



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	03-Sep-15	07-Sep-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	629.00	6,852.00			
Log End Depth (MD, ft)	6,852.00	15,973.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	31-Aug-15 20:50	04-Sep-15 05:30			
Drill/Wipe End Date and Time	31-Aug-15 20:50	06-Sep-15 11:30			
Min Inc (deg) @ Depth (MD, ft)	0.09 @ 5,435.00	86.88 @ 6,973.00			
Max Inc (deg) @ Depth (MD, ft)	82.28 @ 6,788.00	92.81 @ 10,094.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 /			
Flow Rate (gpm)	558.19	319.74			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	8.90 / 27.00	9.90 / 34.00			
Filtrate CL (ppm)	6.00	1,700.00			
pH / Fluid Loss (mptm)	8.90 / 56	9.40 / 38			
PV (cP) / YP (lbf2)	3 / 2.00	12 / 14.00			
% Solids / % Sand	4.30 / 0.15	7.2 / .2			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / 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	475.01 / PDM	330.51 / PDM			

Max Tool Temp (degF) / Source	175.21 / PCM	239.54 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	JW Irwin	JW Irwin			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404299	12334773			
Insert Serial Number	11619985	11400870			
Date and Time Initialized	01-Sep-15 09:32	03-Sep-15 00:56			
Date and Time Read	03-Sep-15 04:11	07-Sep-15 02:10			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	64.00	67.00			
Software Version	6.33	6.21			
Sub Serial Number	11404299	12334773			
Sonde Serial Number	10859920	11478016			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	185.30	178.90			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	57.84	60.58			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404299	12334773			
Insert/Sonde Serial Number	11680918	12037418			

REMARKS

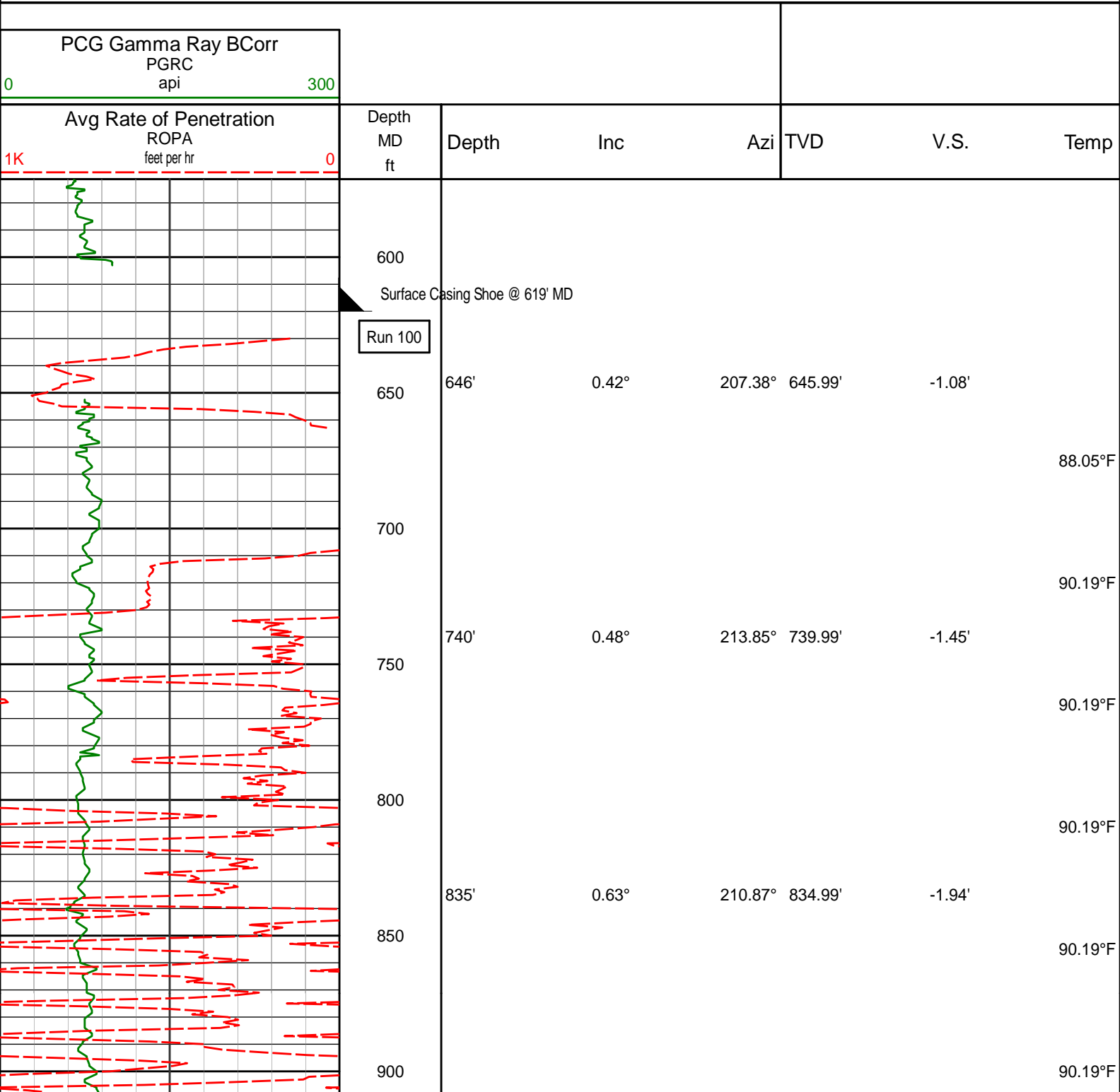
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 6.125"
Mud Density: 9.9-10.3
5. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

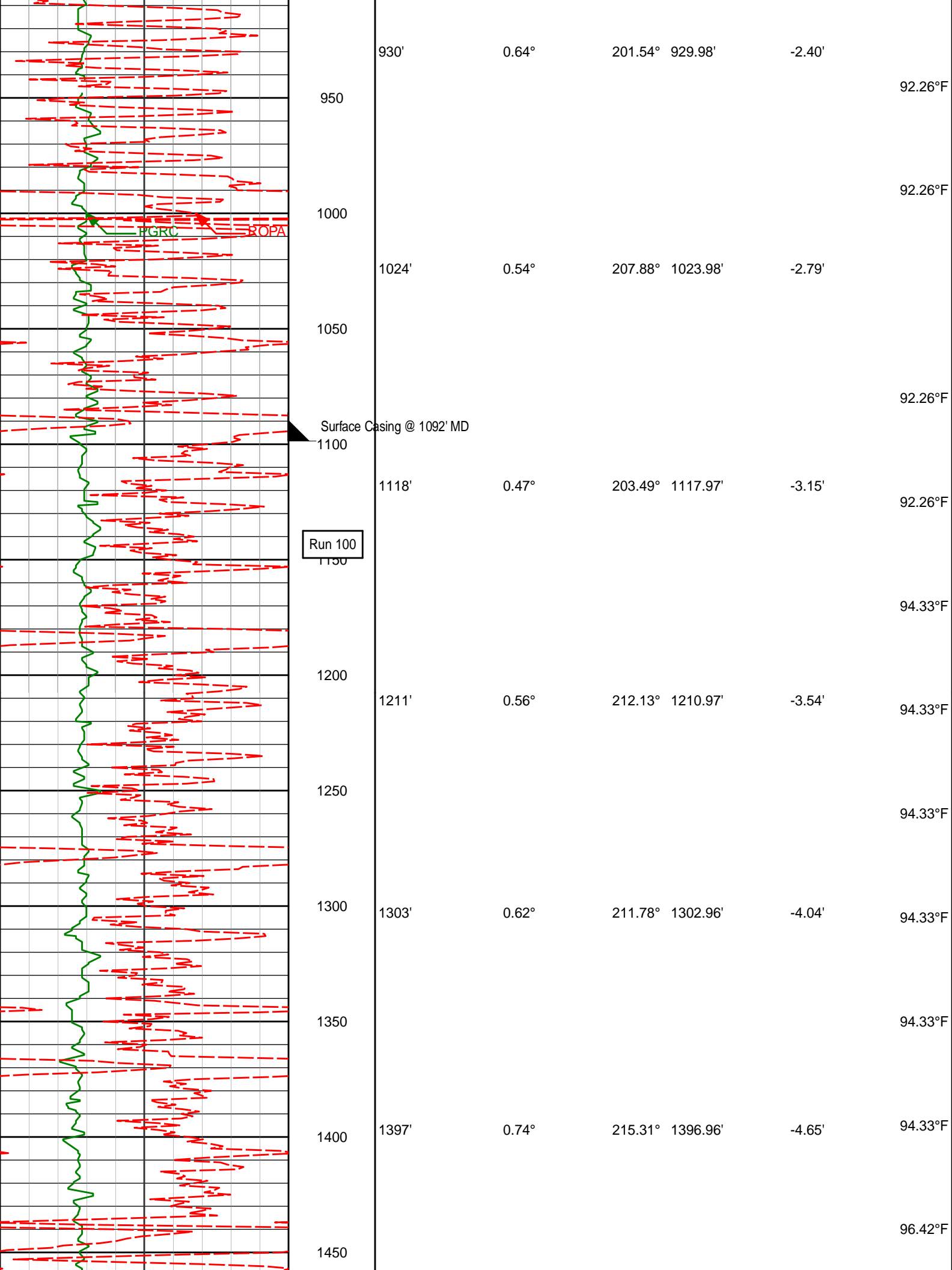
WARRANTY

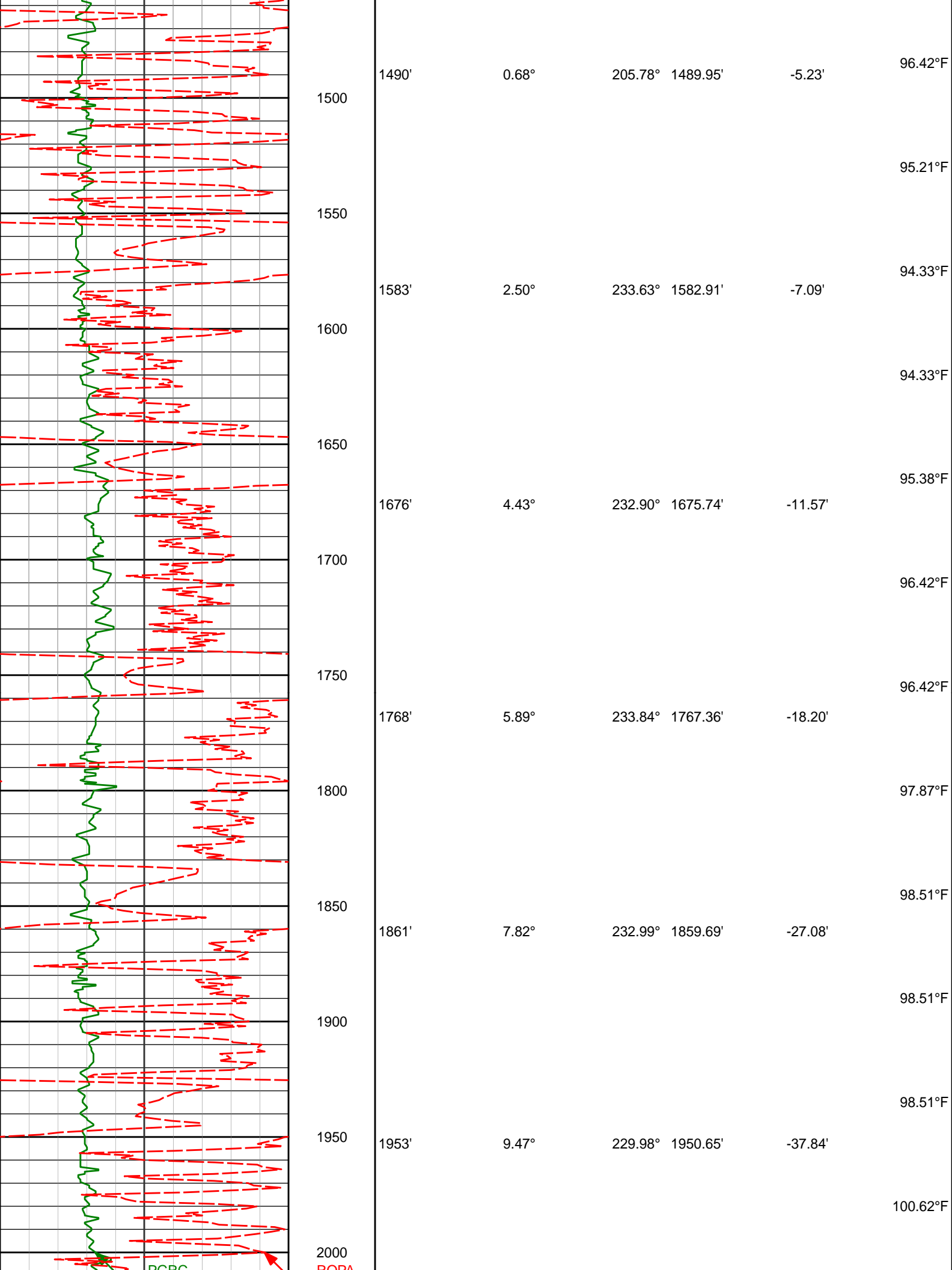
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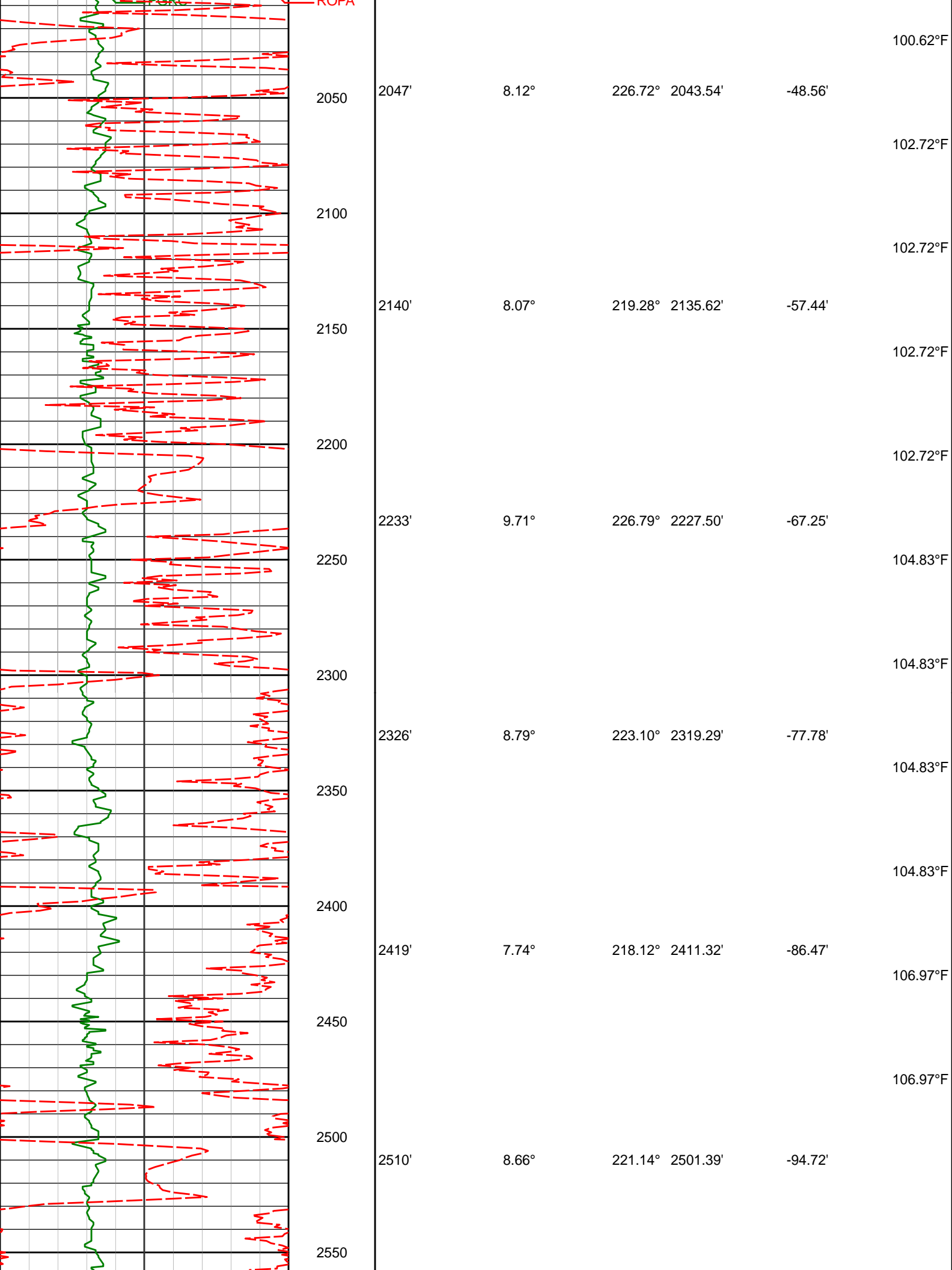
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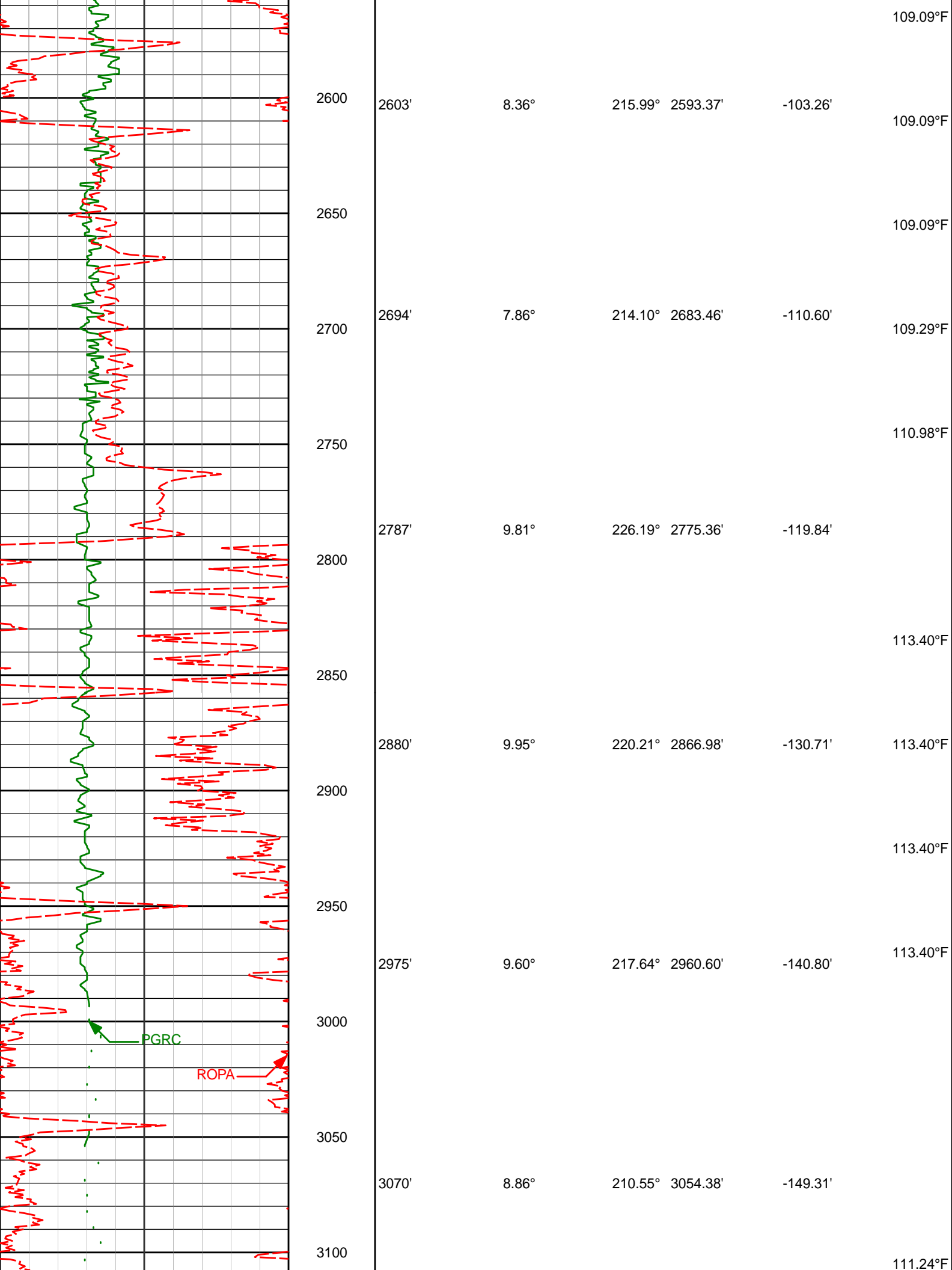
MD Detail 1:600 Scale

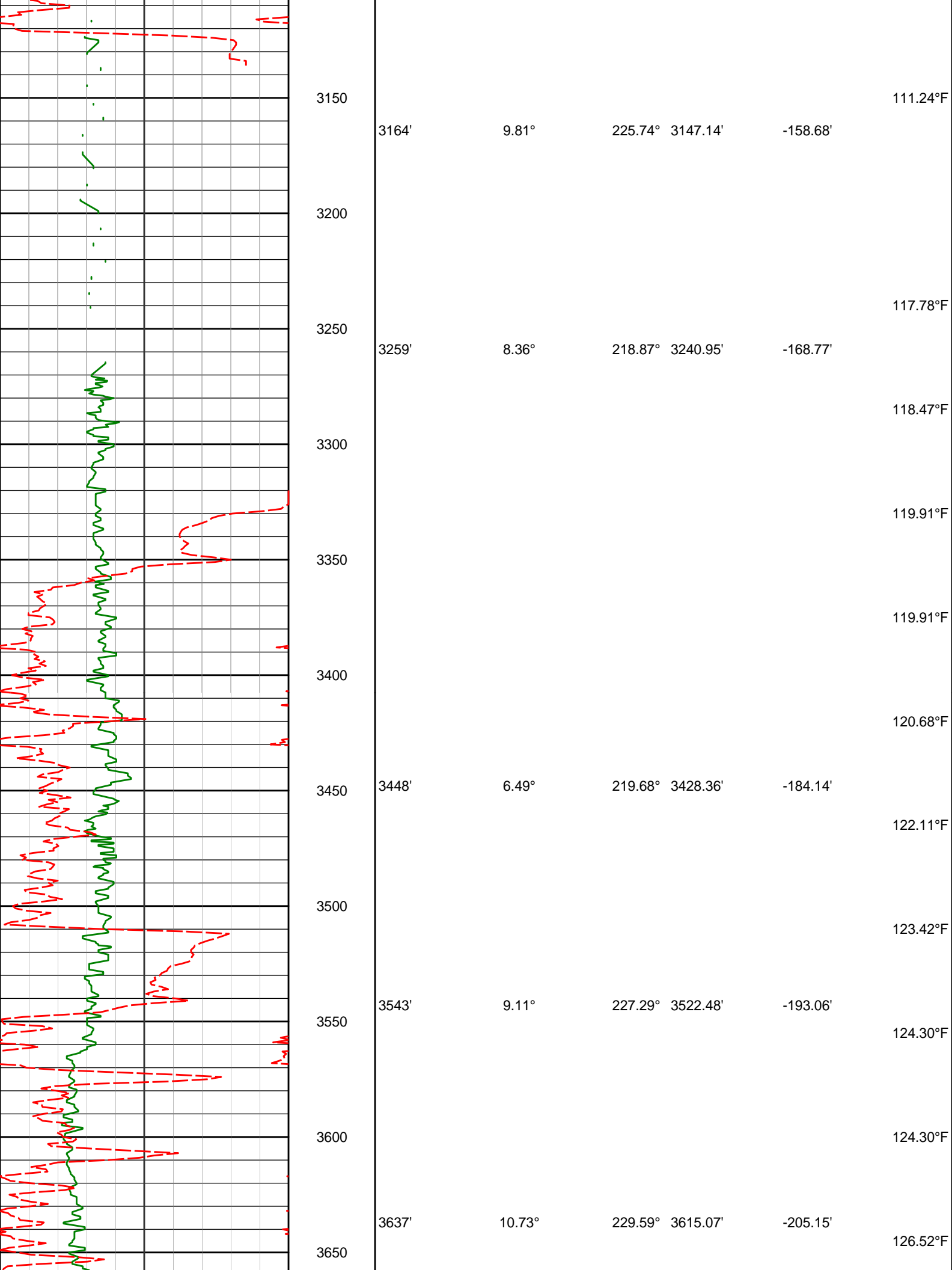


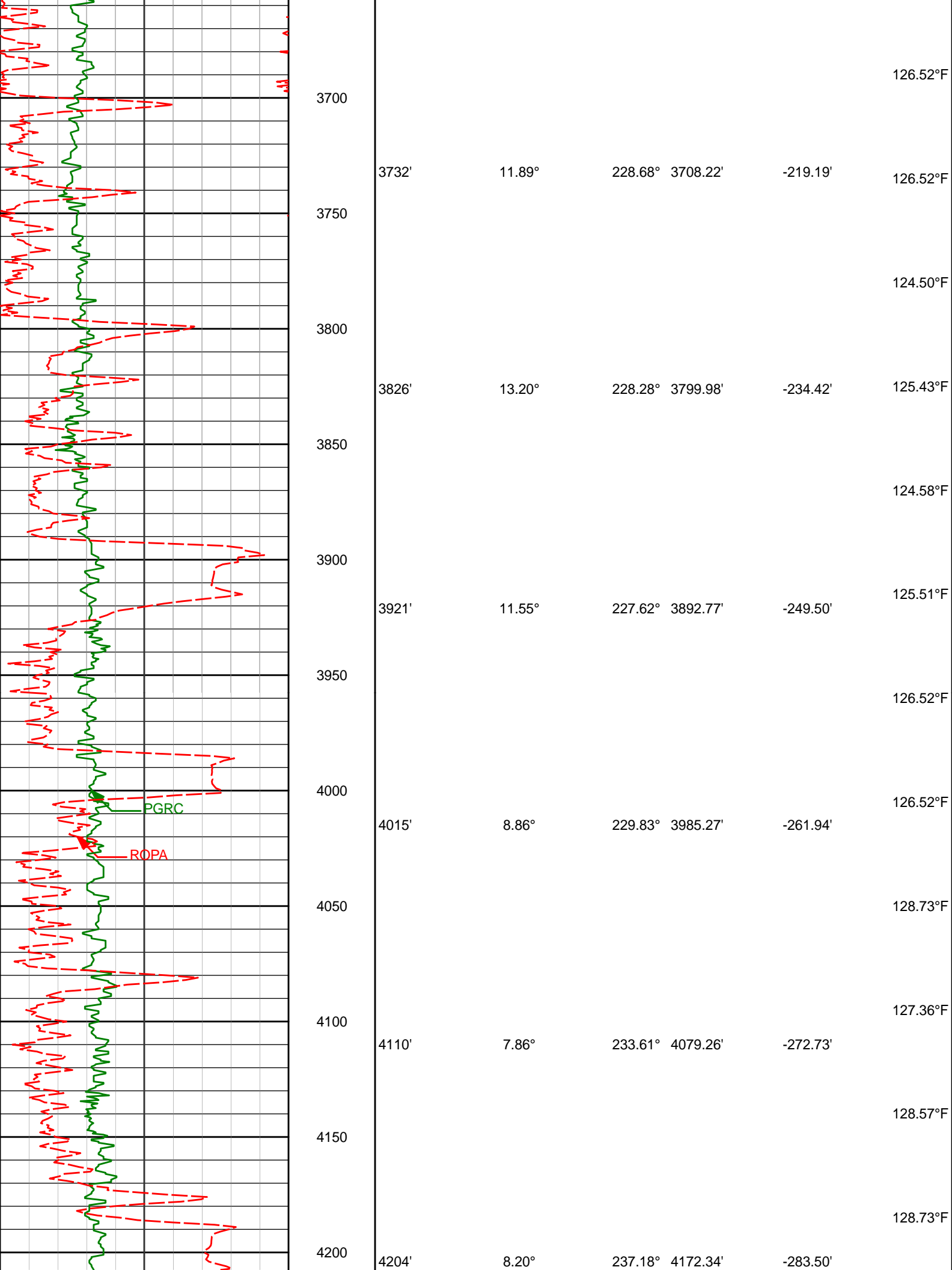


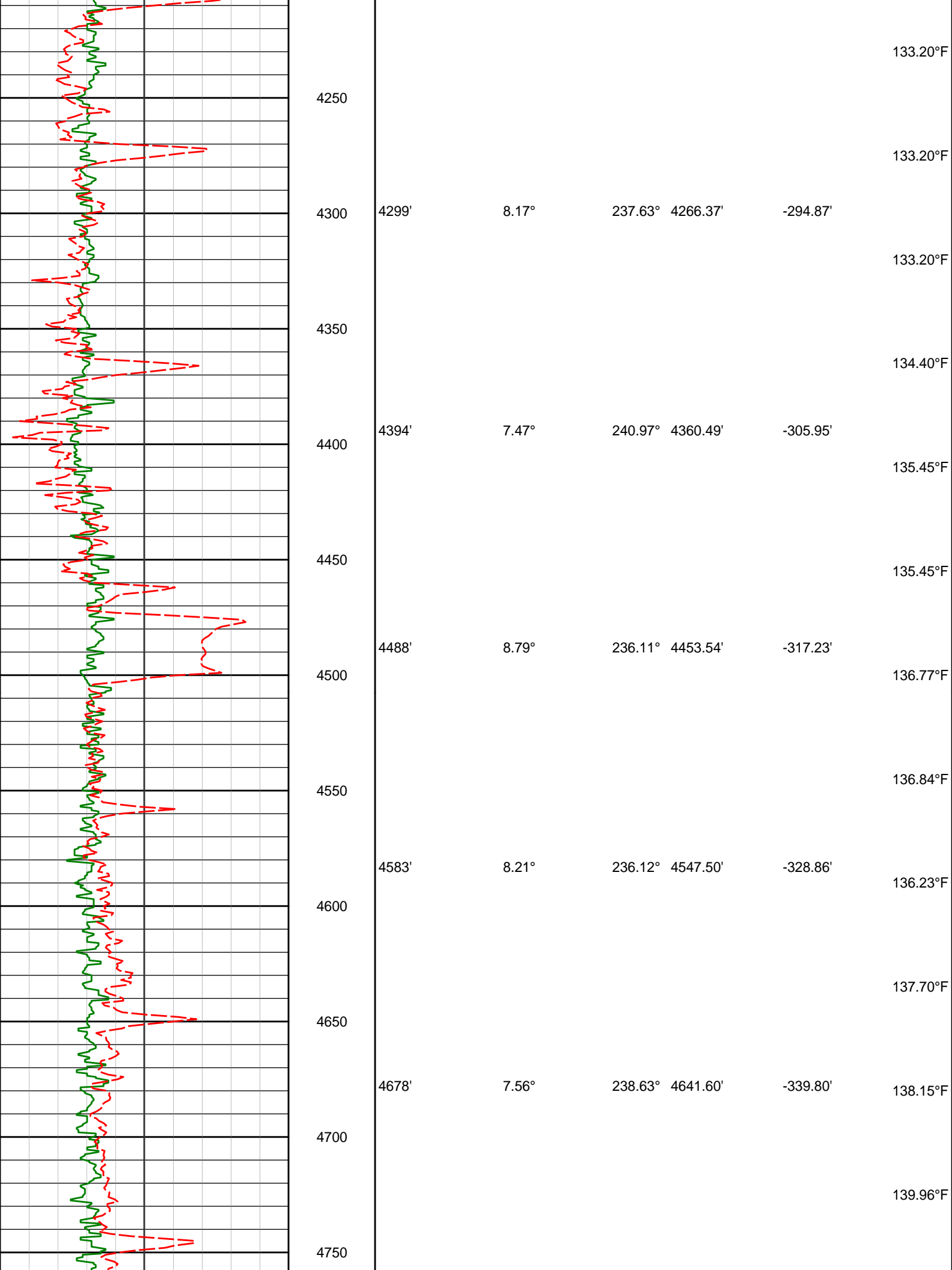


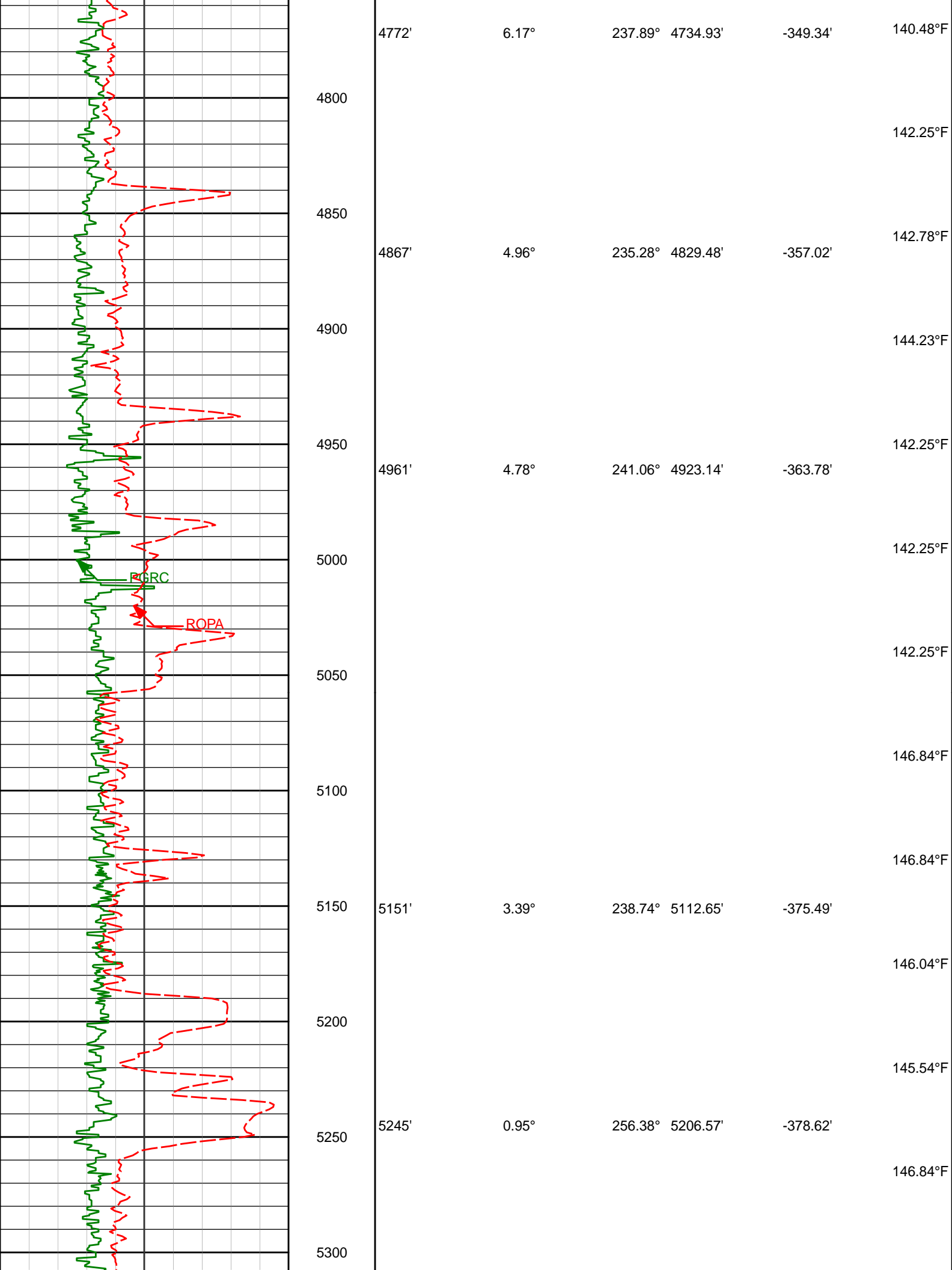


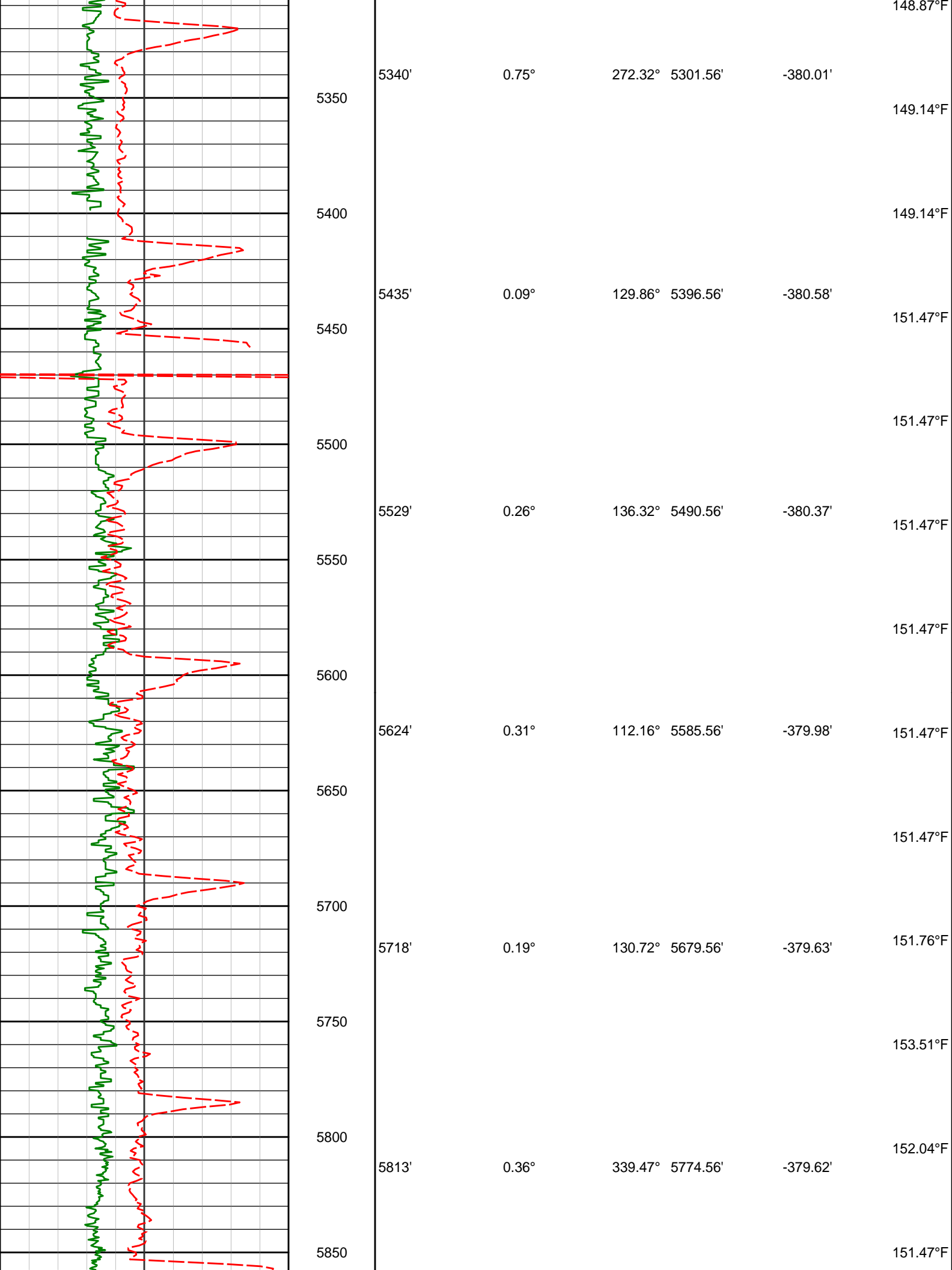


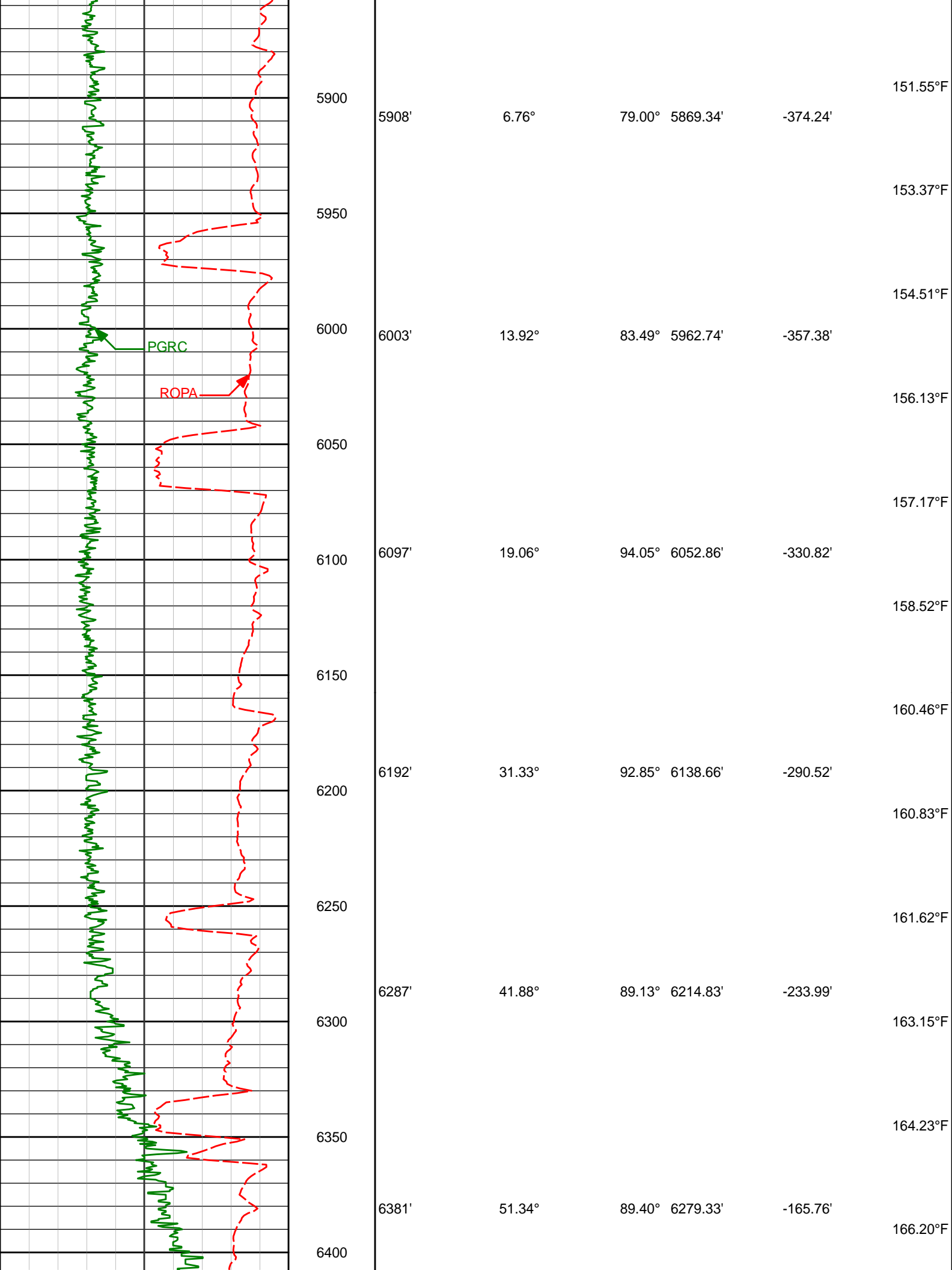


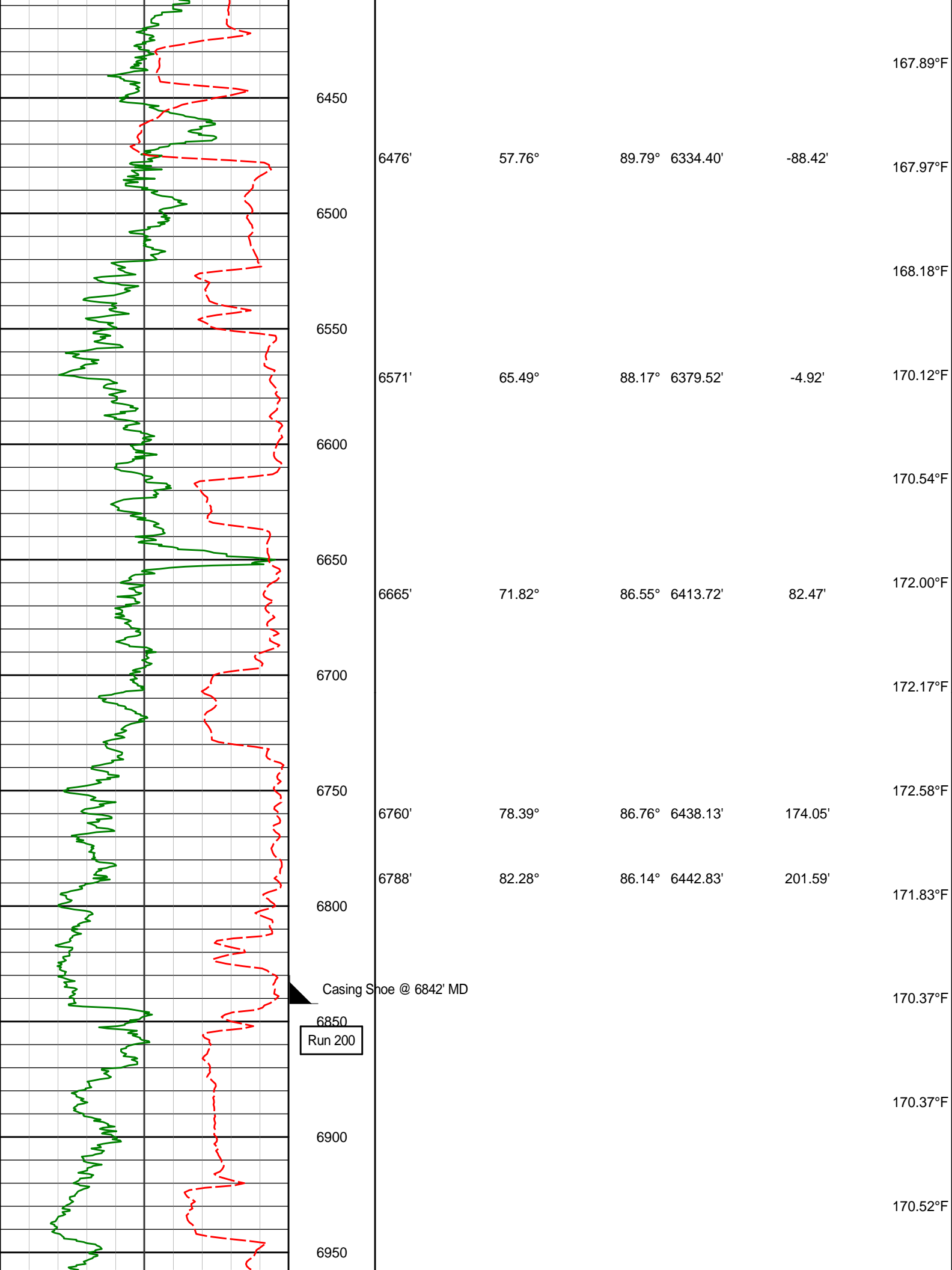


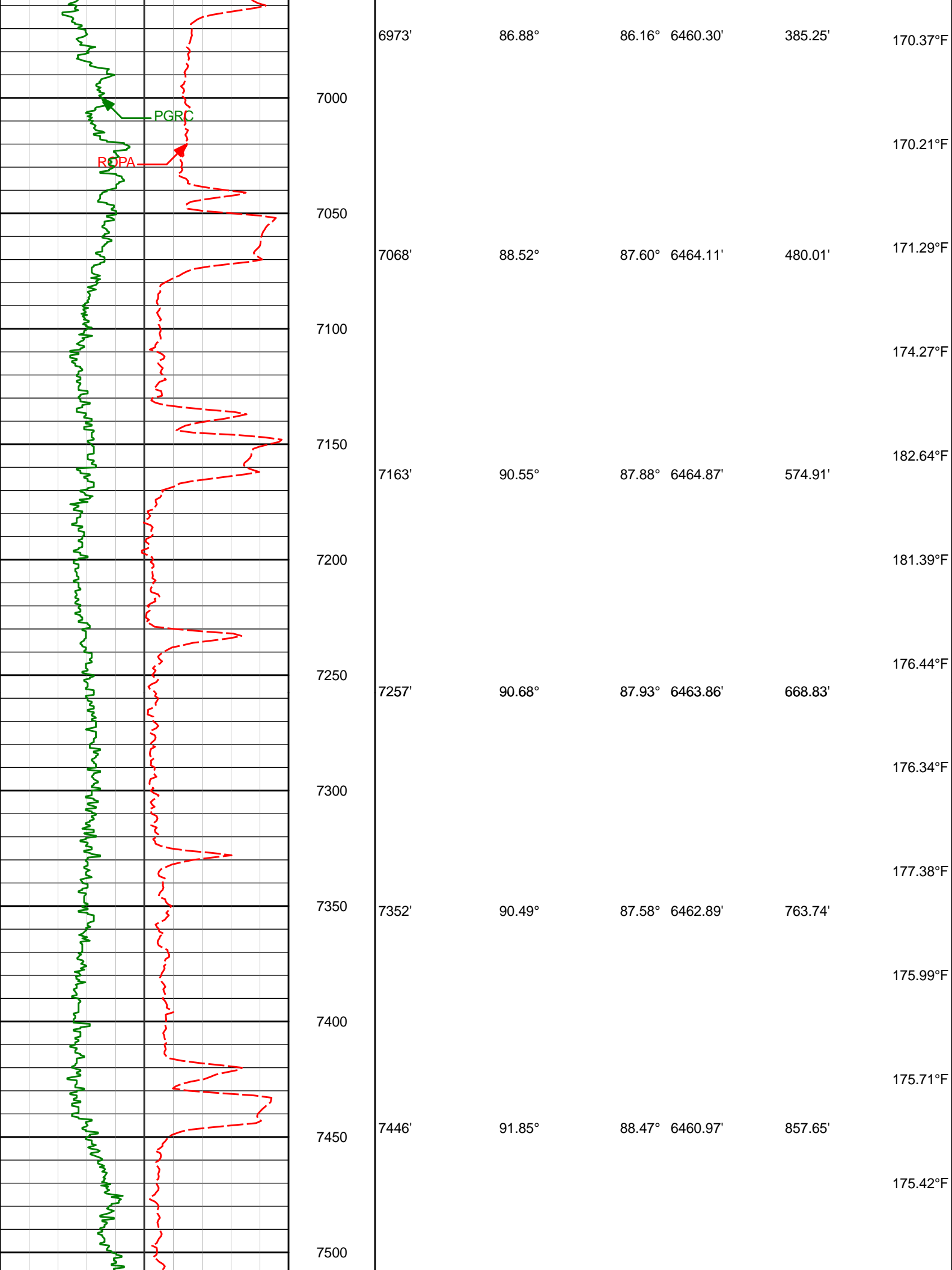


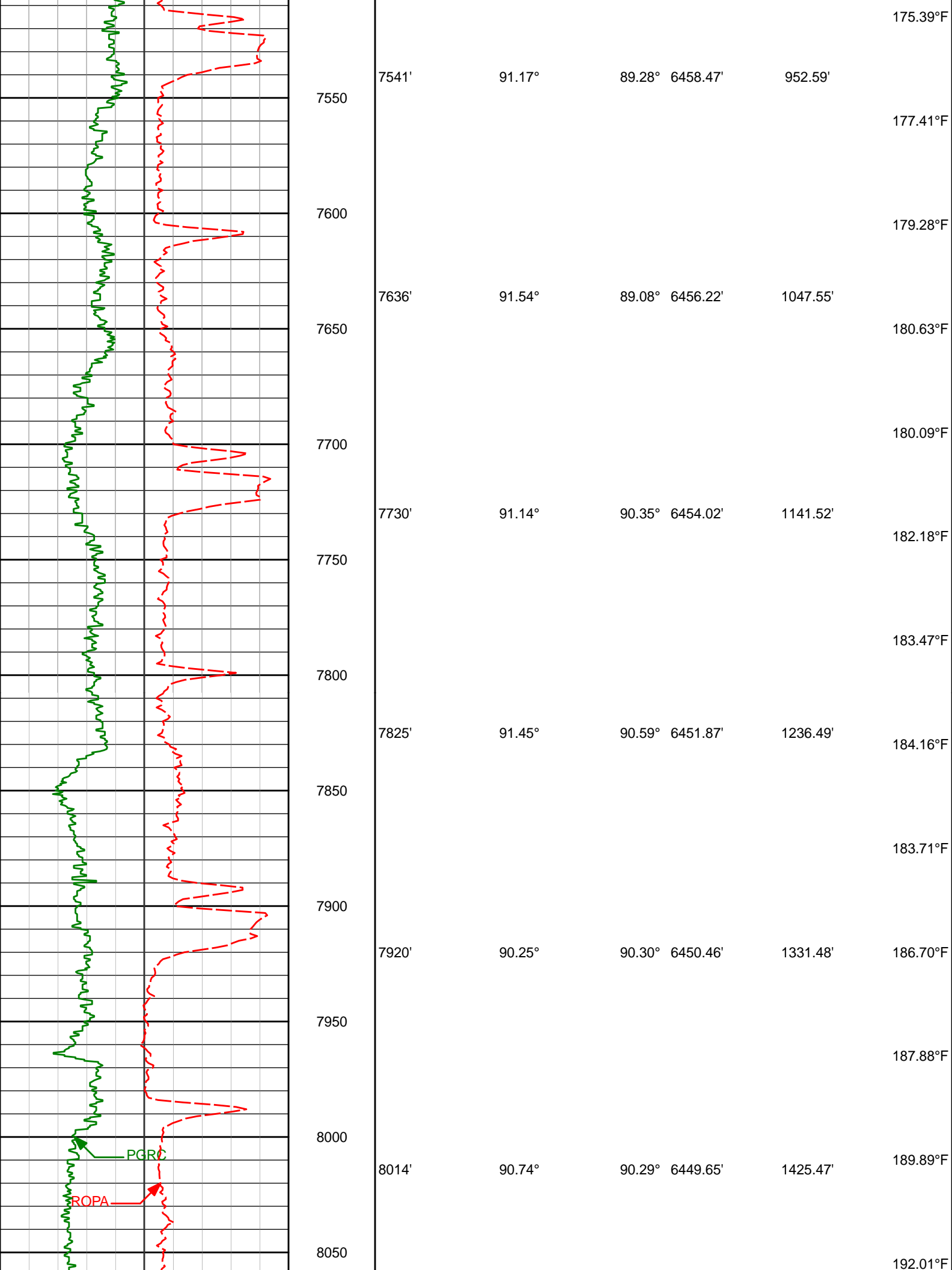


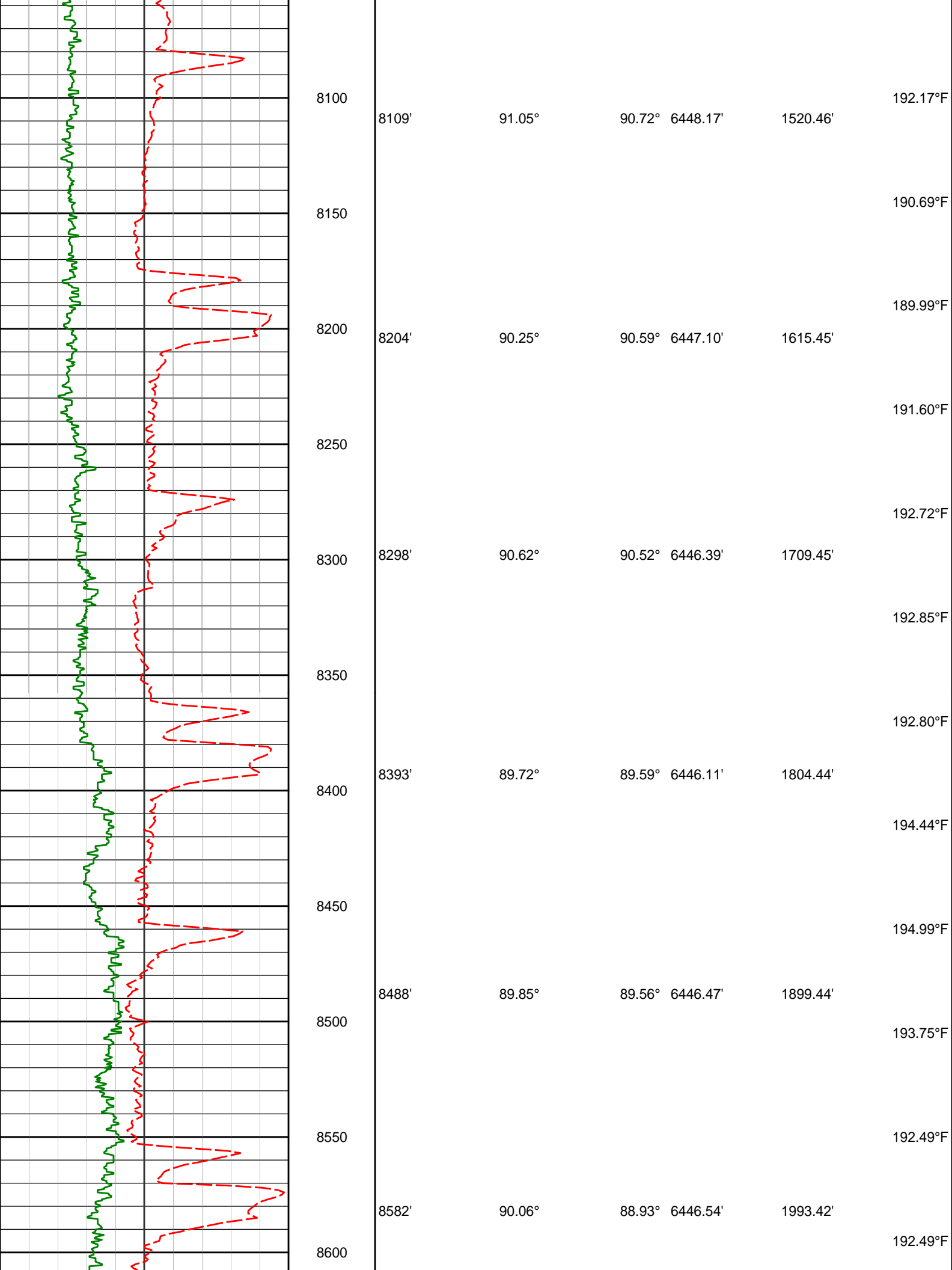


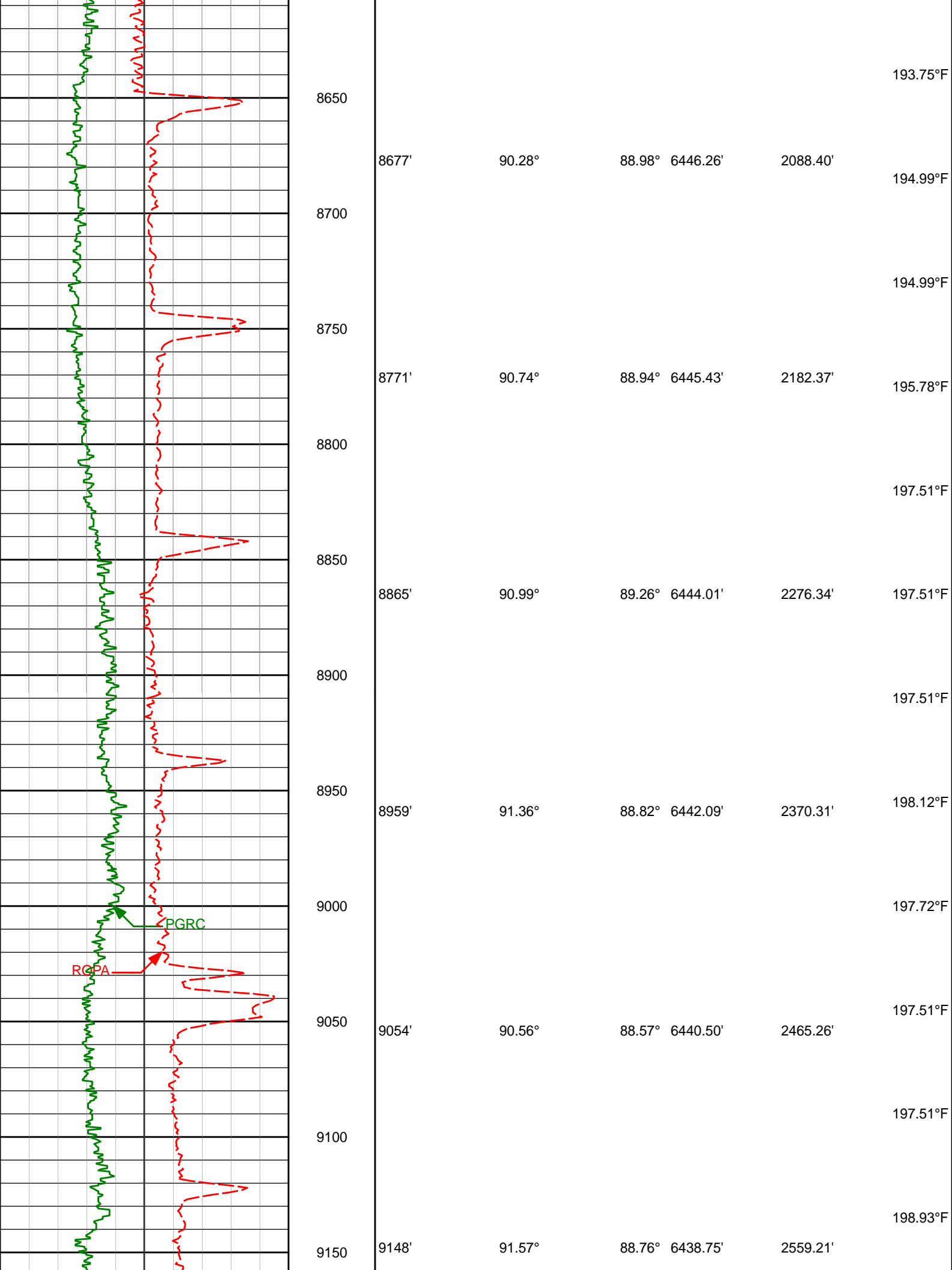


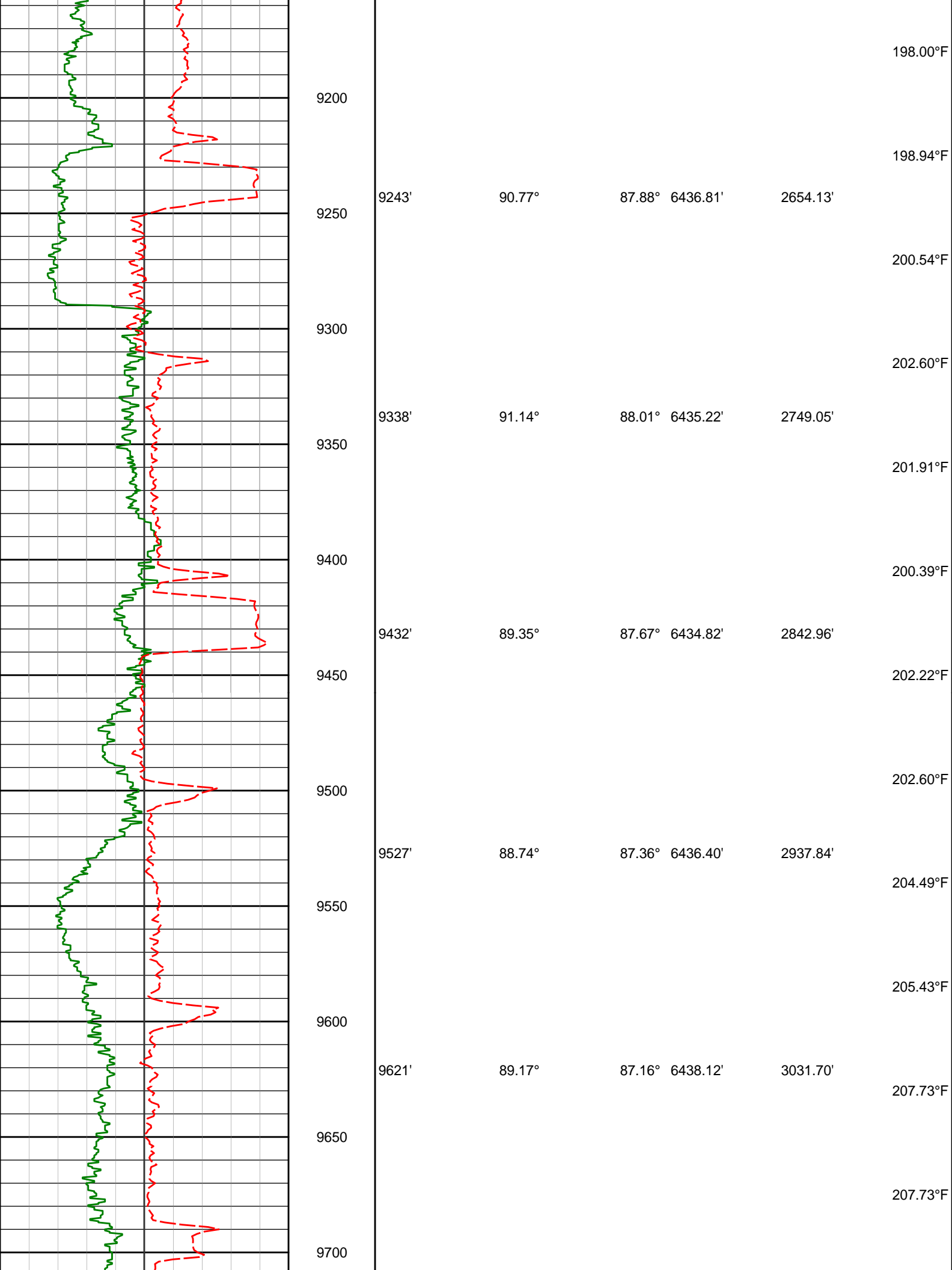


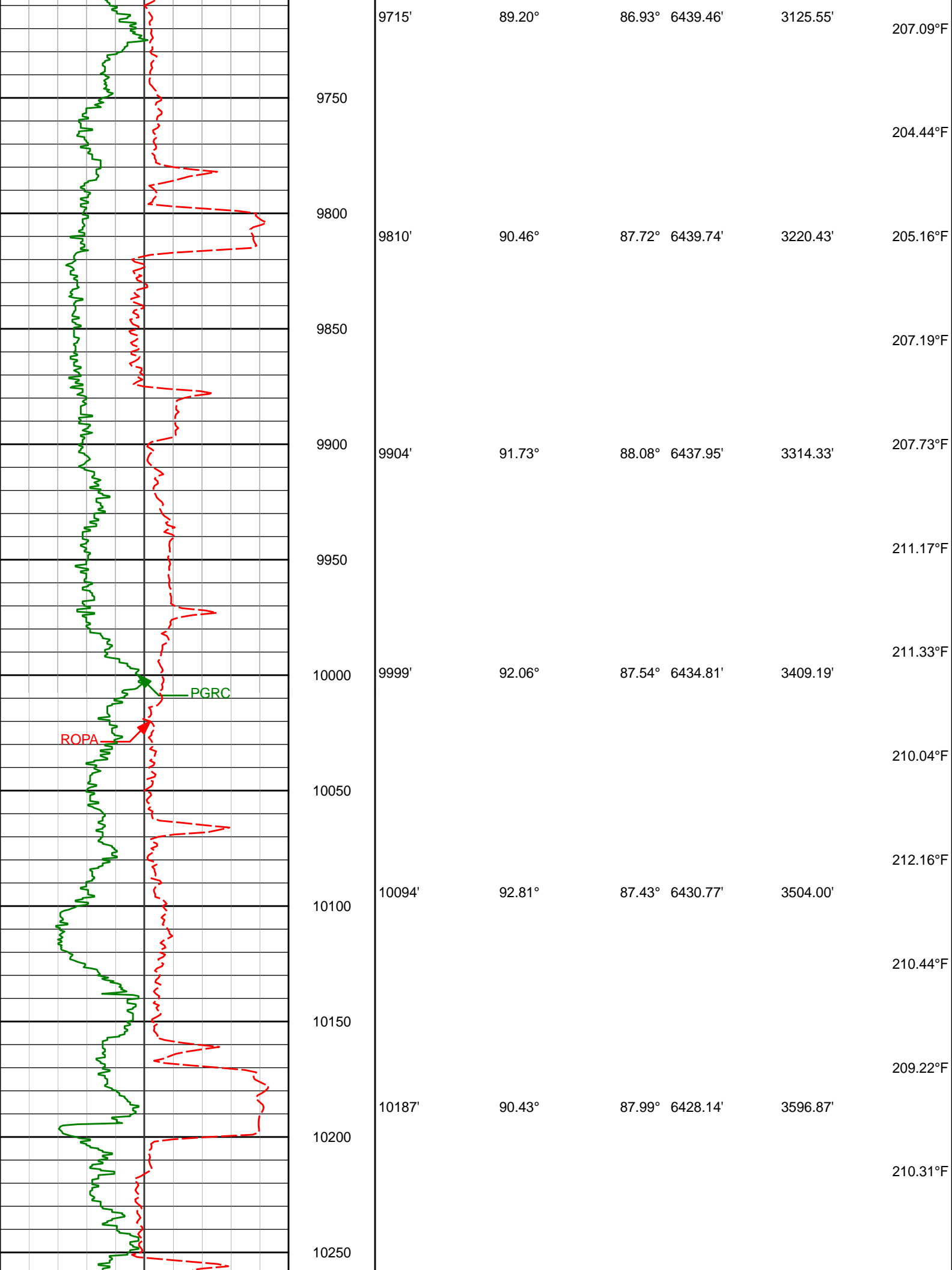


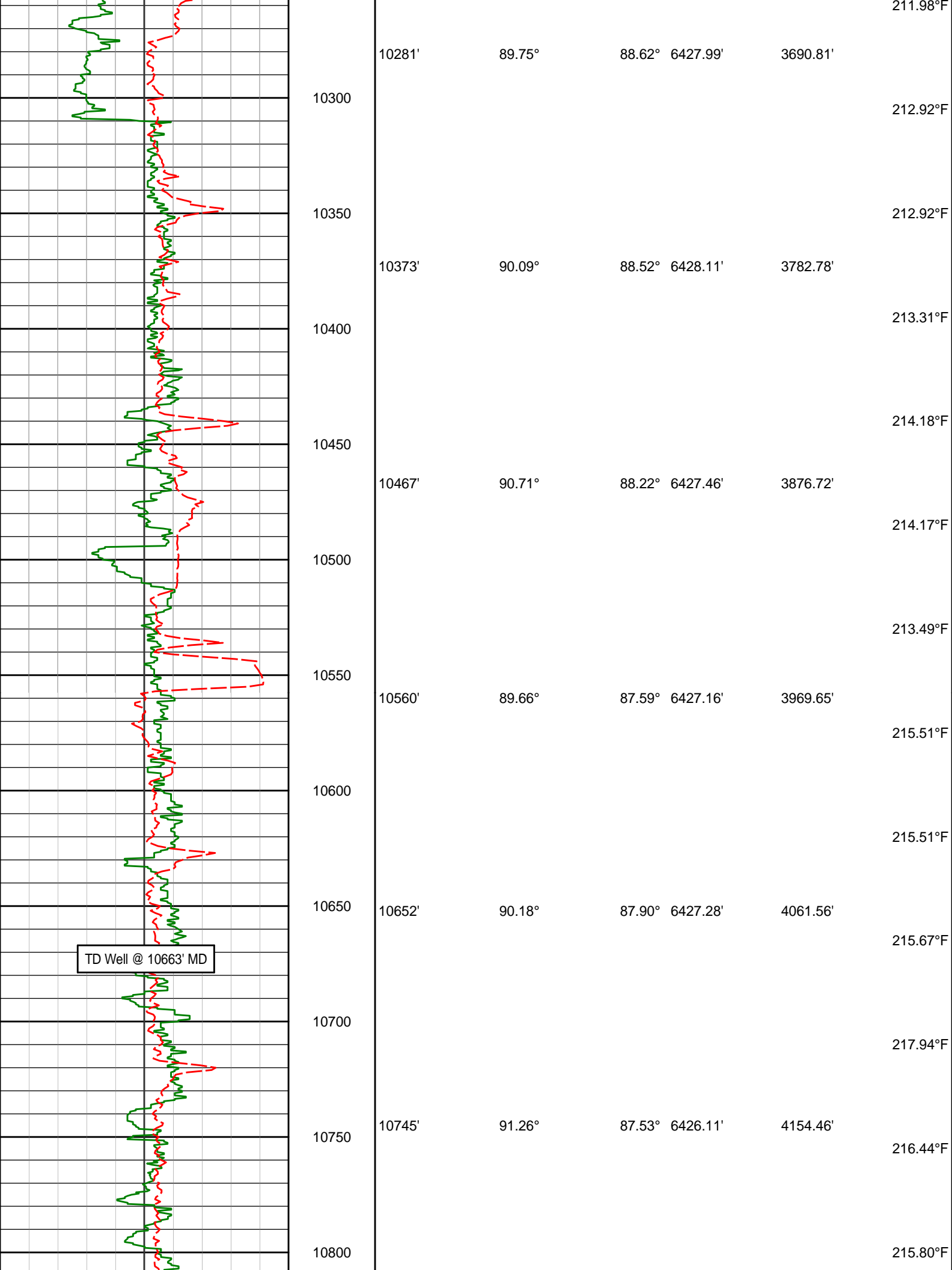


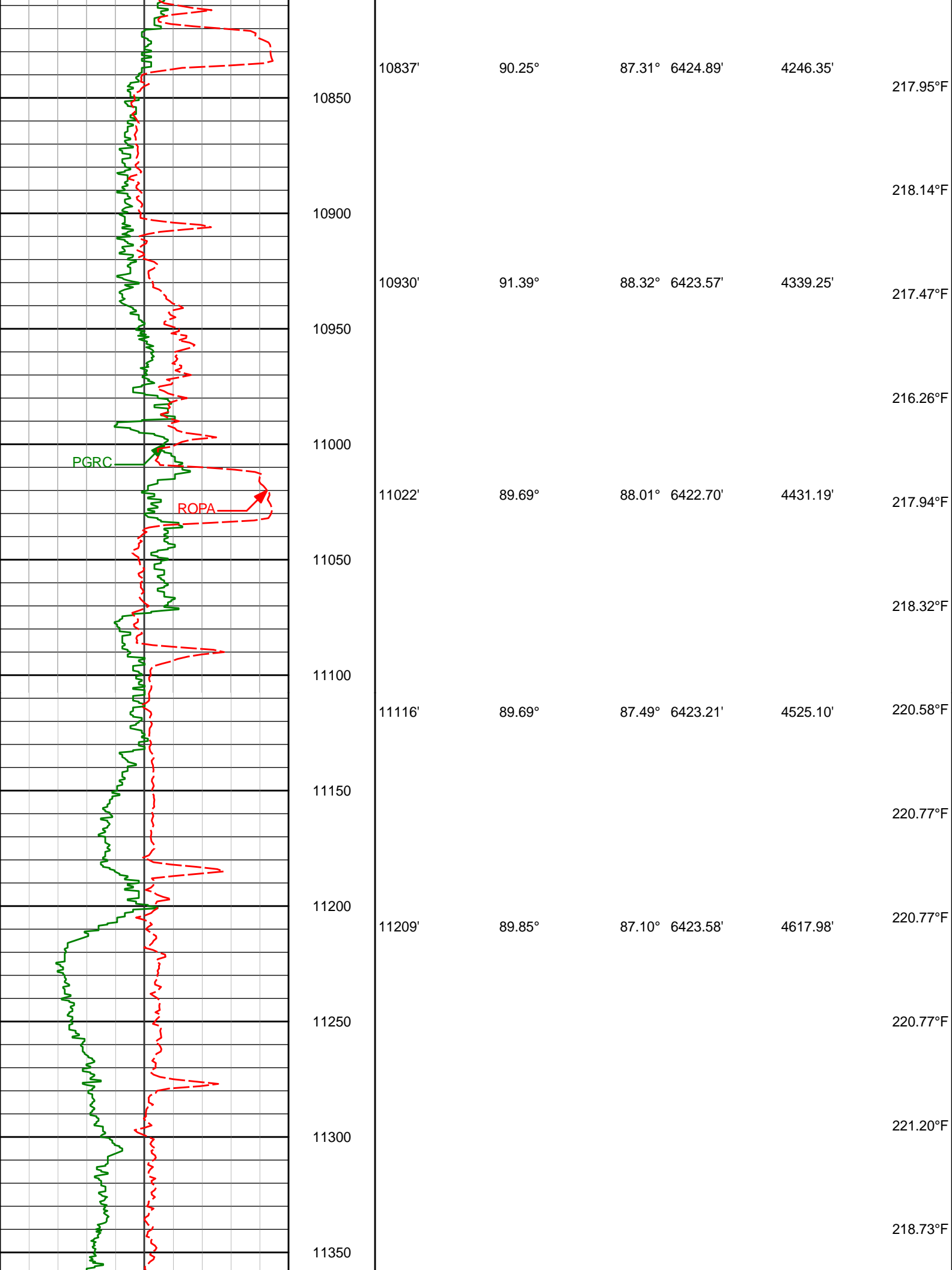


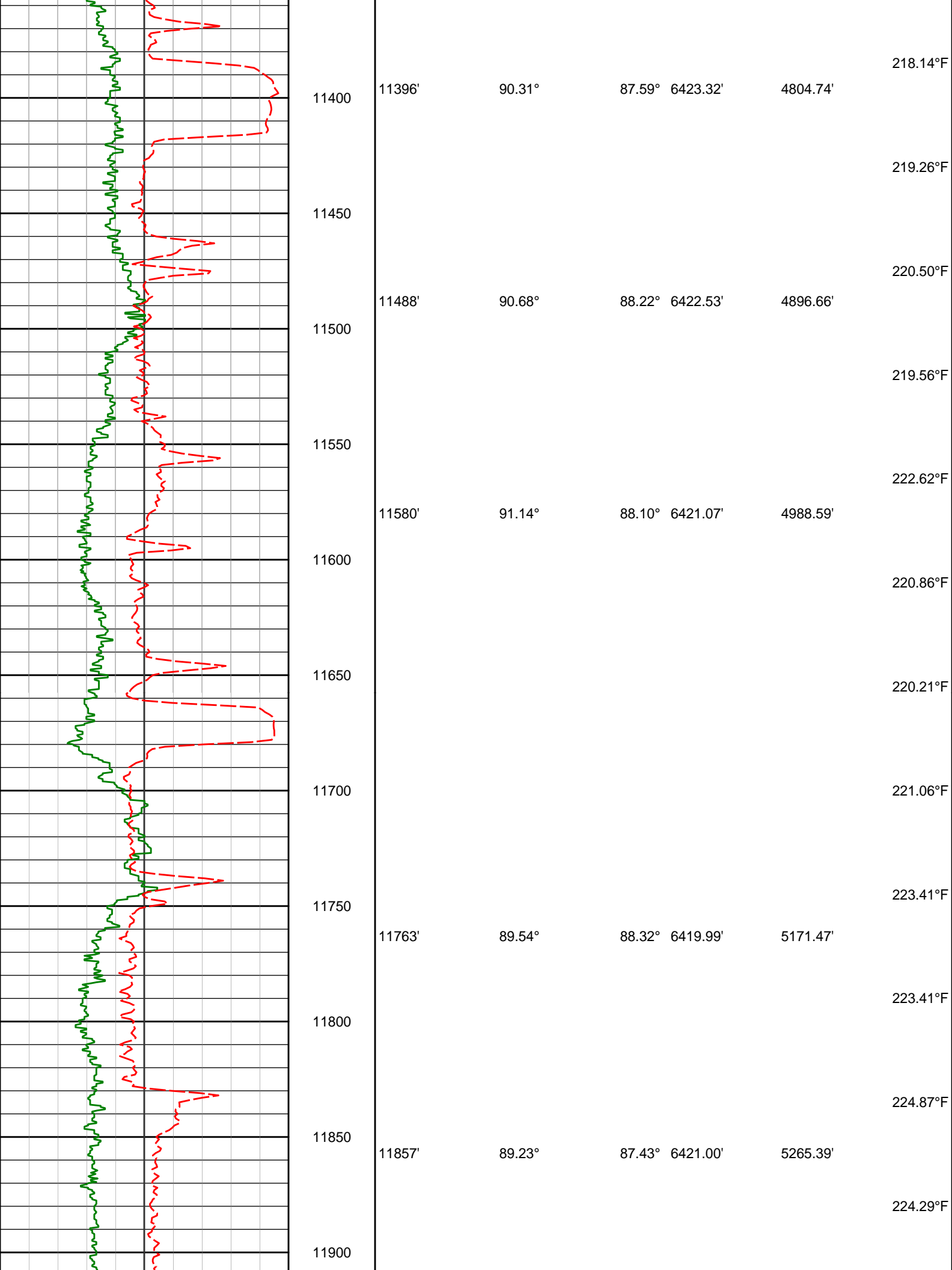


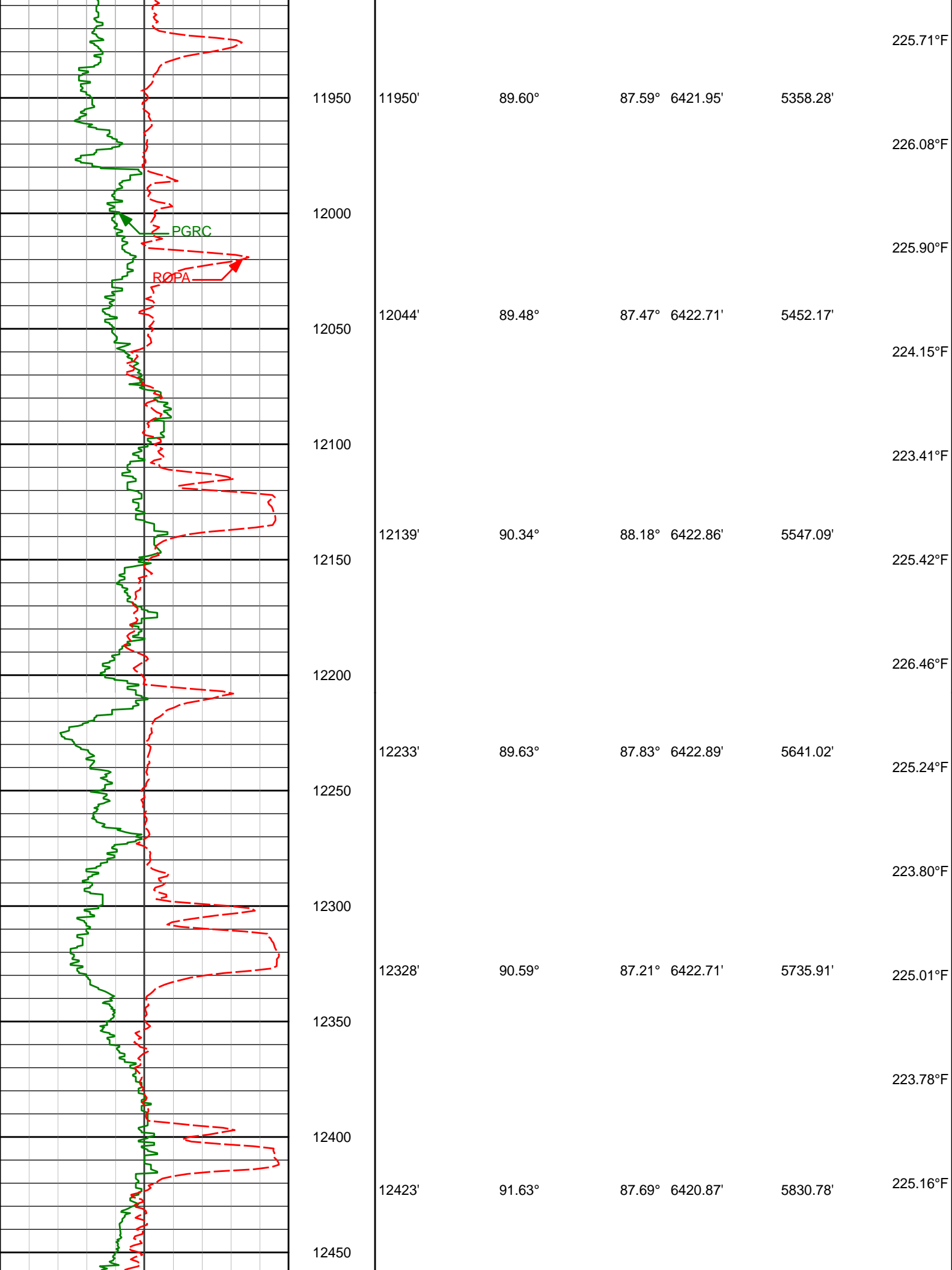


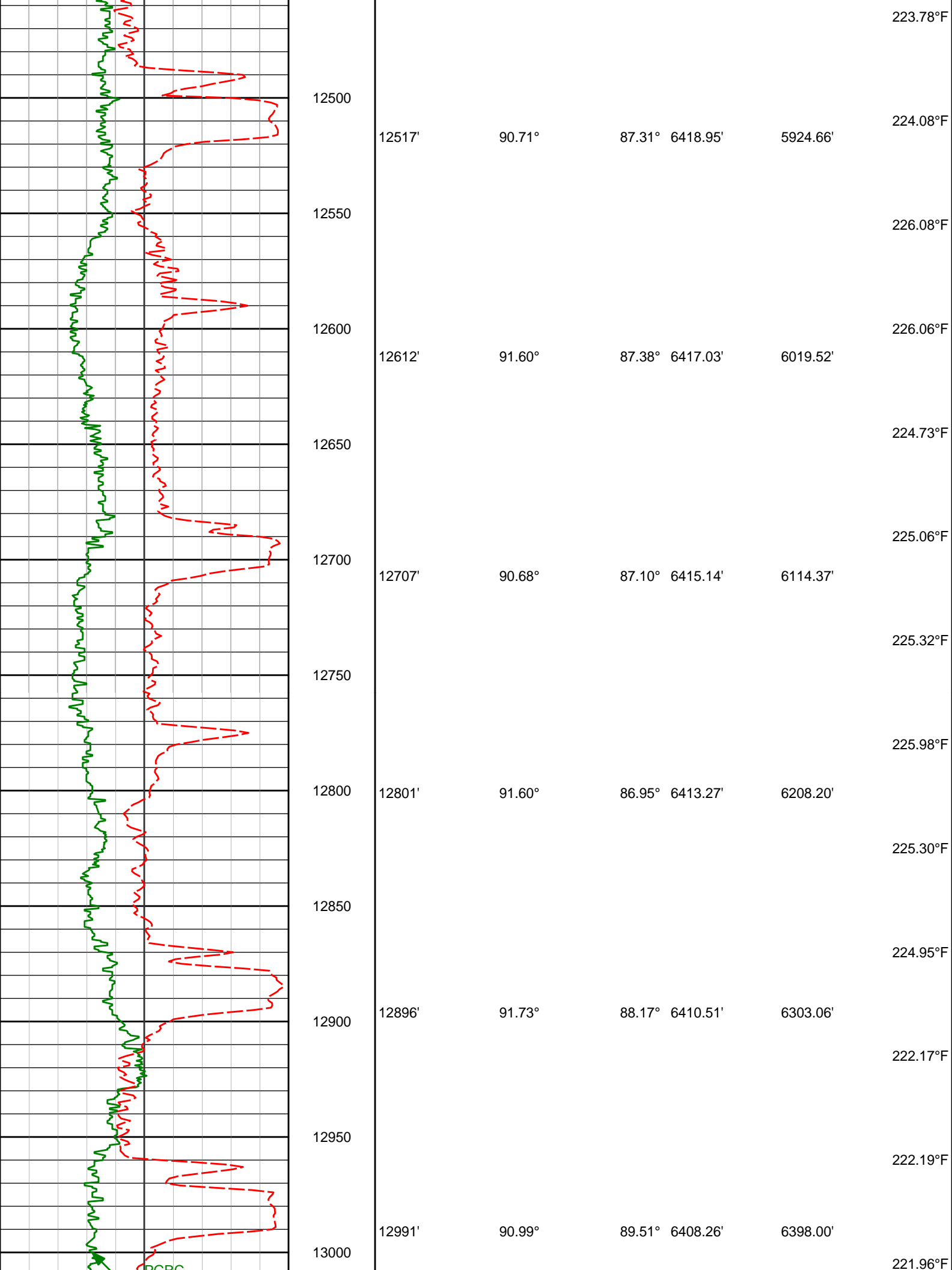


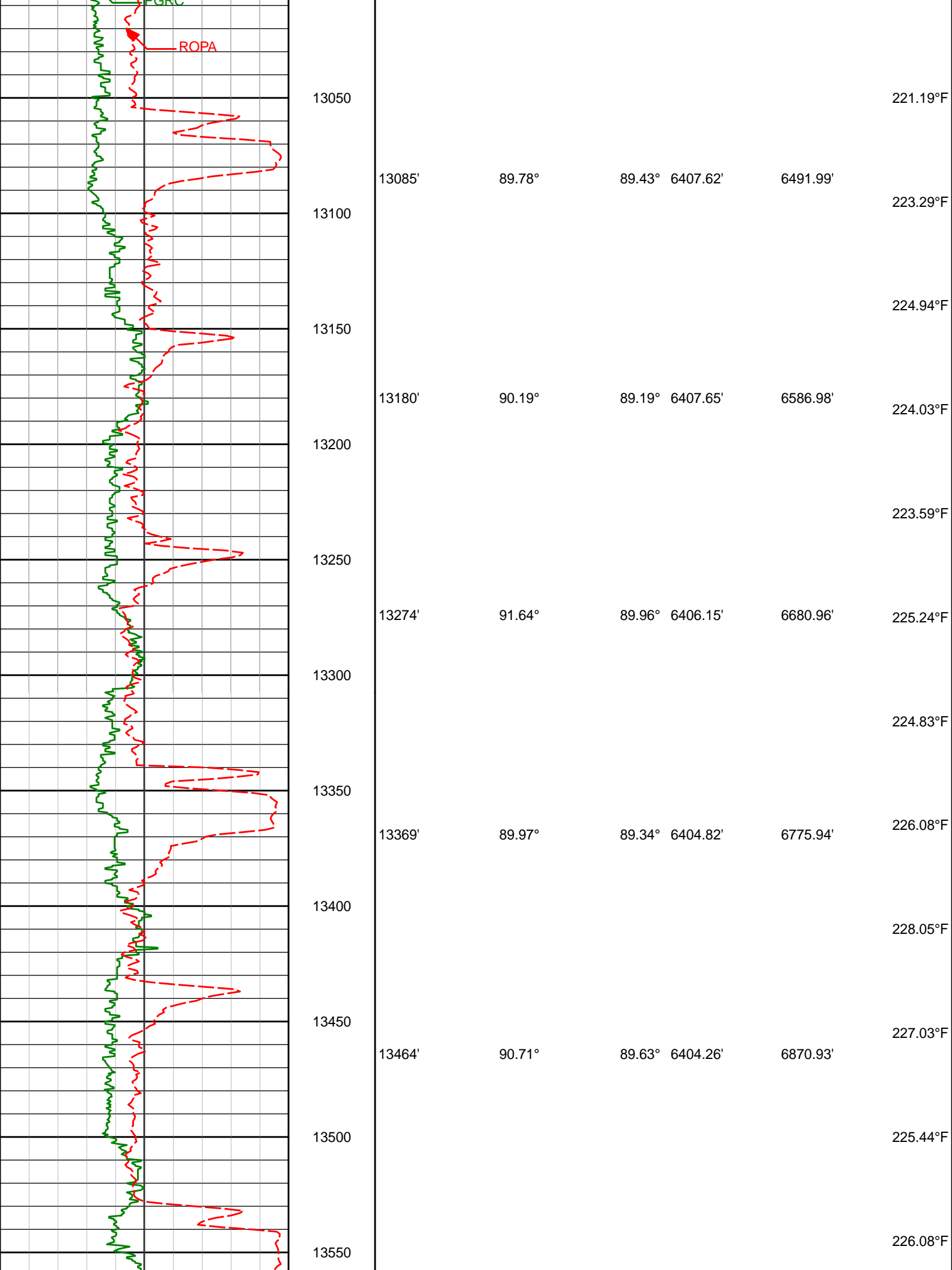


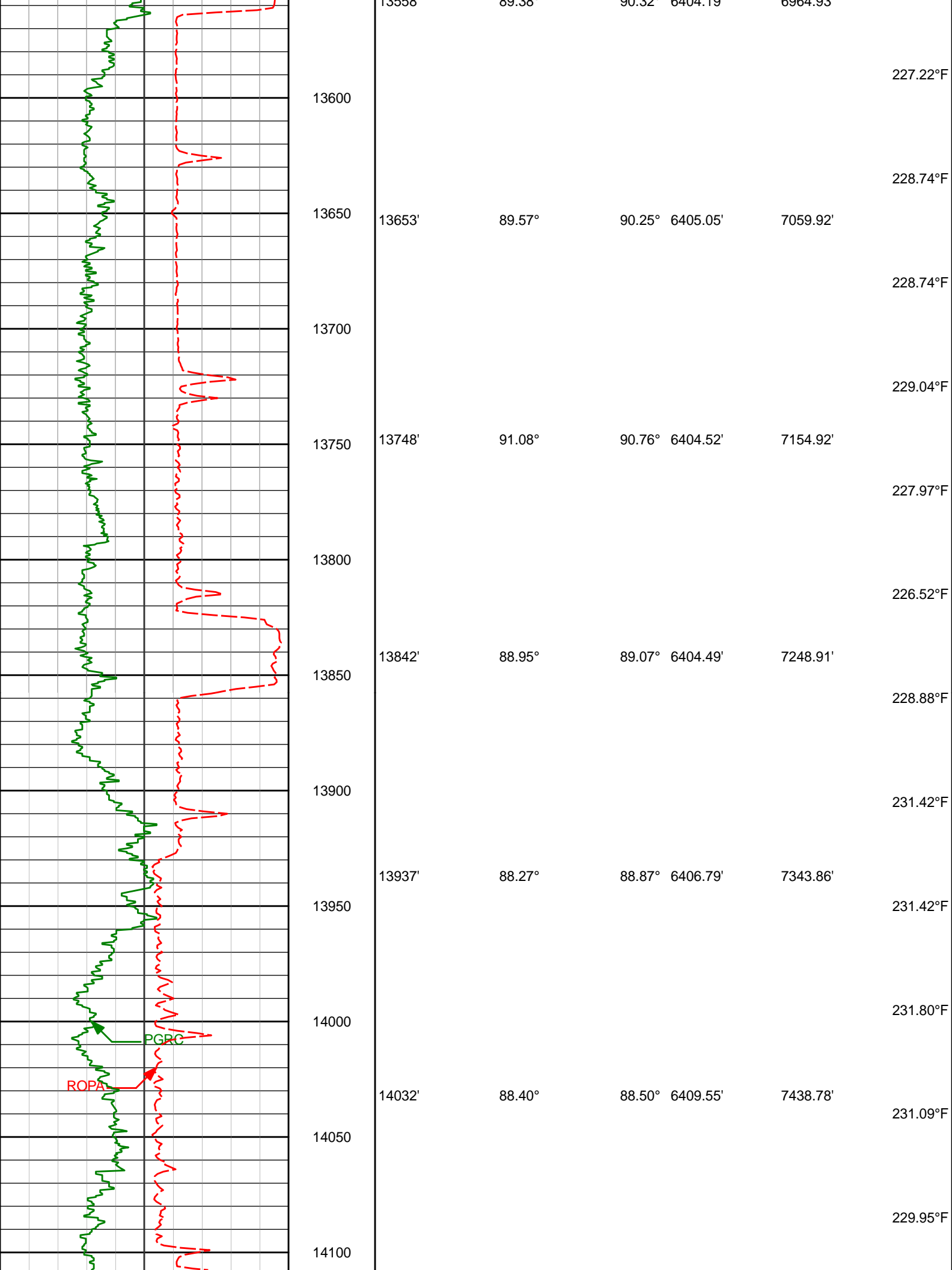


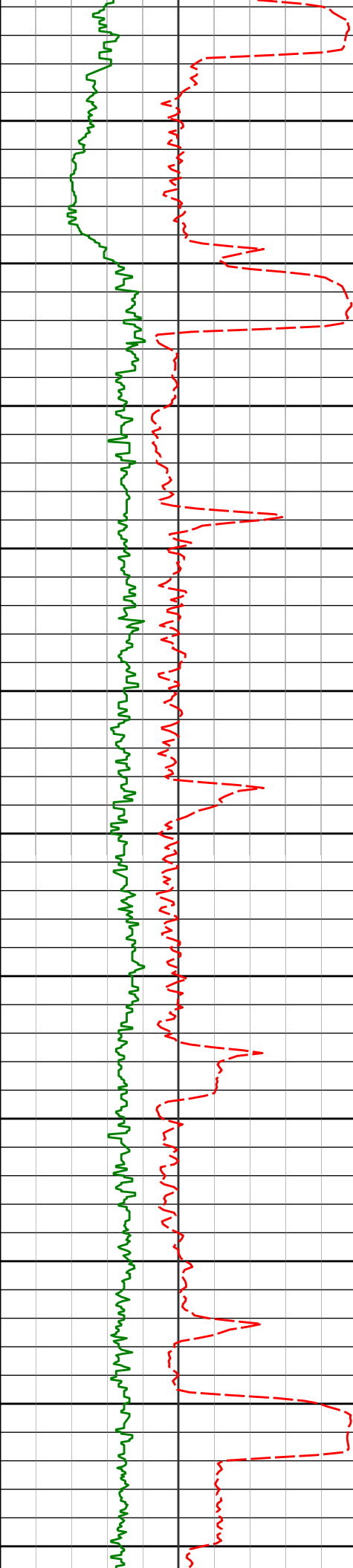




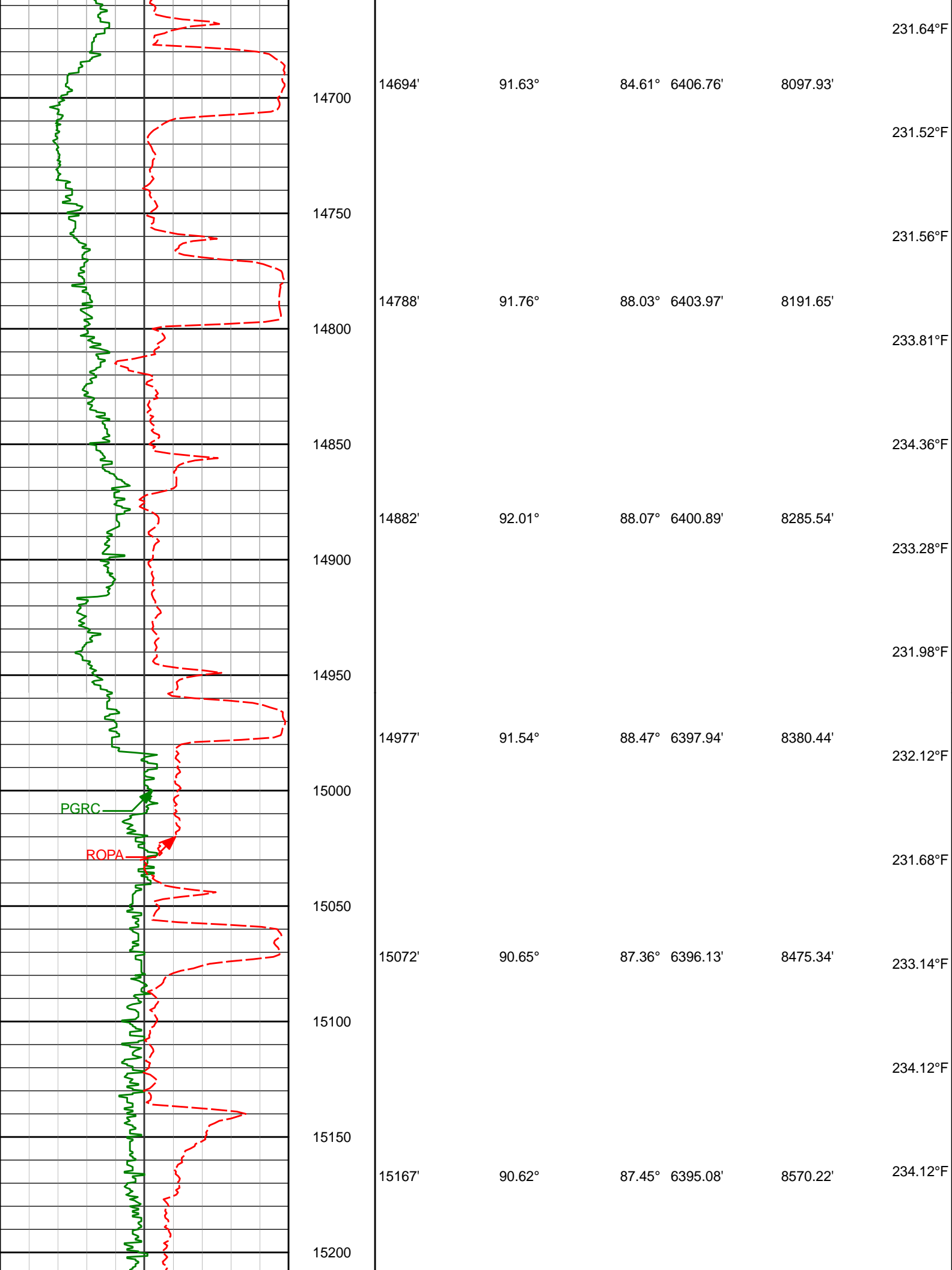


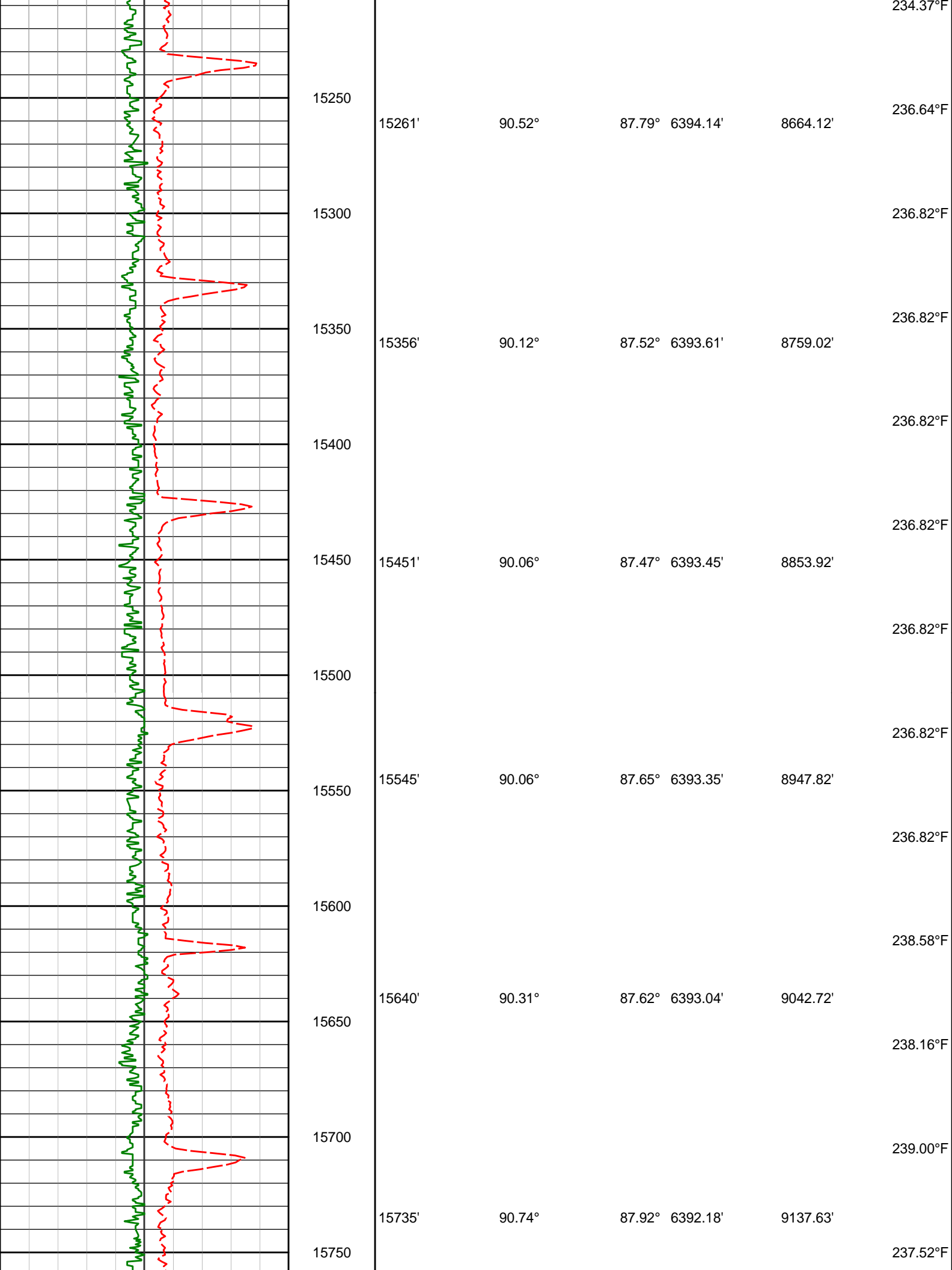


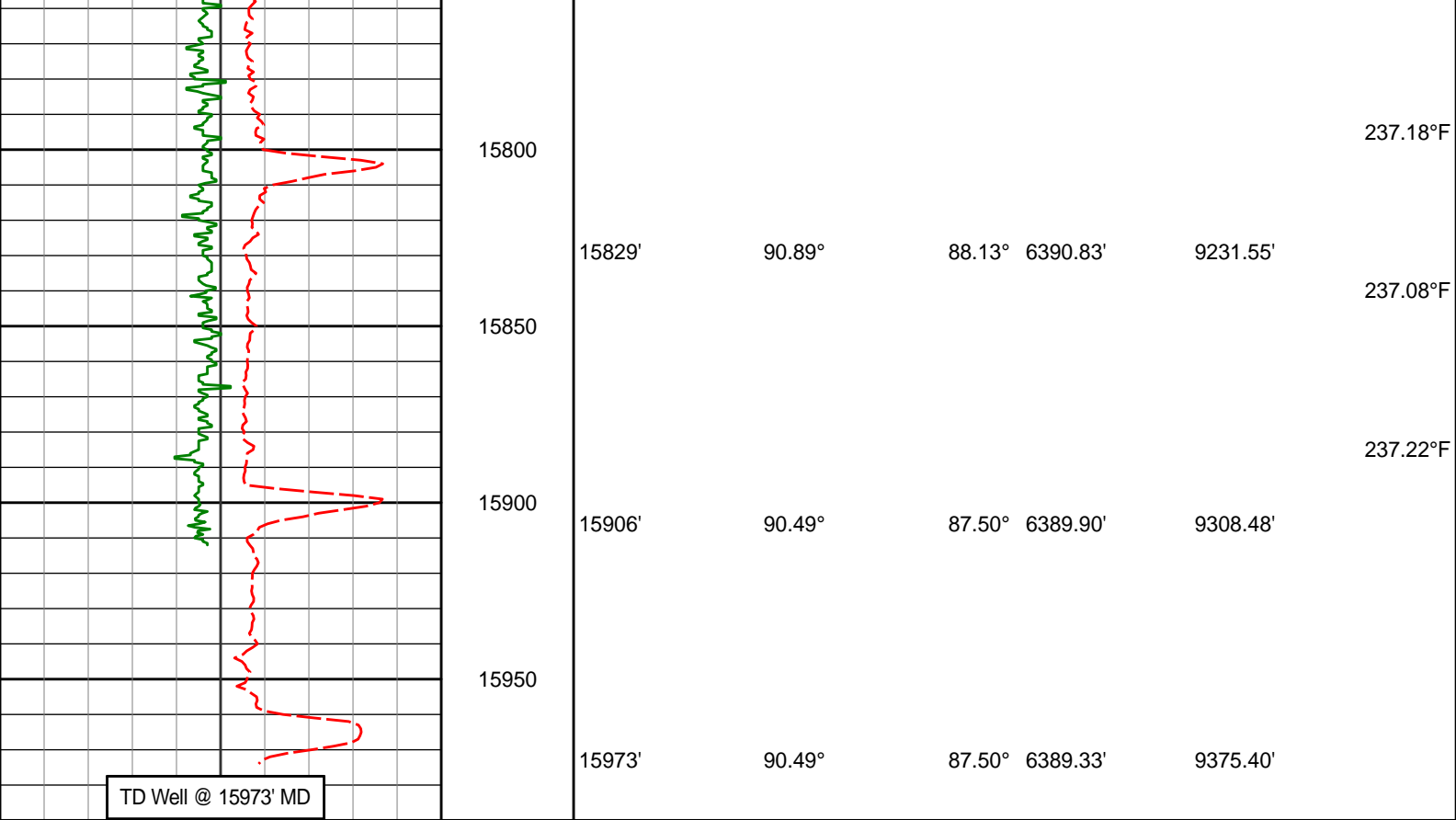




14126'	88.68°	87.01°	6411.95'	7532.66'	230.63°F
14150					229.99°F
14200					
14221'	90.22°	86.47°	6412.87'	7627.48'	231.42°F
14250					231.42°F
14300					
14315'	90.99°	86.32°	6411.89'	7721.27'	233.93°F
14350					234.12°F
14400					234.12°F
14410'	91.17°	85.24°	6410.10'	7815.97'	
14450					234.12°F
14500					235.49°F
14505'	90.74°	83.41°	6408.51'	7910.45'	
14550					233.03°F
14600	14599'	89.88°	81.99°	6408.01'	8003.64'
14650					231.61°F







TD Well @ 15973' MD

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

MD Detail 1:240 Scale

PCG GR XHi-Range RT PGRC api								
0 300								
Avg Rate of Penetration ROPA feet per hr		Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
1K 0								
		600						

Casing Shoe @ 619' MD

Run 100

646'

0.42°

207.38° 645.99'

-1.08'

700

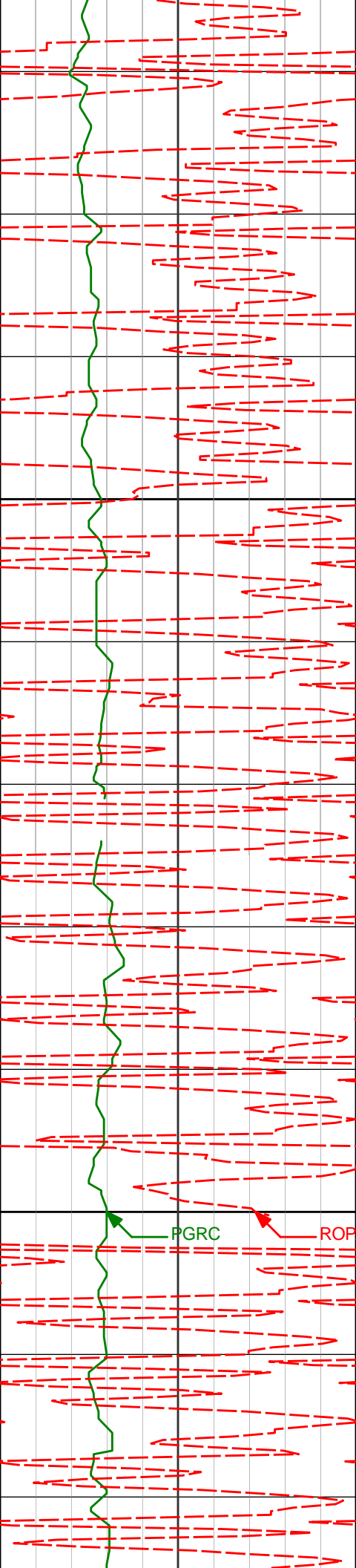
740'

0.48°

213.85° 739.99'

-1.45'

800



835'

0.63°

210.87° 834.99'

-1.94'

900

930'

0.64°

201.54° 929.98'

-2.40'

1000

PGRC

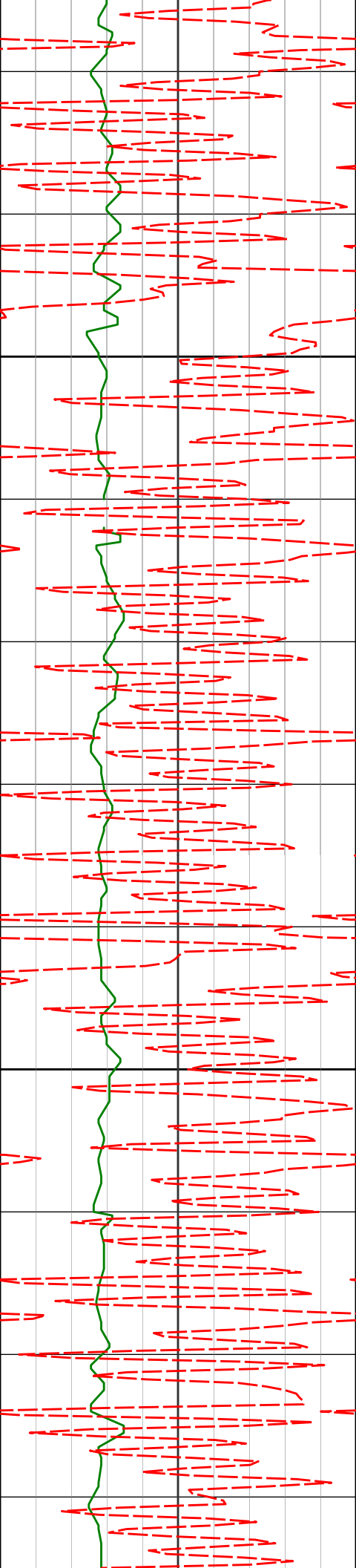
ROPA

1024'

0.54°

207.88° 1023.98'

-2.79'



1100

1118'

0.47°

203.49° 1117.97'

-3.15'

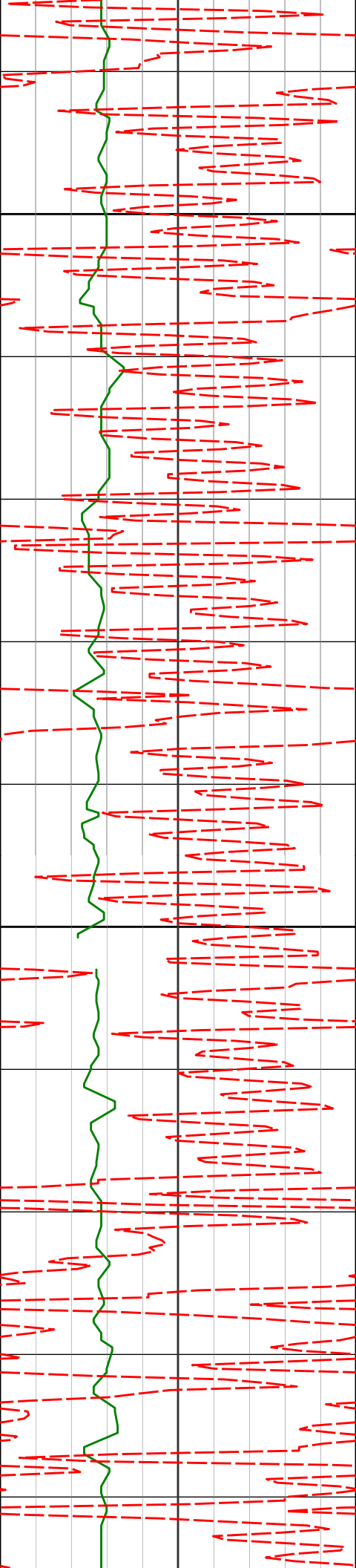
1200

1211'

0.56°

212.13° 1210.97'

-3.54'



1300

1303'

0.62°

211.78° 1302.96'

-4.04'

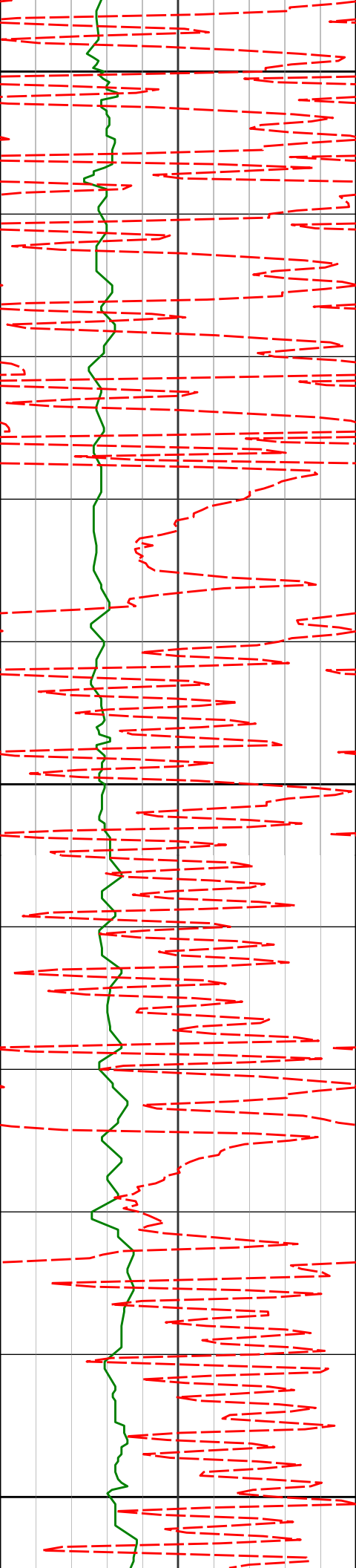
1400

1397'

0.74°

215.31° 1396.96'

-4.65'



1500

1583'

2.50°

233.63°

1582.91'

-7.09'

1600

1676'

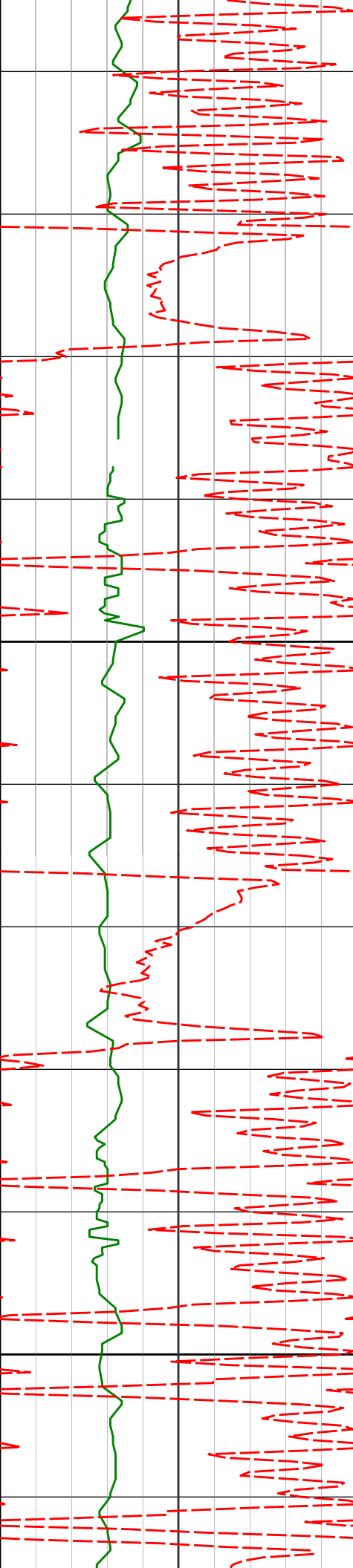
4.43°

232.90°

1675.74'

-11.57'

1700



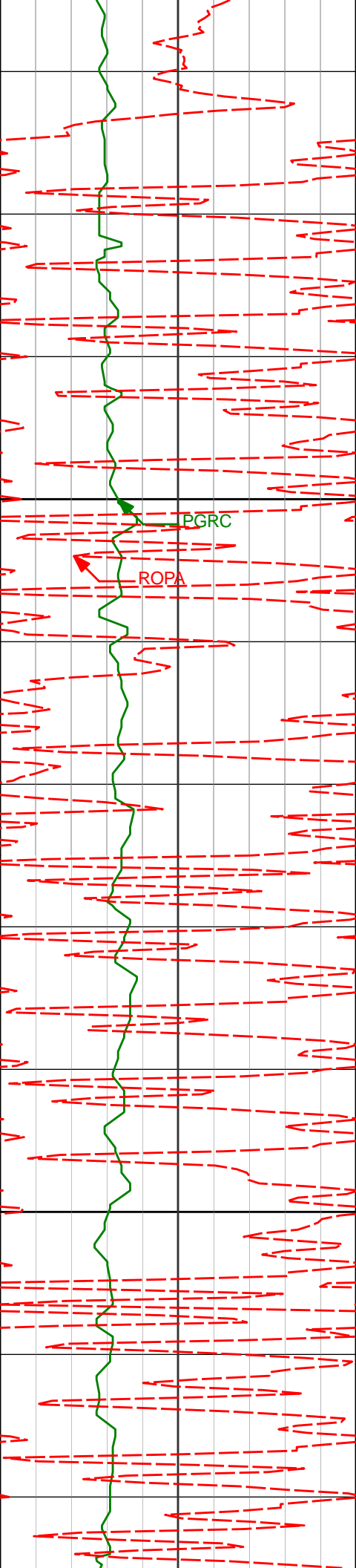
1768'

1800

1861'

1900

1768'	5.89°	233.84°	1767.36'	-18.20'
1861'	7.82°	232.99°	1859.69'	-27.08'



1953'

9.47°

229.98° 1950.65'

-37.84'

2000

PGRC

ROPA

2047'

8.12°

226.72° 2043.54'

-48.56'

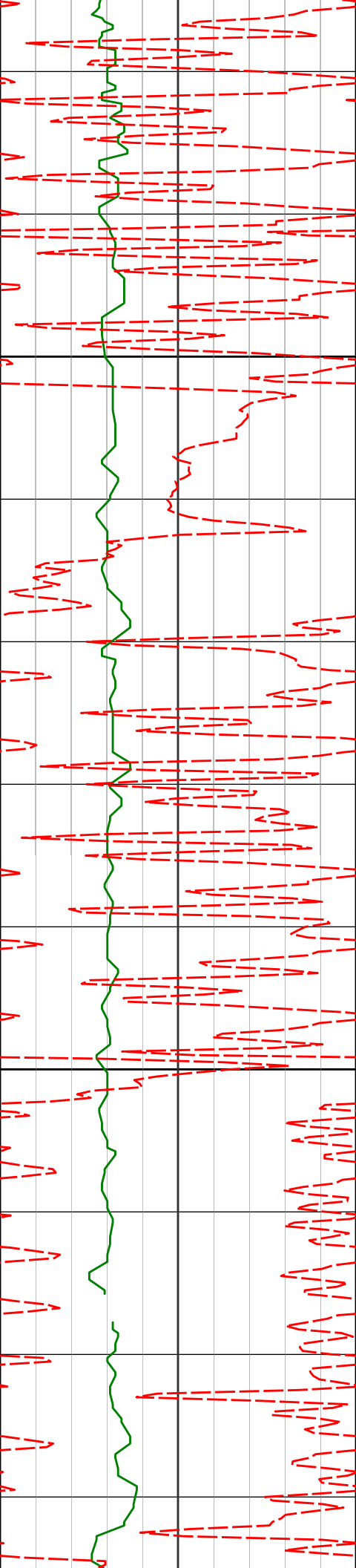
2100

2140'

8.07°

219.28° 2135.62'

-57.44'



2200

2233'

9.71°

226.79° 2227.50'

-67.25'

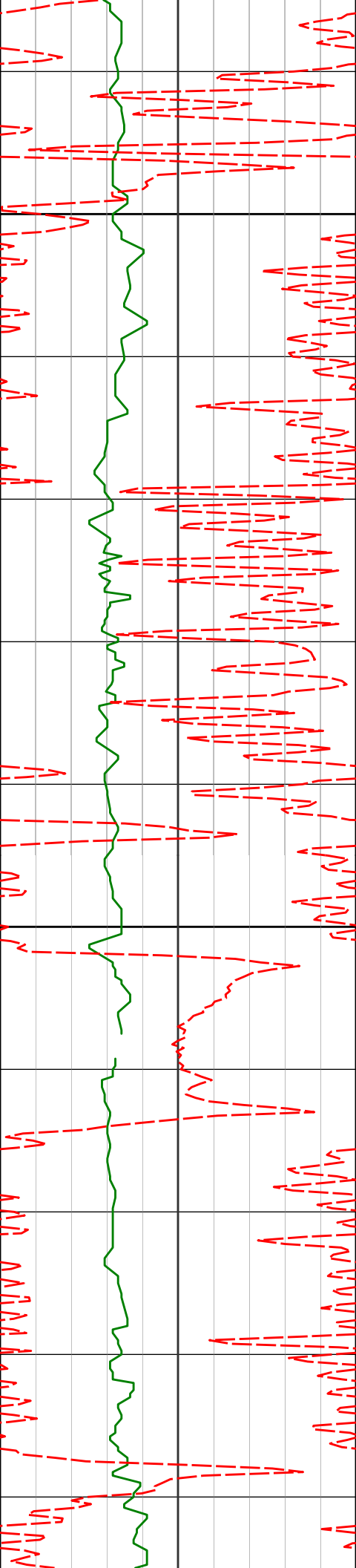
2300

2326'

8.79°

223.10° 2319.29'

-77.78'



2400

2419'

7.74°

218.12° 2411.32'

-86.47'

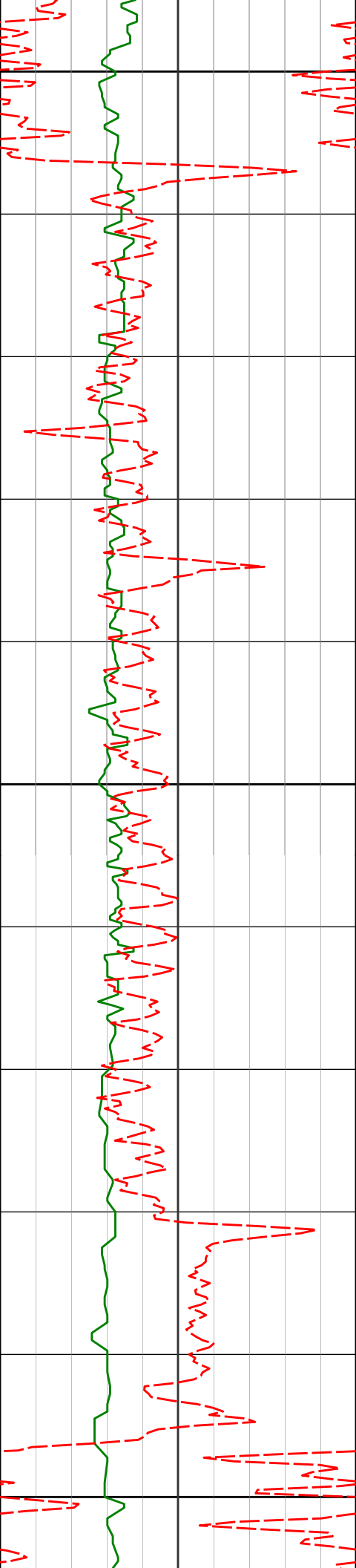
2500

2510'

8.66°

221.14° 2501.39'

-94.72'



2600

2603'

8.36°

215.99° 2593.37'

-103.26'

2700

2694'

7.86°

214.10° 2683.46'

-110.60'

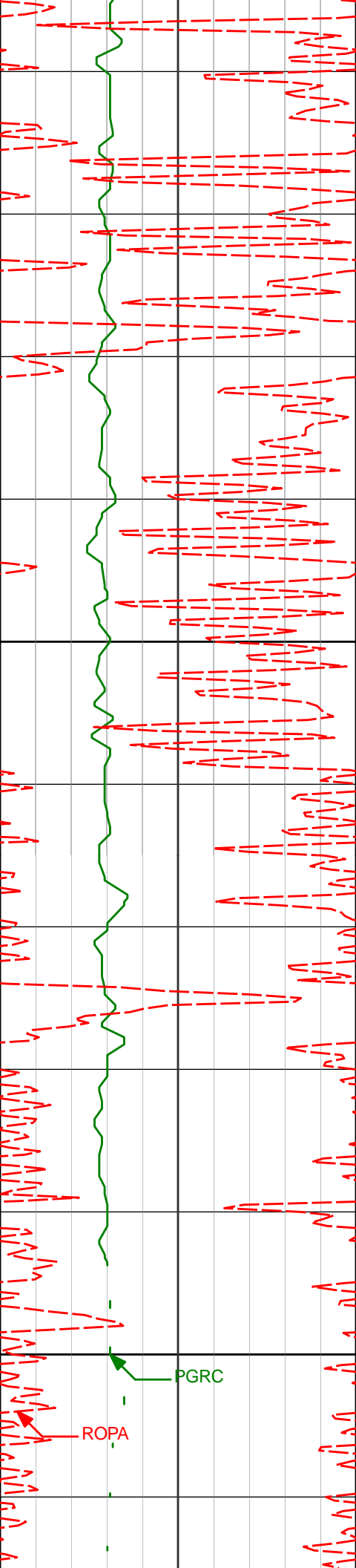
2800

2787'

9.81°

226.19° 2775.36'

-119.84'



2880' 9.95° 220.21° 2866.98' -130.71'

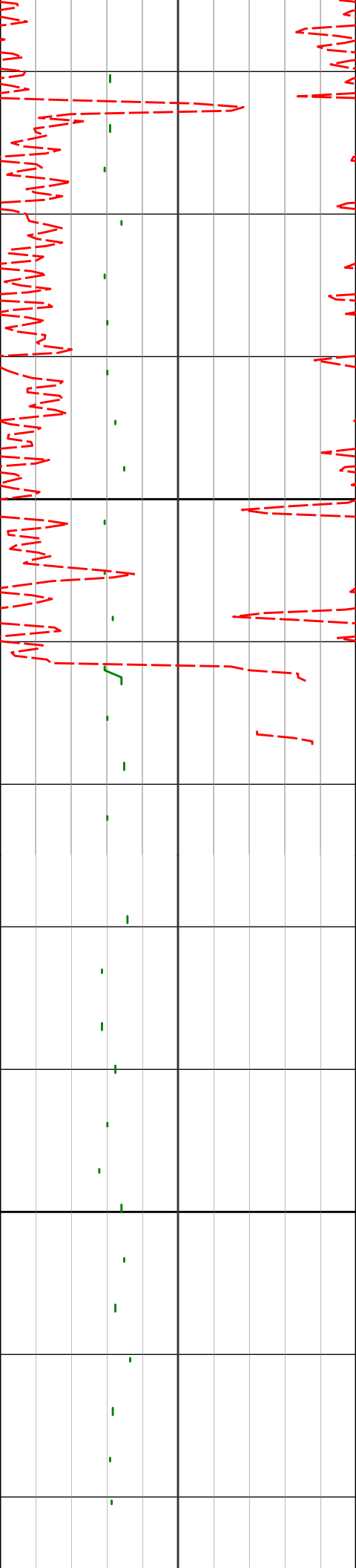
2900

2975' 9.60° 217.64° 2960.60' -140.80'

3000

PGRC

ROPA



3100

3200

3070'

8.86°

210.55° 3054.38'

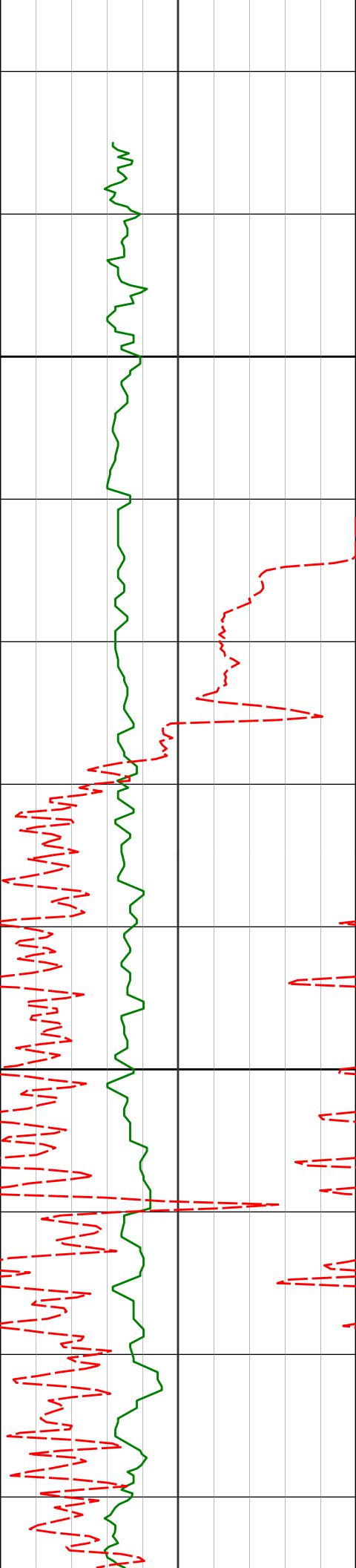
-149.31'

3164'

9.81°

225.74° 3147.14'

-158.68'



3300

3400

3259'

8.36°

218.87° 3240.95'

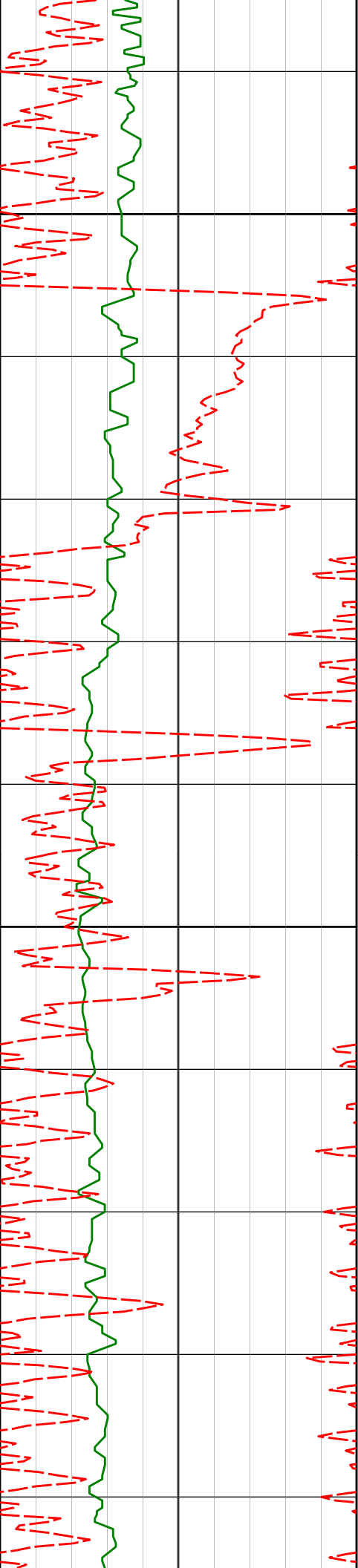
-168.77'

3448'

6.49°

219.68° 3428.36'

-184.14'



3500

3543'

9.11°

227.29° 3522.48'

-193.06'

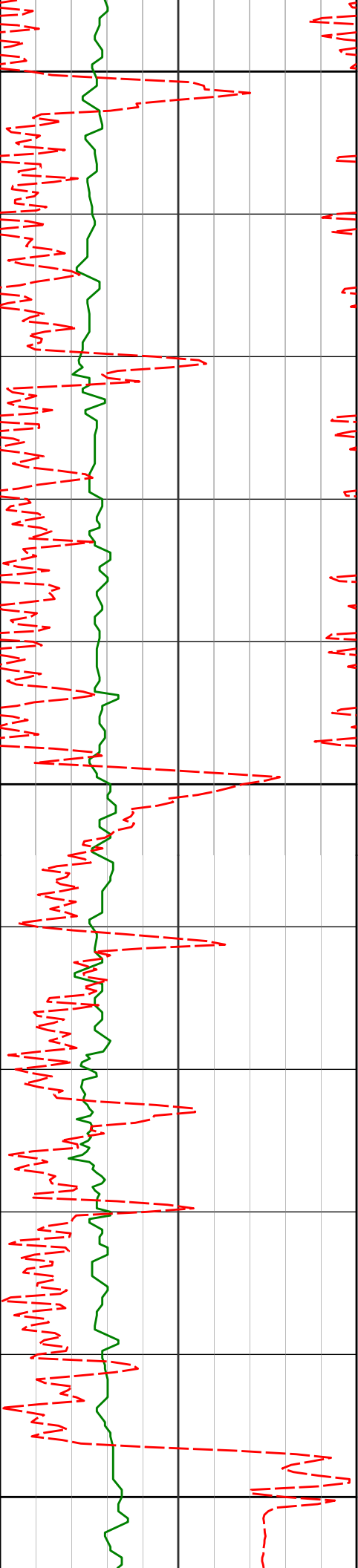
3600

3637'

10.73°

229.59° 3615.07'

-205.15'



3700

3732'

11.89°

228.68° 3708.22'

-219.19'

3800

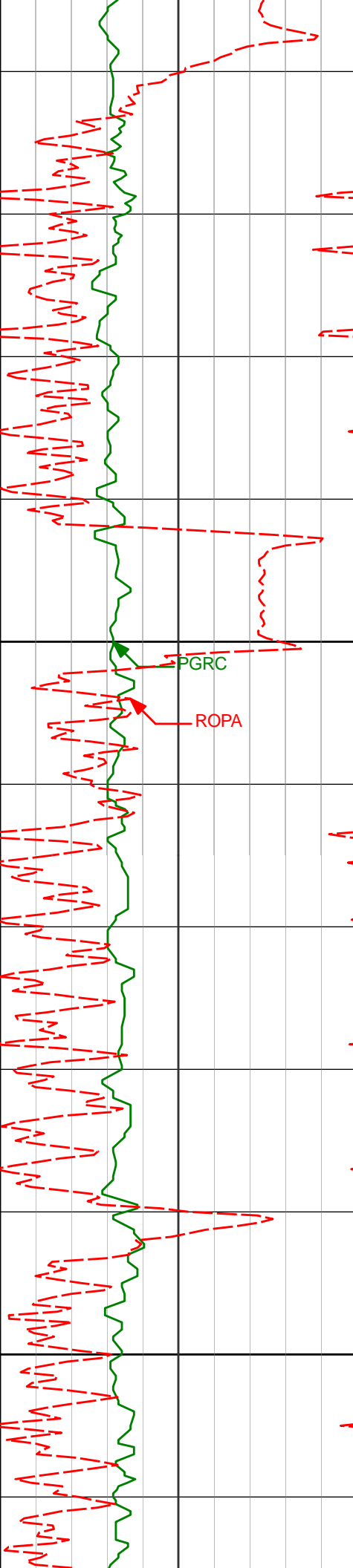
3826'

13.20°

228.28° 3799.98'

-234.42'

3900



4000

4100

3921'

11.55°

227.62° 3892.77'

-249.50'

4015'

8.86°

229.83° 3985.27'

-261.94'

4110'

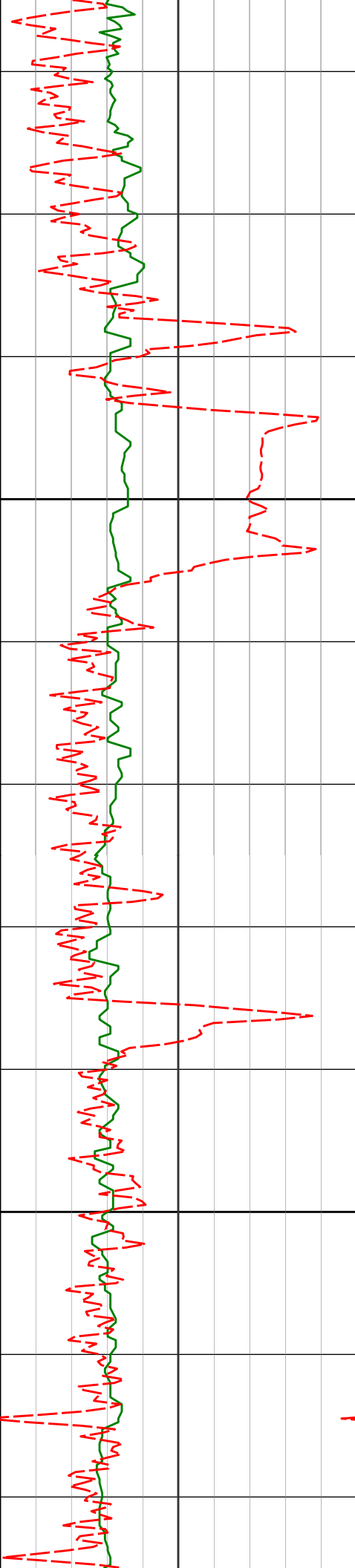
7.86°

233.61° 4079.26'

-272.73'

PGRC

ROPA



4200

4204'

8.20°

237.18° 4172.34'

-283.50'

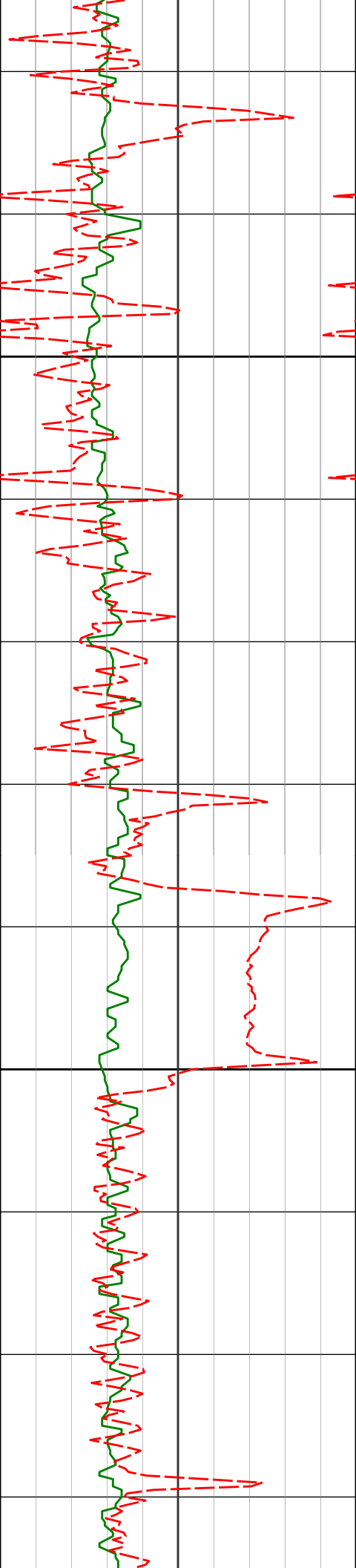
4300

4299'

8.17°

237.63° 4266.37'

-294.87'



4400

4500

4394'

7.47°

240.97° 4360.49'

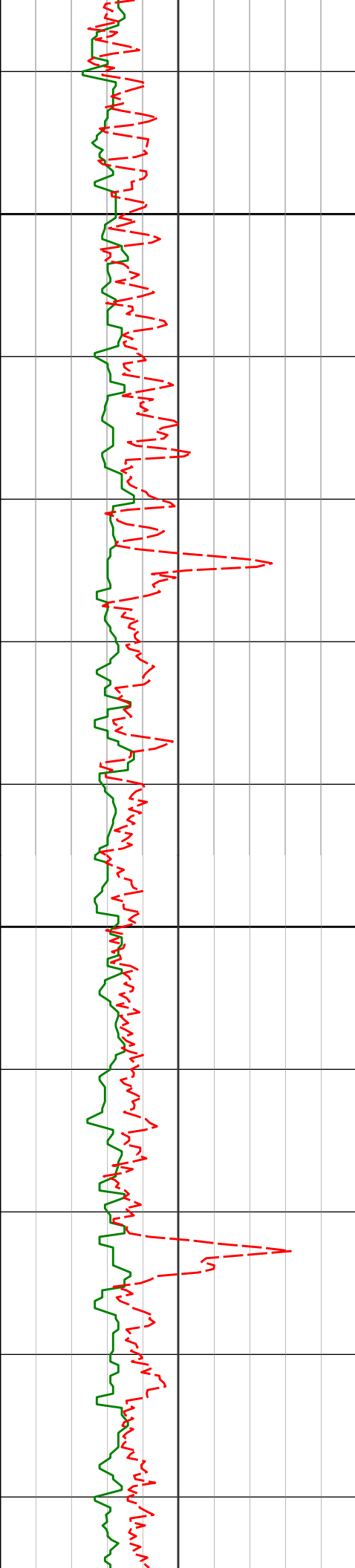
-305.95'

4488'

8.79°

236.11° 4453.54'

-317.23'



4600

4700

4583'

8.21°

236.12° 4547.50'

-328.86'

4678'

7.56°

238.63° 4641.60'

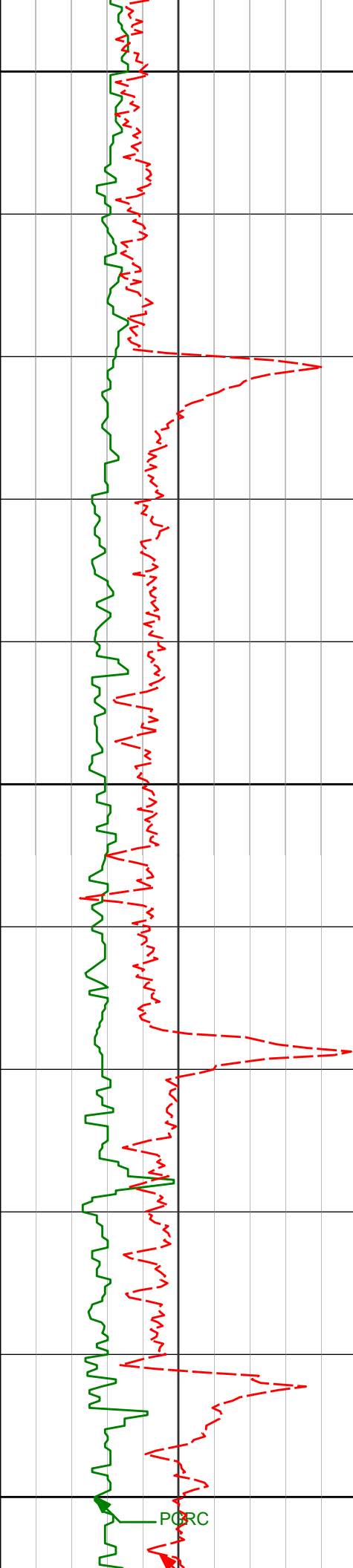
-339.80'

4772'

6.17°

237.89° 4734.93'

-349.34'



4800

4900

5000

4867'

4.96°

235.28° 4829.48'

-357.02'

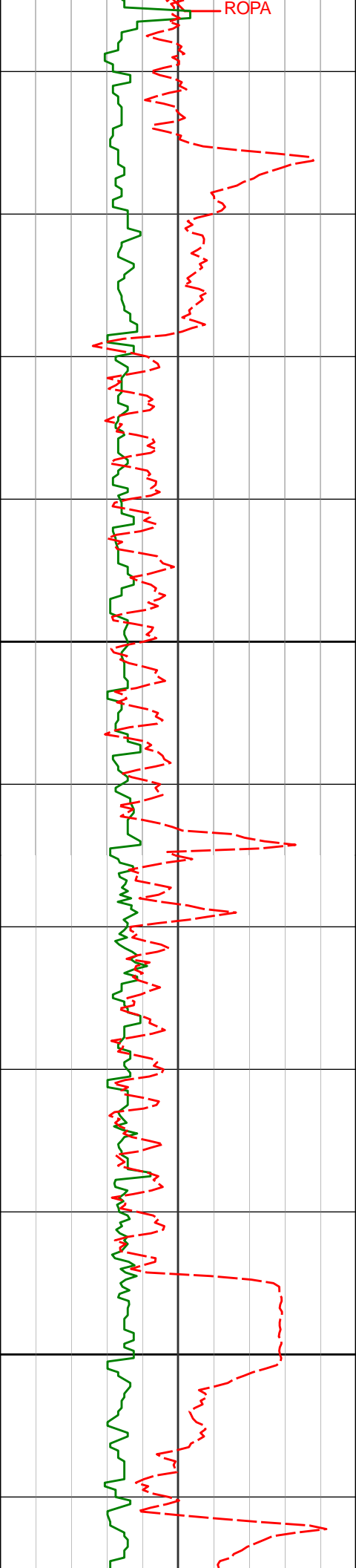
4961'

4.78°

241.06° 4923.14'

-363.78'

PORC



5100

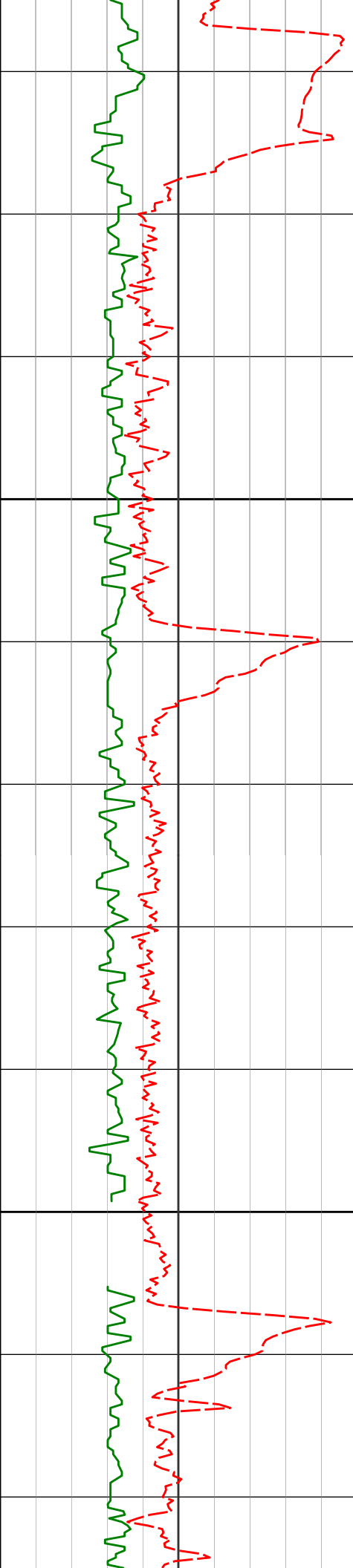
5151'

3.39°

238.74° 5112.65'

-375.49'

5200



5300

5400

5245'

0.95°

256.38° 5206.57'

-378.62'

5340'

0.75°

272.32° 5301.56'

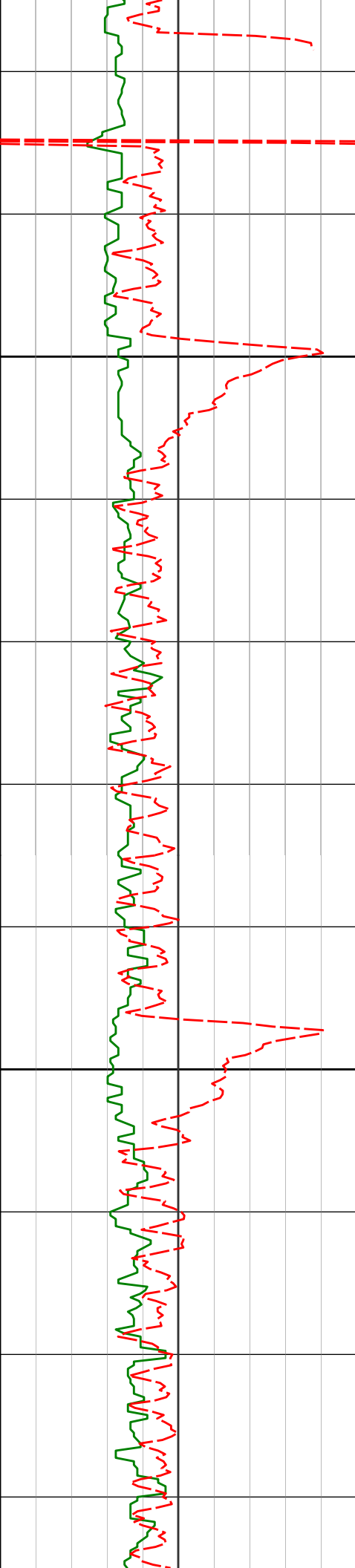
-380.01'

5435'

0.09°

129.86° 5396.56'

-380.58'



5500

5529'

0.26°

136.32° 5490.56'

-380.37'

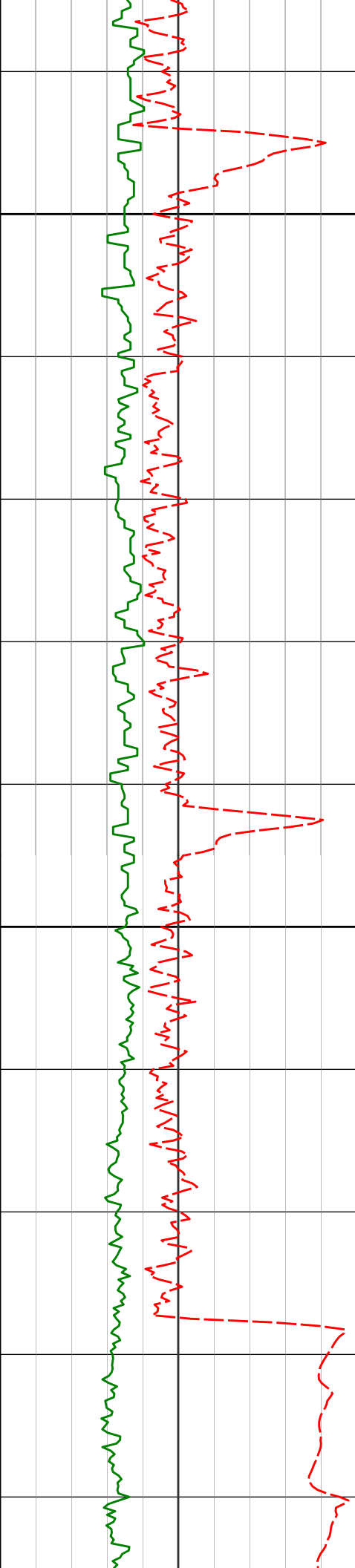
5600

5624'

0.31°

112.16° 5585.56'

-379.98'



5700

5718'

0.19°

130.72° 5679.56'

-379.63'

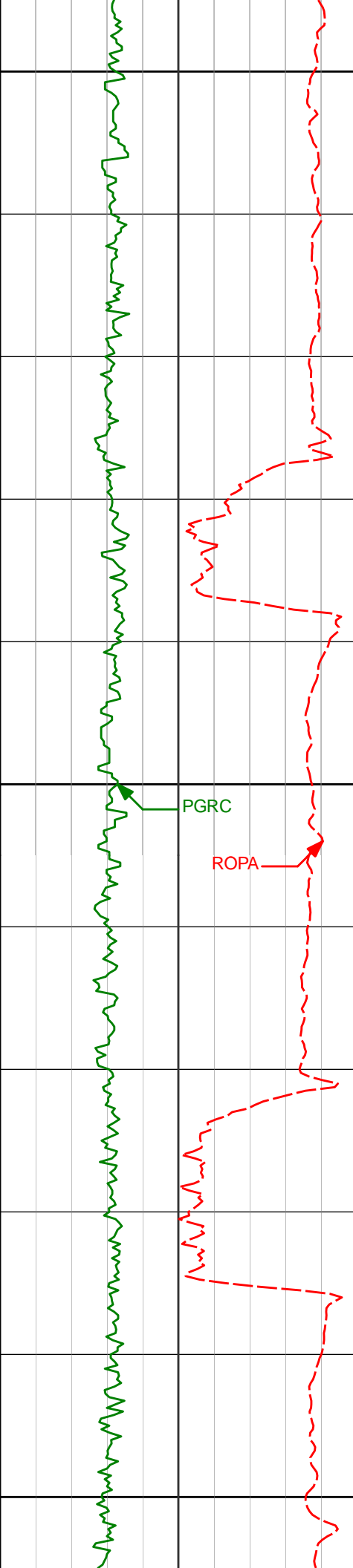
5800

5813'

0.36°

339.47° 5774.56'

-379.62'



5900

5908'

6.76°

79.00° 5869.34'

-374.24'

6000

6003'

13.92°

83.49° 5962.74'

-357.38'

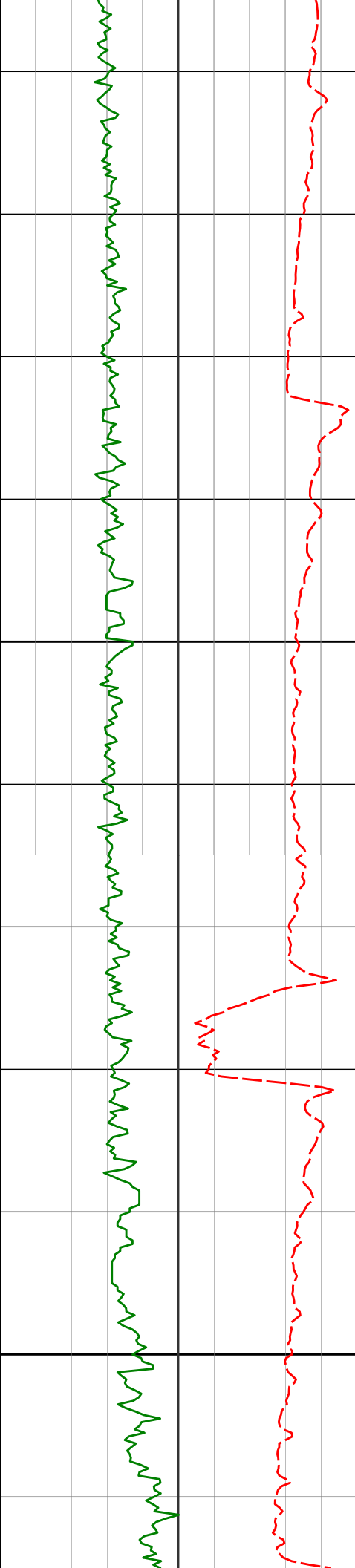
6100

6097'

19.06°

94.05° 6052.86'

-330.82'



6200

6192'

31.33°

92.85° 6138.66'

-290.52'

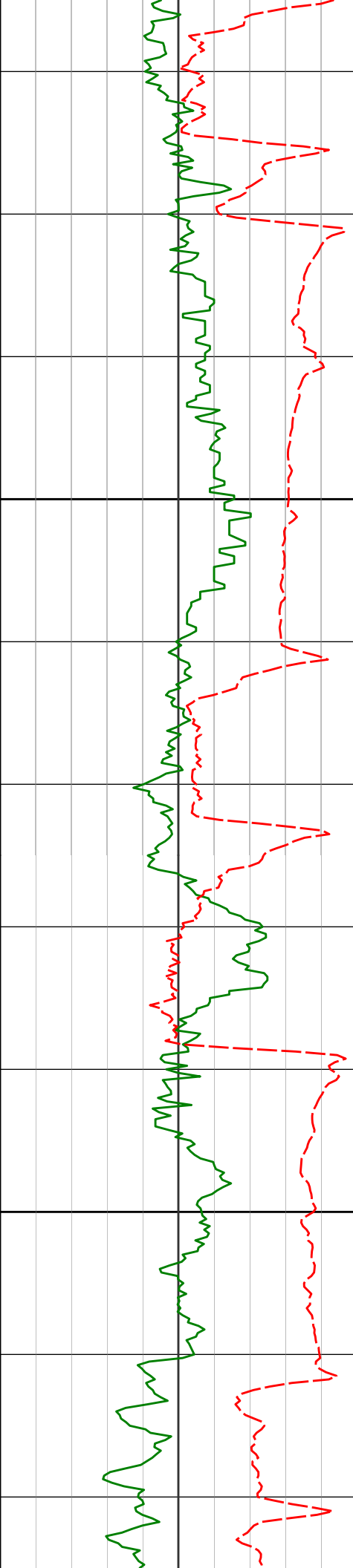
6300

6287'

41.88°

89.13° 6214.83'

-233.99'



6400

6500

6381'

51.34°

89.40° 6279.33'

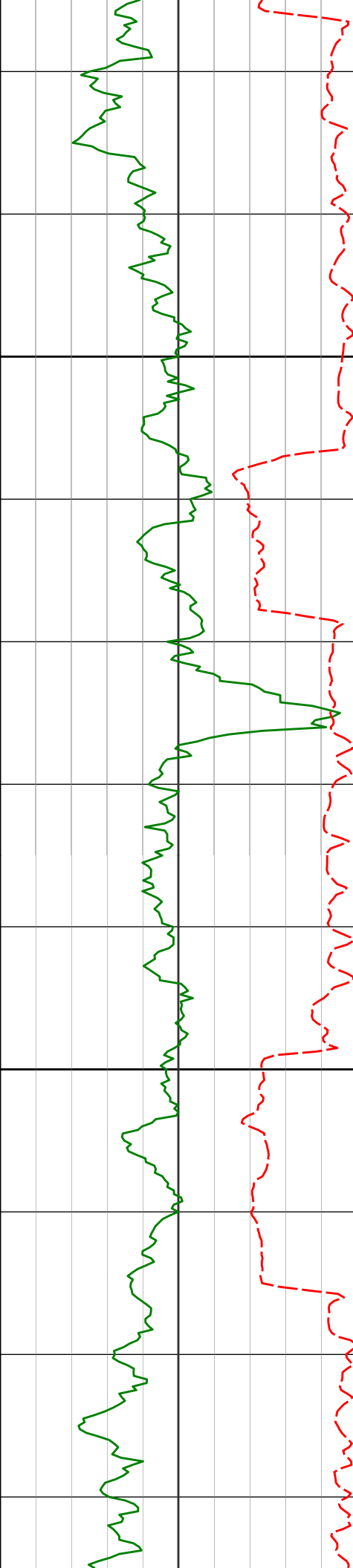
-165.76'

6476'

57.76°

89.79° 6334.40'

-88.42'



6600

6700

6571'

65.49°

88.17° 6379.52'

-4.92'

6665'

71.82°

86.55° 6413.72'

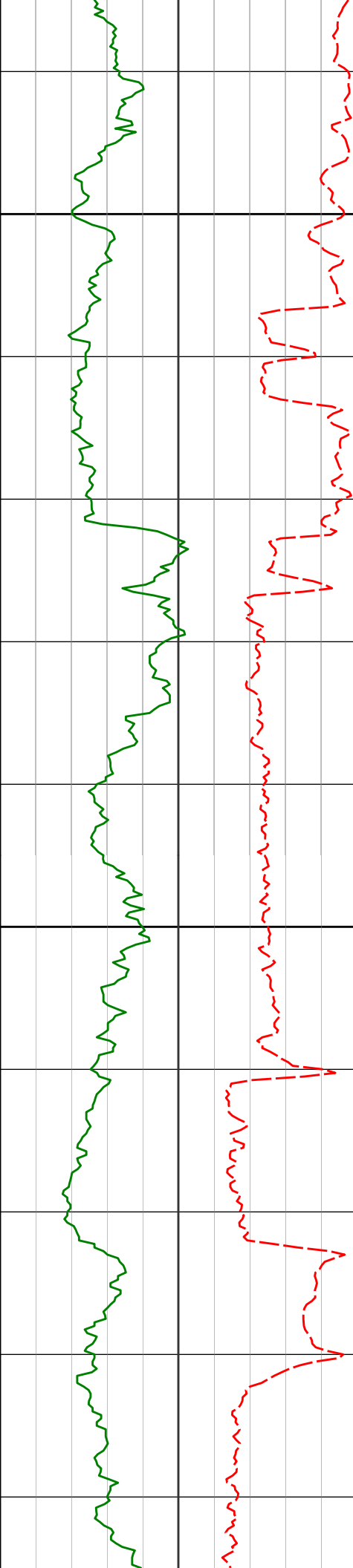
82.47'

6760'

78.39°

86.76° 6438.13'

174.05'



6788'

82.28°

86.14° 6442.83'

201.59'

6800

Casing Shoe @ 6842' MD

Run 200

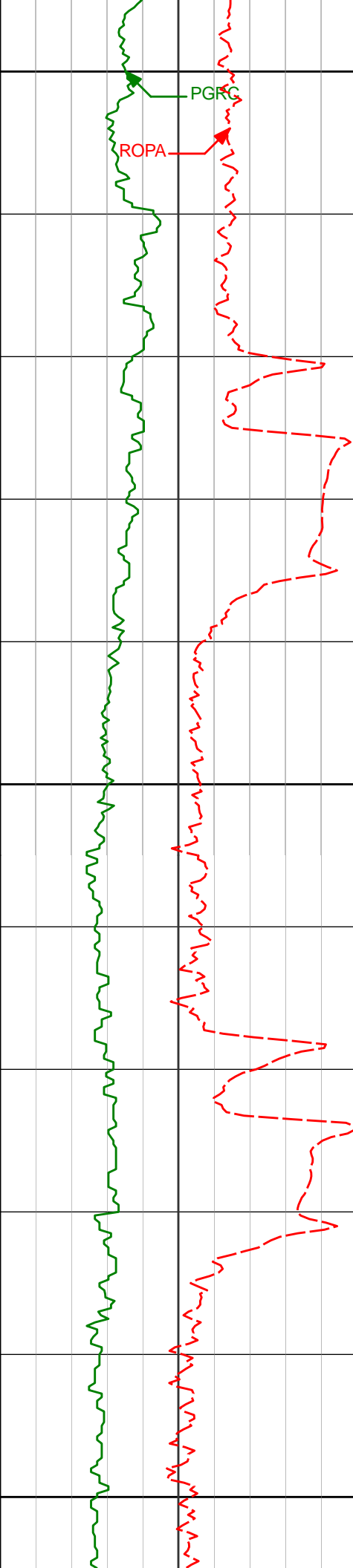
6900

6973'

86.88°

86.16° 6460.30'

385.25'



7000

7100

7200

7068'

88.52°

87.60° 6464.11'

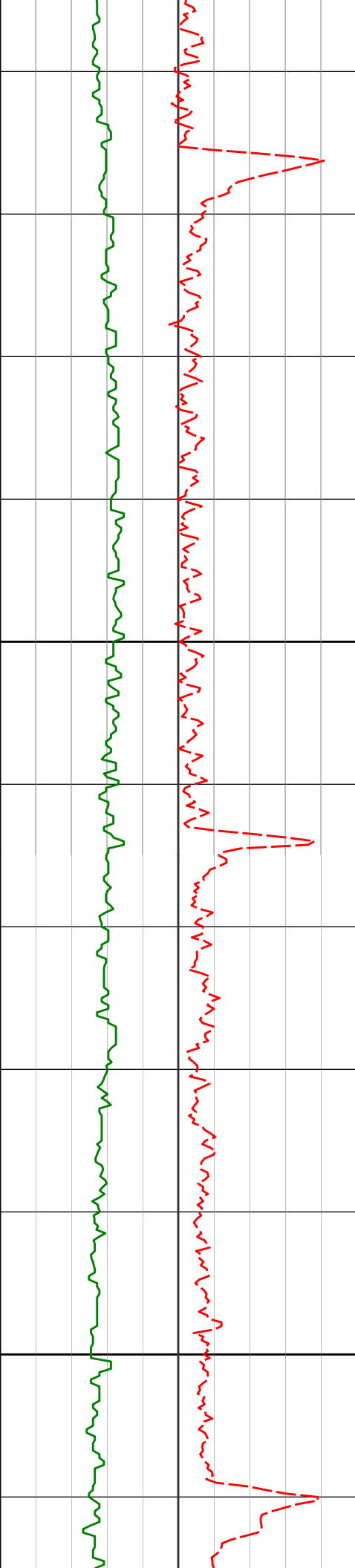
480.01'

7163'

90.55°

87.88° 6464.87'

574.91'



7300

7400

7257'

90.68°

87.93° 6463.86'

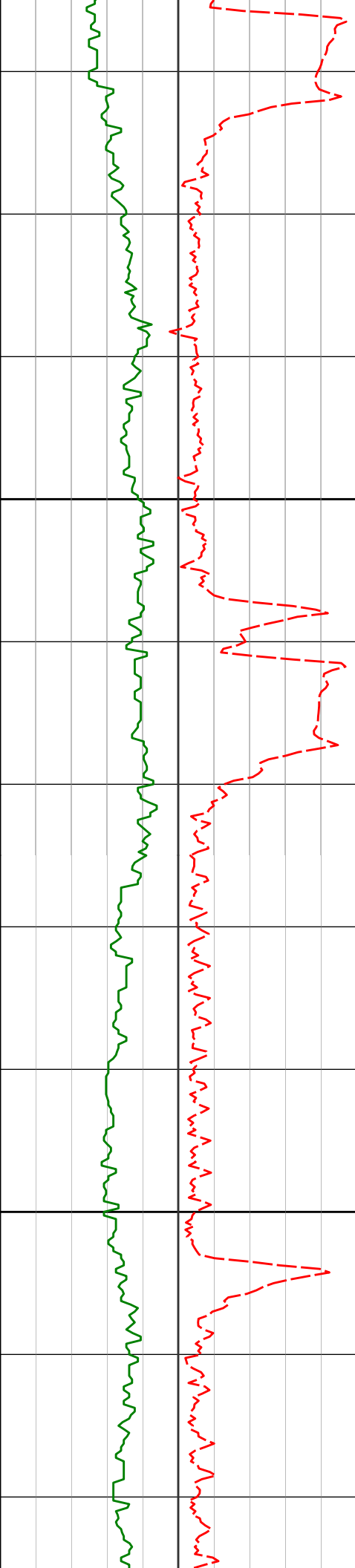
668.83'

7352'

90.49°

87.58° 6462.89'

763.74'



7500

7600

7446'

91.85°

88.47° 6460.97'

857.65'

7541'

91.17°

89.28° 6458.47'

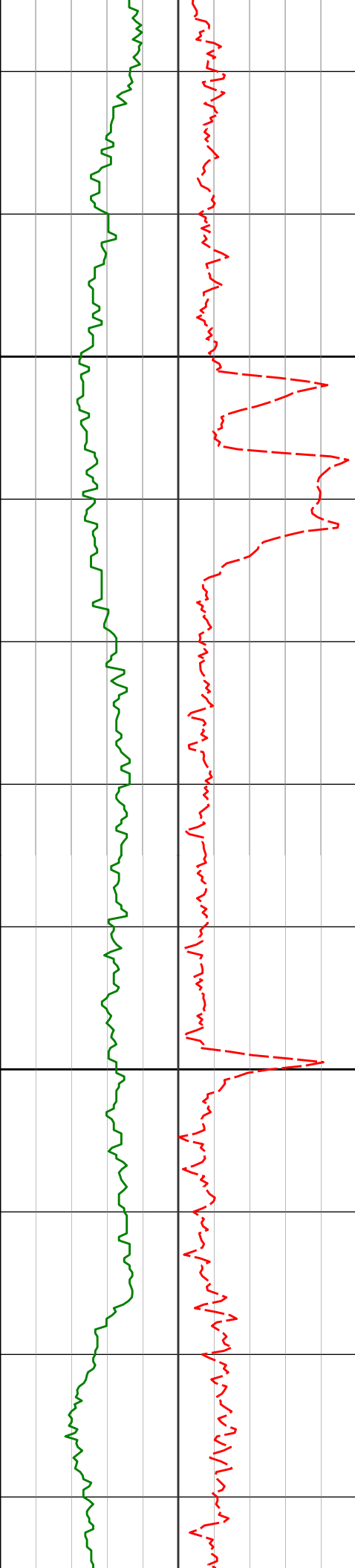
952.59'

7636'

91.54°

89.08° 6456.22'

1047.55'



7700

7730'

91.14°

90.35° 6454.02'

1141.52'

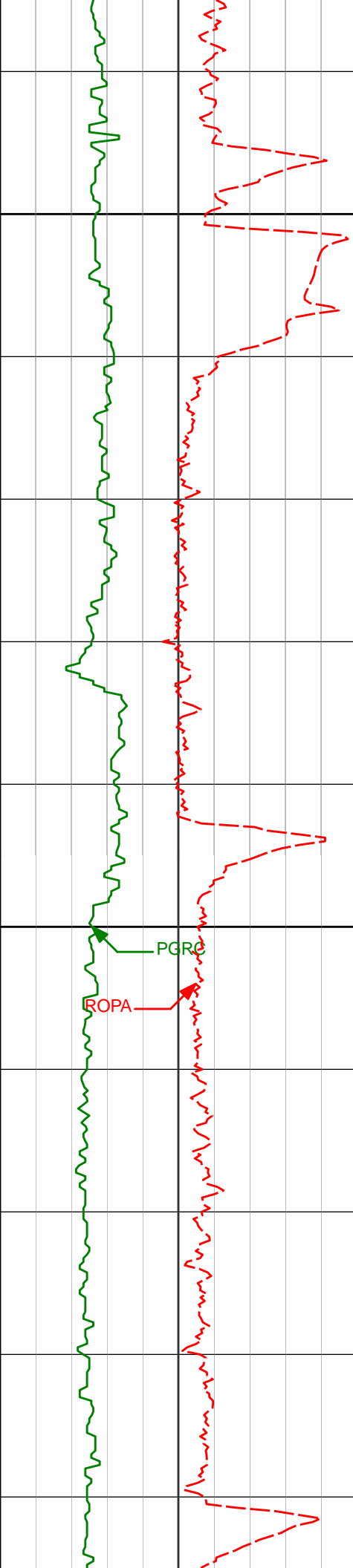
7800

7825'

91.45°

90.59° 6451.87'

1236.49'



7900

7920'

90.25°

90.30° 6450.46'

1331.48'

8000

8014'

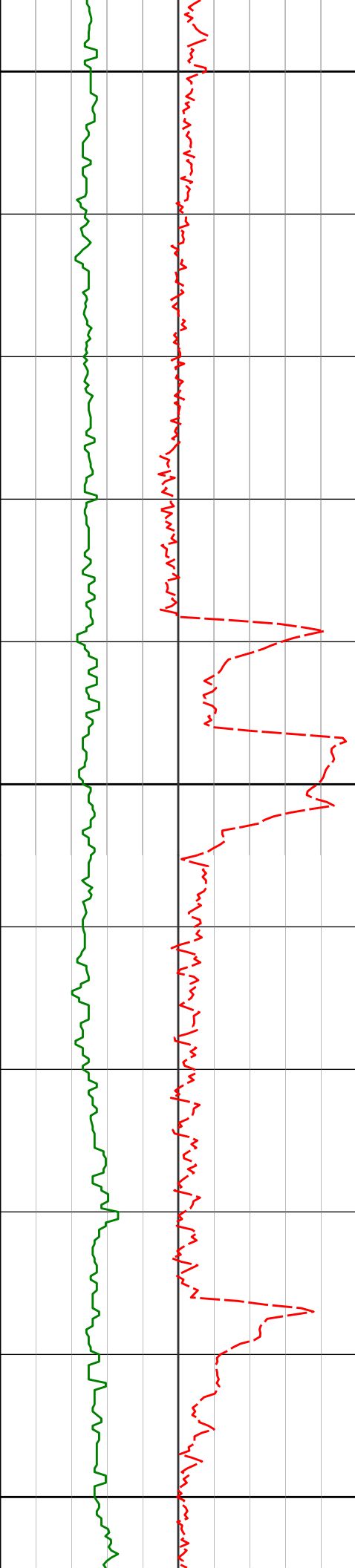
90.74°

90.29° 6449.65'

1425.47'

PGRG

ROPA



8100

8109'

91.05°

90.72° 6448.17'

1520.46'

8200

8204'

90.25°

90.59° 6447.10'

1615.45'

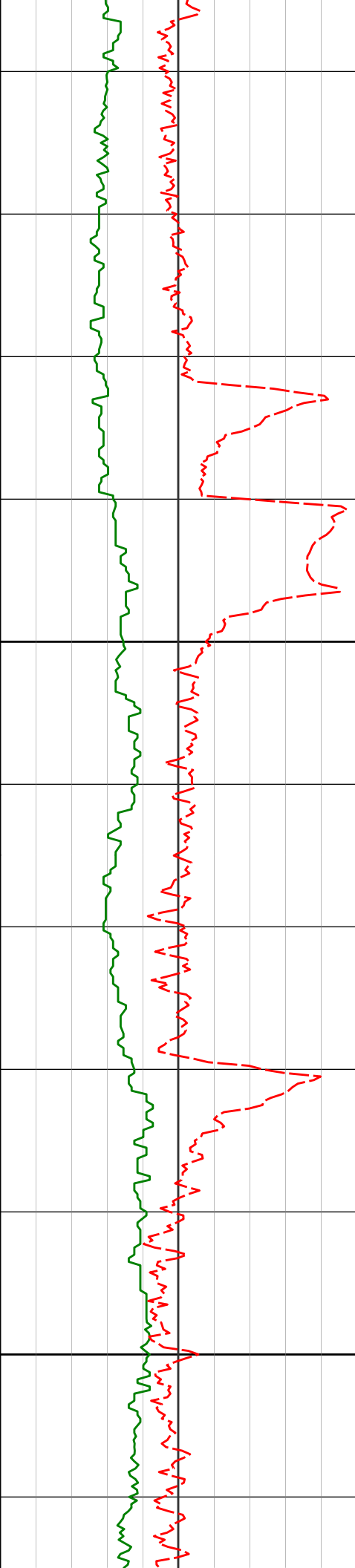
8300

8298'

90.62°

90.52° 6446.39'

1709.45'



8400

8500

8393'

89.72°

89.59° 6446.11'

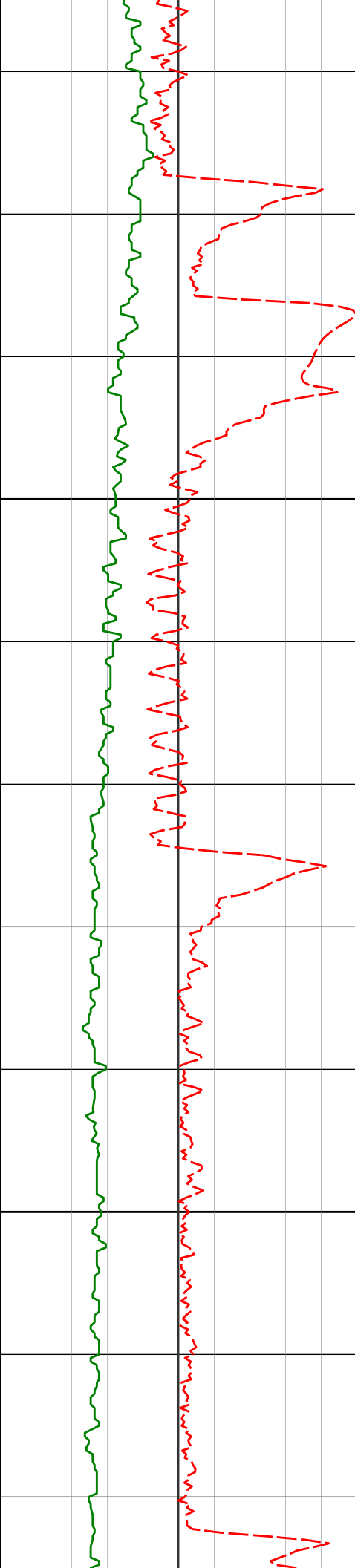
1804.44'

8488'

89.85°

89.56° 6446.47'

1899.44'



8600

8700

8582'

90.06°

88.93° 6446.54'

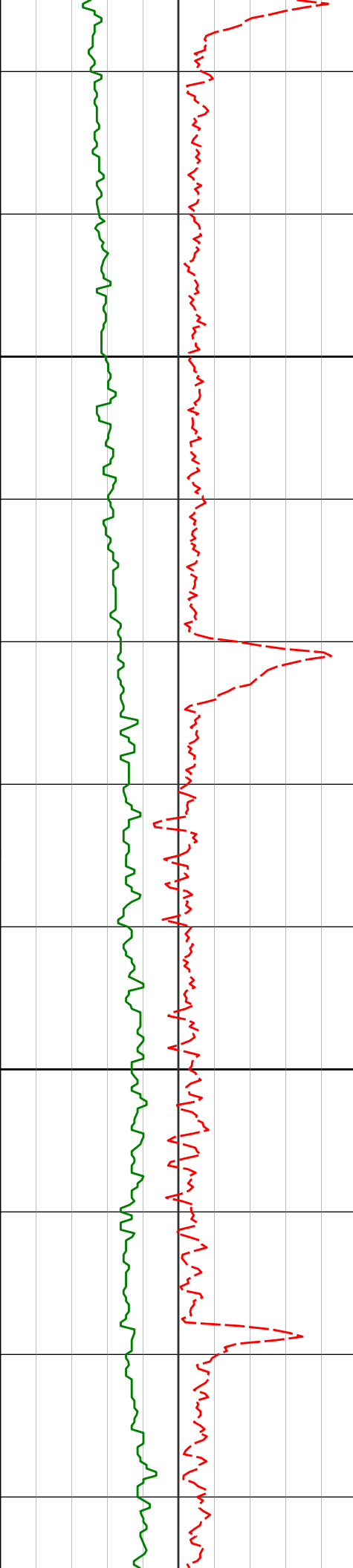
1993.42'

8677'

90.28°

88.98° 6446.26'

2088.40'



8800

8900

8771'

90.74°

88.94° 6445.43'

2182.37'

8865'

90.99°

89.26° 6444.01'

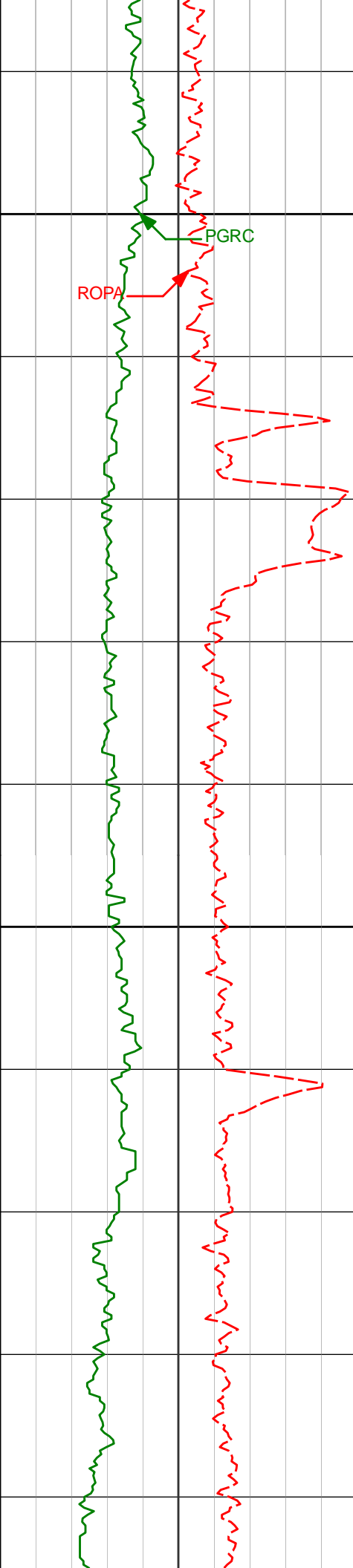
2276.34'

8959'

91.36°

88.82° 6442.09'

2370.31'



9000

9054'

90.56°

88.57° 6440.50'

2465.26'

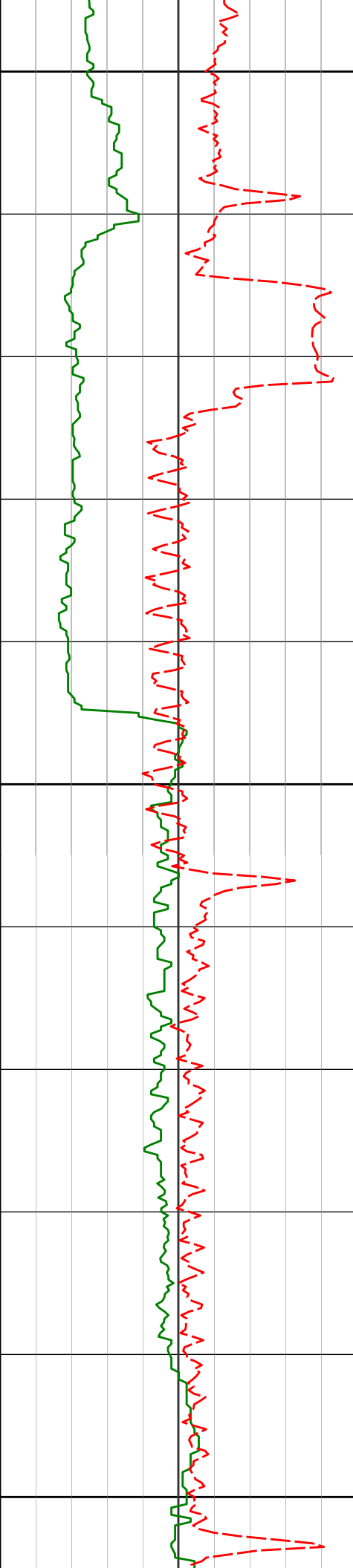
9100

9148'

91.57°

88.76° 6438.75'

2559.21'



9200

9243'

90.77°

87.88° 6436.81'

2654.13'

9300

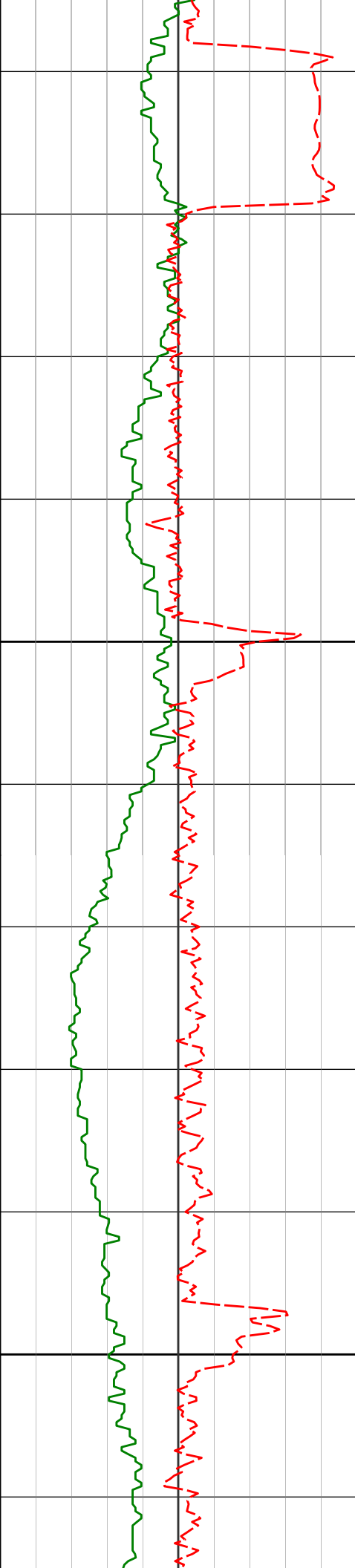
9338'

91.14°

88.01° 6435.22'

2749.05'

9400



9500

9600

9432'

89.35°

87.67° 6434.82'

2842.96'

9527'

88.74°

87.36° 6436.40'

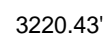
2937.84'

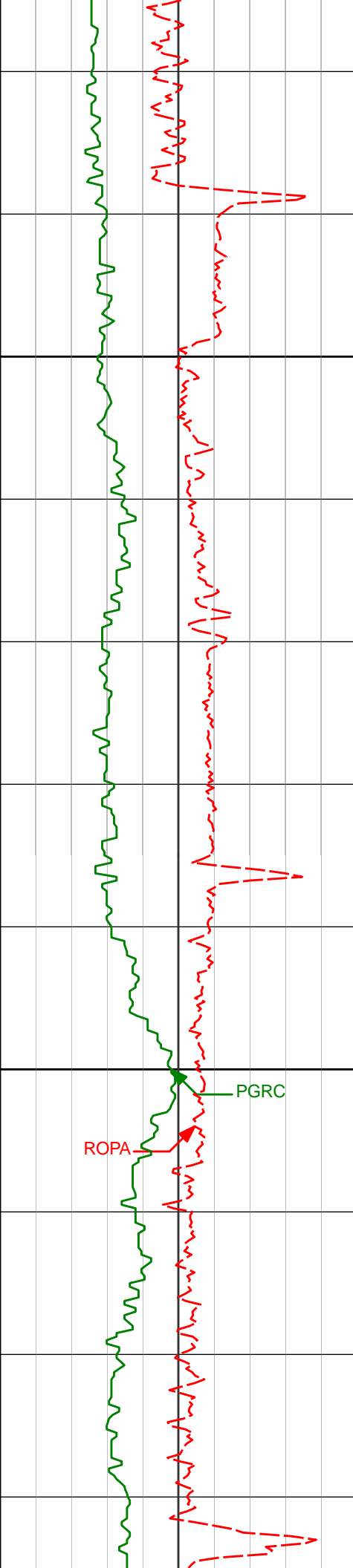
9621'

89.17°

87.16° 6438.12'

3031.70'





9900

9904'

91.73°

88.08° 6437.95'

3314.33'

10000

9999'

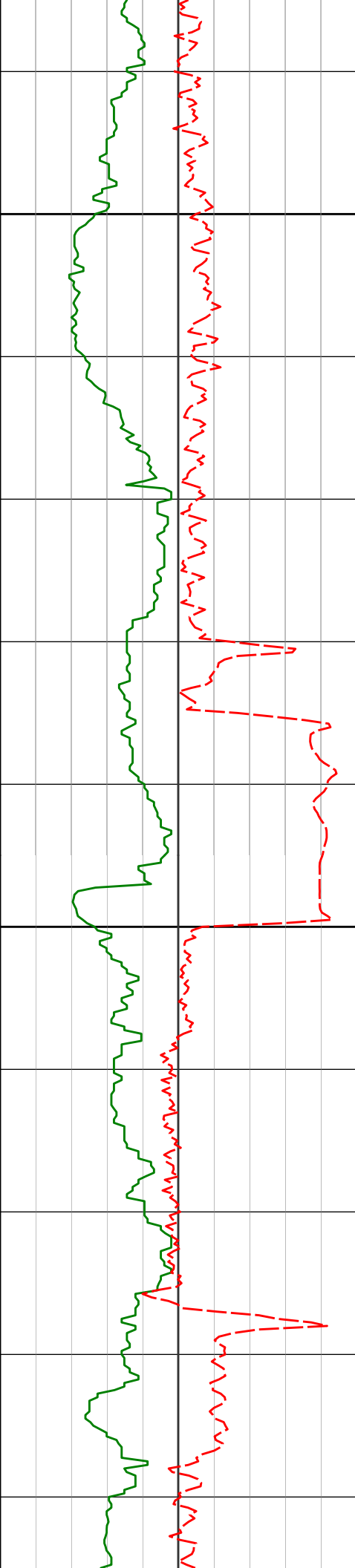
92.06°

87.54° 6434.81'

3409.19'

ROPA

PGRC



10100

10200

10094'

92.81°

87.43° 6430.77'

3504.00'

10187'

90.43°

87.99° 6428.14'

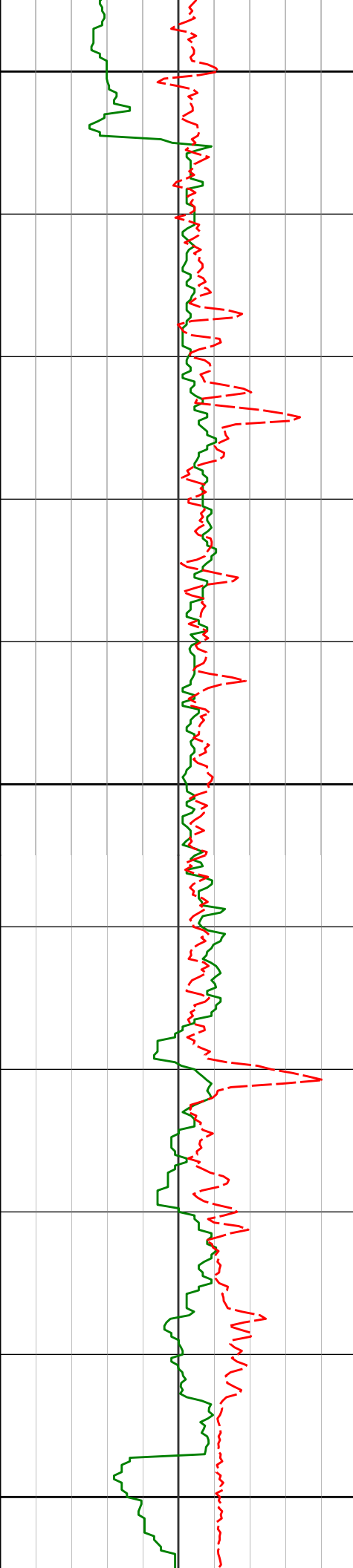
3596.87'

10281'

89.75°

88.62° 6427.99'

3690.81'



10300

10373'

90.09°

88.52° 6428.11'

3782.78'

10400

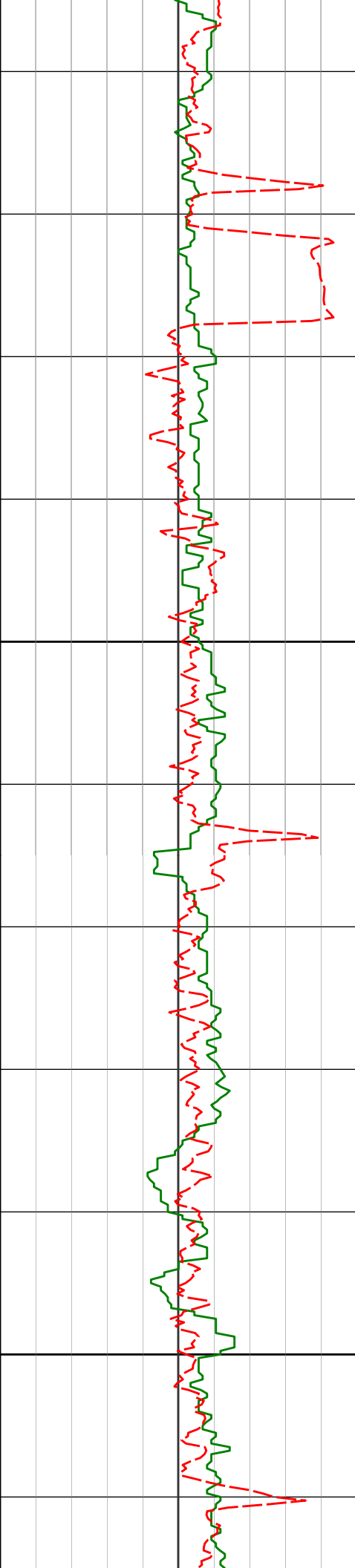
10467'

90.71°

88.22° 6427.46'

3876.72'

10500



10600

10700

10560'

89.66°

87.59° 6427.16'

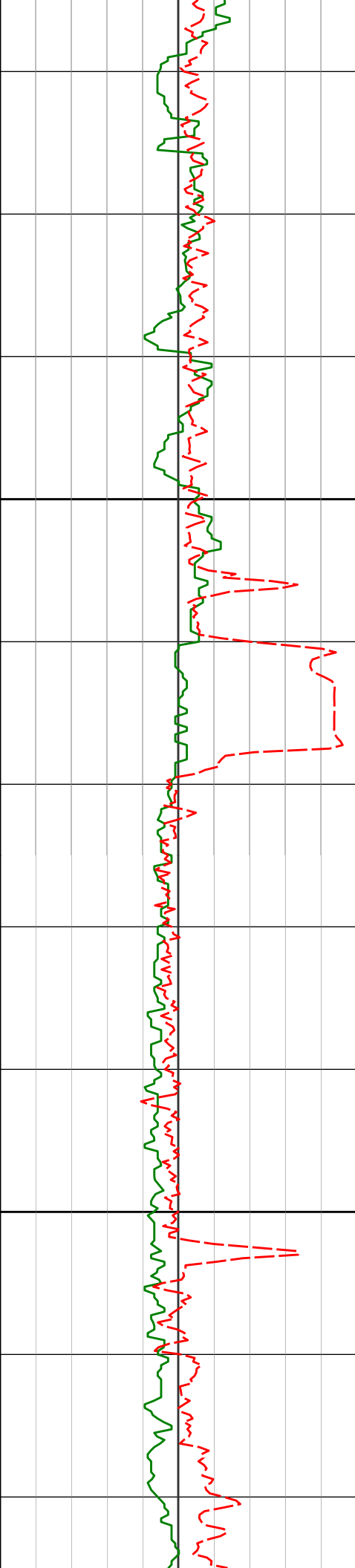
3969.65'

10652'

90.18°

87.90° 6427.28'

4061.56'



10800

10900

10745'

10837'

10930'

91.26°

90.25°

91.39°

87.53° 6426.11'

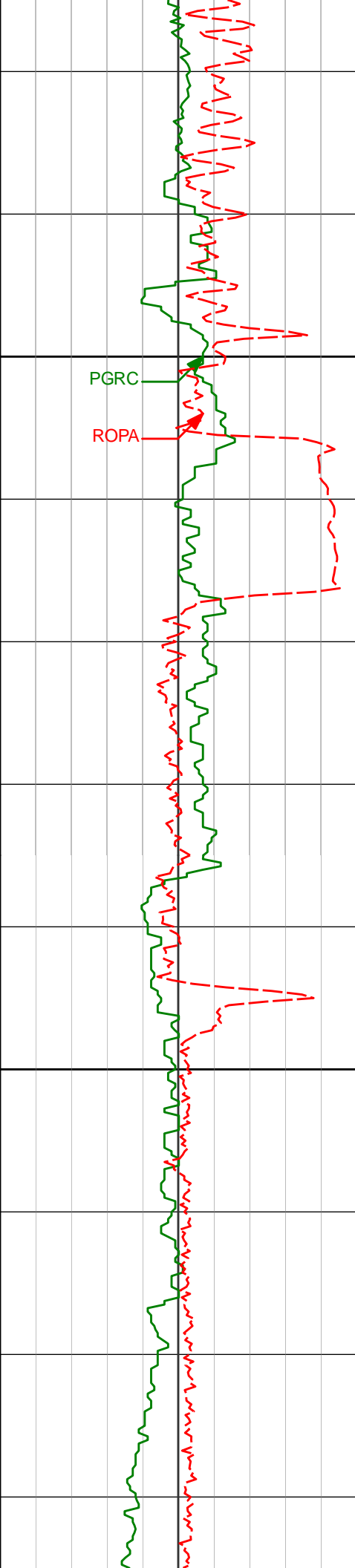
87.31° 6424.89'

88.32° 6423.57'

4154.46'

4246.35'

4339.25'



11000

PGRC

ROPA

11022'

89.69°

88.01° 6422.70'

4431.19'

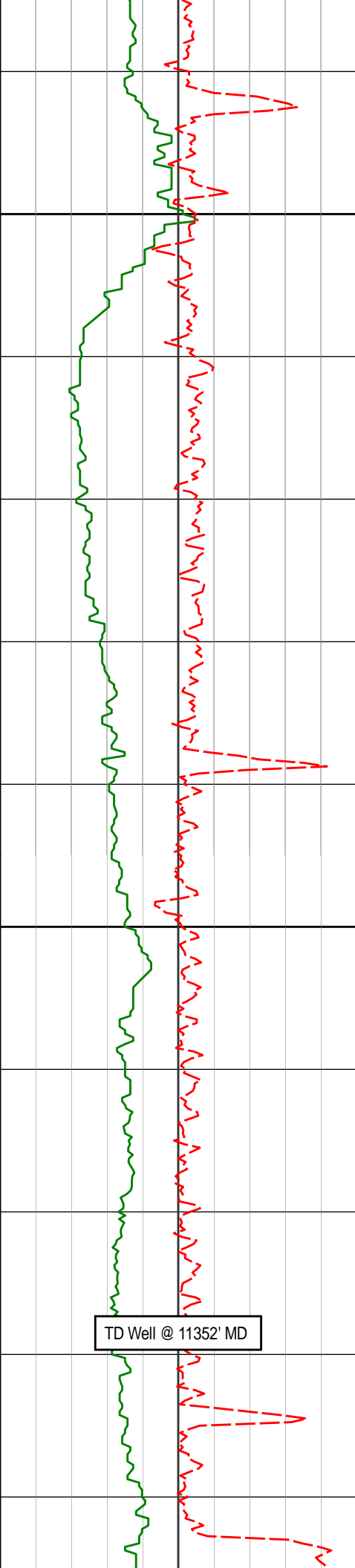
11100

11116'

89.69°

87.49° 6423.21'

4525.10'



11200

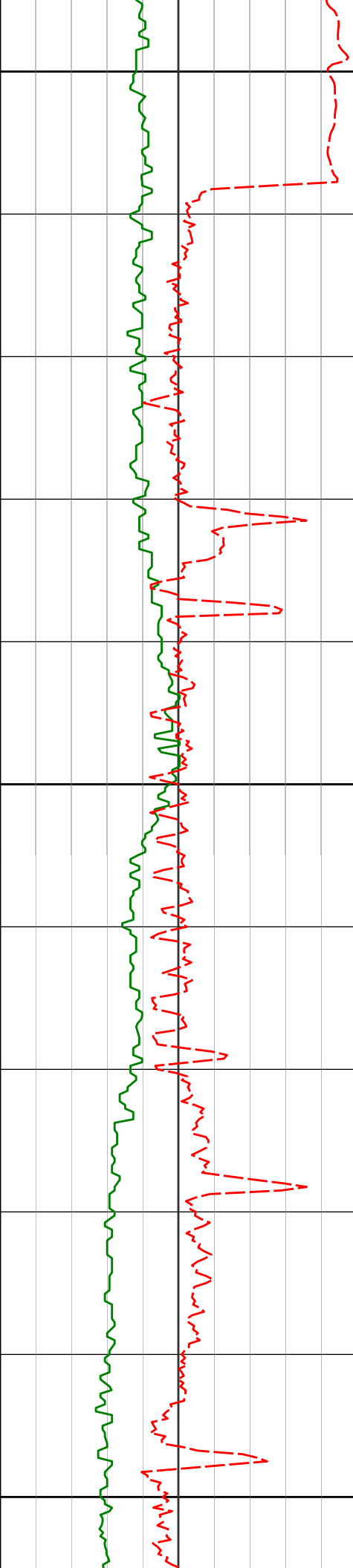
11209'

89.85°

87.10° 6423.58'

4617.98'

11300



11400

11500

11600

11396'

90.31°

87.59° 6423.32'

4804.74'

11488'

90.68°

88.22° 6422.53'

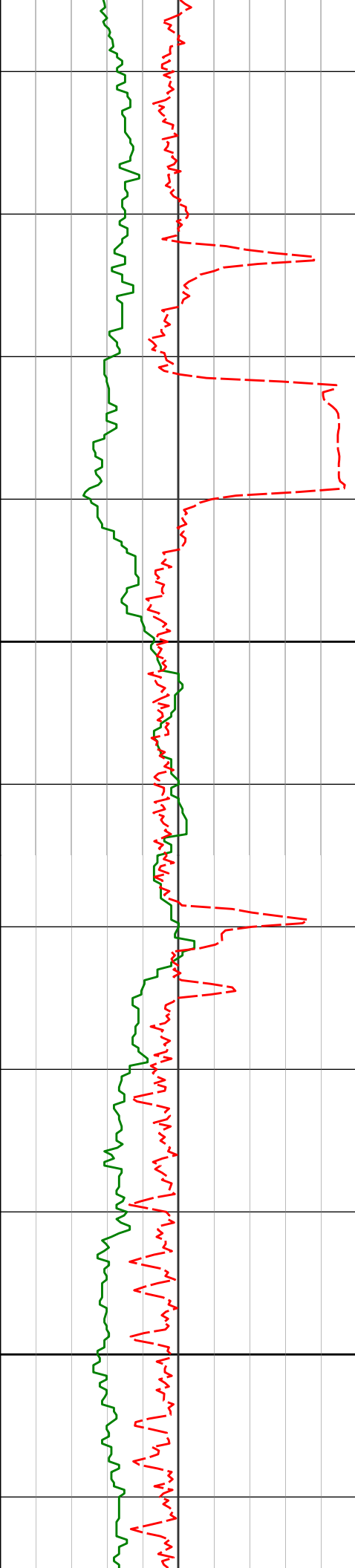
4896.66'

11580'

91.14°

88.10° 6421.07'

4988.59'



11700

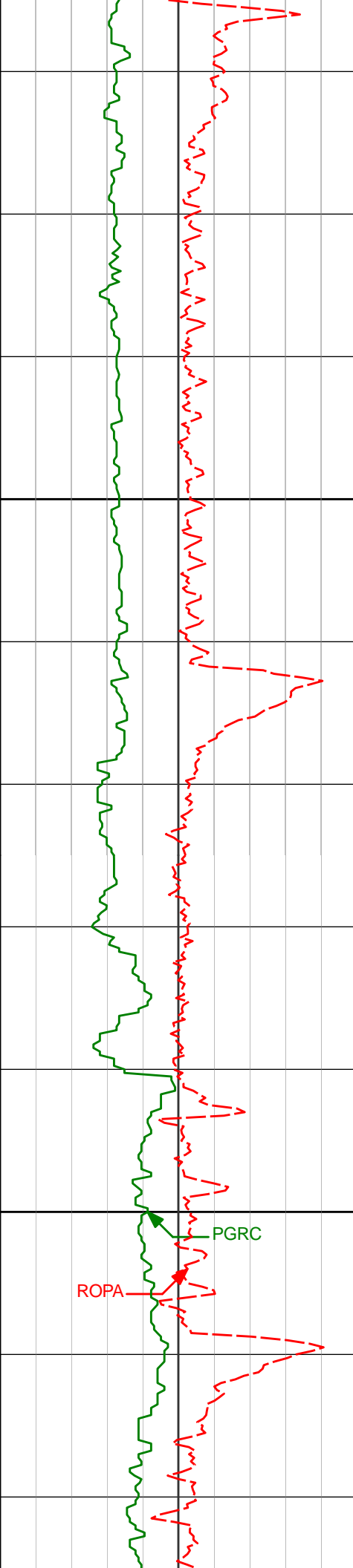
11763'

89.54°

88.32° 6419.99'

5171.47'

11800



11900

12000

11857'

89.23°

87.43° 6421.00'

5265.39'

11950

89.00°

87.59° 6421.95'

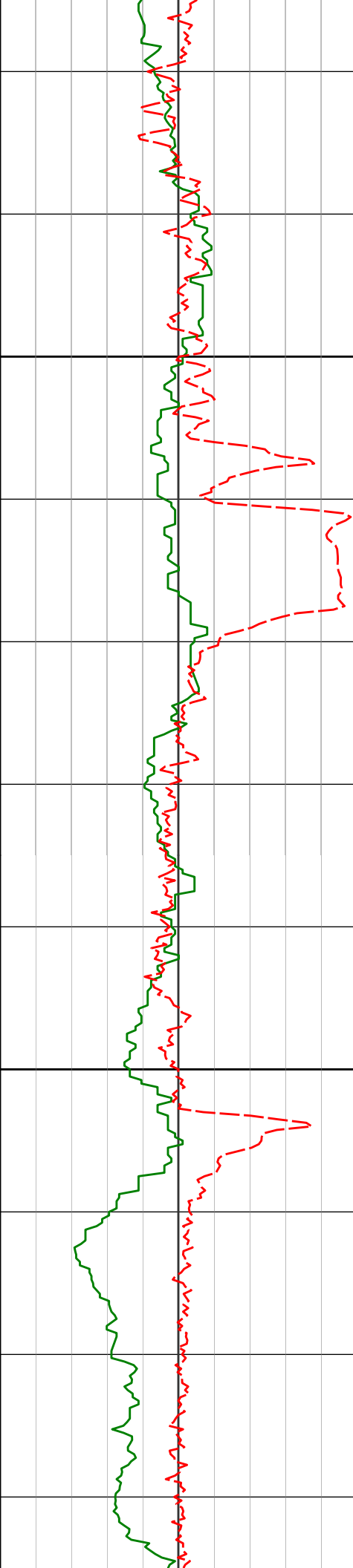
5350.20'

12044'

89.48°

87.47° 6422.71'

5452.17'



12100

12139'

90.34°

88.18° 6422.86'

5547.09'

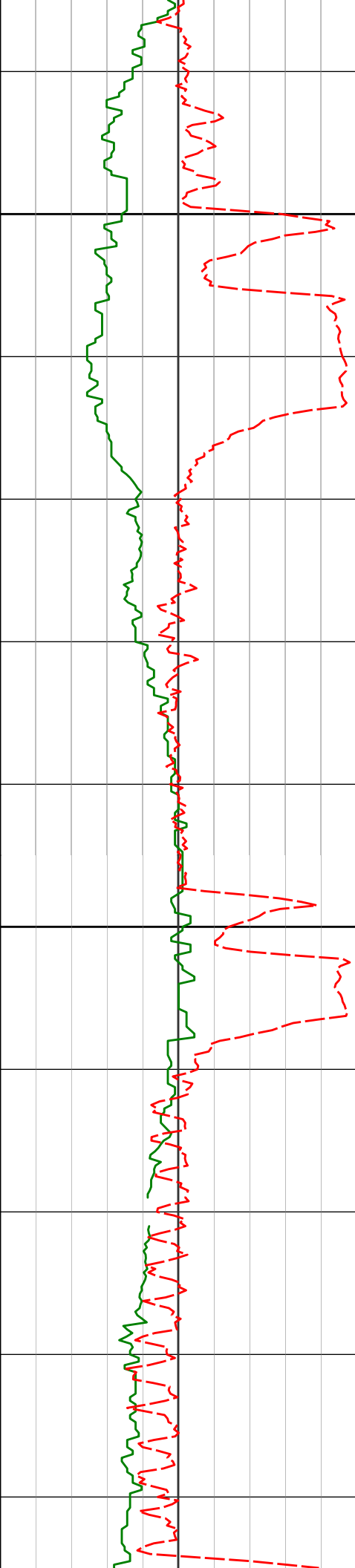
12200

12233'

89.63°

87.83° 6422.89'

5641.02'



12300

12328'

90.59°

87.21° 6422.71'

5735.91'

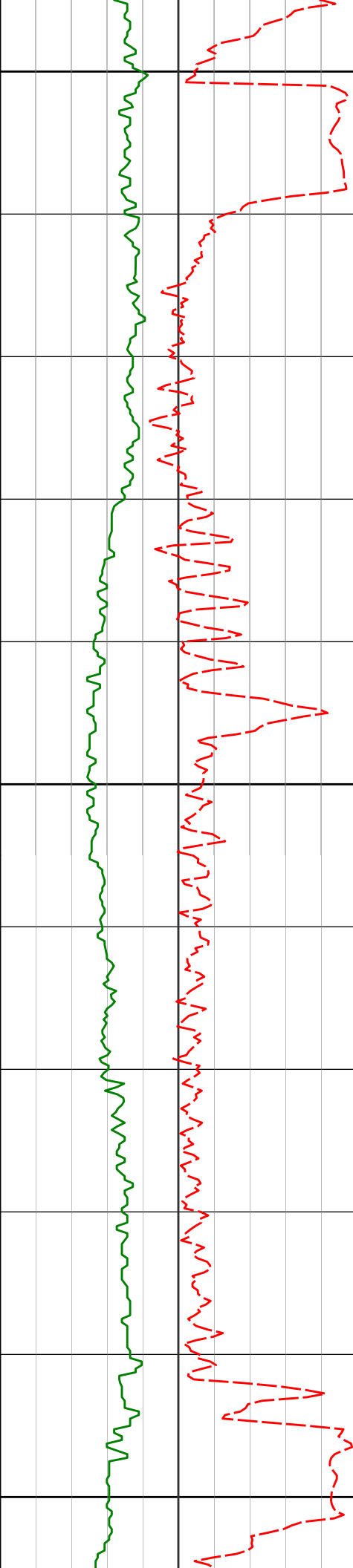
12400

12423'

91.63°

87.69° 6420.87'

5830.78'



12500

12517'

90.71°

87.31° 6418.95'

5924.66'

12600

12612'

91.60°

87.38° 6417.03'

6019.52'

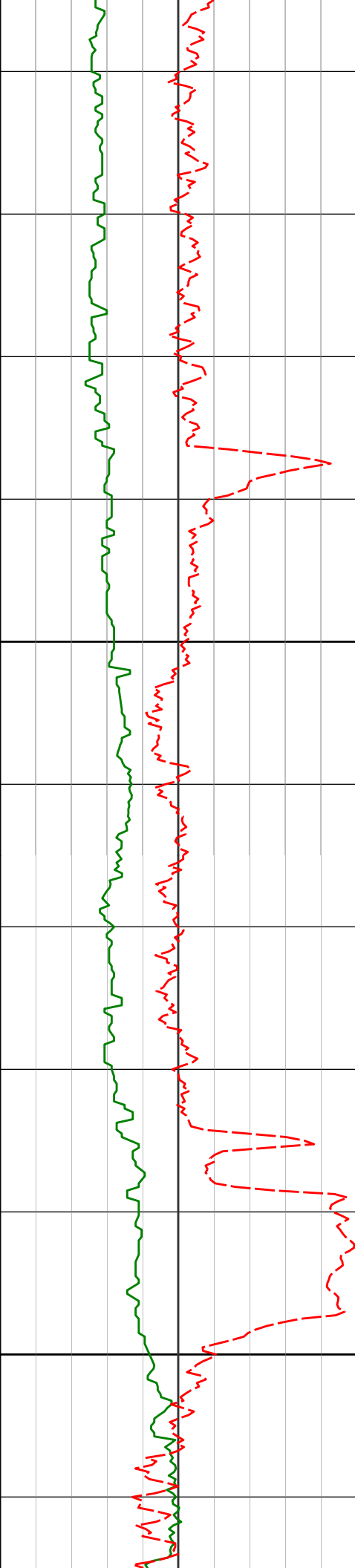
12700

12707'

90.68°

87.10° 6415.14'

6114.37'



12800

12801'

91.60°

86.95° 6413.27'

6208.20'

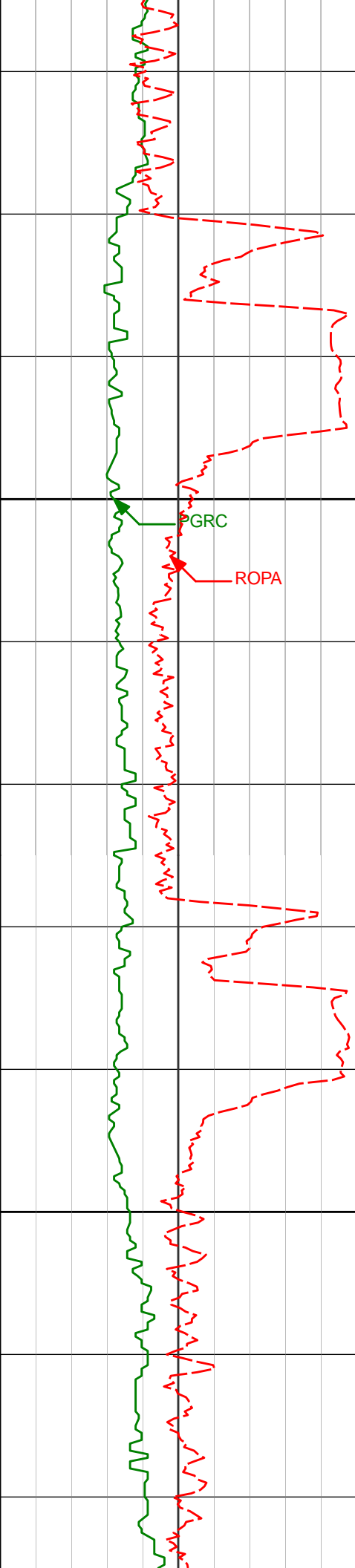
12900

12896'

91.73°

88.17° 6410.51'

6303.06'



13000

13100

12991'

90.99°

89.51° 6408.26'

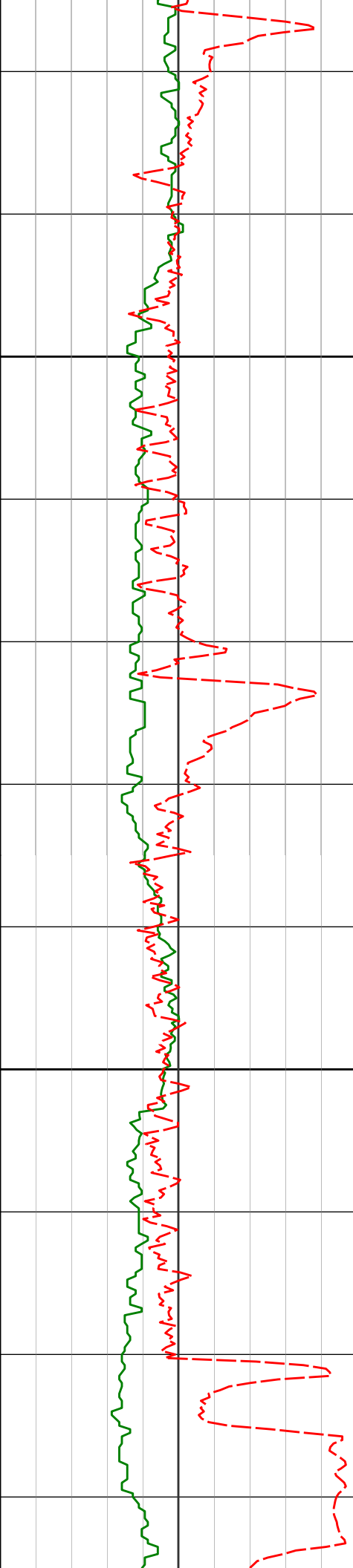
6398.00'

13085'

89.78°

89.43° 6407.62'

6491.99'



13200

13300

13180'

90.19°

89.19° 6407.65'

6586.98'

13274'

91.64°

89.96° 6406.15'

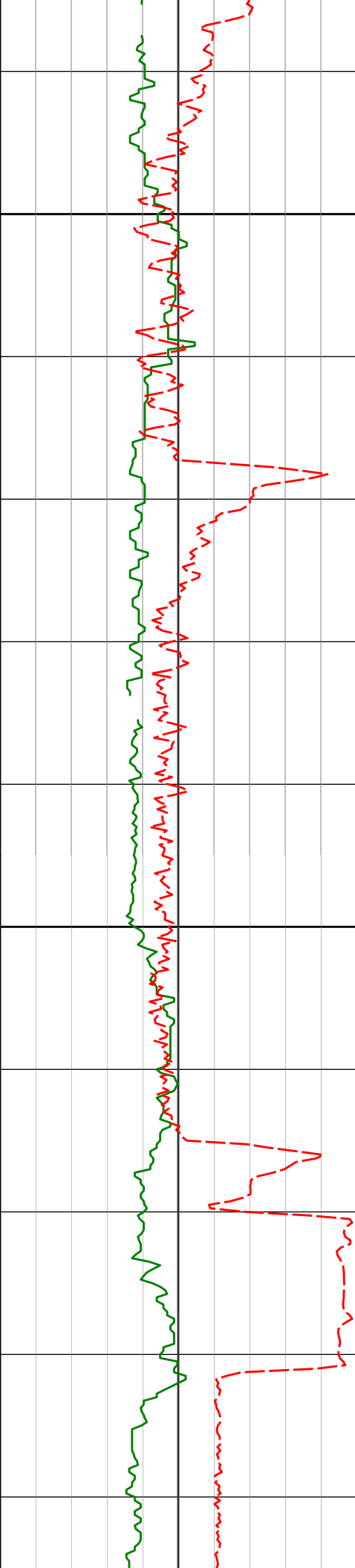
6680.96'

13369'

89.97°

89.34° 6404.82'

6775.94'



13400

13500

13464'

90.71°

89.63° 6404.26'

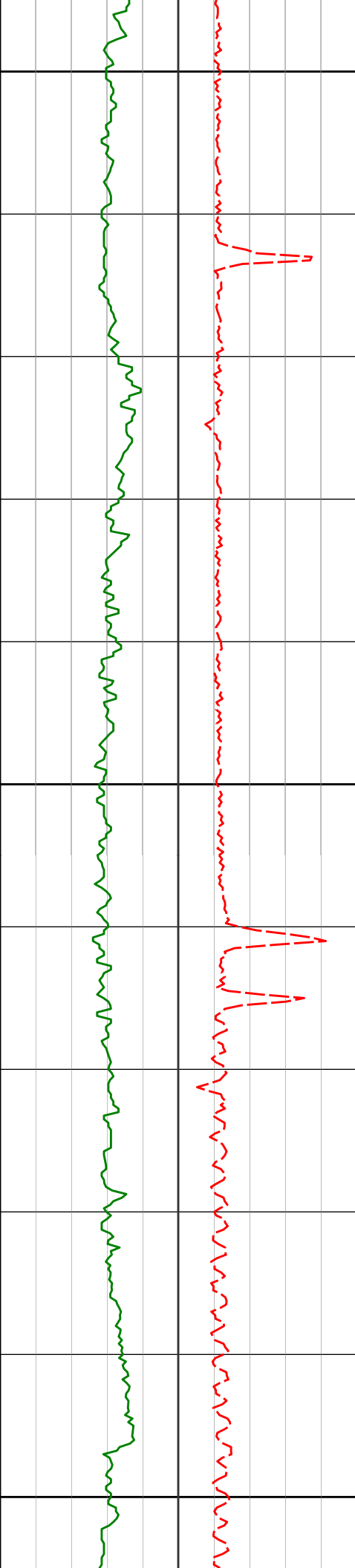
6870.93'

13558'

89.38°

90.32° 6404.19'

6964.93'



13600

13653'

89.57°

90.25° 6405.05'

7059.92'

13700

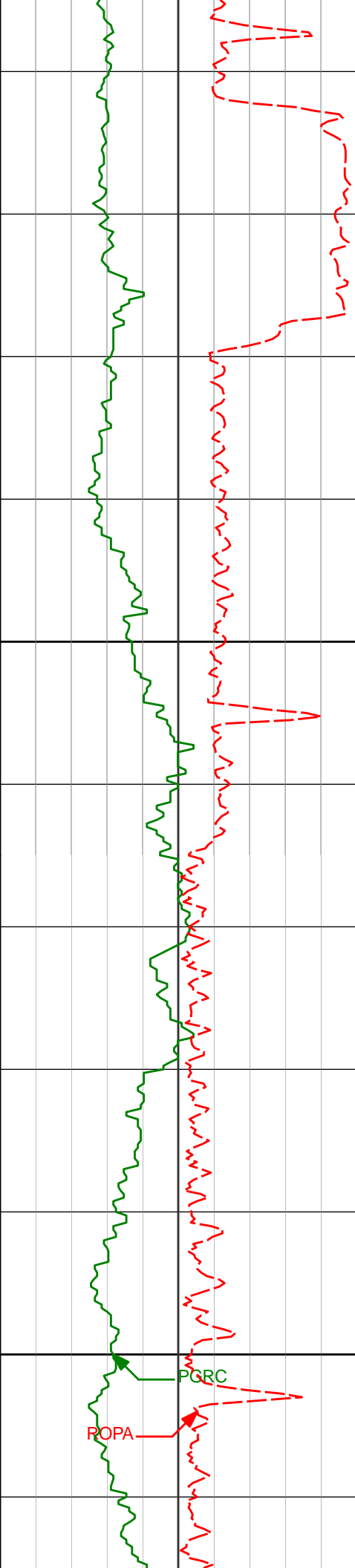
13748'

91.08°

90.76° 6404.52'

7154.92'

13800



13842'

88.95°

89.07° 6404.49'

7248.91'

13900

13937'

88.27°

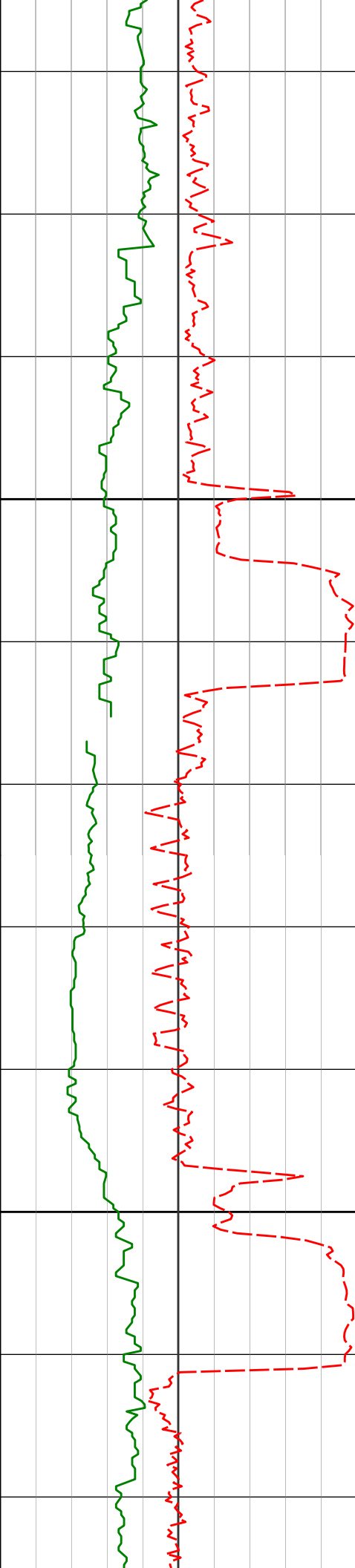
88.87° 6406.79'

7343.86'

14000

PGRC

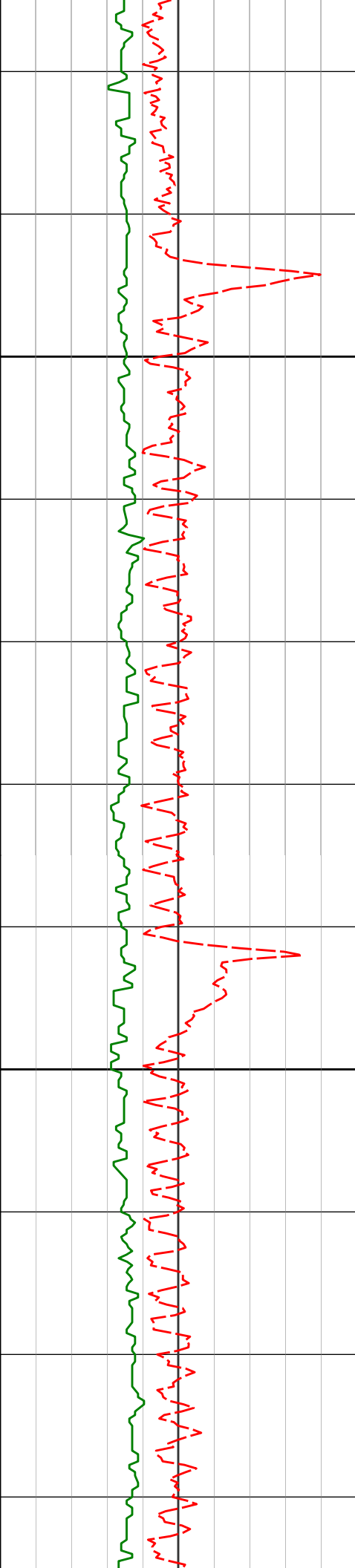
ROPA



14100

14200

14032'	88.40°	88.50°	6409.55'	7438.78'
14126'	88.68°	87.01°	6411.95'	7532.66'
14221'	90.22°	86.47°	6412.87'	7627.48'



14300

14315'

90.99°

86.32° 6411.89'

7721.27'

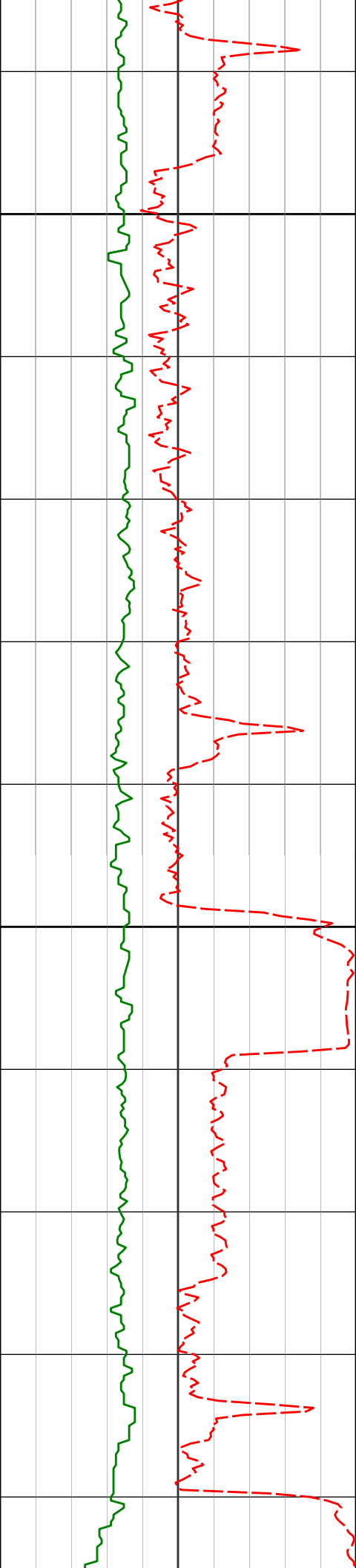
14400

14410'

91.17°

85.24° 6410.10'

7815.97'



14500

14505'

90.74°

83.41° 6408.51'

7910.45'

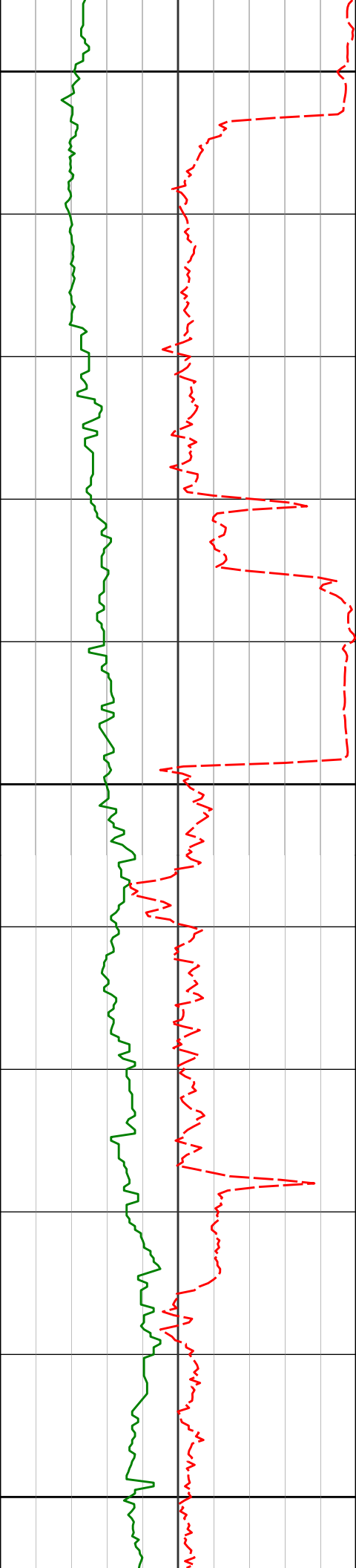
14600

14599'

89.88°

81.99° 6408.01'

8003.64'



14700

14800

14900

14694'

91.63°

84.61° 6406.76'

8097.93'

14788'

91.76°

88.03° 6403.97'

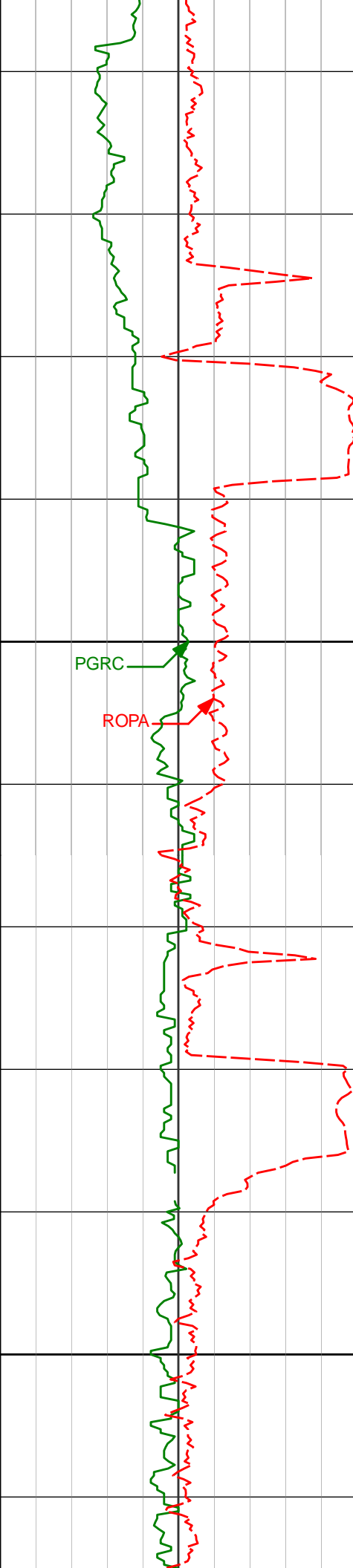
8191.65'

14882'

92.01°

88.07° 6400.89'

8285.54'



15000

PGRC

ROPA

15100

14977'

91.54°

88.47° 6397.94'

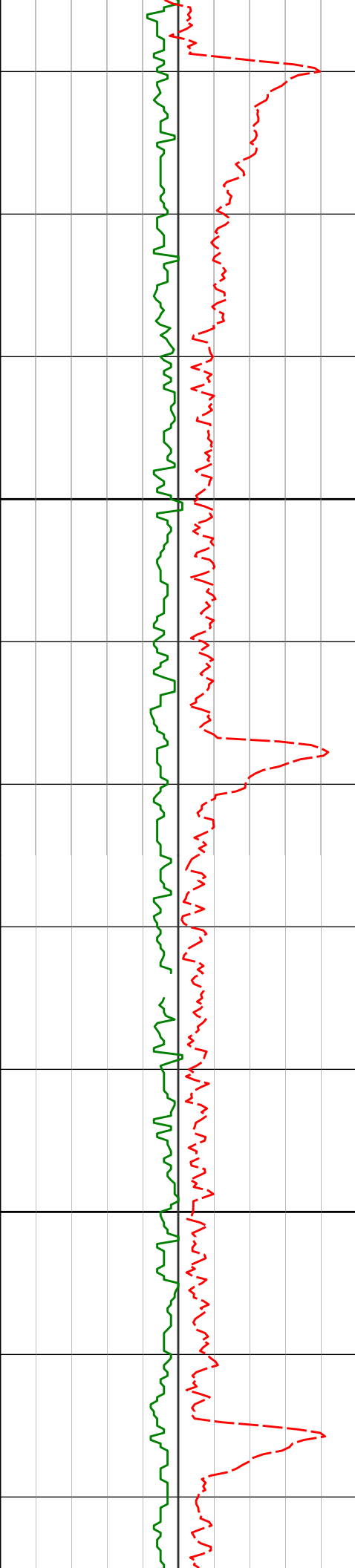
8380.44'

15072'

90.65°

87.36° 6396.13'

8475.34'



15200

15300

15167'

90.62°

87.45° 6395.08'

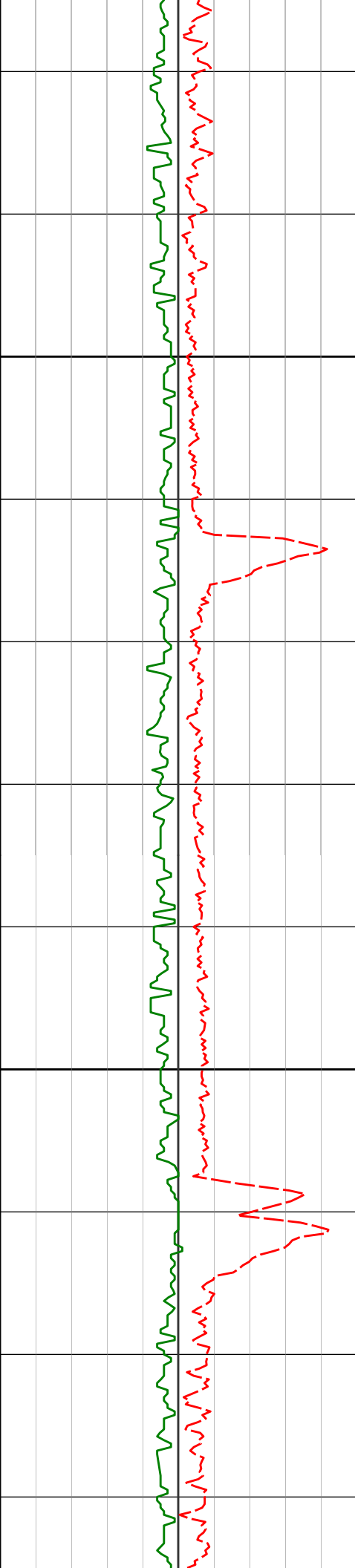
8570.22'

15261'

90.52°

87.79° 6394.14'

8664.12'



15400

15500

15356'

90.12°

87.52° 6393.61'

8759.02'

15451'

90.06°

87.47° 6393.45'

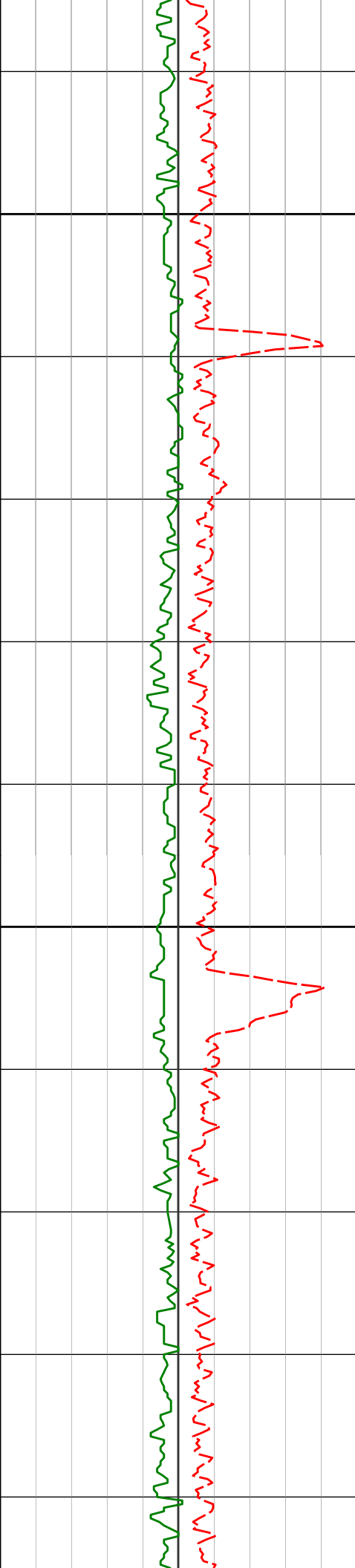
8853.92'

15545'

90.06°

87.65° 6393.35'

8947.82'



15600

15640'

90.31°

87.62° 6393.04'

9042.72'

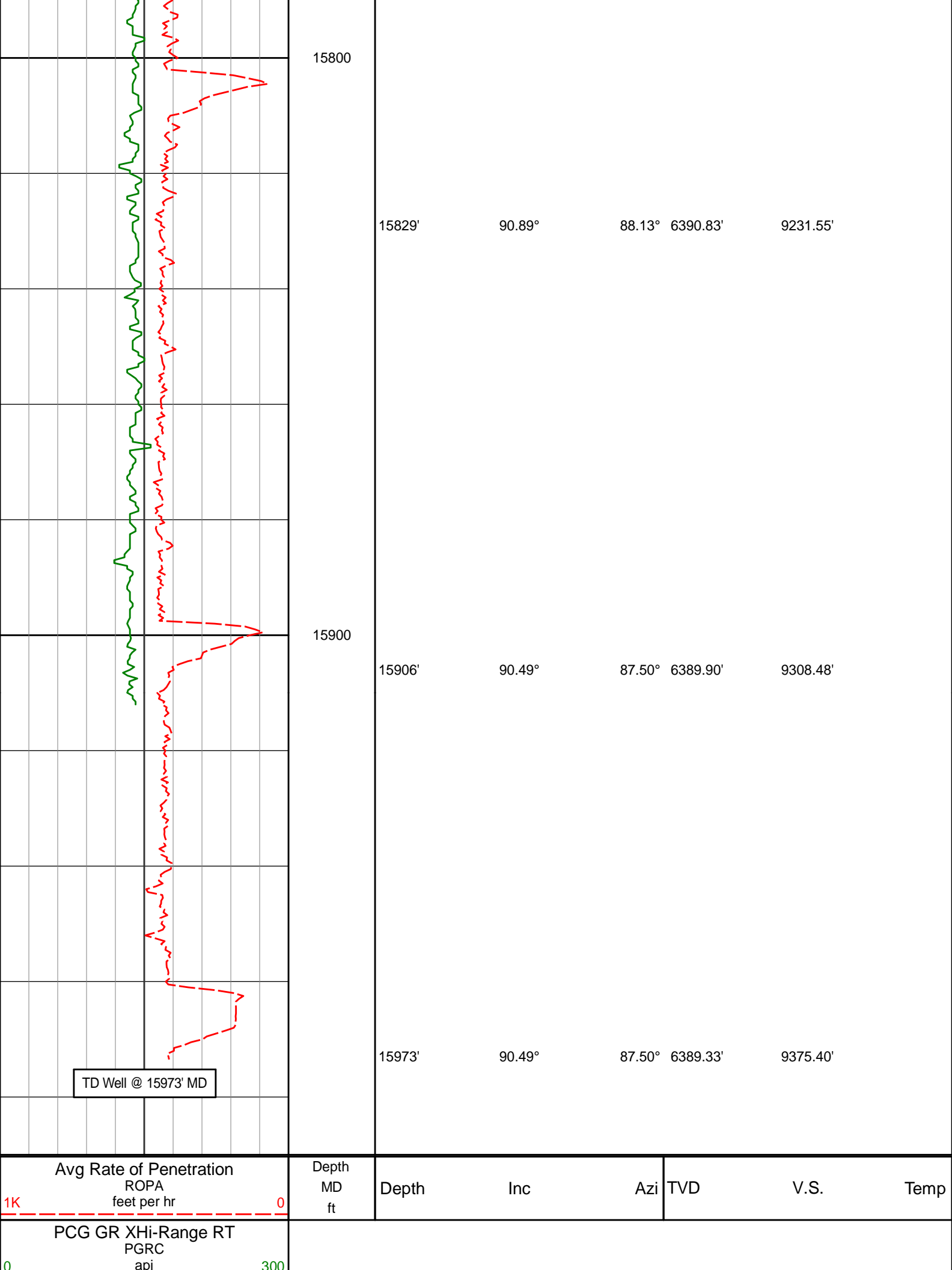
15700

15735'

90.74°

87.92° 6392.18'

9137.63'



TD Well @ 15973' MD

Avg Rate of Penetration
ROPA
feet per hr

Depth
MD
ft

Depth

Inc

Azi

TVD

V.S.

Temp

PCG GR XHi-Range RT
PGRC
api

Depth
MD
ft

Depth

Inc

Azi

TVD

V.S.

Temp

PCG GR XHi-Range RT
PGRC
api

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE32-635
Wattenburg
Weld Colorado
USA
CA-XX-0902674373

<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
646.00	0.42	207.38	645.99	2.10 S	1.09 W	-1.08	0.06
740.00	0.48	213.85	739.99	2.73 S	1.46 W	-1.45	0.09
835.00	0.63	210.87	834.99	3.51 S	1.95 W	-1.94	0.16
930.00	0.64	201.54	929.98	4.45 S	2.41 W	-2.40	0.11
1024.00	0.54	207.88	1023.98	5.32 S	2.81 W	-2.79	0.12
1118.00	0.47	203.49	1117.97	6.07 S	3.17 W	-3.15	0.08
1211.00	0.56	212.13	1210.97	6.80 S	3.57 W	-3.54	0.12
1303.00	0.62	211.78	1302.96	7.60 S	4.06 W	-4.04	0.07
1397.00	0.74	215.31	1396.96	8.52 S	4.68 W	-4.65	0.14
1490.00	0.68	205.78	1489.95	9.51 S	5.27 W	-5.23	0.14
1583.00	2.50	233.63	1582.91	11.20 S	7.13 W	-7.09	2.07
1676.00	4.43	232.90	1675.74	14.57 S	11.63 W	-11.57	2.08
1768.00	5.89	233.84	1767.36	19.49 S	18.27 W	-18.20	1.60
1861.00	7.82	232.99	1859.69	26.12 S	27.18 W	-27.08	2.07
1953.00	9.47	229.98	1950.65	34.75 S	37.97 W	-37.84	1.86
2047.00	8.12	226.72	2043.54	44.27 S	48.73 W	-48.56	1.53
2140.00	8.07	219.28	2135.62	53.83 S	57.64 W	-57.44	1.13
2233.00	9.71	226.79	2227.50	64.25 S	67.49 W	-67.25	2.16
2326.00	8.79	223.10	2319.29	74.81 S	78.06 W	-77.78	1.18
2419.00	7.74	218.12	2411.32	84.92 S	86.78 W	-86.47	1.36
2510.00	8.66	221.14	2501.39	94.90 S	95.07 W	-94.72	1.11
2603.00	8.36	215.99	2593.37	105.65 S	103.65 W	-103.26	0.88
2694.00	7.86	214.10	2683.46	116.15 S	111.02 W	-110.60	0.62
2787.00	9.81	226.19	2775.36	126.91 S	120.31 W	-119.84	2.89
2880.00	9.95	220.21	2866.98	138.53 S	131.22 W	-130.71	1.11
2975.00	9.60	217.64	2960.60	151.07 S	141.35 W	-140.80	0.58
3070.00	8.86	210.55	3054.38	163.64 S	149.91 W	-149.31	1.43
3164.00	9.81	225.74	3147.14	175.46 S	159.33 W	-158.68	2.80
3259.00	8.36	218.87	3240.95	186.49 S	169.46 W	-168.77	1.91
3448.00	6.49	219.68	3428.36	205.41 S	184.90 W	-184.14	0.99
3543.00	9.11	227.29	3522.48	214.64 S	193.85 W	-193.06	2.96
3637.00	10.73	229.59	3615.07	225.36 S	205.98 W	-205.15	1.77
3732.00	11.89	228.68	3708.22	237.55 S	220.06 W	-219.19	1.24
3826.00	13.20	228.28	3799.98	251.09 S	235.34 W	-234.42	1.40
3921.00	11.55	227.62	3892.77	264.72 S	250.47 W	-249.50	1.74
4015.00	8.86	229.83	3985.27	275.73 S	262.95 W	-261.94	2.90
4110.00	7.86	233.61	4079.26	284.31 S	273.77 W	-272.73	1.20
4204.00	8.20	237.18	4172.34	291.75 S	284.58 W	-283.50	0.64
4299.00	8.17	237.63	4266.37	299.03 S	295.97 W	-294.87	0.07
4394.00	7.47	240.97	4360.49	305.65 S	307.07 W	-305.95	0.88
4488.00	8.79	236.11	4453.54	312.62 S	318.38 W	-317.23	1.58
4583.00	8.21	236.12	4547.50	320.45 S	330.04 W	-328.86	0.61
4678.00	7.56	238.63	4641.60	327.48 S	341.00 W	-339.80	0.78
4772.00	6.17	237.89	4734.93	333.38 S	350.56 W	-349.34	1.47
4867.00	4.96	235.28	4829.48	338.44 S	358.27 W	-357.02	1.30
4961.00	4.78	241.06	4923.14	342.65 S	365.04 W	-363.78	0.56
5151.00	3.39	238.74	5112.65	349.40 S	376.77 W	-375.49	0.74
5245.00	0.95	256.38	5206.57	351.03 S	379.91 W	-378.62	2.66
5340.00	0.75	272.32	5301.56	351.19 S	381.30 W	-380.01	0.33
5435.00	0.09	129.86	5396.56	351.21 S	381.87 W	-380.58	0.87
5529.00	0.26	136.32	5490.56	351.42 S	381.66 W	-380.37	0.18
5624.00	0.31	112.16	5585.56	351.67 S	381.27 W	-379.98	0.13
5718.00	0.19	130.72	5679.56	351.87 S	380.92 W	-379.63	0.15
5813.00	0.36	339.47	5774.56	351.69 S	380.91 W	-379.62	0.56

5908.00	6.76	79.00	5869.34	350.34 S	375.52 W	-374.24	7.18
6003.00	13.92	83.49	5962.74	347.98 S	358.66 W	-357.38	7.58
6097.00	19.06	94.05	6052.86	347.78 S	332.10 W	-330.82	6.31
6192.00	31.33	92.85	6138.66	350.11 S	291.81 W	-290.52	12.93
6287.00	41.88	89.13	6214.83	350.86 S	235.27 W	-233.99	11.35
6381.00	51.34	89.40	6279.33	350.00 S	167.05 W	-165.76	10.07
6476.00	57.76	89.79	6334.40	349.46 S	89.70 W	-88.42	6.77
6571.00	65.49	88.17	6379.52	347.94 S	6.20 W	-4.92	8.27
6665.00	71.82	86.55	6413.72	343.89 S	81.21 E	82.47	6.92
6760.00	78.39	86.76	6438.13	338.54 S	172.82 E	174.05	6.92
6788.00	82.28	86.14	6442.83	336.83 S	200.36 E	201.59	14.06
6973.00	86.88	86.16	6460.30	324.46 S	384.07 E	385.25	2.49
7068.00	88.52	87.60	6464.11	319.30 S	478.84 E	480.01	2.30
7163.00	90.55	87.88	6464.87	315.55 S	573.76 E	574.91	2.16
7257.00	90.68	87.93	6463.86	312.11 S	667.69 E	668.83	0.14
7352.00	90.49	87.58	6462.89	308.39 S	762.62 E	763.74	0.42
7446.00	91.85	88.47	6460.97	305.15 S	856.54 E	857.65	1.73
7541.00	91.17	89.28	6458.47	303.29 S	951.48 E	952.59	1.11
7636.00	91.54	89.08	6456.22	301.93 S	1046.45 E	1047.55	0.44
7730.00	91.14	90.35	6454.02	301.47 S	1140.42 E	1141.52	1.41
7825.00	91.45	90.59	6451.87	302.24 S	1235.39 E	1236.49	0.41
7920.00	90.25	90.30	6450.46	302.97 S	1330.38 E	1331.48	1.30
8014.00	90.74	90.29	6449.65	303.46 S	1424.37 E	1425.47	0.52
8109.00	91.05	90.72	6448.17	304.30 S	1519.36 E	1520.46	0.55
8204.00	90.25	90.59	6447.10	305.37 S	1614.34 E	1615.45	0.85
8298.00	90.62	90.52	6446.39	306.28 S	1708.34 E	1709.45	0.40
8393.00	89.72	89.59	6446.11	306.37 S	1803.33 E	1804.44	1.35
8488.00	89.85	89.56	6446.47	305.67 S	1898.33 E	1899.44	0.13
8582.00	90.06	88.93	6446.54	304.44 S	1992.32 E	1993.42	0.71
8677.00	90.28	88.98	6446.26	302.71 S	2087.30 E	2088.40	0.23
8771.00	90.74	88.94	6445.43	301.01 S	2181.29 E	2182.37	0.49
8865.00	90.99	89.26	6444.01	299.53 S	2275.26 E	2276.34	0.43
8959.00	91.36	88.82	6442.09	297.95 S	2369.23 E	2370.31	0.62
9054.00	90.56	88.57	6440.50	295.79 S	2464.19 E	2465.26	0.88
9148.00	91.57	88.76	6438.75	293.59 S	2558.15 E	2559.21	1.10
9243.00	90.77	87.88	6436.81	290.81 S	2653.08 E	2654.13	1.25
9338.00	91.14	88.01	6435.22	287.41 S	2748.01 E	2749.05	0.41
9432.00	89.35	87.67	6434.82	283.87 S	2841.94 E	2842.96	1.94
9527.00	88.74	87.36	6436.40	279.76 S	2936.84 E	2937.84	0.72
9621.00	89.17	87.16	6438.12	275.27 S	3030.71 E	3031.70	0.51
9715.00	89.20	86.93	6439.46	270.43 S	3124.58 E	3125.55	0.25
9810.00	90.46	87.72	6439.74	265.99 S	3219.47 E	3220.43	1.57
9904.00	91.73	88.08	6437.95	262.55 S	3313.39 E	3314.33	1.40
9999.00	92.06	87.54	6434.81	258.92 S	3408.27 E	3409.19	0.67
10094.00	92.81	87.43	6430.77	254.75 S	3503.09 E	3504.00	0.79
10187.00	90.43	87.99	6428.14	251.03 S	3595.97 E	3596.87	2.62
10281.00	89.75	88.62	6427.99	248.25 S	3689.93 E	3690.81	0.99
10373.00	90.09	88.52	6428.11	245.95 S	3781.90 E	3782.78	0.39
10467.00	90.71	88.22	6427.46	243.27 S	3875.86 E	3876.72	0.73
10560.00	89.66	87.59	6427.16	239.87 S	3968.79 E	3969.65	1.32
10652.00	90.18	87.90	6427.28	236.25 S	4060.72 E	4061.56	0.66
10745.00	91.26	87.53	6426.11	232.54 S	4153.64 E	4154.46	1.22
10837.00	90.25	87.31	6424.89	228.40 S	4245.54 E	4246.35	1.13
10930.00	91.39	88.32	6423.57	224.86 S	4338.46 E	4339.25	1.64
11022.00	89.69	88.01	6422.70	221.91 S	4430.40 E	4431.19	1.88
11116.00	89.69	87.49	6423.21	218.21 S	4524.33 E	4525.10	0.55
11209.00	89.85	87.10	6423.58	213.82 S	4617.22 E	4617.98	0.45
11396.00	90.31	87.59	6423.32	205.16 S	4804.02 E	4804.74	0.36
11488.00	90.68	88.22	6422.53	201.80 S	4895.96 E	4896.66	0.79
11580.00	91.14	88.10	6421.07	198.83 S	4987.90 E	4988.59	0.52
11763.00	89.54	88.32	6419.99	193.12 S	5170.80 E	5171.47	0.88
11857.00	89.23	87.43	6421.00	189.63 S	5264.73 E	5265.39	1.01
11950.00	89.60	87.59	6421.95	185.59 S	5357.63 E	5358.28	0.43
12044.00	89.48	87.47	6422.71	181.54 S	5451.54 E	5452.17	0.18
12139.00	90.34	88.18	6422.86	177.94 S	5546.47 E	5547.09	1.17
12233.00	89.63	87.83	6422.89	174.66 S	5640.42 E	5641.02	0.84
12328.00	90.59	87.21	6422.71	170.55 S	5735.32 E	5735.91	1.20
12423.00	91.63	87.69	6420.87	166.32 S	5830.21 E	5830.78	1.21
12517.00	90.71	87.31	6418.95	162.22 S	5924.10 E	5924.66	1.06
12612.00	91.60	87.38	6417.03	157.82 S	6018.98 E	6019.52	0.94
12707.00	90.68	87.10	6415.14	153.24 S	6113.85 E	6114.37	1.02
12801.00	91.60	86.95	6413.27	148.37 S	6207.70 E	6208.20	1.00
12896.00	91.73	88.17	6410.51	144.32 S	6302.57 E	6303.06	1.28
12991.00	90.99	89.51	6408.26	142.39 S	6397.52 E	6398.00	1.61
13085.00	89.78	89.43	6407.62	141.53 S	6491.52 E	6491.99	1.29

13180.00	90.19	89.19	6407.65	140.39 S	6586.51 E	6586.98	0.49
13274.00	91.64	89.96	6406.15	139.70 S	6680.49 E	6680.96	1.74
13369.00	89.97	89.34	6404.82	139.11 S	6775.48 E	6775.94	1.87
13464.00	90.71	89.63	6404.26	138.26 S	6870.47 E	6870.93	0.84
13558.00	89.38	90.32	6404.19	138.22 S	6964.47 E	6964.93	1.59
13653.00	89.57	90.25	6405.05	138.68 S	7059.46 E	7059.92	0.21
13748.00	91.08	90.76	6404.52	139.52 S	7154.45 E	7154.92	1.68
13842.00	88.95	89.07	6404.49	139.37 S	7248.45 E	7248.91	2.89
13937.00	88.27	88.87	6406.79	137.67 S	7343.40 E	7343.86	0.74
14032.00	88.40	88.50	6409.55	135.49 S	7438.34 E	7438.78	0.41
14126.00	88.68	87.01	6411.95	131.81 S	7532.23 E	7532.66	1.62
14221.00	90.22	86.47	6412.87	126.40 S	7627.07 E	7627.48	1.72
14315.00	90.99	86.32	6411.89	120.49 S	7720.88 E	7721.27	0.84
14410.00	91.17	85.24	6410.10	113.50 S	7815.60 E	7815.97	1.16
14505.00	90.74	83.41	6408.51	104.11 S	7910.12 E	7910.45	1.97
14599.00	89.88	81.99	6408.01	92.17 S	8003.35 E	8003.64	1.77
14694.00	91.63	84.61	6406.76	81.09 S	8097.68 E	8097.93	3.31
14788.00	91.76	88.03	6403.97	75.05 S	8191.43 E	8191.65	3.64
14882.00	92.01	88.07	6400.89	71.85 S	8285.33 E	8285.54	0.27
14977.00	91.54	88.47	6397.94	68.98 S	8380.24 E	8380.44	0.65
15072.00	90.65	87.36	6396.13	65.53 S	8475.16 E	8475.34	1.50
15167.00	90.62	87.45	6395.08	61.23 S	8570.05 E	8570.22	0.10
15261.00	90.52	87.79	6394.14	57.33 S	8663.97 E	8664.12	0.37
15356.00	90.12	87.52	6393.61	53.44 S	8758.89 E	8759.02	0.51
15451.00	90.06	87.47	6393.45	49.29 S	8853.80 E	8853.92	0.08
15545.00	90.06	87.65	6393.35	45.29 S	8947.71 E	8947.82	0.19
15640.00	90.31	87.62	6393.04	41.37 S	9042.63 E	9042.72	0.26
15735.00	90.74	87.92	6392.18	37.68 S	9137.55 E	9137.63	0.55
15829.00	90.89	88.13	6390.83	34.45 S	9231.49 E	9231.55	0.27
15906.00	90.49	87.50	6389.90	31.51 S	9308.43 E	9308.48	0.96
15973.00	90.49	87.50	6389.33	28.59 S	9375.36 E	9375.40	0.01

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

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 15973.00 FEET
IS 9375.40 FEET ALONG 90.17 DEGREES (GRID)**

Final survey is a straight line projection to TD.