



1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	17-Apr-13	20-Apr-13			
Rig Bit Number	100	200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,079.00	7,728.00			
Log End Depth (MD, ft)	7,728.00	11,583.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	14-Apr-13 01:45	17-Apr-13 10:12			
Drill/Wipe End Date and Time	17-Apr-13 06:50	17-Apr-13 10:12			
Min Inc (deg) @ Depth (MD, ft)	.36 @ 5,987.00	88.02 @ 8,681.00			
Max Inc (deg) @ Depth (MD, ft)	85.27 @ 7,678.00	92.04 @ 8,112.00			
Bit TFA(in2) / Bit Type	.86 / PDC	.61 / PDC			
Flow Rate (gpm)	552.78	300.00			
Max AV (fpm) / CV (fpm) @ MWD	400.0 / 400.0	530.0 / 530.0			
Fluid Type	Fresh Water Gel	Fresh Water Gel			
Density (ppg) / Viscosity (spqt)	9.60 / 50.00	9.50 / 41.00			
Filtrate CL (ppm)	1,400.00	1,400.00			
pH / Fluid Loss (mptm)	9.00 / 4	9.00 / 5			
PV (cP) / YP (Ihf2)	19 / 19.00	16 / 10.00			
% Solids / % Sand	8.42 / .50	7.9 / .5			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
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 (deg F) / S	107.07 / PDC	200.00 / LOGMA			

Max Tool Temp (degF) / Source	167.97 / PCM	208.90 / HCIM			
Rm @ Max Tool Temp (degF)	N/A @ 167.97	N/A @ 208.90			
Lead MWD Engineer	Patrick Lane	Patrick Lane			
Customer Representative	Stan Walters	Stan Walters			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	HCIM			
Software Version	5.76	88.56			
Sub Serial Number	11404300	11425571			
Insert Serial Number	11680766	11287070			
Date and Time Initialized	13-Apr-13 17:37	18-Apr-13 15:28			
Date and Time Read	17-Apr-13 13:07	20-Apr-13 23:37			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	50.00	45.00			
Software Version	6.21	6.21			
Sub Serial Number	11404300	123			
Sonde Serial Number	11297574	11477975			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	302.59	113.97			

Gamma Ray Sensor Information

Tool Type	PCG	DGR			
Distance From Bit (ft)	53.35	64.78			
Recorded Sample Period (sec)	10	8			
Software Version	8.15	N/A			
Sub Serial Number	11404300	11408221			
Insert/Sonde Serial Number	11681021	11399929			

Resistivity Sensor Information

Tool Type		Slim P4			
Distance From Bit (ft)		57.76			
Recorded Sample Period (sec)		6			
Software Version		5.55			
Sub Serial Number		11514650			
Receiver Insert Serial Number		266706			
Transmitter Insert Serial Number		11287070			
Receiver Orientation		Down			

DDSr-DGR Sensor Information

Tool Type		DDSr-DGR			
Distance From Bit (ft)		67.66			
Recorded Sample Period (sec)		12			
Software Version		10.49			
Sub Serial Number		123			
Insert Serial Number		11270399			
Sensor ID Number		7025			

REMARKS

1. All depths are measured bit depths referenced to the Driller's pipe tally

1. All depths are measured bit depths referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified
4. The following smoothing parameters have been applied to the data:
- DGR (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. INSITE version 7.4.1

WARRANTY

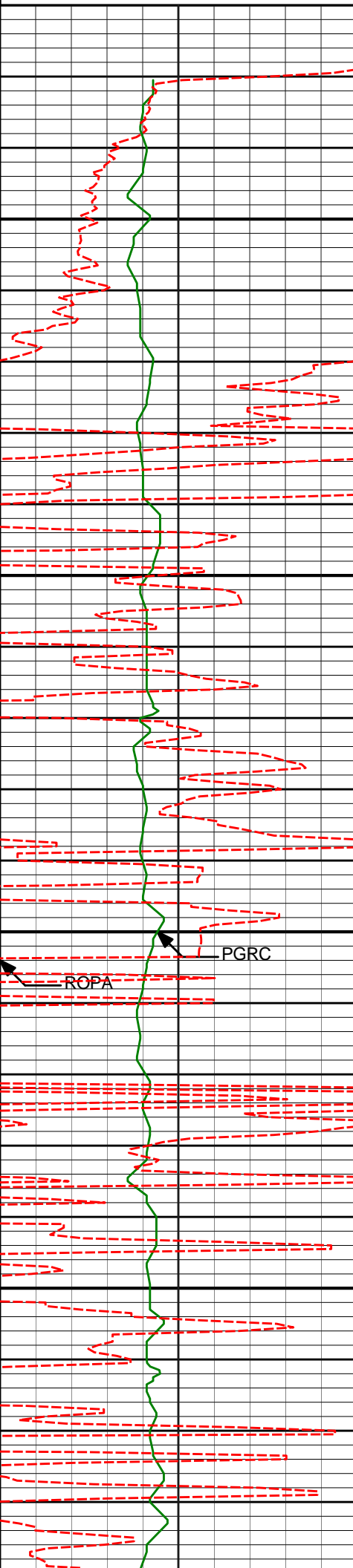
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HALLIBURTON

Sperry Drilling

MD 1:240 Detail Log

Avg Rate of Penetration (ROPA) feet per hr						
500	0					
Gamma Ray KclBh (DGRC) api						
0	250					
Gamma Ray KclBh (PGRC) api		Depth ft 1 : 240				
0	250	DEPTH	INC	AZI	TVD	VS



1100

1150

1200

1250

1171'

0.49°

349.75°

1170.97'

-7.06'

1263'

0.41°

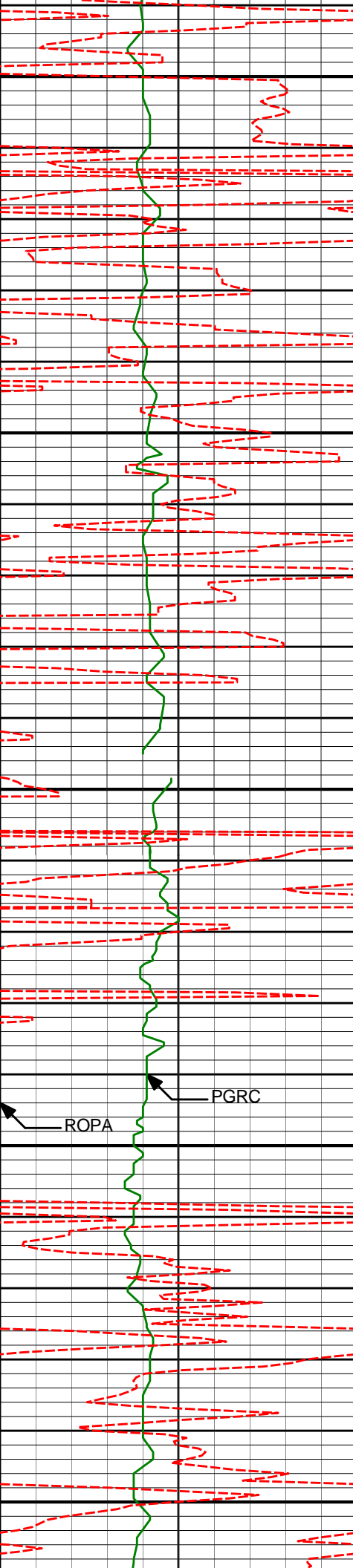
351.13°

1262.97'

-7.76'

ROPA

PGRC



1300

1350

1400

1450

1500

1355'

0.62°

39.85°

1354.97'

-8.47'

1447'

0.85°

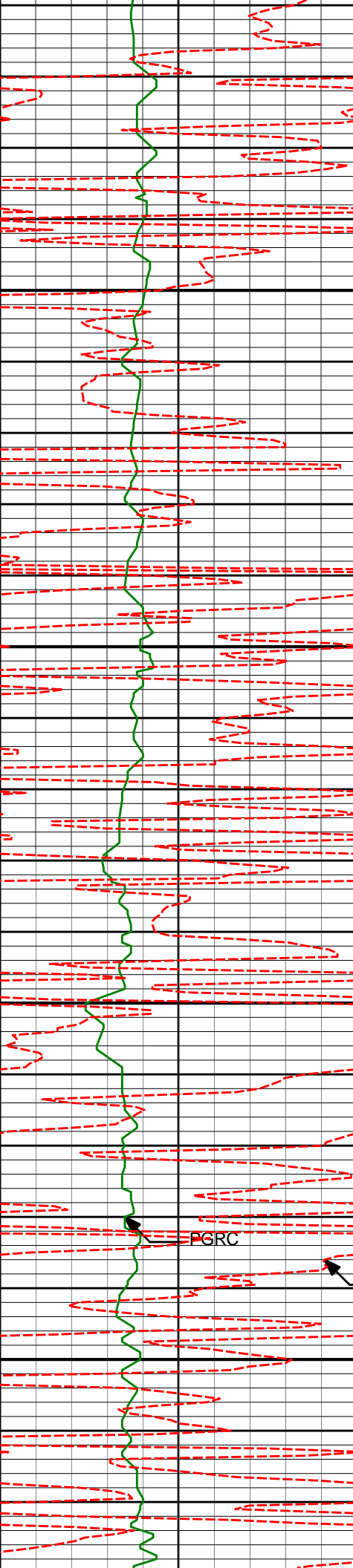
23.21°

1446.96'

-9.48'

ROPA

PGRC



1550

1600

1650

1700

1631'

1.05°

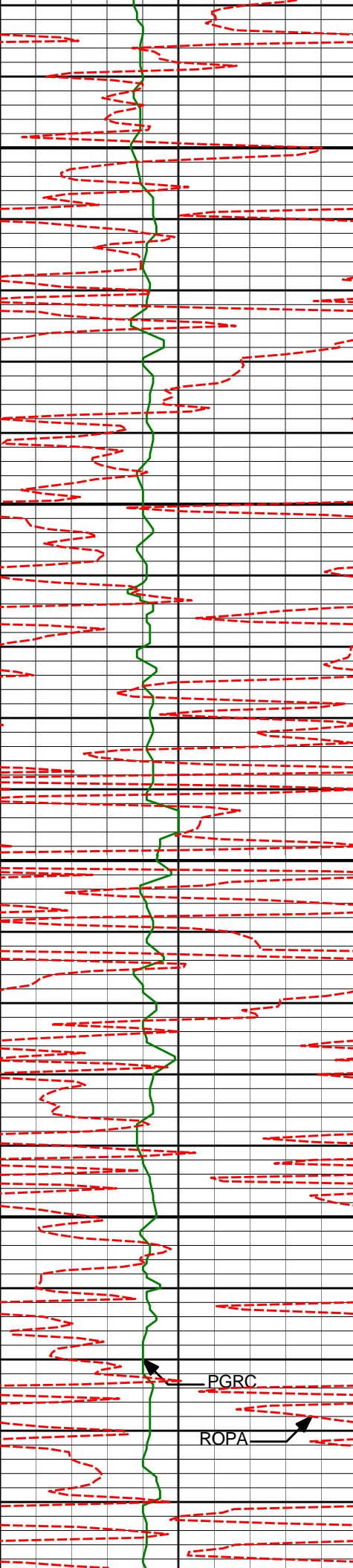
10.51°

1630.93'

-12.41'

PGRC

ROPA



1750

1800

1850

1900

1814'

1.59°

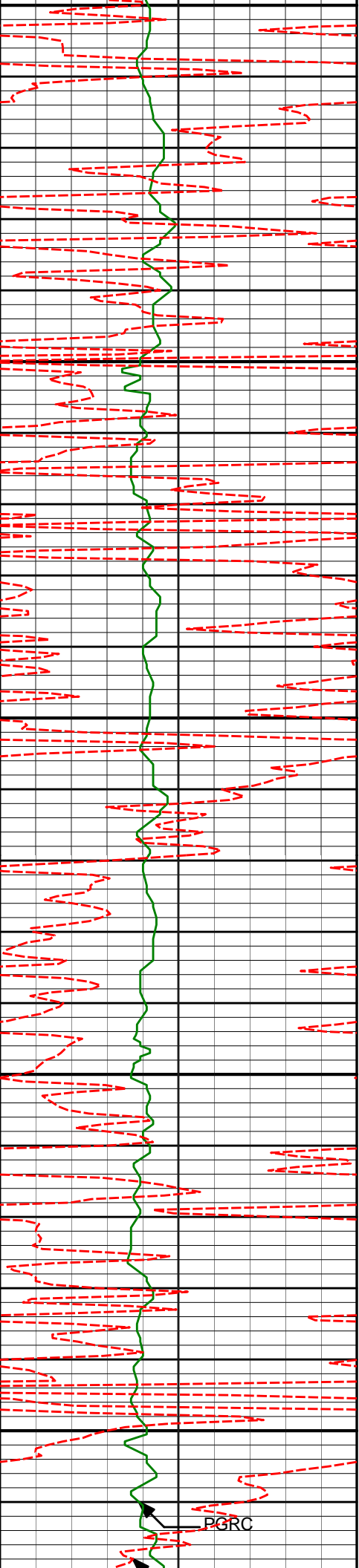
355.77°

1813.89'

-16.60'

PGRC

ROPA



1950

2000

2050

2100

2150

2004'

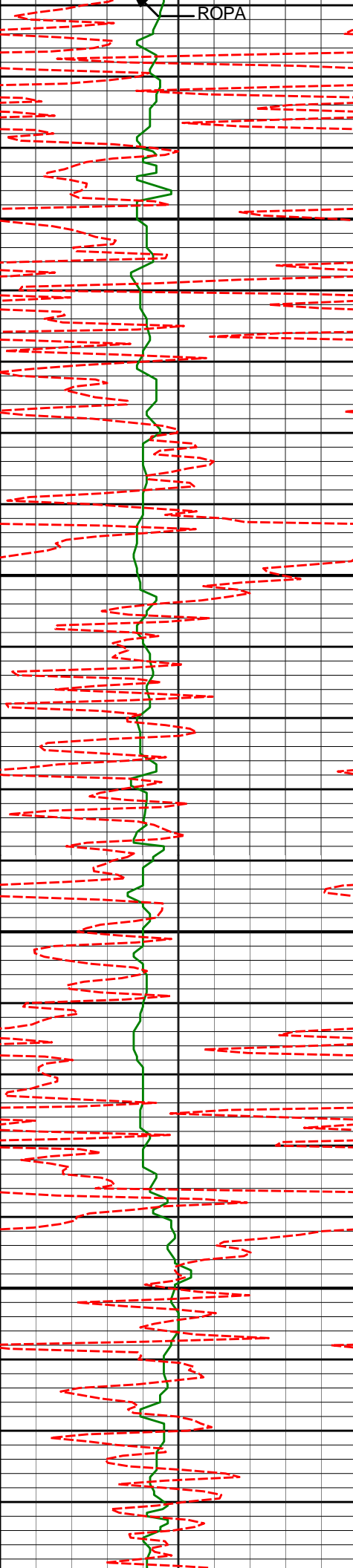
1.20°

343.14°

2003.83'

-21.12'

PGRC



2200

2250

2300

2350

2194'

1.03°

338.98°

2193.79'

-24.61'

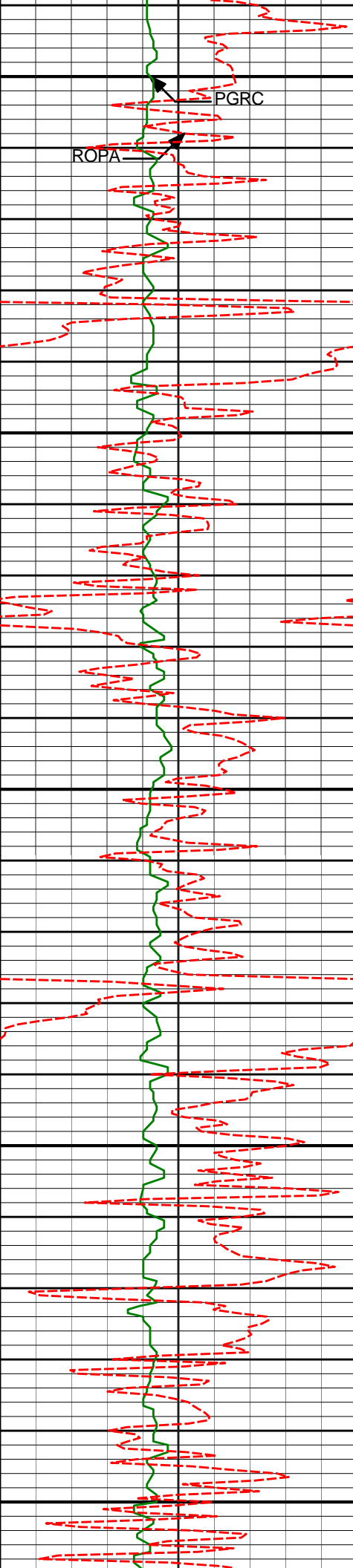
2383'

1.62°

328.44°

2382.74'

-28.45'



2400

2450

2500

2550

2600

PGRC

ROPA

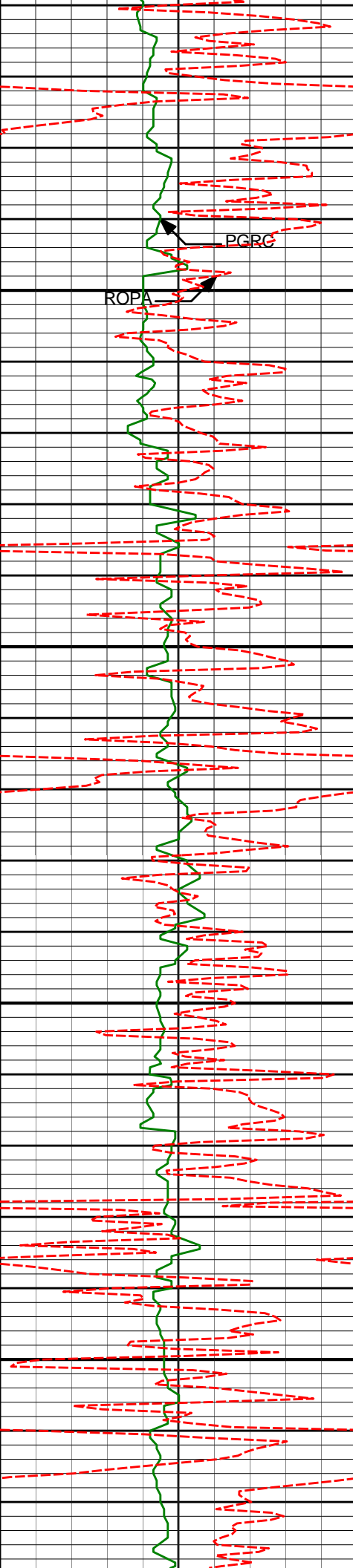
2573'

1.84°

283.54°

2572.66'

-31.39'



ROPA

PGRC

2650

2700

2750

2800

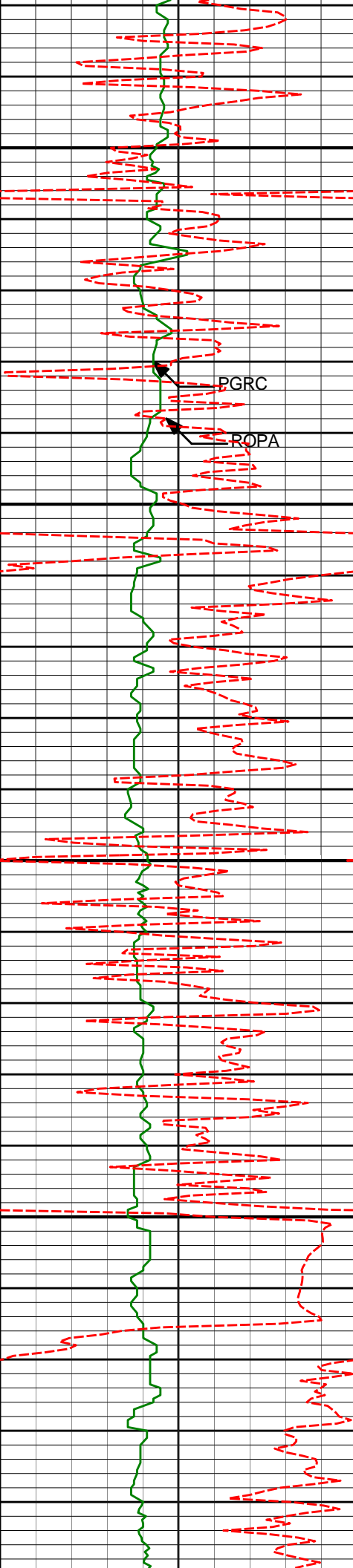
2763'

1.50°

251.66°

2762.59'

-31.26'



2850

2900

2950

3000

PGRC

ROPA

2952'

2.20°

242.91°

2951.49'

-28.76'

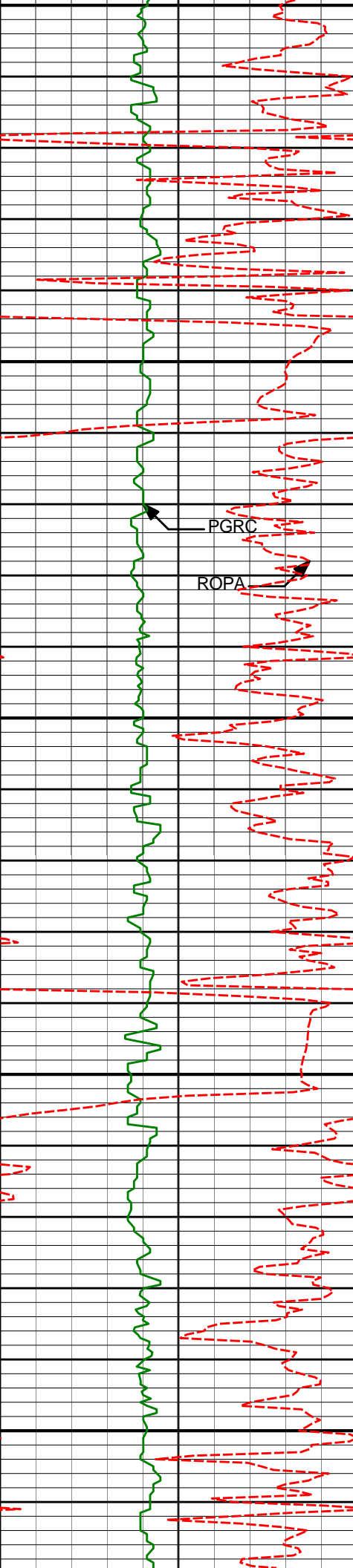
3047'

3.18°

269.61°

3046.39'

-27.86'



3050

3100

3150

3200

3250

PGRC

ROPA

3142'

4.34°

280.69°

3141.18'

-28.43'

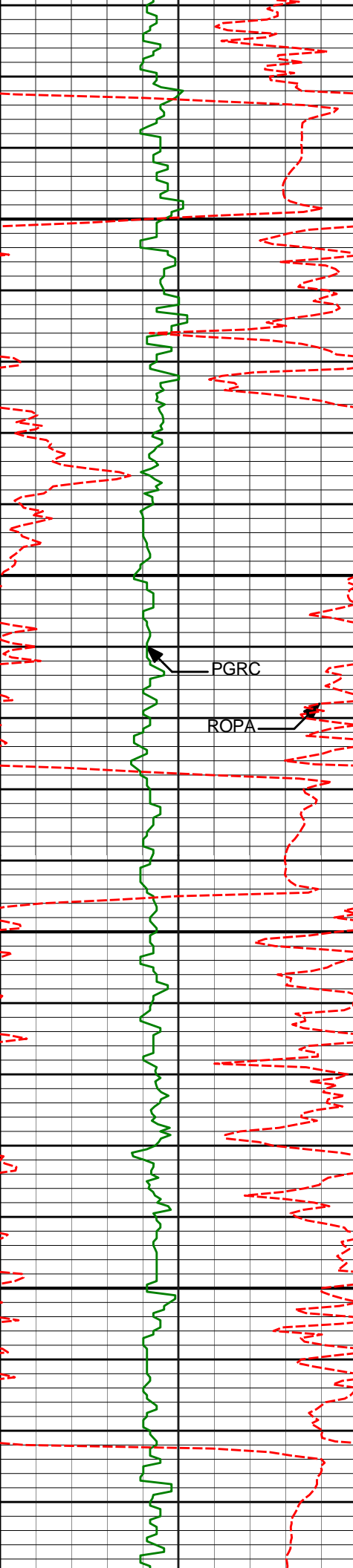
3237'

4.77°

285.49°

3235.88'

-30.06'



3300

3332'

6.30°

301.18°

3330.44'

-33.72'

3350

PGRC

ROPA

3400

3427'

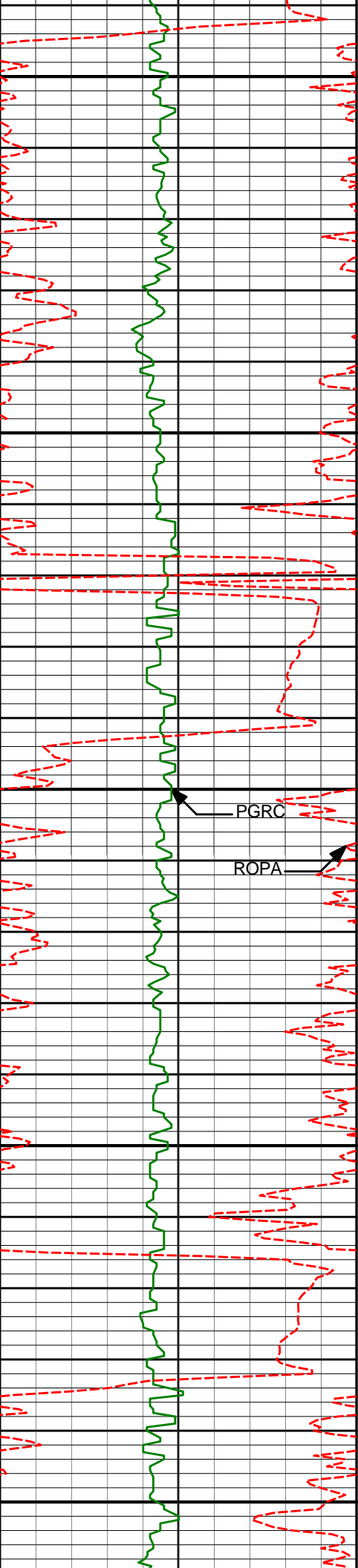
6.58°

308.24°

3424.84'

-39.68'

3450



3500

3522'

7.81°

315.52°

3519.09'

-47.54'

3550

3600

PGRC

ROPA

3617'

9.43°

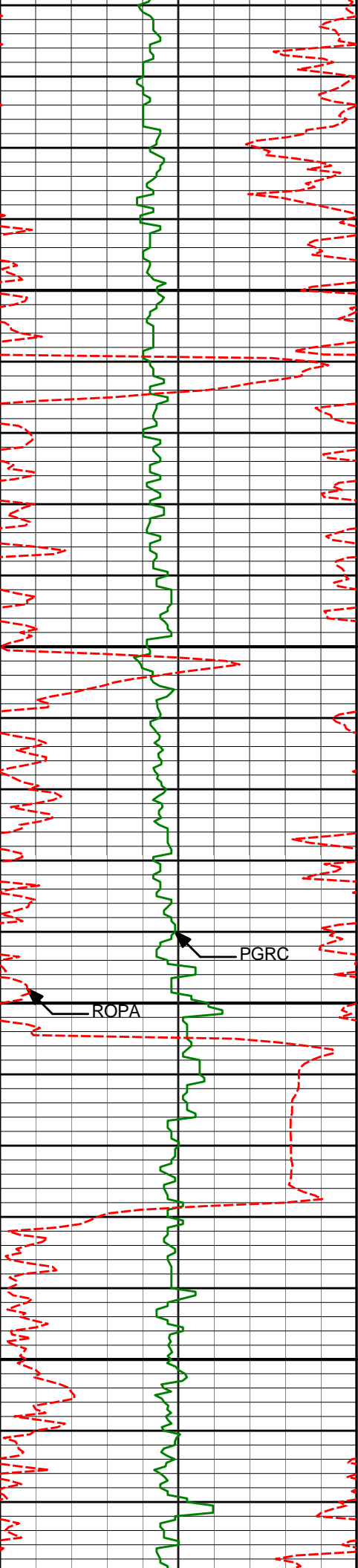
313.65°

3613.02'

-57.39'

3650

3700



3750

3800

3850

3900

3711'

9.62°

312.80°

3705.72'

-67.90'

3806'

8.21°

306.79°

3799.58'

-77.22'

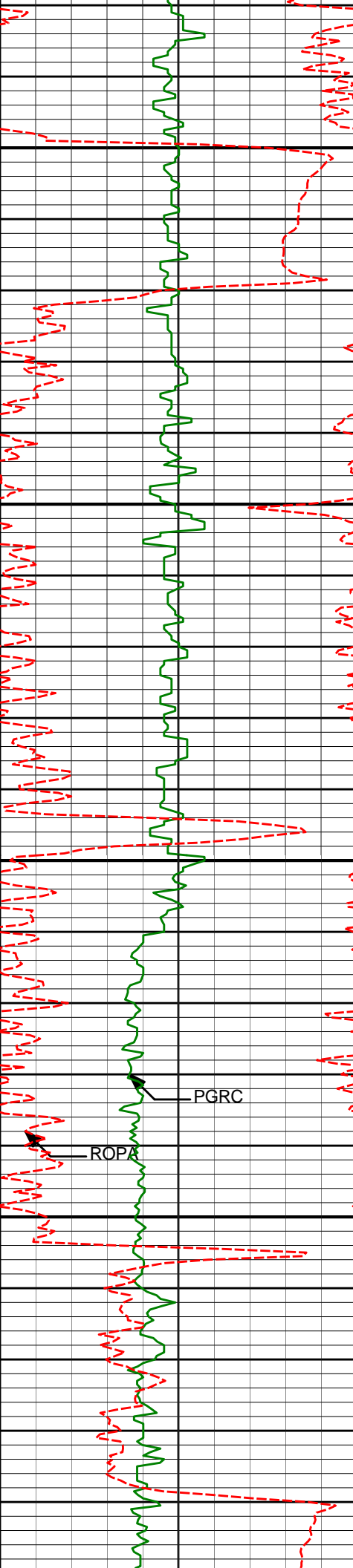
3901'

9.74°

311.36°

3893.41'

-86.45'



3950

3996'

10.60°

307.65°

3986.92'

-96.93'

4000

4050

PGRC

ROPZ

4091'

9.57°

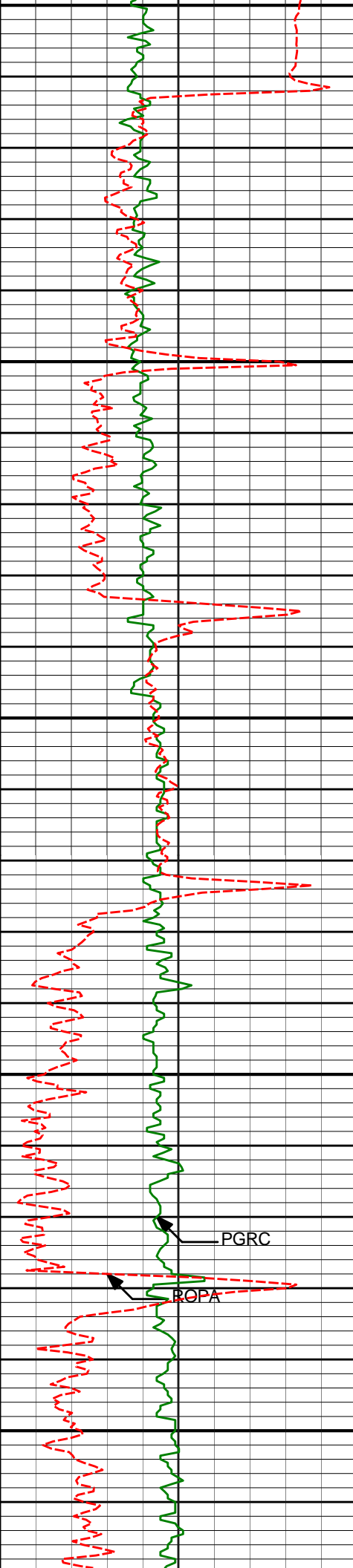
304.54°

4080.45'

-106.58'

4100

4150



4150

4200

4250

4300

4350

4186'

11.83°

305.38°

4173.79'

-116.52'

4281'

11.10°

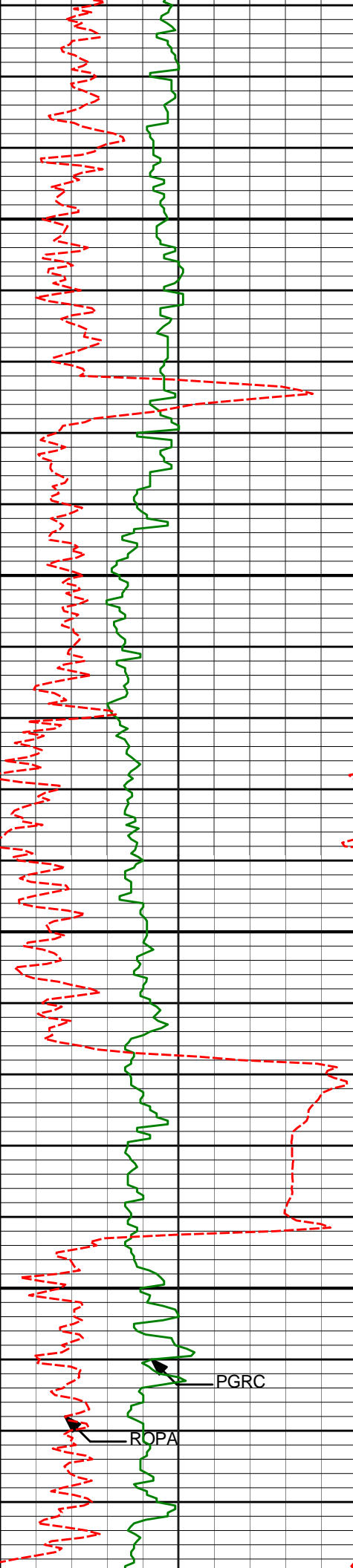
304.05°

4266.90'

-127.09'

PGRC

ROPA



4400

4450

4500

4550

PGRC

ROPA

4375'

9.93°

304.38°

4359.32'

-136.56'

4470'

9.17°

300.07°

4453.00'

-144.82'

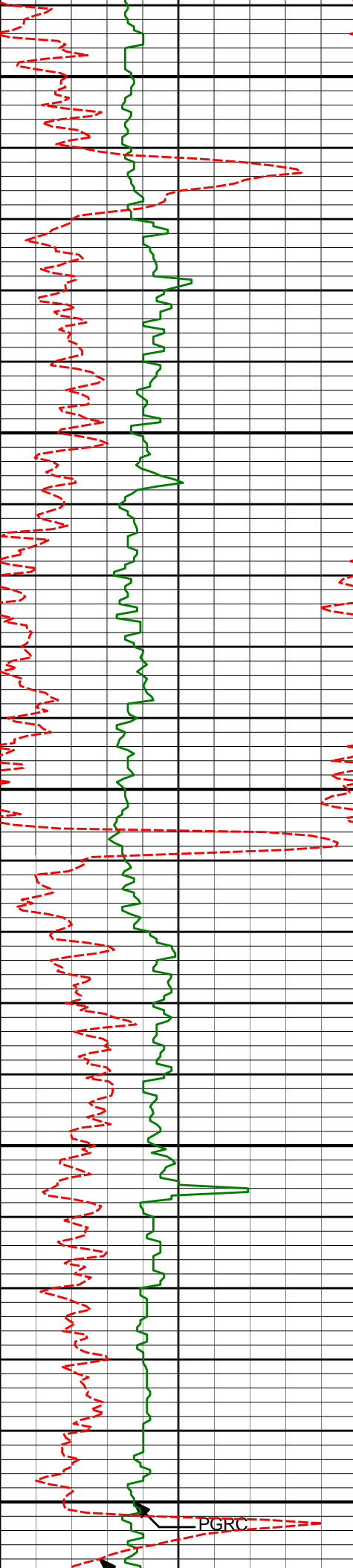
4565'

10.88°

303.92°

4546.55'

-153.44'



4600

4650

4700

4750

4800

4660'

10.06°

302.53°

4639.97'

-162.73'

4755'

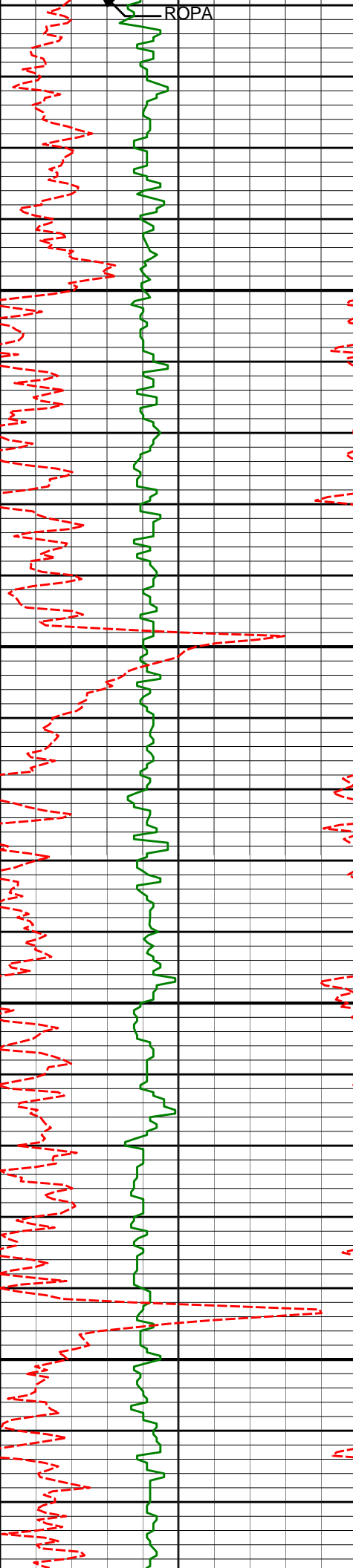
9.18°

304.03°

4733.63'

-171.27'

PGRC



4850

4900

4950

5000

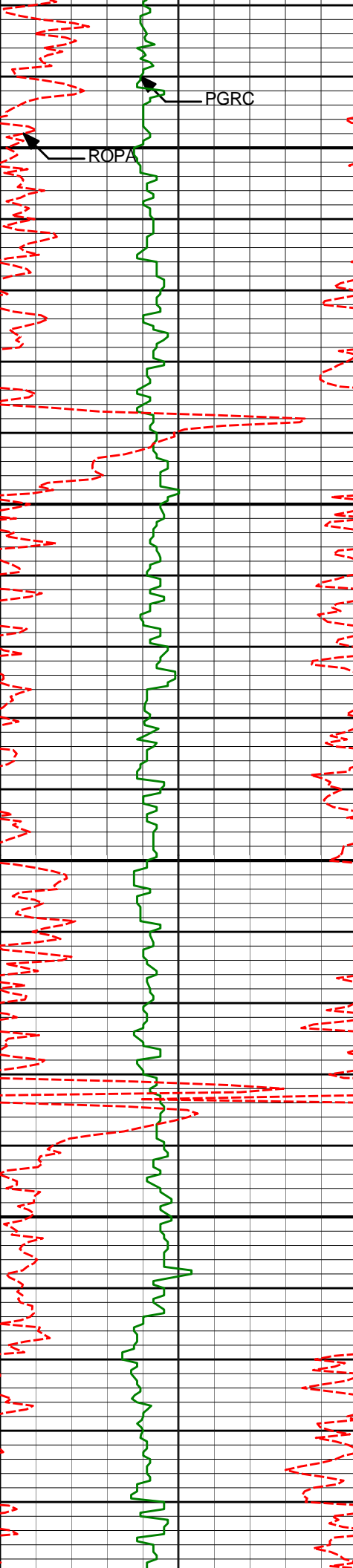
4945'

7.42°

304.99°

4921.63'

-186.50'



5050

5100

5150

5200

5134'

5.21°

316.75°

5109.48'

-199.56'

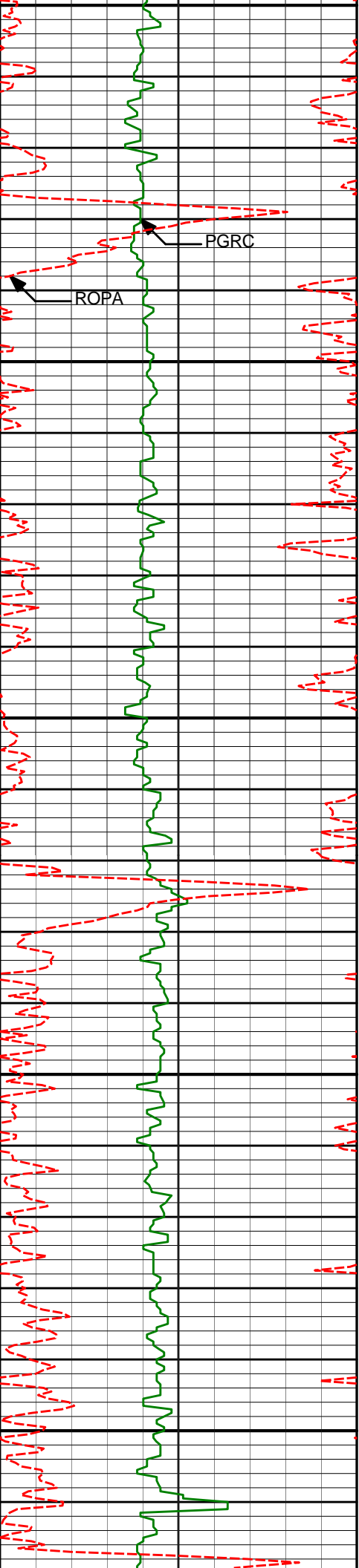
5229'

4.44°

313.55°

5204.15'

-205.17'



5250

PGRC

ROPA

5300

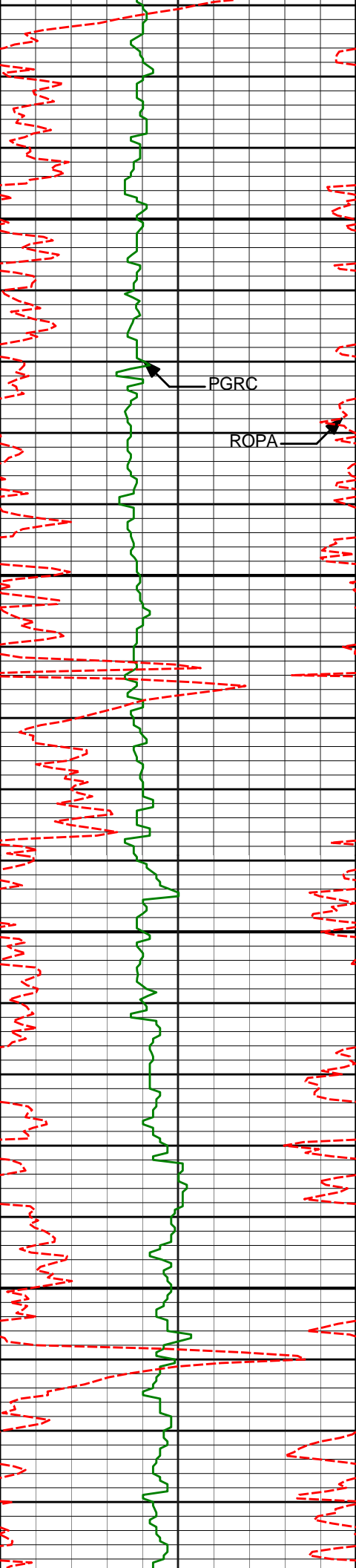
5350

5400

5450

5324'	3.46°	310.65°	5298.92'	-209.51'
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5419'	2.06°	315.49°	5393.81'	-212.55'
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5500

5514'

2.20°

307.66°

5488.74'

-214.84'

PGRC

ROPA

5550

5600

5608'

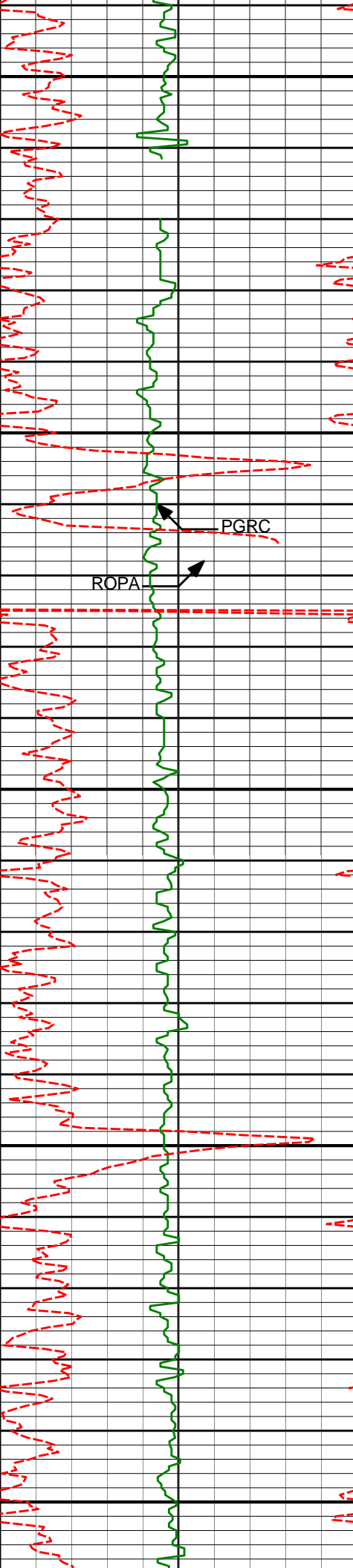
1.54°

297.36°

5582.69'

-216.49'

5650



5700

5703'

1.04°

295.85°

5677.67'

-217.44'

5750

PGRC

ROPA

5800

5850

5893'

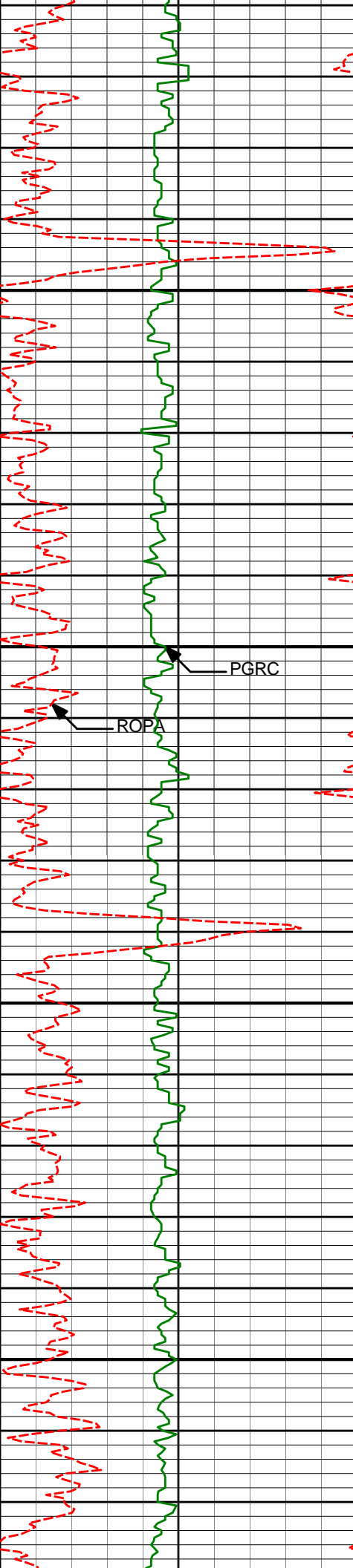
0.51°

265.88°

5867.65'

-218.10'

5900



5950

5987'

0.36°

174.23°

5961.65'

-217.77'

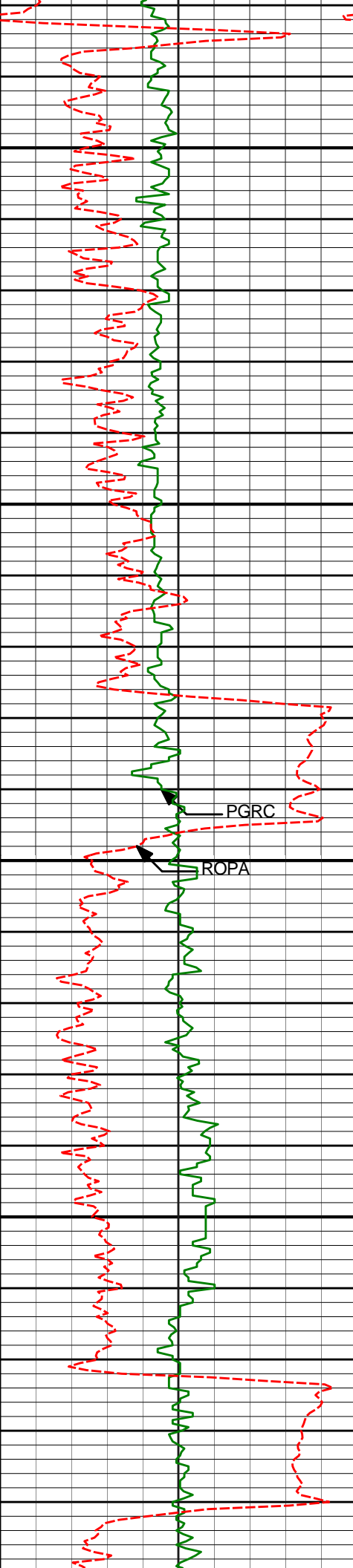
6000

PGRC

ROP

6050

6100



6150

6177'

4.10°

95.26°

6151.48'

-216.64'

6200

PGRC

ROPA

6250

6272'

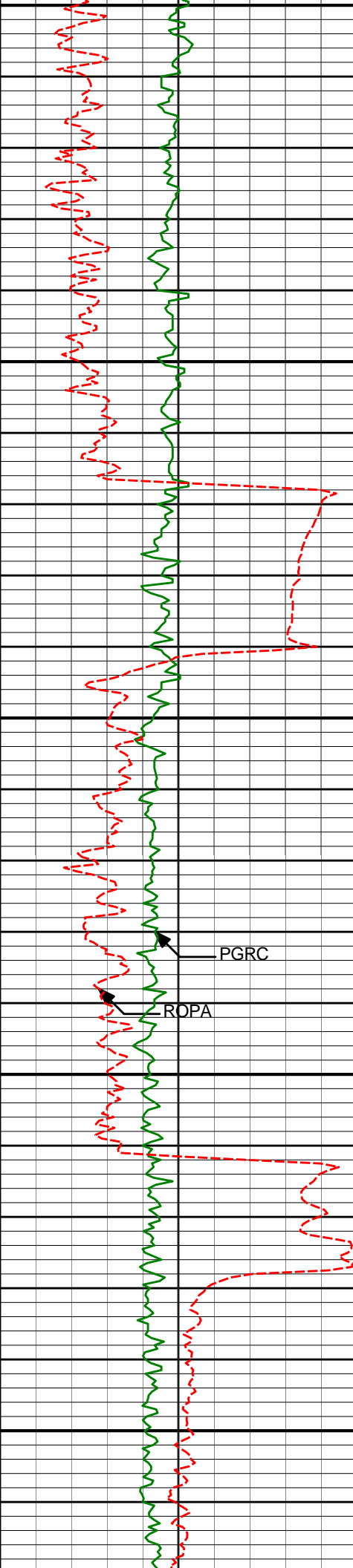
3.23°

104.29°

6246.29'

-215.74'

6300



6350

6367'

2.86°

105.56°

6341.15'

-214.51'

6400

6450

PGRC

ROPA

6500

6550

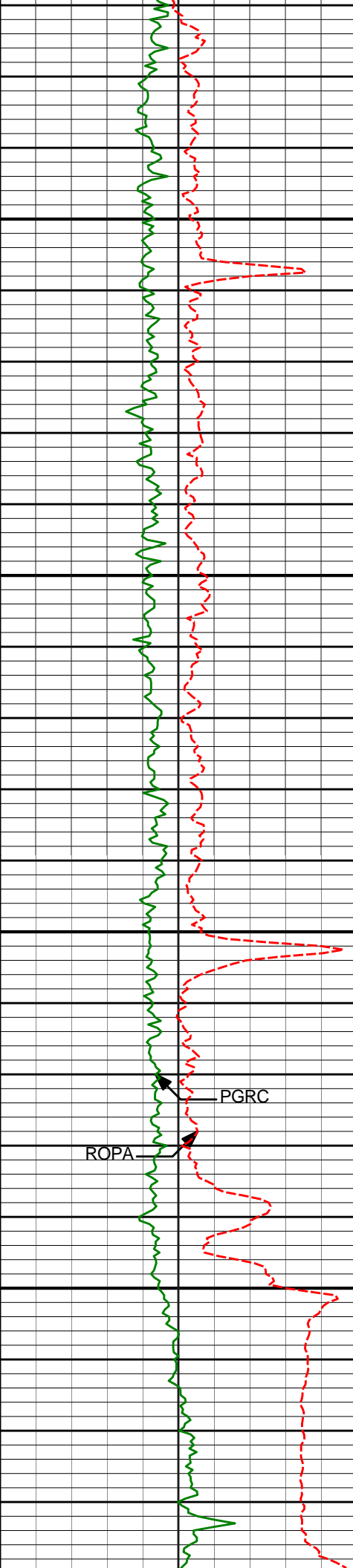
6556'

0.68°

196.82°

6530.07'

-212.21'



6600

6650

6700

6750

PGRC

ROPA

6651'

0.90°

216.47°

6625.06'

-211.07'

6745'

1.62°

184.13°

6719.04'

-209.15'

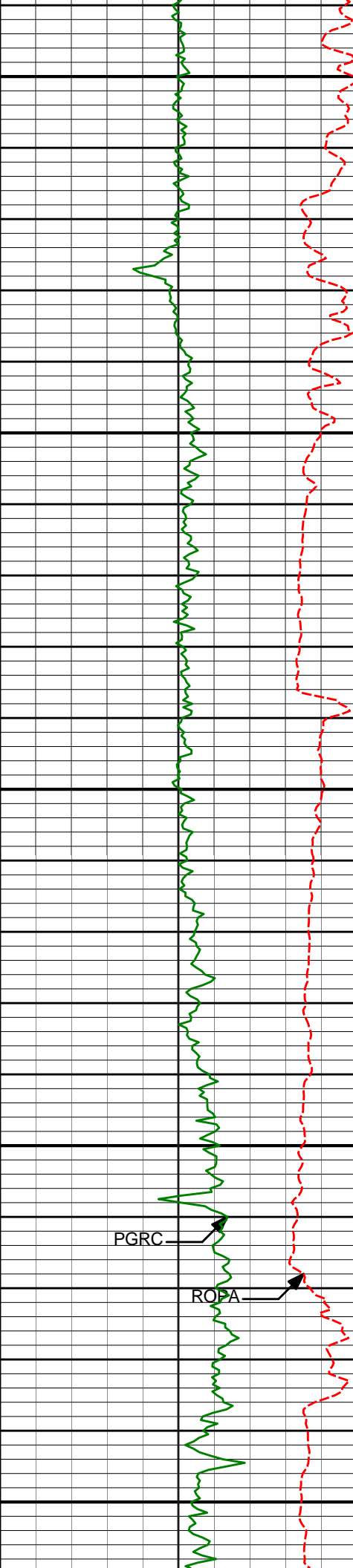
6777'

4.92°

180.84°

6750.98'

-207.33'



6800

6808'

6.75°

179.47°

6781.82'

-204.18'

6840'

9.21°

179.34°

6813.51'

-199.73'

6850

6872'

12.81°

180.20°

6844.92'

-193.63'

6900

6903'

16.64°

179.14°

6874.89'

-185.75'

6935'

20.03°

180.40°

6905.26'

-175.69'

6950

PGRC

6966'

23.61°

181.36°

6934.04'

-164.17'

ROPA

7000

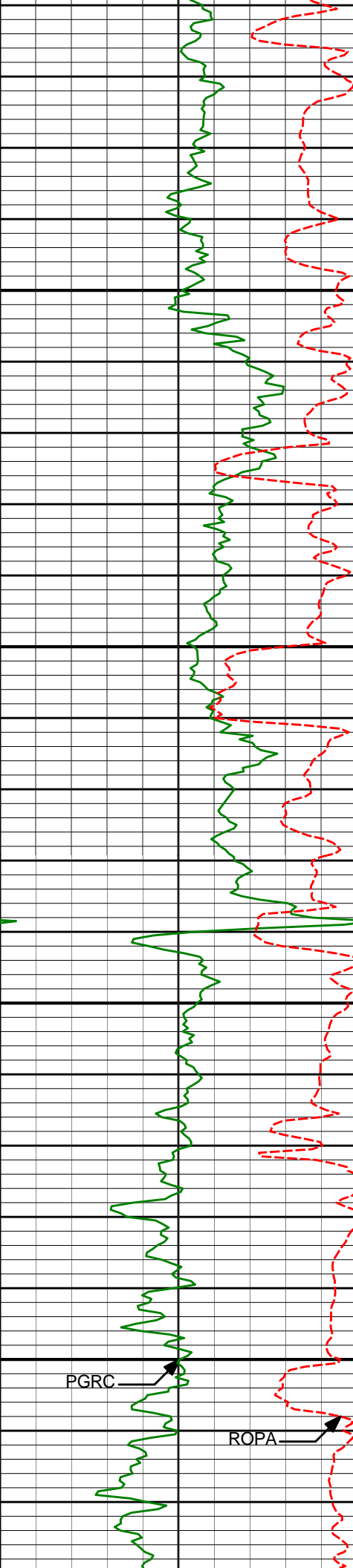
6998'

26.58°

182.75°

6963.01'

-150.60'



7050

7100

7150

7200

7030'	29.20°	183.42°	6991.30'	-135.65'
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7061'	30.90°	185.77°	7018.13'	-120.16'
-------	--------	---------	----------	----------

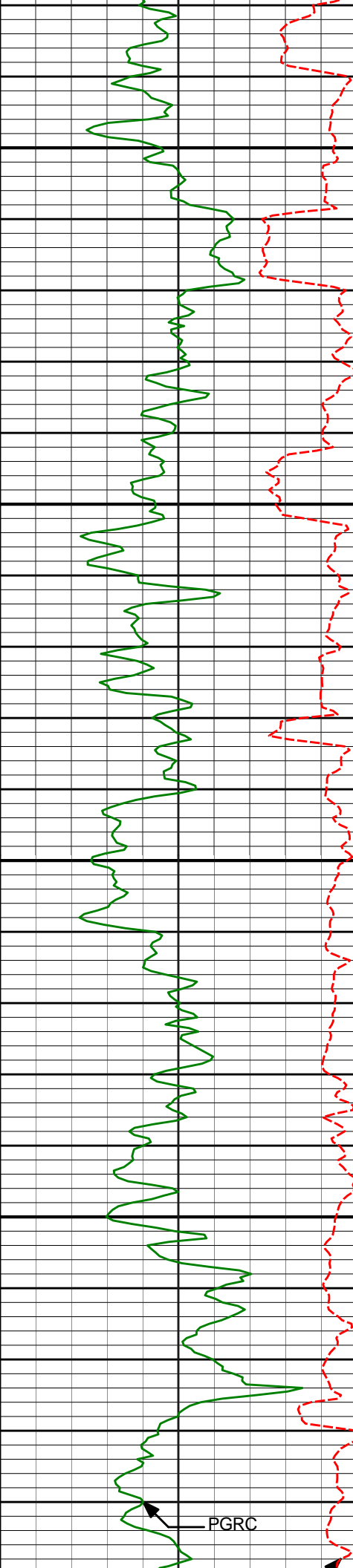
7093'	32.91°	182.99°	7045.29'	-103.29'
-------	--------	---------	----------	----------

7125'	35.00°	181.59°	7071.84'	-85.42'
-------	--------	---------	----------	---------

7156'	37.49°	179.76°	7096.84'	-67.10'
-------	--------	---------	----------	---------

7188'	39.97°	179.74°	7121.80'	-47.08'
-------	--------	---------	----------	---------

7219'	41.93°	178.87°	7145.21'	-26.77'
-------	--------	---------	----------	---------



7250

7251'

44.01°

178.40°

7168.63'

-4.98'

7283'

45.95°

178.55°

7191.26'

17.62'

7300

7314'

48.00°

178.39°

7212.41'

40.27'

7350

7346'

50.93°

178.09°

7233.21'

64.56'

7400

7377'

54.29°

178.76°

7252.03'

89.17'

7409'

57.50°

179.37°

7269.97'

115.65'

7441'

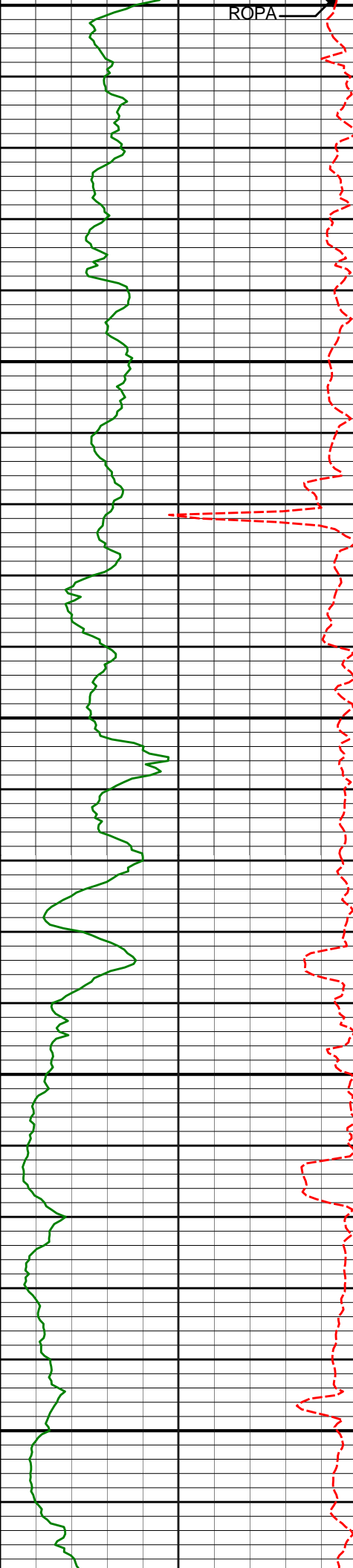
60.67°

180.56°

7286.41'

143.10'

PGRC



7450

7472'

63.37°

181.73°

7300.95'

170.47'

7500

7504'

66.95°

182.78°

7314.39'

199.49'

7535'

70.10°

182.44°

7325.74'

228.32'

7550

7567'

73.57°

182.19°

7335.72'

258.71'

7600

7599'

75.62°

183.59°

7344.22'

289.53'

7630'

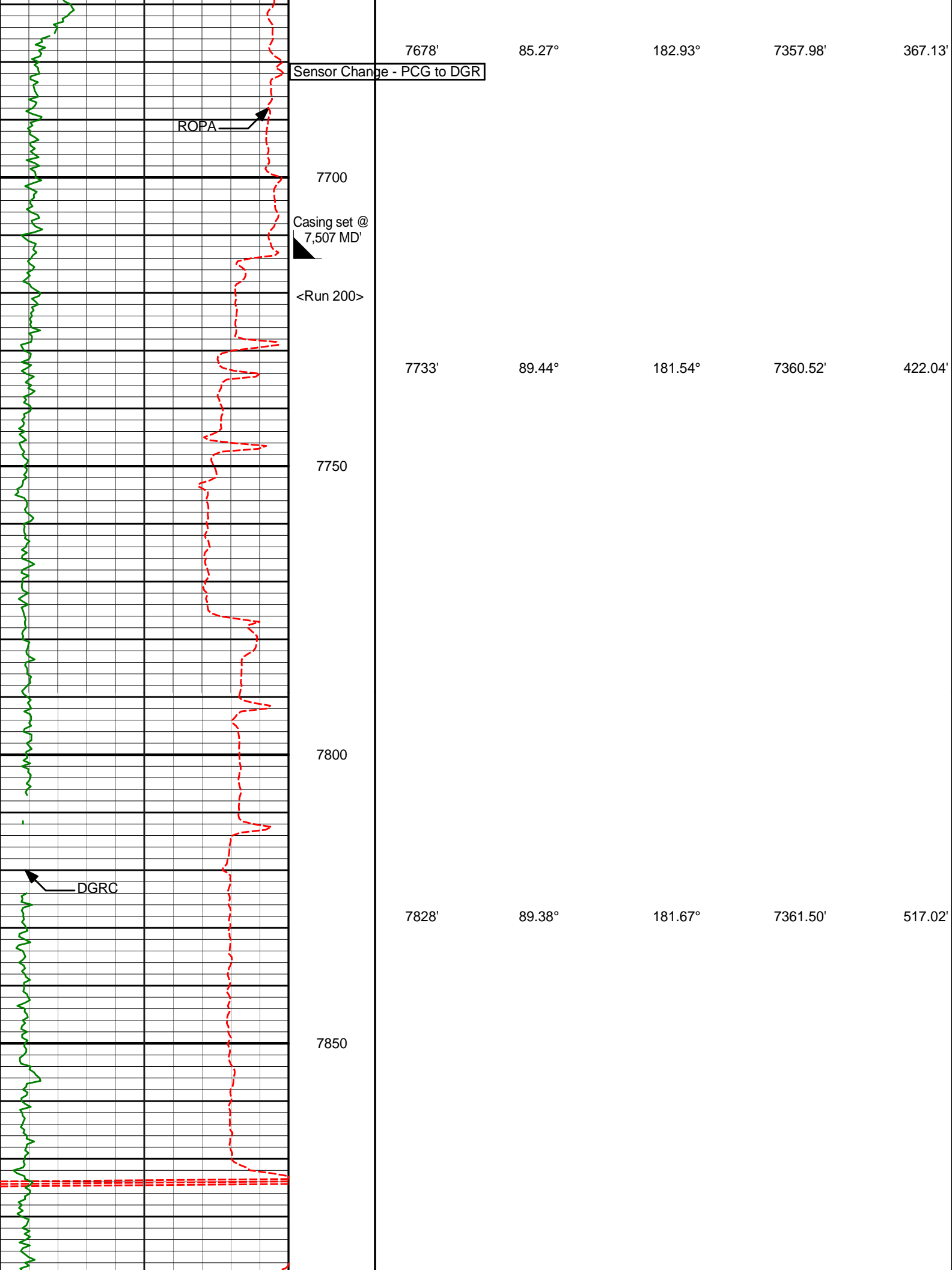
78.43°

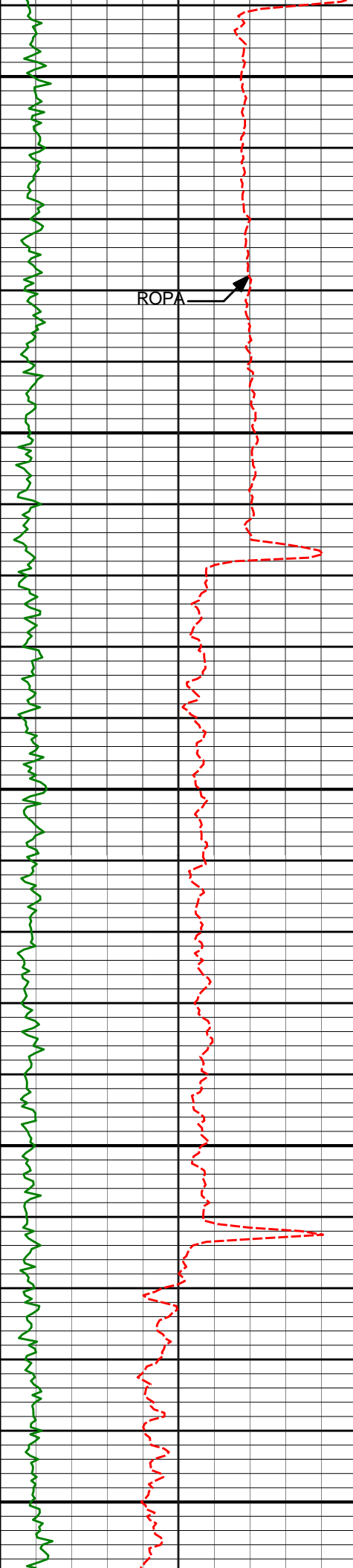
183.83°

7351.18'

319.70'

7650





7900

7923'

89.63°

181.79°

7362.32'

612.00'

ROPA

7950

8000

8017'

90.37°

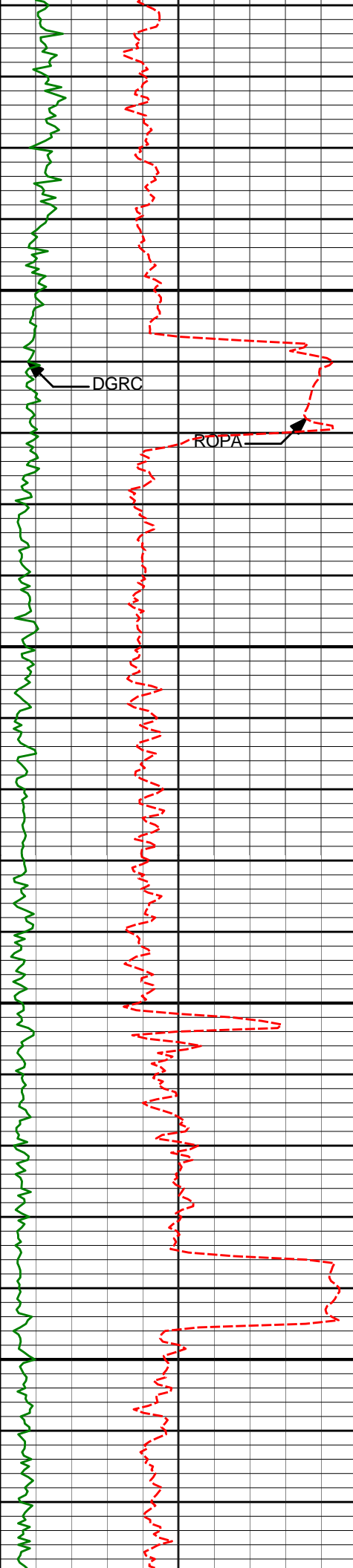
181.75°

7362.32'

705.99'

8050

8100



8150

8200

8250

8300

8112'

92.04°

181.49°

7360.32'

800.95'

DGRC

ROPA

8207'

90.31°

181.27°

7358.38'

895.92'

8302'

90.37°

181.16°

7357.81'

990.91'



8350

8400

8450

8500

8550

ROPA

DGRC

8397'

89.69°

181.51°

7357.76'

1085.91'

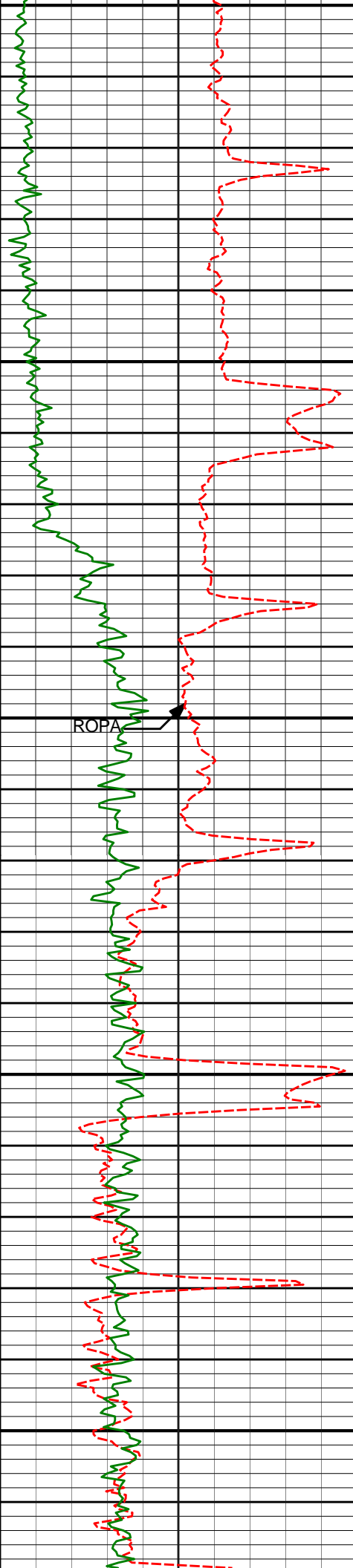
8492'

90.74°

181.61°

7357.40'

1180.89'



8550

8600

8650

8700

8750

8587'

89.94°

182.93°

7356.84'

1275.85'

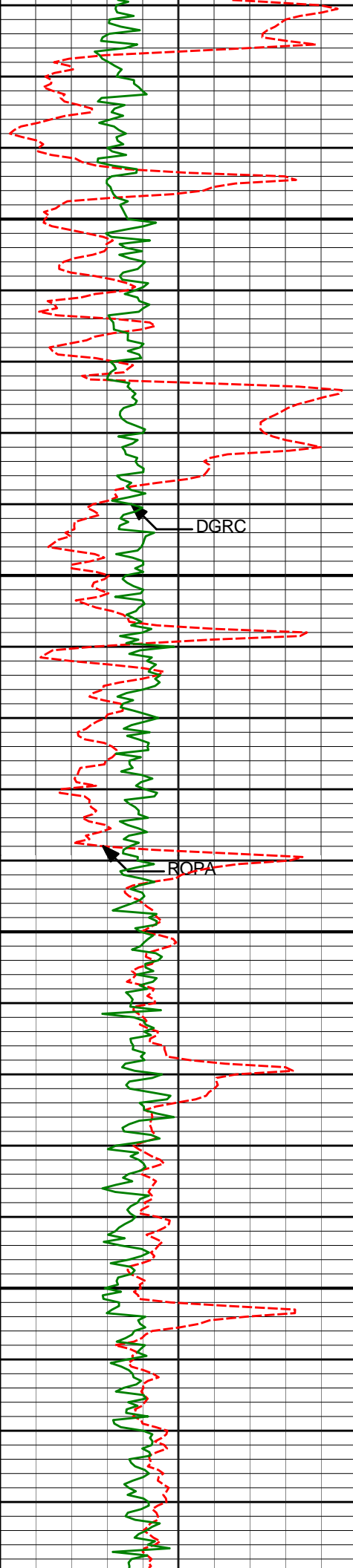
8681'

88.02°

182.86°

7358.51'

1369.77'



8800

8850

8900

8950

8776'

88.70°

182.72°

7361.22'

1464.66'

8871'

89.63°

183.58°

7362.61'

1559.56'

8966'

89.88°

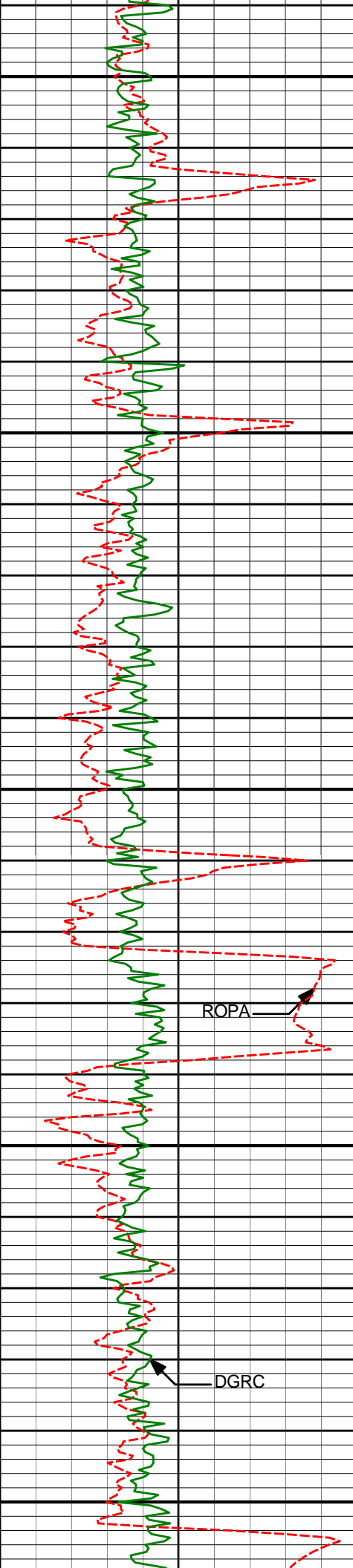
184.04°

7363.02'

1654.42'

DGRC

ROPA



9000

9050

9100

9150

9200

9061'

90.12°

184.32°

7363.02'

1749.25'

ROPA

9156'

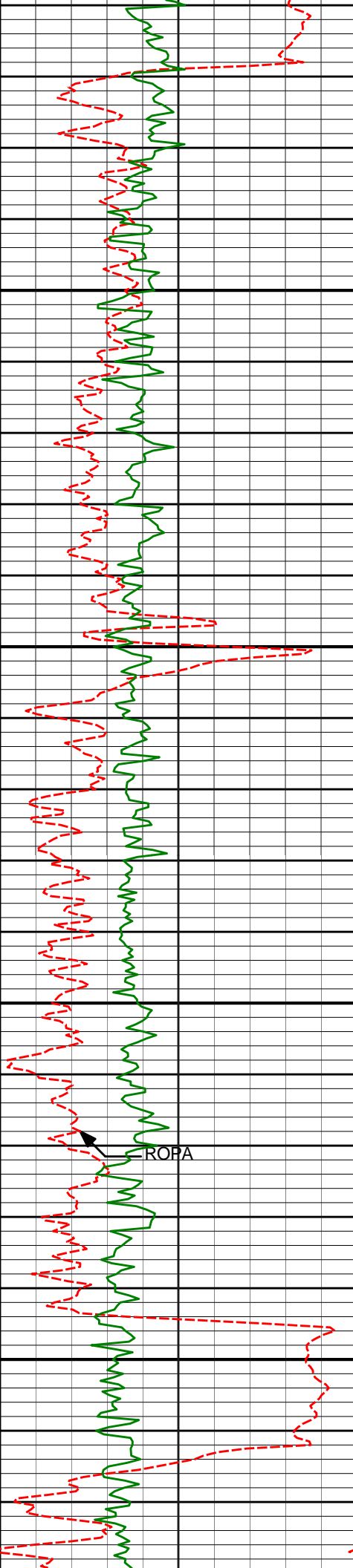
89.81°

183.28°

7363.07'

1844.11'

DGRC



9250

9250'

90.86°

182.59°

7362.51'

1938.03'

9300

9350

9345'

91.23°

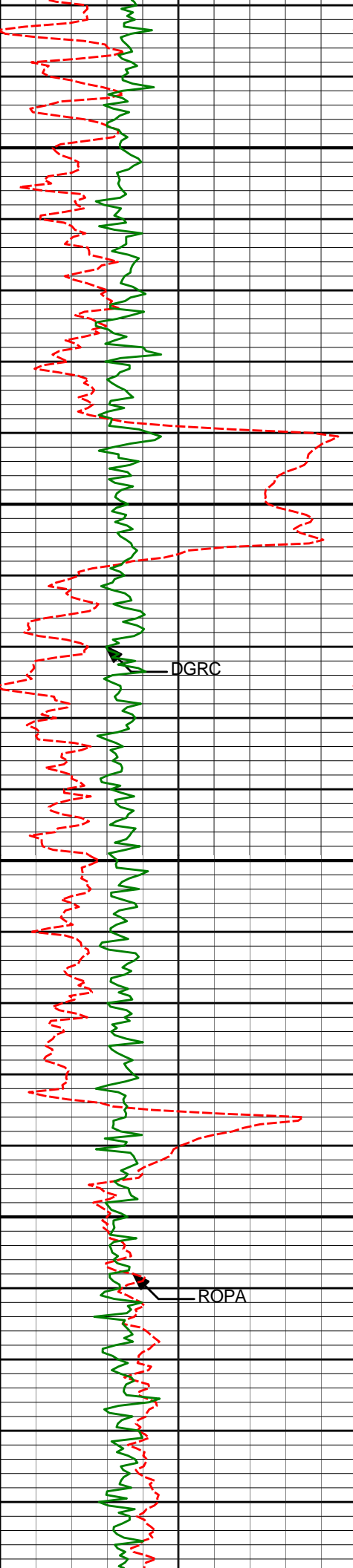
182.45°

7360.77'

2032.97'

9400

ROPA



9450

9500

9550

9600

DGRC

ROPA

9440'

90.74°

181.22°

7359.13'

2127.93'

9535'

90.80°

179.90°

7357.85'

2222.92'

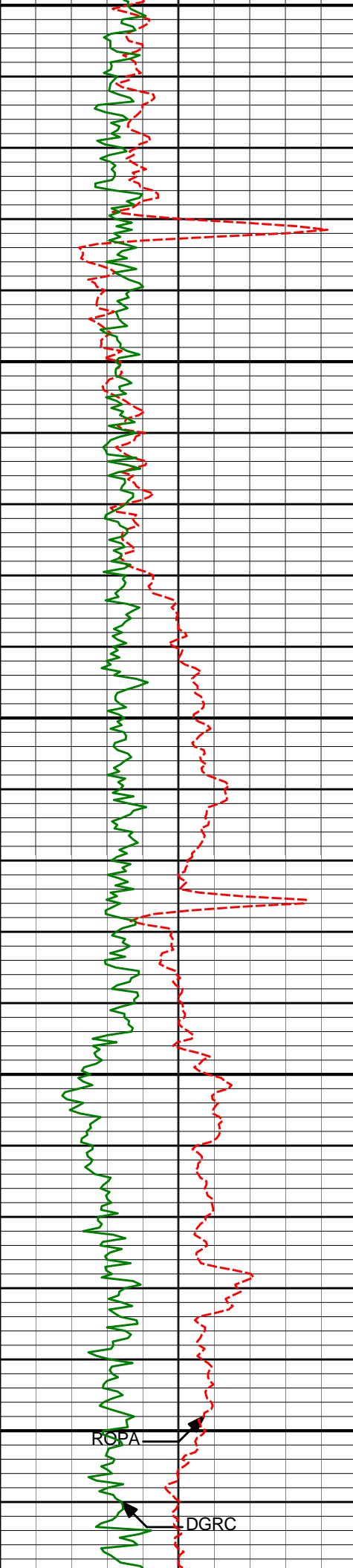
9630'

90.68°

179.29°

7356.62'

2317.90'



9650

9700

9750

9800

9850

9724'

90.43°

178.28°

7355.71'

2411.84'

9819'

88.33°

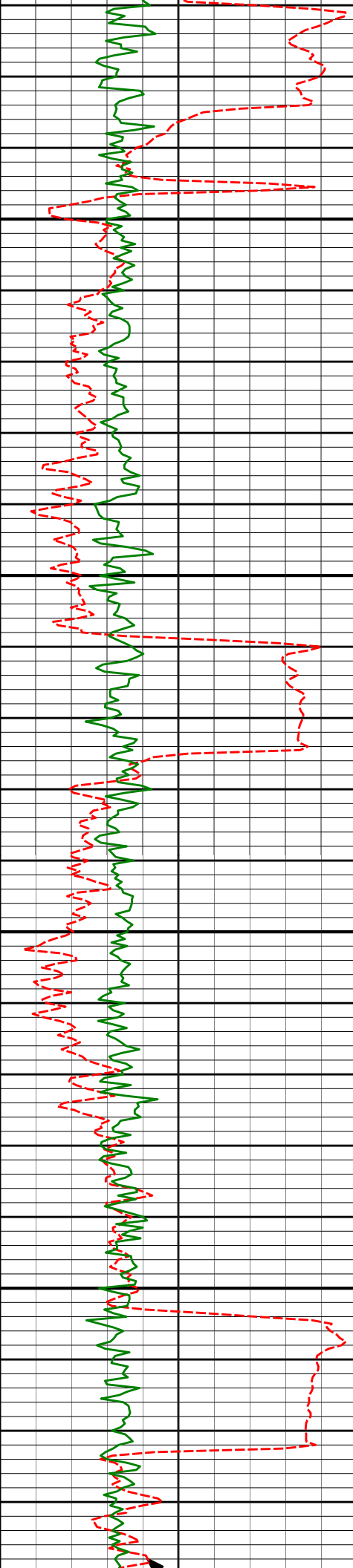
176.72°

7356.73'

2506.68'

ROBA

DGRC



9900

9914'

88.64°

176.41°

7359.24'

2601.40'

9950

10000

10009'

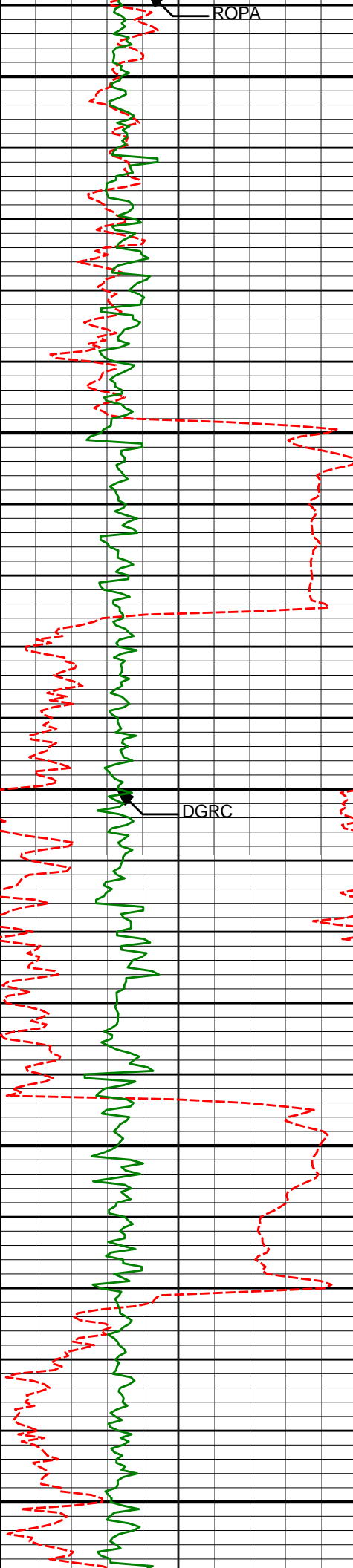
90.06°

176.83°

7360.31'

2696.15'

10050



10100

10104'

89.94°

177.64°

7360.31'

2790.97'

10150

10200

10198'

89.38°

177.85°

7360.87'

2884.84'

10250

10300

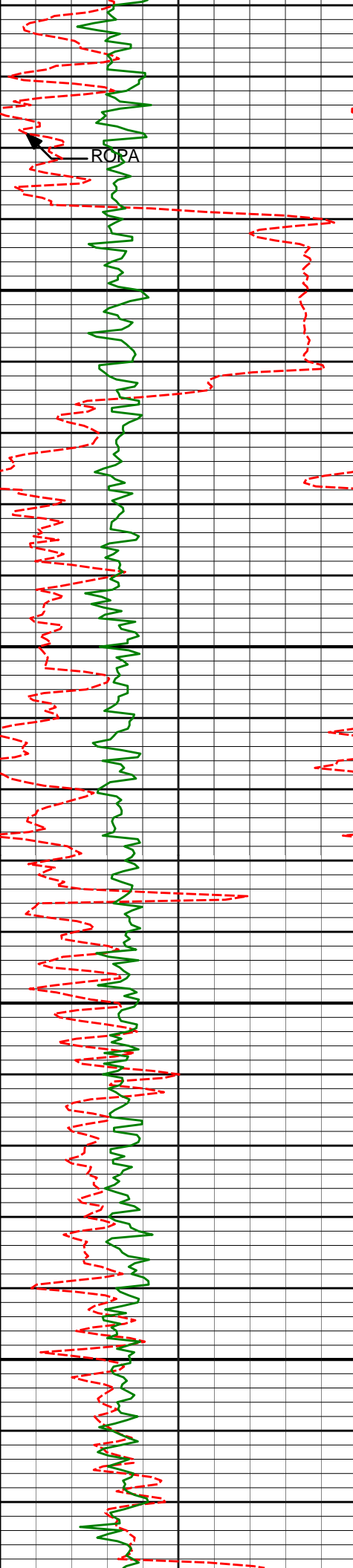
10293'

89.57°

179.66°

7361.74'

2979.78'



10350

10388'

90.19°

180.83°

7361.95'

3074.78'

10400

10450

10483'

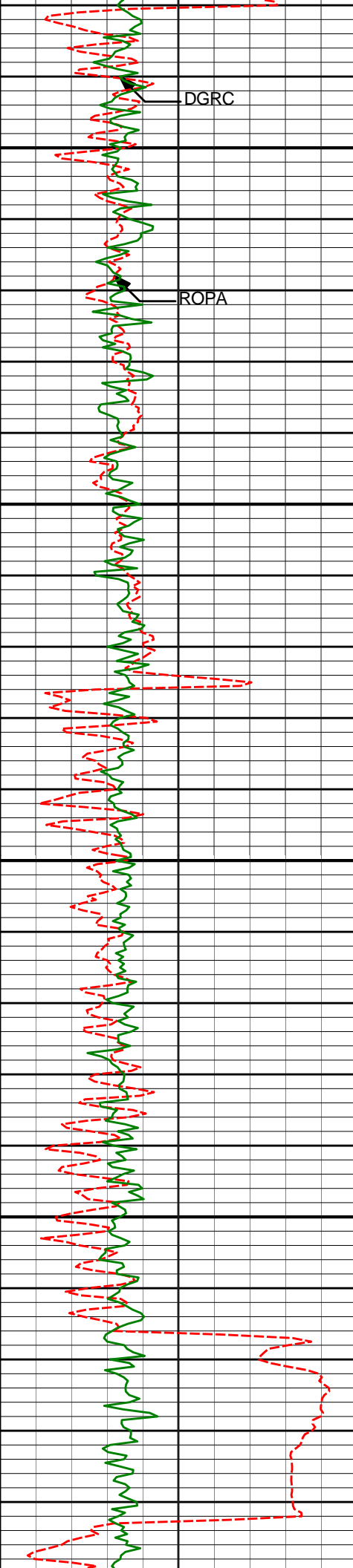
90.37°

180.58°

7361.49'

3169.77'

10500



10550

10600

10650

10700

10750

DGRC

ROPA

10577'

90.31°

179.92°

7360.93'

3263.77'

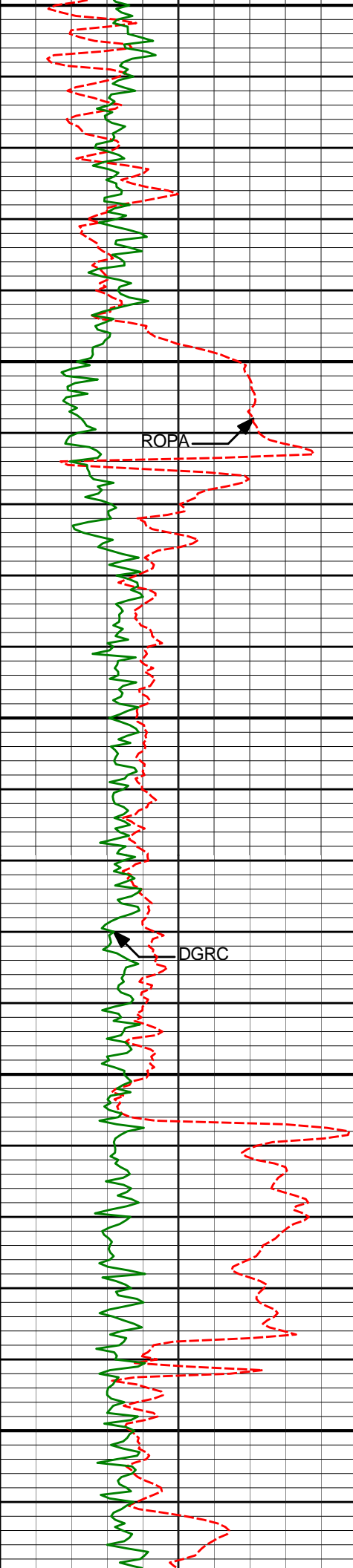
10672'

89.75°

179.00°

7360.88'

3358.75'



10750

10767'

89.57°

180.46°

7361.44'

3453.73'

10800

ROPA

10850

10861'

88.08°

179.28°

7363.37'

3547.69'

DGRC

10900

10950

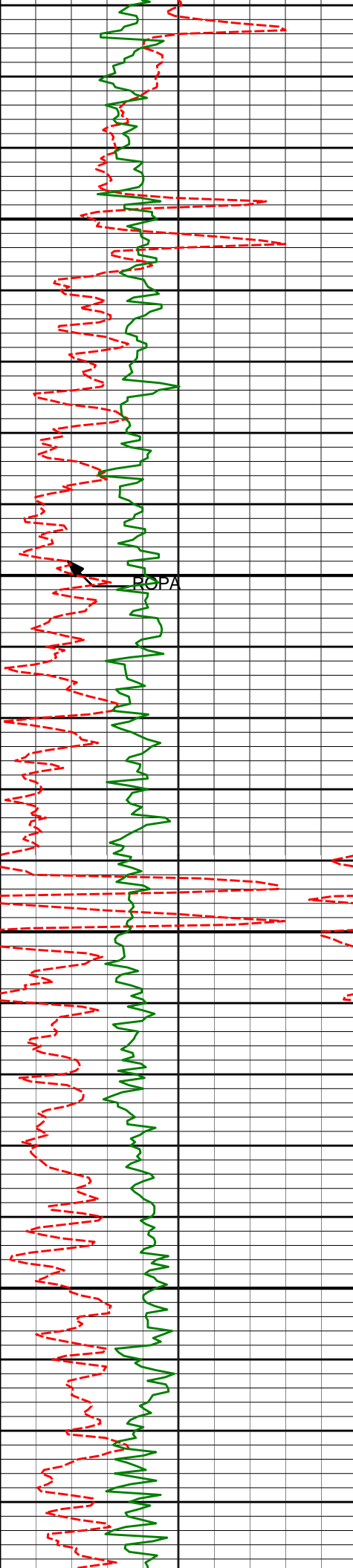
10956'

89.38°

180.84°

7365.47'

3642.66'



11000

11050

11100

11150

POPA

11051'

89.57°

180.95°

7366.34'

3737.66'

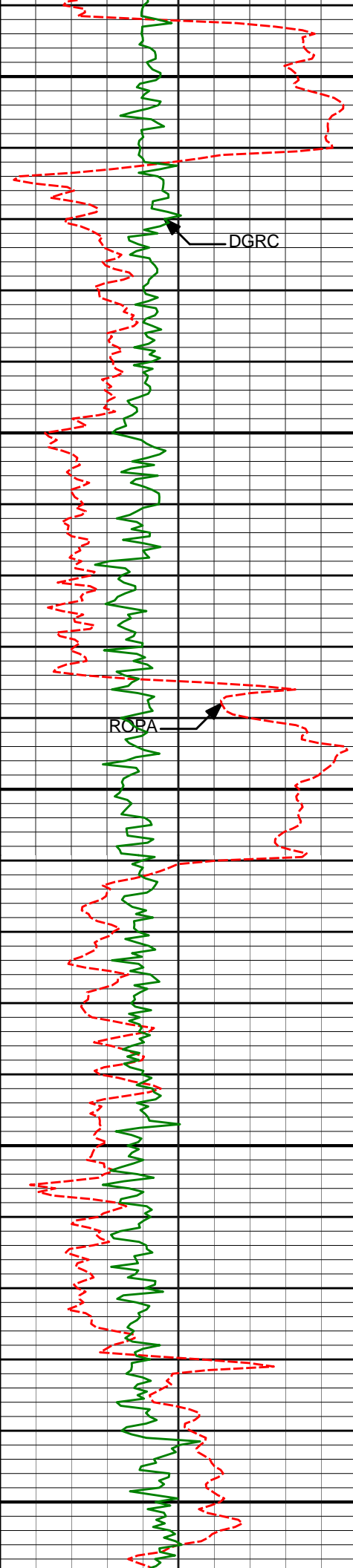
11145'

89.32°

180.45°

7367.25'

3831.65'



11200

DGRC

11241'

89.51°

180.64°

7368.23'

3927.65'

11250

ROPA

11300

11336'

91.18°

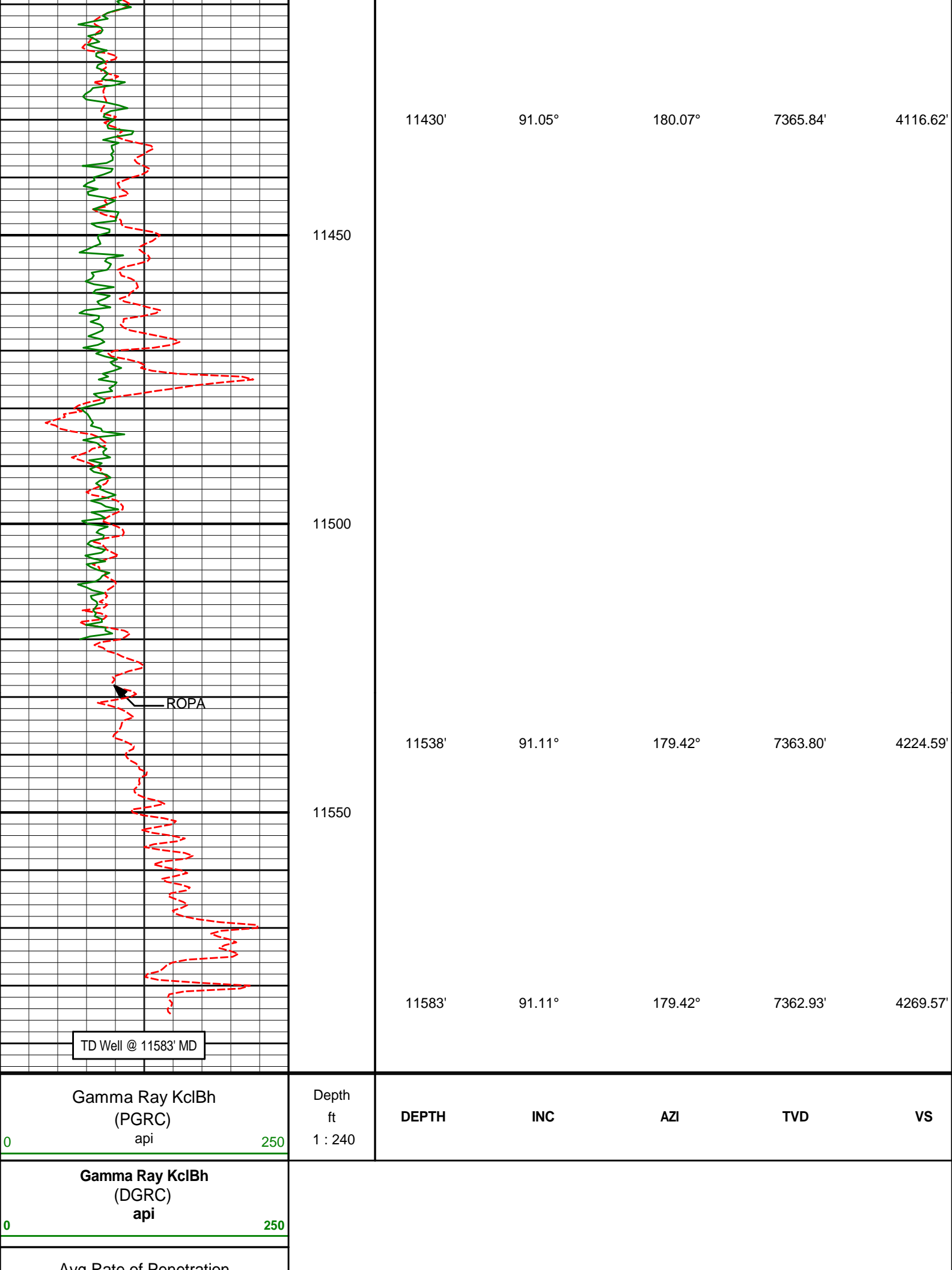
180.62°

7367.67'

4022.64'

11350

11400



TD Well @ 11583' MD

Gamma Ray KclBh
(PGRC)
api

Depth
ft
1 : 240

DEPTH

INC

AZI

TVD

VS

Gamma Ray KclBh
(DGRC)
api

Avg Rate of Penetration



MD 1:240 Detail Log



DIRECTIONAL SURVEY REPORT
Anadarko Petroleum Corp.
Crowder 15C-18HZ
Wattenburg
Weld Colorado
USA
CA-XX-0900217530

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
975.00	0.50	34.87	974.98	5.51 N	1.76 E	-5.53	TIE-IN
1171.00	0.49	349.75	1170.97	7.03 N	2.10 E	-7.06	0.19
1263.00	0.41	351.13	1262.97	7.74 N	1.98 E	-7.76	0.09
1355.00	0.62	39.85	1354.97	8.44 N	2.25 E	-8.47	0.50
1447.00	0.85	23.21	1446.96	9.45 N	2.83 E	-9.48	0.34
1631.00	1.05	10.51	1630.93	12.36 N	3.68 E	-12.41	0.16
1814.00	1.59	355.77	1813.89	16.55 N	3.80 E	-16.60	0.35
2004.00	1.20	343.14	2003.83	21.09 N	3.03 E	-21.12	0.26
2194.00	1.03	338.98	2193.79	24.59 N	1.83 E	-24.61	0.10
2383.00	1.62	328.44	2382.74	28.45 N	0.17 W	-28.45	0.33
2573.00	1.84	283.54	2572.66	31.45 N	4.53 W	-31.39	0.70
2763.00	1.50	251.66	2762.59	31.38 N	9.86 W	-31.26	0.51
2952.00	2.20	242.91	2951.49	28.95 N	15.44 W	-28.76	0.40
3047.00	3.18	269.61	3046.39	28.10 N	19.70 W	-27.86	1.65
3142.00	4.34	280.69	3141.18	28.75 N	25.87 W	-28.43	1.43
3237.00	4.77	285.49	3235.88	30.47 N	33.21 W	-30.06	0.60
3332.00	6.30	301.18	3330.44	34.22 N	41.47 W	-33.72	2.26
3427.00	6.58	308.24	3424.84	40.29 N	50.21 W	-39.68	0.88
3522.00	7.81	315.52	3519.09	48.26 N	59.00 W	-47.54	1.61
3617.00	9.43	313.65	3613.02	58.24 N	69.16 W	-57.39	1.73
3711.00	9.62	312.80	3705.72	68.89 N	80.49 W	-67.90	0.25
3806.00	8.21	306.79	3799.58	78.34 N	91.74 W	-77.22	1.77
3901.00	9.74	311.36	3893.41	87.72 N	103.21 W	-86.45	1.77
3996.00	10.60	307.65	3986.92	98.36 N	116.15 W	-96.93	1.14
4091.00	9.57	304.54	4080.45	108.17 N	129.57 W	-106.58	1.22
4186.00	11.83	305.38	4173.79	118.29 N	144.02 W	-116.52	2.39
4281.00	11.10	304.05	4266.90	129.05 N	159.54 W	-127.09	0.82
4375.00	9.93	304.38	4359.32	138.70 N	173.73 W	-136.56	1.25
4470.00	9.17	300.07	4453.00	147.12 N	187.04 W	-144.82	1.10
4565.00	10.88	303.92	4546.55	155.91 N	201.03 W	-153.44	1.94
4660.00	10.06	302.53	4639.97	165.38 N	215.47 W	-162.73	0.90
4755.00	9.18	304.03	4733.63	174.08 N	228.74 W	-171.27	0.97
4945.00	7.42	304.99	4921.63	189.59 N	251.34 W	-186.50	0.93
5134.00	5.21	316.75	5109.48	202.84 N	267.22 W	-199.56	1.35
5229.00	4.44	313.55	5204.15	208.51 N	272.84 W	-205.17	0.86

5324.00	3.46	310.65	5298.92	212.91 N	277.68 W	-209.51	1.05
5419.00	2.06	315.49	5393.81	216.00 N	281.05 W	-212.55	1.50
5514.00	2.20	307.66	5488.74	218.32 N	283.68 W	-214.84	0.34
5608.00	1.54	297.36	5582.69	220.01 N	286.24 W	-216.49	0.78
5703.00	1.04	295.85	5677.67	220.97 N	288.15 W	-217.44	0.53
5893.00	0.51	265.88	5867.65	221.67 N	290.55 W	-218.10	0.35
5987.00	0.36	174.23	5961.65	221.35 N	290.93 W	-217.77	0.67
6177.00	4.10	95.26	6151.48	220.13 N	284.10 W	-216.64	2.13
6272.00	3.23	104.29	6246.29	219.16 N	278.12 W	-215.74	1.10
6367.00	2.86	105.56	6341.15	217.86 N	273.25 W	-214.51	0.39
6556.00	0.68	196.82	6530.07	215.52 N	269.03 W	-212.21	1.56
6651.00	0.90	216.47	6625.06	214.38 N	269.64 W	-211.07	0.36
6745.00	1.62	184.13	6719.04	212.46 N	270.17 W	-209.15	1.05
6777.00	4.92	180.84	6750.98	210.64 N	270.22 W	-207.33	10.33
6808.00	6.75	179.47	6781.82	207.49 N	270.23 W	-204.18	5.93
6840.00	9.21	179.34	6813.51	203.05 N	270.18 W	-199.73	7.69
6872.00	12.81	180.20	6844.92	196.94 N	270.16 W	-193.63	11.27
6903.00	16.64	179.14	6874.89	189.06 N	270.11 W	-185.75	12.39
6935.00	20.03	180.40	6905.26	179.00 N	270.08 W	-175.69	10.65
6966.00	23.61	181.36	6934.04	167.48 N	270.26 W	-164.17	11.62
6998.00	26.58	182.75	6963.01	153.92 N	270.76 W	-150.60	9.45
7030.00	29.20	183.42	6991.30	138.98 N	271.57 W	-135.65	8.26
7061.00	30.90	185.77	7018.13	123.50 N	272.82 W	-120.16	6.67
7093.00	32.91	182.99	7045.29	106.64 N	274.10 W	-103.29	7.76
7125.00	35.00	181.59	7071.84	88.79 N	274.81 W	-85.42	6.98
7156.00	37.49	179.76	7096.84	70.46 N	275.02 W	-67.10	8.75
7188.00	39.97	179.74	7121.80	50.45 N	274.93 W	-47.08	7.77
7219.00	41.93	178.87	7145.21	30.13 N	274.68 W	-26.77	6.56
7251.00	44.01	178.40	7168.63	8.33 N	274.16 W	-4.98	6.58
7283.00	45.95	178.55	7191.26	14.28 S	273.56 W	17.62	6.09
7314.00	48.00	178.39	7212.41	36.94 S	272.96 W	40.27	6.60
7346.00	50.93	178.09	7233.21	61.24 S	272.21 W	64.56	9.19
7377.00	54.29	178.76	7252.03	85.86 S	271.53 W	89.17	10.99
7409.00	57.50	179.37	7269.97	112.34 S	271.10 W	115.65	10.14
7441.00	60.67	180.56	7286.41	139.79 S	271.09 W	143.10	10.43
7472.00	63.37	181.73	7300.95	167.16 S	271.64 W	170.47	9.32
7504.00	66.95	182.78	7314.39	196.17 S	272.79 W	199.49	11.57
7535.00	70.10	182.44	7325.74	224.99 S	274.10 W	228.32	10.23
7567.00	73.57	182.19	7335.72	255.36 S	275.32 W	258.71	10.84
7599.00	75.62	183.59	7344.22	286.17 S	276.88 W	289.53	7.67
7630.00	78.43	183.83	7351.18	316.31 S	278.84 W	319.70	9.10
7678.00	85.27	182.93	7357.98	363.72 S	281.64 W	367.13	14.37
7733.00	89.44	181.54	7360.52	418.60 S	283.78 W	422.04	7.99
7828.00	89.38	181.67	7361.50	513.56 S	286.44 W	517.02	0.15
7923.00	89.63	181.79	7362.32	608.51 S	289.31 W	612.00	0.29
8017.00	90.37	181.75	7362.32	702.47 S	292.21 W	705.99	0.79
8112.00	92.04	181.49	7360.32	797.41 S	294.90 W	800.95	1.78
8207.00	90.31	181.27	7358.38	892.35 S	297.19 W	895.92	1.84
8302.00	90.37	181.16	7357.81	987.33 S	299.21 W	990.91	0.14
8397.00	89.69	181.51	7357.76	1082.31 S	301.41 W	1085.91	0.80
8492.00	90.74	181.61	7357.40	1177.27 S	304.00 W	1180.89	1.11
8587.00	89.94	182.93	7356.84	1272.19 S	307.75 W	1275.85	1.63
8681.00	88.02	182.86	7358.51	1366.05 S	312.50 W	1369.77	2.04
8776.00	88.70	182.72	7361.22	1460.90 S	317.13 W	1464.66	0.73
8871.00	89.63	183.58	7362.61	1555.74 S	322.35 W	1559.56	1.33
8966.00	89.88	184.04	7363.02	1650.53 S	328.67 W	1654.42	0.55
9061.00	90.12	184.32	7363.02	1745.28 S	335.59 W	1749.25	0.39
9156.00	89.81	183.28	7363.07	1840.07 S	341.88 W	1844.11	1.14
9250.00	90.86	182.59	7362.51	1933.94 S	346.69 W	1938.03	1.34
9345.00	91.23	182.45	7360.77	2028.83 S	350.87 W	2032.97	0.41
9440.00	90.74	181.22	7359.13	2123.77 S	353.92 W	2127.93	1.39
9535.00	90.80	179.90	7357.85	2218.75 S	354.85 W	2222.92	1.40
9630.00	90.68	179.29	7356.62	2313.74 S	354.18 W	2317.90	0.65
9724.00	90.43	178.28	7355.71	2407.72 S	352.19 W	2411.84	1.11
9819.00	88.33	176.72	7356.73	2502.61 S	348.05 W	2506.68	2.75
9914.00	88.64	176.41	7359.24	2597.41 S	342.36 W	2601.40	0.46
10009.00	90.06	176.83	7360.31	2692.23 S	336.76 W	2696.15	1.56
10104.00	89.94	177.64	7360.31	2787.12 S	332.17 W	2790.97	0.86
10198.00	89.38	177.85	7360.87	2881.05 S	328.47 W	2884.84	0.63
10293.00	89.57	179.66	7361.74	2976.02 S	326.40 W	2979.78	1.92
10388.00	90.19	180.83	7361.95	3071.01 S	326.81 W	3074.78	1.39
10483.00	90.37	180.58	7361.49	3166.00 S	327.98 W	3169.77	0.32
10577.00	90.31	179.92	7360.93	3260.00 S	328.39 W	3263.77	0.70
10672.00	89.75	179.00	7360.88	3355.00 S	327.50 W	3358.75	1.13
10767.00	89.57	180.46	7361.44	3449.99 S	327.05 W	3453.73	1.55

10861.00	88.08	179.28	7363.37	3543.97 S	326.85 W	3547.69	2.02
10956.00	89.38	180.84	7365.47	3638.94 S	326.95 W	3642.66	2.14
11051.00	89.57	180.95	7366.34	3733.92 S	328.43 W	3737.66	0.22
11145.00	89.32	180.45	7367.25	3827.91 S	329.57 W	3831.65	0.59
11241.00	89.51	180.64	7368.23	3923.90 S	330.49 W	3927.65	0.28
11336.00	91.18	180.62	7367.67	4018.89 S	331.53 W	4022.64	1.76
11430.00	91.05	180.07	7365.84	4112.87 S	332.09 W	4116.62	0.59
11538.00	91.11	179.42	7363.80	4220.85 S	331.62 W	4224.59	0.60
11583.00	91.11	179.42	7362.93	4265.84 S	331.16 W	4269.57	0.01

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 180.70 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.62 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11583.00 FEET
IS 4278.67 FEET ALONG 184.44 DEGREES (TRUE)**

Final survey is a projection to bit.

Date Printed:23 April 2013