



1 : 240

[illegible]

MWD Run Number	100	200	300		
Date run completed	27-Jul-13	29-Jul-13	31-Jul-13		
Rig Bit Number	1	2	3		
Bit Size (in)	13.500	8.750	8.750		
Tool Nominal OD (in)	8.000	6.750	6.420		
Log Start Depth (TVD, ft)	1.00	961.98	7,120.67		
Log End Depth (TVD, ft)	961.98	7,120.67	7,269.72		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	25-Jul-13 14:33	28-Jul-13 06:00	29-Jul-13 02:30		
Drill/Wipe End Date and Time	25-Jul-13 14:33	29-Jul-13 20:15	30-Jul-13 16:00		
Min Inc (deg) @ Depth (TVD, ft)	.17 @ 329.00	.28 @ 5,931.66	43.72 @ 7,120.67		
Max Inc (deg) @ Depth (TVD, ft)	.62 @ 451.00	39.90 @ 7,084.89	85.43 @ 7,267.27		
Bit TFA(in2) / Bit Type	1.49 / PDC	1.04 / PDC	1.04 / PDC		
Flow Rate (gpm)	463.80	583.66	499.52		
Max AV (fpm) / CV (fpm) @ MWD	723.0 / 181.0	723.0 / 181.0	723.0 / 181.0		
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.55 / 36.00	9.23 / 38.00	9.23 / 38.00		
Filtrate CL (ppm)	900.00	900.00	900.00		
pH / Fluid Loss (mptm)	9.00 / 0	8.50 / 0	8.50 / 0		
PV (cP) / YP (lbf2)	6 / 5.00	11 / 13.00	11 / 13.00		
% Solids / % Sand	1.2 / 0	1.2 / 0	1.2 / 0		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (deg F) / S	25.00 / 25	127.00 / 25M	122.55 / 25M		

Max Tool Temp (degF) / Source	95.00 / 95	167.00 / PCM	182.55 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 95.00	N/A @ 167.00	N/A @ 182.55		
Lead MWD Engineer	Evan LeBlanc	Evan LeBlanc	Evan LeBlanc		
Customer Representative	Mike Bradshaw	Mike Bradshaw	Mike Bradshaw		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11847568	11341324	11341324		
Insert Serial Number	11680751	11227549	11680751		
Date and Time Initialized	26-Jul-13 05:10	28-Jul-13 01:44	29-Jul-13 17:11		
Date and Time Read	27-Jul-13 02:19	29-Jul-13 21:14	31-Jul-13 03:04		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	48.67	45.43	41.10		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11847568	11341324	11341324		
Sonde Serial Number	11145708	11297584	11145708		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	348.35	169.99	348.35		

Gamma Ray Sensor Information

Tool Type	N/A	PCG	PCG		
Distance From Bit (ft)	N/A	50.38	46.03		
Recorded Sample Period (sec)	N/A	10	10		
Software Version	N/A	8.15	8.15		
Sub Serial Number	N/A	11341324	11341324		
Insert/Sonde Serial Number	N/A	11293285	11579782		

REMARKS

1. All depths are true vertical 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 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

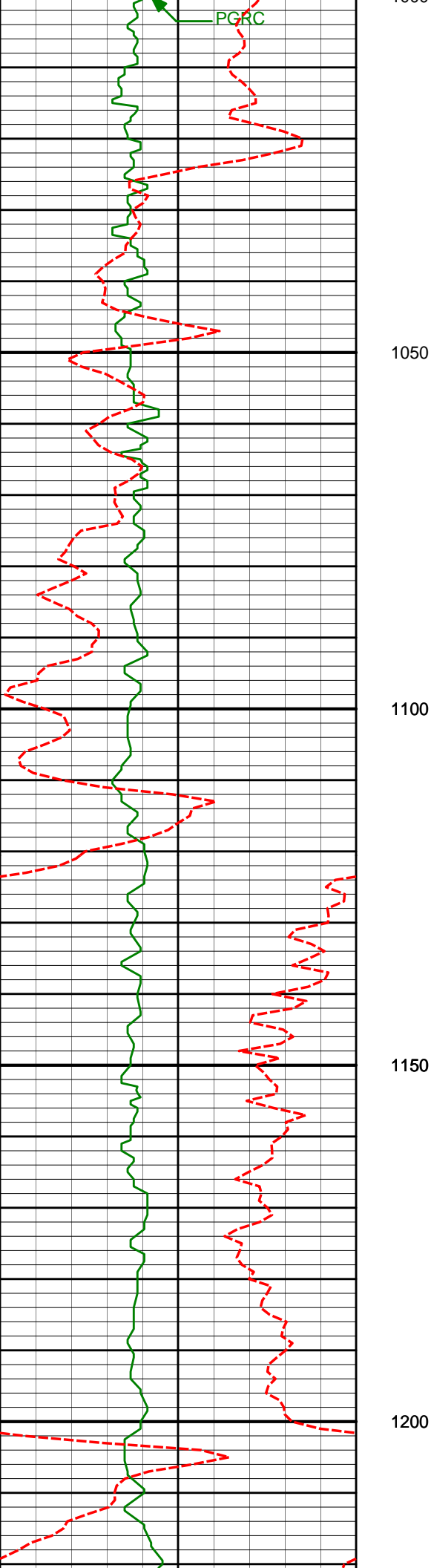
Insite version: 7.4.10

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HALLIBURTON

TVD Main Log 1:240

PCG Gamma Ray BCorr (PGRC) api0300						
Average Rate of Penetration (ROPA) feet per hr7500		Depth				
		Depth	Inc	Azi	TVD	V/S
		912'	0.29°	260.14°	911.98'	-1.73'
Start Gamma Logging						
		950				
Run 200						
		975'	0.55°	263.13°	974.98'	-1.79'
		1000				



1066'

0.55°

270.48°

1065.97'

-1.83'

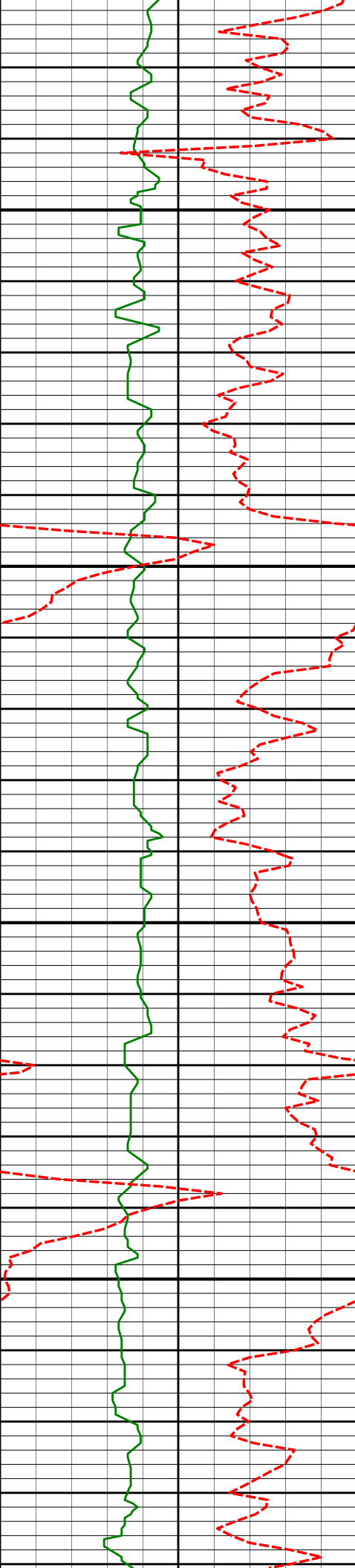
1158'

0.67°

274.53°

1157.97'

-1.78'



1250

1250'

0.68°

267.25°

1249.96'

-1.75'

1300

1341'

0.77°

273.65°

1340.95'

-1.73'

1350

1400

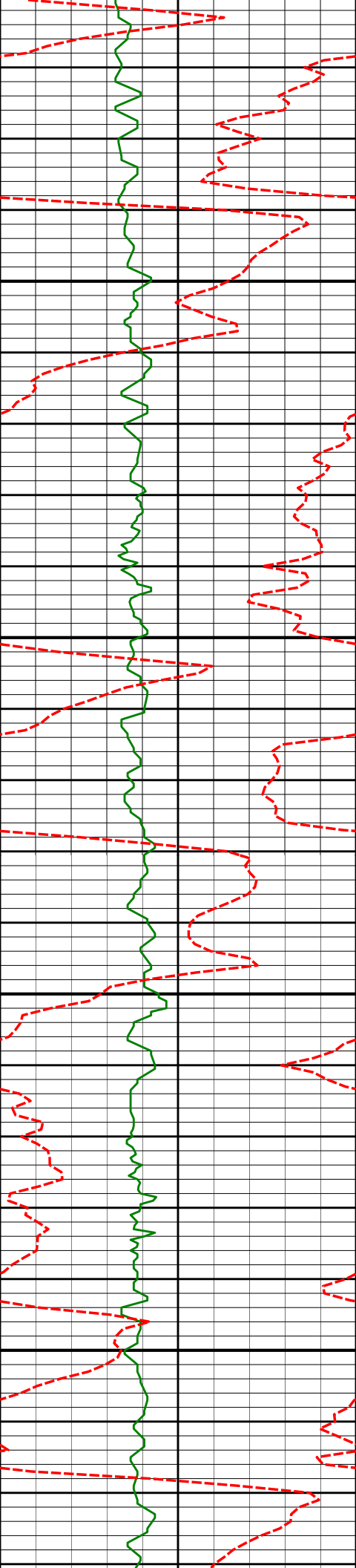
1433'

0.88°

271.44°

1432.94'

-1.66'



1700

1750

1800

1850

1708'

4.57°

189.86°

1707.74'

-8.70'

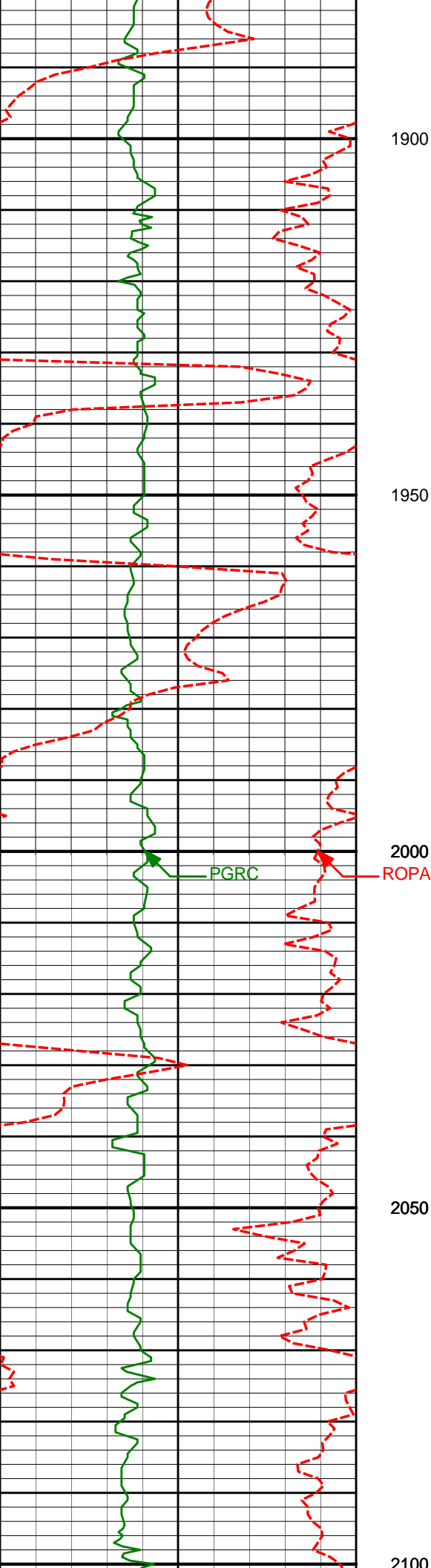
1800'

6.68°

178.00°

1799.29'

-17.66'



1891'

8.53°

178.33°

1889.49'

-29.69'

1886'

10.67°

182.80°

1983.15'

-45.52'

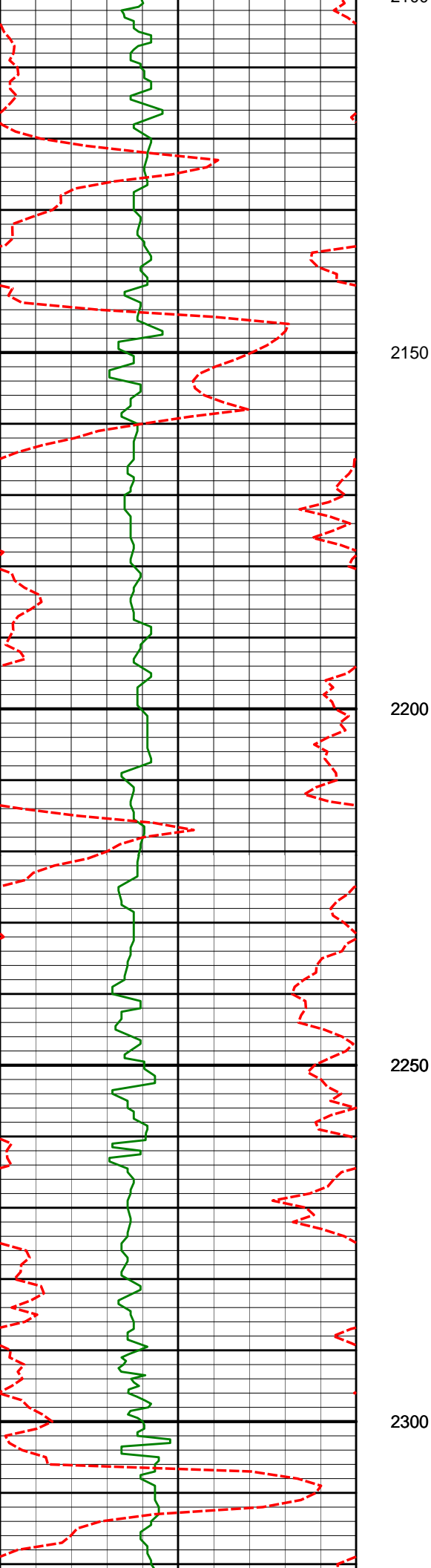
2081'

10.12°

181.86°

2076.59'

-62.64'



2150

2200

2250

2300

2176'

11.18°

179.96°

2169.96'

-80.19'

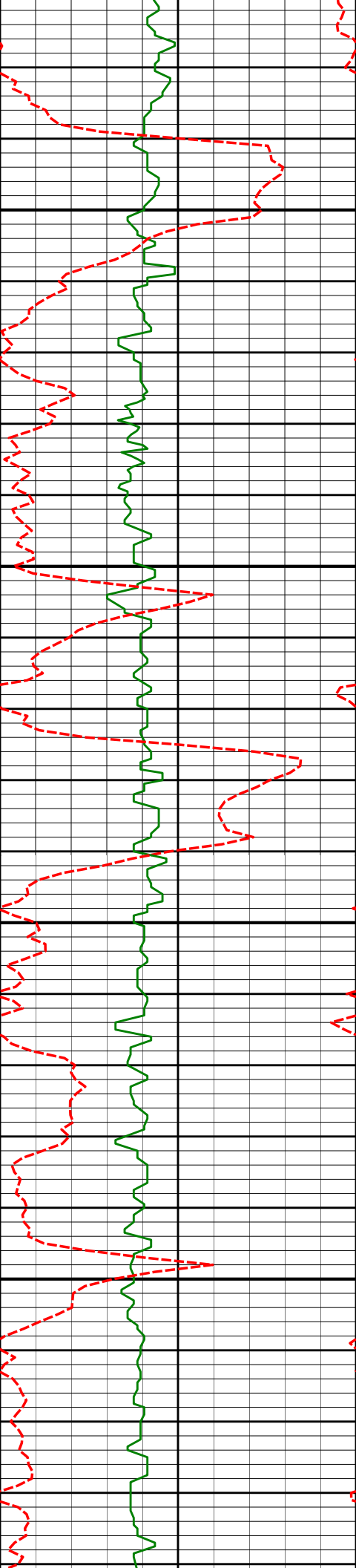
2271'

10.06°

177.98°

2263.33'

-97.69'



2350

2366'

9.77°

182.19°

2356.91'

-114.04'

2400

2450

2462'

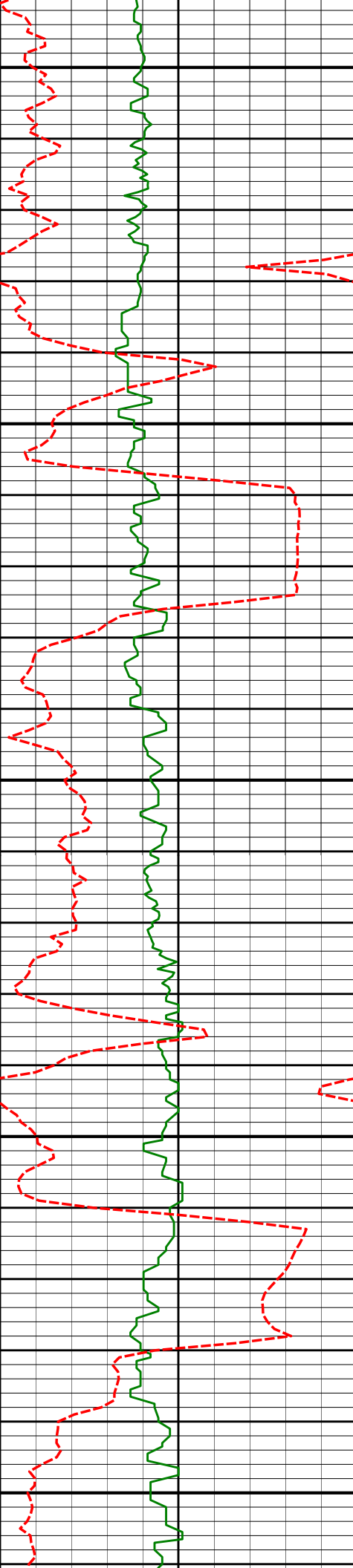
10.46°

187.54°

2451.42'

-130.81'

2500



2550

2600

2650

2700

2750

2557'

8.65°

187.48°

2545.10'

-146.42'

2652'

9.18°

182.22°

2638.95'

-161.06'

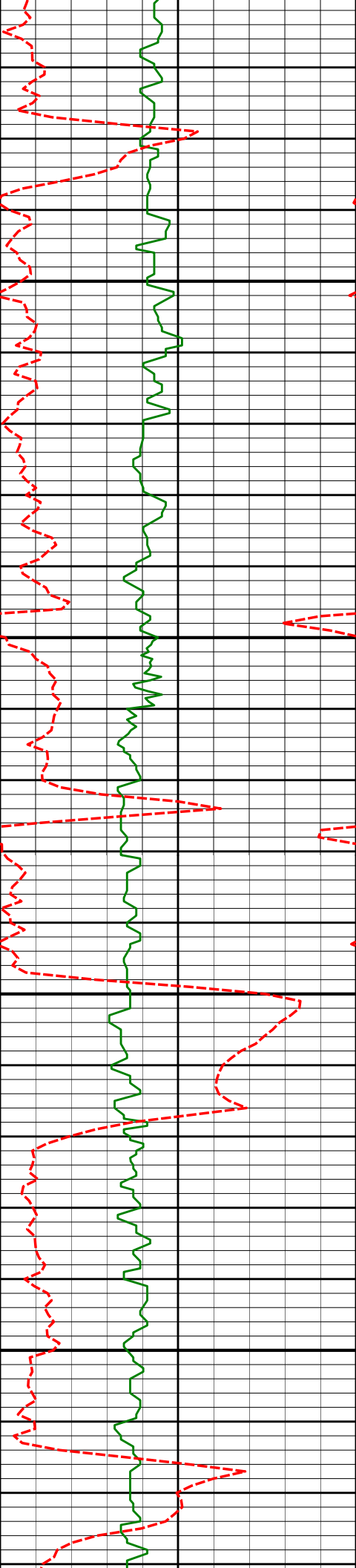
2747'

10.17°

181.15°

2732.60'

-177.02'



2800

2842'

8.66°

181.08°

2826.32'

-192.55'

2850

2900

2937'

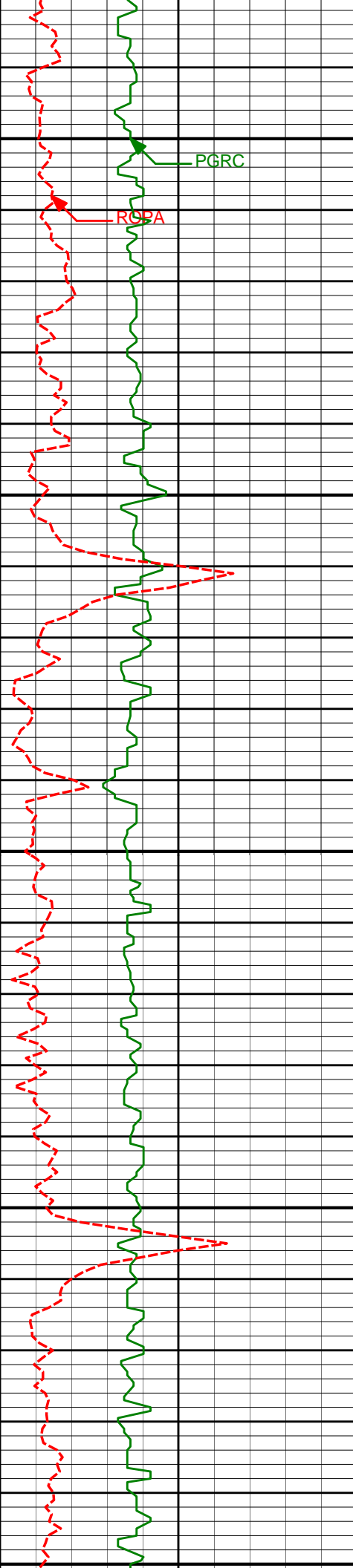
10.64°

180.65°

2919.97'

-208.47'

2950



3000

PGRC

RCPA

3050

3100

3150

3200

3032'

10.74°

181.55°

3013.32'

-226.09'

3127'

10.24°

181.41°

3106.73'

-243.37'

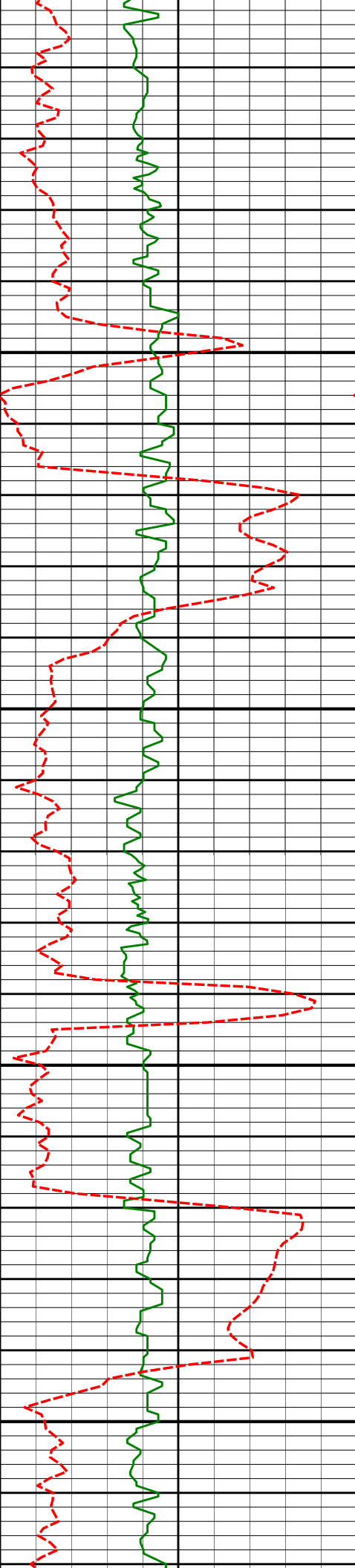
3222'

9.14°

177.96°

3200.38'

-259.35'



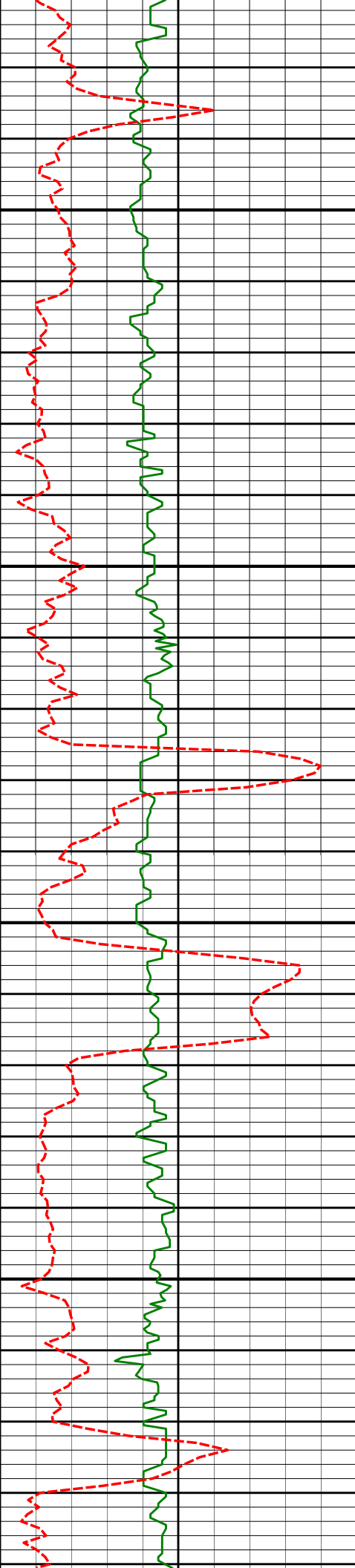
3250

3300

3350

3400

3222	9.14°	177.90°	3200.30'	-299.55'
3318'	9.02°	176.49°	3295.17'	-274.49'
3413'	10.91°	185.58°	3388.74'	-290.87'



3450

3508'

9.56°

188.83°

3482.23'

-307.59'

3500

3550

3603'

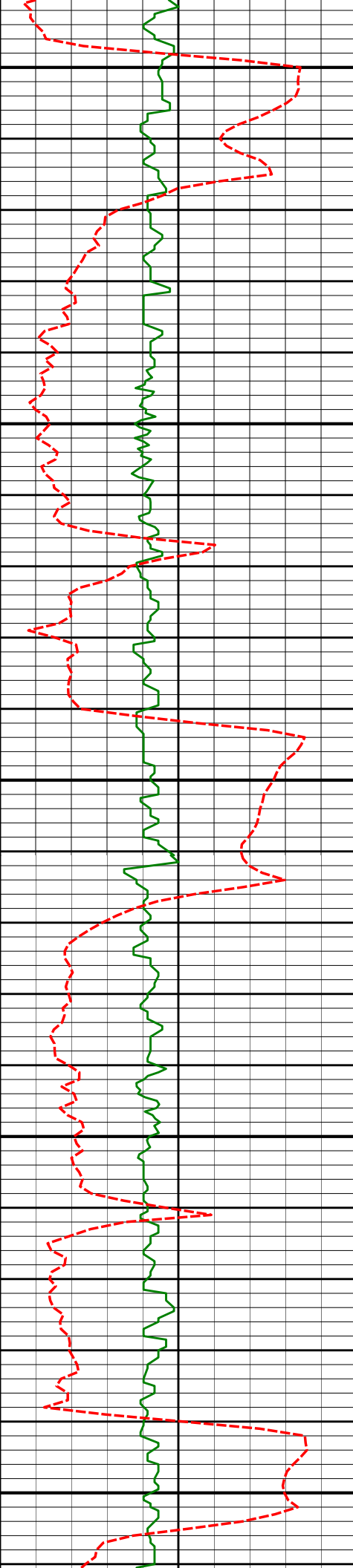
9.26°

184.05°

3575.95'

-323.00'

3600



3650

3698'

9.02°

189.80°

3669.75'

-337.94'

3700

3750

3793'

10.89°

185.31°

3763.31'

-354.20'

3800

3850

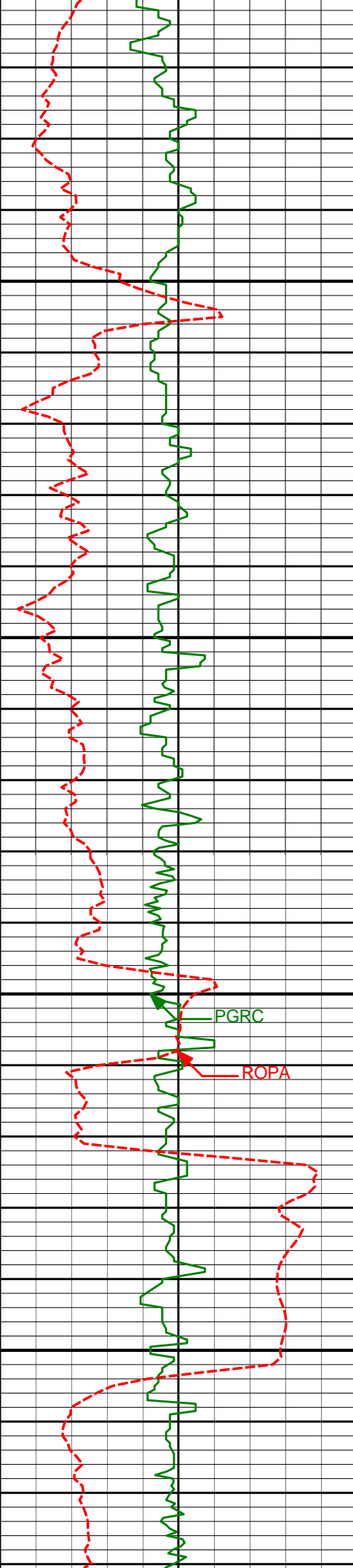
3888'

10.37°

180.57°

3856.68'

-371.68'



3900

3950

4000

4050

3983'

8.53°

178.89°

3950.39'

-387.27'

PGRC

ROPA

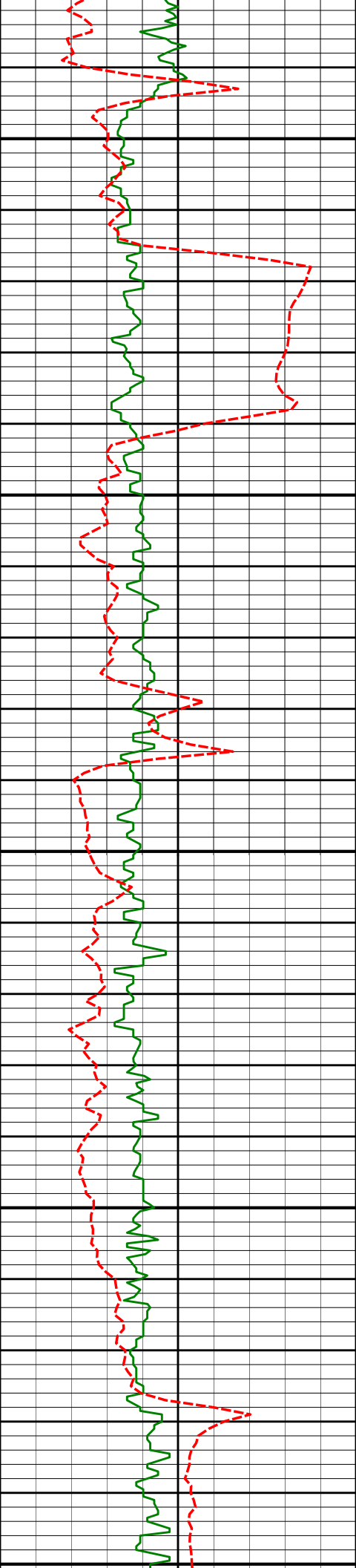
4079'

9.20°

181.37°

4045.24'

-402.06'



4100

4150

4200

4250

4300

4174'

11.42°

185.58°

4138.71'

-419.01'

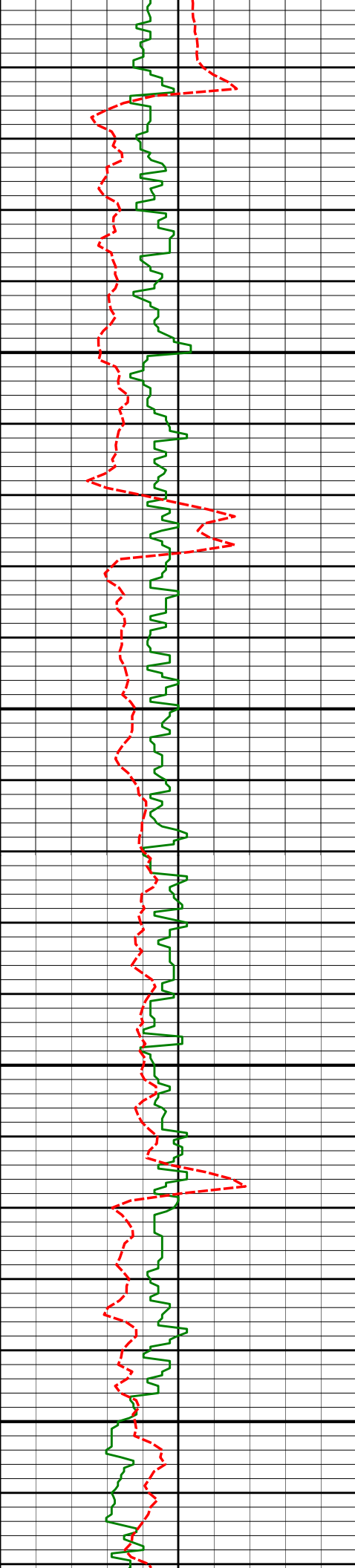
4269'

11.83°

186.32°

4231.76'

-438.03'



4350

4400

4450

4500

4364'

11.22°

187.10°

4324.84'

-456.86'

4459'

9.92°

185.96°

4418.23'

-474.15'

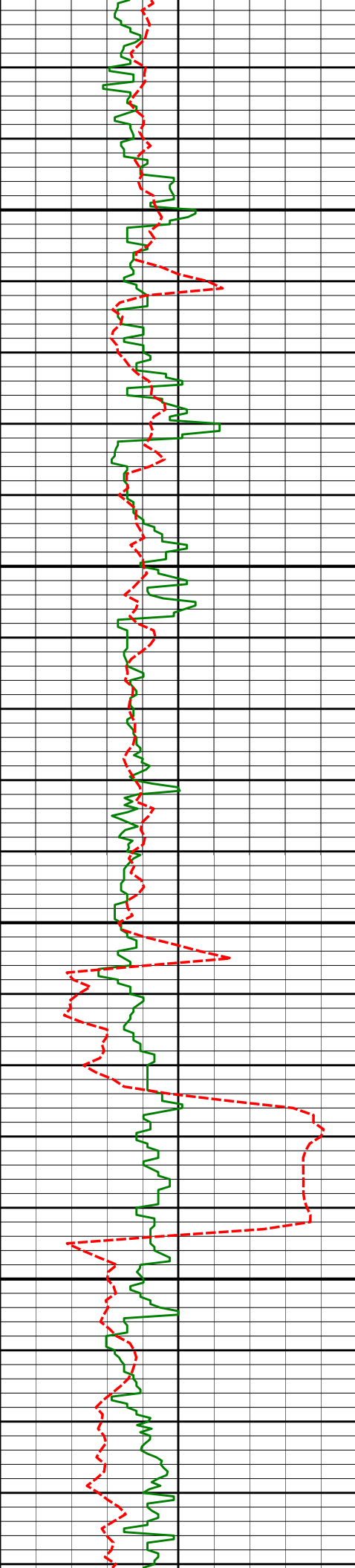
4554'

8.68°

185.21°

4511.98'

-489.41'



4550

4600

4650

4700

4650'

7.76°

187.18°

4606.99'

-503.05'

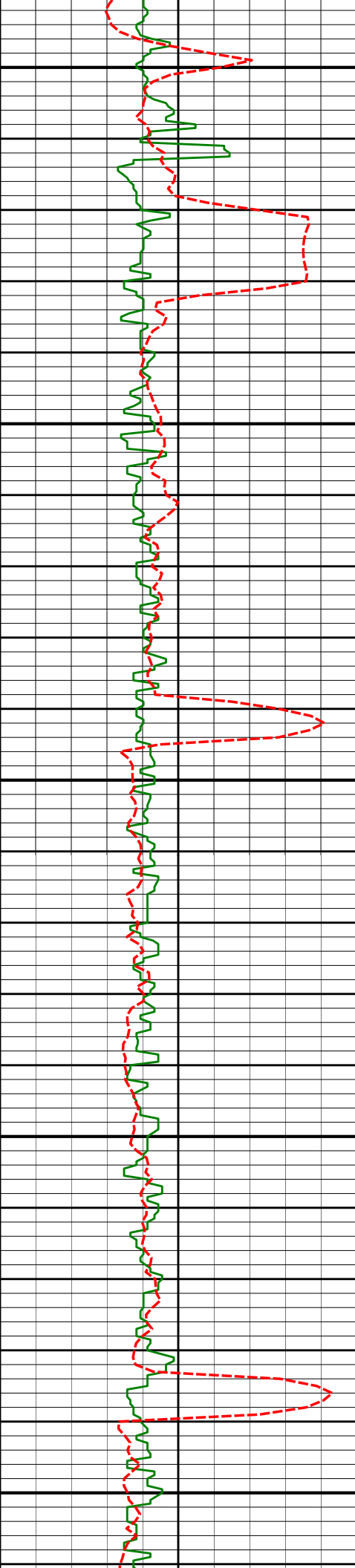
4745'

7.44°

181.47°

4701.16'

-515.55'



4750

4800

4850

4900

4950

4840'

8.34°

173.49°

4795.26'

-528.55'

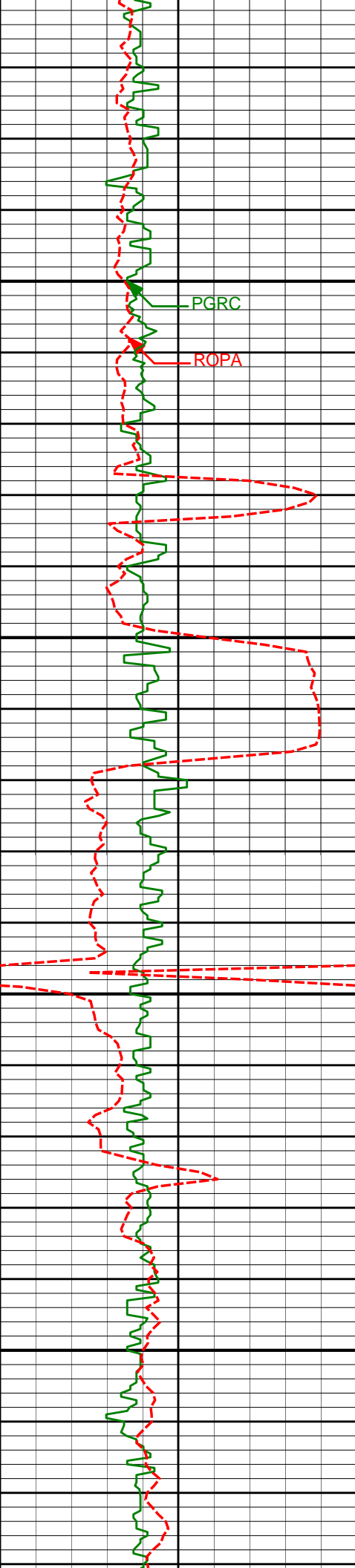
4935'

8.11°

177.29°

4889.28'

-542.10'



5000

5050

5100

5150

5030'

7.38°

180.49°

4983.42'

-554.89'

5125'

8.47°

178.19°

5077.51'

-567.99'

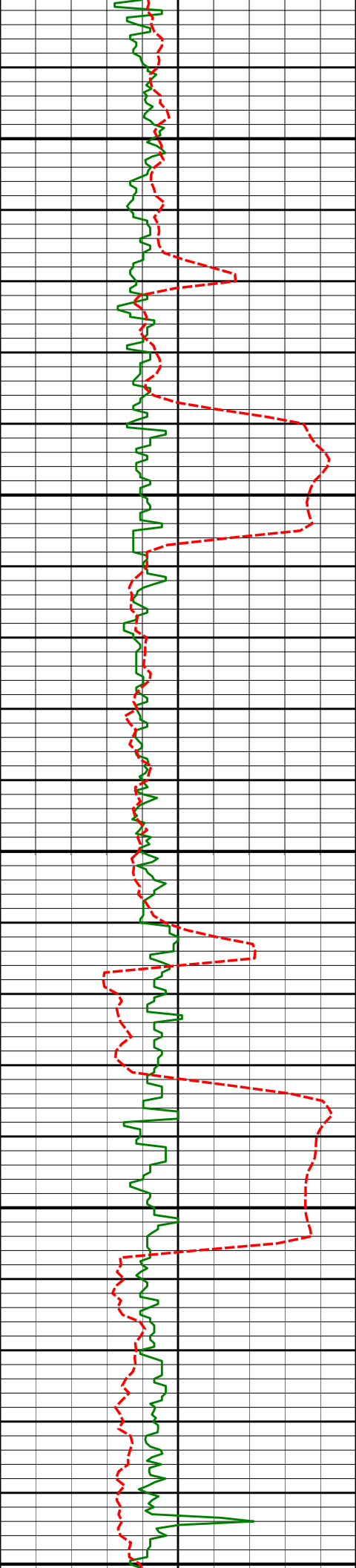
5220'

7.40°

184.50°

5171.60'

-581.08'



5200

5250

5300

5350

5400

5315'

5.86°

177.01°

5265.96'

-592.02'

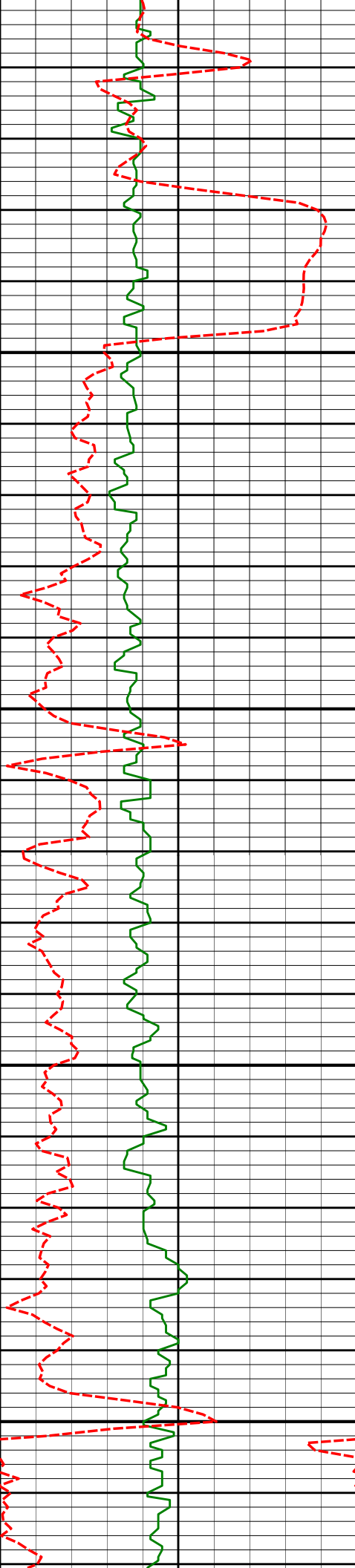
5410'

2.34°

177.88°

5360.70'

-598.80'



5450

5500

5550

5600

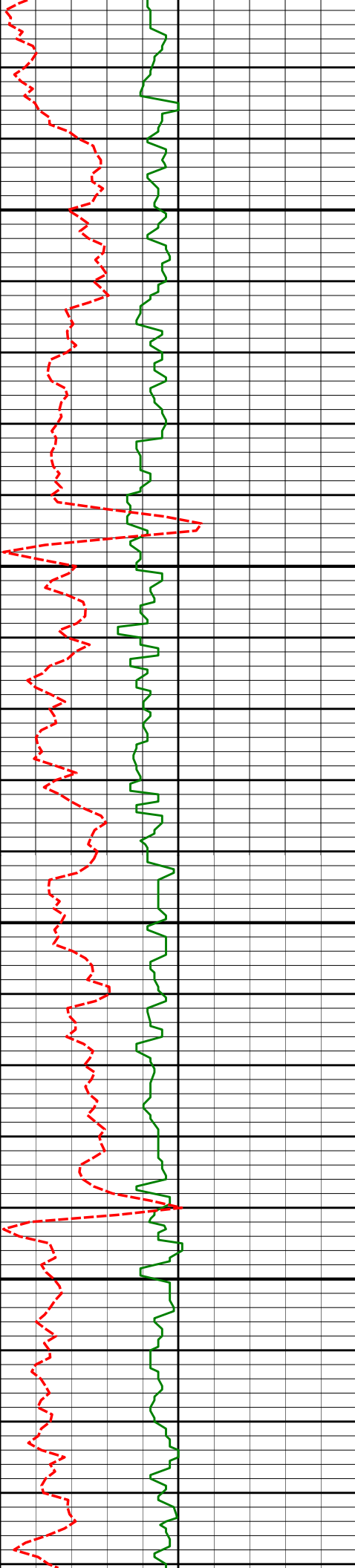
5506'

0.32°

222.11°

5456.67'

-600.96'



5650

5700

5750

5800

5696'

0.54°

263.02°

5646.67'

-601.45'

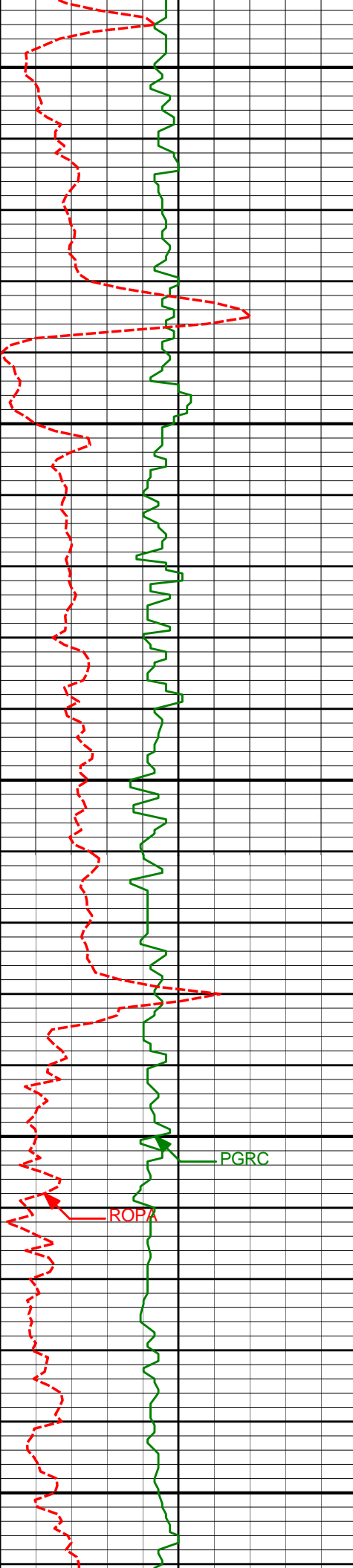
5791'

0.62°

266.51°

5741.66'

-601.53'



5850

5900

5950

6000

6050

5981'

0.28°

266.05°

5931.66'

-601.61'

PGRC

ROPA

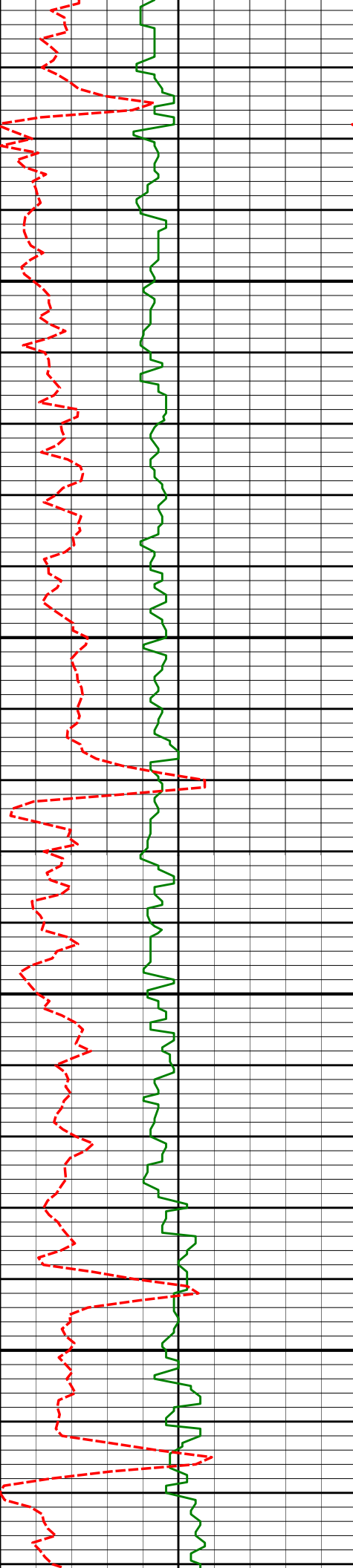
6076'

0.40°

171.95°

6026.66'

-601.95'



6100

6171'

0.37°

178.08°

6121.65'

-602.59'

6150

6200

6266'

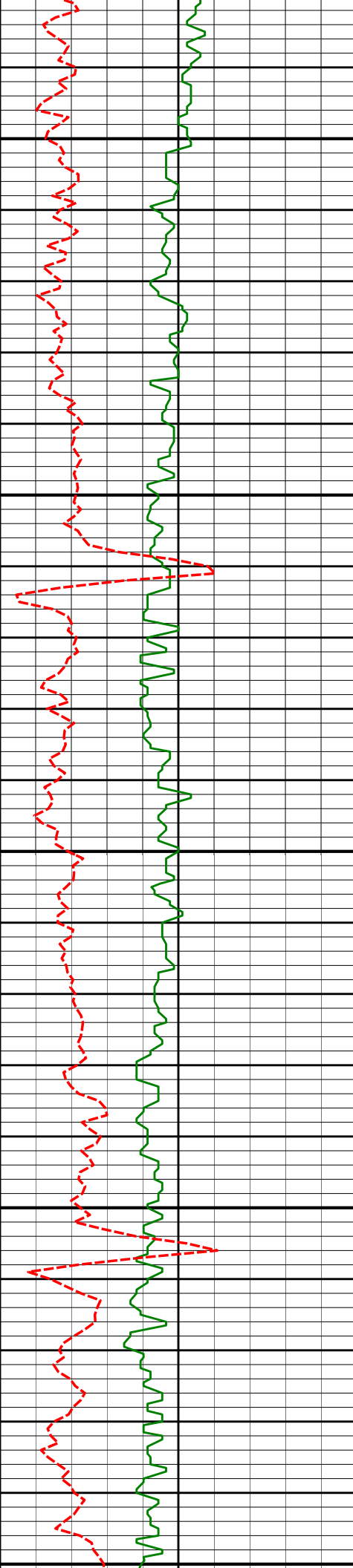
0.48°

153.01°

6216.65'

-603.25'

6250



6300

6361'

0.72°

149.39°

6311.65'

-604.12'

6350

6400

6456'

0.72°

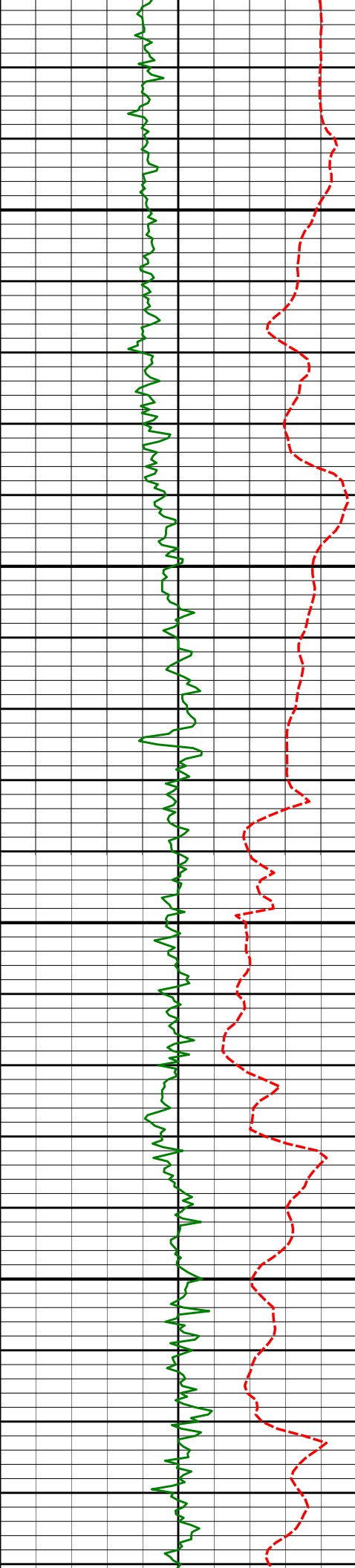
151.65°

6406.64'

-605.17'

6450

6500



6750

6800

6850

6900

6790'

9.71°

357.45°

6740.16'

-600.50'

6837'

13.30°

354.69°

6786.21'

-591.15'

6885'

17.21°

357.31°

6832.51'

-578.55'

6932'

17.86°

2.34°

6877.33'

-564.40'

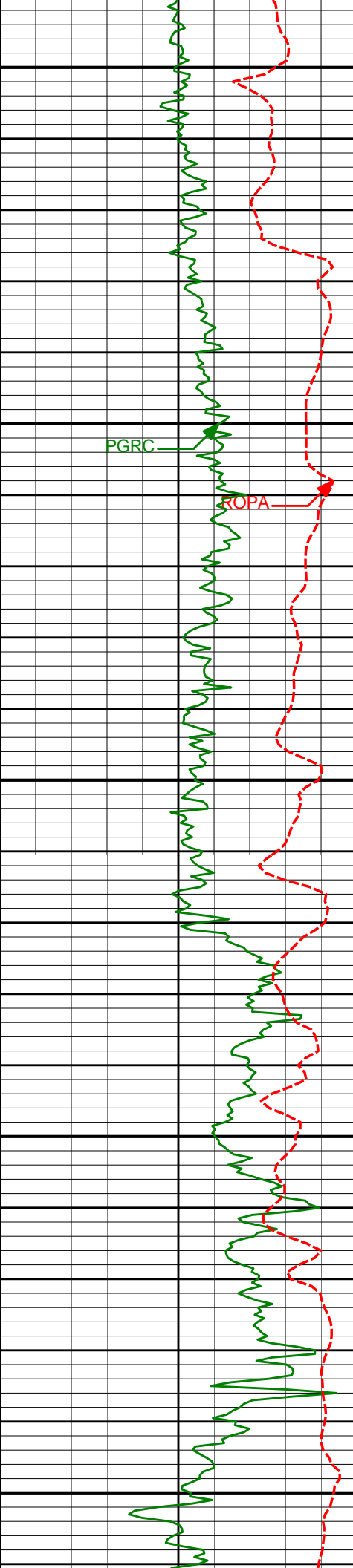
6980'

21.63°

359.70°

6922.50'

-548.20'



6950

7027'

26.01°

356.20°

6965.49'

-529.23'

7000

7075'

30.71°

355.25°

7007.71'

-506.49'

7050

7122'

35.81°

354.22°

7047.00'

-480.81'

7100

7170'

39.90°

353.82°

7084.89'

-451.50'

7150

7266'

50.16°

357.59°

7153.42'

-384.58'

Run 300

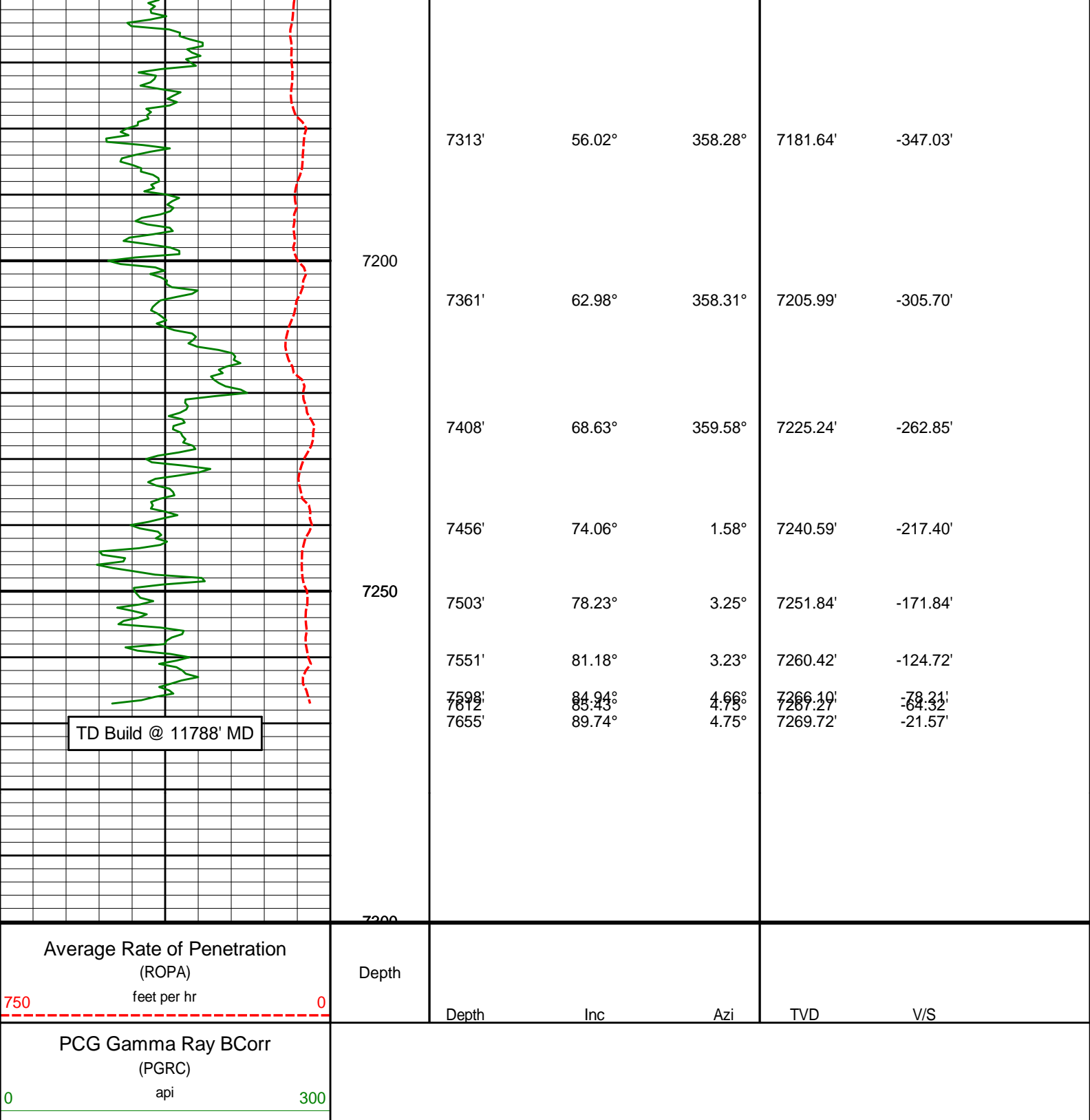
7218'

43.72°

356.72°

7120.67'

-419.60'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
 USA Fed 03N-36HZ
 Wattenburg
 Weld Colorado
 USA
 CA-XX-0900512977

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

0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
142.00	0.24	312.39	142.00	0.20 N	0.22 W	0.20	0.17
236.00	0.32	196.55	236.00	0.08 N	0.44 W	0.09	0.51
329.00	0.17	304.20	329.00	0.09 S	0.63 W	-0.08	0.44
360.00	0.24	282.23	360.00	0.05 S	0.73 W	-0.04	0.34
451.00	0.62	250.29	451.00	0.18 S	1.38 W	-0.16	0.48
545.00	0.58	236.16	544.99	0.61 S	2.25 W	-0.59	0.16
638.00	0.36	256.24	637.99	0.94 S	2.93 W	-0.92	0.29
731.00	0.54	247.46	730.98	1.18 S	3.62 W	-1.15	0.21
825.00	0.56	244.05	824.98	1.55 S	4.44 W	-1.52	0.04
912.00	0.29	260.14	911.98	1.78 S	5.04 W	-1.73	0.34
975.00	0.55	263.16	974.98	1.84 S	5.50 W	-1.79	0.41
1066.00	0.55	270.51	1065.97	1.89 S	6.37 W	-1.83	0.08
1158.00	0.67	274.56	1157.97	1.84 S	7.34 W	-1.78	0.14
1250.00	0.68	267.28	1249.96	1.82 S	8.42 W	-1.75	0.09
1341.00	0.77	273.68	1340.95	1.81 S	9.57 W	-1.73	0.13
1433.00	0.88	271.47	1432.94	1.75 S	10.90 W	-1.66	0.12
1525.00	0.81	259.53	1524.93	1.85 S	12.24 W	-1.75	0.21
1617.00	2.22	202.22	1616.90	3.62 S	13.56 W	-3.51	2.07
1708.00	4.57	189.89	1707.74	8.82 S	14.85 W	-8.70	2.69
1800.00	6.68	178.03	1799.29	17.78 S	15.29 W	-17.66	2.61
1891.00	8.53	178.36	1889.49	29.82 S	14.92 W	-29.69	2.03
1986.00	10.67	182.83	1983.15	45.65 S	15.15 W	-45.52	2.38
2081.00	10.12	181.88	2076.59	62.78 S	15.86 W	-62.64	0.61
2176.00	11.18	179.98	2169.96	80.33 S	16.13 W	-80.19	1.18
2271.00	10.06	178.00	2263.33	97.83 S	15.83 W	-97.69	1.24
2366.00	9.77	182.22	2356.91	114.18 S	15.86 W	-114.04	0.82
2462.00	10.46	187.57	2451.42	130.96 S	17.32 W	-130.81	1.21
2557.00	8.65	187.51	2545.10	146.59 S	19.39 W	-146.42	1.91
2652.00	9.18	182.25	2638.95	161.24 S	20.62 W	-161.06	1.02
2747.00	10.17	181.18	2732.60	177.20 S	21.09 W	-177.02	1.06
2842.00	8.66	181.10	2826.32	192.74 S	21.40 W	-192.55	1.59
2937.00	10.64	180.68	2919.97	208.66 S	21.64 W	-208.47	2.09
3032.00	10.74	181.58	3013.32	226.28 S	21.99 W	-226.09	0.20
3127.00	10.24	181.43	3106.73	243.57 S	22.45 W	-243.37	0.53
3222.00	9.14	177.98	3200.38	259.55 S	22.39 W	-259.35	1.31
3318.00	9.02	176.52	3295.17	274.68 S	21.67 W	-274.49	0.27
3413.00	10.91	185.61	3388.74	291.06 S	22.09 W	-290.87	2.58
3508.00	9.56	188.86	3482.23	307.81 S	24.19 W	-307.59	1.55
3603.00	9.26	184.08	3575.95	323.23 S	25.95 W	-323.00	0.88
3698.00	9.02	189.83	3669.75	338.19 S	27.76 W	-337.94	0.99
3793.00	10.89	185.34	3763.31	354.46 S	29.87 W	-354.20	2.13
3888.00	10.37	180.60	3856.68	371.95 S	30.79 W	-371.68	1.07
3983.00	8.53	178.91	3950.39	387.54 S	30.75 W	-387.27	1.96
4079.00	9.20	181.40	4045.24	402.33 S	30.80 W	-402.06	0.80
4174.00	11.42	185.60	4138.71	419.29 S	31.90 W	-419.01	2.47
4269.00	11.83	186.35	4231.76	438.33 S	33.90 W	-438.03	0.46
4364.00	11.22	187.13	4324.84	457.18 S	36.12 W	-456.86	0.66
4459.00	9.92	185.99	4418.23	474.49 S	38.12 W	-474.15	1.39
4554.00	8.68	185.24	4511.98	489.76 S	39.63 W	-489.41	1.31
4650.00	7.76	187.20	4606.99	503.41 S	41.11 W	-503.05	1.00
4745.00	7.44	181.49	4701.16	515.92 S	42.07 W	-515.55	0.86
4840.00	8.34	173.51	4795.26	528.91 S	41.45 W	-528.55	1.49
4935.00	8.11	177.32	4889.28	542.45 S	40.36 W	-542.10	0.62
5030.00	7.38	180.51	4983.42	555.25 S	40.10 W	-554.89	0.89
5125.00	8.47	178.22	5077.51	568.34 S	39.94 W	-567.99	1.19
5220.00	7.40	184.53	5171.60	581.44 S	40.20 W	-581.08	1.45
5315.00	5.86	177.03	5265.96	592.38 S	40.44 W	-592.02	1.86
5410.00	2.34	177.90	5360.70	599.16 S	40.11 W	-598.80	3.71
5506.00	0.32	222.14	5456.67	601.32 S	40.22 W	-600.96	2.21
5696.00	0.54	263.05	5646.67	601.82 S	41.47 W	-601.45	0.19
5791.00	0.62	266.54	5741.66	601.91 S	42.42 W	-601.53	0.09
5981.00	0.28	266.08	5931.66	602.00 S	43.91 W	-601.61	0.18
6076.00	0.40	171.98	6026.66	602.34 S	44.10 W	-601.95	0.53
6171.00	0.37	178.11	6121.65	602.98 S	44.04 W	-602.59	0.05
6266.00	0.48	153.04	6216.65	603.64 S	43.85 W	-603.25	0.22
6361.00	0.72	149.41	6311.65	604.51 S	43.37 W	-604.12	0.26
6456.00	0.72	151.68	6406.64	605.55 S	42.78 W	-605.17	0.03
6552.00	1.00	158.65	6502.63	606.86 S	42.19 W	-606.48	0.31
6647.00	0.94	154.97	6597.62	608.34 S	41.56 W	-607.97	0.09
6695.00	0.58	109.01	6645.61	608.77 S	41.16 W	-608.41	1.42
6742.00	4.76	2.84	6692.56	606.90 S	40.84 W	-606.54	10.54
6790.00	9.71	357.48	6740.16	600.87 S	40.92 W	-600.50	10.40

6837.00	13.30	354.72	6786.21	591.52 S	41.59 W	-591.15	7.73
6885.00	17.21	357.35	6832.51	578.92 S	42.43 W	-578.55	8.27
6932.00	17.86	2.37	6877.33	564.78 S	42.45 W	-564.40	3.50
6980.00	21.63	359.73	6922.50	548.57 S	42.19 W	-548.20	8.07
7027.00	26.01	356.23	6965.49	529.61 S	42.91 W	-529.23	9.79
7075.00	30.71	355.28	7007.71	506.88 S	44.61 W	-506.49	9.84
7122.00	35.81	354.24	7047.00	481.22 S	46.98 W	-480.81	10.92
7170.00	39.90	353.83	7084.89	451.93 S	50.04 W	-451.50	8.54
7218.00	43.72	356.72	7120.67	420.05 S	52.65 W	-419.60	8.91
7266.00	50.16	357.59	7153.42	385.05 S	54.37 W	-384.58	13.48
7313.00	56.02	358.28	7181.64	347.51 S	55.72 W	-347.03	12.52
7361.00	62.98	358.31	7205.99	306.19 S	56.95 W	-305.70	14.50
7408.00	68.63	359.58	7225.24	263.35 S	57.73 W	-262.85	12.27
7456.00	74.06	1.58	7240.59	217.89 S	57.25 W	-217.40	11.98
7503.00	78.23	3.25	7251.84	172.31 S	55.32 W	-171.84	9.52
7551.00	81.18	3.23	7260.42	125.16 S	52.66 W	-124.72	6.15
7598.00	84.94	4.66	7266.10	78.63 S	49.44 W	-78.21	8.55
7612.00	85.43	4.75	7267.27	64.72 S	48.30 W	-64.32	3.56

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 359.52 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.57 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7612.00 FEET
IS 80.76 FEET ALONG 216.73 DEGREES (TRUE)**

All directional surveys tied onto surface at 0' MD. Final survey is a straight-line projection to the bit.