

PCD Pressure Case Gamma Ray

[illegible]

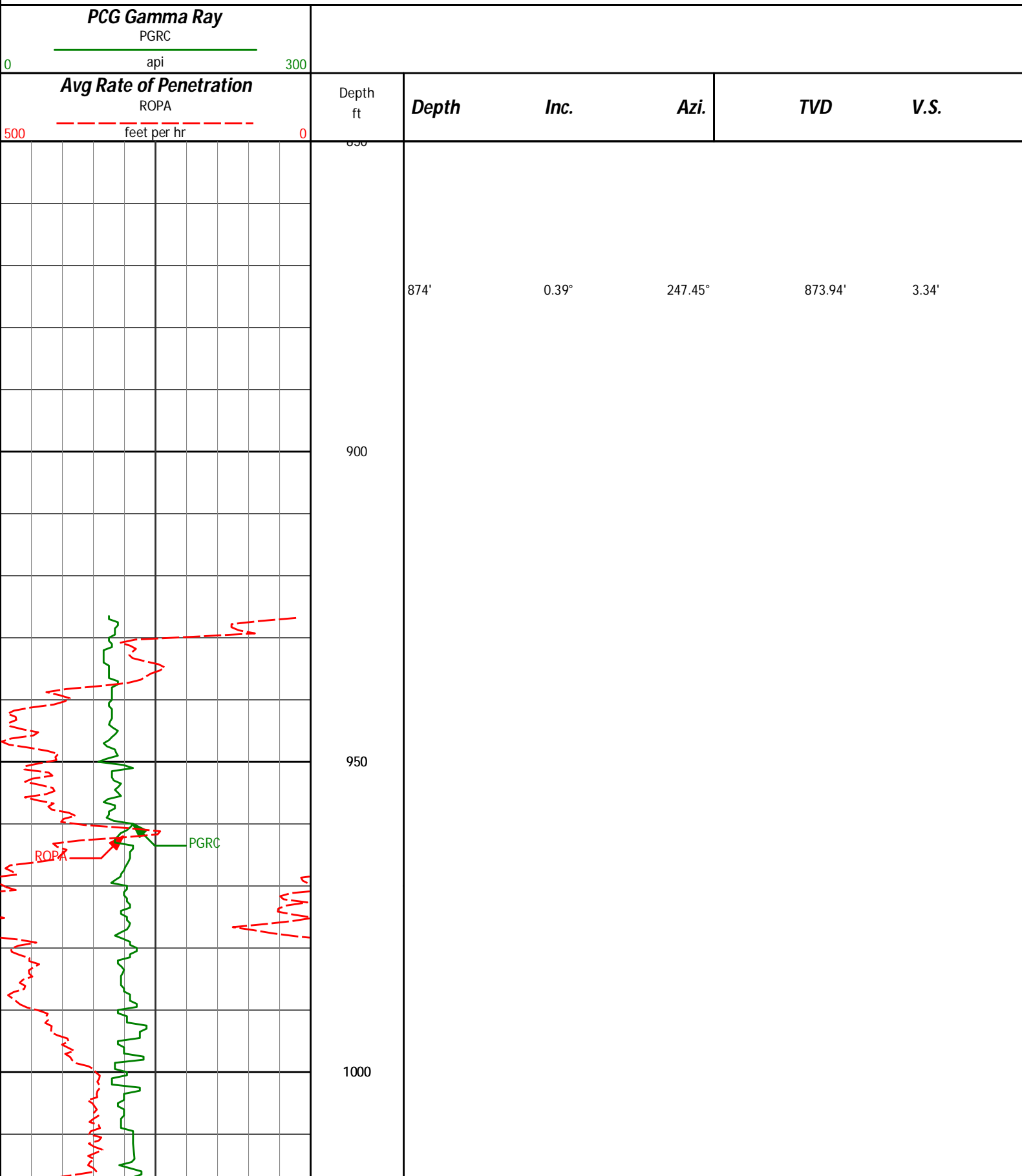
WELL INFORMATION

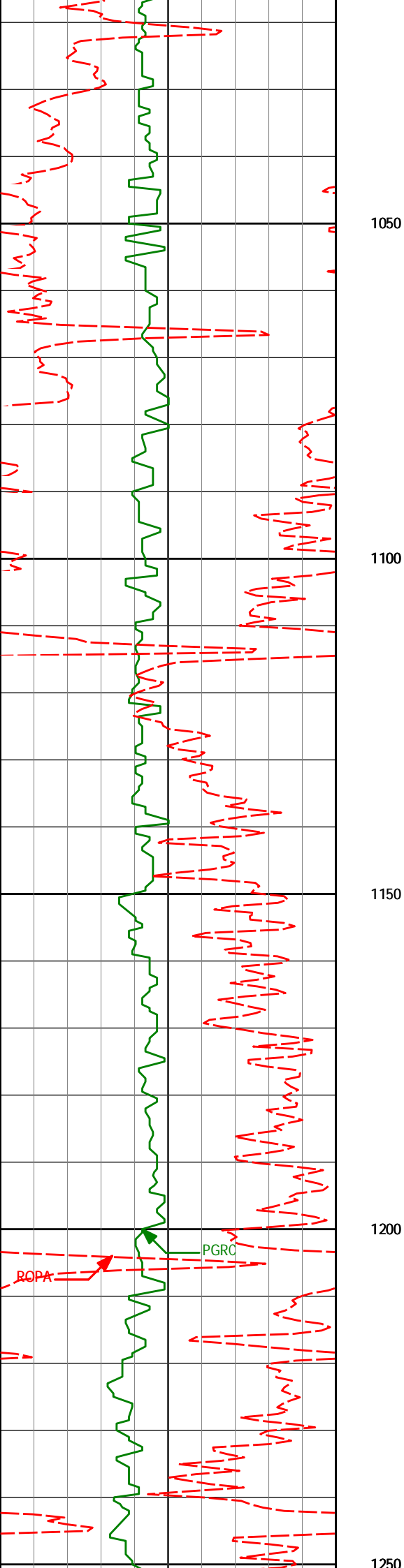
MWD Run Number	100	200	300		
Date run completed	17-Aug-13	02-Sep-13	06-Sep-13		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	13.500	8.750	6.125		
Tool Nominal OD (in)	8.110	6.750	4.750		
Log Start Depth (MD, ft)	13.00	926.00	7,544.00		
Log End Depth (MD, ft)	926.00	7,544.00	12,202.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	17-Aug-13 05:00	30-Aug-13 21:00	03-Sep-13 09:35		
Drill/Wipe End Date and Time	17-Aug-13 14:00	01-Sep-13 17:54	05-Sep-13 03:11		
Min Inc (deg) @ Depth (MD, ft)	.39 @ 874.00	.21 @ 6,507.00	88.15 @ 10,389.00		
Max Inc (deg) @ Depth (MD, ft)	.97 @ 415.00	86.33 @ 7,496.00	91.60 @ 8,011.00		
Bit TFA(in2) / Bit Type	1.49 / PDC	.97 / PDC	.98 / PDC		
Flow Rate (gpm)	579.04	557.14	279.85		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	8.50 / 29.00	9.35 / 38.00	9.80 / 36.00		
Filtrate CL (ppm)	700.00	850.00	1,200.00		
pH / Fluid Loss (mptm)	9.20 / 0	9.30 / 5	9.20 / 5		
PV (cP) / YP (lhf2)	2 / 2.00	14 / 10.00	10 / 14.00		
% Solids / % Sand	6.2 / .2	8.8 / 0.04	8.7 / 0.25		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (degF) / Source	102.72 / PCM	172.78 / PCM	234.12 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 102.72	N/A @ 172.78	N/A @ 234.12		
Lead MWD Engineer	Patrick Megee	Matt Busche	Matt Busche		
Customer Representative					

Sensor Information					
Downhole Processor Information					
Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11812718	11404300	12177824		
Insert Serial Number	11145513	11145513	11400937		
Date and Time Initialized	16-Aug-13 21:21	28-Aug-13 14:30	02-Sep-13 18:39		
Date and Time Read	17-Aug-13 17:52	02-Sep-13 01:30	06-Sep-13 00:55		
ECMB SW Version	N/A	N/A	N/A		
Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	49.70	46.05	43.83		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11812718	11404300	12177824		
Sonde Serial Number	11638573	11478090	11638573		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	109.29	199.66	105.88		
Gamma Ray Sensor Information					
Tool Type	N/A	PCG	PCG		
Distance From Bit (ft)	N/A	51.00	48.78		
Recorded Sample Period (sec)	N/A	10	10		
Software Version	N/A	8.15	8.15		
Sub Serial Number	N/A	11404300	12177824		
Insert/Sonde Serial Number	N/A	11579846	11293376		
REMARKS					
1. All depths are calibrated to the driller's pipe tally and are measured bit depths, measured from the drill floor. 2. No depth corrections have been made for pipe stretch or compression. 3. Critical annular velocities have been calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for syntheic and oil based fluids. 4. All data presented is recorded (memory) data unless otherwise stated. ROPA is realtime data 5. The following smoothing parameters have been applied to the data: ROPA: 0.5 ft interval, 1.2 ft coercion distance, 3 ft gap fill PGRC: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill 6. Insite Version 7.4.2					
WARRANTY					
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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

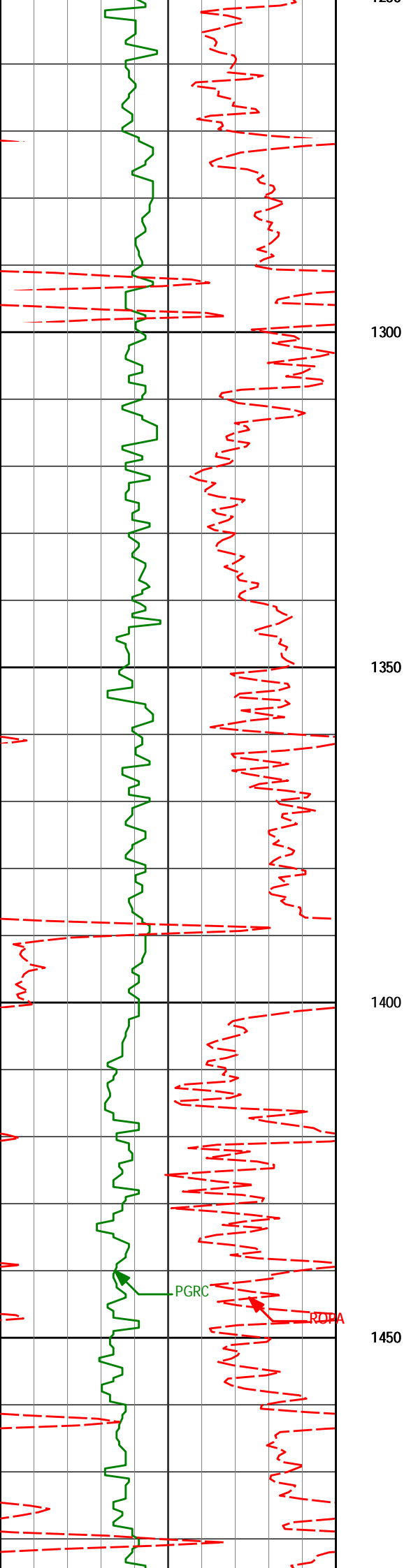
Anadarko
Kunzman 14N-8HZ
Ensign 132
05123370310000





1068'	0.44°	306.20°	1067.94'	3.16'
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1160'	0.53°	315.57°	1159.93'	2.65'
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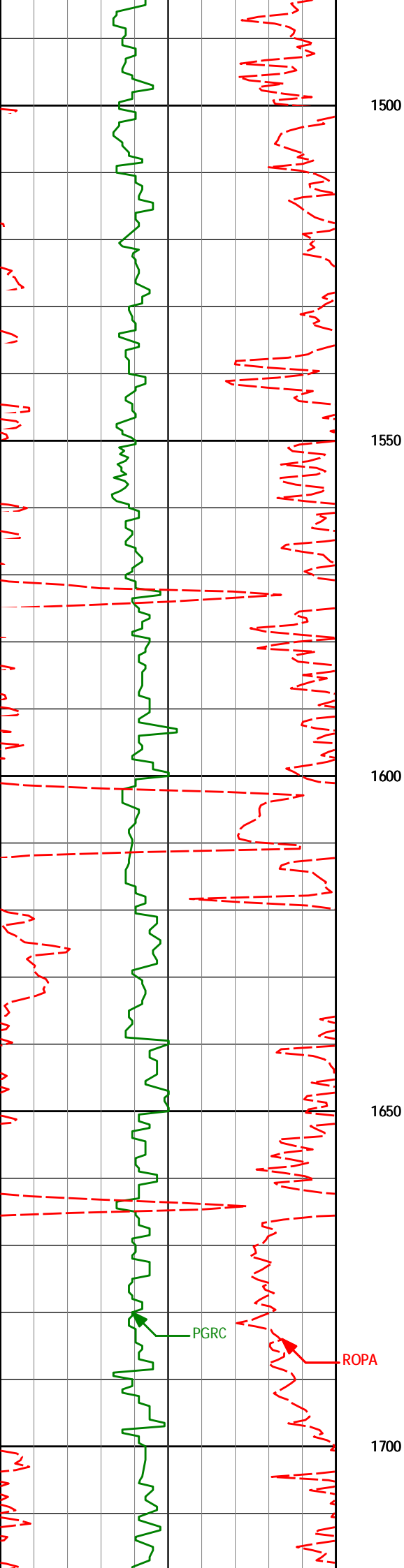


1344'	0.62°	321.70°	1343.92'	1.25'
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1435'	0.68°	330.11°	1434.92'	0.40'
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PGRC

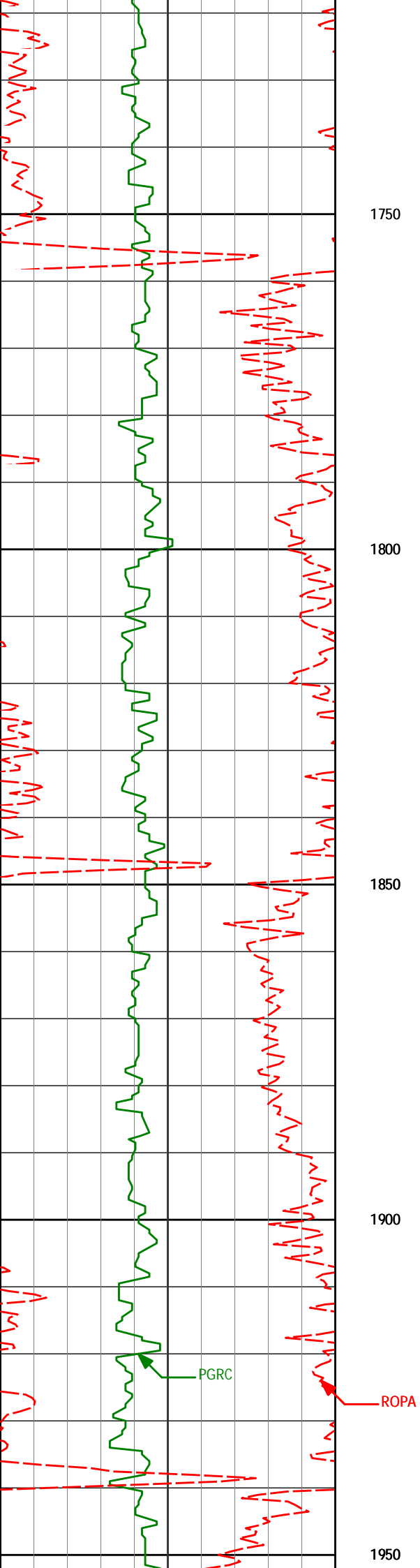
ROPA



1526' 0.89° 332.68° 1525.91' -0.70'

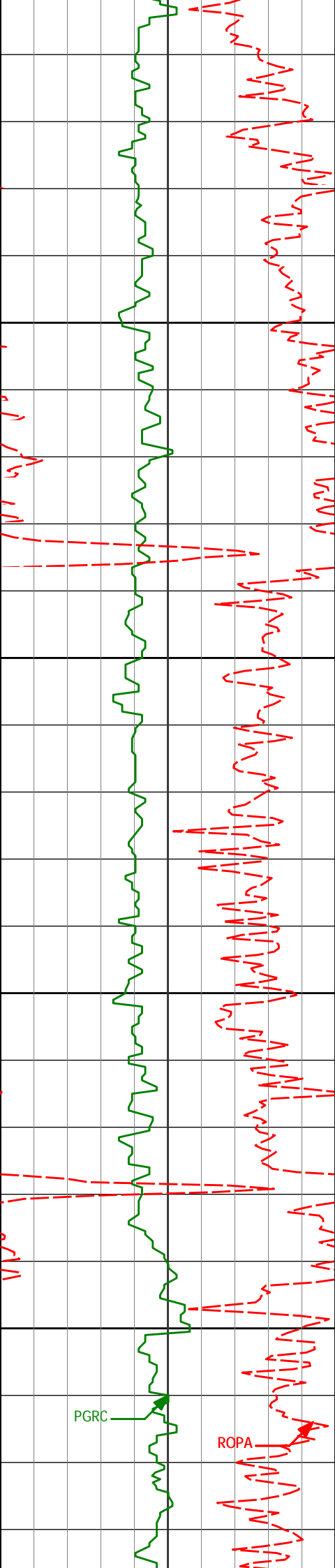
1618' 0.50° 42.49° 1617.90' -1.63'

1710' 0.43° 74.61° 1709.90' -2.02'



1801' 0.38° 24.71° 1800.90' -2.38'

1893' 0.33° 29.81° 1892.90' -2.89'



1988'

0.58°

20.52°

1987.89'

-3.57'

2000

2050

2083'

0.71°

12.36°

2082.89'

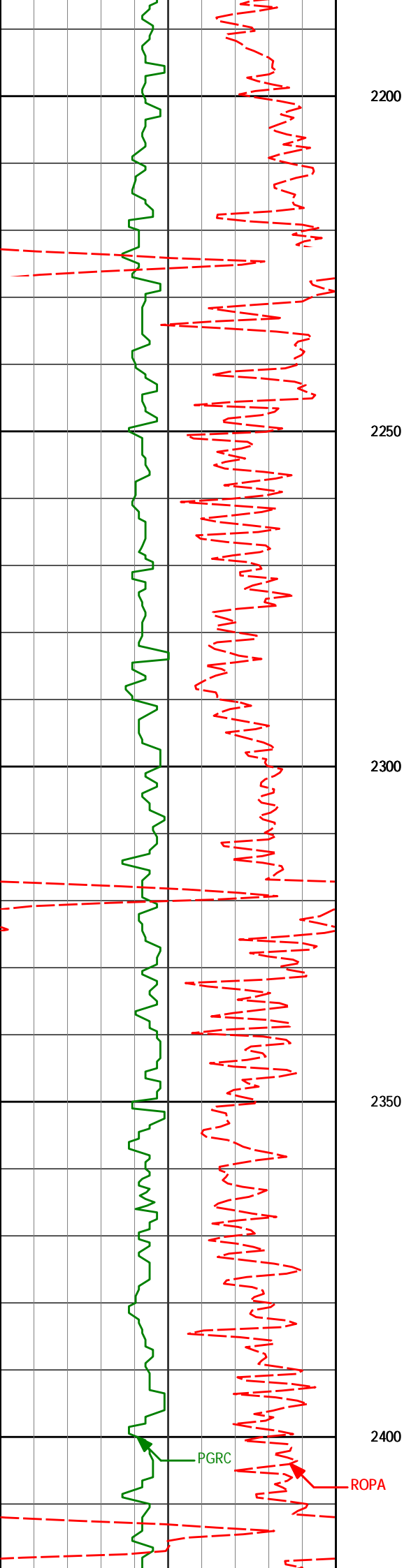
-4.60'

2100

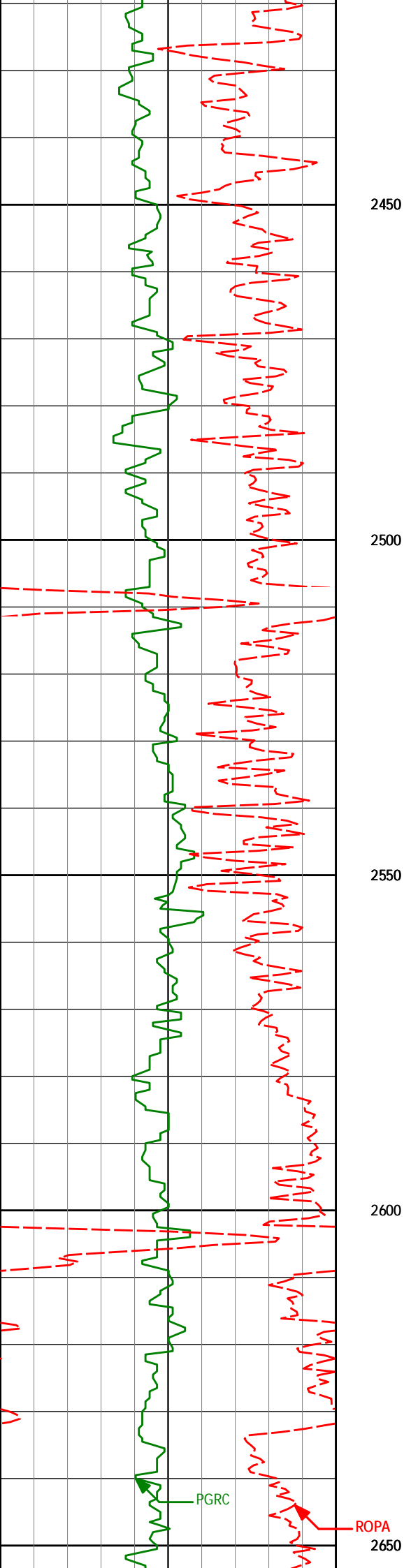
2150

PGRC

ROPA



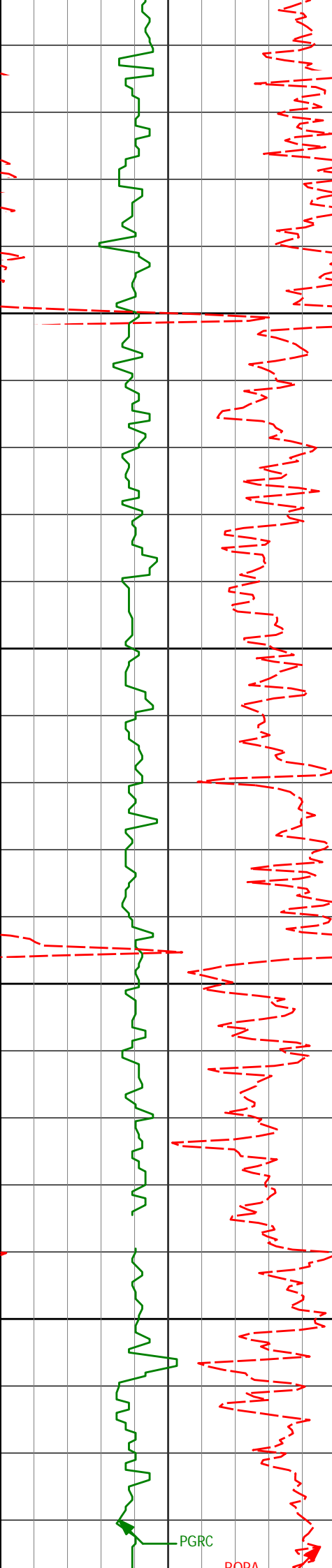
2368'	1.11°	350.53°	2367.85'	-9.05'
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2463' 1.08° 349.07° 2462.84' -10.83'

2558' 0.69° 343.86° 2557.82' -12.26'

2653' 0.94° 333.27° 2652.81' -13.51'



2700

2750

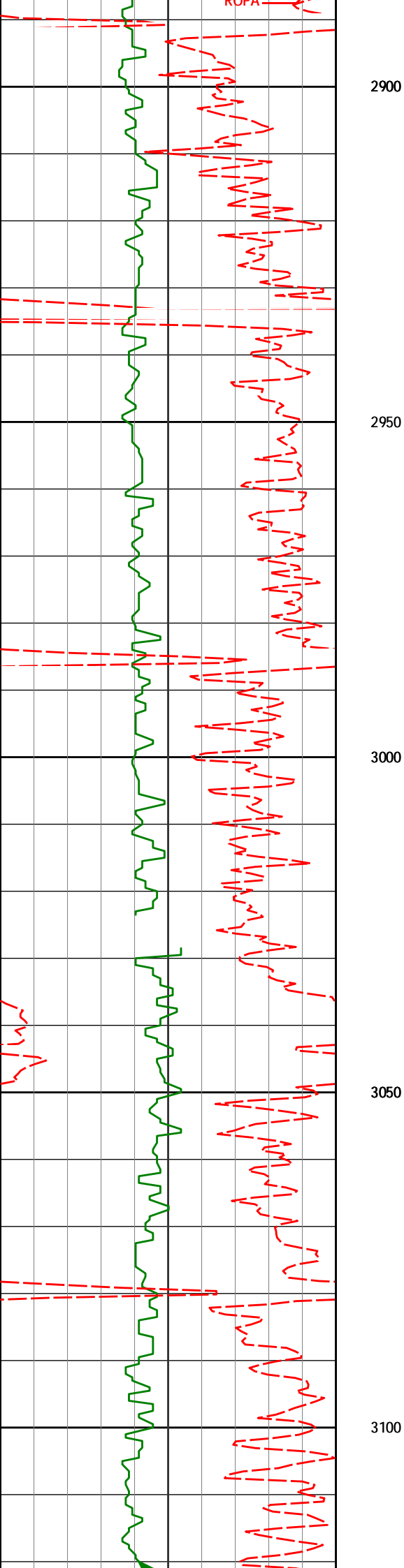
2800

2850

PGRC

POBA

2633	0.74	353.27	2632.01	-13.31
2749'	0.68°	351.01°	2748.80'	-14.77'
2844'	0.89°	358.94°	2843.80'	-16.07'



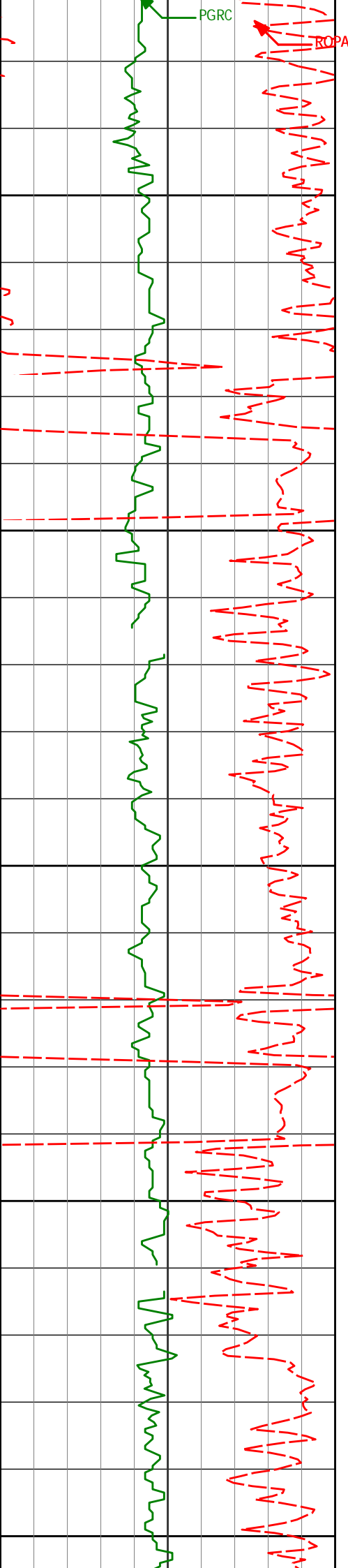
3034'

0.44°

14.89°

3033.78'

-18.25'



3129'

0.96°

45.44°

3128.78'

-19.16'

3150

3200

3224'

2.51°

33.48°

3223.73'

-21.45'

3250

3300

3319'

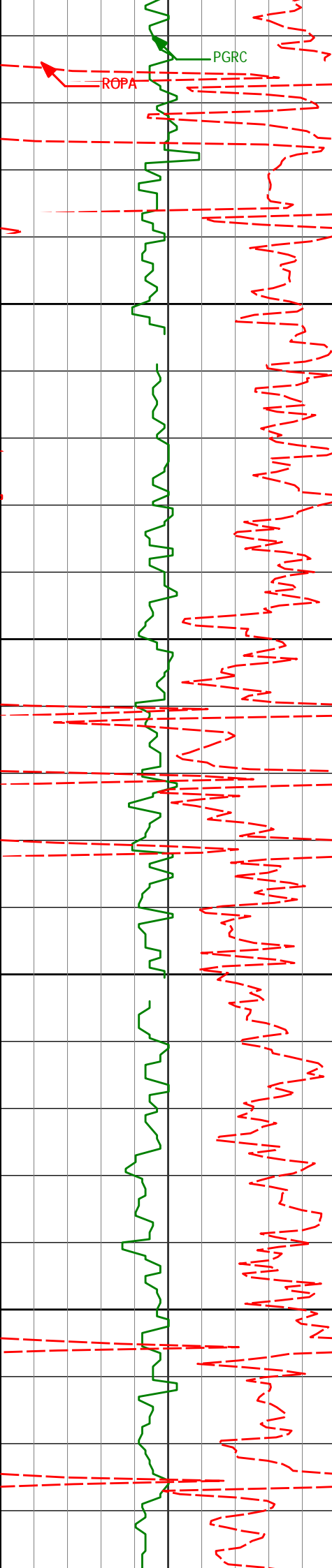
4.04°

28.45°

3318.57'

-26.13'

3350



3400

3414'

5.06°

27.31°

3413.27'

-32.79'

3450

3500

3509'

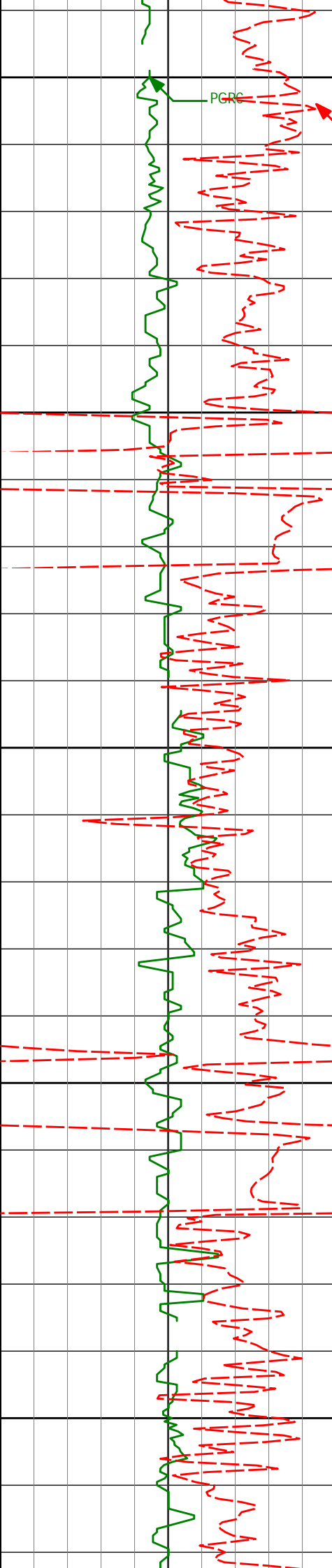
5.03°

22.19°

3507.90'

-40.36'

3550



3600

PCRC

ROPA

3605'

4.26°

20.40°

3603.59'

-47.60'

3650

3700

3700'

5.53°

20.73°

3698.24'

-55.18'

3750

3800

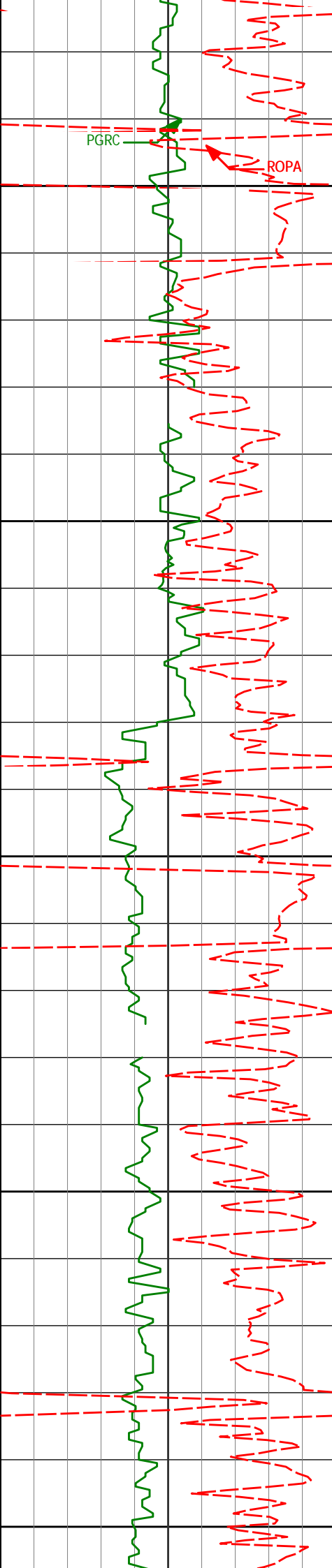
3795'

6.87°

25.31°

3792.68'

-64.59'



3850

3900

3950

4000

4050

3890'

8.17°

27.20°

3886.86'

-75.73'

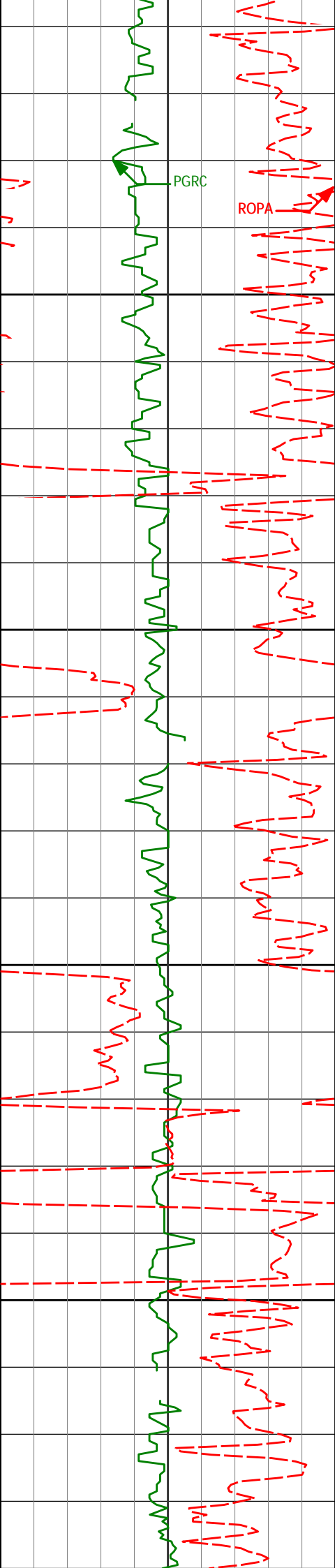
3985'

9.94°

25.74°

3980.68'

-89.11'



4080'	9.43°	25.29°	4074.32'	-103.52'
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4100

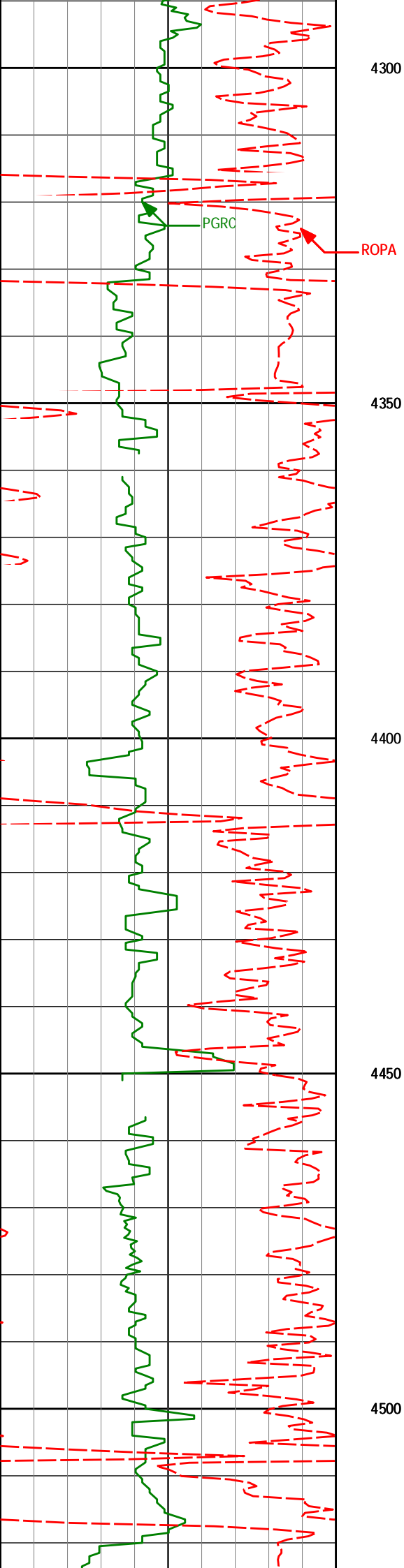
4150

4175'	8.69°	24.03°	4168.14'	-117.11'
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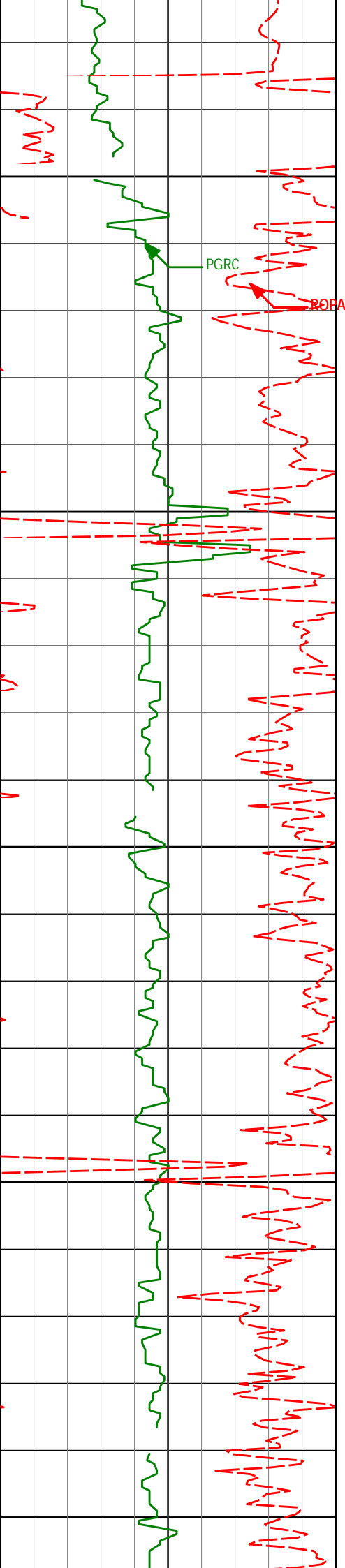
4200

4250

4270'	8.85°	25.36°	4262.02'	-130.26'
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4300				
4350				
4366'	10.08°	24.71°	4356.72'	-144.56'
4400				
4450				
4461'	9.15°	20.81°	4450.38'	-159.16'
4500				



4550

4556'

10.38°

26.04°

4544.00'

-173.91'

PGR

BOBA

4600

4650

4651'

10.38°

24.32°

4637.45'

-189.39'

4700

4750

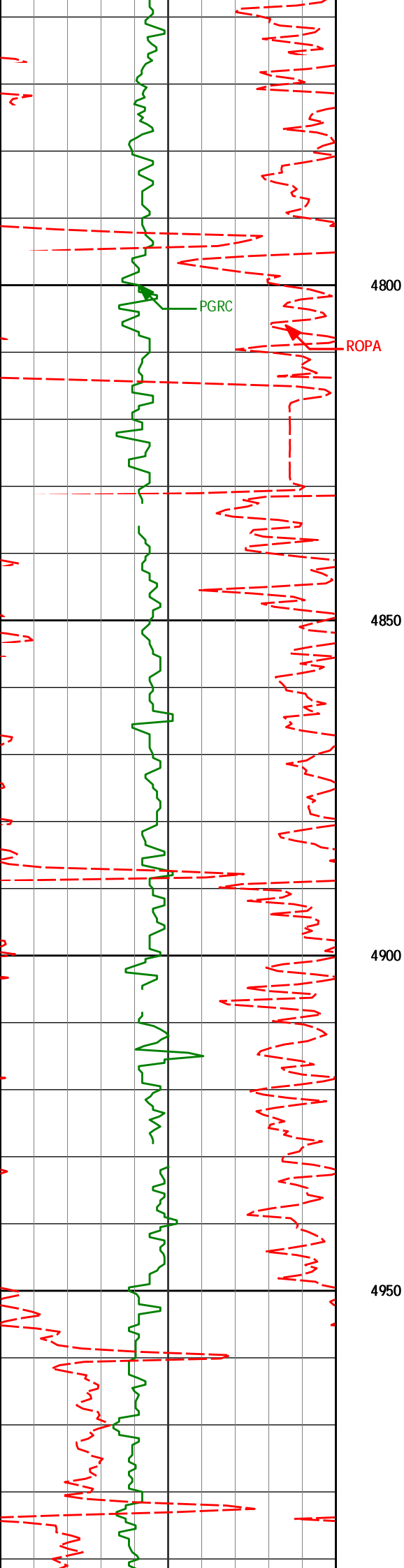
4746'

9.37°

23.62°

4731.04'

-204.26'



4800

4850

4900

4950

4841'

10.17°

28.88°

4824.67'

-218.68'

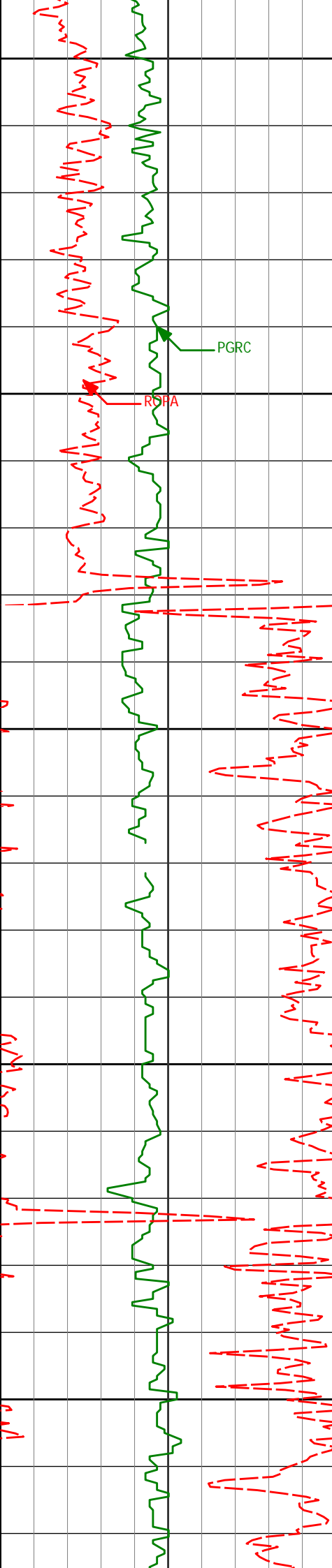
4936'

8.96°

32.83°

4918.34'

-232.23'



5000

5032'

8.29°

32.14°

5013.26'

-244.37'

PGRC

RSHA

5050

5100

5127'

7.54°

32.31°

5107.35'

-255.43'

5150

5200

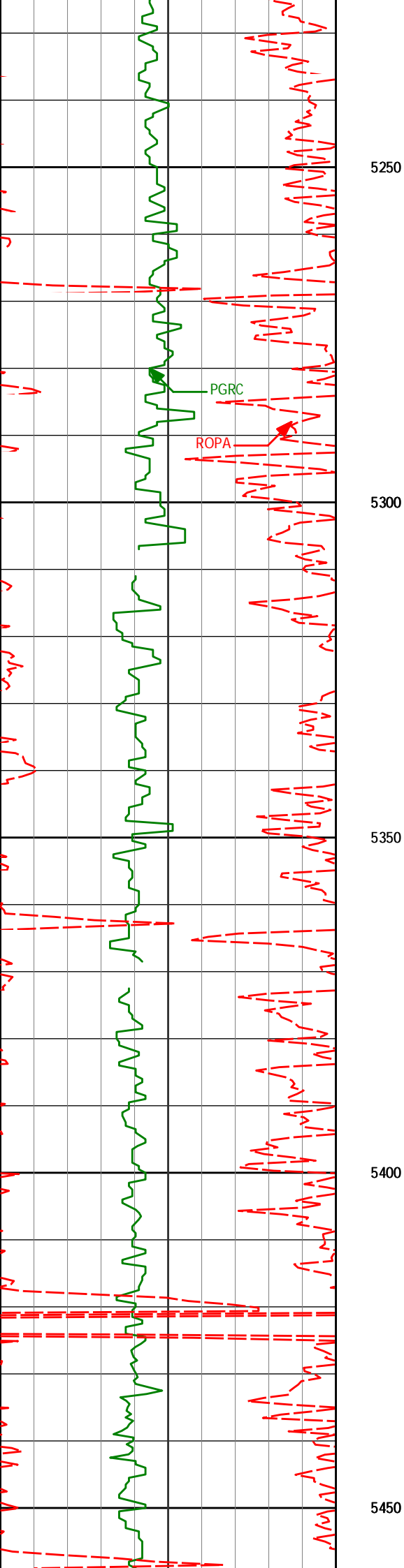
5222'

6.36°

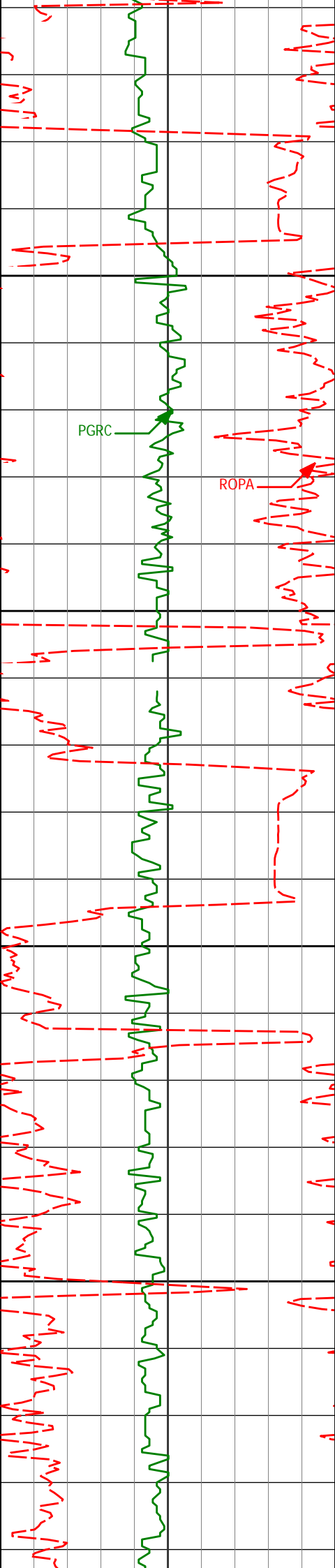
31.10°

5201.65'

-265.19'



5317'	5.73°	28.59°	5296.12'	-273.86'
5412'	5.50°	27.57°	5390.67'	-282.05'



5500

5507'

3.08°

18.78°

5485.40'

-288.50'

5550

5600

5603'

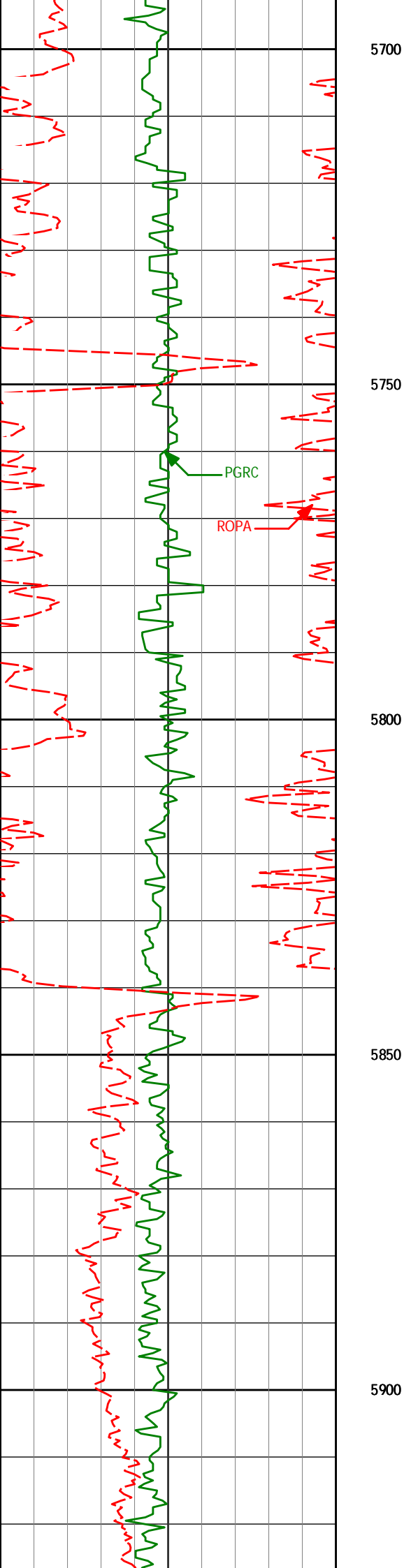
0.52°

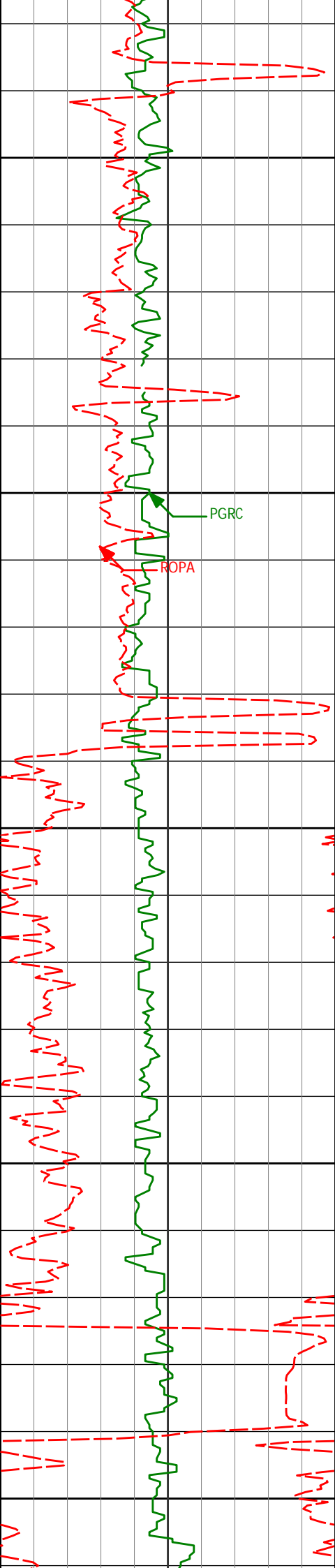
12.60°

5581.34'

-291.37'

5650





5950

5983'

1.22°

13.25°

5961.29'

-296.98'

6000

PGRC

ROPA

6050

6078'

1.42°

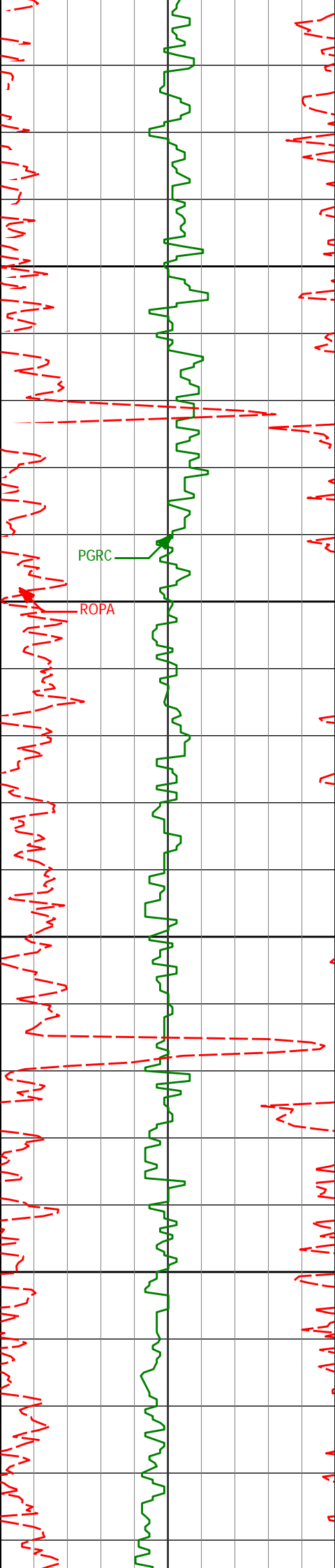
12.86°

6056.27'

-299.12'

6100

6150



6173' 0.26° 152.97° 6151.26' -300.07'

6200

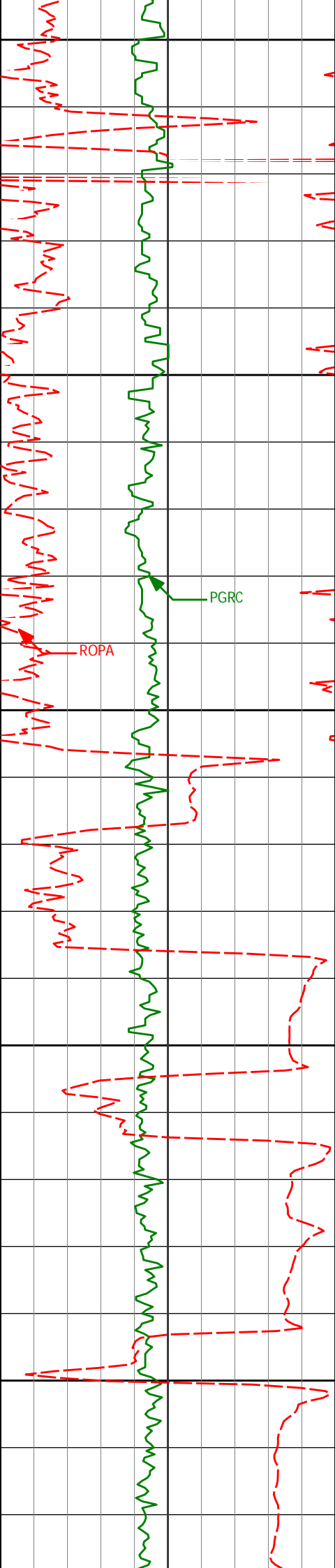
6250

6268' 0.45° 179.03° 6246.26' -299.51'

6300

6350

6364' 0.24° 153.01° 6342.26' -298.95'



6400

6450

6500

6550

6600

6459'

0.35°

156.79°

6437.26'

-298.51'

6507'

0.21°

114.23°

6485.25'

-298.33'

6554'

2.27°

168.05°

6532.24'

-297.39'

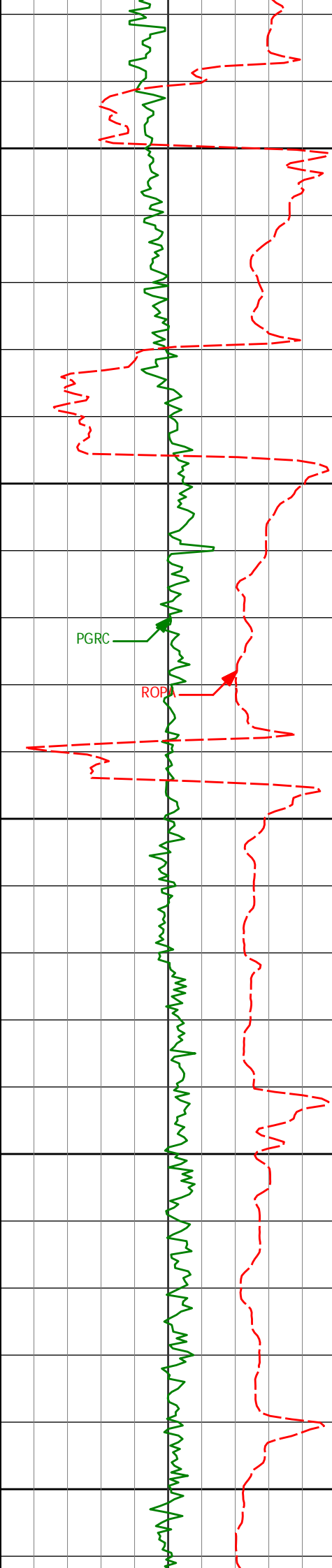
6602'

6.66°

177.78°

6580.08'

-293.67'



6650

6700

6750

6800

6850

6649'

6697'

6744'

6792'

6839'

10.60°

13.74°

18.12°

22.58°

27.10°

181.96°

181.83°

180.93°

182.22°

182.29°

6626.54'

6673.46'

6718.64'

6763.64'

6806.28'

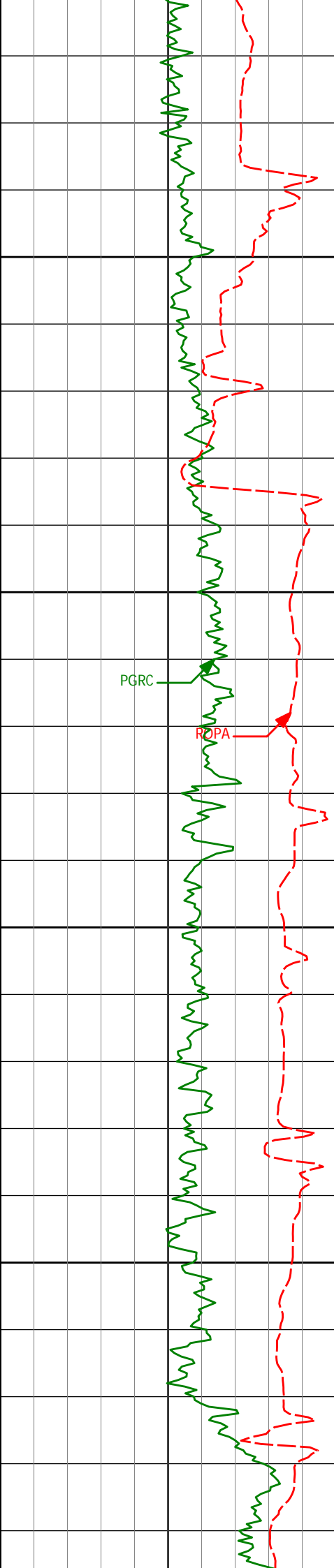
-286.63'

-276.52'

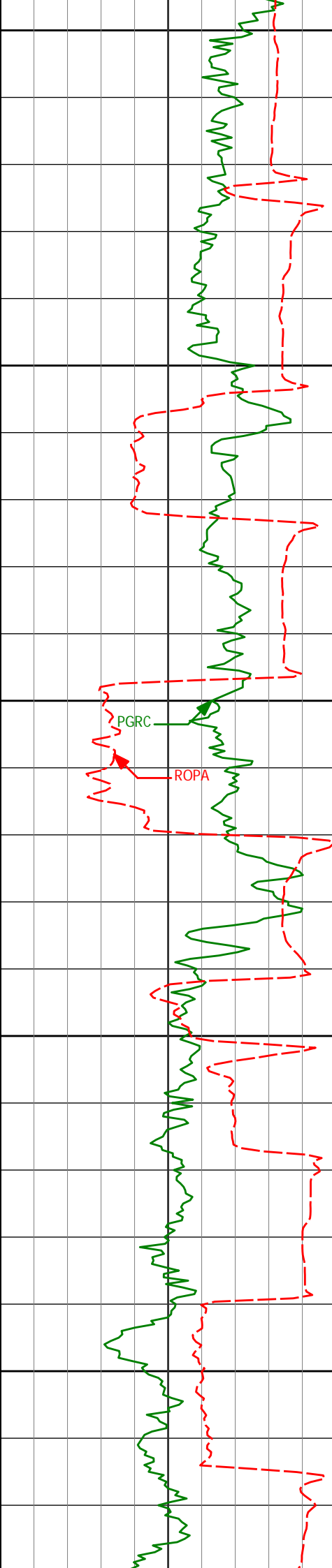
-263.62'

-246.94'

-227.22'



6887'	31.45°	181.57°	6848.14'	-203.77'
6934'	36.51°	178.96°	6887.10'	-177.52'
6982'	41.82°	180.98°	6924.30'	-147.22'
7029'	46.43°	182.63°	6958.03'	-114.52'
7077'	51.74°	183.05°	6989.46'	-78.31'



7100

7124'

57.57°

182.82°

7016.64'

-40.04'

7150

7172'

61.62°

182.21°

7040.93'

1.31'

7200

7219'

65.13°

181.35°

7061.99'

43.29'

7250

7267'

68.47°

179.72°

7080.89'

87.40'

7300

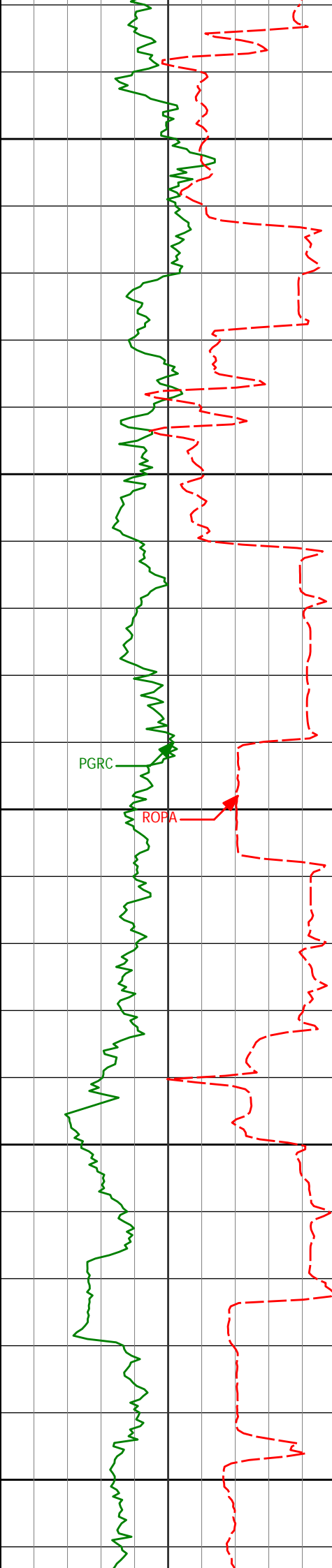
7314'

72.47°

179.44°

7096.60'

131.69'



7350

7362'

75.59°

179.58°

7109.81'

177.83'

7400

7409'

78.65°

178.88°

7120.28'

223.64'

PGRC

ROPA

7450

7452'

82.95°

178.36°

7127.16'

266.06'

7500

7496'

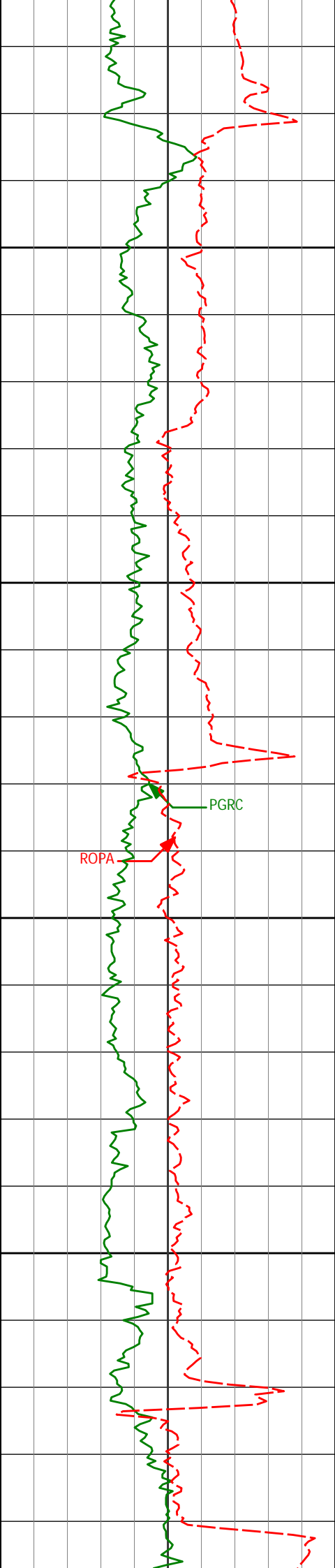
86.33°

179.84°

7131.27'

309.86'

7550



7600

7650

7700

7750

7630'

90.59°

179.69°

7134.87'

443.78'

7726'

91.42°

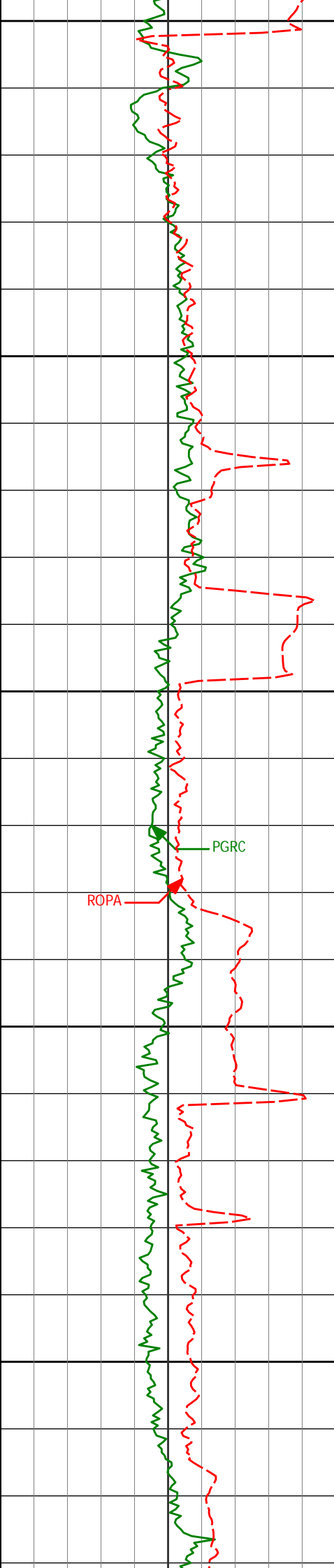
179.50°

7133.18'

539.76'

PGRC

ROPA



7800

7821'

90.96°

178.77°

7131.21'

634.73'

7850

7900

PGRC

ROPA

7950

8000

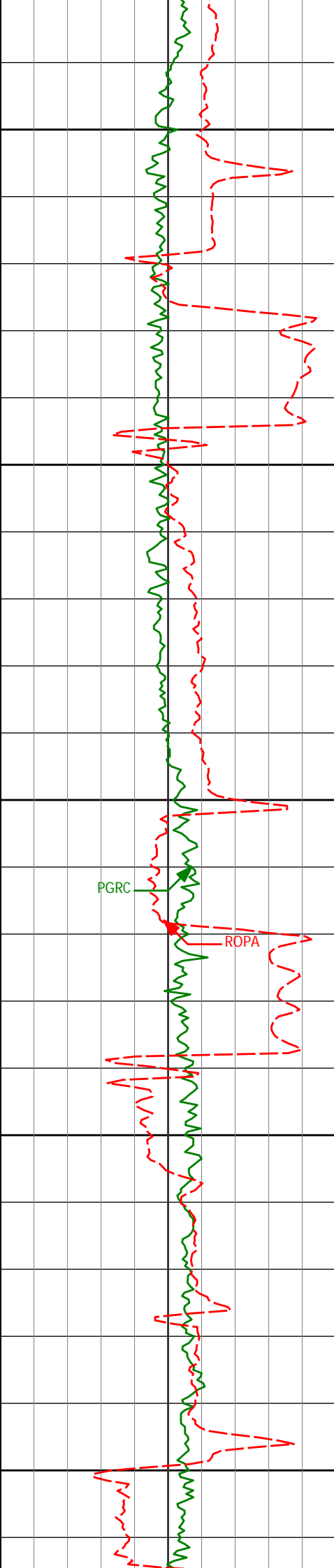
8011'

91.60°

178.57°

7126.97'

824.64'



8050

8100

8150

8200

8250

8106'

90.71°

179.06°

7125.05'

919.60'

PGRC

ROPA

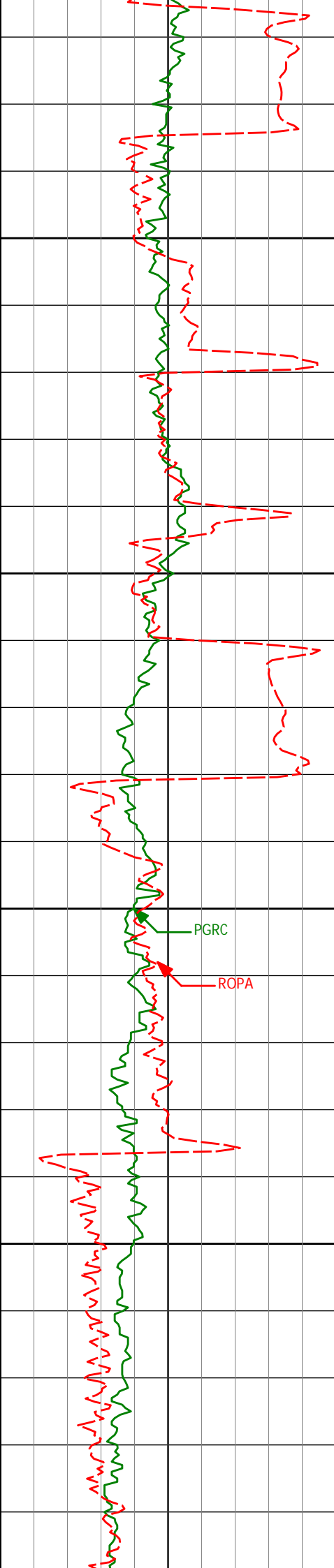
8201'

89.72°

178.97°

7124.69'

1014.58'



8300

8350

8400

8450

8296'

89.17°

180.12°

7125.61'

1109.57'

8391'

88.33°

181.18°

7127.68'

1204.54'

8486'

89.29°

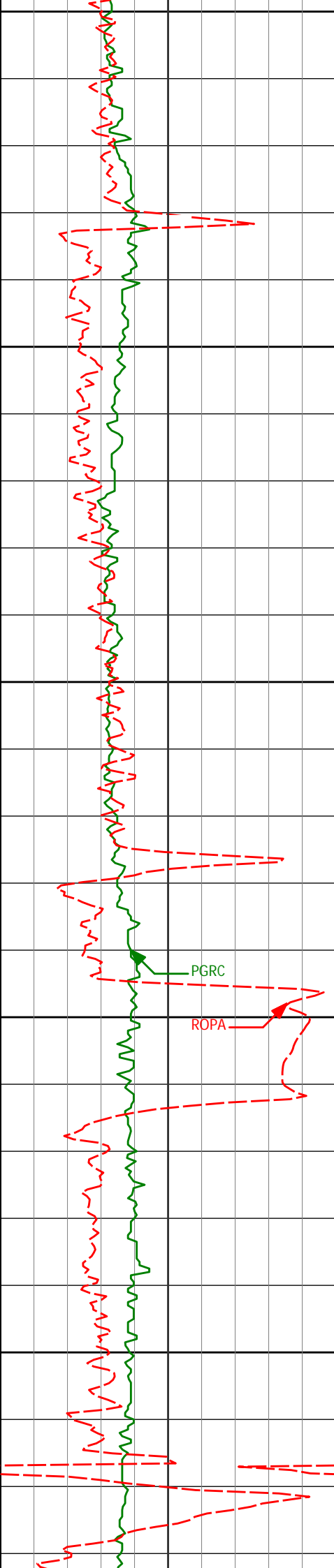
180.73°

7129.65'

1299.51'

PGRC

ROPA



8500

8550

8600

8650

8700

8581'

90.00°

180.13°

7130.24'

1394.50'

8676'

90.18°

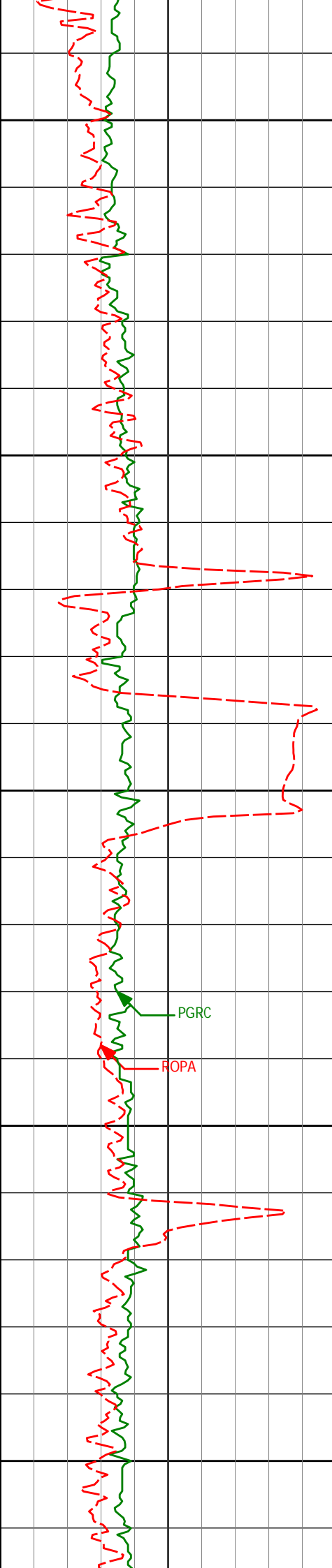
181.54°

7130.09'

1489.48'

PGRC

ROPA



8750

8772'

90.99°

180.98°

7129.11'

1585.45'

8800

8850

8867'

89.60°

180.71°

7128.63'

1680.44'

PGRC

ROPA

8900

8950

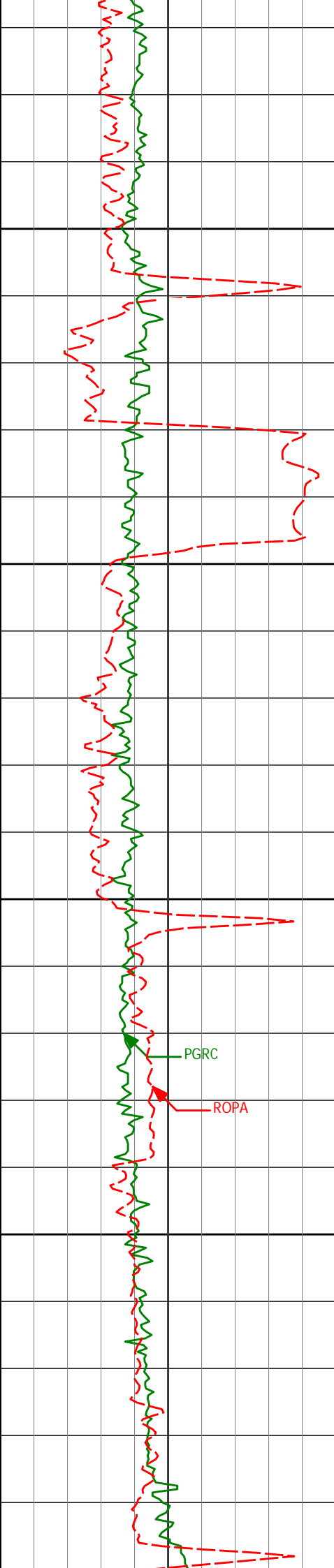
8962'

91.14°

180.70°

7128.01'

1775.42'



9000

9050

9100

9150

9200

PGRC

ROPA

9057'

90.22°

180.62°

7126.88'

1870.41'

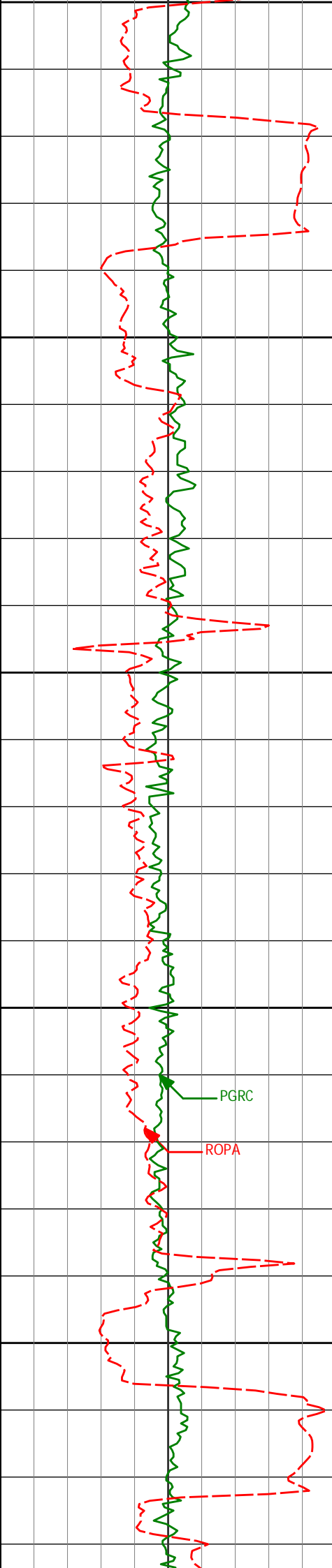
9152'

90.74°

180.29°

7126.09'

1965.40'



9200

9250

9300

9350

9400

9345'

90.83°

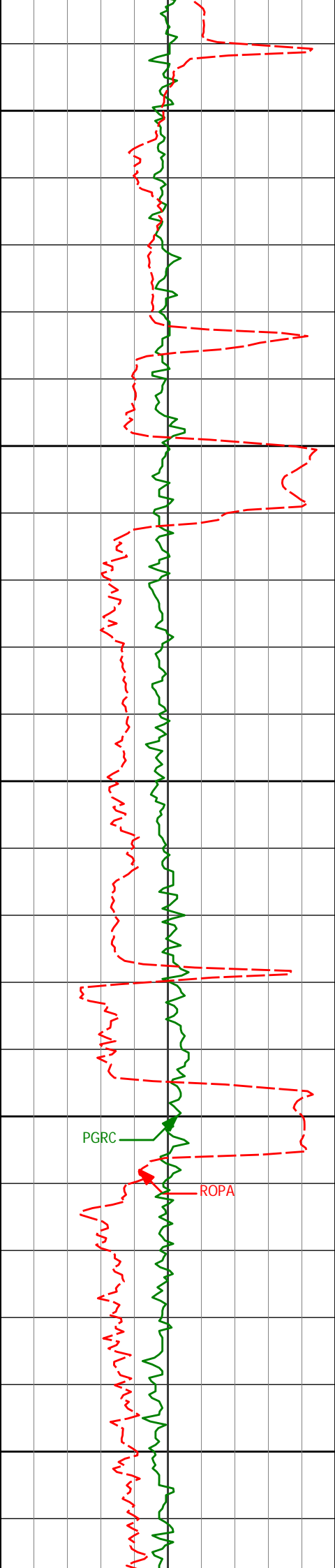
179.95°

7123.44'

2158.38'

PGRC

ROPA



9438'

89.57°

179.62°

7123.12'

2251.38'

9450

9500

9533'

89.88°

180.12°

7123.58'

2346.38'

9550

9600

9650

PGRC

ROPA

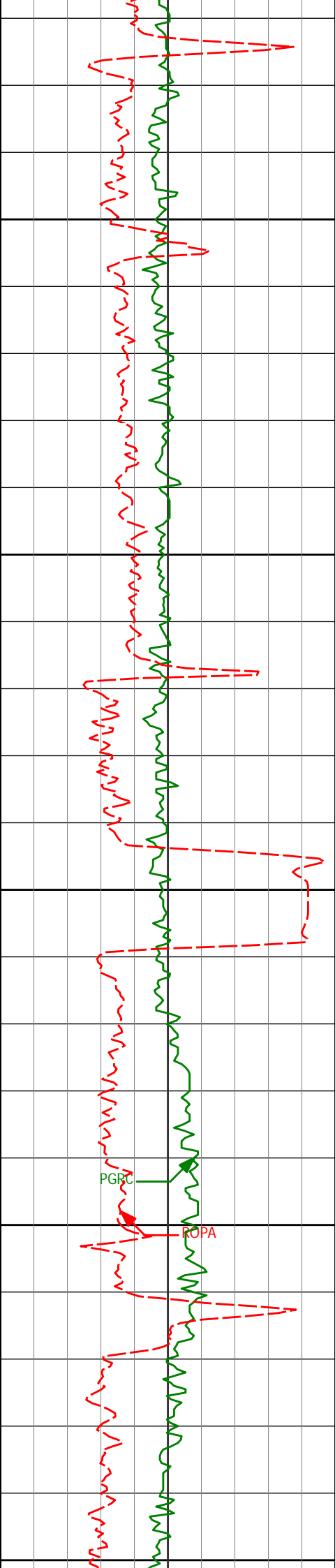
9628'

89.38°

179.44°

7124.19'

2441.37'



9700

9723'

89.72°

179.09°

7124.94'

2536.36'

9750

9800

9818'

89.20°

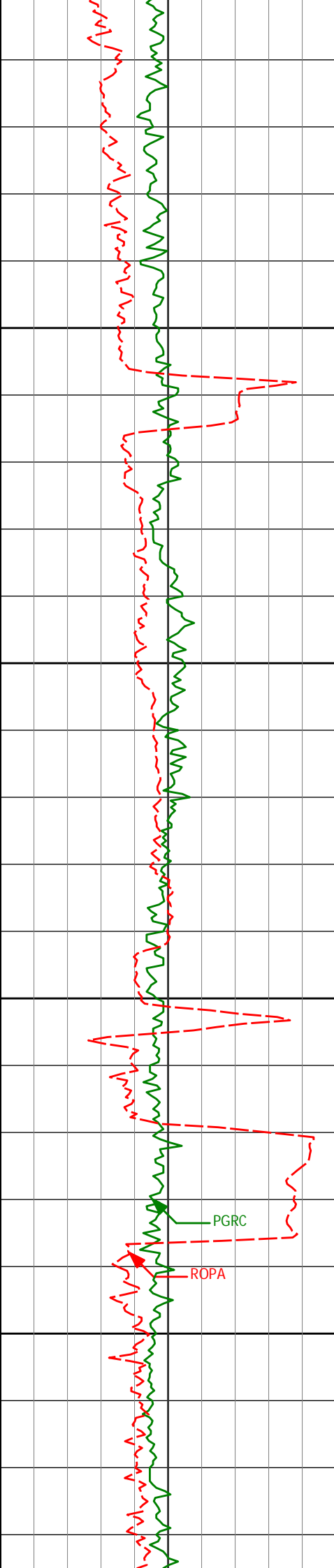
179.41°

7125.83'

2631.35'

9850

9900



9913'	89.54°	179.29°	7126.88'	2726.34'
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9950

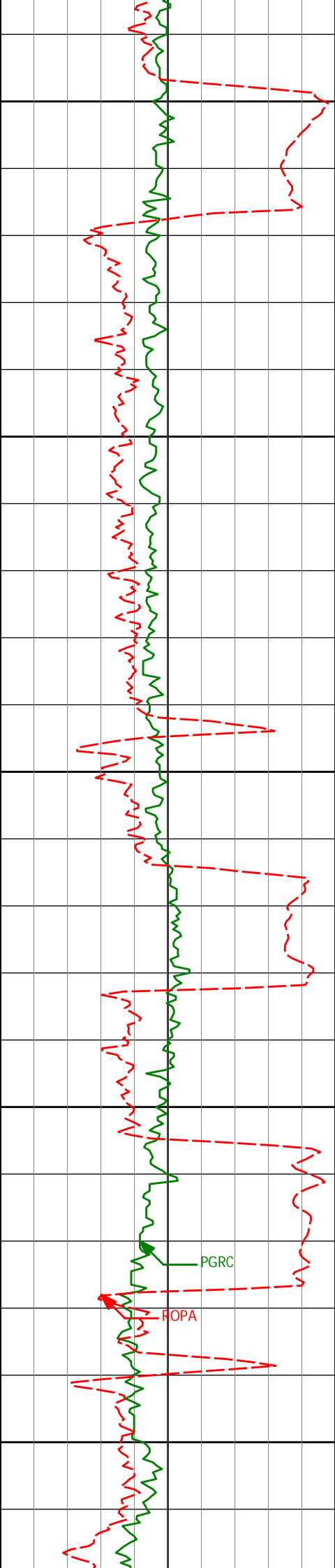
10000

10009'	89.88°	178.66°	7127.36'	2822.33'
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10050

10100

10104'	89.72°	179.49°	7127.69'	2917.31'
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10150

10200

10250

10300

10350

10199'

89.72°

179.79°

7128.16'

3012.31'

10294'

89.29°

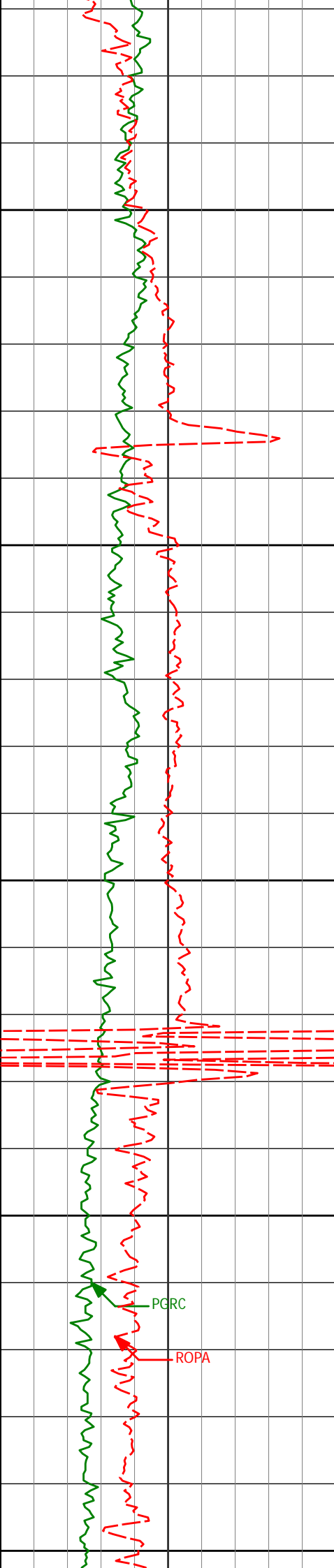
180.45°

7128.98'

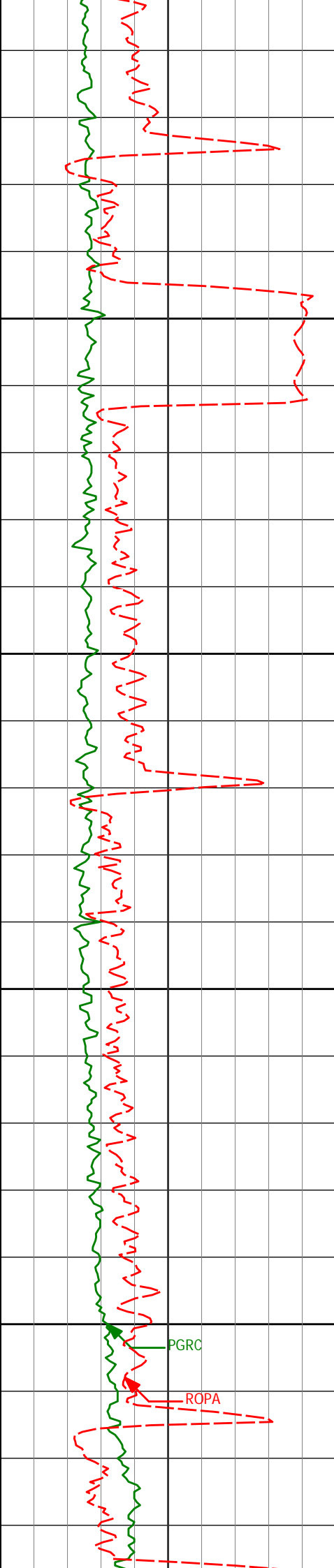
3107.31'

PGRC

ROPA



10389'	88.15°	181.17°	7131.10'	3202.27'
10400				
10450				
10484'	88.61°	180.63°	7133.79'	3297.22'
10500				
10550				
10579'	89.69°	179.82°	7135.20'	3392.20'
10600				



10650

10700

10750

10800

10674'

89.54°

180.47°

7135.83'

3487.20'

10770'

90.59°

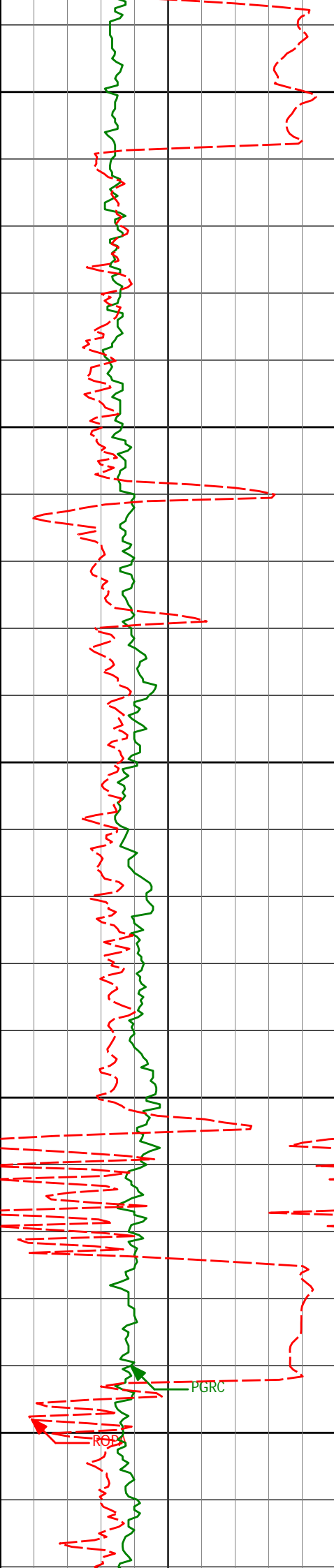
179.93°

7135.72'

3583.20'

PGRC

ROPA



10850

10900

10950

11000

11050

10865'

10960'

11055'

90.40°

91.26°

90.18°

180.41°

179.97°

180.59°

7134.90'

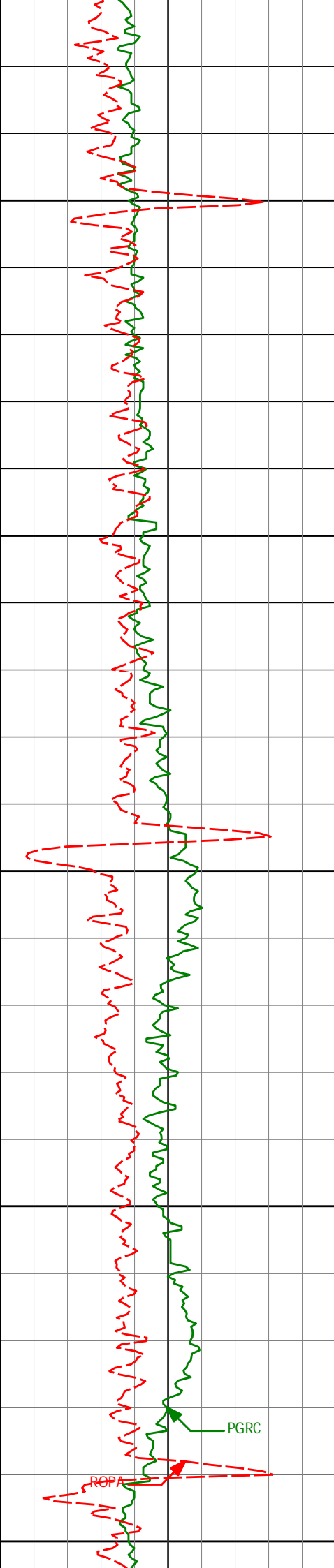
7133.53'

7132.33'

3678.19'

3773.18'

3868.17'



11100

11150

11200

11250

11300

11150'

90.37°

180.18°

7131.88'

3963.16'

11245'

91.17°

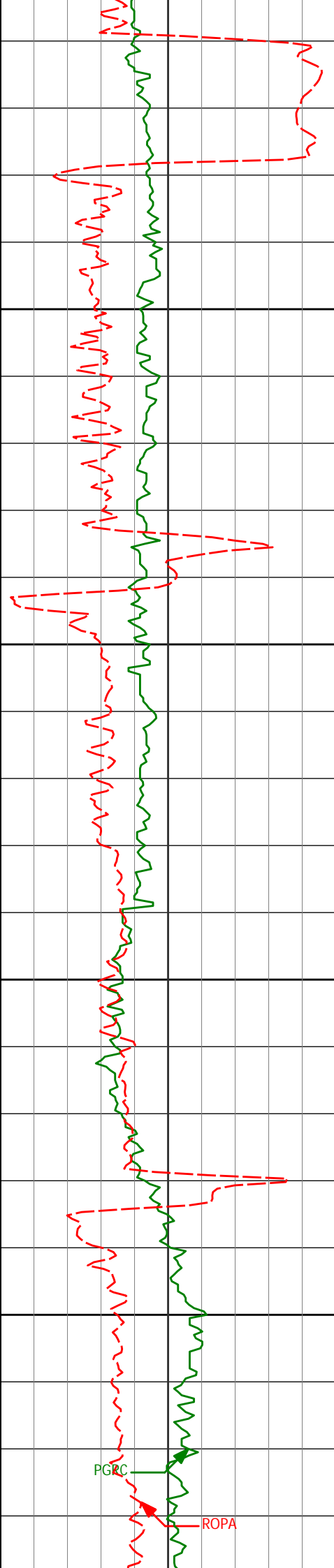
179.71°

7130.60'

4058.16'

PGRC

ROPA



11340'	90.59°	181.11°	7129.14'	4153.14'
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11350

11400

11435'	90.68°	181.11°	7128.09'	4248.11'
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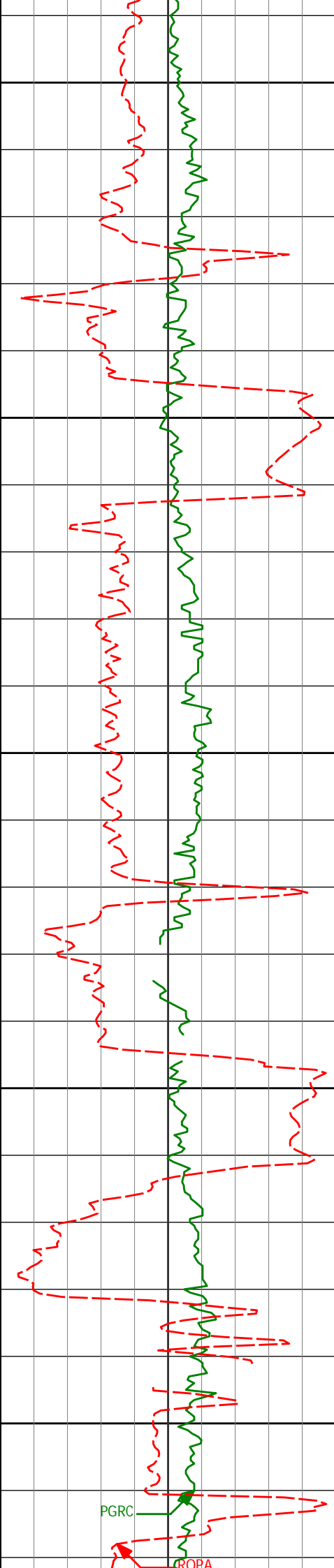
11450

11500

11530'	91.57°	180.21°	7126.22'	4343.08'
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PGRC

ROPA



11550

11600

11650

11700

11750

11625'

90.96°

179.70°

7124.13'

4438.06'

11721'

88.92°

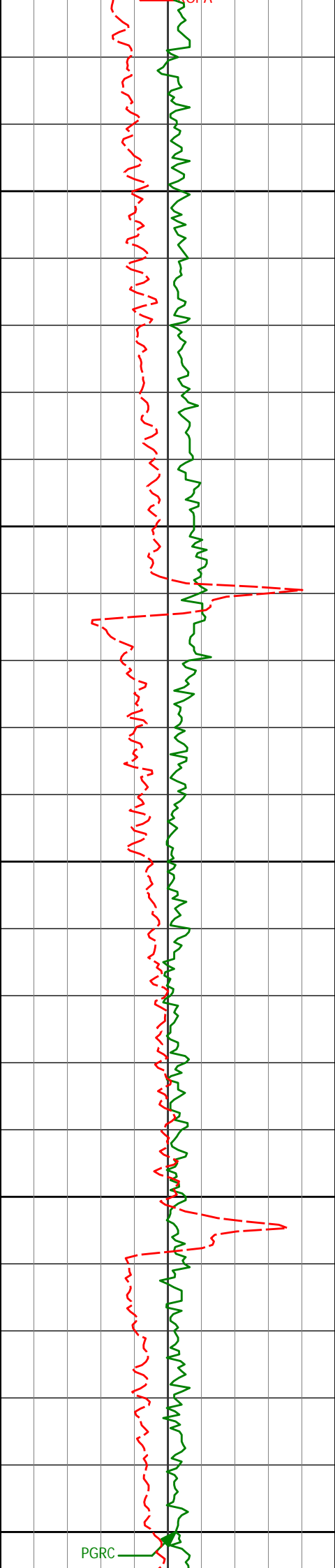
179.24°

7124.23'

4534.05'

PGRC

PROPA



11800

11850

11900

11950

12000

11816'

89.26°

178.89°

7125.74'

4629.03'

11911'

89.75°

178.67°

7126.56'

4724.01'

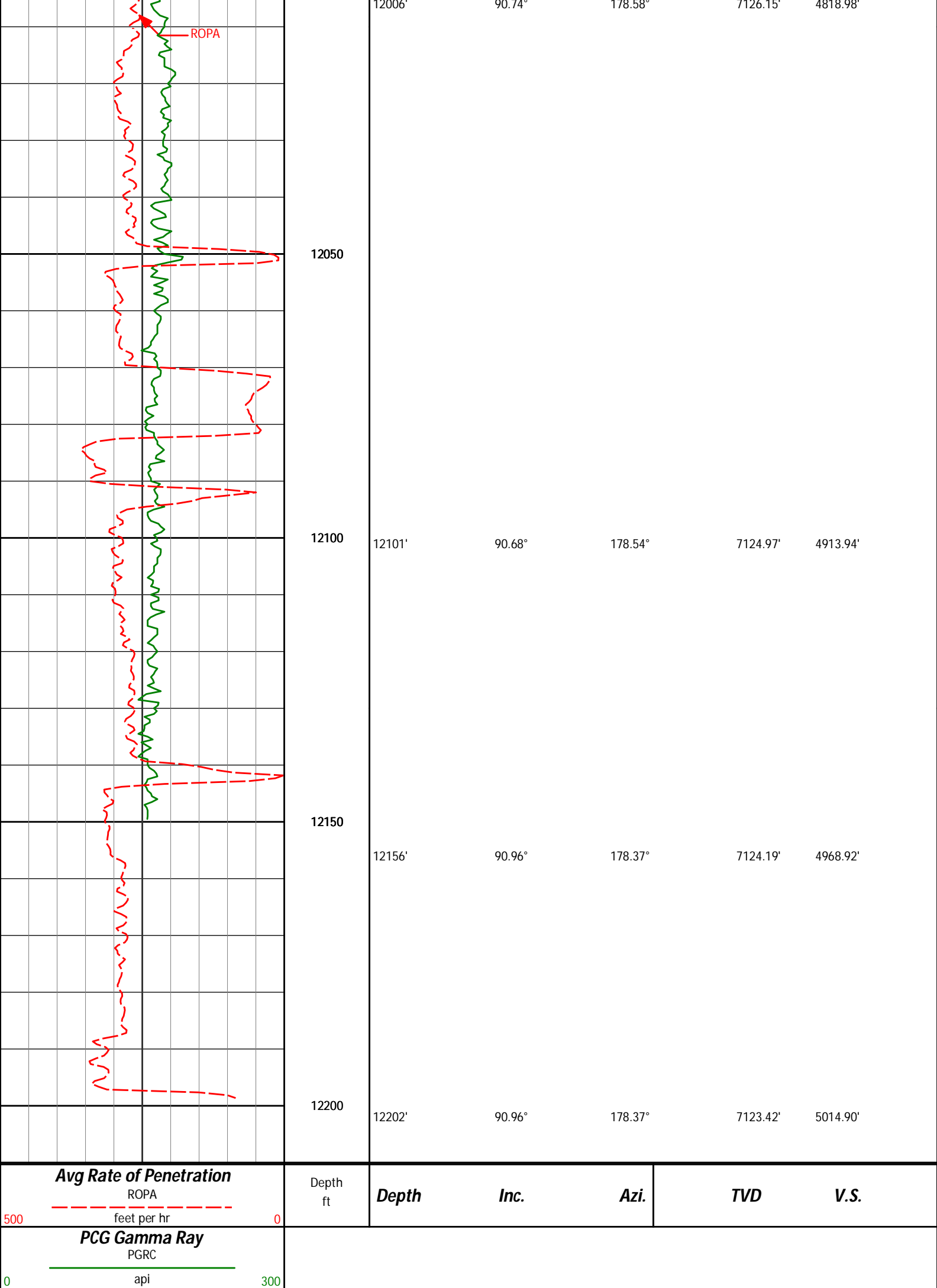
12000'

89.74°

178.58°

7126.15'

4619.82'





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum

Kunzman 14N-8HZ

Wattenburg

Weld Colorado

USA

CA-XX-0900582948

Surveys Starting at 1068' MD are IFR Corrected

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
148.00	0.70	248.34	148.00	0.33 S	0.84 W	0.33	0.47
230.00	0.96	250.82	229.99	0.75 S	1.96 W	0.74	0.31
326.00	0.90	254.35	325.98	1.21 S	3.44 W	1.21	0.09
415.00	0.97	261.84	414.96	1.51 S	4.85 W	1.50	0.16
539.00	0.56	262.43	538.95	1.73 S	6.48 W	1.73	0.33
633.00	0.40	224.94	632.95	2.03 S	7.17 W	2.02	0.36
726.00	0.44	218.04	725.95	2.54 S	7.62 W	2.53	0.07
819.00	0.57	231.12	818.94	3.11 S	8.20 W	3.10	0.18
874.00	0.39	247.45	873.94	3.35 S	8.58 W	3.34	0.40
1068.00	0.44	306.20	1067.94	3.17 S	9.80 W	3.16	0.21
1160.00	0.53	315.57	1159.93	2.66 S	10.39 W	2.65	0.13
1344.00	0.62	321.70	1343.92	1.27 S	11.60 W	1.25	0.06
1435.00	0.68	330.11	1434.92	0.41 S	12.17 W	0.40	0.12
1526.00	0.89	332.68	1525.91	0.68 N	12.77 W	-0.70	0.23
1618.00	0.50	42.49	1617.90	1.61 N	12.82 W	-1.63	0.93
1710.00	0.43	74.61	1709.90	2.00 N	12.22 W	-2.02	0.29
1801.00	0.38	24.71	1800.90	2.36 N	11.76 W	-2.38	0.38
1893.00	0.33	29.81	1892.90	2.87 N	11.50 W	-2.89	0.06
1988.00	0.58	20.52	1987.89	3.56 N	11.20 W	-3.57	0.27
2083.00	0.71	12.36	2082.89	4.58 N	10.90 W	-4.60	0.17
2368.00	1.11	350.53	2367.85	9.03 N	10.98 W	-9.05	0.18
2463.00	1.08	349.07	2462.84	10.82 N	11.30 W	-10.83	0.04
2558.00	0.69	343.86	2557.82	12.25 N	11.63 W	-12.26	0.42
2653.00	0.94	333.27	2652.81	13.49 N	12.14 W	-13.51	0.31
2749.00	0.68	351.01	2748.80	14.76 N	12.58 W	-14.77	0.37
2844.00	0.89	358.94	2843.80	16.05 N	12.69 W	-16.07	0.25
3034.00	0.44	14.89	3033.78	18.23 N	12.53 W	-18.25	0.25
3129.00	0.96	45.44	3128.78	19.15 N	11.86 W	-19.16	0.66
3224.00	2.51	33.48	3223.73	21.44 N	10.15 W	-21.45	1.67
3319.00	4.04	28.45	3318.57	26.12 N	7.41 W	-26.13	1.64
3414.00	5.06	27.31	3413.27	32.78 N	3.89 W	-32.79	1.08
3509.00	5.03	22.19	3507.90	40.36 N	0.40 W	-40.36	0.47
3605.00	4.26	20.40	3603.59	47.60 N	2.44 E	-47.60	0.82
3700.00	5.53	20.73	3698.24	55.19 N	5.29 E	-55.18	1.34
3795.00	6.87	25.31	3792.68	64.61 N	9.34 E	-64.59	1.50
3890.00	8.17	27.20	3886.86	75.75 N	14.85 E	-75.73	1.39
3985.00	9.94	25.74	3980.68	89.14 N	21.50 E	-89.11	1.88
4080.00	9.43	25.29	4074.32	103.56 N	28.38 E	-103.52	0.54
4175.00	8.69	24.03	4168.14	117.15 N	34.63 E	-117.11	0.81
4270.00	8.85	25.36	4262.02	130.31 N	40.68 E	-130.26	0.27
4366.00	10.08	24.71	4356.72	144.61 N	47.36 E	-144.56	1.29
4461.00	9.15	20.81	4450.38	159.23 N	53.52 E	-159.16	1.19
4556.00	10.38	26.04	4544.00	173.98 N	59.96 E	-173.91	1.60
4651.00	10.38	24.32	4637.45	189.47 N	67.24 E	-189.39	0.33
4746.00	9.37	23.62	4731.04	204.35 N	73.86 E	-204.26	1.07
4841.00	10.17	28.88	4824.67	218.78 N	81.01 E	-218.68	1.26
4936.00	8.96	32.83	4918.34	232.34 N	89.07 E	-232.23	1.45
5032.00	8.29	32.14	5013.26	244.49 N	96.81 E	-244.37	0.71
5127.00	7.54	32.31	5107.35	255.55 N	103.78 E	-255.43	0.79
5222.00	6.36	31.10	5201.65	265.33 N	109.83 E	-265.19	1.25
5317.00	5.73	28.59	5296.12	274.00 N	114.82 E	-273.86	0.72
5412.00	5.50	27.57	5390.67	282.20 N	119.20 E	-282.05	0.26
5507.00	3.08	18.78	5485.40	288.65 N	122.13 E	-288.50	2.63
5603.00	0.52	12.60	5581.34	291.52 N	123.05 E	-291.37	2.67
5983.00	1.22	13.25	5961.29	297.14 N	124.36 E	-296.98	0.18
6078.00	1.42	12.86	6056.27	299.27 N	124.85 E	-299.12	0.21
6173.00	0.26	152.97	6151.26	300.22 N	125.21 E	-300.07	1.71
6268.00	0.45	179.03	6246.26	299.66 N	125.31 E	-299.51	0.26
6364.00	0.24	153.01	6342.26	299.10 N	125.41 E	-298.95	0.27

6459.00	0.35	156.79	6437.26	298.66 N	125.62 E	-298.51	0.12
6507.00	0.21	114.23	6485.25	298.49 N	125.75 E	-298.33	0.50
6554.00	2.27	168.05	6532.24	297.54 N	126.03 E	-297.39	4.58
6602.00	6.66	177.78	6580.08	293.83 N	126.33 E	-293.67	9.25
6649.00	10.60	181.96	6626.54	286.78 N	126.29 E	-286.63	8.48
6697.00	13.74	181.83	6673.46	276.67 N	125.96 E	-276.52	6.54
6744.00	18.12	180.93	6718.64	263.78 N	125.66 E	-263.62	9.33
6792.00	22.58	182.22	6763.64	247.10 N	125.18 E	-246.94	9.34
6839.00	27.10	182.29	6806.28	227.37 N	124.40 E	-227.22	9.62
6887.00	31.45	181.57	6848.14	203.92 N	123.62 E	-203.77	9.09
6934.00	36.51	178.96	6887.10	177.67 N	123.54 E	-177.52	11.20
6982.00	41.82	180.98	6924.30	147.37 N	123.52 E	-147.22	11.38
7029.00	46.43	182.63	6958.03	114.67 N	122.48 E	-114.52	10.11
7077.00	51.74	183.05	6989.46	78.46 N	120.67 E	-78.31	11.08
7124.00	57.57	182.82	7016.64	40.19 N	118.71 E	-40.04	12.41
7172.00	61.62	182.21	7040.93	1.16 S	116.90 E	1.31	8.51
7219.00	65.13	181.35	7061.99	43.15 S	115.60 E	43.29	7.65
7267.00	68.47	179.72	7080.89	87.26 S	115.20 E	87.40	7.63
7314.00	72.47	179.44	7096.60	131.55 S	115.52 E	131.69	8.53
7362.00	75.59	179.58	7109.81	177.69 S	115.92 E	177.83	6.51
7409.00	78.65	178.88	7120.28	223.49 S	116.54 E	223.64	6.67
7452.00	82.95	178.36	7127.16	265.92 S	117.56 E	266.06	10.07
7496.00	86.33	179.84	7131.27	309.71 S	118.25 E	309.86	8.38
7630.00	90.59	179.69	7134.87	443.63 S	118.79 E	443.78	3.18
7726.00	91.42	179.50	7133.18	539.61 S	119.47 E	539.76	0.89
7821.00	90.96	178.77	7131.21	634.58 S	120.91 E	634.73	0.91
8011.00	91.60	178.57	7126.97	824.48 S	125.32 E	824.64	0.35
8106.00	90.71	179.06	7125.05	919.44 S	127.28 E	919.60	1.07
8201.00	89.72	178.97	7124.69	1014.43 S	128.91 E	1014.58	1.05
8296.00	89.17	180.12	7125.61	1109.42 S	129.67 E	1109.57	1.34
8391.00	88.33	181.18	7127.68	1204.39 S	128.59 E	1204.54	1.43
8486.00	89.29	180.73	7129.65	1299.35 S	127.01 E	1299.51	1.12
8581.00	90.00	180.13	7130.24	1394.35 S	126.30 E	1394.50	0.98
8676.00	90.18	181.54	7130.09	1489.33 S	124.91 E	1489.48	1.50
8772.00	90.99	180.98	7129.11	1585.30 S	122.80 E	1585.45	1.03
8867.00	89.60	180.71	7128.63	1680.29 S	121.40 E	1680.44	1.49
8962.00	91.14	180.70	7128.01	1775.28 S	120.23 E	1775.42	1.62
9057.00	90.22	180.62	7126.88	1870.26 S	119.14 E	1870.41	0.97
9152.00	90.74	180.29	7126.09	1965.26 S	118.38 E	1965.40	0.65
9345.00	90.83	179.95	7123.44	2158.24 S	117.98 E	2158.38	0.18
9438.00	89.57	179.62	7123.12	2251.23 S	118.33 E	2251.38	1.40
9533.00	89.88	180.12	7123.58	2346.23 S	118.54 E	2346.38	0.62
9628.00	89.38	179.44	7124.19	2441.23 S	118.91 E	2441.37	0.89
9723.00	89.72	179.09	7124.94	2536.22 S	120.13 E	2536.36	0.51
9818.00	89.20	179.41	7125.83	2631.21 S	121.37 E	2631.35	0.64
9913.00	89.54	179.29	7126.88	2726.19 S	122.45 E	2726.34	0.38
10009.00	89.88	178.66	7127.36	2822.18 S	124.16 E	2822.33	0.75
10104.00	89.72	179.49	7127.69	2917.16 S	125.70 E	2917.31	0.89
10199.00	89.72	179.79	7128.16	3012.16 S	126.29 E	3012.31	0.32
10294.00	89.29	180.45	7128.98	3107.15 S	126.10 E	3107.31	0.83
10389.00	88.15	181.17	7131.10	3202.12 S	124.75 E	3202.27	1.42
10484.00	88.61	180.63	7133.79	3297.07 S	123.26 E	3297.22	0.75
10579.00	89.69	179.82	7135.20	3392.06 S	122.89 E	3392.20	1.42
10674.00	89.54	180.47	7135.83	3487.05 S	122.65 E	3487.20	0.70
10770.00	90.59	179.93	7135.72	3583.05 S	122.31 E	3583.20	1.23
10865.00	90.40	180.41	7134.90	3678.05 S	122.03 E	3678.19	0.54
10960.00	91.26	179.97	7133.53	3773.03 S	121.72 E	3773.18	1.02
11055.00	90.18	180.59	7132.33	3868.02 S	121.25 E	3868.17	1.31
11150.00	90.37	180.18	7131.88	3963.02 S	120.61 E	3963.16	0.48
11245.00	91.17	179.71	7130.60	4058.01 S	120.71 E	4058.16	0.98
11340.00	90.59	181.11	7129.14	4152.99 S	120.03 E	4153.14	1.59
11435.00	90.68	181.11	7128.09	4247.97 S	118.19 E	4248.11	0.09
11530.00	91.57	180.21	7126.22	4342.94 S	117.09 E	4343.08	1.33
11625.00	90.96	179.70	7124.13	4437.92 S	117.17 E	4438.06	0.84
11721.00	88.92	179.24	7124.23	4533.91 S	118.05 E	4534.05	2.18
11816.00	89.26	178.89	7125.74	4628.89 S	119.60 E	4629.03	0.51
11911.00	89.75	178.67	7126.56	4723.86 S	121.63 E	4724.01	0.57
12006.00	90.74	178.58	7126.15	4818.83 S	123.91 E	4818.98	1.05
12101.00	90.68	178.54	7124.97	4913.79 S	126.29 E	4913.94	0.08
12156.00	90.96	178.37	7124.19	4968.77 S	127.78 E	4968.92	0.60
12202.00	90.96	178.37	7123.42	5014.74 S	129.08 E	5014.90	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 179.93 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.60 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12202.00 FEET
IS 5016.40 FEET ALONG 178.53 DEGREES (TRUE)**

**Tie In to Surface
Final Survey is a Straightline Projection to Bit**

Date Printed:24 September 2013