

# DGR Dual Gamma Ray



1 : 240

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200	300		
<b>Date run completed</b>	25-Aug-13	27-Aug-13	30-Aug-13		
<b>Rig Bit Number</b>	0100	0200	0300		
<b>Bit Size (in)</b>	8.750	6.125	6.125		
<b>Tool Nominal OD (in)</b>	6.750	4.750	4.750		
<b>Log Start Depth (MD, ft)</b>	603.00	7,519.00	9,197.00		
<b>Log End Depth (MD, ft)</b>	7,519.00	9,197.00	12,059.00		
<b>Drill or Wipe</b>	Drill	Drill	Drill		
<b>Drill/Wipe Start Date and Time</b>	24-Aug-13 05:30	27-Aug-13 04:22	28-Aug-13 07:10		
<b>Drill/Wipe End Date and Time</b>	25-Aug-13 16:30	27-Aug-13 17:00	29-Aug-13 22:15		
<b>Min Inc (deg) @ Depth (MD, ft)</b>	.35 @ 5,317.00	88.15 @ 8,137.00	87.77 @ 10,979.00		
<b>Max Inc (deg) @ Depth (MD, ft)</b>	9.21 @ 2,669.00	92.16 @ 8,895.00	92.10 @ 10,220.00		
<b>Bit TFA(in2) / Bit Type</b>	.97 / PDC	.61 / PDC	.61 / PDC		
<b>Flow Rate (gpm)</b>	568.54	273.50	274.79		
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	492.0 / N/A	492.0 / N/A	492.0 / N/A		
<b>Fluid Type</b>	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
<b>Density (ppg) / Viscosity (spqt)</b>	9.40 / 42.00	9.40 / 38.00	9.40 / 40.00		
<b>Filtrate CL (ppm)</b>	1,500.00	1,500.00	1,500.00		
<b>pH / Fluid Loss (mptm)</b>	8.00 / 8.00	9.40 / 9.40	7.90 / 7.90		
<b>PV (cP) / YP (lbf2)</b>	11 / 11.00	11 / 10.00	14 / 12.00		
<b>% Solids / % Sand</b>	8.9 / .5	4.7 / .25	5.7 / .25		
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A	N/A / N/A		
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Max Tool Temp (deg F) @ MWD</b>	122.00 / 122.00	212.00 / 122.00	222.10 / 122.00		

Max Tool Temp (degF) / Source	180.09 / PCM	212.00 / HCIM	233.18 / HCIM		
Rm @ Max Tool Temp (degF)	N/A @ 180.09	N/A @ 212.00	N/A @ 233.18		
Lead MWD Engineer	Patrick Lane	Patrick Lane	Ryan White		
Customer Representative	Travis Kruckenberg	Travis Kruckenberg	Stan Walters		

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	HCIM	HCIM		
Software Version	5.84	88.56	88.56		
Sub Serial Number	11341336	123	123		
Insert Serial Number	11145558	123	123		
Date and Time Initialized	21-Aug-13 00:43	26-Aug-13 18:10	28-Aug-13 01:53		
Date and Time Read	26-Aug-13 00:47	01-Jan-70 00:00	01-Jan-70 00:00		
ECMB SW Version	N/A	N/A	N/A		

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	51.06	67.65	67.66		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341336	12024220	12024220		
Sonde Serial Number	11062040	11638536	11062040		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	282.22	82.44	310.74		

### Gamma Ray Sensor Information

Tool Type	PCG	DGR	DGR		
Distance From Bit (ft)	56.01	52.75	52.76		
Recorded Sample Period (sec)	10	8	8		
Software Version	8.15	N/A	N/A		
Sub Serial Number	11341336	123	123		
Insert/Sonde Serial Number	11680969	123	123		

### Pulser Controller Sensor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	8.17	8.17		
PIC Software Version	1.40				
Sub/HOC Serial Number	11341336	12024220	12024220		
Insert/Probe/Module SN	11145558	11680772	11145558		
Battery Serial Number	N/A	N/A	N/A		
Valve Insert SN	N/A	N/A	N/A		
DC Insert Serial Number	N/A	N/A	N/A		
Choke Size (32nd)	N/A	N/A	N/A		
Driver Current (amps)	N/A	N/A	N/A		
Driver SMI Current (amps)	N/A	N/A	N/A		
Boot Strap Version	4,130.00				

### DDSr-DGR Sensor Information

Tool Type		DDSr-DGR	DDSr-DGR		
Distance From Bit (ft)		55.67	55.68		
Recorded Sample Period (sec)		12	12		
Software Version		10.49	10.49		
Sub Serial Number		123	123		
Insert Serial Number		11270399	11270399		
Sensor ID Number		7025	7025		

## REMARKS

1. All depths are measured depths referenced to the Driller's pipe tally and are measured from the Drill Floor, 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

5. INSITE version 7.4.1

## WARRANTY

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# HALLIBURTON

## Sperry Drilling

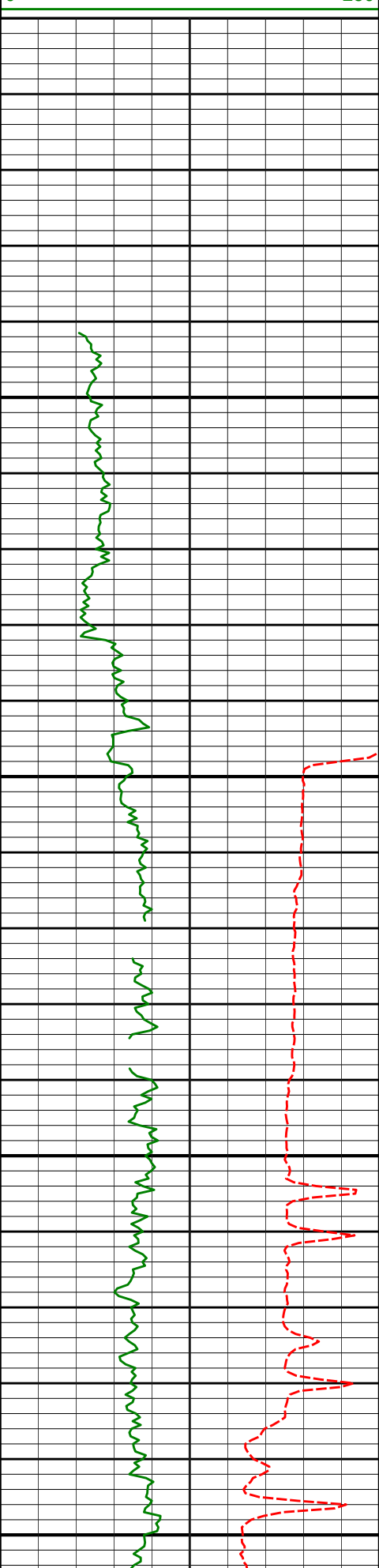
### MD 1:240 Detail Log

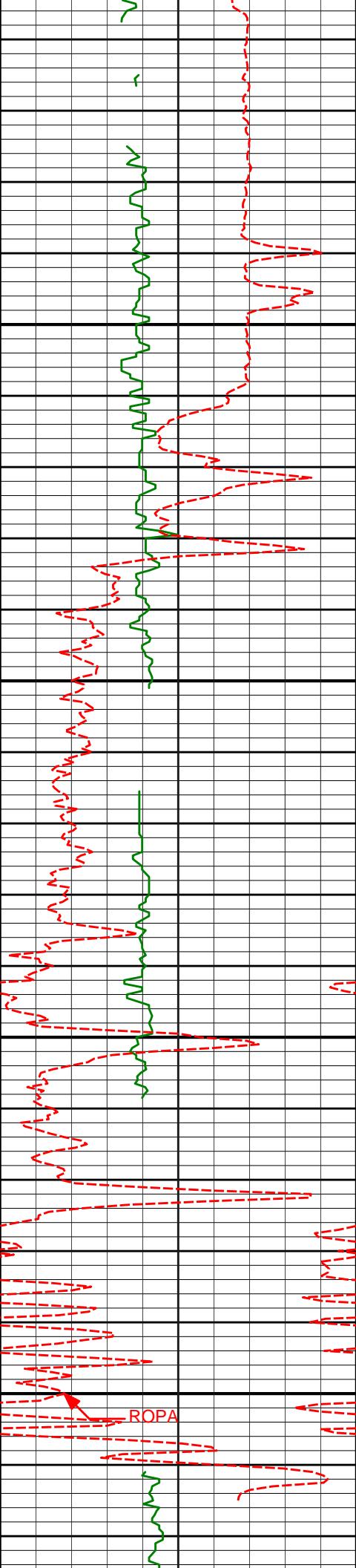
PCG Gamma Ray BCorr  
(PGRC)  
api

0 250

Avg Rate of Penetration  
(ROPA)  
feet per hr

500 0

Gamma Ray KclBh (DGRC) api										Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
0										000					
250															
										600					
										650					
										700					
										733'	2.14°	200.64°	732.92'	-0.92'	
										750					
										800					



850

900

950

1000

828'

2.26°

204.04°

827.85'

0.43'

919'

2.35°

198.68°

918.77'

1.72'

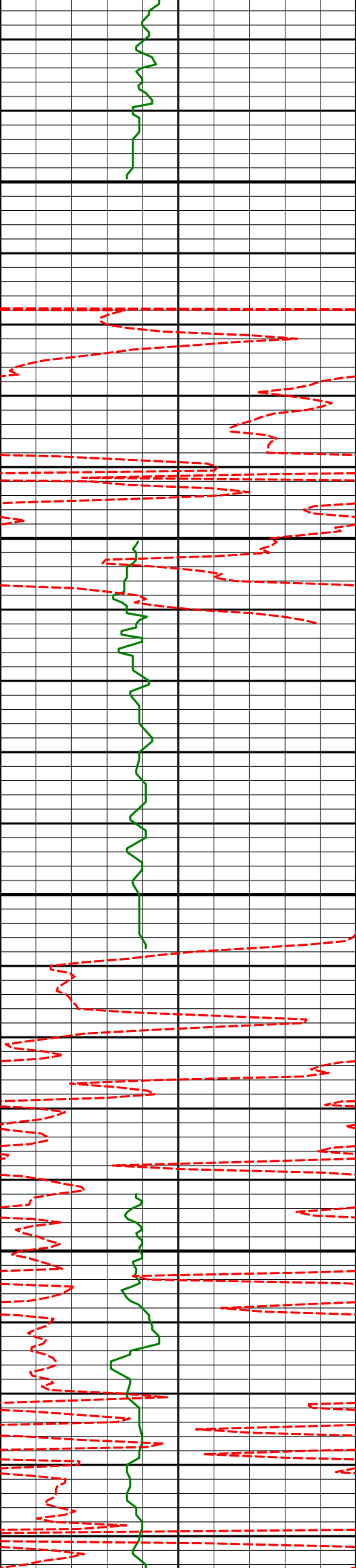
1011'

2.29°

203.69°

1010.70'

3.02'



1050

1100

1150

1200

1103'

2.44°

168.09°

1102.62'

3.31'

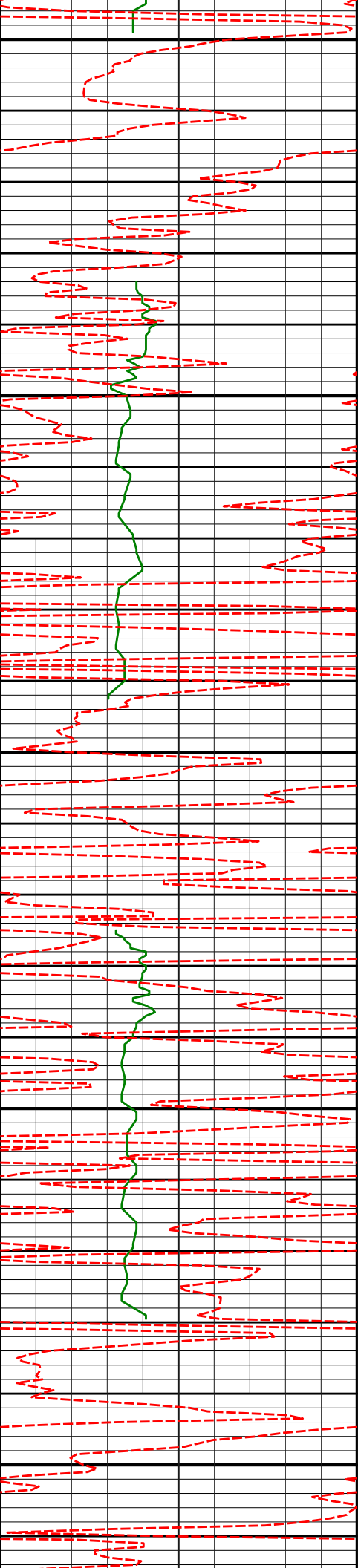
1195'

2.51°

125.06°

1194.54'

1.22'



1250

1300

1350

1400

1450

1286'

4.32°

111.92°

1285.38'

-3.62'

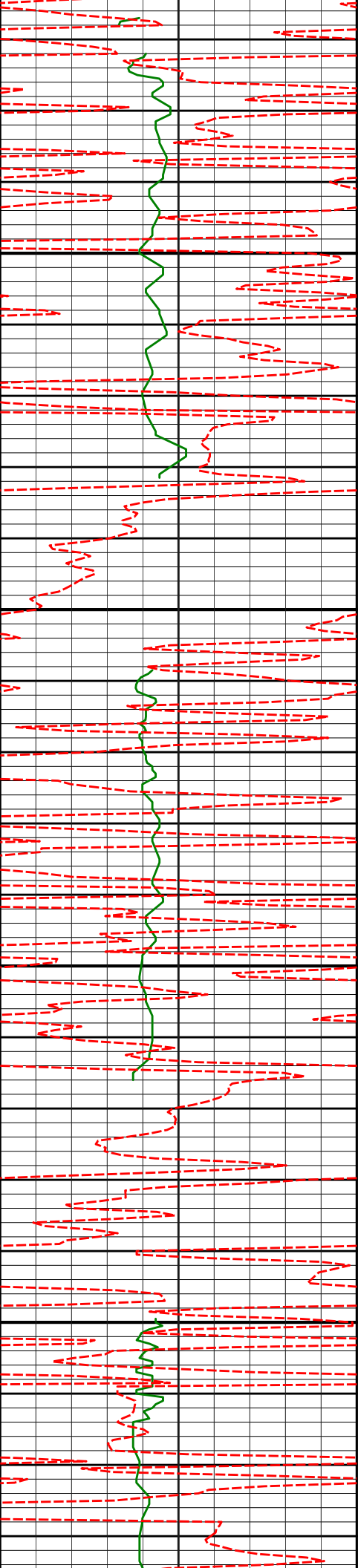
1377'

5.65°

125.43°

1376.04'

-10.50'



1469'

6.46°

116.52°

1467.53'

-18.88'

1500

1550

1561'

5.95°

114.16°

1558.99'

-27.91'

1600

1650

1653'

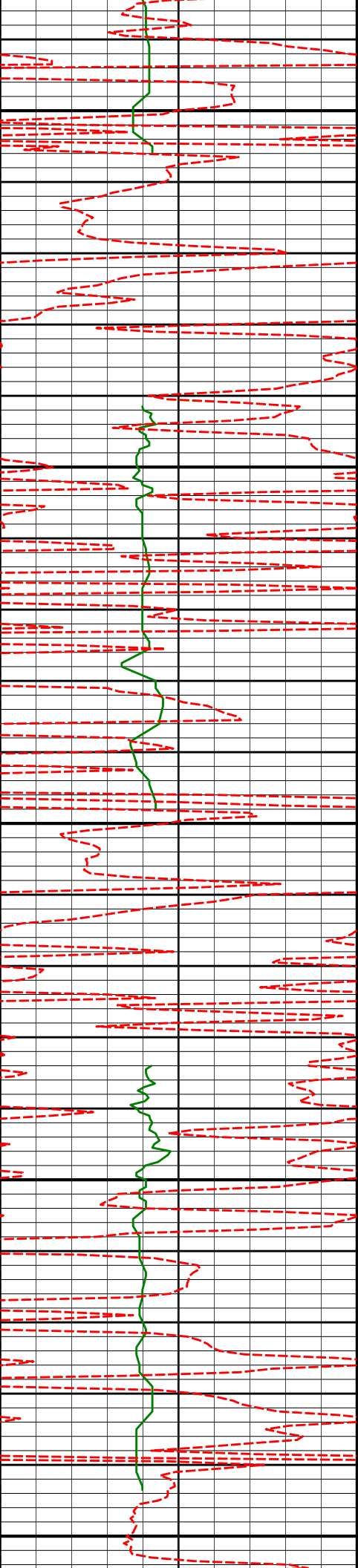
6.47°

95.24°

1650.46'

-37.45'





1700

1750

1800

1850

1900

1745'

7.19°

84.04°

1741.81'

-48.34'

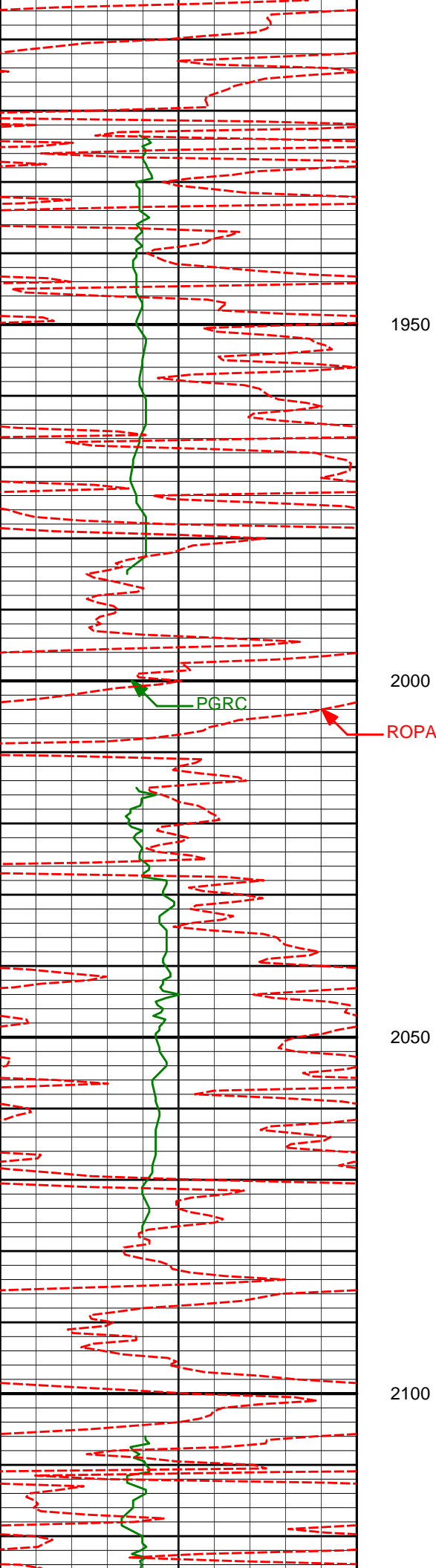
1837'

5.90°

80.23°

1833.21'

-58.71'



1928'	6.33°	62.64°	1923.70'	-67.73'
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1950

2000

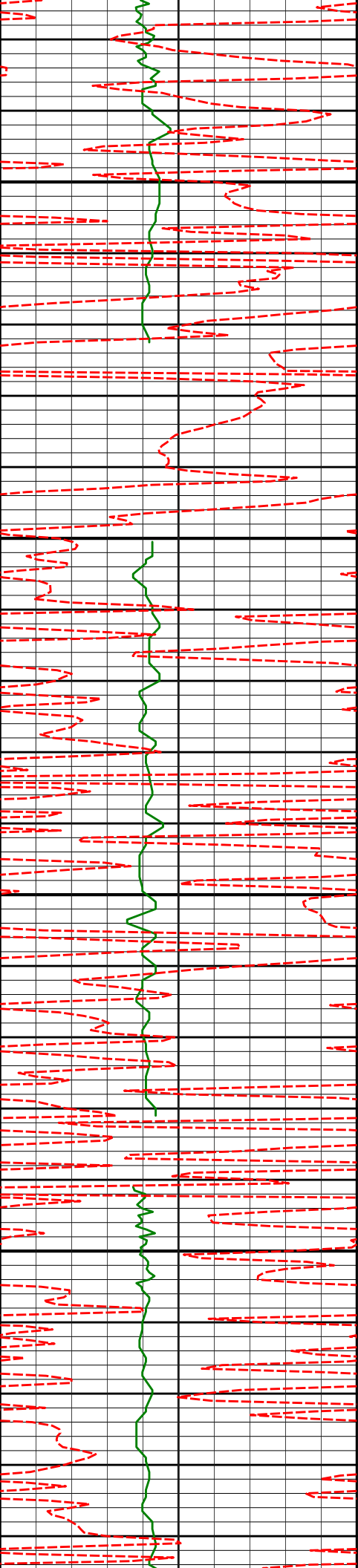
PGRC

2050

2100

2020'	7.17°	49.60°	2015.06'	-76.54'
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2112'	7.32°	46.82°	2106.33'	-85.09'
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2150

2200

2250

2300

2203'

8.06°

50.10°

2196.51'

-94.11'

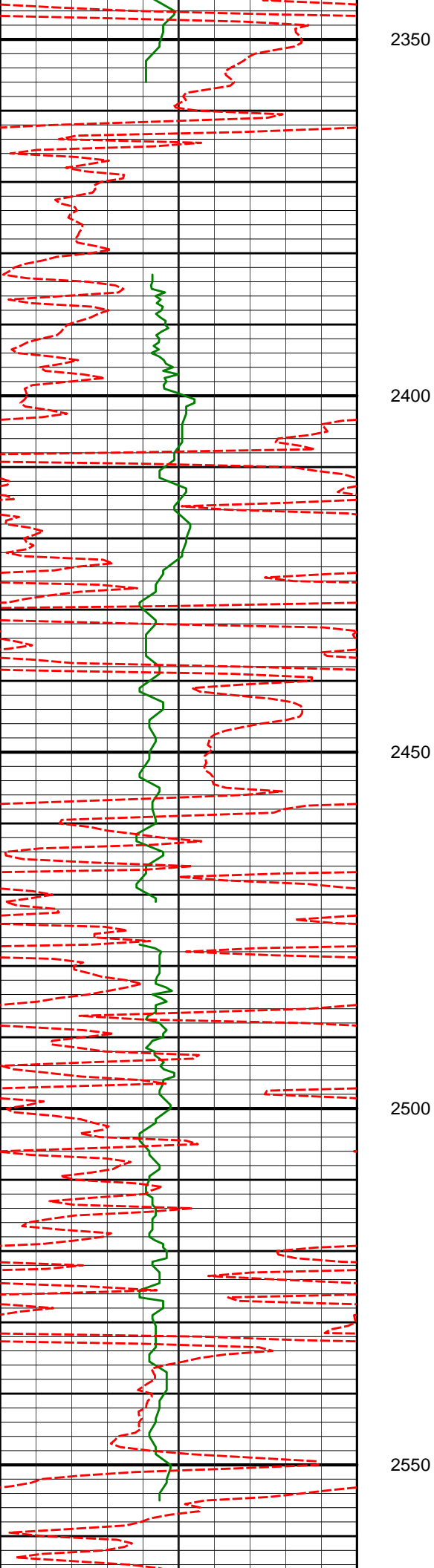
2295'

5.90°

48.26°

2287.82'

-102.50'



2386'

6.31°

50.71°

2378.31'

-109.79'

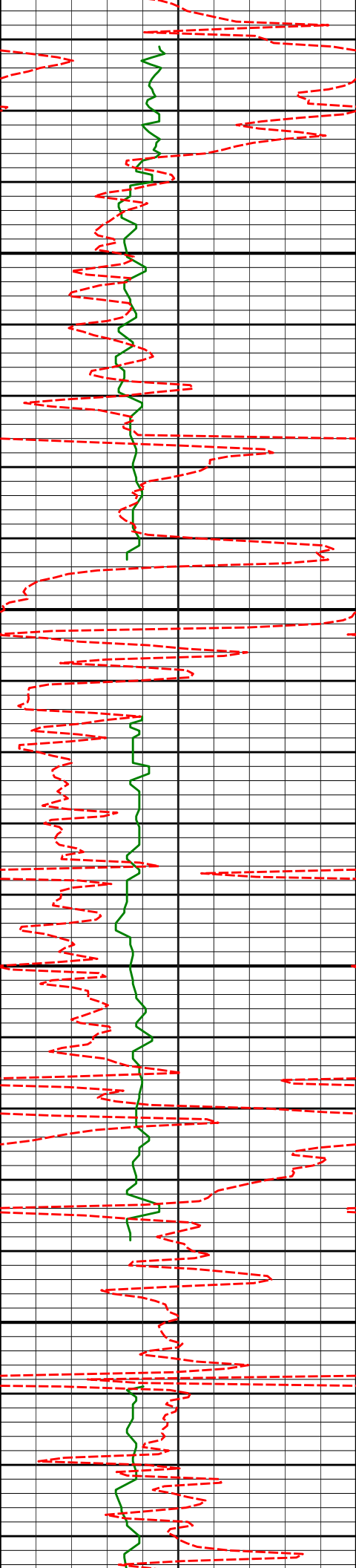
2481'

7.07°

52.95°

2472.66'

-118.41'



2575'

8.31°

59.77°

2565.81'

-128.81'

2600

2650

2669'

9.21°

65.48°

2658.72'

-141.45'

2700

2750

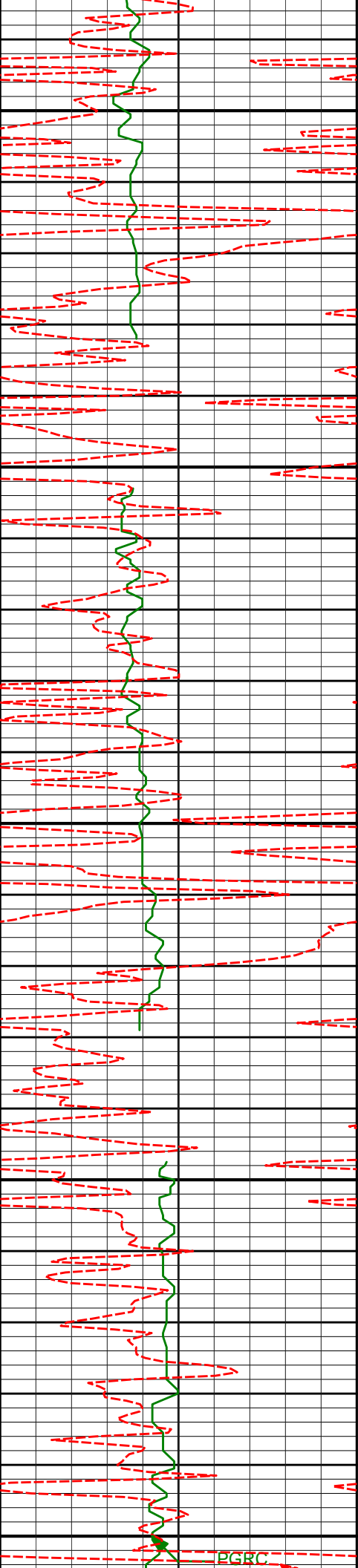
2764'

9.18°

65.25°

2752.50'

-155.17'



2800

2850

2900

2950

3000

2858'

9.20°

64.28°

2845.29'

-168.67'

2952'

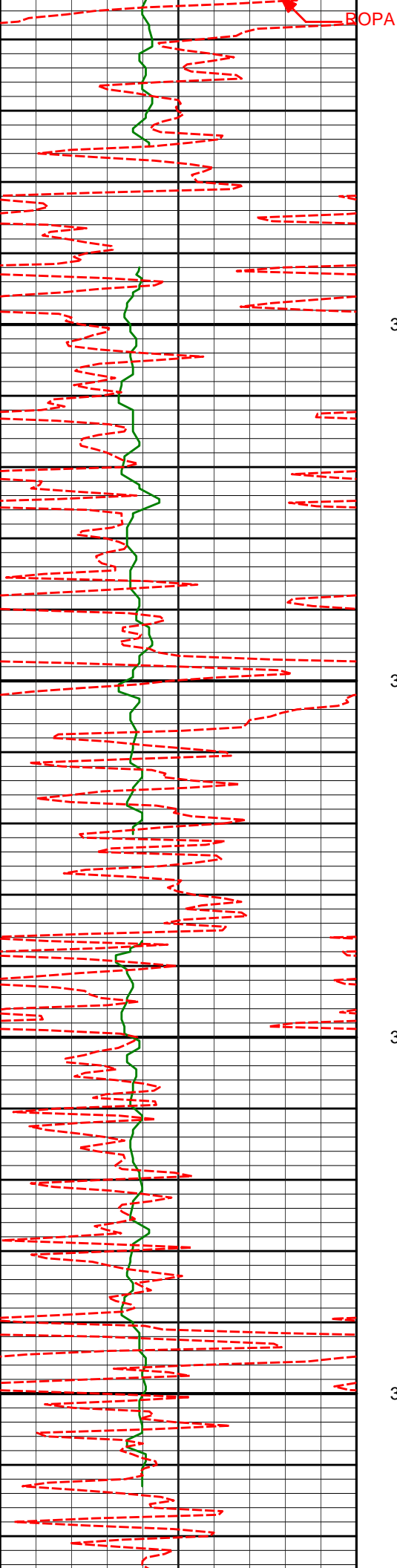
8.79°

63.27°

2938.13'

-181.78'

EGRC



3050

3047'

7.50°

62.79°

3032.17'

-193.70'

3100

3141'

7.23°

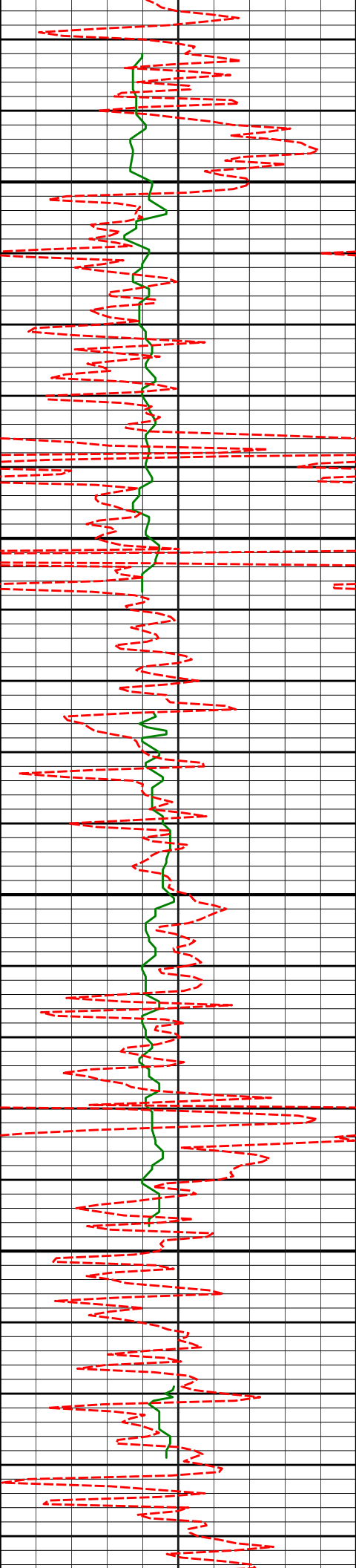
60.39°

3125.40'

-204.23'

3150

3200



3236'

6.27°

59.55°

3219.74'

-213.83'

3250

3300

3331'

5.06°

57.96°

3314.27'

-221.79'

3350

3400

3425'

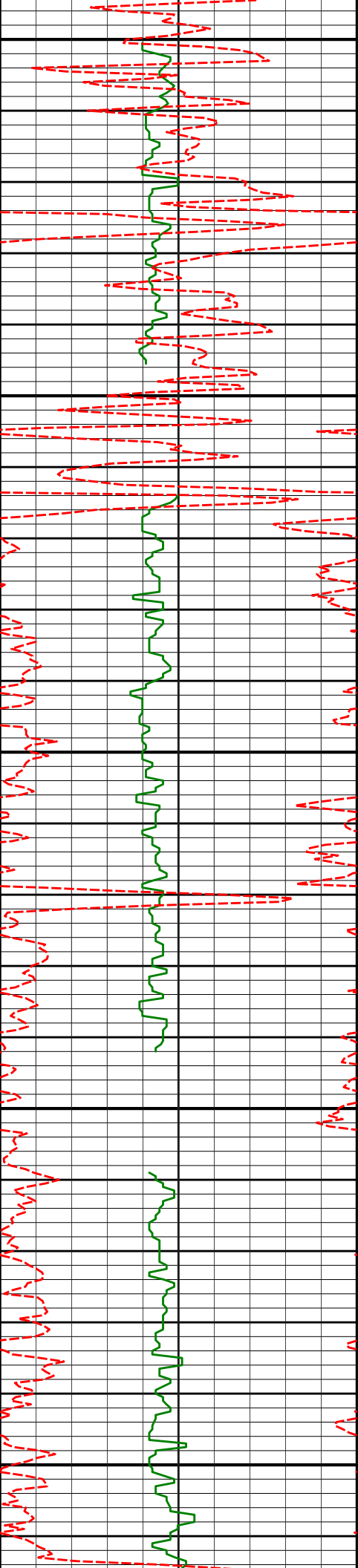
3.86°

52.60°

3407.99'

-227.77'





3450

3500

3550

3600

3650

3520'

3.00°

54.97°

3502.82'

-232.31'

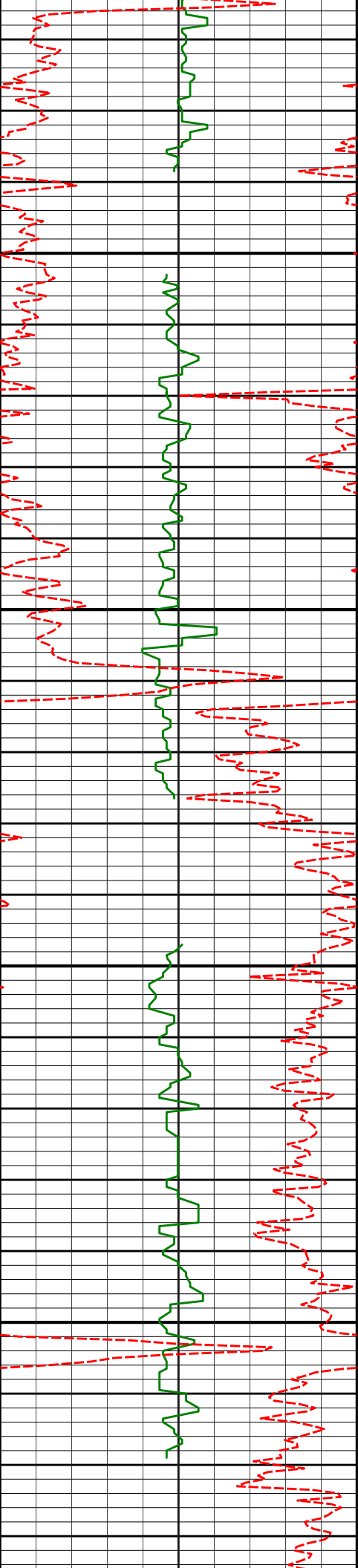
3614'

2.01°

43.74°

3596.73'

-235.43'



3700

3709'

1.60°

54.64°

3691.68'

-237.64'

3750

3800

3804'

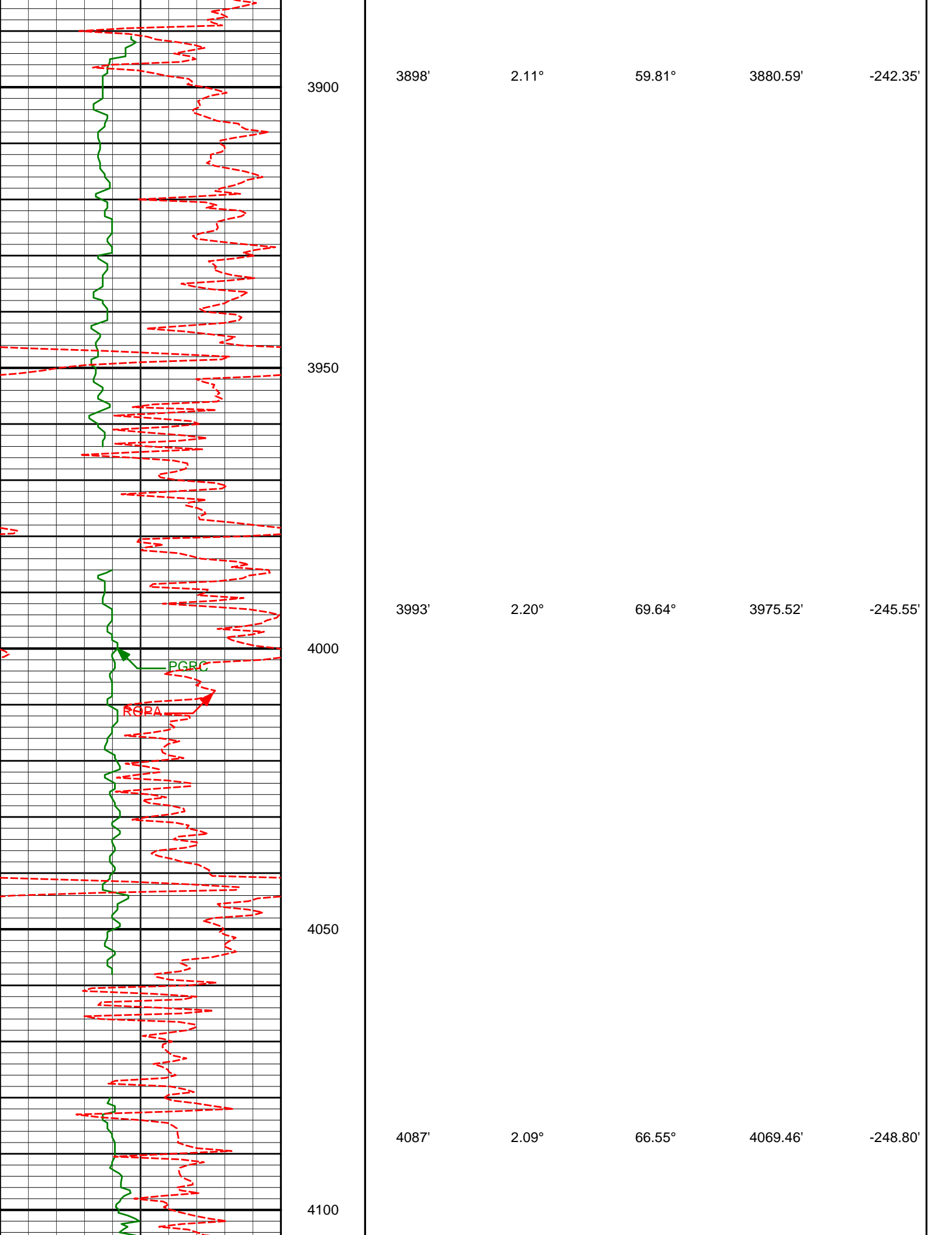
1.68°

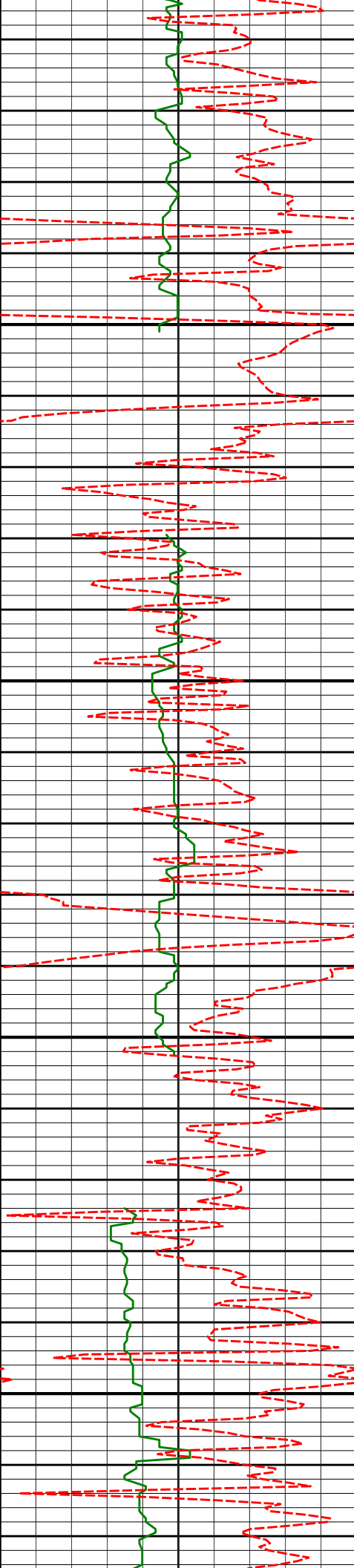
51.58°

3786.64'

-239.79'

3850





4150

4200

4250

4300

4182'

0.41°

210.36°

4164.44'

-250.21'

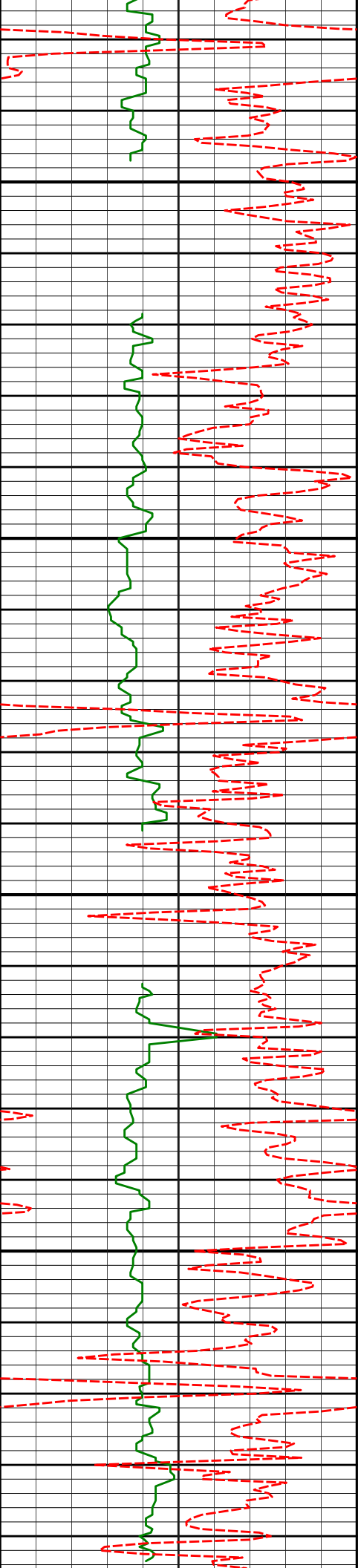
4277'

1.20°

225.77°

4259.43'

-249.34'



4350

4371'

1.36°

234.46°

4353.40'

-247.74'

4400

4450

4466'

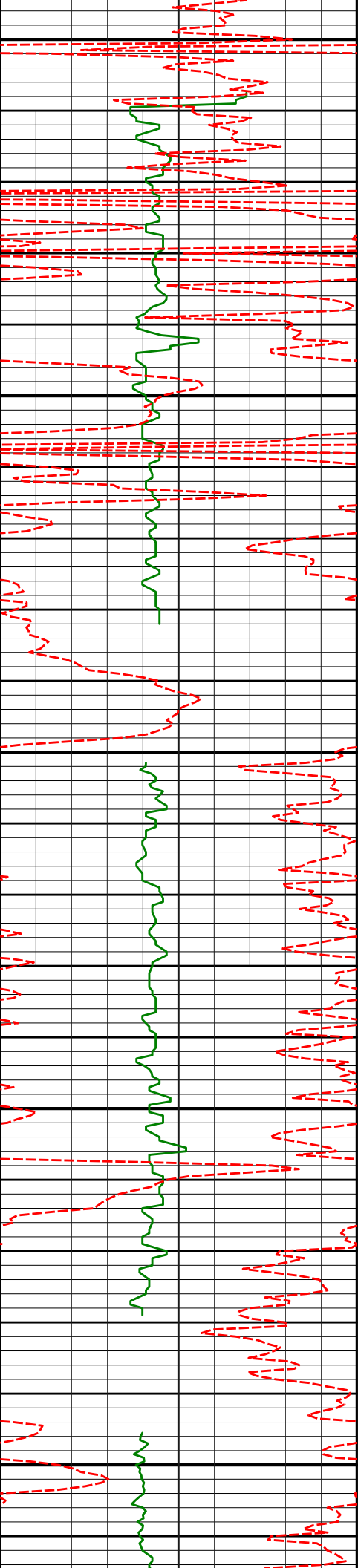
1.30°

233.47°

4448.38'

-245.97'

4500



4550

4560'

1.55°

218.94°

4542.35'

-244.34'

4600

4650

4655'

1.47°

226.34°

4637.32'

-242.67'

4700

4750

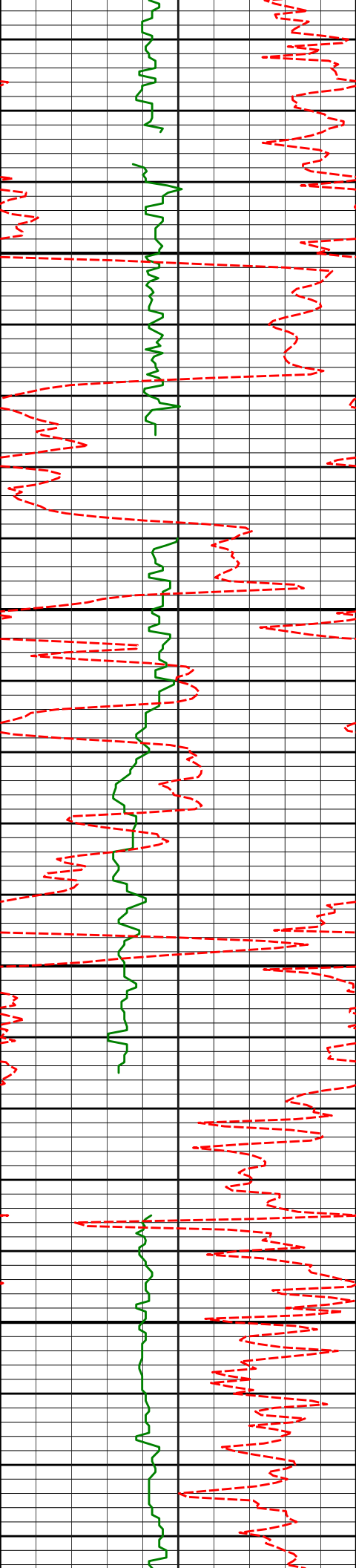
4750'

0.93°

289.45°

4732.30'

-241.07'



4800

4844'

1.24°

342.53°

4826.28'

-240.03'

4850

4900

4939'

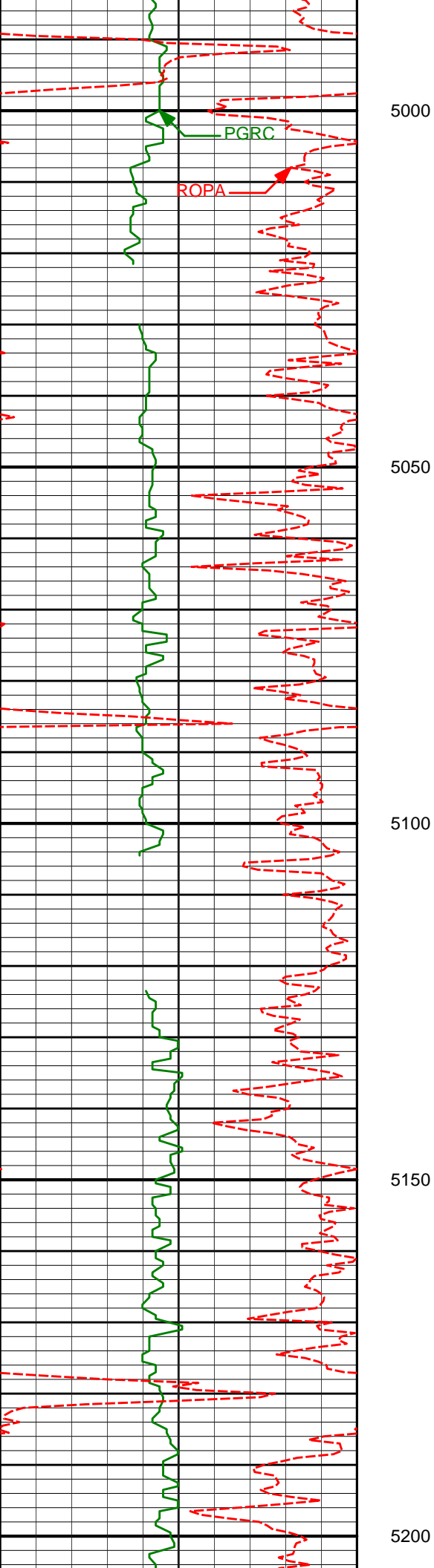
1.44°

340.75°

4921.26'

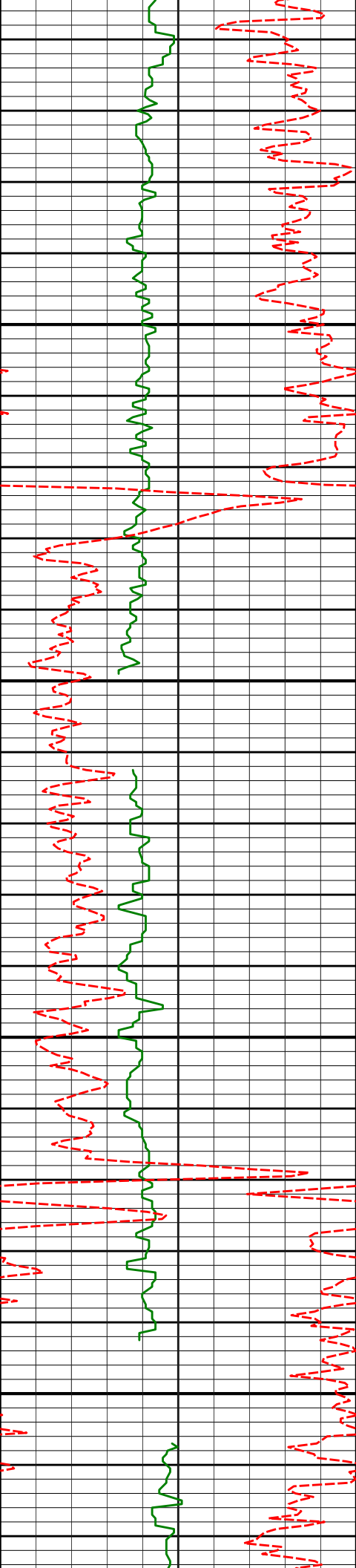
-239.30'

4950



5128'      0.87°      340.12°      5110.22'      -237.99'





5250

5300

5350

5400

5222'

0.42°

336.16°

5204.21'

-237.59'

5317'

0.35°

325.33°

5299.21'

-237.28'

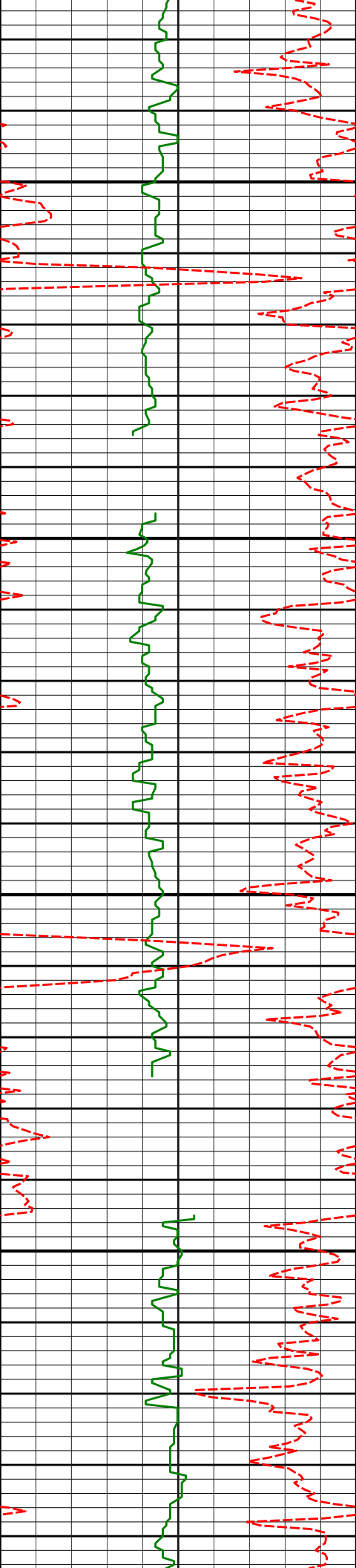
5411'

0.13°

347.88°

5393.21'

-237.09'



5450

5500

5550

5600

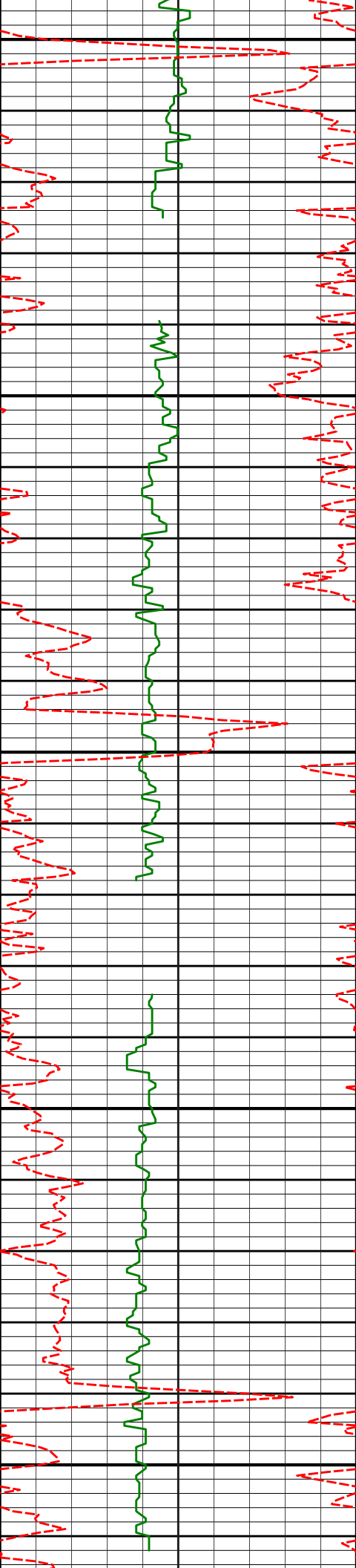
5600'

0.50°

156.55°

5582.21'

-237.38'



5650

5695'

0.50°

137.77°

5677.20'

-237.83'

5700

5750

5790'

0.63°

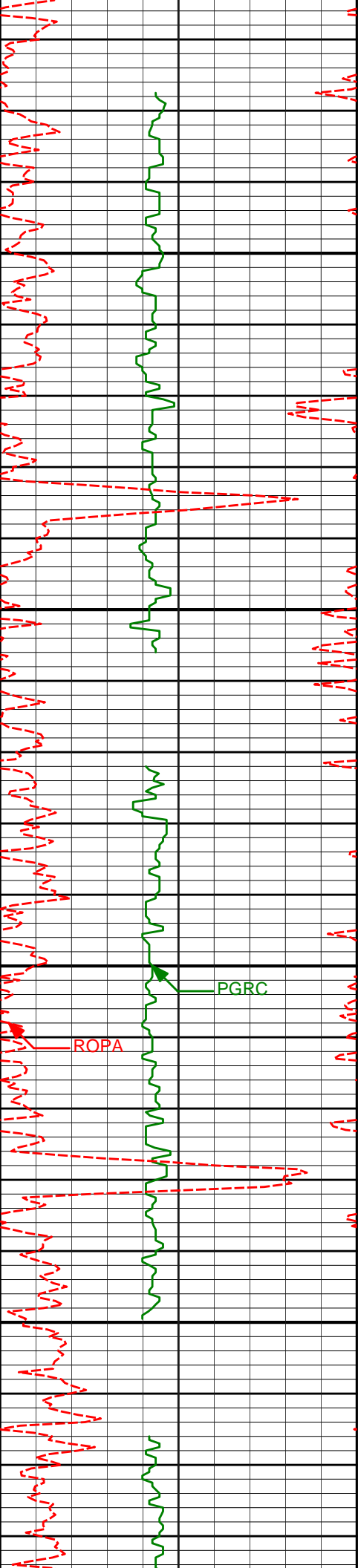
155.26°

5772.20'

-238.34'

5800

5850



5885'

0.60°

126.24°

5867.19'

-238.97'

5900

5950

5980'

0.83°

127.42°

5962.19'

-239.92'

6000

6050

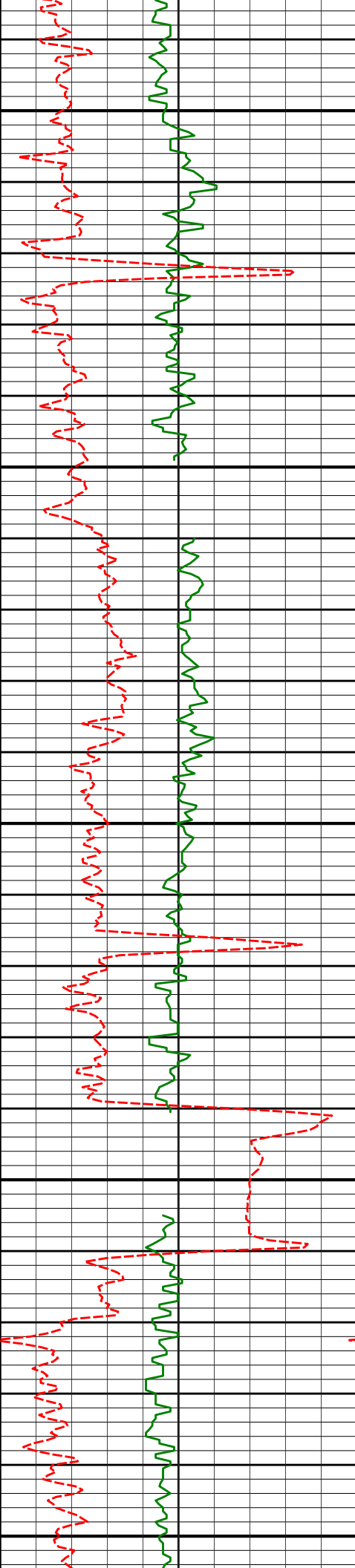
6075'

0.99°

107.35°

6057.18'

-241.26'



6100

6150

6200

6250

6300

6169'

0.99°

115.04°

6151.16'

-242.78'

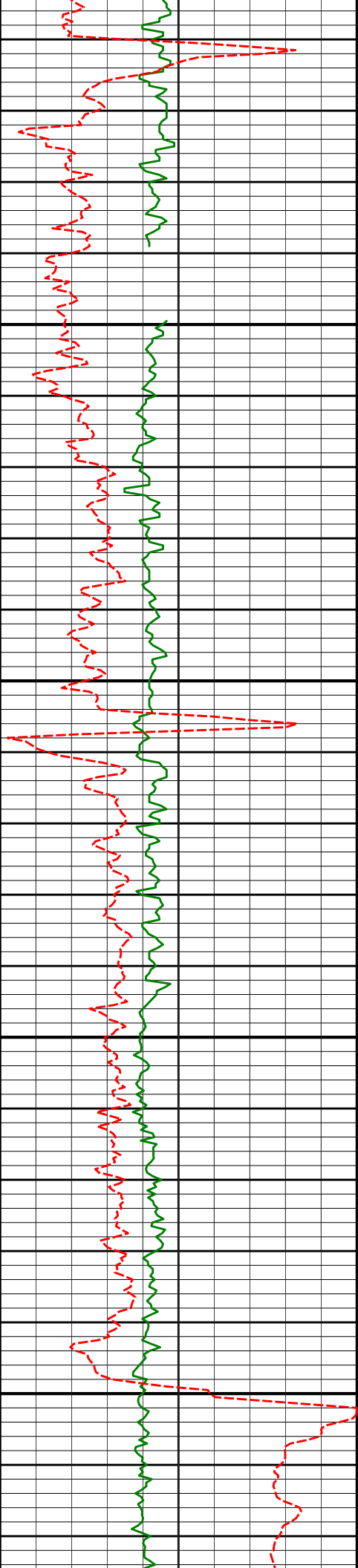
6264'

1.49°

80.48°

6246.14'

-244.74'



6350

6359'

1.68°

91.33°

63411.110'

-247.35'

6400

6450

6454'

2.48°

100.95°

6436.04'

-250.77'

6500

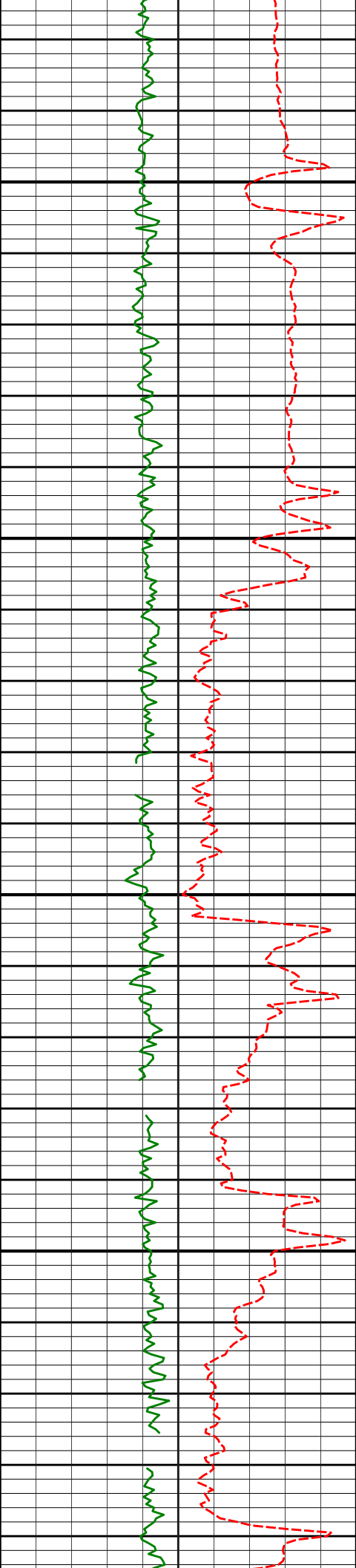
6501'

2.84°

107.63°

6482.99'

-252.88'



6550

6549'

1.51°

265.69°

6530.97'

-253.39'

6600

6596'

5.23°

277.47°

6577.89'

-250.64'

6650

6643'

11.41°

274.56°

6624.37'

-243.87'

6700

6690'

15.48°

275.08°

6670.07'

-232.97'

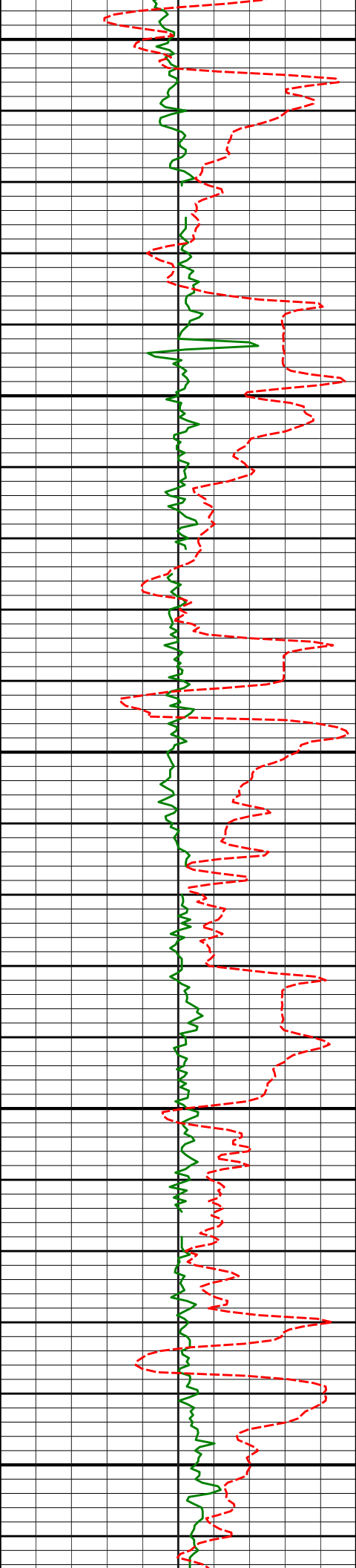
6738'

20.97°

272.65°

6715.65'

-217.99'



6750

6785'

23.88°

268.30°

6759.09'

-200.08'

6800

6833'

27.17°

264.51°

6802.40'

-179.47'

6850

6880'

31.33°

263.41°

6843.40'

-156.67'

6900

6928'

36.34°

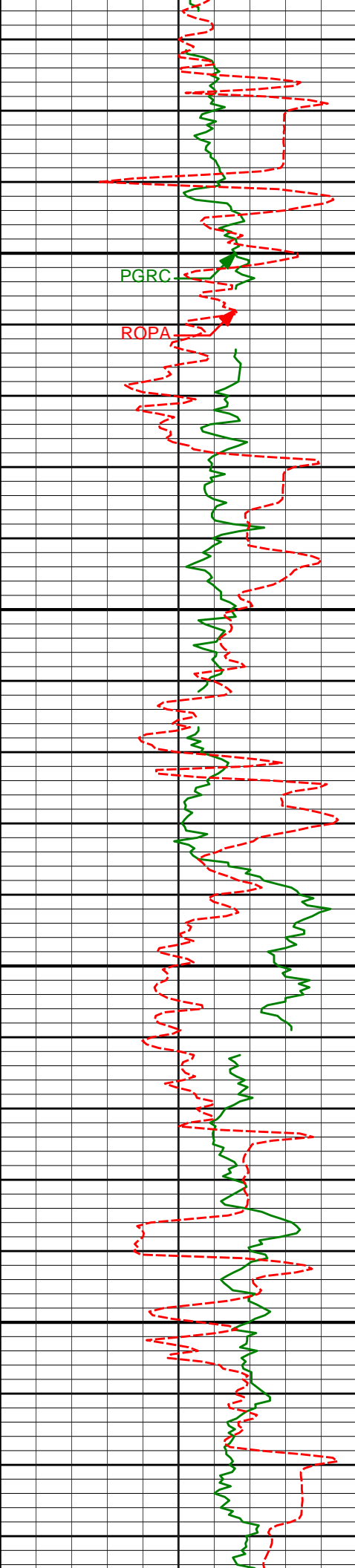
264.27°

6883.26'

-130.14'

6950





7000

7050

7100

7150

6975'

41.60°

264.97°

6919.79'

-100.76'

7023'

45.58°

263.59°

6954.55'

-67.88'

7070'

50.43°

264.98°

6985.99'

-33.17'

7118'

57.22°

267.31°

7014.30'

5.43'

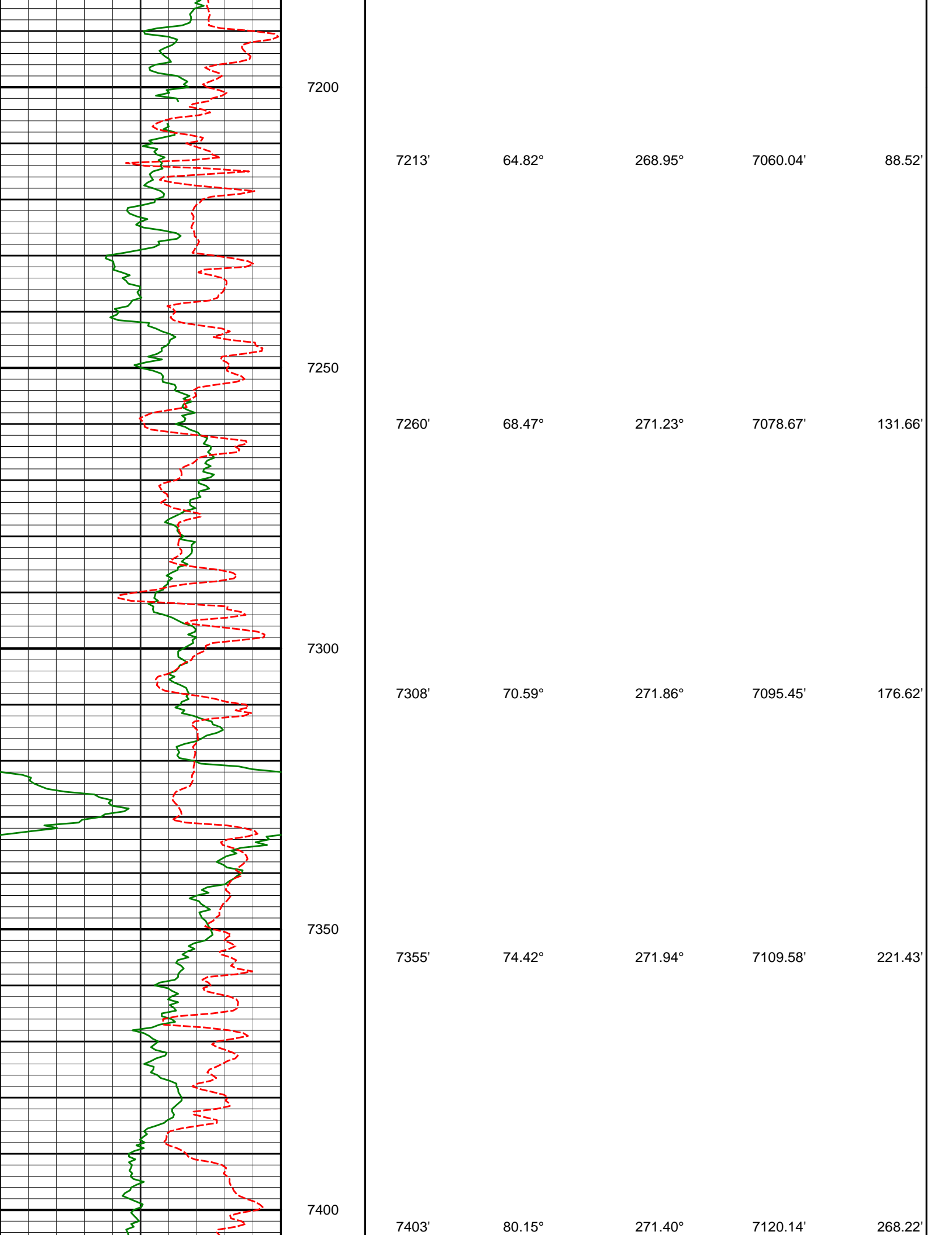
7165'

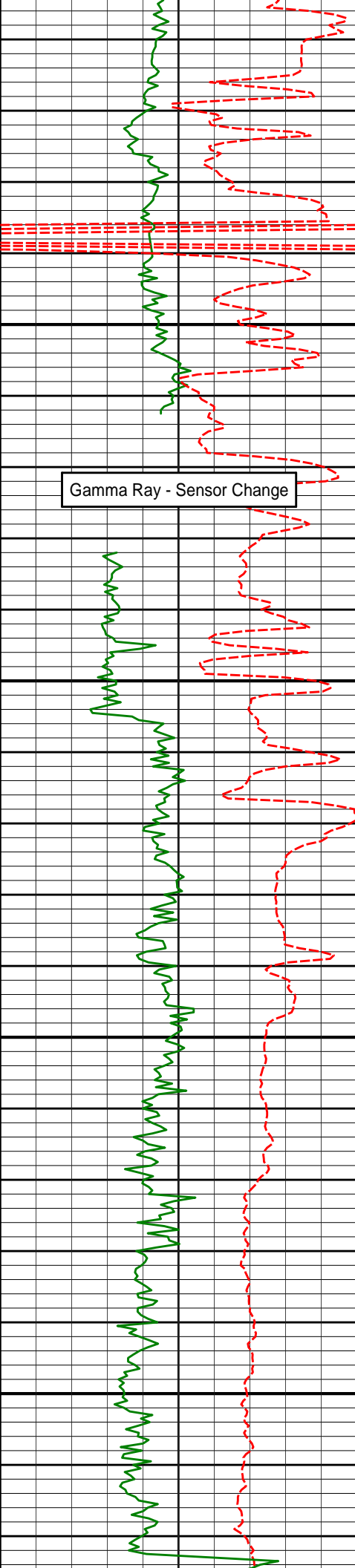
61.34°

267.89°

7038.31'

45.76'





7450

7450'

83.89°

271.26°

7126.67'

314.76'

7466'

85.43°

271.68°

7128.15'

330.68'

7550

7568'

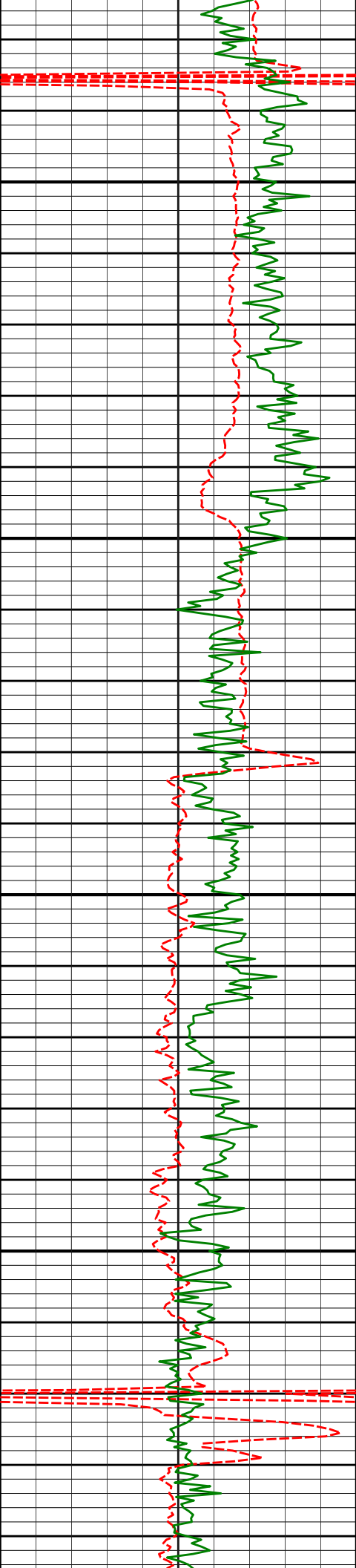
90.25°

270.97°

7132.00'

432.57'

7600



7650

7663'

90.74°

271.08°

7131.18'

527.57'

7700

7750

7757'

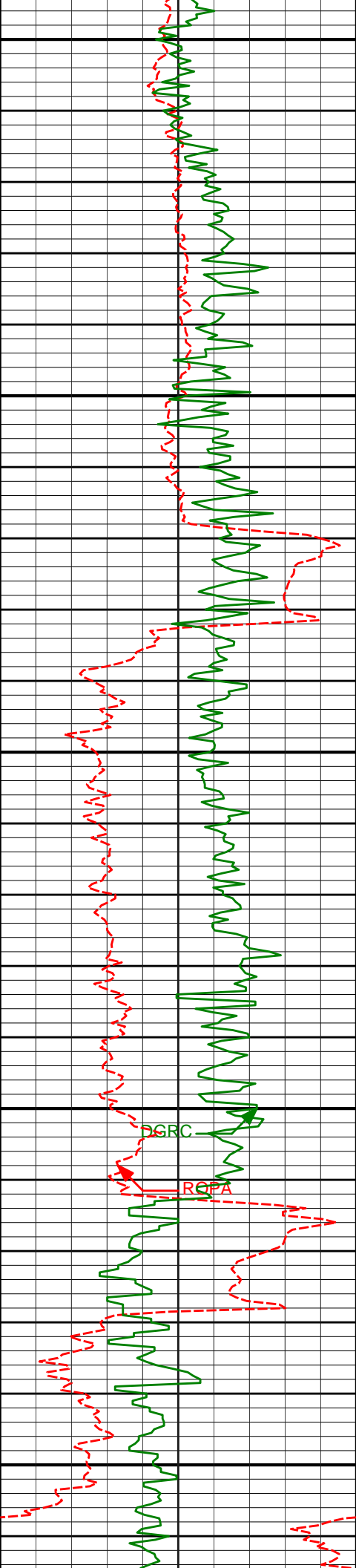
91.36°

271.53°

7129.45'

621.55'

7800



7850

7852'

91.98°

271.72°

7126.69'

716.49'

7900

7950

7947'

90.93°

270.64°

7124.27'

811.46'

8000

DGRC

ROFA

8050

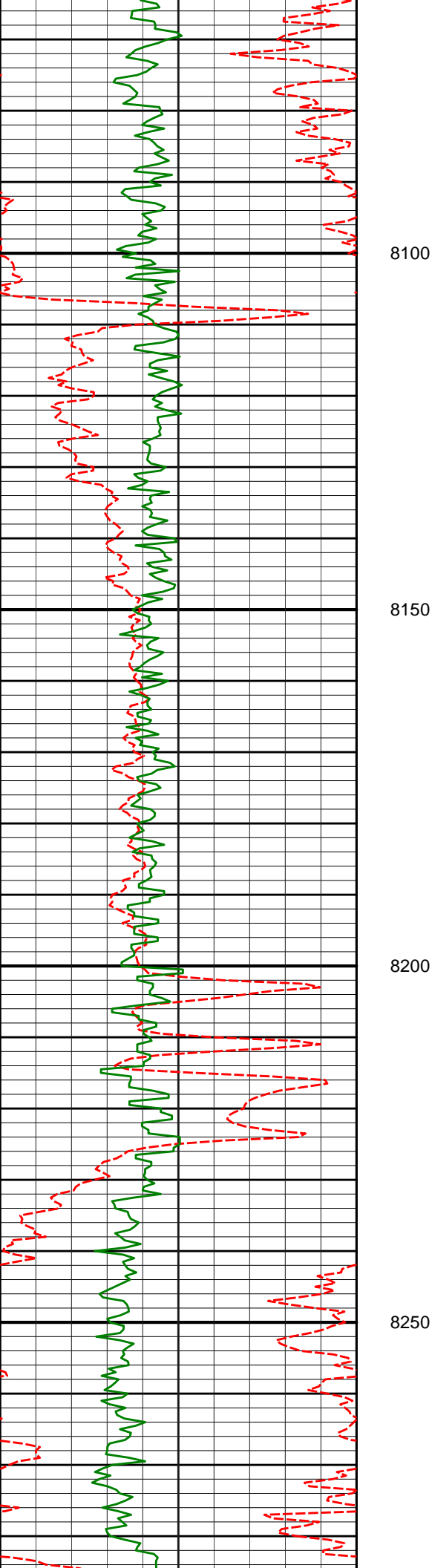
8042'

89.14°

270.56°

7124.22'

906.45'



8100

8150

8200

8250

8137'

88.15°

274.31°

7126.46'

1001.36'

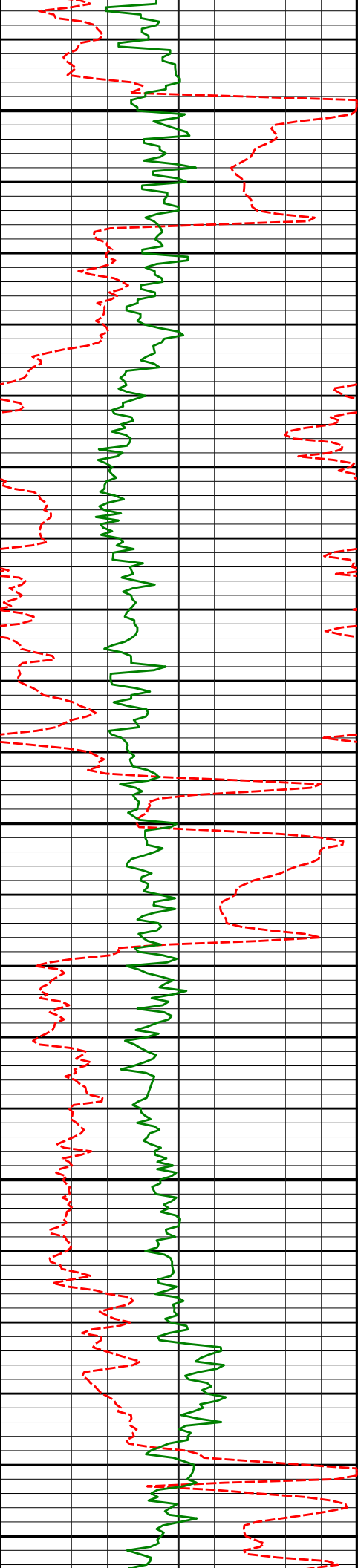
8232'

88.89°

277.38°

7128.92'

1095.94'



8300

8326'

90.19°

276.70°

7129.67'

1189.35'

8350

8400

8421'

90.12°

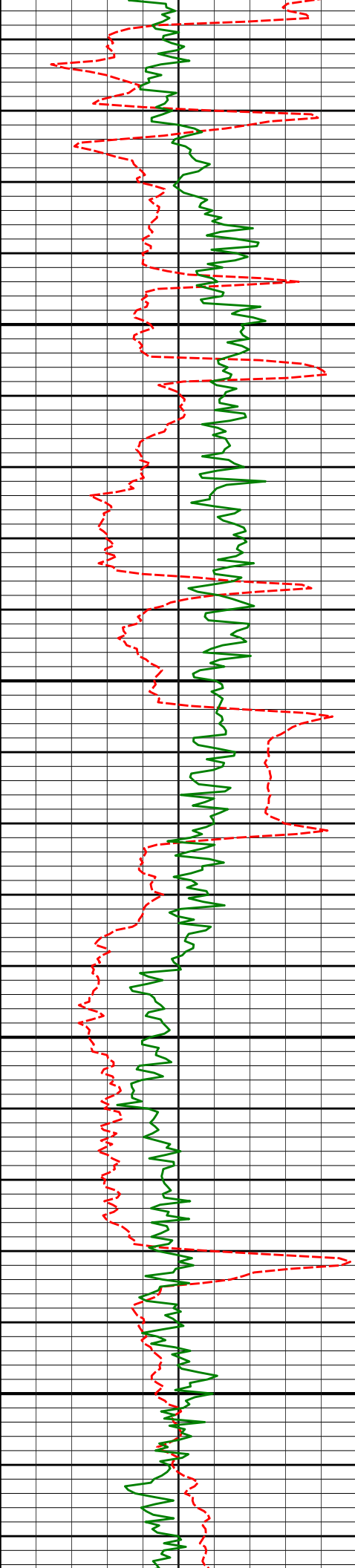
275.40°

7129.41'

1283.94'

8450

8500



8516'

90.12°

274.89°

7129.22'

1378.65'

8550

8600

8611'

89.94°

272.92°

7129.17'

1473.49'

8650

8700

8706'

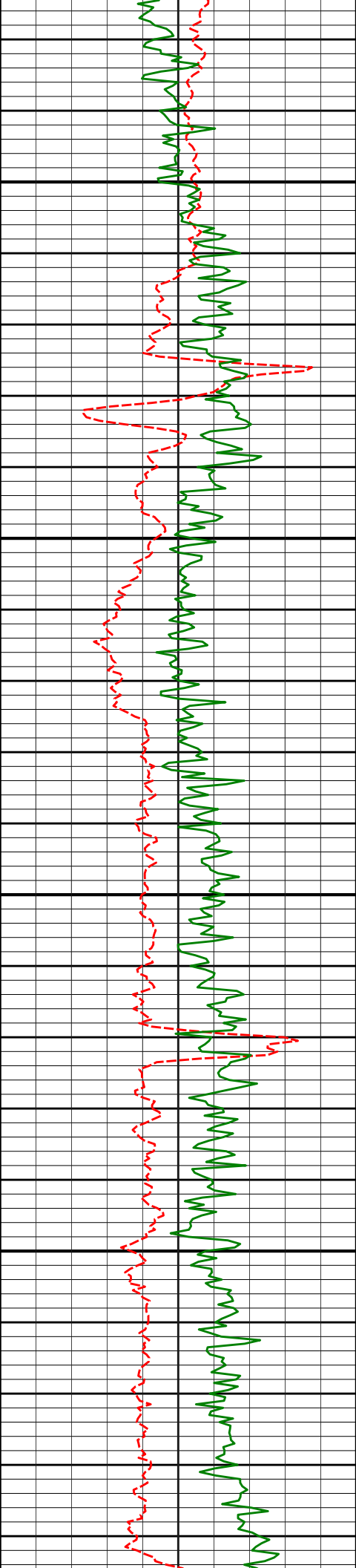
90.19°

271.85°

7129.06'

1568.45'





8750

8800

8850

8900

8800'

91.17°

271.52°

7127.94'

1662.43'

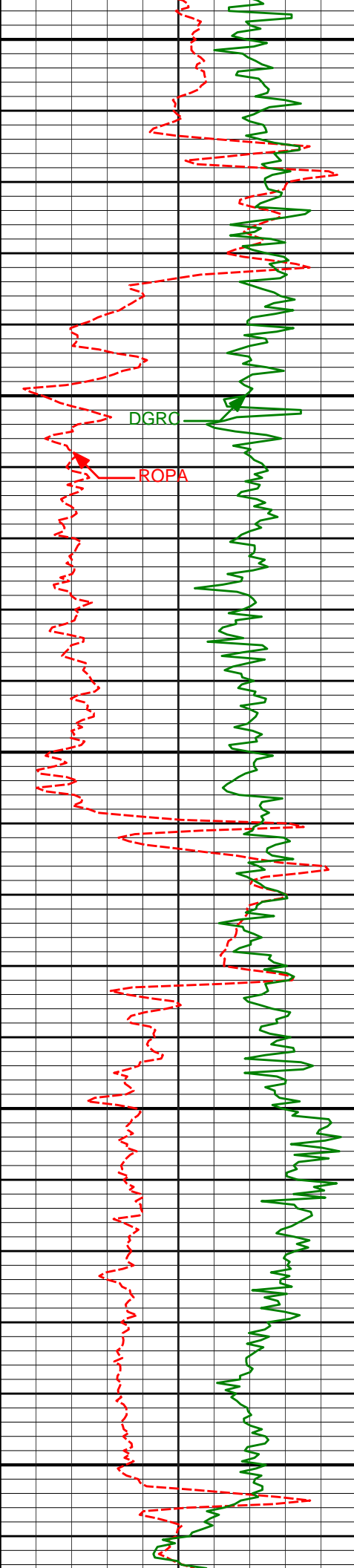
8895'

92.16°

270.68°

7125.18'

1757.39'



8950

8990'

91.30°

269.86°

7122.31'

1852.34'

9000

DGRO

ROPA

9050

9084'

89.26°

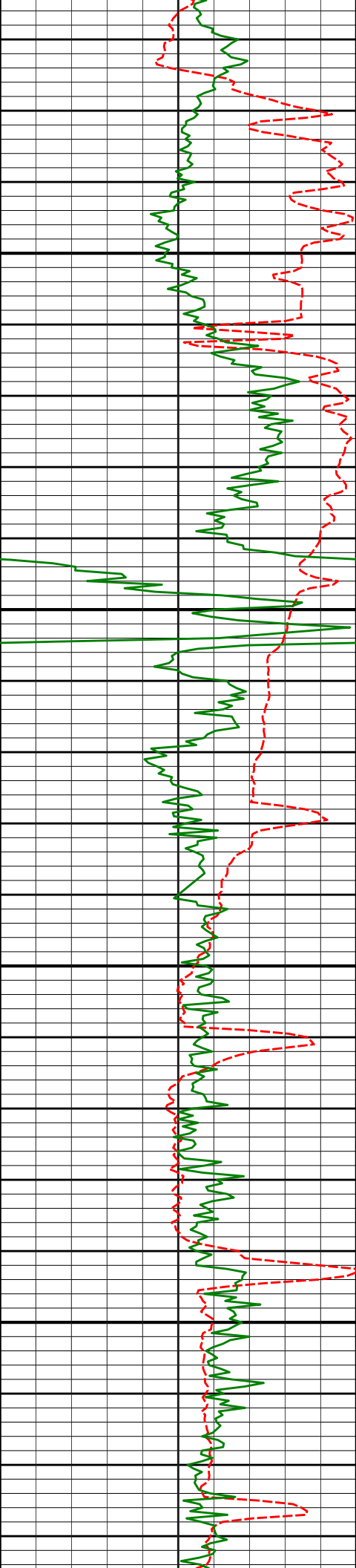
268.30°

7121.85'

1946.29'

9100

9150



<Run 300>  
9200

9250

9300

9350

9179'

89.07°

268.09°

7123.24'

2041.19'

9273'

89.38°

267.94°

7124.51'

2135.08'

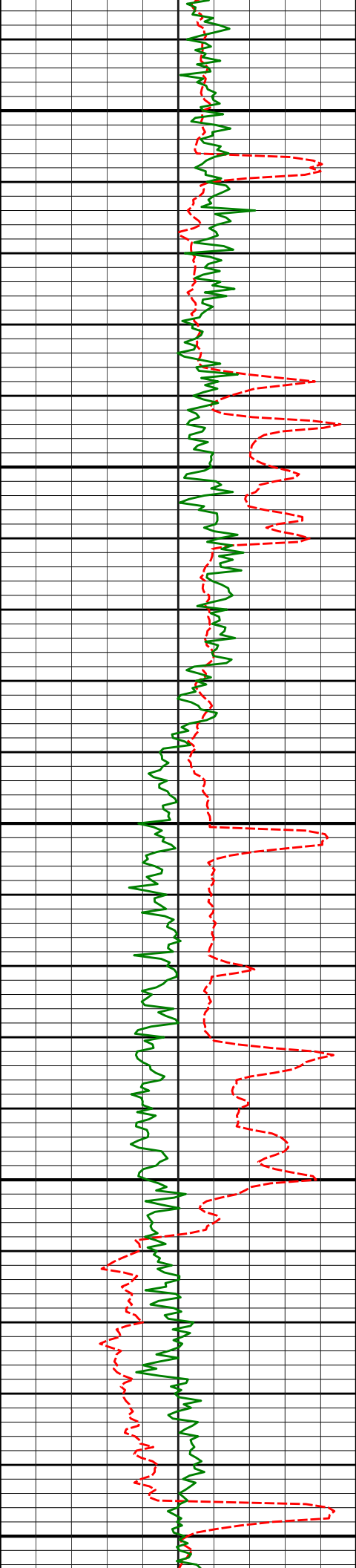
9368'

89.88°

267.75°

7125.12'

2229.96'



9400

9450

9500

9550

9600

9462'

89.88°

269.05°

7125.32'

2323.88'

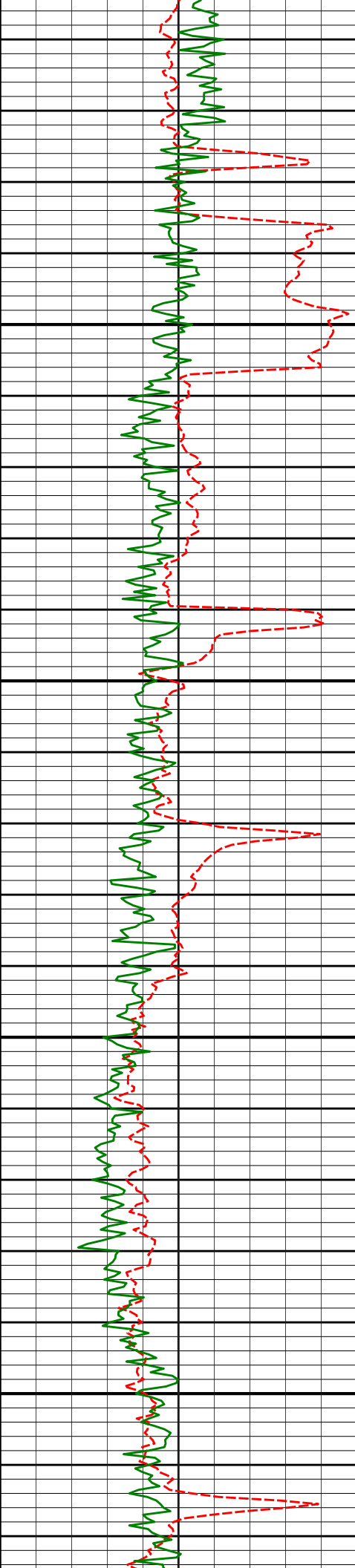
9557'

89.32°

269.45°

7125.98'

2418.85'



9650

9651'

89.07°

270.56°

7127.31'

2512.83'

9700

9750

9746'

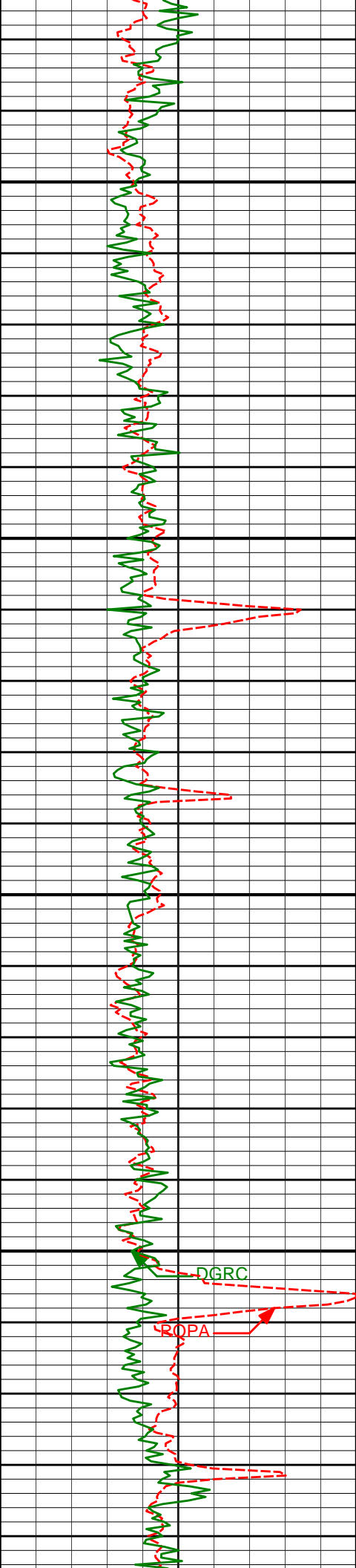
89.20°

270.64°

7128.74'

2607.82'

9800



9850

9900

9950

10000

9841'

89.13°

270.89°

7130.12'

2702.81'

9936'

89.63°

271.15°

7131.15'

2797.80'

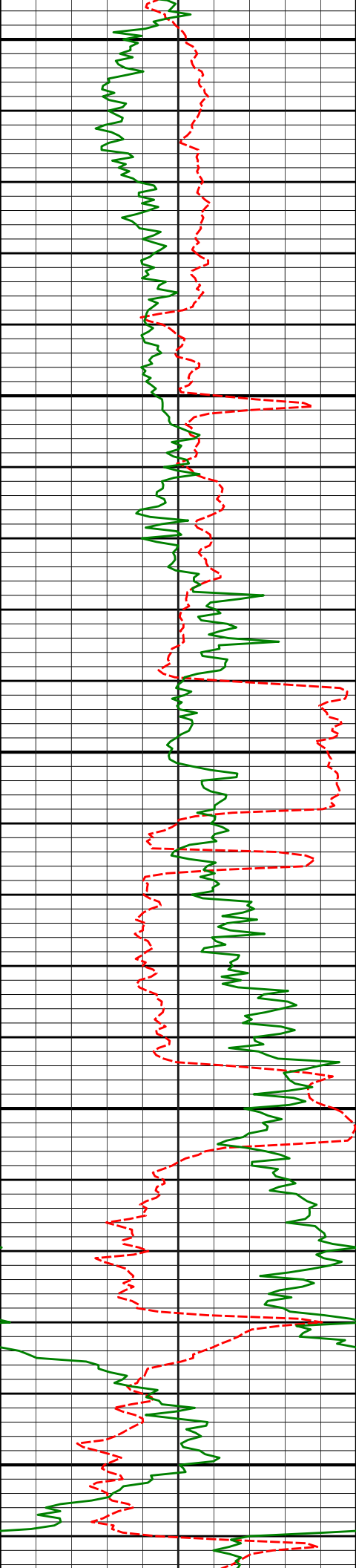
10030'

90.37°

270.60°

7131.15'

2891.80'



10050

10100

10150

10200

10250

10125'

91.98°

270.48°

7129.20'

2986.78'

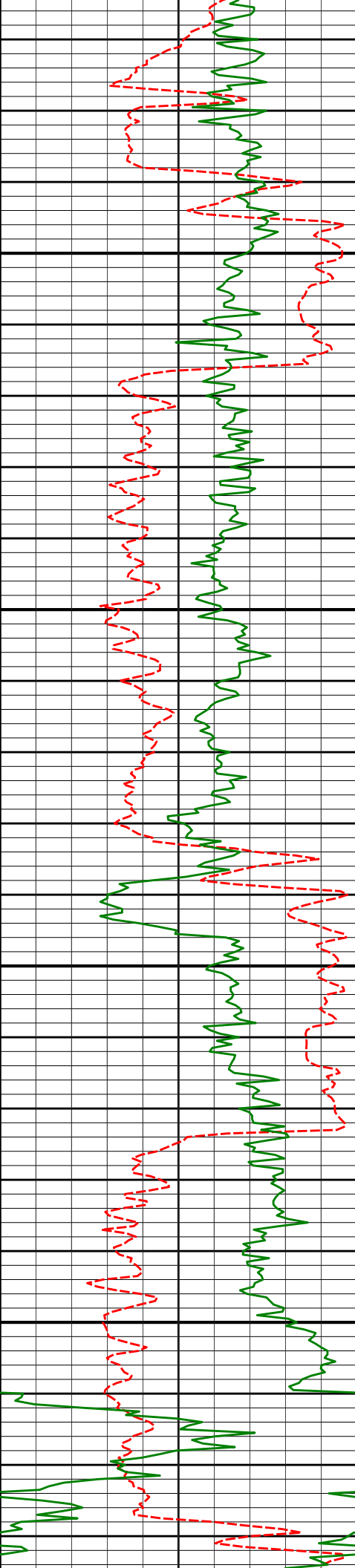
10220'

92.10°

270.42°

7125.82'

3081.72'



10300

10315'

91.67°

270.27°

7122.70'

3176.66'

10350

10400

10410'

91.98°

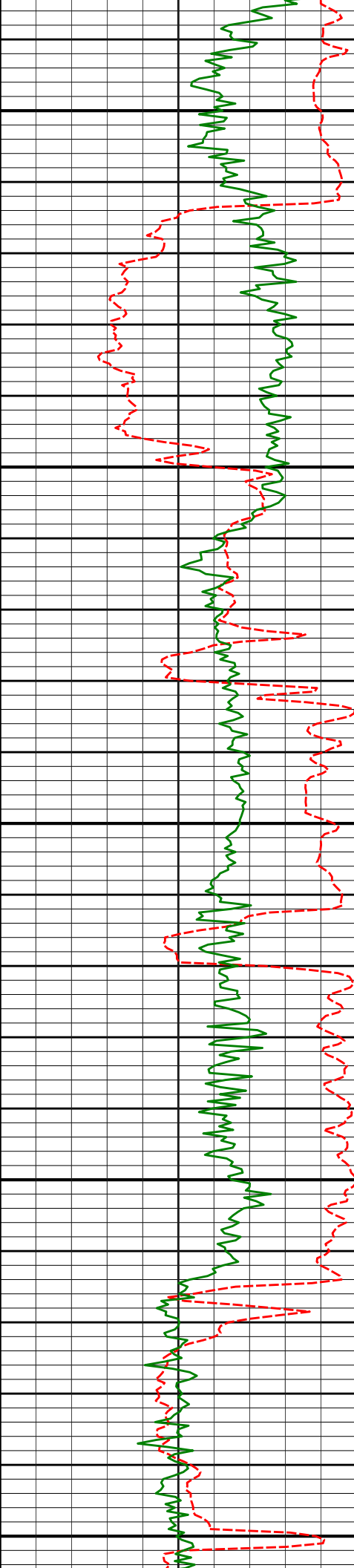
268.74°

7119.67'

3271.59'

10450





10500

10504'

91.61°

268.19°

7116.73'

3365.48'

10550

10600

10599'

90.99°

267.92°

7114.57'

3460.35'

10650

10700

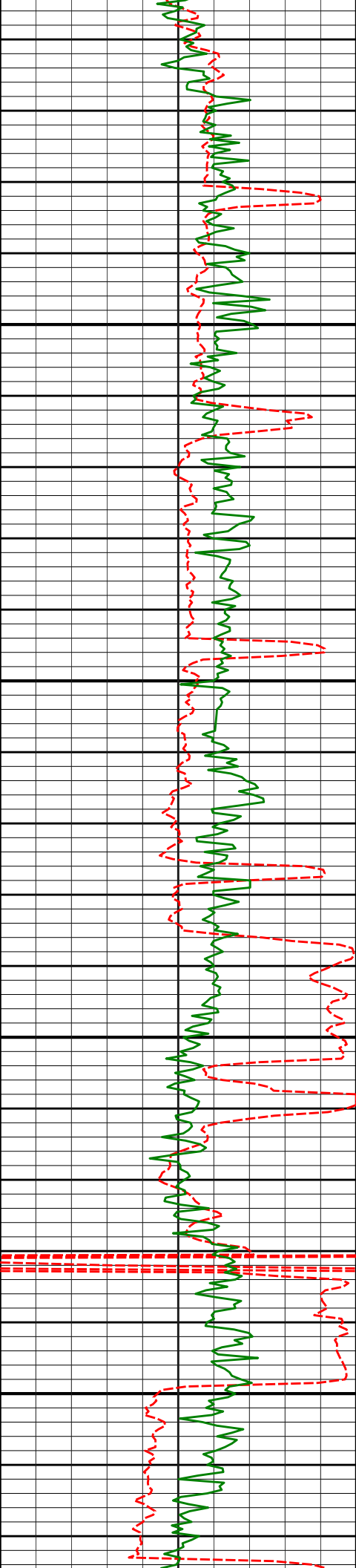
10694'

89.20°

269.22°

7114.41'

3555.28'



10750

10800

10850

10900

10789'

90.06°

268.86°

7115.03'

3650.24'

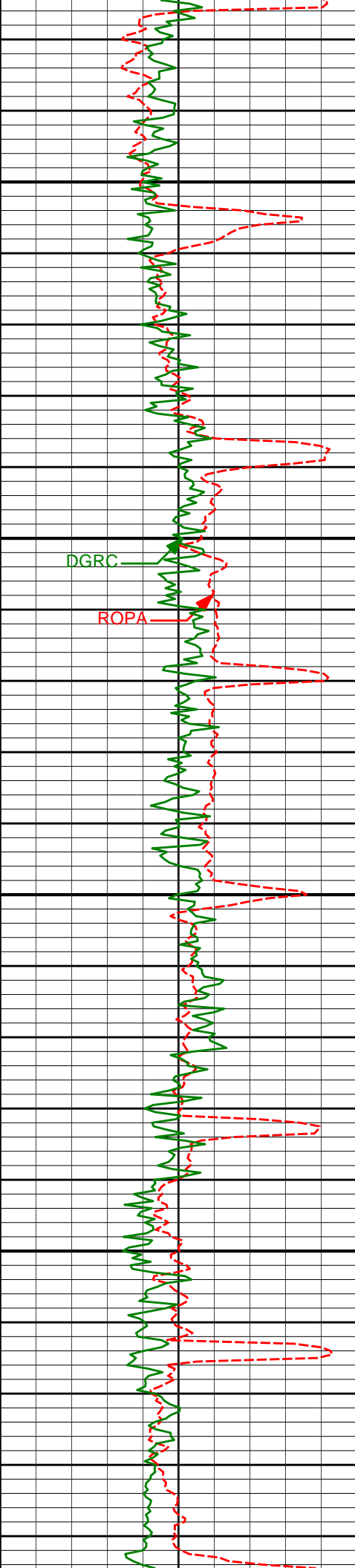
10884'

87.96°

269.01°

7116.67'

3745.17'



10950

10979'

87.77°

268.95°

7120.21'

3840.06'

11000

DGRC

ROPA

11050

11074'

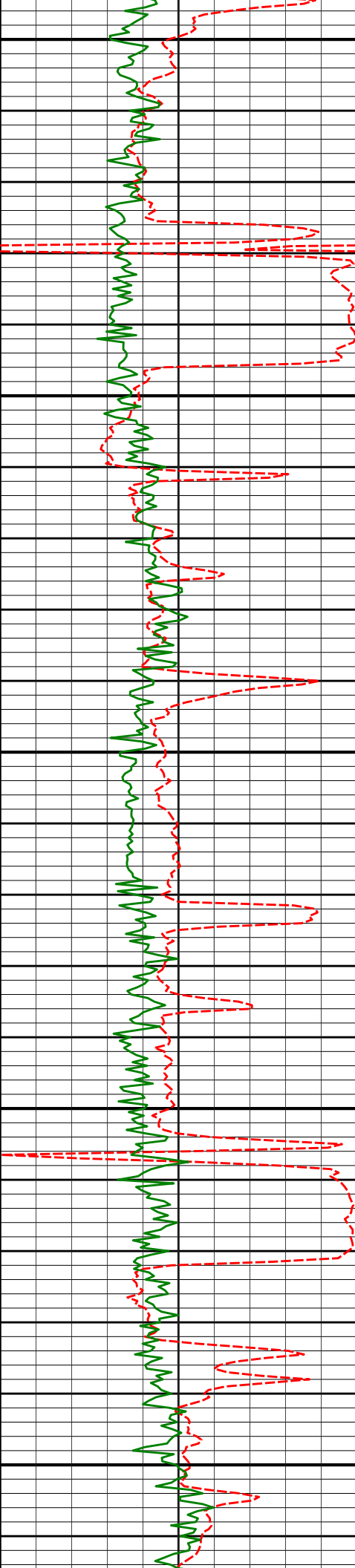
88.14°

268.43°

7123.60'

3934.95'

11100



11150

11169'

88.46°

268.10°

7126.42'

4029.82'

11200

11250

11263'

88.89°

269.09°

7128.59'

4123.73'

11300

11350

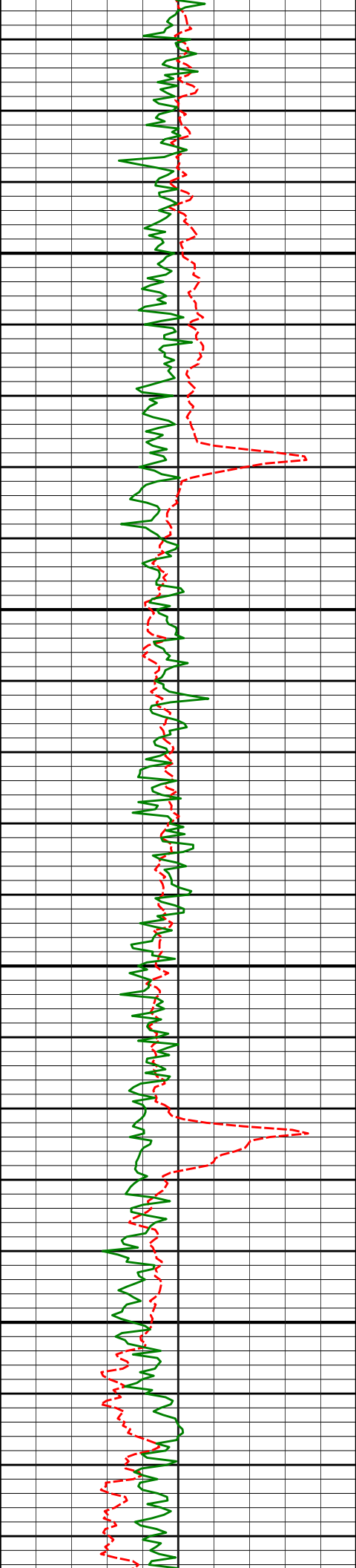
11358'

88.70°

270.49°

7130.59'

4218.69'



11400

11450

11500

11550

11453'

88.76°

270.62°

7132.69'

4313.67'

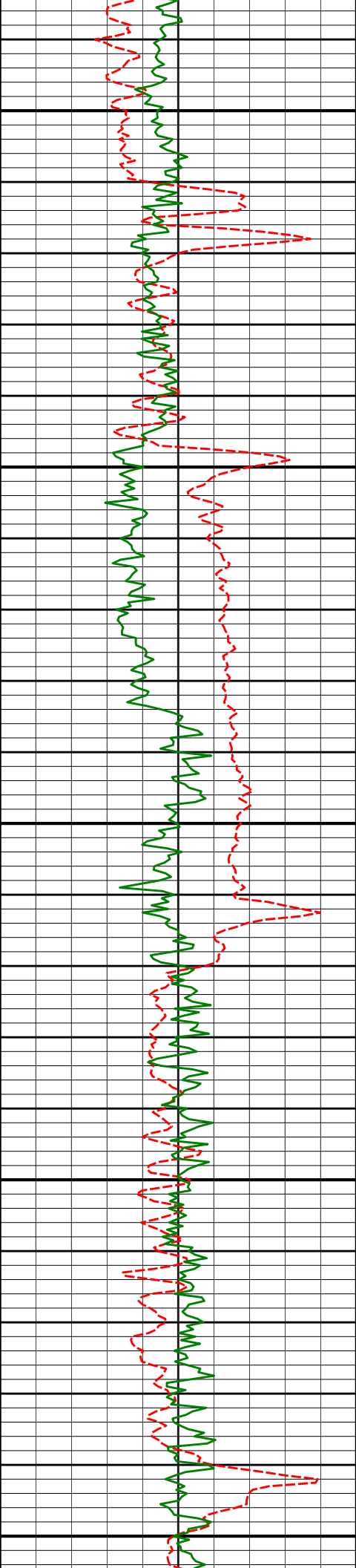
11548'

89.69°

270.67°

7133.98'

4408.66'



11600

11650

11700

11750

11800

11643'

89.01°

271.74°

7135.06'

4503.65'

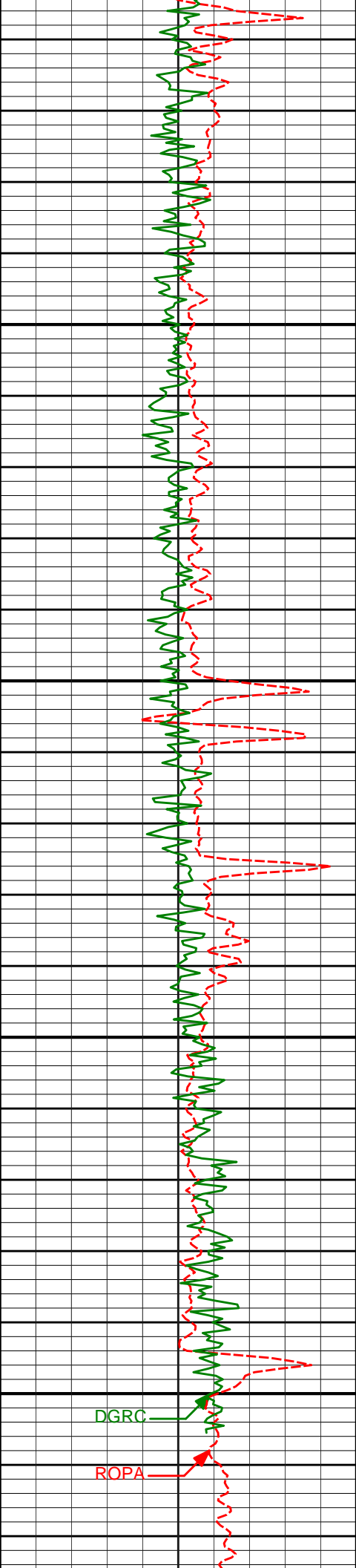
11738'

88.95°

270.99°

7136.75'

4598.63'



11850

11900

11950

12000

11833'

88.64°

270.05°

7138.75'

4693.60'

11927'

88.89°

269.08°

7140.77'

4787.56'

11989'

88.76°

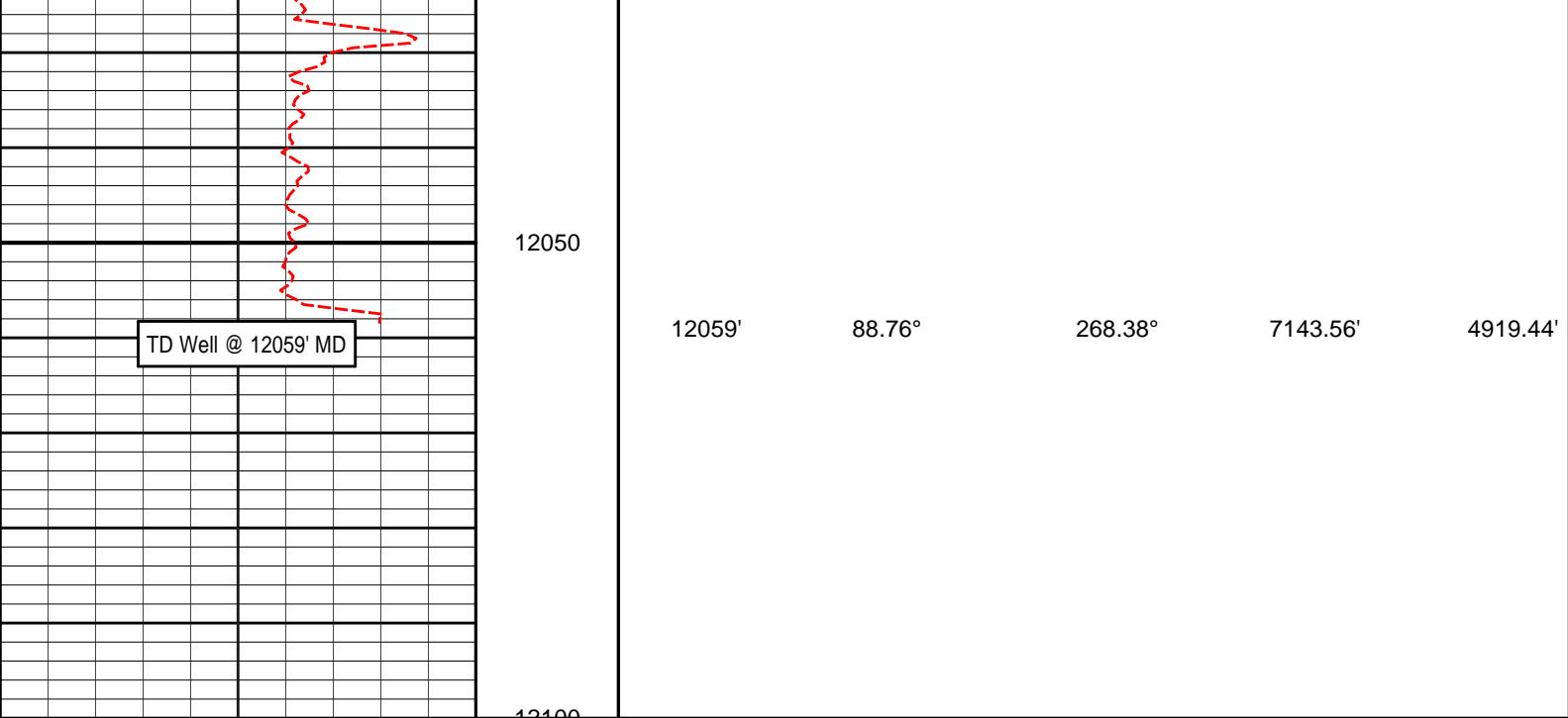
268.38°

7142.04'

4849.51'

DGRC

ROPA



Gamma Ray KclBh (DGRC) api	Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
0 250						
Avg Rate of Penetration (ROPA) feet per hr						
500 0						
PCG Gamma Ray BCorr (PGRC) api						
0 250						

# HALLIBURTON

## Sperry Drilling

### MD 1:240 Detail Log



**HALLIBURTON**

#### DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.

Eisenach Federal 5N-8HZ

Wattenberg

Weld County Colorado

USA

CA-XX-0900582952

Surveys have been IFR Corrections applied.

Measured

Vertical

Vertical



Depth (feet)	Inclination (degrees)	Direction (degrees)	Depth (feet)	Latitude (feet)	Departure (feet)	Section (feet)	Dogleg (deg/100ft)
603.00	1.15	186.84	602.97	2.85 S	1.85 E	-1.88	TIE-IN
733.00	2.14	200.64	732.92	6.42 S	0.84 E	-0.92	0.81
828.00	2.26	204.04	827.85	9.79 S	0.55 W	0.43	0.19
919.00	2.35	198.68	918.77	13.19 S	1.88 W	1.72	0.26
1011.00	2.29	203.69	1010.70	16.66 S	3.22 W	3.02	0.23
1103.00	2.44	168.09	1102.62	20.26 S	3.55 W	3.31	1.58
1195.00	2.51	125.06	1194.54	23.34 S	1.50 W	1.22	1.97
1286.00	4.32	111.92	1285.38	25.76 S	3.31 E	-3.62	2.15
1377.00	5.65	125.43	1376.04	29.64 S	10.14 E	-10.50	1.94
1469.00	6.46	116.52	1467.53	34.57 S	18.46 E	-18.88	1.35
1561.00	5.95	114.16	1558.99	38.84 S	27.44 E	-27.91	0.62
1653.00	6.47	95.24	1650.46	41.26 S	36.96 E	-37.45	2.28
1745.00	7.19	84.04	1741.81	41.14 S	47.85 E	-48.34	1.64
1837.00	5.90	80.23	1833.21	39.74 S	58.23 E	-58.71	1.48
1928.00	6.33	62.64	1923.70	36.64 S	67.30 E	-67.73	2.10
2020.00	7.17	49.60	2015.06	30.59 S	76.17 E	-76.54	1.89
2112.00	7.32	46.82	2106.33	22.85 S	84.82 E	-85.09	0.41
2203.00	8.06	50.10	2196.51	14.79 S	93.94 E	-94.11	0.95
2295.00	5.90	48.26	2287.82	7.51 S	102.42 E	-102.50	2.36
2386.00	6.31	50.71	2378.31	1.23 S	109.78 E	-109.79	0.53
2481.00	7.07	52.95	2472.66	5.60 N	118.49 E	-118.41	0.85
2575.00	8.31	59.77	2565.81	12.51 N	128.97 E	-128.81	1.64
2669.00	9.21	65.48	2658.72	19.05 N	141.69 E	-141.45	1.33
2764.00	9.18	65.25	2752.50	25.38 N	155.49 E	-155.17	0.05
2858.00	9.20	64.28	2845.29	31.78 N	169.07 E	-168.67	0.17
2952.00	8.79	63.27	2938.13	38.27 N	182.25 E	-181.78	0.47
3047.00	7.50	62.79	3032.17	44.37 N	194.25 E	-193.70	1.36
3141.00	7.23	60.39	3125.40	50.10 N	204.85 E	-204.23	0.44
3236.00	6.27	59.55	3219.74	55.68 N	214.52 E	-213.83	1.02
3331.00	5.06	57.96	3314.27	60.53 N	222.54 E	-221.79	1.28
3425.00	3.86	52.60	3407.99	64.65 N	228.57 E	-227.77	1.35
3520.00	3.00	54.97	3502.82	68.02 N	233.14 E	-232.31	0.92
3614.00	2.01	43.74	3596.73	70.62 N	236.30 E	-235.43	1.17
3709.00	1.60	54.64	3691.68	72.60 N	238.53 E	-237.64	0.56
3804.00	1.68	51.58	3786.64	74.23 N	240.70 E	-239.79	0.12
3898.00	2.11	59.81	3880.59	75.95 N	243.28 E	-242.35	0.54
3993.00	2.20	69.64	3975.52	77.47 N	246.50 E	-245.55	0.40
4087.00	2.09	66.55	4069.46	78.78 N	249.76 E	-248.80	0.17
4182.00	0.41	210.36	4164.44	79.17 N	251.18 E	-250.21	2.56
4277.00	1.20	225.77	4259.43	78.19 N	250.30 E	-249.34	0.85
4371.00	1.36	234.46	4353.40	76.85 N	248.68 E	-247.74	0.27
4466.00	1.30	233.47	4448.38	75.56 N	246.90 E	-245.97	0.07
4560.00	1.55	218.94	4542.35	73.93 N	245.24 E	-244.34	0.47
4655.00	1.47	226.34	4637.32	72.09 N	243.56 E	-242.67	0.22
4750.00	0.93	289.45	4732.30	71.51 N	241.95 E	-241.07	1.41
4844.00	1.24	342.53	4826.28	72.73 N	240.92 E	-240.03	1.07
4939.00	1.44	340.75	4921.26	74.84 N	240.22 E	-239.30	0.22
5128.00	0.87	340.12	5110.22	78.43 N	238.95 E	-237.99	0.30
5222.00	0.42	336.16	5204.21	79.42 N	238.57 E	-237.59	0.48
5317.00	0.35	325.33	5299.21	79.97 N	238.26 E	-237.28	0.11
5411.00	0.13	347.88	5393.21	80.31 N	238.08 E	-237.09	0.25
5600.00	0.50	156.55	5582.21	79.77 N	238.36 E	-237.38	0.33
5695.00	0.50	137.77	5677.20	79.08 N	238.80 E	-237.83	0.17
5790.00	0.63	155.26	5772.20	78.30 N	239.30 E	-238.34	0.23
5885.00	0.60	126.24	5867.19	77.53 N	239.92 E	-238.97	0.33
5980.00	0.83	127.42	5962.19	76.82 N	240.87 E	-239.92	0.24
6075.00	0.99	107.35	6057.18	76.16 N	242.20 E	-241.26	0.37
6169.00	0.99	115.04	6151.16	75.57 N	243.71 E	-242.78	0.14
6264.00	1.49	80.48	6246.14	75.43 N	245.67 E	-244.74	0.92
6359.00	1.68	91.33	6341.10	75.60 N	248.28 E	-247.35	0.37
6454.00	2.48	100.95	6436.04	75.18 N	251.69 E	-250.77	0.92
6501.00	2.84	107.63	6482.99	74.63 N	253.80 E	-252.88	1.01
6549.00	1.51	265.69	6530.97	74.22 N	254.30 E	-253.39	8.91
6596.00	5.23	277.47	6577.89	74.45 N	251.56 E	-250.64	8.01
6643.00	11.41	274.56	6624.37	75.10 N	244.79 E	-243.87	13.18
6690.00	15.48	275.08	6670.07	76.03 N	233.91 E	-232.97	8.66
6738.00	20.97	272.65	6715.65	76.99 N	218.93 E	-217.99	11.54
6785.00	23.88	268.30	6759.09	77.10 N	201.02 E	-200.08	7.12
6833.00	27.17	264.51	6802.40	75.76 N	180.39 E	-179.47	7.65

6880.00	31.33	263.41	6843.40	73.33 N	157.56 E	-156.67	8.92
6928.00	36.34	264.27	6883.26	70.48 N	131.00 E	-130.14	10.48
6975.00	41.60	264.97	6919.79	67.72 N	101.58 E	-100.76	11.23
7023.00	45.58	263.59	6954.55	64.41 N	68.66 E	-67.88	8.52
7070.00	50.43	264.98	6985.99	60.94 N	33.91 E	-33.17	10.55
7118.00	57.22	267.31	7014.30	58.38 N	4.72 W	5.43	14.68
7165.00	61.34	267.89	7038.31	56.69 N	45.08 W	45.76	8.83
7213.00	64.82	268.95	7060.04	55.51 N	87.86 W	88.52	7.51
7260.00	68.47	271.23	7078.67	55.59 N	131.00 W	131.66	8.95
7308.00	70.59	271.86	7095.45	56.81 N	175.95 W	176.62	4.58
7355.00	74.42	271.94	7109.58	58.29 N	220.74 W	221.43	8.15
7403.00	80.15	271.40	7120.14	59.66 N	267.52 W	268.22	11.99
7450.00	83.89	271.26	7126.67	60.74 N	314.05 W	314.76	7.96
7466.00	85.43	271.68	7128.15	61.14 N	329.97 W	330.68	9.97
7568.00	90.25	270.97	7132.00	63.50 N	431.84 W	432.57	4.78
7663.00	90.74	271.08	7131.18	65.20 N	526.82 W	527.57	0.53
7757.00	91.36	271.53	7129.45	67.34 N	620.78 W	621.55	0.81
7852.00	91.98	271.72	7126.69	70.03 N	715.70 W	716.49	0.68
7947.00	90.93	270.64	7124.27	71.99 N	810.65 W	811.46	1.59
8042.00	89.14	270.56	7124.22	72.98 N	905.64 W	906.45	1.89
8137.00	88.15	274.31	7126.46	77.02 N	1000.51 W	1001.36	4.08
8232.00	88.89	277.38	7128.92	86.69 N	1094.97 W	1095.94	3.32
8326.00	90.19	276.70	7129.67	98.21 N	1188.26 W	1189.35	1.56
8421.00	90.12	275.40	7129.41	108.22 N	1282.73 W	1283.94	1.37
8516.00	90.12	274.89	7129.22	116.74 N	1377.34 W	1378.65	0.54
8611.00	89.94	272.92	7129.17	123.21 N	1472.12 W	1473.49	2.08
8706.00	90.19	271.85	7129.06	127.16 N	1567.03 W	1568.45	1.16
8800.00	91.17	271.52	7127.94	129.92 N	1660.99 W	1662.43	1.10
8895.00	92.16	270.68	7125.18	131.75 N	1755.93 W	1757.39	1.37
8990.00	91.30	269.86	7122.31	132.19 N	1850.88 W	1852.34	1.25
9084.00	89.26	268.30	7121.85	130.68 N	1944.86 W	1946.29	2.73
9179.00	89.07	268.09	7123.24	127.69 N	2039.80 W	2041.19	0.30
9273.00	89.38	267.94	7124.51	124.44 N	2133.74 W	2135.08	0.37
9368.00	89.88	267.75	7125.12	120.86 N	2228.67 W	2229.96	0.56
9462.00	89.88	269.05	7125.32	118.24 N	2322.63 W	2323.88	1.38
9557.00	89.32	269.45	7125.98	117.00 N	2417.62 W	2418.85	0.72
9651.00	89.07	270.56	7127.31	117.00 N	2511.61 W	2512.83	1.21
9746.00	89.20	270.64	7128.74	118.00 N	2606.59 W	2607.82	0.16
9841.00	89.13	270.89	7130.12	119.27 N	2701.57 W	2702.81	0.27
9936.00	89.63	271.15	7131.15	120.96 N	2796.55 W	2797.80	0.59
10030.00	90.37	270.60	7131.15	122.39 N	2890.54 W	2891.80	0.98
10125.00	91.98	270.48	7129.20	123.29 N	2985.51 W	2986.78	1.70
10220.00	92.10	270.42	7125.82	124.03 N	3080.45 W	3081.72	0.14
10315.00	91.67	270.27	7122.70	124.61 N	3175.39 W	3176.66	0.48
10410.00	91.98	268.74	7119.67	123.79 N	3270.34 W	3271.59	1.64
10504.00	91.61	268.19	7116.73	121.27 N	3364.26 W	3365.48	0.70
10599.00	90.99	267.92	7114.57	118.05 N	3459.18 W	3460.35	0.71
10694.00	89.20	269.22	7114.41	115.68 N	3554.14 W	3555.28	2.33
10789.00	90.06	268.86	7115.03	114.08 N	3649.13 W	3650.24	0.98
10884.00	87.96	269.01	7116.67	112.32 N	3744.09 W	3745.17	2.22
10979.00	87.77	268.95	7120.21	110.63 N	3839.01 W	3840.06	0.21
11074.00	88.14	268.43	7123.60	108.46 N	3933.92 W	3934.95	0.67
11169.00	88.46	268.10	7126.42	105.58 N	4028.84 W	4029.82	0.48
11263.00	88.89	269.09	7128.59	103.28 N	4122.78 W	4123.73	1.15
11358.00	88.70	270.49	7130.59	102.93 N	4217.76 W	4218.69	1.49
11453.00	88.76	270.62	7132.69	103.85 N	4312.73 W	4313.67	0.15
11548.00	89.69	270.67	7133.98	104.92 N	4407.72 W	4408.66	0.98
11643.00	89.01	271.74	7135.06	106.92 N	4502.69 W	4503.65	1.33
11738.00	88.95	270.99	7136.75	109.18 N	4597.65 W	4598.63	0.79
11833.00	88.64	270.05	7138.75	110.04 N	4692.62 W	4693.60	1.04
11927.00	88.89	269.08	7140.77	109.33 N	4786.59 W	4787.56	1.07
11989.00	88.76	268.38	7142.04	107.95 N	4848.56 W	4849.51	1.15
12059.00	88.76	268.38	7143.56	105.97 N	4918.52 W	4919.44	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 370.60 DEGREES (TRUE)

VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 270.69 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.60 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12059.00 FEET  
IS 4919.66 FEET ALONG 271.23 DEGREES (TRUE)

Survey's tied on to surface gyro's.  
Final survey is a projection to bit.

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