

**PCGC - Pressure Case Gamma**  
**PCDC - Pressure Case Directional**

1 : 240

[illegible]

## WELL INFORMATION

MWD Run Number	100	200			
Date run completed	13-May-14	16-May-14			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	4.750	4.750			
Log Start Depth (MD, ft)	1,017.00	7,662.00			
Log End Depth (MD, ft)	7,662.00	11,770.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	10-May-14 03:45	15-May-14 01:10			
Drill/Wipe End Date and Time	13-May-14 04:35	16-May-14 07:30			
Min Inc (deg) @ Depth (MD, ft)	0.06 @ 6,405.00	85.21 @ 10,061.00			
Max Inc (deg) @ Depth (MD, ft)	84.81 @ 7,619.00	91.85 @ 8,731.00			
Bit TFA(in2) / Bit Type	1.18 / PDC	1.24 / PDC			
Flow Rate (gpm)	568.05	299.46			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	9.30 / 50.00	10.20 / 50.00			
Filtrate CL (ppm)	1,500.00	1,450.00			
pH / Fluid Loss (mptm)	8.70 / 26	9.50 / 26			
PV (cP) / YP (lbf2)	17 / 26.00	17 / 26.00			
% Solids / % Sand	8.6 / 0.50	7.9 / 0.50			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (degF) / S	478.75 / PCM	339.00 / PCM			

Max Tool Temp (degF) / Source	172.78 / PCM	226.08 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Matt Busche	Matt Busche			
Customer Representative	Terry Bradshaw	Terry Bradshaw			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.76			
Sub Serial Number	11303519	12334776			
Insert Serial Number	12230081	11680779			
Date and Time Initialized	09-May-14 14:10	14-May-14 15:14			
Date and Time Read	13-May-14 15:46	16-May-14 23:14			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	43.00	43.78			
Software Version	6.21	6.21			
Sub Serial Number	11303519	12334776			
Sonde Serial Number	11638587	11833026			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	226.81	332.94			

### Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	46.08	48.73			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11303519	12334776			
Insert/Sonde Serial Number	11579846	11293433			

## REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The final survey is a projection at the bit.
5. The following smoothing parameters have been applied to the data:
  - PGRC (Corrected Gamma Ray):
    - Interval Resolution: 0.5 ft
    - Interval Distance: 0.6 ft
    - Gap Fill: 3.0 ft
  - ROPA (Average Rate Of Penetration):
    - Interval Resolution: 0.5 ft
    - Interval Distance: 1.2 ft
    - Gap Fill: 3.0 ft

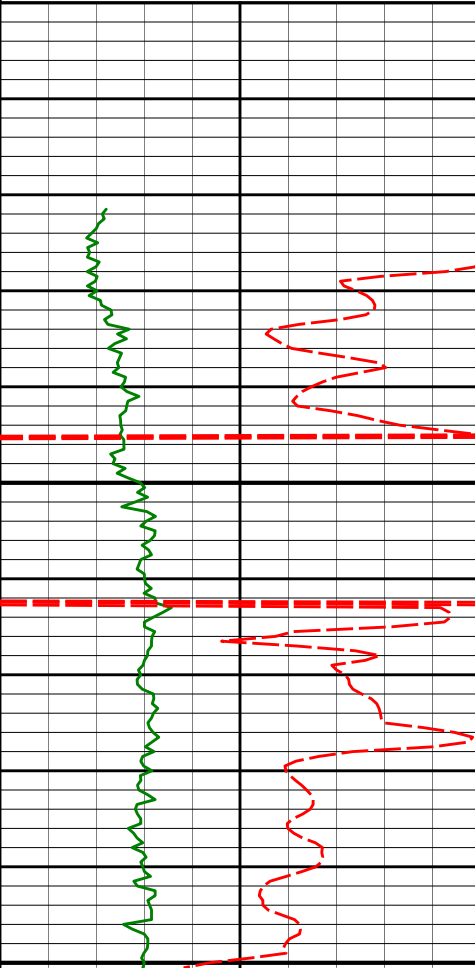
Insite version: 8.0.2

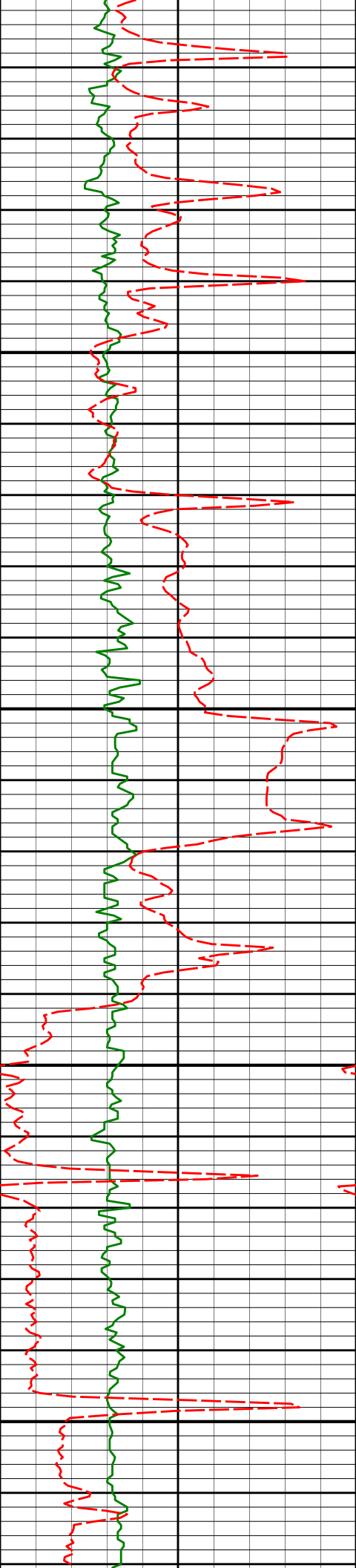
WARRANTY

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HALLIBURTON

TVD Main Log 1:240

PCG Gamma Ray BCorr (PGRC) api						
0300						
Avg Rate of Penetration feet per hr		Depth				
5000		Depth	Inc	Azi	TVD	V/S
		1000	9.625" Casing Shoe @ 1017' MD / 1016.98' TVD			
		1033'				
		1050				
		1096'	0.28°	221.63°	1095.98'	-3.16'
		1100				



1150

1200

1250

1300

1190'

0.62°

223.03°

1189.98'

-3.70'

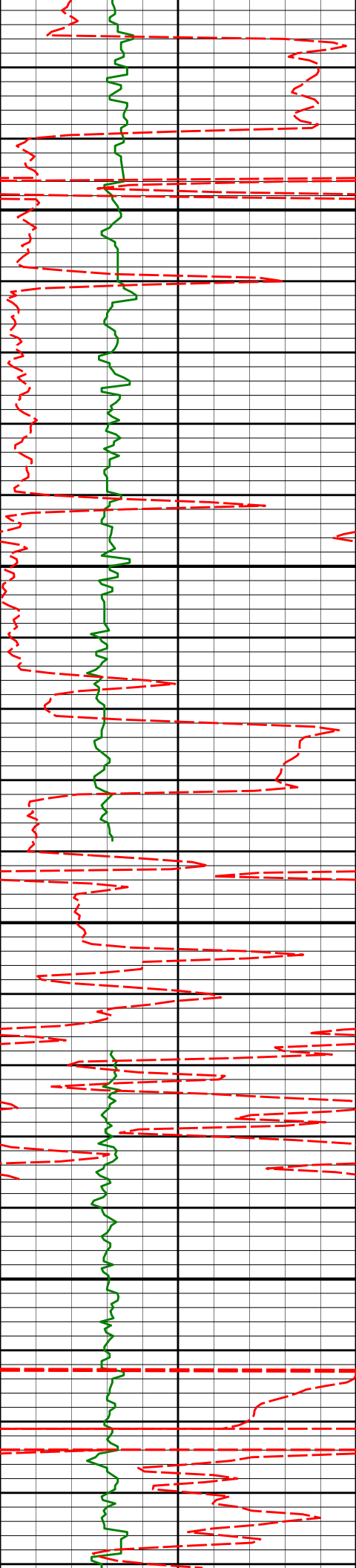
1284'

2.54°

240.46°

1283.94'

-5.07'



1350

1400

1450

1500

1379'

4.45°

236.09°

1378.76'

-8.09'

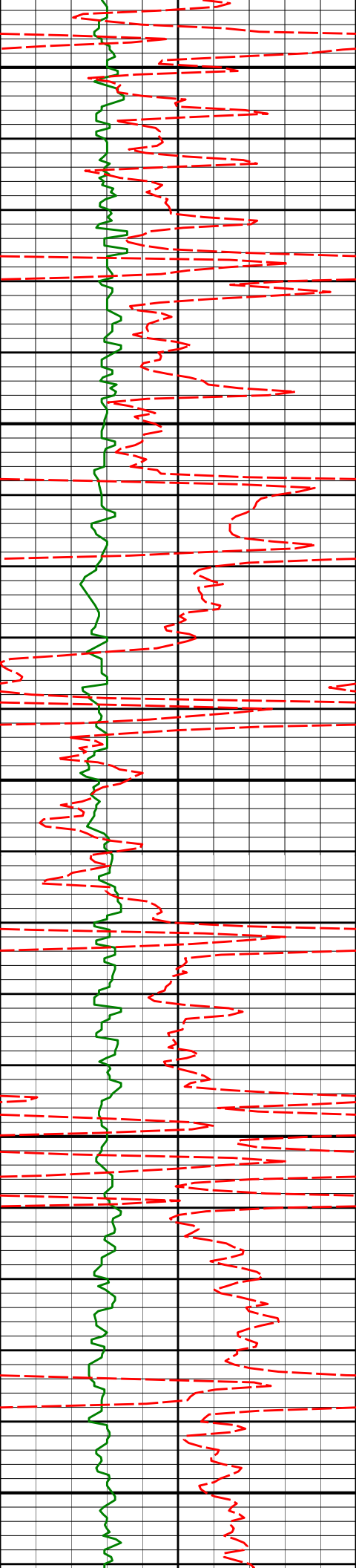
1473'

6.20°

236.37°

1472.35'

-12.83'



1550

1567'

7.69°

243.39°

1565.66'

-18.32'

1600

1650

1661'

9.50°

244.41°

1658.60'

-24.31'

1700

1750

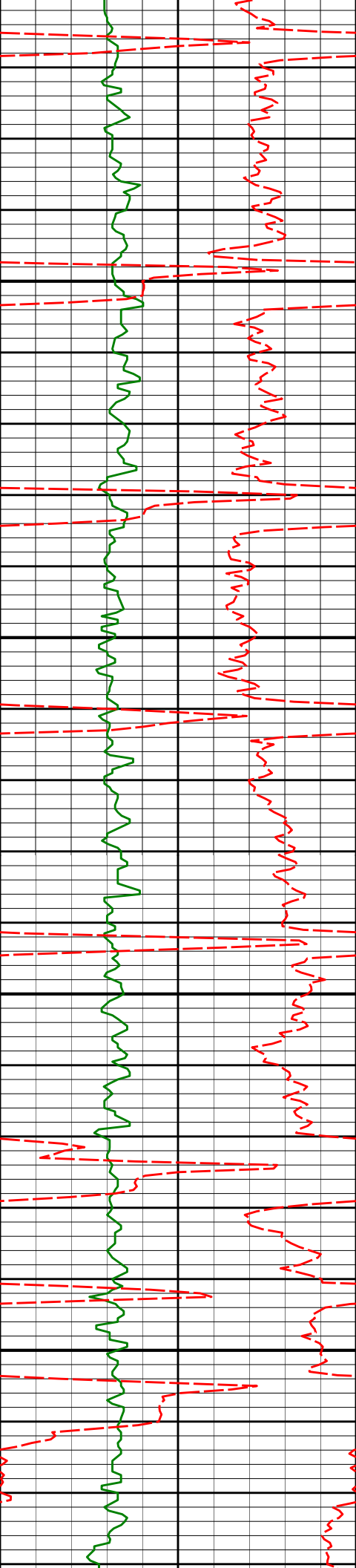
1755'

9.85°

244.72°

1751.26'

-30.88'



1800

1850

1900

1950

1849'

9.76°

244.58°

1843.89'

-37.53'

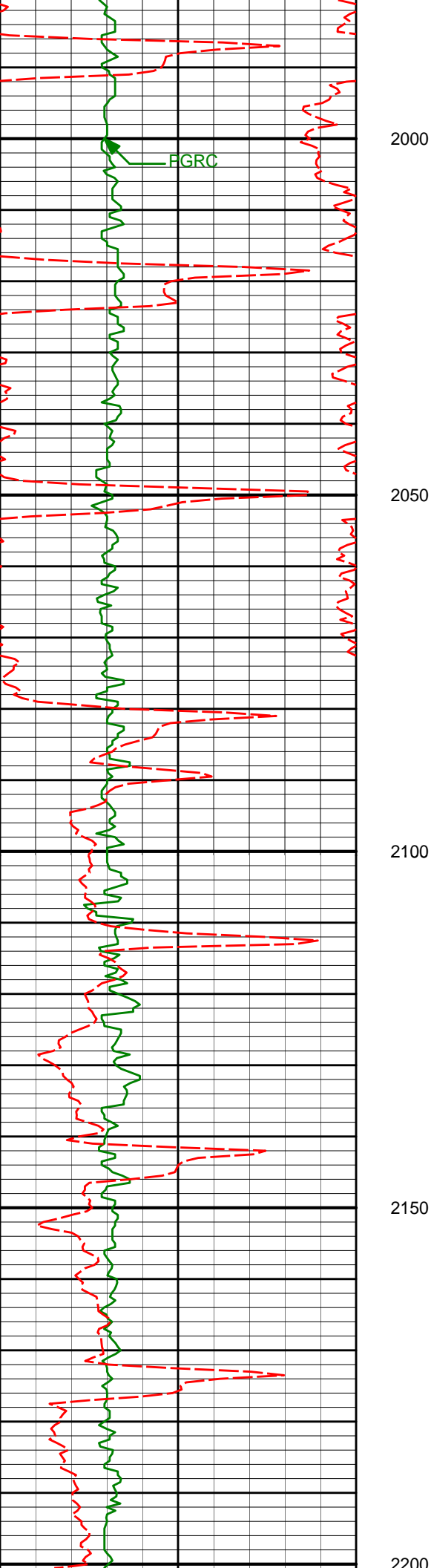
1943'

9.86°

245.81°

1936.51'

-44.04'



2038'

10.32°

245.47°

2030.04'

-50.69'

2132'

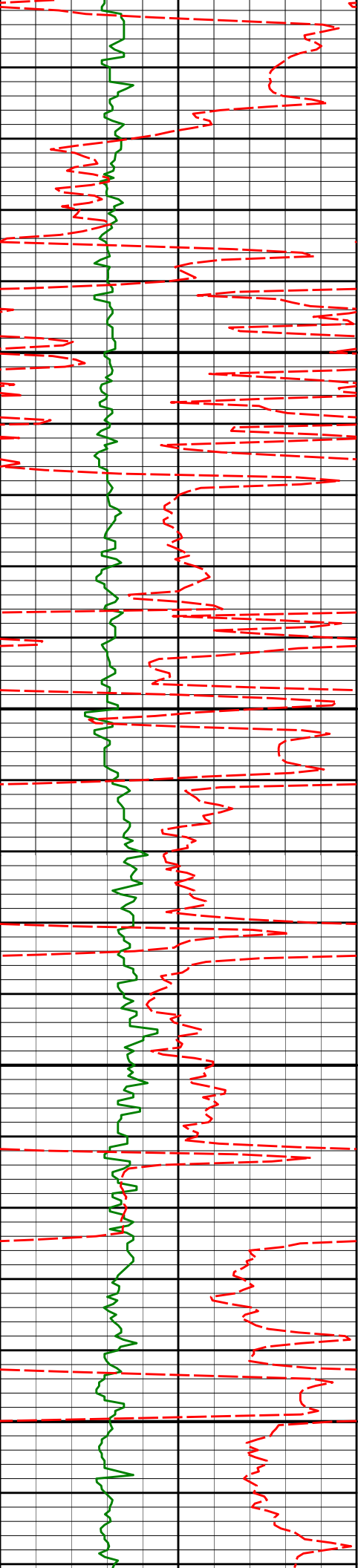
9.90°

247.87°

2122.58'

-57.01'





2200  
2250  
2300  
2350  
2400

2226'

10.42°

237.12°

2215.12'

-64.46'

2320'

10.11°

232.23°

2307.61'

-73.93'

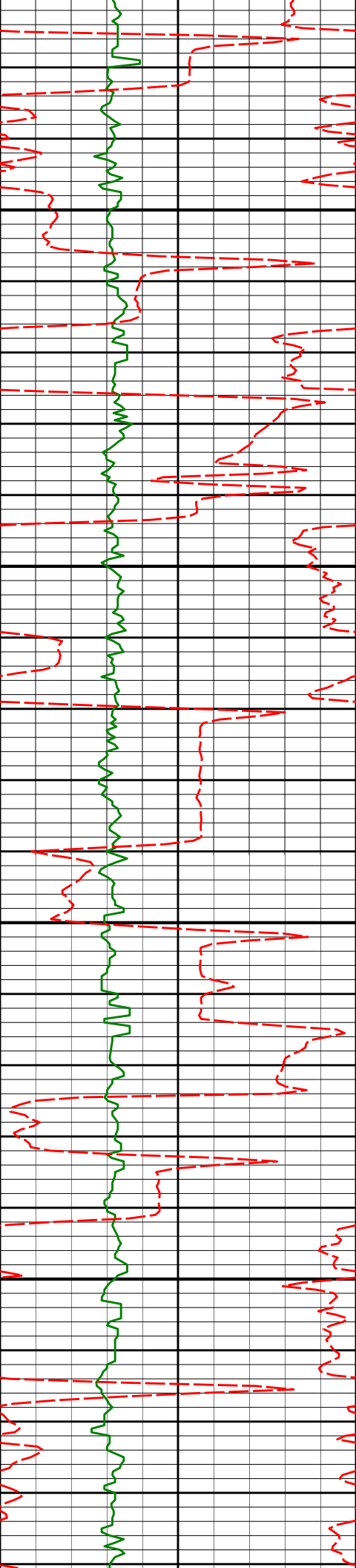
2415'

9.58°

230.64°

2401.21'

-83.87'



2450

2500

2550

2600

2509'

8.26°

241.70°

2494.08'

-91.86'

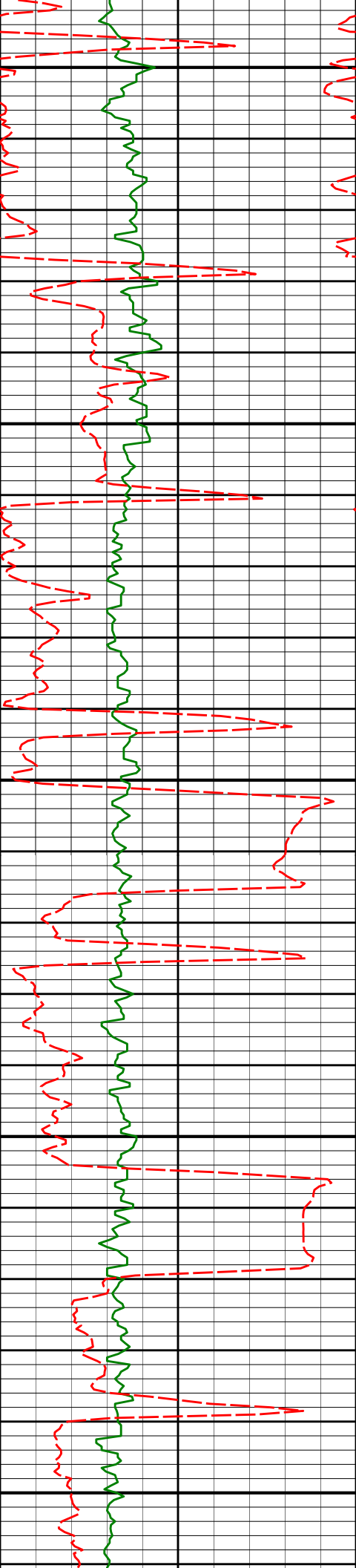
2603'

9.22°

238.02°

2586.99'

-98.87'



2650

2700

2750

2800

2850

2697'

7.73°

239.00°

2679.96'

-105.95'

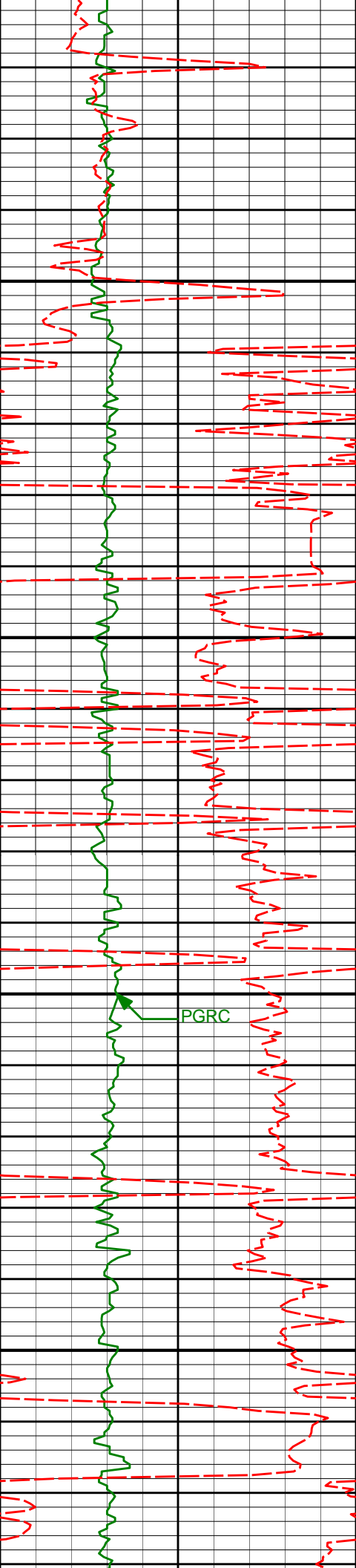
2792'

9.43°

239.65°

2773.90'

-113.00'



2888'

11.74°

239.71°

2868.25'

-121.68'

2900

2950

2983'

10.77°

232.34°

2961.43'

-131.76'

3000

PGRC

3050

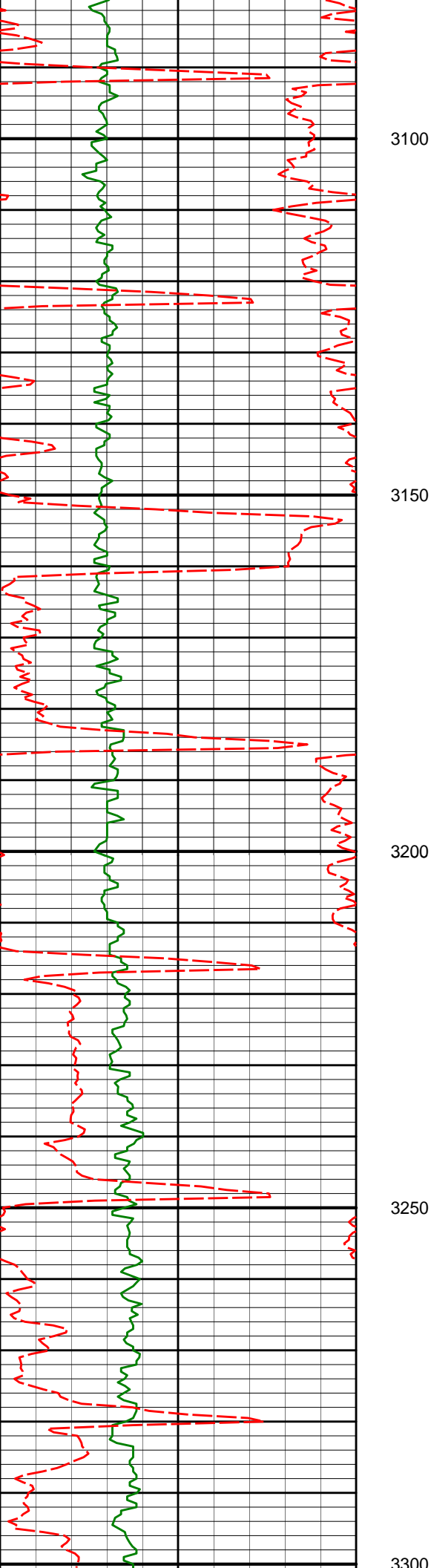
3078'

9.60°

232.56°

3054.93'

-141.80'



3173'

10.14°

240.73°

3148.53'

-150.51'

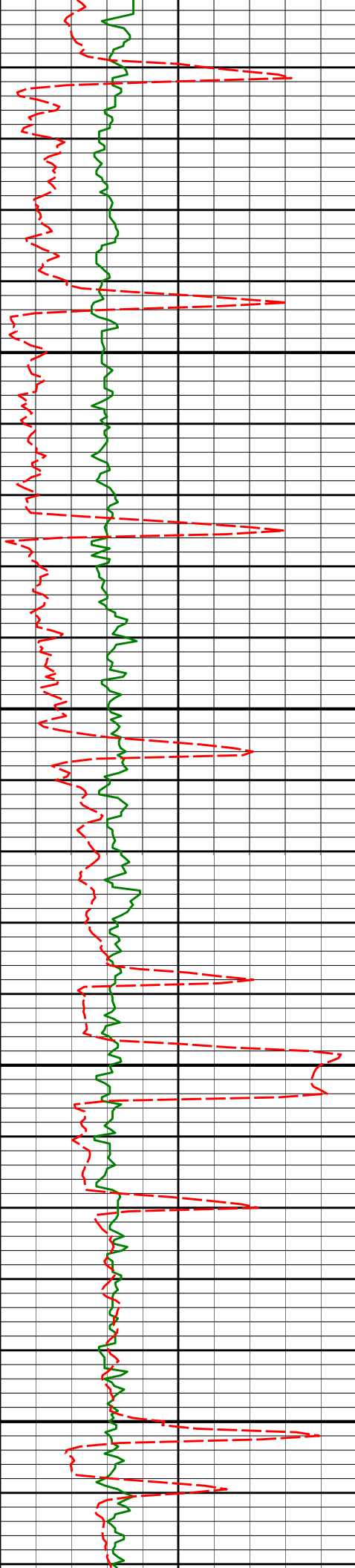
3268'

9.53°

240.80°

3242.13'

-158.23'



3350

3400

3450

3500

3363'

9.34°

241.97°

3335.85'

-165.50'

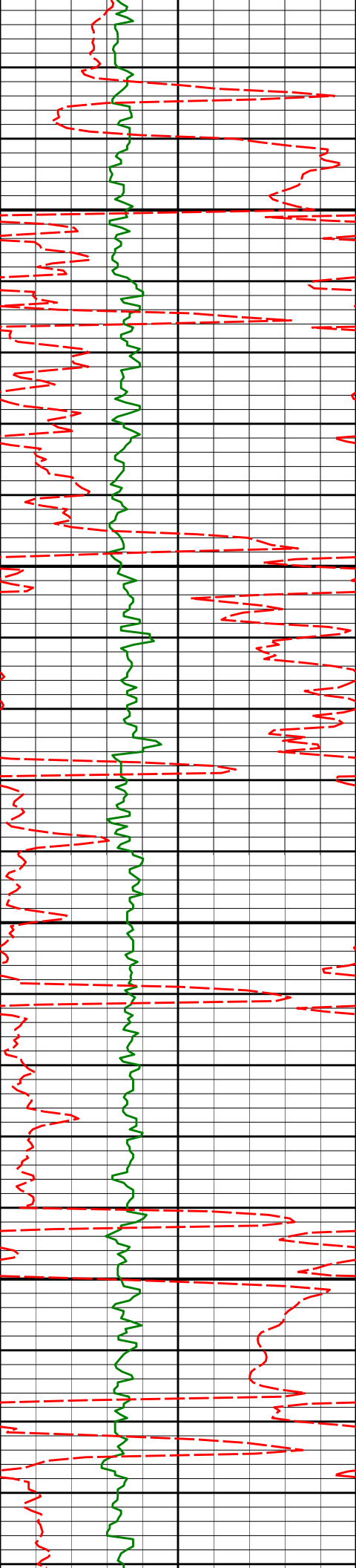
3458'

9.55°

242.62°

3429.56'

-172.55'



3550

3553'

9.39°

239.84°

3523.27'

-179.87'

3600

3650

3648'

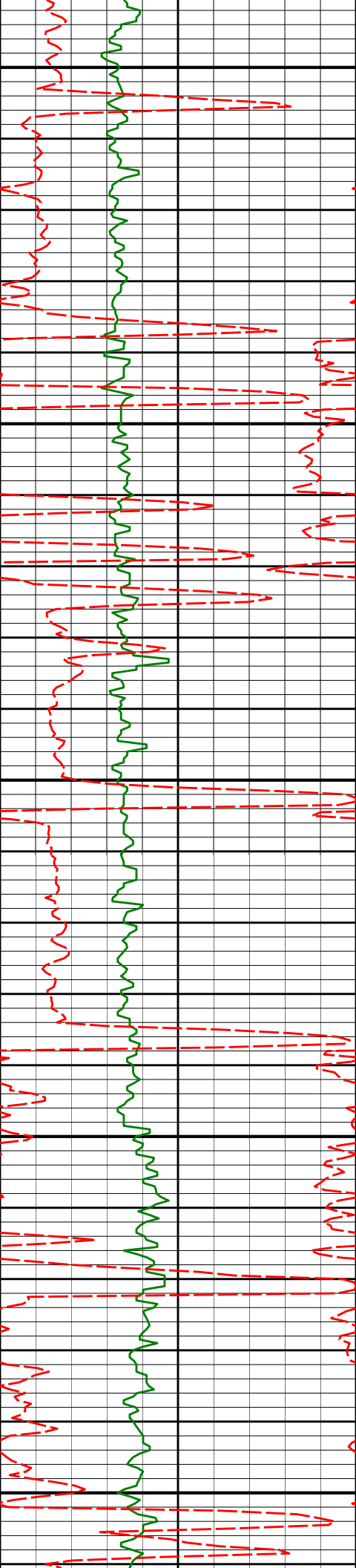
8.41°

240.37°

3617.12'

-187.01'

3700



3750

3800

3850

3900

3950

3743'

10.14°

237.44°

3710.88'

-194.76'

3870'

9.11°

238.11°

3836.09'

-205.83'

3934'

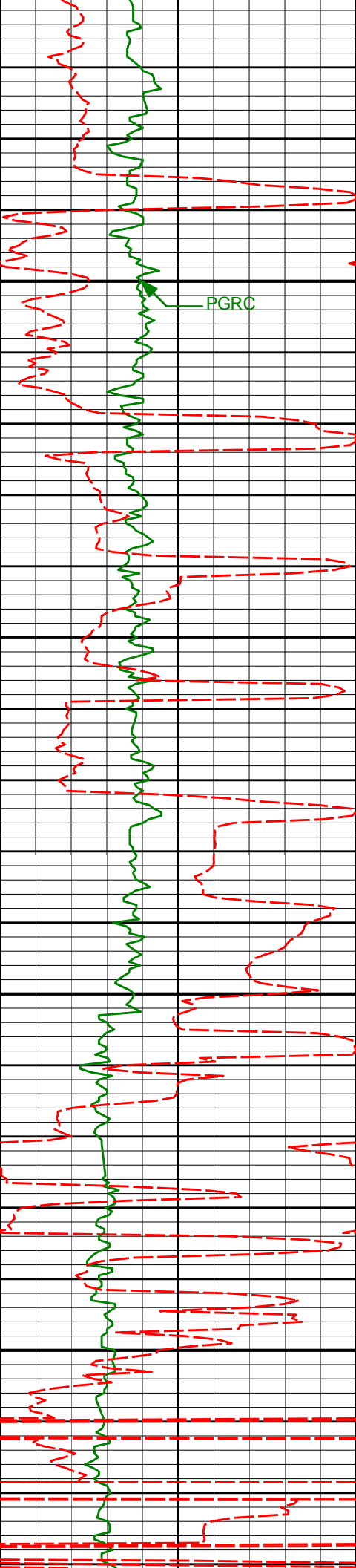
8.22°

240.16°

3899.36'

-210.66'





PGRC

4000

4050

4100

4150

4029'

6.86°

240.27°

3993.53'

-216.70'

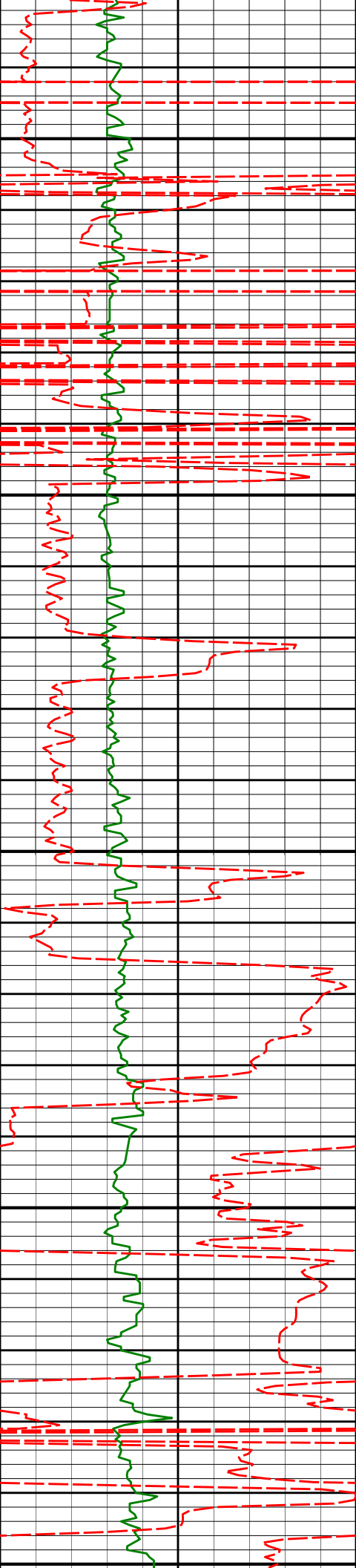
4124'

8.11°

240.26°

4087.72'

-222.69'



4200

4219'

8.71°

239.40°

4181.70'

-229.50'

4250

4300

4314'

8.46°

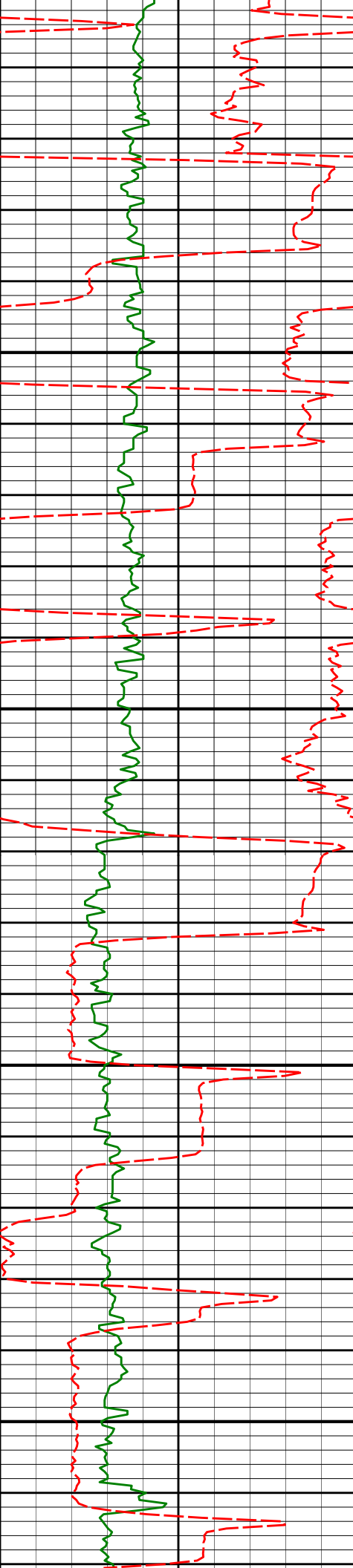
236.69°

4275.64'

-236.83'

4350

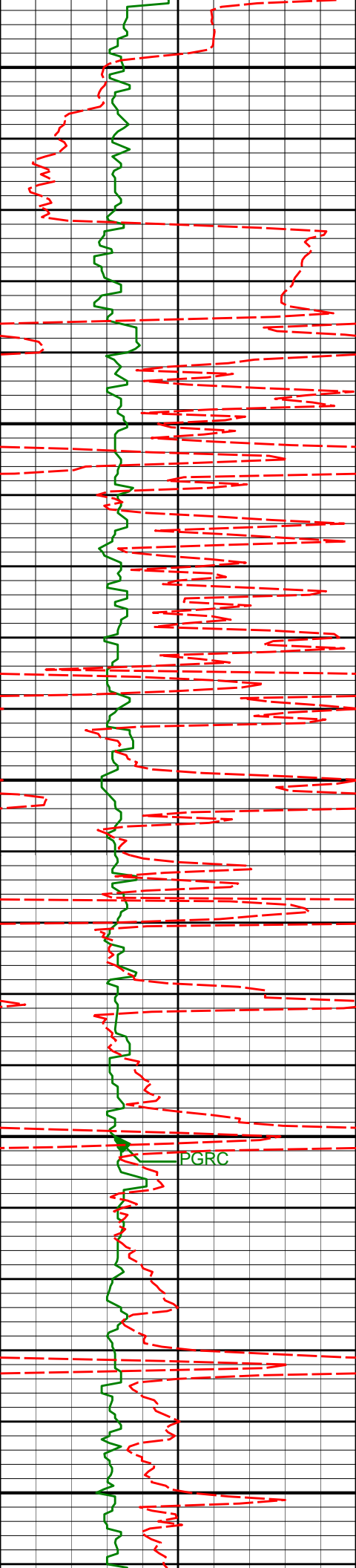
4400



4400  
4450  
4500  
4550  
4600

4409'	5.05°	219.45°	4369.97'	-243.77'
4504'	1.81°	188.62°	4464.80'	-248.44'
4599'	1.06°	128.68°	4559.77'	-250.48'





4850

4885'

0.61°

8.98°

4845.73'

-251.26'

4900

4950

4980'

0.60°

345.56°

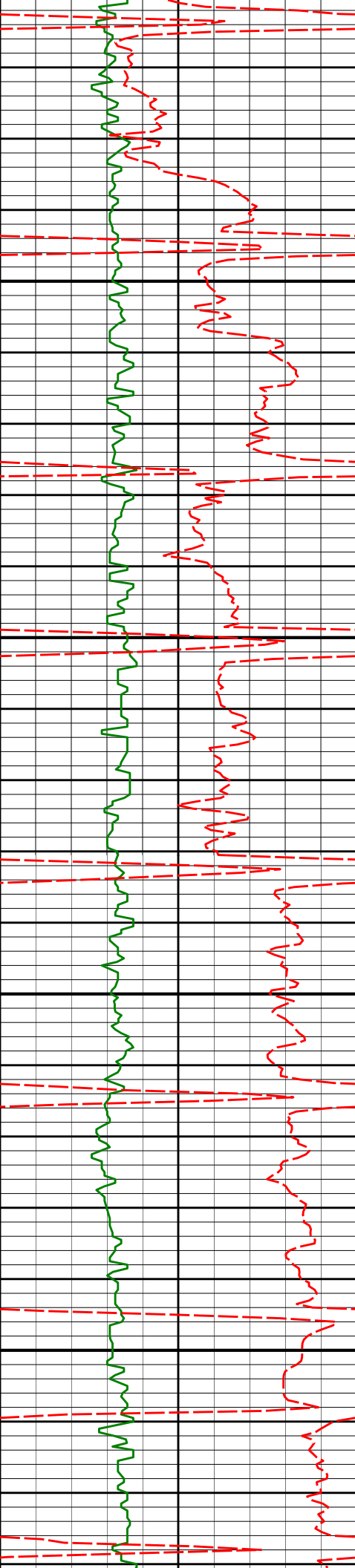
4940.72'

-250.28'

5000

PGRC

5050



5075'

0.93°

14.66°

5035.71'

-249.06'

5100

5150

5170'

1.48°

57.23°

5130.69'

-247.66'

5200

5250

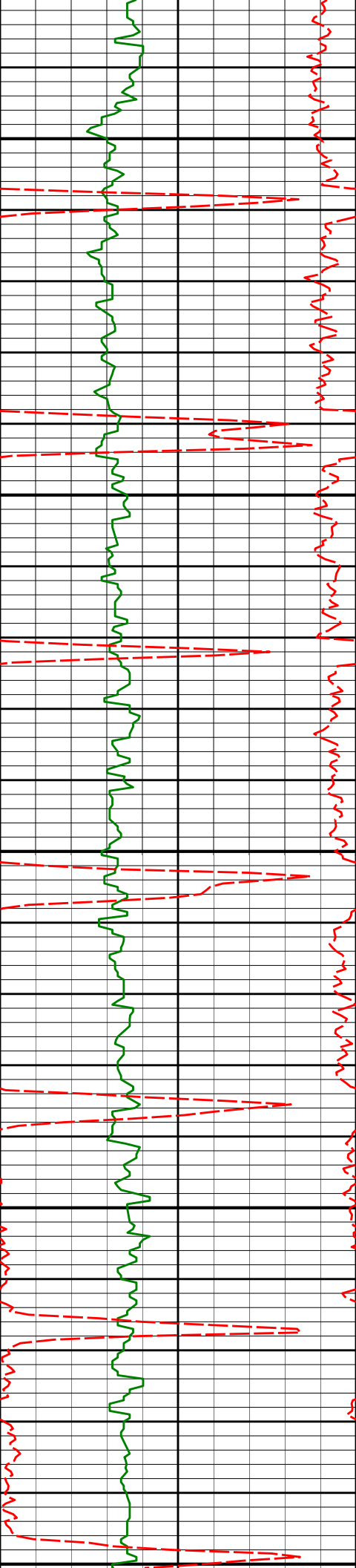
5265'

0.15°

242.54°

5225.68'

-247.07'



5300

5350

5400

5450

5500

5360'

0.29°

234.27°

5320.68'

-247.26'

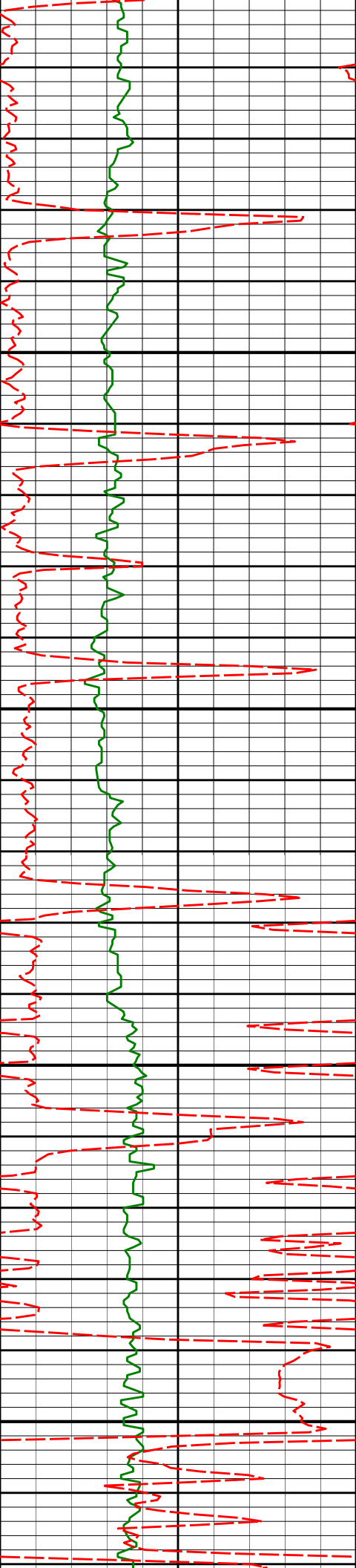
5455'

0.53°

342.78°

5415.68'

-246.98'



5550

5550'

0.88°

358.05°

5510.67'

-245.83'

5600

5650

5700

5644'

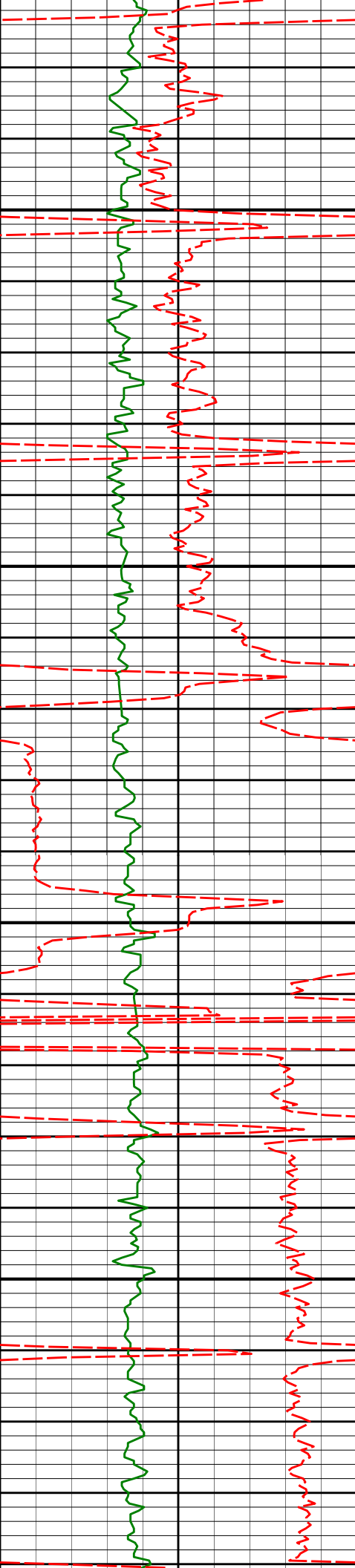
1.51°

350.93°

5604.65'

-243.88'





5750

5800

5850

5900

5740'

0.88°

147.00°

5700.64'

-243.25'

5835'

0.39°

142.82°

5795.64'

-244.13'

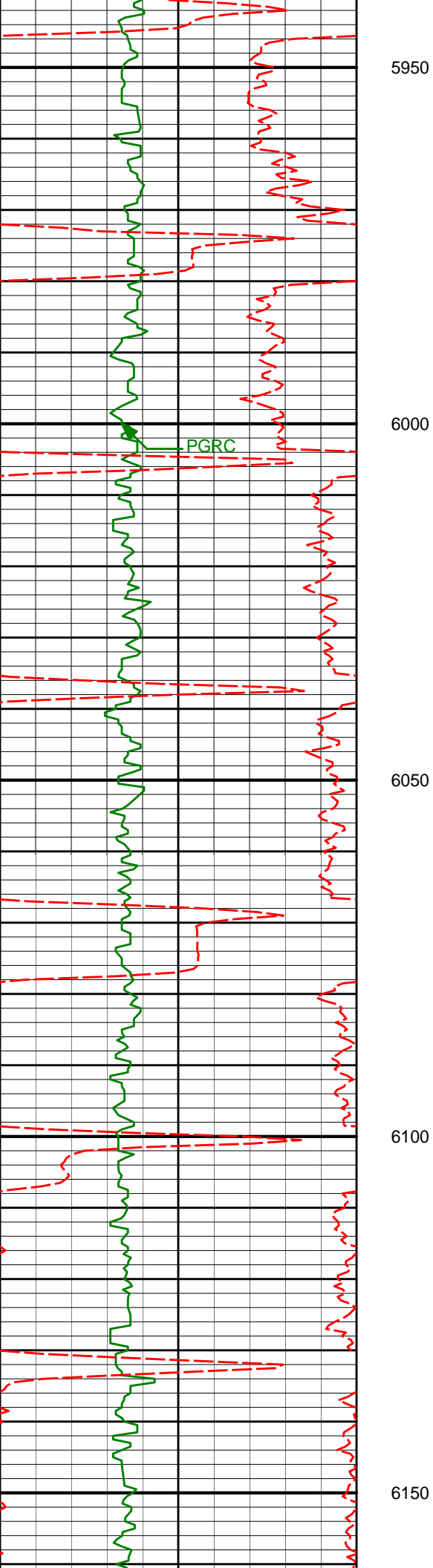
5930'

0.26°

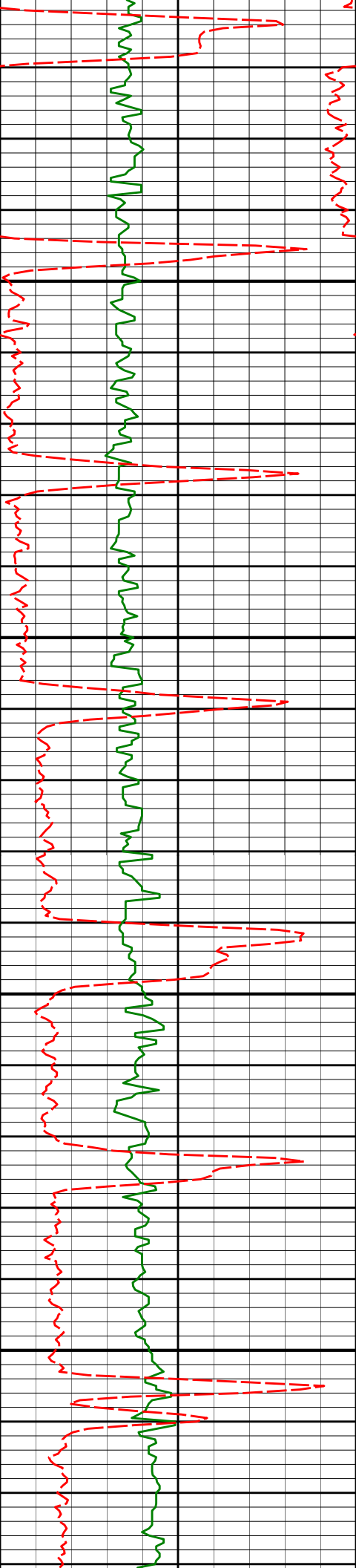
108.35°

5890.64'

-244.46'



6025'	0.13°	35.45°	5985.64'	-244.45'
6120'	0.30°	16.02°	6080.64'	-244.12'



6200

6250

6300

6350

6215'

0.32°

89.23°

6175.63'

-243.88'

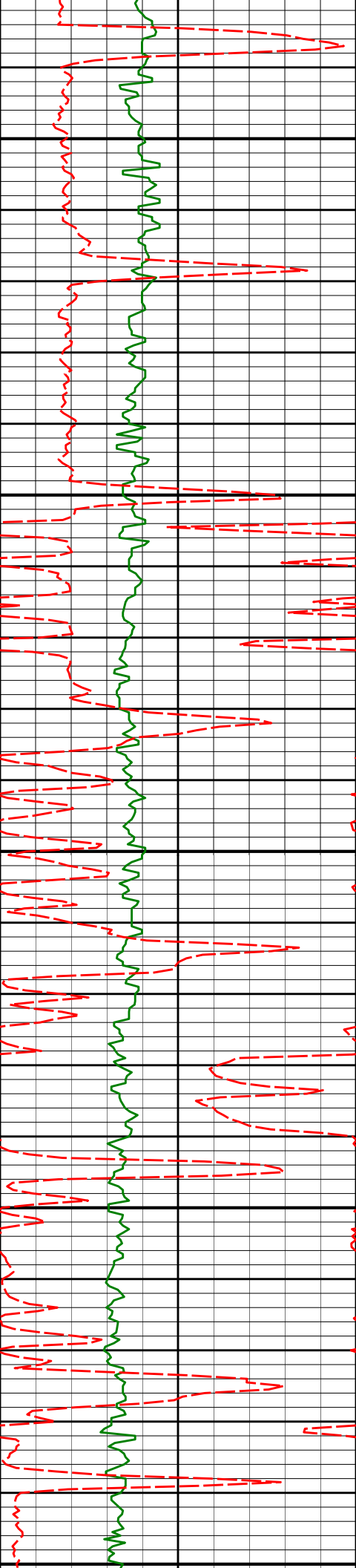
6310'

0.16°

80.37°

6270.63'

-243.86'



6400

6405'

0.06°

42.53°

6365.63'

-243.81'

6450

6500

6500'

0.33°

297.71°

6460.63'

-243.64'

6550

6595'

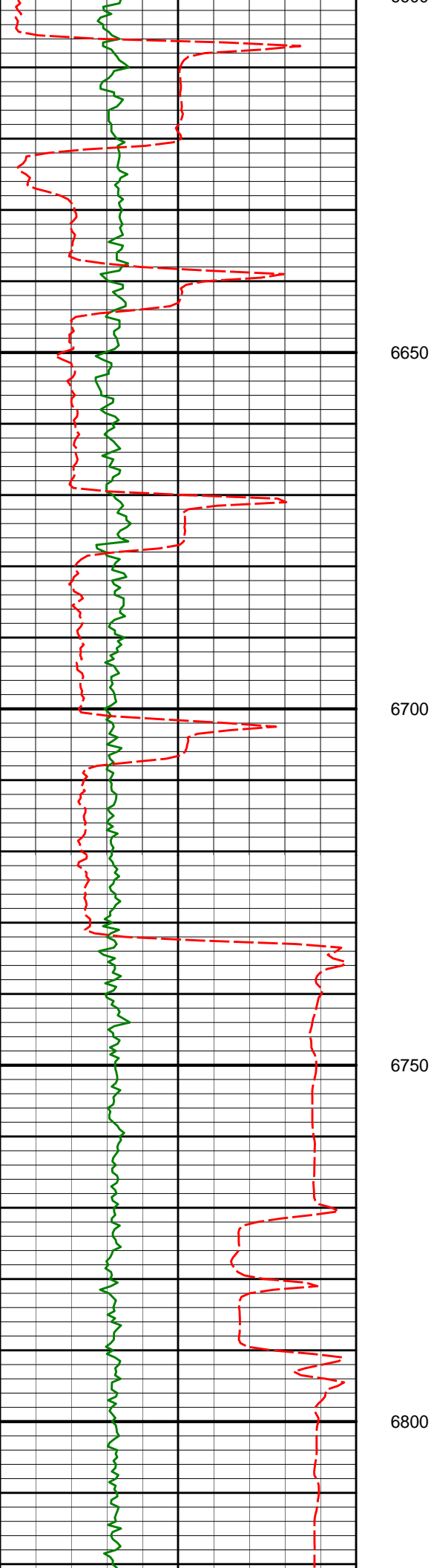
0.39°

289.86°

6555.63'

-243.39'

6600



6690'

0.37°

297.59°

6650.63'

-243.13'

6738'

1.49°

343.48°

6698.62'

-242.46'

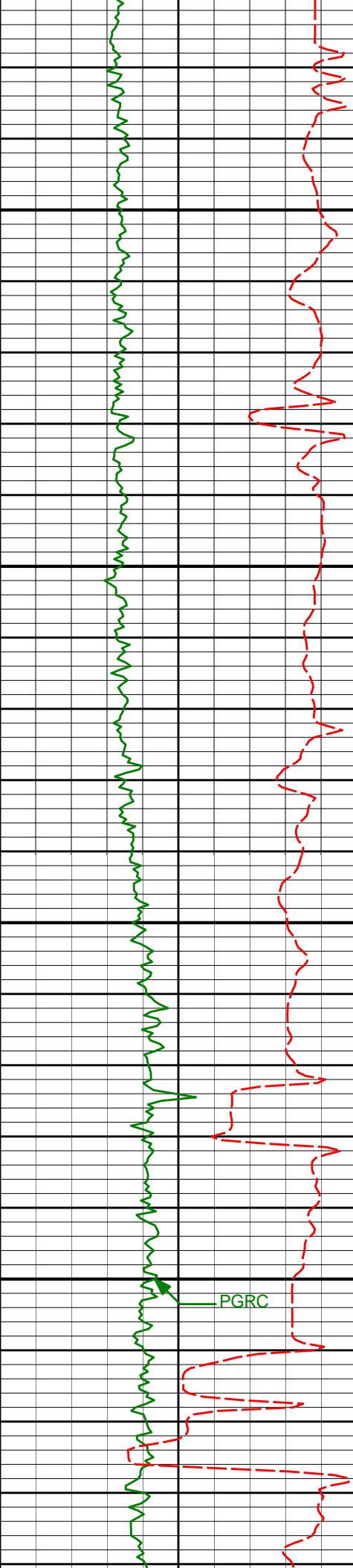
6785'

5.00°

357.12°

6745.54'

-239.82'



6850

6900

6950

7000

6833'

10.29°

359.77°

6793.10'

-233.44'

6880'

14.62°

2.86°

6838.98'

-223.32'

6928'

21.15°

1.72°

6884.64'

-208.61'

6976'

27.35°

359.80°

6928.38'

-188.91'

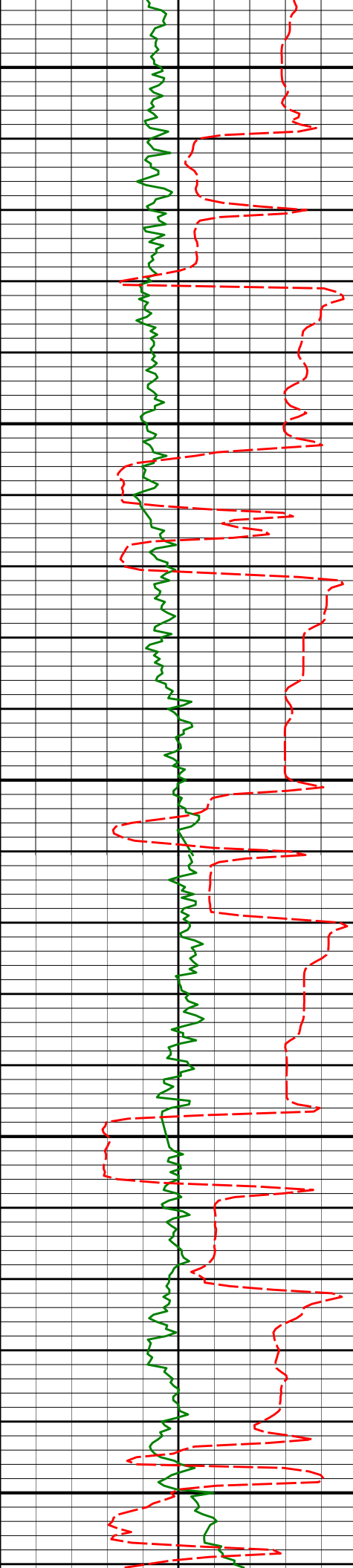
7024'

32.21°

357.26°

6970.03'

-165.09'



7050

7071'

36.30°

357.28°

7008.87'

-138.65'

7100

7119'

40.65°

358.91°

7046.44'

-108.80'

7150

7166'

45.98°

358.72°

7080.62'

-76.57'

7200

7214'

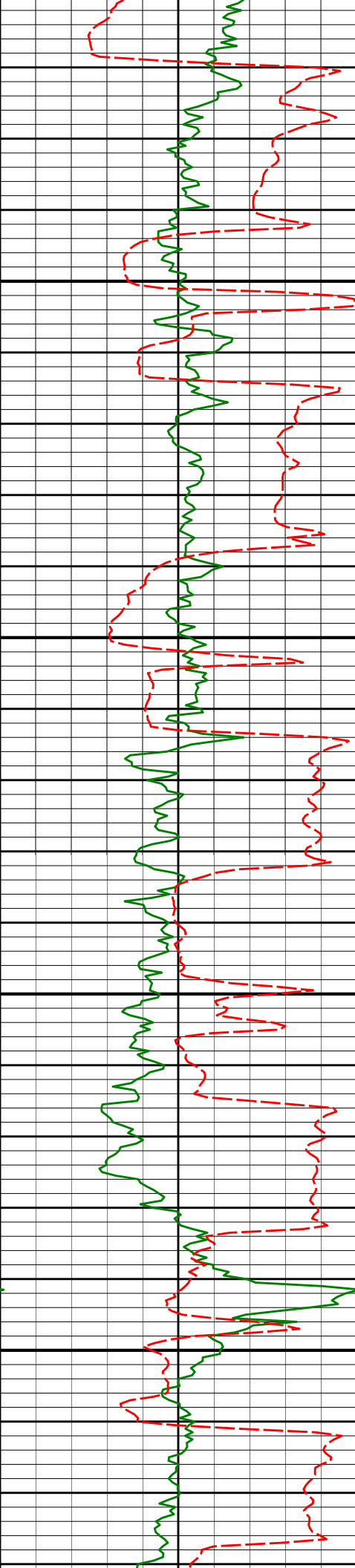
50.98°

359.32°

7112.43'

-40.64'

7250



7300

7309'

59.69°

1.17°

7166.65'

37.24'

7350

7356'

63.33°

0.78°

7189.07'

78.52'

7400

7404'

67.54°

359.67°

7209.02'

122.16'

7450

7451'

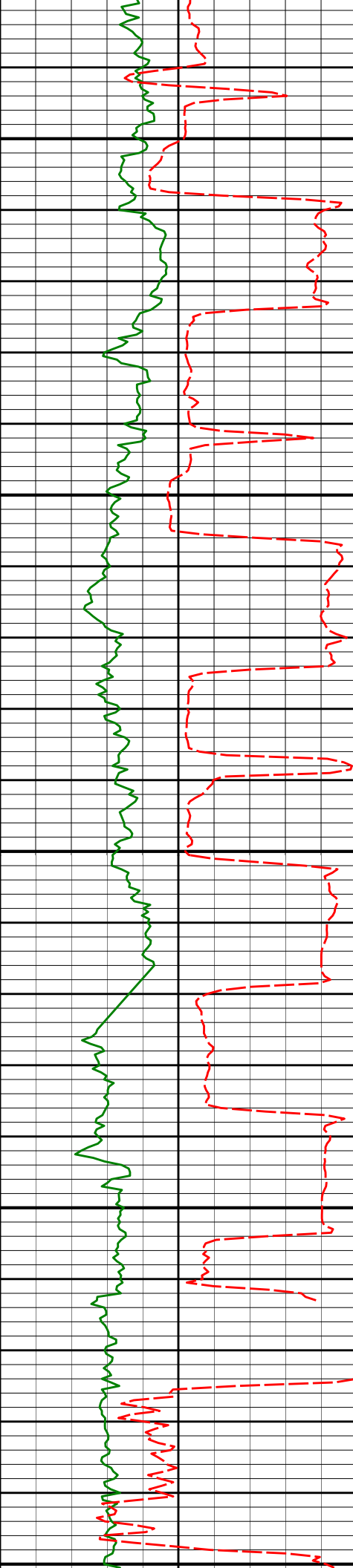
71.80°

358.68°

7225.35'

166.22'





7500

7499'

75.31°

357.69°

7238.93'

212.24'

7550

7546'

78.27°

357.90°

7249.67'

257.98'

7600

7619'

84.81°

357.68°

7260.40'

330.13'

7650

7" Casing Shoe @ 7652' MD / 7262.54' TVD

7685'

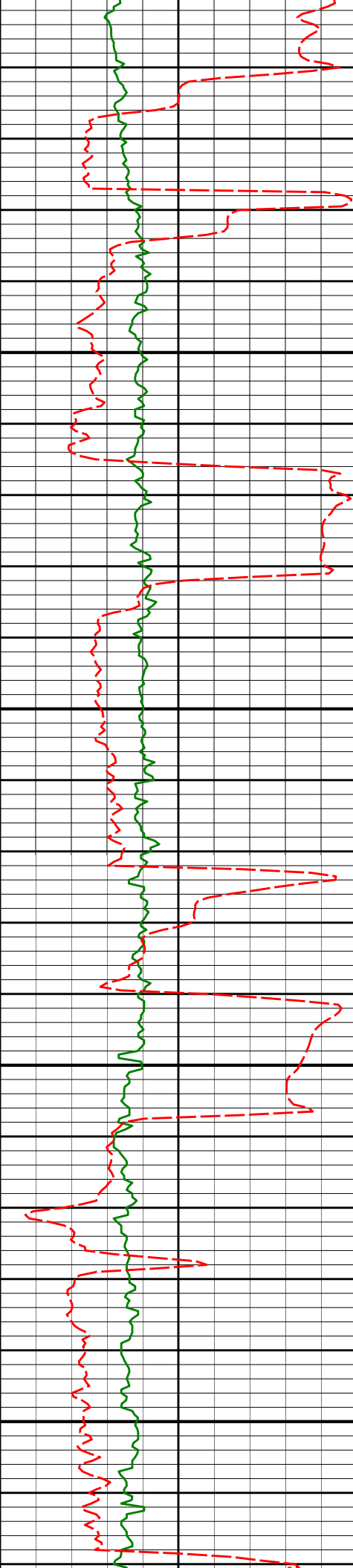
88.86°

357.12°

7264.05'

395.98'

7700



7700  
7750  
7800  
7850  
7900

7780'

89.82°

358.23°

7265.14'

490.94'

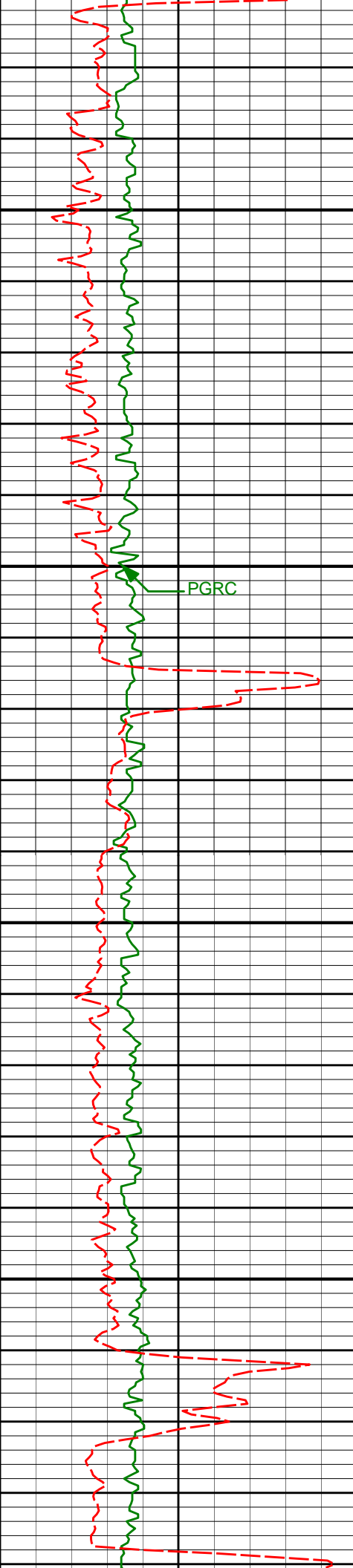
7875'

89.60°

0.50°

7265.62'

585.93'



7950

7970'

90.00°

359.88°

7265.96'

680.91'

8000

PGRC

8050

8065'

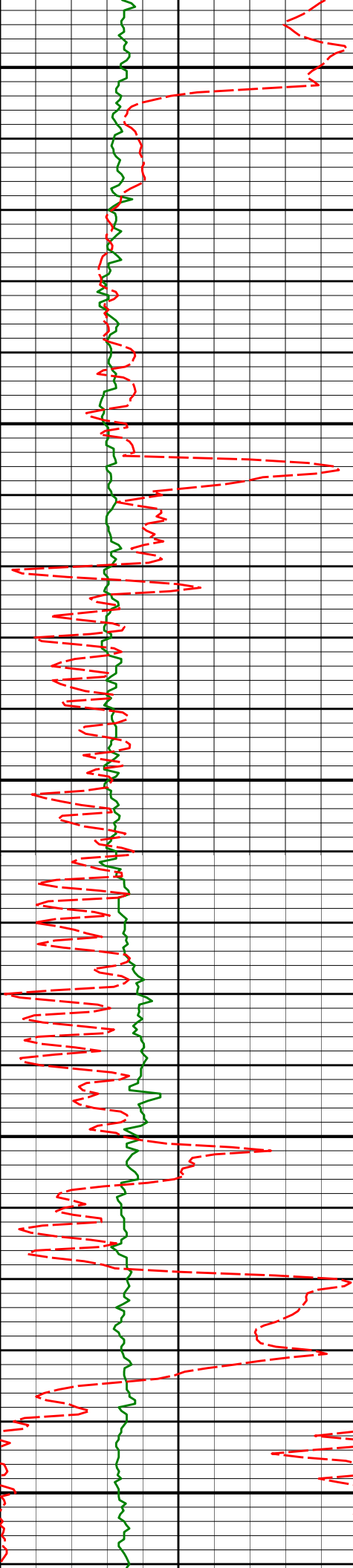
89.91°

359.20°

7266.03'

775.91'

8100



8150

8160'

90.40°

1.89°

7265.77'

870.87'

8200

8250

8255'

89.51°

0.09°

7265.85'

965.82'

8300

8350

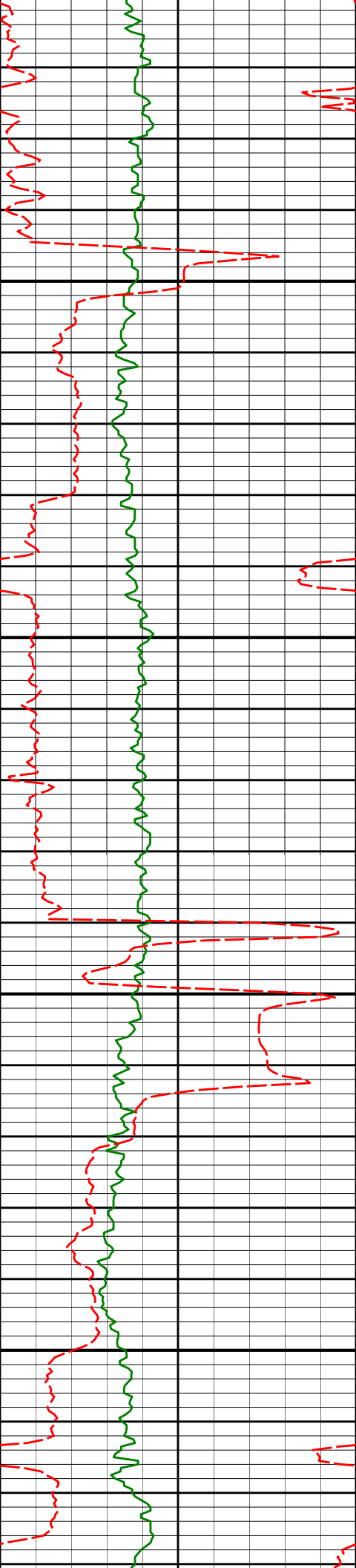
8350'

90.80°

0.85°

7265.59'

1060.79'



8400

8450

8500

8550

8446'

89.35°

359.00°

7265.46'

1156.78'

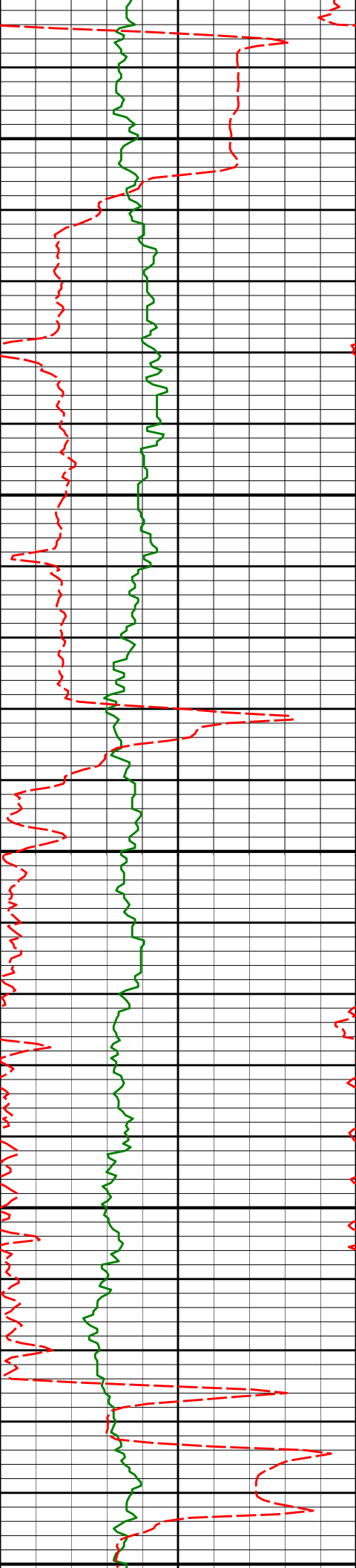
8541'

90.99°

0.92°

7265.18'

1251.76'



8600

8636'

91.67°

0.84°

7262.98'

1346.69'

8650

8700

8731'

91.85°

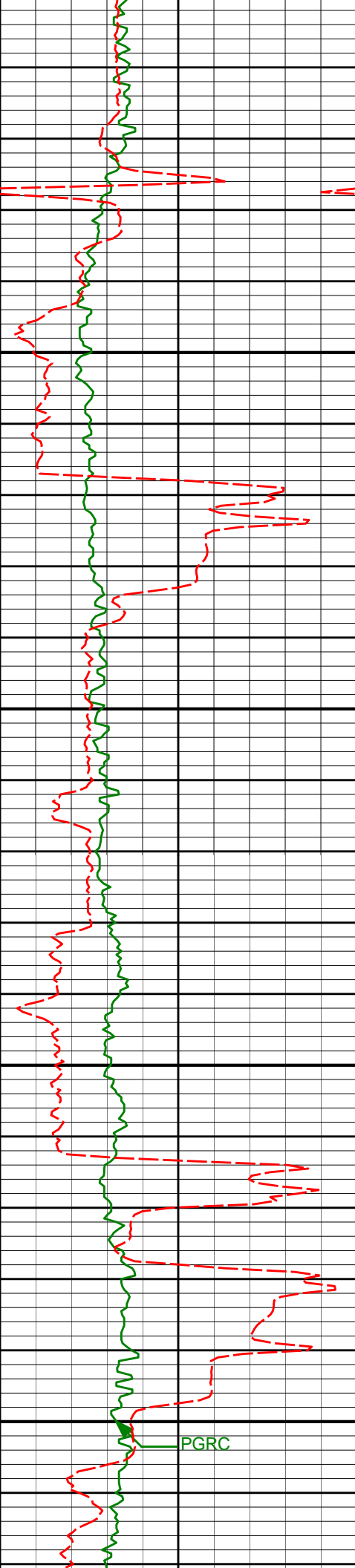
0.37°

7260.06'

1441.62'

8750

8800



8850

8900

8950

9000

8826'

90.83°

0.54°

7257.84'

1536.57'

8921'

91.11°

0.20°

7256.23'

1631.54'

9016'

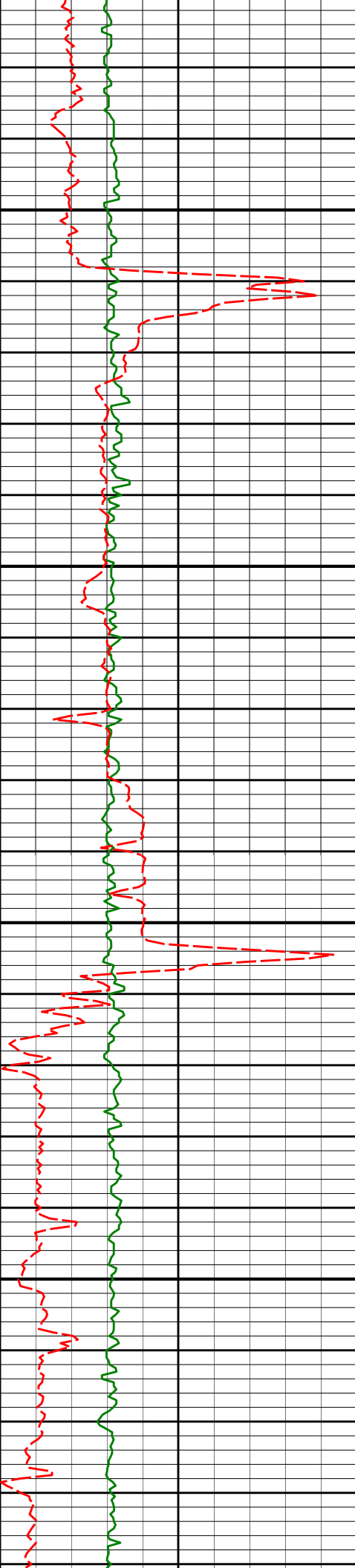
89.23°

358.61°

7255.95'

1726.53'

PGRC



9050

9100

9150

9200

9111'

89.45°

358.48°

7257.04'

1821.51'

9207'

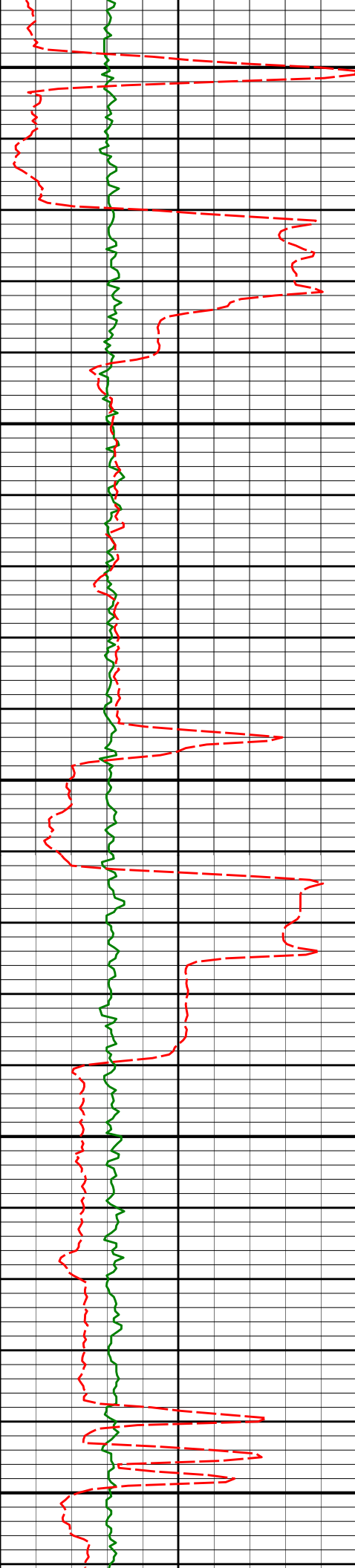
89.91°

357.56°

7257.58'

1917.49'





9250

9300

9350

9400

9450

9301'

90.09°

357.82°

7257.58'

2011.46'

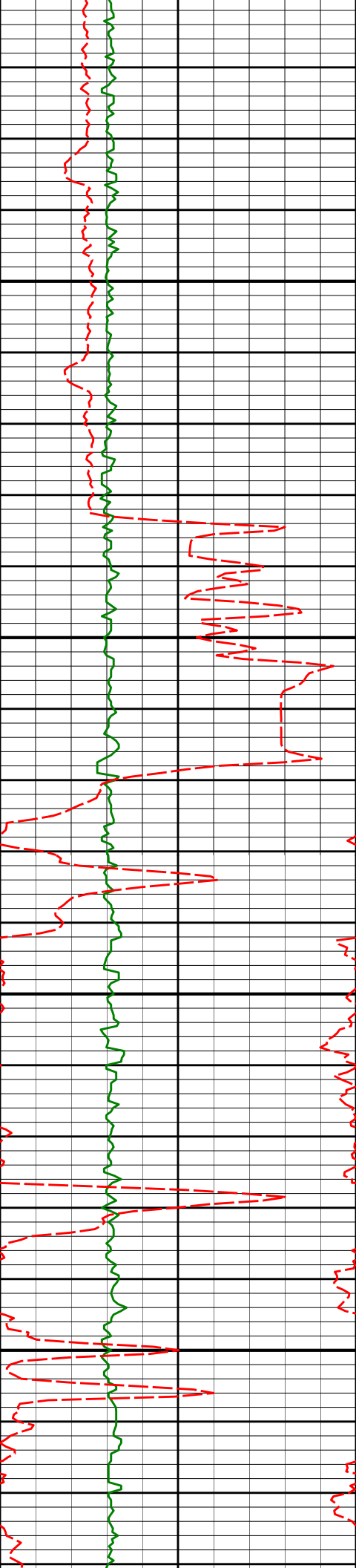
9396'

90.18°

358.73°

7257.35'

2106.45'



9500

9550

9600

9650

9491'

90.40°

357.88°

7256.87'

2201.43'

9586'

90.37°

358.49°

7256.24'

2296.42'



9700

9750

9800

9850

9900

9776'

90.37°

357.57°

7254.59'

2486.34'

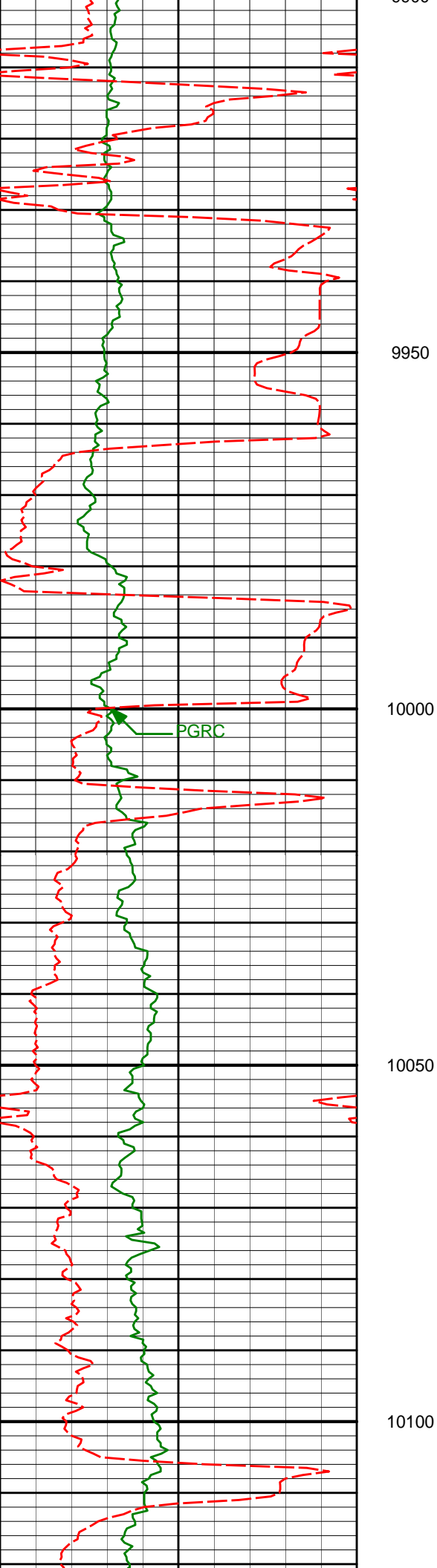
9871'

90.37°

358.46°

7253.98'

2581.32'



9950

9966'

87.78°

358.25°

7255.51'

2676.29'

10000

10050

10061'

85.21°

358.73°

7261.32'

2771.10'

10100



10150

10156'

86.39°

359.56°

7268.28'

2865.84'

10200

10250

10251'

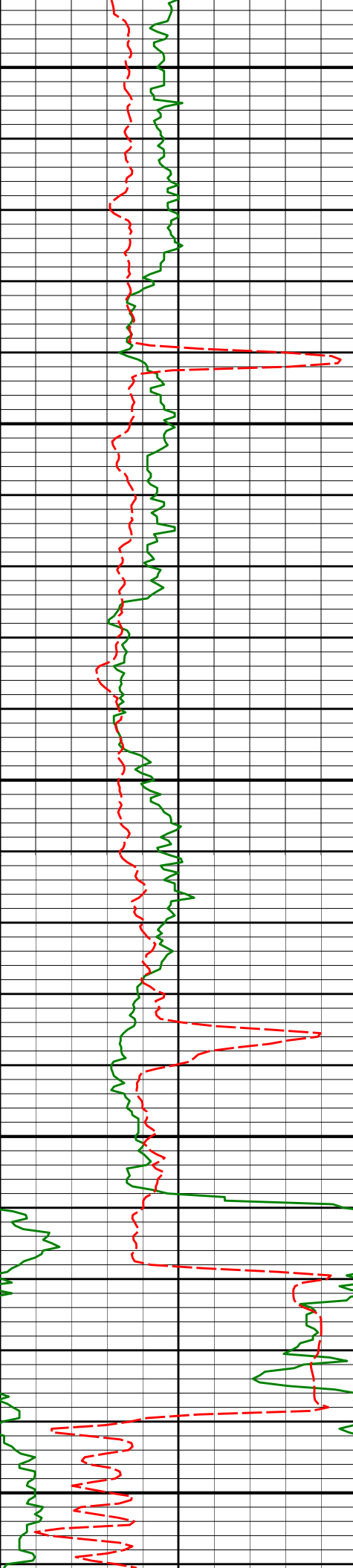
88.18°

359.47°

7272.78'

2960.73'

10300



10350

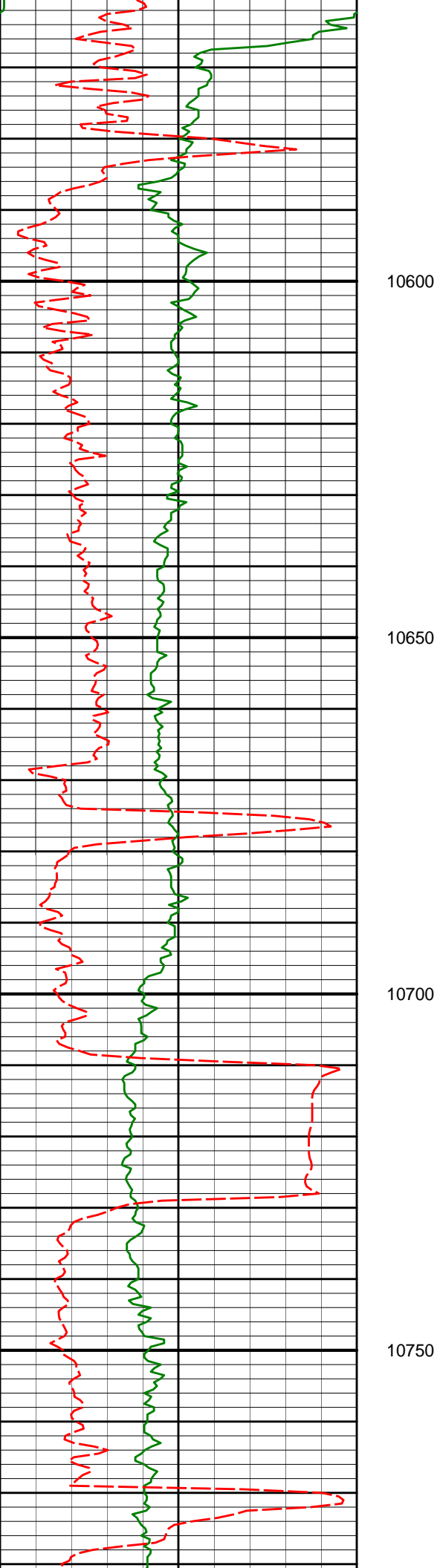
10400

10450

10500

10550

10346'	89.82°	358.56°	7274.44'	3055.71'
10442'	89.29°	357.55°	7275.18'	3151.69'
10537'	89.44°	359.23°	7276.24'	3246.67'



10632'

88.92°

358.96°

7277.60'

3341.66'

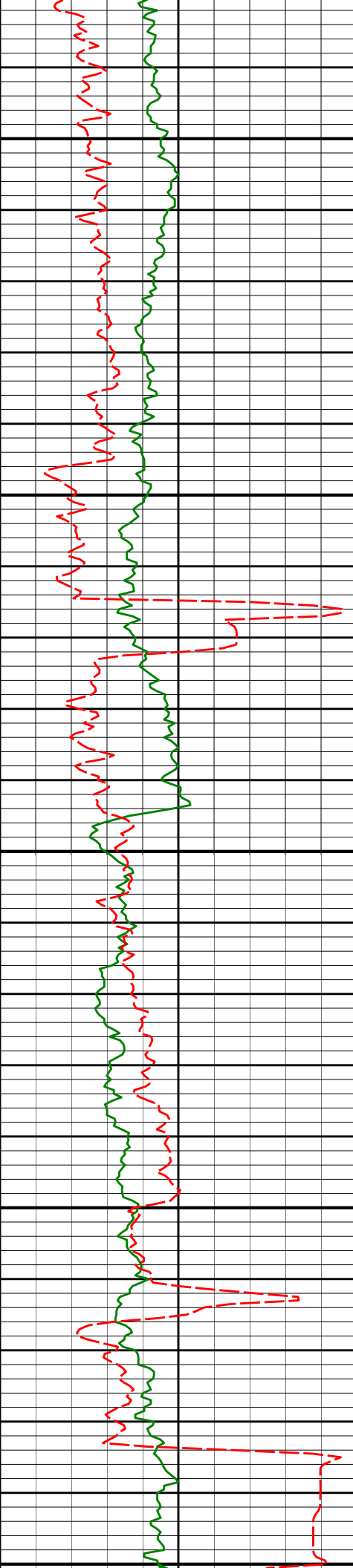
10727'

90.12°

359.56°

7278.39'

3436.65'



10800

10822'

90.18°

359.10°

7278.14'

3531.65'

10850

10900

10917'

89.57°

358.70°

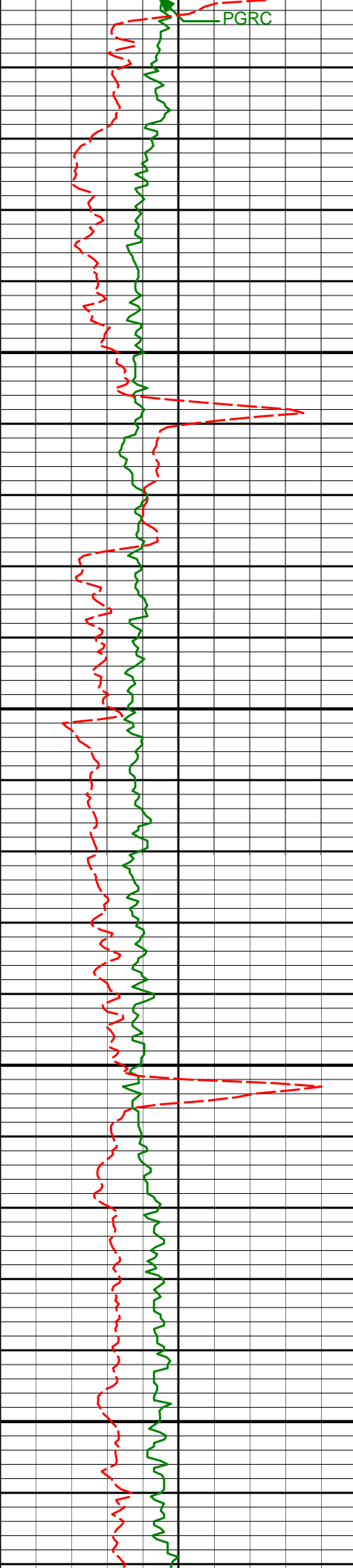
7278.35'

3626.65'

10950

11000





11050

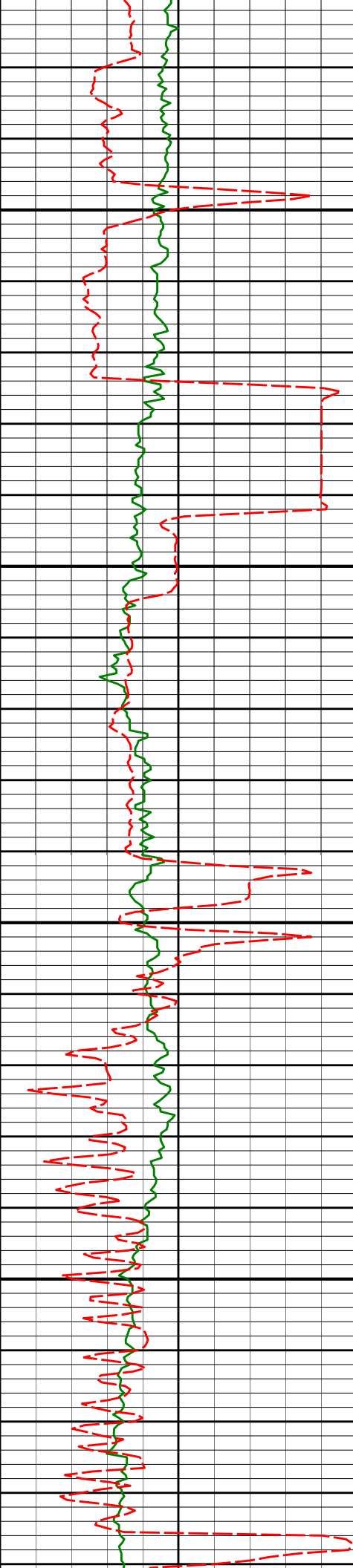
11050

11100

11150

11200

11012'	90.22°	359.64°	7278.52'	3721.65'
11107'	91.17°	0.61°	7277.37'	3816.63'
11202'	91.63°	0.02°	7275.05'	3911.58'



11250

11300

11350

11400

11297'

88.09°

358.71°

7275.28'

4006.56'

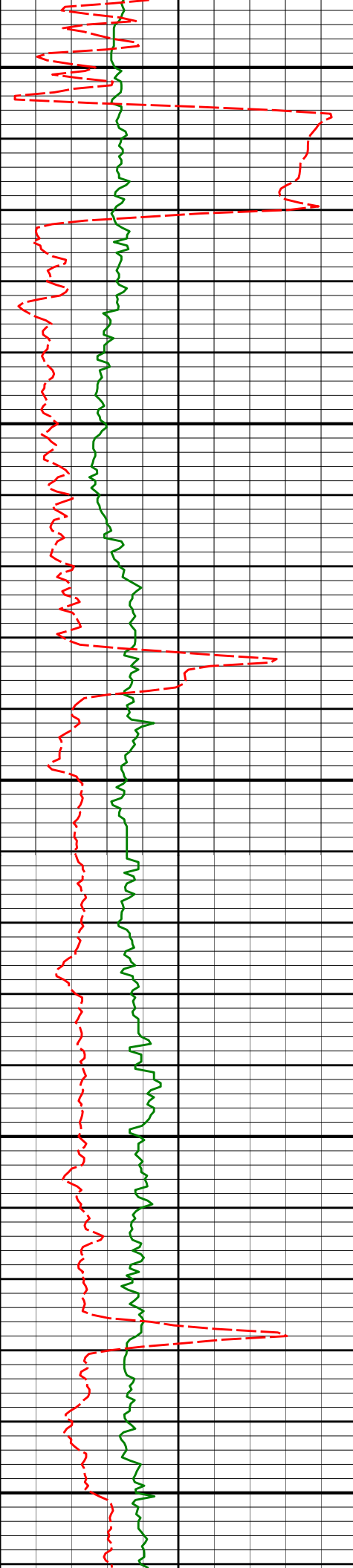
11392'

87.50°

358.18°

7278.94'

4101.48'



11450

11488'

89.11°

356.85°

7281.78'

4197.39'

11500

11550

11583'

88.52°

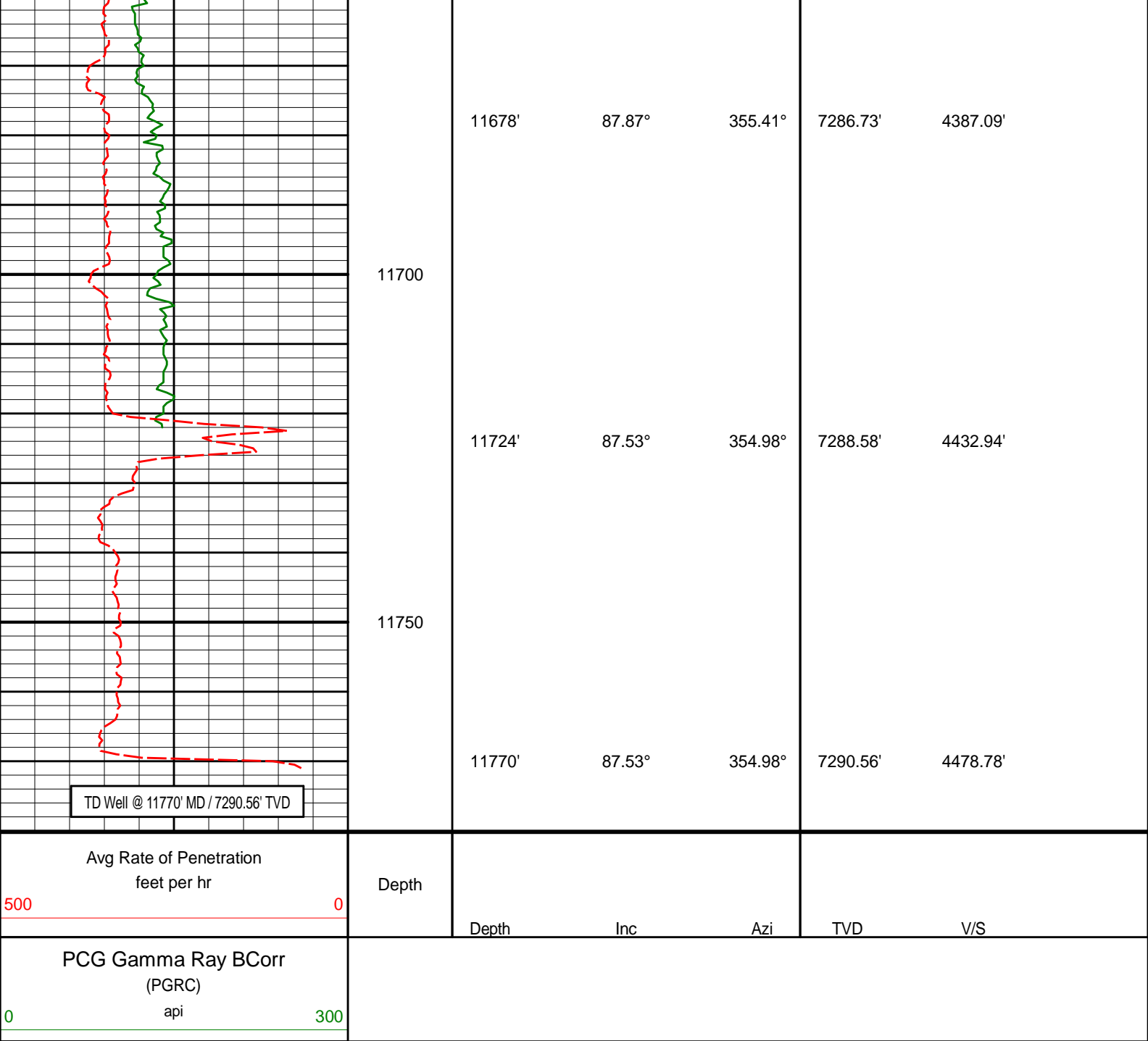
356.61°

7283.74'

4292.29'

11600

11650



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corporation

Maverick 28N-13HZ

Wattenberg

Weld Colorado

USA

CA-XX-0901248131

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
924.00	0.35	61.76	923.98	3.11 S	2.05 W	-3.08	TIE-IN
1033.00	0.15	236.61	1032.98	3.03 S	1.88 W	-3.00	0.46
1096.00	0.28	221.63	1095.98	3.19 S	2.05 W	-3.16	0.22
1190.00	0.62	223.03	1189.98	3.73 S	2.55 W	-3.70	0.36
1284.00	2.54	240.46	1283.94	5.13 S	4.71 W	-5.07	2.08

1379.00	4.45	236.09	1378.76	8.23 S	9.60 W	-8.09	2.03
1473.00	6.20	236.37	1472.35	13.07 S	16.85 W	-12.83	1.86
1567.00	7.69	243.39	1565.66	18.70 S	26.70 W	-18.32	1.82
1661.00	9.50	244.41	1658.60	24.87 S	39.32 W	-24.31	1.93
1755.00	9.85	244.72	1751.26	31.65 S	53.59 W	-30.88	0.38
1849.00	9.76	244.58	1843.89	38.51 S	68.05 W	-37.53	0.10
1943.00	9.86	245.81	1936.51	45.23 S	82.59 W	-44.04	0.25
2038.00	10.32	245.47	2030.04	52.09 S	97.75 W	-50.69	0.49
2132.00	9.90	247.87	2122.58	58.63 S	112.90 W	-57.01	0.63
2226.00	10.42	237.12	2215.12	66.29 S	127.52 W	-64.46	2.09
2320.00	10.11	232.23	2307.61	75.96 S	141.18 W	-73.93	0.98
2415.00	9.58	230.64	2401.21	86.08 S	153.89 W	-83.87	0.63
2509.00	8.26	241.70	2494.08	94.24 S	165.88 W	-91.86	2.30
2603.00	9.22	238.02	2586.99	101.43 S	178.22 W	-98.87	1.18
2697.00	7.73	239.00	2679.96	108.68 S	190.02 W	-105.95	1.59
2792.00	9.43	239.65	2773.90	115.90 S	202.22 W	-113.00	1.79
2888.00	11.74	239.71	2868.25	124.80 S	217.44 W	-121.68	2.41
2983.00	10.77	232.34	2961.43	135.10 S	232.81 W	-131.76	1.82
3078.00	9.60	232.56	3054.93	145.34 S	246.13 W	-141.80	1.23
3173.00	10.14	240.73	3148.53	154.25 S	259.71 W	-150.51	1.58
3268.00	9.53	240.80	3242.13	162.17 S	273.87 W	-158.23	0.64
3363.00	9.34	241.97	3335.85	169.63 S	287.54 W	-165.50	0.28
3458.00	9.55	242.62	3429.56	176.88 S	301.35 W	-172.55	0.25
3553.00	9.39	239.84	3523.27	184.39 S	315.04 W	-179.87	0.51
3648.00	8.41	240.37	3617.12	191.72 S	327.78 W	-187.01	1.04
3743.00	10.14	237.44	3710.88	199.66 S	340.87 W	-194.76	1.89
3870.00	9.11	238.11	3836.09	210.99 S	358.83 W	-205.83	0.82
3934.00	8.22	240.16	3899.36	215.94 S	367.10 W	-210.66	1.47
4029.00	6.86	240.27	3993.53	222.13 S	377.92 W	-216.70	1.43
4124.00	8.11	240.26	4087.72	228.27 S	388.67 W	-222.69	1.32
4219.00	8.71	239.40	4181.70	235.26 S	400.68 W	-229.50	0.65
4314.00	8.46	236.69	4275.64	242.76 S	412.71 W	-236.83	0.50
4409.00	5.05	219.45	4369.97	249.83 S	421.21 W	-243.77	4.14
4504.00	1.81	188.62	4464.80	254.54 S	424.09 W	-248.44	3.81
4599.00	1.06	128.68	4559.77	256.57 S	423.63 W	-250.48	1.66
4694.00	1.08	125.45	4654.75	257.64 S	422.21 W	-251.57	0.07
4789.00	1.19	79.49	4749.74	257.98 S	420.51 W	-251.94	0.94
4885.00	0.61	8.98	4845.73	257.29 S	419.45 W	-251.26	1.19
4980.00	0.60	345.56	4940.72	256.31 S	419.50 W	-250.28	0.26
5075.00	0.93	14.66	5035.71	255.08 S	419.43 W	-249.06	0.53
5170.00	1.48	57.23	5130.69	253.67 S	418.20 W	-247.66	1.07
5265.00	0.15	242.54	5225.68	253.07 S	417.28 W	-247.07	1.72
5360.00	0.29	234.27	5320.68	253.27 S	417.59 W	-247.26	0.15
5455.00	0.53	342.78	5415.68	252.99 S	417.91 W	-246.98	0.72
5550.00	0.88	358.05	5510.67	251.84 S	418.07 W	-245.83	0.41
5644.00	1.51	350.93	5604.65	249.89 S	418.29 W	-243.88	0.69
5740.00	0.88	147.00	5700.64	249.26 S	418.08 W	-243.25	2.44
5835.00	0.39	142.82	5795.64	250.13 S	417.49 W	-244.13	0.52
5930.00	0.26	108.35	5890.64	250.46 S	417.09 W	-244.46	0.24
6025.00	0.13	35.45	5985.64	250.44 S	416.82 W	-244.45	0.27
6120.00	0.30	16.02	6080.64	250.11 S	416.69 W	-244.12	0.19
6215.00	0.32	89.23	6175.63	249.87 S	416.36 W	-243.88	0.39
6310.00	0.16	80.37	6270.63	249.84 S	415.96 W	-243.86	0.17
6405.00	0.06	42.53	6365.63	249.78 S	415.80 W	-243.81	0.12
6500.00	0.33	297.71	6460.63	249.62 S	416.01 W	-243.64	0.37
6595.00	0.39	289.86	6555.63	249.38 S	416.55 W	-243.39	0.08
6690.00	0.37	297.59	6650.63	249.13 S	417.13 W	-243.13	0.06
6738.00	1.49	343.48	6698.62	248.46 S	417.44 W	-242.46	2.63
6785.00	5.00	357.12	6745.54	245.83 S	417.72 W	-239.82	7.59
6833.00	10.29	359.77	6793.10	239.45 S	417.84 W	-233.44	11.04
6880.00	14.62	2.86	6838.98	229.32 S	417.56 W	-223.32	9.32
6928.00	21.15	1.72	6884.64	214.60 S	417.00 W	-208.61	13.62
6976.00	27.35	359.80	6928.38	194.90 S	416.78 W	-188.91	13.02
7024.00	32.21	357.26	6970.03	171.08 S	417.43 W	-165.09	10.46
7071.00	36.30	357.28	7008.87	144.66 S	418.69 W	-138.65	8.70
7119.00	40.65	358.91	7046.44	114.82 S	419.66 W	-108.80	9.30
7166.00	45.98	358.72	7080.62	82.60 S	420.33 W	-76.57	11.34
7214.00	50.98	359.32	7112.43	46.67 S	420.94 W	-40.64	10.46
7261.00	54.94	359.61	7140.74	9.17 S	421.29 W	-3.14	8.44
7309.00	59.69	1.17	7166.65	31.22 N	421.00 W	37.24	10.27
7356.00	63.33	0.78	7189.07	72.51 N	420.30 W	78.52	7.78
7404.00	67.54	359.67	7209.02	116.16 N	420.13 W	122.16	9.02
7451.00	71.80	358.68	7225.35	160.21 N	420.77 W	166.22	9.28
7499.00	75.31	357.69	7238.93	206.22 N	422.23 W	212.24	7.58
7546.00	78.27	357.90	7249.67	251.94 N	423.99 W	257.98	6.31

7619.00	84.81	357.68	7260.40	324.05 N	426.78 W	330.13	8.96
7685.00	88.86	357.12	7264.05	389.87 N	429.77 W	395.98	6.19
7780.00	89.82	358.23	7265.14	484.78 N	433.62 W	490.94	1.54
7875.00	89.60	0.50	7265.62	579.77 N	434.67 W	585.93	2.40
7970.00	90.00	359.88	7265.96	674.77 N	434.36 W	680.91	0.78
8065.00	89.91	359.20	7266.03	769.76 N	435.12 W	775.91	0.72
8160.00	90.40	1.89	7265.77	864.75 N	434.22 W	870.87	2.88
8255.00	89.51	0.09	7265.85	959.73 N	432.58 W	965.82	2.11
8350.00	90.80	0.85	7265.59	1054.72 N	431.80 W	1060.79	1.58
8446.00	89.35	359.00	7265.46	1150.72 N	431.92 W	1156.78	2.45
8541.00	90.99	0.92	7265.18	1245.71 N	431.99 W	1251.76	2.66
8636.00	91.67	0.84	7262.98	1340.67 N	430.53 W	1346.69	0.72
8731.00	91.85	0.37	7260.06	1435.62 N	429.53 W	1441.62	0.53
8826.00	90.83	0.54	7257.84	1530.59 N	428.77 W	1536.57	1.09
8921.00	91.11	0.20	7256.23	1625.57 N	428.16 W	1631.54	0.46
9016.00	89.23	358.61	7255.95	1720.56 N	429.15 W	1726.53	2.59
9111.00	89.45	358.48	7257.04	1815.52 N	431.56 W	1821.51	0.27
9207.00	89.91	357.56	7257.58	1911.46 N	434.87 W	1917.49	1.07
9301.00	90.09	357.82	7257.58	2005.39 N	438.66 W	2011.46	0.34
9396.00	90.18	358.73	7257.35	2100.34 N	441.52 W	2106.45	0.96
9491.00	90.40	357.88	7256.87	2195.30 N	444.33 W	2201.43	0.92
9586.00	90.37	358.49	7256.24	2290.25 N	447.34 W	2296.42	0.64
9681.00	90.62	357.40	7255.42	2385.18 N	450.75 W	2391.39	1.18
9776.00	90.37	357.57	7254.59	2480.09 N	454.92 W	2486.34	0.32
9871.00	90.37	358.46	7253.98	2575.03 N	458.21 W	2581.32	0.94
9966.00	87.78	358.25	7255.51	2669.97 N	460.93 W	2676.29	2.74
10061.00	85.21	358.73	7261.32	2764.75 N	463.43 W	2771.10	2.75
10156.00	86.39	359.56	7268.28	2859.48 N	464.85 W	2865.84	1.52
10251.00	88.18	359.47	7272.78	2954.37 N	465.65 W	2960.73	1.89
10346.00	89.82	358.56	7274.44	3049.33 N	467.28 W	3055.71	1.97
10442.00	89.29	357.55	7275.18	3145.27 N	470.54 W	3151.69	1.19
10537.00	89.44	359.23	7276.24	3240.23 N	473.21 W	3246.67	1.78
10632.00	88.92	358.96	7277.60	3335.21 N	474.71 W	3341.66	0.62
10727.00	90.12	359.56	7278.39	3430.19 N	475.94 W	3436.65	1.41
10822.00	90.18	359.10	7278.14	3525.19 N	477.05 W	3531.65	0.49
10917.00	89.57	358.70	7278.35	3620.17 N	478.87 W	3626.65	0.77
11012.00	90.22	359.64	7278.52	3715.16 N	480.25 W	3721.65	1.20
11107.00	91.17	0.61	7277.37	3810.15 N	480.04 W	3816.63	1.43
11202.00	91.63	0.02	7275.05	3905.12 N	479.52 W	3911.58	0.79
11297.00	88.09	358.71	7275.28	4000.09 N	480.57 W	4006.56	3.97
11392.00	87.50	358.18	7278.94	4094.99 N	483.15 W	4101.48	0.83
11488.00	89.11	356.85	7281.78	4190.85 N	487.31 W	4197.39	2.17
11583.00	88.52	356.61	7283.74	4285.67 N	492.73 W	4292.29	0.67
11678.00	87.87	355.41	7286.73	4380.39 N	499.33 W	4387.09	1.44
11724.00	87.53	354.98	7288.58	4426.19 N	503.18 W	4432.94	1.19
11770.00	87.53	354.98	7290.56	4471.98 N	507.21 W	4478.78	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 359.18 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.56 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11770.00 FEET  
IS 4500.65 FEET ALONG 353.53 DEGREES (TRUE)

All directional surveys tied on to the last gyro survey at 924.00' MD. Final survey is a straight-line projection to the bit.