



WELL INFORMATION					
MWD Run Number	100	200	300	400	
Date run completed	28-Oct-13	29-Oct-13	31-Oct-13	03-Nov-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	6.75	4.750	
Log Start Depth (MD, ft)	977.00	5,056.00	5,496.00	6,967.00	
Log End Depth (MD, ft)	5,056.00	5,496.00	6,967.00	10,826.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	27-Oct-13 21:45	29-Oct-13 05:30	29-Oct-13 17:30	01-Nov-13 03:00	
Drill/Wipe End Date and Time	28-Oct-13 12:30	29-Oct-13 09:30	30-Oct-13 15:45	02-Nov-13 18:30	
Min Inc (deg) @ Depth (MD, ft)	.95 @ 1,272.00	6.60 @ 5,346.00	1.87 @ 5,820.00	85.59 @ 7,039.00	
Max Inc (deg) @ Depth (MD, ft)	21.80 @ 3,925.00	8.04 @ 5,156.00	81.75 @ 6,912.00	93.67 @ 7,324.00	
Bit TFA(in2) / Bit Type	.91 / PDC	.98 / PDC	.98 / PDC	.64 / PDC	
Flow Rate (gpm)	596.30	562.00	555.85	299.60	
Max AV (fpm) / CV (fpm) @ MWD	470.0 / NA	462.0 / NA	434.4 / NA	448.2 / 245.0	
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.65 / 26.00	8.60 / 26.00	9.10 / 31.00	9.58 / 34.00	
Filtrate CL (ppm)	2,000.00	2,000.00	2,000.00	2,500.00	
pH / Fluid Loss (mptm)	8.60 / NA	8.10 / NA	8.30 / NA	9.50 / 7	
PV (cP) / YP (lbf2)	4 / 1.00	4 / 1.00	7 / 4.00	8 / 9.00	
% Solids / % Sand	1.7 / 0.25	1.7 / .25	12 / 0.25	5.9 / 0.20	
% 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	168.00 / PDM	168.04 / PDM	170.07 / PDM	217.00 / PDM	

Max Tool Temp (degF) / Source	133.30 / PCM	146.84 / PCM	170.37 / PCM	217.60 / 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	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez	Johnny Sanchez	

## 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	11400840	11227514	
Date and Time Initialized	27-Oct-13 02:08	01-Jan-70 00:00	29-Oct-13 13:15	30-Oct-13 23:52	
Date and Time Read	29-Oct-13 16:30	29-Oct-13 16:36	31-Oct-13 02:15	03-Nov-13 08:21	
ECMB SW Version	N/A	N/A	N/A	N/A	

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	57.00	56.00	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	11902117	12177530	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	124.36	4.65	172.04	24.20	

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	50.44	48.96	47.86	57.55	
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	11579845	11579776	

## 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

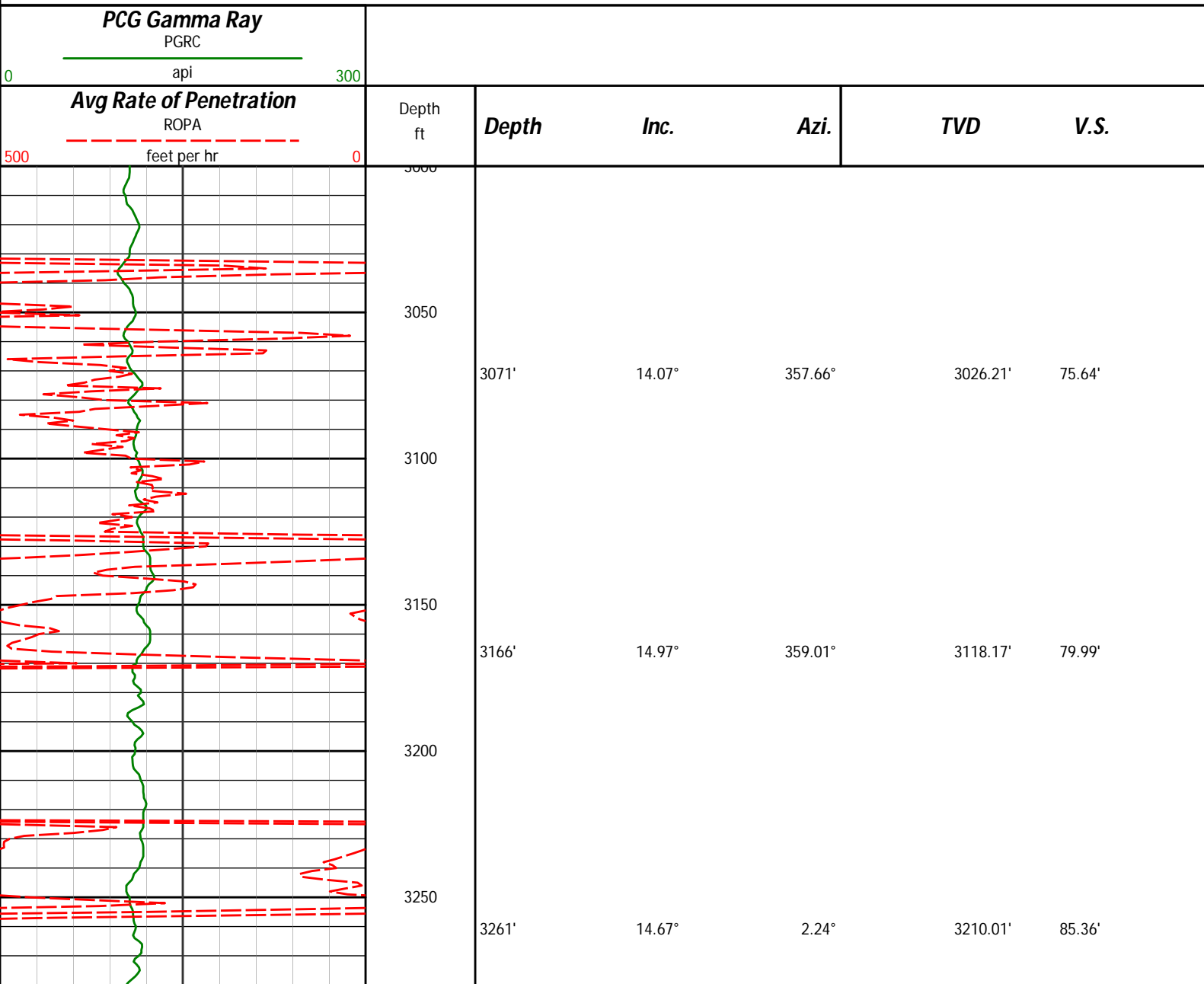
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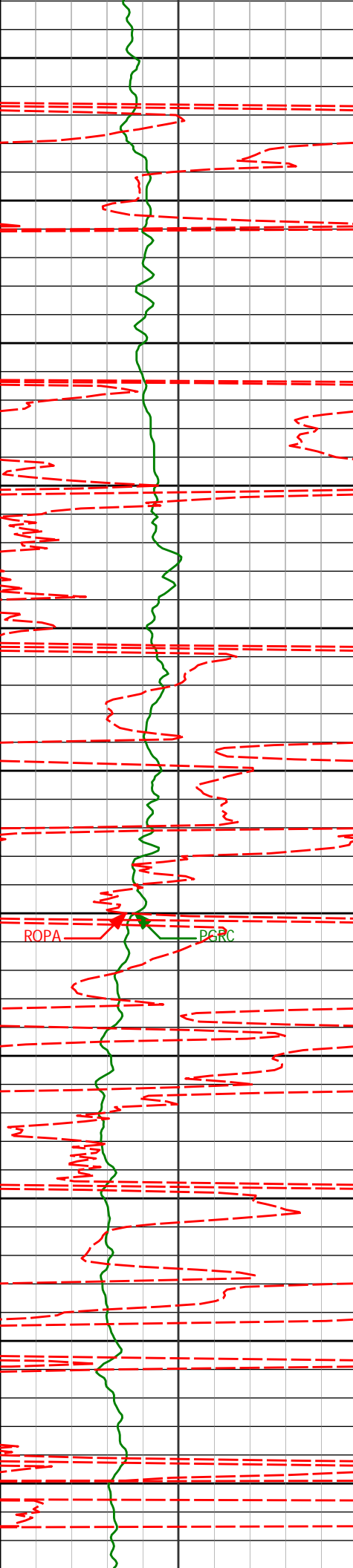
## HALLIBURTON

Sperry Drilling Services

### MD Main Log 1:600

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





3300

3350

3400

3450

3500

3550

3600

3650

3700

3750

3800

3356'

14.07°

359.26°

3302.04'

90.64'

3451'

13.37°

3.83°

3394.33'

95.95'

3545'

13.61°

5.23°

3485.74'

102.25'

3640'

15.77°

5.66°

3577.63'

109.54'

3735'

18.16°

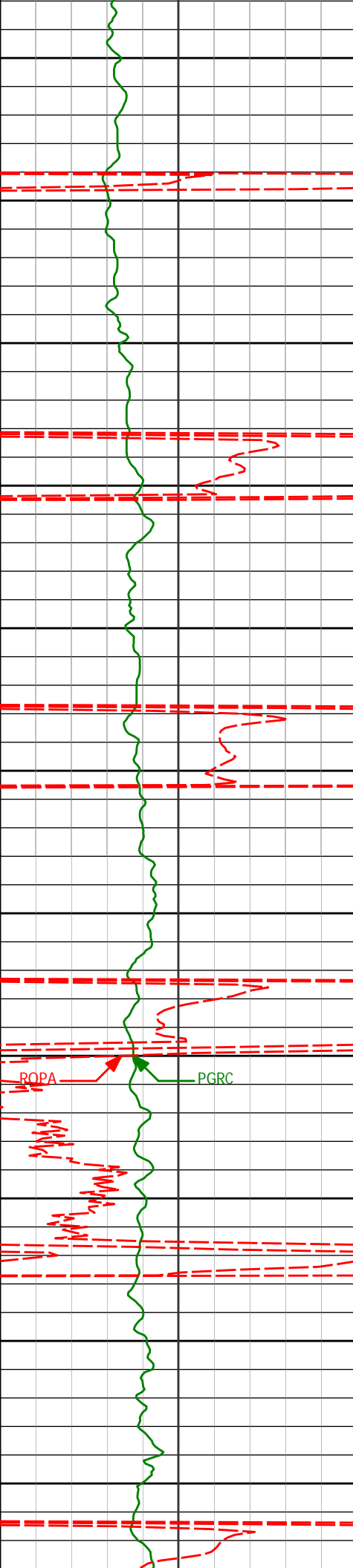
4.20°

3668.49'

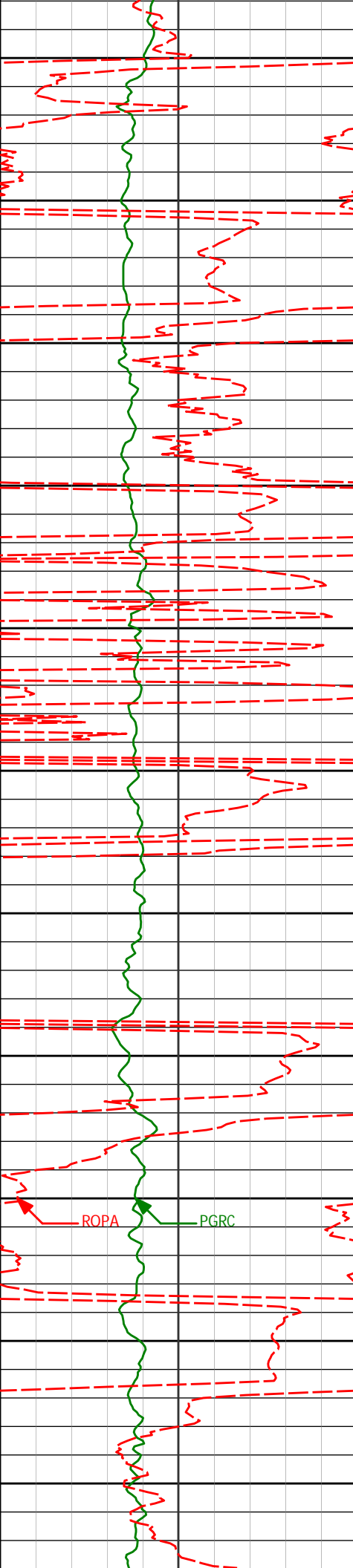
117.66'

ROPA

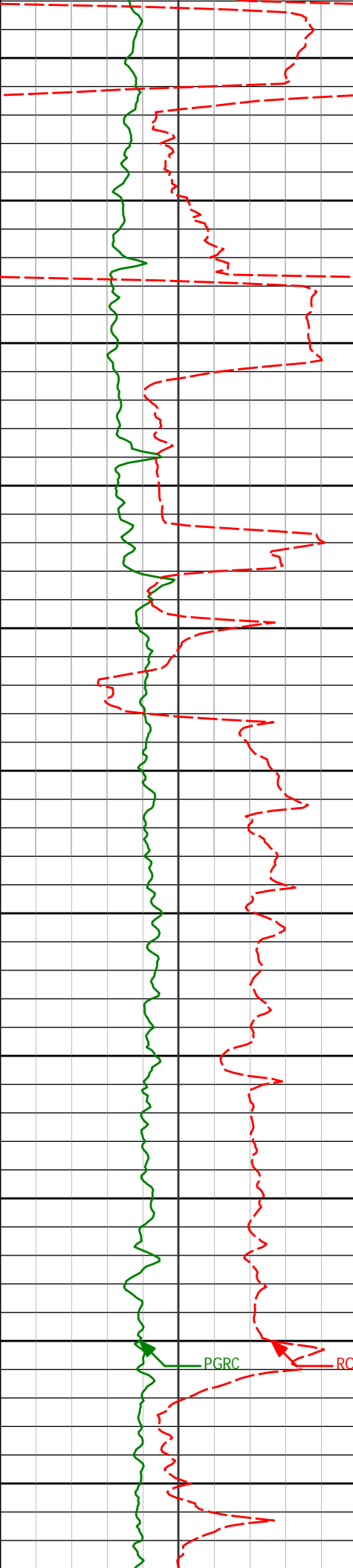
PGRC



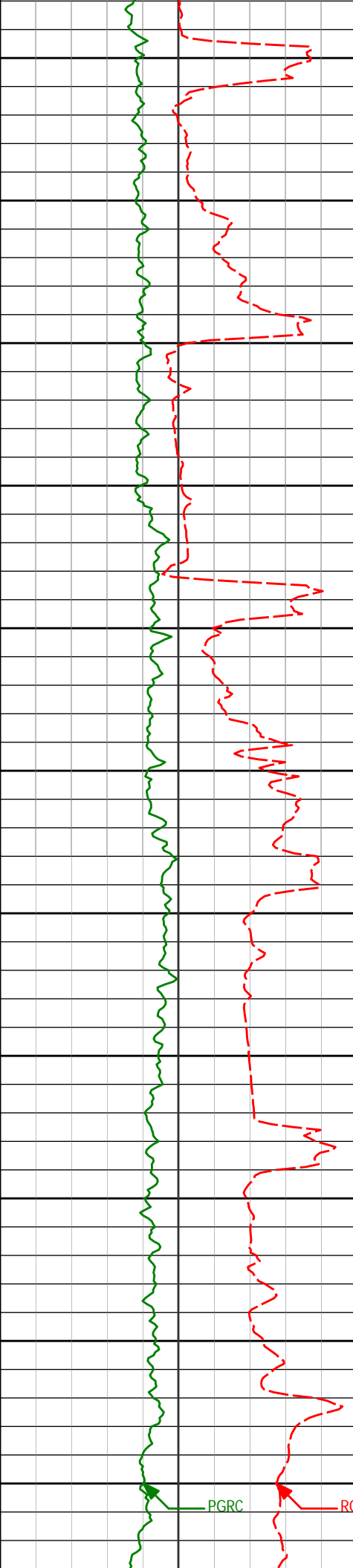
3850				
3900				
3925'	21.80°	4.39°	3847.23'	135.67'
3950				
4000				
4020'	20.15°	0.71°	3935.94'	144.34'
4050				
4100				
4115'	17.37°	358.13°	4025.88'	150.52'
4150				
4200				
4210'	14.00°	354.38°	4117.33'	154.36'
4250				
4300				
4305'	11.02°	354.80°	4210.07'	156.77'
4350				



4400	4399'	11.45°	352.80°	4302.27'	158.67'
4450					
4500	4494'	12.93°	353.11°	4395.12'	160.46'
4550					
4600	4589'	10.78°	347.64°	4488.09'	161.41'
4650					
4700	4684'	8.94°	358.55°	4581.69'	162.75'
4750					
4800	4779'	7.66°	353.09°	4675.70'	164.70'
4850					
4900	4874'	7.28°	351.47°	4769.89'	165.66'



4950				
4969'	7.04°	355.03°	4864.15'	166.77'
5000				
5050				
<Run 200>				
5061'	7.30°	352.59°	4955.43'	167.96'
5100				
5150				
5156'	8.04°	356.65°	5049.58'	169.48'
5200				
5250				
5251'	7.36°	354.93°	5143.73'	171.24'
5300				
5350				
5346'	6.60°	354.58°	5238.02'	172.64'
5400				
5440'	7.58°	356.44°	5331.30'	174.20'
5450				



<Run 300>  
5500

5535'      6.08°      355.39°      5425.62'      175.80'

5550

5600

5630'      5.09°      355.83°      5520.17'      177.04'

5650

5700

5725'      3.21°      346.81°      5614.92'      177.58'

5750

5800

5820'      1.87°      357.77°      5709.82'      177.80'

5850

5900

5915'      2.22°      23.36°      5804.77'      179.14'

5950

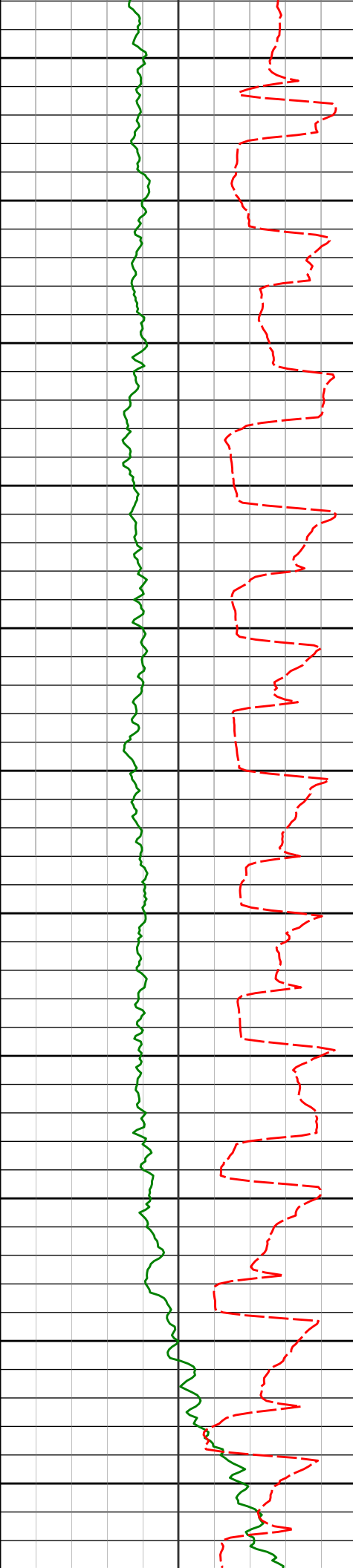
6000

6010'      7.54°      82.73°      5899.43'      186.42'

PGRC

ROPA





6050

6057'

13.79°

87.85°

5945.59'

195.02'

6100

6105'

16.26°

90.01°

5991.95'

207.23'

6150

6152'

18.74°

90.13°

6036.77'

221.04'

6200

6200'

20.65°

91.37°

6081.96'

236.80'

6250

6247'

23.25°

91.69°

6125.55'

253.87'

6300

6295'

26.35°

91.44°

6169.12'

273.43'

6350

6342'

29.84°

90.88°

6210.57'

294.96'

6400

6390'

33.77°

89.57°

6251.36'

319.67'

6450

6437'

37.71°

89.51°

6289.50'

346.55'

6500

6485'

42.85°

88.98°

6326.11'

376.96'

6550

6532'

48.11°

89.35°

6359.05'

409.80'

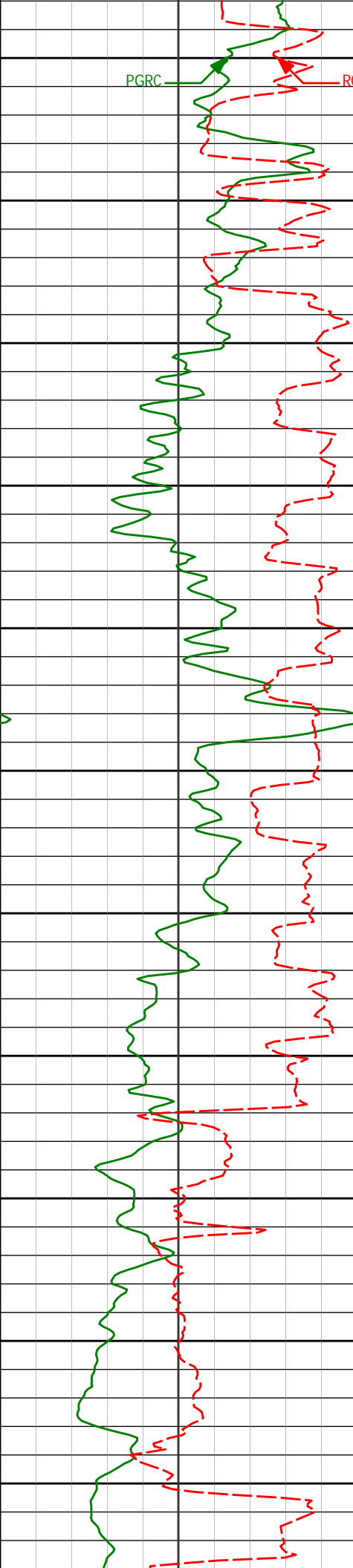
6579'

51.93°

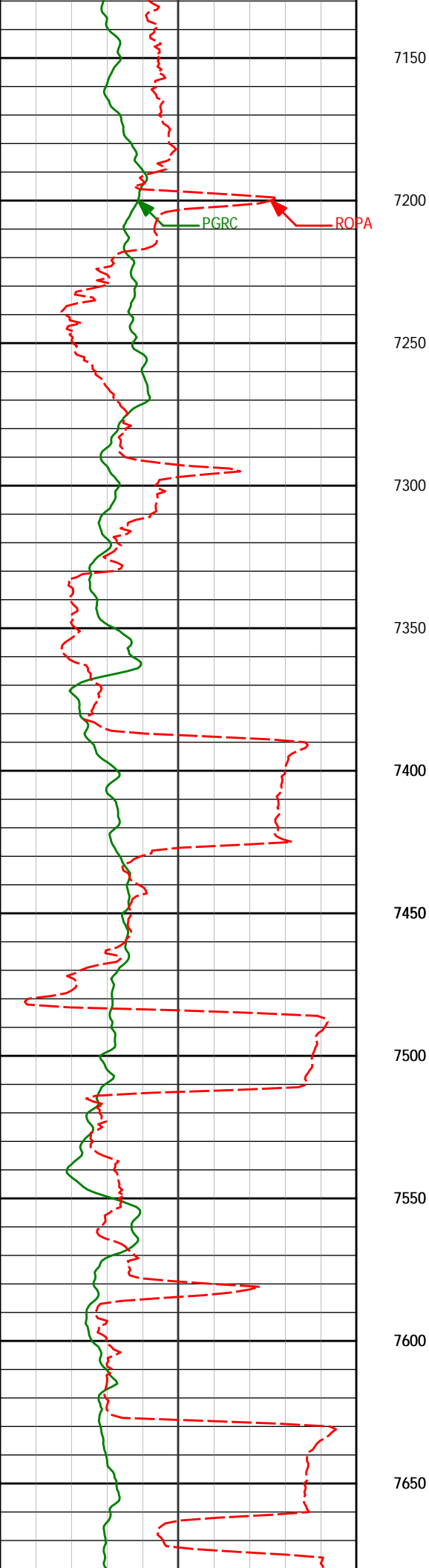
90.04°

6389.24'

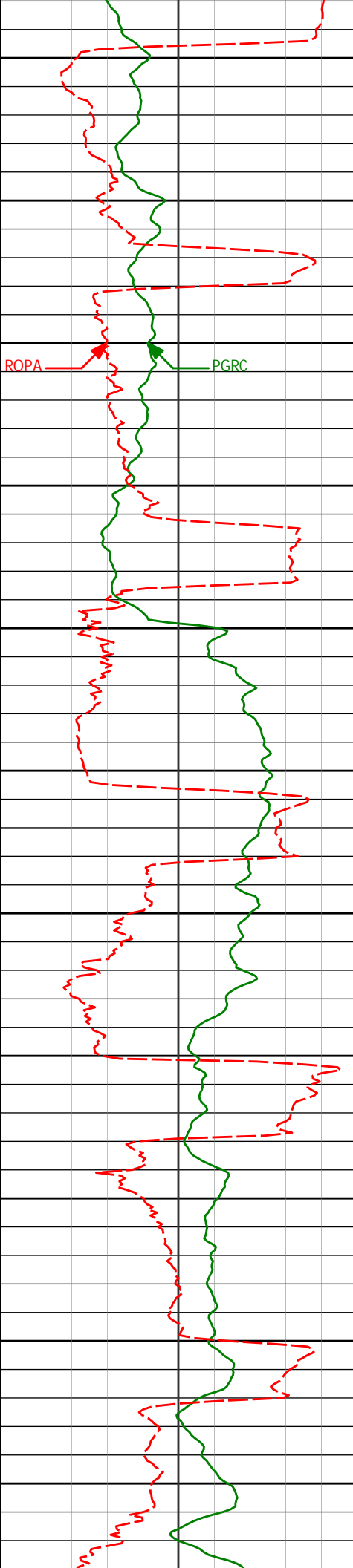
445.04'



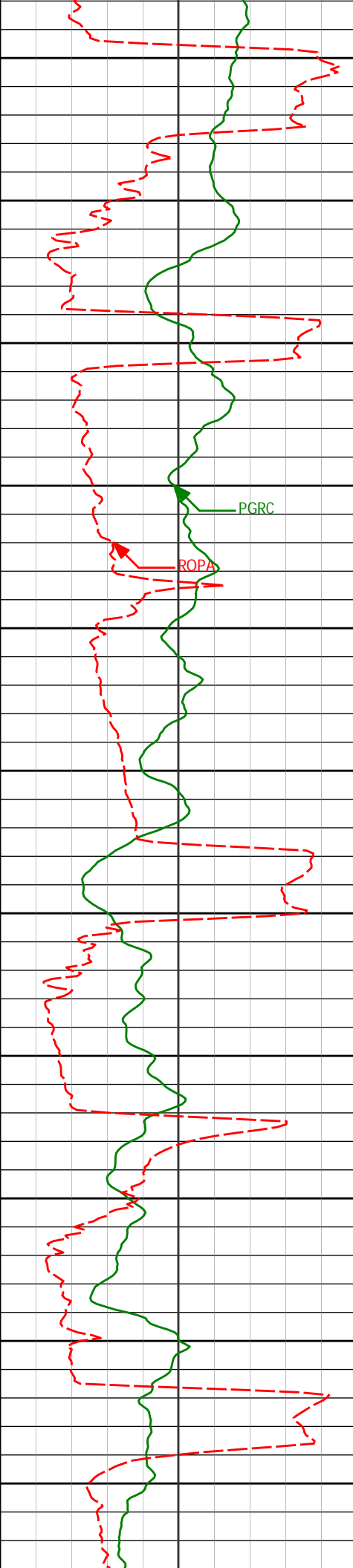
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7134'	89.26°	88.10°	6543.13'	955.96'
7229'	91.42°	88.57°	6542.57'	1049.37'
7324'	93.67°	87.23°	6538.35'	1142.81'
7419'	92.72°	86.65°	6533.06'	1236.46'
7514'	87.84°	82.50°	6532.59'	1330.76'
7609'	88.92°	81.43°	6535.28'	1425.47'



7700	7704'	86.89°	86.77°	6538.75'	1519.80'
7750					
7800	7799'	89.51°	86.43°	6541.74'	1613.64'
7850					
7900	7894'	90.80°	87.86°	6541.48'	1707.38'
7950					
8000	7989'	91.20°	89.16°	6539.82'	1800.73'
8050					
8100	8084'	89.97°	88.80°	6538.85'	1893.93'
8150					
8200	8179'	88.49°	88.12°	6540.13'	1987.29'



8250

8274'

88.95°

89.64°

6542.25'

2080.51'

8300

8350

8369'

88.55°

90.86°

6544.32'

2173.26'

8400

PGRC

ROPA

8450

8464'

89.11°

89.99°

6546.26'

2265.96'

8500

8550

8559'

89.57°

90.49°

6547.36'

2358.74'

8600

8650

8654'

90.77°

89.59°

6547.08'

2451.59'

8700

8750

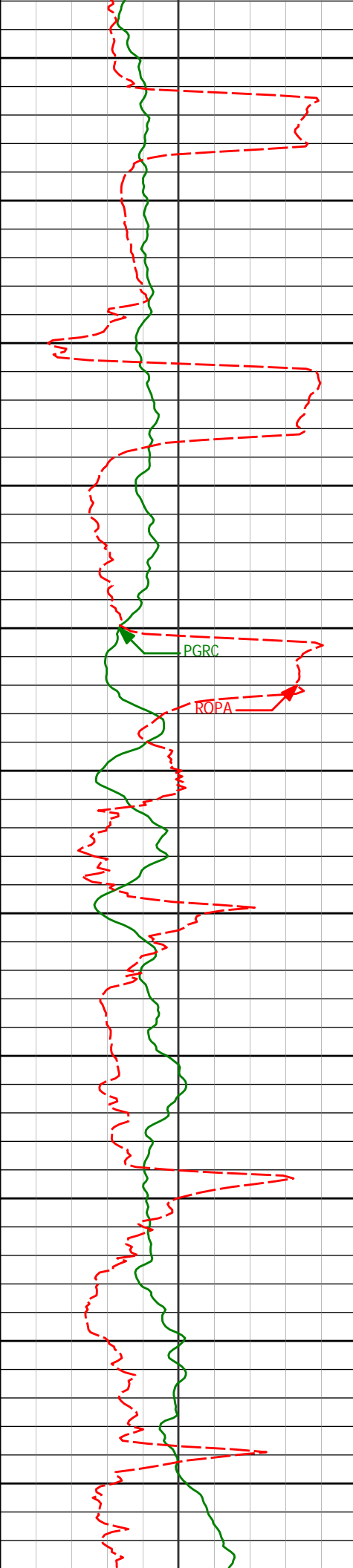
8749'

90.56°

89.66°

6545.97'

2544.58'



8800

8850

8900

8950

9000

9050

9100

9150

9200

9250

9300

8843'	90.86°	90.54°	6544.81'	2636.43'
-------	--------	--------	----------	----------

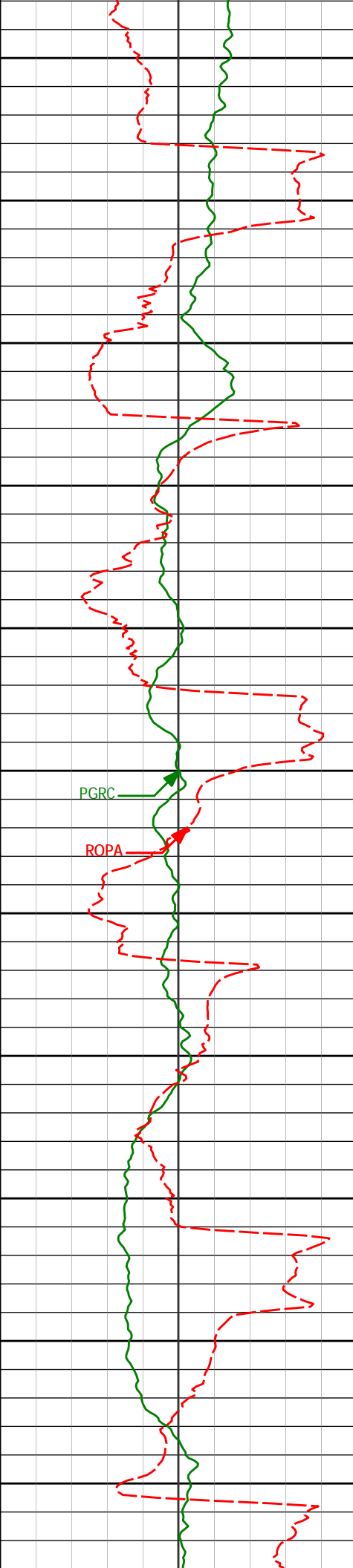
8938'	89.41°	89.69°	6544.59'	2729.25'
-------	--------	--------	----------	----------

9033'	88.00°	90.83°	6546.73'	2822.00'
-------	--------	--------	----------	----------

9128'	88.06°	90.05°	6550.00'	2914.66'
-------	--------	--------	----------	----------

9223'	88.77°	89.07°	6552.63'	3007.64'
-------	--------	--------	----------	----------

9318'	89.23°	87.51°	6554.28'	3101.05'
-------	--------	--------	----------	----------



9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9413'

88.71°

89.77°

6555.99'

3194.34'

9508'

89.54°

88.76°

6557.44'

3287.45'

9603'

89.54°

90.58°

6558.21'

3380.42'

9698'

89.88°

90.03°

6558.69'

3473.18'

9793'

91.45°

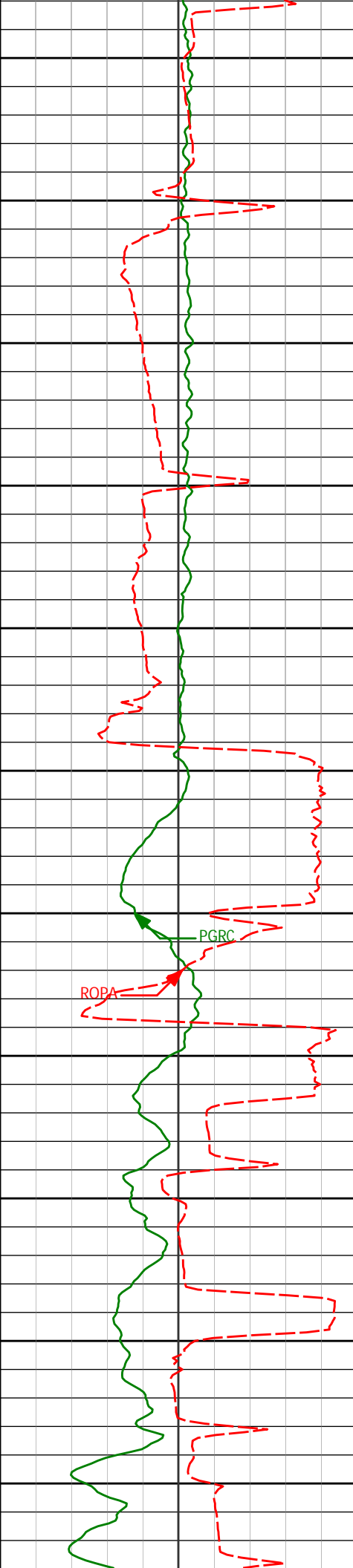
91.63°

6557.58'

3565.74'

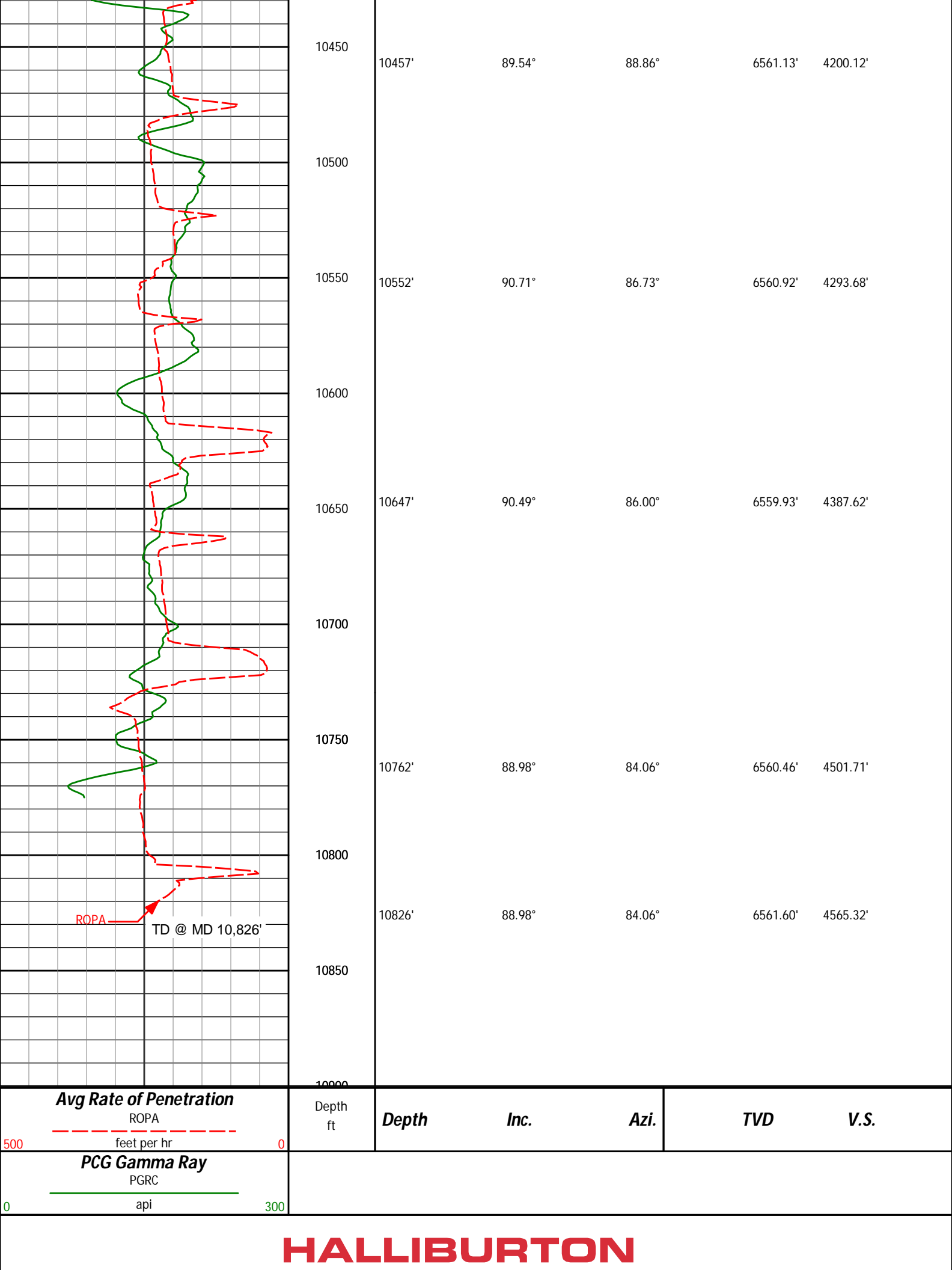
PGRC

ROPA



9888'	89.04°	90.68°	6557.18'	3658.17'
9900				
9950				
9983'	89.23°	92.89°	6558.61'	3750.36'
10000				
10050				
10078'	91.29°	105.90°	6558.18'	3838.52'
10100				
10150				
10172'	89.48°	97.92°	6557.55'	3924.27'
10200				
10267'	89.01°	92.88°	6558.80'	4014.81'
10300				
10362'	89.32°	90.18°	6560.18'	4107.09'
10400				





Avg Rate of Penetration

ROPA

feet per hr

PCG Gamma Ray

PGRC

api

Depth  
ft

Depth

Inc.

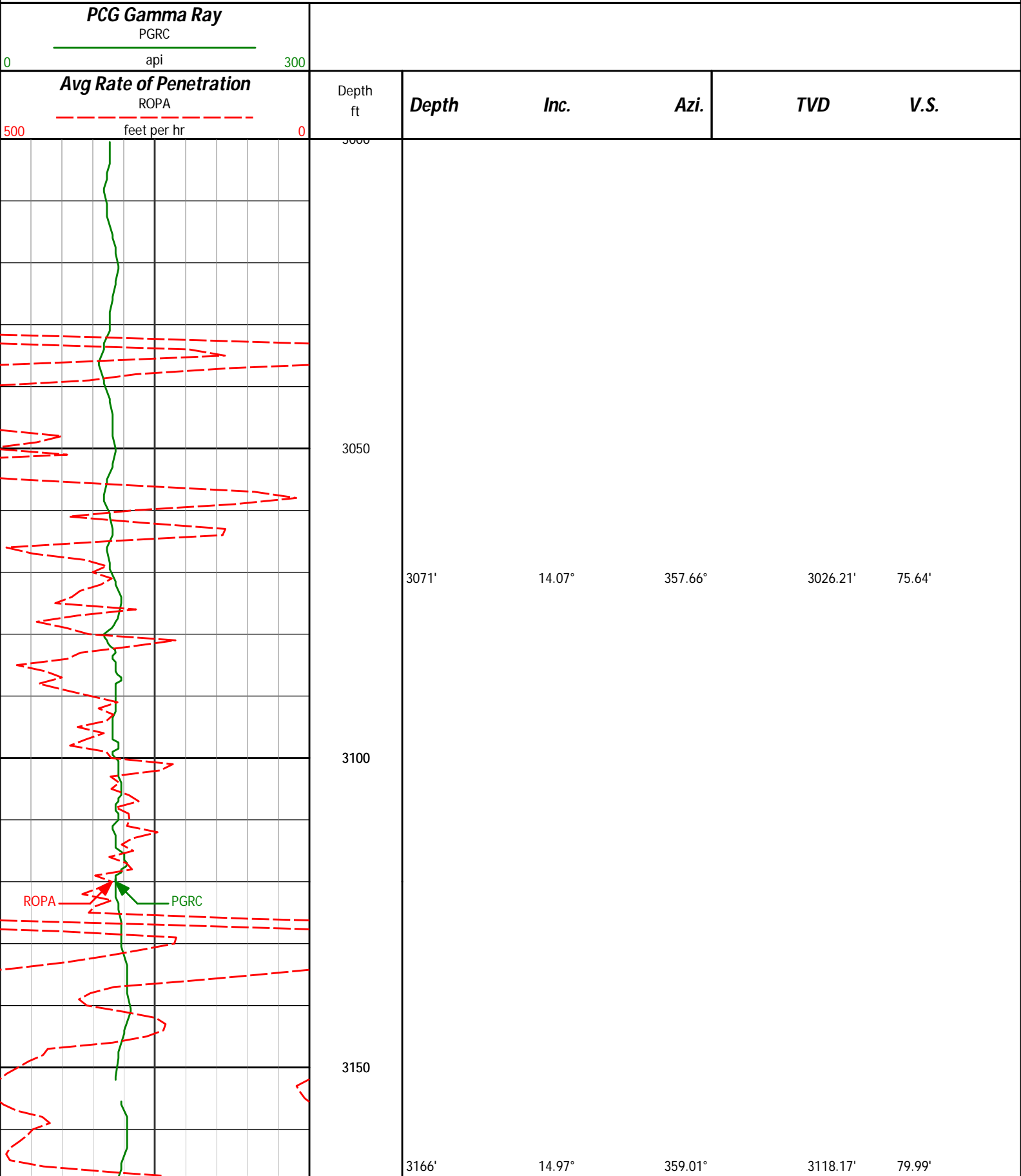
Azi.

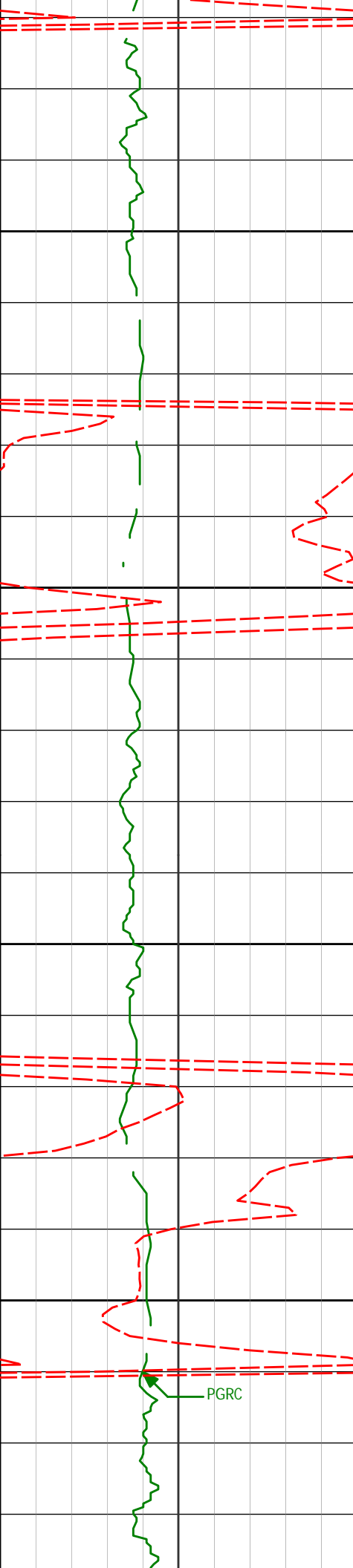
TVD

V.S.

# MD Detail Log 1:240

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





3200

3250

3300

3350

3261'

14.67°

2.24°

3210.01'

85.36'

3356'

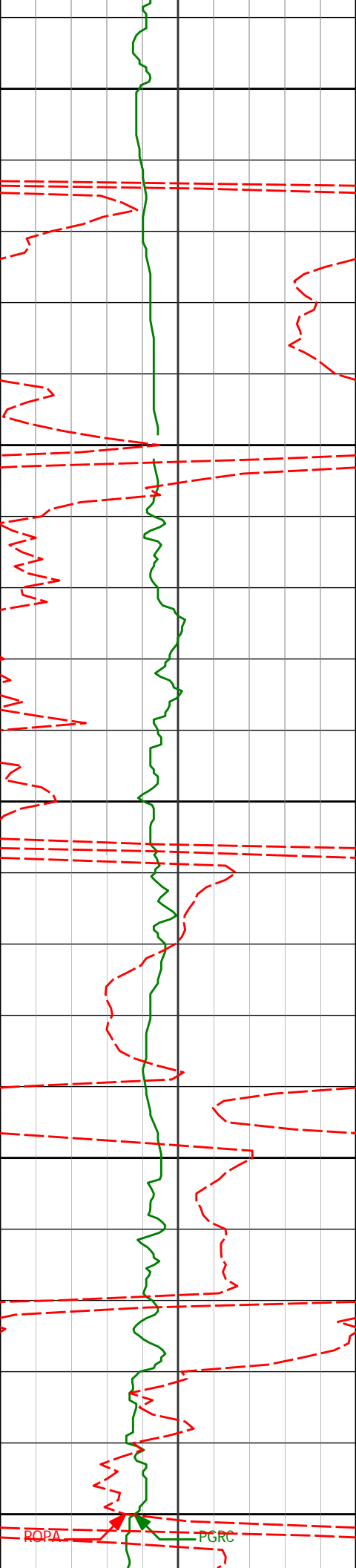
14.07°

359.26°

3302.04'

90.64'

PGRC



3400

3450

3500

3550

3600

3451'

13.37°

3.83°

3394.33'

95.95'

3545'

13.61°

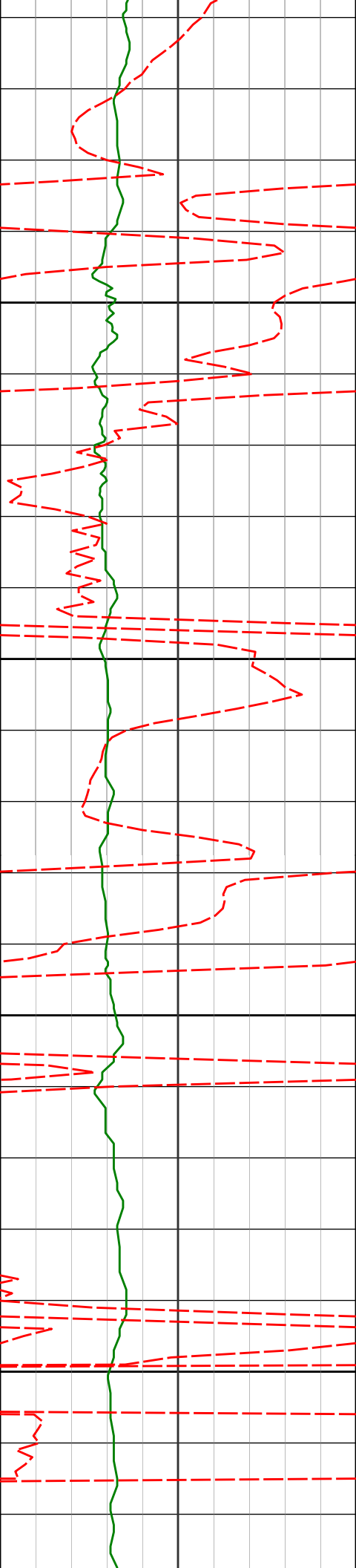
5.23°

3485.74'

102.25'

ROPA

PGRC



3640'

15.77°

5.66°

3577.63'

109.54'

3650

3700

3735'

18.16°

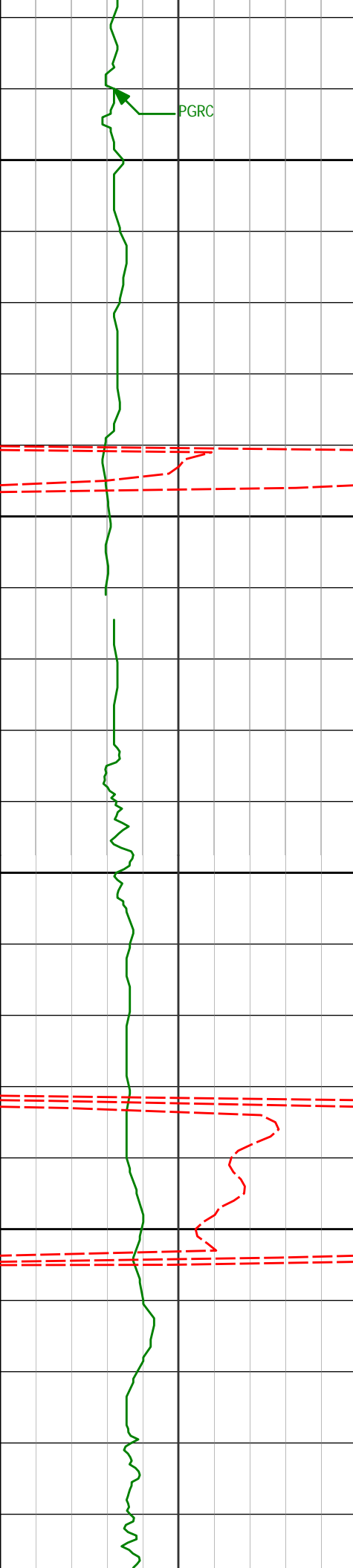
4.20°

3668.49'

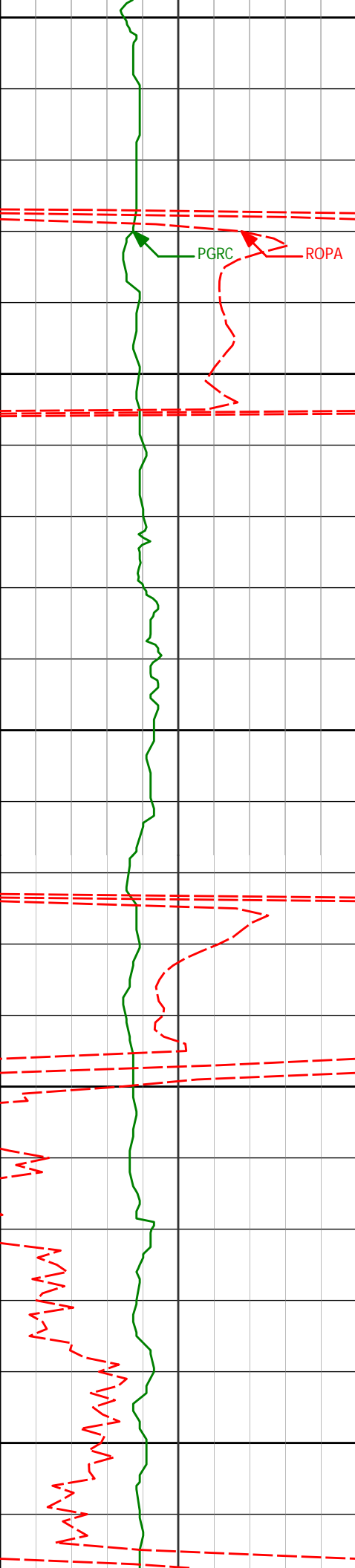
117.66'

3750

3800



3830'	19.61°	3.89°	3758.37'	126.24'
3850				
3900				
3925'	21.80°	4.39°	3847.23'	135.67'
3950				
4000				
4020'	20.15°	0.71°	3935.94'	144.34'



4050

4100

4150

4200

4250

4115'

17.37°

358.13°

4025.88'

150.52'

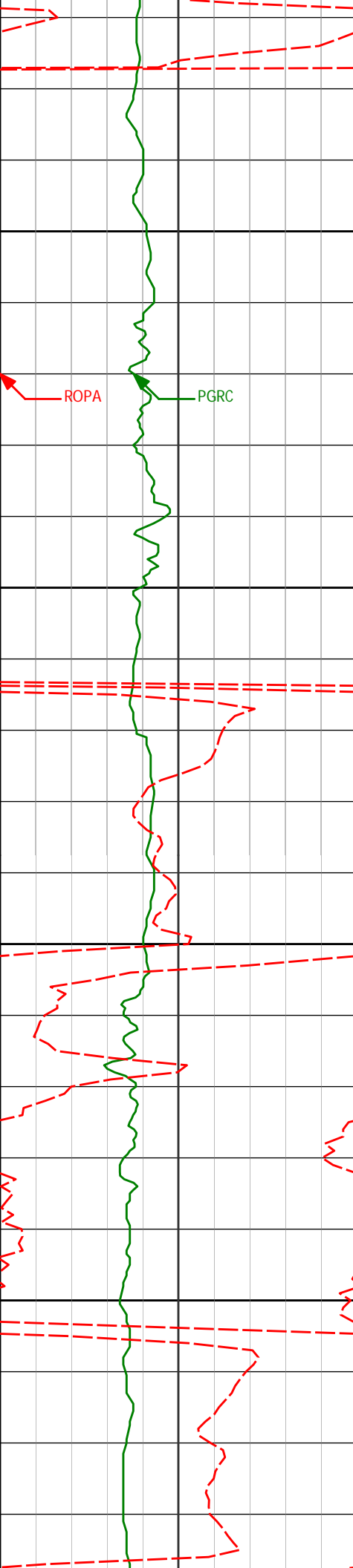
4210'

14.00°

354.38°

4117.33'

154.36'



4300

4305'

11.02°

354.80°

4210.07'

156.77'

4350

4400

4399'

11.45°

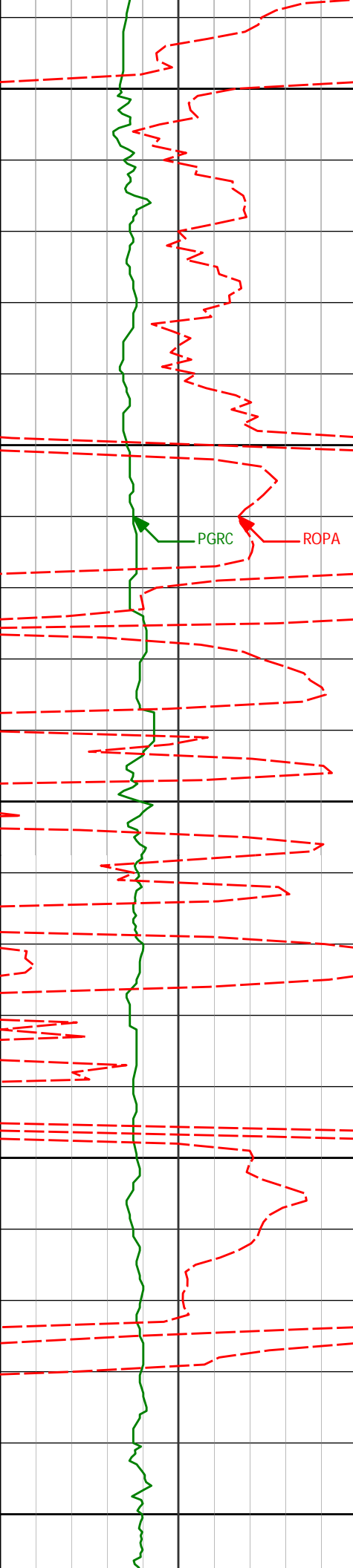
352.80°

4302.27'

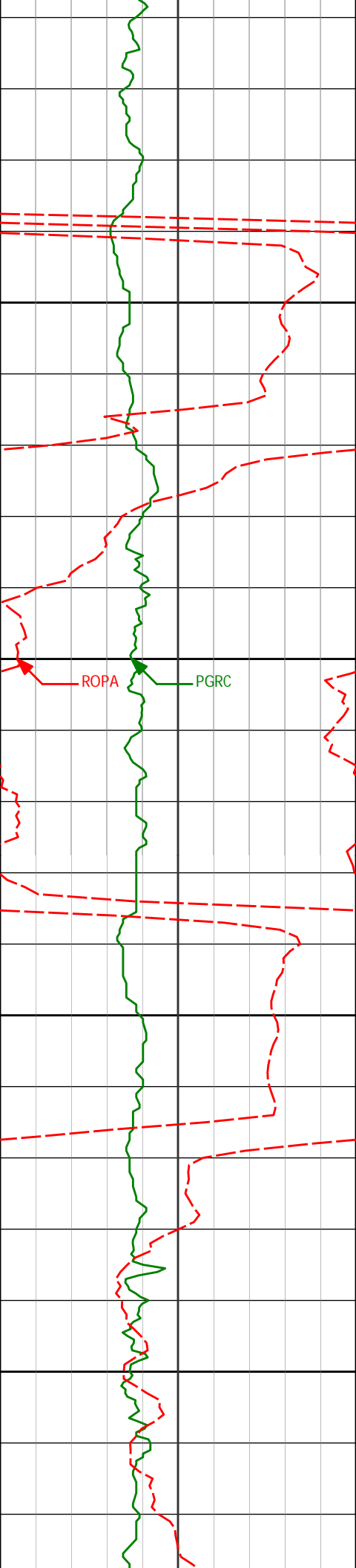
158.67'

4450





4494'	12.93°	353.11°	4395.12'	160.46'
4500				
4550				
4589'	10.78°	347.64°	4488.09'	161.41'
4600				
4650				
4684'	8.94°	358.55°	4581.69'	162.75'
4700				



4750

4800

4850

4900

4779'

7.66°

353.09°

4675.70'

164.70'

ROPA

PGRC

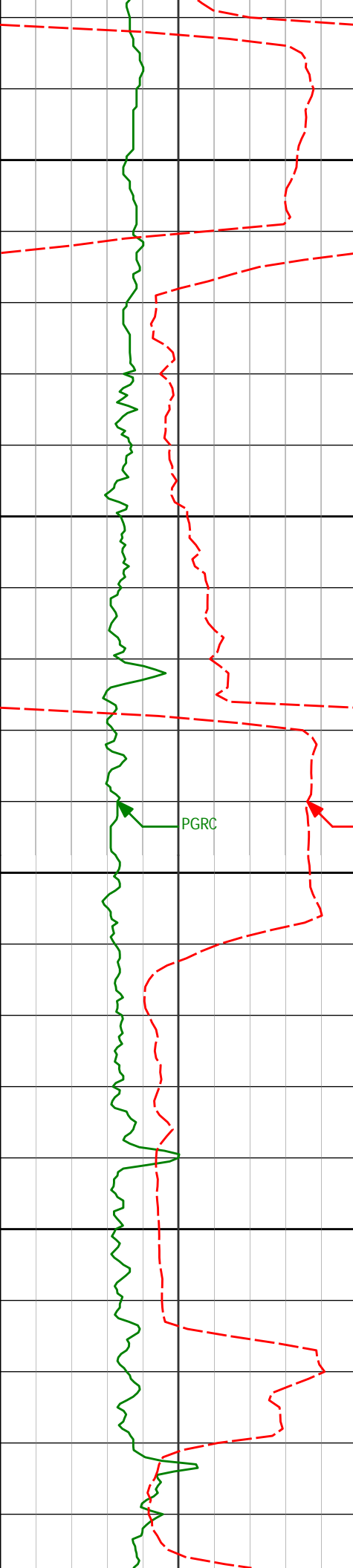
4874'

7.28°

351.47°

4769.89'

165.66'



4950

4969'

7.04°

355.03°

4864.15'

166.77'

5000

5050

<Run 200>

5061'

7.30°

352.59°

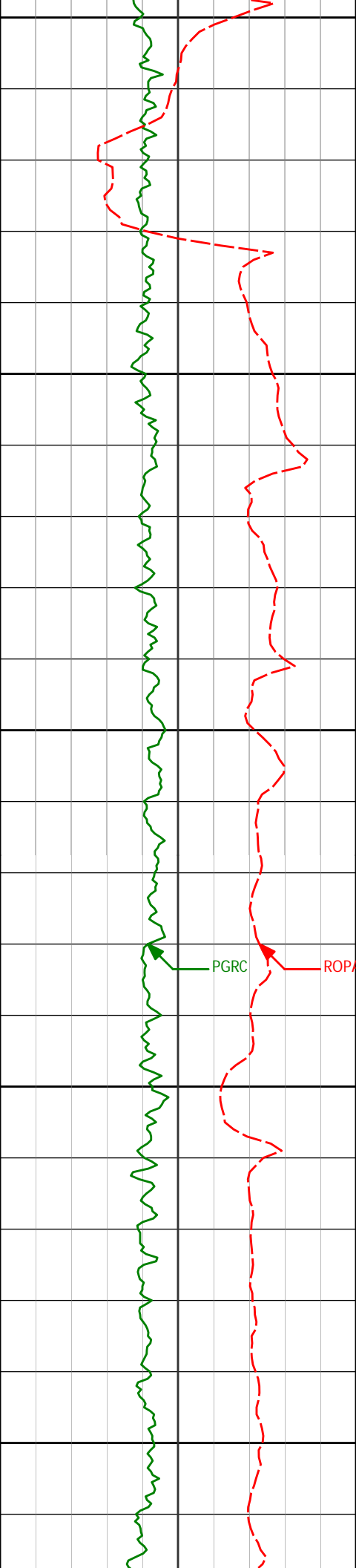
4955.43'

167.96'

5100

PGRC

ROPA



5150

5156'

8.04°

356.65°

5049.58'

169.48'

5200

5250

5251'

7.36°

354.93°

5143.73'

171.24'

5300

5350

5346'

6.60°

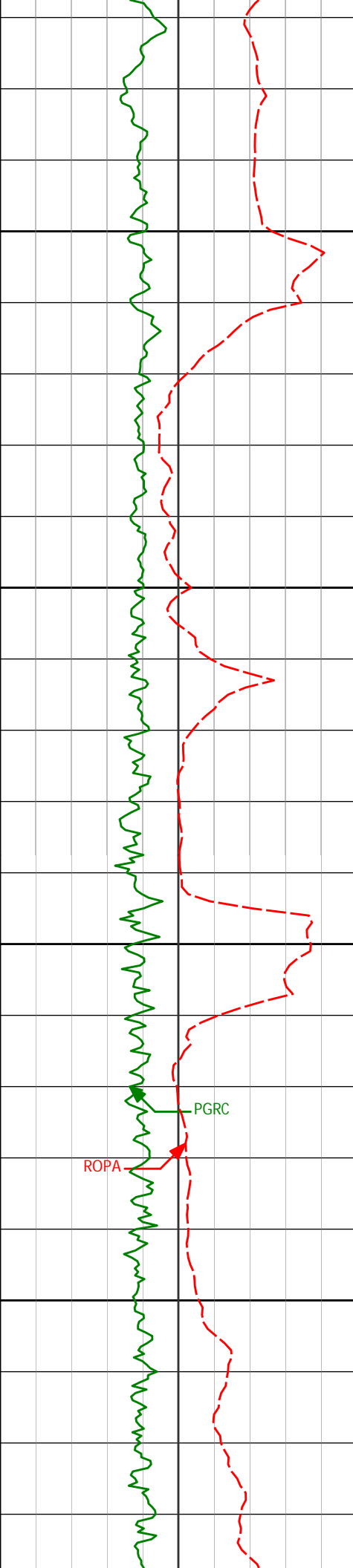
354.58°

5238.02'

172.64'

PGRC

ROPA



5400

5440'

7.58°

356.44°

5331.30'

174.20'

5450

<Run 300>  
5500

PGRC

ROPA

5535'

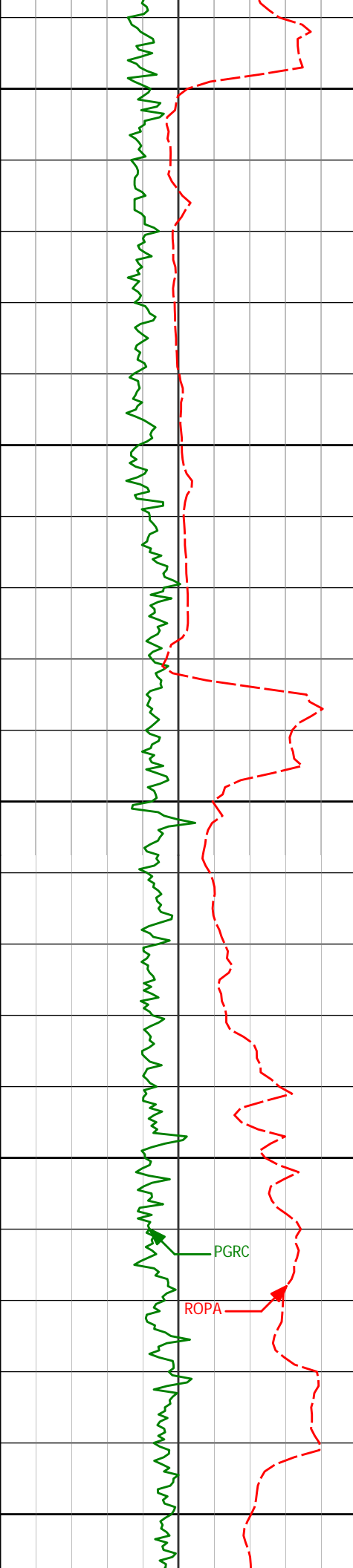
6.08°

355.39°

5425.62'

175.80'

5550



5600

5630'

5.09°

355.83°

5520.17'

177.04'

5650

5700

5725'

3.21°

346.81°

5614.92'

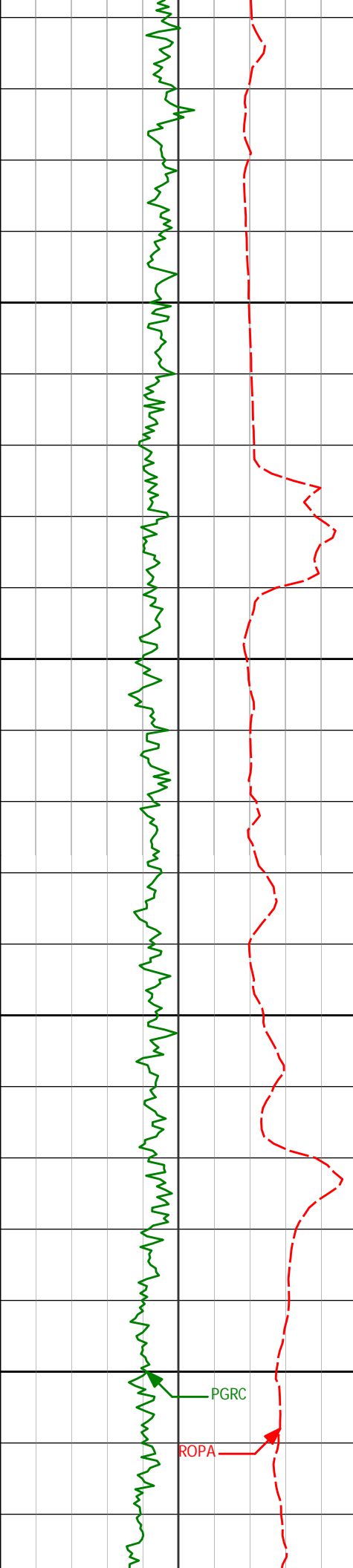
177.58'

5750

5800

PGRC

ROPA



5820'	1.87°	357.77°	5709.82'	177.80'
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5850

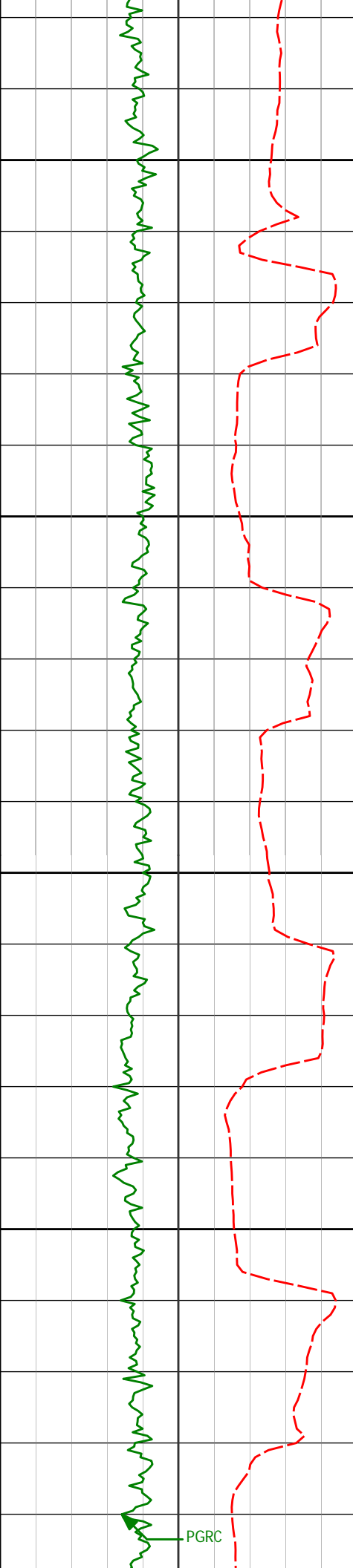
5900

5915'	2.22°	23.36°	5804.77'	179.14'
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5950

6000

6010'	7.54°	82.73°	5899.43'	186.42'
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6050

6057'

13.79°

87.85°

5945.59'

195.02'

6100

6105'

16.26°

90.01°

5991.95'

207.23'

6150

6152'

18.74°

90.13°

6036.77'

221.04'

6200

6200'

20.65°

91.37°

6081.96'

236.80'

6247'

23.25°

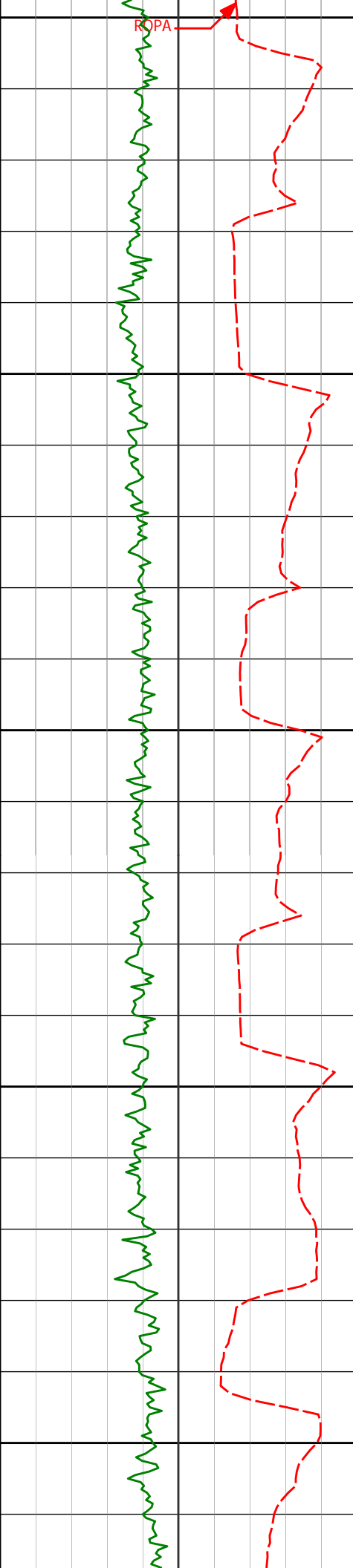
91.69°

6125.55'

253.87'

PGRC





6250

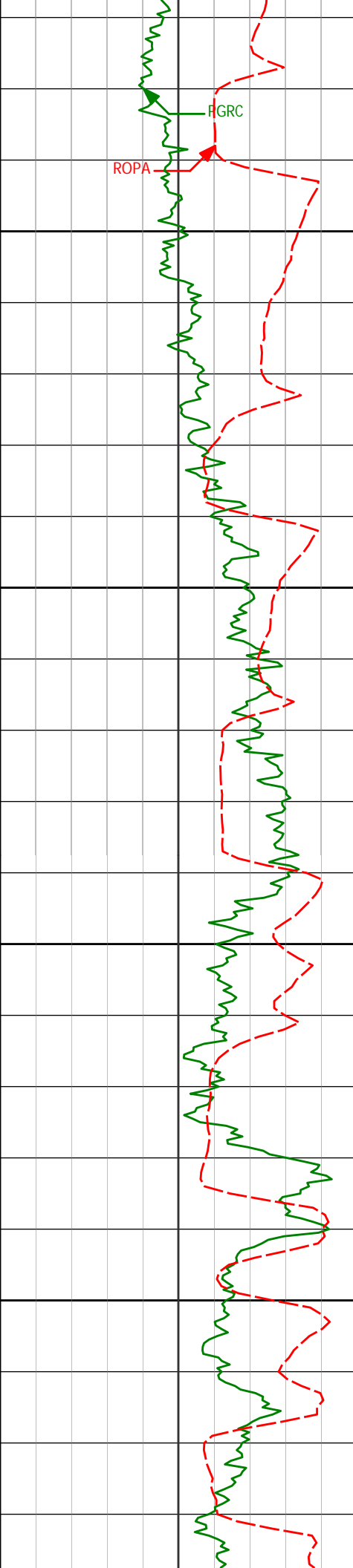
6300

6350

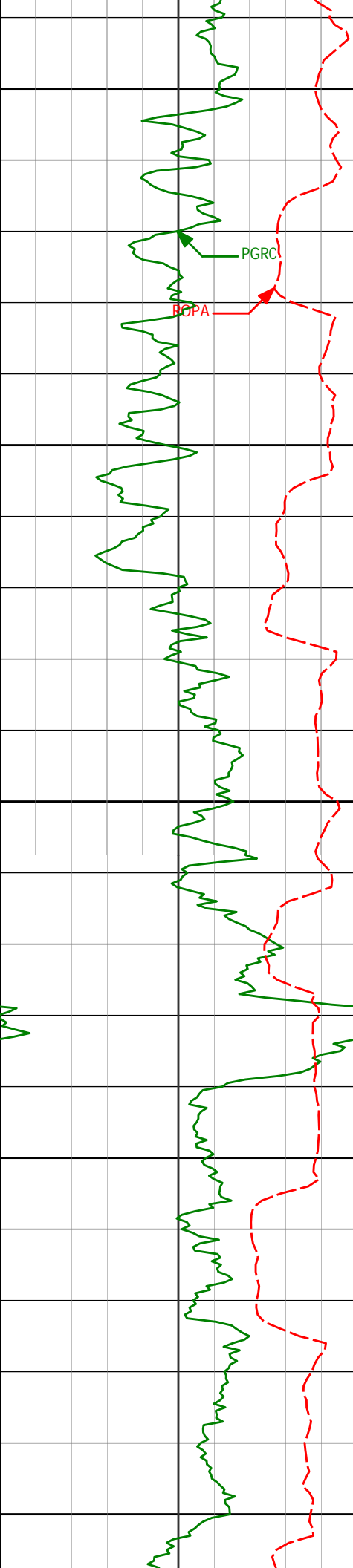
6400

6450

6295'	26.35°	91.44°	6169.12'	273.43'
6342'	29.84°	90.88°	6210.57'	294.96'
6390'	33.77°	89.57°	6251.36'	319.67'
6437'	37.71°	89.51°	6289.50'	346.55'



6485'	42.85°	88.98°	6326.11'	376.96'
6532'	48.11°	89.35°	6359.05'	409.80'
6579'	51.93°	90.04°	6389.24'	445.04'
6626'	55.23°	89.98°	6417.14'	482.01'
6674'	58.77°	90.07°	6443.28'	521.35'



6700

6721'

63.28°

88.87°

6466.04'

561.61'

6750

6769'

66.94°

88.91°

6486.24'

604.34'

6800

6816'

72.01°

90.64°

6502.72'

647.39'

6850

6864'

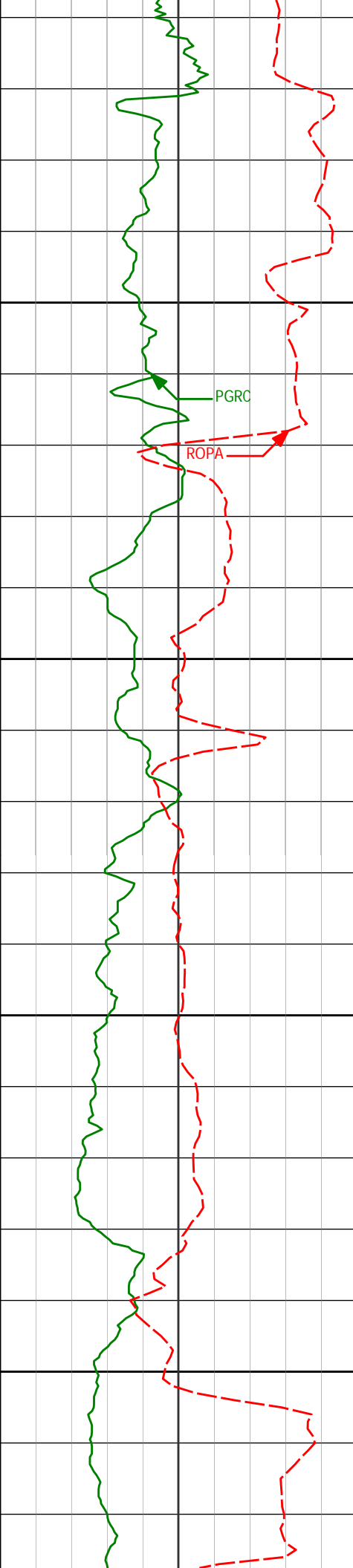
76.41°

90.70°

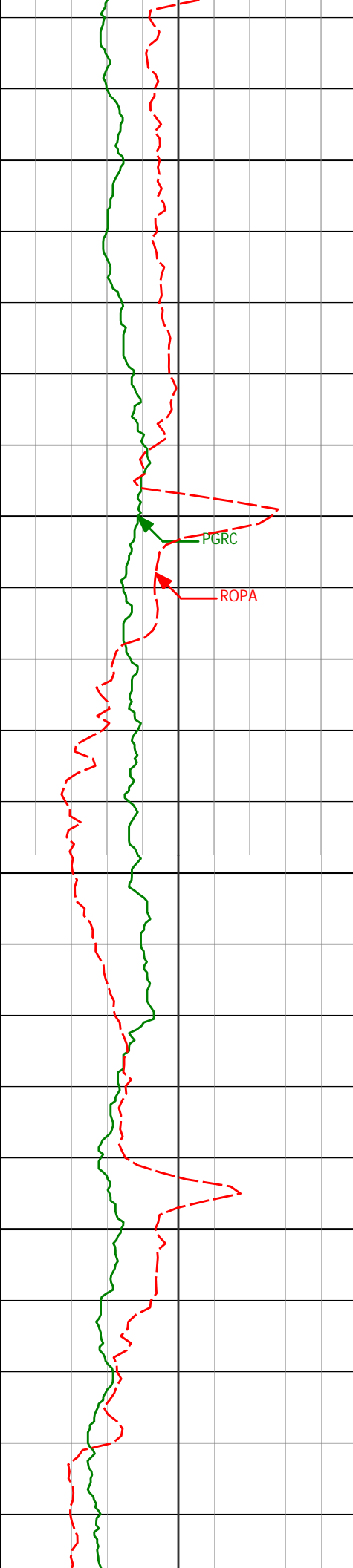
6515.77'

692.41'

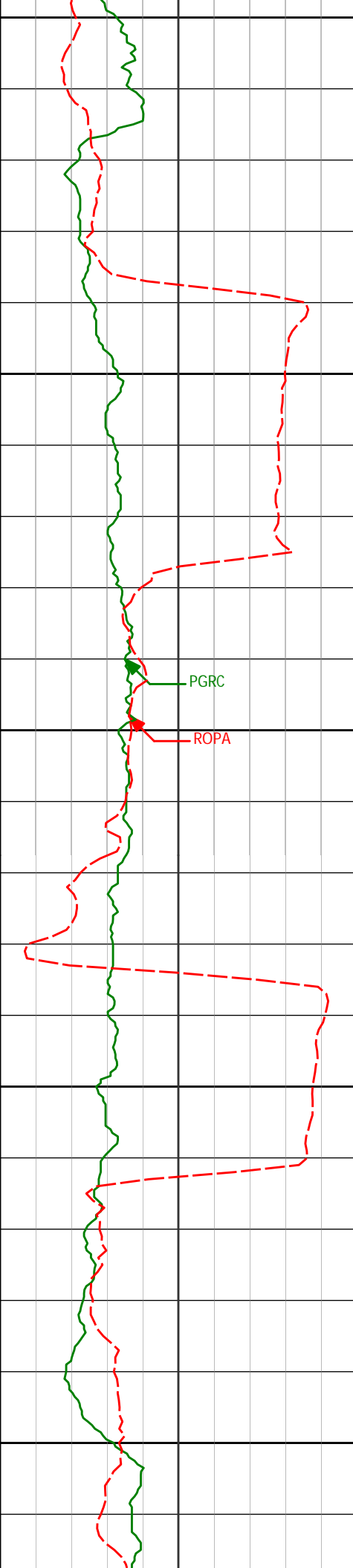
6900



6912'	81.75°	89.58°	6524.87'	738.44'
6950				
Casing Set @ 6,957' MD				
<Run 400>				
7000				
7039'	85.59°	87.32°	6538.87'	862.48'
7050				
7100				



7134'	89.26°	88.10°	6543.13'	955.96'
7150				
7200				
7229'	91.42°	88.57°	6542.57'	1049.37'
7250				
7300				
7324'	93.67°	87.23°	6538.35'	1142.81'



7350

7400

7450

7500

7550

7419'

92.72°

86.65°

6533.06'

1236.46'

PGRC

ROPA

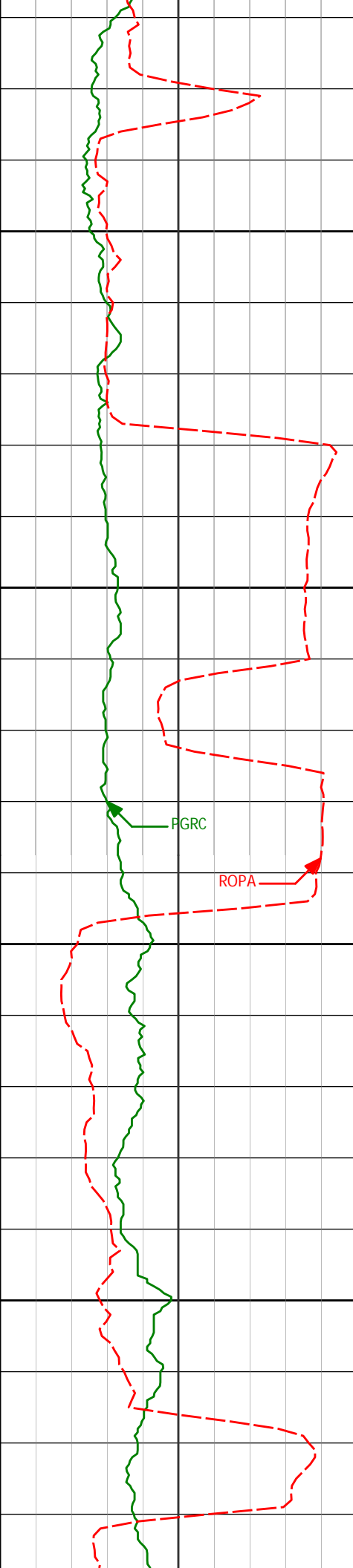
7514'

87.84°

82.50°

6532.59'

1330.76'



7600

7650

7700

7750

7609'

88.92°

81.43°

6535.28'

1425.47'

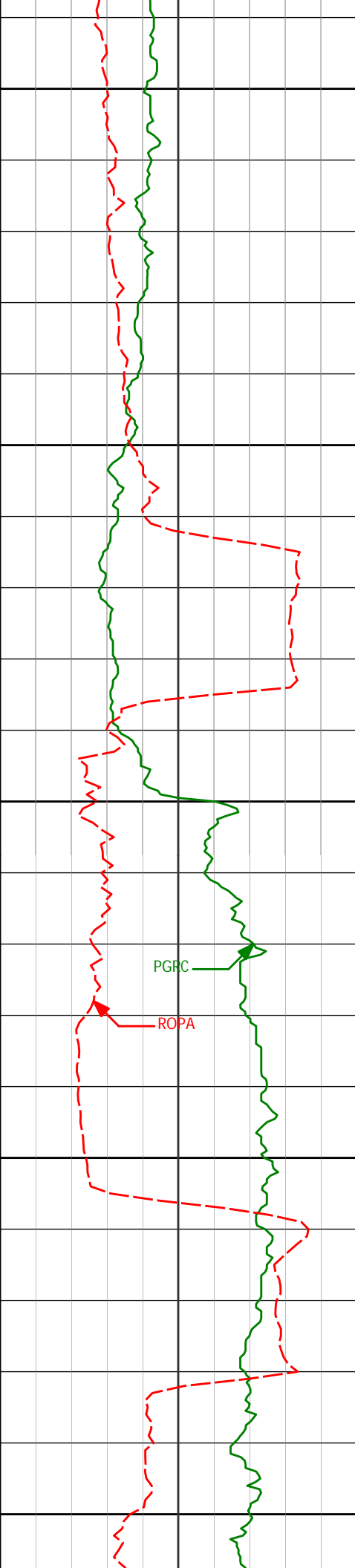
7704'

86.89°

86.77°

6538.75'

1519.80'



7800

7850

7900

7950

8000

7799'

7894'

7989'

89.51°

90.80°

91.20°

86.43°

87.86°

89.16°

6541.74'

6541.48'

6539.82'

1613.64'

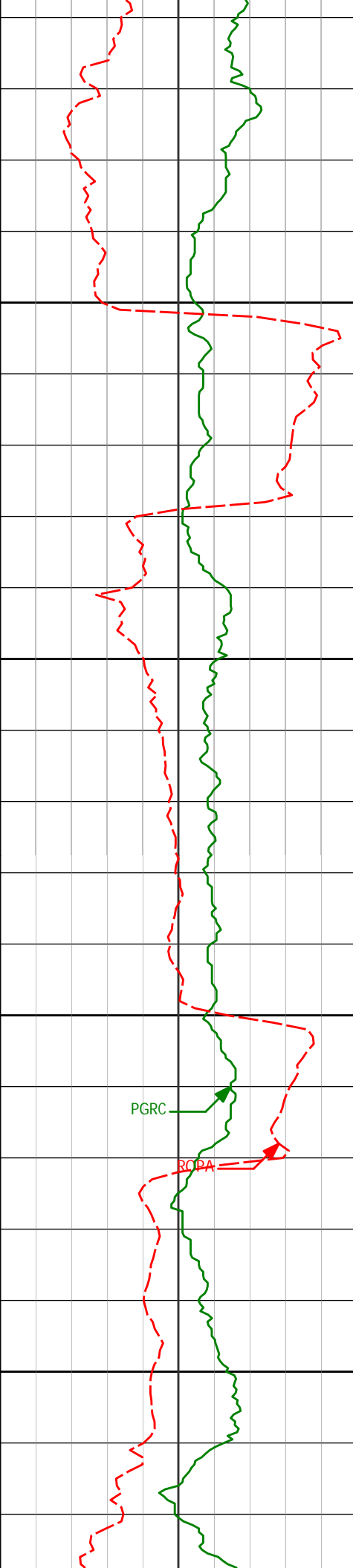
1707.38'

1800.73'

PGHC

ROPA





8050

8084'

89.97°

88.80°

6538.85'

1893.93'

8100

8150

PGRC

ROPA

8179'

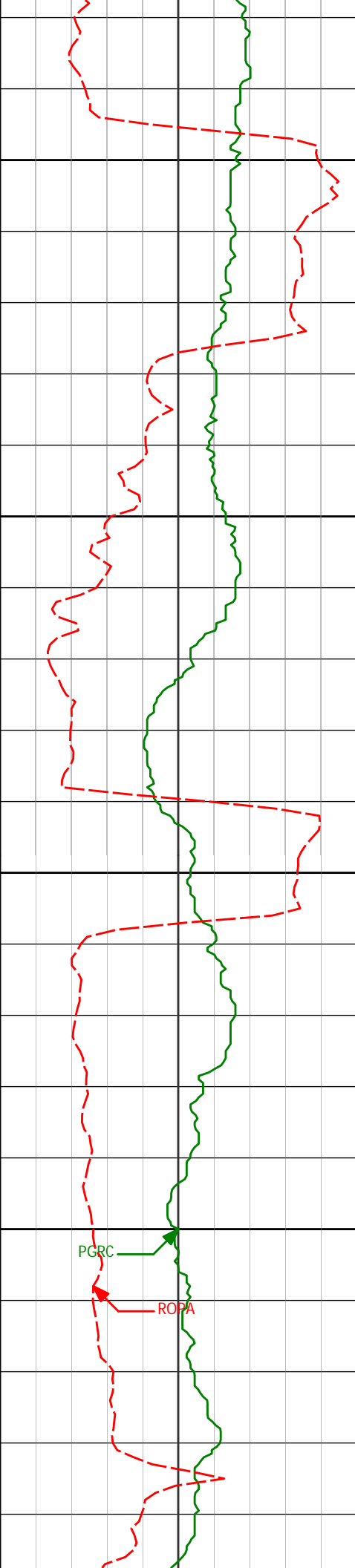
88.49°

88.12°

6540.13'

1987.29'

8200



8250

8274'

88.95°

89.64°

6542.25'

2080.51'

8300

8350

8369'

88.55°

90.86°

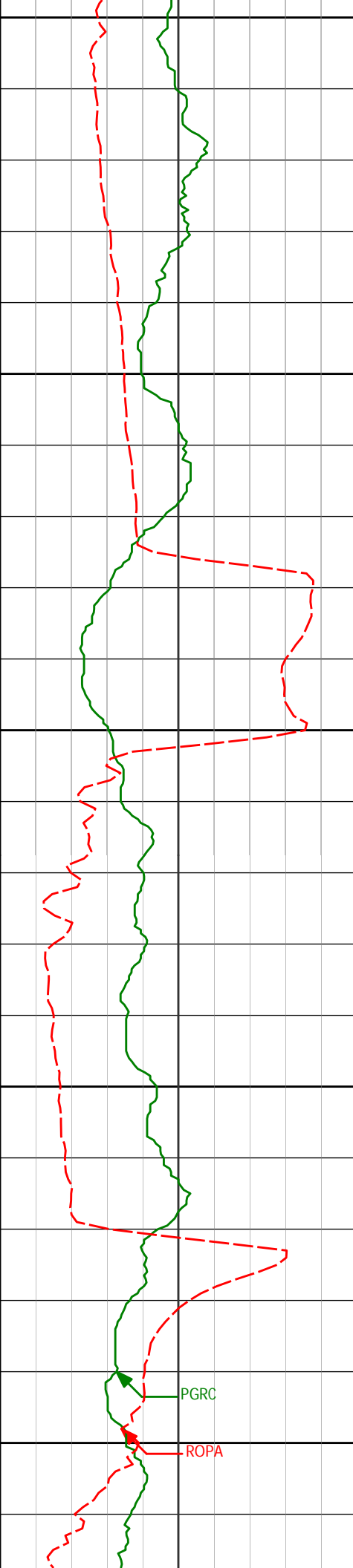
6544.32'

2173.26'

8400

PGRC

ROPA



8450

8464'

89.11°

89.99°

6546.26'

2265.96'

8500

8550

8559'

89.57°

90.49°

6547.36'

2358.74'

8600

8650

8654'

90.77°

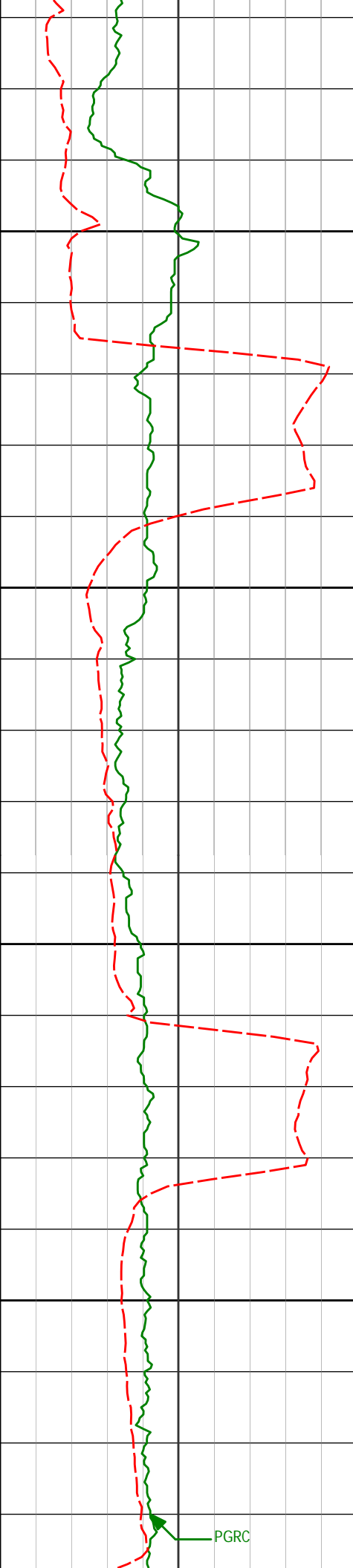
89.59°

6547.08'

2451.59'

PGRC

ROPA



8700

8750

8800

8850

8749'

90.56°

89.66°

6545.97'

2544.58'

8843'

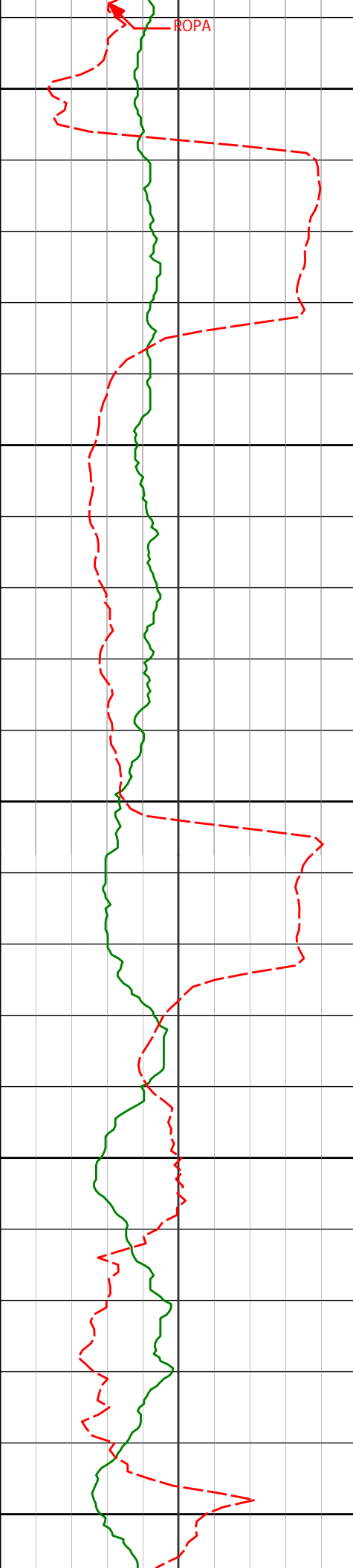
90.86°

90.54°

6544.81'

2636.43'

PGRC



8900

8938'

89.41°

89.69°

6544.59'

2729.25'

8950

9000

9033'

88.00°

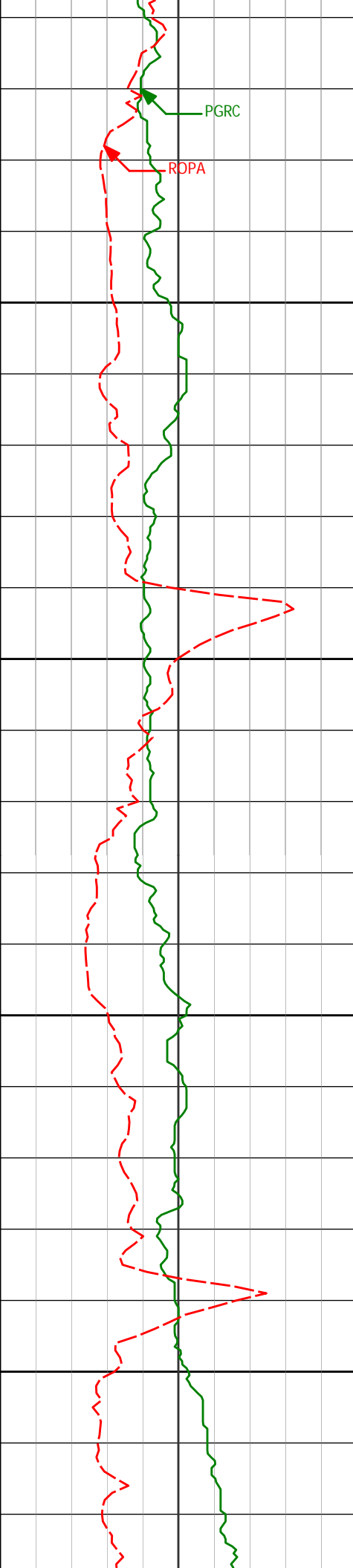
90.83°

6546.73'

2822.00'

9050

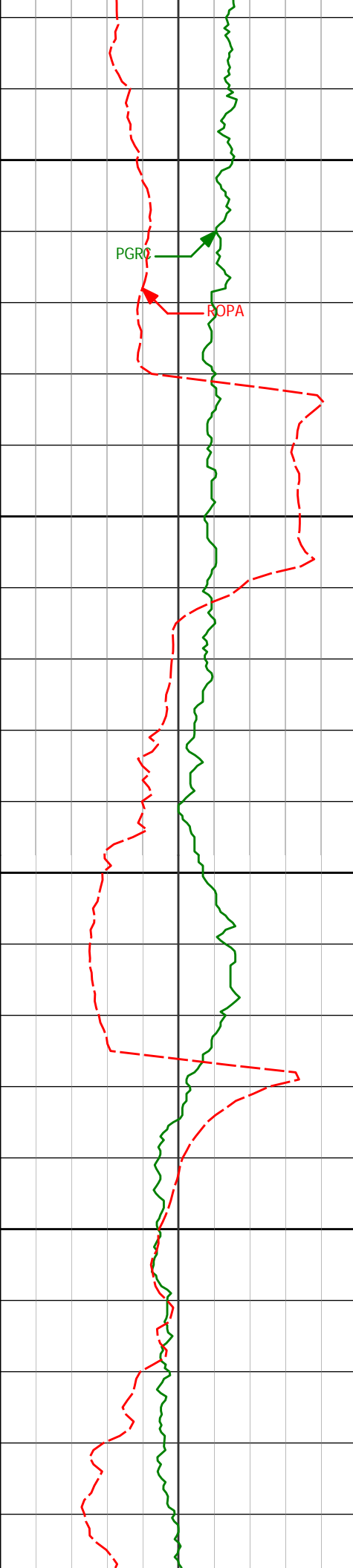
9100



9128'	88.06°	90.05°	6550.00'	2914.66'
-------	--------	--------	----------	----------

9223'	88.77°	89.07°	6552.63'	3007.64'
-------	--------	--------	----------	----------

9318'	89.23°	87.51°	6554.28'	3101.05'
-------	--------	--------	----------	----------



9350

PGRO

ROPA

9400

9413'

88.71°

89.77°

6555.99'

3194.34'

9450

9500

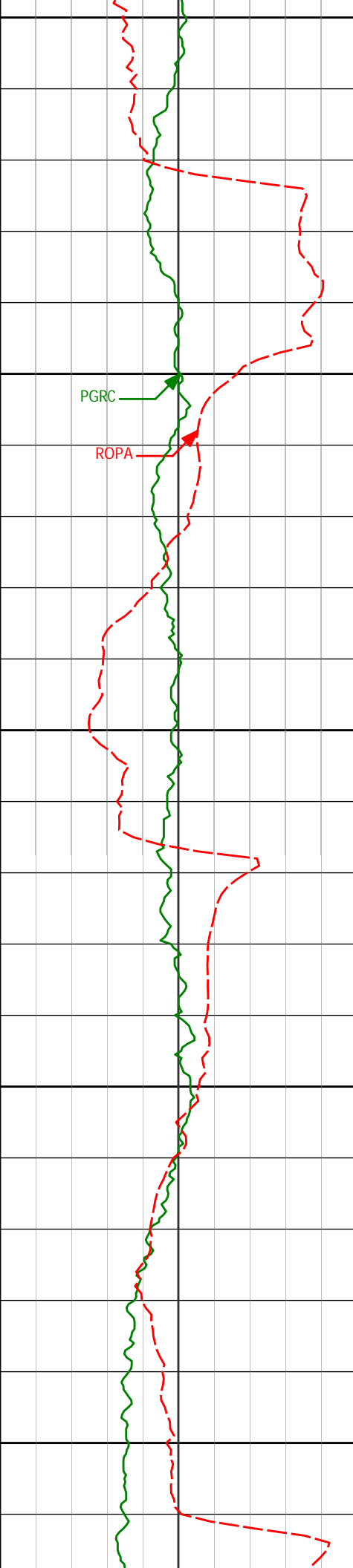
9508'

89.54°

88.76°

6557.44'

3287.45'



9550

9600

9650

9700

9750

PGRC

ROPA

9603'

89.54°

90.58°

6558.21'

3380.42'

9698'

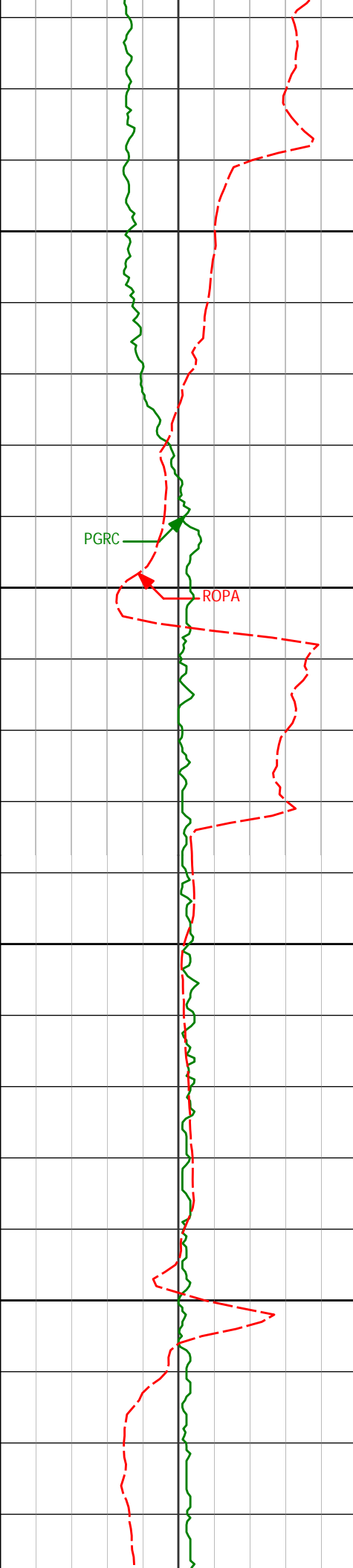
89.88°

90.03°

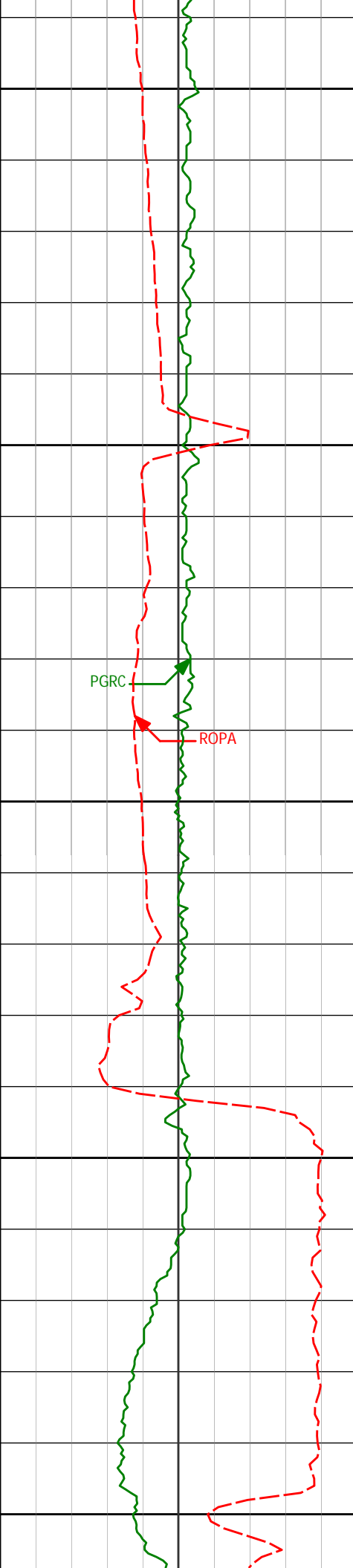
6558.69'

3473.18'





9793'	91.45°	91.63°	6557.58'	3565.74'
9800				
PGRC				
ROPA				
9850				
9888'	89.04°	90.68°	6557.18'	3658.17'
9900				
9950				
9983'	89.23°	92.89°	6558.61'	3750.36'



10000

10050

10078'

91.29°

105.90°

6558.18'

3838.52'

10100

10150

10172'

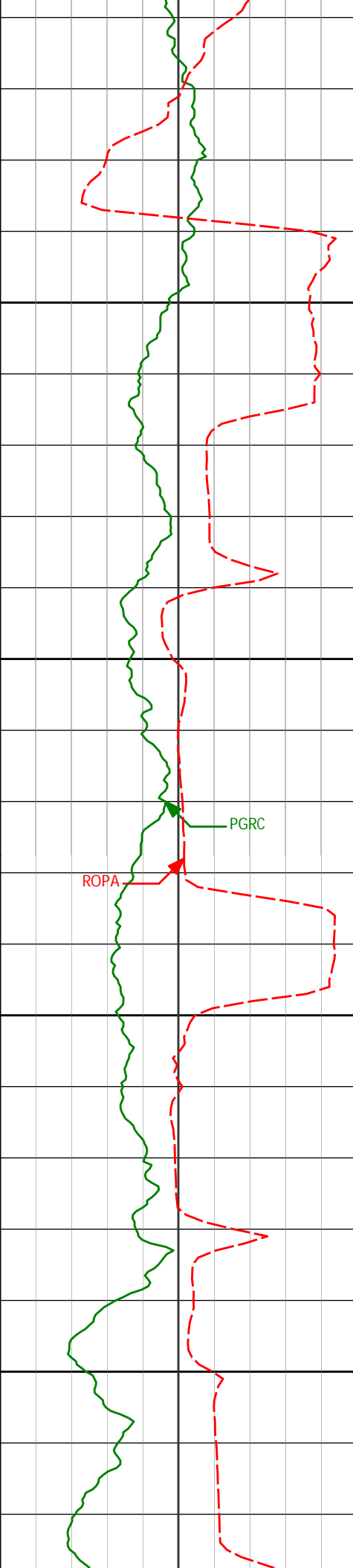
89.48°

97.92°

6557.55'

3924.27'

10200



10250

10267'

89.01°

92.88°

6558.80'

4014.81'

10300

PGRC

ROPA

10350

10362'

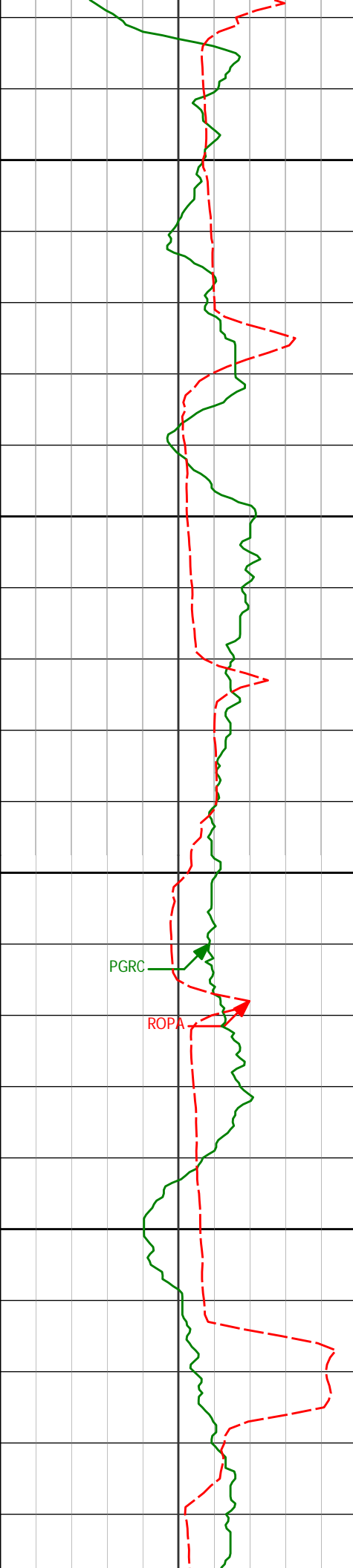
89.32°

90.18°

6560.18'

4107.09'

10400



10450

10457'

89.54°

88.86°

6561.13'

4200.12'

10500

10550

10552'

90.71°

86.73°

6560.92'

4293.68'

PGRC

ROPA

10600

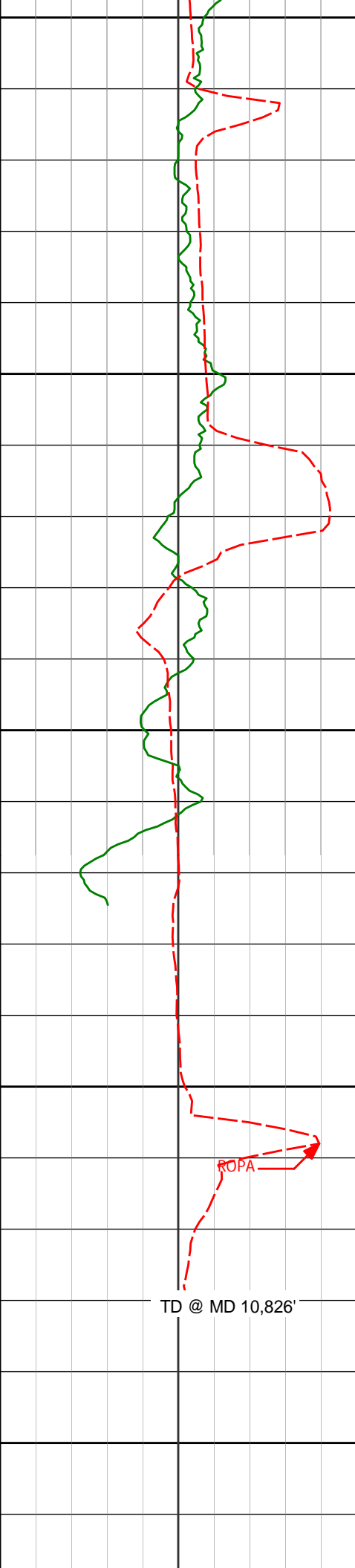
10647'

90.49°

86.00°

6559.93'

4387.62'



10650

10700

10750

10800

10850

10762'

10826'

88.98°

88.98°

84.06°

84.06°

6560.46'

6561.60'

4501.71'

4565.32'

TD @ MD 10,826'

ROPA



## DIRECTIONAL SURVEY REPORT

Surveys are tied into three non-Haliburton surveys at MD 352', 631', and 943' 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	0.10	353.02	352.00	0.30 N	0.04 W	0.03	0.03
631.00	1.60	190.82	630.97	3.28 S	0.80 W	-1.47	0.61
943.00	1.00	175.82	942.88	10.27 S	1.42 W	-3.55	0.22
1086.00	1.05	152.00	1085.86	12.67 S	0.71 W	-3.37	0.30
1179.00	1.29	206.16	1178.85	14.37 S	0.77 W	-3.78	1.17
1272.00	0.95	67.52	1271.84	15.01 S	0.52 W	-3.67	2.26
1364.00	2.52	31.33	1363.80	12.99 S	1.23 E	-1.53	2.00
1457.00	4.33	7.57	1456.63	7.76 S	2.76 E	1.06	2.43
1552.00	6.94	2.60	1551.16	1.53 N	3.49 E	3.74	2.79
1647.00	8.61	354.64	1645.29	14.34 N	3.09 E	6.04	2.09
1742.00	8.89	1.38	1739.19	28.76 N	2.60 E	8.60	1.12
1837.00	10.13	2.18	1832.88	44.45 N	3.10 E	12.39	1.31
1931.00	12.00	359.65	1925.13	62.48 N	3.35 E	16.44	2.05
2026.00	13.07	355.38	2017.86	83.06 N	2.43 E	19.87	1.49
2121.00	13.39	359.83	2110.34	104.77 N	1.53 E	23.56	1.12
2216.00	14.95	0.59	2202.45	128.03 N	1.62 E	28.55	1.65
2311.00	15.15	359.42	2294.19	152.69 N	1.62 E	33.75	0.38
2406.00	14.99	359.38	2385.93	177.39 N	1.36 E	38.70	0.17
2501.00	15.23	359.31	2477.64	202.15 N	1.08 E	43.64	0.25
2596.00	17.16	3.03	2568.87	228.63 N	1.67 E	49.79	2.31
2691.00	14.84	1.50	2660.18	254.79 N	2.73 E	56.34	2.48
2786.00	15.68	359.75	2751.83	279.79 N	2.99 E	61.86	1.01
2881.00	16.39	357.61	2843.14	306.02 N	2.38 E	66.78	0.97
2976.00	15.79	358.12	2934.42	332.33 N	1.39 E	71.37	0.65
3071.00	14.07	357.66	3026.21	356.79 N	0.50 E	75.64	1.81
3166.00	14.97	359.01	3118.17	380.59 N	0.18 W	79.99	1.01
3261.00	14.67	2.24	3210.01	404.88 N	0.07 E	85.36	0.93
3356.00	14.07	359.26	3302.04	428.45 N	0.39 E	90.64	1.00
3451.00	13.37	3.83	3394.33	450.96 N	0.98 E	95.95	1.36
3545.00	13.61	5.23	3485.74	472.81 N	2.71 E	102.25	0.43
3640.00	15.77	5.66	3577.63	496.79 N	5.01 E	109.54	2.28
3735.00	18.16	4.20	3668.49	524.41 N	7.36 E	117.66	2.56
3830.00	19.61	3.89	3758.37	555.08 N	9.53 E	126.24	1.53
3925.00	21.80	4.39	3847.23	588.58 N	11.96 E	135.67	2.31

4020.00	20.15	0.71	3935.94	622.53 N	13.51 E	144.34	2.22
4115.00	17.37	358.13	4025.88	653.07 N	13.25 E	150.52	3.05
4210.00	14.00	354.38	4117.33	678.69 N	11.67 E	154.36	3.70
4305.00	11.02	354.80	4210.07	699.17 N	9.72 E	156.77	3.14
4399.00	11.45	352.80	4302.27	717.38 N	7.73 E	158.67	0.62
4494.00	12.93	353.11	4395.12	737.28 N	5.28 E	160.46	1.56
4589.00	10.78	347.64	4488.09	756.52 N	2.10 E	161.41	2.55
4684.00	8.94	358.55	4581.69	772.58 N	0.01 E	162.75	2.75
4779.00	7.66	353.09	4675.70	786.24 N	0.94 W	164.70	1.58
4874.00	7.28	351.47	4769.89	798.48 N	2.59 W	165.66	0.46
4969.00	7.04	355.03	4864.15	810.23 N	3.99 W	166.77	0.53
5061.00	7.30	352.59	4955.43	821.65 N	5.23 W	167.96	0.44
5156.00	8.04	356.65	5049.58	834.26 N	6.40 W	169.48	0.96
5251.00	7.36	354.93	5143.73	846.96 N	7.33 W	171.24	0.76
5346.00	6.60	354.58	5238.02	858.45 N	8.38 W	172.64	0.80
5440.00	7.58	356.44	5331.30	870.02 N	9.27 W	174.20	1.07
5535.00	6.08	355.39	5425.62	881.29 N	10.07 W	175.80	1.58
5630.00	5.09	355.83	5520.17	890.51 N	10.78 W	177.04	1.04
5725.00	3.21	346.81	5614.92	897.30 N	11.69 W	177.58	2.09
5820.00	1.87	357.77	5709.82	901.44 N	12.36 W	177.80	1.49
5915.00	2.22	23.36	5804.77	904.68 N	11.69 W	179.14	1.02
6010.00	7.54	82.73	5899.43	907.16 N	4.77 W	186.42	7.04
6057.00	13.79	87.85	5945.59	907.76 N	3.90 E	195.02	13.44
6105.00	16.26	90.01	5991.95	907.97 N	16.33 E	207.23	5.28
6152.00	18.74	90.13	6036.77	907.95 N	30.47 E	221.04	5.28
6200.00	20.65	91.37	6081.96	907.73 N	46.64 E	236.80	4.07
6247.00	23.25	91.69	6125.55	907.26 N	64.20 E	253.87	5.54
6295.00	26.35	91.44	6169.12	906.71 N	84.32 E	273.43	6.46
6342.00	29.84	90.88	6210.57	906.27 N	106.45 E	294.96	7.45
6390.00	33.77	89.57	6251.36	906.19 N	131.74 E	319.67	8.31
6437.00	37.71	89.51	6289.50	906.41 N	159.19 E	346.55	8.38
6485.00	42.85	88.98	6326.11	906.83 N	190.21 E	376.96	10.73
6532.00	48.11	89.35	6359.05	907.31 N	223.70 E	409.80	11.21
6579.00	51.93	90.04	6389.24	907.50 N	259.71 E	445.04	8.21
6626.00	55.23	89.98	6417.14	907.49 N	297.53 E	482.01	7.02
6674.00	58.77	90.07	6443.28	907.47 N	337.78 E	521.35	7.38
6721.00	63.28	88.87	6466.04	907.86 N	378.88 E	561.61	9.85
6769.00	66.94	88.91	6486.24	908.70 N	422.40 E	604.34	7.63
6816.00	72.01	90.64	6502.72	908.87 N	466.40 E	647.39	11.32
6864.00	76.41	90.70	6515.77	908.33 N	512.58 E	692.41	9.17
6912.00	81.75	89.58	6524.87	908.22 N	559.69 E	738.44	11.36
7039.00	85.59	87.32	6538.87	911.64 N	685.84 E	862.48	3.50
7134.00	89.26	88.10	6543.13	915.43 N	780.65 E	955.96	3.95
7229.00	91.42	88.57	6542.57	918.19 N	875.60 E	1049.37	2.33
7324.00	93.67	87.23	6538.35	921.67 N	970.44 E	1142.81	2.76
7419.00	92.72	86.65	6533.06	926.73 N	1065.15 E	1236.46	1.17
7514.00	87.84	82.50	6532.59	935.71 N	1159.68 E	1330.76	6.74
7609.00	88.92	81.43	6535.28	948.98 N	1253.70 E	1425.47	1.60
7704.00	86.89	86.77	6538.75	958.74 N	1348.10 E	1519.80	6.01
7799.00	89.51	86.43	6541.74	964.37 N	1442.88 E	1613.64	2.78
7894.00	90.80	87.86	6541.48	969.10 N	1537.75 E	1707.38	2.03
7989.00	91.20	89.16	6539.82	971.57 N	1632.70 E	1800.73	1.43
8084.00	89.97	88.80	6538.85	973.26 N	1727.68 E	1893.93	1.35
8179.00	88.49	88.12	6540.13	975.81 N	1822.64 E	1987.29	1.71
8274.00	88.95	89.64	6542.25	977.67 N	1917.59 E	2080.51	1.67
8369.00	88.55	90.86	6544.32	977.26 N	2012.57 E	2173.26	1.35
8464.00	89.11	89.99	6546.26	976.55 N	2107.54 E	2265.96	1.09
8559.00	89.57	90.49	6547.36	976.15 N	2202.53 E	2358.74	0.72
8654.00	90.77	89.59	6547.08	976.09 N	2297.53 E	2451.59	1.58
8749.00	90.56	89.66	6545.97	976.71 N	2392.52 E	2544.58	0.23
8843.00	90.86	90.54	6544.81	976.54 N	2486.51 E	2636.43	0.99
8938.00	89.41	89.69	6544.59	976.35 N	2581.51 E	2729.25	1.77
9033.00	88.00	90.83	6546.73	975.92 N	2676.48 E	2822.00	1.91
9128.00	88.06	90.05	6550.00	975.19 N	2771.42 E	2914.66	0.82
9223.00	88.77	89.07	6552.63	975.92 N	2866.38 E	3007.64	1.27
9318.00	89.23	87.51	6554.28	978.76 N	2961.32 E	3101.05	1.71
9413.00	88.71	89.77	6555.99	981.01 N	3056.27 E	3194.34	2.44
9508.00	89.54	88.76	6557.44	982.23 N	3151.25 E	3287.45	1.38
9603.00	89.54	90.58	6558.21	982.78 N	3246.24 E	3380.42	1.92
9698.00	89.88	90.03	6558.69	982.27 N	3341.24 E	3473.18	0.68
9793.00	91.45	91.63	6557.58	980.90 N	3436.22 E	3565.74	2.36
9888.00	89.04	90.68	6557.18	978.98 N	3531.19 E	3658.17	2.73
9983.00	89.23	92.89	6558.61	976.02 N	3626.13 E	3750.36	2.33
10078.00	91.29	105.90	6558.18	960.55 N	3719.64 E	3838.52	13.86
10172.00	89.48	97.92	6557.55	941.17 N	3811.54 E	3924.27	8.70

10267.00	89.01	92.88	6558.80	932.23 N	3906.08 E	4014.81	5.33
10362.00	89.32	90.18	6560.18	929.70 N	4001.03 E	4107.09	2.86
10457.00	89.54	88.86	6561.13	930.49 N	4096.02 E	4200.12	1.41
10552.00	90.71	86.73	6560.92	934.15 N	4190.94 E	4293.68	2.56
10647.00	90.49	86.00	6559.93	940.17 N	4285.74 E	4387.62	0.80

10762.00	88.98	84.06	6560.46	950.13 N	4400.30 E	4501.71	2.14
10826.00	88.98	84.06	6561.60	956.75 N	4463.95 E	4565.32	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 77.84 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 10826.00 FEET  
IS 4565.33 FEET ALONG 77.90 DEGREES (GRID)**

Date Printed:03 November 2013