

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100				
Date run completed	25-Dec-13				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	687.00				
Log End Depth (MD, ft)	7,130.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	24-Dec-13 00:45				
Drill/Wipe End Date and Time	25-Dec-13 00:45				
Min Inc (deg) @ Depth (MD, ft)	0.13 @ 6,385.00				
Max Inc (deg) @ Depth (MD, ft)	10.38 @ 2,119.00				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	588.64				
Max AV (fpm) / CV (fpm) @ MWD	473.0 / NA				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	9.60 / 35.00				
Filtrate CL (ppm)	1,300.00				
pH / Fluid Loss (mptm)	9.30 / 8				
PV (cP) / YP (lbf2)	9 / 7.00				
% Solids / % Sand	5.0 / 0.25				
% Oil / Oil:Water Ratio	0 / 0:95				
Rm @ Measured Temp (degF)	NA @ NA				
Rmf @ Measured Temp (degF)	NA @ NA				
Rmc @ Measured Temp (degF)	NA @ NA				
Max Tool Temp (degF) / S	477.04 / PDC				

Max Tool Temp (degF) / Source	177.64 / PCM				
Rm @ Max Tool Temp (degF)	NA @ NA				
Lead MWD Engineer	Gary Eifert				
Customer Representative	Johnny Sanchez				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.84				
Sub Serial Number	11341330				
Insert Serial Number	11400989				
Date and Time Initialized	23-Dec-13 01:21				
Date and Time Read	26-Dec-13 15:23				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.00				
Software Version	6.21				
Sub Serial Number	11341330				
Sonde Serial Number	11478007				
Sensor ID Number	N/A				
Toolface Offset (deg)	242.03				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	47.97				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	1341330				
Insert/Sonde Serial Number	11293391				

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 annual 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 8.0.0

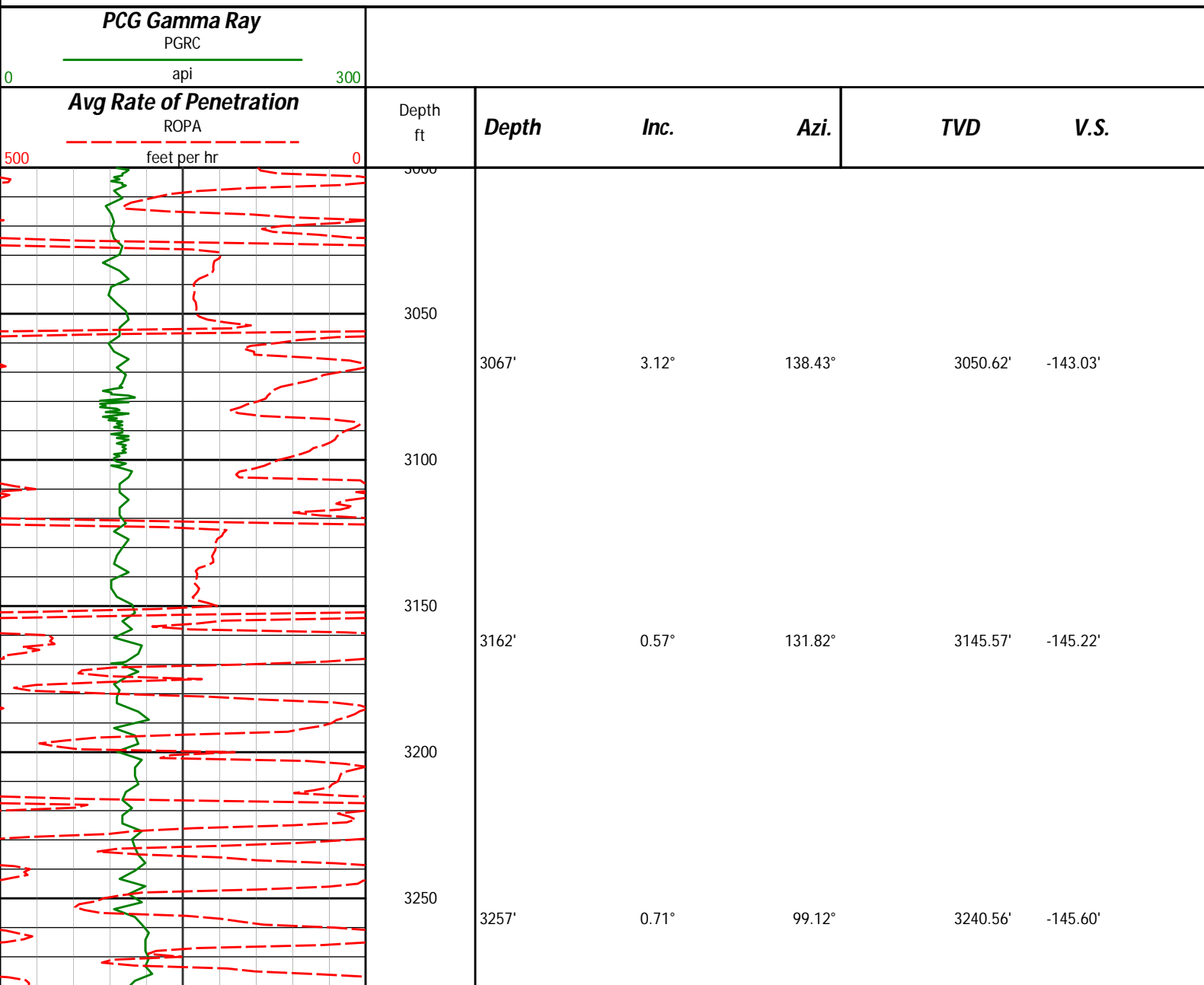
WARRANTY

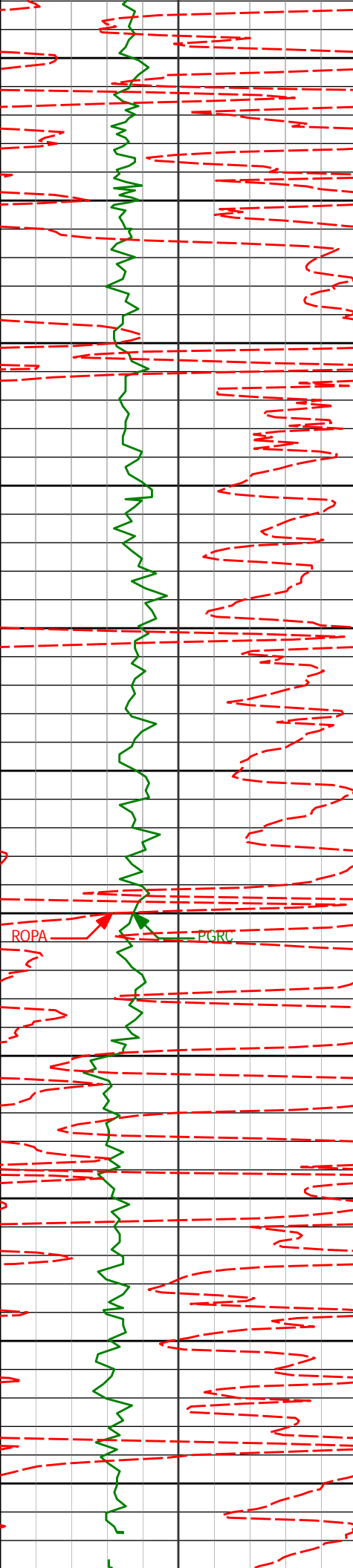
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HALLIBURTON Sperry Drilling Services

MD Main Log 1:600

Noble Energy
Marie D04-74-1HN
H&P 343
T3N-R64W





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3352'

0.24°

189.77°

3335.56'

-145.87'

3446'

0.81°

324.08°

3429.55'

-145.54'

3541'

1.09°

334.68°

3524.54'

-144.20'

3636'

1.07°

301.34°

3619.53'

-142.96'

3731'

0.81°

292.61°

3714.51'

-142.28'

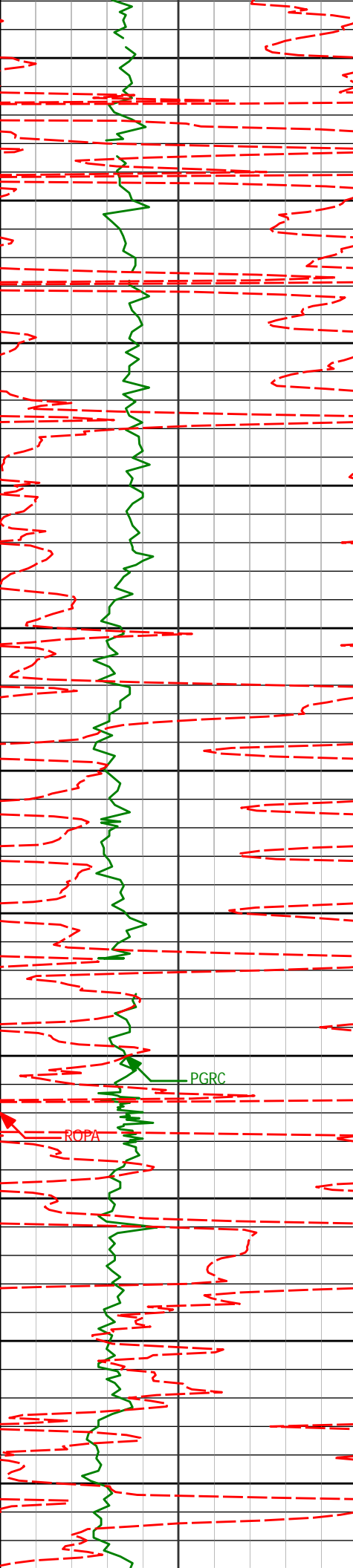
3825'

1.30°

299.40°

3808.50'

-141.55'



3850

3900

3950

4000

4050

4100

4150

4200

4250

4300

4350

3920'

1.13°

302.52°

3903.47'

-140.57'

4015'

0.97°

323.20°

3998.46'

-139.46'

4110'

0.71°

337.67°

4093.45'

-138.30'

4205'

0.84°

357.43°

4188.44'

-137.07'

4300'

0.79°

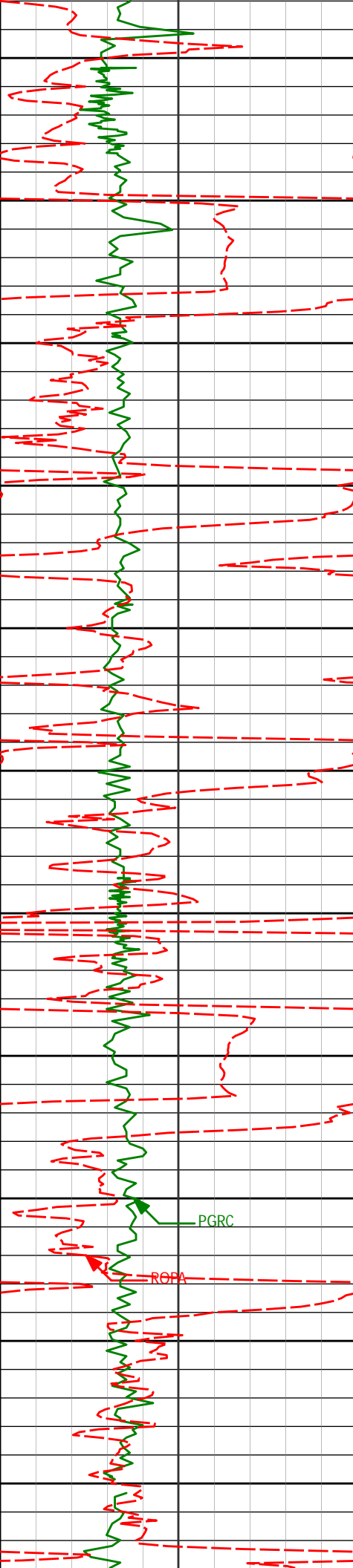
47.40°

4283.43'

-135.92'

PGRC

ROPA



4400

4450

4500

4550

4600

4650

4700

4750

4800

4850

4900

4395'

0.65°

28.27°

4378.42'

-134.97'

4490'

1.03°

109.12°

4473.42'

-134.75'

4584'

0.86°

94.18°

4567.40'

-135.03'

4679'

0.84°

84.06°

4662.39'

-134.97'

4869'

1.33°

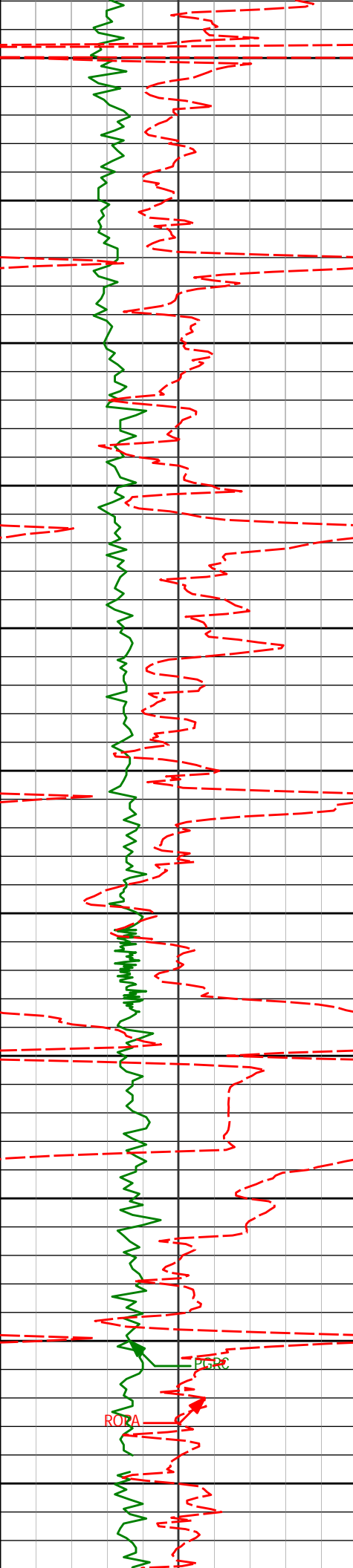
131.43°

4852.36'

-136.19'

PGRC

ROPA



4950

4964'

1.41°

121.07°

4947.34'

-137.47'

5000

5050

5058'

1.34°

122.05°

5041.31'

-138.59'

5100

5150

5200

5250

5248'

1.64°

96.51°

5231.25'

-139.94'

5300

5350

5343'

1.79°

163.60°

5326.21'

-141.46'

5400

5450

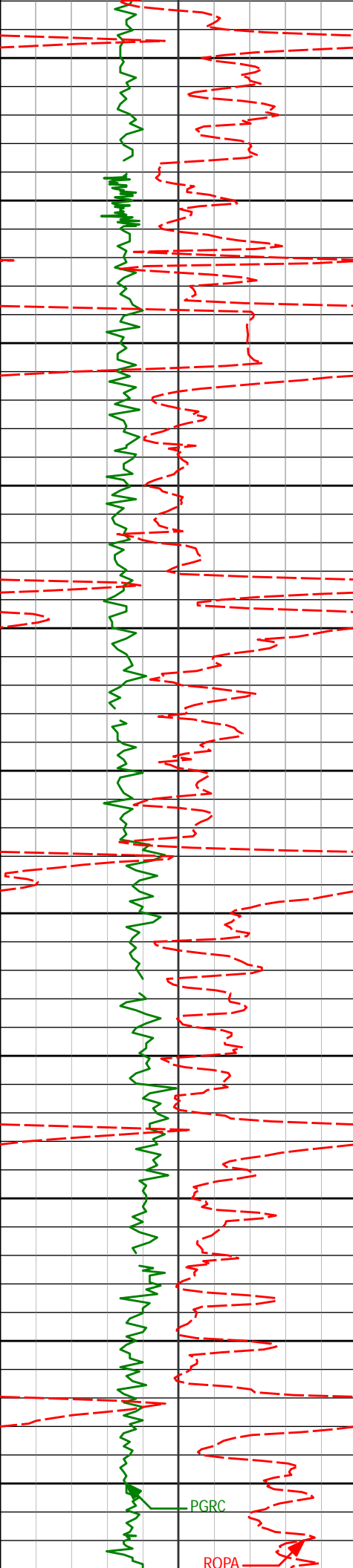
5438'

1.94°

165.67°

5421.16'

-144.42'



5500

5532'	1.49°	183.32°	5515.12'	-147.17'
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5550

5600

5627'	1.20°	224.84°	5610.10'	-149.13'
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5650

5700

5722'	1.21°	219.09°	5705.08'	-150.66'
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5750

5800

5817'	1.21°	229.95°	5800.05'	-152.12'
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5850

5900

5912'	1.11°	232.80°	5895.03'	-153.37'
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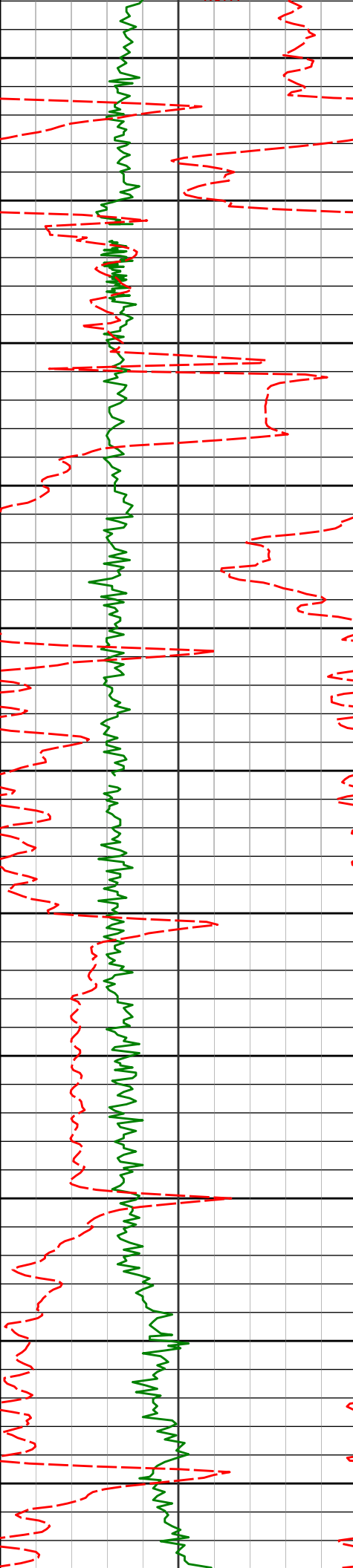
5950

6000

6007'	0.91°	211.53°	5990.02'	-154.61'
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PGRC

ROPA



6050

6100

6150

6200

6250

6300

6350

6400

6450

6500

6550

6101'

0.74°

200.04°

6084.01'

-155.83'

6291'

0.64°

350.11°

6274.00'

-155.96'

6385'

0.13°

290.83°

6368.00'

-155.41'

6480'

0.72°

54.75°

6463.00'

-155.02'

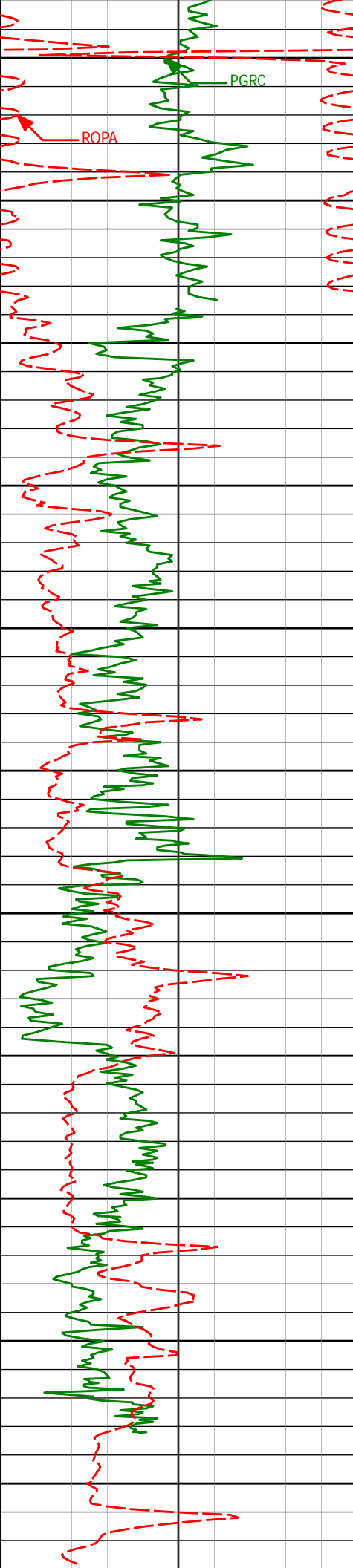
6575'

0.51°

61.60°

6558.00'

-154.45'



6600

PGRC

ROPA

6650

6670'

0.35°

2.92°

6652.99'

-153.95'

6700

6750

6765'

0.29°

62.65°

6747.99'

-153.54'

6800

6850

6860'

0.42°

115.13°

6842.99'

-153.56'

6900

6950

6954'

0.22°

126.67°

6936.99'

-153.80'

7000

7050

7075'

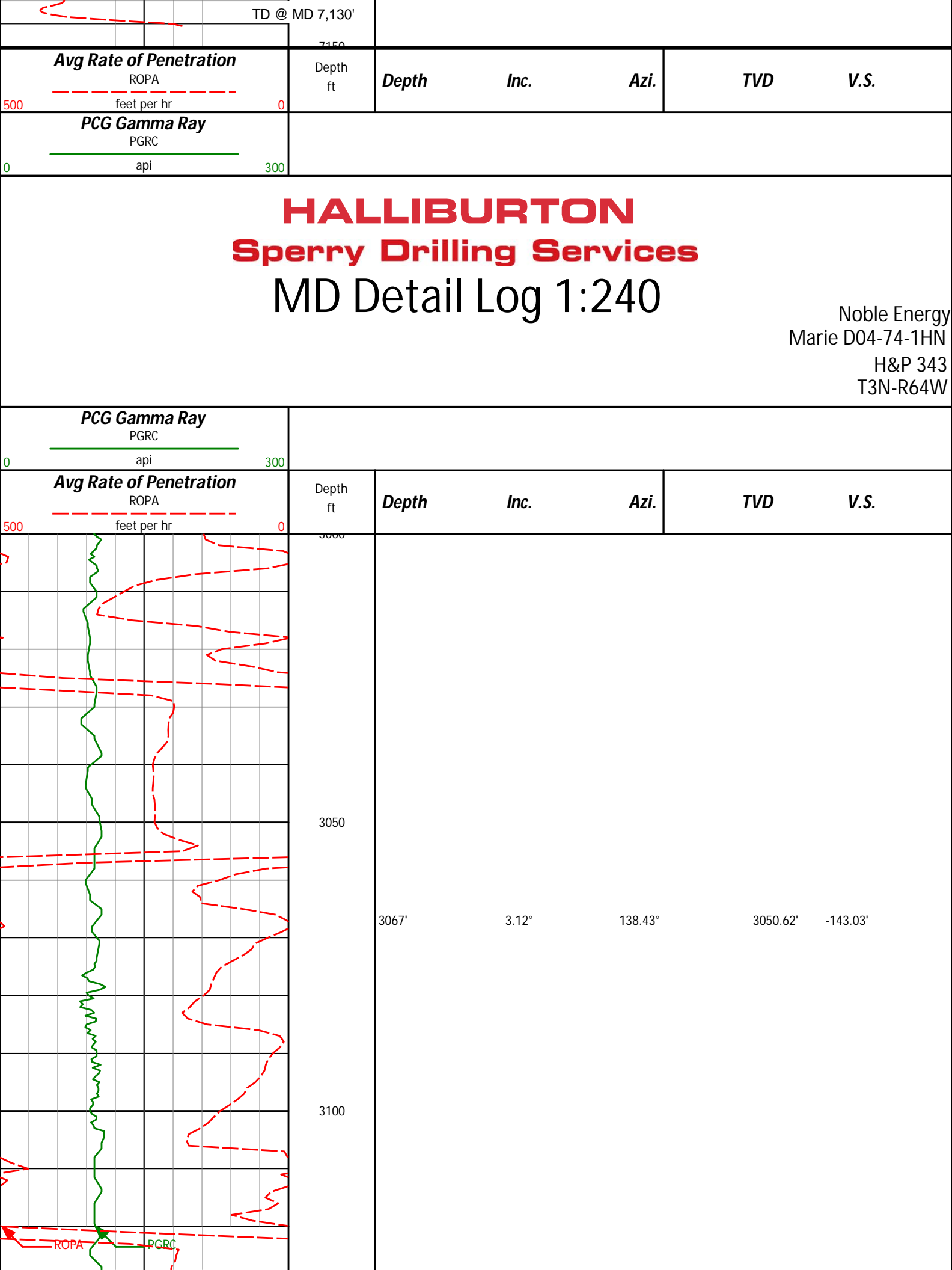
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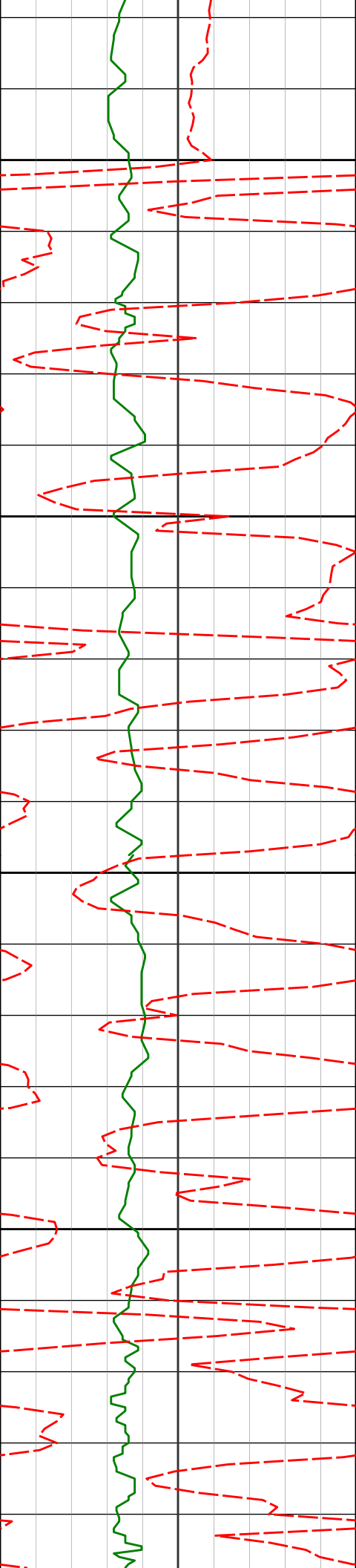
158.76°

7057.99'

-154.15'

7100





3150

3162'

0.57°

131.82°

3145.57'

-145.22'

3200

3250

3257'

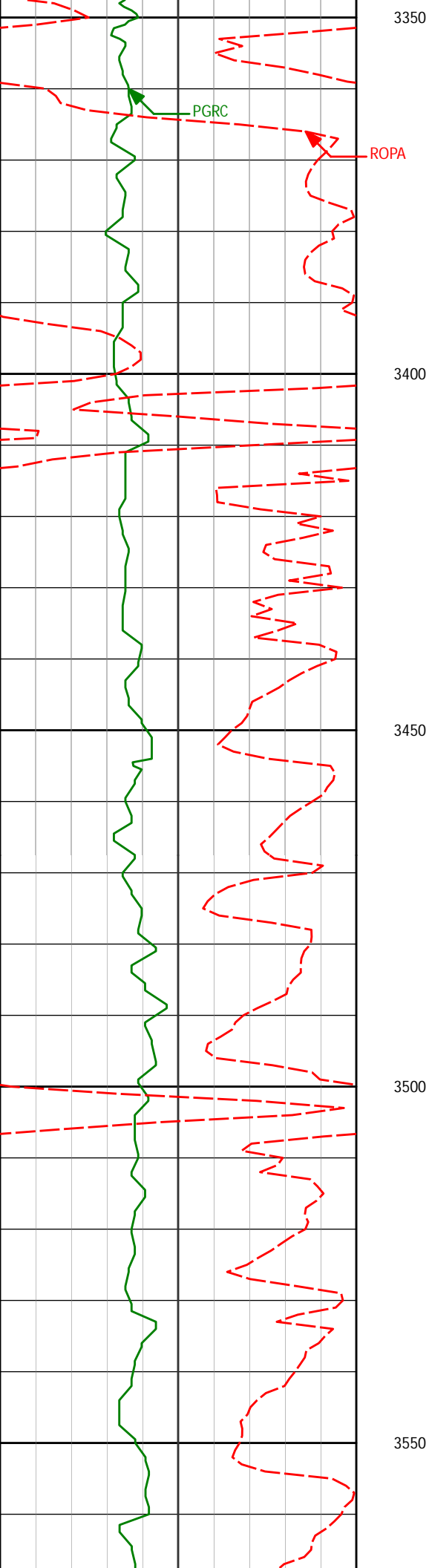
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99.12°

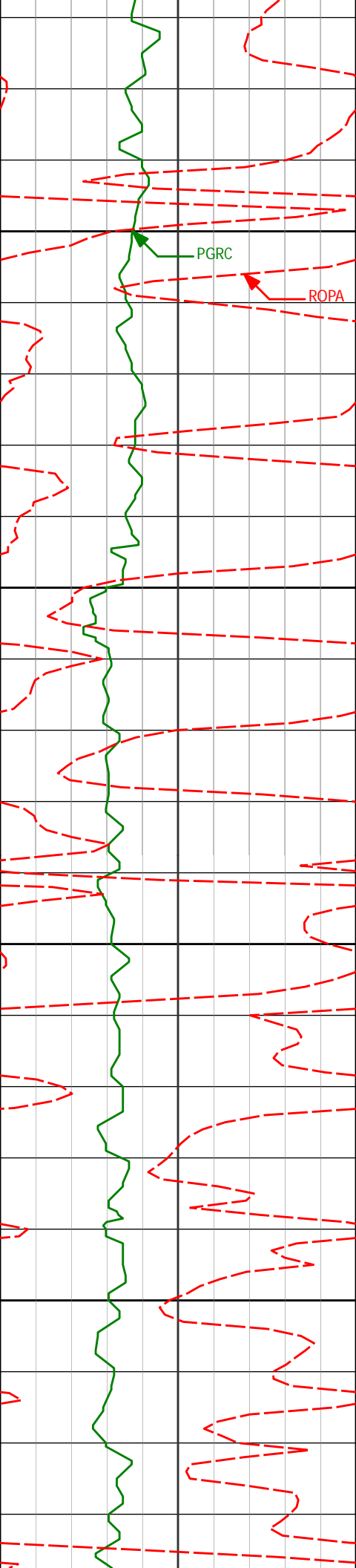
3240.56'

-145.60'

3300



3352'	0.24°	189.77°	3335.56'	-145.87'
3446'	0.81°	324.08°	3429.55'	-145.54'
3541'	1.09°	334.68°	3524.54'	-144.20'



3600

3650

3700

3750

3636'

1.07°

301.34°

3619.53'

-142.96'

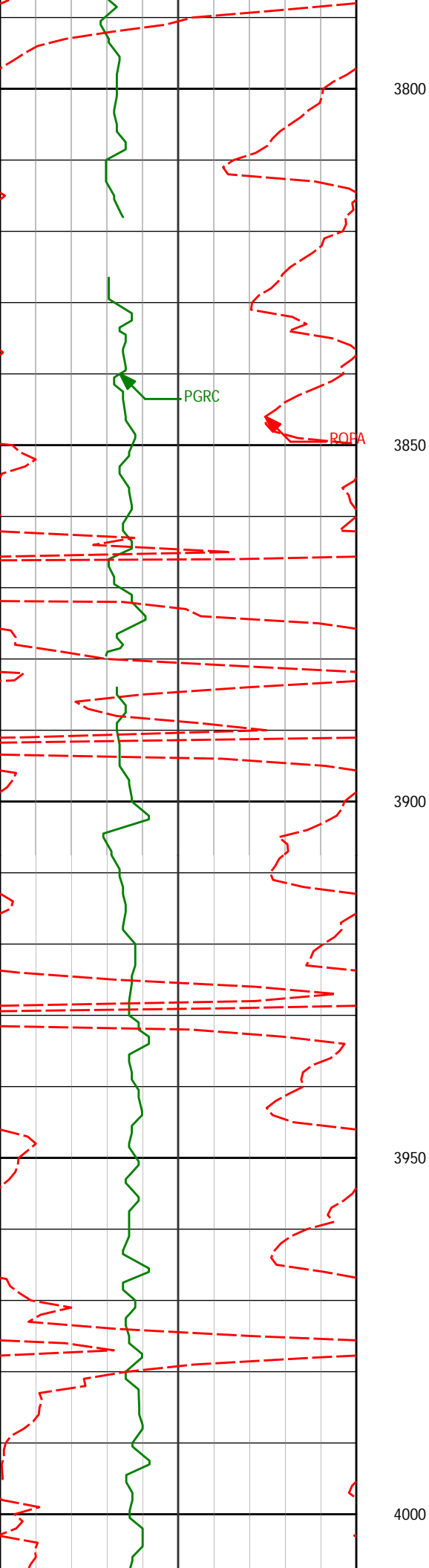
3731'

0.81°

292.61°

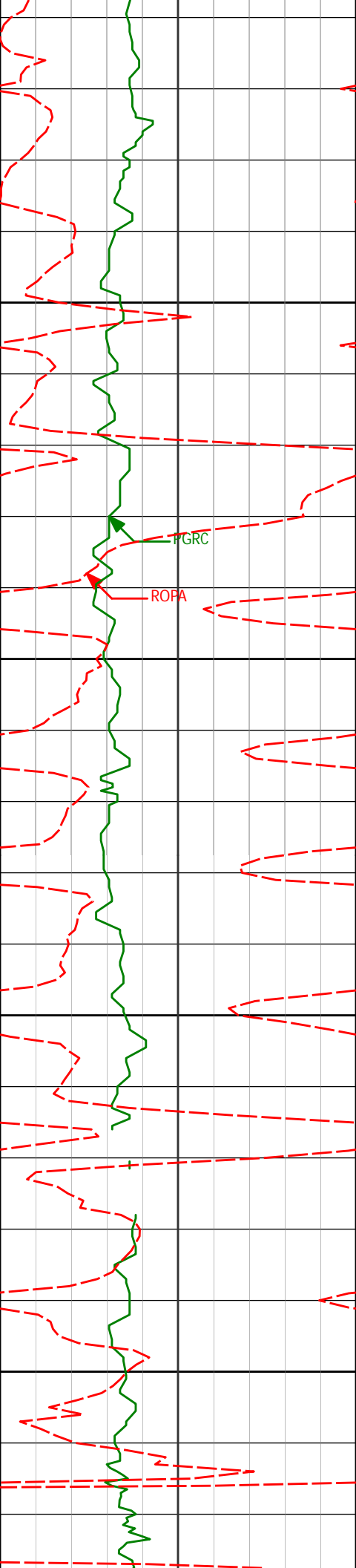
3714.51'

-142.28'



3825' 1.30° 299.40° 3808.50' -141.55'

3920' 1.13° 302.52° 3903.47' -140.57'



4015' 0.97° 323.20° 3998.46' -139.46'

4050

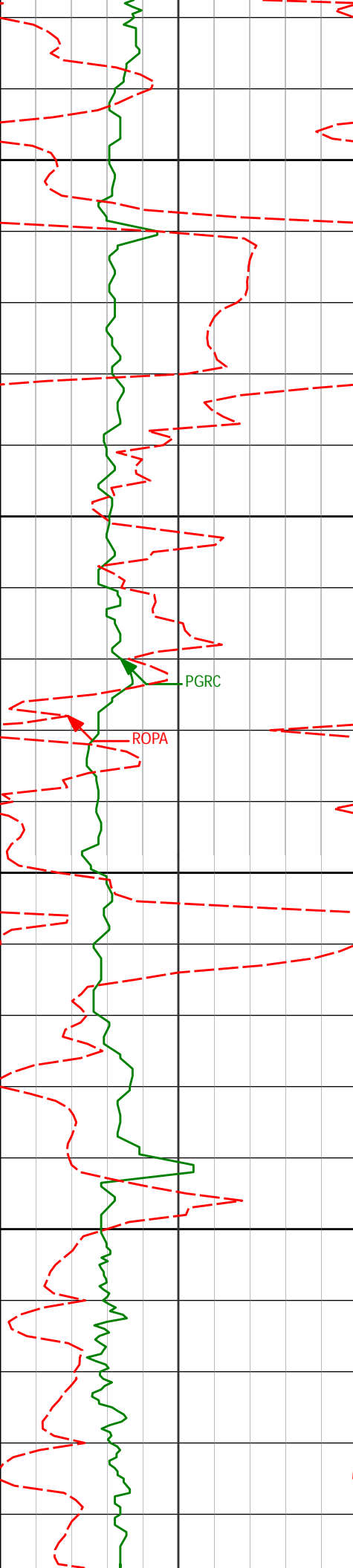
4100

4110' 0.71° 337.67° 4093.45' -138.30'

4150

4200

4205' 0.84° 357.43° 4188.44' -137.07'



4250

4300

4350

4400

PGRC

ROPA

4300'

0.79°

47.40°

4283.43'

-135.92'

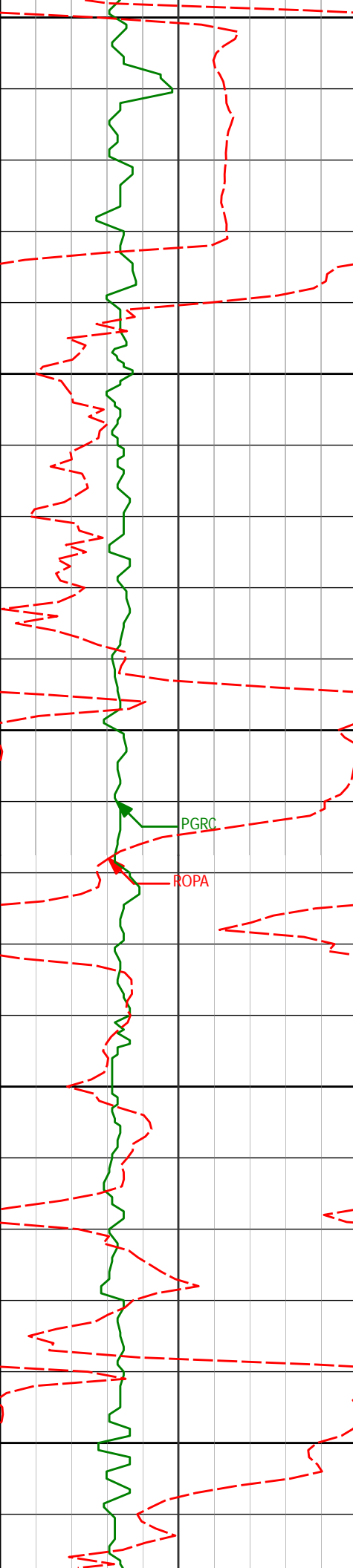
4395'

0.65°

28.27°

4378.42'

-134.97'



4450

4490'

1.03°

109.12°

4473.42'

-134.75'

4500

4550

PGRC

ROPA

4584'

0.86°

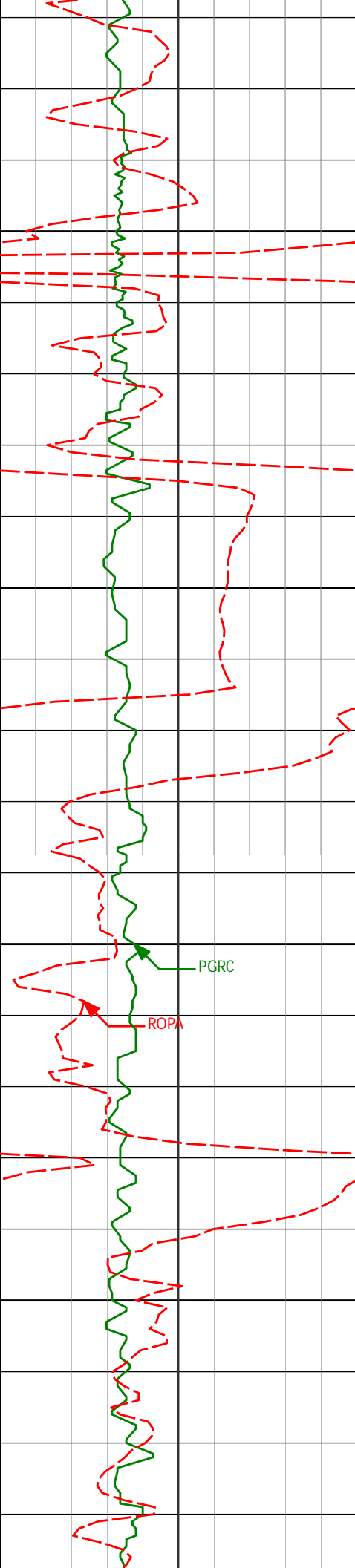
94.18°

4567.40'

-135.03'

4600

4650



4679'

0.84°

84.06°

4662.39'

-134.97'

4700

4750

4800

4850

4869'

1.33°

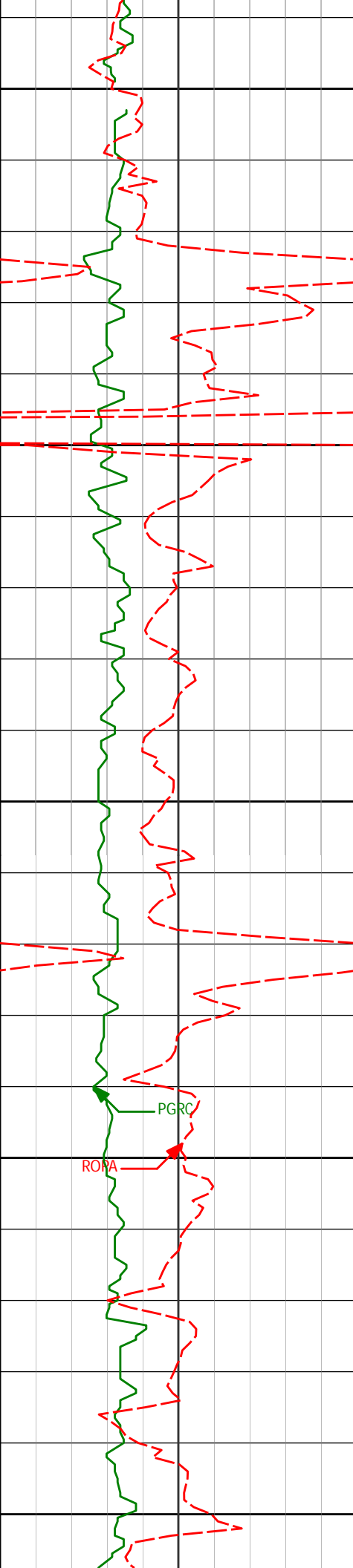
131.43°

4852.36'

-136.19'

PGRC

ROPA



4900

4950

5000

5050

5100

4964'

1.41°

121.07°

4947.34'

-137.47'

PGRC

ROPA

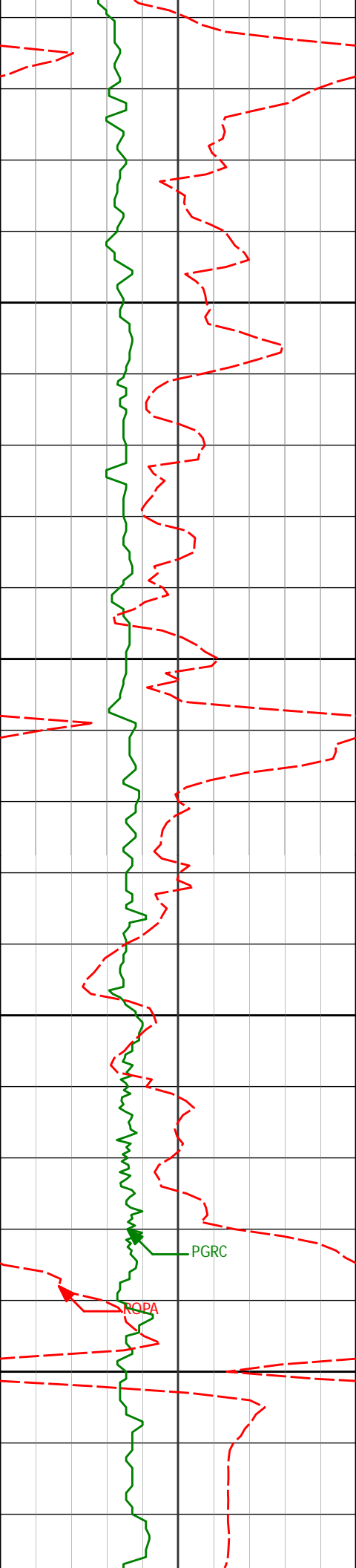
5058'

1.34°

122.05°

5041.31'

-138.59'



5150

5200

5250

5300

5248'

1.64°

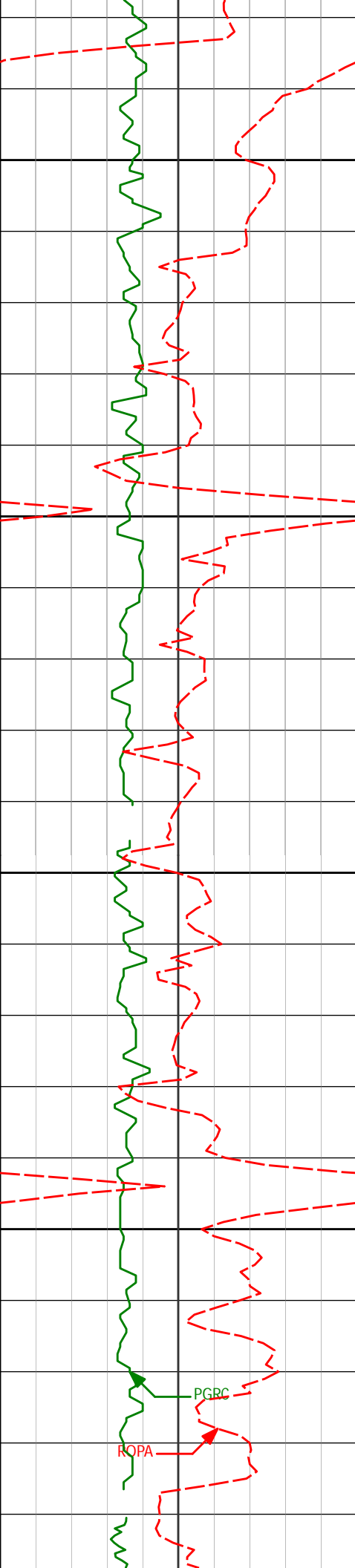
96.51°

5231.25'

-139.94'

PGRC

NOBA



5350

5400

5450

5500

5343'

1.79°

163.60°

5326.21'

-141.46'

5438'

1.94°

165.67°

5421.16'

-144.42'

5532'

1.49°

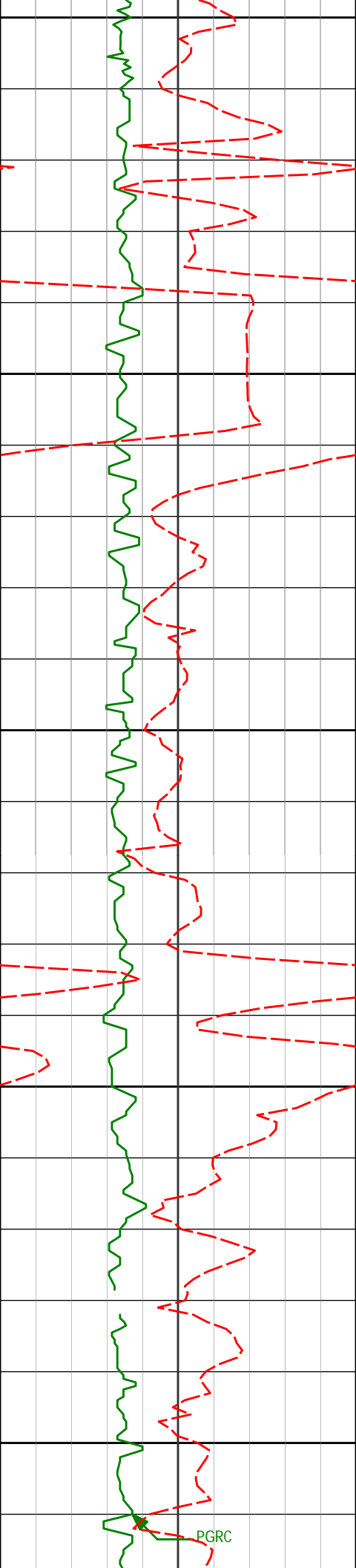
183.32°

5515.12'

-147.17'

PGBC

ROPA



5550

5600

5650

5700

5750

5627'

1.20°

224.84°

5610.10'

-149.13'

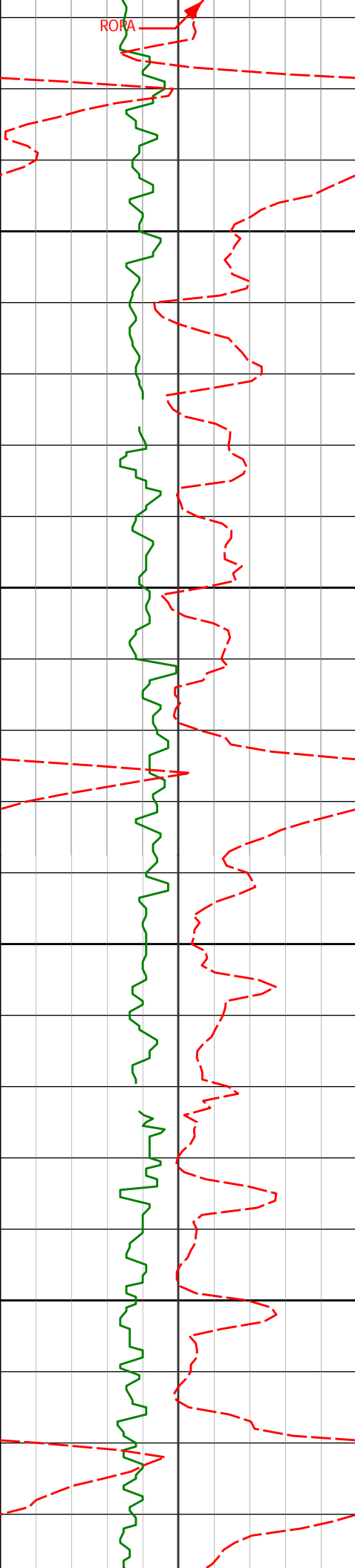
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1.21°

219.09°

5705.08'

-150.66'



5800

5817'

1.21°

229.95°

5800.05'

-152.12'

5850

5900

5912'

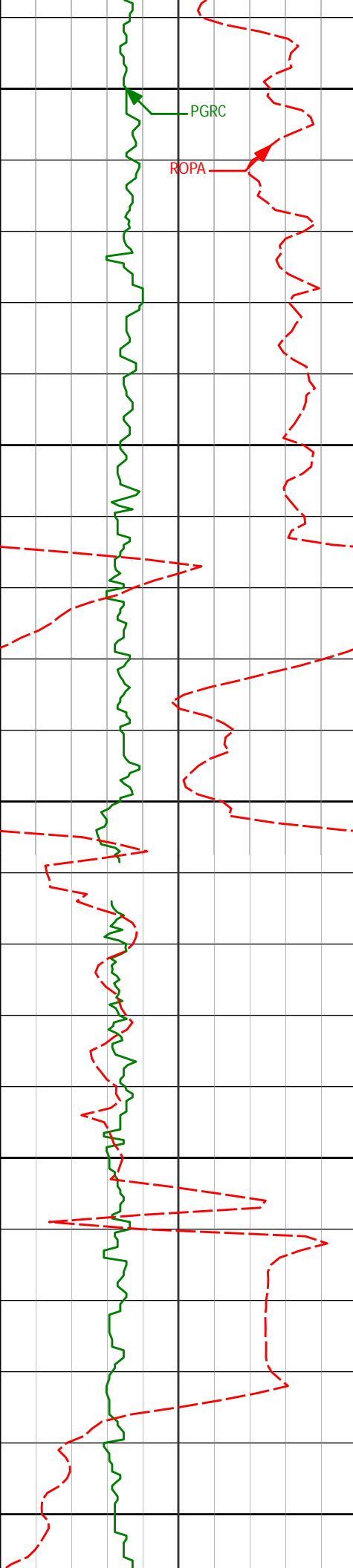
1.11°

232.80°

5895.03'

-153.37'

5950



6000

6007'

0.91°

211.53°

5990.02'

-154.61'

6050

6100

6101'

0.74°

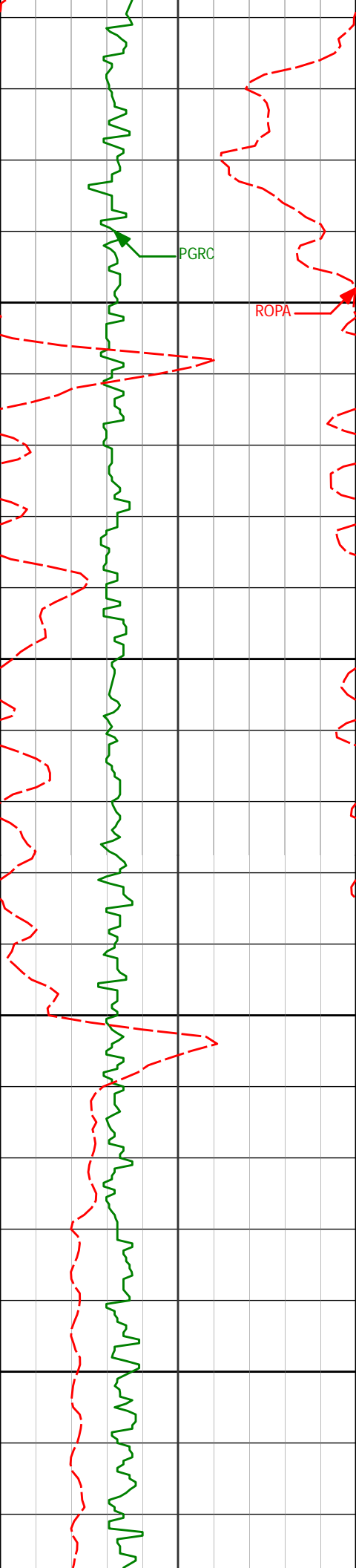
200.04°

6084.01'

-155.83'

6150

6200



6250

6291'

0.64°

350.11°

6274.00'

-155.96'

6300

6350

6385'

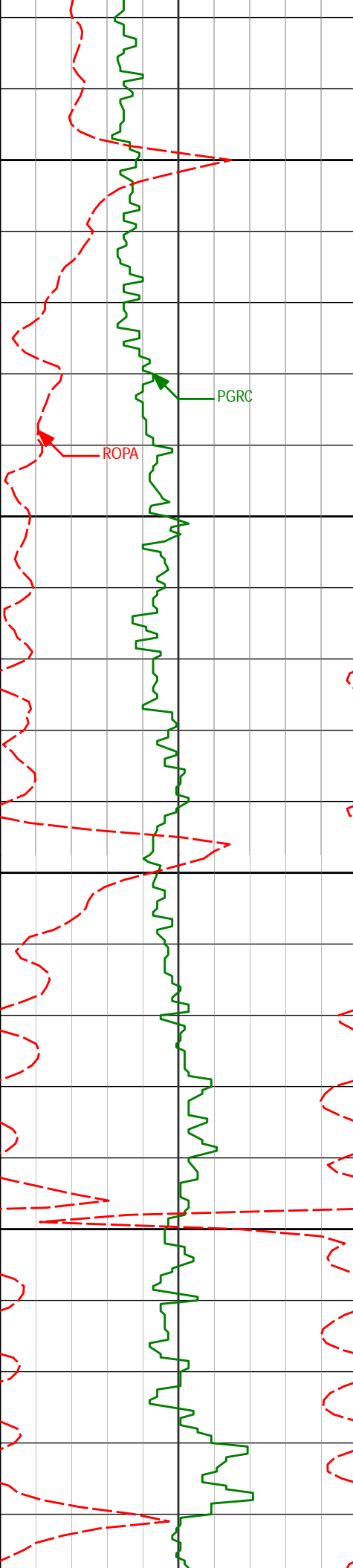
0.13°

290.83°

6368.00'

-155.41'

6400



6450

6480'

0.72°

54.75°

6463.00'

-155.02'

6500

6550

6575'

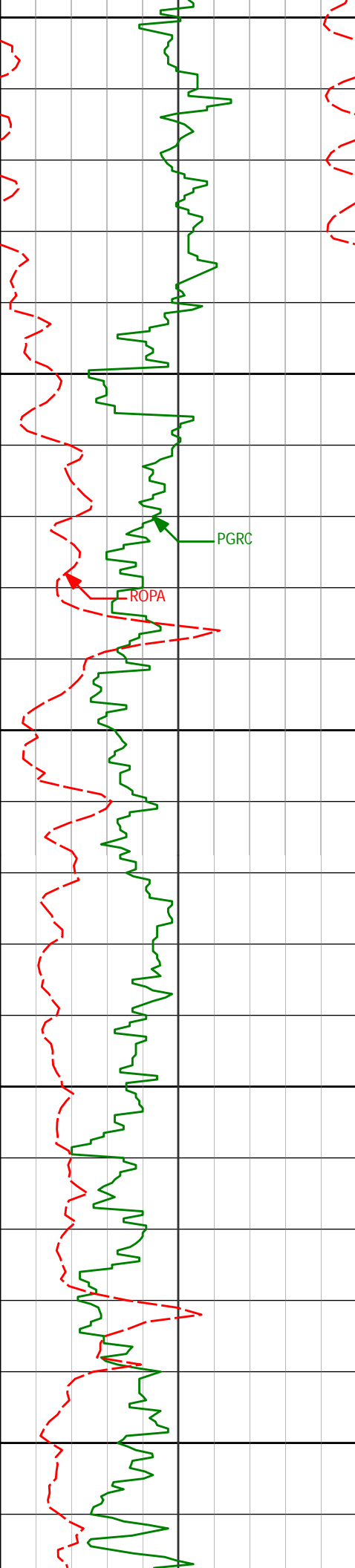
0.51°

61.60°

6558.00'

-154.45'

6600



6650

6670'

0.35°

2.92°

6652.99'

-153.95'

6700

PGRC

ROPA

6750

6765'

0.29°

62.65°

6747.99'

-153.54'

6800

6850

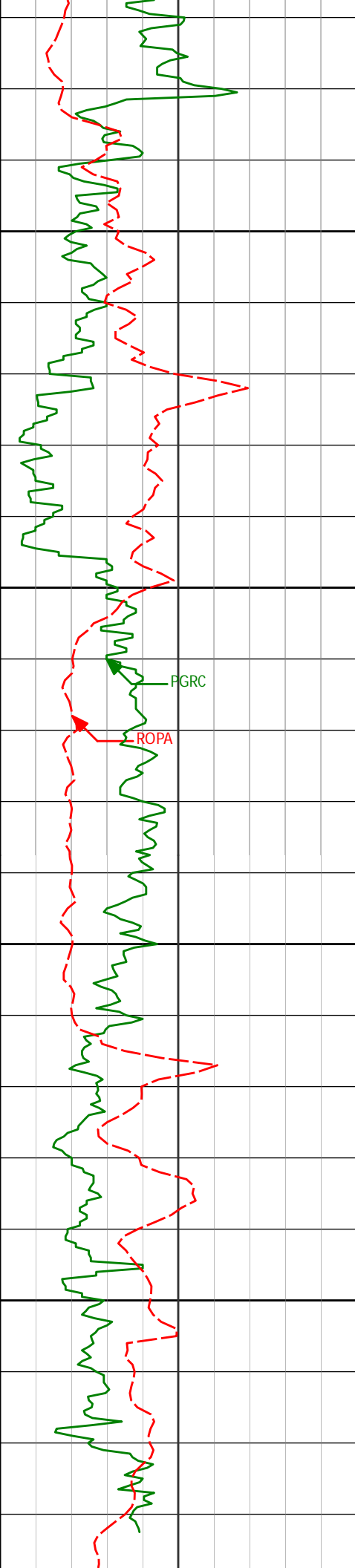
6860'

0.42°

115.13°

6842.99'

-153.56'



6900

6950

7000

7050

6954'

0.22°

126.67°

6936.99'

-153.80'

7075'

0.22°

158.76°

7057.99'

-154.15'

3067.00	3.12	138.43	3050.62	148.01 S	162.53 E	-143.03	2.08
3162.00	0.57	131.82	3145.57	150.26 S	164.60 E	-145.22	2.70
3257.00	0.71	99.12	3240.56	150.66 S	165.53 E	-145.60	0.41
3352.00	0.24	189.77	3335.56	150.95 S	166.08 E	-145.87	0.79
3446.00	0.81	324.08	3429.55	150.61 S	165.66 E	-145.54	1.06
3541.00	1.09	334.68	3524.54	149.25 S	164.88 E	-144.20	0.35
3636.00	1.07	301.34	3619.53	147.97 S	163.73 E	-142.96	0.65
3731.00	0.81	292.61	3714.51	147.25 S	162.36 E	-142.28	0.31
3825.00	1.30	299.40	3808.50	146.47 S	160.81 E	-141.55	0.53
3920.00	1.13	302.52	3903.47	145.44 S	159.08 E	-140.57	0.19
4015.00	0.97	323.20	3998.46	144.29 S	157.81 E	-139.46	0.43
4110.00	0.71	337.67	4093.45	143.11 S	157.11 E	-138.30	0.35
4205.00	0.84	357.43	4188.44	141.87 S	156.85 E	-137.07	0.31
4300.00	0.79	47.40	4283.43	140.73 S	157.30 E	-135.92	0.72
4395.00	0.65	28.27	4378.42	139.81 S	158.04 E	-134.97	0.29
4490.00	1.03	109.12	4473.42	139.61 S	159.11 E	-134.75	1.19
4584.00	0.86	94.18	4567.40	139.94 S	160.61 E	-135.03	0.32
4679.00	0.84	84.06	4662.39	139.92 S	162.01 E	-134.97	0.16
4869.00	1.33	131.43	4852.36	141.24 S	165.05 E	-136.19	0.52
4964.00	1.41	121.07	4947.34	142.57 S	166.88 E	-137.47	0.27
5058.00	1.34	122.05	5041.31	143.75 S	168.80 E	-138.59	0.08
5248.00	1.64	96.51	5231.25	145.24 S	173.38 E	-139.94	0.38
5343.00	1.79	163.60	5326.21	146.81 S	175.15 E	-141.46	2.00
5438.00	1.94	165.67	5421.16	149.80 S	175.97 E	-144.42	0.18
5532.00	1.49	183.32	5515.12	152.56 S	176.29 E	-147.17	0.73
5627.00	1.20	224.84	5610.10	154.50 S	175.52 E	-149.13	1.05
5722.00	1.21	219.09	5705.08	155.99 S	174.19 E	-150.66	0.13
5817.00	1.21	229.95	5800.05	157.41 S	172.79 E	-152.12	0.24
5912.00	1.11	232.80	5895.03	158.61 S	171.29 E	-153.37	0.12
6007.00	0.91	211.53	5990.02	159.81 S	170.15 E	-154.61	0.45
6101.00	0.74	200.04	6084.01	161.02 S	169.55 E	-155.83	0.25
6291.00	0.64	350.11	6274.00	161.13 S	168.95 E	-155.96	0.70
6385.00	0.13	290.83	6368.00	160.58 S	168.76 E	-155.41	0.62
6480.00	0.72	54.75	6463.00	160.20 S	169.15 E	-155.02	0.84
6575.00	0.51	61.60	6558.00	159.65 S	170.01 E	-154.45	0.24
6670.00	0.35	2.92	6652.99	159.16 S	170.39 E	-153.95	0.47
6765.00	0.29	62.65	6747.99	158.76 S	170.62 E	-153.54	0.34
6860.00	0.42	115.13	6842.99	158.80 S	171.15 E	-153.56	0.35
6954.00	0.22	126.67	6936.99	159.05 S	171.61 E	-153.80	0.22
7075.00	0.22	158.76	7057.99	159.41 S	171.88 E	-154.15	0.10

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 1.73 DEGREES (GRID)
A TOTAL CORRECTION OF 7.82 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7075.00 FEET
IS 234.43 FEET ALONG 132.84 DEGREES (GRID)**

Surveys are tied into two non-Haliburton surveys at MD 362' and 661' taken while drilling the surface section.