

PCG Pressure Case Gamma PCD Pressure Case Directional

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	27-Jan-14	28-Jan-14	29-Jan-14	31-Jan-14	
Rig Bit Number	2	3	4	5	
Bit Size (in)	8.750	8.750	6.125	6.125	
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	
Log Start Depth (MD, ft)	668.00	6,293.00	7,341.00	7,341.00	
Log End Depth (MD, ft)	6,293.00	7,341.00	7,341.00	11,395.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	26-Jan-14 02:30	27-Jan-14 11:45	29-Jan-14 03:00	29-Jan-14 11:00	
Drill/Wipe End Date and Time	27-Jan-14 01:30	27-Jan-14 23:30	29-Jan-14 05:45	30-Jan-14 16:15	
Min Inc (deg) @ Depth (MD, ft)	0.19 @ 714.00	12.73 @ 6,338.00	0.00 @ 0.00	86.58 @ 7,429.00	
Max Inc (deg) @ Depth (MD, ft)	19.02 @ 3,825.00	79.44 @ 7,288.00	0.00 @ 0.00	92.65 @ 11,331.00	
Bit TFA(in2) / Bit Type	.9073 / PDC	.9817 / PDC	.9817 / PDC	.9817 / PDC	
Flow Rate (gpm)	593.56	566.67	275.00	300.00	
Max AV (fpm) / CV (fpm) @ MWD	417.4 / NA	392.5 / NA	350.0 / NA	461.6 / 400.0	
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.60 / 26.00	9.95 / 35.00	9.50 / 30.00	9.20 / 29.00	
Filtrate CL (ppm)	2,400.00	3,200.00	3,300.00	3,400.00	
pH / Fluid Loss (mptm)	10.80 / 44	9.60 / 10	8.60 / 11	9.90 / 13	
PV (cP) / YP (lbf2)	2 / 3.00	8 / 10.00	4 / 4.00	3 / 4.00	
% Solids / % Sand	1.40 / 3.00	7.90 / 0.20	1.7 / 0.2	3.60 / 0.15	
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95	0 / 0:95	0 / 0:95	
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Max Tool Temp (degF) / S	125.00 / PDM	125.00 / PDM	75.00 / PDM	222.00 / PDM	

Max Tool Temp (degF) / Source	167.97 / PCM	167.97 / PCM	75.00 / PCM	230.30 / PCM	
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Lead MWD Engineer	Brett Vandergon	Brett Vandergon	Brett Vandergon	Brett Vandergon	
Customer Representative	Johnny Sanchez	Johnny Sanchez	Matt Settles	Matt Settles	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.84	5.84	5.84	5.84	
Sub Serial Number	11341330	11341330	12310743	12310743	
Insert Serial Number	10997273	10997273	11227486	10997273	
Date and Time Initialized	25-Jan-14 13:29	01-Jan-70 00:00	28-Jan-14 11:59	29-Jan-14 05:29	
Date and Time Read	28-Jan-14 06:00	28-Jan-14 06:06	29-Jan-14 07:01	31-Jan-14 03:30	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	55.00	53.00	59.00	64.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341330	11341330	12310743	12310743	
Sonde Serial Number	11477956	11477956	11478086	11477956	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	186.67	347.72	234.95	234.95	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	47.99	45.89	62.16	57.38	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	1341330	1341330	12310743	12310743	
Insert/Sonde Serial Number	12037425	12037425	11120589	12037425	

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

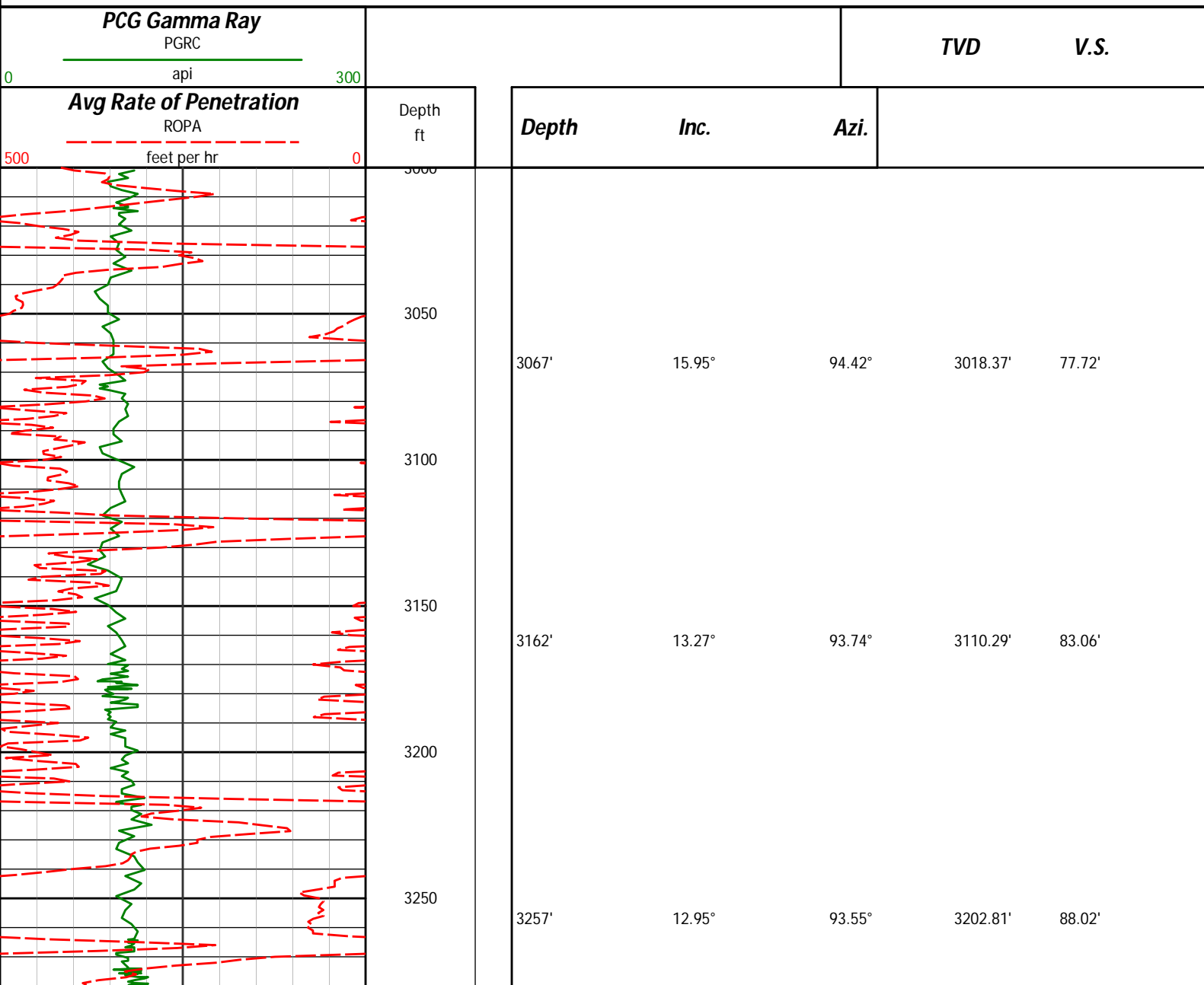
WARRANTY

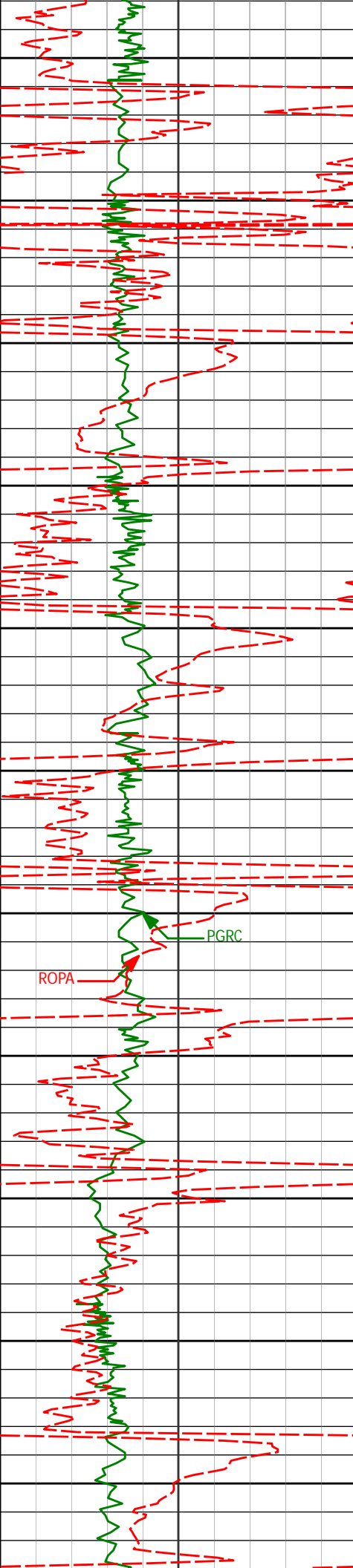
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HALLIBURTON Sperry Drilling Services

MD Main Log 1:600

Noble Energy
Marie D04-72-1HN
H&P 343
T3N-R64W





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3352'

13.79°

96.80°

3295.24'

92.50'

3446'

15.12°

101.32°

3386.26'

95.69'

3541'

15.31°

95.53°

3477.94'

99.40'

3636'

16.49°

96.39°

3569.30'

104.37'

3731'

15.33°

95.04°

3660.66'

109.45'

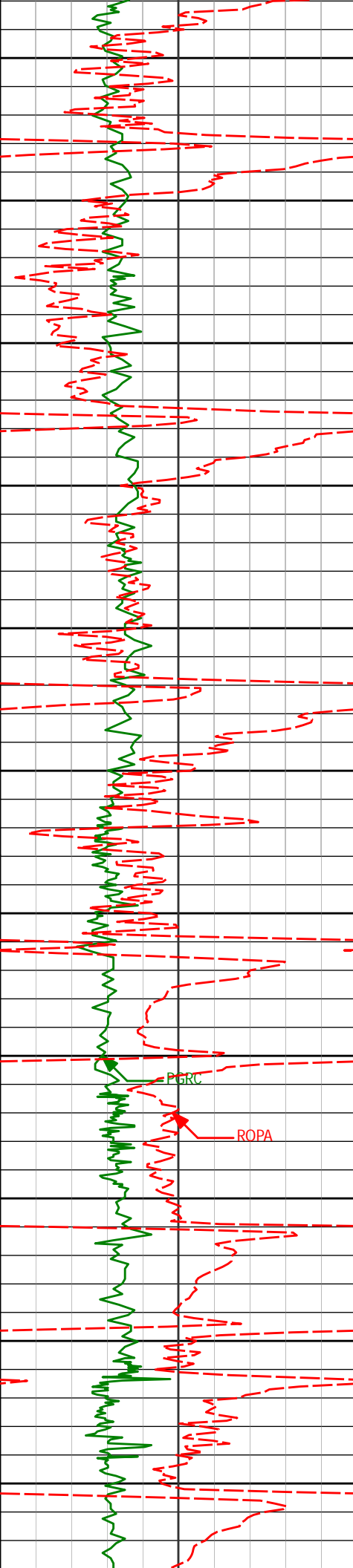
3825'

19.02°

96.50°

3750.45'

114.81'



3850

3900

3950

4000

4050

4100

4150

4200

4250

4300

4350

3920'

18.94°

96.03°

3840.29'

120.55'

4015'

16.01°

94.73°

3930.89'

126.26'

4110'

13.31°

94.12°

4022.79'

131.48'

4205'

14.99°

97.22°

4114.91'

135.99'

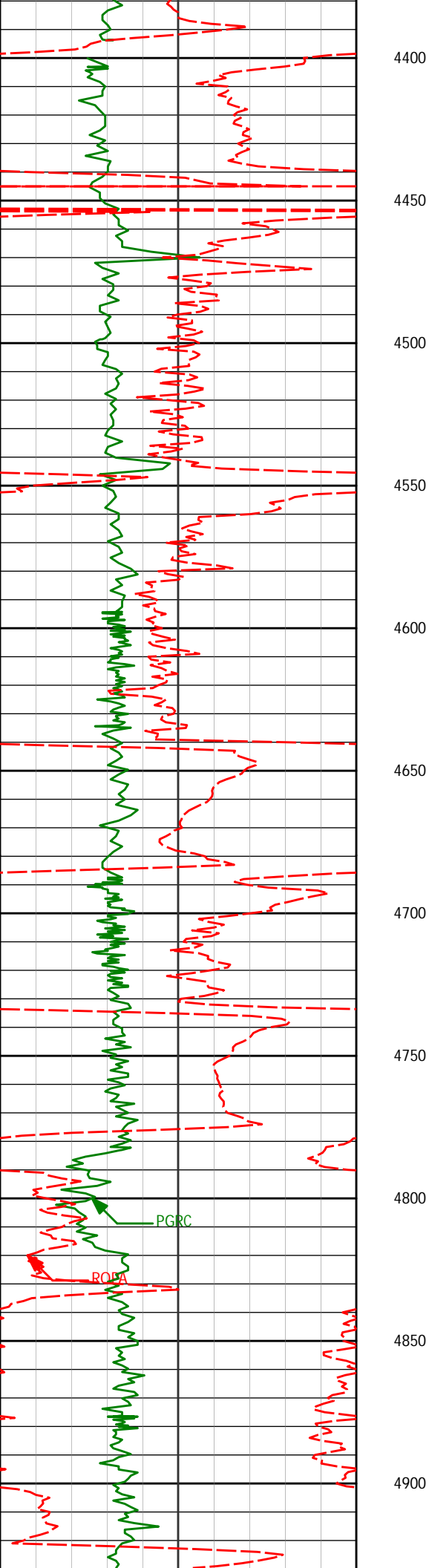
4300'

15.18°

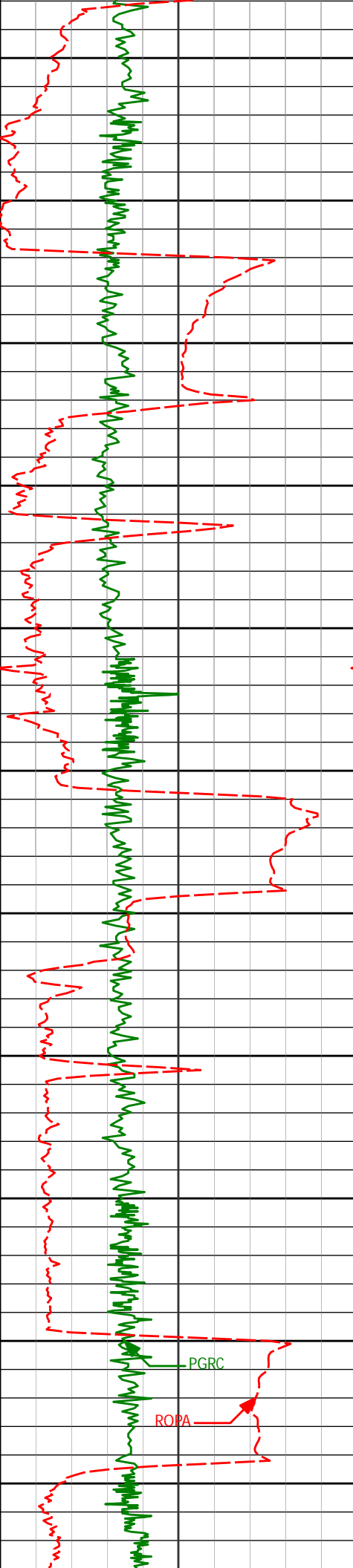
93.79°

4206.64'

140.92'



4395'	16.11°	96.35°	4298.12'	146.19'
4490'	15.53°	95.39°	4389.52'	151.17'
4585'	13.97°	93.03°	4481.39'	156.50'
4679'	14.76°	98.72°	4572.45'	160.95'
4774'	15.99°	96.08°	4664.05'	165.16'
4869'	15.75°	92.32°	4755.43'	170.90'



4950

4964'

13.86°

93.36°

4847.27'

176.85'

5000

5050

5059'

16.94°

94.23°

4938.85'

182.58'

5100

5150

5154'

16.77°

92.49°

5029.77'

189.07'

5200

5250

5248'

15.99°

98.58°

5119.96'

194.35'

5300

5350

5343'

13.60°

98.22°

5211.81'

197.96'

5400

PGRC

ROPA

5450

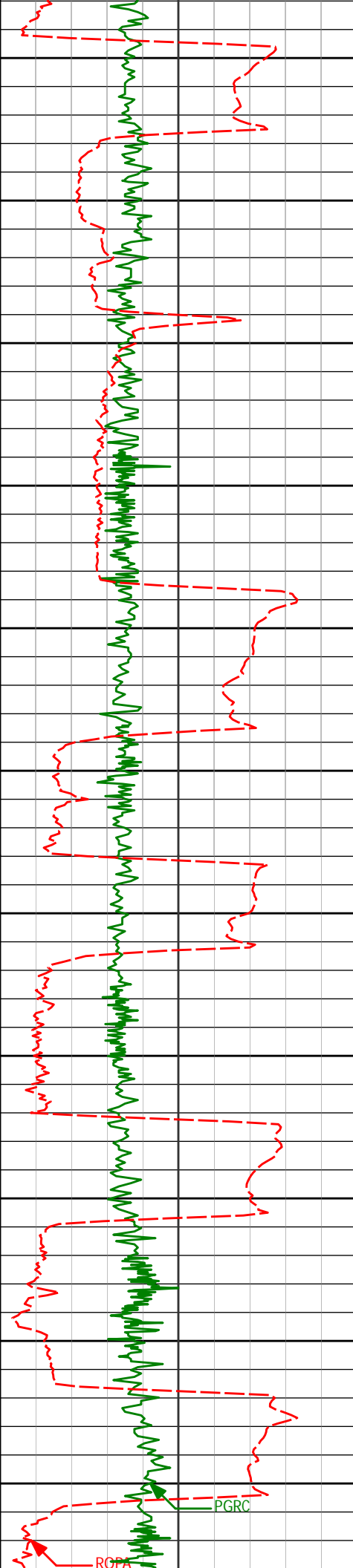
5438'

15.36°

97.27°

5303.79'

201.79'



5500

5532'

15.73°

95.12°

5394.35'

206.50'

5550

5600

5627'

12.95°

89.13°

5486.39'

212.41'

5650

5700

5722'

14.36°

95.44°

5578.70'

218.03'

5750

5800

5817'

15.38°

93.30°

5670.52'

223.37'

5850

5900

5912'

15.36°

96.88°

5762.13'

228.55'

5950

6000

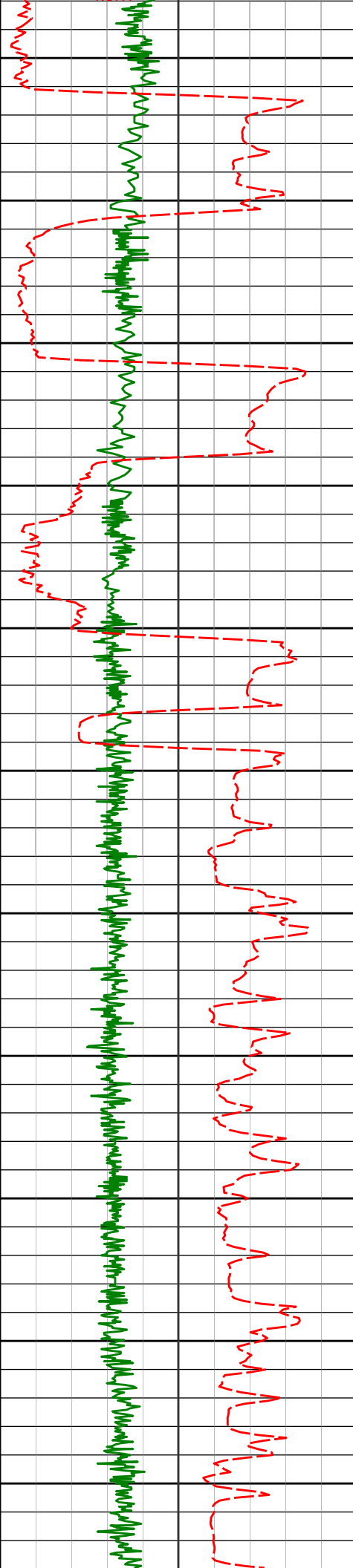
6007'

14.94°

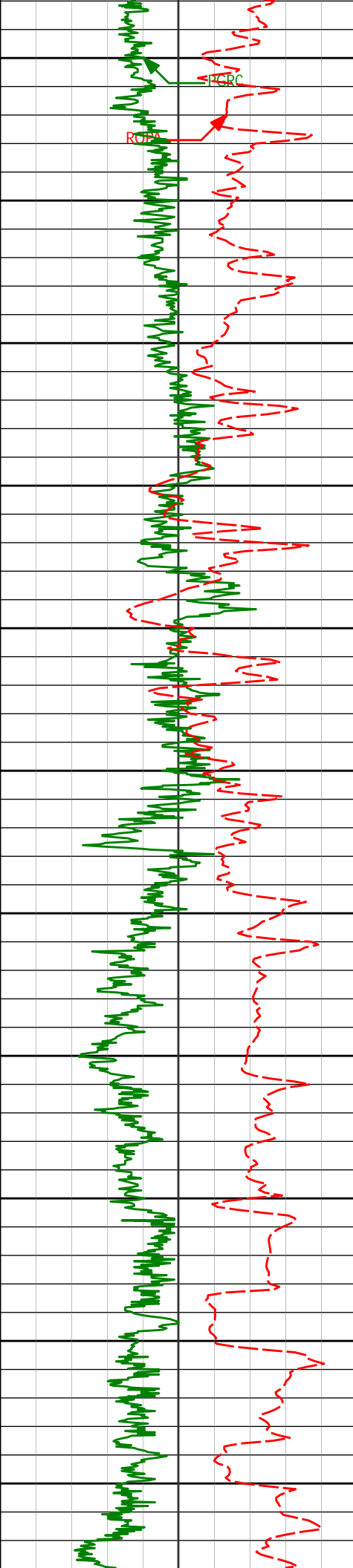
97.26°

5853.83'

232.82'



6050					
6100	6101'	15.63°	98.69°	5944.50'	236.69'
6150					
6200	6196'	15.29°	98.82°	6036.07'	240.32'
6250	6238'	13.61°	95.73°	6076.74'	242.07'
<Run 200> 6300					
6350	6338'	12.73°	90.05°	6174.04'	247.77'
6400	6384'	13.40°	74.50°	6218.86'	252.11'
6450	6432'	15.78°	62.58°	6265.32'	259.67'
6500	6479'	18.00°	55.48°	6310.29'	269.82'
6550	6527'	20.75°	52.63°	6355.57'	282.54'
	6574'	21.90°	48.29°	6399.36'	296.80'



6600

6622'

20.22°

35.03°

6444.18'

312.34'

6650

6668'

21.86°

21.51°

6487.13'

328.44'

6700

6716'

25.92°

15.43°

6531.02'

347.85'

6750

6763'

30.60°

12.82°

6572.41'

370.06'

6800

6850

6858'

42.43°

12.81°

6648.62'

426.34'

6900

6906'

49.58°

12.50°

6681.94'

460.75'

6950

6953'

57.43°

12.32°

6709.87'

498.39'

7000

7001'

65.08°

11.59°

6732.94'

540.28'

7050

7048'

68.42°

10.97°

6751.49'

583.24'

7100

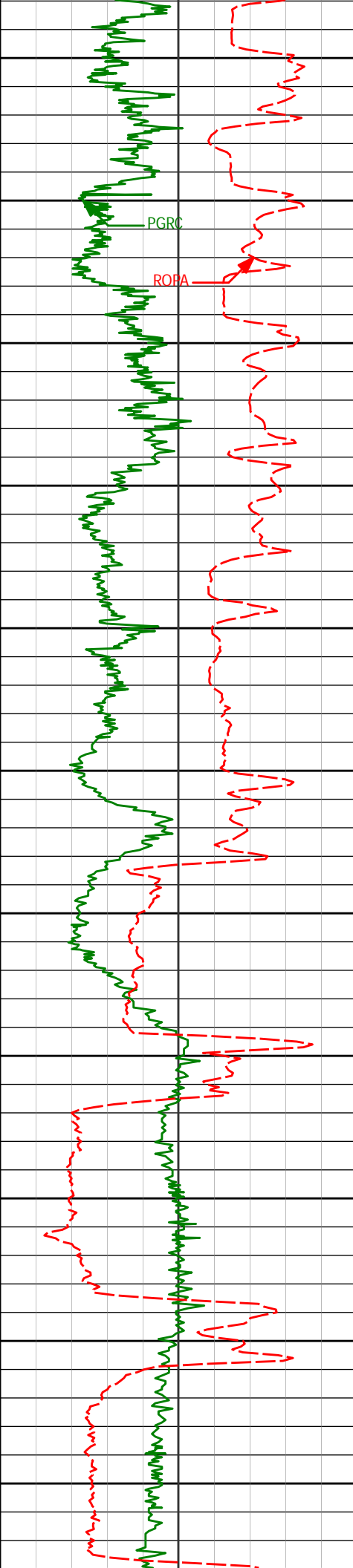
7096'

71.89°

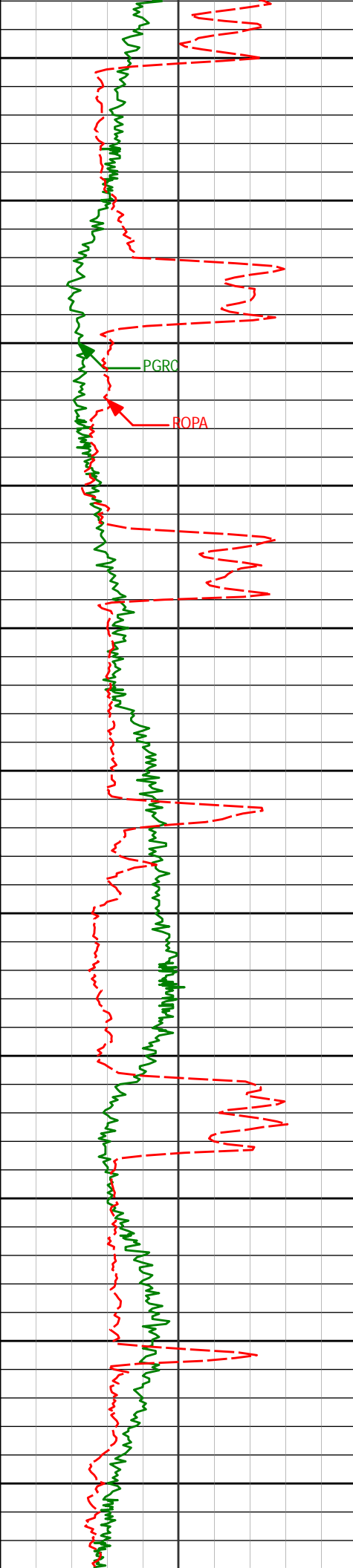
10.12°

6767.78'

628.10'



7150	7143'	74.82°	9.82°	6781.24'	672.79'
7200	7191'	76.42°	8.13°	6793.16'	718.83'
7250	7238'	77.21°	4.84°	6803.89'	763.81'
7300	7288'	79.44°	359.37°	6814.01'	811.11'
<div><div></div><div>Casing Set @ 7,329' MD</div></div> <div><Run 300> <Run 400></div>					
7350					
7400					
7450	7429'	86.58°	356.31°	6831.17'	943.22'
7500					
7550	7522'	90.03°	356.89°	6833.92'	1030.34'
7600					
7650	7613'	89.63°	357.13°	6834.19'	1115.87'



7700

7750

7800

7850

7900

7950

8000

8050

8100

8150

8200

7708'

89.82°

358.96°

6834.65'

1205.73'

7803'

90.62°

0.84°

6834.29'

1296.53'

7898'

89.20°

0.90°

6834.44'

1387.80'

7993'

90.74°

1.68°

6834.49'

1479.25'

8088'

89.17°

359.68°

6834.56'

1570.43'

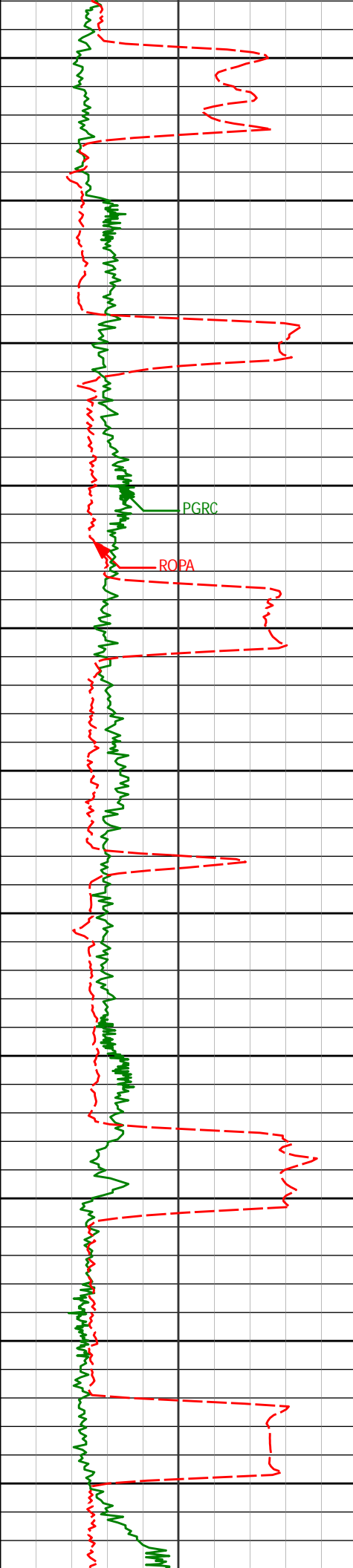
8183'

91.08°

359.40°

6834.36'

1661.06'



8250

8277'

90.31°

1.11°

6833.22'

1751.07'

8300

8350

8372'

90.90°

0.17°

6832.22'

1842.23'

8400

PGRC

ROPA

8450

8467'

89.35°

1.15°

6832.01'

1933.40'

8500

8550

8562'

91.57°

1.59°

6831.25'

2024.88'

8600

8650

8657'

90.22°

1.08°

6829.76'

2116.35'

8700

8750

8751'

88.80°

0.50°

6830.57'

2206.62'



8800

8850

8900

8950

9000

9050

9100

9150

9200

9250

9300

8846'

88.70°

357.88°

6832.64'

2297.04'

8941'

89.97°

358.04°

6833.74'

2386.85'

9036'

91.76°

357.85°

6832.31'

2476.64'

9131'

91.20°

359.01°

6829.85'

2566.68'

9226'

89.26°

359.36°

6829.47'

2657.12'

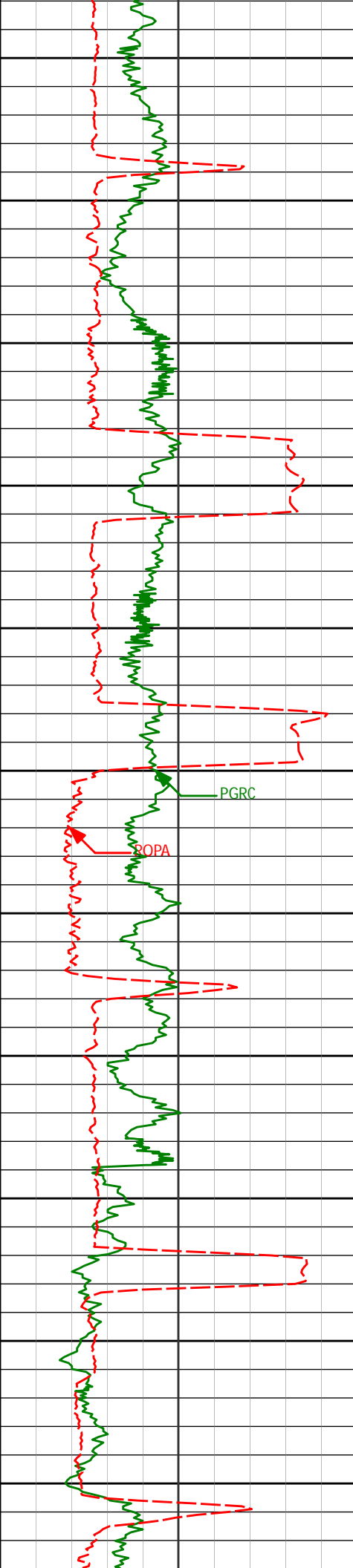
9321'

90.12°

359.31°

6829.98'

2747.65'



9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9416'

91.60°

358.97°

6828.55'

2838.07'

9510'

90.52°

0.22°

6826.81'

2927.76'

9605'

89.54°

0.27°

6826.75'

3018.73'

9700'

90.46°

0.68°

6826.75'

3109.82'

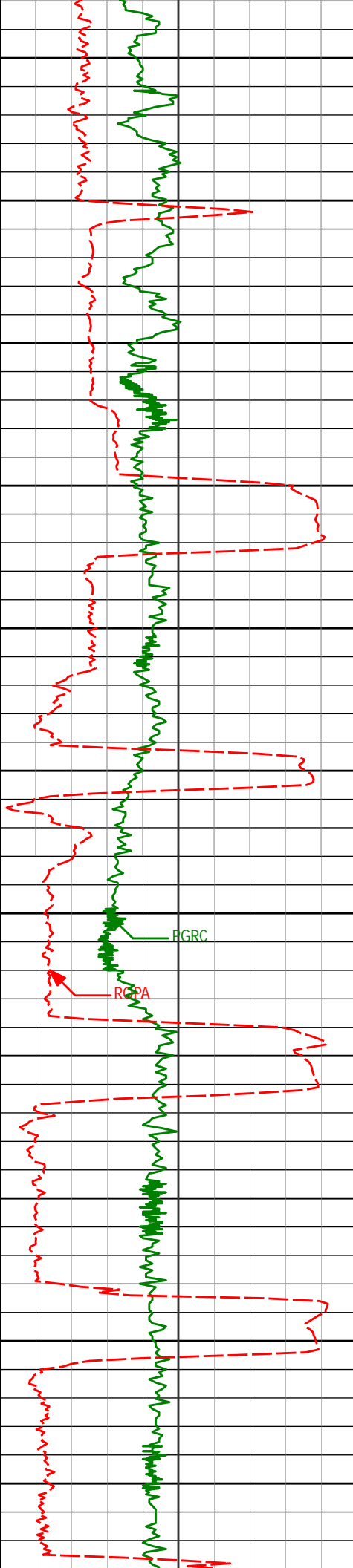
9794'

89.60°

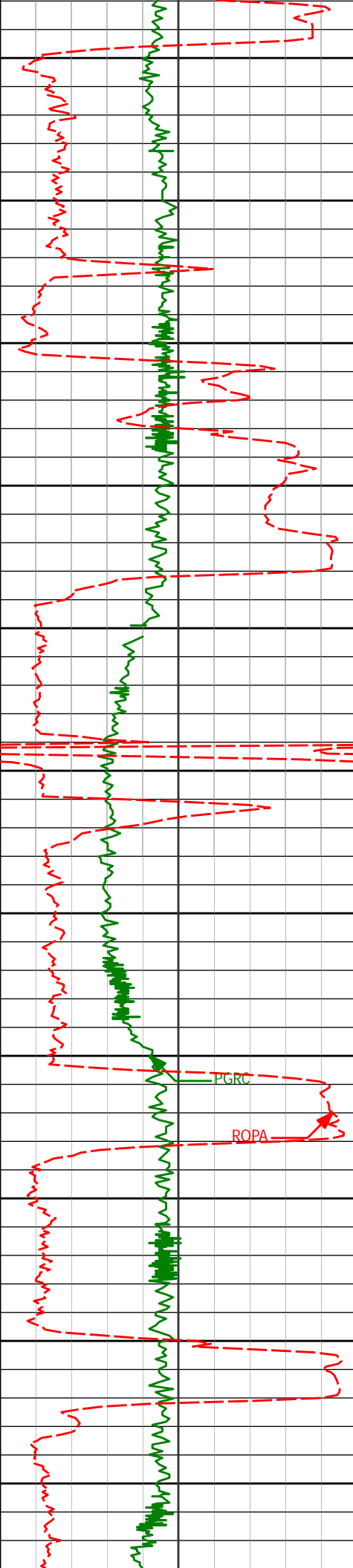
359.57°

6826.70'

3199.78'



9889'	90.31°	359.66°	6826.78'	3290.44'
9900				
9950				
9984'	91.48°	359.25°	6825.30'	3381.02'
10000				
10050				
10078'	90.86°	359.72°	6823.38'	3470.65'
10100				
10150				
10173'	90.99°	359.51°	6821.84'	3561.31'
10200				
10250				
10267'	90.46°	0.42°	6820.65'	3651.19'
10300				
10350				
10362'	89.91°	0.62°	6820.35'	3742.30'
10400				



10450

10500

10550

10600

10650

10700

10750

10800

10850

10900

10950

10456'

89.11°

0.73°

6821.16'

3832.51'

10551'

90.18°

0.25°

6821.74'

3923.60'

10646'

89.69°

0.01°

6821.85'

4014.52'

10741'

91.66°

0.29°

6820.72'

4105.44'

10836'

90.86°

358.86°

6818.63'

4196.06'

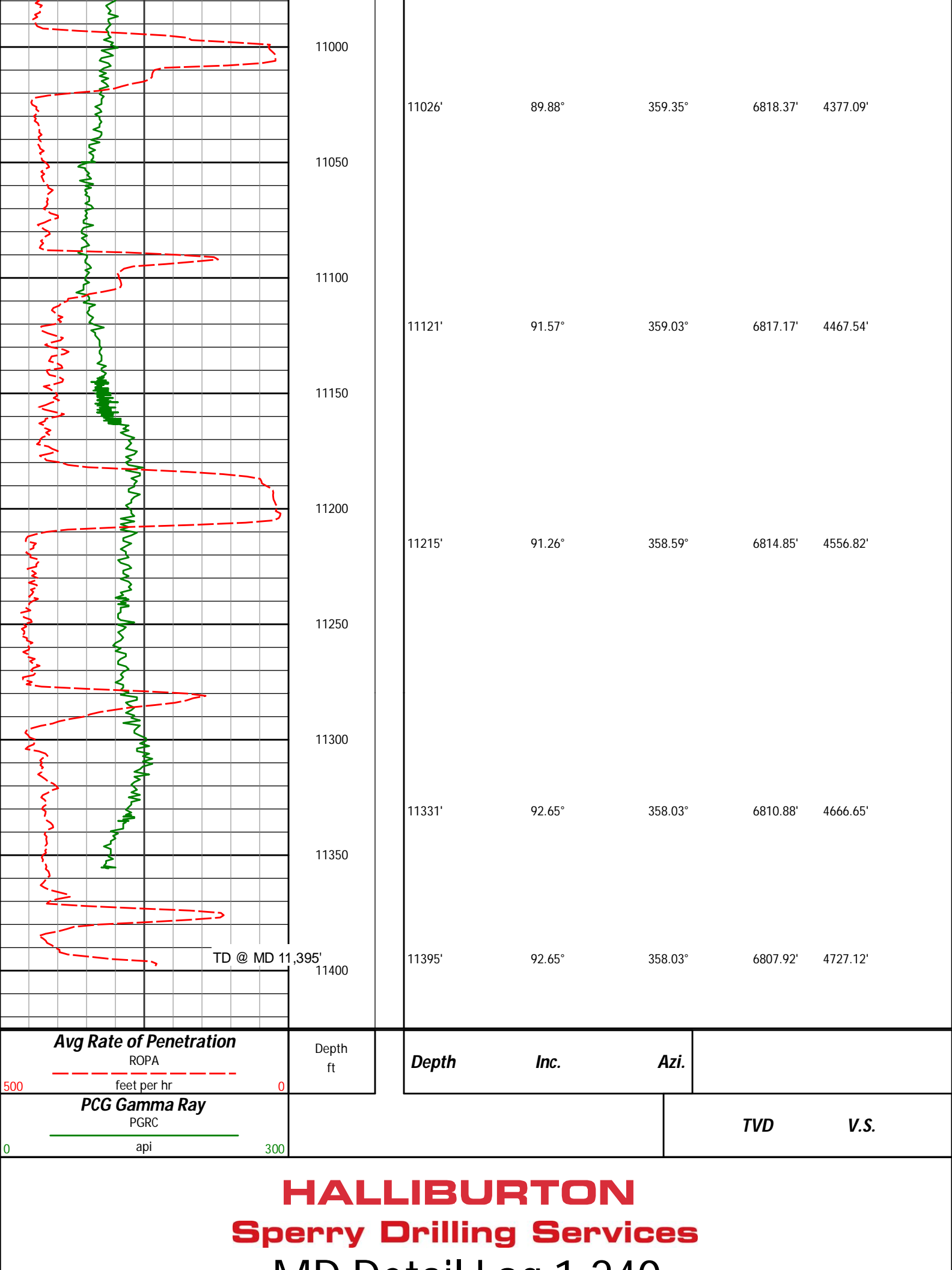
10931'

89.78°

359.50°

6818.09'

4286.51'



Avg Rate of Penetration

ROPA

feet per hr

500

0

PCG Gamma Ray

PGRC

api

0

300

Depth
ft

Depth

Inc.

Azi.

TVD

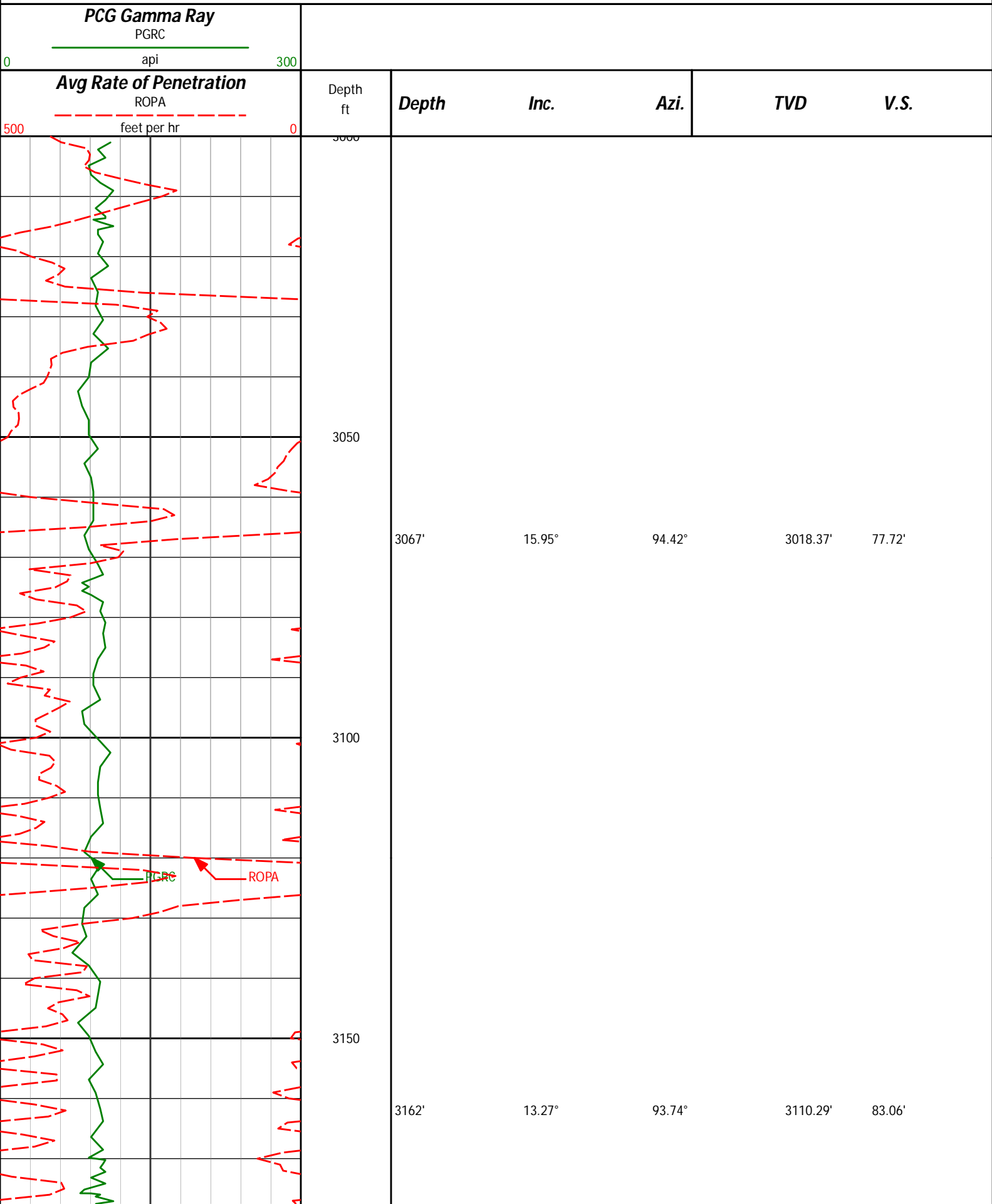
V.S.

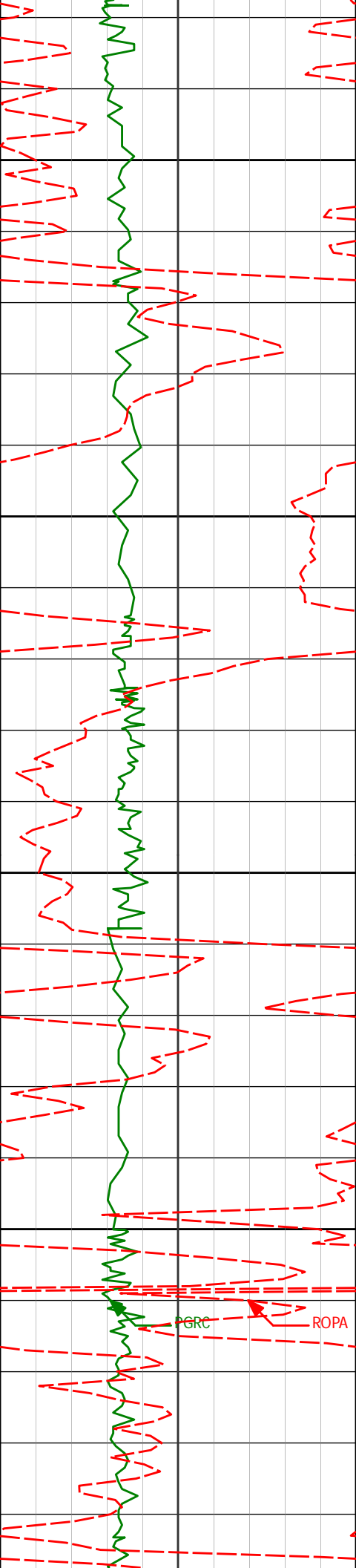
HALLIBURTON
Sperry Drilling Services

MD Detail Log 1-240

MD Detail Log T:240

Noble Energy
Marie D04-72-1HN
H&P 343
T3N-R64W





3200

3250

3300

3350

3257'

12.95°

93.55°

3202.81'

88.02'

3352'

13.79°

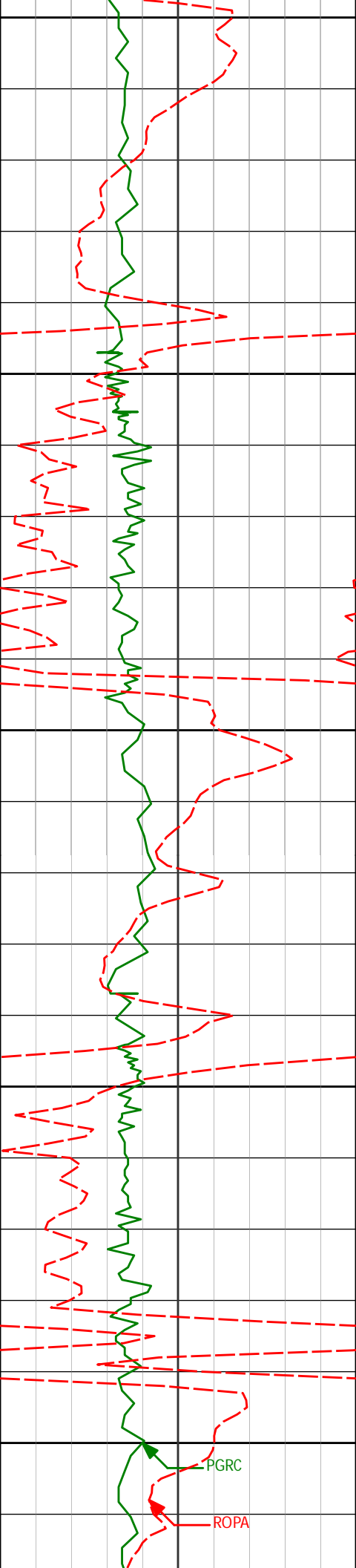
96.80°

3295.24'

92.50'

PGRC

ROPA



3400

3450

3500

3550

3600

3446'

15.12°

101.32°

3386.26'

95.69'

3541'

15.31°

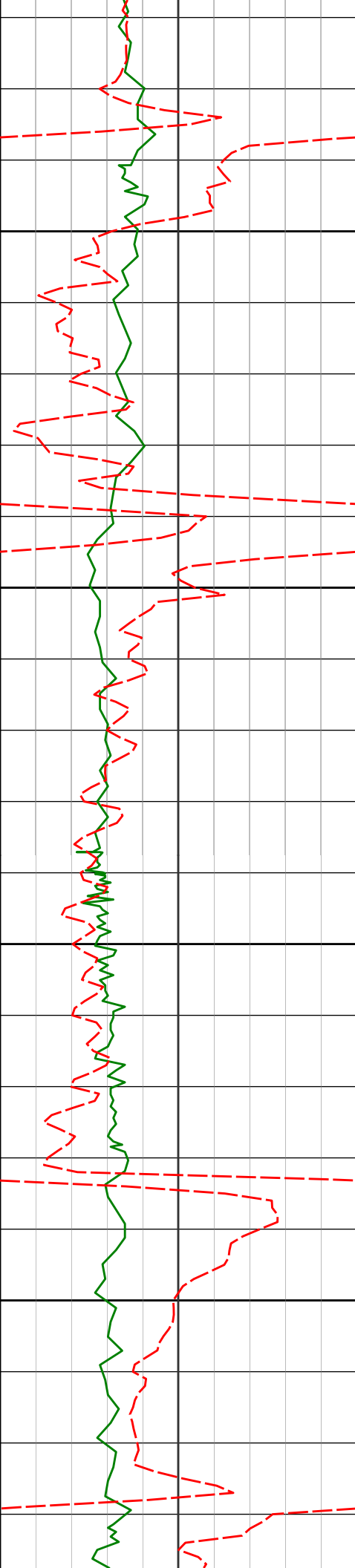
95.53°

3477.94'

99.40'

PGRC

ROPA



3636'

16.49°

96.39°

3569.30'

104.37'

3650

3700

3731'

15.33°

95.04°

3660.66'

109.45'

3750

3800

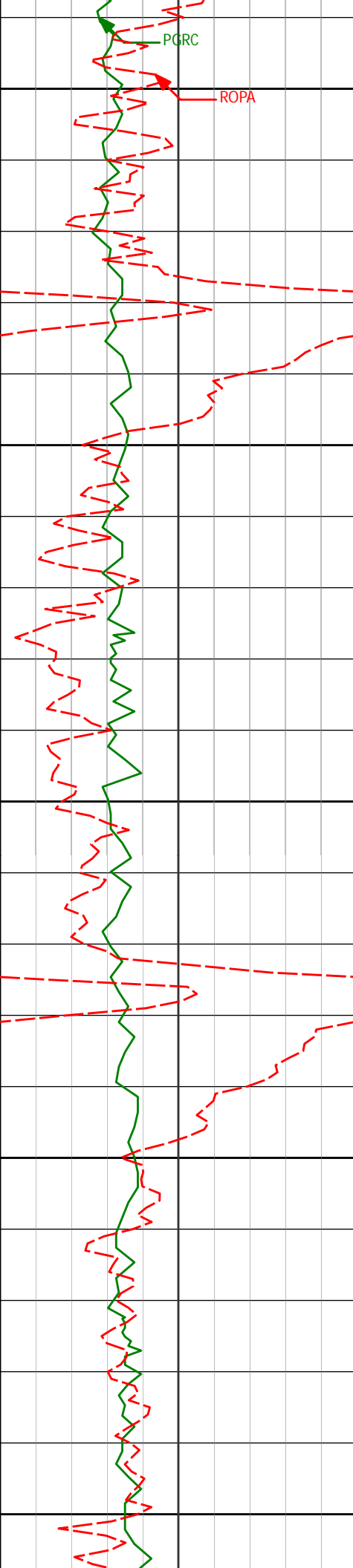
3825'

19.02°

96.50°

3750.45'

114.81'



PGRC

ROPA

3850

3900

3950

4000

4050

3920'

18.94°

96.03°

3840.29'

120.55'

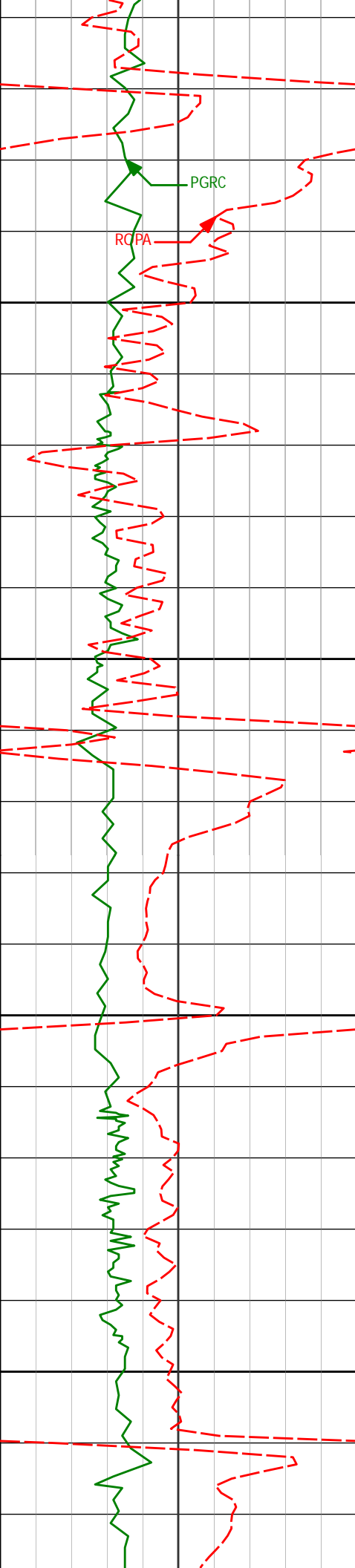
4015'

16.01°

94.73°

3930.89'

126.26'



4100

4150

4200

4250

4110'

4205'

13.31°

14.99°

94.12°

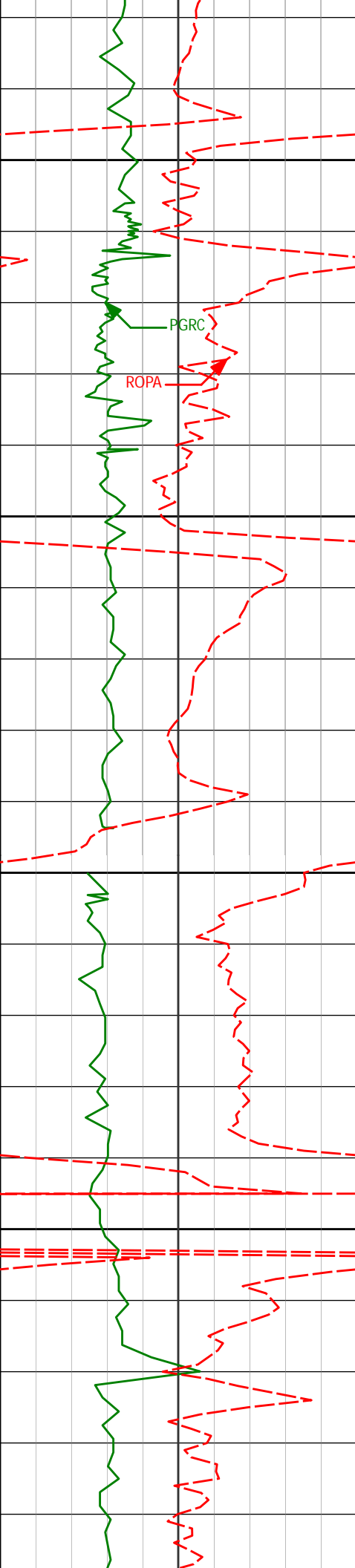
97.22°

4022.79'

4114.91'

131.48'

135.99'



4300

4300'

15.18°

93.79°

4206.64'

140.92'

PGRC

ROPA

4350

4400

4395'

16.11°

96.35°

4298.12'

146.19'

4450

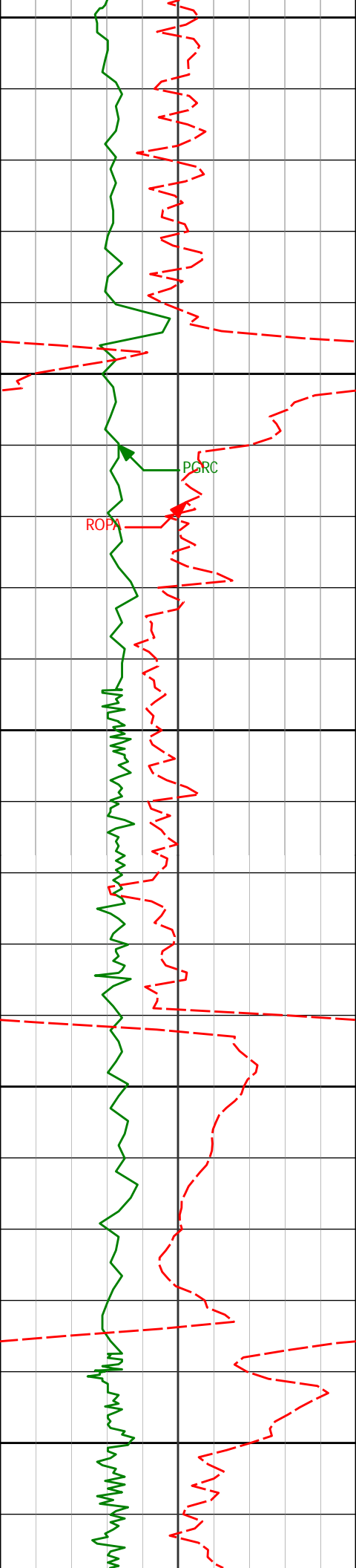
4490'

15.53°

95.39°

4389.52'

151.17'



4500

4550

4600

4650

4700

4585'

13.97°

93.03°

4481.39'

156.50'

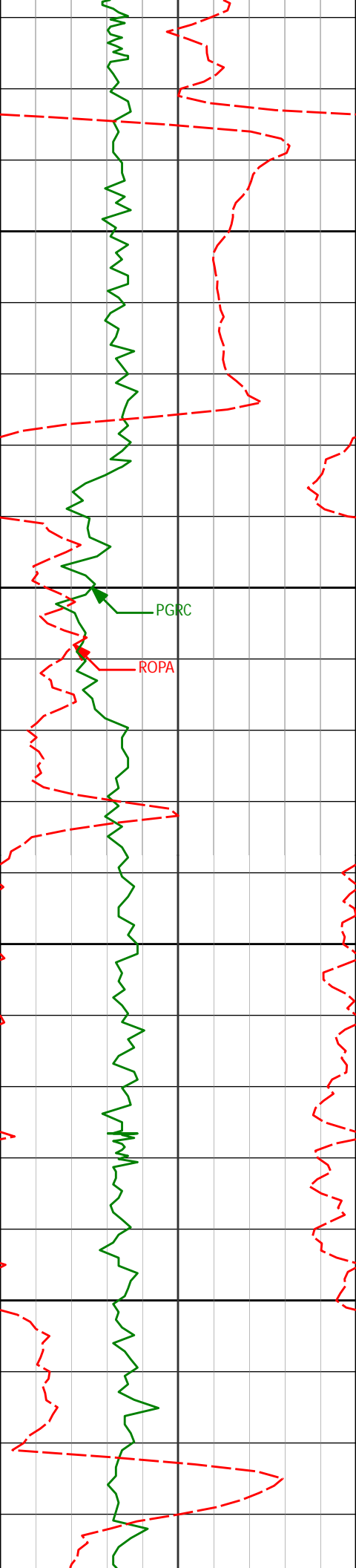
4679'

14.76°

98.72°

4572.45'

160.95'



4750

4774'

15.99°

96.08°

4664.05'

165.16'

4800

4850

4869'

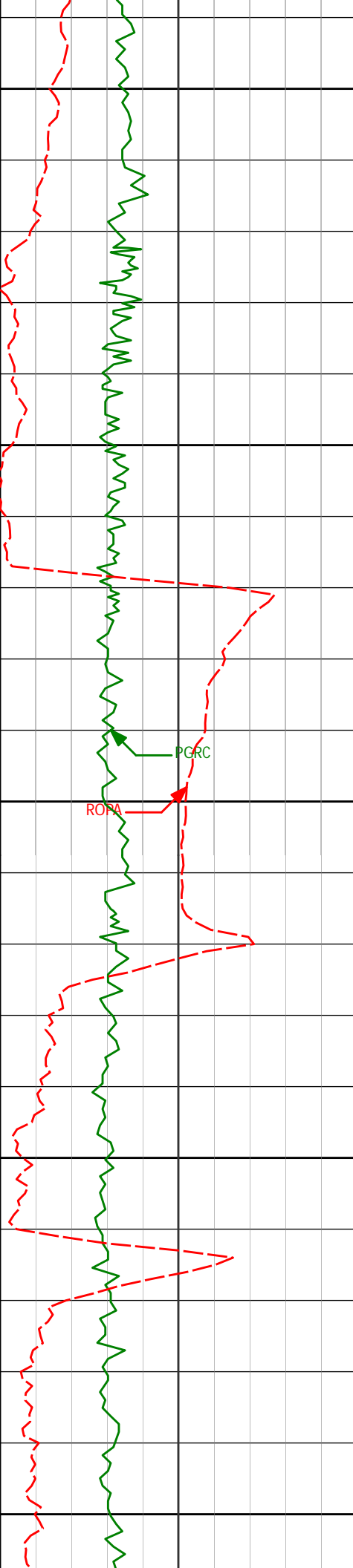
15.75°

92.32°

4755.43'

170.90'

4900



4950

4964'

13.86°

93.36°

4847.27'

176.85'

5000

5050

5059'

16.94°

94.23°

4938.85'

182.58'

5100

5150

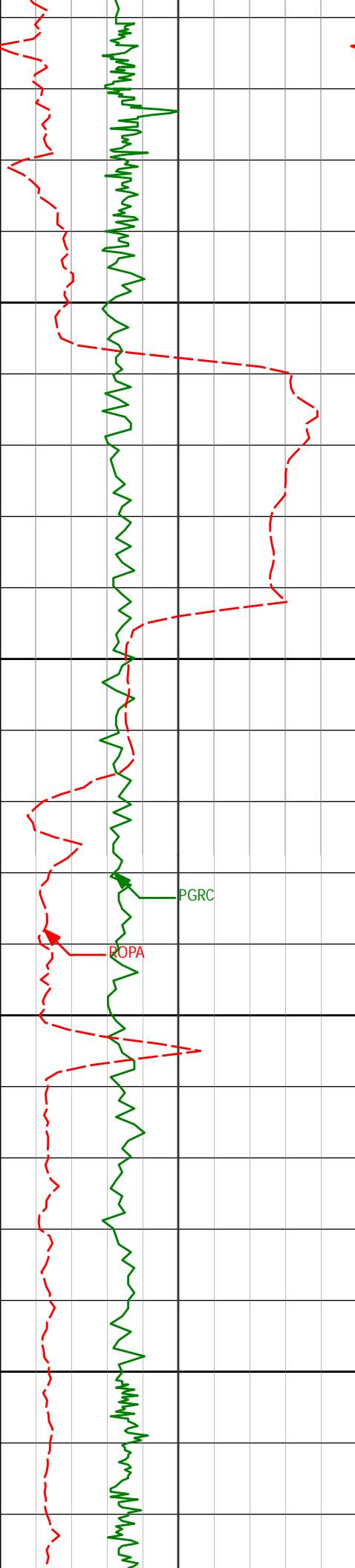
5154'

16.77°

92.49°

5029.77'

189.07'



5200

5250

5300

5350

5248'

15.99°

98.58°

5119.96'

194.35'

PGRC

POPA

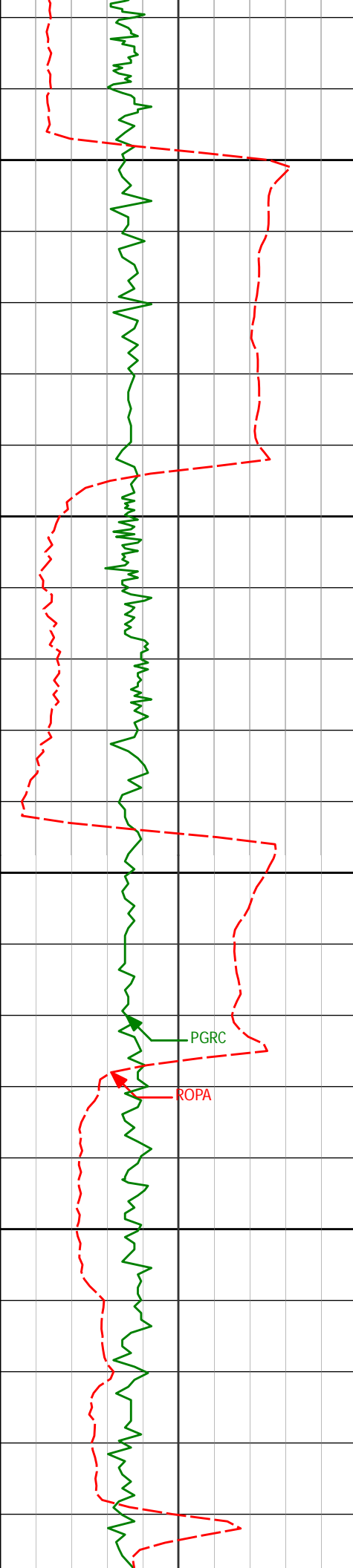
5343'

13.60°

98.22°

5211.81'

197.96'



5400

5438'

15.36°

97.27°

5303.79'

201.79'

5450

5500

PGRC

ROPA

5532'

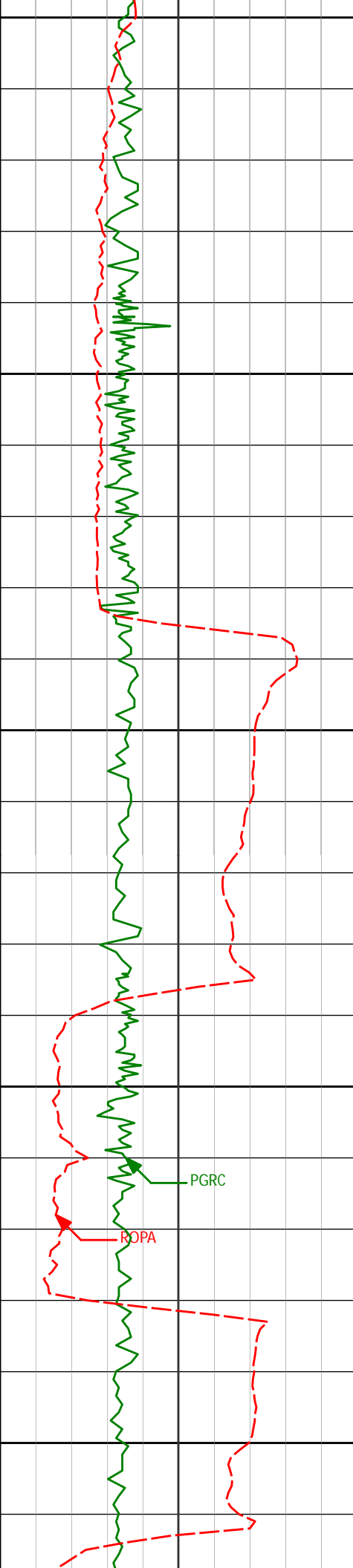
15.73°

95.12°

5394.35'

206.50'

5550



5600

5627'

12.95°

89.13°

5486.39'

212.41'

5650

5700

5722'

14.36°

95.44°

5578.70'

218.03'

5750

PGRC

ROPA

5800

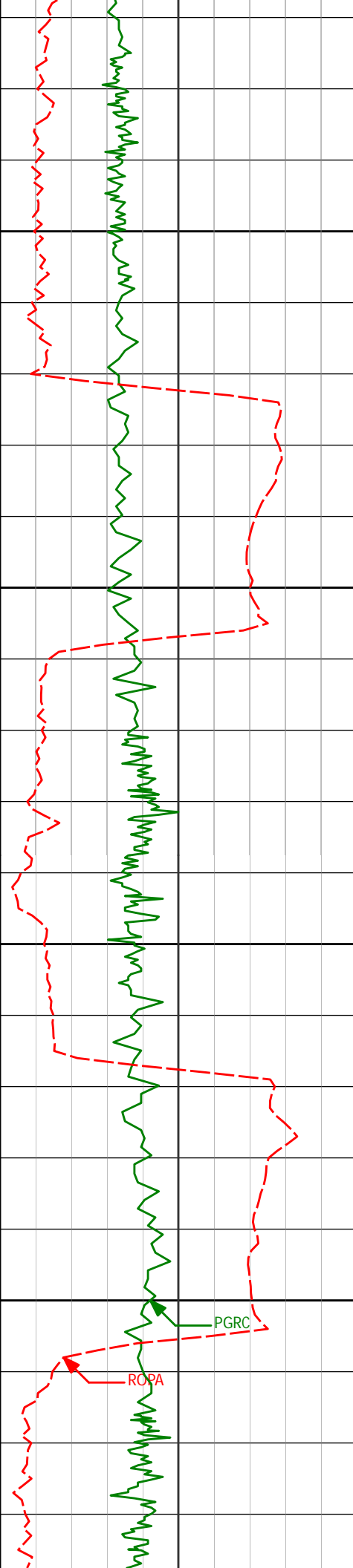
5817'

15.38°

93.30°

5670.52'

223.37'



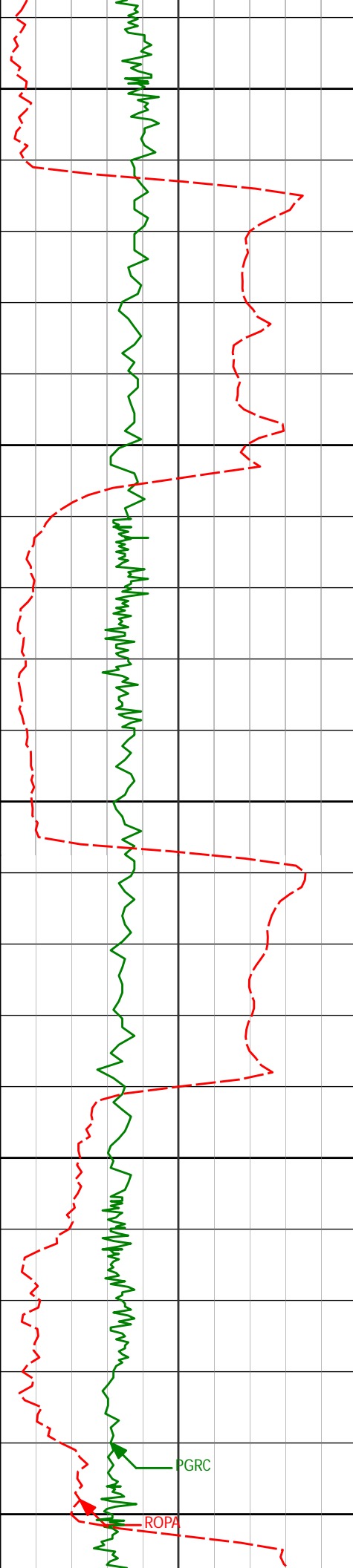
5850

5900

5950

6000

5871'	15.85°	96.85°	5873.82'	228.57'
5912'	15.36°	96.88°	5762.13'	228.55'
6007'	14.94°	97.26°	5853.83'	232.82'



6050

6100

6150

6200

6250

6101'

15.63°

98.69°

5944.50'

236.69'

6196'

15.29°

98.82°

6036.07'

240.32'

6238'

13.61°

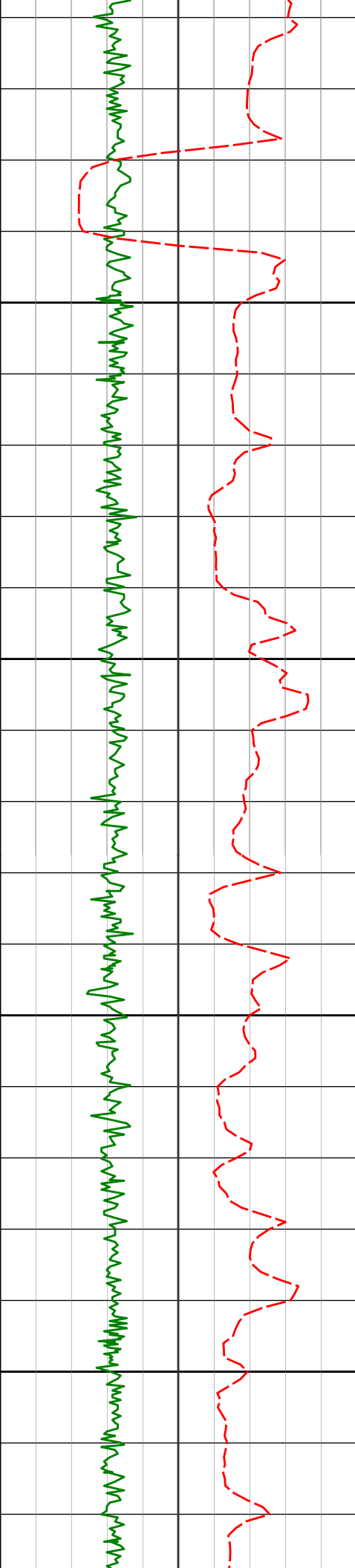
95.73°

6076.74'

242.07'

PGRC

ROPA



<Run 200>

6300

6350

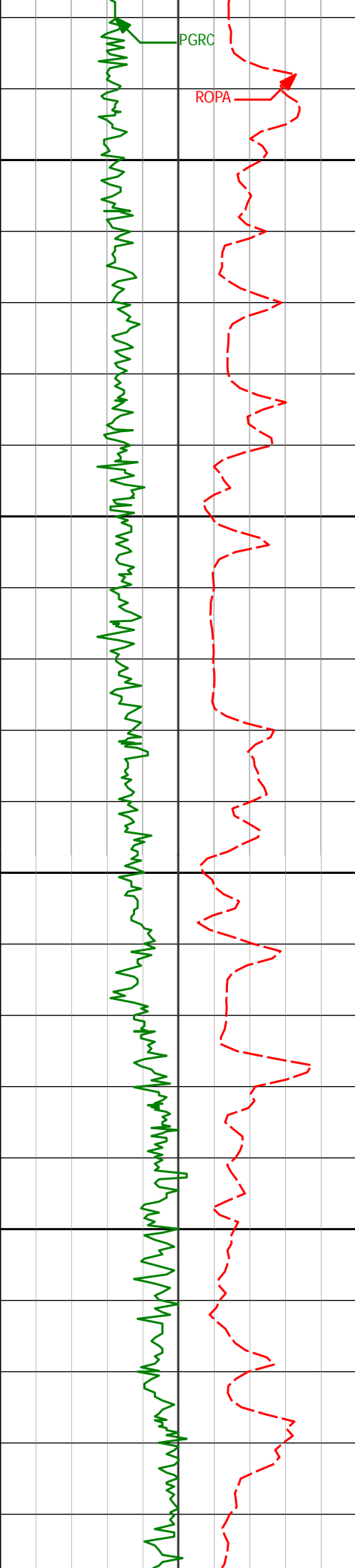
6400

6450

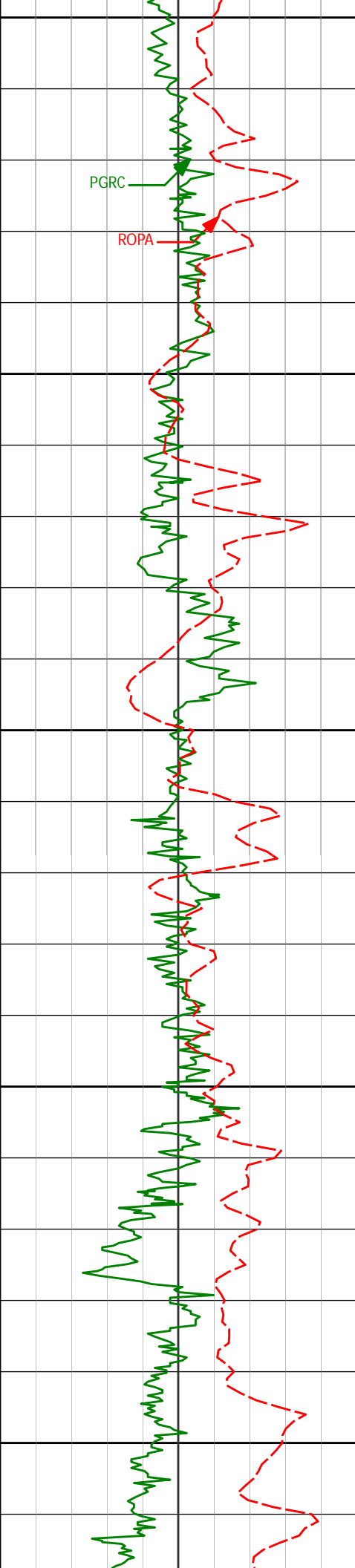
6338'	12.73°	90.05°	6174.04'	247.77'
-------	--------	--------	----------	---------

6384'	13.40°	74.50°	6218.86'	252.11'
-------	--------	--------	----------	---------

6432'	15.78°	62.58°	6265.32'	259.67'
-------	--------	--------	----------	---------



	6479'	18.00°	55.48°	6310.29'	269.82'
6500					
	6527'	20.75°	52.63°	6355.57'	282.54'
6550					
	6574'	21.90°	48.29°	6399.36'	296.80'
6600					
	6622'	20.22°	35.03°	6444.18'	312.34'
6650					
	6668'	21.86°	21.51°	6487.13'	328.44'



6700

6716'

25.92°

15.43°

6531.02'

347.85'

6750

6763'

30.60°

12.82°

6572.41'

370.06'

6800

6850

6858'

42.43°

12.81°

6648.62'

426.34'

6900

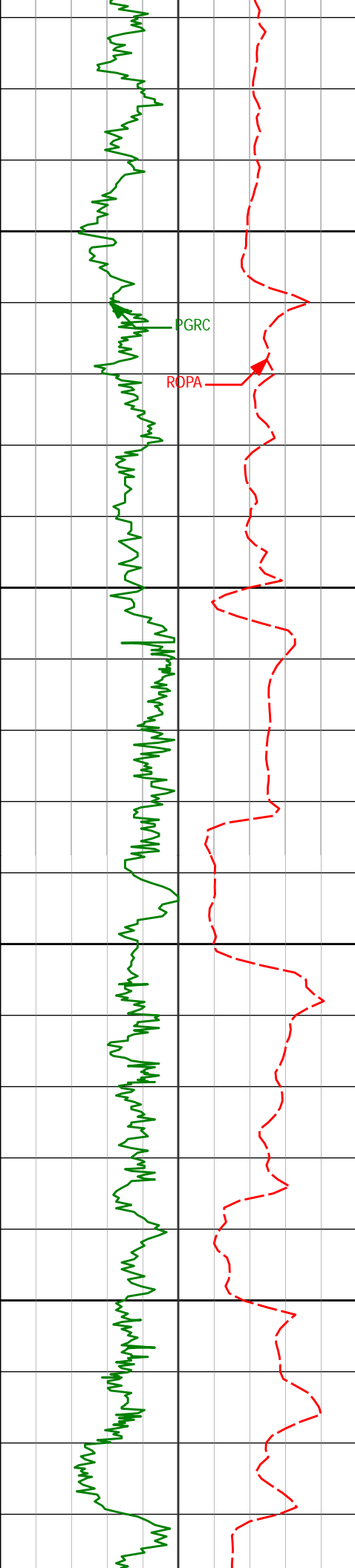
6906'

49.58°

12.50°

6681.94'

460.75'



6950

6953'

57.43°

12.32°

6709.87'

498.39'

7000

7001'

65.08°

11.59°

6732.94'

540.28'

7050

7048'

68.42°

10.97°

6751.49'

583.24'

7100

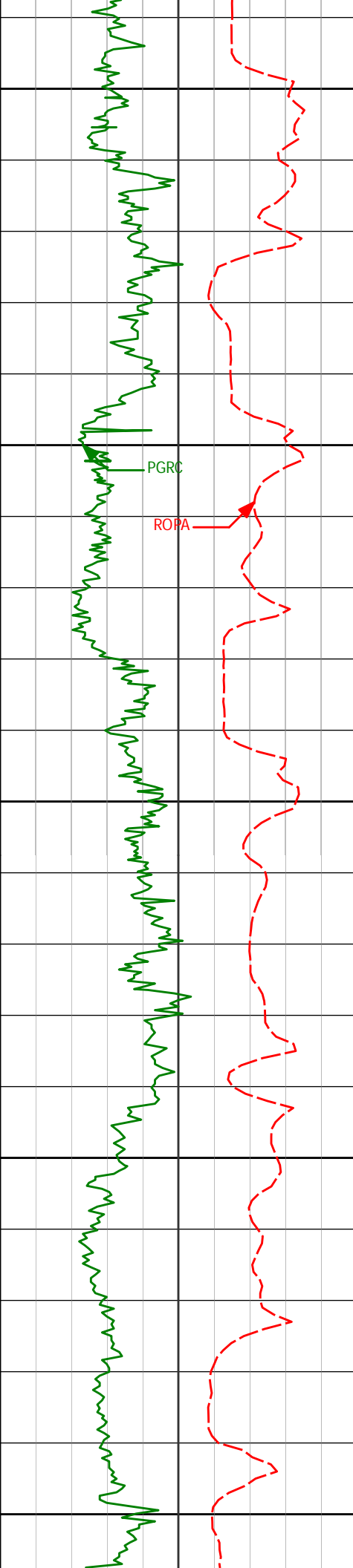
7096'

71.89°

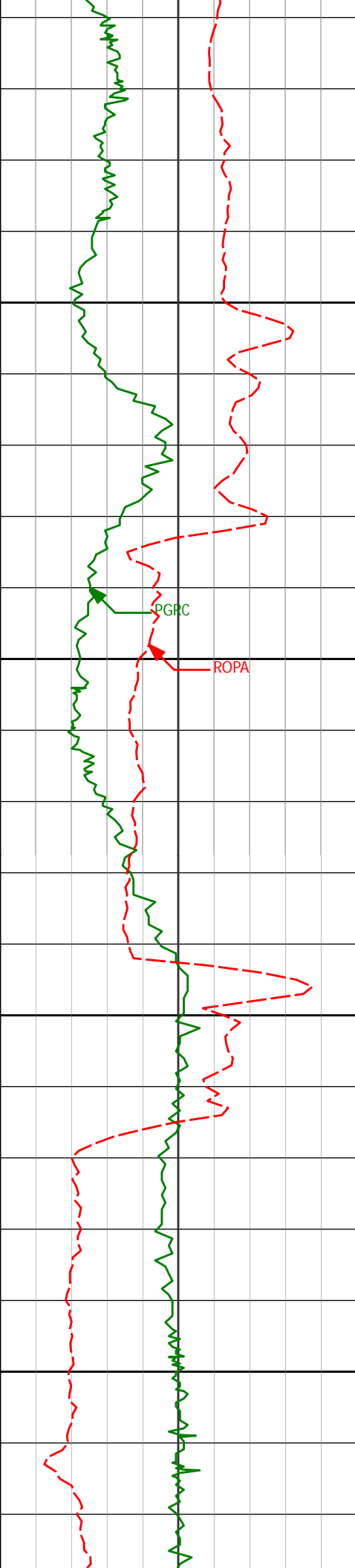
10.12°

6767.78'

628.10'



7143'	74.82°	9.82°	6781.24'	672.79'
7150				
7191'	76.42°	8.13°	6793.16'	718.83'
7200				
7238'	77.21°	4.84°	6803.89'	763.81'
7250				
7288'	79.44°	359.37°	6814.01'	811.11'
7300				
<div><div></div>Casing Set @ 7,329' MD</div>				
<Run 300> <Run 400>				
7350				



7400

7429'

86.58°

356.31°

6831.17'

943.22'

7450

7500

7522'

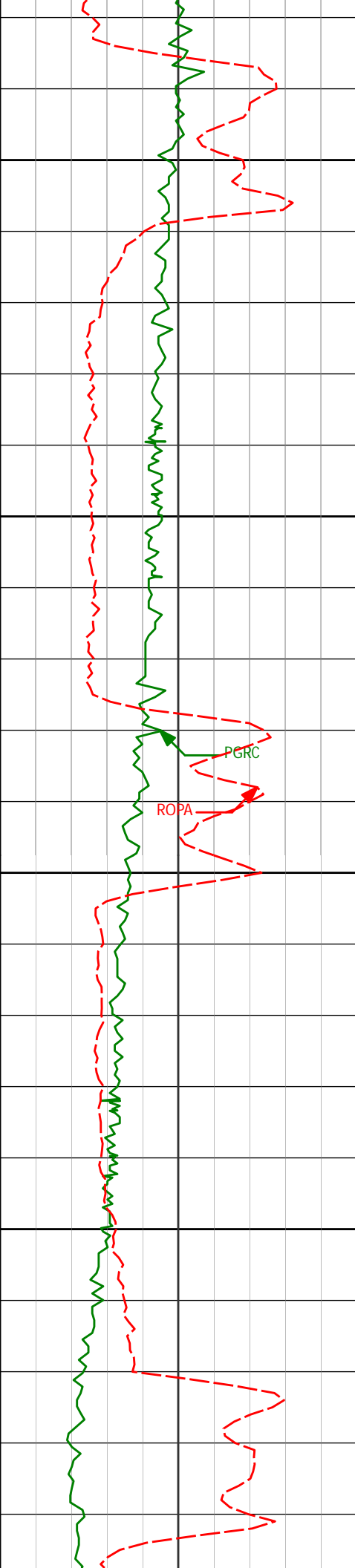
90.03°

356.89°

6833.92'

1030.34'

7550



7600

7613'

89.63°

357.13°

6834.19'

1115.87'

7650

PGRC

ROPA

7700

7708'

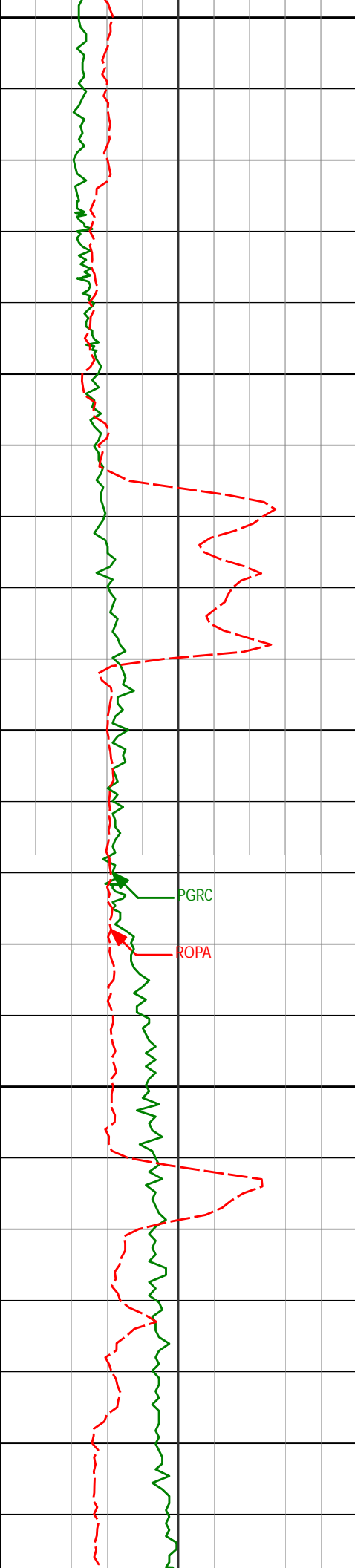
89.82°

358.96°

6834.65'

1205.73'

7750



7800

7850

7900

7950

8000

7803'

90.62°

0.84°

6834.29'

1296.53'

7898'

89.20°

0.90°

6834.44'

1387.80'

7993'

90.74°

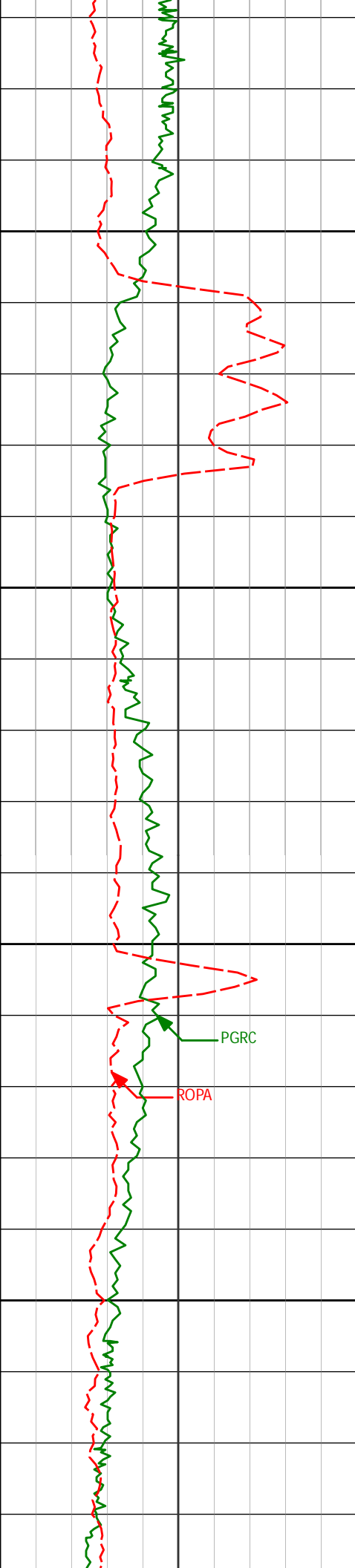
1.68°

6834.49'

1479.25'

PGRC

ROPA



8050

8088'

89.17°

359.68°

6834.56'

1570.43'

8100

8150

PGRC

ROPA

8183'

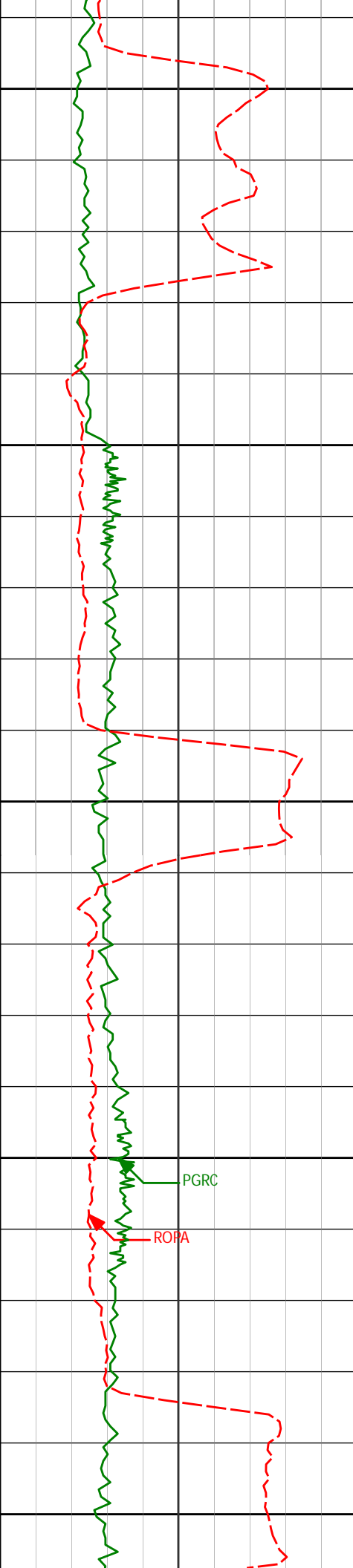
91.08°

359.40°

6834.36'

1661.06'

8200



8250

8277'

90.31°

1.11°

6833.22'

1751.07'

8300

8350

8372'

90.90°

0.17°

6832.22'

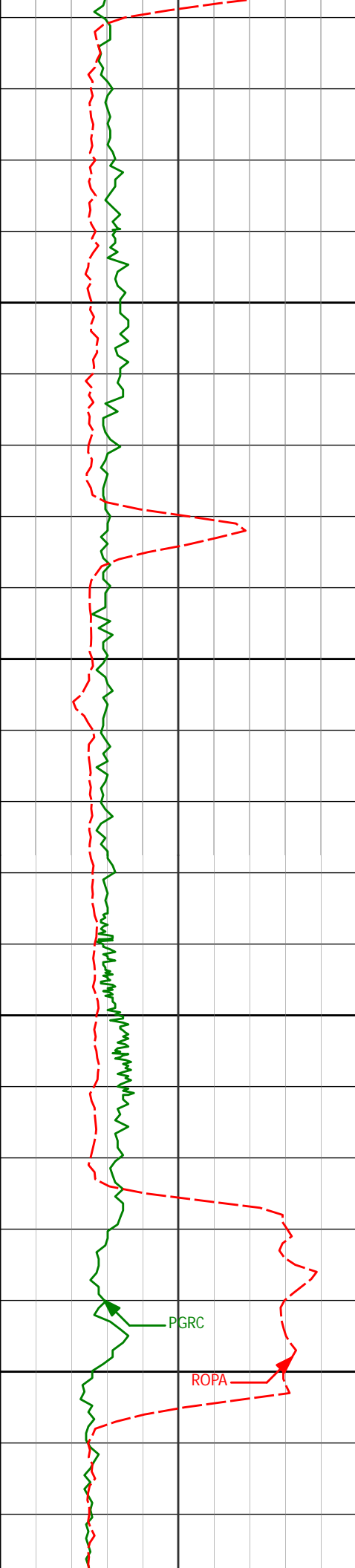
1842.23'

8400

PGRC

ROPA

8450



8467'

89.35°

1.15°

6832.01'

1933.40'

8500

8550

8562'

91.57°

1.59°

6831.25'

2024.88'

8600

8650

8657'

90.22°

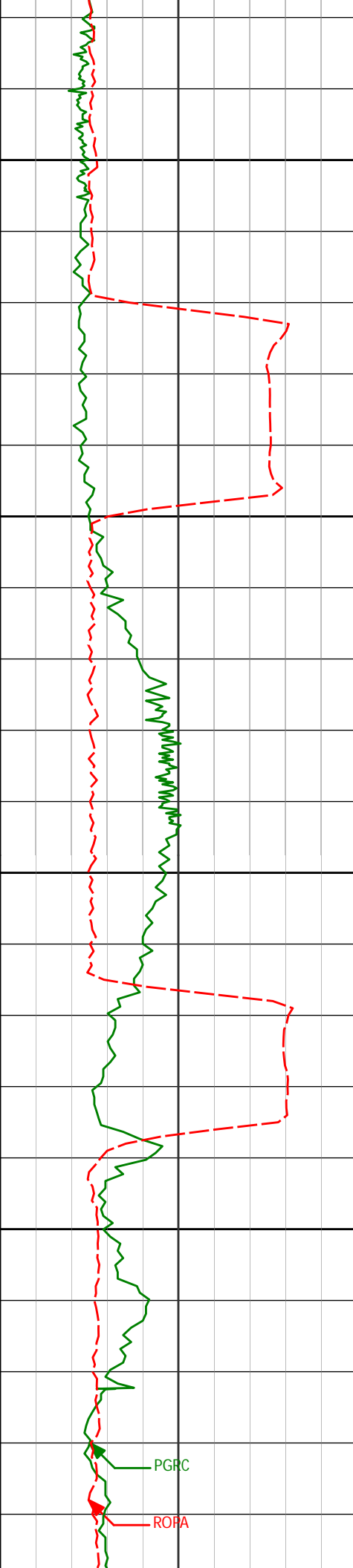
1.08°

6829.76'

2116.35'

PGRC

ROPA



8700

8750

8800

8850

8751'

88.80°

0.50°

6830.57'

2206.62'

8846'

88.70°

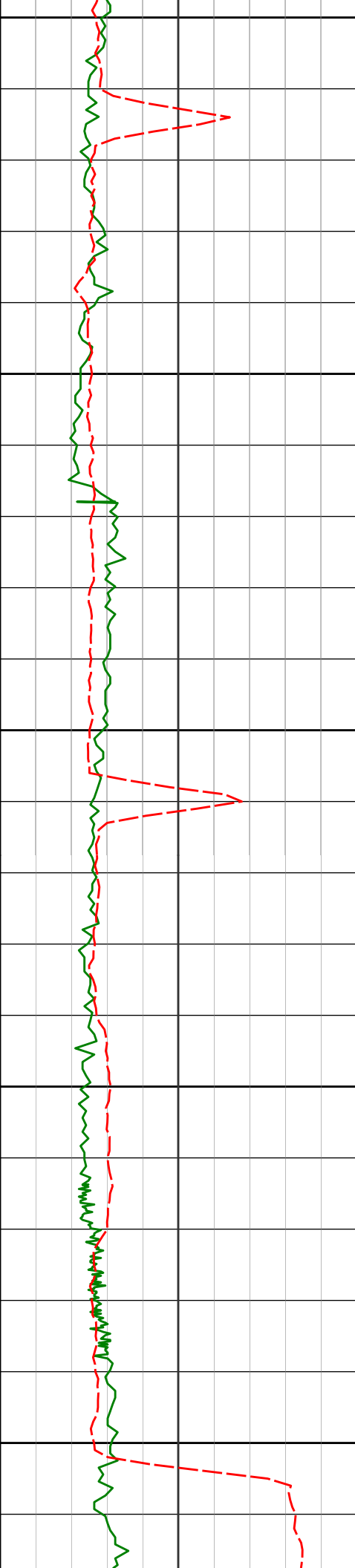
357.88°

6832.64'

2297.04'

PGRC

ROFA



8900

8941'

89.97°

358.04°

6833.74'

2386.85'

8950

9000

9036'

91.76°

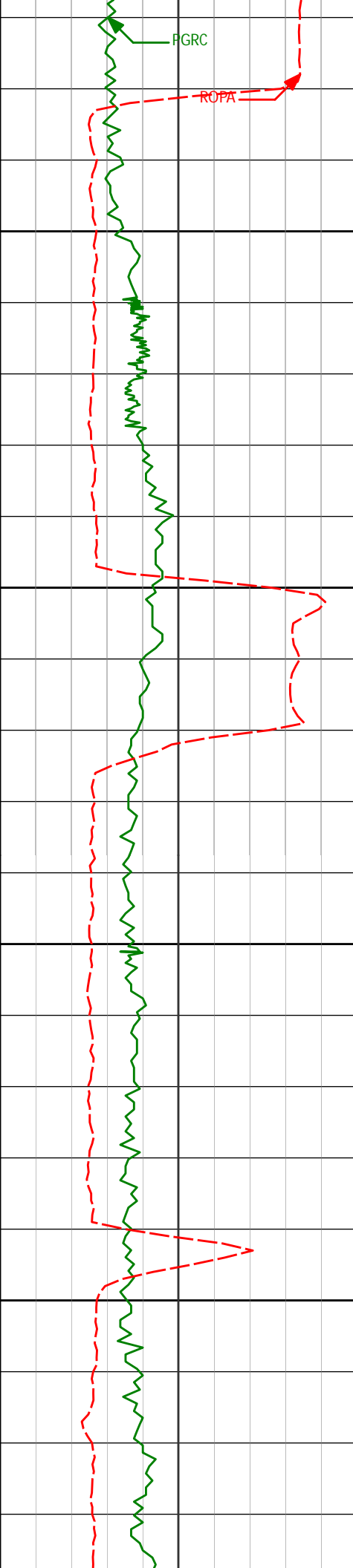
357.85°

6832.31'

2476.64'

9050

9100



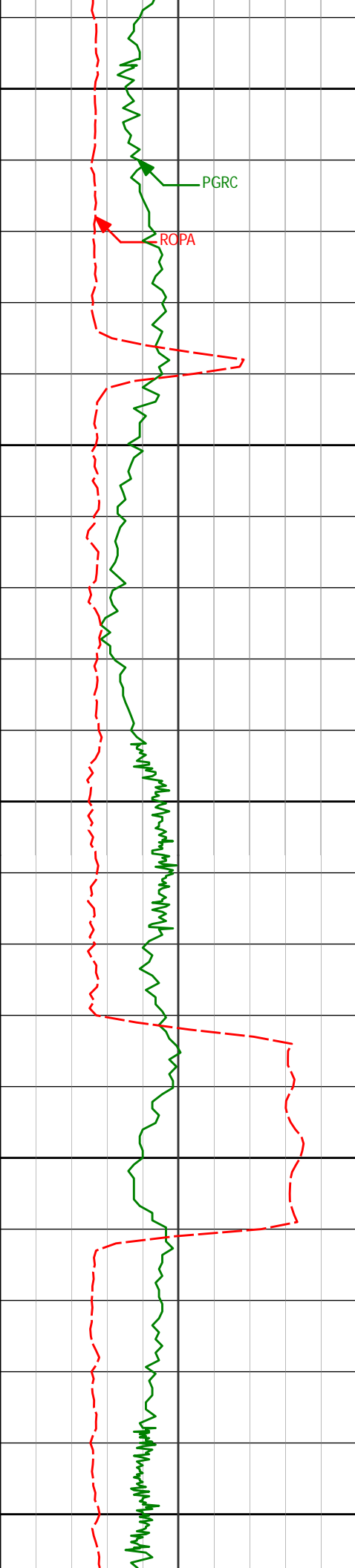
9150

9200

9250

9300

9131'	91.20°	359.01°	6829.85'	2566.68'
9226'	89.26°	359.36°	6829.47'	2657.12'
9321'	90.12°	359.31°	6829.98'	2747.65'



9350

9400

9450

9500

9550

9416'

91.60°

358.97°

6828.55'

2838.07'

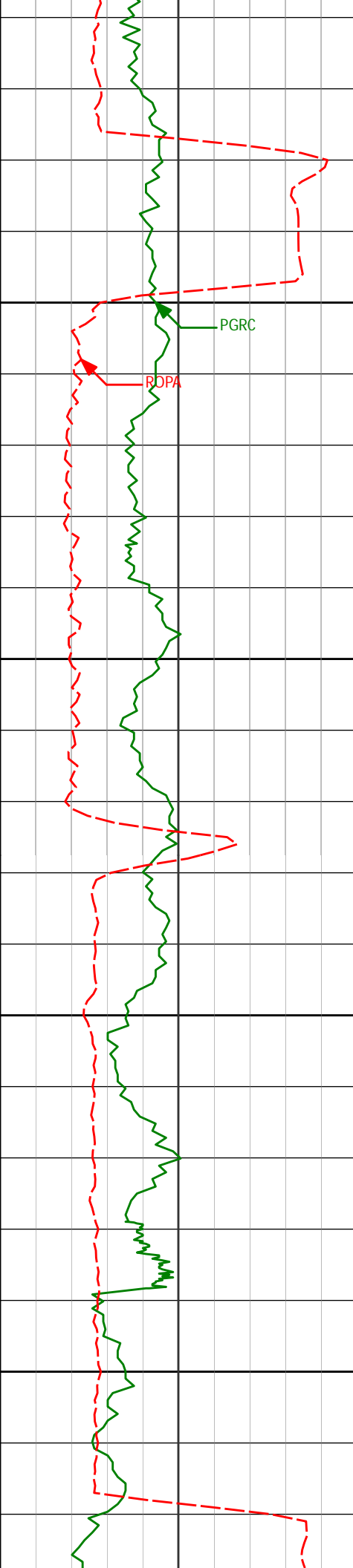
9510'

90.52°

0.22°

6826.81'

2927.76'



9600

9605'

89.54°

0.27°

6826.75'

3018.73'

9650

9700

9700'

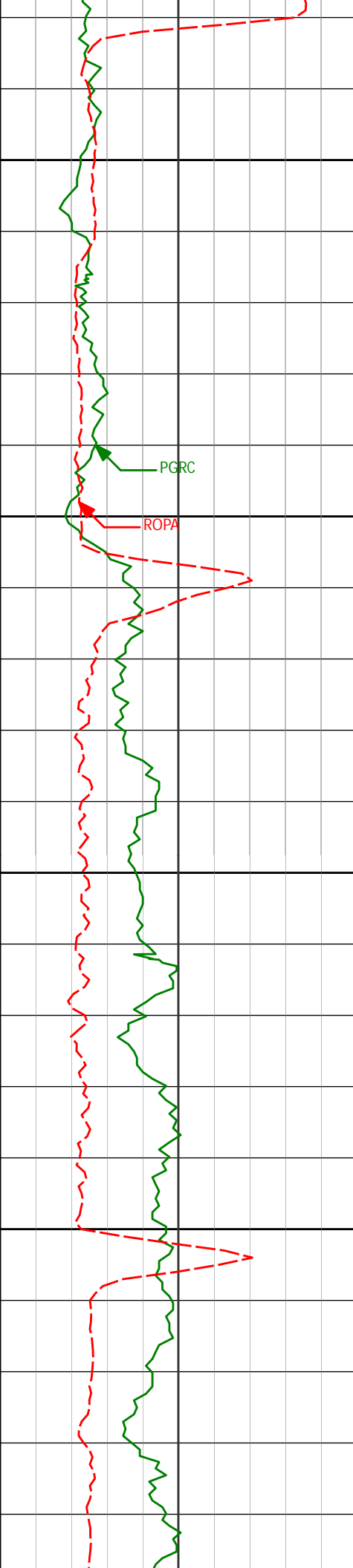
90.46°

0.68°

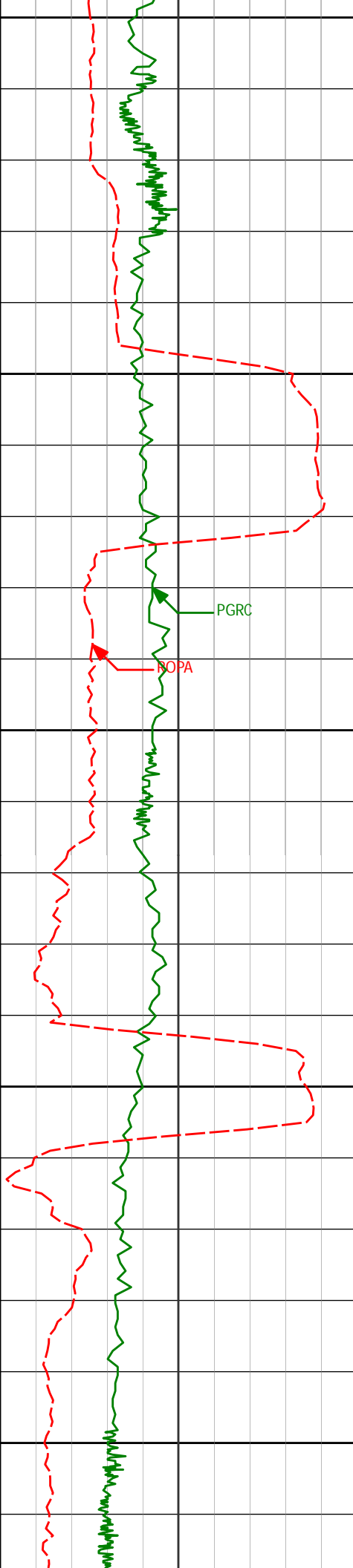
6826.75'

3109.82'

9750



9794'	89.60°	359.57°	6826.70'	3199.78'
9800				
9850				
9889'	90.31°	359.66°	6826.78'	3290.44'
9900				
9950				
9984'	91.48°	359.25°	6825.30'	3381.02'



10000

10050

10100

10150

10200

10078'

90.86°

359.72°

6823.38'

3470.65'

PGRC

ROPA

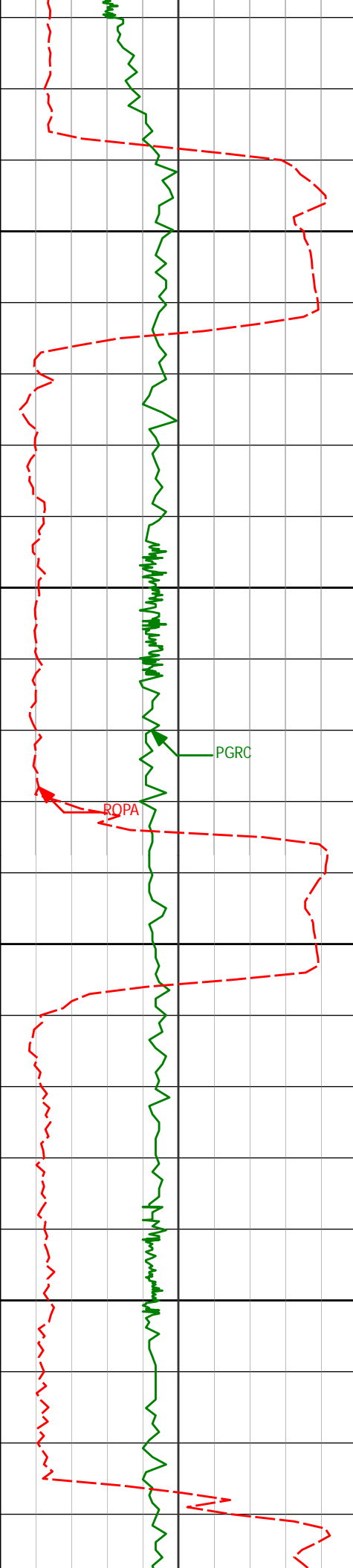
10173'

90.99°

359.51°

6821.84'

3561.31'



10250

10300

10350

10400

10267'

90.46°

0.42°

6820.65'

3651.19'

PGRC

ROPA

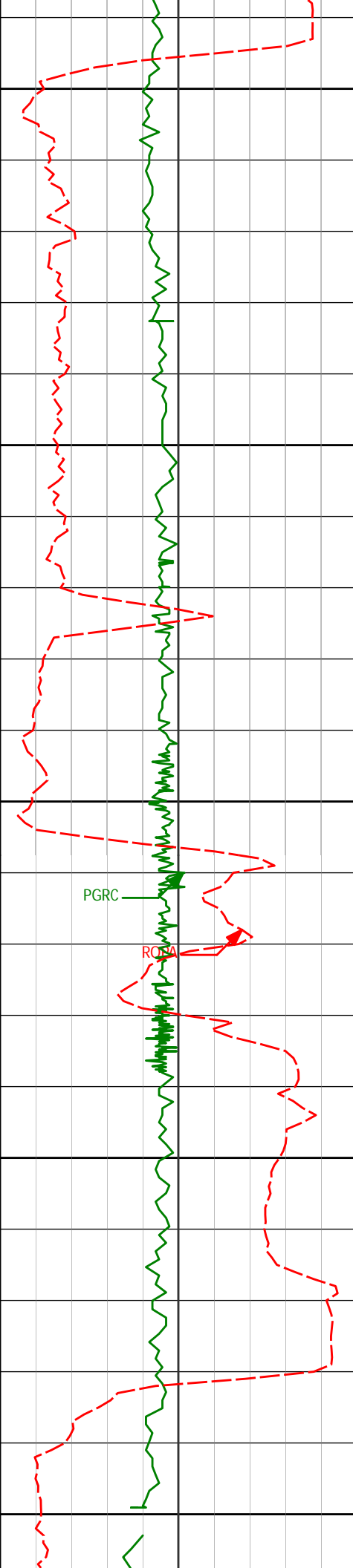
10362'

89.91°

0.62°

6820.35'

3742.30'



10450

10456'

89.11°

0.73°

6821.16'

3832.51'

10500

10550

10551'

90.18°

0.25°

6821.74'

3923.60'

PGRC

RGR

10600

10650

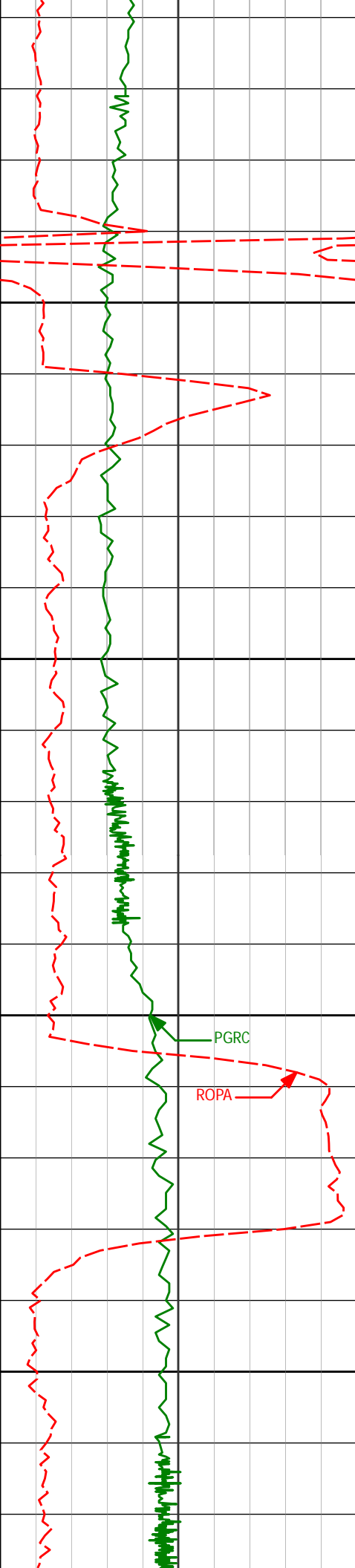
10646'

89.69°

0.01°

6821.85'

4014.52'



10700

10741'

91.66°

0.29°

6820.72'

4105.44'

10750

10800

PGRC

ROPA

10836'

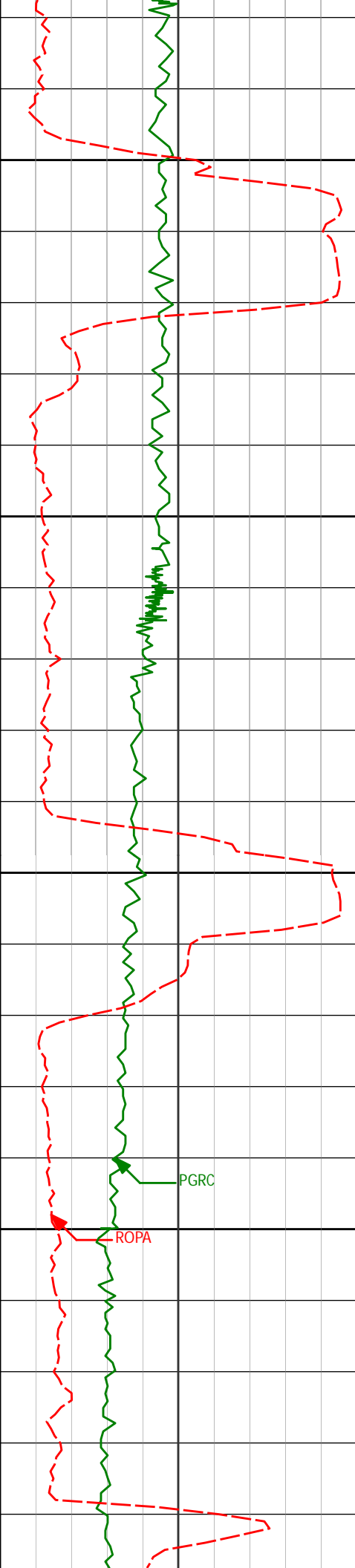
90.86°

358.86°

6818.63'

4196.06'

10850



10900

10931'

89.78°

359.50°

6818.09'

4286.51'

10950

11000

11026'

89.88°

359.35°

6818.37'

4377.09'

11050

PGRC

ROPA



11100

11121'

91.57°

359.03°

6817.17'

4467.54'

11150

11200

11215'

91.26°

358.59°

6814.85'

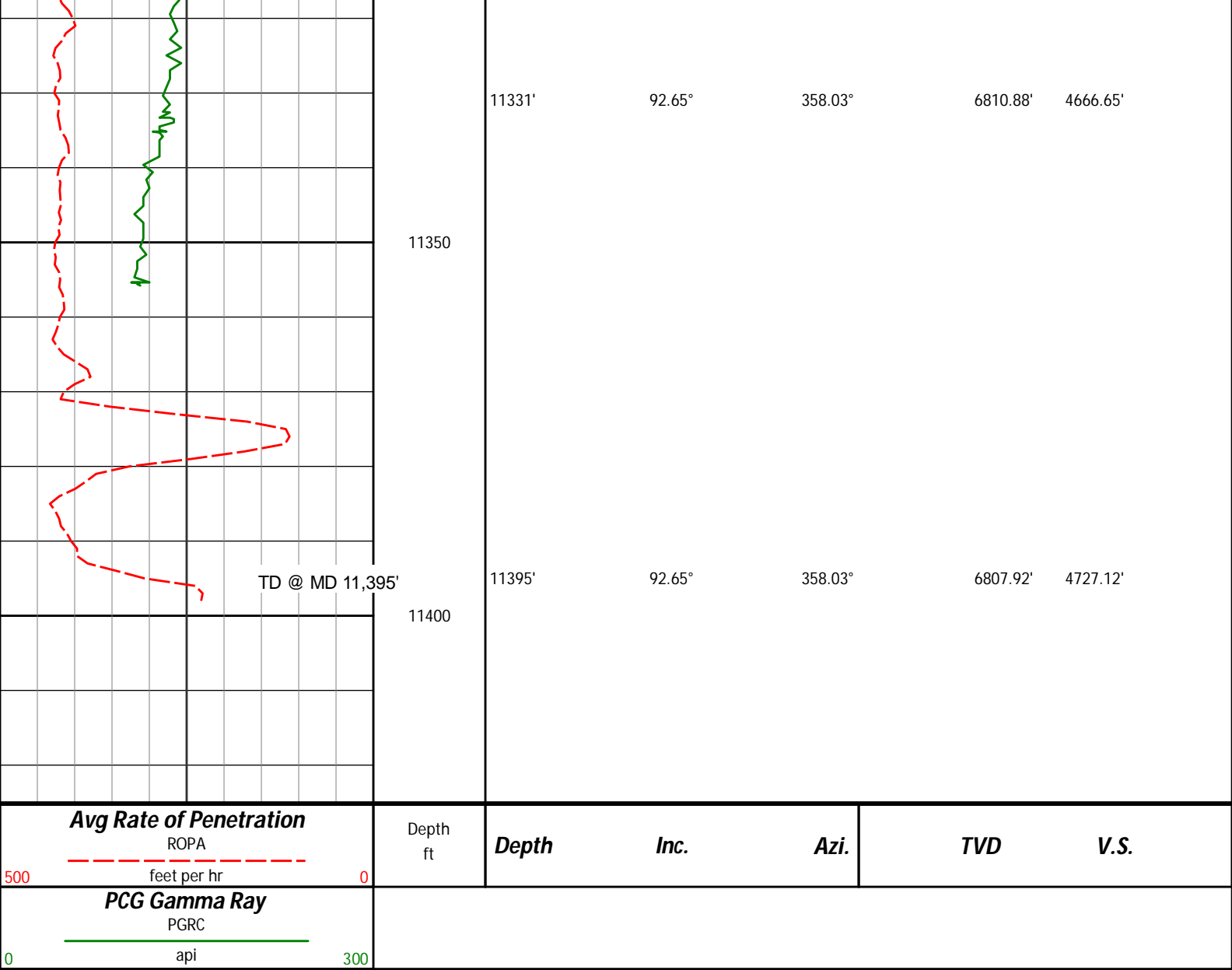
4556.82'

11250

11300

PGRC

ROPA



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Marie D04-72-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900918616

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
350.00	0.60	193.01	349.99	1.79 S	0.41 W	-1.83	0.17
650.00	0.50	166.01	649.98	4.59 S	0.45 W	-4.52	0.09
714.00	0.19	315.06	713.98	4.78 S	0.46 W	-4.71	1.04
900.00	0.37	275.42	899.98	4.51 S	1.27 W	-4.69	0.14
992.00	0.49	206.83	991.98	4.84 S	1.75 W	-5.14	0.54
1085.00	0.77	152.89	1084.97	5.75 S	1.64 W	-5.98	0.67
1177.00	0.81	171.00	1176.96	6.94 S	1.26 W	-7.01	0.27
1270.00	3.16	114.58	1269.91	8.65 S	1.17 E	-7.93	3.00
1362.00	5.97	101.01	1361.61	10.62 S	8.17 E	-7.77	3.26
1456.00	7.05	96.90	1455.00	12.25 S	18.70 E	-6.25	1.25
1551.00	8.25	94.94	1549.15	13.54 S	31.29 E	-3.81	1.29

1645.00	7.56	96.67	1642.26	14.84 S	44.15 E	-1.30	0.77
1740.00	9.15	97.23	1736.25	16.51 S	57.86 E	1.10	1.68
1834.00	10.91	86.77	1828.81	16.95 S	74.16 E	5.44	2.69
1929.00	10.65	93.16	1922.14	16.93 S	91.90 E	10.64	1.29
2024.00	12.71	92.89	2015.17	17.94 S	111.10 E	15.28	2.17
2119.00	14.99	93.84	2107.40	19.29 S	133.79 E	20.62	2.41
2213.00	15.54	90.78	2198.09	20.28 S	158.51 E	26.90	1.04
2308.00	15.30	94.00	2289.67	21.32 S	183.74 E	33.26	0.93
2403.00	14.84	93.36	2381.40	22.91 S	208.39 E	38.94	0.52
2498.00	16.38	95.18	2472.90	24.84 S	233.87 E	44.55	1.70
2593.00	17.39	95.79	2563.80	27.48 S	261.33 E	50.04	1.08
2688.00	17.20	95.21	2654.51	30.19 S	289.44 E	55.66	0.27
2782.00	16.49	95.01	2744.47	32.61 S	316.57 E	61.26	0.75
2877.00	16.71	95.96	2835.52	35.21 S	343.58 E	66.67	0.37
2972.00	15.19	93.97	2926.86	37.49 S	369.58 E	72.08	1.70
3067.00	15.95	94.42	3018.37	39.35 S	395.01 E	77.72	0.81
3162.00	13.27	93.74	3110.29	41.07 S	418.91 E	83.06	2.82
3257.00	12.95	93.55	3202.81	42.44 S	440.42 E	88.02	0.34
3352.00	13.79	96.80	3295.24	44.44 S	462.29 E	92.50	1.18
3446.00	15.12	101.32	3386.26	48.18 S	485.43 E	95.69	1.86
3541.00	15.31	95.53	3477.94	51.82 S	510.07 E	99.40	1.61
3636.00	16.49	96.39	3569.30	54.53 S	535.96 E	104.37	1.27
3731.00	15.33	95.04	3660.66	57.13 S	561.88 E	109.45	1.29
3825.00	19.02	96.50	3750.45	59.96 S	589.48 E	114.81	3.95
3920.00	18.94	96.03	3840.29	63.33 S	620.19 E	120.55	0.18
4015.00	16.01	94.73	3930.89	66.03 S	648.58 E	126.26	3.11
4110.00	13.31	94.12	4022.79	67.89 S	672.55 E	131.48	2.84
4205.00	14.99	97.22	4114.91	70.22 S	695.65 E	135.99	1.93
4300.00	15.18	93.79	4206.64	72.59 S	720.25 E	140.92	0.96
4395.00	16.11	96.35	4298.12	74.87 S	745.76 E	146.19	1.21
4490.00	15.53	95.39	4389.52	77.52 S	771.52 E	151.17	0.66
4585.00	13.97	93.03	4481.39	79.32 S	795.64 E	156.50	1.76
4679.00	14.76	98.72	4572.45	81.73 S	818.80 E	160.95	1.72
4774.00	15.99	96.08	4664.05	84.95 S	843.78 E	165.16	1.49
4869.00	15.75	92.32	4755.43	86.86 S	869.67 E	170.90	1.11
4964.00	13.86	93.36	4847.27	88.05 S	893.92 E	176.85	2.01
5059.00	16.94	94.23	4938.85	89.74 S	919.09 E	182.58	3.25
5154.00	16.77	92.49	5029.77	91.35 S	946.59 E	189.07	0.56
5248.00	15.99	98.58	5119.96	93.87 S	972.94 E	194.35	2.01
5343.00	13.60	98.22	5211.81	97.42 S	996.93 E	197.96	2.52
5438.00	15.36	97.27	5303.79	100.61 S	1020.46 E	201.79	1.88
5532.00	15.73	95.12	5394.35	103.33 S	1045.50 E	206.50	0.72
5627.00	12.95	89.13	5486.39	104.31 S	1068.97 E	212.41	3.31
5722.00	14.36	95.44	5578.70	105.27 S	1091.34 E	218.03	2.15
5817.00	15.38	93.30	5670.52	107.11 S	1115.64 E	223.37	1.22
5912.00	15.36	96.88	5762.13	109.34 S	1140.71 E	228.55	1.00
6007.00	14.94	97.26	5853.83	112.40 S	1165.34 E	232.82	0.46
6101.00	15.63	98.69	5944.50	115.85 S	1189.88 E	236.69	0.84
6196.00	15.29	98.82	6036.07	119.70 S	1214.91 E	240.32	0.36
6238.00	13.61	95.73	6076.74	121.04 S	1225.30 E	242.07	4.39
6290.00	13.49	92.23	6127.29	121.89 S	1237.45 E	244.80	1.60
6338.00	12.73	90.05	6174.04	122.11 S	1248.33 E	247.77	1.89
6384.00	13.40	74.50	6218.86	120.69 S	1258.54 E	252.11	7.76
6432.00	15.78	62.58	6265.32	116.20 S	1269.70 E	259.67	7.95
6479.00	18.00	55.48	6310.29	109.14 S	1281.36 E	269.82	6.45
6527.00	20.75	52.63	6355.57	99.77 S	1294.23 E	282.54	6.05
6574.00	21.90	48.29	6399.36	88.89 S	1307.39 E	296.80	4.15
6622.00	20.22	35.03	6444.18	76.13 S	1318.84 E	312.34	10.50
6668.00	21.86	21.51	6487.13	61.65 S	1326.54 E	328.44	11.11
6716.00	25.92	15.43	6531.02	43.21 S	1332.61 E	347.85	9.88
6763.00	30.60	12.82	6572.41	21.63 S	1338.01 E	370.06	10.30
6858.00	42.43	12.81	6648.62	33.39 N	1350.52 E	426.34	12.46
6906.00	49.58	12.50	6681.94	67.07 N	1358.07 E	460.75	14.89
6953.00	57.43	12.32	6709.87	103.94 N	1366.18 E	498.39	16.71
7001.00	65.08	11.59	6732.94	145.08 N	1374.88 E	540.28	15.99
7048.00	68.42	10.97	6751.49	187.43 N	1383.33 E	583.24	7.20
7096.00	71.89	10.12	6767.78	231.81 N	1391.58 E	628.10	7.41
7143.00	74.82	9.82	6781.24	276.15 N	1399.38 E	672.79	6.27
7191.00	76.42	8.13	6793.16	322.08 N	1406.63 E	718.83	4.78
7238.00	77.21	4.84	6803.89	367.54 N	1411.79 E	763.81	7.02
7288.00	79.44	359.37	6814.01	416.45 N	1413.58 E	811.11	11.58
7429.00	86.58	356.31	6831.17	556.19 N	1408.29 E	943.22	5.51
7522.00	90.03	356.89	6833.92	648.97 N	1402.77 E	1030.34	3.76
7613.00	89.63	357.13	6834.19	739.85 N	1398.03 E	1115.87	0.51
7708.00	89.82	358.96	6834.65	834.79 N	1394.78 E	1205.72	1.93

7708.00	89.82	358.98	6834.83	834.79 N	1394.78 E	1203.73	1.93
7803.00	90.62	0.84	6834.29	929.78 N	1394.62 E	1296.53	2.15
7898.00	89.20	0.90	6834.44	1024.77 N	1396.06 E	1387.80	1.50
7993.00	90.74	1.68	6834.49	1119.74 N	1398.20 E	1479.25	1.82
8088.00	89.17	359.68	6834.56	1214.73 N	1399.33 E	1570.43	2.68
8183.00	91.08	359.40	6834.36	1309.72 N	1398.57 E	1661.06	2.03
8277.00	90.31	1.11	6833.22	1403.71 N	1398.99 E	1751.07	1.99
8372.00	90.90	0.17	6832.22	1498.69 N	1400.05 E	1842.23	1.17
8467.00	89.35	1.15	6832.01	1593.68 N	1401.15 E	1933.40	1.92
8562.00	91.57	1.59	6831.25	1688.65 N	1403.42 E	2024.88	2.38
8657.00	90.22	1.08	6829.76	1783.61 N	1405.63 E	2116.35	1.53
8751.00	88.80	0.50	6830.57	1877.59 N	1406.93 E	2206.62	1.63
8846.00	88.70	357.88	6832.64	1972.55 N	1405.59 E	2297.04	2.76
8941.00	89.97	358.04	6833.74	2067.48 N	1402.20 E	2386.85	1.34
9036.00	91.76	357.85	6832.31	2162.41 N	1398.80 E	2476.64	1.89
9131.00	91.20	359.01	6829.85	2257.34 N	1396.20 E	2566.68	1.35
9226.00	89.26	359.36	6829.47	2352.32 N	1394.85 E	2657.12	2.08
9321.00	90.12	359.31	6829.98	2447.31 N	1393.74 E	2747.65	0.91
9416.00	91.60	358.97	6828.55	2542.29 N	1392.32 E	2838.07	1.60
9510.00	90.52	0.22	6826.81	2636.27 N	1391.65 E	2927.76	1.75
9605.00	89.54	0.27	6826.75	2731.26 N	1392.06 E	3018.73	1.04
9700.00	90.46	0.68	6826.75	2826.26 N	1392.84 E	3109.82	1.06
9794.00	89.60	359.57	6826.70	2920.26 N	1393.04 E	3199.78	1.49
9889.00	90.31	359.66	6826.78	3015.25 N	1392.40 E	3290.44	0.75
9984.00	91.48	359.25	6825.30	3110.24 N	1391.50 E	3381.02	1.31
10078.00	90.86	359.72	6823.38	3204.21 N	1390.65 E	3470.65	0.82
10173.00	90.99	359.51	6821.84	3299.20 N	1390.01 E	3561.31	0.26
10267.00	90.46	0.42	6820.65	3393.19 N	1389.96 E	3651.19	1.12
10362.00	89.91	0.62	6820.35	3488.18 N	1390.82 E	3742.30	0.62
10456.00	89.11	0.73	6821.16	3582.17 N	1391.93 E	3832.51	0.86
10551.00	90.18	0.25	6821.74	3677.17 N	1392.74 E	3923.60	1.24
10646.00	89.69	0.01	6821.85	3772.17 N	1392.95 E	4014.52	0.58
10741.00	91.66	0.29	6820.72	3867.15 N	1393.20 E	4105.44	2.10
10836.00	90.86	358.86	6818.63	3962.13 N	1392.49 E	4196.06	1.72
10931.00	89.78	359.50	6818.09	4057.11 N	1391.13 E	4286.51	1.32
11026.00	89.88	359.35	6818.37	4152.11 N	1390.18 E	4377.09	0.18
11121.00	91.57	359.03	6817.17	4247.09 N	1388.84 E	4467.54	1.82
11215.00	91.26	358.59	6814.85	4341.04 N	1386.89 E	4556.82	0.57
11331.00	92.65	358.03	6810.88	4456.92 N	1383.47 E	4666.65	1.29
11395.00	92.65	358.03	6807.92	4520.81 N	1381.27 E	4727.12	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 16.98 DEGREES (GRID)
A TOTAL CORRECTION OF 7.81 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11395.00 FEET
IS 4727.12 FEET ALONG 16.99 DEGREES (GRID)**

Surveys are tied into two non-Haliburton surveys at MD 350' and 650' taken while drilling the surface section. The final survey is a straight-line projection to bit.