

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	25-Nov-13	26-Nov-13	02-Dec-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	8.750		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	798.00	5,900.00	7,038.00		
Log End Depth (MD, ft)	5,900.00	7,038.00	16,165.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	24-Nov-13 15:30	25-Nov-13 17:30	28-Nov-13 01:00		
Drill/Wipe End Date and Time	25-Nov-13 07:45	26-Nov-13 15:30	02-Dec-13 09:45		
Min Inc (deg) @ Depth (MD, ft)	0.09 @ 4,776.00	2.77 @ 5,960.00	84.87 @ 7,044.00		
Max Inc (deg) @ Depth (MD, ft)	11.07 @ 2,974.00	80.31 @ 6,984.00	93.21 @ 12,226.00		
Bit TFA(in2) / Bit Type	0.91 / PDC	0.98 / PDC	0.98 / PDC		
Flow Rate (gpm)	597.19	571.89	295.75		
Max AV (fpm) / CV (fpm) @ MWD	472.0 / NA	392.0 / NA	454.0 / NA		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	8.50 / 28.00	9.20 / 36.00	9.50 / 34.00		
Filtrate CL (ppm)	2,100.00	2,200.00	2,800.00		
pH / Fluid Loss (mptm)	7.50 / 25	9.00 / 10	10.00 / 7		
PV (cP) / YP (lbf2)	2 / 2.00	9 / 9.00	9 / 9.00		
% Solids / % Sand	1.2 / .2	4 / .3	6.4 / 0.25		
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95	0 / 0:95		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Max Tool Temp (in F) / S	170.07 / PDM	170.07 / PDM	200.51 / PDM		

Max Tool Temp (degF) / Source	170.37 / PCM	170.37 / PCM	239.54 / PCM		
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Lead MWD Engineer	Gary Eifert	Gary Eifert	Gary Eifert		
Customer Representative					

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11341340	11341340	12187588		
Insert Serial Number	11227514	11227514	11400989		
Date and Time Initialized	21-Nov-13 16:40	21-Nov-13 16:40	27-Nov-13 07:32		
Date and Time Read	27-Nov-13 08:06	27-Nov-13 08:12	04-Dec-13 12:42		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	57.00	54.00	67.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341340	11341340	12187588		
Sonde Serial Number	12177530	12177530	11478007		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	292.80	348.30	22.78		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.30	47.53	60.75		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341340	11341340	12187588		
Insert/Sonde Serial Number	11579776	11579776	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

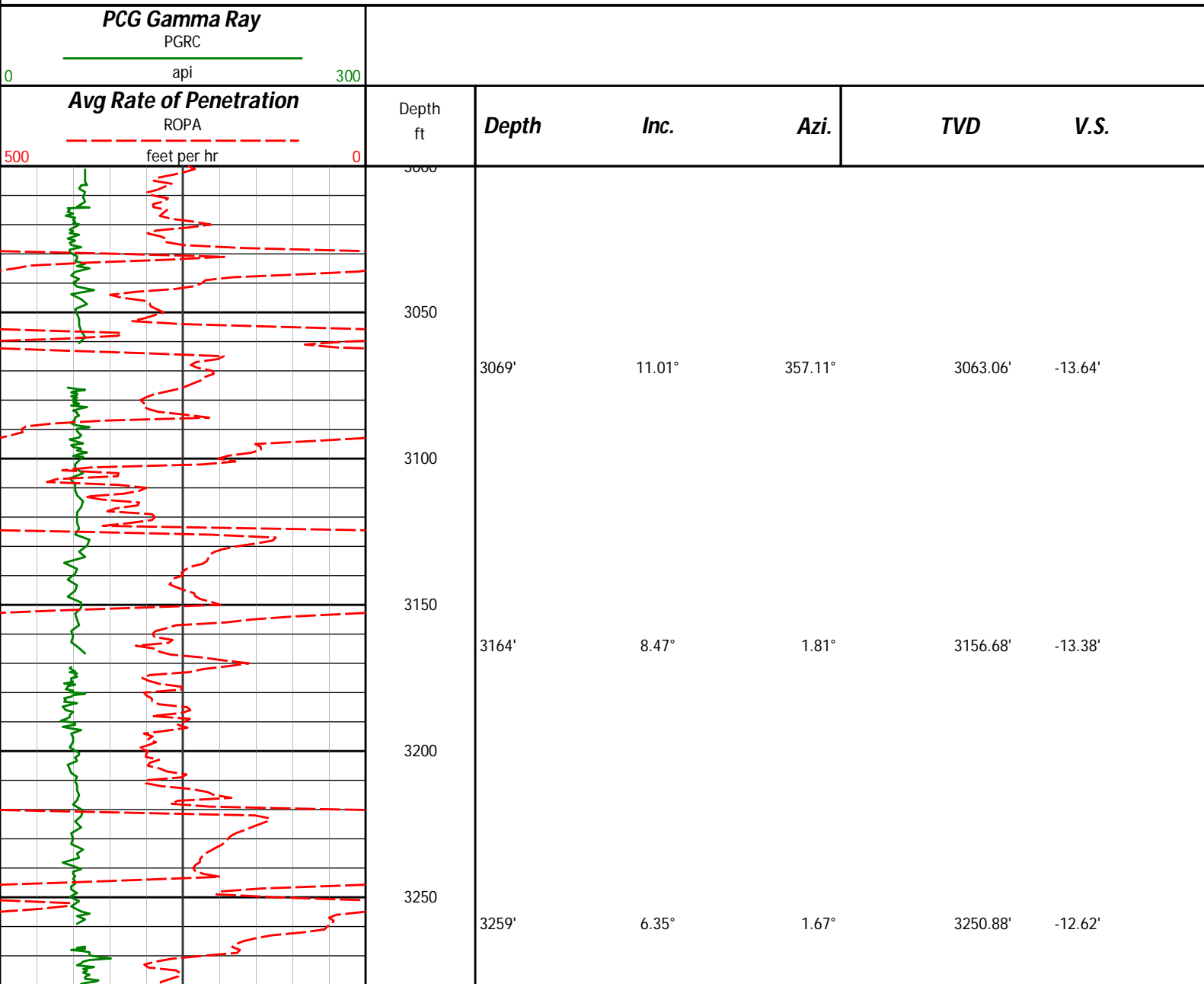
WARRANTY

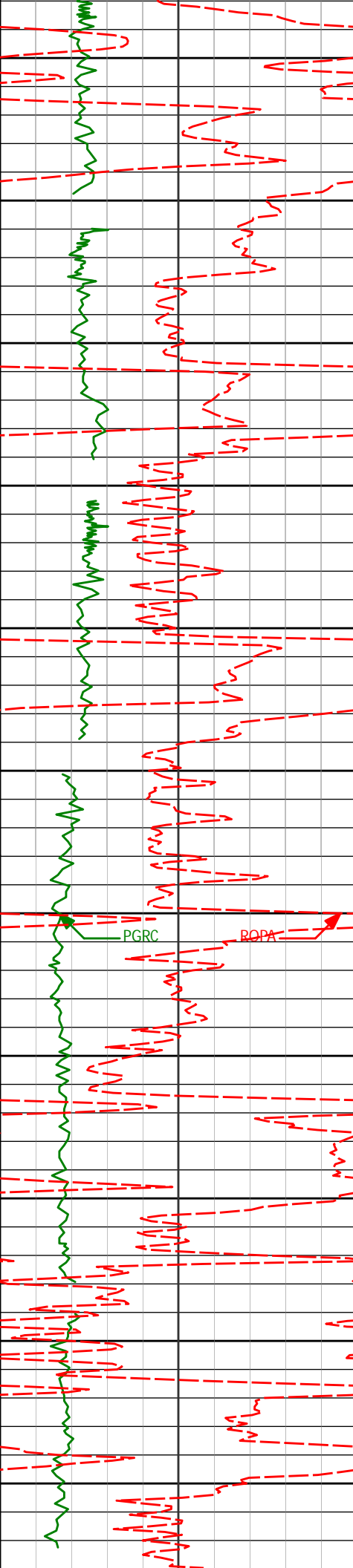
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HALLIBURTON Sperry Drilling Services

MD Main Log 1:600

Noble Energy
NCLP PC AA04-65-1HN
H&P 343
T6N-R63W





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3354'

3.80°

354.72°

3345.50'

-12.50'

3448'

1.83°

5.08°

3439.39'

-12.51'

3543'

0.31°

151.83°

3534.37'

-12.21'

3638'

0.33°

261.59°

3629.37'

-12.37'

3733'

0.68°

229.02°

3724.37'

-13.08'

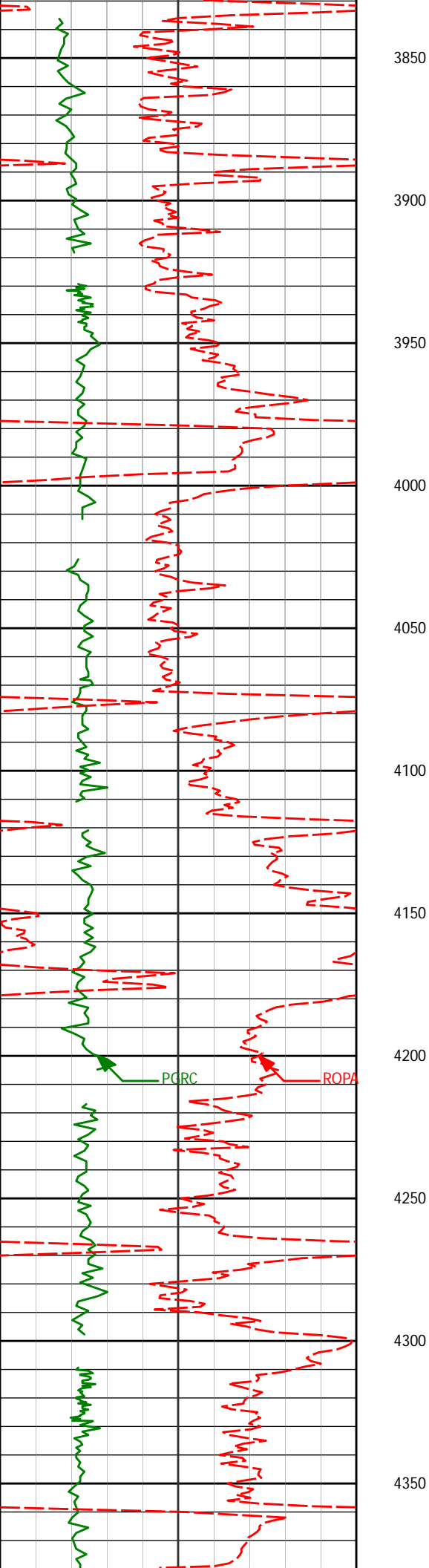
3828'

1.19°

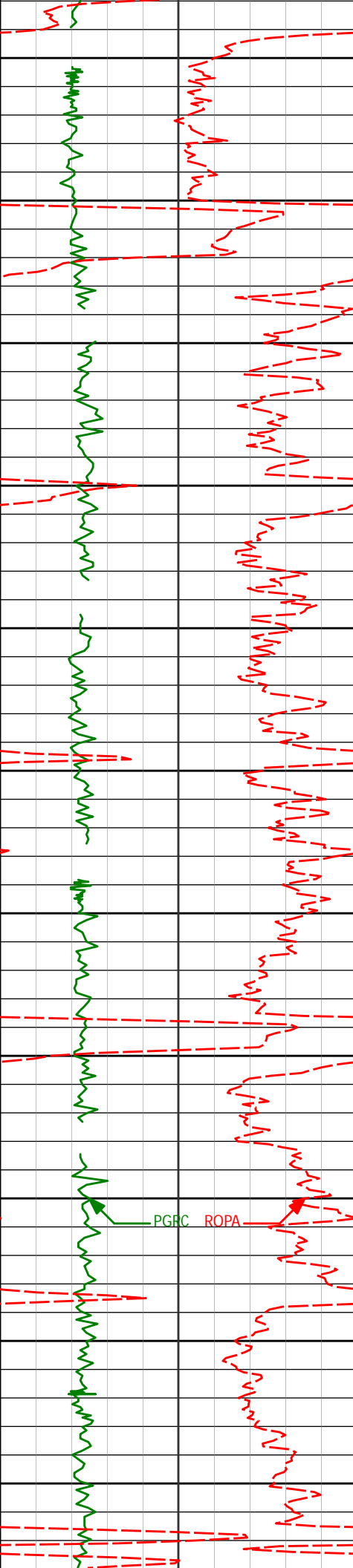
205.05°

3819.35'

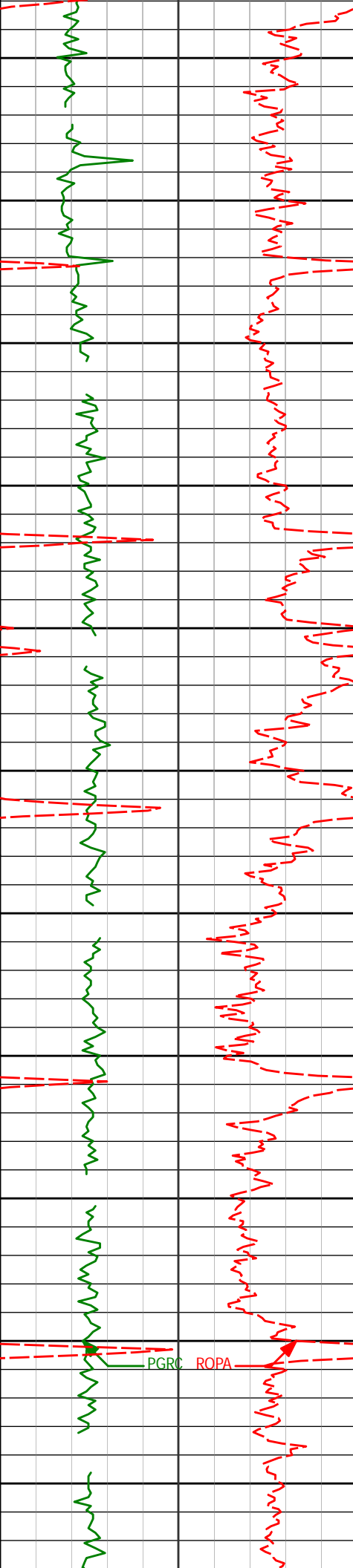
-13.96'



3923'	1.26°	222.87°	3914.33'	-15.14'
4018'	0.15°	6.77°	4009.33'	-15.85'
4112'	0.39°	301.92°	4103.32'	-16.10'
4207'	0.54°	33.37°	4198.32'	-16.11'
4301'	2.04°	85.30°	4292.30'	-14.19'



4400	4396'	1.59°	53.75°	4387.25'	-11.41'
4450					
4500	4491'	0.35°	38.27°	4482.24'	-10.14'
4550					
4600	4586'	0.63°	0.54°	4577.23'	-9.93'
4650					
4700	4681'	1.05°	11.47°	4672.22'	-9.71'
4750					
4800	4776'	0.09°	8.29°	4767.22'	-9.50'
4850					
4900	4871'	0.23°	6.69°	4862.22'	-9.45'



4950

4966'

0.31°

60.68°

4957.22'

-9.20'

5000

5050

5060'

0.31°

340.67°

5051.21'

-9.05'

5100

5150

5154'

0.37°

164.80°

5145.21'

-9.06'

5200

5250

5248'

0.68°

184.93°

5239.21'

-9.05'

5300

5350

5343'

0.72°

103.31°

5334.21'

-8.54'

5400

5437'

1.15°

112.28°

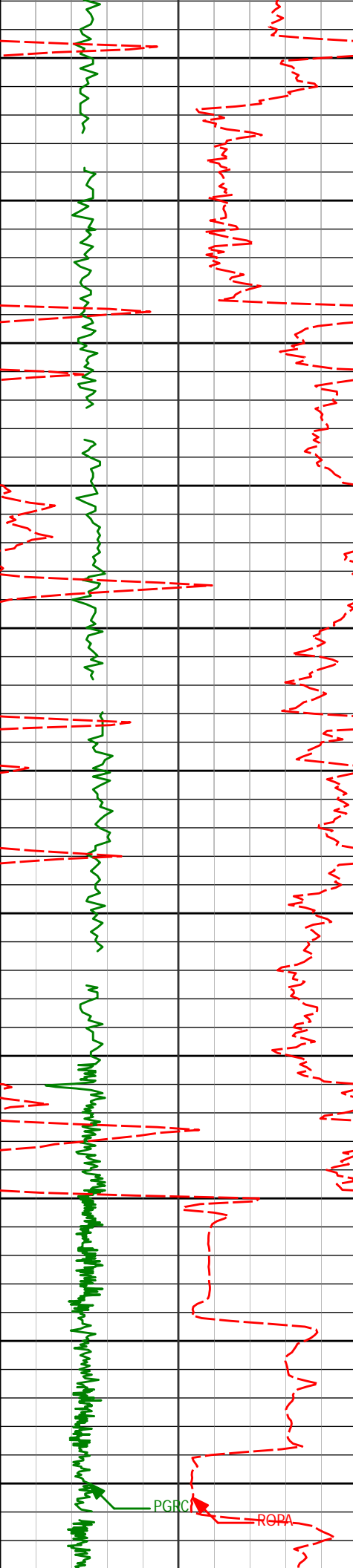
5428.19'

-7.11'

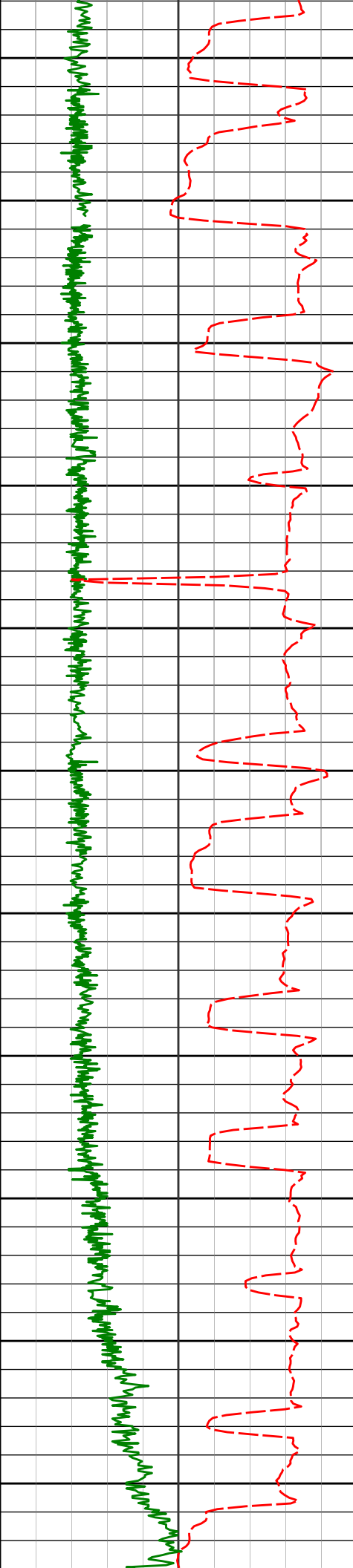
5450

PGRC

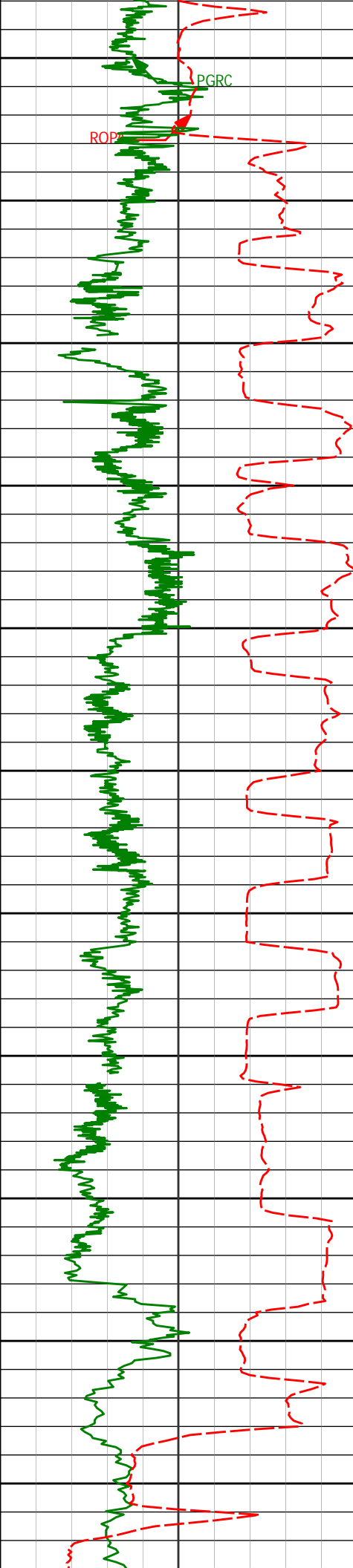
ROPA



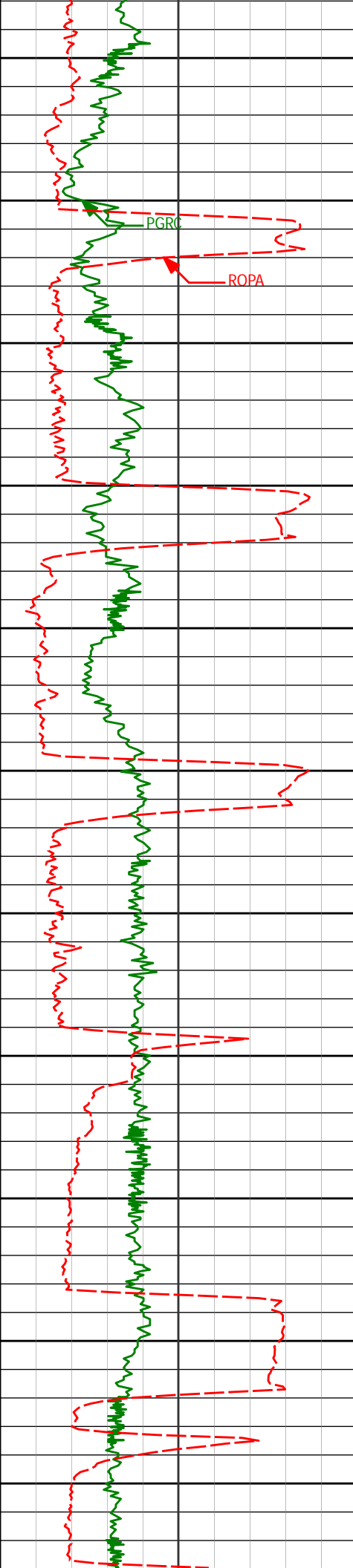
5500				
5532'	1.37°	91.24°	5523.17'	-5.10'
5550				
5600				
5627'	0.93°	108.05°	5618.15'	-3.25'
5650				
5700				
5722'	0.74°	98.43°	5713.14'	-1.92'
5750				
5800				
5843'	0.47°	131.12°	5834.13'	-0.78'
5850				
<Run 200> 5900				
5950				
5960'	2.77°	90.26°	5951.08'	2.39'
6000				
6007'	5.86°	88.34°	5997.94'	5.93'



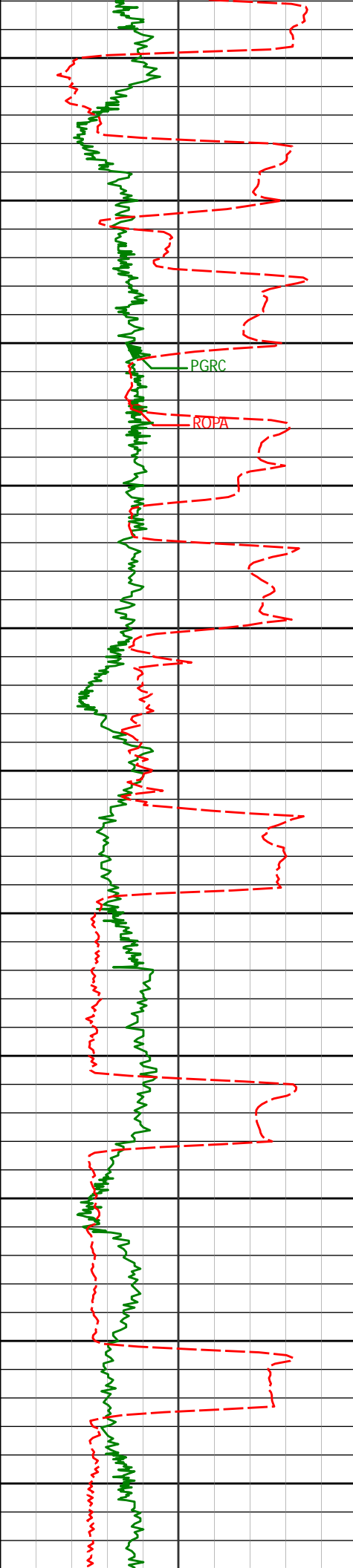
6050	6055'	8.25°	87.93°	6045.58'	11.82'
6100	6101'	9.40°	88.64°	6091.03'	18.88'
6150	6149'	12.60°	92.69°	6138.14'	28.02'
6200	6196'	17.29°	92.09°	6183.54'	40.11'
6250	6244'	23.46°	86.60°	6228.52'	56.79'
6300	6290'	28.31°	85.25°	6269.89'	76.85'
6350	6338'	30.16°	85.28°	6311.78'	100.26'
6400	6384'	33.77°	87.59°	6350.80'	124.60'
6450	6432'	37.62°	89.83°	6389.77'	152.59'
6500	6479'	43.06°	90.73°	6425.58'	182.98'
6550	6527'	49.30°	89.29°	6458.80'	217.58'
	6573'	51.99°	89.13°	6487.97'	253.14'



6600				
6621'	52.51°	88.35°	6517.36'	291.09'
6650				
6668'	57.65°	88.54°	6544.25'	329.62'
6700				
6716'	61.20°	88.57°	6568.67'	370.93'
6750				
6763'	63.71°	89.91°	6590.40'	412.60'
6800				
6850				
6858'	73.69°	90.49°	6624.86'	500.94'
6900				
6906'	77.49°	90.52°	6636.81'	547.38'
6950				
6984'	80.31°	90.89°	6651.82'	623.84'
7000				
▲ Casing Set @ 7,038' MD				
<Run 300>				
7044'	84.87°	88.03°	6659.56'	683.31'
7050				
7100				



7139'	86.51°	89.62°	6666.70'	778.03'
7150				
7200				
7234'	86.86°	89.33°	6672.19'	872.84'
7250				
7300				
7329'	87.87°	88.23°	6676.56'	967.74'
7350				
7400				
7424'	89.97°	88.35°	6678.35'	1062.71'
7450				
7500				
7519'	90.25°	84.73°	6678.17'	1157.66'
7550				
7600				
7614'	91.33°	87.53°	6676.86'	1252.58'
7650				



7700

7708'

88.86°

86.13°

6676.70'

1346.54'

7750

7800

7803'

89.38°

89.97°

6678.16'

1441.51'

7850

7900

7897'

93.08°

92.41°

6676.15'

1535.34'

7950

8000

7992'

89.91°

90.58°

6673.67'

1630.13'

8050

8100

8087'

92.04°

90.29°

6672.05'

1725.04'

8150

8200

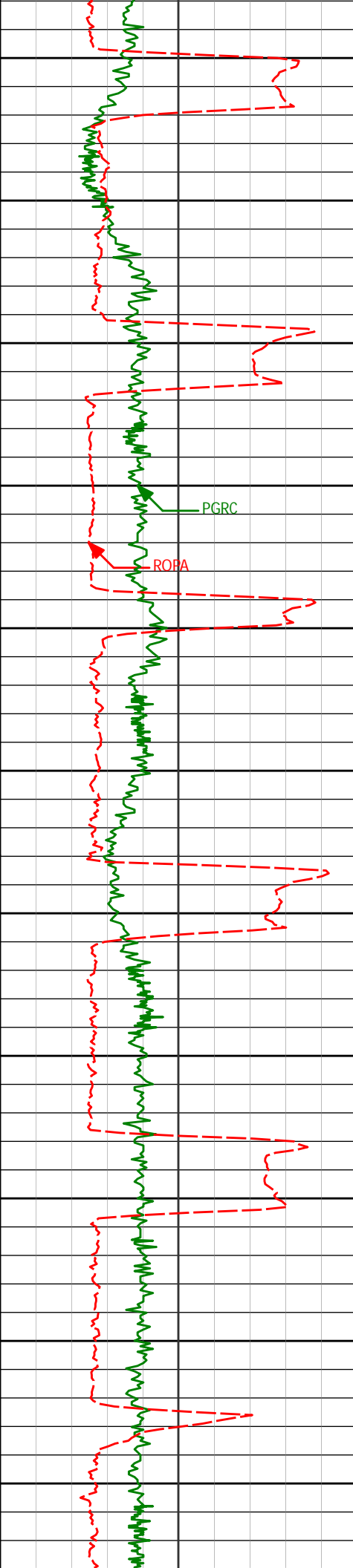
8182'

90.28°

88.97°

6670.13'

1819.99'



8250

8277'

89.35°

90.75°

6670.43'

1914.94'

8300

8350

8372'

91.14°

90.23°

6670.03'

2009.86'

8400

PGRC

ROPA

8450

8467'

91.23°

87.91°

6668.06'

2104.82'

8500

8550

8562'

89.91°

88.50°

6667.12'

2199.82'

8600

8650

8656'

90.99°

90.70°

6666.38'

2293.78'

8700

8750

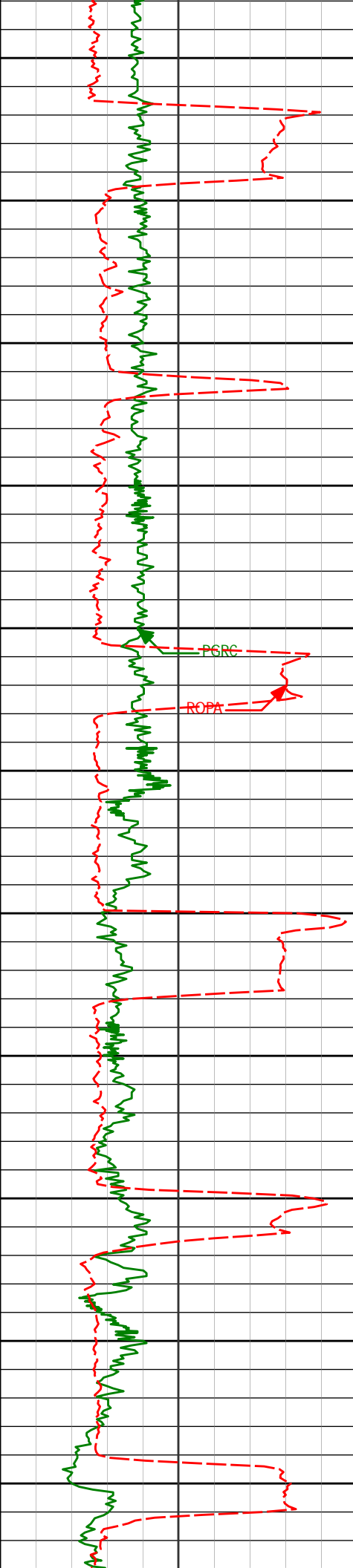
8751'

90.52°

88.54°

6665.13'

2388.74'



8800

8850

8900

8950

9000

9050

9100

9150

9200

9250

9300

8846'	91.23°	90.53°	6663.68'	2483.69'
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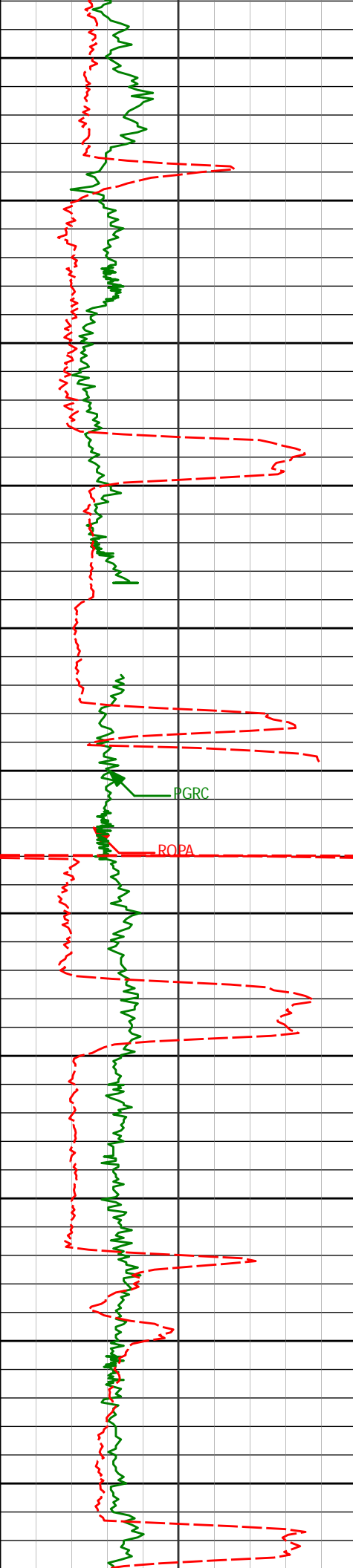
8941'	91.11°	88.86°	6661.74'	2578.64'
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9036'	90.37°	87.83°	6660.51'	2673.63'
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9131'	91.51°	89.63°	6658.95'	2768.61'
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9225'	92.10°	90.27°	6655.99'	2862.52'
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9320'	90.37°	90.48°	6653.94'	2957.42'
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9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9415'

89.88°

90.93°

6653.74'

3052.33'

9510'

91.17°

89.24°

6652.87'

3147.27'

9605'

91.88°

88.97°

6650.34'

3242.23'

9700'

89.88°

88.13°

6648.88'

3337.21'

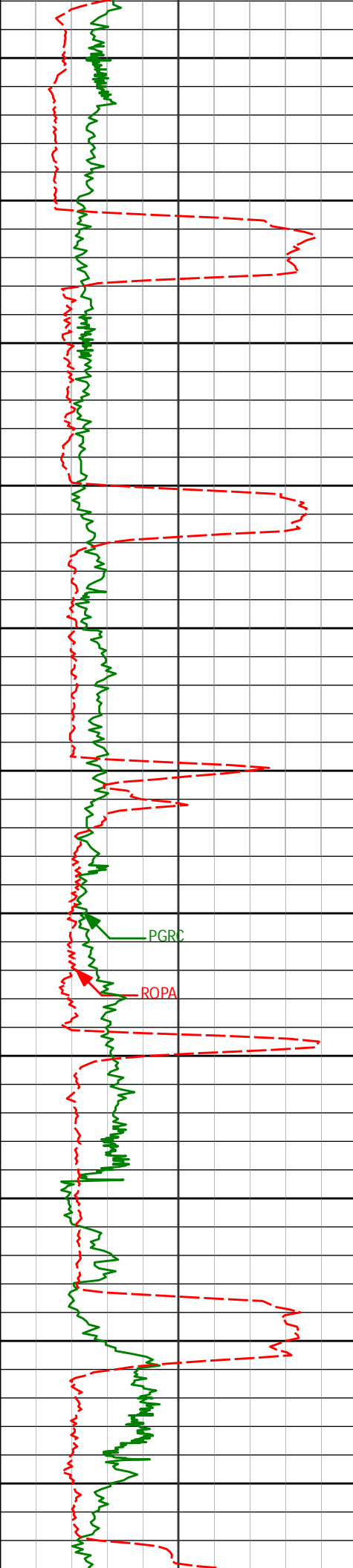
9795'

90.15°

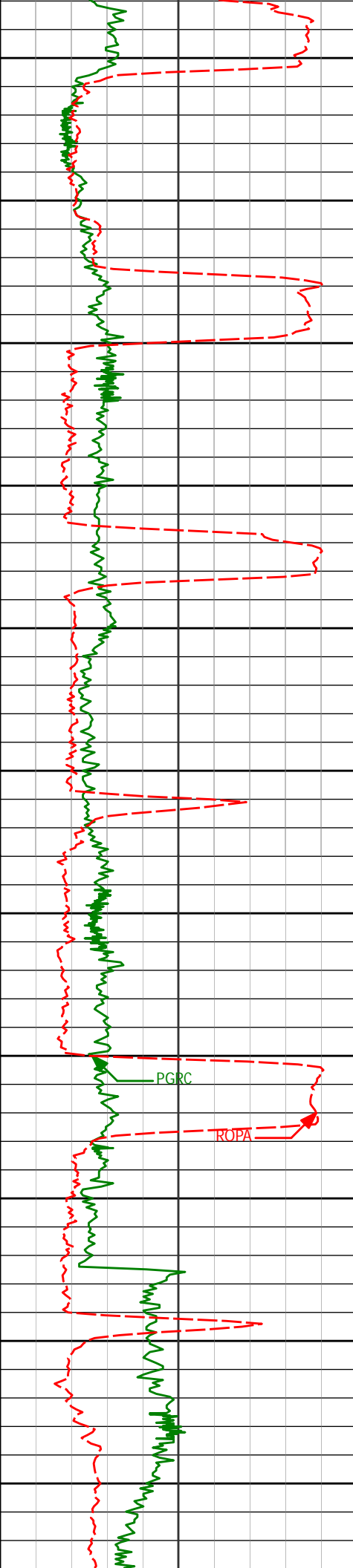
87.61°

6648.85'

3432.21'



9889'	91.85°	88.79°	6647.21'	3526.19'
9900				
9950				
9984'	90.71°	89.47°	6645.09'	3621.15'
10000				
10050				
10079'	89.41°	87.85°	6644.99'	3716.14'
10100				
10150				
10174'	89.57°	87.75°	6645.84'	3811.13'
10200				
10269'	91.39°	89.34°	6645.04'	3906.12'
10300				
10350				
10364'	91.94°	88.45°	6642.28'	4001.07'
10400				



10450

10459'

91.23°

88.45°

6639.65'

4096.04'

10500

10550

10551'

90.25°

89.85°

6638.47'

4188.01'

10600

10650

10643'

89.38°

91.57°

6638.76'

4279.92'

10700

10750

10737'

90.95°

91.84°

6638.49'

4373.74'

10800

10850

10900

10950

PGRC

ROPA

10828'

90.19°

88.93°

6637.59'

4464.66'

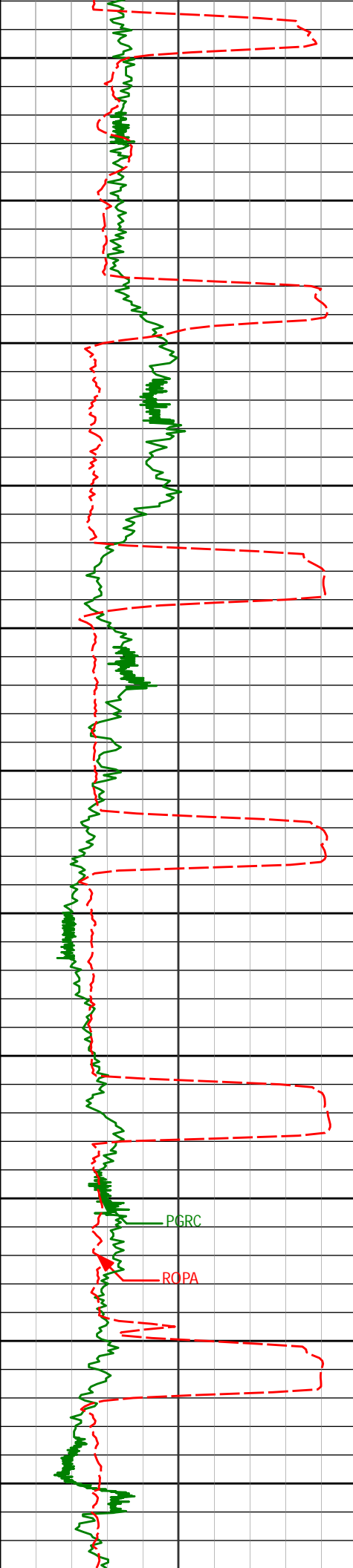
10921'

90.49°

87.91°

6637.03'

4557.66'



11000

11015'

90.77°

89.18°

6636.00'

4651.65'

11050

11100

11107'

89.69°

88.47°

6635.63'

4743.64'

11150

11200

11200'

88.21°

88.08°

6637.34'

4836.62'

11250

11300

11292'

88.86°

88.43°

6639.69'

4928.59'

11350

11400

11385'

92.04°

89.52°

6638.96'

5021.57'

11450

11478'

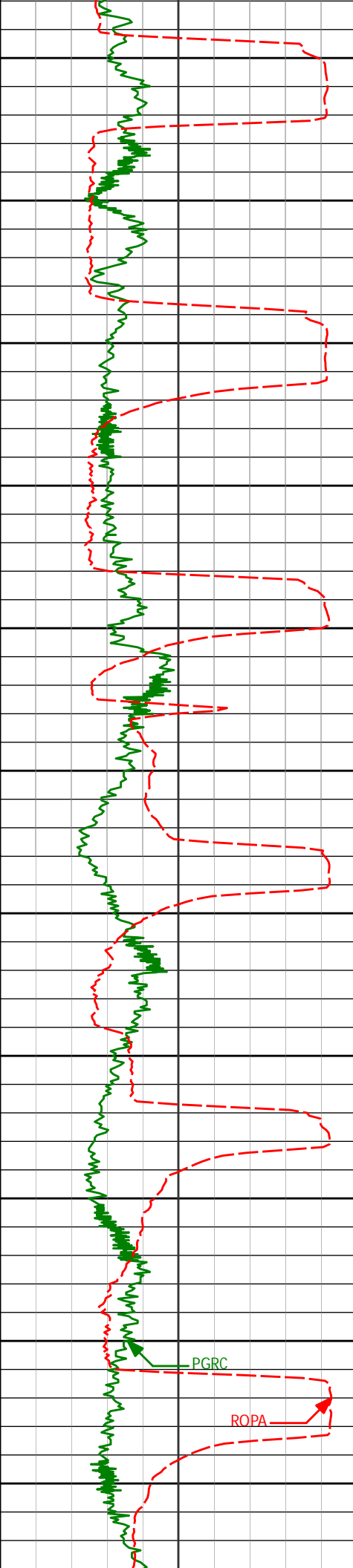
87.78°

86.06°

6639.10'

5114.53'

11500



11550

11571'

87.87°

87.94°

6642.63'

5207.44'

11600

11650

11664'

89.72°

89.11°

6644.59'

5300.41'

11700

11750

11758'

90.83°

87.84°

6644.14'

5394.40'

11800

11850

11851'

91.57°

88.13°

6642.19'

5487.38'

11900

11950

11944'

91.45°

87.89°

6639.74'

5580.35'

12000

12037'

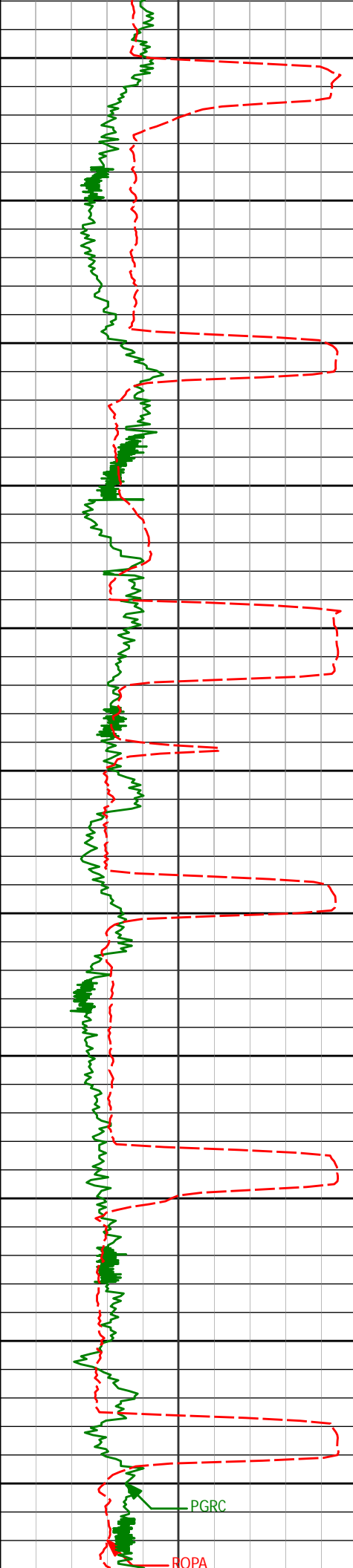
90.74°

88.74°

6637.96'

5673.33'

12050



12100

12131'

90.12°

88.78°

6637.26'

5767.32'

12150

12200

12226'

93.21°

89.65°

6634.50'

5862.25'

12250

12300

12320'

90.40°

88.44°

6631.54'

5956.19'

12350

12400

12415'

91.42°

88.76°

6630.03'

6051.17'

12450

12500

12510'

91.42°

90.28°

6627.67'

6146.11'

12550

12600

12605'

91.17°

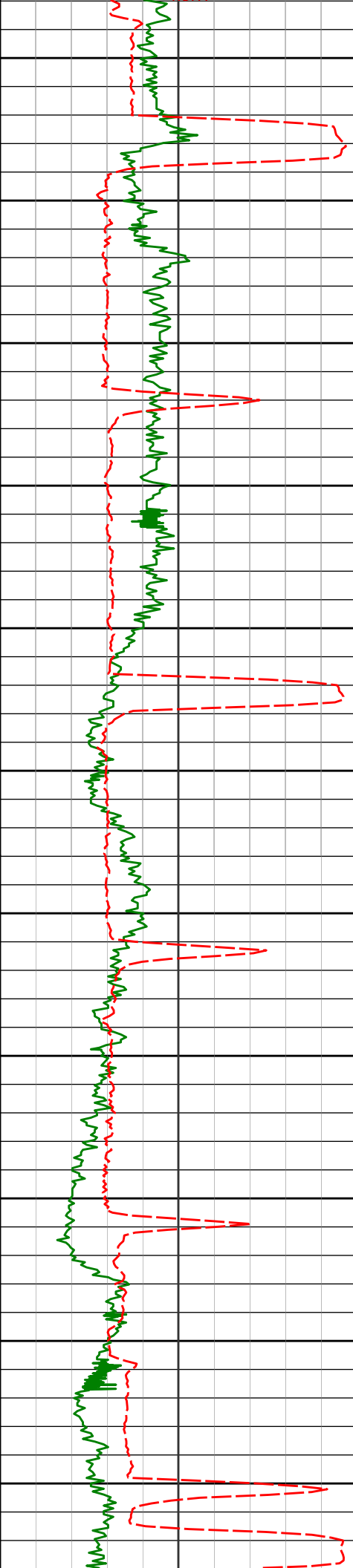
92.15°

6625.53'

6240.96'

PGRC

ROPA



12650

12700

12750

12800

12850

12900

12950

13000

13050

13100

13150

12700'

12800'

12895'

12990'

13085'

89.57°

91.02°

89.60°

89.60°

89.51°

91.39°

90.53°

89.03°

88.66°

87.78°

6624.91'

6624.40'

6623.88'

6624.55'

6625.29'

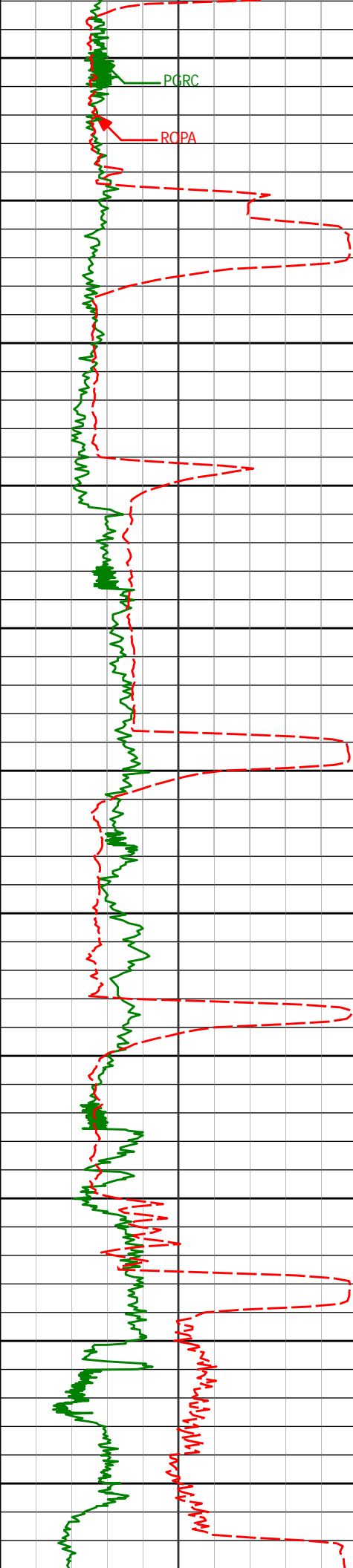
6335.77'

6435.65'

6530.60'

6625.60'

6720.59'



13200

13250

13300

13350

13400

13450

13500

13550

13600

13650

13700

PGRC

RCPA

13275'

91.32°

89.68°

6624.80'

6910.57'

13370'

91.97°

89.70°

6622.07'

7005.50'

13465'

89.48°

88.37°

6620.87'

7100.47'

13559'

89.32°

87.53°

6621.85'

7194.47'

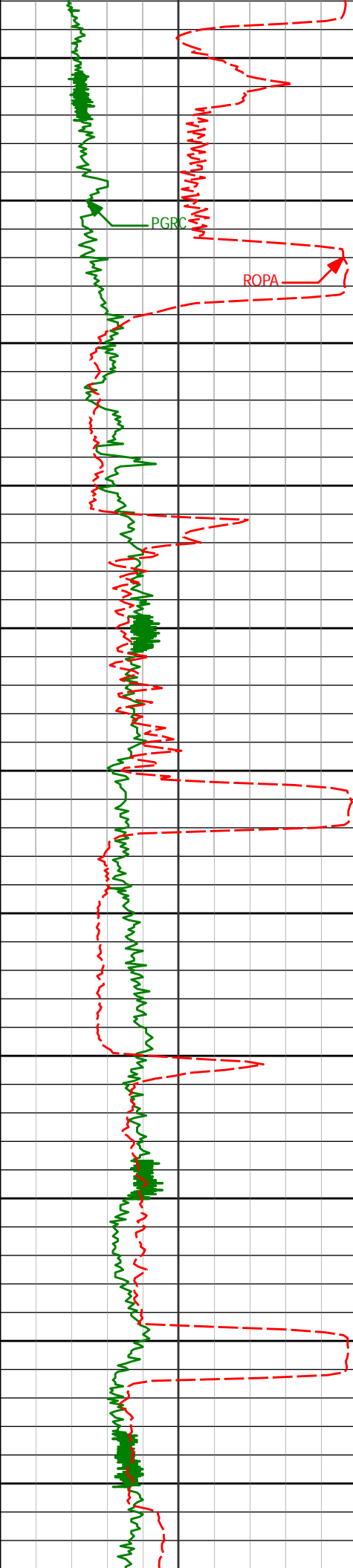
13654'

89.85°

87.89°

6622.54'

7289.46'



13750

13749'

90.68°

87.94°

6622.10'

7384.46'

13800

PGRC

ROPA

13850

13844'

91.51°

90.12°

6620.28'

7479.42'

13900

13939'

90.49°

89.10°

6618.63'

7574.38'

13950

14000

14034'

90.43°

90.56°

6617.86'

7669.33'

14050

14100

14129'

89.88°

88.54°

6617.61'

7764.30'

14150

14200

14224'

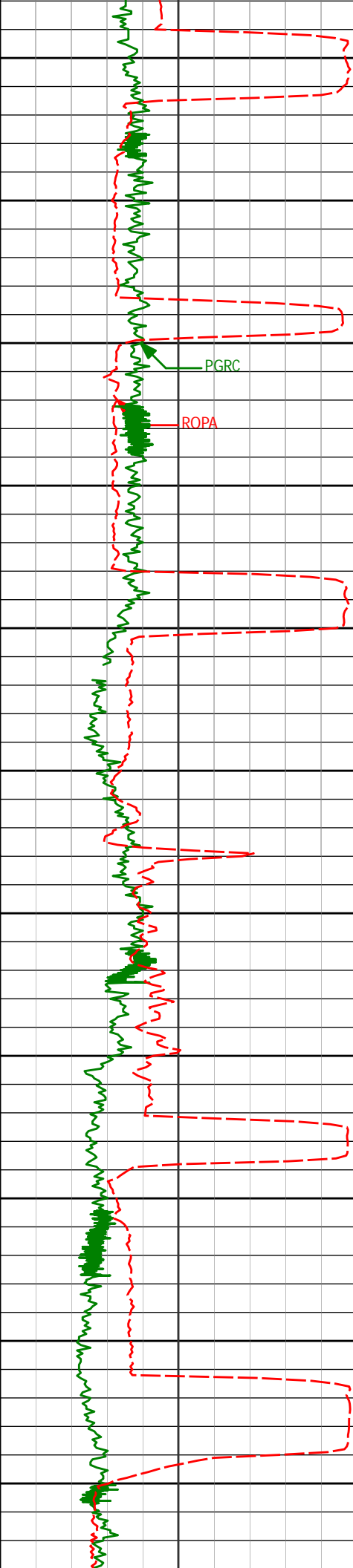
89.32°

88.56°

6618.27'

7859.30'

14250



14300

14319'

91.05°

89.69°

6617.96'

7954.28'

14350

14400

14413'

90.15°

89.33°

6616.98'

8048.25'

14450

14500

14508'

92.13°

88.22°

6615.09'

8143.22'

14550

14600

14603'

92.62°

87.67°

6611.15'

8238.14'

14650

14700

14698'

90.86°

87.56°

6608.27'

8333.08'

14750

14800

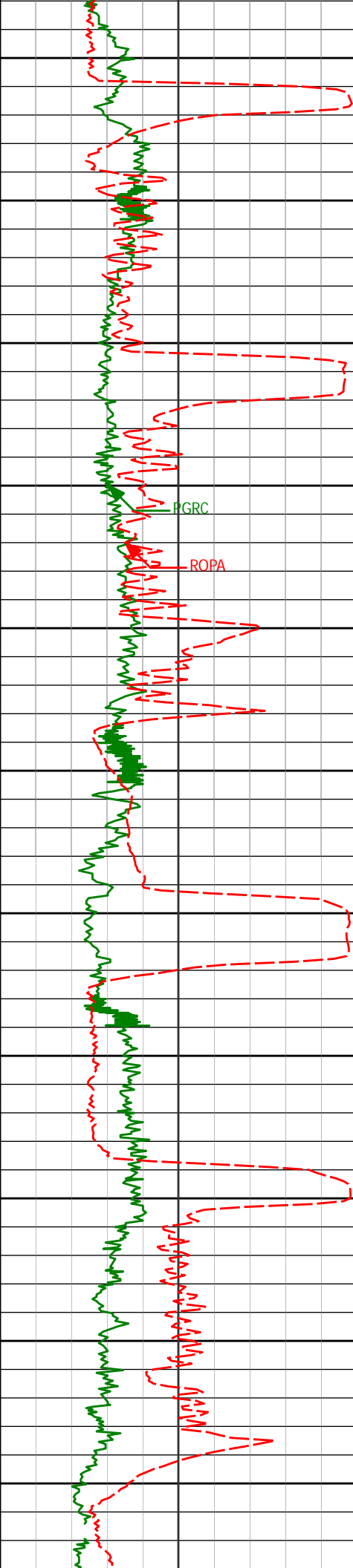
14793'

90.15°

89.57°

6607.43'

8428.07'



14850

14887'

89.51°

88.86°

6607.71'

8522.06'

14900

14950

14982'

90.99°

90.00°

6607.29'

8617.03'

15000

PGRC

ROPA

15050

15077'

91.20°

88.41°

6605.48'

8712.00'

15100

15150

15172'

90.46°

88.52°

6604.10'

8806.98'

15200

15250

15267'

90.28°

90.69°

6603.49'

8901.95'

15300

15350

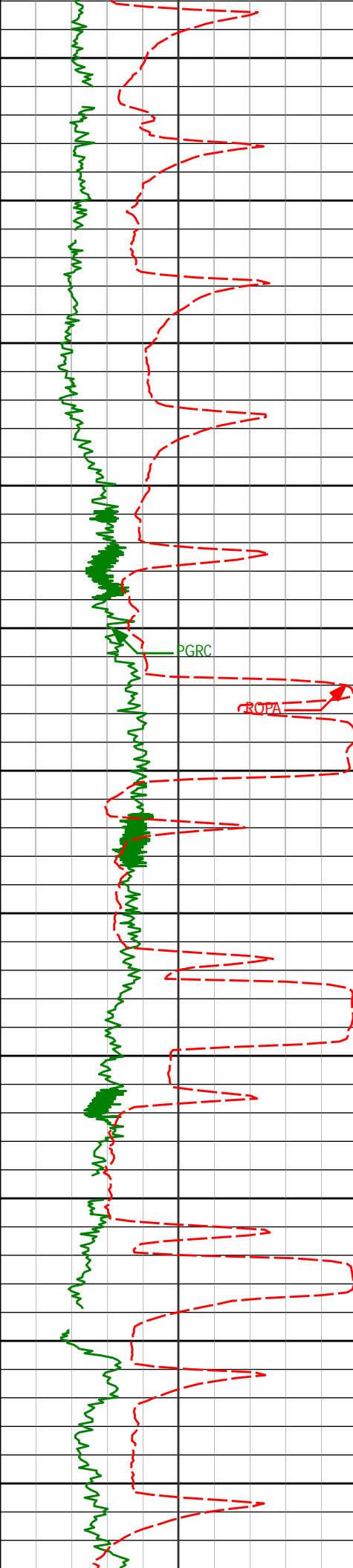
15362'

90.46°

89.83°

6602.88'

8996.88'



15400

15450

15500

15550

15600

15650

15700

15750

15800

15850

15900

15457'

91.42°

90.00°

6601.32'

9091.83'

15551'

92.87°

90.05°

6597.80'

9185.71'

15646'

91.82°

88.73°

6593.91'

9280.61'

15741'

88.58°

88.05°

6593.58'

9375.59'

15836'

88.36°

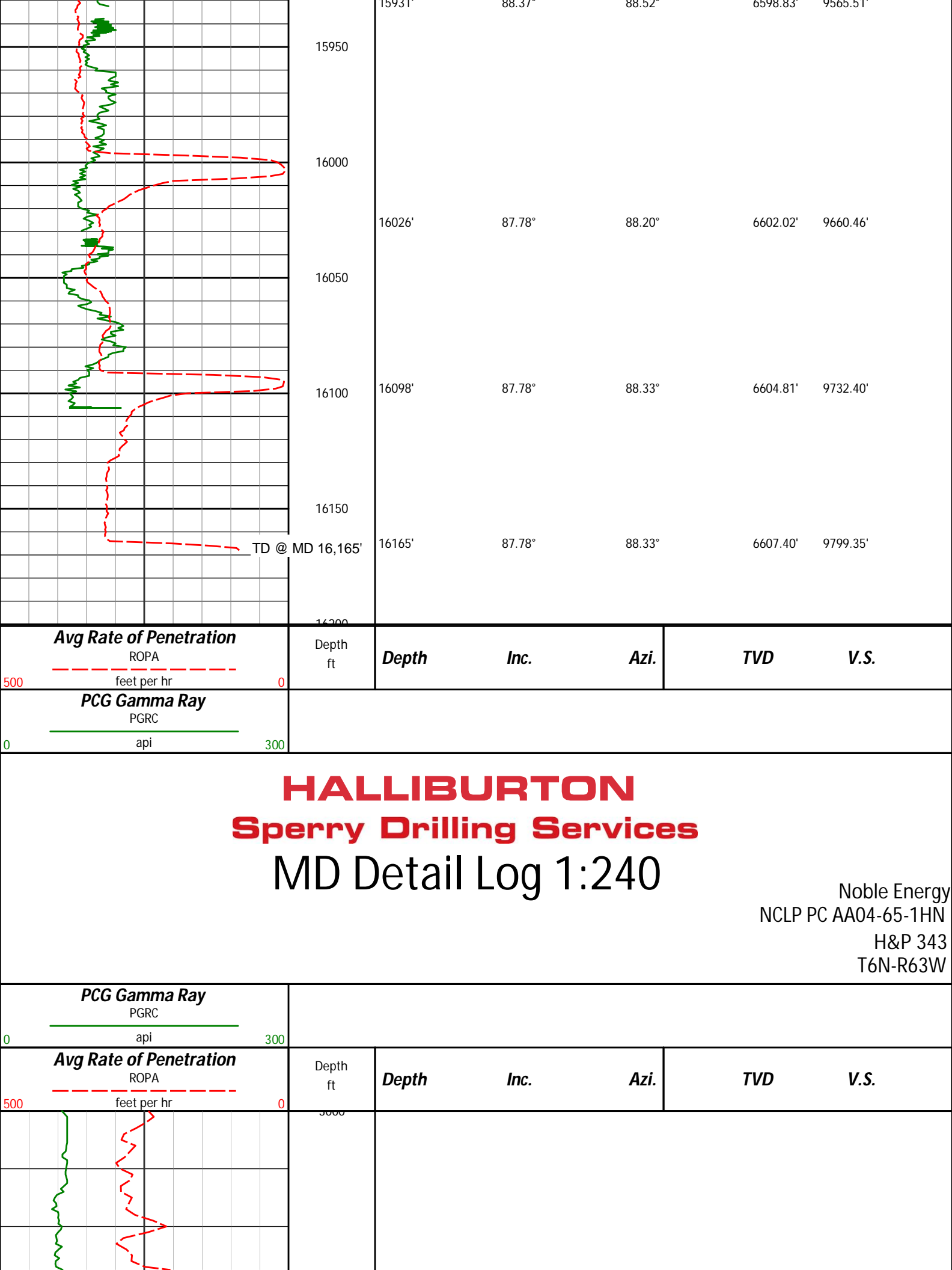
89.30°

6596.12'

9470.56'

PGRC

ROPA



Avg Rate of Penetration

ROPA

feet per hr

PCG Gamma Ray

PGRC

api

HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Noble Energy
NCLP PC AA04-65-1HN
H&P 343
T6N-R63W

PCG Gamma Ray

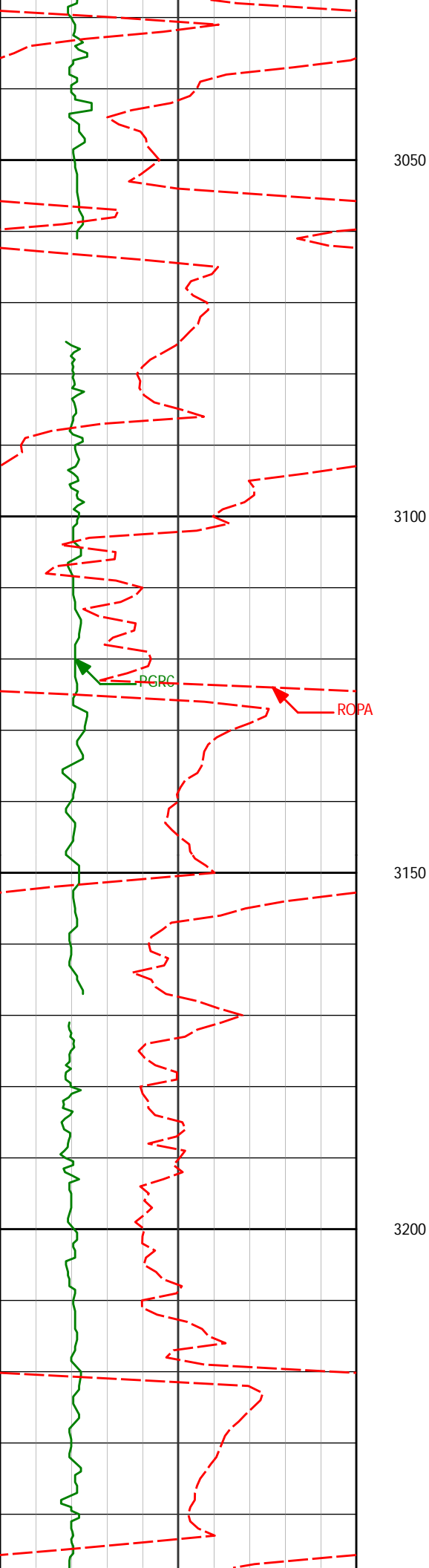
PGRC

api

Avg Rate of Penetration

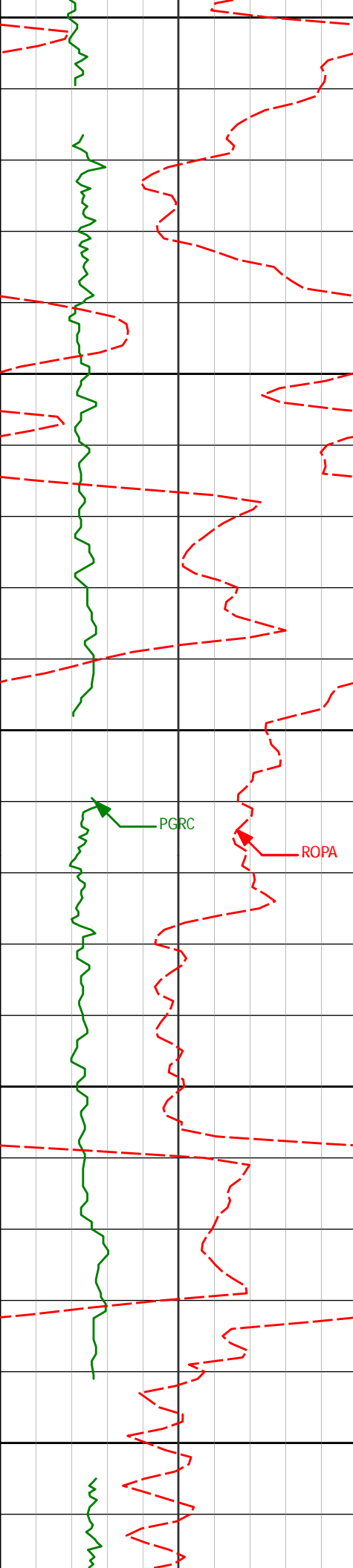
ROPA

feet per hr



3069'	11.01°	357.11°	3063.06'	-13.64'
-------	--------	---------	----------	---------

3164'	8.47°	1.81°	3156.68'	-13.38'
-------	-------	-------	----------	---------



3250

3259'

6.35°

1.67°

3250.88'

-12.62'

3300

3350

3354'

3.80°

354.72°

3345.50'

-12.50'

3400

3450

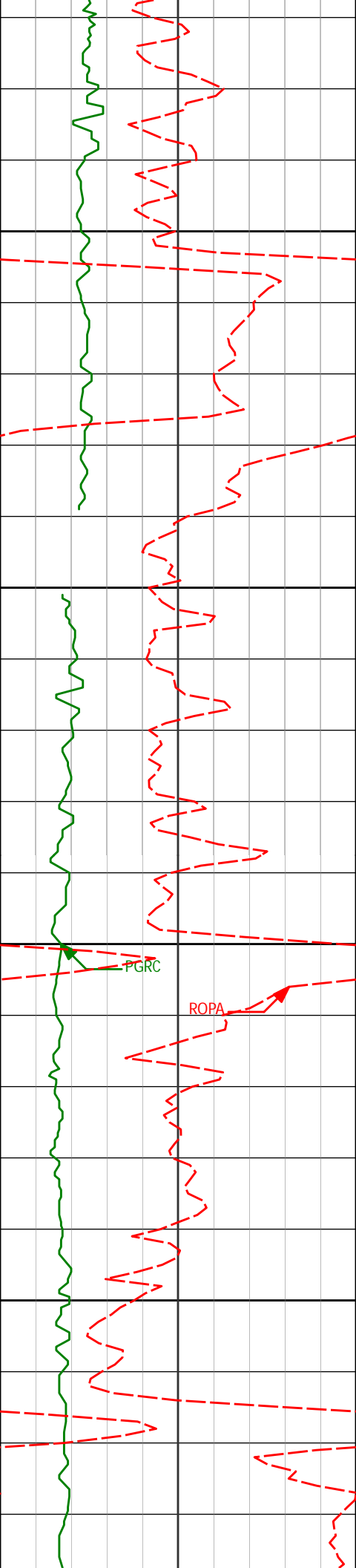
3448'

1.83°

5.08°

3439.39'

-12.51'



3500

3543'

0.31°

151.83°

3534.37'

-12.21'

3550

3600

3638'

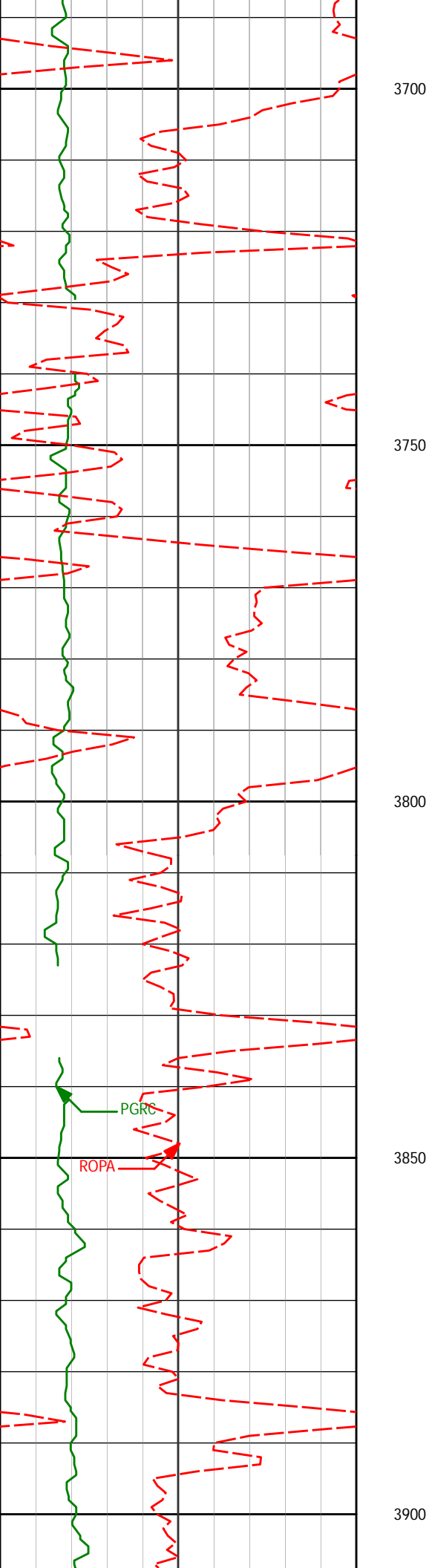
0.33°

261.59°

3629.37'

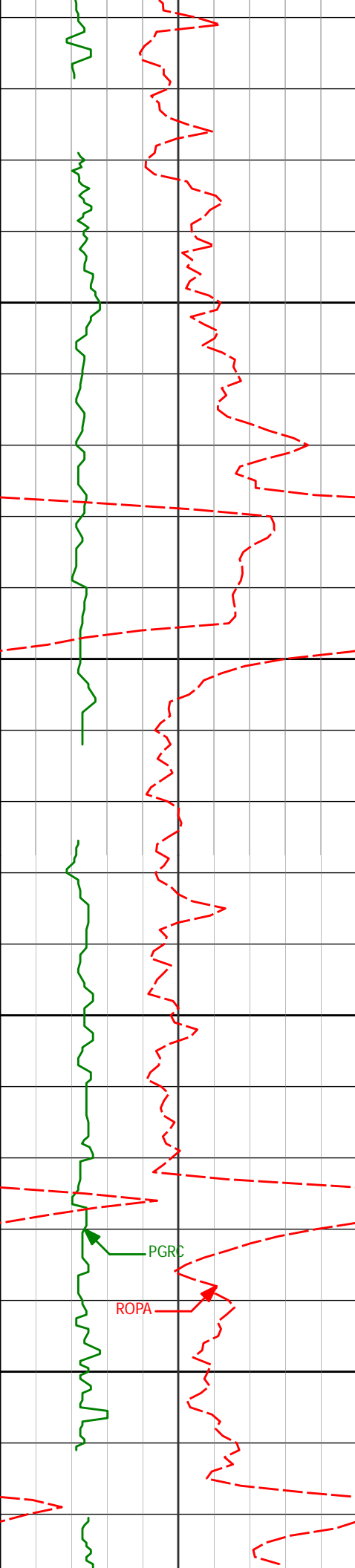
-12.37'

3650



3733' 0.68° 229.02° 3724.37' -13.08'

3828' 1.19° 205.05° 3819.35' -13.96'



3923'

1.26°

222.87°

3914.33'

-15.14'

3950

4000

4018'

0.15°

6.77°

4009.33'

-15.85'

4050

4100

4112'

0.39°

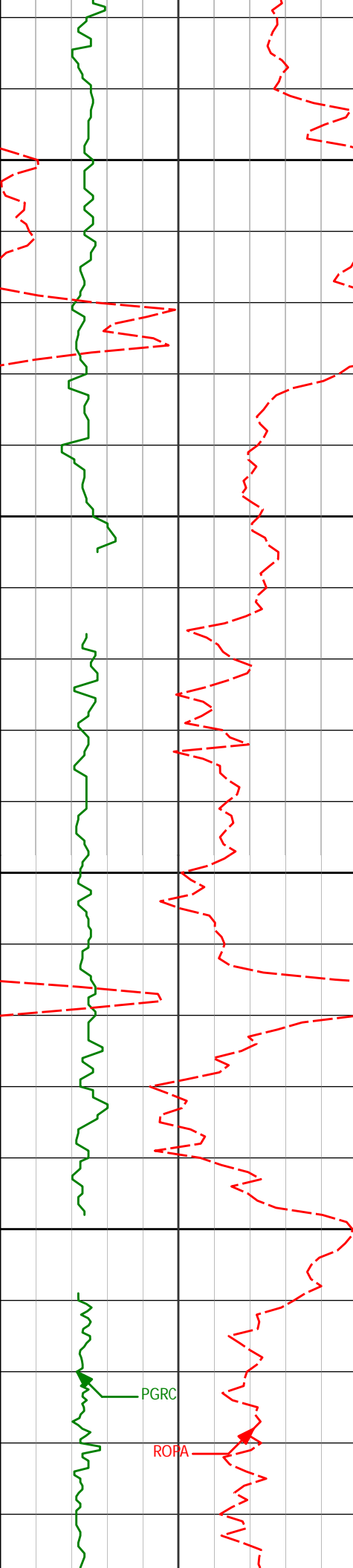
301.92°

4103.32'

-16.10'

PGR

ROPA



4150

4200

4250

4300

4207'

 0.54° 33.37°

4198.32'

-16.11'

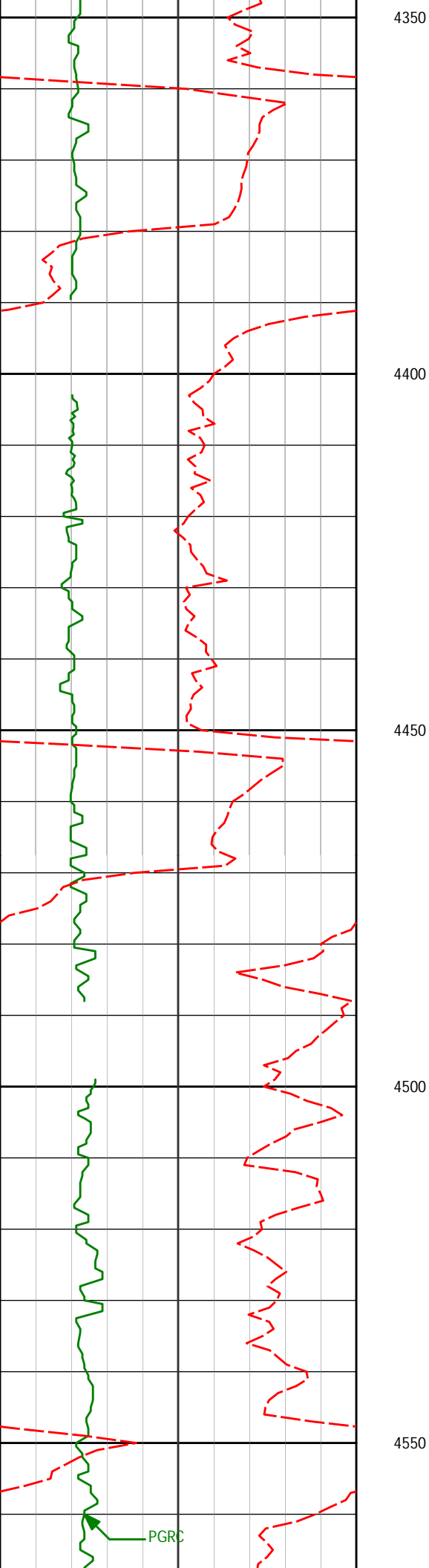
4301'

2.04°

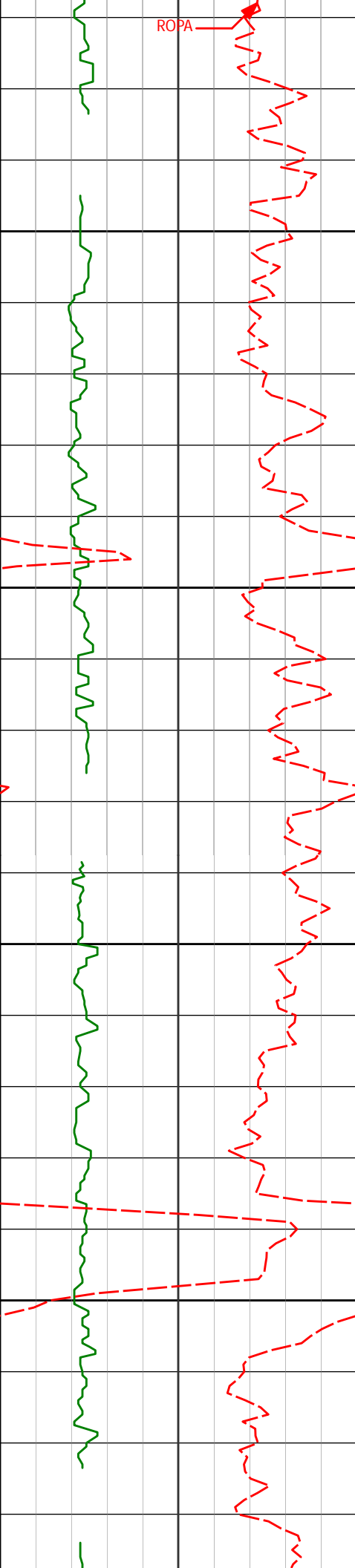
85.30°

4292.30'

-14.19'



4396'	1.59°	53.75°	4387.25'	-11.41'
4491'	0.35°	38.27°	4482.24'	-10.14'



4586'

0.63°

0.54°

4577.23'

-9.93'

4600

4650

4681'

1.05°

11.47°

4672.22'

-9.71'

4700

4750

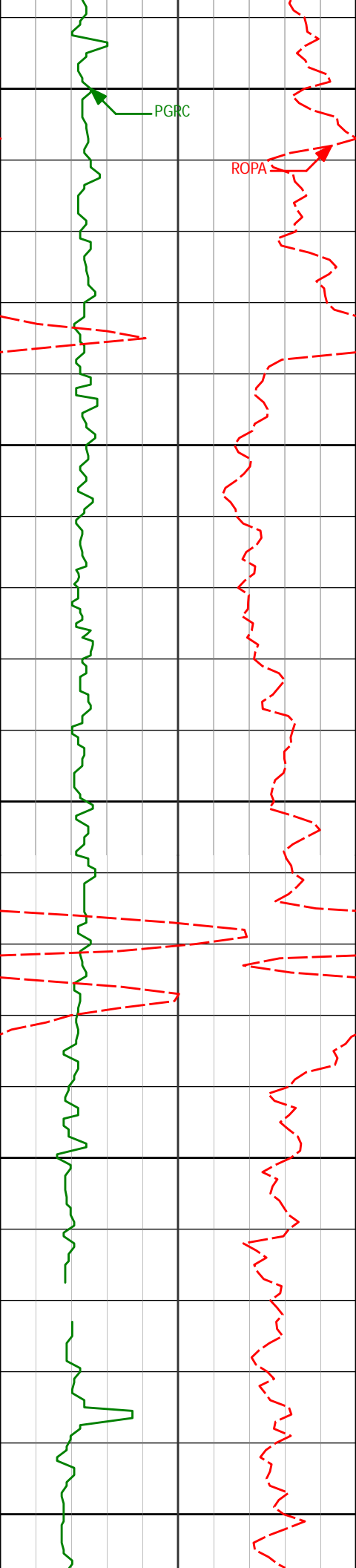
4776'

0.09°

8.29°

4767.22'

-9.50'



4800

PGRC

ROPA

4850

4871'

0.23°

6.69°

4862.22'

-9.45'

4900

4950

4966'

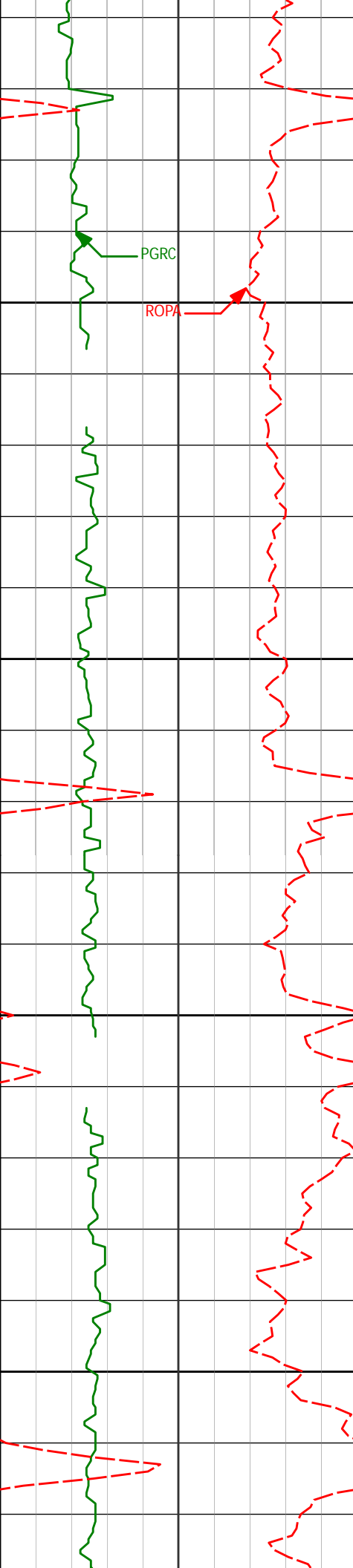
0.31°

60.68°

4957.22'

-9.20'

5000



5050

5060'

0.31°

340.67°

5051.21'

-9.05'

5100

5150

5154'

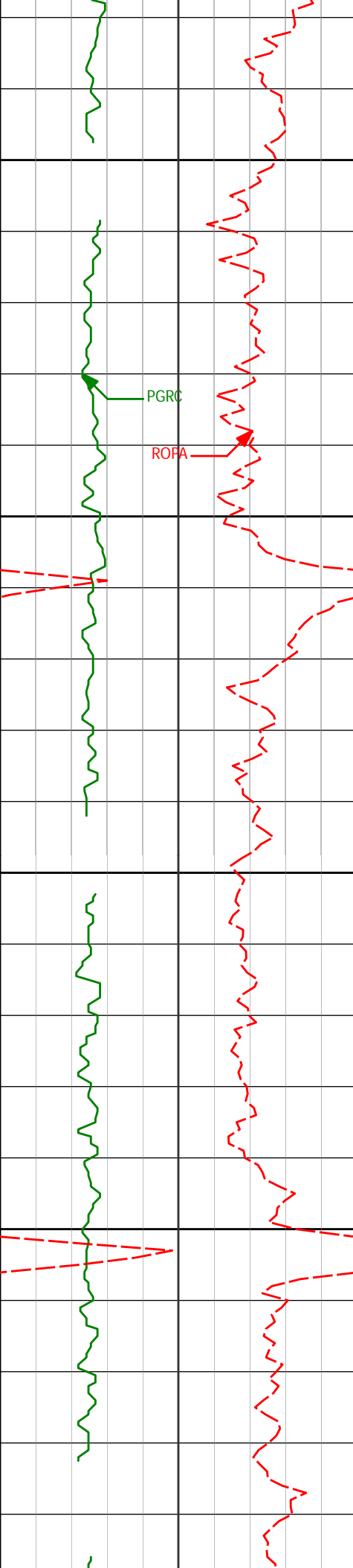
0.37°

164.80°

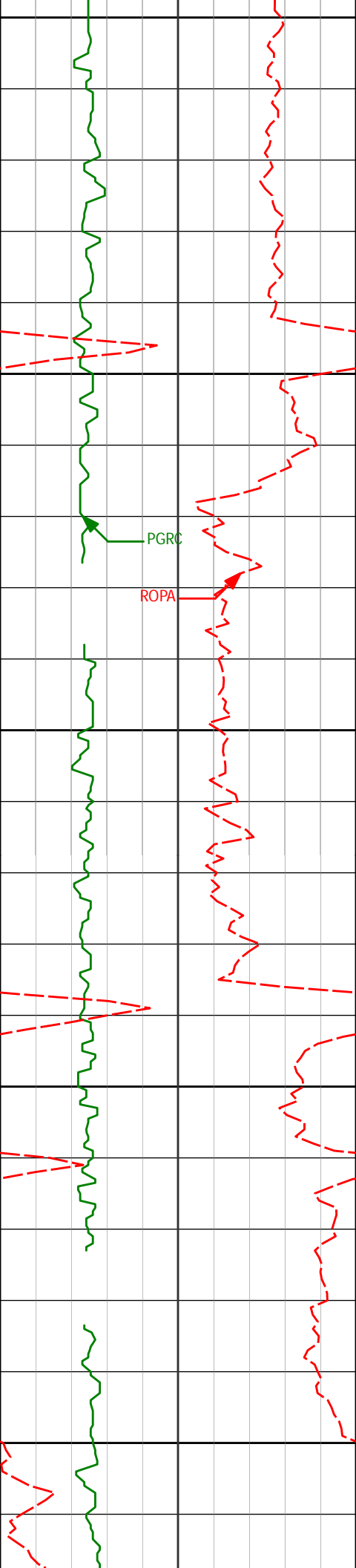
5145.21'

-9.06'

5200



Station	Distance (ft)	Bearing	Distance (ft)	Bearing	Distance (ft)	Bearing
5250	5248'	0.68°	184.93°	5239.21'	-9.05'	
5300						
5350	5343'	0.72°	103.31°	5334.21'	-8.54'	
5400						
	5437'	1.15°	112.28°	5428.19'	-7.11'	



5450

5500

5550

5600

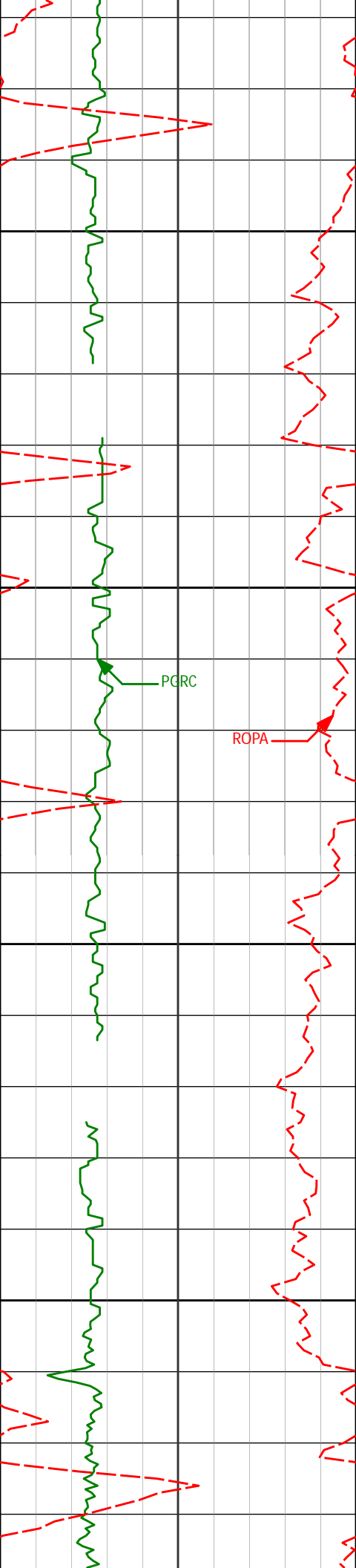
5650

PGR

ROPA

5532'	1.37°	91.24°	5523.17'	-5.10'
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5627'	0.93°	108.05°	5618.15'	-3.25'
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5700

5722'

0.74°

98.43°

5713.14'

-1.92'

5750

5800

5843'

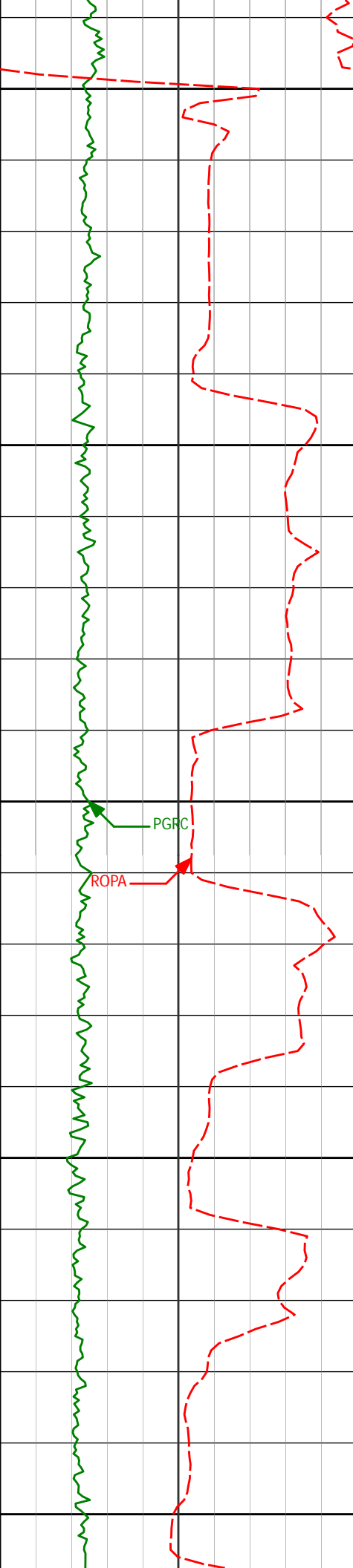
0.47°

131.12°

5834.13'

-0.78'

5850



<Run 200>
5900

5950

5960'

2.77°

90.26°

5951.08'

2.39'

6000

6007'

5.86°

88.34°

5997.94'

5.93'

6050

6055'

8.25°

87.93°

6045.58'

11.82'

6100

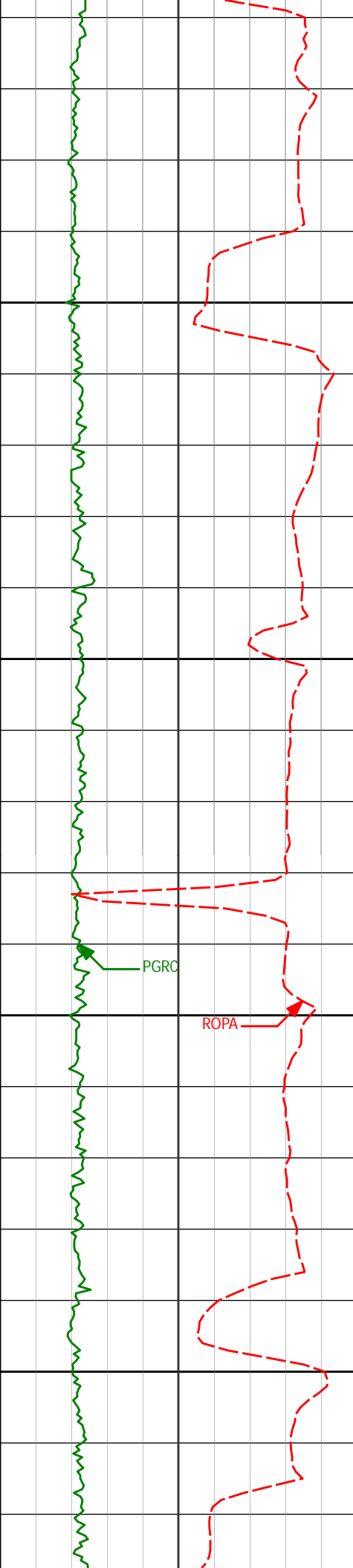
6101'

9.40°

88.64°

6091.03'

18.88'



6150

6200

6250

6300

6149'

6196'

6244'

6290'

12.60°

17.29°

23.46°

28.31°

92.69°

92.09°

86.60°

85.25°

6138.14'

6183.54'

6228.52'

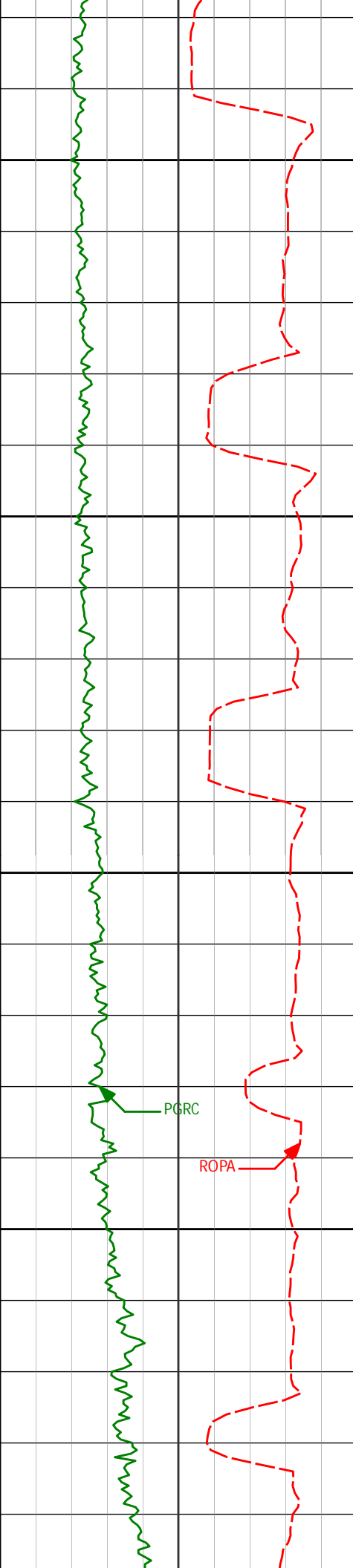
6269.89'

28.02'

40.11'

56.79'

76.85'



6350

6400

6450

6500

6338'

30.16°

85.28°

6311.78'

100.26'

6384'

33.77°

87.59°

6350.80'

124.60'

6432'

37.62°

89.83°

6389.77'

152.59'

6479'

43.06°

90.73°

6425.58'

182.98'

6527'

49.30°

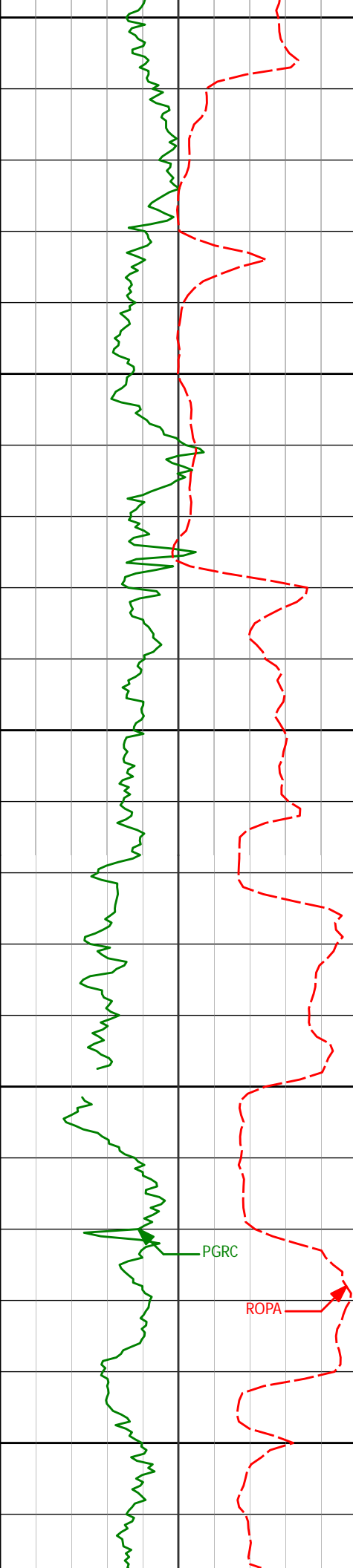
89.29°

6458.80'

217.58'

PGRC

ROPA



6550

6573'

51.99°

89.13°

6487.97'

253.14'

6600

6621'

52.51°

88.35°

6517.36'

291.09'

6650

6668'

57.65°

88.54°

6544.25'

329.62'

6700

6716'

61.20°

88.57°

6568.67'

370.93'

PGRC

ROPA

6750

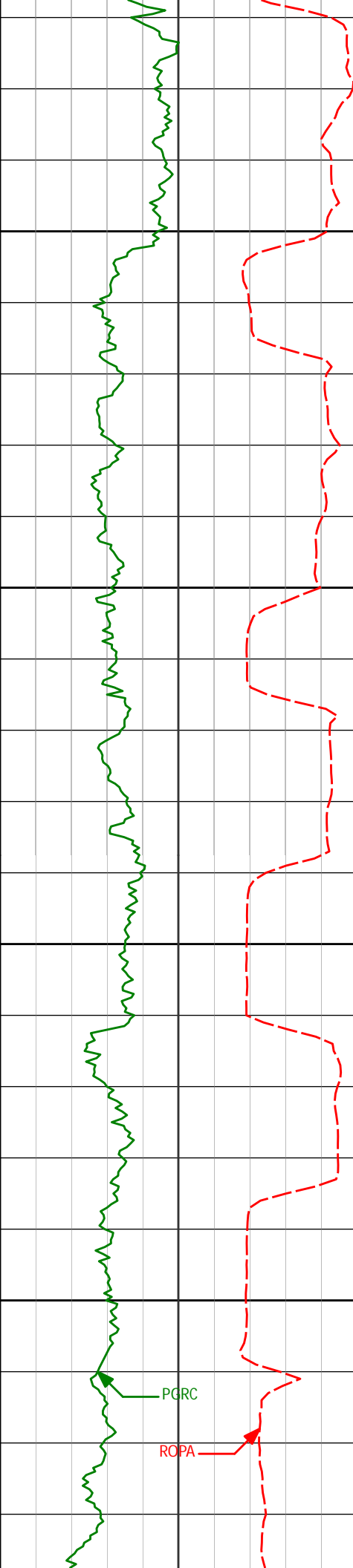
6763'

63.71°

89.91°

6590.40'

412.60'



6800

6850

6900

6950

6858'

73.69°

90.49°

6624.86'

500.94'

6906'

77.49°

90.52°

6636.81'

547.38'

PGRC

ROPA

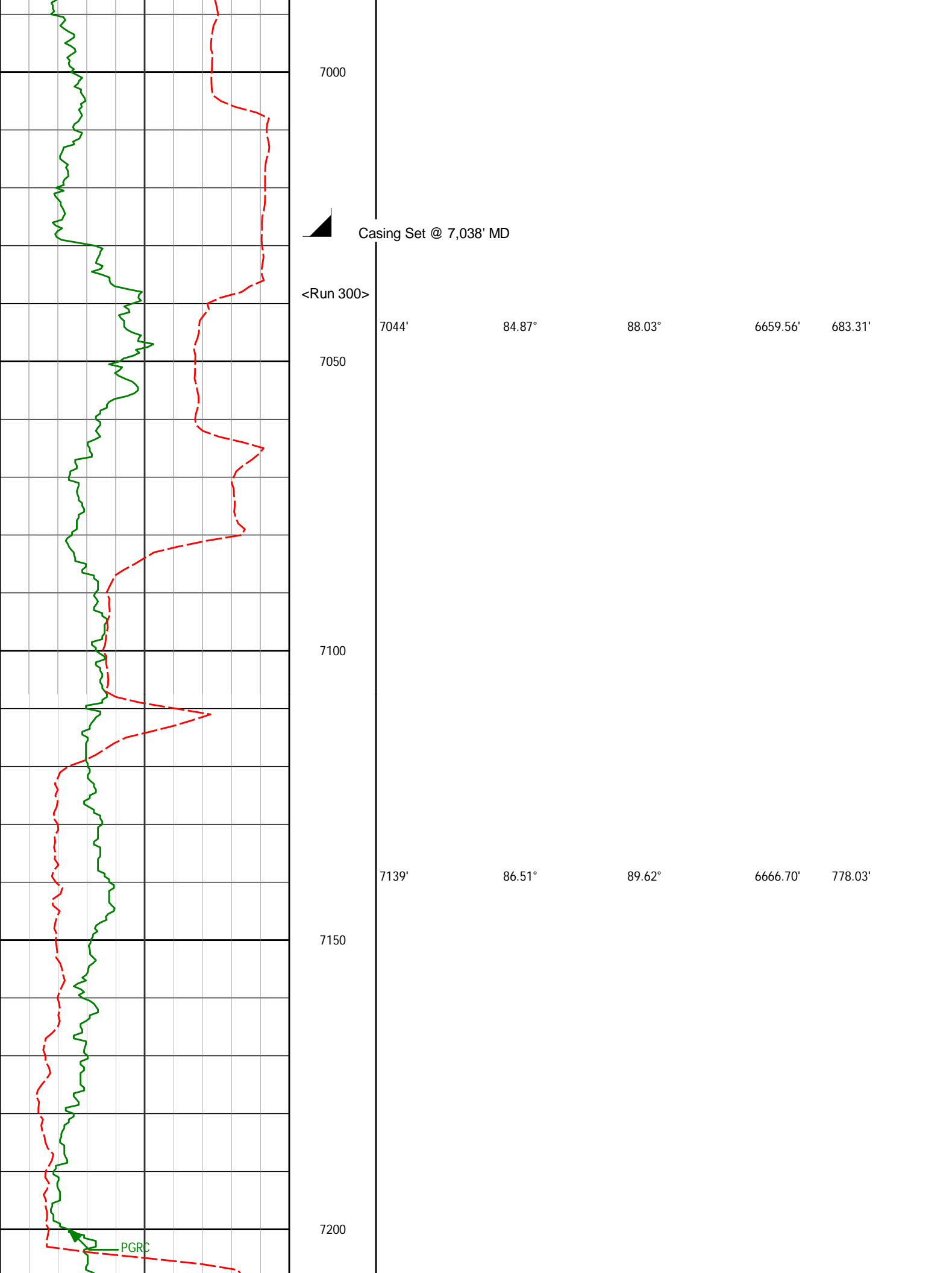
6984'

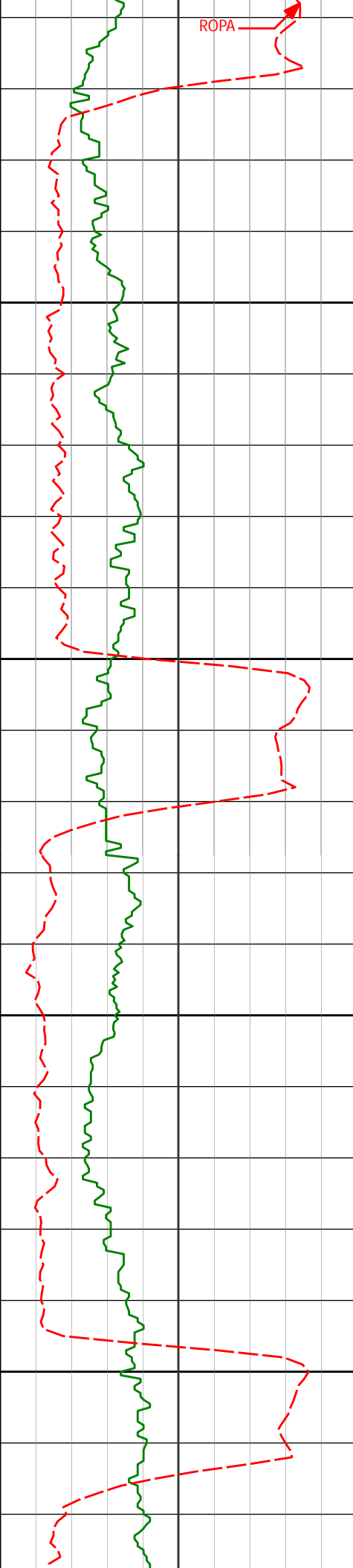
80.31°

90.89°

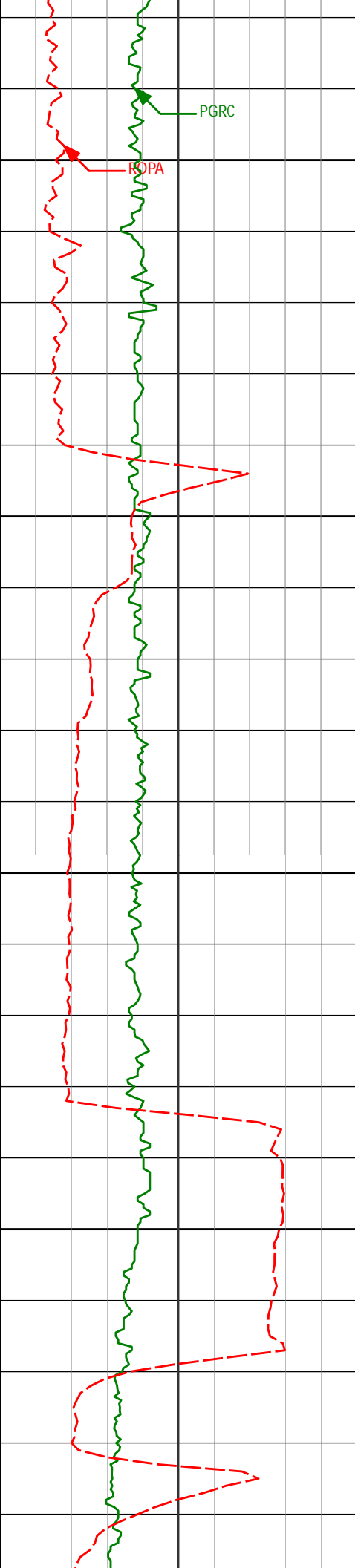
6651.82'

623.84'





7234'	86.86°	89.33°	6672.19'	872.84'
7250				
7300				
7329'	87.87°	88.23°	6676.56'	967.74'
7350				
7400				
7424'	89.97°	88.35°	6678.35'	1062.71'



7450

7500

7550

7600

7519'

90.25°

84.73°

6678.17'

1157.66'

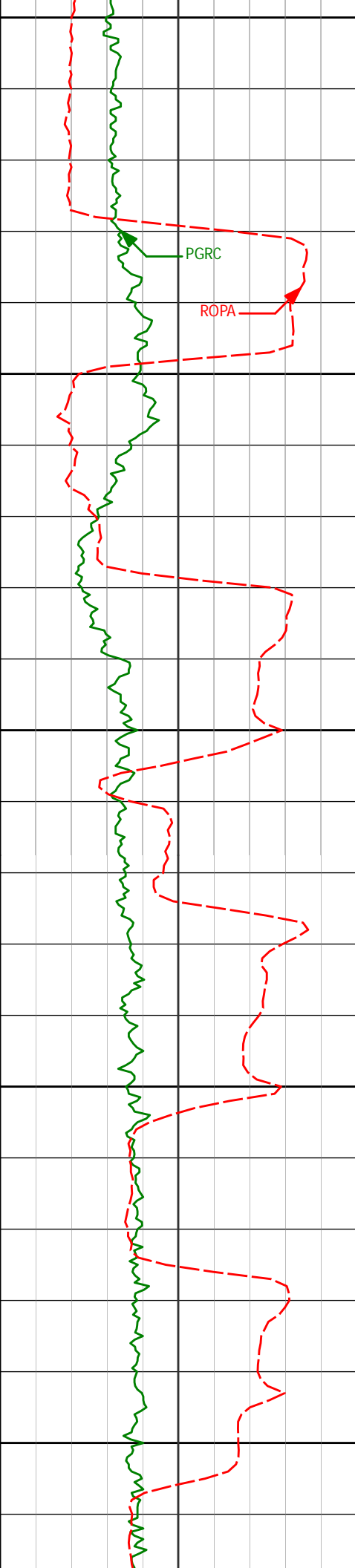
7614'

91.33°

87.53°

6676.86'

1252.58'



7650

7700

7750

7800

7850

7708'

88.86°

86.13°

6676.70'

1346.54'

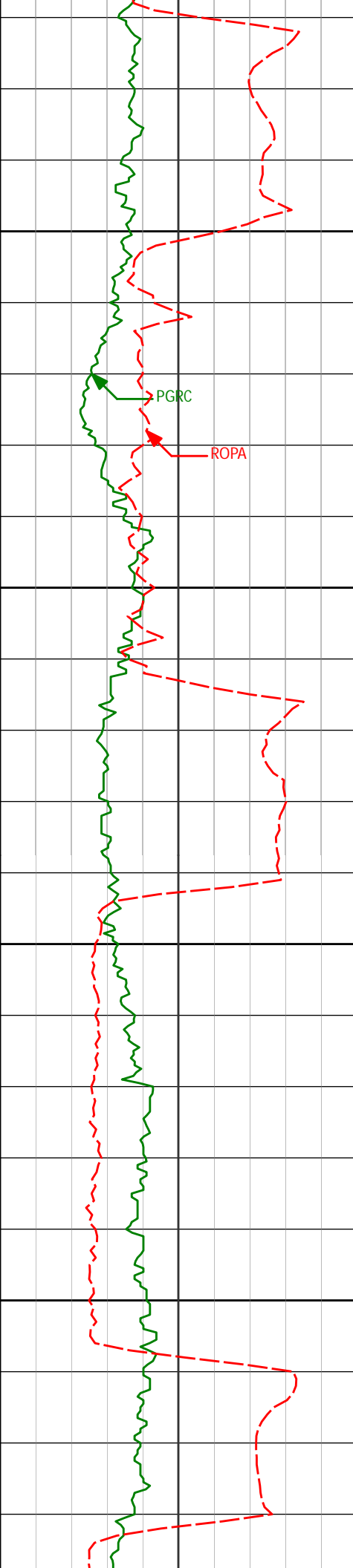
7803'

89.38°

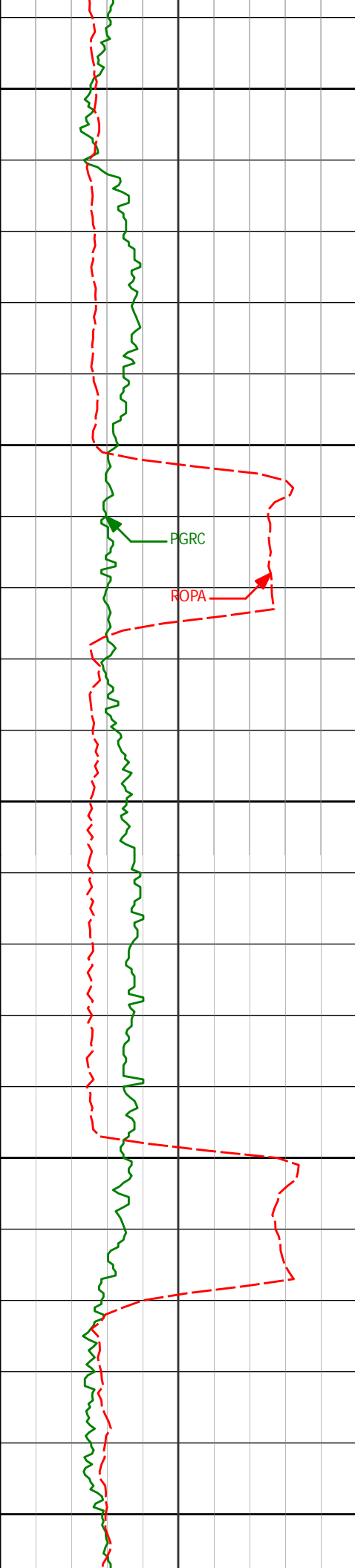
89.97°

6678.16'

1441.51'



7897'	93.08°	92.41°	6676.15'	1535.34'
7900				
7950				
7992'	89.91°	90.58°	6673.67'	1630.13'
8000				
8050				
8087'	92.04°	90.29°	6672.05'	1725.04'



8182'

90.28°

88.97°

6670.13'

1819.99'

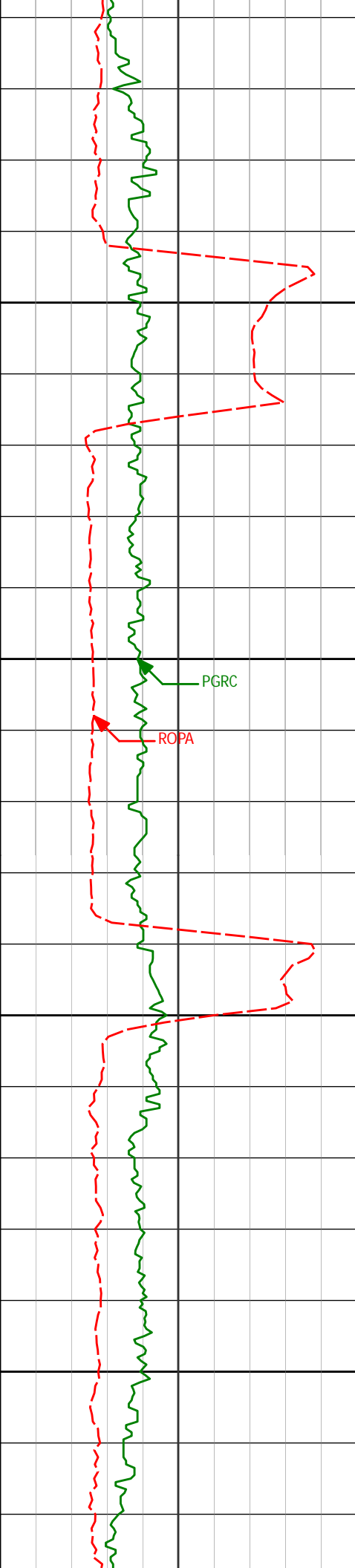
8277'

89.35°

90.75°

6670.43'

1914.94'



8350

8372'

91.14°

90.23°

6670.03'

2009.86'

8400

8450

8467'

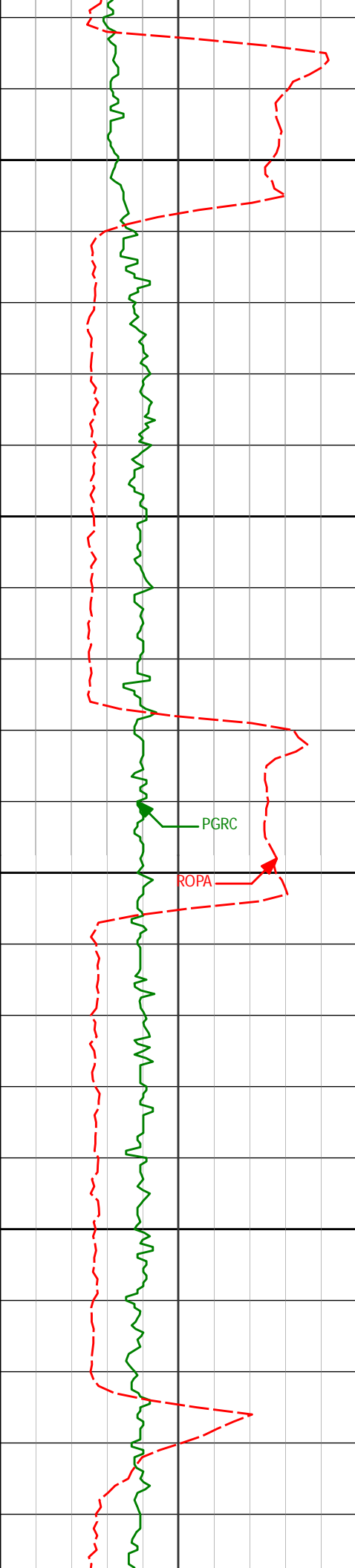
91.23°

87.91°

6668.06'

2104.82'

8500



8550

8562'

89.91°

88.50°

6667.12'

2199.82'

8600

8650

8656'

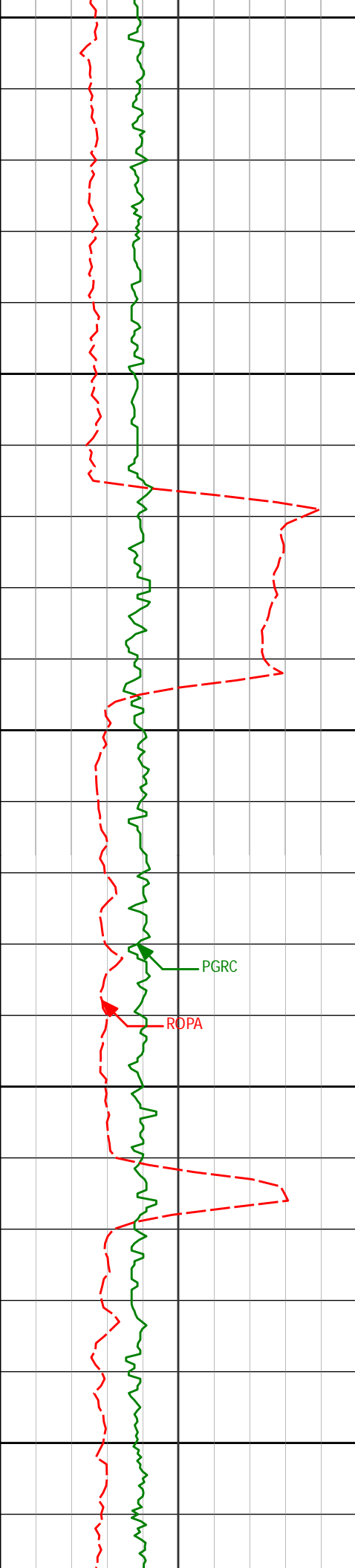
90.99°

90.70°

6666.38'

2293.78'

8700



8750

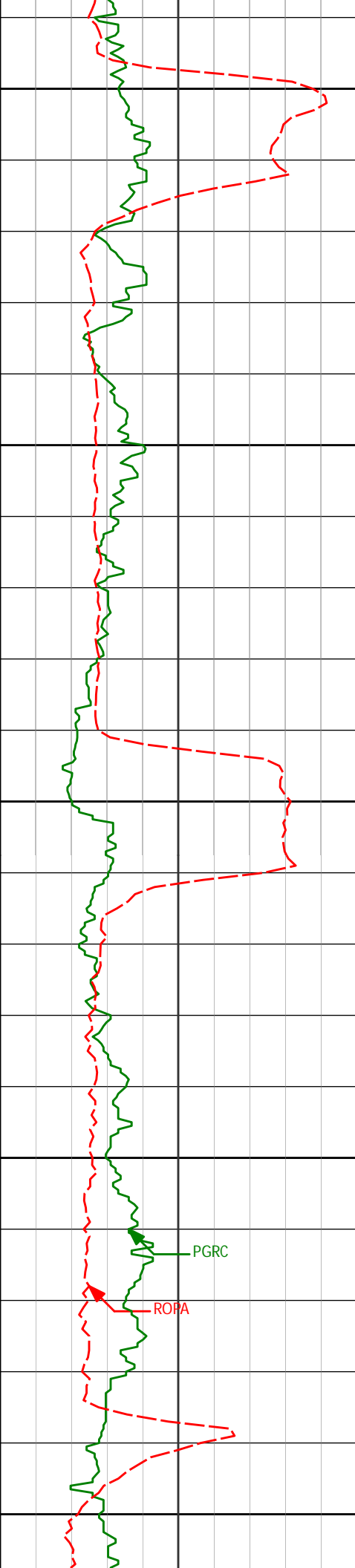
8800

8850

8900

8950

8751'	90.52°	88.54°	6665.13'	2388.74'
8846'	91.23°	90.53°	6663.68'	2483.69'
8941'	91.11°	88.86°	6661.74'	2578.64'



9200

9225'

92.10°

90.27°

6655.99'

2862.52'

9250

9300

9320'

90.37°

90.48°

6653.94'

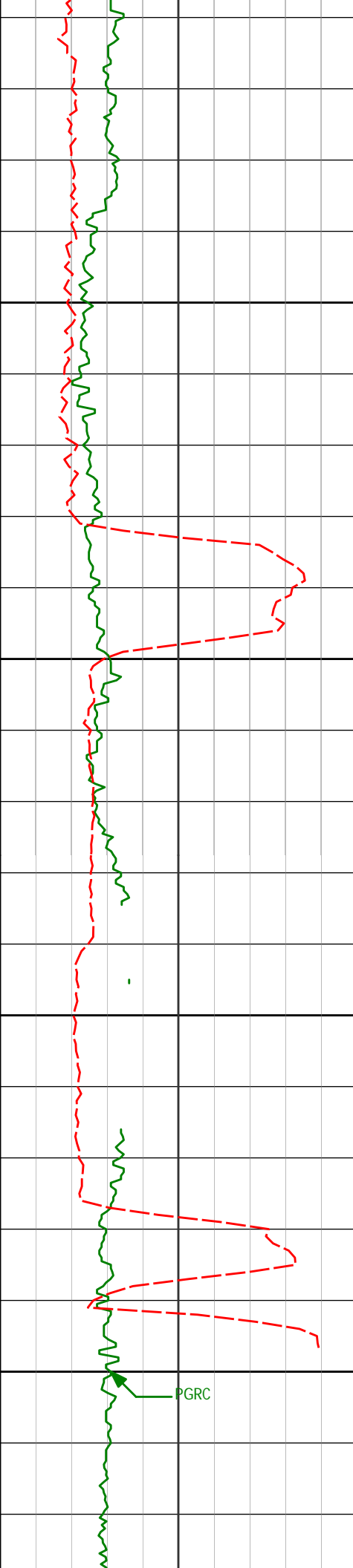
2957.42'

9350

PGRC

ROPA

9400



9450

9500

9550

9600

9415'

89.88°

90.93°

6653.74'

3052.33'

9510'

91.17°

89.24°

6652.87'

3147.27'

9605'

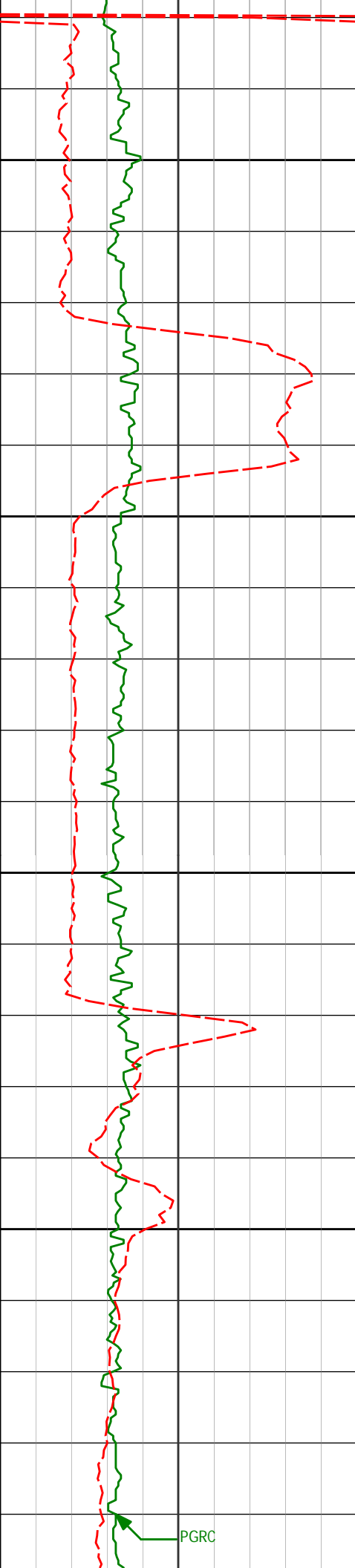
91.88°

88.97°

6650.34'

3242.23'

PGRC



9650

9700

9750

9800

9700'

9795'

89.88°

90.15°

88.13°

87.61°

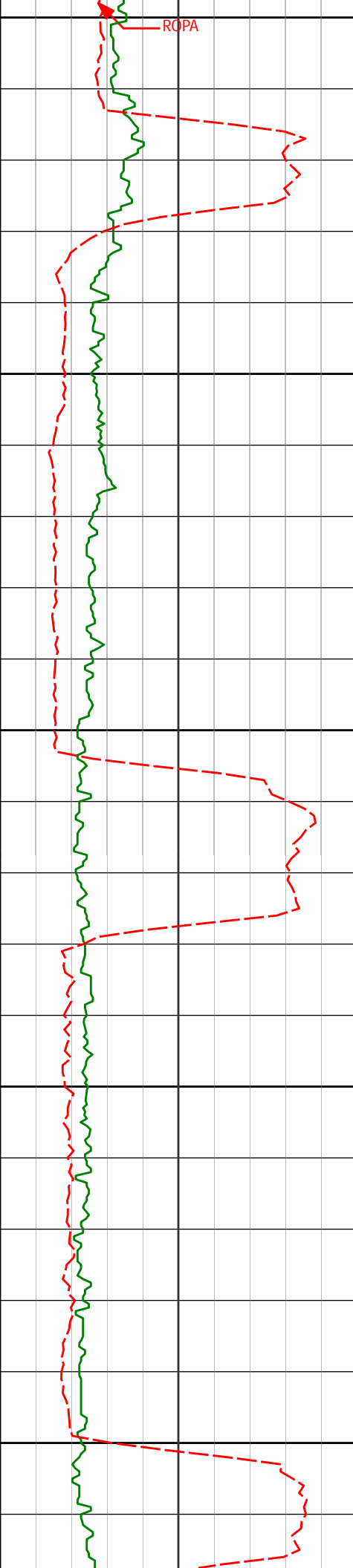
6648.88'

6648.85'

3337.21'

3432.21'

PGRC



9850

9889'

91.85°

88.79°

6647.21'

3526.19'

9900

9950

9984'

90.71°

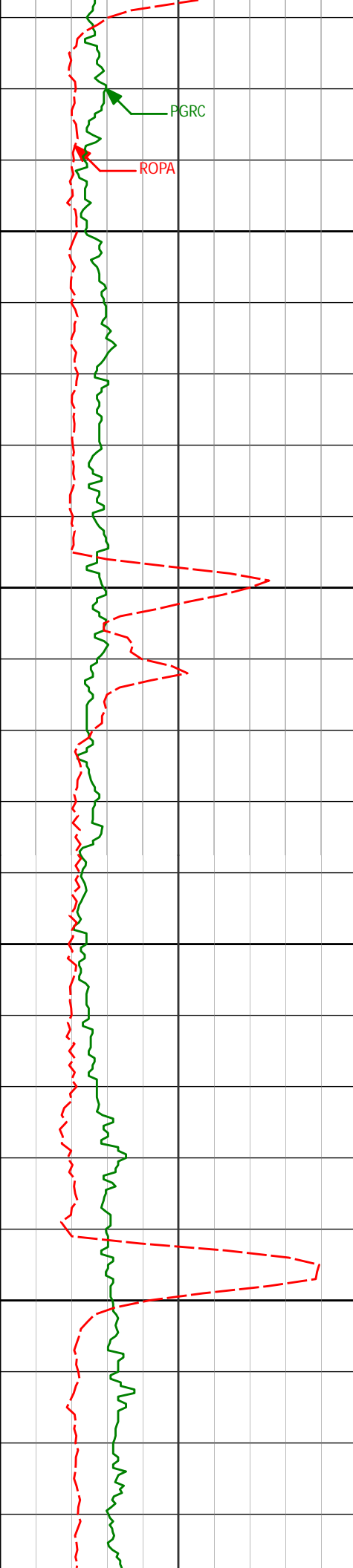
89.47°

6645.09'

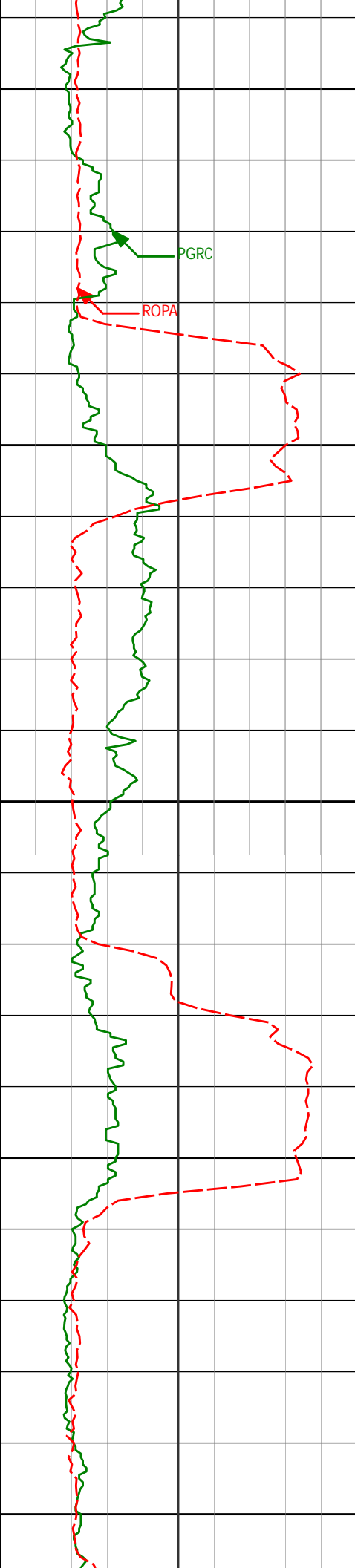
3621.15'

10000

10050



10079'	89.41°	87.85°	6644.99'	3716.14'
10100				
10150				
10174'	89.57°	87.75°	6645.84'	3811.13'
10200				
10250				
10269'	91.39°	89.34°	6645.04'	3906.12'



10300

10350

10400

10450

10500

10364'

91.94°

88.45°

6642.28'

4001.07'

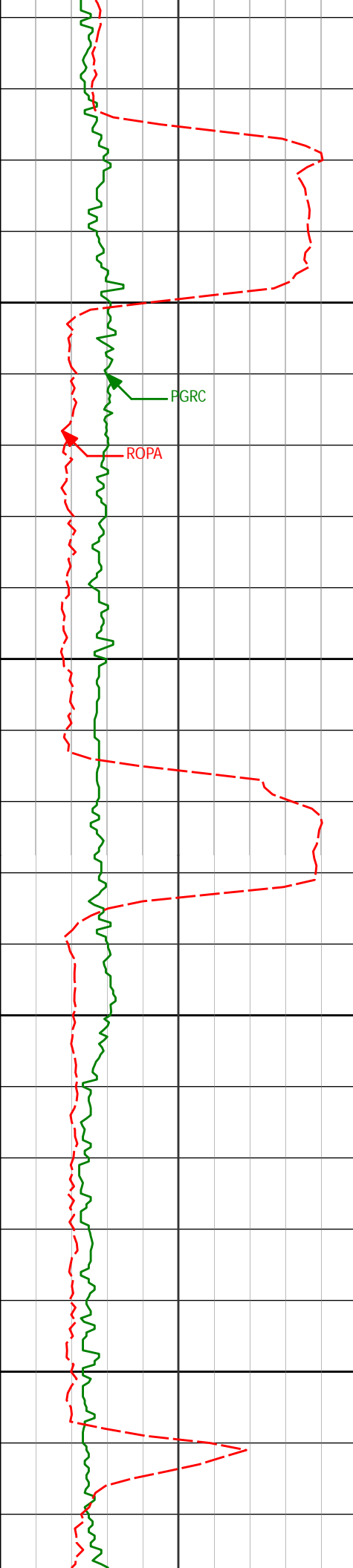
10459'

91.23°

88.45°

6639.65'

4096.04'



10550

10551'

90.25°

89.85°

6638.47'

4188.01'

10600

10650

10700

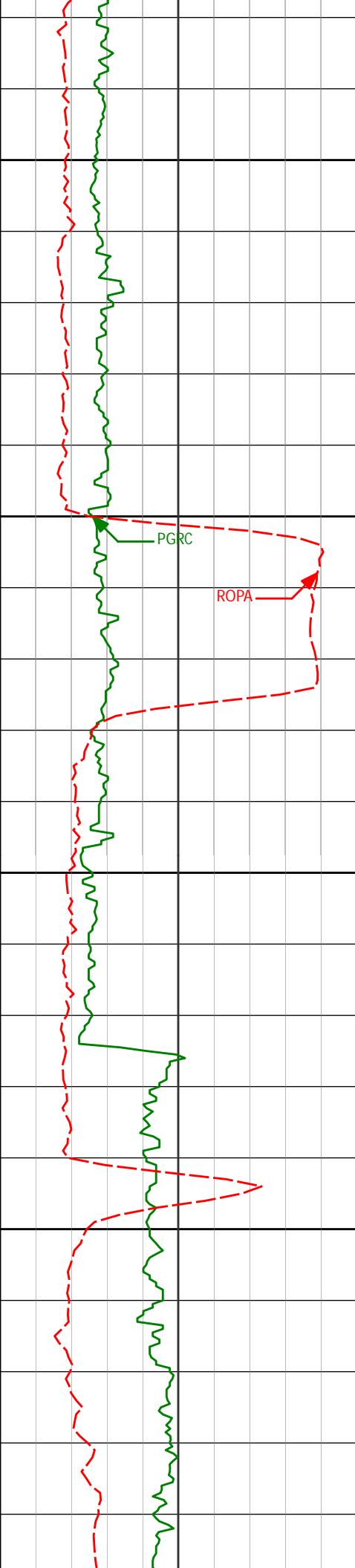
10643'

89.38°

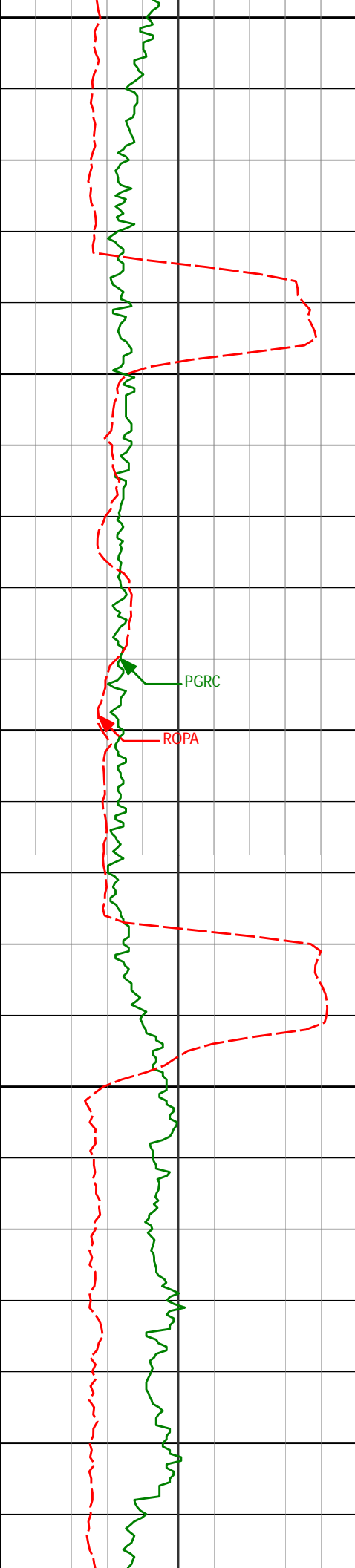
91.57°

6638.76'

4279.92'



10737'	90.95°	91.84°	6638.49'	4373.74'
10750				
10800				
10828'	90.19°	88.93°	6637.59'	4464.66'
10850				
10900				
10921'	90.49°	87.91°	6637.03'	4557.66'



10950

11000

11050

11100

11150

11015'

90.77°

89.18°

6636.00'

4651.65'

11107'

89.69°

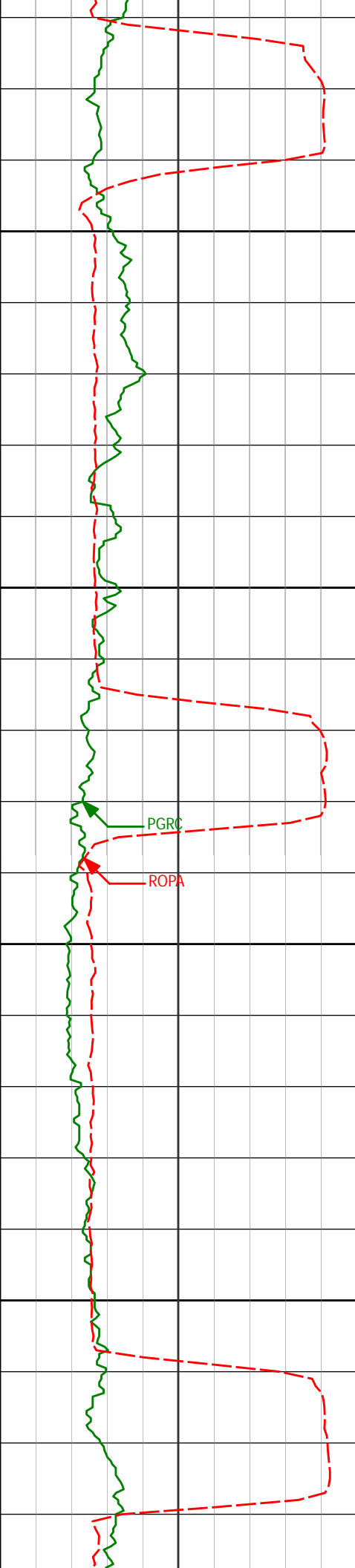
88.47°

6635.63'

4743.64'

PGRC

ROPA



11200

11200'

88.21°

88.08°

6637.34'

4836.62'

11250

11292'

88.86°

88.43°

6639.69'

4928.59'

11300

11350

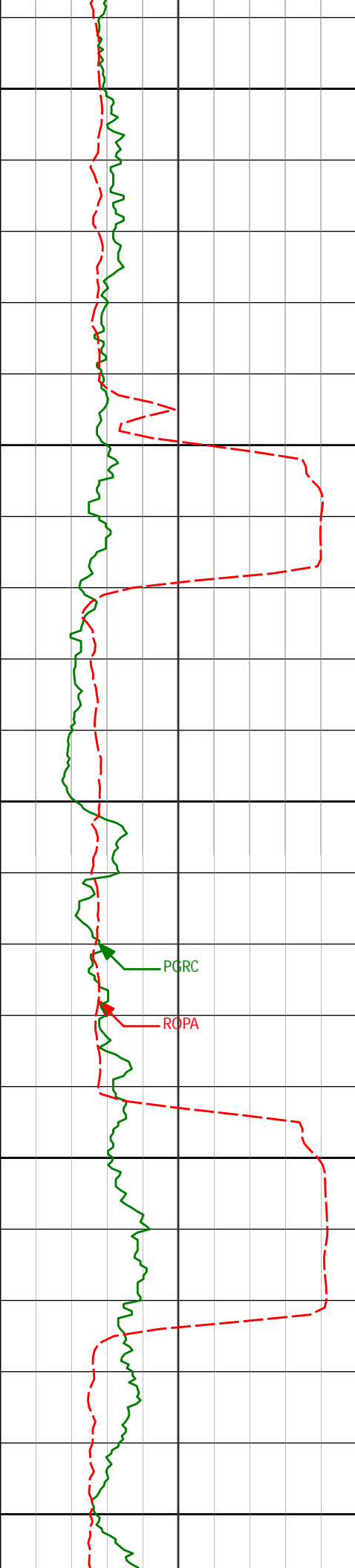
11385'

92.04°

89.52°

6638.96'

5021.57'



11400

11450

11500

11550

11600

11478'

87.78°

86.06°

6639.10'

5114.53'

PGRC

ROPA

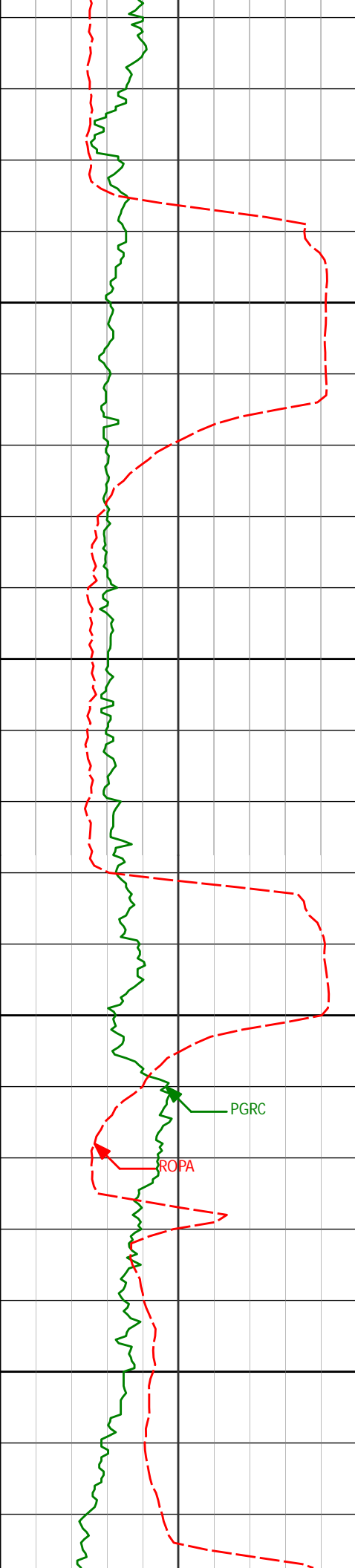
11571'

87.87°

87.94°

6642.63'

5207.44'



11650

11664'

89.72°

89.11°

6644.59'

5300.41'

11700

11750

11758'

90.83°

87.84°

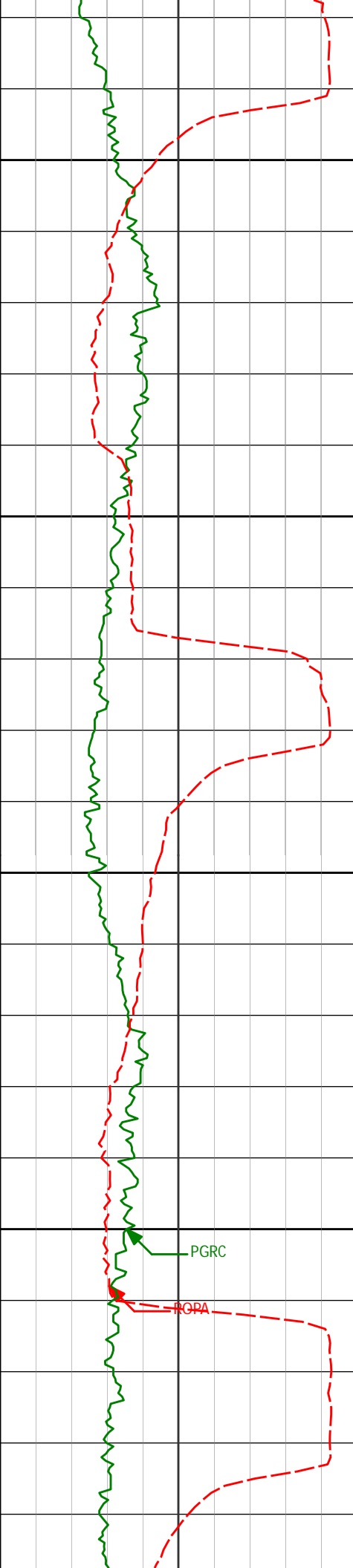
6644.14'

5394.40'

11800

PGRC

ROPA



11850

11851'

91.57°

88.13°

6642.19'

5487.38'

11900

11950

11944'

91.45°

87.89°

6639.74'

5580.35'

12000

PGRC

ROPA

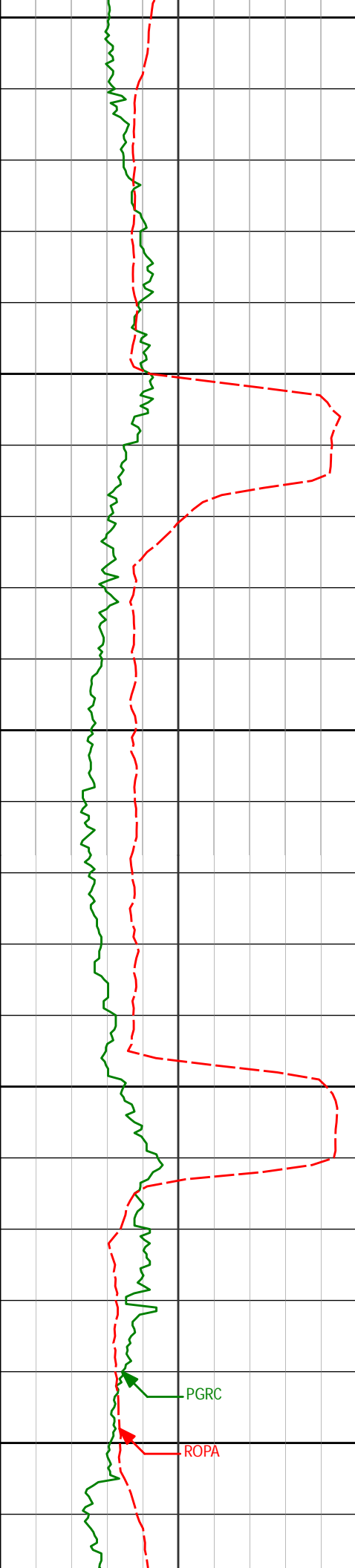
12037'

90.74°

88.74°

6637.96'

5673.33'



12050

12100

12150

12200

12250

12131'

90.12°

88.78°

6637.26'

5767.32'

12226'

93.21°

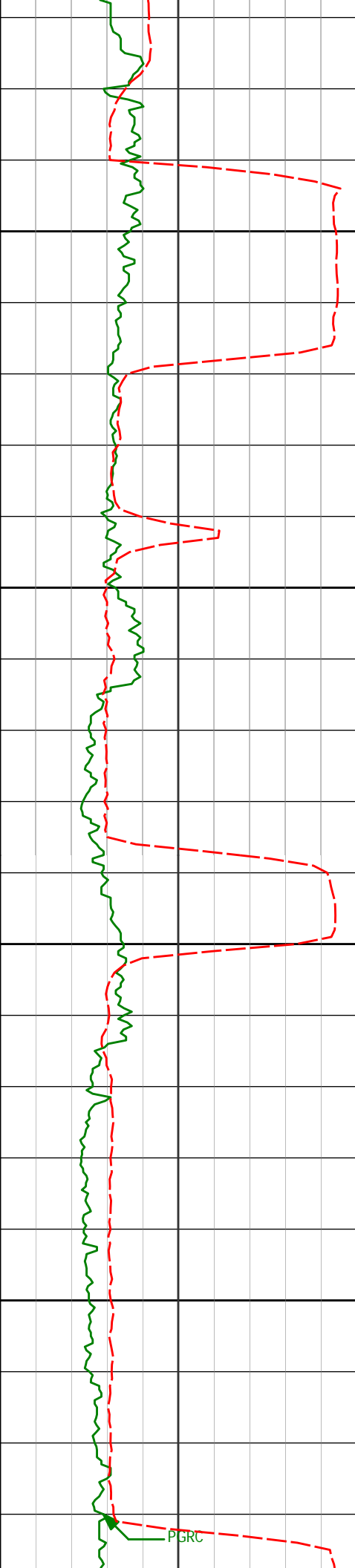
89.65°

6634.50'

5862.25'

PGRC

ROPA



12300

12350

12400

12450

12320'

90.40°

88.44°

6631.54'

5956.19'

12415'

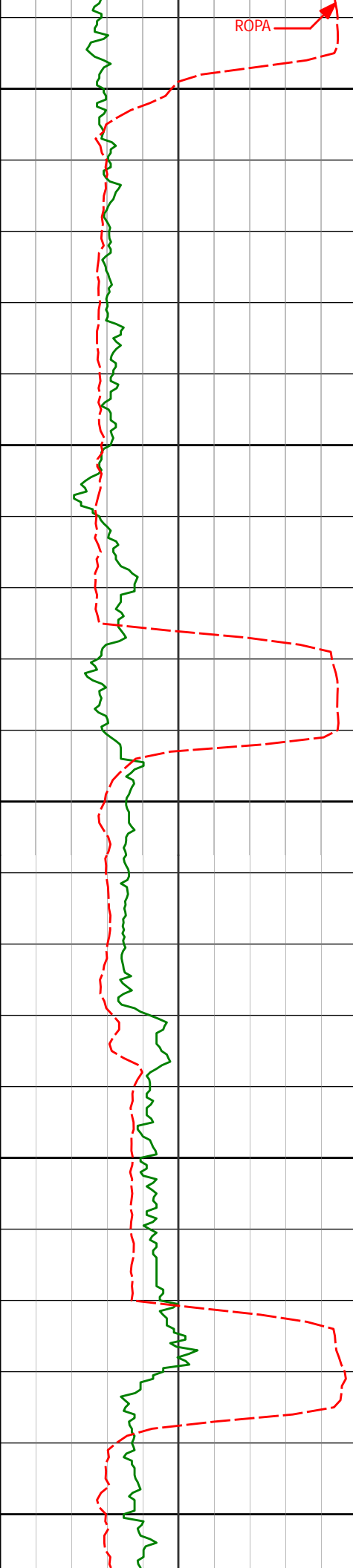
91.42°

88.76°

6630.03'

6051.17'

PGRC



12500

12510'

91.42°

90.28°

6627.67'

6146.11'

12550

12600

12605'

91.17°

92.15°

6625.53'

6240.96'

12650

12700

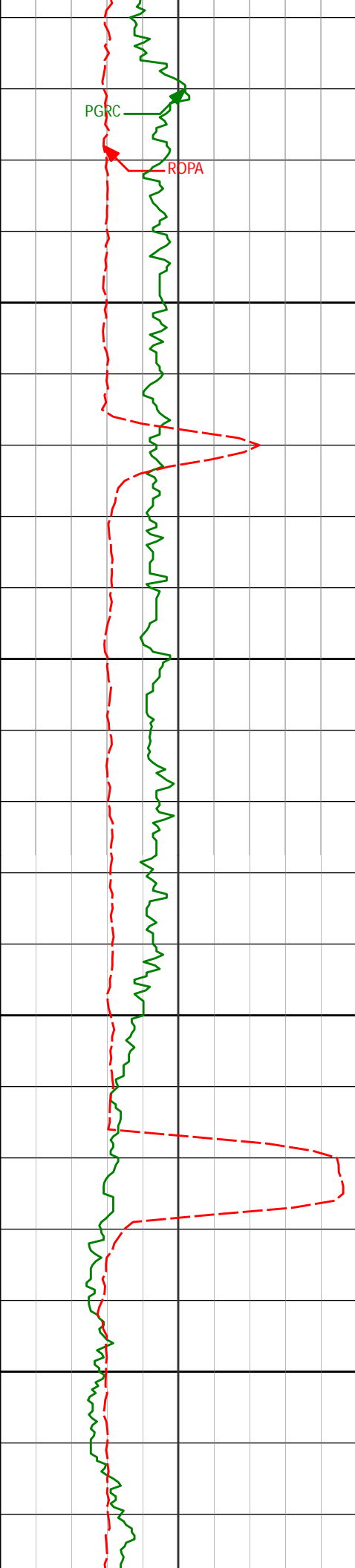
12700'

89.57°

91.39°

6624.91'

6335.77'



12750

12800

12850

12900

12800'

12895'

91.02°

89.60°

90.53°

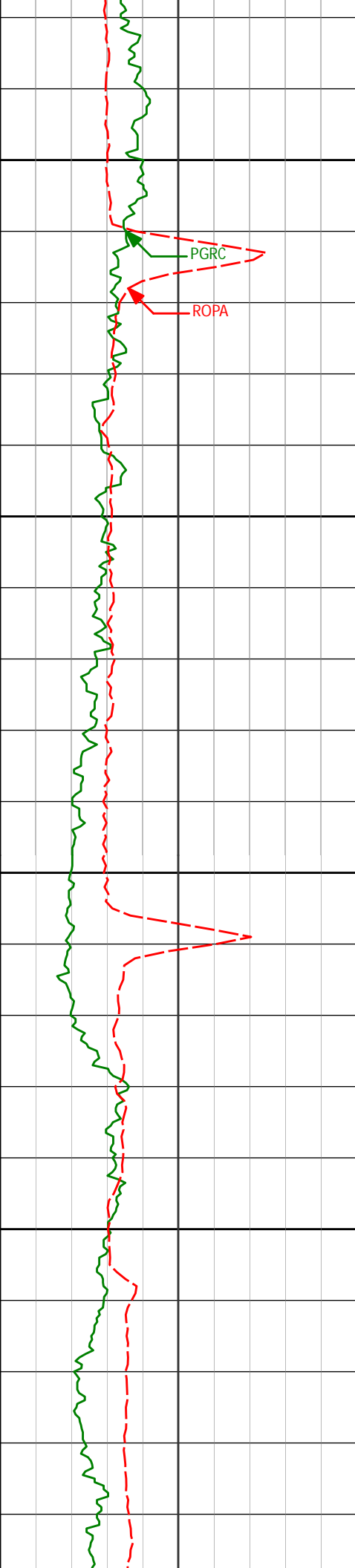
89.03°

6624.40'

6623.88'

6435.65'

6530.60'



12950

13000

13050

13100

12990'

89.60°

88.66°

6624.55'

6625.60'

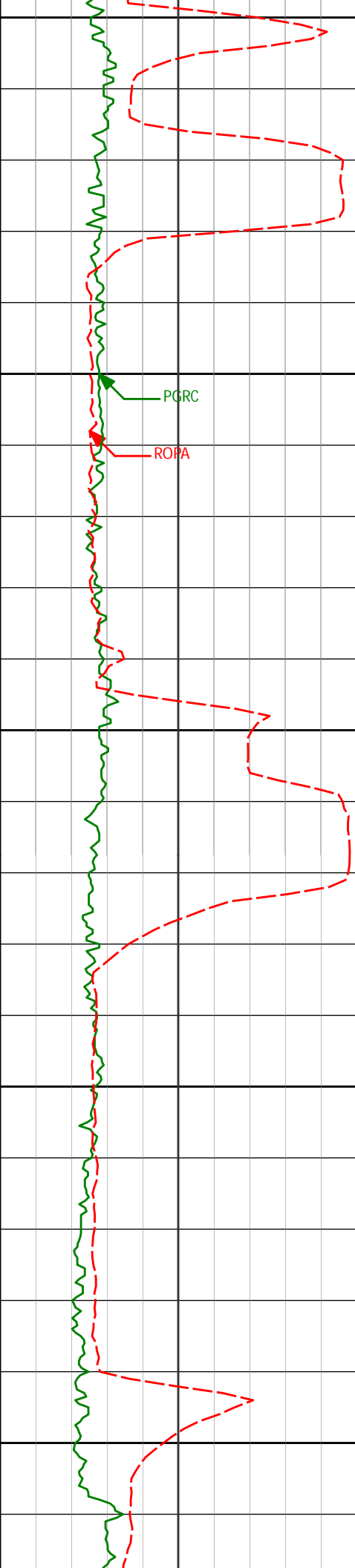
13085'

89.51°

87.78°

6625.29'

6720.59'



13150

13180'

89.88°

88.35°

6625.79'

6815.59'

13200

PGRC

ROPA

13250

13275'

91.32°

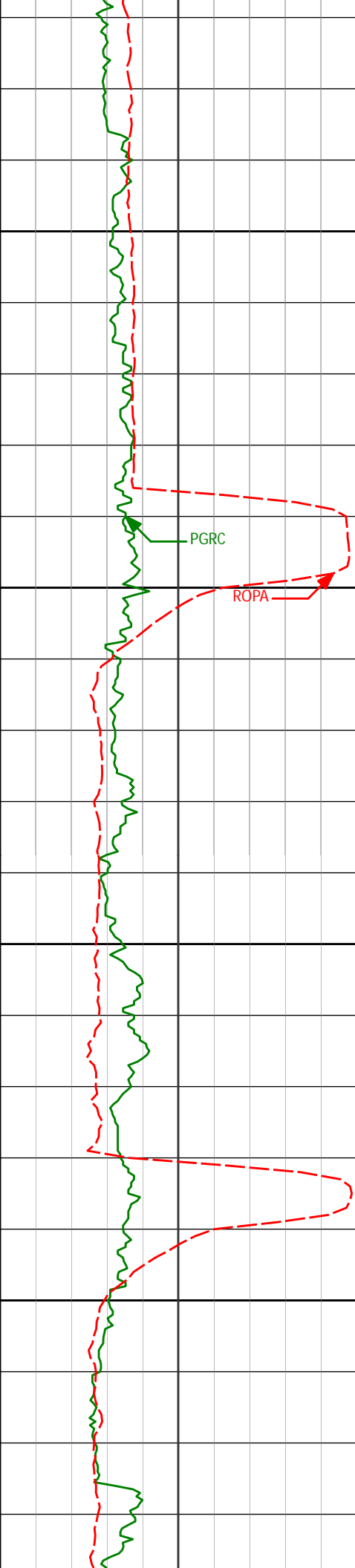
89.68°

6624.80'

6910.57'

13300

13350



13400

13450

13500

13550

PGRC

ROPA

13370'

91.97°

89.70°

6622.07'

7005.50'

13465'

89.48°

88.37°

6620.87'

7100.47'

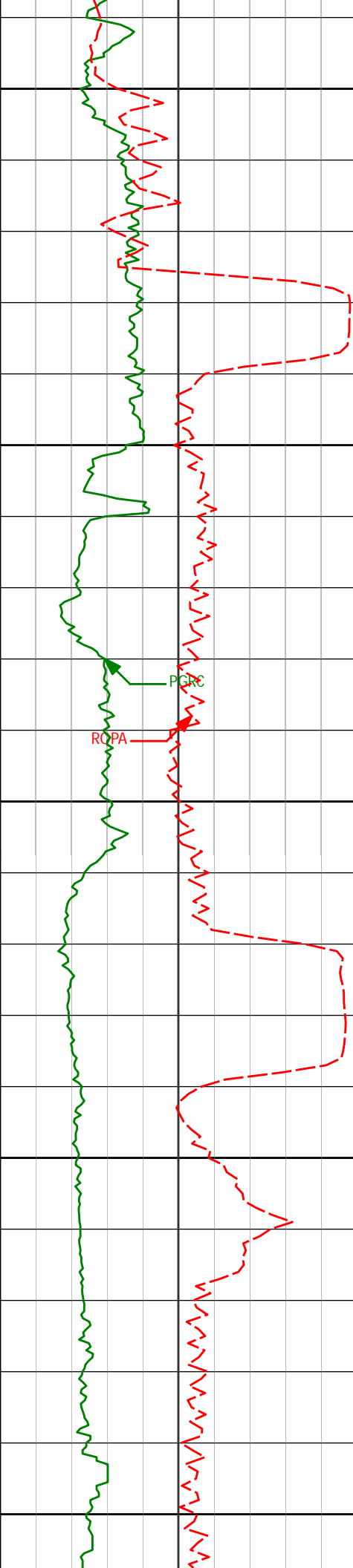
13559'

89.32°

87.53°

6621.85'

7194.47'



13600

13650

13700

13750

13800

13654'

89.85°

87.89°

6622.54'

7289.46'

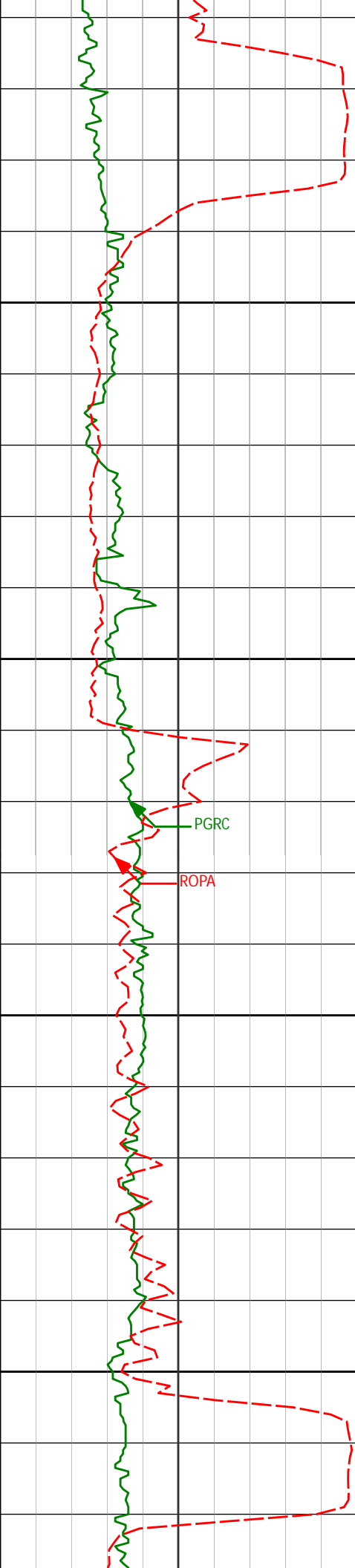
13749'

90.68°

87.94°

6622.10'

7384.46'



13850

13900

13950

14000

13844'

91.51°

90.12°

6620.28'

7479.42'

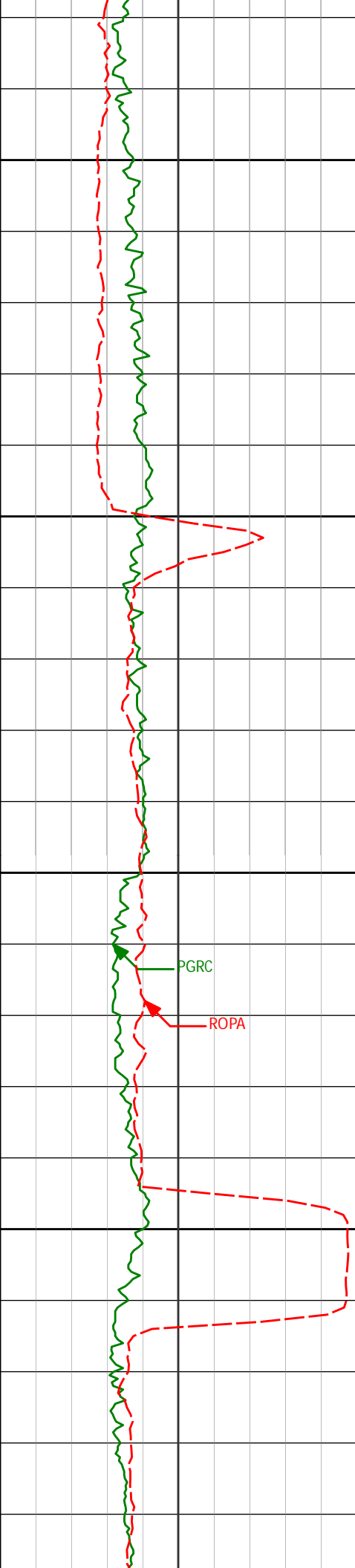
13939'

90.49°

89.10°

6618.63'

7574.38'



14050

14100

14150

14200

14034'

90.43°

90.56°

6617.86'

7669.33'

14129'

89.88°

88.54°

6617.61'

7764.30'

14224'

89.32°

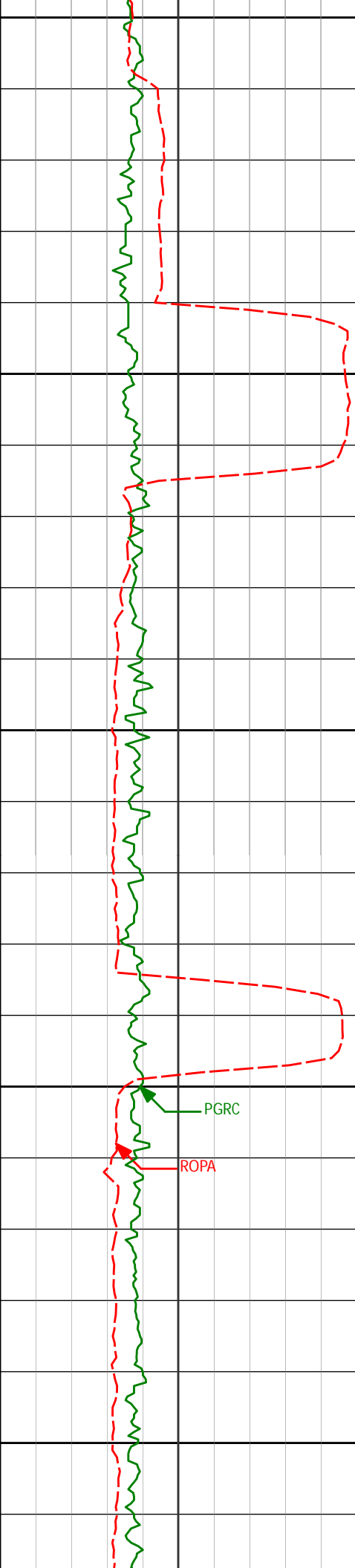
88.56°

6618.27'

7859.30'

PGRC

ROPA



14250

14300

14350

14400

14450

14319'

91.05°

89.69°

6617.96'

7954.28'

14413'

90.15°

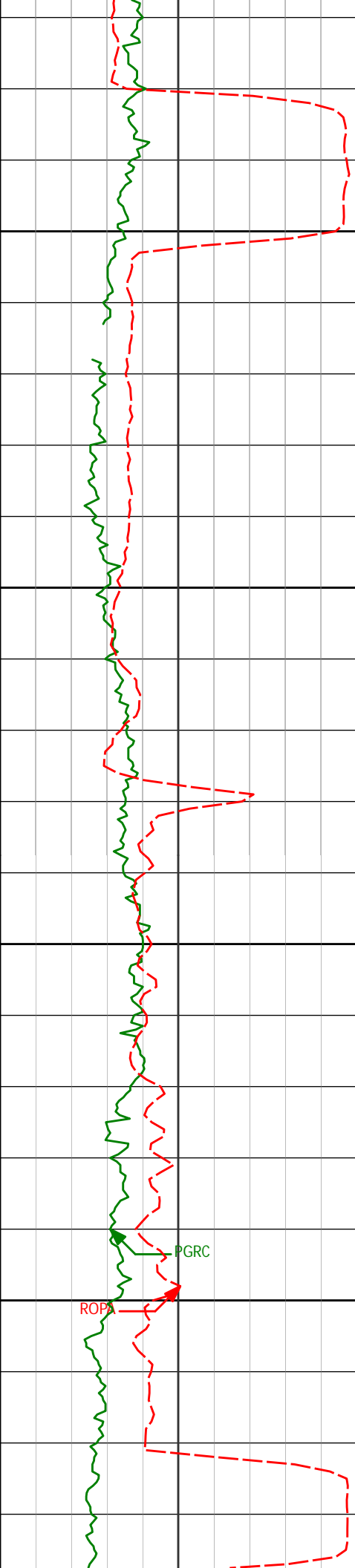
89.33°

6616.98'

8048.25'

PGRC

ROPA



14500

14508'

92.13°

88.22°

6615.09'

8143.22'

14550

14600

14603'

92.62°

87.67°

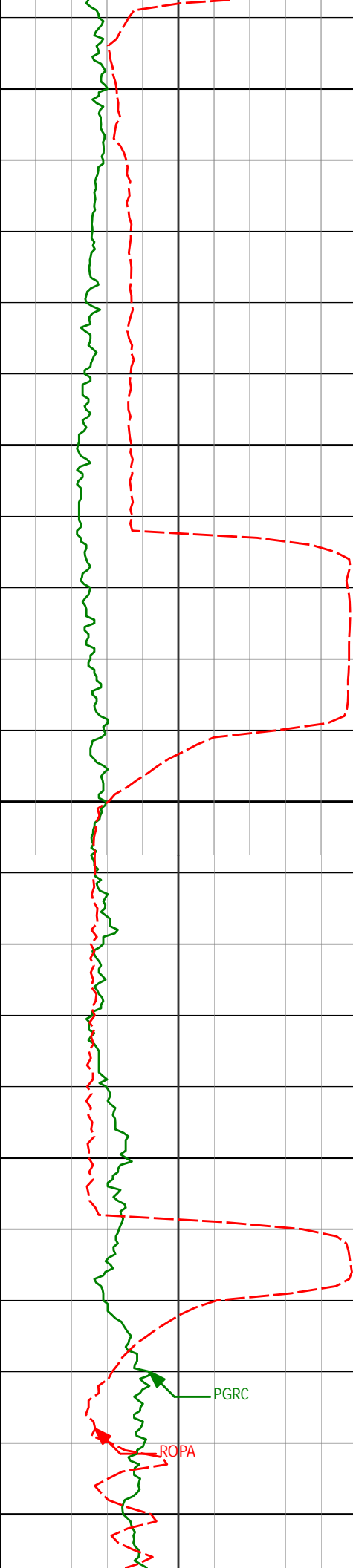
6611.15'

8238.14'

14650

ROPA

PGRC



14700

14750

14800

14850

14900

14698'

90.86°

87.56°

6608.27'

8333.08'

14793'

90.15°

89.57°

6607.43'

8428.07'

14887'

89.51°

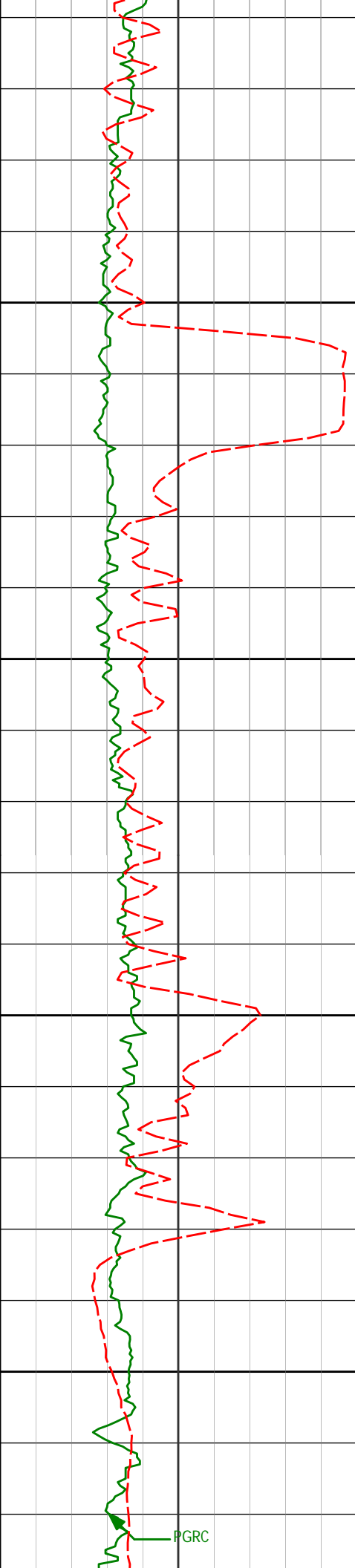
88.86°

6607.71'

8522.06'

PGRC

ROPA



14950

14982'

90.99°

90.00°

6607.29'

8617.03'

15000

15050

15077'

91.20°

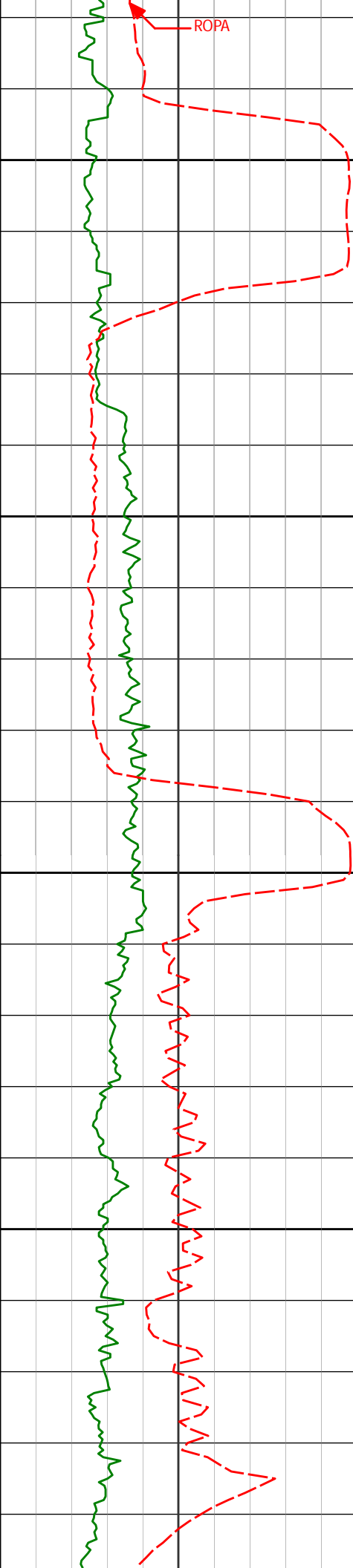
88.41°

6605.48'

8712.00'

15100

PGRC



15150

15172'

90.46°

88.52°

6604.10'

8806.98'

15200

15250

15267'

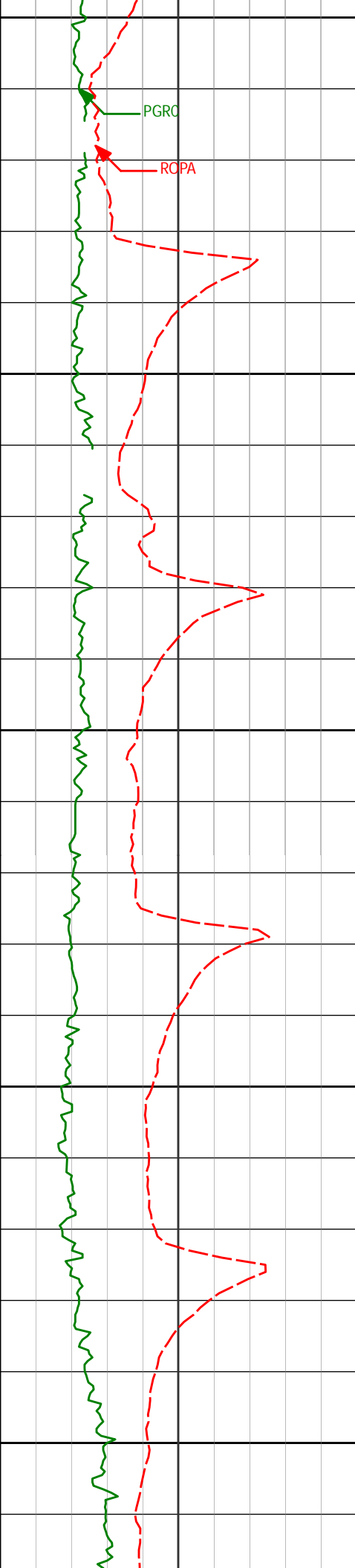
90.28°

90.69°

6603.49'

8901.95'

15300



15350

15362'

90.46°

89.83°

6602.88'

8996.88'

15400

15450

15457'

91.42°

90.00°

6601.32'

9091.83'

15500

15550

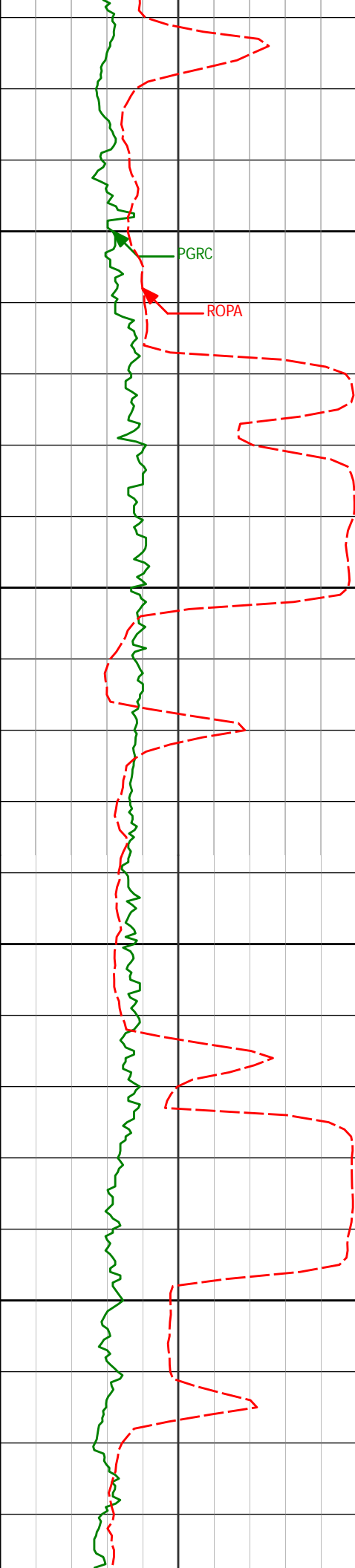
15551'

92.87°

90.05°

6597.80'

9185.71'



15600

PGRC

ROPA

15650

15646'

91.82°

88.73°

6593.91'

9280.61'

15700

15741'

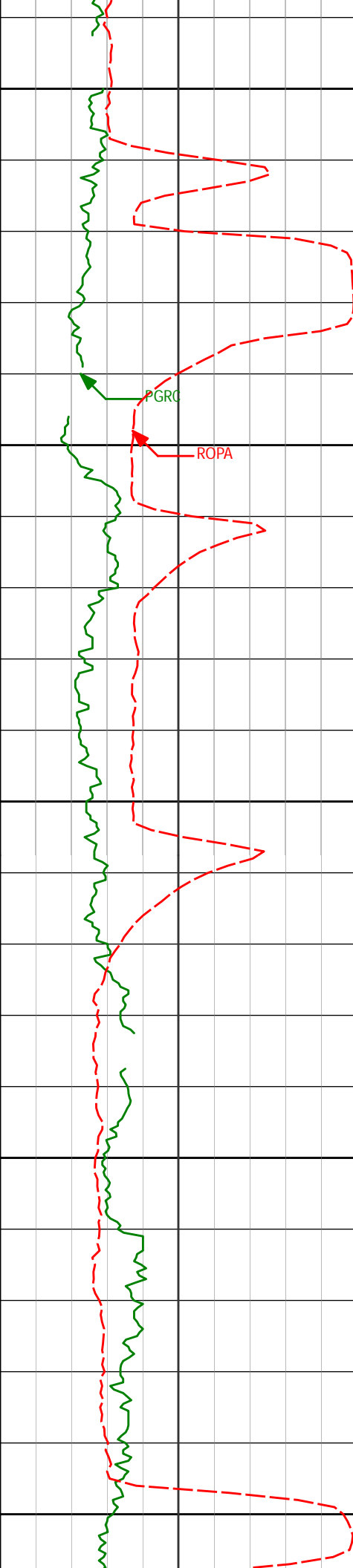
88.58°

88.05°

6593.58'

9375.59'

15750



15800

15836'

88.36°

89.30°

6596.12'

9470.56'

15850

15900

15931'

88.37°

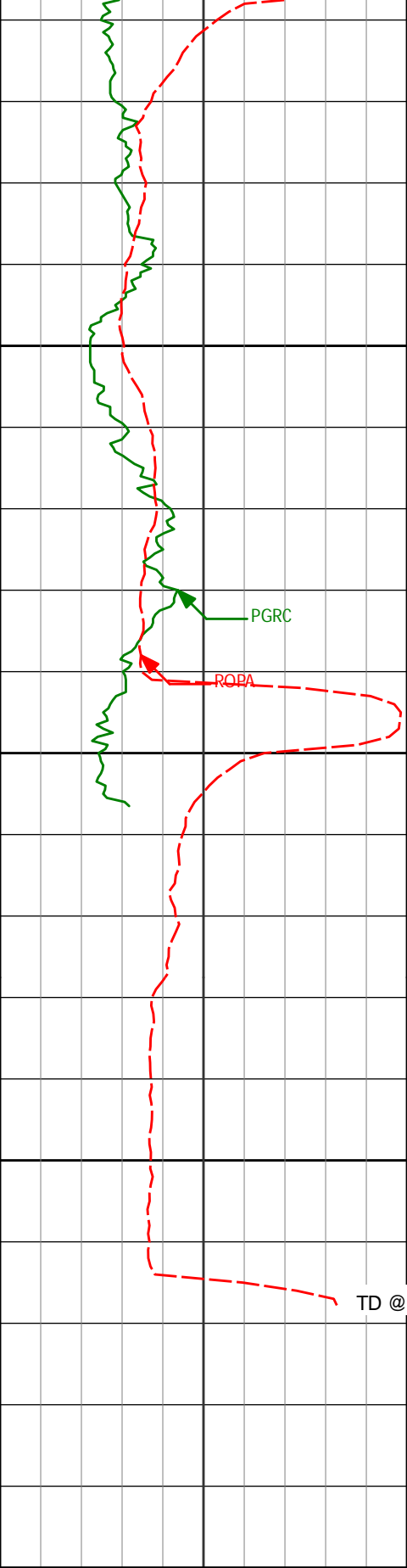
88.52°

6598.83'

9565.51'

15950

16000



16026' 87.78° 88.20° 6602.02' 9660.46'

16098' 87.78° 88.33° 6604.81' 9732.40'

16165' 87.78° 88.33° 6607.40' 9799.35'

<div><div>Avg Rate of Penetration</div><div>ROPA</div><div>feet per hr</div></div>		Depth ft					
<div><div>PCG Gamma Ray</div><div>PGRC</div><div>api</div></div>			Depth	Inc.	Azi.	TVD	V.S.

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
NCLP PC AA04-65-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900859736

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
249.00	0.60	151.83	249.00	1.15 S	0.62 E	0.58	0.24
529.00	0.40	317.43	528.99	1.72 S	0.65 E	0.59	0.35
758.00	0.60	24.73	757.98	0.04 S	0.61 E	0.61	0.25
904.00	0.62	334.31	903.98	1.36 N	0.58 E	0.63	0.36
997.00	0.74	352.79	996.97	2.41 N	0.29 E	0.37	0.27
1090.00	0.65	14.56	1089.96	3.52 N	0.35 E	0.46	0.30
1183.00	0.83	13.67	1182.96	4.68 N	0.64 E	0.79	0.19
1276.00	1.05	353.93	1275.94	6.18 N	0.71 E	0.90	0.42
1370.00	1.00	338.23	1369.93	7.80 N	0.31 E	0.56	0.30
1463.00	0.53	9.35	1462.92	8.98 N	0.08 E	0.36	0.66
1556.00	0.98	327.36	1555.91	10.07 N	0.28 W	0.04	0.74
1648.00	1.02	326.62	1647.90	11.42 N	1.15 W	-0.79	0.05
1743.00	0.97	351.50	1742.89	12.92 N	1.74 W	-1.33	0.45
1838.00	0.72	333.19	1837.87	14.25 N	2.12 W	-1.68	0.38
1933.00	0.77	23.14	1932.87	15.37 N	2.14 W	-1.66	0.66
2027.00	1.18	346.66	2026.85	16.89 N	2.12 W	-1.59	0.77
2122.00	1.32	6.49	2121.83	18.93 N	2.22 W	-1.63	0.48
2216.00	1.04	27.71	2215.81	20.76 N	1.70 W	-1.05	0.55
2311.00	0.78	27.26	2310.80	22.10 N	1.00 W	-0.31	0.27
2406.00	1.19	19.16	2405.79	23.61 N	0.38 W	0.35	0.45
2500.00	3.08	349.24	2499.72	27.01 N	0.53 W	0.31	2.27
2595.00	4.81	340.14	2594.49	33.26 N	2.36 W	-1.32	1.93
2690.00	5.97	340.38	2689.07	41.66 N	5.38 W	-4.07	1.22
2784.00	8.04	347.02	2782.36	52.68 N	8.49 W	-6.84	2.36
2879.00	9.18	348.56	2876.29	66.58 N	11.49 W	-9.40	1.22
2974.00	11.07	349.40	2969.81	82.97 N	14.67 W	-12.07	2.00
3069.00	11.01	357.11	3063.06	101.00 N	16.81 W	-13.64	1.55
3164.00	8.47	1.81	3156.68	117.05 N	17.04 W	-13.38	2.80
3259.00	6.35	1.67	3250.88	129.30 N	16.67 W	-12.62	2.23
3354.00	3.80	354.72	3345.50	137.69 N	16.80 W	-12.50	2.76
3448.00	1.83	5.08	3439.39	142.28 N	16.96 W	-12.51	2.16
3543.00	0.31	151.83	3534.37	143.57 N	16.70 W	-12.21	2.21
3638.00	0.33	261.59	3629.37	143.30 N	16.85 W	-12.37	0.55
3733.00	0.68	229.02	3724.37	142.89 N	17.55 W	-13.08	0.46
3828.00	1.19	205.05	3819.35	141.63 N	18.39 W	-13.96	0.67
3923.00	1.26	222.87	3914.33	139.97 N	19.52 W	-15.14	0.41
4018.00	0.15	6.77	4009.33	139.33 N	20.22 W	-15.85	1.46
4112.00	0.39	301.92	4103.32	139.62 N	20.47 W	-16.10	0.38
4207.00	0.54	33.37	4198.32	140.16 N	20.50 W	-16.11	0.71
4301.00	2.04	85.30	4292.30	140.67 N	18.59 W	-14.19	1.87
4396.00	1.59	53.75	4387.25	141.59 N	15.84 W	-11.41	1.13
4491.00	0.35	38.27	4482.24	142.60 N	14.60 W	-10.14	1.32
4586.00	0.63	0.54	4577.23	143.35 N	14.41 W	-9.93	0.43
4681.00	1.05	11.47	4672.22	144.72 N	14.24 W	-9.71	0.47
4776.00	0.09	8.29	4767.22	145.65 N	14.05 W	-9.50	1.01
4871.00	0.23	6.69	4862.22	145.91 N	14.02 W	-9.45	0.15
4966.00	0.31	60.68	4957.22	146.23 N	13.77 W	-9.20	0.27
5060.00	0.31	340.67	5051.21	146.59 N	13.64 W	-9.05	0.42
5154.00	0.37	164.80	5145.21	146.54 N	13.64 W	-9.06	0.72
5248.00	0.68	184.93	5239.21	145.69 N	13.61 W	-9.05	0.38
5343.00	0.72	103.31	5334.21	144.99 N	13.08 W	-8.54	0.96
5437.00	1.15	112.28	5428.19	144.50 N	11.63 W	-7.11	0.48
5532.00	1.37	91.24	5523.17	144.11 N	9.61 W	-5.10	0.54
5627.00	0.93	108.05	5618.15	143.85 N	7.74 W	-3.25	0.58

5722.00	0.74	98.43	5713.14	143.52 N	6.40 W	-1.92	0.25
5843.00	0.47	131.12	5834.13	143.08 N	5.26 W	-0.78	0.35
5960.00	2.77	90.26	5951.08	142.75 N	2.07 W	2.39	2.08
6007.00	5.86	88.34	5997.94	142.81 N	1.47 E	5.93	6.58
6055.00	8.25	87.93	6045.58	143.01 N	7.36 E	11.82	4.98
6101.00	9.40	88.64	6091.03	143.22 N	14.41 E	18.88	2.51
6149.00	12.60	92.69	6138.14	143.06 N	23.56 E	28.02	6.85
6196.00	17.29	92.09	6183.54	142.57 N	35.67 E	40.11	9.98
6244.00	23.46	86.60	6228.52	142.88 N	52.36 E	56.79	13.44
6290.00	28.31	85.25	6269.89	144.32 N	72.38 E	76.85	10.62
6338.00	30.16	85.28	6311.78	146.26 N	95.74 E	100.26	3.85
6384.00	33.77	87.59	6350.80	147.75 N	120.04 E	124.60	8.28
6432.00	37.62	89.83	6389.77	148.35 N	148.03 E	152.59	8.47
6479.00	43.06	90.73	6425.58	148.19 N	178.44 E	182.98	11.64
6527.00	49.30	89.29	6458.80	148.21 N	213.05 E	217.58	13.18
6573.00	51.99	89.13	6487.97	148.70 N	248.62 E	253.14	5.85
6621.00	52.51	88.35	6517.36	149.53 N	286.56 E	291.09	1.68
6668.00	57.65	88.54	6544.25	150.58 N	325.07 E	329.62	10.94
6716.00	61.20	88.57	6568.67	151.62 N	366.38 E	370.93	7.40
6763.00	63.71	89.91	6590.40	152.17 N	408.04 E	412.60	5.91
6858.00	73.69	90.49	6624.86	151.84 N	496.44 E	500.94	10.52
6906.00	77.49	90.52	6636.81	151.43 N	542.92 E	547.38	7.92
6984.00	80.31	90.89	6651.82	150.49 N	619.45 E	623.84	3.65
7044.00	84.87	88.03	6659.56	151.06 N	678.92 E	683.31	8.95
7139.00	86.51	89.62	6666.70	153.00 N	773.63 E	778.03	2.40
7234.00	86.86	89.33	6672.19	153.87 N	868.46 E	872.84	0.48
7329.00	87.87	88.23	6676.56	155.89 N	963.34 E	967.74	1.57
7424.00	89.97	88.35	6678.35	158.72 N	1058.27 E	1062.71	2.21
7519.00	90.25	84.73	6678.17	164.45 N	1153.08 E	1157.66	3.82
7614.00	91.33	87.53	6676.86	170.87 N	1247.85 E	1252.58	3.16
7708.00	88.86	86.13	6676.70	176.06 N	1341.69 E	1346.54	3.02
7803.00	89.38	89.97	6678.16	179.29 N	1436.61 E	1441.51	4.08
7897.00	93.08	92.41	6676.15	177.34 N	1530.54 E	1535.34	4.71
7992.00	89.91	90.58	6673.67	174.87 N	1625.46 E	1630.13	3.85
8087.00	92.04	90.29	6672.05	174.15 N	1720.44 E	1725.04	2.26
8182.00	90.28	88.97	6670.13	174.76 N	1815.41 E	1819.99	2.32
8277.00	89.35	90.75	6670.43	174.99 N	1910.41 E	1914.94	2.11
8372.00	91.14	90.23	6670.03	174.18 N	2005.40 E	2009.86	1.96
8467.00	91.23	87.91	6668.06	175.72 N	2100.36 E	2104.82	2.44
8562.00	89.91	88.50	6667.12	178.70 N	2195.31 E	2199.82	1.52
8656.00	90.99	90.70	6666.38	179.35 N	2289.29 E	2293.78	2.61
8751.00	90.52	88.54	6665.13	179.98 N	2384.28 E	2388.74	2.33
8846.00	91.23	90.53	6663.68	180.76 N	2479.26 E	2483.69	2.22
8941.00	91.11	88.86	6661.74	181.26 N	2574.23 E	2578.64	1.76
9036.00	90.37	87.83	6660.51	184.00 N	2669.18 E	2673.63	1.33
9131.00	91.51	89.63	6658.95	186.11 N	2764.14 E	2768.61	2.24
9225.00	92.10	90.27	6655.99	186.19 N	2858.10 E	2862.52	0.93
9320.00	90.37	90.48	6653.94	185.57 N	2953.07 E	2957.42	1.83
9415.00	89.88	90.93	6653.74	184.40 N	3048.06 E	3052.33	0.70
9510.00	91.17	89.24	6652.87	184.26 N	3143.05 E	3147.27	2.24
9605.00	91.88	88.97	6650.34	185.74 N	3238.00 E	3242.23	0.80
9700.00	89.88	88.13	6648.88	188.15 N	3332.96 E	3337.21	2.28
9795.00	90.15	87.61	6648.85	191.68 N	3427.89 E	3432.21	0.62
9889.00	91.85	88.79	6647.21	194.63 N	3521.82 E	3526.19	2.20
9984.00	90.71	89.47	6645.09	196.07 N	3616.79 E	3621.15	1.40
10079.00	89.41	87.85	6644.99	198.29 N	3711.76 E	3716.14	2.19
10174.00	89.57	87.75	6645.84	201.94 N	3806.68 E	3811.13	0.20
10269.00	91.39	89.34	6645.04	204.35 N	3901.64 E	3906.12	2.54
10364.00	91.94	88.45	6642.28	206.18 N	3996.58 E	4001.07	1.10
10459.00	91.23	88.45	6639.65	208.75 N	4091.51 E	4096.04	0.75
10551.00	90.25	89.85	6638.47	210.12 N	4183.49 E	4188.01	1.86
10643.00	89.38	91.57	6638.76	208.98 N	4275.48 E	4279.92	2.10
10737.00	90.95	91.84	6638.49	206.18 N	4369.43 E	4373.74	1.69
10828.00	90.19	88.93	6637.59	205.57 N	4460.42 E	4464.66	3.30
10921.00	90.49	87.91	6637.03	208.13 N	4553.38 E	4557.66	1.14
11015.00	90.77	89.18	6636.00	210.52 N	4647.34 E	4651.65	1.38
11107.00	89.69	88.47	6635.63	212.41 N	4739.32 E	4743.64	1.40
11200.00	88.21	88.08	6637.34	215.21 N	4832.26 E	4836.62	1.65
11292.00	88.86	88.43	6639.69	218.01 N	4924.18 E	4928.59	0.80
11385.00	92.04	89.52	6638.96	219.67 N	5017.15 E	5021.57	3.61
11478.00	87.78	86.06	6639.10	223.25 N	5110.05 E	5114.53	5.90
11571.00	87.87	87.94	6642.63	228.12 N	5202.85 E	5207.44	2.02
11664.00	89.72	89.11	6644.59	230.51 N	5295.79 E	5300.41	2.35
11758.00	90.83	87.84	6644.14	233.01 N	5389.75 E	5394.40	1.79
11851.00	91.57	88.13	6642.19	236.28 N	5482.68 E	5487.38	0.85

11944.00	91.45	87.89	6639.74	239.51 N	5575.59 E	5580.35	0.29
12037.00	90.74	88.74	6637.96	242.24 N	5668.53 E	5673.33	1.19
12131.00	90.12	88.78	6637.26	244.28 N	5762.50 E	5767.32	0.66
12226.00	93.21	89.65	6634.50	245.58 N	5857.44 E	5862.25	3.38
12320.00	90.40	88.44	6631.54	247.15 N	5951.37 E	5956.19	3.25
12415.00	91.42	88.76	6630.03	249.47 N	6046.33 E	6051.17	1.13
12510.00	91.42	90.28	6627.67	250.26 N	6141.29 E	6146.11	1.60
12605.00	91.17	92.15	6625.53	248.25 N	6236.24 E	6240.96	1.99
12700.00	89.57	91.39	6624.91	245.31 N	6331.19 E	6335.77	1.86
12800.00	91.02	90.53	6624.40	243.64 N	6431.17 E	6435.65	1.69
12895.00	89.60	89.03	6623.88	244.00 N	6526.17 E	6530.60	2.17
12990.00	89.60	88.66	6624.55	245.92 N	6621.15 E	6625.60	0.39
13085.00	89.51	87.78	6625.29	248.87 N	6716.10 E	6720.59	0.93
13180.00	89.88	88.35	6625.79	252.08 N	6811.04 E	6815.59	0.72
13275.00	91.32	89.68	6624.80	253.71 N	6906.02 E	6910.57	2.06
13370.00	91.97	89.70	6622.07	254.22 N	7000.97 E	7005.50	0.68
13465.00	89.48	88.37	6620.87	255.82 N	7095.94 E	7100.47	2.97
13559.00	89.32	87.53	6621.85	259.19 N	7189.88 E	7194.47	0.91
13654.00	89.85	87.89	6622.54	262.98 N	7284.80 E	7289.46	0.67
13749.00	90.68	87.94	6622.10	266.44 N	7379.73 E	7384.46	0.88
13844.00	91.51	90.12	6620.28	268.05 N	7474.70 E	7479.42	2.46
13939.00	90.49	89.10	6618.63	268.69 N	7569.68 E	7574.38	1.52
14034.00	90.43	90.56	6617.86	268.98 N	7664.67 E	7669.33	1.54
14129.00	89.88	88.54	6617.61	269.72 N	7759.66 E	7764.30	2.20
14224.00	89.32	88.56	6618.27	272.13 N	7854.63 E	7859.30	0.59
14319.00	91.05	89.69	6617.96	273.58 N	7949.61 E	7954.28	2.18
14413.00	90.15	89.33	6616.98	274.38 N	8043.60 E	8048.25	1.03
14508.00	92.13	88.22	6615.09	276.41 N	8138.56 E	8143.22	2.39
14603.00	92.62	87.67	6611.15	279.81 N	8233.41 E	8238.14	0.78
14698.00	90.86	87.56	6608.27	283.77 N	8328.28 E	8333.08	1.86
14793.00	90.15	89.57	6607.43	286.14 N	8423.24 E	8428.07	2.24
14887.00	89.51	88.86	6607.71	287.43 N	8517.23 E	8522.06	1.02
14982.00	90.99	90.00	6607.29	288.38 N	8612.22 E	8617.03	1.97
15077.00	91.20	88.41	6605.48	289.69 N	8707.19 E	8712.00	1.69
15172.00	90.46	88.52	6604.10	292.24 N	8802.15 E	8806.98	0.79
15267.00	90.28	90.69	6603.49	292.89 N	8897.14 E	8901.95	2.29
15362.00	90.46	89.83	6602.88	292.46 N	8992.14 E	8996.88	0.92
15457.00	91.42	90.00	6601.32	292.60 N	9087.12 E	9091.83	1.03
15551.00	92.87	90.05	6597.80	292.56 N	9181.05 E	9185.71	1.54
15646.00	91.82	88.73	6593.91	293.57 N	9275.97 E	9280.61	1.77
15741.00	88.58	88.05	6593.58	296.24 N	9370.91 E	9375.59	3.48
15836.00	88.36	89.30	6596.12	298.44 N	9465.85 E	9470.56	1.34
15931.00	88.37	88.52	6598.83	300.25 N	9560.80 E	9565.51	0.82
16026.00	87.78	88.20	6602.02	302.96 N	9655.70 E	9660.46	0.71
16098.00	87.78	88.33	6604.81	305.14 N	9727.62 E	9732.40	0.18
16165.00	87.78	88.33	6607.40	307.09 N	9794.54 E	9799.35	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 88.21 DEGREES (GRID)
A TOTAL CORRECTION OF 7.73 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16165.00 FEET
IS 9799.35 FEET ALONG 88.20 DEGREES (GRID)**

Surveys are tied into three non-Haliburton surveys at MD 249', 529' and 758' taken while drilling the surface section. The final survey is a straight-line projection to bit.