

DGR Dual Gamma Ray

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	03-Dec-13	08-Dec-13			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,246.00	7,823.00			
Log End Depth (MD, ft)	7,823.00	12,480.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	30-Nov-13 19:55	05-Dec-13 18:18			
Drill/Wipe End Date and Time	03-Dec-13 09:36	07-Dec-13 18:35			
Min Inc (deg) @ Depth (MD, ft)	0.22 @ 6,785.00	89.84 @ 7,823.00			
Max Inc (deg) @ Depth (MD, ft)	89.84 @ 7,823.00	89.84 @ 7,823.00			
Bit TFA(in2) / Bit Type	1.49 / PDC	0.98 / PDC			
Flow Rate (gpm)	571.94	275.86			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Polymer	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	8.50 / 29.00	10.10 / 38.00			
Filtrate CL (ppm)	1,200.00	1,400.00			
pH / Fluid Loss (mptm)	9.20 / 3	9.00 / 4			
PV (cP) / YP (lbf2)	1 / 4.00	12 / 10.00			
% Solids / % Sand	8.5 / 0.50	6.2 / 0.75			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	478.07 / PDM	338.74 / PDM			

Max Tool Temp (degF) / Source	170.37 / PCM	228.74 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Matt Busche	Matt Busche			
Customer Representative	Sam Taylor	Sam Taylor			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11404283	12187590			
Insert Serial Number	11400908	11227549			
Date and Time Initialized	30-Nov-13 10:49	04-Dec-13 22:26			
Date and Time Read	03-Dec-13 22:45	11-Dec-13 15:13			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	44.90	43.48			
Software Version	6.21	6.21			
Sub Serial Number	11404283	12187590			
Sonde Serial Number	11477984	11833053			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	193.72	79.58			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.85	48.43			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404283	12187590			
Insert/Sonde Serial Number	11579809	11681022			

REMARKS

1. All depths are measured depth, 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 projection to 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

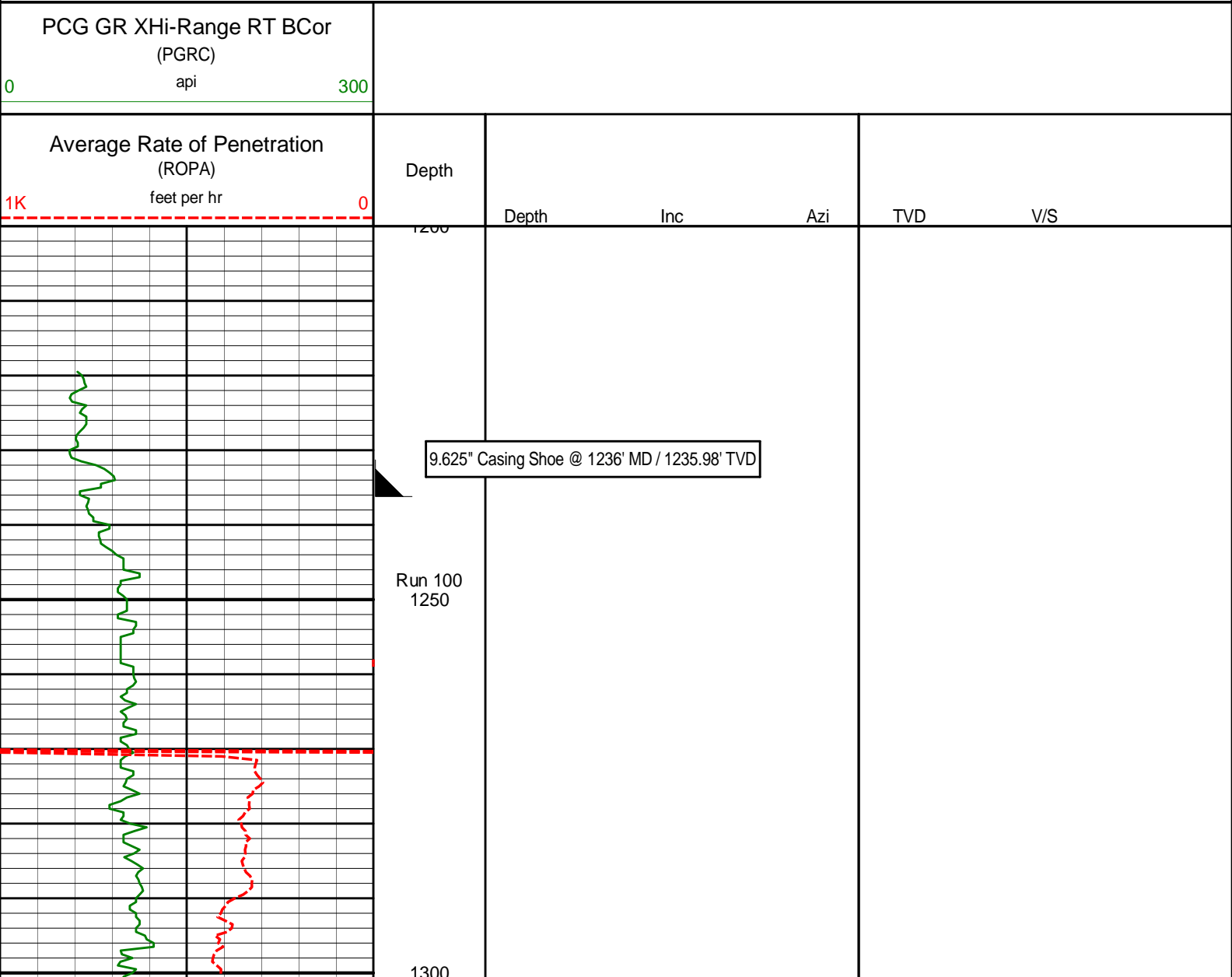
Insite version: 8.0

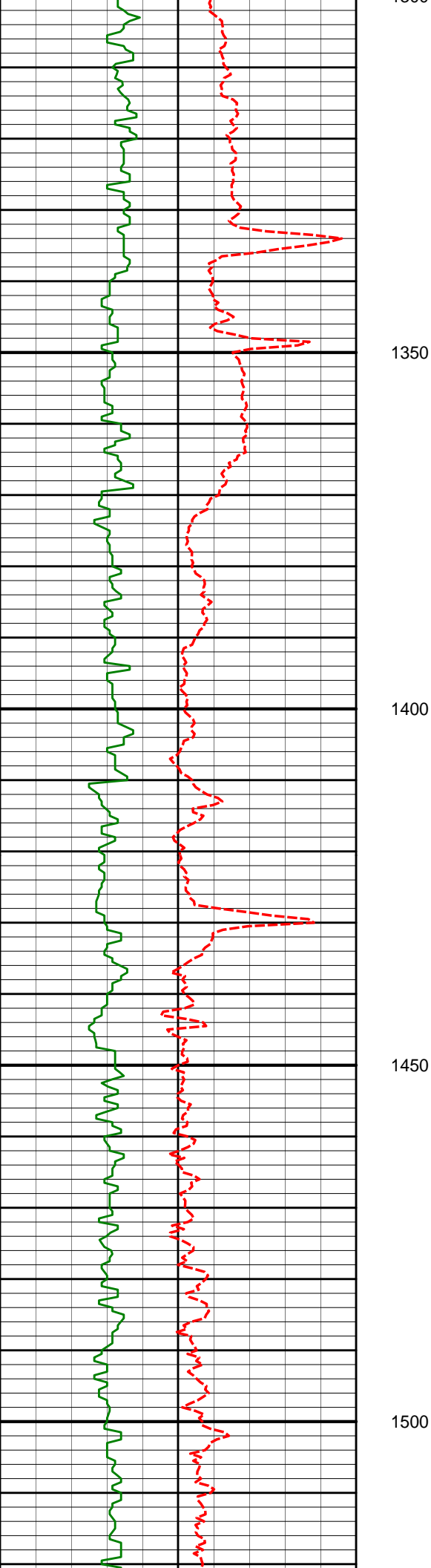
WARRANTY

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MD Main Log 1:240





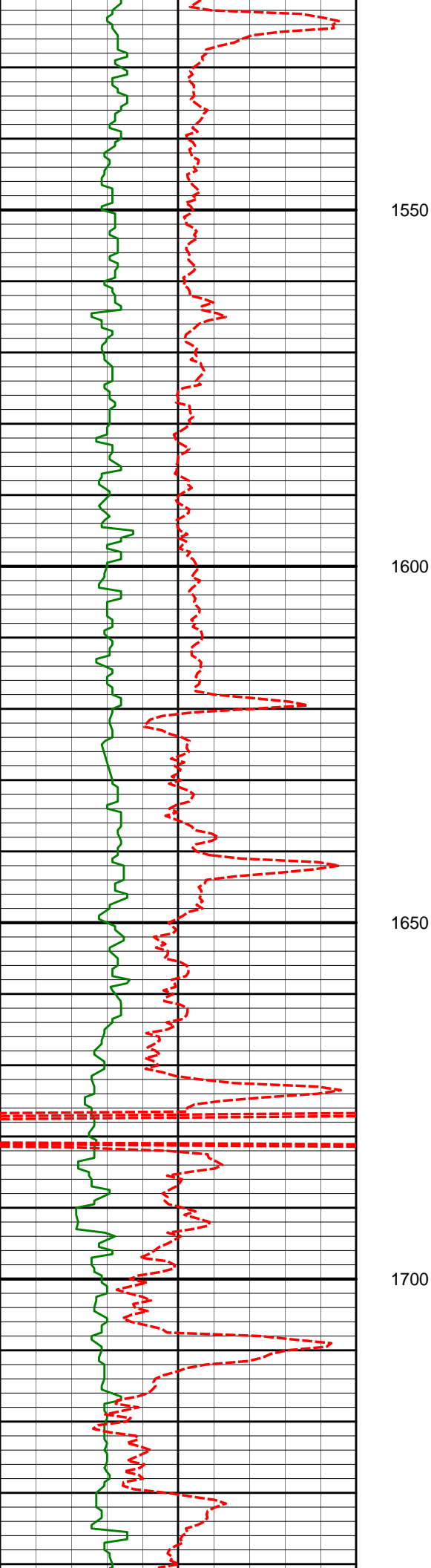
1477'

0.39°

64.84°

1476.98'

-5.47'



1572'

0.42°

66.74°

1571.97'

-5.74'

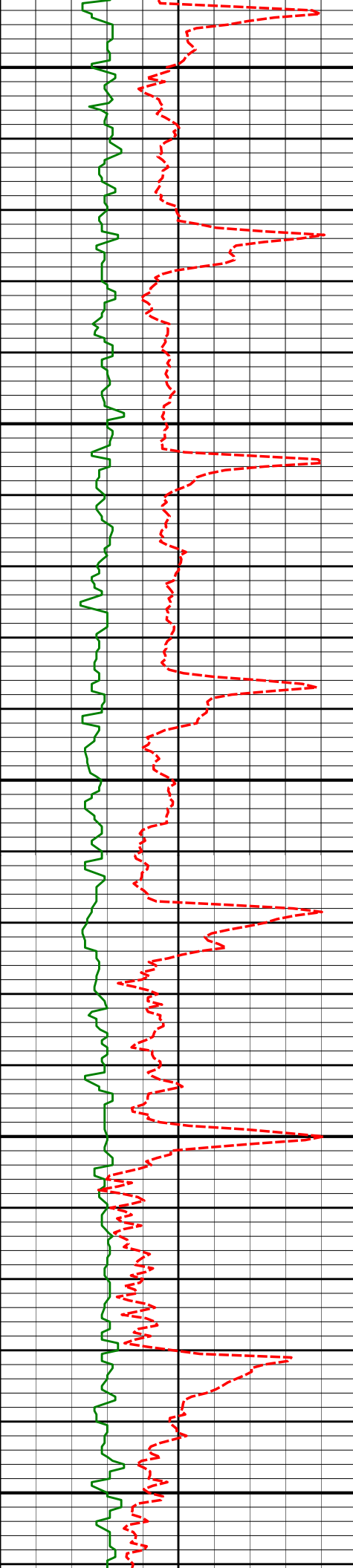
1666'

0.53°

33.59°

1665.97'

-6.24'



1750

1760'

0.49°

18.33°

1759.97'

-6.98'

1800

1850

1855'

0.52°

22.64°

1854.96'

-7.76'

1900

1950

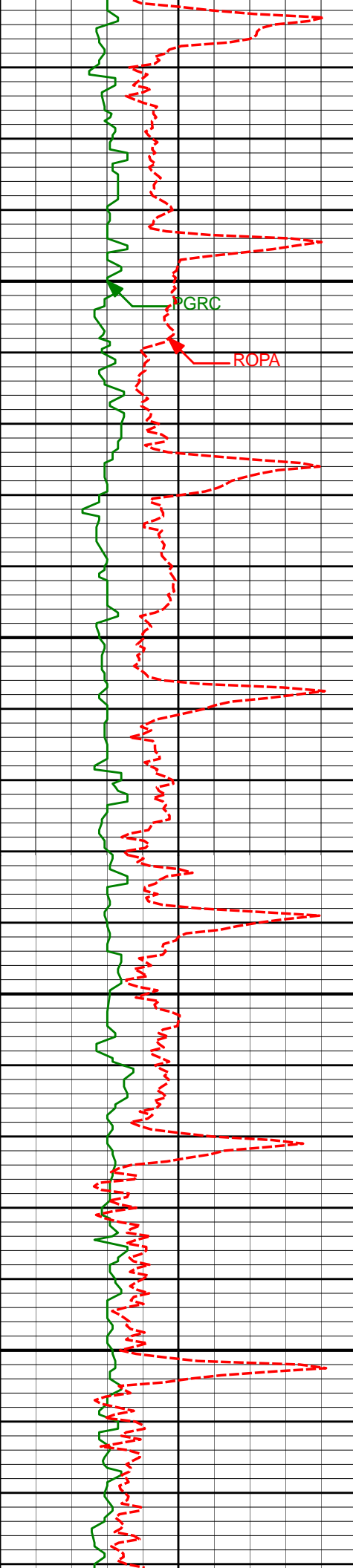
1949'

0.40°

20.72°

1948.96'

-8.46'



2000

PGRC

ROPA

2050

2043'

0.52°

4.08°

2042.96'

-9.19'

2100

2138'

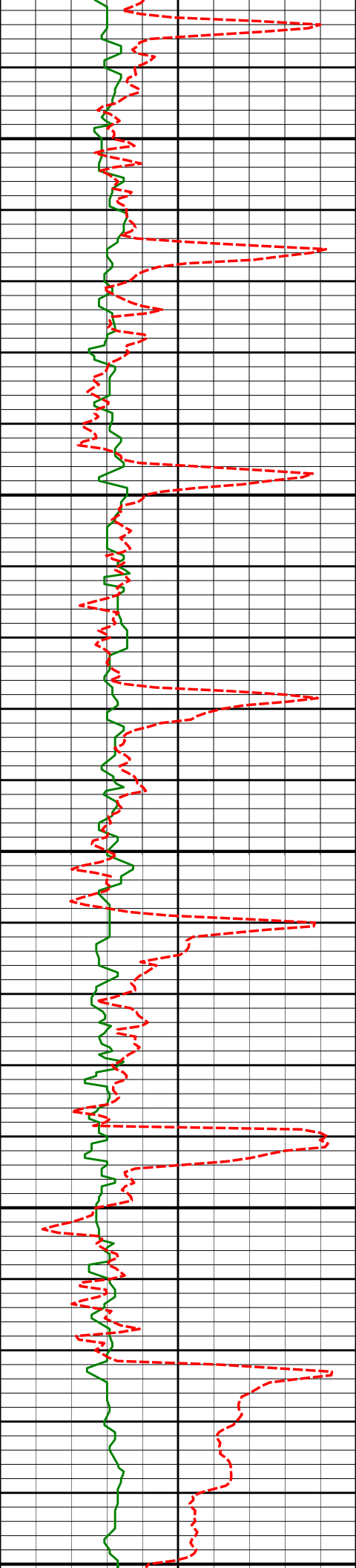
0.43°

34.14°

2137.96'

-9.92'

2150



2200

2232'

0.63°

9.29°

2231.95'

-10.72'

2250

2300

2350

2358'

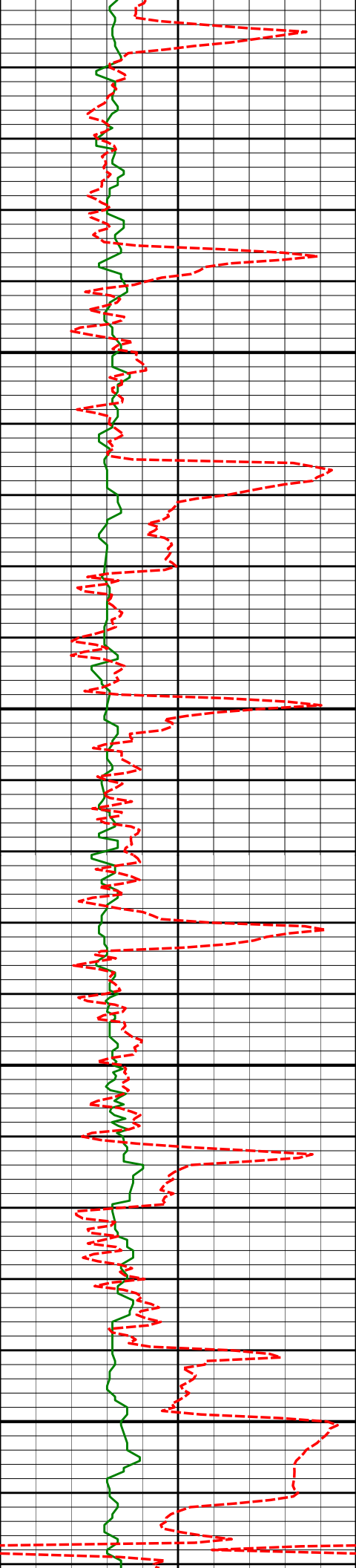
0.74°

346.30°

2357.94'

-12.19'

2400



2400

2450

2500

2550

2600

2420'

0.52°

348.03°

2419.94'

-12.86'

2514'

0.39°

8.87°

2513.94'

-13.59'

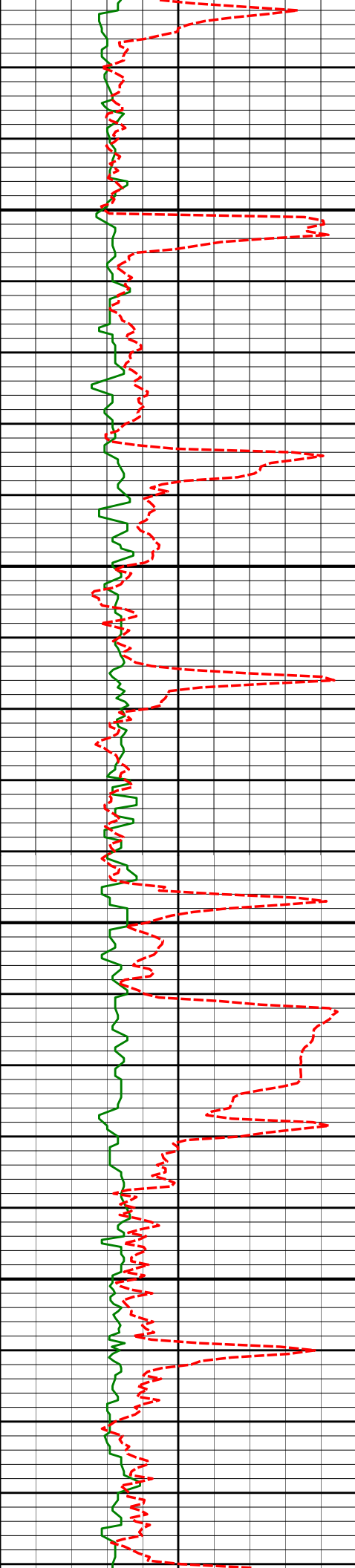
2608'

1.73°

24.15°

2607.92'

-15.20'



2650

2700

2750

2800

2702'

2.31°

30.28°

2701.86'

-18.12'

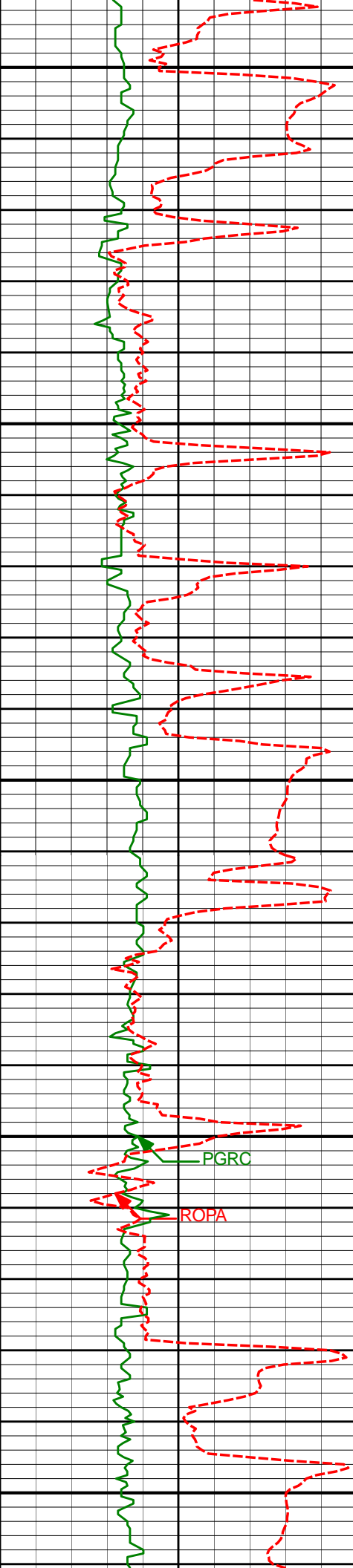
2796'

4.35°

33.15°

2795.70'

-22.73'



2850

2890'

5.43°

29.36°

2889.35'

-29.58'

2900

2950

2984'

6.62°

47.24°

2982.84'

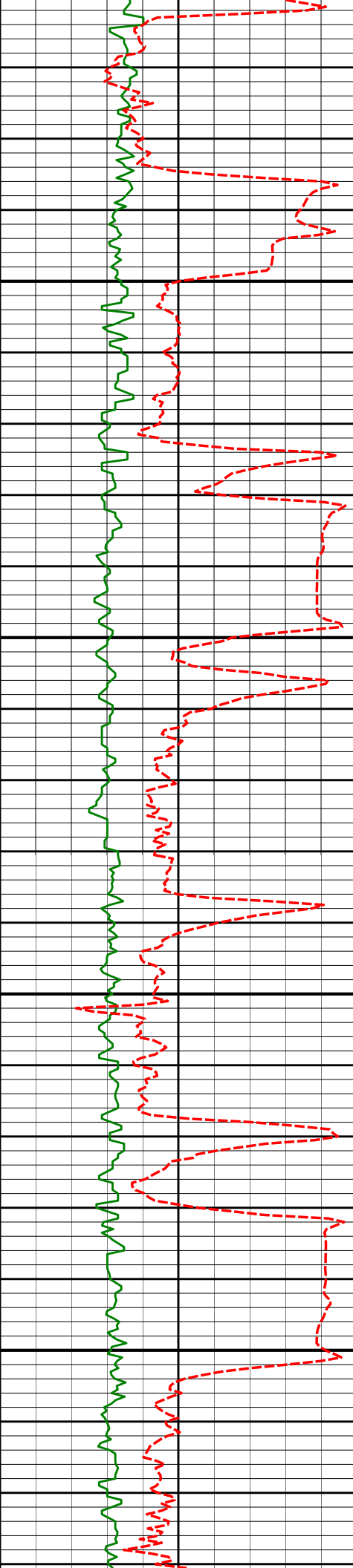
-37.11'

3000

3050

PGRC

ROPA



3078'

8.44°

49.99°

3076.02'

-45.19'

3100

3150

3173'

10.95°

50.43°

3169.66'

-55.37'

3200

3250

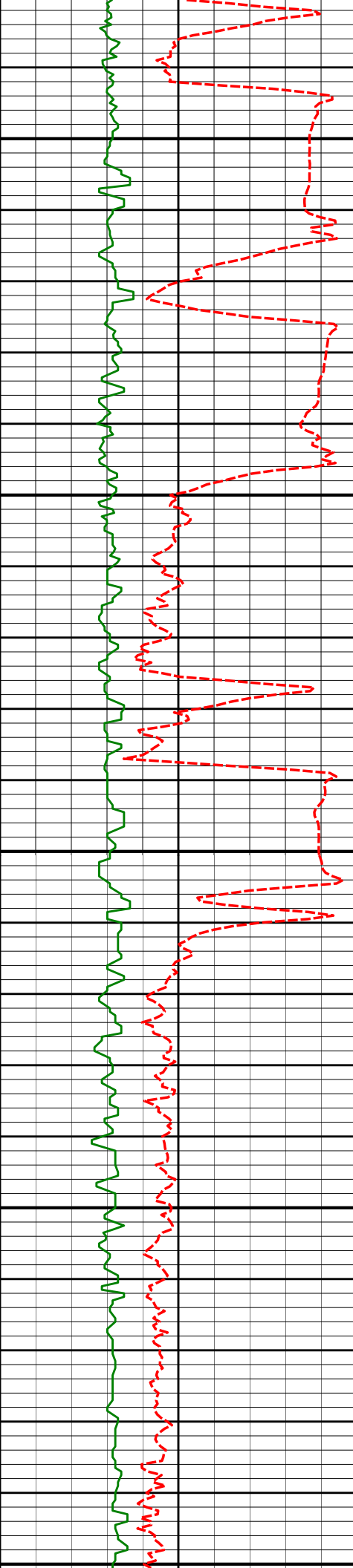
3268'

12.94°

43.37°

3262.60'

-68.80'



3300

3350

3400

3450

3500

3363'

16.22°

28.77°

3354.56'

-88.12'

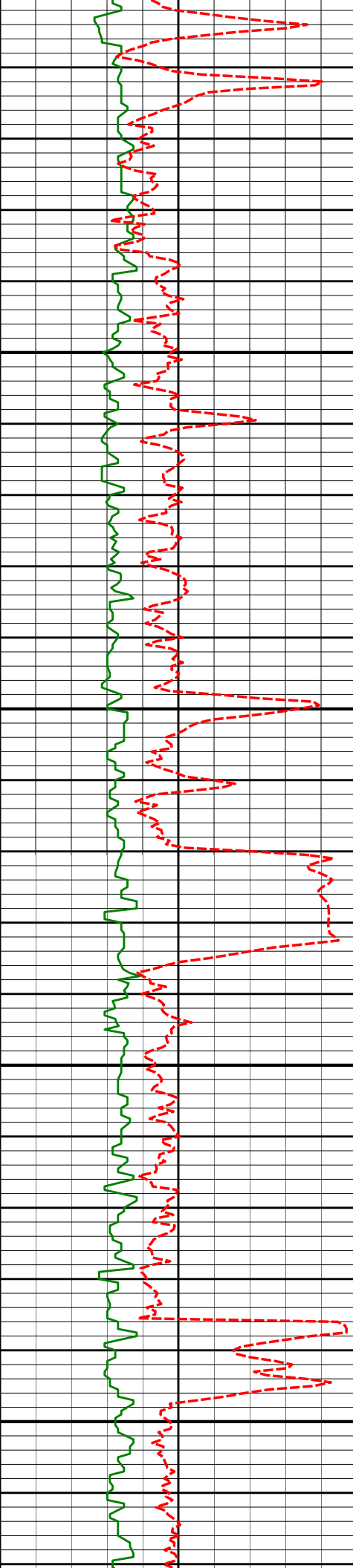
3458'

15.37°

17.71°

3446.00'

-111.71'



3550

3553'

13.69°

14.56°

3537.96'

-134.56'

3600

3650

3649'

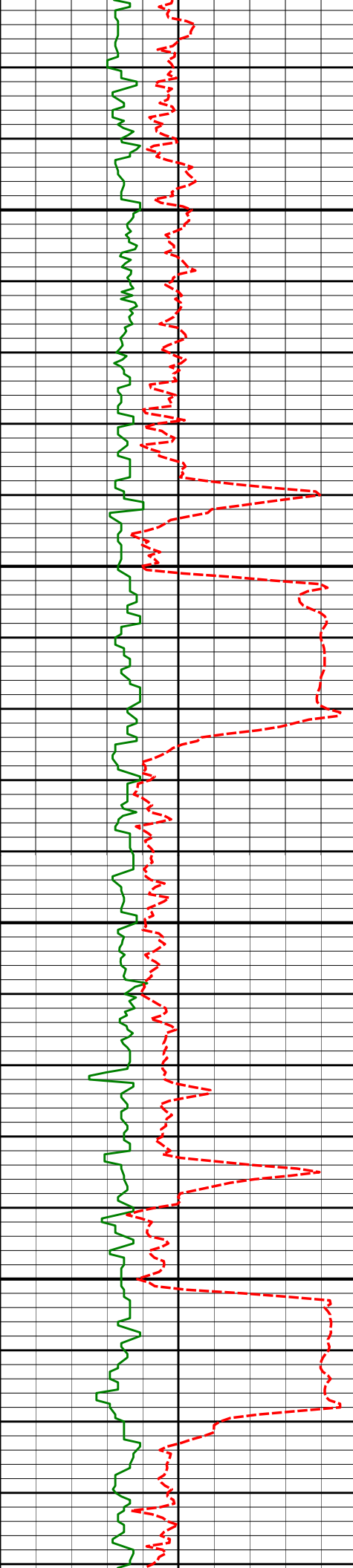
14.63°

9.96°

3631.04'

-157.48'

3700



3750

3800

3850

3900

3744'

13.11°

5.69°

3723.27'

-180.01'

3839'

12.89°

13.61°

3815.84'

-201.01'

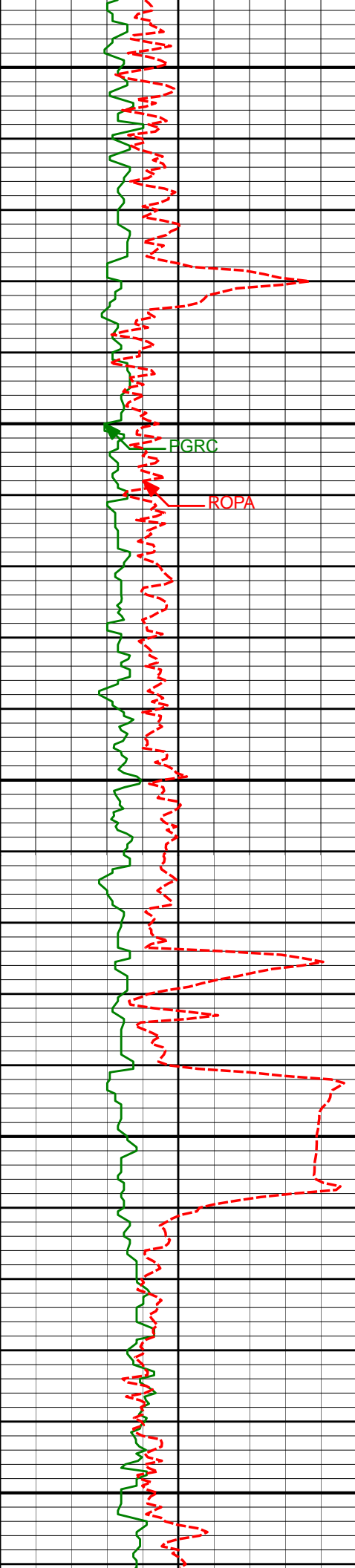
3934'

12.44°

18.72°

3908.53'

-220.98'



3950

4000

4050

4100

4150

FGRC

ROPA

4027'

10.83°

13.93°

3999.62'

-238.93'

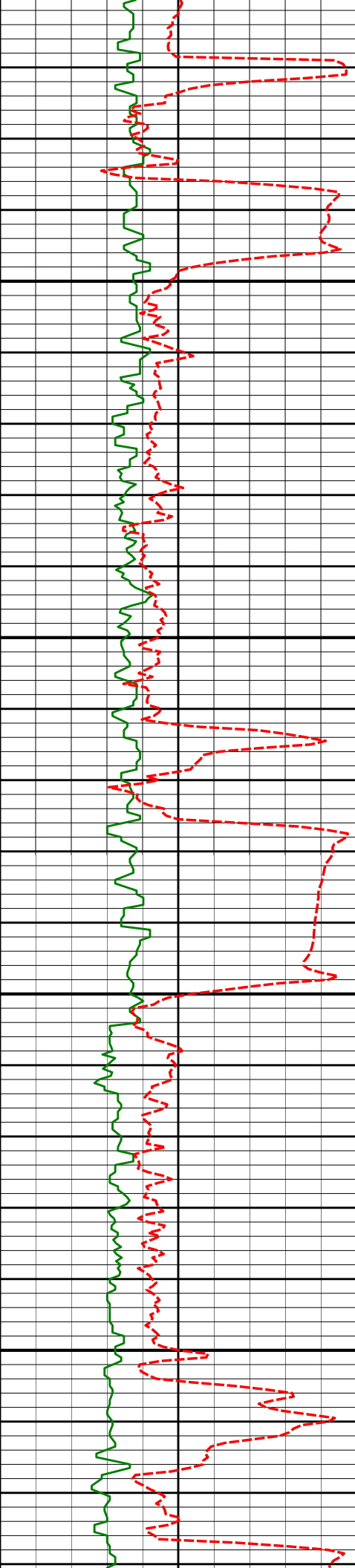
4122'

10.30°

23.49°

4093.02'

-255.36'



4200

4217'

9.74°

26.83°

4186.57'

-270.30'

4250

4300

4313'

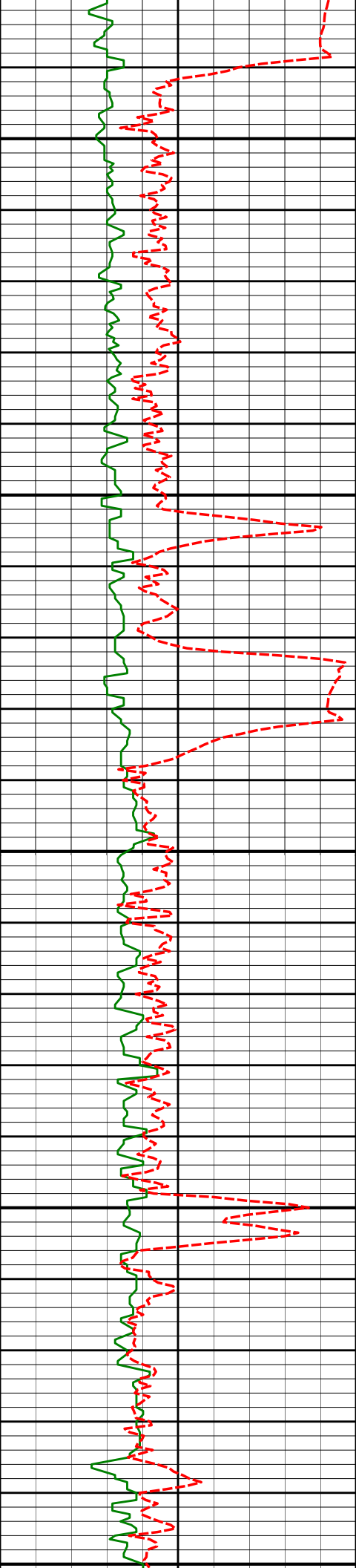
12.38°

27.37°

4280.78'

-286.65'

4350



4400

4408'

13.94°

24.75°

4373.28'

-306.05'

4450

4500

4503'

14.05°

16.50°

4465.47'

-327.47'

4550

4600

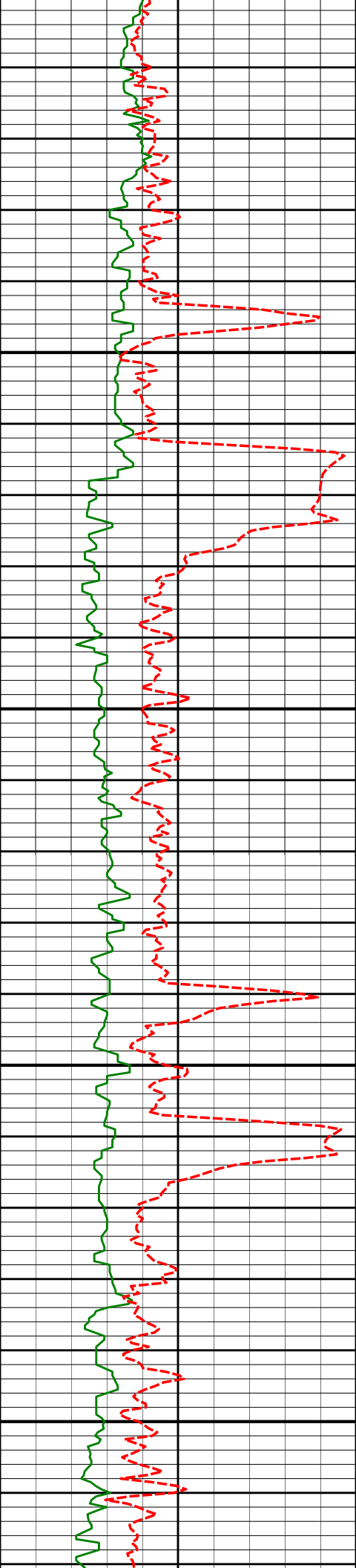
4598'

12.45°

14.12°

4557.94'

-348.44'



4650

4700

4750

4800

4693'

13.20°

16.88°

4650.57'

-368.73'

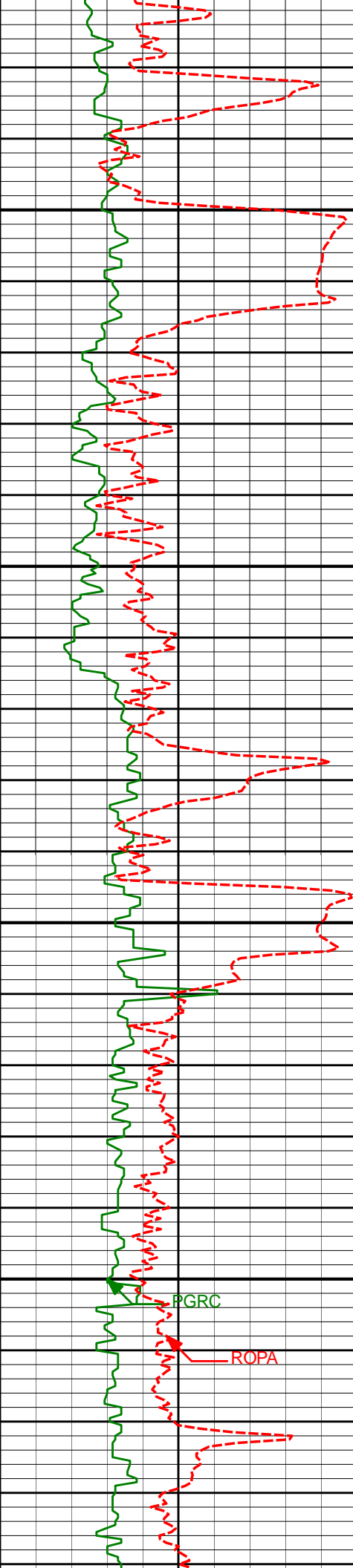
4788'

12.74°

17.13°

4743.15'

-389.09'



4850

4883'

13.82°

22.61°

4835.61'

-409.55'

4900

4950

4979'

14.28°

22.02°

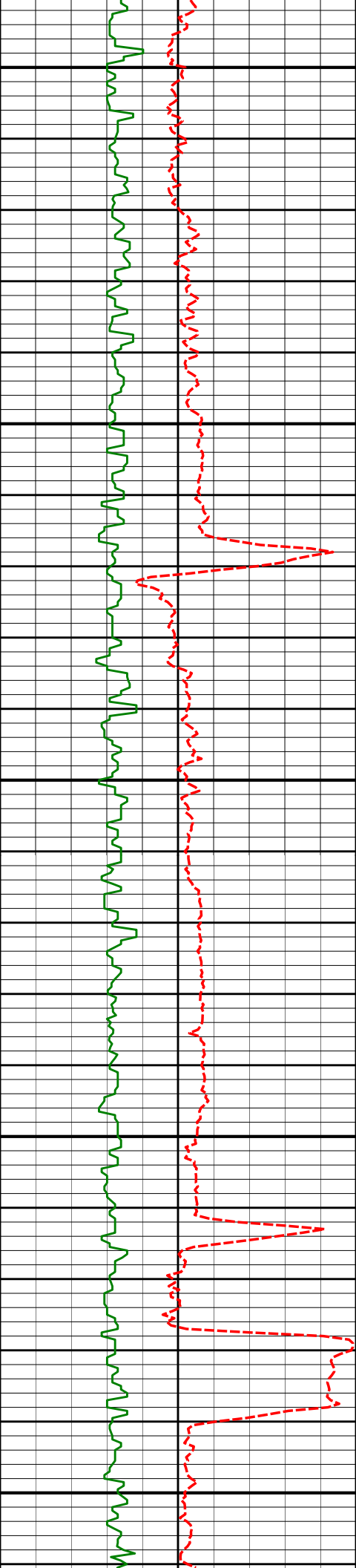
4928.74'

-431.08'

5000

PGRC

ROPA



5050

5074'

14.15°

20.40°

5020.83'

-452.79'

5100

5150

5169'

12.86°

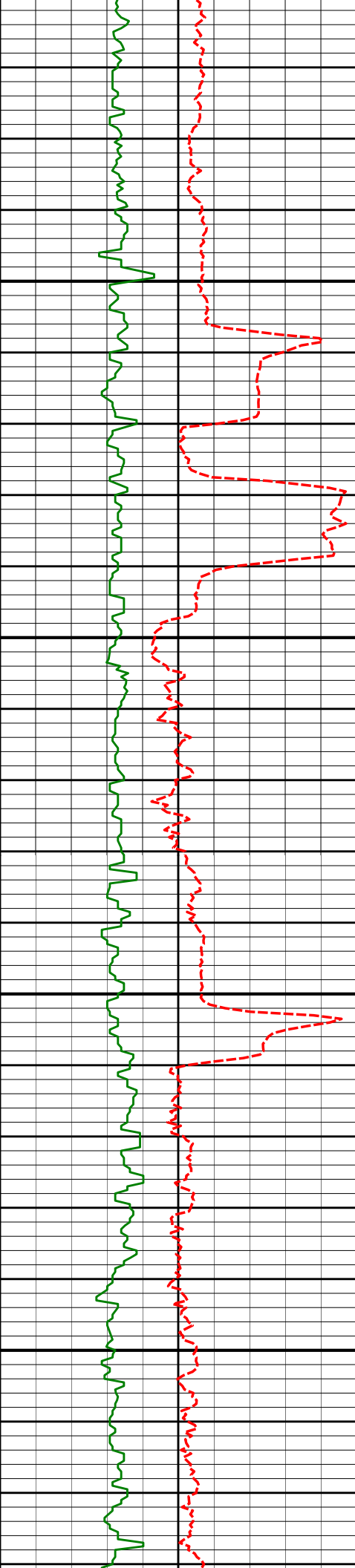
18.37°

5113.20'

-473.68'

5200

5250



5300

5350

5400

5450

5264'

13.47°

19.32°

5205.70'

-494.13'

5359'

14.37°

19.32°

5297.91'

-515.66'

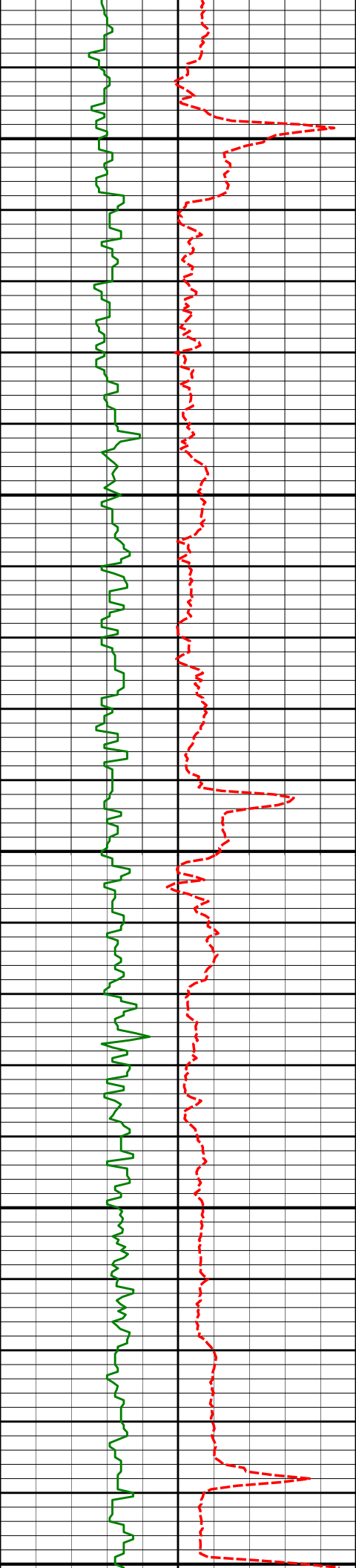
5454'

13.39°

18.04°

5390.14'

-537.22'



5500

5550

5600

5650

5700

5549'

12.91°

16.95°

5482.65'

-557.81'

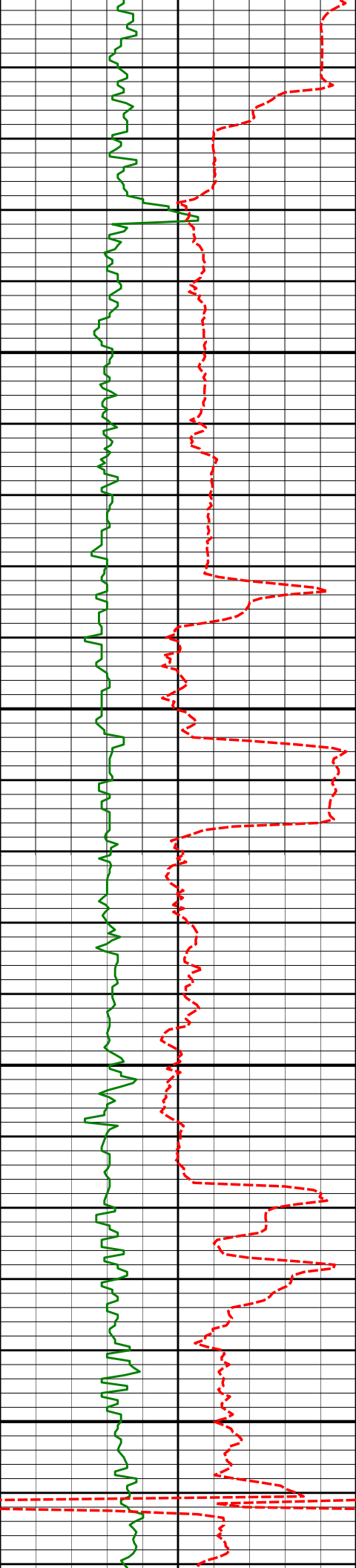
5644'

11.93°

16.29°

5575.42'

-577.36'



5700
5750
5800
5850
5900

5740'

12.79°

22.38°

5669.20'

-596.69'

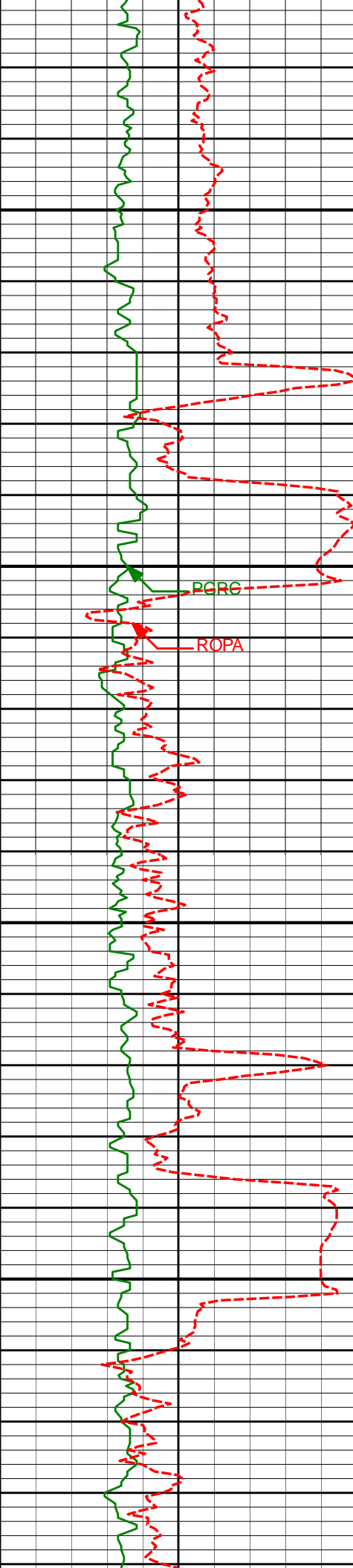
5835'

13.58°

22.22°

5761.69'

-616.70'



5950

6000

6050

6100

5930'

12.20°

21.06°

5854.30'

-636.37'

6024'

11.29°

23.67°

5946.33'

-654.03'

6119'

11.37°

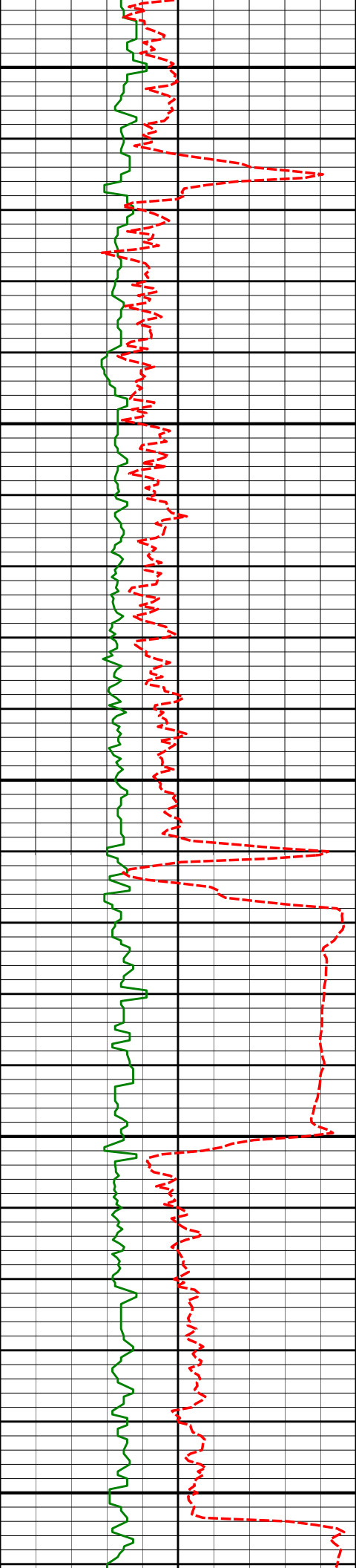
24.79°

6039.48'

-671.02'

PCRC

ROPA



6150

6200

6250

6300

6350

6214'

8.15°

26.66°

6133.09'

-685.52'

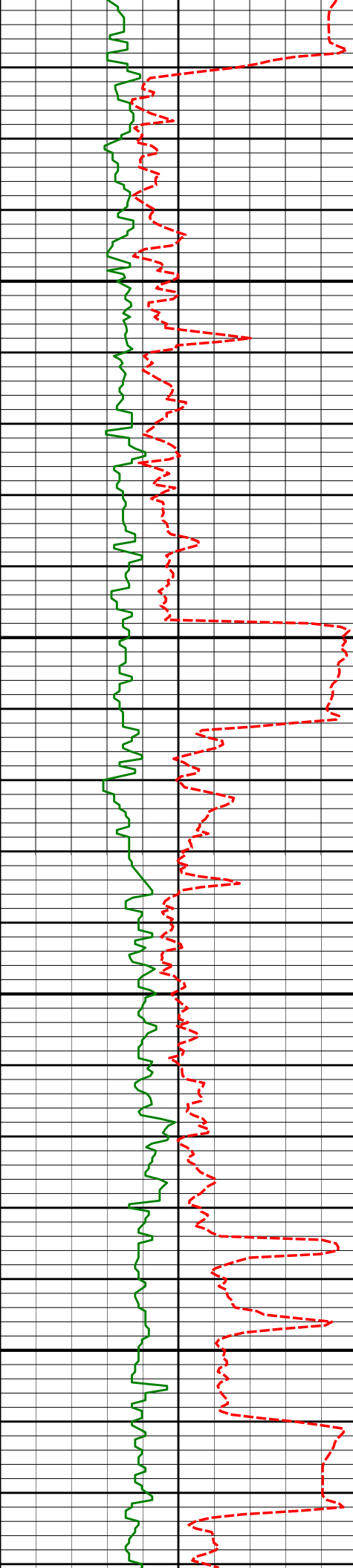
6309'

11.87°

25.45°

6226.63'

-700.34'



6400

6404'

10.90°

11.46°

6319.78'

-717.94'

6450

6500

6499'

7.62°

5.96°

6413.53'

-733.01'

6550



6600

6650

6700

6750

6800

6594'

4.98°

2.78°

6507.95'

-743.39'

6690'

0.99°

8.82°

6603.80'

-748.37'

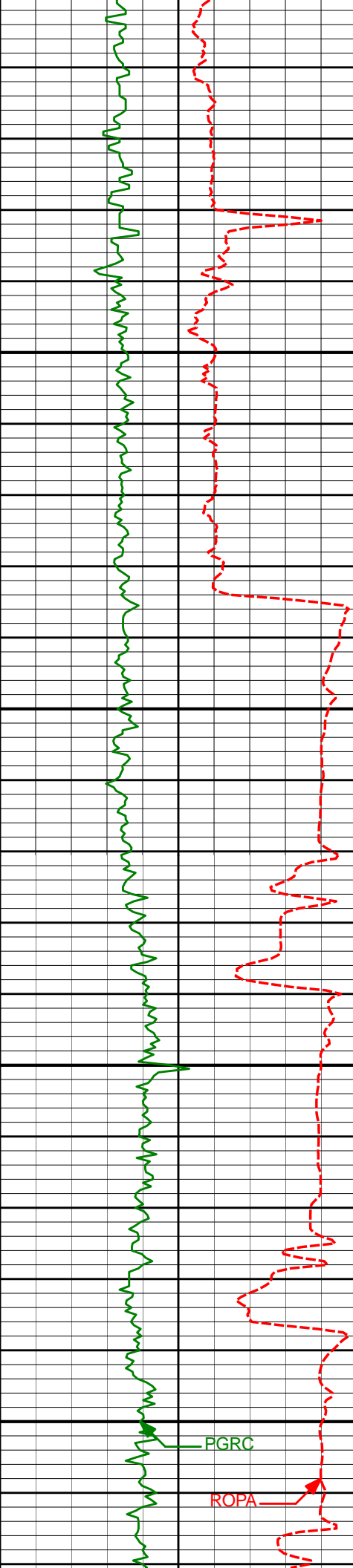
6785'

0.22°

111.39°

6698.79'

-749.11'



6850

6900

6950

7000

PGRC

ROPA

6880'

0.40°

195.26°

6793.79'

-748.73'

6928'

5.80°

189.21°

6841.70'

-746.17'

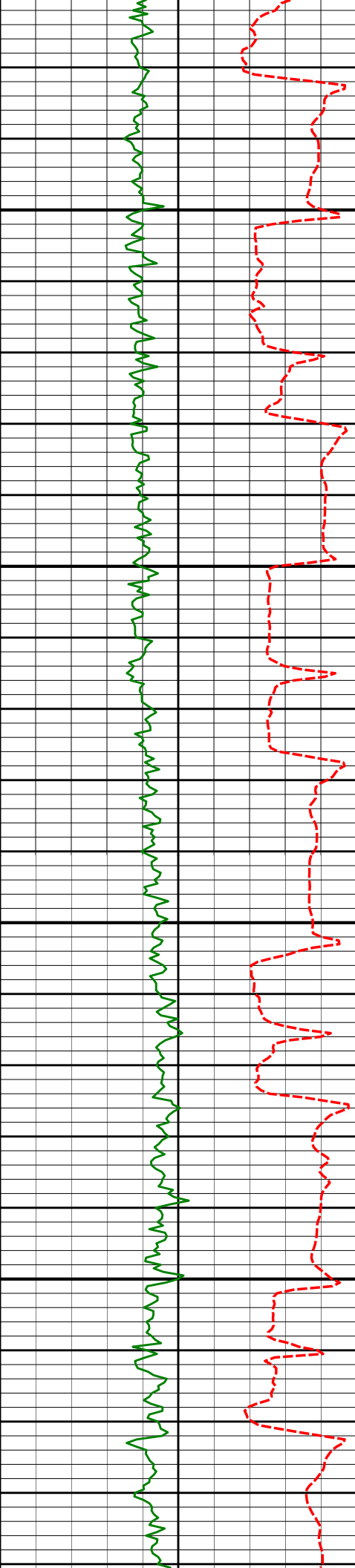
6975'

12.14°

188.16°

6888.10'

-738.93'



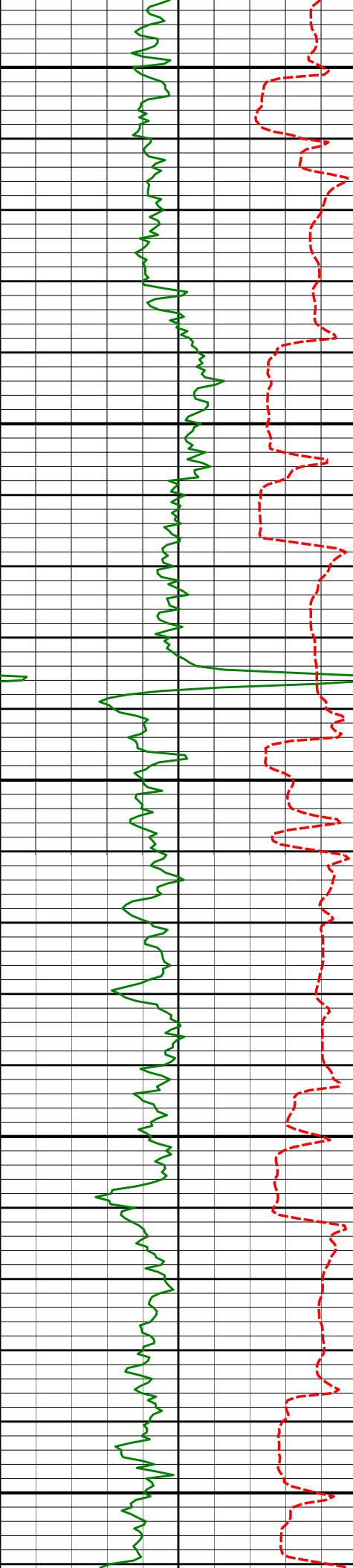
7050

7100

7150

7200

7023'	17.18°	187.18°	6934.53'	-726.90'
7070'	19.98°	186.27°	6979.07'	-712.03'
7118'	22.89°	183.94°	7023.75'	-694.57'
7165'	26.39°	177.96°	7066.47'	-675.01'
7213'	29.95°	174.08°	7108.78'	-652.41'



7250

7260'

34.96°

178.41°

7148.43'

-627.26'

7300

7308'

38.44°

181.74°

7186.92'

-598.59'

7350

7355'

43.27°

181.24°

7222.45'

-567.86'

7400

7403'

49.63°

179.77°

7255.51'

-533.10'

7450

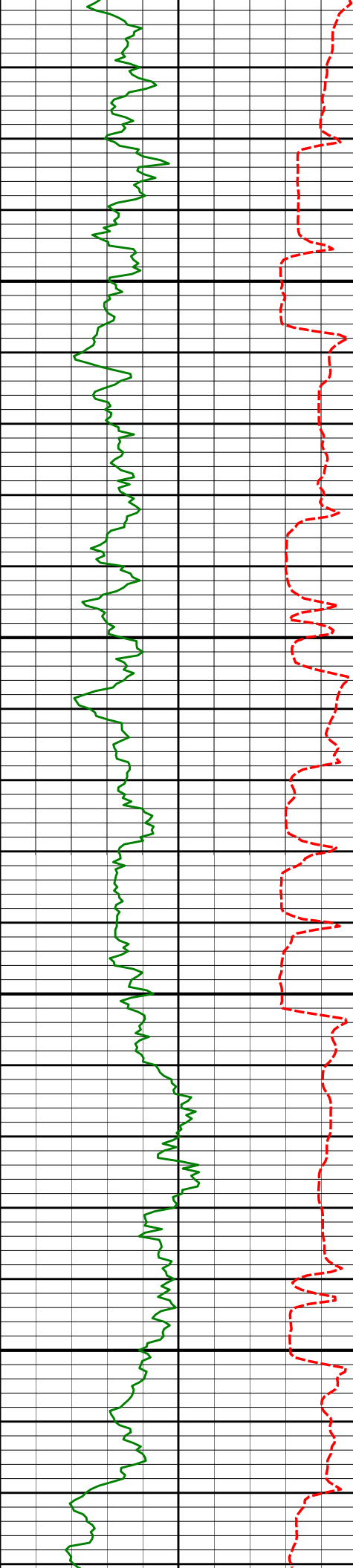
7450'

54.16°

179.67°

7284.51'

-496.12'



7500

7550

7600

7650

Run 400

7498'

58.65°

179.43°

7311.06'

-456.15'

7546'

63.92°

179.81°

7334.11'

-414.07'

7594'

66.58°

180.16°

7354.21'

-370.48'

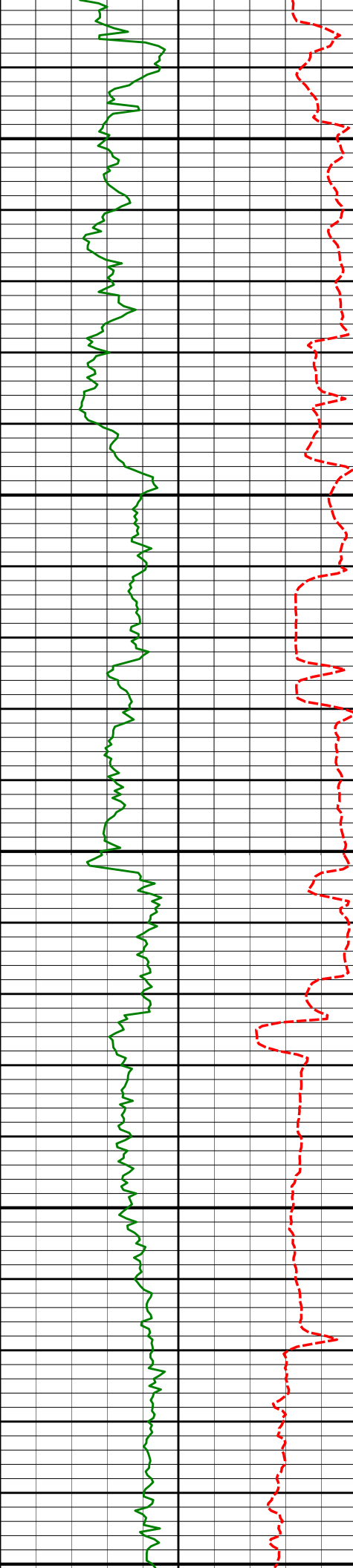
7641'

73.05°

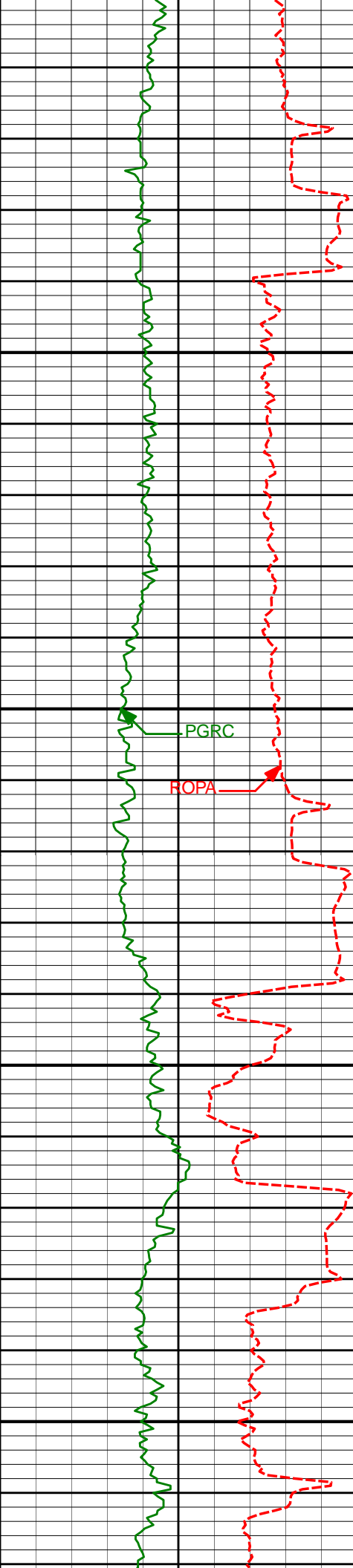
181.44°

7370.42'

-326.40'



	7689'	77.25°	181.55°	7382.71'	-280.03'
7700					
	7736'	82.80°	183.03°	7390.85'	-233.81'
7750					
	7776'	85.77°	183.55°	7394.84'	-194.09'
	Gamma sensor in casing from 7773' to 7813' MD				
7800					
	7" Casing Shoe @ 7813' MD / 7396.68' TVD				
Run 200	7823'	90.15°	184.59°	7396.51'	-147.26'
7850					
	7873'	89.82°	184.17°	7396.52'	-97.42'
7900					



7950

7968'

91.45°

183.21°

7395.47'

-2.65'

8000

PGRC

ROPA

8050

8063'

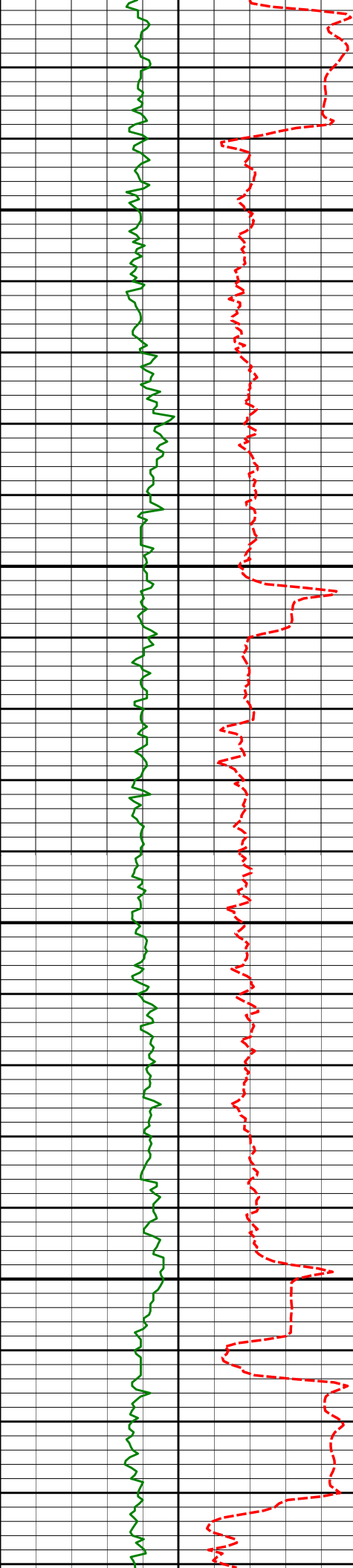
91.79°

180.65°

7392.78'

92.23'

8100



8150

8158'

89.78°

177.76°

7391.48'

187.20'

8200

8250

8253'

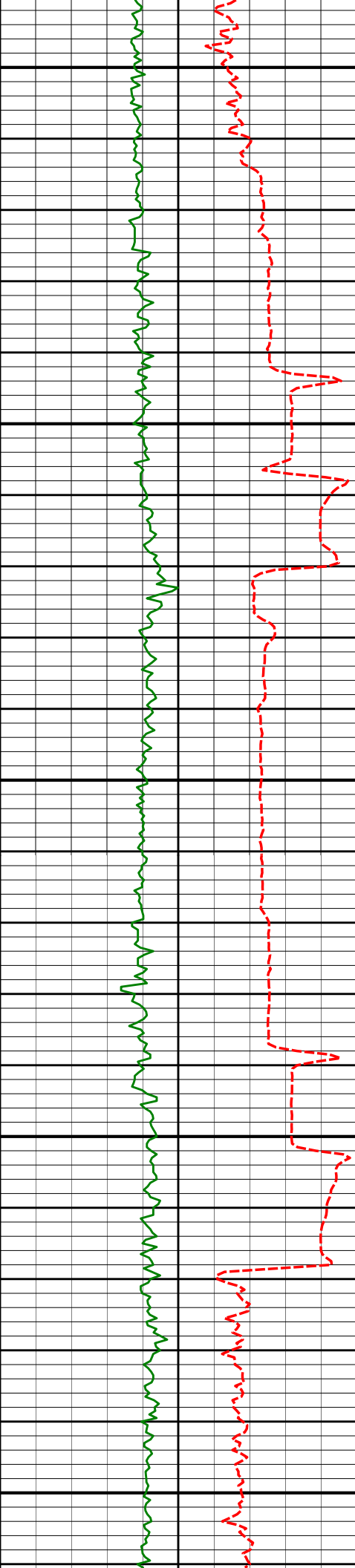
91.23°

178.17°

7390.64'

282.15'

8300



8350

8348'

90.37°

176.63°

7389.32'

377.06'

8400

8450

8443'

89.54°

176.90°

7389.39'

471.92'

8500

8550

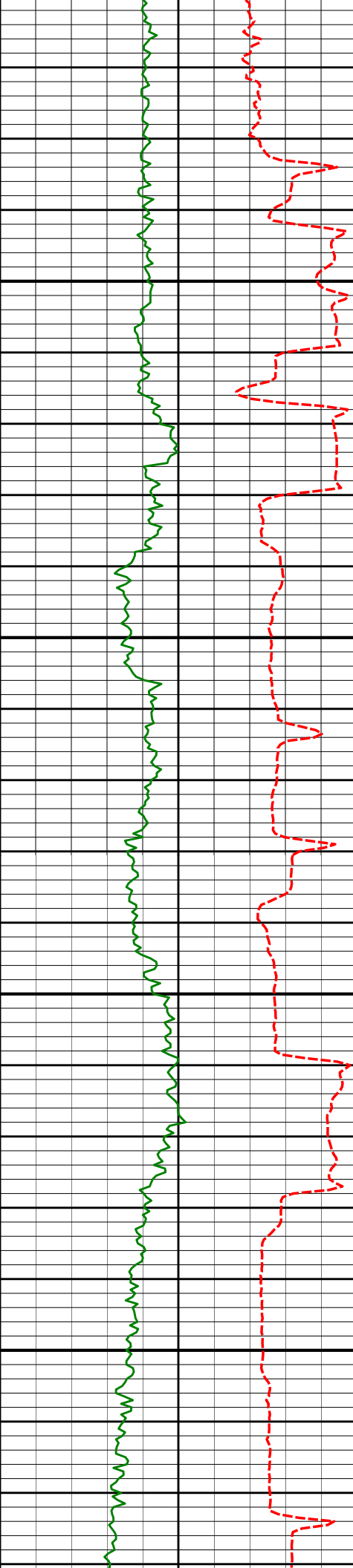
8538'

91.76°

177.13°

7388.31'

566.80'



8600

8634'

87.38°

176.56°

7389.04'

662.65'

8650

8700

8729'

88.98°

177.21°

7392.05'

757.48'

8750



8800

8824'

89.88°

177.05°

7393.00'

852.37'

8850

8900

8919'

89.54°

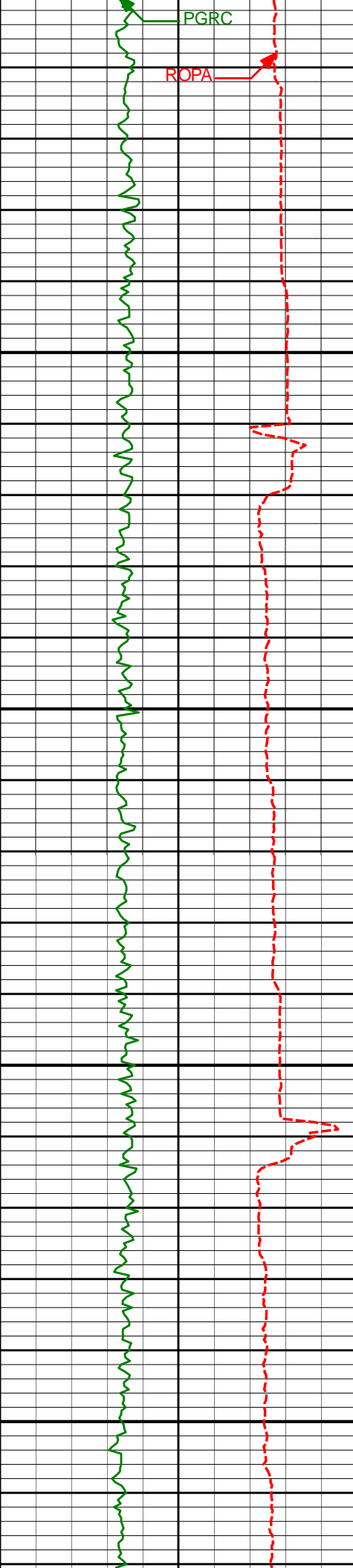
178.33°

7393.48'

947.30'

8950

9000



9000

9050

9100

9150

9200

9014'

89.69°

178.90°

7394.12'

1042.28'

9109'

89.60°

179.84°

7394.71'

1137.27'

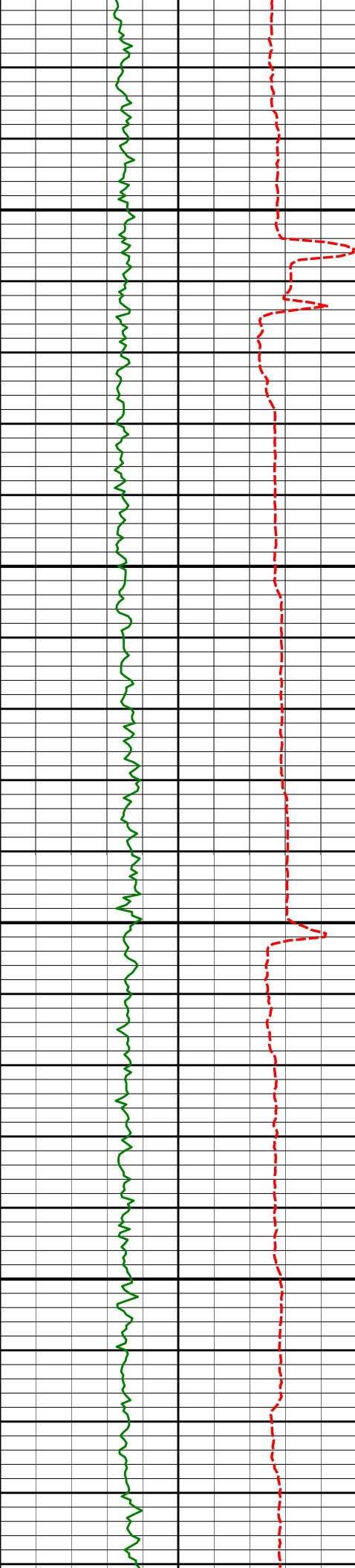
9205'

89.72°

180.12°

7395.27'

1233.27'



9250

9300

9350

9400

9300'

90.15°

180.91°

7395.38'

1328.26'

9395'

89.72°

181.95°

7395.49'

1423.22'



9450

9490'

89.97°

180.20°

7395.75'

1518.19'

9500

9550

9585'

90.22°

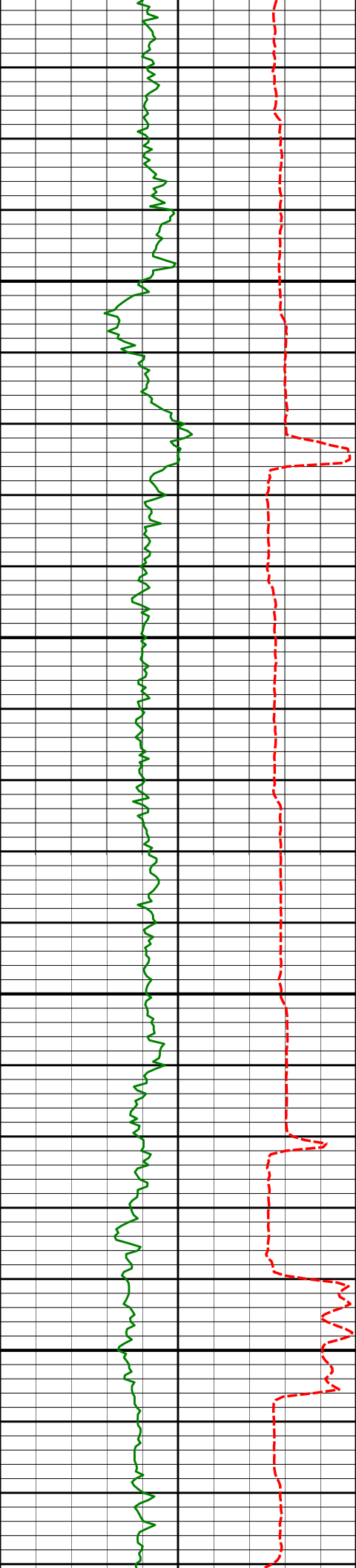
179.40°

7395.59'

1613.19'

9600

9650



9700

9750

9800

9850

9681'

90.22°

179.31°

7395.22'

1709.19'

9776'

91.51°

179.33°

7393.79'

1804.17'

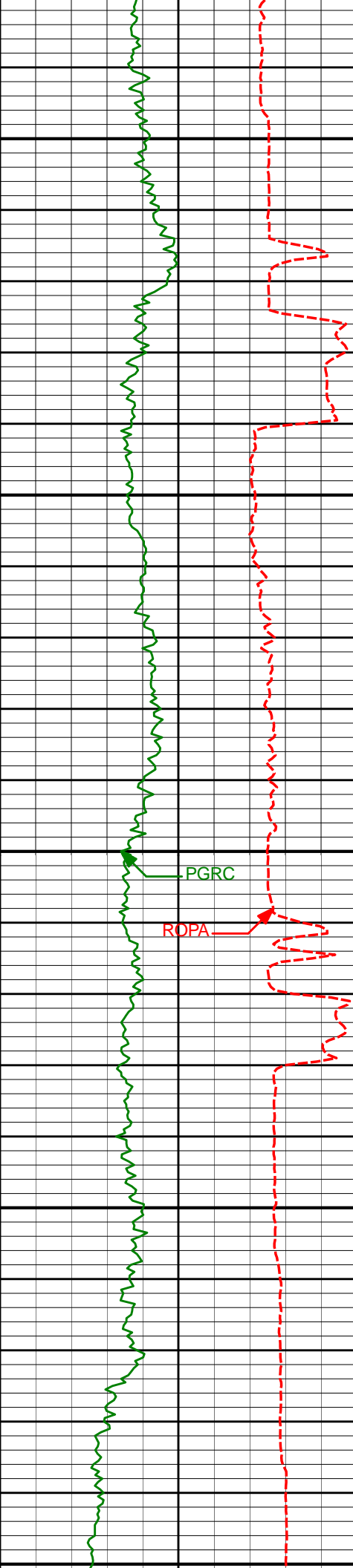
9871'

90.77°

178.97°

7391.90'

1899.15'



9900

9950

10000

10050

10100

PGRC

ROPA

9966'

90.09°

179.49°

7391.18'

1994.14'

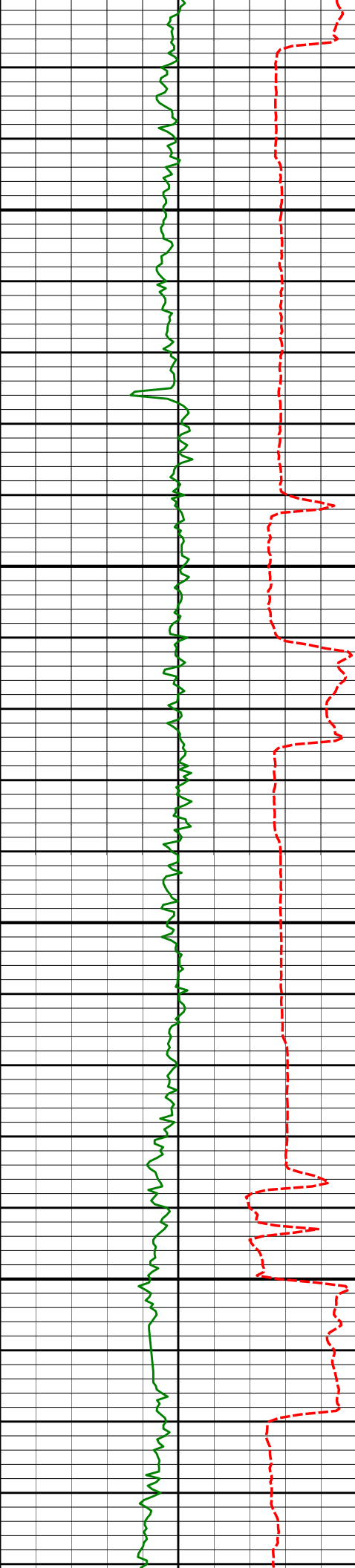
10061'

88.83°

179.33°

7392.08'

2089.13'



10350

10400

10450

10500

10347'

90.18°

178.08°

7391.61'

2375.06'

10442'

87.75°

177.74°

7393.33'

2469.99'

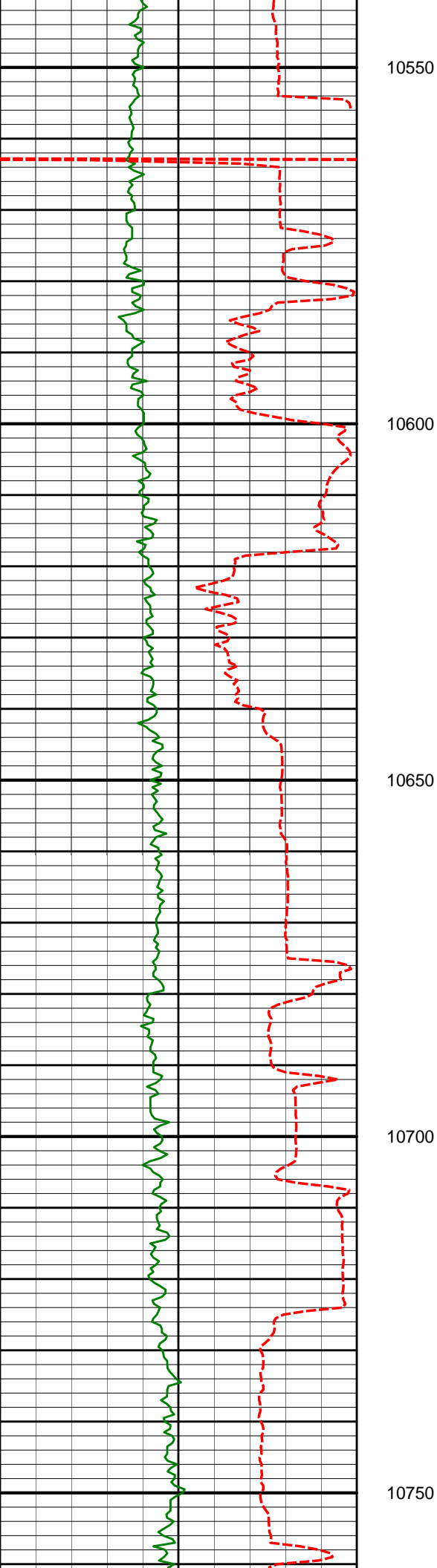
10537'

87.66°

179.33°

7397.14'

2564.89'



10550

10600

10650

10700

10750

10632'

90.71°

180.48°

7398.49'

2659.86'

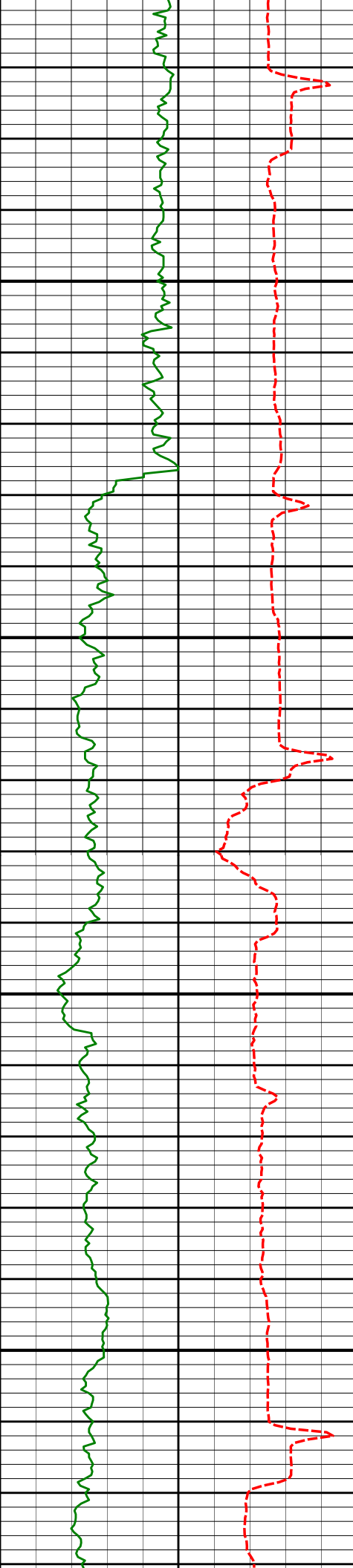
10727'

89.85°

181.22°

7398.02'

2754.84'



10800

10822'

89.32°

180.89°

7398.71'

2849.82'

10850

10900

10918'

89.04°

180.19°

7400.08'

2945.80'

10950



11000

11050

11100

11150

11200

11013'

89.69°

181.80°

7401.14'

3040.77'

11108'

91.08°

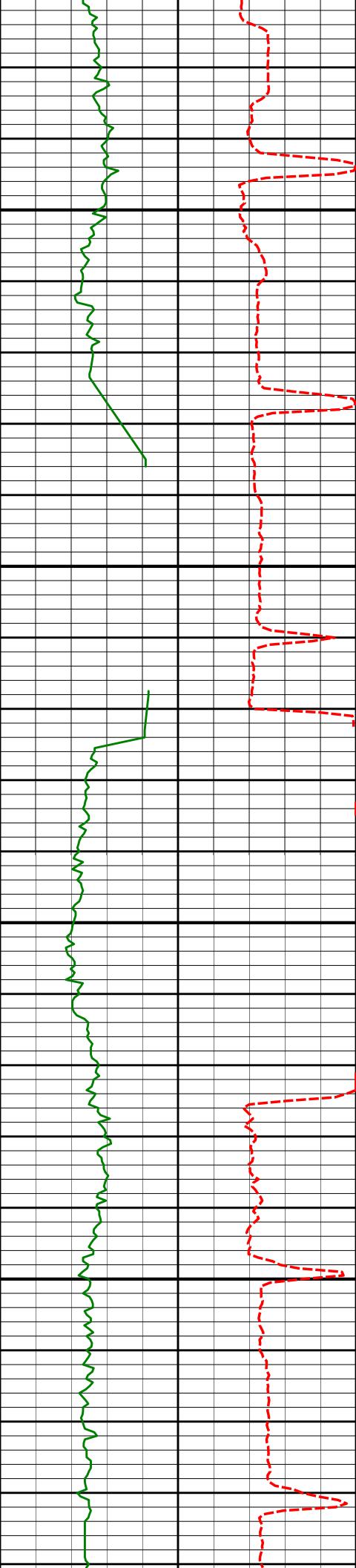
182.68°

7400.50'

3135.67'



11200	11203'	90.83°	182.47°	7398.92'	3230.55'
11250					
11300	11298'	90.40°	181.66°	7397.90'	3325.47'
11350					
11400	11393'	90.22°	181.48°	7397.38'	3420.42'



11450

11488'

90.15°

180.89°

7397.07'

3515.39'

11500

11550

11583'

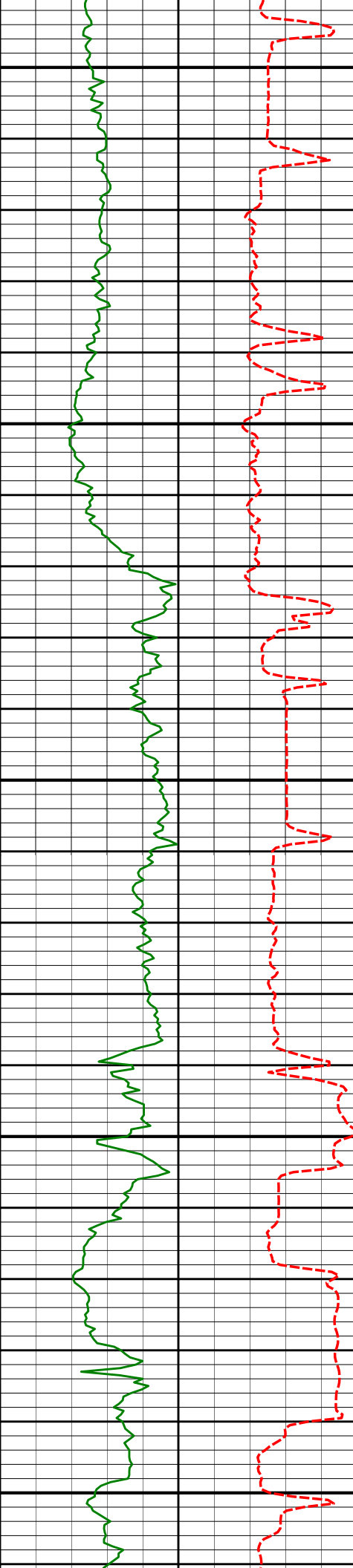
89.82°

180.78°

7397.10'

3610.37'

11600



11650

11679'

91.51°

180.83°

7395.99'

3706.35'

11700

11750

11774'

92.74°

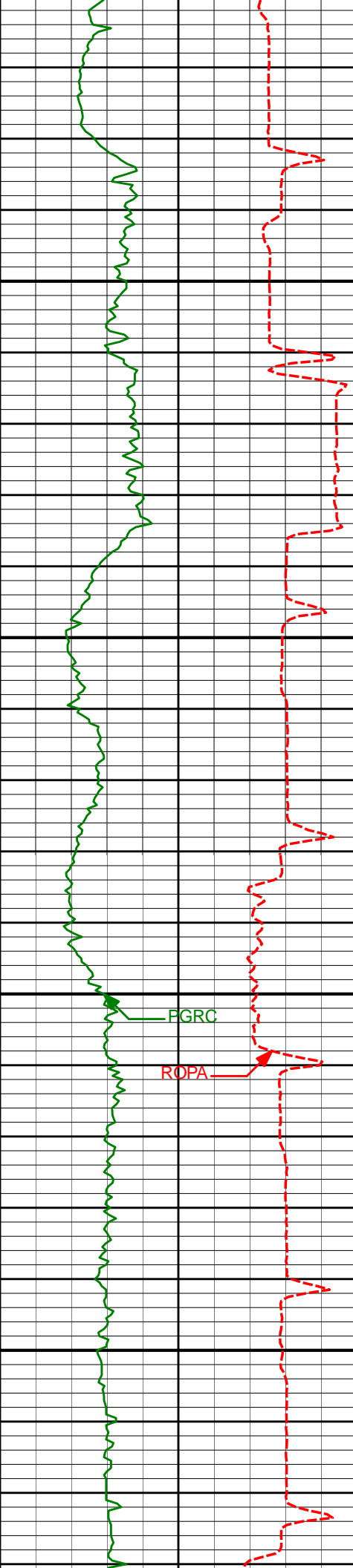
180.03°

7392.46'

3801.27'

11800

11850



11900

11950

12000

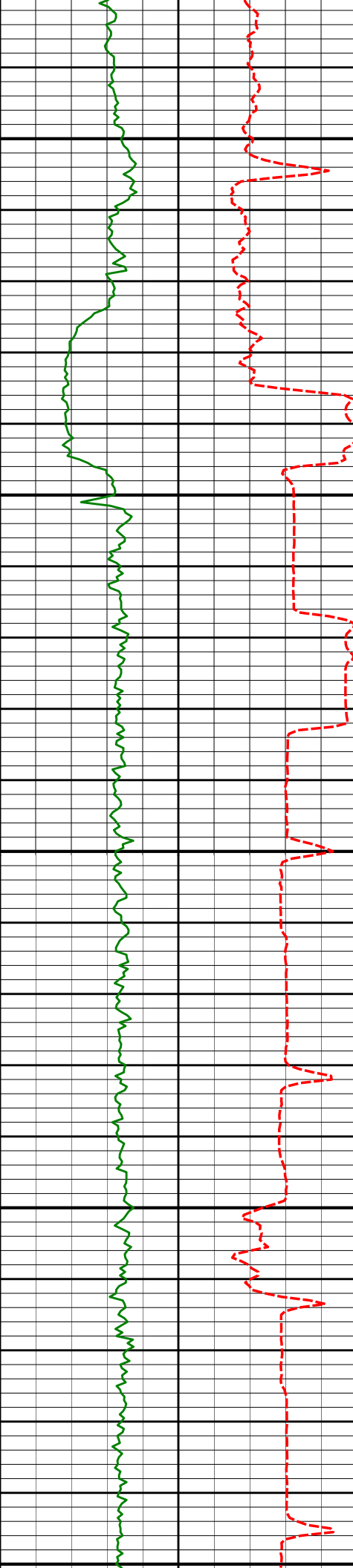
12050

11869' 91.23° 180.58° 7389.17' 3896.21'

11964' 89.01° 178.69° 7388.97' 3991.20'

PGRC

ROPA



12100

12150

12200

12250

12300

12091'

90.15°

177.88°

7389.90'

4118.15'

12154'

90.80°

178.88°

7389.38'

4181.13'

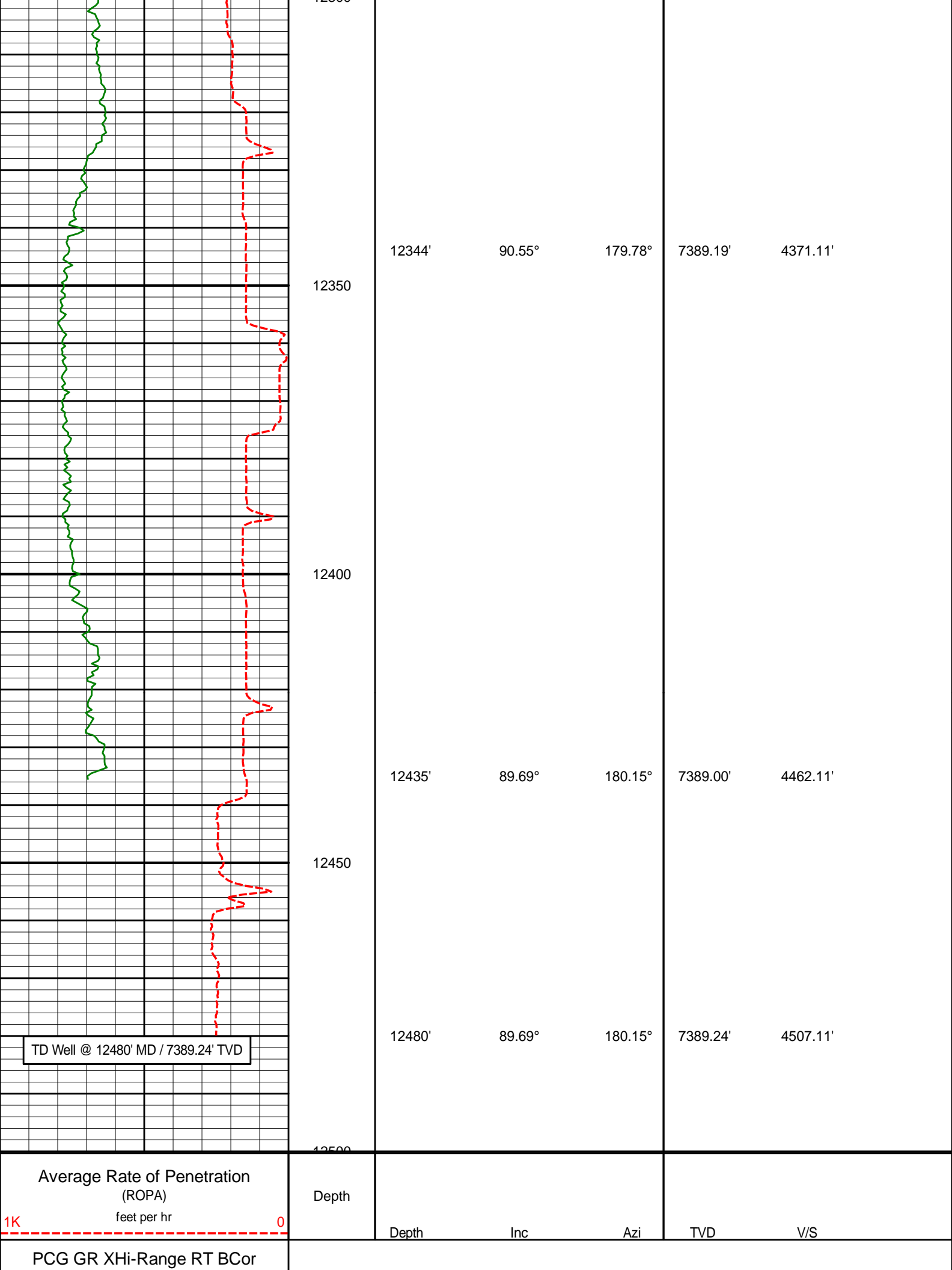
12249'

89.44°

179.21°

7389.18'

4276.12'



TD Well @ 12480' MD / 7389.24' TVD

Average Rate of Penetration
(ROPA)

feet per hr

Depth

Depth

Inc

Azi

TVD

V/S

PCG GR XHi-Range RT BCor

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.
Highway 160 37N-2HZ
Watenberg
Weld Colorado
USA
CA-XX-0900754407

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1138.00	0.36	283.76	1137.98	4.72 N	0.80 W	-4.72	TIE-IN
1477.00	0.39	64.84	1476.98	5.46 N	0.79 W	-5.47	0.21
1572.00	0.42	66.74	1571.97	5.74 N	0.18 W	-5.74	0.03
1666.00	0.53	33.59	1665.97	6.24 N	0.38 E	-6.24	0.31
1760.00	0.49	18.33	1759.97	6.98 N	0.75 E	-6.98	0.15
1855.00	0.52	22.64	1854.96	7.76 N	1.04 E	-7.76	0.05
1949.00	0.40	20.72	1948.96	8.46 N	1.32 E	-8.46	0.13
2043.00	0.52	4.08	2042.96	9.20 N	1.47 E	-9.19	0.19
2138.00	0.43	34.14	2137.96	9.92 N	1.70 E	-9.92	0.27
2232.00	0.63	9.29	2231.95	10.72 N	1.98 E	-10.72	0.32
2358.00	0.74	346.30	2357.94	12.20 N	1.90 E	-12.19	0.23
2420.00	0.52	348.03	2419.94	12.86 N	1.74 E	-12.86	0.36
2514.00	0.39	8.87	2513.94	13.60 N	1.71 E	-13.59	0.22
2608.00	1.73	24.15	2607.92	15.21 N	2.34 E	-15.20	1.44
2702.00	2.31	30.28	2701.86	18.14 N	3.87 E	-18.12	0.66
2796.00	4.35	33.15	2795.70	22.76 N	6.78 E	-22.73	2.18
2890.00	5.43	29.36	2889.35	29.62 N	10.91 E	-29.58	1.20
2984.00	6.62	47.24	2982.84	37.18 N	17.07 E	-37.11	2.35
3078.00	8.44	49.99	3076.02	45.29 N	26.33 E	-45.19	1.97
3173.00	10.95	50.43	3169.66	55.52 N	38.63 E	-55.37	2.64
3268.00	12.94	43.37	3262.60	69.00 N	52.89 E	-68.80	2.60
3363.00	16.22	28.77	3354.56	88.38 N	66.59 E	-88.12	5.16
3458.00	15.37	17.71	3446.00	112.01 N	76.80 E	-111.71	3.29
3553.00	13.69	14.56	3537.96	134.88 N	83.46 E	-134.56	1.95
3649.00	14.63	9.96	3631.04	157.82 N	88.41 E	-157.48	1.53
3744.00	13.11	5.69	3723.27	180.36 N	91.56 E	-180.01	1.93
3839.00	12.89	13.61	3815.84	201.38 N	95.12 E	-201.01	1.89
3934.00	12.44	18.72	3908.53	221.37 N	100.90 E	-220.98	1.27
4027.00	10.83	13.93	3999.62	239.34 N	106.22 E	-238.93	2.02
4122.00	10.30	23.49	4093.02	255.79 N	111.75 E	-255.36	1.93
4217.00	9.74	26.83	4186.57	270.75 N	118.76 E	-270.30	0.85
4313.00	12.38	27.37	4280.78	287.14 N	127.16 E	-286.65	2.75
4408.00	13.94	24.75	4373.28	306.58 N	136.63 E	-306.05	1.76
4503.00	14.05	16.50	4465.47	328.03 N	144.70 E	-327.47	2.10
4598.00	12.45	14.12	4557.94	349.02 N	150.47 E	-348.44	1.78
4693.00	13.20	16.88	4650.57	369.33 N	156.12 E	-368.73	1.02
4788.00	12.74	17.13	4743.15	389.72 N	162.36 E	-389.09	0.49
4883.00	13.82	22.61	4835.61	410.21 N	169.80 E	-409.55	1.75
4979.00	14.28	22.02	4928.74	431.77 N	178.65 E	-431.08	0.50
5074.00	14.15	20.40	5020.83	453.51 N	187.09 E	-452.79	0.44
5169.00	12.86	18.37	5113.20	474.43 N	194.47 E	-473.68	1.45
5264.00	13.47	19.32	5205.70	494.90 N	201.47 E	-494.13	0.68
5359.00	14.37	19.32	5297.91	516.47 N	209.03 E	-515.66	0.95
5454.00	13.39	18.04	5390.14	538.06 N	216.33 E	-537.22	1.08
5549.00	12.91	16.95	5482.65	558.67 N	222.83 E	-557.81	0.57
5644.00	11.93	16.29	5575.42	578.24 N	228.68 E	-577.36	1.04
5740.00	12.79	22.38	5669.20	597.59 N	235.51 E	-596.69	1.63
5835.00	13.58	22.22	5761.69	617.64 N	243.73 E	-616.70	0.83
5930.00	12.20	21.06	5854.30	637.34 N	251.56 E	-636.37	1.48
6024.00	11.29	23.67	5946.33	655.03 N	258.82 E	-654.03	1.12
6119.00	11.37	24.79	6039.48	672.05 N	266.48 E	-671.02	0.25
6214.00	8.15	26.66	6133.09	686.57 N	273.43 E	-685.52	3.41
6309.00	11.87	25.45	6226.63	701.42 N	280.65 E	-700.34	3.92

6404.00	10.90	11.46	6319.78	719.05 N	286.64 E	-717.94	3.07
6499.00	7.62	5.96	6413.53	734.12 N	289.08 E	-733.01	3.57
6594.00	4.98	2.78	6507.95	744.51 N	289.93 E	-743.39	2.80
6690.00	0.99	8.82	6603.80	749.49 N	290.26 E	-748.37	4.16
6785.00	0.22	111.39	6698.79	750.23 N	290.56 E	-749.11	1.12
6880.00	0.40	195.26	6793.79	749.85 N	290.64 E	-748.73	0.46
6928.00	5.80	189.21	6841.70	747.29 N	290.21 E	-746.17	11.25
6975.00	12.14	188.16	6888.10	740.05 N	289.12 E	-738.93	13.49
7023.00	17.18	187.18	6934.53	728.01 N	287.52 E	-726.90	10.51
7070.00	19.98	186.27	6979.07	713.14 N	285.78 E	-712.03	5.99
7118.00	22.89	183.94	7023.75	695.67 N	284.24 E	-694.57	6.32
7165.00	26.39	177.96	7066.47	676.10 N	283.98 E	-675.01	9.13
7213.00	29.95	174.08	7108.78	653.51 N	285.60 E	-652.41	8.34
7260.00	34.96	178.41	7148.43	628.36 N	287.18 E	-627.26	11.74
7308.00	38.44	181.74	7186.92	599.69 N	287.11 E	-598.59	8.35
7355.00	43.27	181.24	7222.45	568.97 N	286.32 E	-567.86	10.30
7403.00	49.63	179.77	7255.51	534.20 N	286.04 E	-533.10	13.43
7450.00	54.16	179.67	7284.51	497.23 N	286.22 E	-496.12	9.64
7498.00	58.65	179.43	7311.06	457.25 N	286.53 E	-456.15	9.36
7546.00	63.92	179.81	7334.11	415.17 N	286.81 E	-414.07	11.00
7594.00	66.58	180.16	7354.21	371.59 N	286.82 E	-370.48	5.58
7641.00	73.05	181.44	7370.42	327.50 N	286.19 E	-326.40	14.00
7689.00	77.25	181.55	7382.71	281.13 N	284.98 E	-280.03	8.75
7736.00	82.80	183.03	7390.85	234.90 N	283.13 E	-233.81	12.21
7776.00	85.77	183.55	7394.84	195.17 N	280.84 E	-194.09	7.54
7823.00	90.15	184.59	7396.51	148.33 N	277.51 E	-147.26	9.58
7873.00	89.82	184.17	7396.52	98.47 N	273.69 E	-97.42	1.07
7968.00	91.45	183.21	7395.47	3.68 N	267.58 E	-2.65	1.99
8063.00	91.79	180.65	7392.78	91.22 S	264.38 E	92.23	2.72
8158.00	89.78	177.76	7391.48	186.19 S	265.70 E	187.20	3.71
8253.00	91.23	178.17	7390.64	281.12 S	269.07 E	282.15	1.59
8348.00	90.37	176.63	7389.32	376.01 S	273.38 E	377.06	1.86
8443.00	89.54	176.90	7389.39	470.86 S	278.74 E	471.92	0.92
8538.00	91.76	177.13	7388.31	565.72 S	283.69 E	566.80	2.35
8634.00	87.38	176.56	7389.04	661.54 S	288.97 E	662.65	4.60
8729.00	88.98	177.21	7392.05	756.35 S	294.13 E	757.48	1.82
8824.00	89.88	177.05	7393.00	851.23 S	298.89 E	852.37	0.96
8919.00	89.54	178.33	7393.48	946.15 S	302.72 E	947.30	1.39
9014.00	89.69	178.90	7394.12	1041.12 S	305.01 E	1042.28	0.62
9109.00	89.60	179.84	7394.71	1136.11 S	306.06 E	1137.27	0.99
9205.00	89.72	180.12	7395.27	1232.11 S	306.09 E	1233.27	0.32
9300.00	90.15	180.91	7395.38	1327.10 S	305.24 E	1328.26	0.95
9395.00	89.72	181.95	7395.49	1422.07 S	302.87 E	1423.22	1.18
9490.00	89.97	180.20	7395.75	1517.05 S	301.08 E	1518.19	1.86
9585.00	90.22	179.40	7395.59	1612.05 S	301.42 E	1613.19	0.88
9681.00	90.22	179.31	7395.22	1708.04 S	302.50 E	1709.19	0.09
9776.00	91.51	179.33	7393.79	1803.02 S	303.62 E	1804.17	1.36
9871.00	90.77	178.97	7391.90	1897.99 S	305.03 E	1899.15	0.87
9966.00	90.09	179.49	7391.18	1992.98 S	306.31 E	1994.14	0.90
10061.00	88.83	179.33	7392.08	2087.97 S	307.29 E	2089.13	1.34
10156.00	89.91	179.02	7393.12	2182.95 S	308.66 E	2184.12	1.18
10251.00	90.86	178.42	7392.49	2277.92 S	310.78 E	2279.10	1.18
10347.00	90.18	178.08	7391.61	2373.87 S	313.71 E	2375.06	0.79
10442.00	87.75	177.74	7393.33	2468.79 S	317.17 E	2469.99	2.58
10537.00	87.66	179.33	7397.14	2563.68 S	319.60 E	2564.89	1.68
10632.00	90.71	180.48	7398.49	2658.65 S	319.76 E	2659.86	3.43
10727.00	89.85	181.22	7398.02	2753.64 S	318.35 E	2754.84	1.19
10822.00	89.32	180.89	7398.71	2848.62 S	316.60 E	2849.82	0.66
10918.00	89.04	180.19	7400.08	2944.61 S	315.69 E	2945.80	0.79
11013.00	89.69	181.80	7401.14	3039.58 S	314.04 E	3040.77	1.83
11108.00	91.08	182.68	7400.50	3134.51 S	310.33 E	3135.67	1.73
11203.00	90.83	182.47	7398.92	3229.40 S	306.06 E	3230.55	0.34
11298.00	90.40	181.66	7397.90	3324.33 S	302.64 E	3325.47	0.97
11393.00	90.22	181.48	7397.38	3419.29 S	300.04 E	3420.42	0.27
11488.00	90.15	180.89	7397.07	3514.27 S	298.07 E	3515.39	0.63
11583.00	89.82	180.78	7397.10	3609.26 S	296.69 E	3610.37	0.37
11679.00	91.51	180.83	7395.99	3705.24 S	295.34 E	3706.35	1.76
11774.00	92.74	180.03	7392.46	3800.17 S	294.63 E	3801.27	1.54
11869.00	91.23	180.58	7389.17	3895.11 S	294.12 E	3896.21	1.69
11964.00	89.01	178.69	7388.97	3990.10 S	294.73 E	3991.20	3.07
12091.00	90.15	177.88	7389.90	4117.03 S	298.53 E	4118.15	1.10
12154.00	90.80	178.88	7389.38	4180.00 S	300.31 E	4181.13	1.89
12249.00	89.44	179.21	7389.18	4274.99 S	301.89 E	4276.12	1.47
12344.00	90.55	179.78	7389.19	4369.98 S	302.73 E	4371.11	1.31
12437.00	89.22	182.45	7392.22	4463.82 S	302.78 E	4463.44	1.82

12435.00	89.69	180.15	7389.00	4460.98 S	302.79 E	4462.11	1.03
12480.00	89.69	180.15	7389.24	4505.98 S	302.67 E	4507.11	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 179.78 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.53 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12480.00 FEET
IS 4516.13 FEET ALONG 176.16 DEGREES (TRUE)**

All directional surveys tied on to the last gyro survey at 1138' MD. Final survey is a straight-line projection to the bit.

Date Printed:11 December 2013