

## PCGC-Pressure Case Gamma PCDC-Pressure Case Directional

1:240

[illegible]

## WELL INFORMATION

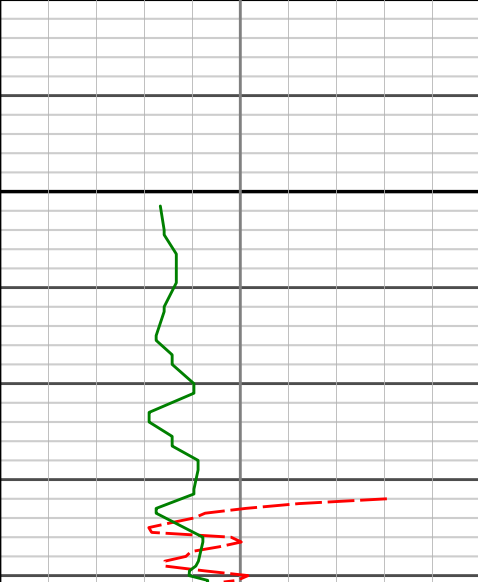
<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	27-Dec-19	30-Dec-19			
<b>Rig Bit Number</b>	0100	0200			
<b>Bit Size (in)</b>	8.750	8.500			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (MD, ft)</b>	1,602.00	14,042.00			
<b>Log End Depth (MD, ft)</b>	14,042.00	21,935.00			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	25-Dec-19 01:15	27-Dec-19 06:00			
<b>Drill/Wipe End Date and Time</b>	27-Dec-19 05:30	27-Dec-19 15:15			
<b>Min Inc (deg) @ Depth (MD, ft)</b>	0.67 @ 8,737.00	87.53 @ 15,585.00			
<b>Max Inc (deg) @ Depth (MD, ft)</b>	93.26 @ 13,707.00	91.36 @ 21,576.00			
<b>Bit TFA(in2) / Bit Type</b>	0.74 / PDC	0.81 / PDC			
<b>Flow Rate (gpm)</b>	650.00	630.00			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	566.0 / 301.0	566.0 / 301.0			
<b>Fluid Type</b>	Mineral Oil Bas	Diesel Mud Base			
<b>Density (ppg) / Viscosity (spqt)</b>	9.70 / 42.00	10.40 / 45.00			
<b>Filtrate CL (ppm)</b>	41,500.00	42,000.00			
<b>pH / API Filtrate (mptm)</b>	N/A / 17	N/A / 17			
<b>PV (cP) / YP (lhf2)</b>	14 / 8.00	17 / 11.00			
<b>% Solids / % Sand</b>	11.5 / 0	13.5 / 0			
<b>% Oil / Oil:Water Ratio</b>	68.5 / 77:23	65.5 / 77:23			
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			

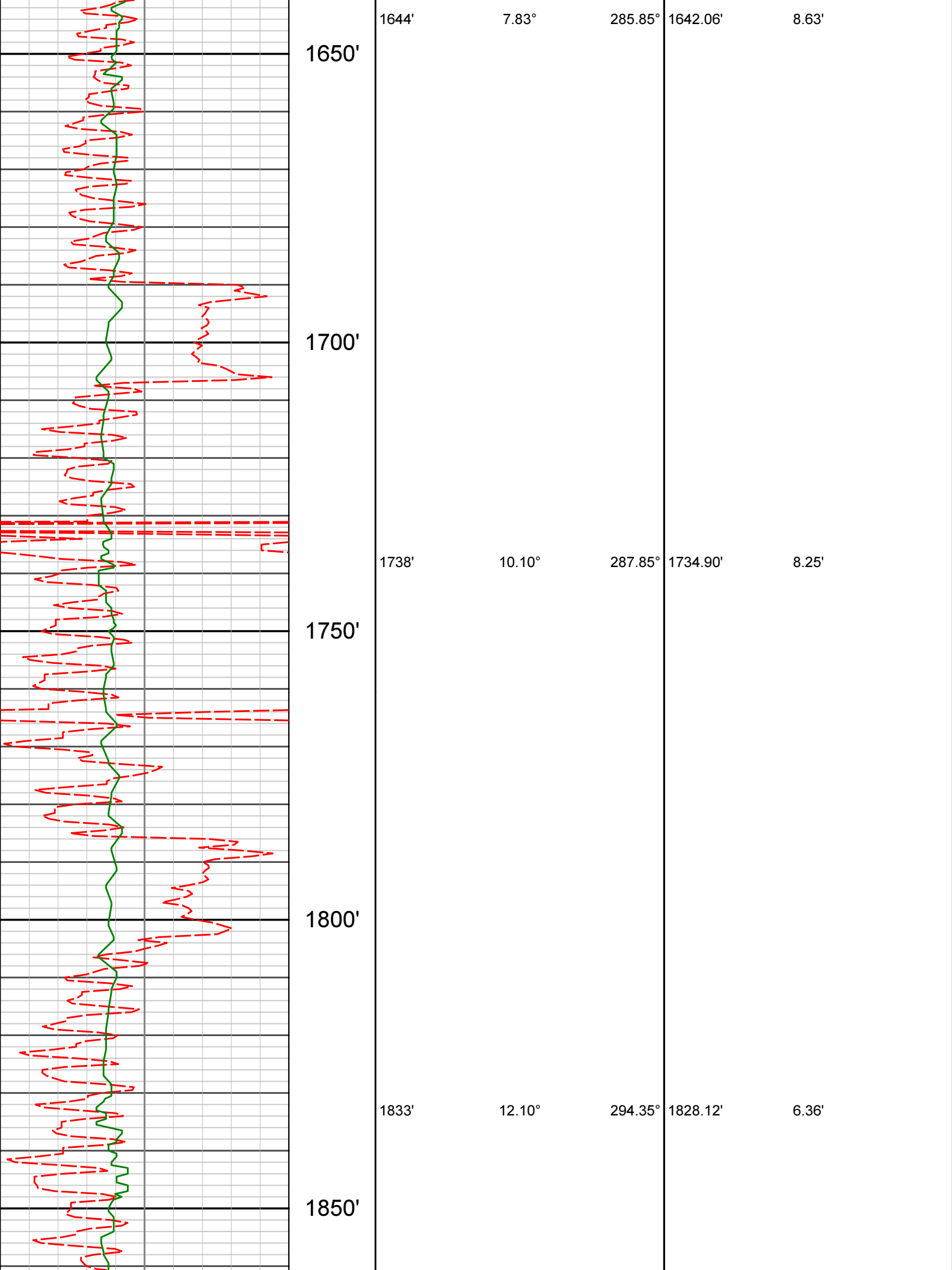
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (degF) / Source	244.00 / EMT	269.60 / iCruise			
Rm @ Max Tool Temp (degF)	N/A @ 244.00	N/A @ 269.60			
Lead MWD Engineer	William Melenka	William Melenka			
Customer Representative	N/A	N/A			
SENSOR INFORMATION					
Downhole Processor Information					
Tool Type	EMT-DTU	EMT-DTU			
Software Version	4.48	8.12A			
Sub Serial Number					
Insert Serial Number					
Date and Time Initialized	N/A	N/A			
Date and Time Read	N/A	N/A			
ECMB SW Version	N/A	N/A			
Directional Sensor Information					
Tool Type	PCDC	iCruise DM			
Distance From Bit (ft)	47.03	17			
Software Version	6.43	3.7			
Sub Serial Number	123456				
Sonde Serial Number	12934811				
Sensor ID Number	N/A				
Toolface Offset (deg)	0.53				
Gamma Ray Sensor Information					
Tool Type	PCG	iCruise GM			
Distance From Bit (ft)	51.93	12			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	3.06			
Sub Serial Number	123456				
Insert/Sonde Serial Number	11579760				
Rotary Steerable Information					
Tool Type		iCruise			
Distance From Bit (ft)		5.85			
Software Version		3.44			
Sub Serial Number		13021251			
REMARKS					
<p>1. All depths are calibrated to the driller's pipe tally and are measured depth measured from the drill floor.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. All data presented is recorded (Tool memory data) unless otherwise stated.</p> <p>4. Environmental parameters used to process gamma ray are as follows:</p> <p>Hole Size: 8.75 in and 8.50 in. Mud weight: 9.6 - 9.9 ppm</p> <p>5. The following smoothing parameters have been applied to the data:</p> <p>Main Log 1:240 (5"):</p>					

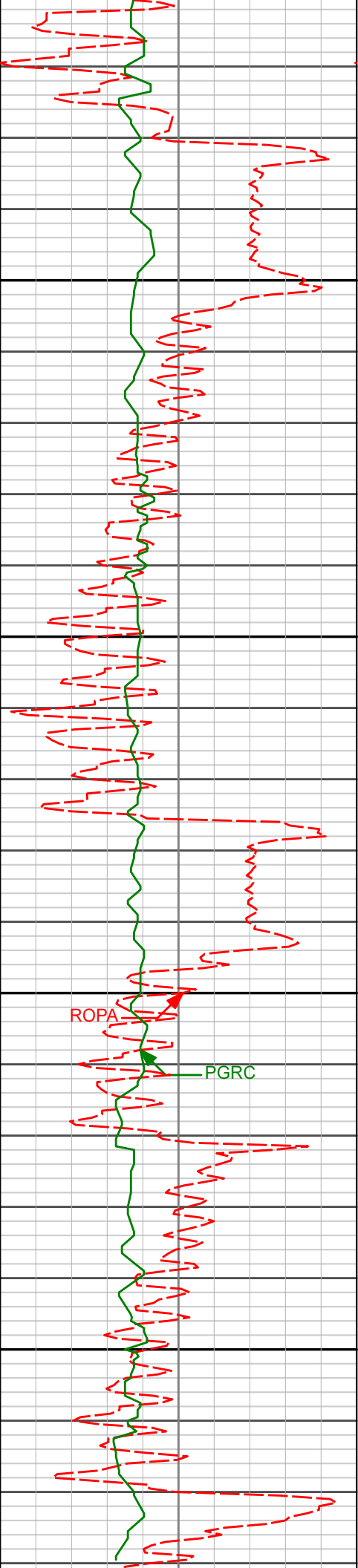
- 6. Gaps in gamma data are from detection issues
- 7. Gaps in ROP are from Block Height Calibration.
- 7. Insite version 9.2.0

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## 5" MD Log (1:240)

<div>PCG Gamma Ray BCorr</div> <div>(PGRC)</div> <div>api</div> <div>0300</div>								
<div>Avg Rate of Penetration</div> <div>(ROPA)</div> <div>feet per hr</div> <div>2K0</div>		<div>MD</div> <div>1 : 240</div> <div>ft</div>	<div>Depth</div>	<div>Inc</div>	<div>Azi</div>	<div>TVD</div>	<div>V/S</div>	<div>Temp</div>
		1600'	<div>Casing Shoe @ 1600' MD</div>					





1900'

1950'

2000'

2050'

1928'

14.68°

291.22°

1920.53'

3.62'

ROPA

PGRC

2047'

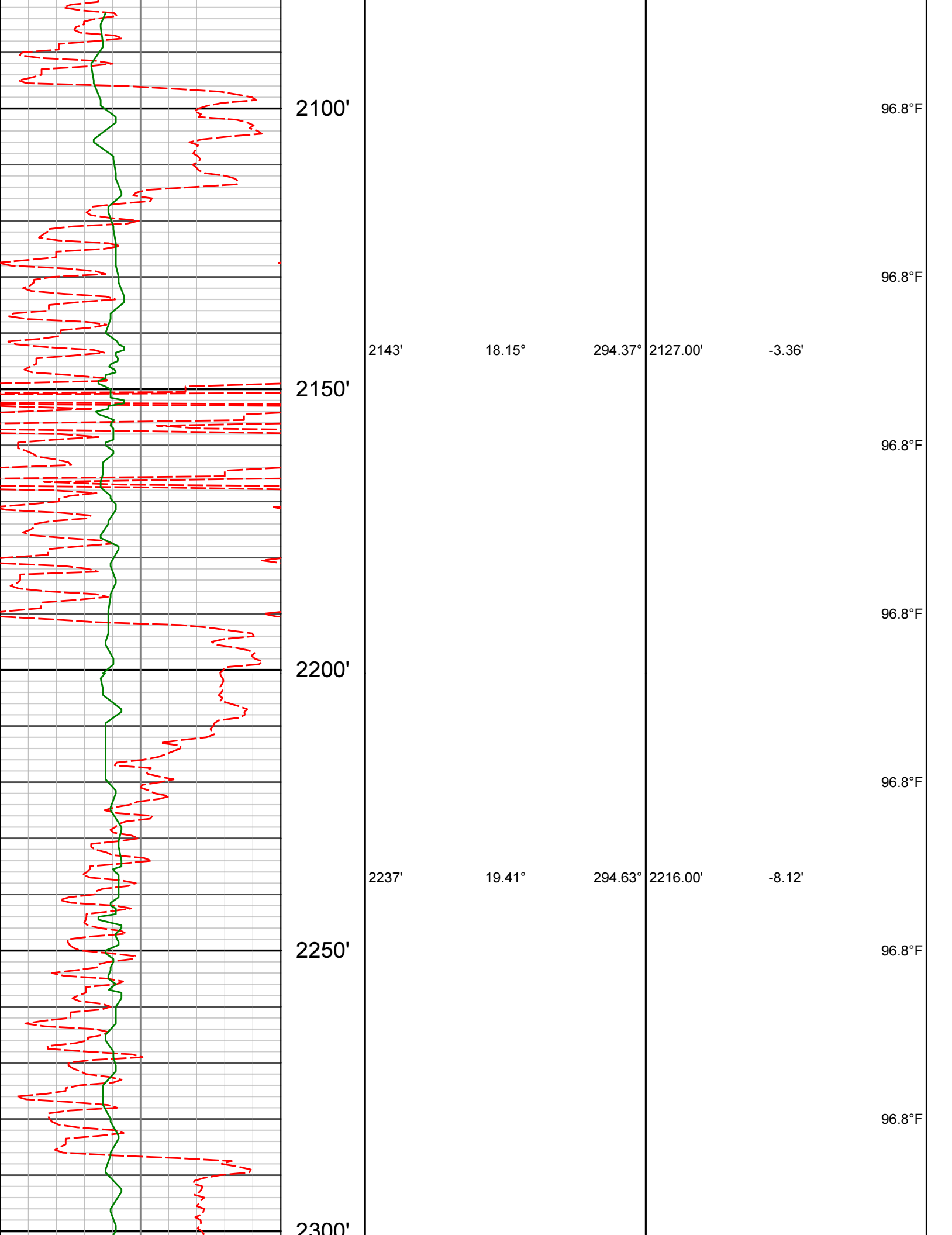
16.10°

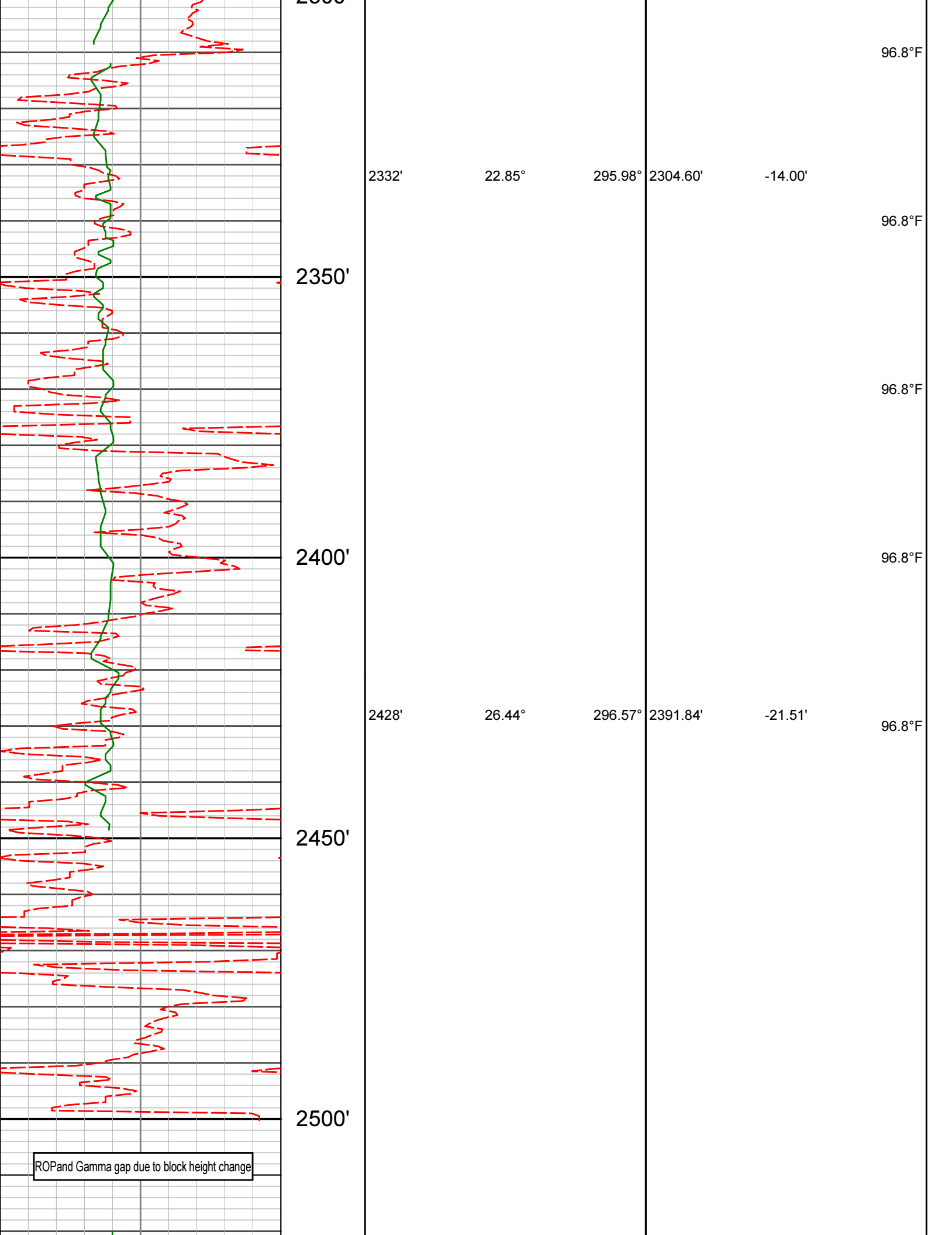
291.55°

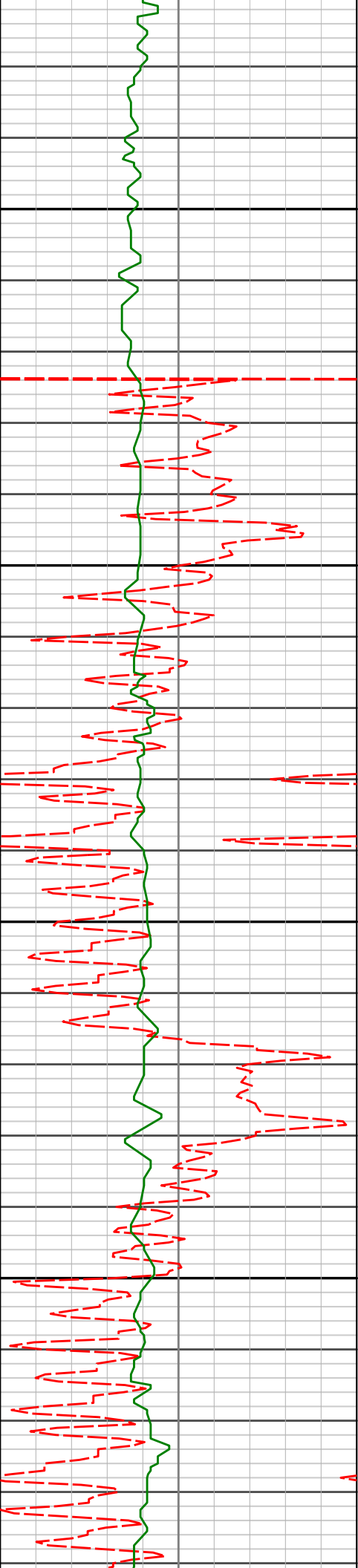
2035.26'

0.36'

96.8°F







2550'

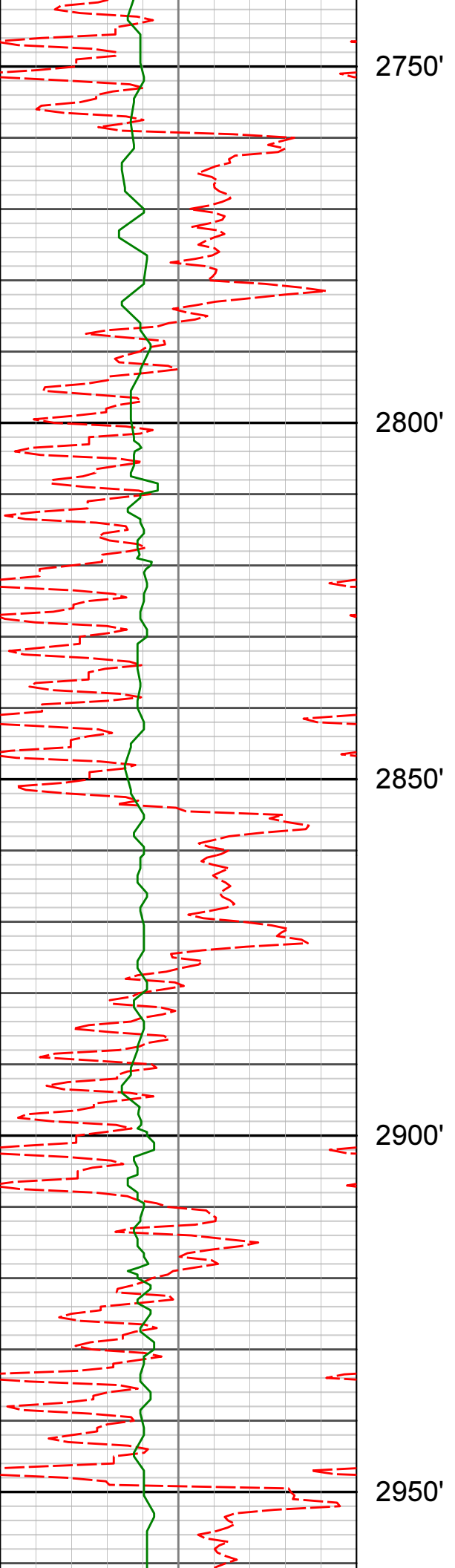
2600'

2650'

2700'

2522'	25.69°	295.61°	2476.28'	-29.13'
2617'	28.57°	290.97°	2560.83'	-34.94'
2713'	29.34°	291.91°	2644.83'	-39.78'





2808'

31.71°

292.25°

2726.66'

-45.34'

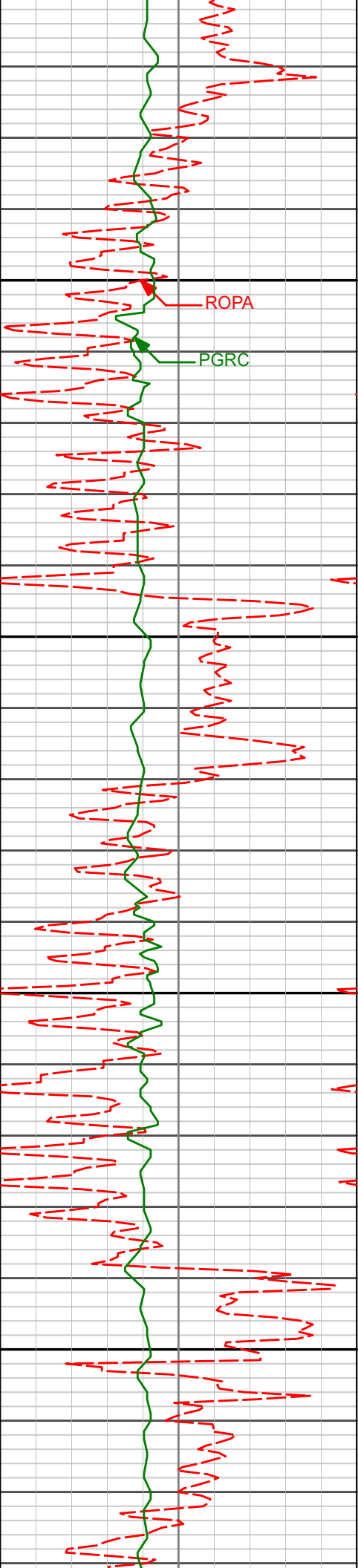
2901'

33.46°

290.69°

2805.02'

-50.56'



3000'

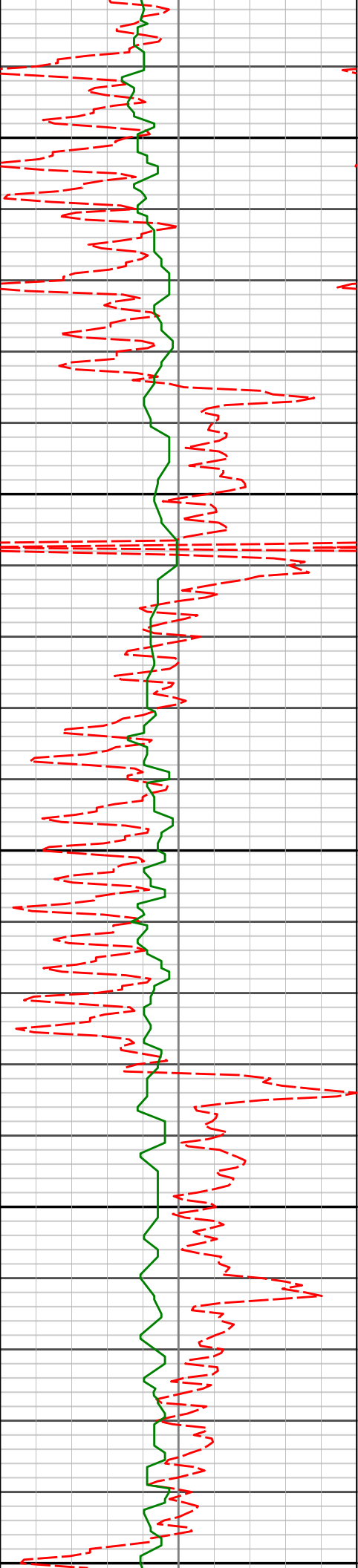
3050'

3100'

3150'

2995'	35.43°	288.72°	2882.53'	-54.46'
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3091'	37.01°	293.81°	2959.99'	-60.23'
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3200'

3250'

3300'

3350'

3400'

3185'

37.86°

291.72°

3034.63'

-67.48'

3279'

39.28°

291.44°

3108.13'

-73.72'

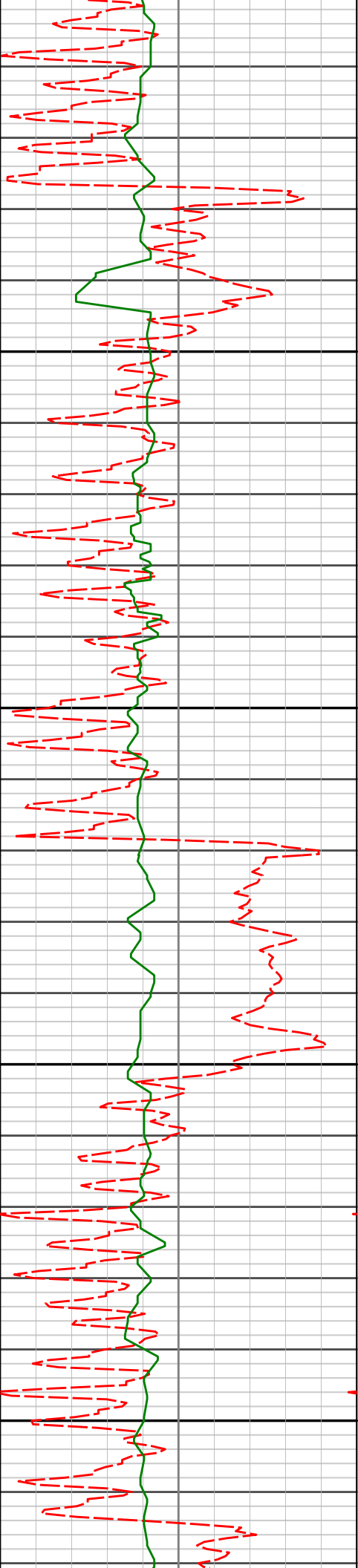
3374'

43.05°

292.22°

3179.64'

-80.66'



3450'

3469'

41.88°

292.00°

3249.72'

-88.08'

3500'

3550'

3564'

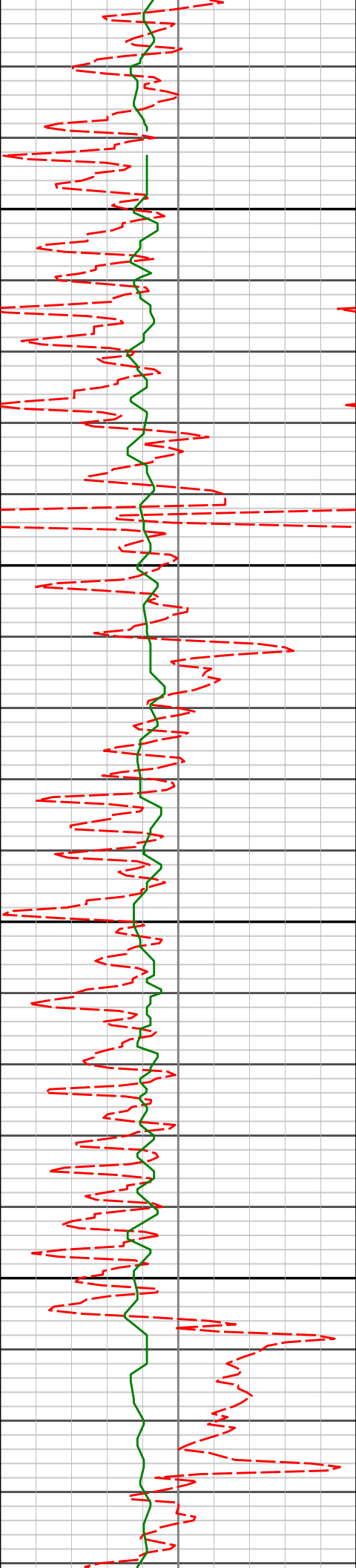
44.59°

295.79°

3318.93'

-97.67'

3600'



3650'

3659'

42.75°

296.76°

3387.65'

-109.97'

3700'

3750'

3754'

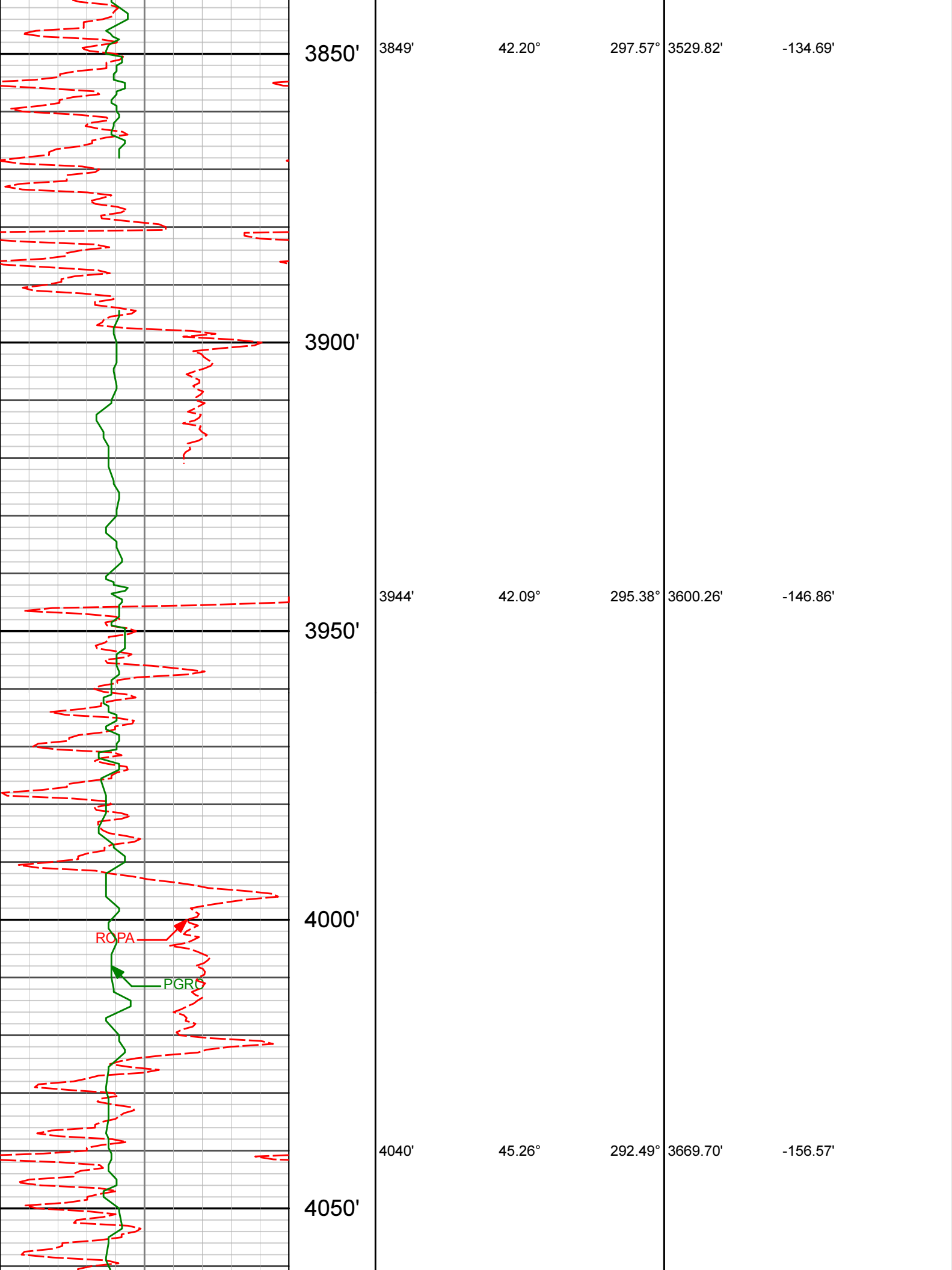
40.63°

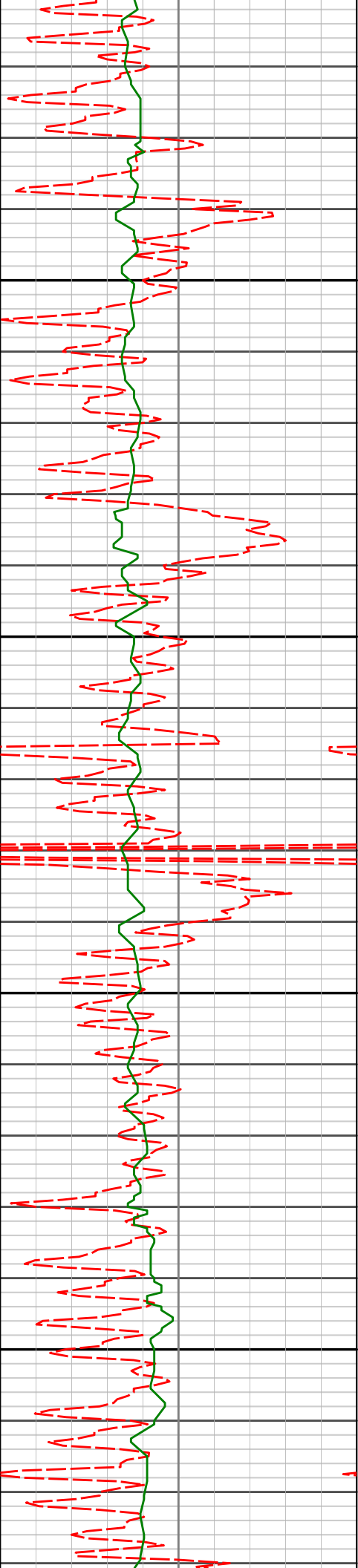
296.38°

3458.58'

-122.14'

3800'





4100'

4135'

43.03°

292.48°

3737.86'

-164.66'

4150'

4200'

4231'

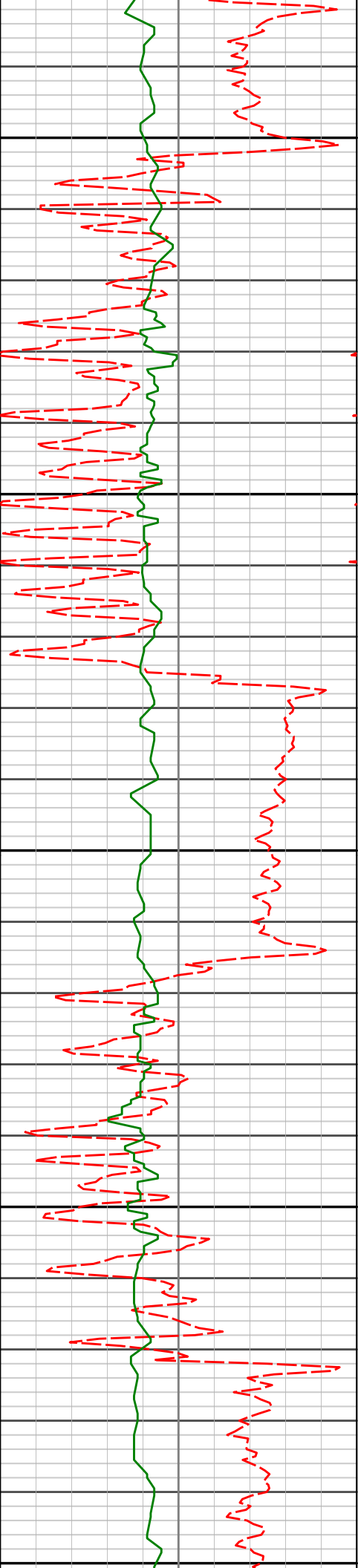
40.94°

292.18°

3809.22'

-172.33'

4250'



4300'

4326'

36.76°

287.20°

3883.21'

-176.83'

4350'

4400'

4421'

38.73°

291.71°

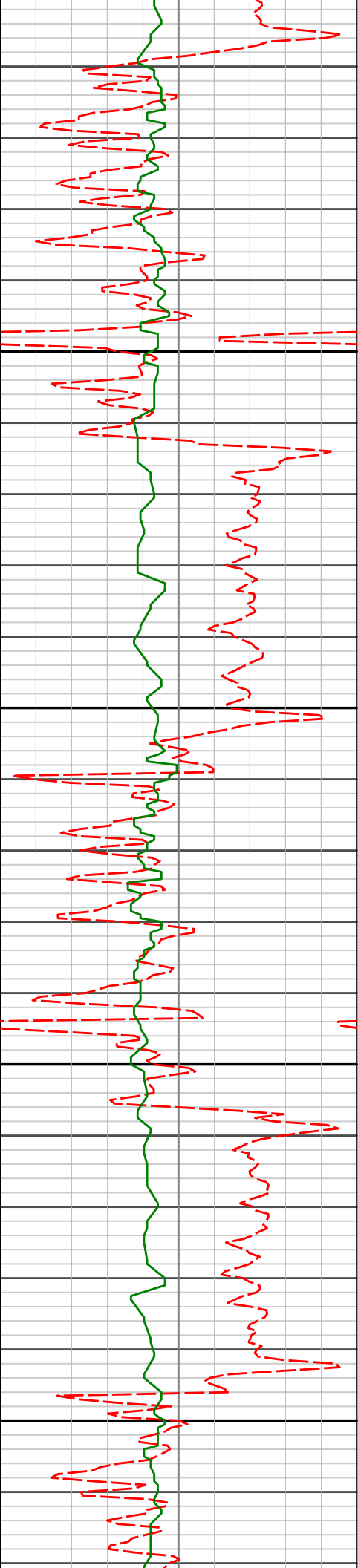
3958.34'

-180.92'

4450'

4500'





4517'

40.62°

296.11°

4032.24'

-189.96'

4550'

4600'

4612'

43.64°

298.01°

4102.69'

-202.79'

4650'

4700'

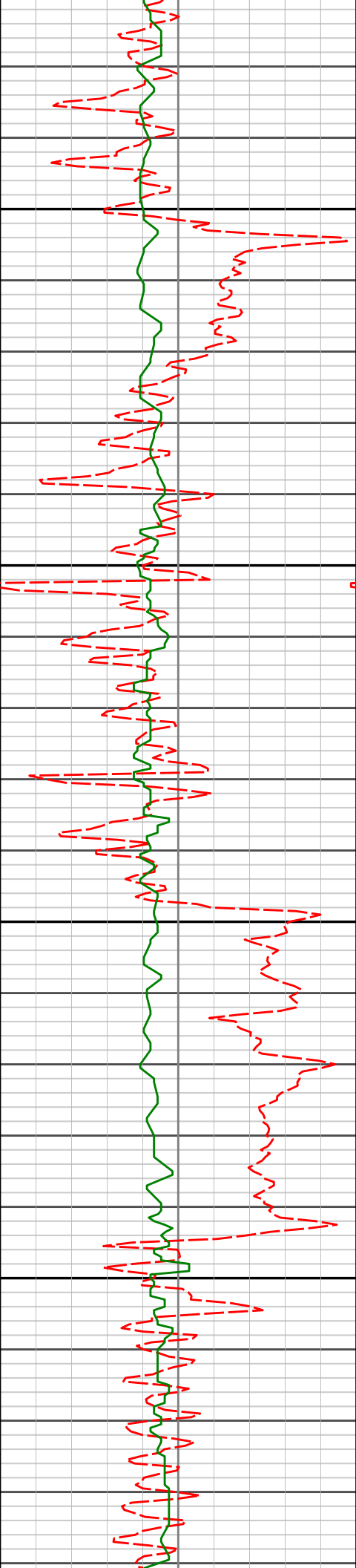
4708'

44.55°

294.14°

4171.64'

-215.06'



4750'

4800'

4850'

4900'

4803'

41.26°

292.93°

4241.22'

-224.16'

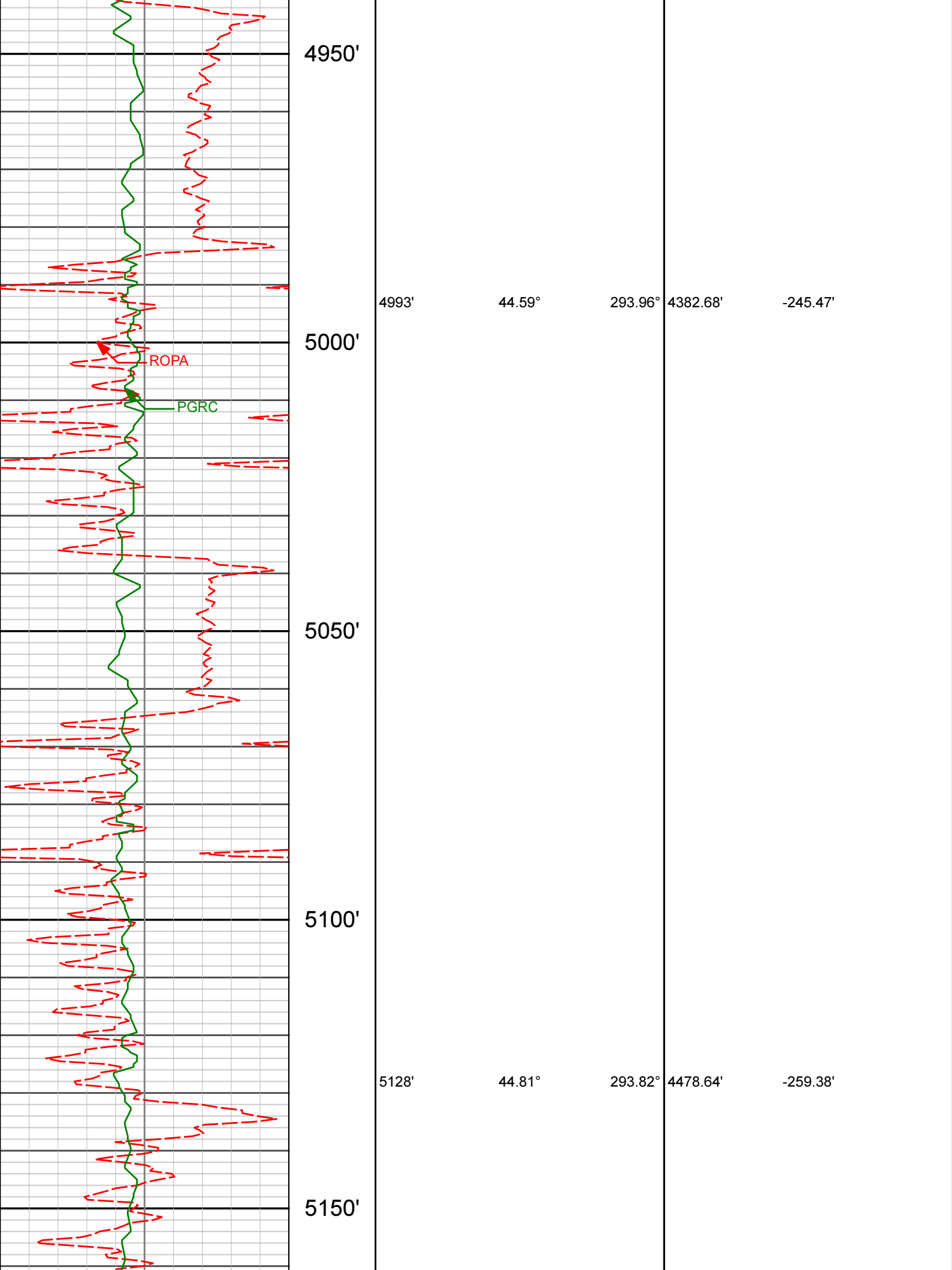
4898'

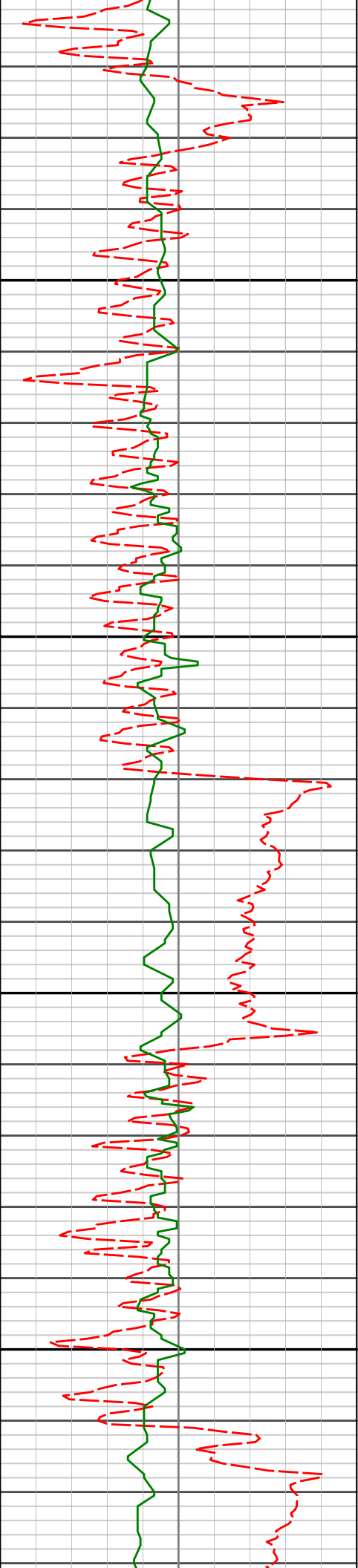
40.84°

296.90°

4312.88'

-234.39'





5200'

5223'

41.60°

293.97°

4547.88'

-268.90'

5250'

5300'

5318'

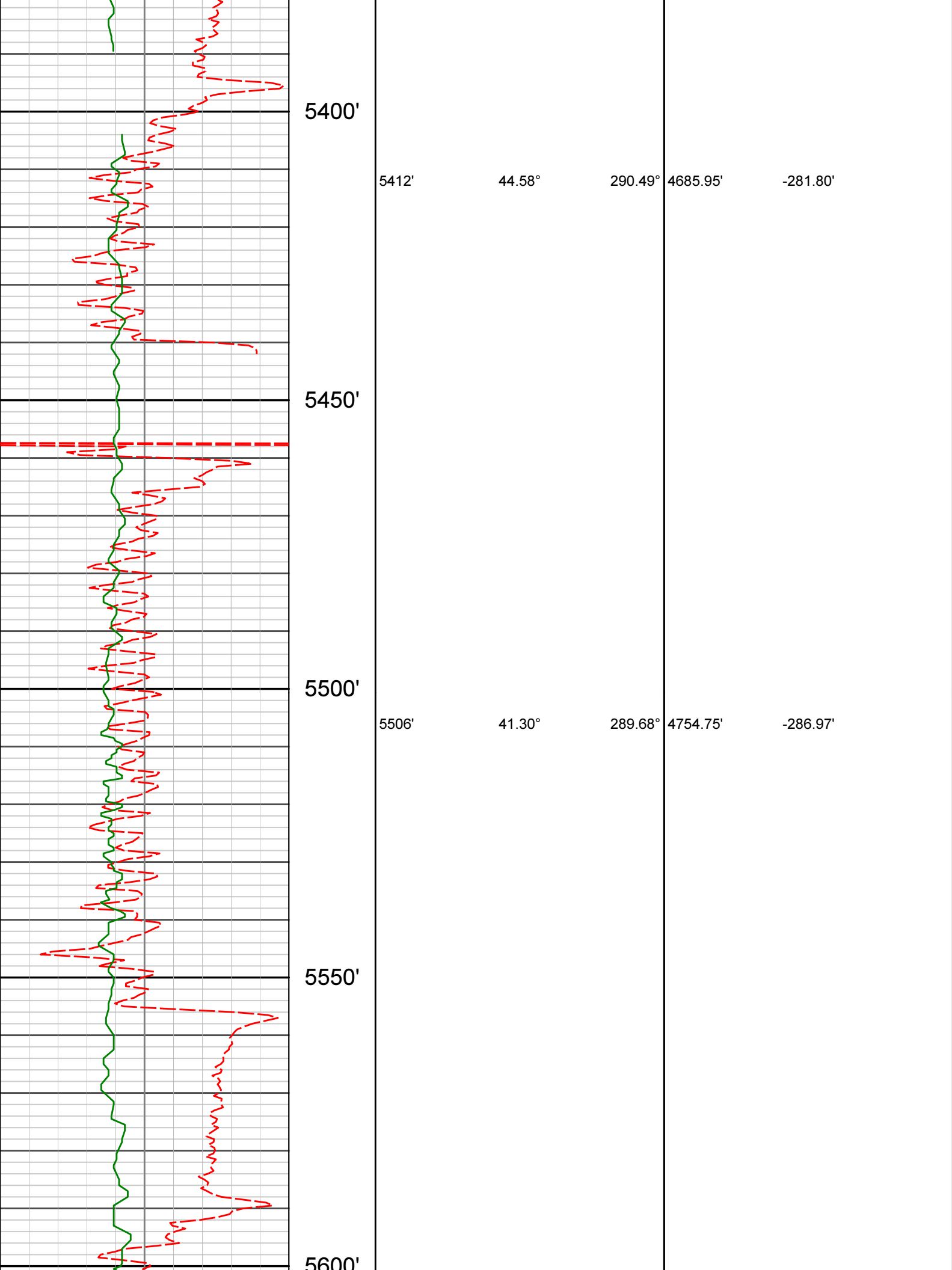
43.05°

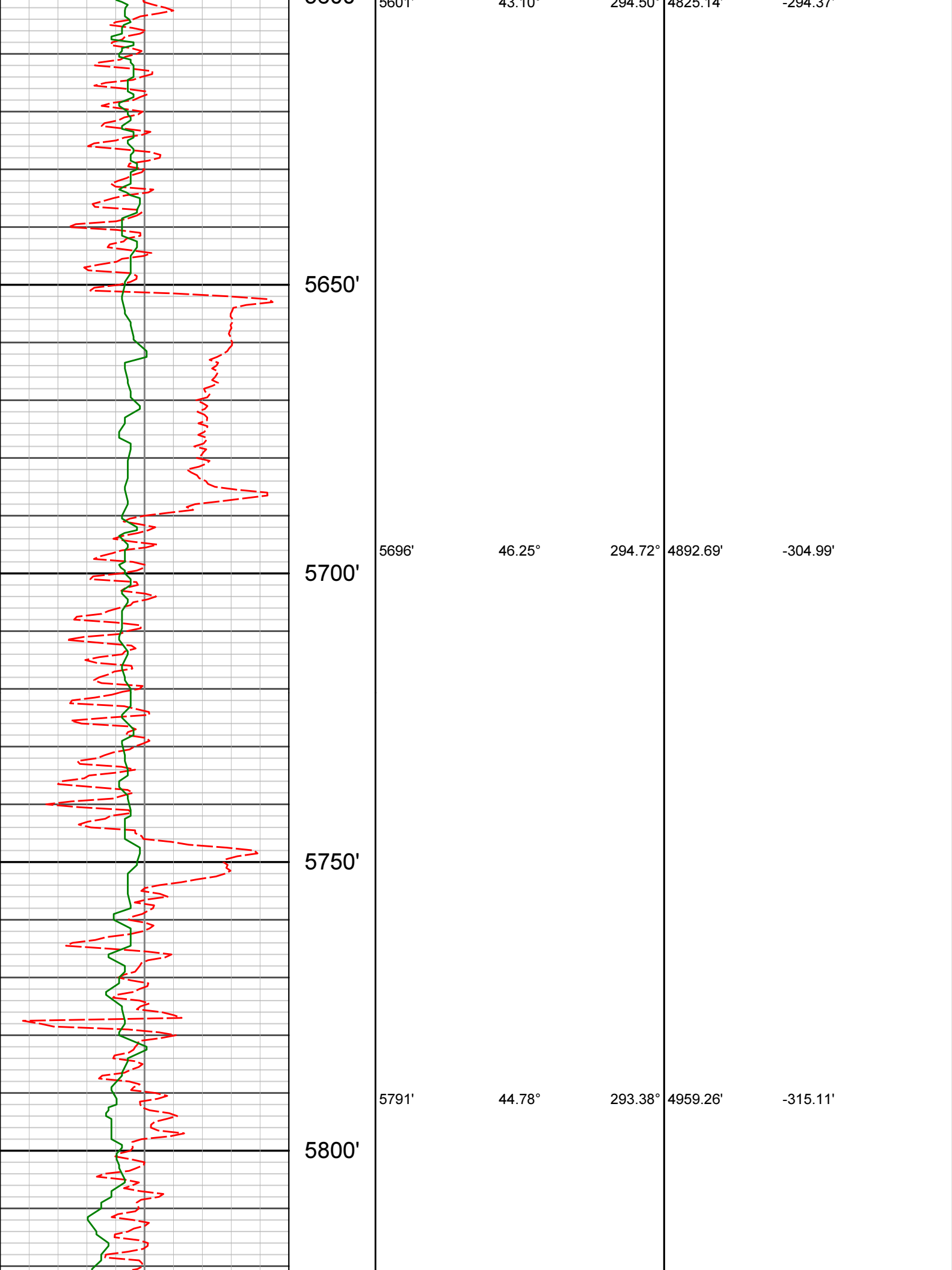
290.22°

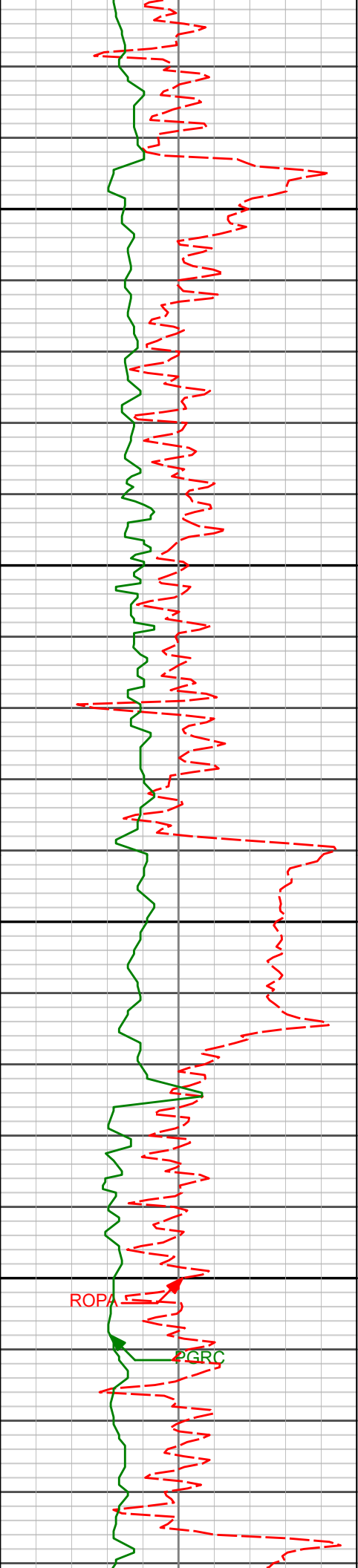
4618.13'

-276.26'

5350'







5850'

5886'

43.49°

293.62°

5027.44'

-324.35'

5900'

5950'

5980'

44.84°

294.31°

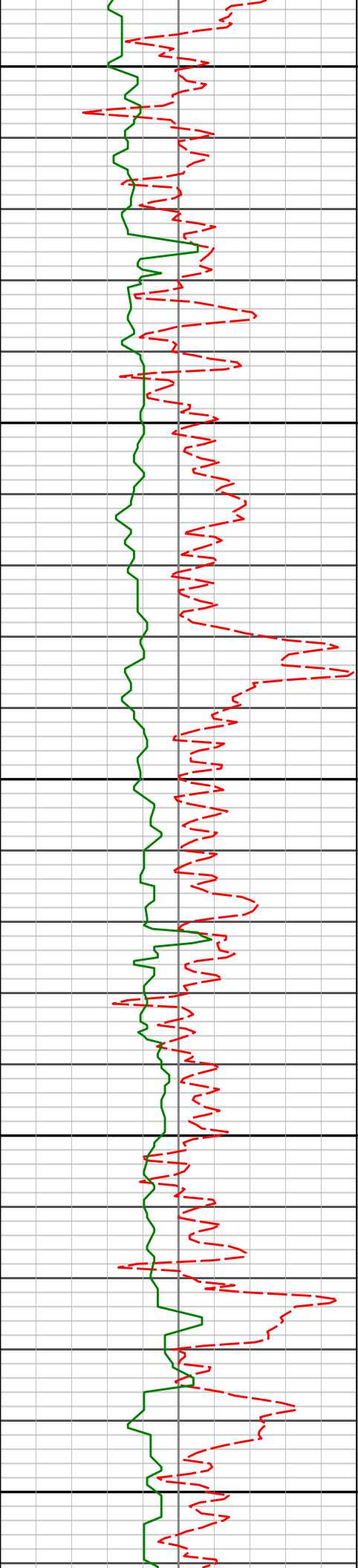
5094.87'

-334.03'

6000'

ROPA

PGRC



6050'

6075'

43.80°

294.35°

5162.83'

-344.26'

6100'

6150'

6170'

42.56°

294.34°

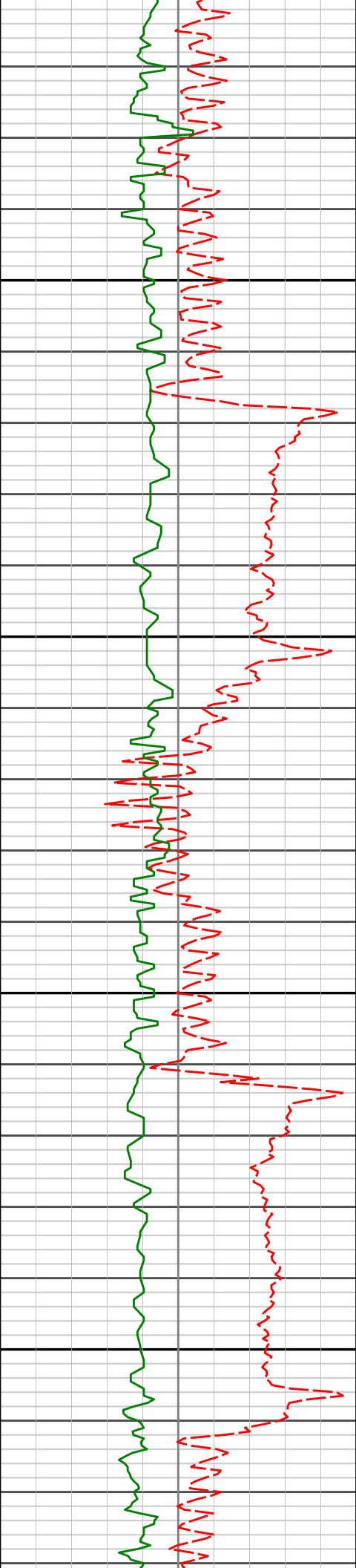
5232.11'

-354.29'

6200'

6250'





6266'

40.24°

295.35°

5304.11'

-364.62'

6300'

6350'

6361'

41.35°

294.59°

5376.03'

-374.86'

6400'

6450'

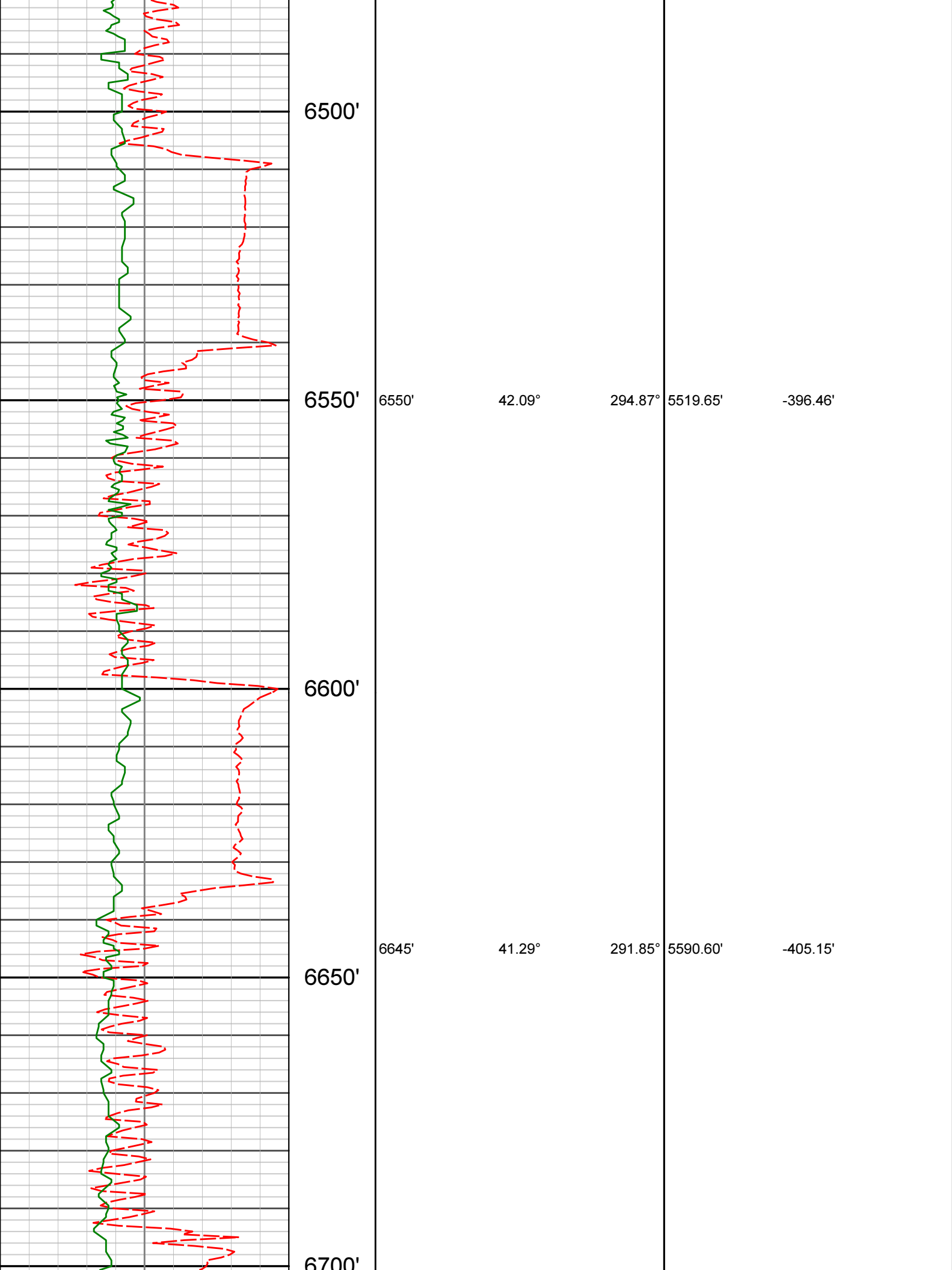
6455'

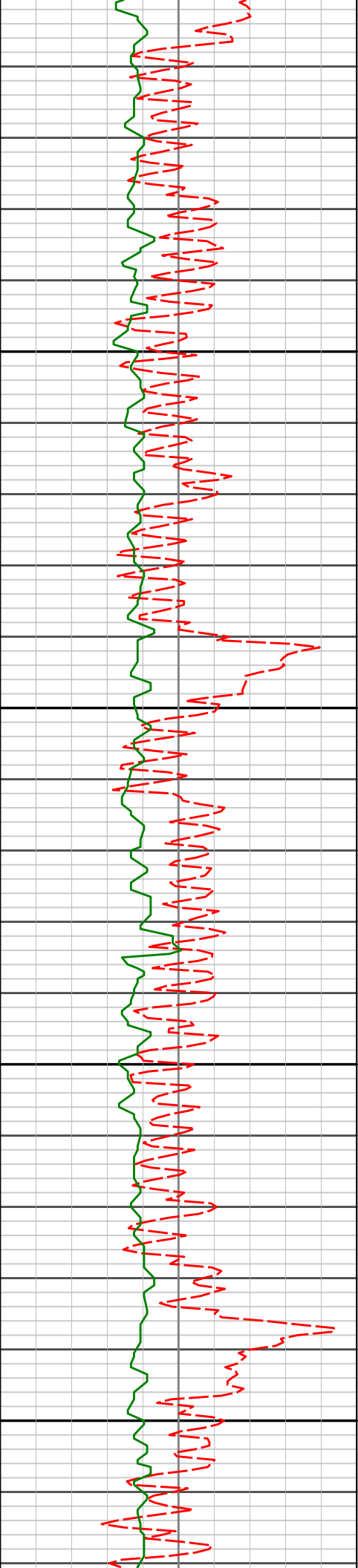
39.36°

296.51°

5447.66'

-385.49'





6700

6750

6800

6850

6900

6740'

39.05°

290.94°

5663.20'

-411.49'

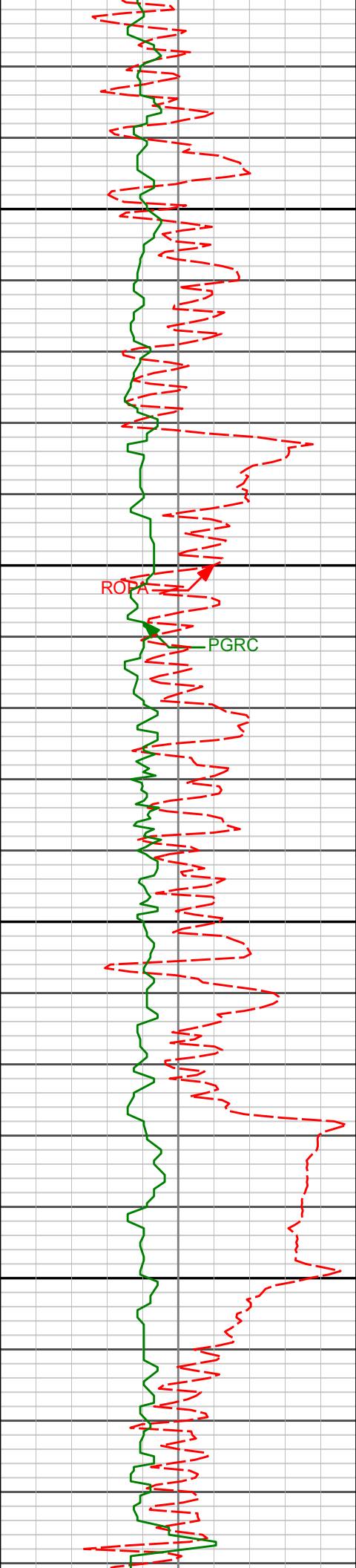
6835'

36.04°

291.31°

5738.51'

-417.19'



6950'

7000'

7050'

7100'

6930'

32.40°

290.08°

5817.05'

-422.08'

7025'

28.97°

289.82°

5898.74'

-425.88'

7121'

29.25°

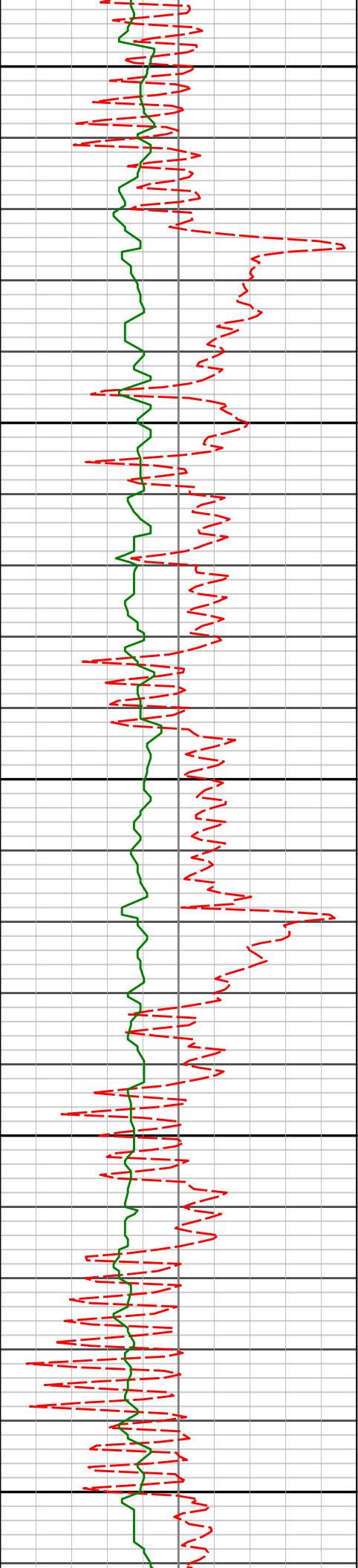
292.37°

5982.61'

-430.46'

ROPA

PGRC



7150'

7200'

7250'

7300'

7350'

7216'

27.19°

293.92°

6066.32'

-436.44'

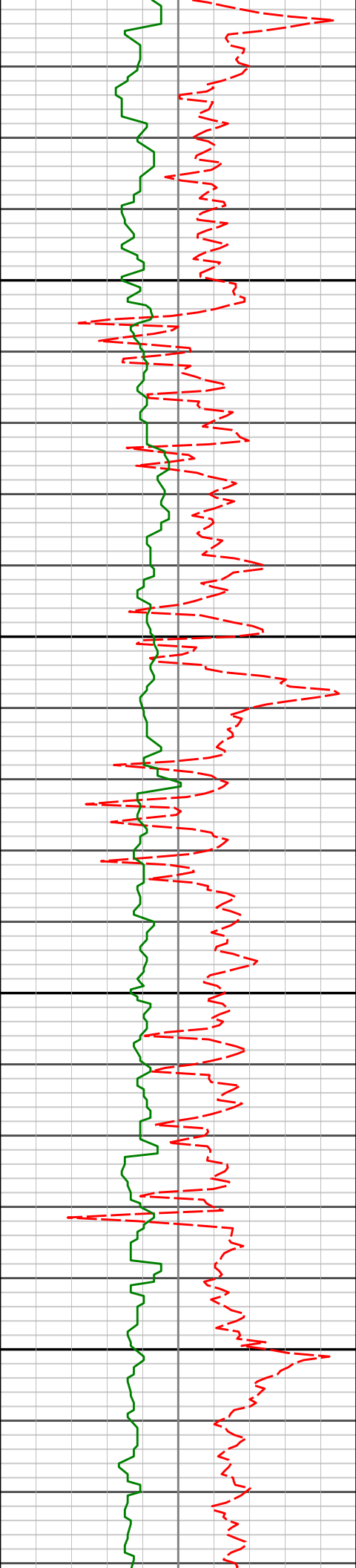
7311'

24.03°

294.40°

6151.97'

-442.64'



7400'

7406'

20.44°

294.19°

6239.89'

-448.16'

7450'

7500'

7502'

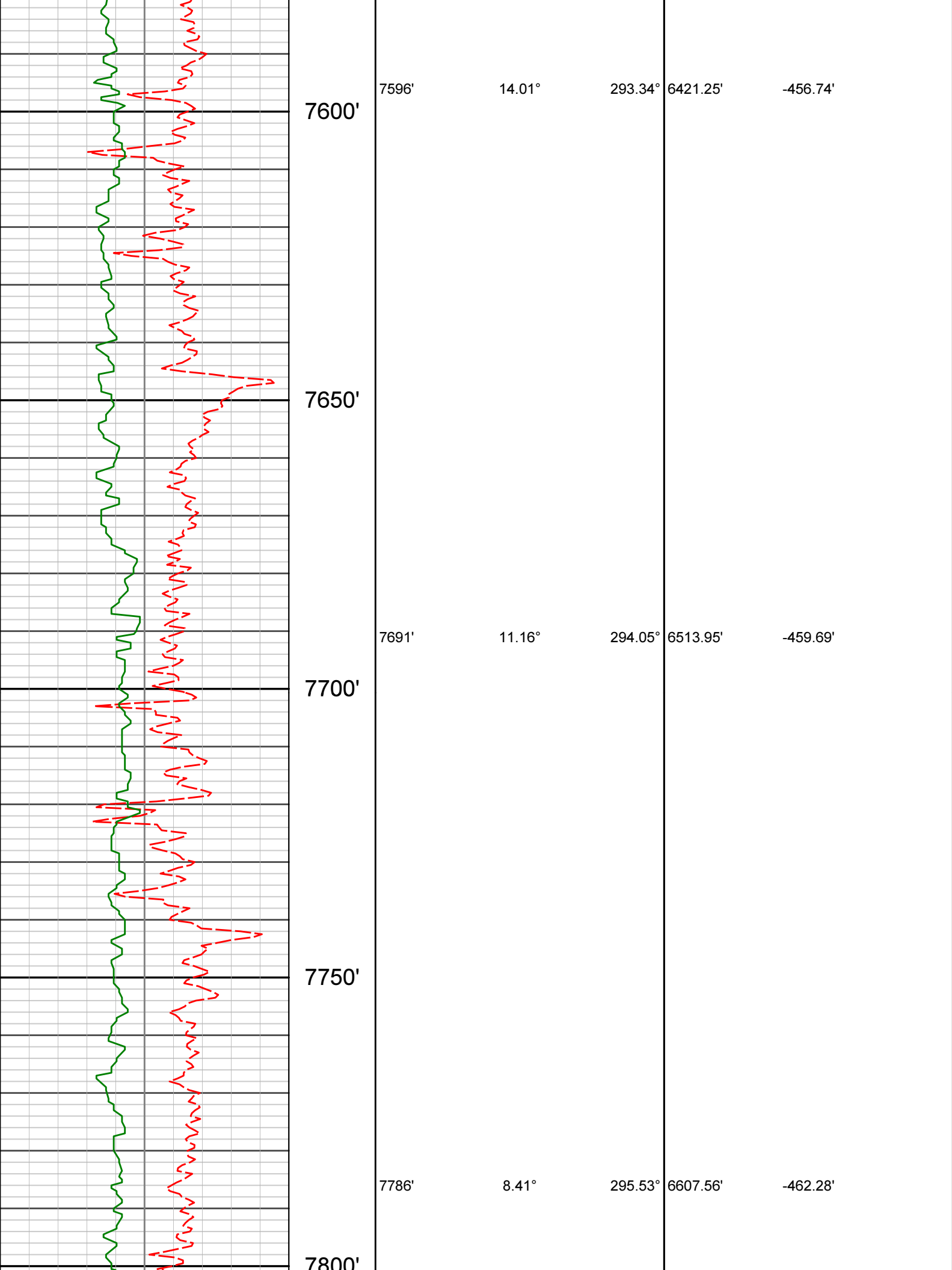
17.25°

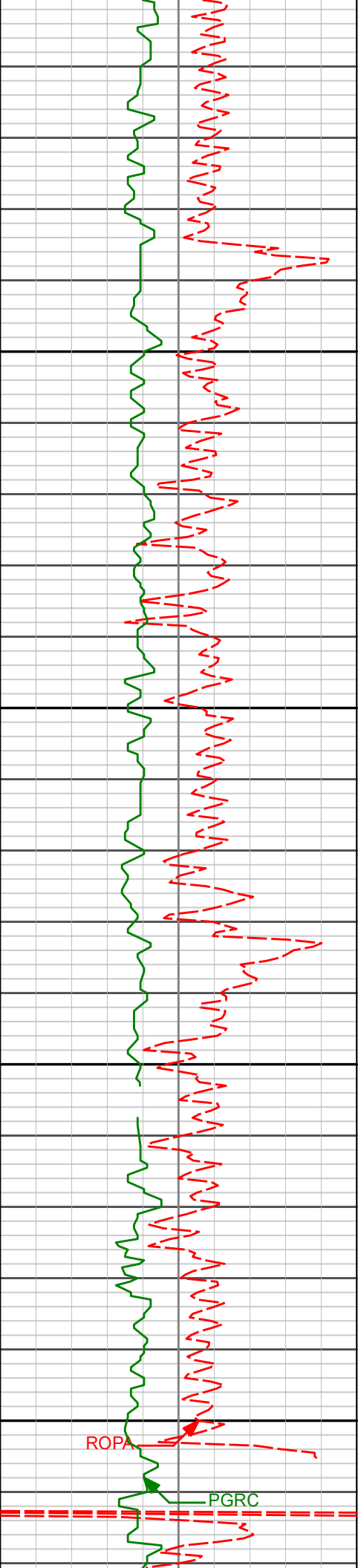
294.62°

6330.73'

-452.96'

7550'





7850'

7882'

7900'

7950'

7976'

8000'

6.70°

298.52°

4.52°

297.48°

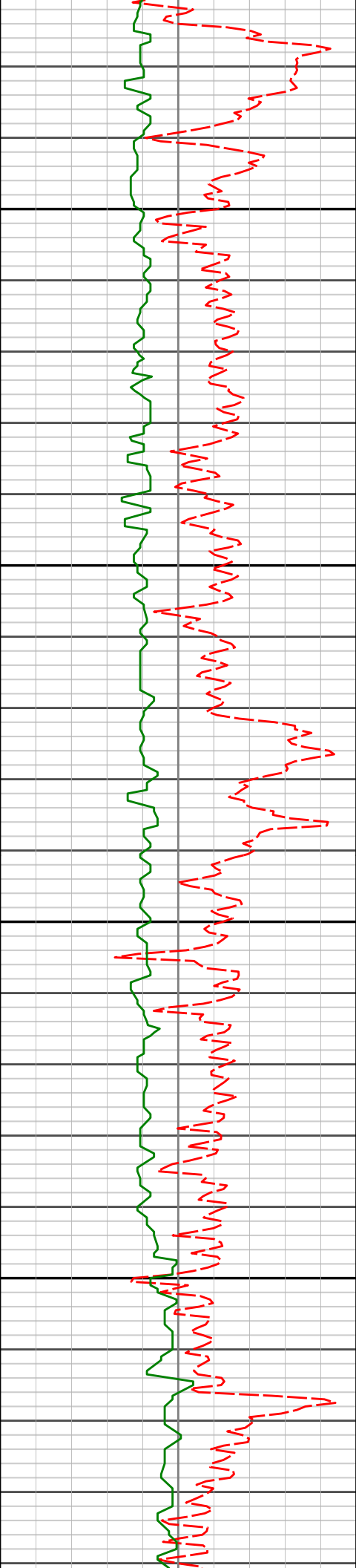
6702.73'

6796.27'

-464.77'

-466.78'





8050'

8072'

3.08°

296.22°

6892.06'

-468.05'

8100'

8150'

8167'

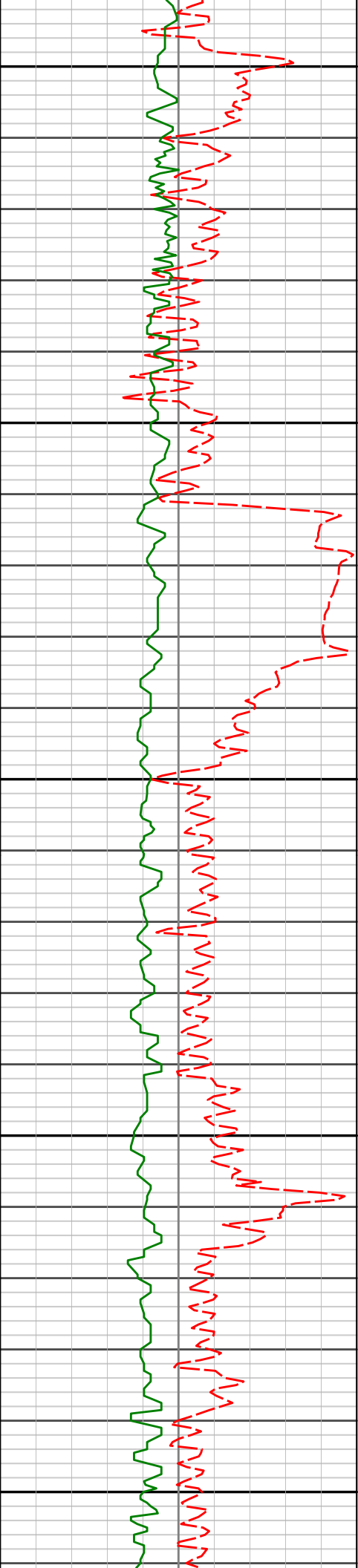
2.75°

292.38°

6986.93'

-468.80'

8200'



8250'

8262'

2.09°

286.02°

7081.85'

-469.09'

8300'

8350'

8356'

1.07°

203.83°

7175.82'

-468.24'

8400'

8450'

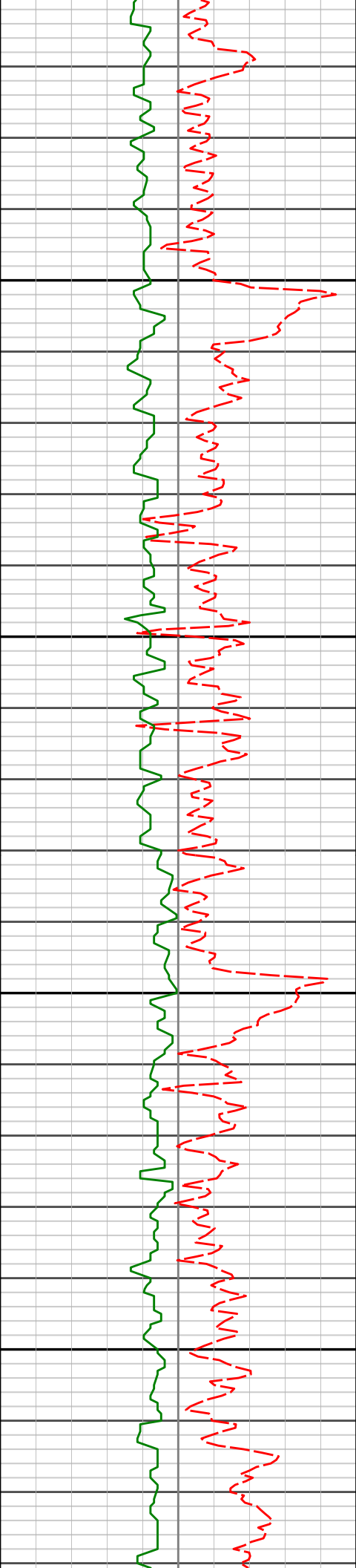
8452'

0.97°

195.11°

7271.80'

-466.53'



8500'

8550'

8600'

8650'

8546'

0.86°

176.32°

7365.79'

-465.07'

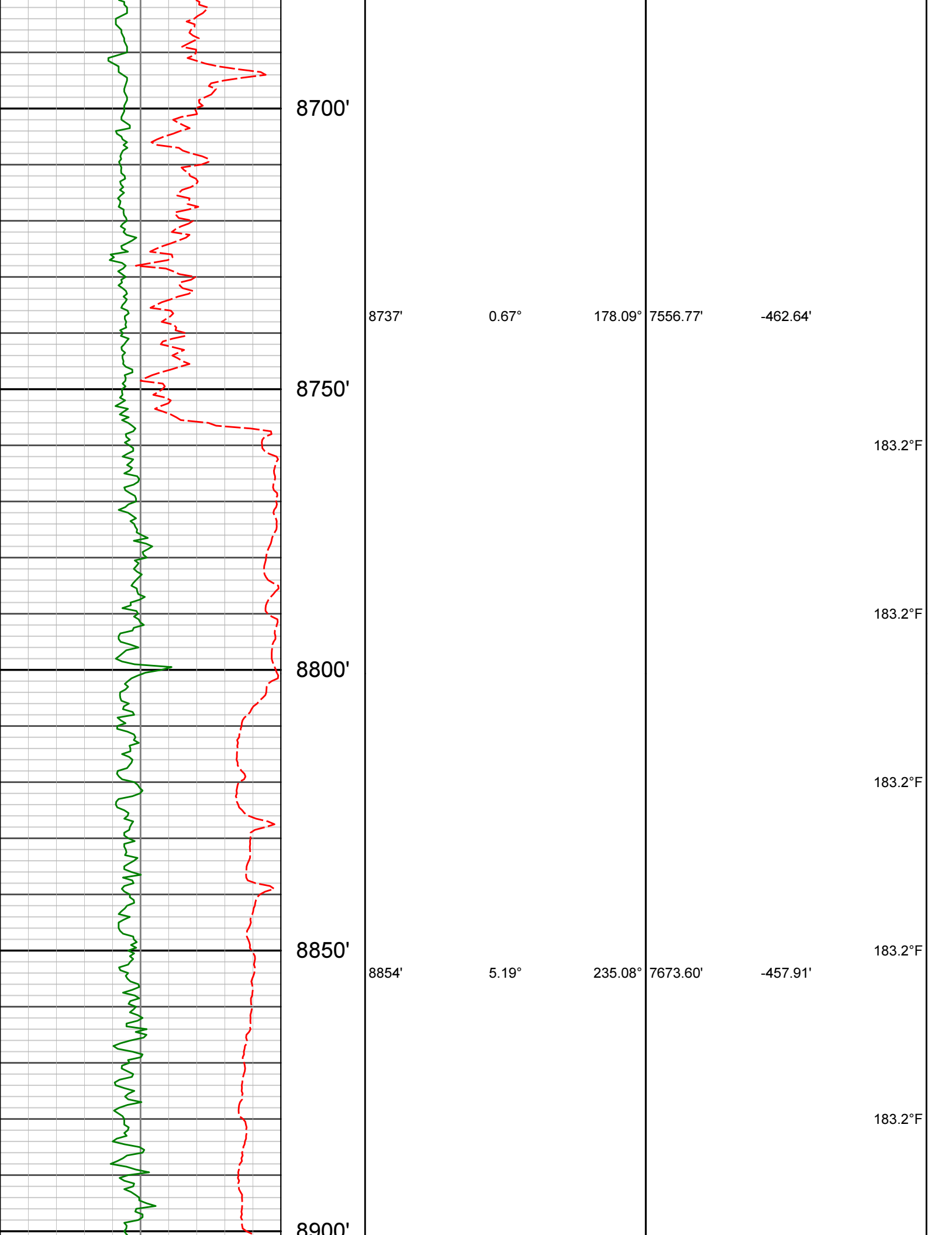
8641'

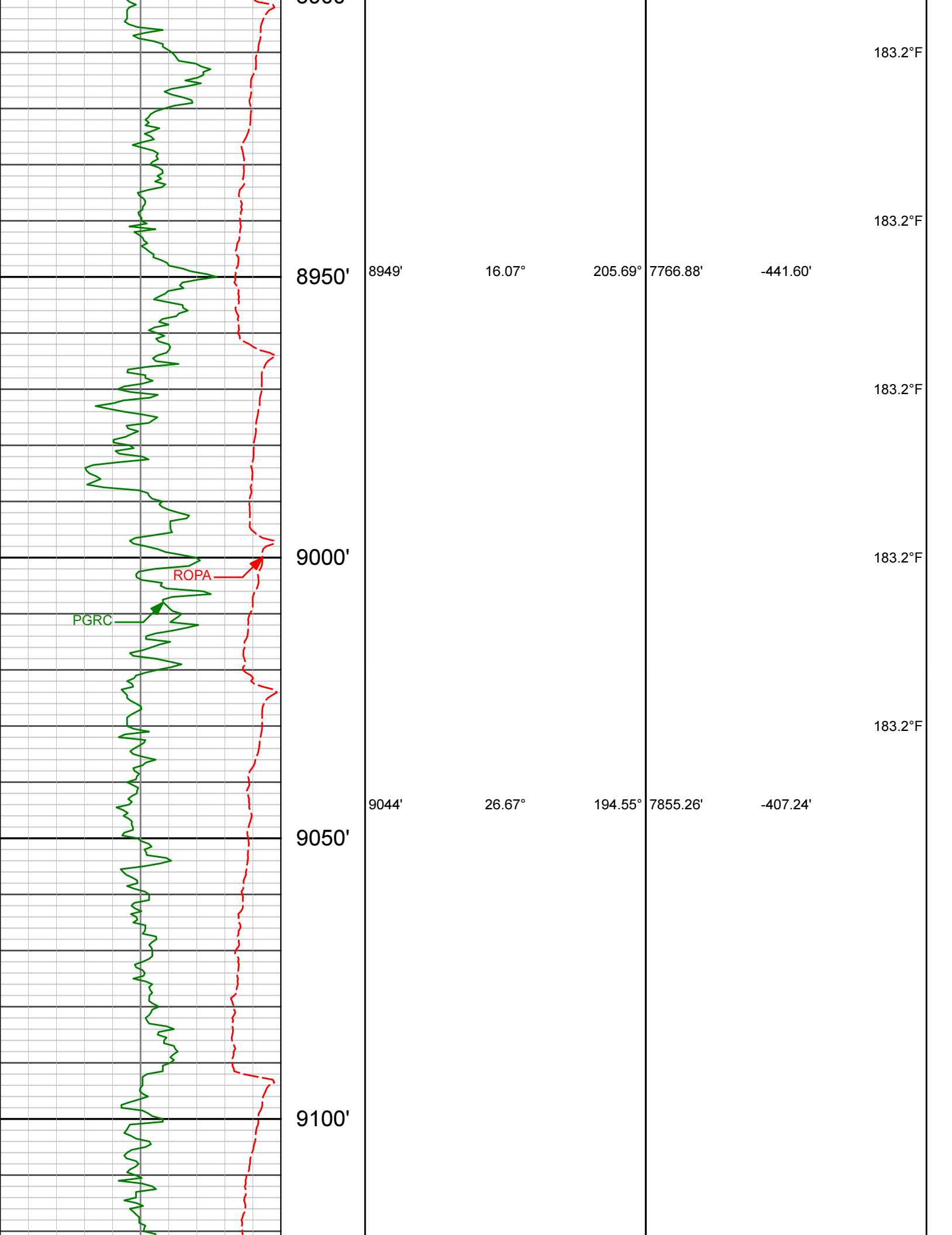
0.86°

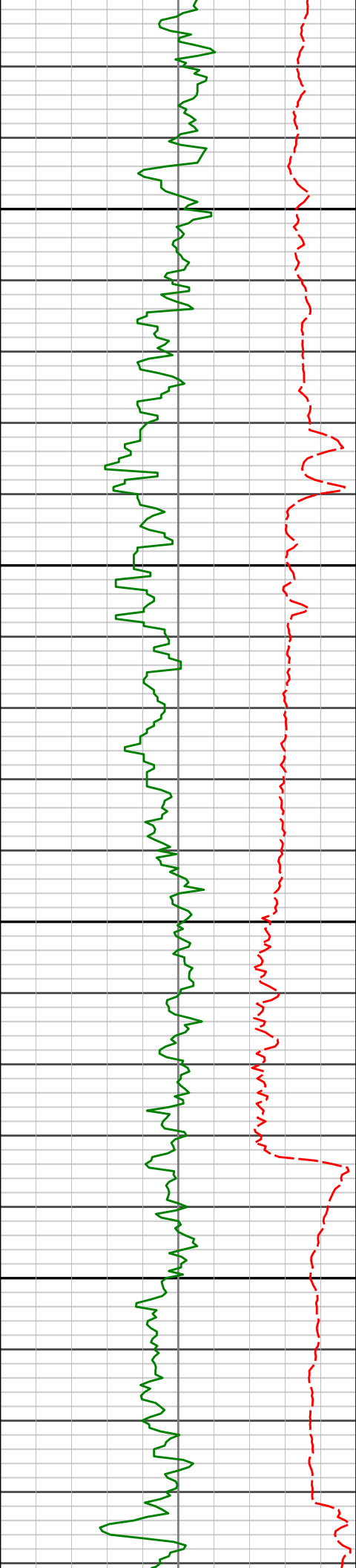
164.08°

7460.78'

-463.79'







9139'

38.87°

179.69°

7935.12'

-356.97'

9150'

9200'

9235'

43.57°

176.20°

8007.32'

-296.70'

9250'

9300'

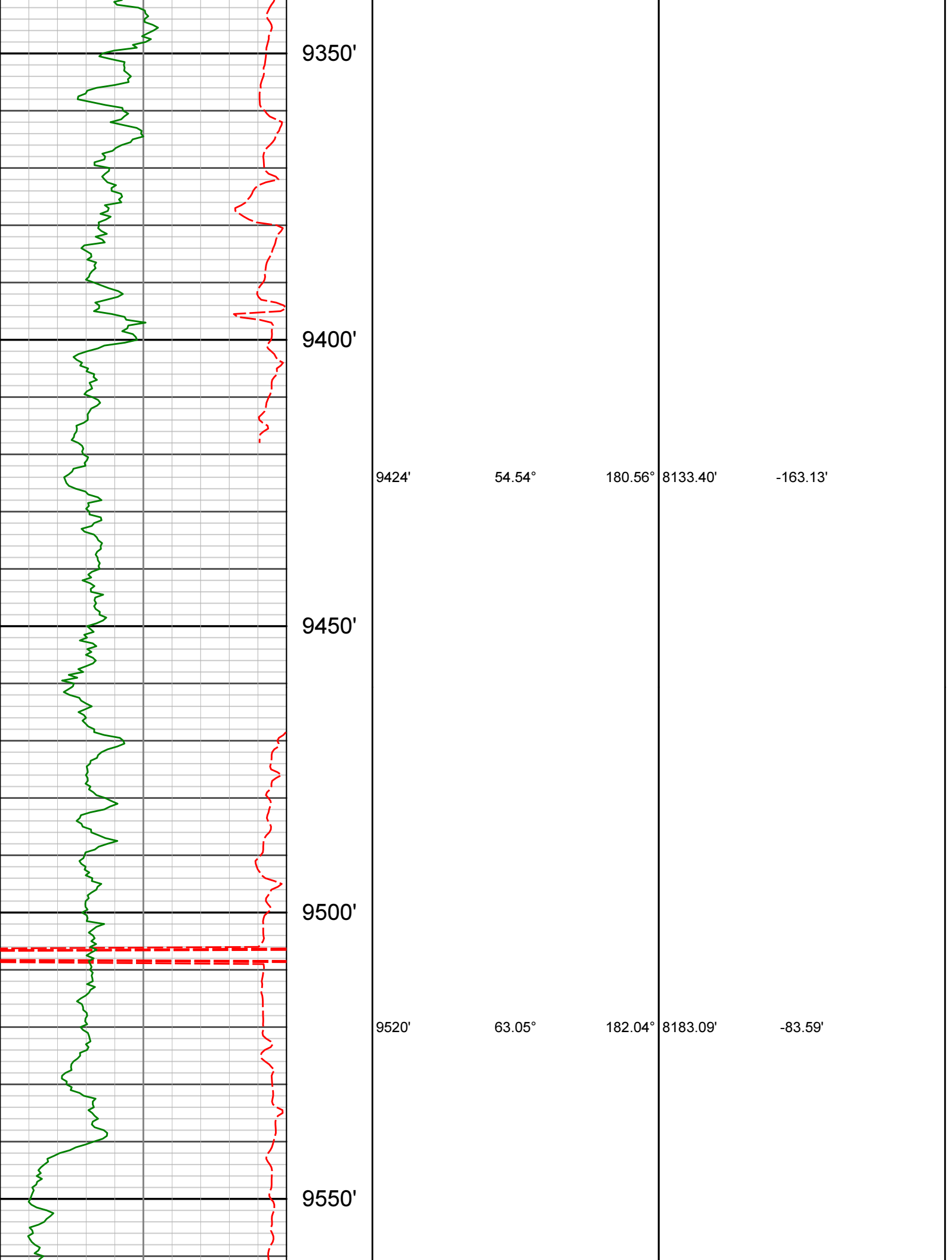
9330'

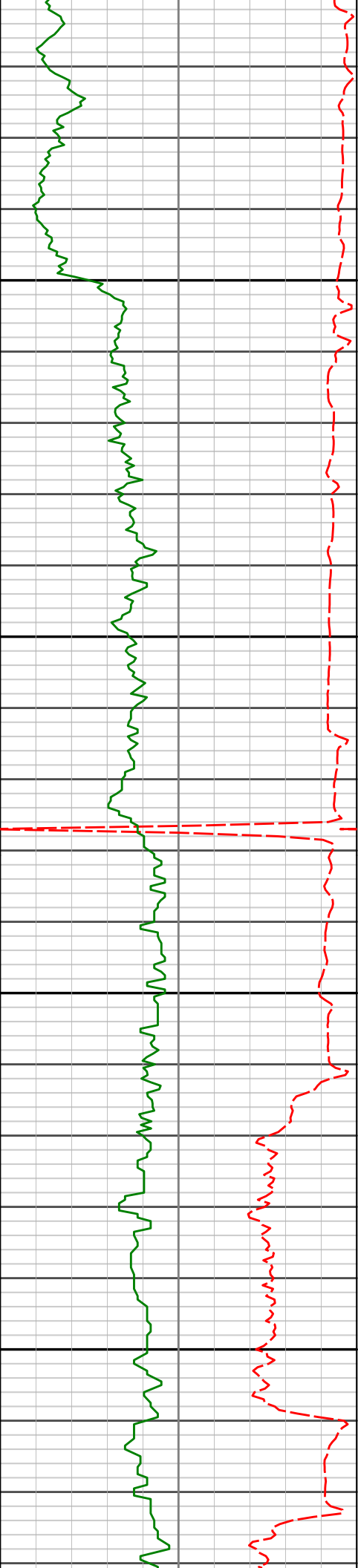
47.14°

176.57°

8074.06'

-232.84'





9600'

9650'

9700'

9750'

9615'

74.98°

185.65°

8217.06'

3.14'

9710'

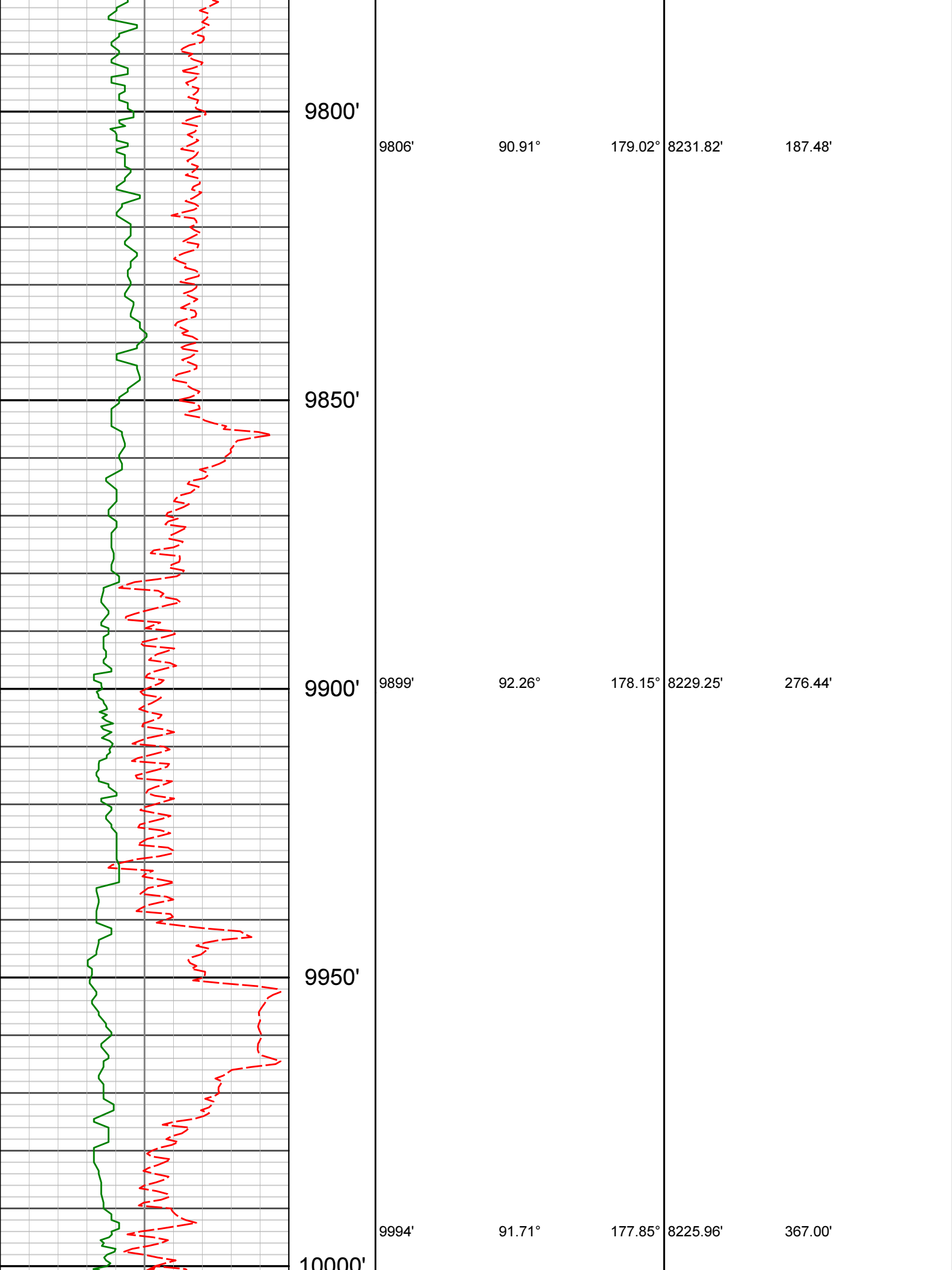
88.12°

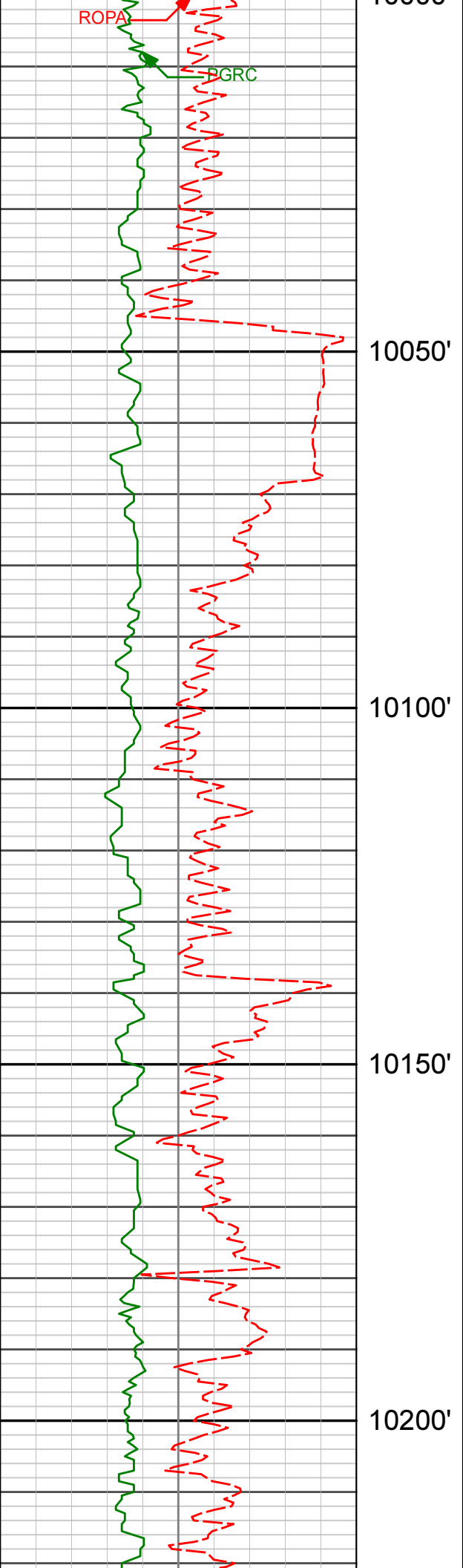
181.51°

8231.00'

94.86'







10090'

88.42°

175.99°

8225.85'

458.00'

10100'

10150'

10185'

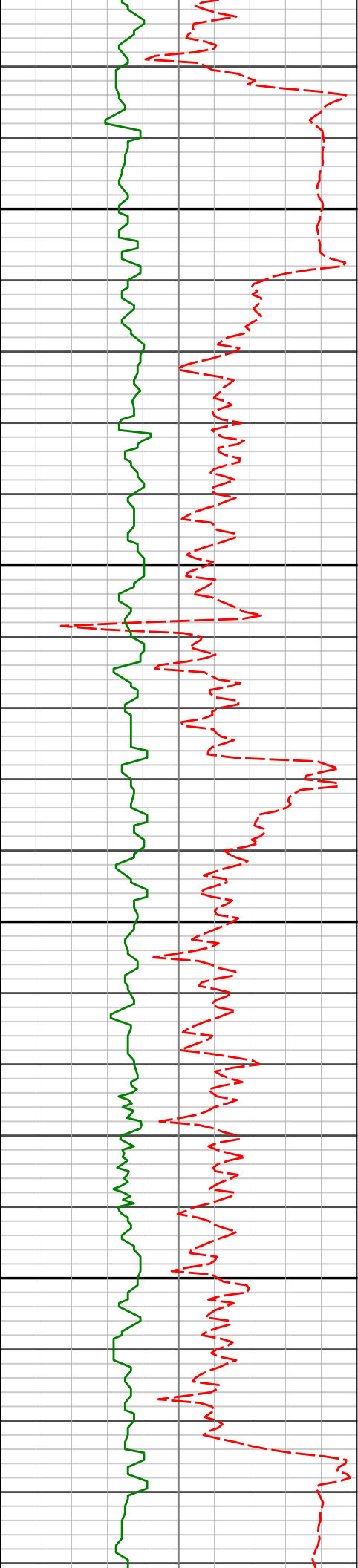
89.77°

175.58°

8227.35'

547.44'

10200'



10250'

10280'

89.33°

178.69°

8228.10'

637.60'

10300'

10350'

7" Casing Shoe @ 00000' MD

10376'

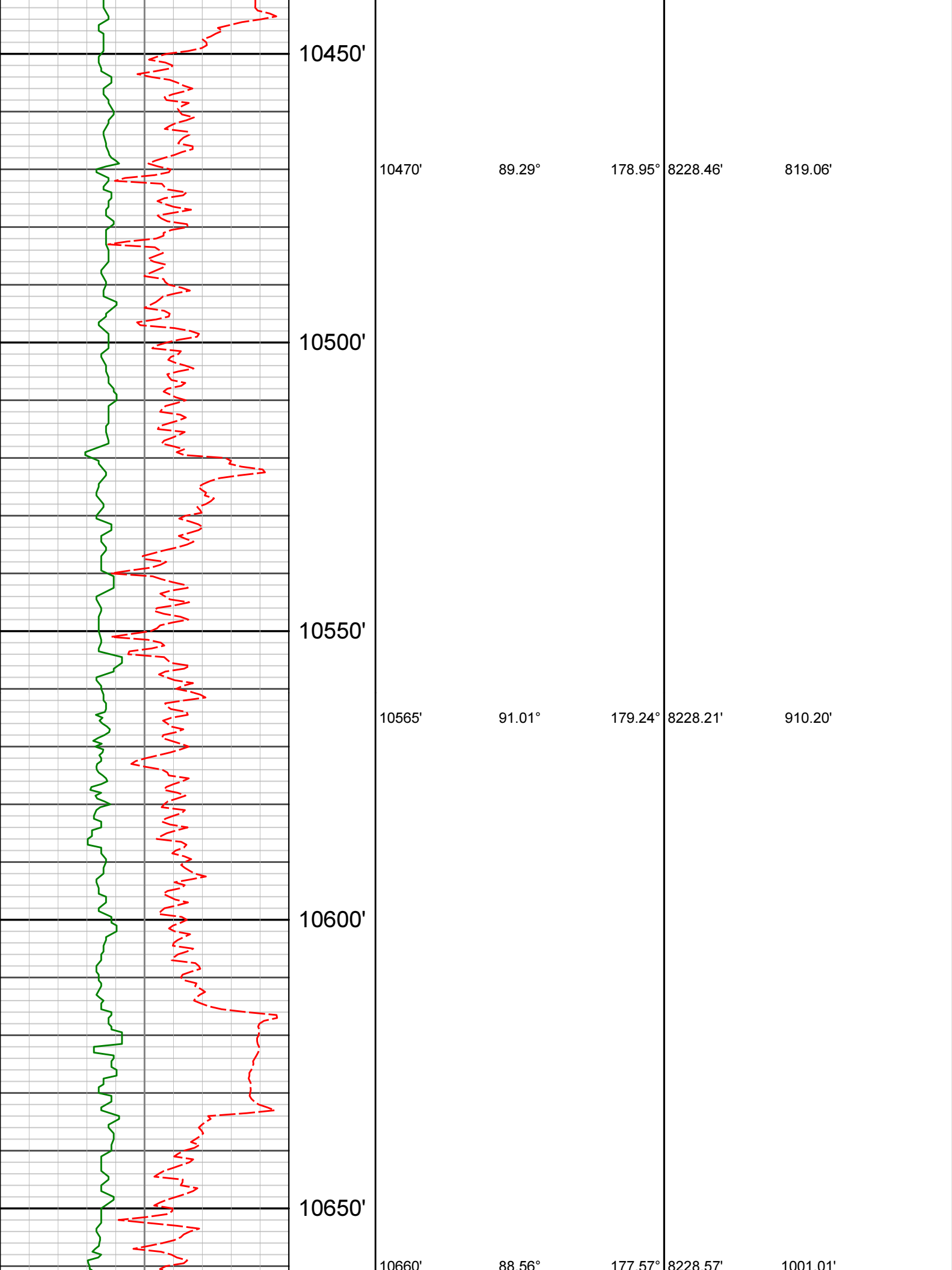
90.47°

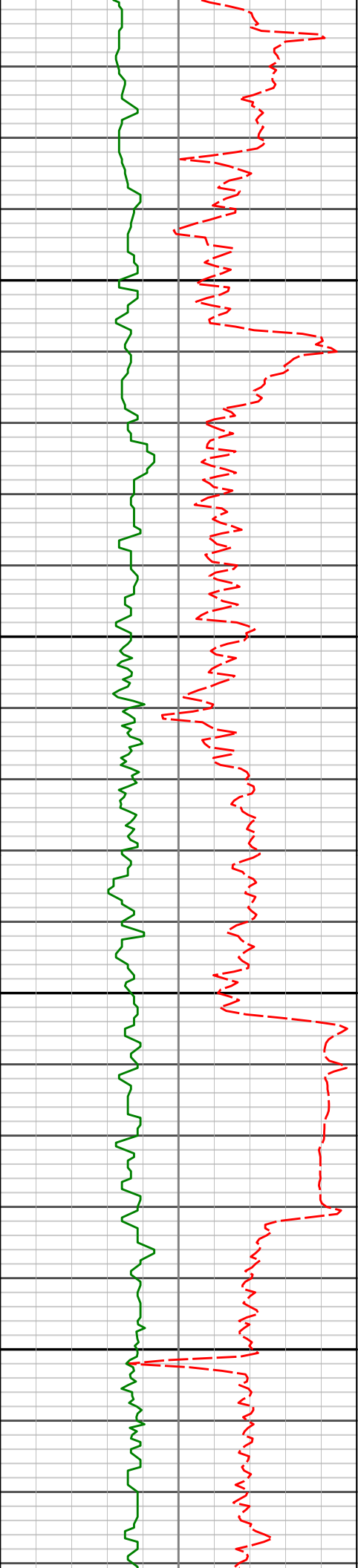
177.64°

8228.27'

729.26'

10400'





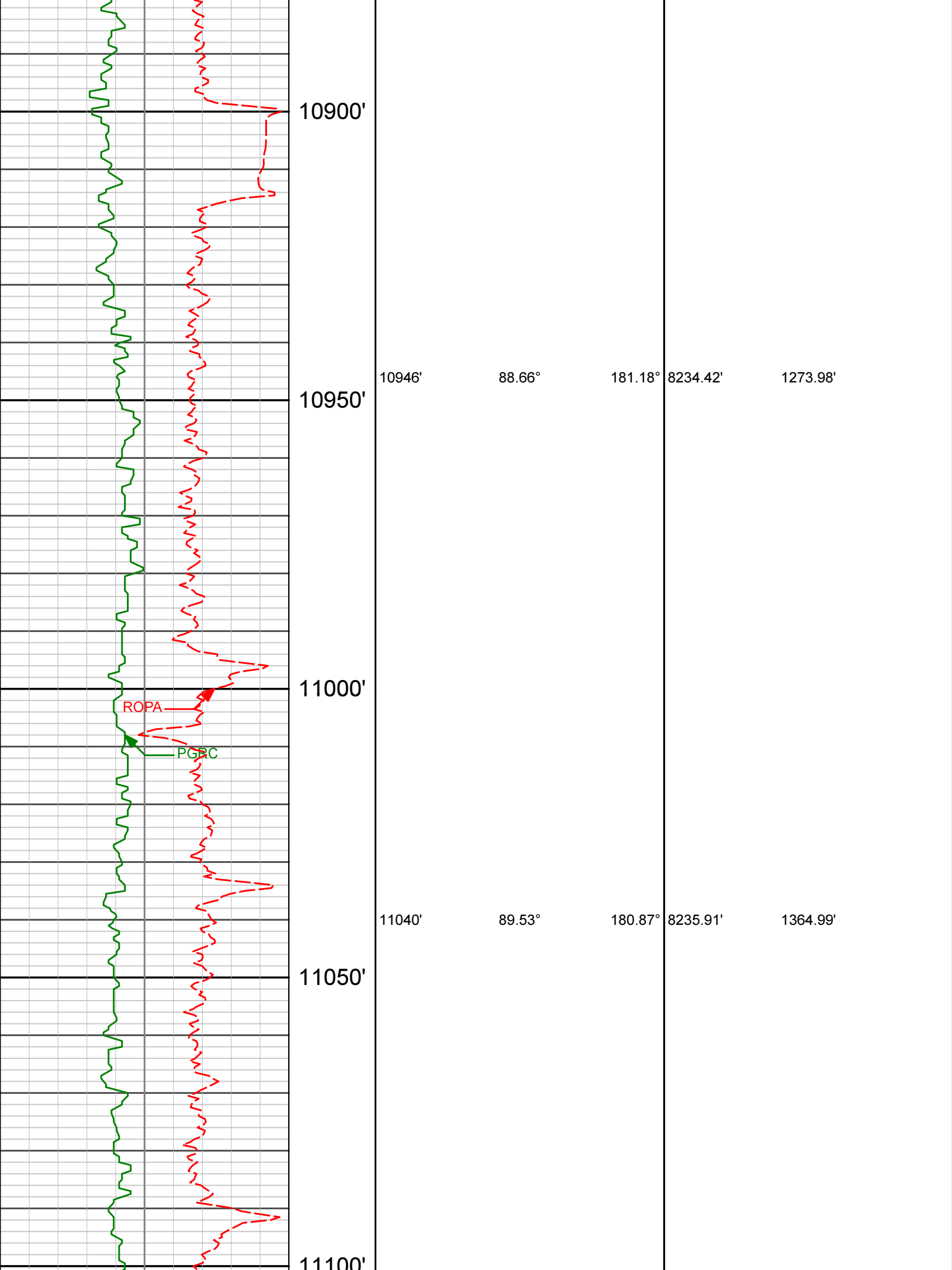
10700'

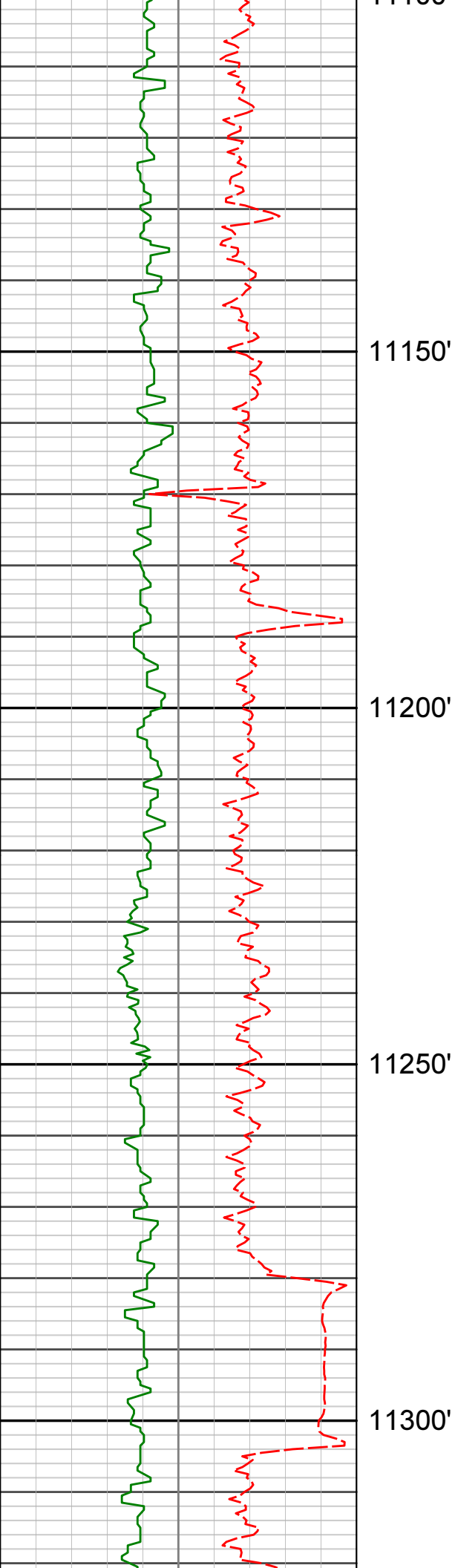
10750'

10800'

10850'

10755'	89.19°	176.30°	8230.44'	1091.07'
10851'	88.69°	178.93°	8232.21'	1182.42'





11135'

90.81°

179.52°

8235.63'

1456.63'

11150'

11200'

11231'

92.19°

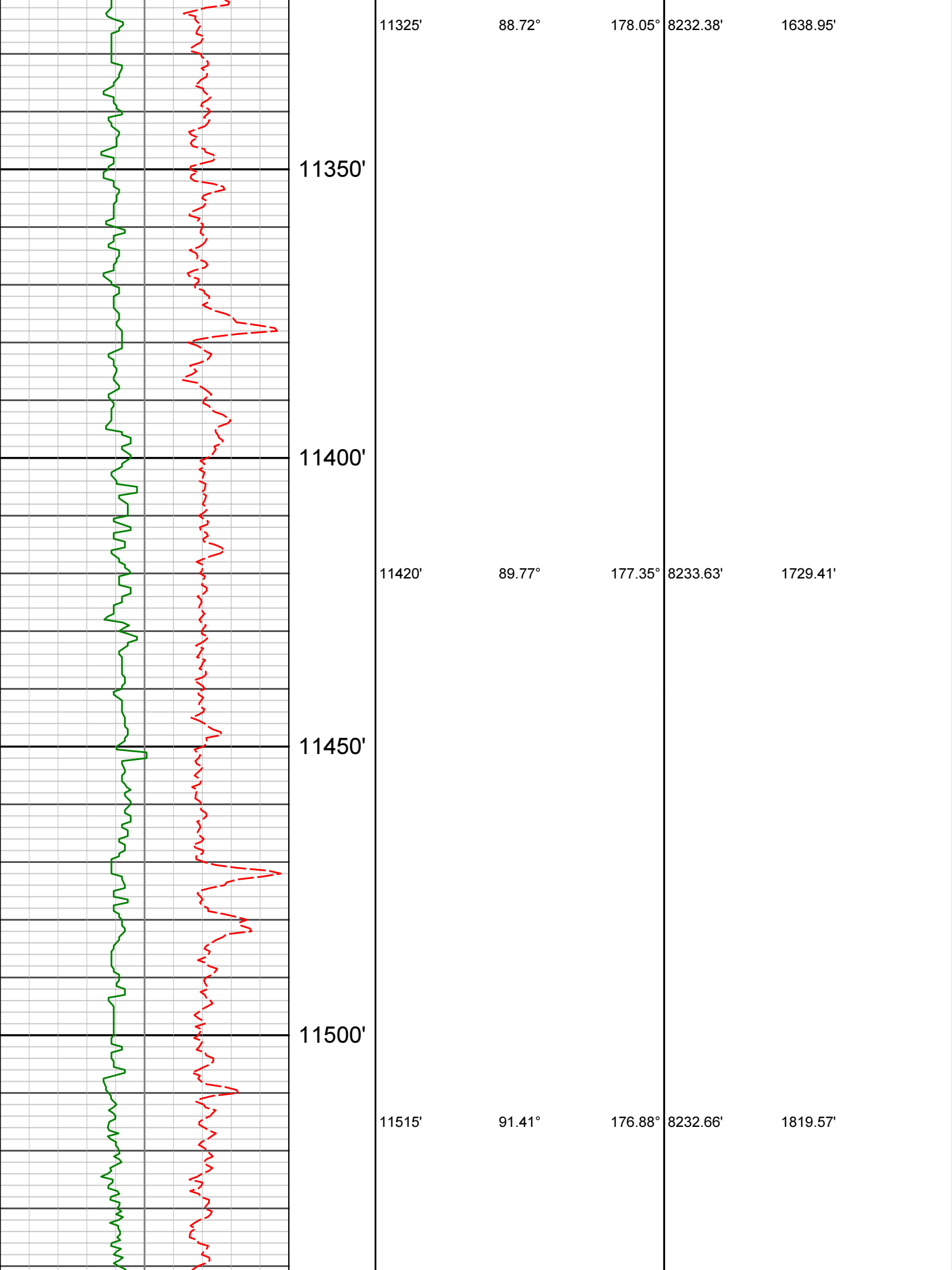
179.56°

8233.12'

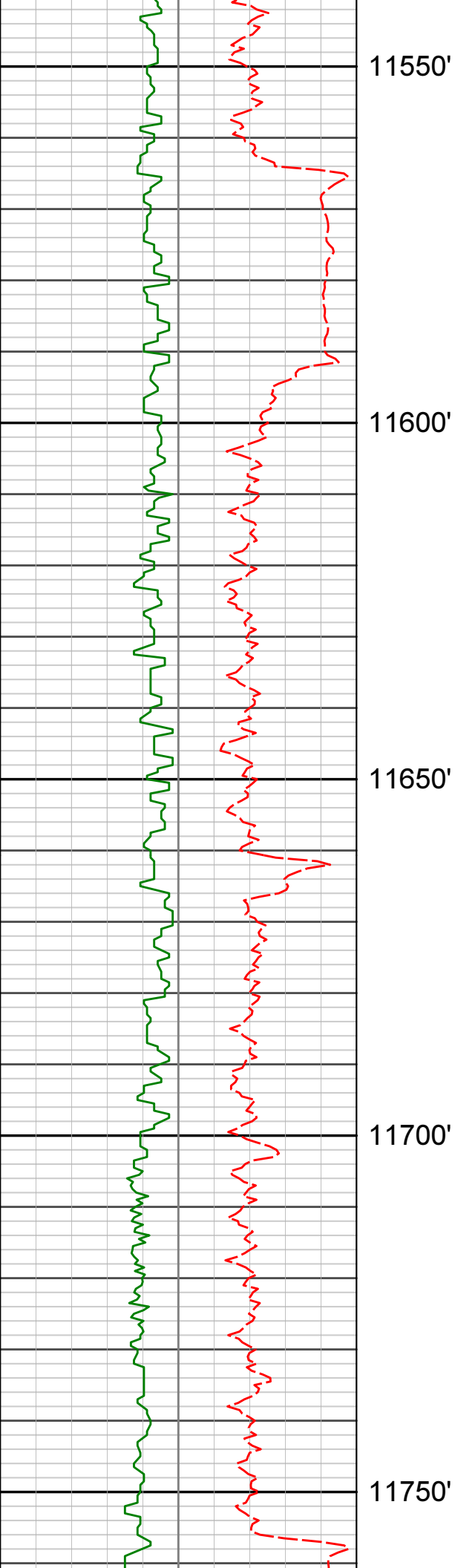
1548.91'

11250'

11300'







11610'

89.80°

179.74°

8231.65'

1910.32'

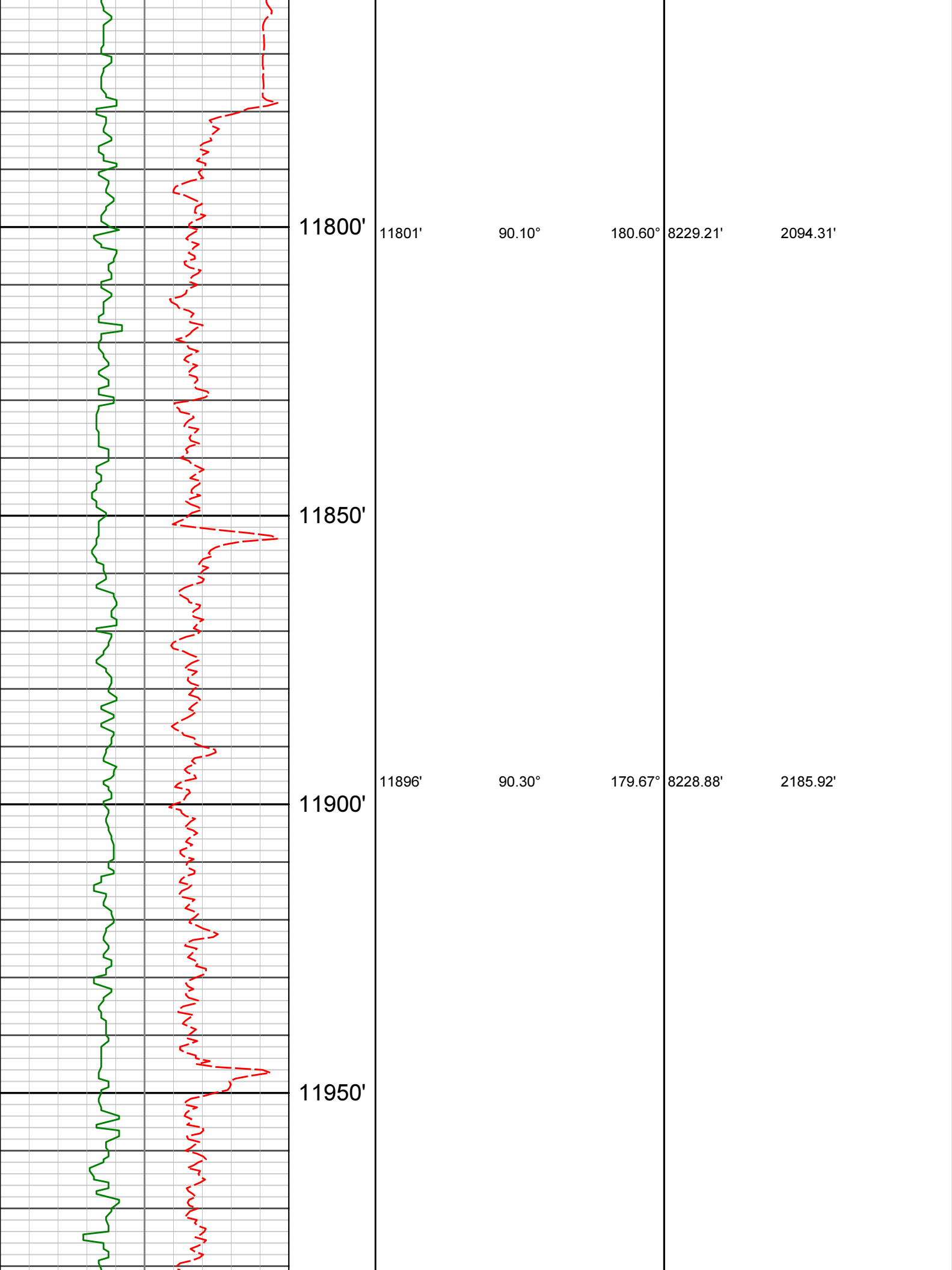
11706'

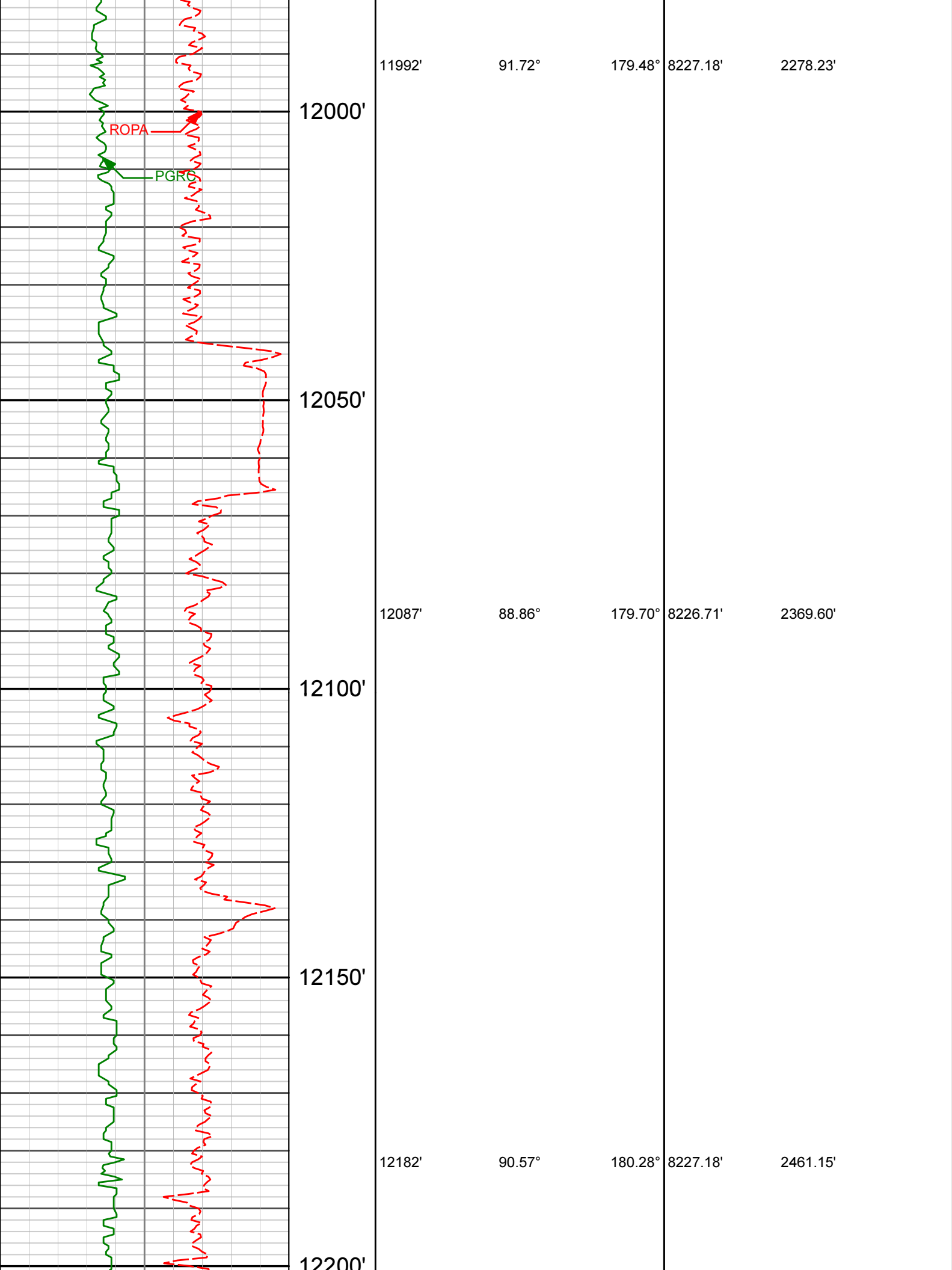
91.51°

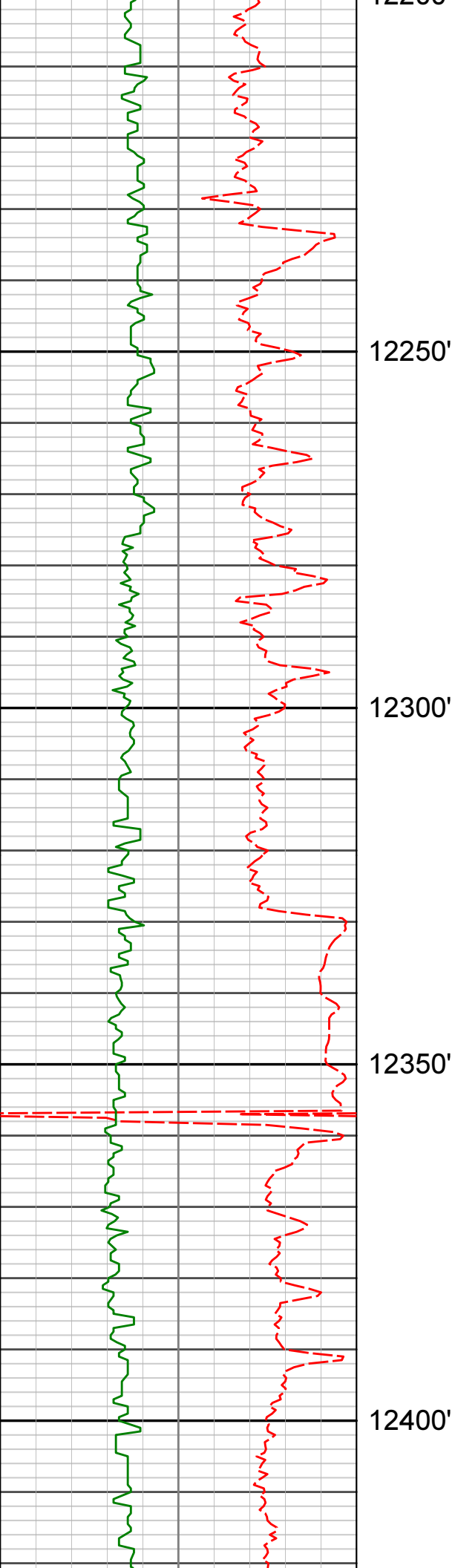
179.66°

8230.55'

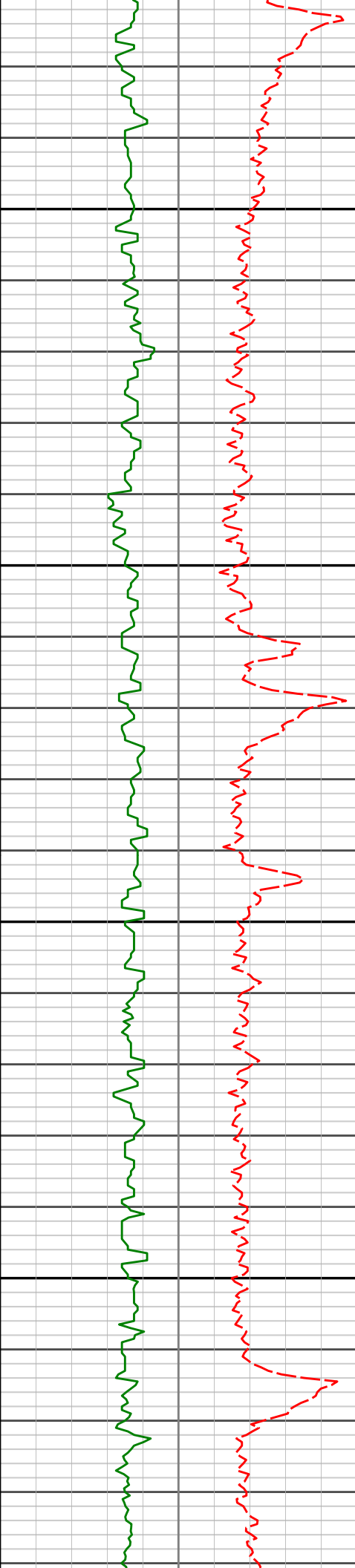
2002.70'







12278'	91.95°	179.42°	8225.06'	2553.58'
12300'				
12350'				
12373'	88.72°	180.45°	8224.51'	2645.09'
12400'				



12450'

12469'

89.23°

178.81°

8226.23'

2737.43'

12500'

12550'

12564'

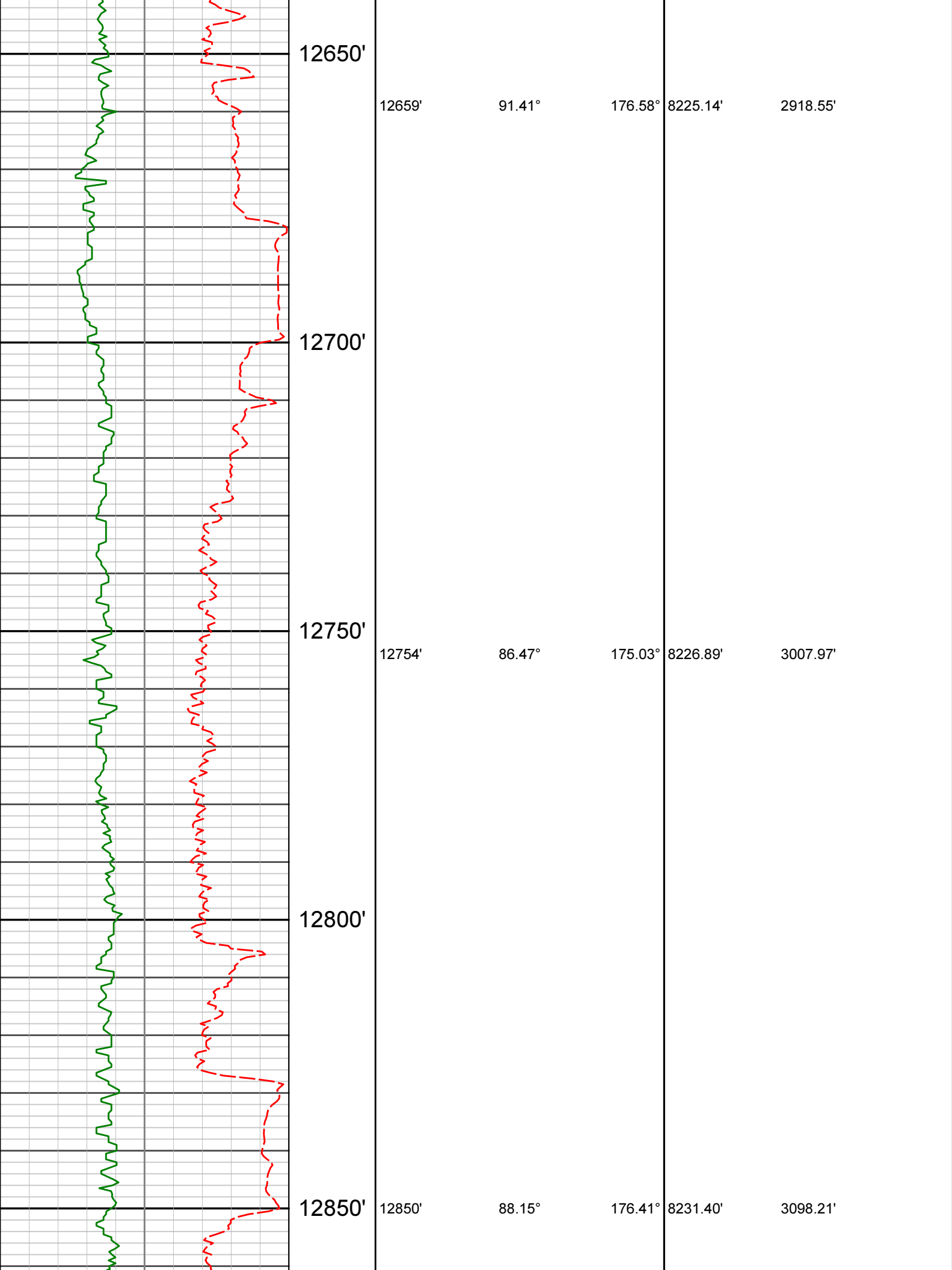
90.34°

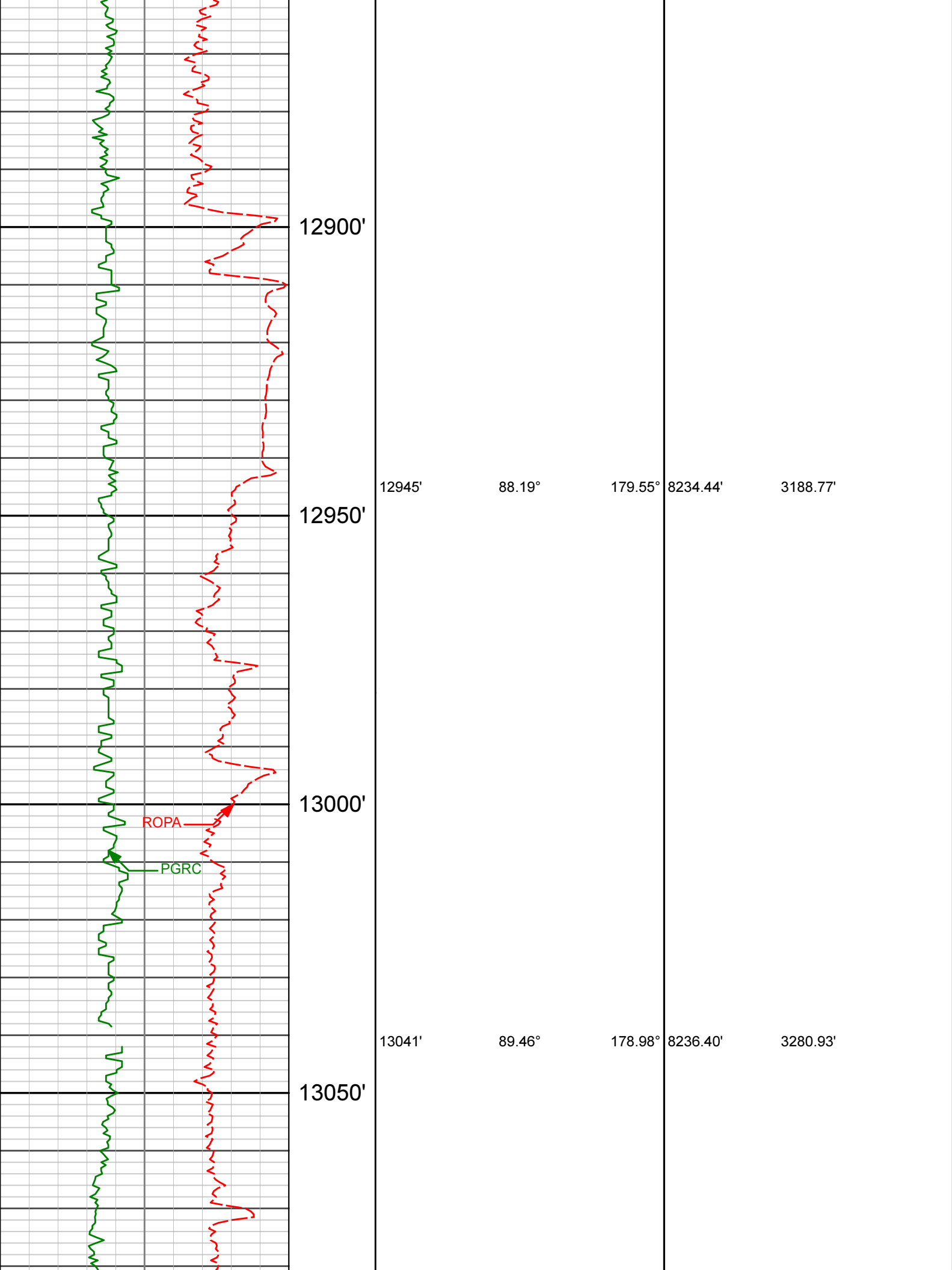
178.13°

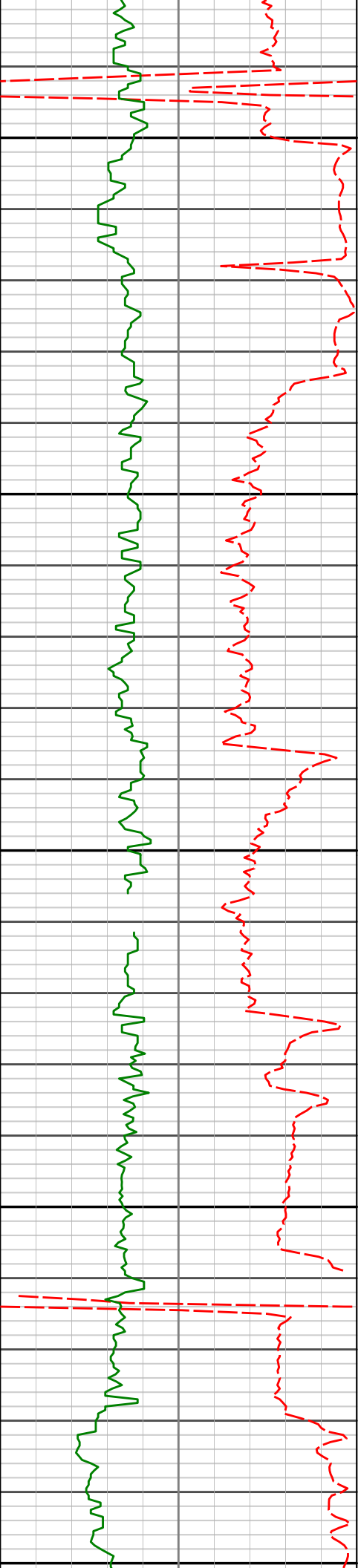
8226.59'

2828.27'

12600'







13100'

13135'

90.13°

181.81°

8236.74'

3371.69'

13150'

13200'

13231'

91.88°

182.41°

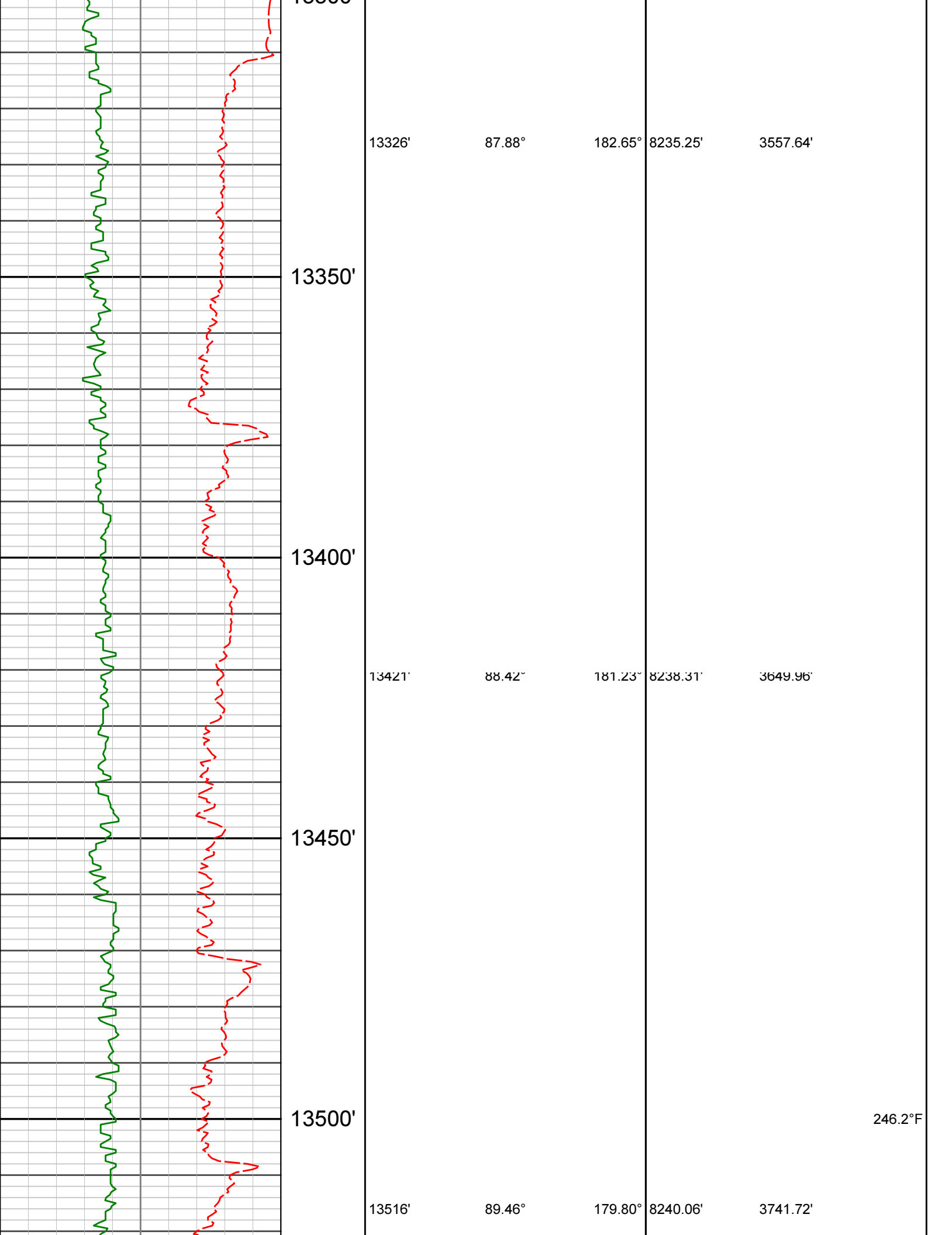
8235.05'

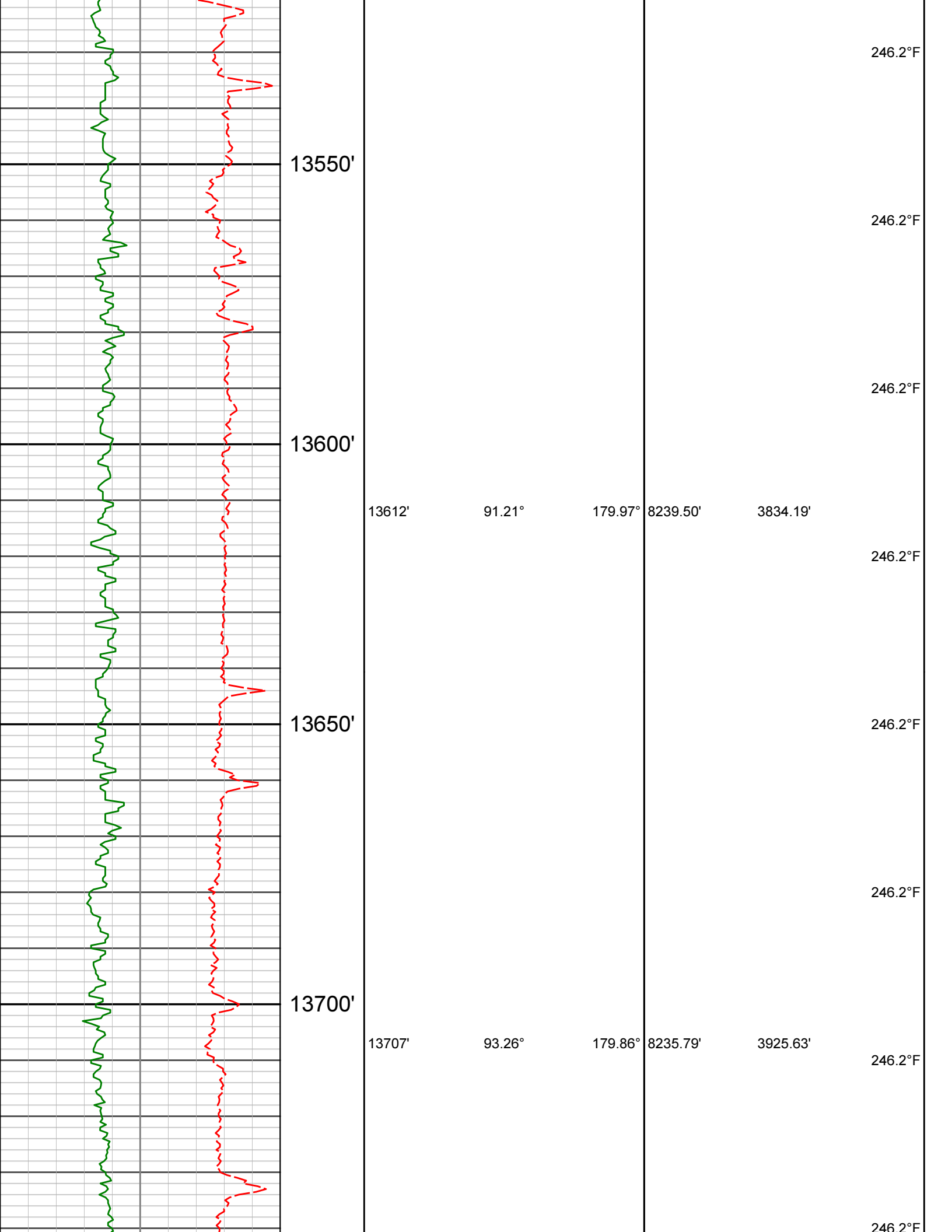
3465.07'

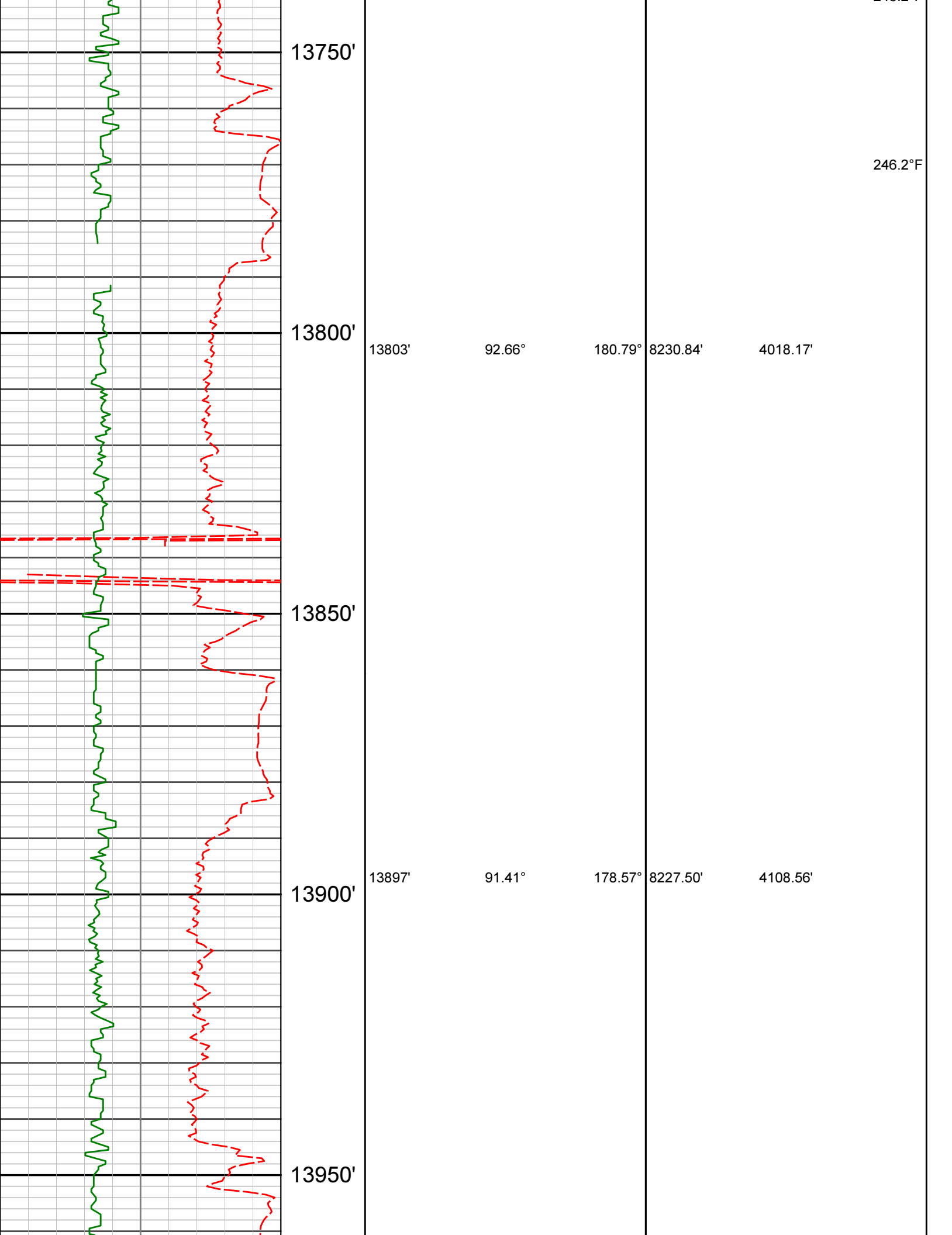
13250'

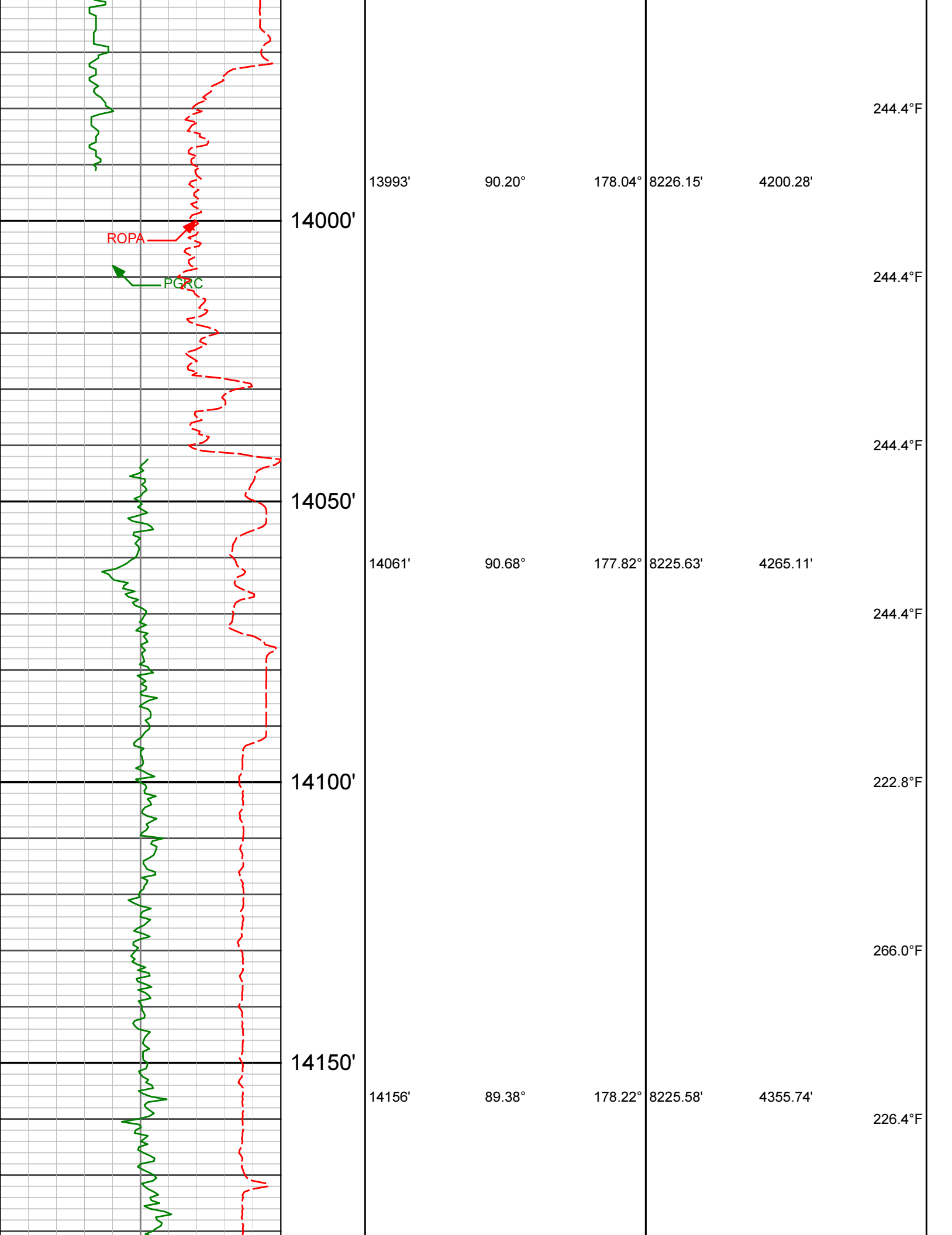
13300'

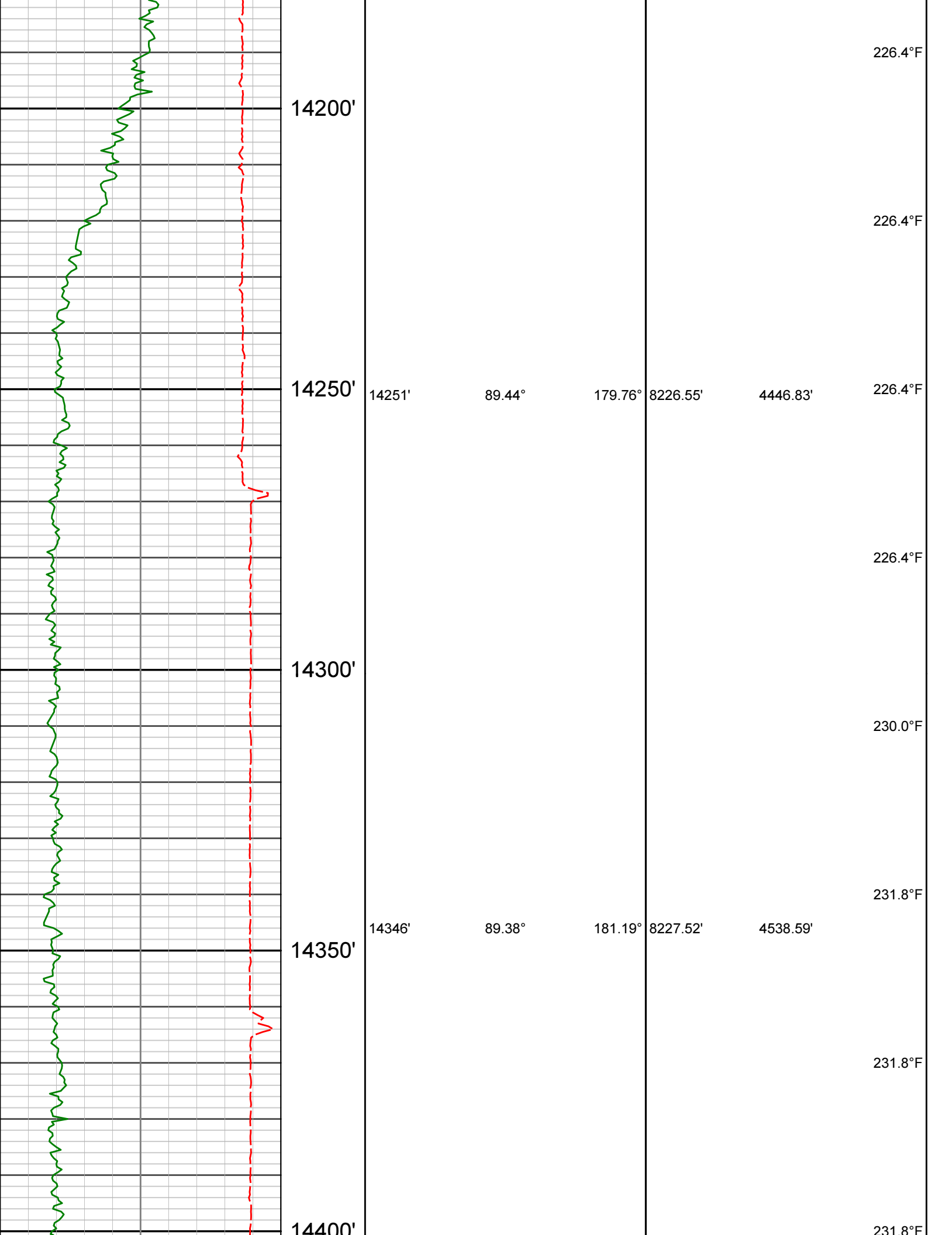


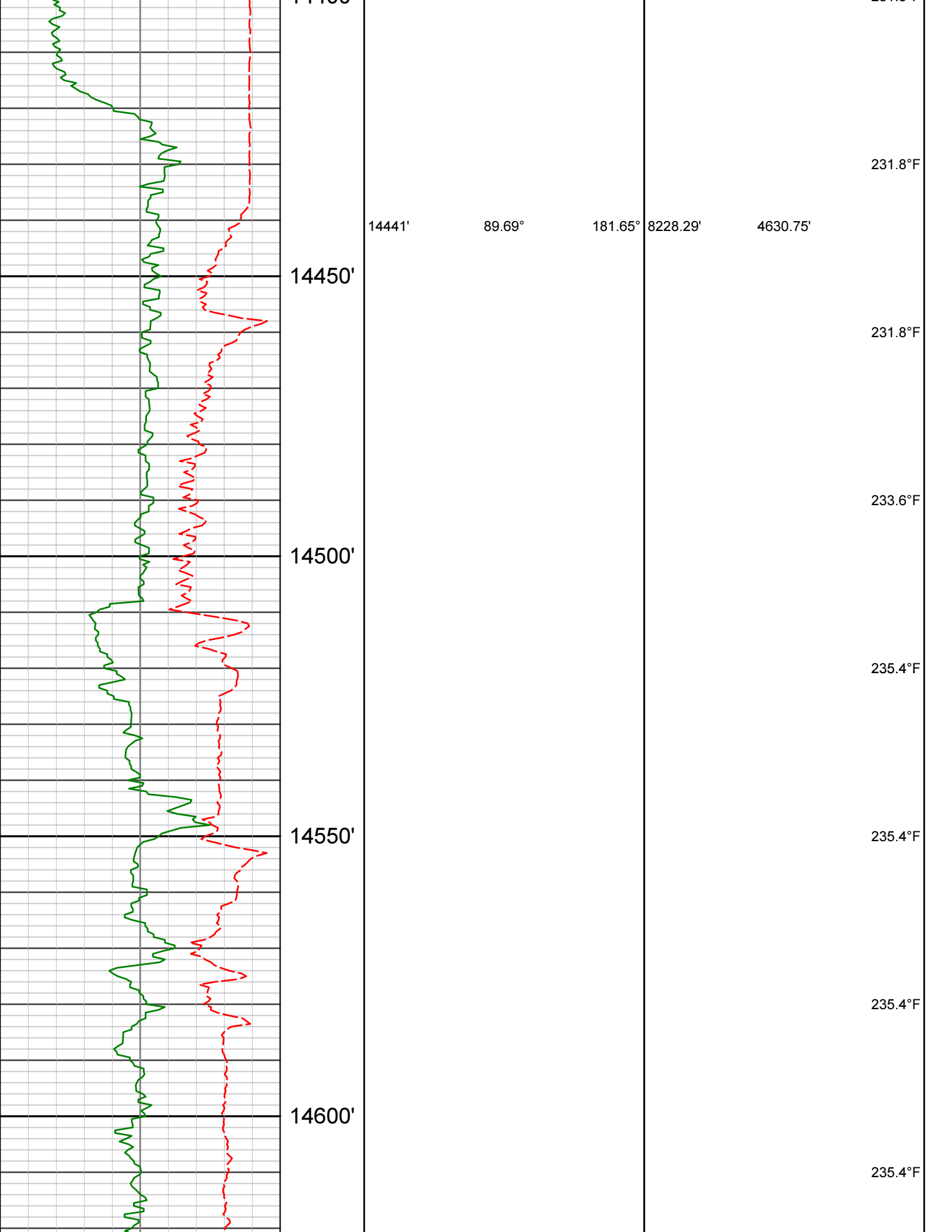


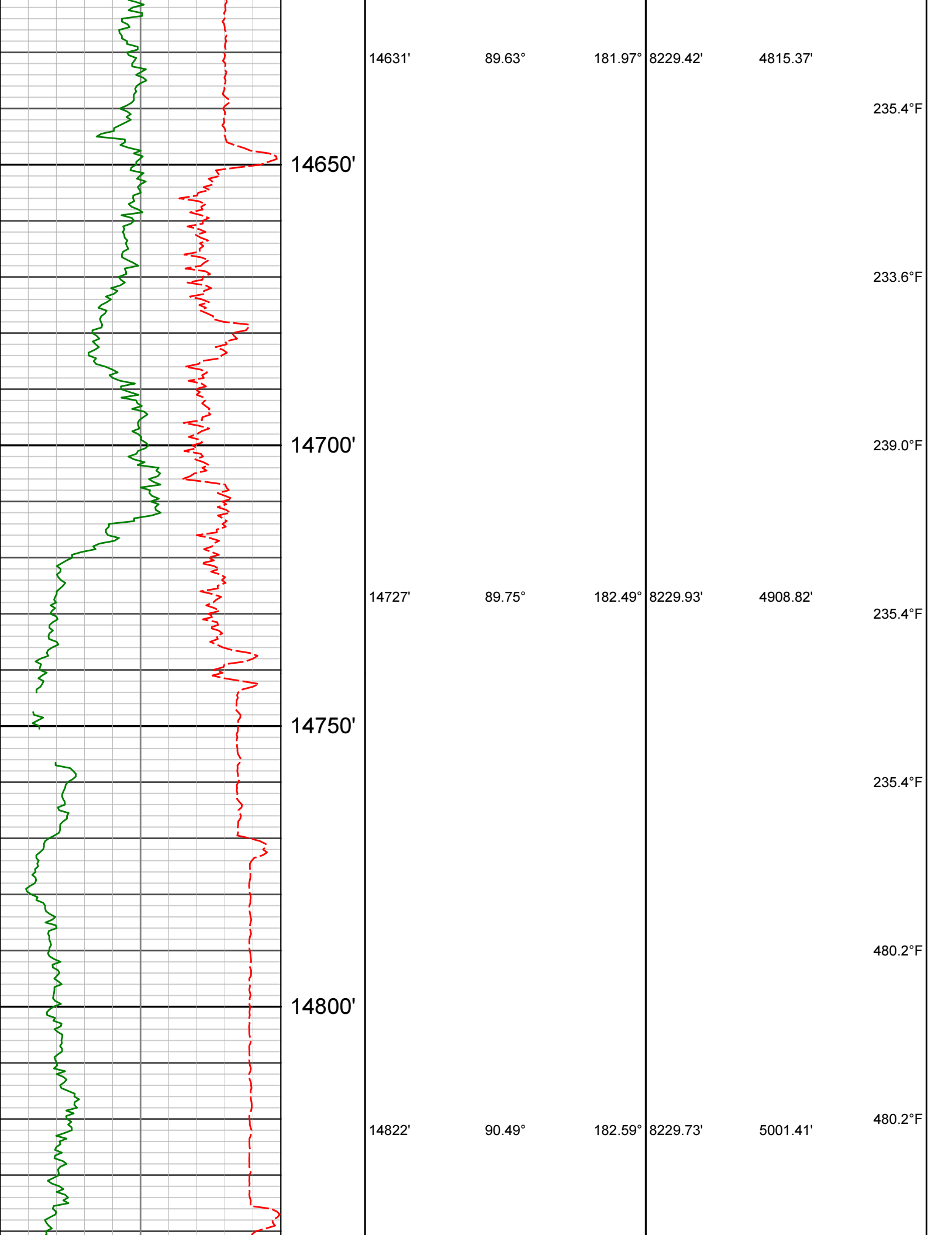


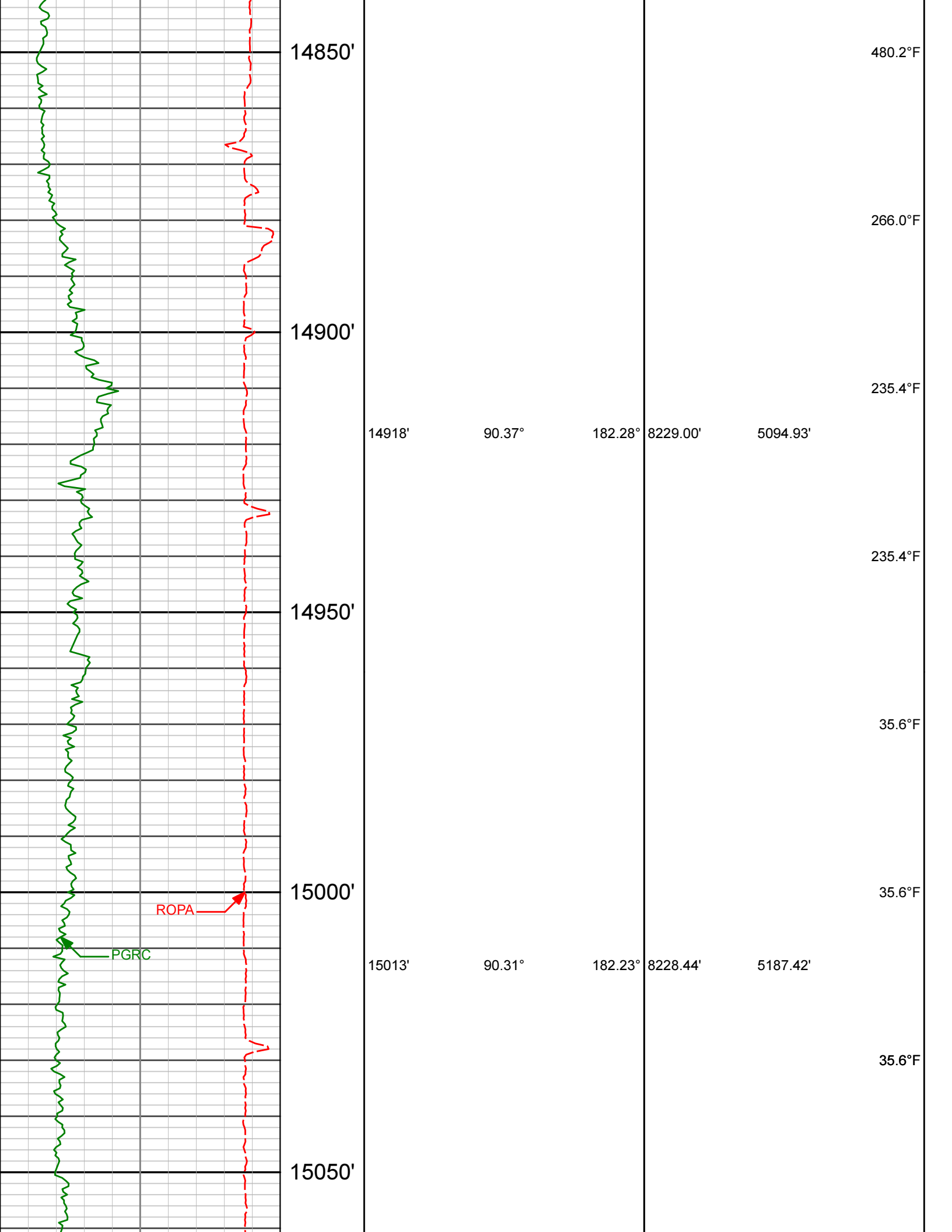




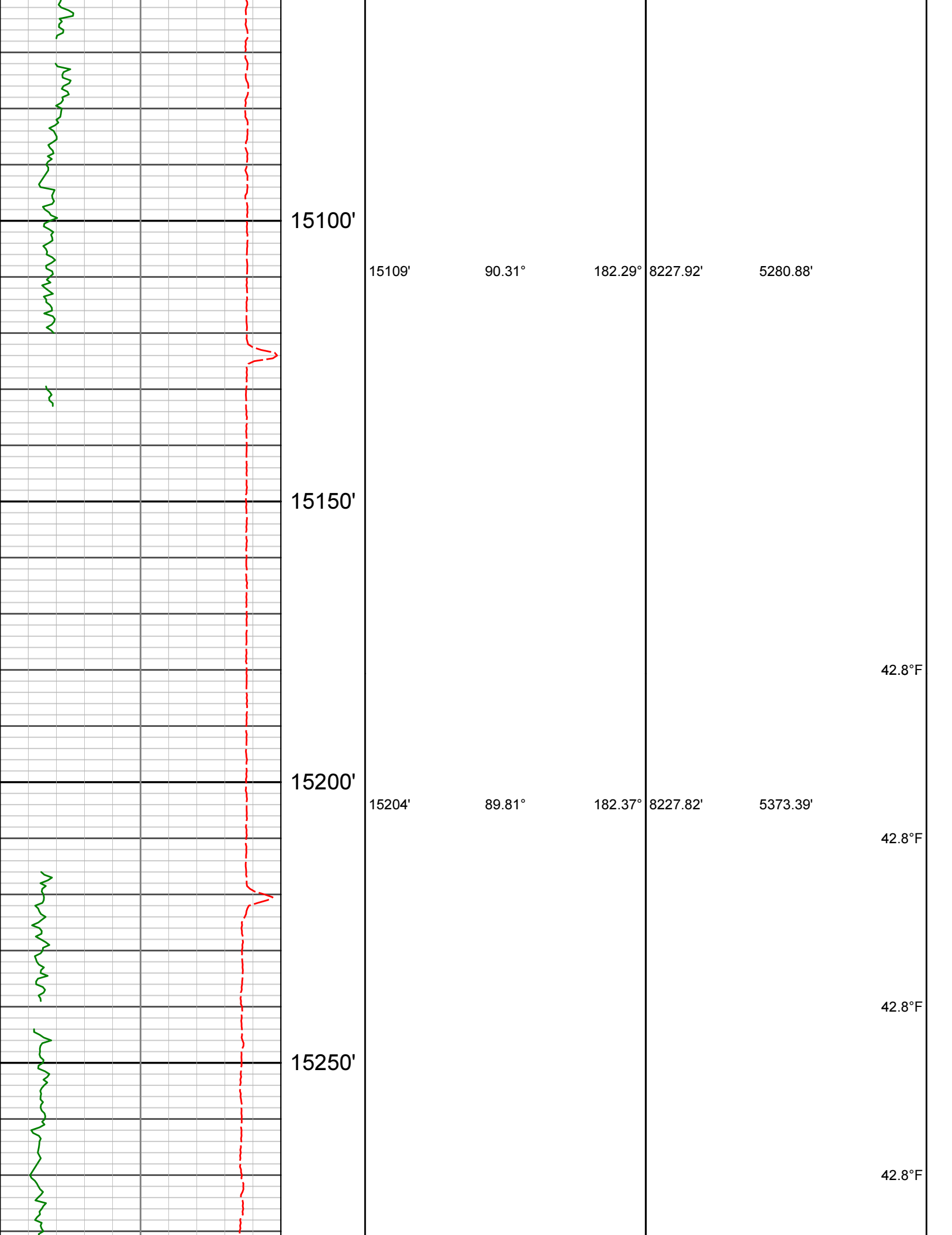


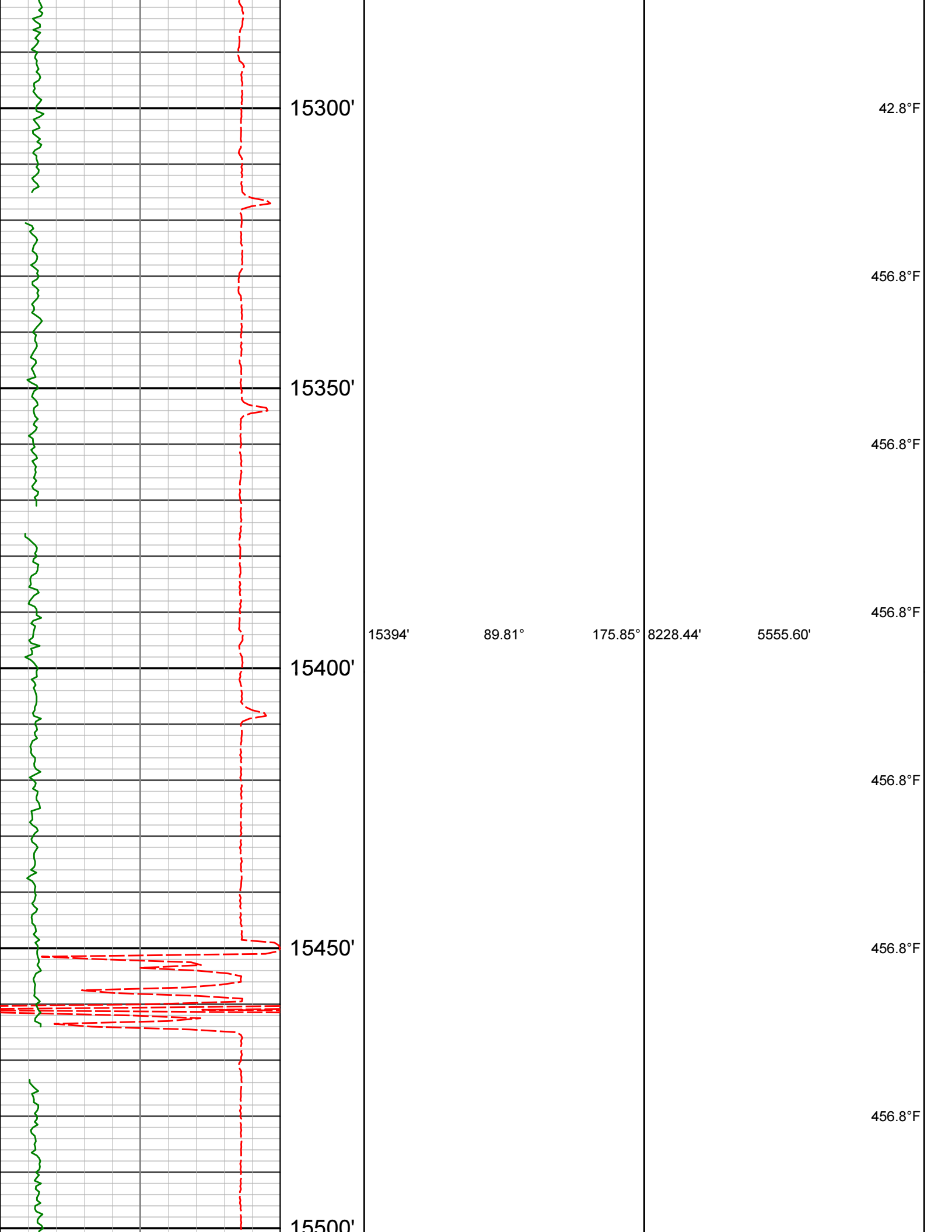


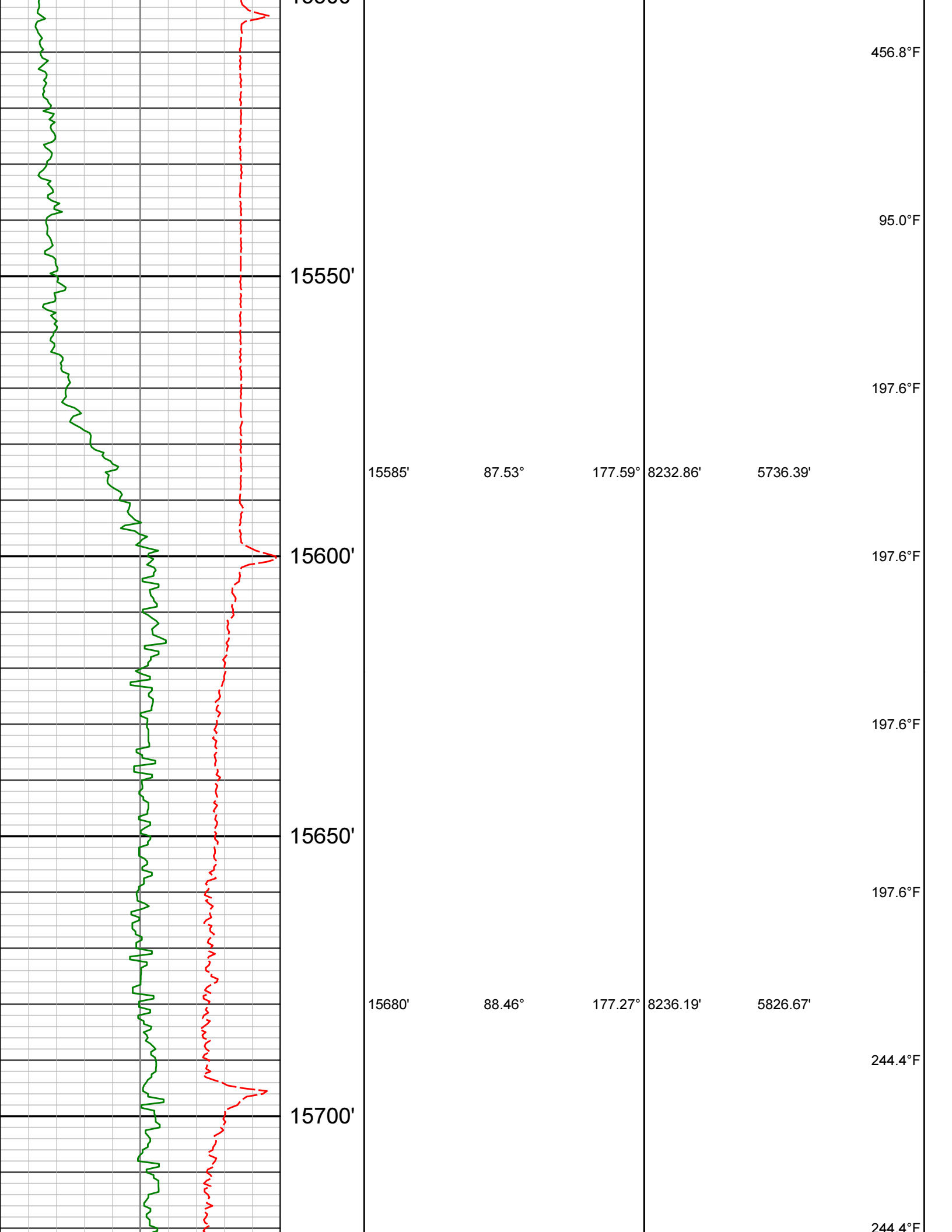


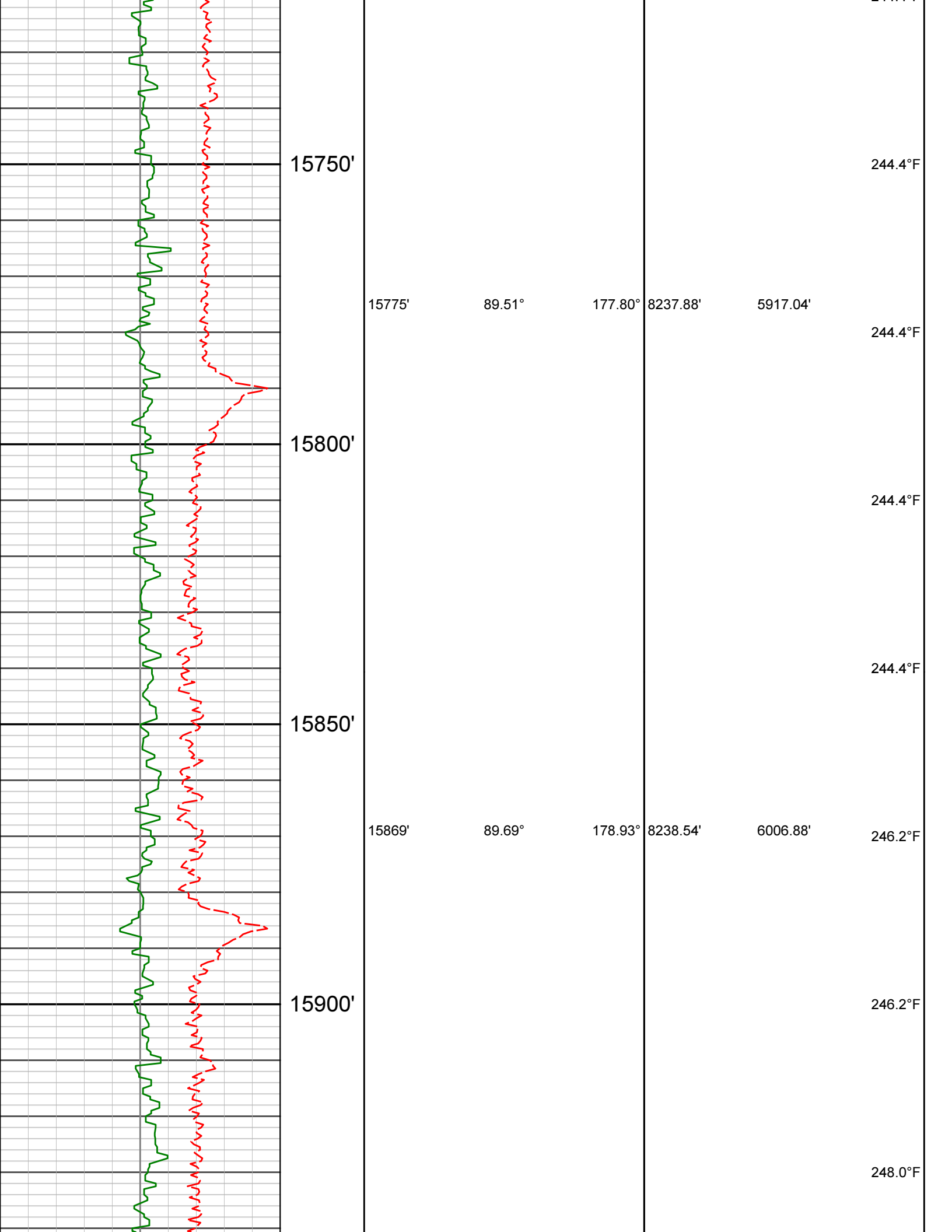


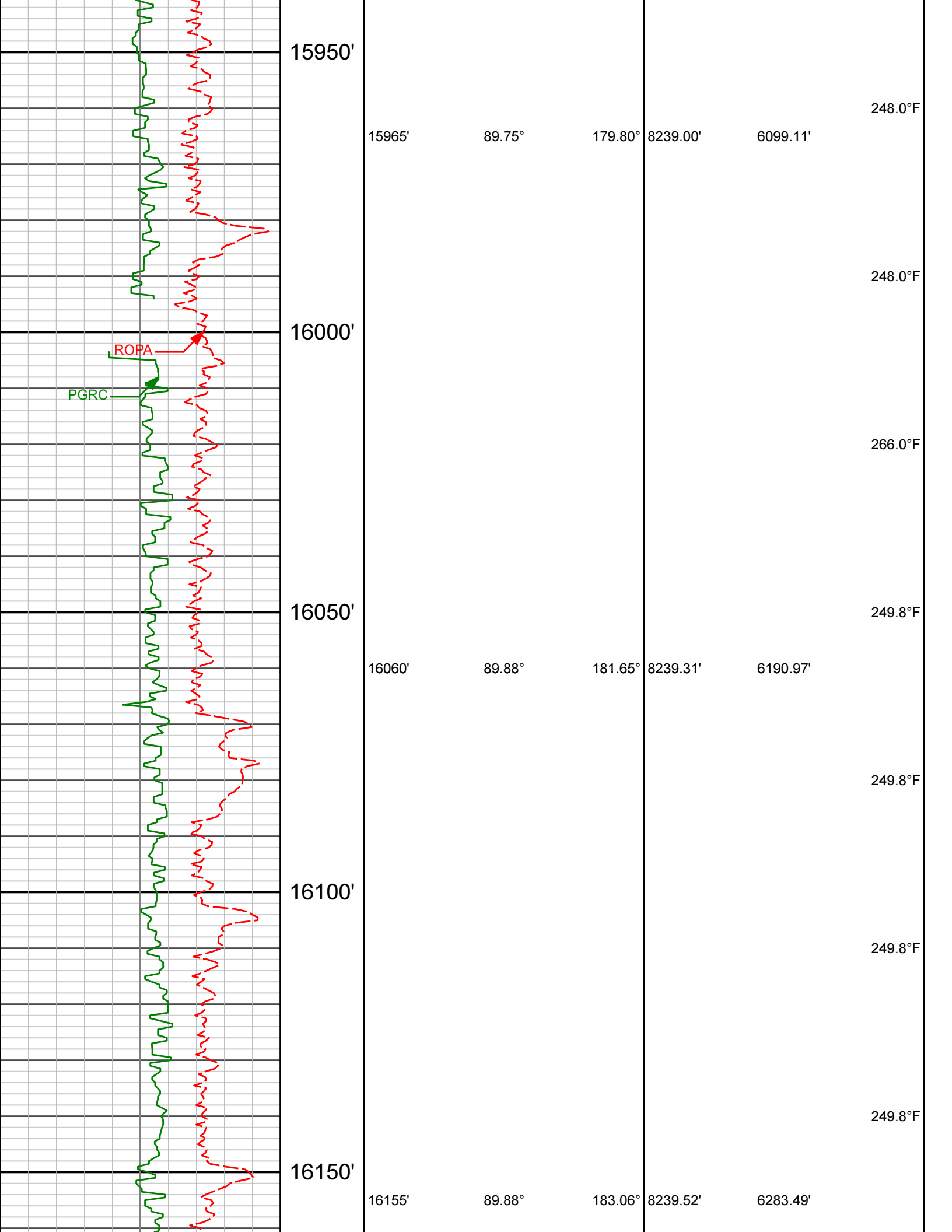


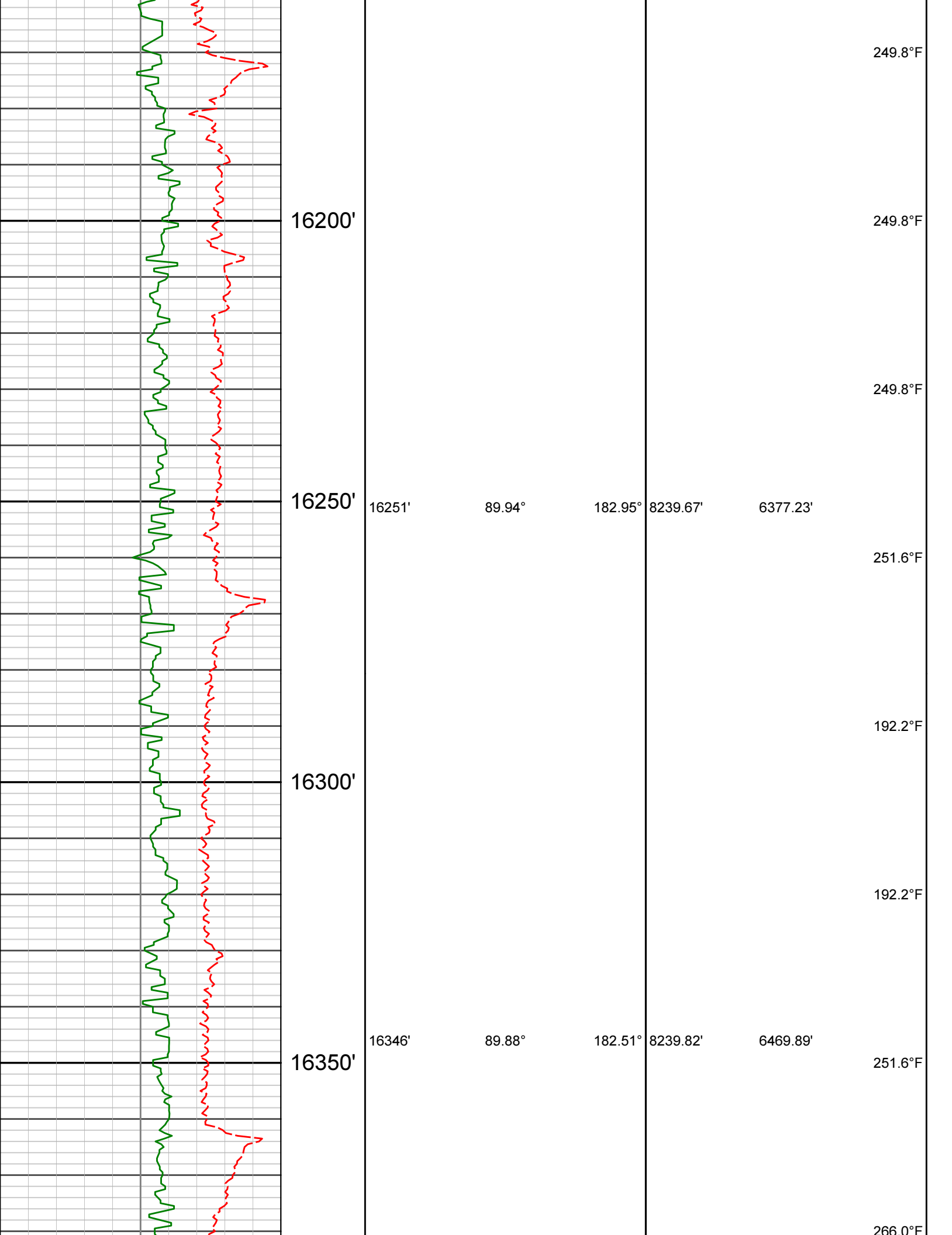


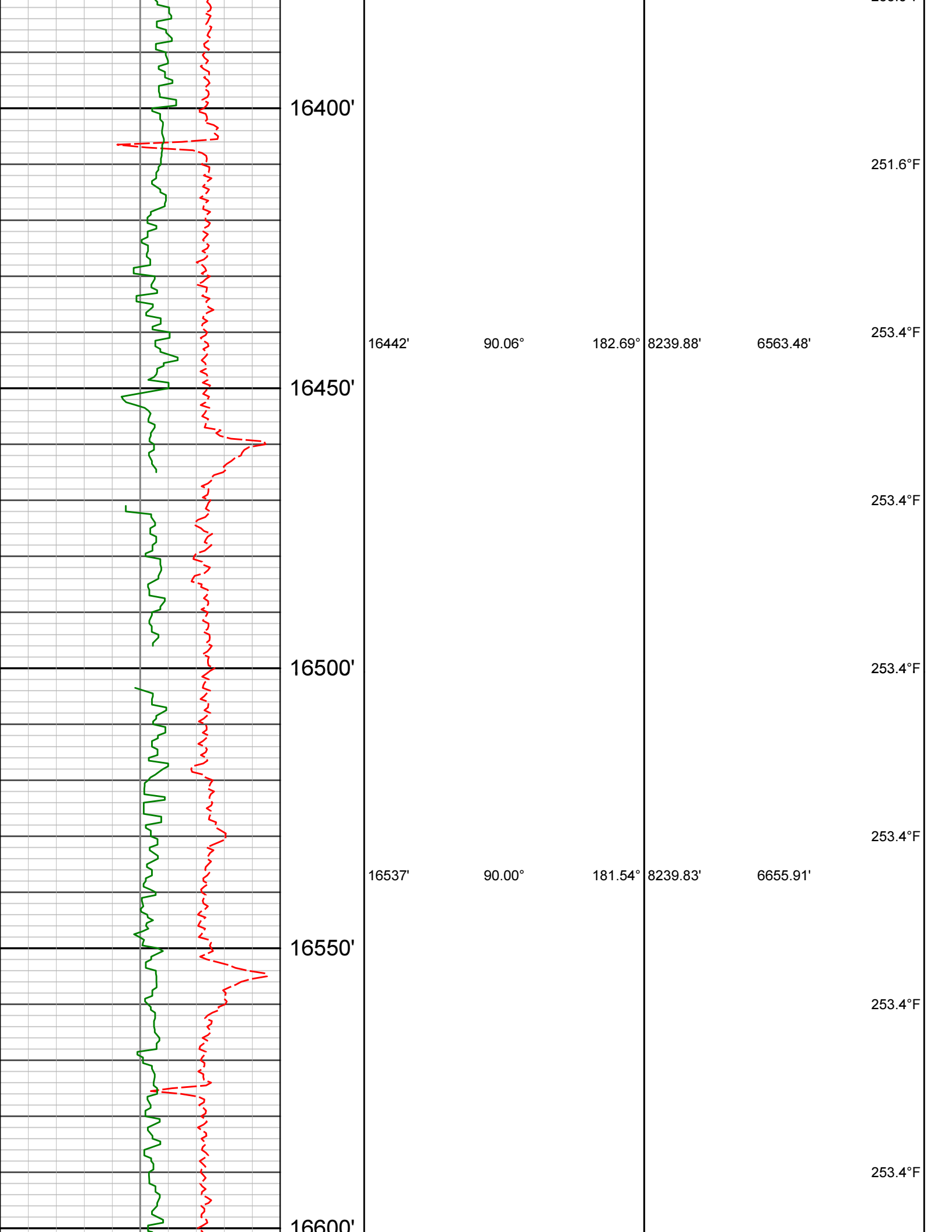


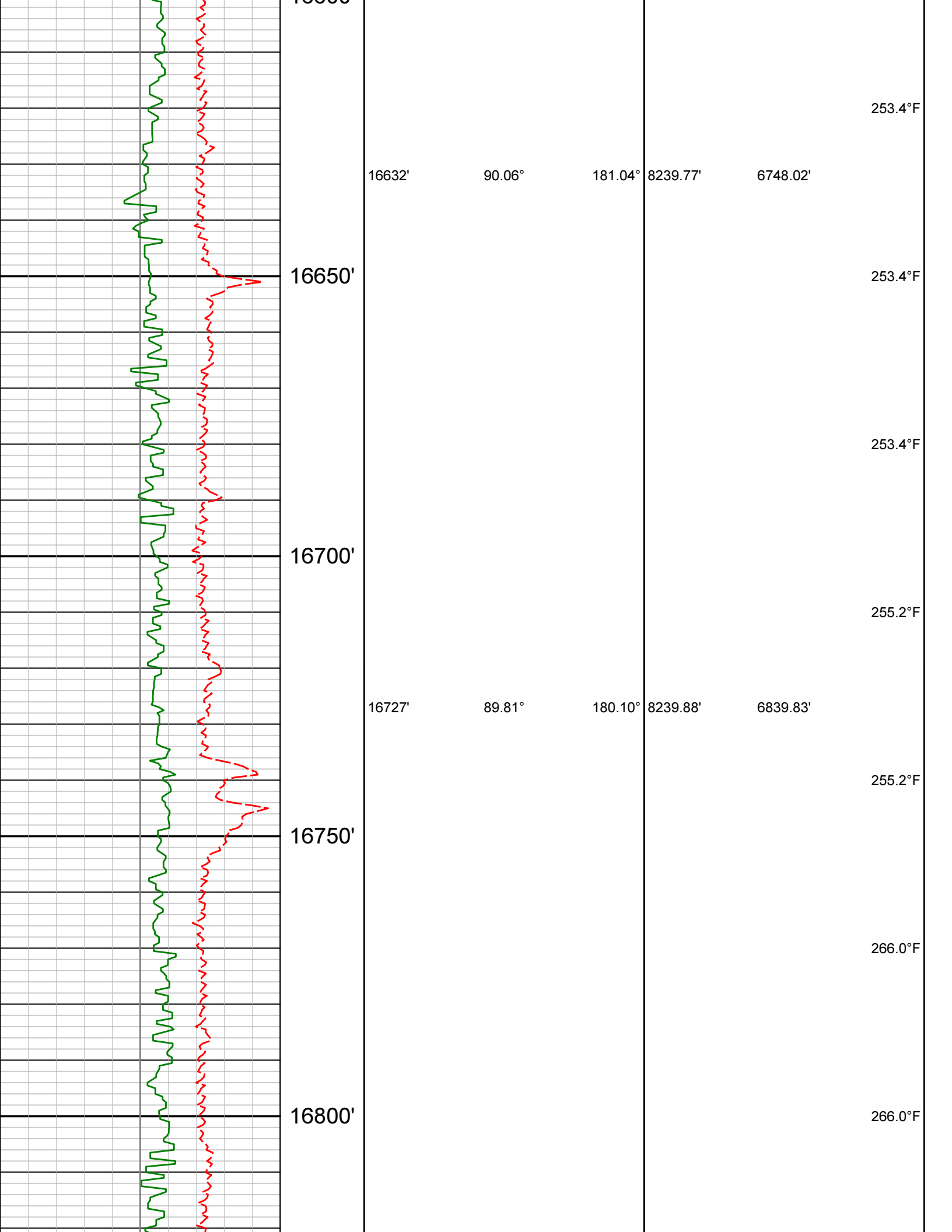




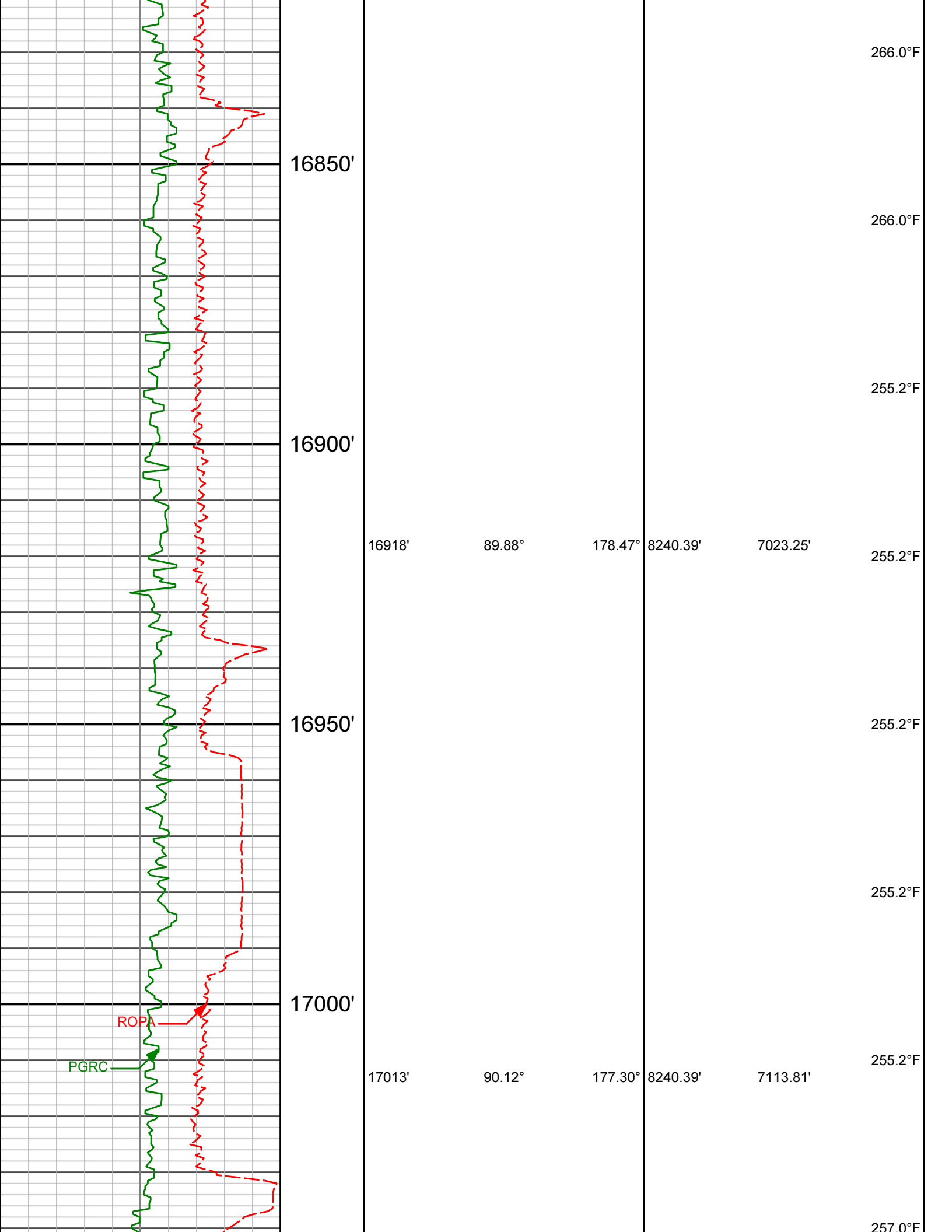


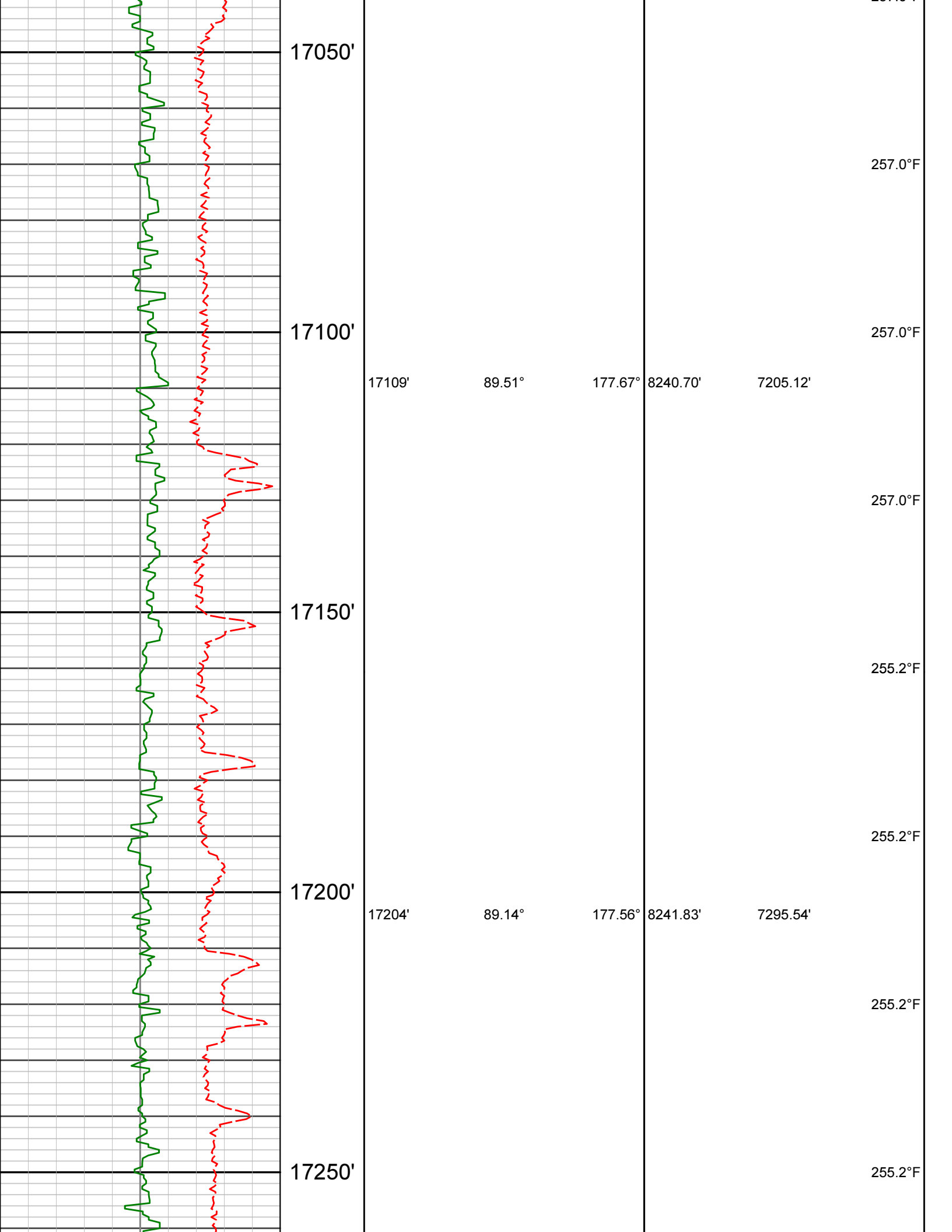


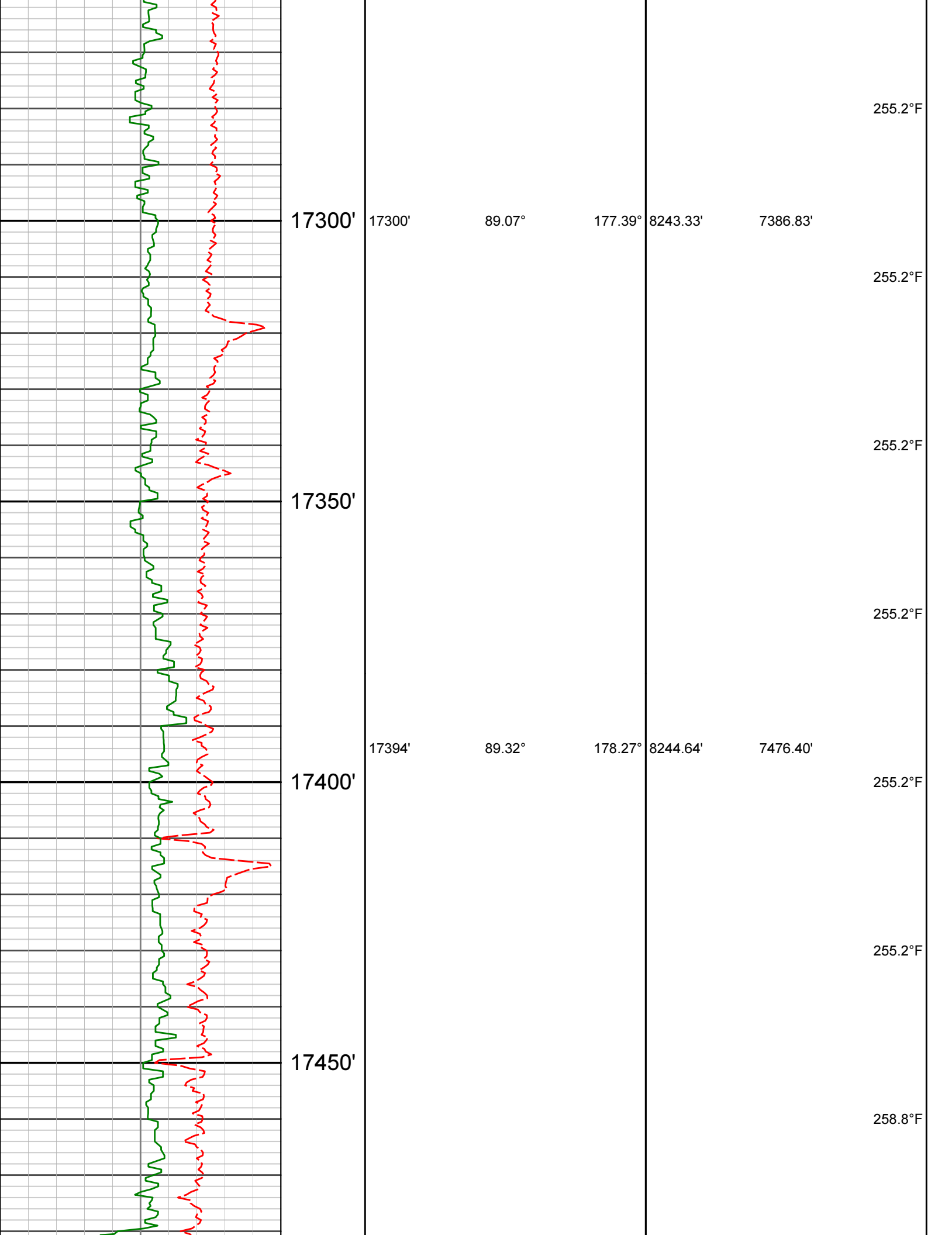


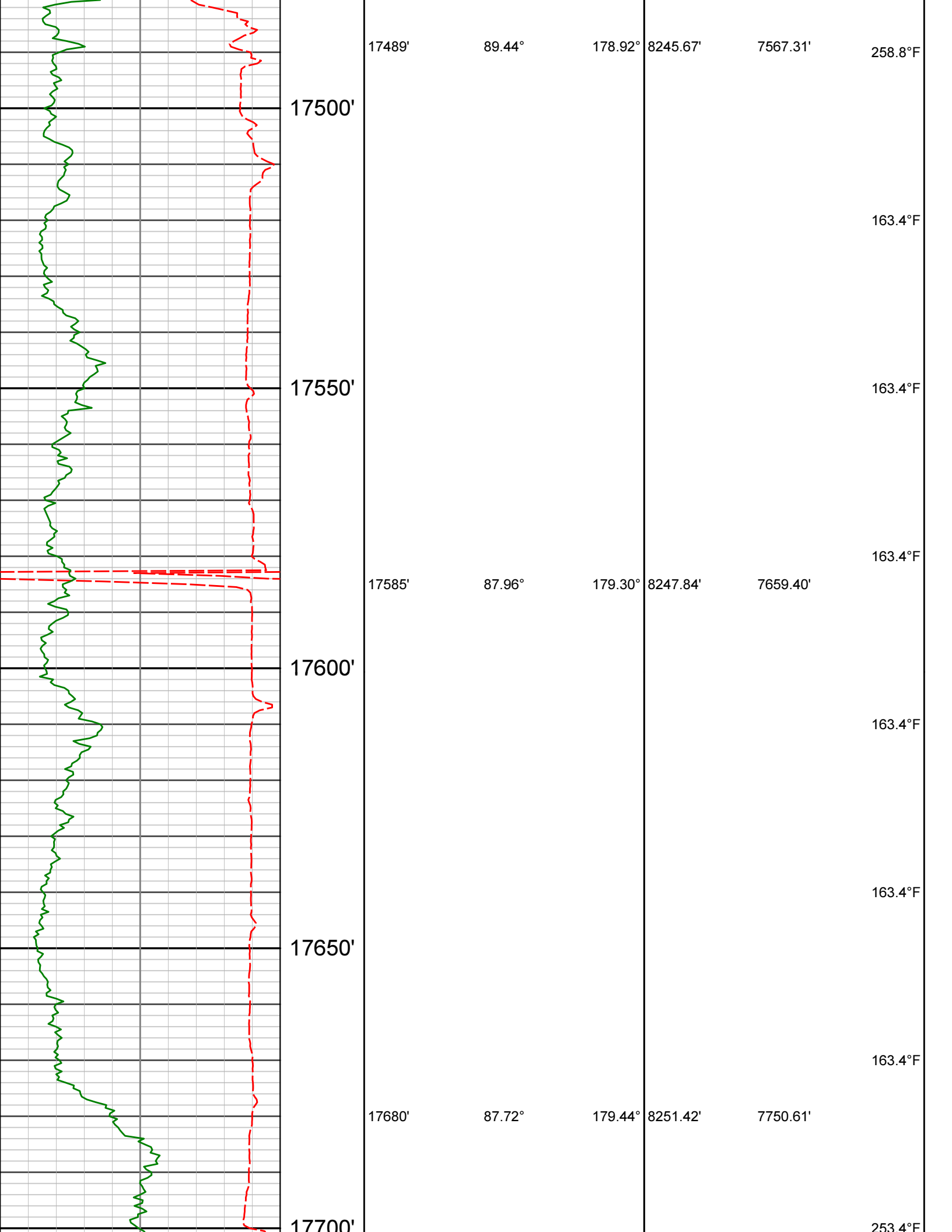


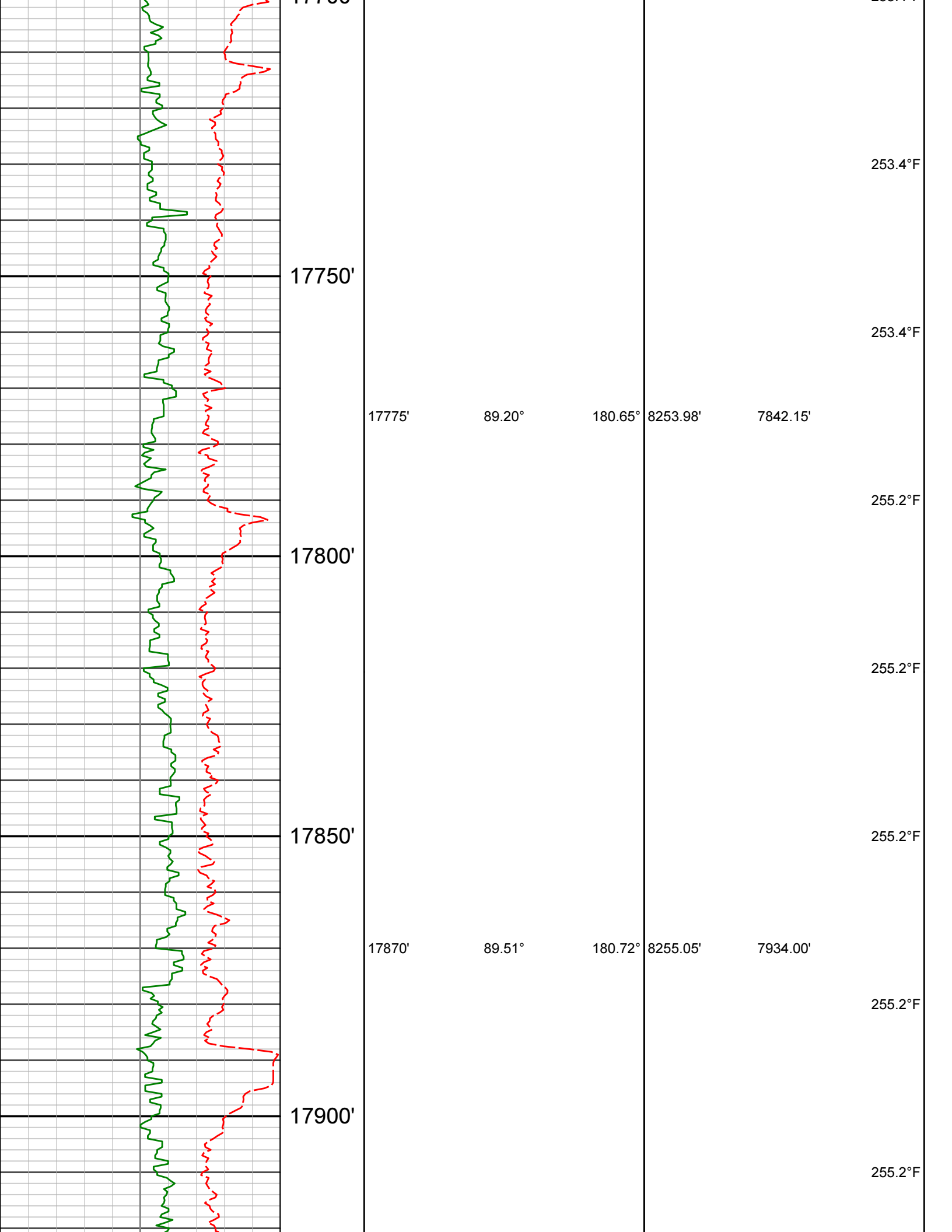


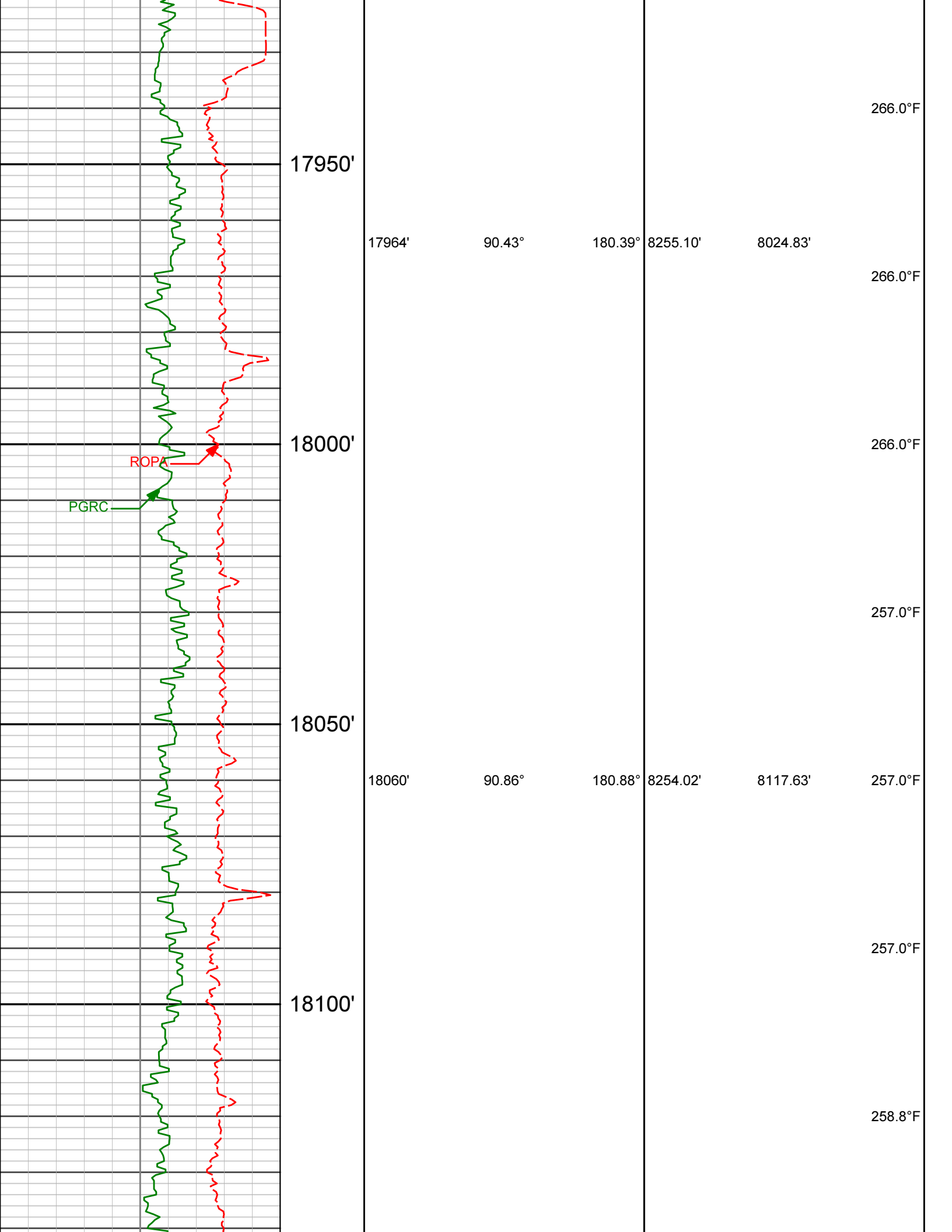


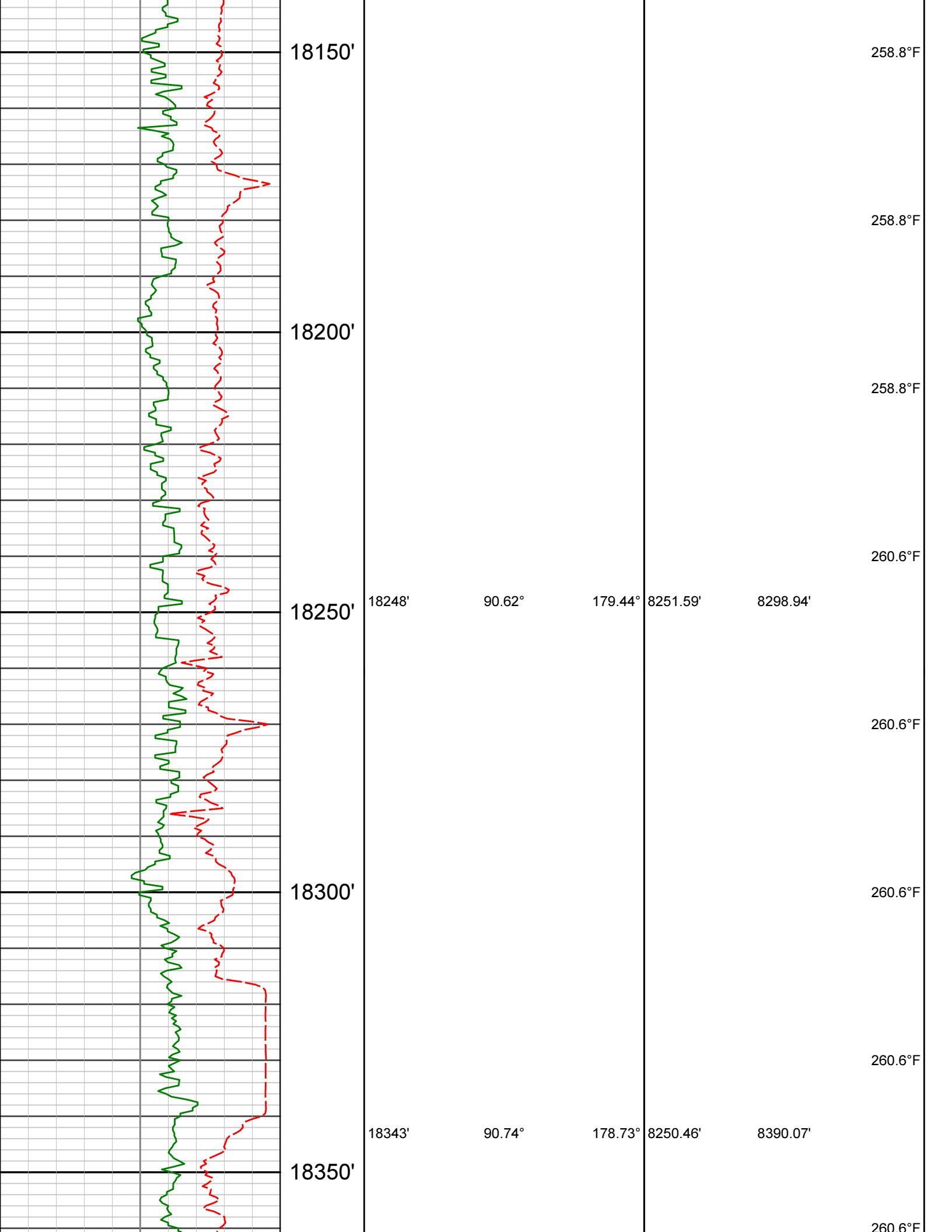


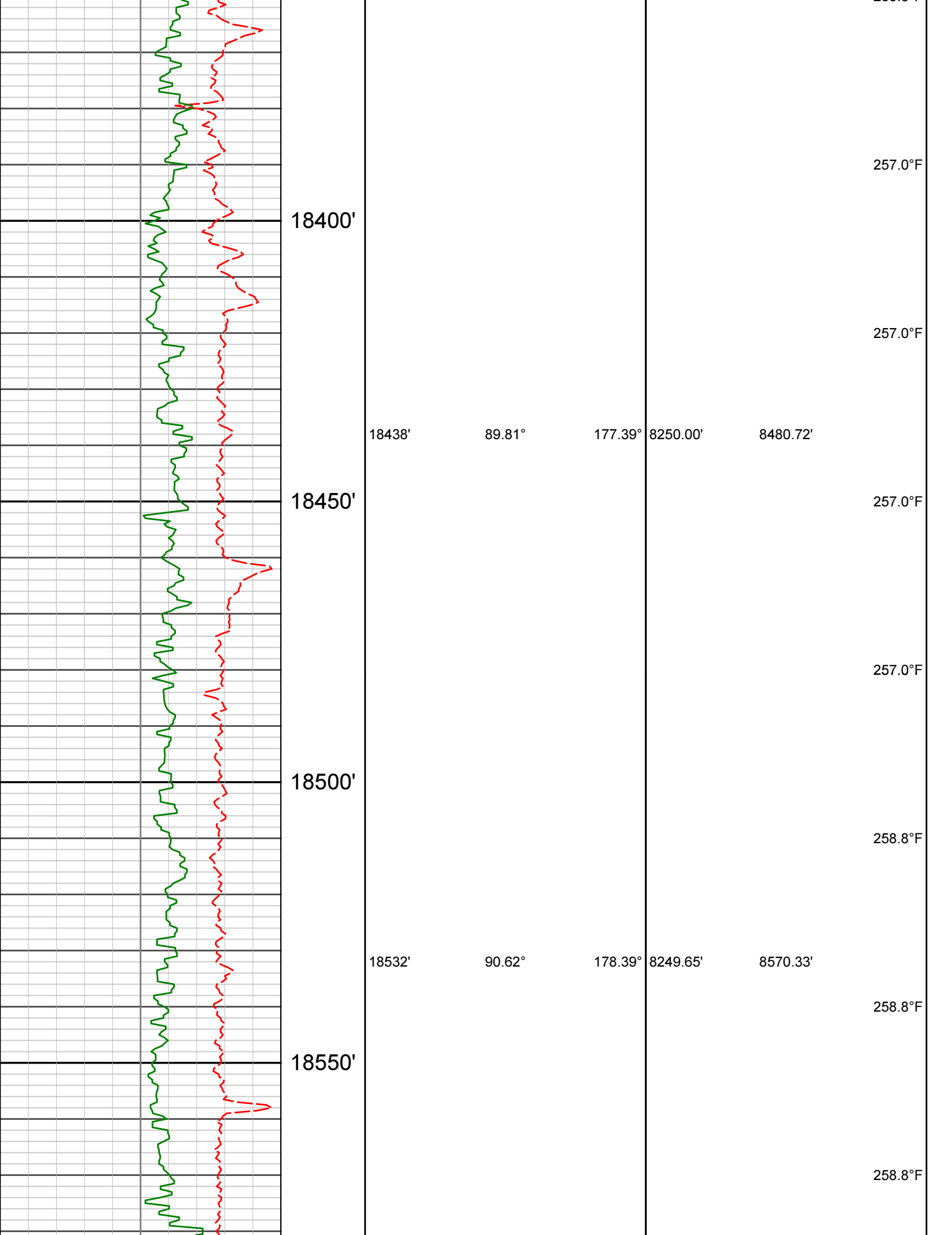




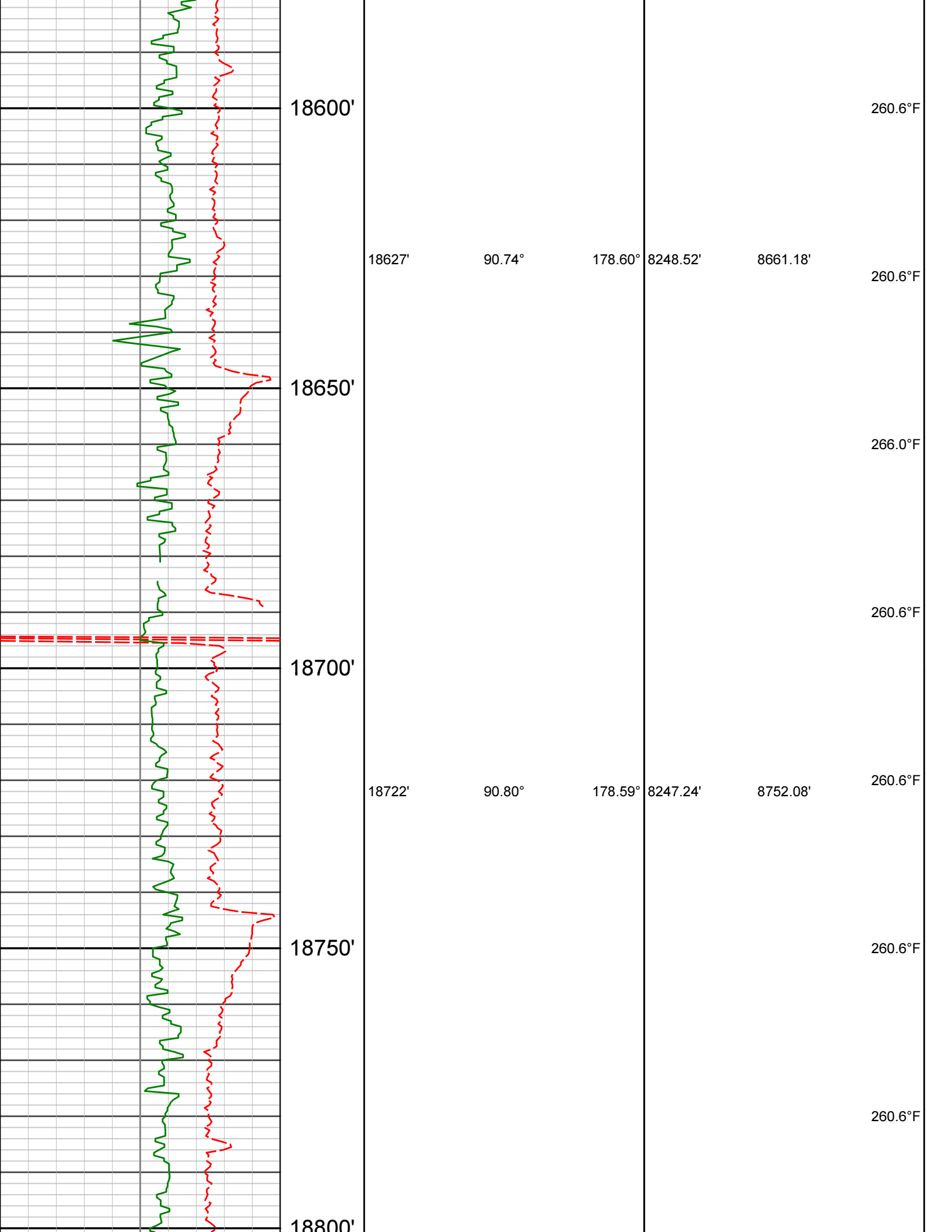


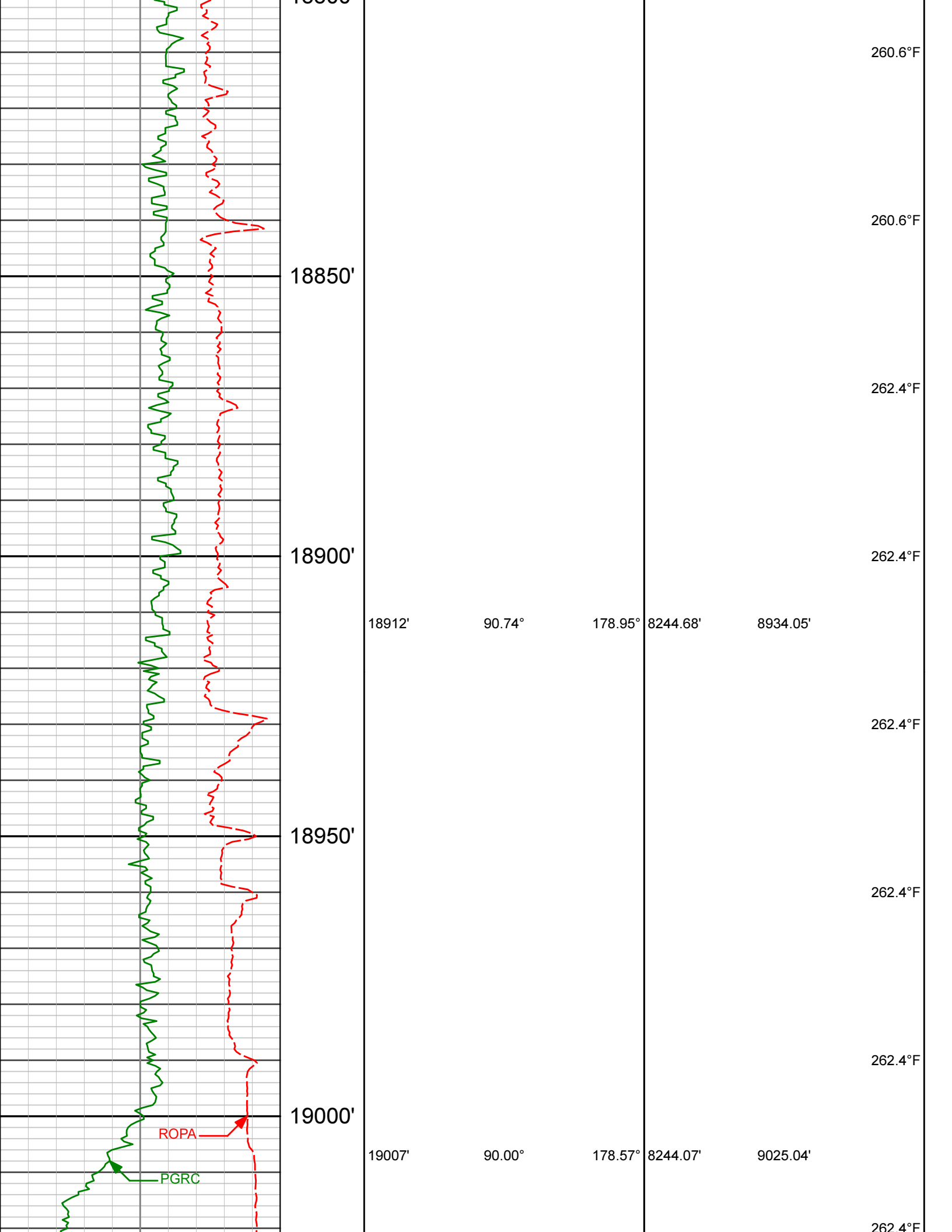


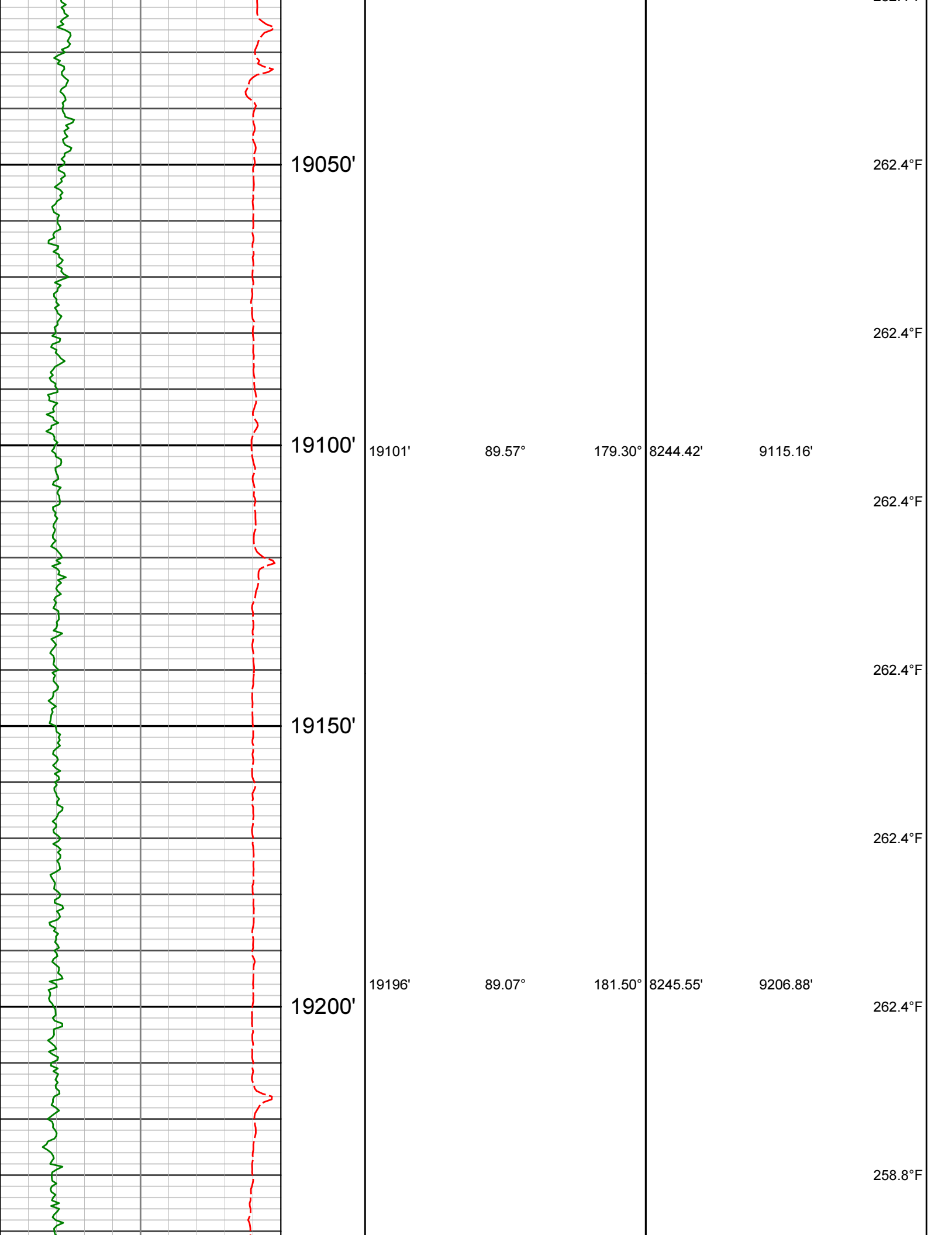


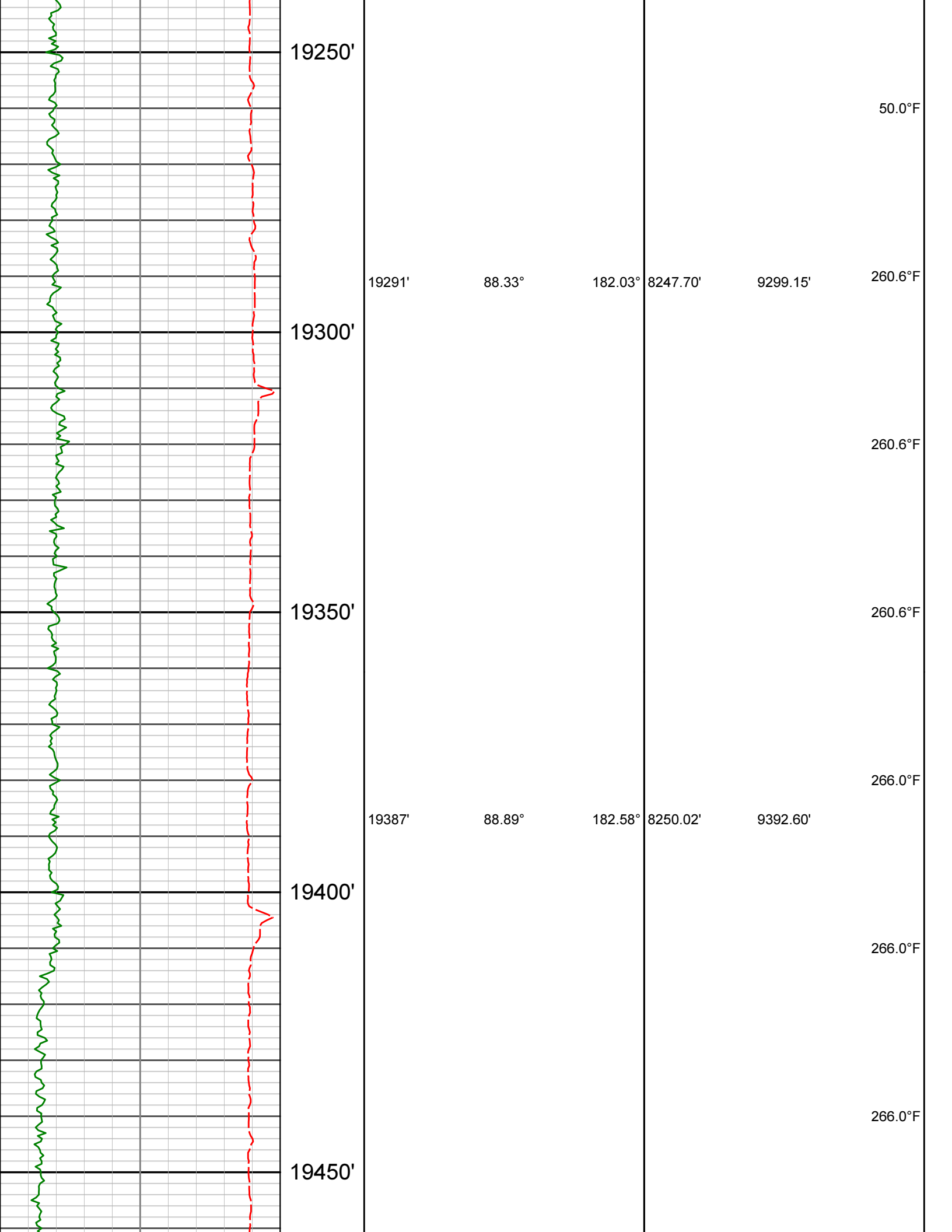


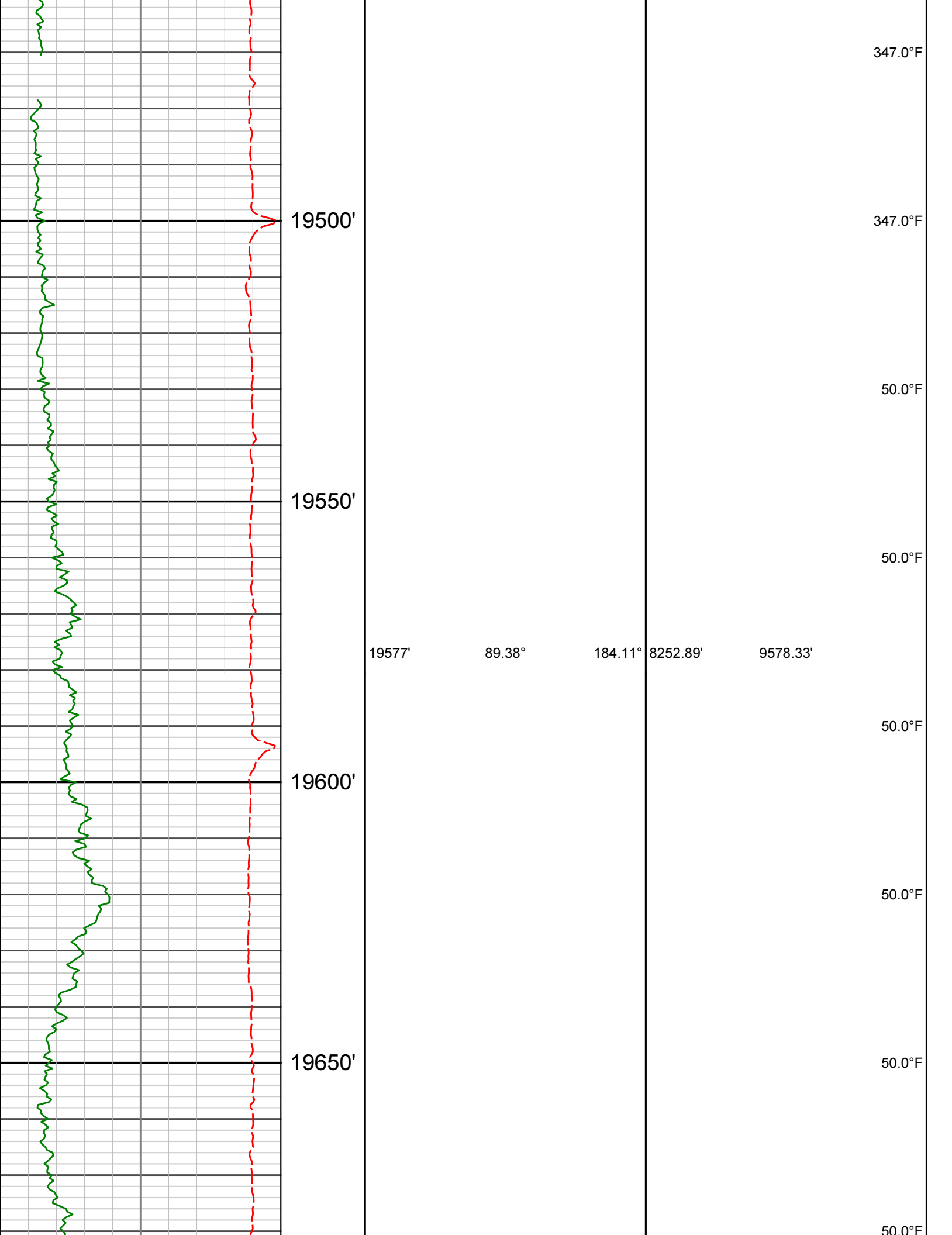


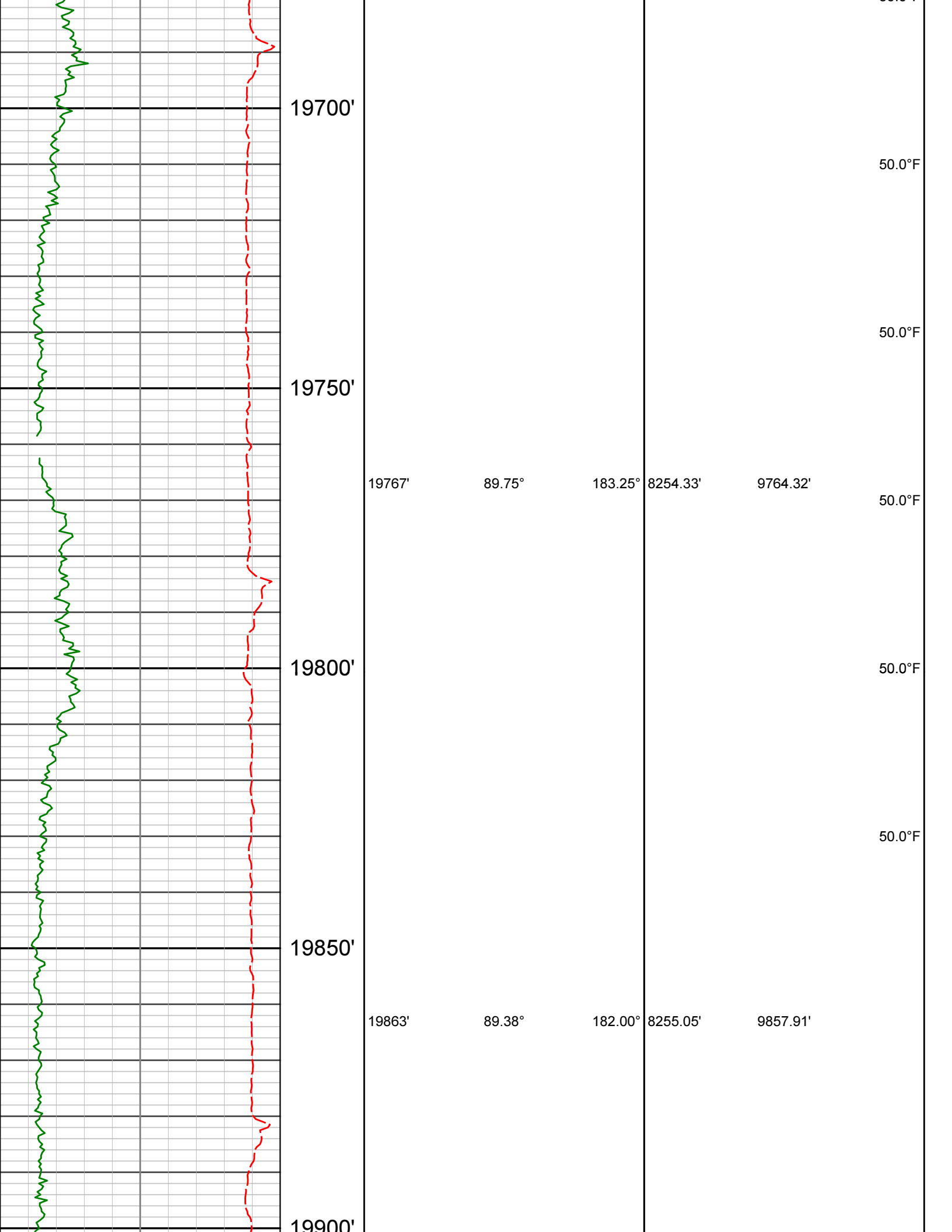


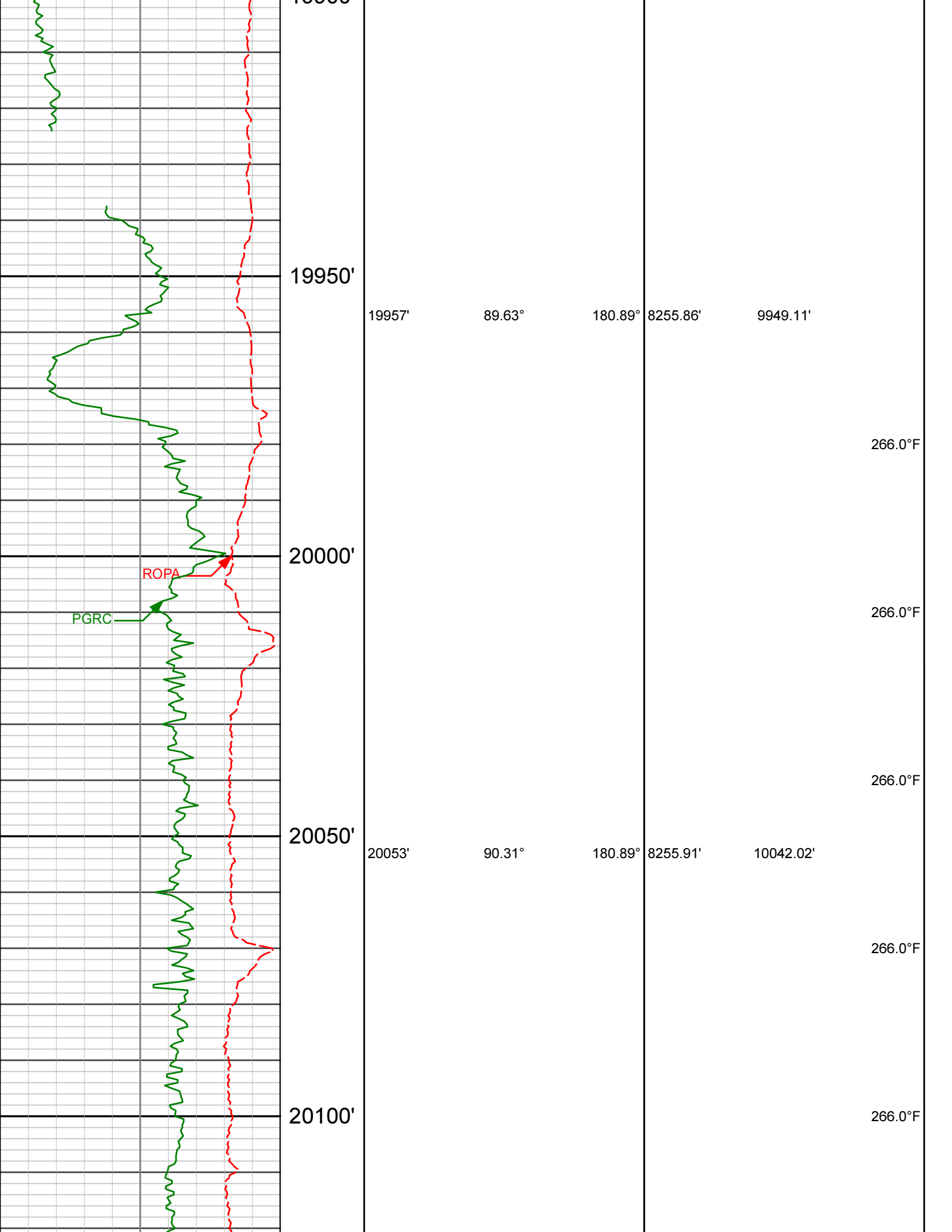


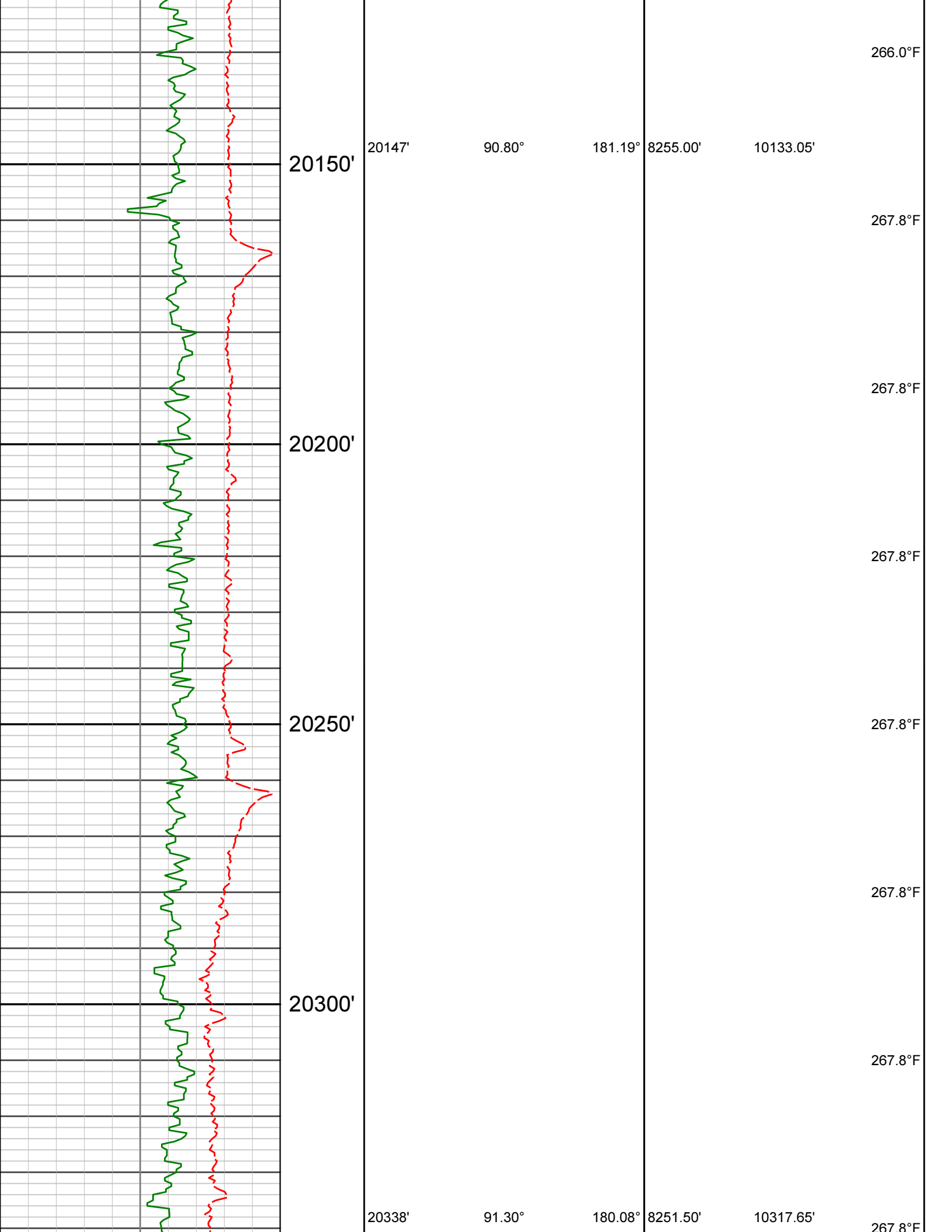




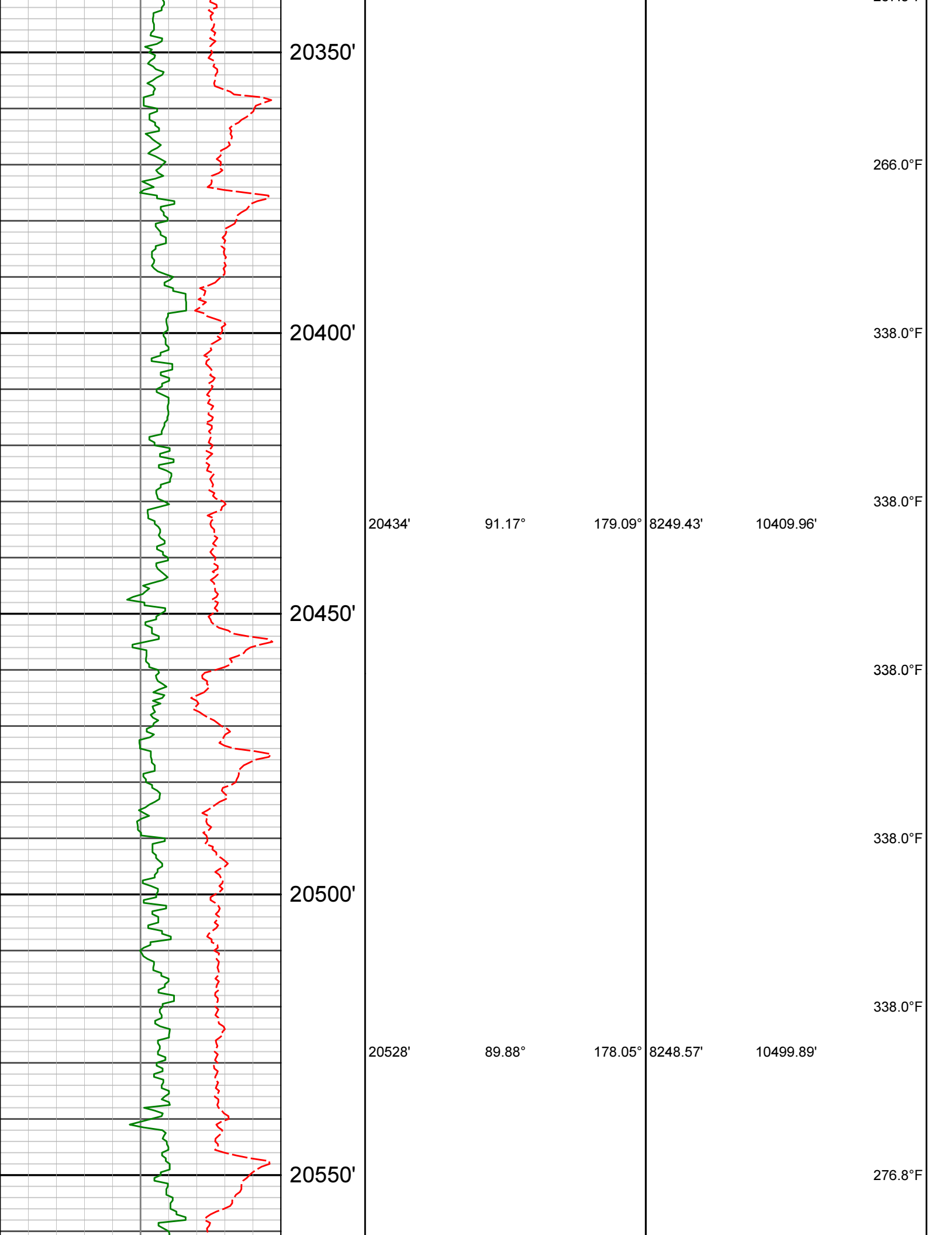


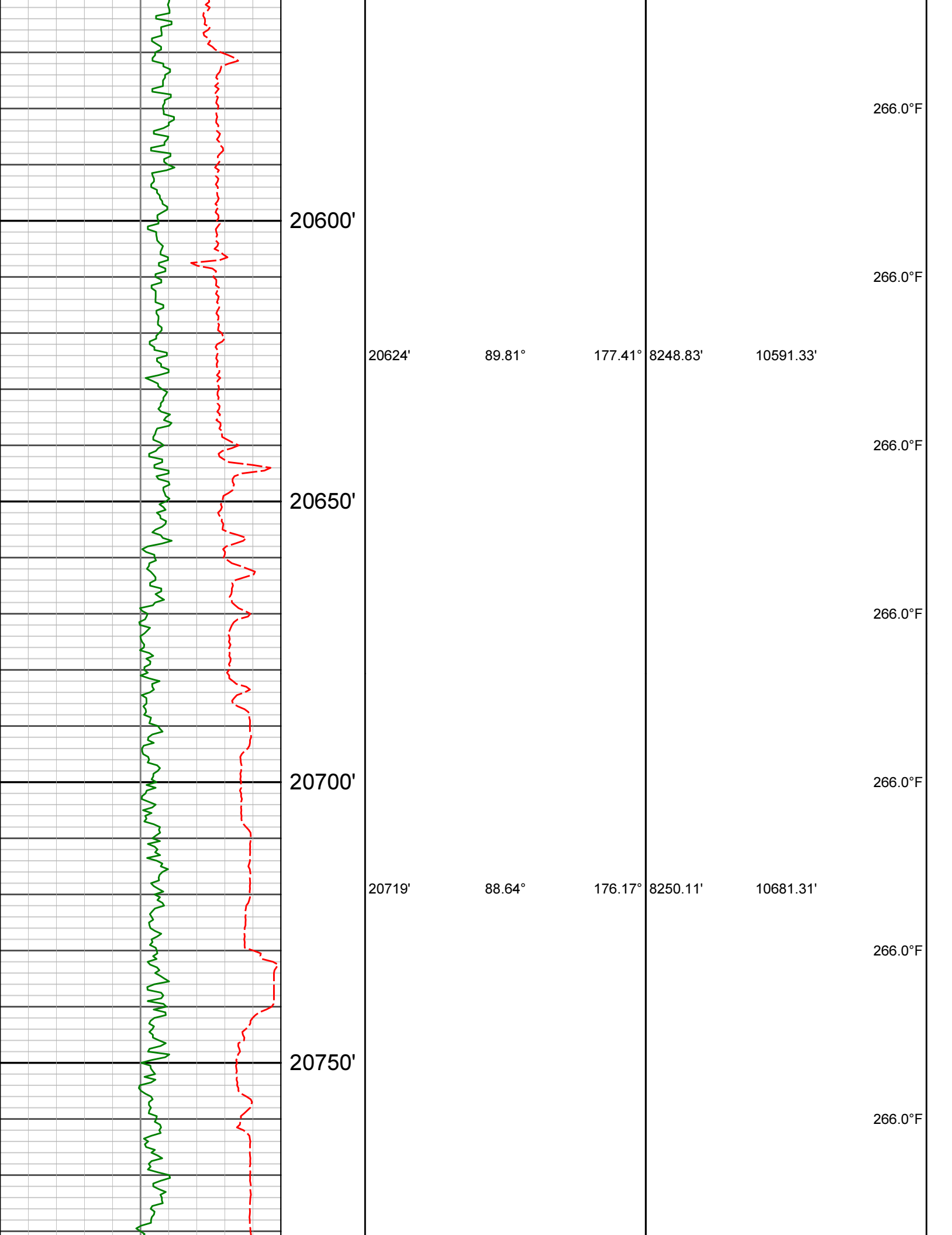


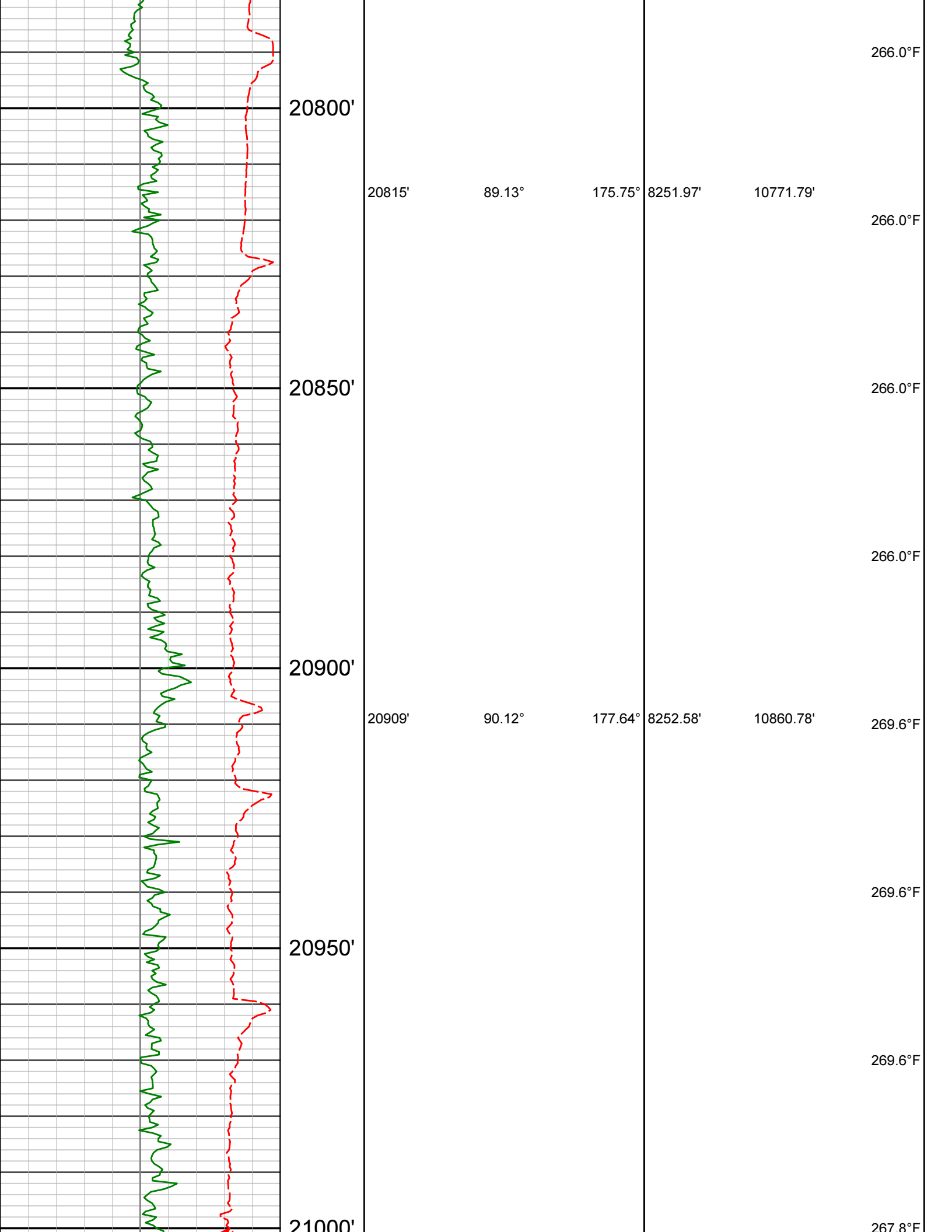


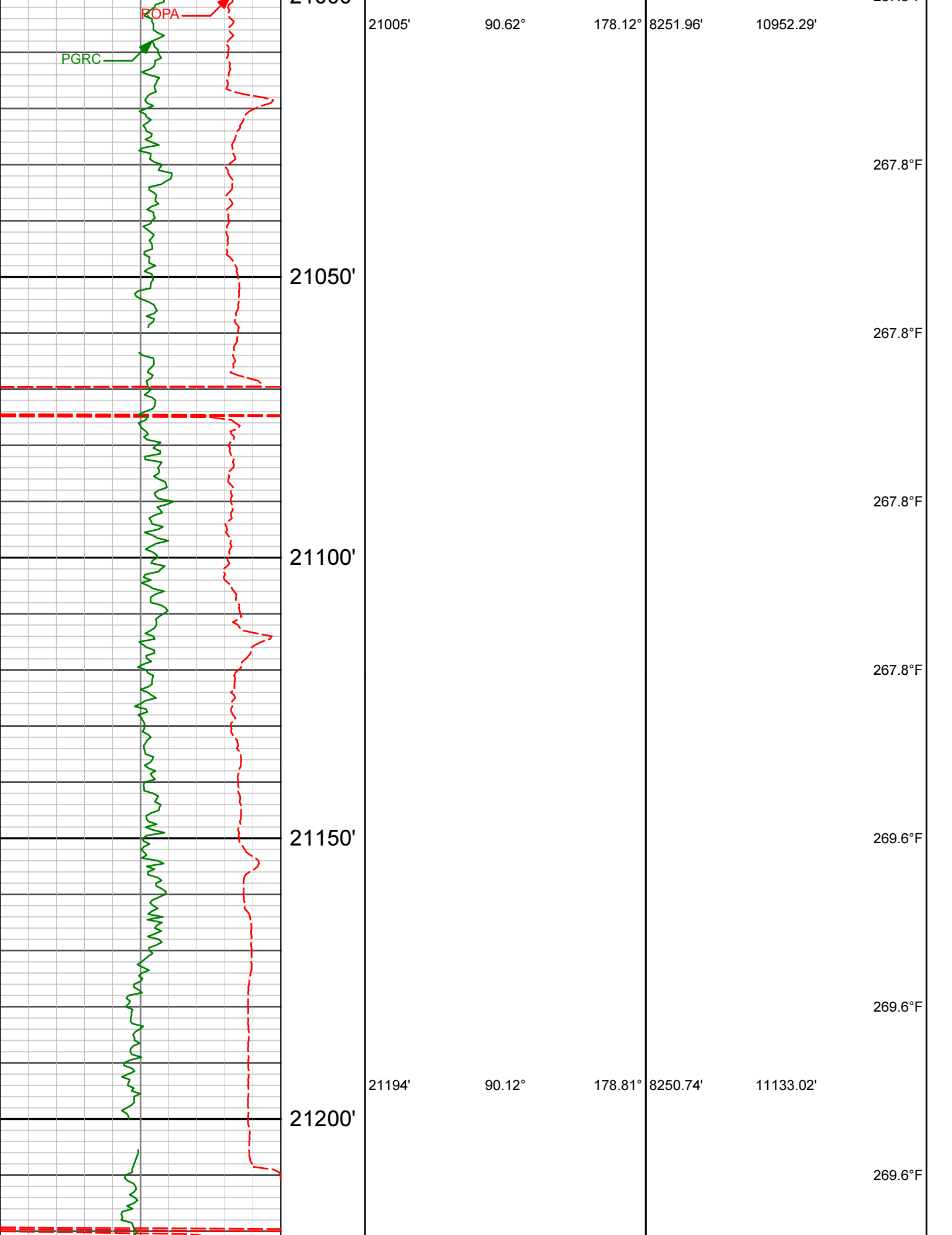


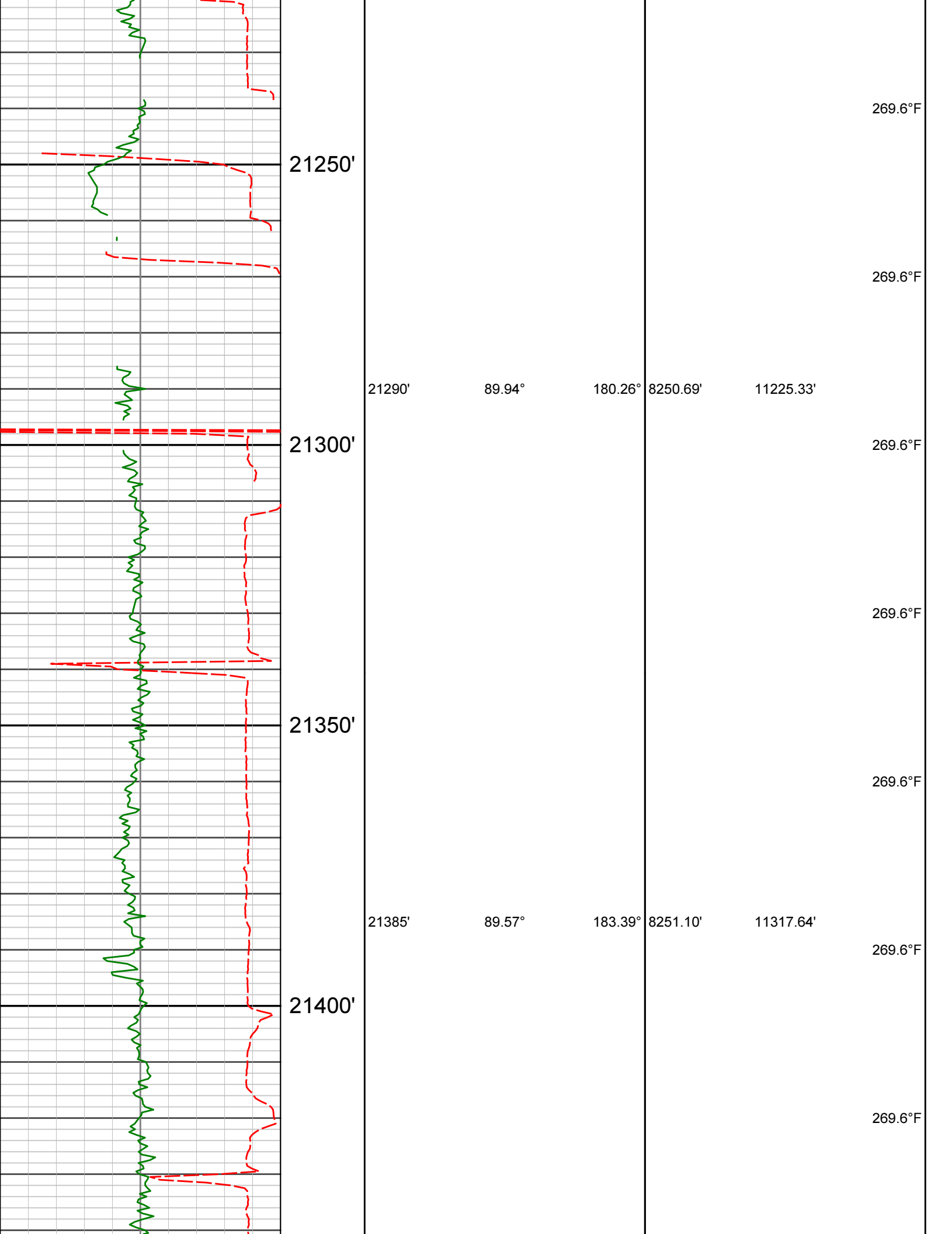


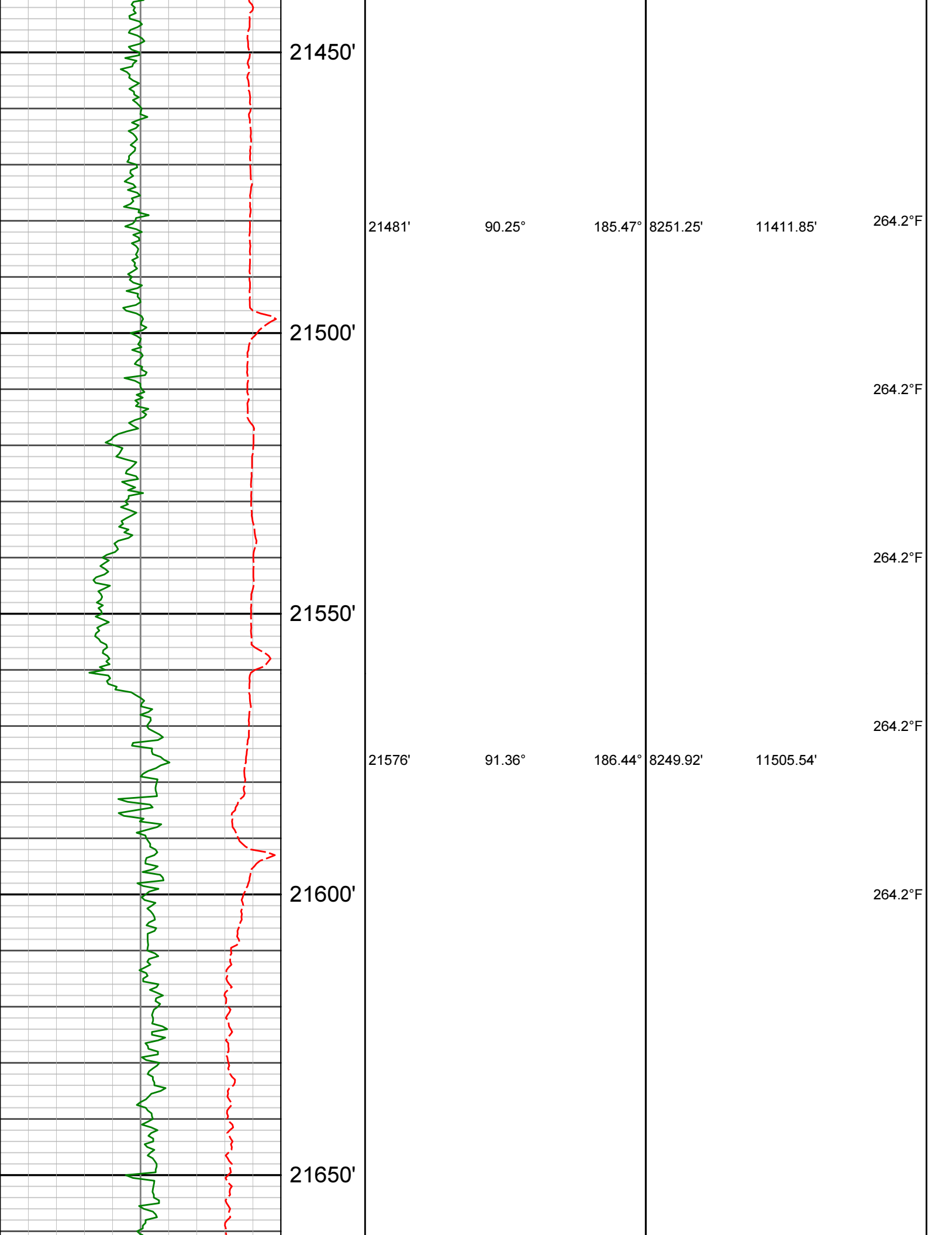


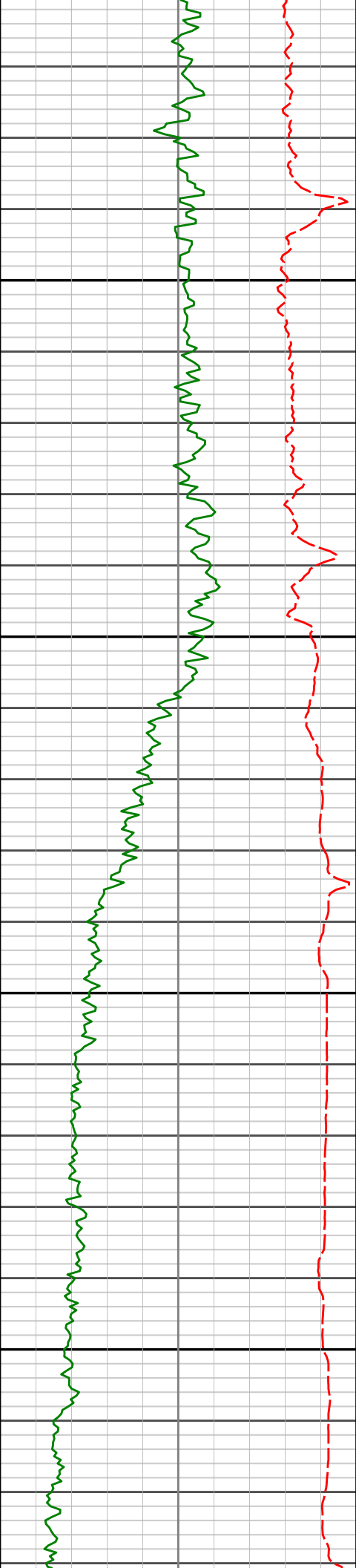












21672'

91.30°

183.26°

8247.70'

11599.85'

21700'

21750'

21767'

90.00°

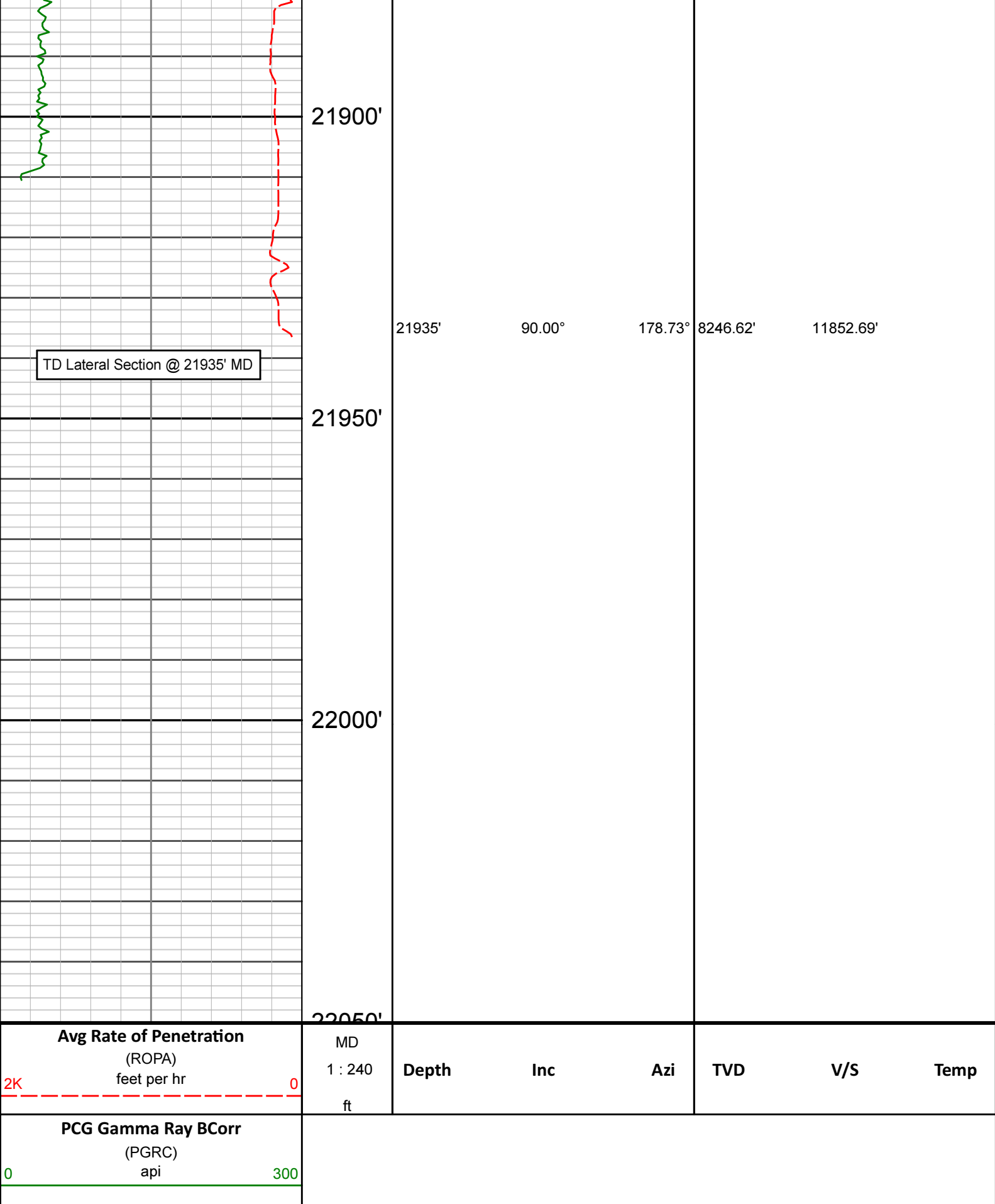
178.73°

8246.62'

11691.81'

21800'

21850'





## DIRECTIONAL SURVEY REPORT

Extraction Oil Gas  
NORTHWEST A S20-25-11C  
Wattenberg  
Broomfield Colorado  
USA  
CA-XX-0906082680  
Surveys from 0' to 1565' are 3rd party surveys.  
First Sperry survey at 1644'.

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
131.00	0.71	167.82	131.00	0.79 S	0.17 E	0.72	0.54
223.00	0.88	164.78	222.99	2.03 S	0.48 E	1.83	0.19
314.00	0.84	164.47	313.98	3.35 S	0.84 E	3.00	0.04
403.00	0.80	164.47	402.97	4.58 S	1.18 E	4.10	0.04
492.00	0.35	77.39	491.96	5.12 S	1.61 E	4.50	0.96
582.00	0.57	66.73	581.96	4.88 S	2.29 E	4.09	0.26
672.00	0.66	52.45	671.96	4.39 S	3.11 E	3.40	0.20
761.00	0.84	49.72	760.95	3.65 S	4.02 E	2.45	0.21
851.00	0.97	231.41	850.95	3.70 S	3.93 E	2.52	2.01
940.00	0.97	230.75	939.93	4.65 S	2.75 E	3.74	0.01
1029.00	0.97	225.46	1028.92	5.65 S	1.63 E	5.01	0.10
1118.00	0.84	219.69	1117.91	6.68 S	0.68 E	6.26	0.18
1208.00	0.97	226.25	1207.90	7.72 S	0.29 W	7.52	0.18
1297.00	2.43	268.91	1296.86	8.27 S	2.72 W	8.70	2.07
1386.00	3.67	280.85	1385.73	7.77 S	7.41 W	9.47	1.56
1475.00	5.48	289.05	1474.45	5.85 S	14.22 W	9.43	2.16
1565.00	8.04	287.86	1563.81	2.52 S	24.28 W	8.90	2.85
1644.00	7.83	285.85	1642.06	0.65 N	34.71 W	8.63	0.44
1738.00	10.10	287.85	1734.90	4.92 N	48.71 W	8.25	2.44
1833.00	12.10	294.35	1828.12	11.58 N	65.72 W	6.36	2.48
1928.00	14.68	291.22	1920.53	20.05 N	86.02 W	3.62	2.82
2047.00	16.10	291.55	2035.26	31.57 N	115.43 W	0.36	1.19
2143.00	18.15	294.37	2127.00	42.63 N	141.43 W	-3.36	2.30
2237.00	19.41	294.63	2216.00	55.18 N	168.96 W	-8.12	1.35
2332.00	22.85	295.98	2304.60	69.84 N	199.90 W	-14.00	3.65
2428.00	26.44	296.57	2391.84	87.57 N	235.78 W	-21.51	3.75
2522.00	25.69	295.61	2476.28	105.73 N	272.86 W	-29.13	0.91
2617.00	28.57	290.97	2560.83	122.77 N	312.66 W	-34.94	3.76
2713.00	29.34	291.91	2644.83	139.76 N	355.91 W	-39.78	0.93
2808.00	31.71	292.25	2726.66	157.90 N	400.62 W	-45.34	2.50
2901.00	33.46	290.69	2805.02	176.22 N	447.23 W	-50.56	2.09
2995.00	35.43	288.72	2882.53	194.12 N	497.29 W	-54.46	2.41
3091.00	37.01	293.81	2959.99	214.72 N	550.10 W	-60.23	3.54
3185.00	37.86	291.72	3034.63	236.82 N	602.79 W	-67.48	1.62
3279.00	39.28	291.44	3108.13	258.37 N	657.28 W	-73.72	1.52
3374.00	43.05	292.22	3179.64	281.63 N	715.31 W	-80.66	4.01
3469.00	41.88	292.00	3249.72	305.78 N	774.73 W	-88.08	1.24
3564.00	44.59	295.79	3318.93	332.18 N	834.18 W	-97.67	3.95
3659.00	42.75	296.76	3387.65	361.21 N	893.00 W	-109.97	2.06
3754.00	40.63	296.38	3458.58	389.47 N	949.50 W	-122.14	2.25
3849.00	42.20	297.57	3529.82	417.99 N	1005.50 W	-134.69	1.85
3944.00	42.09	295.38	3600.26	446.41 N	1062.55 W	-146.86	1.55
4040.00	45.26	292.49	3669.70	473.25 N	1123.14 W	-156.57	3.90
4135.00	43.03	292.48	3737.86	498.56 N	1184.27 W	-164.66	2.34
4231.00	40.94	292.18	3809.22	522.96 N	1243.67 W	-172.33	2.19
4326.00	36.76	287.20	3883.21	543.13 N	1299.69 W	-176.83	5.49
4421.00	38.73	291.71	3958.34	562.53 N	1354.47 W	-180.92	3.57
4517.00	40.62	296.11	4032.24	587.39 N	1410.45 W	-189.96	3.53
4612.00	43.64	298.01	4102.69	616.41 N	1467.17 W	-202.79	3.45

## NORTHWEST A S20-25-11C

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
4708.00	44.55	294.14	4171.64	645.74 N	1527.16 W	-215.06	2.96
4803.00	41.26	292.93	4241.22	671.58 N	1586.43 W	-224.16	3.58
4898.00	40.84	296.90	4312.88	697.84 N	1642.99 W	-234.39	2.78
4993.00	44.59	293.96	4382.68	725.45 N	1701.19 W	-245.47	4.47
5128.00	44.81	293.82	4478.64	763.90 N	1788.01 W	-259.38	0.18
5223.00	41.60	293.97	4547.88	790.24 N	1847.47 W	-268.90	3.38
5318.00	43.05	290.22	4618.13	814.26 N	1906.72 W	-276.26	3.07
5412.00	44.58	290.49	4685.95	836.90 N	1967.74 W	-281.80	1.64
5506.00	41.30	289.68	4754.75	858.91 N	2027.87 W	-286.97	3.54
5601.00	43.10	294.50	4825.14	882.93 N	2086.95 W	-294.37	3.90
5696.00	46.25	294.72	4892.69	910.75 N	2147.66 W	-304.99	3.31
5791.00	44.78	293.38	4959.26	938.37 N	2209.54 W	-315.11	1.84
5886.00	43.49	293.62	5027.44	964.75 N	2270.21 W	-324.35	1.37
5980.00	44.84	294.31	5094.87	991.36 N	2330.05 W	-334.03	1.52
6075.00	43.80	294.35	5162.83	1018.70 N	2390.53 W	-344.26	1.10
6170.00	42.56	294.34	5232.11	1045.50 N	2449.76 W	-354.29	1.30
6266.00	40.24	295.35	5304.11	1072.16 N	2507.37 W	-364.62	2.52
6361.00	41.35	294.59	5376.03	1098.36 N	2563.64 W	-374.86	1.29
6455.00	39.36	296.51	5447.66	1124.58 N	2618.56 W	-385.49	2.50
6550.00	42.09	294.87	5519.65	1151.43 N	2674.41 W	-396.46	3.08
6645.00	41.29	291.85	5590.60	1176.48 N	2732.39 W	-405.15	2.28
6740.00	39.05	290.94	5663.20	1198.84 N	2789.44 W	-411.49	2.43
6835.00	36.04	291.31	5738.51	1219.70 N	2843.44 W	-417.19	3.17
6930.00	32.40	290.08	5817.05	1238.60 N	2893.39 W	-422.08	3.91
7025.00	28.97	289.82	5898.74	1255.15 N	2938.95 W	-425.88	3.60
7121.00	29.25	292.37	5982.61	1271.96 N	2982.52 W	-430.46	1.32
7216.00	27.19	293.92	6066.32	1289.60 N	3023.83 W	-436.44	2.30
7311.00	24.03	294.40	6151.97	1306.39 N	3061.30 W	-442.64	3.34
7406.00	20.44	294.19	6239.89	1321.18 N	3094.06 W	-448.16	3.77
7502.00	17.25	294.62	6330.73	1333.99 N	3122.30 W	-452.96	3.33
7596.00	14.01	293.34	6421.25	1344.30 N	3145.42 W	-456.74	3.47
7691.00	11.16	294.05	6513.95	1352.61 N	3164.39 W	-459.69	3.00
7786.00	8.41	295.53	6607.56	1359.36 N	3179.05 W	-462.28	2.91
7882.00	6.70	298.52	6702.73	1365.06 N	3190.31 W	-464.77	1.83
7976.00	4.52	297.48	6796.27	1369.38 N	3198.41 W	-466.78	2.32
8072.00	3.08	296.22	6892.06	1372.27 N	3204.09 W	-468.05	1.50
8167.00	2.75	292.38	6986.93	1374.27 N	3208.48 W	-468.80	0.41
8262.00	2.09	286.02	7081.85	1375.61 N	3212.26 W	-469.09	0.75
8356.00	1.07	203.83	7175.82	1375.28 N	3214.26 W	-468.24	2.36
8452.00	0.97	195.11	7271.80	1373.67 N	3214.84 W	-466.53	0.19
8546.00	0.86	176.32	7365.79	1372.20 N	3215.00 W	-465.07	0.34
8641.00	0.86	164.08	7460.78	1370.80 N	3214.76 W	-463.79	0.19
8737.00	0.67	178.09	7556.77	1369.55 N	3214.54 W	-462.64	0.28
8854.00	5.19	235.08	7673.60	1365.84 N	3218.86 W	-457.91	4.15
8949.00	16.07	205.69	7766.88	1351.48 N	3228.11 W	-441.60	12.44
9044.00	26.67	194.55	7855.26	1318.89 N	3239.20 W	-407.24	11.91
9139.00	38.87	179.69	7935.12	1268.17 N	3244.42 W	-356.97	15.29
9235.00	43.57	176.20	8007.32	1205.00 N	3242.07 W	-296.70	5.46
9330.00	47.14	176.57	8074.06	1137.55 N	3237.82 W	-232.84	3.76
9424.00	54.54	180.56	8133.40	1064.76 N	3236.13 W	-163.13	8.54
9520.00	63.05	182.04	8183.09	982.75 N	3238.03 W	-83.59	8.96
9615.00	74.98	185.65	8217.06	894.44 N	3244.08 W	3.14	13.05
9710.00	88.12	181.51	8231.00	800.88 N	3249.88 W	94.86	14.49
9806.00	90.91	179.02	8231.82	704.90 N	3250.32 W	187.48	3.89
9899.00	92.26	178.15	8229.25	611.97 N	3248.03 W	276.44	1.73

## NORTHWEST A S20-25-11C

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
9994.00	91.71	177.85	8225.96	517.08 N	3244.72 W	367.00	0.65
10090.00	88.42	175.99	8225.85	421.24 N	3239.57 W	458.00	3.94
10185.00	89.77	175.58	8227.35	326.51 N	3232.59 W	547.44	1.48
10280.00	89.33	178.69	8228.10	231.64 N	3227.85 W	637.60	3.31
10376.00	90.47	177.64	8228.27	135.70 N	3224.77 W	729.26	1.62
10470.00	89.29	178.95	8228.46	41.74 N	3221.98 W	819.06	1.87
10565.00	91.01	179.24	8228.21	53.24 S	3220.47 W	910.20	1.83
10660.00	88.56	177.57	8228.57	148.20 S	3217.83 W	1001.01	3.12
10755.00	89.19	176.30	8230.44	243.04 S	3212.76 W	1091.07	1.49
10851.00	88.69	178.93	8232.21	338.93 S	3208.76 W	1182.42	2.79
10946.00	88.66	181.18	8234.42	433.90 S	3208.86 W	1273.98	2.37
11040.00	89.53	180.87	8235.91	527.87 S	3210.54 W	1364.99	0.99
11135.00	90.81	179.52	8235.63	622.87 S	3210.86 W	1456.63	1.96
11231.00	92.19	179.56	8233.12	718.83 S	3210.09 W	1548.91	1.44
11325.00	88.72	178.05	8232.38	812.79 S	3208.13 W	1638.95	4.02
11420.00	89.77	177.35	8233.63	907.70 S	3204.32 W	1729.41	1.32
11515.00	91.41	176.88	8232.66	1002.57 S	3199.54 W	1819.57	1.80
11610.00	89.80	179.74	8231.65	1097.51 S	3196.75 W	1910.32	3.46
11706.00	91.51	179.66	8230.55	1193.50 S	3196.25 W	2002.70	1.79
11801.00	90.10	180.60	8229.21	1288.49 S	3196.46 W	2094.31	1.78
11896.00	90.30	179.67	8228.88	1383.49 S	3196.68 W	2185.92	1.00
11992.00	91.72	179.48	8227.18	1479.47 S	3195.96 W	2278.23	1.48
12087.00	88.86	179.70	8226.71	1574.45 S	3195.28 W	2369.60	3.02
12182.00	90.57	180.28	8227.18	1669.45 S	3195.26 W	2461.15	1.91
12278.00	91.95	179.42	8225.06	1765.42 S	3195.01 W	2553.58	1.69
12373.00	88.72	180.45	8224.51	1860.41 S	3194.90 W	2645.09	3.57
12469.00	89.23	178.81	8226.23	1956.38 S	3194.28 W	2737.43	1.79
12564.00	90.34	178.13	8226.59	2051.35 S	3191.73 W	2828.27	1.37
12659.00	91.41	176.58	8225.14	2146.23 S	3187.35 W	2918.55	1.98
12754.00	86.47	175.03	8226.89	2240.93 S	3180.40 W	3007.97	5.46
12850.00	88.15	176.41	8231.40	2336.55 S	3173.25 W	3098.21	2.27
12945.00	88.19	179.55	8234.44	2431.43 S	3169.90 W	3188.77	3.30
13041.00	89.46	178.98	8236.40	2527.40 S	3168.68 W	3280.93	1.45
13135.00	90.13	181.81	8236.74	2621.39 S	3169.33 W	3371.69	3.09
13231.00	91.88	182.41	8235.05	2717.30 S	3172.86 W	3465.07	1.93
13326.00	87.88	182.65	8235.25	2812.19 S	3177.05 W	3557.64	4.22
13421.00	88.42	181.23	8238.31	2907.08 S	3180.27 W	3649.96	1.61
13516.00	89.46	179.80	8240.06	3002.06 S	3181.12 W	3741.72	1.86
13612.00	91.21	179.97	8239.50	3098.05 S	3180.92 W	3834.19	1.83
13707.00	93.26	179.86	8235.79	3192.98 S	3180.78 W	3925.63	2.17
13803.00	92.66	180.79	8230.84	3288.85 S	3181.33 W	4018.17	1.16
13897.00	91.41	178.57	8227.50	3382.78 S	3180.80 W	4108.56	2.71
13993.00	90.20	178.04	8226.15	3478.72 S	3177.96 W	4200.28	1.37
14061.00	90.68	177.82	8225.63	3546.68 S	3175.51 W	4265.11	0.78
14156.00	89.38	178.22	8225.58	3641.62 S	3172.23 W	4355.74	1.43
14251.00	89.44	179.76	8226.55	3736.59 S	3170.55 W	4446.83	1.62
14346.00	89.38	181.19	8227.52	3831.58 S	3171.34 W	4538.59	1.51
14441.00	89.69	181.65	8228.29	3926.55 S	3173.70 W	4630.75	0.58
14631.00	89.63	181.97	8229.42	4116.45 S	3179.69 W	4815.37	0.17
14727.00	89.75	182.49	8229.93	4212.38 S	3183.42 W	4908.82	0.56
14822.00	90.49	182.59	8229.73	4307.28 S	3187.64 W	5001.41	0.79
14918.00	90.37	182.28	8229.00	4403.20 S	3191.72 W	5094.93	0.35
15013.00	90.31	182.23	8228.44	4498.12 S	3195.45 W	5187.42	0.08
15109.00	90.31	182.29	8227.92	4594.04 S	3199.23 W	5280.88	0.07
15204.00	89.81	182.37	8227.82	4688.97 S	3203.09 W	5373.39	0.53

## NORTHWEST A S20-25-11C

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
15394.00	89.81	175.85	8228.44	4878.84 S	3200.14 W	5555.60	3.43
15585.00	87.53	177.59	8232.86	5069.45 S	3189.21 W	5736.39	1.50
15680.00	88.46	177.27	8236.19	5164.30 S	3184.95 W	5826.67	1.03
15775.00	89.51	177.80	8237.88	5259.19 S	3180.87 W	5917.04	1.24
15869.00	89.69	178.93	8238.54	5353.15 S	3178.19 W	6006.88	1.21
15965.00	89.75	179.80	8239.00	5449.14 S	3177.12 W	6099.11	0.91
16060.00	89.88	181.65	8239.31	5544.13 S	3178.32 W	6190.97	1.95
16155.00	89.88	183.06	8239.52	5639.05 S	3182.22 W	6283.49	1.48
16251.00	89.94	182.95	8239.67	5734.92 S	3187.25 W	6377.23	0.13
16346.00	89.88	182.51	8239.82	5829.81 S	3191.77 W	6469.89	0.47
16442.00	90.06	182.69	8239.88	5925.71 S	3196.13 W	6563.48	0.27
16537.00	90.00	181.54	8239.83	6020.64 S	3199.64 W	6655.91	1.21
16632.00	90.06	181.04	8239.77	6115.62 S	3201.78 W	6748.02	0.53
16727.00	89.81	180.10	8239.88	6210.61 S	3202.73 W	6839.83	1.03
16918.00	89.88	178.47	8240.39	6401.59 S	3200.34 W	7023.25	0.86
17013.00	90.12	177.30	8240.39	6496.53 S	3196.84 W	7113.81	1.26
17109.00	89.51	177.67	8240.70	6592.43 S	3192.62 W	7205.12	0.75
17204.00	89.14	177.56	8241.83	6687.34 S	3188.67 W	7295.54	0.41
17300.00	89.07	177.39	8243.33	6783.24 S	3184.44 W	7386.83	0.18
17394.00	89.32	178.27	8244.64	6877.16 S	3180.88 W	7476.40	0.97
17489.00	89.44	178.92	8245.67	6972.13 S	3178.55 W	7567.31	0.69
17585.00	87.96	179.30	8247.84	7068.09 S	3177.06 W	7659.40	1.59
17680.00	87.72	179.44	8251.42	7163.01 S	3176.02 W	7750.61	0.30
17775.00	89.20	180.65	8253.98	7257.97 S	3176.10 W	7842.15	2.01
17870.00	89.51	180.72	8255.05	7352.96 S	3177.23 W	7934.00	0.33
17964.00	90.43	180.39	8255.10	7446.96 S	3178.15 W	8024.83	1.04
18060.00	90.86	180.88	8254.02	7542.94 S	3179.22 W	8117.63	0.68
18248.00	90.62	179.44	8251.59	7730.92 S	3179.74 W	8298.94	0.78
18343.00	90.74	178.73	8250.46	7825.90 S	3178.23 W	8390.07	0.76
18438.00	89.81	177.39	8250.00	7920.84 S	3175.01 W	8480.72	1.72
18532.00	90.62	178.39	8249.65	8014.78 S	3171.55 W	8570.33	1.37
18627.00	90.74	178.60	8248.52	8109.74 S	3169.06 W	8661.18	0.25
18722.00	90.80	178.59	8247.24	8204.70 S	3166.72 W	8752.08	0.07
18912.00	90.74	178.95	8244.68	8394.64 S	3162.64 W	8934.05	0.20
19007.00	90.00	178.57	8244.07	8489.61 S	3160.59 W	9025.04	0.88
19101.00	89.57	179.30	8244.42	8583.60 S	3158.85 W	9115.16	0.90
19196.00	89.07	181.50	8245.55	8678.58 S	3159.52 W	9206.88	2.37
19291.00	88.33	182.03	8247.70	8773.51 S	3162.44 W	9299.15	0.96
19387.00	88.89	182.58	8250.02	8869.40 S	3166.30 W	9392.60	0.82
19577.00	89.38	184.11	8252.89	9059.05 S	3177.38 W	9578.33	0.84
19767.00	89.75	183.25	8254.33	9248.65 S	3189.57 W	9764.32	0.49
19863.00	89.38	182.00	8255.05	9344.55 S	3193.96 W	9857.91	1.36
19957.00	89.63	180.89	8255.86	9438.51 S	3196.33 W	9949.11	1.21
20053.00	90.31	180.89	8255.91	9534.50 S	3197.82 W	10042.02	0.71
20147.00	90.80	181.19	8255.00	9628.48 S	3199.53 W	10133.05	0.62
20338.00	91.30	180.08	8251.50	9819.43 S	3201.64 W	10317.65	0.64
20434.00	91.17	179.09	8249.43	9915.41 S	3200.94 W	10409.96	1.04
20528.00	89.88	178.05	8248.57	10009.37 S	3198.60 W	10499.89	1.76
20624.00	89.81	177.41	8248.83	10105.29 S	3194.80 W	10591.33	0.67
20719.00	88.64	176.17	8250.11	10200.13 S	3189.48 W	10681.31	1.79
20815.00	89.13	175.75	8251.97	10295.88 S	3182.72 W	10771.79	0.68
20909.00	90.12	177.64	8252.58	10389.71 S	3177.30 W	10860.78	2.27
21005.00	90.62	178.12	8251.96	10485.64 S	3173.74 W	10952.29	0.72
21194.00	90.12	178.81	8250.74	10674.57 S	3168.67 W	11133.02	0.45
21290.00	89.94	180.26	8250.69	10770.57 S	3167.89 W	11225.33	1.53

## NORTHWEST A S20-25-11C

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
21385.00	89.57	183.39	8251.10	10865.50 S	3170.92 W	11317.64	3.32
21481.00	90.25	185.47	8251.25	10961.21 S	3178.34 W	11411.85	2.28
21576.00	91.36	186.44	8249.92	11055.69 S	3188.19 W	11505.54	1.55
21672.00	91.30	183.26	8247.70	11151.30 S	3196.30 W	11599.85	3.32
21767.00	90.00	178.73	8246.62	11246.26 S	3197.95 W	11691.81	4.96
21935.00	90.00	178.73	8246.62	11414.22 S	3194.23 W	11852.69	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 195.47 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.24 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 21935.00 FEET  
IS 11852.74 FEET ALONG 195.63 DEGREES (TRUE)

Final survey is a projection to bit.