

PCG Pressure Case Gamma Ray
DGR Dual Gamma Ray
PCD Pressure Case Directional

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	15-Jul-13	19-Jul-13	20-Jul-13	23-Jul-13	
Rig Bit Number	0100	0200	0300	0400	
Bit Size (in)	13.500	8.750	8.750	6.125	
Tool Nominal OD (in)	6.750	6.750	6.750	4.750	
Log Start Depth (MD, ft)	1.00	947.00	7,569.00	7,775.00	
Log End Depth (MD, ft)	947.00	7,569.00	7,775.00	11,955.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	14-Jul-13 06:05	14-Jul-13 23:23	19-Jul-13 14:00	21-Jul-13 16:30	
Drill/Wipe End Date and Time	14-Jul-13 22:45	14-Jul-13 23:23	20-Jul-13 01:15	23-Jul-13 01:00	
Min Inc (deg) @ Depth (MD, ft)	.14 @ 601.00	.10 @ 5,790.00	70.32 @ 7,598.00	88.08 @ 8,451.00	
Max Inc (deg) @ Depth (MD, ft)	.70 @ 891.00	63.94 @ 7,550.00	88.30 @ 7,732.00	91.61 @ 11,905.00	
Bit TFA(in2) / Bit Type	1.49 / PDC	1.04 / PDC	.92 / Tricone	.92 / PDC	
Flow Rate (gpm)	541.32	585.72	505.33	275.00	
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.50 / 28.00	9.38 / 39.00	10.20 / 36.00	9.82 / 38.00	
Filtrate CL (ppm)	400.00	N/A	850.00	800.00	
pH / Fluid Loss (mptm)	8.00 / 0	9.50 / 6	8.60 / 6	8.80 / 6	
PV (cP) / YP (lbf2)	1 / 4.00	13 / 11.00	13 / 11.00	13 / 11.00	
% Solids / % Sand	1.2 / N/A	N/A / 1.00	9.8 / 1.00	9.8 / 1.00	
% Oil / Oil:Water Ratio	N/A / N/A	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	N/A @ N/A	
Rmf @ Measured Temp (degF)	N/A @ N/A	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	N/A @ N/A	
Max Tool Temp (degF) / Source	96.42 / PCM	185.02 / PCM	205.16 / PCM	240.23 / HCIM	
Rm @ Max Tool Temp (degF)	N/A @ 96.42	N/A @ 185.02	N/A @ 205.16	N/A @ 240.23	
Lead MWD Engineer	Matt Busche	Matt Busche	Matt Busche	Matt Busche	
Customer Representative	Sam Taylor	Sam Taylor	Terry Bradshaw	Terry Bradshaw	

SENSOR INFORMATION

Downhole Processor Information					
Tool Type	PCM	PCM	PCM	HCIM	
Software Version	5.84	5.84	5.84	88.56	
Sub Serial Number	11847568	11341324	11341324	90368385	
Insert Serial Number	11145581	11227549	11145581	11709656	
Date and Time Initialized	13-Jul-13 18:39	15-Jul-13 13:33	19-Jul-13 00:21	21-Jul-13 08:20	
Date and Time Read	15-Jul-13 04:23	19-Jul-13 08:29	20-Jul-13 15:33	23-Jul-13 22:06	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information					
Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	56.00	45.28	42.18	48.06	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11847568	11341324	11341324	11991621	
Sonde Serial Number	11833228	11297584	11833228	11297584	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	111.28	276.84	199.17	25.71	

Gamma Ray Sensor Information					
Tool Type	N/A	PCG	PCG	DGR	
Distance From Bit (ft)	N/A	50.23	47.13	70.07	
Recorded Sample Period (sec)	N/A	10	10	8	
Software Version	N/A	8.15	8.15	N/A	
Sub Serial Number	N/A	11341324	11341324	90368385	
Insert/Sonde Serial Number	N/A	11579782	11293285	272793	

REMARKS
<p>1. All depths are calibrated to the driller's pipe tally and are measured bit depths, measured from the drill floor.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. Critical annular velocities have been calculated using the "Power Law" model for water based fluids and the "Bingha Plastic" model for syntheic and oil based fluids.</p> <p>4. All data presented is recorded (memory) data unless otherwise stated. ROPA is real time data</p> <p>5. Enviromental parameters used to process the data are as follows: Hole Diameter: 8.75 and 6.13 inches Mud Weight: 8.5-10.2 ppg KCI Concentration: 0%</p> <p>6. 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 DGRCC: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill</p> <p>7. Switch from PCG to DGR</p> <p>7. Insite Version 7.4.2</p>

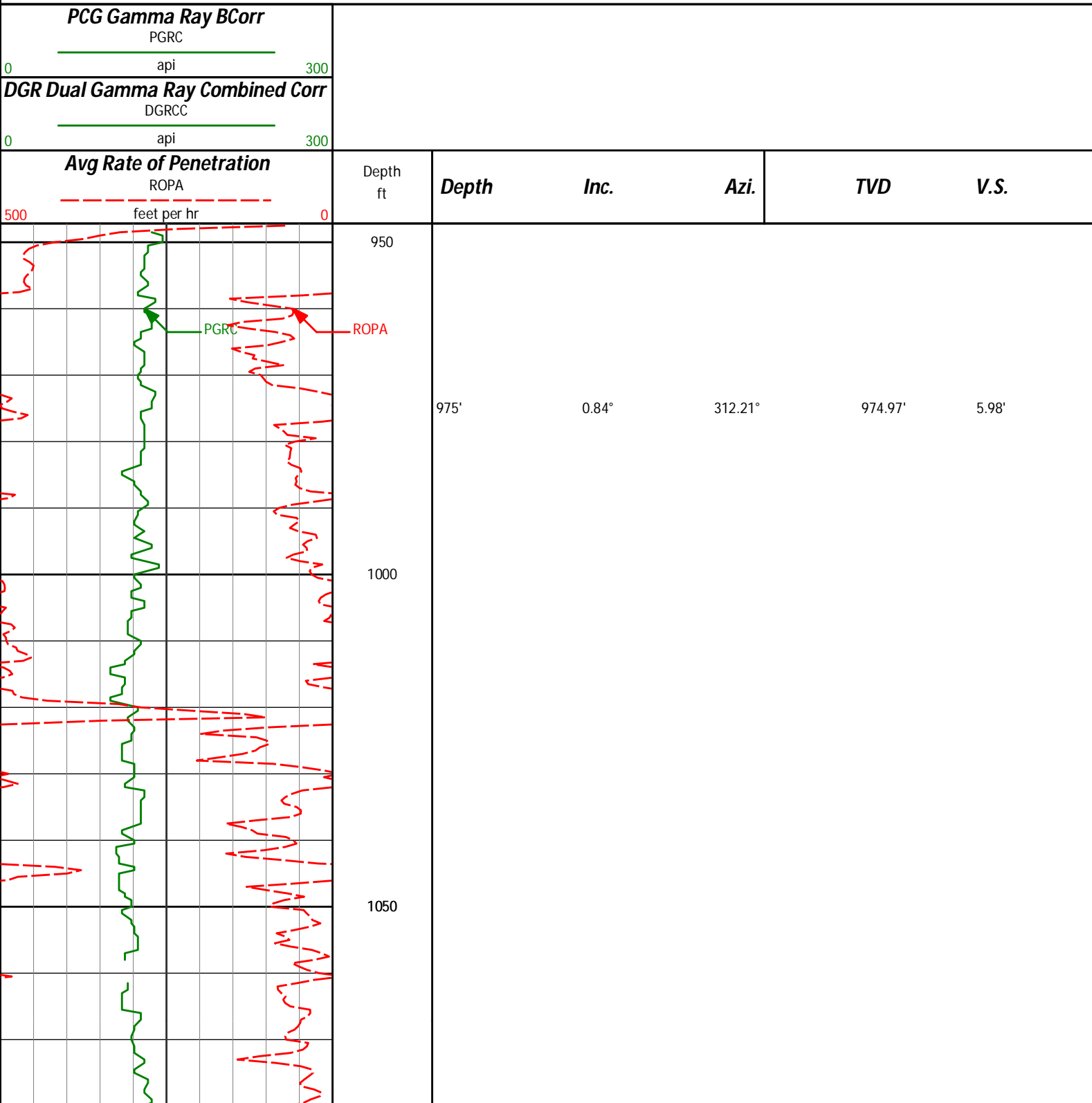
WARRANTY

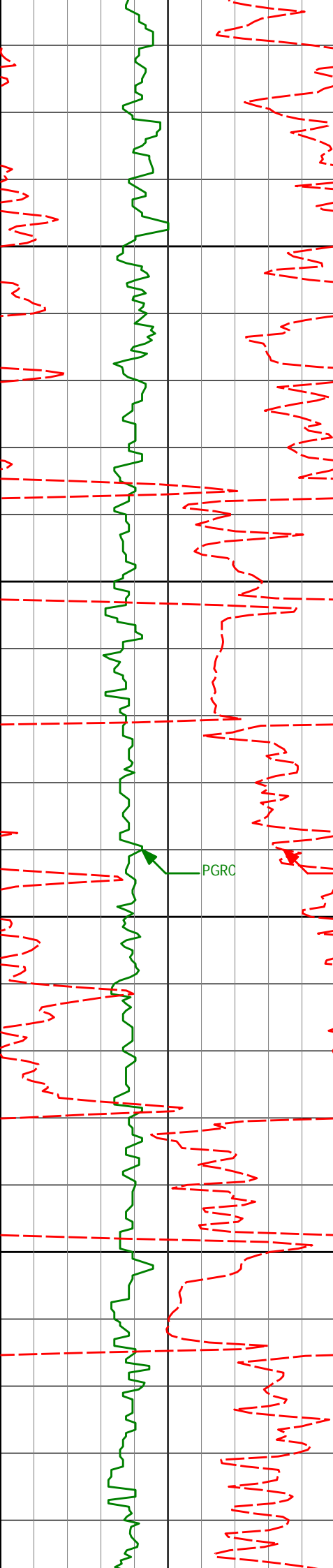
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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Anadarko
USA Fed 29C-36HZ
Ensign 132
Weld County, CO





1350

1400

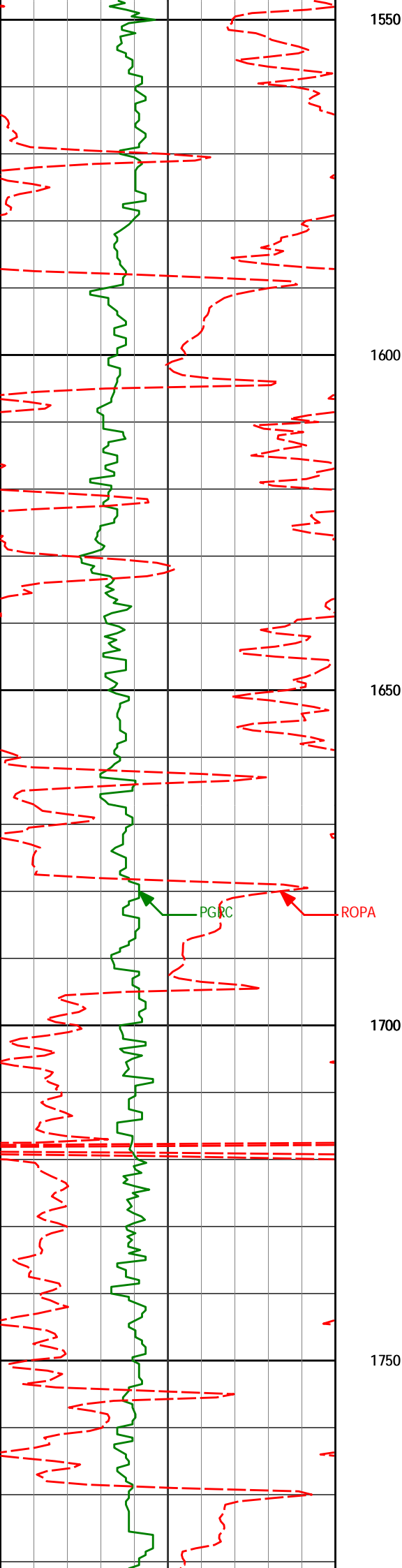
1450

1500

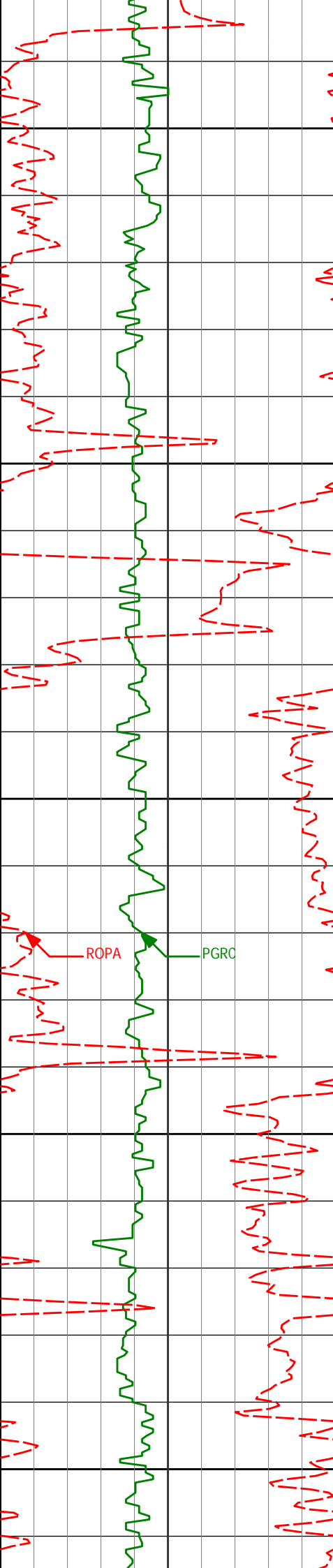
1341'	3.11°	275.36°	1340.86'	10.32'
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1432'	4.65°	255.86°	1431.65'	9.78'
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1524'	6.65°	242.65°	1523.20'	6.59'
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1616'	7.84°	230.04°	1614.47'	0.31'
1708'	8.86°	219.98°	1705.50'	-8.95'



1800

1850

1900

1950

2000

1799'

9.77°

207.49°

1795.31'

-21.00'

1891'

11.21°

209.58°

1885.77'

-35.53'

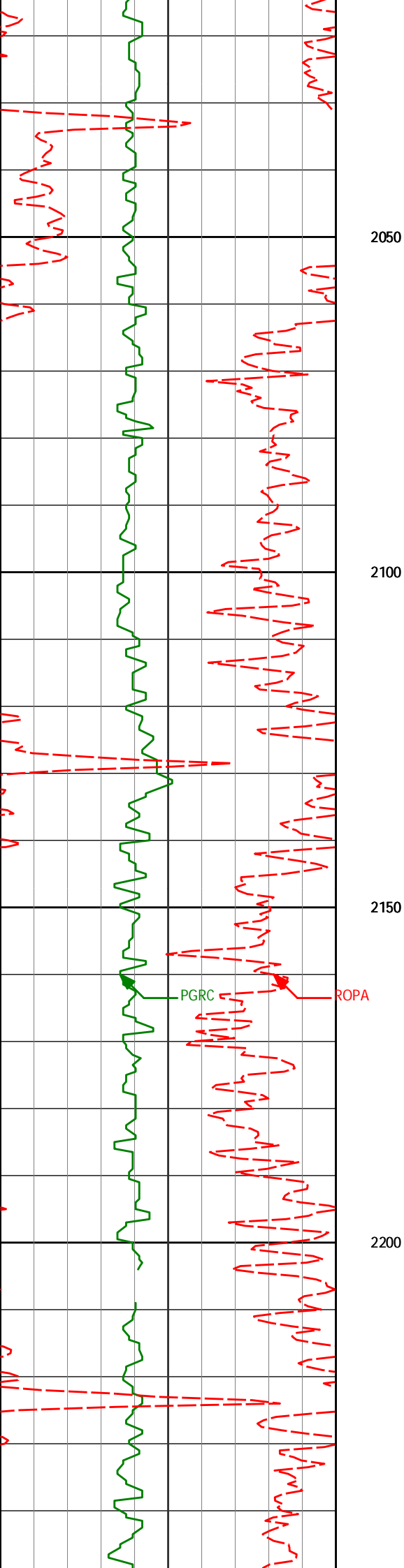
1986'

11.35°

209.07°

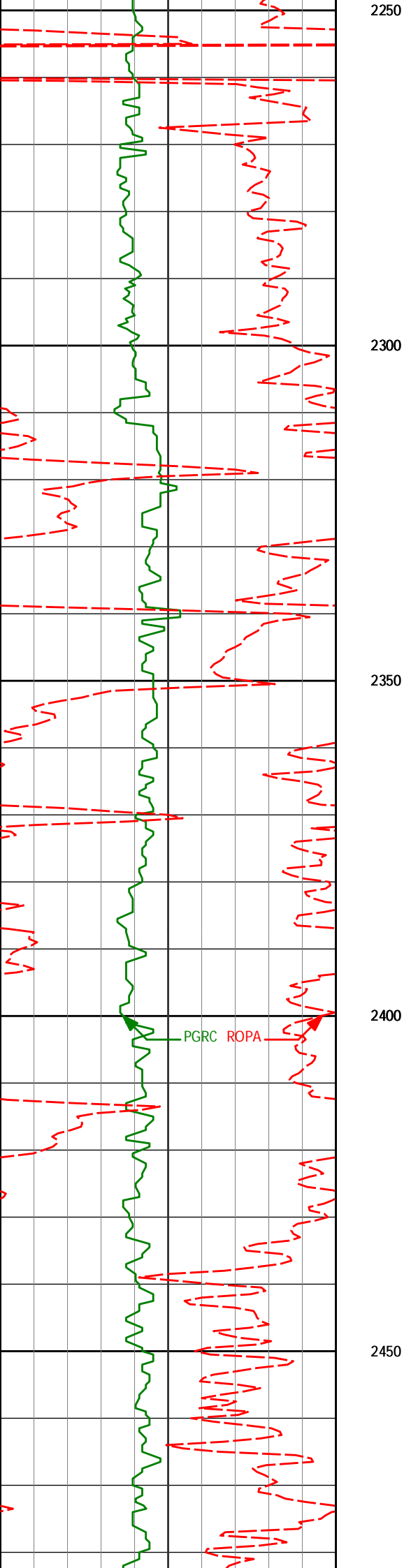
1978.93'

-51.54'



2081'	11.03°	208.76°	2072.13'	-67.49'
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2176'	10.59°	209.39°	2165.44'	-82.88'
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2271' 10.05° 209.93° 2258.91' -97.49'

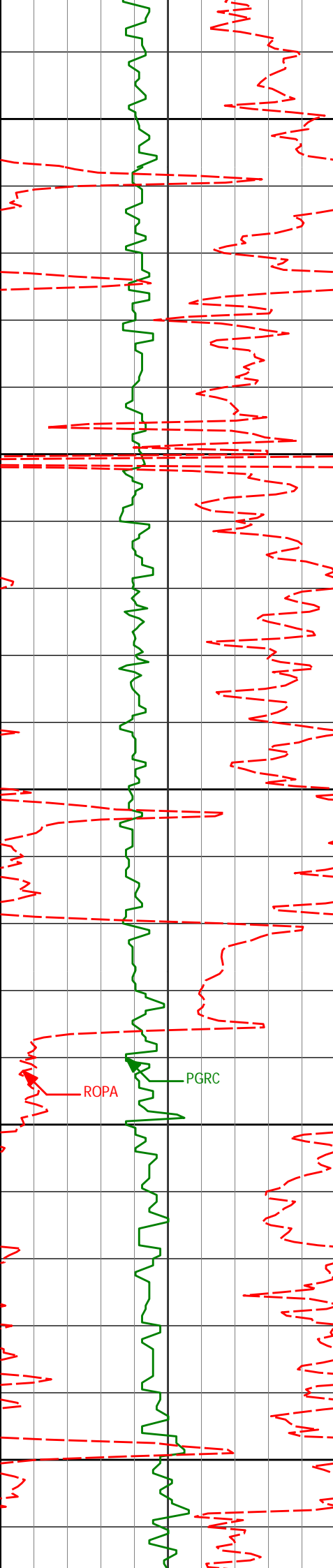
2300

2350

2366' 11.23° 209.92° 2352.27' -112.51'

2400

2450



2500

2550

2600

2650

2700

2556'

9.06°

212.22°

2539.29'

-140.84'

2651'

10.54°

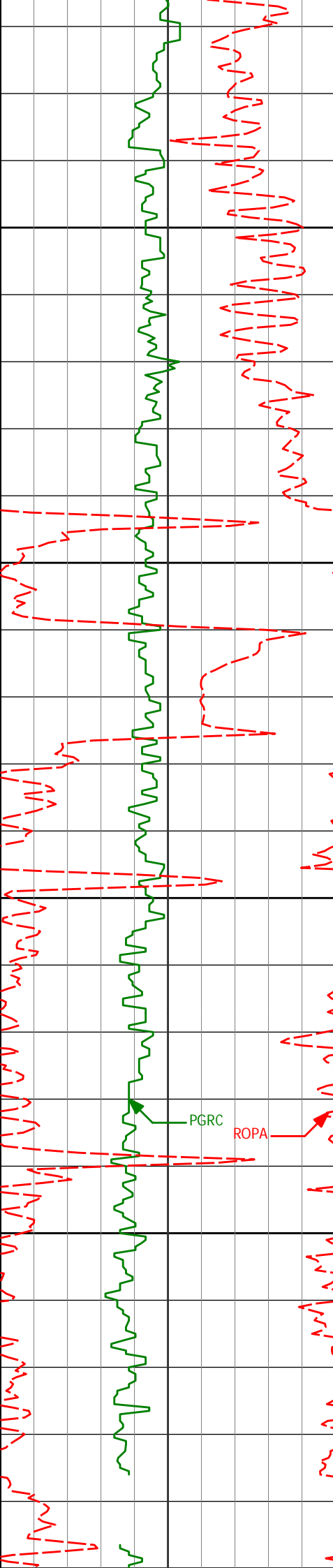
207.51°

2632.90'

-154.70'

ROPA

PGRC



2750

2800

2850

2900

2950

2746'

9.16°

209.29°

2726.50'

-168.84'

2842'

10.74°

210.38°

2821.05'

-183.05'

2937'

10.74°

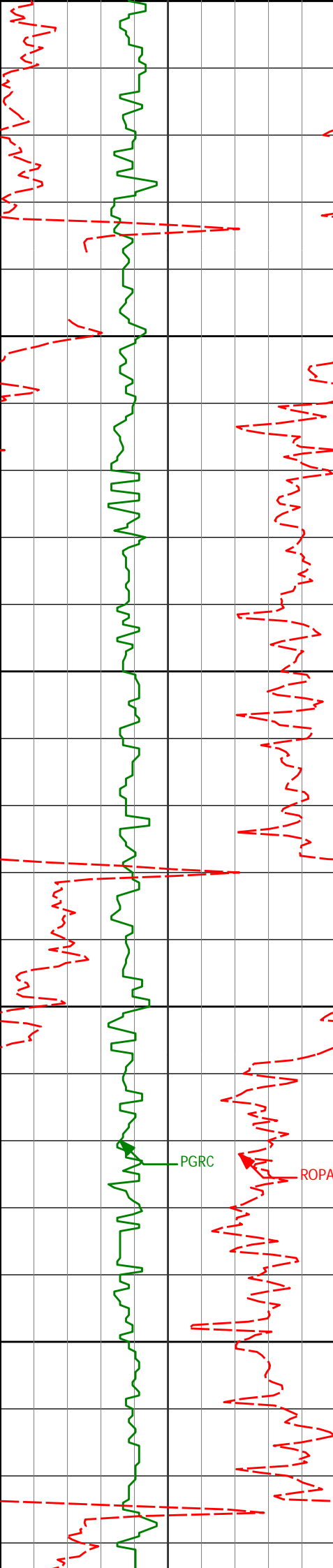
212.42°

2914.39'

-197.96'

PGRC

ROPA



2950

3000

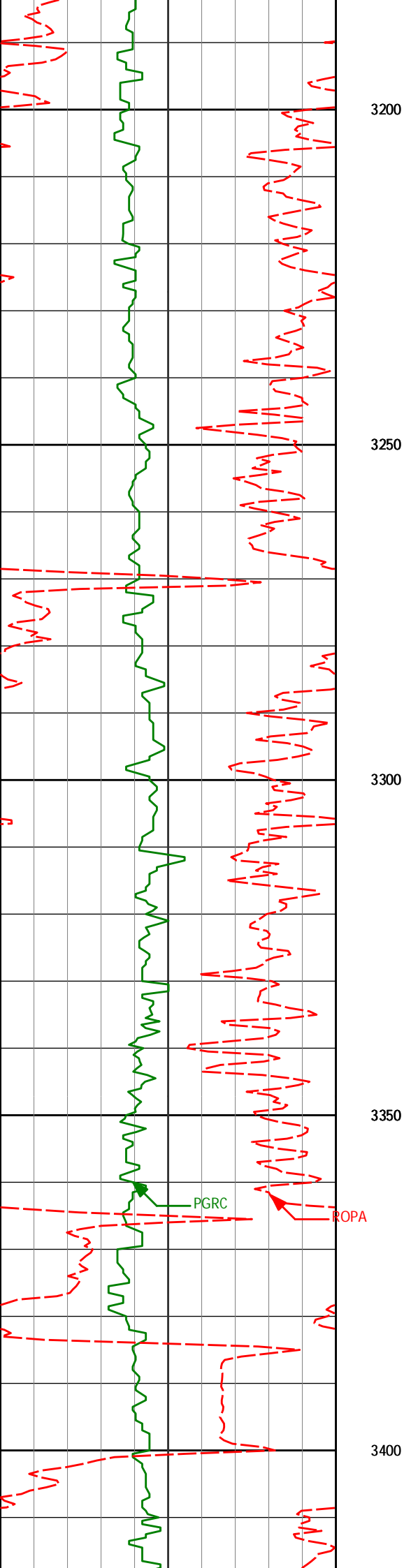
3050

3100

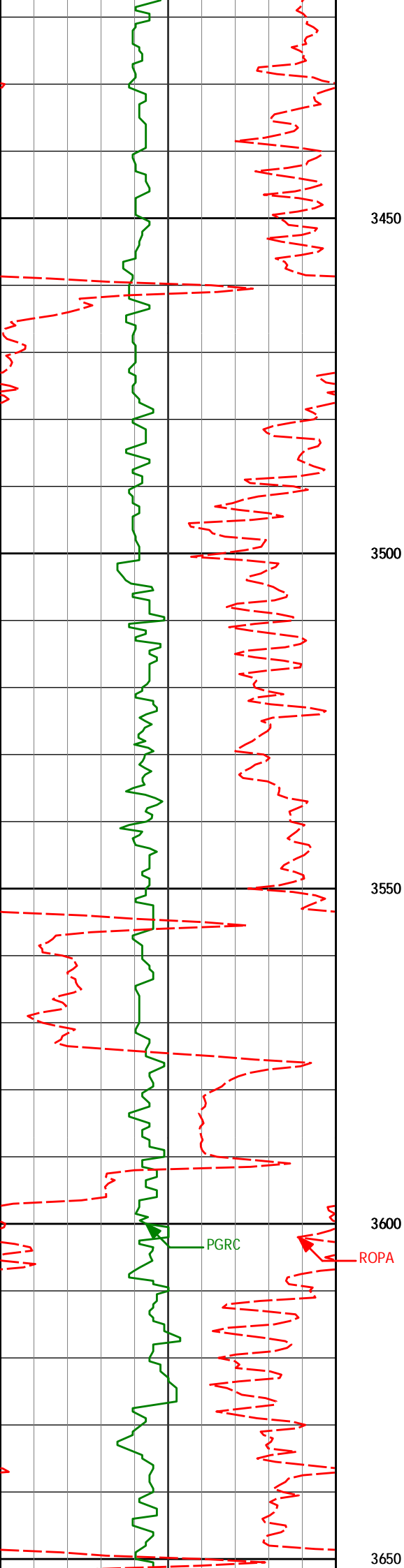
3150

3032'	10.80°	212.55°	3007.72'	-212.74'
-------	--------	---------	----------	----------

3127'	10.65°	212.76°	3101.06'	-227.42'
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3200				
3222'	10.51°	214.31°	3194.44'	-241.76'
3250				
3300				
3317'	9.35°	213.18°	3288.02'	-255.18'
3350				
3400				
3412'	10.41°	208.97°	3381.61'	-268.97'



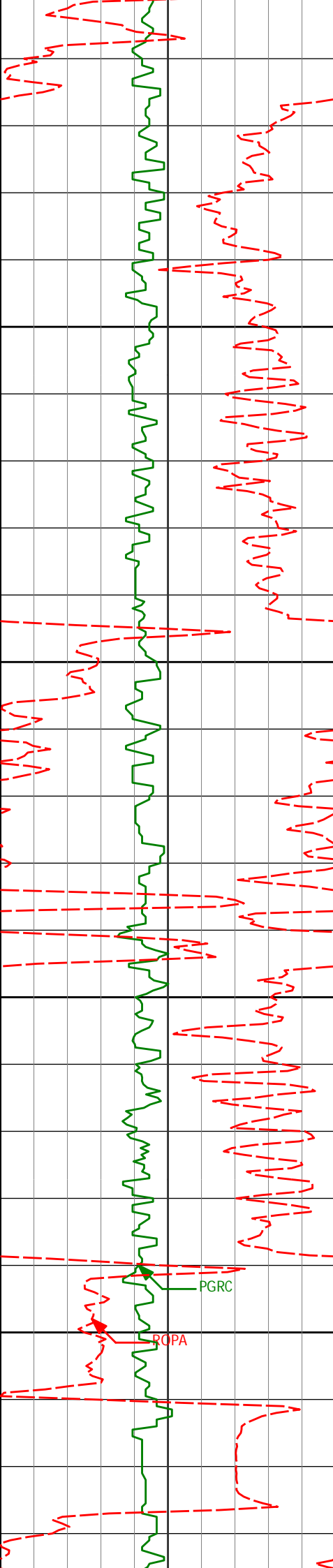
3508'

9.61°

210.67°

3476.15'

-283.28'



3700

3750

3800

3850

3698'

9.78°

207.72°

3663.43'

-310.87'

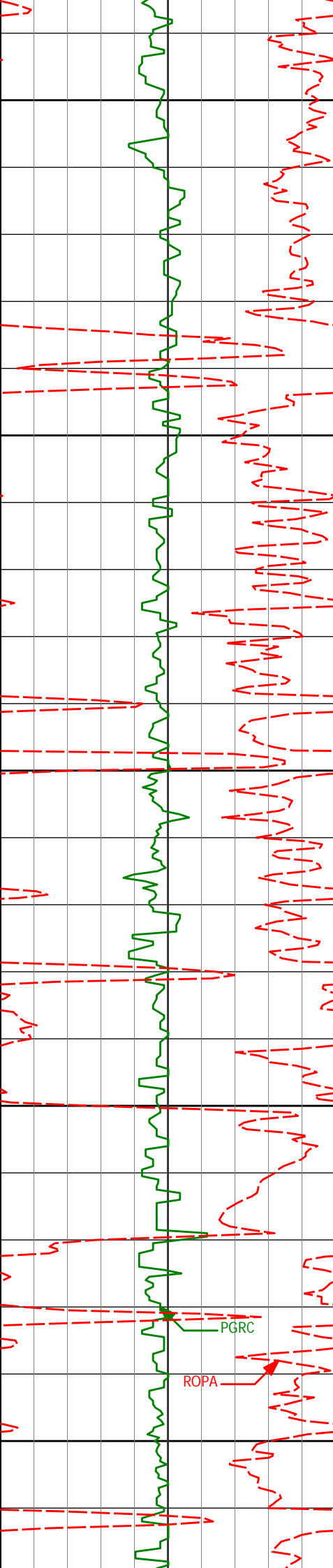
3793'

8.46°

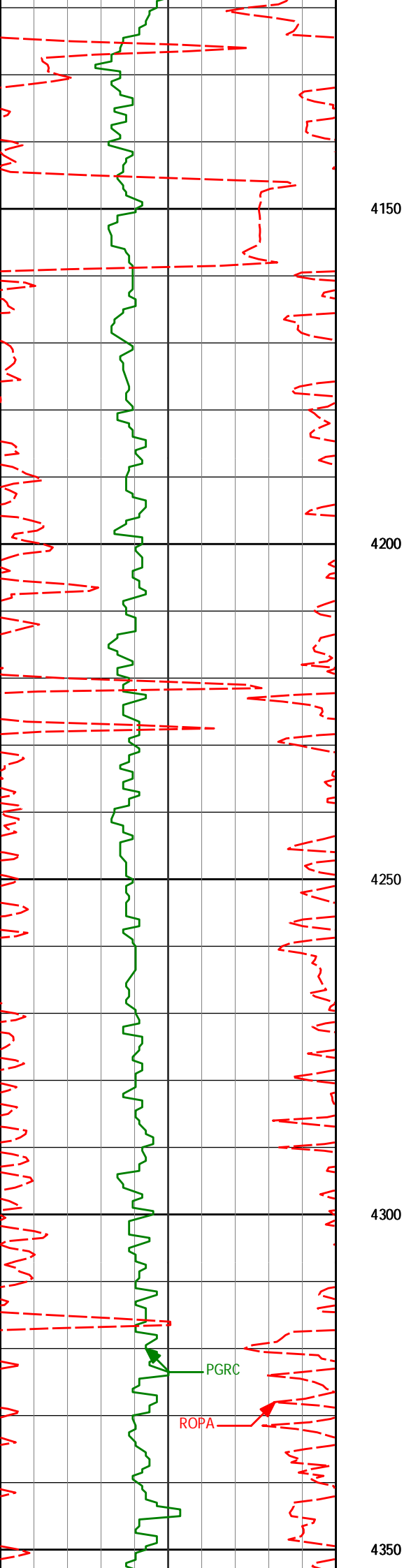
208.58°

3757.23'

-324.00'



3888'	9.93°	210.03°	3851.01'	-337.07'
3983'	8.78°	210.49°	3944.74'	-350.25'
4078'	9.67°	206.31°	4038.51'	-363.50'



4173'

10.58°

210.46°

4132.03'

-378.00'

4150

4200

4250

4269'

10.95°

210.40°

4226.34'

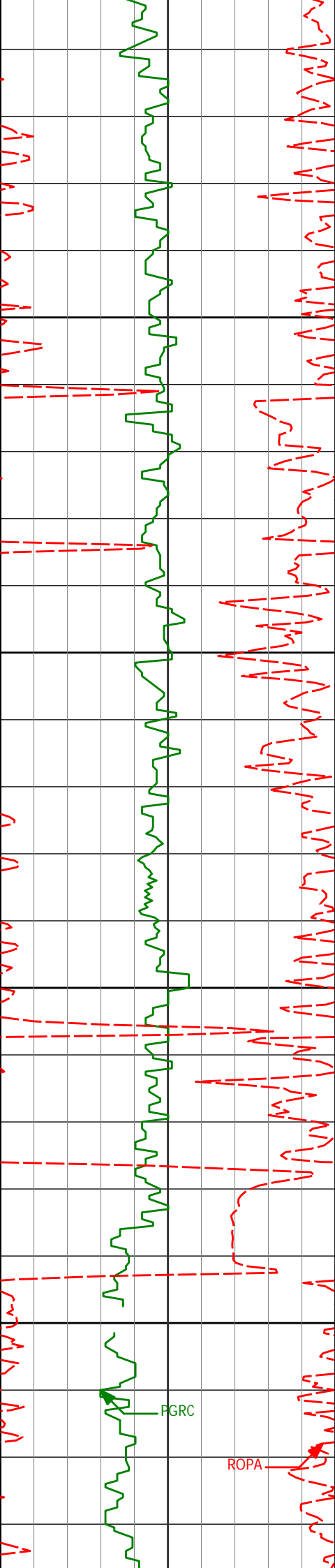
-393.27'

4300

4350

PGRC

ROPA



4400

4450

4500

4550

4364'

10.61°

212.39°

4319.67'

-408.24'

4459'

9.28°

212.11°

4413.24'

-421.93'

4554'

10.58°

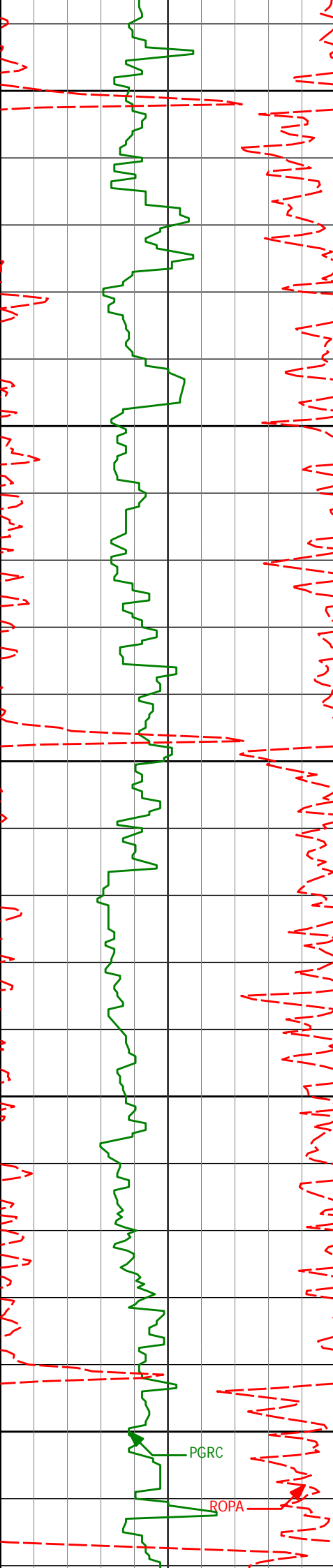
208.96°

4506.81'

-435.87'

PGRC

ROPA



4600

4650

4700

4750

4800

PGRC

ROPA

4649'

10.47°

209.48°

4600.22'

-450.84'

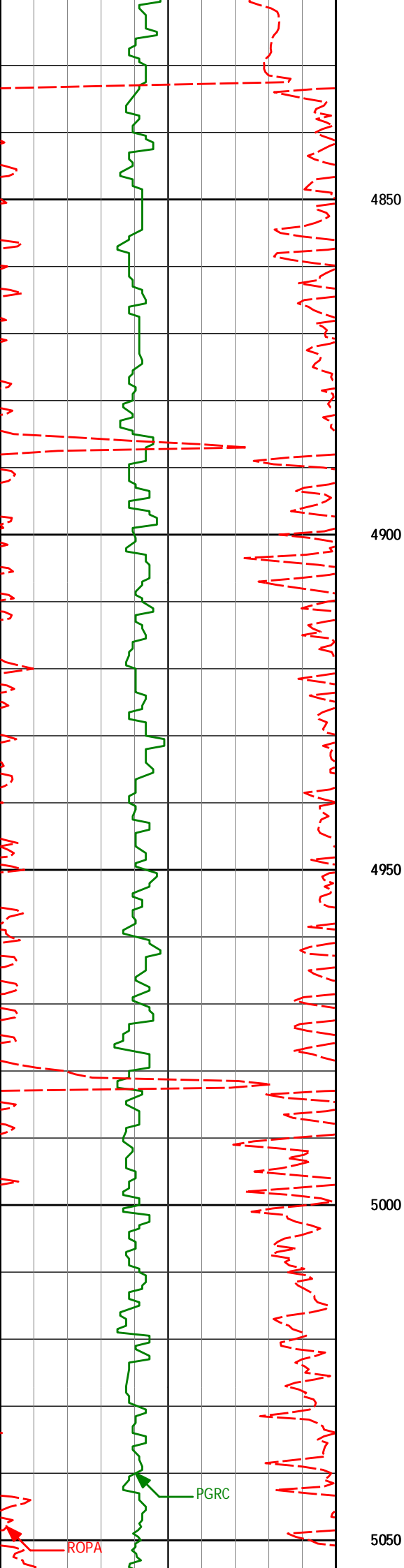
4744'

9.46°

210.14°

4693.78'

-464.93'



4839'

10.30°

207.98°

4787.37'

-479.02'

4850

4900

4934'

9.92°

208.87°

4880.90'

-493.52'

4950

5000

5030'

9.06°

208.79°

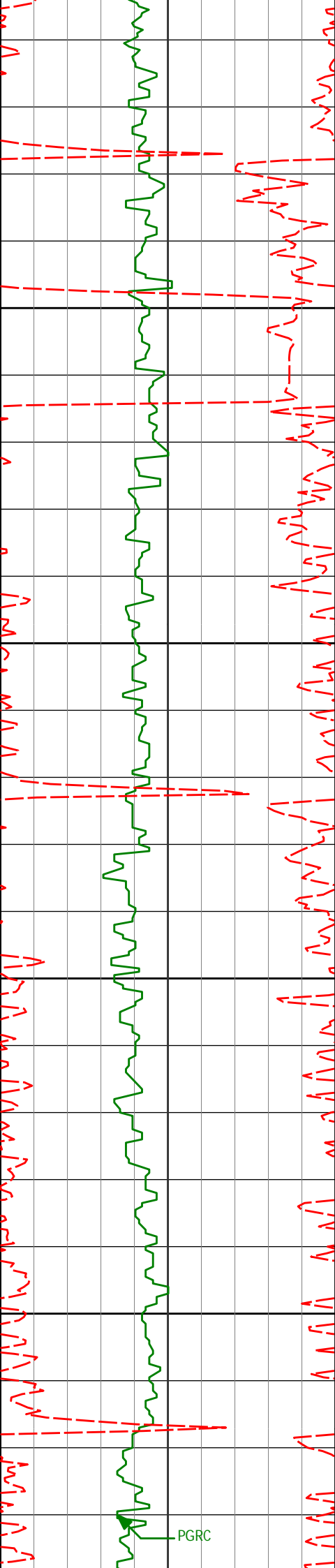
4975.58'

-507.22'

5050

PGRC

ROPA



5100

5125'

9.54°

200.45°

5069.34'

-521.02'

5150

5200

5220'

8.40°

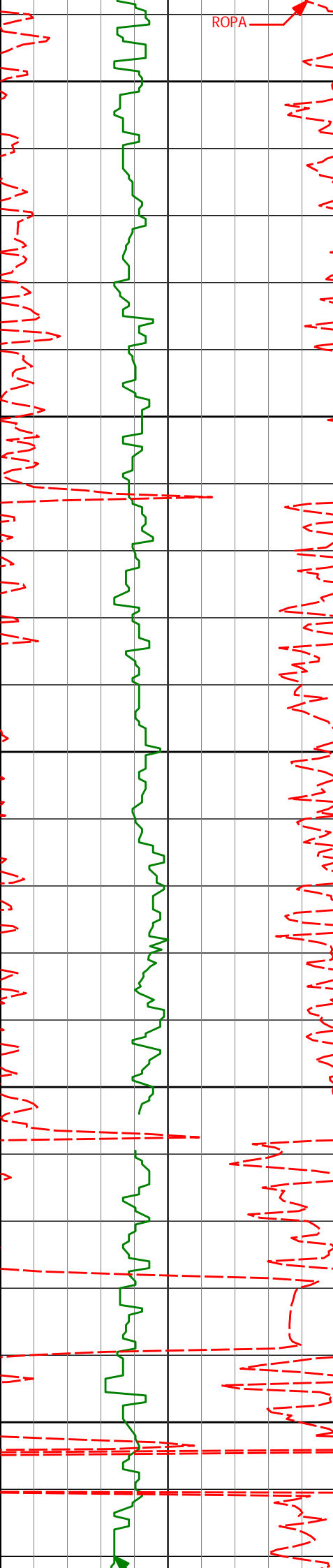
200.80°

5163.17'

-534.77'

5250

PGRC



5300

5315'

7.54°

202.46°

5257.26'

-546.91'

5350

5400

5410'

6.40°

206.13°

5351.55'

-557.33'

5450

5500

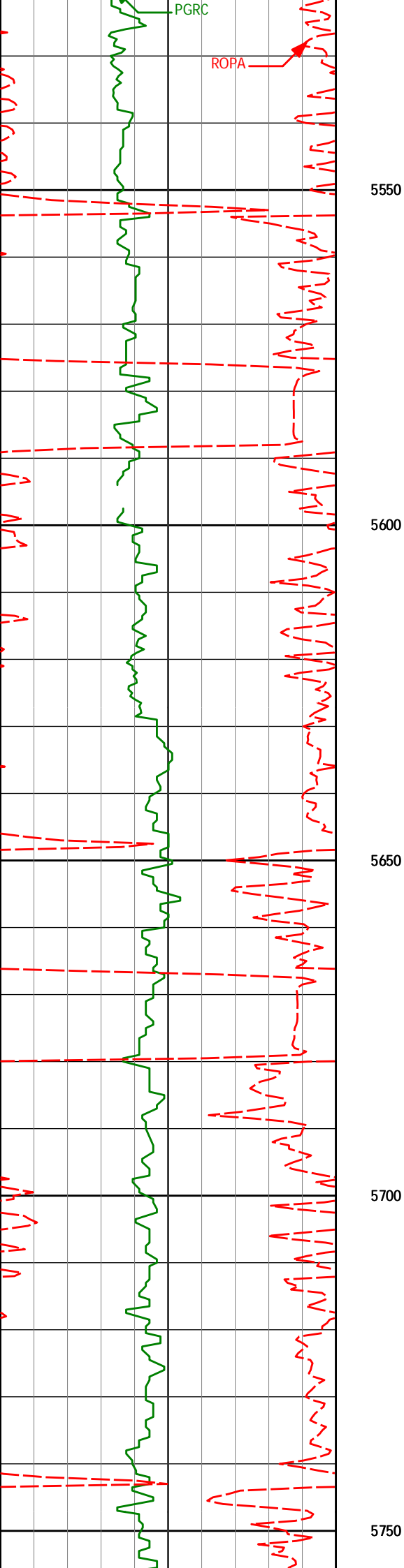
5505'

4.42°

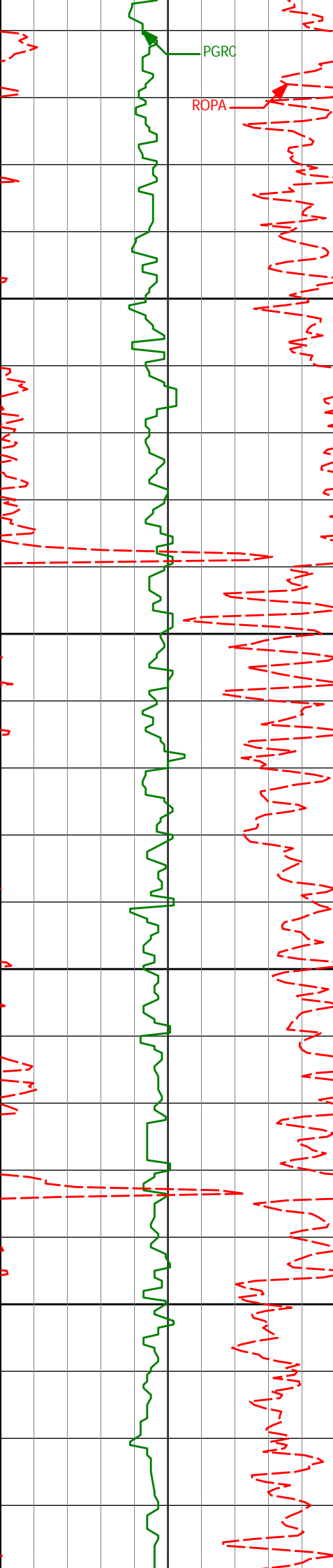
204.66°

5446.12'

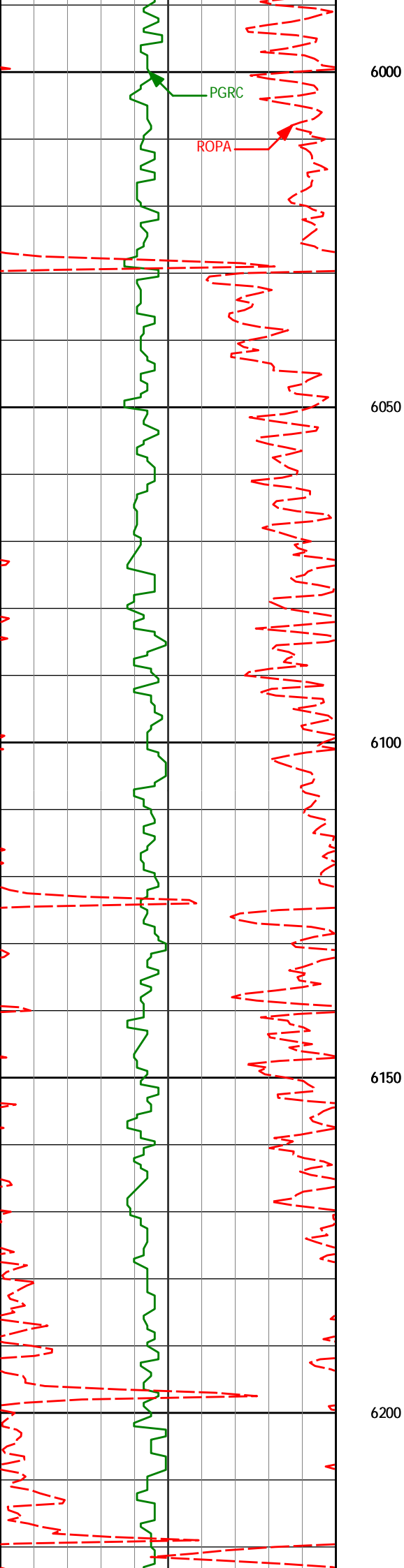
-565.33'



5600'	2.57°	199.62°	5540.94'	-570.61'
5695'	0.48°	160.74°	5635.91'	-572.98'



5790'	0.10°	151.52°	5730.90'	-573.44'
5800				
5850				
5885'	0.10°	134.93°	5825.90'	-573.57'
5900				
5950				
5980'	0.11°	135.87°	5920.90'	-573.70'



6076'

0.37°

153.44°

6016.90'

-574.04'

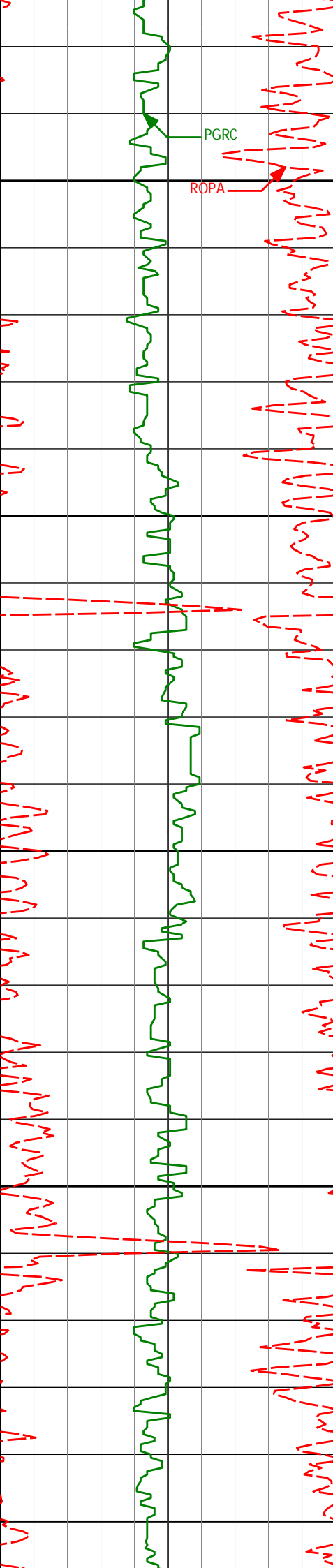
6171'

0.58°

123.94°

6111.90'

-574.60'



6250

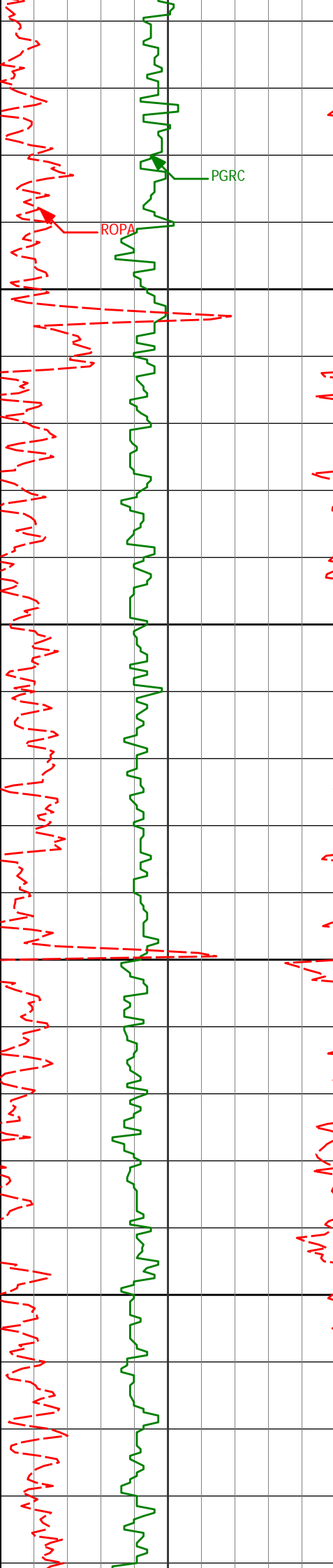
6300

6350

6400

6450

6266'	0.59°	129.26°	6206.90'	-575.19'
6361'	0.68°	126.50°	6301.89'	-575.85'
6456'	0.78°	159.14°	6396.88'	-576.81'



6500

6550

6600

6650

6551'

1.02°

151.75°

6491.87'

-578.17'

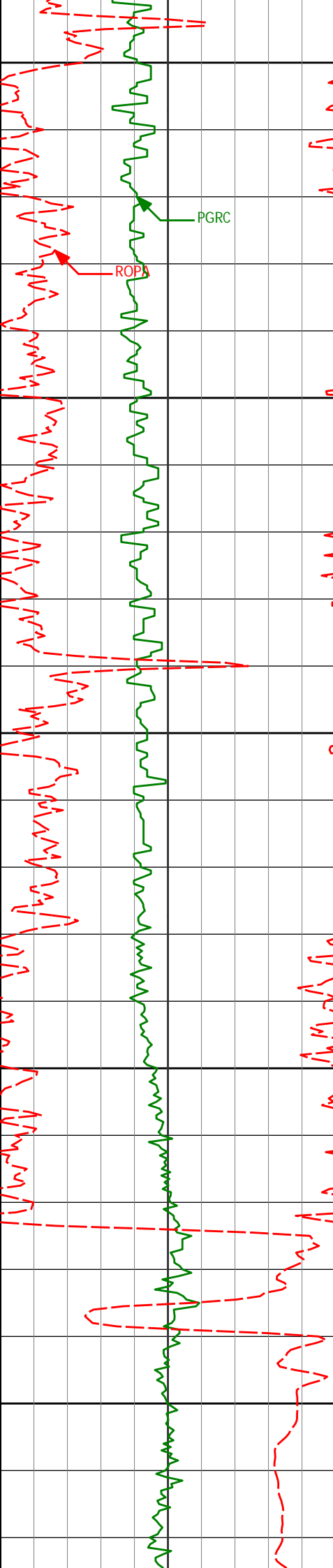
6646'

0.89°

148.18°

6586.86'

-579.56'



6700

PGRC

ROPA

6750

6800

6850

6900

6741'

0.71°

151.42°

6681.85'

-580.71'

6836'

0.68°

145.77°

6776.84'

-581.71'

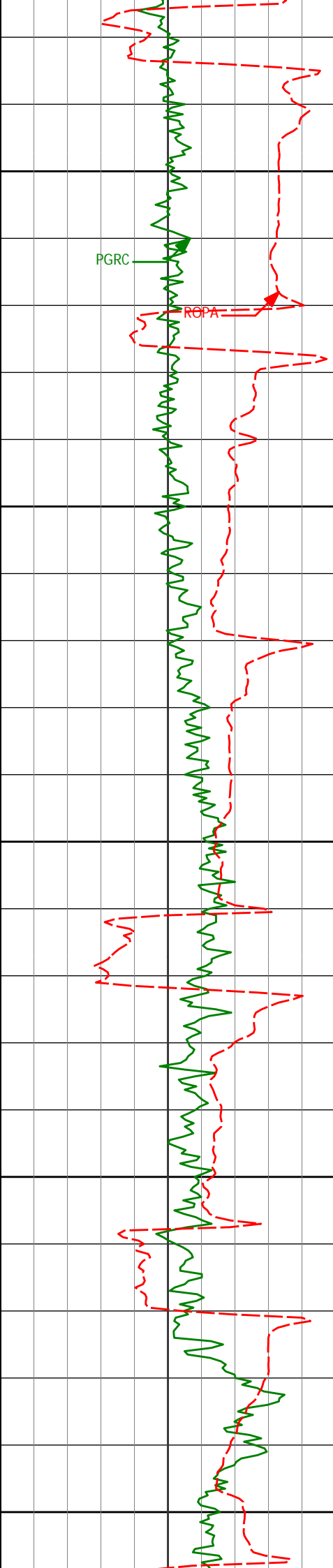
6888'

0.83°

20.32°

6828.84'

-581.62'



6950

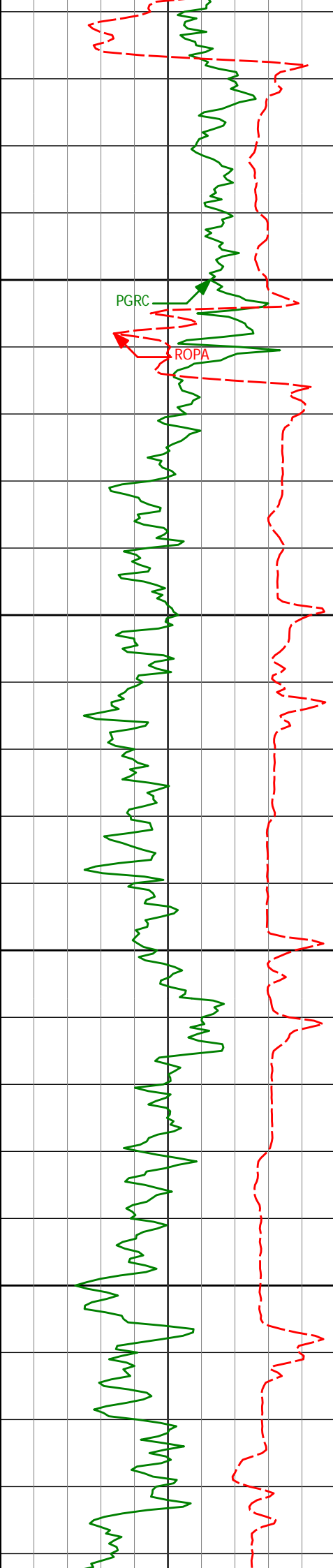
7000

7050

7100

7150

6931'	3.63°	8.78°	6871.80'	-579.99'
6973'	7.10°	2.26°	6913.61'	-576.08'
7026'	13.29°	355.59°	6965.75'	-566.72'
7074'	17.13°	355.24°	7012.06'	-554.15'
7122'	20.46°	357.07°	7057.50'	-538.71'



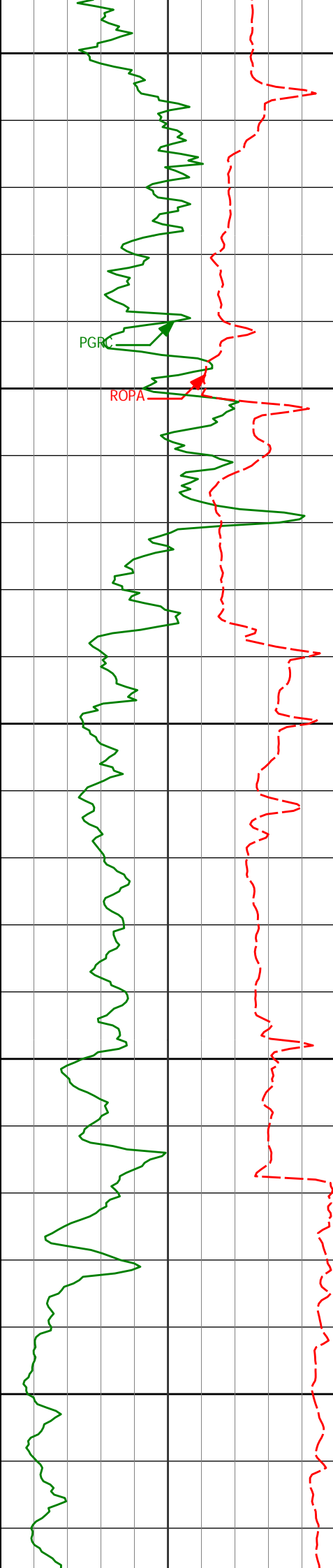
7200

7250

7300

7350

7170'	23.21°	0.76°	7102.05'	-520.87'
7217'	26.70°	0.40°	7144.66'	-501.05'
7265'	31.86°	358.83°	7186.51'	-477.59'
7312'	36.83°	358.47°	7225.30'	-451.08'
7360'	41.93°	358.54°	7262.39'	-420.63'



7400

7407'

47.76°

357.25°

7295.70'

-387.51'

7450

7455'

54.04°

356.37°

7325.96'

-350.30'

7500

7502'

59.09°

359.24°

7351.85'

-311.11'

7550

7550'

63.94°

2.89°

7374.74'

-268.97'

7600

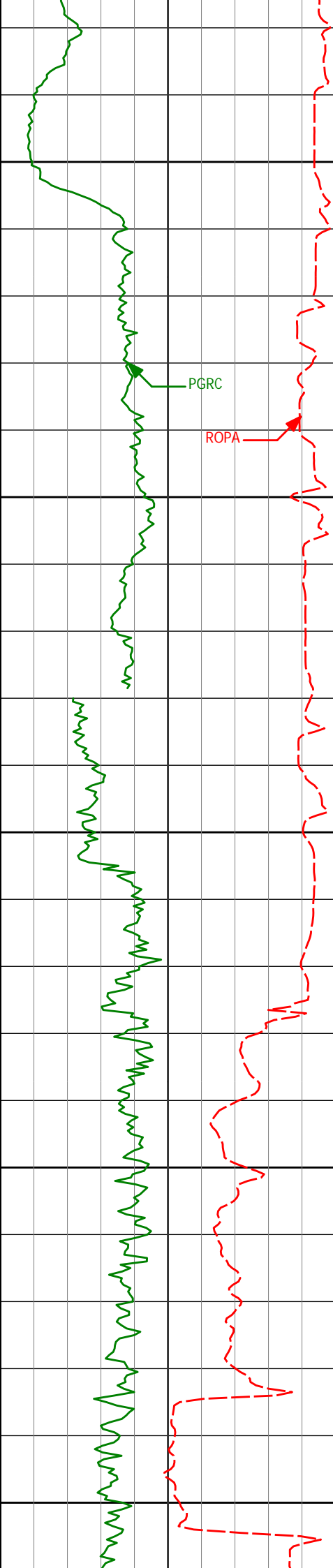
7598'

70.32°

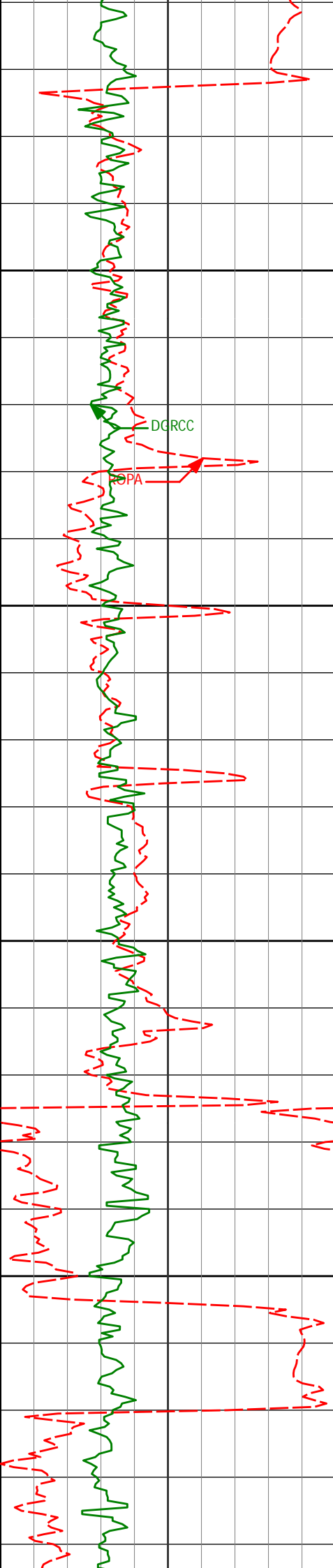
3.22°

7393.39'

-224.89'



	7630'	75.39°	2.52°	7402.82'	-194.40'
7650					
	7661'	79.31°	0.85°	7409.61'	-164.20'
7700	7693'	83.33°	0.92°	7414.44'	-132.59'
See Remark 7	7732'	88.30°	1.06°	7417.28'	-93.74'
7750					
	7786'	89.63°	0.50°	7418.26'	-39.78'
7800					
7850					



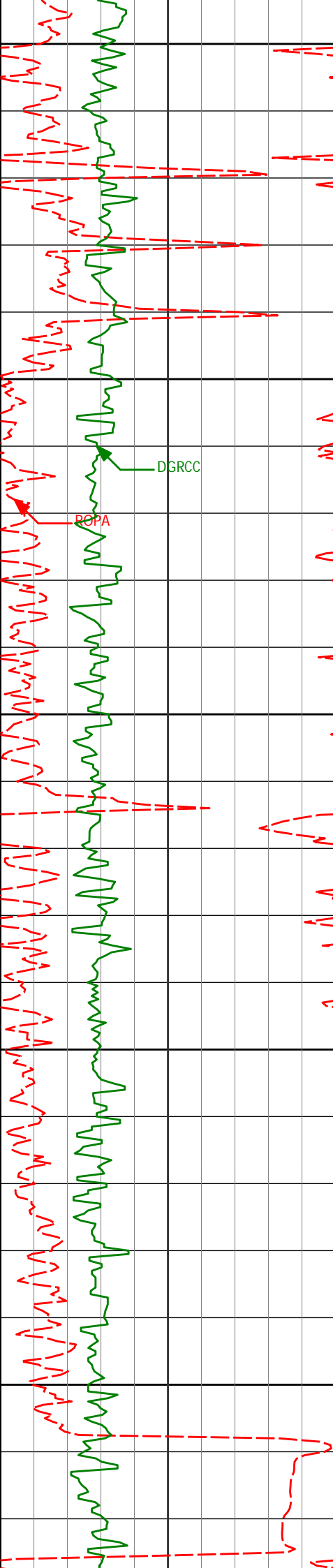
7900

7950

8000

8050

7881'	91.05°	1.31°	7417.69'	55.15'
7976'	90.87°	1.31°	7416.10'	150.05'
8071'	91.30°	359.39°	7414.30'	244.99'



8100

8150

8200

8250

8300

DGRCC

ROPA

8166'

91.30°

358.37°

7412.15'

339.97'

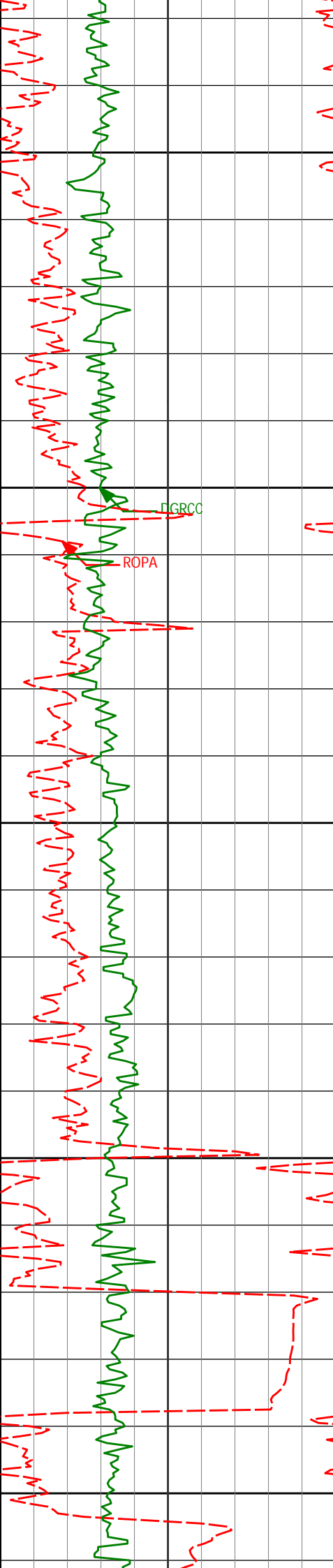
8261'

90.99°

357.30°

7410.25'

434.93'



8350

8356'

89.07°

358.33°

7410.20'

529.91'

8400

DGRCC

ROPA

8450

8451'

88.08°

356.75°

7412.56'

624.86'

8500

8550

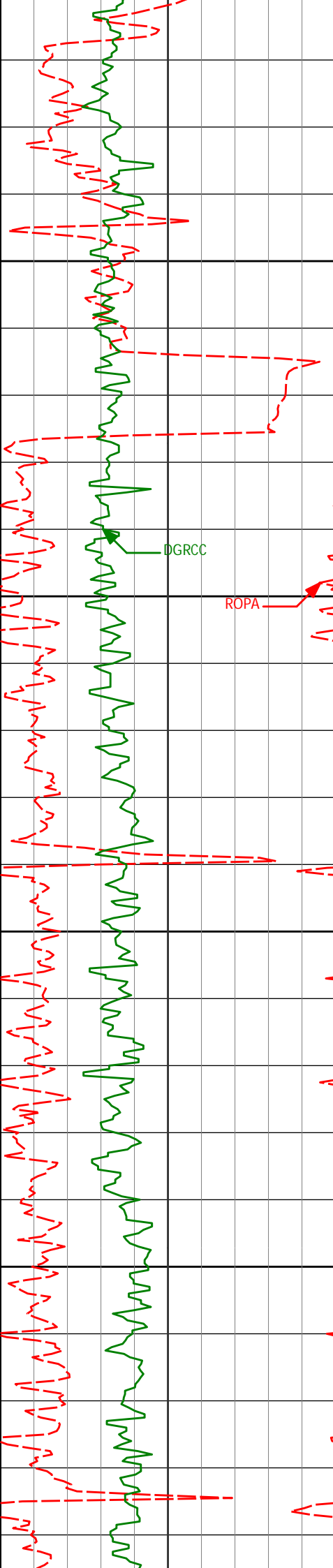
8546'

89.57°

358.14°

7414.51'

719.81'



8600

8641'

90.06°

0.32°

7414.82'

814.80'

8650

DGRCC

ROPA

8700

8736'

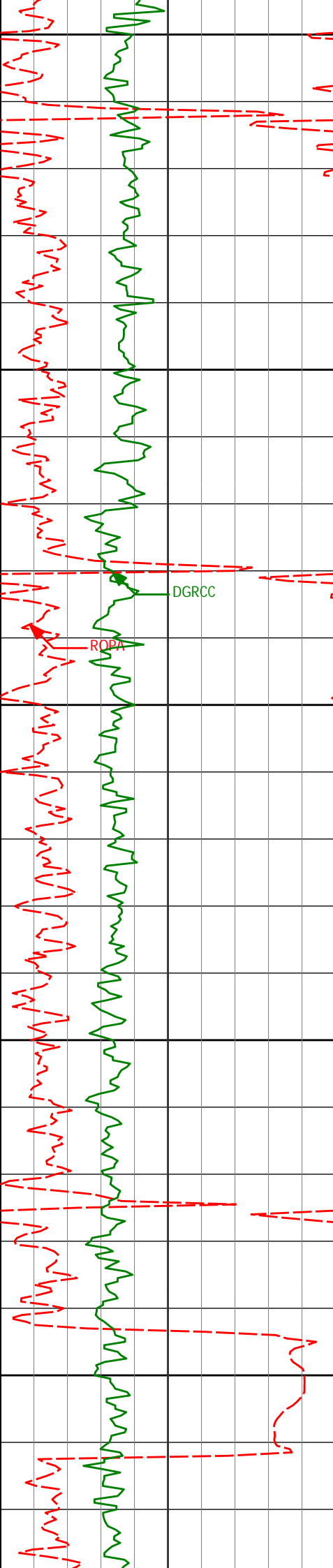
89.81°

359.86°

7414.92'

909.77'

8750



8800

8831'

89.26°

359.12°

7415.70'

1004.76'

8850

DGRCC

ROPA

8900

8927'

88.64°

358.50°

7417.46'

1100.74'

8950

9000

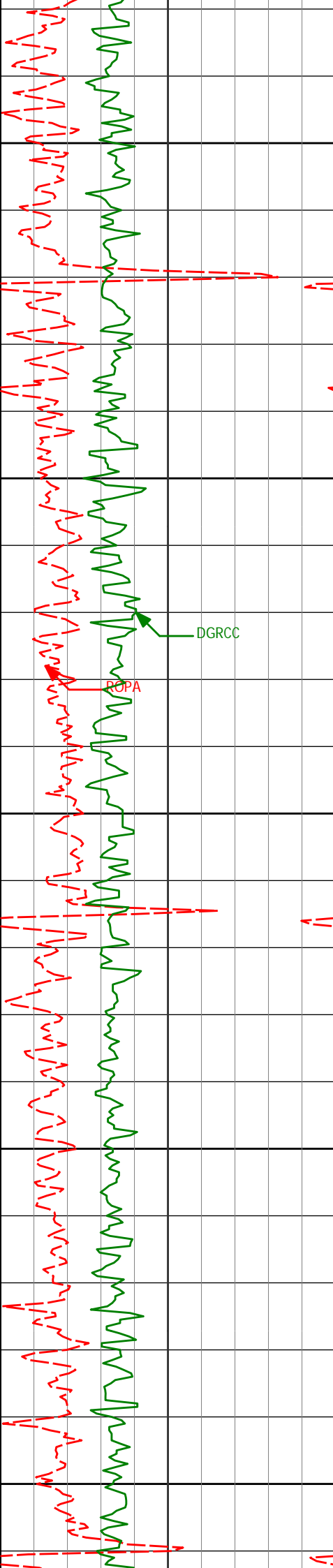
9022'

90.43°

357.16°

7418.23'

1195.72'



9050

9100

9150

9200

9250

9117'

90.62°

356.98°

7417.36'

1290.67'

DGRCC

ECPA

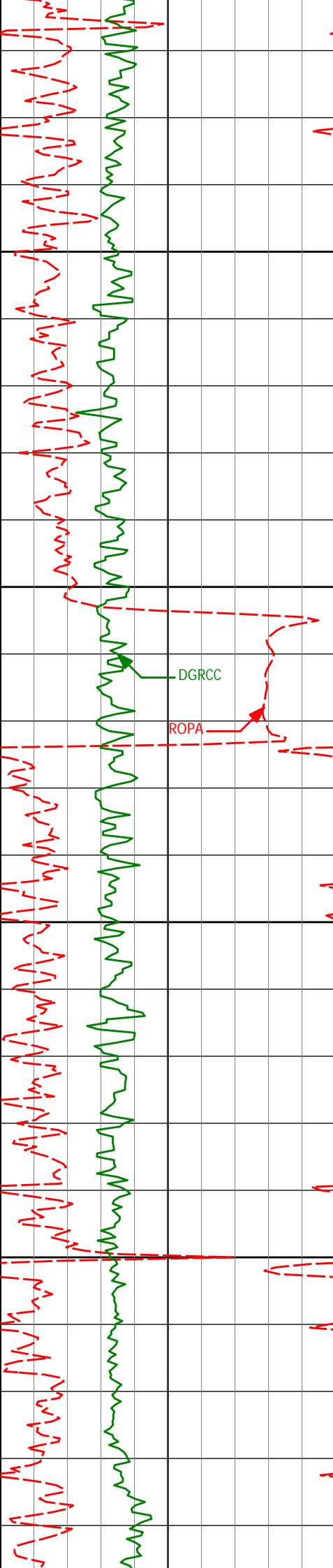
9212'

90.19°

356.91°

7416.68'

1385.62'



9300

9307'

89.94°

356.44°

7416.58'

1480.55'

9350

DGRCC

ROPA

9400

9402'

90.31°

358.33°

7416.37'

1575.52'

9450

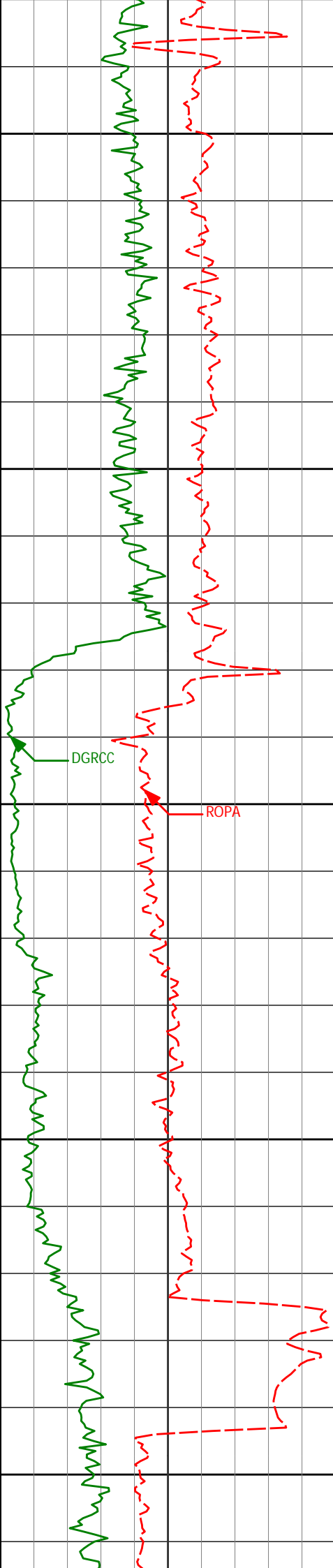
9457'

90.03°

357.10°

7416.11'

1470.50'



9750

9782'

89.69°

358.70°

7413.60'

1955.45'

9800

9850

9877'

89.26°

358.45°

7414.47'

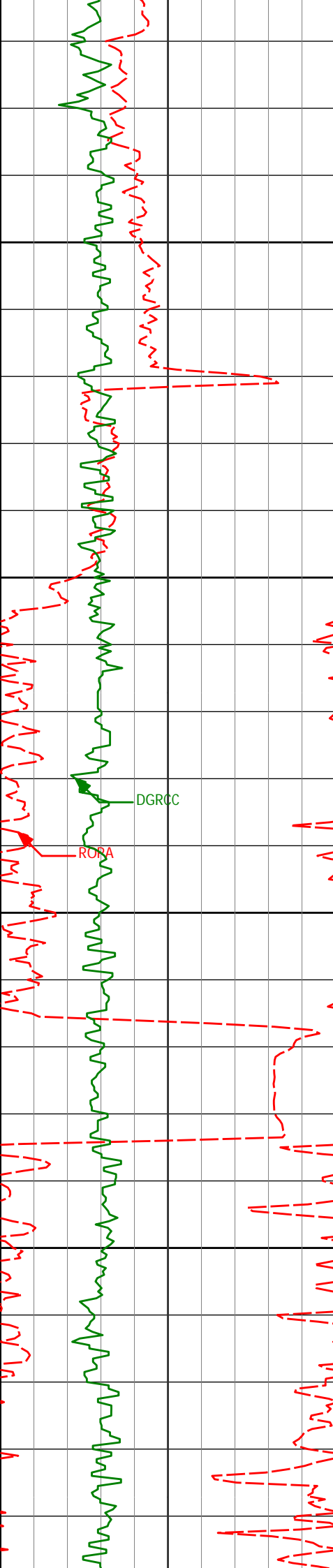
2050.44'

9900

9950

DGRCC

ROPA



9973'	90.56°	358.19°	7414.62'	2146.44'
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10000

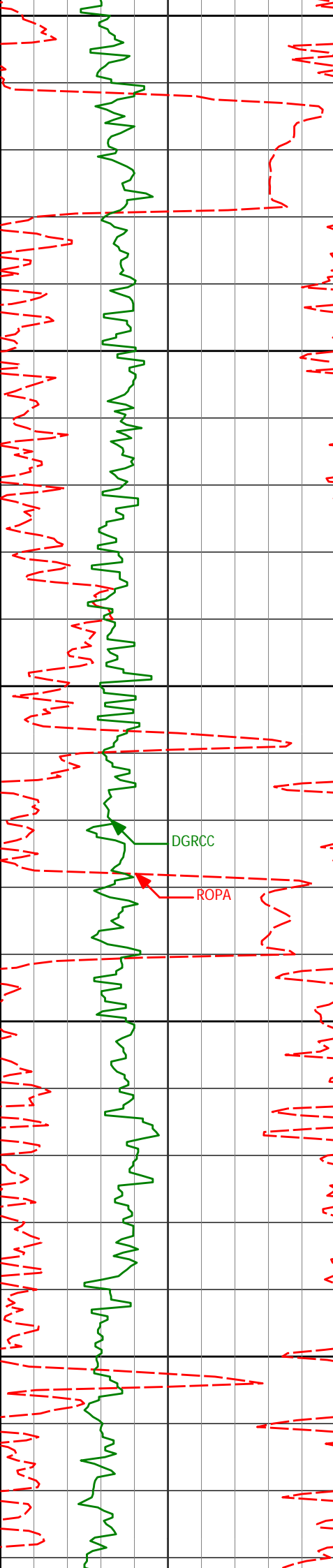
10050

10068'	88.83°	355.33°	7415.13'	2241.36'
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10100

10150

10163'	88.64°	356.74°	7417.22'	2336.22'
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10200

10250

10300

10350

10400

10258'

90.38°

358.66°

7418.04'

2431.19'

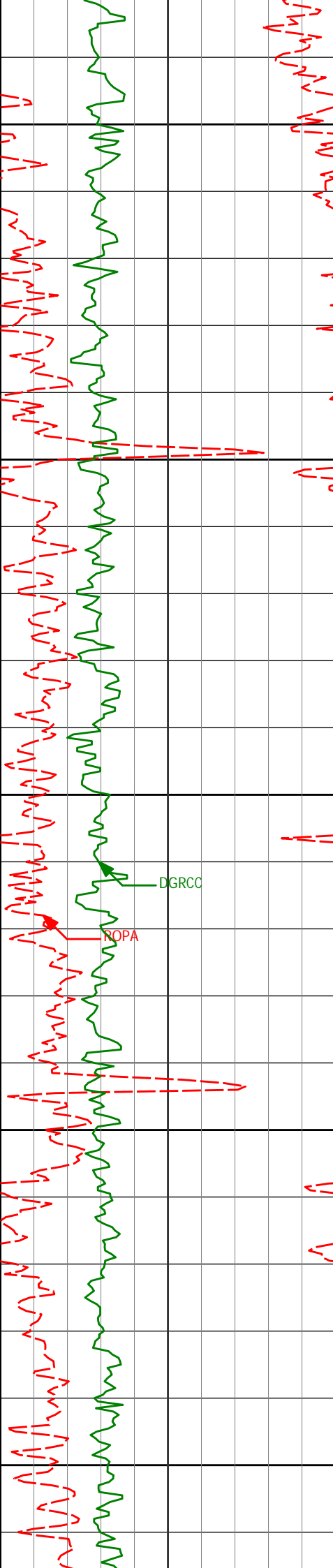
10353'

91.11°

1.50°

7416.80'

2526.15'



10450

10500

10550

10600

10650

10448'

10543'

90.74°

90.43°

1.41°

359.89°

7415.27'

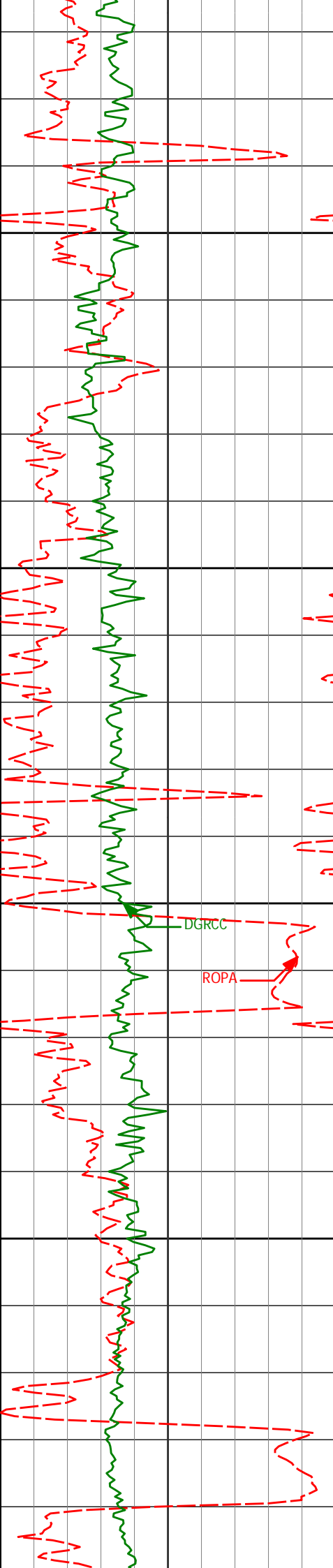
7414.30'

2621.04'

2715.98'

DGRCC

ROPA



10700

10733'

89.01°

357.57°

7415.23'

2905.96'

10750

10800

DGRCC

ROPA

10828'

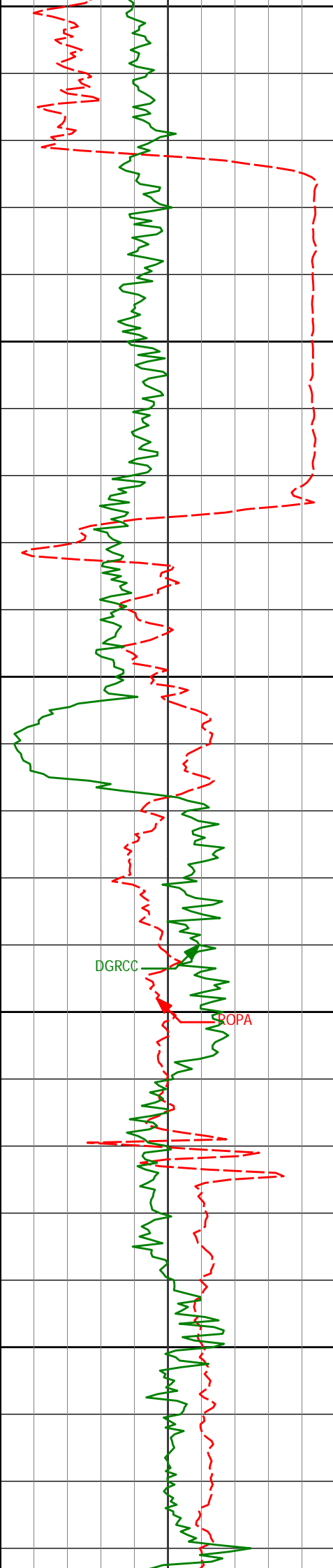
89.38°

358.14°

7416.56'

3000.94'

10850



10900

10923'

89.26°

357.87°

7417.69'

3095.92'

10950

11000

11018'

89.01°

357.18°

7419.12'

3190.89'

11050

11100

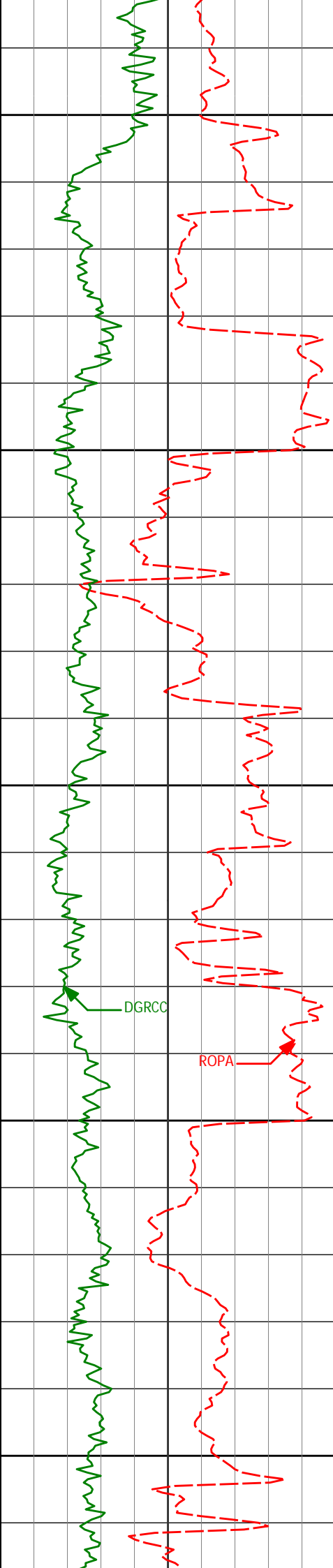
11113'

88.70°

355.60°

7421.02'

3285.78'



11150

11200

11250

11300

11350

11208'

89.51°

355.31°

7422.51'

3380.60'

11303'

90.12°

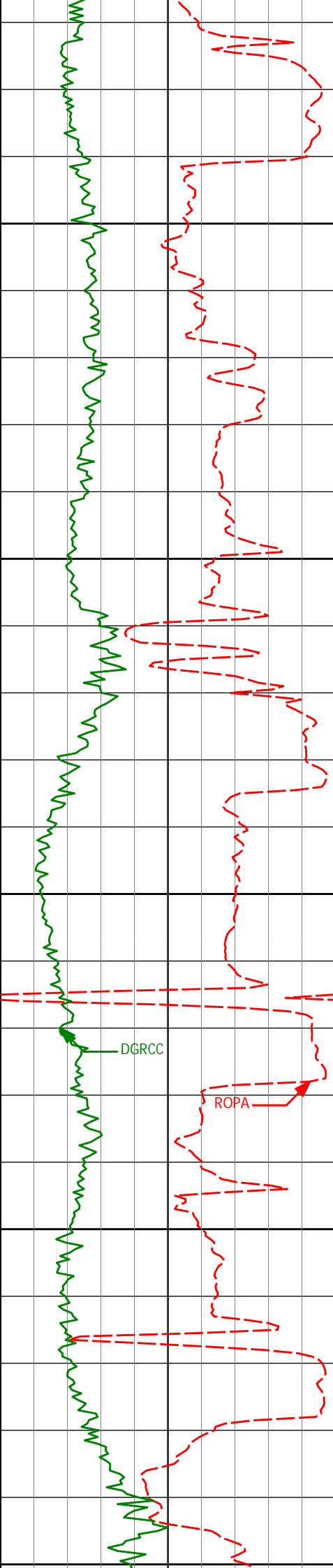
355.67°

7422.81'

3475.44'

DGRCC

ROPA



11400

11450

11500

11550

11600

11399'

11494'

11589'

90.62°

90.68°

90.56°

356.28°

357.62°

359.92°

7422.19'

7421.11'

7420.09'

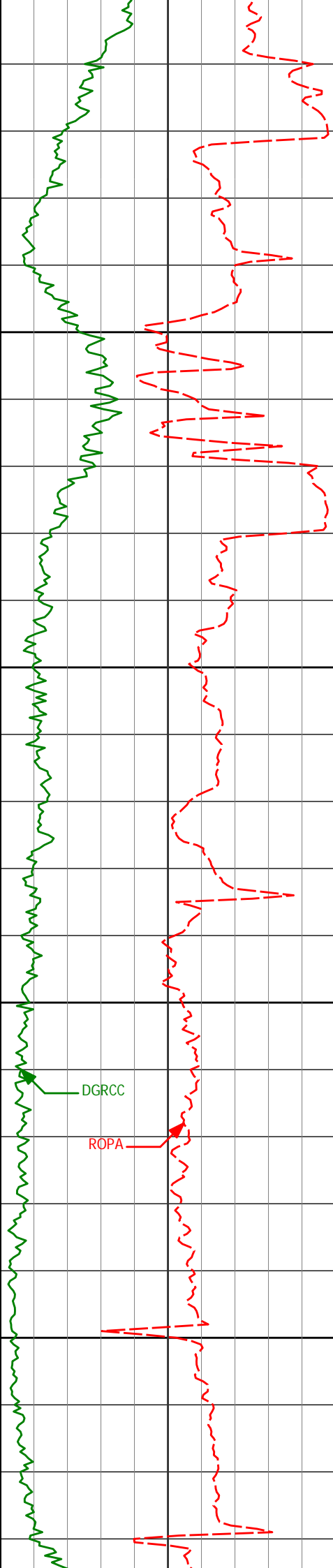
3571.32'

3666.26'

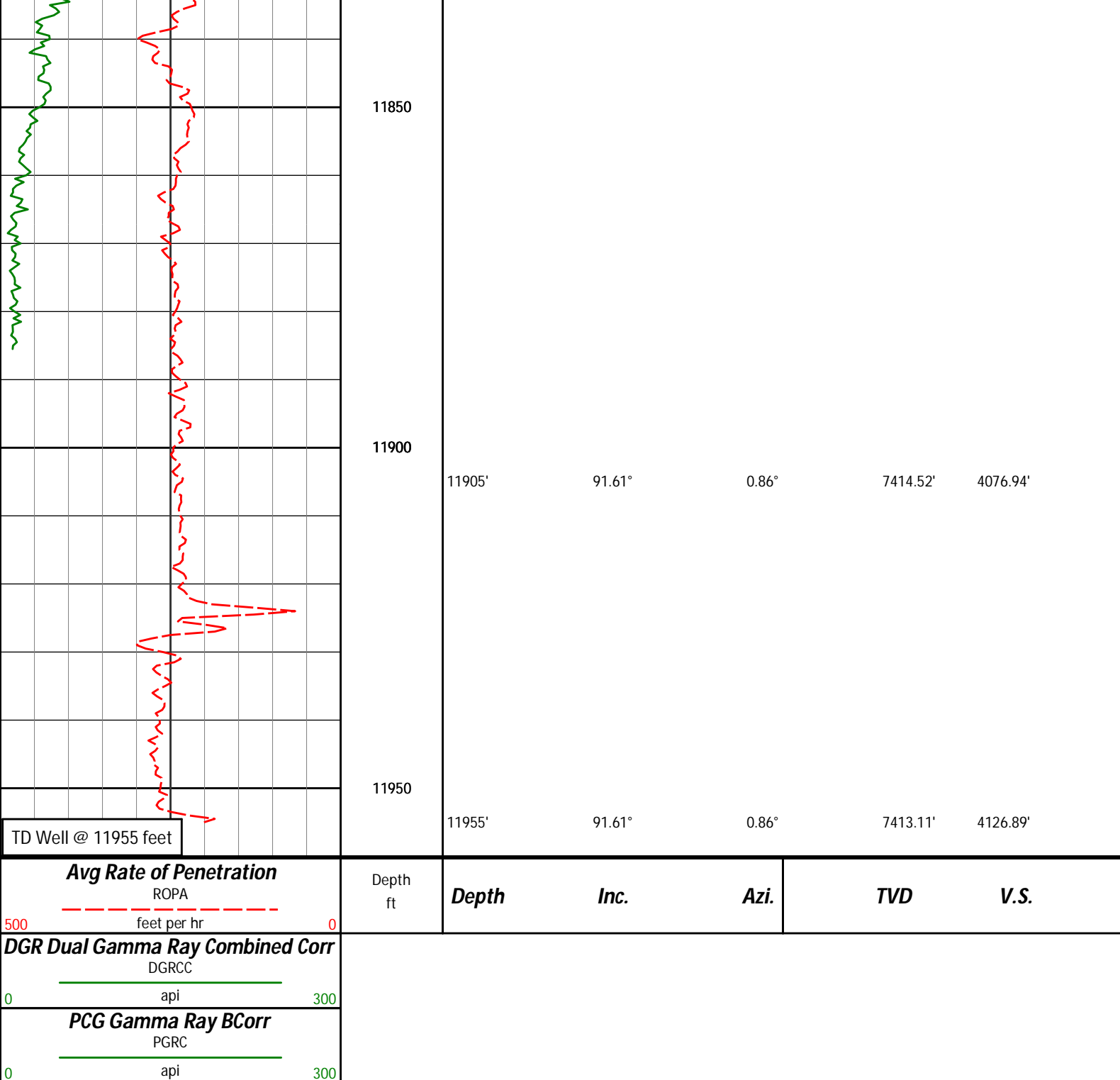
3761.25'

DGRCC

ROPA



11650				
11650				
11684'	90.93°	1.64°	7418.85'	3856.18'
11700				
11750				
11779'	90.93°	1.28°	7417.31'	3951.07'
11800				



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko
USA FED 29C-36HZ
Wattenberg
Weld Colorado
USA
CA-XX-0900382959
Surveys are IFR Corrected

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
323.00	0.57	322.08	322.99	1.27 N	0.99 W	1.29	0.18
415.00	0.34	342.83	414.99	1.89 N	1.35 W	1.92	0.30
507.00	0.28	11.05	506.99	2.37 N	1.39 W	2.40	0.18
601.00	0.14	11.21	600.99	2.71 N	1.32 W	2.74	0.15
725.00	0.62	247.68	724.99	2.51 N	1.43 W	2.54	0.40

725.00	0.62	347.68	724.99	3.51 N	1.43 W	3.54	0.40
818.00	0.66	322.34	817.98	4.43 N	1.87 W	4.47	0.30
891.00	0.70	320.53	890.98	5.11 N	2.41 W	5.15	0.06
975.00	0.84	312.21	974.97	5.92 N	3.19 W	5.98	0.21
1249.00	1.21	312.68	1248.92	9.23 N	6.81 W	9.37	0.14
1341.00	3.11	275.36	1340.86	10.12 N	10.00 W	10.32	2.47
1432.00	4.65	255.86	1431.65	9.45 N	16.04 W	9.78	2.21
1524.00	6.65	242.65	1523.20	6.09 N	24.39 W	6.59	2.58
1616.00	7.84	230.04	1614.47	0.39 S	33.93 W	0.31	2.15
1708.00	8.86	219.98	1705.50	9.85 S	43.29 W	-8.95	1.93
1799.00	9.77	207.49	1795.31	22.07 S	51.36 W	-21.00	2.43
1891.00	11.21	209.58	1885.77	36.77 S	59.38 W	-35.53	1.62
1986.00	11.35	209.07	1978.93	52.97 S	68.48 W	-51.54	0.18
2081.00	11.03	208.76	2072.13	69.11 S	77.39 W	-67.49	0.34
2176.00	10.59	209.39	2165.44	84.68 S	86.05 W	-82.88	0.48
2271.00	10.05	209.93	2258.91	99.47 S	94.47 W	-97.49	0.58
2366.00	11.23	209.92	2352.27	114.68 S	103.22 W	-112.51	1.24
2556.00	9.06	212.22	2539.29	143.37 S	120.43 W	-140.84	1.16
2651.00	10.54	207.51	2632.90	157.41 S	128.43 W	-154.70	1.77
2746.00	9.16	209.29	2726.50	171.71 S	136.14 W	-168.84	1.49
2842.00	10.74	210.38	2821.05	186.09 S	144.40 W	-183.05	1.66
2937.00	10.74	212.42	2914.39	201.20 S	153.63 W	-197.96	0.40
3032.00	10.80	212.55	3007.72	216.17 S	163.16 W	-212.74	0.07
3127.00	10.65	212.76	3101.06	231.06 S	172.70 W	-227.42	0.16
3222.00	10.51	214.31	3194.44	245.60 S	182.33 W	-241.76	0.33
3317.00	9.35	213.18	3288.02	259.21 S	191.44 W	-255.18	1.24
3412.00	10.41	208.97	3381.61	273.18 S	199.82 W	-268.97	1.35
3508.00	9.61	210.67	3476.15	287.66 S	208.11 W	-283.28	0.89
3698.00	9.78	207.72	3663.43	315.59 S	223.71 W	-310.87	0.28
3793.00	8.46	208.58	3757.23	328.87 S	230.80 W	-324.00	1.40
3888.00	9.93	210.03	3851.01	342.10 S	238.25 W	-337.07	1.57
3983.00	8.78	210.49	3944.74	355.44 S	246.02 W	-350.25	1.21
4078.00	9.67	206.31	4038.51	368.84 S	253.24 W	-363.50	1.17
4173.00	10.58	210.46	4132.03	383.51 S	261.20 W	-378.00	1.23
4269.00	10.95	210.40	4226.34	398.97 S	270.28 W	-393.27	0.39
4364.00	10.61	212.39	4319.67	414.14 S	279.53 W	-408.24	0.53
4459.00	9.28	212.11	4413.24	428.01 S	288.29 W	-421.93	1.40
4554.00	10.58	208.96	4506.81	442.13 S	296.58 W	-435.87	1.48
4649.00	10.47	209.48	4600.22	457.27 S	305.05 W	-450.84	0.15
4744.00	9.46	210.14	4693.78	471.54 S	313.22 W	-464.93	1.07
4839.00	10.30	207.98	4787.37	485.79 S	321.13 W	-479.02	0.97
4934.00	9.92	208.87	4880.90	500.46 S	329.06 W	-493.52	0.43
5030.00	9.06	208.79	4975.58	514.32 S	336.69 W	-507.22	0.90
5125.00	9.54	200.45	5069.34	528.26 S	343.05 W	-521.02	1.50
5220.00	8.40	200.80	5163.17	542.12 S	348.26 W	-534.77	1.20
5315.00	7.54	202.46	5257.26	554.37 S	353.11 W	-546.91	0.94
5410.00	6.40	206.13	5351.55	564.88 S	357.82 W	-557.33	1.29
5505.00	4.42	204.66	5446.12	572.96 S	361.68 W	-565.33	2.09
5600.00	2.57	199.62	5540.94	578.30 S	363.92 W	-570.61	1.97
5695.00	0.48	160.74	5635.91	580.68 S	364.51 W	-572.98	2.33
5790.00	0.10	151.52	5730.90	581.13 S	364.34 W	-573.44	0.40
5885.00	0.10	134.93	5825.90	581.26 S	364.24 W	-573.57	0.03
5980.00	0.11	135.87	5920.90	581.38 S	364.12 W	-573.70	0.01
6076.00	0.37	153.44	6016.90	581.73 S	363.91 W	-574.04	0.28
6171.00	0.58	123.94	6111.90	582.27 S	363.38 W	-574.60	0.33
6266.00	0.59	129.26	6206.90	582.85 S	362.60 W	-575.19	0.06
6361.00	0.68	126.50	6301.89	583.49 S	361.77 W	-575.85	0.10
6456.00	0.78	159.14	6396.88	584.43 S	361.08 W	-576.81	0.44
6551.00	1.02	151.75	6491.87	585.78 S	360.45 W	-578.17	0.28
6646.00	0.89	148.18	6586.86	587.15 S	359.66 W	-579.56	0.15
6741.00	0.71	151.42	6681.85	588.30 S	358.99 W	-580.71	0.20
6836.00	0.68	145.77	6776.84	589.28 S	358.40 W	-581.71	0.08
6888.00	0.83	20.32	6828.84	589.18 S	358.09 W	-581.62	2.58
6931.00	3.63	8.78	6871.80	587.54 S	357.78 W	-579.99	6.56
6973.00	7.10	2.26	6913.61	583.63 S	357.47 W	-576.08	8.38
7026.00	13.29	355.59	6965.75	574.28 S	357.81 W	-566.72	11.87
7074.00	17.13	355.24	7012.06	561.73 S	358.82 W	-554.15	8.00
7122.00	20.46	357.07	7057.50	546.30 S	359.84 W	-538.71	7.04
7170.00	23.21	0.76	7102.05	528.46 S	360.14 W	-520.87	6.40
7217.00	26.70	0.40	7144.66	508.64 S	359.94 W	-501.05	7.43
7265.00	31.86	358.83	7186.51	485.17 S	360.13 W	-477.59	10.87
7312.00	36.83	358.47	7225.30	458.67 S	360.76 W	-451.08	10.58
7360.00	41.93	358.54	7262.39	428.24 S	361.55 W	-420.63	10.63
7407.00	47.76	357.25	7295.70	395.13 S	362.79 W	-387.51	12.55
7455.00	54.04	356.37	7325.96	357.96 S	364.87 W	-350.30	13.16
7502.00	59.09	359.24	7351.85	318.78 S	366.34 W	-311.11	11.89

7550.00	63.94	2.89	7374.74	276.62 S	365.53 W	-268.97	12.11
7598.00	70.32	3.22	7393.39	232.48 S	363.17 W	-224.89	13.31
7630.00	75.39	2.52	7402.82	201.95 S	361.64 W	-194.40	15.98
7661.00	79.31	0.85	7409.61	171.73 S	360.76 W	-164.20	13.69
7693.00	83.33	0.92	7414.44	140.10 S	360.27 W	-132.59	12.56
7732.00	88.30	1.06	7417.28	101.23 S	359.60 W	-93.74	12.75
7786.00	89.63	0.50	7418.26	47.24 S	358.86 W	-39.78	2.67
7881.00	91.05	1.31	7417.69	47.74 N	357.36 W	55.15	1.72
7976.00	90.87	1.31	7416.10	142.70 N	355.19 W	150.05	0.19
8071.00	91.30	359.39	7414.30	237.68 N	354.61 W	244.99	2.07
8166.00	91.30	358.37	7412.15	332.64 N	356.46 W	339.97	1.07
8261.00	90.99	357.30	7410.25	427.55 N	360.05 W	434.93	1.17
8356.00	89.07	358.33	7410.20	522.47 N	363.67 W	529.91	2.29
8451.00	88.08	356.75	7412.56	617.35 N	367.75 W	624.86	1.96
8546.00	89.57	358.14	7414.51	712.23 N	371.98 W	719.81	2.14
8641.00	90.06	0.32	7414.82	807.22 N	373.26 W	814.80	2.35
8736.00	89.81	359.86	7414.92	902.22 N	373.11 W	909.77	0.55
8831.00	89.26	359.12	7415.70	997.21 N	373.96 W	1004.76	0.97
8927.00	88.64	358.50	7417.46	1093.17 N	375.95 W	1100.74	0.91
9022.00	90.43	357.16	7418.23	1188.09 N	379.55 W	1195.72	2.35
9117.00	90.62	356.98	7417.36	1282.97 N	384.40 W	1290.67	0.28
9212.00	90.19	356.91	7416.68	1377.83 N	389.47 W	1385.62	0.46
9307.00	89.94	356.44	7416.58	1472.67 N	394.98 W	1480.55	0.56
9402.00	90.31	358.33	7416.37	1567.56 N	399.31 W	1575.52	2.03
9497.00	90.00	357.10	7416.11	1662.49 N	403.10 W	1670.50	1.34
9592.00	91.11	357.63	7415.19	1757.38 N	407.47 W	1765.46	1.29
9687.00	90.56	358.93	7413.81	1852.32 N	410.32 W	1860.45	1.49
9782.00	89.69	358.70	7413.60	1947.30 N	412.28 W	1955.45	0.95
9877.00	89.26	358.45	7414.47	2042.27 N	414.64 W	2050.44	0.52
9973.00	90.56	358.19	7414.62	2138.23 N	417.46 W	2146.44	1.38
10068.00	88.83	355.33	7415.13	2233.06 N	422.83 W	2241.36	3.52
10163.00	88.64	356.74	7417.22	2327.81 N	429.39 W	2336.22	1.50
10258.00	90.38	358.66	7418.04	2422.72 N	433.21 W	2431.19	2.73
10353.00	91.11	1.50	7416.80	2517.70 N	433.07 W	2526.15	3.09
10448.00	90.74	1.41	7415.27	2612.66 N	430.66 W	2621.04	0.40
10543.00	90.43	359.89	7414.30	2707.64 N	429.58 W	2715.98	1.63
10733.00	89.01	357.57	7415.23	2897.58 N	433.79 W	2905.96	1.43
10828.00	89.38	358.14	7416.56	2992.50 N	437.35 W	3000.94	0.72
10923.00	89.26	357.87	7417.69	3087.44 N	440.66 W	3095.92	0.31
11018.00	89.01	357.18	7419.12	3182.34 N	444.76 W	3190.89	0.77
11113.00	88.70	355.60	7421.02	3277.12 N	450.74 W	3285.78	1.69
11208.00	89.51	355.31	7422.51	3371.81 N	458.27 W	3380.60	0.91
11303.00	90.12	355.67	7422.81	3466.52 N	465.74 W	3475.44	0.75
11399.00	90.62	356.28	7422.19	3562.28 N	472.48 W	3571.32	0.82
11494.00	90.68	357.62	7421.11	3657.14 N	477.53 W	3666.26	1.41
11589.00	90.56	359.92	7420.09	3752.10 N	479.57 W	3761.25	2.42
11684.00	90.93	1.64	7418.85	3847.08 N	478.28 W	3856.18	1.85
11779.00	90.93	1.28	7417.31	3942.04 N	475.86 W	3951.07	0.38
11905.00	91.61	0.86	7414.52	4067.98 N	473.50 W	4076.94	0.63
11955.00	91.61	0.86	7413.11	4117.96 N	472.75 W	4126.89	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 358.81 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.57 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11955.00 FEET
IS 4145.01 FEET ALONG 353.45 DEGREES (TRUE)**

**Tie in @ Surface
Final Survey is a Straightline Projection to Bit**