



1:600 / 1:240

WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	01-Jul-13	02-Jul-13	05-Jul-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.75	8.75	6.125		
Tool Nominal OD (in)	6.75	6.75	4.75		
Log Start Depth (MD, ft)	678	6,040	7,080		
Log End Depth (MD, ft)	6,040	7,080	11,100		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	29-Jun-13 00:00	01-Jul-13 08:53	03-Jul-13 18:45		
Drill/Wipe End Date and Time	29-Jun-13 00:00	02-Jul-13 10:16	05-Jul-13 01:03		
Min Inc (deg) @ Depth (MD, ft)	.13 @ 1,003	10.02 @ 6,046	87.16 @ 7,184		
Max Inc (deg) @ Depth (MD, ft)	13.69 @ 3,833	83.71 @ 7,026	91.64 @ 10,879		
Bit TFA(in2) / Bit Type	.75 / PDC	.9 / N/A	.55 / PDC		
Flow Rate (gpm)	595.88	596.95	291.85		
Max AV (fpm) / CV (fpm) @ MWD	474 / N/A	477 / N/A	491 / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.6 / 28	9.5 / 36	9.1 / 33		
Filtrate CL (ppm)	2,000	2,000	2,100		
pH / Fluid Loss (mptm)	8.8 / 8.8	7.9 / 7.9	8.6 / 8.6		
PV (cP) / YP (Ihf2)	1 / 2	10 / 12	5 / 5		
% Solids / % Sand	2.2 / 0.75	6 / 0.25	5.4 / 0.1		
% 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		
Min Tool Temp (in F) / S	107.07 / PGM	107.07 / PGM	622.14 / PGM		

Max Tool Temp (degF) / Source	167.97 / PCM	167.97 / PCM	226.1 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 167.97	N/A @ 167.97	N/A @ 226.1		
Lead MWD Engineer	Robert Barnes	Chris Befort	Chris Befort		
Customer Representative	Stetson Neilson	Stetson Neilson	Jim Turner		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11404299	11404299	12177825		
Insert Serial Number	11227549	11227549	11227549		
Date and Time Initialized	29-Jun-13 09:26	29-Jun-13 09:26	03-Jul-13 09:14		
Date and Time Read	02-Jul-13 16:34	02-Jul-13 16:54	05-Jul-13 12:29		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57	54	67		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11404299	11404299	12177825		
Sonde Serial Number	11638498	11638498	11638498		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	199.38	259.35	126.47		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.67	47.61	69.49		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11404299	11404299	12177825		
Insert/Sonde Serial Number	11293344	11293344	11293344		

REMARKS

1. All depths are calibrated to driller's pipe tally and are true vertical 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: 0.5 ft
Interval Distance: 1.2 ft
Interval Distance: 1.2 ft

6. Insite Version 7.4.2

WARRANTY

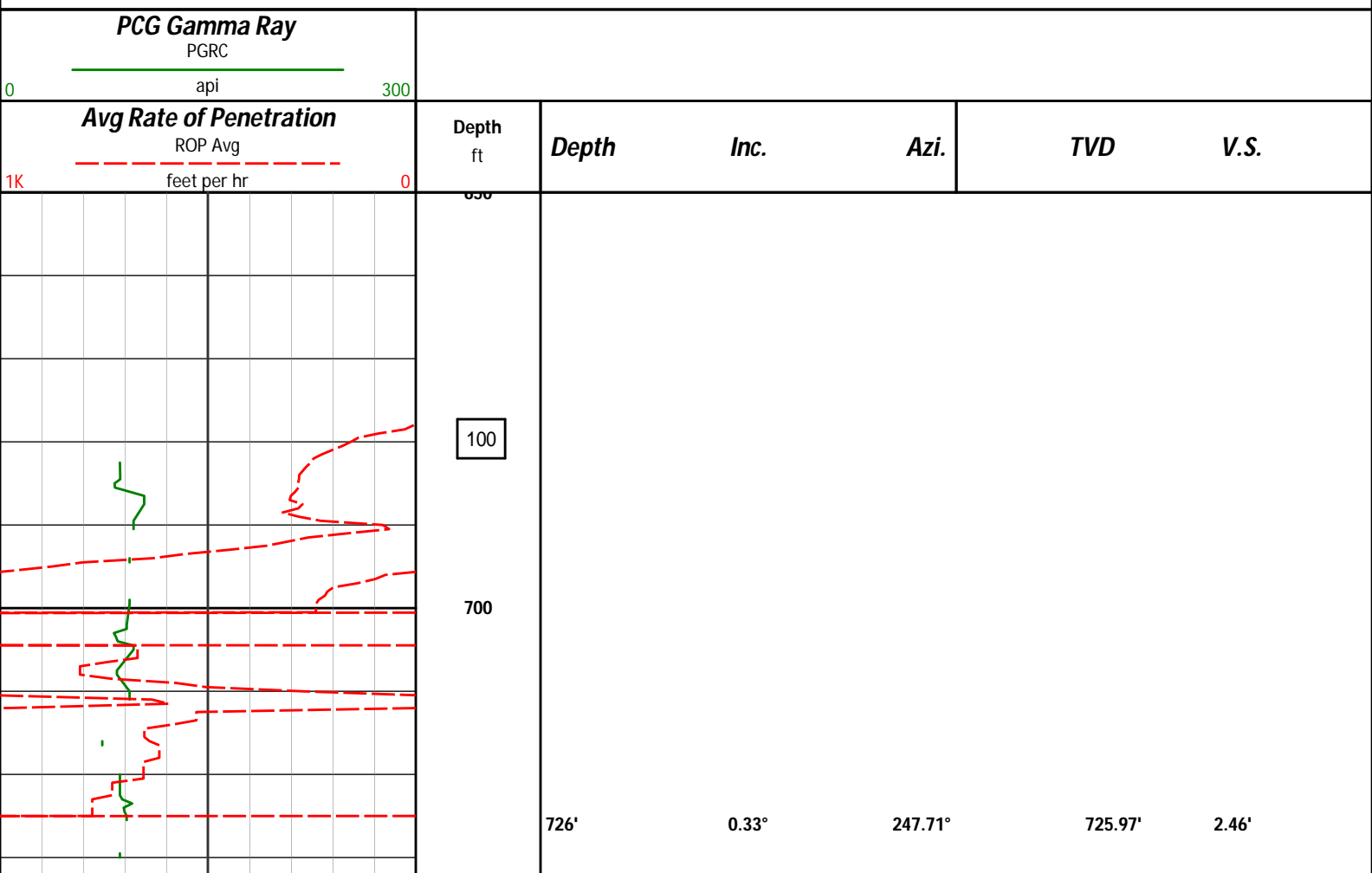
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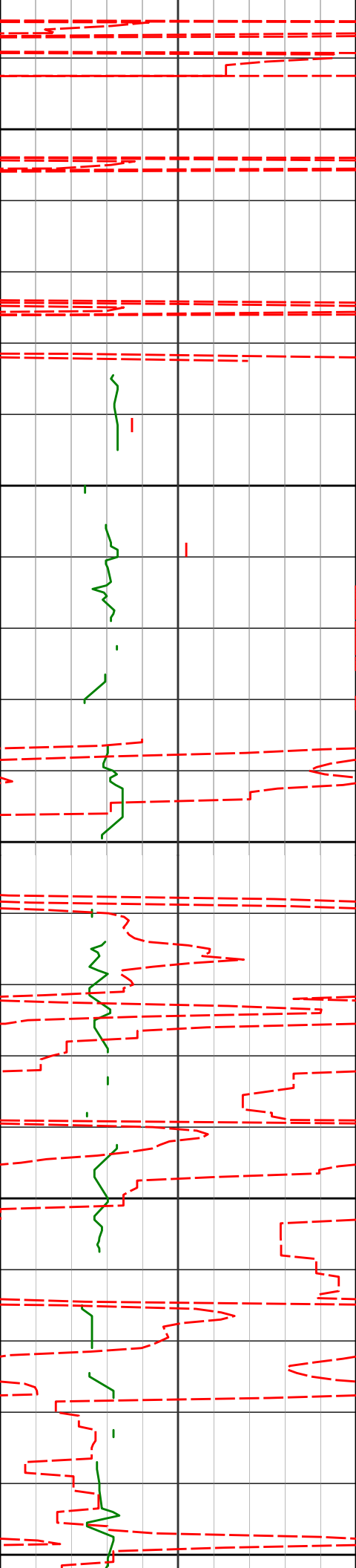
HALLIBURTON

Sperry Drilling Services

MD Detail Log 1:240

Noble Energy
Wells Ranch USXAA23-65-1HN
H&P 321
Sec. 24-T6N-R63W





750

800

850

900

950

818'

0.13°

252.74°

817.97'

2.82'

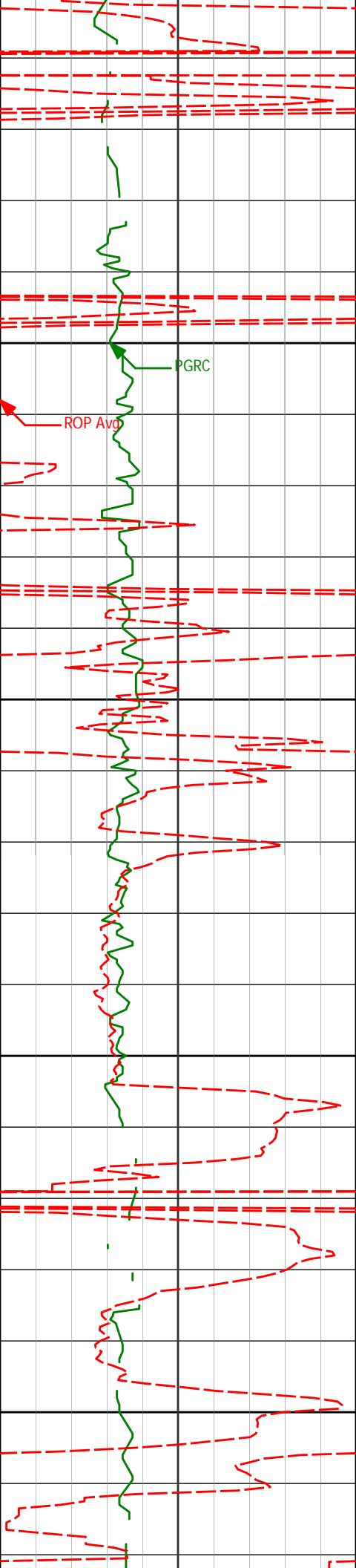
910'

0.21°

38.93°

909.97'

2.80'



1000

1050

1100

1150

1003'

0.13°

108.90°

1002.97'

2.58'

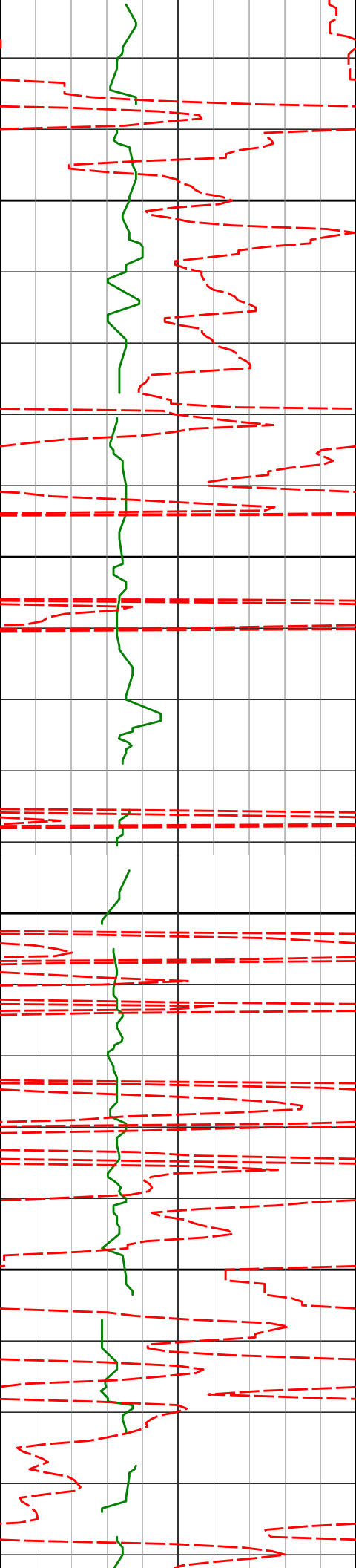
1095'

0.18°

107.35°

1094.97'

2.36'



1187'

0.21°

60.28°

1186.97'

2.08'

1200

1250

1279'

0.73°

86.14°

1278.97'

1.34'

1300

1350

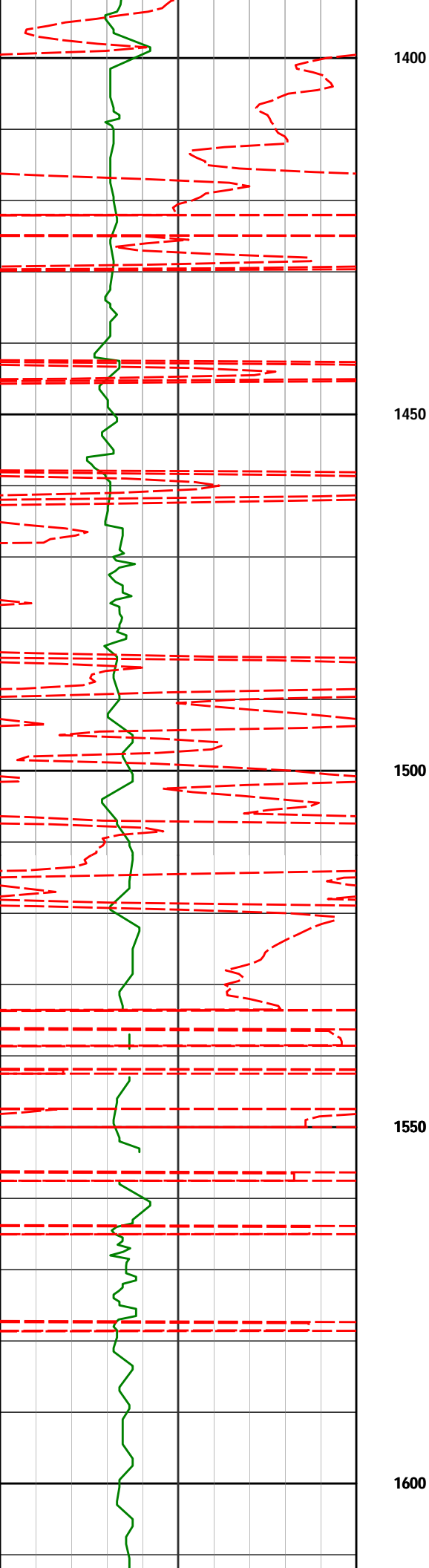
1371'

0.75°

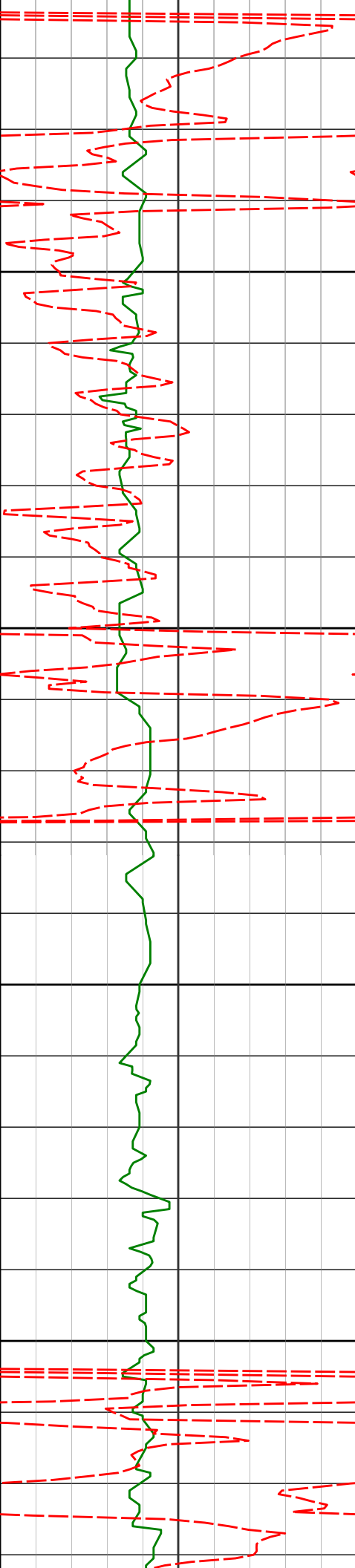
57.11°

1370.96'

0.20'



1463'	1.10°	52.10°	1462.95'	-1.13'
1557'	0.82°	294.39°	1556.94'	-1.36'



1650

1700

1750

1800

1652'

2.43°

257.17°

1651.90'

1.21'

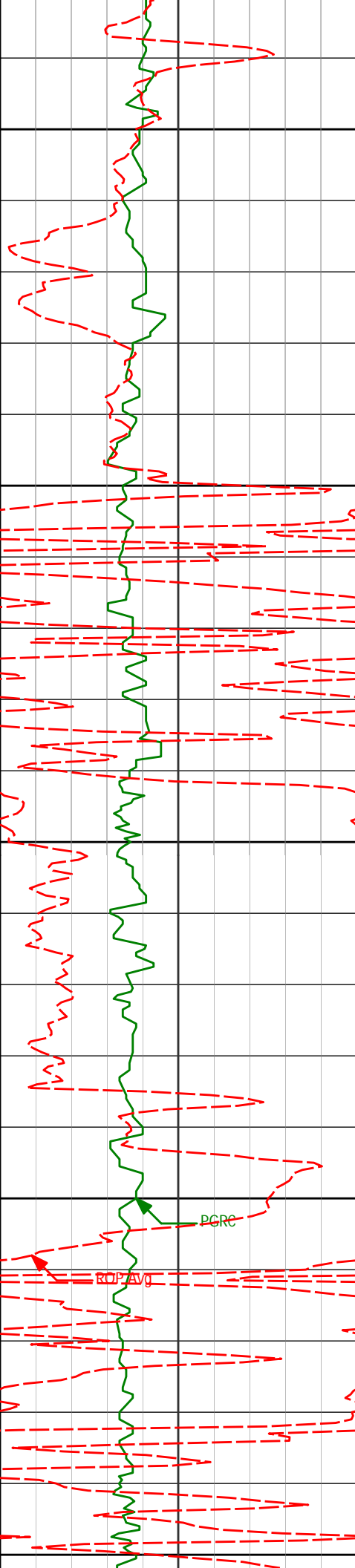
1747'

0.66°

265.36°

1746.87'

3.76'



1850

1900

1950

2000

2050

1842'

0.92°

244.42°

1841.86'

5.04'

1936'

0.65°

233.47°

1935.85'

6.24'

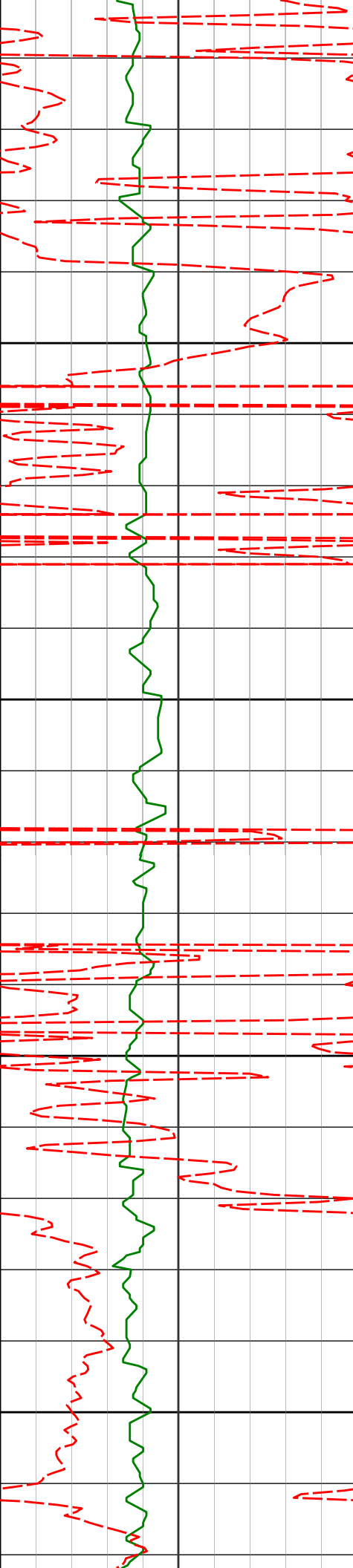
2031'

0.71°

252.23°

2030.84'

7.30'



2100

2150

2200

2250

2126'

0.46°

106.59°

2125.84'

7.54'

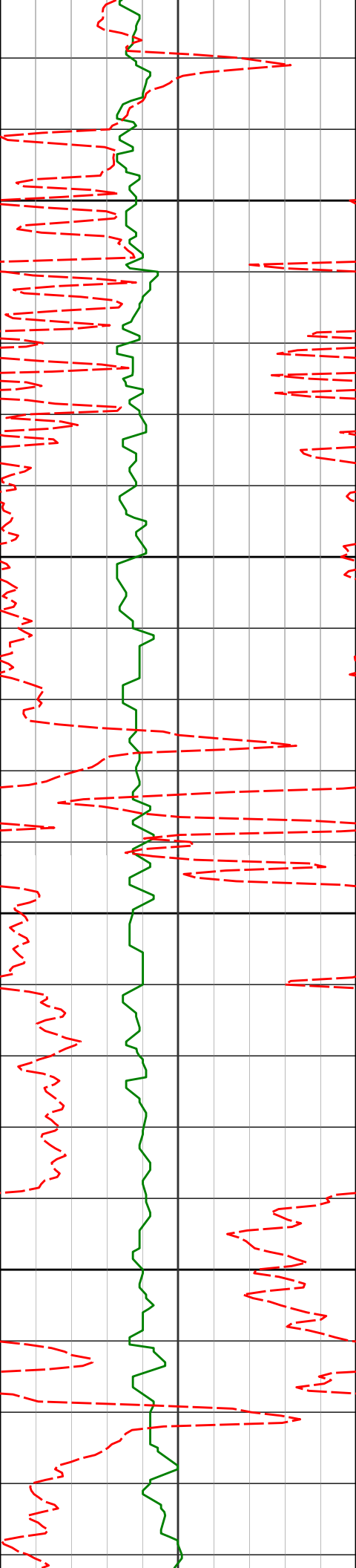
2221'

0.40°

115.10°

2220.84'

6.92'



2300

2350

2400

2450

2316'

0.65°

119.35°

2315.83'

6.22'

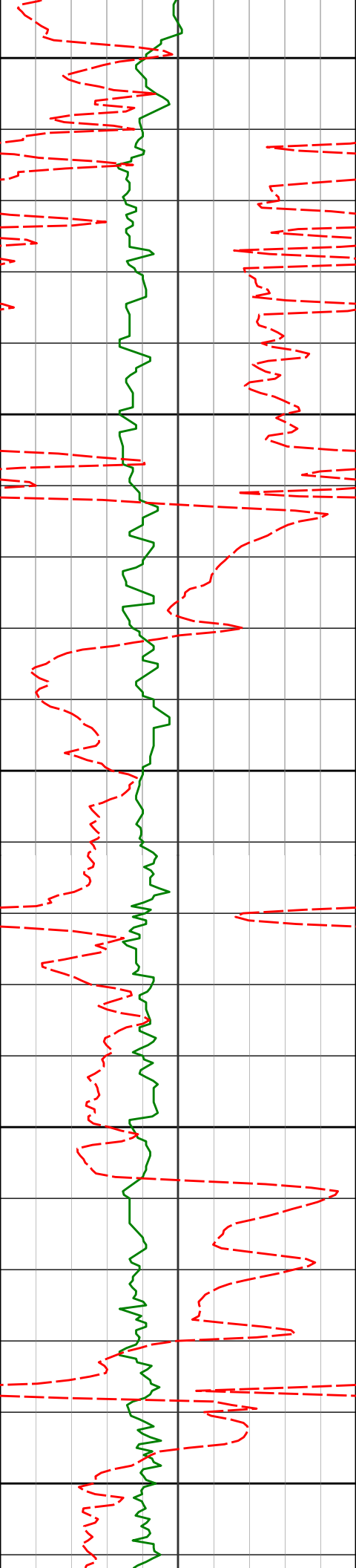
2411'

0.62°

106.46°

2410.83'

5.33'



2500

2506'	0.64°	115.42°	2505.82'	4.43'
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2550

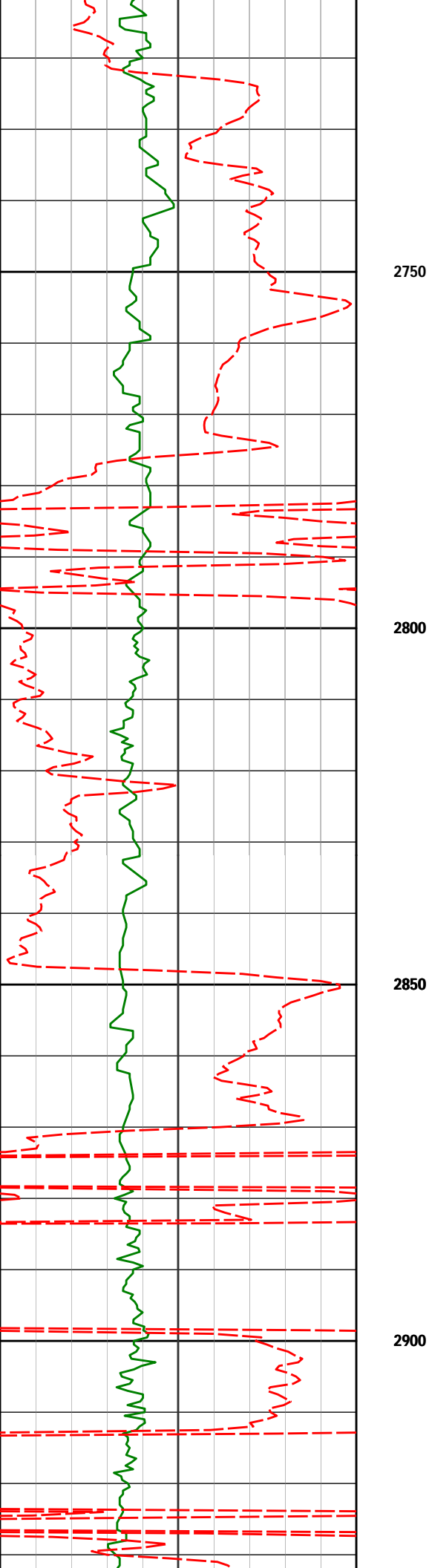
2600

2600'	1.45°	193.91°	2599.81'	4.47'
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2650

2700

2695'	3.74°	195.98°	2694.70'	6.27'
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2790'

5.72°

190.25°

2789.38'

9.19'

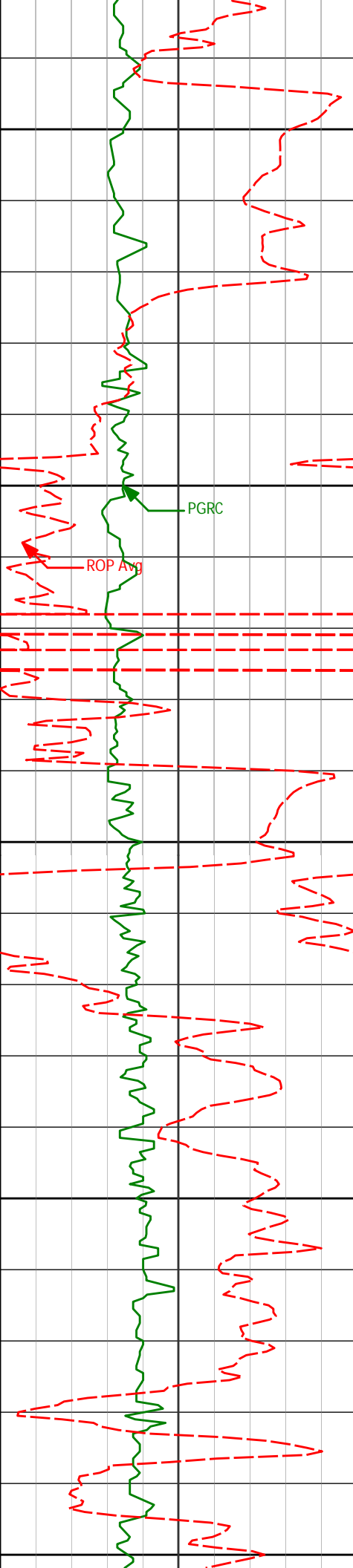
2885'

7.33°

194.45°

2883.76'

13.22'



2950

2980'

9.43°

196.71°

2977.74'

19.09'

3000

PGRC

ROP Avg

3050

3075'

10.13°

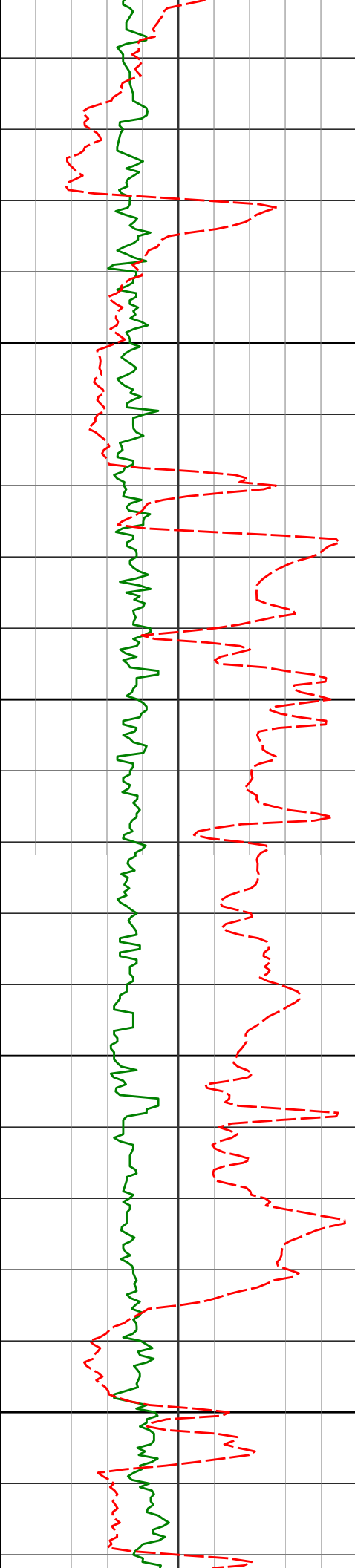
201.04°

3071.36'

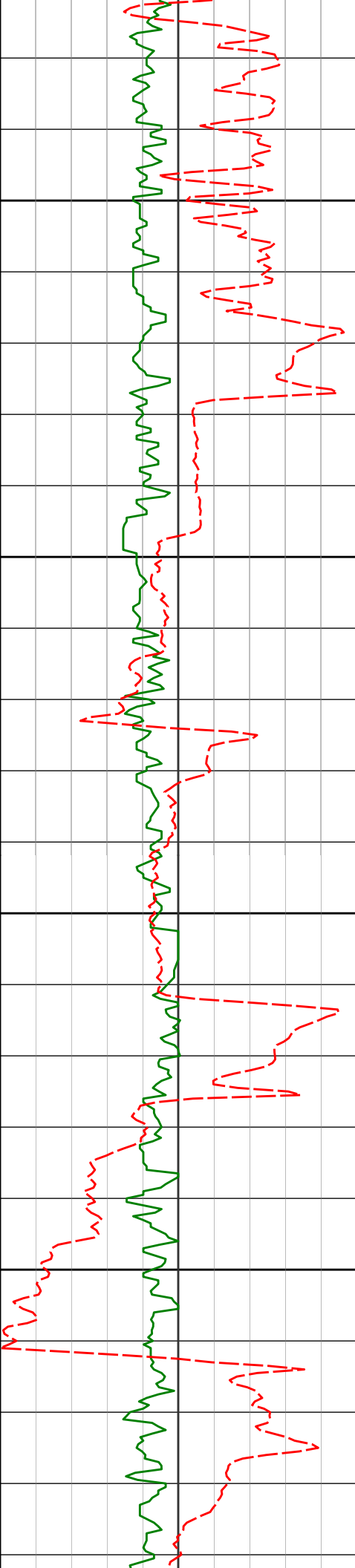
26.74'

3100

3150



3169'	9.38°	198.86°	3164.00'	34.55'
3200				
3250				
3264'	10.19°	198.88°	3257.62'	42.19'
3300				
3350				
3359'	9.55°	203.15°	3351.21'	50.40'



3400

3450

3500

3550

3454'

9.43°

206.49°

3444.91'

59.20'

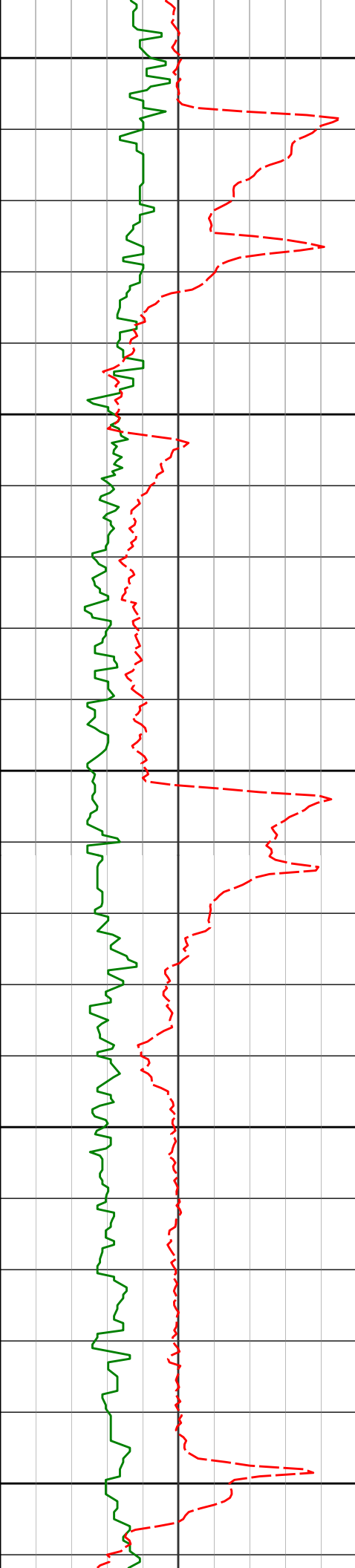
3549'

9.50°

201.38°

3538.62'

67.76'



3600

3643'

10.38°

197.59°

3631.21'

75.57'

3650

3700

3738'

12.48°

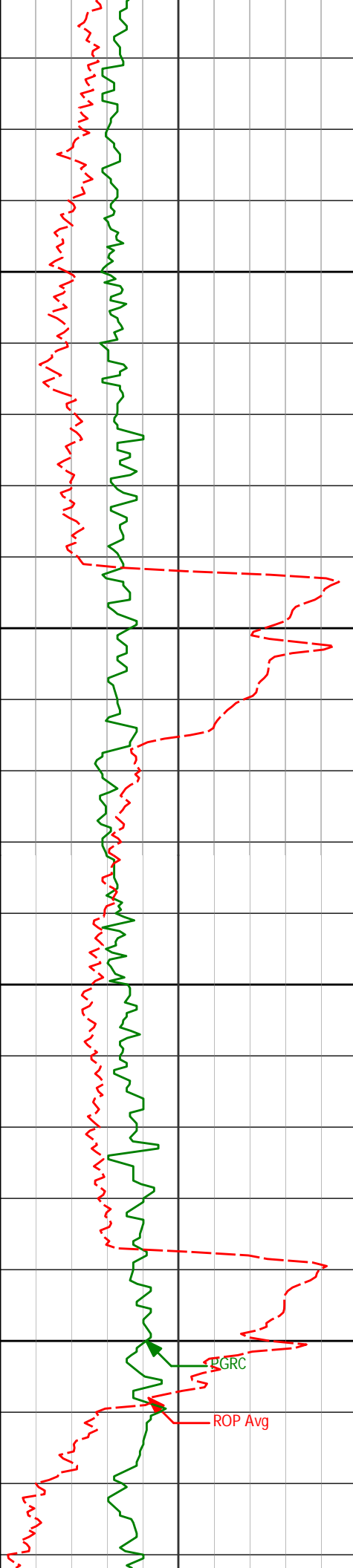
201.87°

3724.32'

84.78'

3750

3800



3833'

13.69°

200.95°

3816.85'

95.78'

3850

3900

3928'

13.10°

200.01°

3909.27'

106.73'

3950

4000

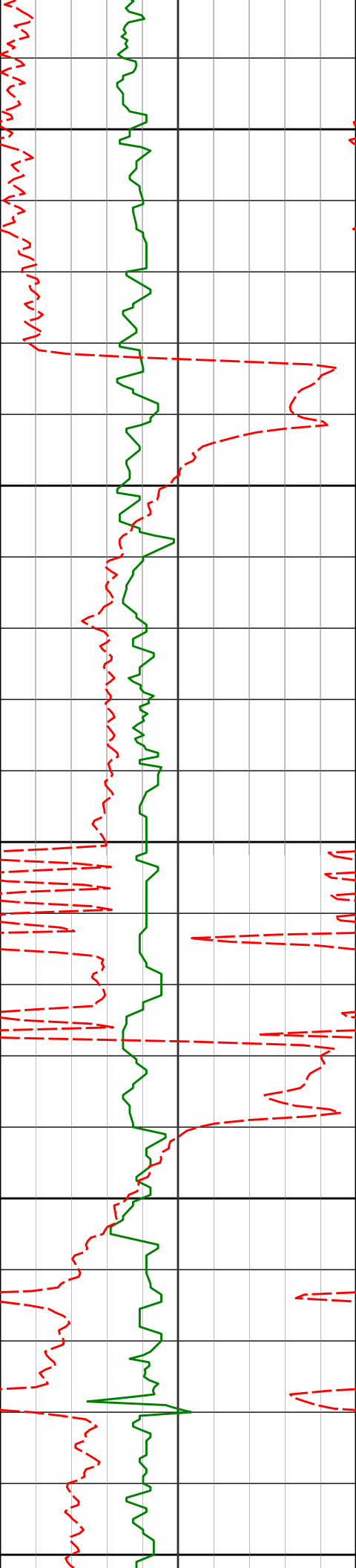
4023'

11.59°

197.83°

4002.07'

116.38'



4050

4100

4150

4200

4250

4118'

10.62°

197.14°

4095.29'

124.65'

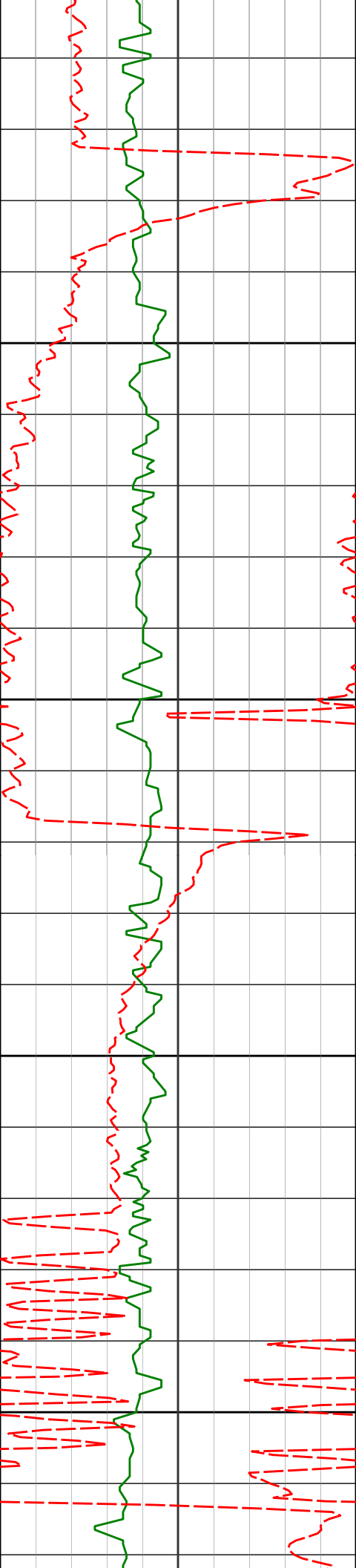
4212'

9.99°

198.78°

4187.78'

132.36'



4300

4307'

9.15°

200.42°

4281.45'

140.00'

4350

4400

4402'

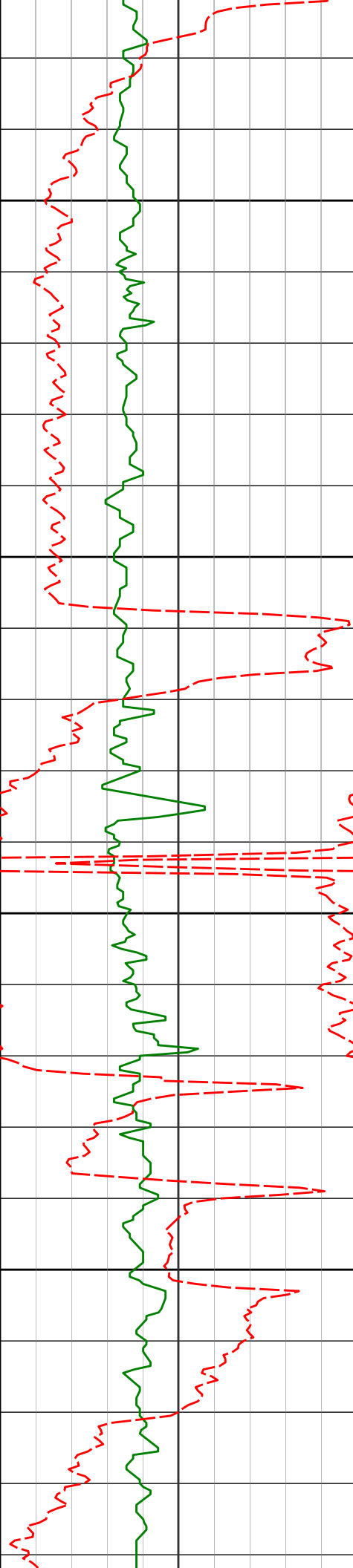
8.67°

201.41°

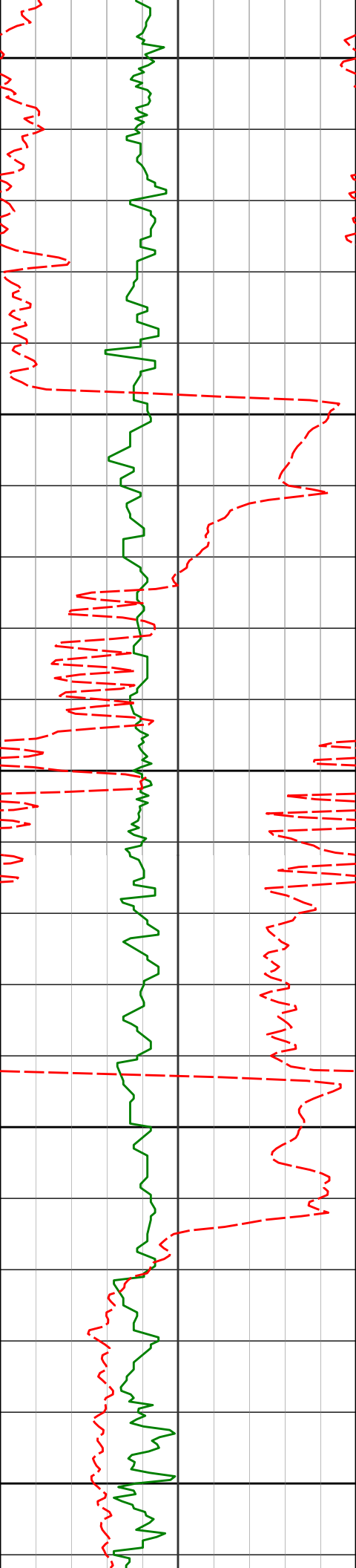
4375.31'

147.41'

4450



4497'	8.99°	201.83°	4469.18'	154.92'
4500				
4550				
4591'	9.21°	199.30°	4562.00'	162.34'
4600				
4650				
4686'	8.00°	200.30°	4655.93'	169.26'



4700

4750

4800

4850

4900

4781'

8.05°

201.69°

4750.00'

175.96'

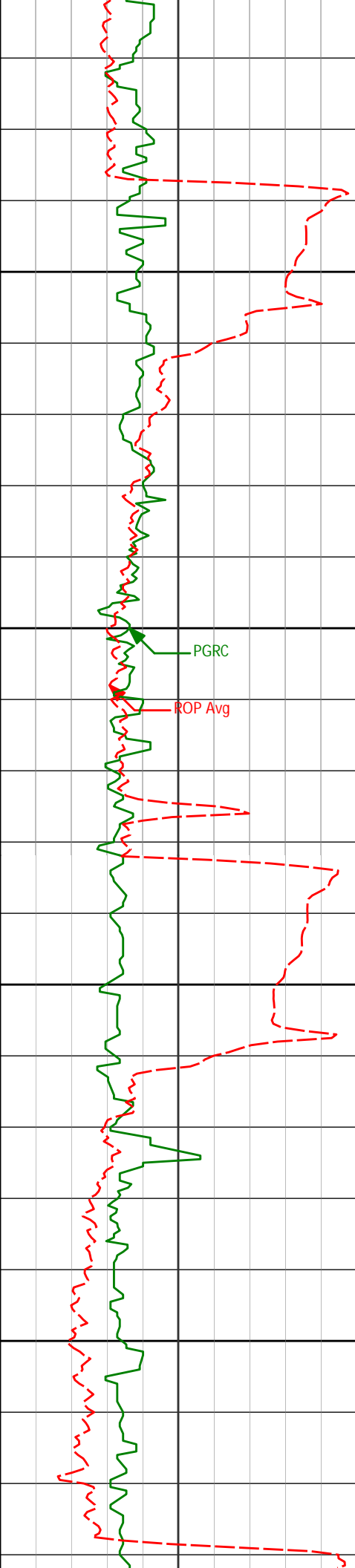
4876'

8.56°

196.45°

4844.00'

182.47'



4950

4970'

8.67°

197.99°

4936.94'

188.78'

5000

5050

5065'

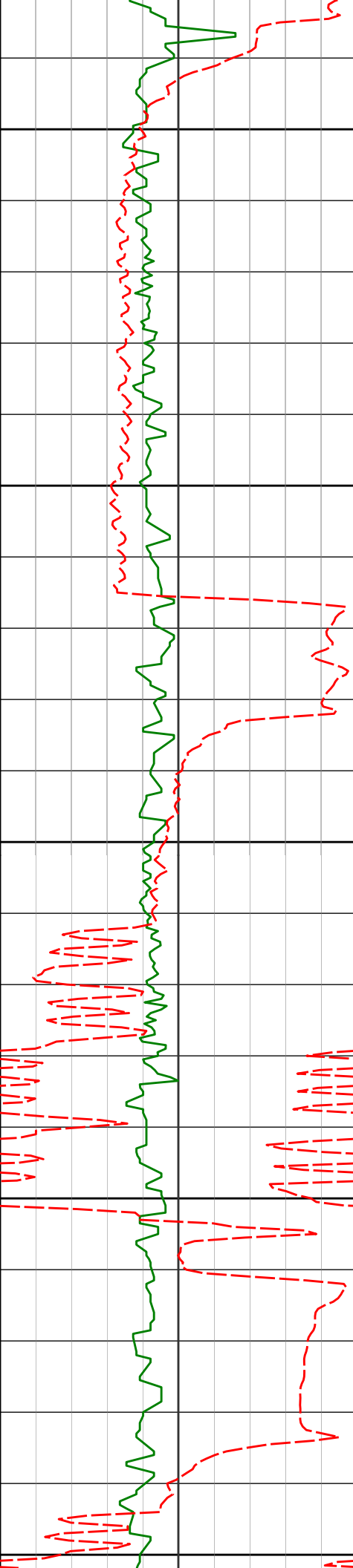
10.48°

193.88°

5030.62'

195.48'

5100



5150

5160'

9.73°

192.72°

5124.14'

201.90'

5200

5250

5255'

8.13°

200.07°

5217.99'

208.23'

5300

5350

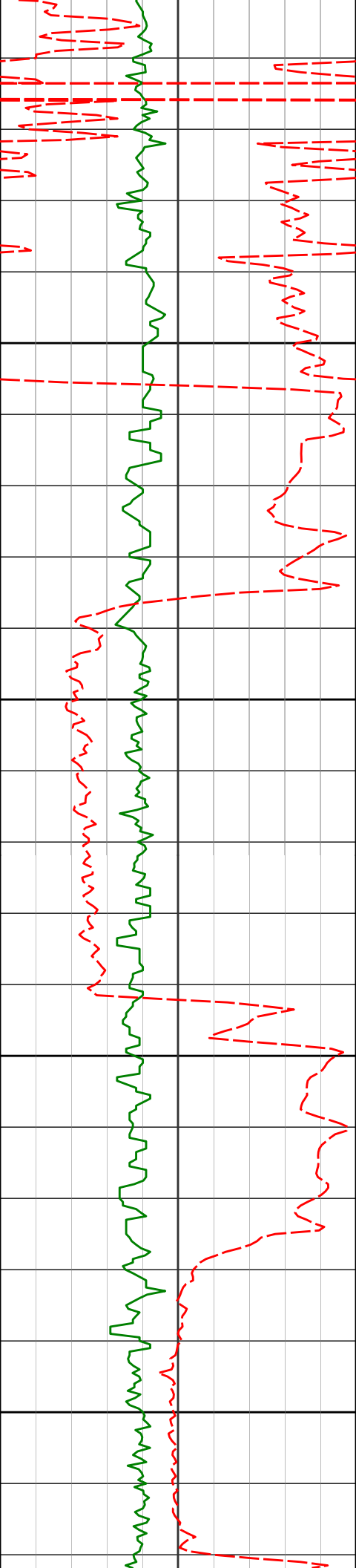
5350'

8.59°

193.18°

5311.98'

214.25'



5400

5450

5500

5550

5444'

8.69°

199.34°

5404.92'

220.35'

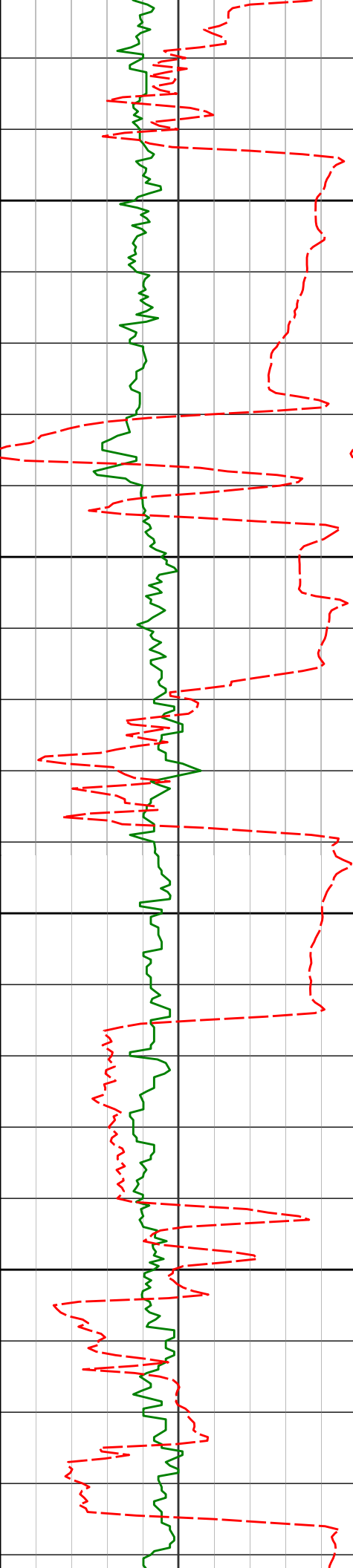
5539'

8.93°

202.46°

5498.80'

227.69'



5600

5650

5700

5750

5634'

9.98°

200.94°

5592.51'

235.73'

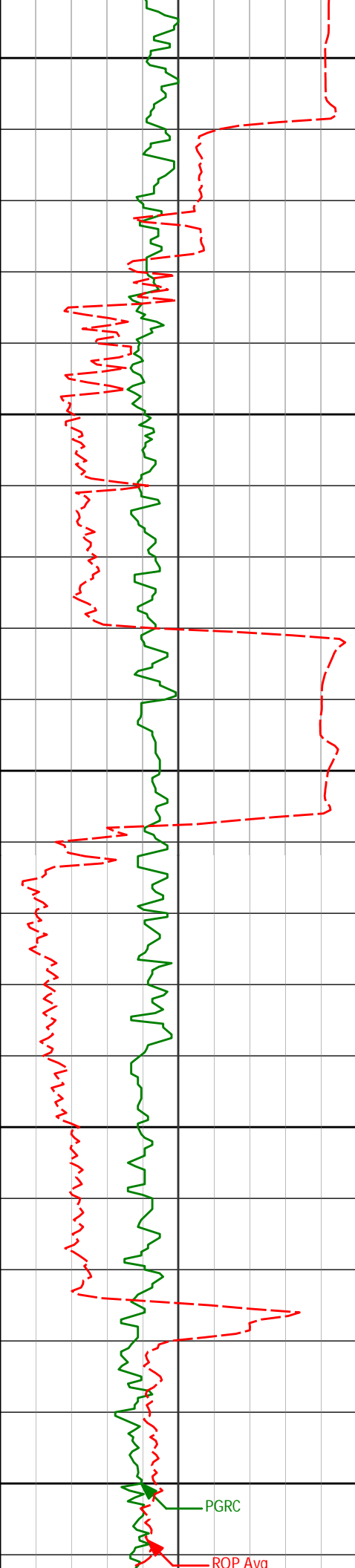
5728'

12.24°

201.05°

5684.74'

244.89'



5800

5823'

12.08°

204.41°

5777.61'

255.52'

5850

5900

5918'

12.02°

203.89°

5870.52'

266.47'

5950

5983'

9.69°

206.51°

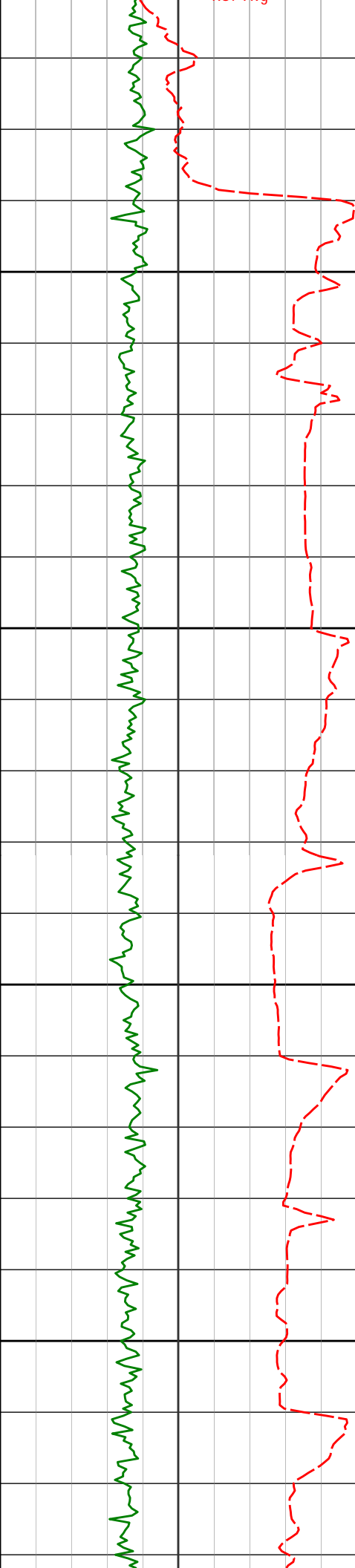
5934.35'

273.39'

6000

PGRC

ROP Ava



200

6050

6100

6150

6200

6046'

10.02°

202.04°

5996.42'

279.35'

6107'

12.46°

205.46°

6056.25'

285.88'

6155'

14.74°

209.26°

6102.90'

292.65'

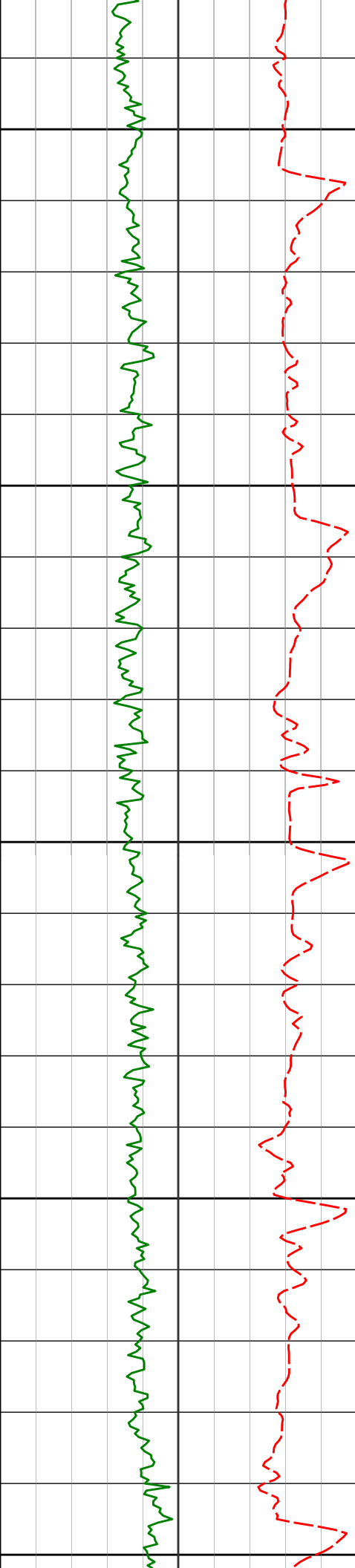
6202'

16.49°

211.32°

6148.16'

300.73'



6250

6250'

20.49°

222.00°

6193.69'

311.74'

6300

6297'

24.98°

228.46°

6237.03'

326.58'

6350

6345'

29.99°

230.91°

6279.60'

345.59'

6400

6392'

34.83°

232.94°

6319.27'

367.69'

6450

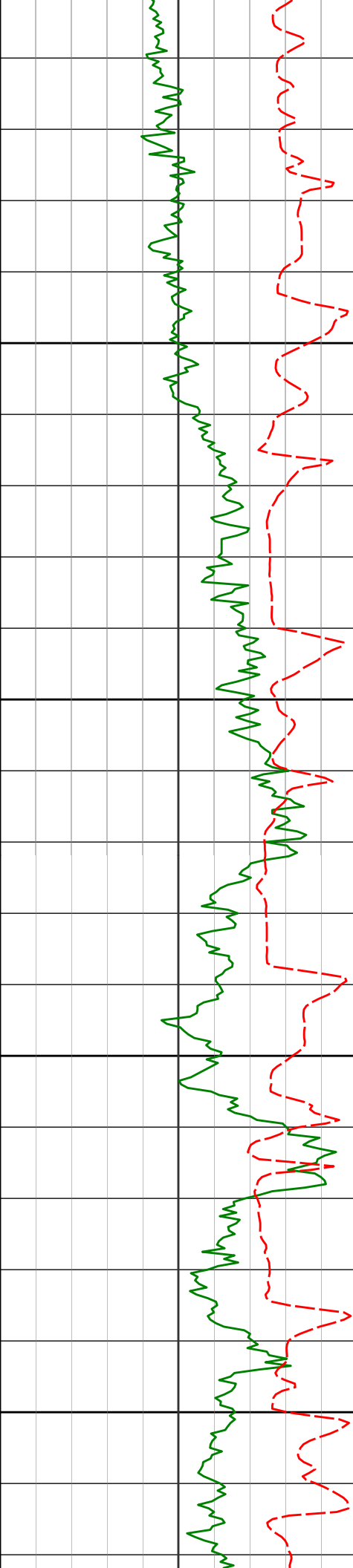
6440'

40.13°

237.63°

6357.35'

394.09'



6500

6550

6600

6650

6486'

44.32°

241.10°

6391.42'

422.90'

6534'

47.37°

242.62°

6424.85'

455.50'

6581'

49.99°

245.74°

6455.88'

489.35'

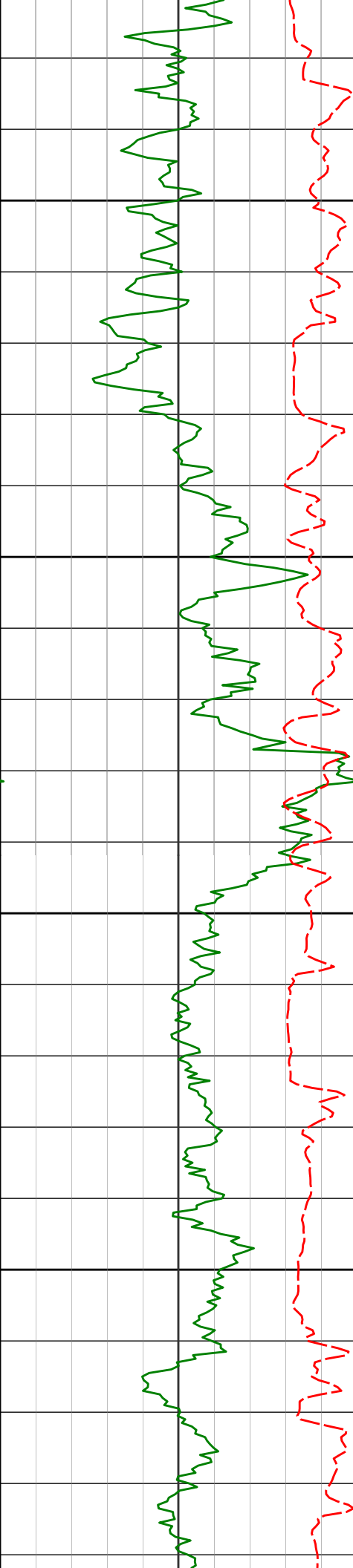
6629'

52.55°

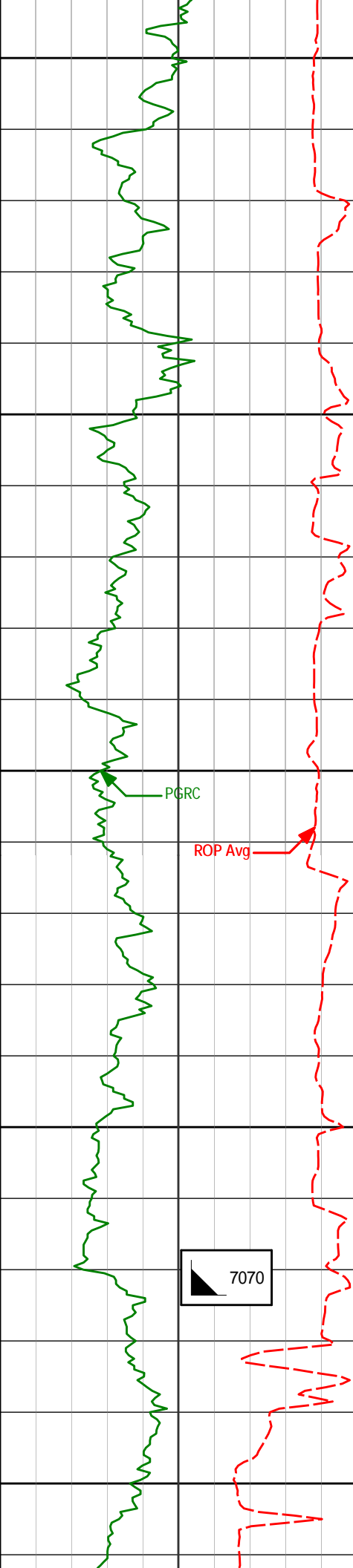
249.08°

6485.92'

525.79'



6675'	55.48°	252.33°	6512.95'	562.45'
6700				
6723'	58.12°	256.77°	6539.24'	602.37'
6750				
6770'	62.76°	259.01°	6562.42'	643.19'
6800				
6818'	67.71°	262.33°	6582.52'	686.76'
6850				
6865'	71.99°	264.93°	6598.71'	730.81'



6900

6913'

74.31°

265.43°

6612.62'

776.60'

6950

6960'

79.13°

267.30°

6623.42'

822.09'

7000

7008'

81.32°

267.59°

6631.56'

869.06'

7026'

83.71°

267.98°

6633.91'

886.77'

7050

300

7100

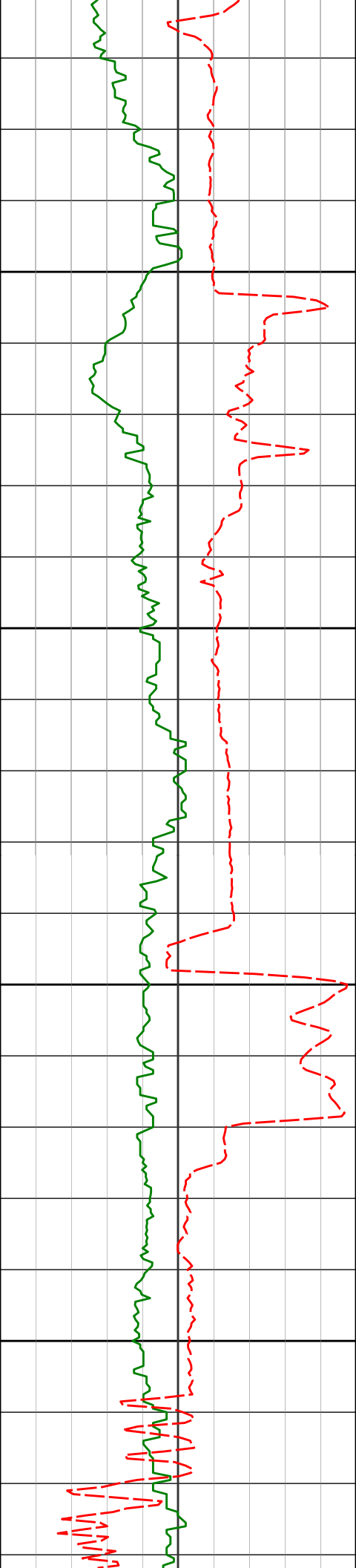
7108'

87.47°

270.24°

6640.21'

967.61'



7150

7200

7250

7300

7184'

87.16°

270.25°

6643.77'

1042.46'

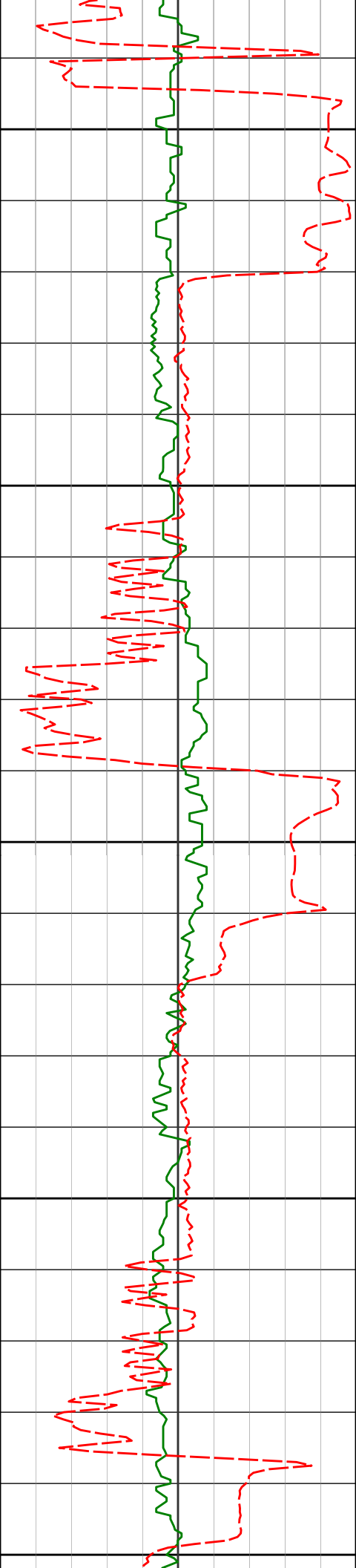
7278'

87.84°

269.69°

6647.87'

1135.13'



7350

7373'

89.26°

269.37°

6650.28'

1228.95'

7400

7450

7468'

91.11°

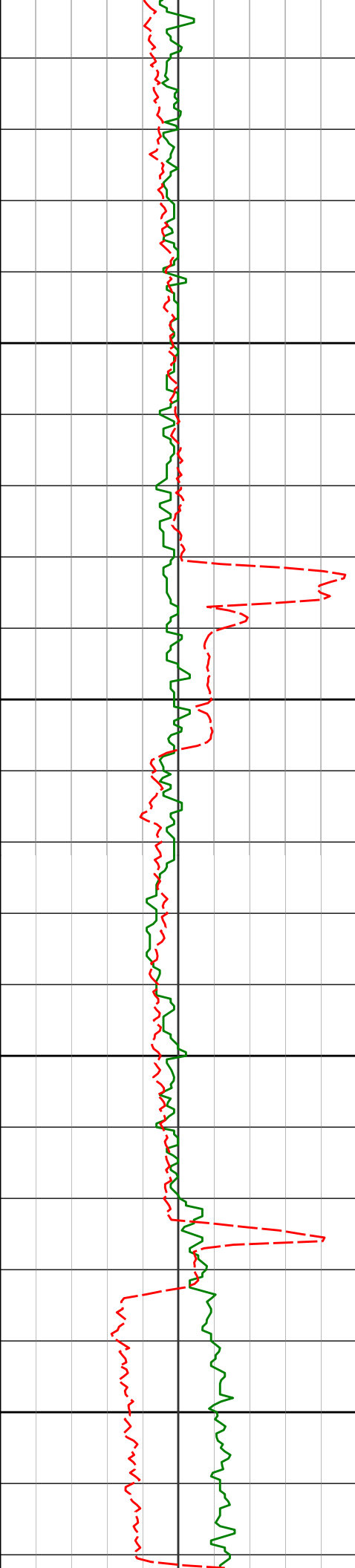
268.88°

6649.97'

1322.90'

7500

7550



7600

7650

7700

7750

7562'

91.30°

268.63°

6648.00'

1415.94'

7657'

90.62°

268.74°

6646.41'

1509.99'

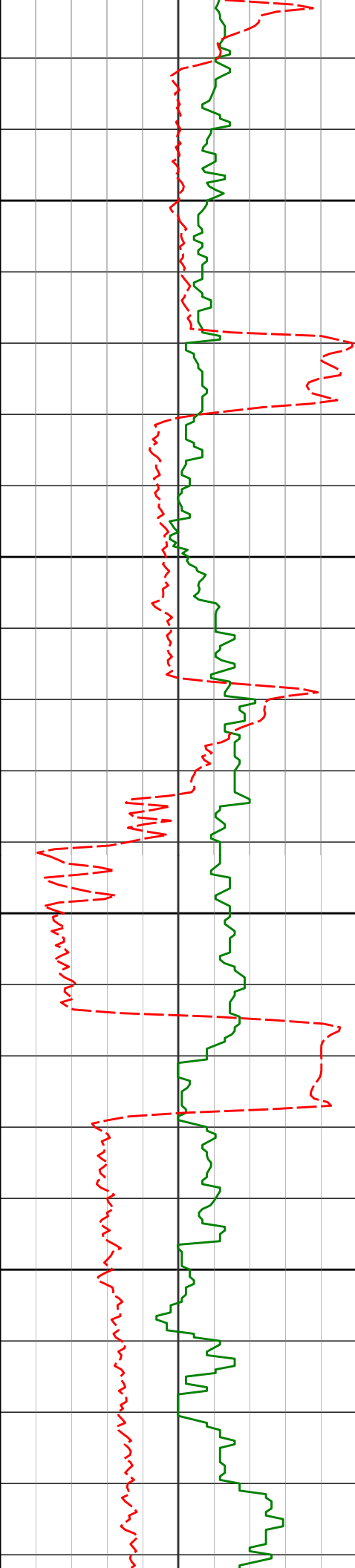
7752'

89.94°

268.46°

6645.95'

1604.07'



7800

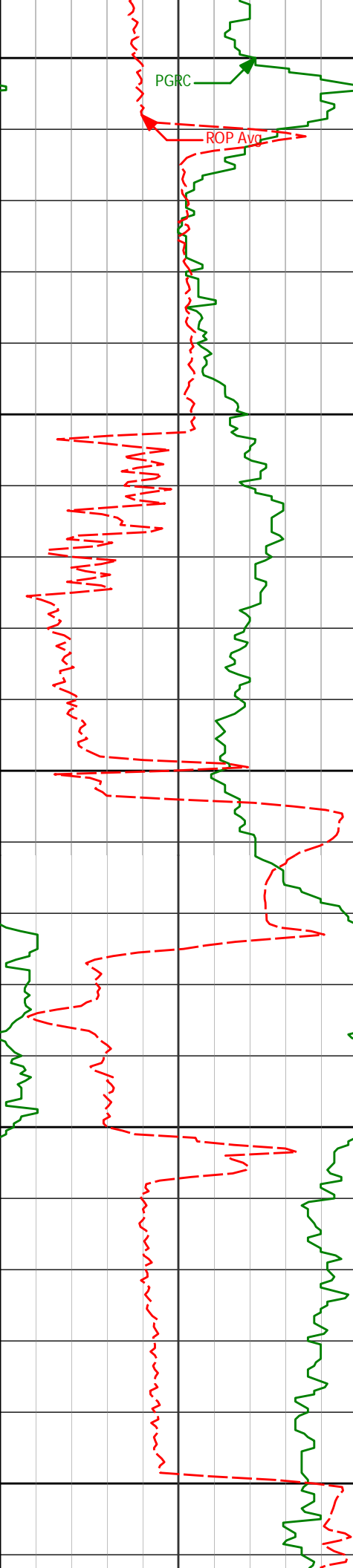
7850

7900

7950

7846' 89.11° 268.04° 6646.73' 1697.23'

7941' 90.80° 270.05° 6646.81' 1791.20'



8000

PGRC

ROP Avg

8050

8100

8150

8200

8036'

88.12°

269.22°

6647.70'

1885.02'

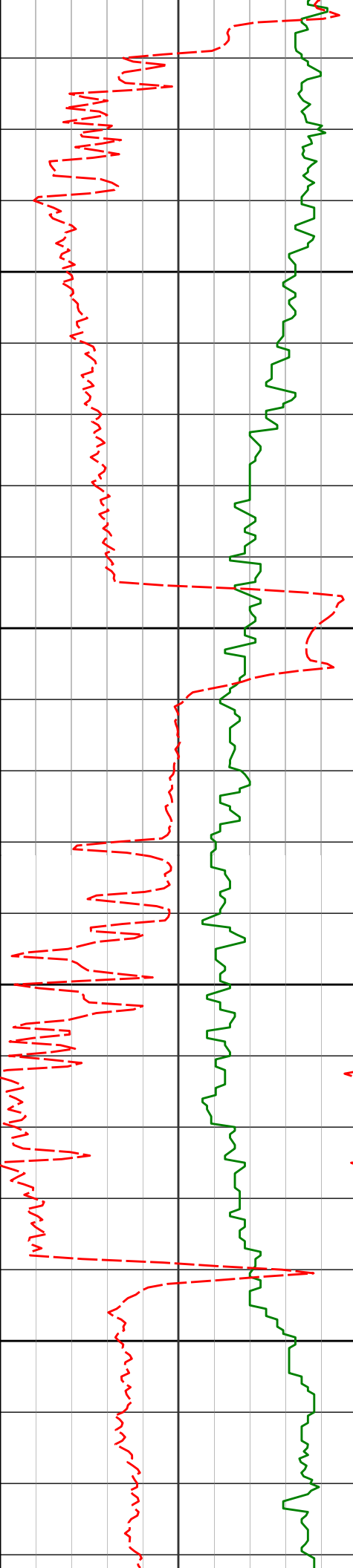
8130'

88.40°

269.11°

6650.56'

1977.93'



8225'

88.83°

269.91°

6652.85'

2071.76'

8250

8300

8319'

90.09°

269.90°

6653.74'

2164.53'

8350

8400

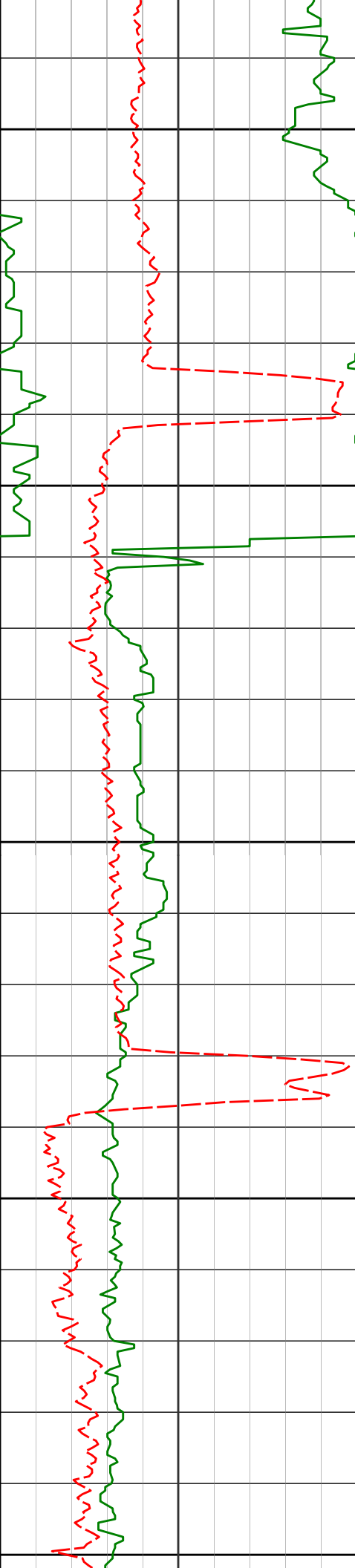
8414'

91.14°

271.14°

6652.72'

2258.11'



8450

8500

8550

8600

8650

8509'

90.92°

270.48°

6651.01'

2351.60'

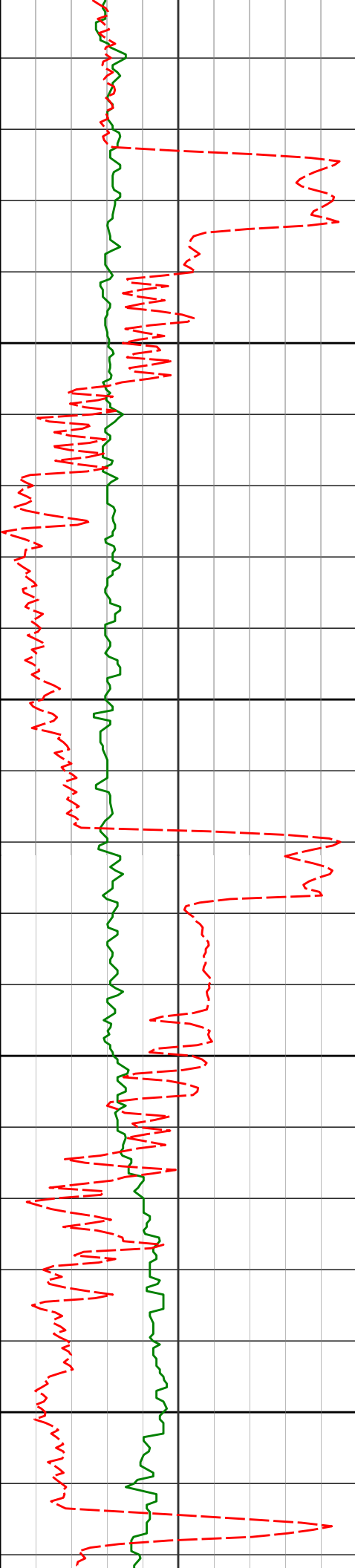
8604'

90.49°

270.54°

6649.83'

2445.18'



8700

8750

8800

8850

8699'

8793'

89.91°

89.04°

268.46°

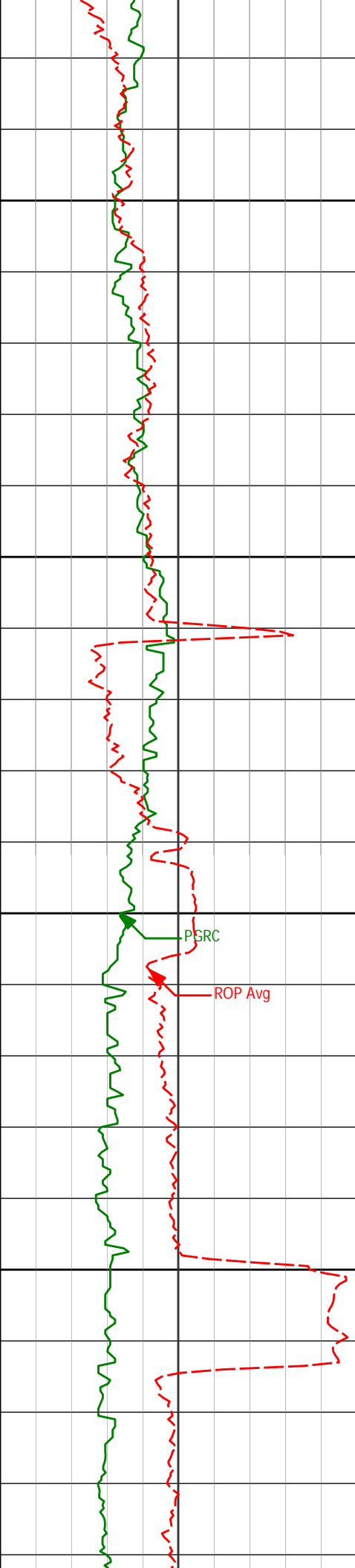
267.00°

6649.50'

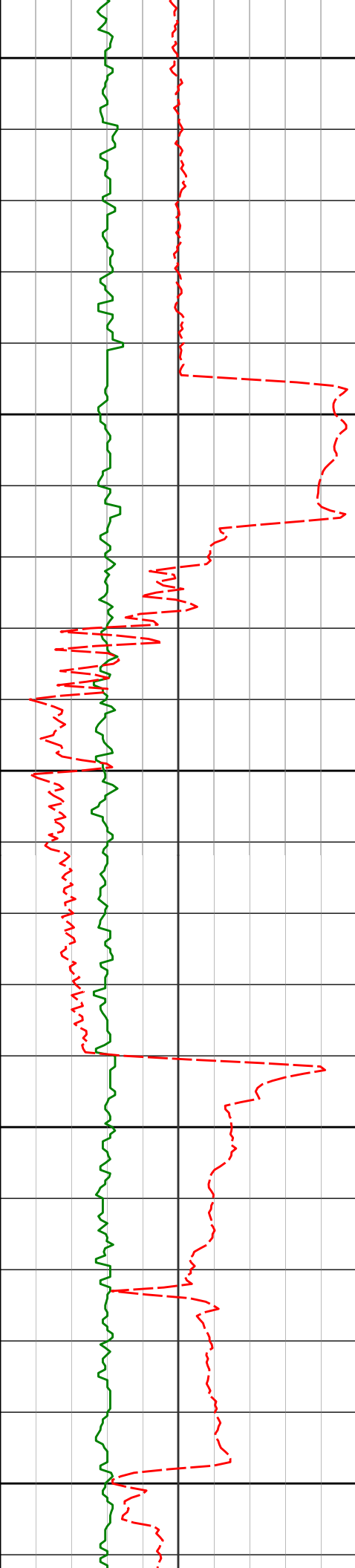
6650.36'

2539.04'

2632.31'



8888'	89.38°	267.55°	6651.67'	2726.66'
8900				
8950				
8983'	90.22°	267.48°	6652.00'	2820.97'
9000				
9050				
9078'	88.92°	268.12°	6652.71'	2915.23'



9100

9150

9200

9250

9300

9173'

89.41°

271.49°

6654.09'

3008.99'

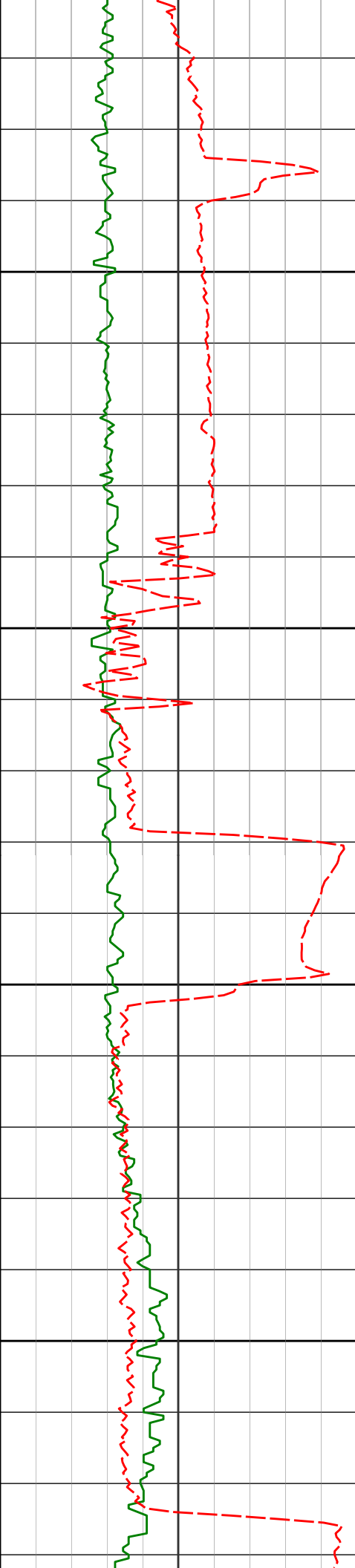
9268'

89.32°

271.66°

6655.14'

3102.25'



9350

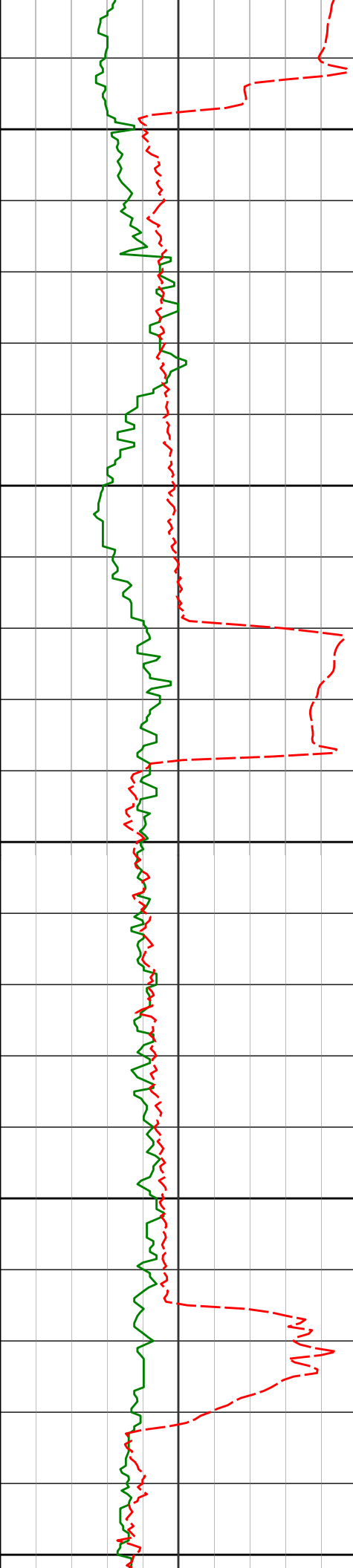
9362' 89.60° 272.29° 6656.03' 3194.41'

9400

9450

9457' 89.01° 270.50° 6657.18' 3287.73'

9500



9550

9552'

87.66°

268.71°

6659.94'

3381.52'

9600

9650

9647'

88.98°

268.25°

6662.73'

3475.59'

9700

9750

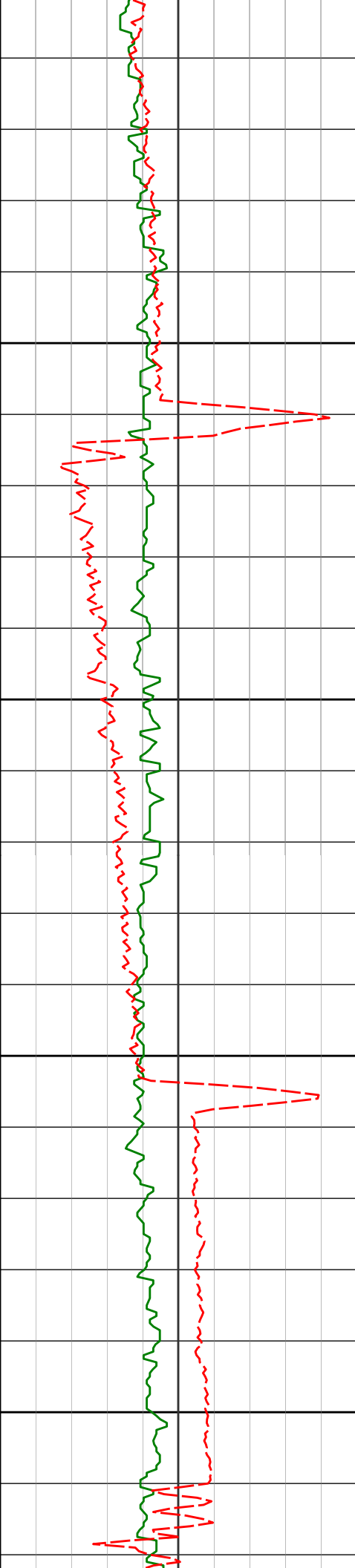
9742'

89.78°

269.20°

6663.75'

3569.63'



9800

9837'

90.12°

269.55°

6663.82'

3663.53'

9850

9900

9931'

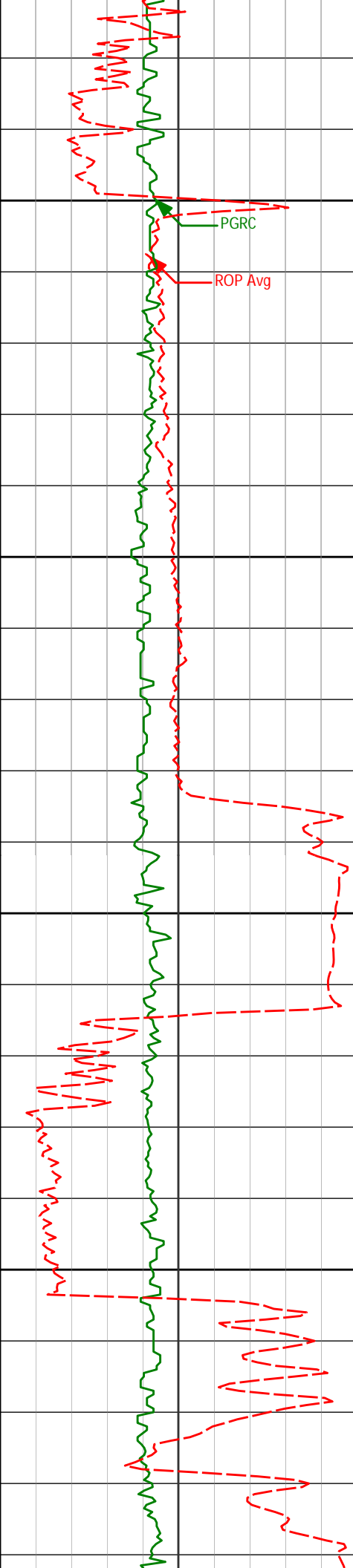
89.29°

267.60°

6664.31'

3756.62'

9950



10000

10050

10100

10150

10026'

90.12°

266.89°

6664.79'

3850.98'

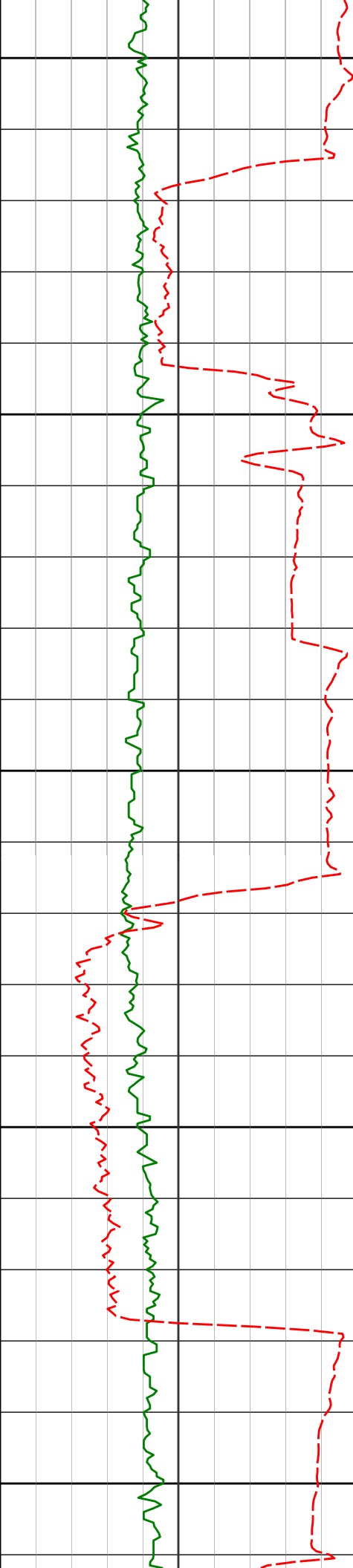
10120'

89.26°

267.47°

6665.30'

3944.37'



10200

10215'

89.54°

267.55°

6666.29'

4038.68'

10250

10300

10310'

89.78°

268.52°

6666.86'

4132.89'

10350

10400

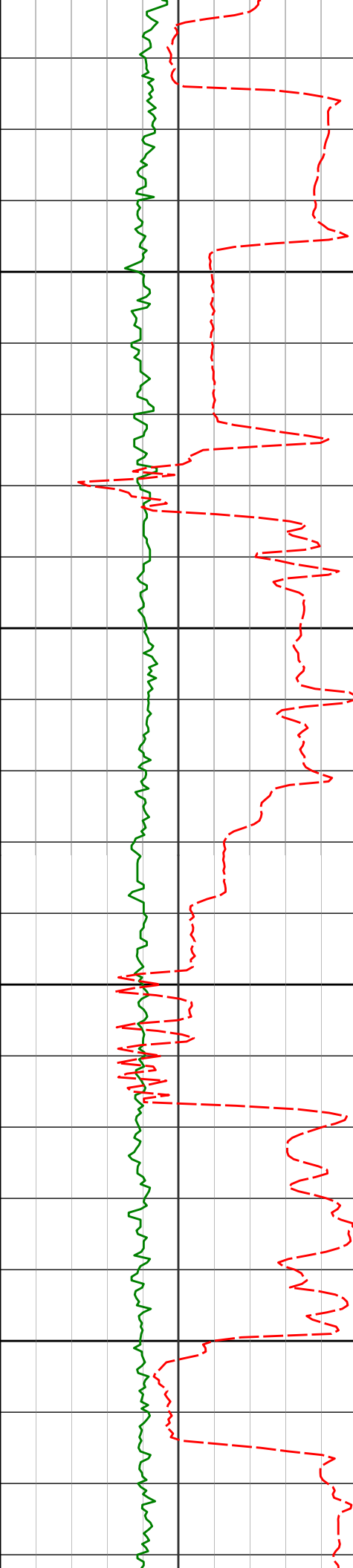
10405'

89.63°

269.28°

6667.34'

4226.90'



10450

10500

10550

10600

10500'

89.38°

269.32°

6668.16'

4320.81'

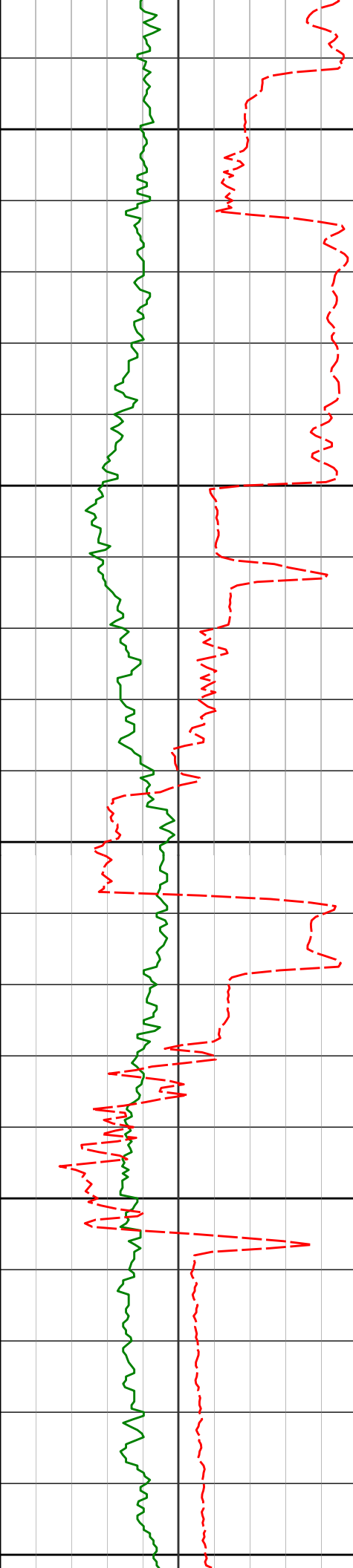
10595'

89.35°

267.29°

6669.21'

4414.95'



10650

10689'

91.20°

271.31°

6668.76'

4507.85'

10700

10750

10800

10850

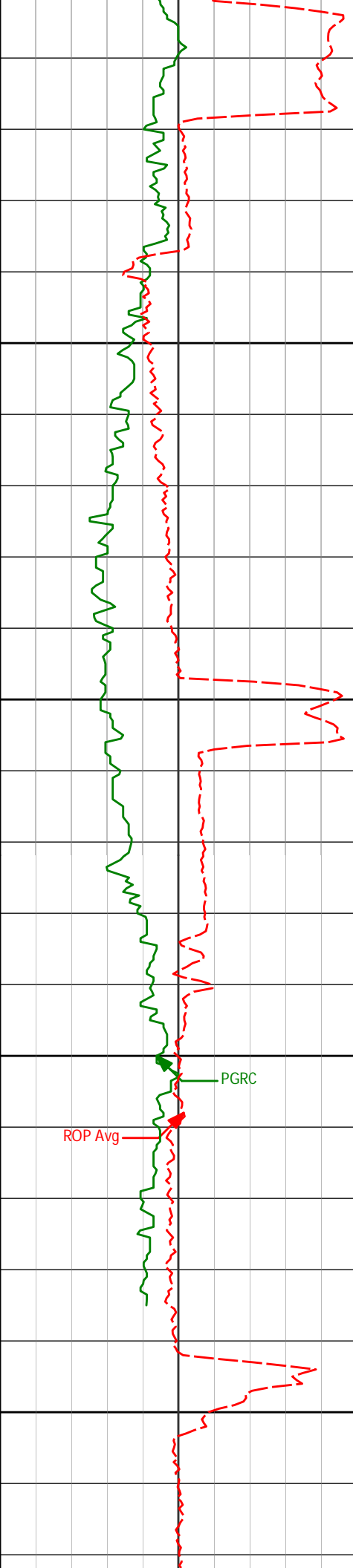
10784'

89.60°

271.31°

6668.09'

4601.20'



10879'	91.64°	273.19°	6667.07'	4694.24'
--------	--------	---------	----------	----------

10900

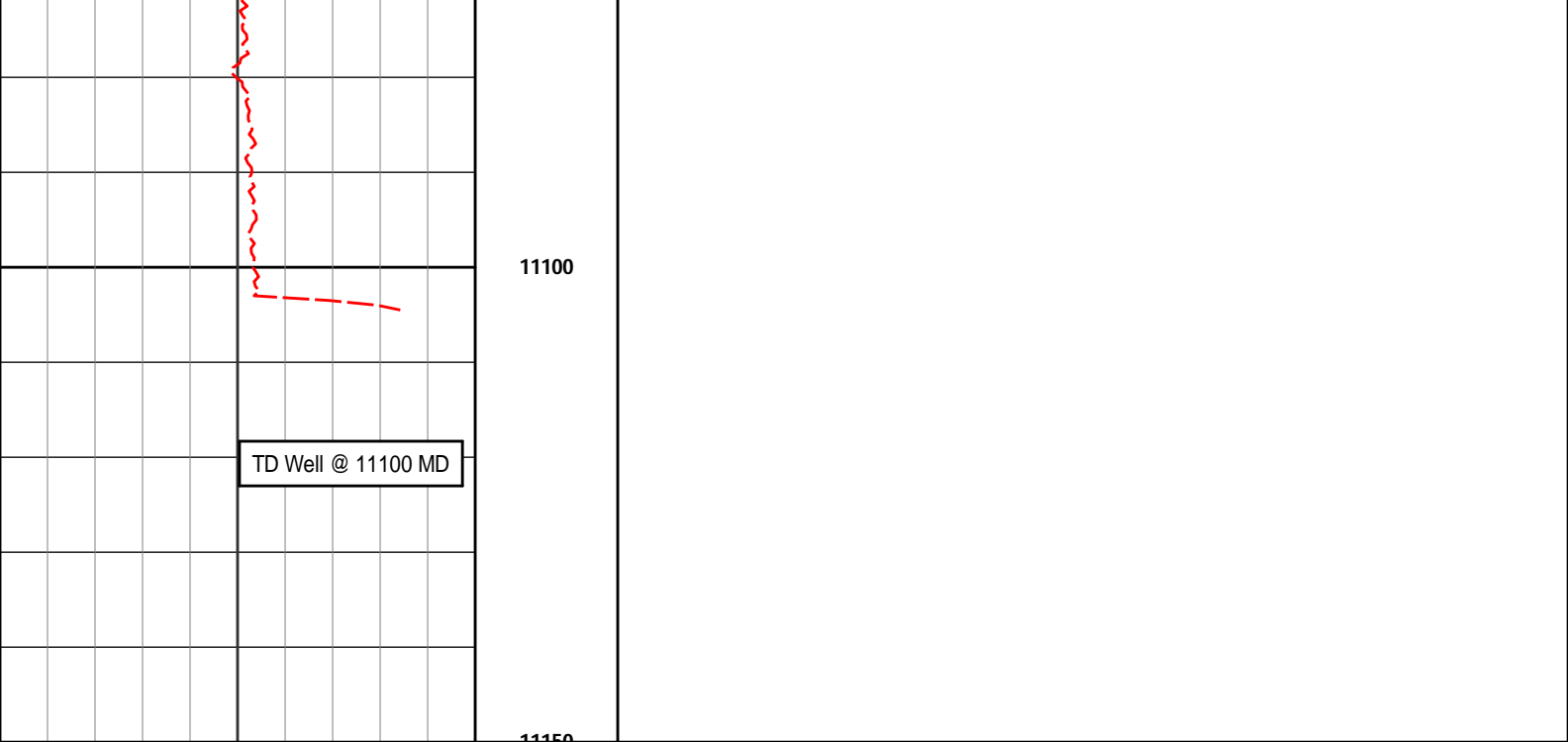
10950

10973'	90.77°	272.53°	6665.09'	4786.08'
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11000

11033'	90.43°	272.21°	6664.46'	4844.82'
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11050



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

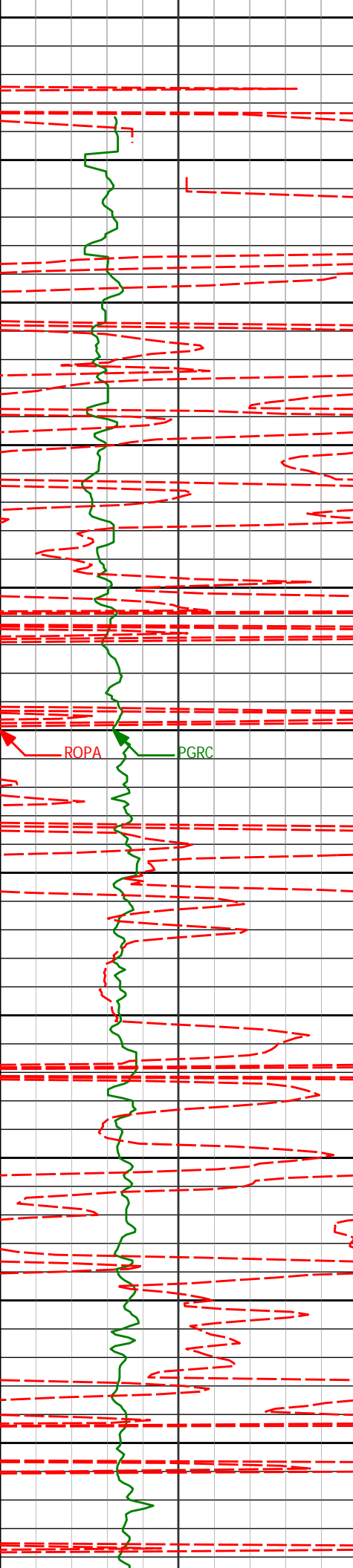
HALLIBURTON

Sperry Drilling Services

MD Correlation Log 1:600

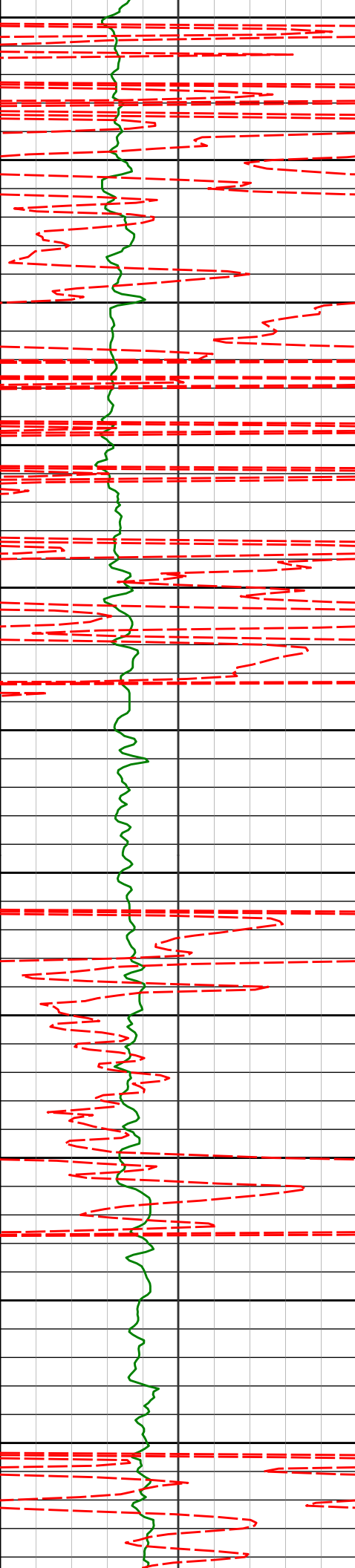
Noble Energy
Wells Ranch USXAA23-65-1HN
H&P 321
Sec. 24-T6N-R63W

PCG Gamma Ray PGRC							
0	api	300					
Avg Rate of Penetration ROP Avg		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
1K	feet per hr	0					
		600					
		650	642'	0.70°	7.10°	641.98'	2.37'
		100					
		700	726'	0.33°	247.71°	725.97'	2.46'



750
800
850
900
950
1000
1050
1100
1150
1200
1250

818'	0.13°	252.74°	817.97'	2.82'
910'	0.21°	38.93°	909.97'	2.80'
1003'	0.13°	108.90°	1002.97'	2.58'
1095'	0.18°	107.35°	1094.97'	2.36'
1187'	0.21°	60.28°	1186.97'	2.08'
1279'	0.73°	86.14°	1278.97'	1.34'



1300

1350

1400

1450

1500

1550

1600

1650

1700

1750

1800

1371'

0.75°

57.11°

1370.96'

0.20'

1463'

1.10°

52.10°

1462.95'

-1.13'

1557'

0.82°

294.39°

1556.94'

-1.36'

1652'

2.43°

257.17°

1651.90'

1.21'

1747'

0.66°

265.36°

1746.87'

3.76'

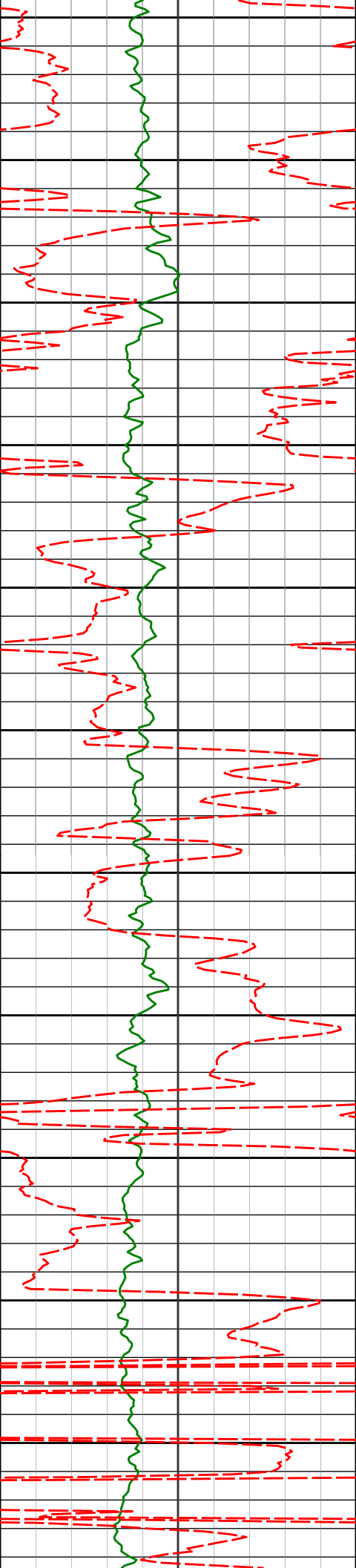
1842'

0.92°

244.42°

1841.86'

5.04'



2400

2411'

0.62°

106.46°

2410.83'

5.33'

2450

2500

2506'

0.64°

115.42°

2505.82'

4.43'

2550

2600

2600'

1.45°

193.91°

2599.81'

4.47'

2650

2700

2695'

3.74°

195.98°

2694.70'

6.27'

2750

2800

2790'

5.72°

190.25°

2789.38'

9.19'

2850

2900

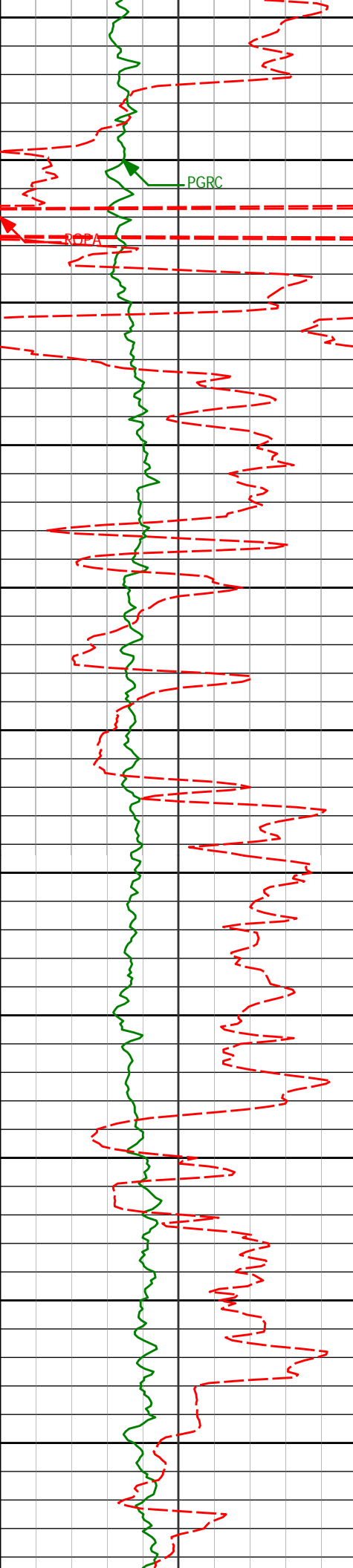
2885'

7.33°

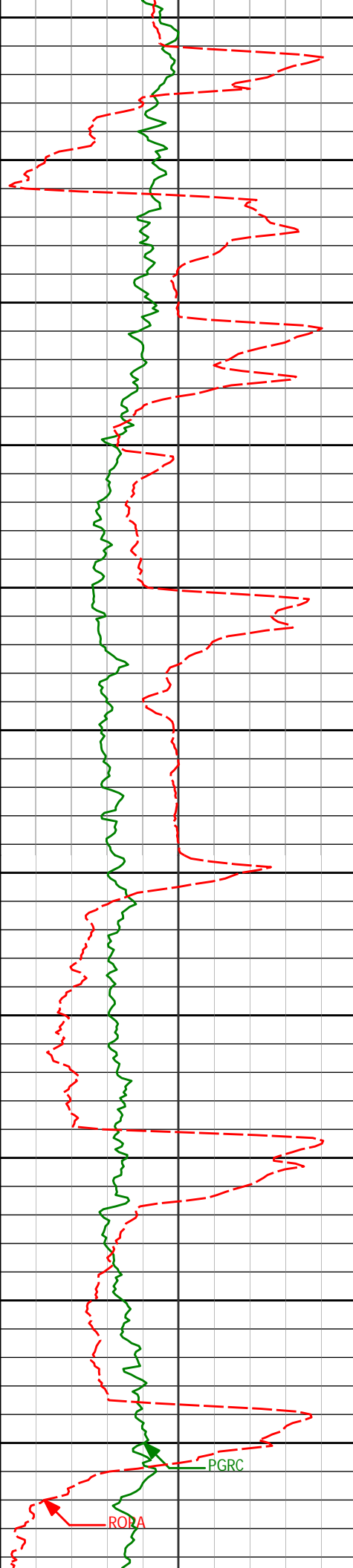
194.45°

2883.76'

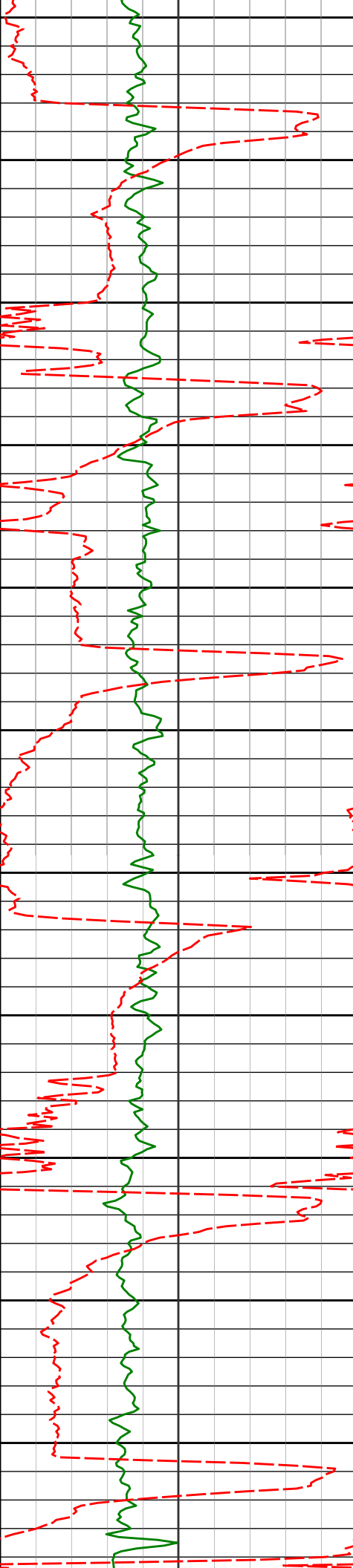
13.22'



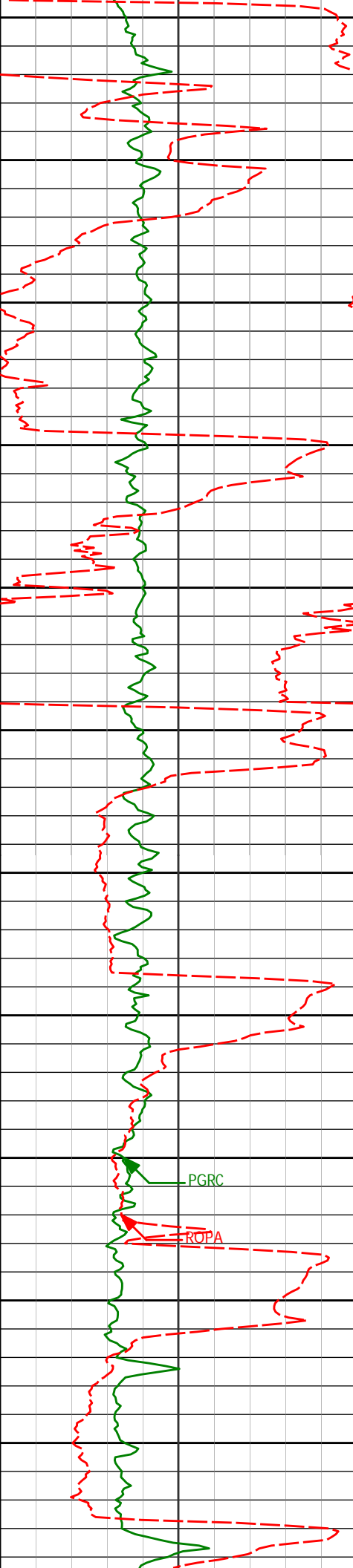
2980'	9.43°	196.71°	2977.74'	19.09'
3075'	10.13°	201.04°	3071.36'	26.74'
3169'	9.38°	198.86°	3164.00'	34.55'
3264'	10.19°	198.88°	3257.62'	42.19'
3359'	9.55°	203.15°	3351.21'	50.40'
3454'	9.43°	206.49°	3444.91'	59.20'



3500					
3550	3549'	9.50°	201.38°	3538.62'	67.76'
3600					
3650	3643'	10.38°	197.59°	3631.21'	75.57'
3700					
3750	3738'	12.48°	201.87°	3724.32'	84.78'
3800					
3850	3833'	13.69°	200.95°	3816.85'	95.78'
3900					
3950	3928'	13.10°	200.01°	3909.27'	106.73'
4000					
	4023'	11.59°	197.83°	4002.07'	116.38'



4050				
4100				
4118'	10.62°	197.14°	4095.29'	124.65'
4150				
4200				
4212'	9.99°	198.78°	4187.78'	132.36'
4250				
4300				
4307'	9.15°	200.42°	4281.45'	140.00'
4350				
4400				
4402'	8.67°	201.41°	4375.31'	147.41'
4450				
4500				
4497'	8.99°	201.83°	4469.18'	154.92'
4550				
4591'	9.21°	199.30°	4562.00'	162.34'



4600

4650

4686'

8.00°

200.30°

4655.93'

169.26'

4700

4750

4781'

8.05°

201.69°

4750.00'

175.96'

4800

4850

4876'

8.56°

196.45°

4844.00'

182.47'

4900

4950

4970'

8.67°

197.99°

4936.94'

188.78'

5000

PGRC

ROPA

5050

5065'

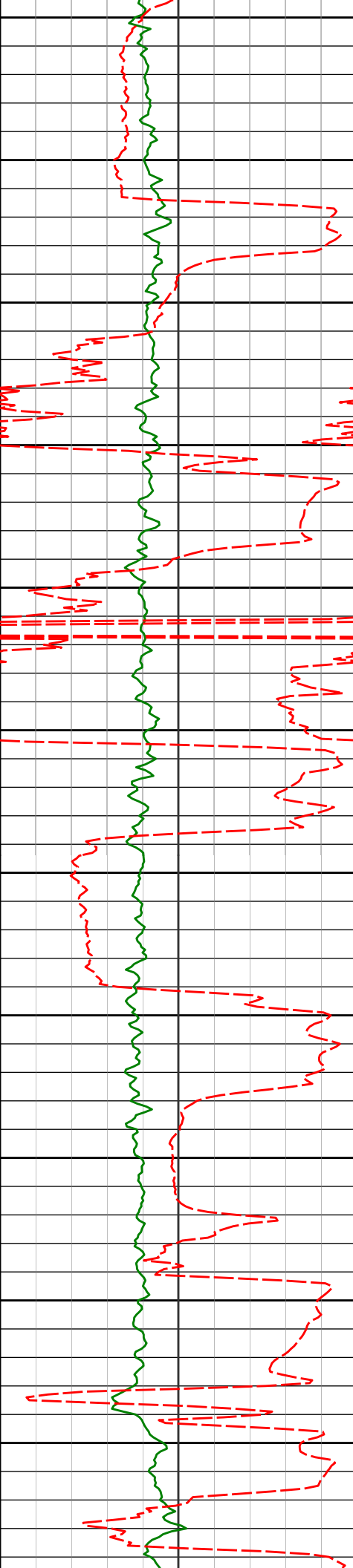
10.48°

193.88°

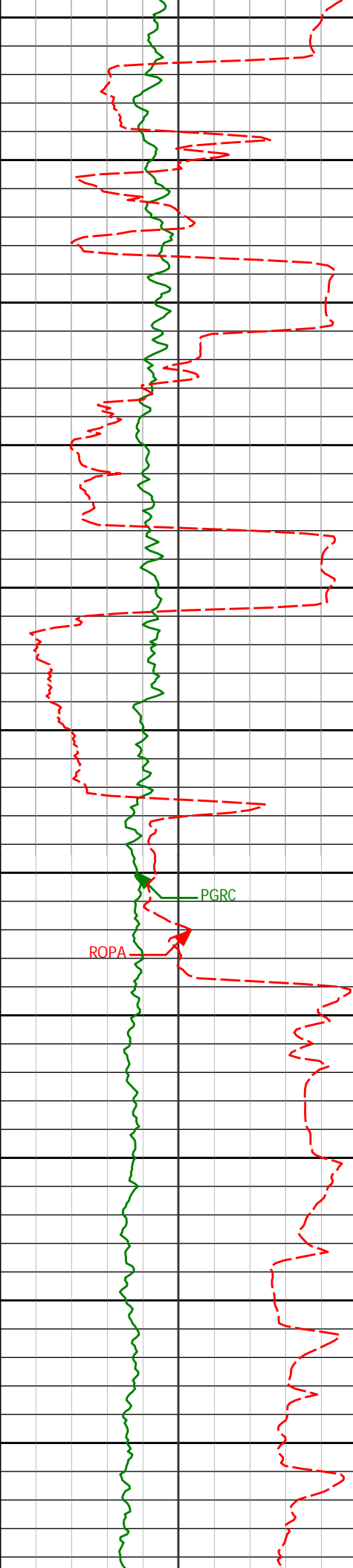
5030.62'

195.48'

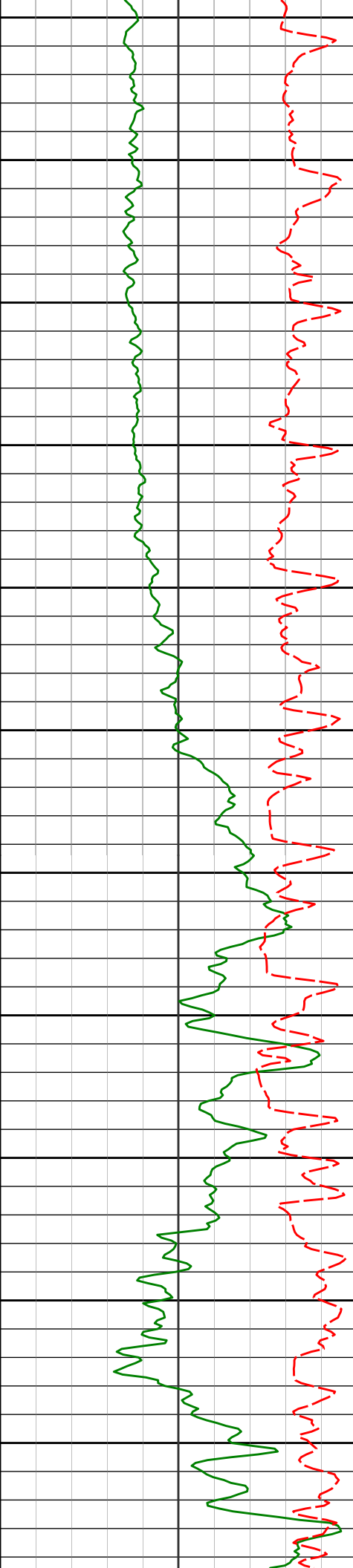
5100



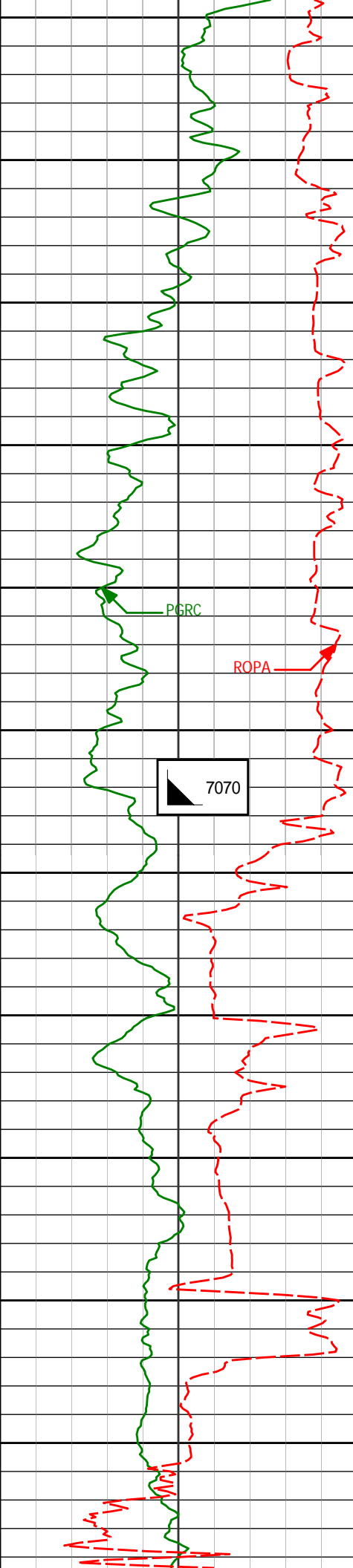
5150	5160'	9.73°	192.72°	5124.14'	201.90'
5200					
5250	5255'	8.13°	200.07°	5217.99'	208.23'
5300					
5350	5350'	8.59°	193.18°	5311.98'	214.25'
5400					
5450	5444'	8.69°	199.34°	5404.92'	220.35'
5500					
5550	5539'	8.93°	202.46°	5498.80'	227.69'
5600					
5650	5634'	9.98°	200.94°	5592.51'	235.73'



5700					
	5728'	12.24°	201.05°	5684.74'	244.89'
5750					
5800					
	5823'	12.08°	204.41°	5777.61'	255.52'
5850					
5900					
	5918'	12.02°	203.89°	5870.52'	266.47'
5950					
	5983'	9.69°	206.51°	5934.35'	273.39'
6000					
<div>200</div> 6050	6046'	10.02°	202.04°	5996.42'	279.35'
6100	6107'	12.46°	205.46°	6056.25'	285.88'
6150	6155'	14.74°	209.26°	6102.90'	292.65'
6200	6202'	16.49°	211.32°	6148.16'	300.73'



6250	6250'	20.49°	222.00°	6193.69'	311.74'
6300	6297'	24.98°	228.46°	6237.03'	326.58'
6350	6345'	29.99°	230.91°	6279.60'	345.59'
6400	6392'	34.83°	232.94°	6319.27'	367.69'
6450	6440'	40.13°	237.63°	6357.35'	394.09'
6500	6486'	44.32°	241.10°	6391.42'	422.90'
6550	6534'	47.37°	242.62°	6424.85'	455.50'
6600	6581'	49.99°	245.74°	6455.88'	489.35'
6650	6629'	52.55°	249.08°	6485.92'	525.79'
6700	6675'	55.48°	252.33°	6512.95'	562.45'
6750	6723'	58.12°	256.77°	6539.24'	602.37'
	6770'	62.76°	259.01°	6562.42'	643.19'



6800

6850

6900

6950

7000

7050

7100

7150

7200

7250

7300

6818'

6865'

6913'

6960'

7008'

7026'

7108'

7184'

7278'

67.71°

71.99°

74.31°

79.13°

81.32°

83.71°

87.47°

87.16°

87.84°

262.33°

264.93°

265.43°

267.30°

267.59°

267.98°

270.24°

270.25°

269.69°

6582.52'

6598.71'

6612.62'

6623.42'

6631.56'

6633.91'

6640.21'

6643.77'

6647.87'

686.76'

730.81'

776.60'

822.09'

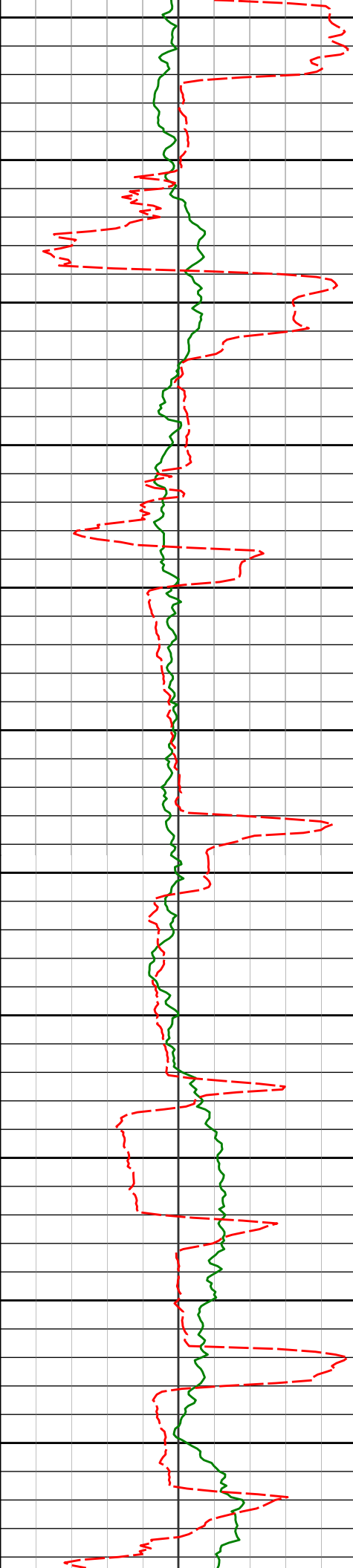
869.06'

886.77'

967.61'

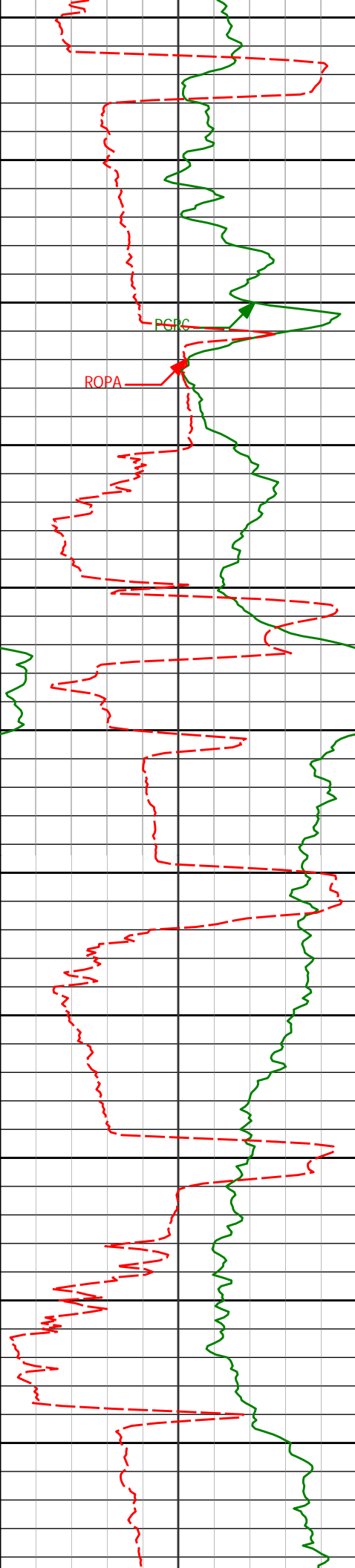
1042.46'

1135.13'



7350
7400
7450
7500
7550
7600
7650
7700
7750
7800
7850

7373'	89.26°	269.37°	6650.28'	1228.95'
7468'	91.11°	268.88°	6649.97'	1322.90'
7562'	91.30°	268.63°	6648.00'	1415.94'
7657'	90.62°	268.74°	6646.41'	1509.99'
7752'	89.94°	268.46°	6645.95'	1604.07'
7846'	89.11°	268.04°	6646.73'	1697.23'



7900

7941'

90.80°

270.05°

6646.81'

1791.20'

7950

8000

8036'

88.12°

269.22°

6647.70'

1885.02'

8050

8100

8130'

88.40°

269.11°

6650.56'

1977.93'

8150

8200

8225'

88.83°

269.91°

6652.85'

2071.76'

8250

8300

8319'

90.09°

269.90°

6653.74'

2164.53'

8350

8400

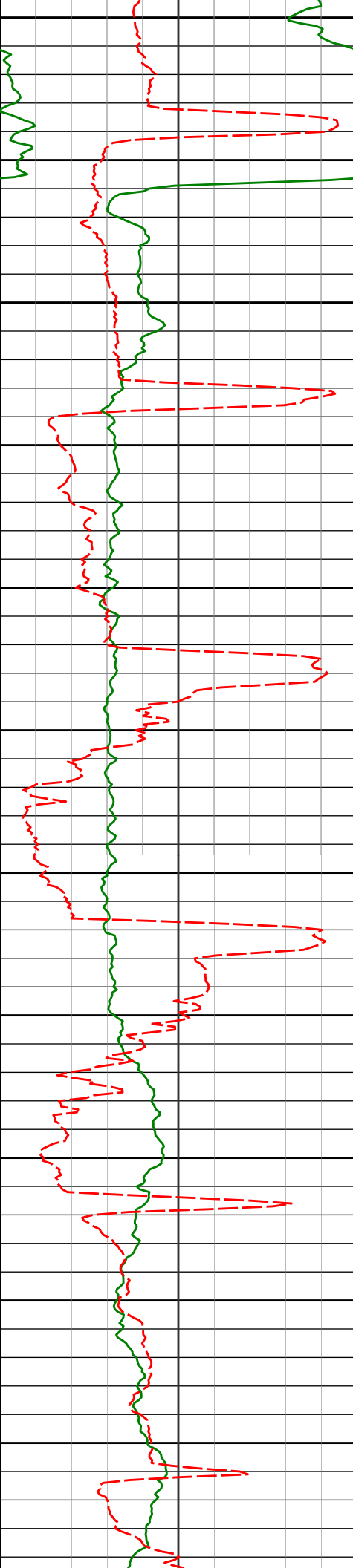
8414'

91.14°

271.14°

6652.72'

2258.11'



8450

8500

8550

8600

8650

8700

8750

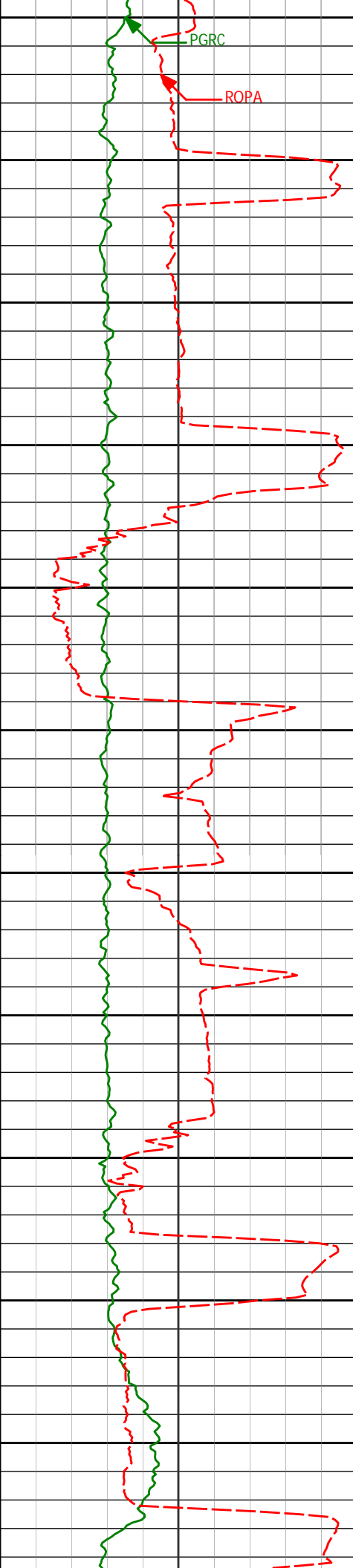
8800

8850

8900

8950

8509'	90.92°	270.48°	6651.01'	2351.60'
8604'	90.49°	270.54°	6649.83'	2445.18'
8699'	89.91°	268.46°	6649.50'	2539.04'
8793'	89.04°	267.00°	6650.36'	2632.31'
8888'	89.38°	267.55°	6651.67'	2726.66'
8983'	90.22°	267.48°	6652.00'	2820.97'



9000

9050

9100

9150

9200

9250

9300

9350

9400

9450

9500

9078'

88.92°

268.12°

6652.71'

2915.23'

9173'

89.41°

271.49°

6654.09'

3008.99'

9268'

89.32°

271.66°

6655.14'

3102.25'

9362'

89.60°

272.29°

6656.03'

3194.41'

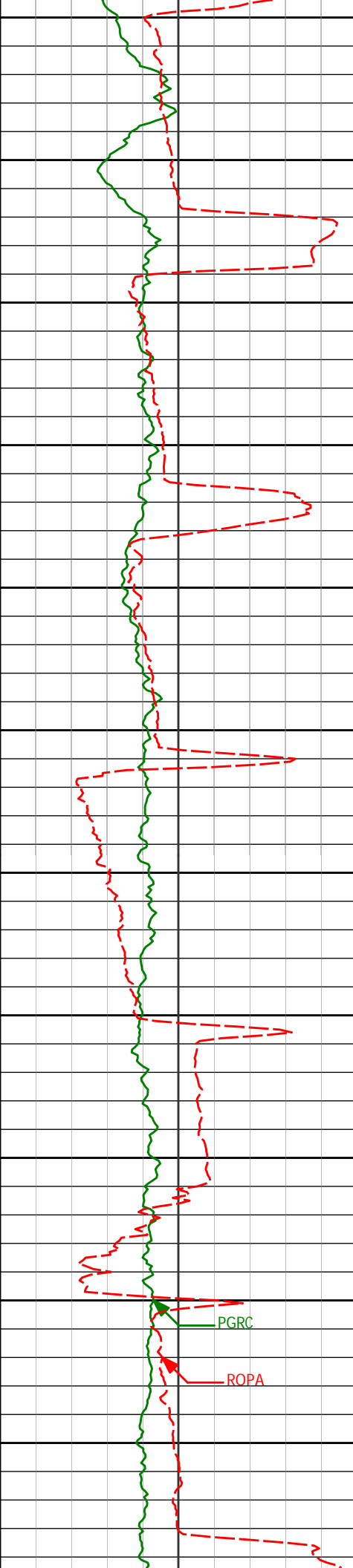
9457'

89.01°

270.50°

6657.18'

3287.73'



9550	9552'	87.66°	268.71°	6659.94'	3381.52'
9600					
9650	9647'	88.98°	268.25°	6662.73'	3475.59'
9700					
9750	9742'	89.78°	269.20°	6663.75'	3569.63'
9800					
9850	9837'	90.12°	269.55°	6663.82'	3663.53'
9900					
9950	9931'	89.29°	267.60°	6664.31'	3756.62'
10000					
10050	10026'	90.12°	266.89°	6664.79'	3850.98'



10100					
	10120'	89.26°	267.47°	6665.30'	3944.37'
10150					
10200					
	10215'	89.54°	267.55°	6666.29'	4038.68'
10250					
10300					
	10310'	89.78°	268.52°	6666.86'	4132.89'
10350					
10400					
	10405'	89.63°	269.28°	6667.34'	4226.90'
10450					
10500					
	10500'	89.38°	269.32°	6668.16'	4320.81'
10550					
10600					
	10595'	89.35°	267.29°	6669.21'	4414.95'

<div> <div>11200</div> <div> <div>Avg Rate of Penetration</div> <div>ROP Avg</div> <div>feet per hr</div> </div> </div> <div> <div>1K</div> <div>0</div> </div>		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
<div> <div>PCG Gamma Ray</div> <div>PGRC</div> <div>api</div> </div> <div> <div>0</div> <div>300</div> </div>							



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch USX AA23-65-1HN-A1
Wattenberg
Weld Colorado
USA
CA-XX-0900544021

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
235.00	0.60	284.50	235.00	0.31 N	1.19 W	1.13	0.26
642.00	0.70	7.10	641.98	3.31 N	2.95 W	2.37	0.21
726.00	0.33	247.71	725.97	3.73 N	3.11 W	2.46	1.08
818.00	0.13	252.74	817.97	3.59 N	3.45 W	2.82	0.22
910.00	0.21	38.93	909.97	3.69 N	3.45 W	2.80	0.35
1003.00	0.13	108.90	1002.97	3.79 N	3.24 W	2.58	0.22
1095.00	0.18	107.35	1094.97	3.71 N	3.01 W	2.36	0.06
1187.00	0.21	60.28	1186.97	3.75 N	2.73 W	2.08	0.17
1279.00	0.73	86.14	1278.97	3.88 N	2.00 W	1.34	0.60
1371.00	0.75	57.11	1370.96	4.24 N	0.90 W	0.20	0.40
1463.00	1.10	52.10	1462.95	5.11 N	0.30 E	-1.13	0.39
1557.00	0.82	294.39	1556.94	5.95 N	0.40 E	-1.36	1.76
1652.00	2.43	257.17	1651.90	5.78 N	2.18 W	1.21	1.94
1747.00	0.66	265.36	1746.87	5.29 N	4.69 W	3.76	1.87
1842.00	0.92	244.42	1841.86	4.92 N	5.92 W	5.04	0.40
1936.00	0.65	233.47	1935.85	4.28 N	7.03 W	6.24	0.33
2031.00	0.71	252.23	2030.84	3.78 N	8.02 W	7.30	0.24
2126.00	0.46	106.59	2125.84	3.49 N	8.21 W	7.54	1.18
2221.00	0.40	115.10	2220.84	3.24 N	7.55 W	6.92	0.09
2316.00	0.65	119.35	2315.83	2.83 N	6.77 W	6.22	0.27
2411.00	0.62	106.46	2410.83	2.42 N	5.81 W	5.33	0.15
2506.00	0.64	115.42	2505.82	2.04 N	4.83 W	4.43	0.11
2600.00	1.45	193.91	2599.81	0.67 N	4.64 W	4.47	1.56
2695.00	3.74	195.98	2694.70	3.48 S	5.78 W	6.27	2.41
2790.00	5.72	190.25	2789.38	11.11 S	7.48 W	9.19	2.15
2885.00	7.33	194.45	2883.76	21.64 S	9.83 W	13.22	1.76
2980.00	9.43	196.71	2977.74	34.97 S	13.58 W	19.09	2.24
3075.00	10.13	201.04	3071.36	50.22 S	18.82 W	26.74	1.07
3169.00	9.38	198.86	3164.00	65.18 S	24.26 W	34.55	0.89
3264.00	10.19	198.88	3257.62	80.46 S	29.48 W	42.19	0.85
3359.00	9.55	203.15	3351.21	95.66 S	35.30 W	50.40	1.03
3454.00	9.43	206.49	3444.91	109.86 S	41.87 W	59.20	0.59
3549.00	9.50	201.38	3538.62	124.13 S	48.20 W	67.76	0.89
3643.00	10.38	197.59	3631.21	139.42 S	53.59 W	75.57	1.17
3738.00	12.48	201.87	3724.32	157.11 S	60.00 W	84.78	2.38
3833.00	13.69	200.95	3816.85	177.14 S	67.84 W	95.78	1.29
3928.00	13.10	200.01	3909.27	197.75 S	75.54 W	106.73	0.66
4023.00	11.59	197.83	4002.07	216.95 S	82.15 W	116.38	1.66
4118.00	10.62	197.14	4095.29	234.40 S	87.65 W	124.65	1.03
4212.00	9.99	198.78	4187.78	250.40 S	92.83 W	132.36	0.74
4307.00	9.15	200.42	4281.45	265.28 S	98.12 W	140.00	0.93
4402.00	8.67	201.41	4375.31	279.02 S	103.37 W	147.41	0.53
4497.00	8.99	201.83	4469.18	292.58 S	108.74 W	154.92	0.35
4591.00	9.21	199.30	4562.00	306.50 S	113.96 W	162.34	0.48
4686.00	8.00	200.30	4655.93	319.87 S	118.76 W	169.26	1.28
4781.00	8.05	201.69	4750.00	332.26 S	123.52 W	175.96	0.21
4876.00	8.56	196.45	4844.00	345.22 S	127.98 W	182.47	0.96

4970.00	8.67	197.99	4936.94	358.67 S	132.14 W	188.78	0.27
5065.00	10.48	193.88	5030.62	373.86 S	136.43 W	195.48	2.04
5160.00	9.73	192.72	5124.14	390.07 S	140.27 W	201.90	0.82
5255.00	8.13	200.07	5217.99	404.22 S	144.34 W	208.23	2.06
5350.00	8.59	193.18	5311.98	417.43 S	148.27 W	214.25	1.16
5444.00	8.69	199.34	5404.92	430.97 S	152.22 W	220.35	0.99
5539.00	8.93	202.46	5498.80	444.56 S	157.41 W	227.69	0.56
5634.00	9.98	200.94	5592.51	459.06 S	163.17 W	235.73	1.13
5728.00	12.24	201.05	5684.74	475.97 S	169.66 W	244.89	2.41
5823.00	12.08	204.41	5777.61	494.42 S	177.39 W	255.52	0.76
5918.00	12.02	203.89	5870.52	512.51 S	185.50 W	266.47	0.13
5983.00	9.69	206.51	5934.35	523.60 S	190.69 W	273.39	3.66
6046.00	10.02	202.04	5996.42	533.42 S	195.11 W	279.35	1.32
6107.00	12.46	205.46	6056.25	544.28 S	199.93 W	285.88	4.15
6155.00	14.74	209.26	6102.90	554.28 S	205.14 W	292.65	5.09
6202.00	16.49	211.32	6148.16	565.20 S	211.53 W	300.73	3.92
6250.00	20.49	222.00	6193.69	577.27 S	220.70 W	311.74	10.88
6297.00	24.98	228.46	6237.03	589.98 S	233.64 W	326.58	10.92
6345.00	29.99	230.91	6279.60	604.27 S	250.55 W	345.59	10.71
6392.00	34.83	232.94	6319.27	619.78 S	270.39 W	367.69	10.54
6440.00	40.13	237.63	6357.35	636.33 S	294.42 W	394.09	12.54
6486.00	44.32	241.10	6391.42	652.05 S	321.02 W	422.90	10.42
6534.00	47.37	242.62	6424.85	668.28 S	351.39 W	455.50	6.75
6581.00	49.99	245.74	6455.88	683.63 S	383.16 W	489.35	7.47
6629.00	52.55	249.08	6485.92	697.99 S	417.73 W	525.79	7.62
6675.00	55.48	252.33	6512.95	710.27 S	452.85 W	562.45	8.55
6723.00	58.12	256.77	6539.24	720.94 S	491.55 W	602.37	9.49
6770.00	62.76	259.01	6562.42	729.49 S	531.51 W	643.19	10.72
6818.00	67.71	262.33	6582.52	736.53 S	574.51 W	686.76	12.07
6865.00	71.99	264.93	6598.71	741.41 S	618.35 W	730.81	10.49
6913.00	74.31	265.43	6612.62	745.27 S	664.12 W	776.60	4.92
6960.00	79.13	267.30	6623.42	748.16 S	709.76 W	822.09	10.96
7008.00	81.32	267.59	6631.56	750.27 S	757.01 W	869.06	4.60
7026.00	83.71	267.98	6633.91	750.96 S	774.84 W	886.77	13.45
7108.00	87.47	270.24	6640.21	752.22 S	856.57 W	967.61	5.35
7184.00	87.16	270.25	6643.77	751.90 S	932.49 W	1042.46	0.40
7278.00	87.84	269.69	6647.87	751.95 S	1026.39 W	1135.13	0.93
7373.00	89.26	269.37	6650.28	752.73 S	1121.36 W	1228.95	1.53
7468.00	91.11	268.88	6649.97	754.18 S	1216.34 W	1322.90	2.02
7562.00	91.30	268.63	6648.00	756.22 S	1310.30 W	1415.94	0.34
7657.00	90.62	268.74	6646.41	758.40 S	1405.26 W	1509.99	0.72
7752.00	89.94	268.46	6645.95	760.72 S	1500.23 W	1604.07	0.77
7846.00	89.11	268.04	6646.73	763.58 S	1594.18 W	1697.23	0.99
7941.00	90.80	270.05	6646.81	765.17 S	1689.16 W	1791.20	2.76
8036.00	88.12	269.22	6647.70	765.77 S	1784.15 W	1885.02	2.95
8130.00	88.40	269.11	6650.56	767.14 S	1878.09 W	1977.93	0.32
8225.00	88.83	269.91	6652.85	767.95 S	1973.06 W	2071.76	0.95
8319.00	90.09	269.90	6653.74	768.11 S	2067.05 W	2164.53	1.34
8414.00	91.14	271.14	6652.72	767.25 S	2162.04 W	2258.11	1.71
8509.00	90.92	270.48	6651.01	765.90 S	2257.02 W	2351.60	0.73
8604.00	90.49	270.54	6649.83	765.05 S	2352.00 W	2445.18	0.46
8699.00	89.91	268.46	6649.50	765.88 S	2446.99 W	2539.04	2.27
8793.00	89.04	267.00	6650.36	769.60 S	2540.91 W	2632.31	1.81
8888.00	89.38	267.55	6651.67	774.11 S	2635.80 W	2726.66	0.68
8983.00	90.22	267.48	6652.00	778.23 S	2730.71 W	2820.97	0.88
9078.00	88.92	268.12	6652.71	781.87 S	2825.63 W	2915.23	1.52
9173.00	89.41	271.49	6654.09	782.19 S	2920.61 W	3008.99	3.58
9268.00	89.32	271.66	6655.14	779.58 S	3015.56 W	3102.25	0.20
9362.00	89.60	272.29	6656.03	776.35 S	3109.50 W	3194.41	0.73
9457.00	89.01	270.50	6657.18	774.03 S	3204.46 W	3287.73	1.98
9552.00	87.66	268.71	6659.94	774.69 S	3299.42 W	3381.52	2.37
9647.00	88.98	268.25	6662.73	777.20 S	3394.34 W	3475.59	1.48
9742.00	89.78	269.20	6663.75	779.32 S	3489.31 W	3569.63	1.31
9837.00	90.12	269.55	6663.82	780.36 S	3584.30 W	3663.53	0.51
9931.00	89.29	267.60	6664.31	782.69 S	3678.27 W	3756.62	2.25
10026.00	90.12	266.89	6664.79	787.26 S	3773.15 W	3850.98	1.16
10120.00	89.26	267.47	6665.30	791.88 S	3867.04 W	3944.37	1.11
10215.00	89.54	267.55	6666.29	796.01 S	3961.94 W	4038.68	0.30
10310.00	89.78	268.52	6666.86	799.28 S	4056.88 W	4132.89	1.05
10405.00	89.63	269.28	6667.34	801.11 S	4151.86 W	4226.90	0.82
10500.00	89.38	269.32	6668.16	802.27 S	4246.85 W	4320.81	0.26
10595.00	89.35	267.29	6669.21	805.08 S	4341.80 W	4414.95	2.14
10689.00	91.20	271.31	6668.76	806.23 S	4435.77 W	4507.85	4.71
10784.00	89.60	271.31	6668.09	804.07 S	4530.74 W	4601.20	1.69

10879.00	91.64	273.19	6667.07	800.34 S	4625.65 W	4694.24	2.92
10973.00	90.77	272.53	6665.09	795.65 S	4719.51 W	4786.08	1.16
11033.00	90.43	272.21	6664.46	793.17 S	4779.46 W	4844.82	0.77

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 260.63 DEGREES (GRID)
A TOTAL CORRECTION OF 7.70 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11033.00 FEET
IS 4844.83 FEET ALONG 260.58 DEGREES (GRID)**

**First two survey are from 3rd party source (Muilti Shot EMS) and provided by CO-man on location before drilling.
Depth 235 Inc 0.60 Azi 284.50
Depth 642 Inc 0.70 Azi 367.10
Tied in @ Surface**

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