

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 600 / 1 : 240

Country : USA			
Field : Wattenburg			
Location : Lat: 40° 26' 54.92" North Long: 104° 23' 38.72" West			
Well : Wells Ranch AA35-69-1AHNC			
Company : Noble Energy			
Rig : H&P 321			
LOCATION			
Latitude : 40° 26' 54.92" North Longitude : 104° 23' 38.72" West			
UTM Easting = 3,307,778.650 ft UTM Northing = 1,408,180.930 ft			
Company : Noble Energy Rig : H&P 321 Well : Wells Ranch AA35-69-1AHNC Field : Wattenburg Country : USA API Number : 05-123-38666			
Other Services Directional Drilling			
Permanent Datum : Ground Level Log Measured From : Drill Floor Drilling Measured From : Drill Floor			
Elevation : 4810.00 ft 30.00 ft Above Permanent Datum			
MD LOG			
Elev. KB N/A DF 4840.00 ft GL 4810.00 ft WD N/A			
Depth Logged : 642.00 ft To 11,299.00 ft Date Logged : 07-Feb-14 To 14-Feb-14 Total Depth MD : 11,299.00 ft TVD : 6,755.97 ft Spud Date : 06-Feb-14			
Unit No. : 11210424 Plot Type : Final Plot Date : 14-Feb-14			
Job No. : CA-XX-0901058458			
Borehole Record (MD)			
Run No.	Size	From	To
0100	8.750 in	642.00 ft	6,116.00 ft
0200	8.750 in	6,116.00 ft	7,076.00 ft
0300	6.125 in	7,076.00 ft	11,299.00 ft
Casing Record (MD)			
Run No.	Size	From	To
	9.625 in	34.90 lbpft	SURFACE 632.00 ft
	7.000 in	26.00 lbpft	SURFACE 7,066.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	09-Feb-14	10-Feb-14	14-Feb-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.830	6.830	4.790		
Log Start Depth (MD, ft)	642.00	6,116.00	7,076.00		
Log End Depth (MD, ft)	6,116.00	7,076.00	11,299.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	08-Feb-14 00:16	09-Feb-14 13:06	11-Feb-14 23:54		
Drill/Wipe End Date and Time	08-Feb-14 20:38	10-Feb-14 00:05	13-Feb-14 16:20		
Min Inc (deg) @ Depth (MD, ft)	0.22 @ 1,090.00	0.28 @ 6,122.00	85.93 @ 7,099.00		
Max Inc (deg) @ Depth (MD, ft)	13.27 @ 3,921.00	84.04 @ 7,022.00	92.03 @ 8,882.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	1.37 / PDC	0.65 / PDC		
Flow Rate (gpm)	597.59	588.14	313.43		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.75 / 31.00	9.60 / 40.00	9.43 / 36.00		
Filtrate CL (ppm)	1,200.00	1,400.00	2,100.00		
pH / Fluid Loss (mptm)	8.60 / 25	8.70 / 9	9.50 / 8		
PV (cP) / YP (lbf2)	3 / 2.00	10 / 11.00	9 / 8.00		
% Solids / % Sand	2.90 / 0.35	6.60 / 0.25	6.20 / 0.25		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		

Max Tool Temp (degF) / Source	141.70 / PCM	158.60 / PCM	243.20 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 141.70	N/A @ 158.60	N/A @ 243.20		
Lead MWD Engineer	Robert Barnes	Robert Barnes	Robert Barnes		
Customer Representative	Josh Kanwischer	Josh Kanwischer	Jim Turner		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11341336	11341336	12177826		
Insert Serial Number	11680794	11680794	11680794		
Date and Time Initialized	05-Feb-14 04:40	05-Feb-14 04:40	10-Feb-14 17:53		
Date and Time Read	10-Feb-14 09:07	10-Feb-14 09:19	14-Feb-14 02:30		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	54.00	65.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341336	11341336	12177826		
Sonde Serial Number	12177556	12177556	12177556		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	173.08	234.85	336.19		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	48.07	47.40	67.57		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341336	11341336	12177826		
Insert/Sonde Serial Number	11293391	11293391	11293391		

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 Resolution: 1.2 ft

6. Insite Version v8.0.10

WARRANTY

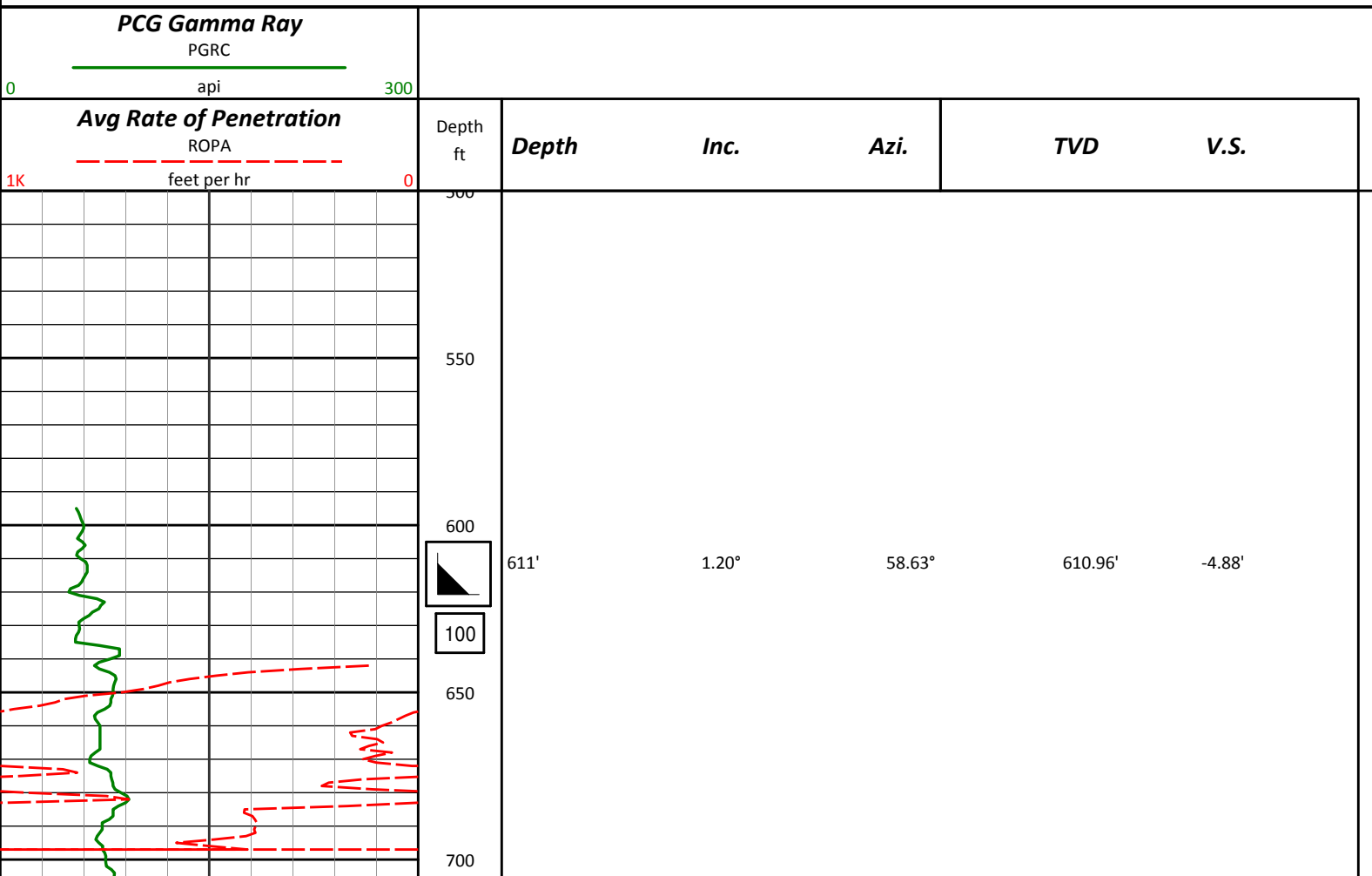
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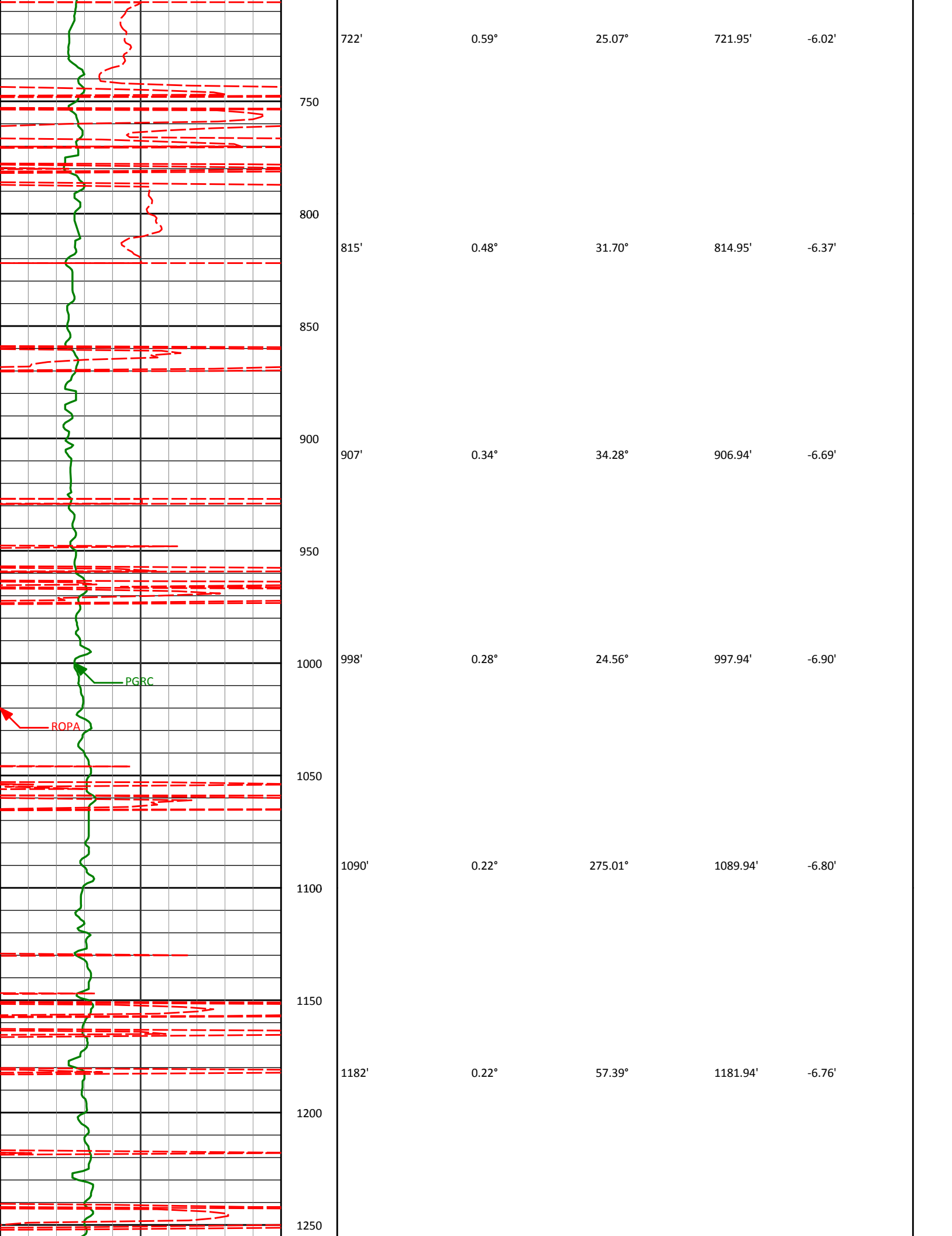
HALLIBURTON

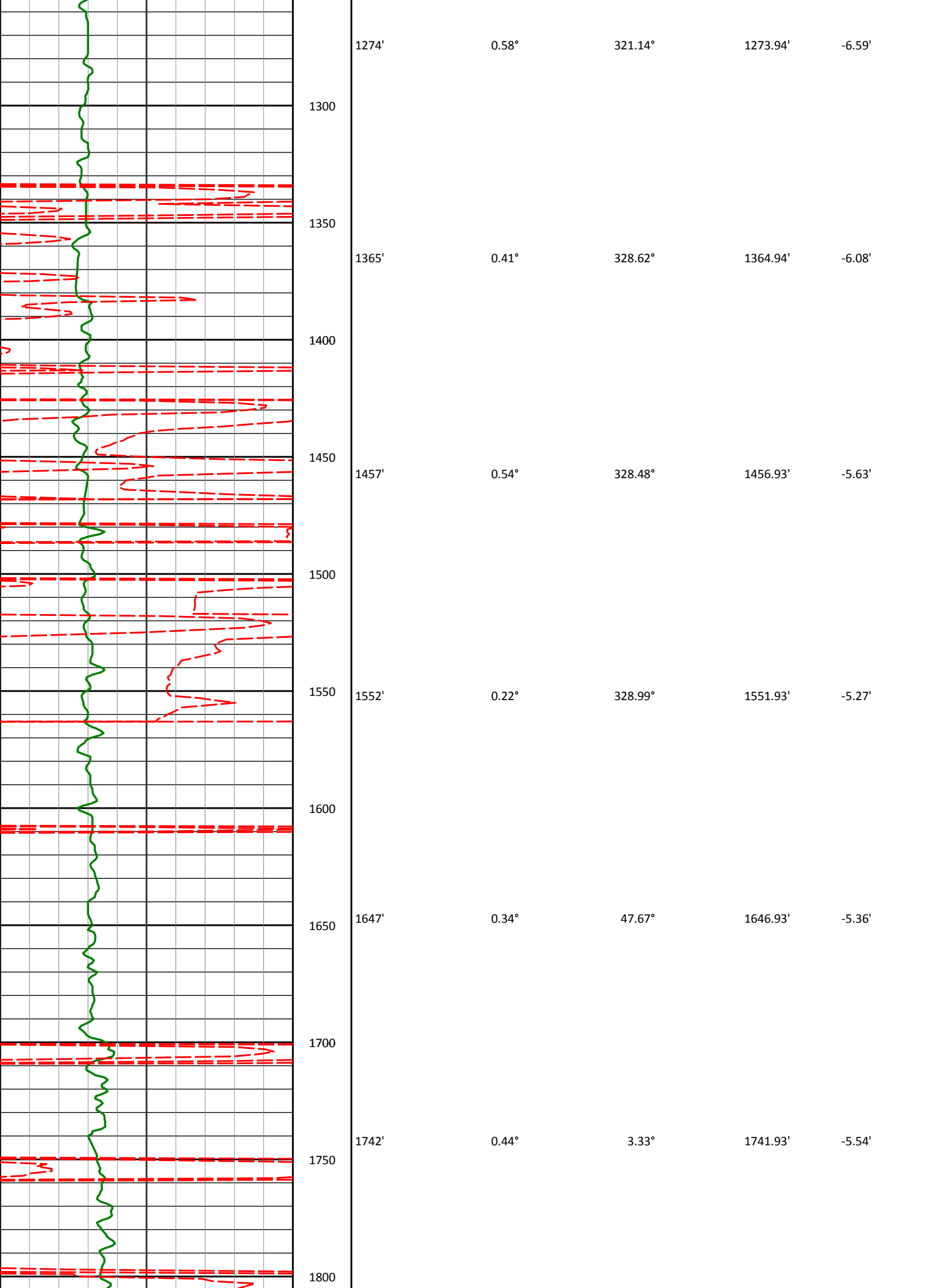
Sperry Drilling Services

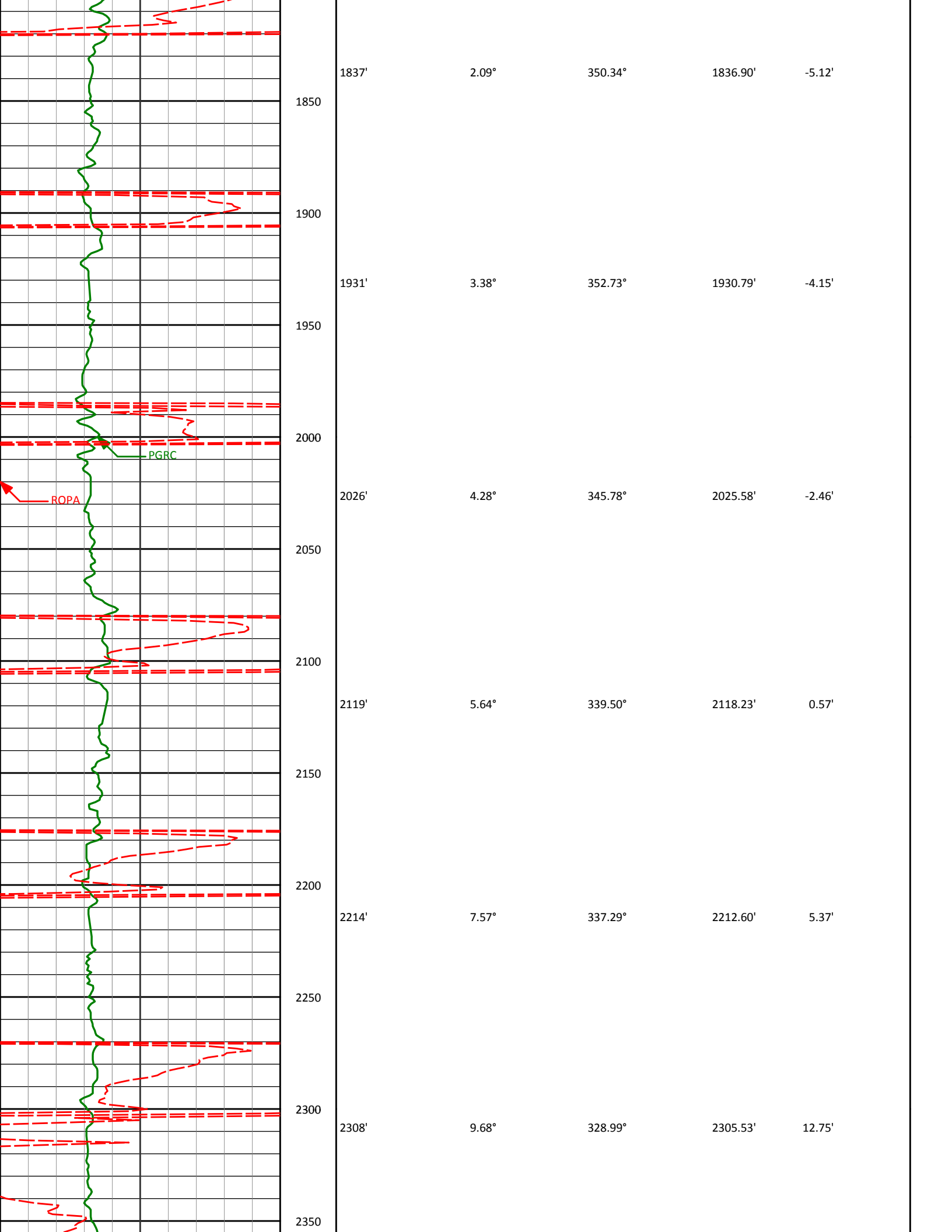
MD Correlation Log 1:600

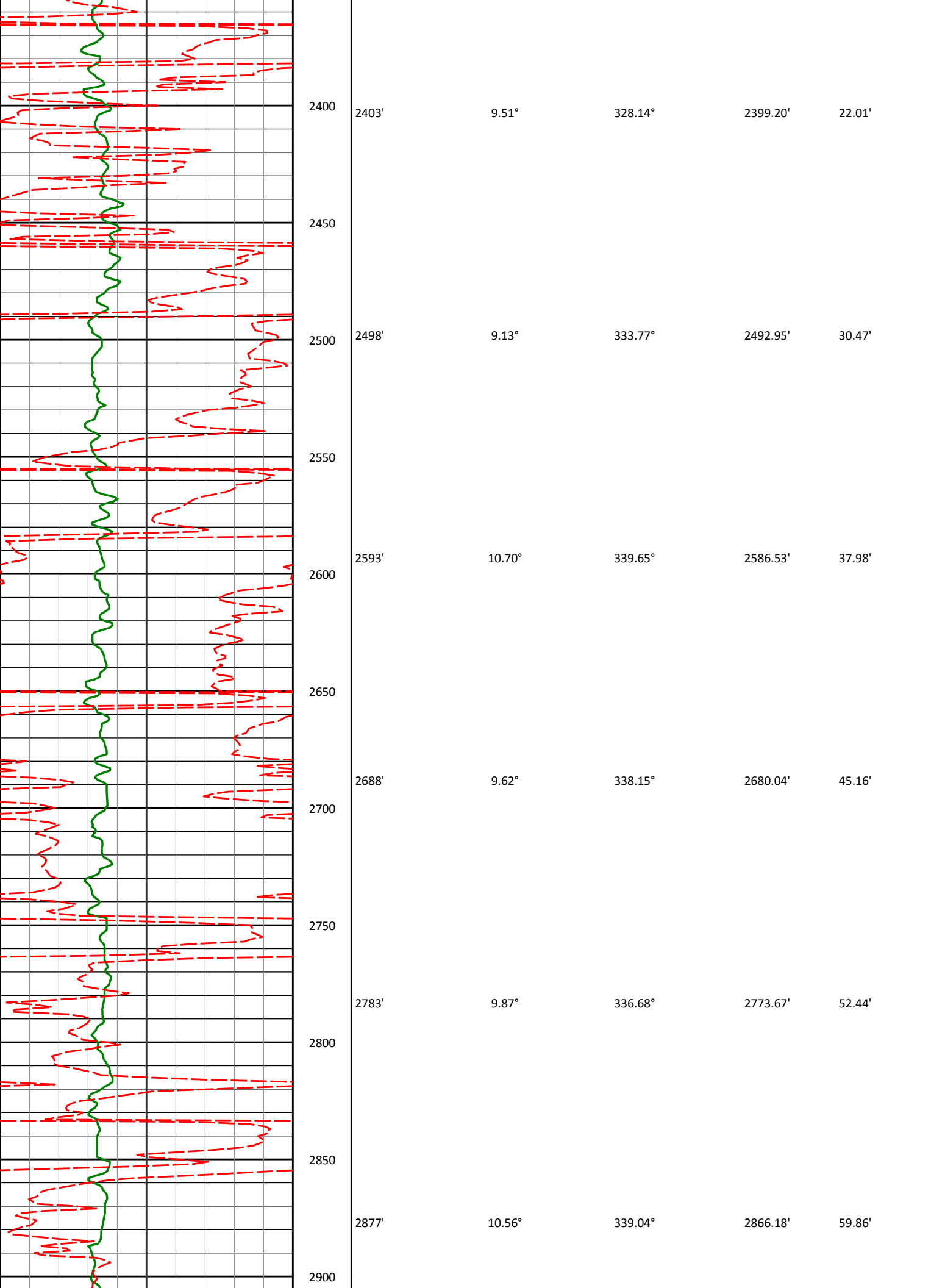
Noble Energy
Wells Ranch AA35-69-1AHNC
H&P 321
Sec. 36-T6N-R63W

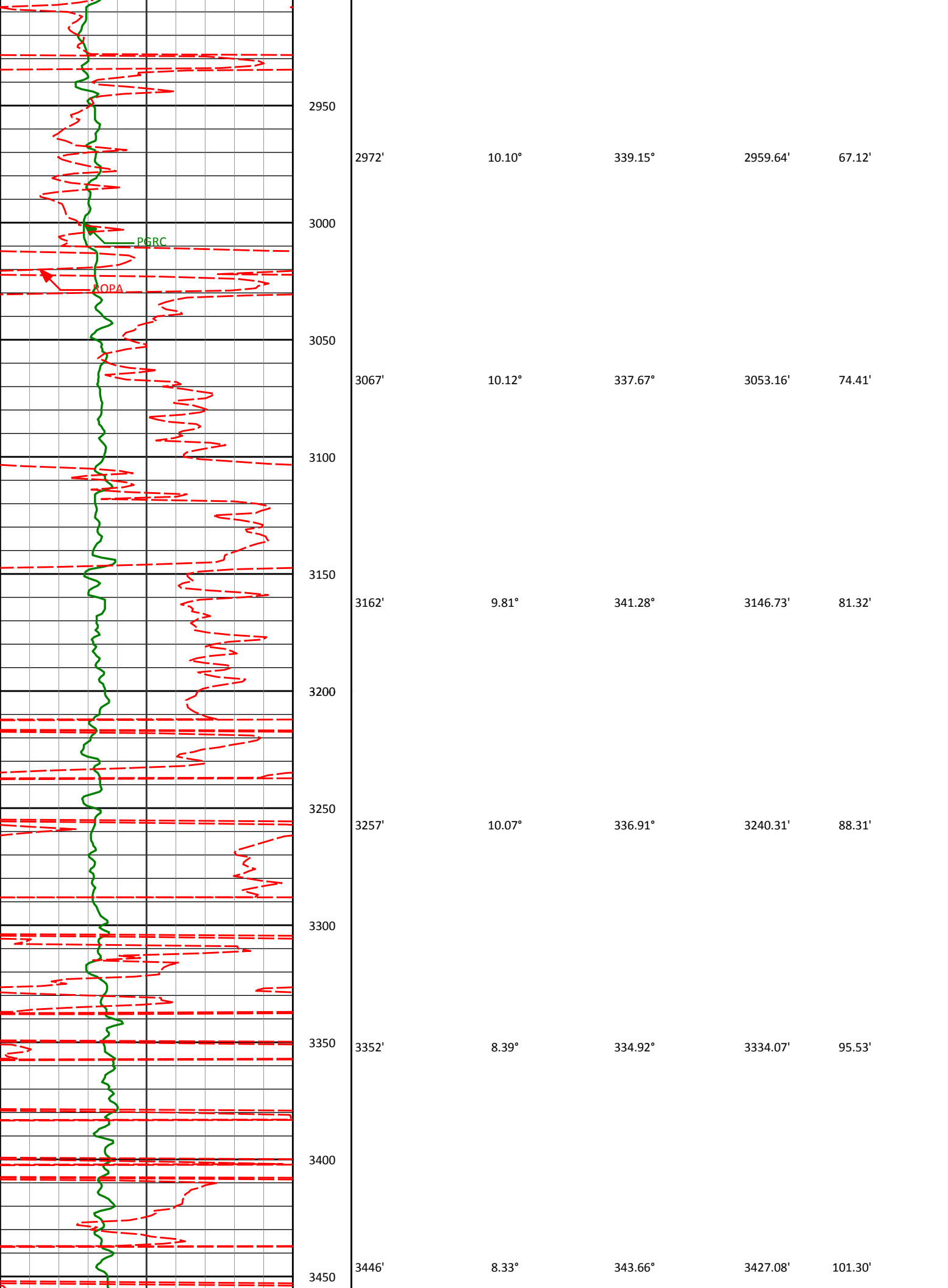


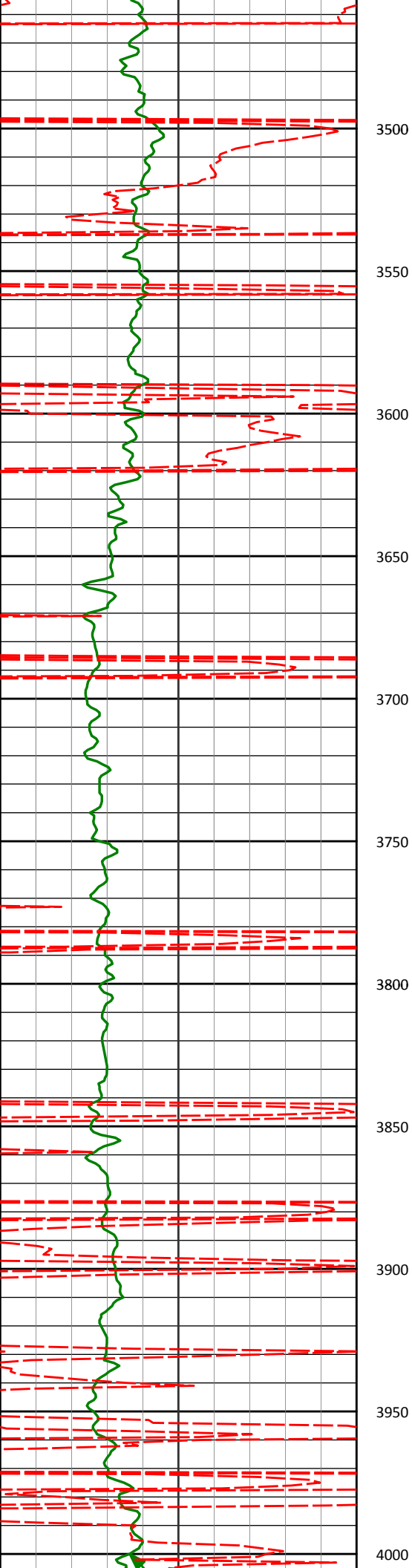












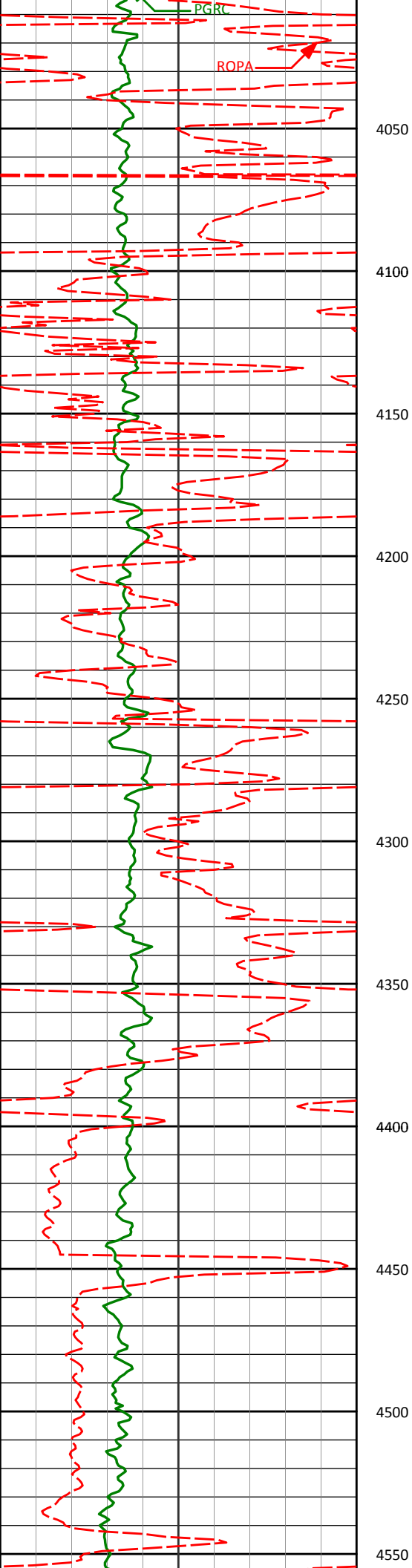
3541'	10.52°	345.92°	3520.79'	106.47'
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3636'	10.45°	343.96°	3614.20'	112.20'
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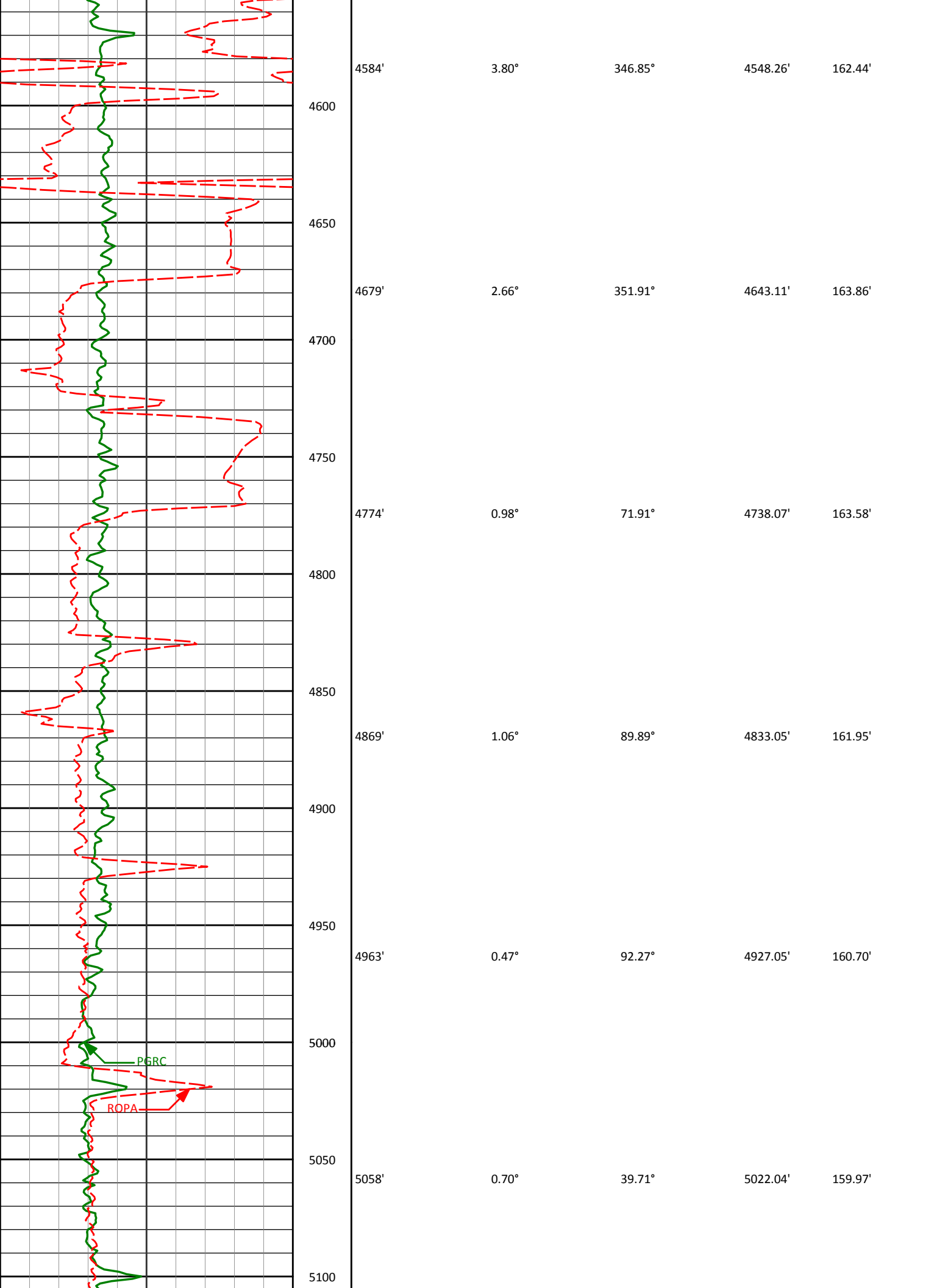
3731'	11.22°	342.52°	3707.51'	118.63'
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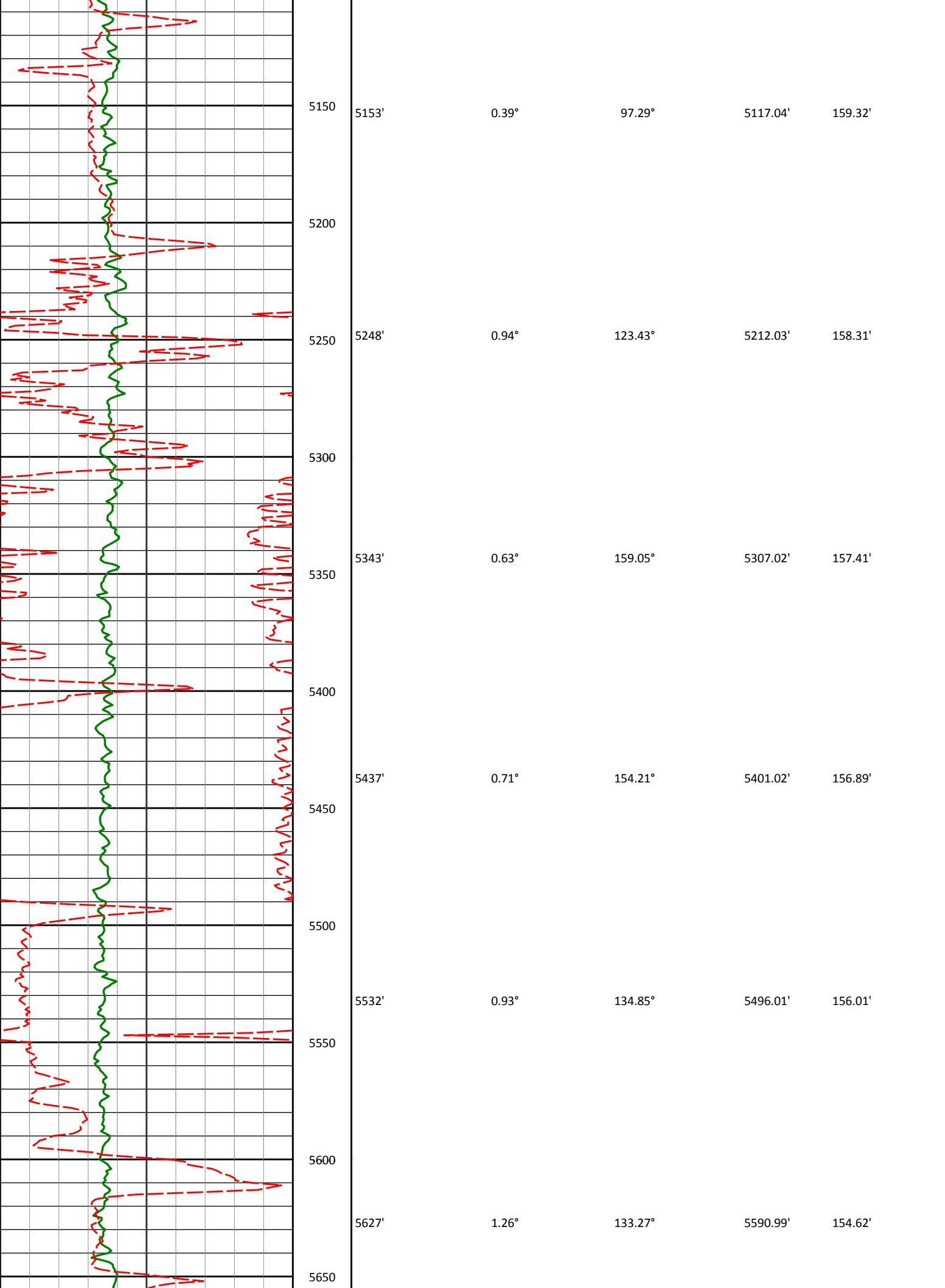
3826'	12.42°	342.88°	3800.49'	125.80'
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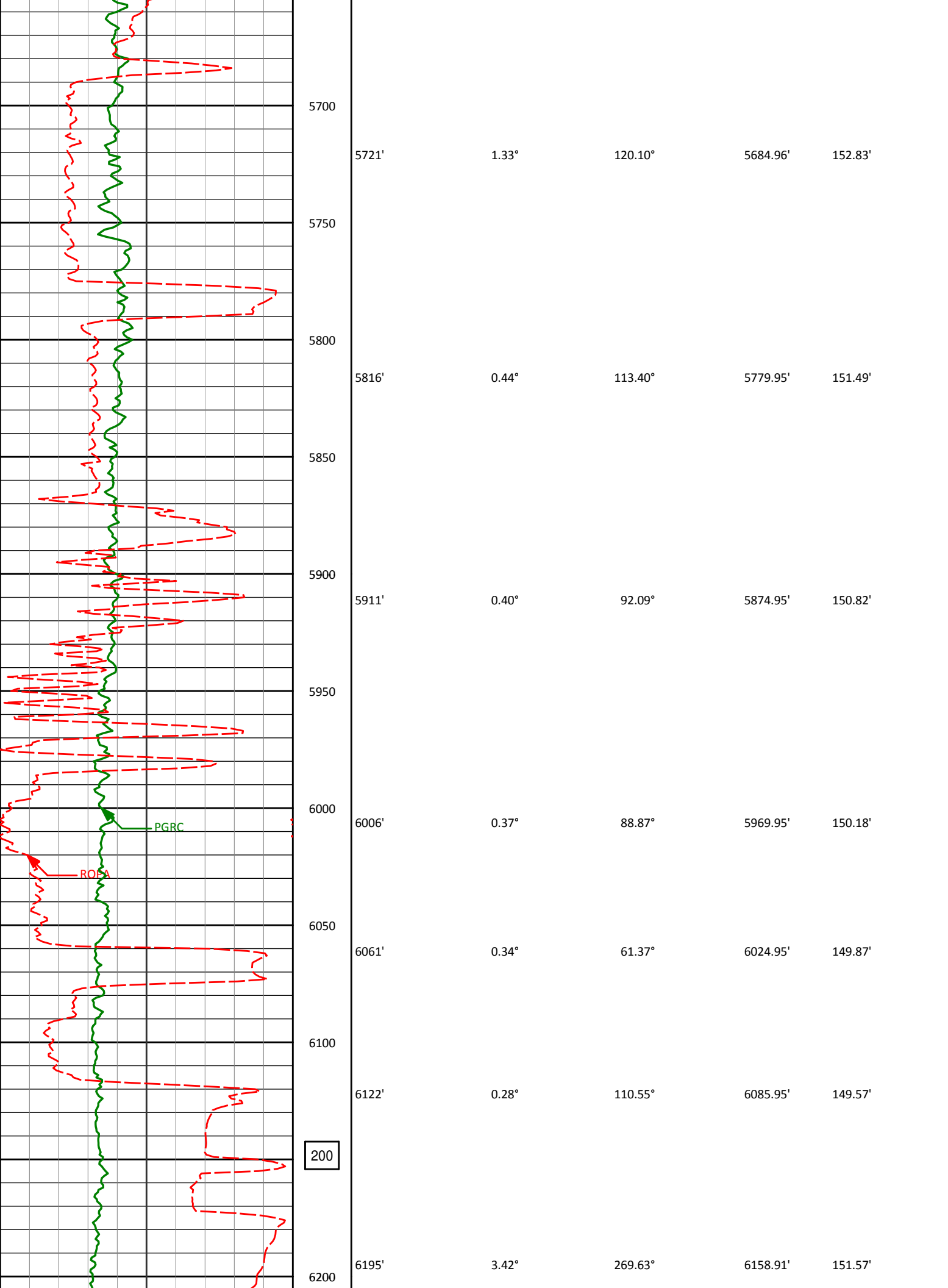
3921'	13.27°	343.00°	3893.12'	133.50'
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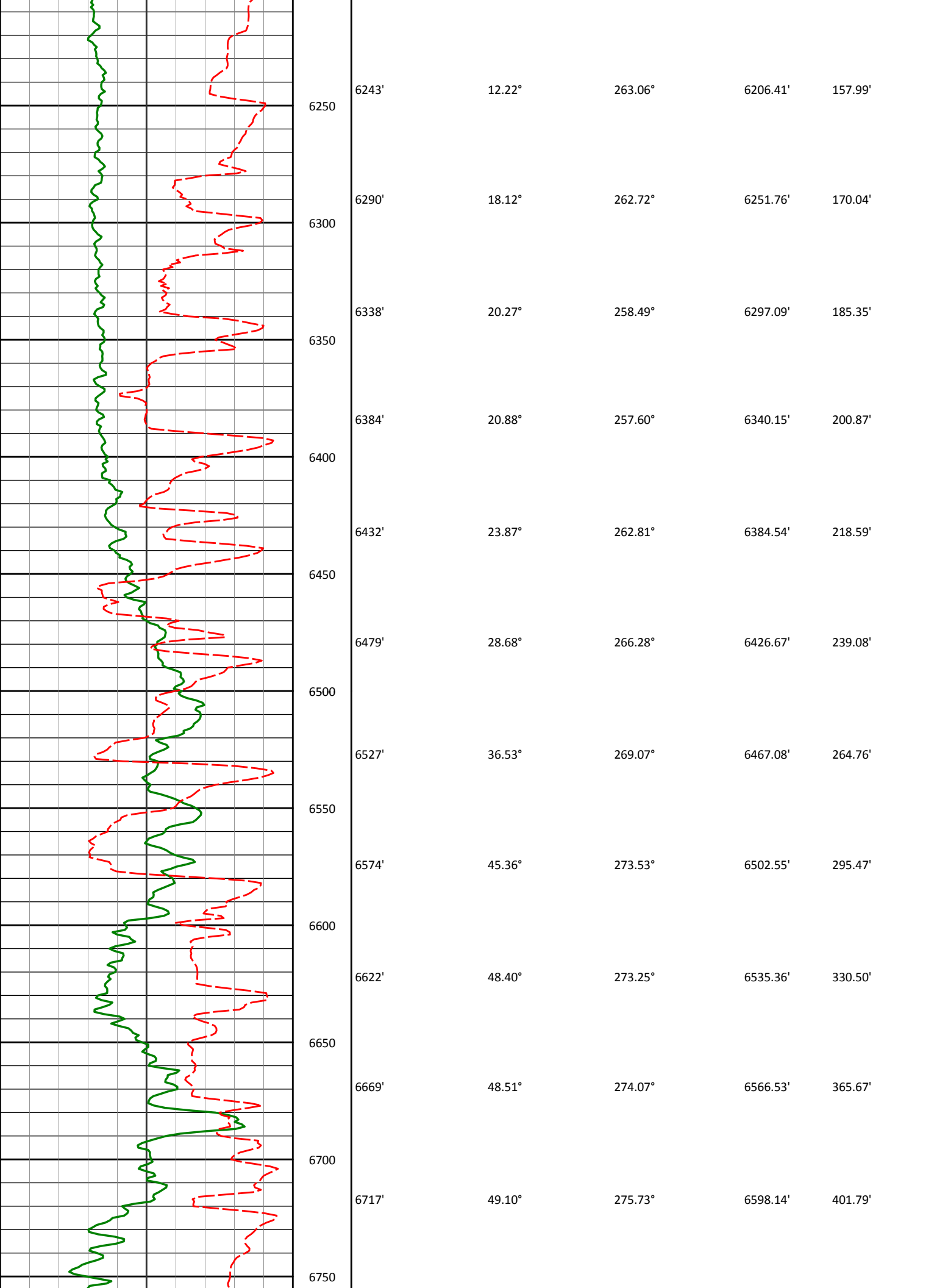


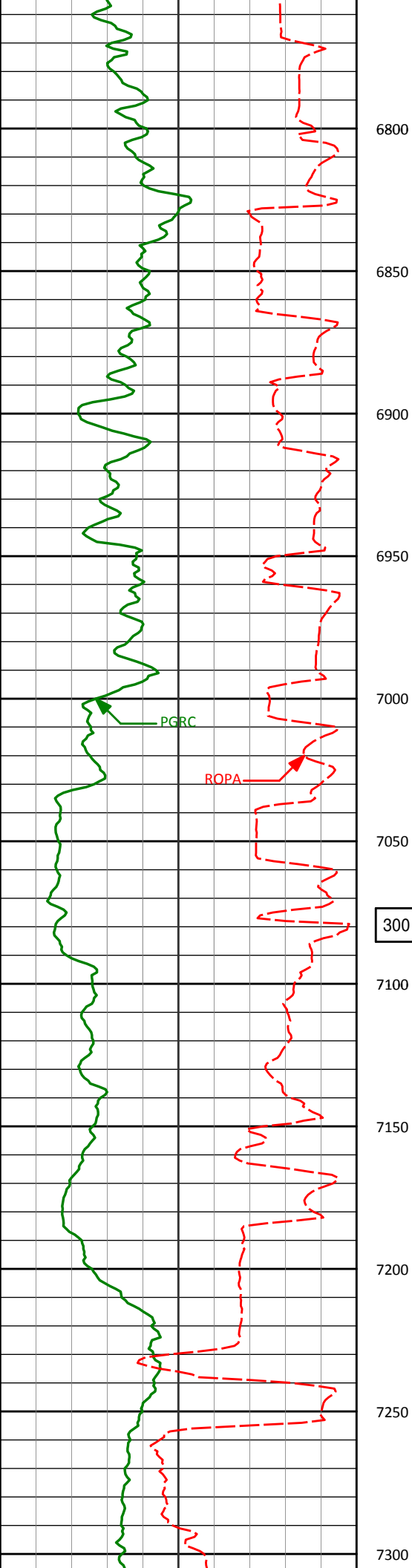
4016'	13.21°	342.73°	3985.59'	141.46'
4050				
4100				
4111'	10.62°	344.58°	4078.54'	148.41'
4150				
4200				
4205'	9.13°	348.59°	4171.14'	153.36'
4250				
4300				
4300'	7.19°	348.17°	4265.18'	157.05'
4350				
4400				
4395'	4.36°	350.86°	4359.68'	159.55'
4450				
4490'	3.57°	353.42°	4454.46'	160.95'
4500				
4550				



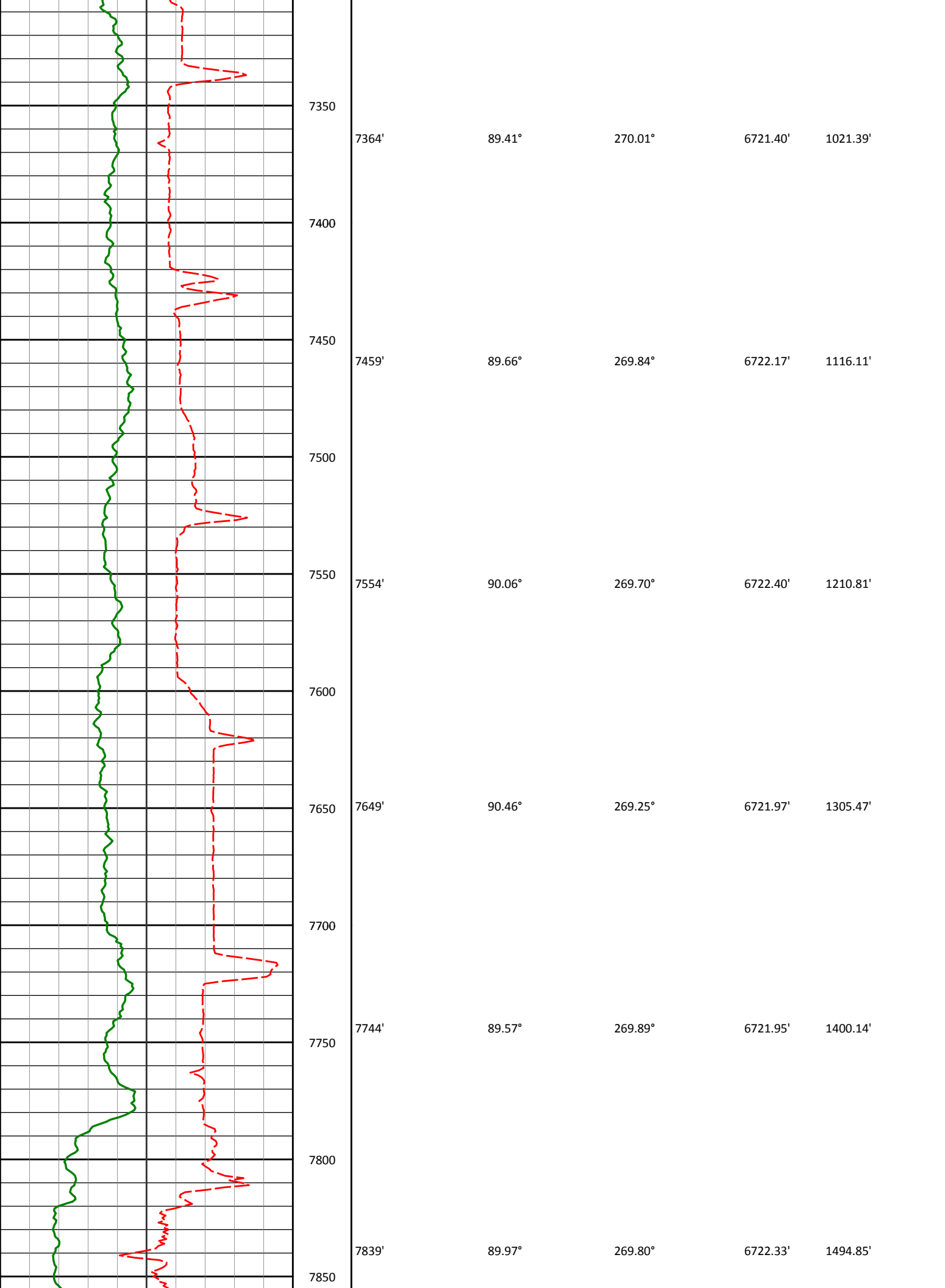


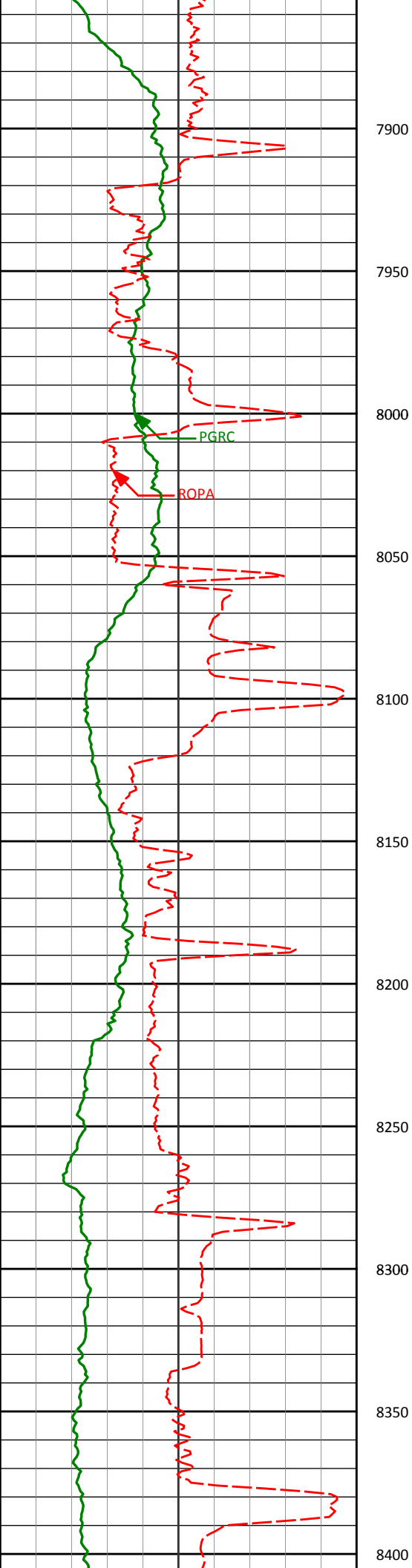




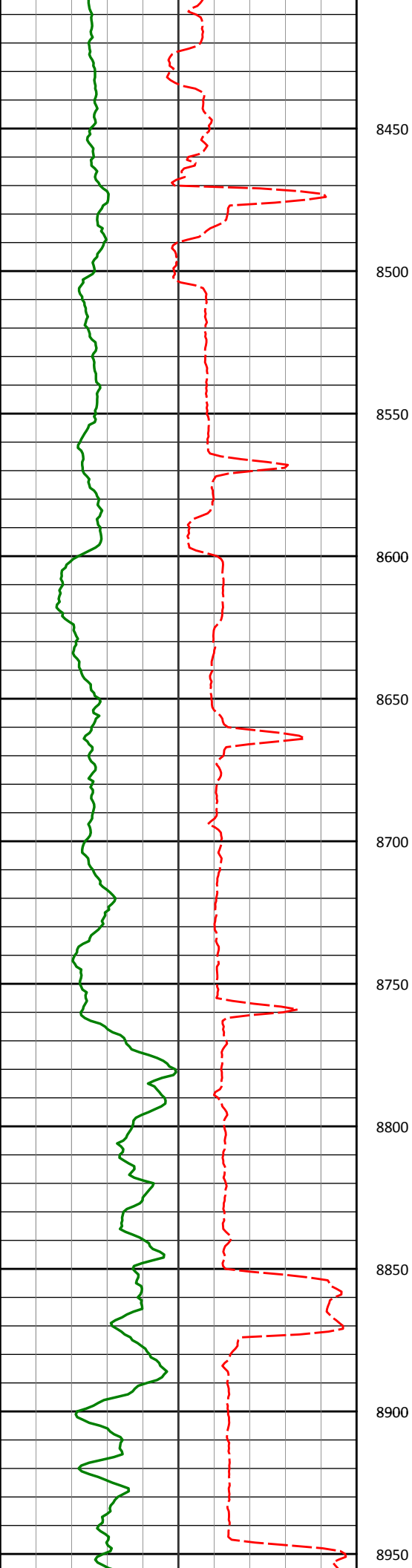


6763'	55.72°	271.98°	6626.19'	438.21'
6800				
6811'	64.86°	267.63°	6649.97'	479.70'
6850				
6858'	69.08°	267.04°	6668.35'	522.62'
6900				
6906'	72.07°	268.65°	6684.31'	567.60'
6950				
6953'	77.36°	270.42°	6696.70'	612.76'
7000				
7001'	82.89°	270.93°	6704.93'	659.93'
7022'	84.04°	270.54°	6707.32'	680.76'
7050				
7100				
7099'	85.93°	270.72°	6714.05'	757.30'
7150				
7175'	87.78°	269.74°	6718.22'	832.99'
7200				
7250				
7270'	89.48°	269.95°	6720.49'	927.67'
7300				

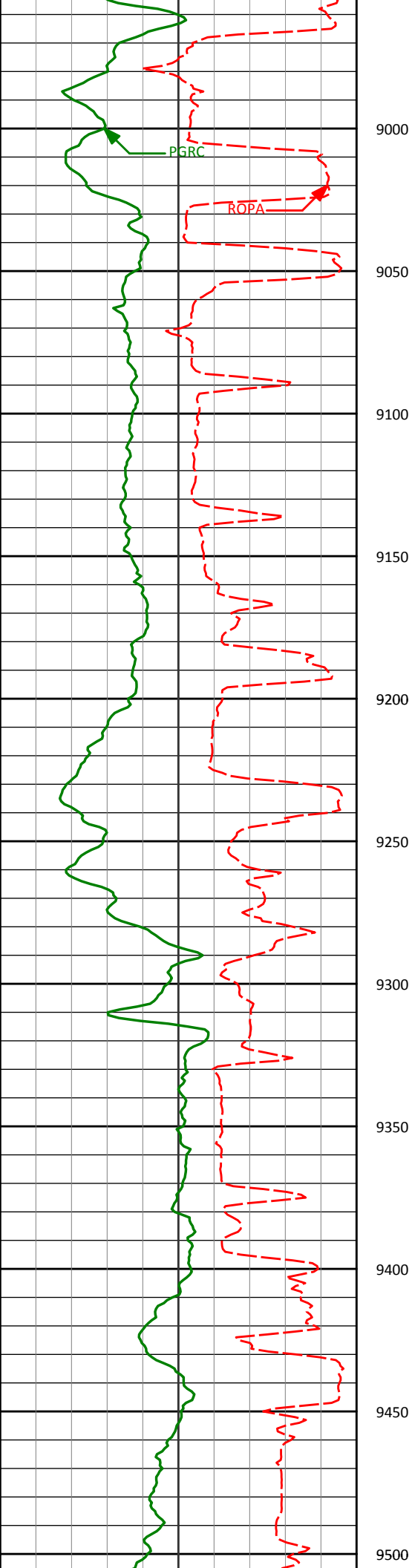




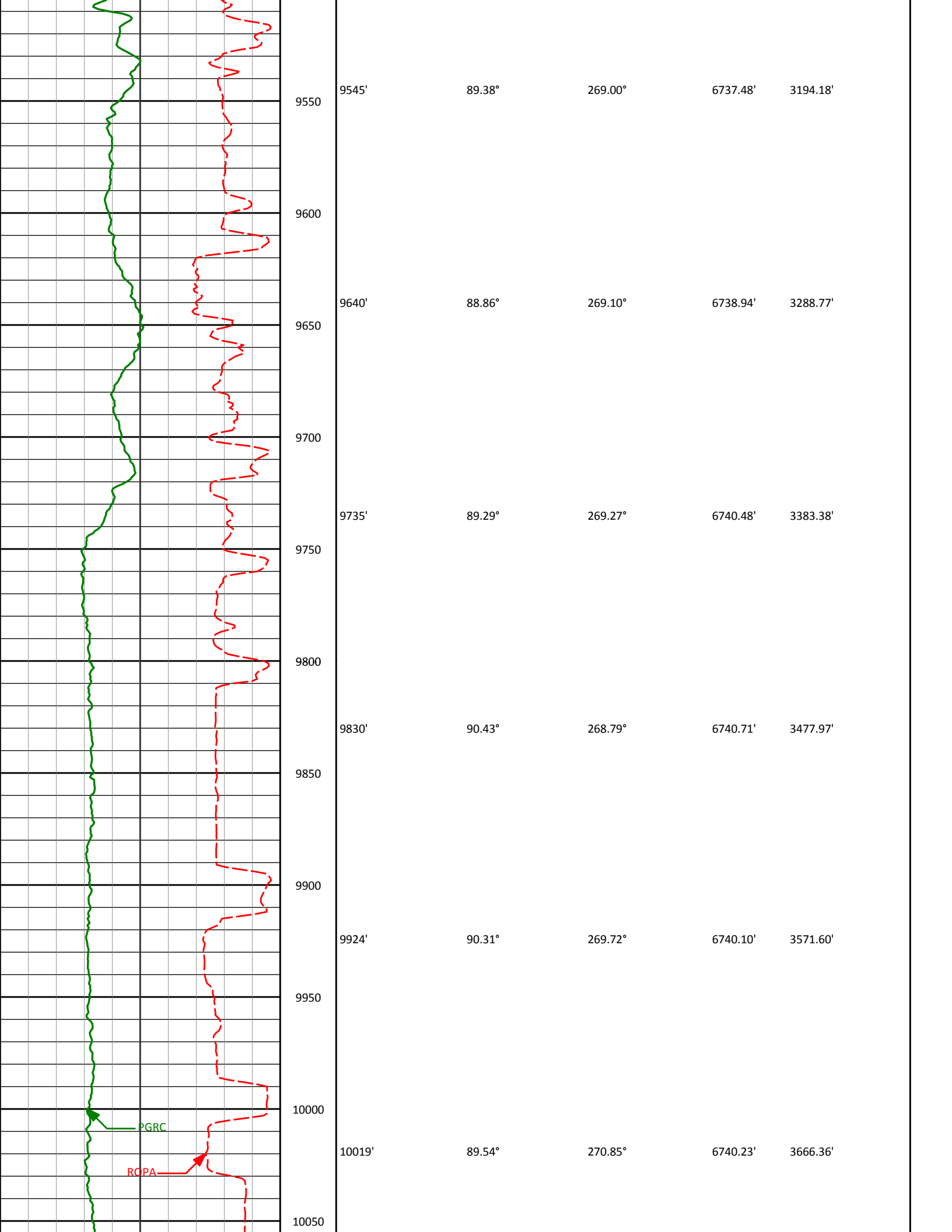
7900				
7934'	89.94°	269.77°	6722.40'	1589.55'
7950				
8000				
8029'	90.03°	269.74°	6722.43'	1684.25'
8050				
8100				
8123'	88.95°	268.92°	6723.26'	1777.89'
8150				
8200				
8218'	89.29°	269.51°	6724.72'	1872.50'
8250				
8300				
8313'	88.27°	268.46°	6726.75'	1967.07'
8350				
8400				

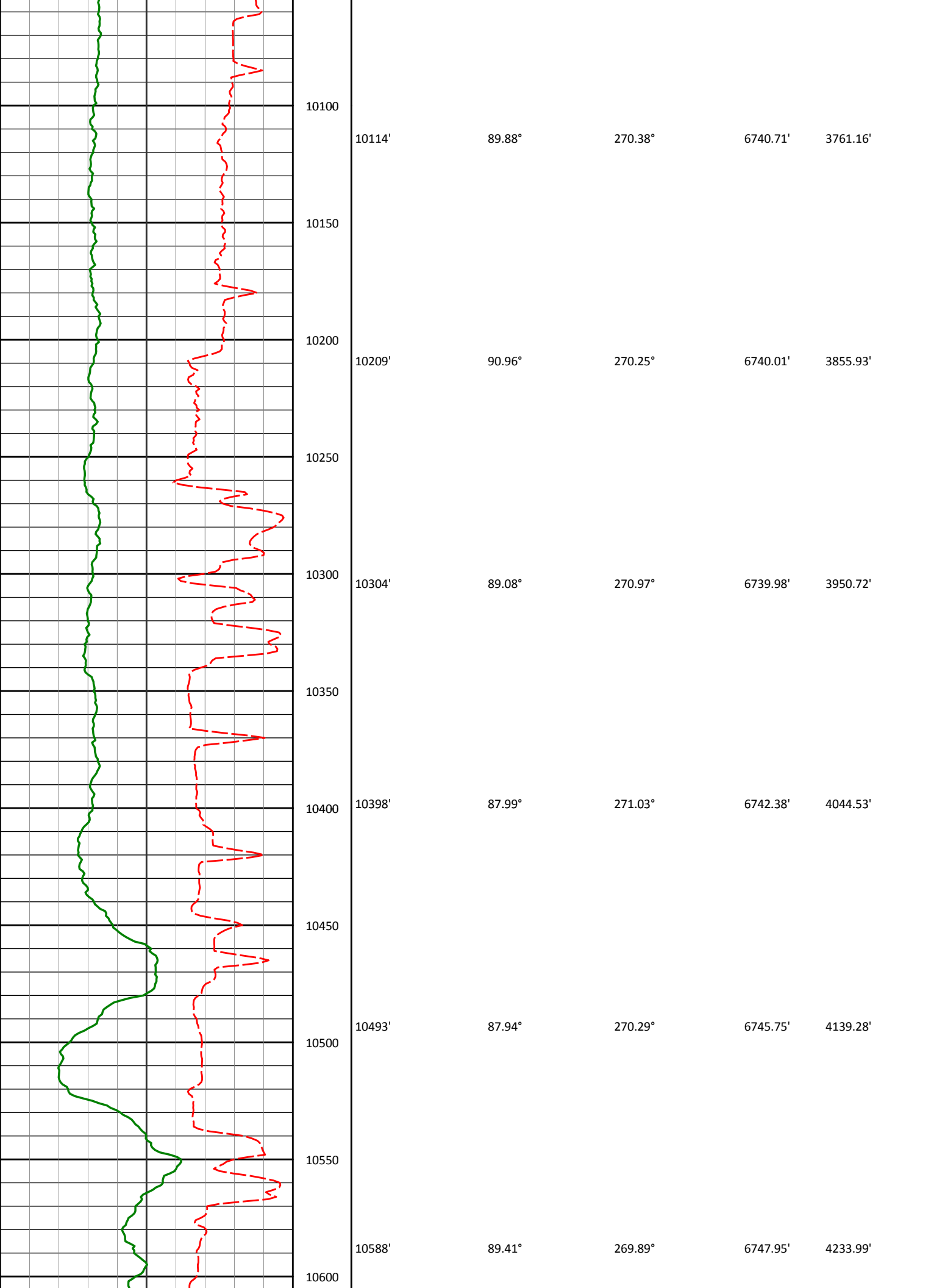


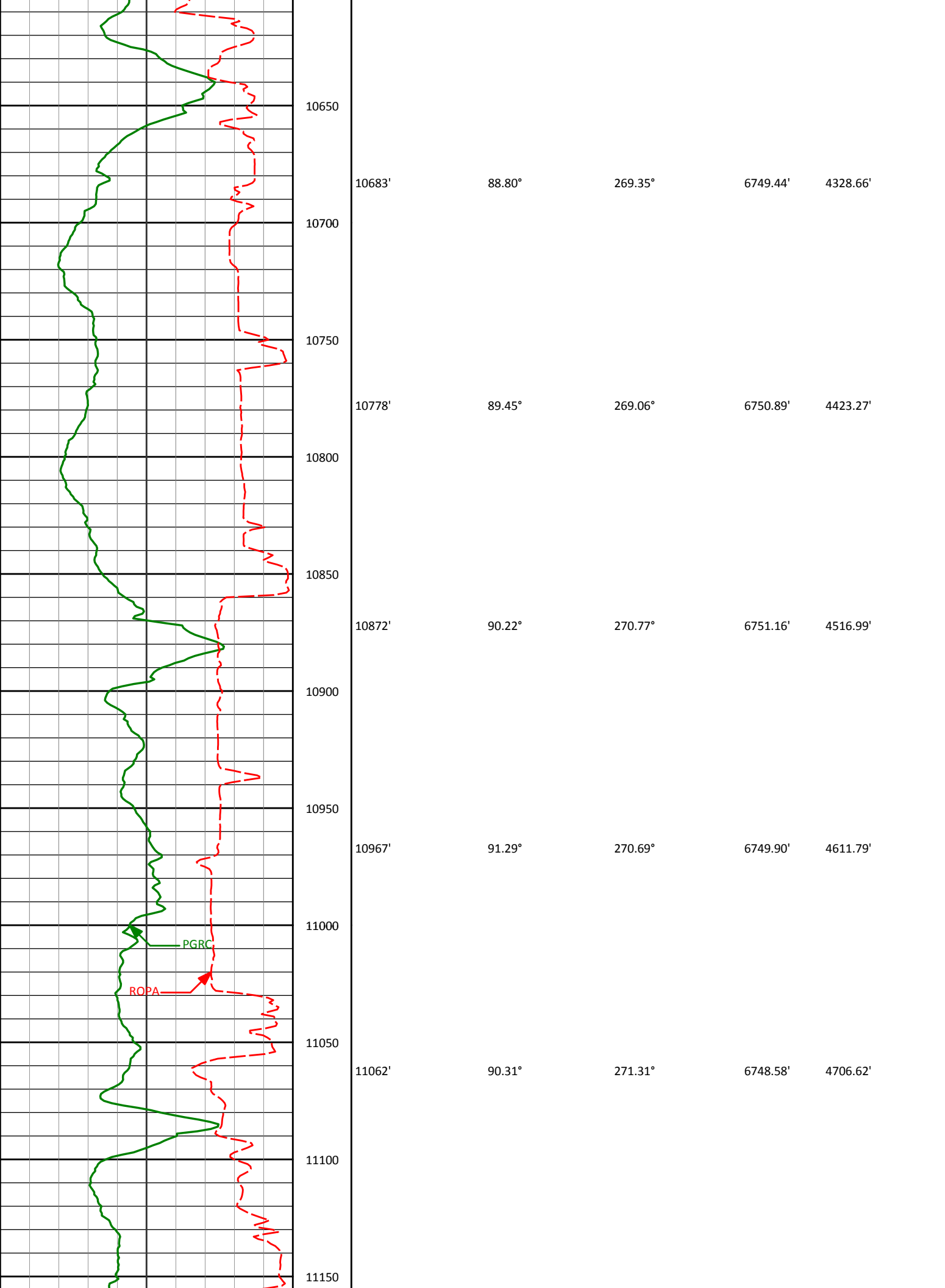
8408'	89.45°	269.34°	6728.64'	2061.62'
8502'	89.48°	268.95°	6729.51'	2155.23'
8597'	89.57°	268.65°	6730.30'	2249.79'
8692'	90.09°	268.27°	6730.58'	2344.29'
8787'	91.02°	268.23°	6729.66'	2438.75'
8882'	92.03°	270.13°	6727.14'	2533.33'

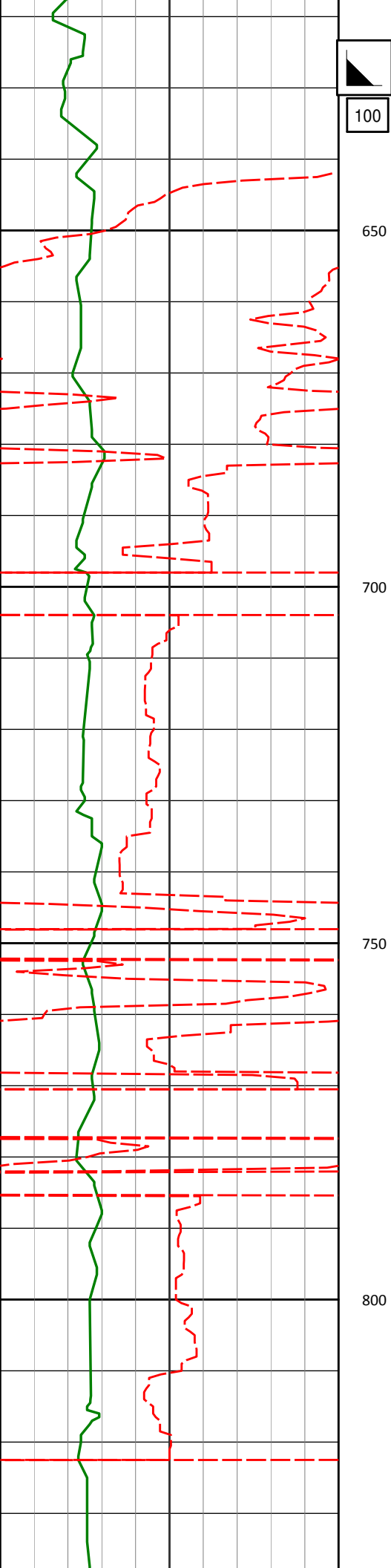


8976'	91.54°	270.48°	6724.21'	2627.06'
9000				
9071'	88.86°	269.89°	6723.88'	2721.80'
9100				
9166'	89.45°	269.49°	6725.28'	2816.48'
9200				
9261'	87.41°	270.45°	6727.88'	2911.16'
9300				
9356'	87.22°	270.38°	6732.33'	3005.84'
9400				
9451'	88.58°	270.06°	6735.81'	3100.53'
9500				









722'

0.59°

25.07°

721.95'

-6.02'

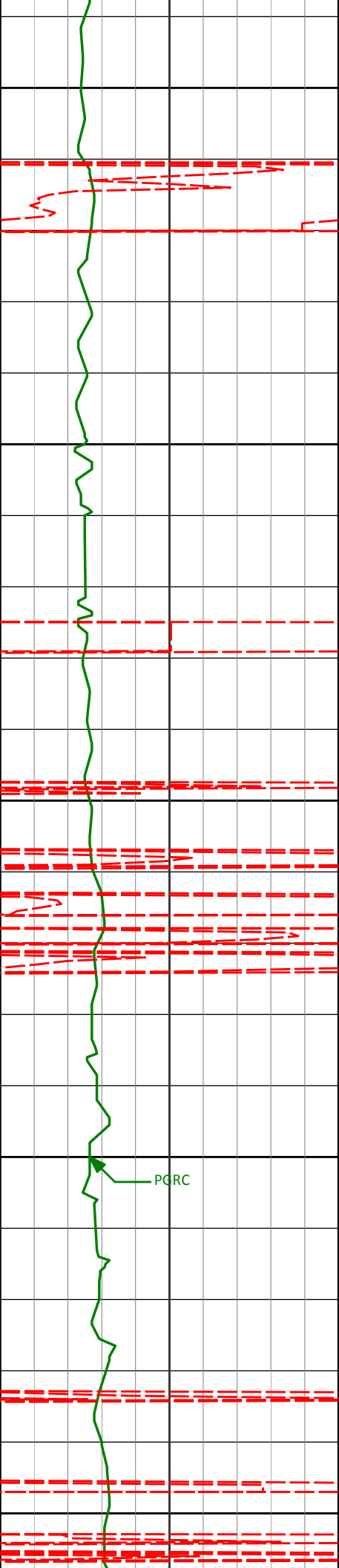
815'

0.48°

31.70°

814.95'

-6.37'



850

900

950

1000

1050

907'

0.34°

34.28°

906.94'

-6.69'

998'

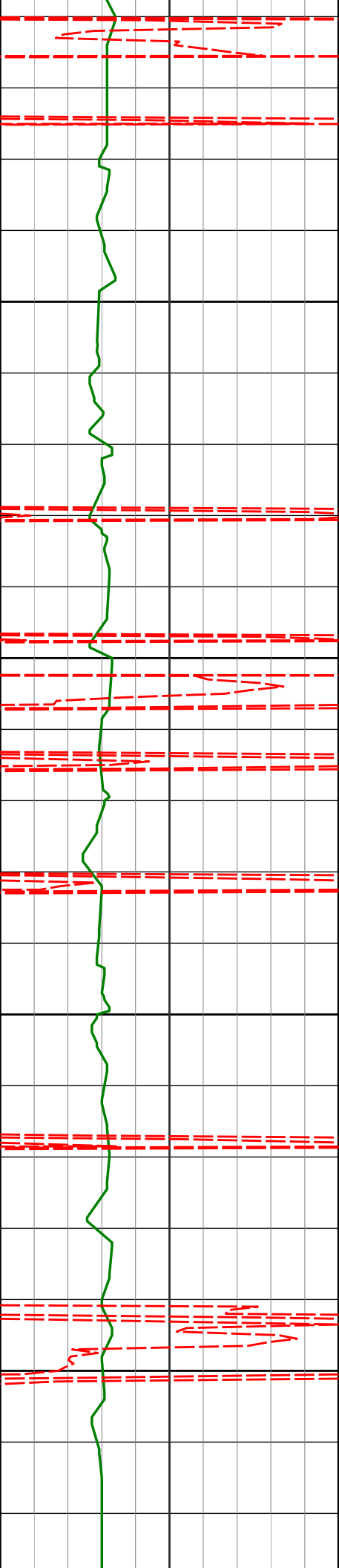
0.28°

24.56°

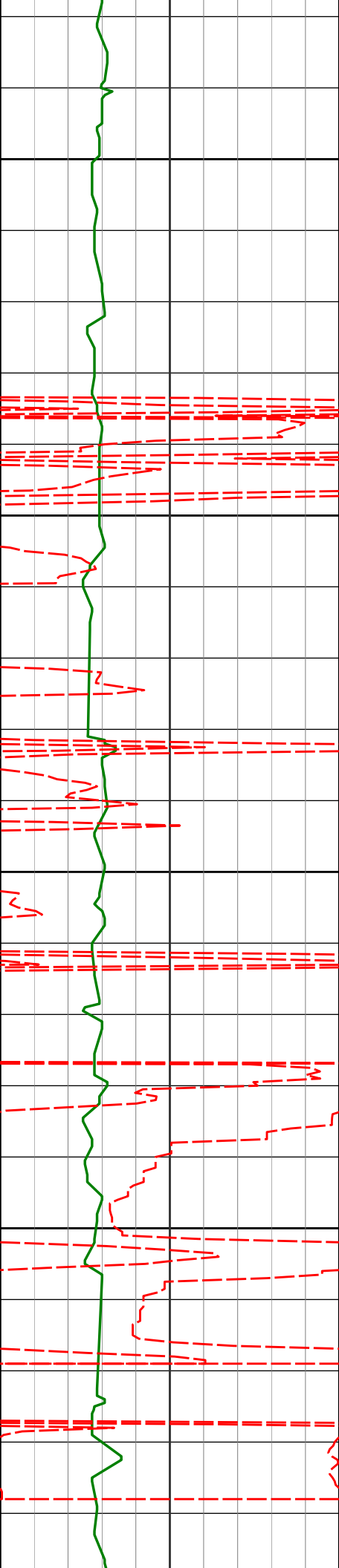
997.94'

-6.90'

PGRC



1090'	0.22°	275.01°	1089.94'	-6.80'
1100				
1150				
1182'	0.22°	57.39°	1181.94'	-6.76'
1200				
1250				
1274'	0.58°	321.14°	1273.94'	-6.59'



1300

1350

1400

1450

1365'

0.41°

328.62°

1364.94'

-6.08'

1457'

0.54°

328.48°

1456.93'

-5.63'



1500

1550

1600

1650

1700

1552'

0.22°

328.99°

1551.93'

-5.27'

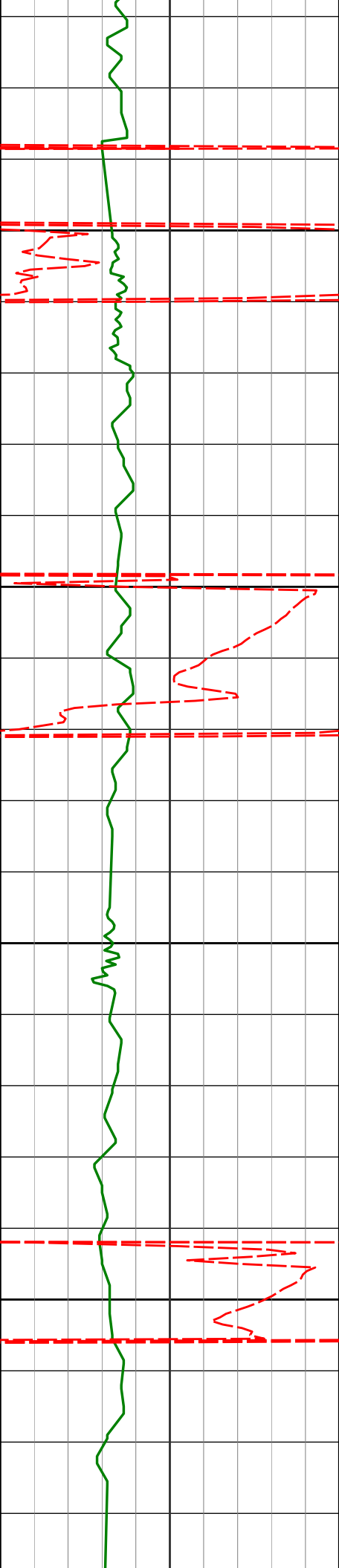
1647'

0.34°

47.67°

1646.93'

-5.36'



1742'

0.44°

3.33°

1741.93'

-5.54'

1750

1800

1837'

2.09°

350.34°

1836.90'

-5.12'

1850

1900

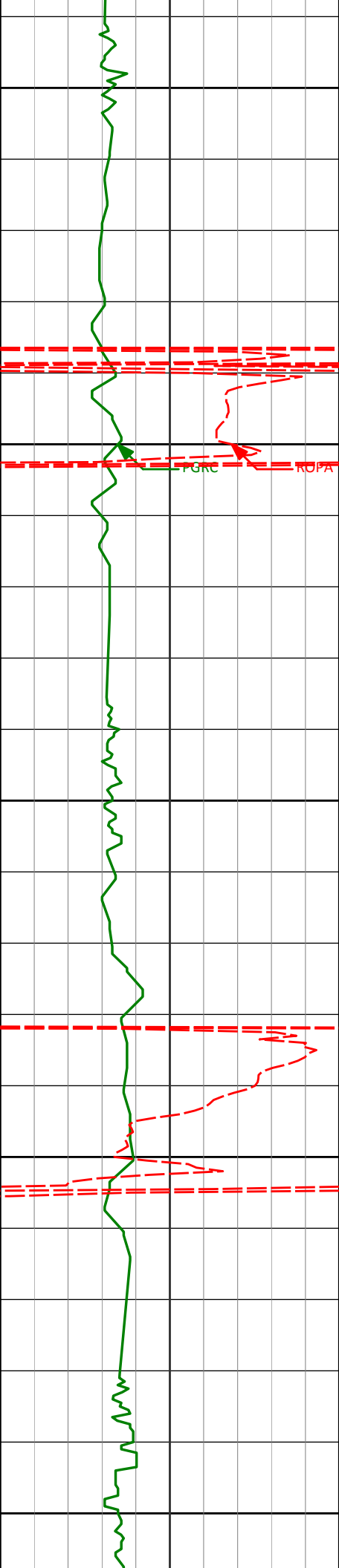
1931'

3.38°

352.73°

1930.79'

-4.15'



1950

2000

2050

2100

2150

2026'

4.28°

345.78°

2025.58'

-2.46'

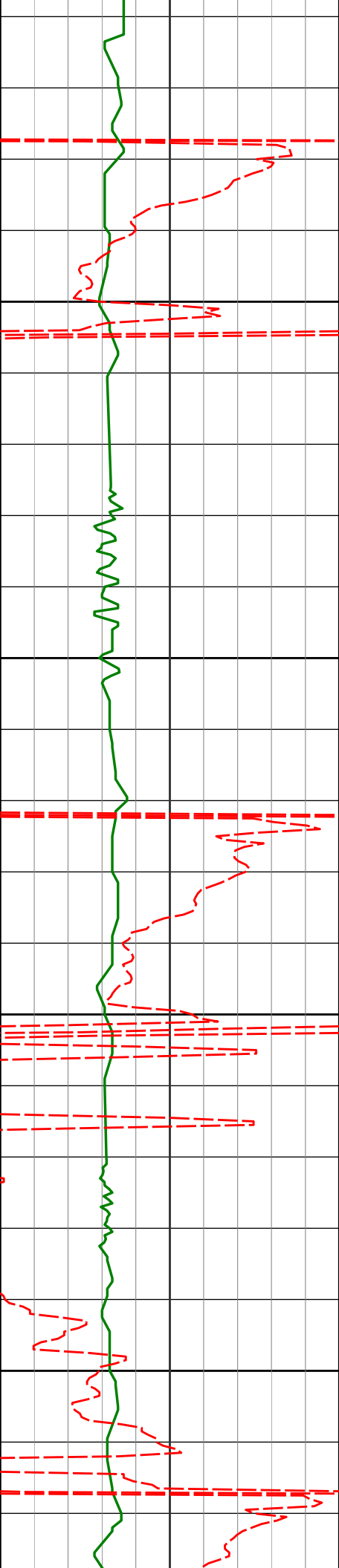
2119'

5.64°

339.50°

2118.23'

0.57'



2200

2250

2300

2350

2214'

7.57°

337.29°

2212.60'

5.37'

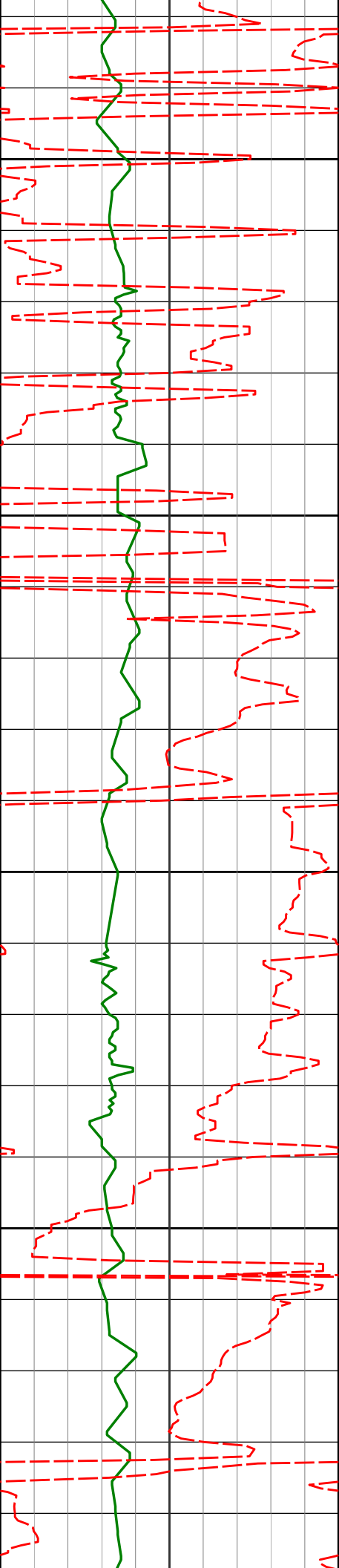
2308'

9.68°

328.99°

2305.53'

12.75'



2400

2450

2500

2550

2403'

2498'

2593'

9.51°

9.13°

10.70°

328.14°

333.77°

339.65°

2399.20'

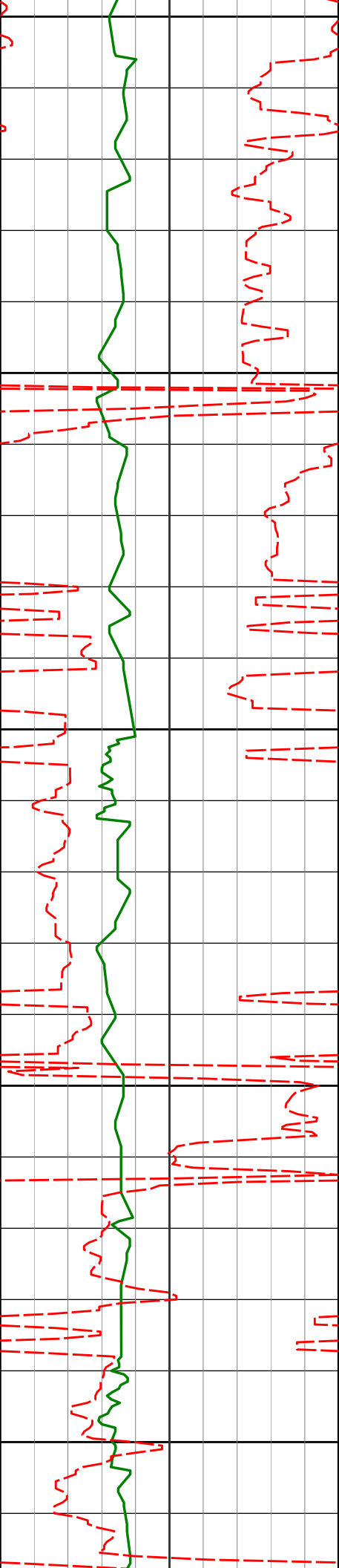
2492.95'

2586.53'

22.01'

30.47'

37.98'



2600

2650

2700

2750

2800

2688'

9.62°

338.15°

2680.04'

45.16'

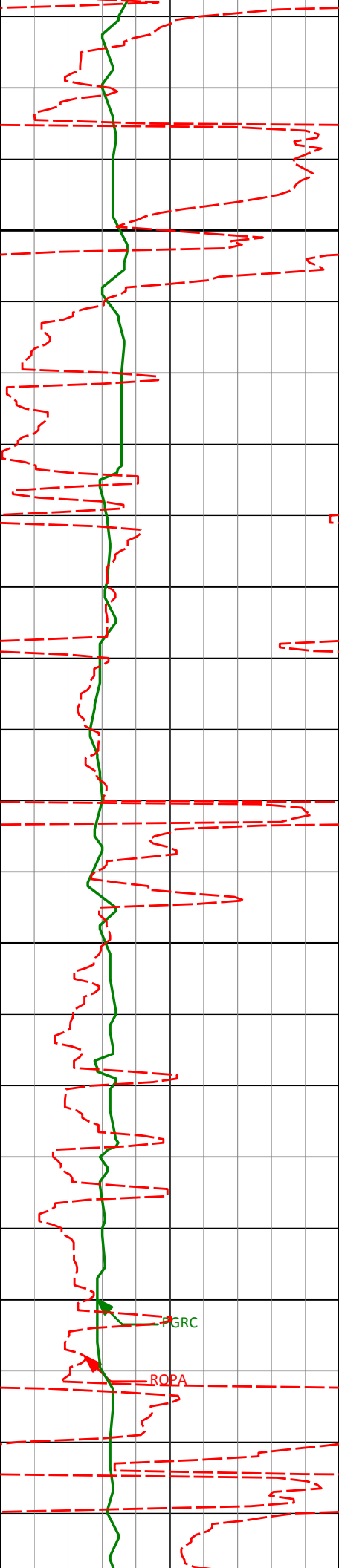
2783'

9.87°

336.68°

2773.67'

52.44'



2850

2877'

10.56°

339.04°

2866.18'

59.86'

2900

2950

2972'

10.10°

339.15°

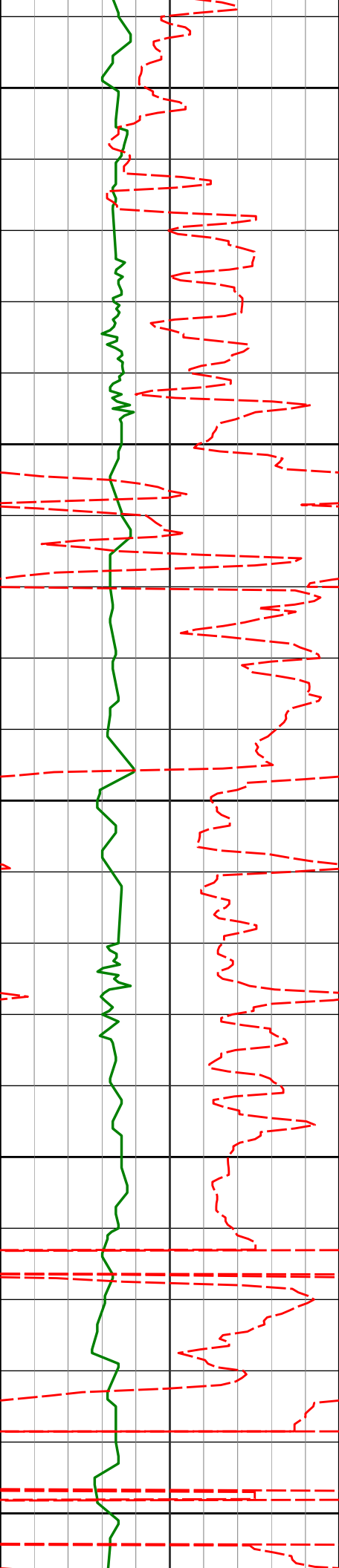
2959.64'

67.12'

3000

FGRC

ROPA



3050

3067'

10.12°

337.67°

3053.16'

74.41'

3100

3150

3162'

9.81°

341.28°

3146.73'

81.32'

3200

3250

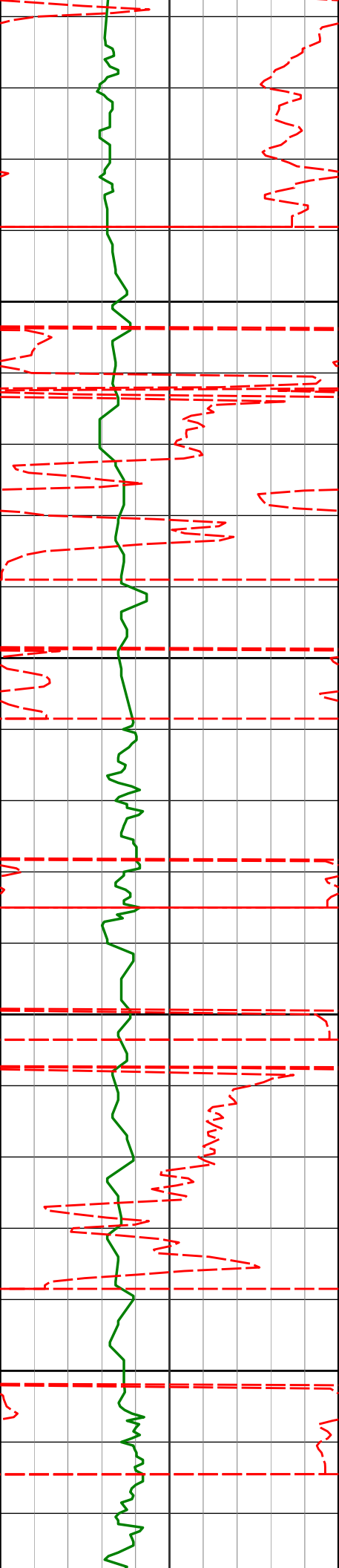
3257'

10.07°

336.91°

3240.31'

88.31'



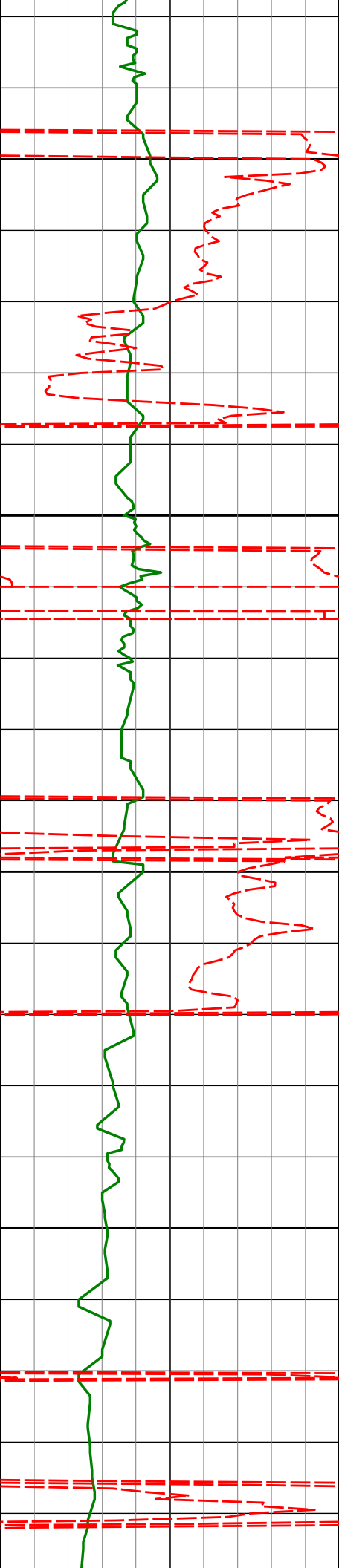
3300

3350

3400

3450

3352'	8.39°	334.92°	3334.07'	95.53'
3446'	8.33°	343.66°	3427.08'	101.30'



3500

3550

3600

3650

3541'

10.52°

345.92°

3520.79'

106.47'

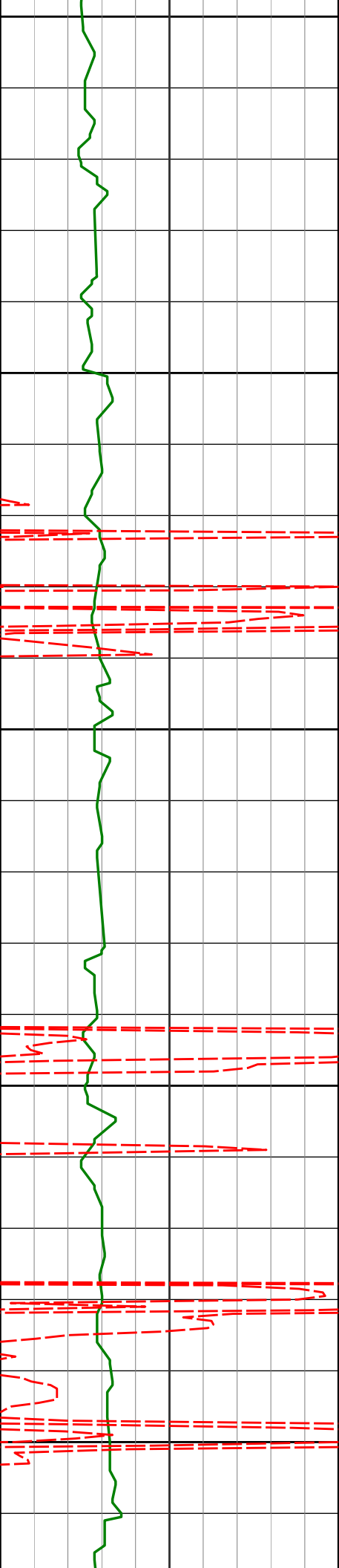
3636'

10.45°

343.96°

3614.20'

112.20'



3700

3731'

11.22°

342.52°

3707.51'

118.63'

3750

3800

3826'

12.42°

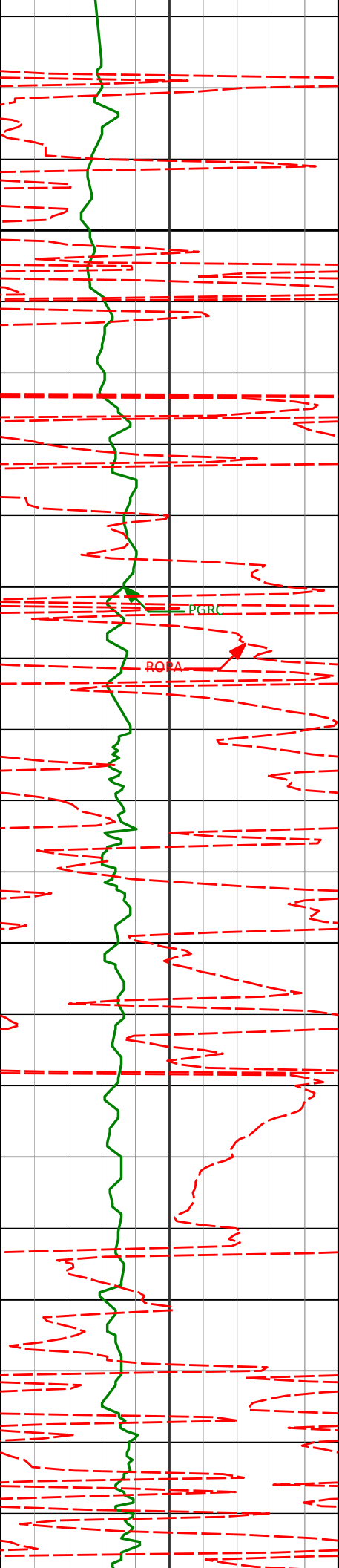
342.88°

3800.49'

125.80'

3850

3900



3950

4000

4050

4100

3921'

13.27°

343.00°

3893.12'

133.50'

4016'

13.21°

342.73°

3985.59'

141.46'

4111'

10.62°

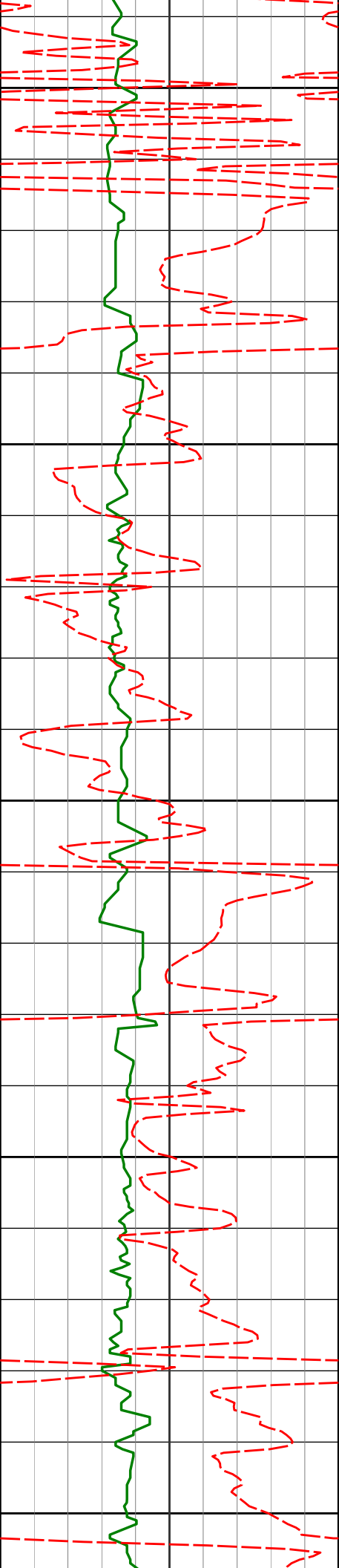
344.58°

4078.54'

148.41'

PGR

ROPA



4150

4200

4250

4300

4350

4205'

9.13°

348.59°

4171.14'

153.36'

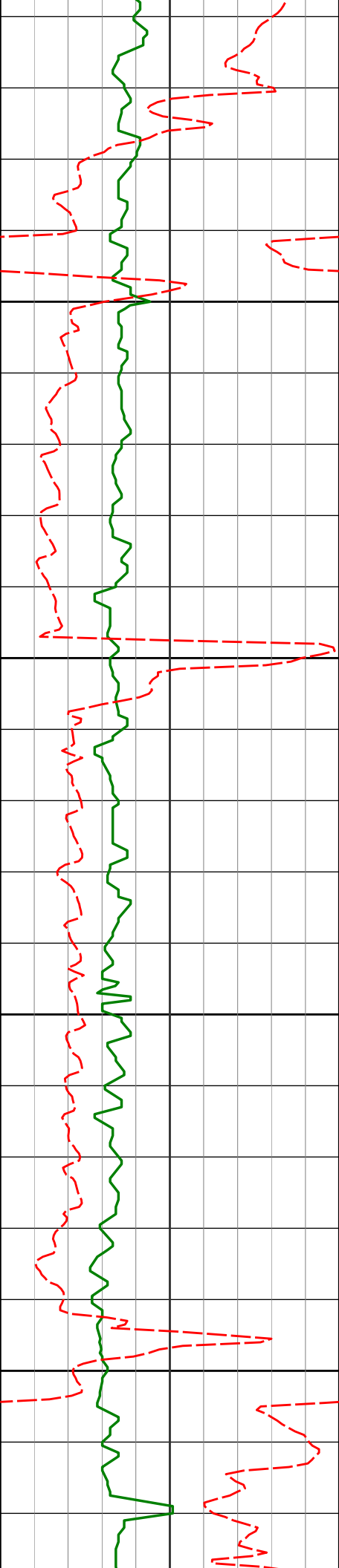
4300'

7.19°

348.17°

4265.18'

157.05'



4400

4450

4500

4550

4395'

4.36°

350.86°

4359.68'

159.55'

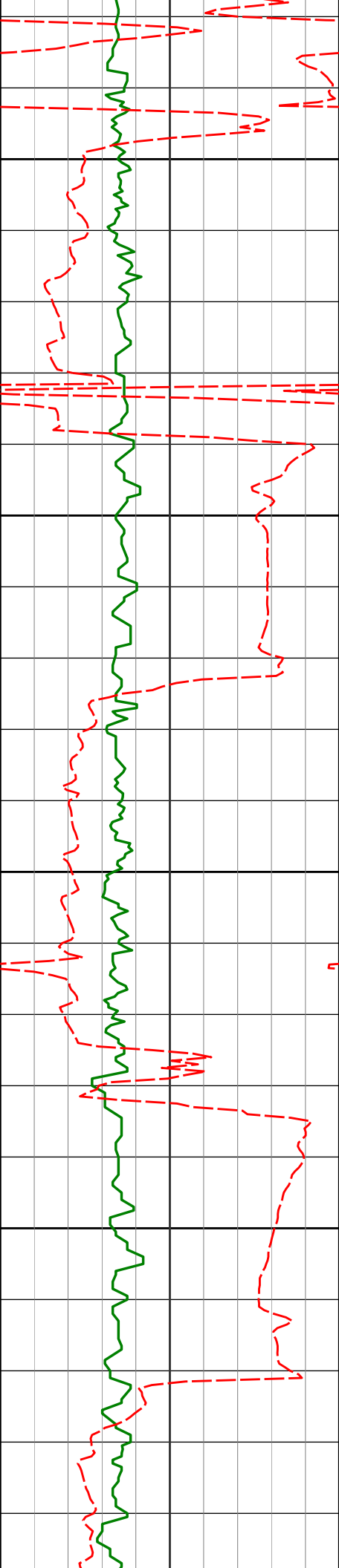
4490'

3.57°

353.42°

4454.46'

160.95'



4584'

3.80°

346.85°

4548.26'

162.44'

4600

4650

4679'

2.66°

351.91°

4643.11'

163.86'

4700

4750

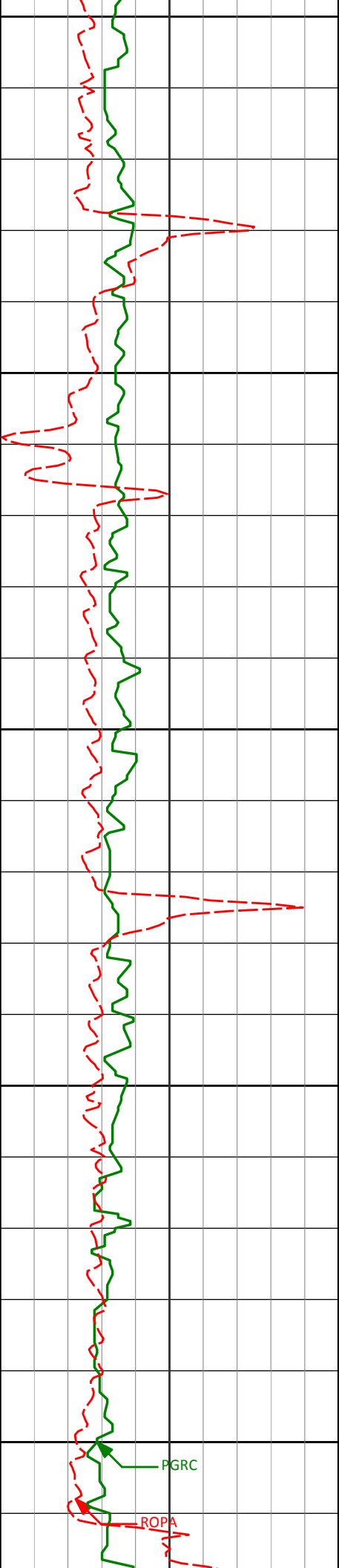
4774'

0.98°

71.91°

4738.07'

163.58'



4800

4850

4900

4950

5000

4869'

1.06°

89.89°

4833.05'

161.95'

4963'

0.47°

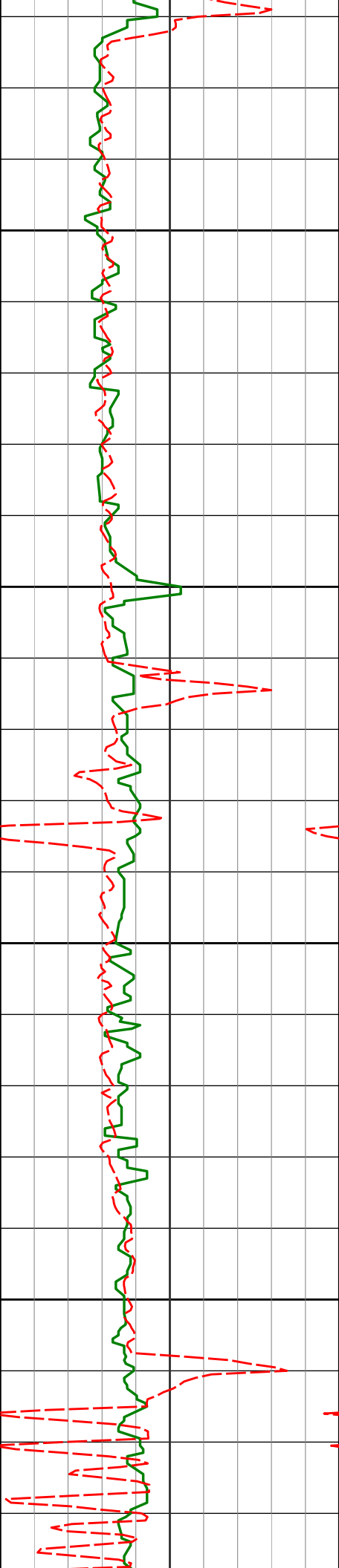
92.27°

4927.05'

160.70'

PGRC

ROPA



5050

5058'

0.70°

39.71°

5022.04'

159.97'

5100

5150

5153'

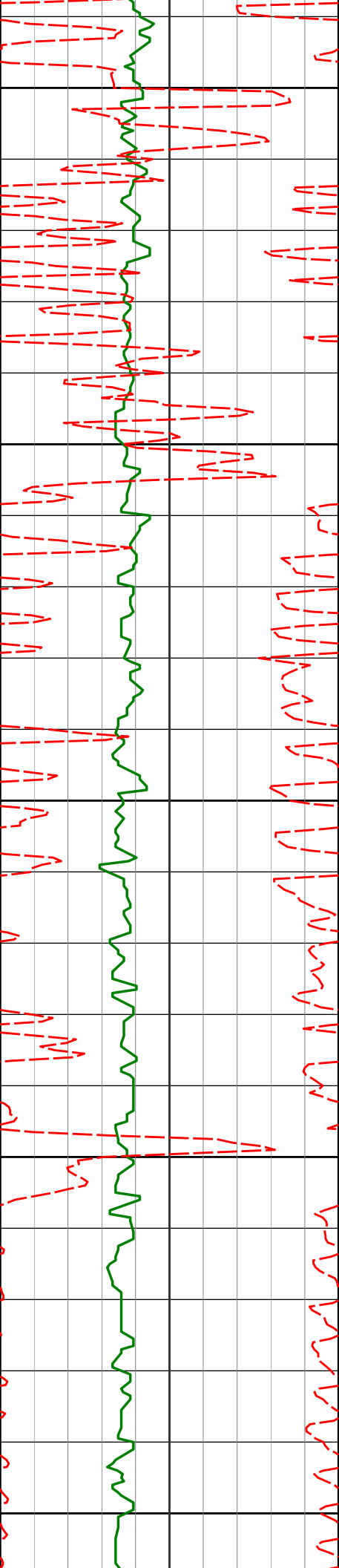
0.39°

97.29°

5117.04'

159.32'

5200



5250

5300

5350

5400

5450

5248'

5343'

5437'

0.94°

0.63°

0.71°

123.43°

159.05°

154.21°

5212.03'

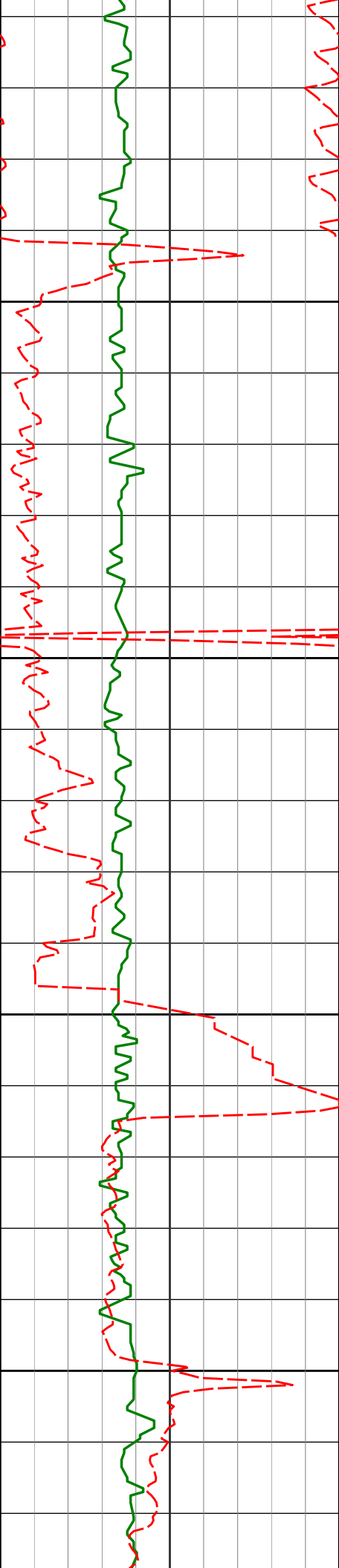
5307.02'

5401.02'

158.31'

157.41'

156.89'



5500

5532'

0.93°

134.85°

5496.01'

156.01'

5550

5600

5627'

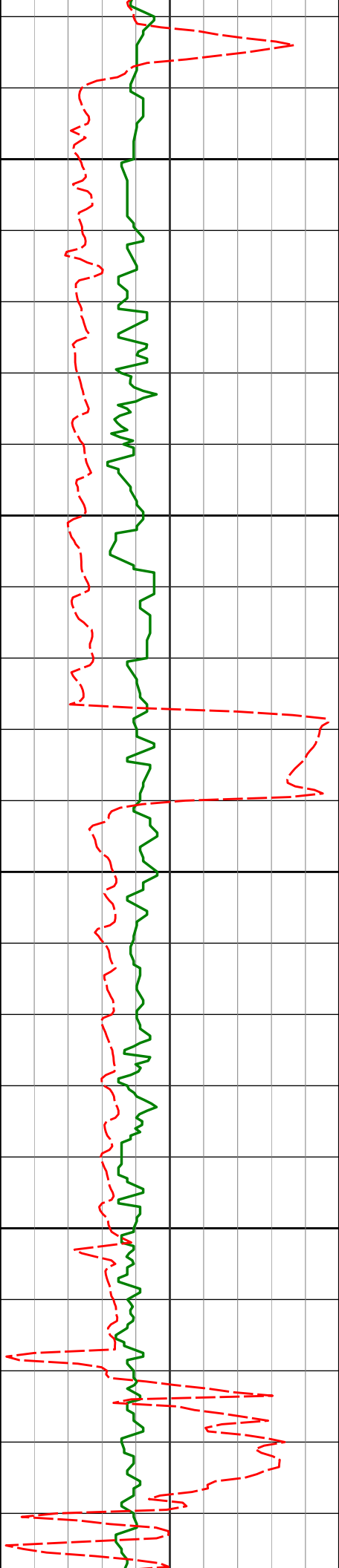
1.26°

133.27°

5590.99'

154.62'

5650



5700

5721'

1.33°

120.10°

5684.96'

152.83'

5750

5800

5816'

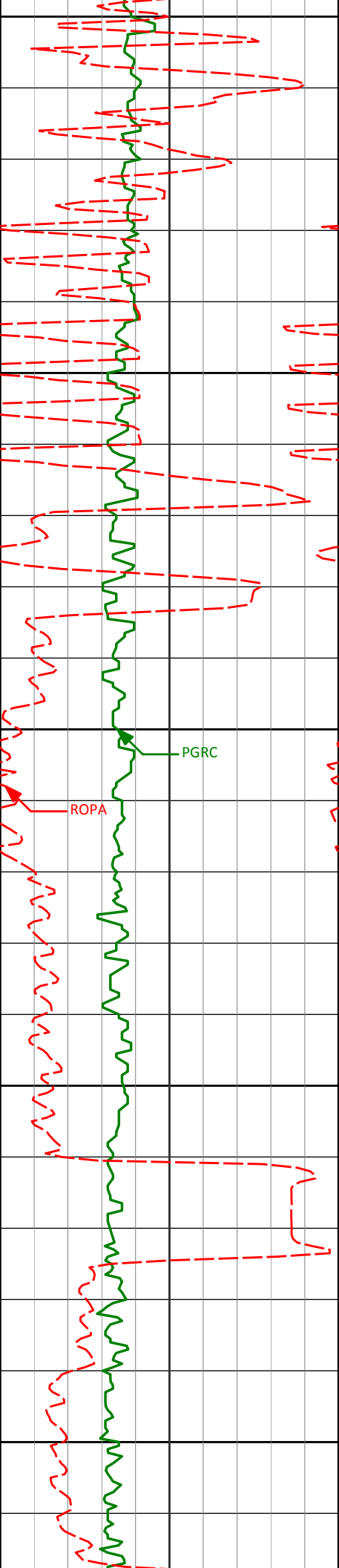
0.44°

113.40°

5779.95'

151.49'

5850



5900

5911'

0.40°

92.09°

5874.95'

150.82'

5950

6000

6006'

0.37°

88.87°

5969.95'

150.18'

6050

6061'

0.34°

61.37°

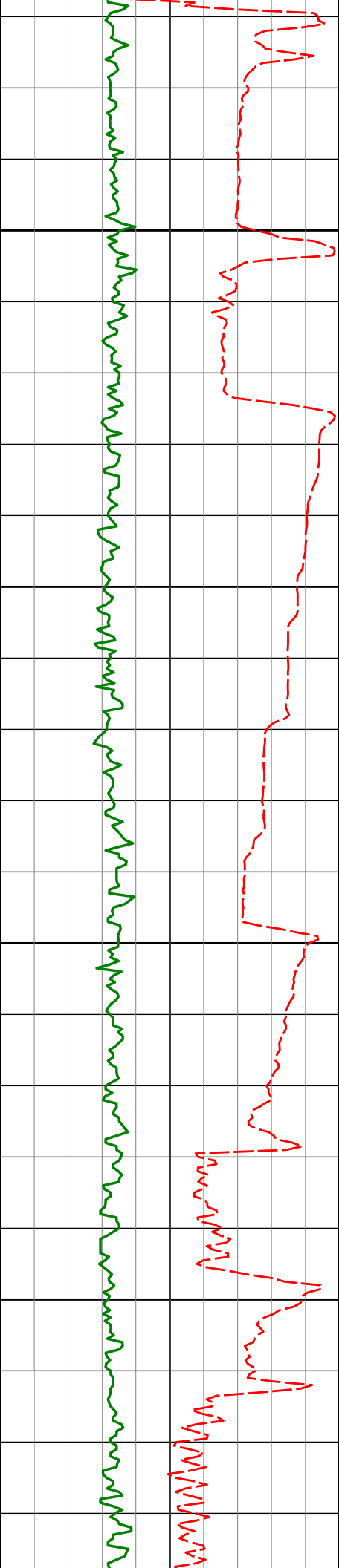
6024.95'

149.87'

6100

PGRC

ROPA



200

6150

6200

6250

6300

6122'

0.28°

110.55°

6085.95'

149.57'

6195'

3.42°

269.63°

6158.91'

151.57'

6243'

12.22°

263.06°

6206.41'

157.99'

6290'

18.12°

262.72°

6251.76'

170.04'

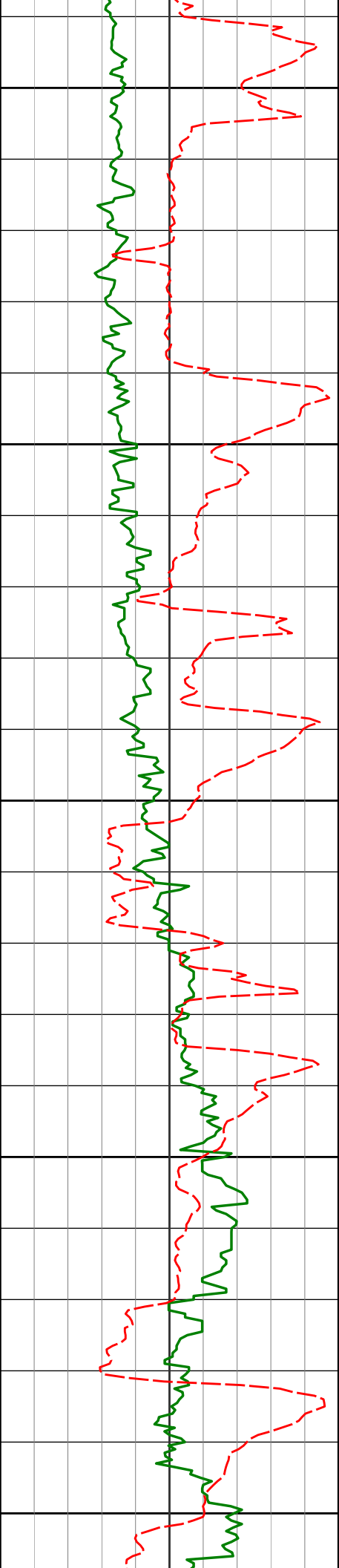
6300'

20.27°

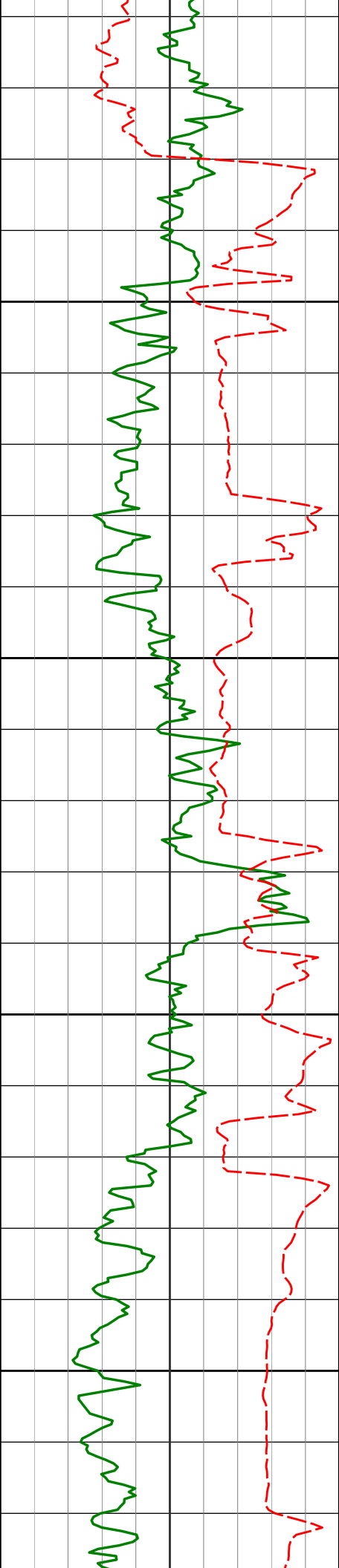
250.40°

6307.00'

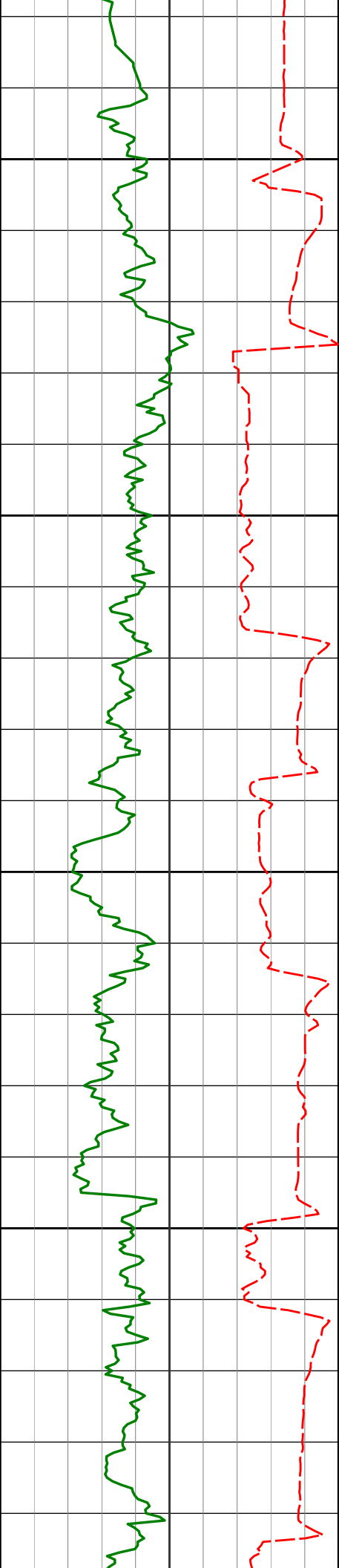
185.25'



6338'	20.27°	258.49°	6297.09'	185.35'
6384'	20.88°	257.60°	6340.15'	200.87'
6432'	23.87°	262.81°	6384.54'	218.59'
6479'	28.68°	266.28°	6426.67'	239.08'
6527'	36.53°	269.07°	6467.08'	264.76'



6574'	45.36°	273.53°	6502.55'	295.47'
6600				
6622'	48.40°	273.25°	6535.36'	330.50'
6650				
6669'	48.51°	274.07°	6566.53'	365.67'
6700				
6717'	49.10°	275.73°	6598.14'	401.79'
6750				
6763'	55.72°	271.98°	6626.19'	438.21'



6800

6811'

64.86°

267.63°

6649.97'

479.70'

6850

6858'

69.08°

267.04°

6668.35'

522.62'

6900

6906'

72.07°

268.65°

6684.31'

567.60'

6950

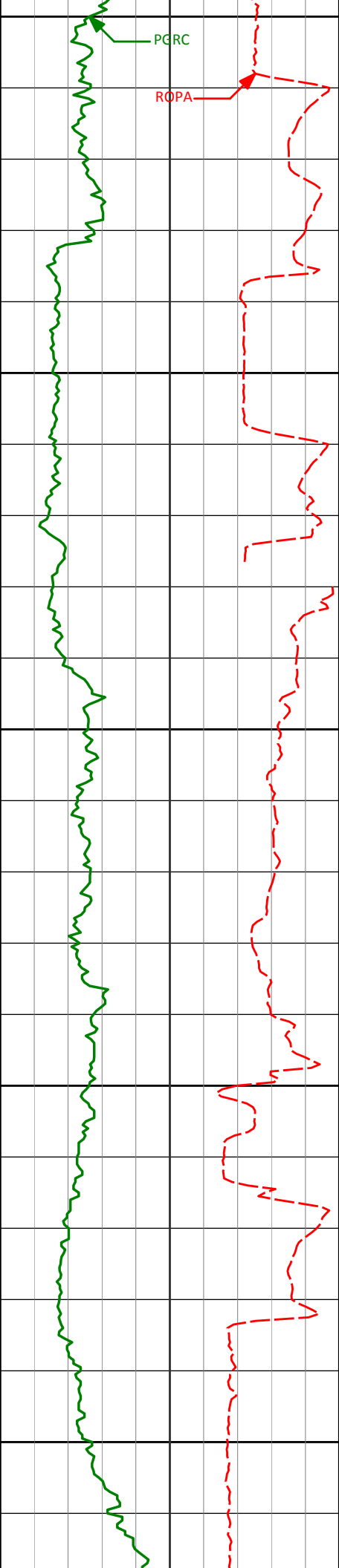
6953'

77.36°

270.42°

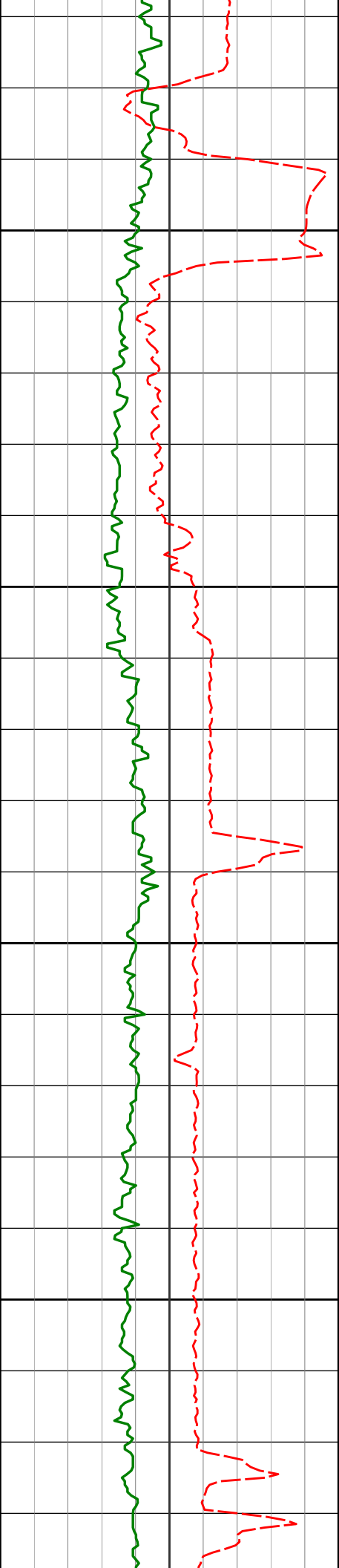
6696.70'

612.76'



7000
7001'
7022'
7050
7100
7150
7200

7001'	82.89°	270.93°	6704.93'	659.93'
7022'	84.04°	270.54°	6707.32'	680.76'
7099'	85.93°	270.72°	6714.05'	757.30'
7175'	87.78°	269.74°	6718.22'	832.99'



7250

7270'

89.48°

269.95°

6720.49'

927.67'

7300

7350

7364'

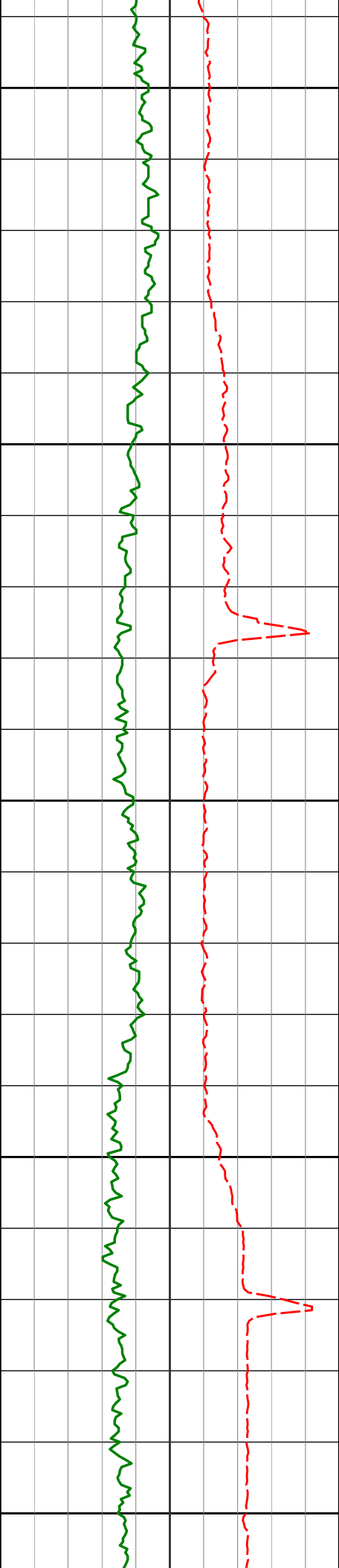
89.41°

270.01°

6721.40'

1021.39'

7400



7450

7459'

89.66°

269.84°

6722.17'

1116.11'

7500

7550

7554'

90.06°

269.70°

6722.40'

1210.81'

7600

7650

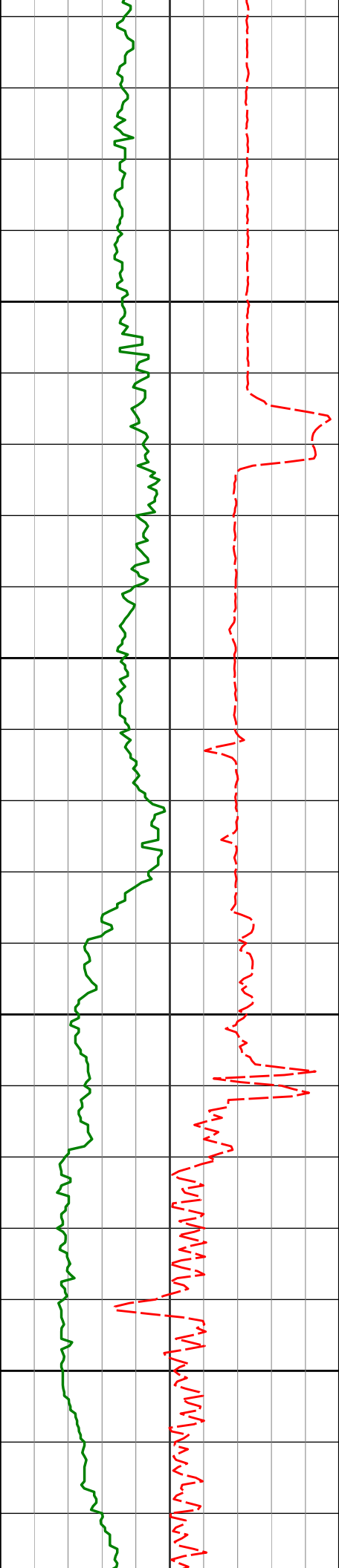
7649'

90.46°

269.25°

6721.97'

1305.47'



7700

7744'

89.57°

269.89°

6721.95'

1400.14'

7750

7800

7839'

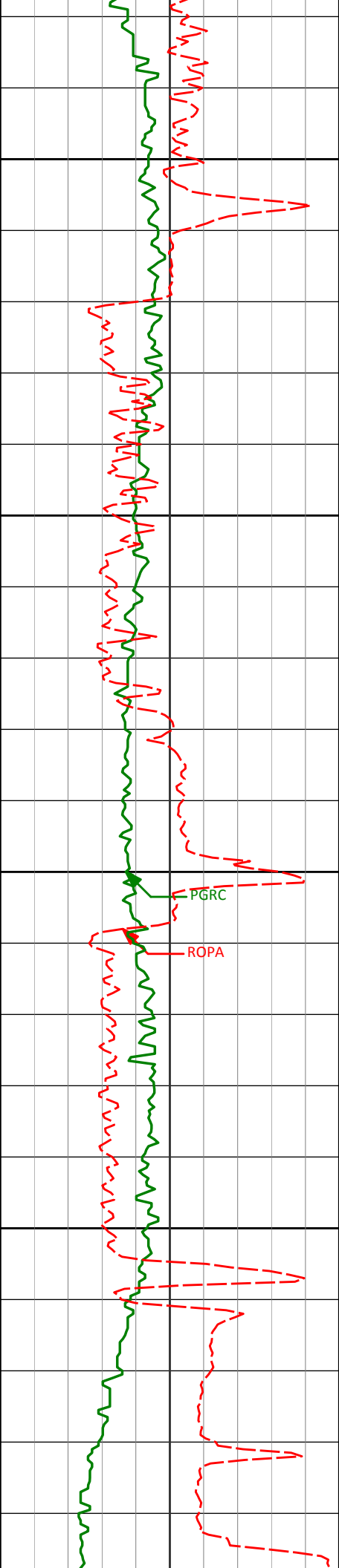
89.97°

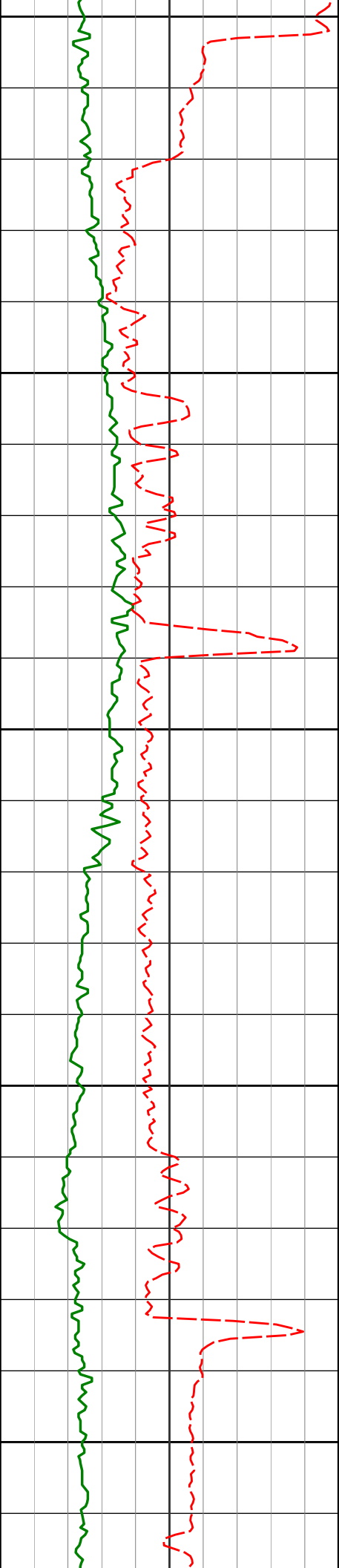
269.80°

6722.33'

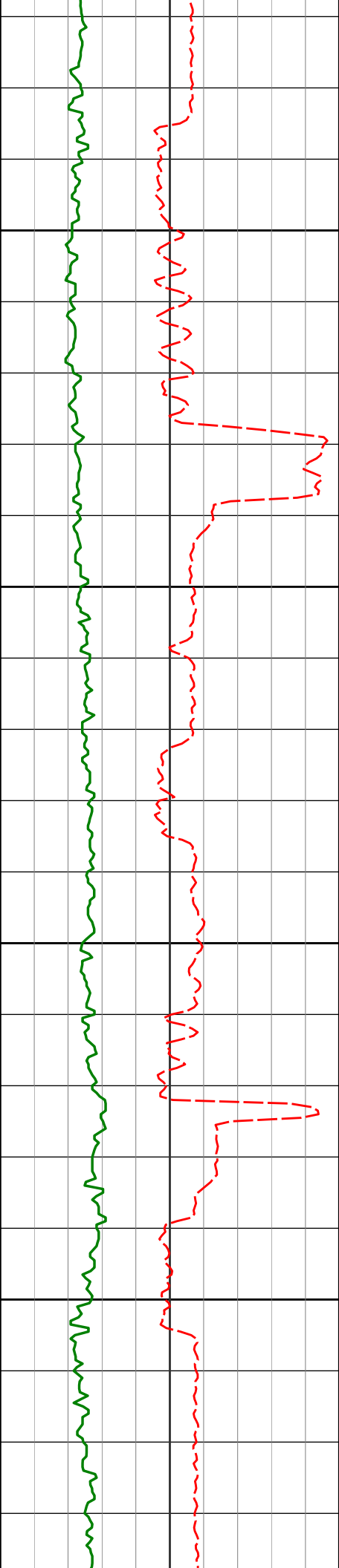
1494.85'

7850





8100				
8123'	88.95°	268.92°	6723.26'	1777.89'
8150				
8200				
8218'	89.29°	269.51°	6724.72'	1872.50'
8250				
8300				
8313'	88.27°	268.46°	6726.75'	1967.07'



8350

8400

8450

8500

8408'

89.45°

269.34°

6728.64'

2061.62'

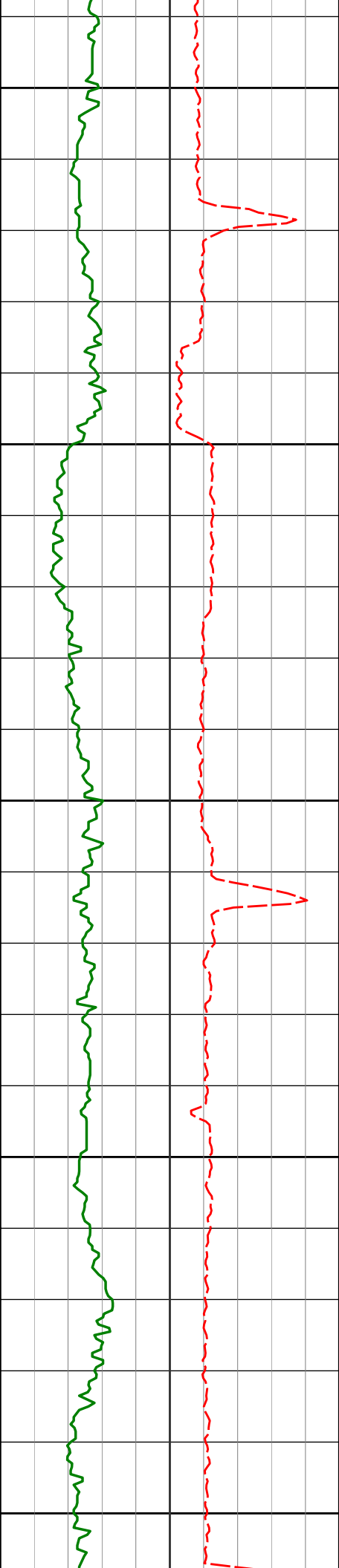
8502'

89.48°

268.95°

6729.51'

2155.23'



8550

8600

8650

8700

8750

8597'

89.57°

268.65°

6730.30'

2249.79'

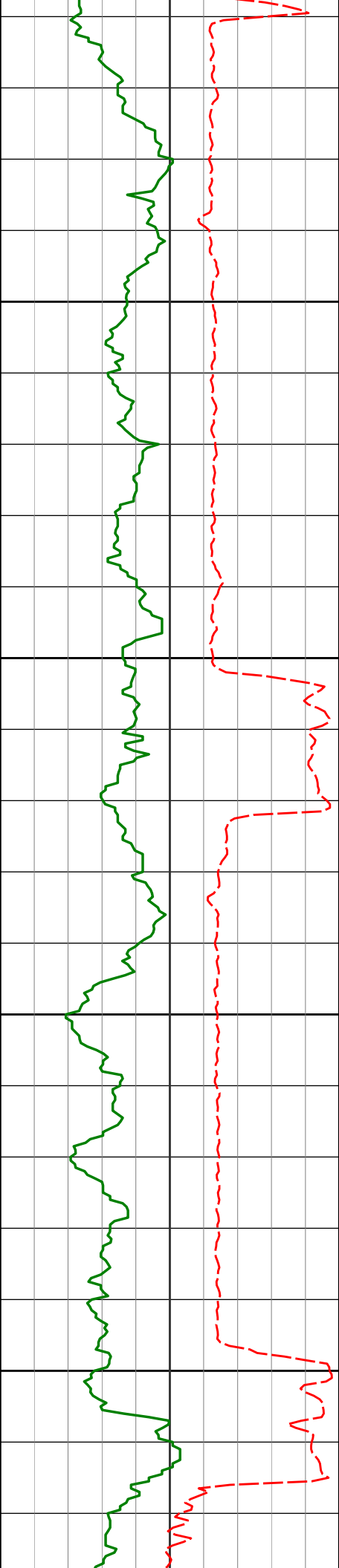
8692'

90.09°

268.27°

6730.58'

2344.29'



8787'

91.02°

268.23°

6729.66'

2438.75'

8800

8850

8882'

92.03°

270.13°

6727.14'

2533.33'

8900

8950

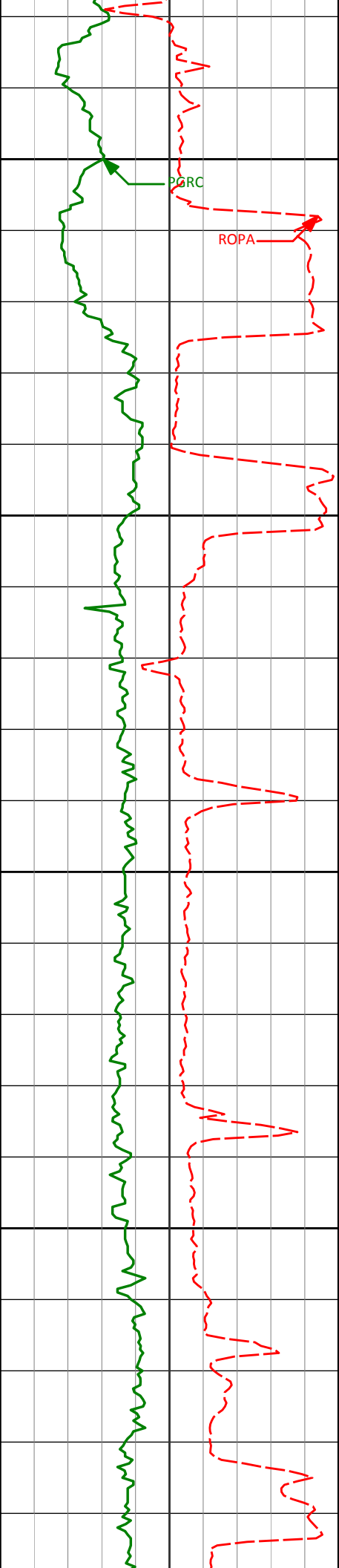
8976'

91.54°

270.48°

6724.21'

2627.06'



9000

9050

9100

9150

9071'

88.86°

269.89°

6723.88'

2721.80'

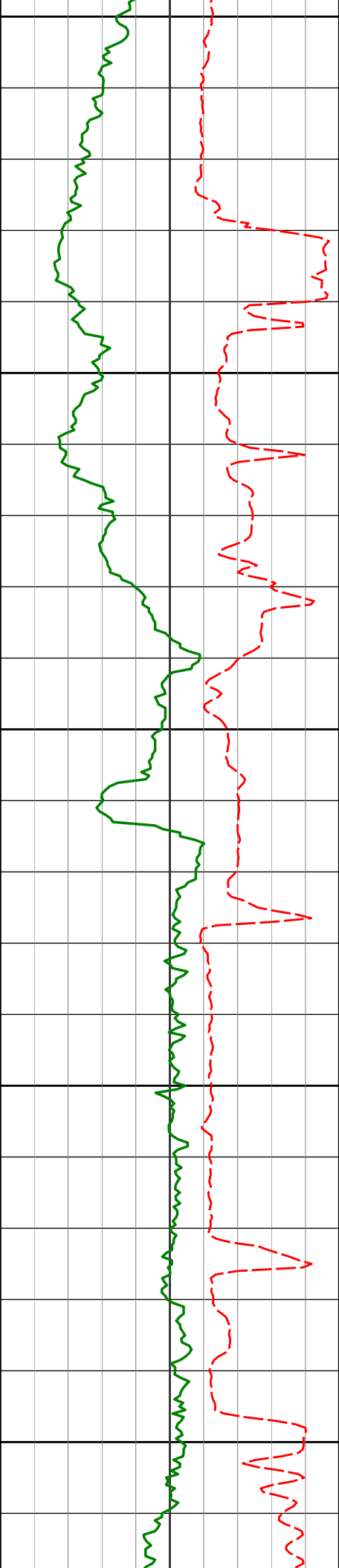
9166'

89.45°

269.49°

6725.28'

2816.48'



9200

9250

9300

9350

9400

9261'

87.41°

270.45°

6727.88'

2911.16'

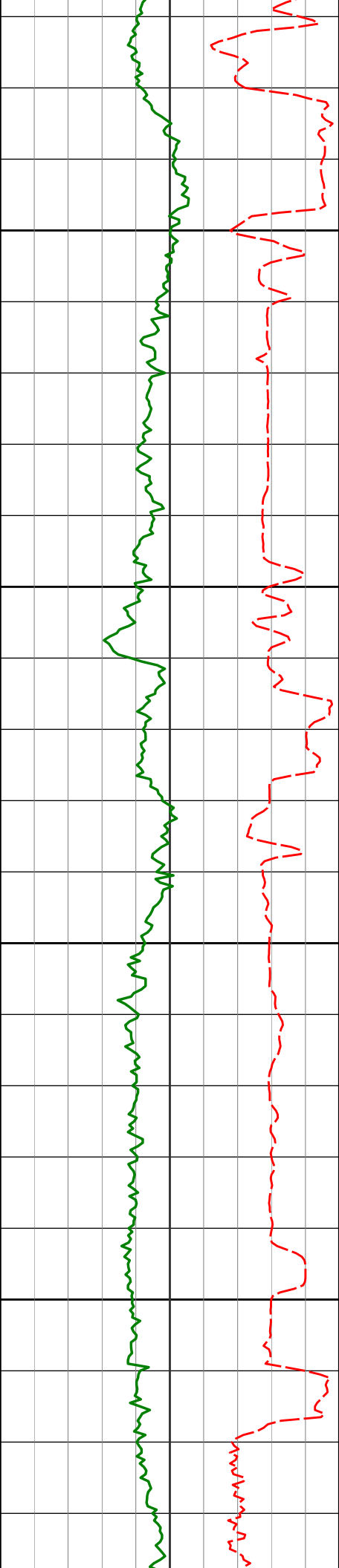
9356'

87.22°

270.38°

6732.33'

3005.84'



9450

9500

9550

9600

9451'

9545'

88.58°

89.38°

270.06°

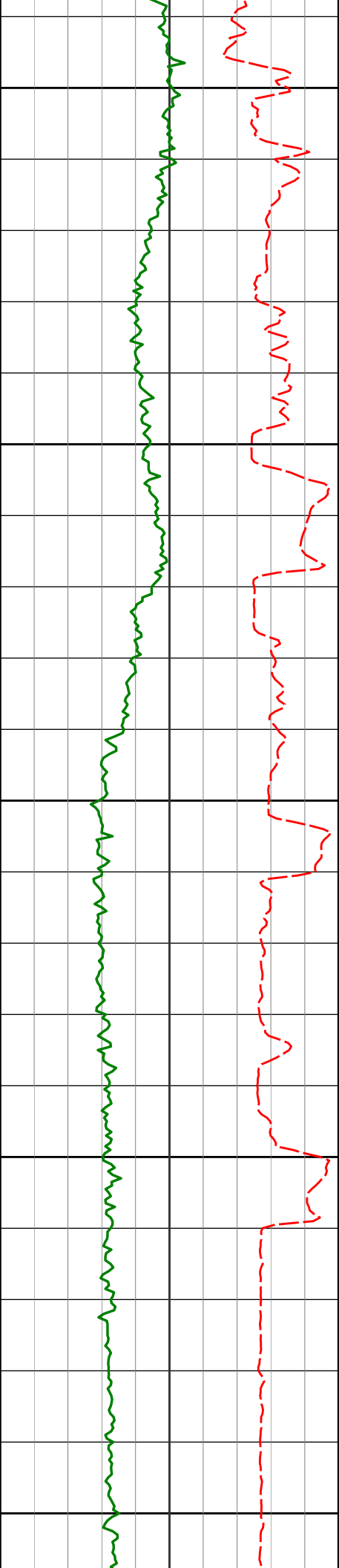
269.00°

6735.81'

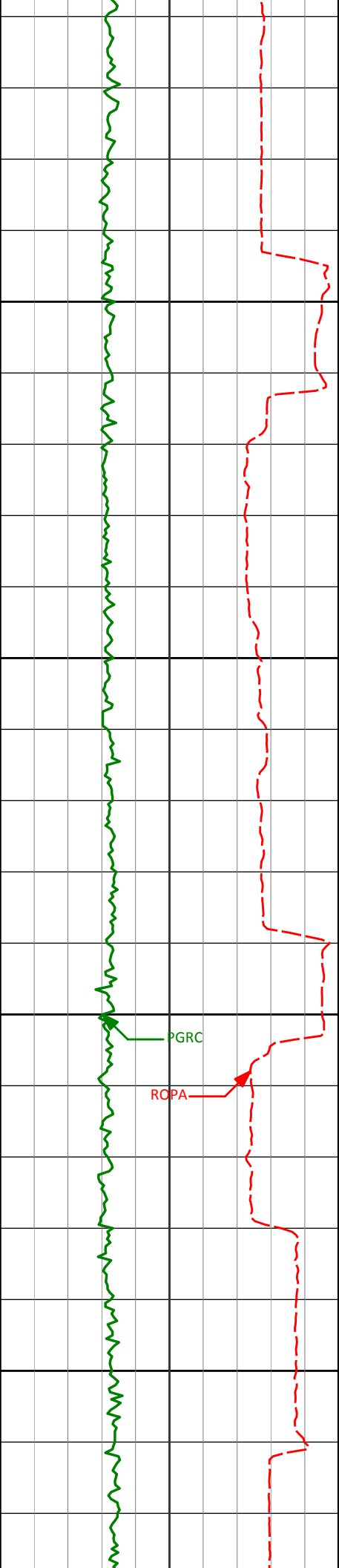
6737.48'

3100.53'

3194.18'



9640'	88.86°	269.10°	6738.94'	3288.77'
9650				
9700				
9735'	89.29°	269.27°	6740.48'	3383.38'
9750				
9800				
9830'	90.43°	268.79°	6740.71'	3477.97'
9850				



9900

9924'

90.31°

269.72°

6740.10'

3571.60'

9950

10000

PGRC

ROPA

10019'

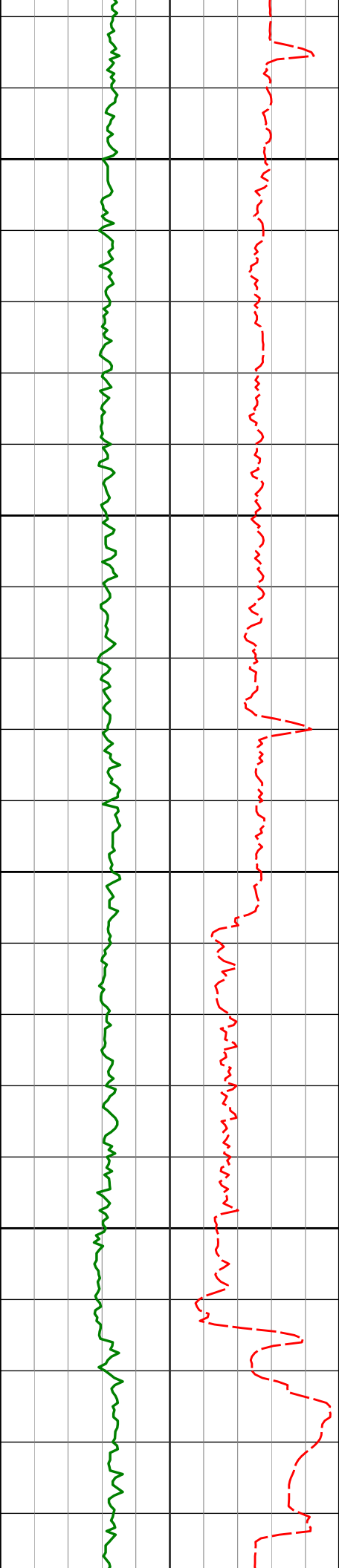
89.54°

270.85°

6740.23'

3666.36'

10050



10100

10114'

89.88°

270.38°

6740.71'

3761.16'

10150

10200

10209'

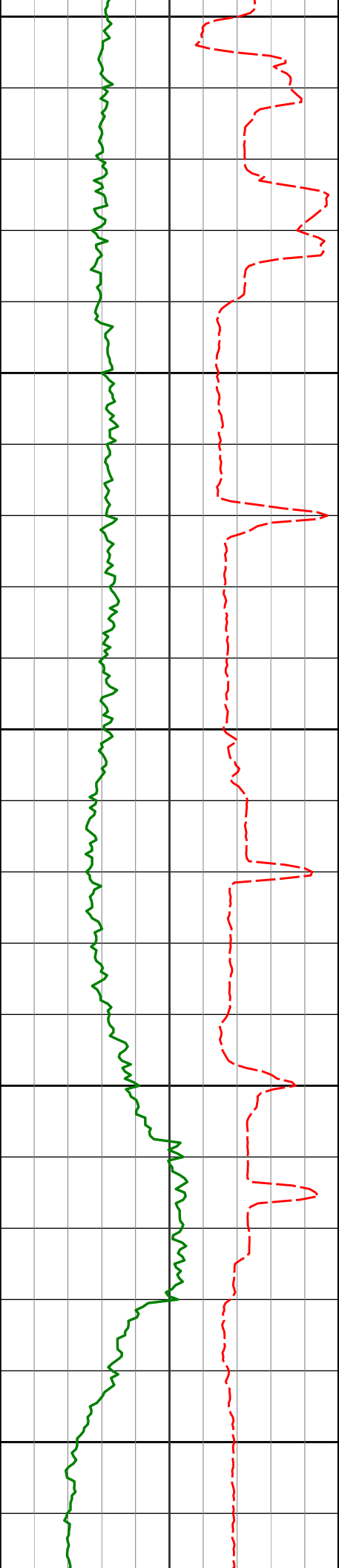
90.96°

270.25°

6740.01'

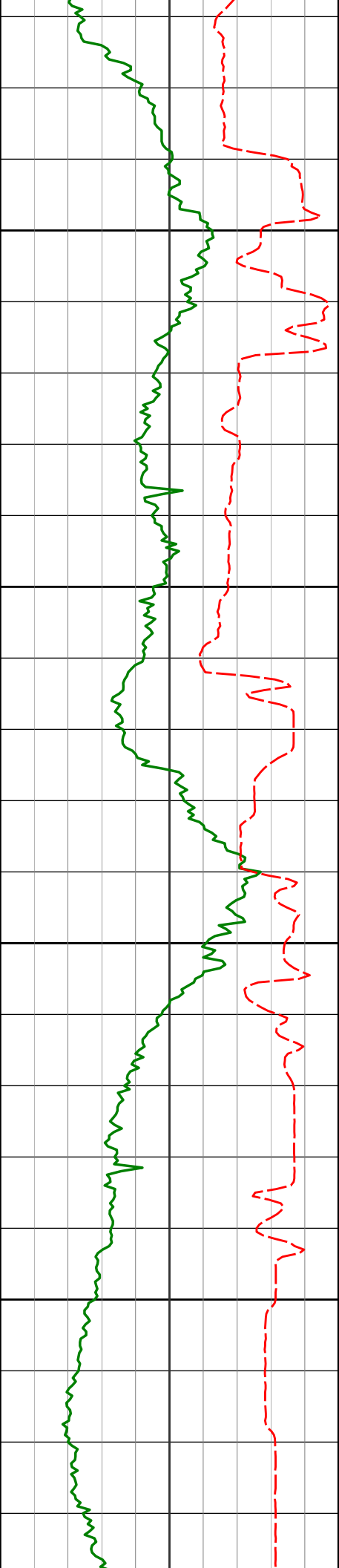
3855.93'

10250



10300
10350
10400
10450
10500

10304'	89.08°	270.97°	6739.98'	3950.72'
10398'	87.99°	271.03°	6742.38'	4044.53'
10493'	87.94°	270.29°	6745.75'	4139.28'



10550

10588'

89.41°

269.89°

6747.95'

4233.99'

10600

10650

10683'

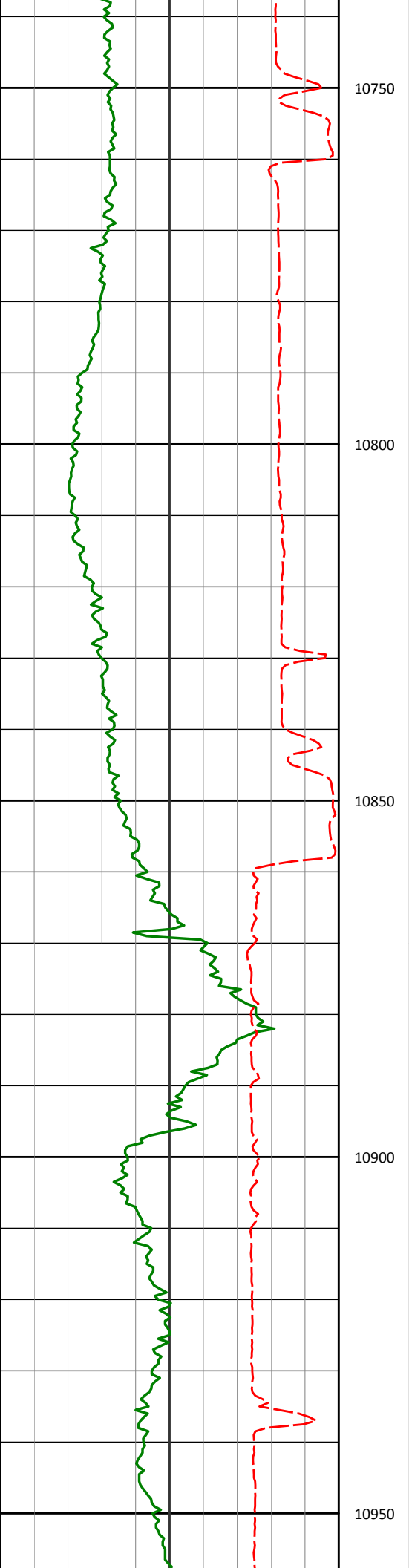
88.80°

269.35°

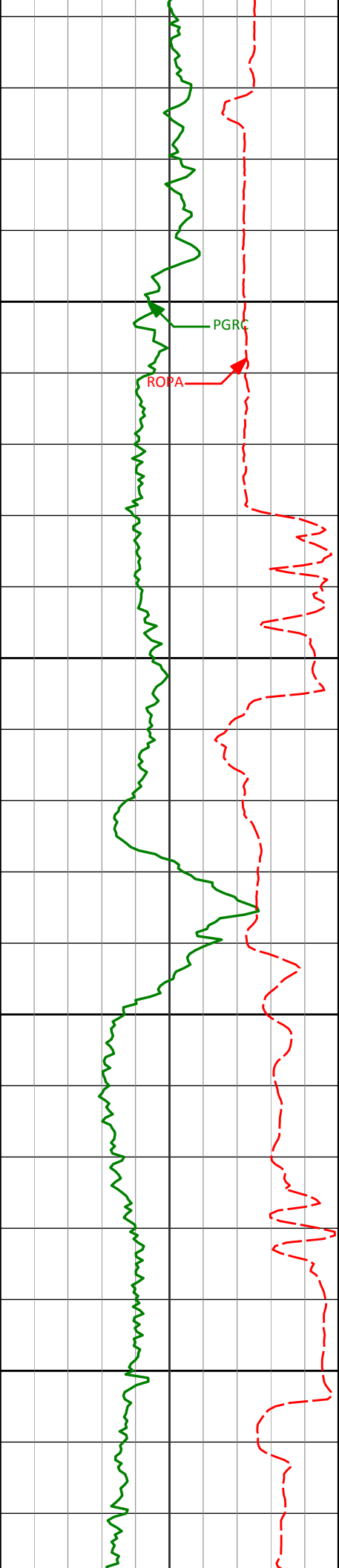
6749.44'

4328.66'

10700



10750				
10778'	89.45°	269.06°	6750.89'	4423.27'
10800				
10850				
10872'	90.22°	270.77°	6751.16'	4516.99'
10900				
10950				



10967'	91.29°	270.69°	6749.90'	4611.79'
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11000

ROPA

PGR

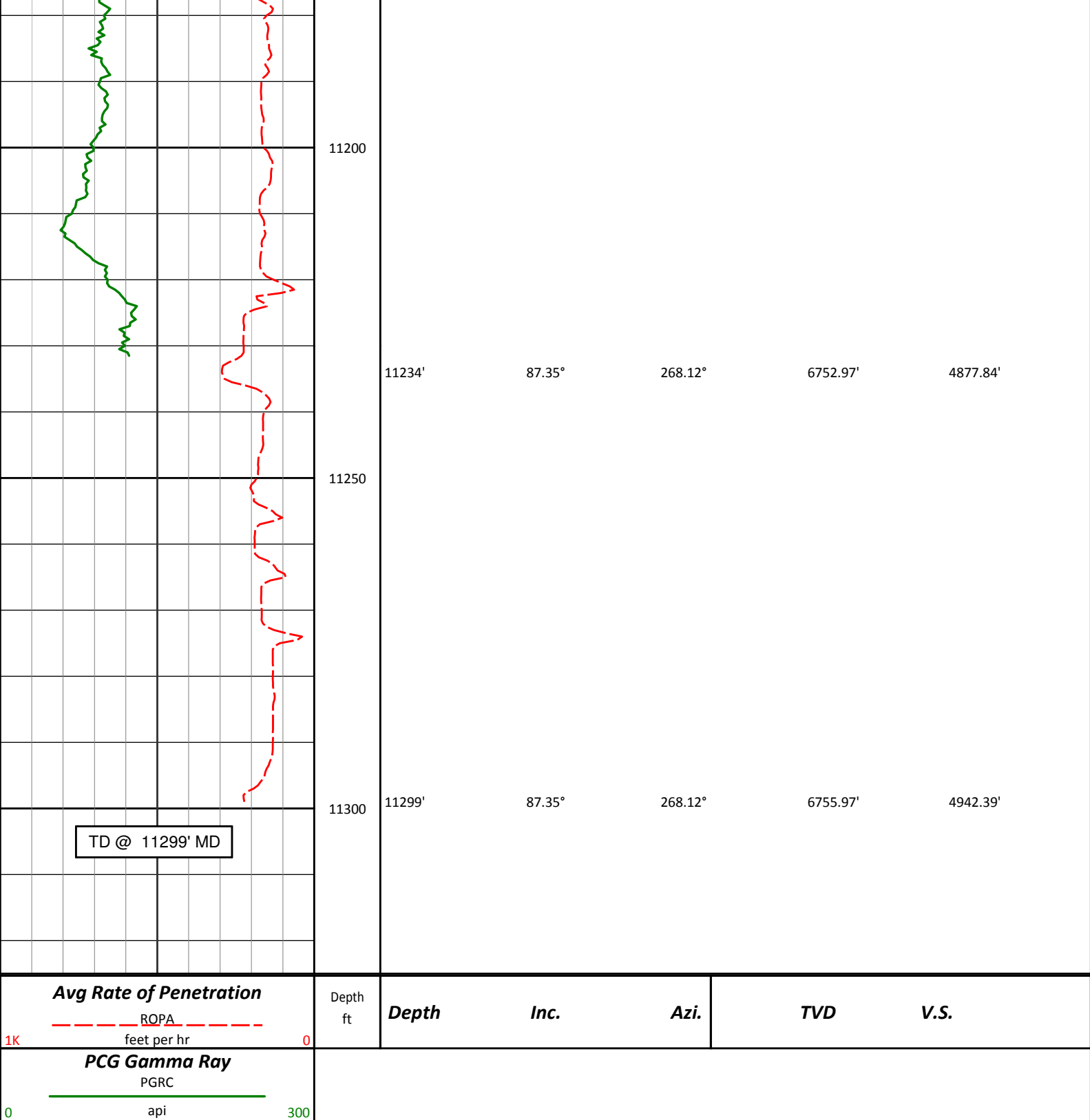
11050

11062'	90.31°	271.31°	6748.58'	4706.62'
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11100

11150

11157'	88.09°	268.55°	6749.91'	4801.32'
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<div><div>Avg Rate of Penetration</div><div><div>ROPA</div><div>feet per hr</div></div></div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
1K	0						
<div><div>PCG Gamma Ray</div><div><div>PGRC</div><div>api</div></div></div>							
0	300						

HALLIBURTON

DIRECTIONAL SURVEY REPORT
Noble Energy
Wells Ranch AA35-69-1AHNC
Wattenburg
Weld Colorado
USA
CA-XX-0901058458

Measured Depth	Inclination	Direction	Vertical Depth	Latitude	Departure	Vertical Section	Dogleg
-------------------	-------------	-----------	-------------------	----------	-----------	---------------------	--------

	(feet)	(degrees)	(degrees)	(feet)	(feet)	(feet)	(feet)	(deg/100ft)
	0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
	266.00	0.60	146.93	266.00	1.17 S	0.76 E	-0.85	0.23
	611.00	1.20	58.63	610.96	0.80 S	4.83 E	-4.88	0.38
	722.00	0.59	25.07	721.95	0.32 N	6.06 E	-6.02	0.70
	815.00	0.48	31.70	814.95	1.09 N	6.47 E	-6.37	0.14
	907.00	0.34	34.28	906.94	1.64 N	6.83 E	-6.69	0.15
	998.00	0.28	24.56	997.94	2.07 N	7.07 E	-6.90	0.09
	1090.00	0.22	275.01	1089.94	2.29 N	6.99 E	-6.80	0.45
	1182.00	0.22	57.39	1181.94	2.40 N	6.96 E	-6.76	0.45
	1274.00	0.58	321.14	1273.94	2.85 N	6.82 E	-6.59	0.70
	1365.00	0.41	328.62	1364.94	3.49 N	6.36 E	-6.08	0.20
	1457.00	0.54	328.48	1456.93	4.14 N	5.96 E	-5.63	0.14
	1552.00	0.22	328.99	1551.93	4.68 N	5.64 E	-5.27	0.34
	1647.00	0.34	47.67	1646.93	5.03 N	5.75 E	-5.36	0.39
	1742.00	0.44	3.33	1741.93	5.58 N	5.98 E	-5.54	0.32
	1837.00	2.09	350.34	1836.90	7.65 N	5.71 E	-5.12	1.75
	1931.00	3.38	352.73	1930.79	12.09 N	5.07 E	-4.15	1.38
	2026.00	4.28	345.78	2025.58	18.31 N	3.85 E	-2.46	1.06
	2119.00	5.64	339.50	2118.23	25.95 N	1.39 E	0.57	1.57
	2214.00	7.57	337.29	2212.60	36.10 N	2.66 W	5.37	2.05
	2308.00	9.68	328.99	2305.53	48.58 N	9.12 W	12.75	2.60
	2403.00	9.51	328.14	2399.20	62.09 N	17.38 W	22.01	0.23
	2498.00	9.13	333.77	2492.95	75.52 N	24.85 W	30.47	1.04
	2593.00	10.70	339.65	2586.53	90.55 N	31.25 W	37.98	1.96
	2688.00	9.62	338.15	2680.04	106.19 N	37.27 W	45.16	1.17
	2783.00	9.87	336.68	2773.67	121.03 N	43.45 W	52.44	0.37
	2877.00	10.56	339.04	2866.18	136.48 N	49.72 W	59.86	0.86
	2972.00	10.10	339.15	2959.64	152.39 N	55.80 W	67.12	0.48
	3067.00	10.12	337.67	3053.16	167.89 N	61.93 W	74.41	0.27
	3162.00	9.81	341.28	3146.73	183.28 N	67.70 W	81.32	0.73
	3257.00	10.07	336.91	3240.31	198.58 N	73.56 W	88.31	0.84
	3352.00	8.39	334.92	3334.07	212.50 N	79.75 W	95.53	1.80
	3446.00	8.33	343.66	3427.08	225.25 N	84.58 W	101.30	1.35
	3541.00	10.52	345.92	3520.79	240.27 N	88.62 W	106.47	2.34
	3636.00	10.45	343.96	3614.20	256.96 N	93.11 W	112.20	0.38
	3731.00	11.22	342.52	3707.51	274.05 N	98.27 W	118.63	0.86
	3826.00	12.42	342.88	3800.49	292.63 N	104.05 W	125.80	1.27
	3921.00	13.27	343.00	3893.12	312.82 N	110.25 W	133.50	0.90
	4016.00	13.21	342.73	3985.59	333.62 N	116.66 W	141.46	0.09
	4111.00	10.62	344.58	4078.54	352.42 N	122.21 W	148.41	2.76
	4205.00	9.13	348.59	4171.14	368.09 N	125.99 W	153.36	1.74
	4300.00	7.19	348.17	4265.18	381.29 N	128.70 W	157.05	2.04
	4395.00	4.36	350.86	4359.68	390.68 N	130.49 W	159.55	2.99
	4490.00	3.57	353.42	4454.46	397.18 N	131.40 W	160.95	0.85
	4584.00	3.80	346.85	4548.26	403.12 N	132.45 W	162.44	0.51
	4679.00	2.66	351.91	4643.11	408.37 N	133.47 W	163.86	1.24
	4774.00	0.98	71.91	4738.07	410.81 N	133.01 W	163.58	2.81
	4869.00	1.06	89.89	4833.05	411.06 N	131.36 W	161.95	0.35
	4963.00	0.47	92.27	4927.05	411.05 N	130.11 W	160.70	0.63
	5058.00	0.70	39.71	5022.04	411.48 N	129.35 W	159.97	0.59
	5153.00	0.39	97.29	5117.04	411.88 N	128.66 W	159.32	0.62
	5248.00	0.94	123.43	5212.03	411.41 N	127.68 W	158.31	0.65
	5343.00	0.63	159.05	5307.02	410.50 N	126.85 W	157.41	0.59
	5437.00	0.71	154.21	5401.02	409.49 N	126.41 W	156.89	0.10
	5532.00	0.93	134.85	5496.01	408.42 N	125.61 W	156.01	0.37
	5627.00	1.26	133.27	5590.99	407.16 N	124.30 W	154.62	0.35
	5721.00	1.33	120.10	5684.96	405.90 N	122.60 W	152.83	0.32
	5816.00	0.44	113.40	5779.95	405.20 N	121.31 W	151.49	0.94
	5911.00	0.40	92.09	5874.95	405.05 N	120.65 W	150.82	0.17
	6006.00	0.37	88.87	5969.95	405.04 N	120.01 W	150.18	0.04
	6061.00	0.34	61.37	6024.95	405.12 N	119.69 W	149.87	0.31
	6122.00	0.28	110.55	6085.95	405.16 N	119.39 W	149.57	0.43
	6195.00	3.42	269.63	6158.91	405.08 N	121.40 W	151.57	5.05
	6243.00	12.22	263.06	6206.41	404.45 N	127.89 W	157.99	18.40
	6290.00	18.12	262.72	6251.76	402.93 N	140.09 W	170.04	12.55
	6338.00	20.27	258.49	6297.09	400.32 N	155.64 W	185.35	5.33
	6384.00	20.88	257.60	6340.15	396.97 N	171.46 W	200.87	1.49
	6432.00	23.87	262.81	6384.54	393.92 N	189.45 W	218.59	7.47
	6479.00	28.68	266.28	6426.67	391.99 N	210.15 W	239.08	10.74
	6527.00	36.53	269.07	6467.08	391.01 N	235.97 W	264.76	16.65

6574.00	45.36	273.53	6502.55	391.82 N	266.72 W	295.47	19.78
6622.00	48.40	273.25	6535.36	393.89 N	301.69 W	330.50	6.35
6669.00	48.51	274.07	6566.53	396.13 N	336.79 W	365.67	1.33
6717.00	49.10	275.73	6598.14	399.22 N	372.78 W	401.79	2.88
6763.00	55.72	271.98	6626.19	401.61 N	409.12 W	438.21	15.77
6811.00	64.86	267.63	6649.97	401.40 N	450.75 W	479.70	20.60
6858.00	69.08	267.04	6668.35	399.39 N	493.94 W	522.62	9.05
6906.00	72.07	268.65	6684.31	397.69 N	539.17 W	567.60	6.99
6953.00	77.36	270.42	6696.70	397.33 N	584.49 W	612.76	11.83
7001.00	82.89	270.93	6704.93	397.89 N	631.76 W	659.93	11.57
7022.00	84.04	270.54	6707.32	398.16 N	652.62 W	680.76	5.78
7099.00	85.93	270.72	6714.05	399.00 N	729.32 W	757.30	2.47
7175.00	87.78	269.74	6718.22	399.31 N	805.20 W	832.99	2.75
7270.00	89.48	269.95	6720.49	399.05 N	900.17 W	927.67	1.80
7364.00	89.41	270.01	6721.40	399.02 N	994.16 W	1021.39	0.10
7459.00	89.66	269.84	6722.17	398.89 N	1089.16 W	1116.11	0.32
7554.00	90.06	269.70	6722.40	398.51 N	1184.16 W	1210.81	0.45
7649.00	90.46	269.25	6721.97	397.64 N	1279.15 W	1305.47	0.63
7744.00	89.57	269.89	6721.95	396.93 N	1374.15 W	1400.14	1.15
7839.00	89.97	269.80	6722.33	396.67 N	1469.15 W	1494.85	0.43
7934.00	89.94	269.77	6722.40	396.31 N	1564.14 W	1589.55	0.04
8029.00	90.03	269.74	6722.43	395.91 N	1659.14 W	1684.25	0.10
8123.00	88.95	268.92	6723.26	394.81 N	1753.13 W	1777.89	1.44
8218.00	89.29	269.51	6724.72	393.51 N	1848.11 W	1872.50	0.72
8313.00	88.27	268.46	6726.75	391.82 N	1943.07 W	1967.07	1.54
8408.00	89.45	269.34	6728.64	390.00 N	2038.03 W	2061.62	1.55
8502.00	89.48	268.95	6729.51	388.60 N	2132.02 W	2155.23	0.42
8597.00	89.57	268.65	6730.30	386.61 N	2226.99 W	2249.79	0.33
8692.00	90.09	268.27	6730.58	384.05 N	2321.96 W	2344.29	0.68
8787.00	91.02	268.23	6729.66	381.15 N	2416.91 W	2438.75	0.98
8882.00	92.03	270.13	6727.14	379.79 N	2511.86 W	2533.33	2.26
8976.00	91.54	270.48	6724.21	380.29 N	2605.81 W	2627.06	0.64
9071.00	88.86	269.89	6723.88	380.60 N	2700.80 W	2721.80	2.89
9166.00	89.45	269.49	6725.28	380.09 N	2795.79 W	2816.48	0.75
9261.00	87.41	270.45	6727.88	380.04 N	2890.75 W	2911.16	2.37
9356.00	87.22	270.38	6732.33	380.72 N	2985.64 W	3005.84	0.21
9451.00	88.58	270.06	6735.81	381.09 N	3080.57 W	3100.53	1.47
9545.00	89.38	269.00	6737.48	380.32 N	3174.55 W	3194.18	1.41
9640.00	88.86	269.10	6738.94	378.74 N	3269.53 W	3288.77	0.56
9735.00	89.29	269.27	6740.48	377.39 N	3364.51 W	3383.38	0.49
9830.00	90.43	268.79	6740.71	375.78 N	3459.49 W	3477.97	1.30
9924.00	90.31	269.72	6740.10	374.56 N	3553.48 W	3571.60	1.00
10019.00	89.54	270.85	6740.23	375.03 N	3648.48 W	3666.36	1.44
10114.00	89.88	270.38	6740.71	376.05 N	3743.47 W	3761.16	0.61
10209.00	90.96	270.25	6740.01	376.58 N	3838.46 W	3855.93	1.15
10304.00	89.08	270.97	6739.98	377.59 N	3933.45 W	3950.72	2.12
10398.00	87.99	271.03	6742.38	379.23 N	4027.41 W	4044.53	1.16
10493.00	87.94	270.29	6745.75	380.32 N	4122.34 W	4139.28	0.78
10588.00	89.41	269.89	6747.95	380.47 N	4217.31 W	4233.99	1.60
10683.00	88.80	269.35	6749.44	379.84 N	4312.30 W	4328.66	0.86
10778.00	89.45	269.06	6750.89	378.52 N	4407.28 W	4423.27	0.75
10872.00	90.22	270.77	6751.16	378.38 N	4501.27 W	4516.99	2.00
10967.00	91.29	270.69	6749.90	379.59 N	4596.26 W	4611.79	1.13
11062.00	90.31	271.31	6748.58	381.25 N	4691.23 W	4706.62	1.22
11157.00	88.09	268.55	6749.91	381.13 N	4786.21 W	4801.32	3.73
11234.00	87.35	268.12	6752.97	378.90 N	4863.11 W	4877.84	1.11
11299.00	87.35	268.12	6755.97	376.77 N	4928.01 W	4942.39	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 274.32 DEGREES (GRID)
A TOTAL CORRECTION OF 7.64 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11299.00 FEET
IS 4942.39 FEET ALONG 274.37 DEGREES (GRID)

First Two survey's are from 3rd party source (Muulti Shot EMS) and provided by CO-man on location before drilling.
MD 266 Inc 0.60 Azi 146.93
MD 611 Inc 1.20 Azi 58.63

Tied in @ Surface
Magnetic direction of 7.633 has been added to AZI for grid direction correction.

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