



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	15-Sep-13	16-Sep-13	18-Sep-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.75		
Log Start Depth (MD, ft)	981.00	5,893.00	6,962.00		
Log End Depth (MD, ft)	5,893.00	6,962.00	11,066.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	14-Sep-13 03:00	15-Sep-13 07:00	17-Sep-13 01:30		
Drill/Wipe End Date and Time	14-Sep-13 23:00	15-Sep-13 22:30	18-Sep-13 01:00		
Min Inc (deg) @ Depth (MD, ft)	0 @ 650.00	7.81 @ 5,900.00	87.53 @ 7,810.00		
Max Inc (deg) @ Depth (MD, ft)	16.97 @ 3,910.00	85.56 @ 6,909.00	92.86 @ 8,460.00		
Bit TFA(in2) / Bit Type	.86 / PDC	1.24 / PDC	.86 / PDC		
Flow Rate (gpm)	600.00	598.21	298.21		
Max AV (fpm) / CV (fpm) @ MWD	NA / NA	NA / NA	NA / NA		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.30 / 27.00	9.30 / 33.00	9.20 / 31.00		
Filtrate CL (ppm)	2,200.00	2,200.00	3,000.00		
pH / Fluid Loss (mptm)	9.70 / NA	9.10 / NA	10.50 / NA		
PV (cP) / YP (lbf2)	3 / 3.00	10 / 8.00	7 / 6.00		
% Solids / % Sand	3 / 0.2	2 / 0.2	4.7 / 0.20		
% Oil / Oil:Water Ratio	0 / 0:95	0 / 0:95	0 / 0:95		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Max Tool Temp (deg F) / S	127.07 / PDM	127.07 / PDM	222.77 / PDM		

Max Tool Temp (degF) / Source	167.97 / PCM	167.97 / PCM	220.77 / PCM		
Rm @ Max Tool Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Lead MWD Engineer	Gary Eifert	Gary Eifert	Gary Eifert		
Customer Representative	Matt Settles	Matt Settles	Matt Settles		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11341325	11341325	12134697		
Insert Serial Number	11400826	11400826	11400840		
Date and Time Initialized	13-Sep-13 10:09	13-Sep-13 10:09	16-Sep-13 09:31		
Date and Time Read	16-Sep-13 02:51	16-Sep-13 02:57	18-Sep-13 10:01		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.00	53.00	64.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341325	11341325	12134697		
Sonde Serial Number	11145627	11145627	11902117		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	120.74	147.08	195.13		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.82	46.72	56.83		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341325	11341325	12134697		
Insert/Sonde Serial Number	11293298	11293298	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

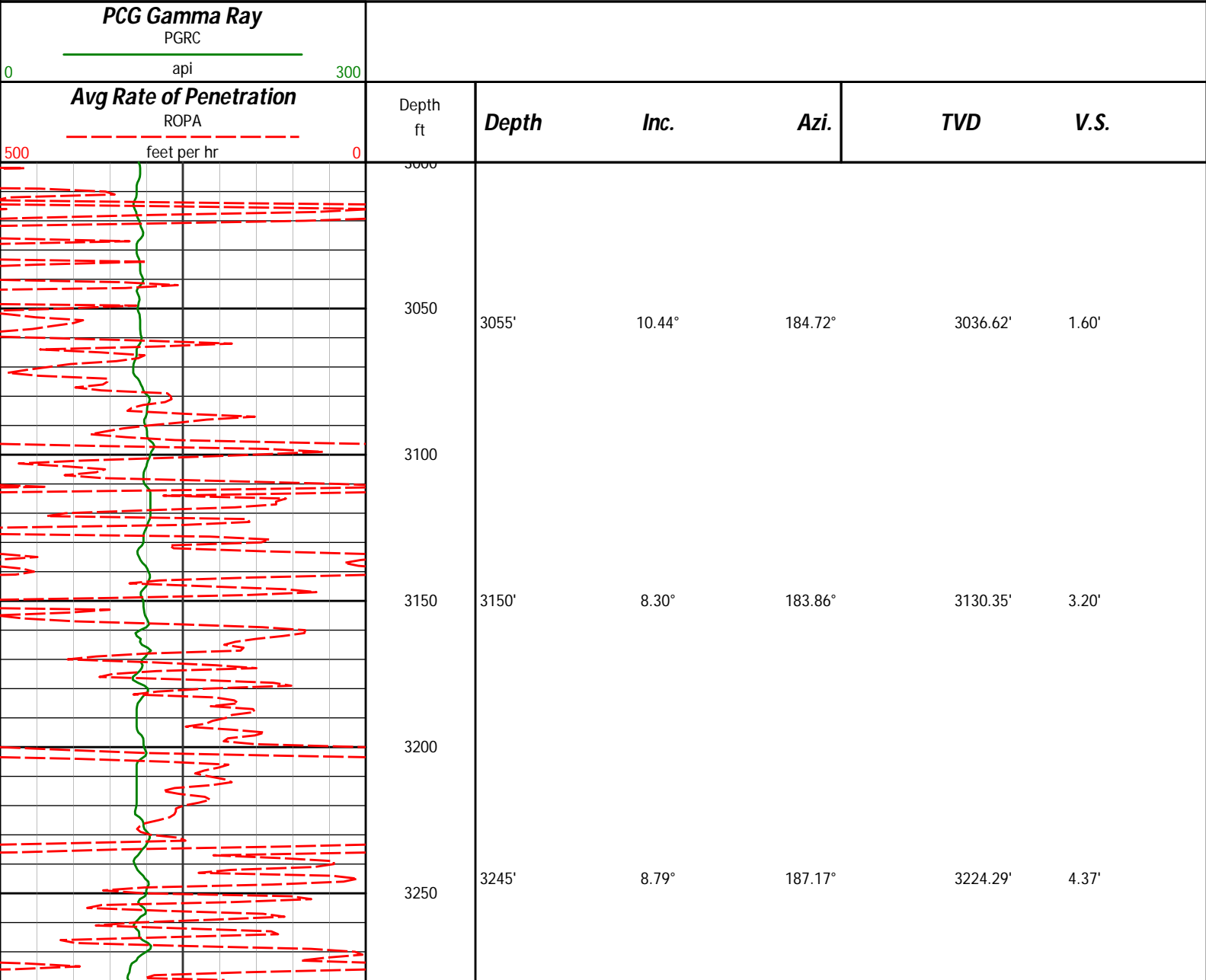
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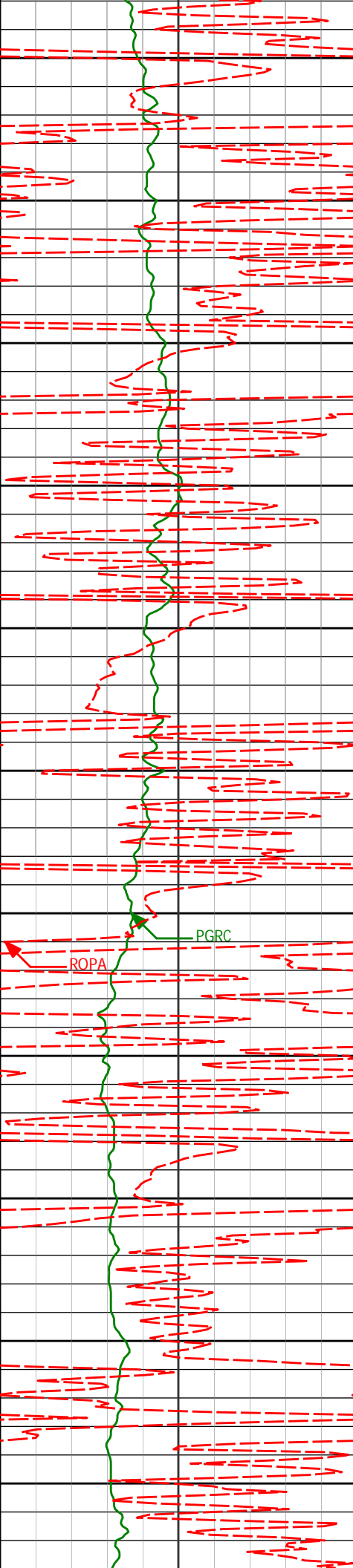
HALLIBURTON

Sperry Drilling Services

MD Main Log 1:600

Noble Energy
Wells Ranch USX AE20-62HN
H&P 343
T6N-R62W





3300

3340'

8.85°

192.67°

3318.17'

4.46'

3350

3400

3435'

8.40°

184.75°

3412.10'

4.83'

3450

3500

3530'

10.33°

186.16°

3505.83'

6.12'

3550

3600

3625'

12.56°

186.98°

3598.93'

7.33'

3650

3700

3720'

15.07°

191.42°

3691.18'

7.69'

3750

3800

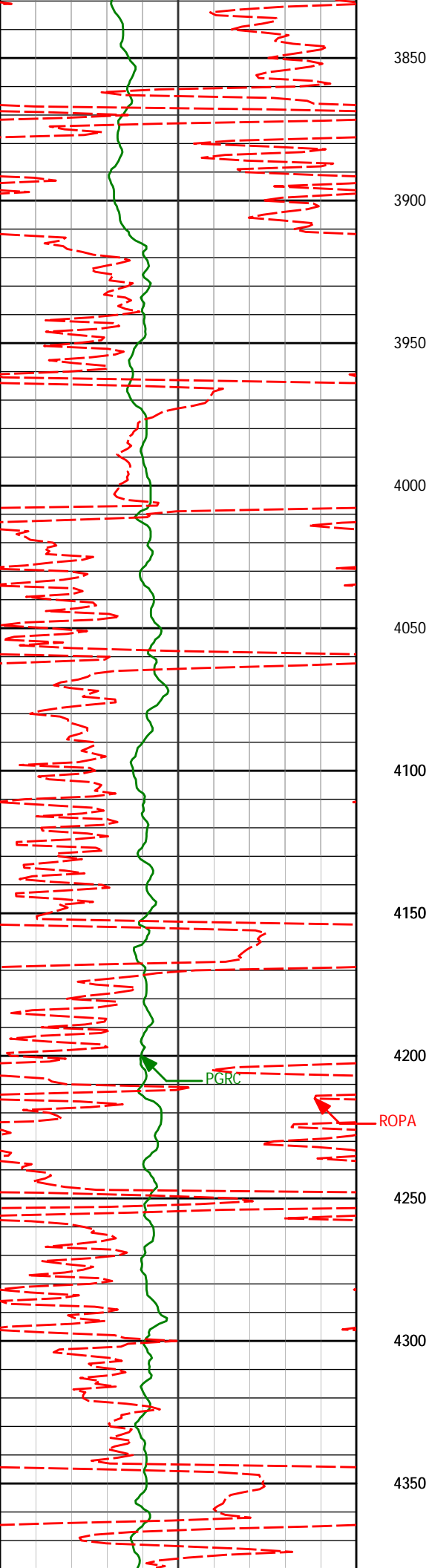
3815'

16.18°

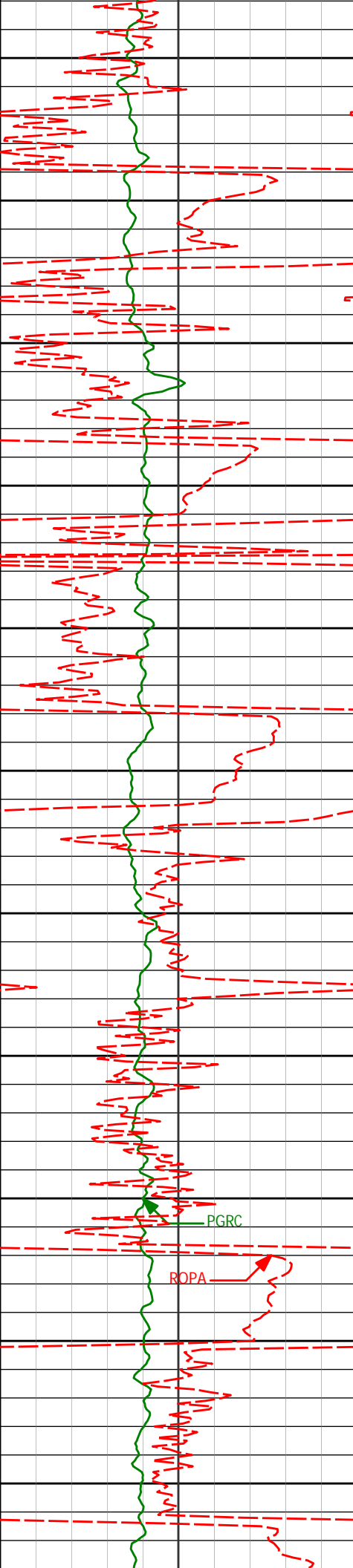
188.42°

3782.67'

7.88'



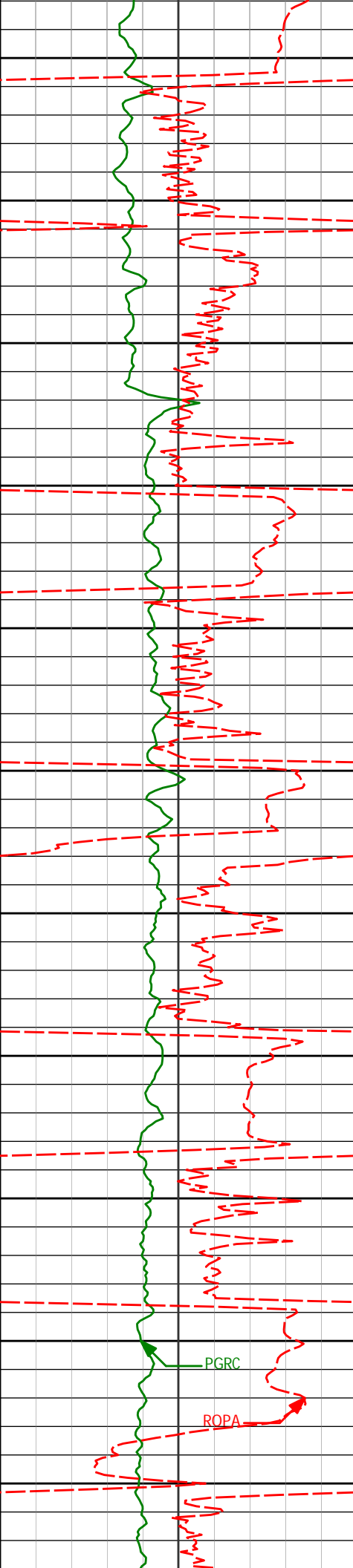
3910'	16.97°	190.17°	3873.72'	8.35'
4005'	14.13°	198.82°	3965.25'	6.66'
4100'	12.20°	204.87°	4057.75'	2.42'
4195'	9.81°	205.03°	4151.00'	-2.17'
4290'	6.94°	210.09°	4244.98'	-6.17'



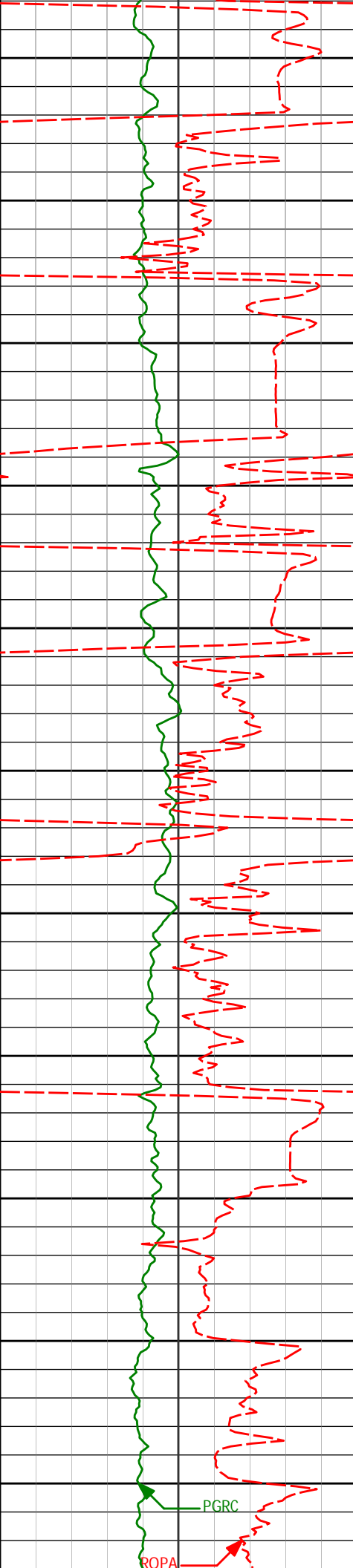
4385'	6.37°	205.57°	4339.34'	-9.50'
4400				
4450				
4480'	7.16°	196.35°	4433.68'	-11.51'
4500				
4550				
4575'	7.02°	195.59°	4527.95'	-12.67'
4600				
4650				
4669'	8.00°	184.17°	4621.15'	-12.50'
4700				
4750				
4764'	6.87°	185.58°	4715.35'	-11.33'
4800				
4850				
4858'	7.56°	186.41°	4808.60'	-10.45'
4900				

PGRC

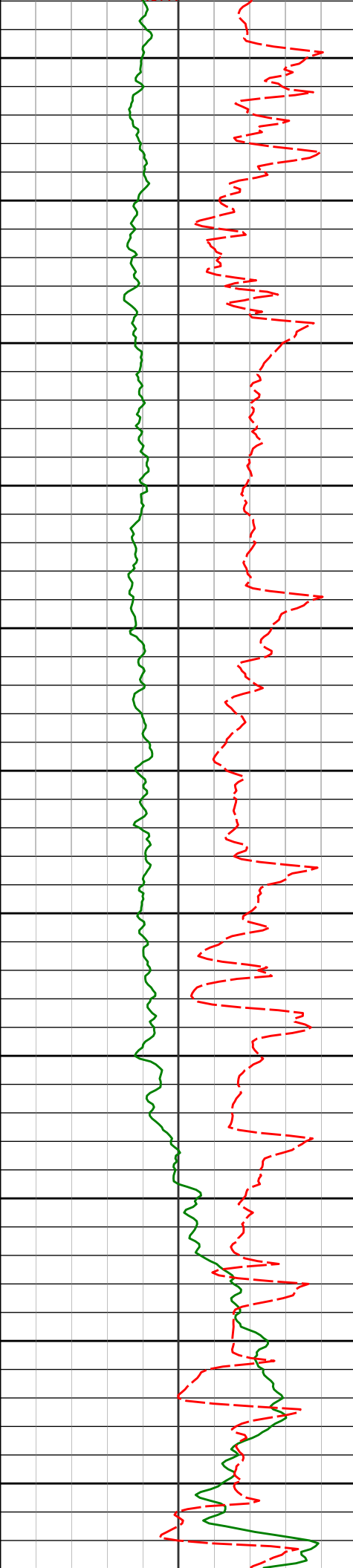
ROPA



4950	4953'	9.24°	188.29°	4902.58'	-9.76'
5000					
5050	5048'	8.39°	186.42°	4996.46'	-9.02'
5100					
5150	5143'	7.40°	186.26°	5090.56'	-8.12'
5200					
5250	5238'	6.26°	178.21°	5184.88'	-6.60'
5300					
5350	5333'	7.05°	174.32°	5279.24'	-3.91'
5400					
5450	5428'	9.17°	183.49°	5373.29'	-1.41'



5500				
5523'	9.50°	187.53°	5467.03'	-0.13'
5550				
5600				
5619'	9.01°	189.26°	5561.78'	0.39'
5650				
5700				
5713'	9.33°	188.70°	5654.58'	0.73'
5750				
5800				
5808'	6.15°	185.89°	5748.71'	1.34'
5840'	5.25°	185.86°	5780.55'	1.58'
5850				
<Run 200> 5900				
5900'	7.81°	194.20°	5840.15'	1.52'
5950				
5948'	12.97°	204.20°	5887.36'	0.00'
6000				
5995'	16.35°	197.62°	5932.82'	-2.11'



6050

6090'

22.51°

184.33°

6022.41'

-1.92'

6100

6150

6185'

24.94°

157.93°

6109.62'

10.73'

6200

6250

6280'

31.01°

134.51°

6193.73'

41.81'

6300

6328'

35.82°

127.82°

6233.80'

64.52'

6350

6375'

39.03°

123.85°

6271.13'

90.29'

6400

6423'

43.15°

118.38°

6307.31'

119.77'

6450

6470'

48.22°

115.04°

6340.14'

152.02'

6500

6518'

52.21°

111.90°

6370.85'

187.93'

6550

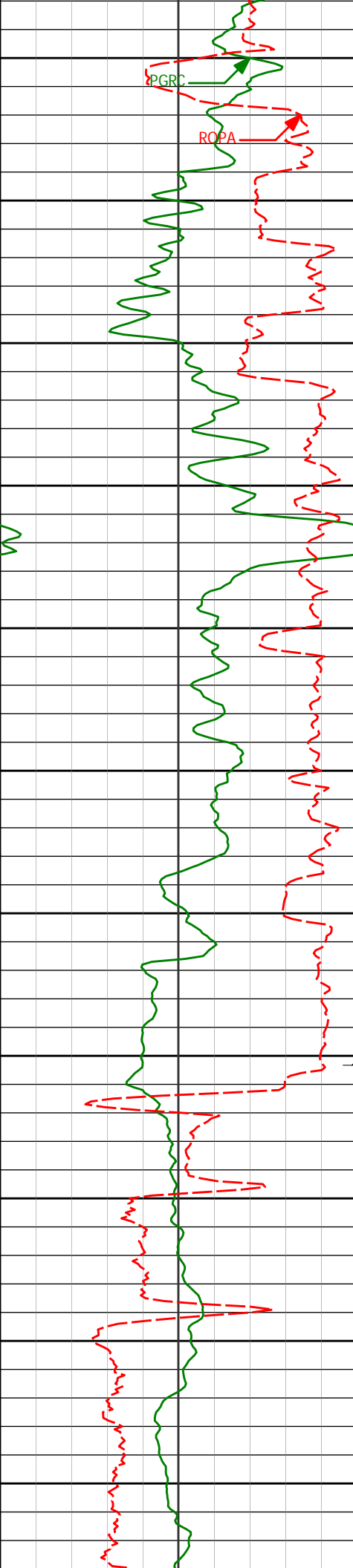
6565'

56.00°

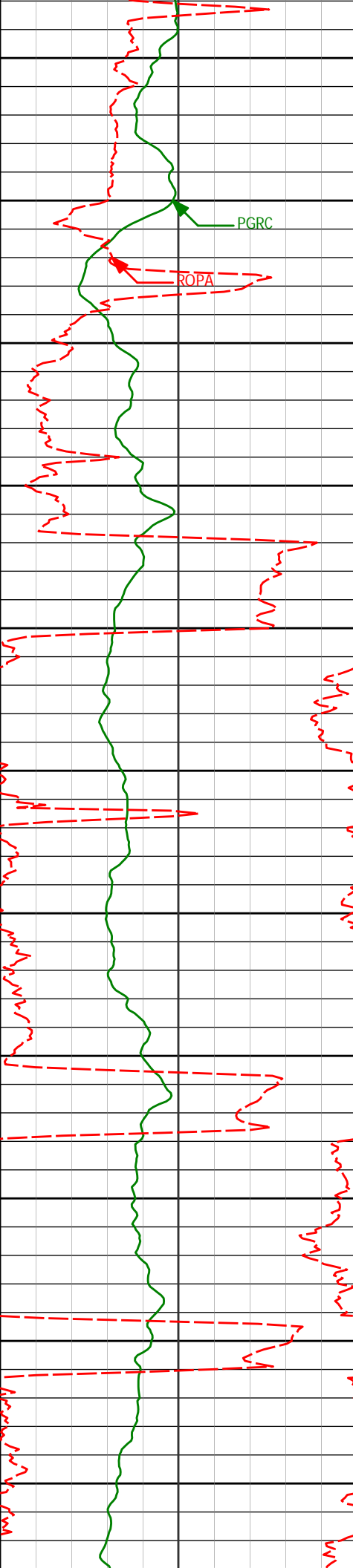
108.68°

6398.41'

225.42'



6600	6613'	59.70°	107.17°	6423.95'	265.69'
6650	6660'	62.22°	106.18°	6446.76'	306.52'
6700	6708'	64.39°	105.15°	6468.32'	349.22'
6750	6755'	69.94°	102.35°	6486.56'	392.43'
6800	6803'	75.41°	100.49°	6500.85'	438.23'
6850	6849'	81.33°	100.52°	6510.12'	483.26'
6900	6909'	85.56°	98.19°	6516.97'	542.84'
6950 Casing Set @ 6,952' MD					
<Run 300>					
7000					
7050					
	7067'	88.49°	91.46°	6525.17'	699.80'
7100					



7150

7160'

88.40°

90.57°

6527.70'

791.55'

7200

7250

7253'

88.18°

90.05°

6530.47'

883.10'

7300

7350

7345'

89.63°

86.74°

6532.23'

973.09'

7400

7450

7438'

91.17°

87.37°

6531.58'

1063.61'

7500

7550

7531'

89.51°

86.22°

6531.03'

1154.03'

7600

7650

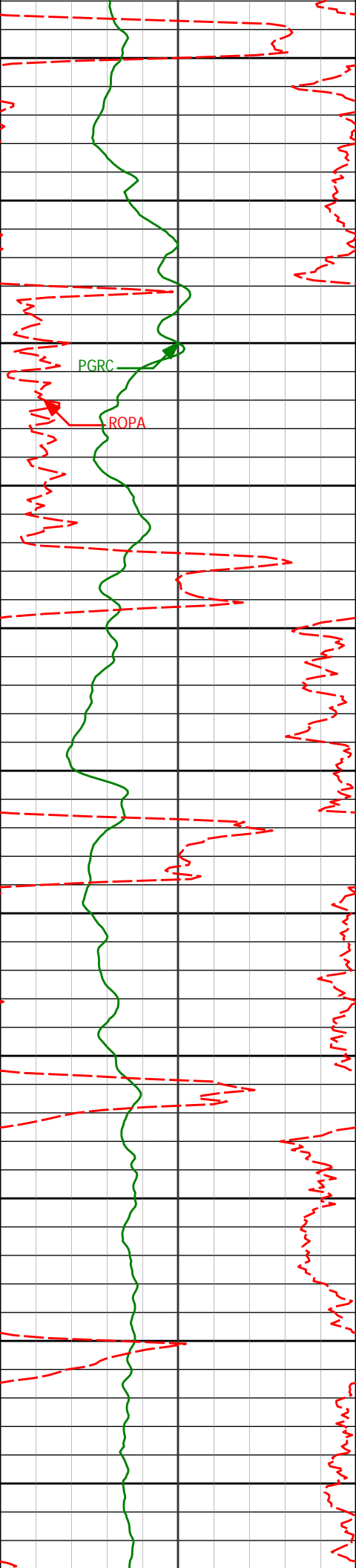
7624'

89.54°

87.18°

6531.80'

1244.42'



7700

7717'

88.30°

85.93°

6533.55'

1334.73'

7750

7800

7810'

87.53°

84.88°

6536.94'

1424.55'

7850

7900

7901'

87.90°

85.86°

6540.57'

1512.41'

7950

8000

7993'

88.92°

87.73°

6543.12'

1601.82'

8050

8100

8085'

90.12°

87.65°

6543.89'

1691.60'

8150

8200

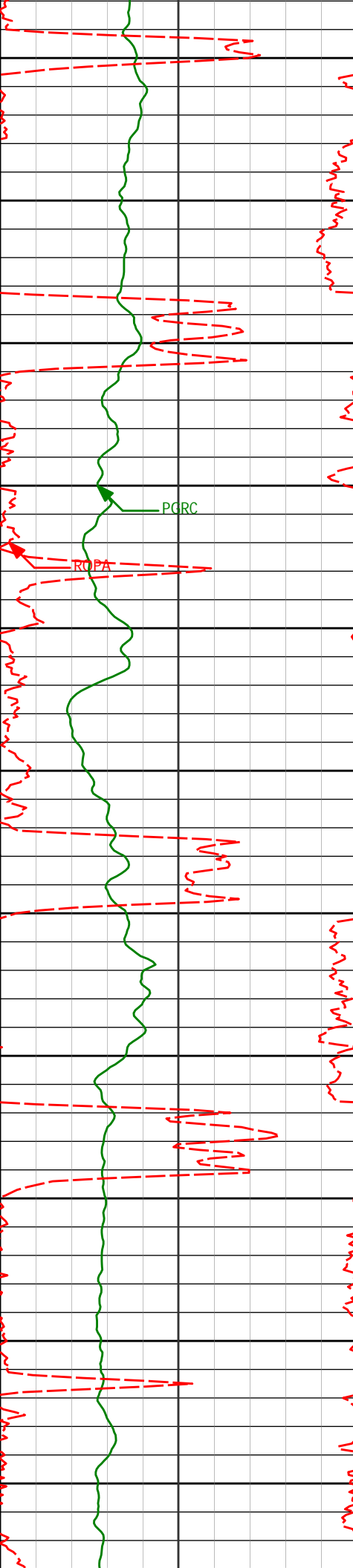
8178'

90.28°

86.44°

6543.57'

1782.12'



8250

8271'

89.94°

83.18°

6543.39'

1871.73'

8300

8350

8365'

91.94°

86.23°

6541.84'

1962.24'

8400

PGRC

ROPA

8450

8460'

92.86°

85.69°

6537.87'

2054.20'

8500

8550

8555'

92.31°

88.25°

6533.58'

2146.54'

8600

8650

8649'

90.34°

87.77°

6531.41'

2238.35'

8700

8750

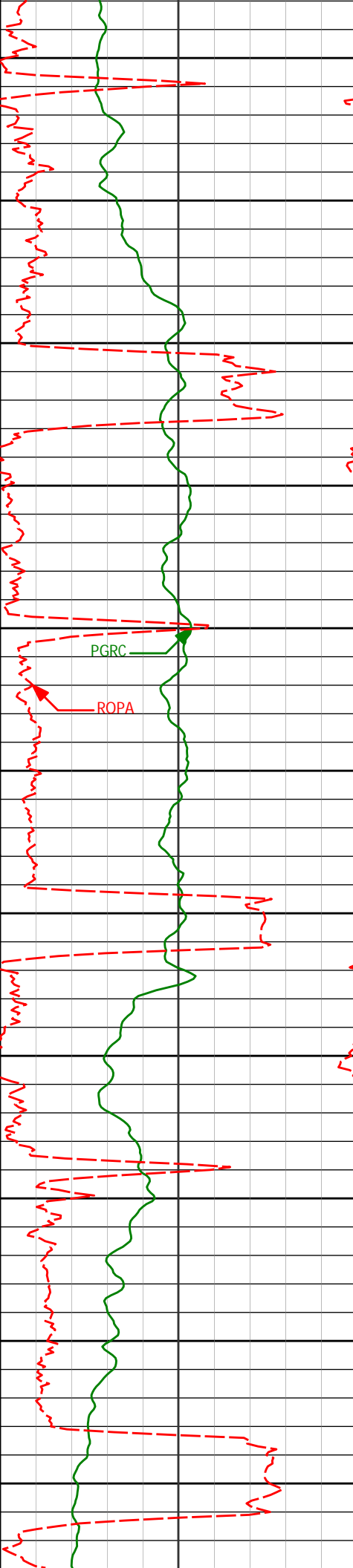
8744'

90.96°

88.08°

6530.33'

2331.14'



8800

8839'

92.31°

88.69°

6527.62'

2424.05'

8850

8900

8934'

90.09°

87.33°

6525.63'

2516.85'

8950

9000

9029'

91.79°

87.24°

6524.07'

2609.39'

9050

9100

9124'

88.58°

86.37°

6523.77'

2701.75'

9150

9200

9219'

88.55°

85.95°

6526.14'

2793.85'

9250

9300

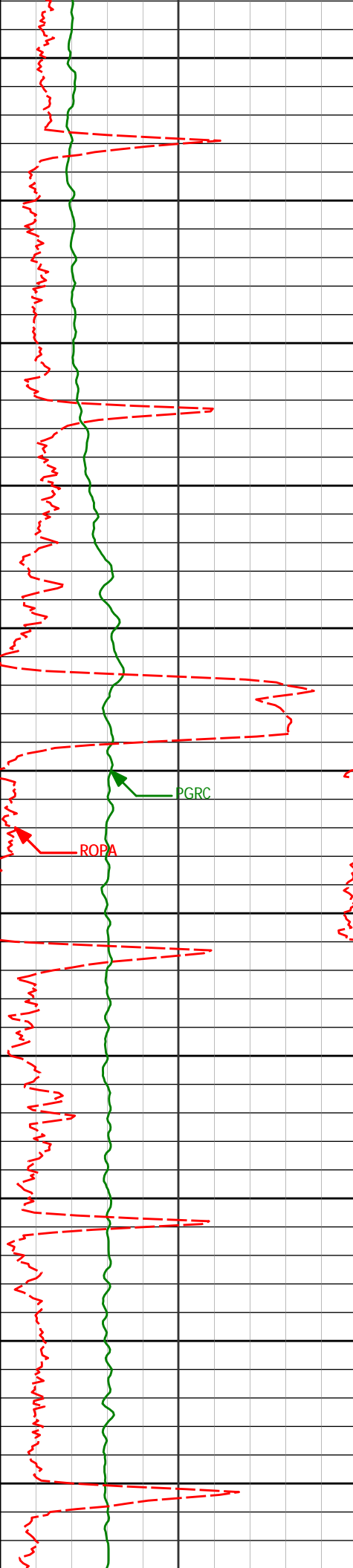
9313'

90.15°

88.77°

6527.21'

2885.44'



9350

9400

9450

9500

9550

9600

9650

9700

9750

9800

9850

9408'

90.77°

89.04°

6526.45'

2978.56'

9503'

92.00°

89.24°

6524.15'

3071.74'

9598'

90.59°

89.89°

6522.00'

3165.05'

9693'

90.12°

89.44°

6521.42'

3258.42'

9788'

90.40°

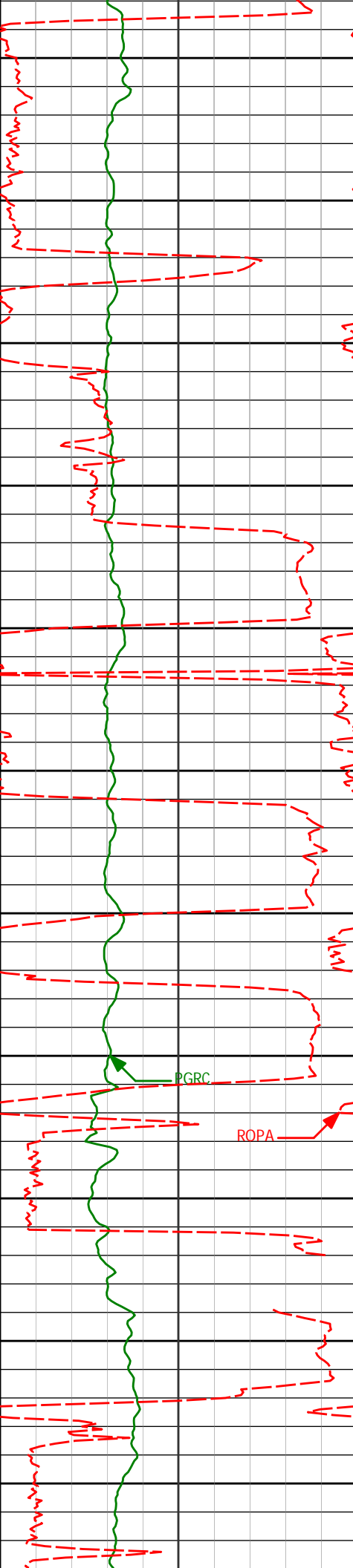
90.02°

6520.99'

3351.80'



9883'	90.15°	89.29°	6520.53'	3445.17'
9978'	90.49°	90.17°	6520.00'	3538.55'
10073'	90.59°	90.74°	6519.10'	3632.15'
10168'	90.65°	90.80°	6518.08'	3725.83'
10263'	90.56°	92.35°	6517.07'	3819.72'
10358'	89.91°	90.57°	6516.68'	3913.59'

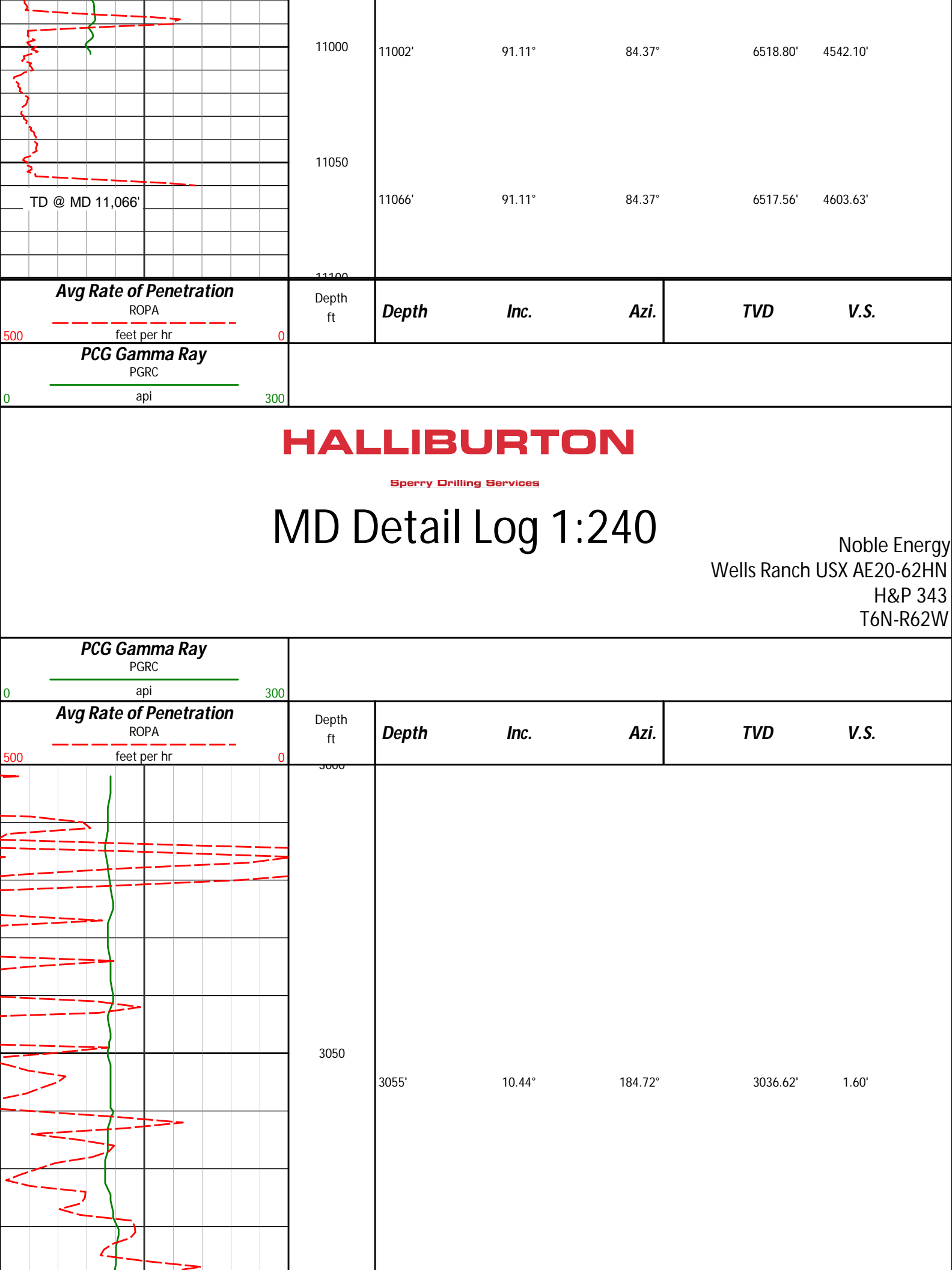


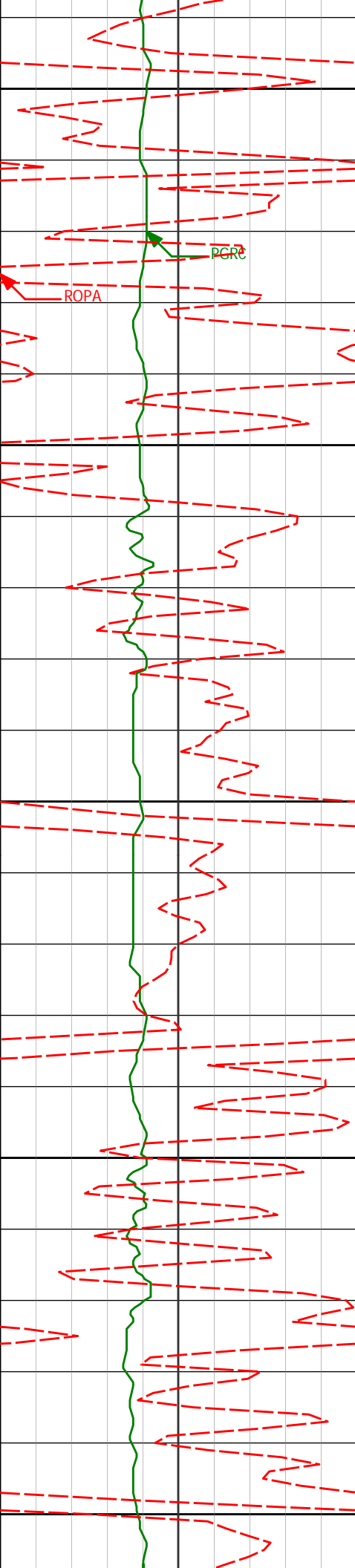
10450
10500
10550
10600
10650
10700
10750
10800
10850
10900
10950

10453'	90.25°	88.78°	6516.55'	4006.96'
10548'	90.25°	90.39°	6516.14'	4100.30'
10643'	91.48°	91.94°	6514.70'	4194.08'
10738'	89.01°	87.94°	6514.29'	4287.50'
10832'	87.62°	84.78°	6517.06'	4378.68'
10927'	89.67°	84.09°	6519.31'	4470.03'

PGRC

ROPA





3100

3150

3200

3250

3300

3150'

3245'

8.30°

8.79°

183.86°

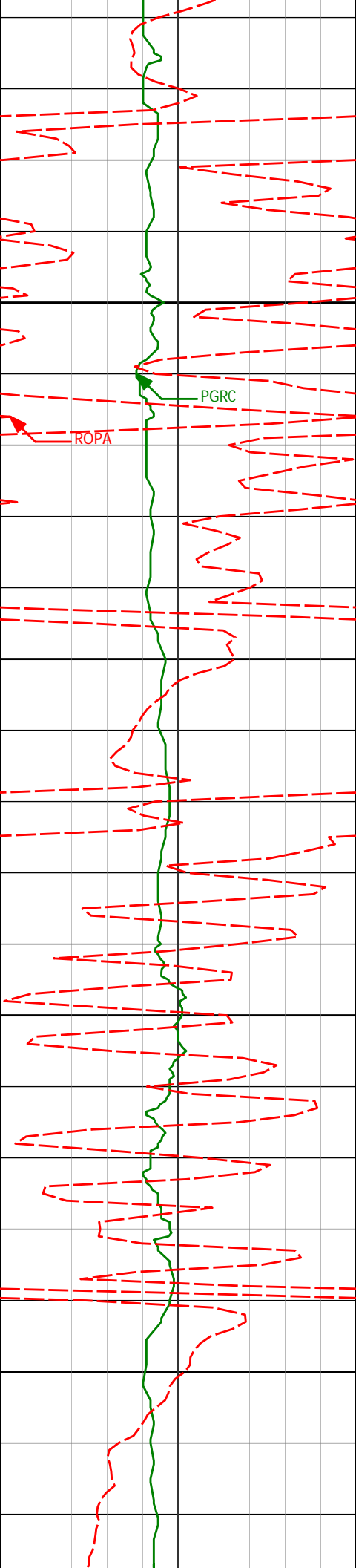
187.17°

3130.35'

3224.29'

3.20'

4.37'



3340'	8.85°	192.67°	3318.17'	4.46'
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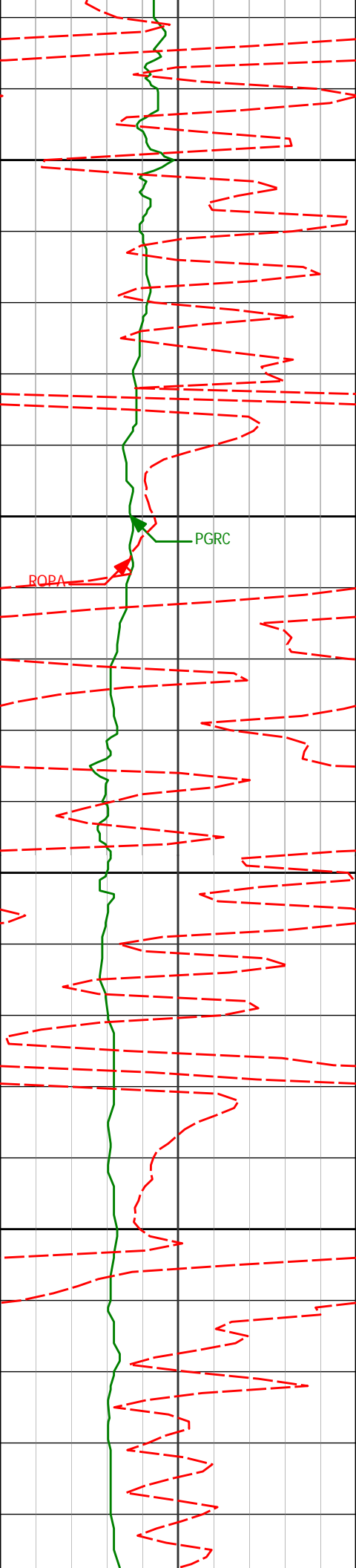
3350

3400

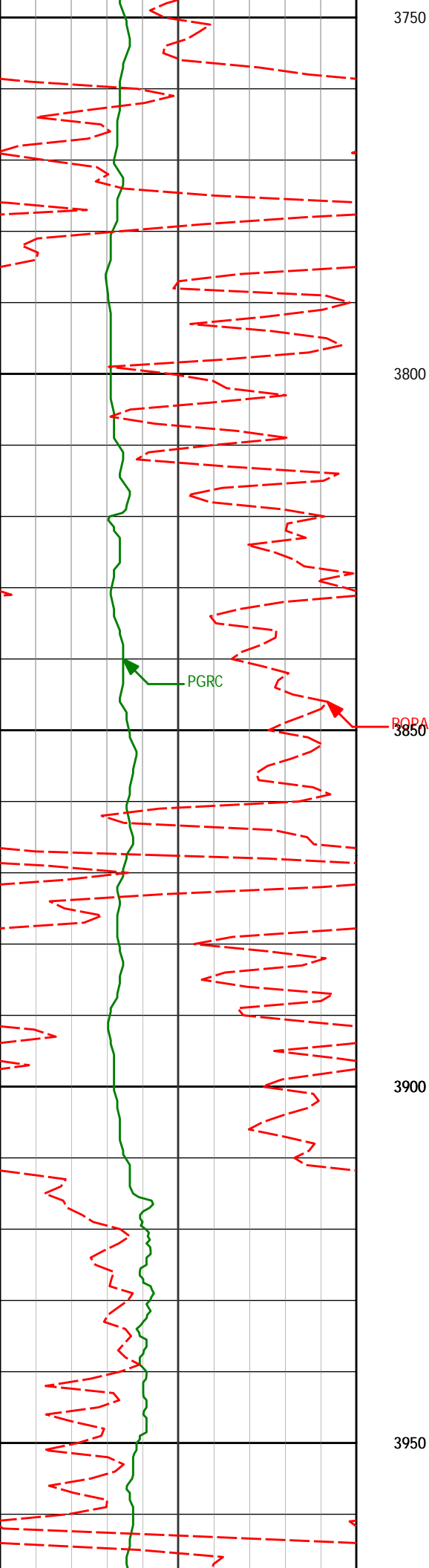
3435'	8.40°	184.75°	3412.10'	4.83'
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3450

3500

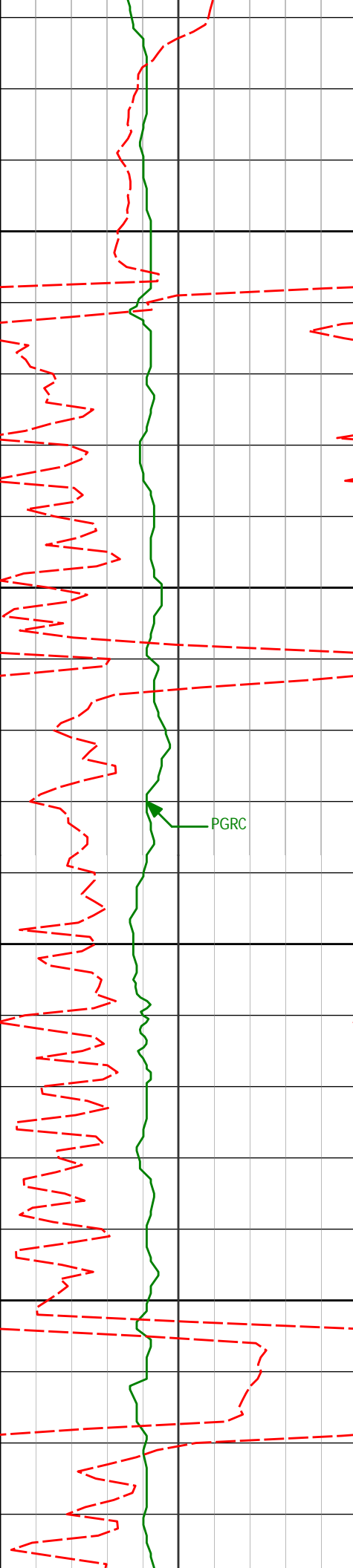


3530'	10.33°	186.16°	3505.83'	6.12'
3550				
3600				
3625'	12.56°	186.98°	3598.93'	7.33'
3650				
3700				
3720'	15.07°	191.42°	3691.18'	7.69'



3815'	16.18°	188.42°	3782.67'	7.88'
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3910'	16.97°	190.17°	3873.72'	8.35'
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4000

4050

4100

4150

PGRC

4005'

14.13°

198.82°

3965.25'

6.66'

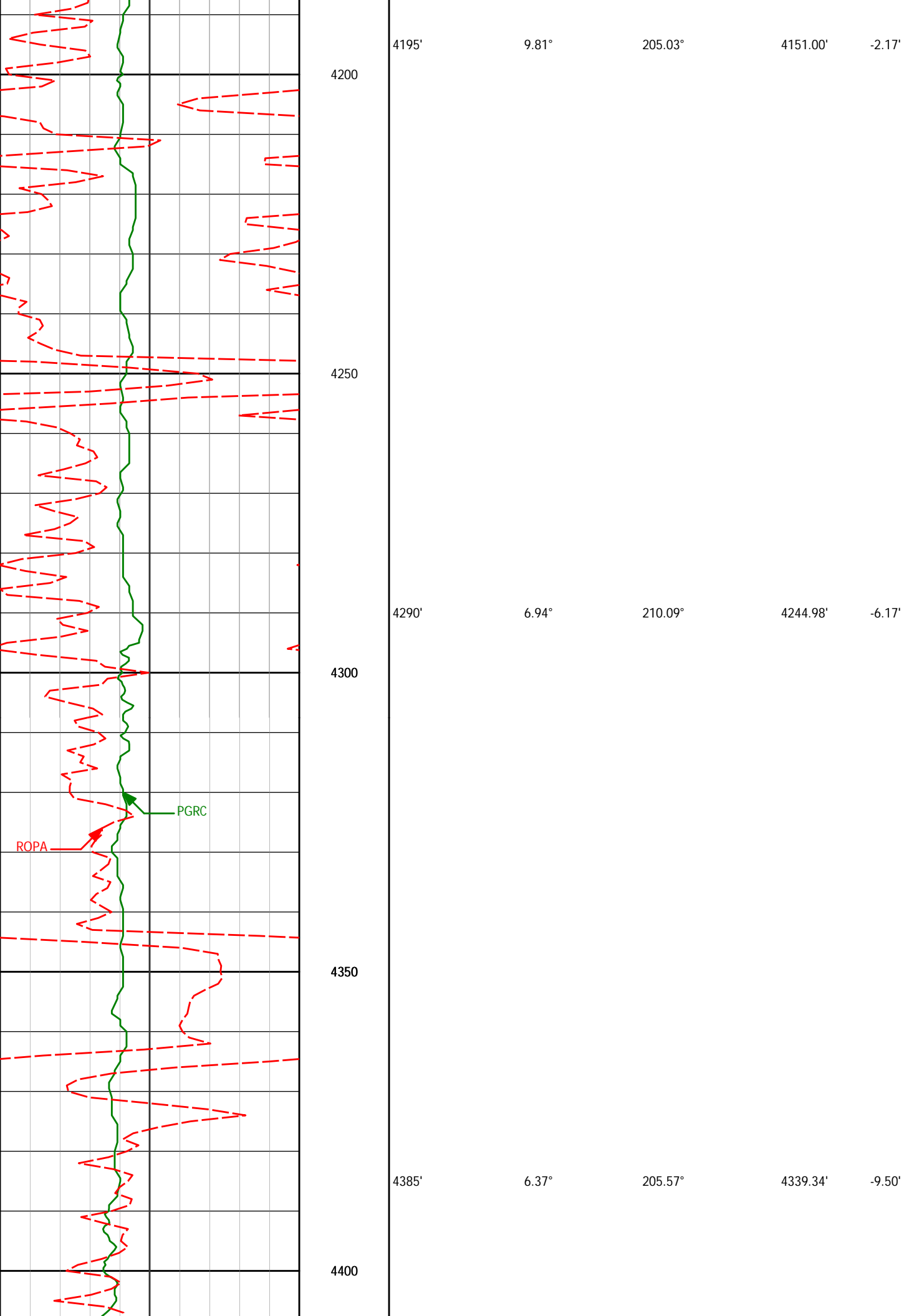
4100'

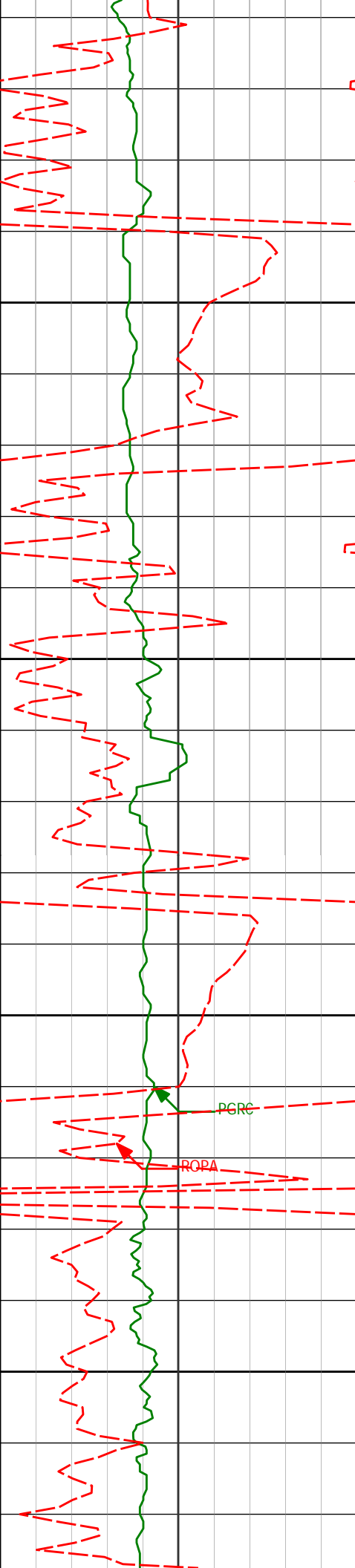
12.20°

204.87°

4057.75'

2.42'





4450

4500

4550

4600

4480'

7.16°

196.35°

4433.68'

-11.51'

4575'

7.02°

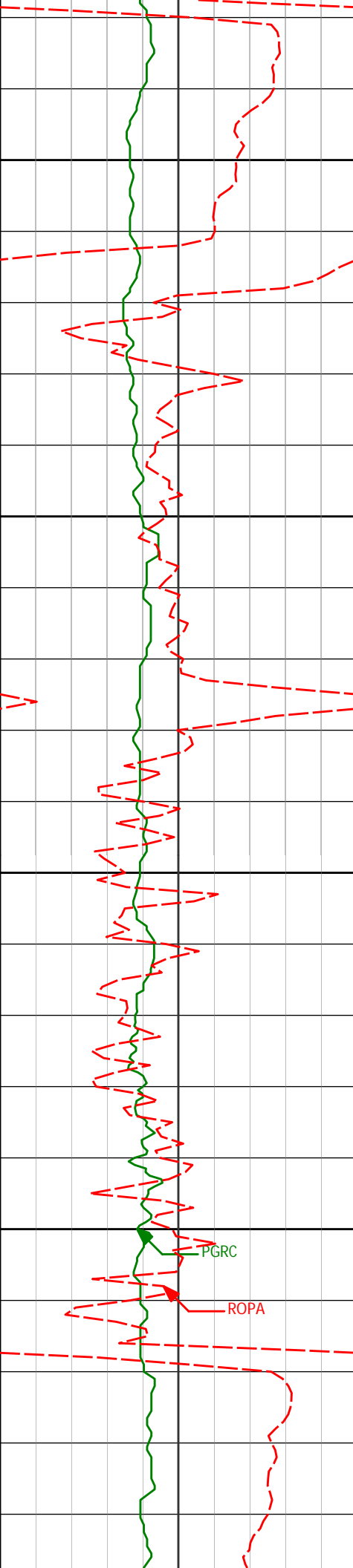
195.59°

4527.95'

-12.67'

PGRC

ROPA



4650

4669'

8.00°

184.17°

4621.15'

-12.50'

4700

4750

4764'

6.87°

185.58°

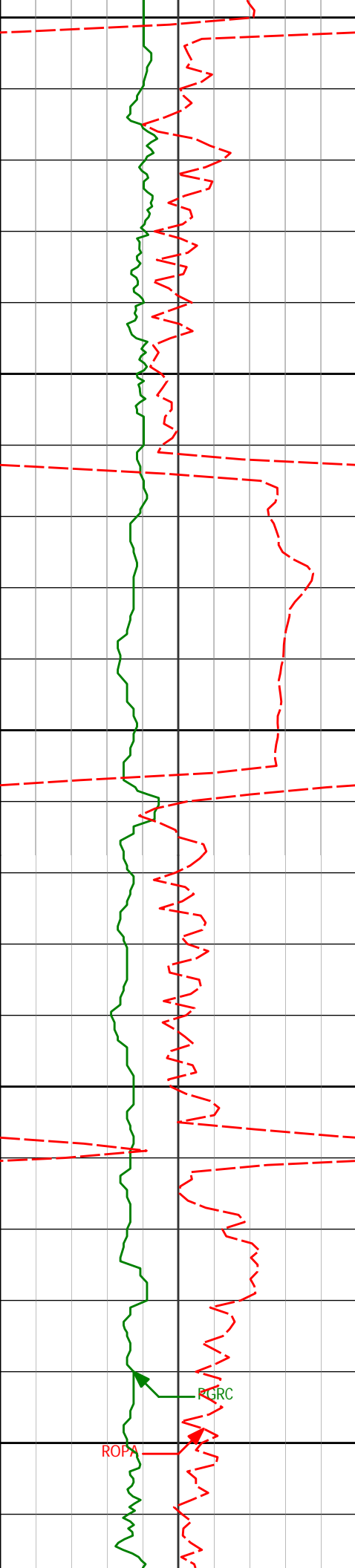
4715.35'

-11.33'

4800

PGRC

ROPA



4850

4858'

7.56°

186.41°

4808.60'

-10.45'

4900

4950

4953'

9.24°

188.29°

4902.58'

-9.76'

5000

5050

5048'

8.39°

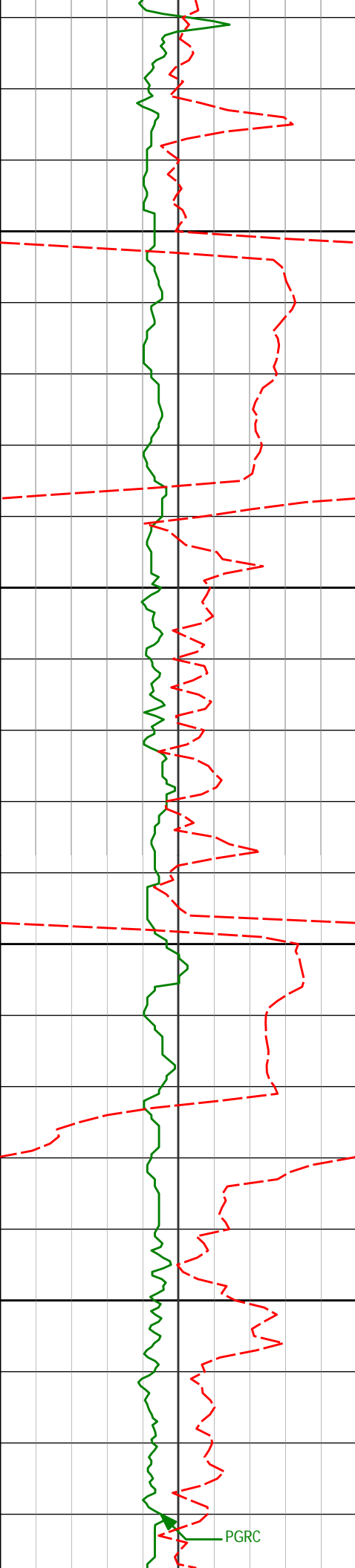
186.42°

4996.46'

-9.02'

ROP

RGRC



5100

5150

5200

5250

PGRC

5143'

7.40°

186.26°

5090.56'

-8.12'

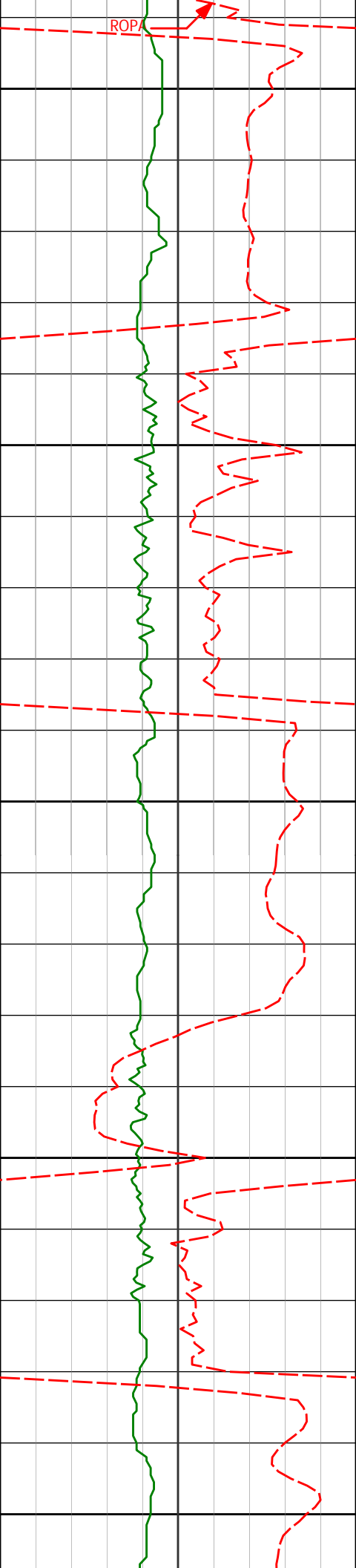
5238'

6.26°

178.21°

5184.88'

-6.60'



5300

5333'

7.05°

174.32°

5279.24'

-3.91'

5350

5400

5428'

9.17°

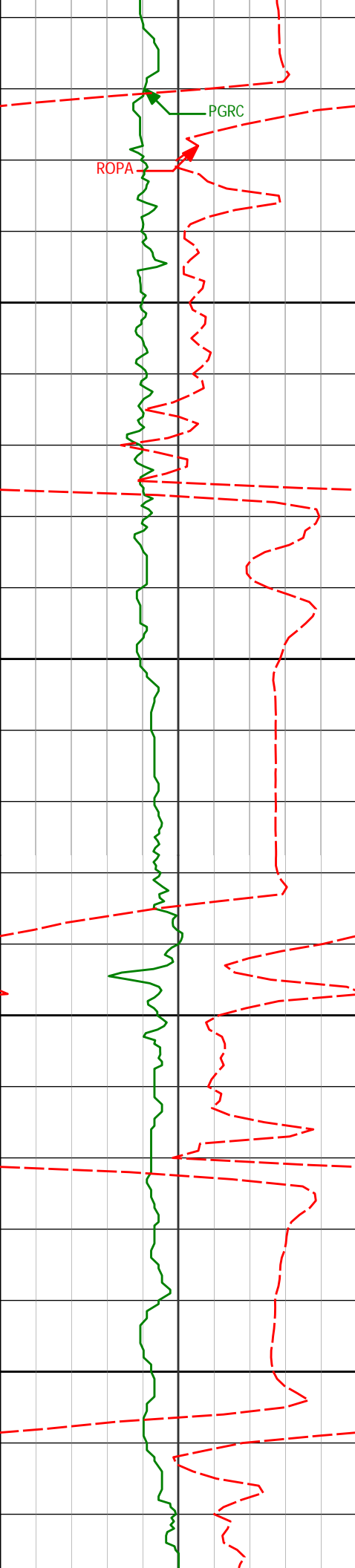
183.49°

5373.29'

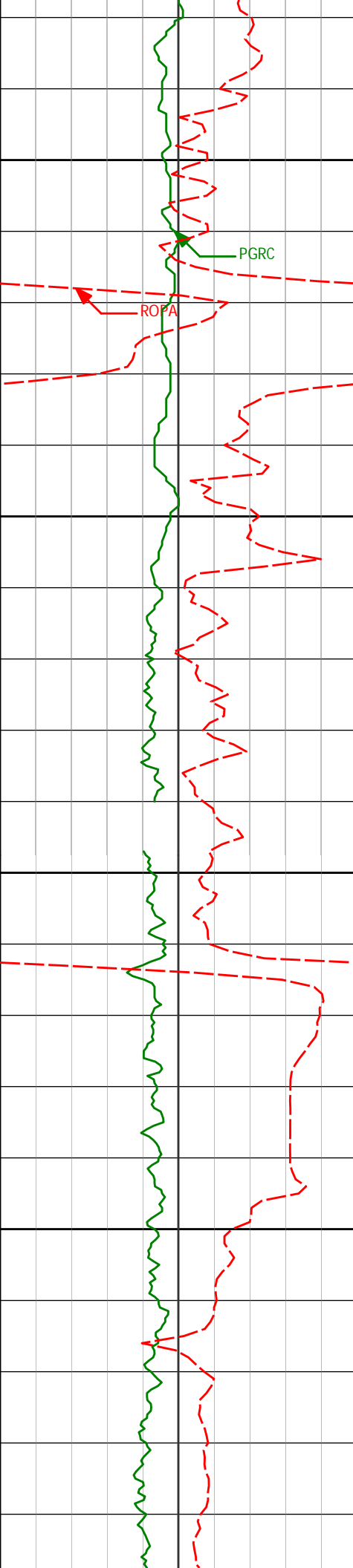
-1.41'

5450

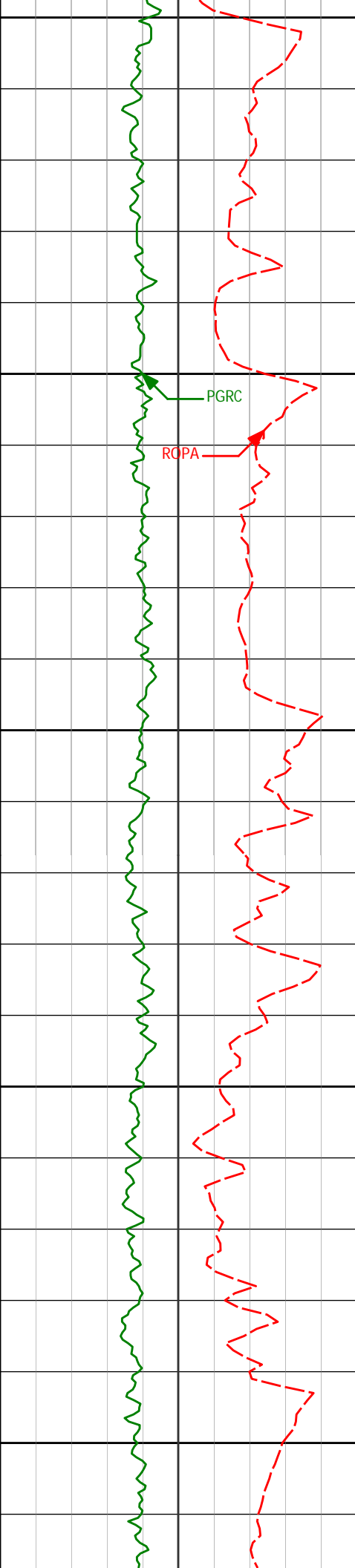
5500



5523'	9.50°	187.53°	5467.03'	-0.13'
5550				
5600				
5619'	9.01°	189.26°	5561.78'	0.39'
5650				
5700				
5713'	9.33°	188.70°	5654.58'	0.73'



Station	Distance (ft)	Angle (°)	Distance (ft)	Angle (°)	Distance (ft)
5750					
5800	5808'	6.15°	185.89°	5748.71'	1.34'
	5840'	5.25°	185.86°	5780.55'	1.58'
5850					
<Run 200>					
5900	5900'	7.81°	194.20°	5840.15'	1.52'



5950

6000

6050

6100

6150

5948

5995'

6090'

12.97°

16.35°

22.51°

204.20°

197.62°

184.33°

5887.36

5932.82'

6022.41'

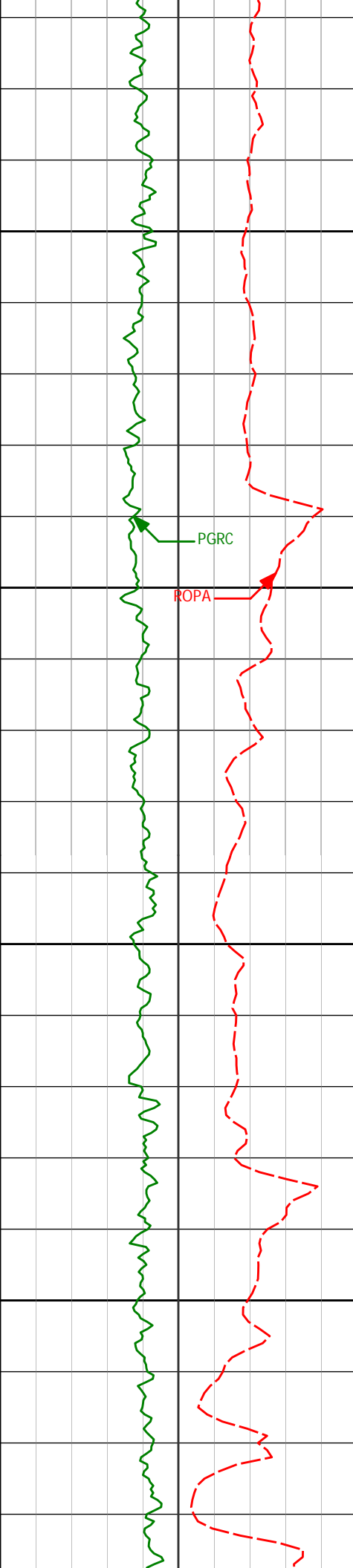
0.00'

-2.11'

-1.92'

PGRC

ROPA



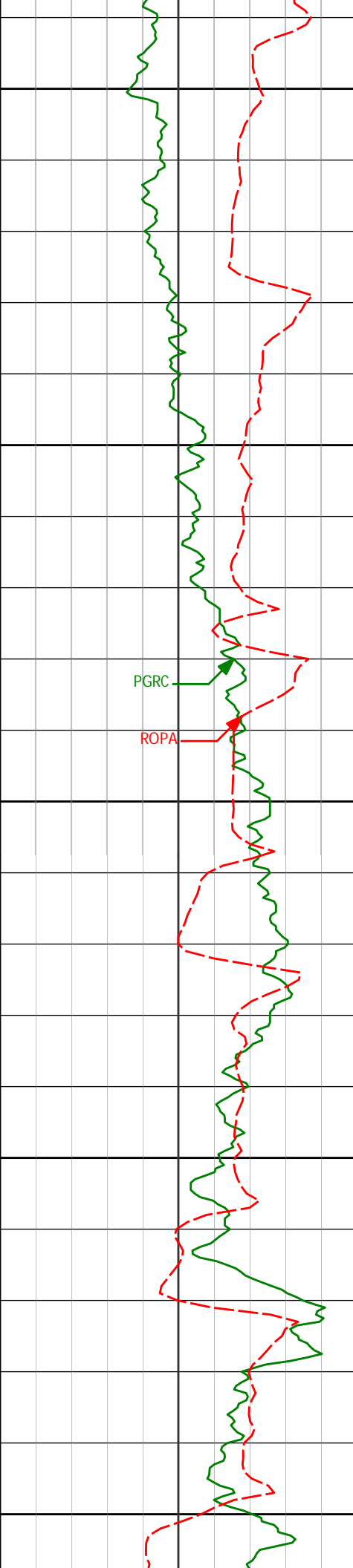
6200

6250

6300

6350

6185'	24.94°	157.93°	6109.62'	10.73'
6280'	31.01°	134.51°	6193.73'	41.81'
6328'	35.82°	127.82°	6233.80'	64.52'
6375'	39.03°	123.85°	6271.13'	90.29'



6400

6423'

43.15°

118.38°

6307.31'

119.77'

6450

6470'

48.22°

115.04°

6340.14'

152.02'

PGRC

ROPA

6500

6518'

52.21°

111.90°

6370.85'

187.93'

6550

6565'

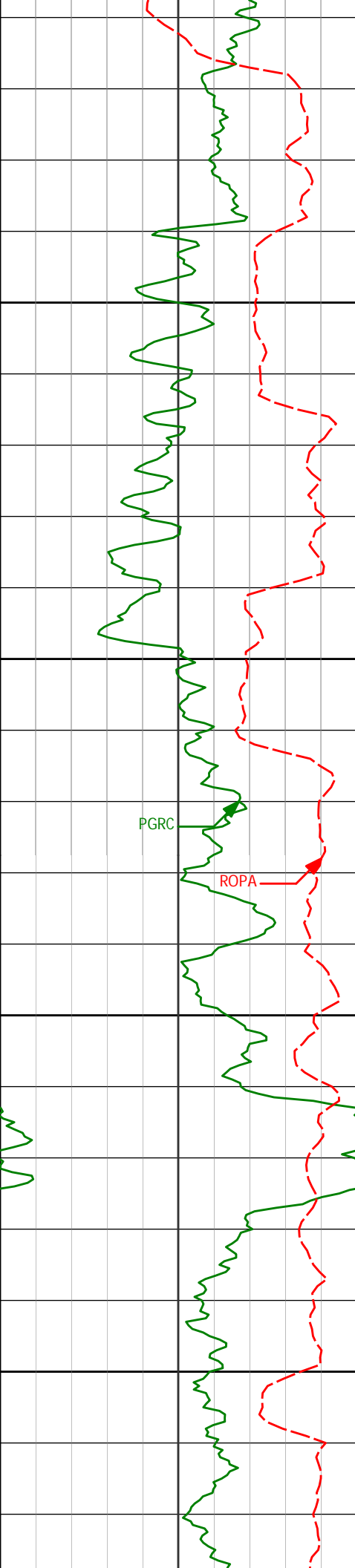
56.00°

108.68°

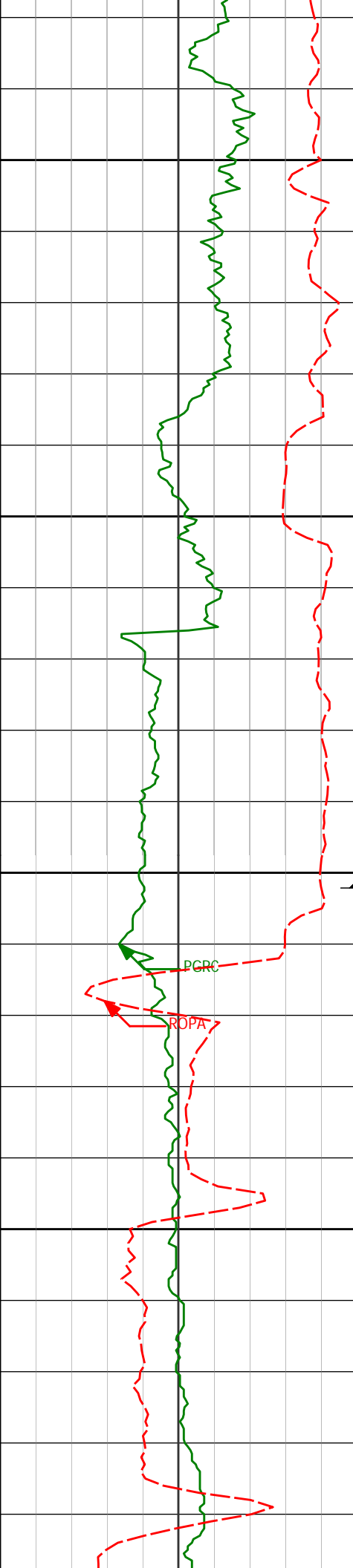
6398.41'

225.42'

6600



6613'	59.70°	107.17°	6423.95'	265.69'
6650				
6660'	62.22°	106.18°	6446.76'	306.52'
6700				
6708'	64.39°	105.15°	6468.32'	349.22'
6750				
6755'	69.94°	102.35°	6486.56'	392.43'
6800				
6803'	75.41°	100.49°	6500.85'	438.23'



6850

6849'

81.33°

100.52°

6510.12'

483.26'

6900

6909'

85.56°

98.19°

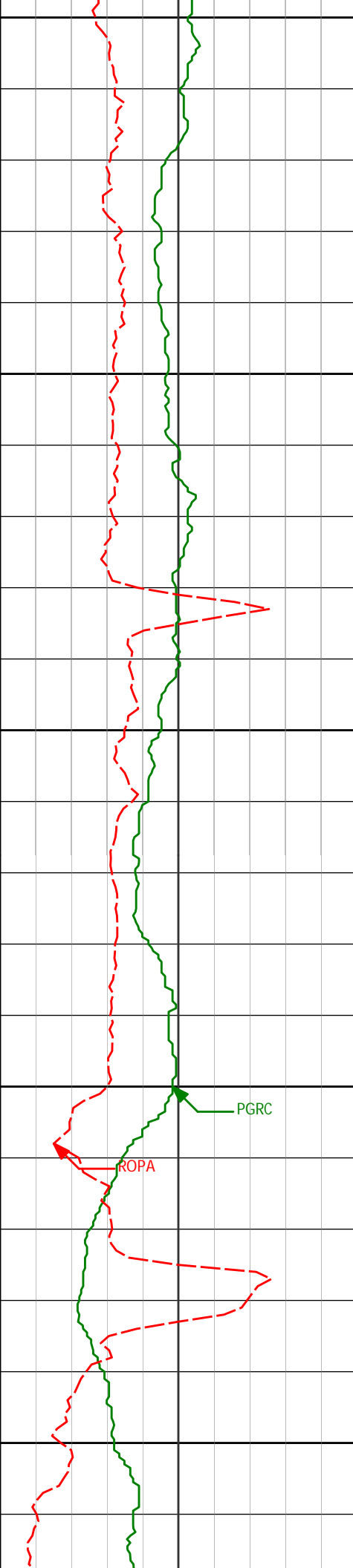
6516.97'

542.84'

6950 Casing Set @ 6,952' MD

<Run 300>

7000



7050

7067'

88.49°

91.46°

6525.17'

699.80'

7100

7150

7160'

88.40°

90.57°

6527.70'

791.55'

7200

PGRC

ROPA

7250

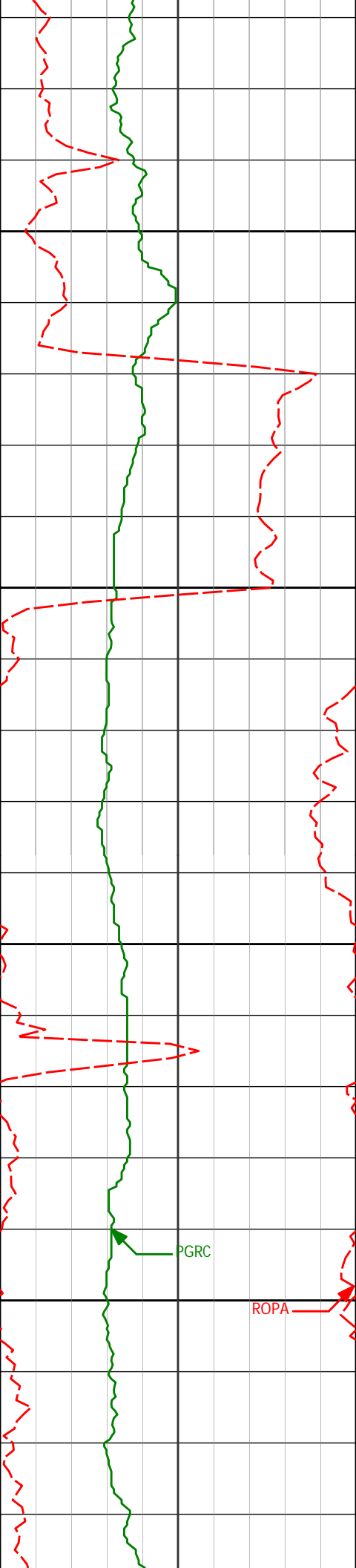
7253'

88.18°

90.05°

6530.47'

883.10'



7300

7345'

89.63°

86.74°

6532.23'

973.09'

7350

7400

7438'

91.17°

87.37°

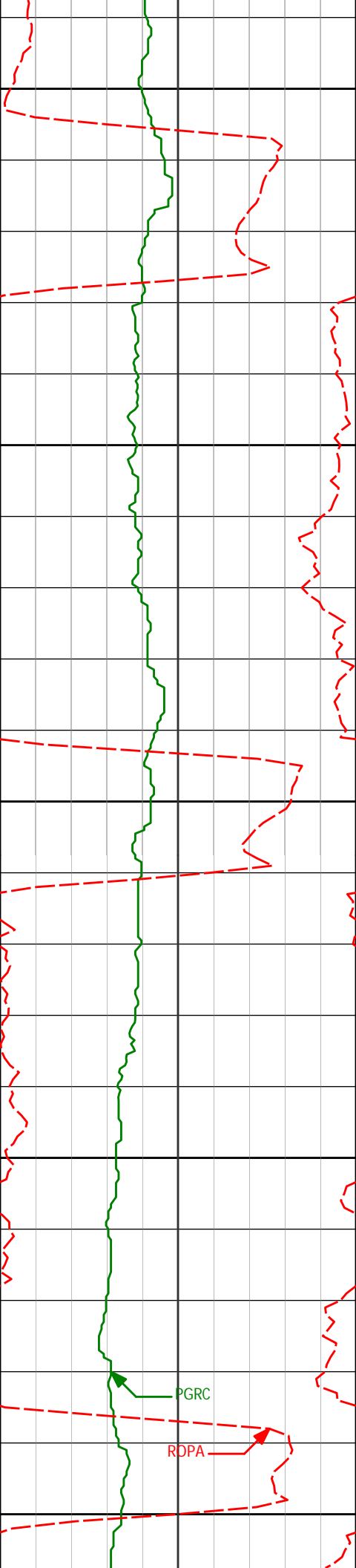
6531.58'

1063.61'

7450

PGRC

ROPA



7500

7531'

89.51°

86.22°

6531.03'

1154.03'

7550

7600

7624'

89.54°

87.18°

6531.80'

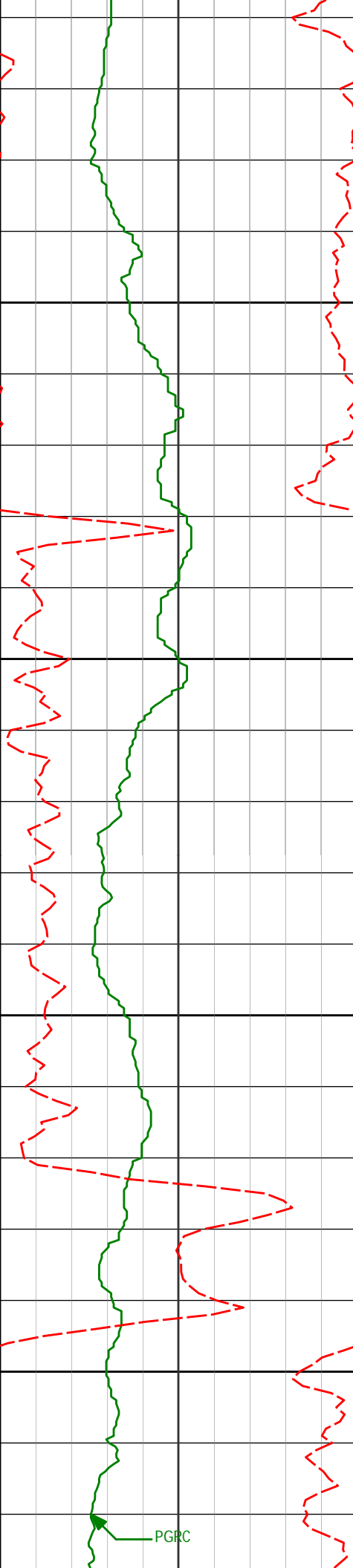
1244.42'

7650

PGRC

ROPA

7700



7717'	88.30°	85.93°	6533.55'	1334.73'
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7750

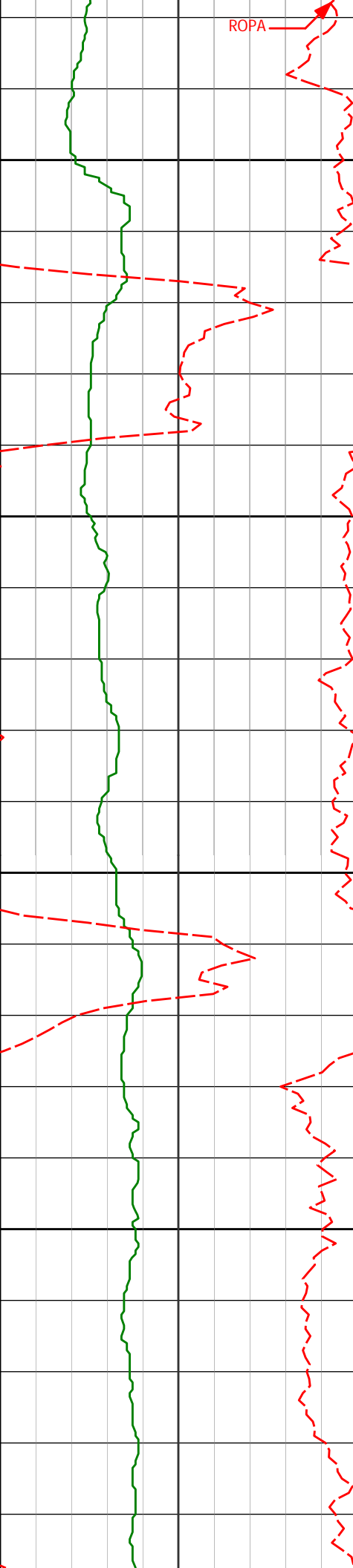
7800

7810'	87.53°	84.88°	6536.94'	1424.55'
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7850

7900

7901'	87.90°	85.86°	6540.57'	1512.41'
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7950

8000

8050

8100

7993'

88.92°

87.73°

6543.12'

1601.82'

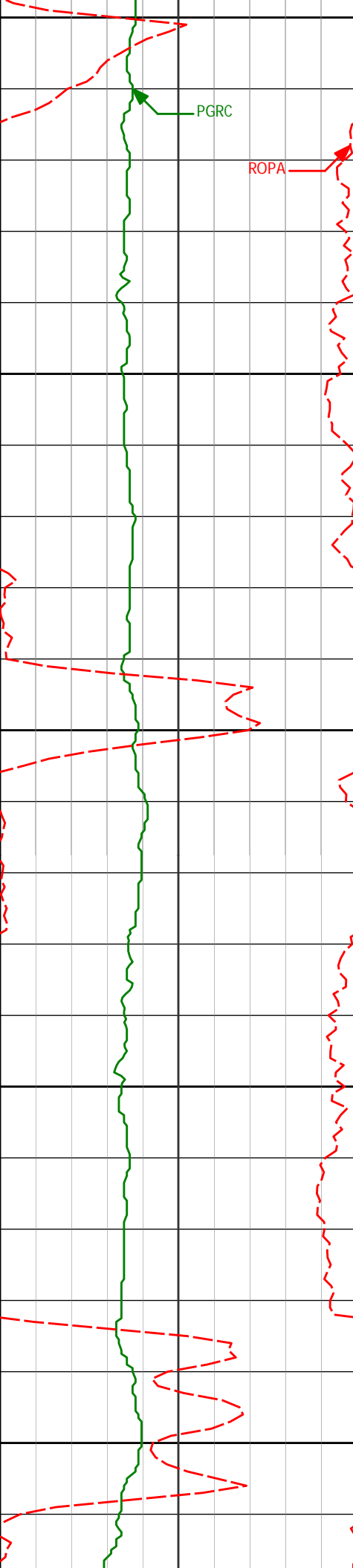
8085'

90.12°

87.65°

6543.89'

1691.60'



8150

8178'

90.28°

86.44°

6543.57'

1782.12'

8200

8250

8271'

89.94°

83.18°

6543.39'

1871.73'

8300

8350

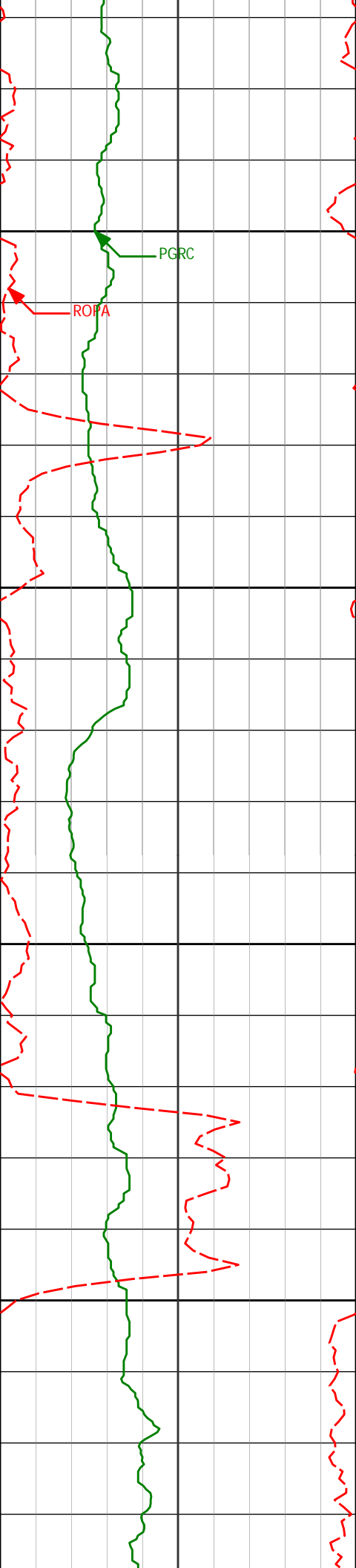
8365'

91.94°

86.23°

6541.84'

1962.24'



8400

PGRC

ROPA

8450

8460'

92.86°

85.69°

6537.87'

2054.20'

8500

8550

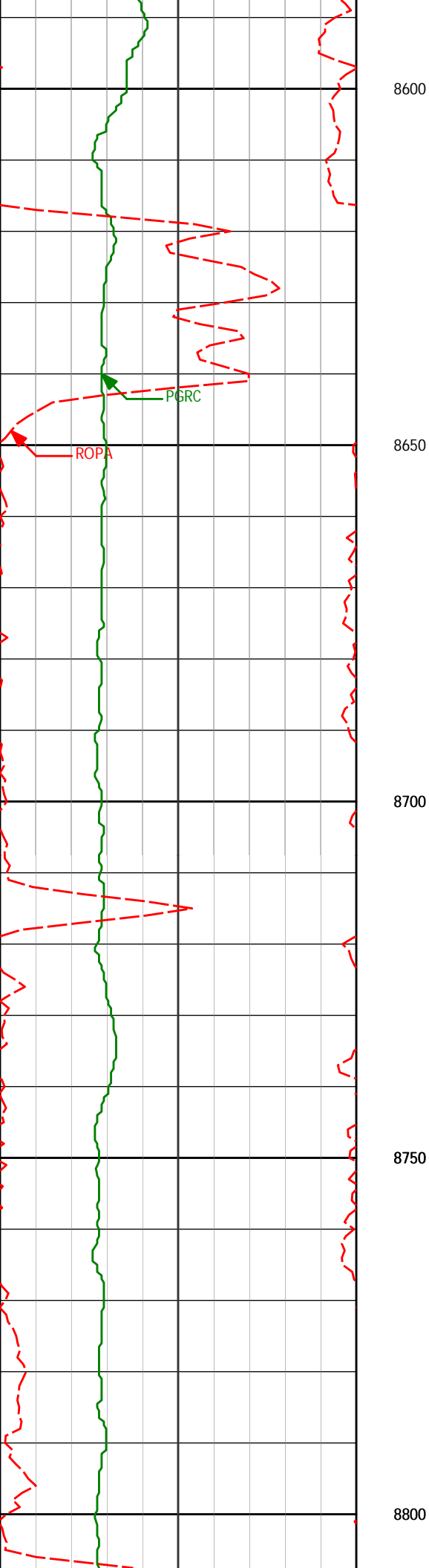
8555'

92.31°

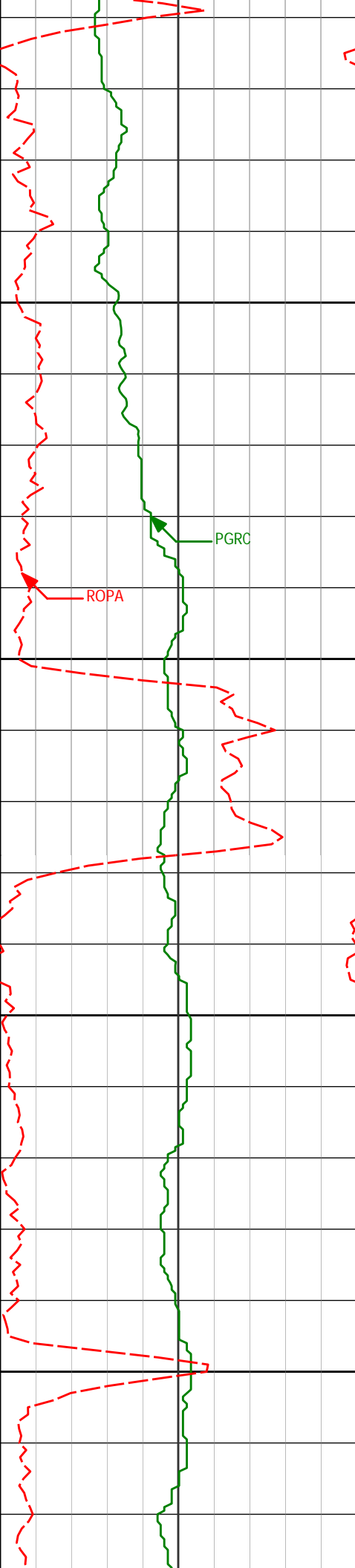
88.25°

6533.58'

2146.54'



8649'	90.34°	87.77°	6531.41'	2238.35'
8744'	90.96°	88.08°	6530.33'	2331.14'



8839' 92.31° 88.69° 6527.62' 2424.05'

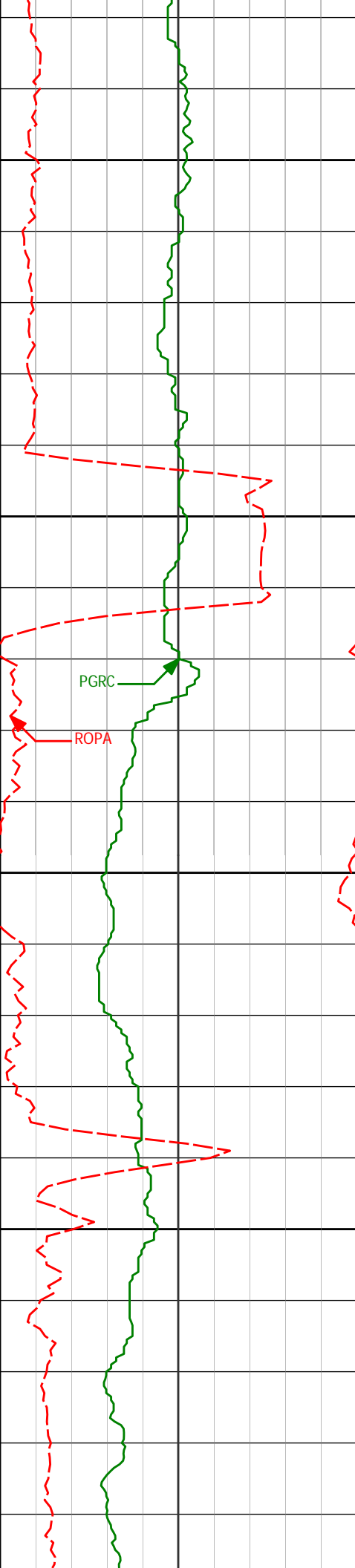
8850

8900

8934' 90.09° 87.33° 6525.63' 2516.85'

8950

9000



9050

9100

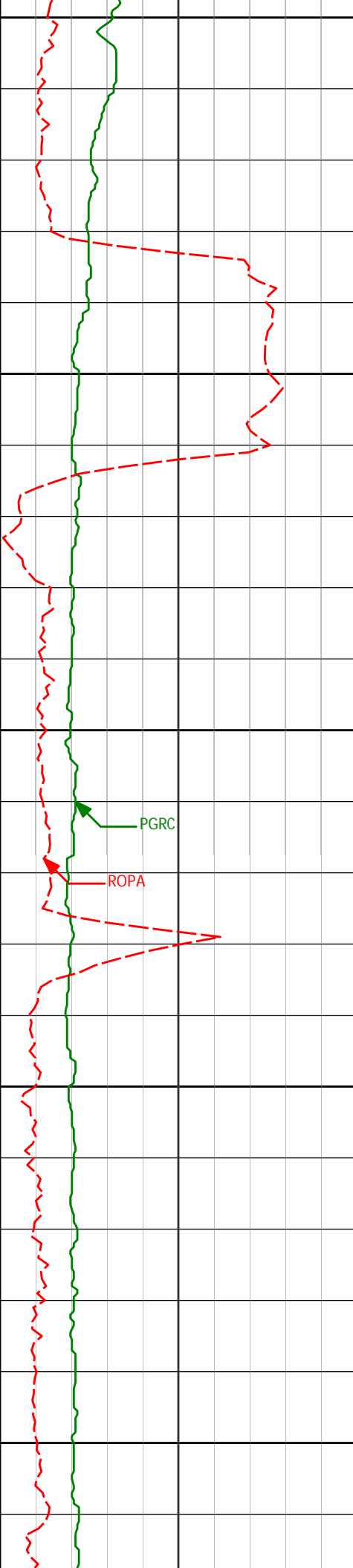
9150

9200

PGRC

ROPA

9029'	91.79°	87.24°	6524.07'	2609.39'
9124'	88.58°	86.37°	6523.77'	2701.75'
9219'	88.55°	85.95°	6526.14'	2793.85'



9250

9300

9350

9400

9450

9313'

90.15°

88.77°

6527.21'

2885.44'

9408'

90.77°

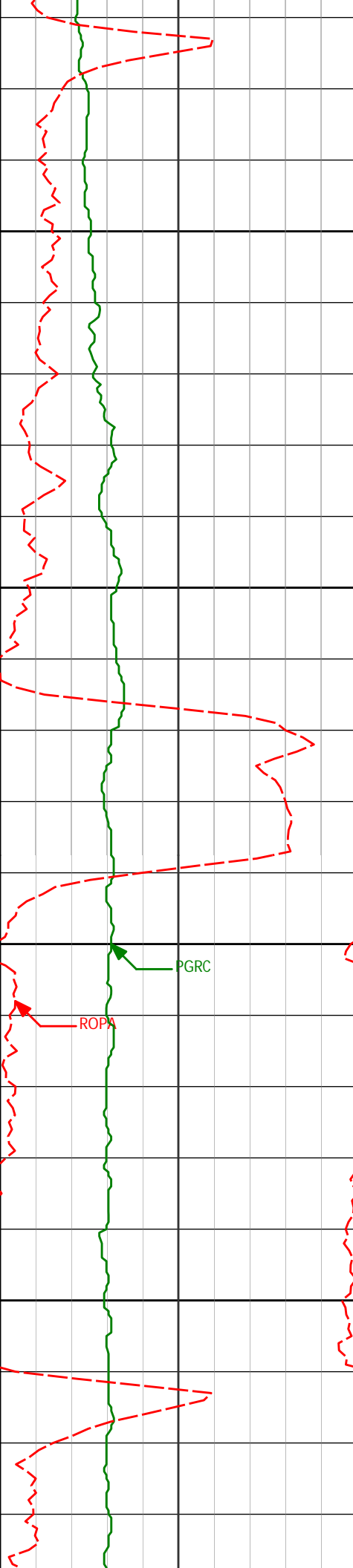
89.04°

6526.45'

2978.56'

PGRC

ROPA



9500

9550

9600

9650

9503'

92.00°

89.24°

6524.15'

3071.74'

9598'

90.59°

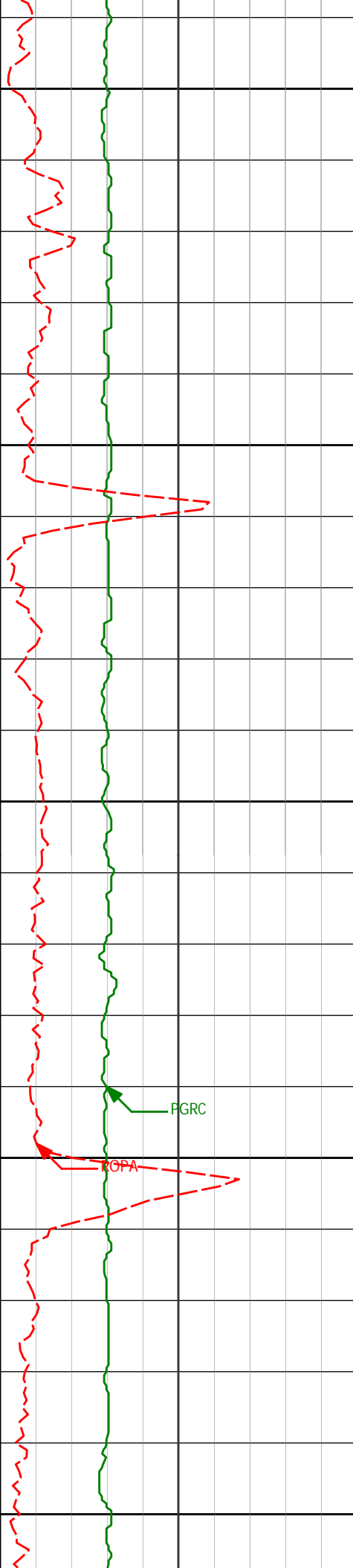
89.89°

6522.00'

3165.05'

PGRC

ROPA



9693'	90.12°	89.44°	6521.42'	3258.42'
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9700

9750

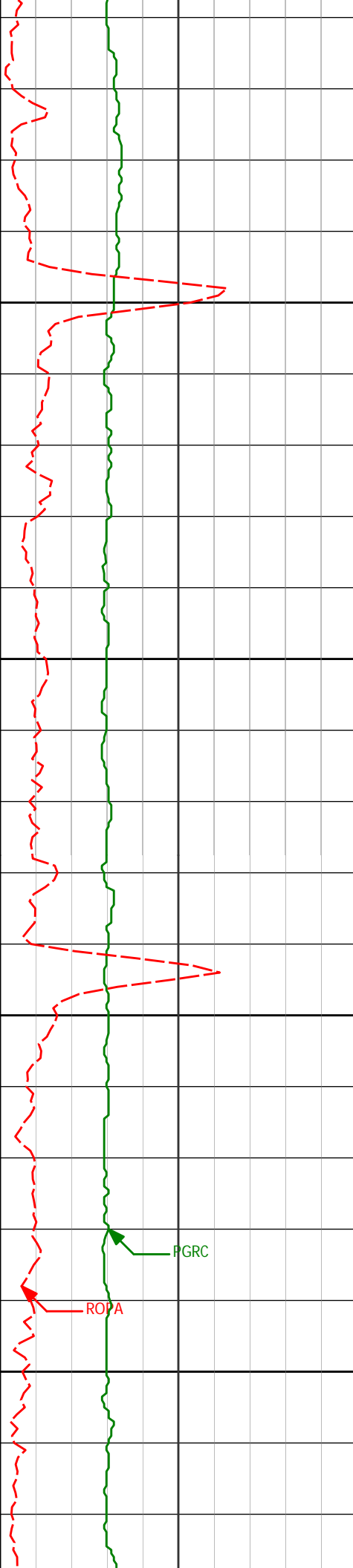
9788'	90.40°	90.02°	6520.99'	3351.80'
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9800

9850

9883'	90.15°	89.29°	6520.53'	3445.17'
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9900



9950

9978'

90.49°

90.17°

6520.00'

3538.55'

10000

10050

10073'

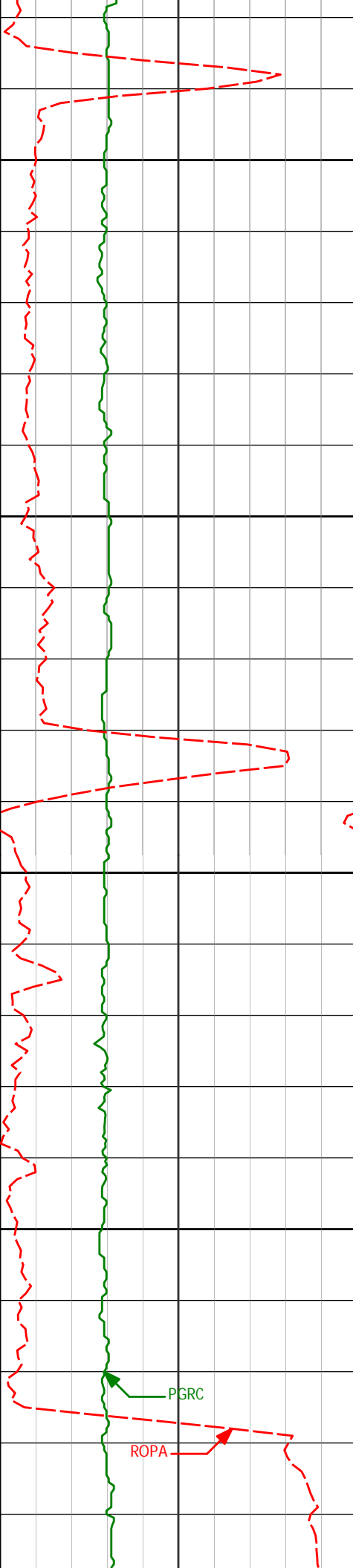
90.59°

90.74°

6519.10'

3632.15'

10100



10150

10168'

90.65°

90.80°

6518.08'

3725.83'

10200

10250

10263'

90.56°

92.35°

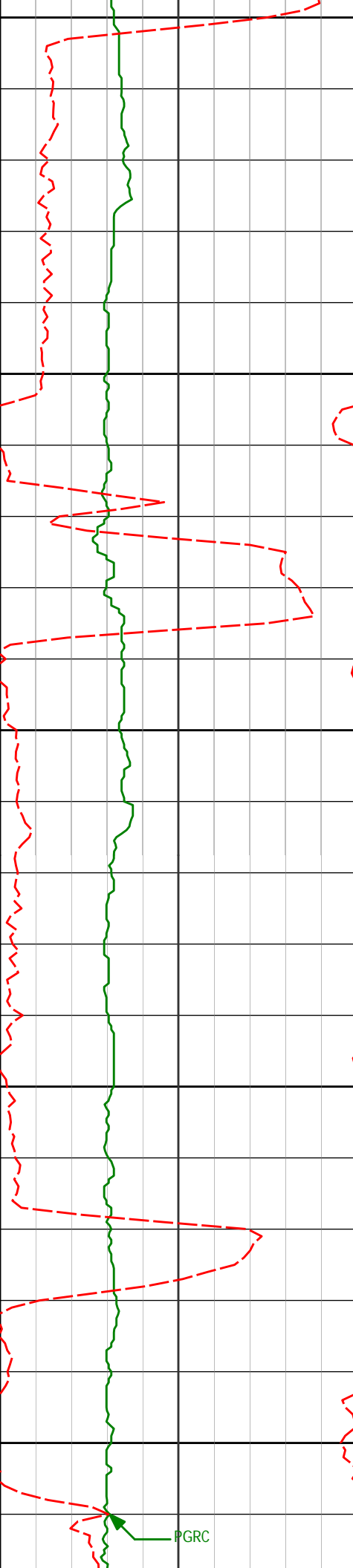
6517.07'

3819.72'

10300

PGRC

ROPA



10350

10358'

89.91°

90.57°

6516.68'

3913.59'

10400

10450

10453'

90.25°

88.78°

6516.55'

4006.96'

10500

10550

10548'

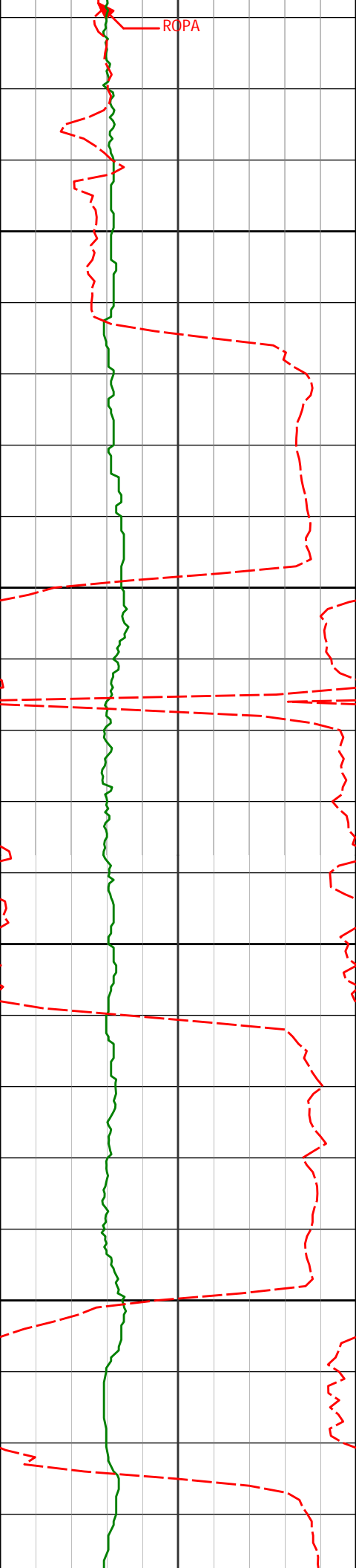
90.25°

90.39°

6516.14'

4100.30'

PGRC



10600

10643'

91.48°

91.94°

6514.70'

4194.08'

10650

10700

10738'

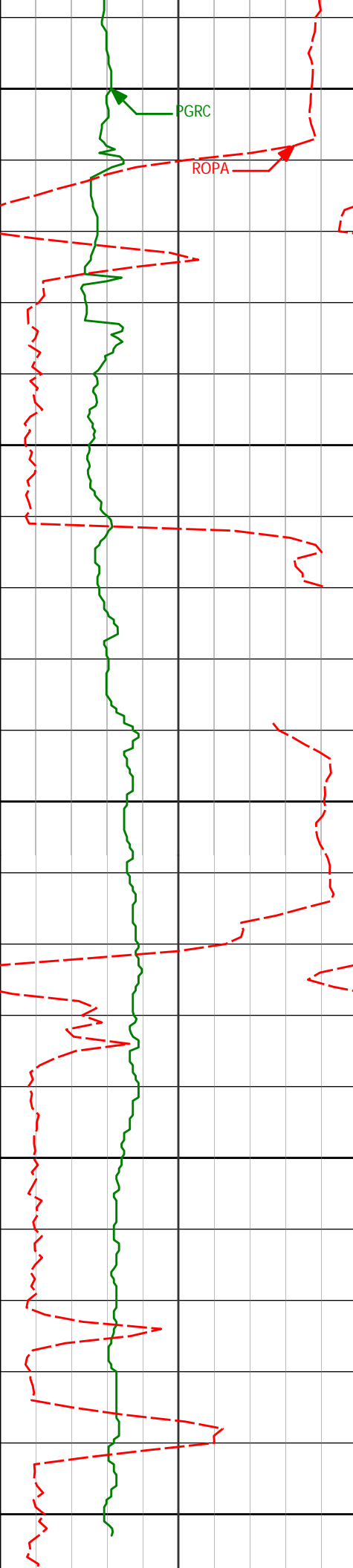
89.01°

87.94°

6514.29'

4287.50'

10750



10800

PGRC

ROPA

10850

10900

10950

11000

10832'

87.62°

84.78°

6517.06'

4378.68'

10927'

89.67°

84.09°

6519.31'

4470.03'

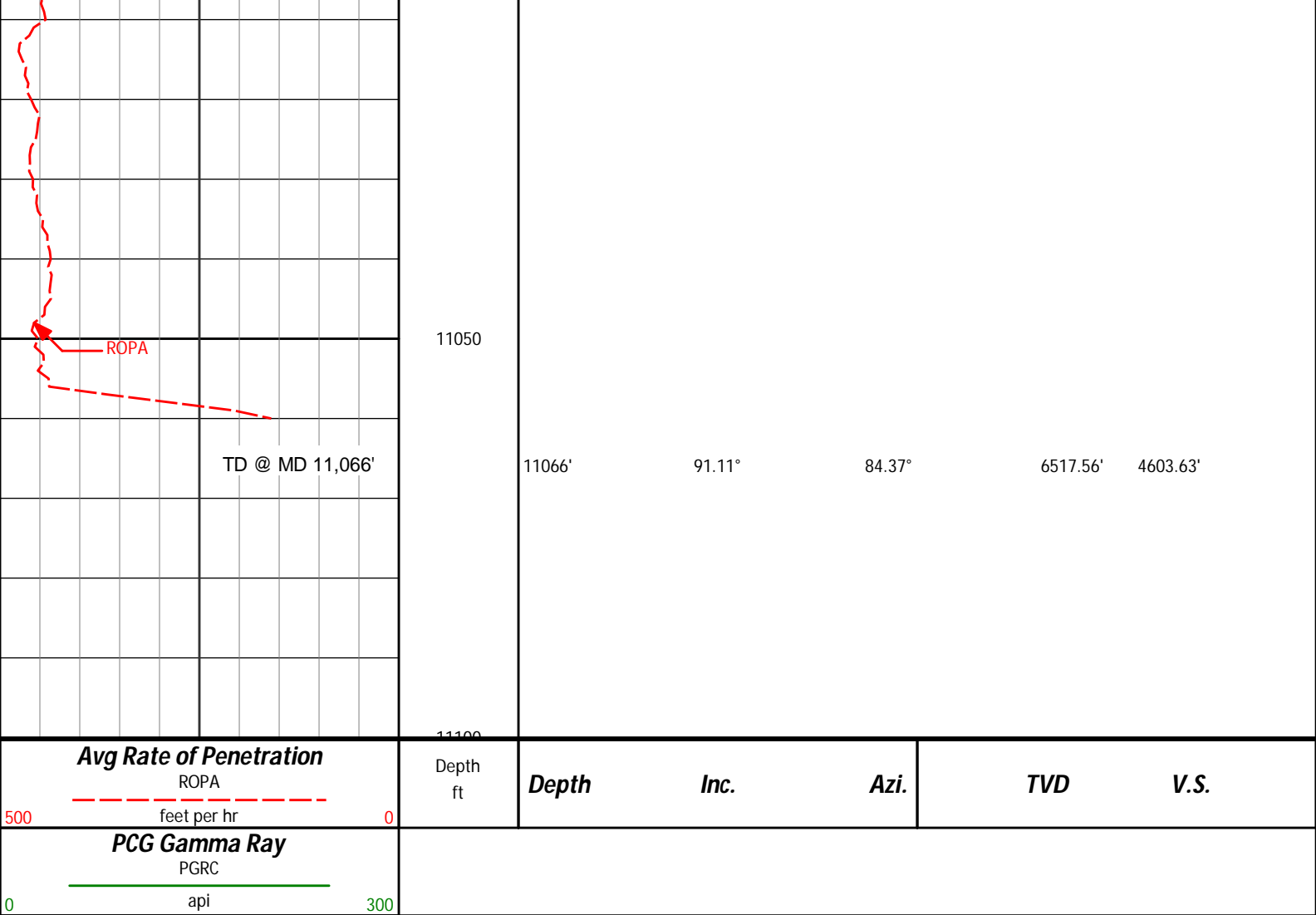
11002'

91.11°

84.37°

6518.80'

4542.10'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE20-62HN
Wattenberg
Weld Colorado
USA
CA-XX-0900735960

Surveys are tied into three non-Haliburton surveys at MD 368', 650' and 970' taken 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
368.00	0.20	114.73	368.00	0.27 S	0.58 E	0.62	0.05
650.00	0.00	148.93	650.00	0.47 S	1.03 E	1.10	0.07
970.00	0.50	260.83	969.99	0.70 S	0.35 W	-0.22	0.16
994.00	0.25	244.47	993.99	0.74 S	0.50 W	-0.36	1.12
1086.00	0.25	199.72	1085.99	1.01 S	0.75 W	-0.55	0.21
1179.00	0.17	284.59	1178.99	1.17 S	0.95 W	-0.73	0.31
1272.00	0.19	144.65	1271.99	1.26 S	0.99 W	-0.75	0.36
1365.00	0.29	191.93	1364.99	1.62 S	0.95 W	-0.65	0.23
1458.00	0.09	339.34	1457.99	1.78 S	1.03 W	-0.69	0.40
1551.00	2.14	188.98	1550.97	3.42 S	1.32 W	-0.69	2.39
1642.00	3.53	181.70	1641.86	7.90 S	1.67 W	-0.23	1.57
1734.00	4.46	188.12	1733.63	14.28 S	2.26 W	0.33	1.12
1827.00	5.47	180.99	1826.28	22.29 S	2.85 W	1.18	1.27
1919.00	6.62	194.61	1917.78	31.80 S	4.26 W	1.49	1.99

	2012.00	8.51	199.96	2009.96	43.46 S	7.96 W	-0.07	2.17
	2106.00	10.28	201.11	2102.70	57.82 S	13.36 W	-2.81	1.89
	2201.00	10.23	200.02	2196.18	73.66 S	19.30 W	-5.82	0.21
	2296.00	9.46	200.49	2289.78	88.90 S	24.92 W	-8.63	0.81
	2391.00	9.78	190.35	2383.45	104.15 S	29.10 W	-10.01	1.81
	2486.00	8.88	189.78	2477.19	119.31 S	31.80 W	-9.95	0.95
	2581.00	10.62	183.55	2570.82	135.28 S	33.59 W	-8.86	2.14
	2675.00	9.56	184.90	2663.37	151.70 S	34.79 W	-7.11	1.16
	2770.00	11.38	181.46	2756.78	168.93 S	35.70 W	-4.92	2.02
	2865.00	10.39	180.71	2850.07	186.87 S	36.05 W	-2.06	1.05
	2960.00	11.46	186.08	2943.35	204.82 S	37.15 W	0.07	1.55
	3055.00	10.44	184.72	3036.62	222.78 S	38.86 W	1.60	1.11
	3150.00	8.30	183.86	3130.35	238.20 S	40.03 W	3.20	2.26
	3245.00	8.79	187.17	3224.29	252.25 S	41.40 W	4.37	0.73
	3340.00	8.85	192.67	3318.17	266.58 S	43.91 W	4.46	0.89
	3435.00	8.40	184.75	3412.10	280.62 S	46.09 W	4.83	1.34
	3530.00	10.33	186.16	3505.83	296.01 S	47.57 W	6.12	2.05
	3625.00	12.56	186.98	3598.93	314.73 S	49.74 W	7.33	2.35
	3720.00	15.07	191.42	3691.18	337.09 S	53.45 W	7.69	2.87
	3815.00	16.18	188.42	3782.67	362.29 S	57.83 W	7.88	1.44
	3910.00	16.97	190.17	3873.72	389.03 S	62.22 W	8.35	0.98
	4005.00	14.13	198.82	3965.25	413.66 S	68.41 W	6.66	3.85
	4100.00	12.20	204.87	4057.75	433.75 S	76.37 W	2.42	2.49
	4195.00	9.81	205.03	4151.00	450.19 S	84.02 W	-2.17	2.52
	4290.00	6.94	210.09	4244.98	462.49 S	90.32 W	-6.17	3.12
	4385.00	6.37	205.57	4339.34	472.21 S	95.47 W	-9.50	0.81
	4480.00	7.16	196.35	4433.68	482.65 S	99.41 W	-11.51	1.41
	4575.00	7.02	195.59	4527.95	493.92 S	102.64 W	-12.67	0.18
	4669.00	8.00	184.17	4621.15	505.98 S	104.66 W	-12.50	1.89
	4764.00	6.87	185.58	4715.35	518.23 S	105.69 W	-11.33	1.20
	4858.00	7.56	186.41	4808.60	529.97 S	106.93 W	-10.45	0.74
	4953.00	9.24	188.29	4902.58	543.73 S	108.73 W	-9.76	1.79
	5048.00	8.39	186.42	4996.46	558.16 S	110.60 W	-9.02	0.94
	5143.00	7.40	186.26	5090.56	571.13 S	112.04 W	-8.12	1.04
	5238.00	6.26	178.21	5184.88	582.39 S	112.55 W	-6.60	1.56
	5333.00	7.05	174.32	5279.24	593.37 S	111.81 W	-3.91	0.96
	5428.00	9.17	183.49	5373.29	606.73 S	111.69 W	-1.41	2.61
	5523.00	9.50	187.53	5467.03	622.06 S	113.18 W	-0.13	0.77
	5619.00	9.01	189.26	5561.78	637.33 S	115.43 W	0.39	0.59
	5713.00	9.33	188.70	5654.58	652.13 S	117.77 W	0.73	0.35
	5808.00	6.15	185.89	5748.71	664.80 S	119.45 W	1.34	3.37
	5840.00	5.25	185.86	5780.55	667.96 S	119.78 W	1.58	2.81
	5900.00	7.81	194.20	5840.15	674.65 S	121.06 W	1.52	4.54
	5948.00	12.97	204.20	5887.36	682.73 S	124.07 W	0.00	11.35
	5995.00	16.35	197.62	5932.82	693.85 S	128.24 W	-2.11	8.01
	6090.00	22.51	184.33	6022.41	724.77 S	133.67 W	-1.92	7.94
	6185.00	24.94	157.93	6109.62	761.58 S	127.49 W	10.73	11.38
	6280.00	31.01	134.51	6193.73	797.43 S	102.42 W	41.81	13.10
	6328.00	35.82	127.82	6233.80	814.73 S	82.49 W	64.52	12.61
	6375.00	39.03	123.85	6271.13	831.41 S	59.32 W	90.29	8.54
	6423.00	43.15	118.38	6307.31	847.65 S	32.31 W	119.77	11.39
	6470.00	48.22	115.04	6340.14	862.71 S	2.27 W	152.02	11.92
	6518.00	52.21	111.90	6370.85	877.37 S	31.56 E	187.93	9.71
	6565.00	56.00	108.68	6398.41	890.55 S	67.27 E	225.42	9.79
	6613.00	59.70	107.17	6423.95	903.04 S	105.93 E	265.69	8.16
	6660.00	62.22	106.18	6446.76	914.83 S	145.29 E	306.52	5.67
	6708.00	64.39	105.15	6468.32	926.40 S	186.58 E	349.22	4.91
	6755.00	69.94	102.35	6486.56	936.67 S	228.64 E	392.43	13.02
	6803.00	75.41	100.49	6500.85	945.73 S	273.54 E	438.23	11.98
	6849.00	81.33	100.52	6510.12	953.94 S	317.82 E	483.26	12.87
	6909.00	85.56	98.19	6516.97	963.62 S	376.62 E	542.84	8.04
	7067.00	88.49	91.46	6525.17	976.87 S	533.74 E	699.80	4.64
	7160.00	88.40	90.57	6527.70	978.52 S	626.69 E	791.55	0.96
	7253.00	88.18	90.05	6530.47	979.02 S	719.64 E	883.10	0.61
	7345.00	89.63	86.74	6532.23	976.44 S	811.57 E	973.09	3.93
	7438.00	91.17	87.37	6531.58	971.67 S	904.45 E	1063.61	1.79
	7531.00	89.51	86.22	6531.03	966.47 S	997.29 E	1154.03	2.17
	7624.00	89.54	87.18	6531.80	961.11 S	1090.14 E	1244.42	1.03
	7717.00	88.30	85.93	6533.55	955.53 S	1182.95 E	1334.73	1.89
	7810.00	87.53	84.88	6536.94	948.08 S	1275.59 E	1424.55	1.40
	7901.00	87.90	85.86	6540.57	940.74 S	1366.22 E	1512.41	1.15
	7993.00	88.92	87.73	6543.12	935.60 S	1458.03 E	1601.82	2.31
	8085.00	90.12	87.65	6543.89	931.89 S	1549.95 E	1691.60	1.31
	8178.00	90.28	86.44	6543.57	927.10 S	1642.83 E	1782.12	1.31
	8271.00	89.94	83.18	6543.39	918.69 S	1735.43 E	1871.73	3.52

8365.00	91.94	86.23	6541.84	910.01 S	1829.00 E	1962.24	3.88
8460.00	92.86	85.69	6537.87	903.33 S	1923.68 E	2054.20	1.12
8555.00	92.31	88.25	6533.58	898.31 S	2018.44 E	2146.54	2.75
8649.00	90.34	87.77	6531.41	895.05 S	2112.36 E	2238.35	2.16
8744.00	90.96	88.08	6530.33	891.61 S	2207.29 E	2331.14	0.73
8839.00	92.31	88.69	6527.62	888.93 S	2302.21 E	2424.05	1.56
8934.00	90.09	87.33	6525.63	885.63 S	2397.12 E	2516.85	2.74
9029.00	91.79	87.24	6524.07	881.13 S	2492.00 E	2609.39	1.79
9124.00	88.58	86.37	6523.77	875.84 S	2586.84 E	2701.75	3.50
9219.00	88.55	85.95	6526.14	869.48 S	2681.59 E	2793.85	0.44
9313.00	90.15	88.77	6527.21	865.15 S	2775.48 E	2885.44	3.45
9408.00	90.77	89.04	6526.45	863.34 S	2870.46 E	2978.56	0.71
9503.00	92.00	89.24	6524.15	861.91 S	2965.42 E	3071.74	1.31
9598.00	90.59	89.89	6522.00	861.19 S	3060.39 E	3165.05	1.63
9693.00	90.12	89.44	6521.42	860.63 S	3155.38 E	3258.42	0.68
9788.00	90.40	90.02	6520.99	860.19 S	3250.38 E	3351.80	0.68
9883.00	90.15	89.29	6520.53	859.62 S	3345.38 E	3445.17	0.81
9978.00	90.49	90.17	6520.00	859.17 S	3440.37 E	3538.55	0.99
10073.00	90.59	90.74	6519.10	859.92 S	3535.36 E	3632.15	0.61
10168.00	90.65	90.80	6518.08	861.20 S	3630.35 E	3725.83	0.09
10263.00	90.56	92.35	6517.07	863.81 S	3725.31 E	3819.72	1.63
10358.00	89.91	90.57	6516.68	866.23 S	3820.27 E	3913.59	1.99
10453.00	90.25	88.78	6516.55	865.69 S	3915.26 E	4006.96	1.92
10548.00	90.25	90.39	6516.14	865.00 S	4010.26 E	4100.30	1.69
10643.00	91.48	91.94	6514.70	866.93 S	4105.22 E	4194.08	2.08
10738.00	89.01	87.94	6514.29	866.83 S	4200.19 E	4287.50	4.95
10832.00	87.62	84.78	6517.06	860.87 S	4293.95 E	4378.68	3.67
10927.00	89.67	84.09	6519.31	851.66 S	4388.47 E	4470.03	2.28
11002.00	91.11	84.37	6518.80	844.12 S	4463.09 E	4542.10	1.96
11066.00	91.11	84.37	6517.56	837.84 S	4526.77 E	4603.63	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 100.30 DEGREES (GRID)
A TOTAL CORRECTION OF 7.63 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11066.00 FEET
IS 4603.65 FEET ALONG 100.49 DEGREES (GRID)**