



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	16-Jul-15	22-Jul-15			
Rig Bit Number	2	3			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	756.00	6,926.00			
Log End Depth (MD, ft)	6,927.00	15,845.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	14-Jul-15 22:22	17-Jul-15 12:00			
Drill/Wipe End Date and Time	16-Jul-15 05:30	21-Jul-15 10:00			
Min Inc (deg) @ Depth (MD, ft)	0.07 @ 4,740.00	82.23 @ 6,965.00			
Max Inc (deg) @ Depth (MD, ft)	76.97 @ 6,872.00	93.51 @ 15,782.00			
Bit TFA(in2) / Bit Type	0.91 / PDC	0.65 / PDC			
Flow Rate (gpm)	586.41	292.66			
Max AV (fpm) / CV (fpm) @ MWD	350.0 / 400.0	450.0 / 750.0			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	9.60 / 37.00	9.76 / 35.00			
Filtrate CL (ppm)	1,000.00	1,300.00			
pH / Fluid Loss (mptm)	8.60 / 7	7.50 / 7			
PV (cP) / YP (lhf2)	13 / 7.00	8 / 6.00			
% Solids / % Sand	10.40 / 0.1	2.90 / 0.1			
% Oil / Oil:Water Ratio	N/A / N/A	1.50 / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	426.55 / 80M	370.25 / 80M			

Max Tool Temp (degF) / Source	182.55 / PCM	253.35 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Adam Sampson	Adam Sampson			
Customer Representative	Dave Neilsen	Charles Colve			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404289	12187588			
Insert Serial Number	11400868	11400868			
Date and Time Initialized	14-Jul-15 13:26	16-Jul-15 11:50			
Date and Time Read	16-Jul-15 10:16	22-Jul-15 02:56			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.00	63.00			
Software Version	6.21	6.21			
Sub Serial Number	11404289	12187588			
Sonde Serial Number	11833222	11833222			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	319.53	59.60			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	42.33	50.49			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404289	12187588			
Insert/Sonde Serial Number	11681007	11681007			

REMARKS

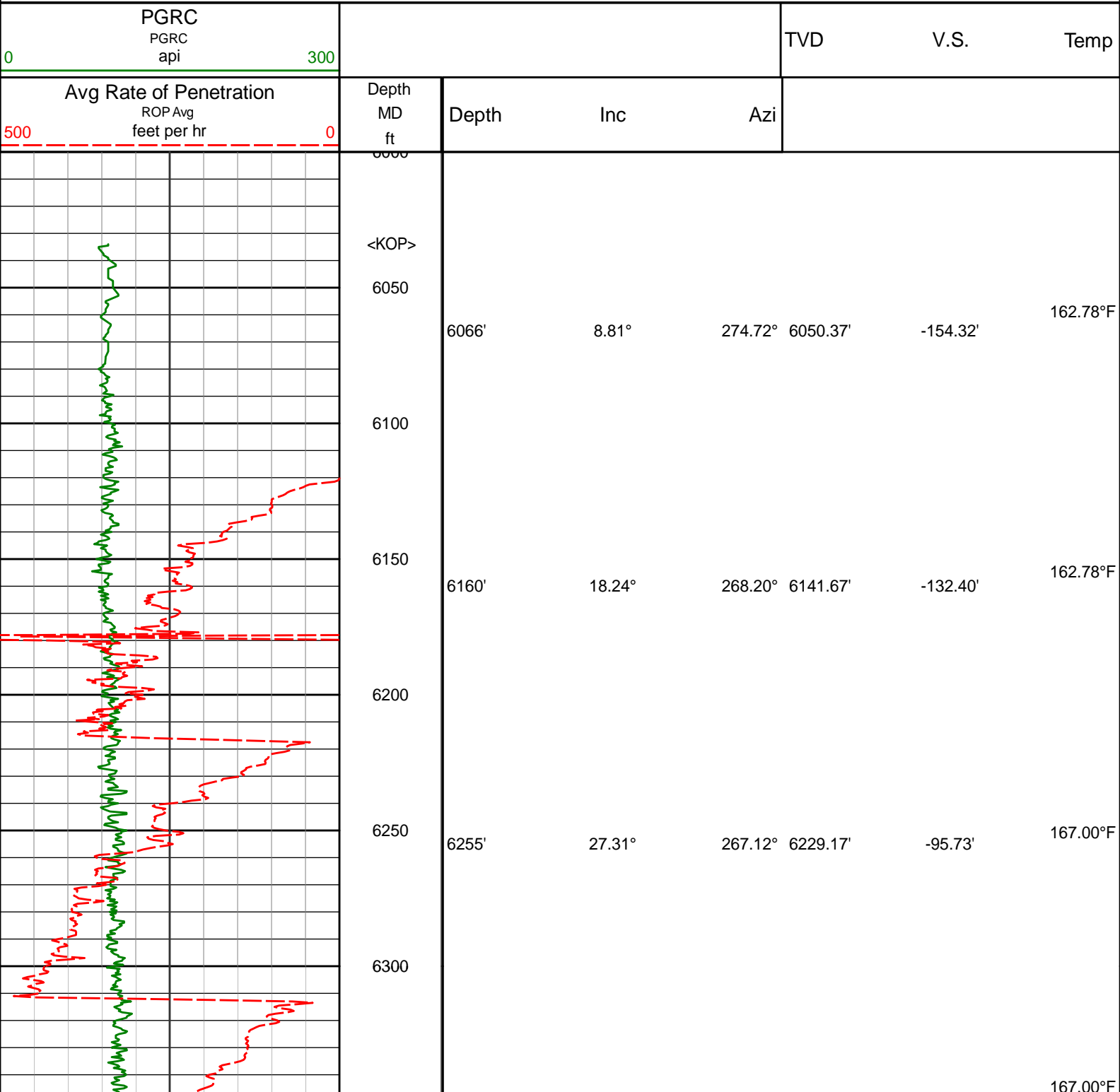
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - 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.

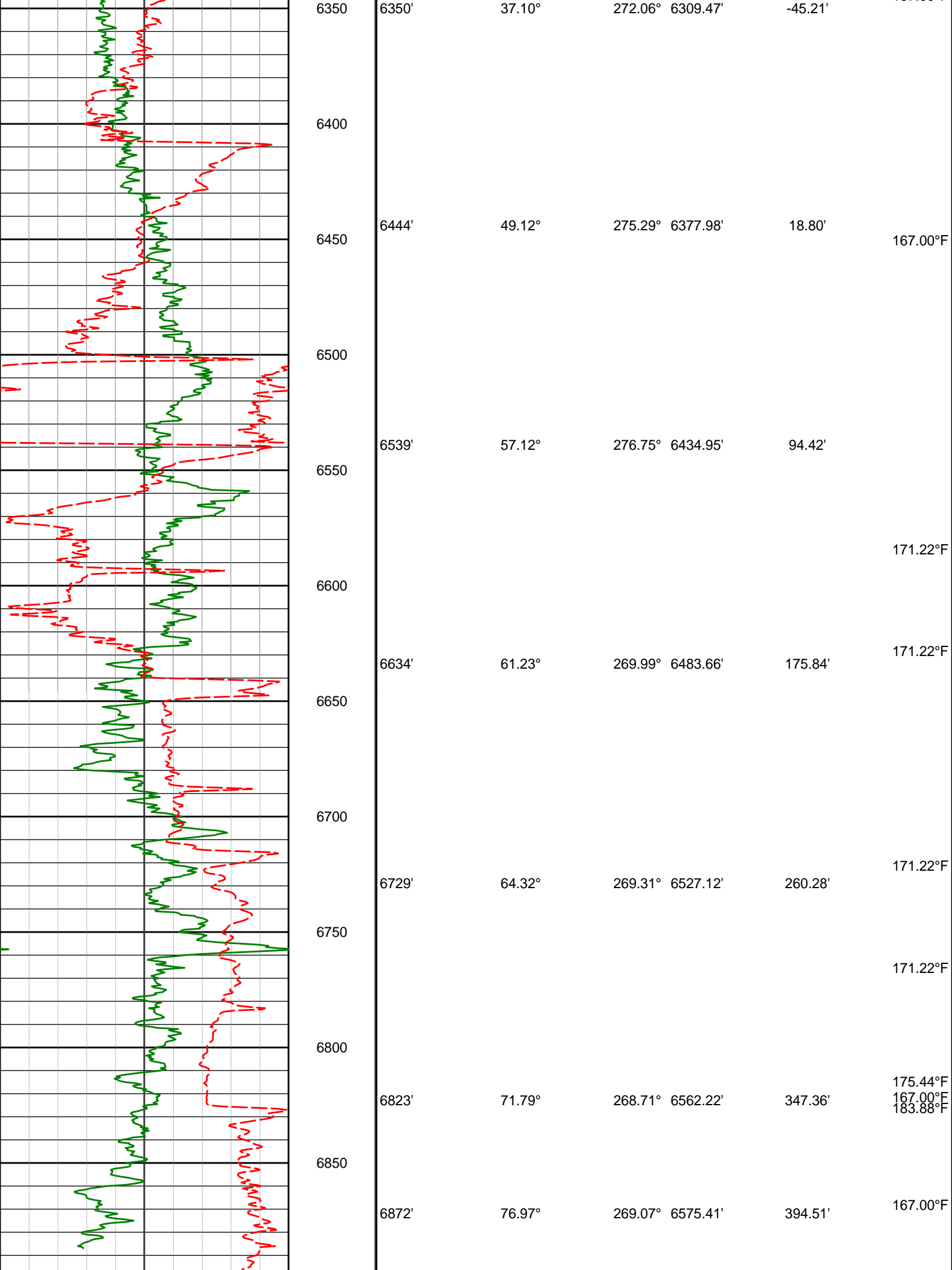
WARRANTY

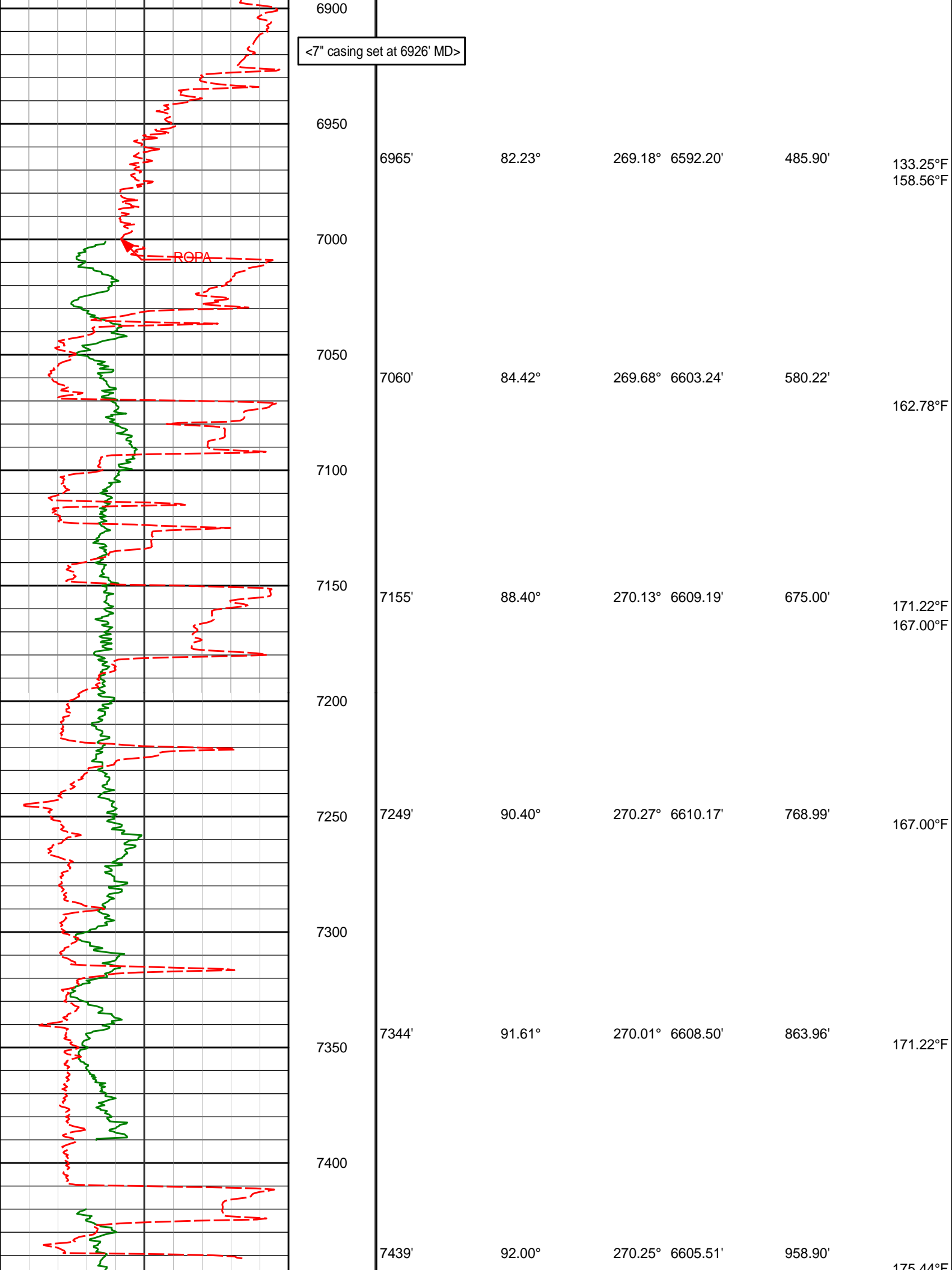
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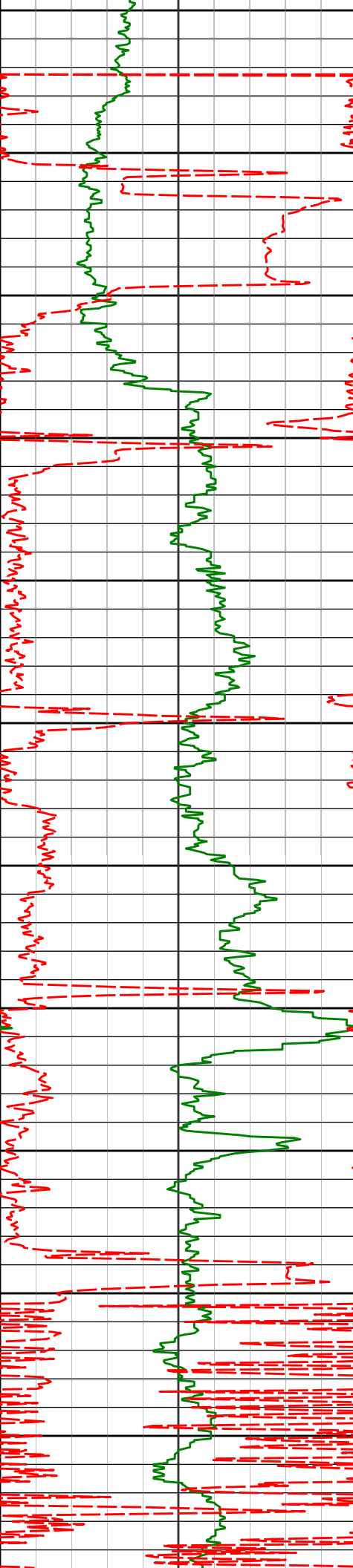
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MD Detail 1:600 Scale









7534'

90.46°

271.13° 6603.47'

1053.88'

179.66°F

7628'

89.88°

270.60° 6603.19'

1147.88'

179.66°F

7723'

89.20°

270.78° 6603.96'

1242.87'

7818'

88.21°

271.01° 6606.10'

1337.85'

183.88°F

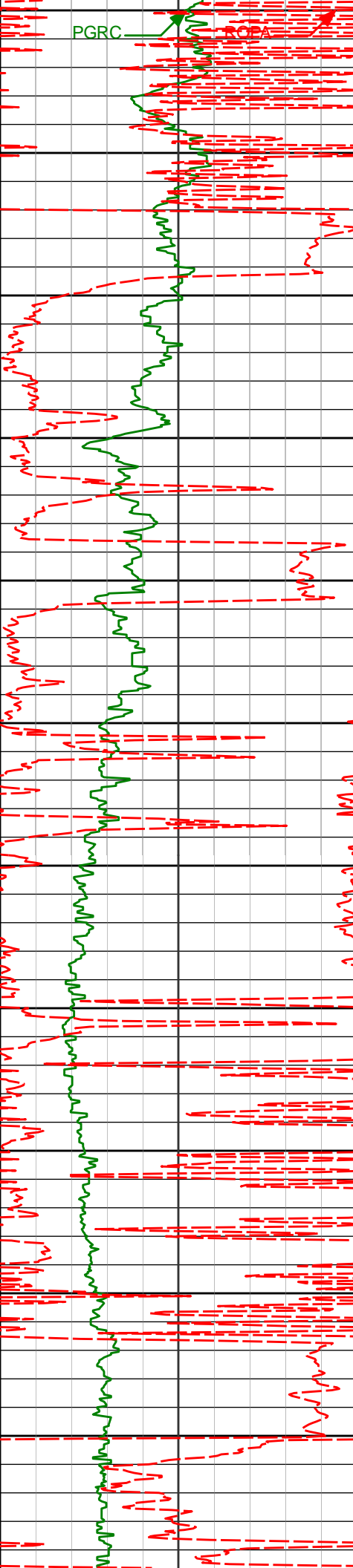
7913'

89.20°

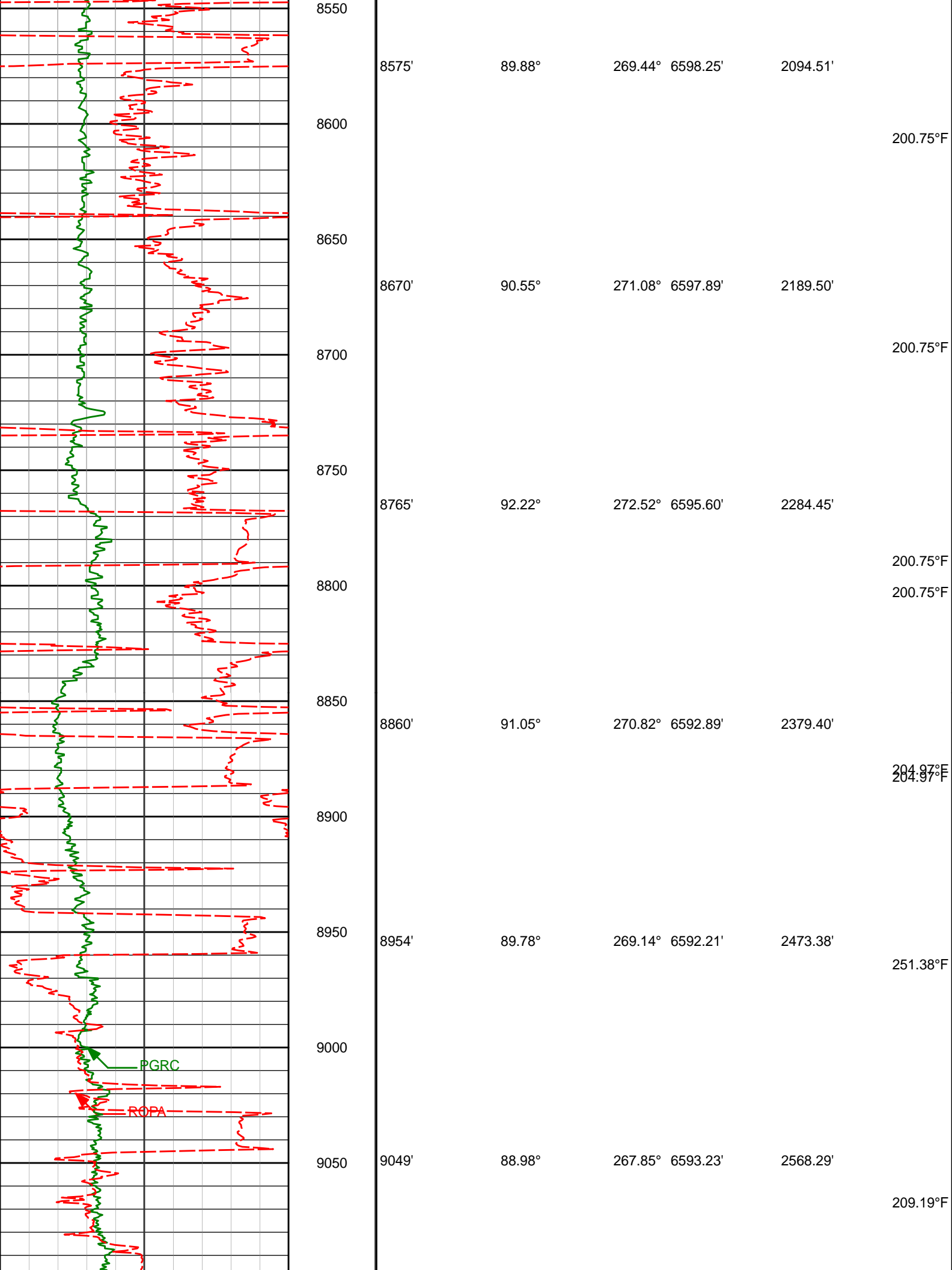
270.97° 6608.25'

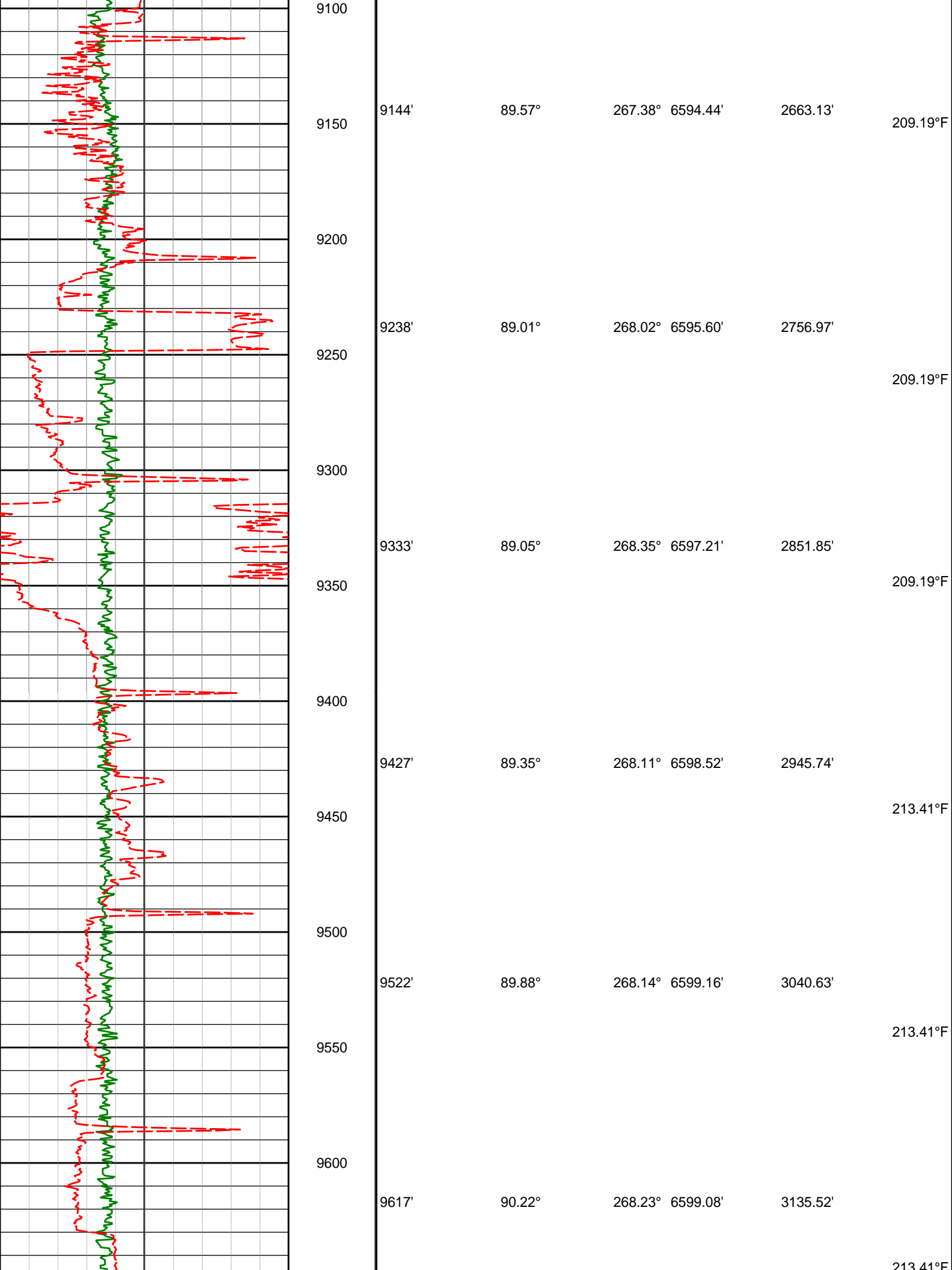
1432.82'

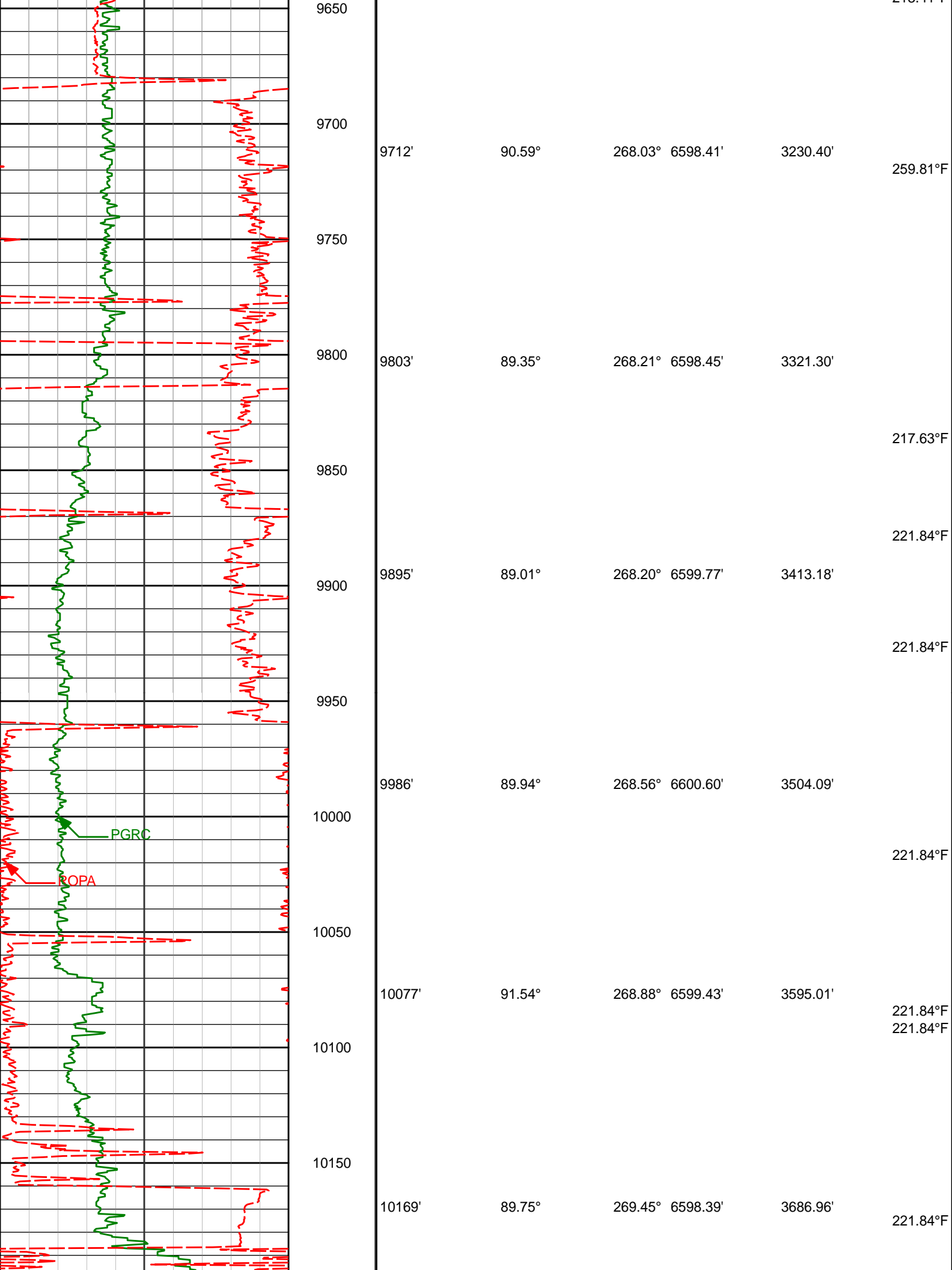
188.09°F

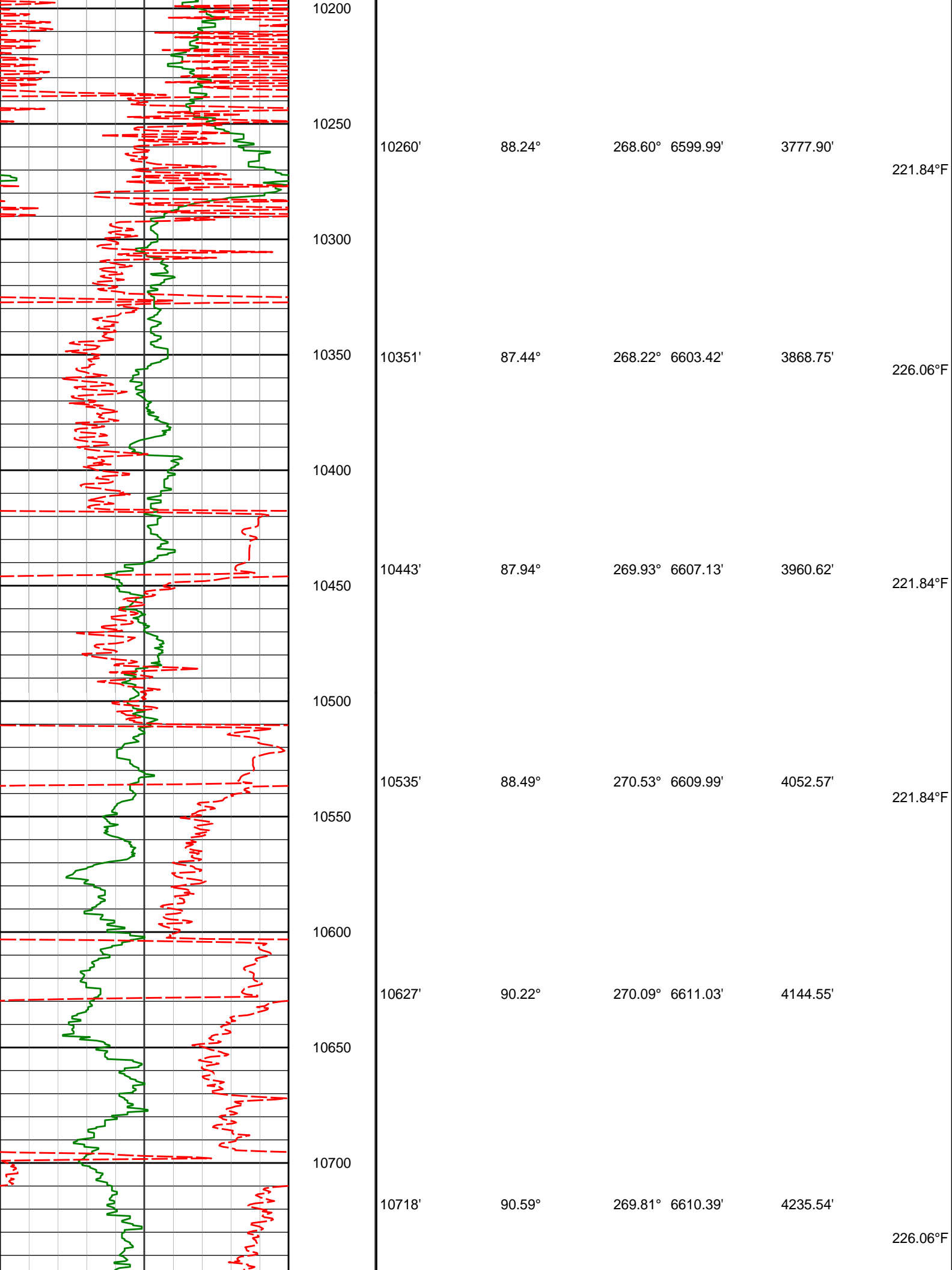


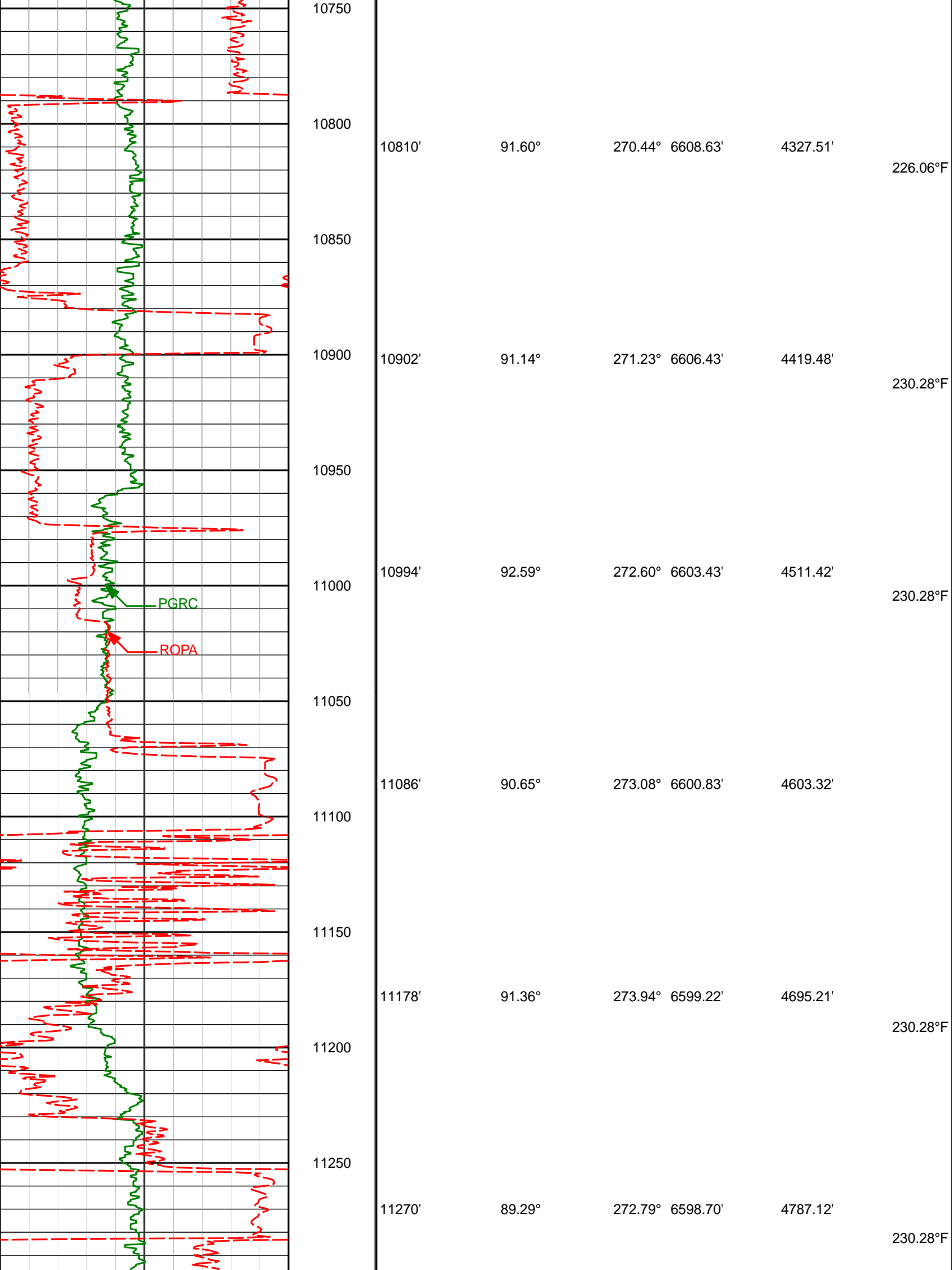
8000	8007'	88.86°	270.61°	6609.84'	1526.81'	188.09°F 268.25°F
8050						
8100	8102'	89.26°	271.21°	6611.40'	1621.79'	
8150						
8200	8197'	91.11°	271.15°	6611.09'	1716.79'	188.09°F 188.09°F
8250						
8300	8291'	91.33°	270.77°	6609.09'	1810.77'	196.53°F
8350						
8400	8386'	93.14°	271.09°	6605.39'	1905.69'	
8450						
8500	8481'	92.81°	270.34°	6600.46'	2000.56'	196.53°F

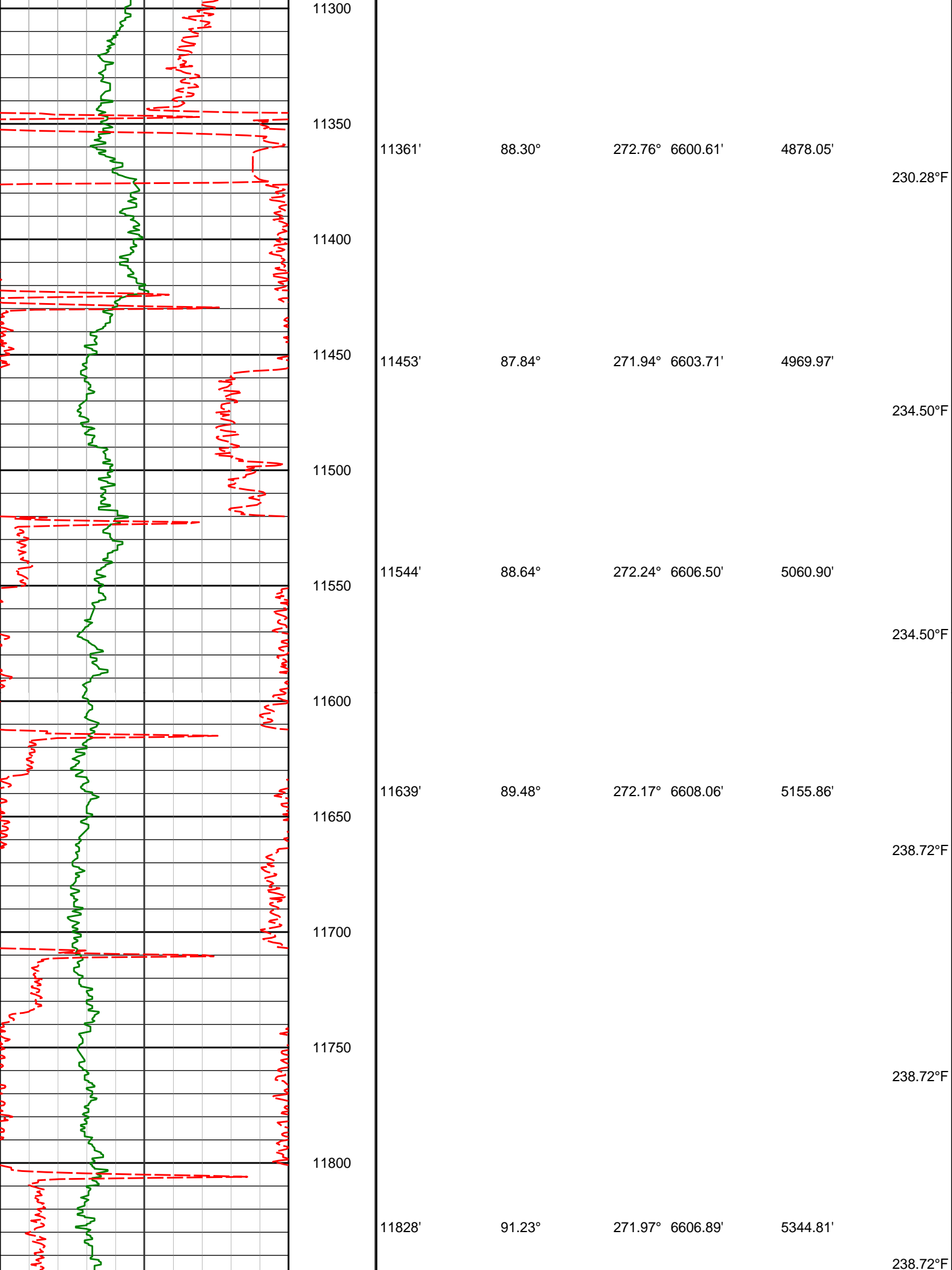


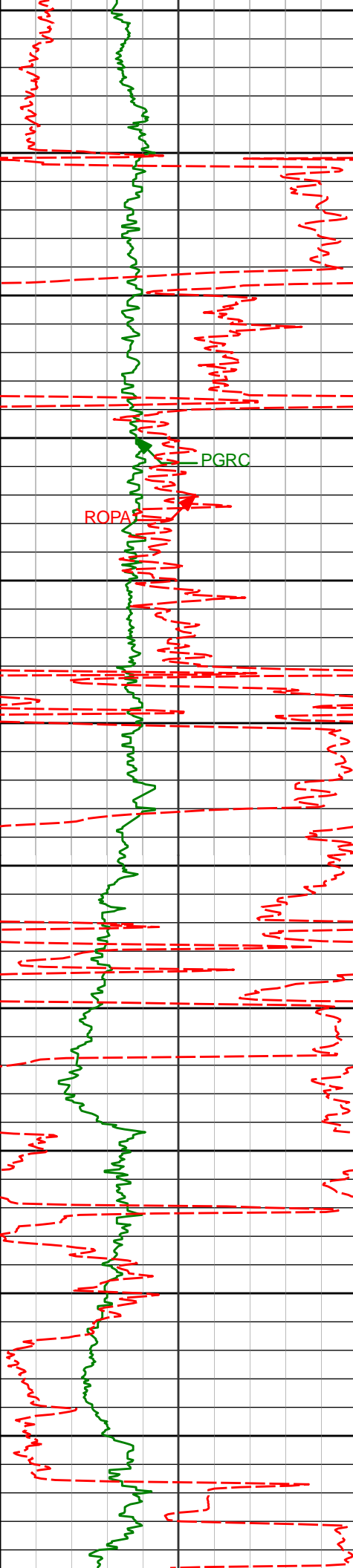




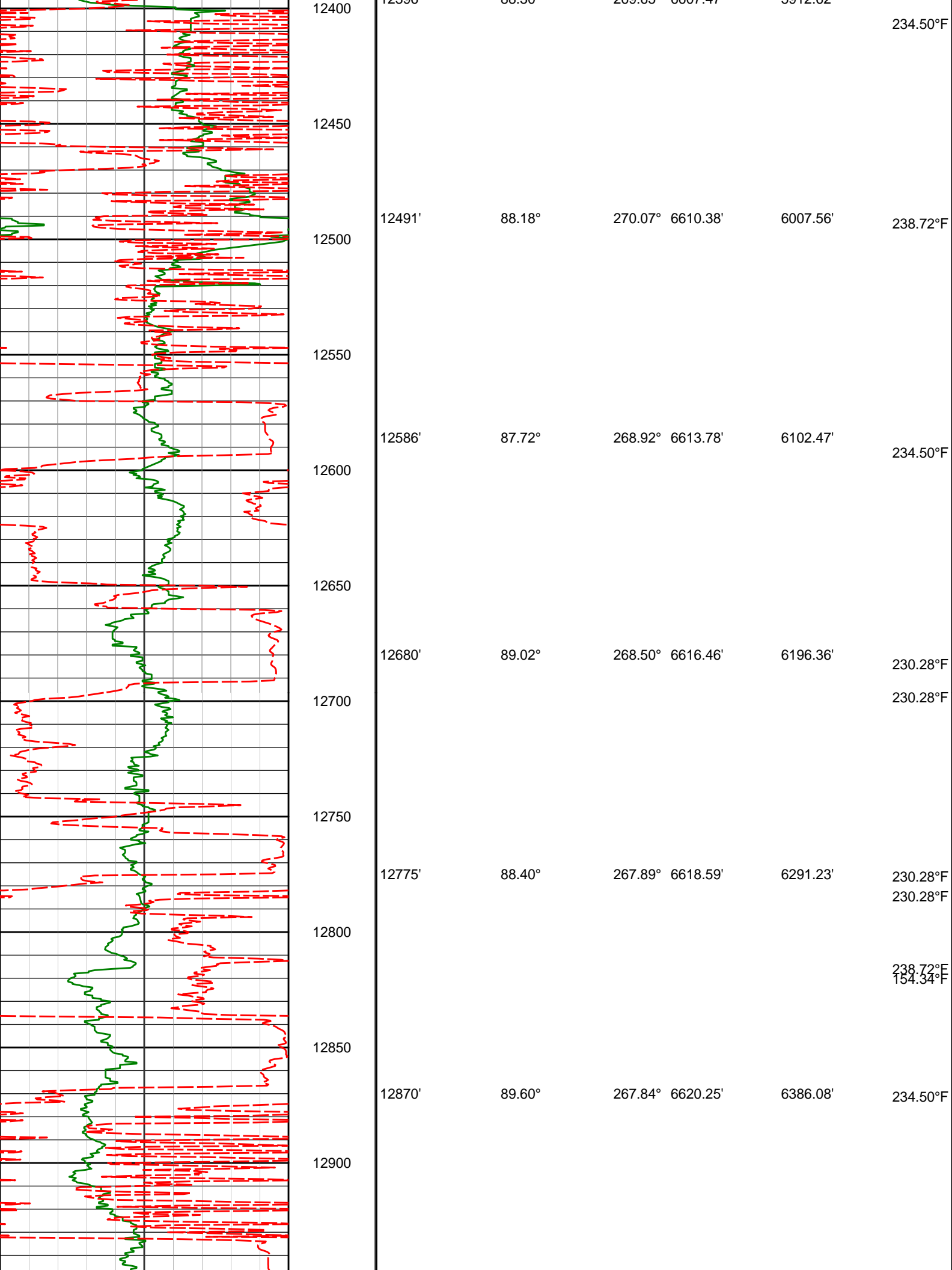






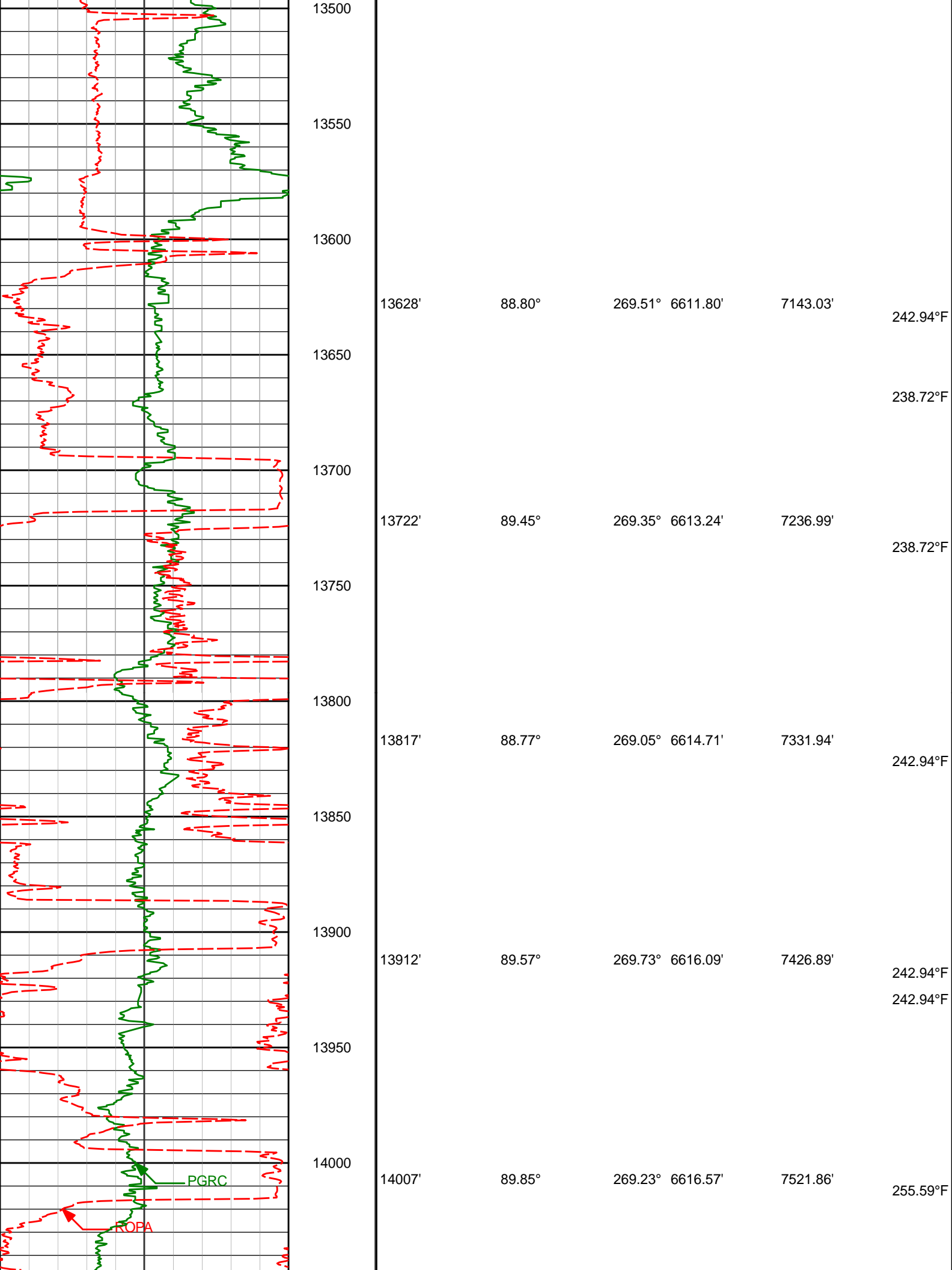


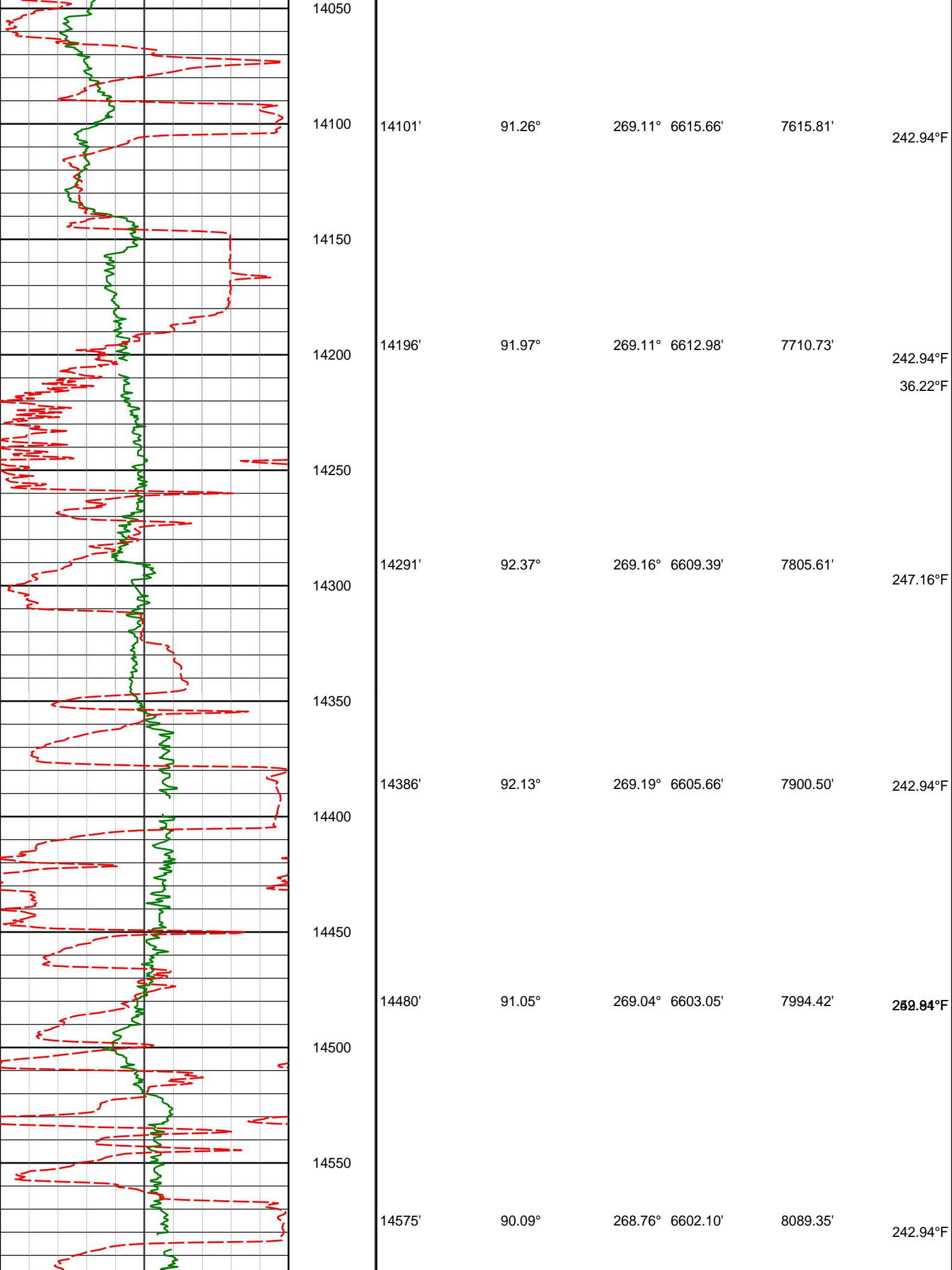
11850					
11900					
11923'	91.48°	270.17°	6604.65'	5439.78'	234.50°F
11950					
12000					
12018'	91.17°	269.71°	6602.45'	5534.74'	238.72°F
12050					
12100					
12112'	89.88°	270.26°	6601.59'	5628.73'	234.50°F
12150					
12200					
12207'	88.40°	270.06°	6603.01'	5723.70'	230.28°F
12250					
12300					
12302'	88.95°	270.04°	6605.21'	5818.67'	238.72°F
12350					
12396'	88.30°	269.65°	6607.47'	5912.62'	

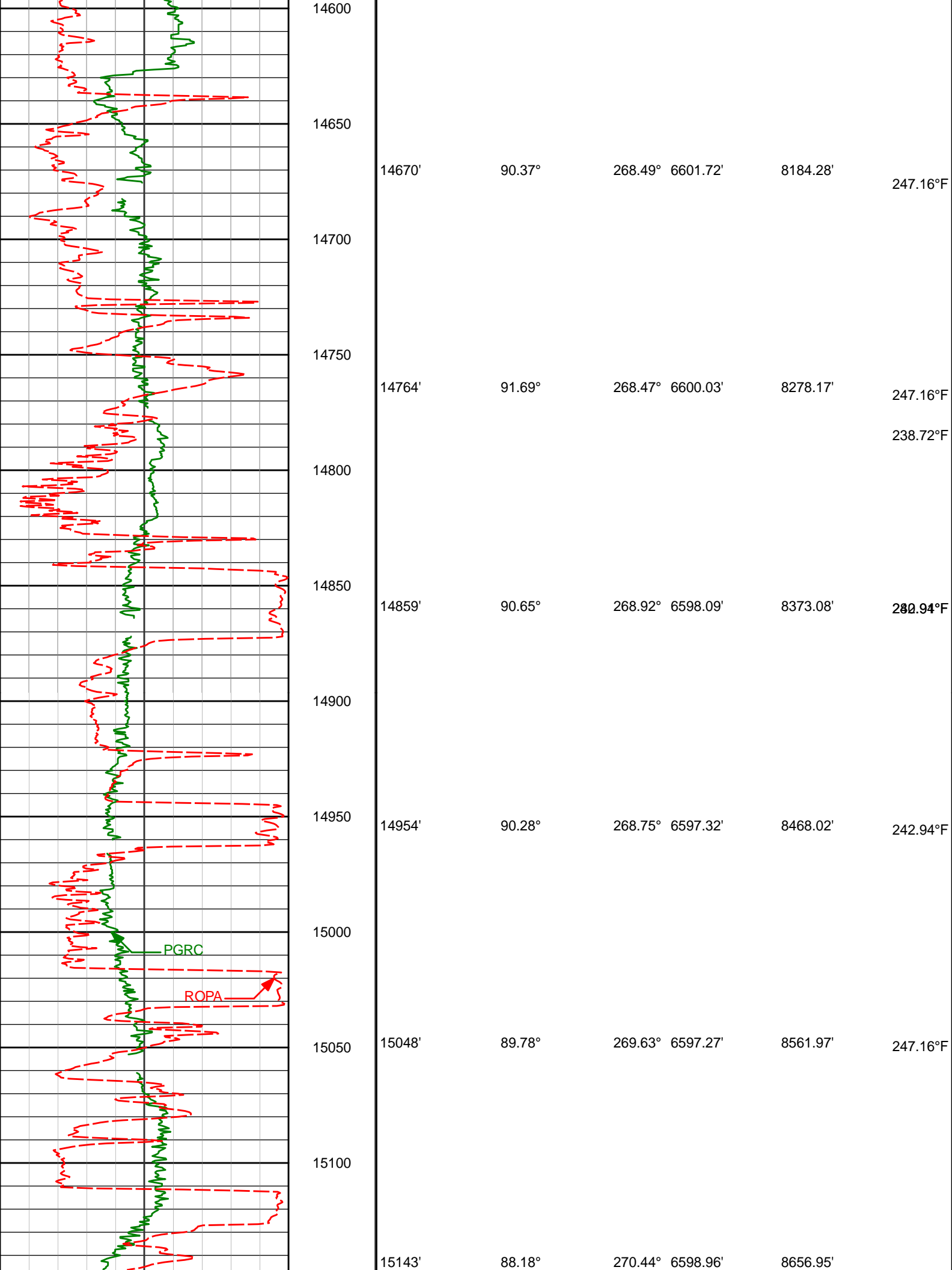


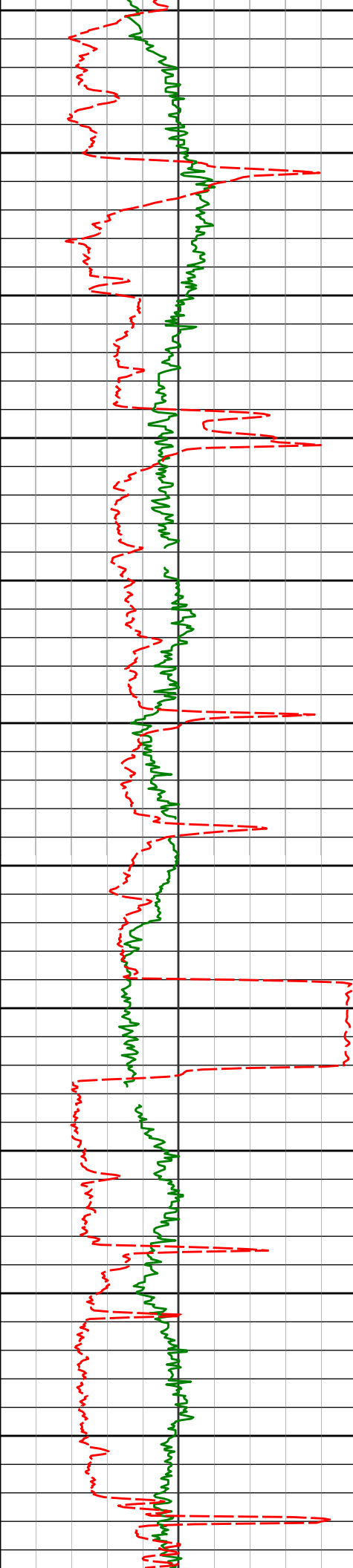


12965'	91.30°	267.39°	6619.51'	6480.92'	234.50°F
13059'	91.79°	267.58°	6616.97'	6574.72'	238.72°F
13154'	90.49°	268.15°	6615.08'	6669.56'	238.72°F
13249'	90.28°	267.36°	6614.44'	6764.42'	238.72°F
13344'	91.33°	267.56°	6613.11'	6859.24'	
13438'	90.89°	269.07°	6611.29'	6953.12'	238.72°F









15150
15200
15238'
15250
15300
15332'
15350
15400
15427'
15450
15500
15522'
15550
15600
15616'
15650

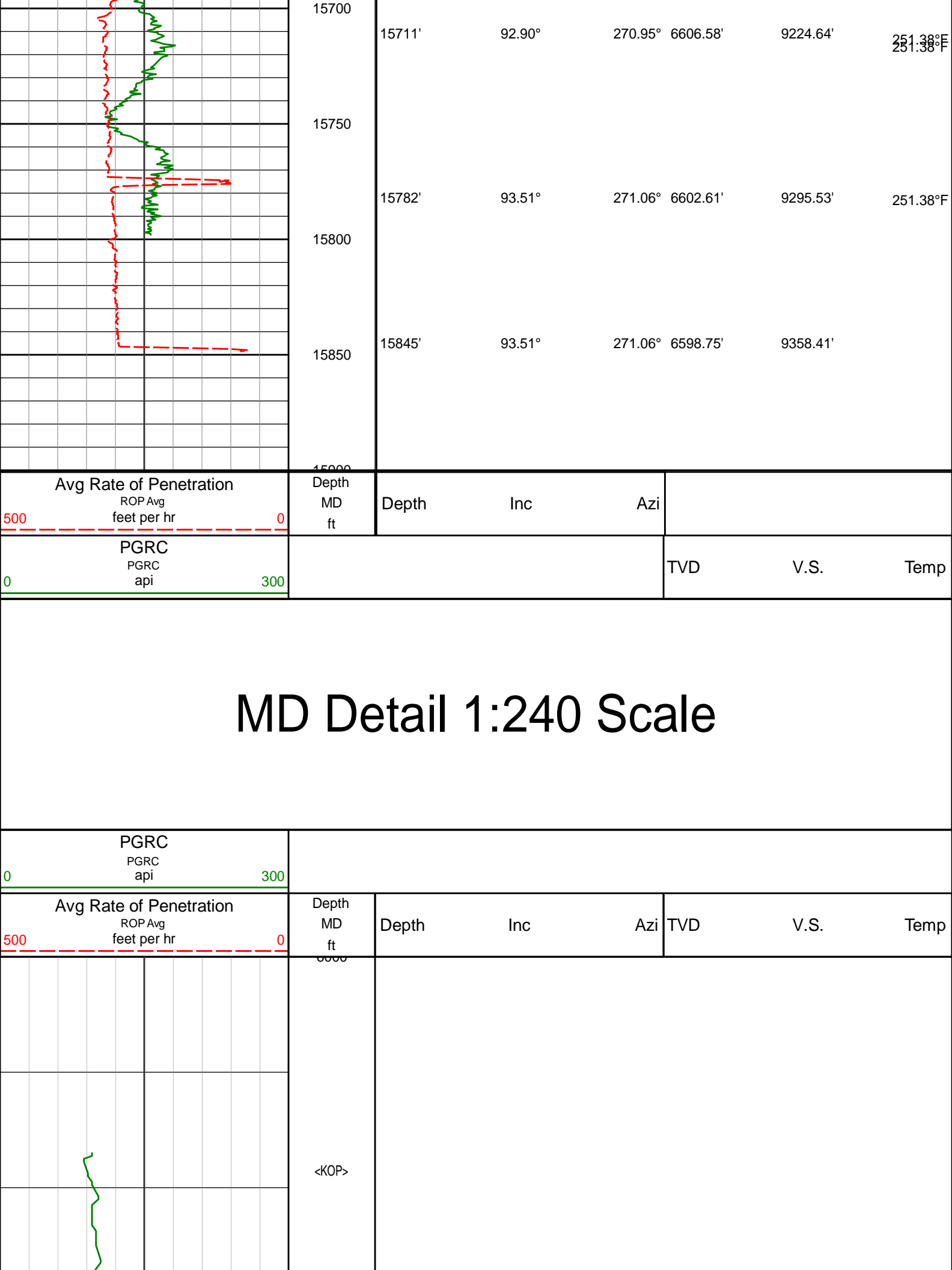
15238'
15332'
15427'
15522'
15616'

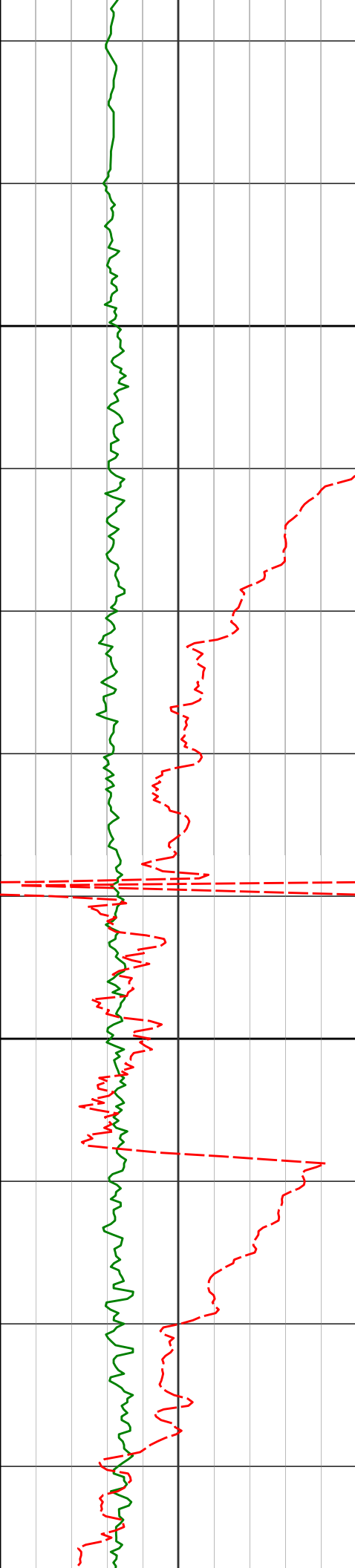
87.85°
87.93°
87.68°
89.97°
91.42°

270.71° 6602.25'
270.30° 6605.71'
270.59° 6609.35'
270.84° 6611.30'
270.91° 6610.16'

8751.89'
8845.82'
8940.75'
9035.72'
9129.71'

247.16°F
247.16°F
251.38°F
251.38°F
251.38°F
247.16°F
251.38°F





6100

6200

6066'

8.81°

274.72° 6050.37'

-154.32'

162.78°F

6160'

18.24°

268.20° 6141.67'

-132.40'

162.78°F

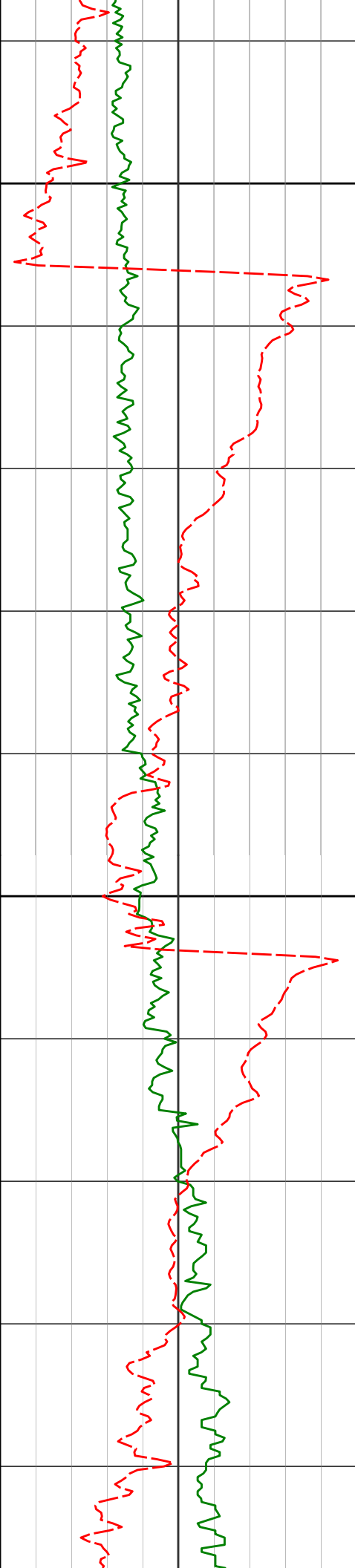
6255'

27.31°

267.12° 6229.17'

-95.73'

167.00°F



6300

6400

6350'

6444'

37.10°

49.12°

272.06°

275.29°

6309.47'

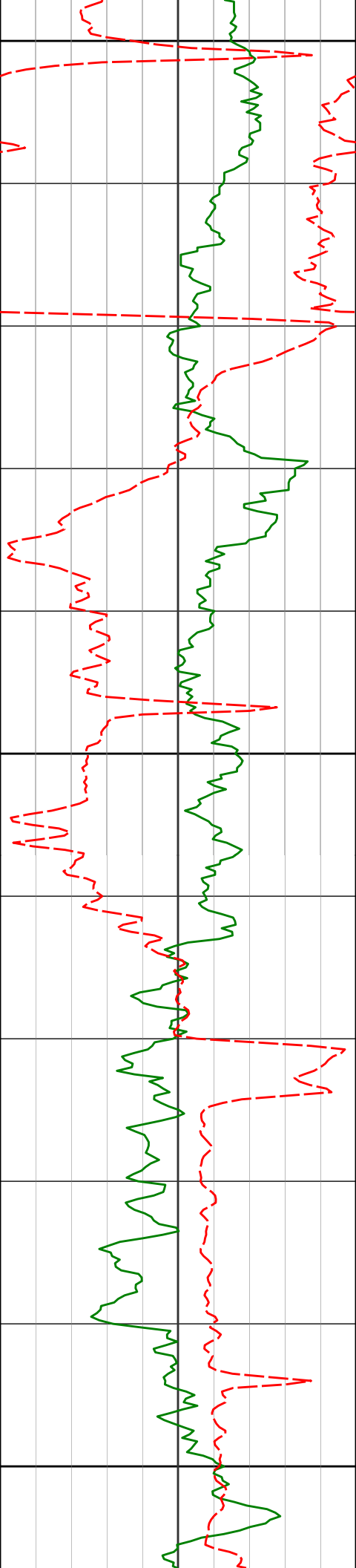
6377.98'

-45.21'

18.80'

167.00°F

167.00°F



6500

6539'

57.12°

276.75°

6434.95'

94.42'

6600

6634'

61.23°

269.99°

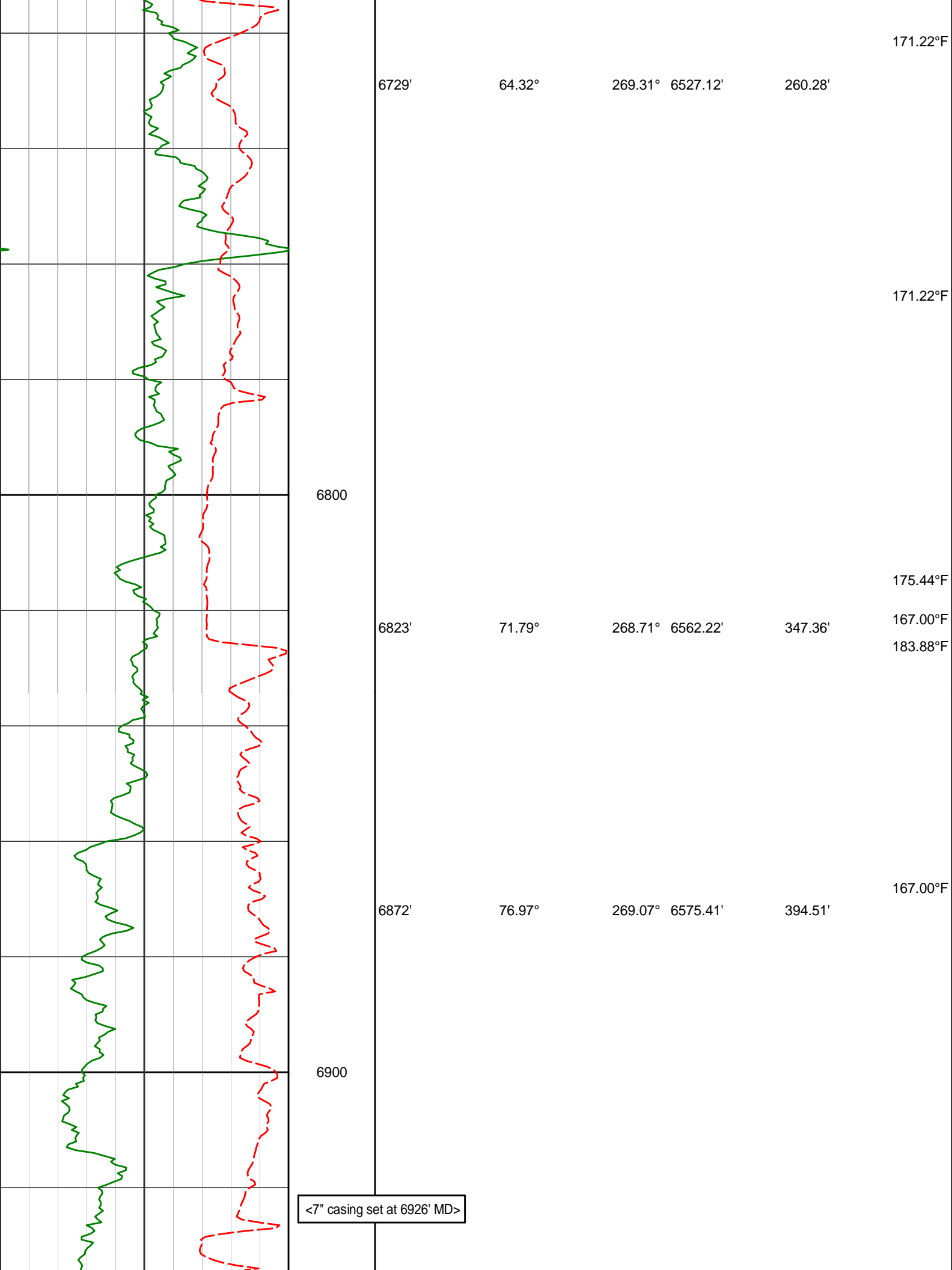
6483.66'

175.84'

6700

171.22°F

171.22°F



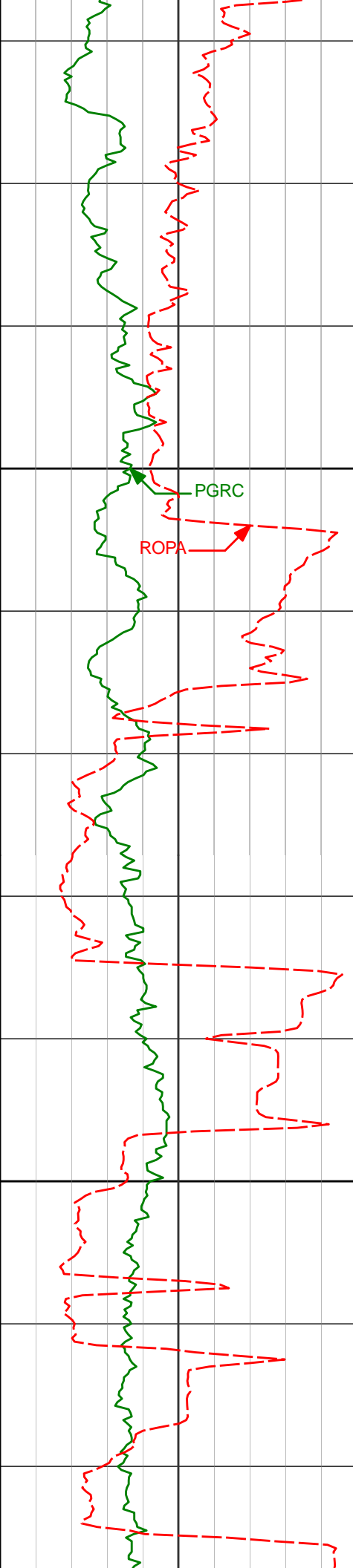
171.22°F

171.22°F

175.44°F

167.00°F
183.88°F

167.00°F



7000

7100

6965'

82.23°

269.18° 6592.20'

485.90'

133.25°F

158.56°F

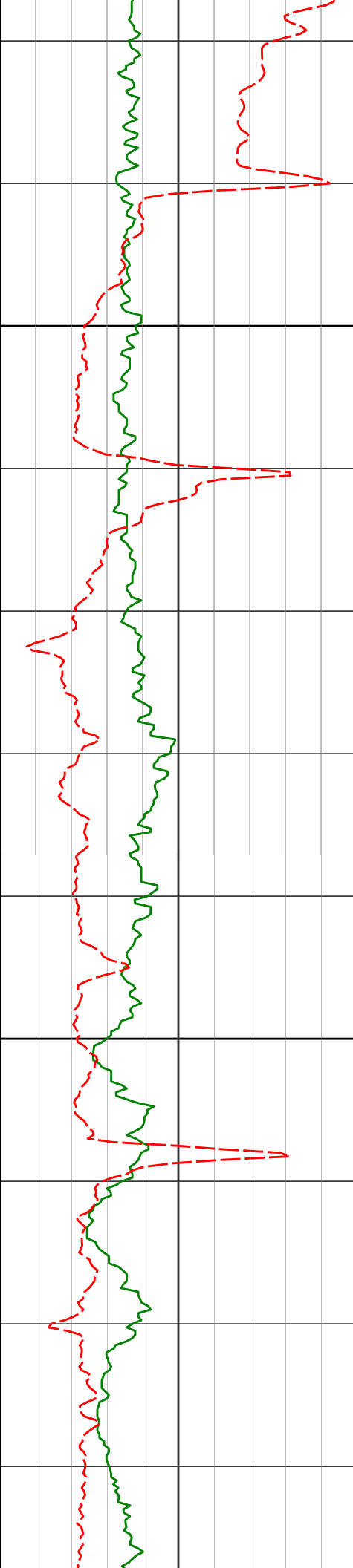
7060'

84.42°

269.68° 6603.24'

580.22'

162.78°F



7155'

88.40°

270.13° 6609.19'

675.00'

171.22°F

167.00°F

7249'

90.40°

270.27° 6610.17'

768.99'

167.00°F

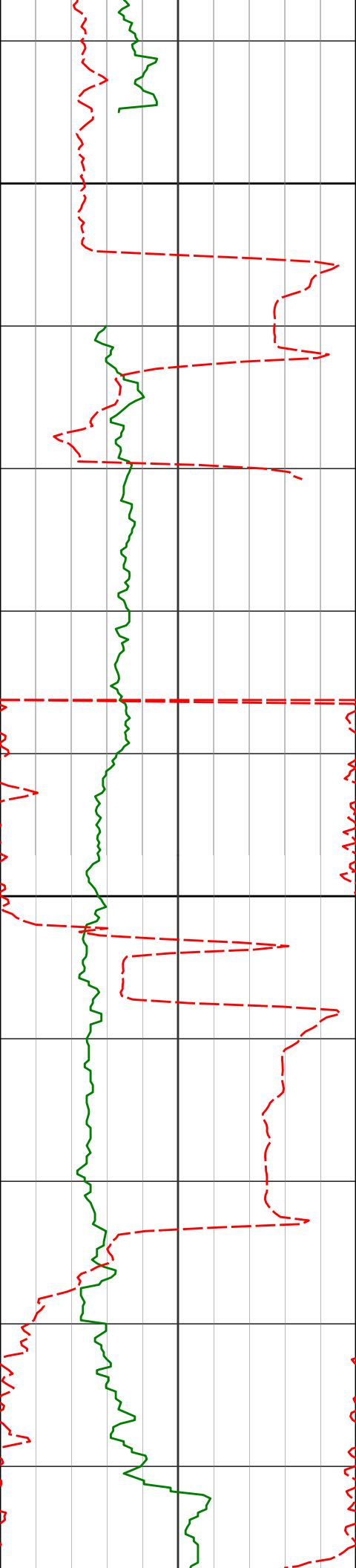
7344'

91.61°

270.01° 6608.50'

863.96'

171.22°F



7400

7439'

92.00°

270.25° 6605.51'

958.90'

175.44°F

7500

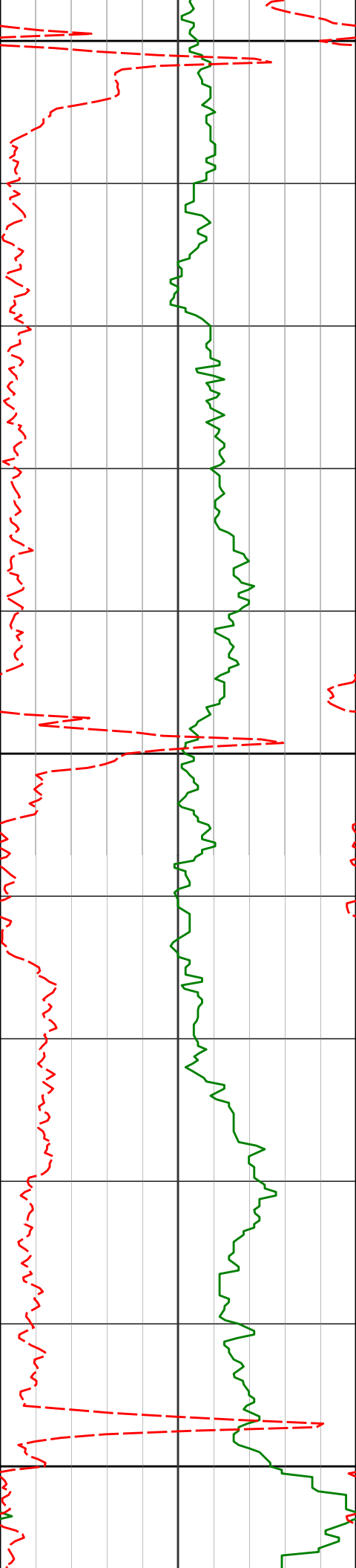
7534'

90.46°

271.13° 6603.47'

1053.88'

179.66°F



7600

7628'

89.88°

270.60° 6603.19'

1147.88'

179.66°F

7700

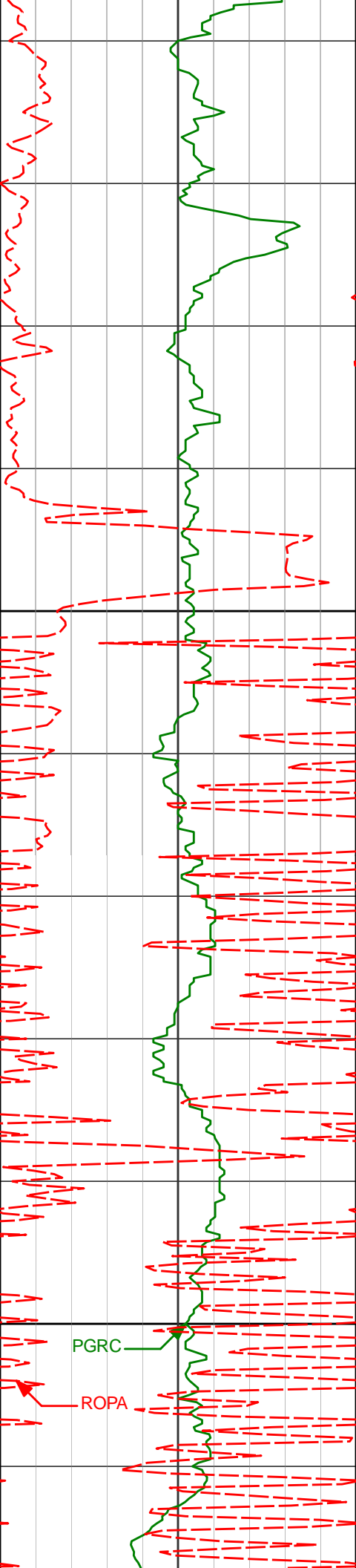
7723'

89.20°

270.78° 6603.96'

1242.87'

7800



7900

8000

PGRC

ROPA

7818'

88.21°

271.01° 6606.10'

1337.85'

183.88°F

7913'

89.20°

270.97° 6608.25'

1432.82'

188.09°F

8007'

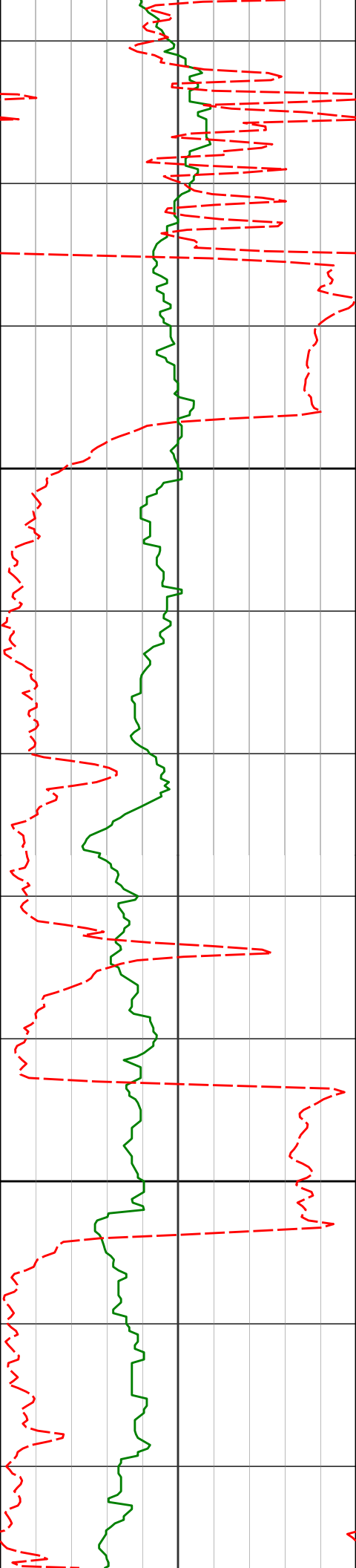
88.86°

270.61° 6609.84'

1526.81'

188.09°F

268.25°F



8100

8102'

89.26°

271.21° 6611.40'

1621.79'

8200

8197'

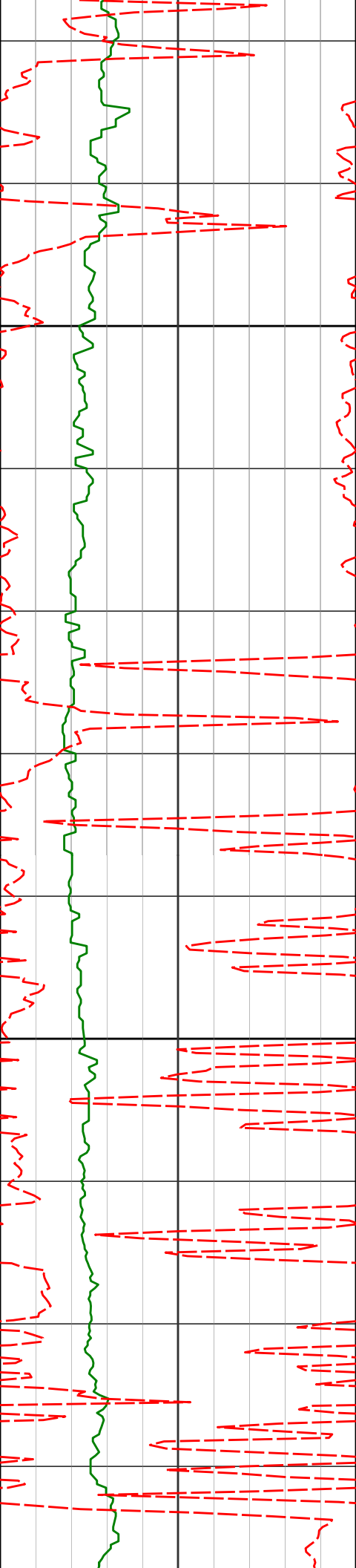
91.11°

271.15° 6611.09'

1716.79'

188.09°F

188.09°F



8291'

91.33°

270.77° 6609.09'

1810.77'

8300

196.53°F

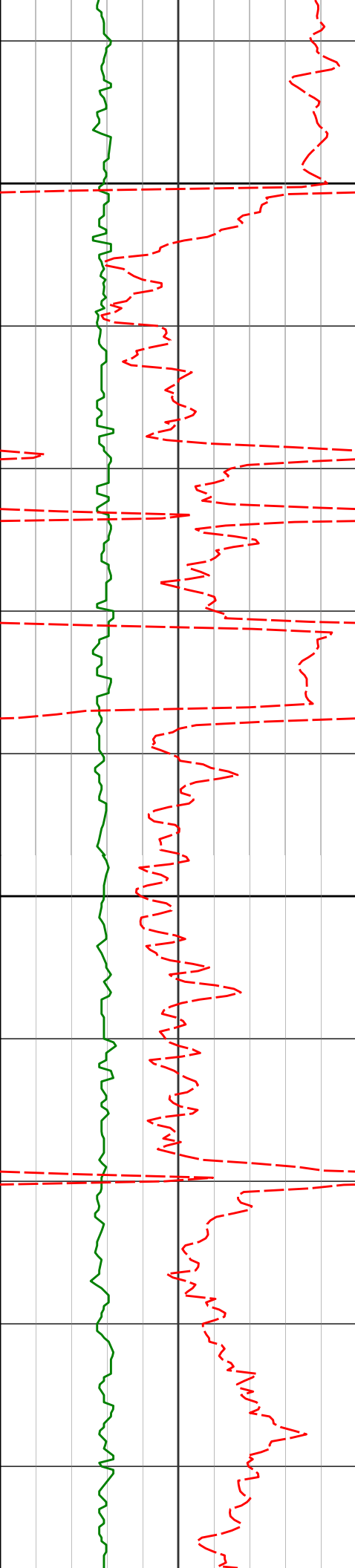
8386'

93.14°

271.09° 6605.39'

1905.69'

8400



8500

8600

8481'

92.81°

270.34° 6600.46'

2000.56'

196.53°F

8575'

89.88°

269.44° 6598.25'

2094.51'

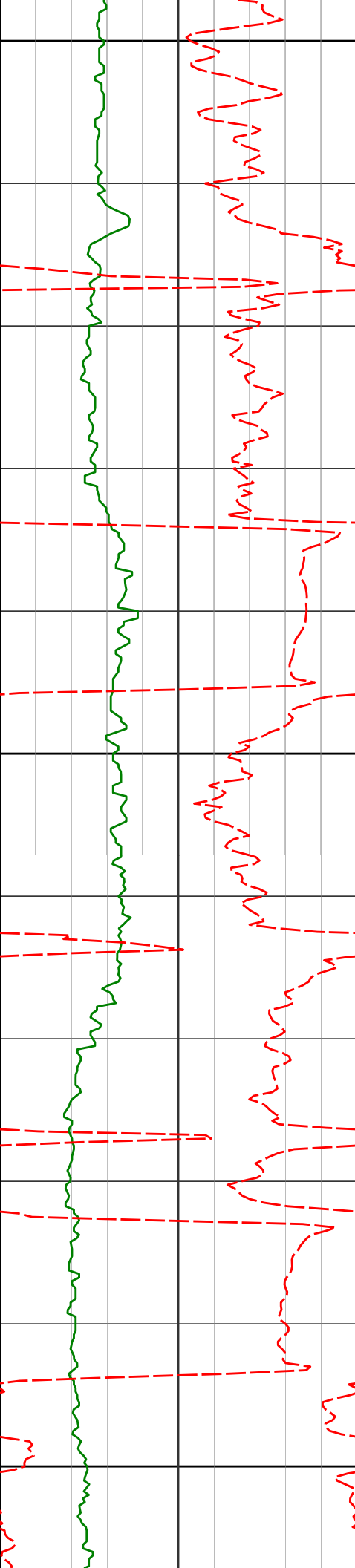
200.75°F

8670'

90.55°

271.08° 6597.89'

2189.50'



8700

8765'

92.22°

272.52° 6595.60'

2284.45'

8800

8860'

91.05°

270.82° 6592.89'

2379.40'

8900

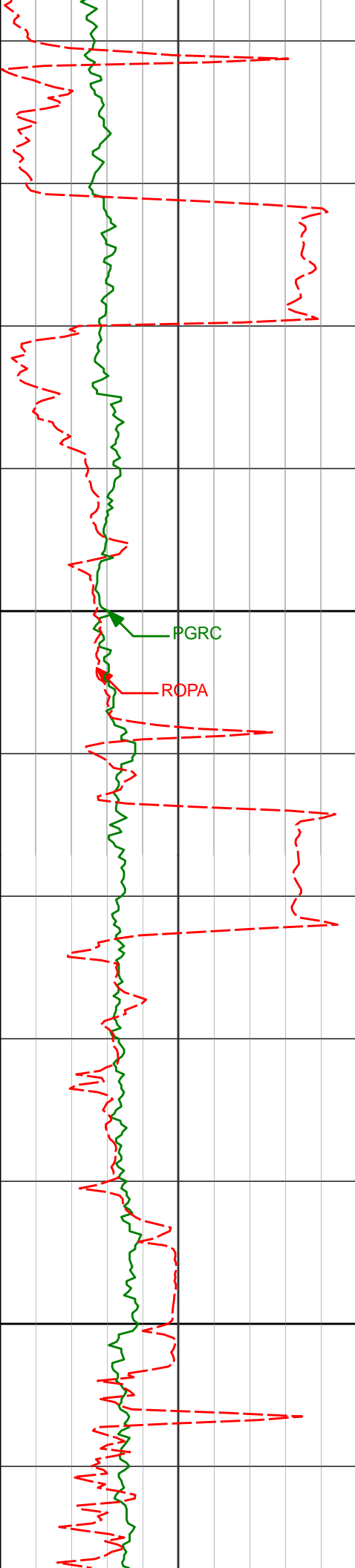
200.75°F

200.75°F

200.75°F

204.97°F

204.97°F



9000

PGRC

ROPA

9100

8954'

89.78°

269.14° 6592.21'

2473.38'

251.38°F

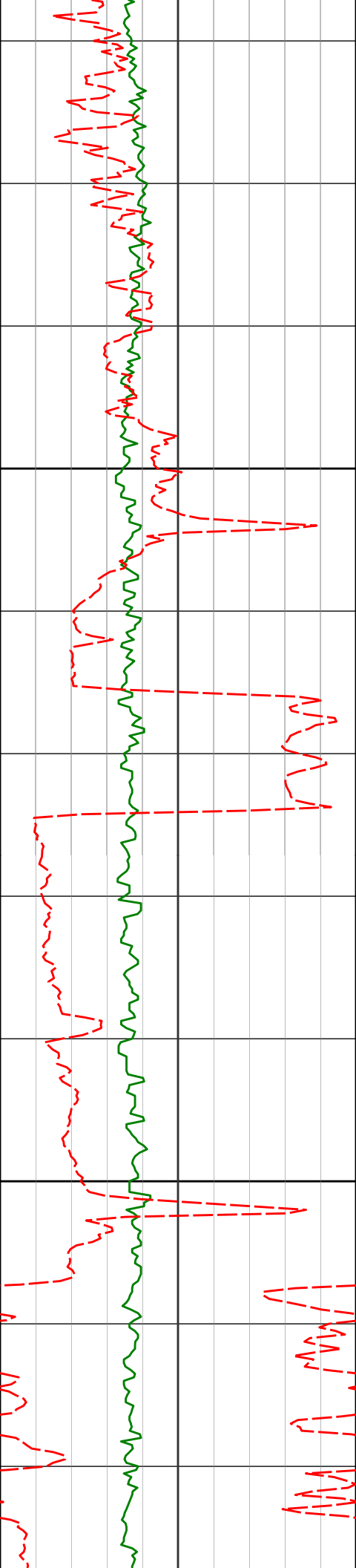
9049'

88.98°

267.85° 6593.23'

2568.29'

209.19°F



9144'

89.57°

267.38° 6594.44'

2663.13'

209.19°F

9200

9238'

89.01°

268.02° 6595.60'

2756.97'

209.19°F

9300

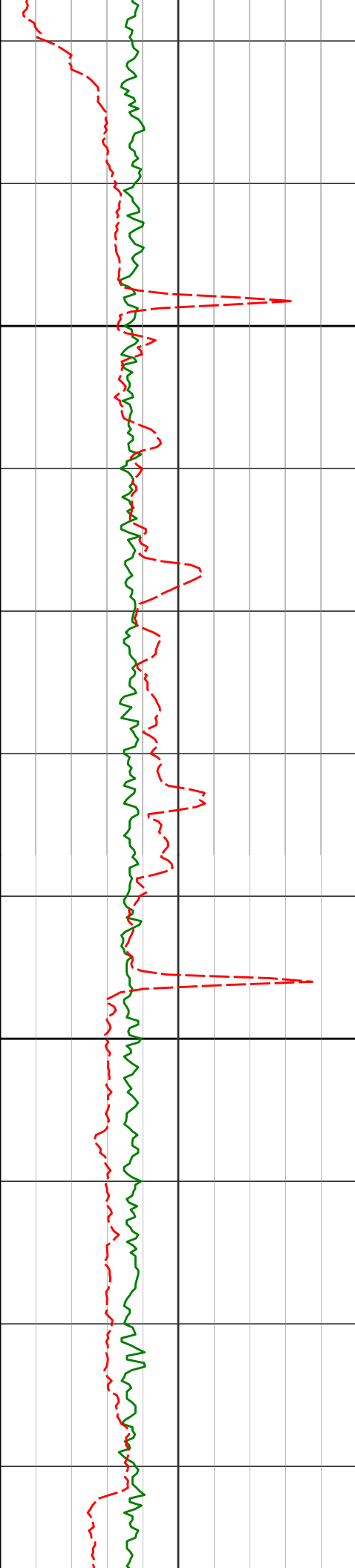
9333'

89.05°

268.35° 6597.21'

2851.85'

209.19°F



9400

9427'

89.35°

268.11° 6598.52'

2945.74'

213.41°F

9500

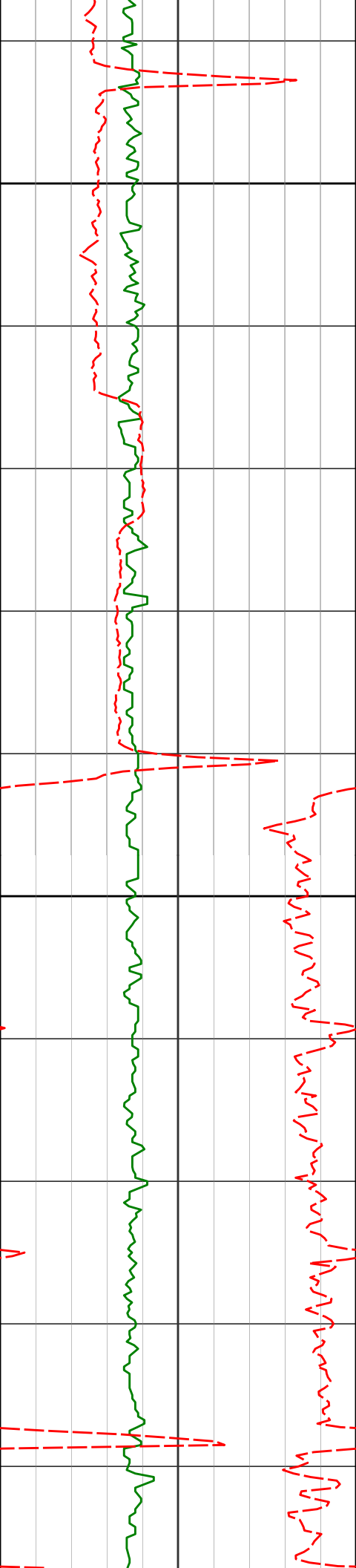
9522'

89.88°

268.14° 6599.16'

3040.63'

213.41°F



9600

9617'

90.22°

268.23° 6599.08'

3135.52'

213.41°F

9700

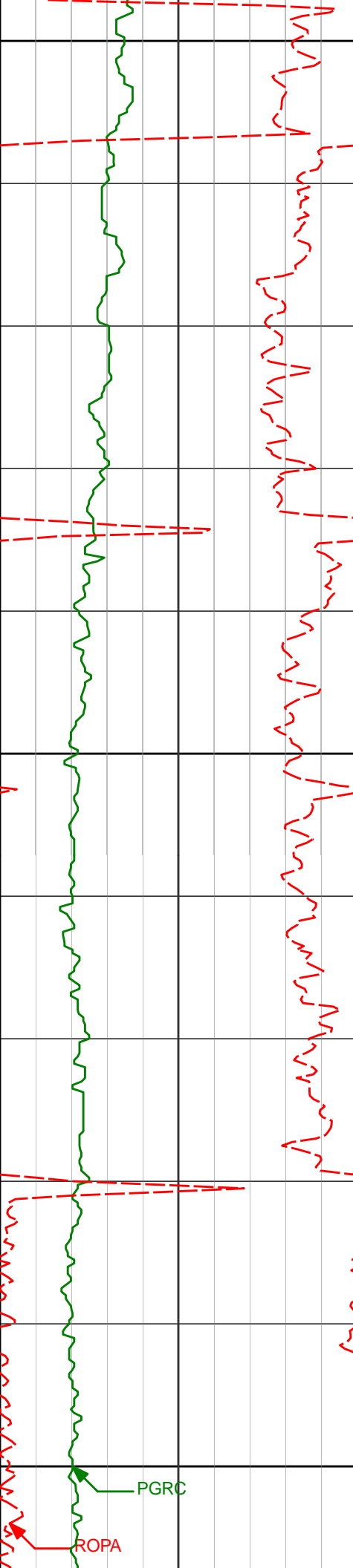
9712'

90.59°

268.03° 6598.41'

3230.40'

259.81°F



9800

9803'

89.35°

268.21° 6598.45'

3321.30'

217.63°F

221.84°F

9900

9895'

89.01°

268.20° 6599.77'

3413.18'

221.84°F

10000

9986'

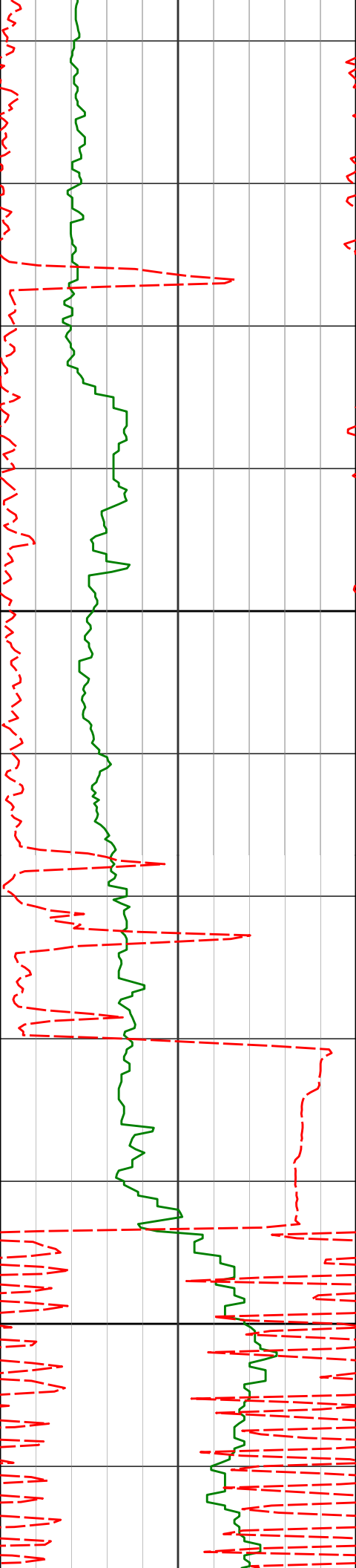
89.94°

268.56° 6600.60'

3504.09'

PGRC

ROPA



10100

10200

10077'

10169'

91.54°

89.75°

268.88° 6599.43'

269.45° 6598.39'

3595.01'

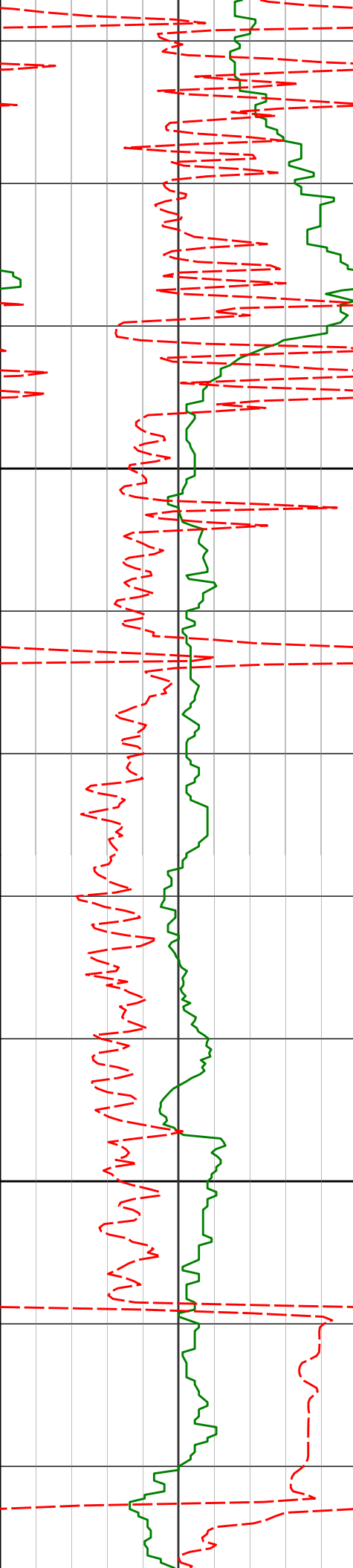
3686.96'

221.84°F

221.84°F

221.84°F

221.84°F



10260'

88.24°

268.60° 6599.99'

3777.90'

221.84°F

10300

10351'

87.44°

268.22° 6603.42'

3868.75'

226.06°F

10400

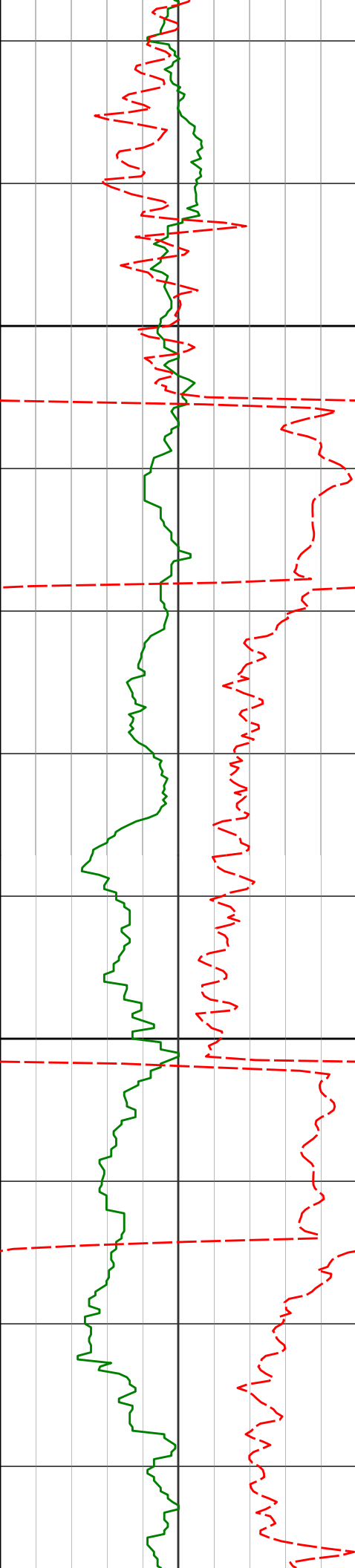
10443'

87.94°

269.93° 6607.13'

3960.62'

221.84°F



10500

10600

10535'

10627'

88.49°

90.22°

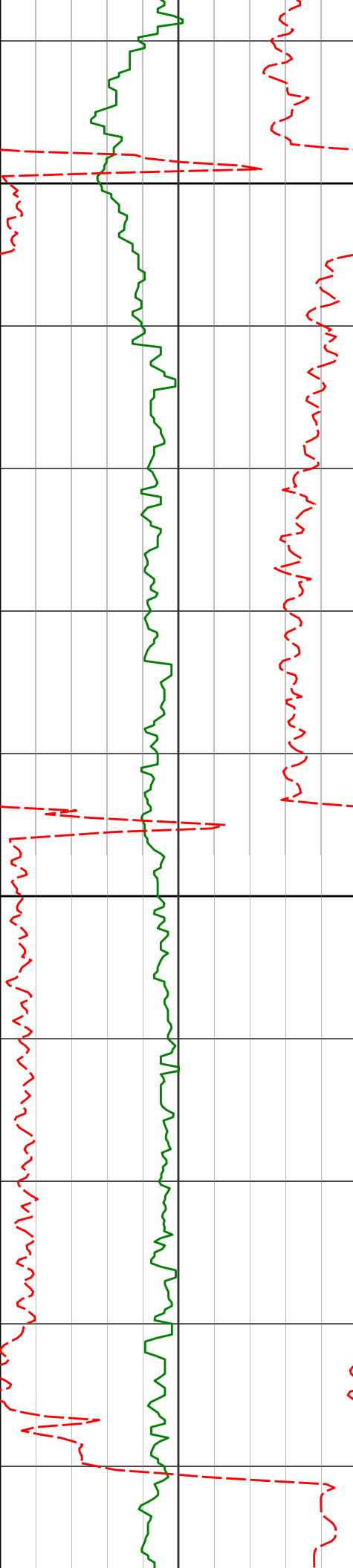
270.53° 6609.99'

270.09° 6611.03'

4052.57'

4144.55'

221.84°F



10700

10718'

90.59°

269.81° 6610.39'

4235.54'

226.06°F

10800

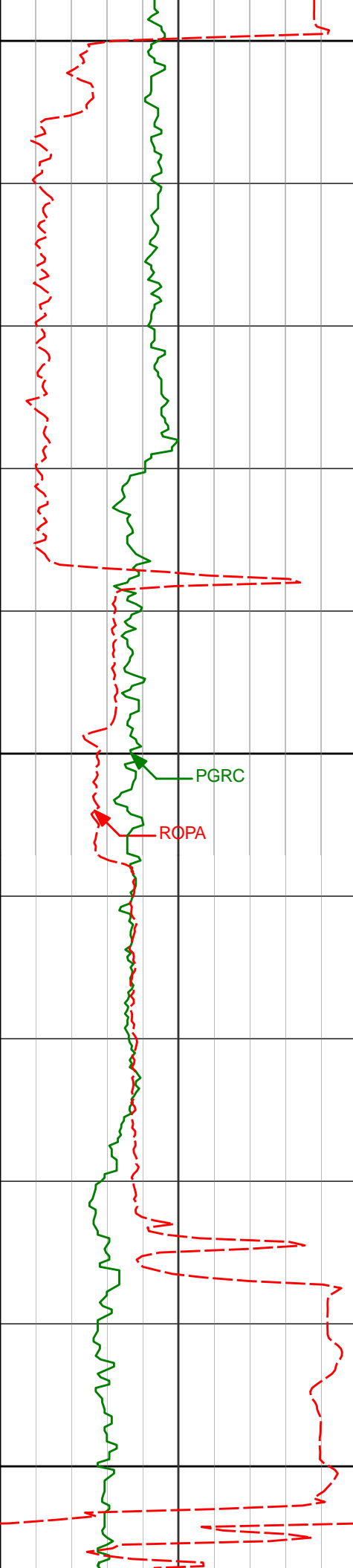
10810'

91.60°

270.44° 6608.63'

4327.51'

226.06°F



10900

10902'

91.14°

271.23° 6606.43'

4419.48'

230.28°F

11000

10994'

92.59°

272.60° 6603.43'

4511.42'

230.28°F

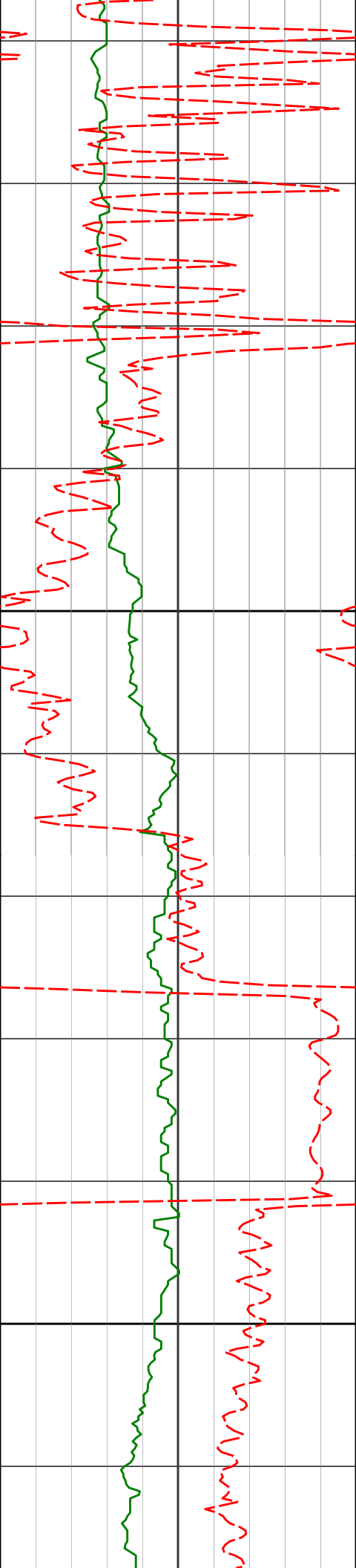
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11200

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230.28°F

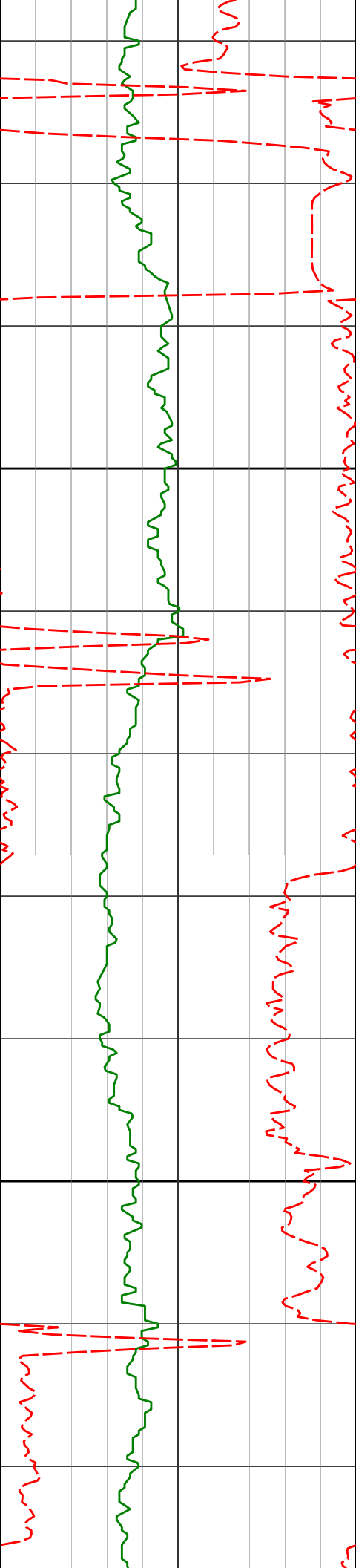
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4878.05'

230.28°F

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87.84°

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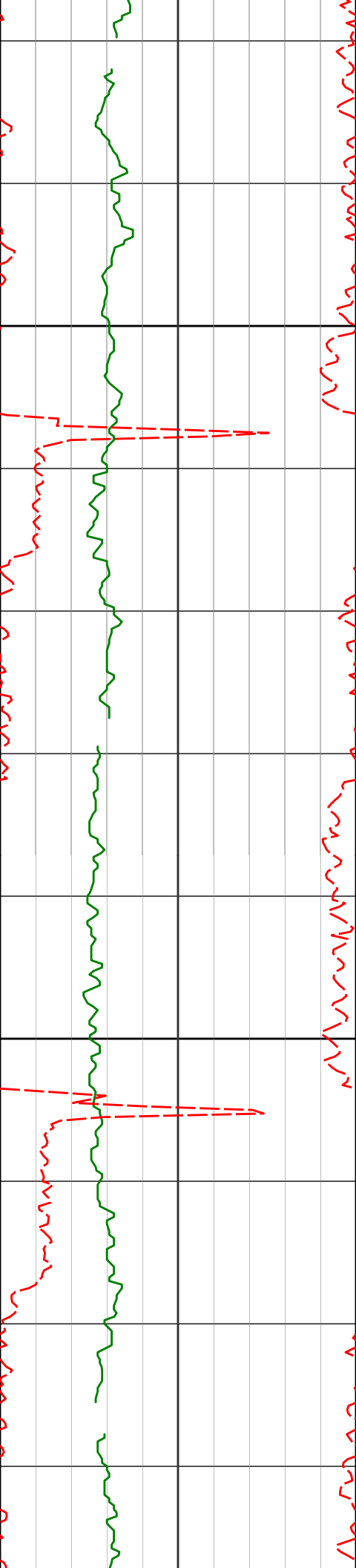
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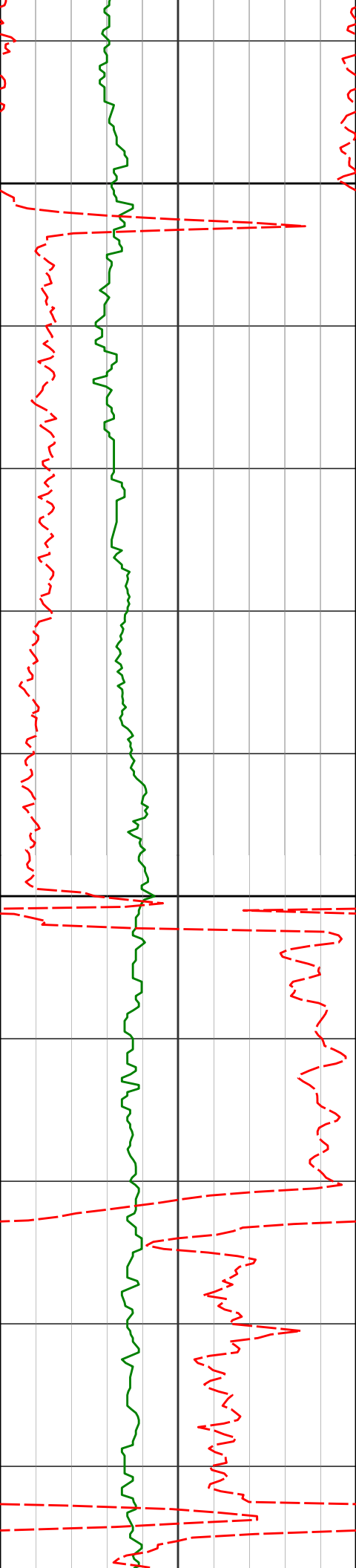
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238.72°F

238.72°F



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238.72°F

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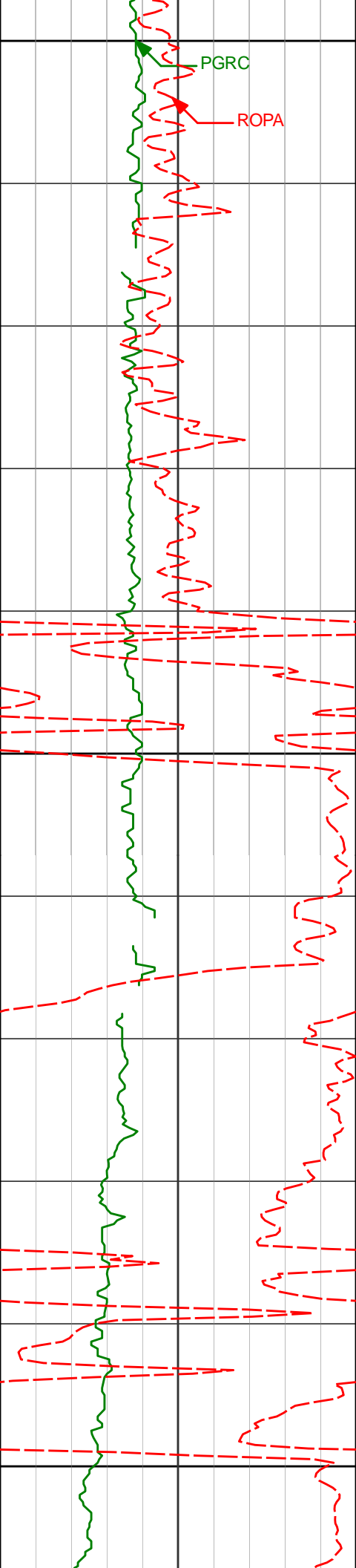
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238.72°F

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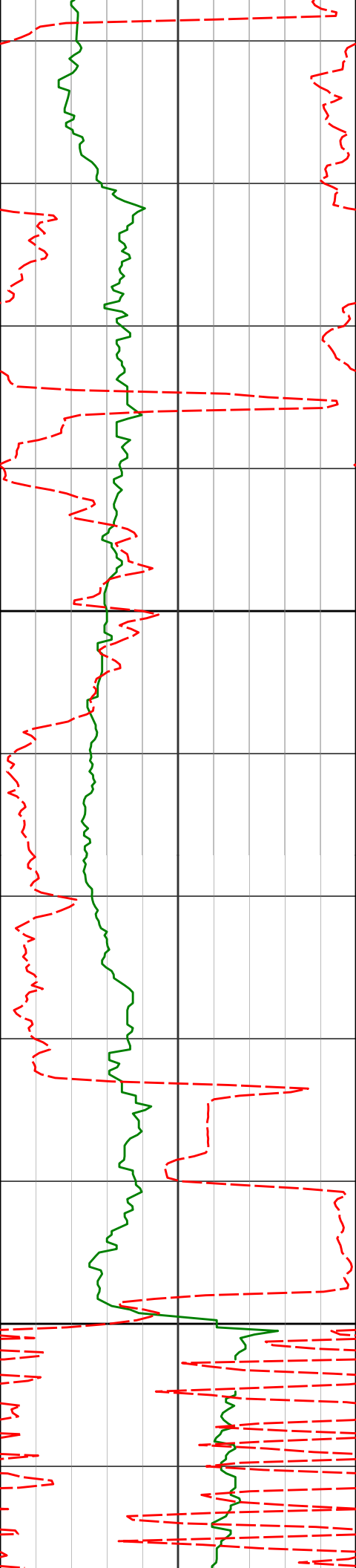
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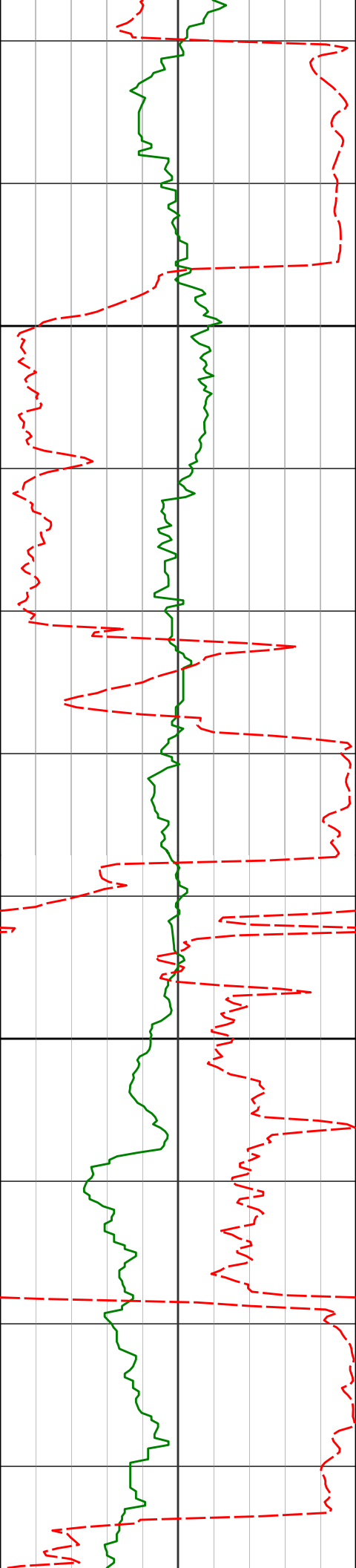
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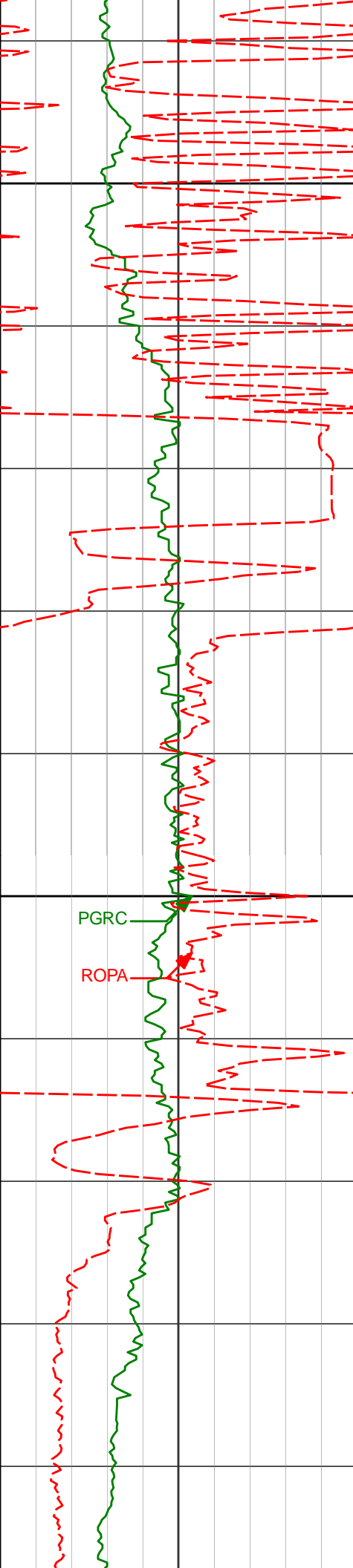
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12800 230.28°F

238.72°F
154.34°F

12870' 89.60° 267.84° 6620.25' 6386.08' 234.50°F



12900

12965'

91.30°

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6480.92'

234.50°F

13000

PGRC

ROPA

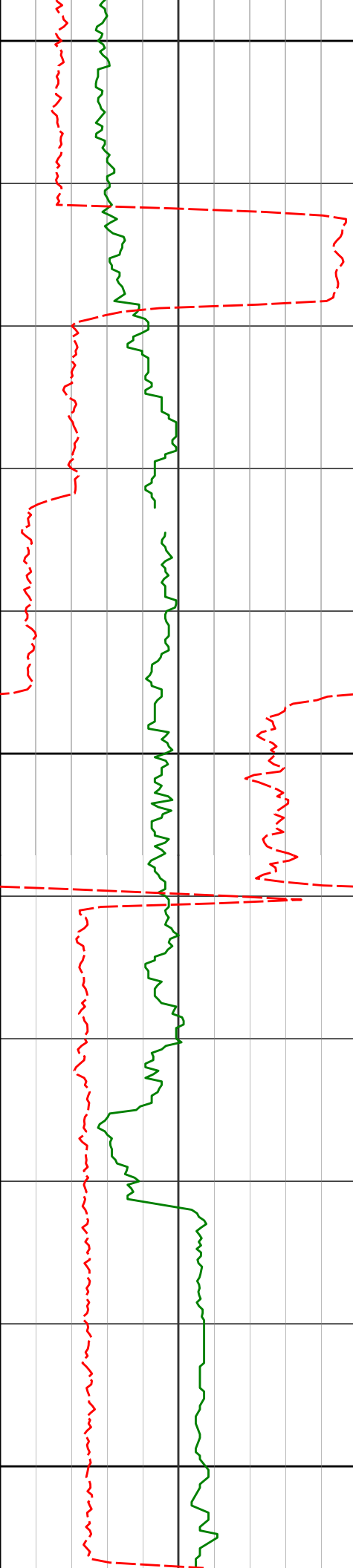
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238.72°F

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90.28°

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238.72°F

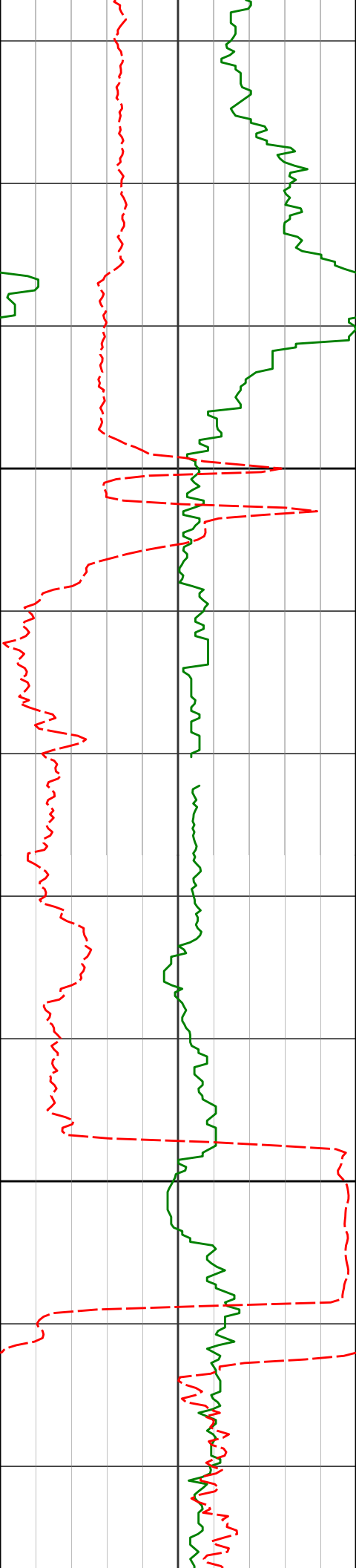
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6859.24'

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238.72°F



13600

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242.94°F

238.72°F

13700

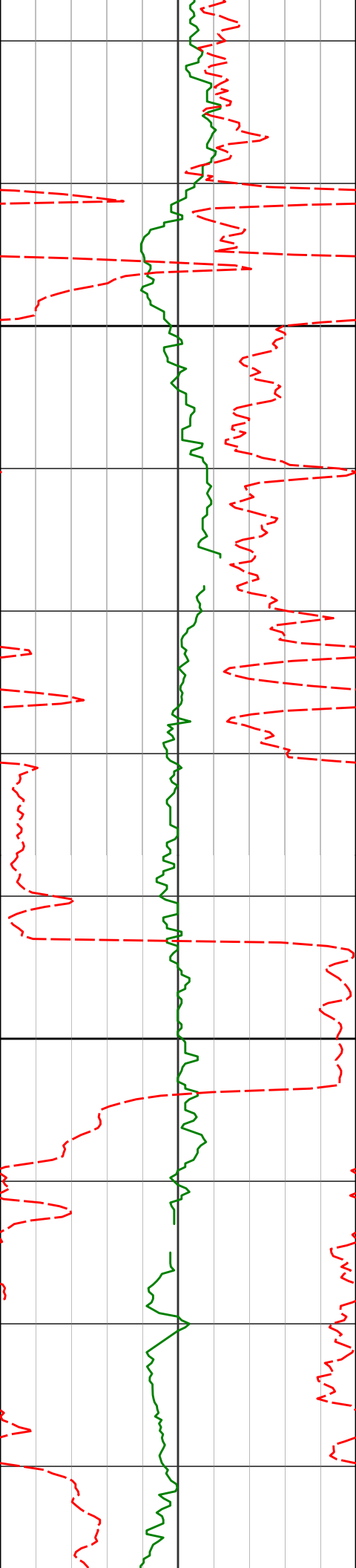
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13800

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88.77°

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242.94°F

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13912'

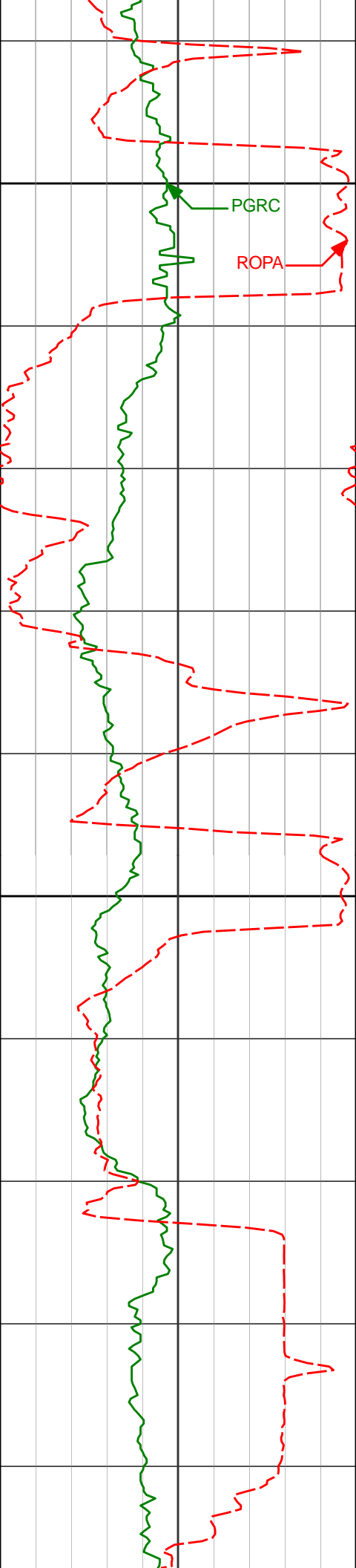
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242.94°F

242.94°F



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89.85°

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255.59°F

PGRC

ROPA

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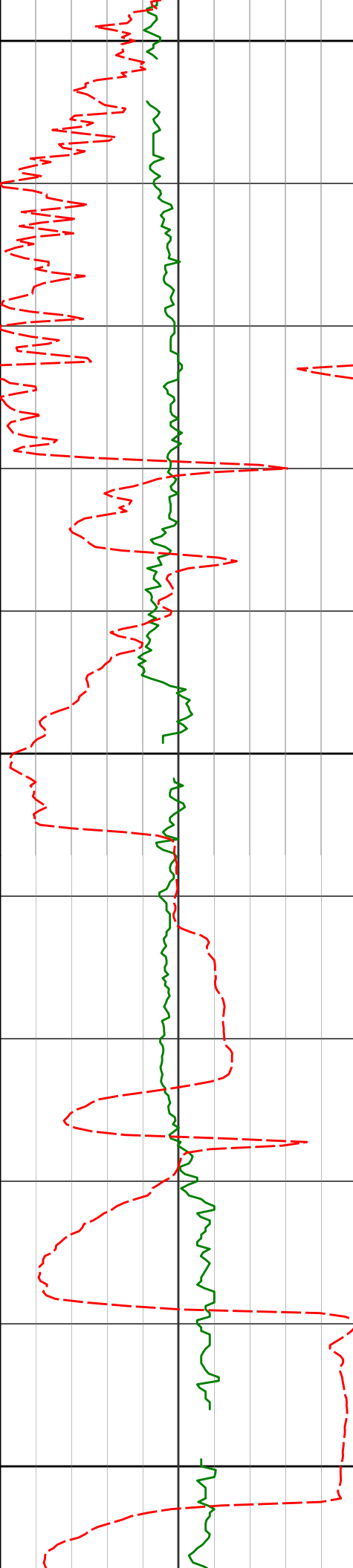
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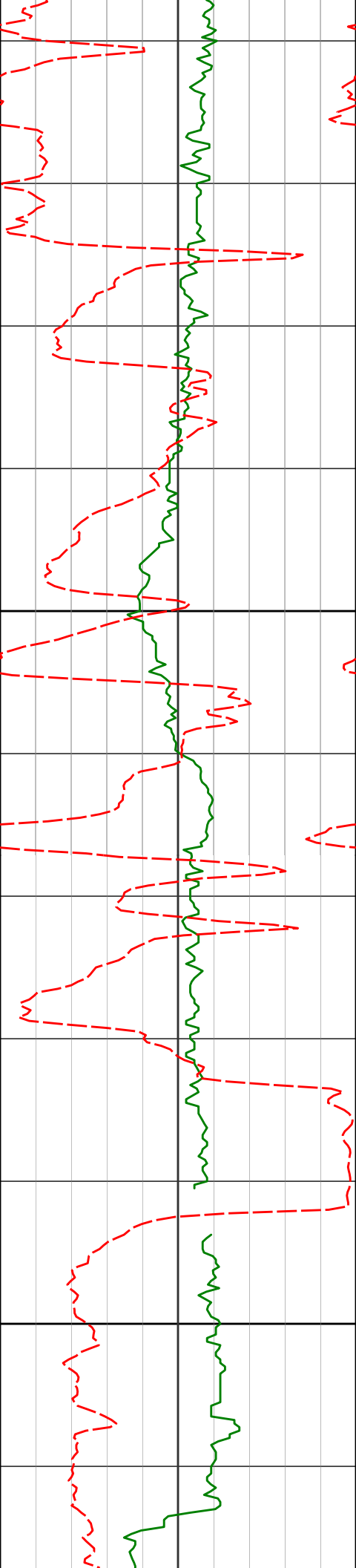


14200

14300

14400

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14291'	92.37°	269.16°	6609.39'	7805.61'	247.16°F
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14500

14600

14480'

91.05°

269.04° 6603.05'

7994.42'

259.81°F

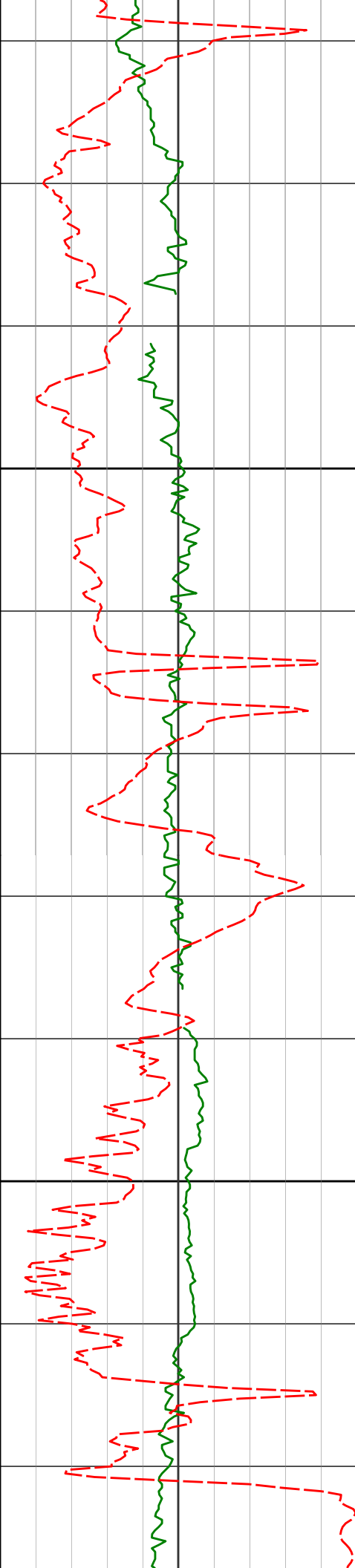
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247.16°F

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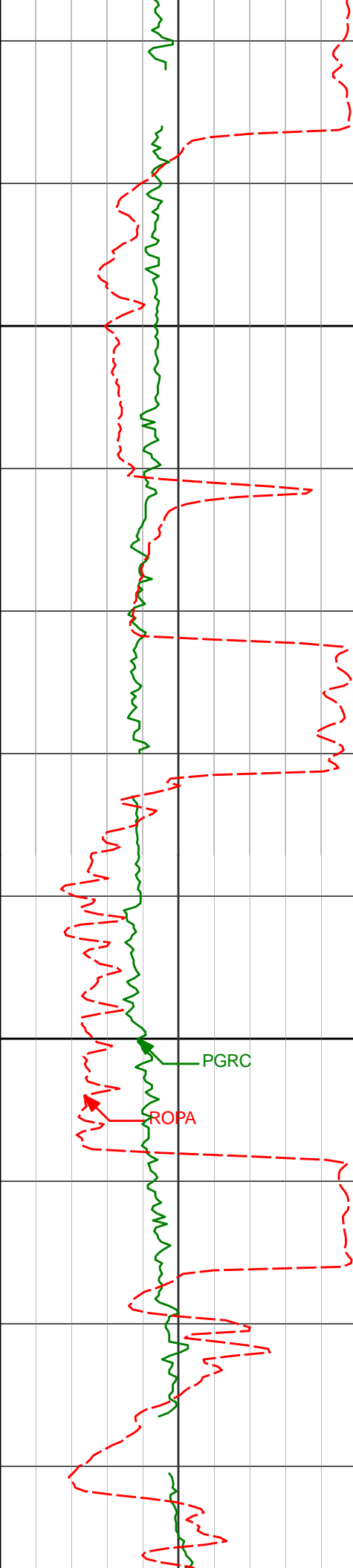
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8278.17'

247.16°F

238.72°F



14900

15000

PGRC

ROPA

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90.65°

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280.91°F

14954'

90.28°

268.75° 6597.32'

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242.94°F

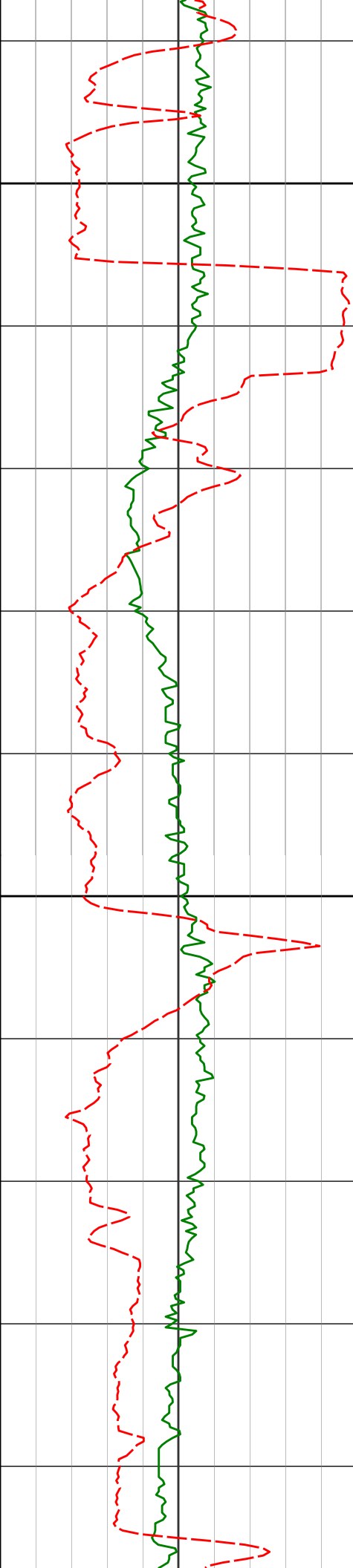
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247.16°F

15200

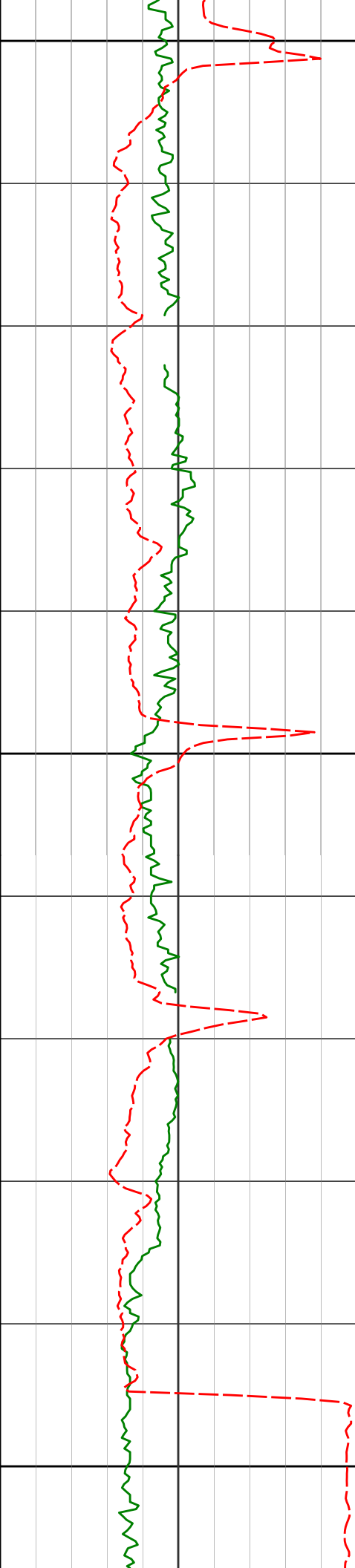
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247.16°F



15300

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8845.82'

251.38°F

15400

15427'

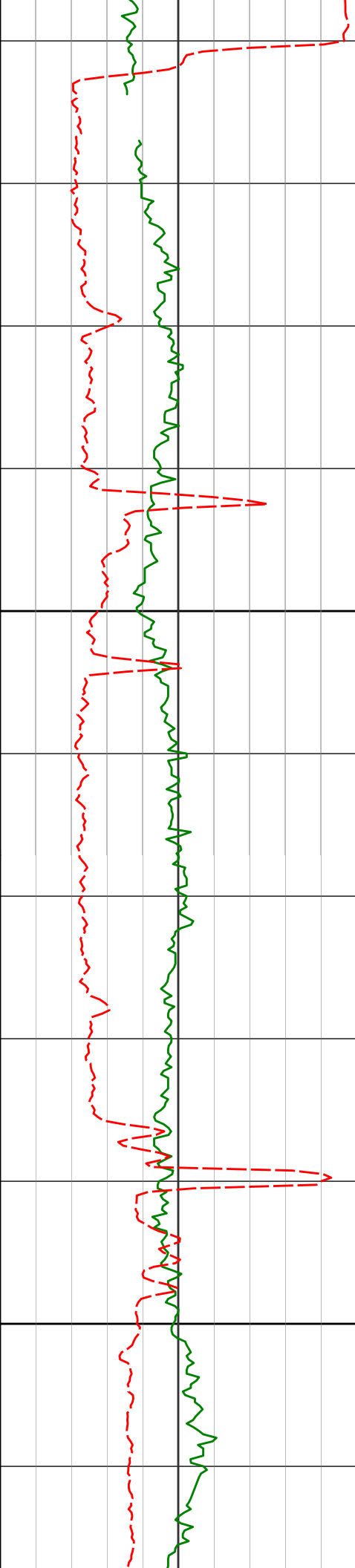
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8940.75'

251.38°F

15500



15522'

89.97°

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247.16°F

15600

15616'

91.42°

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9129.71'

251.38°F

15700

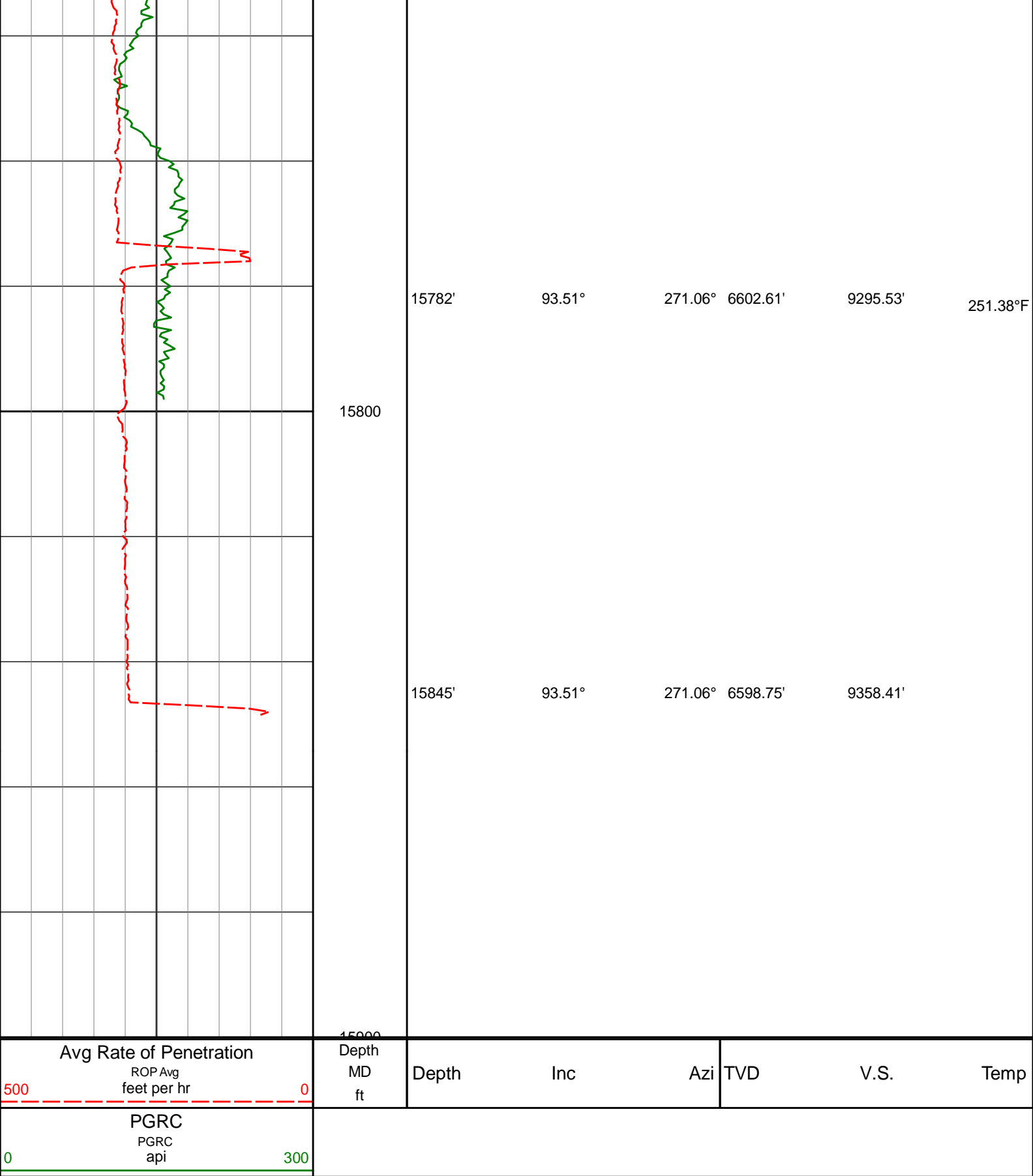
15711'

92.90°

270.95° 6606.58'

9224.64'

251.38°F
251.38°F



HALLIBURTON

DIRECTIONAL SURVEY REPORT
Noble Energy
70 Ranch State BB18-689
Wattenberg

0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
300.00	0.21	111.77	300.00	0.20 S	0.51 E	-0.51	0.07
600.00	0.43	111.77	599.99	0.83 S	2.07 E	-2.08	0.07
766.00	0.55	111.77	765.99	1.35 S	3.38 E	-3.41	0.07
826.00	0.59	111.77	825.99	1.57 S	3.94 E	-3.96	0.07
921.00	0.83	119.24	920.98	2.09 S	4.99 E	-5.03	0.26
1015.00	0.75	114.89	1014.97	2.68 S	6.14 E	-6.19	0.10
1201.00	0.60	109.72	1200.96	3.52 S	8.17 E	-8.22	0.08
1293.00	1.21	328.32	1292.95	2.86 S	8.12 E	-8.16	1.87
1384.00	1.09	336.30	1383.93	1.25 S	7.26 E	-7.28	0.22
1475.00	0.92	330.60	1474.92	0.19 N	6.55 E	-6.55	0.22
1567.00	0.99	324.14	1566.90	1.48 N	5.72 E	-5.70	0.14
1658.00	1.01	323.47	1657.89	2.76 N	4.78 E	-4.74	0.02
1750.00	1.02	338.96	1749.88	4.17 N	4.01 E	-3.94	0.30
1841.00	2.01	11.89	1840.85	6.49 N	4.05 E	-3.95	1.41
1933.00	2.46	12.69	1932.78	10.00 N	4.81 E	-4.66	0.48
2025.00	3.90	37.04	2024.64	14.42 N	7.13 E	-6.91	2.12
2116.00	5.89	42.77	2115.30	20.32 N	12.17 E	-11.85	2.25
2208.00	7.55	46.25	2206.66	27.97 N	19.74 E	-19.30	1.85
2301.00	8.76	44.16	2298.72	37.27 N	29.09 E	-28.50	1.34
2392.00	7.93	36.67	2388.76	47.28 N	37.66 E	-36.92	1.50
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2576.00	7.70	36.53	2570.95	67.42 N	53.69 E	-52.63	0.85
2668.00	7.76	46.00	2662.12	76.68 N	61.83 E	-60.62	1.38
2759.00	7.15	45.14	2752.35	84.94 N	70.26 E	-68.92	0.68
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2942.00	7.92	50.00	2933.61	101.09 N	89.56 E	-87.96	0.53
3036.00	7.49	49.01	3026.76	109.27 N	99.15 E	-97.42	0.49
3131.00	8.58	49.79	3120.82	117.91 N	109.23 E	-107.37	1.16
3226.00	7.55	45.78	3214.88	126.84 N	119.12 E	-117.12	1.23
3320.00	6.65	46.96	3308.16	134.86 N	127.53 E	-125.39	0.98
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3699.00	5.69	42.51	3684.38	168.83 N	158.17 E	-155.50	1.49
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6350.00	37.10	272.06	6309.47	165.52 N	47.82 E	-45.21	10.66
6444.00	49.12	275.29	6377.98	169.83 N	16.14 W	18.80	13.00
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6634.00	61.23	269.99	6483.66	182.52 N	172.99 W	175.84	7.49
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6823.00	71.79	268.71	6562.22	180.47 N	344.57 W	347.36	7.96
6872.00	76.97	269.07	6575.41	179.56 N	391.74 W	394.51	10.60
6965.00	82.23	269.18	6592.20	178.17 N	483.16 W	485.90	5.66
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9712.00	90.59	268.03	6598.41	174.36 N	3228.06 W	3230.40	0.44
9803.00	89.35	268.21	6598.45	171.37 N	3319.01 W	3321.30	1.38
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10627.00	90.22	270.09	6611.03	157.86 N	4142.59 W	4144.55	1.94
10718.00	90.59	269.81	6610.39	157.78 N	4233.58 W	4235.54	0.51
10810.00	91.60	270.44	6608.63	157.98 N	4325.56 W	4327.51	1.29
10902.00	91.14	271.23	6606.43	159.32 N	4417.53 W	4419.48	0.99
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11178.00	91.36	273.94	6599.22	172.58 N	4693.08 W	4695.21	1.21
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11361.00	88.30	272.76	6600.61	182.38 N	4875.79 W	4878.05	1.09
11453.00	87.84	271.94	6603.71	186.15 N	4967.65 W	4969.97	1.02
11544.00	88.64	272.24	6606.50	189.47 N	5058.55 W	5060.90	0.94
11639.00	89.48	272.17	6608.06	193.12 N	5153.47 W	5155.86	0.89
11828.00	91.23	271.97	6606.89	199.95 N	5342.33 W	5344.81	0.93
11923.00	91.48	270.17	6604.65	201.72 N	5437.29 W	5439.78	1.91
12018.00	91.17	269.71	6602.45	201.62 N	5532.26 W	5534.74	0.58
12112.00	89.88	270.26	6601.59	201.60 N	5626.25 W	5628.73	1.49
12207.00	88.40	270.06	6603.01	201.86 N	5721.24 W	5723.70	1.57
12302.00	88.95	270.04	6605.21	201.95 N	5816.21 W	5818.67	0.58
12396.00	88.30	269.65	6607.47	201.69 N	5910.19 W	5912.62	0.81
12491.00	88.18	270.07	6610.38	201.46 N	6005.14 W	6007.56	0.46
12586.00	87.72	268.92	6613.78	200.62 N	6100.07 W	6102.47	1.30
12680.00	89.02	268.50	6616.46	198.51 N	6194.01 W	6196.36	1.45
12775.00	88.40	267.89	6618.59	195.52 N	6288.94 W	6291.23	0.92
12870.00	89.60	267.84	6620.25	191.98 N	6383.86 W	6386.08	1.26
12965.00	91.30	267.39	6619.51	188.03 N	6478.77 W	6480.92	1.85
13059.00	91.79	267.58	6616.97	183.90 N	6572.64 W	6574.72	0.56
13154.00	90.49	268.15	6615.08	180.36 N	6667.55 W	6669.56	1.49
13249.00	90.28	267.36	6614.44	176.64 N	6762.48 W	6764.42	0.86
13344.00	91.33	267.56	6613.11	172.43 N	6857.37 W	6859.24	1.13
13438.00	90.89	269.07	6611.29	169.67 N	6951.31 W	6953.12	1.67
13628.00	88.80	269.51	6611.80	167.32 N	7141.29 W	7143.03	1.12
13722.00	89.45	269.35	6613.24	166.38 N	7235.27 W	7236.99	0.71
13817.00	88.77	269.05	6614.71	165.05 N	7330.25 W	7331.94	0.78

13912.00	89.57	269.73	6616.09	164.04 N	7425.23 W	7426.89	1.11
14007.00	89.85	269.23	6616.57	163.18 N	7520.23 W	7521.86	0.60
14101.00	91.26	269.11	6615.66	161.82 N	7614.21 W	7615.81	1.51
14196.00	91.97	269.11	6612.98	160.34 N	7709.16 W	7710.73	0.75
14291.00	92.37	269.16	6609.39	158.91 N	7804.08 W	7805.61	0.42
14386.00	92.13	269.19	6605.66	157.54 N	7899.00 W	7900.50	0.25
14480.00	91.05	269.04	6603.05	156.09 N	7992.95 W	7994.42	1.16
14575.00	90.09	268.76	6602.10	154.27 N	8087.93 W	8089.35	1.05
14670.00	90.37	268.49	6601.72	151.99 N	8182.90 W	8184.28	0.41
14764.00	91.69	268.47	6600.03	149.50 N	8276.85 W	8278.17	1.40
14859.00	90.65	268.92	6598.09	147.33 N	8371.80 W	8373.08	1.19
14954.00	90.28	268.75	6597.32	145.40 N	8466.78 W	8468.02	0.43
15048.00	89.78	269.63	6597.27	144.07 N	8560.77 W	8561.97	1.08
15143.00	88.18	270.44	6598.96	144.13 N	8655.75 W	8656.95	1.89
15238.00	87.85	270.71	6602.25	145.08 N	8750.69 W	8751.89	0.45
15332.00	87.93	270.30	6605.71	145.91 N	8844.62 W	8845.82	0.44
15427.00	87.68	270.59	6609.35	146.65 N	8939.55 W	8940.75	0.40
15522.00	89.97	270.84	6611.30	147.83 N	9034.51 W	9035.72	2.42
15616.00	91.42	270.91	6610.16	149.27 N	9128.49 W	9129.71	1.54
15711.00	92.90	270.95	6606.58	150.81 N	9223.41 W	9224.64	1.56
15782.00	93.51	271.06	6602.61	152.05 N	9294.29 W	9295.53	0.87
15845.00	93.51	271.06	6598.75	153.22 N	9357.16 W	9358.41	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 270.90 DEGREES (GRID)
A TOTAL CORRECTION OF 7.70 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15845.00 FEET
IS 9358.41 FEET ALONG 270.94 DEGREES (GRID)**

Last survey is a projection to bit at TD