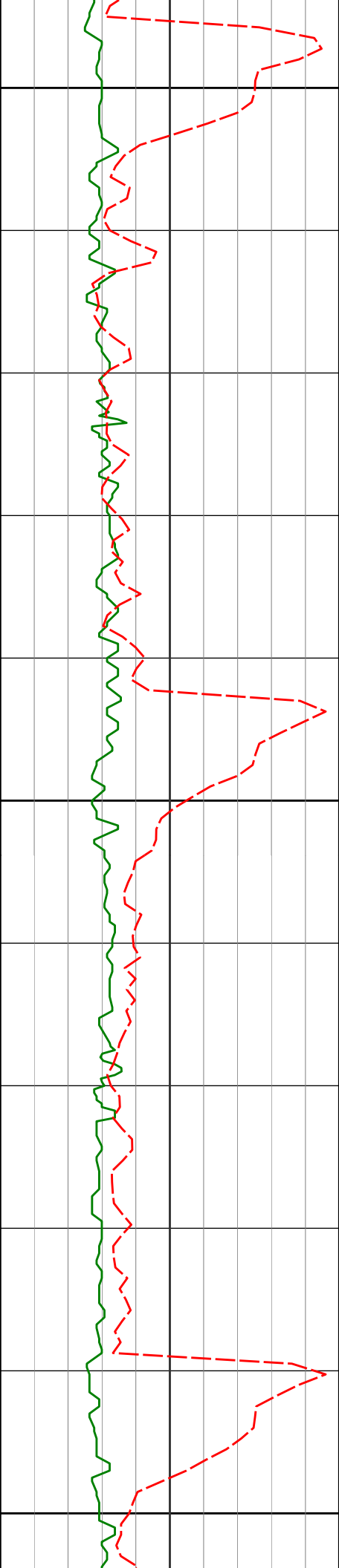
104.83°F

104.83°F

104.83°F

106.97°F

106.97°F



3100

3150'

9.27°

13.21°

3133.01'

-41.89'

3200

3245'

8.81°

12.57°

3226.83'

-43.89'

3300

106.97°F

106.97°F

106.97°F

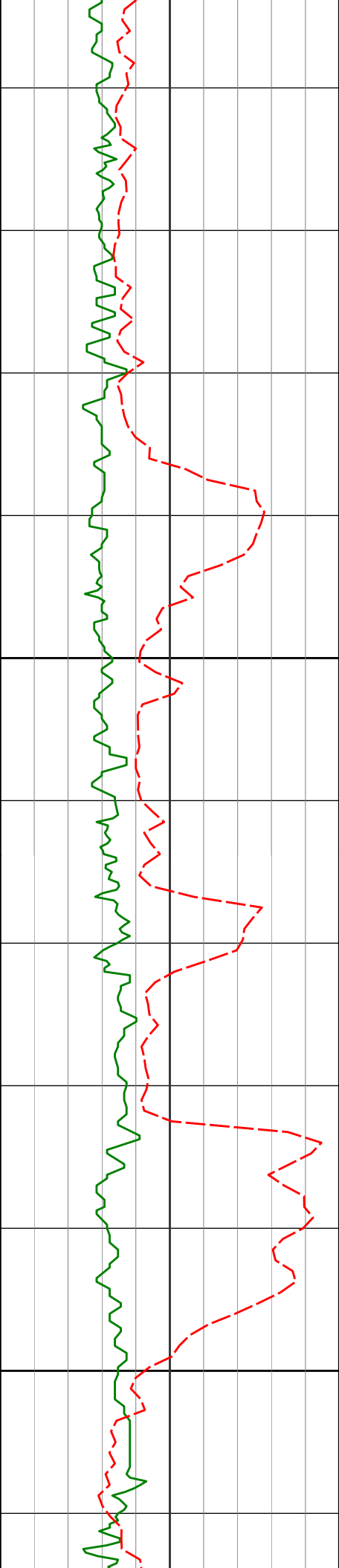
106.97°F

109.09°F

109.09°F

109.09°F

109.09°F



3400

3500

3340'

8.52°

12.06°

3320.74'

-45.65'

109.09°F

109.09°F

109.29°F

3434'

7.79°

11.86°

3413.79'

-47.22'

111.24°F

111.24°F

111.24°F

3529'

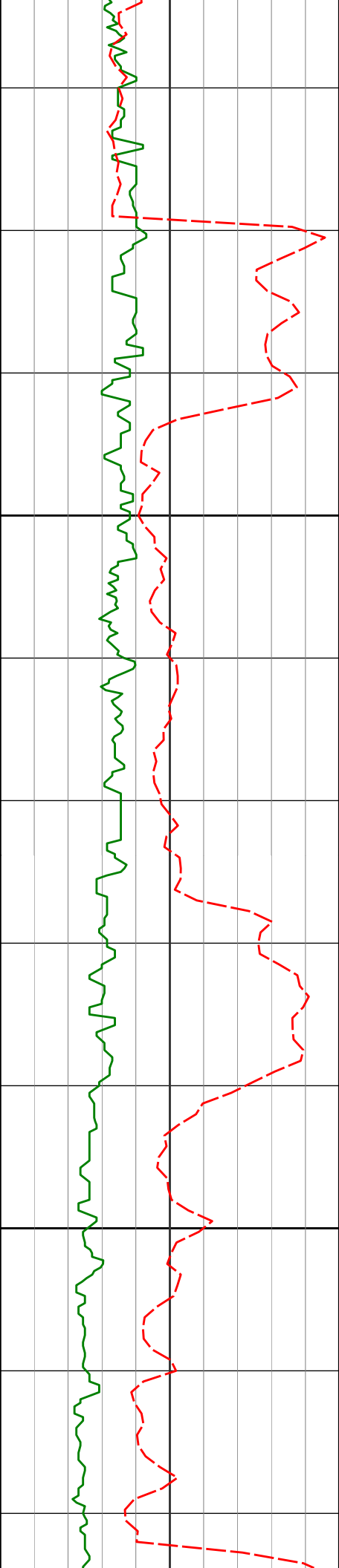
8.46°

13.38°

3507.84'

-48.95'

111.24°F



3600

3623'

8.78°

12.94°

3600.78'

-50.89'

113.40°F

113.40°F

113.40°F

113.40°F

3700

3718'

9.42°

25.68°

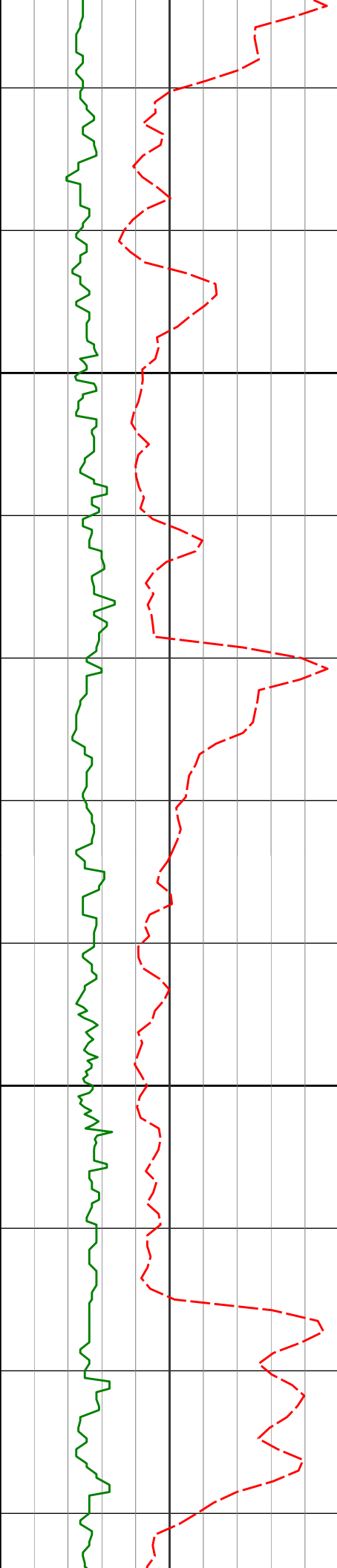
3694.59'

-54.58'

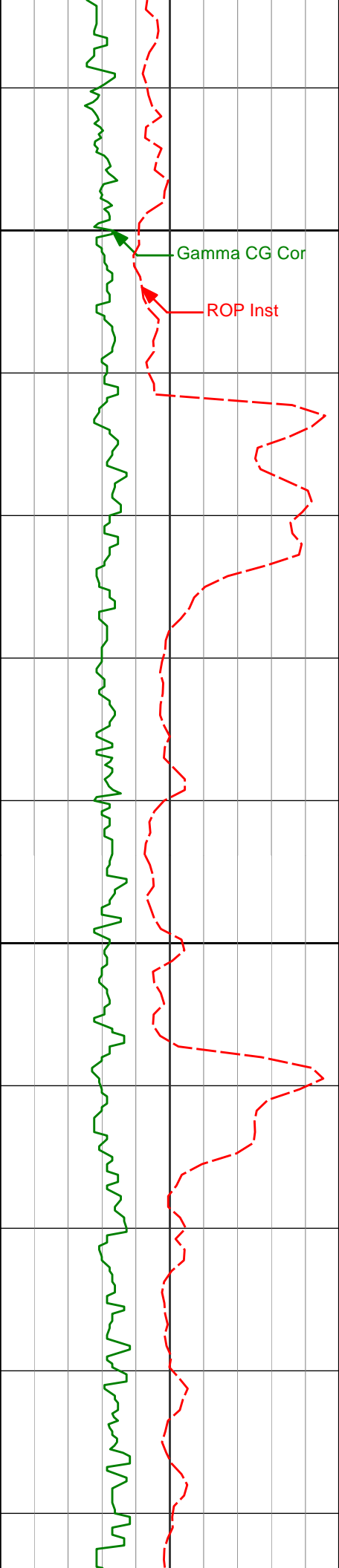
115.56°F

111.24°F

111.24°F



				115.56°F
				115.56°F
3813'	10.47°	28.17°	3788.16'	-60.66'
				115.56°F
				115.56°F
				115.56°F
				116.23°F
3907'	11.73°	26.67°	3880.40'	-67.48'
				116.12°F
				115.56°F
				117.05°F



4000

4001'

10.95°

25.00° 3972.57'

-73.99'

117.73°F

117.73°F

117.73°F

4095'

8.87°

26.51° 4065.16'

-79.64'

119.29°F

4100

119.91°F

119.91°F

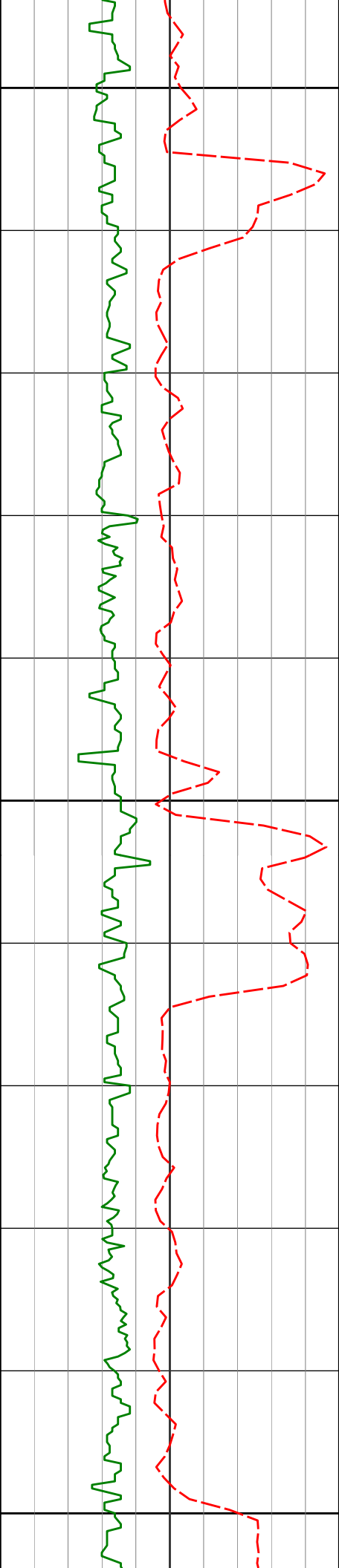
4190'

8.76°

28.89° 4159.04'

-85.20'

119.91°F



4200

120.38°F

122.11°F

4284'

8.15°

29.47°

4252.02'

-90.81'

122.11°F

122.11°F

4300

122.11°F

4378'

8.13°

23.95°

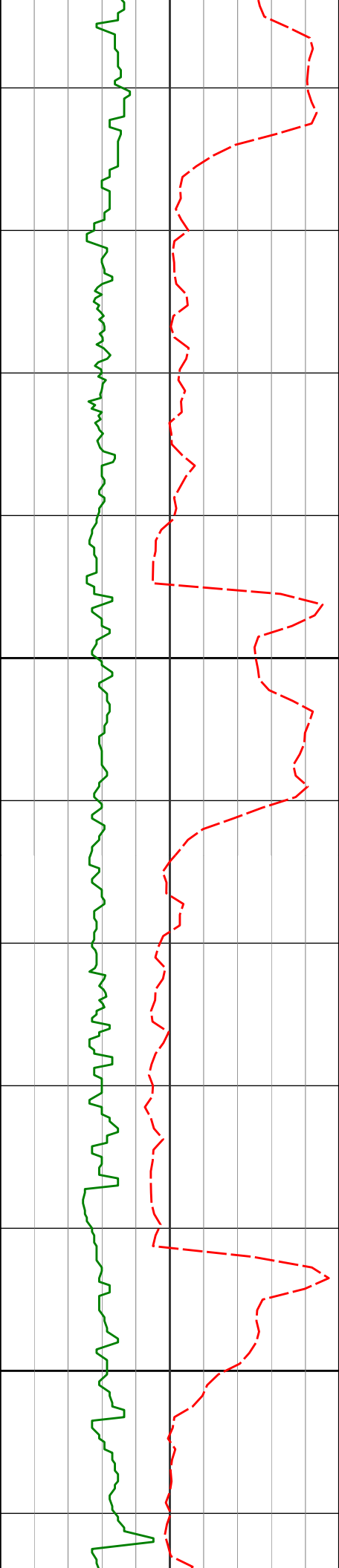
4345.07'

-95.68'

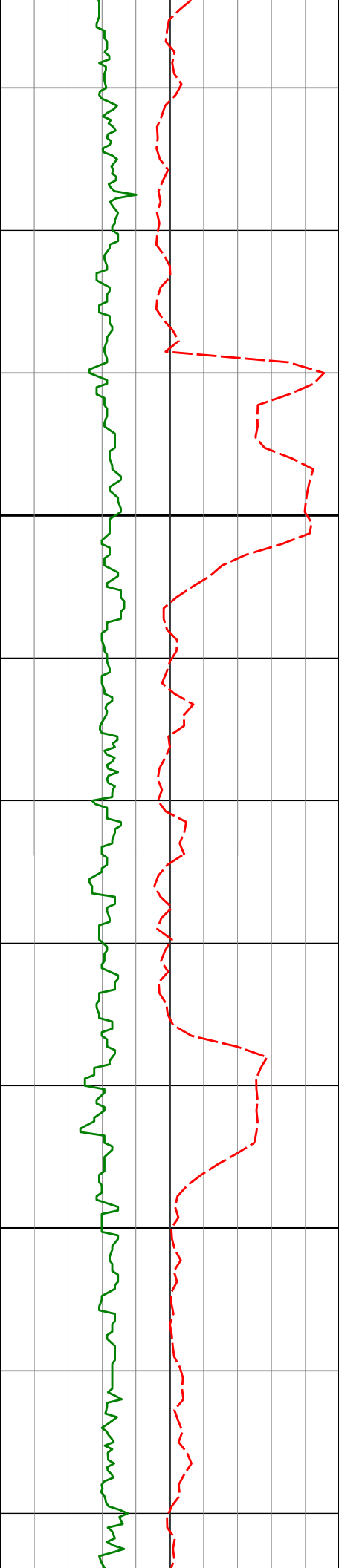
122.11°F

122.11°F

4400



					122.11°F
4473'	8.56°	19.73°	4439.07'	-99.61'	123.12°F
					124.30°F
4500					124.30°F
4567'	9.31°	11.22°	4531.93'	-102.15'	124.30°F
					124.30°F
					126.52°F
4600					
					126.52°F
4662'	8.62°	7.62°	4625.77'	-103.25'	



4700

4757'

8.64°

13.85°

4719.69'

-104.62'

4800

4851'

8.08°

13.13°

4812.69'

-106.59'

126.52°F

126.52°F

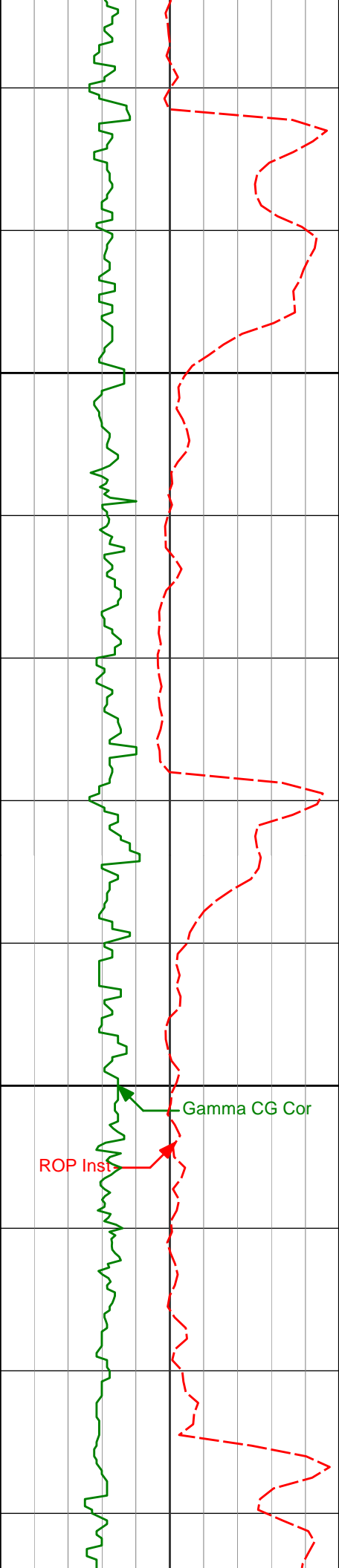
126.71°F

128.73°F

128.73°F

128.73°F

128.73°F



4900

4946'

8.88°

15.38°

4906.66'

-108.80'

5000

5040'

7.70°

15.22°

4999.67'

-111.17'

128.73°F

128.73°F

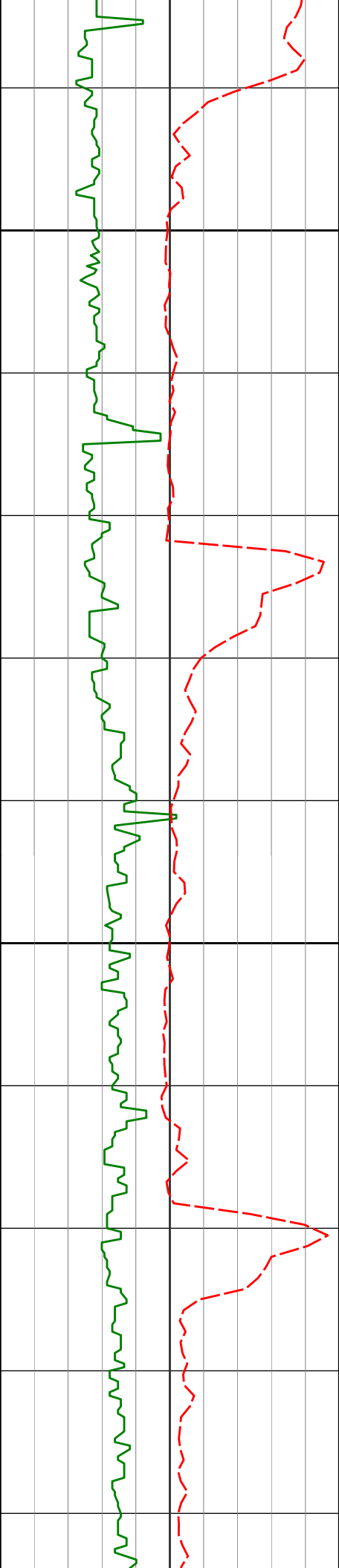
130.96°F

130.96°F

131.44°F

131.84°F

130.96°F



5100

5200

5135'

5229'

5324'

8.97°

8.63°

7.22°

19.61°

17.93°

16.94°

5093.67'

5186.56'

5280.65'

-114.11'

-117.48'

-120.26'

130.96°F

132.70°F

133.20°F

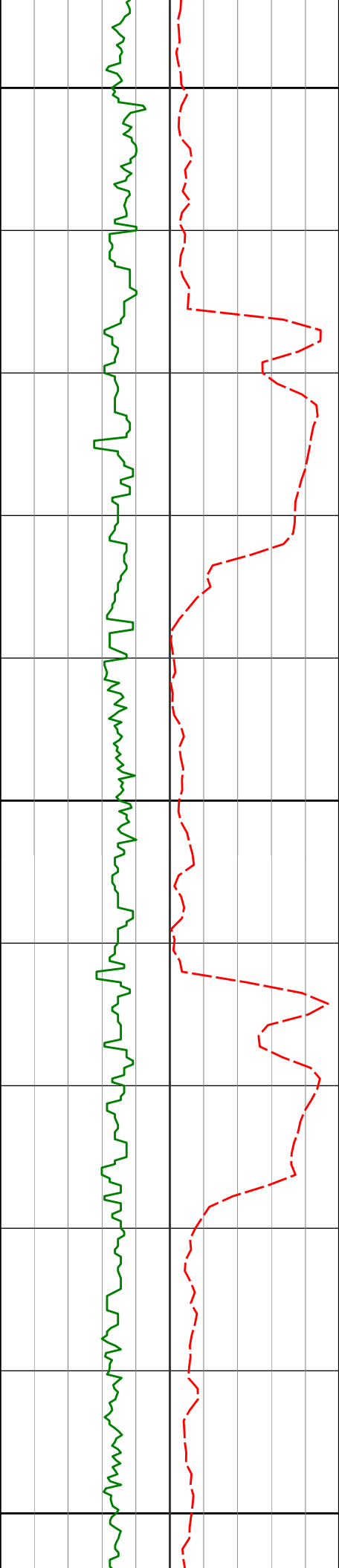
133.20°F

135.45°F

135.45°F

135.45°F

137.39°F



5300

135.90°F

137.06°F

137.47°F

5418'

8.28°

17.28°

5373.79'

-122.87'

5400

136.30°F

135.45°F

137.59°F

5512'

8.16°

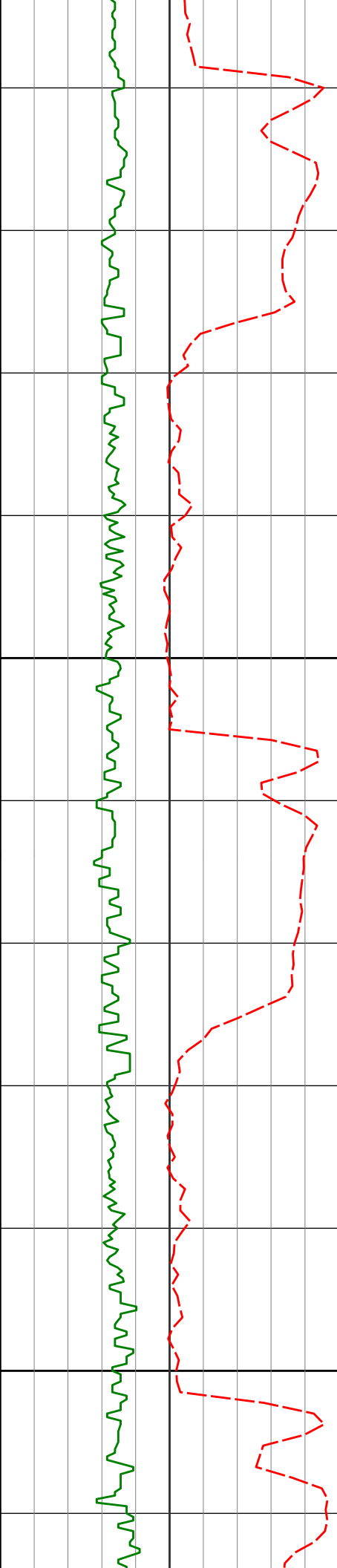
20.62°

5466.83'

-126.05'

5500

136.69°F



5600

5700

5607'

5701'

8.55°

10.73°

18.04°

21.72°

5560.82'

5653.49'

-129.41'

-133.44'

135.45°F

135.45°F

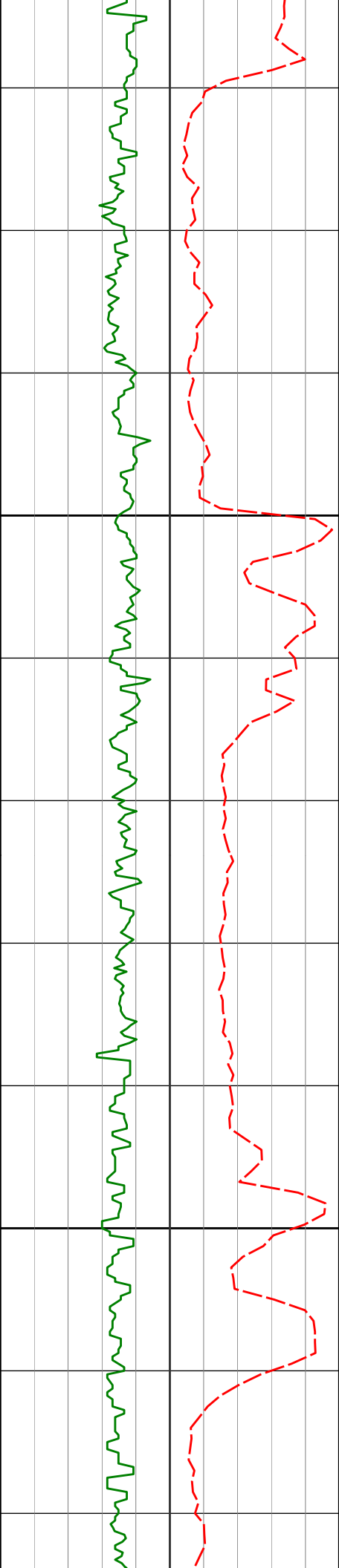
135.45°F

135.45°F

137.07°F

137.70°F

137.70°F



5800

5900

5796'

6.19°

13.89°

5747.43'

-136.72'

5890'

3.73°

15.25°

5841.07'

-138.02'

5985'

2.21°

0.20°

5935.95'

-138.40'

138.13°F

139.96°F

141.90°F

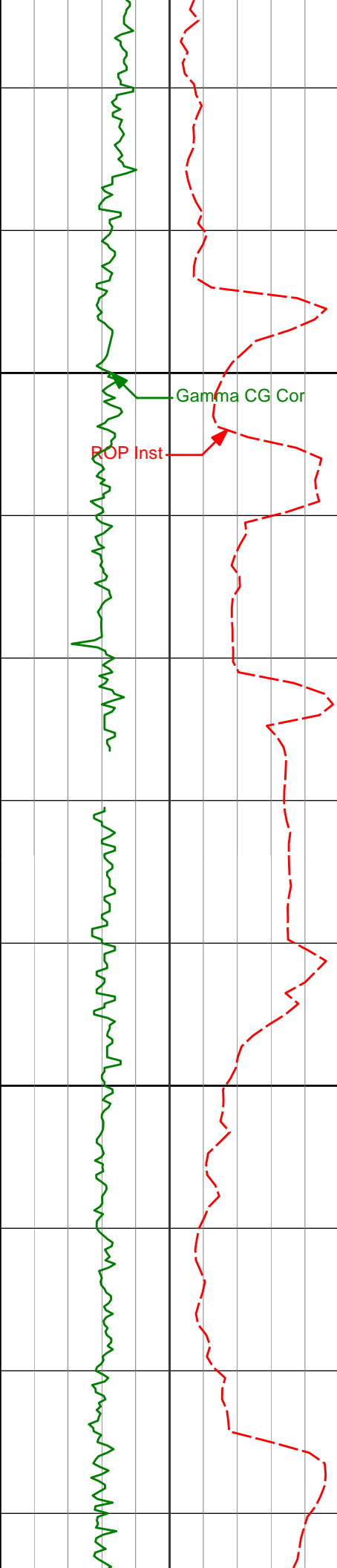
142.25°F

143.70°F

144.06°F

144.54°F

146.26°F



6000

6080'

0.80°

2.40°

6030.91'

-138.20'

146.84°F

147.96°F

149.14°F

149.14°F

149.14°F

6100

6175'

0.80°

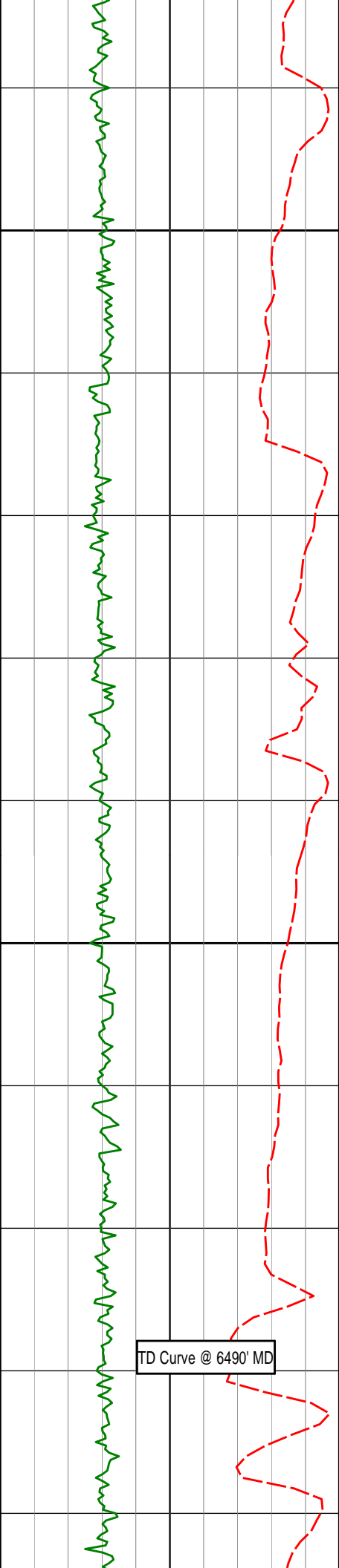
83.02°

6125.90'

-138.82'

151.03°F

151.47°F



6223'

2.12°

297.24°

6173.89'

-138.32'

6200

6269'

6.51°

283.94°

6219.75'

-134.95'

6300

6364'

15.35°

267.70°

6312.96'

-117.12'

TD Curve @ 6490' MD

151.90°F

154.22°F

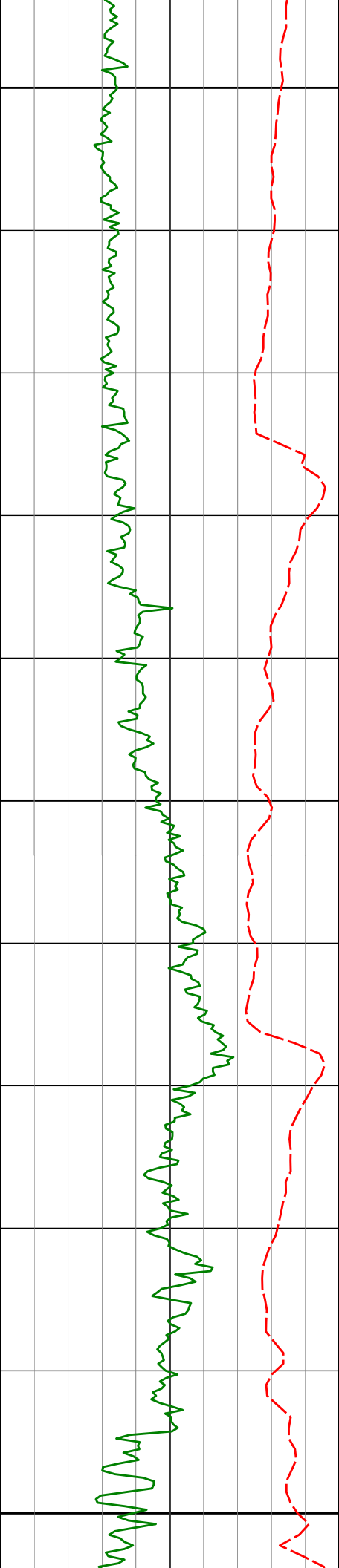
155.86°F

156.13°F

157.48°F

158.47°F

159.52°F



6400

6459'

20.83°

275.75°

6403.24'

-87.74'

160.83°F

161.18°F

6500

6553'

30.46°

278.20°

6487.88'

-47.14'

162.83°F

162.07°F

163.20°F

6600

6648'

40.55°

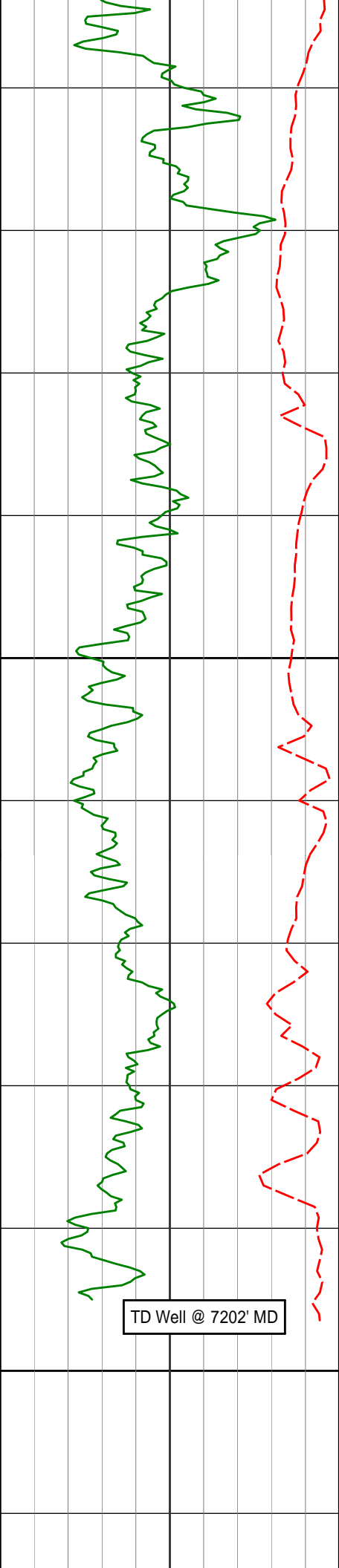
269.24°

6565.17'

7.80'

163.20°F

163.41°F



6700	6743'	48.24°	267.38°	6633.00'	73.71'	164.66°F
						165.12°F
6800	6837'	58.03°	273.04°	6689.36'	148.51'	165.58°F
						165.95°F
	6932'	68.61°	270.98°	6731.96'	233.12'	
	6980'	71.99°	271.40°	6748.14'	278.20'	166.62°F
	7027'	73.25°	270.37°	6762.18'	322.92'	
	7075'	75.96°	270.52°	6774.92'	369.03'	
	7122'	79.94°	271.28°	6784.73'	414.86'	168.56°F
	7146'	82.15°	270.96°	6788.46'	438.50'	

[illegible]**HALLIBURTON**

DIRECTIONAL SURVEY REPORT

**Noble Energy
Wells Ranch AA11-690
Wattensburg
Weld Colorado
USA
CA-XX-0902422703
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
639.00	0.35	281.95	639.00	0.41 N	1.92 W	1.95	0.05
731.00	0.33	277.10	730.99	0.50 N	2.46 W	2.49	0.04
823.00	0.40	295.41	822.99	0.67 N	3.01 W	3.06	0.15
916.00	0.56	293.95	915.99	0.99 N	3.72 W	3.80	0.17
1008.00	0.52	269.91	1007.99	1.18 N	4.56 W	4.64	0.25
1100.00	0.59	283.75	1099.98	1.29 N	5.44 W	5.53	0.16
1210.00	0.31	105.19	1209.98	1.34 N	5.70 W	5.80	0.82
1301.00	0.28	117.27	1300.98	1.18 N	5.26 W	5.34	0.08
1394.00	0.34	77.61	1393.98	1.13 N	4.78 W	4.86	0.24
1486.00	0.44	68.06	1485.97	1.32 N	4.19 W	4.29	0.12
1579.00	1.58	38.47	1578.96	2.46 N	3.06 W	3.27	1.31
1671.00	3.10	29.48	1670.88	5.62 N	1.05 W	1.56	1.70
1763.00	4.61	23.29	1762.67	11.18 N	1.64 E	-0.61	1.70
1946.00	8.31	23.45	1944.48	30.07 N	9.81 E	-7.03	2.02
2038.00	9.07	21.88	2035.42	42.89 N	15.16 E	-11.18	0.86
2129.00	9.22	17.83	2125.27	56.49 N	20.06 E	-14.83	0.73
2221.00	8.98	14.87	2216.11	70.44 N	24.16 E	-17.64	0.57
2313.00	10.08	12.07	2306.84	85.25 N	27.69 E	-19.80	1.29
2405.00	9.39	11.05	2397.51	100.49 N	30.81 E	-21.52	0.77
2497.00	8.58	17.19	2488.39	114.40 N	34.27 E	-23.70	1.36
2588.00	9.57	19.08	2578.25	128.03 N	38.75 E	-26.92	1.14
2680.00	9.79	15.00	2668.94	142.81 N	43.27 E	-30.07	0.78
2772.00	9.08	13.10	2759.69	157.44 N	46.94 E	-32.40	0.83
2866.00	8.52	12.42	2852.59	171.46 N	50.12 E	-34.28	0.62
2961.00	9.38	18.58	2946.43	185.67 N	54.10 E	-36.95	1.36
3056.00	9.05	13.35	3040.21	200.28 N	58.29 E	-39.80	0.95
3150.00	9.27	13.21	3133.01	214.85 N	61.73 E	-41.89	0.24
3245.00	8.81	12.57	3226.83	229.41 N	65.07 E	-43.89	0.50
3340.00	8.52	12.06	3320.74	243.40 N	68.12 E	-45.65	0.31

Wells Ranch AA11-690

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
3434.00	7.79	11.86	3413.79	256.44 N	70.89 E	-47.22	0.79
3529.00	8.46	13.38	3507.84	269.54 N	73.83 E	-48.95	0.74
3623.00	8.78	12.94	3600.78	283.25 N	77.03 E	-50.89	0.35
3718.00	9.42	25.68	3694.59	297.32 N	82.02 E	-54.58	2.22
3813.00	10.47	28.17	3788.16	311.94 N	89.47 E	-60.66	1.19
3907.00	11.73	26.67	3880.40	328.00 N	97.79 E	-67.48	1.38
4001.00	10.95	25.00	3972.57	344.62 N	105.84 E	-73.99	0.90
4095.00	8.87	26.51	4065.16	359.20 N	112.85 E	-79.64	2.23
4190.00	8.76	28.89	4159.04	372.08 N	119.62 E	-85.20	0.40
4284.00	8.15	29.47	4252.02	384.16 N	126.35 E	-90.81	0.65
4378.00	8.13	23.95	4345.07	396.04 N	132.33 E	-95.68	0.83
4473.00	8.56	19.73	4439.07	408.83 N	137.45 E	-99.61	0.78
4567.00	9.31	11.22	4531.93	422.87 N	141.29 E	-102.15	1.62
4662.00	8.62	7.62	4625.77	437.47 N	143.73 E	-103.25	0.93
4757.00	8.64	13.85	4719.69	451.46 N	146.38 E	-104.62	0.98
4851.00	8.08	13.13	4812.69	464.75 N	149.57 E	-106.59	0.60
4946.00	8.88	15.38	4906.66	478.32 N	153.03 E	-108.80	0.91
5040.00	7.70	15.22	4999.67	491.39 N	156.61 E	-111.17	1.26
5135.00	8.97	19.61	5093.67	504.50 N	160.77 E	-114.11	1.50
5229.00	8.63	17.93	5186.56	518.12 N	165.40 E	-117.48	0.46
5324.00	7.22	16.94	5280.65	530.60 N	169.33 E	-120.26	1.49
5418.00	8.28	17.28	5373.79	542.72 N	173.06 E	-122.87	1.13
5512.00	8.16	20.62	5466.83	555.42 N	177.42 E	-126.05	0.52
5607.00	8.55	18.04	5560.82	568.45 N	181.98 E	-129.41	0.57
5701.00	10.73	21.72	5653.49	583.22 N	187.38 E	-133.44	2.41
5796.00	6.19	13.89	5747.43	596.41 N	191.89 E	-136.72	4.92
5890.00	3.73	15.25	5841.07	604.28 N	193.91 E	-138.02	2.61
5985.00	2.21	0.20	5935.95	609.10 N	194.73 E	-138.40	1.79
6080.00	0.80	2.40	6030.91	611.59 N	194.76 E	-138.20	1.49
6175.00	0.80	83.02	6125.90	612.34 N	195.45 E	-138.82	1.09
6223.00	2.12	297.24	6173.89	612.79 N	194.99 E	-138.32	5.87
6269.00	6.51	283.94	6219.75	613.80 N	191.70 E	-134.95	9.73
6364.00	15.35	267.70	6312.96	614.60 N	173.87 E	-117.12	9.76
6459.00	20.83	275.75	6403.24	615.79 N	144.48 E	-87.74	6.32
6553.00	30.46	278.20	6487.88	620.87 N	104.17 E	-47.14	10.31
6648.00	40.55	269.24	6565.17	623.91 N	49.28 E	7.80	11.92
6743.00	48.24	267.38	6633.00	621.88 N	17.10 W	73.71	8.22
6837.00	58.03	273.04	6689.36	622.39 N	92.16 W	148.51	11.46
6932.00	68.61	270.98	6731.96	625.29 N	176.86 W	233.12	11.31
6980.00	71.99	271.40	6748.14	626.24 N	222.04 W	278.20	7.10
7027.00	73.25	270.37	6762.18	626.93 N	266.88 W	322.92	3.39
7075.00	75.96	270.52	6774.92	627.29 N	313.16 W	369.03	5.66
7122.00	79.94	271.28	6784.73	628.02 N	359.10 W	414.86	8.61
7146.00	82.15	270.96	6788.46	628.48 N	382.81 W	438.50	9.29

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 275.23 DEGREES (GRID)
A TOTAL CORRECTION OF 7.65 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7146.00 FEET
IS 735.89 FEET ALONG 328.65 DEGREES (GRID)