

PCGK - Pressure Case Gamma

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	13-May-14	19-May-14			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,253.00	7,369.00			
Log End Depth (MD, ft)	7,369.00	16,602.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	10-May-14 03:30	14-May-14 21:45			
Drill/Wipe End Date and Time	12-May-14 18:00	19-May-14 00:03			
Min Inc (deg) @ Depth (MD, ft)	0.18 @ 2,789.00	90.03 @ 7,369.00			
Max Inc (deg) @ Depth (MD, ft)	85.03 @ 7,292.00	90.03 @ 7,369.00			
Bit TFA(in2) / Bit Type	2.23 / PDC	1.86 / PDC			
Flow Rate (gpm)	598.30	279.49			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Mineral Oil Bas			
Density (ppg) / Viscosity (spqt)	9.70 / 60.00	9.90 / 58.00			
Filtrate CL (ppm)	900.00	279,856.00			
pH / Fluid Loss (mptm)	9.30 / 0	N/A / 2.1			
PV (cP) / YP (lbf2)	13 / 19.00	17 / 11.00			
% Solids / % Sand	10.20 / 0.10	14.00 / 0.10			
% Oil / Oil:Water Ratio	N/A / N/A	63.00 / 73:27			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	100.00 / PCM	222.0 / PCM			

Max Tool Temp (degF) / Source	162.80 / PCM	239.0 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 162.80	N/A @ 239.00			
Lead MWD Engineer	Clay Wass	Caleb Jones			
Customer Representative	Scott Hancock	Scott Hancock			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.84	5.76			
Sub Serial Number	11342293	12310740			
Insert Serial Number	10997273	10997273			
Date and Time Initialized	09-May-14 10:27	14-May-14 04:21			
Date and Time Read	13-May-14 11:39	20-May-14 06:23			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	75.47	63.83			
Software Version	6.21	6.21			
Sub Serial Number	11342293	12310740			
Sonde Serial Number	11638501	11638501			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	198.40	246.28			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	65.45	54.00			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342293	12310740			
Insert/Sonde Serial Number	11681025	11681025			

REMARKS

1. Depths are Measured Depths, referenced to Driller's pipe tally, and measured from the rig floor.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the Power Law model for water based fluids and the Bingham Plastic model for oil based fluids.
4. All data presented is recorded 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

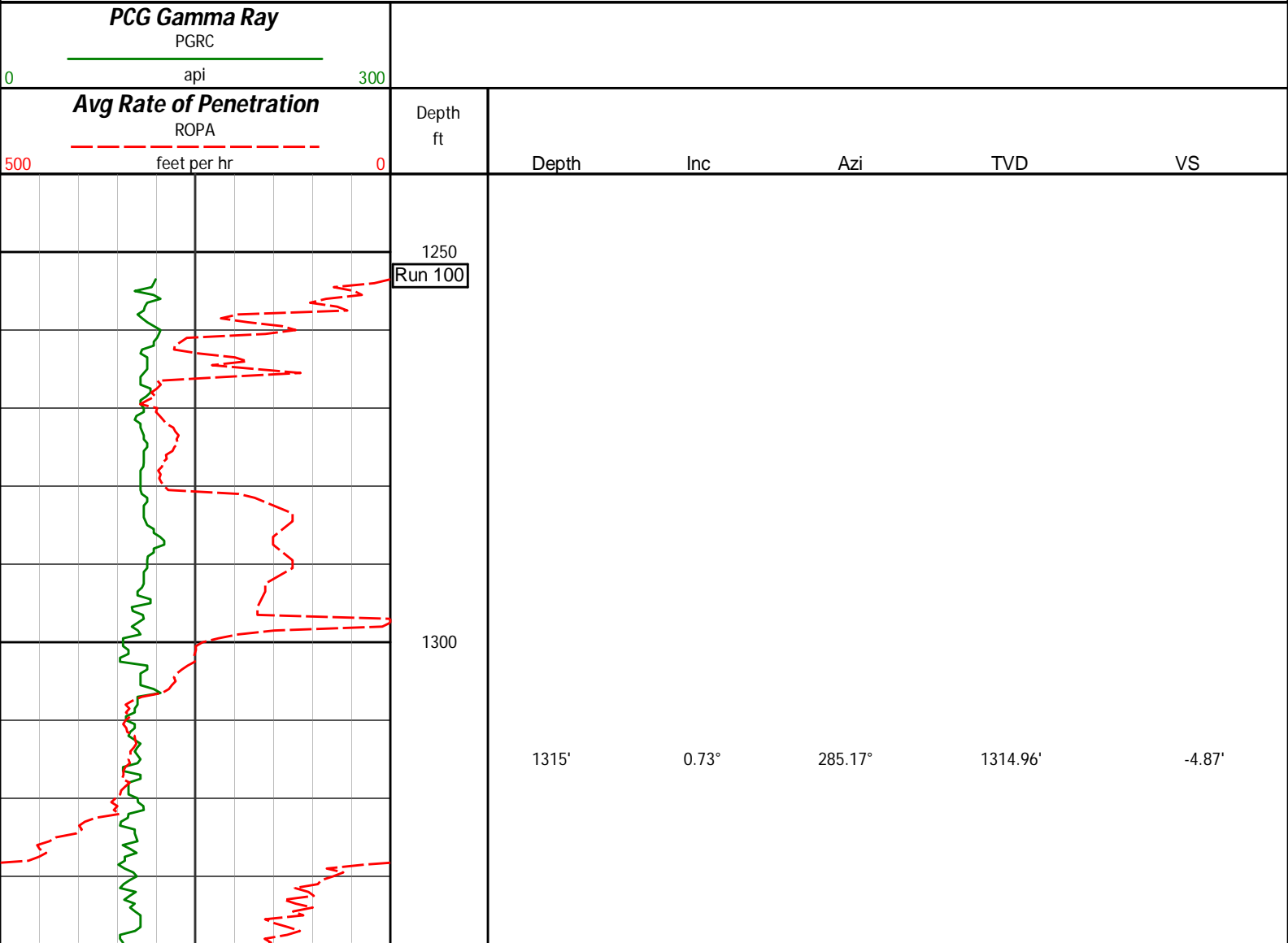
ROPA (Average Rate of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

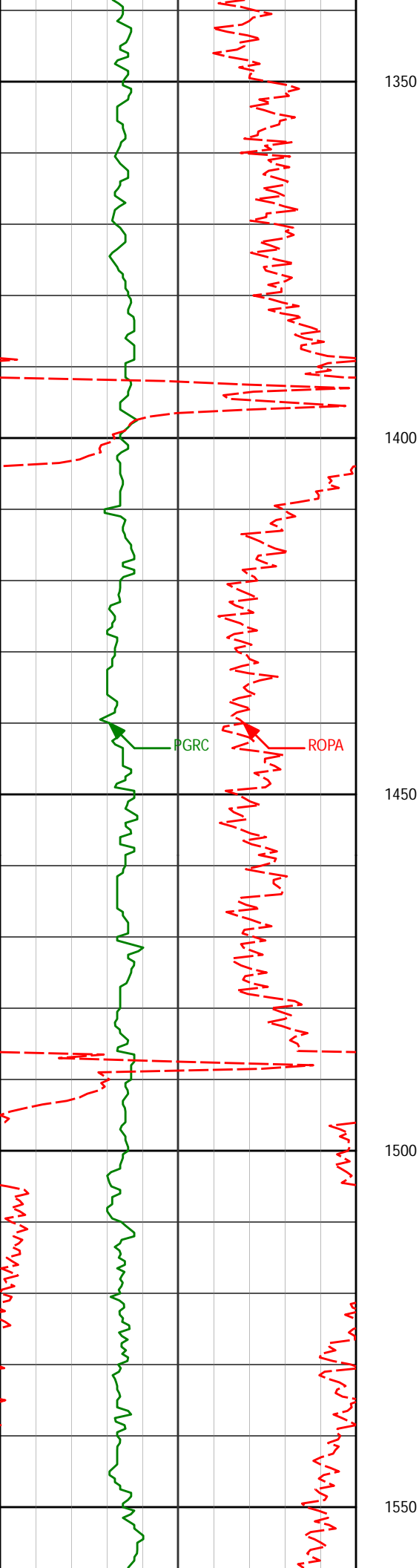
WARRANTY

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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Anadarko PC
Sekich State 16N-17HZ
Xtreme 22
Sec. 18-T3N-R67W





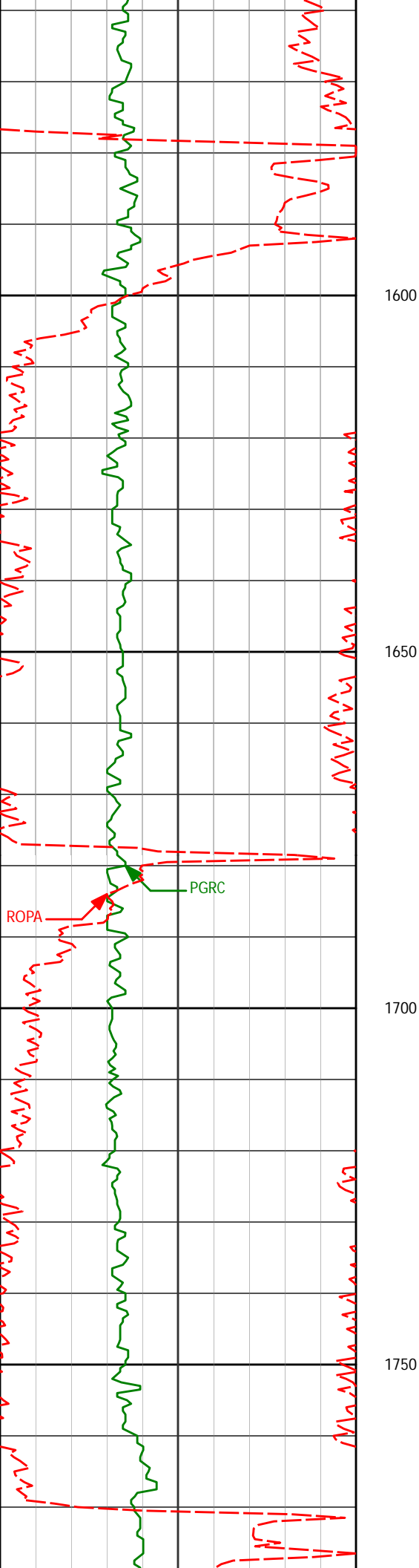
1505'

0.60°

287.36°

1504.94'

-6.99'



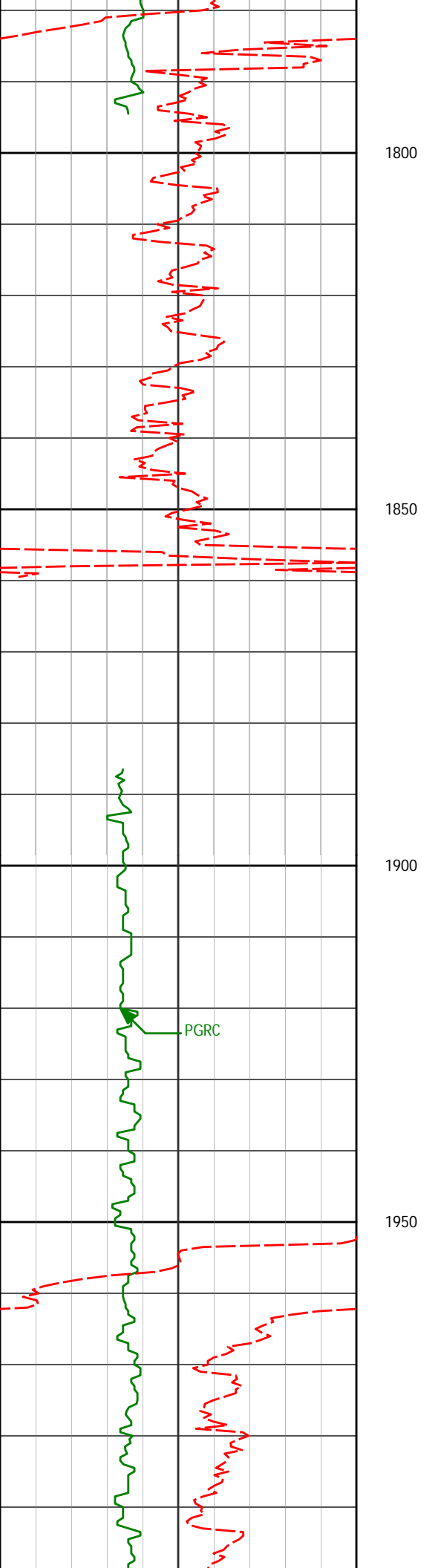
1693'

1.10°

165.41°

1692.93'

-7.47'



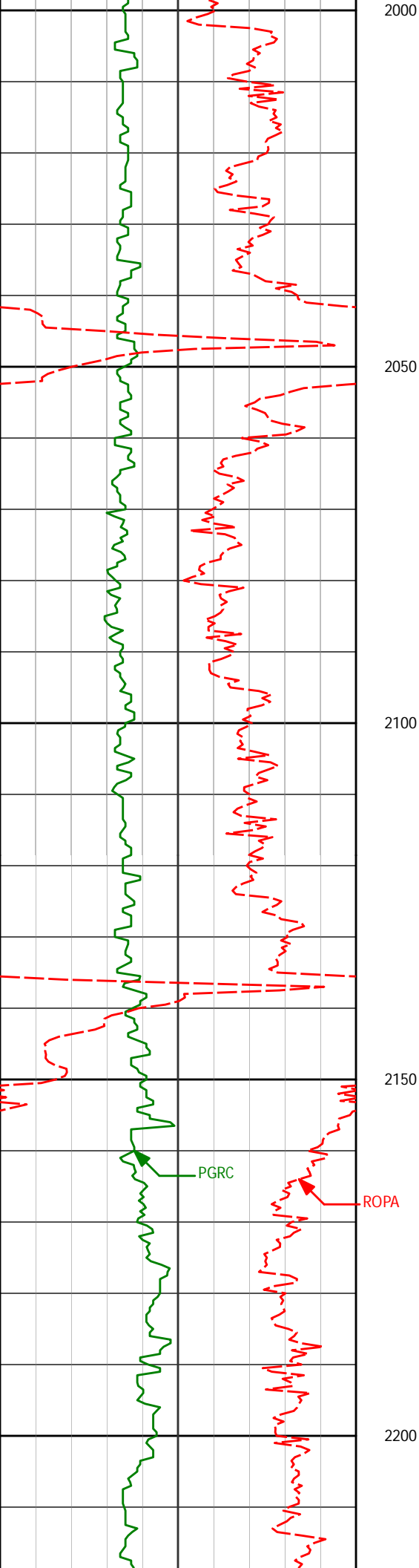
1876'

0.84°

21.22°

1875.92'

-6.53'



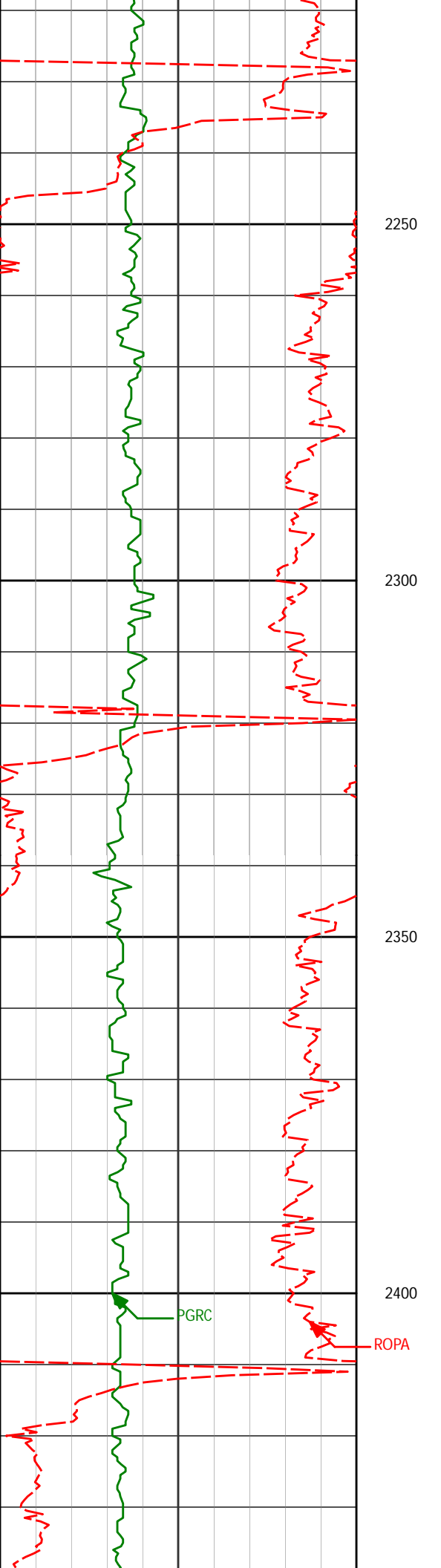
2059'

1.10°

346.59°

2058.90'

-6.47'



2241'

0.53°

286.56°

2240.88'

-7.70'

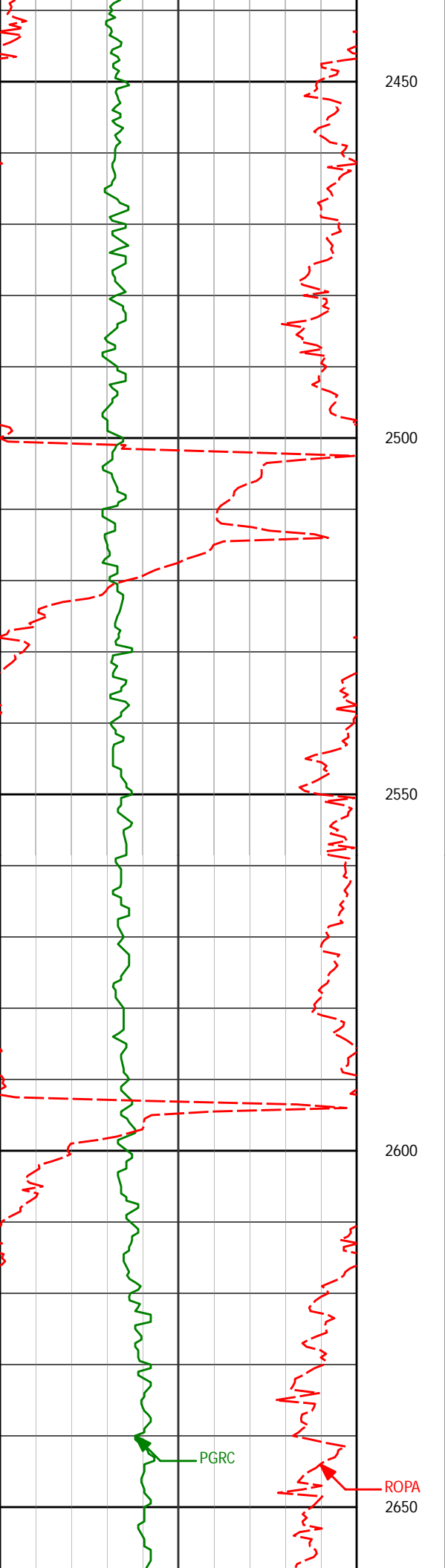
2424'

1.08°

268.59°

2423.86'

-10.23'



2607'

0.38°

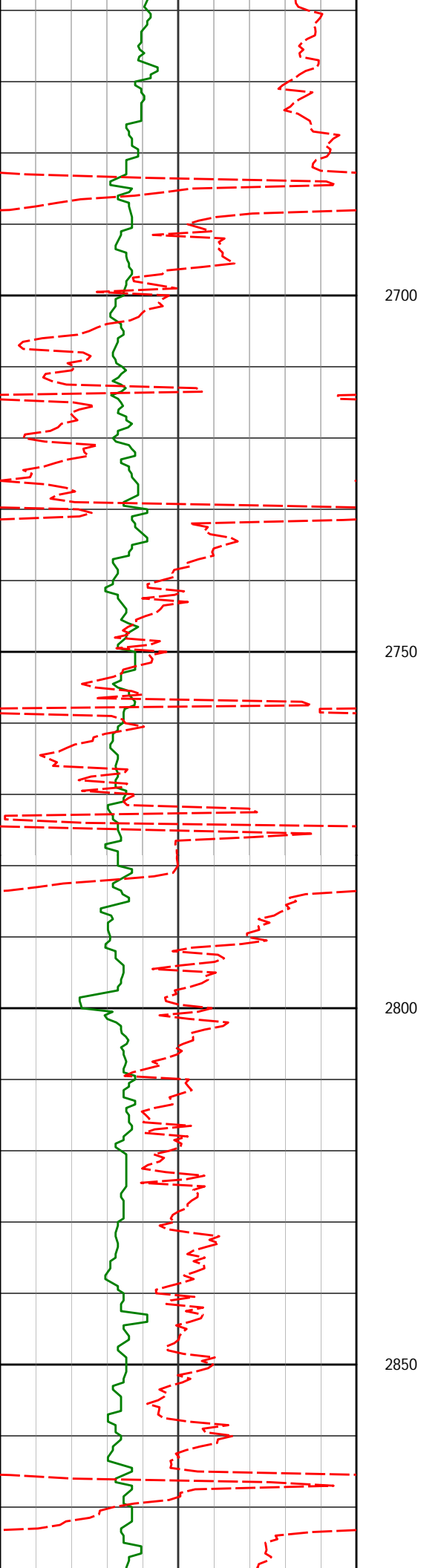
131.44°

2606.85'

-11.50'

PGRC

ROPA
2650



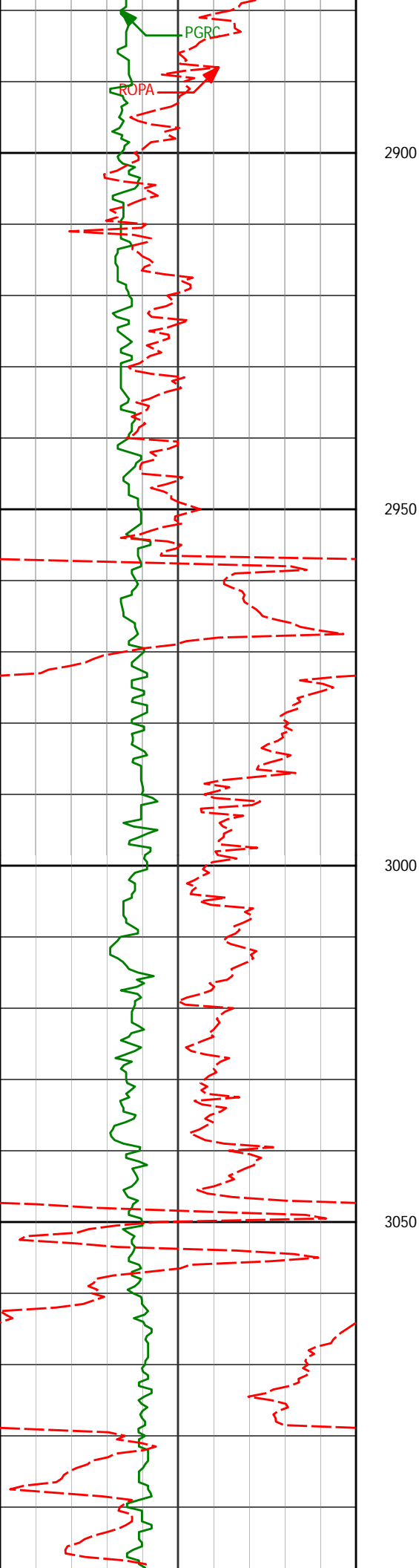
2789'

0.18°

339.12°

2788.85'

-11.15'



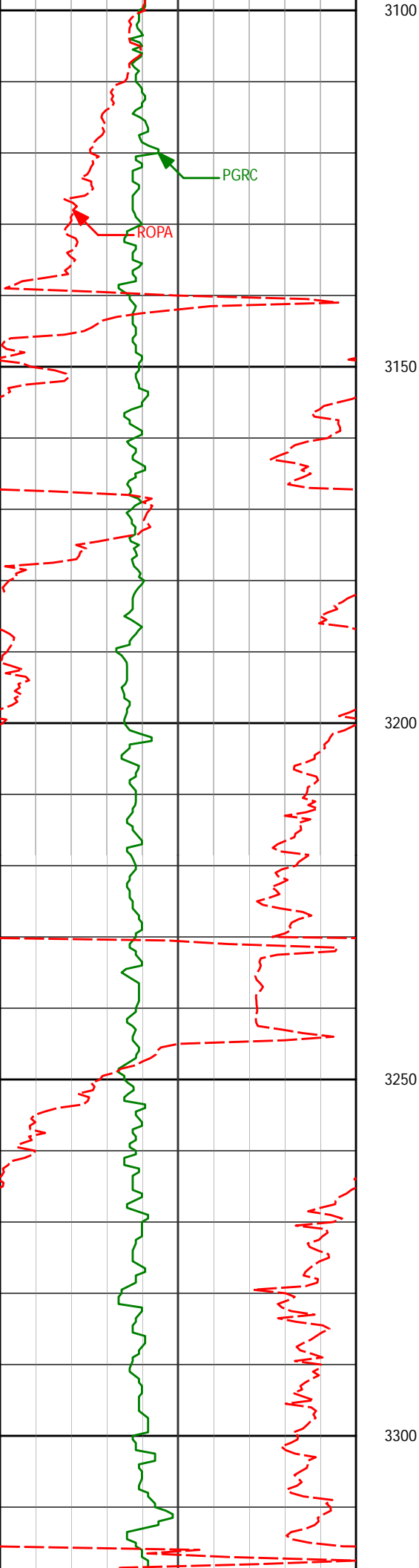
2971'

0.46°

42.07°

2970.85'

-10.76'



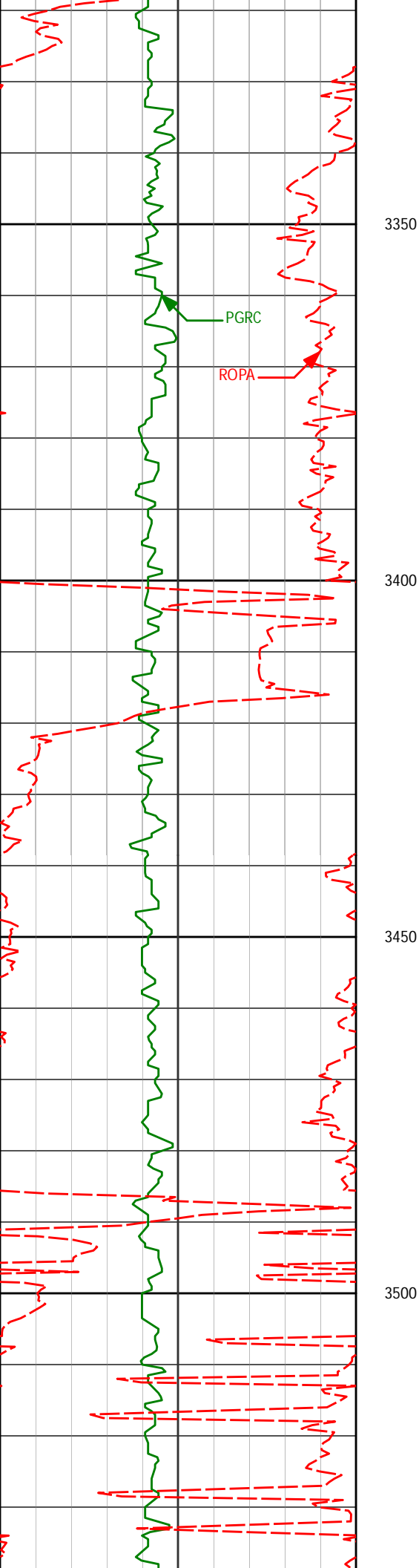
3154'

0.48°

6.68°

3153.84'

-10.19'



3325'

1.91°

139.03°

3324.81'

-8.23'

3350

PGRC

ROPA

3400

3450

3500

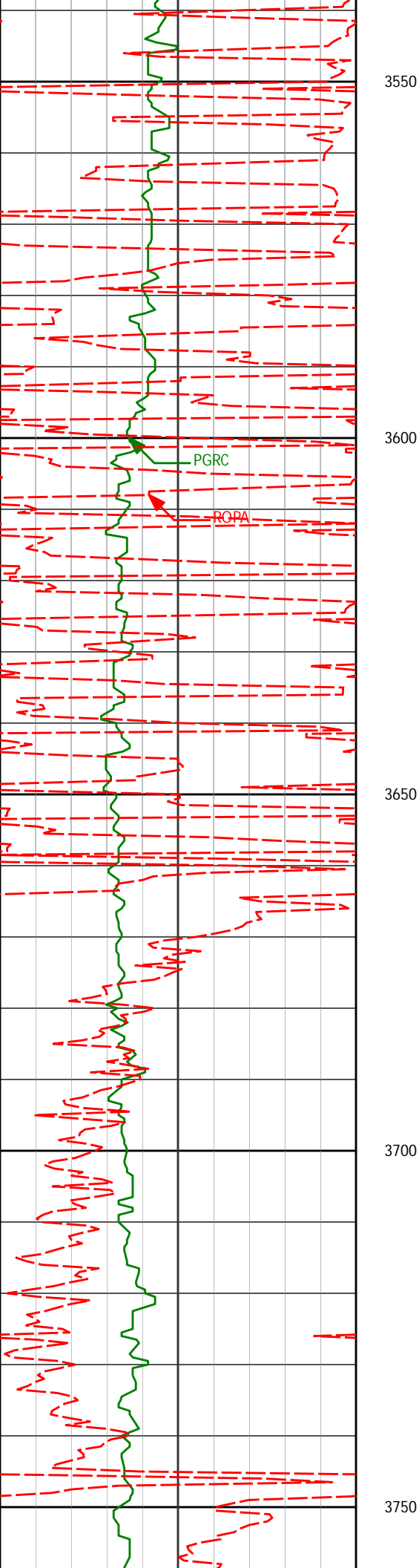
3496'

0.37°

85.37°

3495.78'

-5.80'



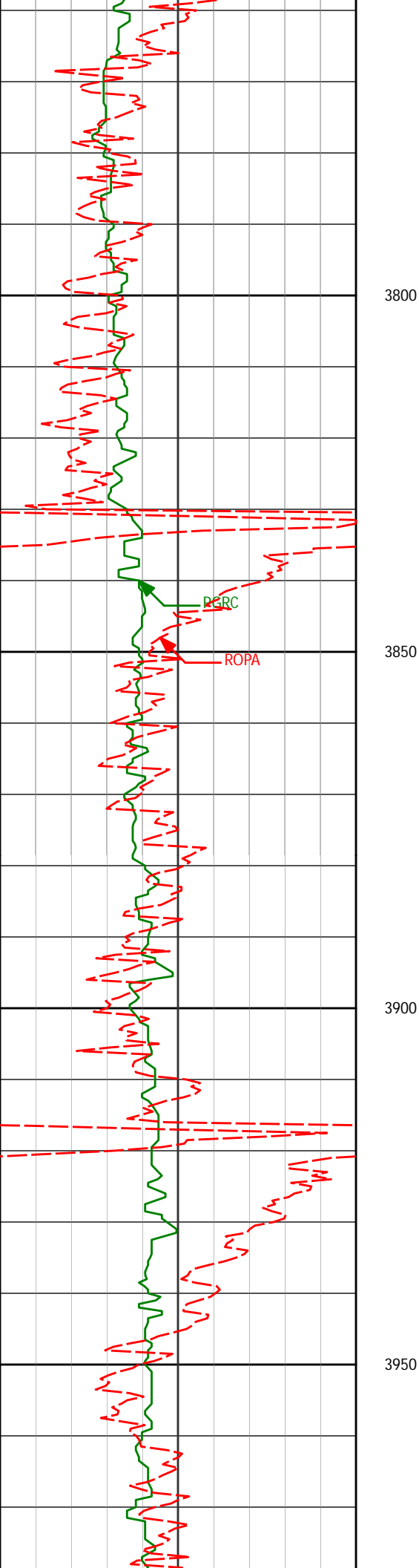
3667'

0.35°

44.20°

3666.77'

-4.89'



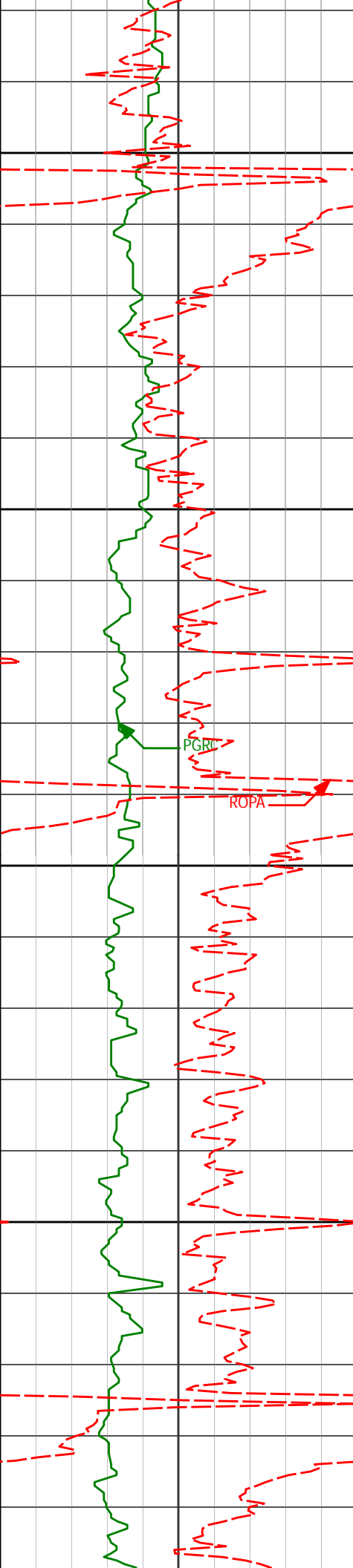
3839'

0.23°

9.77°

3838.77'

-4.47'



4000

4010'

0.28°

316.90°

4009.77'

-4.70'

4050

PGRI

ROPA

4100

4150

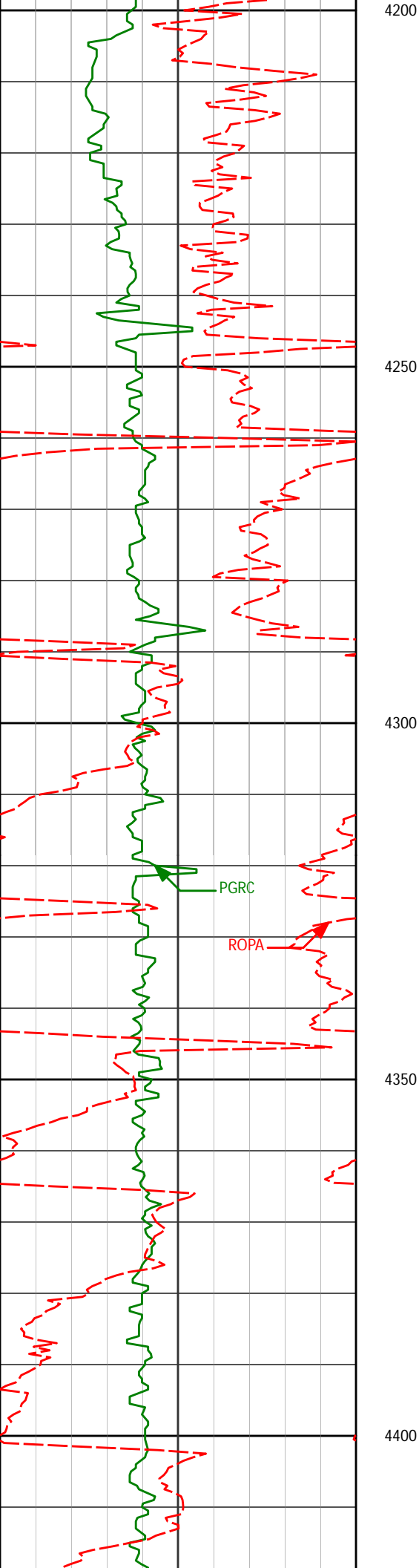
4181'

0.55°

347.23°

4180.77'

-5.17'



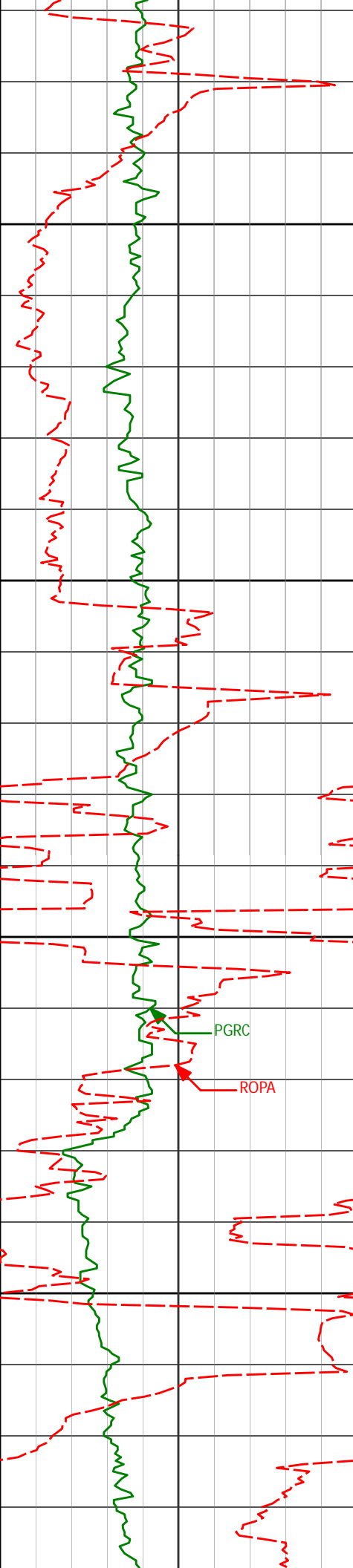
4352'

0.47°

298.35°

4351.76'

-5.98'



4450

4500

4550

4600

PGRC

ROPA

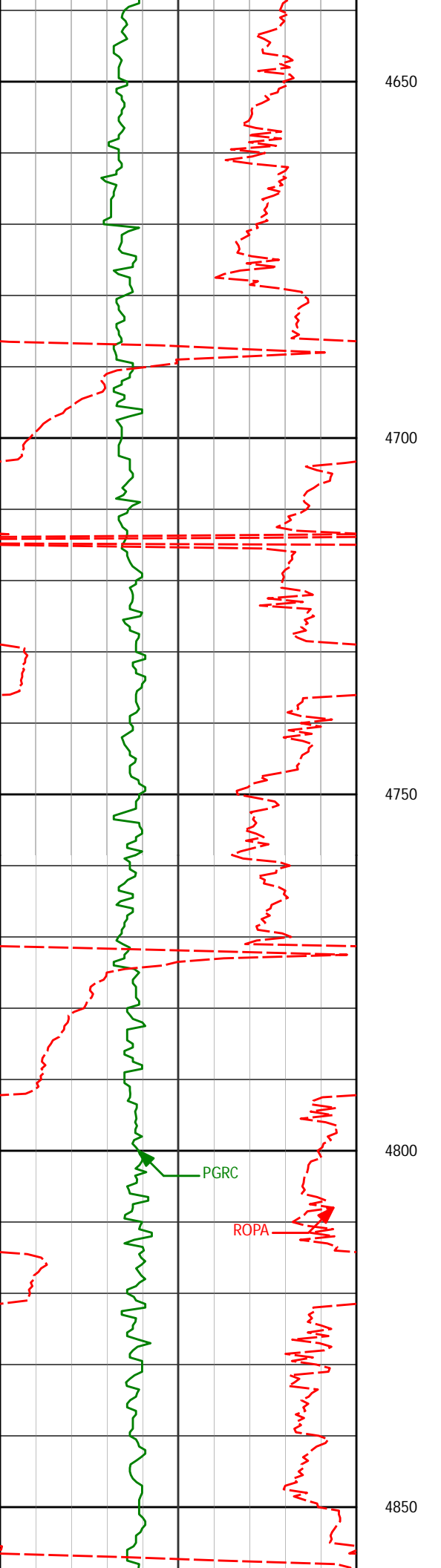
4524'

1.35°

222.05°

4523.74'

-7.95'



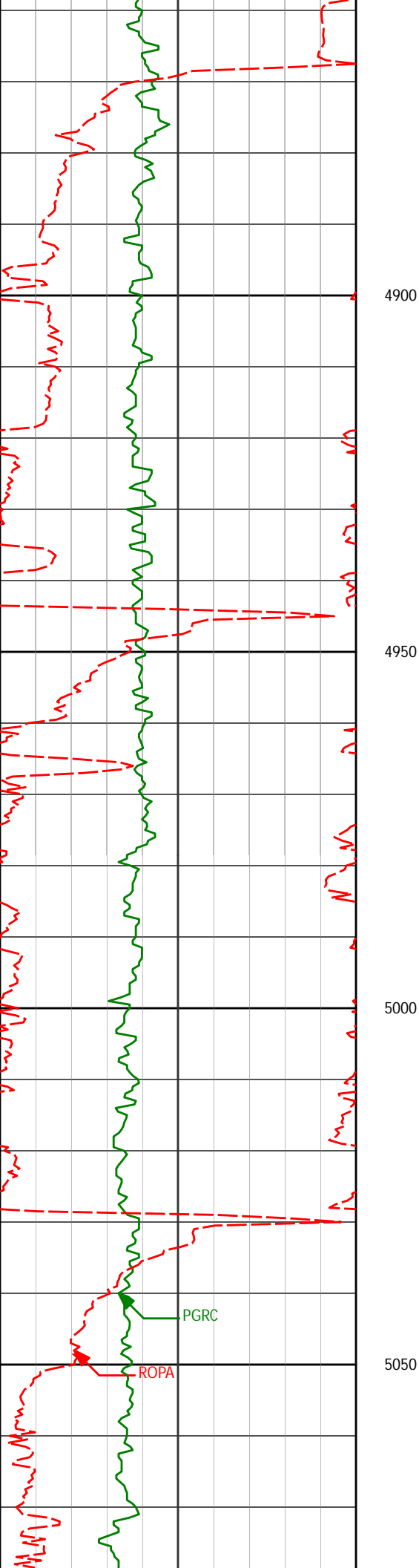
4695'

0.57°

254.33°

4694.72'

-10.10'



4866'

0.49°

341.72°

4865.71'

-11.15'

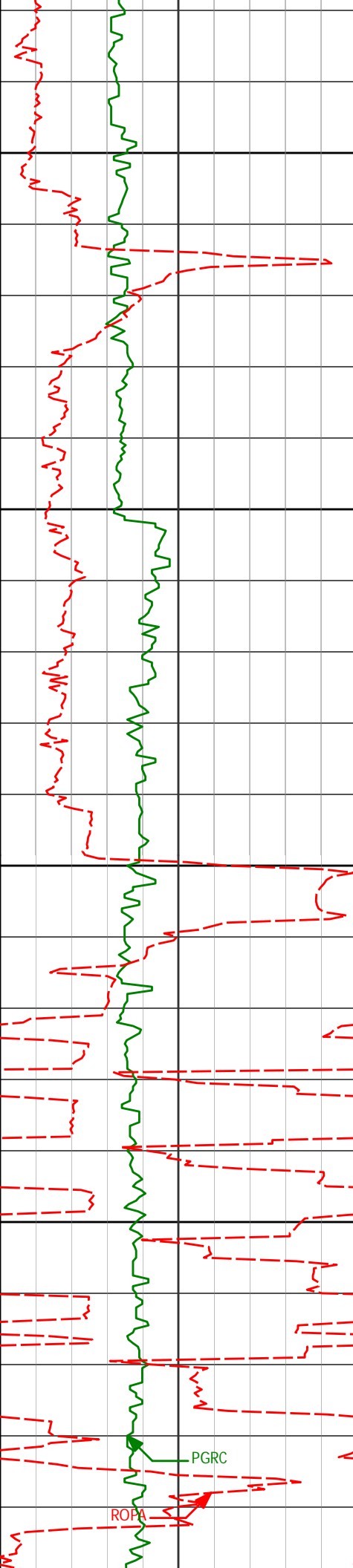
5037'

0.59°

340.75°

5036.70'

-11.68'



5100

5150

5200

5250

5209'

0.62°

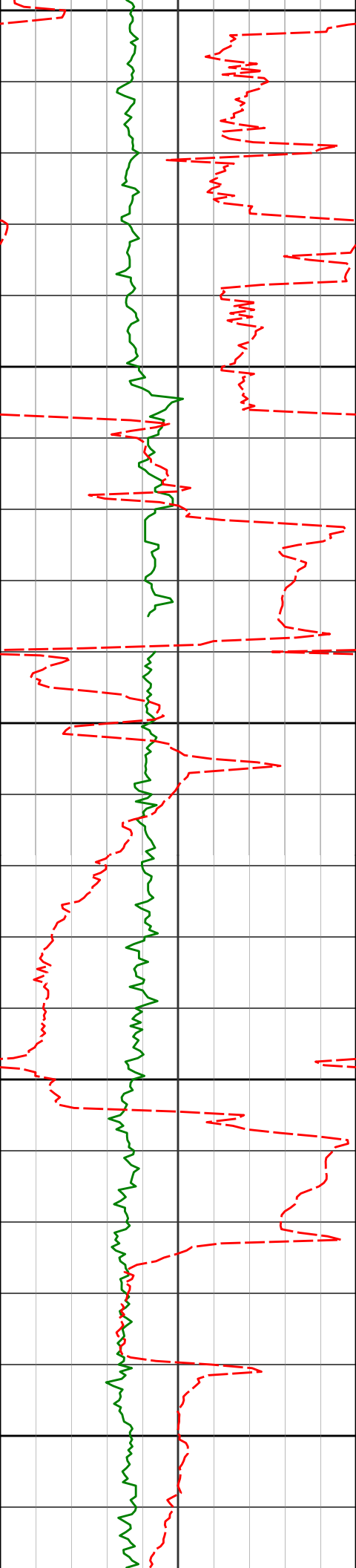
255.14°

5208.70'

-12.88'

PGRC

ROPA



5300

5350

5400

5450

5500

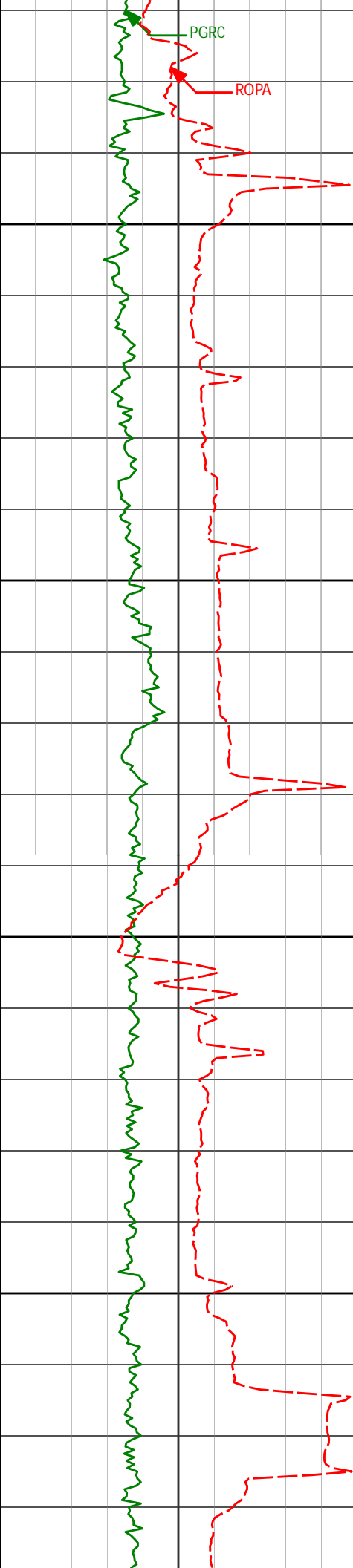
5380'

0.90°

256.27°

5379.68'

-15.07'



5550

5551'

1.91°

98.08°

5550.66'

-13.55'

5600

5650

5700

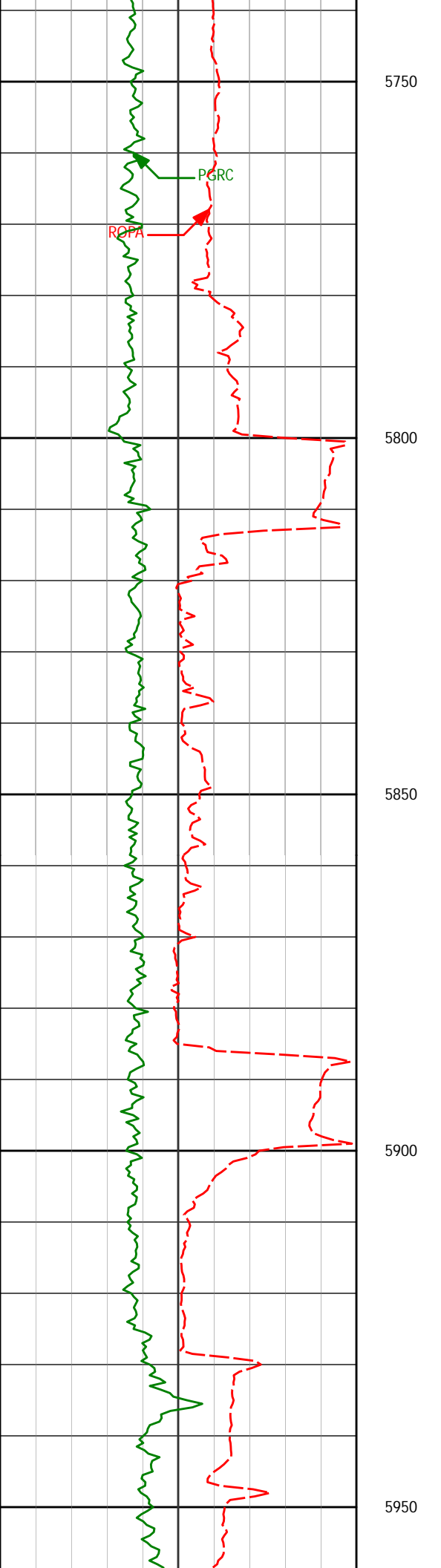
5723'

1.45°

88.61°

5722.58'

-8.54'



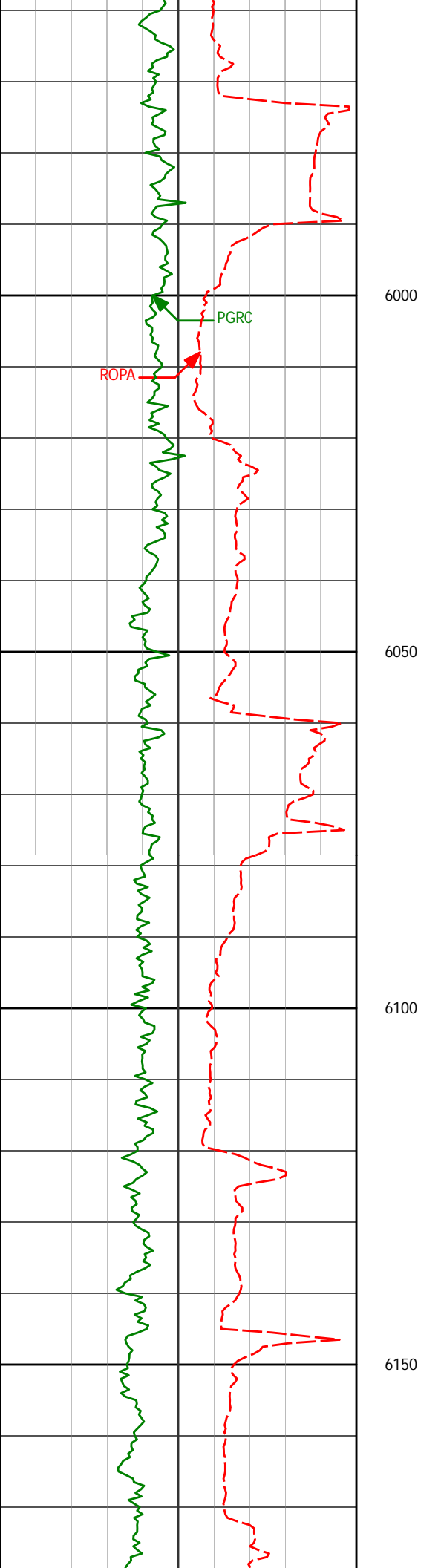
5894'

2.57°

121.81°

5893.48'

-3.10'



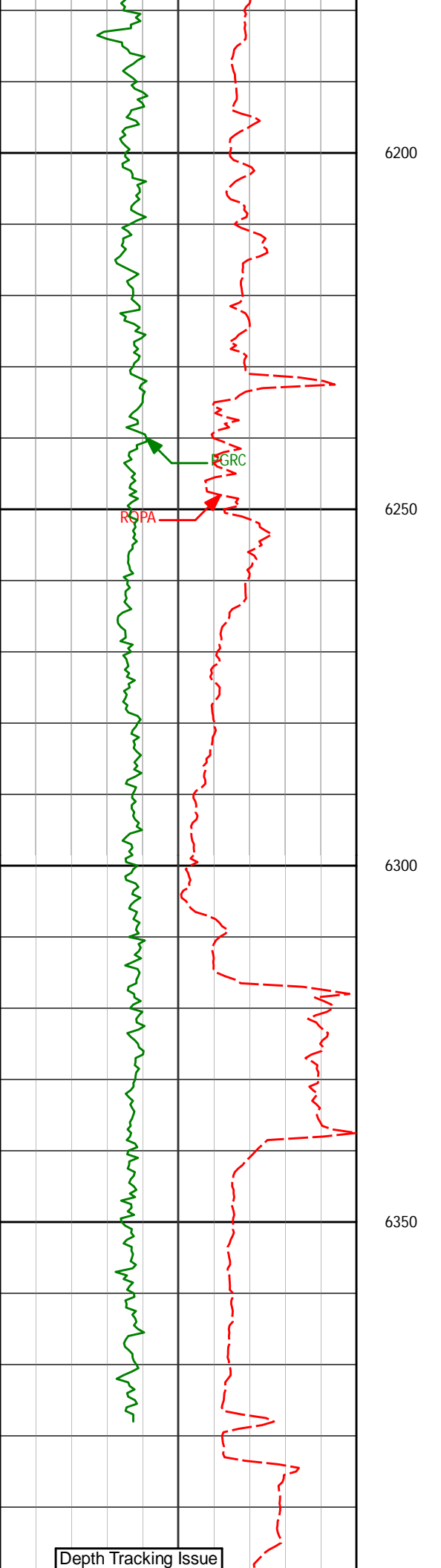
6066'

4.11°

163.20°

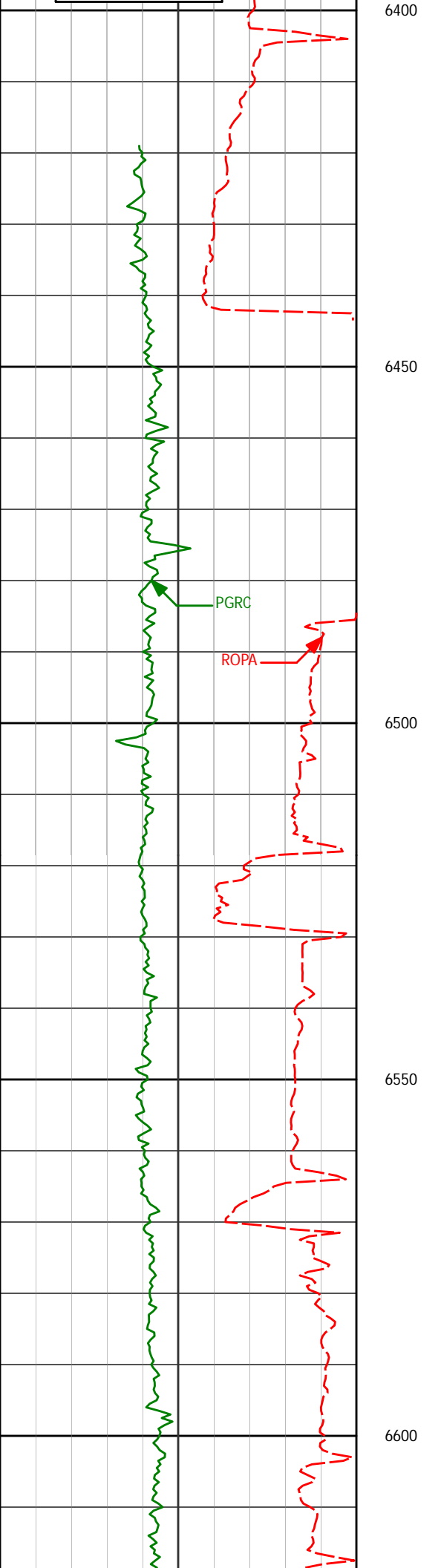
6065.21'

2.00'

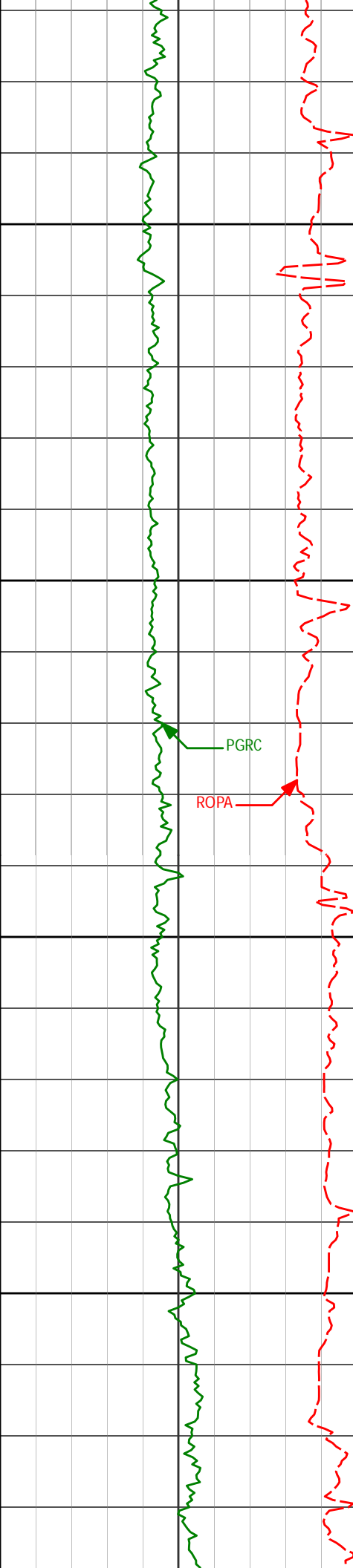


6237' 3.25° 163.10° 6235.85' 5.23'

6366' 1.02° 151.63° 6364.75' 6.87'



6400				
6409'	0.61°	167.63°	6407.75'	7.10'
6450				
6452'	1.69°	136.69°	6450.74'	7.59'
6494'	5.31°	128.71°	6492.66'	9.54'
6500				
6537'	8.46°	120.69°	6535.34'	13.83'
6550				
6580'	11.69°	115.48°	6577.67'	20.50'
6600				



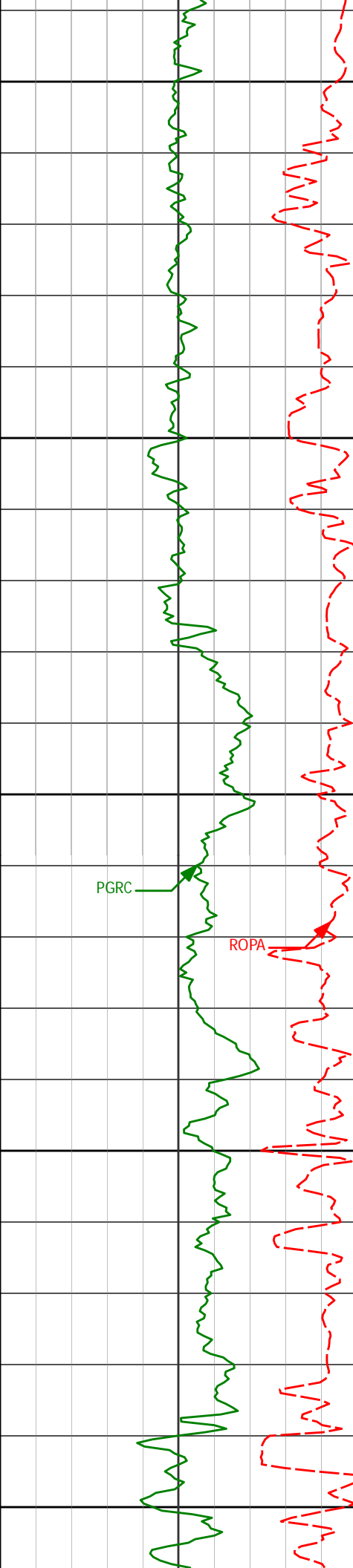
6650

6700

6750

6800

6623'	15.08°	110.13°	6619.50'	29.71'
6666'	17.78°	105.85°	6660.74'	41.30'
6709'	22.61°	105.57°	6701.09'	55.61'
6752'	27.05°	105.36°	6740.10'	73.03'
6795'	32.00°	103.98°	6777.51'	93.56'
6837'	37.13°	102.66°	6812.08'	116.77'



6850

6880'

42.65°

101.26°

6845.06'

143.77'

6900

6923'

47.21°

96.79°

6875.51'

173.77'

6950

PGRC

6966'

50.73°

93.97°

6903.73'

206.08'

ROPA

7000

7009'

55.96°

91.45°

6929.40'

240.53'

7050

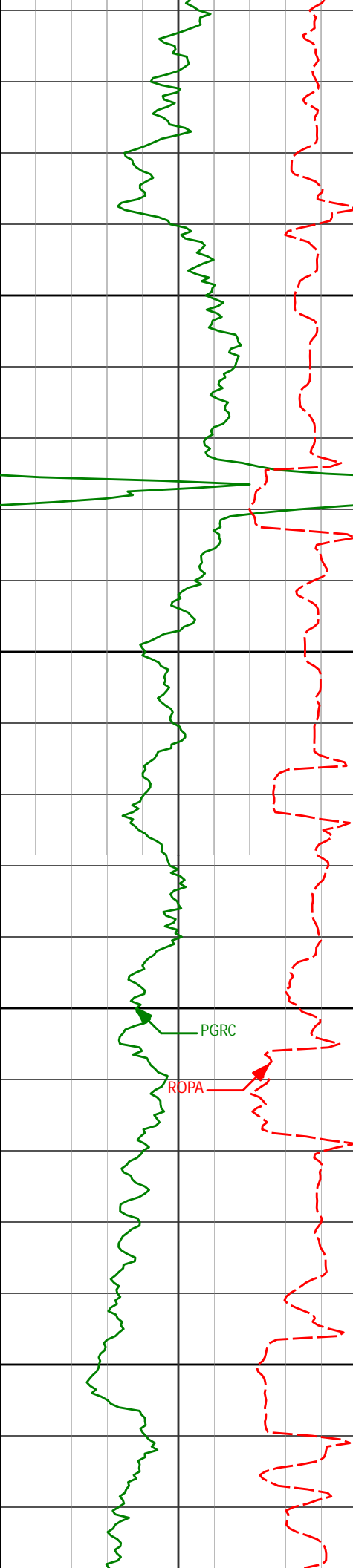
7052'

60.89°

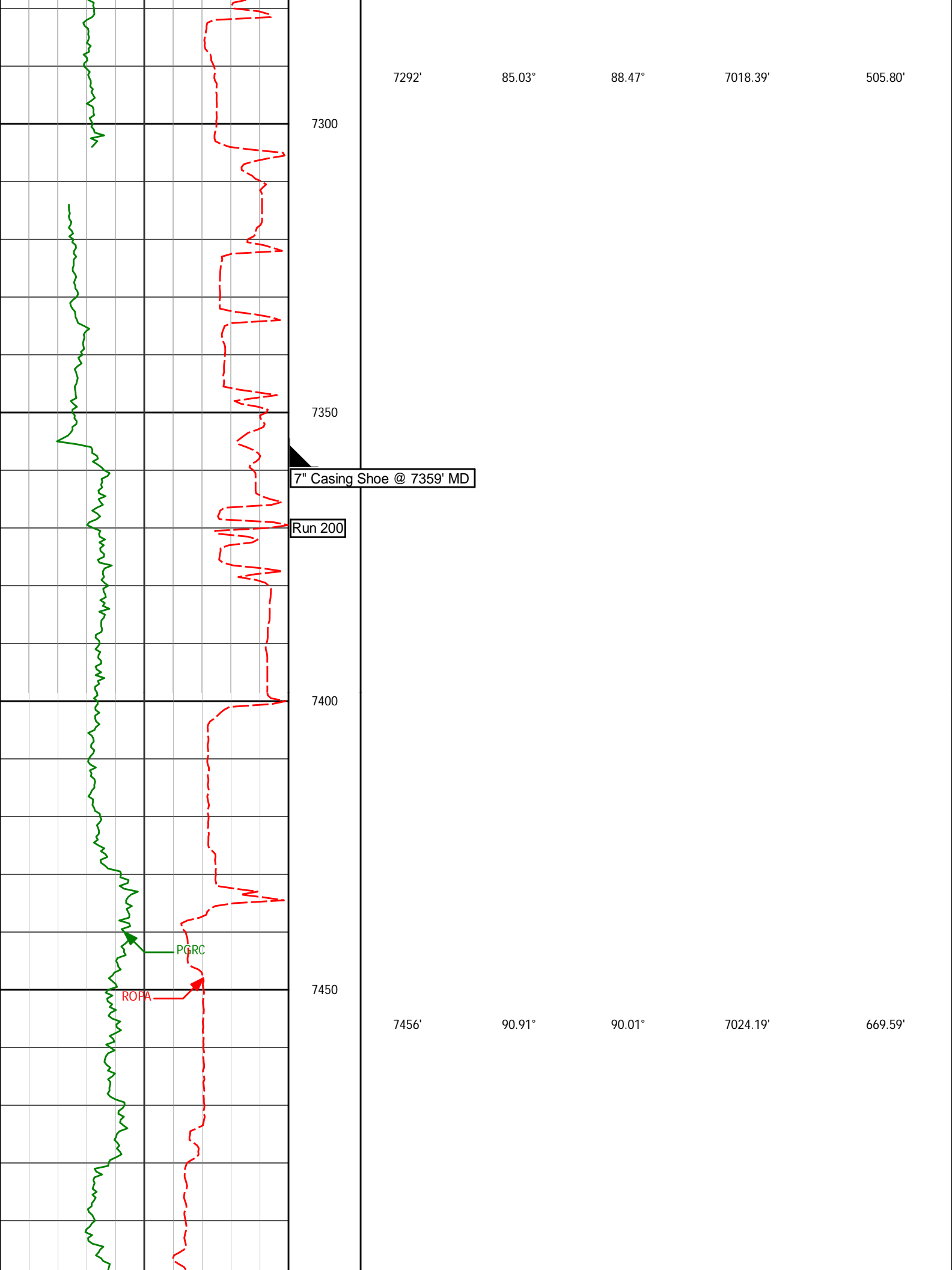
91.24°

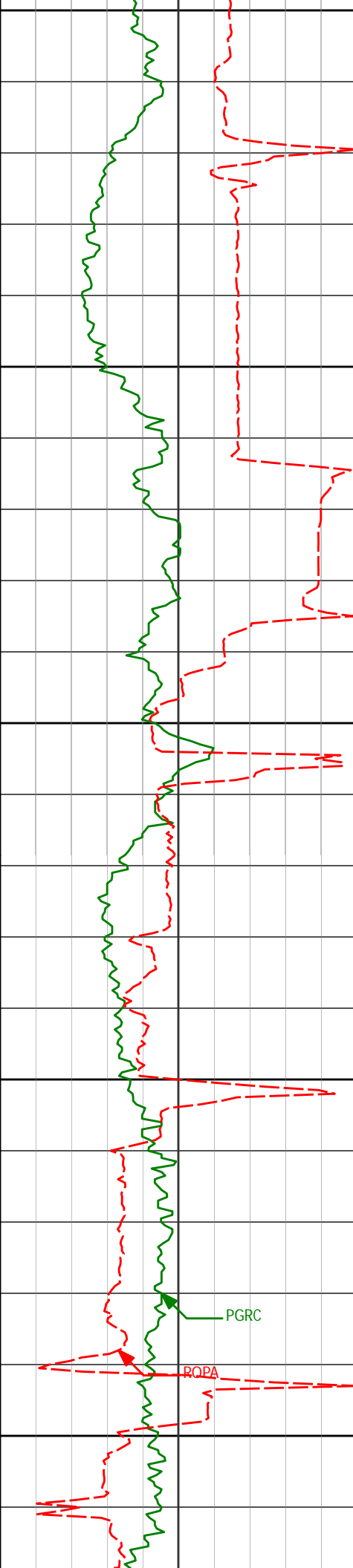
6951.91'

277.14'



7094'	65.77°	91.15°	6970.75'	314.66'
7137'	70.58°	90.30°	6986.73'	354.56'
7180'	74.99°	88.58°	6999.46'	395.62'
7223'	79.15°	88.21°	7009.08'	437.50'
7266'	83.12°	88.41°	7015.70'	479.95'





7500

7550

7600

7650

7700

7628'

89.86°

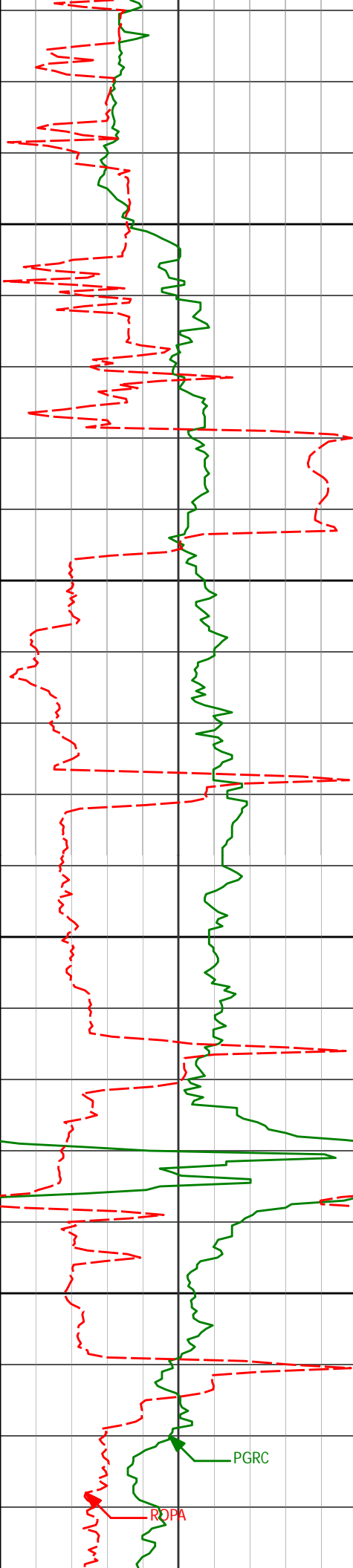
91.84°

7023.04'

841.56'

PGRC

ROPA



7750

7800

7850

7900

7799'

89.64°

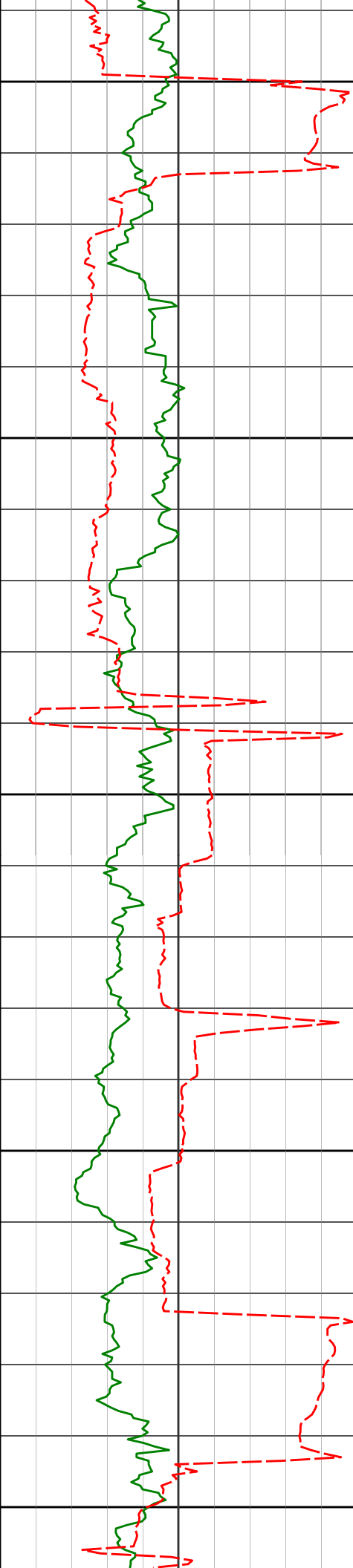
92.89°

7023.78'

1012.45'

PGRC

ROPA



7950

7971'

89.92°

92.41°

7024.44'

1184.30'

8000

8050

8100

8150

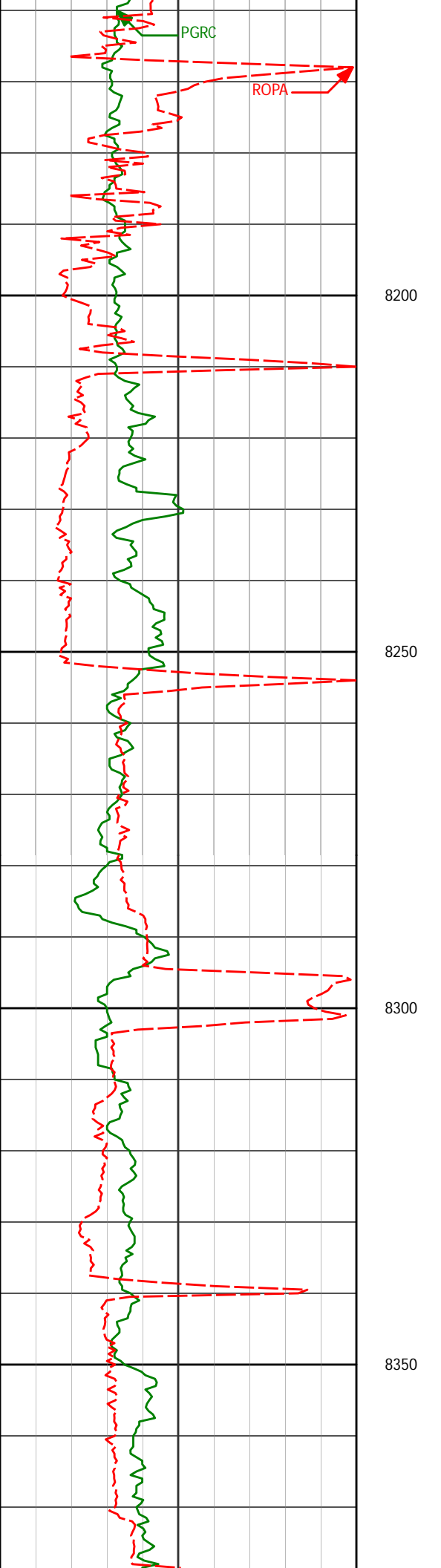
8142'

90.11°

93.47°

7024.40'

1355.12'



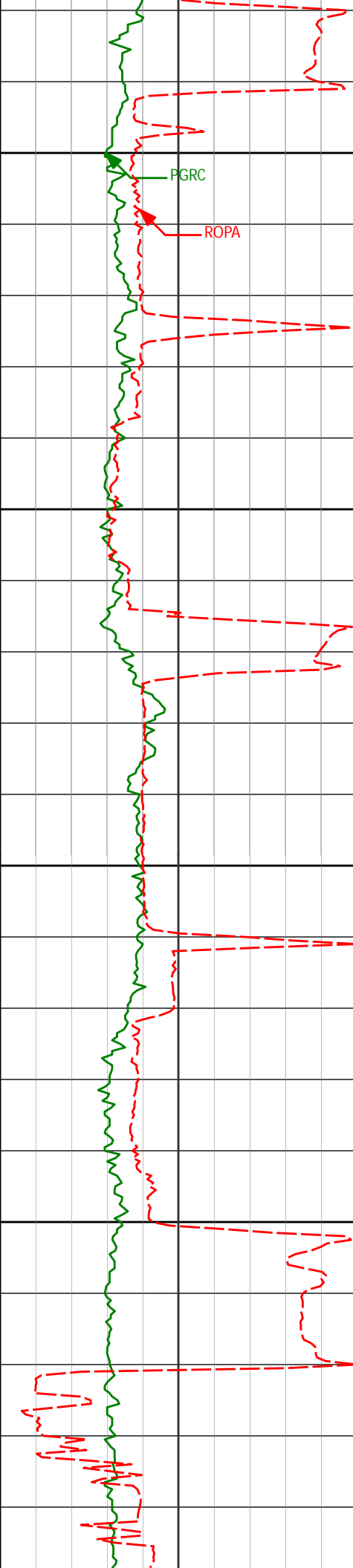
8313'

90.01°

92.16°

7024.22'

1525.95'



8400

PGRC

ROPA

8450

8500

8550

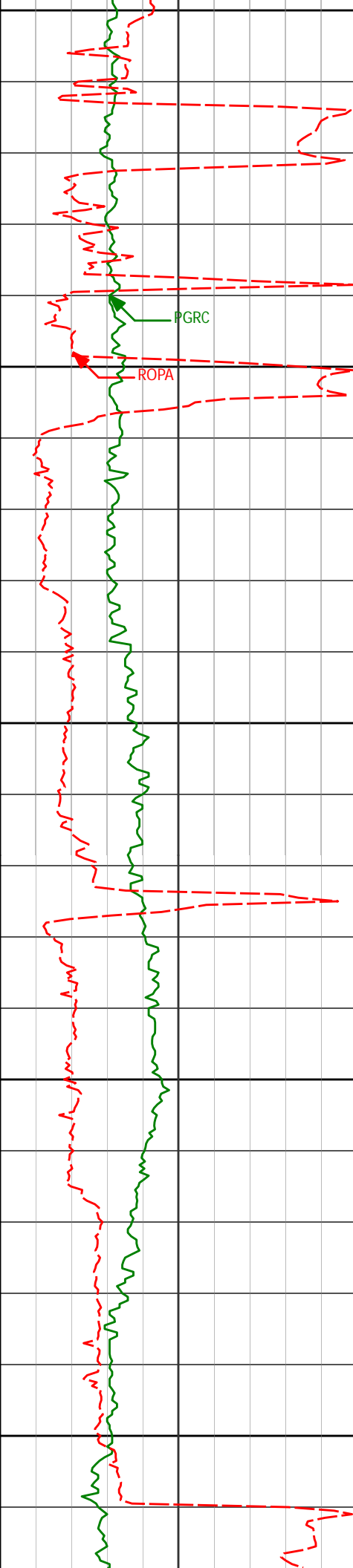
8485'

92.20°

92.70°

7020.90'

1697.79'



8600

8650

8700

8750

8800

PGRC

ROPA

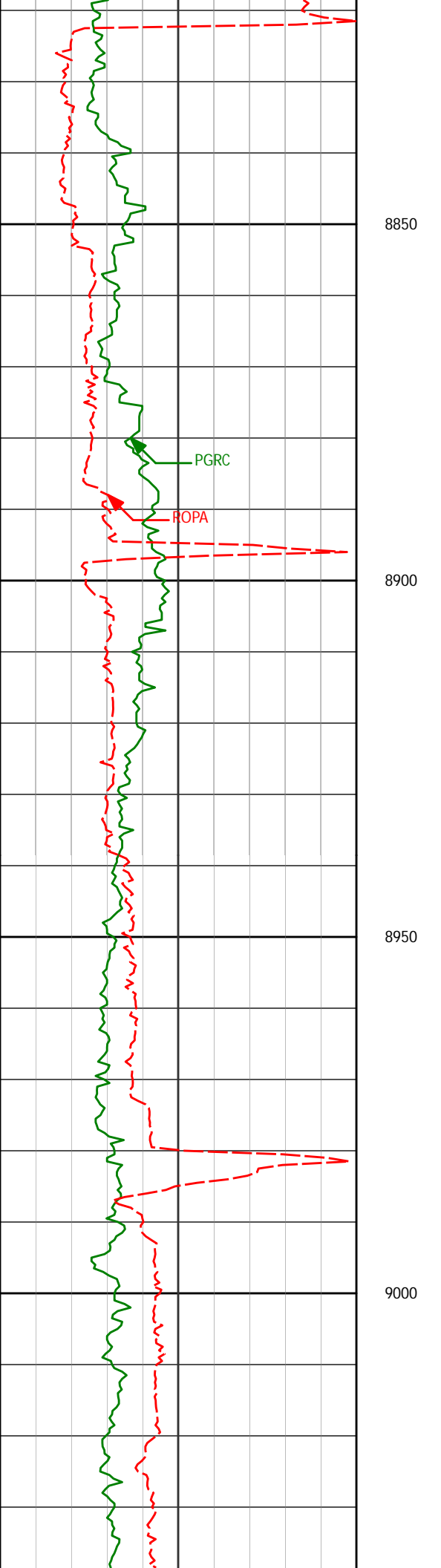
8656'

89.34°

91.56°

7018.61'

1868.67'



8828'

90.54°

92.44°

7018.79'

2040.59'

8850

PGRC

ROPA

8900

8950

9000

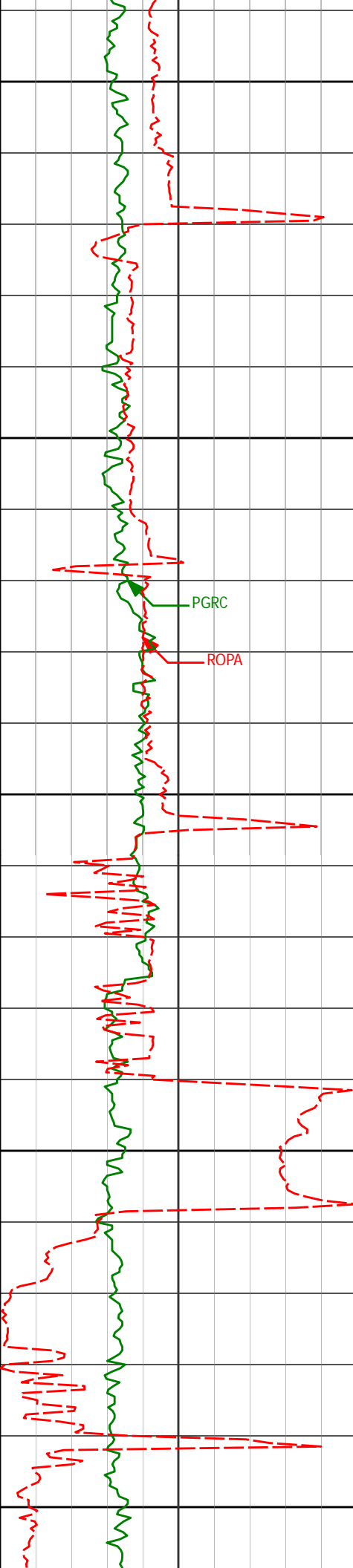
8999'

90.05°

91.64°

7017.91'

2211.51'



9050

9100

9150

9200

9250

PGRC

ROPA

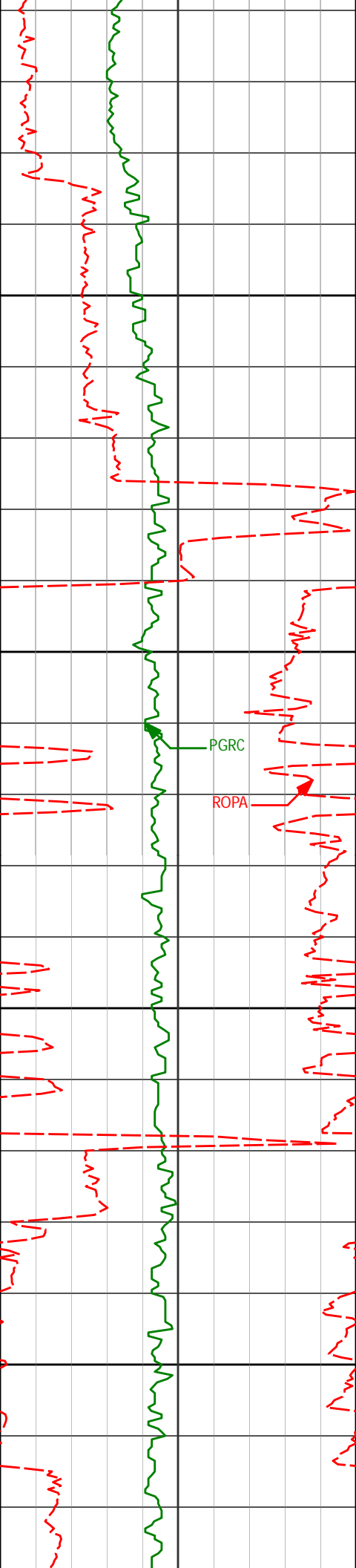
9170'

90.54°

90.48°

7017.02'

2382.49'



9300

9350

9400

9450

PGRC

ROPA

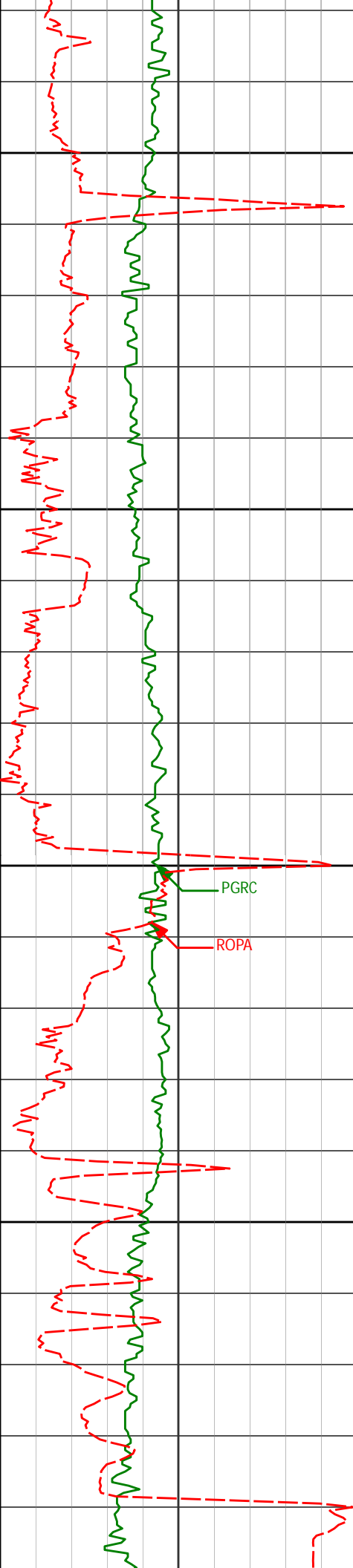
9348'

90.45°

91.46°

7015.49'

2560.47'



9500

9531'

90.32°

91.08°

7014.26'

2743.44'

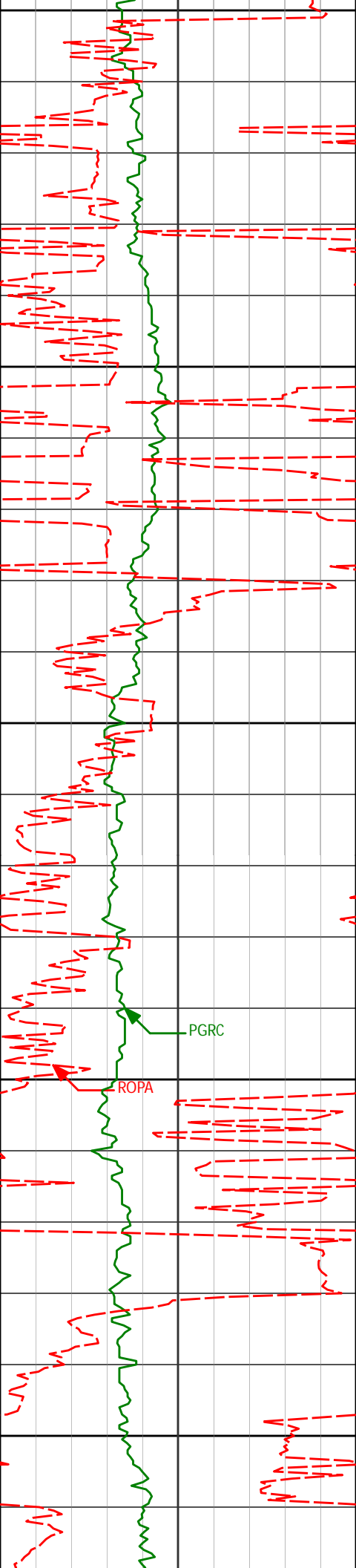
9550

9600

PGRC

ROPA

9650



9700

9715'

91.49°

90.76°

7011.35'

2927.40'

9750

9800

PGRC

ROPA

9850

9900

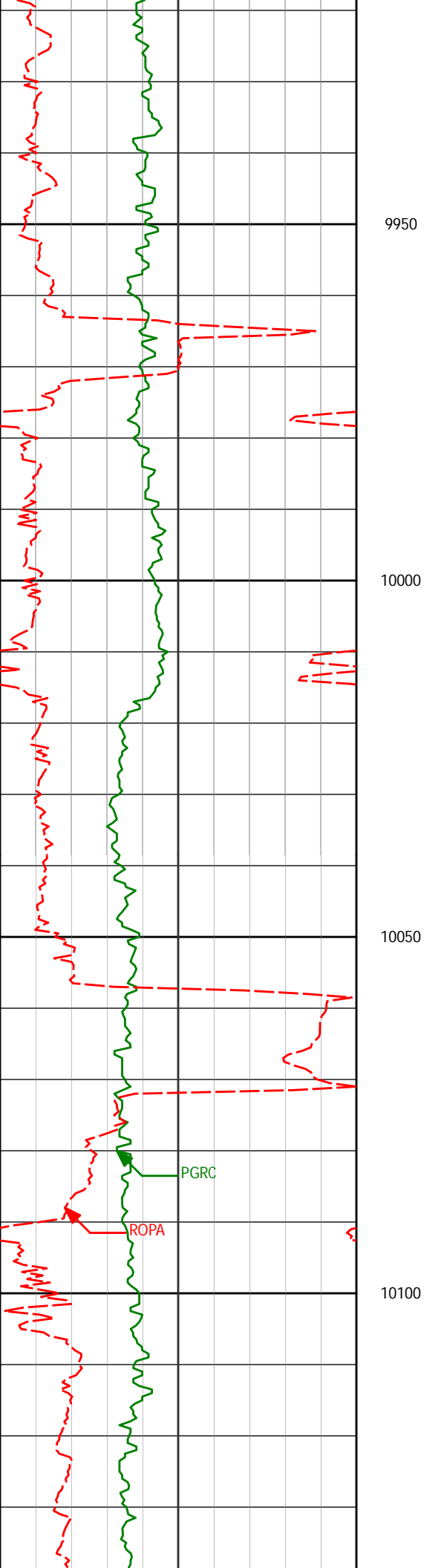
9899'

91.68°

90.85°

7006.26'

3111.32'



9950

10000

10050

10100

PGRC

ROPA

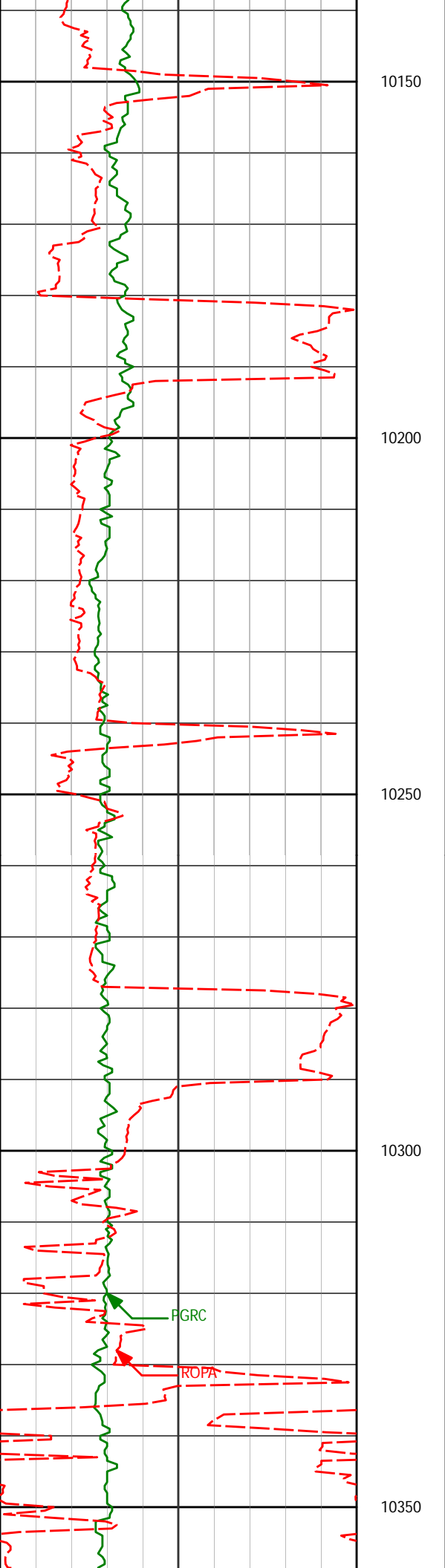
10082'

91.34°

90.25°

7001.44'

3294.26'



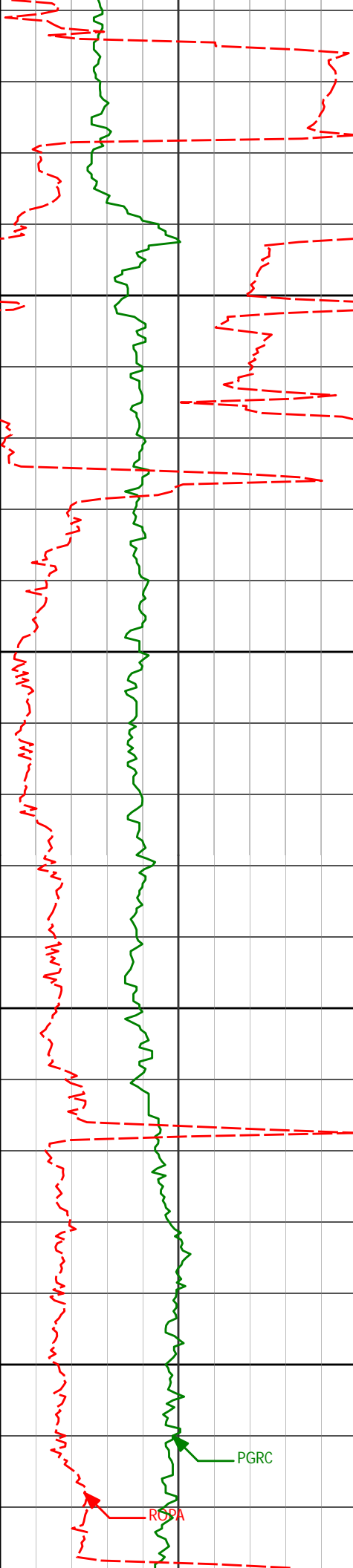
10267'

91.37°

89.53°

6997.06'

3479.20'



10400

10450

10500

10550

10449'

89.71°

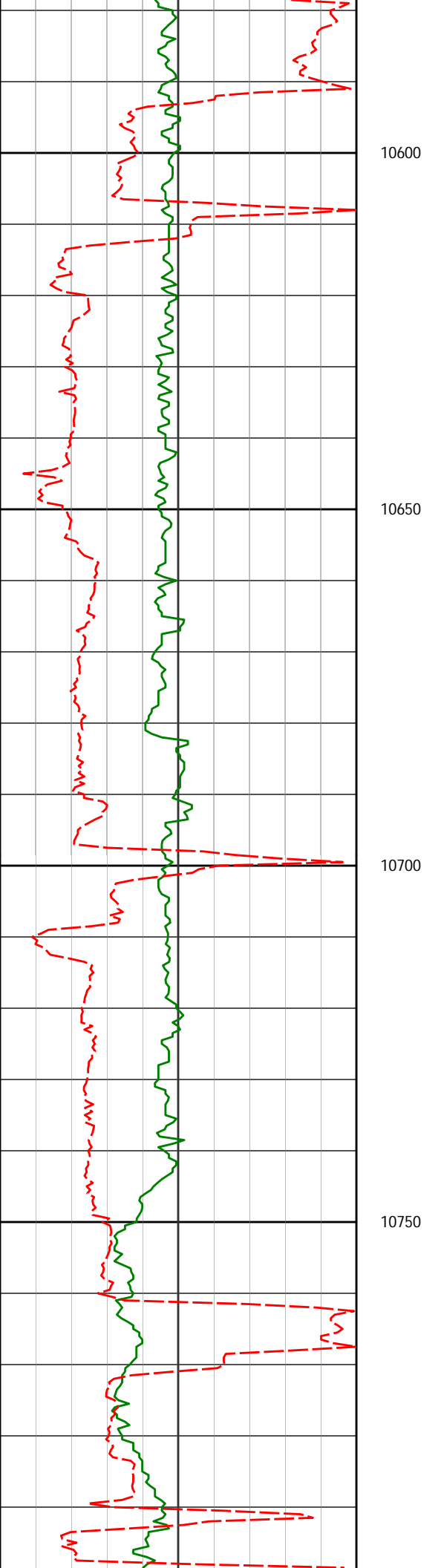
88.98°

6995.35'

3661.15'

PGRC

ROPA



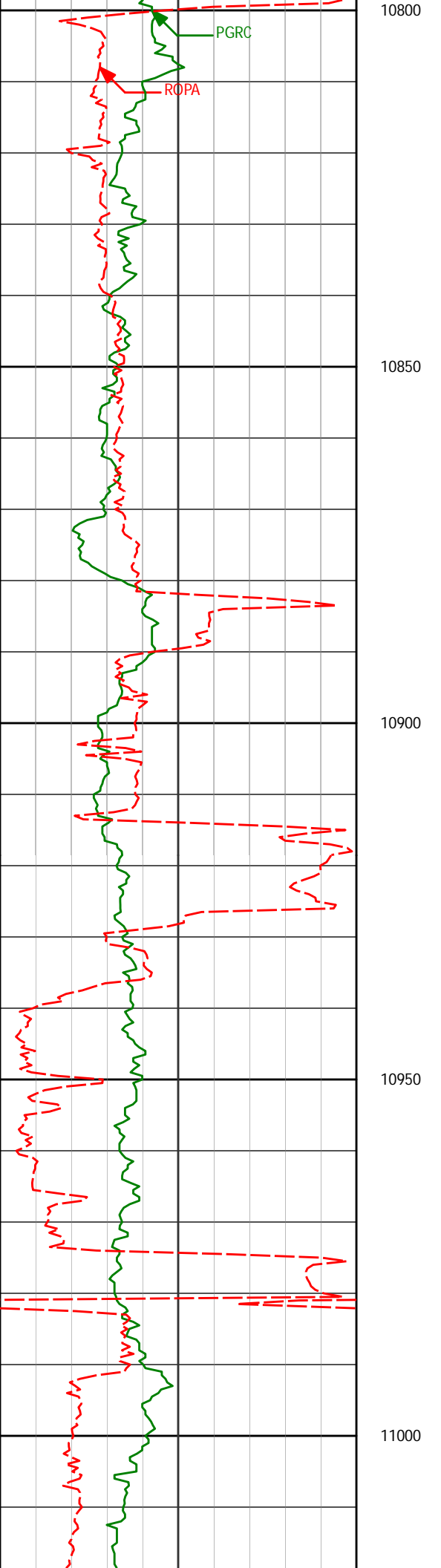
10633'

89.09°

88.72°

6997.28'

3845.08'



10814'

88.11°

88.76°

7001.70'

4025.96'

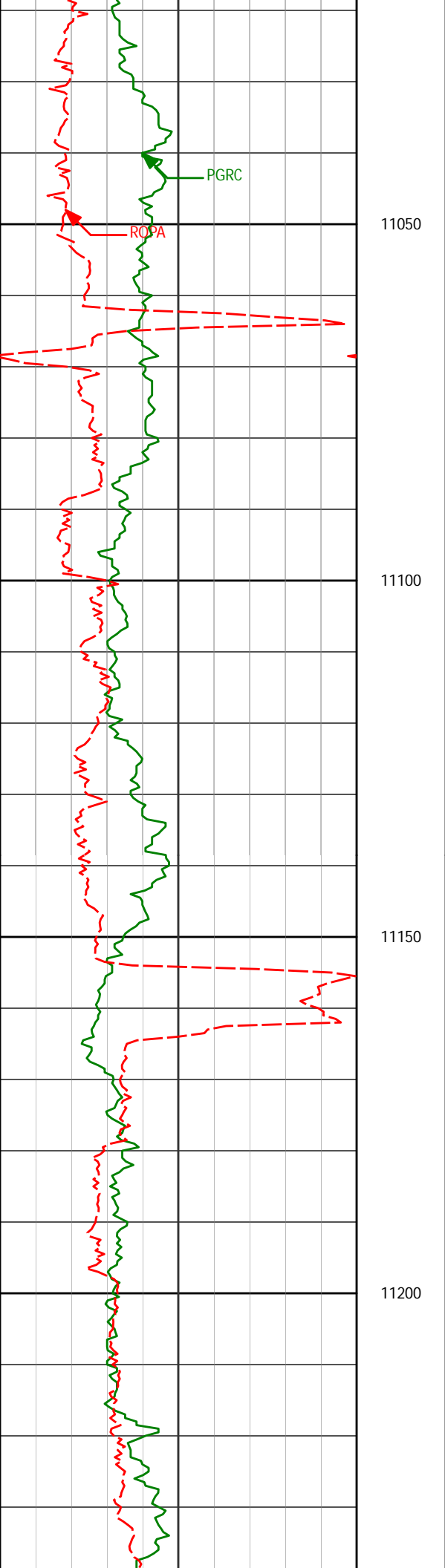
10997'

89.96°

89.93°

7004.78'

4208.90'



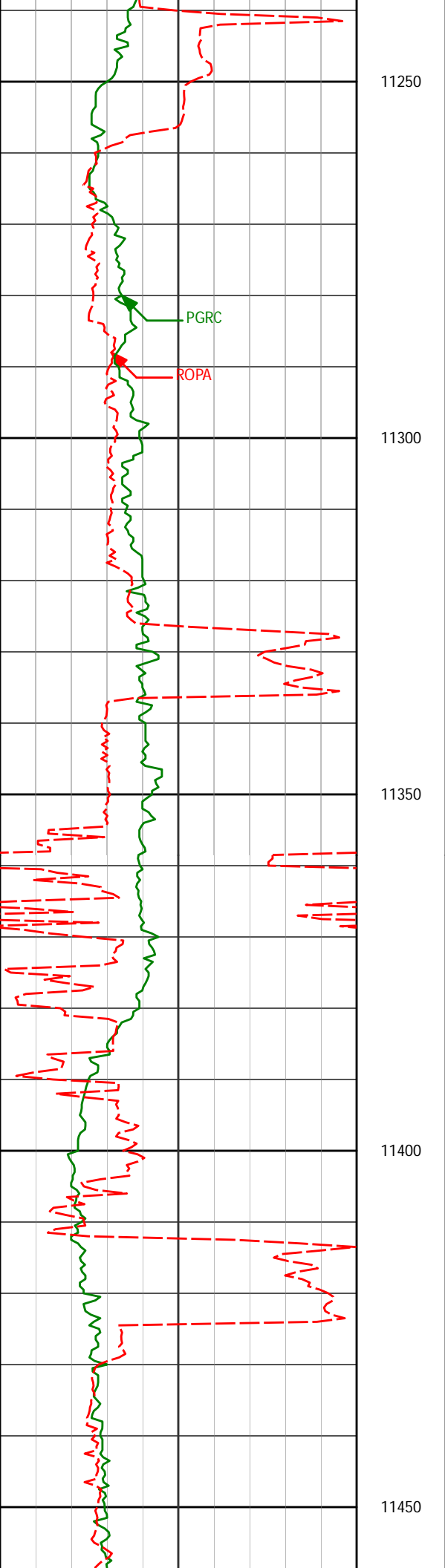
11174'

89.86°

89.94°

7005.06'

4385.89'



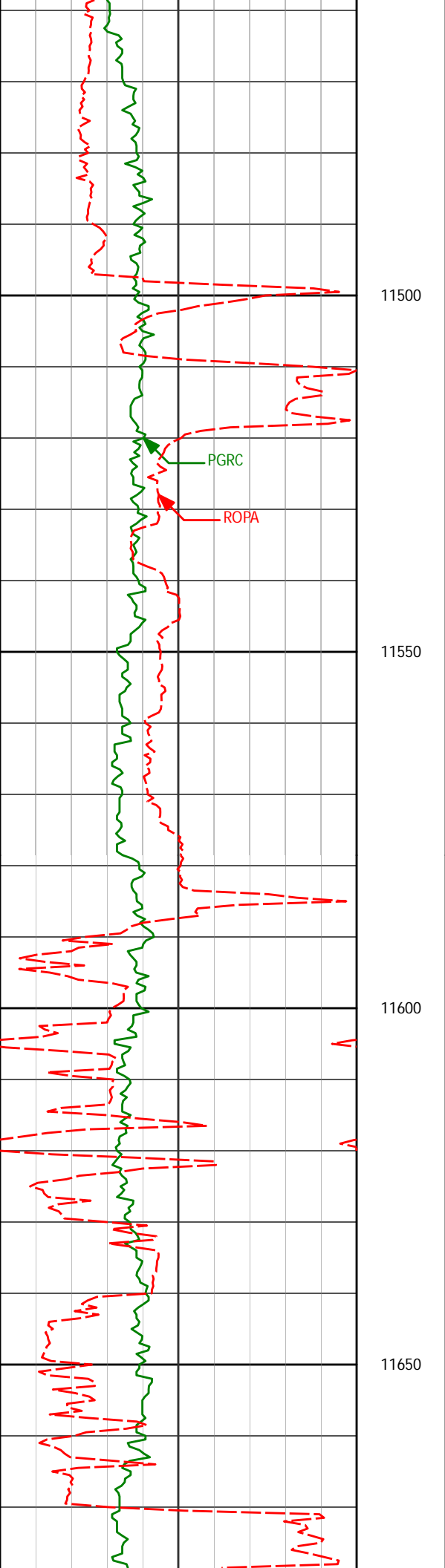
11345'

88.91°

89.78°

7006.89'

4556.87'



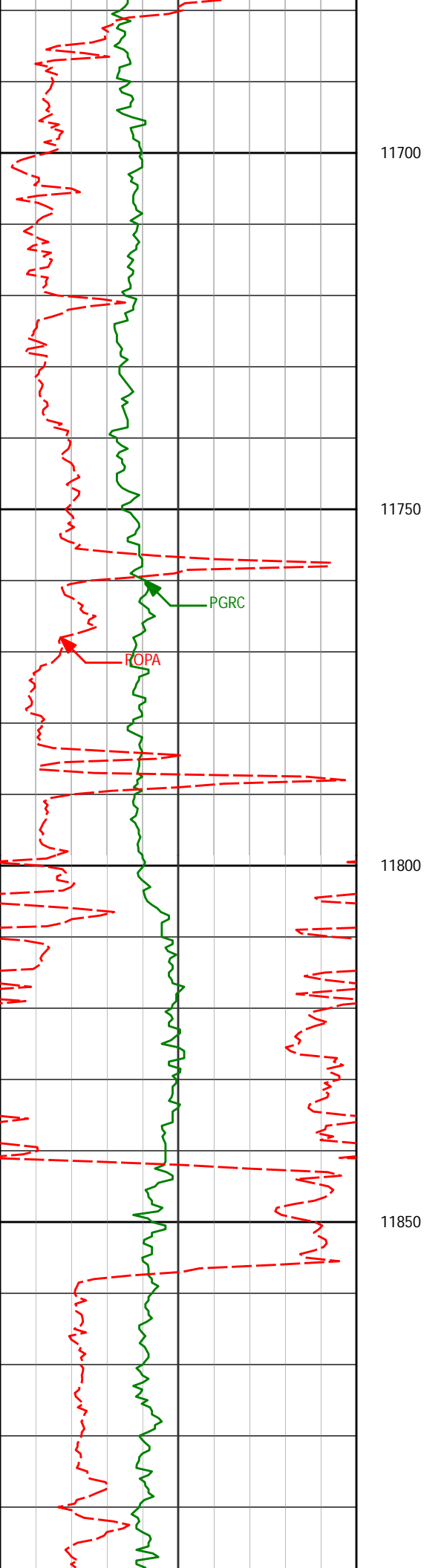
11516'

90.54°

89.98°

7007.72'

4727.86'



11688'

90.51°

89.57°

7006.14'

4899.85'

11700

11750

PGRC

ROPA

11800

11850

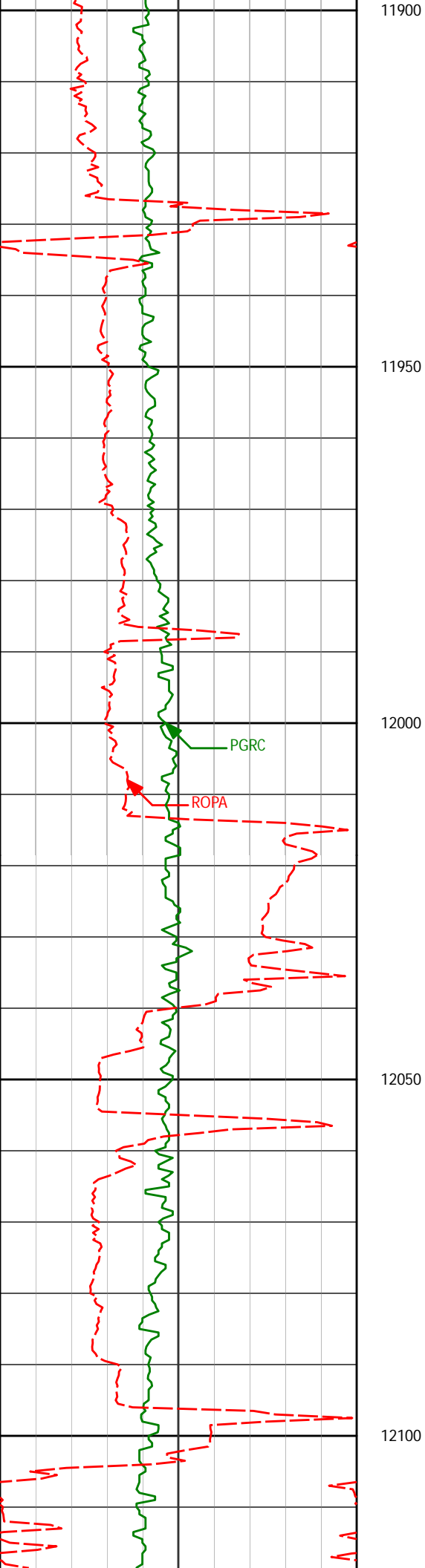
11859'

90.11°

89.19°

7005.21'

5070.82'



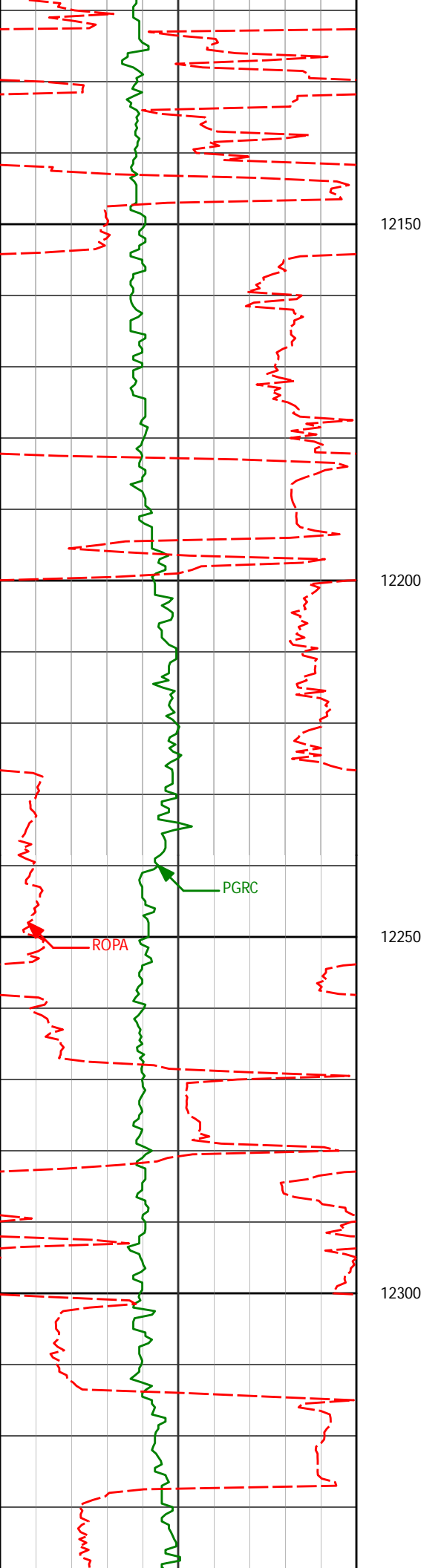
12030'

91.28°

90.90°

7003.14'

5241.80'



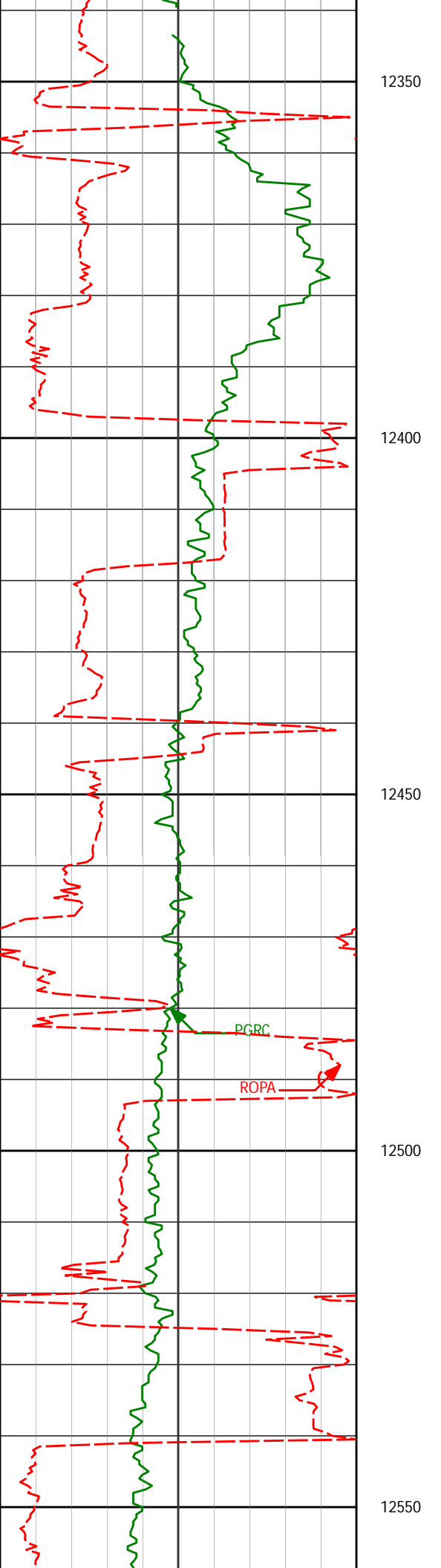
12201'

88.63°

87.47°

7003.27'

5412.72'



12373'

87.70°

89.13°

7008.78'

5584.52'

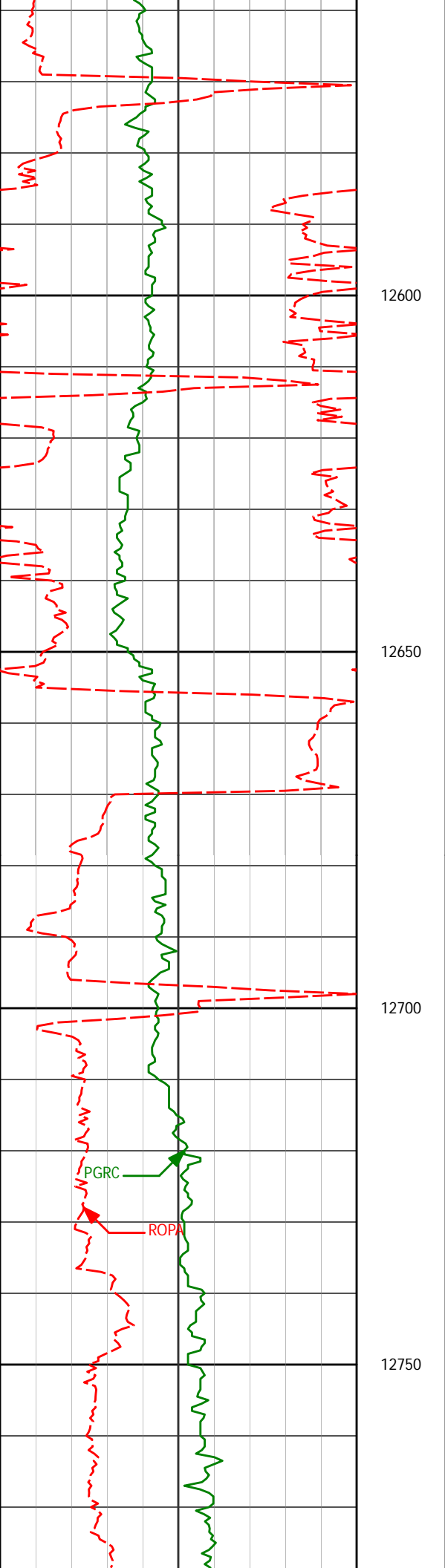
12544'

89.77°

89.86°

7012.56'

5755.45'



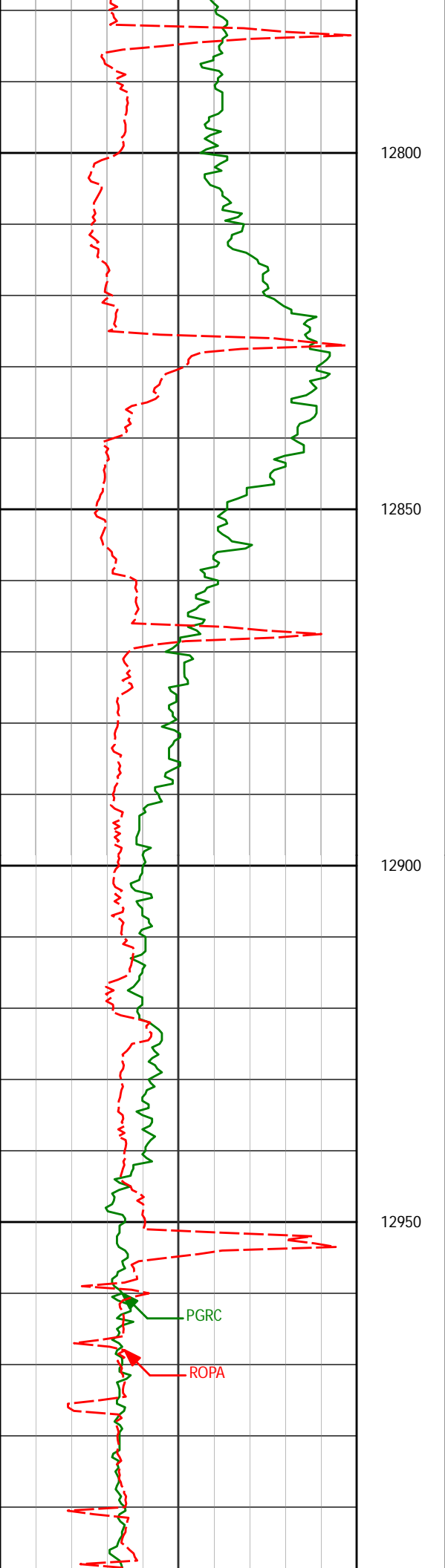
12715'

91.43°

90.95°

7010.77'

5926.43'



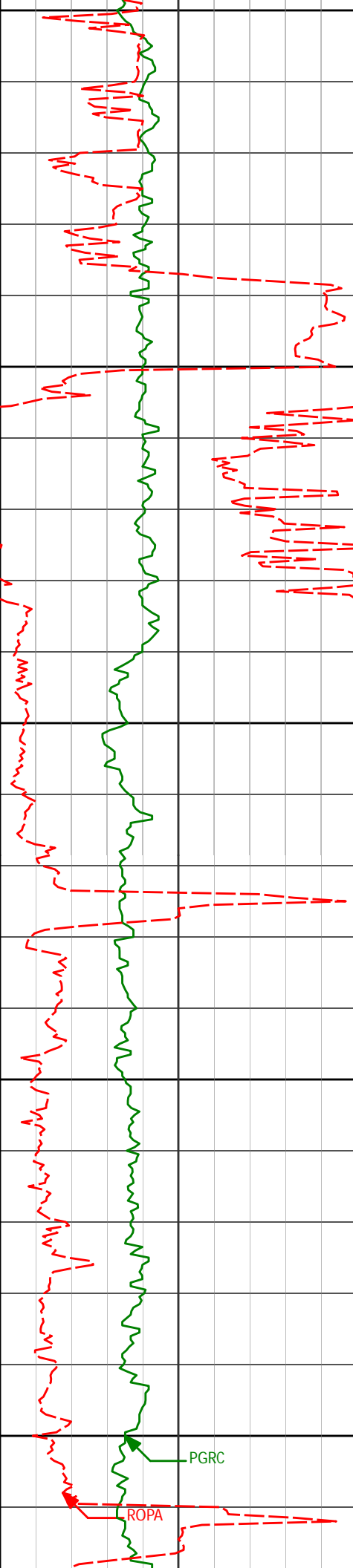
12887'

91.28°

90.10°

7006.70'

6098.38'



13000

13050

13100

13150

13200

13058'

91.34°

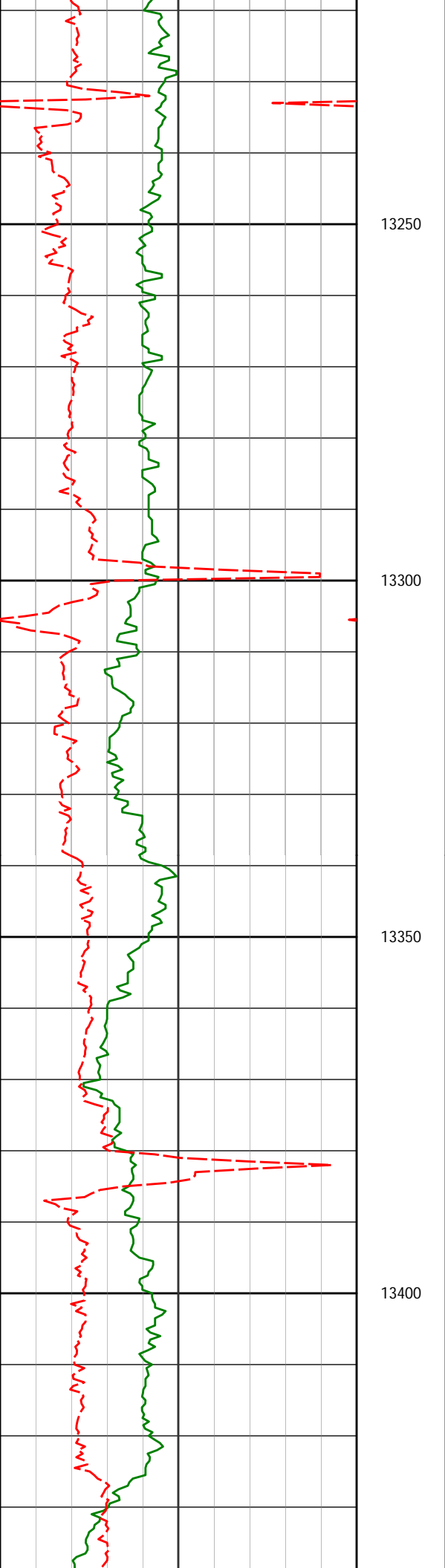
90.44°

7002.79'

6269.34'

PGRC

ROPA



13229'

90.94°

90.61°

6999.39'

6440.30'

13250

13300

13350

13400

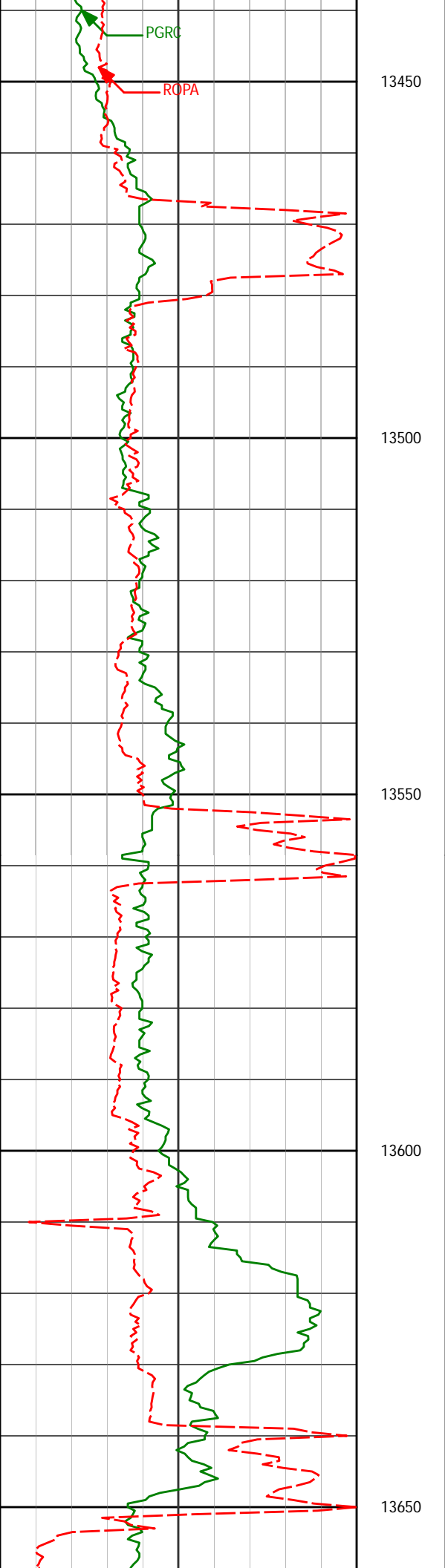
13401'

89.74°

89.72°

6998.37'

6612.29'



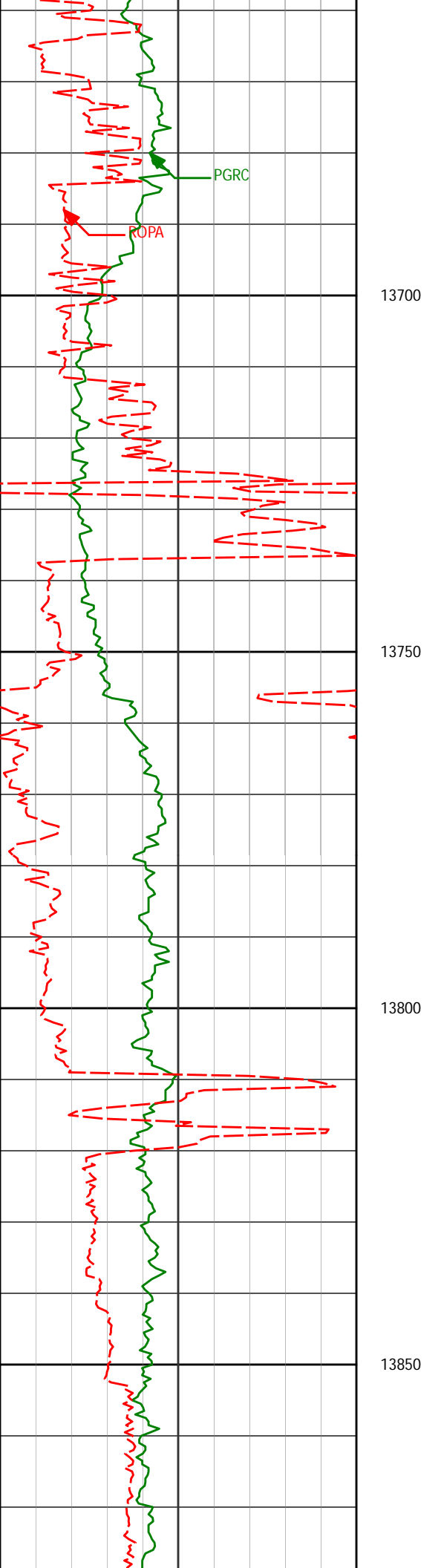
13572'

89.89°

89.89°

6998.92'

6783.29'



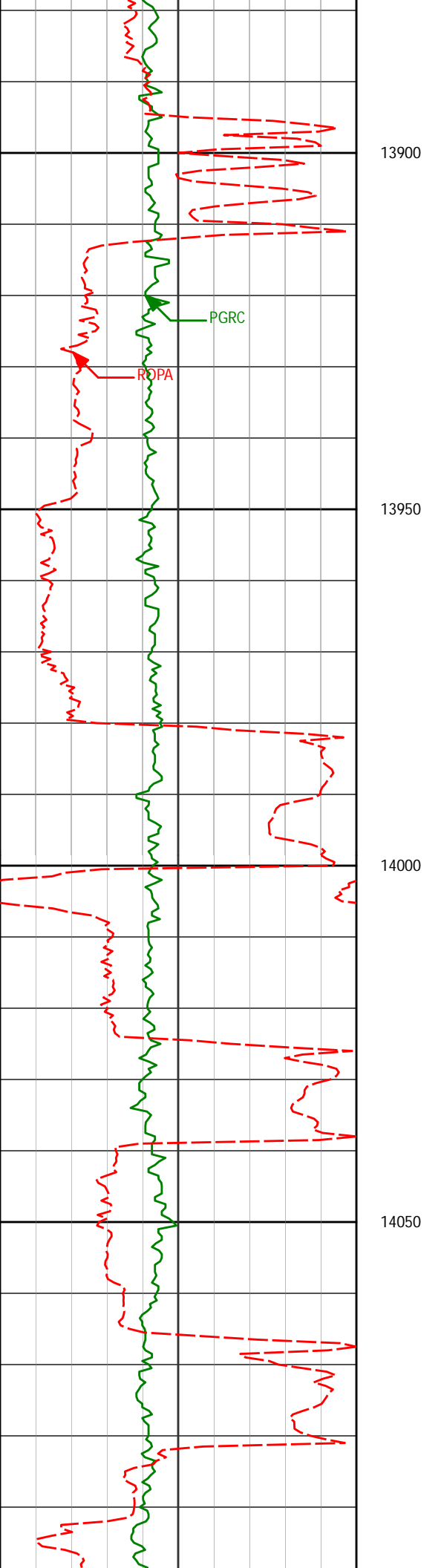
13744'

91.06°

90.13°

6997.49'

6955.28'



13915'

91.46°

91.40°

6993.73'

7126.22'

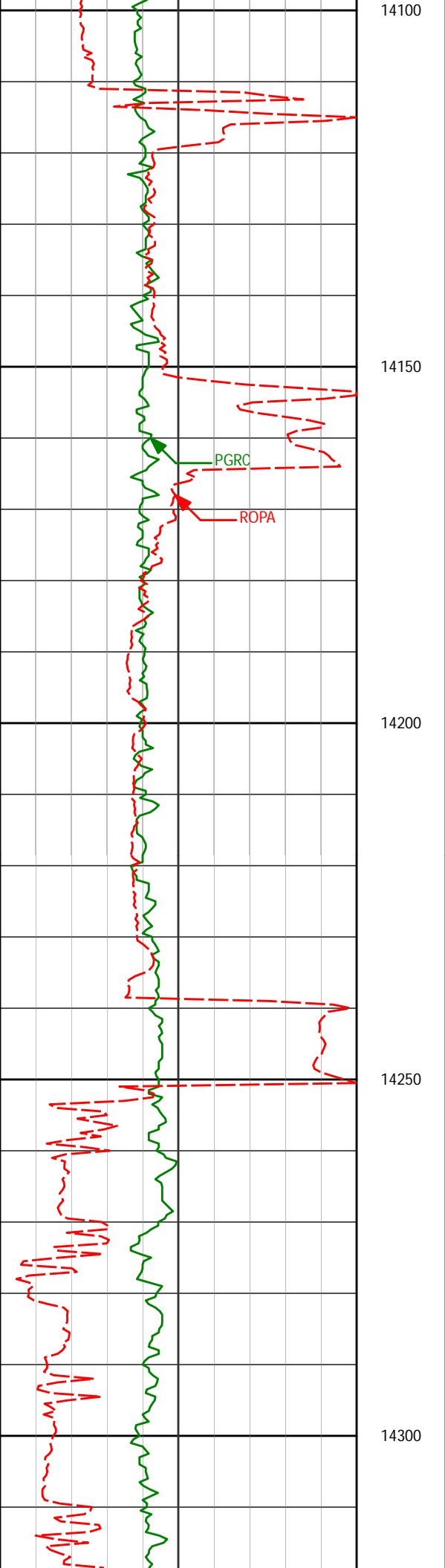
14087'

89.77°

91.52°

6991.89'

7298.17'



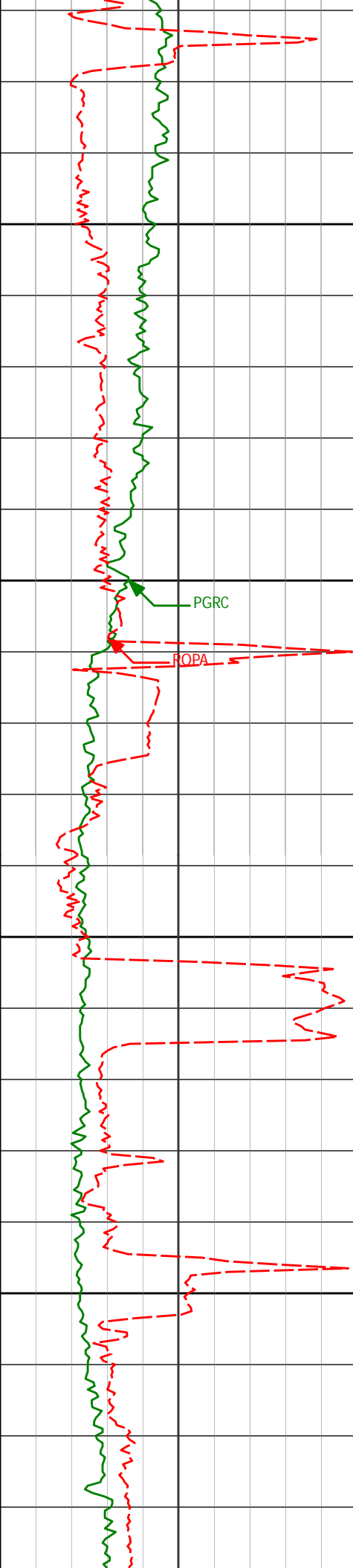
14258'

88.87°

89.14°

6993.92'

7469.15'



14350

14400

14450

14500

PGRC

ROPA

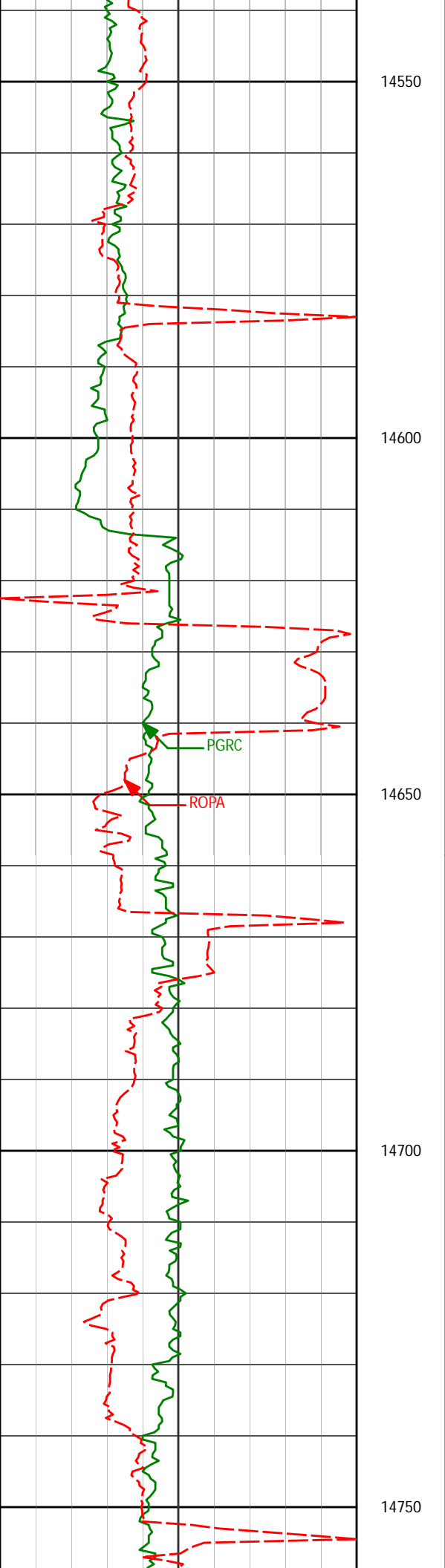
14429'

88.53°

88.96°

6997.80'

7640.06'



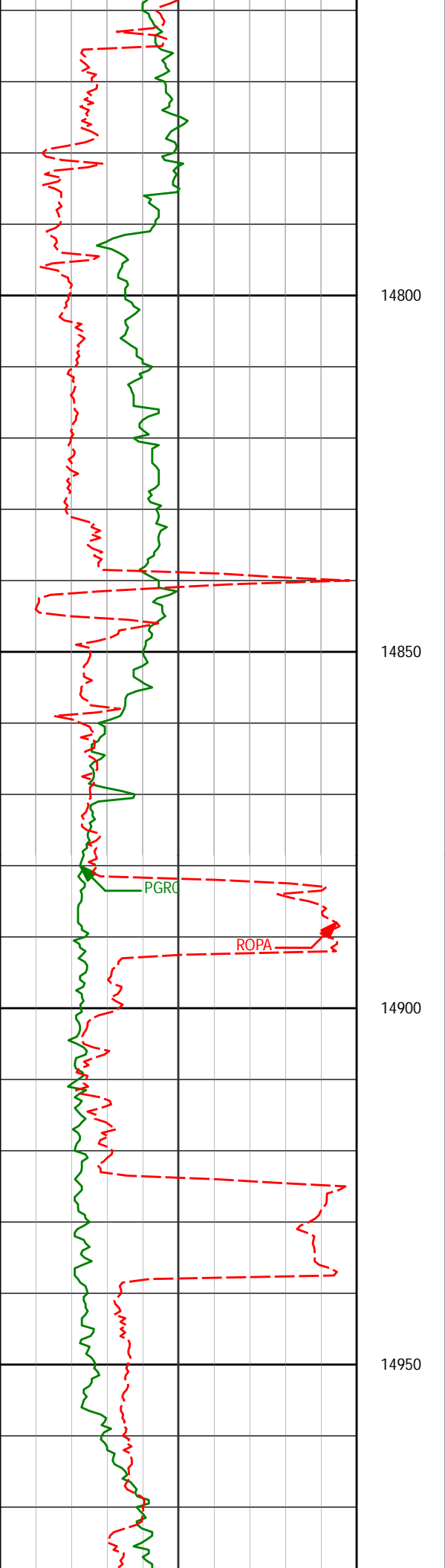
14601'

89.40°

88.44°

7000.90'

7811.96'



14772'

89.92°

87.50°

7001.92'

7982.82'

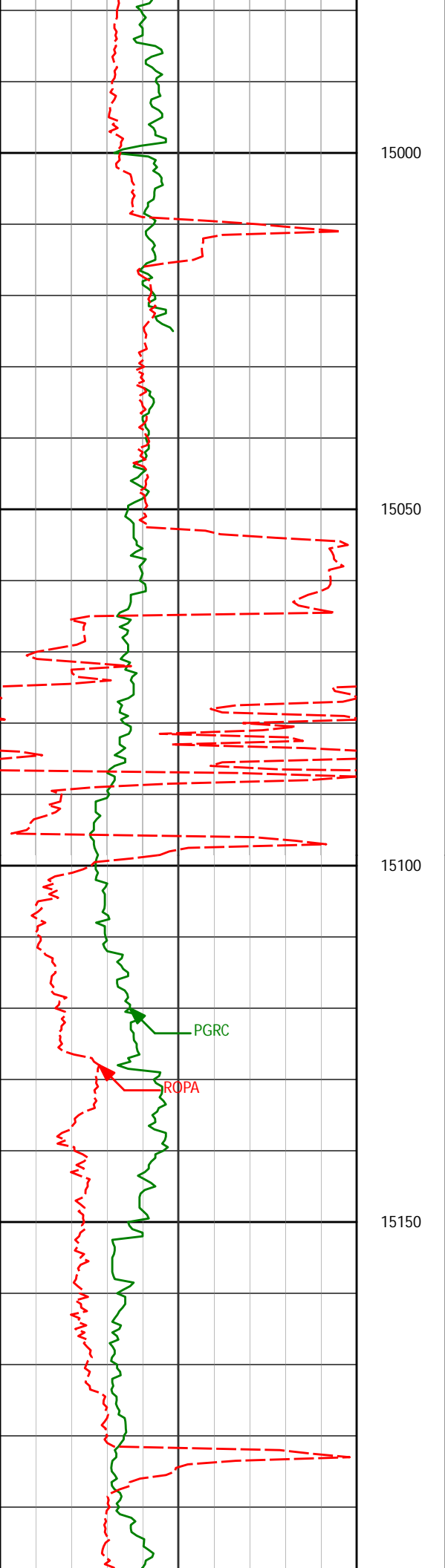
14943'

89.89°

89.43°

7002.20'

8153.72'



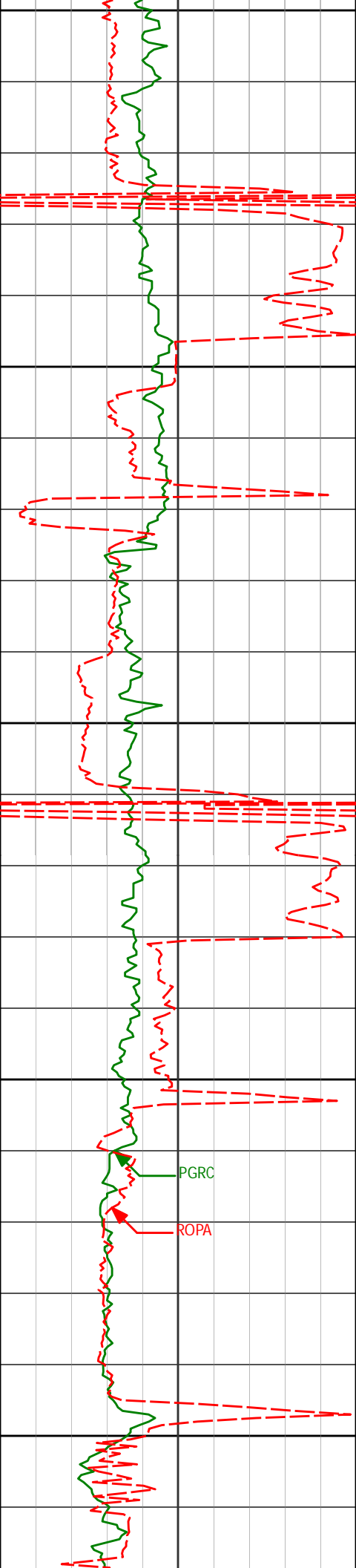
15115'

90.94°

88.08°

7000.96'

8325.64'



15200

15250

15300

15350

15400

15286'

90.29°

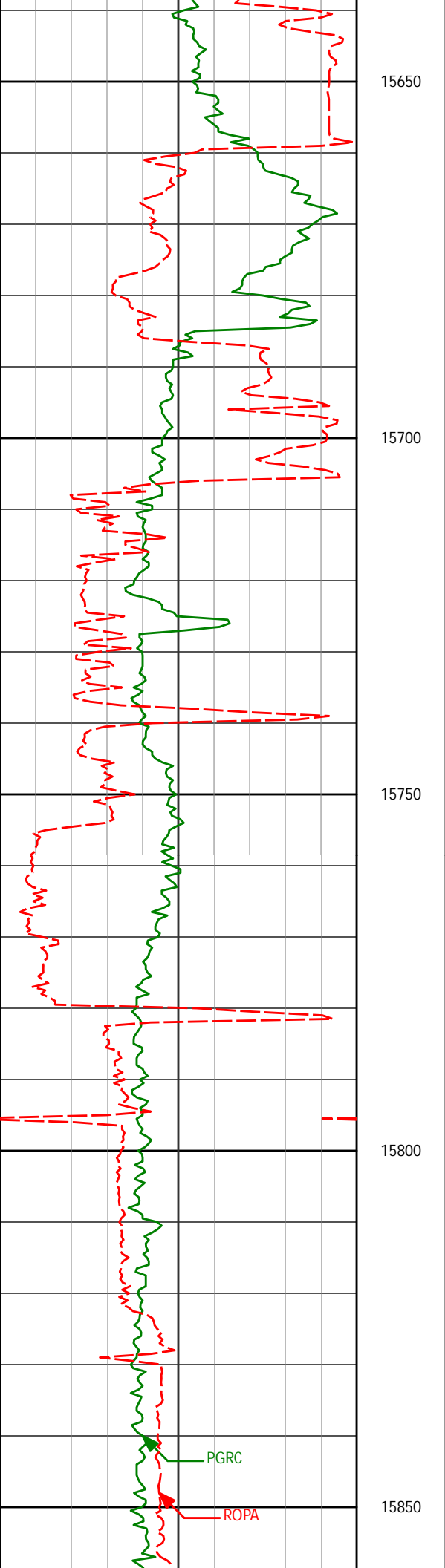
88.19°

6999.12'

8496.51'

PGRC

ROPA



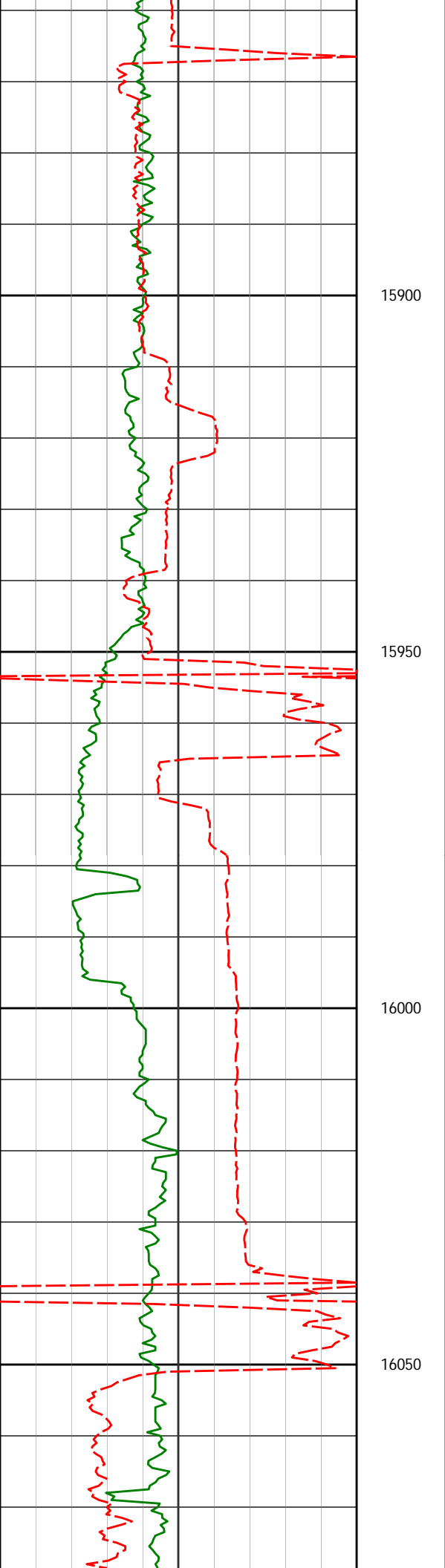
15714'

91.12°

90.96°

6995.84'

8924.38'



15885'

91.40°

90.70°

6992.08'

9095.33'

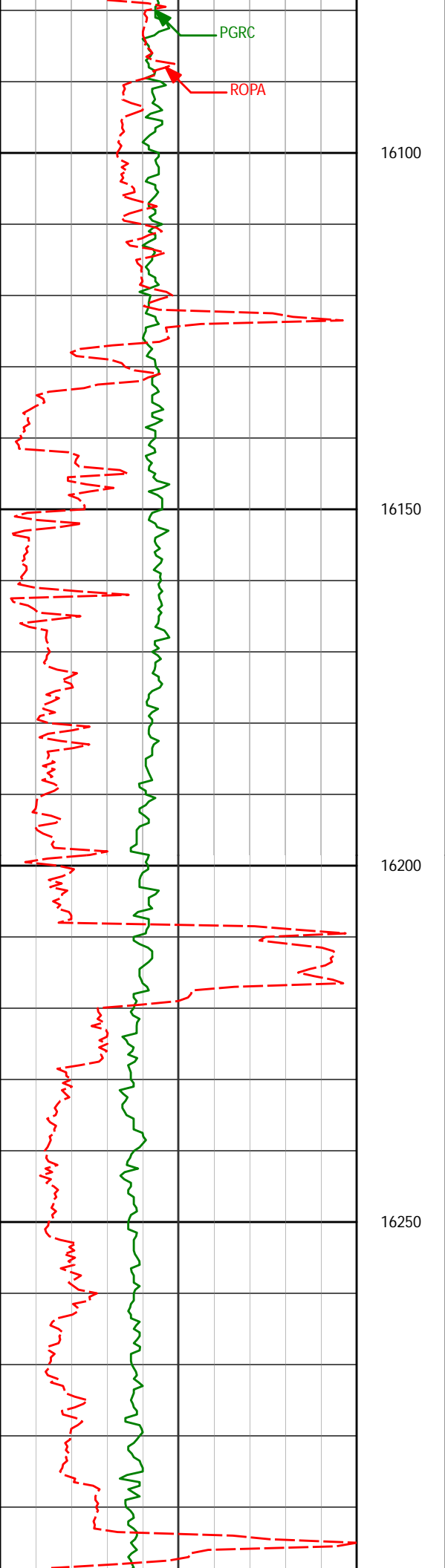
16057'

90.11°

89.84°

6989.82'

9267.31'



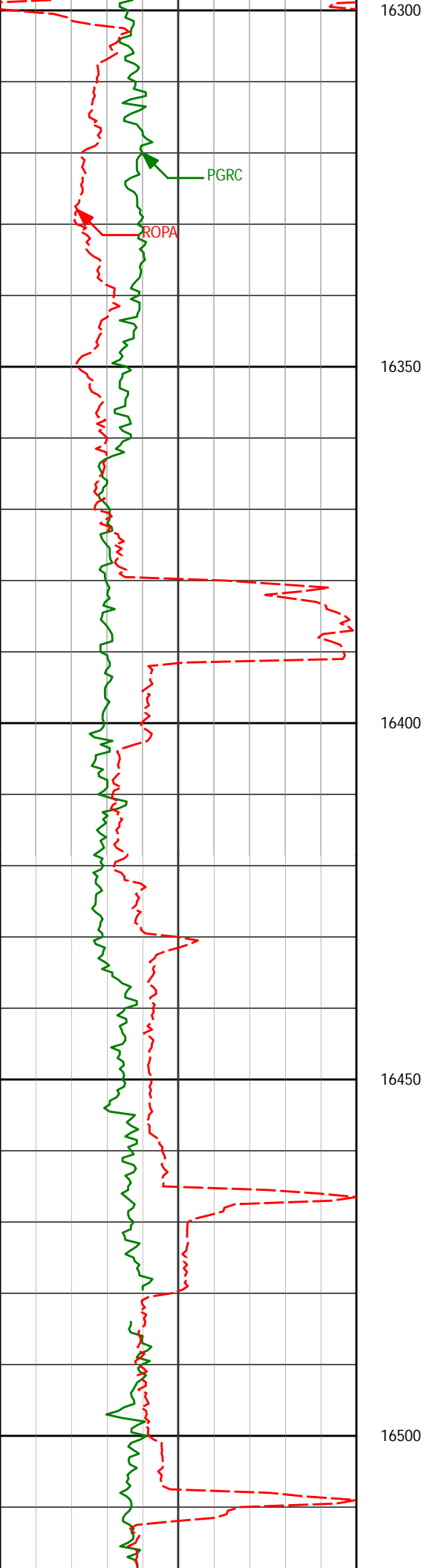
16228'

90.02°

88.41°

6989.62'

9438.27'



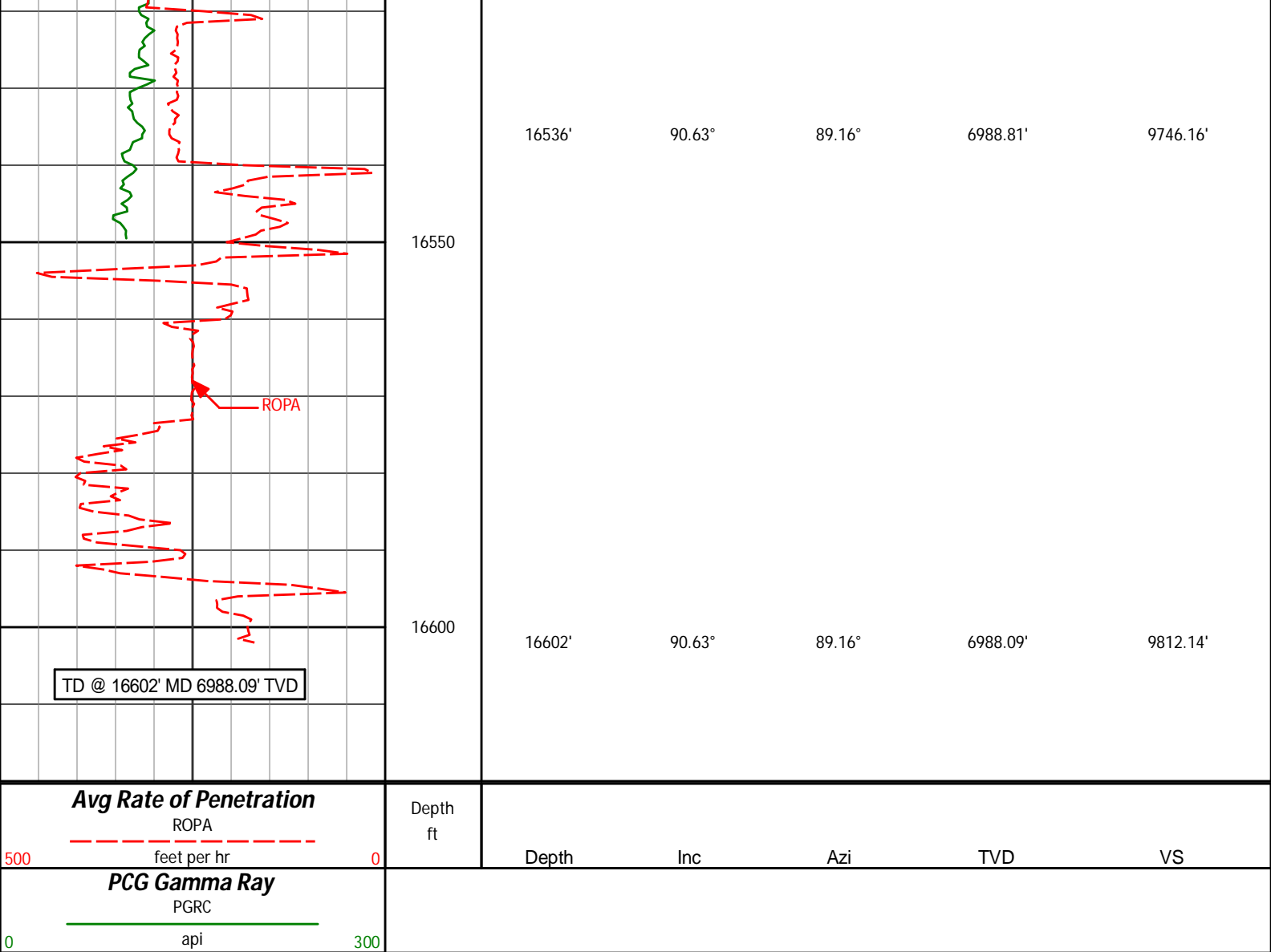
16399'

90.01°

88.93°

6989.58'

9609.20'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko PC
Sekich State 16N-17HZ
Wattenburg
Weld Colorado
USA
CA-XX-0901271362

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1187.00	0.33	16.66	1186.96	3.12 S	4.20 W	-4.18	TIE-IN
1315.00	0.73	285.17	1314.96	2.55 S	4.88 W	-4.87	0.63
1505.00	0.60	287.36	1504.94	1.94 S	7.00 W	-6.99	0.07
1693.00	1.10	165.41	1692.93	3.39 S	7.48 W	-7.47	0.80
1876.00	0.84	21.22	1875.92	3.84 S	6.56 W	-6.53	1.01
2059.00	1.10	346.59	2058.90	0.88 S	6.48 W	-6.47	0.34
2241.00	0.53	286.56	2240.88	1.06 N	7.69 W	-7.70	0.52
2424.00	1.08	268.59	2423.86	1.26 N	10.23 W	-10.23	0.33
2607.00	0.38	131.44	2606.85	0.81 N	11.49 W	-11.50	0.76
2789.00	0.18	339.12	2788.85	0.68 N	11.14 W	-11.15	0.30
2971.00	0.46	42.07	2970.85	1.49 N	10.76 W	-10.76	0.23
3154.00	0.48	6.68	3153.84	2.79 N	10.17 W	-10.19	0.16
3325.00	1.91	139.03	3324.81	1.35 N	8.22 W	-8.23	1.32
3496.00	0.37	85.37	3495.78	0.75 S	5.80 W	-5.80	1.00
3667.00	0.35	44.20	3666.77	0.33 S	4.89 W	-4.89	0.15

3839.00	0.23	9.77	3838.77	0.38 N	4.46 W	-4.47	0.12
4010.00	0.28	316.90	4009.77	1.03 N	4.69 W	-4.70	0.14
4181.00	0.55	347.23	4180.77	2.13 N	5.16 W	-5.17	0.20
4352.00	0.47	298.35	4351.76	3.27 N	5.96 W	-5.98	0.25
4524.00	1.35	222.05	4523.74	2.10 N	7.94 W	-7.95	0.77
4695.00	0.57	254.33	4694.72	0.37 N	10.10 W	-10.10	0.54
4866.00	0.49	341.72	4865.71	0.84 N	11.15 W	-11.15	0.43
5037.00	0.59	340.75	5036.70	2.37 N	11.67 W	-11.68	0.06
5209.00	0.62	255.14	5208.70	2.97 N	12.86 W	-12.88	0.48
5380.00	0.90	256.27	5379.68	2.41 N	15.06 W	-15.07	0.16
5551.00	1.91	98.08	5550.66	1.70 N	13.54 W	-13.55	1.62
5723.00	1.45	88.61	5722.58	1.34 N	8.53 W	-8.54	0.31
5894.00	2.57	121.81	5893.48	0.62 S	3.11 W	-3.10	0.92
6066.00	4.11	163.20	6065.21	8.56 S	1.95 E	2.00	1.61
6237.00	3.25	163.10	6235.85	19.06 S	5.13 E	5.23	0.50
6366.00	1.02	151.63	6364.75	23.57 S	6.74 E	6.87	1.75
6409.00	0.61	167.63	6407.75	24.13 S	6.97 E	7.10	1.08
6452.00	1.69	136.69	6450.74	24.82 S	7.46 E	7.59	2.81
6494.00	5.31	128.71	6492.66	26.48 S	9.40 E	9.54	8.68
6537.00	8.46	120.69	6535.34	29.34 S	13.67 E	13.83	7.64
6580.00	11.69	115.48	6577.67	32.83 S	20.33 E	20.50	7.80
6623.00	15.08	110.13	6619.50	36.63 S	29.51 E	29.71	8.39
6666.00	17.78	105.85	6660.74	40.35 S	41.08 E	41.30	6.88
6709.00	22.61	105.57	6701.09	44.37 S	55.37 E	55.61	11.23
6752.00	27.05	105.36	6740.10	49.18 S	72.77 E	73.03	10.33
6795.00	32.00	103.98	6777.51	54.52 S	93.27 E	93.56	11.62
6837.00	37.13	102.66	6812.08	59.99 S	116.45 E	116.77	12.34
6880.00	42.65	101.26	6845.06	65.69 S	143.42 E	143.77	13.01
6923.00	47.21	96.79	6875.51	70.40 S	173.40 E	173.77	12.89
6966.00	50.73	93.97	6903.73	73.42 S	205.68 E	206.08	9.56
7009.00	55.96	91.45	6929.40	75.02 S	240.12 E	240.53	13.04
7052.00	60.89	91.24	6951.91	75.88 S	276.74 E	277.14	11.47
7094.00	65.77	91.15	6970.75	76.66 S	314.25 E	314.66	11.62
7137.00	70.58	90.30	6986.73	77.16 S	354.15 E	354.56	11.34
7180.00	74.99	88.58	6999.46	76.75 S	395.21 E	395.62	10.94
7223.00	79.15	88.21	7009.08	75.58 S	437.09 E	437.50	9.71
7266.00	83.12	88.41	7015.70	74.33 S	479.55 E	479.95	9.24
7292.00	85.03	88.47	7018.39	73.62 S	505.40 E	505.80	7.35
7456.00	90.91	90.01	7024.19	71.45 S	669.21 E	669.59	3.71
7628.00	89.86	91.84	7023.04	74.23 S	841.17 E	841.56	1.23
7799.00	89.64	92.89	7023.78	81.29 S	1012.02 E	1012.45	0.63
7971.00	89.92	92.41	7024.44	89.24 S	1183.84 E	1184.30	0.32
8142.00	90.11	93.47	7024.40	98.01 S	1354.61 E	1355.12	0.63
8313.00	90.01	92.16	7024.22	106.41 S	1525.40 E	1525.95	0.77
8485.00	92.20	92.70	7020.90	113.70 S	1697.20 E	1697.79	1.31
8656.00	89.34	91.56	7018.61	120.05 S	1868.05 E	1868.67	1.80
8828.00	90.54	92.44	7018.79	126.05 S	2039.94 E	2040.59	0.87
8999.00	90.05	91.64	7017.91	132.14 S	2210.83 E	2211.51	0.55
9170.00	90.54	90.48	7017.02	135.30 S	2381.79 E	2382.49	0.74
9348.00	90.45	91.46	7015.49	138.32 S	2559.76 E	2560.47	0.55
9531.00	90.32	91.08	7014.26	142.37 S	2742.71 E	2743.44	0.22
9715.00	91.49	90.76	7011.35	145.33 S	2926.66 E	2927.40	0.66
9899.00	91.68	90.85	7006.26	147.91 S	3110.57 E	3111.32	0.11
10082.00	91.34	90.25	7001.44	149.67 S	3293.50 E	3294.26	0.38
10267.00	91.37	89.53	6997.06	149.31 S	3478.44 E	3479.20	0.39
10449.00	89.71	88.98	6995.35	146.95 S	3660.41 E	3661.15	0.96
10633.00	89.09	88.72	6997.28	143.25 S	3844.36 E	3845.08	0.37
10814.00	88.11	88.76	7001.70	139.27 S	4025.26 E	4025.96	0.54
10997.00	89.96	89.93	7004.78	137.18 S	4208.22 E	4208.90	1.20
11174.00	89.86	89.94	7005.06	136.98 S	4385.21 E	4385.89	0.06
11345.00	88.91	89.78	7006.89	136.56 S	4556.20 E	4556.87	0.56
11516.00	90.54	89.98	7007.72	136.21 S	4727.19 E	4727.86	0.96
11688.00	90.51	89.57	7006.14	135.53 S	4899.19 E	4899.85	0.24
11859.00	90.11	89.19	7005.21	133.68 S	5070.17 E	5070.82	0.32
12030.00	91.28	90.90	7003.14	133.81 S	5241.15 E	5241.80	1.21
12201.00	88.63	87.47	7003.27	131.38 S	5412.09 E	5412.72	2.53
12373.00	87.70	89.13	7008.78	126.28 S	5583.92 E	5584.52	1.11
12544.00	89.77	89.86	7012.56	124.78 S	5754.86 E	5755.45	1.28
12715.00	91.43	90.95	7010.77	125.98 S	5925.84 E	5926.43	1.16
12887.00	91.28	90.10	7006.70	127.56 S	6097.78 E	6098.38	0.50
13058.00	91.34	90.44	7002.79	128.37 S	6268.74 E	6269.34	0.20
13229.00	90.94	90.61	6999.39	129.93 S	6439.69 E	6440.30	0.25
13401.00	89.74	89.72	6998.37	130.43 S	6611.69 E	6612.29	0.87
13572.00	89.89	89.89	6998.92	129.85 S	6782.68 E	6783.29	0.13

13744.00	91.06	90.13	6997.49	129.88 S	6954.67 E	6955.28	0.69
13915.00	91.46	91.40	6993.73	132.16 S	7125.61 E	7126.22	0.78
14087.00	89.77	91.52	6991.89	136.54 S	7297.54 E	7298.17	0.99
14258.00	88.87	89.14	6993.92	137.52 S	7468.51 E	7469.15	1.49
14429.00	88.53	88.96	6997.80	134.69 S	7639.45 E	7640.06	0.22
14601.00	89.40	88.44	7000.90	130.79 S	7811.37 E	7811.96	0.59
14772.00	89.92	87.50	7001.92	124.73 S	7982.26 E	7982.82	0.63
14943.00	89.89	89.43	7002.20	120.15 S	8153.19 E	8153.72	1.13
15115.00	90.94	88.08	7000.96	116.41 S	8325.14 E	8325.64	0.99
15286.00	90.29	88.19	6999.12	110.85 S	8496.04 E	8496.51	0.39
15457.00	90.17	92.09	6998.43	111.27 S	8667.00 E	8667.48	2.28
15542.00	90.35	92.06	6998.05	114.34 S	8751.94 E	8752.43	0.21
15714.00	91.12	90.96	6995.84	118.88 S	8923.87 E	8924.38	0.78
15885.00	91.40	90.70	6992.08	121.35 S	9094.81 E	9095.33	0.22
16057.00	90.11	89.84	6989.82	122.16 S	9266.78 E	9267.31	0.90
16228.00	90.02	88.41	6989.62	119.55 S	9437.76 E	9438.27	0.84
16399.00	90.01	88.93	6989.58	115.58 S	9608.71 E	9609.20	0.30
16536.00	90.63	89.16	6988.81	113.30 S	9745.69 E	9746.16	0.48
16602.00	90.63	89.16	6988.09	112.33 S	9811.68 E	9812.14	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 90.31 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 16602.00 FEET
IS 9812.32 FEET ALONG 90.66 DEGREES (TRUE)**

Directional surveys tied on to gyro surveys at 1187' MD. Final survey is a projection to bit.