



**1 : 600 / 1 : 240**

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	13-Jun-15	14-Jun-15	19-Jun-15		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	637.00	6,363.00	7,206.00		
Log End Depth (MD, ft)	6,363.00	7,206.00	13,956.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	12-Jun-15 09:00	13-Jun-15 12:00	15-Jun-14 03:15		
Drill/Wipe End Date and Time	13-Jun-15 04:00	13-Jun-15 22:30	18-Jun-14 11:00		
Min Inc (deg) @ Depth (MD, ft)	0.03 @ 5,599.00	16.22 @ 6,453.00	85.96 @ 7,252.00		
Max Inc (deg) @ Depth (MD, ft)	10.03 @ 4,178.00	82.55 @ 7,153.00	92.65 @ 8,728.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	0.86 / PDC	0.65 / PDC		
Flow Rate (gpm)	593.78	567.06	293.36		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.60 / 27.00	9.99 / 32.00	10.00 / 39.00		
Filtrate CL (ppm)	1,300.00	1,300.00	1,200.00		
pH / Fluid Loss (mptm)	8.50 / 0	9.70 / 0	9.20 / 0		
PV (cP) / YP (lhf2)	1 / 2.00	8 / 7.00	17 / 9.00		
% Solids / % Sand	1.50 / 0.00	0.20 / 0.10	8 / .2		
% 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 (degF) / Source	172.78 / PCM	172.78 / PCM	230.30 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Adam Sampson	Adam Sampson	Paul Kock		
Customer Representative	Dave Neilson	Dave Neilson	Dave Neilson		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341324	11341324	12365885		
Insert Serial Number	11400838	11400838	11619996		
Date and Time Initialized	11-Jun-15 08:54	11-Jun-15 08:54	14-Jun-15 16:35		
Date and Time Read	14-Jun-15 04:38	14-Jun-15 04:45	19-Jun-15 00:49		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	52.00	53.00	65.00		
Software Version	6.33	6.33	6.21		
Sub Serial Number	11341324	11341324	12365885		
Sonde Serial Number	11638623	11638623	11833222		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	88.60	266.50	170.30		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	40.19	41.14	52.41		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341324	11341324	12365885		
Insert/Sonde Serial Number	12071280	12071280	11579787		

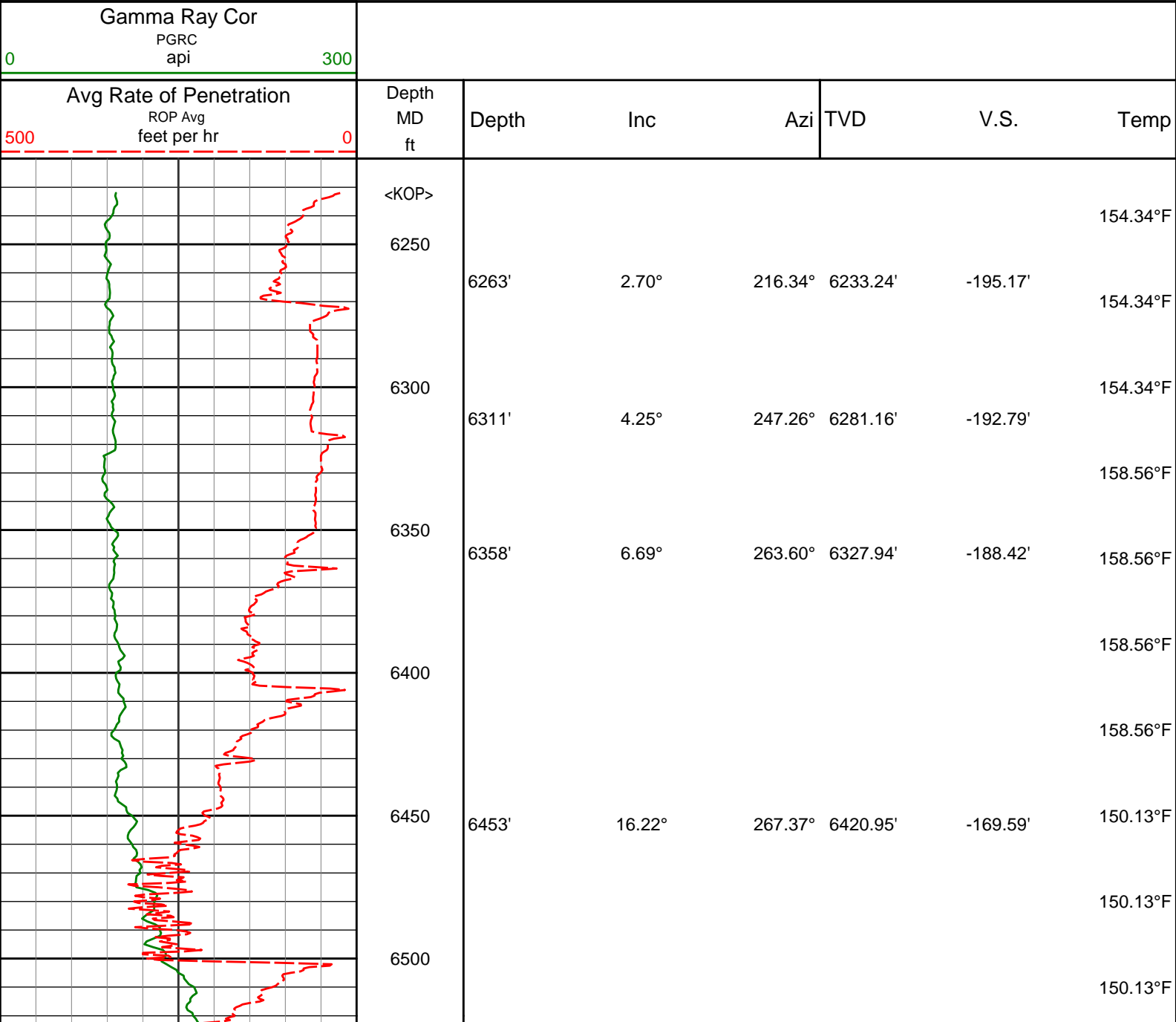
## REMARKS

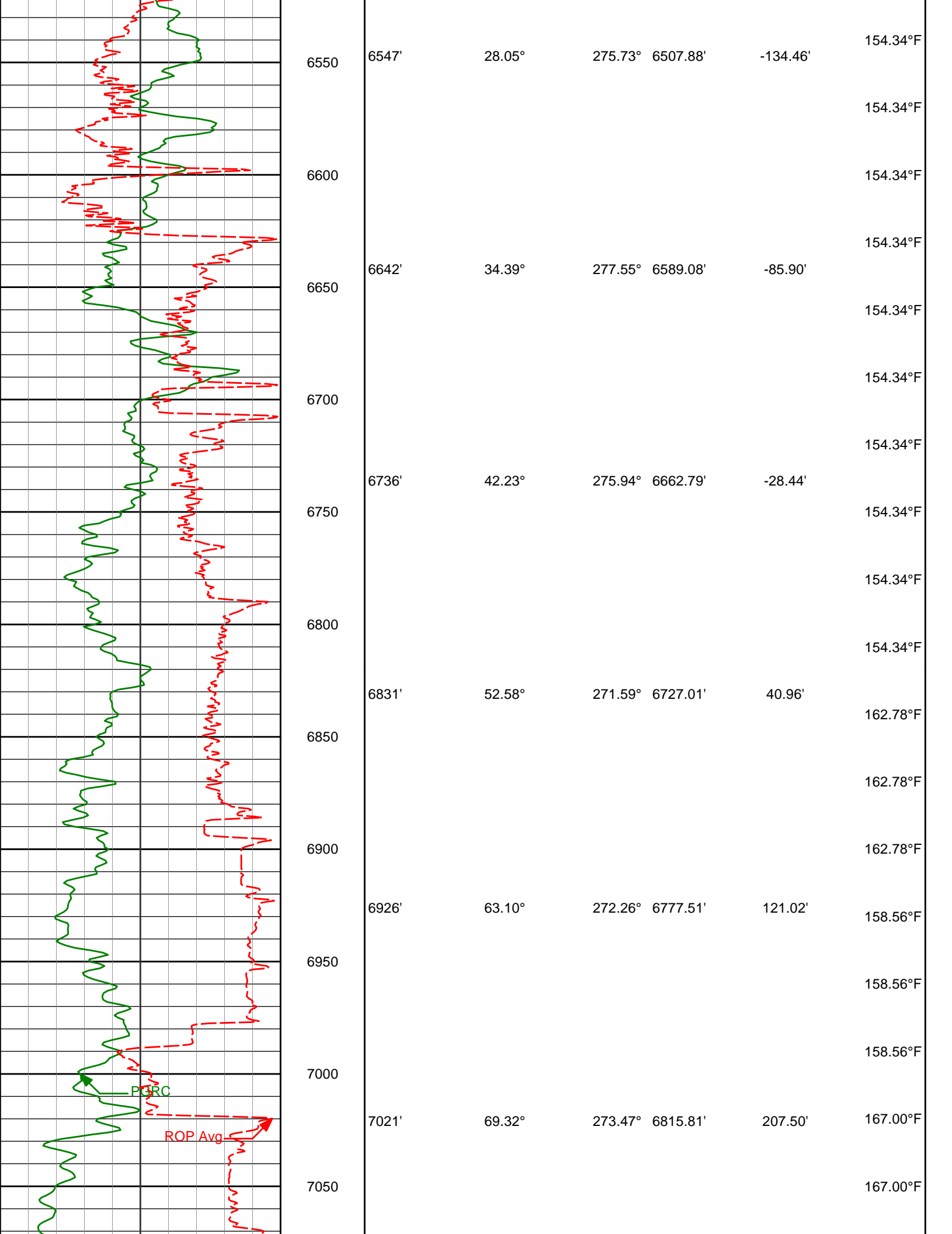
1. All depths are calibrated to the driller's pipe tally and are measured from the rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
  - ROPA: Average Rate of Penetration is real time data.
  - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
  - All ROP in logs - 0.5 ft interval, 1.2 ft coercion distance.
  - Gamma in 2" (1:600) logs - 1 ft interval, 3 ft coercion distance.
  - Gamma in 5" (1:240) logs - 0.5 ft interval, 0.6 ft coercion distance.
5. INSITE version 8.1.10
6. Gamma presented inside casing/cement from 7165 ft. MD to 7206 ft. MD.

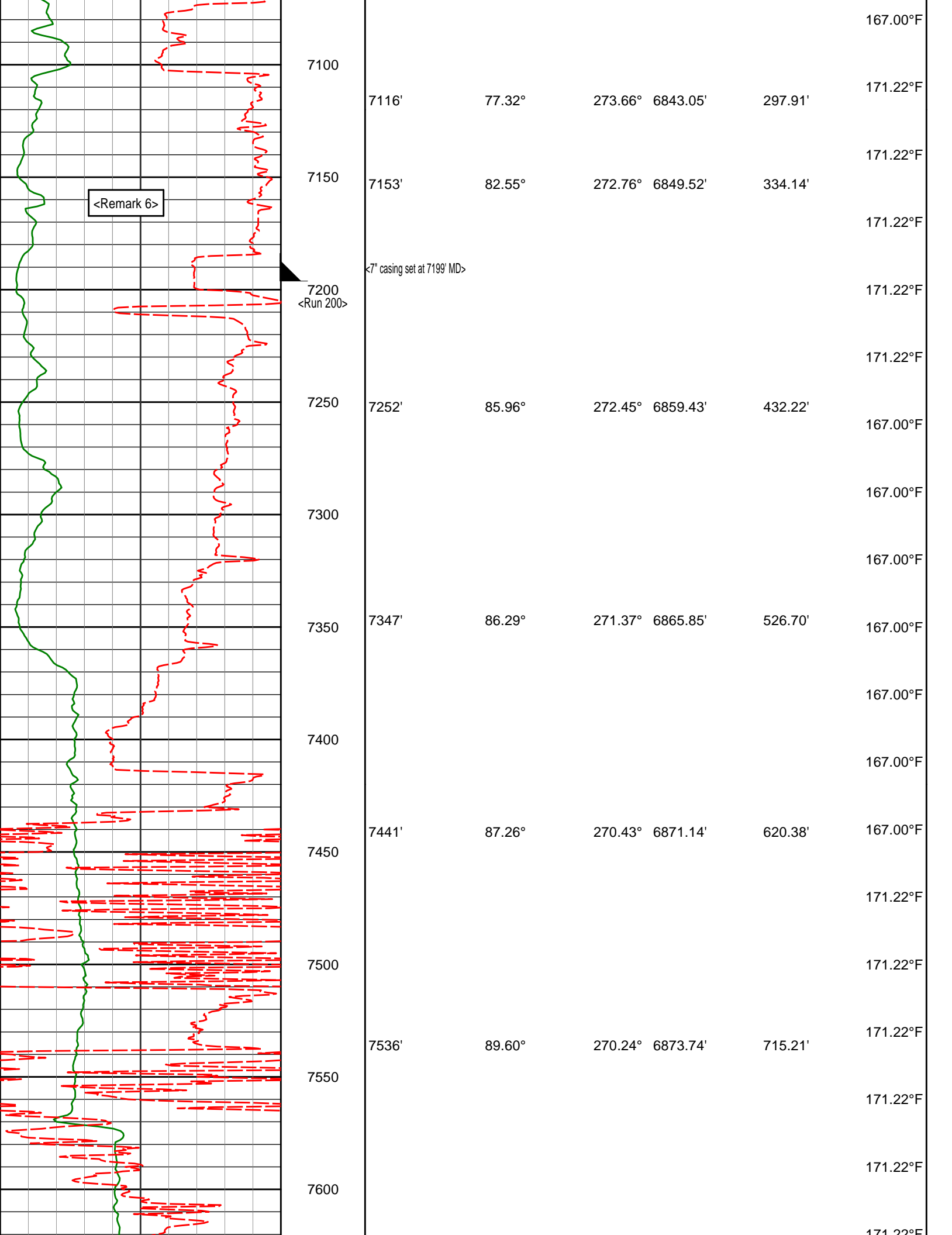
## WARRANTY

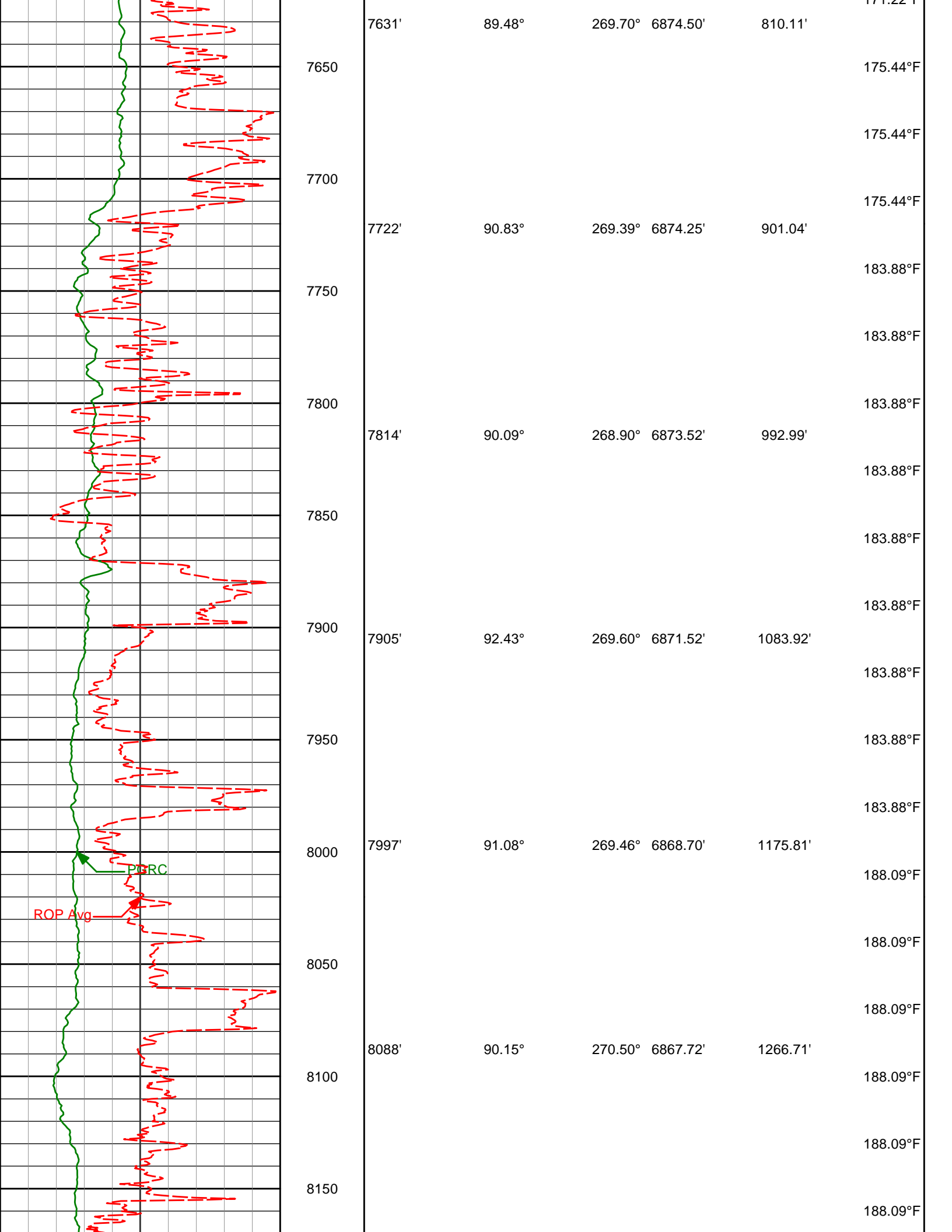
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES 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 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.

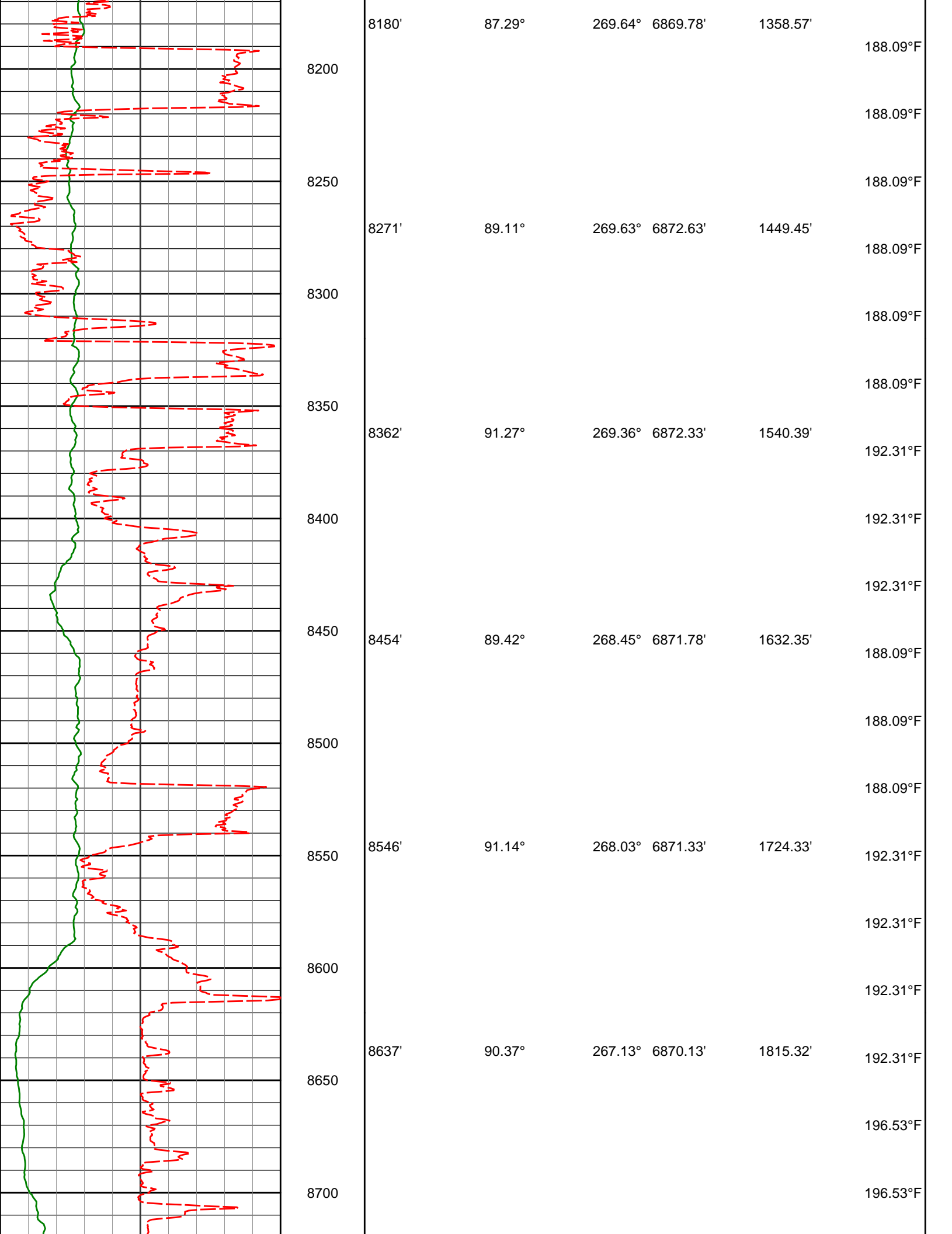
# MD Detail 1:600 Scale

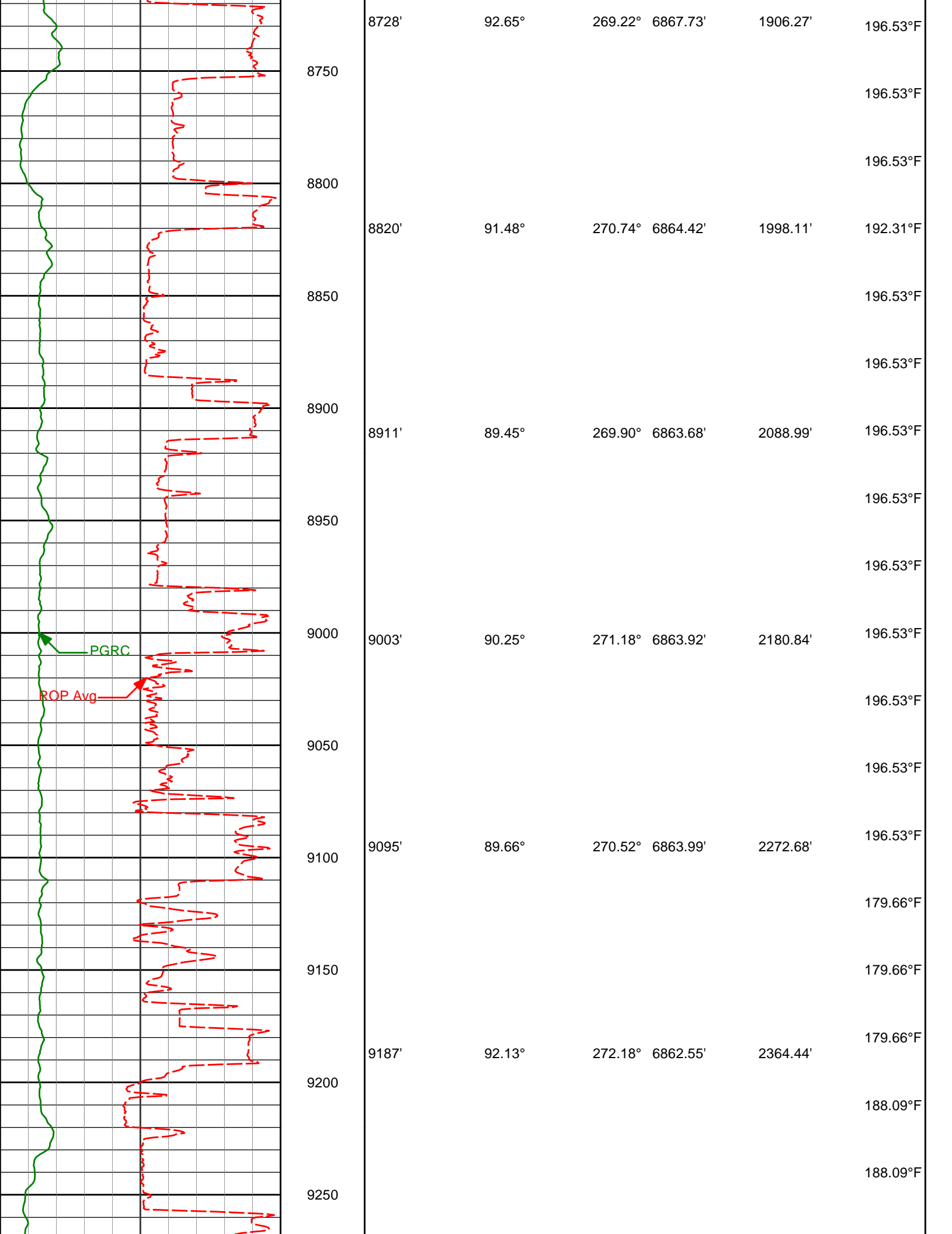




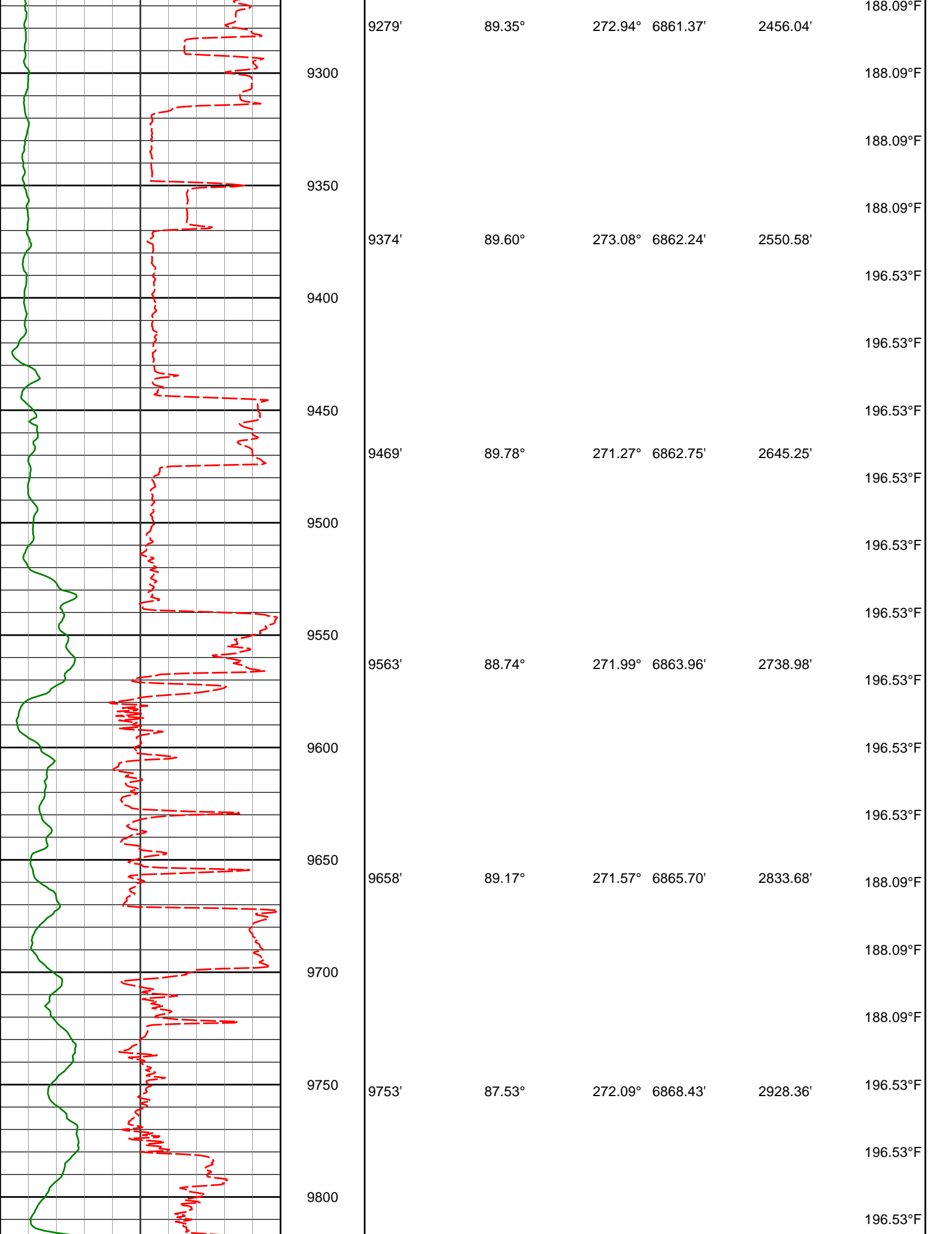


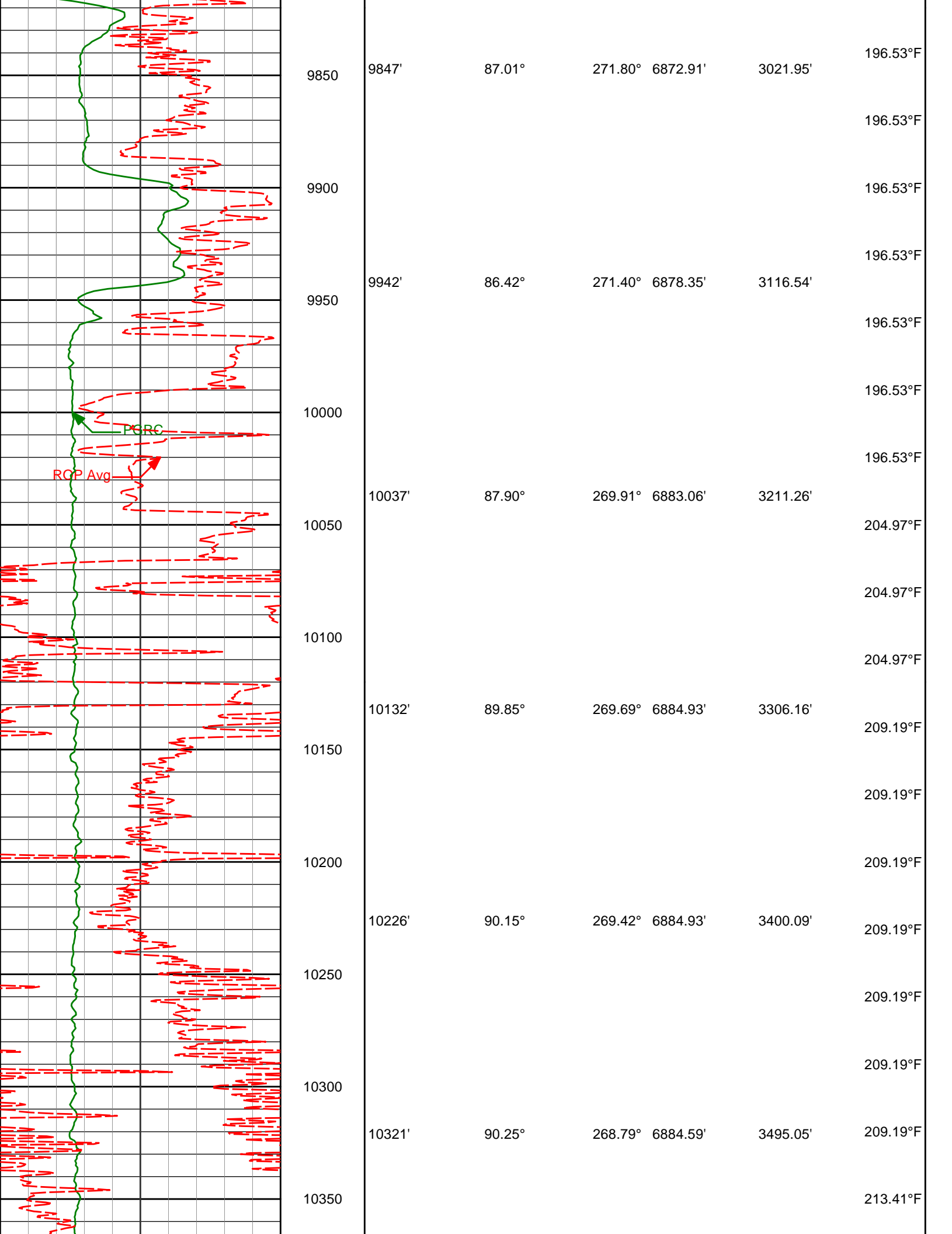


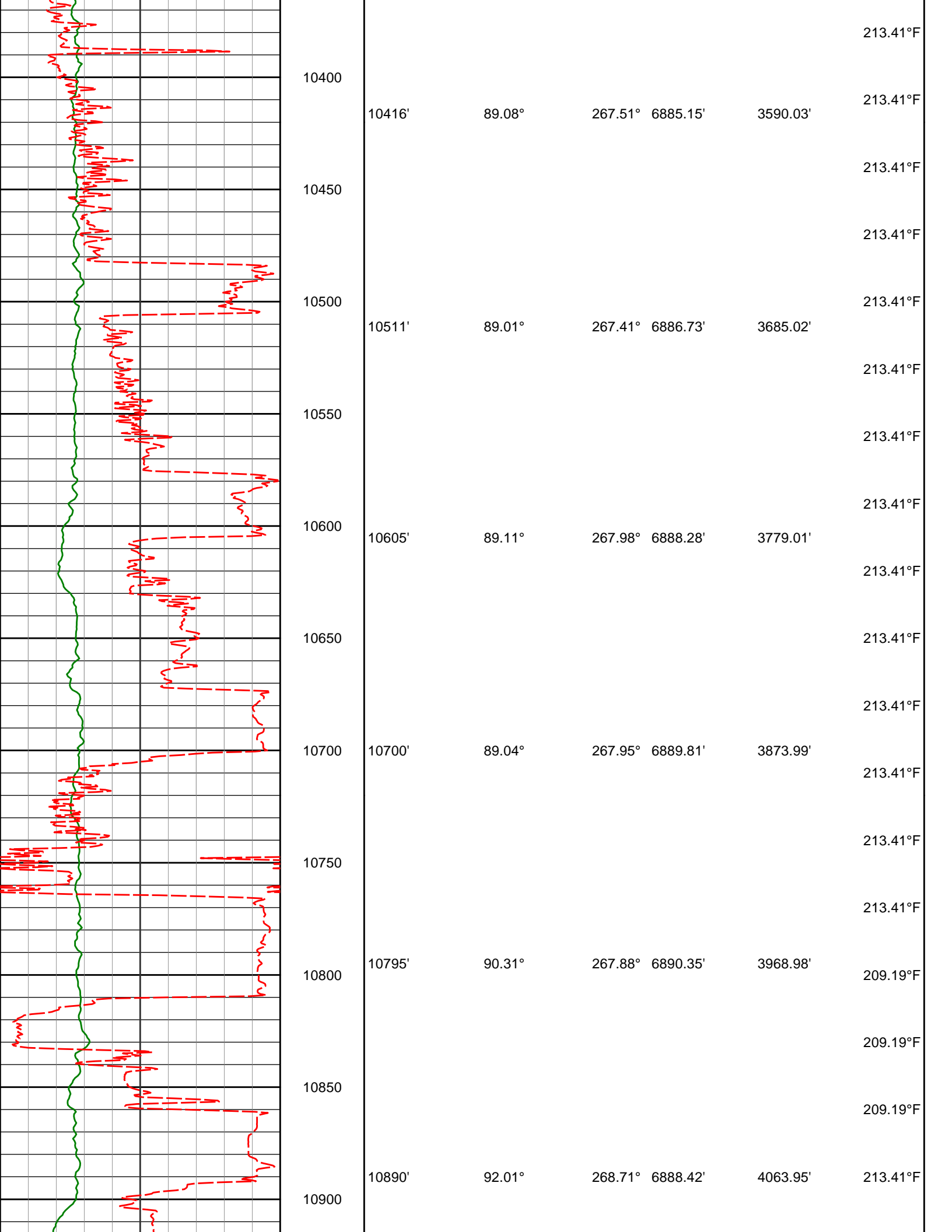


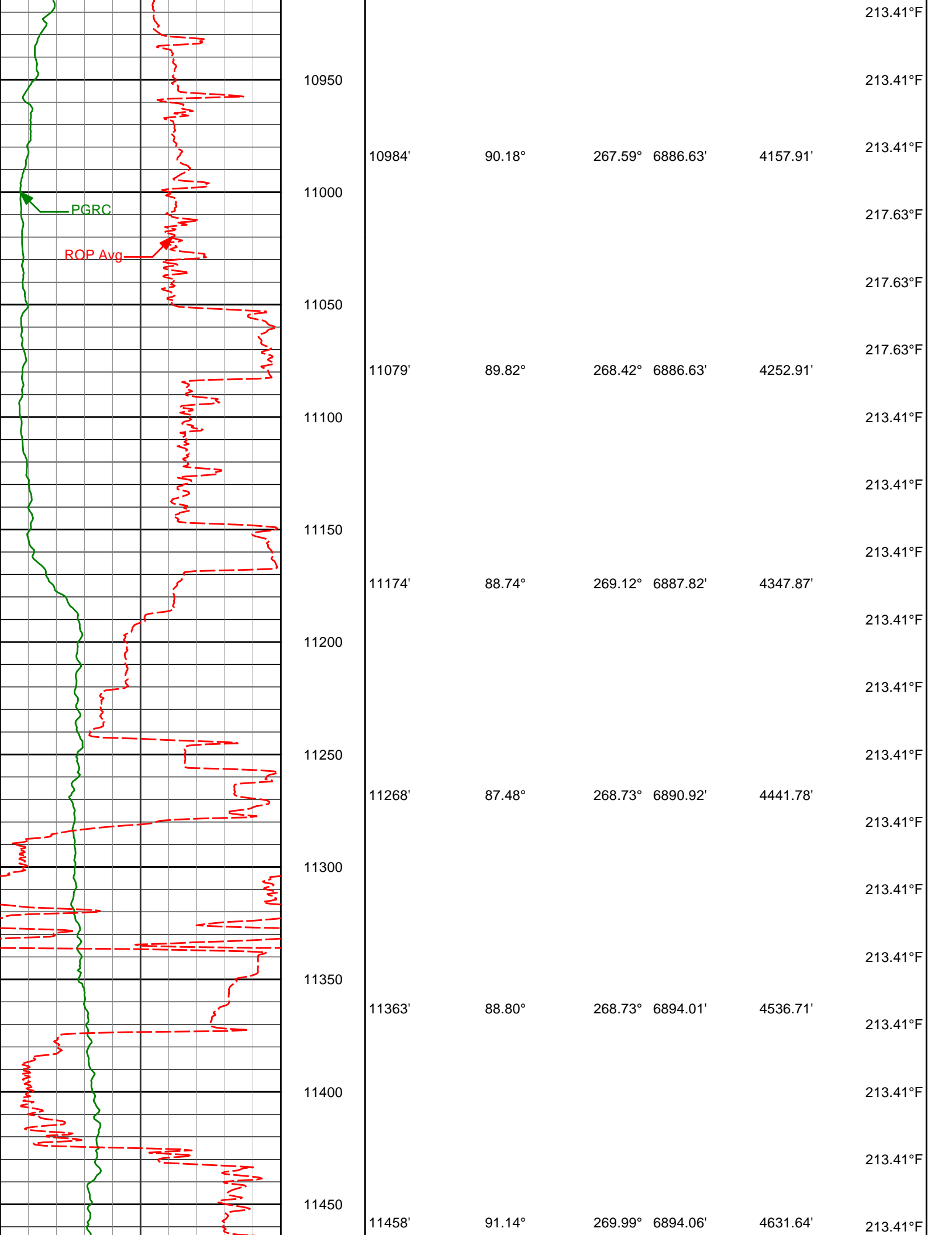


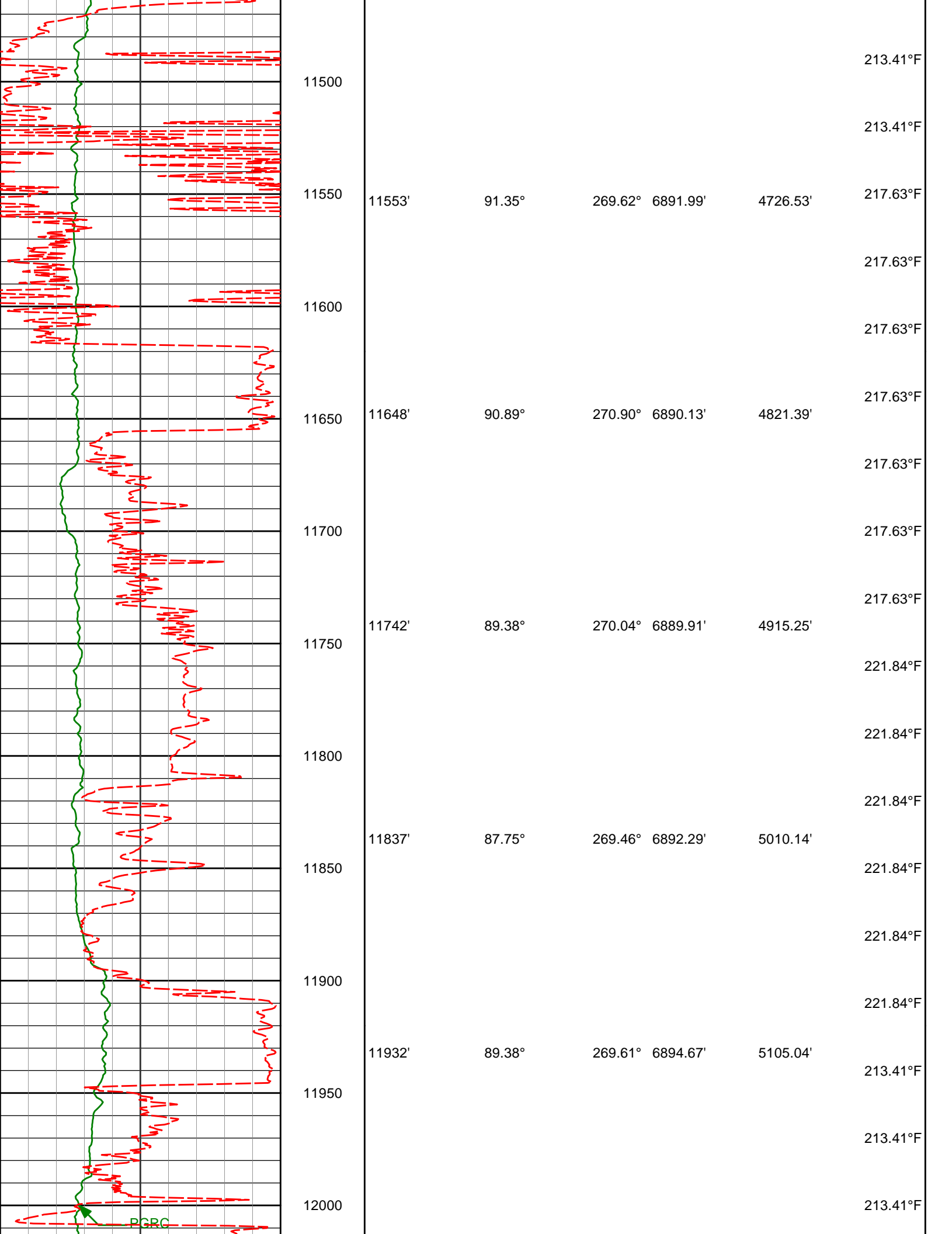


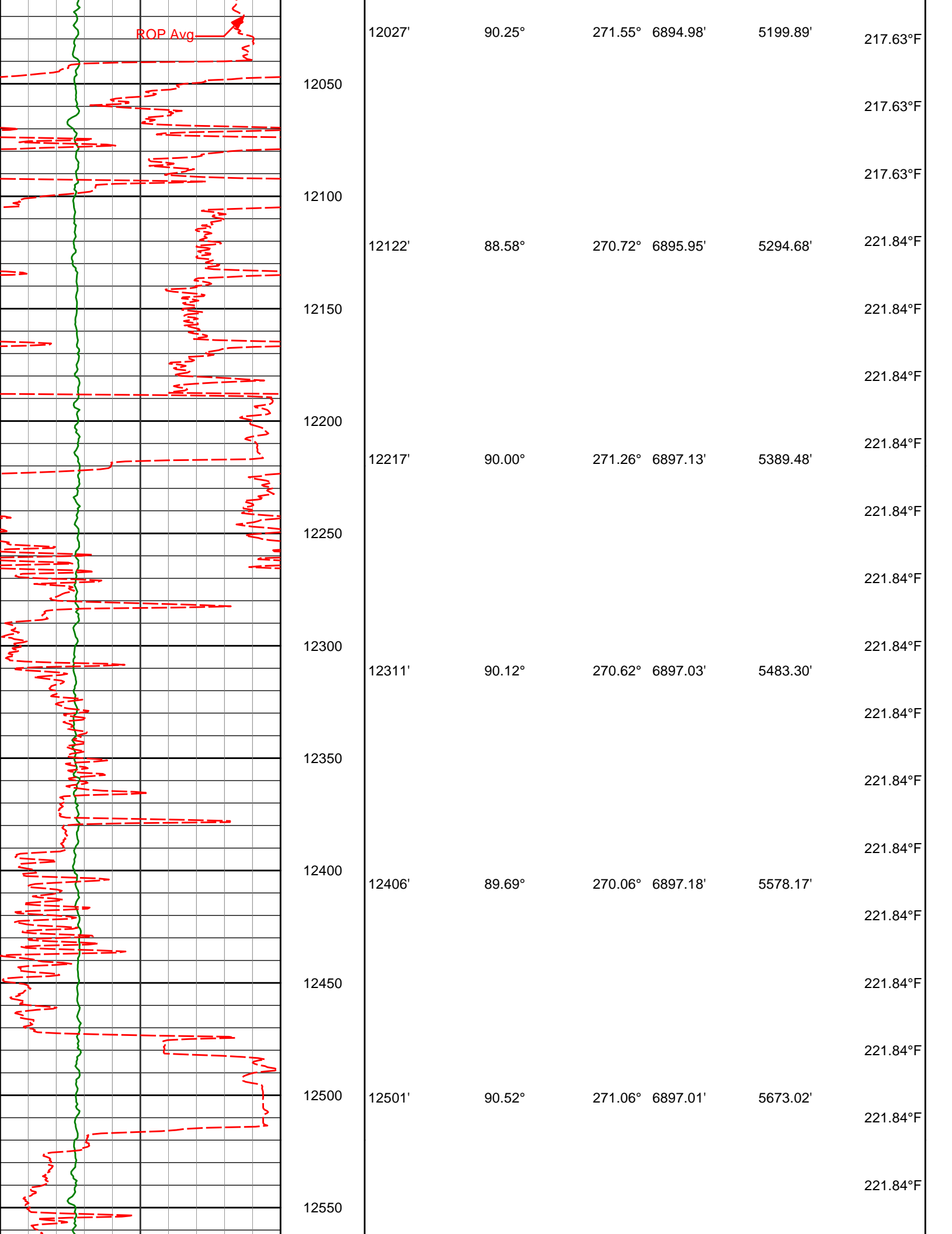


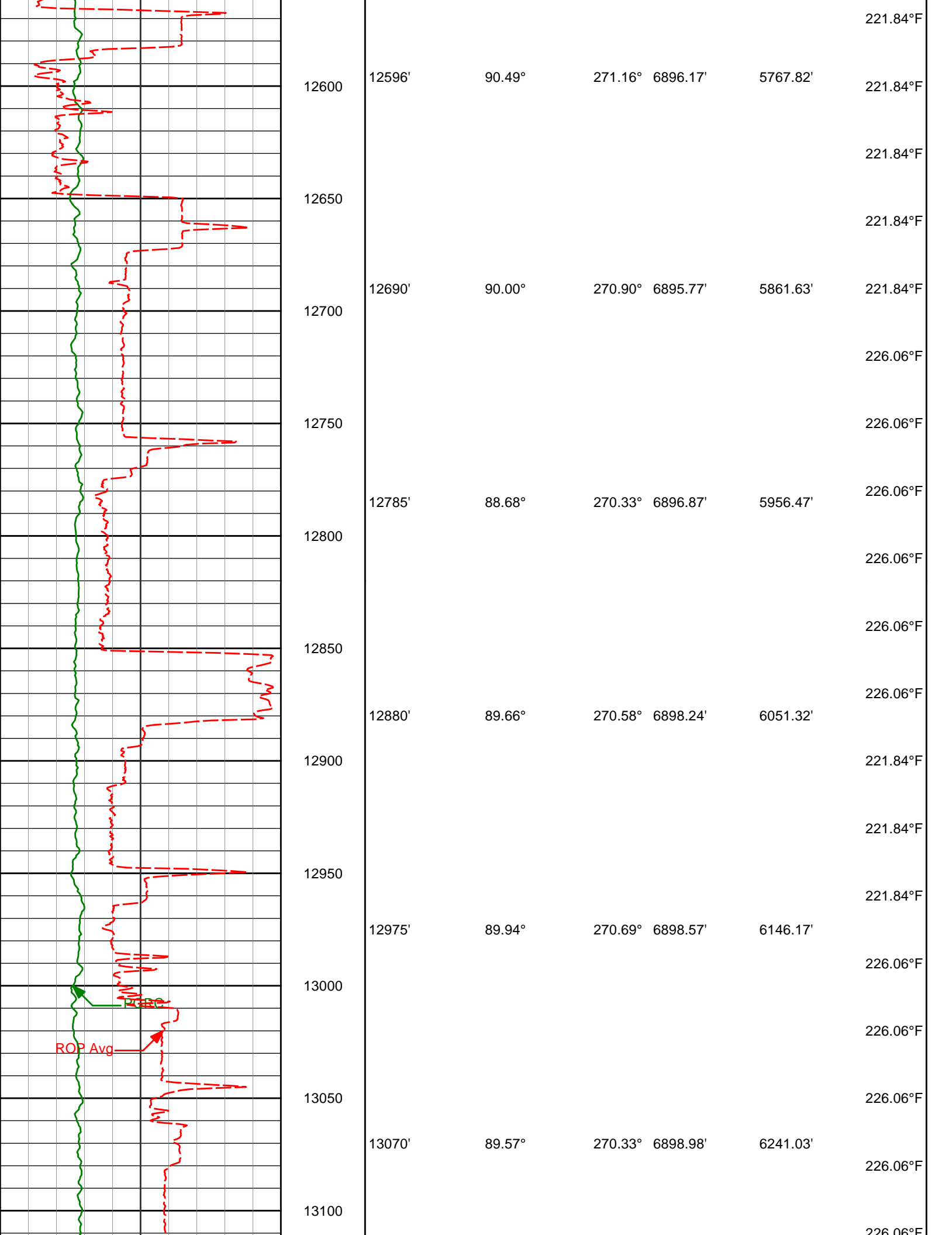


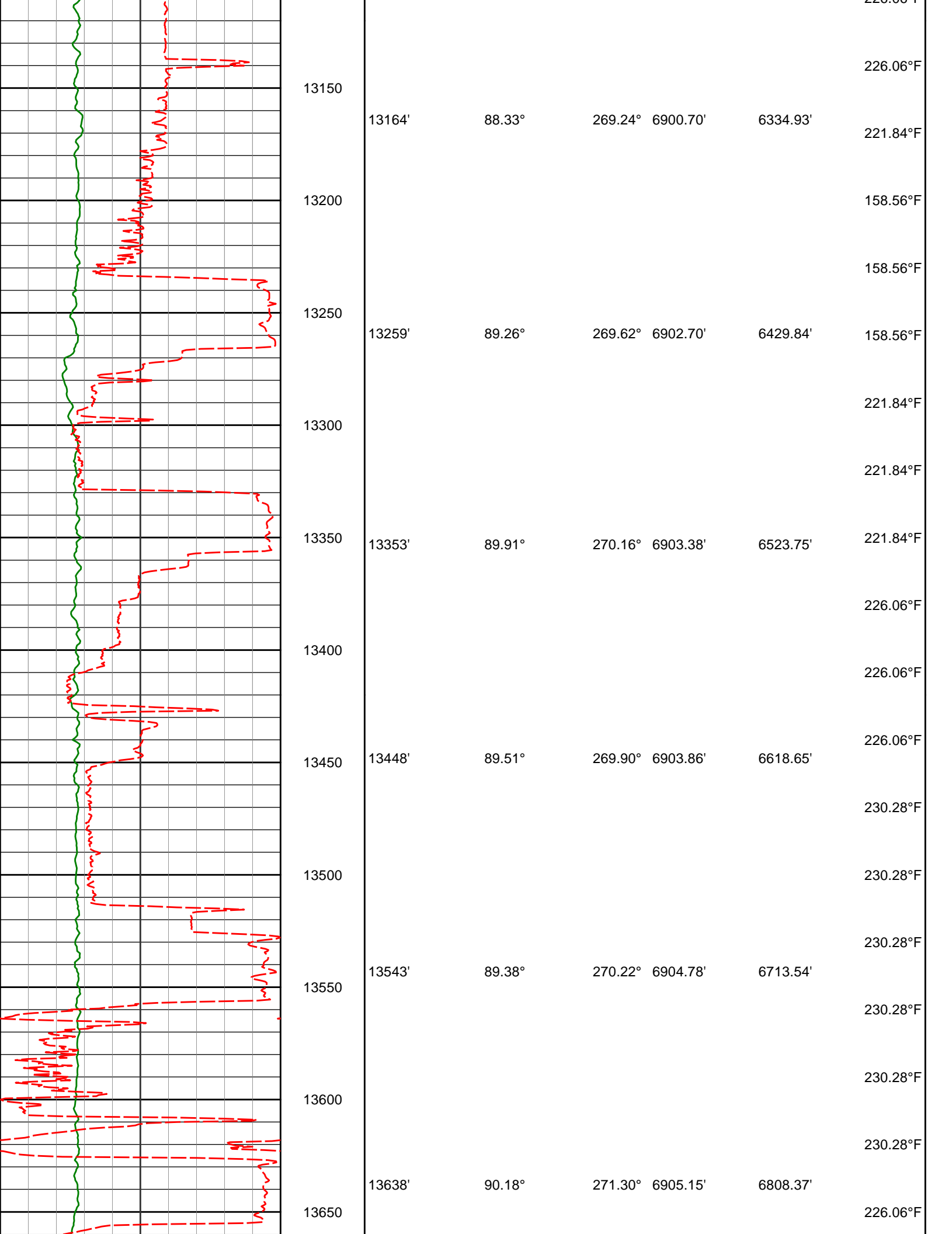




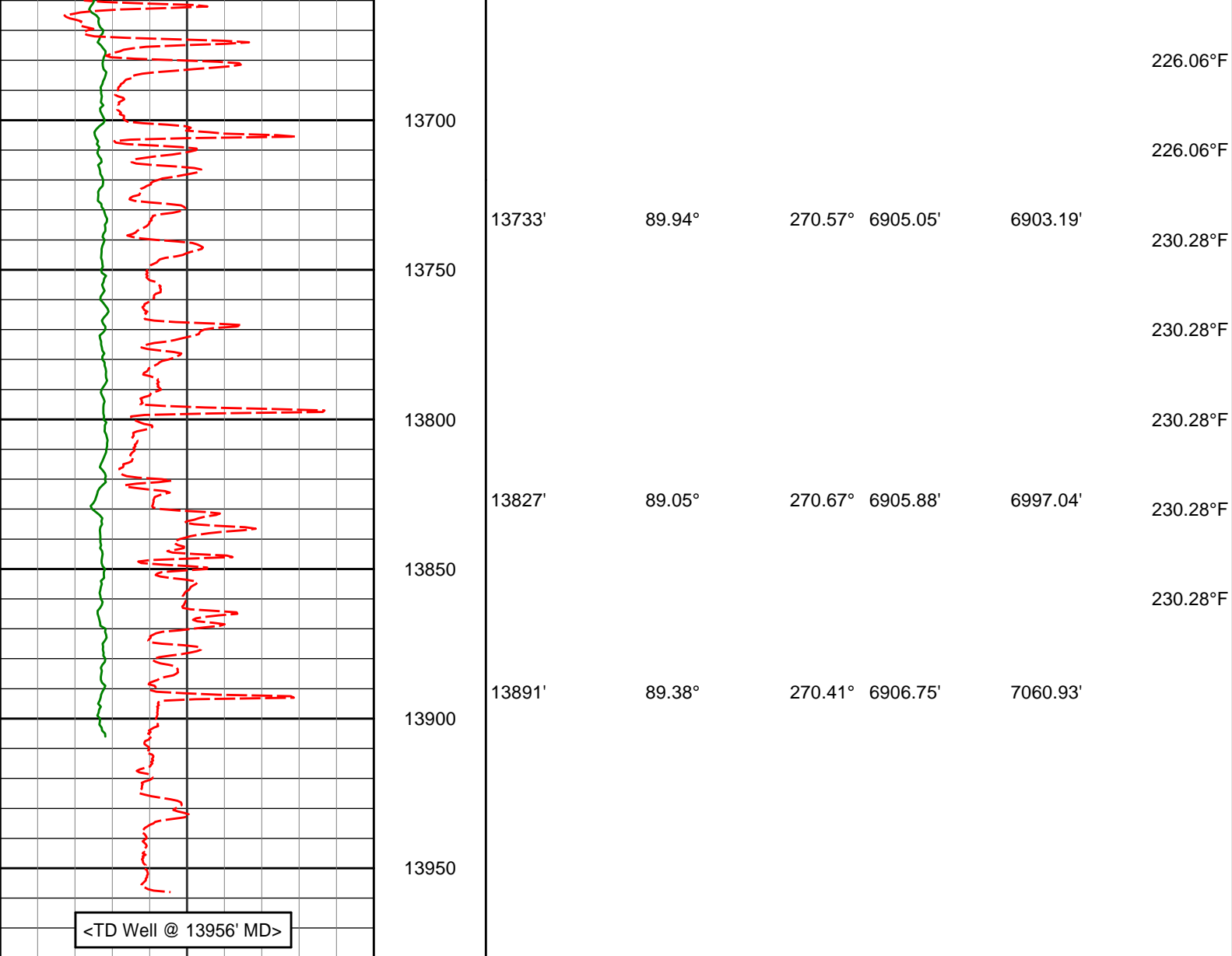






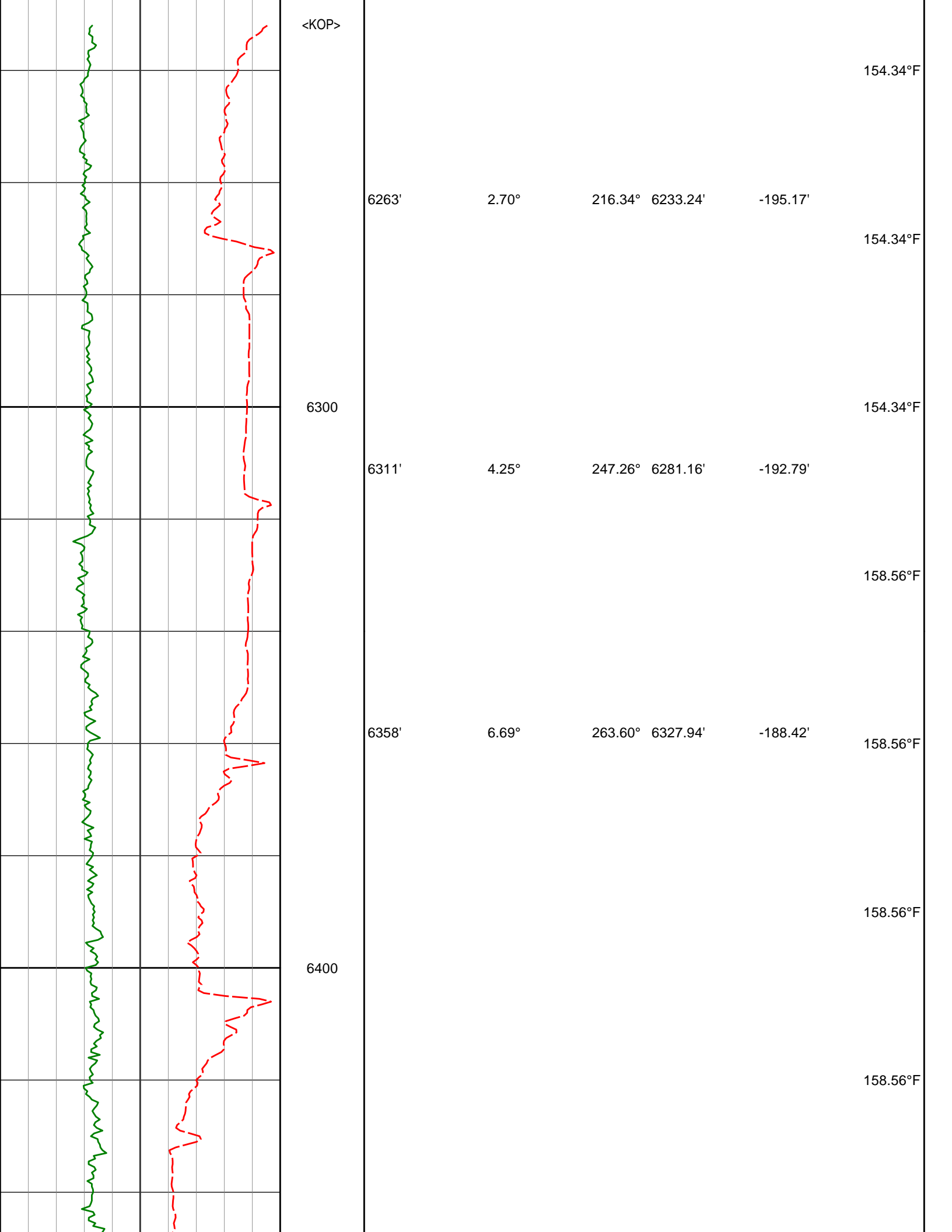


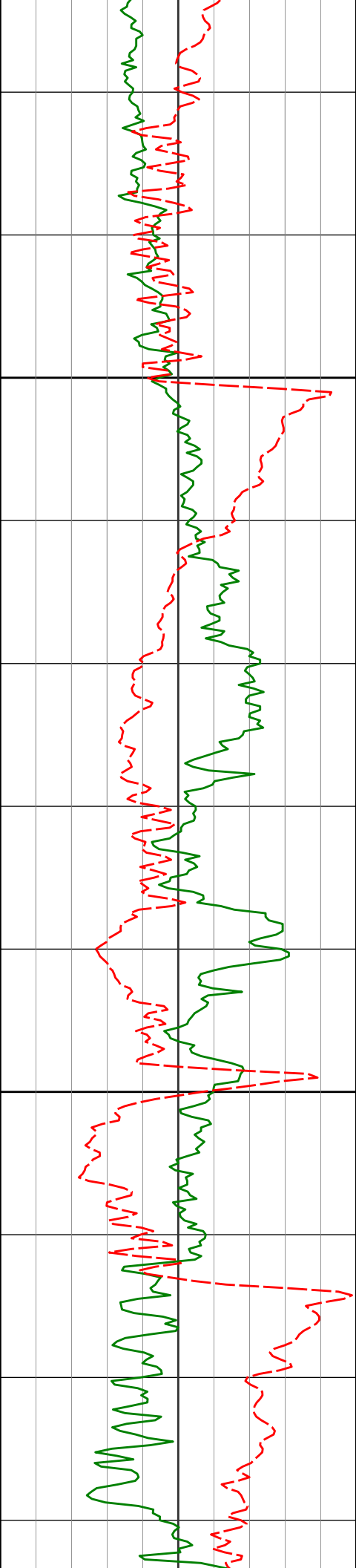




## MD Detail 1:240 Scale

Gamma Ray Cor PGRC api																								
0300																								
Avg Rate of Penetration ROP Avg feet per hr										Depth MD ft		Depth			Inc		Azi		TVD		V.S.		Temp	
5000																								





6500

6600

6453'

16.22°

267.37°

6420.95'

-169.59'

150.13°F

150.13°F

150.13°F

6547'

28.05°

275.73°

6507.88'

-134.46'

154.34°F

154.34°F

154.34°F

154.34°F

6642'

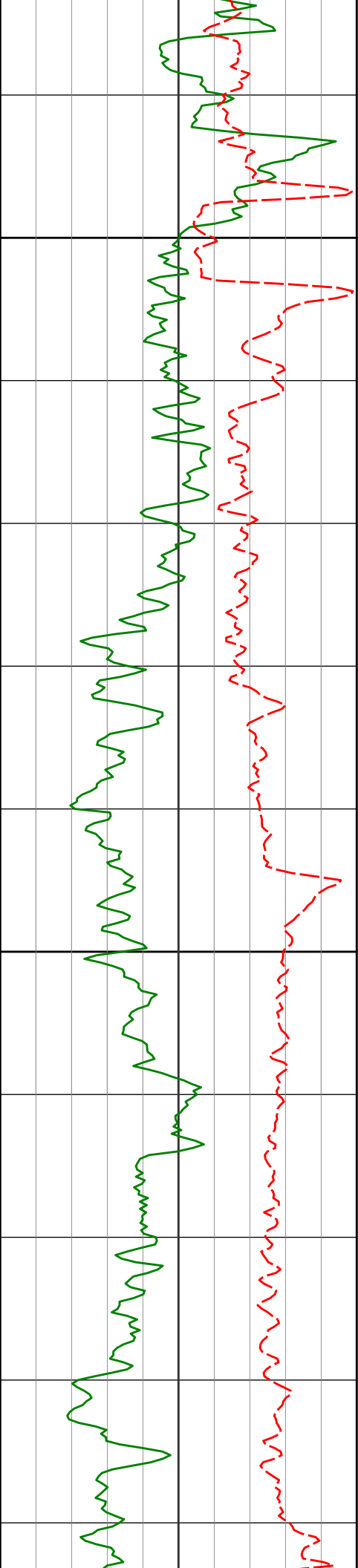
34.39°

277.55°

6589.08'

-85.90'

154.34°F



6700

6800

6736'

42.23°

275.94°

6662.79'

-28.44'

6831'

52.58°

271.59°

6727.01'

40.96'

154.34°F

154.34°F

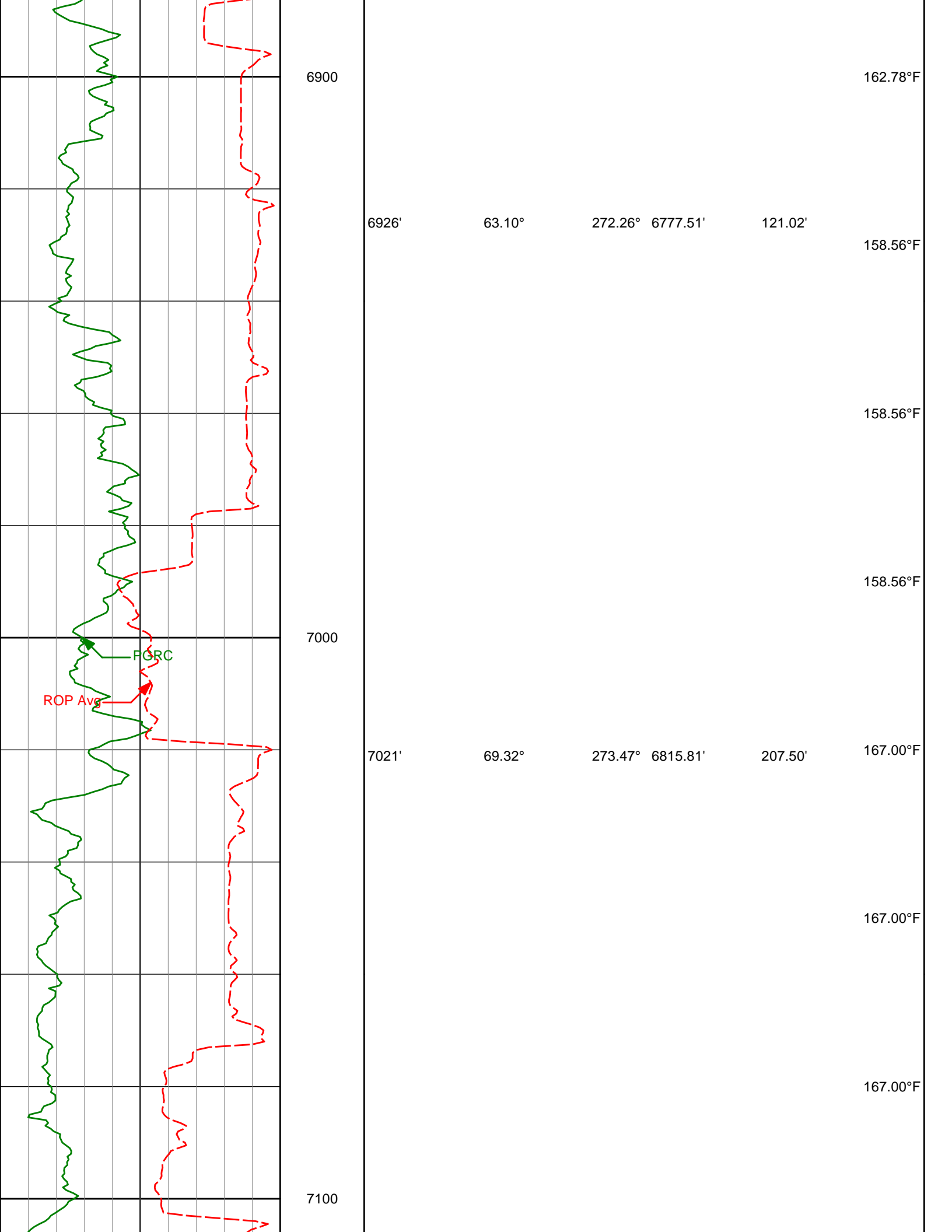
154.34°F

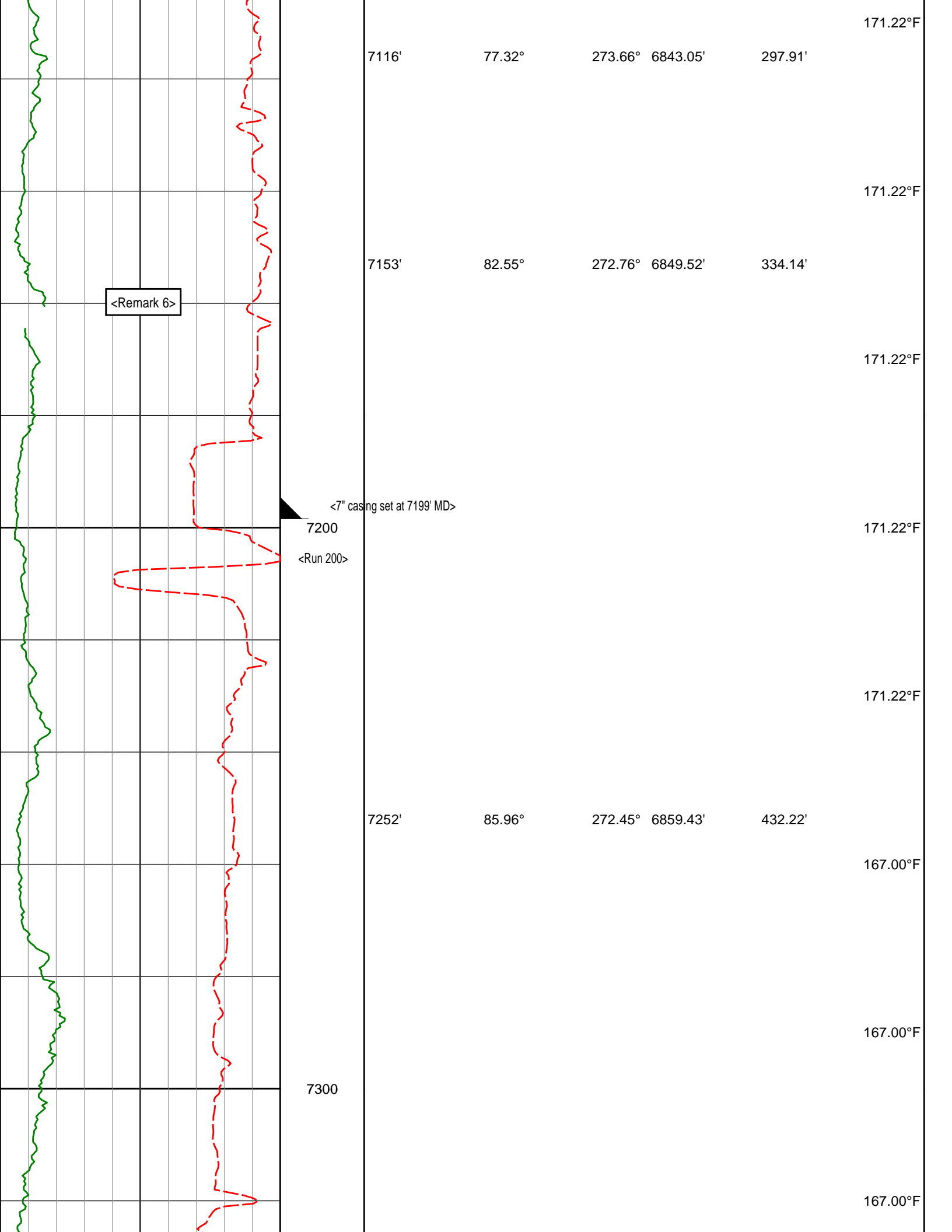
154.34°F

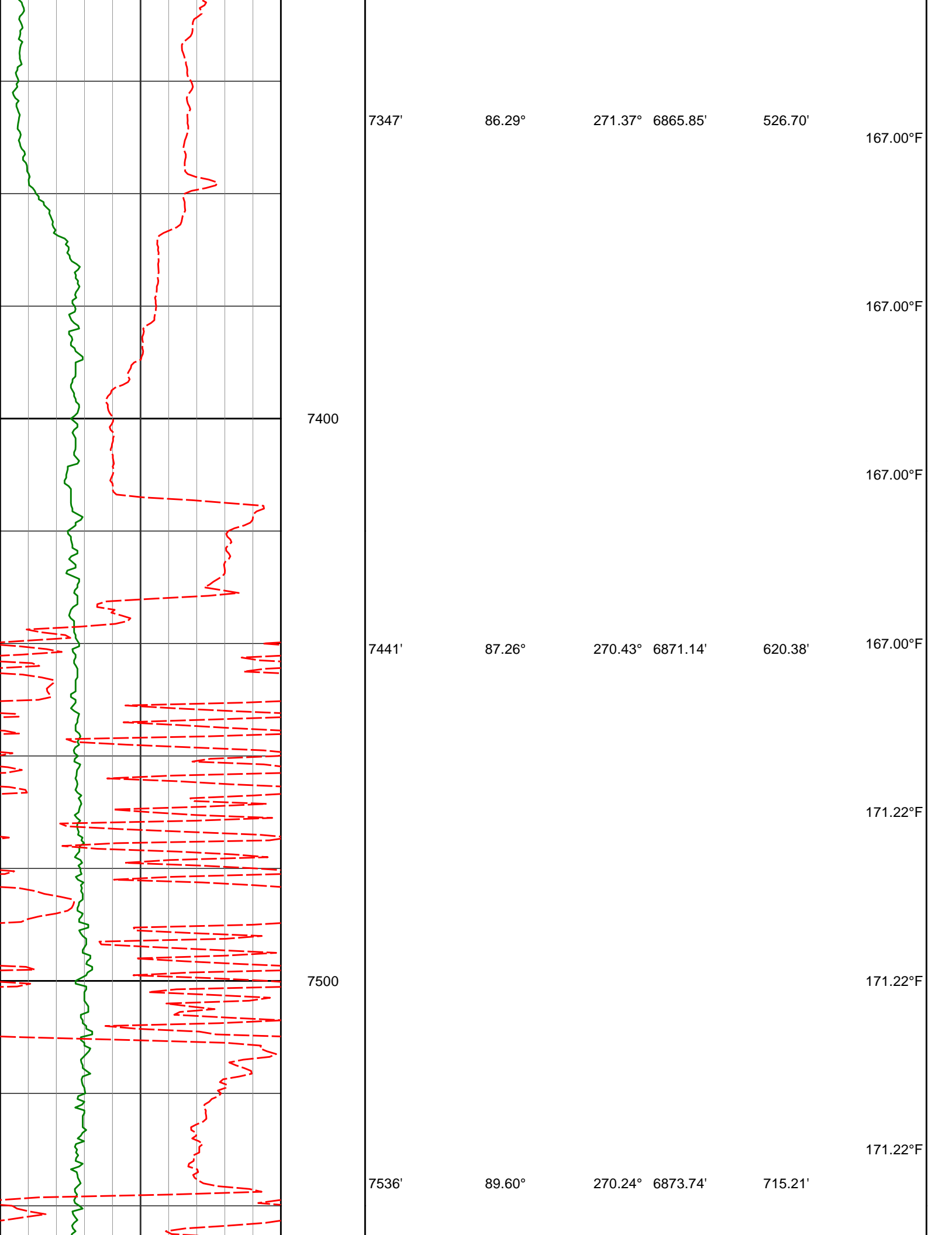
154.34°F

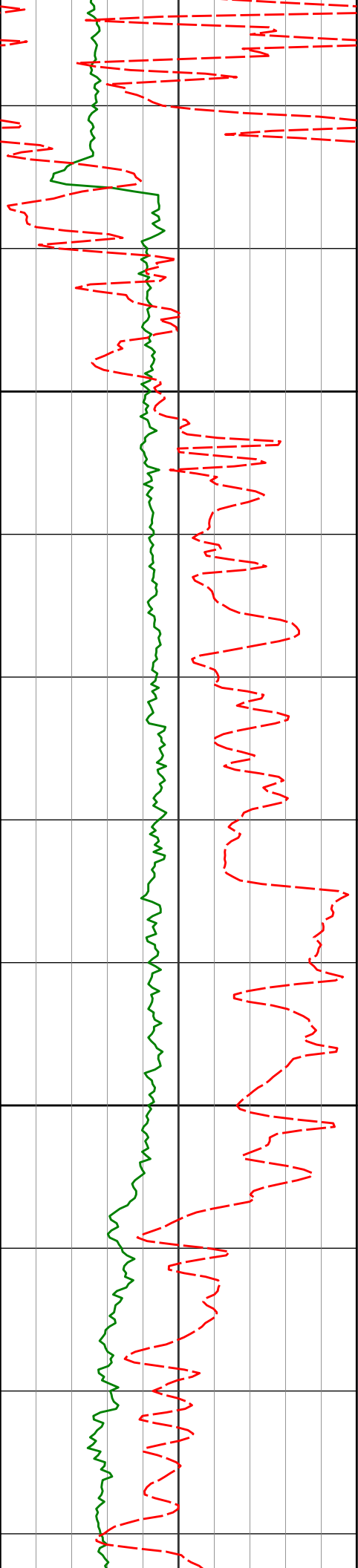
162.78°F

162.78°F









7600

7700

7631'

7722'

89.48°

90.83°

269.70°

269.39°

6874.50'

6874.25'

810.11'

901.04'

171.22°F

171.22°F

171.22°F

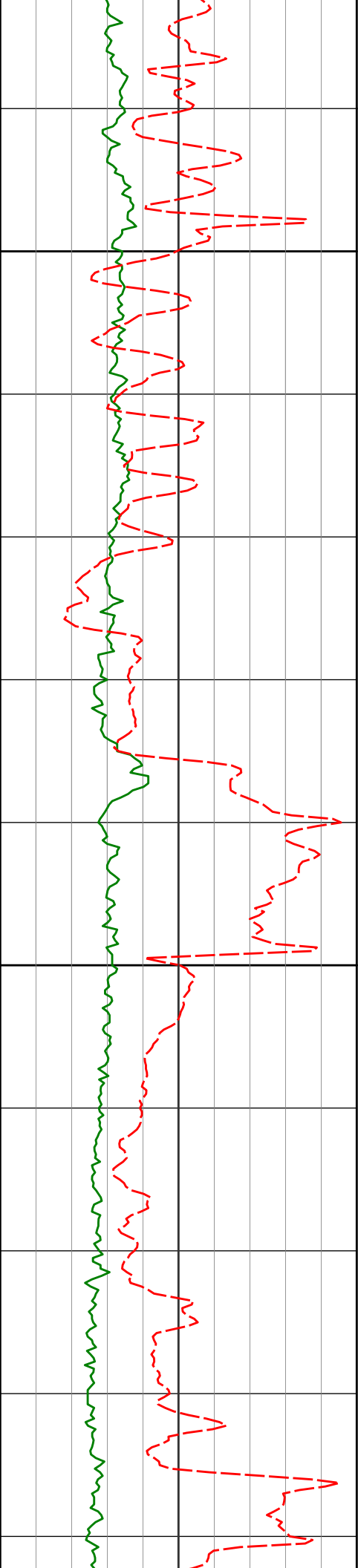
175.44°F

175.44°F

175.44°F

183.88°F





7800

7814'

90.09°

268.90°

6873.52'

992.99'

7900

7905'

92.43°

269.60°

6871.52'

1083.92'

183.88°F

183.88°F

183.88°F

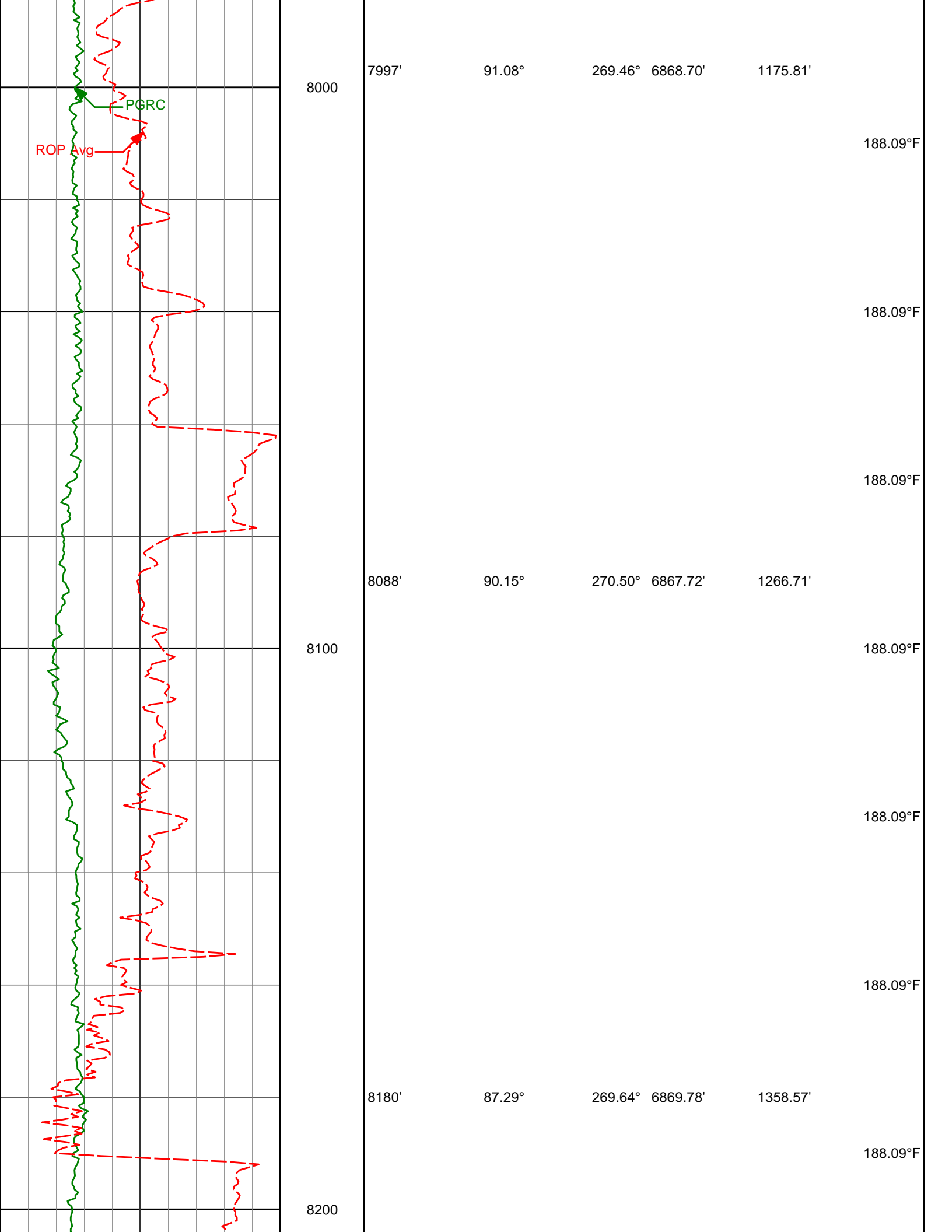
183.88°F

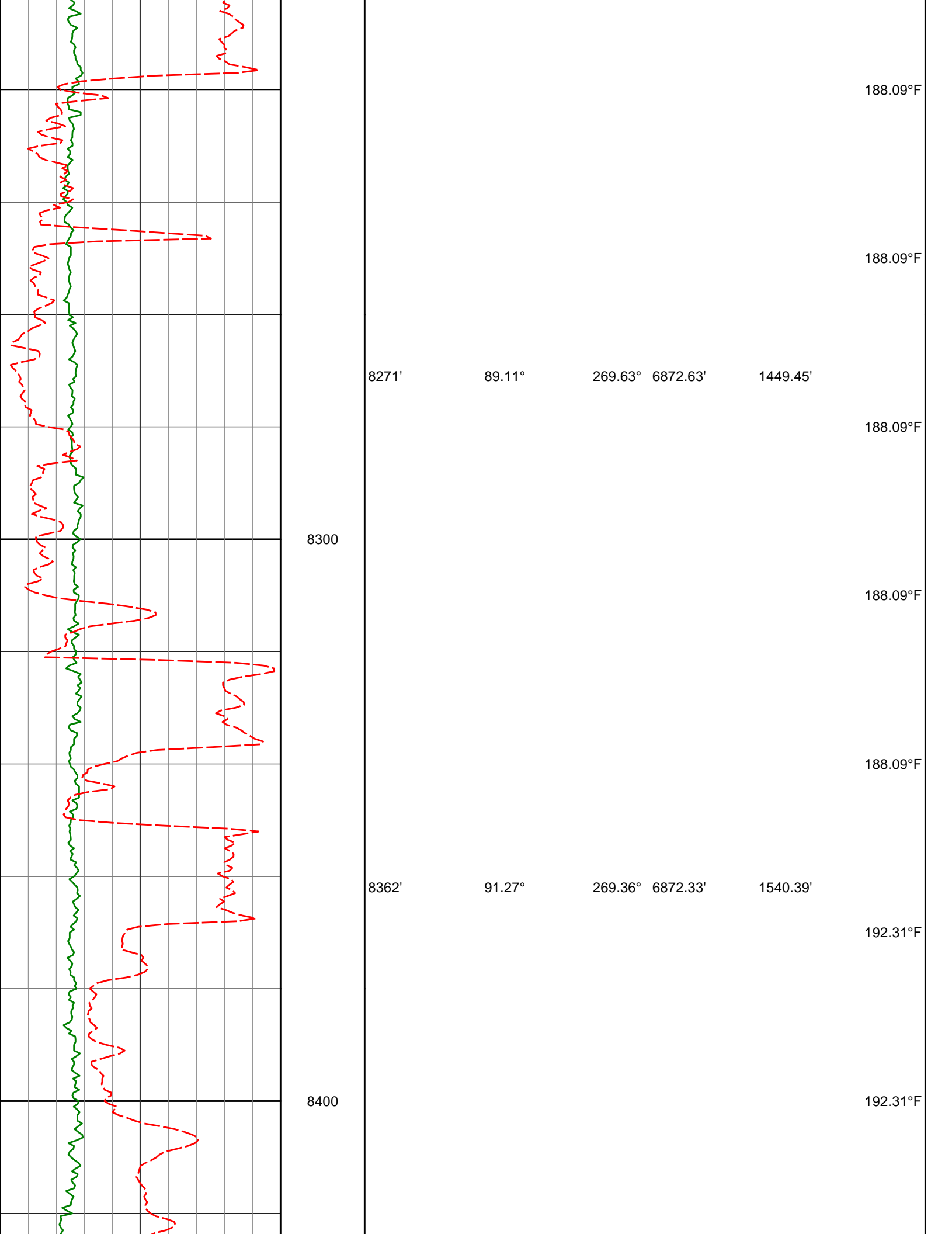
183.88°F

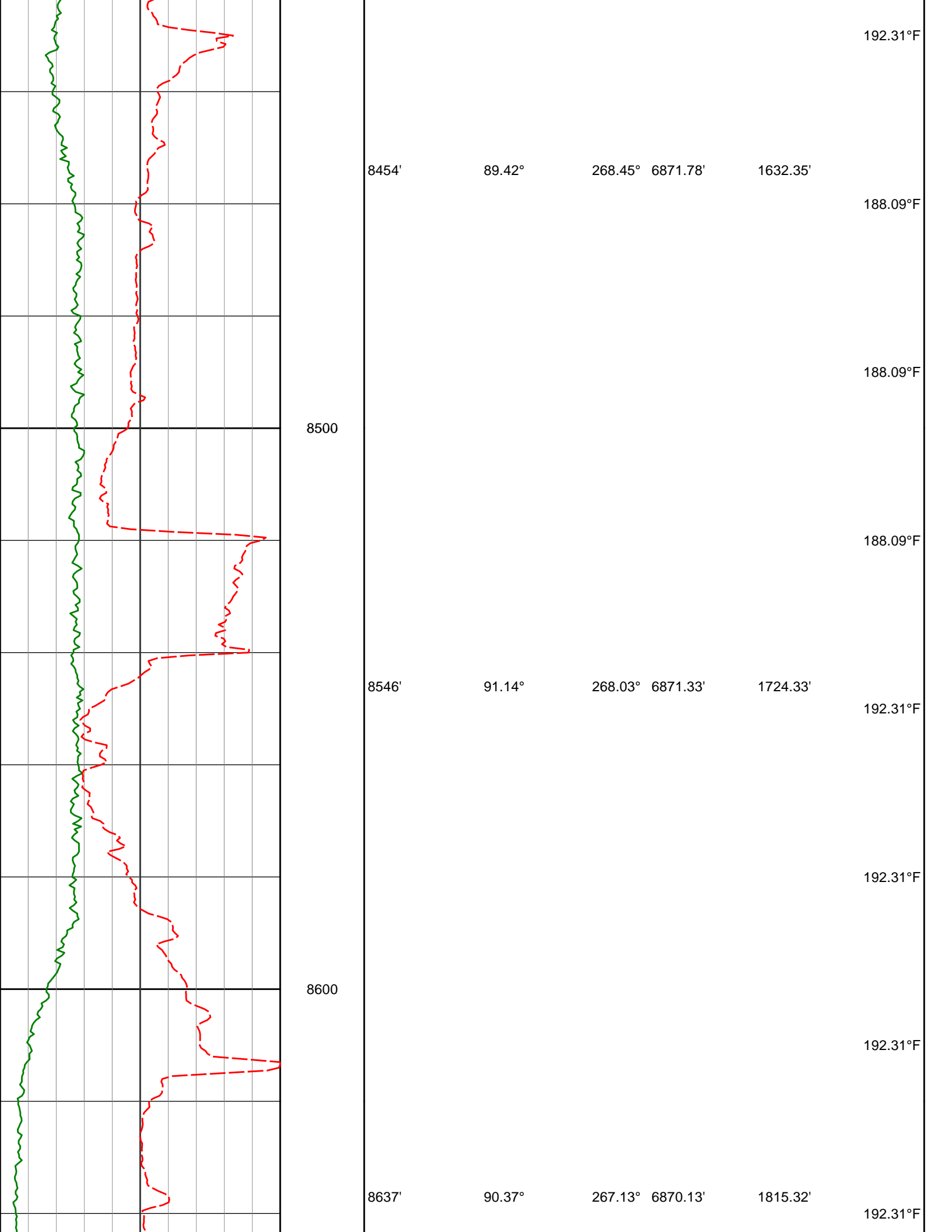
183.88°F

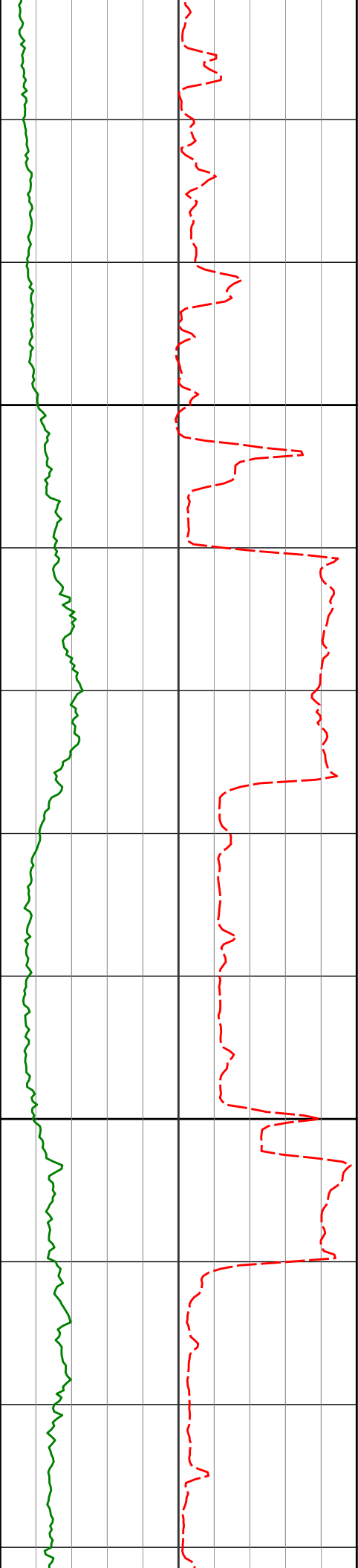
183.88°F

183.88°F









8700

8800

8728'

8820'

92.65°

91.48°

269.22°

270.74°

6867.73'

6864.42'

1906.27'

1998.11'

196.53°F

196.53°F

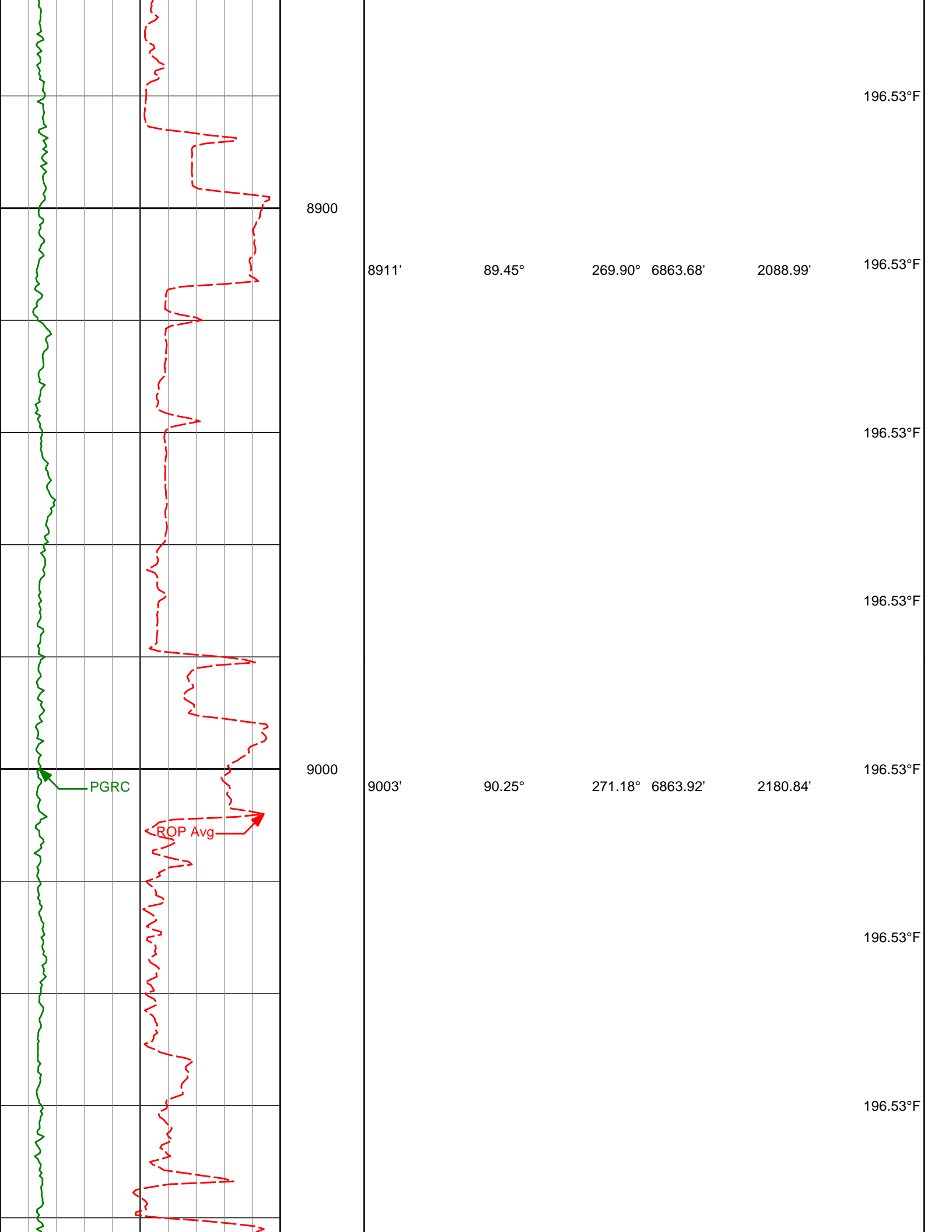
196.53°F

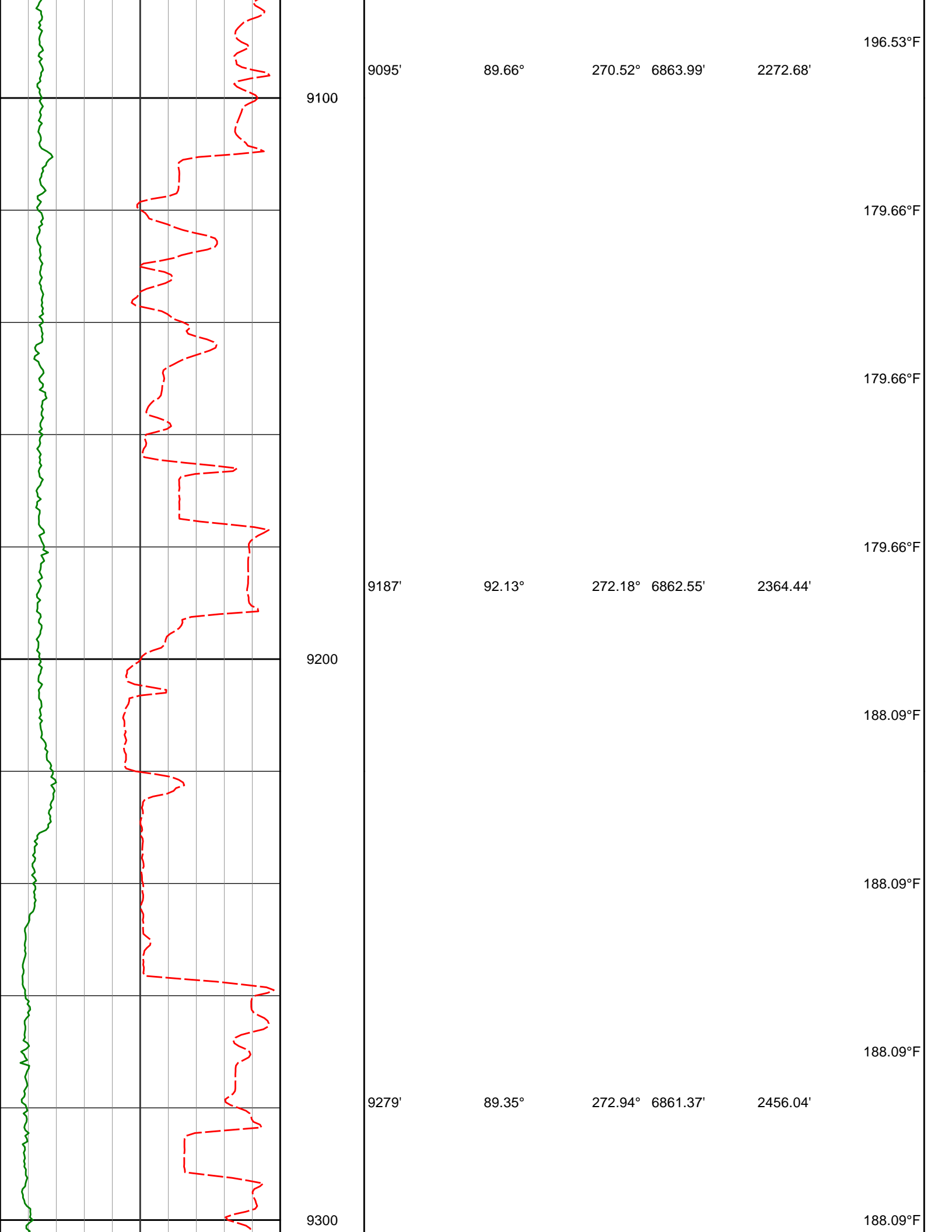
196.53°F

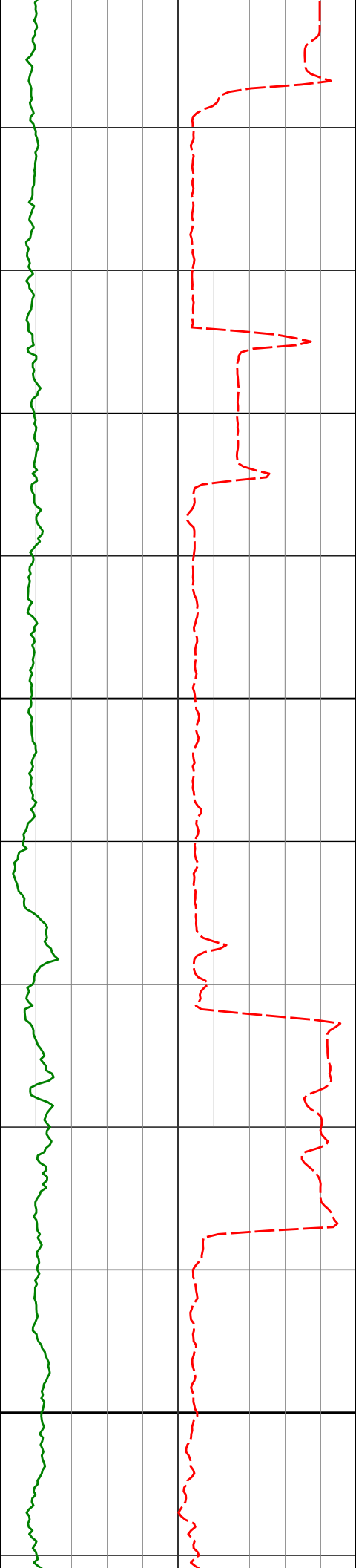
196.53°F

192.31°F

196.53°F







9400

9500

9374'

9469'

89.60°

89.78°

273.08°

271.27°

6862.24'

6862.75'

2550.58'

2645.25'

188.09°F

188.09°F

196.53°F

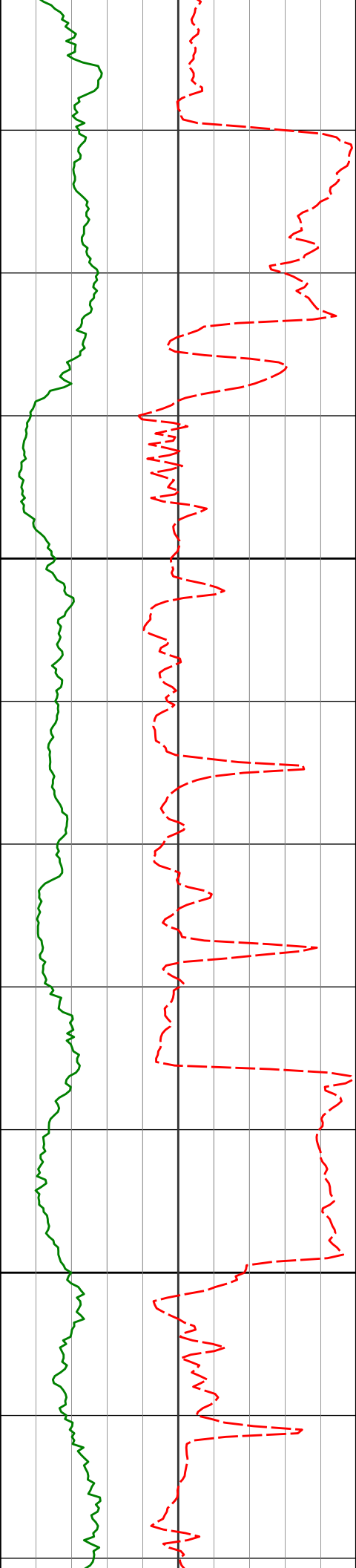
196.53°F

196.53°F

196.53°F

196.53°F





9600

9700

9563'

9658'

88.74°

89.17°

271.99°

271.57°

6863.96'

6865.70'

2738.98'

2833.68'

196.53°F

196.53°F

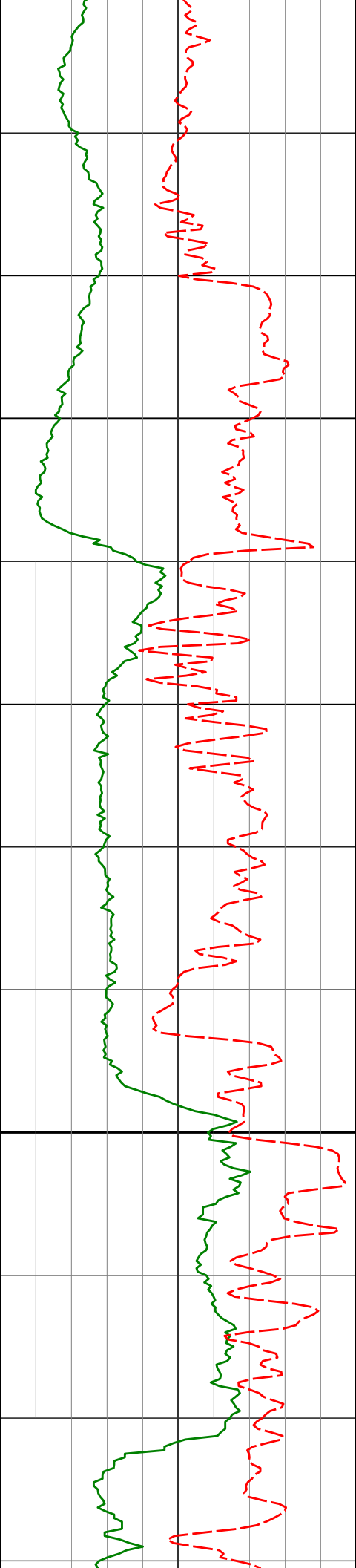
196.53°F

196.53°F

188.09°F

188.09°F

188.09°F



9800

9900

9753'

87.53°

272.09°

6868.43'

2928.36'

196.53°F

196.53°F

196.53°F

196.53°F

9847'

87.01°

271.80°

6872.91'

3021.95'

196.53°F

196.53°F

196.53°F

9942'

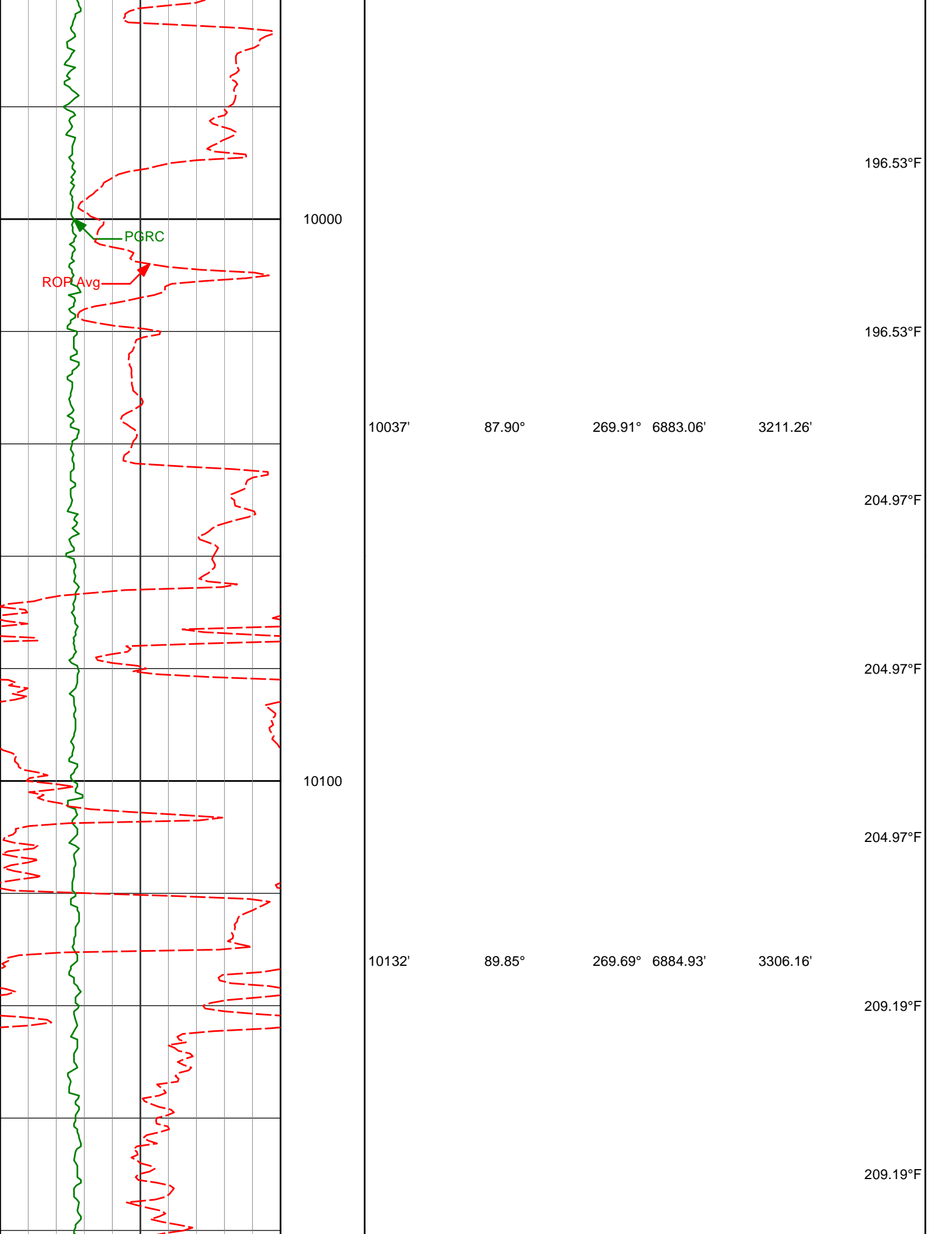
86.42°

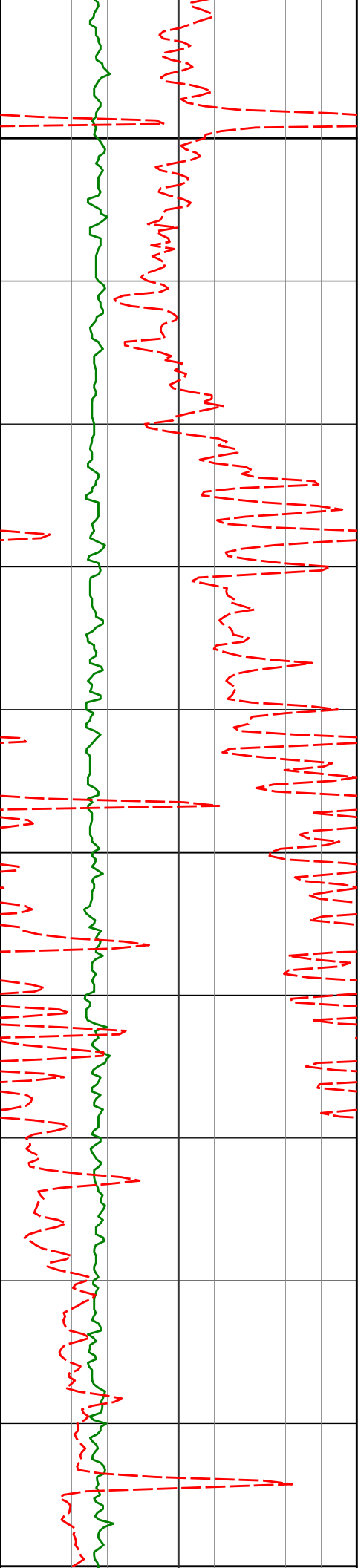
271.40°

6878.35'

3116.54'

196.53°F





10200

209.19°F

10226'

90.15°

269.42° 6884.93'

3400.09'

209.19°F

209.19°F

209.19°F

10300

209.19°F

10321'

90.25°

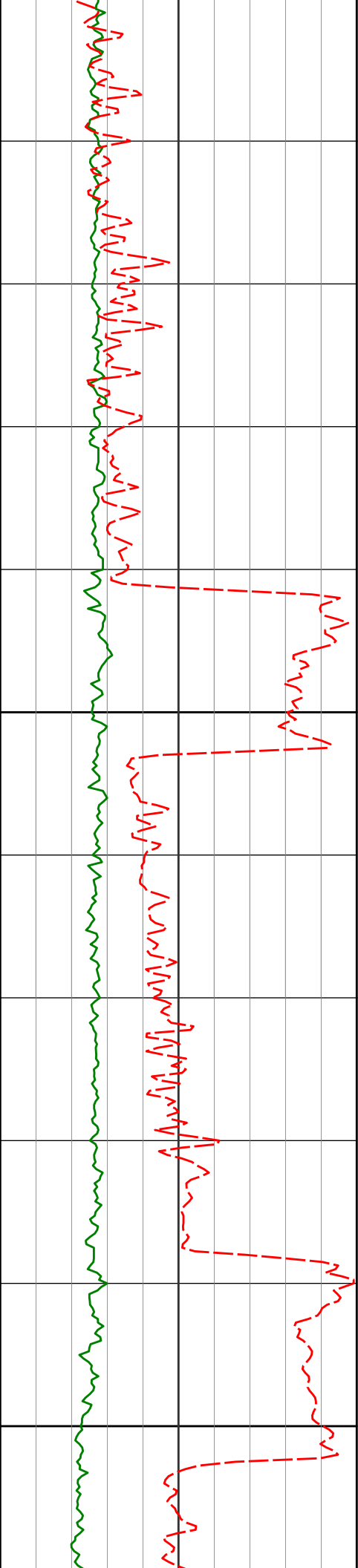
268.79° 6884.59'

3495.05'

213.41°F

213.41°F

10400



10400

10416'

89.08°

267.51° 6885.15'

3590.03'

213.41°F

213.41°F

213.41°F

10500

10511'

89.01°

267.41° 6886.73'

3685.02'

213.41°F

213.41°F

213.41°F

10600

10605'

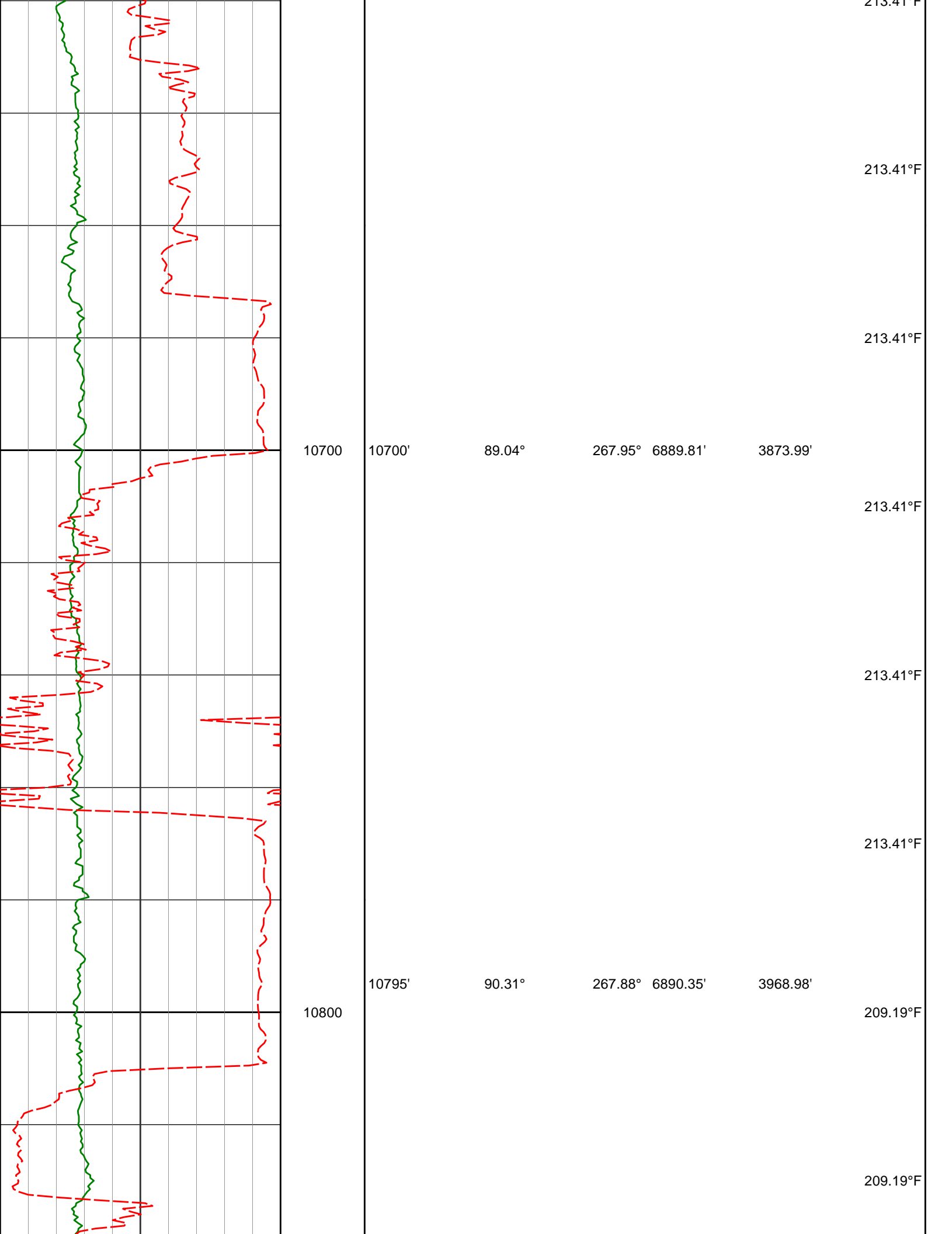
89.11°

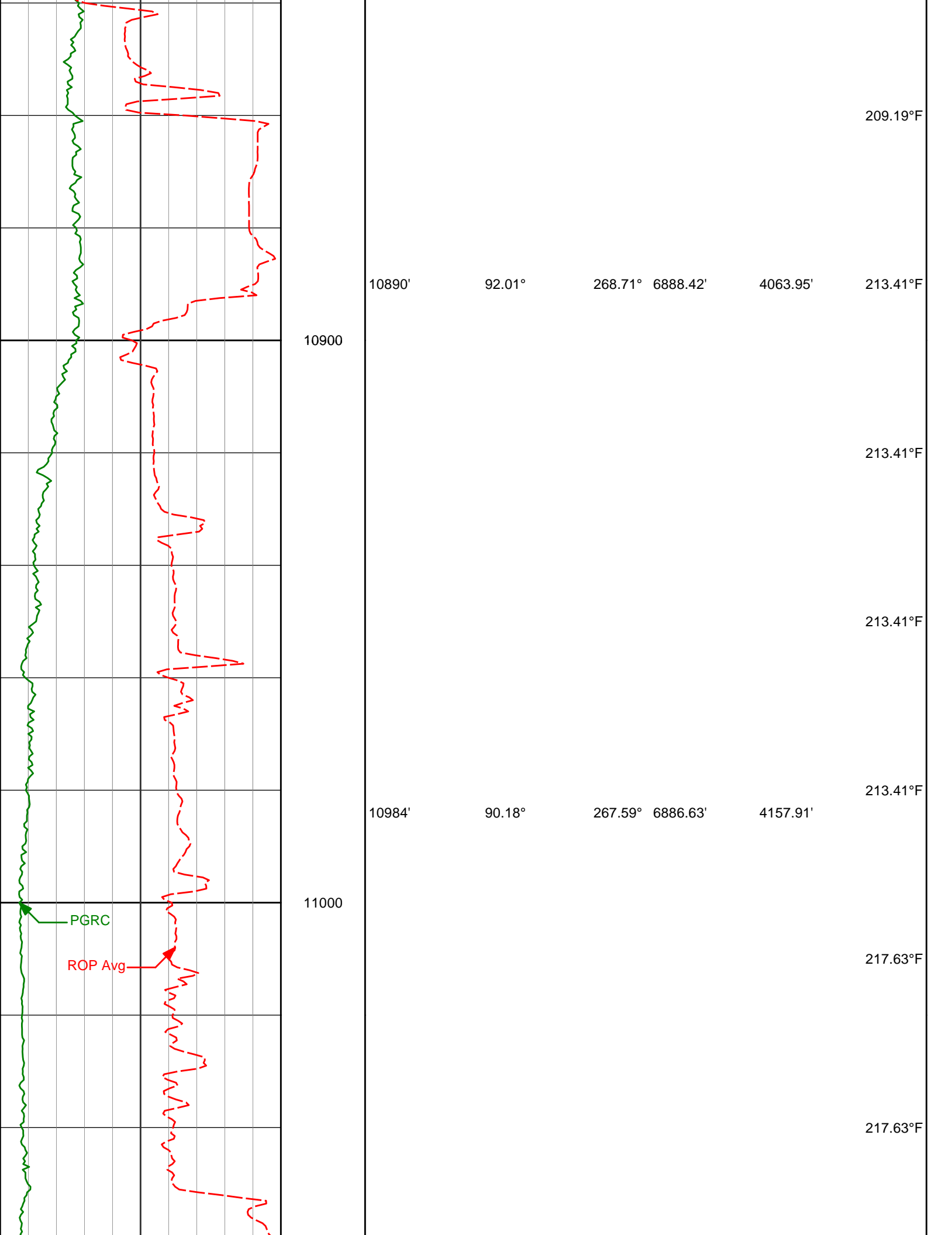
267.98° 6888.28'

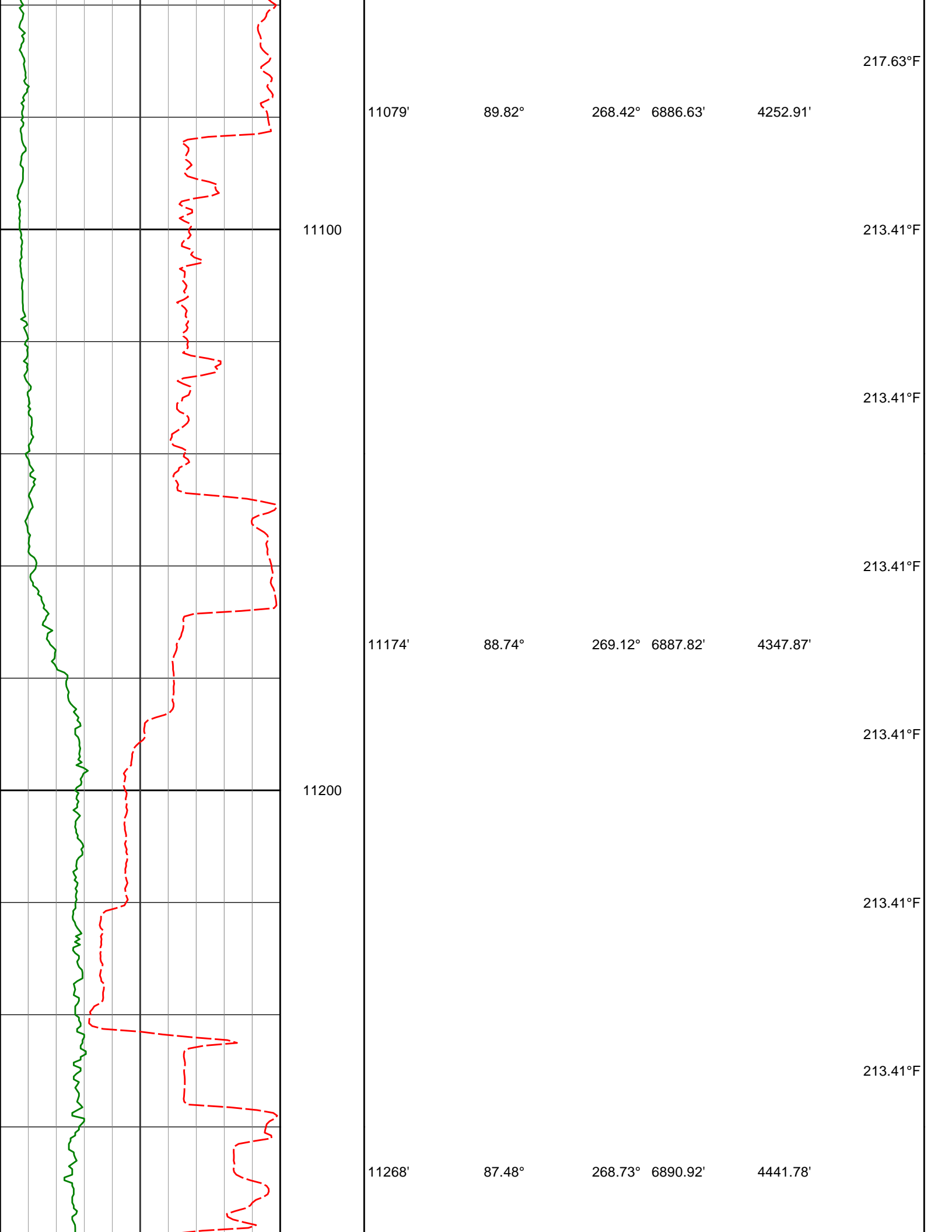
3779.01'

213.41°F

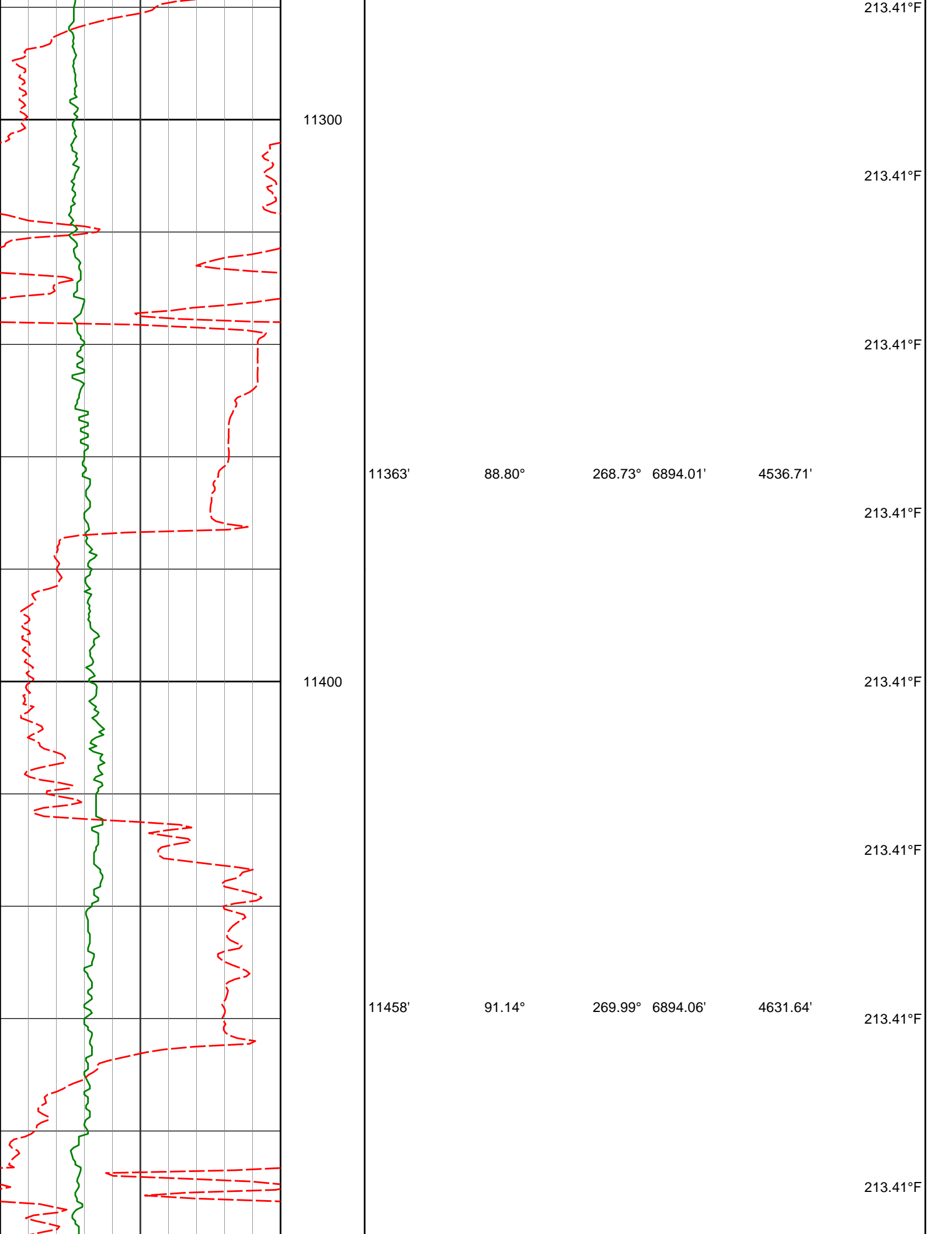
213.41°F

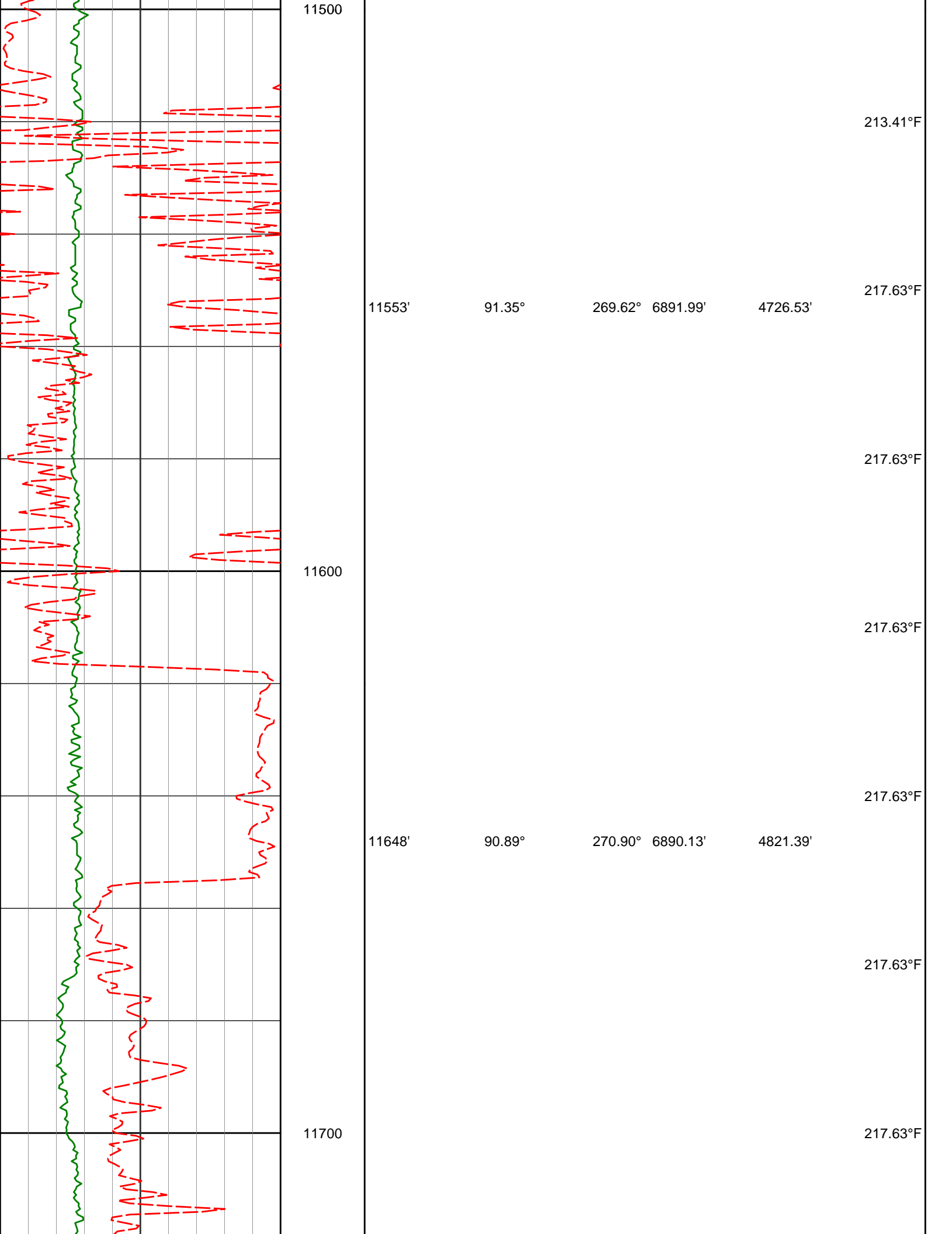


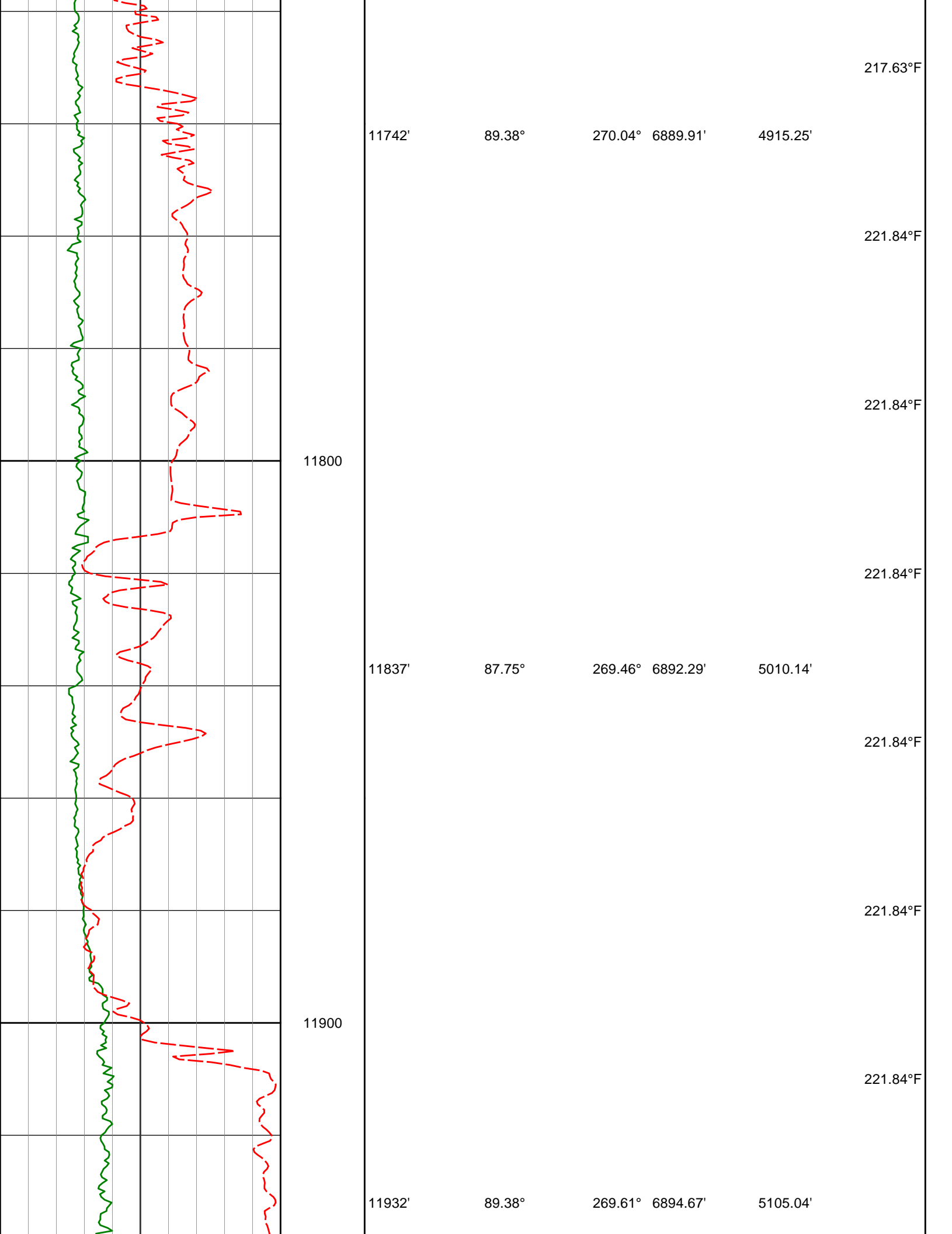


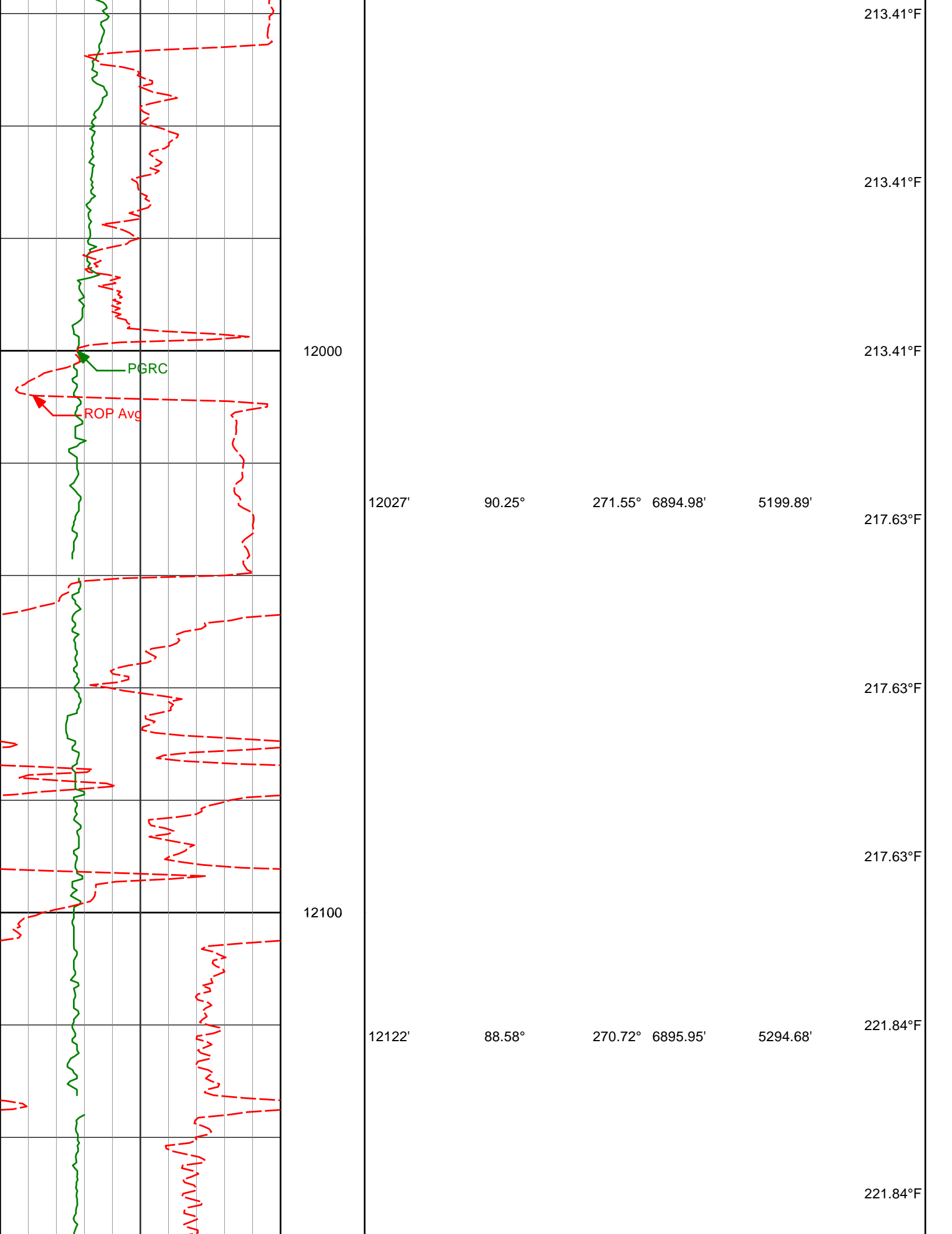


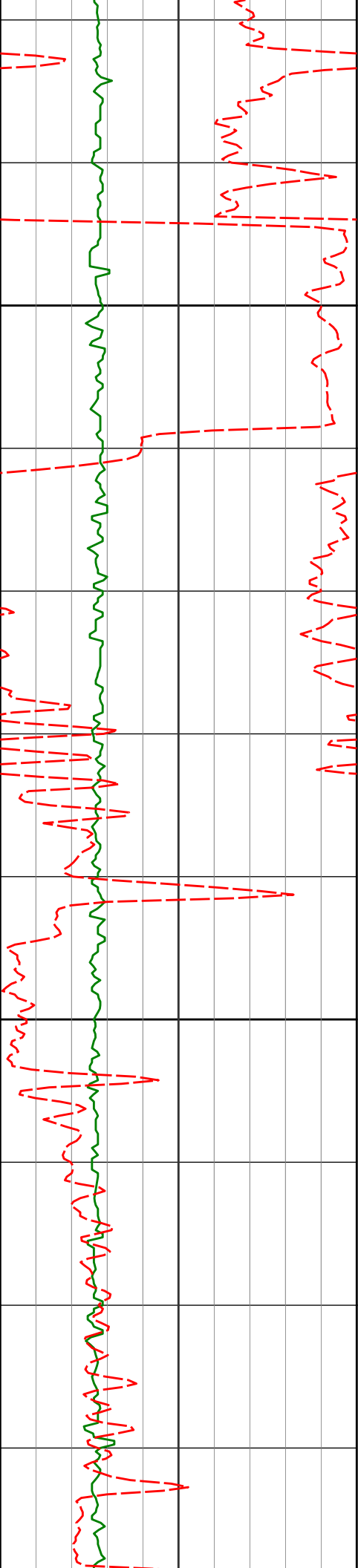












12200

12217'

12300

12311'

90.00°

90.12°

271.26° 6897.13'

270.62° 6897.03'

5389.48'

5483.30'

221.84°F

221.84°F

221.84°F

221.84°F

221.84°F

221.84°F

221.84°F



12400

12500

12406'

12501'

12596'

89.69°

90.52°

90.49°

270.06°

271.06°

271.16°

6897.18'

6897.01'

6896.17'

5578.17'

5673.02'

5767.82'

221.84°F

221.84°F

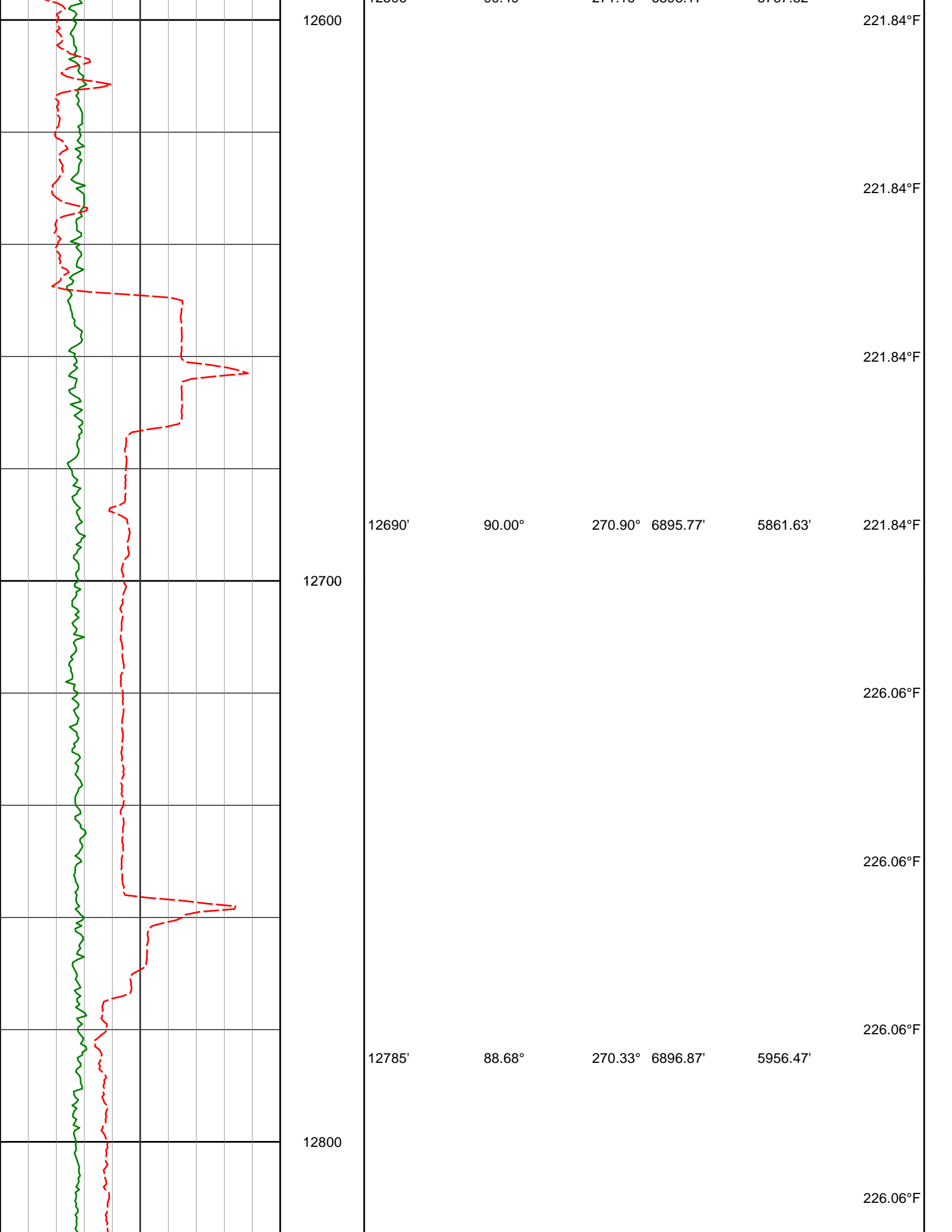
221.84°F

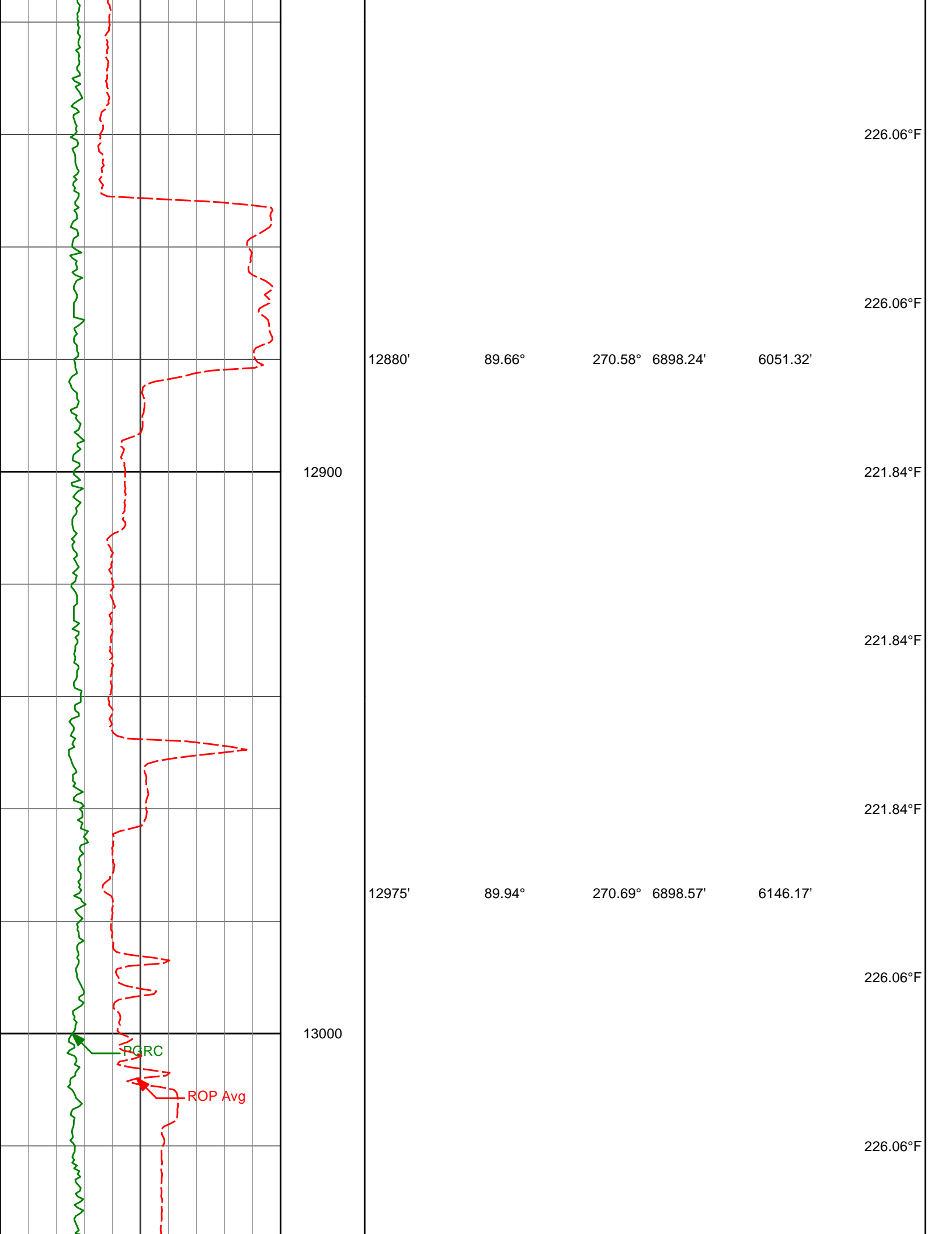
221.84°F

221.84°F

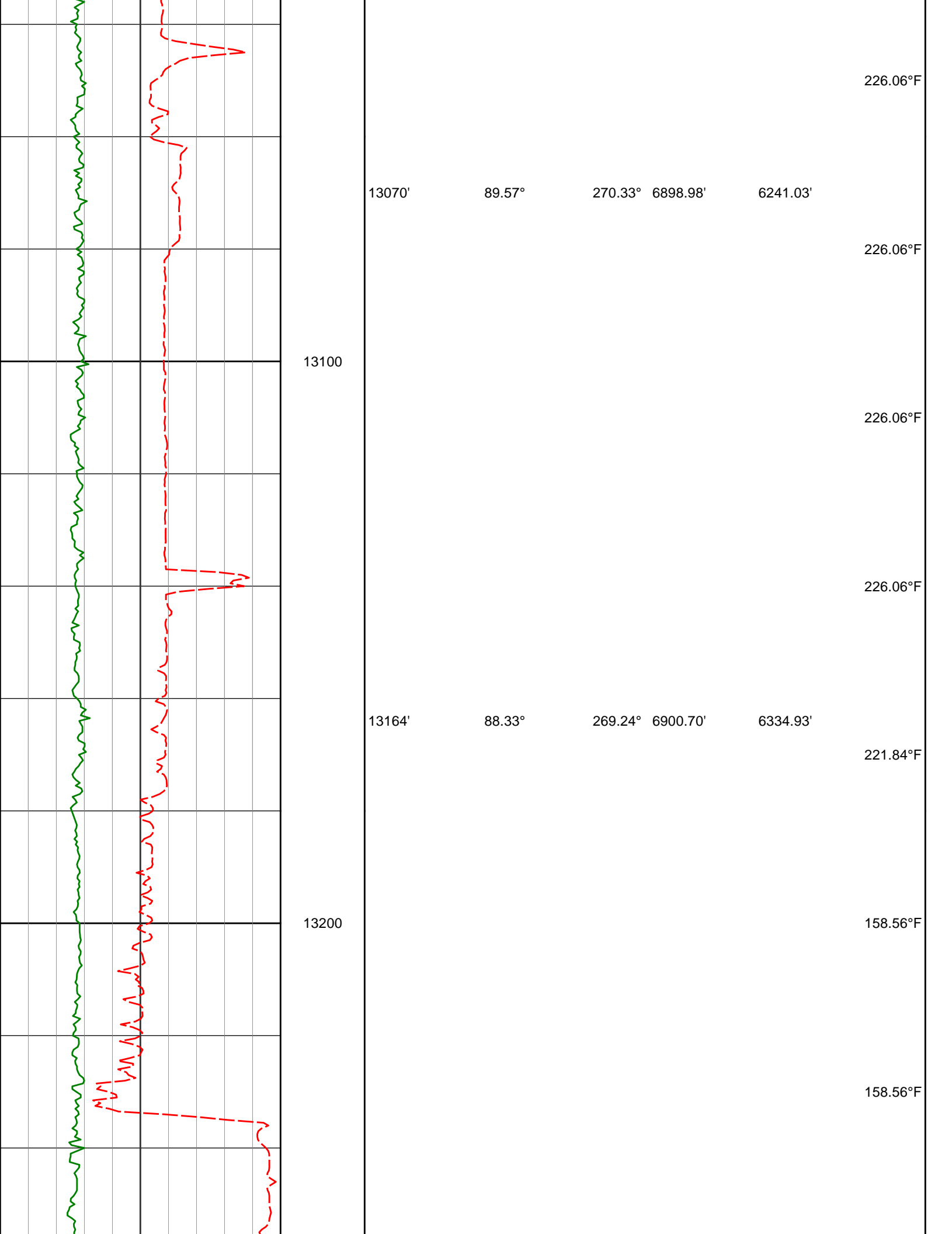
221.84°F

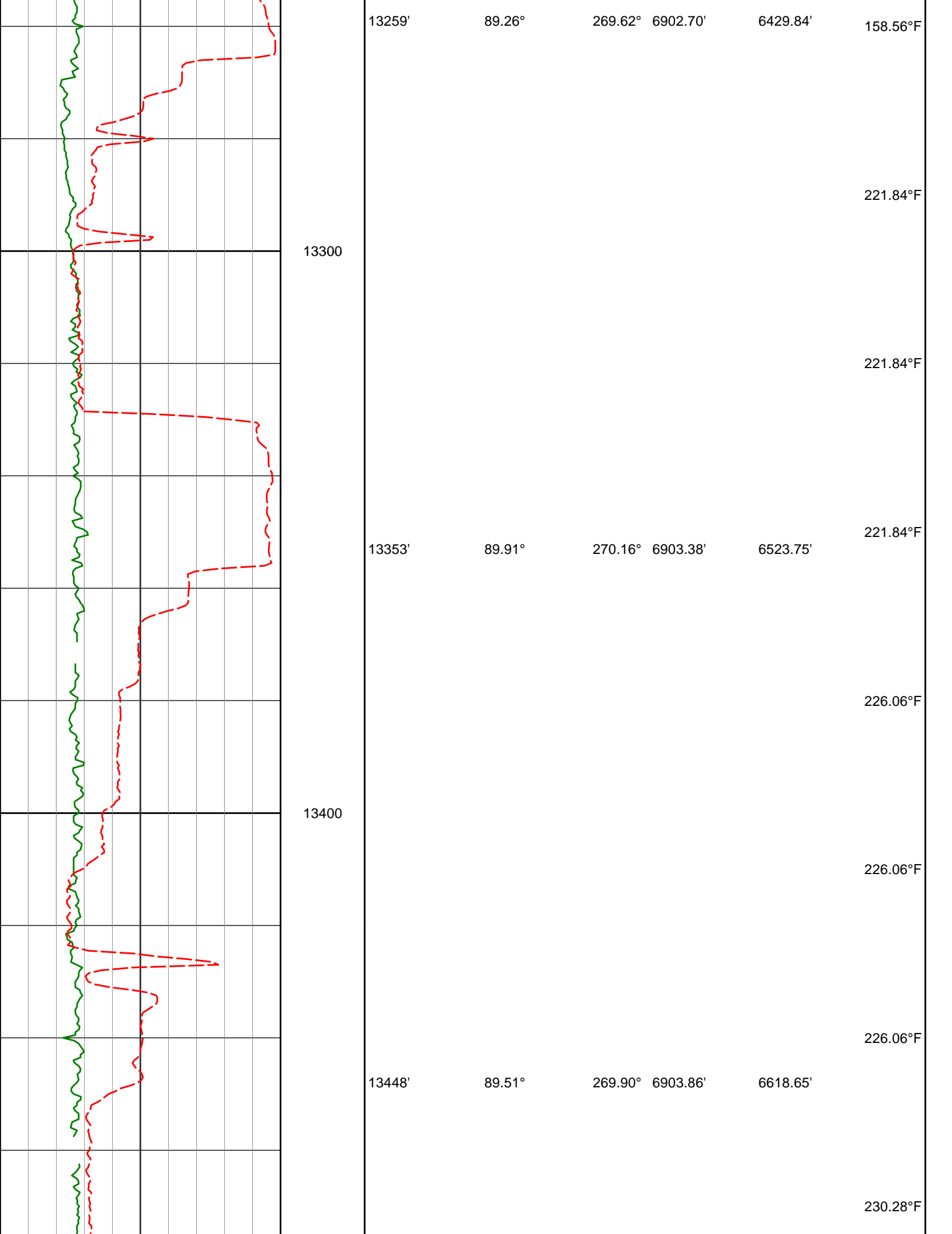
221.84°F

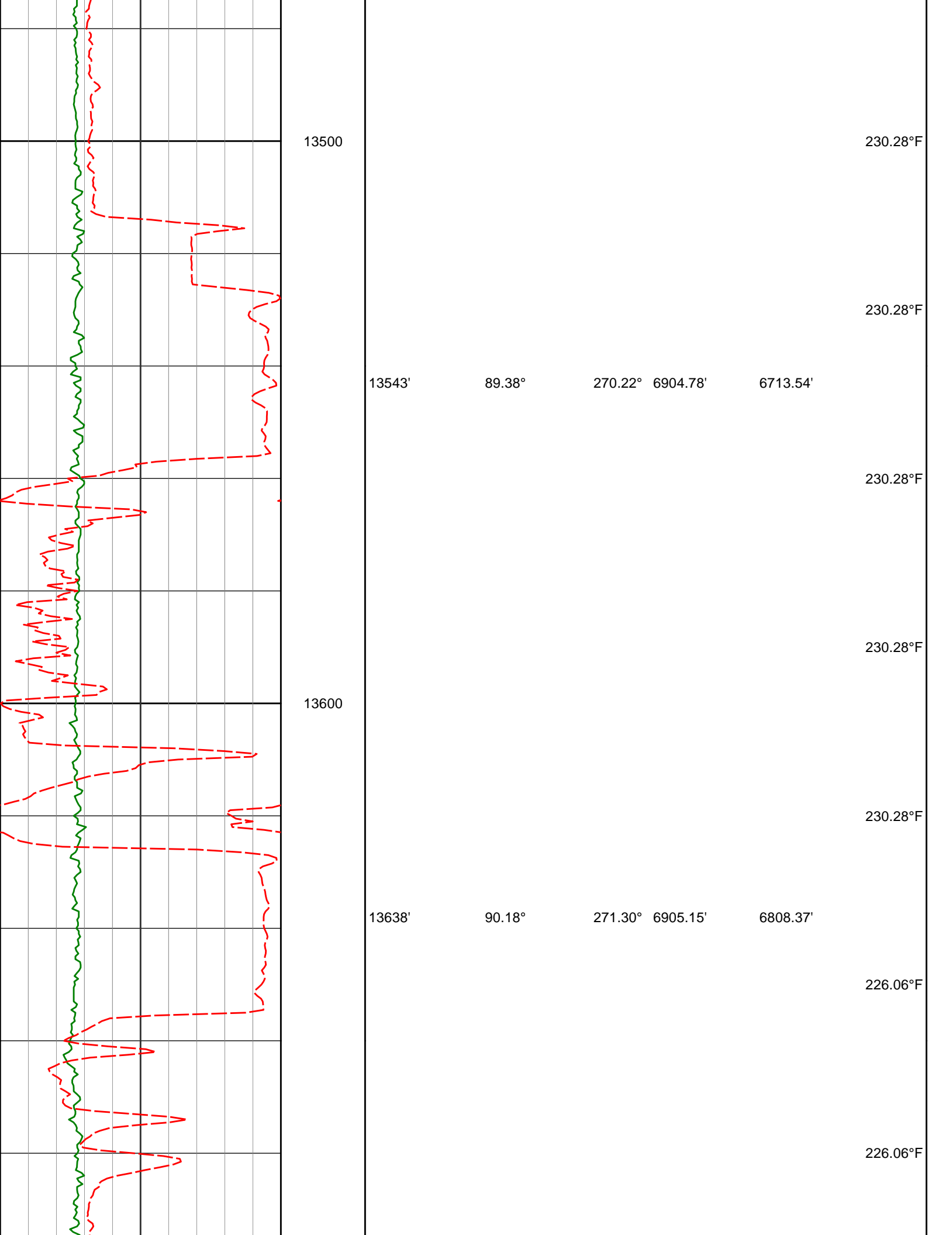


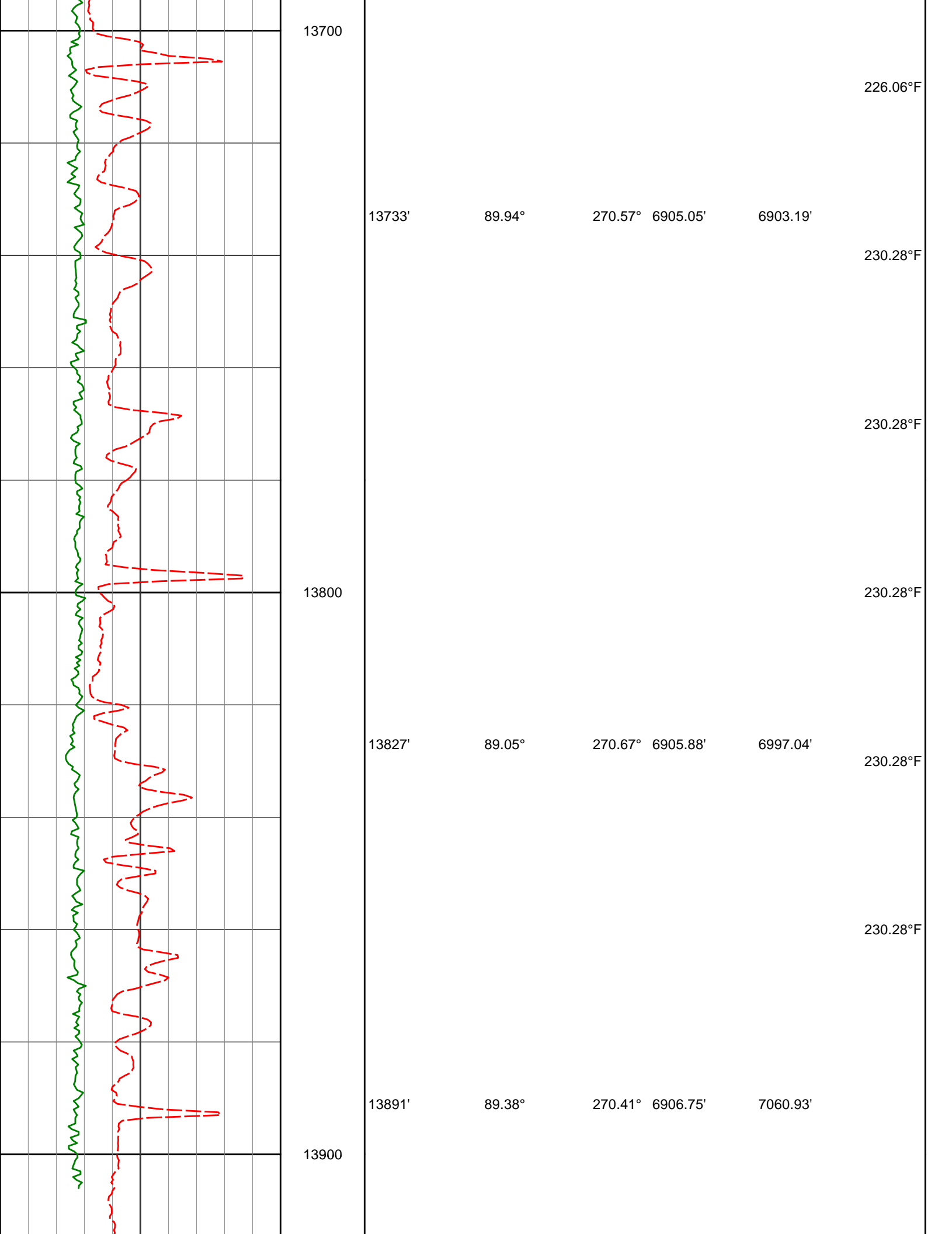


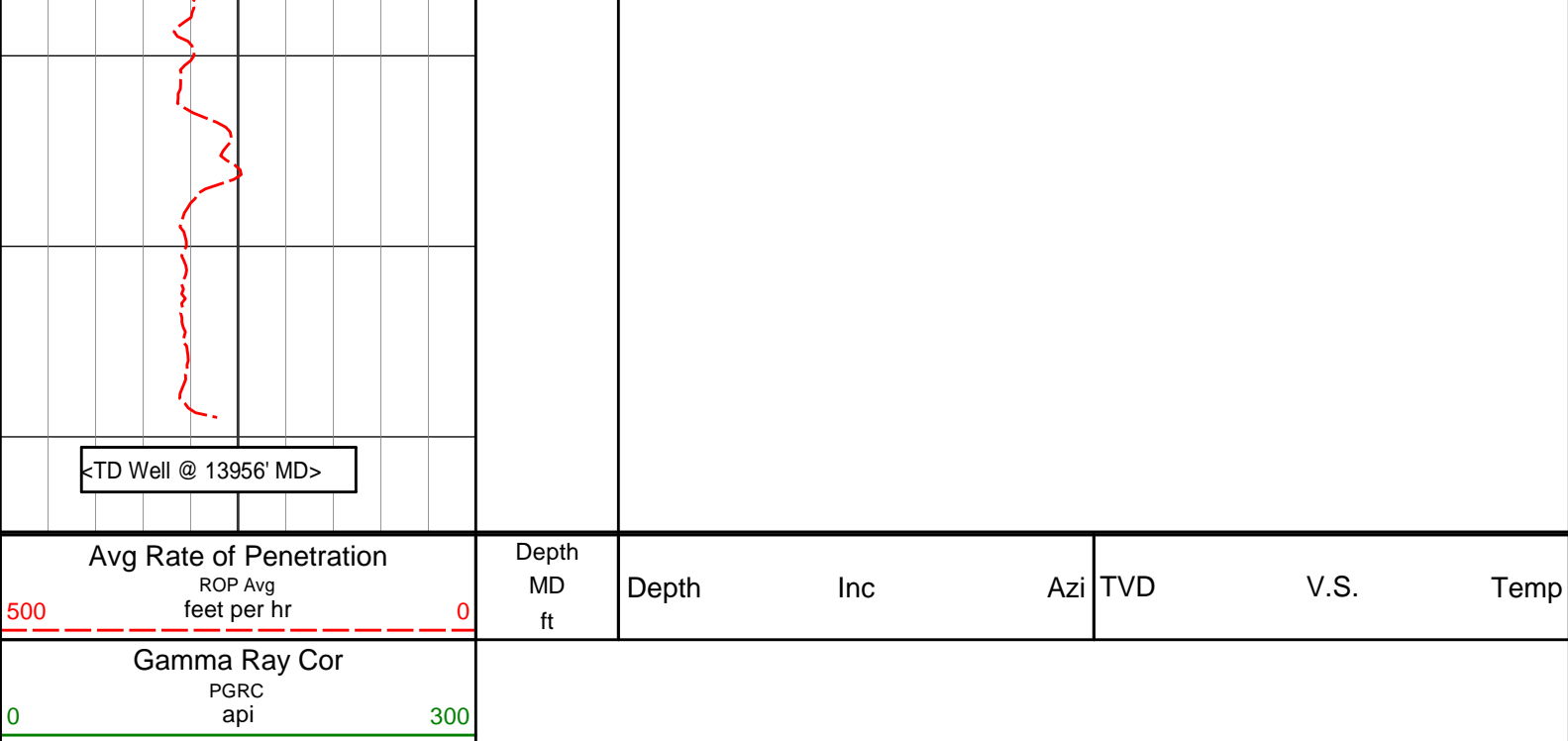












## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Noble Energy  
Wells Ranch AA11-654  
Wattenberg  
Weld Colorado  
USA  
CA-XX-0902308243

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
300.00	0.06	276.43	300.00	0.02 N	0.16 W	0.16	0.02
637.00	0.12	276.43	637.00	0.08 N	0.68 W	0.68	0.02
729.00	0.14	276.43	729.00	0.10 N	0.89 W	0.88	0.02
824.00	0.04	91.62	824.00	0.11 N	0.97 W	0.96	0.19
1014.00	0.34	198.51	1014.00	0.43 S	1.07 W	1.09	0.19
1108.00	0.18	190.15	1108.00	0.84 S	1.19 W	1.22	0.17
1200.00	0.35	259.00	1200.00	1.04 S	1.49 W	1.54	0.36
1383.00	0.44	199.03	1382.99	1.81 S	2.27 W	2.35	0.22
1566.00	0.11	249.29	1565.99	2.54 S	2.67 W	2.78	0.21
1657.00	0.42	258.06	1656.99	2.64 S	3.07 W	3.19	0.34
1748.00	0.22	151.92	1747.99	2.86 S	3.32 W	3.45	0.57
1840.00	0.15	206.12	1839.99	3.13 S	3.29 W	3.43	0.19
1932.00	0.59	191.18	1931.99	3.70 S	3.44 W	3.60	0.48
2023.00	2.35	144.68	2022.95	5.68 S	2.45 W	2.70	2.19
2115.00	4.41	155.12	2114.79	10.42 S	0.13 E	0.35	2.32
2206.00	6.47	159.97	2205.38	18.41 S	3.35 E	-2.51	2.32
2297.00	9.04	159.10	2295.54	29.90 S	7.66 E	-6.29	2.83
2389.00	8.30	154.90	2386.49	42.67 S	13.05 E	-11.10	1.06
2481.00	9.31	155.29	2477.40	55.44 S	18.98 E	-16.44	1.11
2573.00	8.60	149.08	2568.28	68.10 S	25.63 E	-22.50	1.30
2665.00	9.19	146.78	2659.17	80.15 S	33.19 E	-29.50	0.75
2757.00	8.97	144.28	2750.02	92.12 S	41.40 E	-37.16	0.49
2851.00	9.23	139.39	2842.84	103.80 S	50.58 E	-45.81	0.87
2946.00	8.76	136.16	2936.67	114.80 S	60.55 E	-55.26	0.72
3040.00	9.06	137.24	3029.54	125.40 S	70.54 E	-64.75	0.37
3135.00	9.75	147.54	3123.27	137.68 S	79.93 E	-73.58	1.91
3230.00	9.38	144.06	3216.95	150.73 S	88.79 E	-81.84	0.72
3325.00	9.47	139.70	3310.67	162.95 S	98.39 E	-90.86	0.76

3323.00	9.47	133.70	3310.07	102.93 S	90.33 E	-90.80	0.70
3420.00	9.15	135.16	3404.42	174.27 S	108.77 E	-100.72	0.84
3515.00	7.95	145.00	3498.36	185.00 S	117.86 E	-109.31	1.99
3609.00	7.73	136.40	3591.49	194.91 S	125.95 E	-116.95	1.27
3704.00	8.23	137.22	3685.57	204.53 S	134.98 E	-125.53	0.54
3894.00	8.99	153.10	3873.45	227.75 S	150.94 E	-140.41	1.31
3988.00	9.52	151.47	3966.23	241.13 S	157.97 E	-146.83	0.64
4083.00	9.51	149.99	4059.92	254.83 S	165.65 E	-153.88	0.26
4178.00	10.03	150.83	4153.54	268.85 S	173.61 E	-161.19	0.56
4272.00	8.02	150.80	4246.38	281.72 S	180.80 E	-167.78	2.14
4367.00	7.86	149.20	4340.46	293.09 S	187.36 E	-173.82	0.28
4462.00	6.76	153.83	4434.69	303.69 S	193.15 E	-179.12	1.32
4557.00	7.07	156.71	4529.00	314.08 S	197.93 E	-183.42	0.49
4651.00	5.41	154.32	4622.44	323.38 S	202.14 E	-187.20	1.79
4746.00	5.22	151.49	4717.03	331.21 S	206.14 E	-190.84	0.34
4841.00	3.48	150.83	4811.75	337.53 S	209.61 E	-194.02	1.83
4936.00	2.32	158.21	4906.63	341.83 S	211.72 E	-195.94	1.28
5031.00	2.12	160.54	5001.56	345.27 S	213.02 E	-197.08	0.23
5125.00	2.19	157.09	5095.49	348.56 S	214.30 E	-198.21	0.16
5220.00	1.90	156.71	5190.43	351.68 S	215.63 E	-199.39	0.30
5315.00	0.58	171.58	5285.41	353.61 S	216.33 E	-200.00	1.42
5410.00	0.35	102.75	5380.41	354.15 S	216.68 E	-200.33	0.59
5505.00	0.41	145.62	5475.41	354.49 S	217.15 E	-200.79	0.30
5599.00	0.03	69.37	5569.40	354.75 S	217.37 E	-200.99	0.42
5694.00	0.55	169.39	5664.40	355.19 S	217.47 E	-201.07	0.58
5789.00	0.51	204.26	5759.40	356.02 S	217.38 E	-200.94	0.34
5884.00	0.65	245.30	5854.39	356.64 S	216.71 E	-200.25	0.45
5979.00	1.30	223.94	5949.38	357.64 S	215.47 E	-198.97	0.77
6073.00	1.66	219.90	6043.35	359.45 S	213.86 E	-197.27	0.40
6168.00	1.75	172.54	6138.31	361.95 S	213.16 E	-196.46	1.45
6263.00	2.70	216.34	6233.24	365.19 S	212.02 E	-195.17	1.98
6311.00	4.25	247.26	6281.16	366.79 S	209.71 E	-192.79	4.96
6358.00	6.69	263.60	6327.94	367.77 S	205.38 E	-188.42	6.11
6453.00	16.22	267.37	6420.95	369.00 S	186.59 E	-169.59	10.05
6547.00	28.05	275.73	6507.88	367.39 S	151.35 E	-134.46	13.00
6642.00	34.39	277.55	6589.08	361.63 S	102.47 E	-85.90	6.74
6736.00	42.23	275.94	6662.79	354.86 S	44.65 E	-28.44	8.41
6831.00	52.58	271.59	6727.01	350.50 S	25.03 W	40.96	11.40
6926.00	63.10	272.26	6777.51	347.77 S	105.29 W	121.02	11.09
7021.00	69.32	273.47	6815.81	343.40 S	192.07 W	207.50	6.65
7116.00	77.32	273.66	6843.05	337.74 S	282.82 W	297.91	8.43
7153.00	82.55	272.76	6849.52	335.70 S	319.18 W	334.14	14.32
7252.00	85.96	272.45	6859.43	331.22 S	417.57 W	432.22	3.46
7347.00	86.29	271.37	6865.85	328.07 S	512.29 W	526.70	1.19
7441.00	87.26	270.43	6871.14	326.59 S	606.13 W	620.38	1.44
7536.00	89.60	270.24	6873.74	326.04 S	701.09 W	715.21	2.47
7631.00	89.48	269.70	6874.50	326.09 S	796.08 W	810.11	0.58
7722.00	90.83	269.39	6874.25	326.81 S	887.08 W	901.04	1.52
7814.00	90.09	268.90	6873.52	328.18 S	979.06 W	992.99	0.96
7905.00	92.43	269.60	6871.52	329.37 S	1070.03 W	1083.92	2.68
7997.00	91.08	269.46	6868.70	330.13 S	1161.98 W	1175.81	1.48
8088.00	90.15	270.50	6867.72	330.16 S	1252.97 W	1266.71	1.53
8180.00	87.29	269.64	6869.78	330.05 S	1344.94 W	1358.57	3.25
8271.00	89.11	269.63	6872.63	330.63 S	1435.89 W	1449.45	2.00
8362.00	91.27	269.36	6872.33	331.43 S	1526.88 W	1540.39	2.39
8454.00	89.42	268.45	6871.78	333.19 S	1618.86 W	1632.35	2.24
8546.00	91.14	268.03	6871.33	336.01 S	1710.81 W	1724.33	1.92
8637.00	90.37	267.13	6870.13	339.85 S	1801.72 W	1815.32	1.30
8728.00	92.65	269.22	6867.73	342.75 S	1892.63 W	1906.27	3.40
8820.00	91.48	270.74	6864.42	342.78 S	1984.56 W	1998.11	2.08
8911.00	89.45	269.90	6863.68	342.28 S	2075.55 W	2088.99	2.41
9003.00	90.25	271.18	6863.92	341.41 S	2167.55 W	2180.84	1.64
9095.00	89.66	270.52	6863.99	340.04 S	2259.54 W	2272.68	0.96
9187.00	92.13	272.18	6862.55	337.88 S	2351.49 W	2364.44	3.23
9279.00	89.35	272.94	6861.37	333.77 S	2443.38 W	2456.04	3.13
9374.00	89.60	273.08	6862.24	328.78 S	2538.24 W	2550.58	0.30
9469.00	89.78	271.27	6862.75	325.18 S	2633.17 W	2645.25	1.91
9563.00	88.74	271.99	6863.96	322.50 S	2727.12 W	2738.98	1.35
9658.00	89.17	271.57	6865.70	319.55 S	2822.06 W	2833.68	0.63
9753.00	87.53	272.09	6868.43	316.52 S	2916.97 W	2928.36	1.81
9847.00	87.01	271.80	6872.91	313.33 S	3010.81 W	3021.95	0.63
9942.00	86.42	271.40	6878.35	310.69 S	3105.61 W	3116.54	0.75

10037.00	87.90	269.91	6883.06	309.60 S	3200.49 W	3211.26	2.21
10132.00	89.85	269.69	6884.93	309.93 S	3295.46 W	3306.16	2.07
10226.00	90.15	269.42	6884.93	310.66 S	3389.46 W	3400.09	0.43
10321.00	90.25	268.79	6884.59	312.15 S	3484.45 W	3495.05	0.67
10416.00	89.08	267.51	6885.15	315.21 S	3579.39 W	3590.03	1.83
10511.00	89.01	267.41	6886.73	319.42 S	3674.29 W	3685.02	0.13
10605.00	89.11	267.98	6888.28	323.20 S	3768.20 W	3779.01	0.62
10700.00	89.04	267.95	6889.81	326.58 S	3863.12 W	3873.99	0.08
10795.00	90.31	267.88	6890.35	330.03 S	3958.06 W	3968.98	1.34
10890.00	92.01	268.71	6888.42	332.86 S	4052.99 W	4063.95	1.99
10984.00	90.18	267.59	6886.63	335.89 S	4146.92 W	4157.91	2.28
11079.00	89.82	268.42	6886.63	339.20 S	4241.86 W	4252.91	0.95
11174.00	88.74	269.12	6887.82	341.24 S	4336.83 W	4347.87	1.35
11268.00	87.48	268.73	6890.92	343.00 S	4430.76 W	4441.78	1.40
11363.00	88.80	268.73	6894.01	345.11 S	4525.69 W	4536.71	1.39
11458.00	91.14	269.99	6894.06	346.17 S	4620.67 W	4631.64	2.80
11553.00	91.35	269.62	6891.99	346.49 S	4715.65 W	4726.53	0.45
11648.00	90.89	270.90	6890.13	346.06 S	4810.63 W	4821.39	1.43
11742.00	89.38	270.04	6889.91	345.29 S	4904.62 W	4915.25	1.85
11837.00	87.75	269.46	6892.29	345.70 S	4999.58 W	5010.14	1.82
11932.00	89.38	269.61	6894.67	346.47 S	5094.55 W	5105.04	1.72
12027.00	90.25	271.55	6894.98	345.51 S	5189.54 W	5199.89	2.24
12122.00	88.58	270.72	6895.95	343.63 S	5284.51 W	5294.68	1.96
12217.00	90.00	271.26	6897.13	341.99 S	5379.49 W	5389.48	1.60
12311.00	90.12	270.62	6897.03	340.45 S	5473.47 W	5483.30	0.69
12406.00	89.69	270.06	6897.18	339.88 S	5568.47 W	5578.17	0.74
12501.00	90.52	271.06	6897.01	338.96 S	5663.46 W	5673.02	1.37
12596.00	90.49	271.16	6896.17	337.12 S	5758.44 W	5767.82	0.11
12690.00	90.00	270.90	6895.77	335.43 S	5852.43 W	5861.63	0.59
12785.00	88.68	270.33	6896.87	334.41 S	5947.41 W	5956.47	1.51
12880.00	89.66	270.58	6898.24	333.65 S	6042.40 W	6051.32	1.06
12975.00	89.94	270.69	6898.57	332.60 S	6137.39 W	6146.17	0.32
13070.00	89.57	270.33	6898.98	331.75 S	6232.39 W	6241.03	0.54
13164.00	88.33	269.24	6900.70	332.11 S	6326.37 W	6334.93	1.76
13259.00	89.26	269.62	6902.70	333.05 S	6421.34 W	6429.84	1.06
13353.00	89.91	270.16	6903.38	333.23 S	6515.34 W	6523.75	0.90
13448.00	89.51	269.90	6903.86	333.18 S	6610.33 W	6618.65	0.50
13543.00	89.38	270.22	6904.78	333.08 S	6705.33 W	6713.54	0.36
13638.00	90.18	271.30	6905.15	331.82 S	6800.32 W	6808.37	1.41
13733.00	89.94	270.57	6905.05	330.27 S	6895.30 W	6903.19	0.81
13827.00	89.05	270.67	6905.88	329.25 S	6989.29 W	6997.04	0.95
13891.00	89.38	270.41	6906.75	328.65 S	7053.29 W	7060.93	0.66
13956.00	89.38	270.41	6907.46	328.19 S	7118.28 W	7125.84	0.00

**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 267.39 DEGREES (GRID)  
A TOTAL CORRECTION OF 7.38 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13956.00 FEET  
IS 7125.84 FEET ALONG 267.36 DEGREES (GRID)**

Surveys at 300 ft and 637 ft were interpolated from first survey at 729 ft per Noble Energy.

Last survey is a projection from 13891 ft MD to TD at 13956 ft MD.