



1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	16-Aug-13	17-Aug-13	22-Aug-13		
Rig Bit Number	100	200	300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	8.000		
Log Start Depth (MD, ft)	585.00	7,267.00	7862		
Log End Depth (MD, ft)	7,267.00	7,862.00	12393		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	13-Aug-13 15:22	14-Aug-13 17:41	19-Aug-13 01:20		
Drill/Wipe End Date and Time	13-Aug-13 15:22	14-Aug-13 17:41	19-Aug-13 01:20		
Min Inc (deg) @ Depth (MD, ft)	.68 @ 1,012.00	39.96 @ 7,309.00	87.10 @ 7,874.00		
Max Inc (deg) @ Depth (MD, ft)	25.06 @ 7,166.00	83.56 @ 7,813.00	92.22 @ 8,538.00		
Bit TFA(in2) / Bit Type	.97 / PDC	.97 / PDC	.61 / PDC		
Flow Rate (gpm)	595.73	520.00	385		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	9.80 / 43.00	9.80 / 45.00	9.6 / 43.00		
Filtrate CL (ppm)	1,800.00	1,800.00	1700.0		
pH / Fluid Loss (mptm)	9.30 / 5	9.30 / 5	9.1 / 5		
PV (cP) / YP (lbf/ft2)	13 / 12.00	13 / 13.00	13 / 13.		
% Solids / % Sand	7.7 / 3	7 / 3	7.3 / 3		
% 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 (deg F) / S	122.22 / 122	122.22 / 122	212.78 / 122.11		

Max Tool Temp (degF) / Source	120.00 / 120	120.00 / 120	243.76 / HCM		
Rm @ Max Tool Temp (degF)	N/A @ 120.00	N/A @ 120.00	N/A @ 243.76		
Lead MWD Engineer	Patrick Lane	Patrick Lane	Patrick Lane		
Customer Representative	Stan Walters	Stan Walters	Stan Walters		

SENSOR INFORMATION

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	51.06	46.56	73.65		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341332	11341332	12024220		
Sonde Serial Number	11638536	11062040	11638536		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	208.34	37.89	176.99		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	DGR		
Distance From Bit (ft)	56.01	51.51	58.73		
Recorded Sample Period (sec)	10	10	8		
Software Version	8.15	8.15	N/A		
Sub Serial Number	11341332	11341332	90372706		
Insert/Sonde Serial Number	11680969	11293337	10441358		

Pulser Controller Sensor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	8.17		
PIC Software Version	1.40	1.40	1.40		
Sub/HOC Serial Number	11341332	11341332	12024220		
Insert/Probe/Module SN	11680772	11145558	11680772		
Battery Serial Number	N/A	N/A	N/A		
Valve Insert SN	N/A	N/A	N/A		
DC Insert Serial Number	N/A	N/A	N/A		
Choke Size (32nd)	N/A	N/A	N/A		
Driver Current (amps)	N/A	N/A	N/A		
Driver SMI Current (amps)	N/A	N/A	N/A		
Boot Strap Version	4,130.00	4,130.00	4130.00		

DDSr-DGR Sensor Information

Tool Type			DDSr-DGR		
Distance From Bit (ft)			61.62		
Recorded Sample Period (sec)			12		
Software Version			10.88		
Sub Serial Number			90372706		
Insert Serial Number			11664672		
Sensor ID Number			8238		

REMARKS

1. All depths are true vertical depths referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified
4. The following smoothing parameters have been applied to the data:

4. 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

5. I N S I T E v e r s i o n 7.4.1

WARRANTY

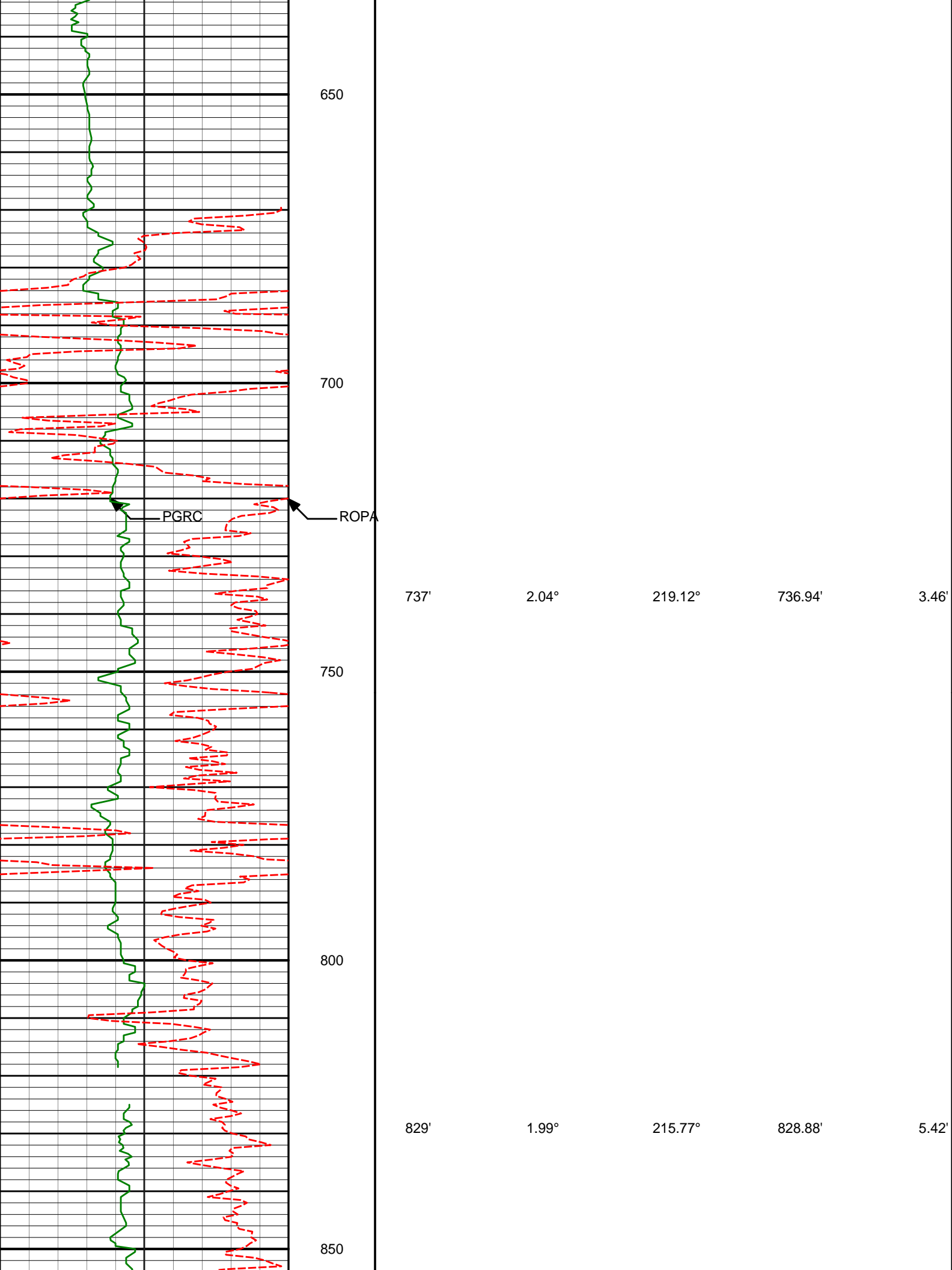
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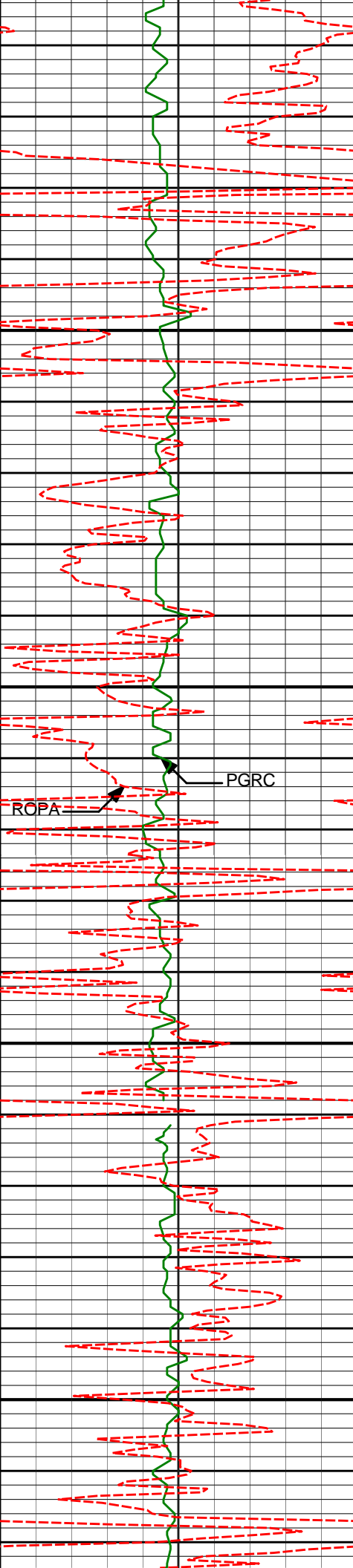
HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log

[illegible]





900

950

1000

1050

ROP

PGRC

920'

0.96°

240.73°

919.85'

7.01'

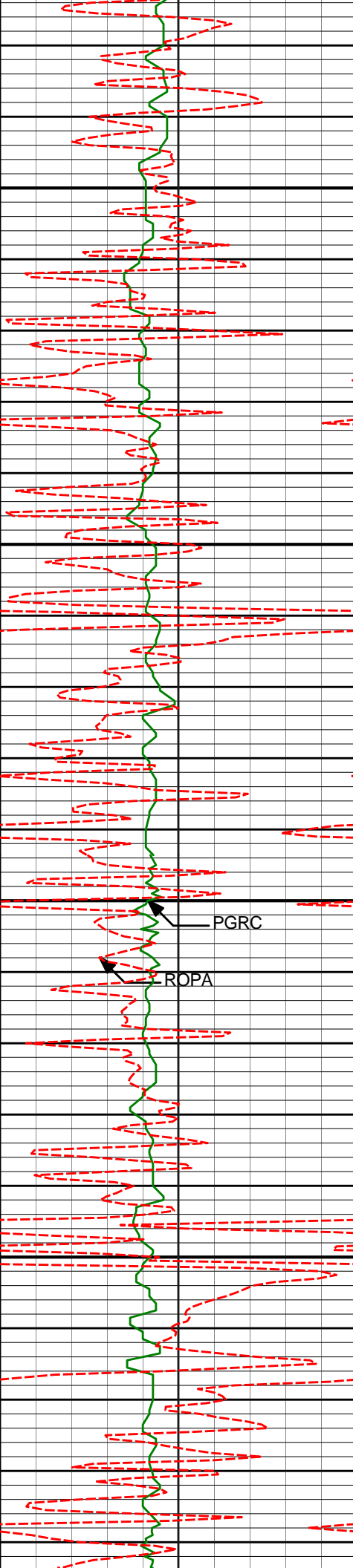
1012'

0.68°

258.35°

1011.84'

8.21'



1100

1104'

0.75°

262.56°

1103.83'

9.34'

1150

1200

1196'

0.76°

266.17°

1195.82'

10.55'

PGRC

ROPA

1250

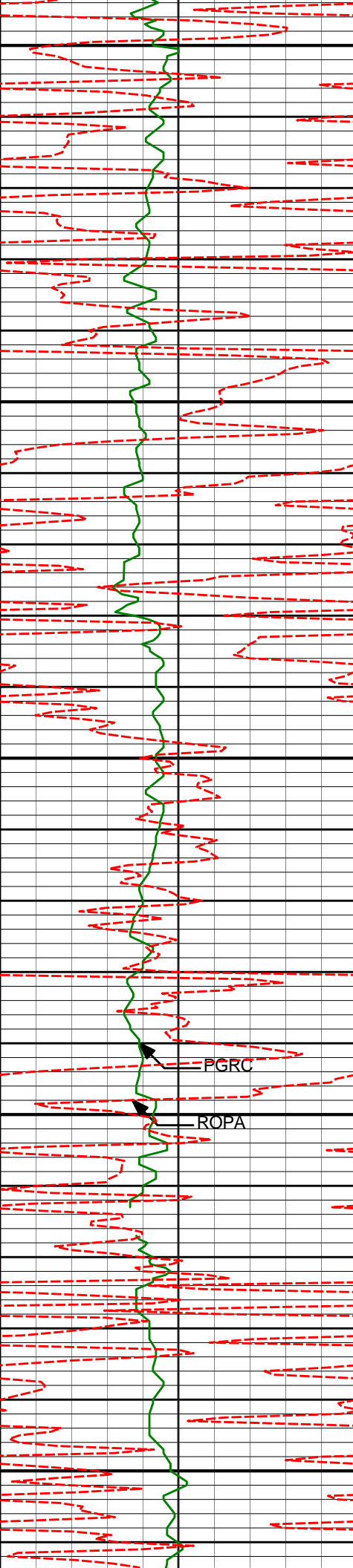
1287'

2.38°

0.82°

1286.80'

11.13'



1300

1350

1400

1450

1500

1378'

4.20°

13.51°

1377.64'

10.34'

1470'

6.17°

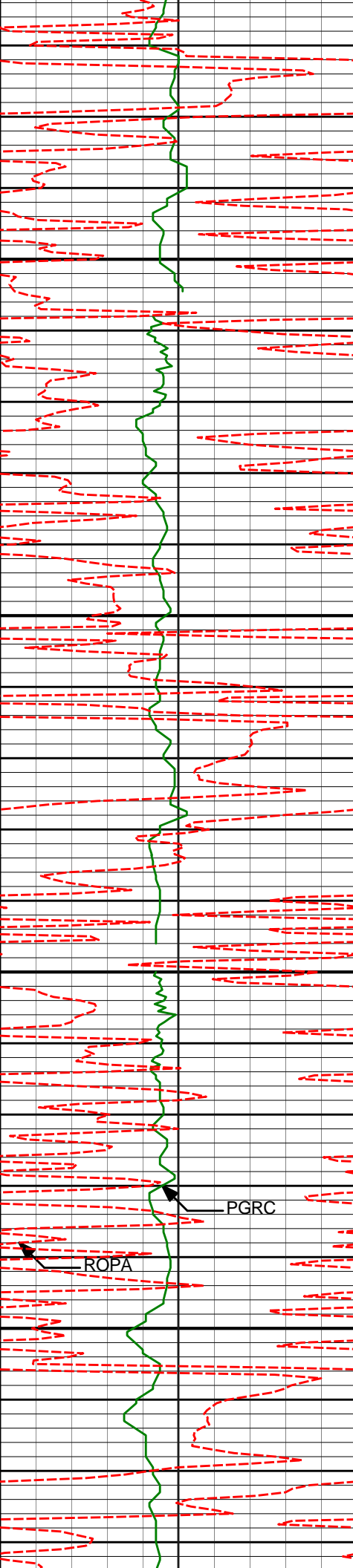
10.18°

1469.26'

8.69'

PGRC

ROPA



1550

1562'

5.78°

1.30°

1560.76'

7.73'

1600

1650

1654'

7.10°

6.43°

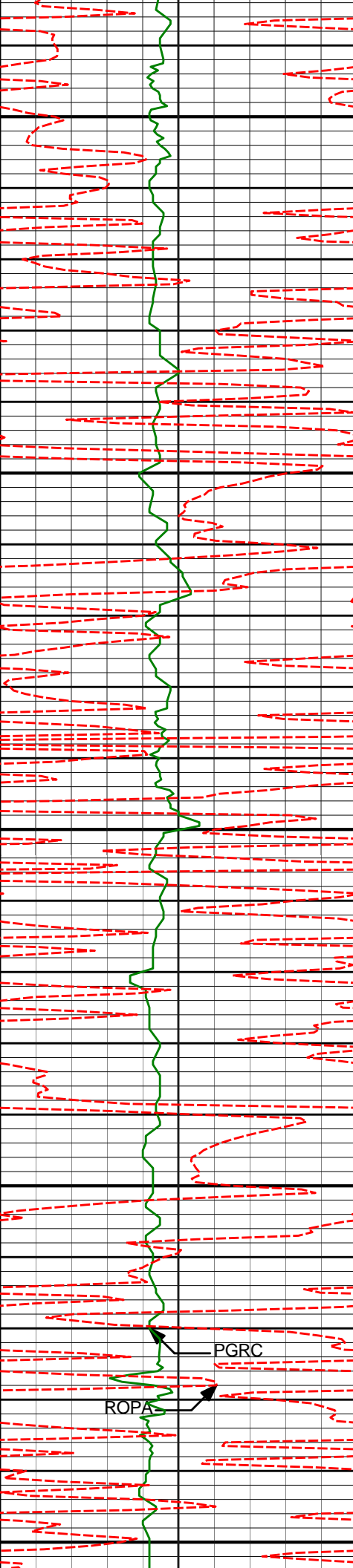
1652.18'

7.02'

1700

PGRC

ROPA



1750

1800

1850

1900

1950

1746'

9.00°

16.29°

1743.28'

4.39'

1838'

11.35°

17.24°

1833.82'

-0.28'

1929'

12.78°

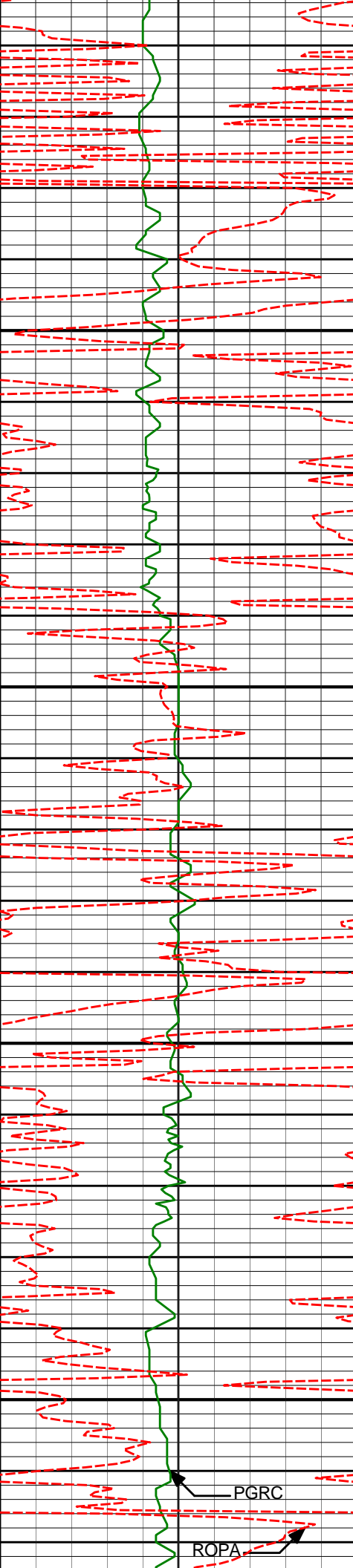
14.83°

1922.81'

-5.48'

PGRC

ROPA



2000

2021'

13.87°

12.15°

2012.33'

-10.36'

2050

2100

2113'

13.31°

6.81°

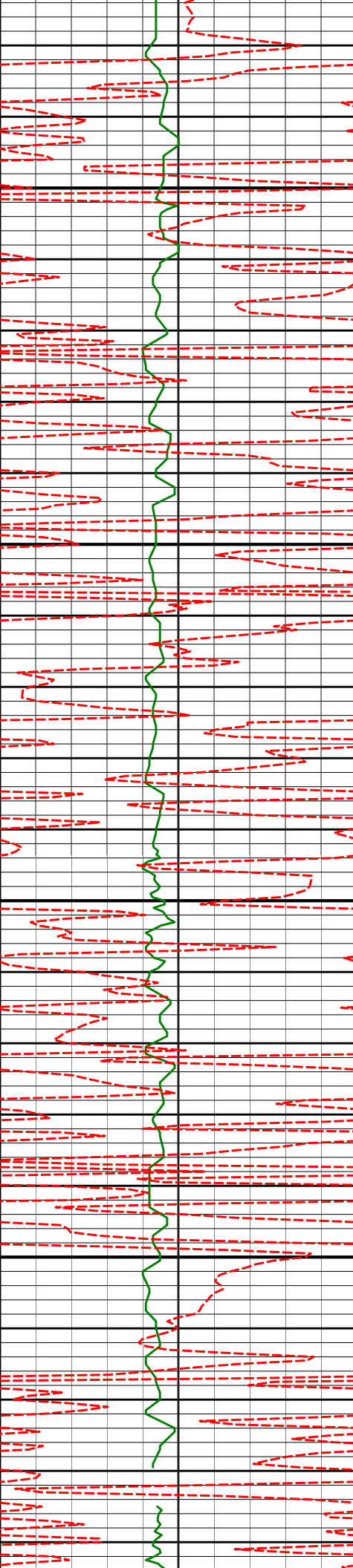
2101.76'

-13.89'

2150

PGRC

ROPA



2200

2204'

14.18°

8.82°

2190.16'

-16.80'

2250

2295'

12.86°

5.13°

2278.63'

-19.37'

2300

2350

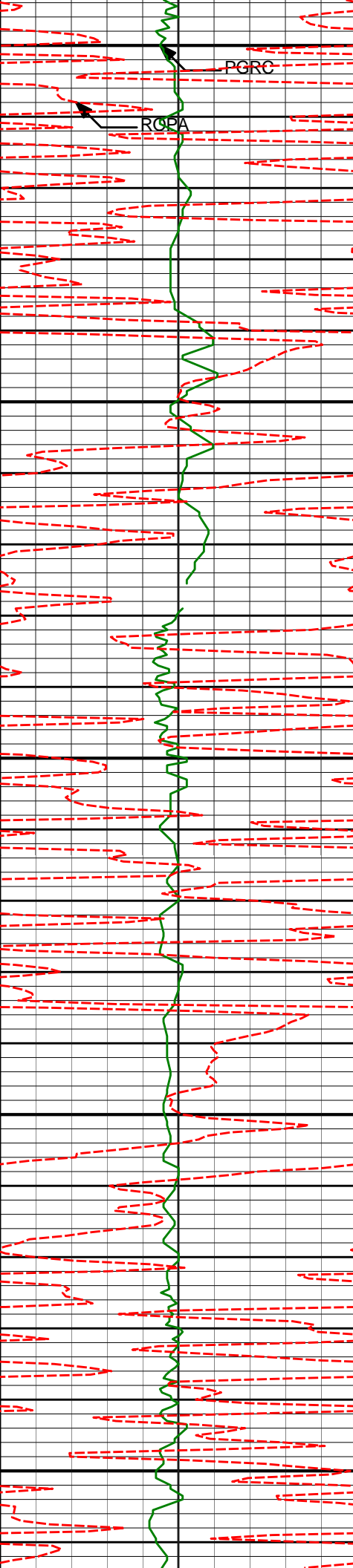
2387'

12.87°

7.83°

2368.32'

-21.63'



2400

PGRC

ROPA

2450

2482'

13.30°

9.61°

2460.86'

-24.85'

2500

2550

2577'

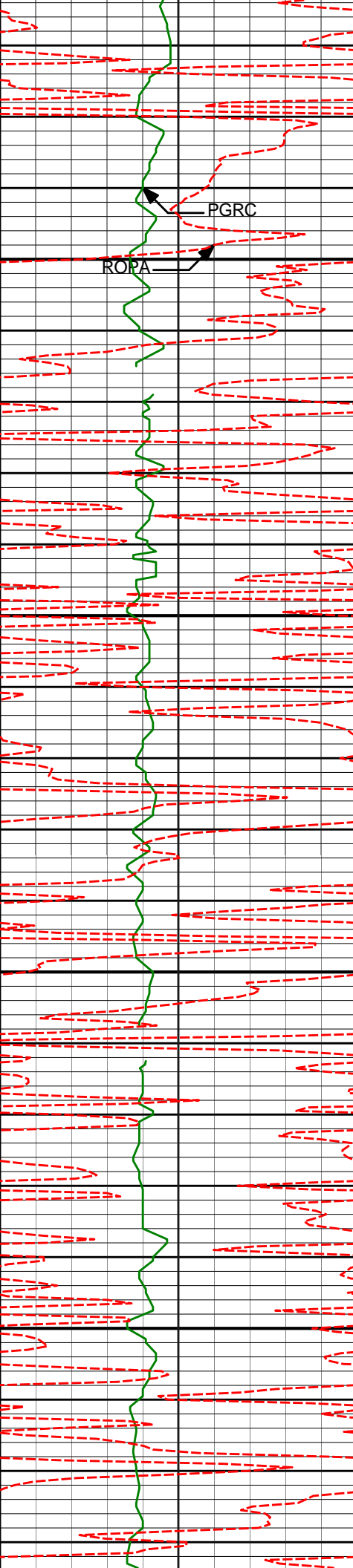
13.53°

16.17°

2553.27'

-29.72'

2600



2650

2672'

15.21°

20.88°

2645.30'

-37.22'

2700

2750

2766'

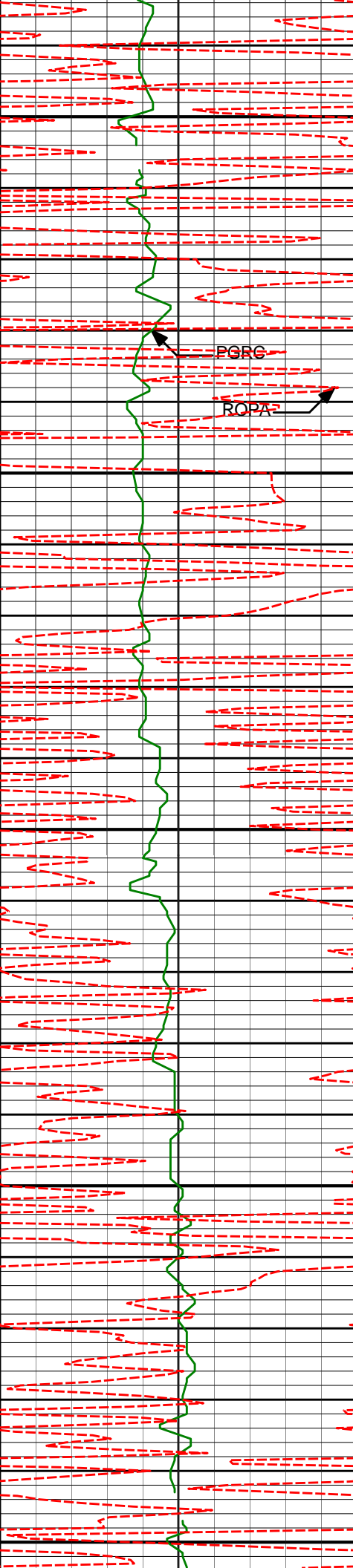
15.20°

20.45°

2736.01'

-45.88'

2800



2850

2861'

15.10°

18.94°

2827.71'

-54.20'

PGRG

ROPA

2900

2950

2956'

15.14°

17.40°

2919.42'

-61.88'

3000

3050

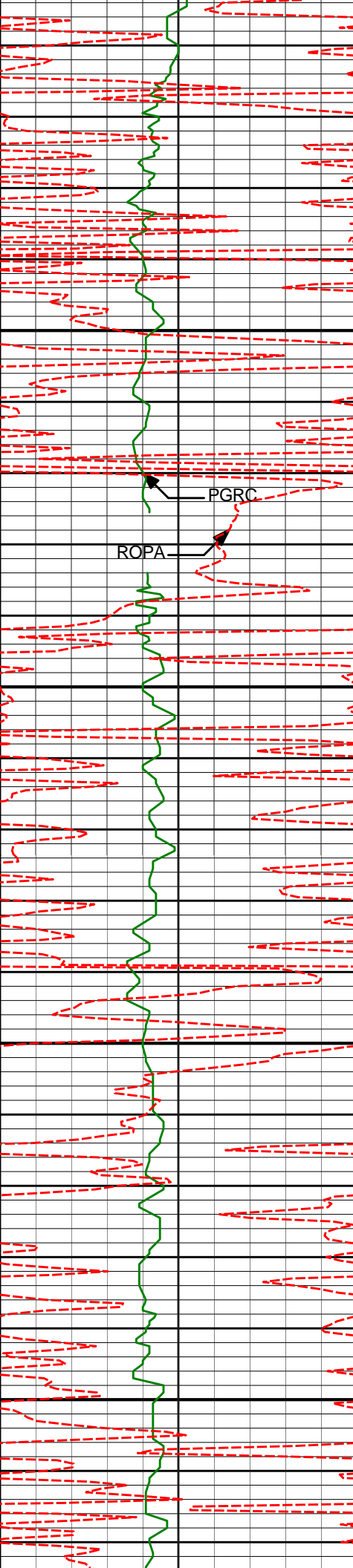
3051'

12.94°

15.44°

3011.58'

-68.38'



3100

PGRC

ROPA

3150

3200

3250

3146'

14.62°

18.45°

3103.84'

-74.97'

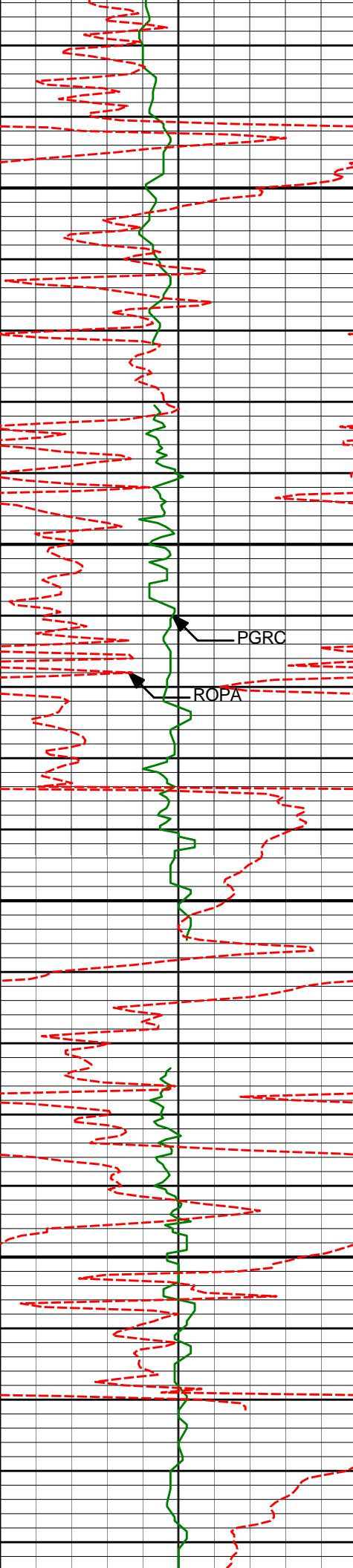
3240'

12.45°

16.97°

3195.22'

-81.64'



3300

3335'

9.87°

15.29°

3288.42'

-86.74'

3350

PGRC

ROPA

3400

3430'

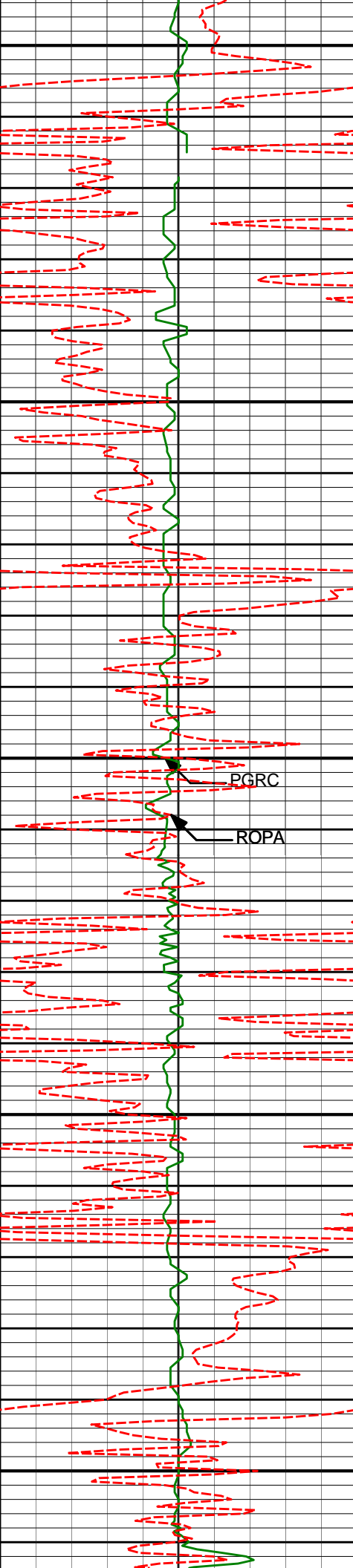
11.89°

16.65°

3381.71'

-91.66'

3450



3500

3525'

14.66°

16.53°

3474.16'

-97.84'

3550

3600

PGRC

ROPA

3620'

11.85°

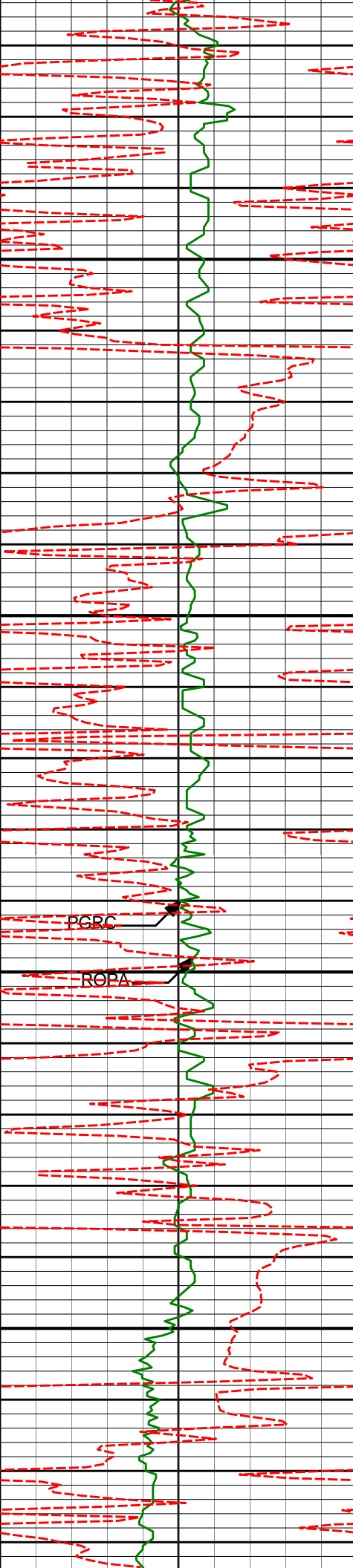
11.33°

3566.62'

-103.13'

3650

3700



3750

3800

PGRC

ROPA

3850

3900

3715'

12.72°

4.99°

3659.45'

-105.91'

3805'

12.52°

12.55°

3747.28'

-108.85'

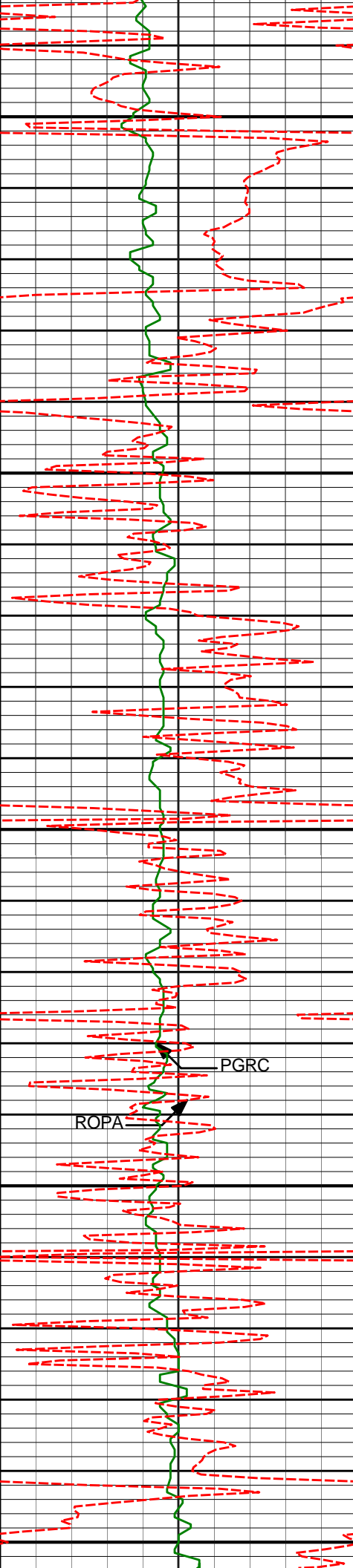
3899'

13.05°

14.93°

3838.95'

-113.76'



3950

3994'

17.88°

15.96°

3930.49'

-120.48'

4000

4050

PGRC

ROPA

4088'

16.93°

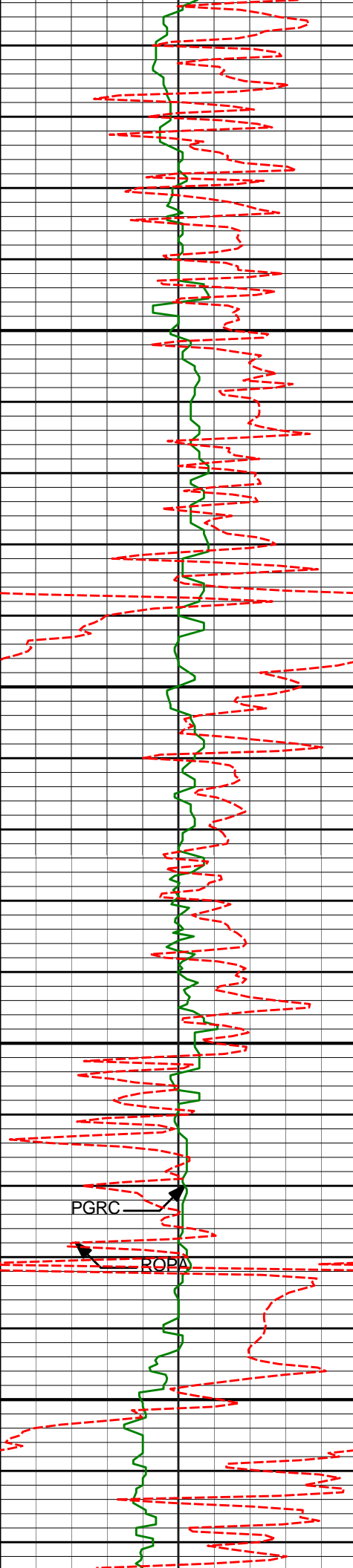
13.95°

4020.18'

-127.70'

4100

4150



4200

4250

4300

4350

PGRC

ROPA

4183'

15.85°

12.43°

4111.32'

-133.78'

4278'

13.54°

12.75°

4203.21'

-138.97'

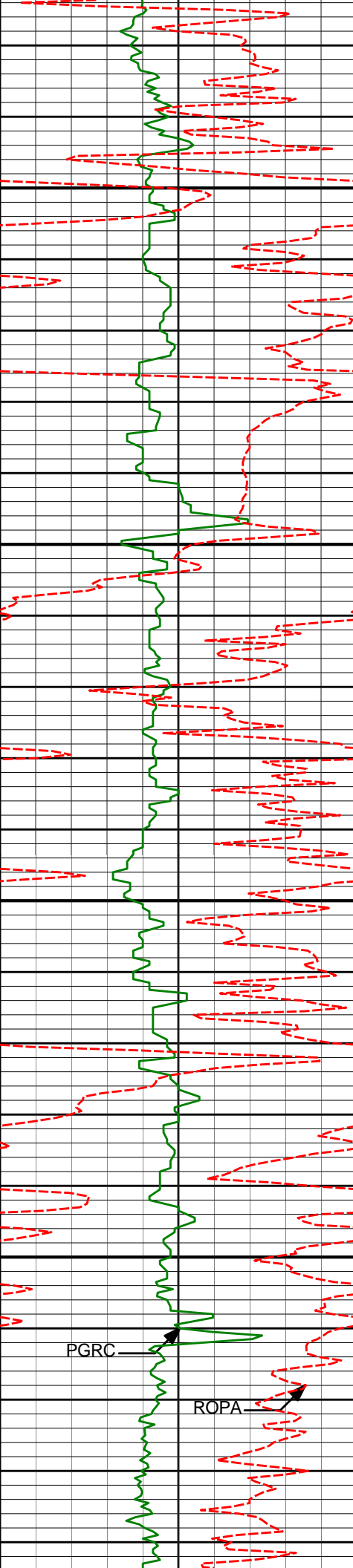
4372'

13.35°

11.28°

4294.63'

-143.48'



4400

4450

4500

4550

4467'

14.65°

15.10°

4386.81'

-148.71'

4561'

12.66°

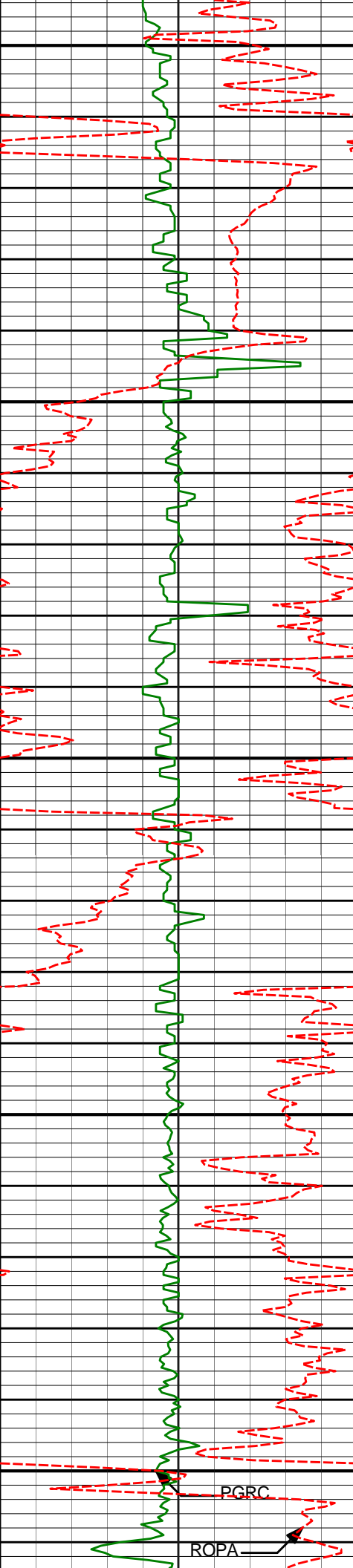
11.99°

4478.15'

-153.90'

PGRC

ROPA



4600

4650

4700

4750

4800

4656'

14.78°

18.15°

4570.44'

-159.80'

4751'

14.19°

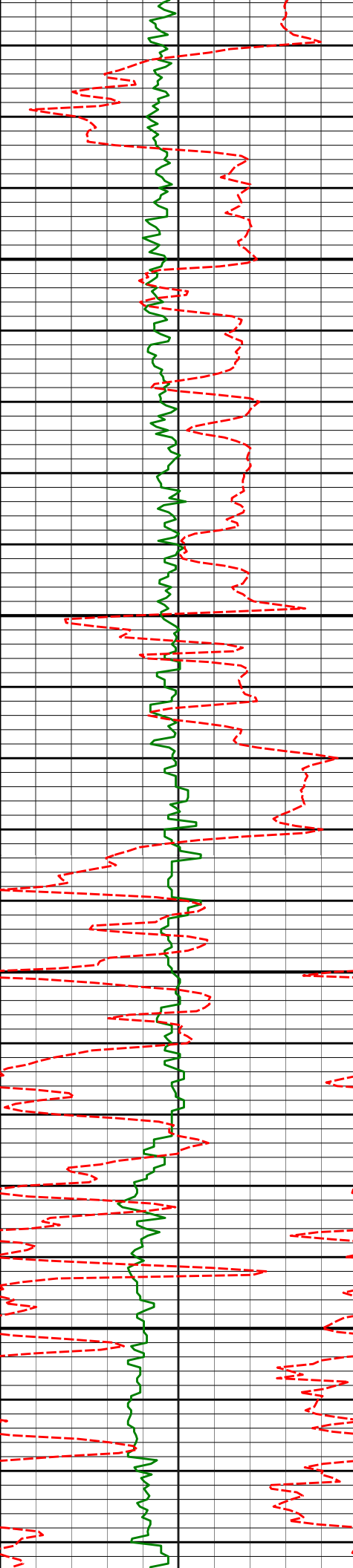
18.05°

4662.42'

-167.14'

PGRC

ROPA



4850

4900

4950

5000

4845'

15.15°

19.95°

4753.35'

-174.86'

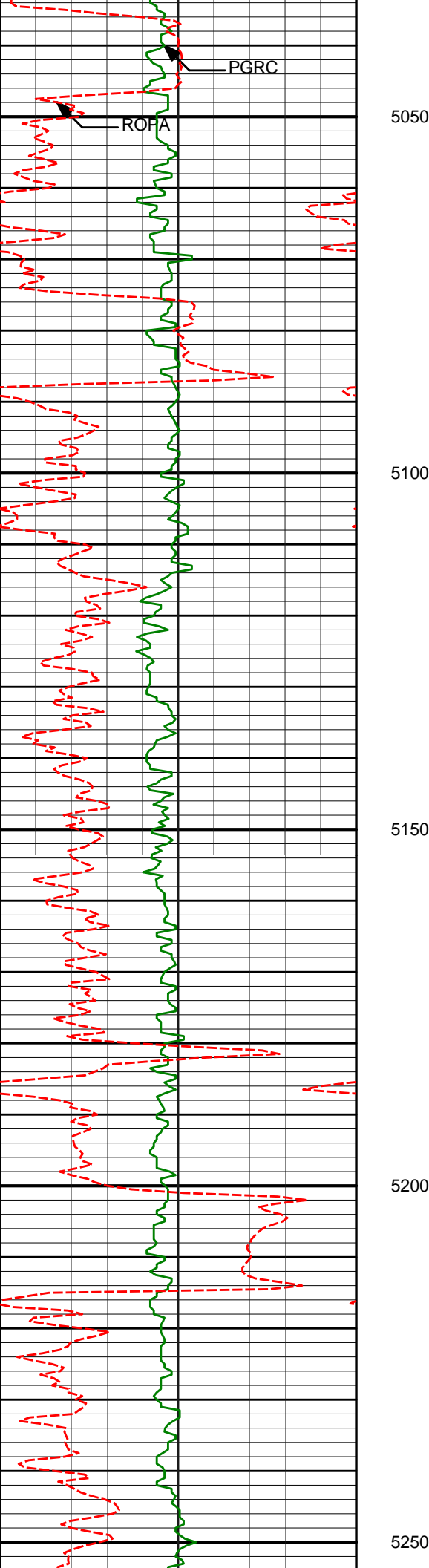
4940'

15.41°

13.40°

4845.00'

-181.97'



5050

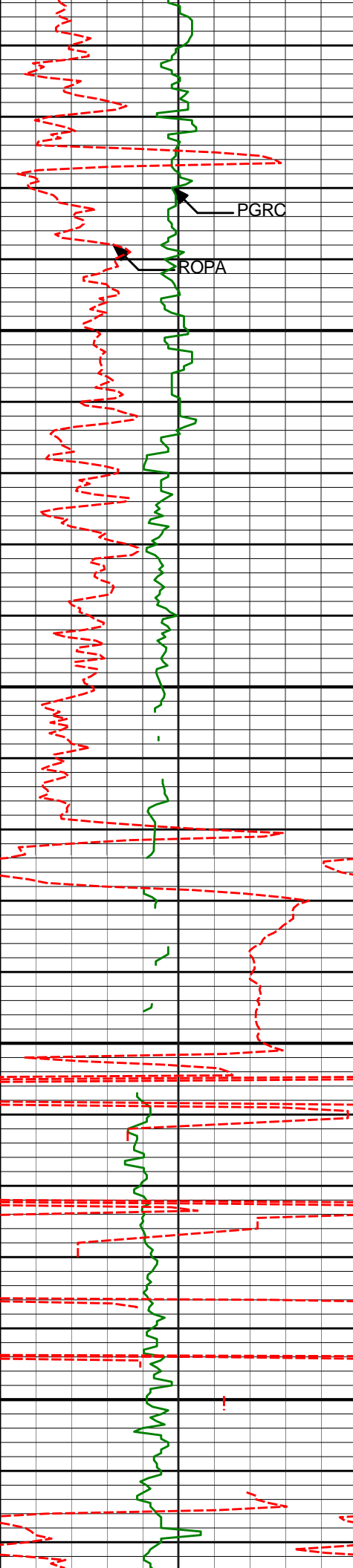
5100

5150

5200

5250

5034'	15.63°	12.33°	4935.57'	-187.52'
5129'	14.32°	10.73°	5027.35'	-192.39'
5223'	14.46°	11.27°	5118.40'	-196.79'



5300

5318'

12.63°

8.81°

5210.75'

-200.65'

5350

5400

5413'

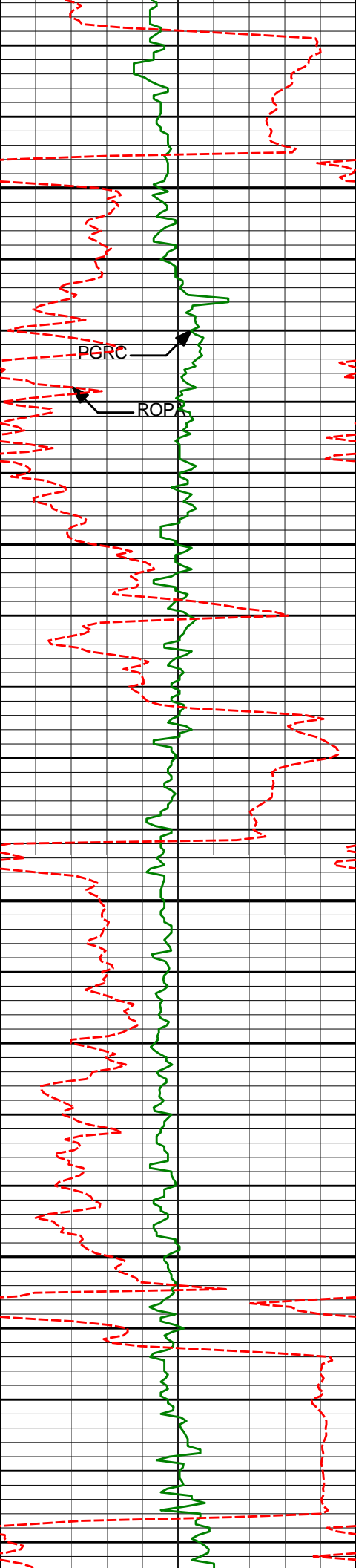
13.48°

12.64°

5303.30'

-204.62'

5450



5500

5507'

14.01°

12.93°

5394.60'

-209.52'

PGRC

ROP

5550

5600

5602'

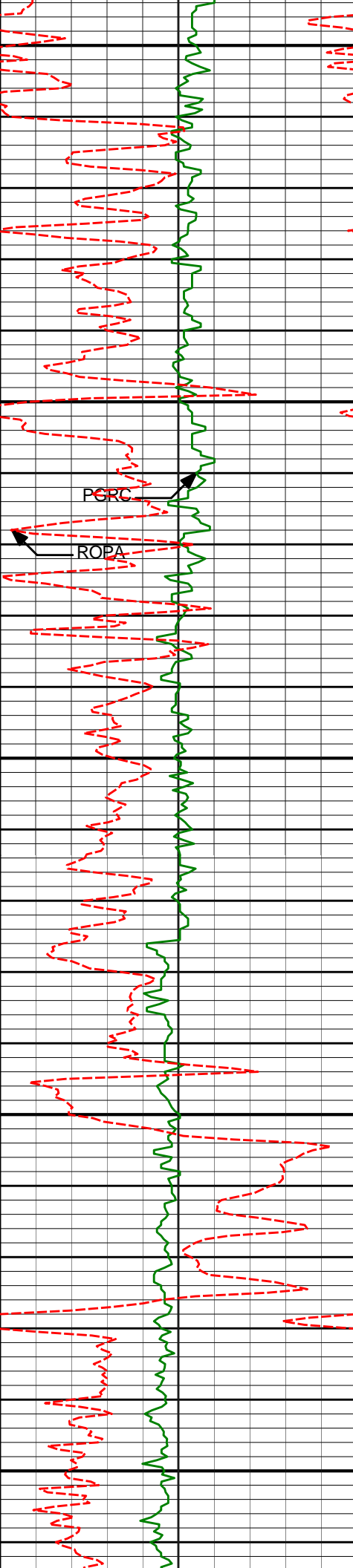
13.37°

9.82°

5486.91'

-213.92'

5650



5700

5750

5800

5850

5900

5696'

14.47°

12.72°

5578.15'

-218.31'

5790'

11.91°

8.81°

5669.66'

-222.34'

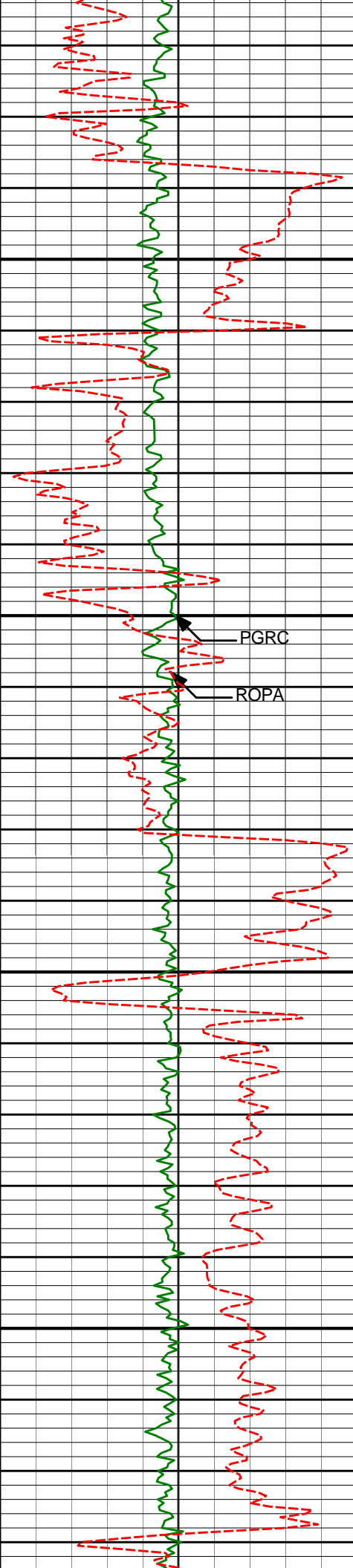
5885'

11.81°

3.87°

5762.63'

-224.45'



5950

5981'

12.37°

1.88°

5856.51'

-225.40'

6000

PGRC

ROPA

6050

6075'

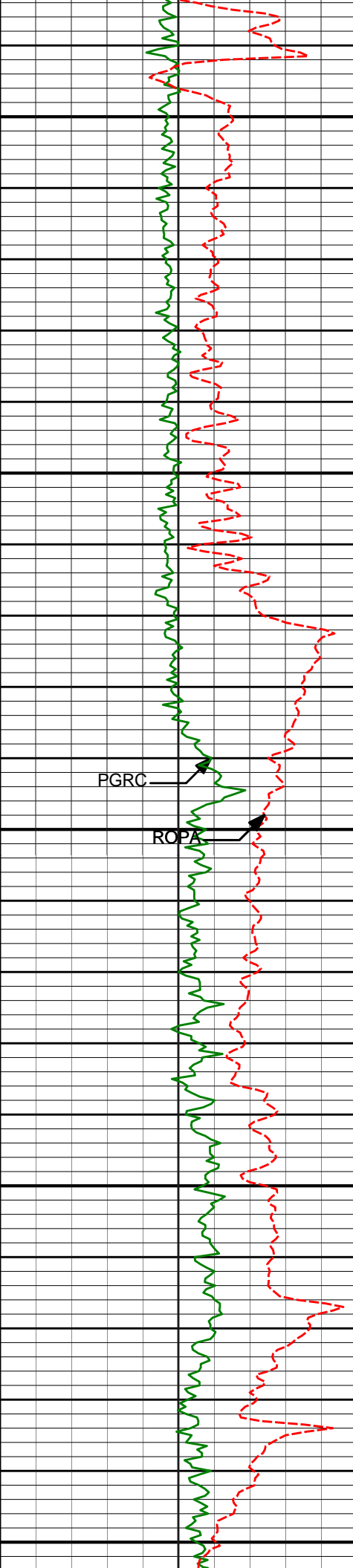
13.28°

0.70°

5948.16'

-225.81'

6100



6150

6170'

11.38°

359.69°

6040.96'

-225.85'

6200

PGRC

ROPA

6250

6265'

10.49°

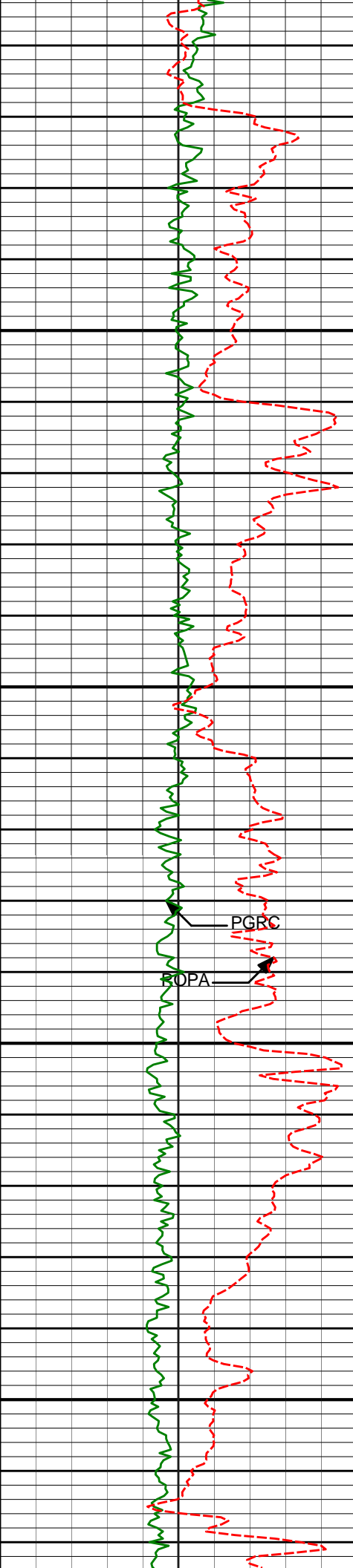
359.99°

6134.24'

-225.75'

6300

6350



6400

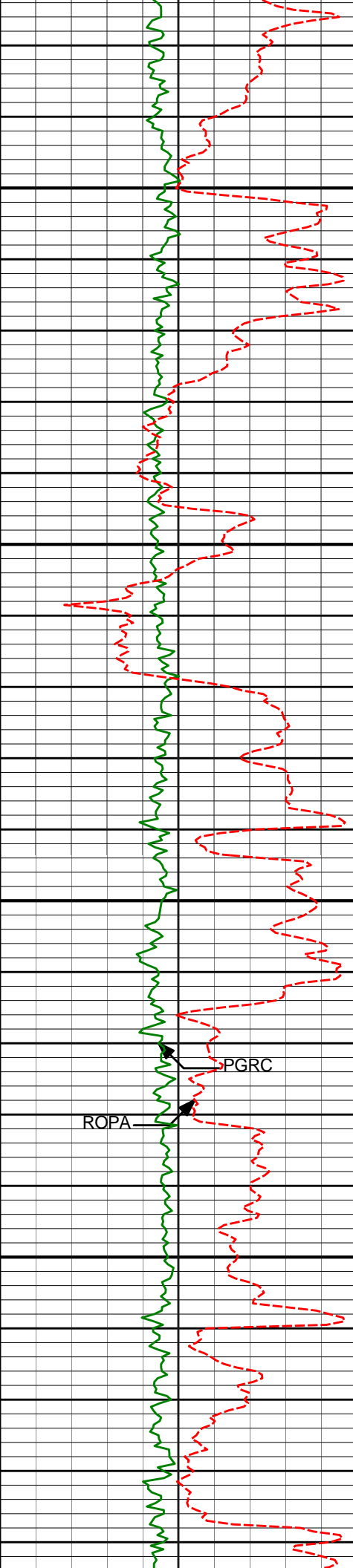
6450

6500

6550

PGRC
BOPA

6360'	9.27°	359.77°	6227.83'	-225.68'
6455'	7.46°	9.74°	6321.82'	-226.67'
6550'	5.89°	25.93°	6416.18'	-229.82'



6600

6644'

4.48°

23.05°

6509.79'

-233.35'

6650

6700

6750

PGRC

ROPA

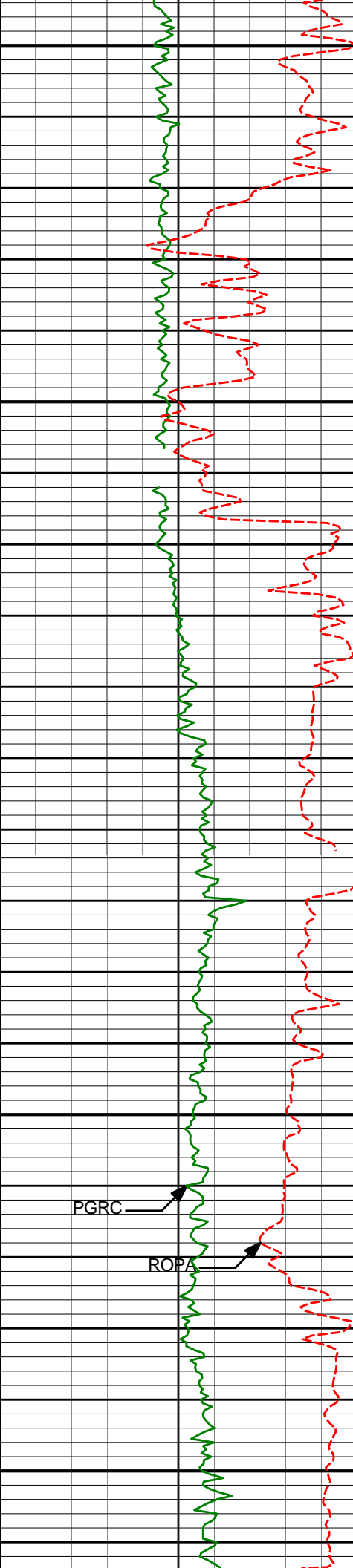
6739'

3.10°

29.76°

6604.58'

-236.06'



6800

6814'

2.07°

25.27°

6679.51'

-237.64'

6834'

2.24°

27.81°

6699.49'

-237.98'

6850

6881'

0.87°

344.28°

6746.47'

-238.31'

6900

6929'

5.65°

270.72°

6794.39'

-235.84'

6950

PGRC

ROPA

6976'

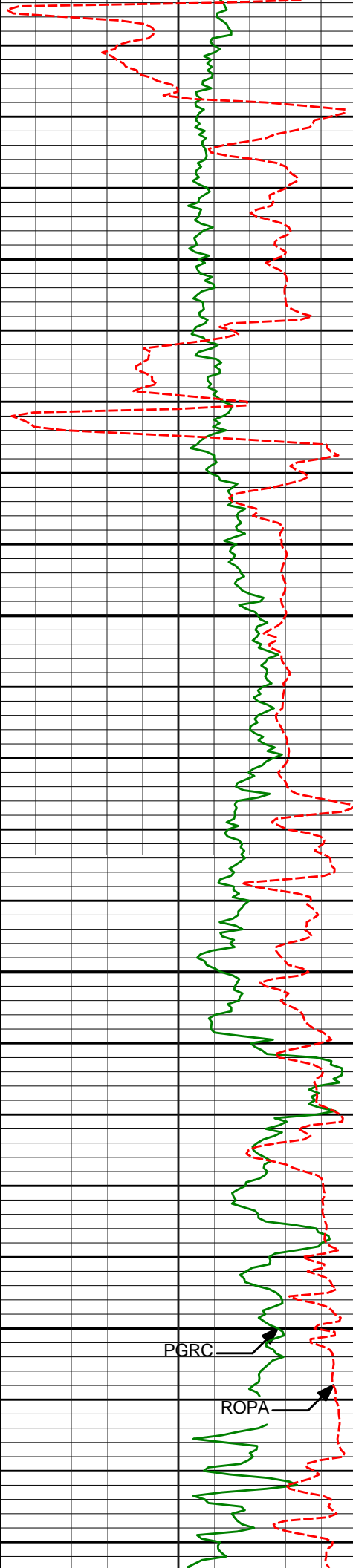
10.65°

272.50°

6840.90'

-229.19'

7000



7050

7100

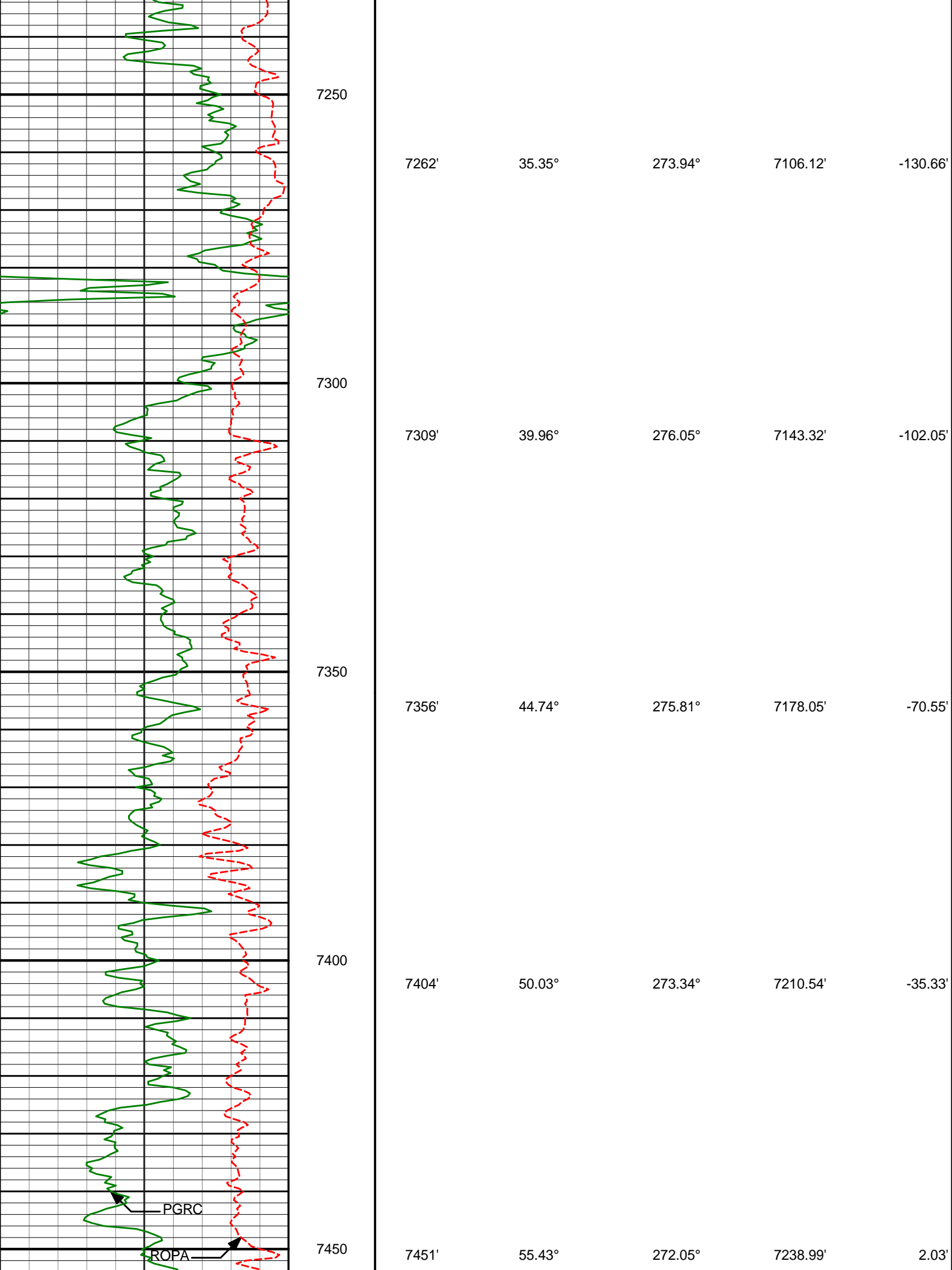
7150

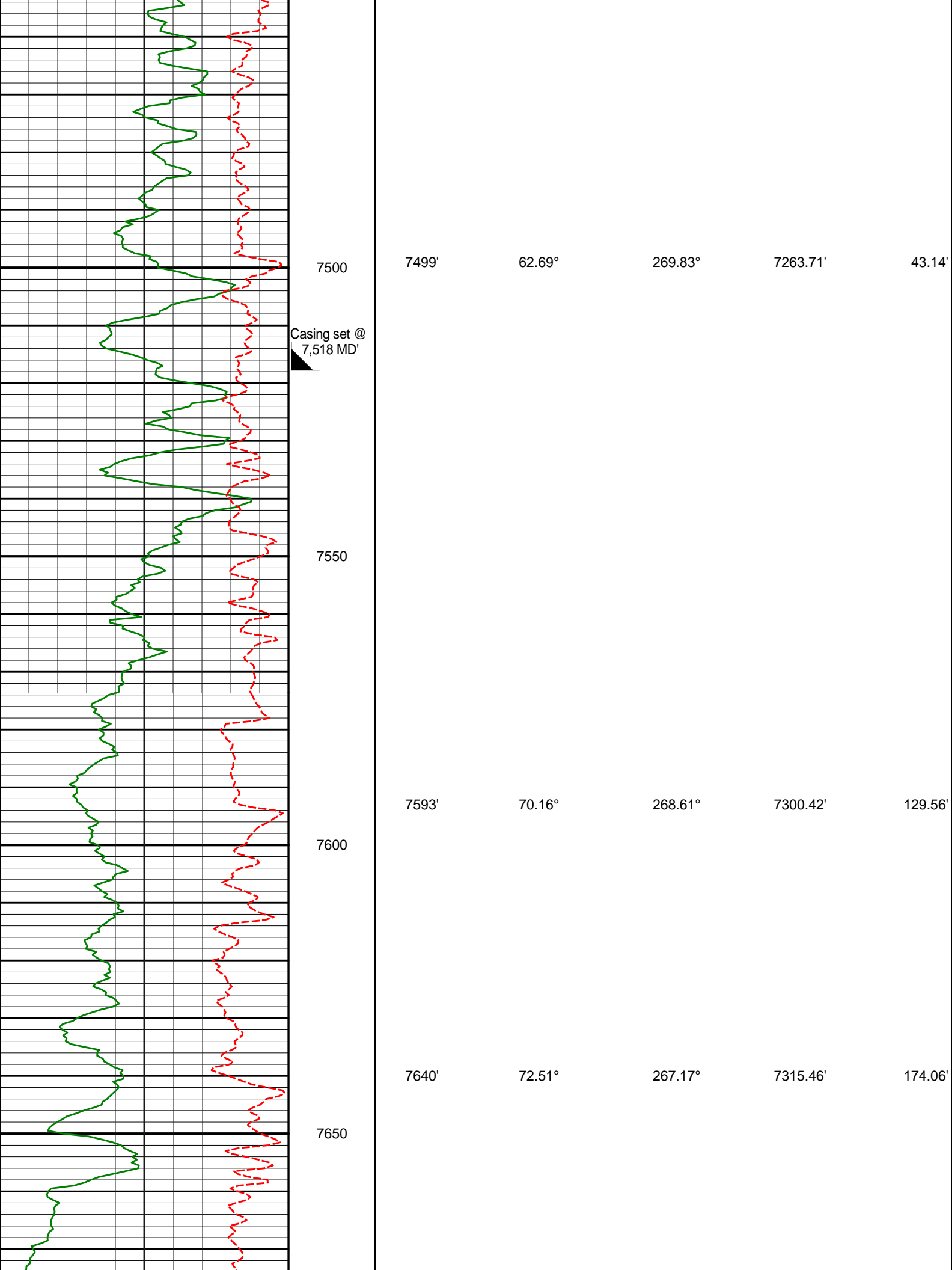
7200

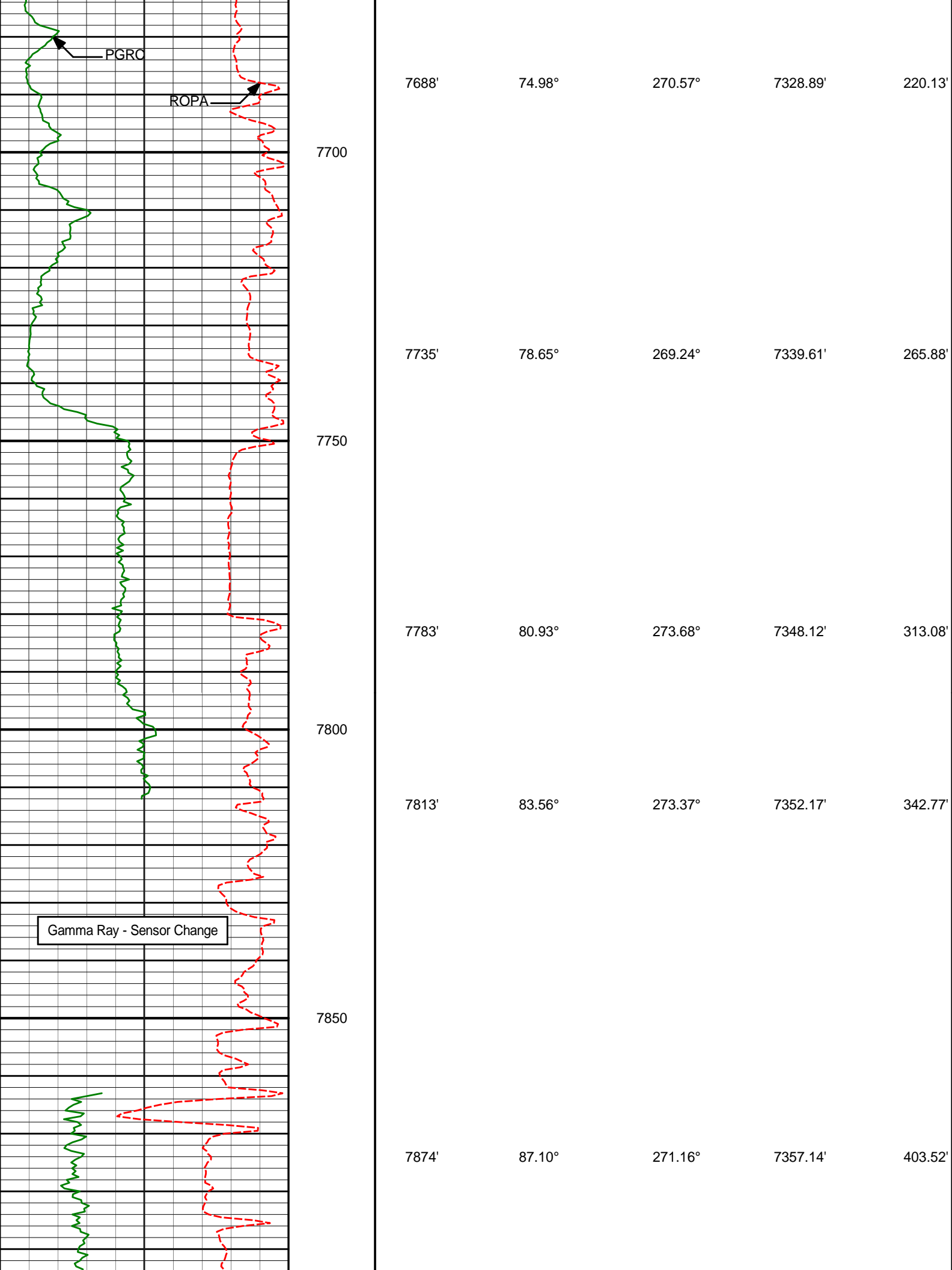
PGRC

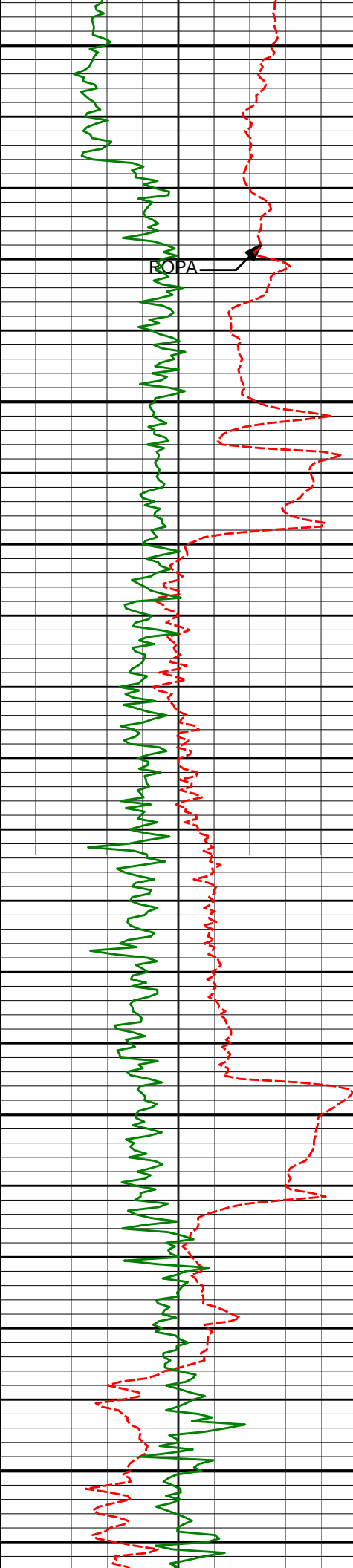
ROPA

7024'	11.25°	246.83°	6888.06'	-220.45'
7071'	14.14°	256.43°	6933.91'	-210.66'
7119'	20.72°	262.54°	6979.68'	-196.54'
7166'	25.06°	266.58°	7022.97'	-178.35'
7218'	29.95°	270.56°	7069.08'	-154.37'









BOPA

7900

7950

8000

8050

8100

7969'

87.72°

272.98°

7361.43'

498.37'

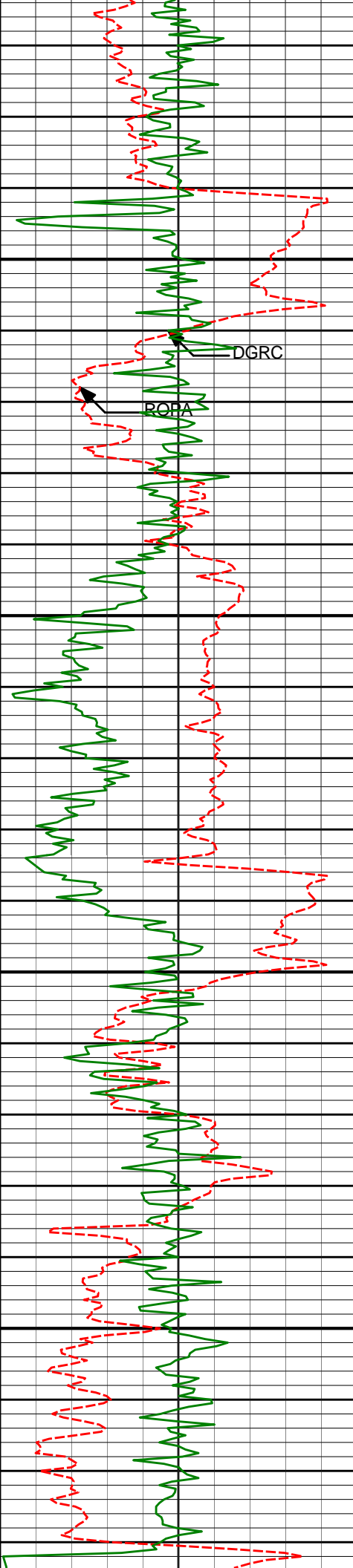
8064'

88.52°

274.26°

7364.55'

593.14'



8150

8159'

89.69°

274.63°

7366.03'

687.86'

DGRC

RODA

8200

8250

8254'

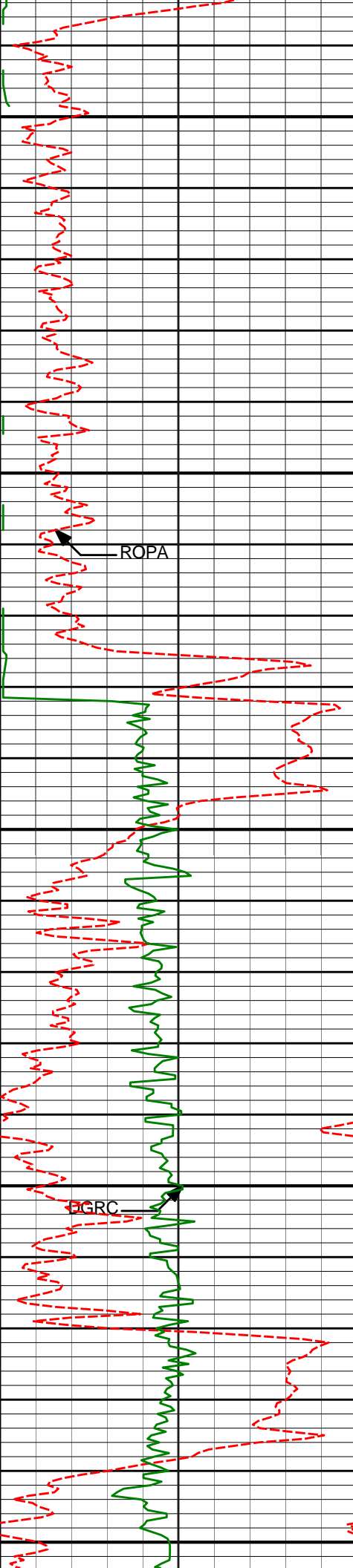
90.74°

274.14°

7365.67'

782.59'

8300



8350

8349'

90.93°

274.43°

7364.29'

877.34'

8400

ROPA

8450

8443'

91.05°

272.76°

7362.67'

971.15'

8500

BGRC

8550

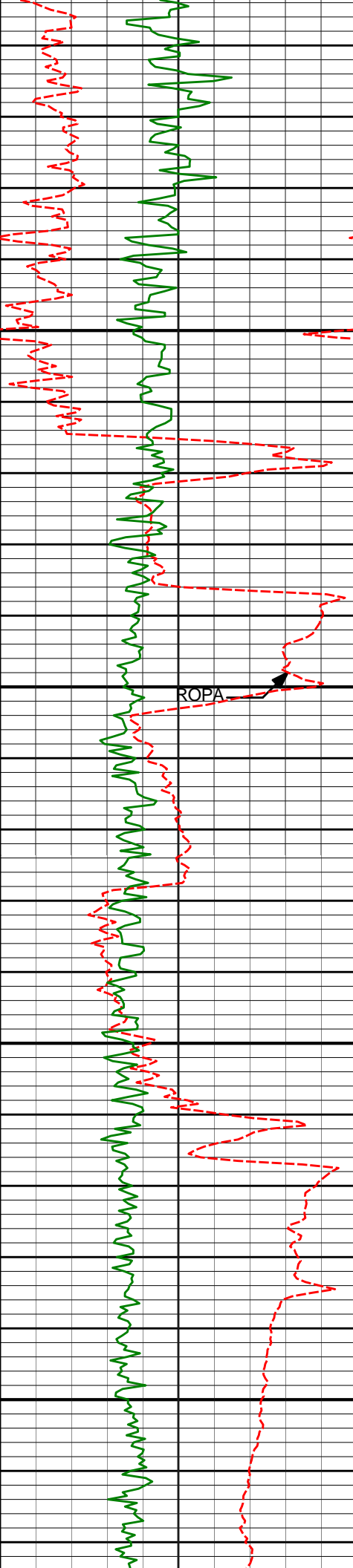
8538'

92.22°

271.80°

7359.95'

1066.04'



8600

8633'

92.04°

271.33°

7356.42'

1160.94'

8650

8700

8728'

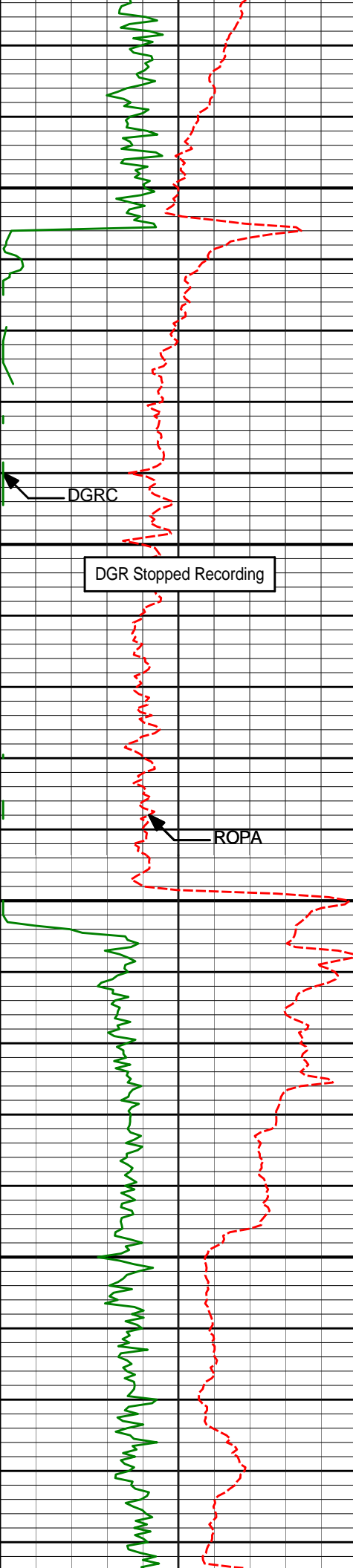
89.75°

269.39°

7354.94'

1255.92'

8750



8800

8822'

88.15°

268.11°

7356.66'

1349.87'

DGRC

DGR Stopped Recording

8850

ROPA

8900

8917'

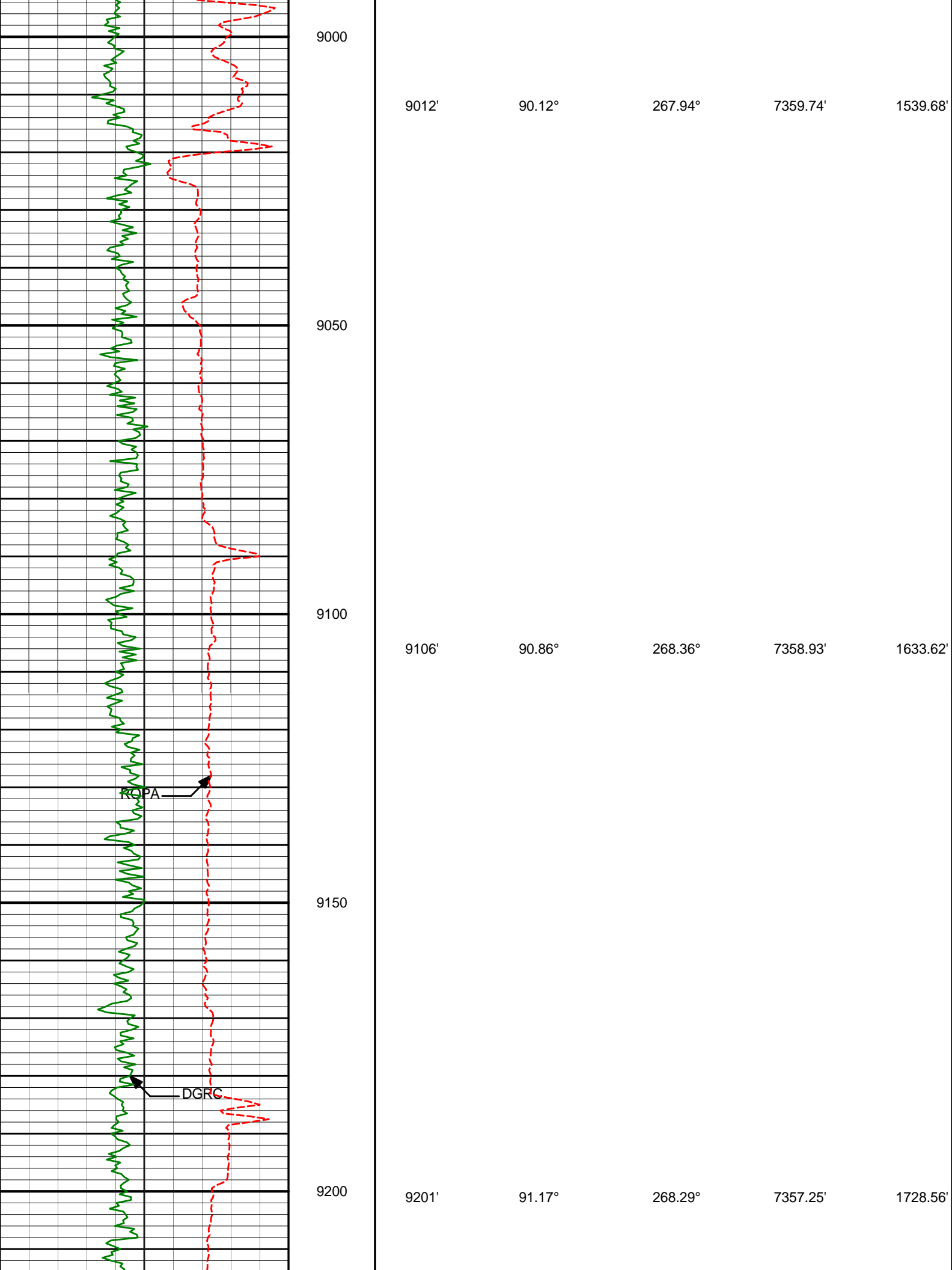
89.01°

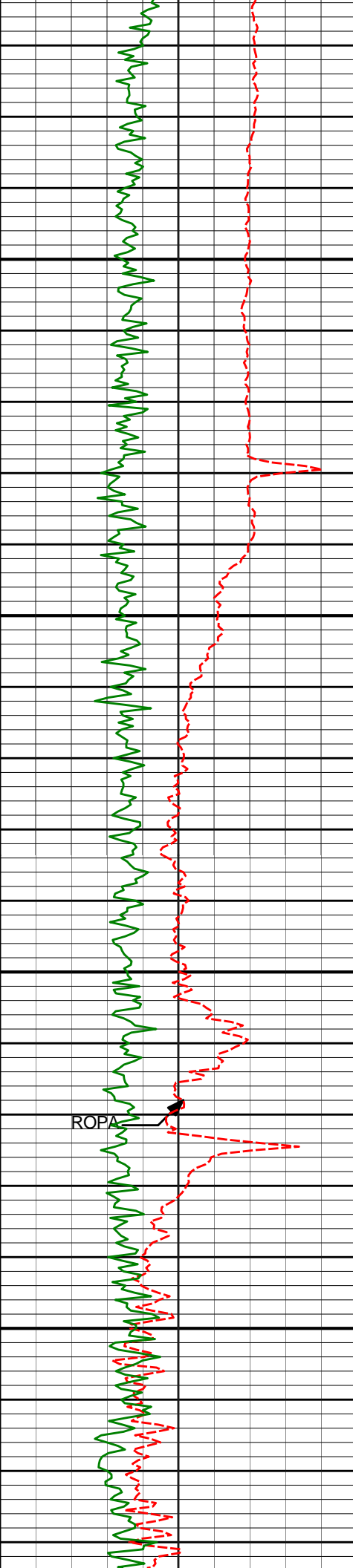
267.62°

7359.02'

1444.77'

8950





9250

9300

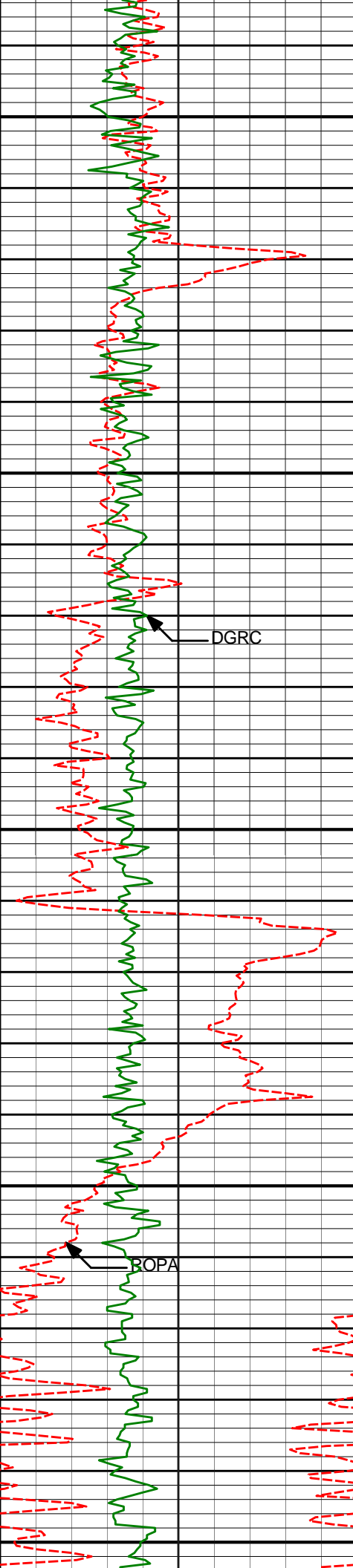
9350

9400

ROPA

9295'	91.30°	268.15°	7355.23'	1822.48'
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9390'	90.68°	267.67°	7353.58'	1917.40'
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9450

9484'

90.12°

266.61°

7352.93'

2011.26'

9500

DGRC

9550

9579'

90.00°

267.32°

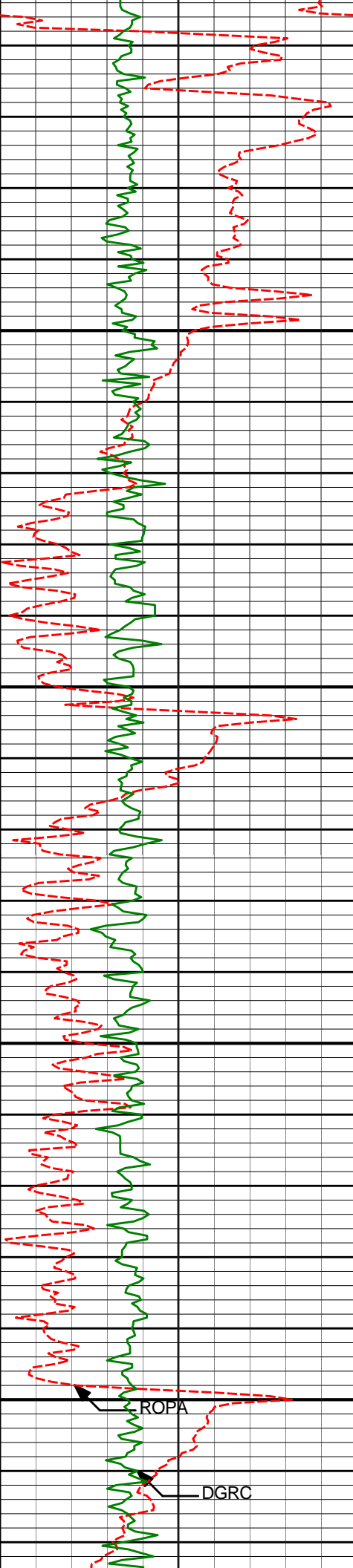
7352.83'

2106.12'

9600

ROPA

9650



9700

9750

9800

9850

ROPA

DGRC

9673'

90.56°

267.93°

7352.37'

2200.02'

9768'

90.49°

268.59°

7351.50'

2294.97'

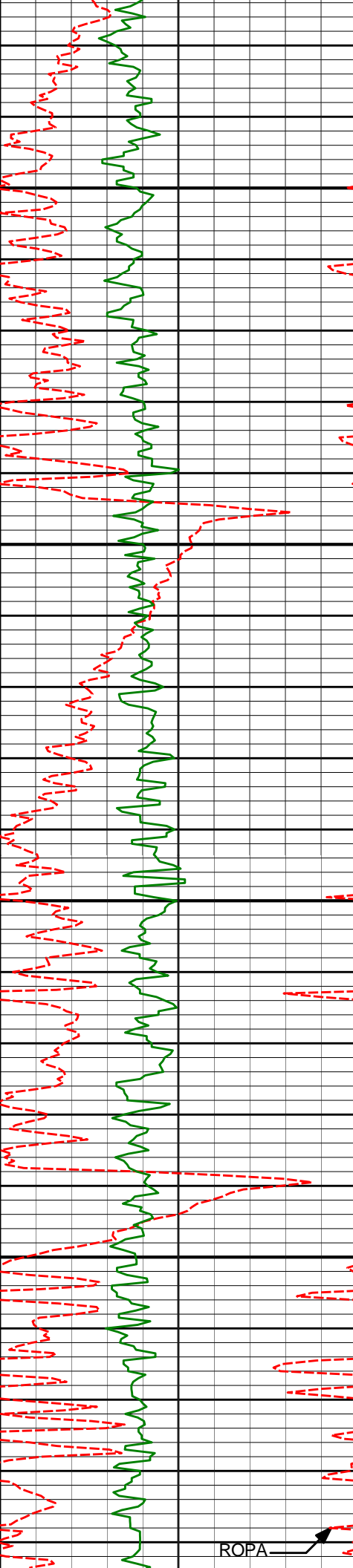
9863'

90.49°

268.59°

7350.69'

2389.93'



9900

9950

10000

10050

9958'

90.99°

268.55°

7349.46'

2484.89'

10053'

90.68°

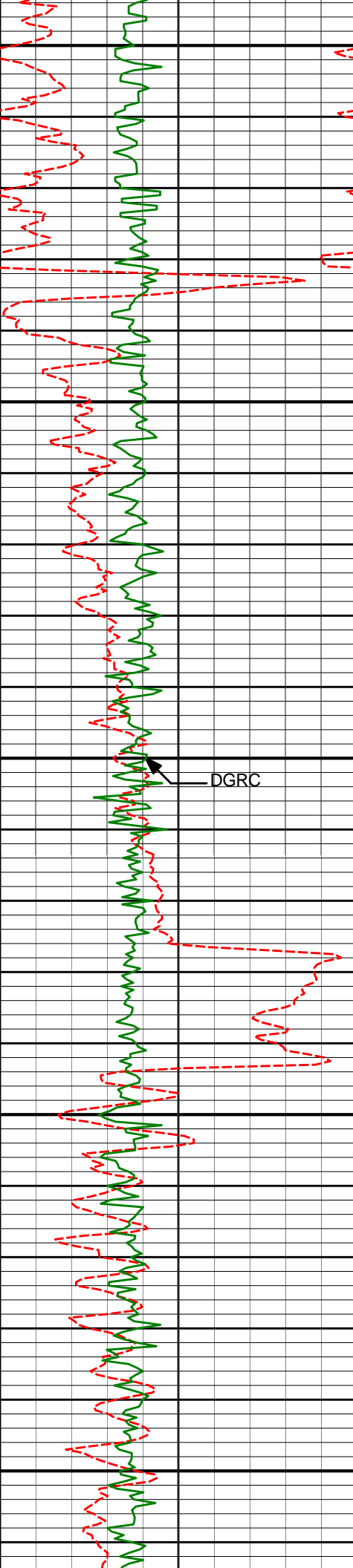
267.95°

7348.07'

2579.82'

ROPA





10100

10150

10200

10250

10300

10147'

90.93°

268.01°

7346.75'

2673.75'

10242'

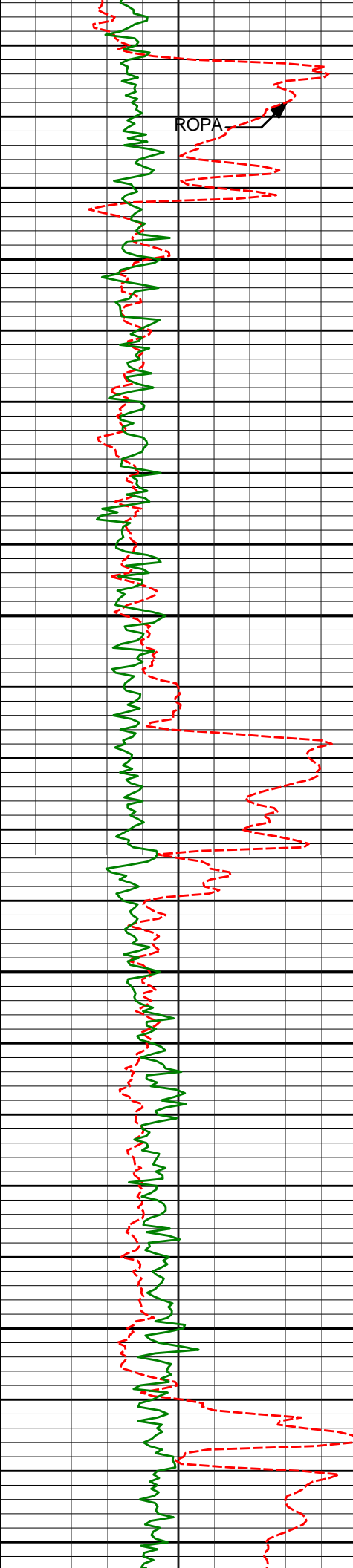
89.63°

268.08°

7346.29'

2768.68'

DGRC



ROPA

10337'

88.70°

268.55°

7347.67'

2863.62'

10350

10400

10432'

88.52°

269.34°

7349.98'

2958.57'

10450

10500

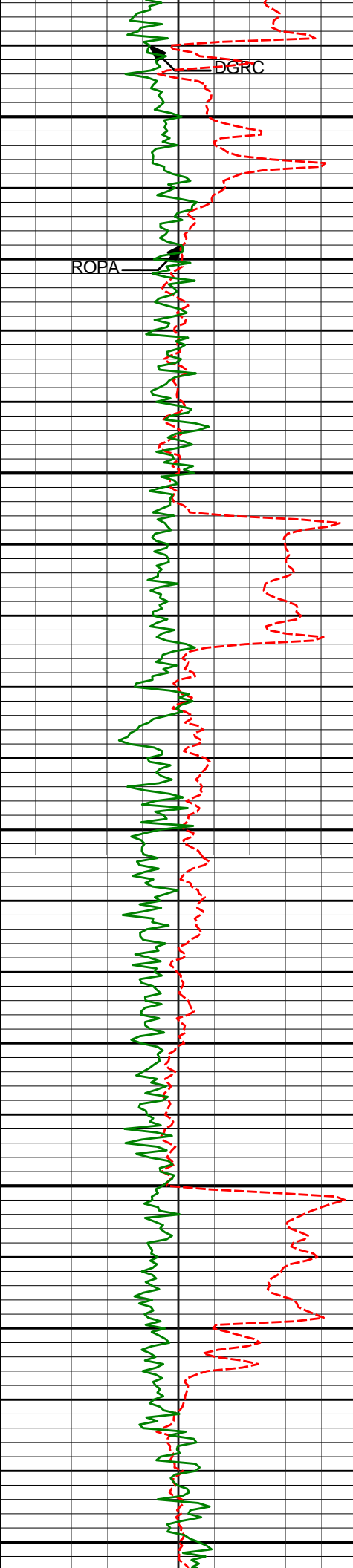
10526'

88.02°

269.50°

7352.82'

3052.52'



DGR

ROPA

10550

10600

10650

10700

10750

10621'

87.84°

269.85°

7356.25'

3147.46'

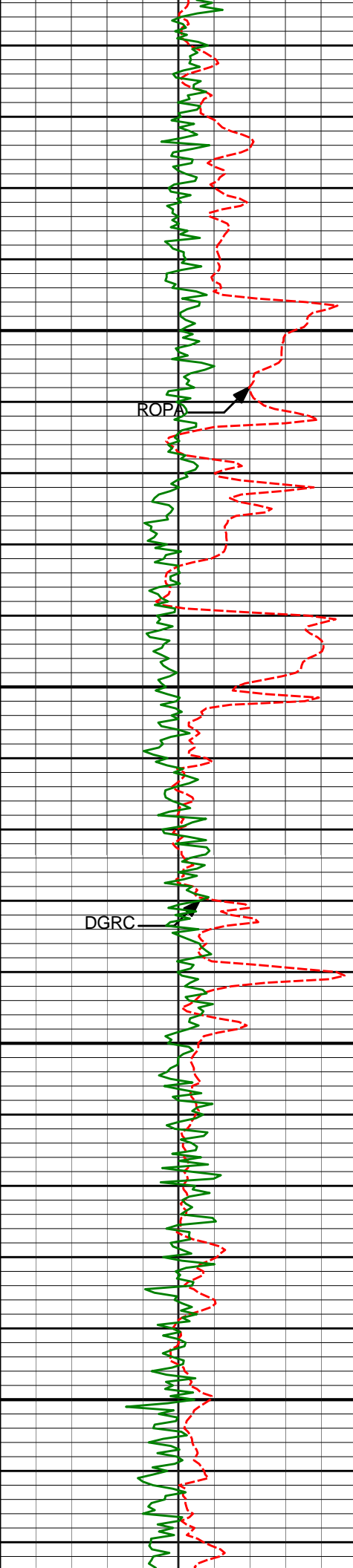
10716'

87.53°

270.67°

7360.09'

3242.38'



10800

ROPA

10811'

90.31°

271.72°

7361.88'

3337.33'

10850

DGRC

10906'

91.24°

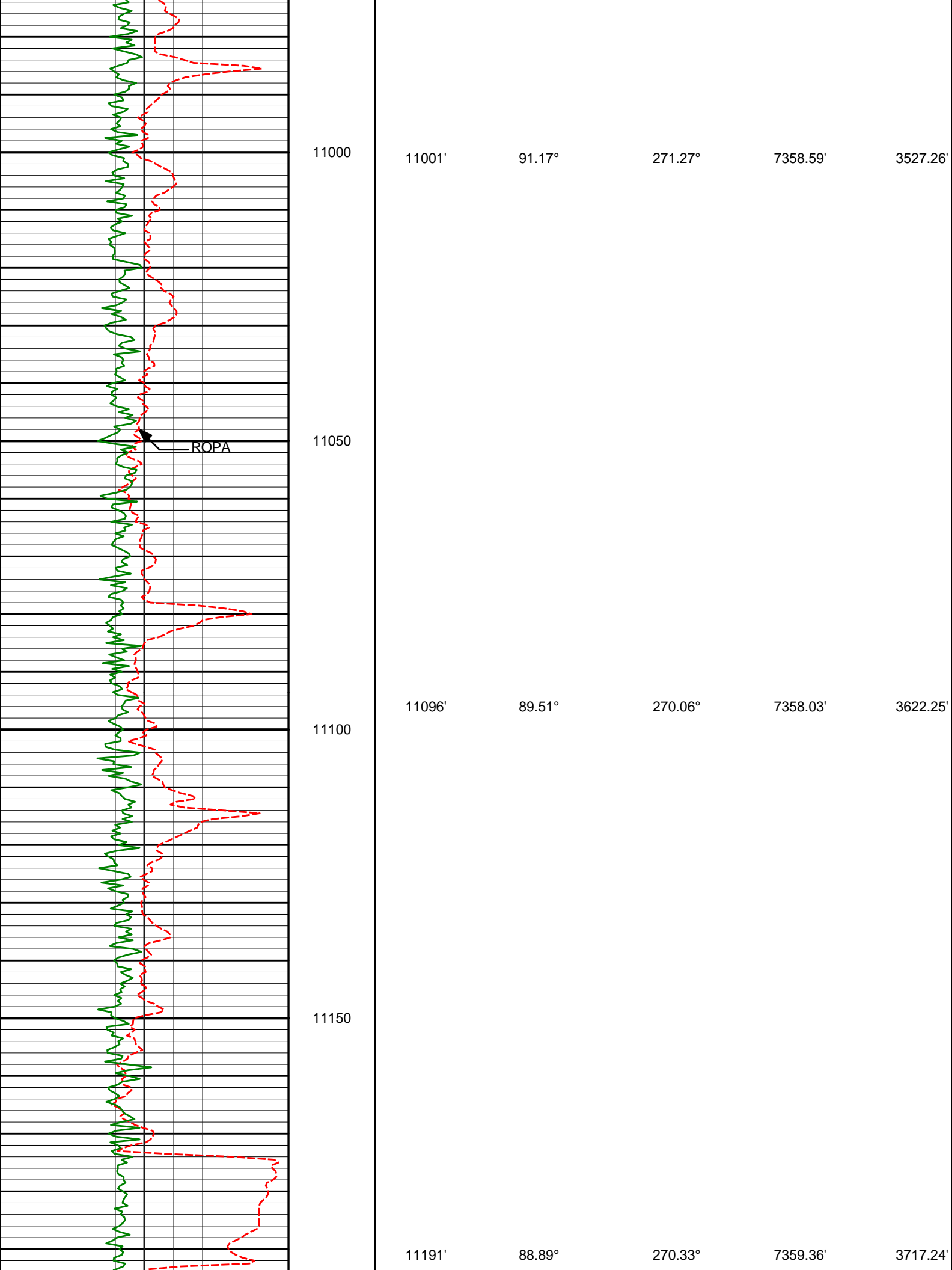
271.26°

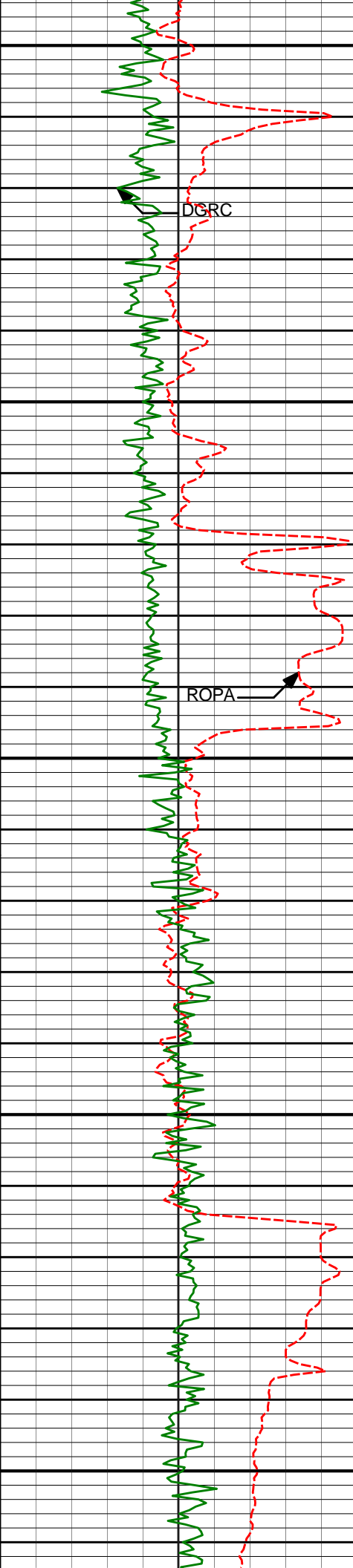
7360.59'

3432.30'

10900

10950





11200

DGRC

11250

ROPA

11300

11350

11400

11286'

89.38°

270.16°

7360.79'

3812.23'

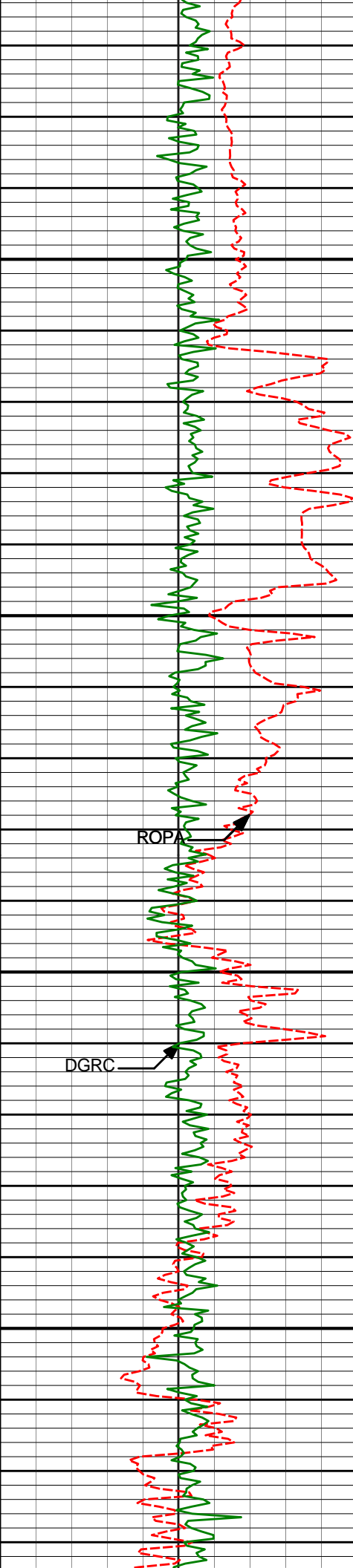
11380'

89.38°

270.53°

7361.81'

3906.22'



11450

11475'

90.31°

270.89°

7362.06'

4001.21'

11500

ROPA

11550

DGRC

11570'

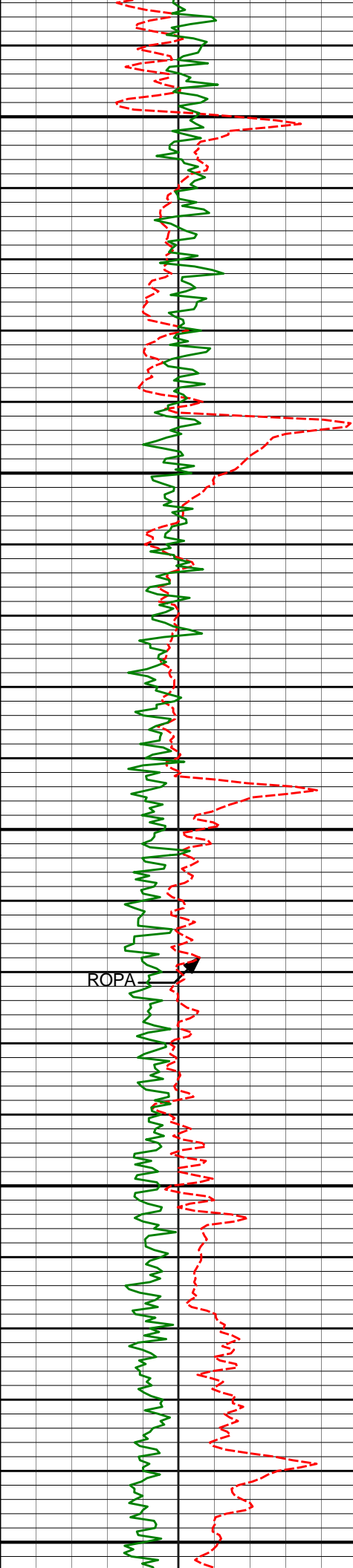
90.99°

270.69°

7360.99'

4096.20'

11600



11650

11665'

90.99°

270.05°

7359.35'

4191.19'

11700

11750

11760'

91.48°

268.85°

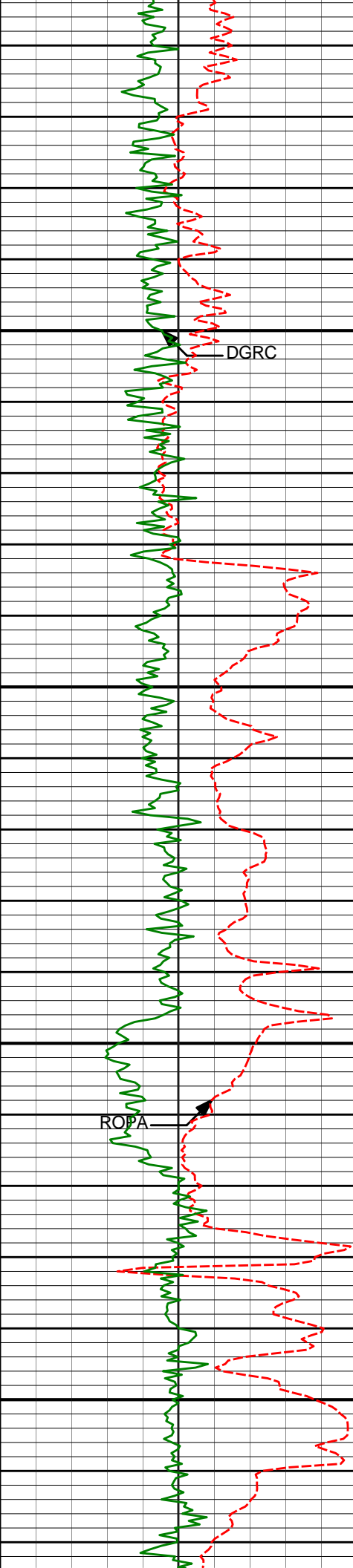
7357.30'

4286.15'

ROPA

11800

11850



11900

DGRC

11950

12000

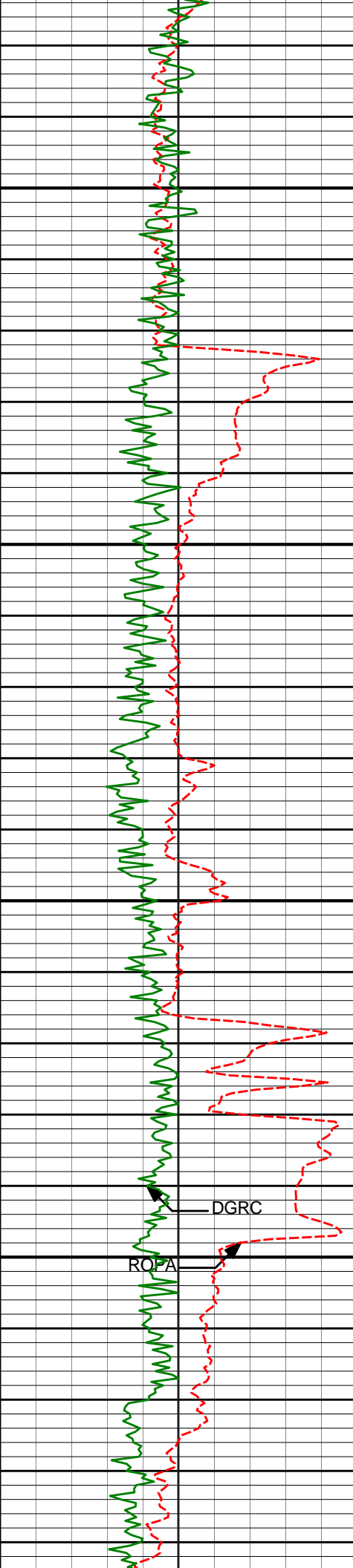
ROPA

12050

11855' 91.11° 267.71° 7355.15' 4381.08'

11949' 90.56° 266.06° 7353.78' 4474.91'

12044' 91.30° 266.70° 7352.24' 4569.70'



12100

12150

12200

12250

12138'

92.10°

266.75°

7349.45'

4663.49'

12233'

91.36°

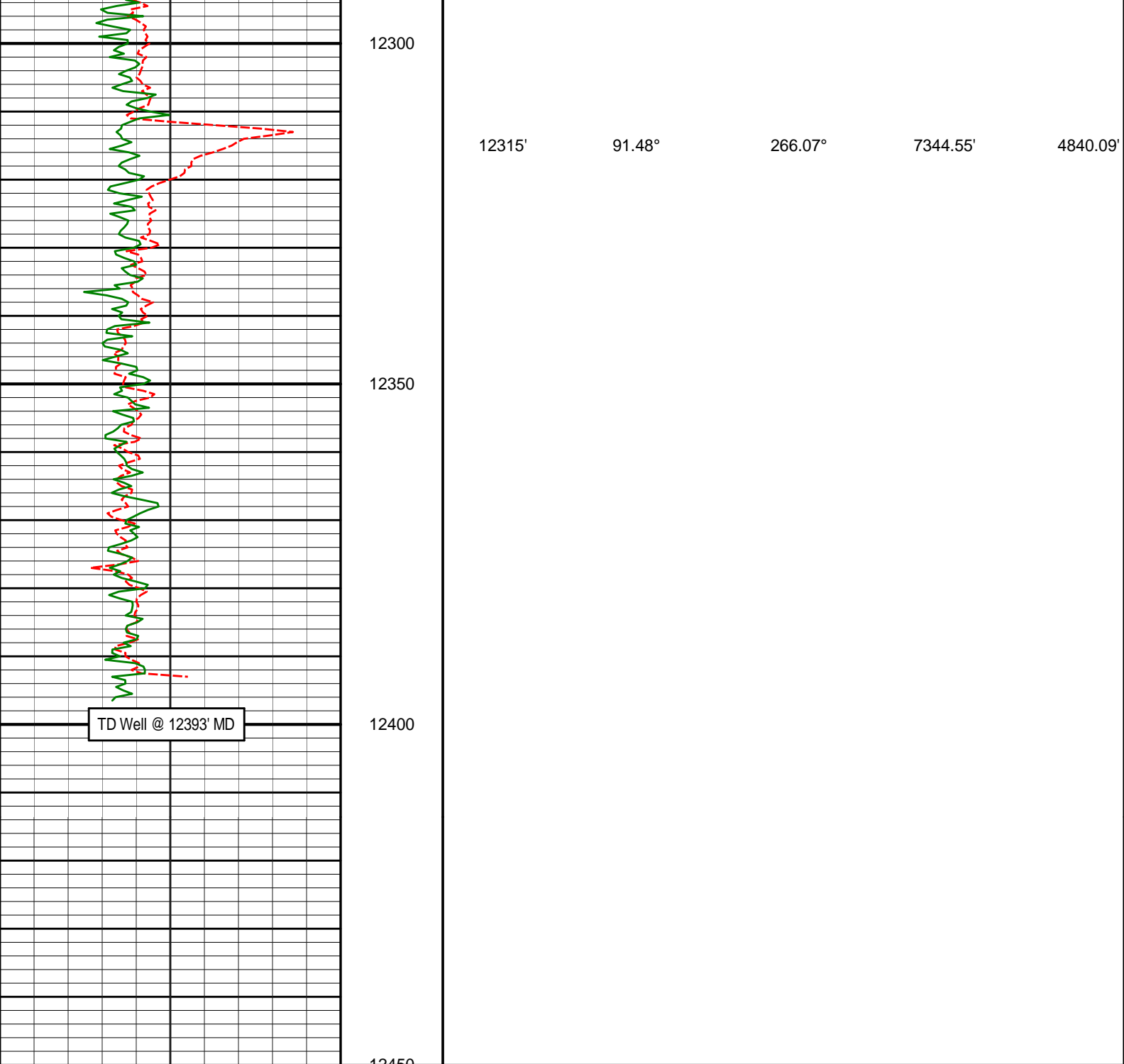
266.88°

7346.58'

4758.28'

ROPA

DGRC



Gamma Ray KclBh (DGRC) api	Depth ft 1 : 240	DEPTH	INC	AZI	TVD	VS
0250						
Avg Rate of Penetration (ROPA) feet per hr						
5000						
PCG Gamma Ray BCorr (PGRC) api						
0250						

MD 1:240 Detail Log



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp.
Eisenach Federal 30C-8HZ
Wattenberg
Weld Colorado
USA
CA-XX-0900582953
Survey's tied on to surface gyro's.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
584.00	0.94	204.59	583.99	0.97 S	1.23 W	1.23	TIE-IN
737.00	2.04	219.10	736.94	4.22 S	3.47 W	3.46	0.75
829.00	1.99	215.75	828.88	6.79 S	5.44 W	5.42	0.14
920.00	0.96	240.72	919.85	8.45 S	7.02 W	7.01	1.31
1012.00	0.68	258.33	1011.84	8.93 S	8.23 W	8.21	0.41
1104.00	0.75	262.54	1103.83	9.12 S	9.36 W	9.34	0.10
1196.00	0.76	266.16	1195.82	9.24 S	10.57 W	10.55	0.05
1287.00	2.38	0.80	1286.80	7.39 S	11.14 W	11.13	2.81
1378.00	4.20	13.50	1377.64	2.26 S	10.34 W	10.34	2.14
1470.00	6.17	10.16	1469.26	5.88 N	8.68 W	8.69	2.17
1562.00	5.78	1.28	1560.76	15.38 N	7.71 W	7.73	1.09
1654.00	7.10	6.42	1652.18	25.66 N	6.97 W	7.02	1.56
1746.00	9.00	16.28	1743.28	38.22 N	4.31 W	4.39	2.55
1838.00	11.35	17.23	1833.82	53.78 N	0.39 E	-0.28	2.56
1929.00	12.78	14.83	1922.81	72.06 N	5.62 E	-5.48	1.66
2021.00	13.87	12.14	2012.33	92.68 N	10.54 E	-10.36	1.36
2113.00	13.31	6.79	2101.76	113.97 N	14.11 E	-13.89	1.50
2204.00	14.18	8.81	2190.16	135.39 N	17.06 E	-16.80	1.09
2295.00	12.86	5.11	2278.63	156.49 N	19.67 E	-19.37	1.73
2387.00	12.87	7.81	2368.32	176.84 N	21.97 E	-21.63	0.65
2482.00	13.30	9.60	2460.86	198.10 N	25.23 E	-24.85	0.62
2577.00	13.53	16.16	2553.27	219.55 N	30.15 E	-29.72	1.62
2672.00	15.21	20.89	2645.30	241.87 N	37.68 E	-37.22	2.16
2766.00	15.20	20.46	2736.01	264.93 N	46.39 E	-45.88	0.12
2861.00	15.10	18.94	2827.71	288.31 N	54.76 E	-54.20	0.43
2956.00	15.14	17.40	2919.42	311.85 N	62.48 E	-61.88	0.42
3051.00	12.94	15.43	3011.58	333.94 N	69.02 E	-68.38	2.37
3146.00	14.62	18.45	3103.84	355.57 N	75.65 E	-74.97	1.92
3240.00	12.45	16.97	3195.22	376.52 N	82.36 E	-81.64	2.34
3335.00	9.87	15.28	3288.42	394.17 N	87.50 E	-86.74	2.74
3430.00	11.89	16.64	3381.71	411.40 N	92.45 E	-91.66	2.14
3525.00	14.66	16.52	3474.16	432.31 N	98.67 E	-97.84	2.92
3620.00	11.85	11.31	3566.62	453.40 N	104.00 E	-103.13	3.21
3715.00	12.72	4.97	3659.45	473.39 N	106.82 E	-105.91	1.69
3805.00	12.52	12.54	3747.28	492.78 N	109.80 E	-108.85	1.85
3899.00	13.05	14.92	3838.95	512.99 N	114.74 E	-113.76	0.79
3994.00	17.88	15.96	3930.49	537.39 N	121.52 E	-120.48	5.09
4088.00	16.93	13.95	4020.18	564.54 N	128.78 E	-127.70	1.20
4183.00	15.85	12.42	4111.32	590.64 N	134.91 E	-133.78	1.22
4278.00	13.54	12.74	4203.21	614.16 N	140.15 E	-138.97	2.43
4372.00	13.35	11.27	4294.63	635.53 N	144.70 E	-143.48	0.42
4467.00	14.65	15.10	4386.81	657.89 N	149.97 E	-148.71	1.68
4561.00	12.66	11.98	4478.15	679.44 N	155.21 E	-153.90	2.26
4656.00	14.78	18.15	4570.44	701.15 N	161.14 E	-159.80	2.71
4751.00	14.19	18.05	4662.42	723.73 N	168.53 E	-167.14	0.62

	4845.00	15.15	19.95	4753.35	746.23 N	176.29 E	-174.86	1.14
	4940.00	15.41	13.39	4845.00	770.18 N	183.45 E	-181.97	1.84
	5034.00	15.63	12.32	4935.57	794.70 N	189.04 E	-187.52	0.38
	5129.00	14.32	10.72	5027.35	818.75 N	193.96 E	-192.39	1.45
	5223.00	14.46	11.25	5118.40	841.68 N	198.41 E	-196.79	0.20
	5318.00	12.63	8.79	5210.75	863.58 N	202.31 E	-200.65	2.02
	5413.00	13.48	12.63	5303.30	884.65 N	206.32 E	-204.62	1.28
	5507.00	14.01	12.92	5394.60	906.43 N	211.26 E	-209.52	0.57
	5602.00	13.37	9.81	5486.91	928.47 N	215.70 E	-213.92	1.03
	5696.00	14.47	12.71	5578.15	950.63 N	220.14 E	-218.31	1.39
	5790.00	11.91	8.79	5669.66	971.68 N	224.21 E	-222.34	2.88
	5885.00	11.81	3.84	5762.63	991.07 N	226.35 E	-224.45	1.08
	5981.00	12.37	1.85	5856.51	1011.15 N	227.34 E	-225.40	0.73
	6075.00	13.28	0.67	5948.16	1032.01 N	227.80 E	-225.81	1.01
	6170.00	11.38	359.67	6040.96	1052.29 N	227.87 E	-225.85	2.01
	6265.00	10.49	359.96	6134.24	1070.31 N	227.81 E	-225.75	0.94
	6360.00	9.27	359.75	6227.83	1086.61 N	227.77 E	-225.68	1.28
	6455.00	7.46	9.72	6321.82	1100.34 N	228.78 E	-226.67	2.43
	6550.00	5.89	25.92	6416.18	1110.81 N	231.95 E	-229.82	2.57
	6644.00	4.48	23.04	6509.79	1118.52 N	235.50 E	-233.35	1.52
	6739.00	3.10	29.75	6604.58	1124.17 N	238.22 E	-236.06	1.52
	6814.00	2.07	25.26	6679.51	1127.16 N	239.81 E	-237.64	1.40
	6834.00	2.24	27.80	6699.49	1127.83 N	240.14 E	-237.98	0.97
	6881.00	0.87	344.26	6746.47	1128.98 N	240.47 E	-238.31	3.65
	6929.00	5.65	270.68	6794.39	1129.36 N	238.01 E	-235.84	11.39
	6976.00	10.65	272.43	6840.90	1129.57 N	231.35 E	-229.19	10.65
	7024.00	11.25	246.77	6888.06	1127.91 N	222.61 E	-220.45	10.15
	7071.00	14.14	256.35	6933.91	1124.75 N	212.82 E	-210.66	7.59
	7119.00	20.72	262.42	6979.68	1122.24 N	198.69 E	-196.54	14.20
	7166.00	25.06	266.44	7022.97	1120.53 N	180.50 E	-178.35	9.81
	7218.00	29.95	270.38	7069.08	1119.93 N	156.51 E	-154.37	10.03
	7262.00	35.35	273.72	7106.12	1120.83 N	132.81 E	-130.66	12.93
	7309.00	39.96	275.79	7143.32	1123.24 N	104.21 E	-102.05	10.17
	7356.00	44.74	275.50	7178.05	1126.35 N	72.71 E	-70.55	10.18
	7404.00	50.03	272.98	7210.54	1128.92 N	37.50 E	-35.33	11.68
	7451.00	55.43	271.64	7238.99	1130.41 N	0.14 E	2.03	11.71
	7499.00	62.55	269.69	7263.71	1130.87 N	40.97 W	43.14	15.24
	7546.00	67.63	268.25	7283.50	1130.09 N	83.57 W	85.74	11.16
	7593.00	70.16	268.08	7300.42	1128.68 N	127.39 W	129.56	5.39
	7640.00	72.51	268.55	7315.46	1127.38 N	171.90 W	174.06	5.09
	7688.00	74.98	269.68	7328.89	1126.67 N	217.97 W	220.13	5.62
	7735.00	78.65	271.99	7339.61	1127.34 N	263.71 W	265.88	9.16
	7783.00	80.93	272.45	7348.12	1129.17 N	310.92 W	313.08	4.84
	7813.00	83.56	273.04	7352.17	1130.59 N	340.60 W	342.77	8.98
	7874.00	87.10	271.13	7357.14	1132.80 N	401.35 W	403.52	6.59
	7969.00	87.72	272.94	7361.43	1136.17 N	496.19 W	498.37	2.01
	8064.00	88.52	274.23	7364.55	1142.11 N	590.95 W	593.14	1.60
	8159.00	89.69	274.60	7366.03	1149.42 N	685.65 W	687.86	1.29
	8254.00	90.74	274.11	7365.67	1156.64 N	780.38 W	782.59	1.22
	8349.00	90.93	274.40	7364.29	1163.68 N	875.10 W	877.34	0.36
	8443.00	91.05	272.73	7362.67	1169.53 N	968.90 W	971.15	1.78
	8538.00	92.22	271.77	7359.95	1173.26 N	1063.79 W	1066.04	1.59
	8633.00	92.04	271.30	7356.42	1175.80 N	1158.69 W	1160.94	0.53
	8728.00	89.75	269.36	7354.94	1176.35 N	1253.67 W	1255.92	3.16
	8822.00	88.15	268.08	7356.66	1174.25 N	1347.62 W	1349.87	2.18
	8917.00	89.01	267.59	7359.02	1170.66 N	1442.52 W	1444.77	1.04
	9012.00	90.12	267.91	7359.74	1166.93 N	1537.45 W	1539.68	1.22
	9106.00	90.86	268.33	7358.93	1163.85 N	1631.39 W	1633.62	0.91
	9201.00	91.17	268.26	7357.25	1161.02 N	1726.33 W	1728.56	0.33
	9295.00	91.30	268.12	7355.23	1158.05 N	1820.27 W	1822.48	0.20
	9390.00	90.68	267.64	7353.58	1154.54 N	1915.19 W	1917.40	0.83
	9484.00	90.12	266.58	7352.93	1149.80 N	2009.06 W	2011.26	1.28
	9579.00	90.00	267.28	7352.83	1144.71 N	2103.92 W	2106.12	0.75
	9673.00	90.56	267.90	7352.37	1140.76 N	2197.84 W	2200.02	0.89
	9768.00	90.49	268.56	7351.50	1137.82 N	2292.79 W	2294.97	0.70
	9863.00	90.49	268.56	7350.69	1135.44 N	2387.76 W	2389.93	0.00
	9958.00	90.99	268.52	7349.46	1133.02 N	2482.72 W	2484.89	0.53
	10053.00	90.68	267.92	7348.07	1130.06 N	2577.66 W	2579.82	0.71
	10147.00	90.93	267.97	7346.75	1126.69 N	2671.59 W	2673.75	0.27
	10242.00	89.63	268.05	7346.29	1123.40 N	2766.53 W	2768.68	1.37
	10337.00	88.70	268.51	7347.67	1120.54 N	2861.48 W	2863.62	1.09
	10432.00	88.52	269.31	7349.98	1118.74 N	2956.43 W	2958.57	0.86
	10526.00	88.02	269.47	7352.82	1117.74 N	3050.38 W	3052.52	0.56
	10621.00	87.84	269.82	7356.25	1117.15 N	3145.32 W	3147.46	0.41

10716.00	87.53	270.64	7360.09	1117.53 N	3240.24 W	3242.38	0.92
10811.00	90.31	271.69	7361.88	1119.46 N	3335.19 W	3337.33	3.13
10906.00	91.24	271.22	7360.59	1121.87 N	3430.15 W	3432.30	1.10
11001.00	91.17	271.23	7358.59	1123.90 N	3525.11 W	3527.26	0.07
11096.00	89.51	270.03	7358.03	1124.95 N	3620.10 W	3622.25	2.16
11191.00	88.89	270.29	7359.36	1125.21 N	3715.09 W	3717.24	0.71
11286.00	89.38	270.12	7360.79	1125.55 N	3810.07 W	3812.23	0.55
11380.00	89.38	270.50	7361.81	1126.06 N	3904.07 W	3906.22	0.40
11475.00	90.31	270.86	7362.06	1127.19 N	3999.06 W	4001.21	1.05
11570.00	90.99	270.66	7360.99	1128.45 N	4094.04 W	4096.20	0.75
11665.00	90.99	270.02	7359.35	1129.01 N	4189.03 W	4191.19	0.67
11760.00	91.48	268.82	7357.30	1128.05 N	4284.00 W	4286.15	1.36
11855.00	91.11	267.68	7355.15	1125.15 N	4378.93 W	4381.08	1.26
11949.00	90.56	266.03	7353.78	1119.99 N	4472.77 W	4474.91	1.85
12044.00	91.30	266.67	7352.24	1113.95 N	4567.57 W	4569.70	1.03
12138.00	92.10	266.71	7349.45	1108.52 N	4661.37 W	4663.49	0.85
12233.00	91.36	266.85	7346.58	1103.19 N	4756.17 W	4758.28	0.79
12315.00	91.48	266.04	7344.55	1098.10 N	4837.99 W	4840.09	1.00

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 270.11 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.61 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12315.00 FEET
IS 4961.05 FEET ALONG 282.79 DEGREES (TRUE)**

Final survey is a projection to bit.