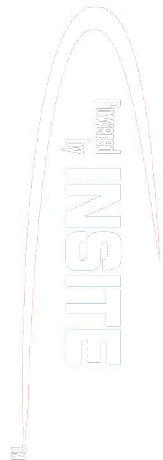


PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 600 / 1 : 240

Country : USA			
Field : Wattenburg			
Location : Lat: 40° 31' 16.28" North Long: 104° 27' 1.15" West			
Well : NCLP PC AA04-69-1HN			
Company : Noble Energy			
Rig : H&P 321			
LOCATION			
Latitude : 40° 31' 16.28" North Longitude : 104° 27' 1.15" West			
UTM Easting = 3,291,817.320 ft UTM Northing = 1,434,437.350 ft			
Company : Noble Energy			
Rig : H&P 321			
Well : NCLP PC AA04-69-1HN			
Field : Wattenburg			
Country : USA			
API Number : 05-123-37179			
Permanent Datum : Ground Level			
Log Measured From : Drill Floor			
Drilling Measured From : Drill Floor			
Depth Logged : 758.00 ft To 16,290.00 ft			
Date Logged : 07-Dec-13 To 19-Dec-13			
Total Depth MD : 16,290.00 ft TVD : 6,596.12 ft			
Spud Date : 09-Dec-13			
Run No.			
Size			
0100			
0200			
0300			
Borehole Record (MD)			
From			
To			
Run No.			
Size			
0100			
0200			
0300			
Casing Record (MD)			
From			
To			
Run No.			
Size			
0100			
0200			
0300			
Unit No. : 11210424			
Job No. : CA-XX-0900859724			
Plot Type : Final			
Plot Date : 19-Dec-13			
MD LOG			
Elevation : 4710.00 ft			
30.00 ft Above Permanent Datum			
Other Services			
Directional Drilling			
KB			
N/A			
DF			
4740.00 ft			
GL			
4710.00 ft			
WD			
N/A			

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	12-Dec-13	13-Dec-13	19-Dec-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.860	6.860	4.760		
Log Start Depth (MD, ft)	758.00	5,583.00	7,087.00		
Log End Depth (MD, ft)	5,583.00	7,087.00	16,290.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	11-Dec-13 06:10	12-Dec-13 14:00	14-Dec-13 20:09		
Drill/Wipe End Date and Time	12-Dec-13 05:00	13-Dec-13 10:33	19-Dec-13 02:40		
Min Inc (deg) @ Depth (MD, ft)	0.11 @ 2,105.00	11.54 @ 5,611.00	86.43 @ 7,119.00		
Max Inc (deg) @ Depth (MD, ft)	14.12 @ 5,043.00	81.29 @ 7,033.00	93.27 @ 14,556.00		
Bit TFA(in2) / Bit Type	0.78 / PDC	1.24 / PDC	0.86 / PDC		
Flow Rate (gpm)	556.69	539.55	304.12		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	NA / NA		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.70 / 32.00	9.20 / 39.00	9.48 / 36.00		
Filtrate CL (ppm)	2,100.00	2,800.00	2,500.00		
pH / Fluid Loss (mptm)	8.30 / 13	8.00 / 7	9.20 / 8		
PV (cP) / YP (Ihf2)	6 / 5.00	12 / 14.00	10 / 7.00		
% Solids / % Sand	2.90 / 0.50	5.00 / 0.25	8.50 / 0.15		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	1.70 / NA		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	NA @ NA		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	NA @ NA		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	NA @ NA		

Max Tool Temp (degF) / Source	129.00 / PCM	162.80 / PCM	268.30 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 129.00	N/A @ 162.80	NA @ 268.30		
Lead MWD Engineer	Kyle Wass	Kyle Wass	Kyle Wass		
Customer Representative	Stetson Nielsen	Stetson Nielsen	Jim Turner		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.76	5.76		
Sub Serial Number	11341339	11341339	11730104		
Insert Serial Number	11680735	11680735	11680735		
Date and Time Initialized	09-Dec-13 18:21	09-Dec-13 18:21	14-Dec-13 04:11		
Date and Time Read	13-Dec-13 22:52	13-Dec-13 22:58	19-Dec-13 13:31		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	54.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341339	11341339	11730104		
Sonde Serial Number	11638628	11638628	11638628		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	223.08	210.89	225.09		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.39	47.21	66.75		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341339	11341339	11730104		
Insert/Sonde Serial Number	11579771	11579771	11579771		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth from the Drill Floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Brigham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified.
5. The following smoothing parameters have been applied to the data:
1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft

1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

6. Insite Version V8.0.0

WARRANTY

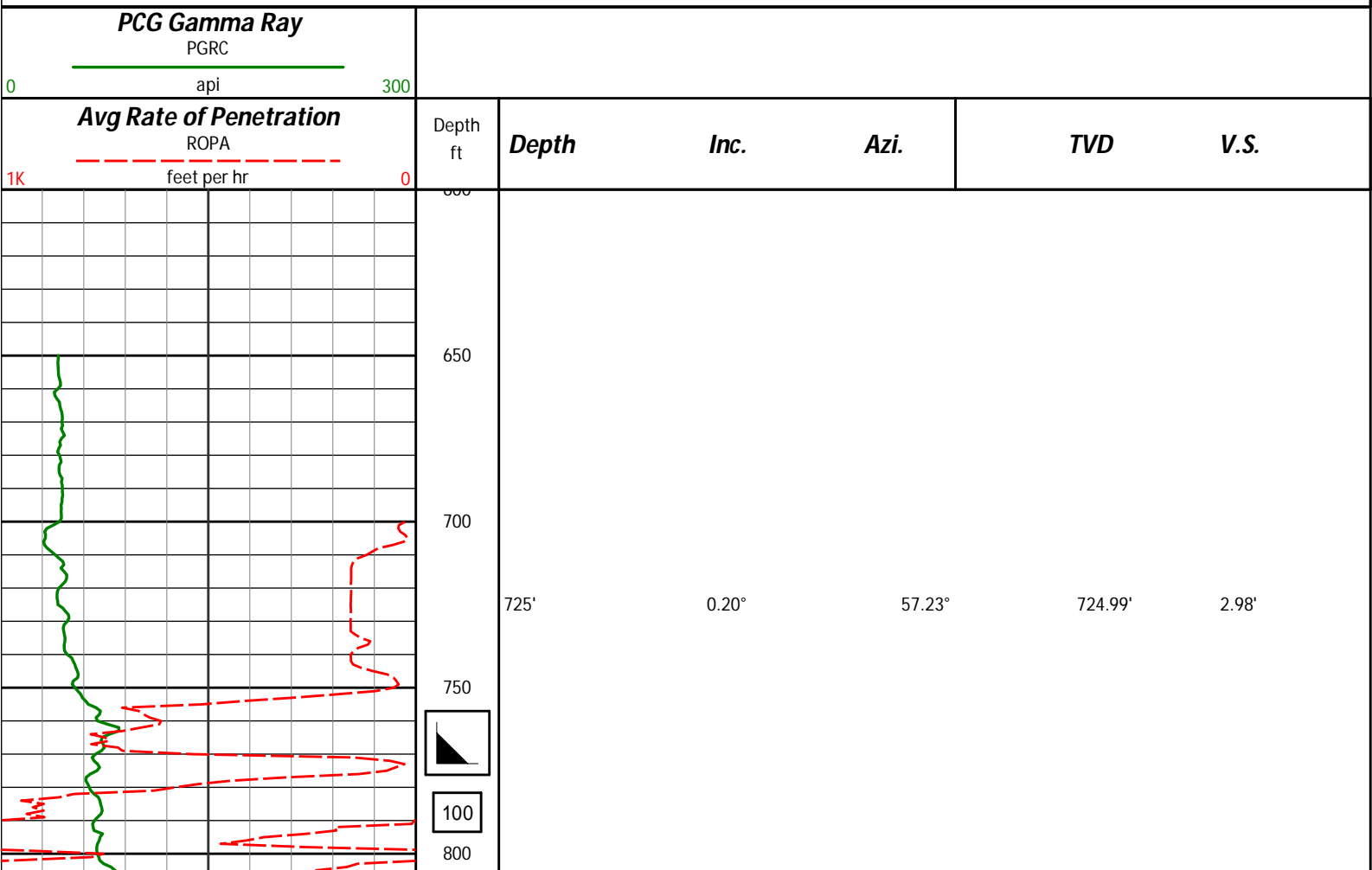
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES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

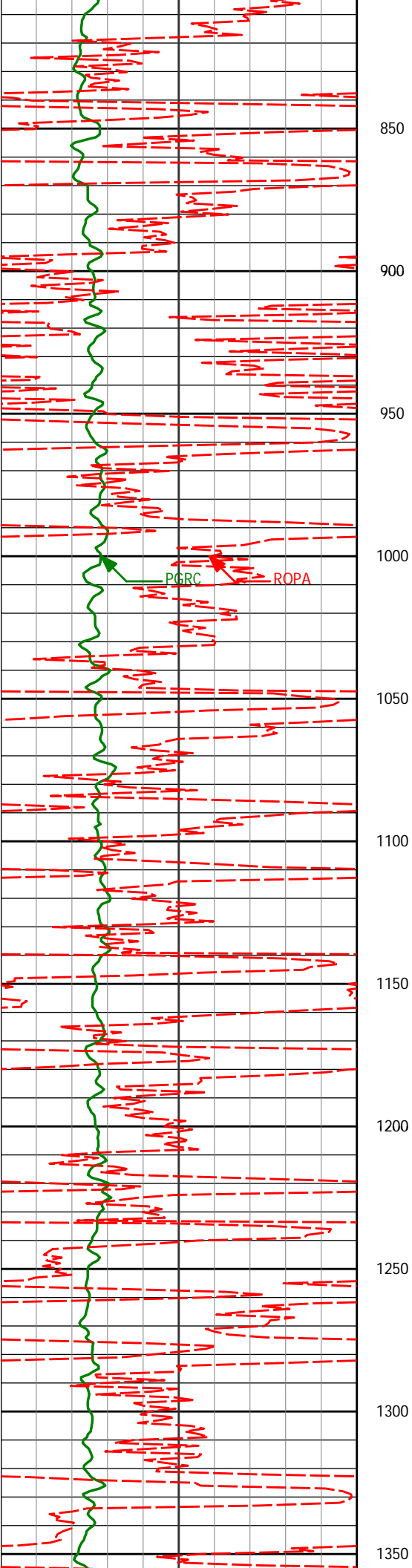
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Sperry Drilling Services

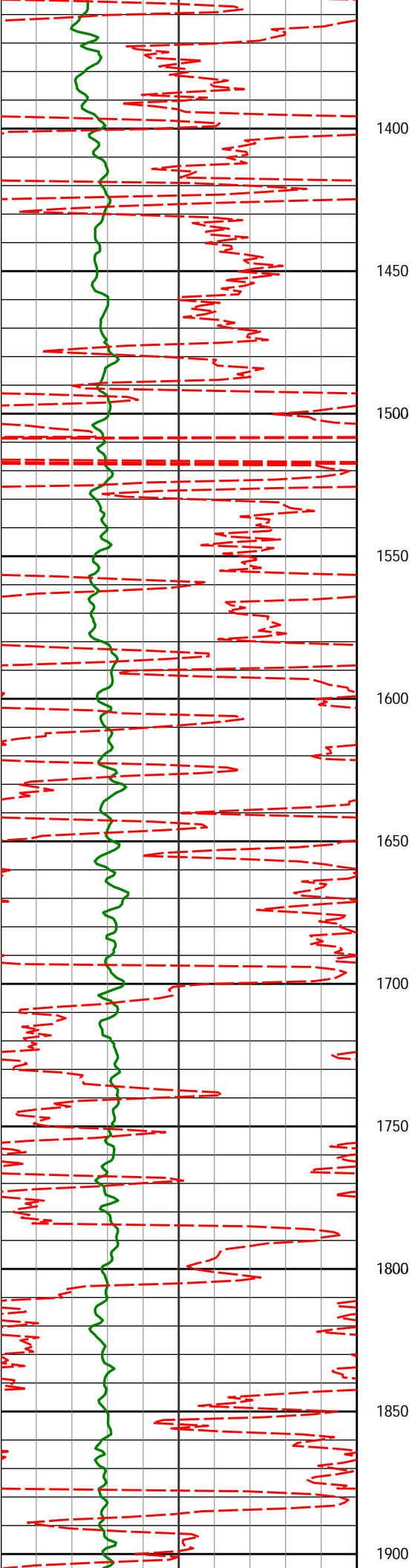
MD Correlation Log 1:600

Noble Energy
NCLP PC AA04-69-1HN
H&P 321
Sec. 4-T6N-R63W

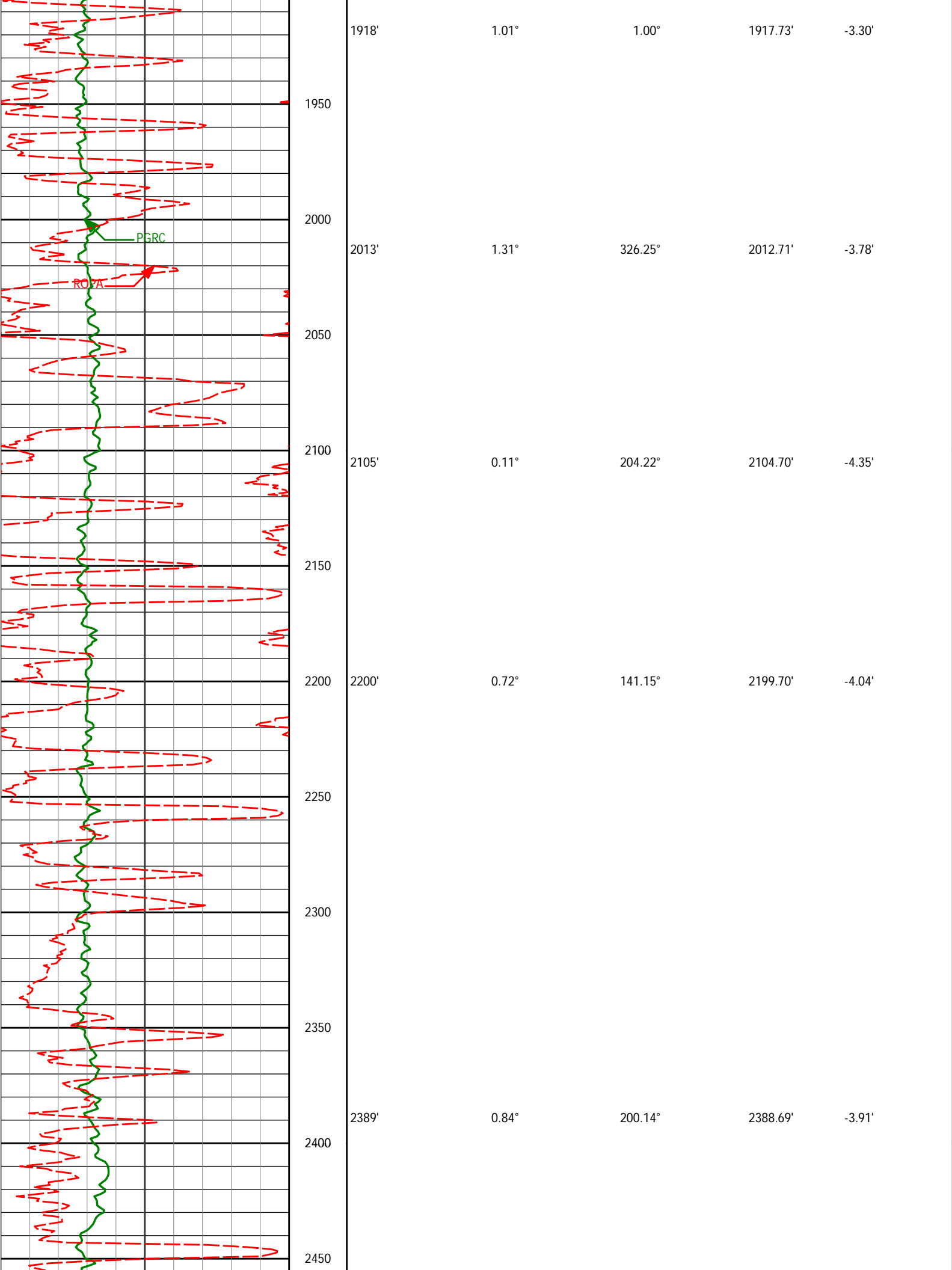


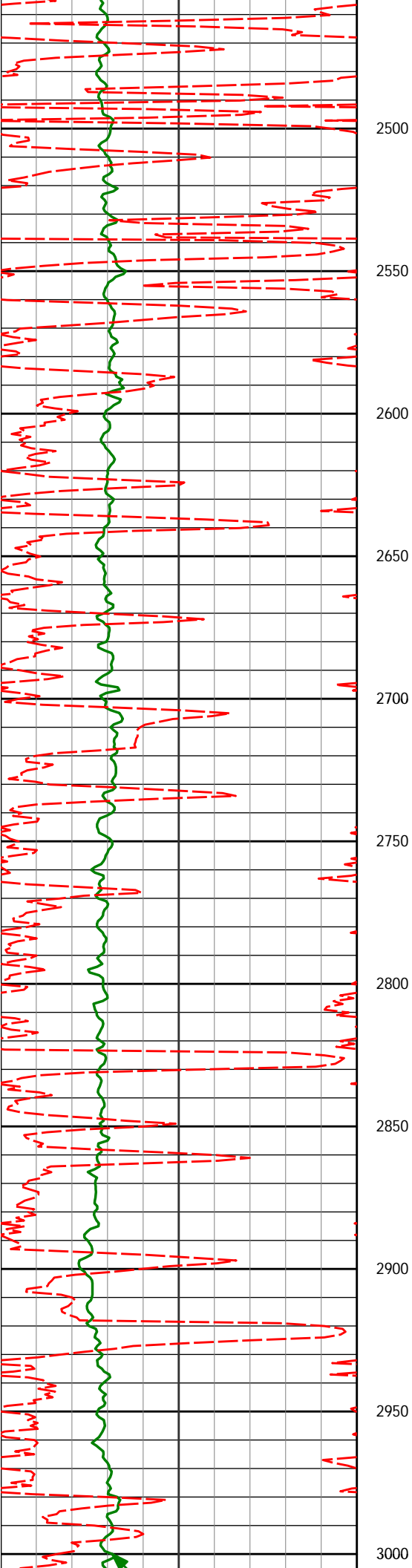


810'	0.85°	319.22°	809.98'	2.73'
902'	1.20°	326.92°	901.97'	1.84'
1086'	1.18°	352.26°	1085.93'	0.76'
1180'	1.08°	4.66°	1179.91'	0.81'

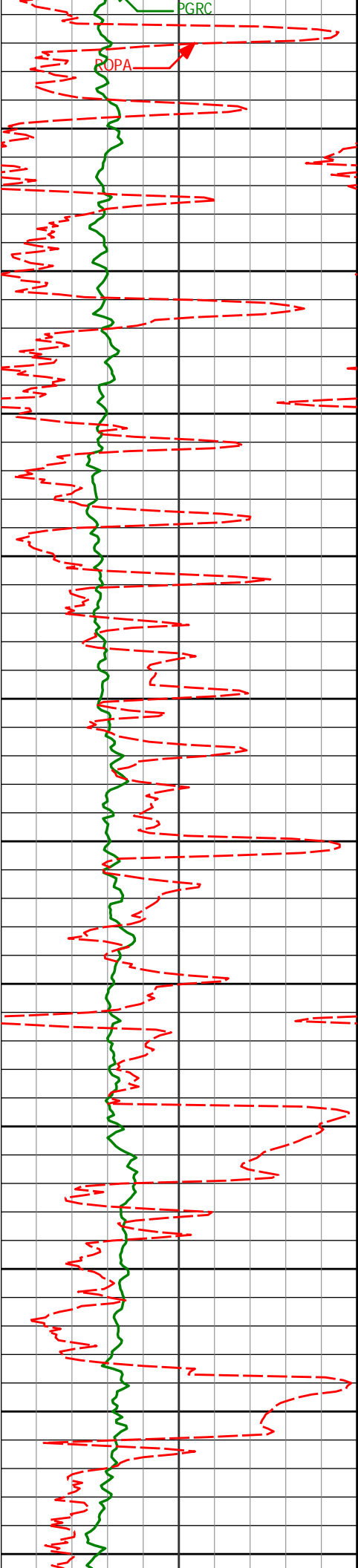


1364'	1.58°	353.10°	1363.86'	0.91'
1400				
1450				
1457'	1.21°	322.16°	1456.84'	0.29'
1500				
1550	1.05°	337.57°	1548.82'	-0.53'
1600				
1641'	1.57°	336.96°	1640.79'	-1.23'
1650				
1700				
1732'	1.55°	313.67°	1731.76'	-2.48'
1750				
1800				
1825'	0.83°	355.18°	1824.74'	-3.35'
1850				
1900				





2485'	1.23°	215.77°	2484.67'	-4.85'
2500				
2550				
2600				
2650				
2674'	0.77°	265.27°	2673.65'	-7.41'
2700				
2750				
2769'	0.68°	268.70°	2768.64'	-8.61'
2800				
2850				
2864'	0.84°	261.65°	2863.63'	-9.86'
2900				
2950				
2959'	1.11°	256.23°	2958.62'	-11.46'
3000				



3050

3100

3150

3200

3250

3300

3350

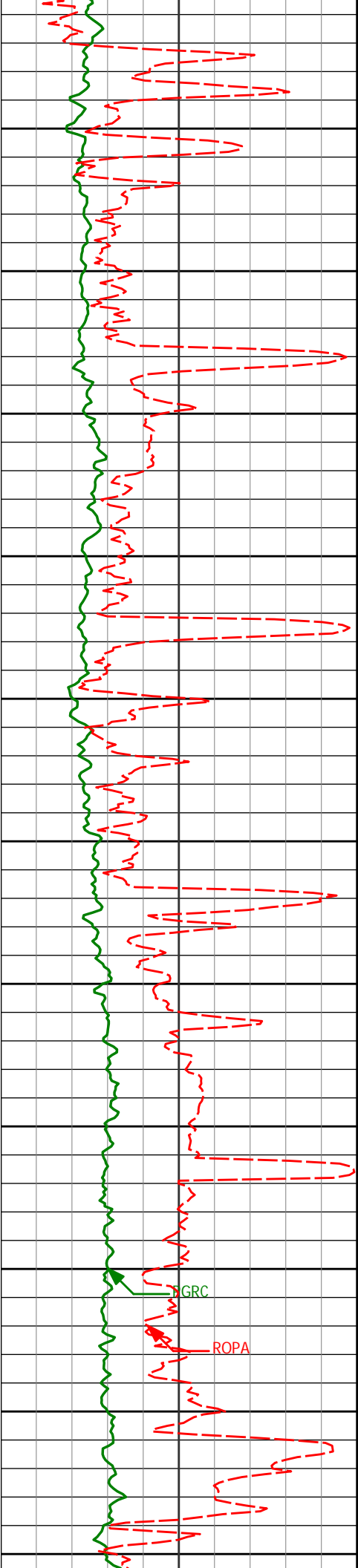
3400

3450

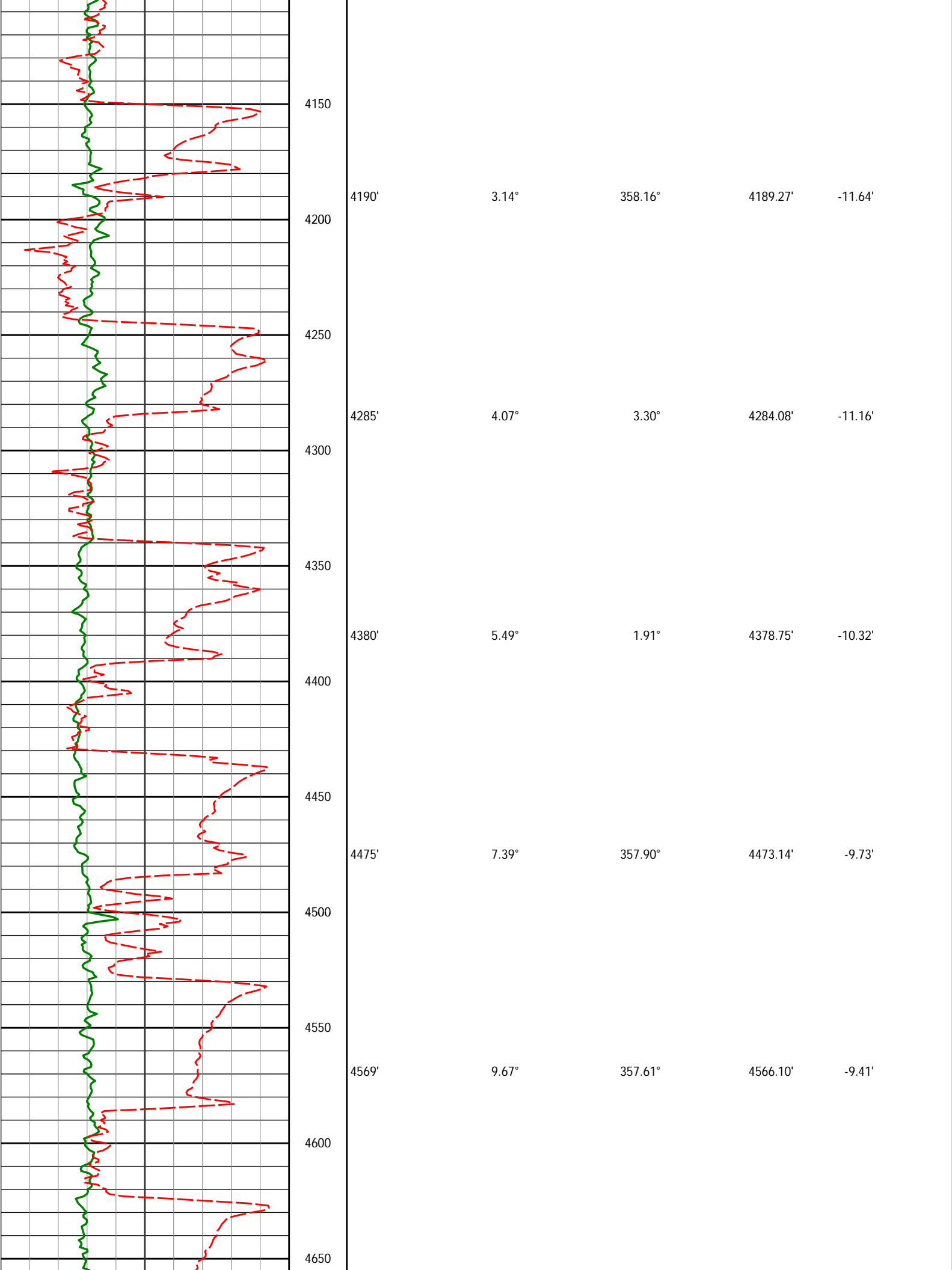
3500

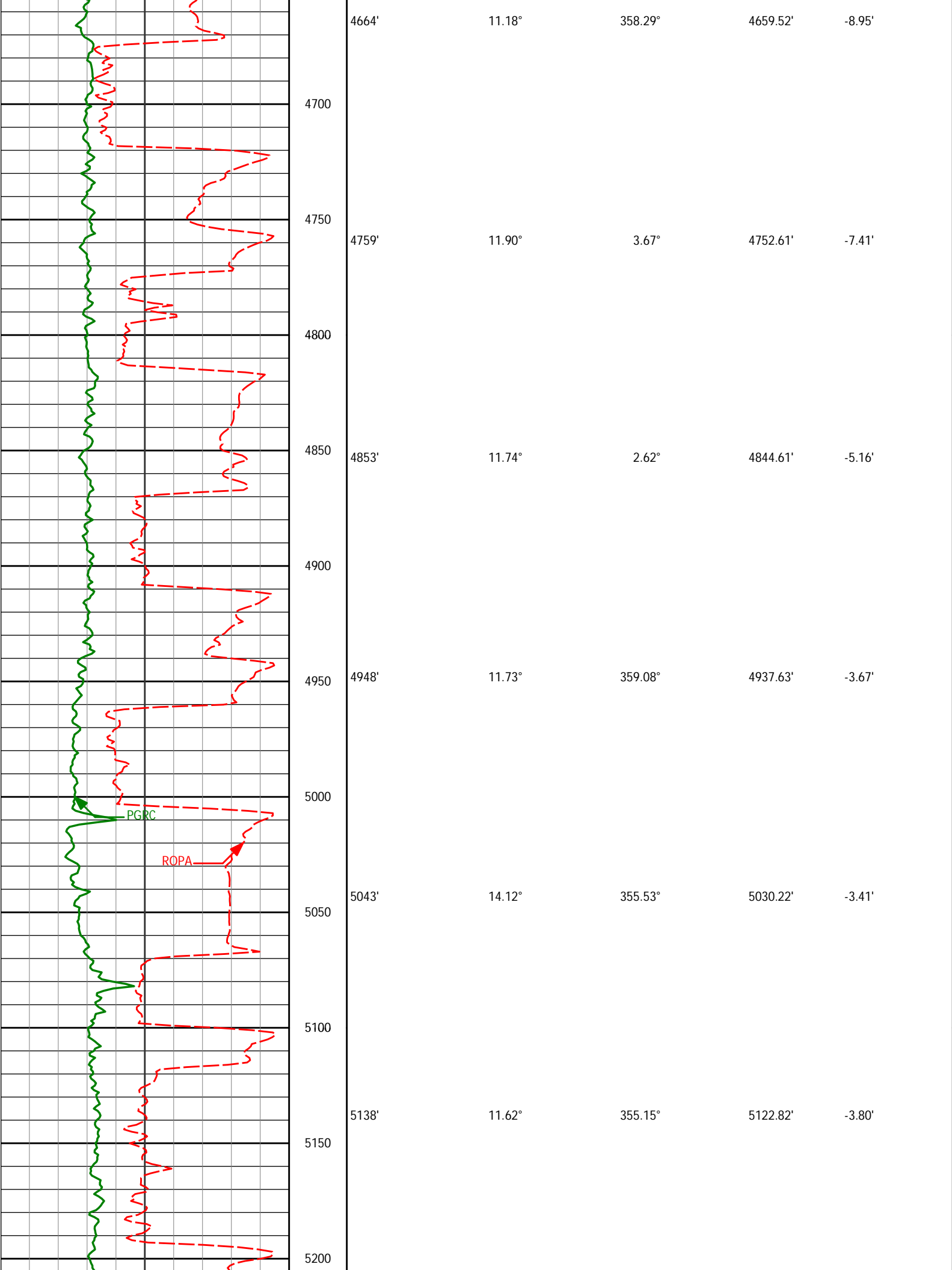
3550

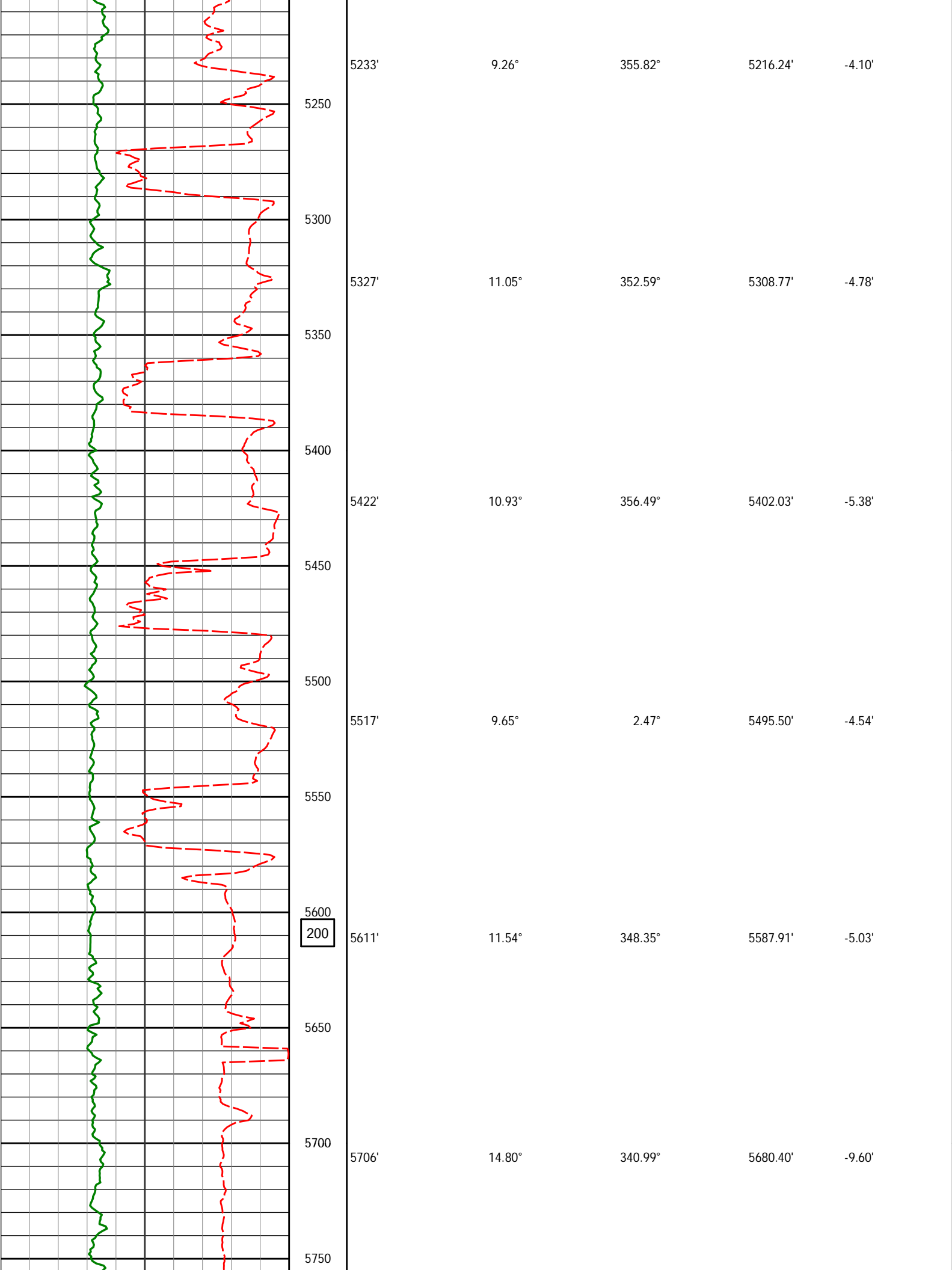
3148'	1.10°	215.54°	3147.58'	-14.41'
3243'	1.77°	221.33°	3242.55'	-16.02'
3338'	2.35°	207.19°	3337.49'	-18.05'
3433'	0.96°	256.29°	3432.45'	-19.83'
3527'	0.47°	51.08°	3526.45'	-20.29'

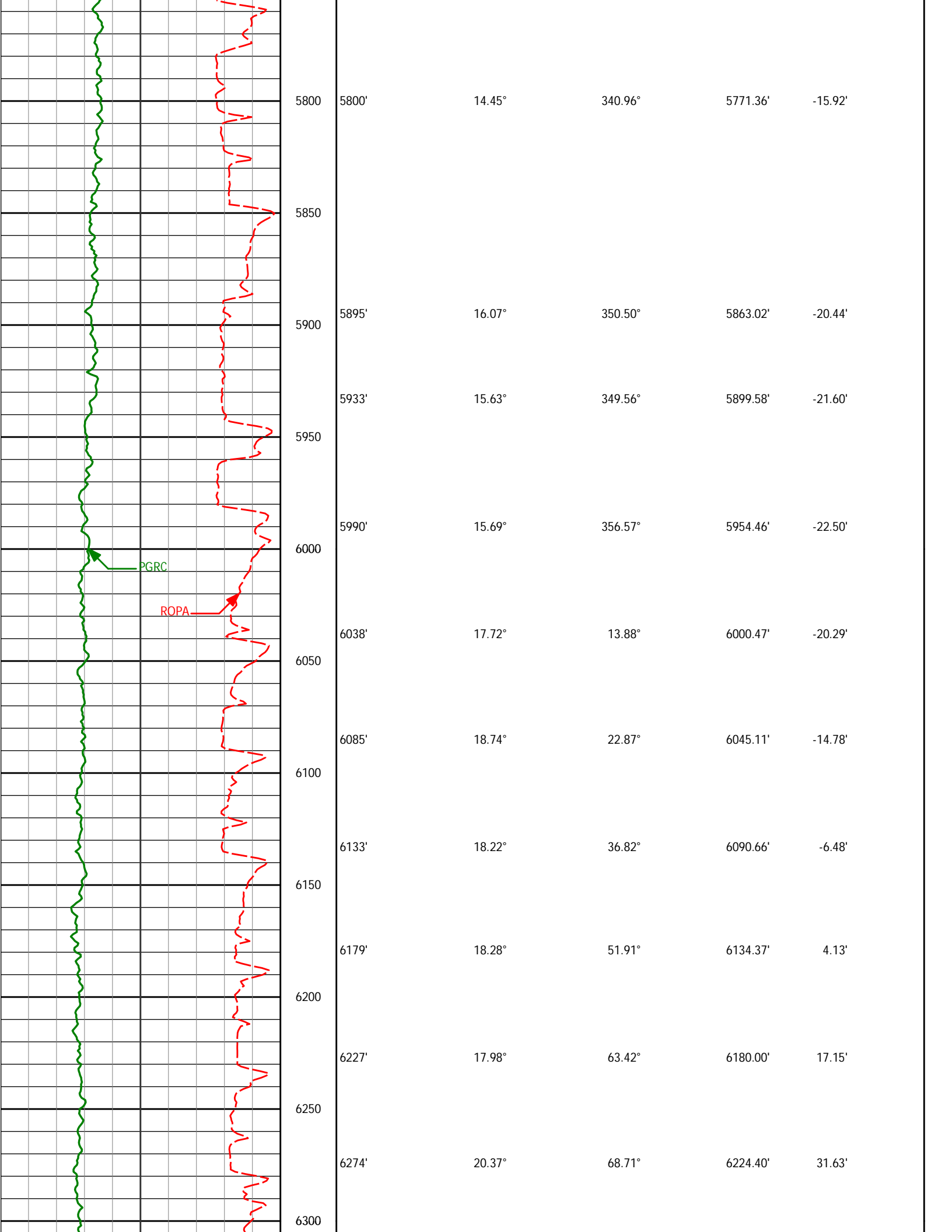


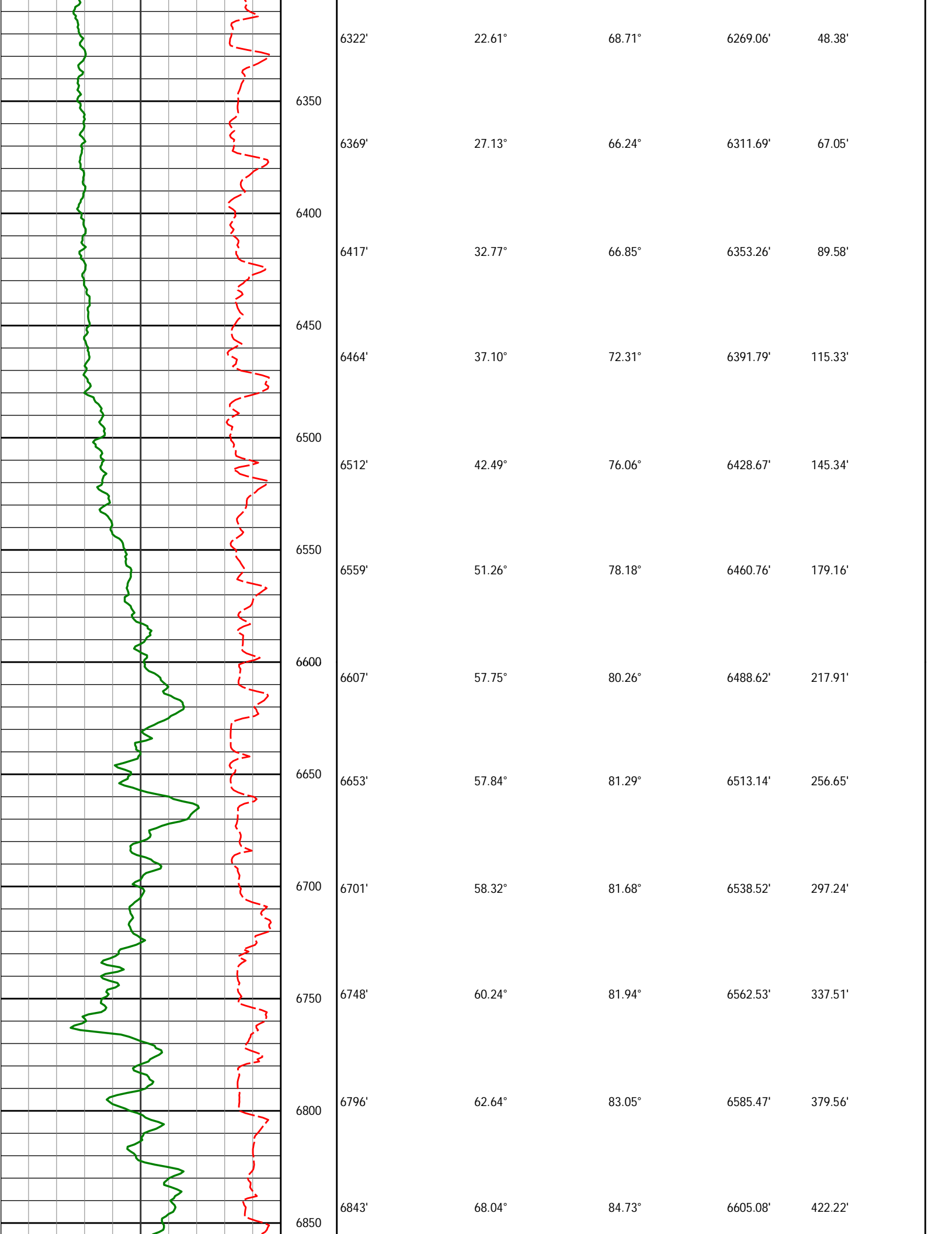
3600				
3622'	0.50°	82.38°	3621.45'	-19.56'
3650				
3700				
3717'	1.10°	81.39°	3716.44'	-18.24'
3750				
3800				
3811'	1.18°	85.23°	3810.42'	-16.37'
3850				
3900				
3906'	0.96°	74.22°	3905.40'	-14.62'
3950				
4000				
4001'	0.56°	74.32°	4000.39'	-13.39'
4050				
4095'	2.14°	16.67°	4094.37'	-12.33'
4100				

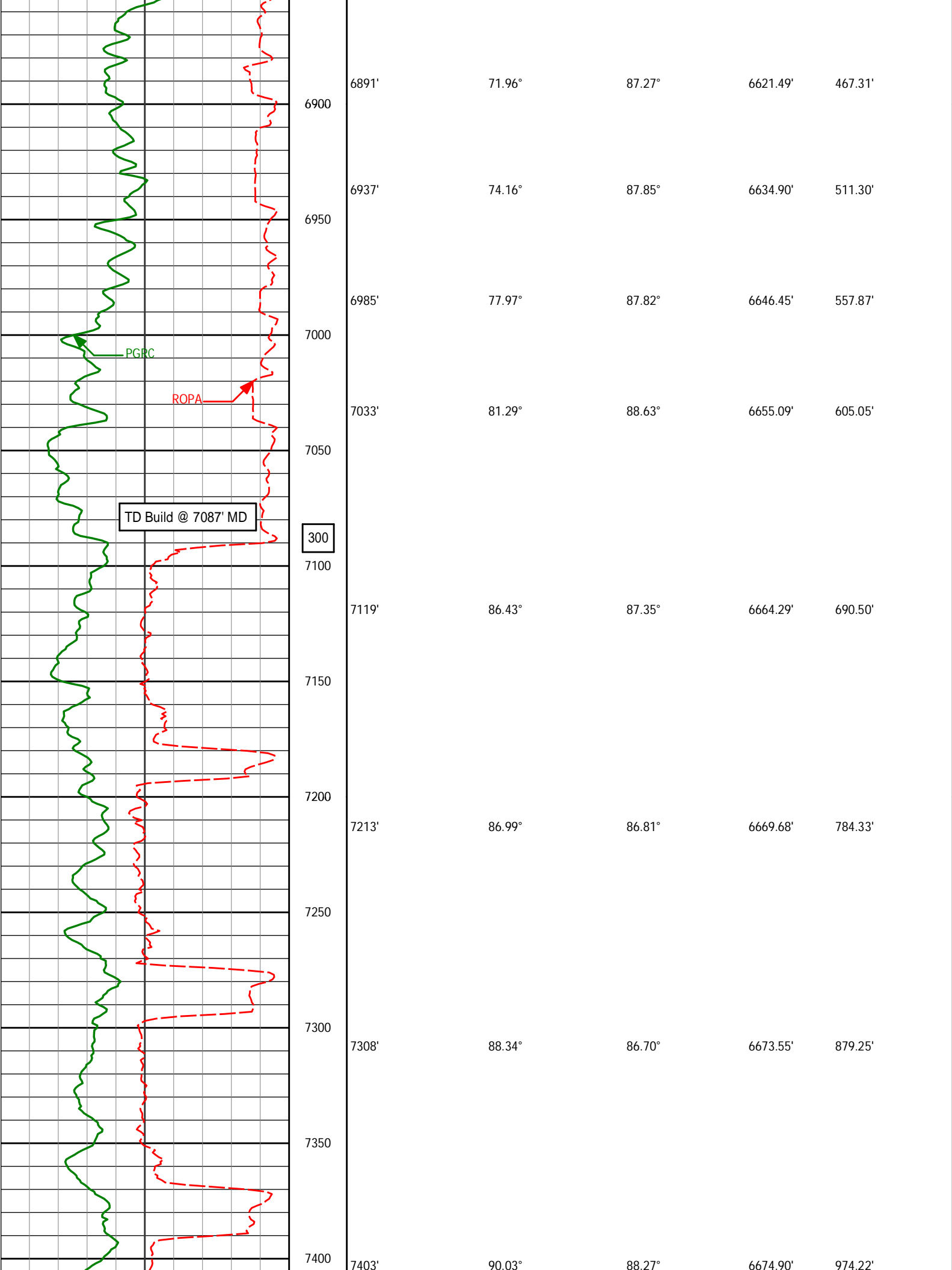


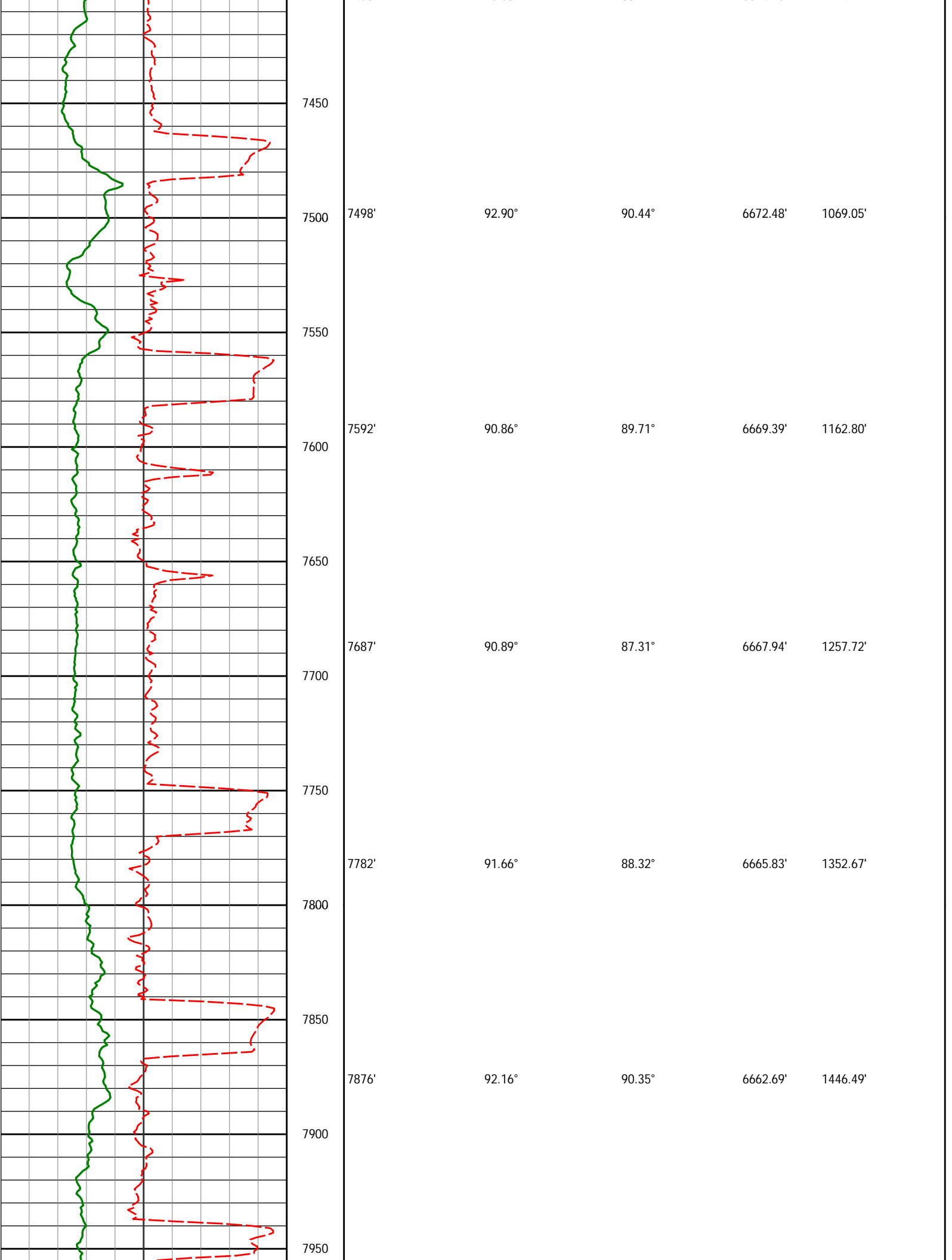


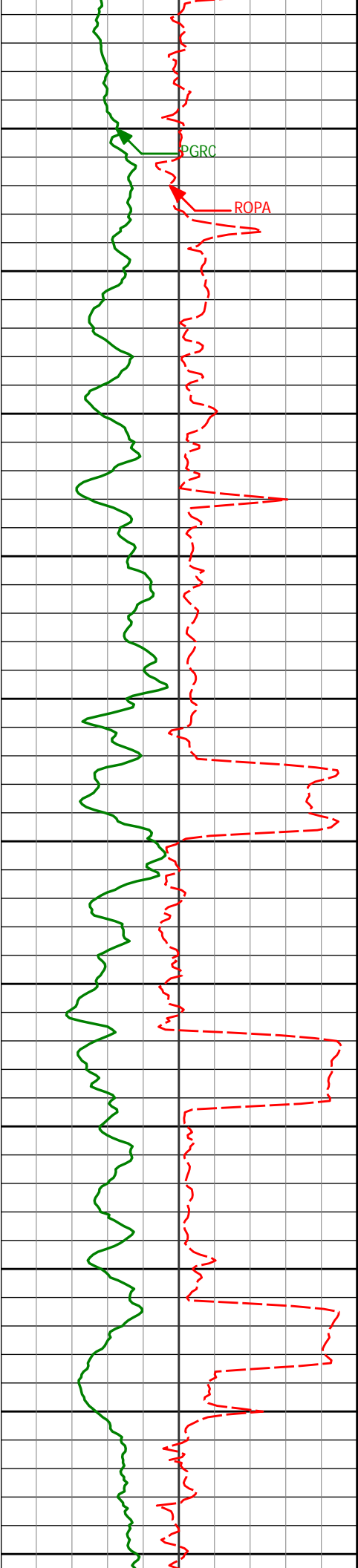




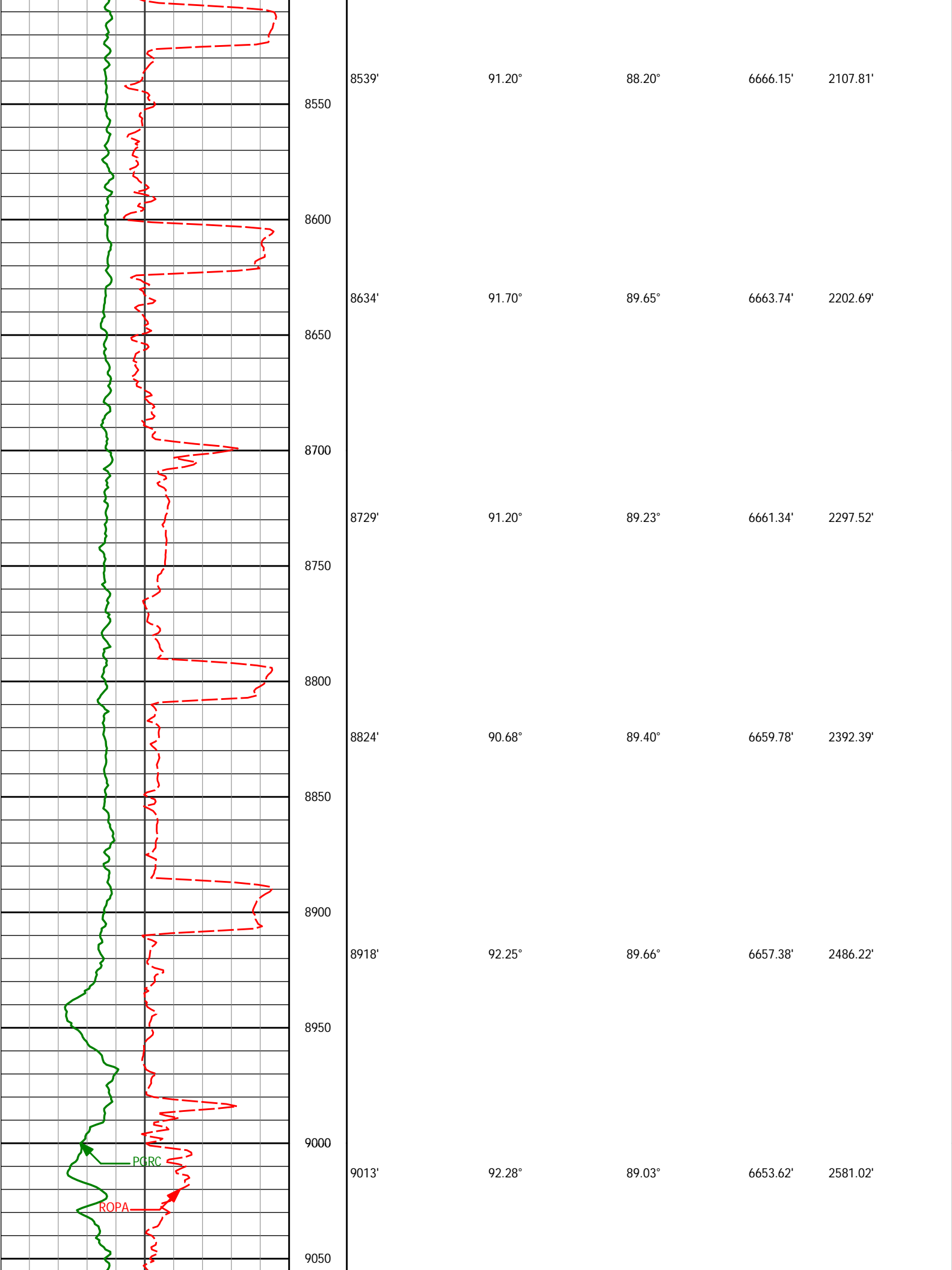


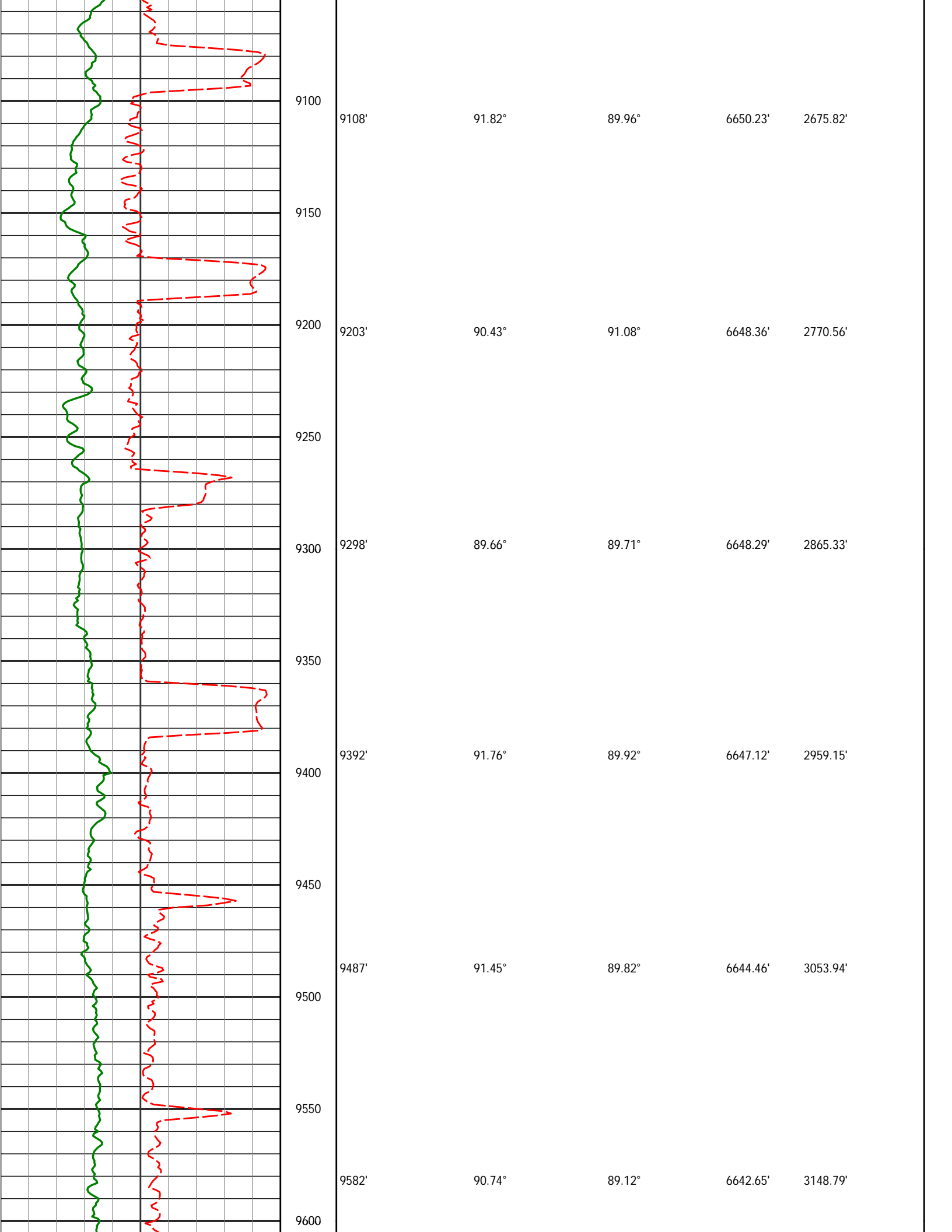


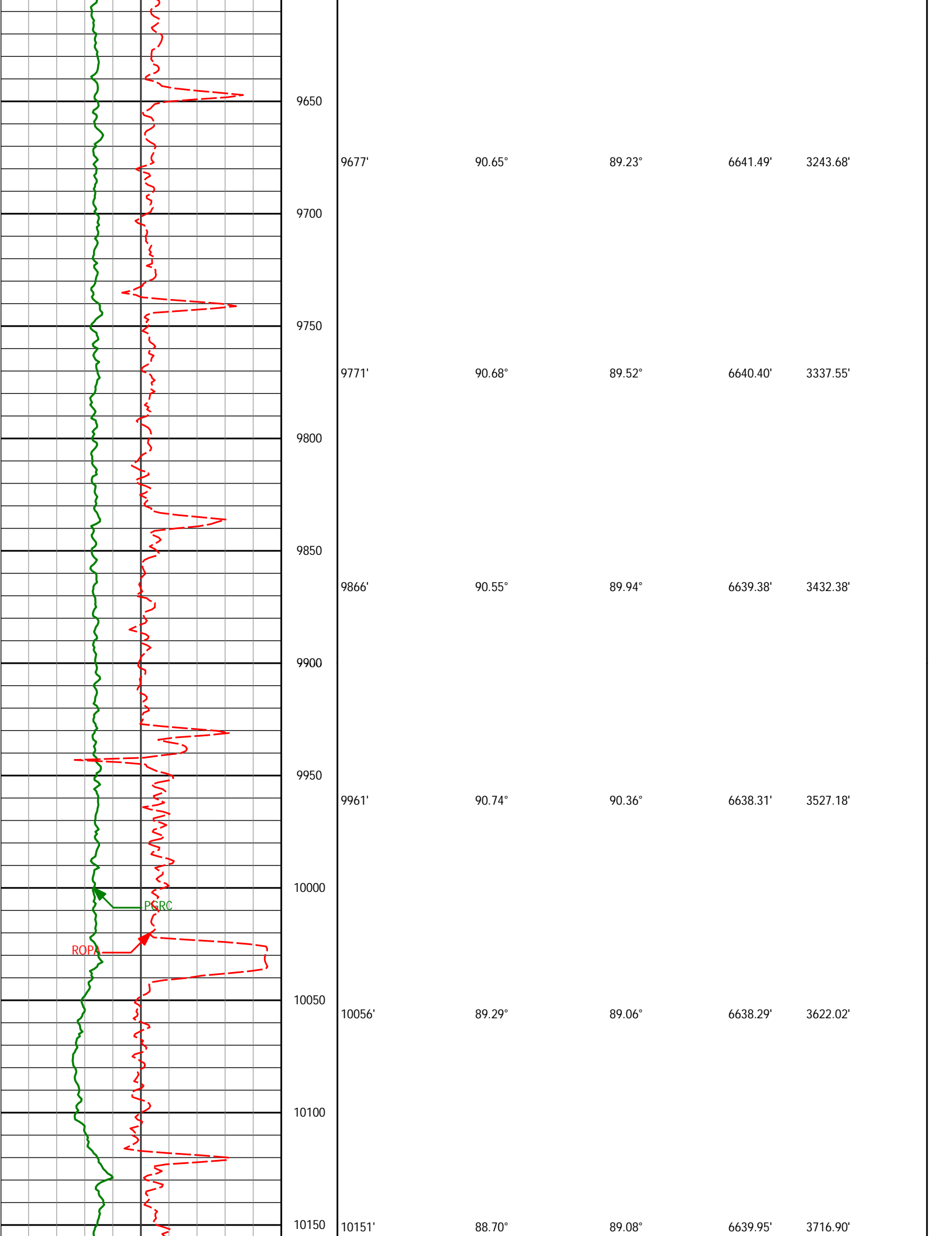


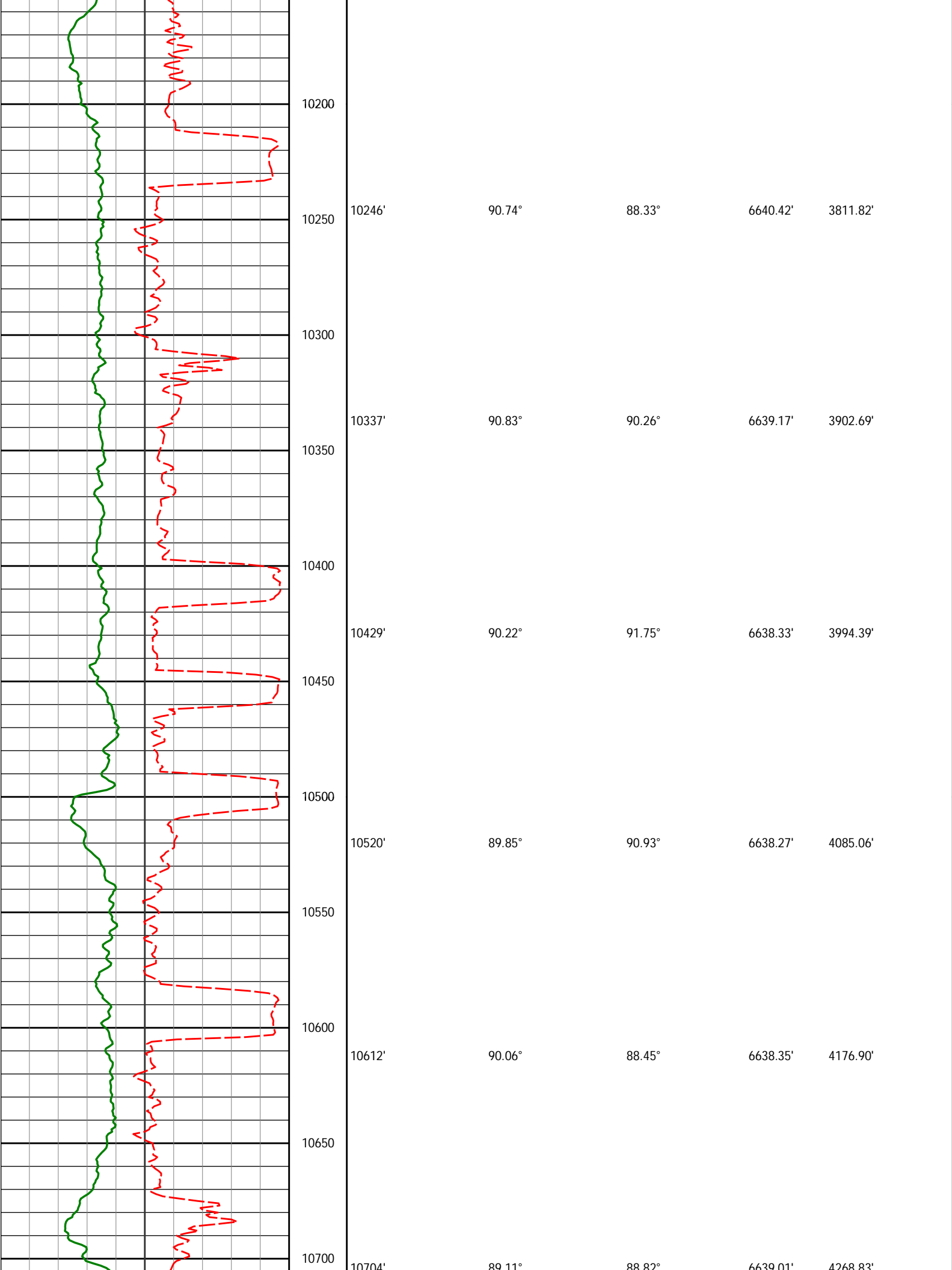


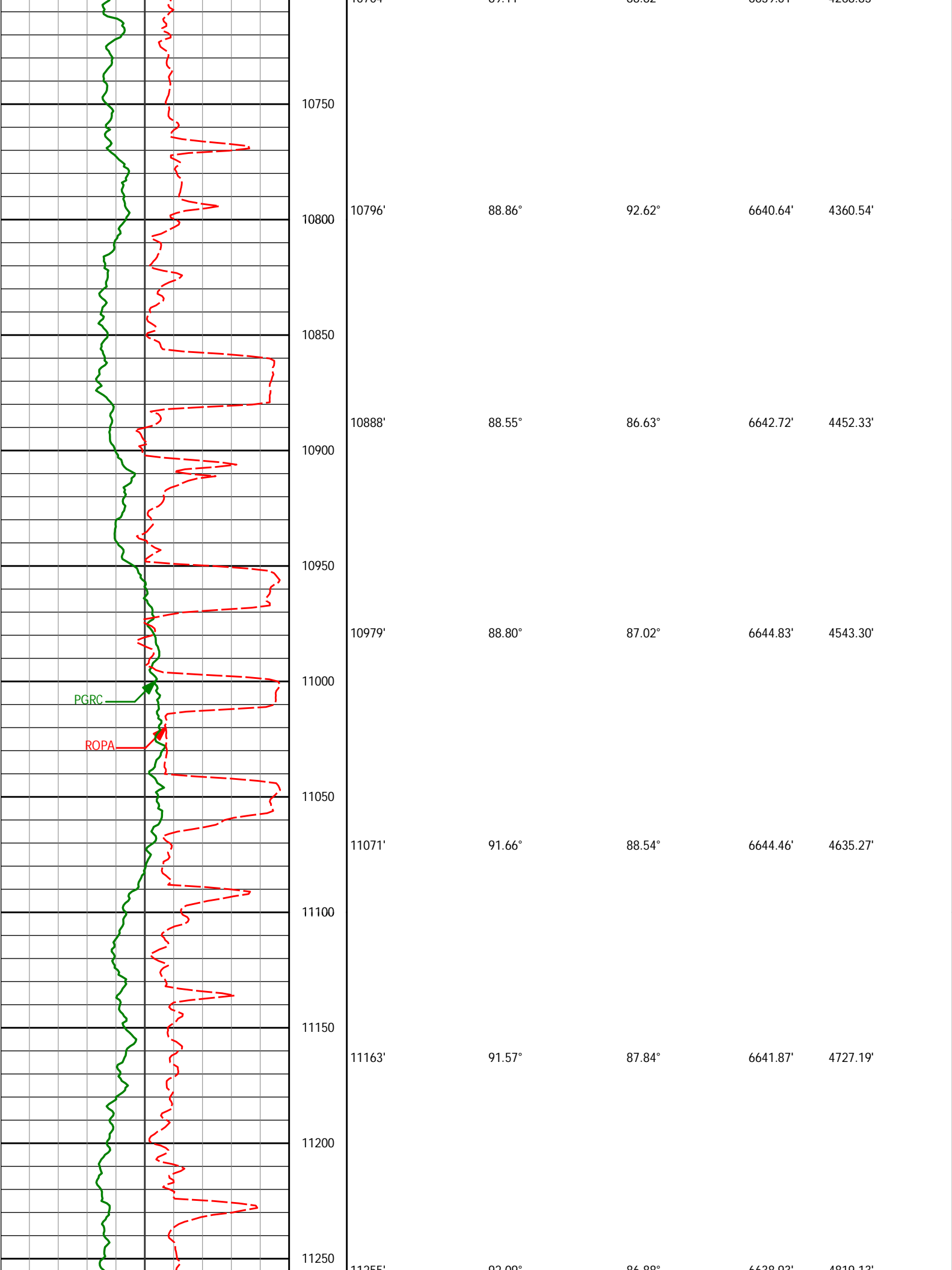
7971'	91.11°	91.50°	6659.98'	1541.16'	
8000					
8050					
8066'	90.34°	91.00°	6658.78'	1635.81'	
8100					
8150					
8160'	88.37°	91.52°	6659.84'	1729.47'	
8200					
8250	8255'	87.78°	89.56°	6663.03'	1824.17'
8300					
8350	8349'	88.64°	88.74°	6665.97'	1918.01'
8400					
8450	8444'	89.97°	89.43°	6667.12'	2012.90'
8500					

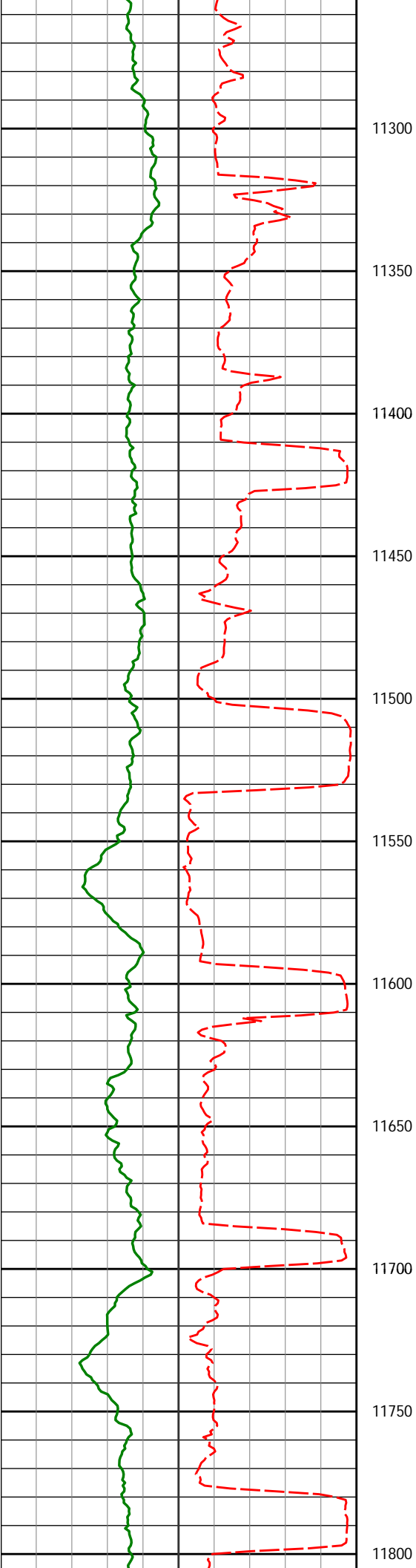




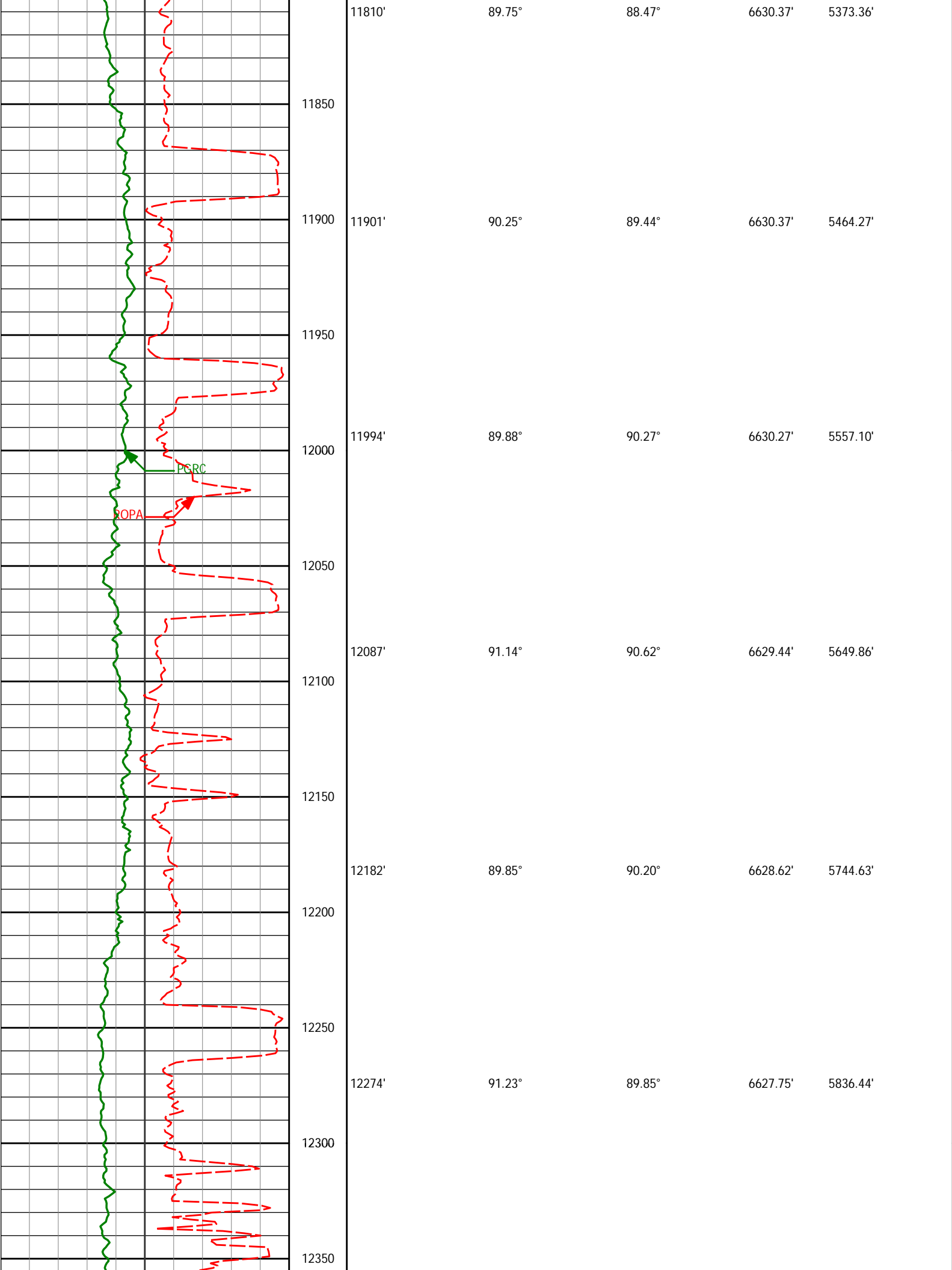


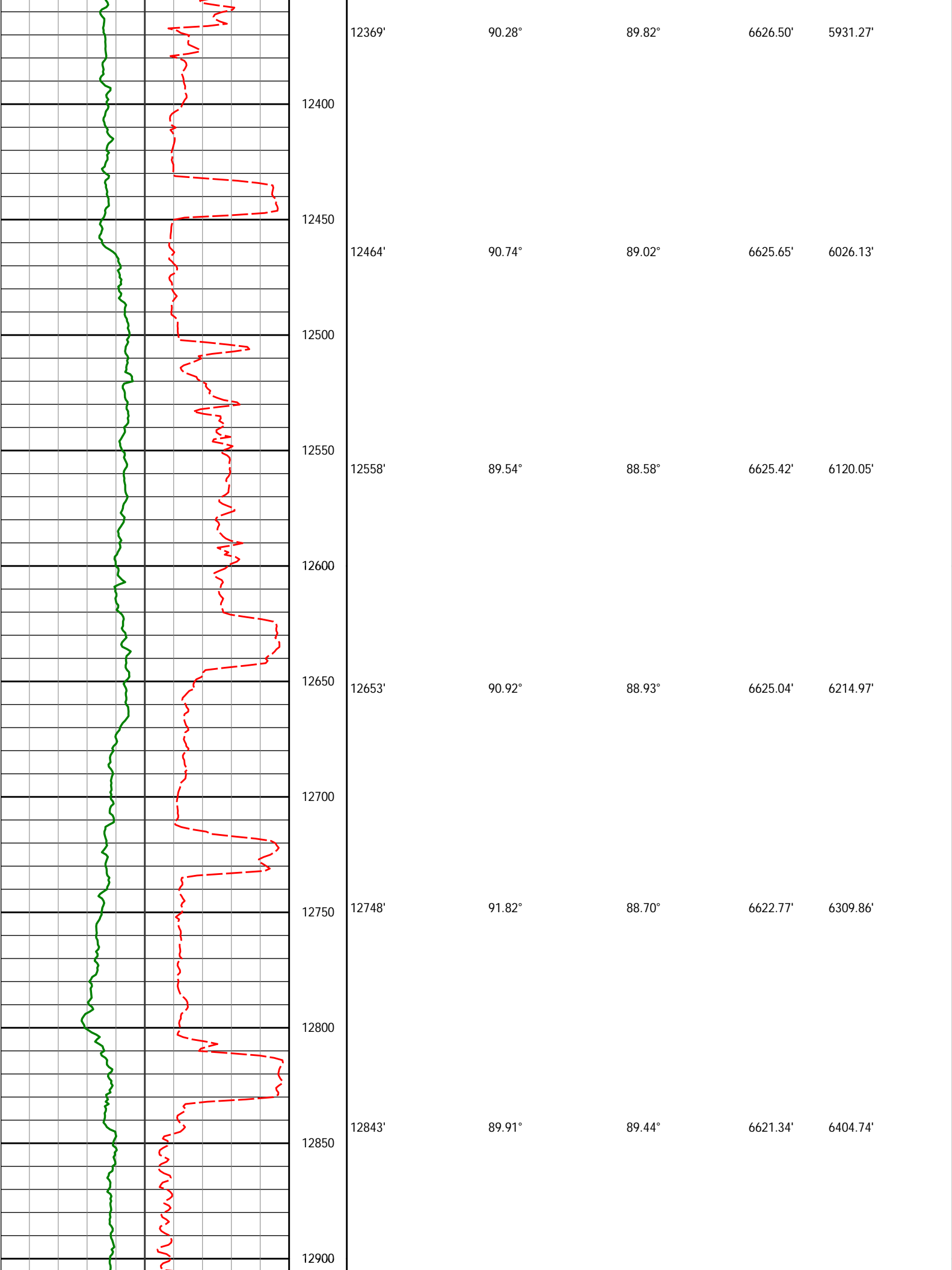


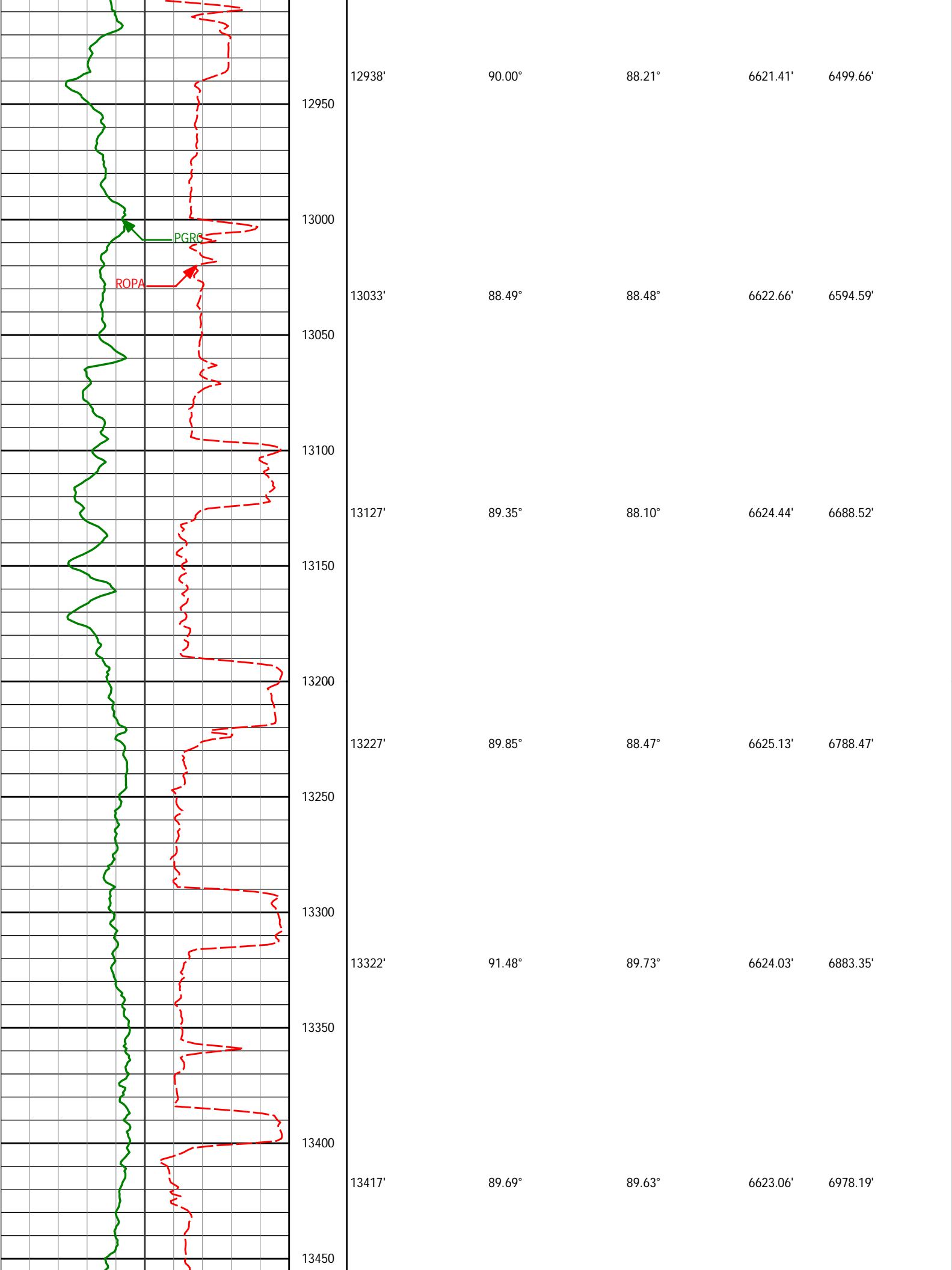


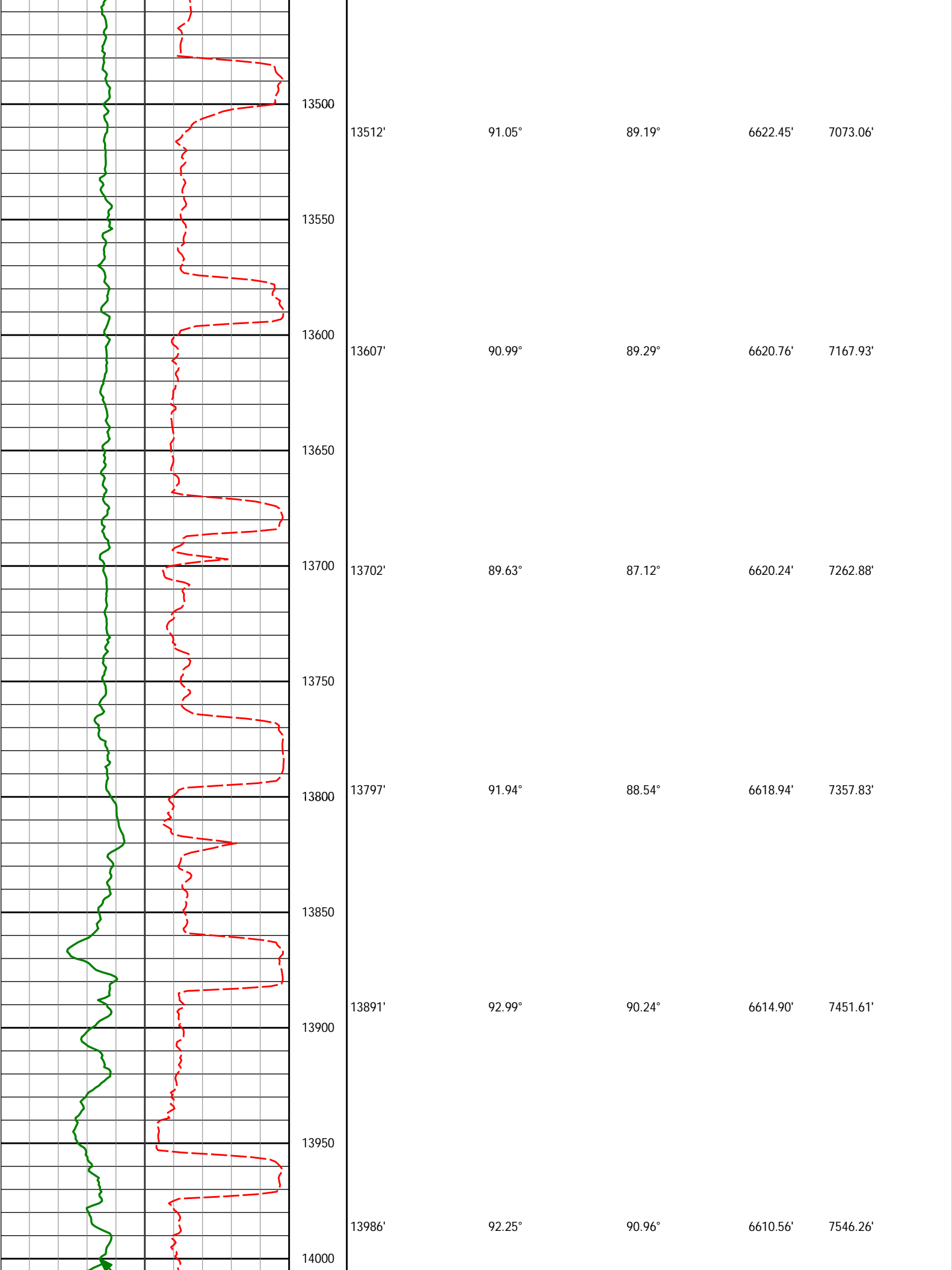


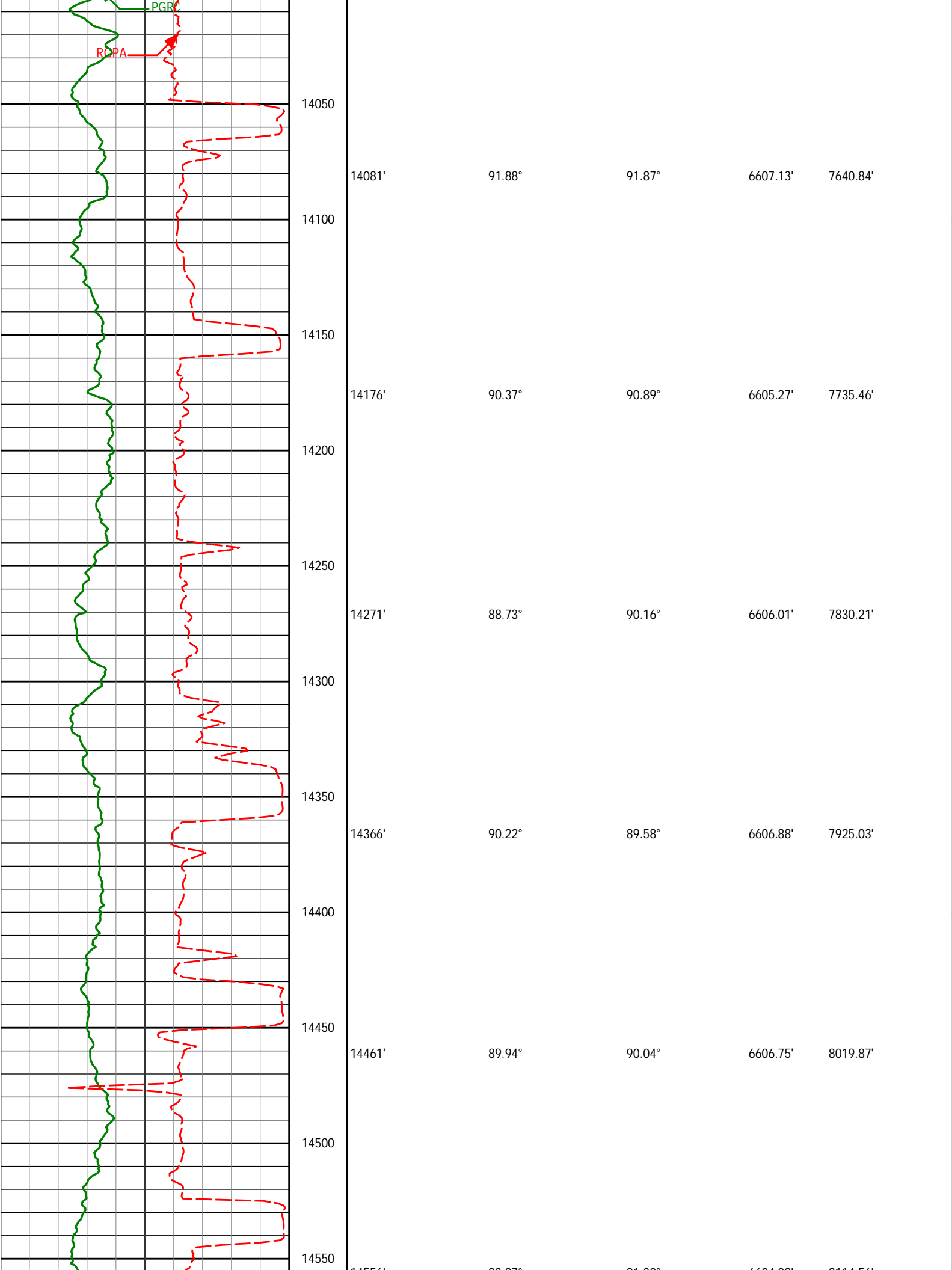
11255	92.09°	86.88°	6636.93'	4819.13'
11300				
11349'	91.98°	86.61°	6635.59'	4913.06'
11350				
11400				
11441'	89.35°	86.44°	6634.52'	5005.05'
11450				
11500				
11533'	92.92°	90.06°	6632.70'	5096.96'
11550				
11600				
11626'	91.60°	90.90°	6629.03'	5189.65'
11650				
11700				
11718'	88.49°	89.20°	6628.96'	5281.45'
11750				
11800				

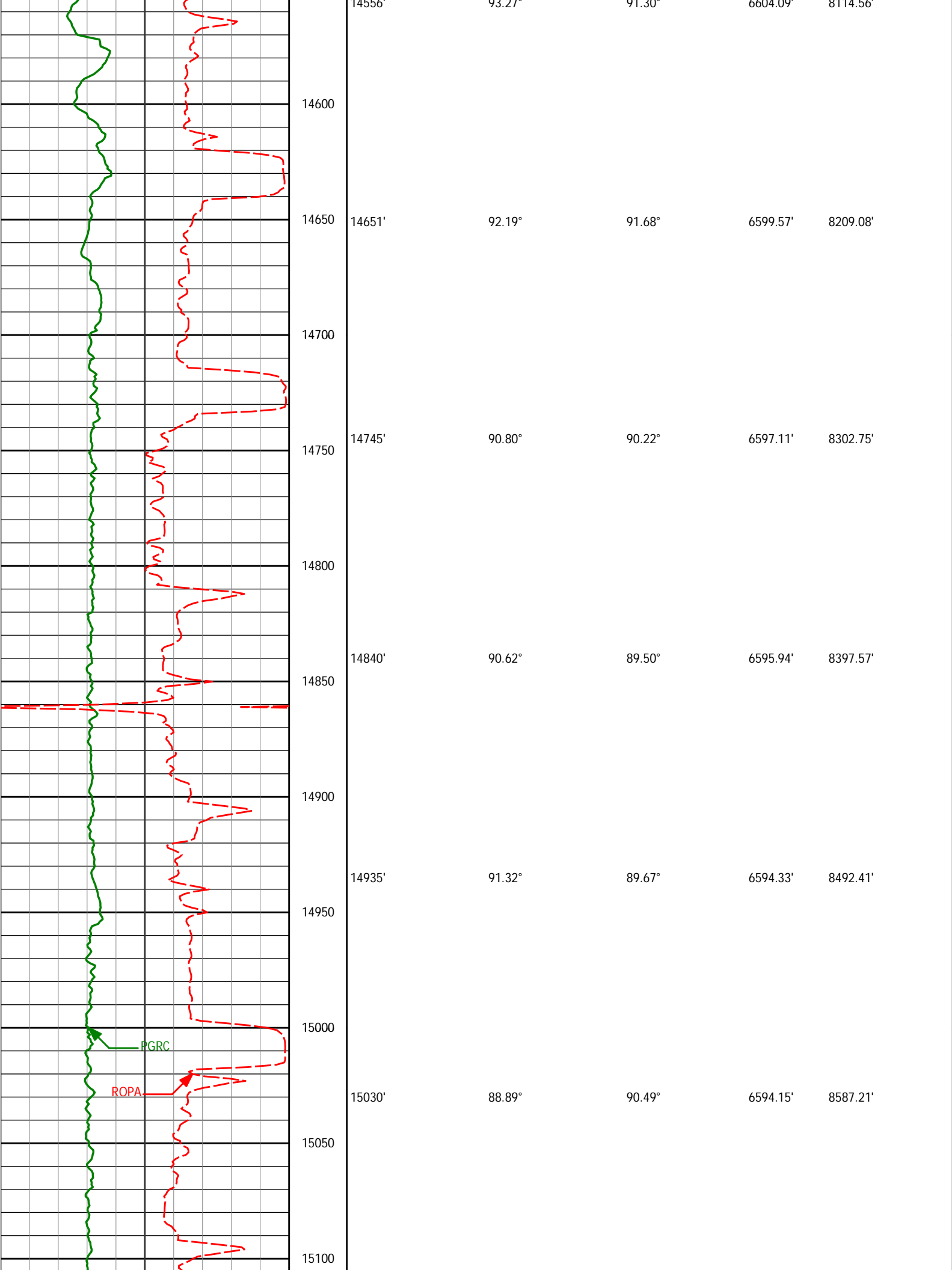


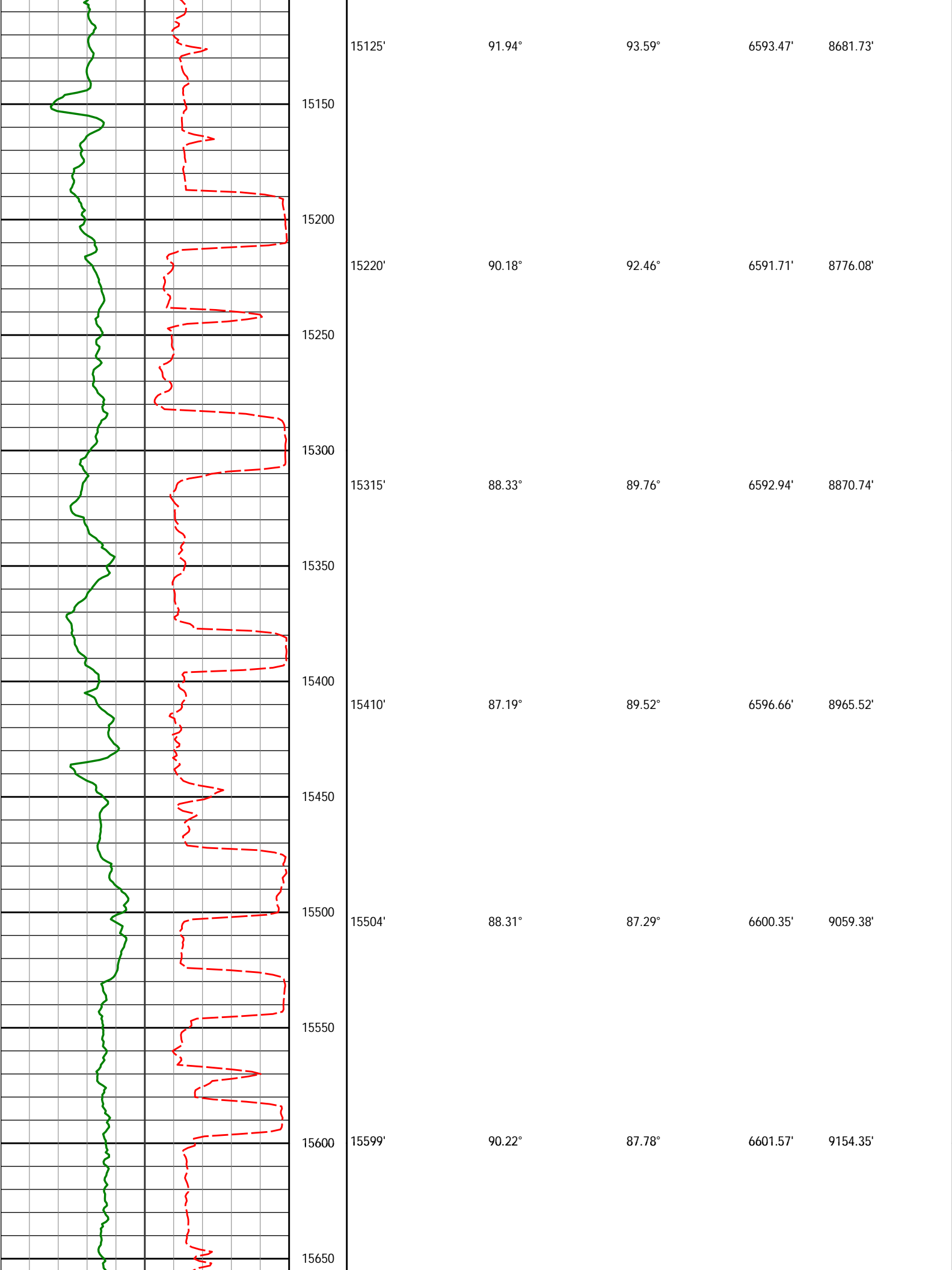


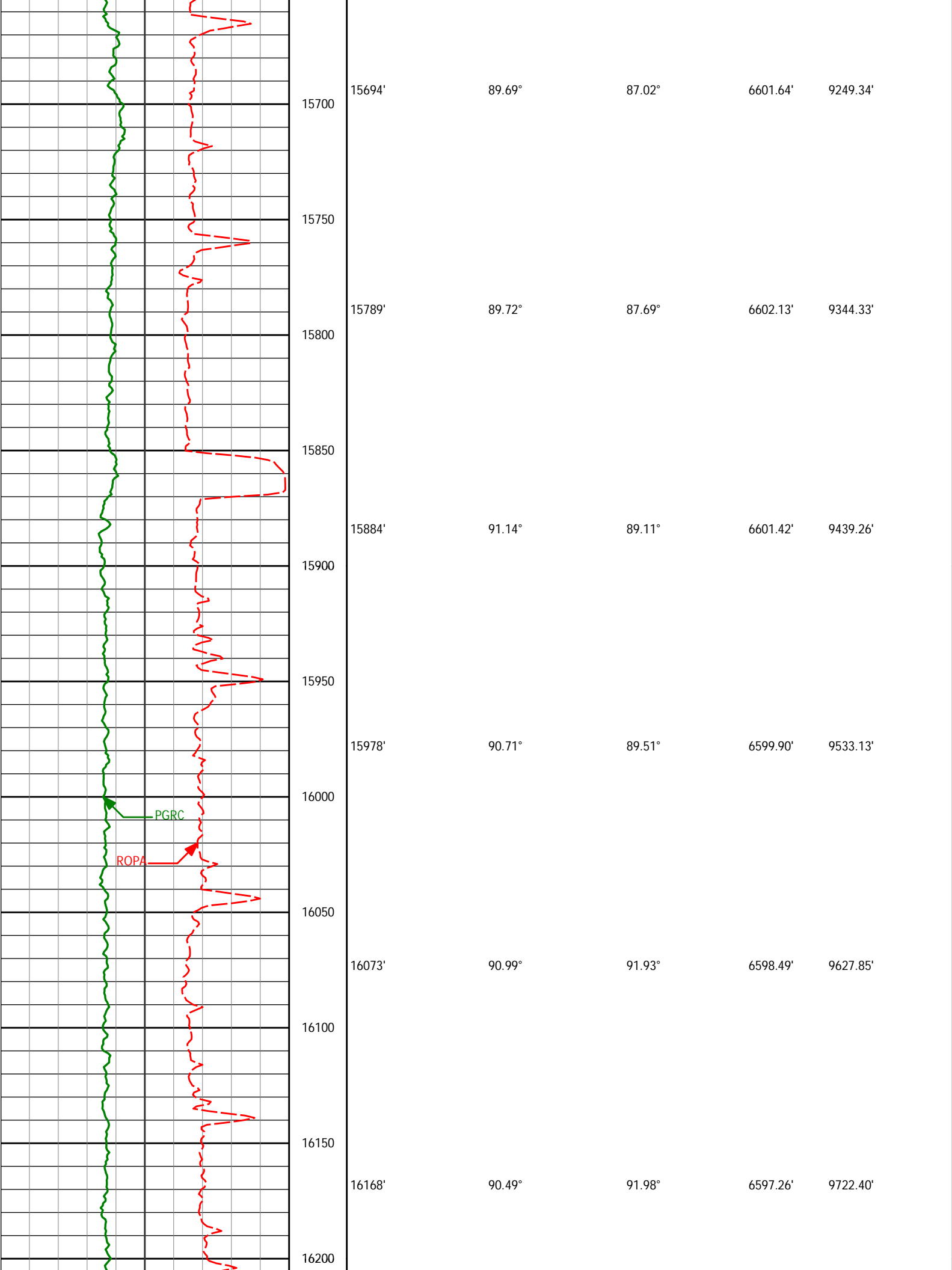


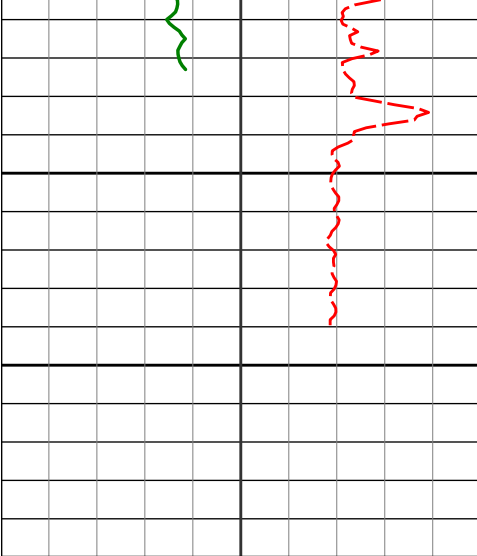










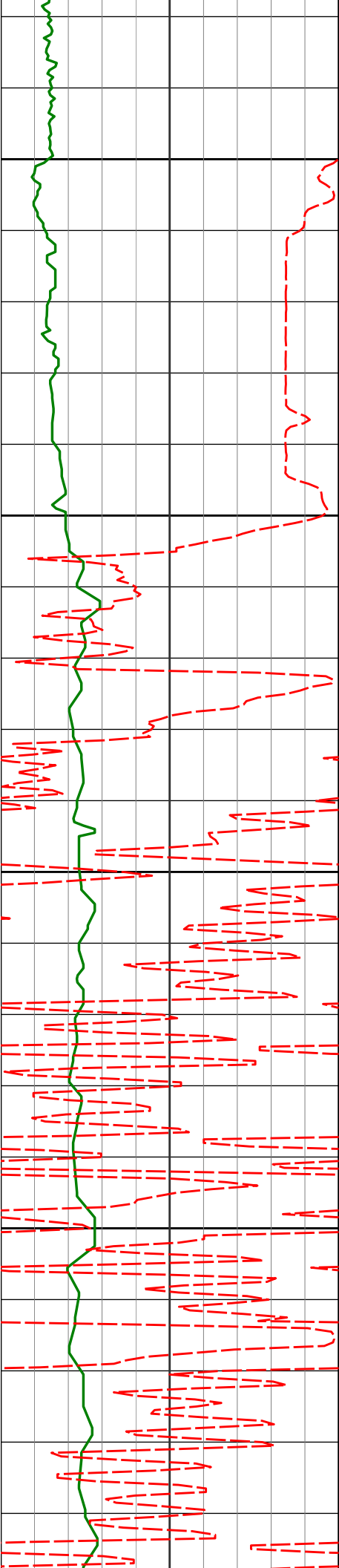


<div><div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div></div><div>1K0</div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div><div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div><div>0300</div></div>							

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy
NCLP PC AA04-69-1HN
H&P 321
Sec. 4-T6N-R63W

<div><div>PCG Gamma Ray</div><div>PGRC</div><div><div>0</div><div>api</div><div>300</div></div></div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
<div><div>Avg Rate of Penetration</div><div><div>ROPA</div><div>feet per hr</div></div><div><div>1K</div><div>0</div></div></div>										Depth ft	Depth	Inc.	Azi.	TVD		V.S.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		



100

700

750

800

850

725'

0.20°

57.23°

724.99'

2.98'

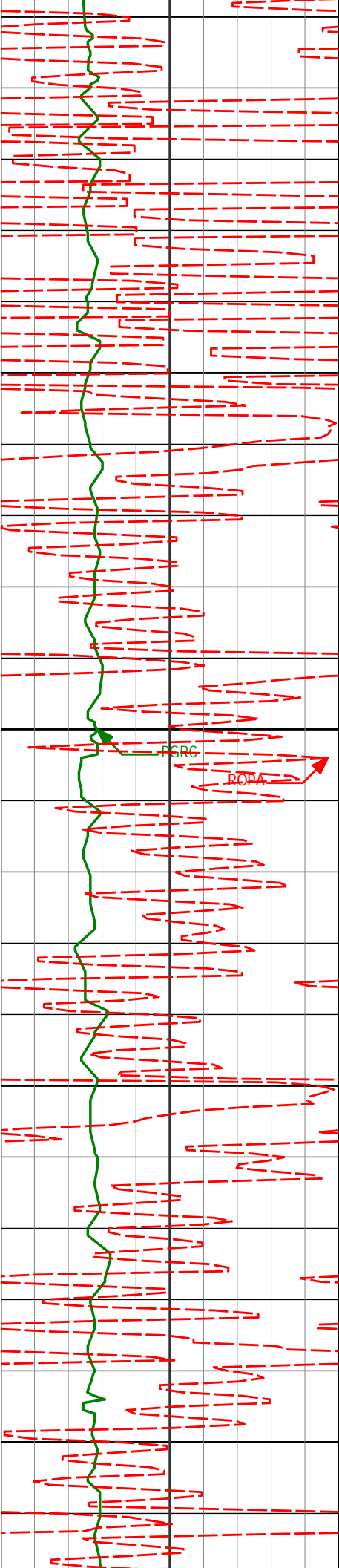
810'

0.85°

319.22°

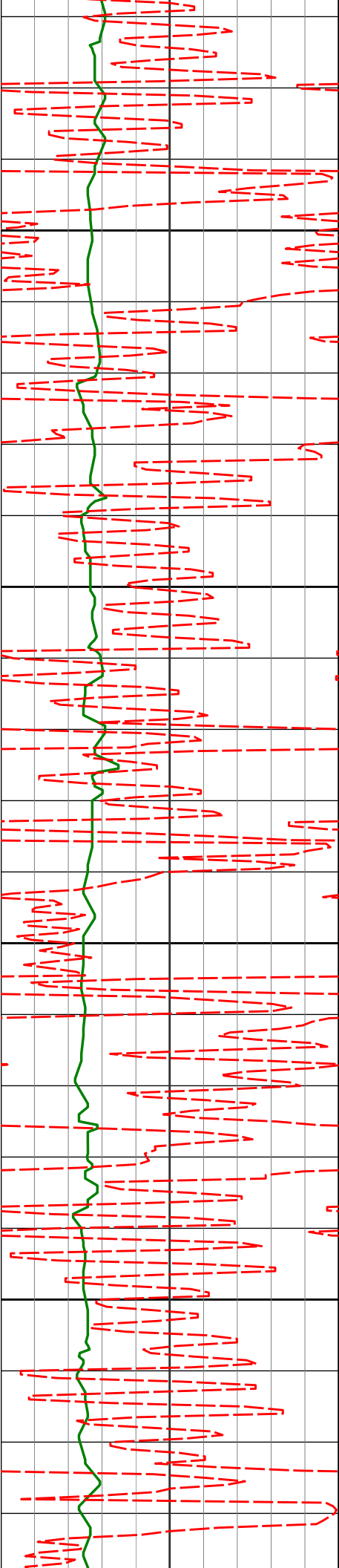
809.98'

2.73'



900
950
1000
1050
1100

902'	1.20°	326.92°	901.97'	1.84'
1086'	1.18°	352.26°	1085.93'	0.76'



1150

1180'

1.08°

4.66°

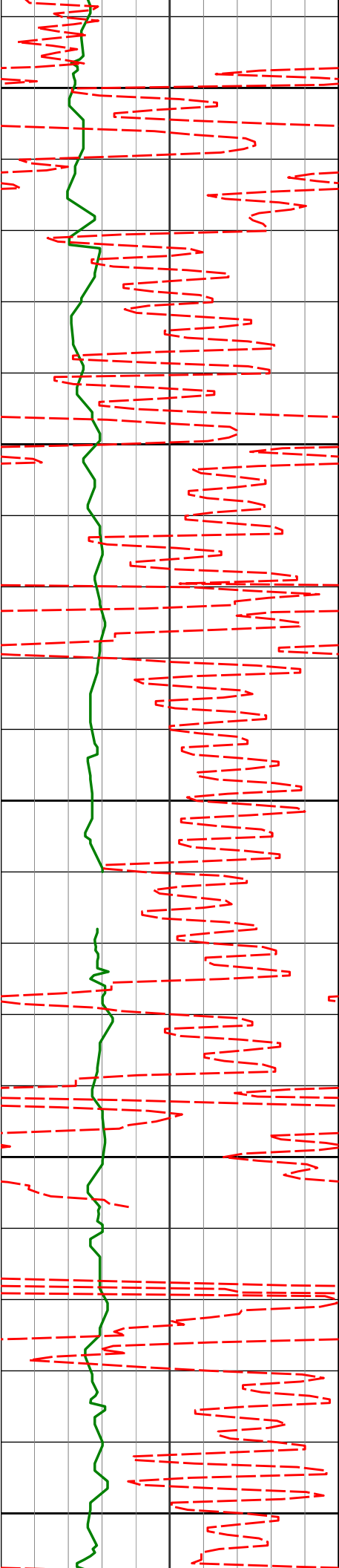
1179.91'

0.81'

1200

1250

1300



1350

1364'

1.58°

353.10°

1363.86'

0.91'

1400

1450

1457'

1.21°

322.16°

1456.84'

0.29'

1500

1550

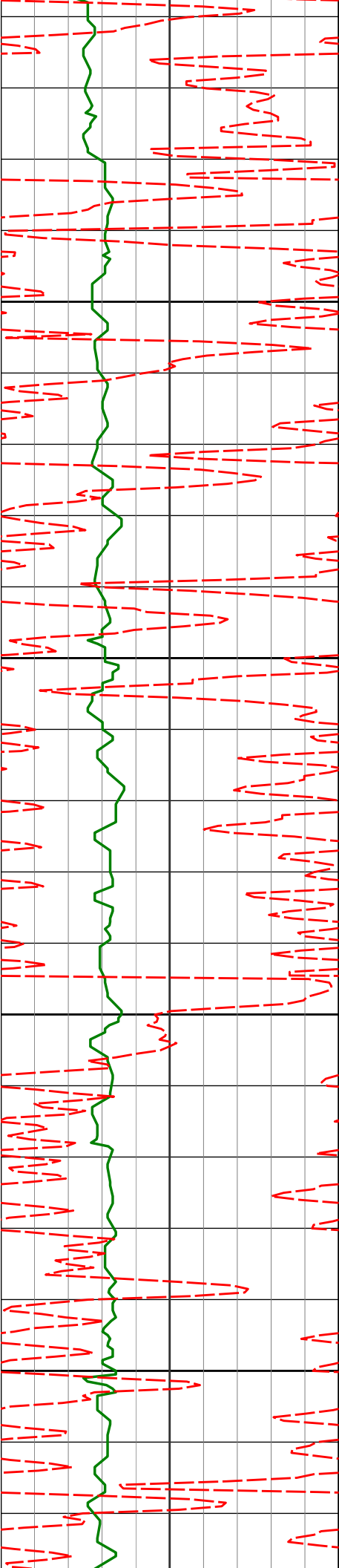
1549'

1.05°

337.57°

1548.82'

-0.53'



1600

1650

1700

1750

1641'

1.57°

336.96°

1640.79'

-1.23'

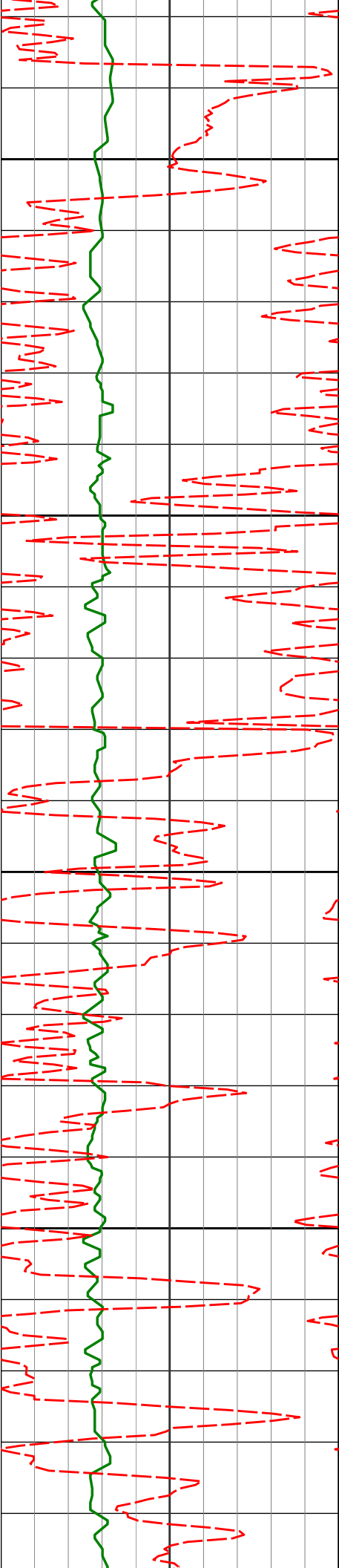
1732'

1.55°

313.67°

1731.76'

-2.48'



1800

1825'

0.83°

355.18°

1824.74'

-3.35'

1850

1900

1918'

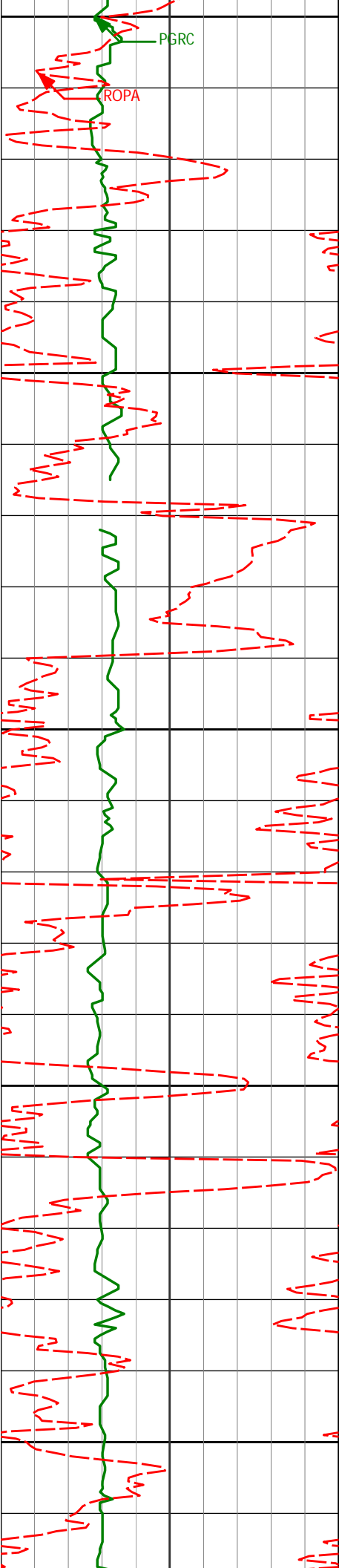
1.01°

1.00°

1917.73'

-3.30'

1950



2000

2013'

1.31°

326.25°

2012.71'

-3.78'

2050

2100

2105'

0.11°

204.22°

2104.70'

-4.35'

2150

2200

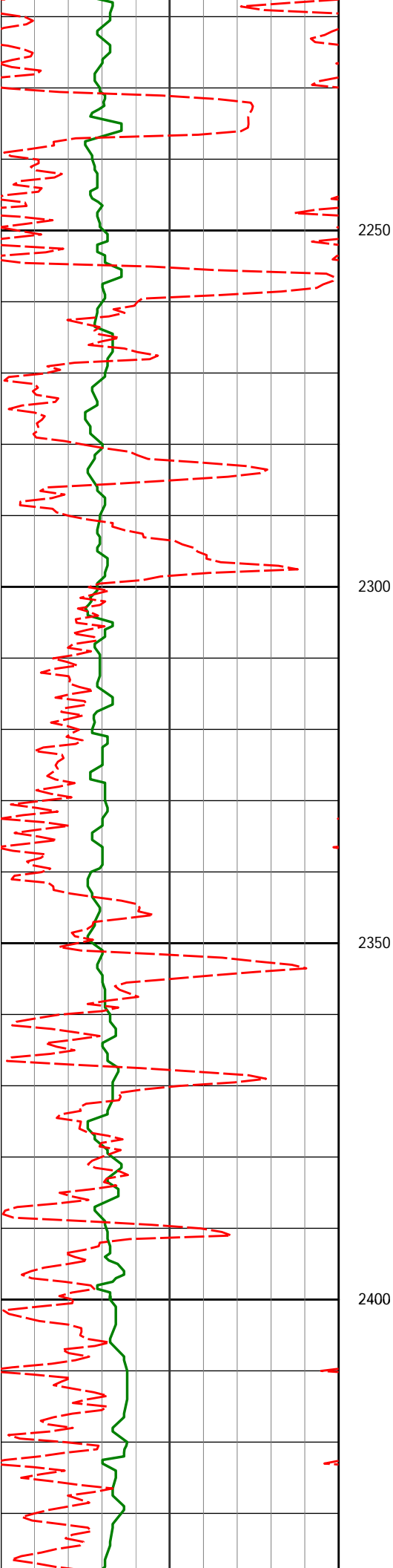
2200'

0.72°

141.15°

2199.70'

-4.04'



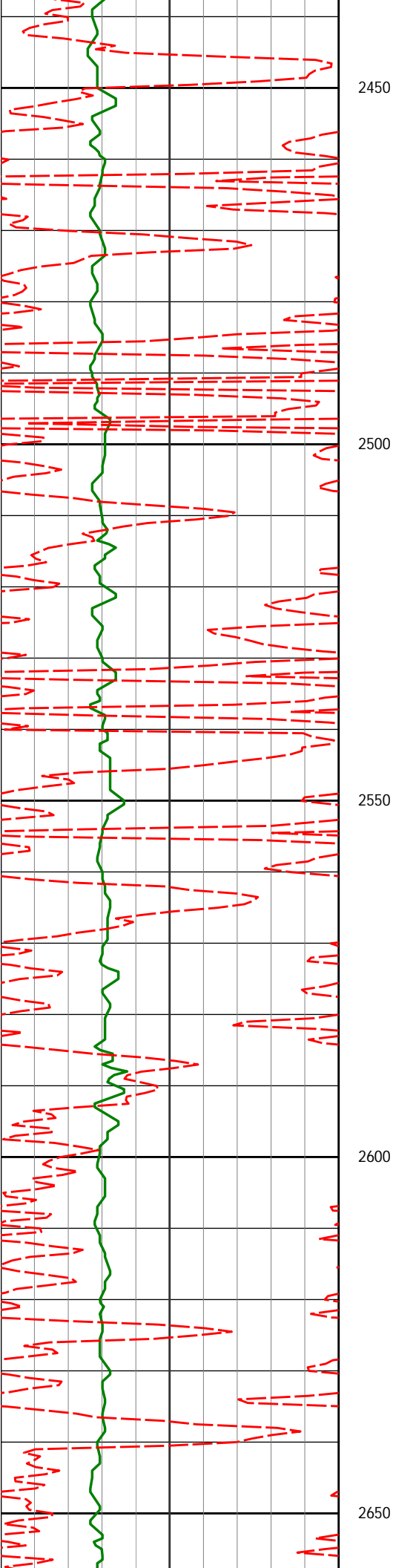
2389'

0.84°

200.14°

2388.69'

-3.91'



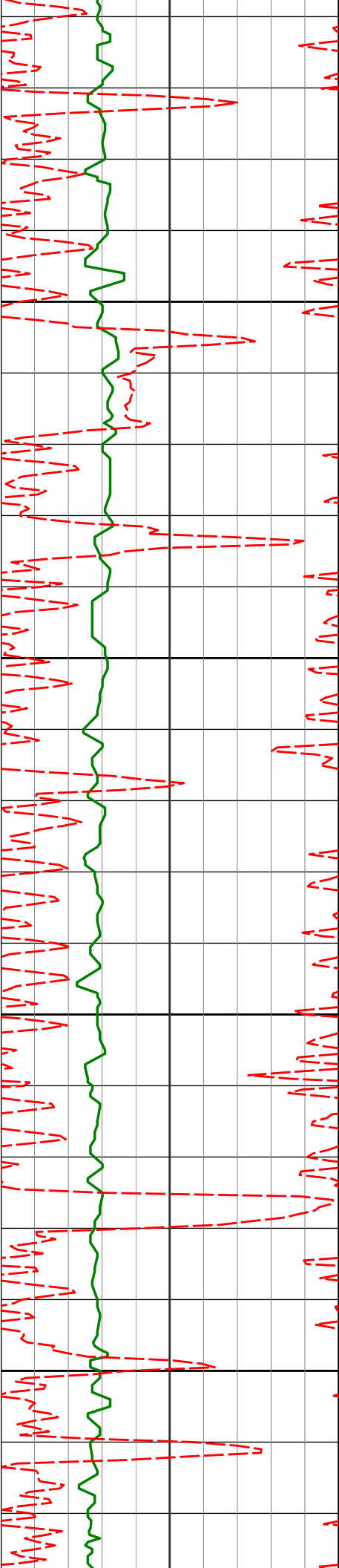
2485'

1.23°

215.77°

2484.67'

-4.85'



2674'

0.77°

265.27°

2673.65'

-7.41'

2700

2750

2769'

0.68°

268.70°

2768.64'

-8.61'

2800

2850

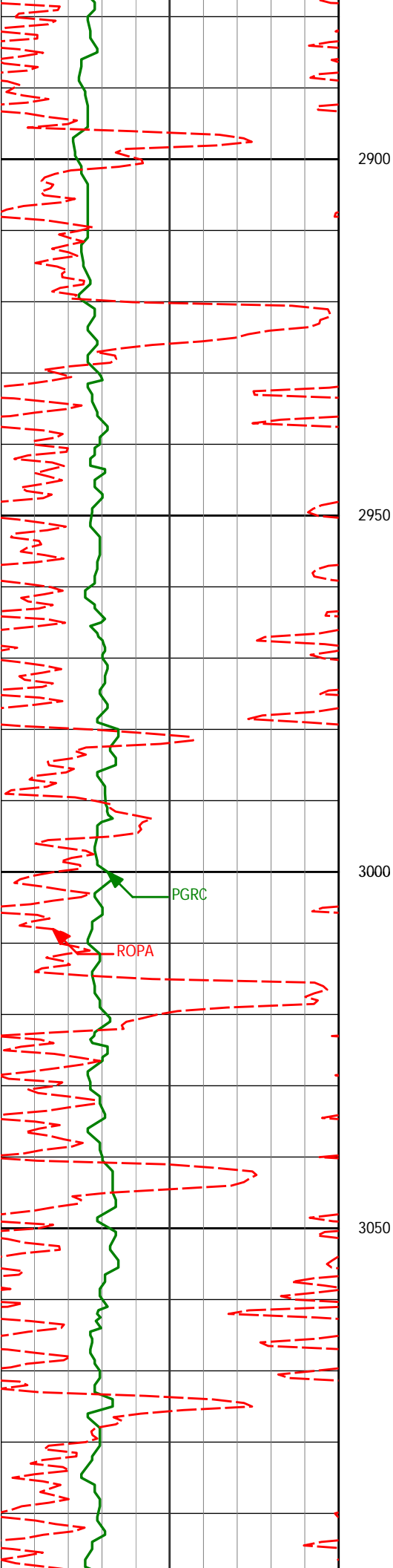
2864'

0.84°

261.65°

2863.63'

-9.86'



2959'

1.11°

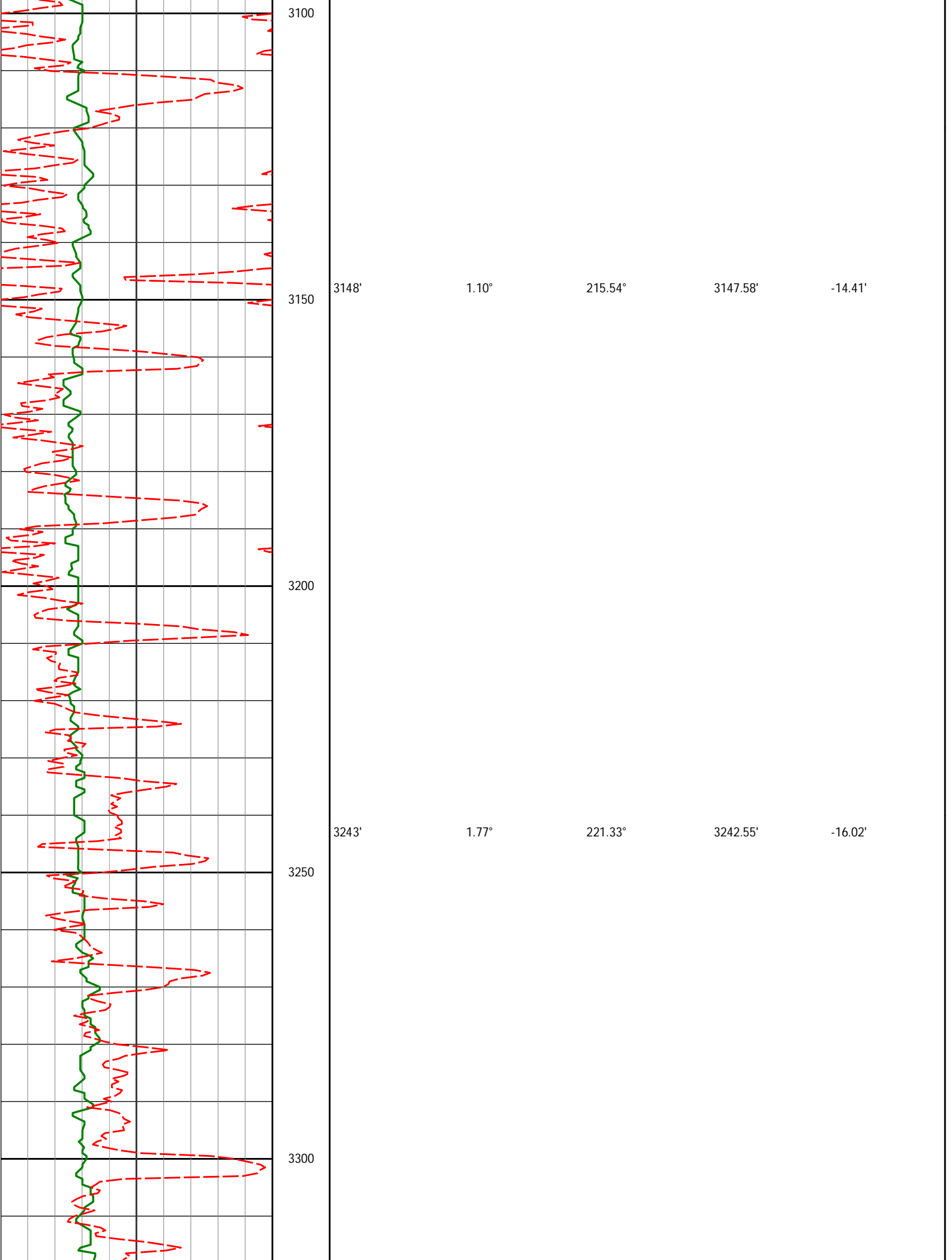
256.23°

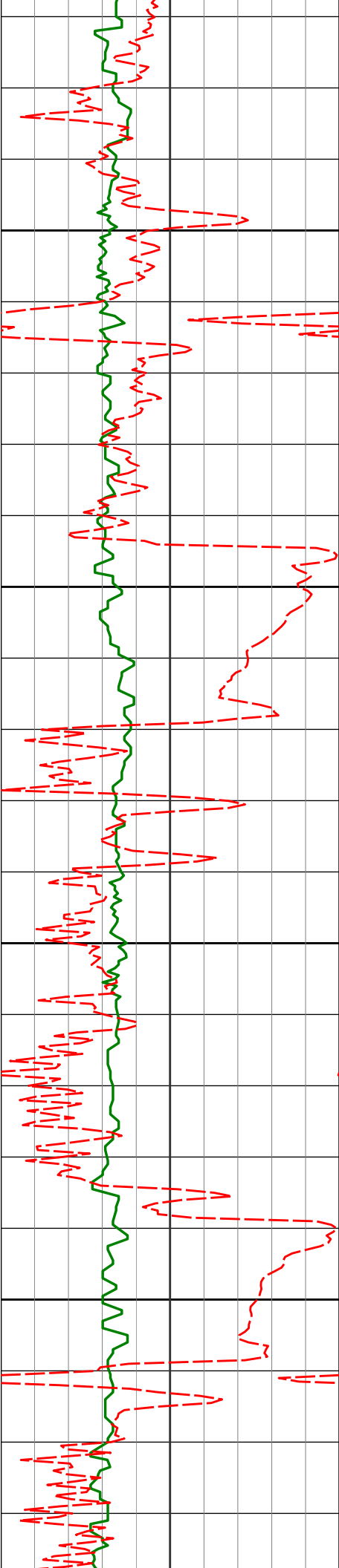
2958.62'

-11.46'

PGRC

ROPA





3338'

2.35°

207.19°

3337.49'

-18.05'

3350

3400

3433'

0.96°

256.29°

3432.45'

-19.83'

3450

3500

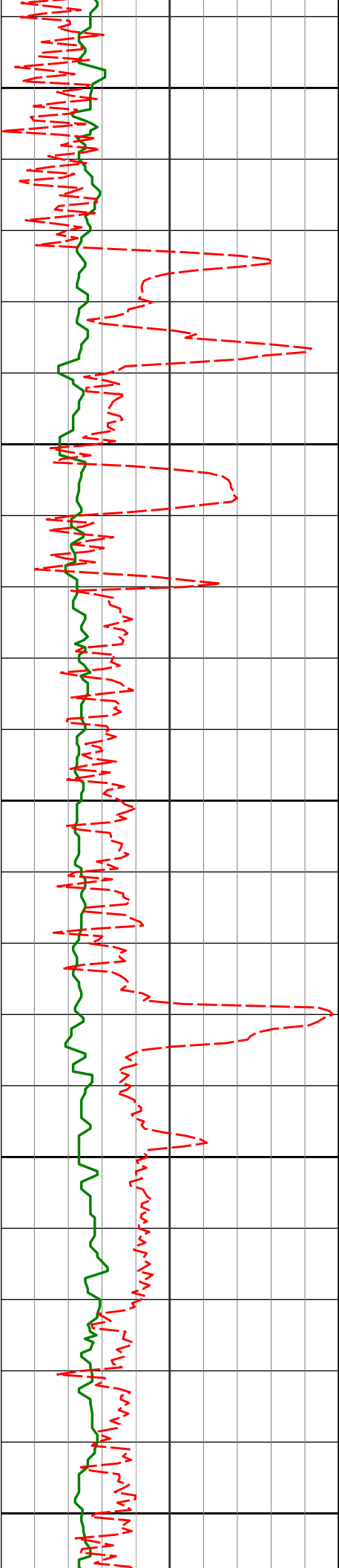
3527'

0.47°

51.08°

3526.45'

-20.29'



3550

3600

3650

3700

3750

3622'

0.50°

82.38°

3621.45'

-19.56'

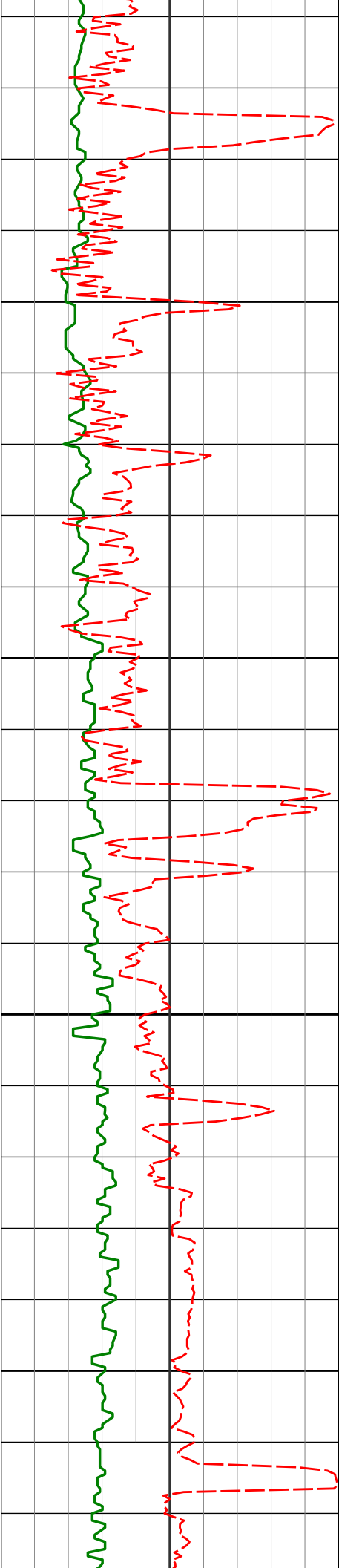
3717'

1.10°

81.39°

3716.44'

-18.24'



3800

3850

3900

3950

3811'

1.18°

85.23°

3810.42'

-16.37'

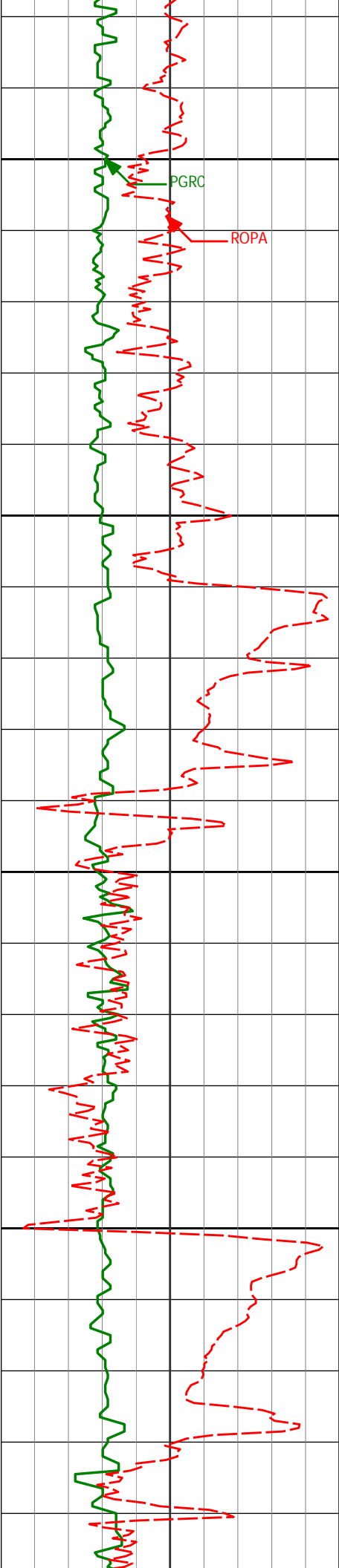
3906'

0.96°

74.22°

3905.40'

-14.62'



4000

4050

4100

4150

4001'

4095'

4190'

0.56°

2.14°

3.14°

74.32°

16.67°

358.16°

4000.39'

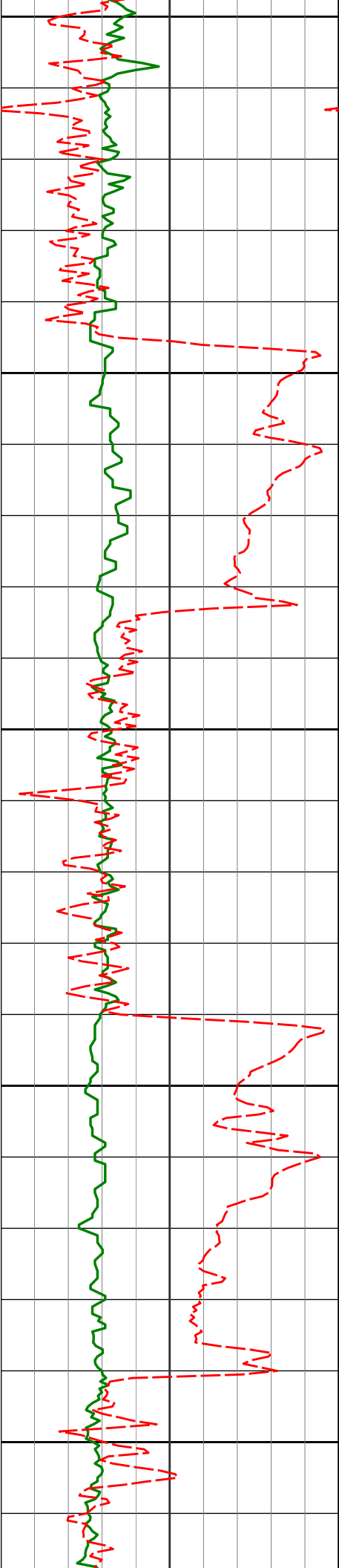
4094.37'

4189.27'

-13.39'

-12.33'

-11.64'



4200

4250

4300

4350

4400

4285'

4.07°

3.30°

4284.08'

-11.16'

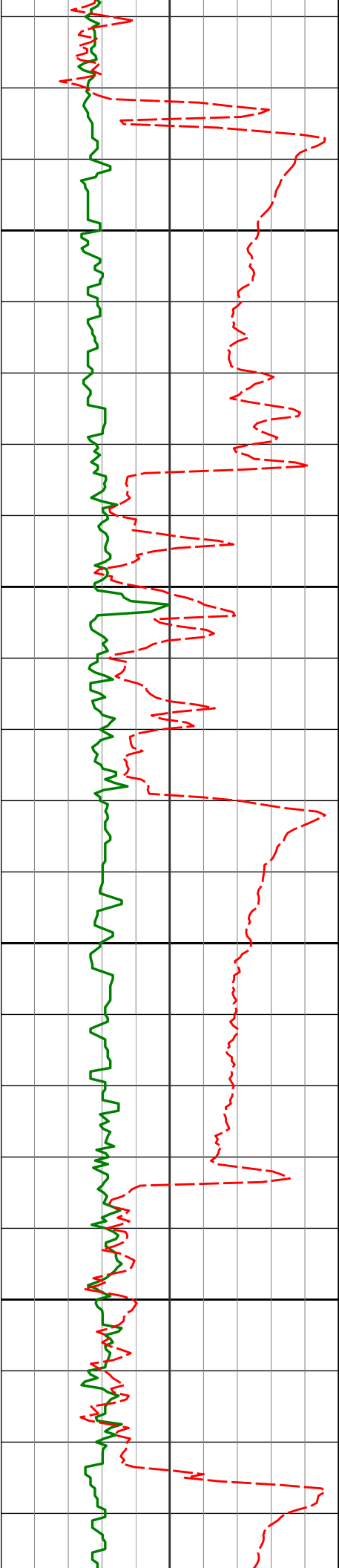
4380'

5.49°

1.91°

4378.75'

-10.32'



4450

4475'

7.39°

357.90°

4473.14'

-9.73'

4500

4550

4569'

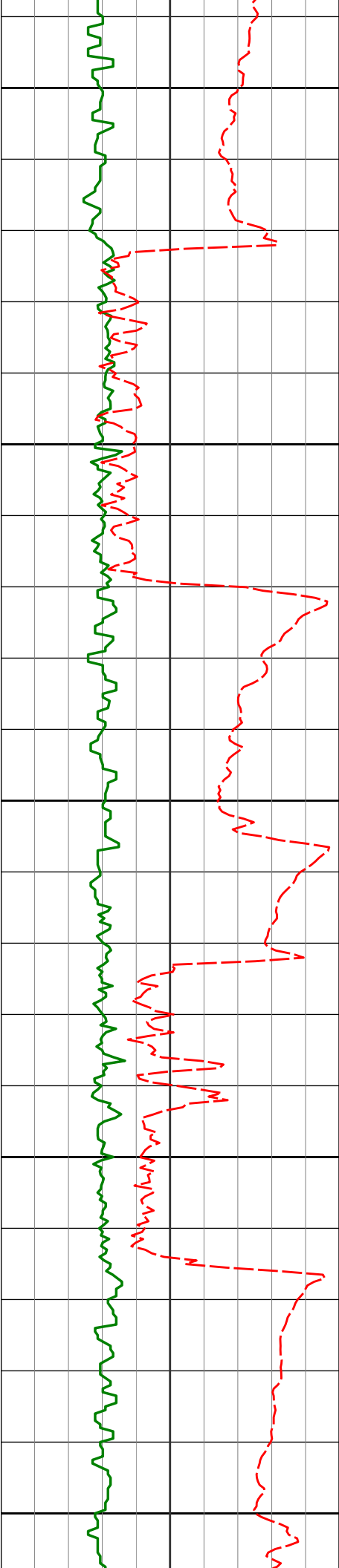
9.67°

357.61°

4566.10'

-9.41'

4600



4650

4664'

11.18°

358.29°

4659.52'

-8.95'

4700

4750

4759'

11.90°

3.67°

4752.61'

-7.41'

4800

4850

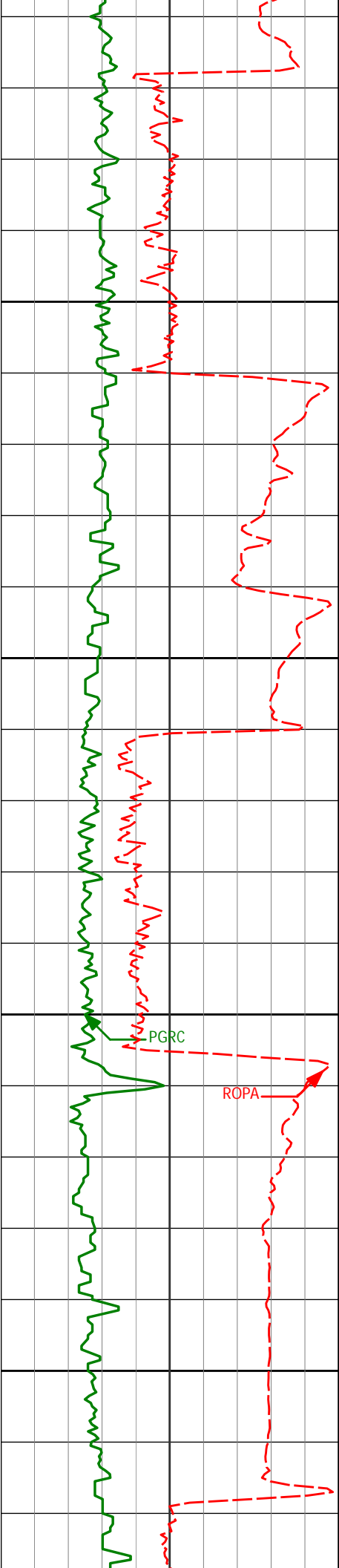
4853'

11.74°

2.62°

4844.61'

-5.16'



4900

4950

5000

5050

4948'

11.73°

359.08°

4937.63'

-3.67'

PGRC

ROPA

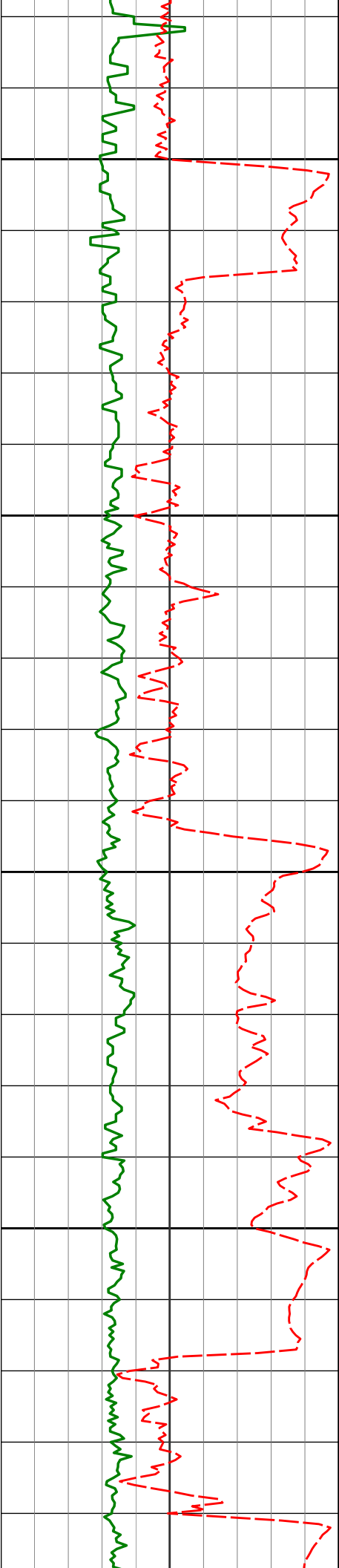
5043'

14.12°

355.53°

5030.22'

-3.41'



5100

5138'

11.62°

355.15°

5122.82'

-3.80'

5150

5200

5233'

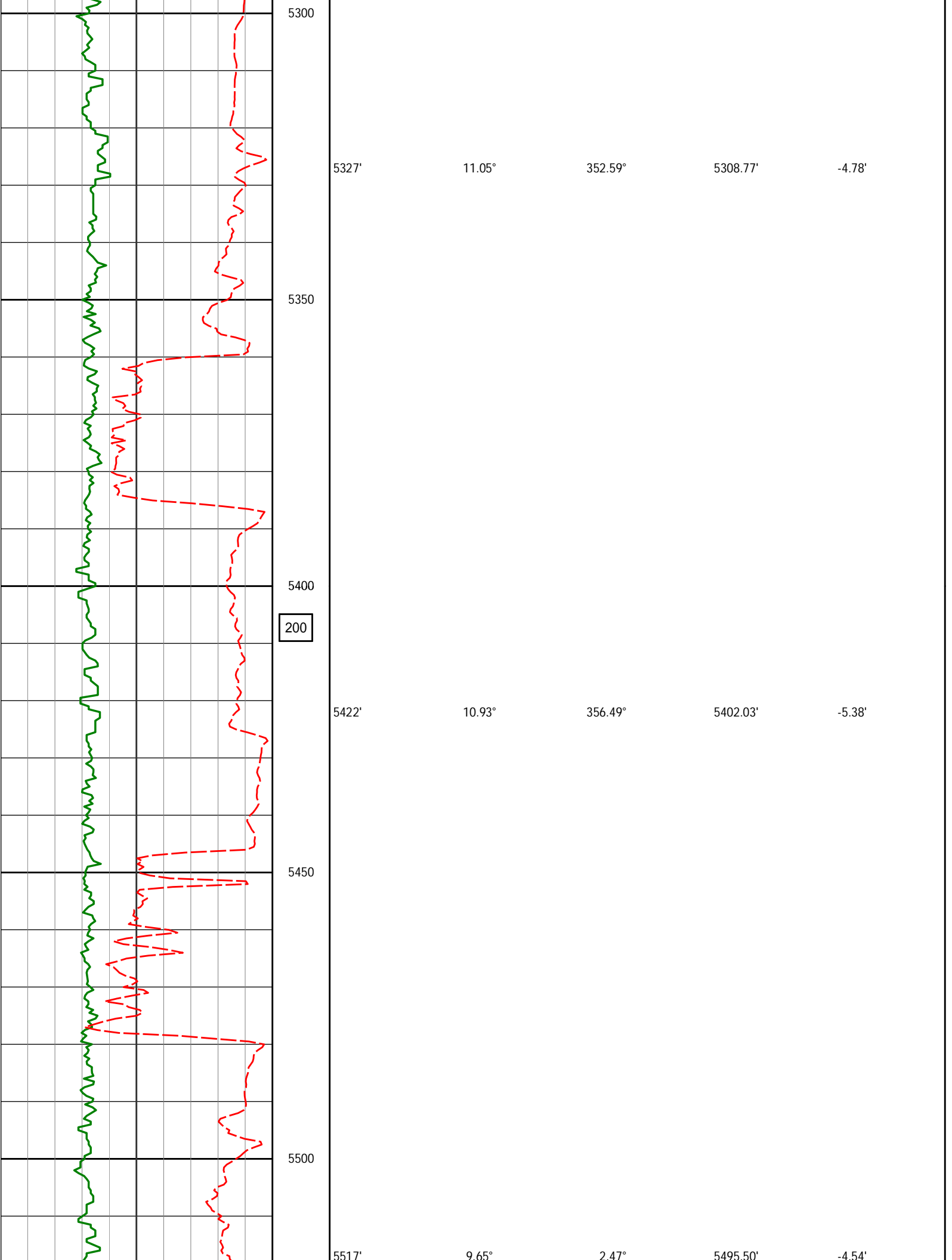
9.26°

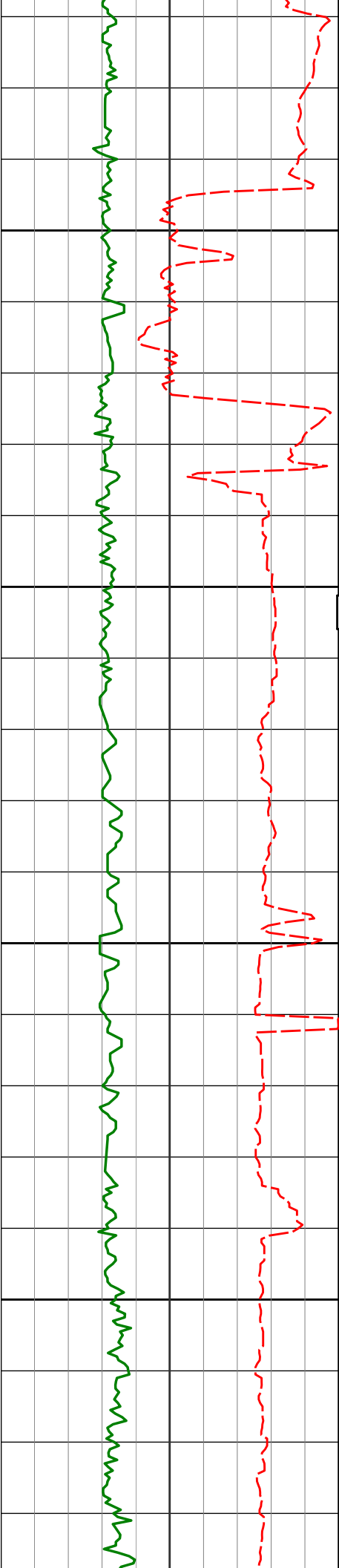
355.82°

5216.24'

-4.10'

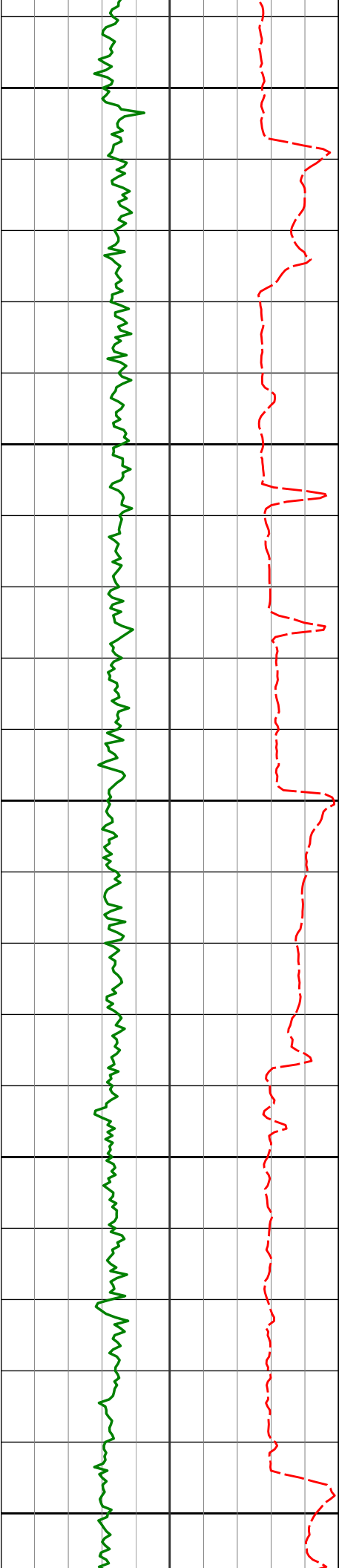
5250



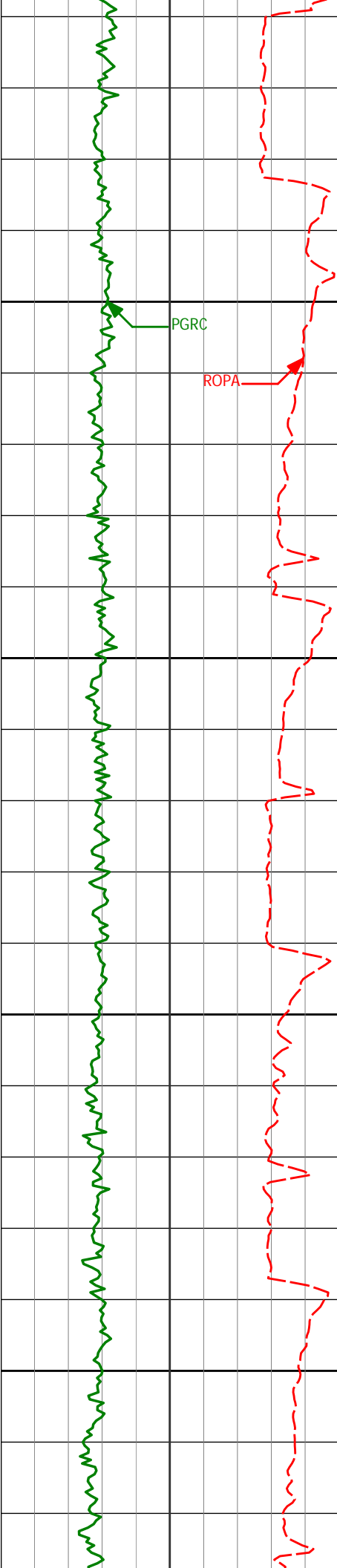


5550
5600
200
5650
5700

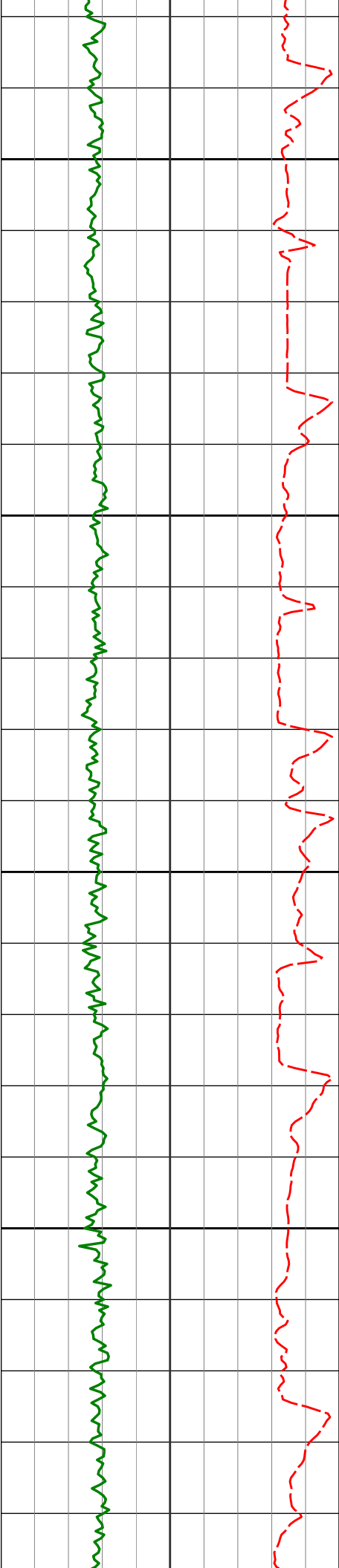
5611'	11.54°	348.35°	5587.91'	-5.03'
5706'	14.80°	340.99°	5680.40'	-9.60'



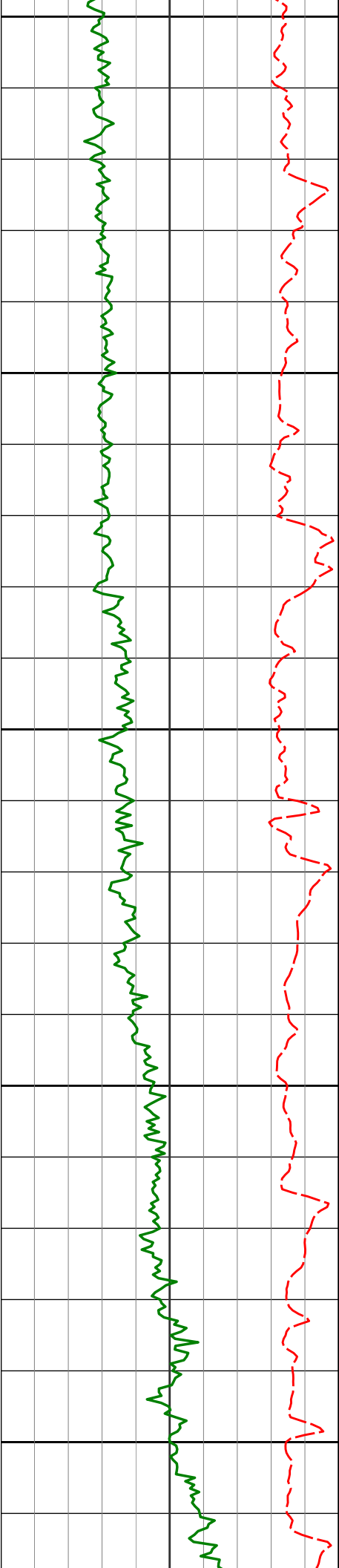
5750					
5800	5800'	14.45°	340.96°	5771.36'	-15.92'
5850					
5900	5895'	16.07°	350.50°	5863.02'	-20.44'
5950	5933'	15.63°	349.56°	5899.58'	-21.60'



5990'	15.69°	356.57°	5954.46'	-22.50'
6000				
6038'	17.72°	13.88°	6000.47'	-20.29'
6050				
6085'	18.74°	22.87°	6045.11'	-14.78'
6100				
6133'	18.22°	36.82°	6090.66'	-6.48'
6150				



6179'	18.28°	51.91°	6134.37'	4.13'
6200				
6227'	17.98°	63.42°	6180.00'	17.15'
6250				
6274'	20.37°	68.71°	6224.40'	31.63'
6300				
6322'	22.61°	68.71°	6269.06'	48.38'
6350				
6369'	27.13°	66.24°	6311.69'	67.05'



6400

6417'

6450

6464'

6500

6512'

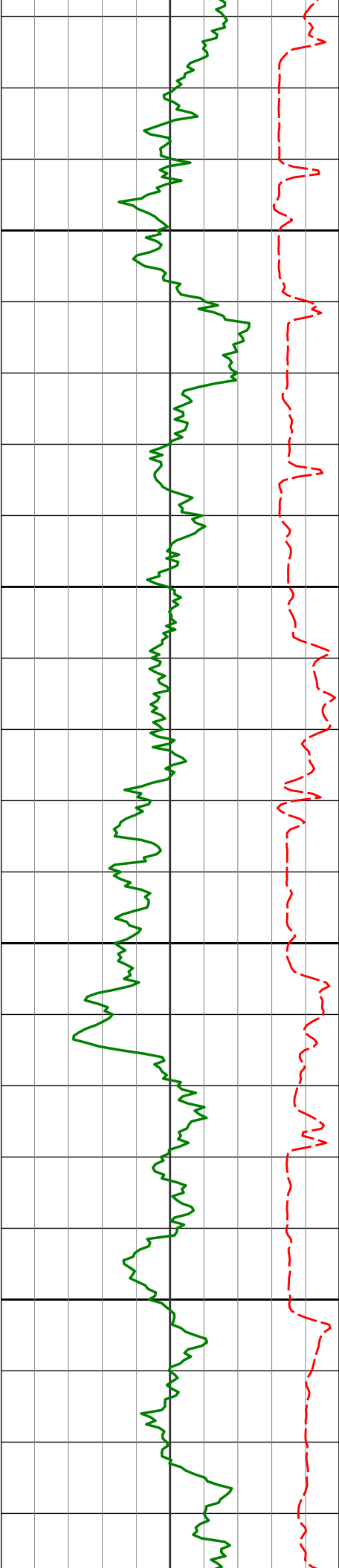
6550

6559'

6600

6607'

6417'	32.77°	66.85°	6353.26'	89.58'
6464'	37.10°	72.31°	6391.79'	115.33'
6512'	42.49°	76.06°	6428.67'	145.34'
6559'	51.26°	78.18°	6460.76'	179.16'
6607'	57.75°	80.26°	6488.62'	217.91'



6650

6653'

57.84°

81.29°

6513.14'

256.65'

6700

6701'

58.32°

81.68°

6538.52'

297.24'

6750

6748'

60.24°

81.94°

6562.53'

337.51'

6800

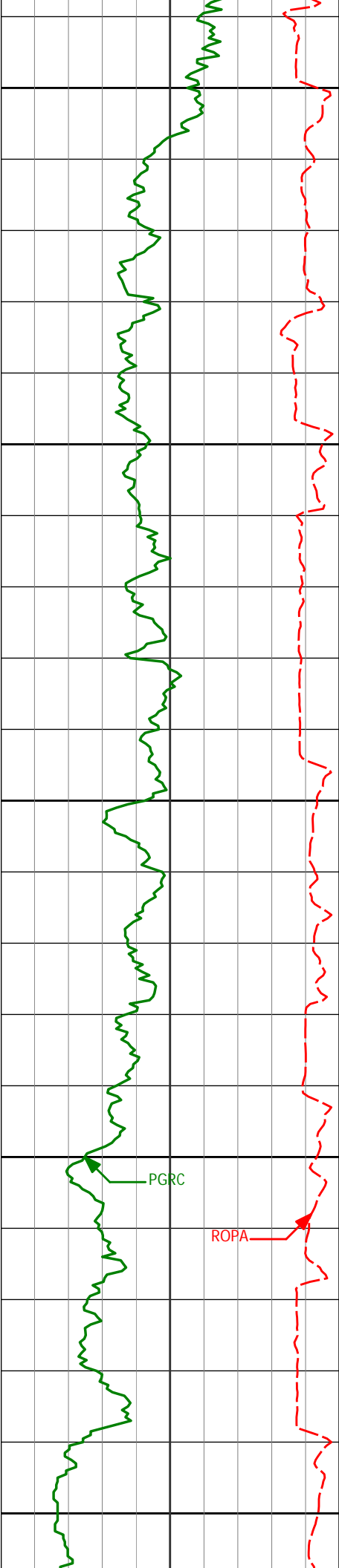
6796'

62.64°

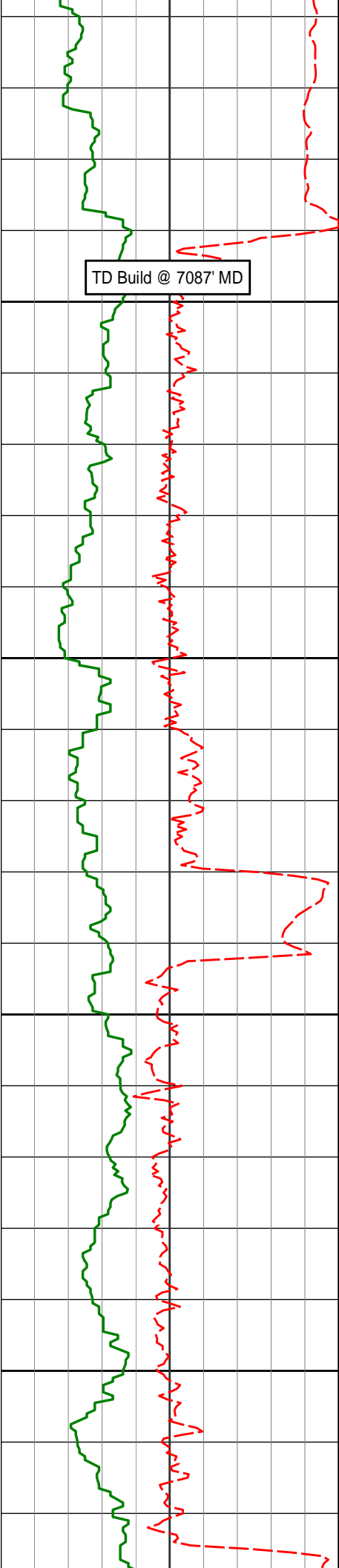
83.05°

6585.47'

379.56'



6843'	68.04°	84.73°	6605.08'	422.22'
6850				
6891'	71.96°	87.27°	6621.49'	467.31'
6900				
6937'	74.16°	87.85°	6634.90'	511.30'
6950				
6985'	77.97°	87.82°	6646.45'	557.87'
7000				
7033'	81.29°	88.63°	6655.09'	605.05'
7050				



300

7100

7119'

86.43°

87.35°

6664.29'

690.50'

7150

7200

7213'

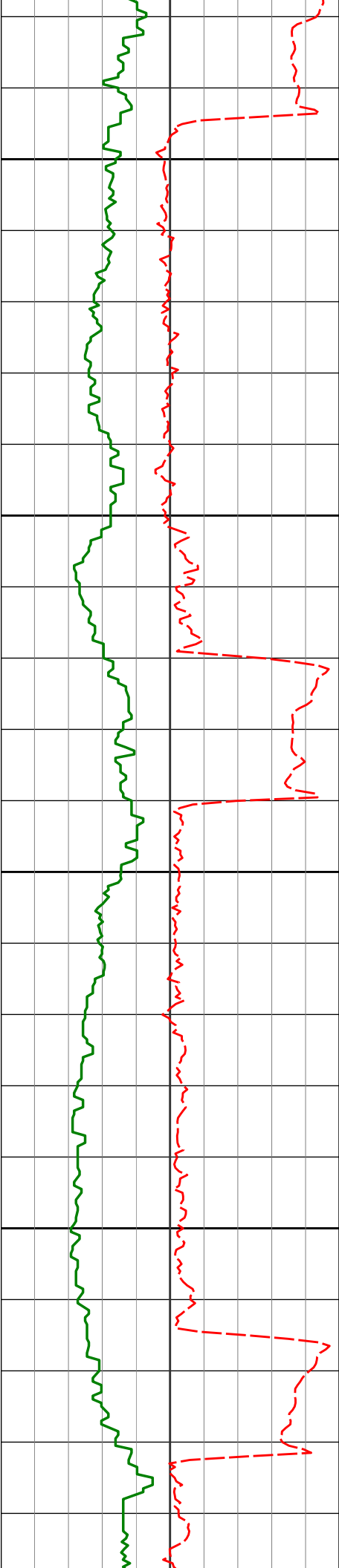
86.99°

86.81°

6669.68'

784.33'

7250



7300

7308'

88.34°

86.70°

6673.55'

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7350

7400

7403'

90.03°

88.27°

6674.90'

974.22'

7450

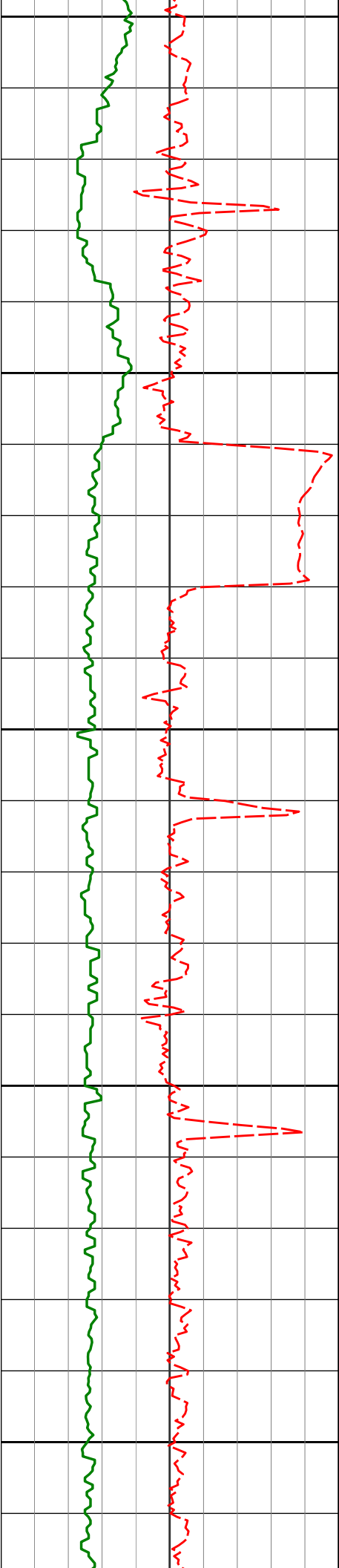
7403'

90.03°

88.27°

6674.90'

974.22'



7500

7550

7600

7650

7700

7498

7592'

7687'

92.90

90.86°

90.89°

90.44

89.71°

87.31°

6672.48

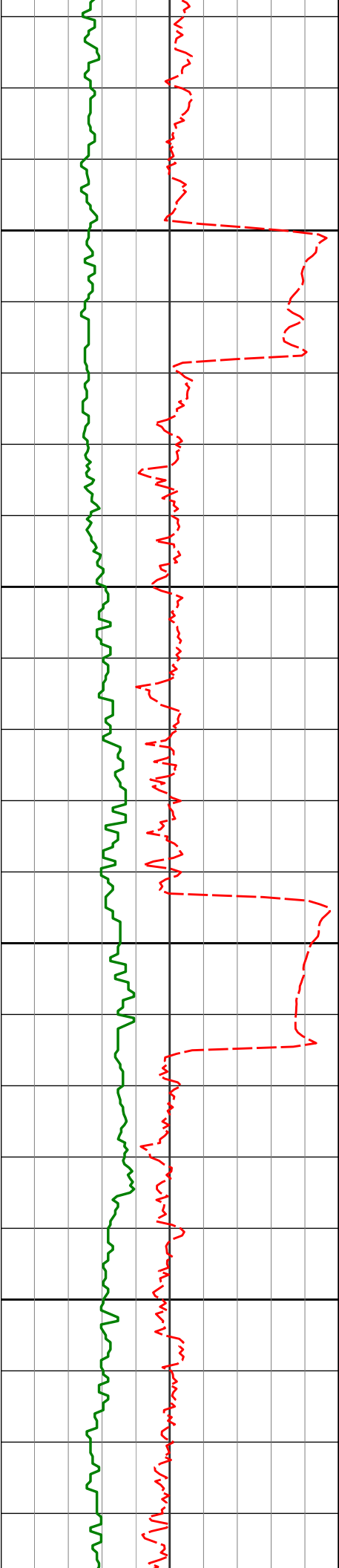
6669.39'

6667.94'

1069.05

1162.80'

1257.72'



7750

7782'

91.66°

88.32°

6665.83'

1352.67'

7800

7850

7876'

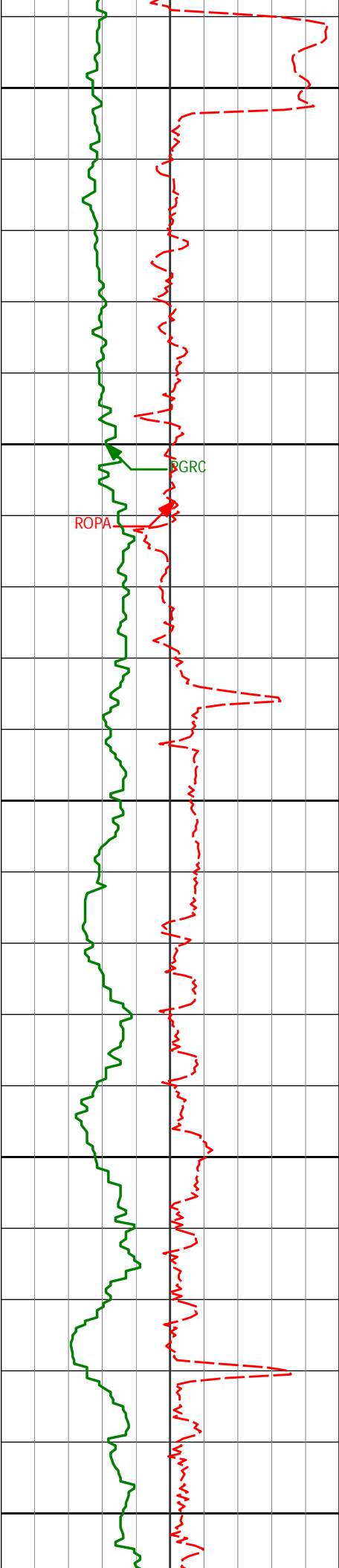
92.16°

90.35°

6662.69'

1446.49'

7900



7950

7971'

91.11°

91.50°

6659.98'

1541.16'

8000

BGRC

ROPA

8050

8066'

90.34°

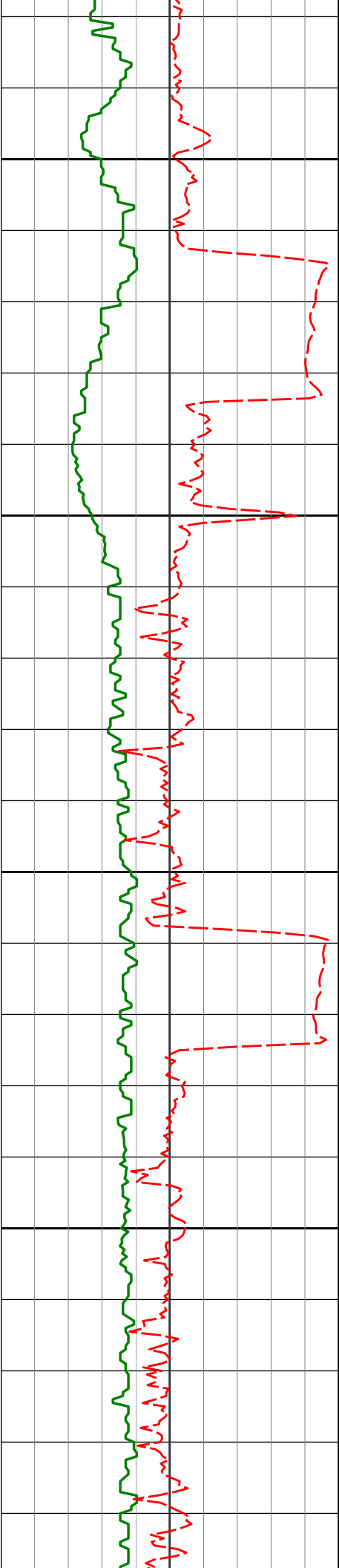
91.00°

6658.78'

1635.81'

8100

8150



8400

8444'

89.97°

89.43°

6667.12'

2012.90'

8450

8500

8539'

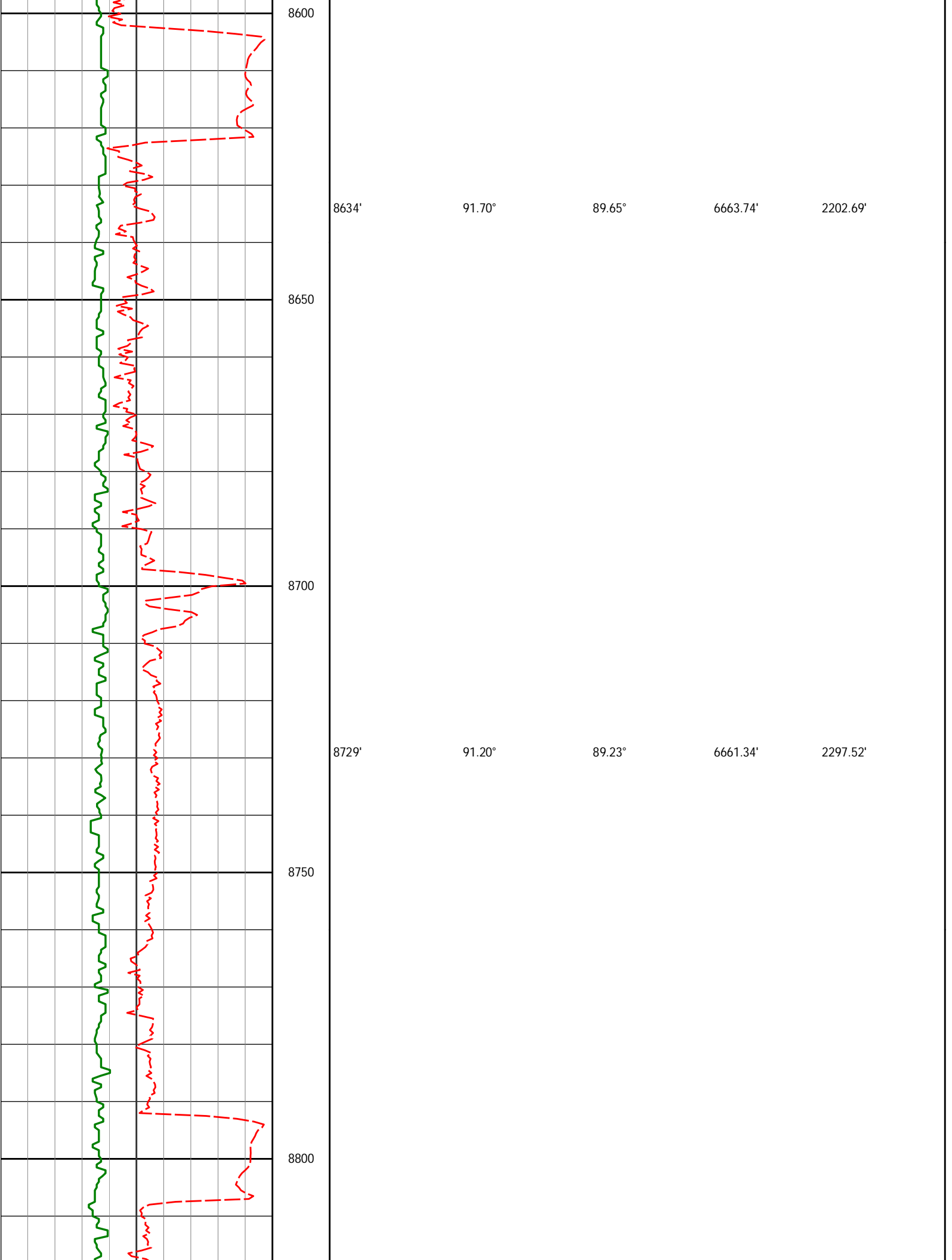
91.20°

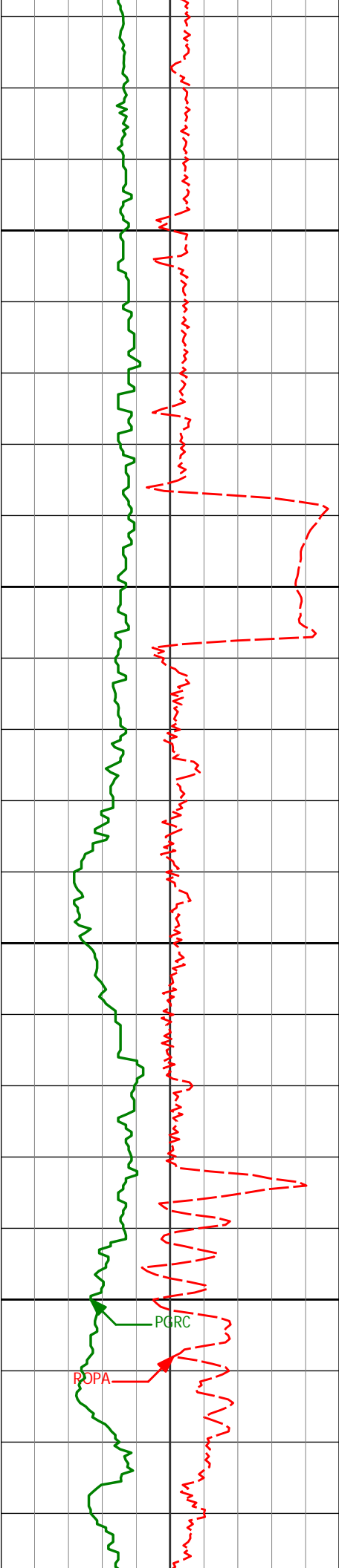
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6666.15'

2107.81'

8550





8824'

90.68°

89.40°

6659.78'

2392.39'

8850

8900

8918'

92.25°

89.66°

6657.38'

2486.22'

8950

9000

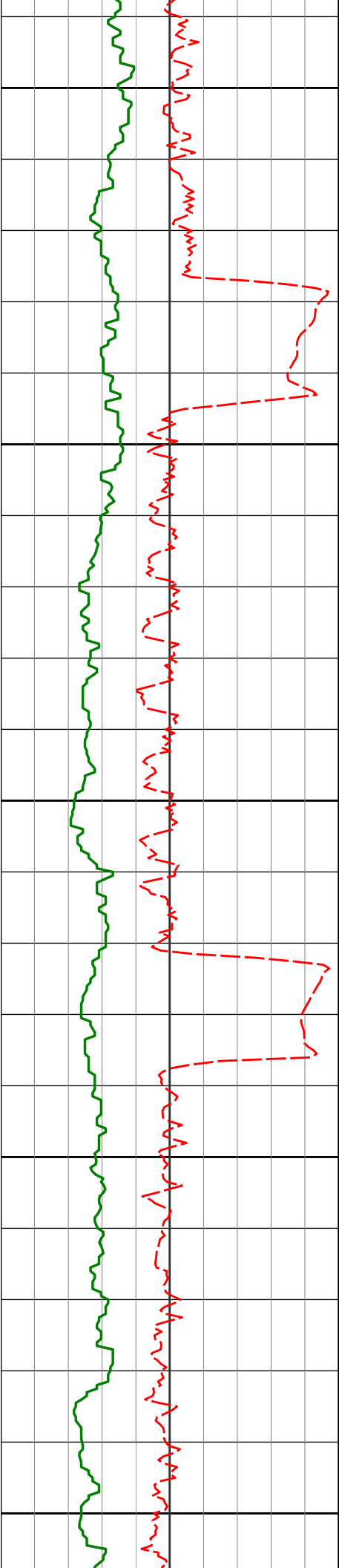
9013'

92.28°

89.03°

6653.62'

2581.02'



9050

9100

9150

9200

9250

9108'

91.82°

89.96°

6650.23'

2675.82'

9203'

90.43°

91.08°

6648.36'

2770.56'



9300

9350

9400

9450

9298'

9392'

89.66°

91.76°

89.71°

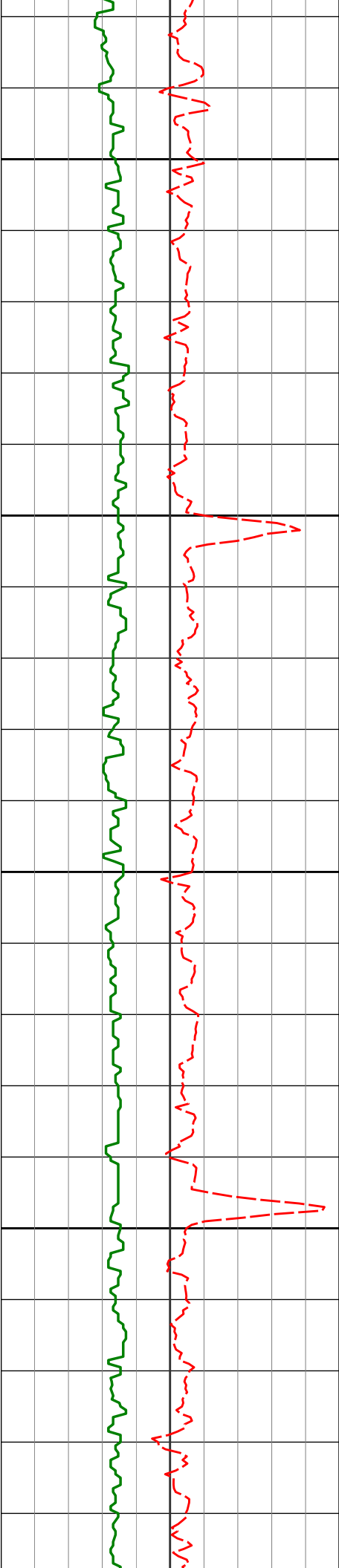
89.92°

6648.29'

6647.12'

2865.33'

2959.15'



9487'

91.45°

89.82°

6644.46'

3053.94'

9500

9550

9582'

90.74°

89.12°

6642.65'

3148.79'

9600

9650

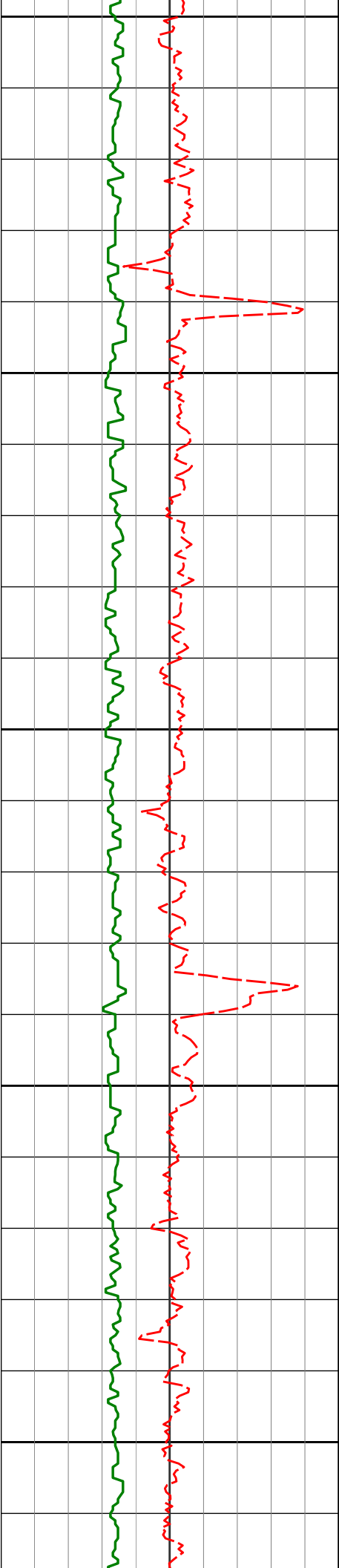
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90.65°

89.23°

6641.49'

3243.68'



9700

9750

9800

9850

9900

9771'

90.68°

89.52°

6640.40'

3337.55'

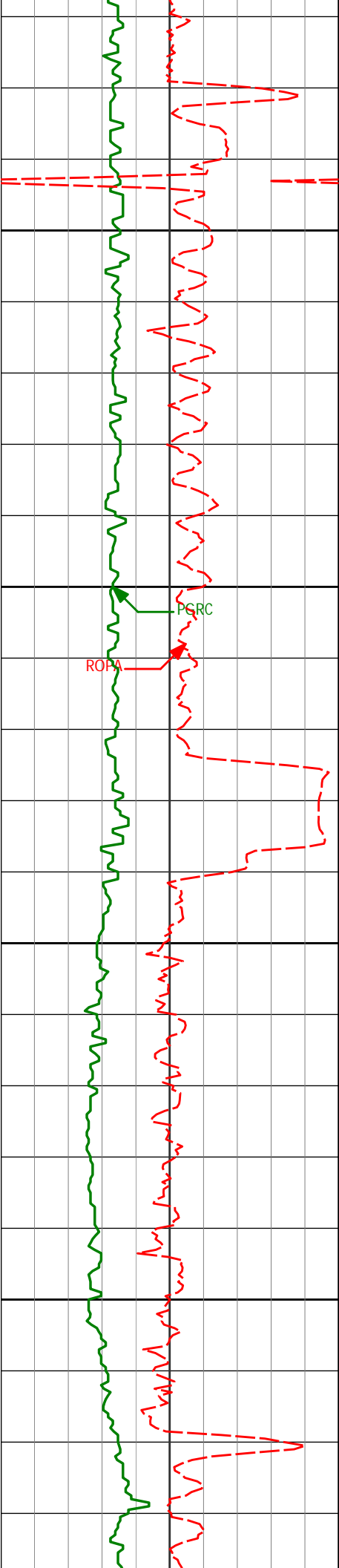
9866'

90.55°

89.94°

6639.38'

3432.38'



9950

9961'

90.74°

90.36°

6638.31'

3527.18'

10000

ROPA

PGRC

10050

10056'

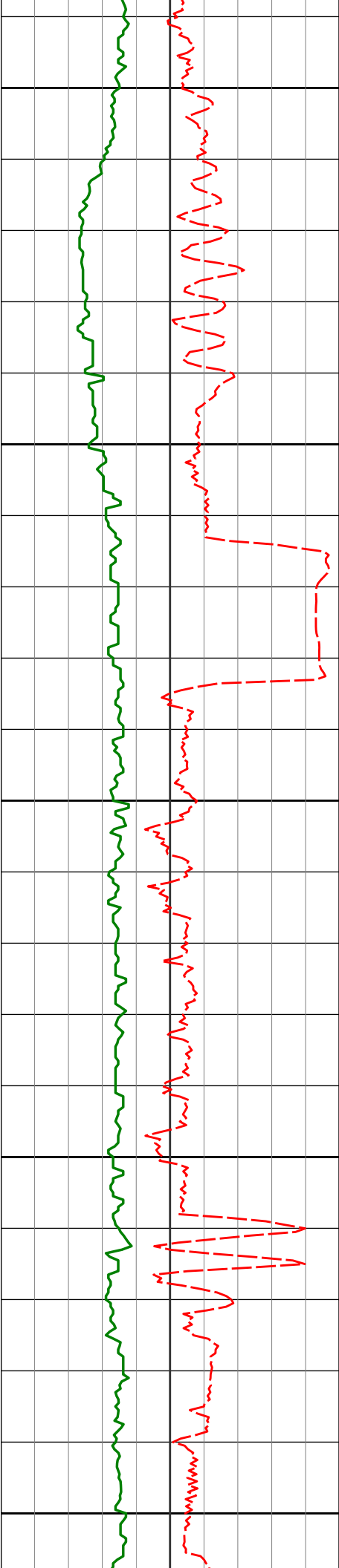
89.29°

89.06°

6638.29'

3622.02'

10100



10150

10151'

88.70°

89.08°

6639.95'

3716.90'

10200

10250

10246'

90.74°

88.33°

6640.42'

3811.82'

10300

10350

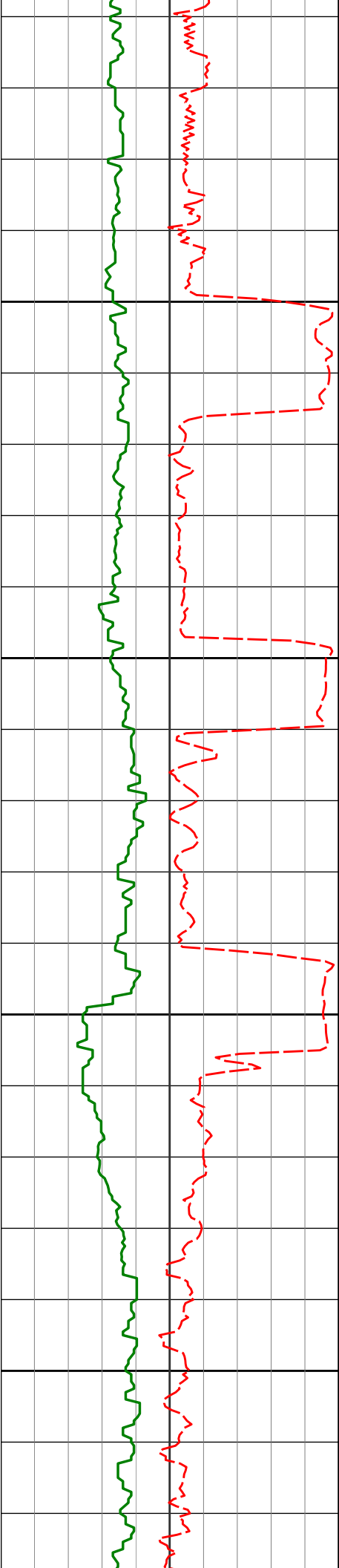
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90.26°

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3902.69'



10400

10429'

90.22°

91.75°

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3994.39'

10450

10500

10520'

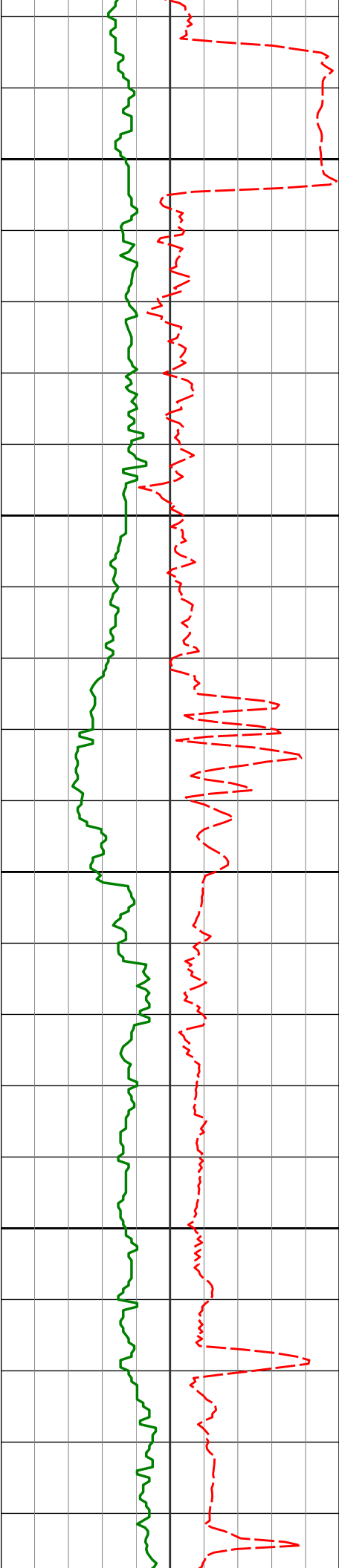
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90.93°

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4085.06'

10550



10600

10612'

90.06°

88.45°

6638.35'

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10704'

89.11°

88.82°

6639.01'

4268.83'

10750

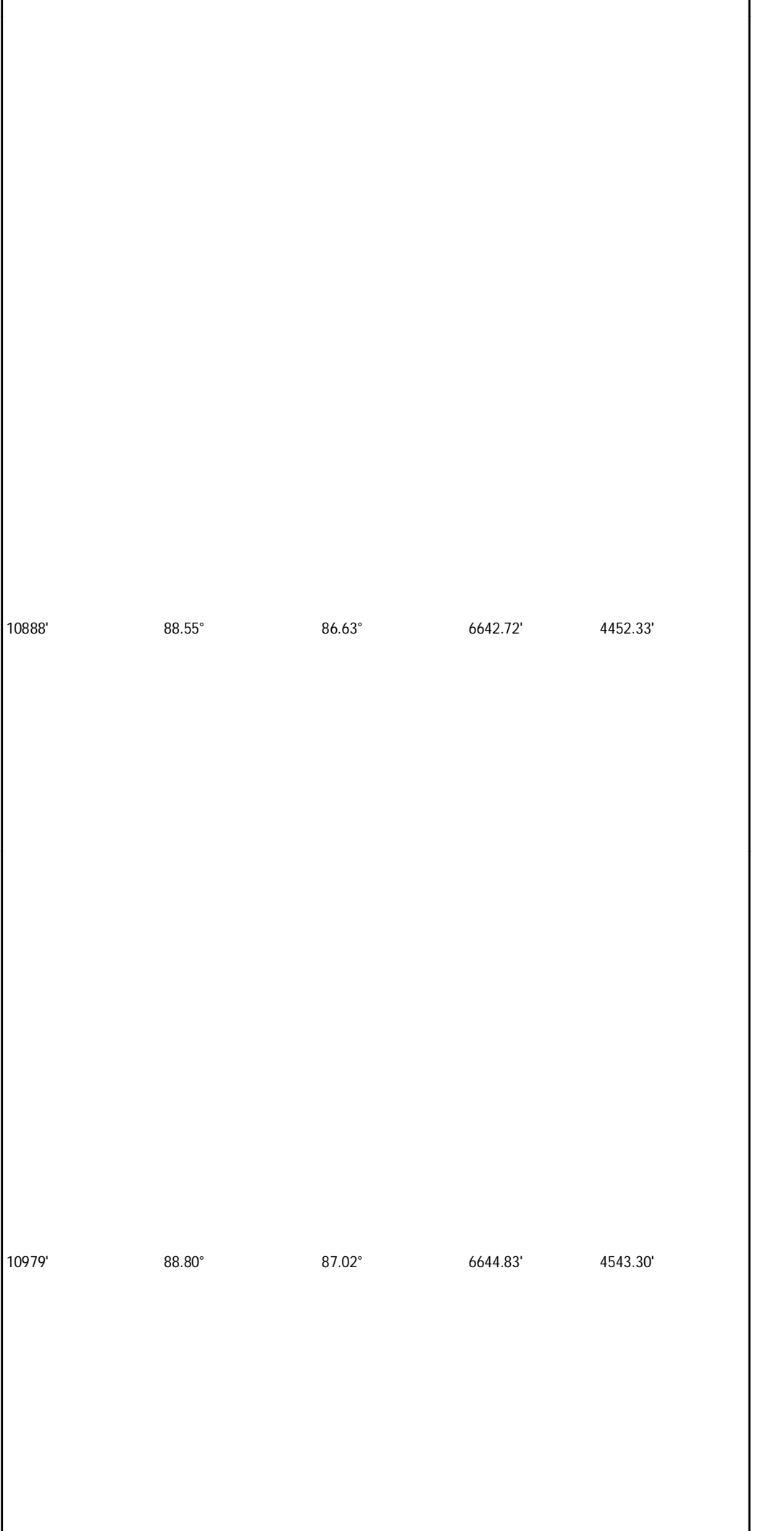
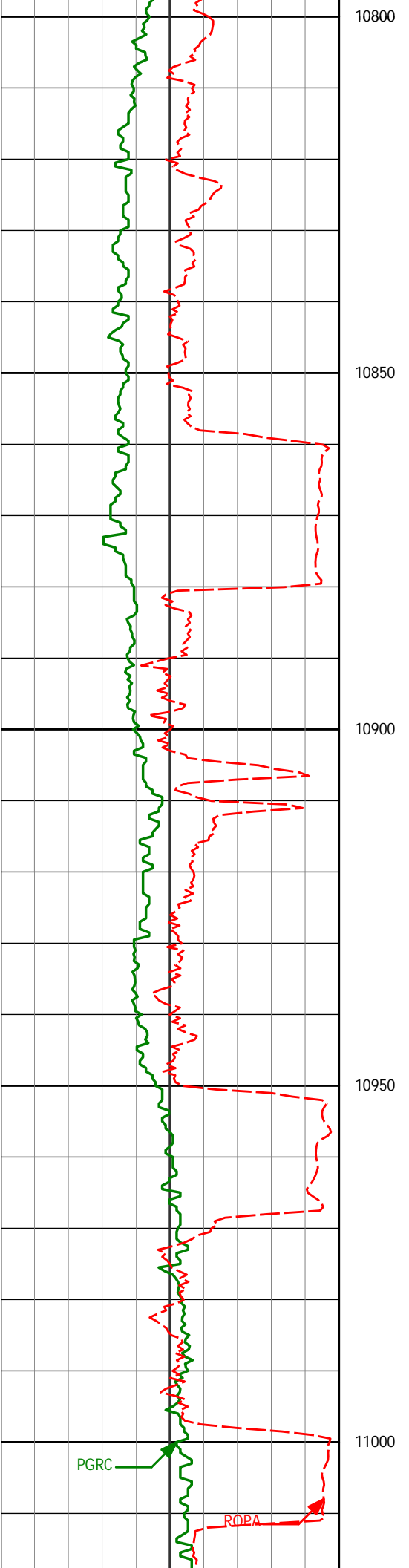
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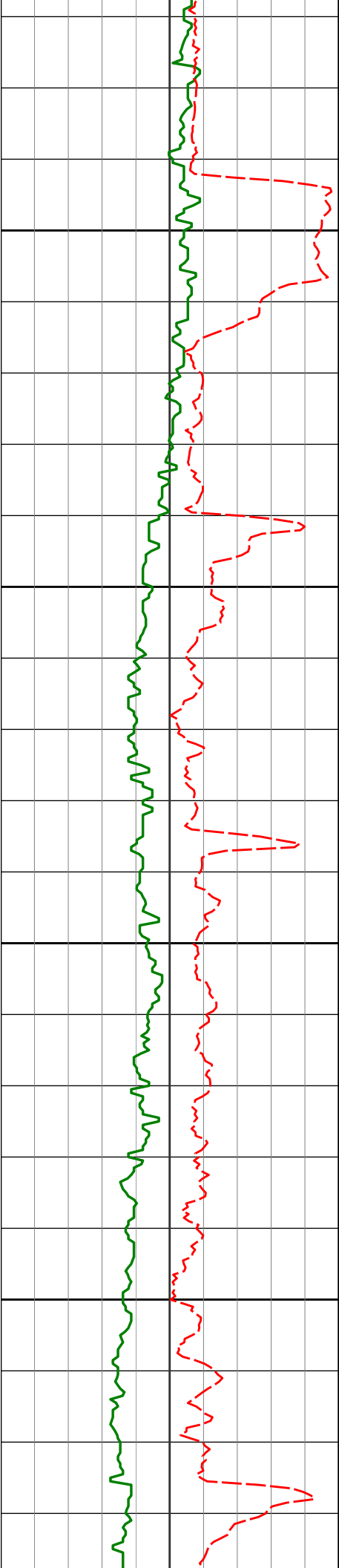
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4360.54'





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91.66°

88.54°

6644.46'

4635.27'

11100

11150

11163'

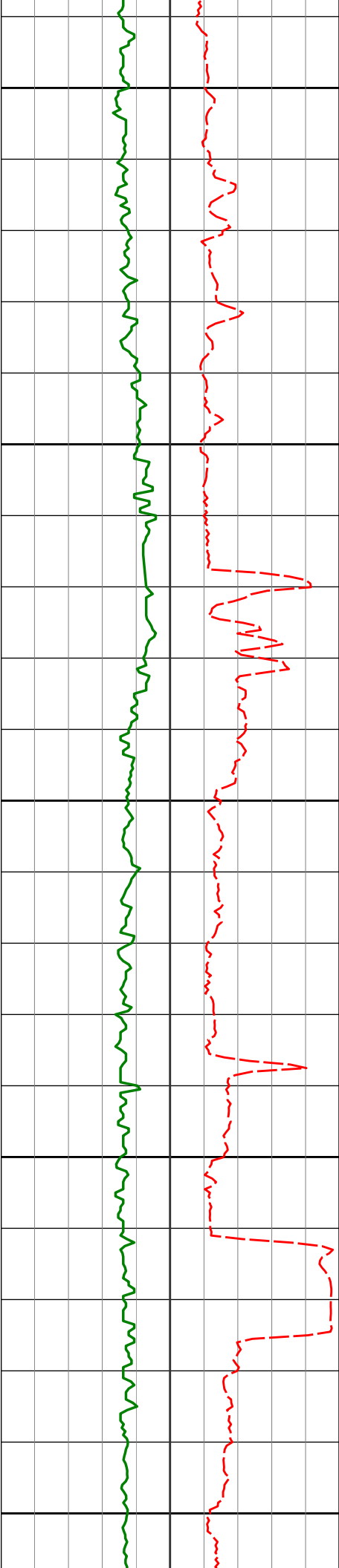
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87.84°

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4727.19'

11200



11250

11255'

92.09°

86.88°

6638.93'

4819.13'

11300

11350

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91.98°

86.61°

6635.59'

4913.06'

11400

11441'

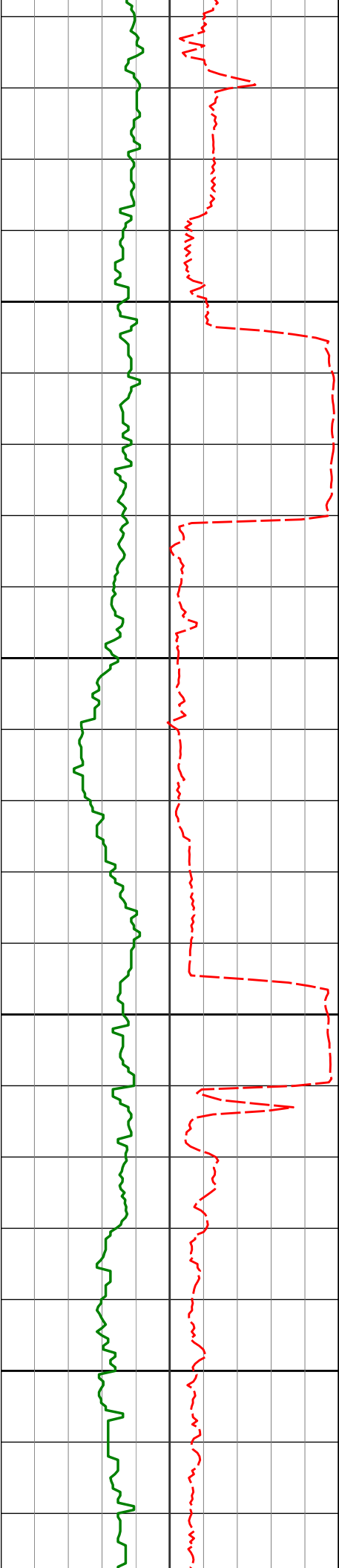
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11500

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90.06°

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5096.96'

11550

11600

11626'

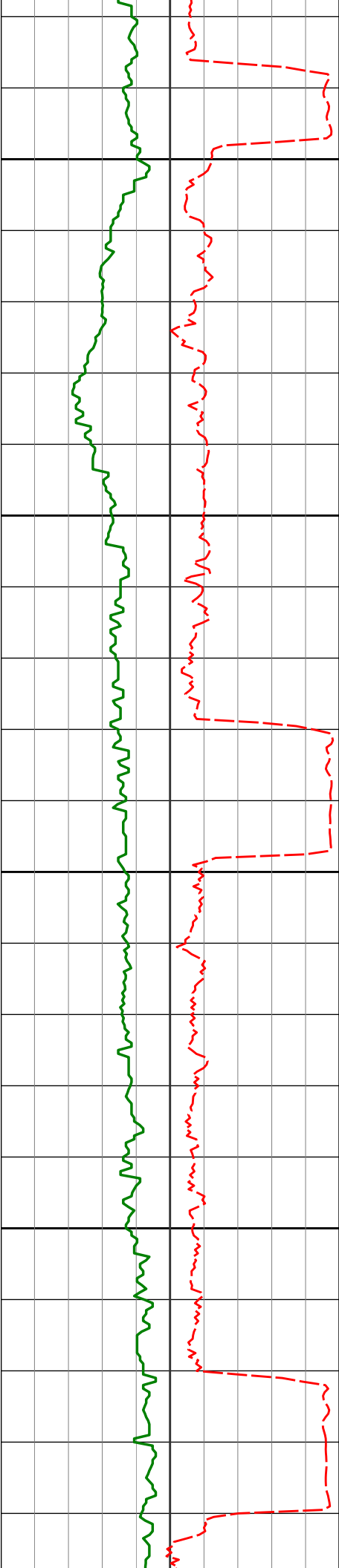
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11700

11718'

88.49°

89.20°

6628.96'

5281.45'

11750

11800

11810'

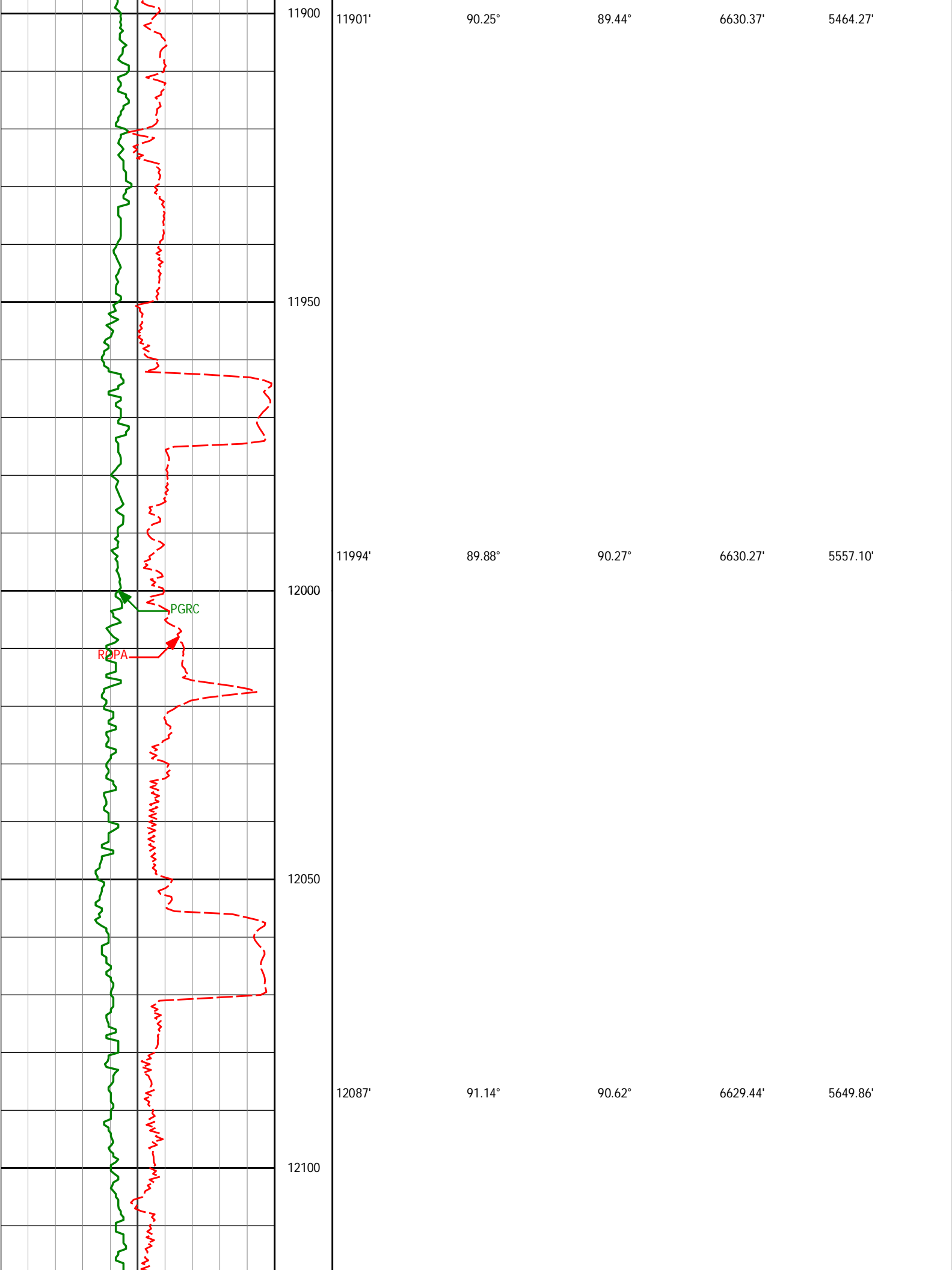
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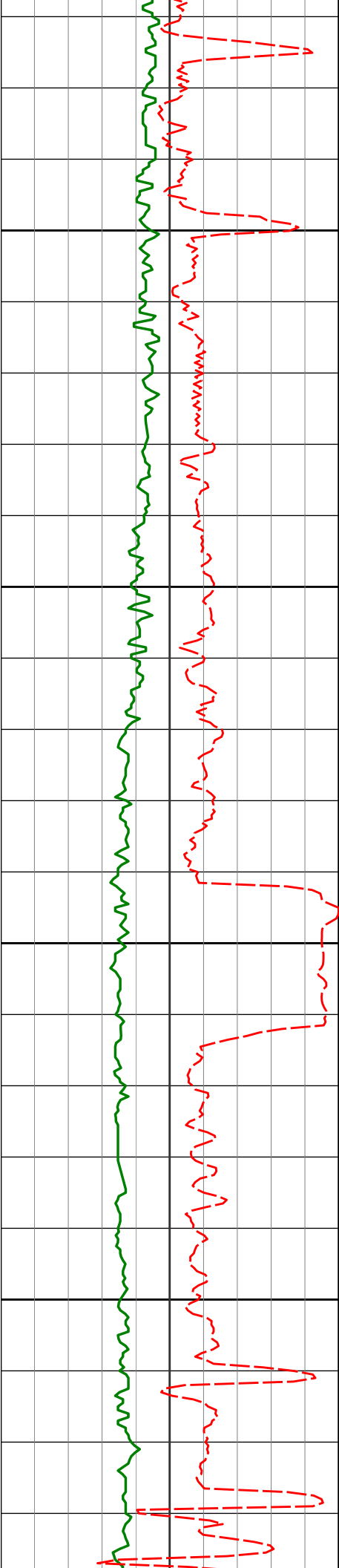
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89.85°

90.20°

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12200

12250

12274'

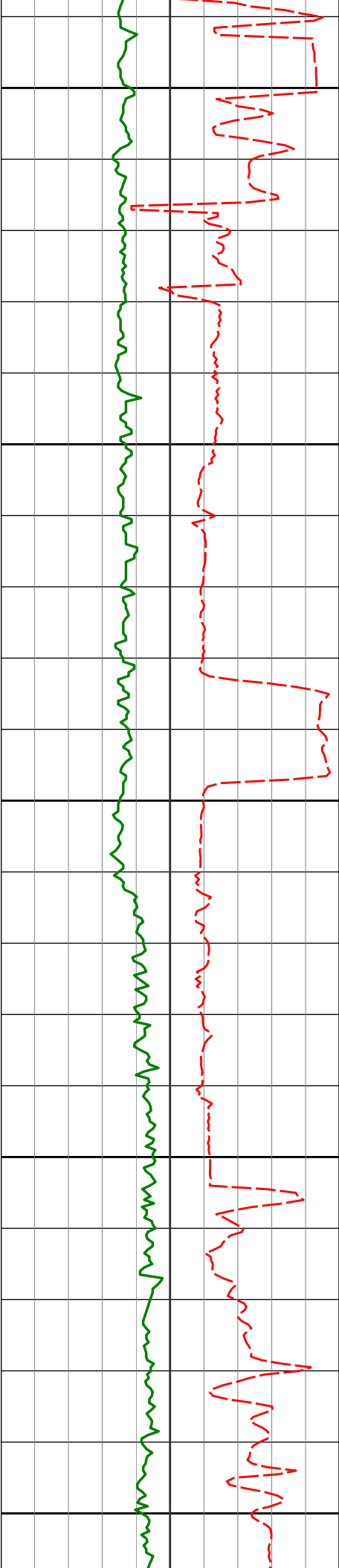
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12350

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90.28°

89.82°

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12400

12450

12464'

90.74°

89.02°

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6026.13'

12500

12550

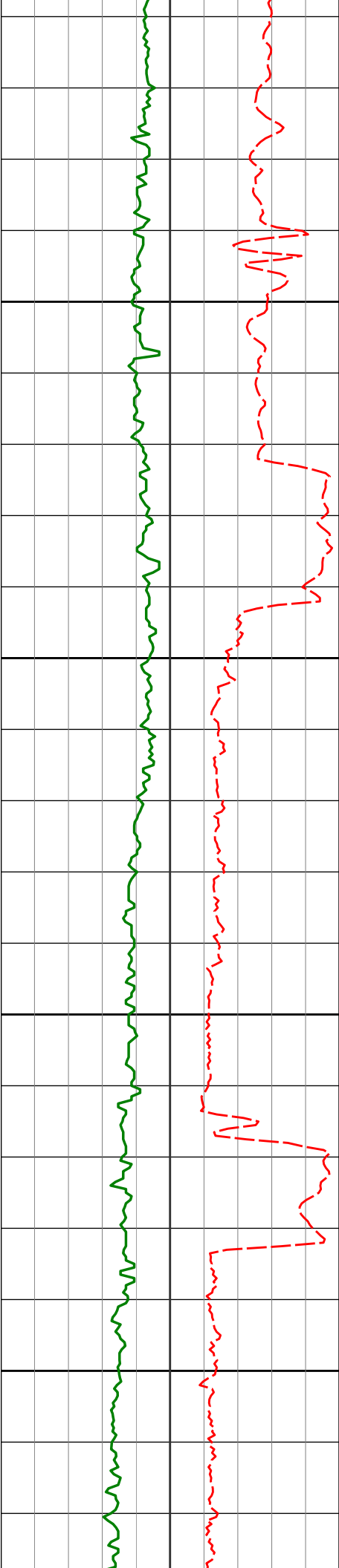
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6625.42'

6120.05'



12600

12650

12700

12750

12558

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12748'

89.54

90.92°

91.82°

88.58

88.93°

88.70°

6625.42

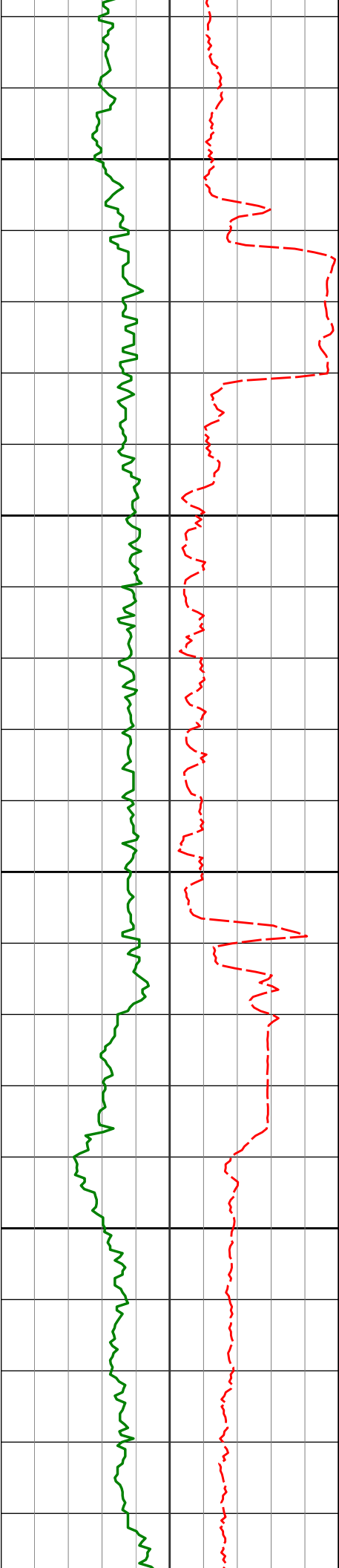
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12800

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89.44°

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12850

12900

12938'

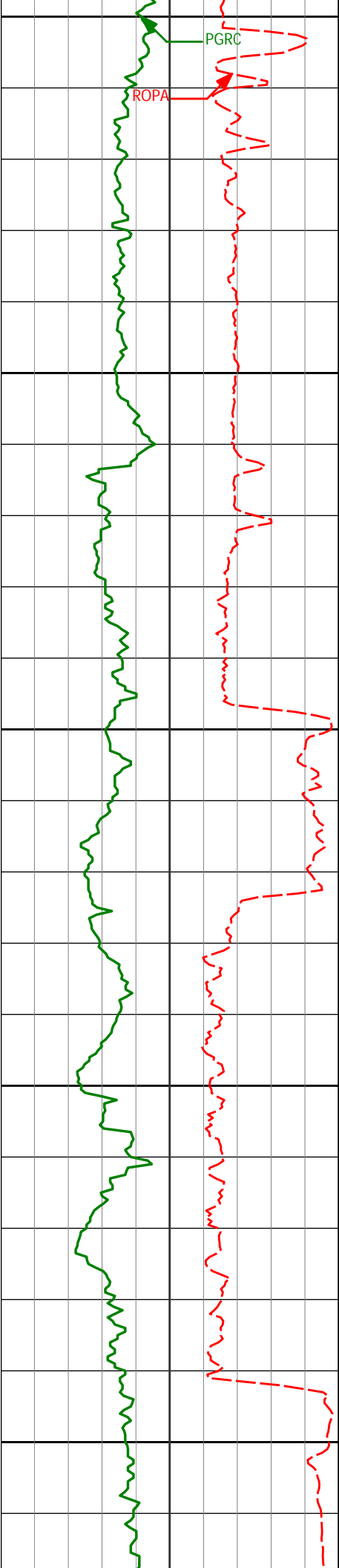
90.00°

88.21°

6621.41'

6499.66'

12950



PGRG

ROPA

13000

13033'

13050

13100

13127'

13150

13200

88.49°

88.48°

6622.66'

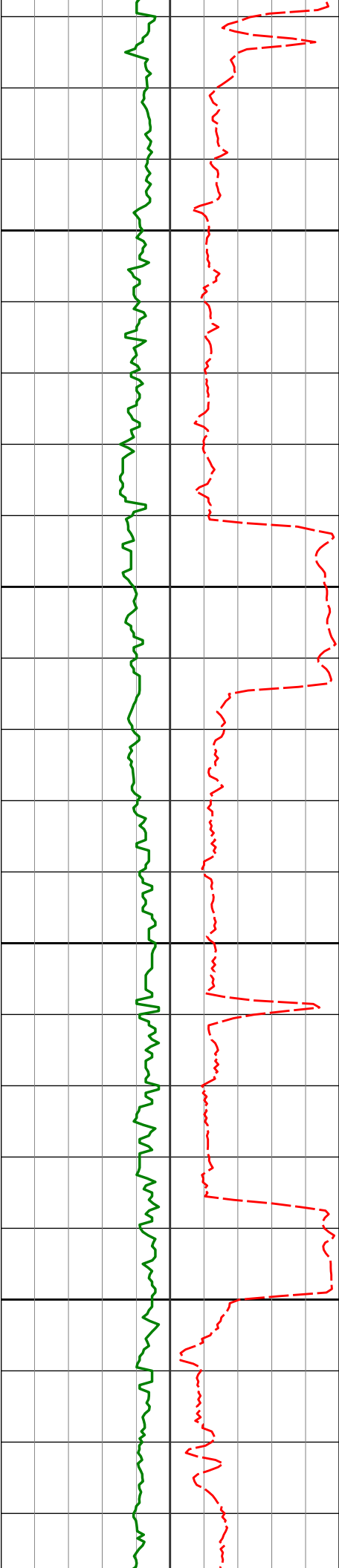
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6688.52'



13227'

89.85°

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6625.13'

6788.47'

13250

13300

13322'

91.48°

89.73°

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6883.35'

13350

13400

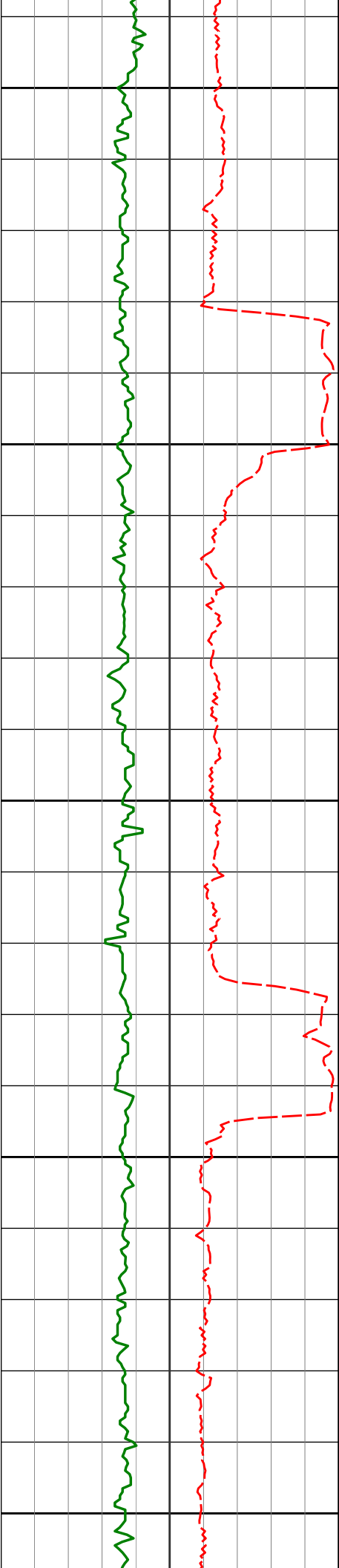
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89.69°

89.63°

6623.06'

6978.19'



13450

13500

13550

13600

13650

13512'

91.05°

89.19°

6622.45'

7073.06'

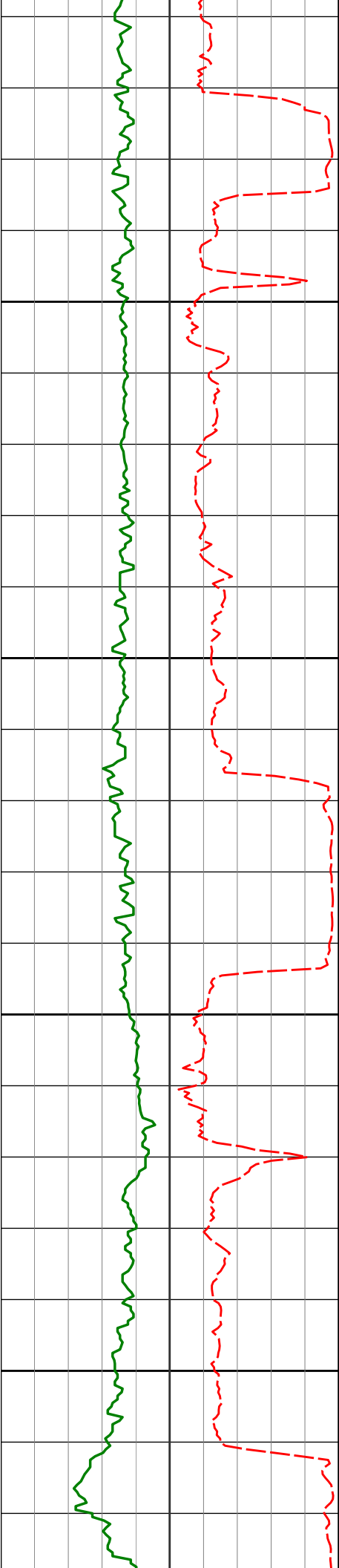
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89.29°

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13700

13702'

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13750

13800

13797'

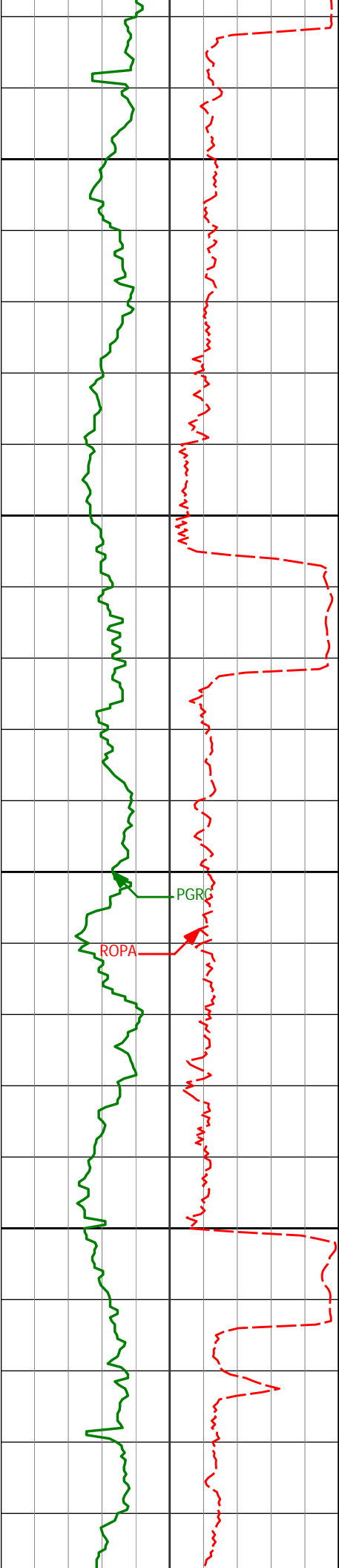
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88.54°

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92.99°

90.24°

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7451.61'

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92.25°

90.96°

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7546.26'

14000

PGRG

ROPA

14050

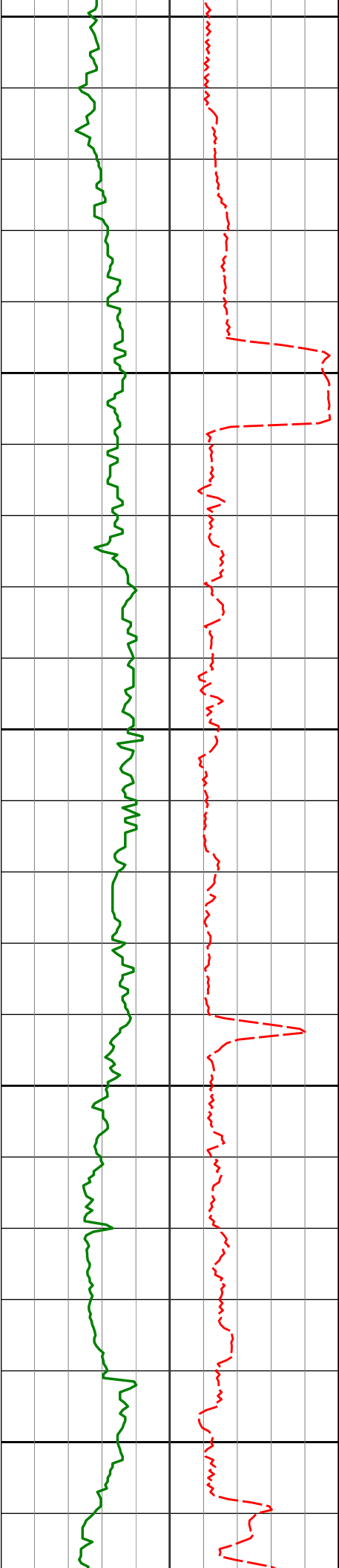
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91.87°

6607.13'

7640.84'



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14150

14200

14250

14300

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90.89°

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7735.46'

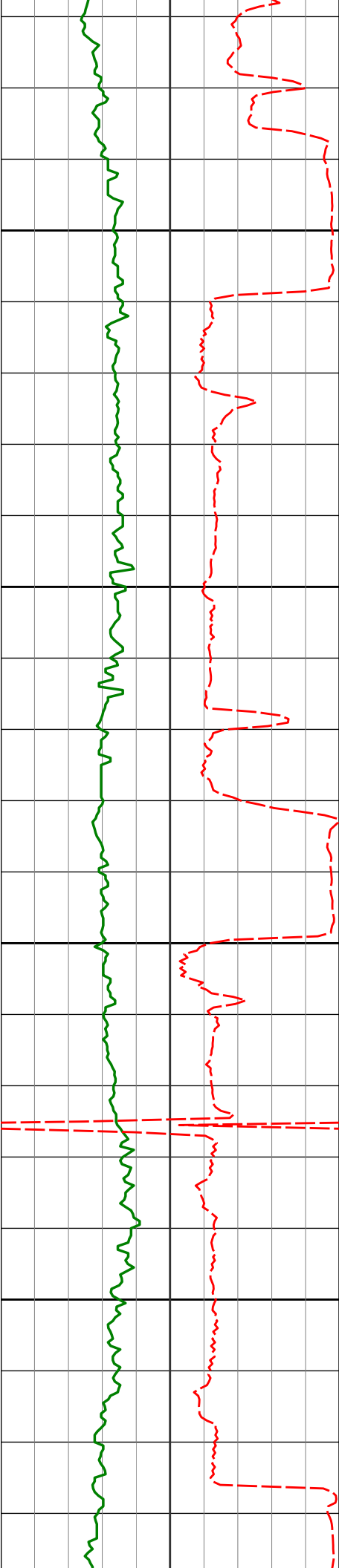
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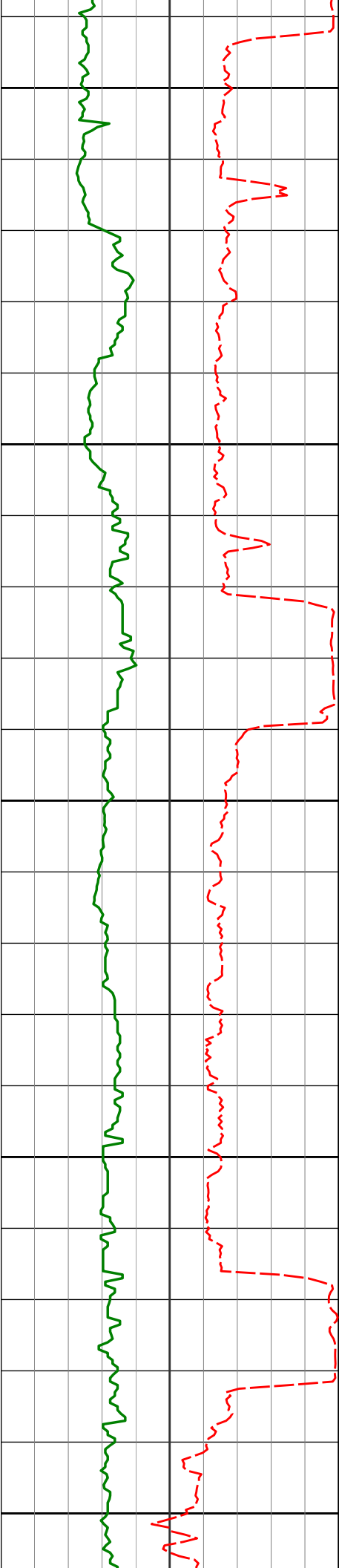
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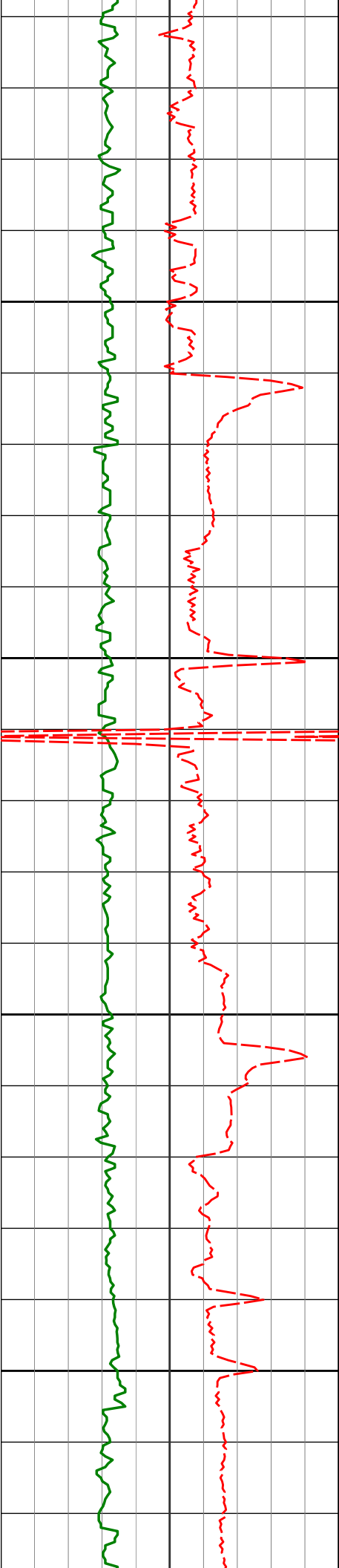
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89.50°

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14850

14900

14935'

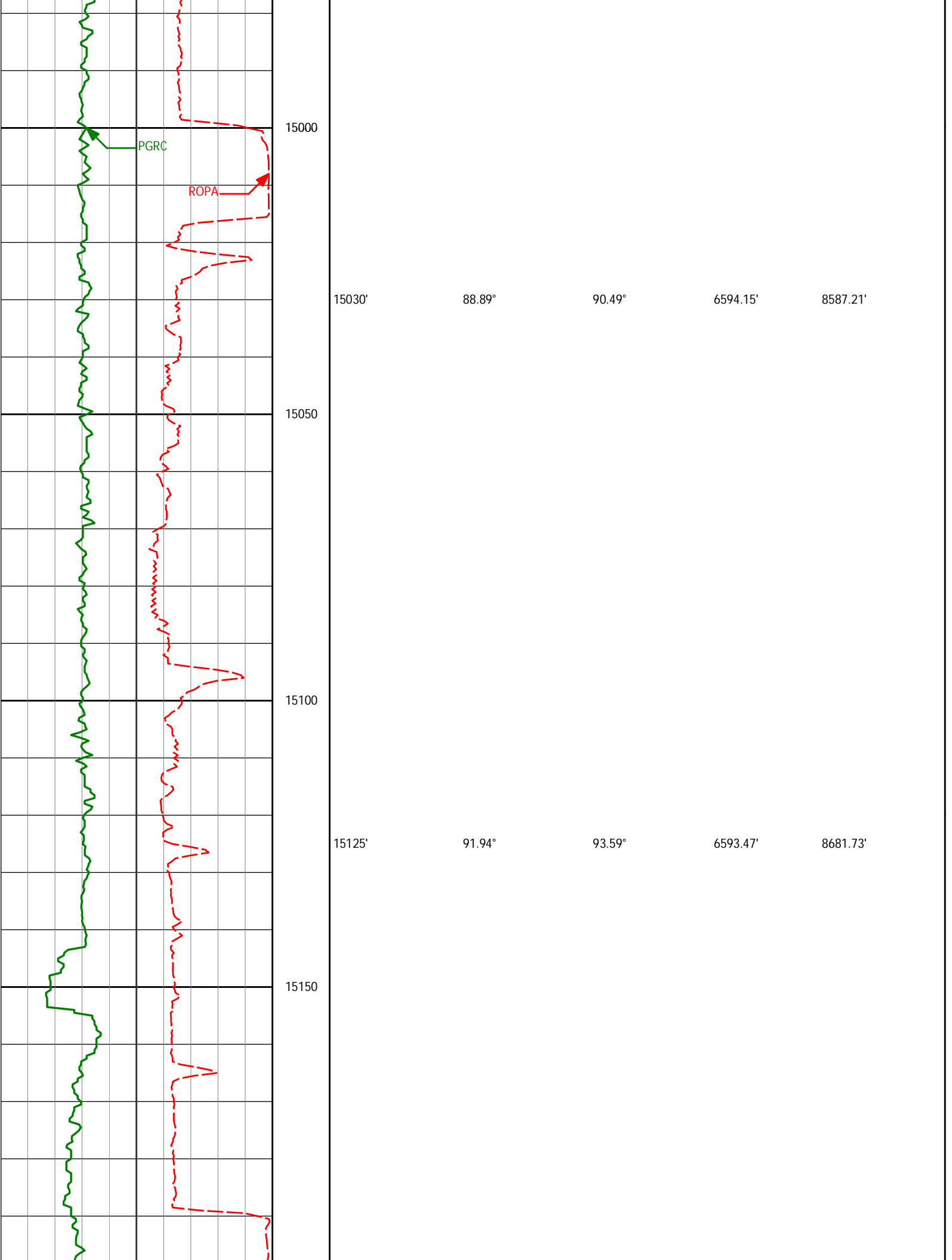
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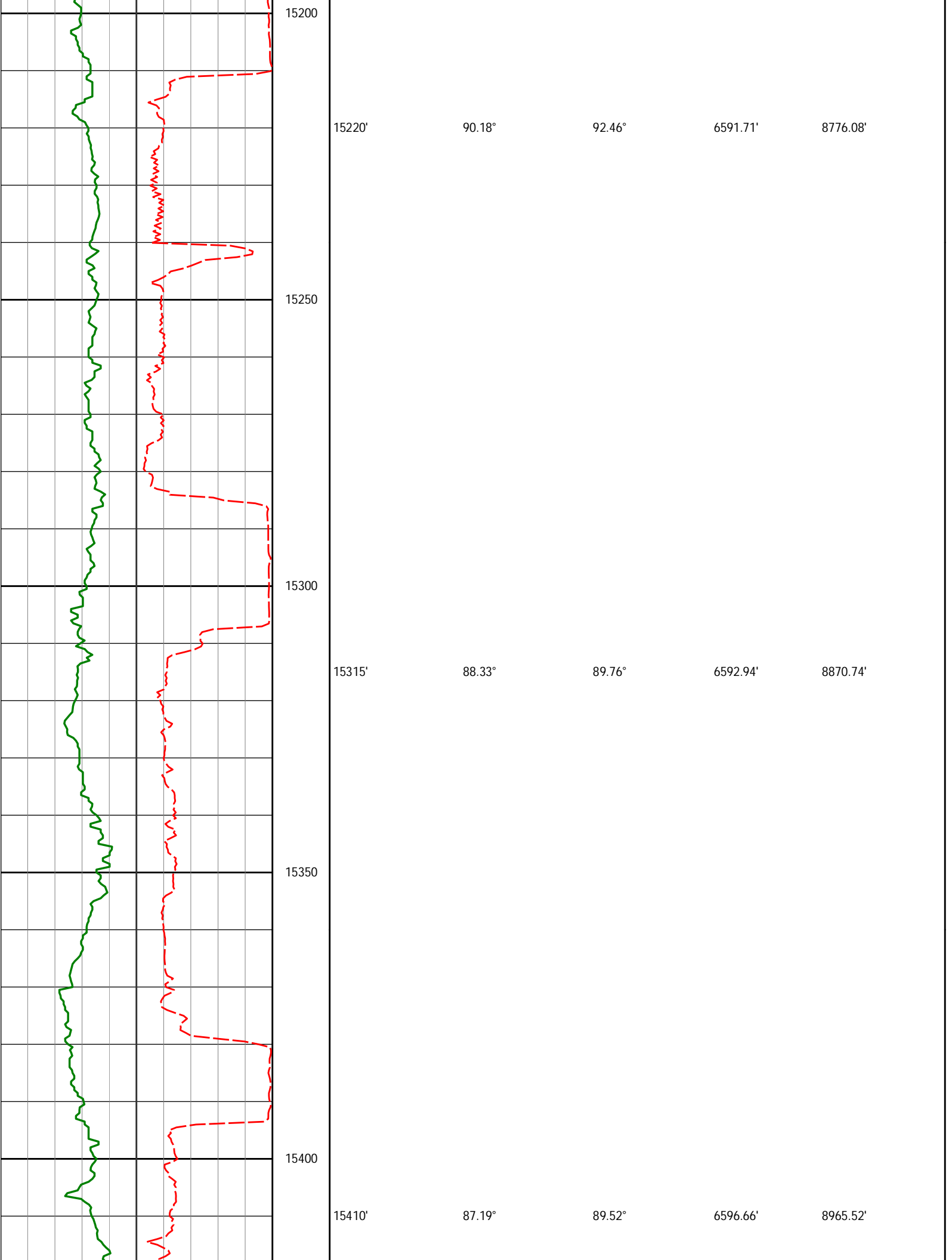
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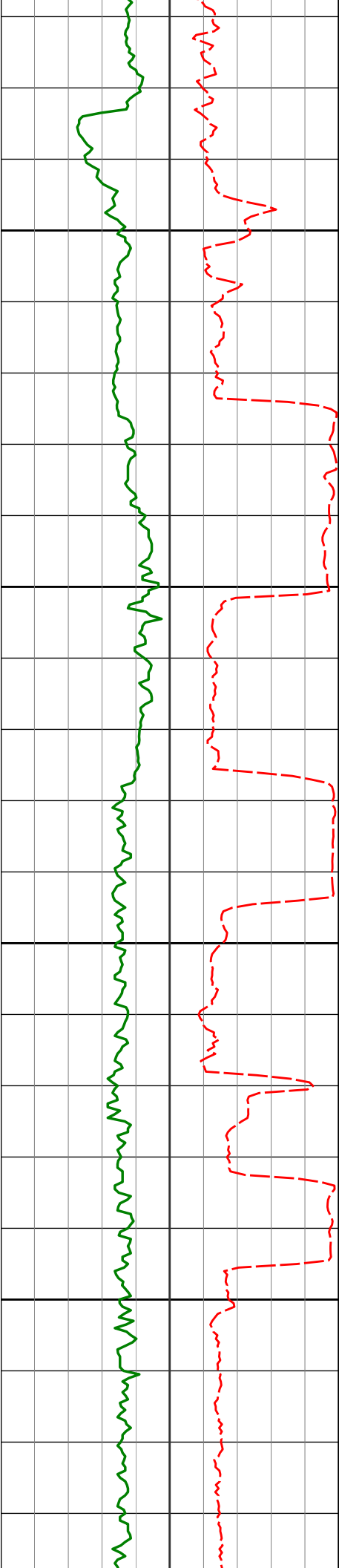
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15500

15550

15600

15504'

15599'

88.31°

90.22°

87.29°

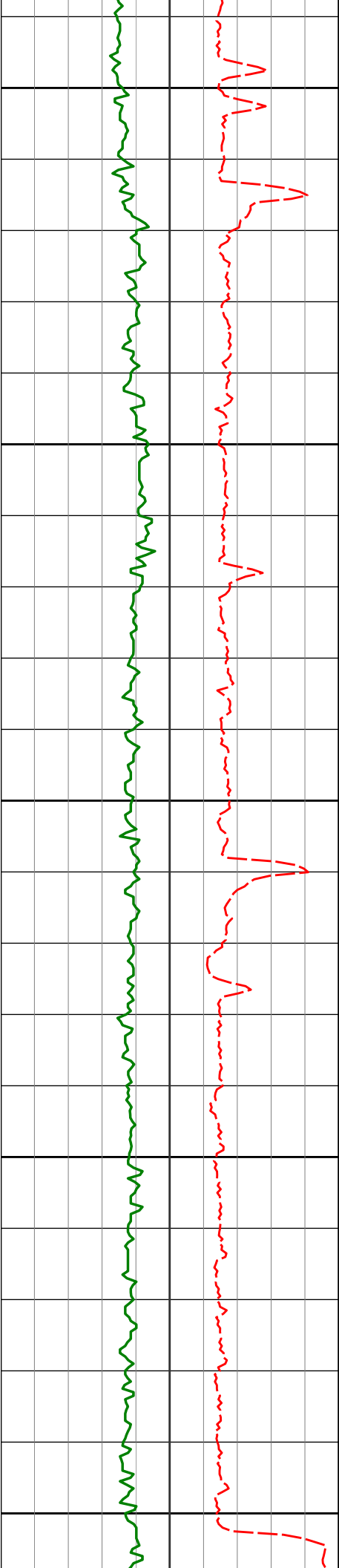
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6601.57'

9059.38'

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15650

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89.69°

87.02°

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9249.34'

15700

15750

15789'

89.72°

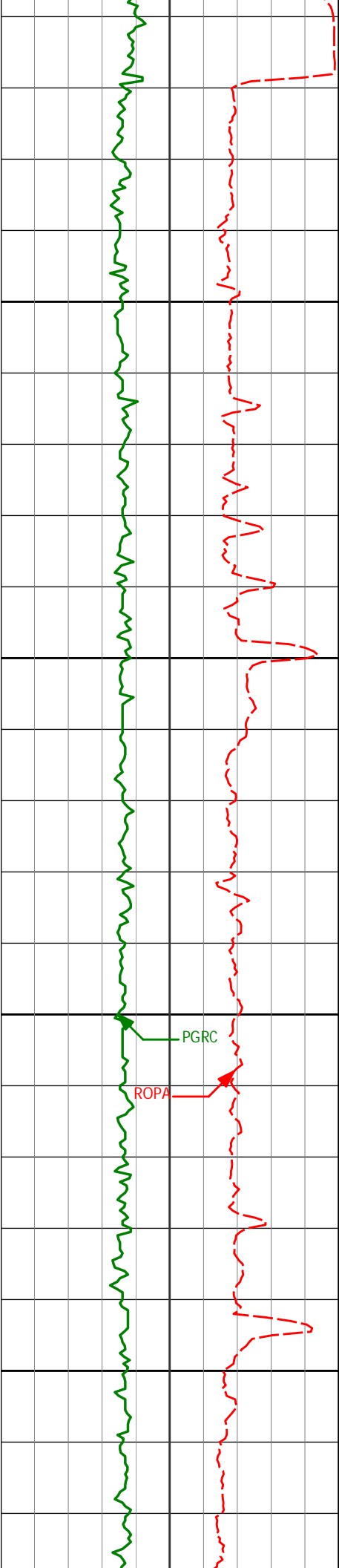
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9344.33'

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15850



15884'

15900

15950

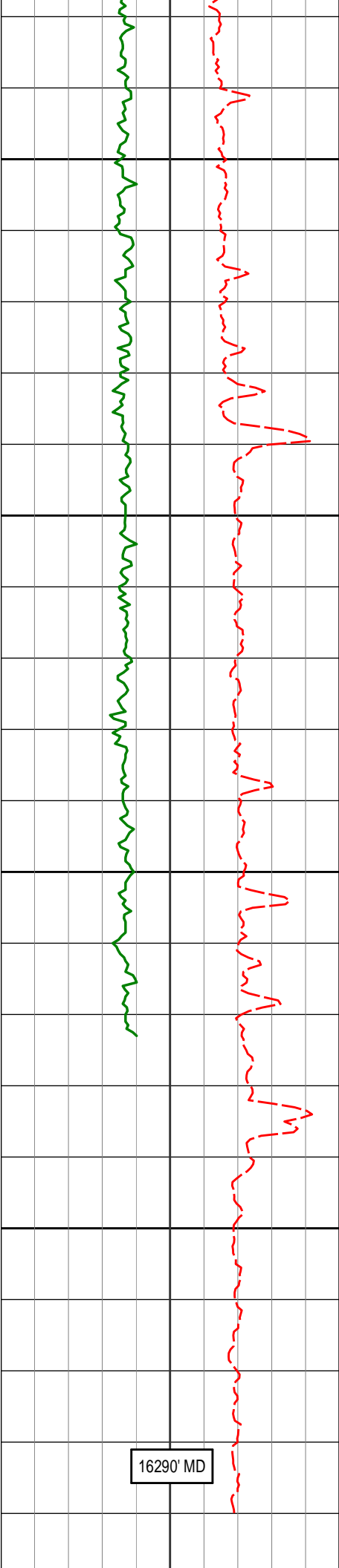
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16000

16050

16073'

15884'	91.14°	89.11°	6601.42'	9439.26'
15978'	90.71°	89.51°	6599.90'	9533.13'
16073'	90.99°	91.93°	6598.49'	9627.85'



16100

16150

16200

16250

16168'

90.49°

91.98°

6597.26'

9722.40'

16226'

90.55°

93.81°

6596.74'

9780.02'

16290'

90.55°

93.81°

6596.12'

9843.49'

5138.00	11.62	355.15	5122.82	171.99 N	14.54 W	-3.80	2.63
5233.00	9.26	355.82	5216.24	189.15 N	15.91 W	-4.10	2.49
5327.00	11.05	352.59	5308.77	205.62 N	17.62 W	-4.78	2.00
5422.00	10.93	356.49	5402.03	223.64 N	19.35 W	-5.38	0.79
5517.00	9.65	2.47	5495.50	240.59 N	19.55 W	-4.54	1.75
5611.00	11.54	348.35	5587.91	257.67 N	21.11 W	-5.03	3.40
5706.00	14.80	340.99	5680.40	278.46 N	26.99 W	-9.60	3.85
5800.00	14.45	340.96	5771.36	300.90 N	34.72 W	-15.92	0.37
5895.00	16.07	350.50	5863.02	325.07 N	40.76 W	-20.44	3.14
5933.00	15.63	349.56	5899.58	335.30 N	42.56 W	-21.60	1.34
5990.00	15.69	356.57	5954.46	350.54 N	44.41 W	-22.50	3.32
6038.00	17.72	13.88	6000.47	364.12 N	43.05 W	-20.29	11.14
6085.00	18.74	22.87	6045.11	378.03 N	38.39 W	-14.78	6.36
6133.00	18.22	36.82	6090.66	391.14 N	30.90 W	-6.48	9.25
6179.00	18.28	51.91	6134.37	401.36 N	20.90 W	4.13	10.25
6227.00	17.98	63.42	6180.00	409.32 N	8.35 W	17.15	7.48
6274.00	20.37	68.71	6224.40	415.54 N	5.76 E	31.63	6.28
6322.00	22.61	68.71	6269.06	421.92 N	22.15 E	48.38	4.67
6369.00	27.13	66.24	6311.69	429.52 N	40.38 E	67.05	9.87
6417.00	32.77	66.85	6353.26	439.05 N	62.36 E	89.58	11.77
6464.00	37.10	72.31	6391.79	448.36 N	87.58 E	115.33	11.36
6512.00	42.49	76.06	6428.67	456.67 N	117.13 E	145.34	12.29
6559.00	51.26	78.18	6460.76	464.27 N	150.55 E	179.16	18.95
6607.00	57.75	80.26	6488.62	471.54 N	188.92 E	217.91	13.97
6653.00	57.84	81.29	6513.14	477.78 N	227.34 E	256.65	1.90
6701.00	58.32	81.68	6538.52	483.81 N	267.63 E	297.24	1.21
6748.00	60.24	81.94	6562.53	489.57 N	307.62 E	337.51	4.11
6796.00	62.64	83.05	6585.47	495.07 N	349.41 E	379.56	5.40
6843.00	68.04	84.73	6605.08	499.60 N	391.87 E	422.22	11.94
6891.00	71.96	87.27	6621.49	502.73 N	436.85 E	467.31	9.56
6937.00	74.16	87.85	6634.90	504.61 N	480.81 E	511.30	4.93
6985.00	77.97	87.82	6646.45	506.37 N	527.36 E	557.87	7.94
7033.00	81.29	88.63	6655.09	507.83 N	574.55 E	605.05	7.11
7119.00	86.43	87.35	6664.29	510.83 N	659.97 E	690.50	6.16
7213.00	86.99	86.81	6669.68	515.61 N	753.69 E	784.33	0.83
7308.00	88.34	86.70	6673.55	520.98 N	848.46 E	879.25	1.43
7403.00	90.03	88.27	6674.90	525.15 N	943.35 E	974.22	2.43
7498.00	92.90	90.44	6672.48	526.22 N	1038.30 E	1069.05	3.79
7592.00	90.86	89.71	6669.39	526.10 N	1132.24 E	1162.80	2.30
7687.00	90.89	87.31	6667.94	528.57 N	1227.19 E	1257.72	2.53
7782.00	91.66	88.32	6665.83	532.19 N	1322.10 E	1352.67	1.34
7876.00	92.16	90.35	6662.69	533.28 N	1416.03 E	1446.49	2.22
7971.00	91.11	91.50	6659.98	531.75 N	1510.98 E	1541.16	1.64
8066.00	90.34	91.00	6658.78	529.67 N	1605.95 E	1635.81	0.97
8160.00	88.37	91.52	6659.84	527.61 N	1699.91 E	1729.47	2.17
8255.00	87.78	89.56	6663.03	526.71 N	1794.85 E	1824.17	2.15
8349.00	88.64	88.74	6665.97	528.11 N	1888.79 E	1918.01	1.26
8444.00	89.97	89.43	6667.12	529.62 N	1983.77 E	2012.90	1.58
8539.00	91.20	88.20	6666.15	531.59 N	2078.74 E	2107.81	1.83
8634.00	91.70	89.65	6663.74	533.37 N	2173.69 E	2202.69	1.61
8729.00	91.20	89.23	6661.34	534.30 N	2268.66 E	2297.52	0.69
8824.00	90.68	89.40	6659.78	535.43 N	2363.64 E	2392.39	0.58
8918.00	92.25	89.66	6657.38	536.21 N	2457.60 E	2486.22	1.69
9013.00	92.28	89.03	6653.62	537.29 N	2552.52 E	2581.02	0.66
9108.00	91.82	89.96	6650.23	538.13 N	2647.45 E	2675.82	1.09
9203.00	90.43	91.08	6648.36	537.26 N	2742.43 E	2770.56	1.88
9298.00	89.66	89.71	6648.29	536.61 N	2837.42 E	2865.33	1.65
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9487.00	91.45	89.82	6644.46	537.13 N	3026.37 E	3053.94	0.34
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9771.00	90.68	89.52	6640.40	540.40 N	3310.32 E	3337.55	0.31
9866.00	90.55	89.94	6639.38	540.85 N	3405.31 E	3432.38	0.46
9961.00	90.74	90.36	6638.31	540.60 N	3500.31 E	3527.18	0.49
10056.00	89.29	89.06	6638.29	541.08 N	3595.30 E	3622.02	2.05
10151.00	88.70	89.08	6639.95	542.62 N	3690.27 E	3716.90	0.62
10246.00	90.74	88.33	6640.42	544.77 N	3785.24 E	3811.82	2.29
10337.00	90.83	90.26	6639.17	545.89 N	3876.22 E	3902.69	2.12
10429.00	90.22	91.75	6638.33	544.28 N	3968.20 E	3994.39	1.75
10520.00	89.85	90.93	6638.27	542.15 N	4059.18 E	4085.06	0.99
10612.00	90.06	88.45	6638.35	542.64 N	4151.17 E	4176.90	2.71
10704.00	89.11	88.82	6639.01	544.84 N	4243.14 E	4268.83	1.11

10764.00	88.86	88.82	6640.64	544.84 N	4243.14 E	4268.03	1.11
10796.00	88.55	86.63	6642.72	544.28 N	4335.10 E	4360.54	4.14
10888.00	88.80	87.02	6644.83	549.32 N	4427.03 E	4452.33	6.52
10979.00					4517.87 E	4543.30	0.51
11071.00	91.66	88.54	6644.46	552.88 N	4609.78 E	4635.27	3.52
11163.00	91.57	87.84	6641.87	555.79 N	4701.70 E	4727.19	0.77
11255.00	92.09	86.88	6638.93	560.02 N	4793.56 E	4819.13	1.19
11349.00	91.98	86.61	6635.59	565.36 N	4887.34 E	4913.06	0.31
11441.00	89.35	86.44	6634.52	570.93 N	4979.16 E	5005.05	2.86
11533.00	92.92	90.06	6632.70	573.74 N	5071.07 E	5096.96	5.53
11626.00	91.60	90.90	6629.03	572.96 N	5163.99 E	5189.65	1.68
11718.00	88.49	89.20	6628.96	572.88 N	5255.98 E	5281.45	3.85
11810.00	89.75	88.47	6630.37	574.76 N	5347.94 E	5373.36	1.58
11901.00	90.25	89.44	6630.37	576.41 N	5438.93 E	5464.27	1.20
11994.00	89.88	90.27	6630.27	576.65 N	5531.93 E	5557.10	0.98
12087.00	91.14	90.62	6629.44	575.93 N	5624.92 E	5649.86	1.41
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13607.00	90.99	89.29	6620.76	598.73 N	7144.51 E	7167.93	0.12
13702.00	89.63	87.12	6620.24	601.71 N	7239.46 E	7262.88	2.70
13797.00	91.94	88.54	6618.94	605.30 N	7334.37 E	7357.83	2.85
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13986.00	92.25	90.96	6610.56	605.31 N	7523.17 E	7546.26	1.09
14081.00	91.88	91.87	6607.13	602.97 N	7618.08 E	7640.84	1.03
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14271.00	88.73	90.16	6606.01	599.81 N	7808.02 E	7830.21	1.89
14366.00	90.22	89.58	6606.88	600.02 N	7903.01 E	7925.03	1.68
14461.00	89.94	90.04	6606.75	600.34 N	7998.01 E	8019.87	0.57
14556.00	93.27	91.30	6604.09	599.23 N	8092.95 E	8114.56	3.75
14651.00	92.19	91.68	6599.57	596.76 N	8187.81 E	8209.08	1.21
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14840.00	90.62	89.50	6595.94	595.44 N	8376.75 E	8397.57	0.78
14935.00	91.32	89.67	6594.33	596.12 N	8471.73 E	8492.41	0.76
15030.00	88.89	90.49	6594.15	595.99 N	8566.72 E	8587.21	2.70
15125.00	91.94	93.59	6593.47	592.61 N	8661.64 E	8681.73	4.58
15220.00	90.18	92.46	6591.71	587.60 N	8756.48 E	8776.08	2.20
15315.00	88.33	89.76	6592.94	585.76 N	8851.45 E	8870.74	3.44
15410.00	87.19	89.52	6596.66	586.36 N	8946.37 E	8965.52	1.23
15504.00	88.31	87.29	6600.35	588.97 N	9040.25 E	9059.38	2.65
15599.00	90.22	87.78	6601.57	593.06 N	9135.15 E	9154.35	2.08
15694.00	89.69	87.02	6601.64	597.37 N	9230.05 E	9249.34	0.98
15789.00	89.72	87.69	6602.13	601.75 N	9324.95 E	9344.33	0.71
15884.00	91.14	89.11	6601.42	604.40 N	9419.91 E	9439.26	2.11
15978.00	90.71	89.51	6599.90	605.53 N	9513.89 E	9533.13	0.62
16073.00	90.99	91.93	6598.49	604.34 N	9608.86 E	9627.85	2.56
16168.00	90.49	91.98	6597.26	601.10 N	9703.80 E	9722.40	0.53
16226.00	90.55	93.81	6596.74	598.17 N	9761.72 E	9780.02	3.16
16290.00	90.55	93.81	6596.12	593.92 N	9825.58 E	9843.49	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 86.43 DEGREES (GRID)

A TOTAL CORRECTION OF 7.72 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16290.00 FEET
IS 9843.51 FEET ALONG 86.54 DEGREES (GRID)

First three survey's are from 3rd party source (Muilti Shot EMS) and provided by CO-man on location before drilling.

Depth 241 Inc 0.60 Azi 68.53

Depth 511 Inc 0.40 Azi 172.73

Depth 725 Inc 0.20 Azi 57.23

Tied in @ Surface

Magnettic direction of 7.724 has been added to AZI for grid direction correction.

Date Printed:19 December 2013