



WELL INFORMATION					
MWD Run Number	100	200	300	400	
Date run completed	21-Oct-13	21-Oct-13	22-Oct-13	25-Oct-13	
Rig Bit Number	2	3	4	5	
Bit Size (in)	8.750	8.750	8.750	6.125	
Tool Nominal OD (in)	6.750	6.750	6.750	4.750	
Log Start Depth (MD, ft)	974.00	5,980.00	6,513.00	6,950.00	
Log End Depth (MD, ft)	5,980.00	6,513.00	6,950.00	11,077.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	20-Oct-13 08:00	21-Oct-13 05:30	21-Oct-13 17:45	23-Oct-13 13:00	
Drill/Wipe End Date and Time	20-Oct-13 21:30	21-Oct-13 11:00	22-Oct-13 00:15	24-Oct-13 22:22	
Min Inc (deg) @ Depth (MD, ft)	.40 @ 1,367.00	1.84 @ 6,013.00	38.10 @ 6,583.00	85.67 @ 7,249.00	
Max Inc (deg) @ Depth (MD, ft)	19.39 @ 3,834.00	26.50 @ 6,488.00	87.32 @ 6,895.00	94.54 @ 9,318.00	
Bit TFA(in2) / Bit Type	.86 / PDC	.86 / PDC	.86 / PDC	.64 / PDC	
Flow Rate (gpm)	600.00	500.00	513.89	300.00	
Max AV (fpm) / CV (fpm) @ MWD	462.0 / NA	462.0 / NA	318.0 / NA	448.0 / 245.0	
Fluid Type	Fresh Water Gel	Native/Spud Mud	Fresh Water Gel	Native/Spud Mud	
Density (ppg) / Viscosity (spqt)	8.70 / 28.00	10.25 / 36.00	10.30 / 32.00	9.40 / 30.00	
Filtrate CL (ppm)	2,200.00	2,200.00	2,200.00	2,500.00	
pH / Fluid Loss (mptm)	9.00 / NA	9.50 / NA	9.00 / NA	10.20 / 8	
PV (cP) / YP (lbf2)	2 / 2.00	12 / 11.00	9 / 7.00	10 / 5.00	
% Solids / % Sand	2.50 / 0.5	5.70 / 0.25	5.7 / 0.25	4.7 / 0.10	
% 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	N/A @ N/A	
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	N/A @ N/A	
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	N/A @ N/A	
Max Tool Temp (deg F) / S	458.48 / PDM	444.88 / PDM	454.88 / PDM	347.88 / PDM	

Max Tool Temp (degF) / Source	150.10 / PCM	141.00 / PCM	154.30 / PCM	217.00 / PCM	
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA	N/A @ N/A	
Lead MWD Engineer	Brett Vandergon	Brett Vandergon	Brett Vandergon	Brett Vandergon	
Customer Representative	Matt Settles	Matt Settles	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	11404301	11404301	11404301	12187588	
Insert Serial Number	11227514	11227514	11227514	11400840	
Date and Time Initialized	19-Oct-13 14:58	01-Jan-70 00:00	01-Jan-70 00:00	22-Oct-13 07:54	
Date and Time Read	22-Oct-13 06:38	22-Oct-13 06:43	22-Oct-13 06:49	25-Oct-13 06:54	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	58.00	55.00	55.00	64.00	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11404301	11404301	11404301	12187588	
Sonde Serial Number	12177530	12177530	12177530	11902117	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	304.66	29.25	224.93	162.61	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	51.54	47.78	47.86	57.46	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11404301	11404301	11404301	12187588	
Insert/Sonde Serial Number	11579776	11579776	11579776	11579845	

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 7.4.2

WARRANTY

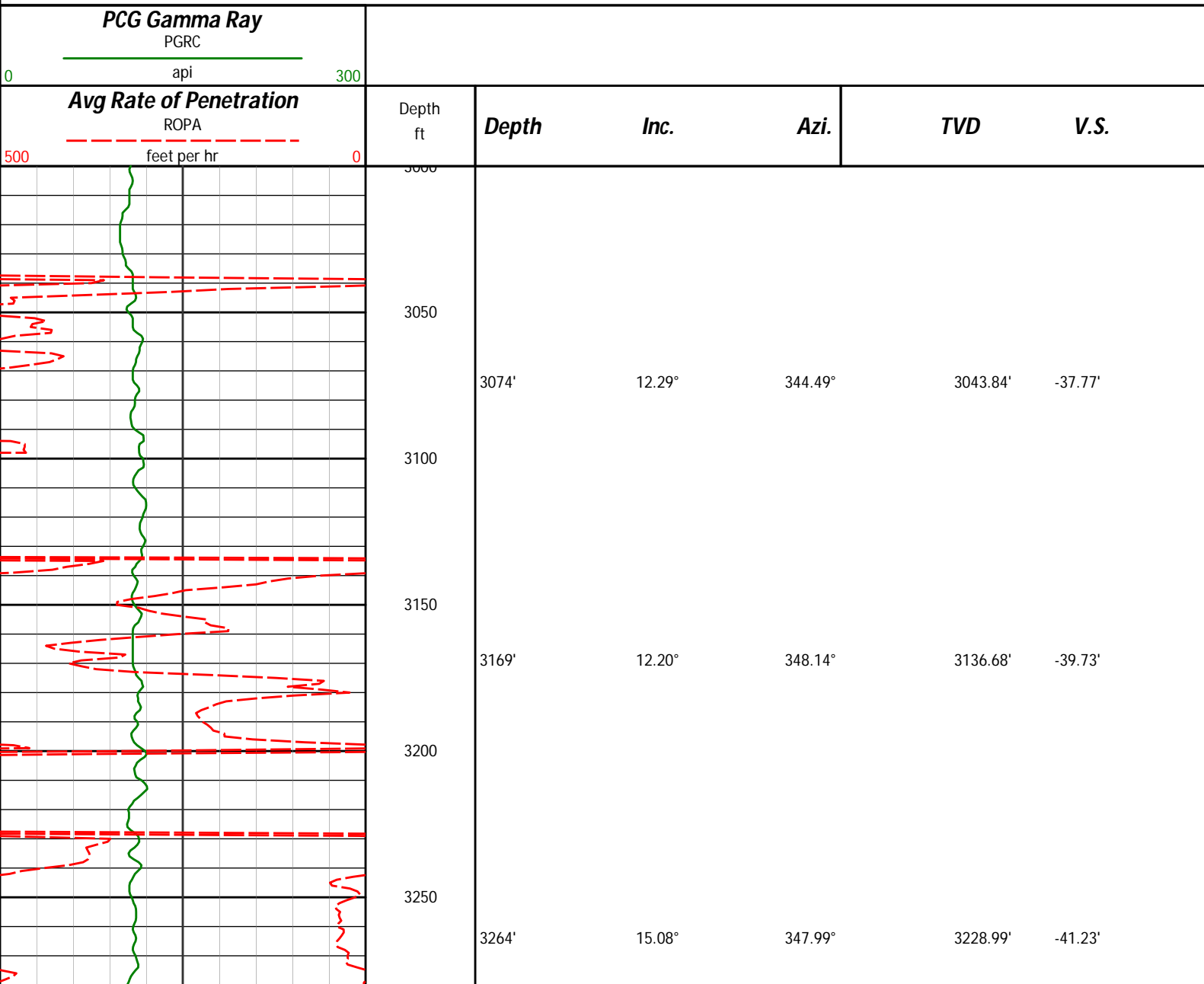
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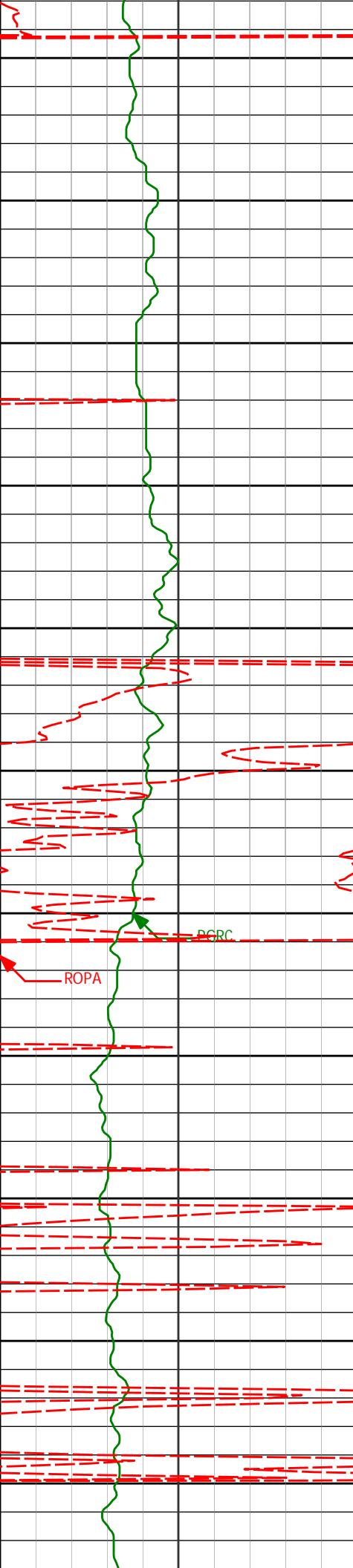
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Sperry Drilling Services

MD Main Log 1:600

Noble Energy
Wells Ranch AE20-65-1HN
H&P 343
T6N-R62W





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3359'

13.36°

347.39°

3321.08'

-42.93'

3454'

10.30°

347.86°

3414.05'

-44.40'

3549'

11.82°

345.40°

3507.28'

-46.10'

3644'

15.74°

343.89°

3599.53'

-49.00'

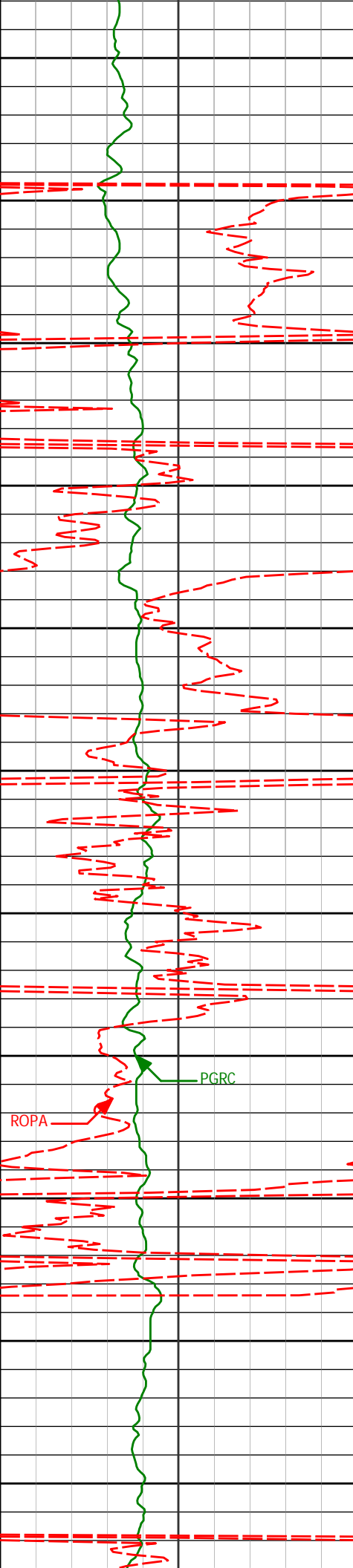
3739'

17.60°

343.07°

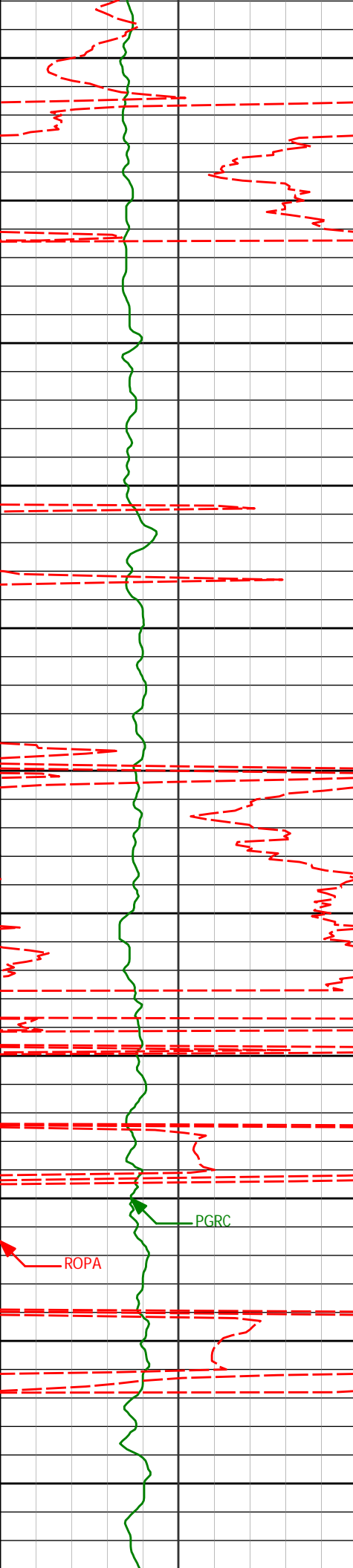
3690.53'

-53.00'

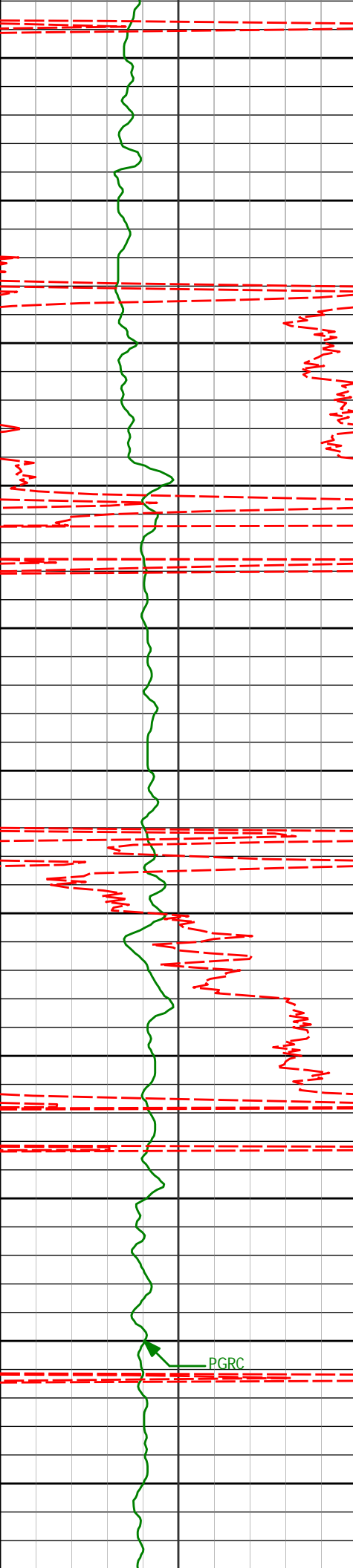


3850
3900
3950
4000
4050
4100
4150
4200
4250
4300
4350

3834'	19.39°	343.82°	3780.62'	-57.42'
3929'	18.59°	339.82°	3870.46'	-62.80'
4023'	14.70°	341.81°	3960.50'	-68.03'
4118'	9.32°	334.47°	4053.39'	-72.45'
4213'	6.14°	338.06°	4147.52'	-75.97'
4308'	3.81°	329.87°	4242.15'	-78.37'



4400	4403'	0.99°	288.31°	4337.06'	-80.30'
4450					
4500	4498'	0.54°	235.92°	4432.06'	-81.44'
4550					
4600	4593'	1.70°	157.26°	4527.04'	-81.48'
4650					
4700	4688'	4.75°	147.00°	4621.88'	-79.47'
4750					
4800	4783'	4.25°	143.61°	4716.59'	-76.14'
4850					
4900	4878'	2.33°	163.36°	4811.43'	-74.19'



4950

4973'

1.75°

182.52°

4906.37'

-74.17'

5000

5050

5068'

1.90°

169.44°

5001.32'

-74.37'

5100

5150

5163'

1.22°

157.18°

5096.29'

-74.05'

5200

5250

5258'

0.65°

179.98°

5191.27'

-73.86'

5300

5350

5352'

0.78°

206.73°

5285.27'

-74.30'

5400

PGRC

5450

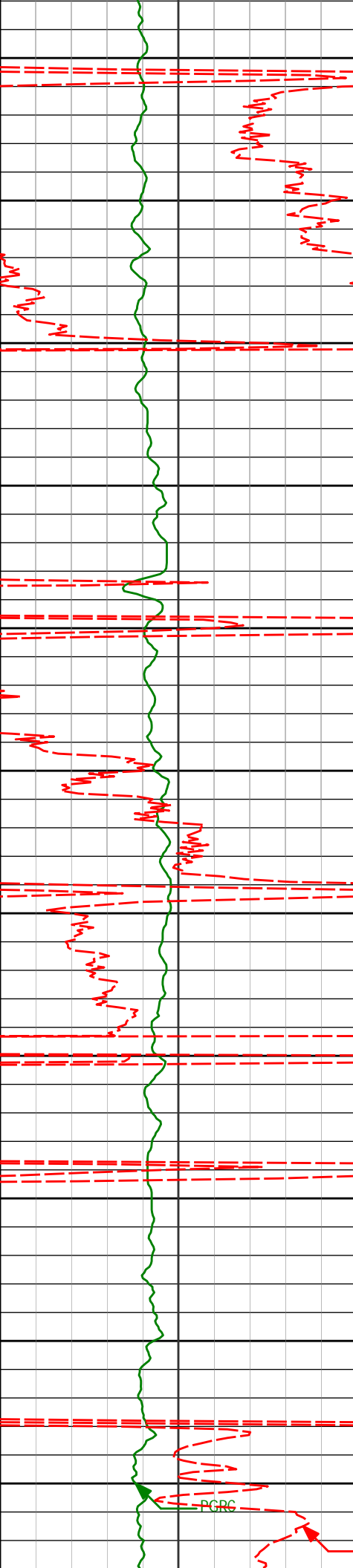
5447'

0.65°

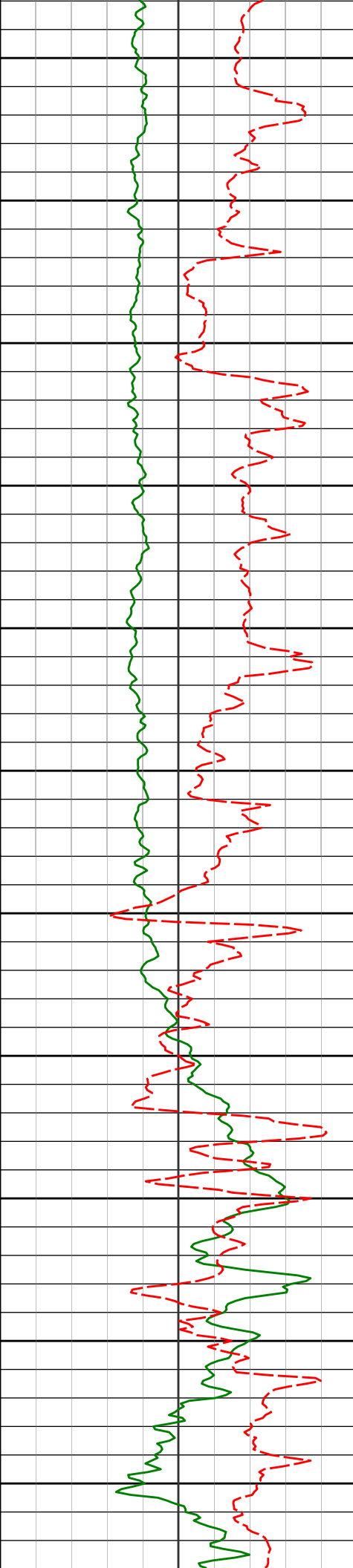
189.93°

5380.26'

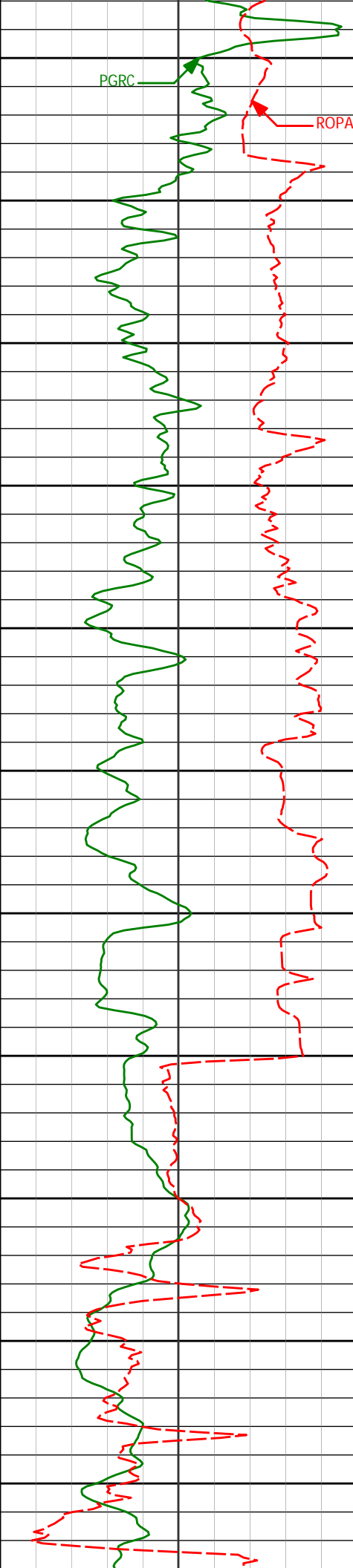
-74.84'



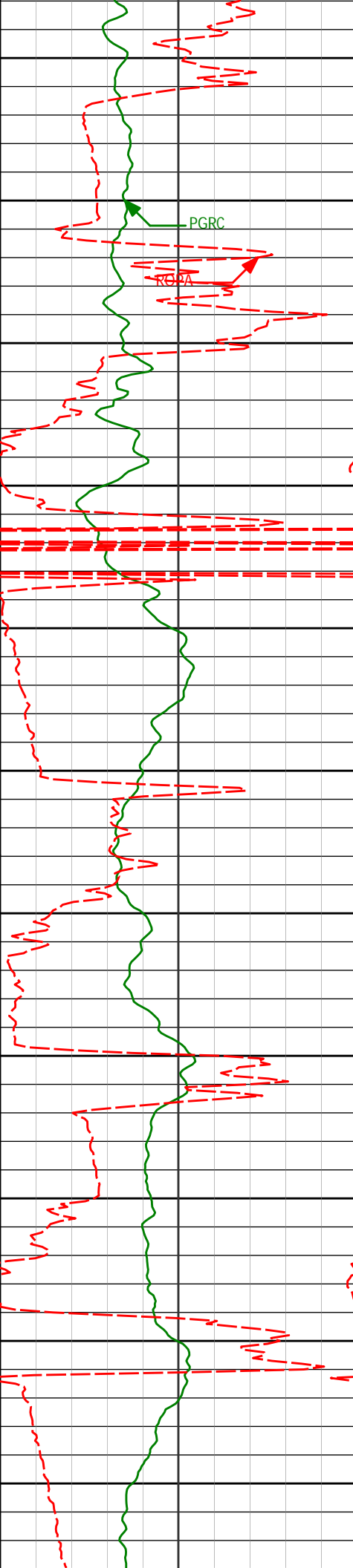
5500				
5542'	0.74°	125.12°	5475.25'	-74.55'
5550				
5600				
5637'	1.00°	129.97°	5570.24'	-73.55'
5650				
5700				
5732'	0.75°	127.57°	5665.23'	-72.56'
5750				
5800				
5827'	0.91°	100.01°	5760.22'	-71.40'
5850				
5900				
5922'	1.03°	50.31°	5855.21'	-69.96'
5950				
<Run 200>				
6000				
6013'	1.84°	70.32°	5946.18'	-67.82'



6050				
6100	6108'	8.84°	87.26°	6040.71' -59.04'
6150				
6200	6203'	11.17°	85.87°	6134.26' -42.59'
6250				
6300	6298'	17.38°	87.17°	6226.28' -19.26'
6350				
6400	6393'	22.51°	91.43°	6315.56' 12.82'
6450				
6500	6488'	26.50°	92.09°	6401.99' 51.62'
<Run 300>				
6550				



6583'	38.10°	89.99°	6482.16'	101.67'
6600				
6678'	53.72°	86.64°	6548.06'	169.28'
6772'	71.47°	85.74°	6591.15'	252.17'
6820'	80.10°	87.85°	6602.93'	298.48'
6866'	83.77°	89.43°	6609.39'	343.70'
6895'	87.32°	89.86°	6611.64'	372.34'
6950				
7018'	91.66°	90.88°	6612.73'	493.97'
7064'	92.35°	90.28°	6611.12'	539.41'
7100				



7150

7156'

91.42°

89.15°

6608.10'

630.51'

7200

7250

7249'

85.67°

89.25°

6610.46'

722.68'

7300

7342'

88.27°

89.08°

6615.37'

814.80'

7350

7400

7434'

90.37°

89.25°

6616.46'

906.05'

7450

7500

7527'

91.51°

88.47°

6614.93'

998.35'

7550

7600

7620'

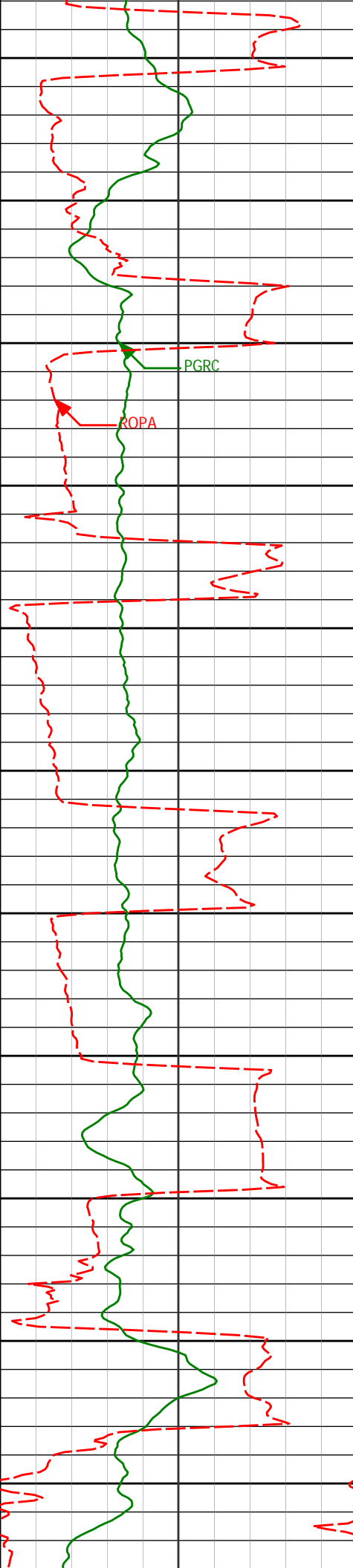
88.77°

85.62°

6614.71'

1090.96'

7650



7700

7712'

92.22°

87.42°

6613.92'

1182.64'

7750

7800

7805'

90.62°

85.94°

6611.61'

1275.28'

7850

7900

7898'

90.22°

82.05°

6610.94'

1368.19'

7950

8000

7991'

90.22°

82.80°

6610.59'

1461.19'

8050

8100

8084'

94.11°

89.02°

6607.08'

1553.83'

8150

8200

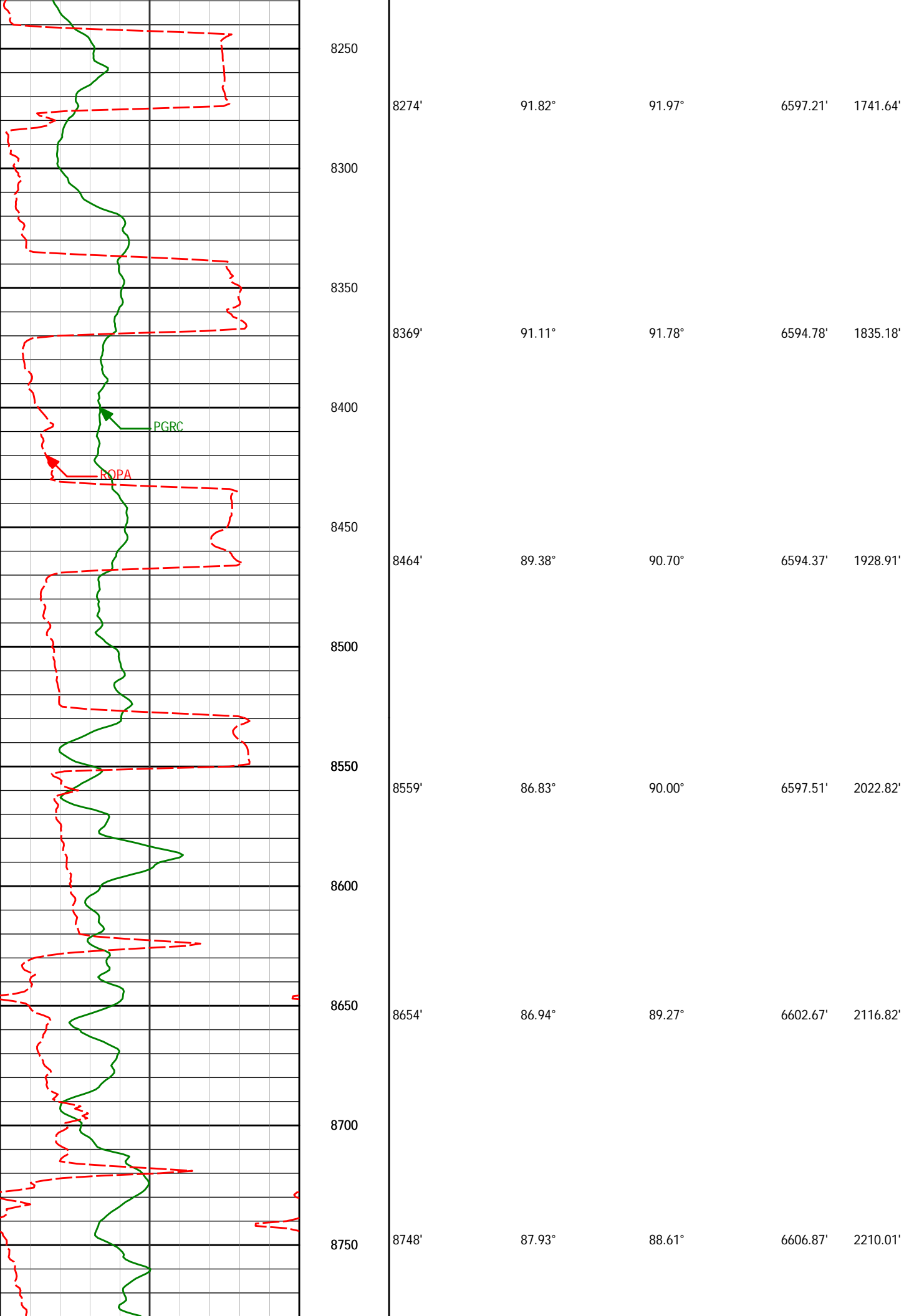
8179'

92.99°

89.53°

6601.20'

1647.86'





8800

8850

8900

8950

9000

9050

9100

9150

9200

9250

9300

8843'

86.63°

87.15°

6611.38'

2304.38'

8938'

87.44°

90.17°

6616.29'

2398.59'

9033'

89.78°

89.50°

6618.59'

2492.64'

9128'

92.53°

89.47°

6616.68'

2586.78'

9223'

92.25°

88.35°

6612.72'

2680.99'

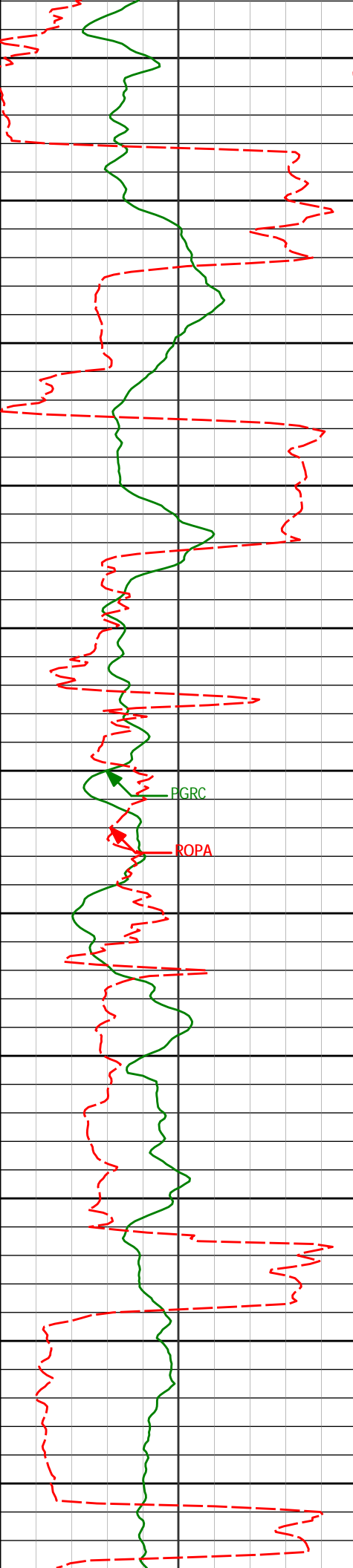
9318'

94.54°

87.86°

6607.10'

2775.26'



9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9413'

93.61°

87.87°

6600.35'

2869.51'

9508'

88.33°

87.36°

6598.73'

2963.99'

9603'

88.02°

87.03°

6601.75'

3058.53'

9698'

88.71°

86.49°

6604.47'

3153.15'

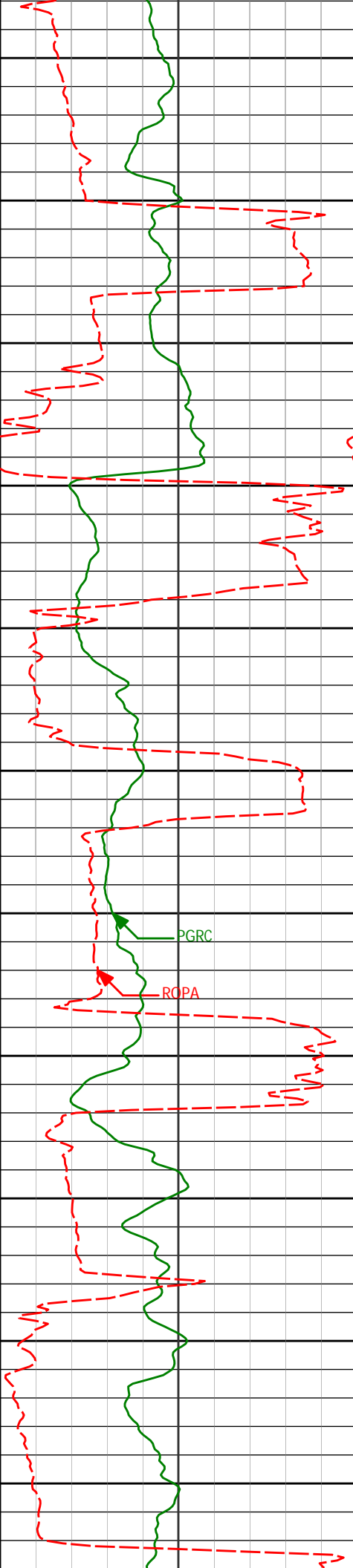
9793'

90.09°

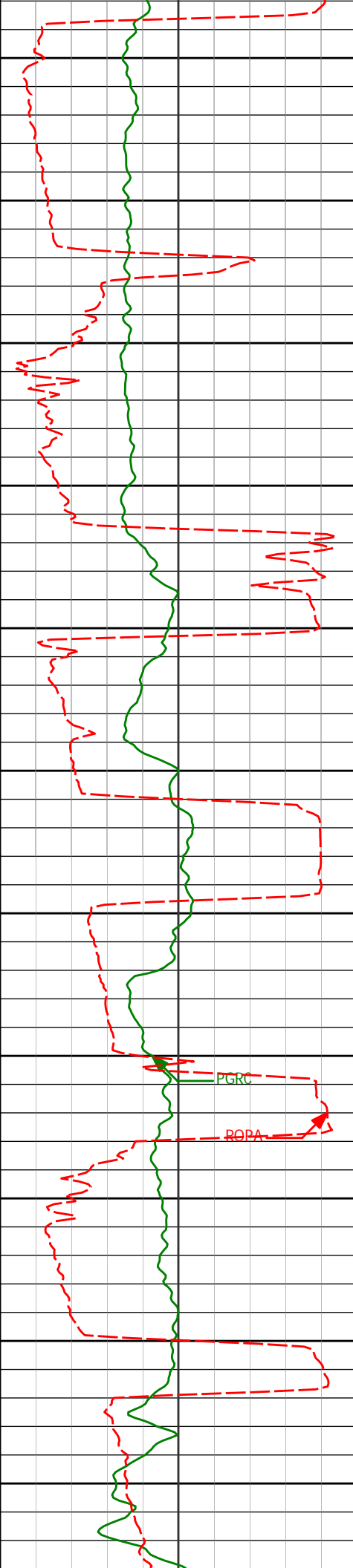
87.76°

6605.46'

3247.75'



9888'	92.66°	89.16°	6603.18'	3342.09'
9900				
9950				
9983'	92.47°	88.87°	6598.93'	3436.26'
10000				
10050				
10077'	91.51°	89.90°	6595.67'	3529.40'
10100				
10150				
10172'	91.20°	89.78°	6593.43'	3623.47'
10200				
10267'	87.35°	88.12°	6594.63'	3717.72'
10300				
10350				
10362'	87.47°	87.89°	6598.93'	3812.09'
10400				



10450

10457'

89.75°

86.53°

6601.23'

3906.64'

10500

10550

10552'

89.85°

84.40°

6601.56'

4001.45'

10600

10650

10647'

91.39°

86.07°

6600.54'

4096.28'

10700

10750

10742'

90.71°

87.44°

6598.80'

4190.92'

10800

PGRC

RQPA

10850

10837'

91.26°

88.53°

6597.16'

4285.37'

10900

10932'

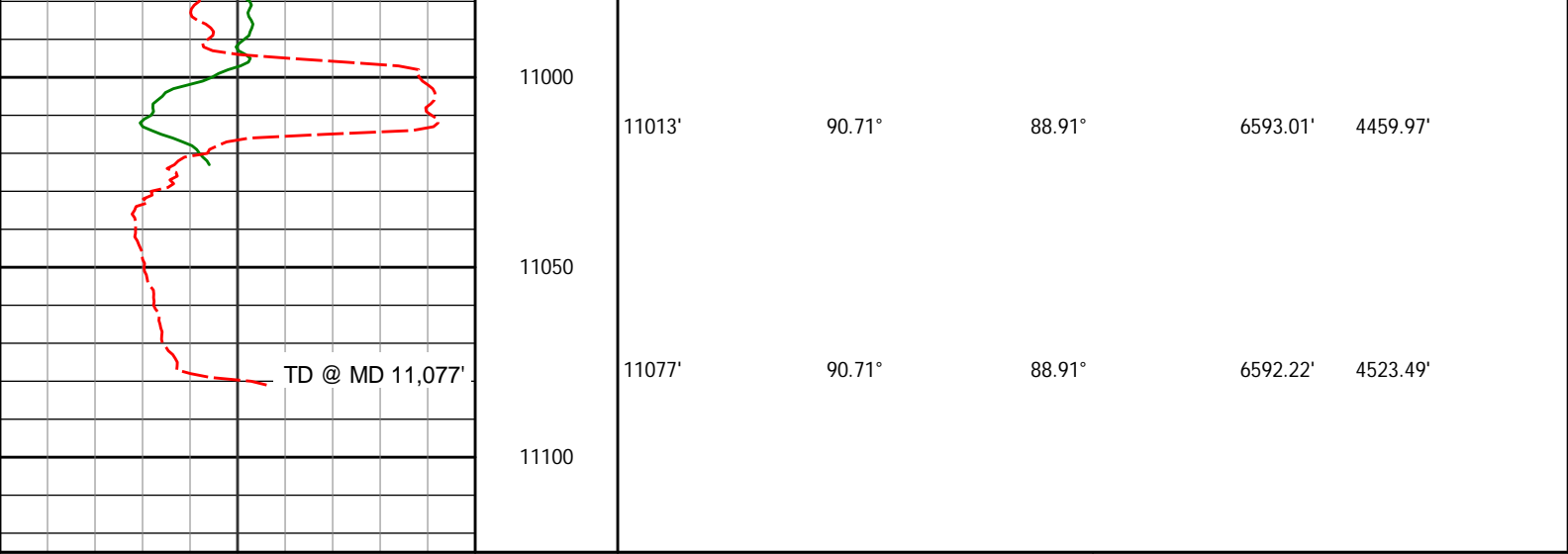
91.70°

89.28°

6594.71'

4379.63'

10950



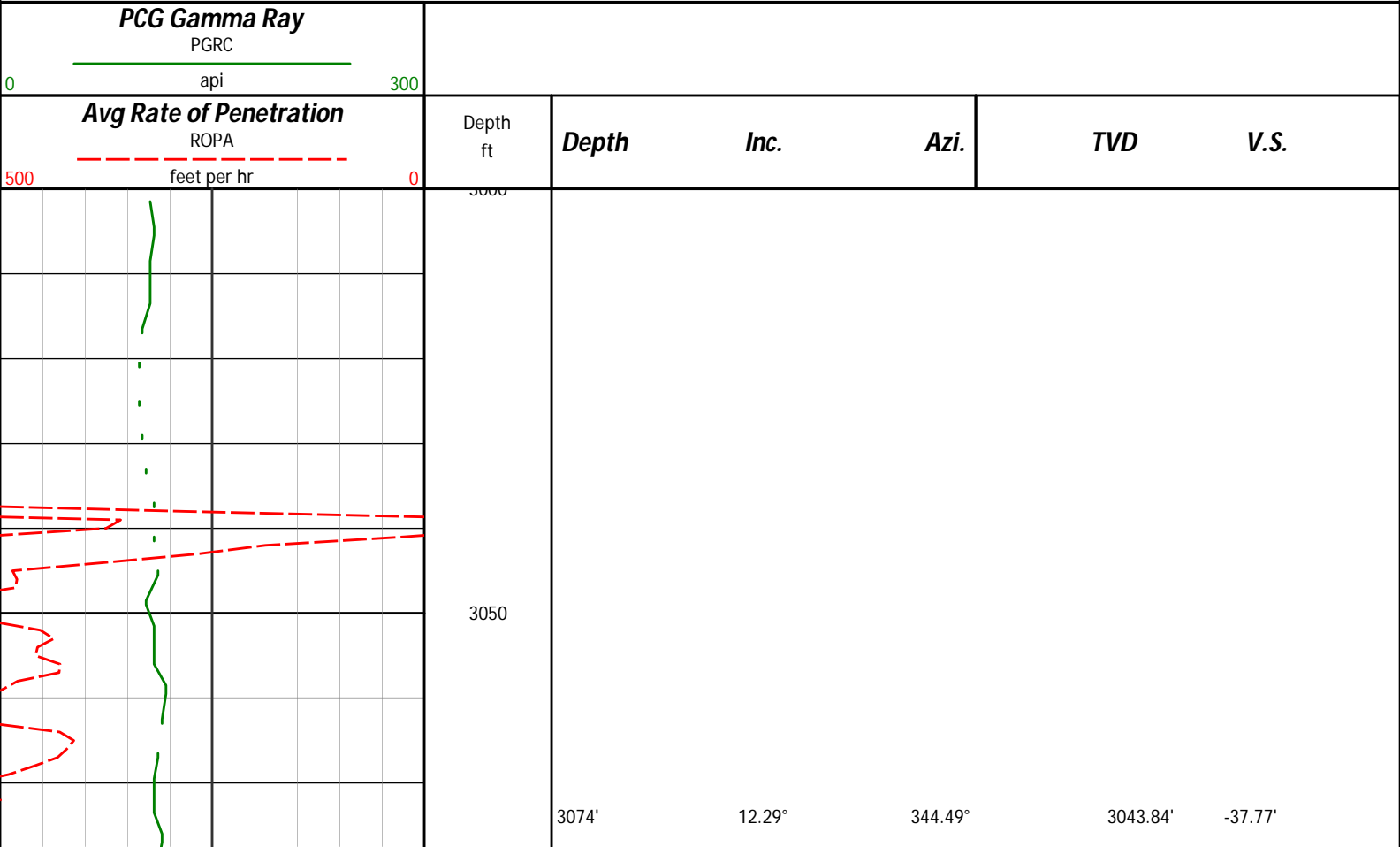
Avg Rate of Penetration ROPA feet per hr	Depth ft	Depth	Inc.	Azi.	TVD	V.S.
500	0					
PCG Gamma Ray PGRC api						
0	300					

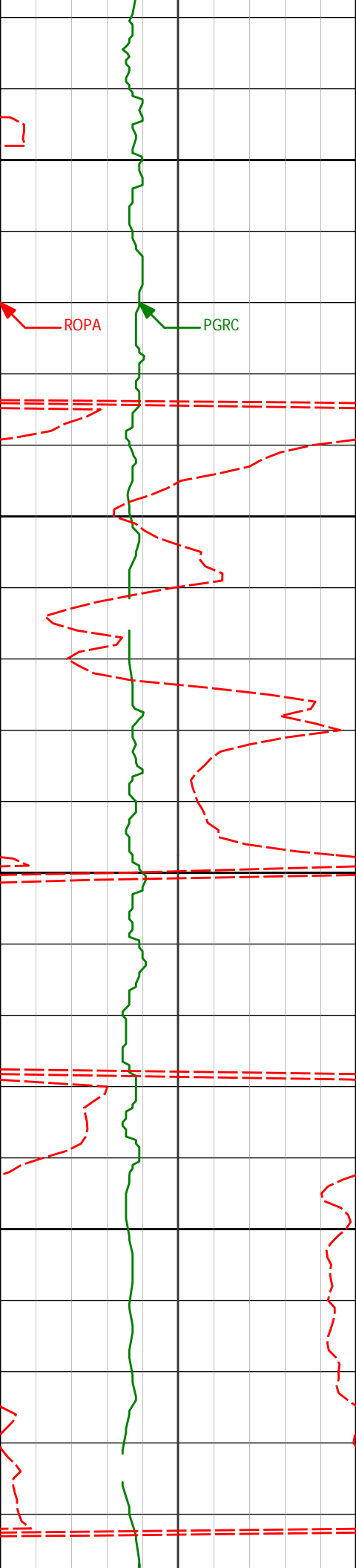
HALLIBURTON

Sperry Drilling Services

MD Detail Log 1:240

Noble Energy
Wells Ranch AE20-65-1HN
H&P 343
T6N-R62W





3100

3150

3200

3250

3169'

3264'

12.20°

15.08°

348.14°

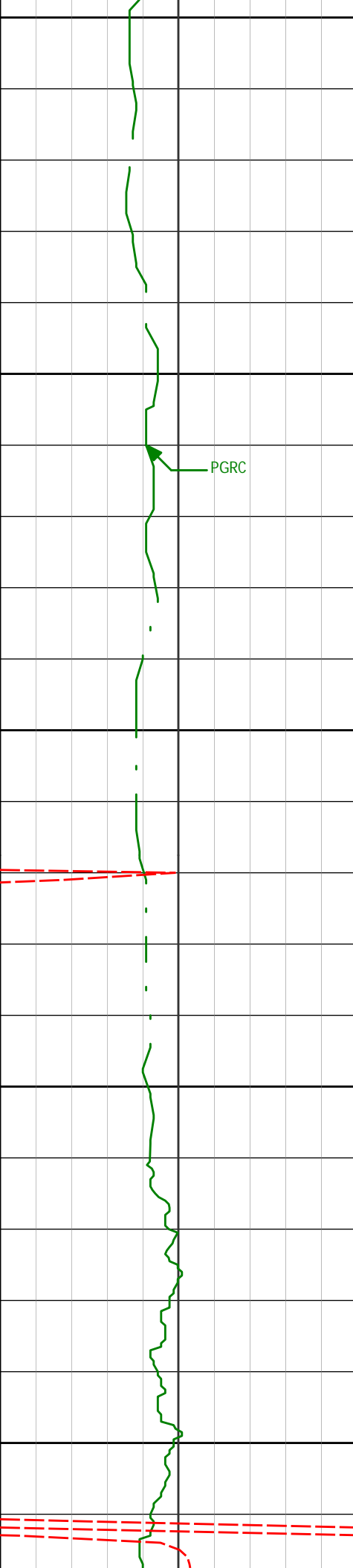
347.99°

3136.68'

3228.99'

-39.73'

-41.23'



3300

3350

3400

3450

3500

3359'

13.36°

347.39°

3321.08'

-42.93'

PGRC

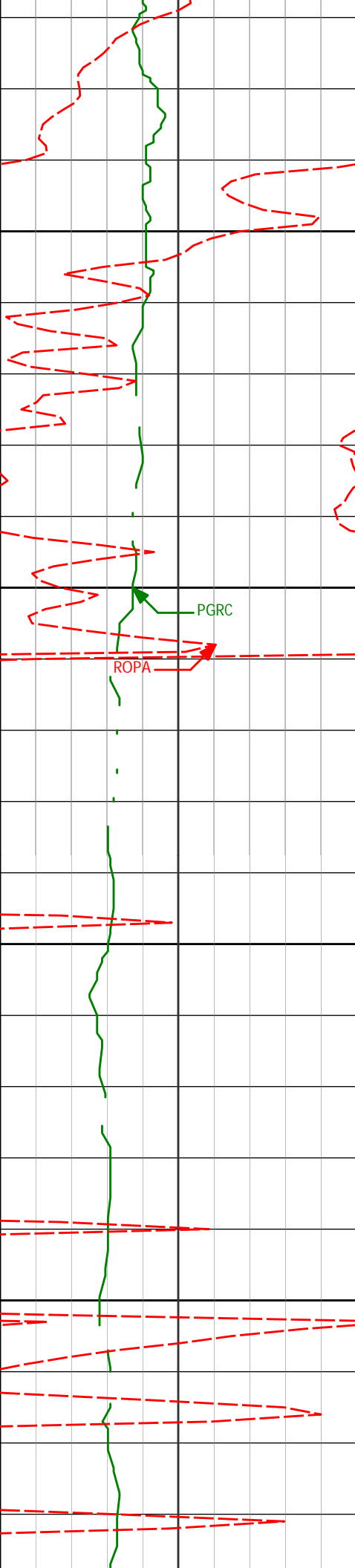
3454'

10.30°

347.86°

3414.05'

-44.40'



3550

3600

3650

3700

3549'

11.82°

345.40°

3507.28'

-46.10'

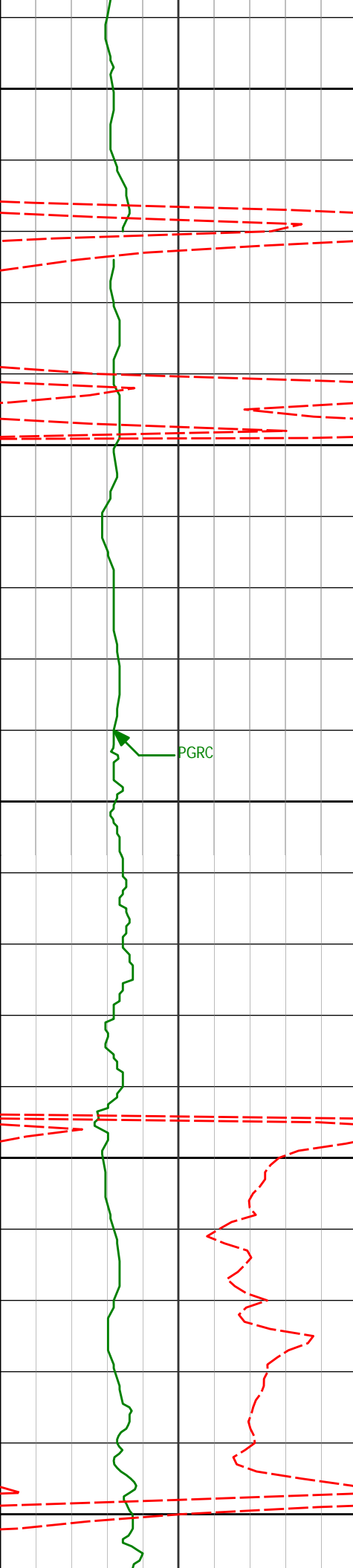
3644'

15.74°

343.89°

3599.53'

-49.00'



3750

3800

3850

3900

3950

3834'

19.39°

343.82°

3780.62'

-57.42'

3929'

18.59°

339.82°

3870.46'

-62.80'

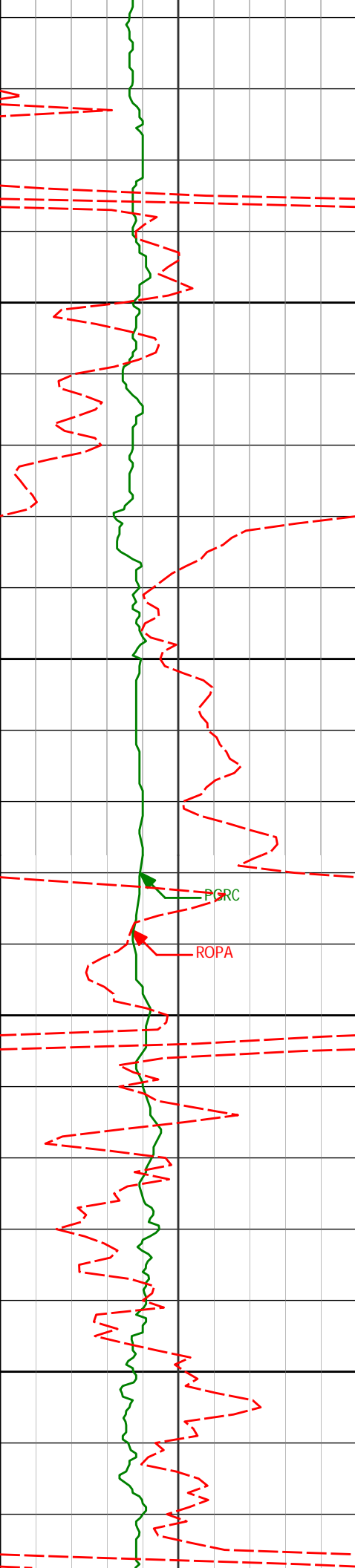
3739'

17.60°

343.07°

3690.53'

-53.00'



4000

4050

4100

4150

4023'

14.70°

341.81°

3960.50'

-68.03'

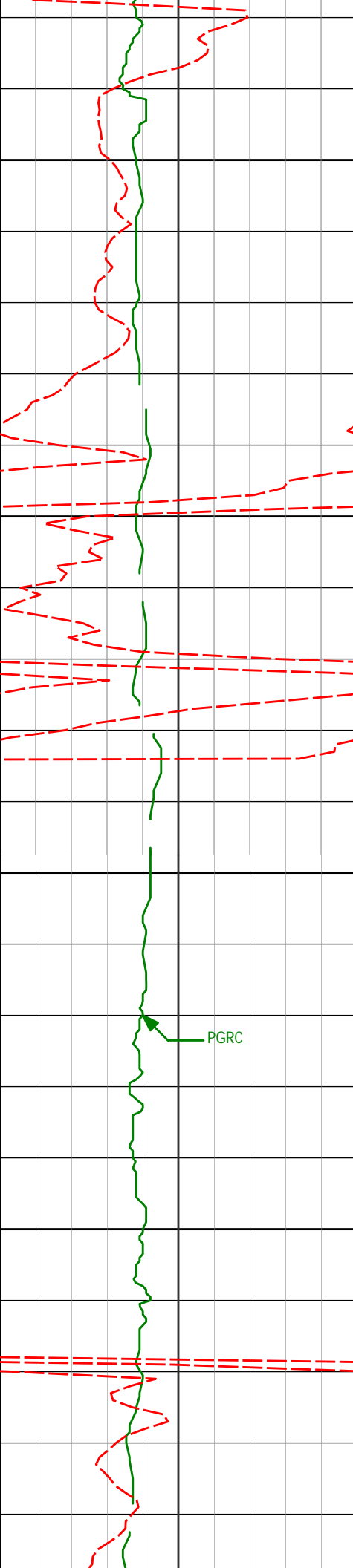
4118'

9.32°

334.47°

4053.39'

-72.45'



4200

4213'

6.14°

338.06°

4147.52'

-75.97'

4250

4300

4308'

3.81°

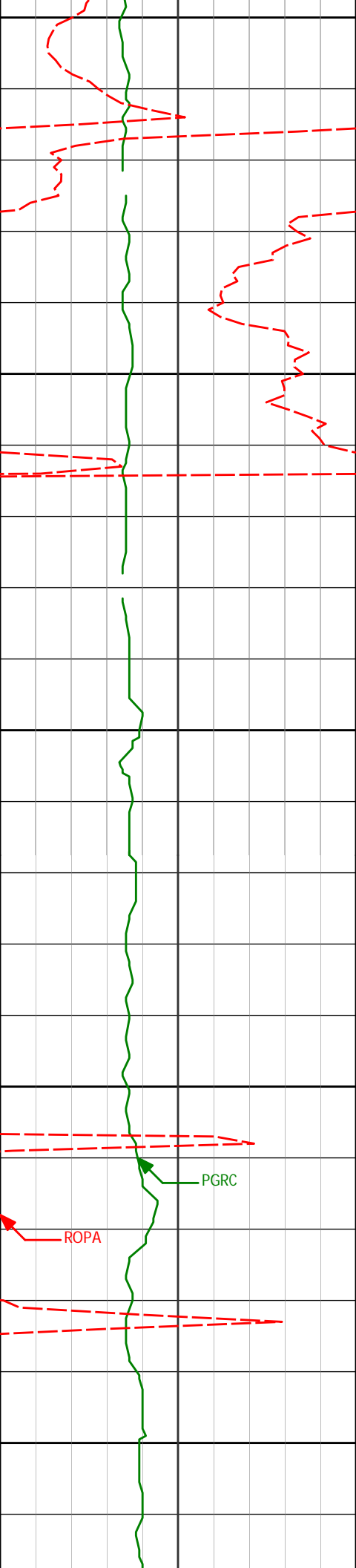
329.87°

4242.15'

-78.37'

4350

PGRC



4400

4450

4500

4550

4600

4403'

4498'

4593'

0.99°

0.54°

1.70°

288.31°

235.92°

157.26°

4337.06'

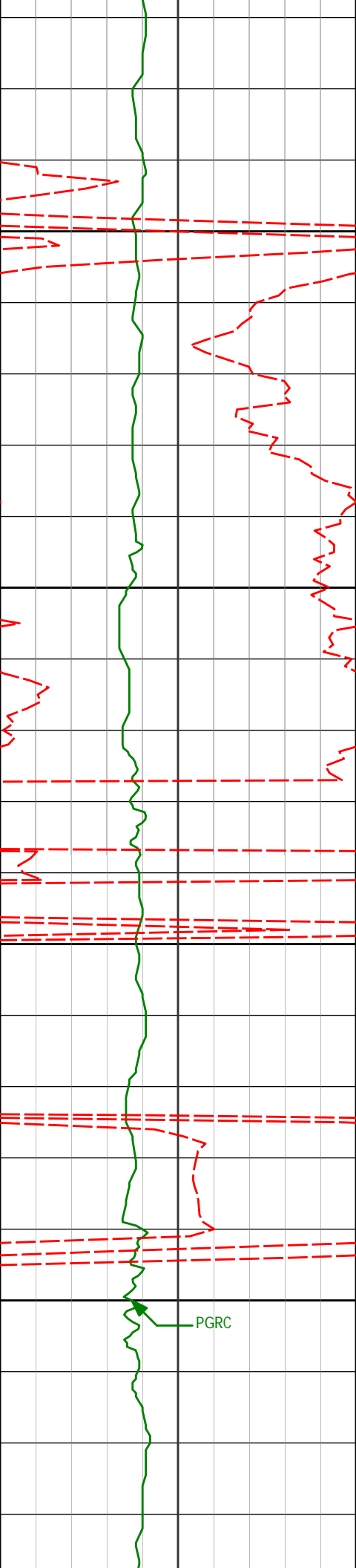
4432.06'

4527.04'

-80.30'

-81.44'

-81.48'



4650

4700

4750

4800

4688'

4.75°

147.00°

4621.88'

-79.47'

4783'

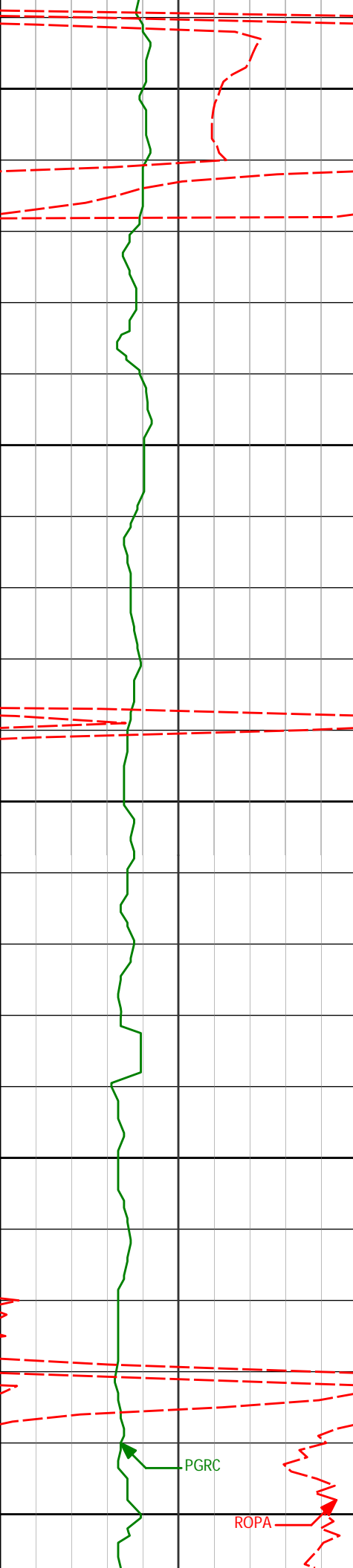
4.25°

143.61°

4716.59'

-76.14'

PGRC



4850

4878'

2.33°

163.36°

4811.43'

-74.19'

4900

4950

4973'

1.75°

182.52°

4906.37'

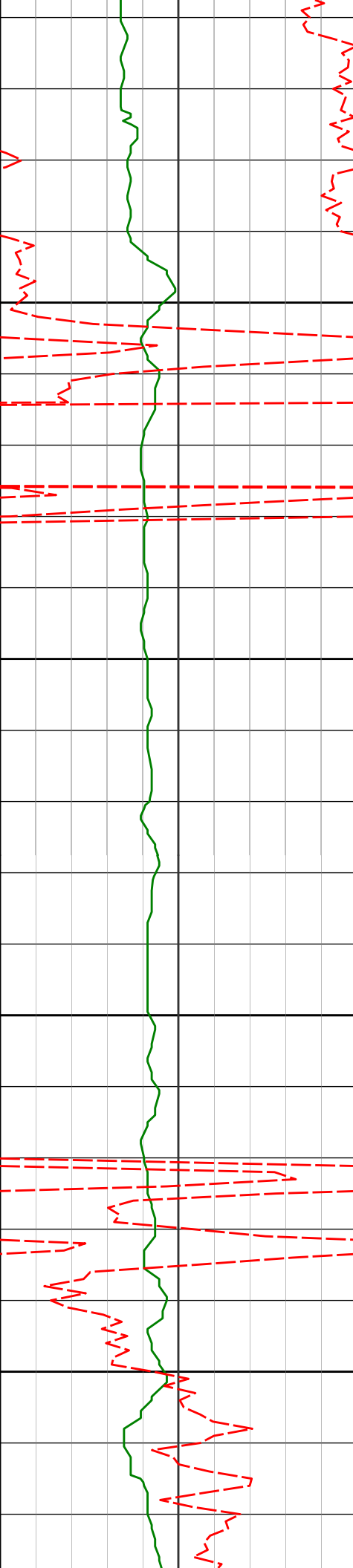
-74.17'

5000

5050

PGRC

ROPA



5100

5150

5200

5250

5068'

1.90°

169.44°

5001.32'

-74.37'

5163'

1.22°

157.18°

5096.29'

-74.05'

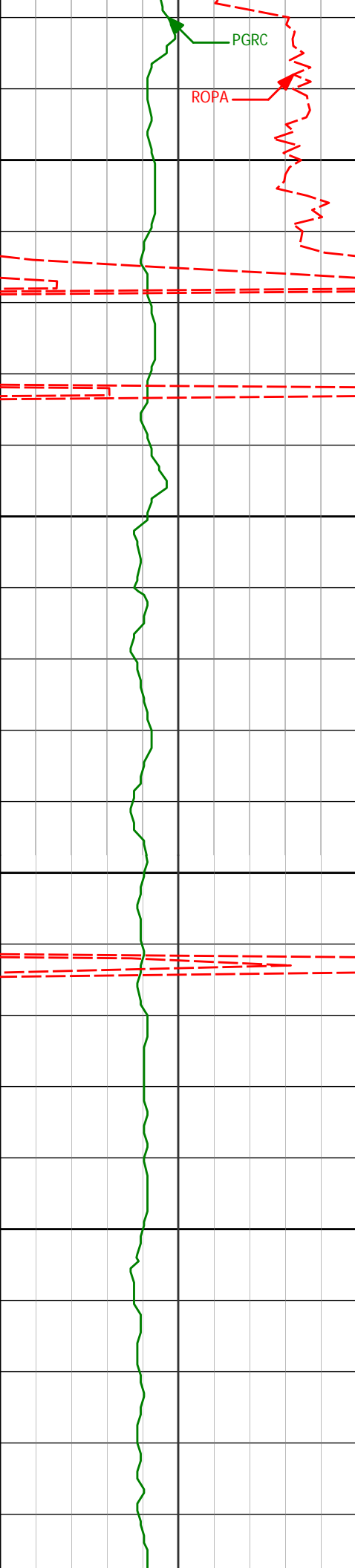
5258'

0.65°

179.98°

5191.27'

-73.86'



5300

5350

5400

5450

5352'

0.78°

206.73°

5285.27'

-74.30'

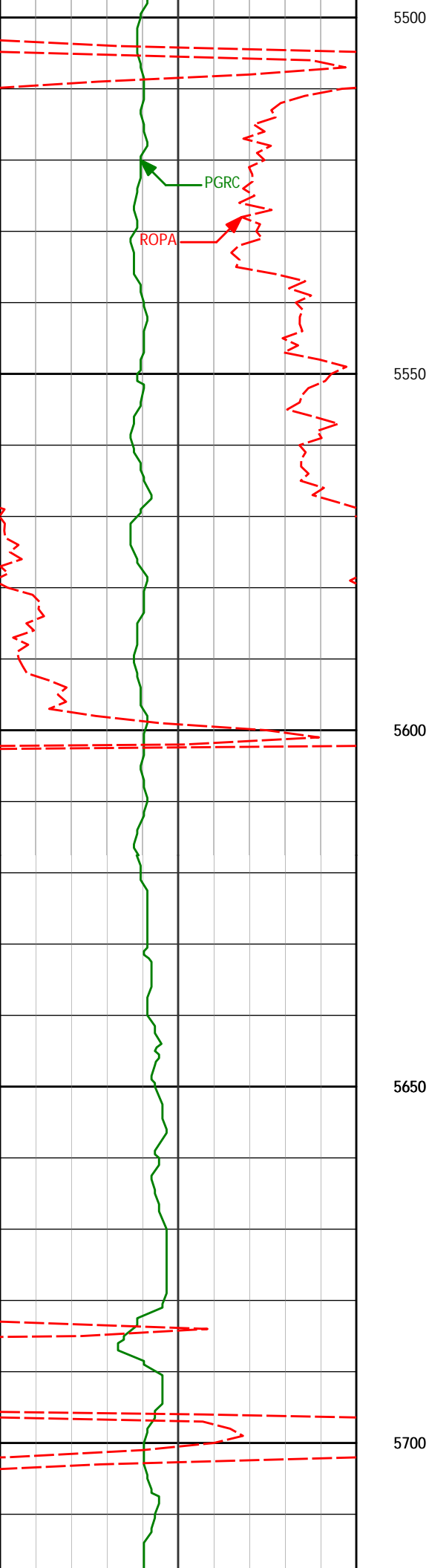
5447'

0.65°

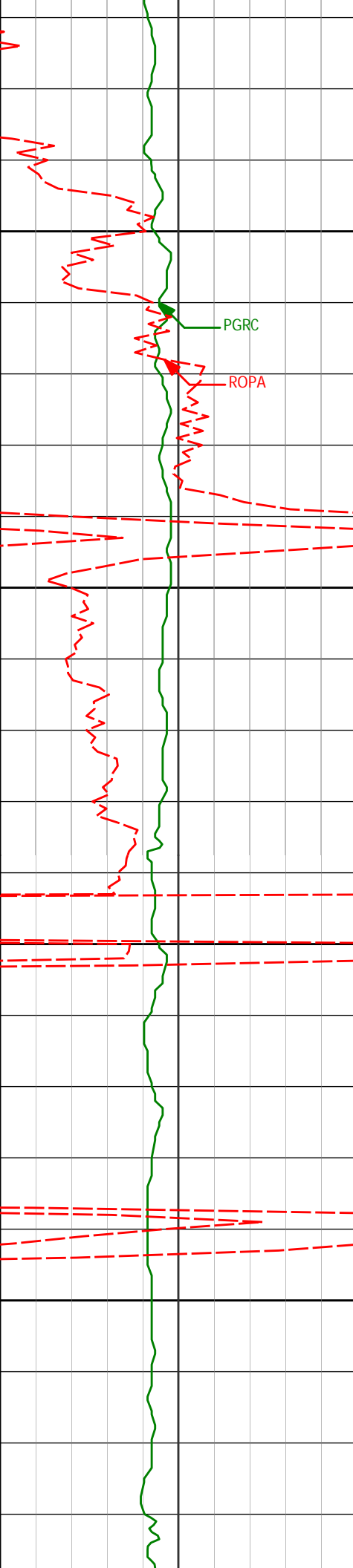
189.93°

5380.26'

-74.84'



5500				
5542'	0.74°	125.12°	5475.25'	-74.55'
5550				
5600				
5637'	1.00°	129.97°	5570.24'	-73.55'
5650				
5700				



5732'

0.75°

127.57°

5665.23'

-72.56'

5750

PGRC

ROPA

5800

5827'

0.91°

100.01°

5760.22'

-71.40'

5850

5900

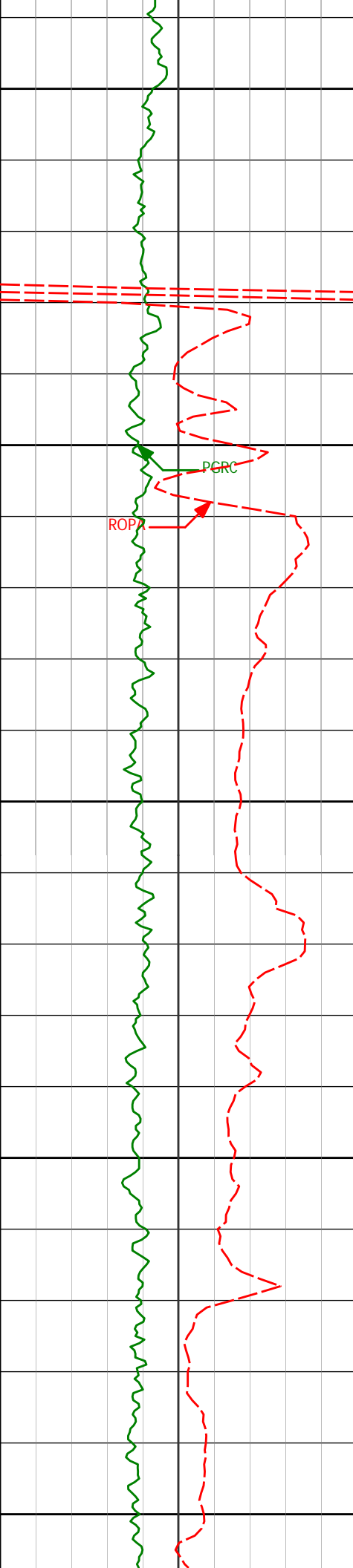
5922'

1.03°

50.31°

5855.21'

-69.96'



<Run 200>

6000

PCRC

ROPA

6050

6100

6150

6013'

1.84°

70.32°

5946.18'

-67.82'

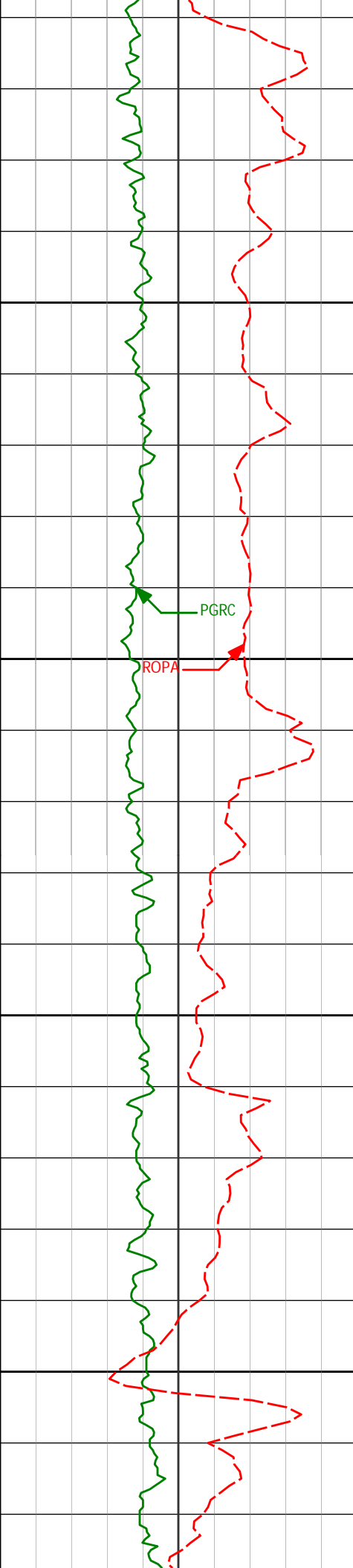
6108'

8.84°

87.26°

6040.71'

-59.04'



6200

6203'

11.17°

85.87°

6134.26'

-42.59'

6250

6300

6350

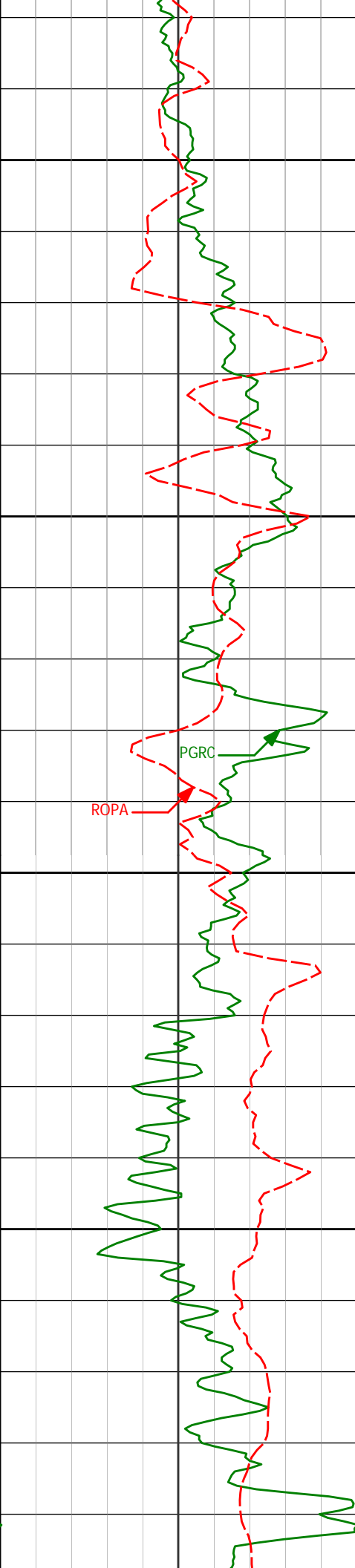
6298'

17.38°

87.17°

6226.28'

-19.26'



6400

6450

6500

<Run 300>

6550

6393'

22.51°

91.43°

6315.56'

12.82'

6488'

26.50°

92.09°

6401.99'

51.62'

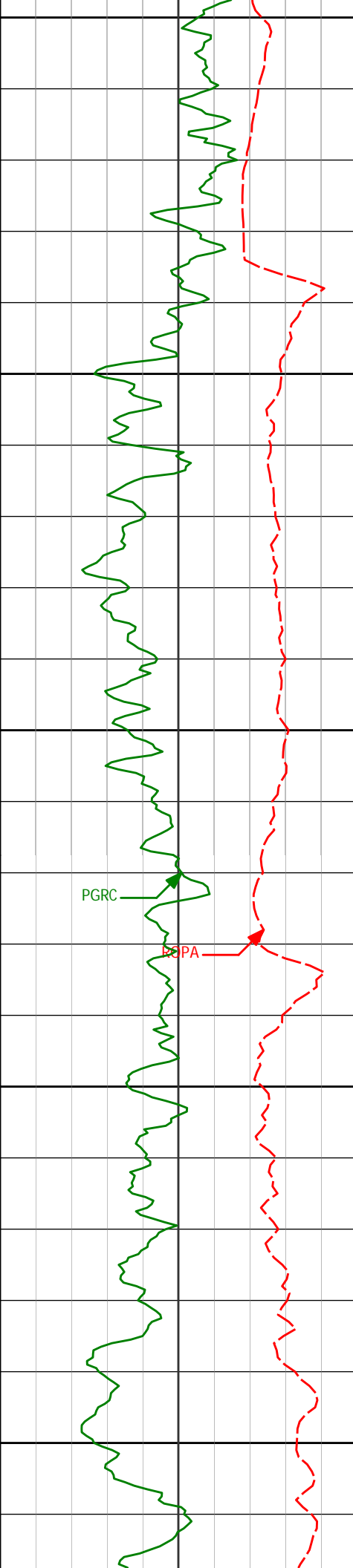
6583'

38.10°

89.99°

6482.16'

101.67'



6600

6650

6700

6750

6800

PGRC

EAPA

6678'

53.72°

86.64°

6548.06'

169.28'

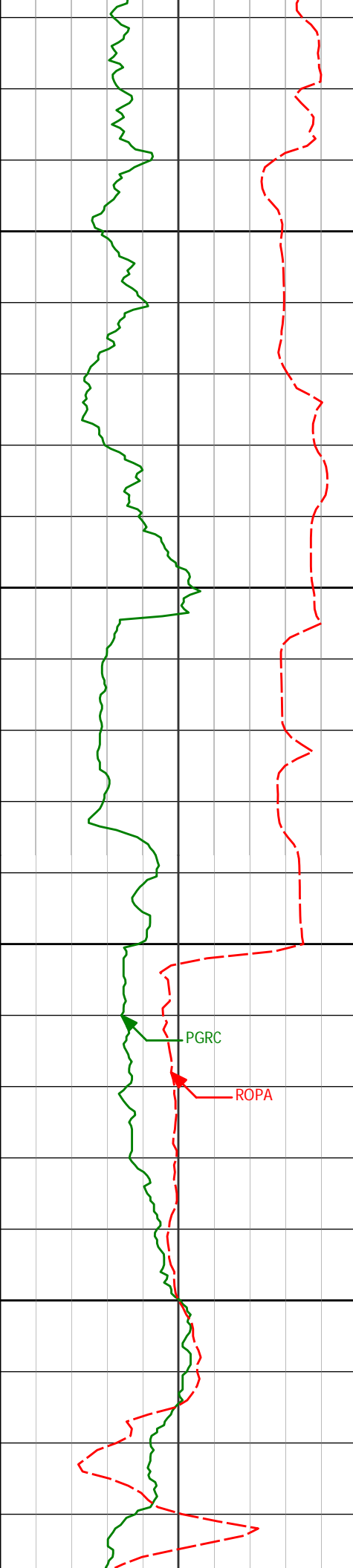
6772'

71.47°

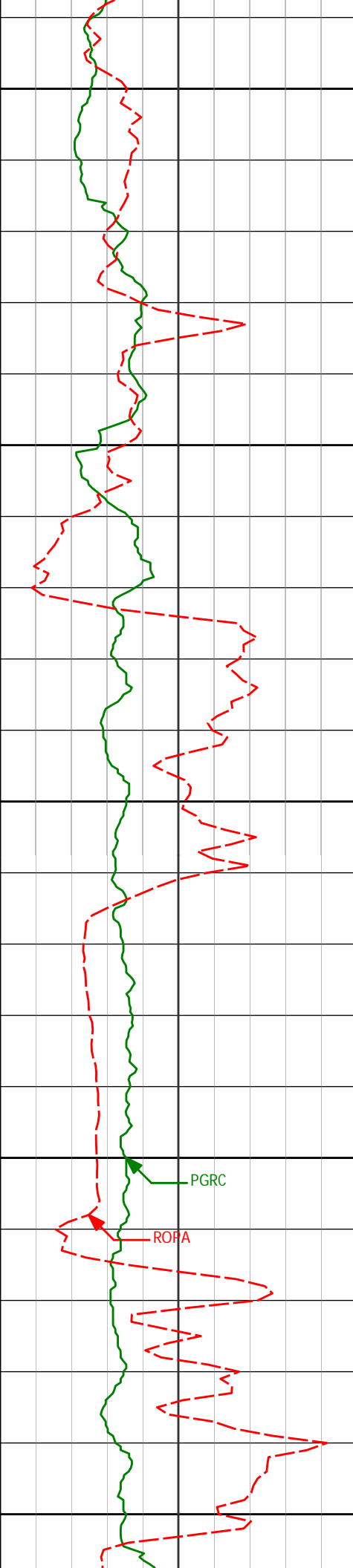
85.74°

6591.15'

252.17'



6820'	80.10°	87.85°	6602.93'	298.48'
6850				
6866'	83.77°	89.43°	6609.39'	343.70'
6895'	87.32°	89.86°	6611.64'	372.34'
6900				
 Casing Set @ 7,120' MD				
6950 <Run 400>				
7000				
7018'	91.66°	90.88°	6612.73'	493.97'



7050

7064'

92.35°

90.28°

6611.12'

539.41'

7100

7150

7156'

91.42°

89.15°

6608.10'

630.51'

7200

PGRC

ROFA

7250

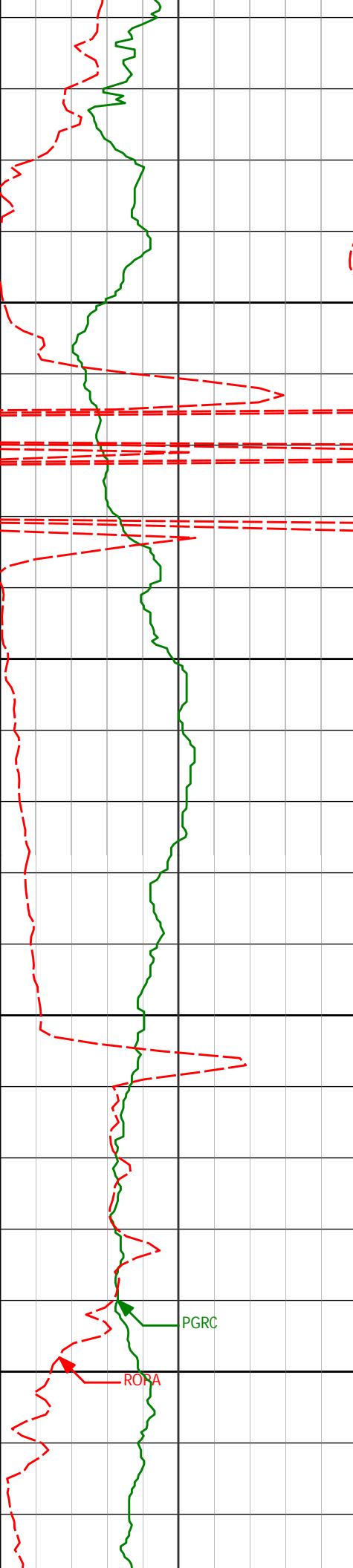
7249'

85.67°

89.25°

6610.46'

722.68'



7300

7350

7400

7450

7342'

88.27°

89.08°

6615.37'

814.80'

7434'

90.37°

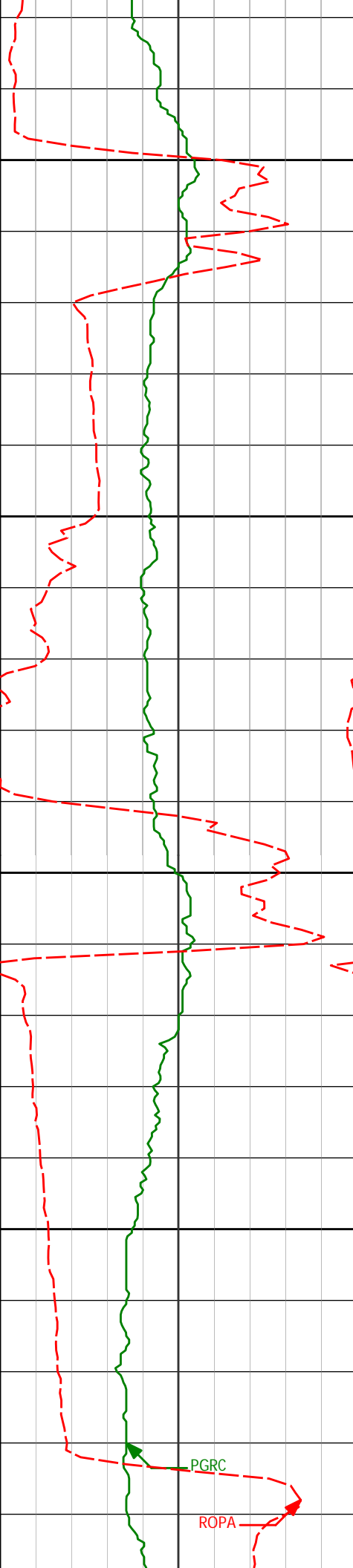
89.25°

6616.46'

906.05'

PGRC

ROPA



7500

7527'

91.51°

88.47°

6614.93'

998.35'

7550

7600

7620'

88.77°

85.62°

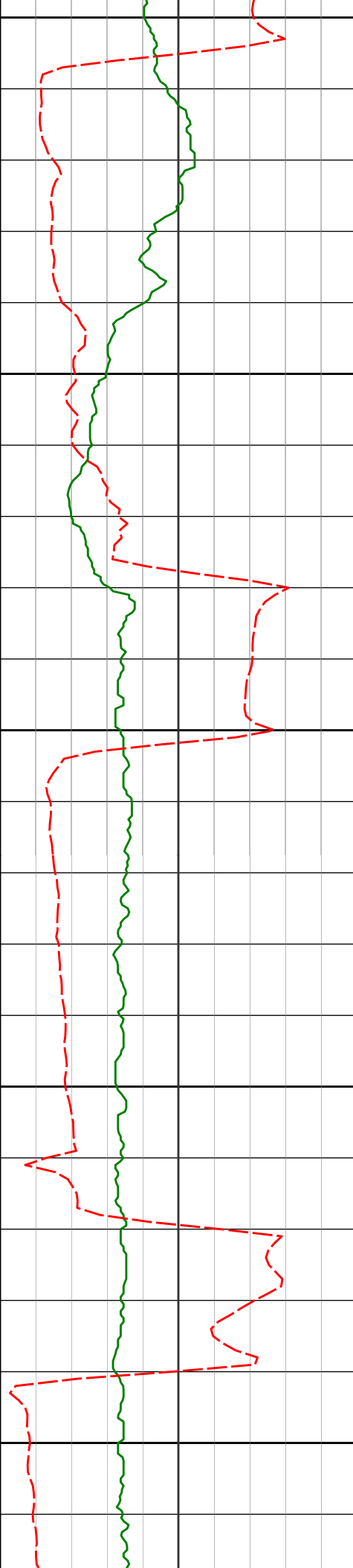
6614.71'

1090.96'

7650

PGRC

ROPA



7700

7712'

92.22°

87.42°

6613.92'

1182.64'

7750

7800

7805'

90.62°

85.94°

6611.61'

1275.28'

7850

7900

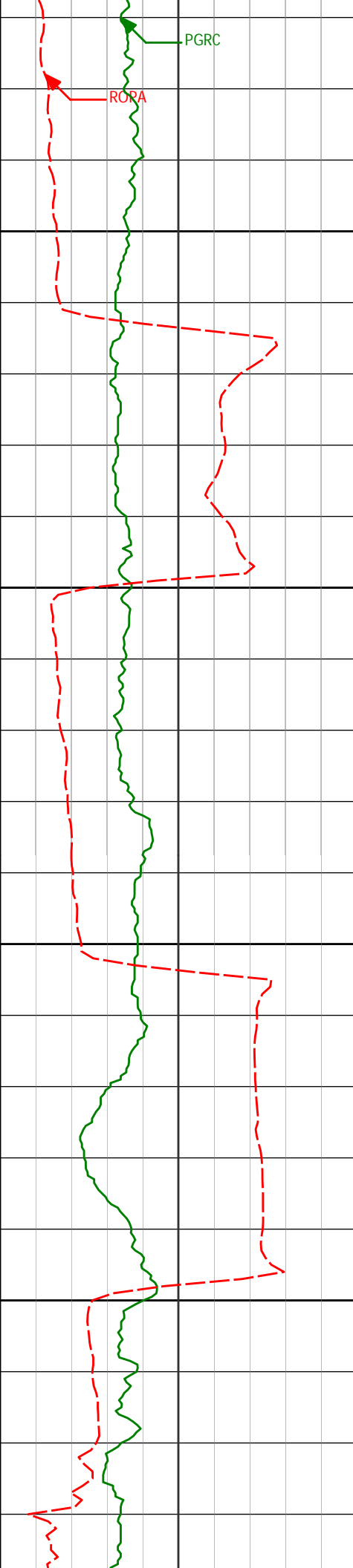
7898'

90.22°

82.05°

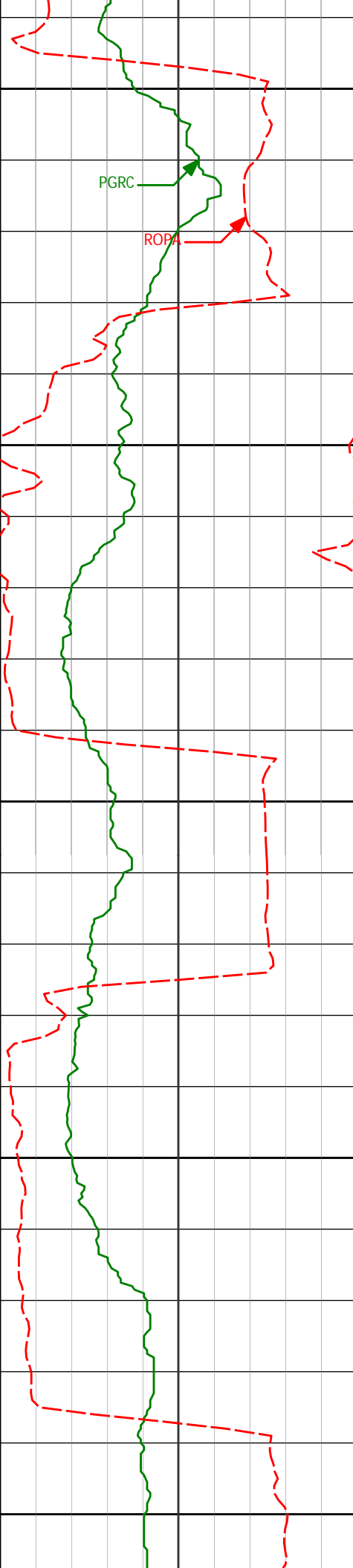
6610.94'

1368.19'



7991' 90.22° 82.80° 6610.59' 1461.19'

8084' 94.11° 89.02° 6607.08' 1553.83'



8150

PGRC

ROPA

8200

8250

8300

8350

8179'

92.99°

89.53°

6601.20'

1647.86'

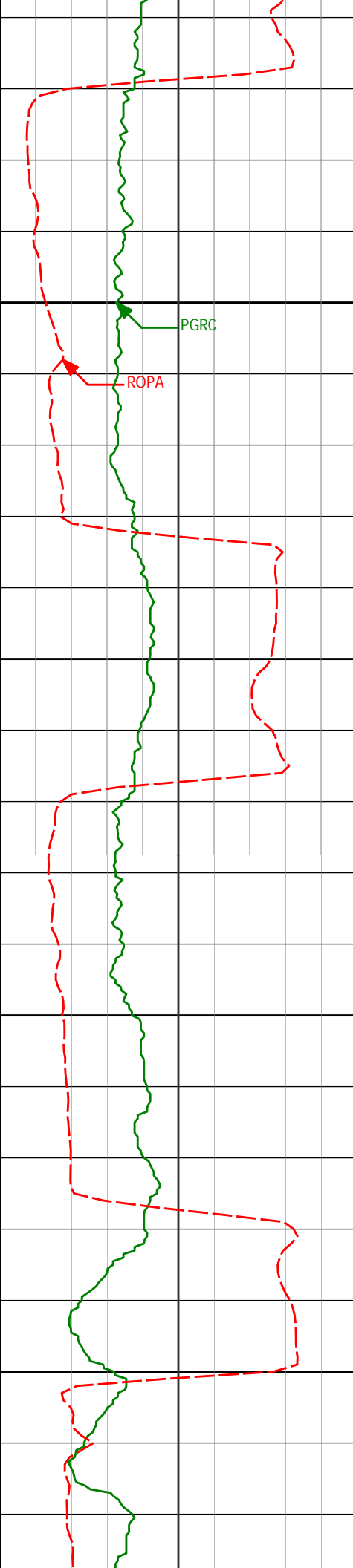
8274'

91.82°

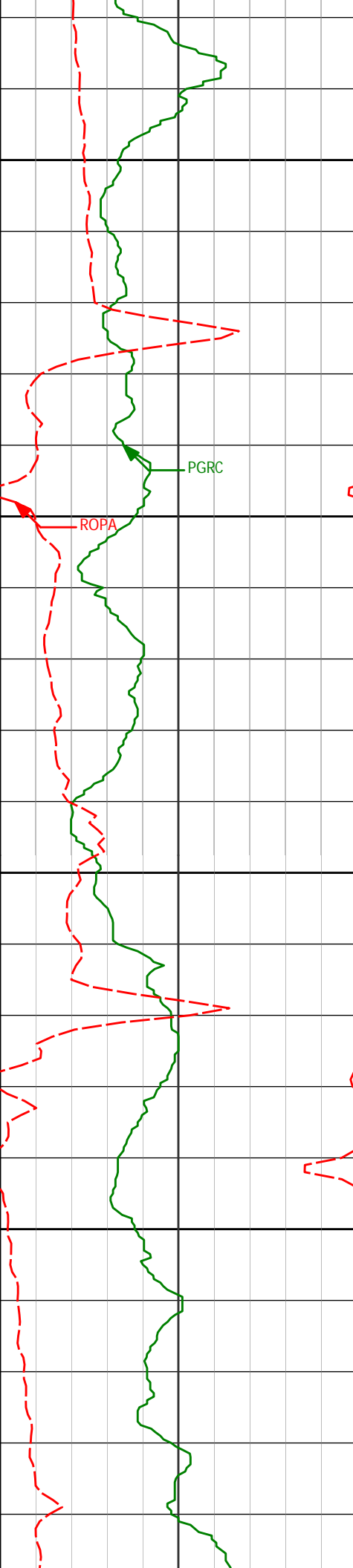
91.97°

6597.21'

1741.64'



8369'	91.11°	91.78°	6594.78'	1835.18'
8400				
8450				
8464'	89.38°	90.70°	6594.37'	1928.91'
8500				
8550				
8559'	86.83°	90.00°	6597.51'	2022.82'



8600

8650

8700

8750

8654'

86.94°

89.27°

6602.67'

2116.82'

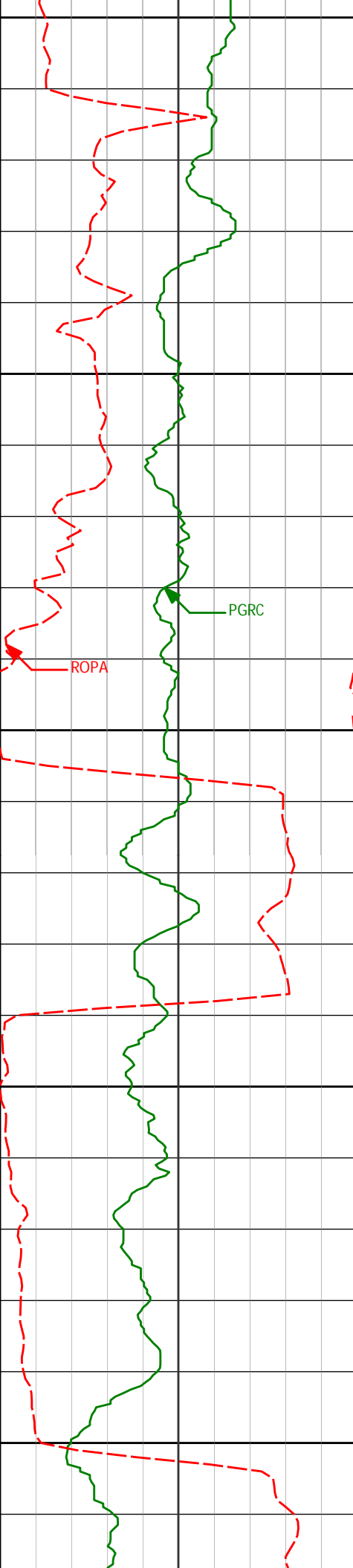
8748'

87.93°

88.61°

6606.87'

2210.01'



8800

8843'

86.63°

87.15°

6611.38'

2304.38'

8850

PGRC

ROPA

8900

8938'

87.44°

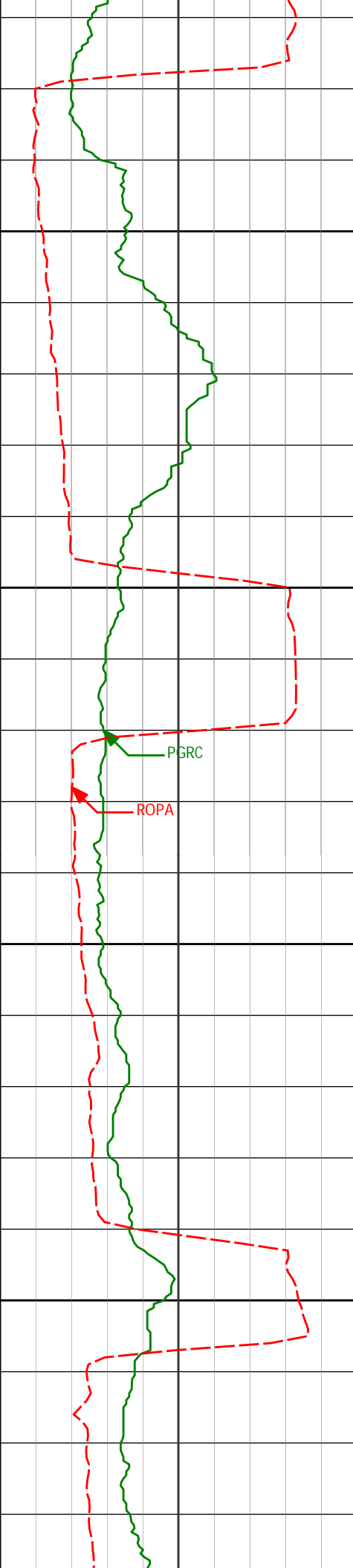
90.17°

6616.29'

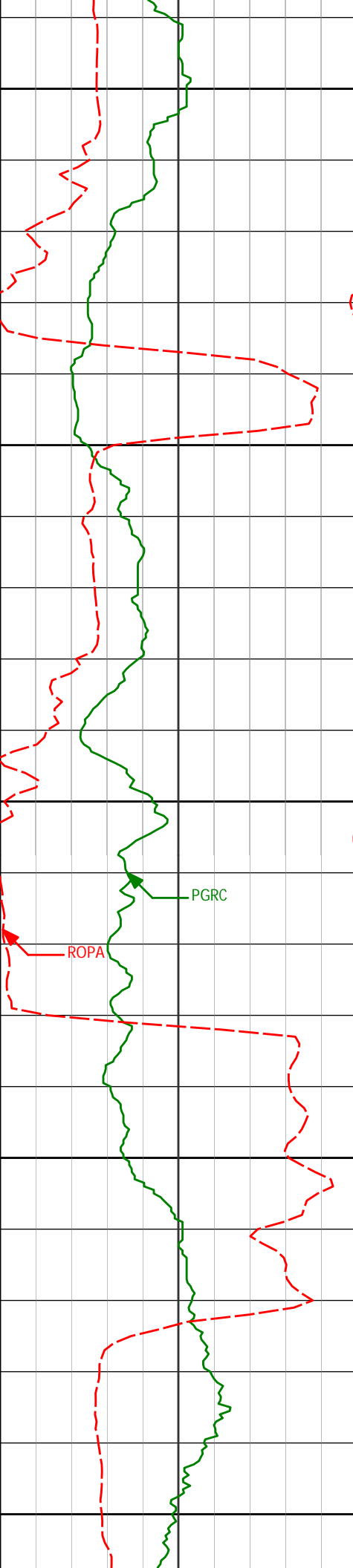
2398.59'

8950

9000



9033'	89.78°	89.50°	6618.59'	2492.64'
9128'	92.53°	89.47°	6616.68'	2586.78'
9223'	92.25°	88.35°	6612.72'	2680.99'



9250

9300

9350

9400

9450

9318'

94.54°

87.86°

6607.10'

2775.26'

PGRC

ROPA

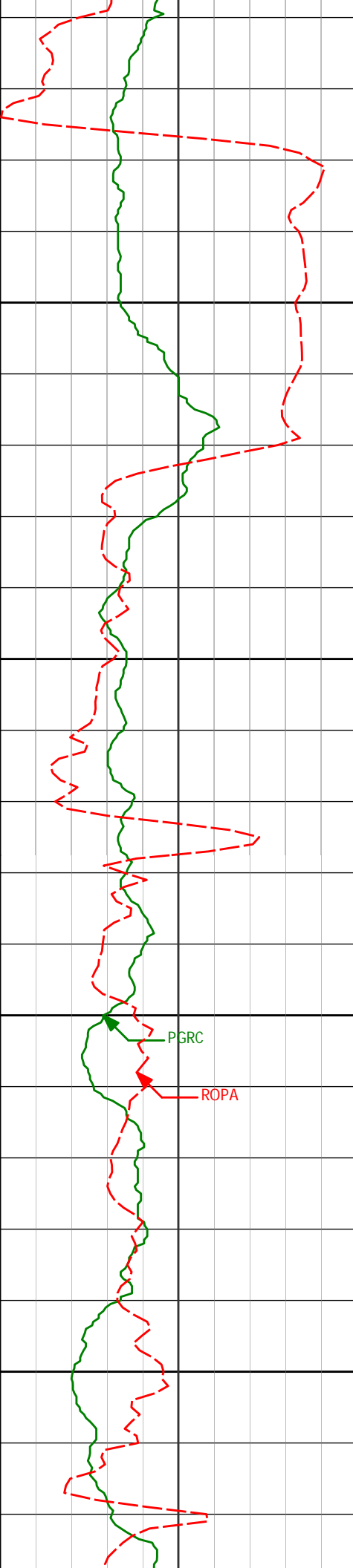
9413'

93.61°

87.87°

6600.35'

2869.51'



9500

9508'

88.33°

87.36°

6598.73'

2963.99'

9550

9600

9603'

88.02°

87.03°

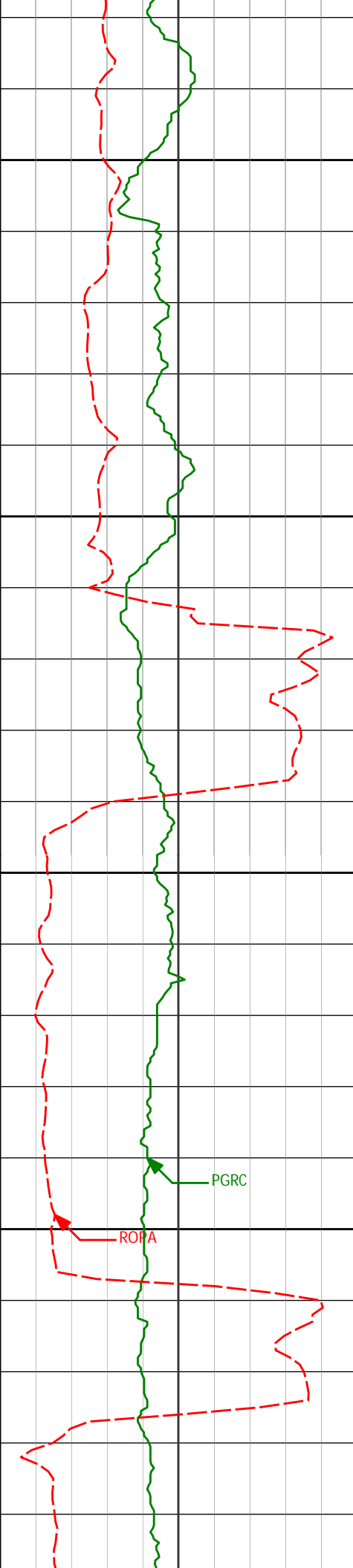
6601.75'

3058.53'

9650

PGRC

ROPA



9700

9750

9800

9850

9698'

9793'

9888'

88.71°

90.09°

92.66°

86.49°

87.76°

89.16°

6604.47'

6605.46'

6603.18'

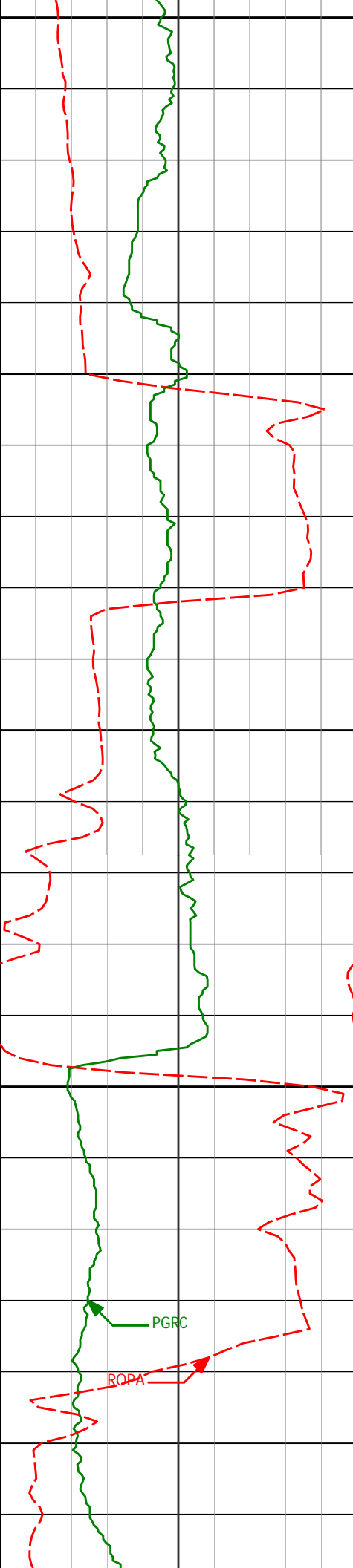
3153.15'

3247.75'

3342.09'

PGRC

ROPA



9900

9950

10000

10050

10100

9983'

92.47°

88.87°

6598.93'

3436.26'

10077'

91.51°

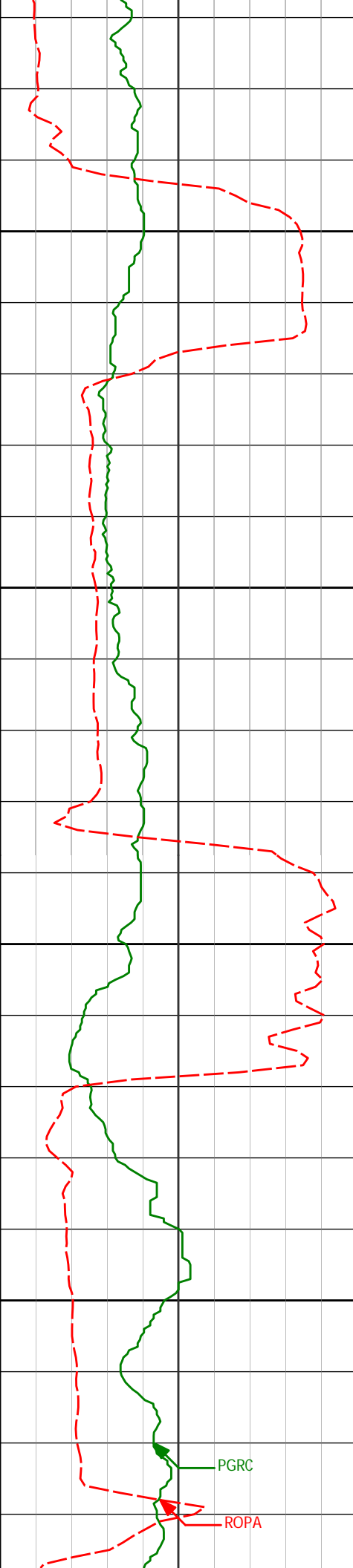
89.90°

6595.67'

3529.40'

PGRC

ROPA



10150

10200

10250

10300

10172'

91.20°

89.78°

6593.43'

3623.47'

10267'

87.35°

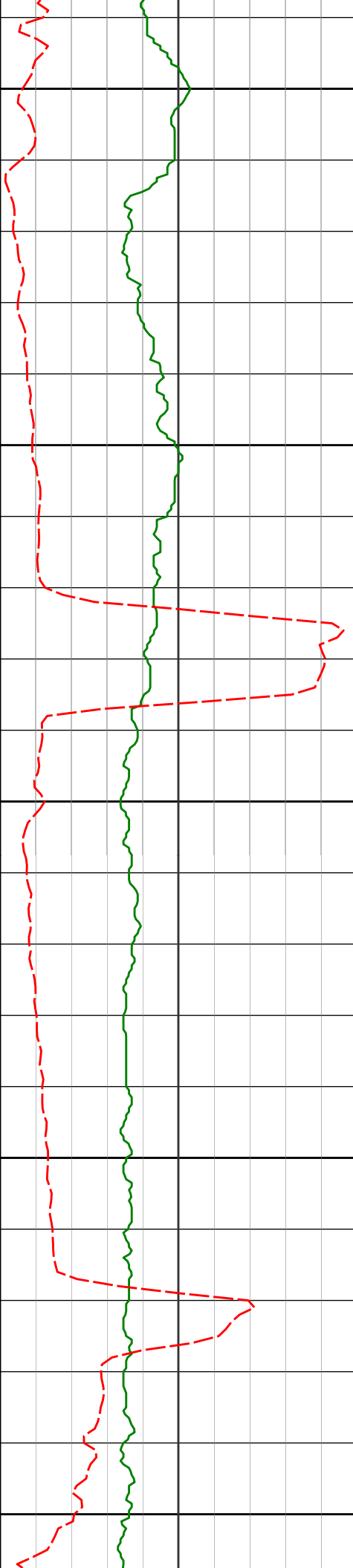
88.12°

6594.63'

3717.72'

PGRC

ROPA



10350

10362'

87.47°

87.89°

6598.93'

3812.09'

10400

10450

10457'

89.75°

86.53°

6601.23'

3906.64'

10500

10550

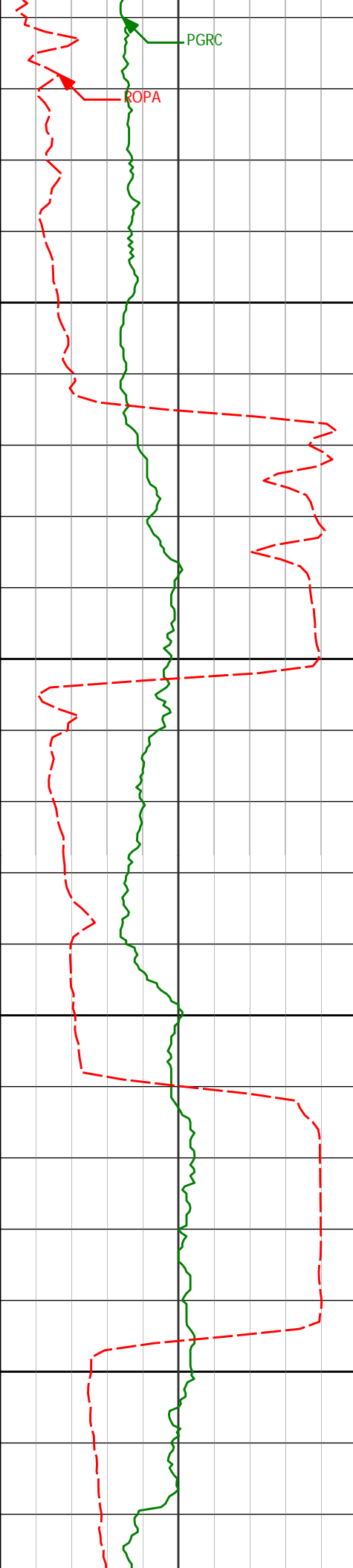
10552'

89.85°

84.40°

6601.56'

4001.45'



10600

10650

10700

10750

10647'

91.39°

86.07°

6600.54'

4096.28'

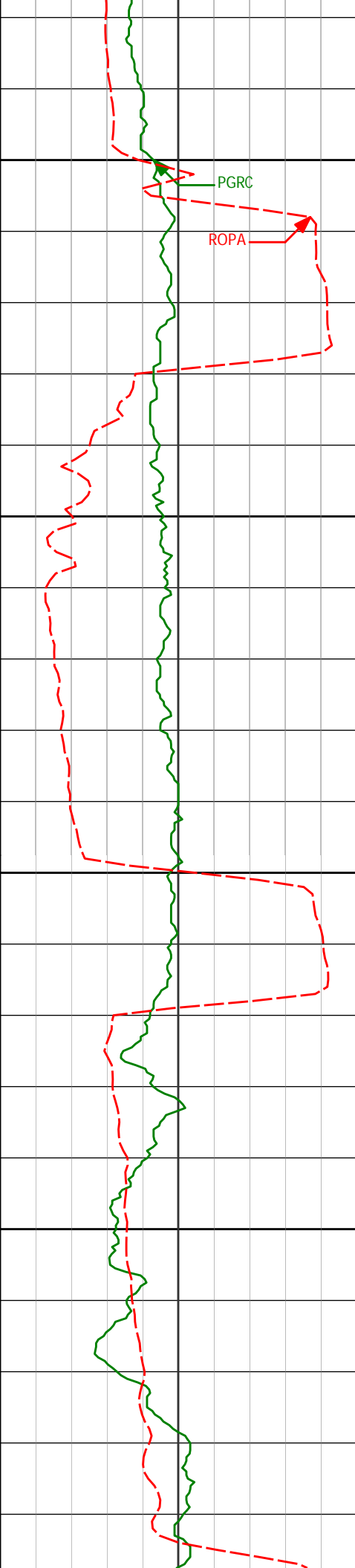
10742'

90.71°

87.44°

6598.80'

4190.92'



10800

10850

10900

10950

10837'

91.26°

88.53°

6597.16'

4285.37'

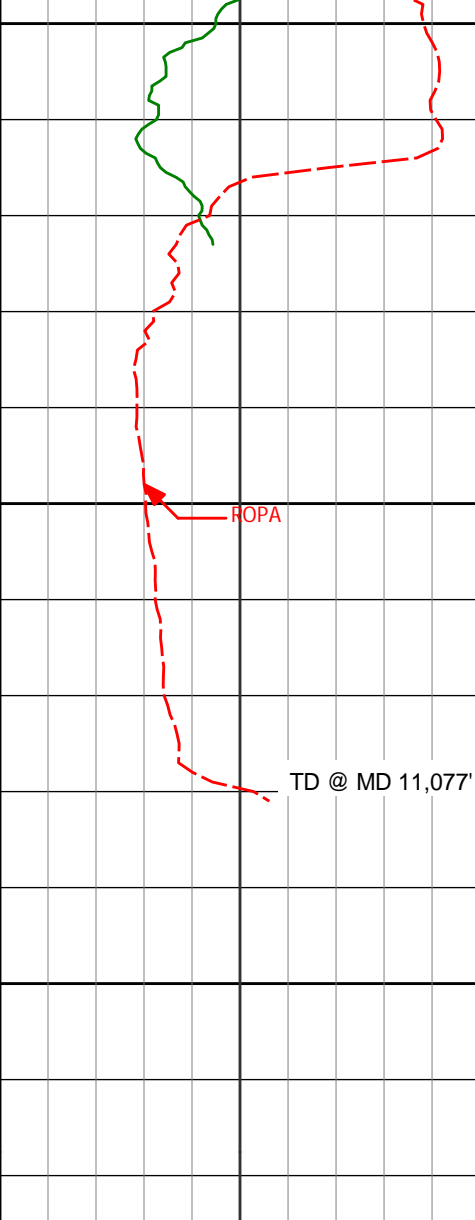
10932'

91.70°

89.28°

6594.71'

4379.63'



11000					
	11013'	90.71°	88.91°	6593.01'	4459.97'
11050					
	11077'	90.71°	88.91°	6592.22'	4523.49'
11100					

Avg Rate of Penetration ROPA 500 feet per hr 0		Depth ft	Depth	Inc.	Azi.	TVD	V.S.
PCG Gamma Ray PGRC 0 api 300							



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
 Wells Ranch AE20-65-1HN
 Wattenburg
 Weld Colorado
 USA
 CA-XX-0900808844

Surveys are tied into three non-Haliburton surveys at MD 352', 619', and 942' taken with a gyro while drilling the surface hole. Final survey is a straight-line projection to bit.

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
352.00	0.30	79.14	352.00	0.17 N	0.91 E	0.92	0.09
619.00	0.10	275.54	619.00	0.33 N	1.36 E	1.39	0.15
942.00	0.20	65.64	942.00	0.59 N	1.59 E	1.66	0.09

1089.00	0.42	118.94	1088.99	0.44 N	2.29 E	2.33	0.23
1274.00	0.49	97.14	1273.99	0.01 N	3.66 E	3.62	0.10
1367.00	0.40	44.38	1366.99	0.20 N	4.28 E	4.26	0.43
1461.00	0.68	34.31	1460.98	0.89 N	4.82 E	4.90	0.31
1555.00	2.41	15.95	1554.95	3.26 N	5.68 E	6.08	1.89
1650.00	3.38	352.58	1649.83	7.95 N	5.87 E	6.93	1.59
1745.00	4.25	327.77	1744.62	13.71 N	3.63 E	5.52	1.94
1840.00	6.67	327.30	1839.18	21.33 N	1.23 W	1.79	2.55
1935.00	9.91	338.97	1933.18	33.60 N	7.15 W	-2.34	3.83
2030.00	11.71	341.40	2026.50	50.37 N	13.16 W	-5.93	1.96
2125.00	13.29	344.72	2119.24	70.04 N	19.11 W	-9.05	1.82
2220.00	13.63	343.19	2211.63	91.29 N	25.22 W	-12.11	0.52
2315.00	12.35	343.93	2304.20	111.76 N	31.27 W	-15.21	1.36
2409.00	12.31	339.82	2396.03	130.83 N	37.51 W	-18.71	0.94
2504.00	12.81	344.16	2488.76	150.47 N	43.88 W	-22.24	1.12
2599.00	13.76	343.73	2581.22	171.44 N	49.92 W	-25.27	1.01
2694.00	12.12	343.22	2673.80	191.84 N	55.97 W	-28.38	1.73
2789.00	13.28	346.71	2766.48	212.01 N	61.36 W	-30.87	1.46
2884.00	13.76	346.10	2858.85	233.59 N	66.58 W	-33.00	0.52
2979.00	13.33	345.82	2951.21	255.17 N	71.98 W	-35.30	0.45
3074.00	12.29	344.49	3043.84	275.54 N	77.36 W	-37.77	1.14
3169.00	12.20	348.14	3136.68	295.10 N	82.13 W	-39.73	0.82
3264.00	15.08	347.99	3228.99	317.02 N	86.76 W	-41.23	3.03
3359.00	13.36	347.39	3321.08	339.81 N	91.73 W	-42.93	1.82
3454.00	10.30	347.86	3414.05	358.83 N	95.91 W	-44.40	3.22
3549.00	11.82	345.40	3507.28	376.55 N	100.15 W	-46.10	1.67
3644.00	15.74	343.89	3599.53	398.35 N	106.18 W	-49.00	4.15
3739.00	17.60	343.07	3690.53	424.48 N	113.94 W	-53.00	1.97
3834.00	19.39	343.82	3780.62	453.36 N	122.52 W	-57.42	1.89
3929.00	18.59	339.82	3870.46	482.72 N	132.14 W	-62.80	1.60
4023.00	14.70	341.81	3960.50	508.13 N	141.04 W	-68.03	4.18
4118.00	9.32	334.47	4053.39	526.54 N	148.12 W	-72.45	5.88
4213.00	6.14	338.06	4147.52	538.20 N	153.33 W	-75.97	3.38
4308.00	3.81	329.87	4242.15	545.65 N	156.82 W	-78.37	2.56
4403.00	0.99	288.31	4337.06	548.64 N	159.19 W	-80.30	3.31
4498.00	0.54	235.92	4432.06	548.65 N	160.34 W	-81.44	0.83
4593.00	1.70	157.26	4527.04	547.10 N	160.17 W	-81.48	1.76
4688.00	4.75	147.00	4621.88	542.50 N	157.48 W	-79.47	3.26
4783.00	4.25	143.61	4716.59	536.37 N	153.25 W	-76.14	0.60
4878.00	2.33	163.36	4811.43	531.69 N	150.61 W	-74.19	2.32
4973.00	1.75	182.52	4906.37	528.39 N	150.12 W	-74.17	0.93
5068.00	1.90	169.44	5001.32	525.39 N	149.89 W	-74.37	0.47
5163.00	1.22	157.18	5096.29	522.90 N	149.21 W	-74.05	0.80
5258.00	0.65	179.98	5191.27	521.43 N	148.82 W	-73.86	0.70
5352.00	0.78	206.73	5285.27	520.33 N	149.11 W	-74.30	0.37
5447.00	0.65	189.93	5380.26	519.22 N	149.49 W	-74.84	0.26
5542.00	0.74	125.12	5475.25	518.34 N	149.08 W	-74.55	0.79
5637.00	1.00	129.97	5570.24	517.45 N	147.93 W	-73.55	0.28
5732.00	0.75	127.57	5665.23	516.53 N	146.80 W	-72.56	0.27
5827.00	0.91	100.01	5760.22	516.02 N	145.57 W	-71.40	0.45
5922.00	1.03	50.31	5855.21	516.44 N	144.16 W	-69.96	0.87
6013.00	1.84	70.32	5946.18	517.46 N	142.15 W	-67.82	1.03
6108.00	8.84	87.26	6040.71	518.32 N	133.41 W	-59.04	7.47
6203.00	11.17	85.87	6134.26	519.33 N	116.93 W	-42.59	2.46
6298.00	17.38	87.17	6226.28	520.69 N	93.56 W	-19.26	6.54
6393.00	22.51	91.43	6315.56	520.94 N	61.19 W	12.82	5.61
6488.00	26.50	92.09	6401.99	519.72 N	21.82 W	51.62	4.21
6583.00	38.10	89.99	6482.16	518.95 N	28.84 E	101.67	12.27
6678.00	53.72	86.64	6548.06	521.21 N	96.81 E	169.28	16.63
6772.00	71.47	85.74	6591.15	526.79 N	179.74 E	252.17	18.90
6820.00	80.10	87.85	6602.93	529.37 N	226.15 E	298.48	18.46
6866.00	83.77	89.43	6609.39	530.45 N	271.67 E	343.70	8.67
6895.00	87.32	89.86	6611.64	530.62 N	300.58 E	372.34	12.35
7018.00	91.66	90.88	6612.73	529.83 N	423.54 E	493.97	3.63
7064.00	92.35	90.28	6611.12	529.36 N	469.51 E	539.41	1.97
7156.00	91.42	89.15	6608.10	529.82 N	561.45 E	630.51	1.59
7249.00	85.67	89.25	6610.46	531.11 N	654.38 E	722.68	6.18
7342.00	88.27	89.08	6615.37	532.46 N	747.23 E	814.80	2.80
7434.00	90.37	89.25	6616.46	533.80 N	839.21 E	906.05	2.28
7527.00	91.51	88.47	6614.93	535.65 N	932.17 E	998.35	1.49
7620.00	88.77	85.62	6614.71	540.44 N	1025.03 E	1090.96	4.25
7712.00	92.22	87.42	6613.92	546.02 N	1116.84 E	1182.64	4.23
7805.00	90.62	85.94	6611.61	551.40 N	1209.65 E	1275.28	2.35
7898.00	90.22	82.05	6610.94	561.13 N	1302.12 E	1368.19	4.20

7991.00	90.22	82.80	6610.59	573.40 N	1394.31 E	1461.19	0.80
8084.00	94.11	89.02	6607.08	580.03 N	1486.94 E	1553.83	7.89
8179.00	92.99	89.53	6601.20	581.23 N	1581.75 E	1647.86	1.29
8274.00	91.82	91.97	6597.21	579.99 N	1676.65 E	1741.64	2.84
8369.00	91.11	91.78	6594.78	576.88 N	1771.57 E	1835.18	0.78
8464.00	89.38	90.70	6594.37	574.83 N	1866.54 E	1928.91	2.15
8559.00	86.83	90.00	6597.51	574.25 N	1961.48 E	2022.82	2.79
8654.00	86.94	89.27	6602.67	574.86 N	2056.33 E	2116.82	0.78
8748.00	87.93	88.61	6606.87	576.59 N	2150.22 E	2210.01	1.26
8843.00	86.63	87.15	6611.38	580.10 N	2245.04 E	2304.38	2.06
8938.00	87.44	90.17	6616.29	582.33 N	2339.88 E	2398.59	3.29
9033.00	89.78	89.50	6618.59	582.60 N	2434.84 E	2492.64	2.57
9128.00	92.53	89.47	6616.68	583.46 N	2529.81 E	2586.78	2.89
9223.00	92.25	88.35	6612.72	585.27 N	2624.71 E	2680.99	1.22
9318.00	94.54	87.86	6607.10	588.40 N	2719.49 E	2775.26	2.47
9413.00	93.61	87.87	6600.35	591.93 N	2814.18 E	2869.51	0.98
9508.00	88.33	87.36	6598.73	595.88 N	2909.05 E	2963.99	5.58
9603.00	88.02	87.03	6601.75	600.53 N	3003.89 E	3058.53	0.47
9698.00	88.71	86.49	6604.47	605.90 N	3098.69 E	3153.15	0.92
9793.00	90.09	87.76	6605.46	610.67 N	3193.57 E	3247.75	1.98
9888.00	92.66	89.16	6603.18	613.22 N	3288.49 E	3342.09	3.08
9983.00	92.47	88.87	6598.93	614.85 N	3383.38 E	3436.26	0.36
10077.00	91.51	89.90	6595.67	615.85 N	3477.32 E	3529.40	1.50
10172.00	91.20	89.78	6593.43	616.12 N	3572.29 E	3623.47	0.34
10267.00	87.35	88.12	6594.63	617.87 N	3667.25 E	3717.72	4.42
10362.00	87.47	87.89	6598.93	621.17 N	3762.09 E	3812.09	0.27
10457.00	89.75	86.53	6601.23	625.79 N	3856.94 E	3906.64	2.80
10552.00	89.85	84.40	6601.56	633.31 N	3951.64 E	4001.45	2.25
10647.00	91.39	86.07	6600.54	641.21 N	4046.30 E	4096.28	2.39
10742.00	90.71	87.44	6598.80	646.59 N	4141.13 E	4190.92	1.61
10837.00	91.26	88.53	6597.16	649.93 N	4236.05 E	4285.37	1.29
10932.00	91.70	89.28	6594.71	651.75 N	4331.00 E	4379.63	0.91
11013.00	90.71	88.91	6593.01	653.03 N	4411.97 E	4459.97	1.30
11077.00	90.71	88.91	6592.22	654.24 N	4475.96 E	4523.49	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 81.90 DEGREES (GRID)
A TOTAL CORRECTION OF 7.62 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11077.00 FEET
IS 4523.52 FEET ALONG 81.68 DEGREES (GRID)**