

PCG-K Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	07-Feb-14	13-Feb-14			
Rig Bit Number	0100	200			
Bit Size (in)	8.750	6.750			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,132.00	7,676.00			
Log End Depth (MD, ft)	7,676.00	14,302.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	05-Feb-14 16:35	09-Feb-14 17:00			
Drill/Wipe End Date and Time	07-Feb-14 05:45	12-Feb-14 21:45			
Min Inc (deg) @ Depth (MD, ft)	0.11 @ 1,204.00	87.26 @ 8,751.00			
Max Inc (deg) @ Depth (MD, ft)	84.45 @ 7,624.00	94.57 @ 8,004.00			
Bit TFA(in2) / Bit Type	0.97 / PDC	0.97 / PDC			
Flow Rate (gpm)	572.24	572.24			
Max AV (fpm) / CV (fpm) @ MWD	252.0 / N/A	N/A / N/A			
Fluid Type	Polymer	Polymer			
Density (ppg) / Viscosity (spqt)	9.20 / 41.00	9.00 / 43.00			
Filtrate CL (ppm)	2,200.00	2,400.00			
pH / Fluid Loss (mptm)	1.00 / 10	9.30 / 6			
PV (cP) / YP (lbf2)	8 / 6.00	13 / 7.00			
% Solids / % Sand	1.6 / 0.75	4.7 / 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 (in F) / S	107.07 / PCM	220.44 / PCM			

Max Tool Temp (degF) / Source	167.97 / PCM	223.41 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 167.97	N/A @ 223.41			
Lead MWD Engineer	Ryan White	Ryan White			
Customer Representative	Travis Kruckenberg	Travis Kruckenberg			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.84			
Sub Serial Number	11341342	12334778			
Insert Serial Number	11145604	11145604			
Date and Time Initialized	01-Feb-14 17:24	07-Feb-14 17:34			
Date and Time Read	01-Jan-70 00:00	01-Jan-70 00:00			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	49.72	47.85			
Software Version	6.21	6.21			
Sub Serial Number	11341342	12334778			
Sonde Serial Number	11902192	11902192			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	230.74	157.45			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	54.67	52.80			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341342	12334778			
Insert/Sonde Serial Number	11293410	11293410			

REMARKS

1. All depths are measured bit 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. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. All data presented is recorded data unless otherwise specified
5. The following smoothing parameters have been applied to the data:
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
6. INSITE version 8.0.10 Build 08

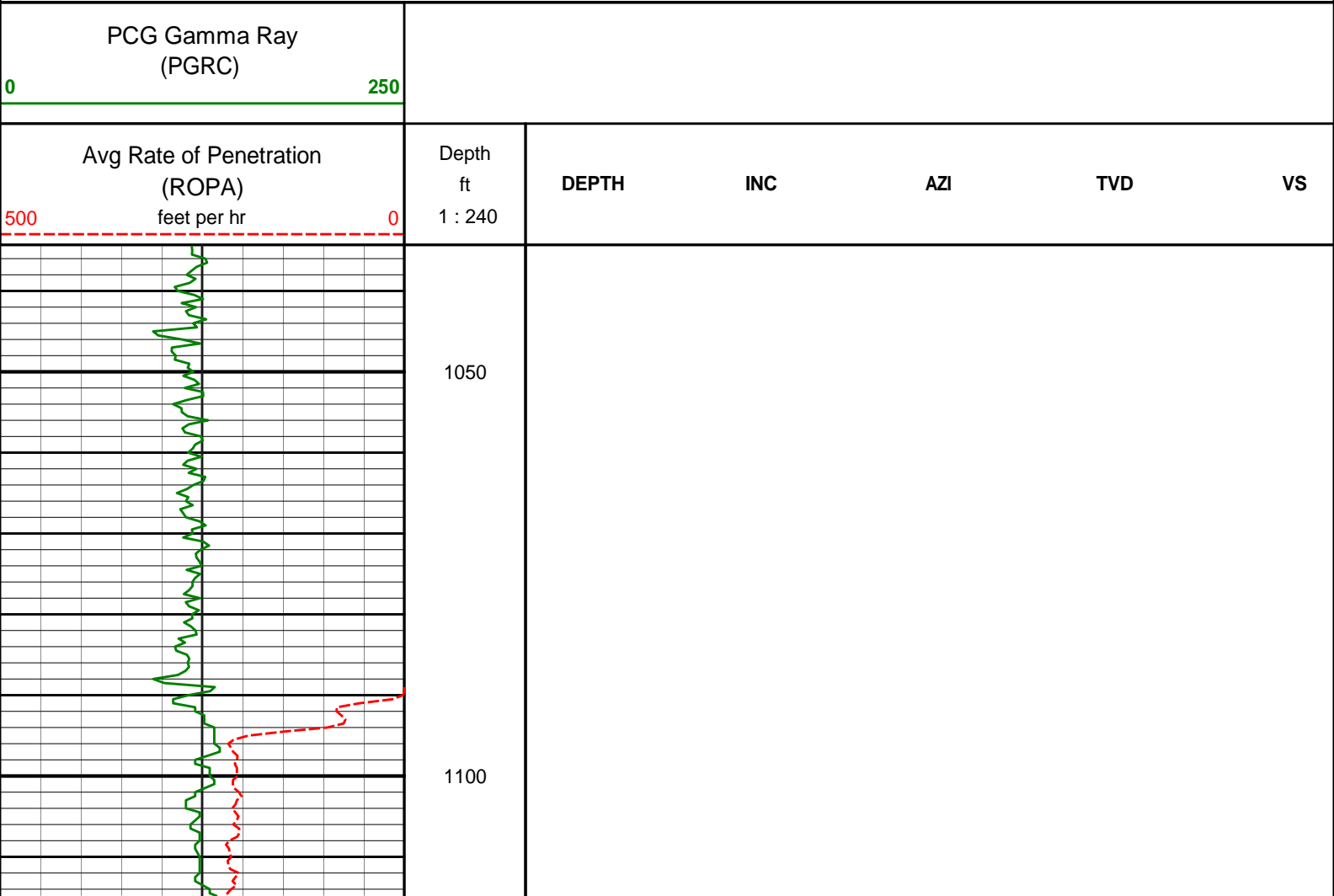
WARRANTY

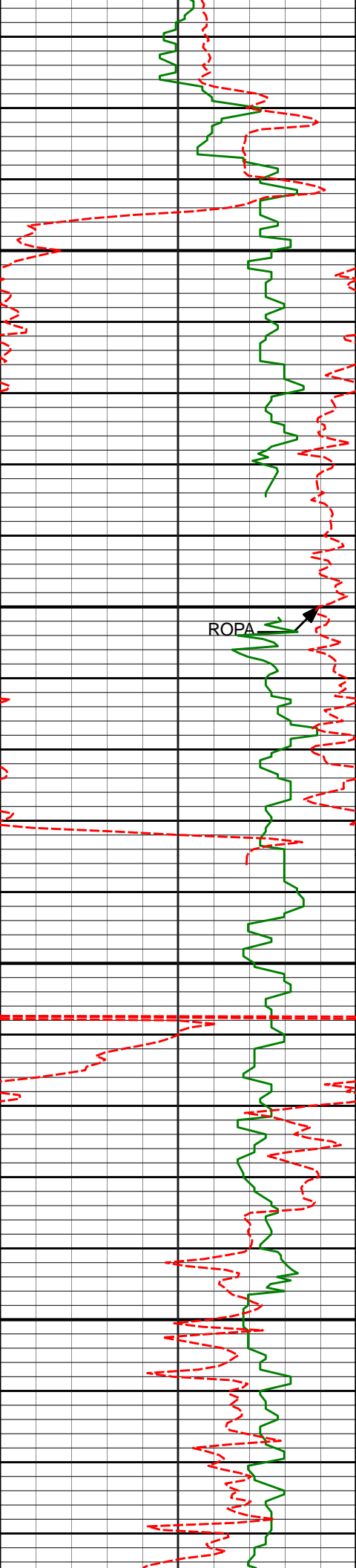
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HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log





1150

1200

1250

1300

ROPA

1204'

0.11°

339.51°

1203.94'

5.22'

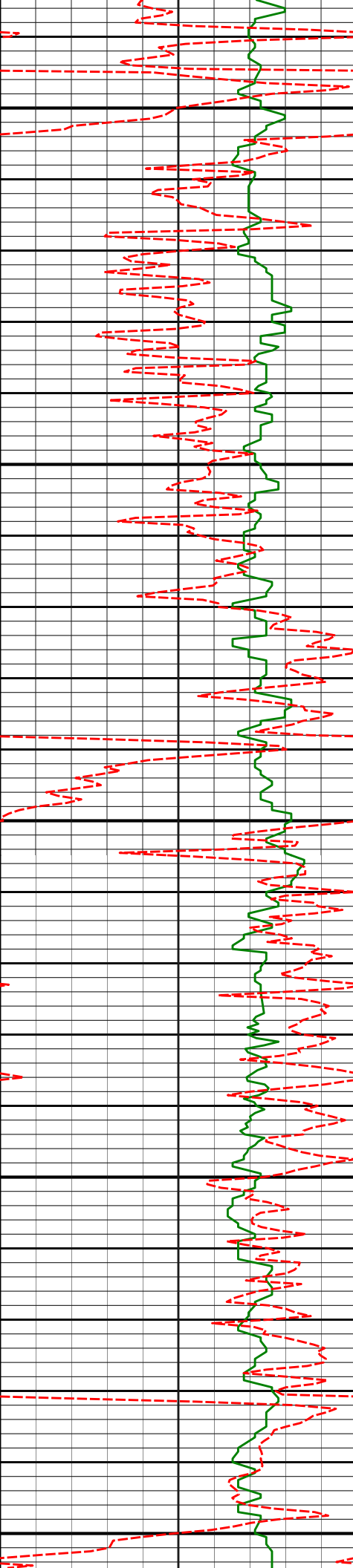
1296'

0.73°

339.01°

1295.94'

5.84'



1350

1388'

0.68°

2.29°

1387.93'

6.93'

1400

1450

1479'

0.59°

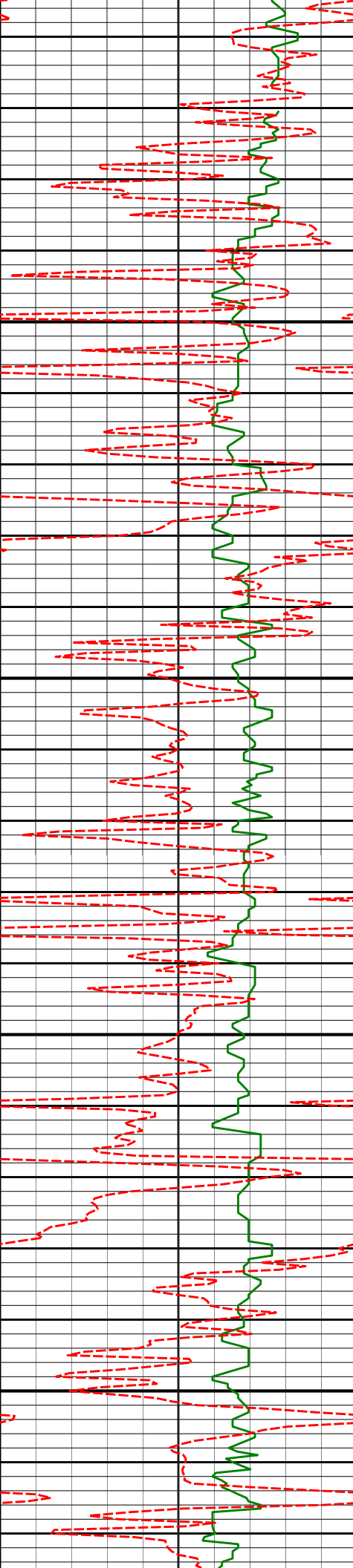
355.09°

1478.92'

7.94'

1500

1550



1600

1650

1700

1750

1573'

1.41°

289.43°

1572.91'

8.80'

1665'

1.52°

282.70°

1664.88'

9.43'

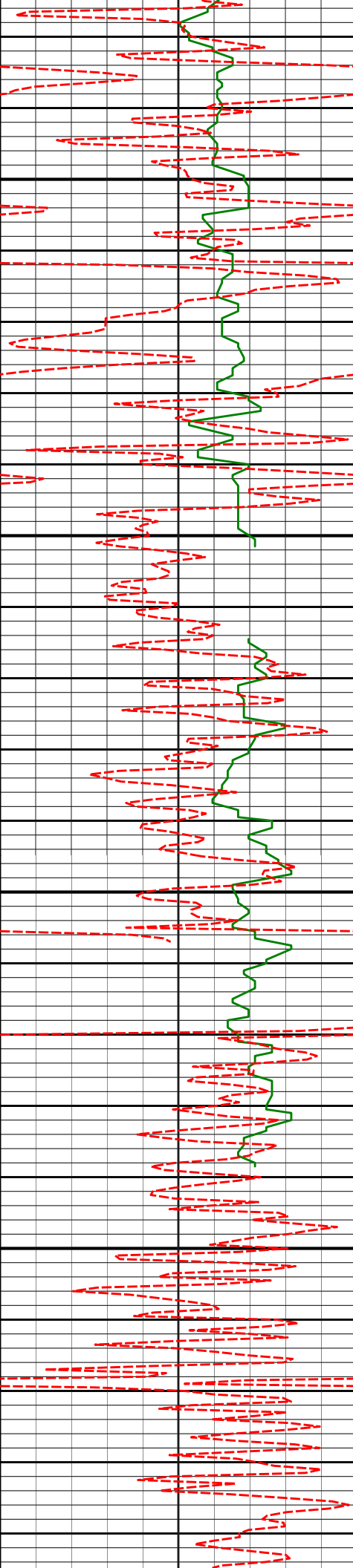
1758'

1.69°

282.73°

1757.85'

9.98'



1800

1850

1900

1950

1851'

1.57°

286.72°

1850.81'

10.63'

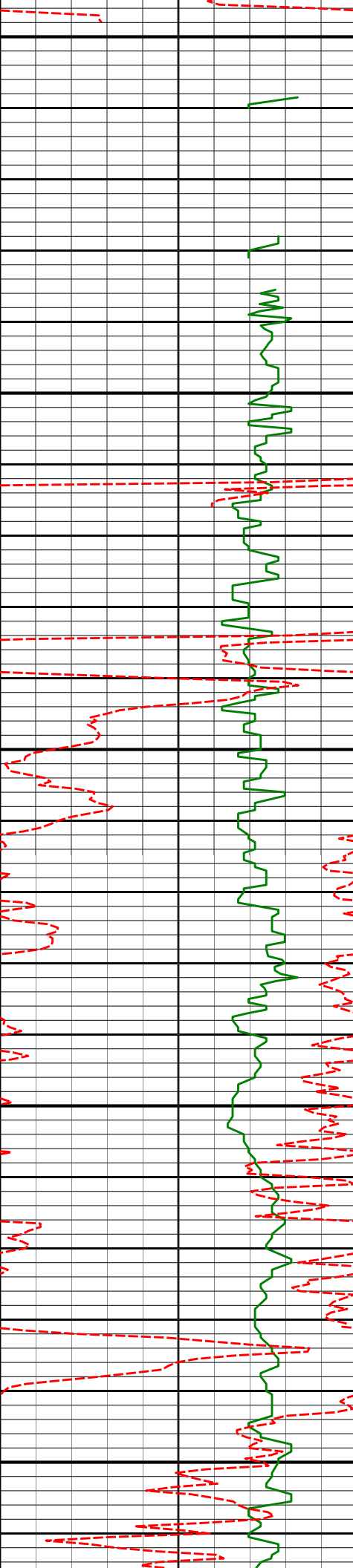
1945'

1.57°

290.69°

1944.77'

11.44'



2000

2050

2100

2150

2200

2037'

1.67°

292.05°

2036.74'

12.37'

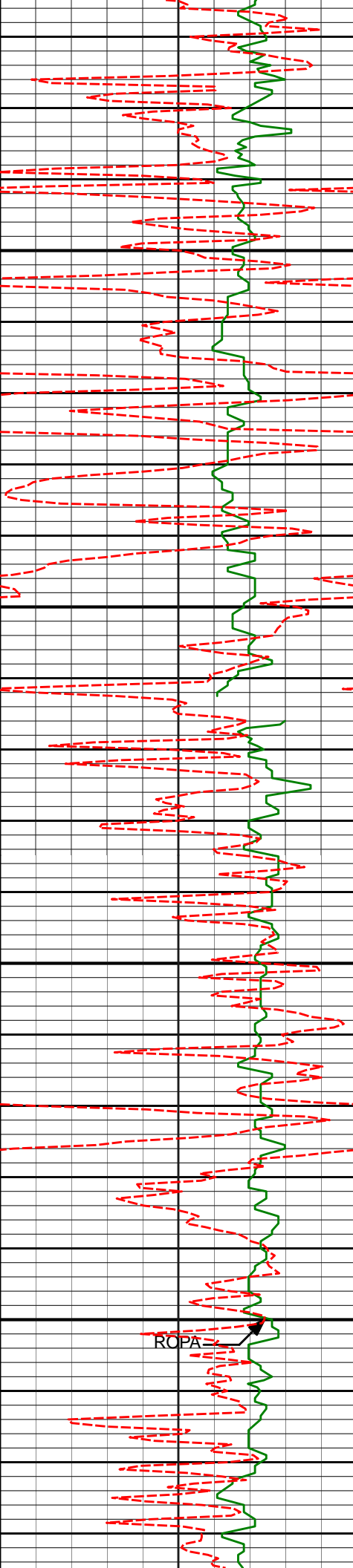
2131'

1.70°

295.66°

2130.69'

13.46'



2250

2300

2350

2400

2224'

1.76°

296.61°

2223.65'

14.68'

2317'

1.81°

307.26°

2316.61'

16.19'

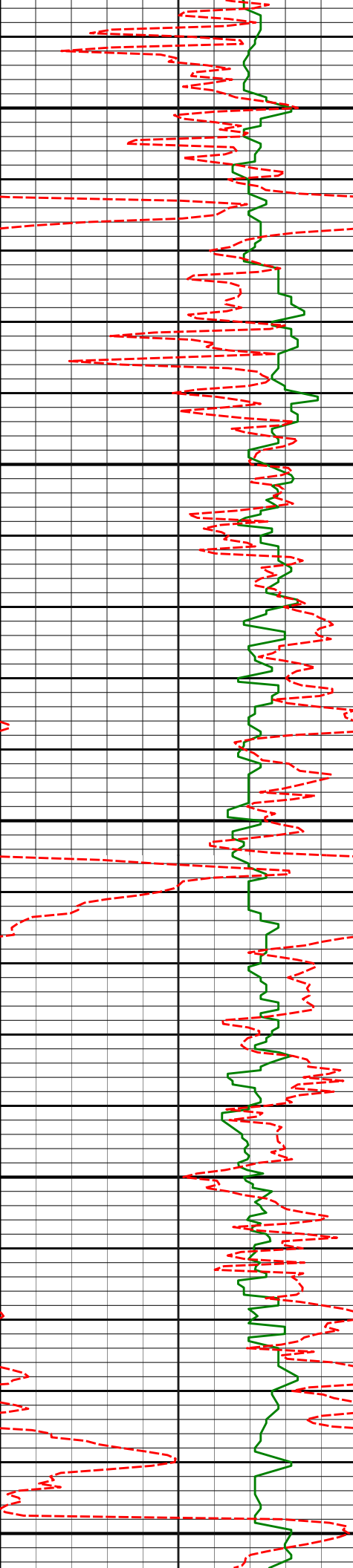
2410'

1.82°

316.86°

2409.56'

18.14'



2450

2500

2550

2600

2650

2503'

1.27°

330.57°

2502.53'

20.11'

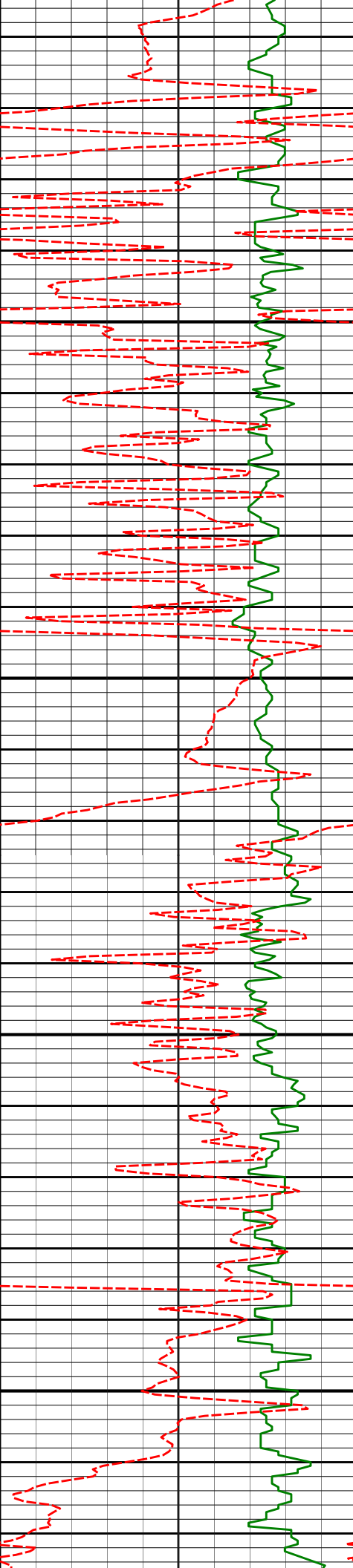
2597'

1.21°

334.78°

2596.51'

21.90'



2700

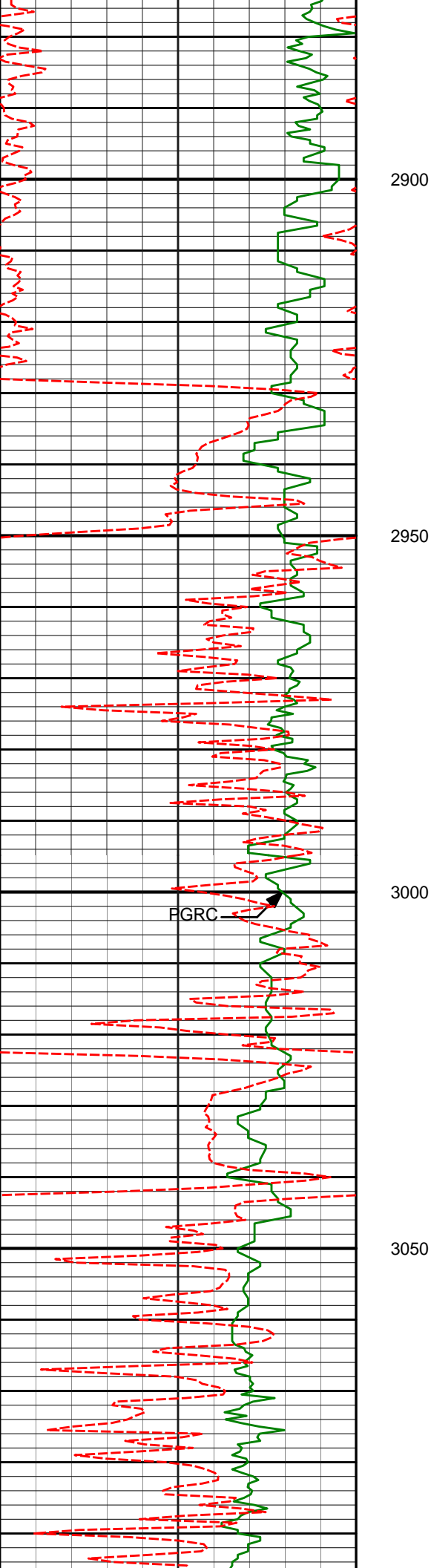
2750

2800

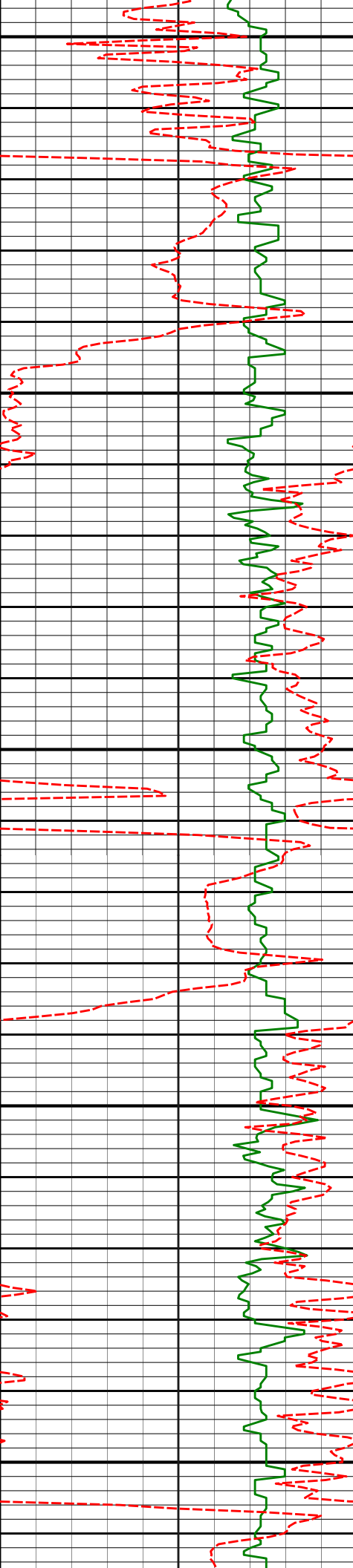
2850

2690'	2.93°	289.10°	2689.45'	23.55'
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2783'	5.12°	277.42°	2782.21'	24.81'
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2876'	6.72°	277.78°	2874.71'	26.01'
2970'	8.74°	273.56°	2967.86'	27.11'
3065'	10.49°	267.73°	3061.52'	27.09'



3100

3150

3200

3250

3300

3159'

11.66°

261.47°

3153.77'

25.20'

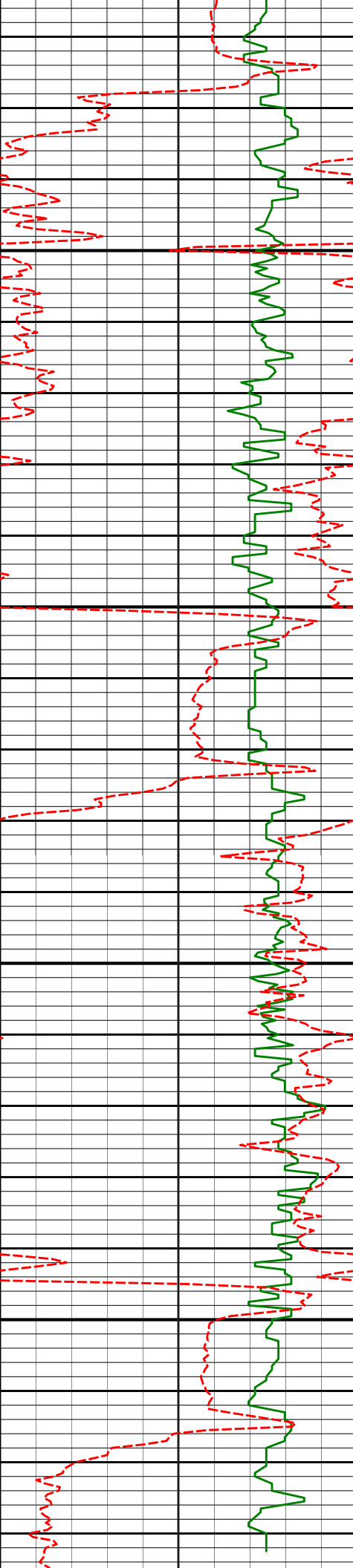
3254'

12.77°

259.16°

3246.62'

21.65'



3350

3400

3450

3500

3348'

14.36°

254.04°

3338.00'

16.33'

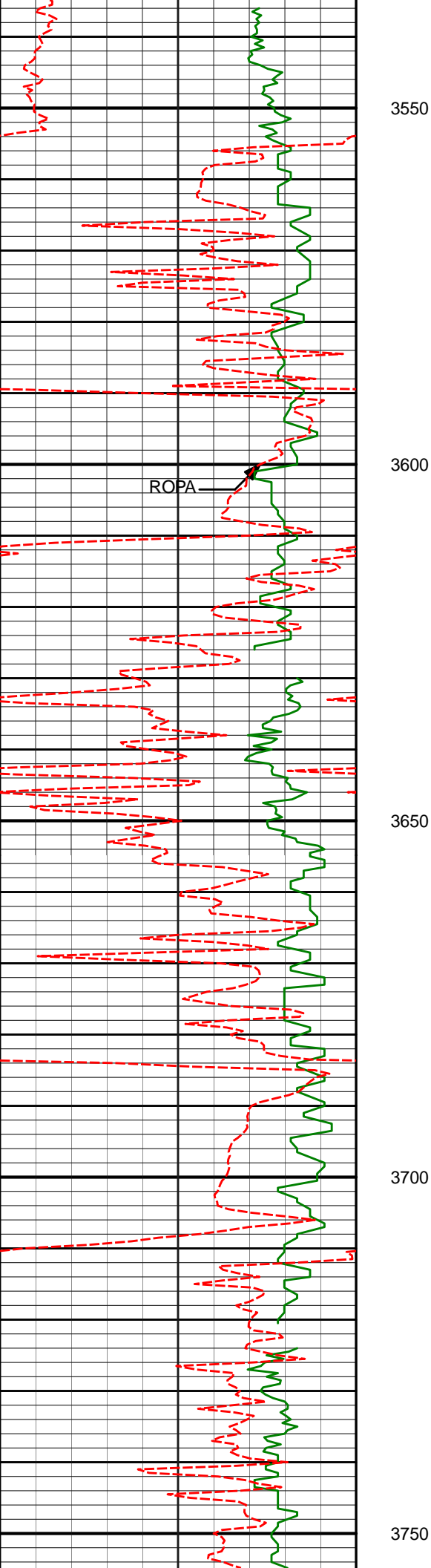
3443'

15.73°

256.58°

3429.74'

9.92'



3537'

16.26°

253.12°

3520.10'

2.95'

3632'

16.08°

250.80°

3611.34'

-5.43'

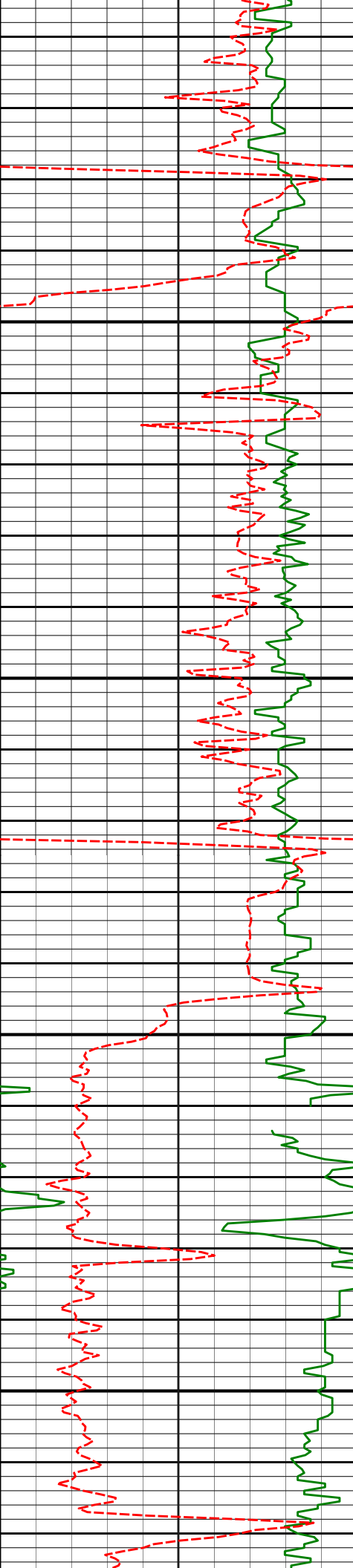
3726'

17.94°

252.12°

3701.23'

-14.36'



3800

3850

3900

3950

3821'

17.25°

255.28°

3791.79'

-22.64'

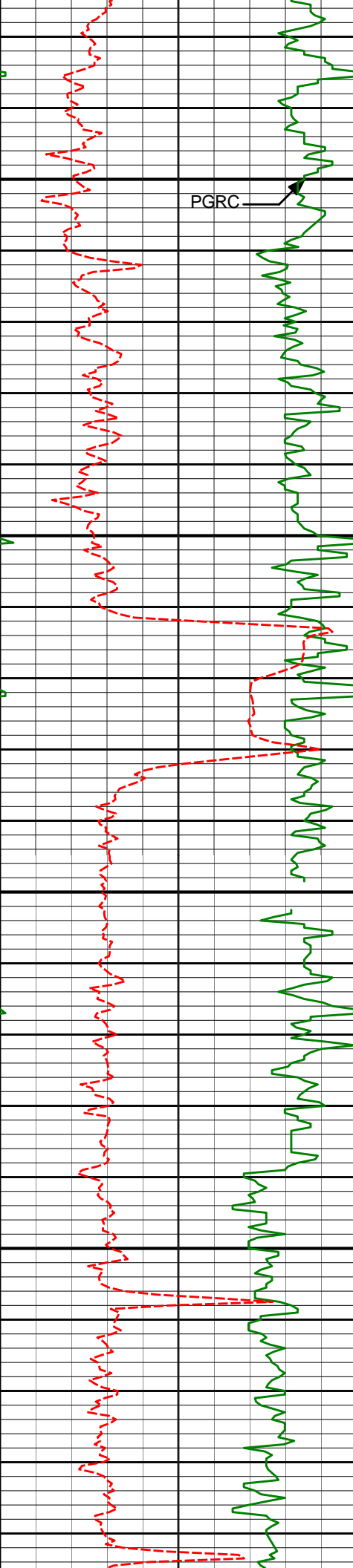
3915'

18.46°

254.92°

3881.26'

-30.27'



PGRC

4000

4050

4100

4150

4010'

17.02°

256.19°

3971.74'

-37.72'

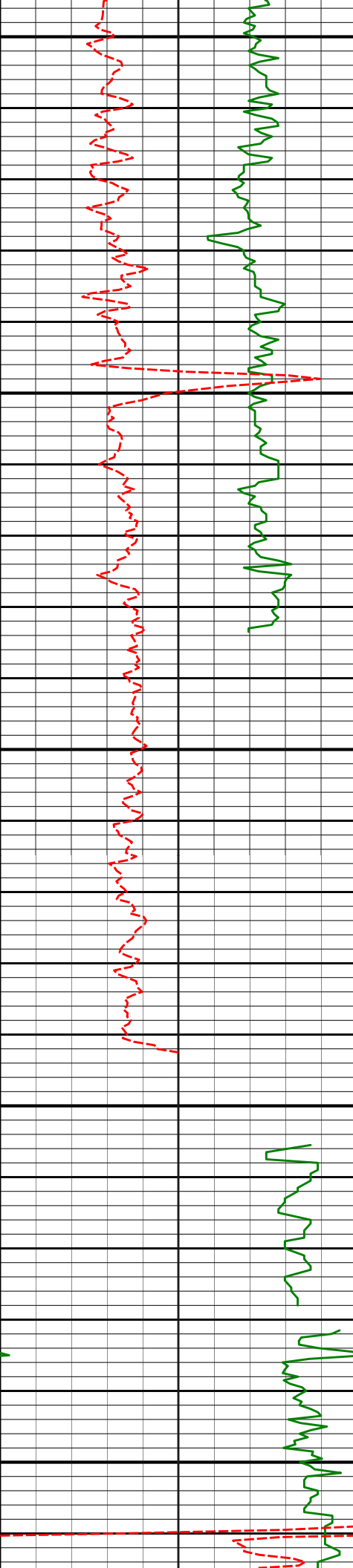
4104'

18.33°

256.46°

4061.30'

-44.68'



4200

4250

4300

4350

4400

4199'

4293'

4388'

17.80°

18.25°

17.06°

258.29°

258.94°

259.55°

4151.62'

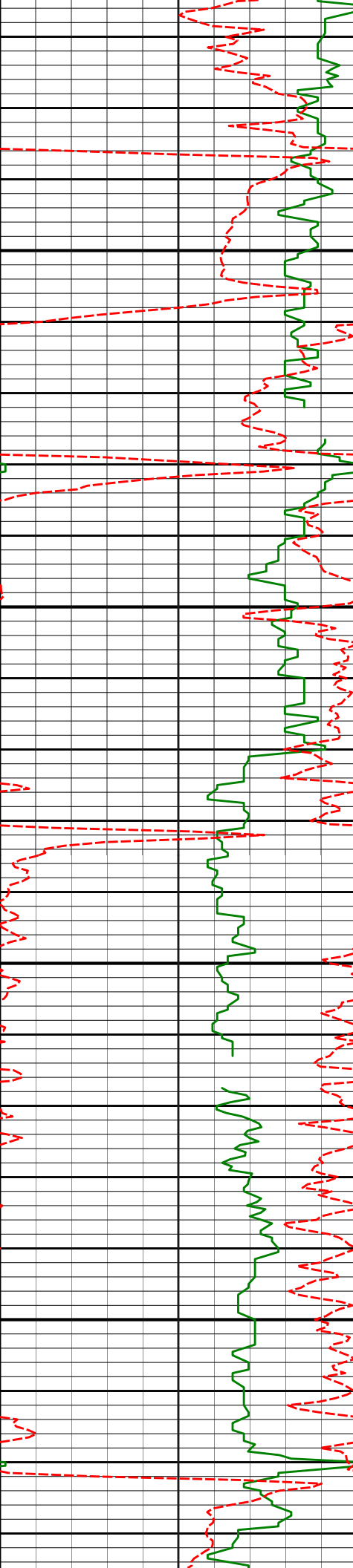
4241.00'

4331.53'

-51.34'

-57.30'

-62.90'



4450

4500

4550

4600

4483'

17.67°

266.14°

4422.21'

-66.61'

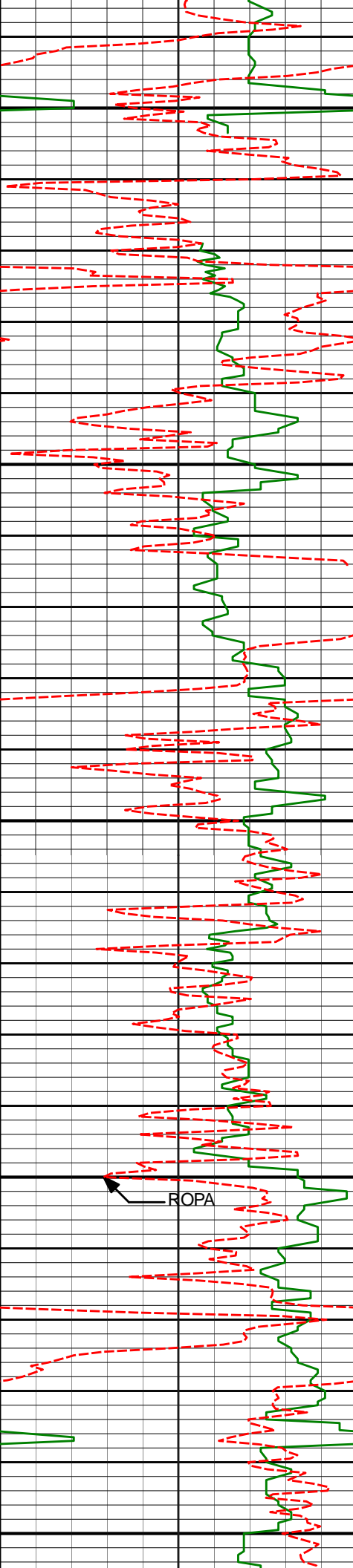
4577'

17.01°

267.16°

4511.93'

-68.47'



4650

4672'

19.02°

261.80°

4602.28'

-71.59'

4700

4750

4766'

18.43°

260.28°

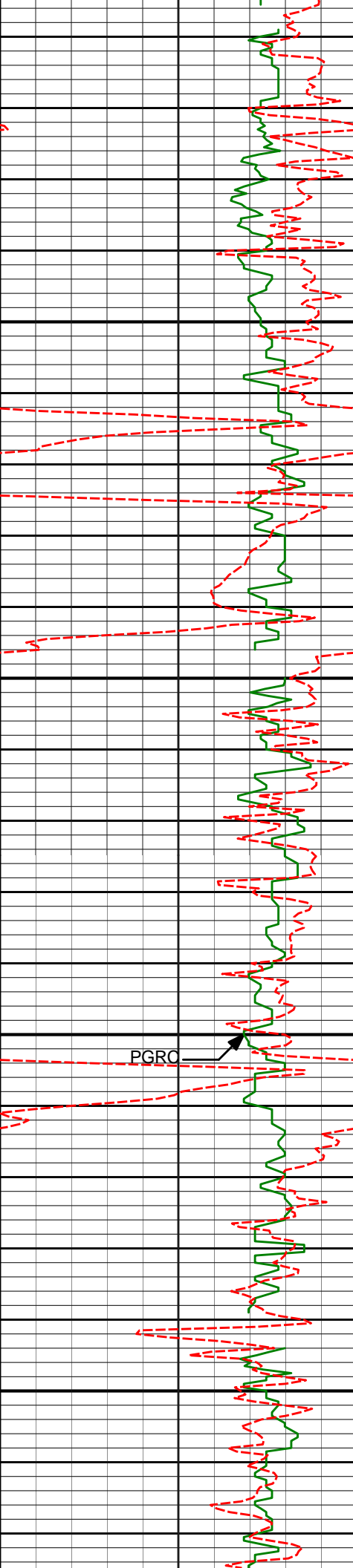
4691.30'

-76.51'

4800

ROPA

4850



4900

4950

5000

5050

4861'

16.97°

259.52°

4781.80'

-81.79'

4955'

19.01°

260.09°

4871.20'

-87.14'

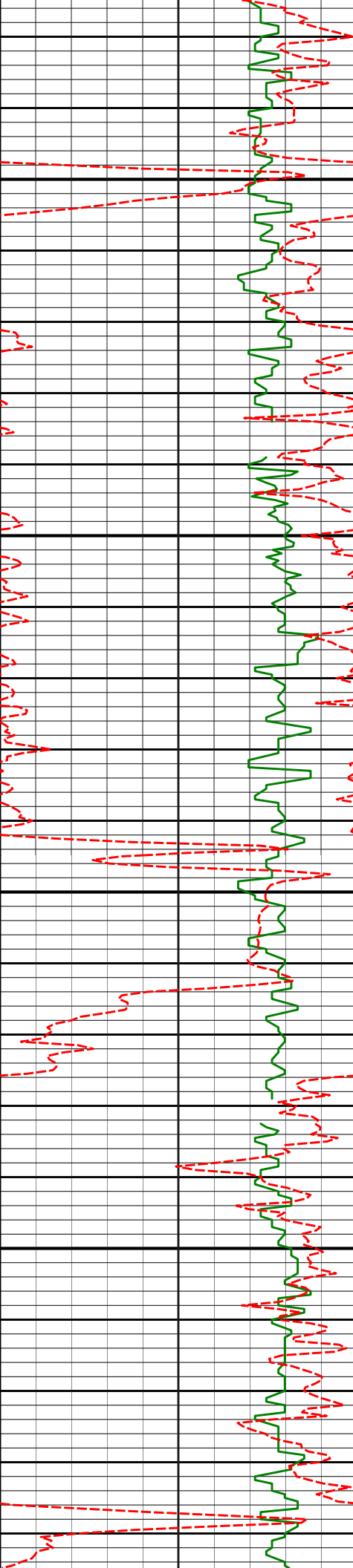
5050'

17.23°

258.39°

4961.49'

-92.85'



5100

5144'

15.74°

258.57°

5051.62'

-98.38'

5150

5200

5239'

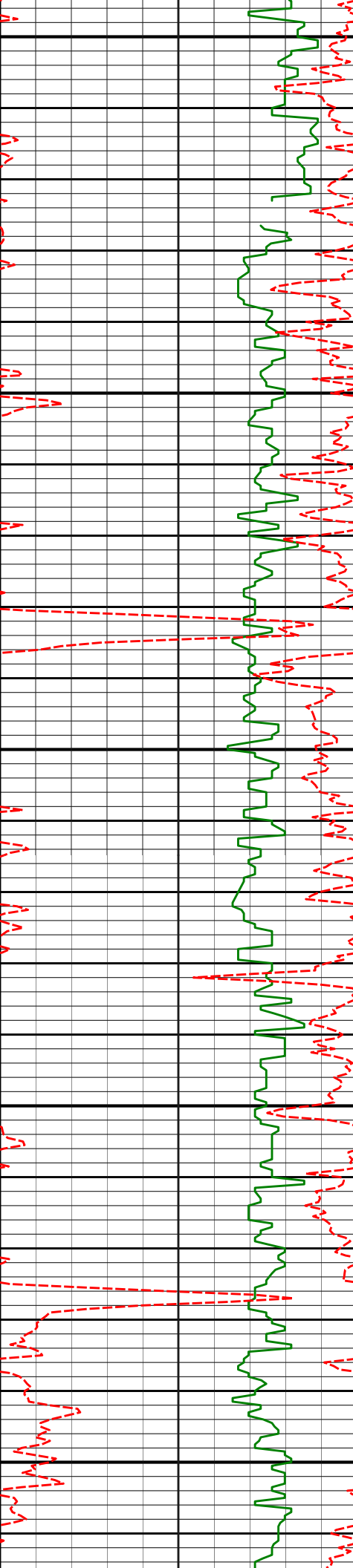
16.57°

259.85°

5142.87'

-103.52'

5250



5300

5333'

14.93°

258.28°

5233.34'

-108.54'

5350

5400

5428'

14.09°

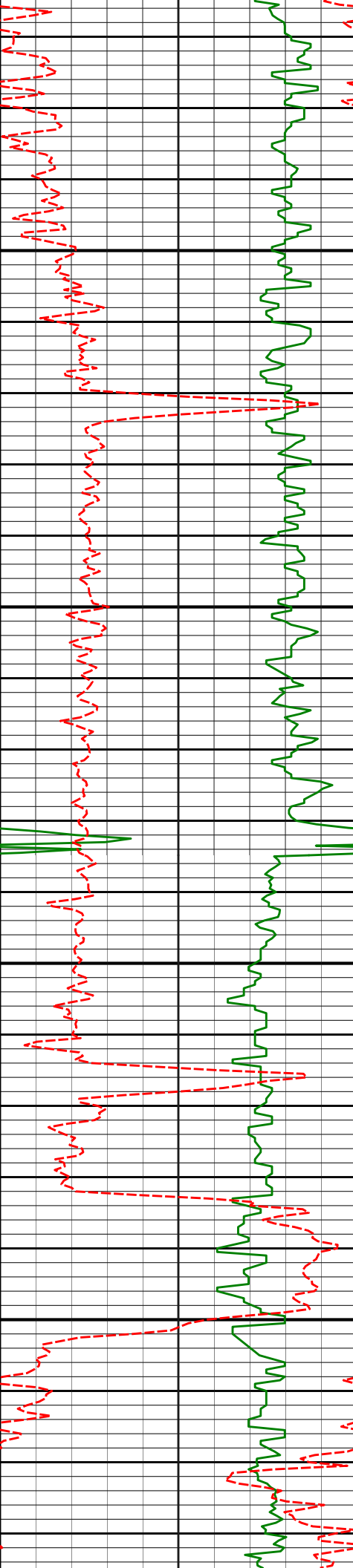
258.51°

5325.31'

-113.51'

5450

5500



5522'

12.51°

259.34°

5416.78'

-117.83'

5550

5600

5617'

11.40°

260.49°

5509.72'

-121.44'

5650

5700

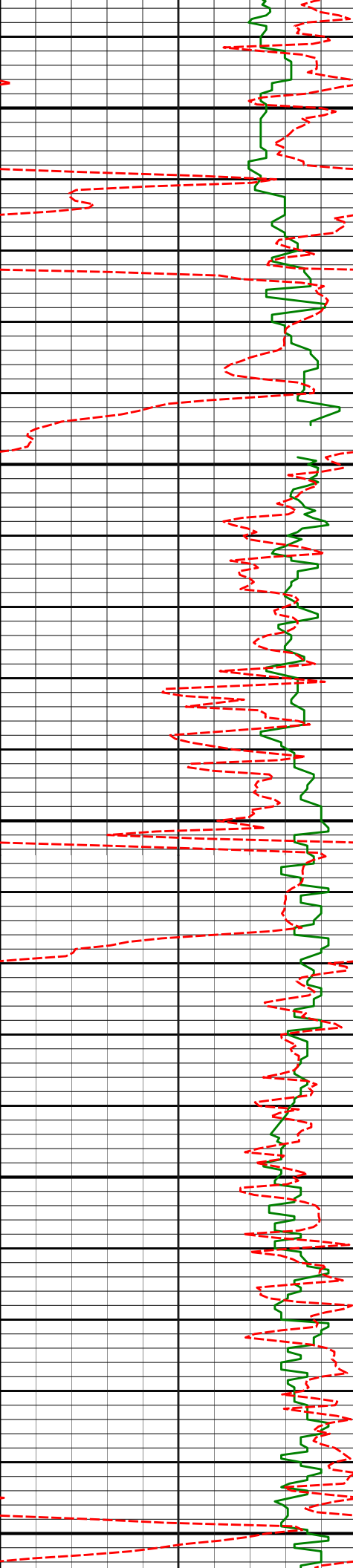
5711'

10.22°

258.03°

5602.05'

-124.83'



5750

5800

5850

5900

5950

5806'

7.33°

254.61°

5695.93'

-128.30'

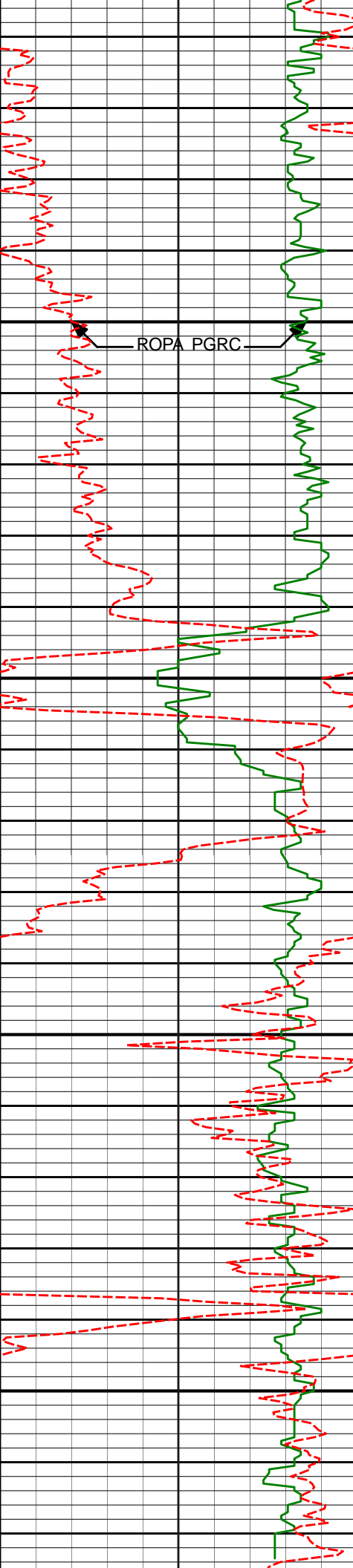
5900'

4.53°

251.31°

5789.42'

-131.15'



6000

6050

6100

6150

5995'

3.87°

254.84°

5884.16'

-133.24'

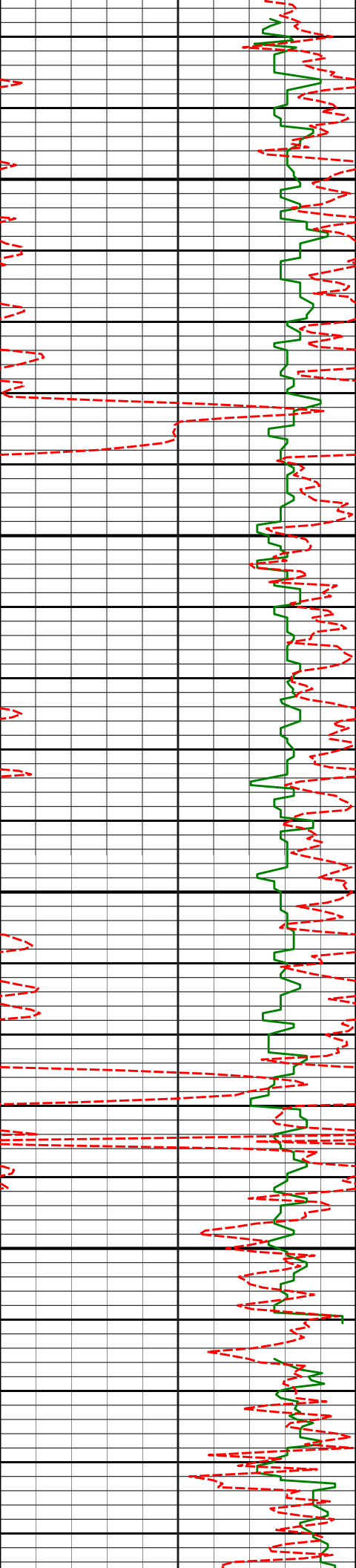
6089'

1.99°

279.70°

5978.04'

-133.83'



6200

6250

6300

6350

6184'

1.33°

277.55°

6073.00'

-133.43'

6278'

1.31°

300.53°

6166.97'

-132.76'

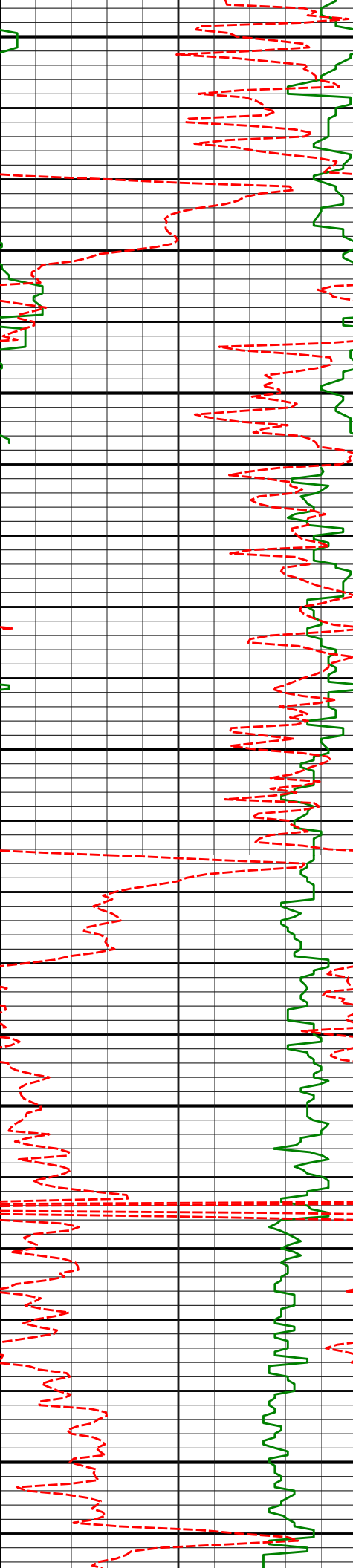
6373'

1.52°

313.50°

6261.95'

-131.35'



6400

6450

6500

6550

6600

6467'

1.62°

324.35°

6355.91'

-129.43'

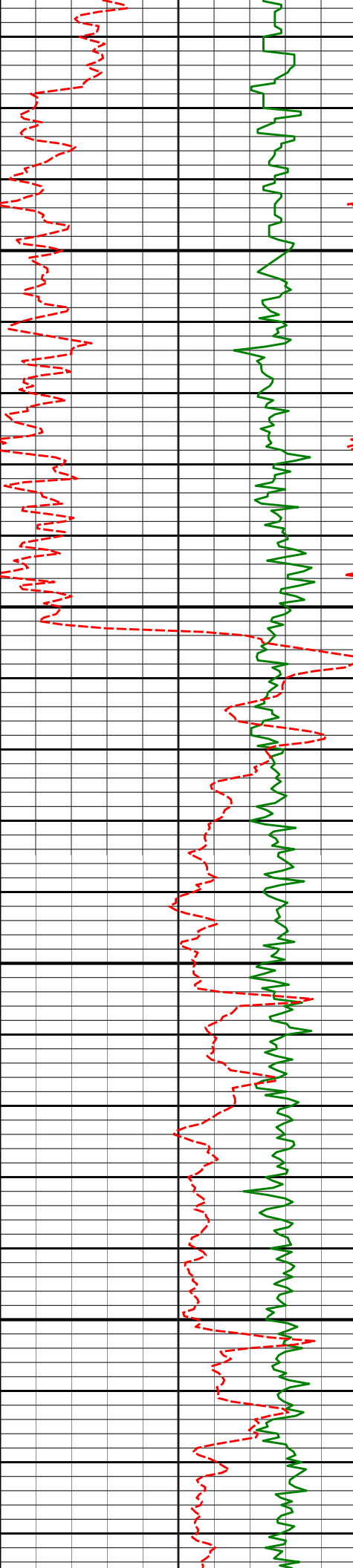
6562'

1.87°

338.83°

6450.87'

-126.90'



6650

6656'

2.08°

350.49°

6544.81'

-123.80'

6700

6750

6751'

6.92°

16.11°

6639.50'

-116.58'

6800

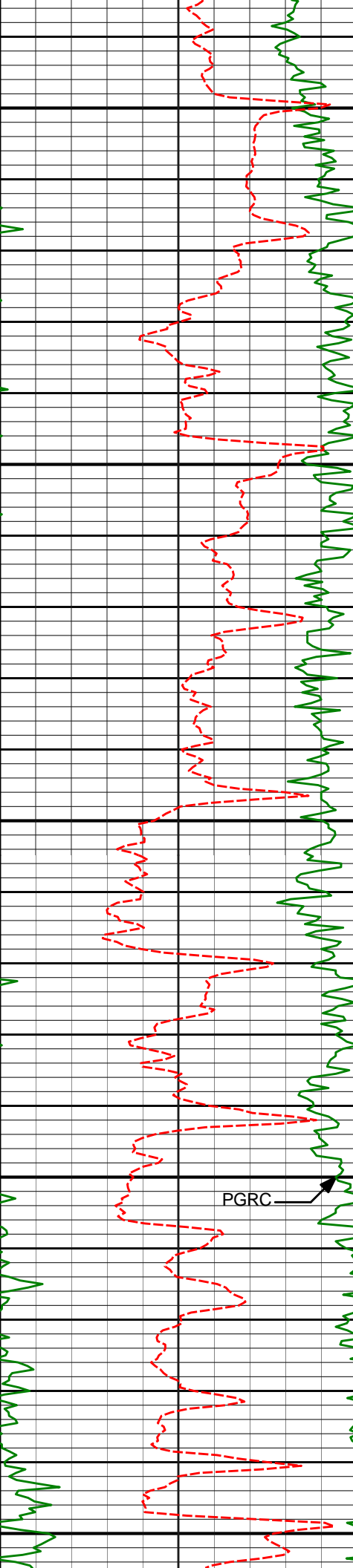
6798'

13.57°

18.69°

6685.72'

-108.61'



6850

6845'

19.60°

10.69°

6730.75'

-95.60'

6900

6892'

23.16°

8.26°

6774.51'

-78.68'

6950

6940'

26.03°

11.15°

6818.15'

-58.98'

7000

6987'

27.56°

7.19°

6860.11'

-38.04'

7050

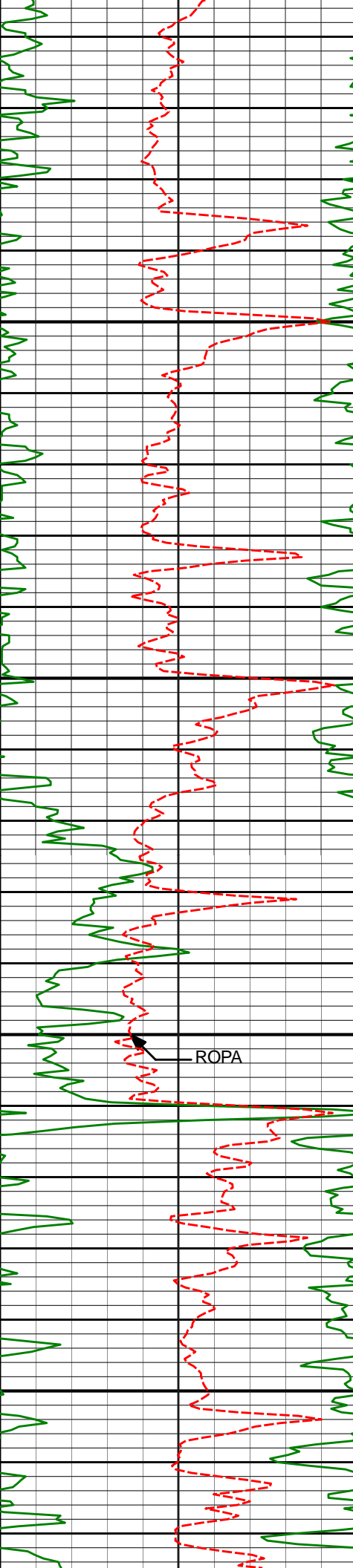
7034'

27.32°

359.92°

6901.83'

-16.46'



<Run 200>

7100

7150

7200

7250

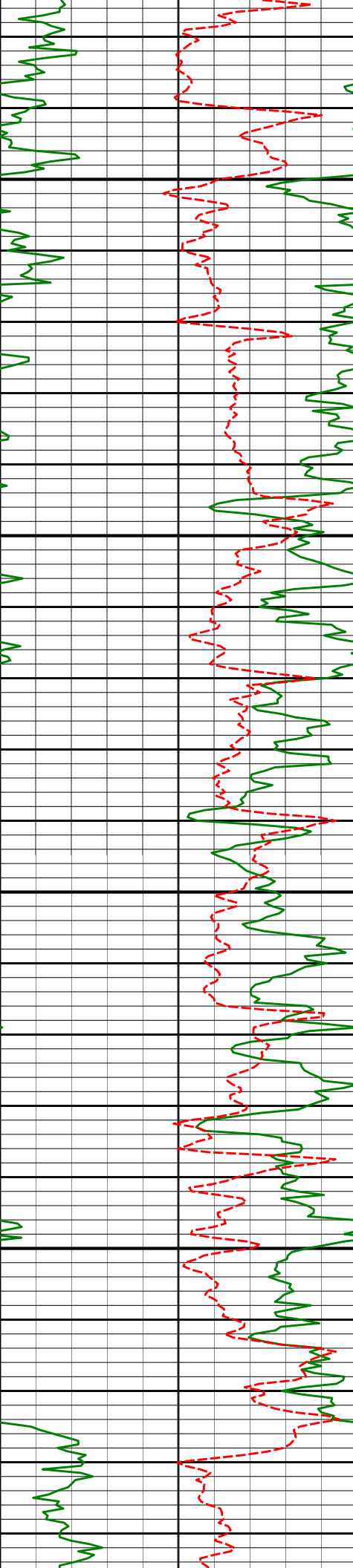
7081'	32.34°	357.36°	6942.59'	6.90'
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7129'	39.30°	356.39°	6981.49'	34.92'
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7176'	44.00°	358.45°	7016.60'	66.10'
-------	--------	---------	----------	--------

7223'	45.49°	358.26°	7049.98'	99.16'
-------	--------	---------	----------	--------

7270'	48.13°	0.26°	7082.15'	133.41'
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7300

7318'

52.16°

0.38°

7112.90'

170.25'

7350

7365'

56.03°

1.41°

7140.46'

208.31'

7400

7412'

60.72°

1.64°

7165.10'

248.32'

7450

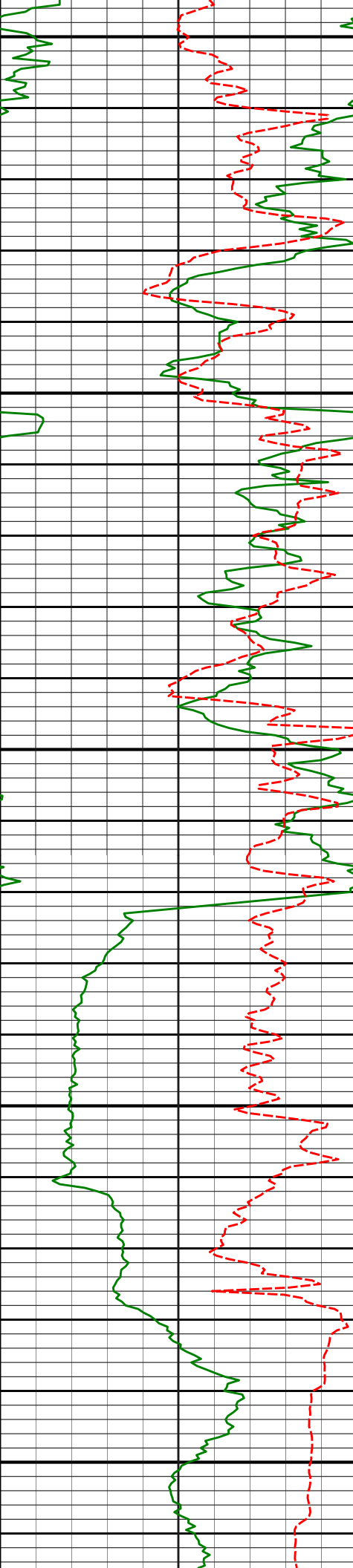
7459'

64.78°

1.46°

7186.62'

290.08'



Casing set @
7,932 MD'
7550

7500

7507'	71.40°	358.88°	7204.52'	334.59'
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7554'	76.63°	358.06°	7217.46'	379.73'
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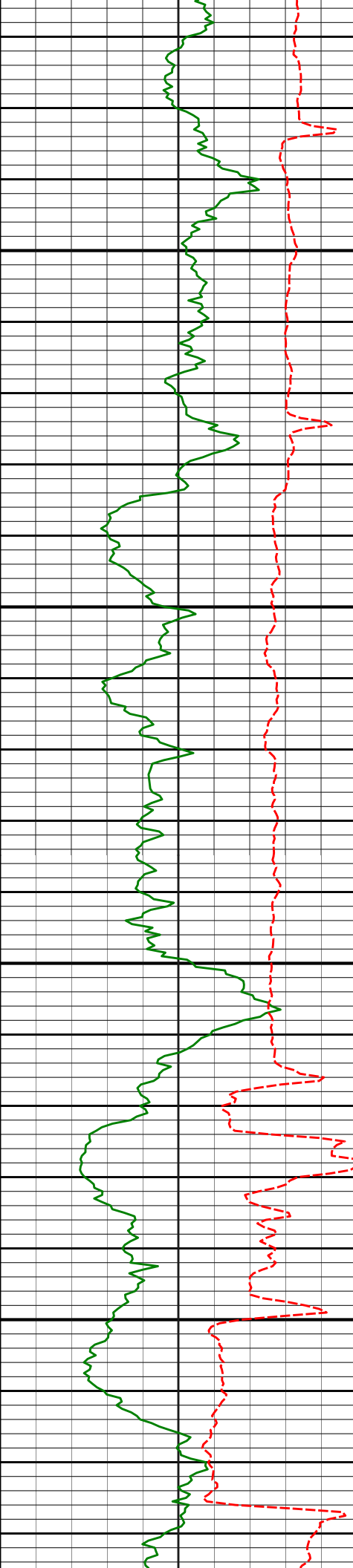
7600

7601'	81.78°	358.35°	7226.26'	425.84'
-------	--------	---------	----------	---------

7624'	84.45°	358.61°	7229.02'	448.66'
-------	--------	---------	----------	---------

7650

7700



7750

7800

7850

7900

7724'

92.56°

1.83°

7231.62'

548.53'

7817'

93.48°

1.44°

7226.72'

641.38'

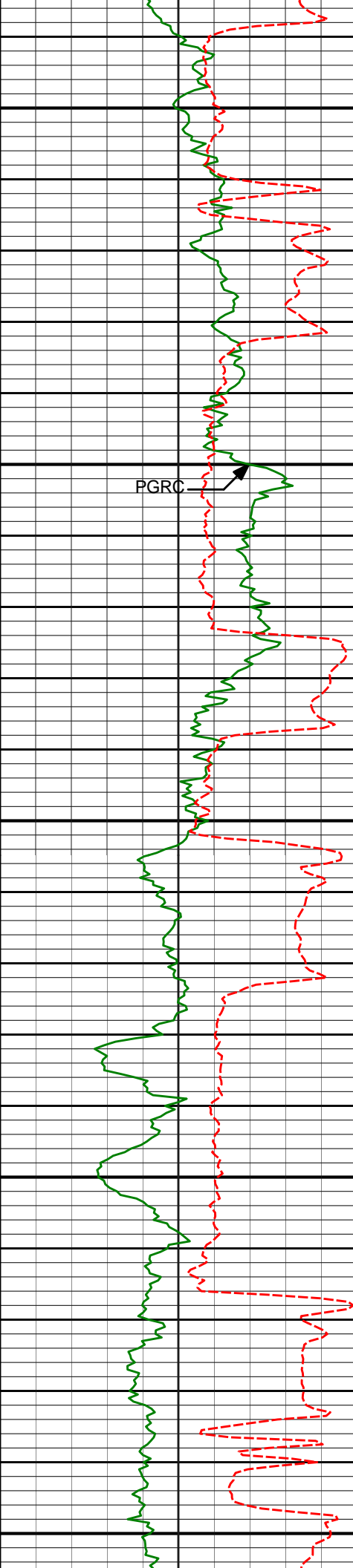
7911'

94.44°

1.93°

7220.23'

735.13'



7950

8000

8050

8100

8150

PGRC



8004'

94.57°

2.43°

7212.93'

827.80'

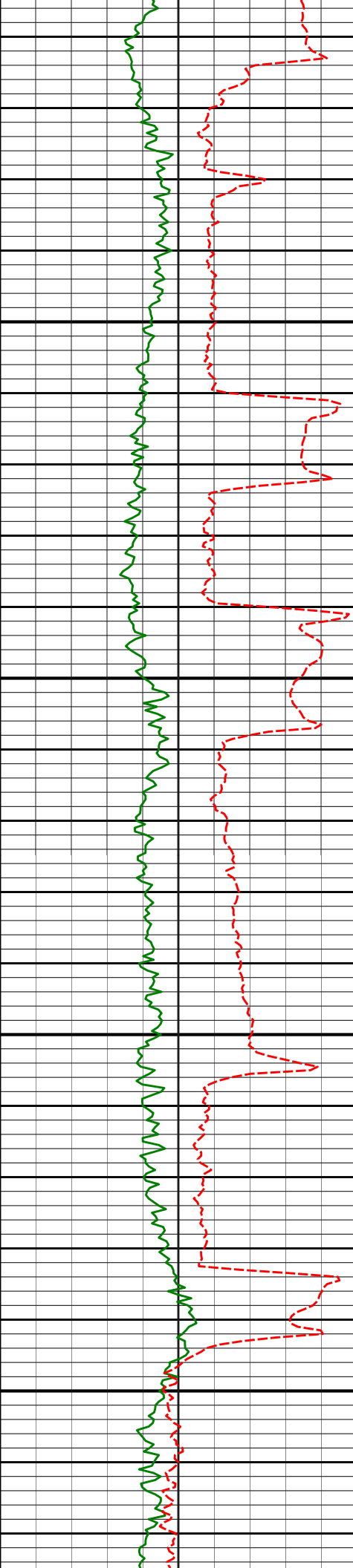
8096'

92.50°

2.52°

7207.25'

919.56'



8200

8250

8300

8350

8190'

90.49°

1.84°

7204.80'

1013.48'

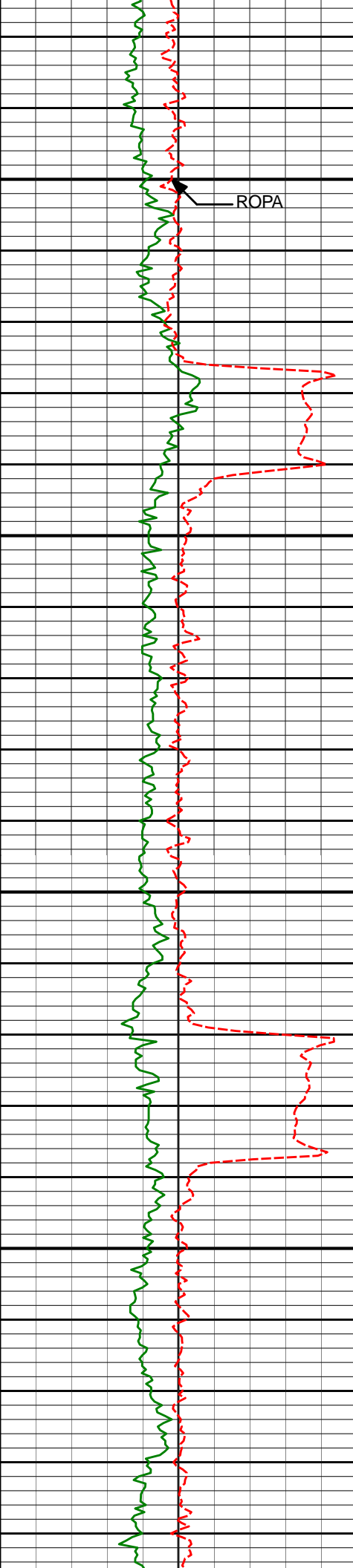
8283'

89.60°

359.97°

7204.73'

1106.48'



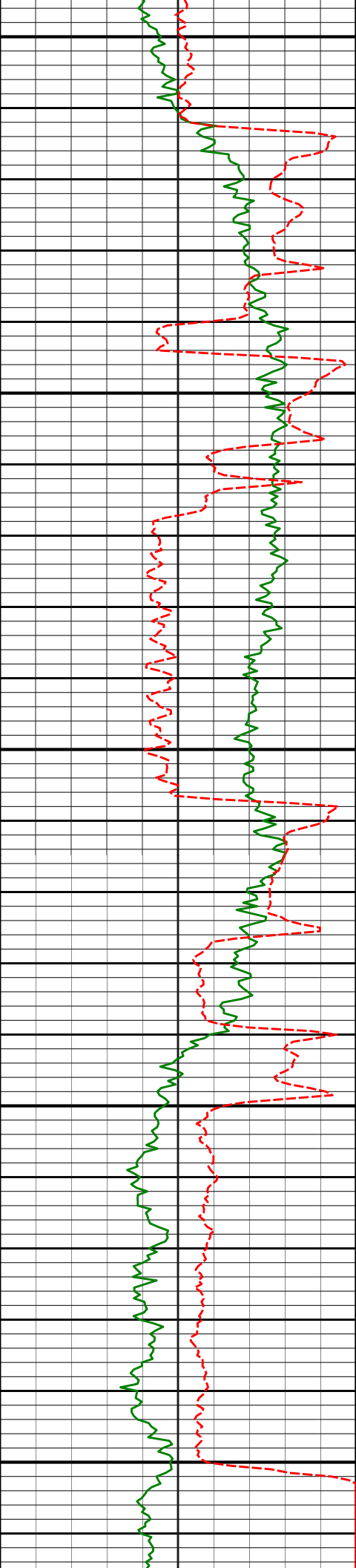
8400

8450

8500

8550

8376'	89.78°	359.07°	7205.23'	1199.46'
8470'	90.12°	359.14°	7205.31'	1293.44'
8562'	90.40°	358.39°	7204.90'	1385.39'



8600

8650

8700

8750

8800

8657'

89.35°

358.73°

7205.10'

1480.34'

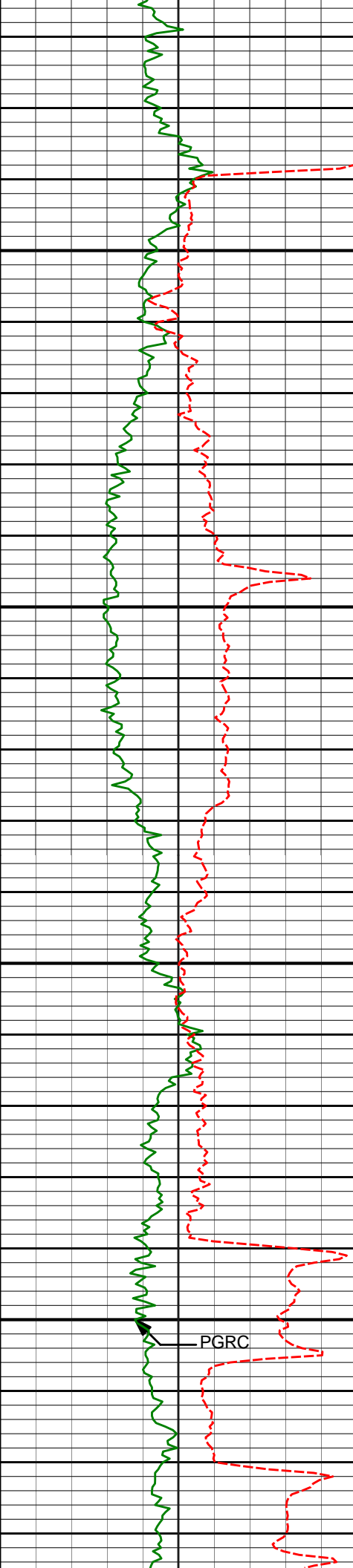
8751'

87.26°

358.13°

7207.89'

1574.24'



8850

8900

8950

9000

PGRC

8846'

88.03°

357.69°

7211.79'

1669.06'

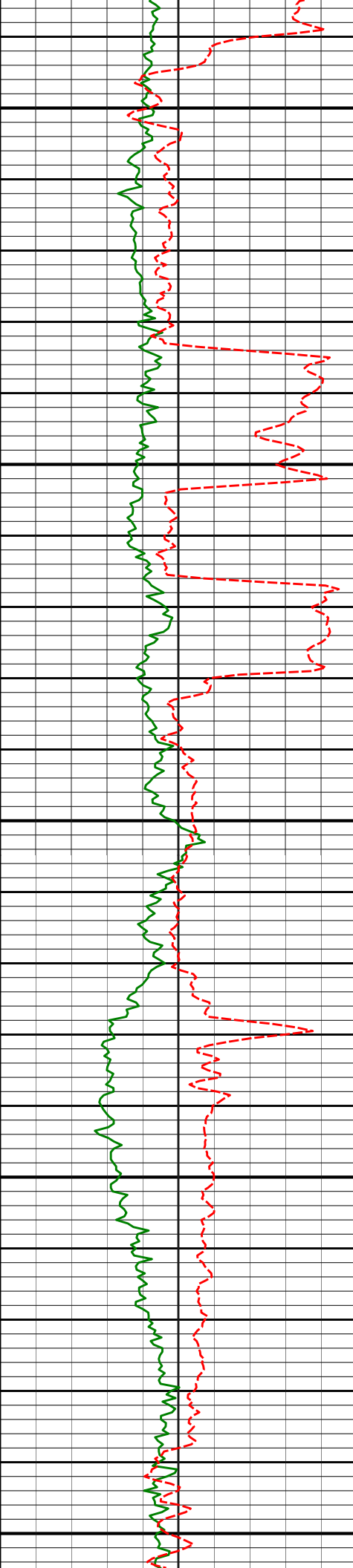
8940'

90.62°

357.71°

7212.90'

1762.94'



9050

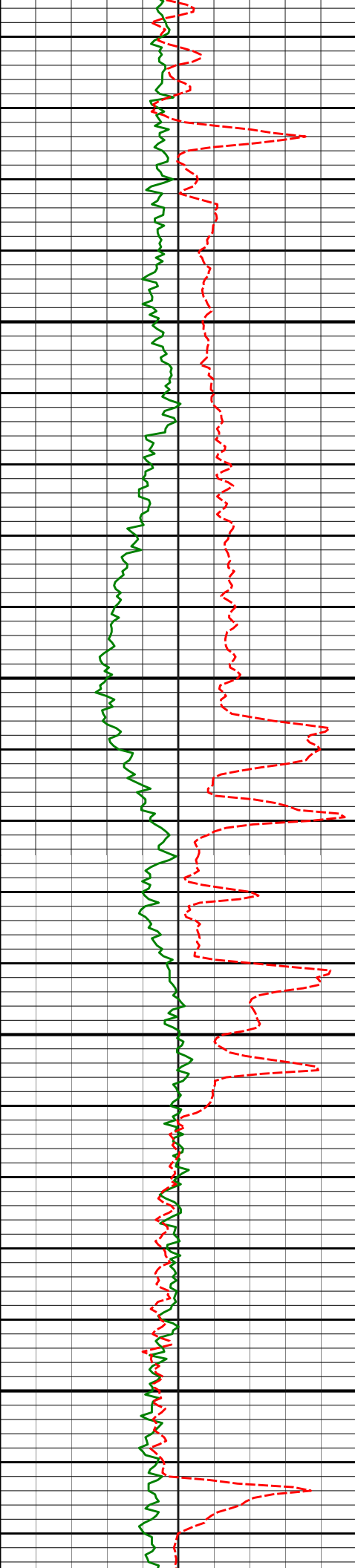
9100

9150

9200

9250

9035	89.88	358.51°	7212.48	1857.60
9129'	87.93°	358.55°	7214.28'	1951.79'
9224'	89.01°	358.78°	7216.81'	2046.71'



9300

9319'

90.74°

358.50°

7217.02'

2141.65'

9350

9400

9413'

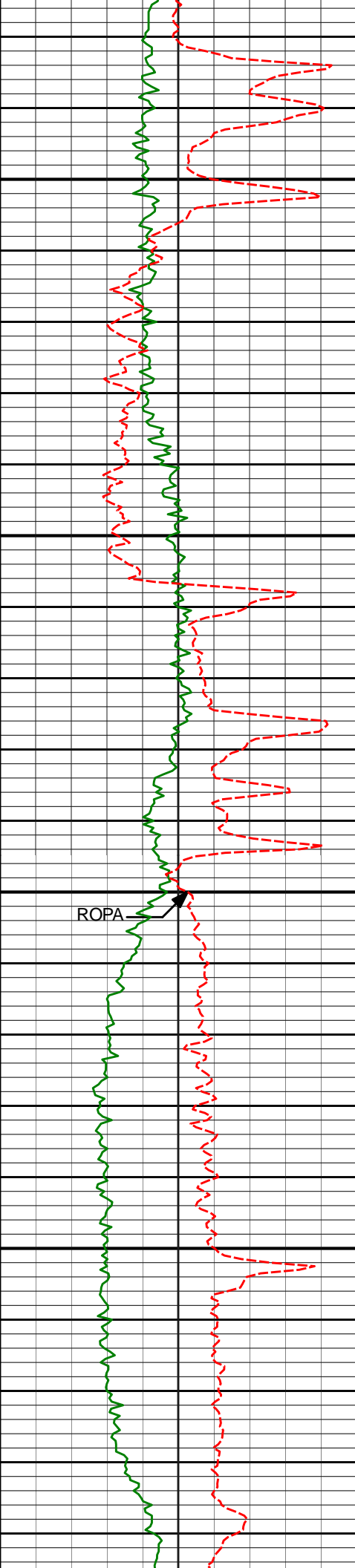
89.85°

359.25°

7216.54'

2235.62'

9450



9500

9550

9600

9650

ROPA

9507'

90.00°

359.42°

7216.66'

2329.60'

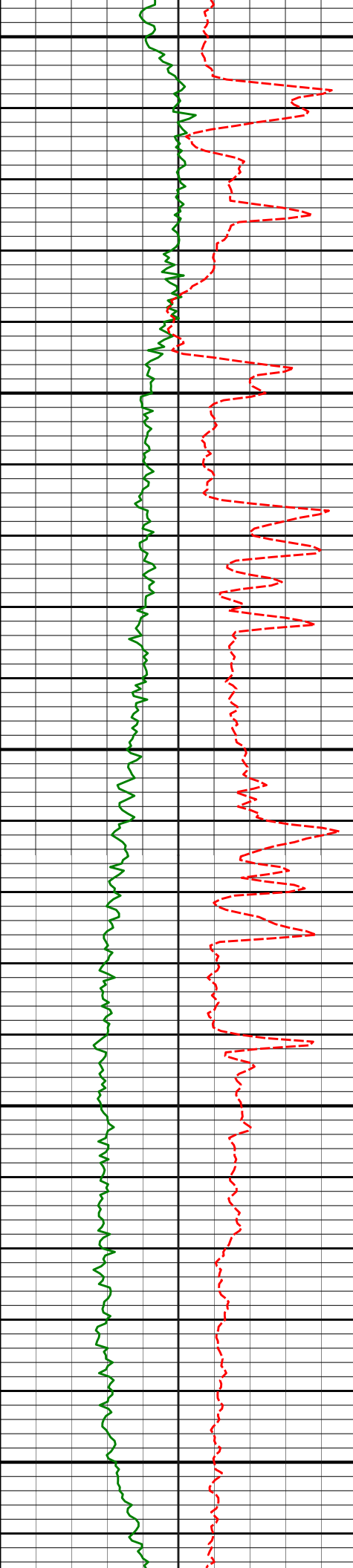
9602'

88.80°

358.74°

7217.66'

2424.56'



9700

9750

9800

9850

9900

9695

91.14°

358.95°

7217.70'

2517.32'

9790'

89.35°

358.98°

7217.30'

2612.49'

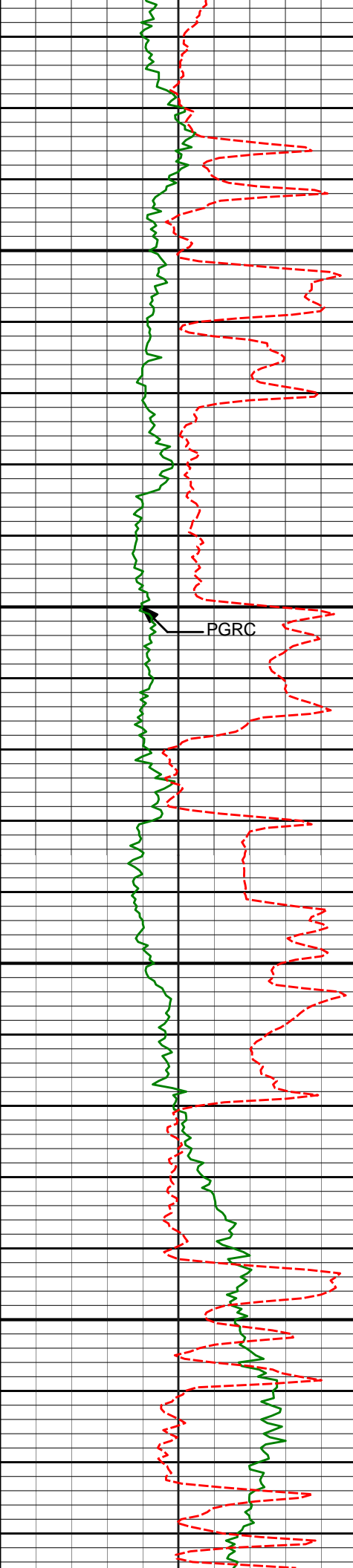
9884'

90.46°

359.58°

7217.45'

2706.46'



9950

9979'

91.33°

0.22°

7215.97'

2801.45'

10000

PGRC

10050

10074'

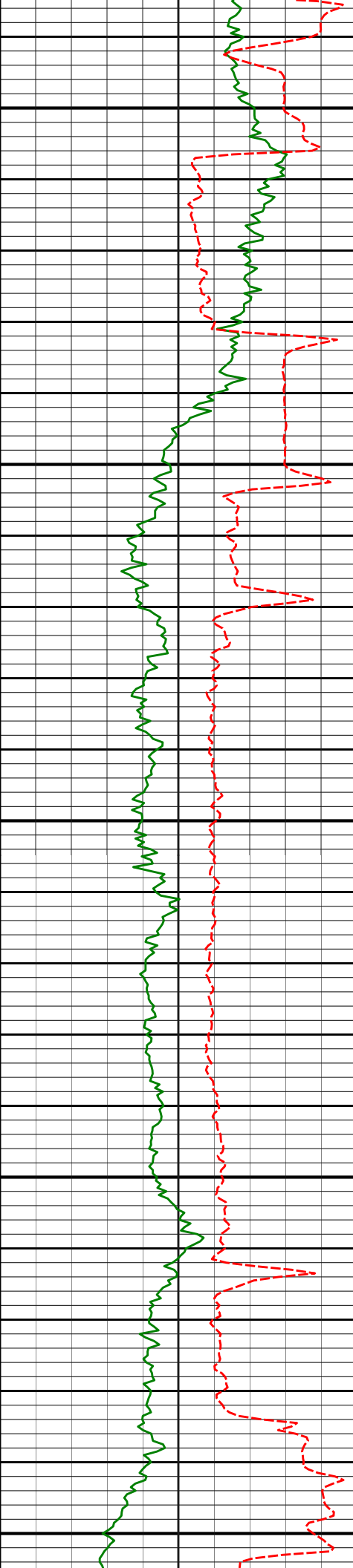
90.74°

1.48°

7214.25'

2896.43'

10100



10150

10200

10250

10300

10350

10168'

88.95°

2.18°

7214.51'

2990.39'

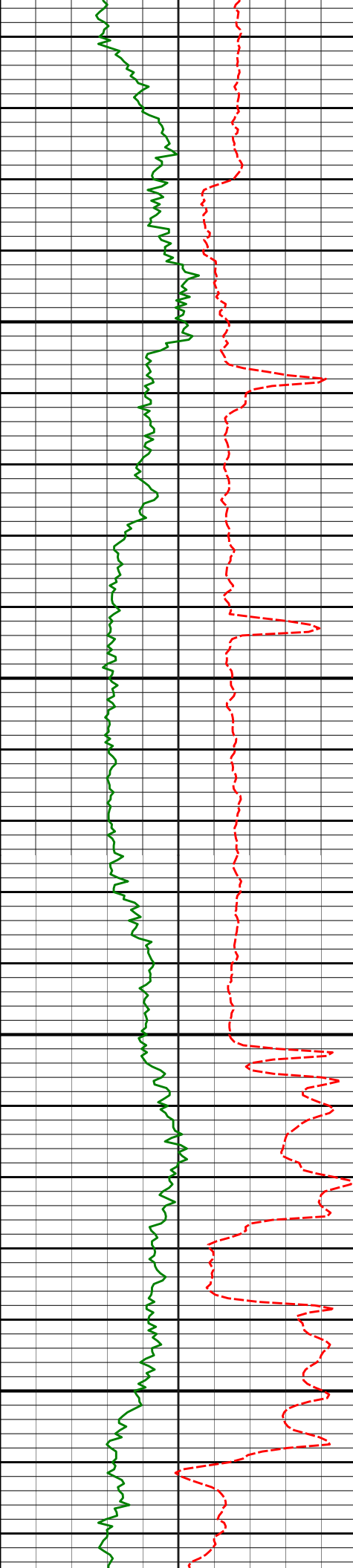
10262'

88.31°

2.25°

7216.76'

3084.32'



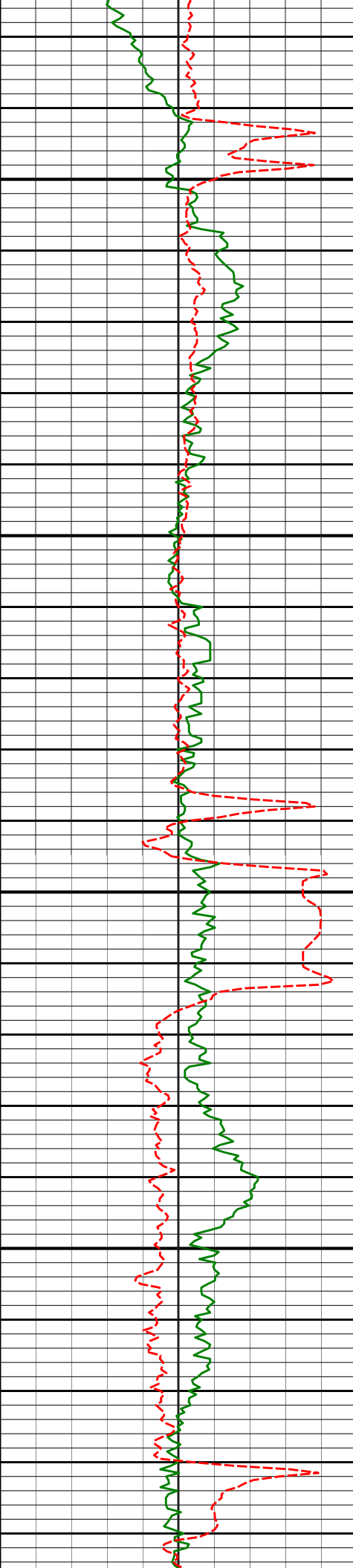
10400

10450

10500

10550

10357'	87.91°	2.72°	7219.89'	3179.21'
10451'	89.45°	2.72°	7222.05'	3273.11'
10546'	88.09°	2.84°	7224.09'	3368.00'



10600

10650

10700

10750

10640'

88.34°

2.56°

7227.02'

3461.89'

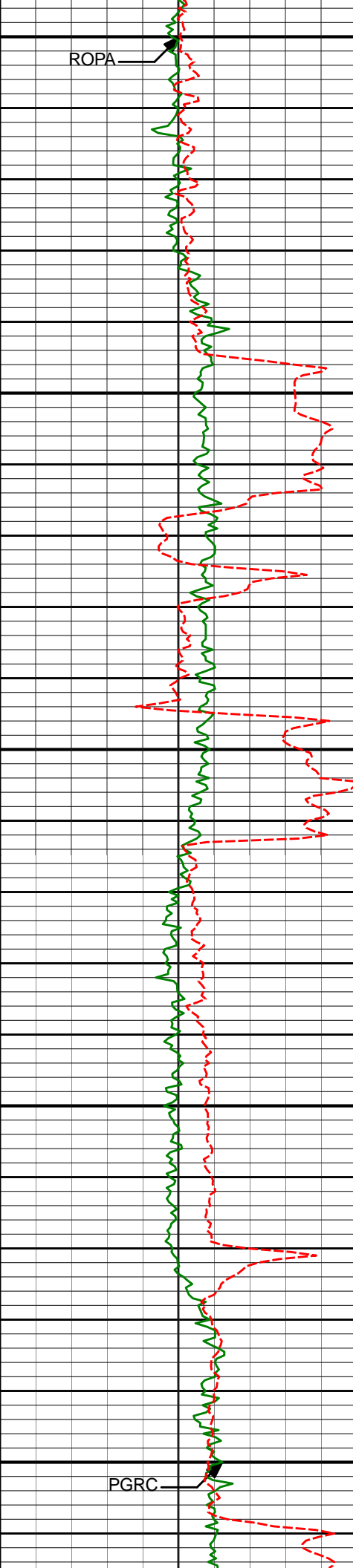
10735'

88.03°

1.67°

7230.03'

3556.80'



ROPA

PGRC

10800

10850

10900

10950

11000

10829'

90.18°

1.56°

7231.50'

3650.76'

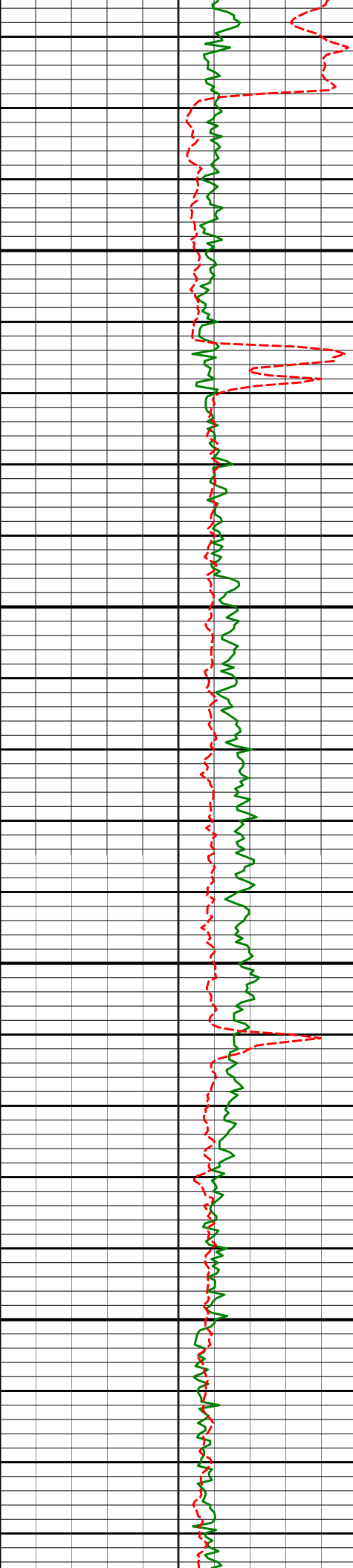
10924'

88.67°

1.89°

7232.45'

3745.73'



11050

11100

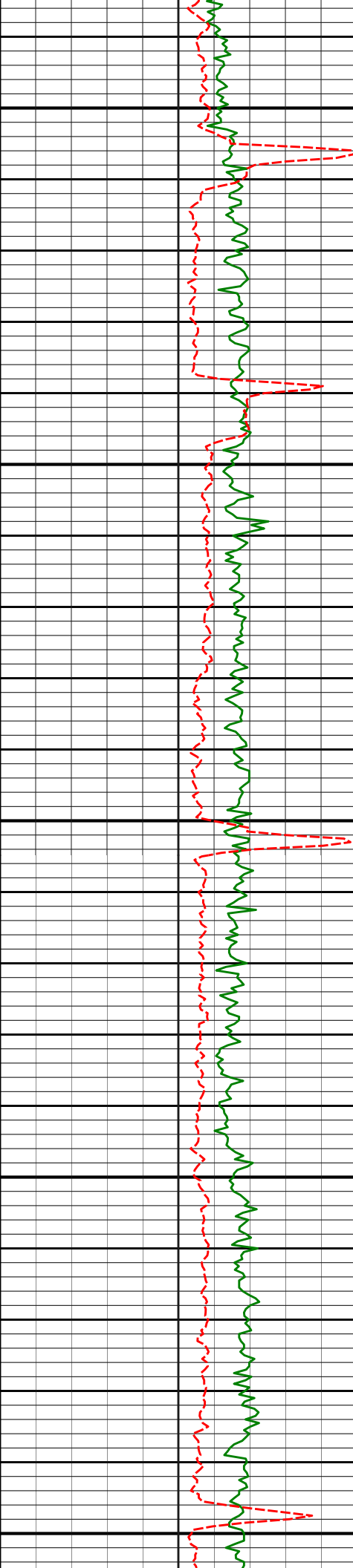
11150

11200

11018'	89.45°	1.46°	7233.99'	3839.69'
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11113'	89.69°	0.85°	7234.71'	3934.68'
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11207'	90.03°	359.82°	7234.94'	4028.68'
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11250

11300

11350

11400

11450

11302'

90.09°

358.94°

7234.84'

4123.66'

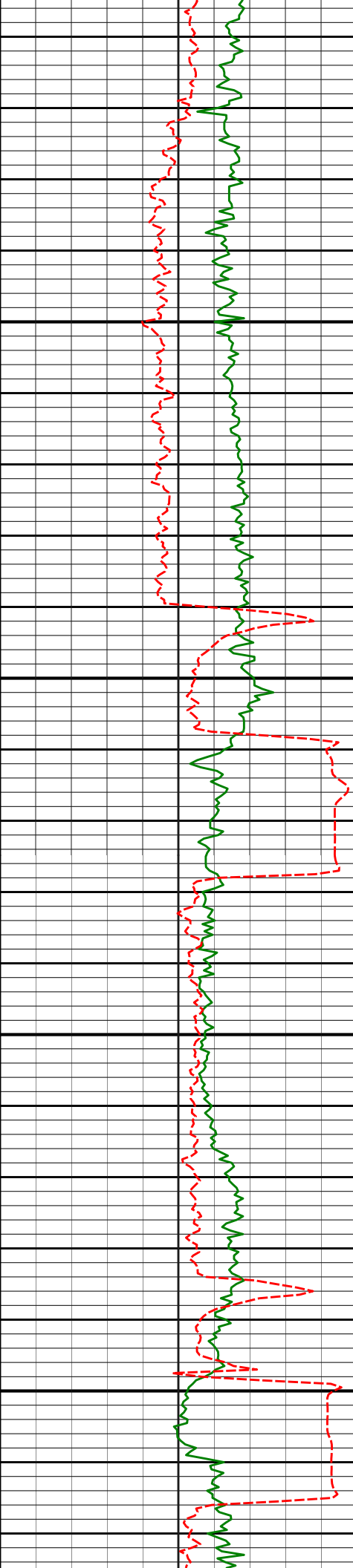
11396'

90.09°

357.82°

7234.69'

4217.60'



11500

11550

11600

11650

11490'	89.91°	356.49°	7234.69'	4311.44'
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11585'	89.48°	356.63°	7235.20'	4406.22'
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11679'

89.88°

357.92°

7235.72'

4500.08'

11700

11750

11773'

91.05°

358.27°

7234.96'

4593.99'

11800

11850

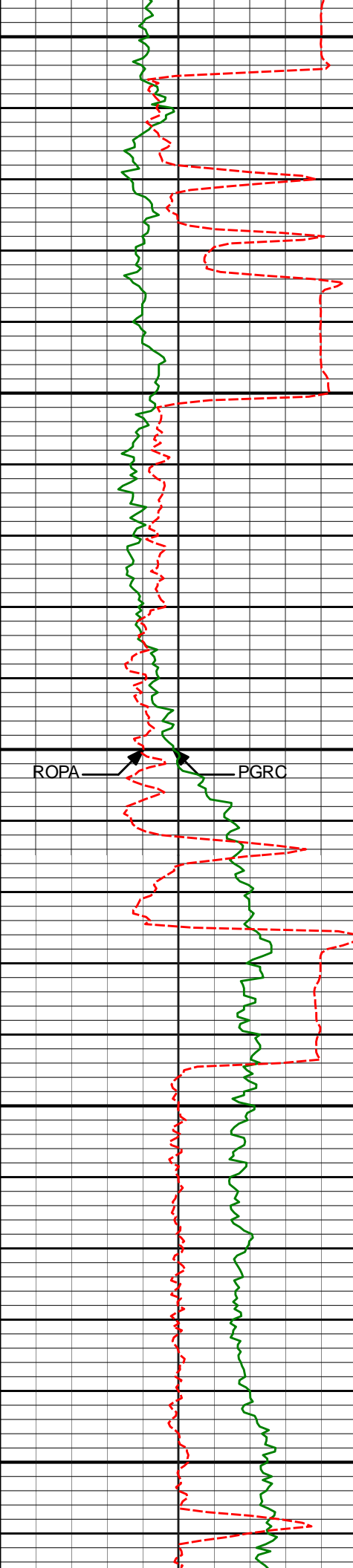
11868'

91.17°

358.70°

7233.12'

4688.92'



11900

11950

12000

12050

12100

ROPA PGRC

11962'

90.86°

1.01°

7231.45'

4782.89'

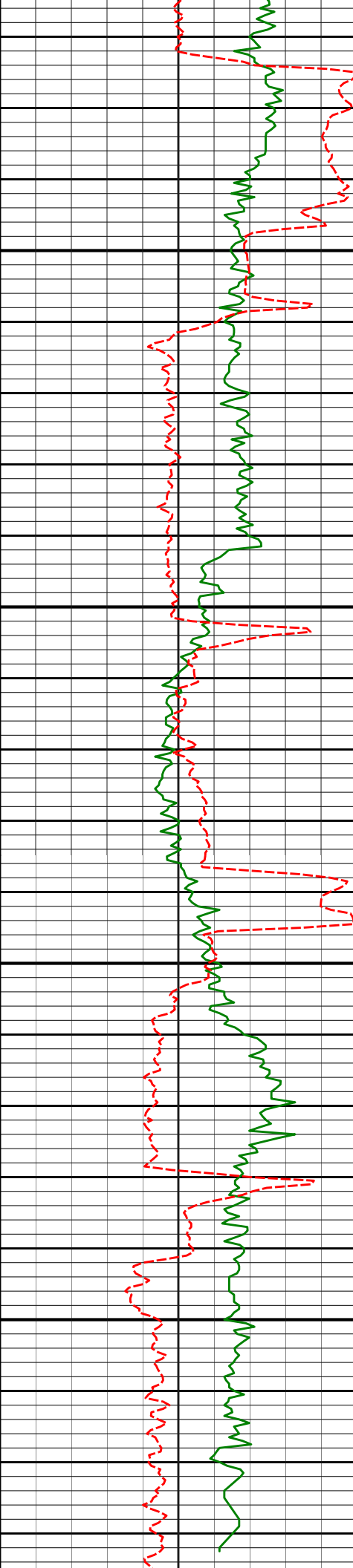
12057'

91.54°

2.28°

7229.46'

4877.85'



12150

12151'

90.68°

2.26°

7227.64'

4971.78'

12200

12250

12246'

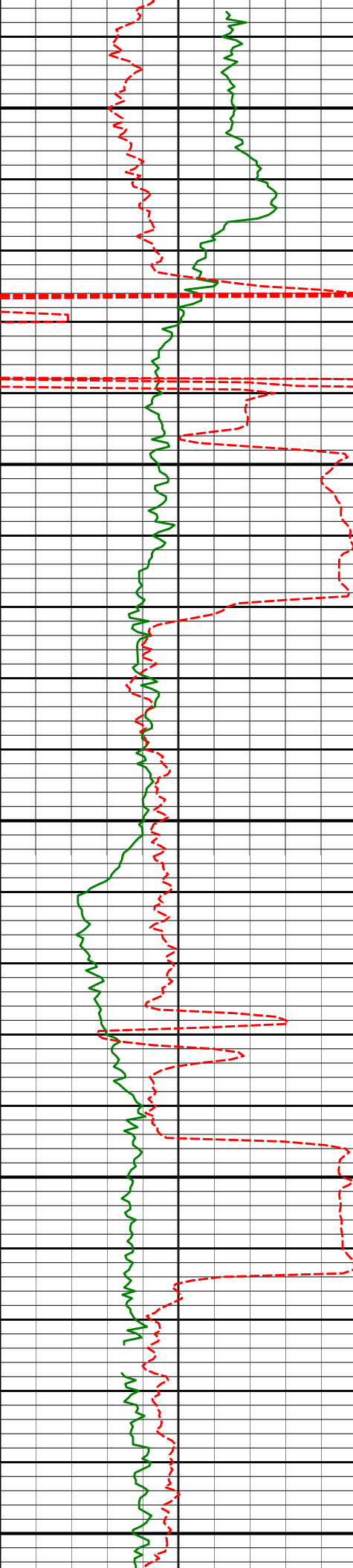
90.37°

2.70°

7226.77'

5066.72'

12300



12350

12400

12450

12500

12550

12340'

91.17°

3.52°

7225.51'

5160.61'

12435'

90.71°

2.96°

7223.95'

5255.48'

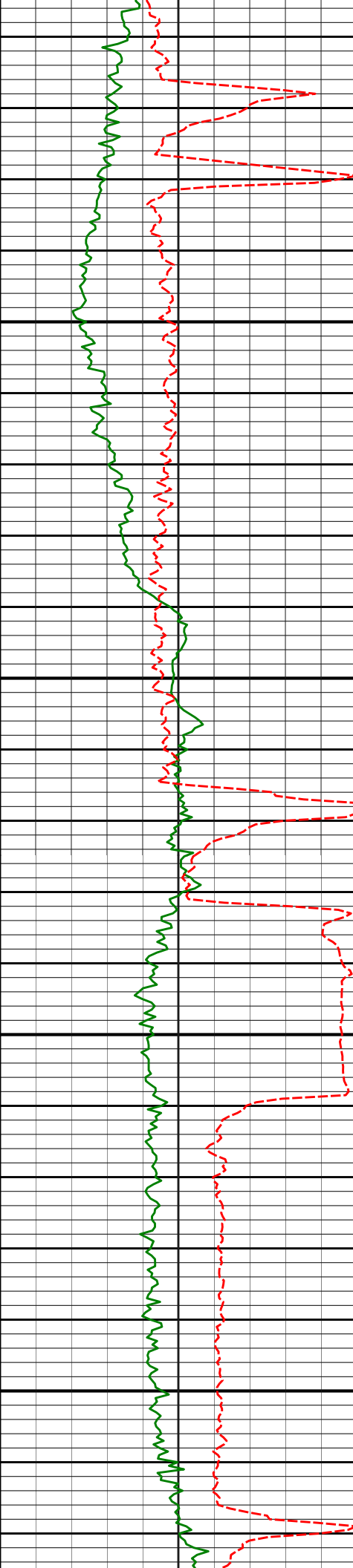
12530'

89.51°

2.93°

7223.77'

5350.39'



12600

12650

12700

12750

12624'

90.99°

2.33°

7223.36'

5444.31'

12719'

89.54°

1.70°

7222.92'

5539.27'



12800

12813'

90.40°

1.58°

7222.97'

5633.25'

12850

12900

12908'

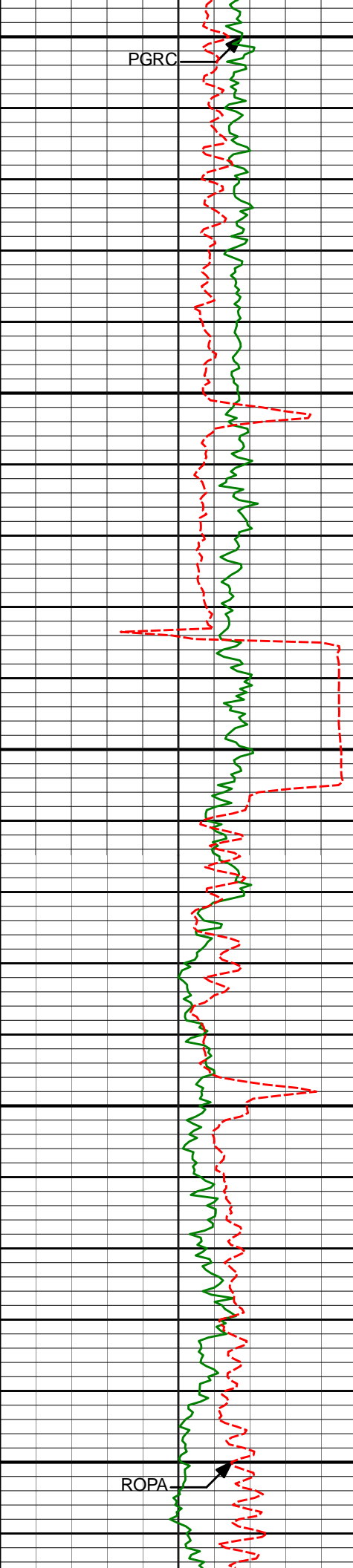
91.08°

1.32°

7221.74'

5728.23'

12950



13000

PGRC

13050

13100

13150

13200

ROPA

13002'

88.67°

0.54°

7221.95'

5822.22'

13097'

89.35°

1.86°

7223.59'

5917.19'

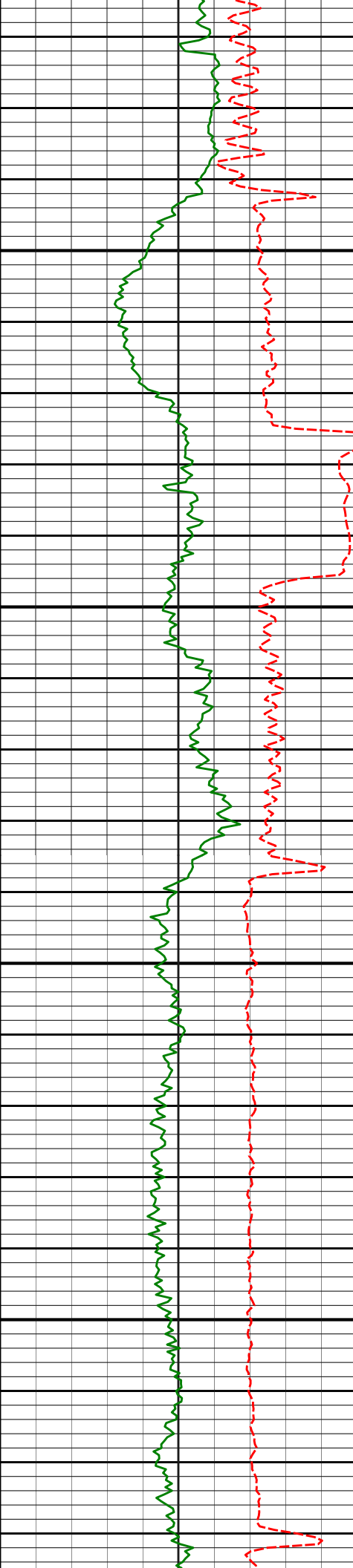
13192'

89.66°

1.48°

7224.41'

6012.17'



13250

13300

13350

13400

13286'

88.40°

1.00°

7226.00'

6106.14'

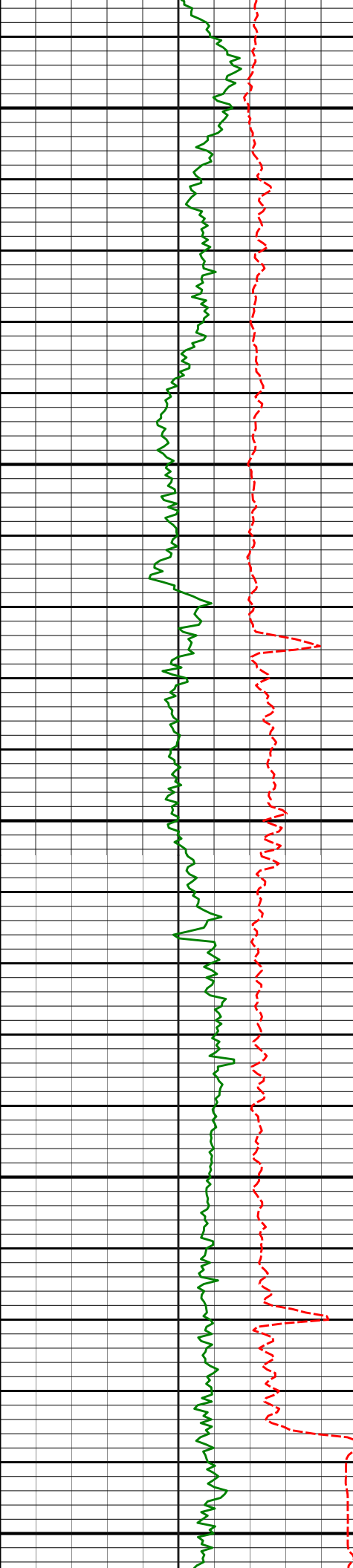
13381'

88.83°

0.58°

7228.29'

6201.11'



13450

13475'

90.00°

0.27°

7229.25'

6295.11'

13500

13550

13570'

90.99°

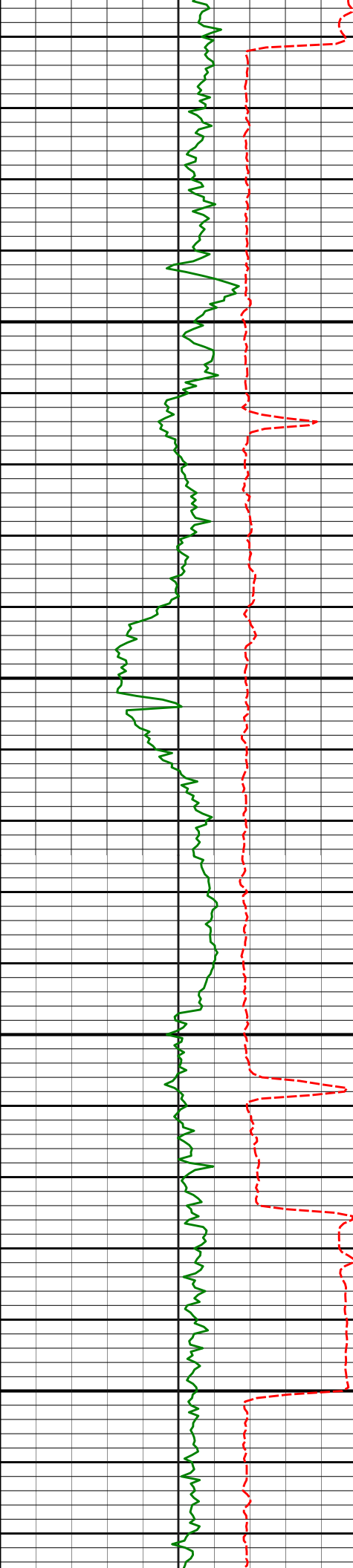
0.26°

7228.43'

6390.10'

13600

13650



13700

13750

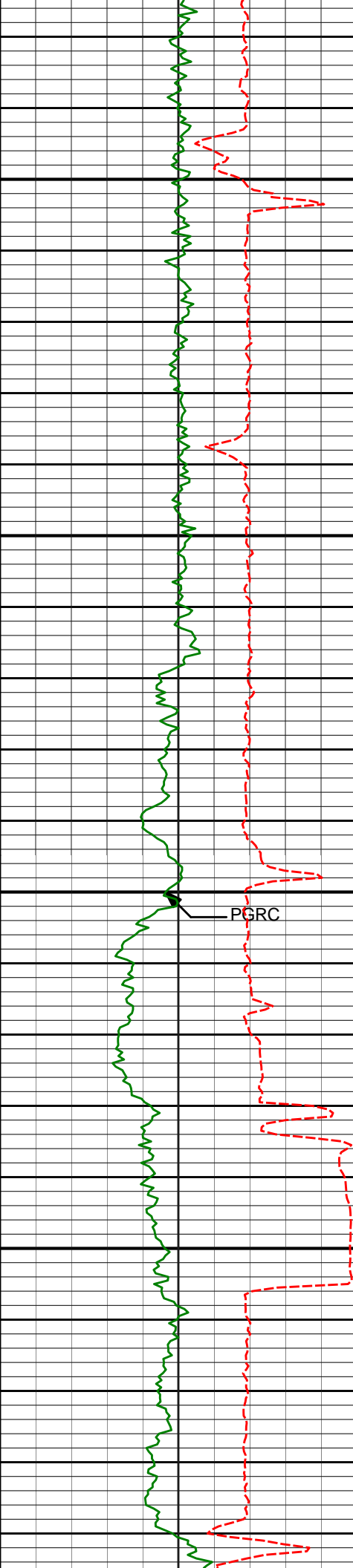
13800

13850

13664'	89.88°	0.15°	7227.72'	6484.10'
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13759'	90.96°	359.98°	7227.02'	6579.09'
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13853'	89.85°	0.32°	7226.36'	6673.08'
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13900

13950

14000

14050

PGRC

13948'

90.62°

359.85°

7225.97'

6768.08'

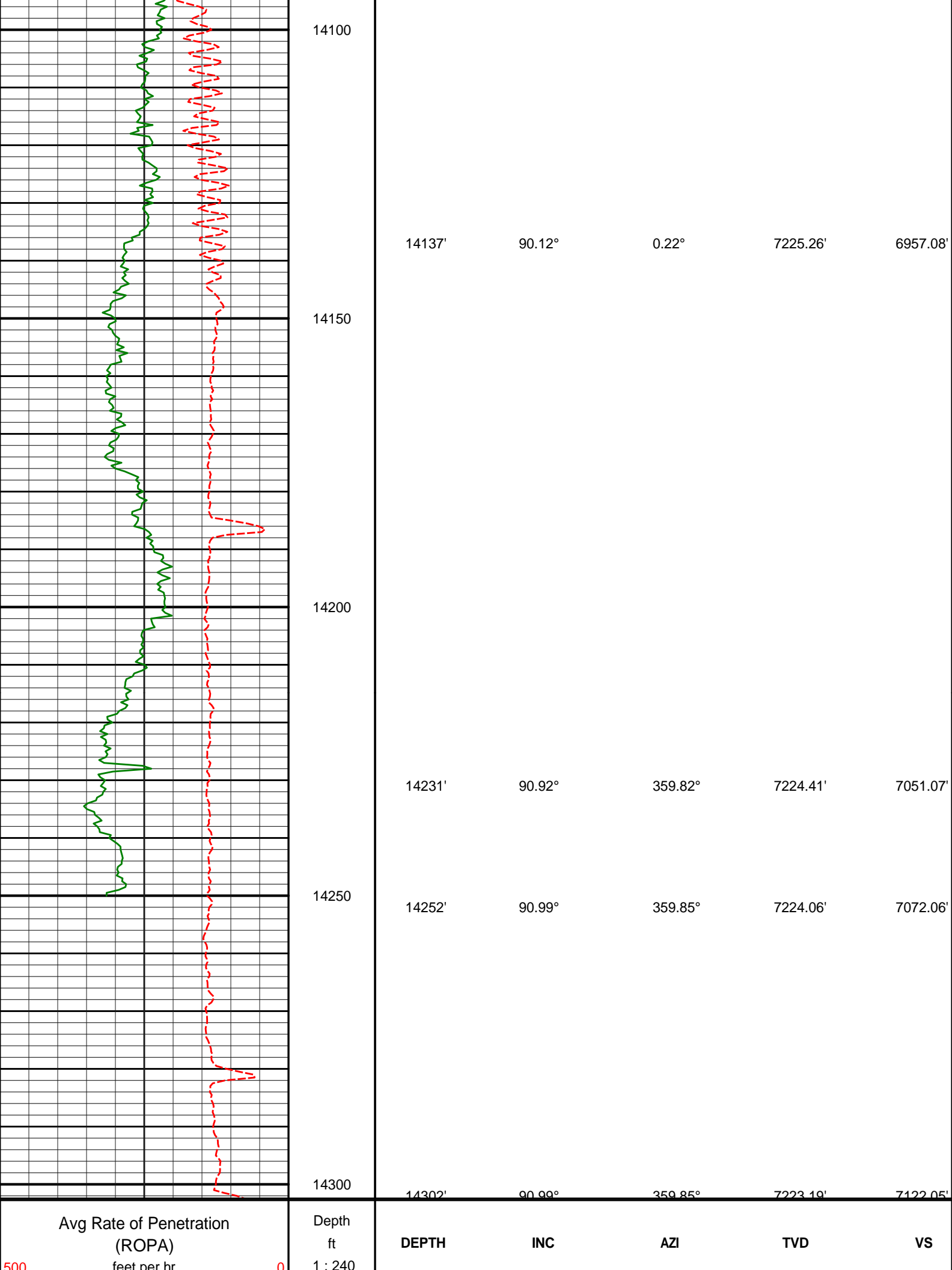
14043'

90.06°

0.24°

7225.41'

6863.08'



Avg Rate of Penetration (ROPA) feet per hr		Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
500	0						

0

PCG Gamma Ray
(PGRC)

250

HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log

HALLIBURTON							
DIRECTIONAL SURVEY REPORT							
Anadarko Petroleum Corp.							
Paragon 25N-31HZ							
Wattenberg							
Weld Colorado							
USA							
CA-XX-0901046399							
Survey's tied on to surface gyro's.							
Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1074.00	0.20	216.88	1073.94	5.34 N	7.60 W	5.28	TIE-IN
1204.00	0.11	339.51	1203.94	5.28 N	7.78 W	5.22	0.21
1296.00	0.73	339.01	1295.94	5.91 N	8.02 W	5.84	0.67
1388.00	0.68	2.29	1387.93	7.00 N	8.21 W	6.93	0.31
1479.00	0.59	355.09	1478.92	8.00 N	8.23 W	7.94	0.13
1573.00	1.41	289.43	1572.91	8.87 N	9.36 W	8.80	1.37
1665.00	1.52	282.70	1664.88	9.52 N	11.62 W	9.43	0.22
1758.00	1.69	282.73	1757.85	10.09 N	14.16 W	9.98	0.18
1851.00	1.57	286.72	1850.81	10.76 N	16.72 W	10.63	0.18
1945.00	1.57	290.69	1944.77	11.58 N	19.15 W	11.44	0.12
2037.00	1.67	292.05	2036.74	12.53 N	21.58 W	12.37	0.12
2131.00	1.70	295.66	2130.69	13.65 N	24.10 W	13.46	0.12
2224.00	1.76	296.61	2223.65	14.89 N	26.62 W	14.68	0.07
2317.00	1.81	307.26	2316.61	16.42 N	29.07 W	16.19	0.36
2410.00	1.82	316.86	2409.56	18.38 N	31.25 W	18.14	0.33
2503.00	1.27	330.57	2502.53	20.36 N	32.76 W	20.11	0.71
2597.00	1.21	334.78	2596.51	22.16 N	33.70 W	21.90	0.12
2690.00	2.93	289.10	2689.45	23.83 N	36.36 W	23.55	2.43
2783.00	5.12	277.42	2782.21	25.14 N	42.72 W	24.81	2.50
2876.00	6.72	277.78	2874.71	26.42 N	52.23 W	26.01	1.72
2970.00	8.74	273.56	2967.86	27.60 N	64.81 W	27.11	2.23
3065.00	10.49	267.73	3061.52	27.71 N	80.66 W	27.09	2.11
3159.00	11.66	261.47	3153.77	25.96 N	98.60 W	25.20	1.78
3254.00	12.77	259.16	3246.62	22.56 N	118.41 W	21.65	1.28
3348.00	14.36	254.04	3338.00	17.40 N	139.82 W	16.33	2.12
3443.00	15.73	256.58	3429.74	11.18 N	163.67 W	9.92	1.60
3537.00	16.26	253.12	3520.10	4.40 N	188.66 W	2.95	1.16
3632.00	16.08	250.80	3611.34	3.79 S	213.81 W	-5.43	0.71
3726.00	17.94	252.12	3701.23	12.52 S	239.89 W	-14.36	2.02
3821.00	17.25	255.28	3791.79	20.59 S	267.44 W	-22.64	1.24
3915.00	18.46	254.92	3881.26	28.00 S	295.29 W	-30.27	1.29
4010.00	17.02	256.19	3971.74	35.24 S	323.31 W	-37.72	1.57

4104.00	18.33	256.46	4061.30	41.98 S	351.04 W	-44.68	1.40
4199.00	17.80	258.29	4151.62	48.43 S	379.79 W	-51.34	0.82
4293.00	18.25	258.94	4241.00	54.17 S	408.30 W	-57.30	0.52
4388.00	17.06	259.55	4331.53	59.55 S	436.60 W	-62.90	1.27
4483.00	17.67	266.14	4422.21	63.05 S	464.70 W	-66.61	2.17
4577.00	17.01	267.16	4511.93	64.69 S	492.66 W	-68.47	0.77
4672.00	19.02	261.80	4602.28	67.58 S	521.87 W	-71.59	2.74
4766.00	18.43	260.28	4691.30	72.28 S	551.68 W	-76.51	0.81
4861.00	16.97	259.52	4781.80	77.33 S	580.11 W	-81.79	1.56
4955.00	19.01	260.09	4871.20	82.47 S	608.68 W	-87.14	2.18
5050.00	17.23	258.39	4961.49	87.96 S	637.71 W	-92.85	1.95
5144.00	15.74	258.57	5051.62	93.29 S	663.85 W	-98.38	1.59
5239.00	16.57	259.85	5142.87	98.23 S	689.81 W	-103.52	0.95
5333.00	14.93	258.28	5233.34	103.05 S	714.86 W	-108.54	1.80
5428.00	14.09	258.51	5325.31	107.84 S	738.18 W	-113.51	0.89
5522.00	12.51	259.34	5416.78	112.00 S	759.40 W	-117.83	1.69
5617.00	11.40	260.49	5509.72	115.46 S	778.77 W	-121.44	1.19
5711.00	10.22	258.03	5602.05	118.72 S	796.09 W	-124.83	1.35
5806.00	7.33	254.61	5695.93	122.08 S	810.18 W	-128.30	3.09
5900.00	4.53	251.31	5789.42	124.86 S	819.48 W	-131.15	3.00
5995.00	3.87	254.84	5884.16	126.90 S	826.13 W	-133.24	0.75
6089.00	1.99	279.70	5978.04	127.46 S	830.80 W	-133.83	2.37
6184.00	1.33	277.55	6073.00	127.03 S	833.52 W	-133.43	0.70
6278.00	1.31	300.53	6166.97	126.34 S	835.52 W	-132.76	0.56
6373.00	1.52	313.50	6261.95	124.93 S	837.37 W	-131.35	0.40
6467.00	1.62	324.35	6355.91	122.99 S	839.05 W	-129.43	0.33
6562.00	1.87	338.83	6450.87	120.45 S	840.39 W	-126.90	0.53
6656.00	2.08	350.49	6544.81	117.34 S	841.23 W	-123.80	0.48
6751.00	6.92	16.11	6639.50	110.14 S	839.93 W	-116.58	5.39
6798.00	13.57	18.69	6685.72	102.18 S	837.37 W	-108.61	14.18
6845.00	19.60	10.69	6730.75	89.20 S	834.14 W	-95.60	13.69
6892.00	23.16	8.26	6774.51	72.30 S	831.35 W	-78.68	7.80
6940.00	26.03	11.15	6818.15	52.62 S	827.95 W	-58.98	6.48
6987.00	27.56	7.19	6860.11	31.71 S	824.60 W	-38.04	5.00
7034.00	27.32	359.92	6901.83	10.13 S	823.25 W	-16.46	7.14
7081.00	32.34	357.36	6942.59	13.23 N	823.85 W	6.90	11.02
7129.00	39.30	356.39	6981.49	41.26 N	825.40 W	34.92	14.55
7176.00	44.00	358.45	7016.60	72.45 N	826.78 W	66.10	10.41
7223.00	45.49	358.26	7049.98	105.52 N	827.73 W	99.16	3.18
7270.00	48.13	0.26	7082.15	139.78 N	828.16 W	133.41	6.42
7318.00	52.16	0.38	7112.90	176.62 N	827.95 W	170.25	8.40
7365.00	56.03	1.41	7140.46	214.67 N	827.35 W	208.31	8.42
7412.00	60.72	1.64	7165.10	254.67 N	826.28 W	248.32	9.99
7459.00	64.78	1.46	7186.62	296.43 N	825.15 W	290.08	8.64
7507.00	71.40	358.88	7204.52	340.93 N	825.04 W	334.59	14.66
7554.00	76.63	358.06	7217.46	386.08 N	826.25 W	379.73	11.25
7601.00	81.78	358.35	7226.26	432.21 N	827.70 W	425.84	10.97
7624.00	84.45	358.61	7229.02	455.04 N	828.30 W	448.66	11.66
7724.00	92.56	1.83	7231.62	554.91 N	827.91 W	548.53	8.72
7817.00	93.48	1.44	7226.72	647.74 N	825.26 W	641.38	1.07
7911.00	94.44	1.93	7220.23	741.47 N	822.51 W	735.13	1.15
8004.00	94.57	2.43	7212.93	834.12 N	818.98 W	827.80	0.55
8096.00	92.50	2.52	7207.25	925.85 N	815.02 W	919.56	2.25
8190.00	90.49	1.84	7204.80	1019.74 N	811.44 W	1013.48	2.26
8283.00	89.60	359.97	7204.73	1112.73 N	809.97 W	1106.48	2.23
8376.00	89.78	359.07	7205.23	1205.72 N	810.75 W	1199.46	0.99
8470.00	90.12	359.14	7205.31	1299.71 N	812.22 W	1293.44	0.37
8562.00	90.40	358.39	7204.90	1391.69 N	814.20 W	1385.39	0.87
8657.00	89.35	358.73	7205.10	1486.66 N	816.59 W	1480.34	1.16
8751.00	87.26	358.13	7207.89	1580.57 N	819.16 W	1574.24	2.31
8846.00	88.03	357.69	7211.79	1675.43 N	822.63 W	1669.06	0.93
8940.00	90.62	357.71	7212.90	1769.34 N	826.40 W	1762.94	2.76
9035.00	89.88	358.51	7212.48	1864.29 N	829.53 W	1857.86	1.15
9129.00	87.93	358.55	7214.28	1958.23 N	831.94 W	1951.79	2.07
9224.00	89.01	358.78	7216.81	2053.17 N	834.16 W	2046.71	1.16
9319.00	90.74	358.50	7217.02	2148.14 N	836.41 W	2141.65	1.84
9413.00	89.85	359.25	7216.54	2242.12 N	838.26 W	2235.62	1.24
9507.00	90.00	359.42	7216.66	2336.11 N	839.35 W	2329.60	0.24
9602.00	88.80	358.74	7217.66	2431.09 N	840.87 W	2424.56	1.45
9695.00	91.14	358.95	7217.70	2524.07 N	842.75 W	2517.52	2.53
9790.00	89.35	358.98	7217.30	2619.05 N	844.46 W	2612.49	1.88
9884.00	90.46	359.58	7217.45	2713.04 N	845.64 W	2706.46	1.34
9979.00	91.33	0.22	7215.97	2808.03 N	845.81 W	2801.45	1.14
10074.00	90.74	1.48	7214.25	2903.00 N	844.40 W	2896.43	1.46
10168.00	88.05	2.18	7214.51	2996.04 N	841.40 W	2990.38	2.04

10168.00	88.93	2.18	7214.51	2990.94 N	841.40 W	2990.39	2.04
10262.00	88.31	2.25	7216.76	3090.85 N	837.77 W	3084.32	0.68
10357.00	87.91	2.72	7219.89	3185.71 N	833.65 W	3179.21	0.65
10451.00	89.45	2.72	7222.05	3279.57 N	829.19 W	3273.11	1.64
10546.00	88.09	2.84	7224.09	3374.44 N	824.58 W	3368.00	1.44
10640.00	88.34	2.56	7227.02	3468.29 N	820.16 W	3461.89	0.40
10735.00	88.03	1.67	7230.03	3563.17 N	816.65 W	3556.80	0.99
10829.00	90.18	1.56	7231.50	3657.12 N	814.01 W	3650.76	2.29
10924.00	88.67	1.89	7232.45	3752.07 N	811.15 W	3745.73	1.63
11018.00	89.45	1.46	7233.99	3846.01 N	808.40 W	3839.69	0.95
11113.00	89.69	0.85	7234.71	3940.99 N	806.48 W	3934.68	0.69
11207.00	90.03	359.82	7234.94	4034.99 N	805.93 W	4028.68	1.15
11302.00	90.09	358.94	7234.84	4129.98 N	806.96 W	4123.66	0.93
11396.00	90.09	357.82	7234.69	4223.94 N	809.62 W	4217.60	1.19
11490.00	89.91	356.49	7234.69	4317.82 N	814.29 W	4311.44	1.43
11585.00	89.48	356.63	7235.20	4412.65 N	819.99 W	4406.22	0.48
11679.00	89.88	357.92	7235.72	4506.54 N	824.45 W	4500.08	1.44
11773.00	91.05	358.27	7234.96	4600.48 N	827.58 W	4593.99	1.30
11868.00	91.17	358.70	7233.12	4695.43 N	830.09 W	4688.92	0.47
11962.00	90.86	1.01	7231.45	4789.41 N	830.33 W	4782.89	2.48
12057.00	91.54	2.28	7229.46	4884.35 N	827.60 W	4877.85	1.52
12151.00	90.68	2.26	7227.64	4978.26 N	823.88 W	4971.78	0.92
12246.00	90.37	2.70	7226.77	5073.16 N	819.77 W	5066.72	0.57
12340.00	91.17	3.52	7225.51	5167.02 N	814.67 W	5160.61	1.22
12435.00	90.71	2.96	7223.95	5261.85 N	809.30 W	5255.48	0.76
12530.00	89.51	2.93	7223.77	5356.72 N	804.42 W	5350.39	1.26
12624.00	90.99	2.33	7223.36	5450.62 N	800.11 W	5444.31	1.70
12719.00	89.54	1.70	7222.92	5545.56 N	796.77 W	5539.27	1.66
12813.00	90.40	1.58	7222.97	5639.52 N	794.08 W	5633.25	0.92
12908.00	91.08	1.32	7221.74	5734.48 N	791.67 W	5728.23	0.77
13002.00	88.67	0.54	7221.95	5828.46 N	790.15 W	5822.22	2.69
13097.00	89.35	1.86	7223.59	5923.42 N	788.16 W	5917.19	1.56
13192.00	89.66	1.48	7224.41	6018.38 N	785.39 W	6012.17	0.52
13286.00	88.40	1.00	7226.00	6112.34 N	783.36 W	6106.14	1.43
13381.00	88.83	0.58	7228.29	6207.30 N	782.05 W	6201.11	0.63
13475.00	90.00	0.27	7229.25	6301.29 N	781.35 W	6295.11	1.29
13570.00	90.99	0.26	7228.43	6396.29 N	780.91 W	6390.10	1.04
13664.00	89.88	0.15	7227.72	6490.28 N	780.57 W	6484.10	1.19
13759.00	90.96	359.98	7227.02	6585.28 N	780.47 W	6579.09	1.15
13853.00	89.85	0.32	7226.36	6679.27 N	780.22 W	6673.08	1.24
13948.00	90.62	359.85	7225.97	6774.27 N	780.08 W	6768.08	0.95
14043.00	90.06	0.24	7225.41	6869.27 N	780.00 W	6863.08	0.72
14137.00	90.12	0.22	7225.26	6963.27 N	779.63 W	6957.08	0.07
14231.00	90.92	359.82	7224.41	7057.26 N	779.59 W	7051.07	0.95
14252.00	90.99	359.85	7224.06	7078.26 N	779.65 W	7072.06	0.36
14302.00	90.99	359.85	7223.19	7128.25 N	779.79 W	7122.05	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 0.44 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.49 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 14302.00 FEET
IS 7170.78 FEET ALONG 353.76 DEGREES (TRUE)**

Final survey is a straight line projection to bit.