

PCGK - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	05-Feb-15	08-Feb-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.830	4.660			
Log Start Depth (MD, ft)	1,324.00	7,576.00			
Log End Depth (MD, ft)	7,576.00	11,541.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	03-Feb-15 16:30	07-Feb-15 01:10			
Drill/Wipe End Date and Time	05-Feb-15 05:30	08-Feb-15 09:30			
Min Inc (deg) @ Depth (MD, ft)	1.00 @ 1,372.00	88.49 @ 10,335.00			
Max Inc (deg) @ Depth (MD, ft)	21.28 @ 2,761.00	91.85 @ 10,606.00			
Bit TFA(in2) / Bit Type	1.48 / PDC	1.24 / PDC			
Flow Rate (gpm)	586.67	293.04			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Polymer	Polymer			
Density (ppg) / Viscosity (spqt)	8.50 / 28.00	9.70 / 40.00			
Filtrate CL (ppm)	3,800.00	0.00			
pH / Fluid Loss (mptm)	7.50 / 0	9.00 / 0			
PV (cP) / YP (lbf2)	1 / 1.00	13 / 11.00			
% Solids / % Sand	2.00 / 0.25	4.10 / 0.20			
% Oil / Oil:Water Ratio	1.00 / N/A	2.00 / 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 (in F) / S	478.78 / PCM	339.33 / PCM			

Max Tool Temp (degF) / Source	172.78 / PCM	226.08 / PCM			
Rm @ Max Tool Temp (degF)	PCM @ 172.78	PCM @ 226.08			
Lead MWD Engineer	Aleksey Treskov	Aleksey Treskov			
Customer Representative	Mike Olsen	Mike Olsen			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11341332	12310754			
Insert Serial Number	11680732	11227547			
Date and Time Initialized	02-Feb-15 22:57	06-Feb-15 12:21			
Date and Time Read	05-Feb-15 14:07	08-Feb-15 17:15			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	44.12	40.46			
Software Version	6.21	6.21			
Sub Serial Number	11341332	12310754			
Sonde Serial Number	11833253	11062073			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	253.54	202.23			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.07	45.41			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341332	12310754			
Insert/Sonde Serial Number	12071280	11579832			

REMARKS

1. Depths are measured depths, referenced to Driller's pipe tally, and measure from the rig floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded unless otherwise specified. Run 200 gamma isrealtime data.
4. Remark #4 Data gap between 3973' to 4064' MD is due to a loss of depth tracking due to Pason resetting block position.
5. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft
Gap Fill: 3.0 ft

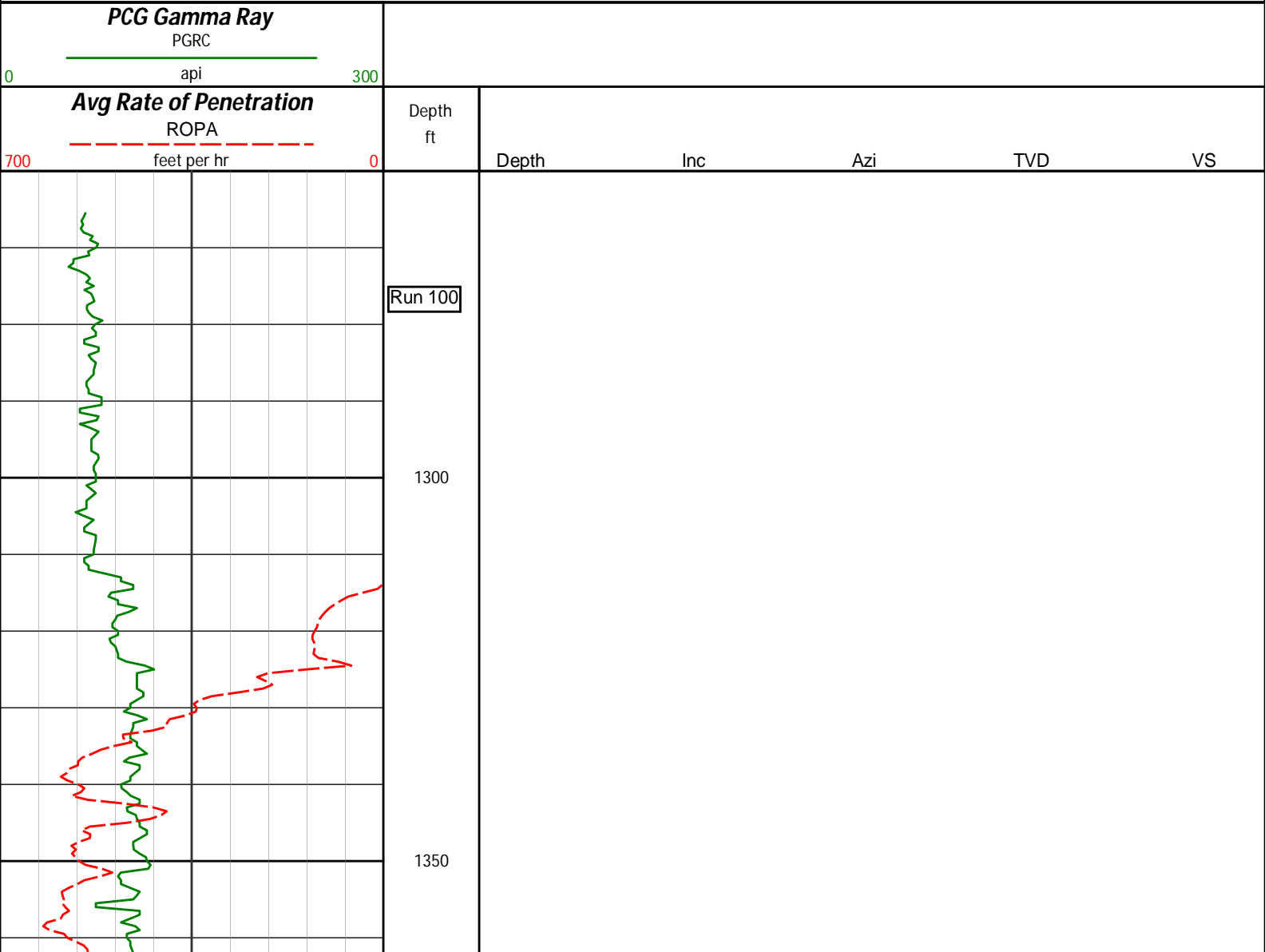
ROPA (Average Rate of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

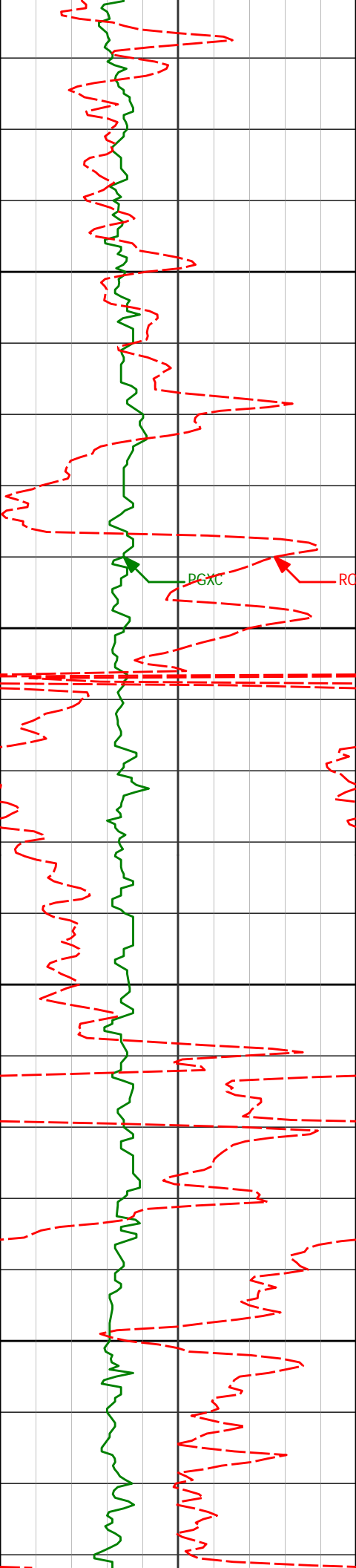
WARRANTY

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HALLIBURTON
Sperry Drilling Services

MD Detail Log 1:240





1400

1450

1500

1550

1372'

1.00°

15.41°

1371.87'

2.10'

1466'

1.78°

312.07°

1465.85'

3.87'

1559'

3.50°

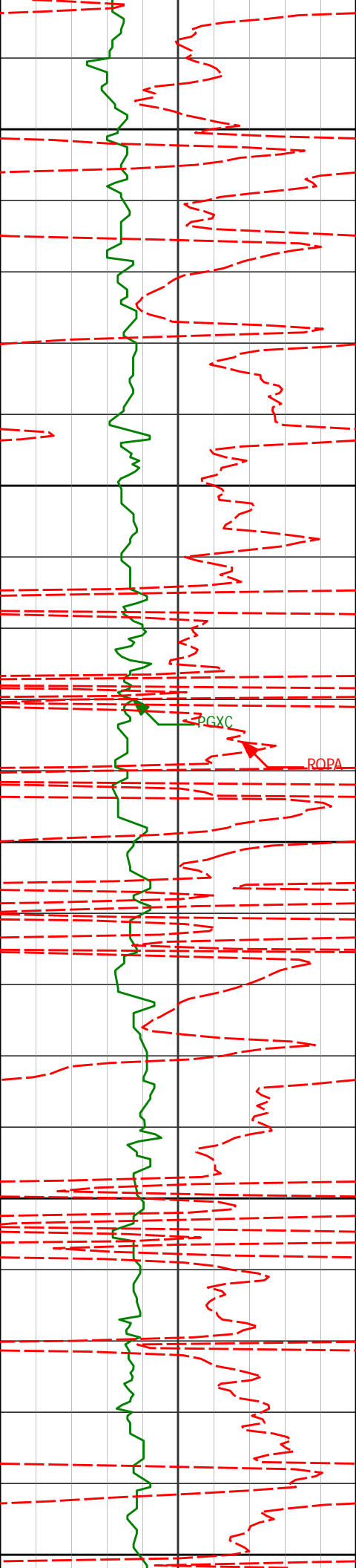
290.05°

1558.75'

5.81'

PGXC

RCPA



1600

1650

1700

1750

1800

1653'

5.59°

275.24°

1652.45'

7.22'

1746'

6.88°

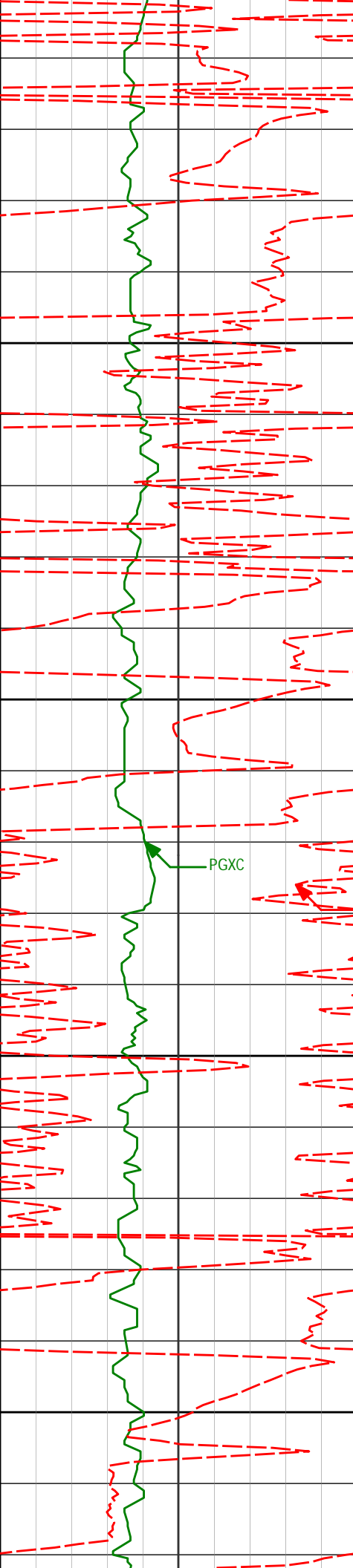
264.73°

1744.90'

7.12'

PGXC

ROPA



1850

1900

1950

2000

1840'

8.11°

252.83°

1838.10'

4.64'

PGXC

ROPA

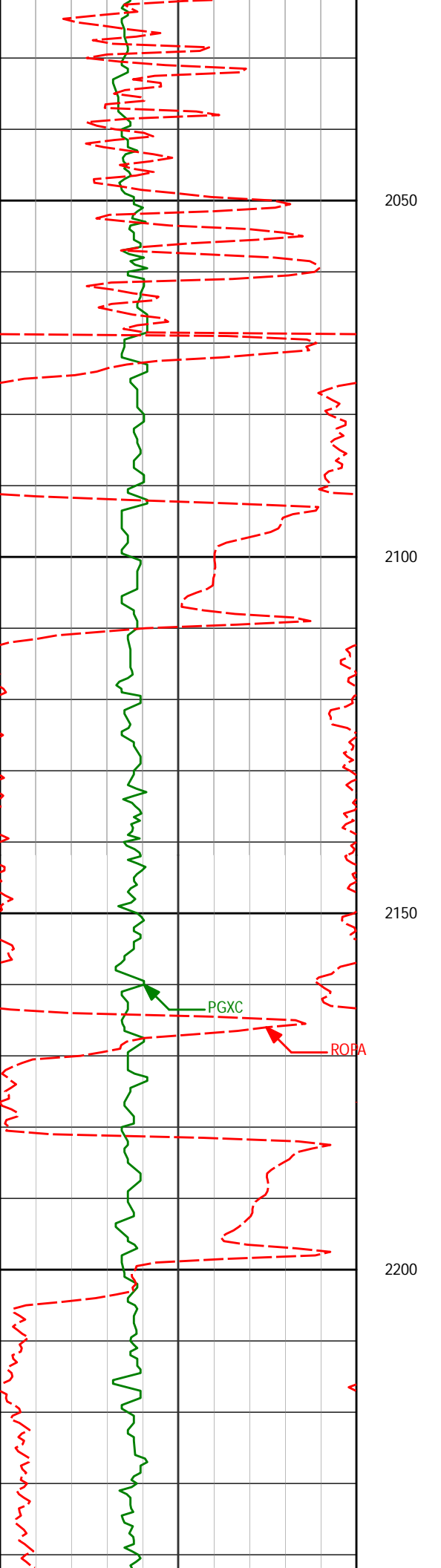
1933'

9.79°

251.18°

1929.97'

0.16'



2027'

11.29°

249.39°

2022.38'

-5.66'

2050

2100

2120'

13.82°

254.71°

2113.15'

-11.80'

2150

PGXC

ROBA

2200

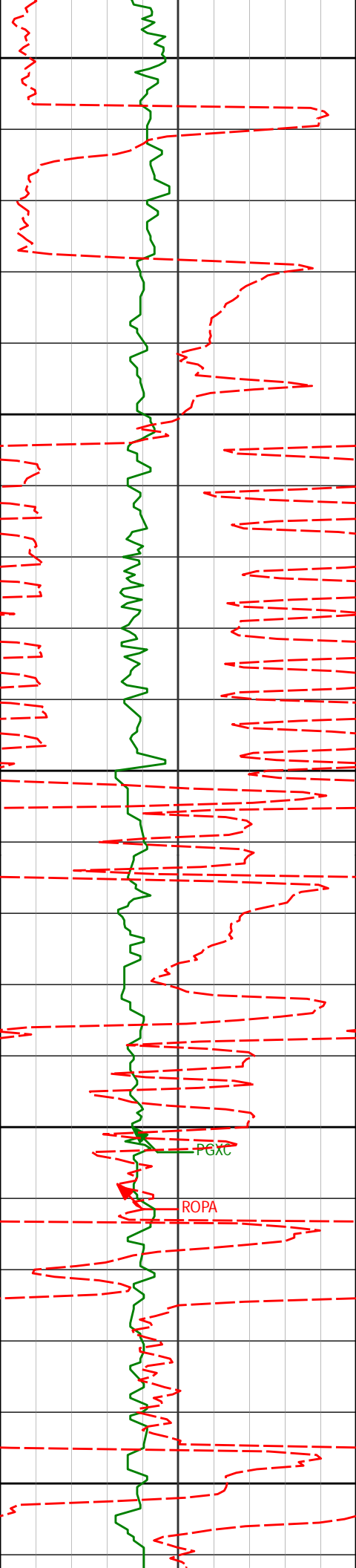
2214'

15.71°

253.97°

2204.04'

-18.27'



2250

2300

2350

2400

2450

2308'

17.93°

252.85°

2294.02'

-26.05'

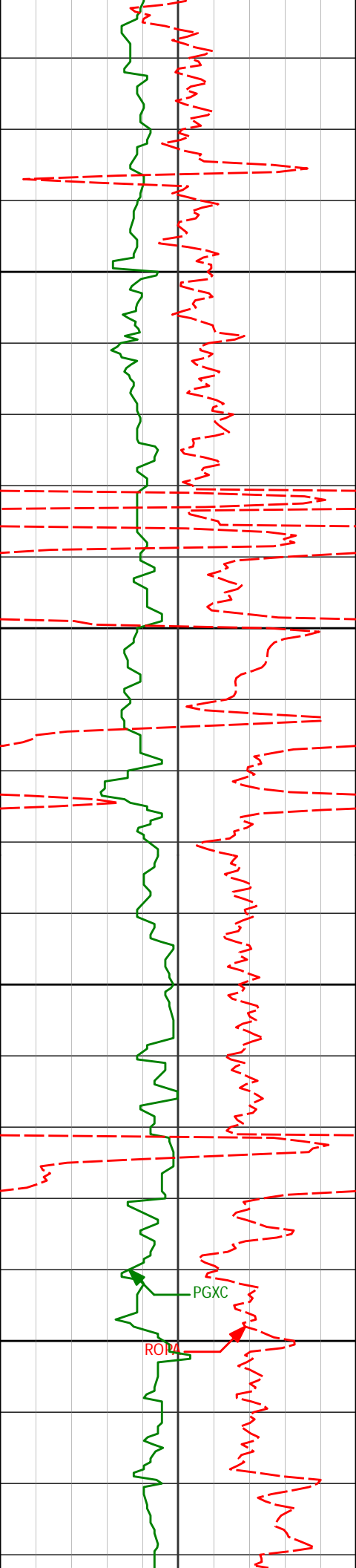
2401'

20.31°

252.68°

2381.88'

-35.08'



2500

2550

2600

2650

2491'

19.38°

251.44°

2466.53'

-44.48'

2581'

20.06°

253.73°

2551.26'

-53.56'

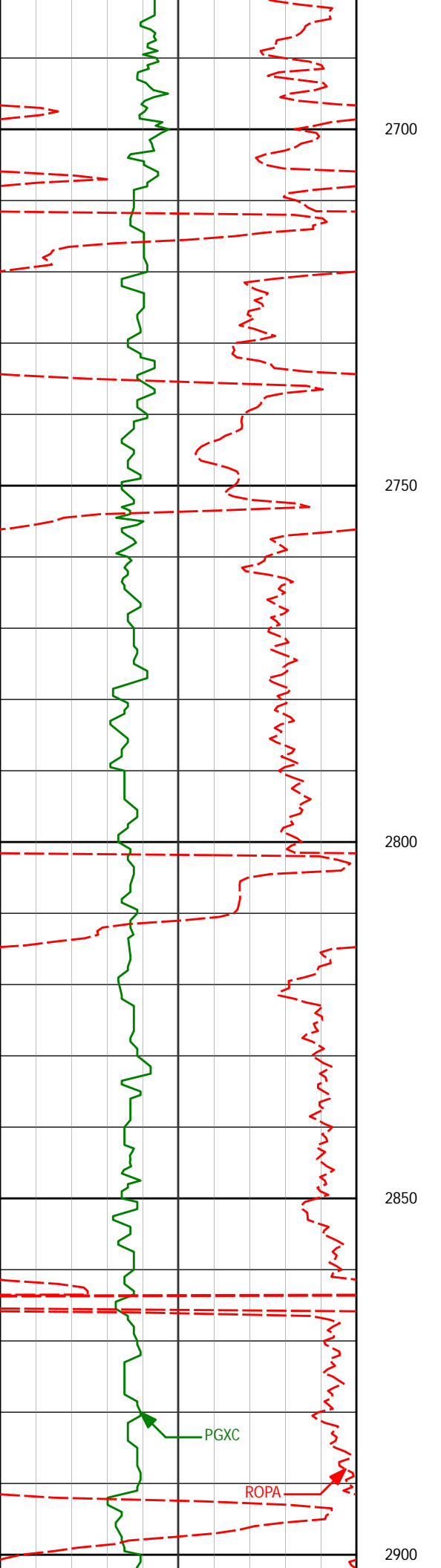
2671'

19.03°

253.48°

2636.07'

-62.06'



2700

2750

2800

2850

2900

2761'

21.28°

251.27°

2720.55'

-71.48'

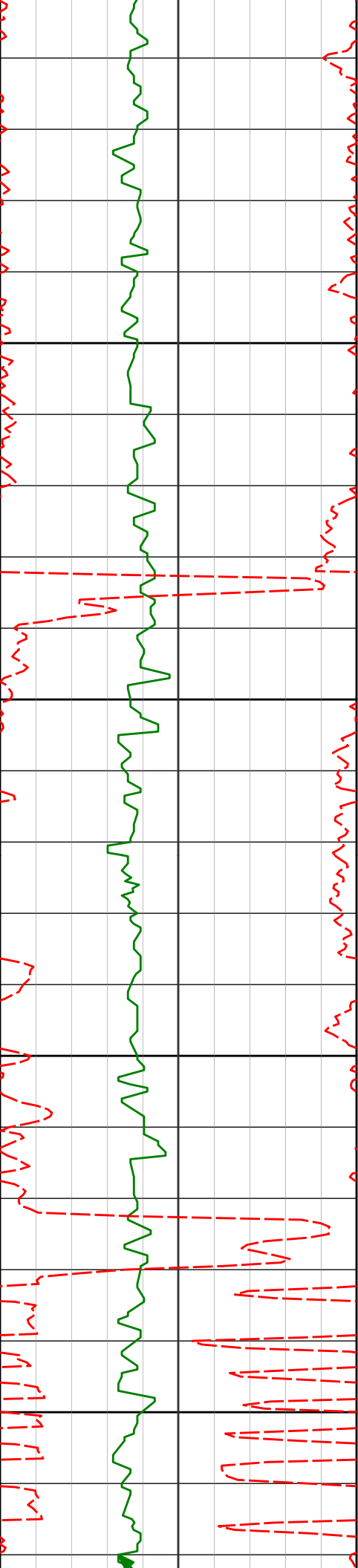
2851'

20.96°

251.31°

2804.51'

-81.88'



2941'

20.57°

250.59°

2888.66'

-92.29'

2950

3000

3031'

19.78°

251.11°

2973.14'

-102.48'

3050

3100

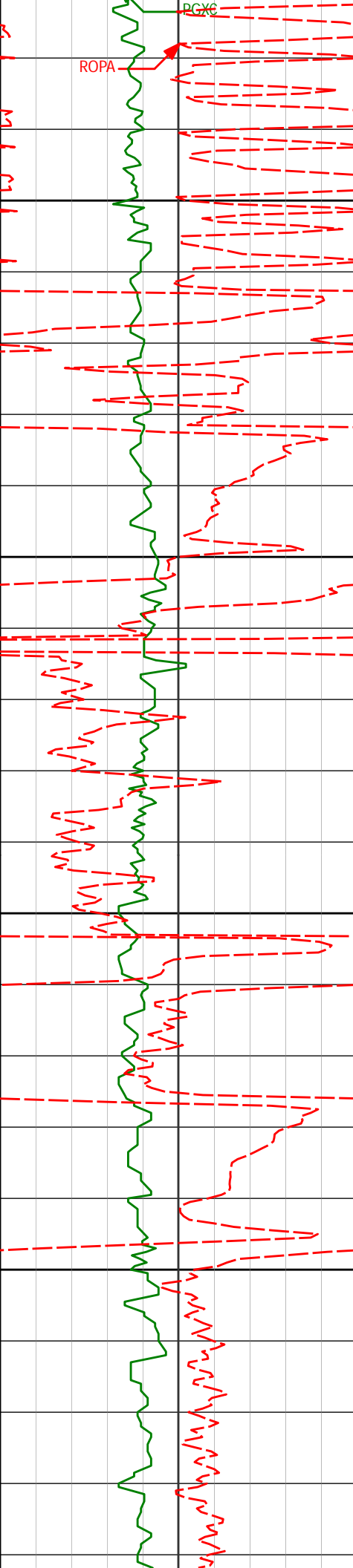
3121'

18.62°

251.07°

3058.13'

-112.07'



3150

3200

3250

3300

3211'

19.48°

252.79°

3143.20'

-121.17'

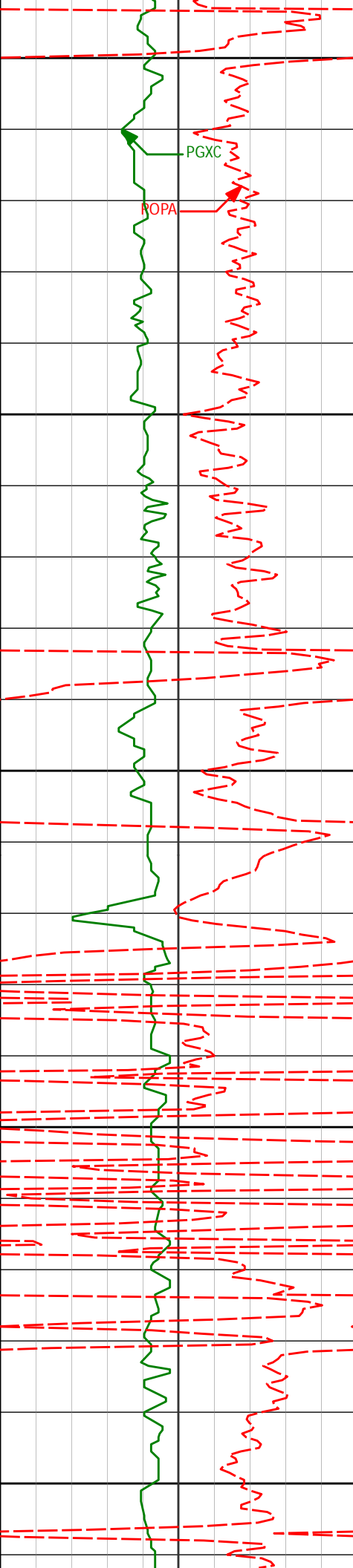
3301'

21.60°

252.53°

3227.48'

-130.58'



3350

PGXC

ROPA

3391'

19.76°

252.62°

3311.67'

-140.10'

3400

3450

3481'

21.09°

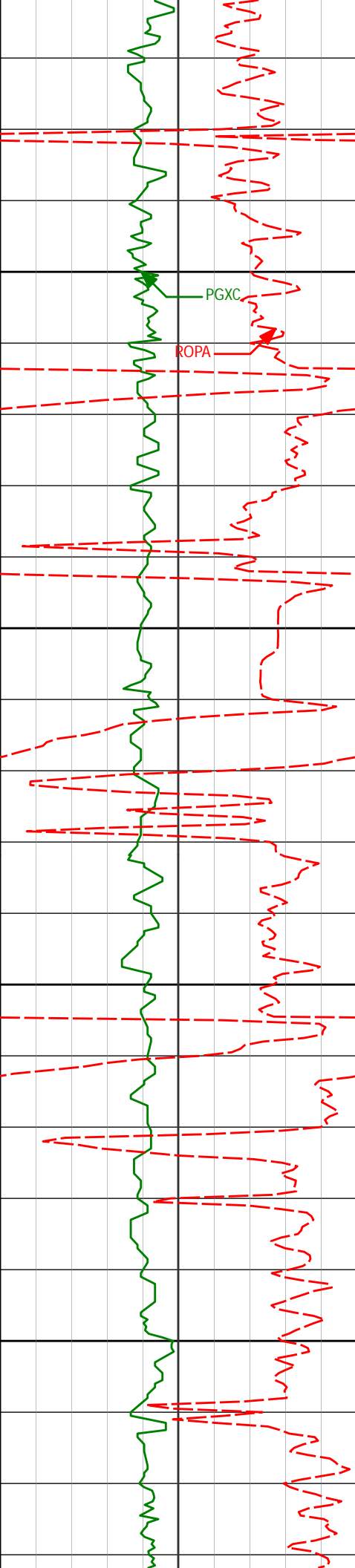
254.03°

3396.01'

-149.10'

3500

3550



3600

3650

3700

3750

3571'

19.11°

252.90°

3480.53'

-157.89'

3661'

20.27°

253.10°

3565.27'

-166.76'

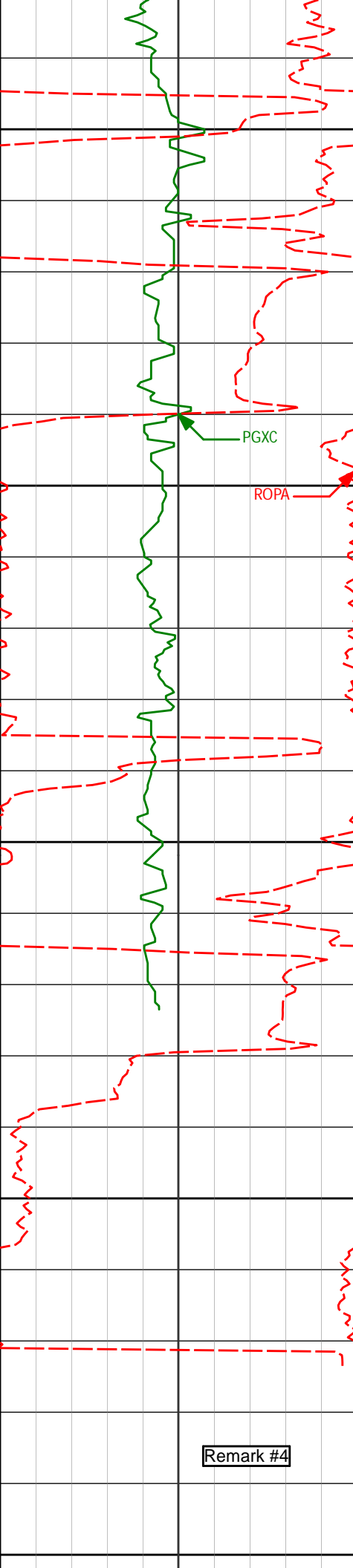
3751'

18.73°

252.94°

3650.10'

-175.53'



3800

3841'

20.25°

252.97°

3734.94'

-184.33'

3850

ROPA

3900

3931'

20.23°

255.79°

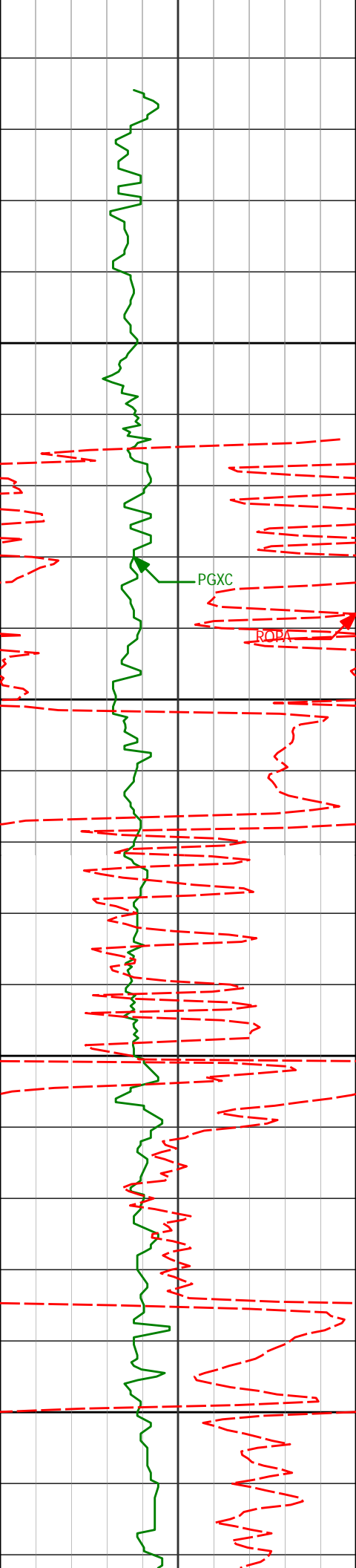
3819.39'

-192.71'

3950

Remark #4

4000



4021'

19.05°

256.87°

3904.15'

-199.87'

4050

PGXC

ROPA

4100

4111'

20.28°

255.13°

3988.90'

-207.21'

4150

4200

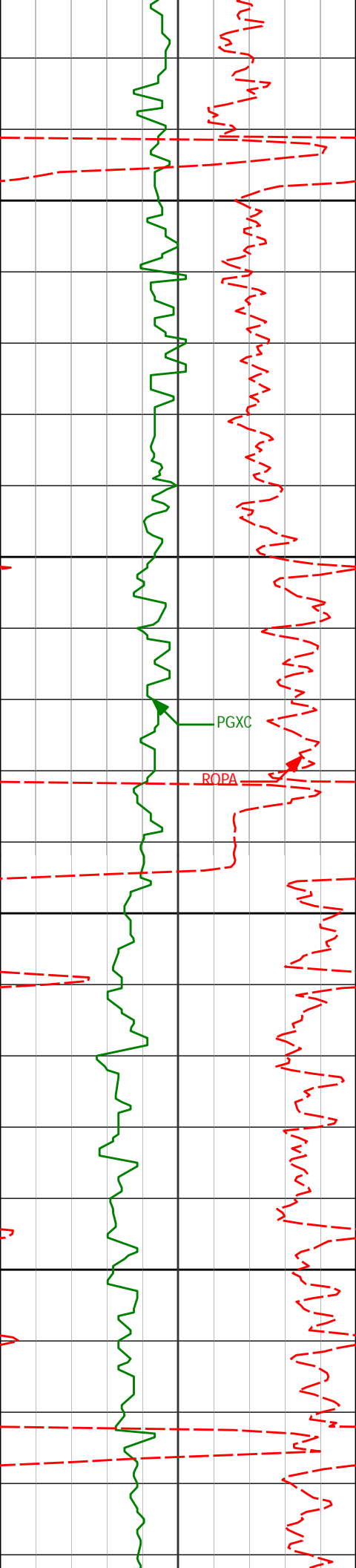
4201'

21.51°

252.19°

4072.98'

-216.26'



4250

4291'

20.89°

252.70°

4156.89'

-226.07'

4300

4350

4381'

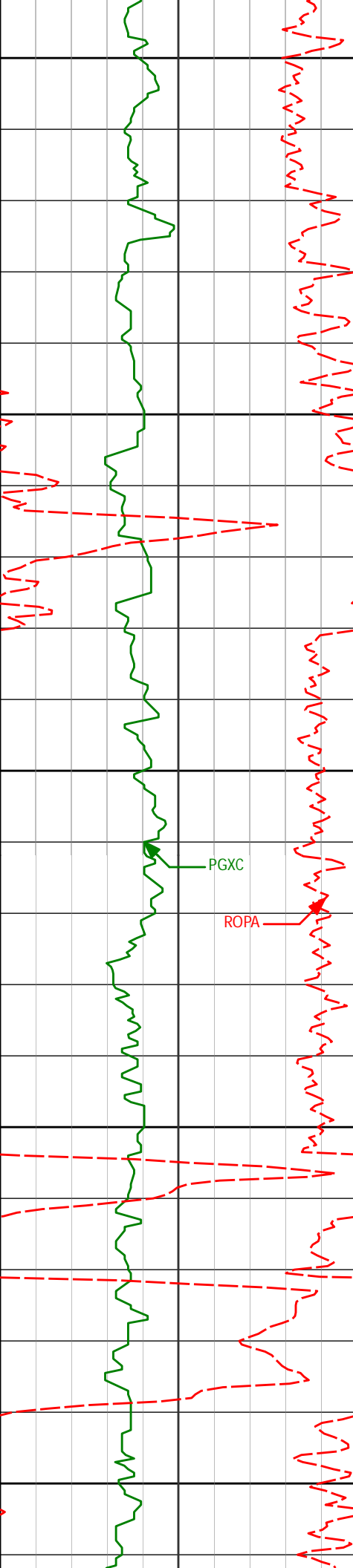
20.41°

251.77°

4241.11'

-235.76'

4400



4450

4471'

19.78°

251.07°

4325.63'

-245.61'

4500

4550

4561'

18.93°

250.90°

4410.54'

-255.32'

4600

4650

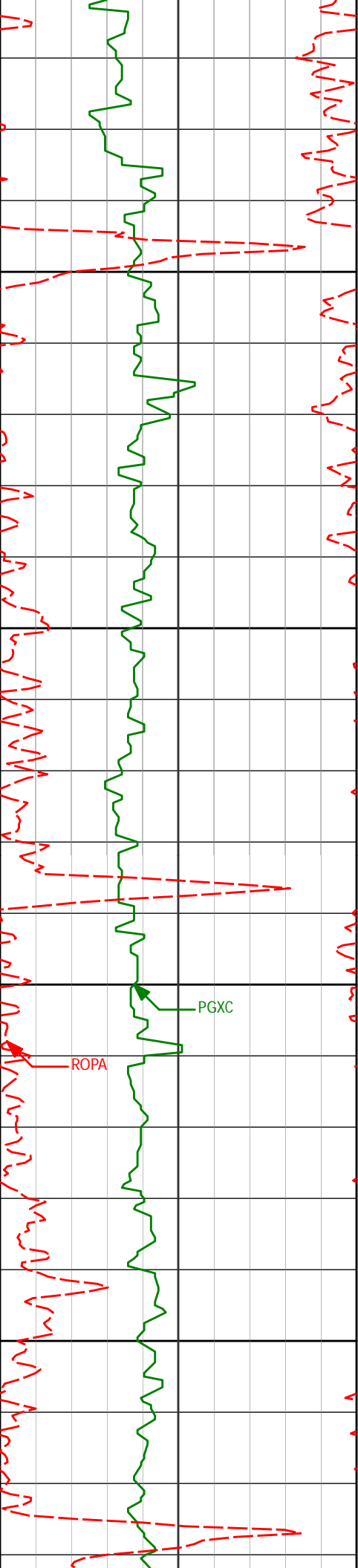
4651'

21.04°

252.84°

4495.12'

-264.87'



4700

4741'

20.33°

252.40°

4579.31'

-274.36'

4750

4800

PGXC

ROPA

4831'

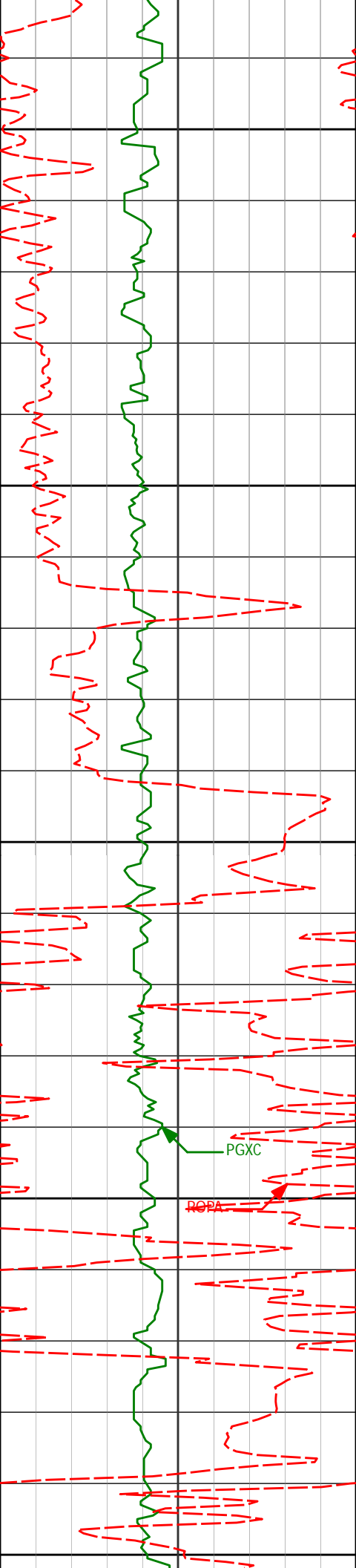
19.99°

252.61°

4663.80'

-283.69'

4850



4900

4950

5000

5050

5100

4921'

18.22°

251.78°

4748.84'

-292.68'

5011'

18.61°

255.14°

4834.23'

-300.77'

PGXC

ROPA

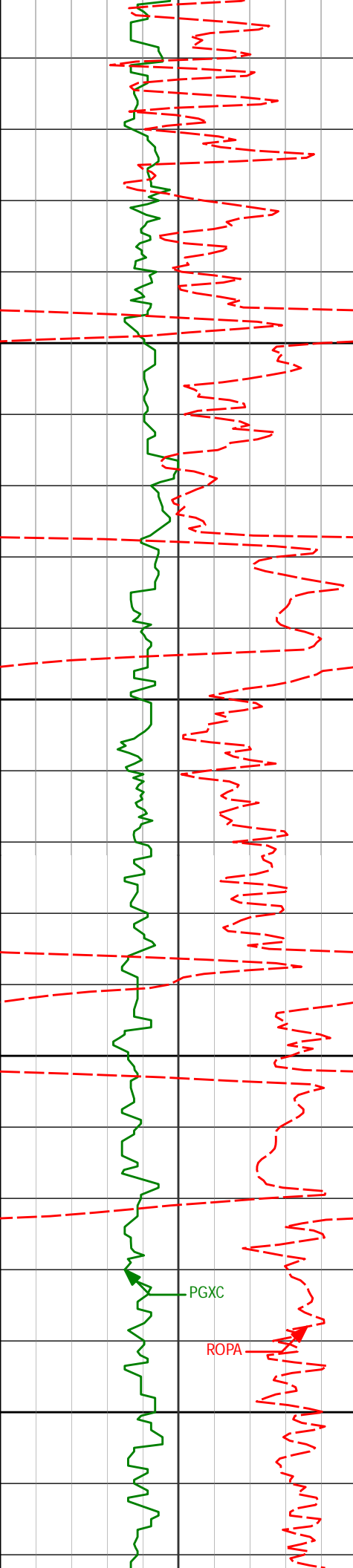
5101'

19.12°

260.94°

4919.41'

-306.77'



5150

5200

5250

5300

PGXC

ROPA

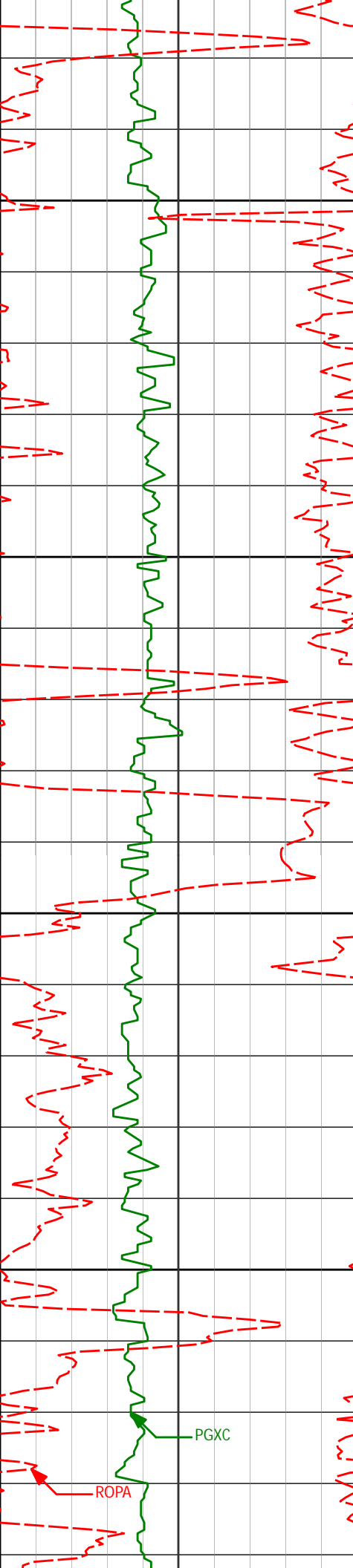
5191'

19.23°

260.44°

5004.41'

-311.55'



5350

5371'

21.18°

257.63°

5173.33'

-323.44'

5400

5450

5461'

20.01°

252.44°

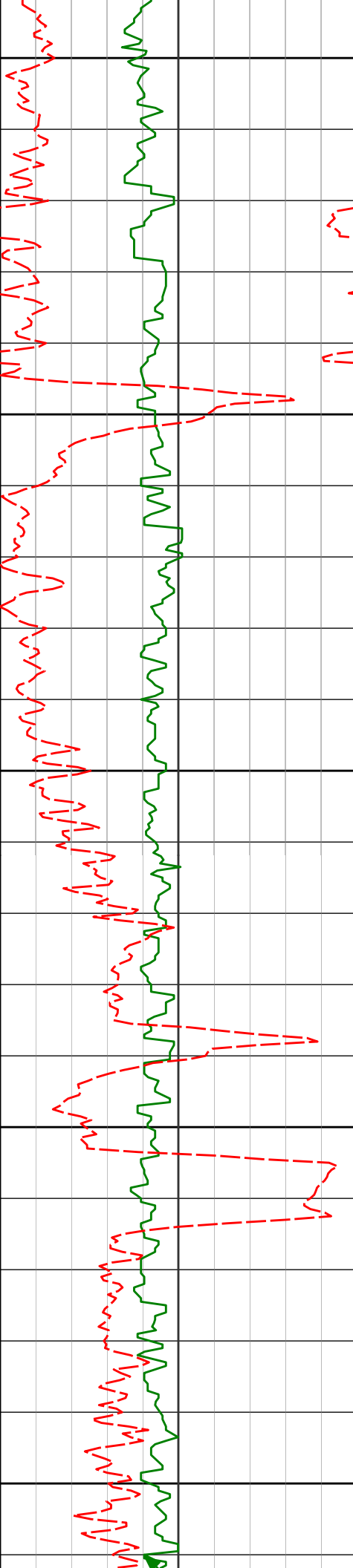
5257.59'

-331.57'

5500

PGXC

ROPA



5550

5551'

18.72°

251.73°

5342.49'

-340.75'

5600

5641'

16.18°

251.55°

5428.34'

-349.25'

5650

5700

5730'

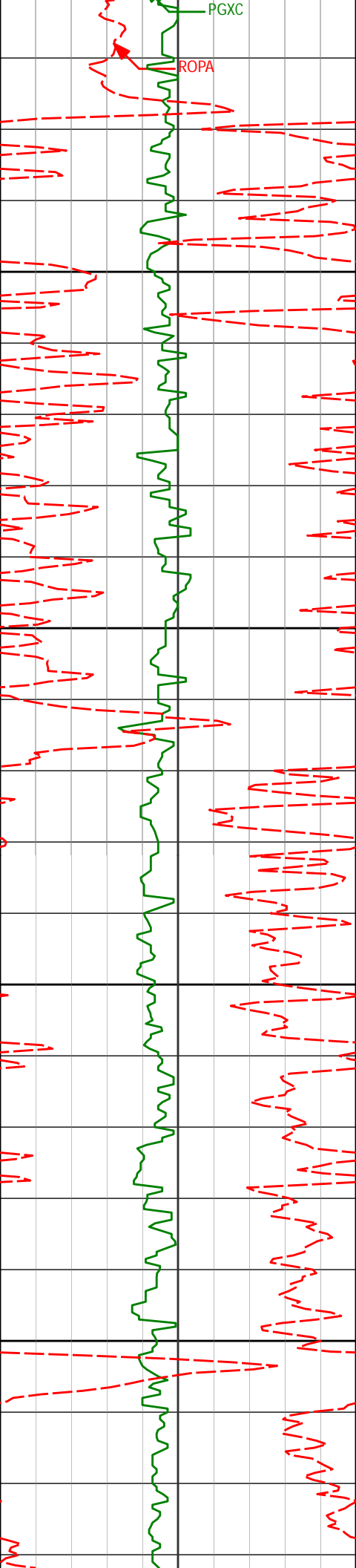
16.28°

250.03°

5513.80'

-357.43'

5750



5800

5850

5900

5950

5820'

14.53°

250.64°

5600.56'

-365.48'

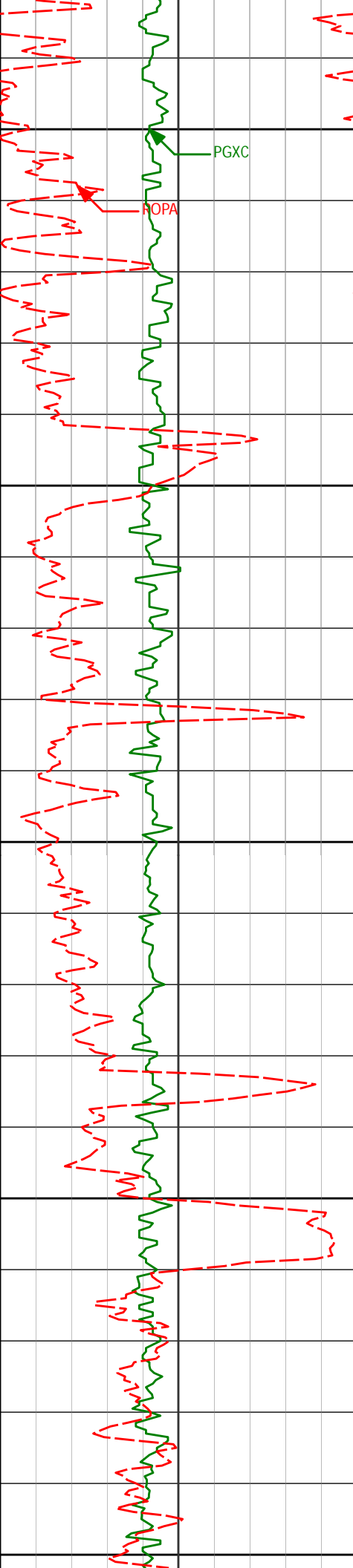
5910'

12.55°

250.89°

5688.06'

-372.43'



6000
6050
6100
6150
6200

6000'
6090'
6180'

10.76°
9.45°
7.78°

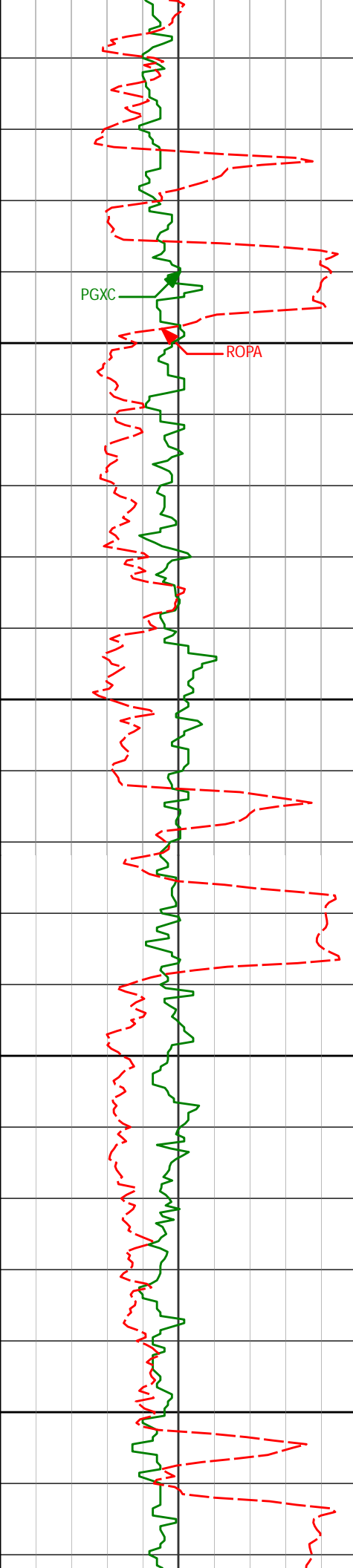
250.49°
251.36°
251.13°

5776.20'
5864.80'
5953.78'

-378.43'
-383.60'
-387.93'

PGXC

ROPA



6250

6270'

6.40°

244.70°

6043.09'

-392.05'

6300

6350

6360'

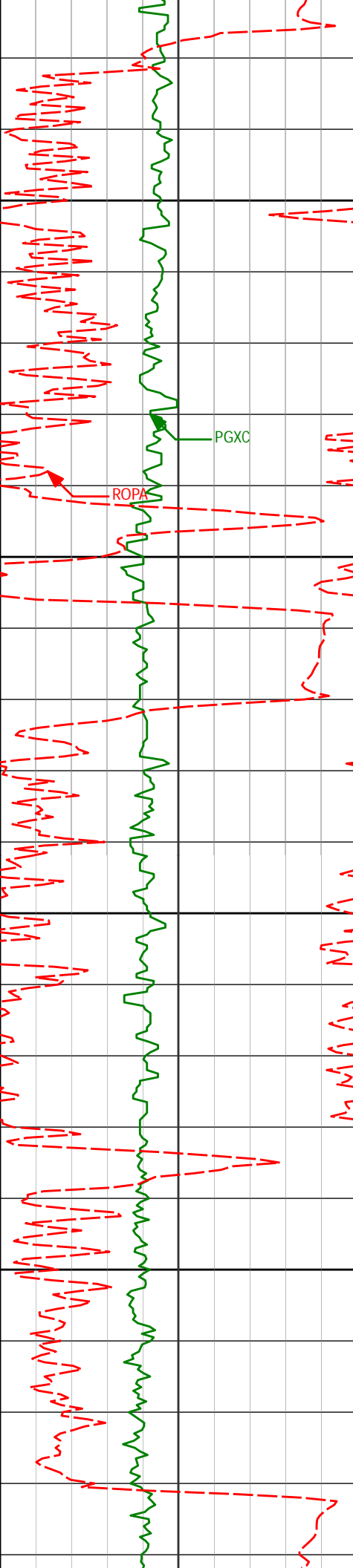
4.50°

248.35°

6132.68'

-395.49'

6400



6450

6450'

2.23°

253.31°

6222.52'

-397.30'

6500

6540'

0.42°

291.86°

6312.49'

-397.68'

6550

6600

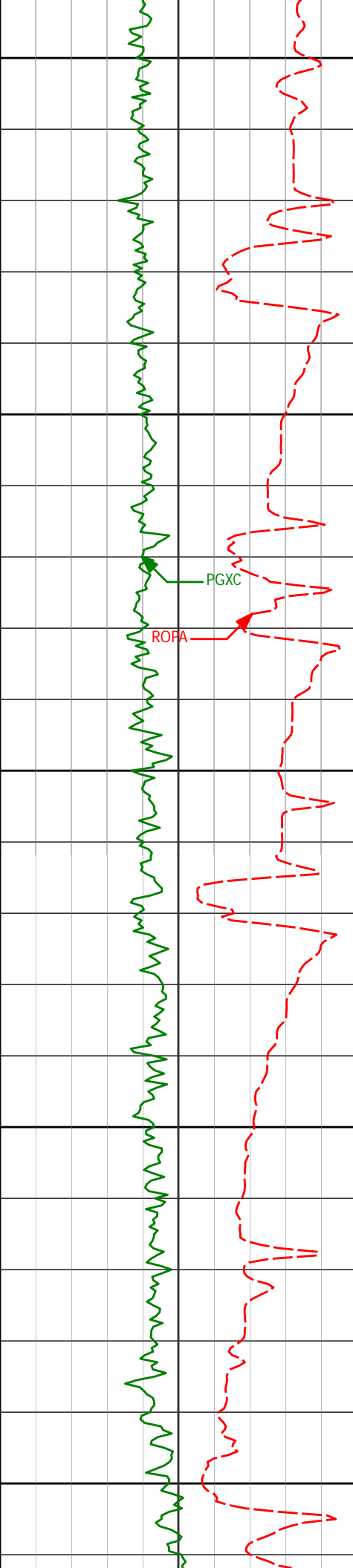
6631'

0.86°

316.46°

6403.49'

-397.06'



6650

6700

6750

6800

6850

6721'

12.97°

9.05°

6492.69'

-386.56'

PGXC

ROPA

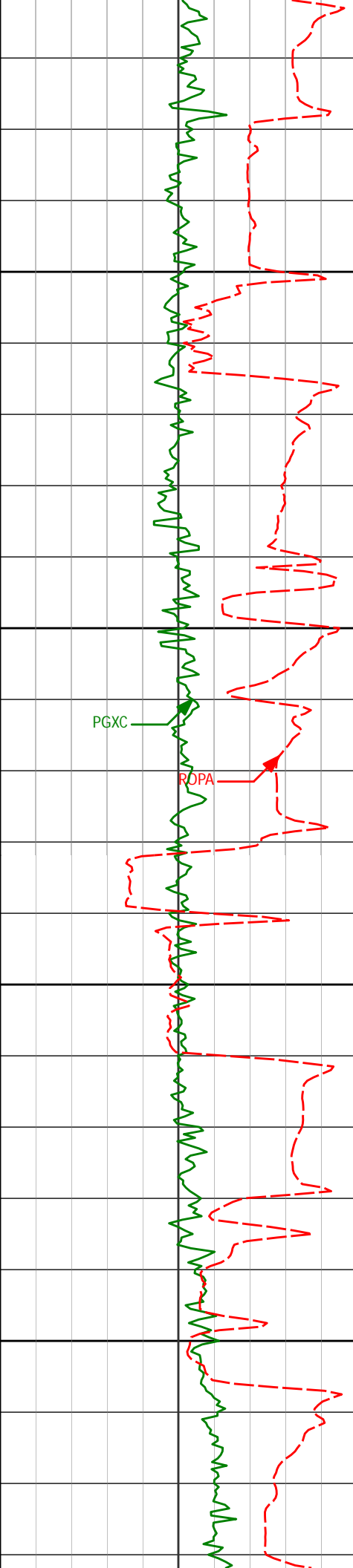
6811'

25.99°

10.70°

6577.35'

-357.08'



6900

6901'

28.20°

9.83°

6657.47'

-316.74'

6950

PGXC

ROPA

7000

6991'

37.75°

8.70°

6732.89'

-268.44'

7050

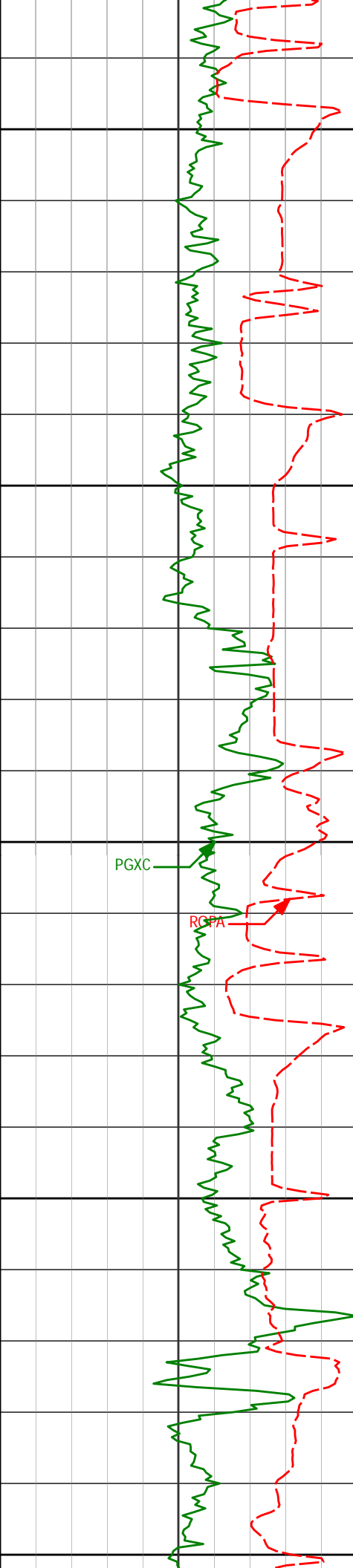
7081'

43.24°

1.18°

6801.34'

-210.31'



7100

7150

7200

7250

7300

PGXC

RCPA

7171'

50.76°

358.72°

6862.68'

-144.55'

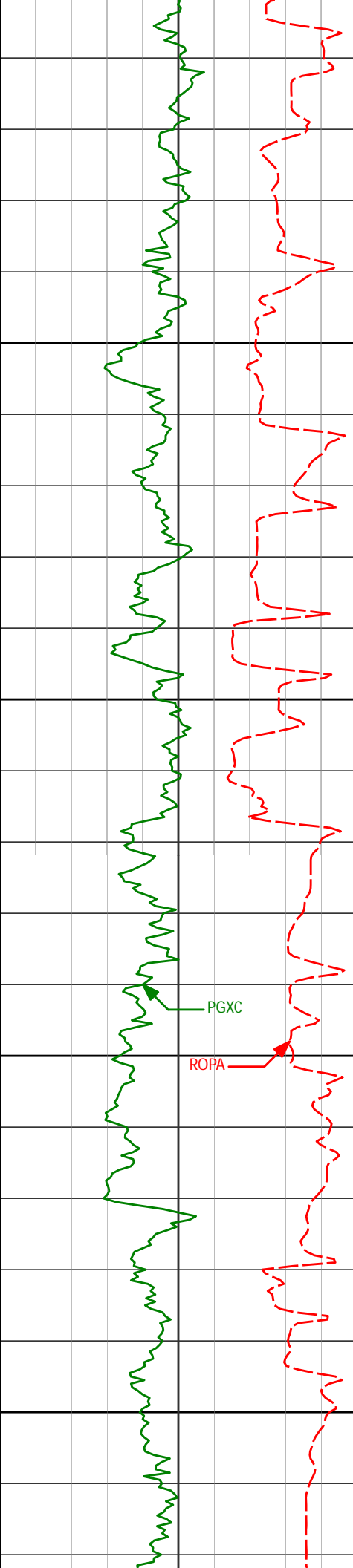
7261'

56.81°

0.45°

6915.83'

-71.97'



7350

7351'

69.87°

0.18°

6956.13'

8.28'

7400

7441'

74.79°

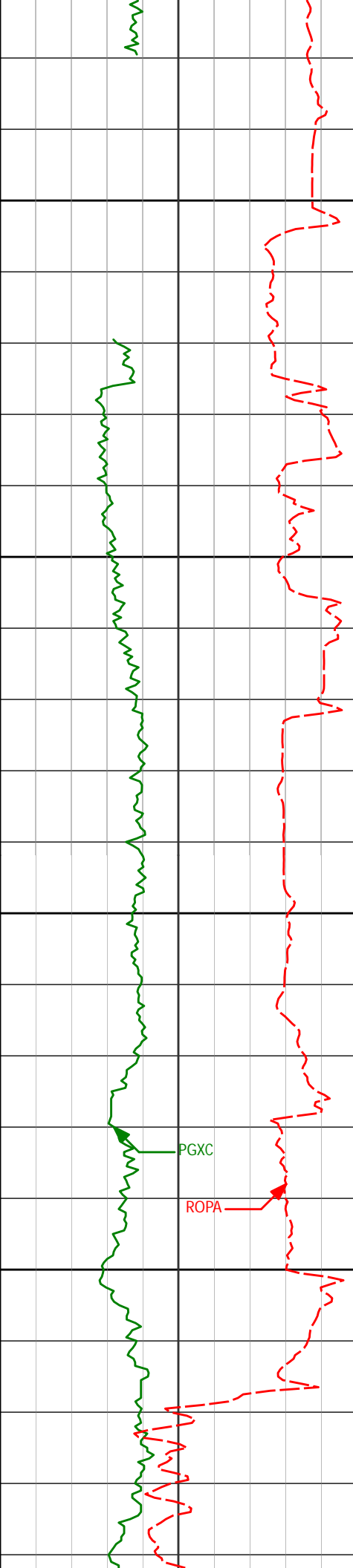
1.70°

6983.44'

93.99'

7450

7500



7530

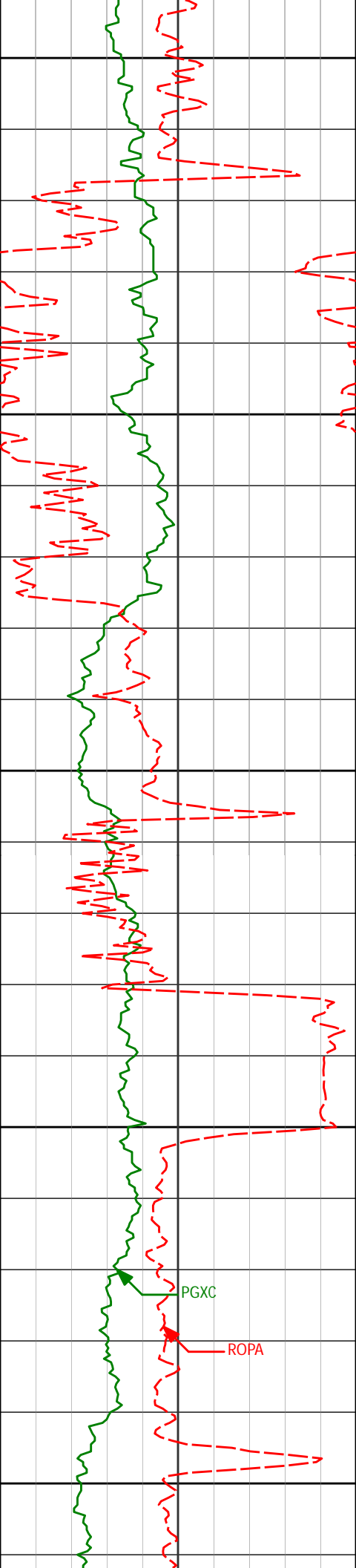
7550

7600

7650

7700

7530'	88.77°	0.06°	6996.13'	181.85'
<div>7" Casing Shoe</div>				
<div>Run 200</div>				
7636'	91.26°	0.77°	6996.11'	287.84'
7726'	90.46°	0.97°	6994.76'	377.82'



7750

7800

7850

7900

7950

7816'

90.80°

0.89°

6993.77'

467.80'

7906'

89.88°

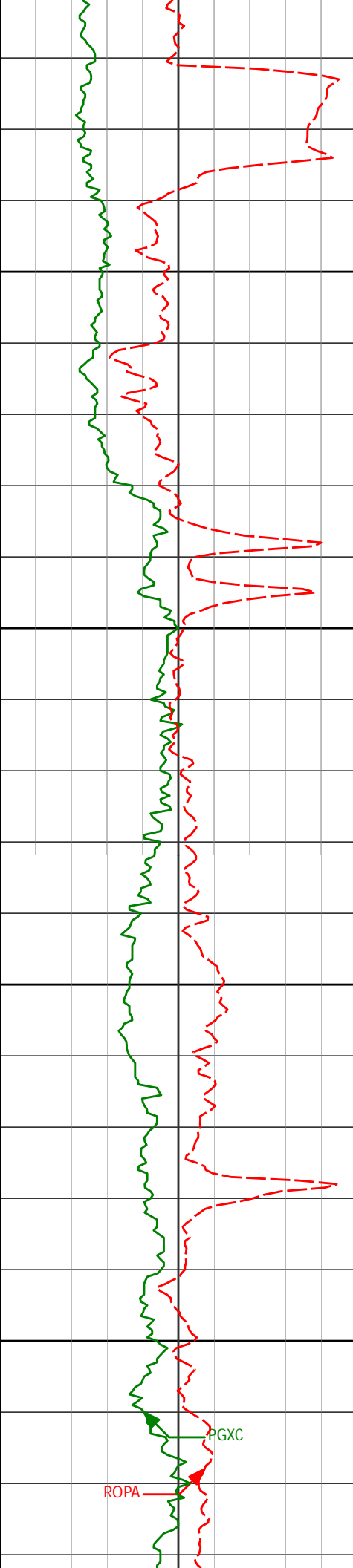
0.04°

6993.23'

557.79'

PGXC

ROPA



8000

8050

8100

8150

7996'

89.14°

359.40°

6994.00'

647.79'

8086'

89.78°

359.29°

6994.85'

737.78'

PGXC

ROPA

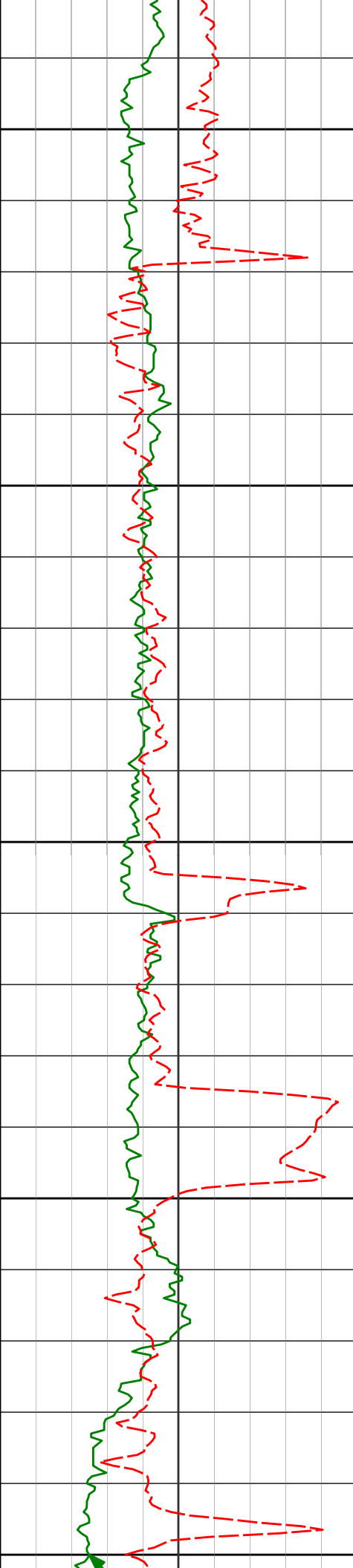
8176'

89.69°

358.69°

6995.27'

827.76'



8200

8250

8300

8350

8400

8266'

90.18°

358.56°

6995.37'

917.73'

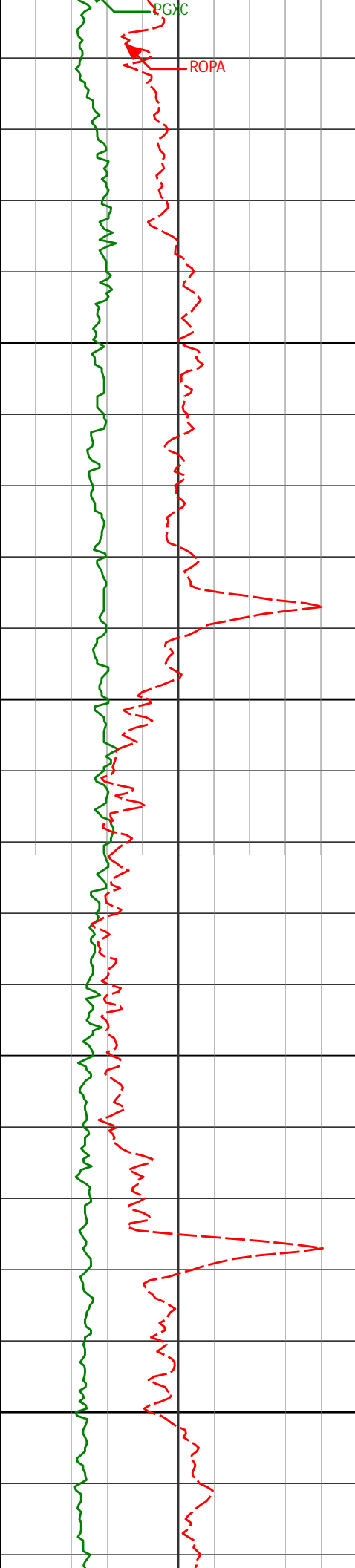
8356'

89.41°

359.57°

6995.69'

1007.72'



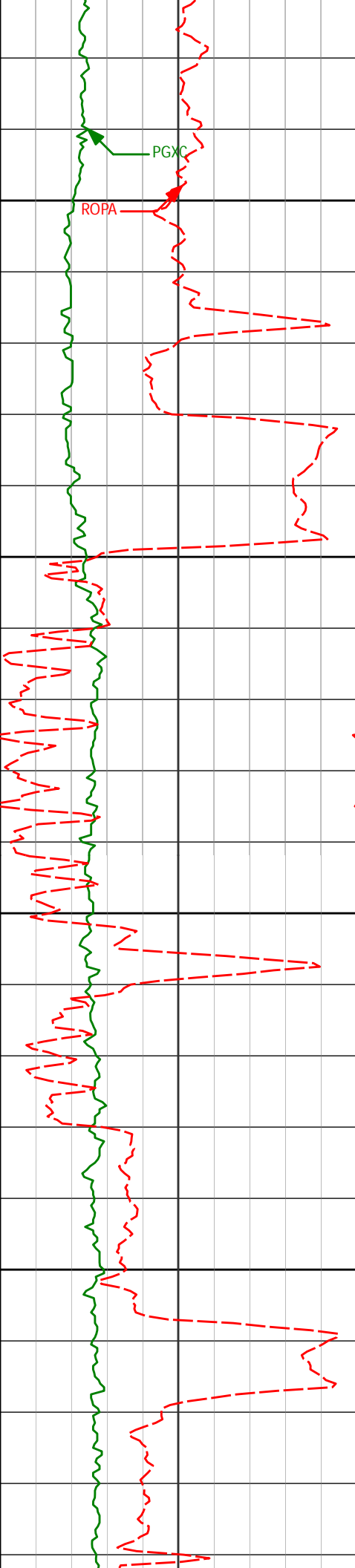
8446'	89.60°	358.96°	6996.47'	1097.71'
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8500

8536'	89.88°	358.76°	6996.88'	1187.69'
-------	--------	---------	----------	----------

8550

8600



8650

8700

8750

8800

8626'

90.46°

357.94°

6996.61'

1277.65'

8716'

89.69°

359.61°

6996.49'

1367.63'

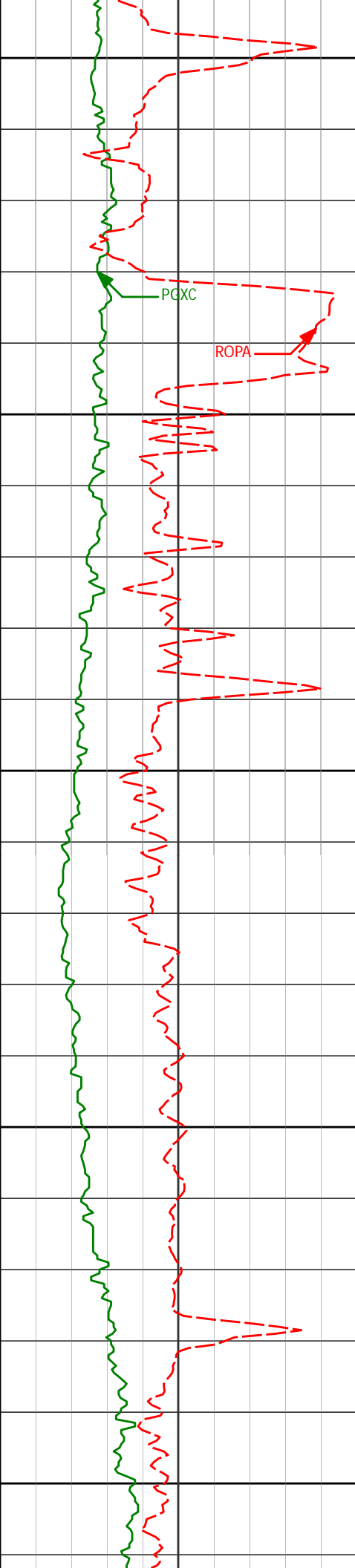
8806'

89.91°

359.28°

6996.81'

1457.62'



8850

8900

8950

9000

9050

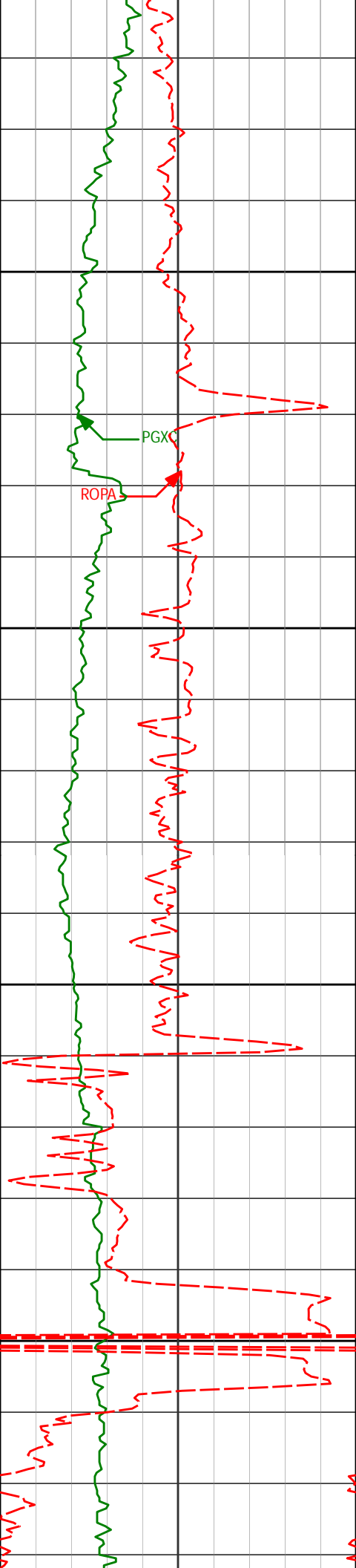
8896'

89.26°

0.55°

6997.46'

1547.62'



9100

9150

9200

9250

9076'

90.15°

0.36°

6998.38'

1727.61'

9166'

91.05°

0.12°

6997.44'

1817.60'

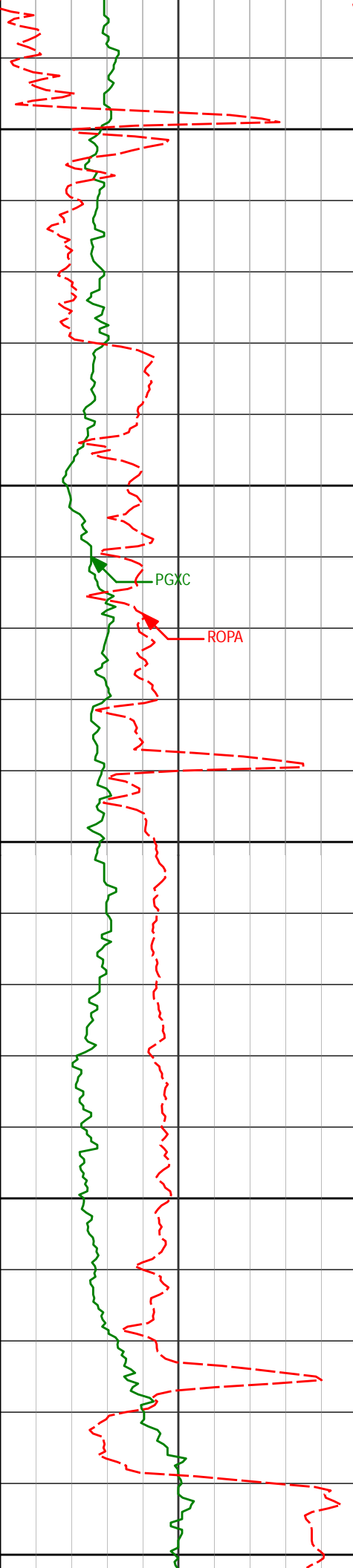
9256'

90.18°

0.02°

6996.48'

1907.59'



9300

9350

9400

9450

9500

9346'

90.59°

359.98°

6995.87'

1997.59'

PGXC

ROPA

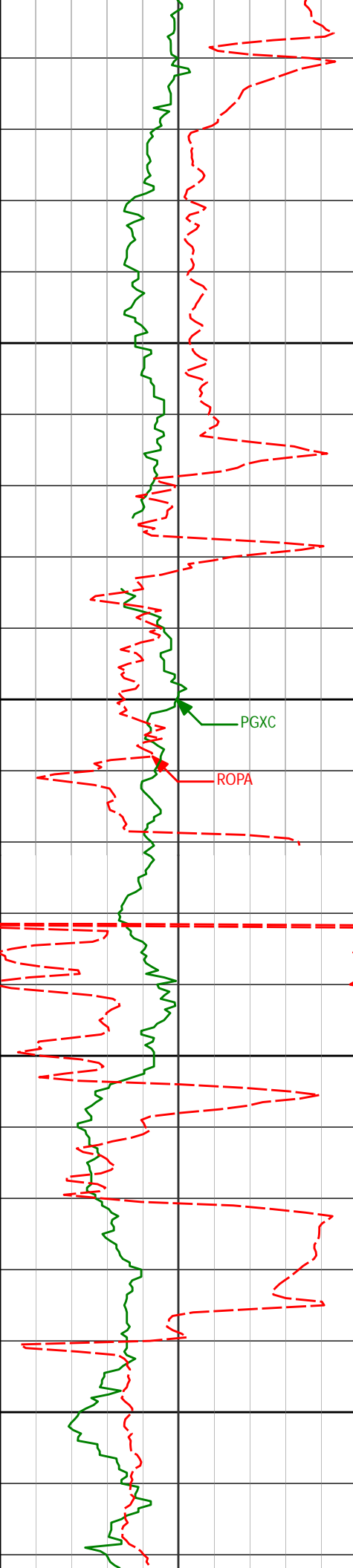
9436'

91.26°

359.56°

6994.42'

2087.58'



9550

9600

9650

9700

9525'

89.75°

359.62°

6993.63'

2176.57'

9615'

90.49°

359.12°

6993.45'

2266.56'

9705'

90.22°

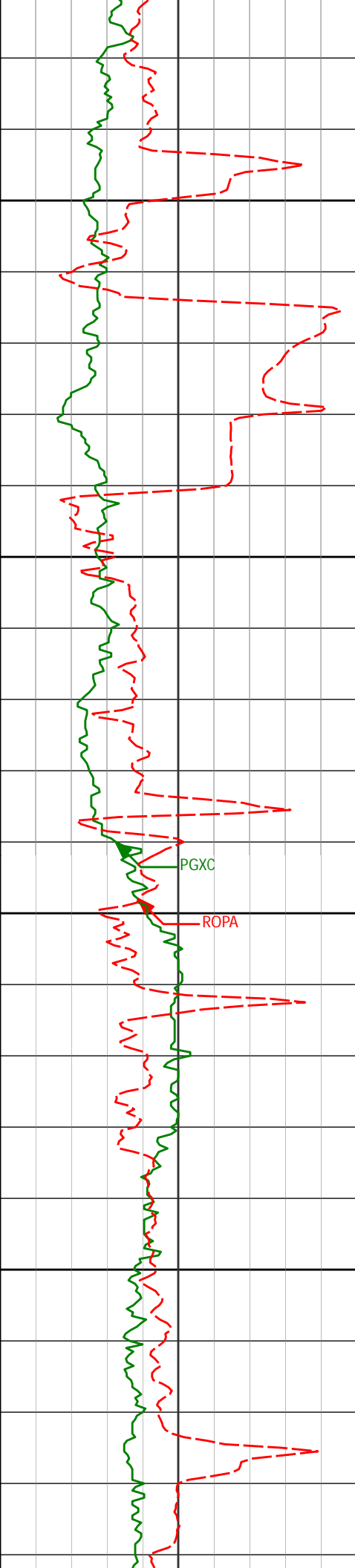
359.51°

6992.89'

2356.56'

PGXC

ROPA



9750

9800

9850

9900

PGXC

ROPA

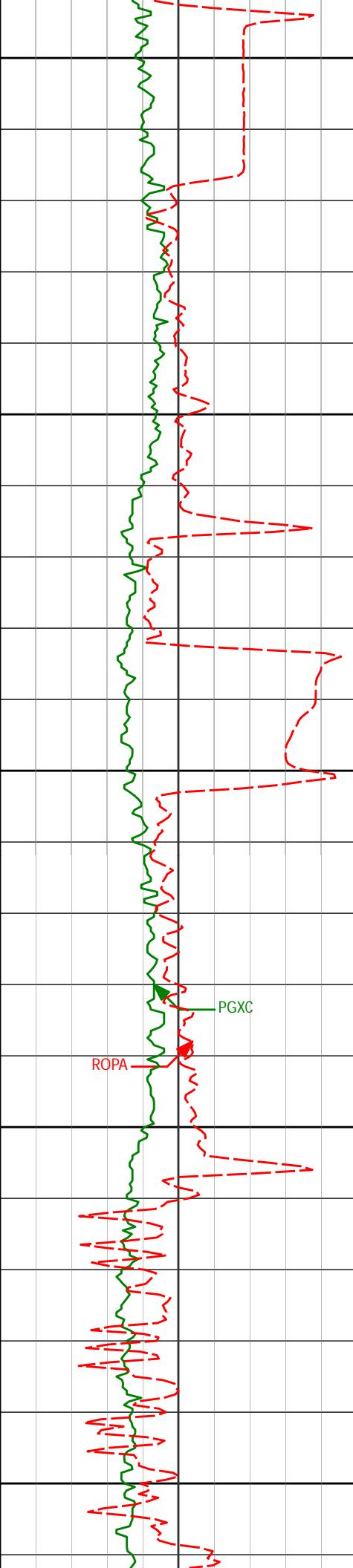
9885'

90.15°

359.55°

6992.31'

2536.55'



9950

9975'

90.62°

358.86°

6991.70'

2626.54'

10000

10050

10065'

89.66°

0.26°

6991.48'

2716.53'

10100

10150

10155'

88.95°

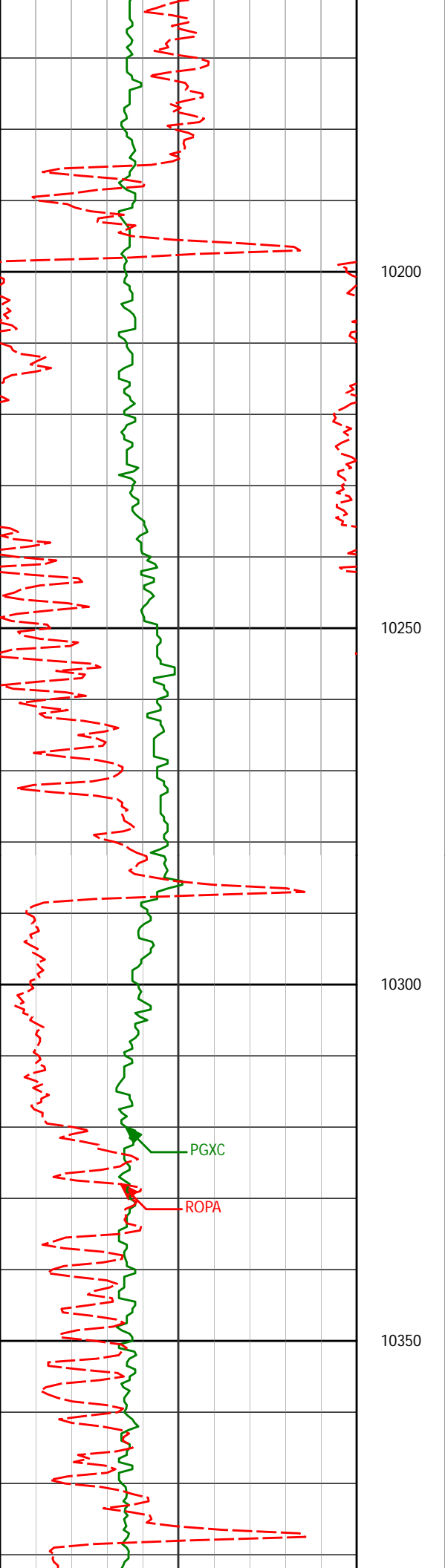
359.47°

6992.57'

2806.52'

ROPA

PGXC



10245'

89.72°

359.75°

6993.62'

2896.51'

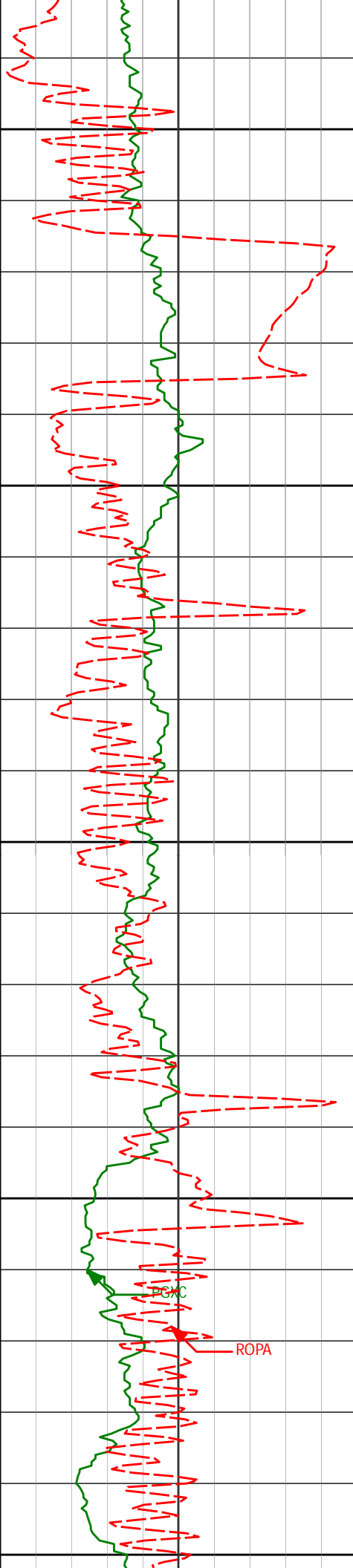
10335'

88.49°

358.80°

6995.02'

2986.49'



10400

10426'

89.82°

359.49°

6996.37'

3077.47'

10450

10500

10516'

91.26°

0.22°

6995.52'

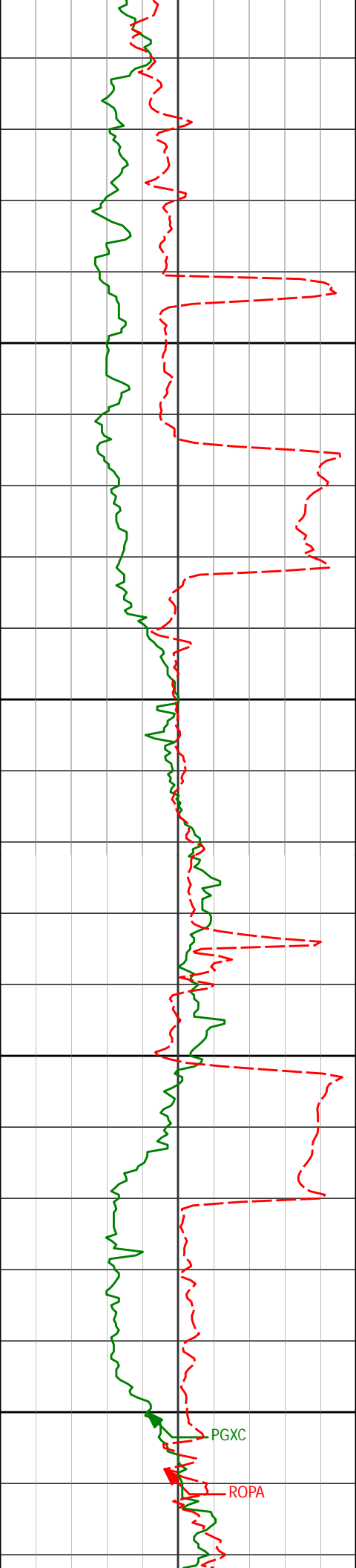
3167.46'

10550

PGC

ROPA

10600



10650

10700

10750

10800

10606'

91.85°

0.15°

6993.08'

3257.43'

10696'

90.99°

359.54°

6990.85'

3347.40'

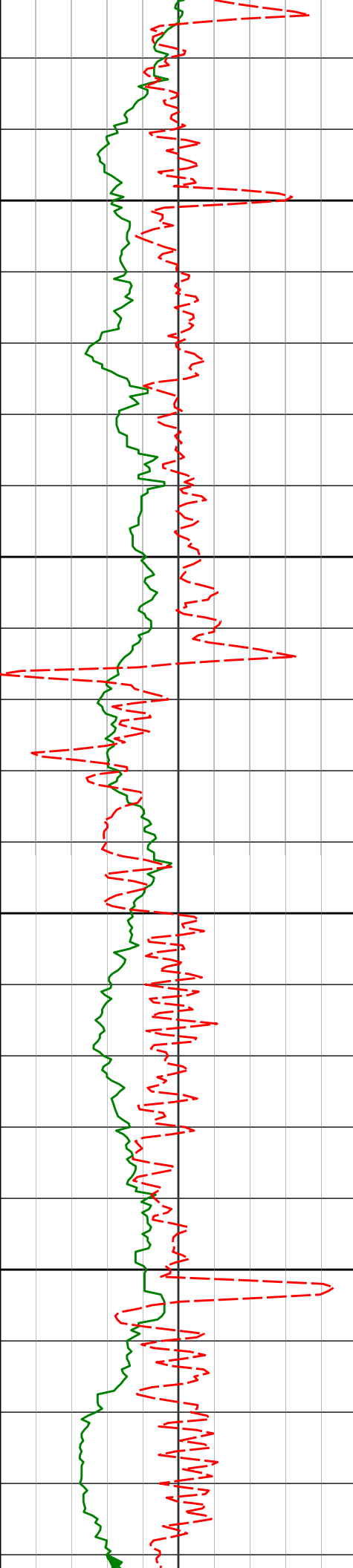
10786'

89.23°

0.68°

6990.67'

3437.39'



10850

10900

10950

11000

10876'

90.06°

0.58°

6991.23'

3527.39'

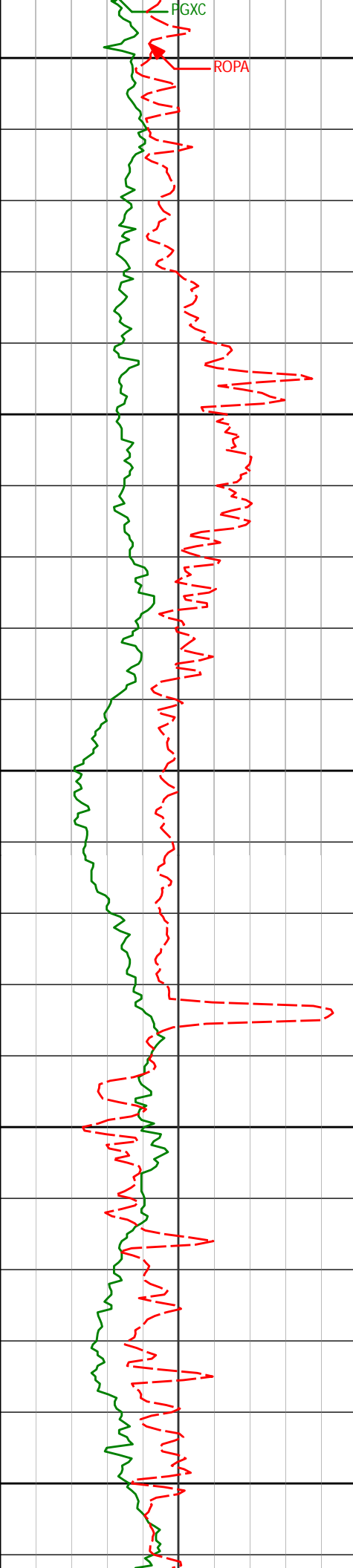
10966'

90.25°

0.64°

6990.99'

3617.38'



11050

11056'

90.15°

359.93°

6990.67'

3707.38'

11100

11150

11146'

90.95°

0.27°

6989.81'

3797.37'

11200

11250

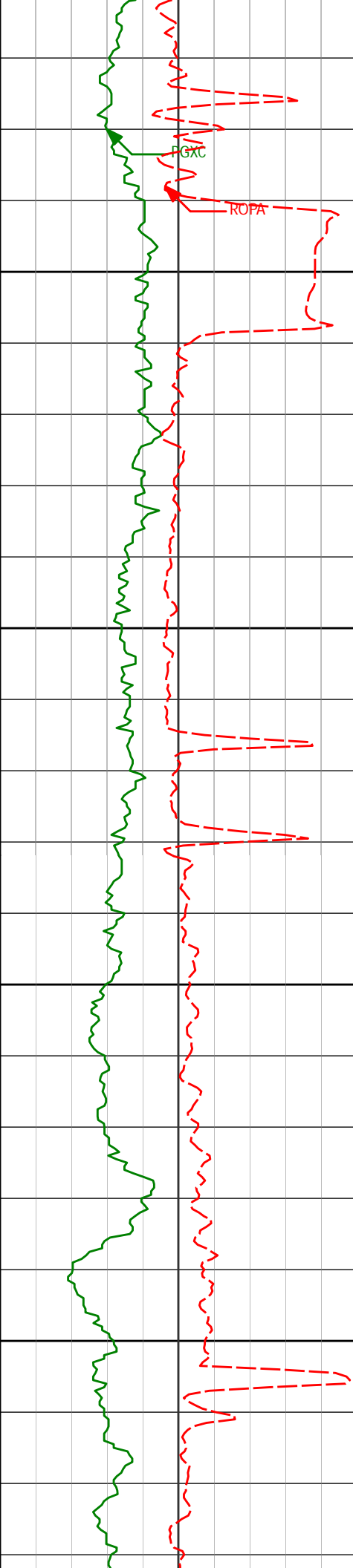
11236'

91.17°

359.94°

6988.14'

3887.36'



11300

11350

11400

11450

11326'

90.09°

358.51°

6987.15'

3977.34'

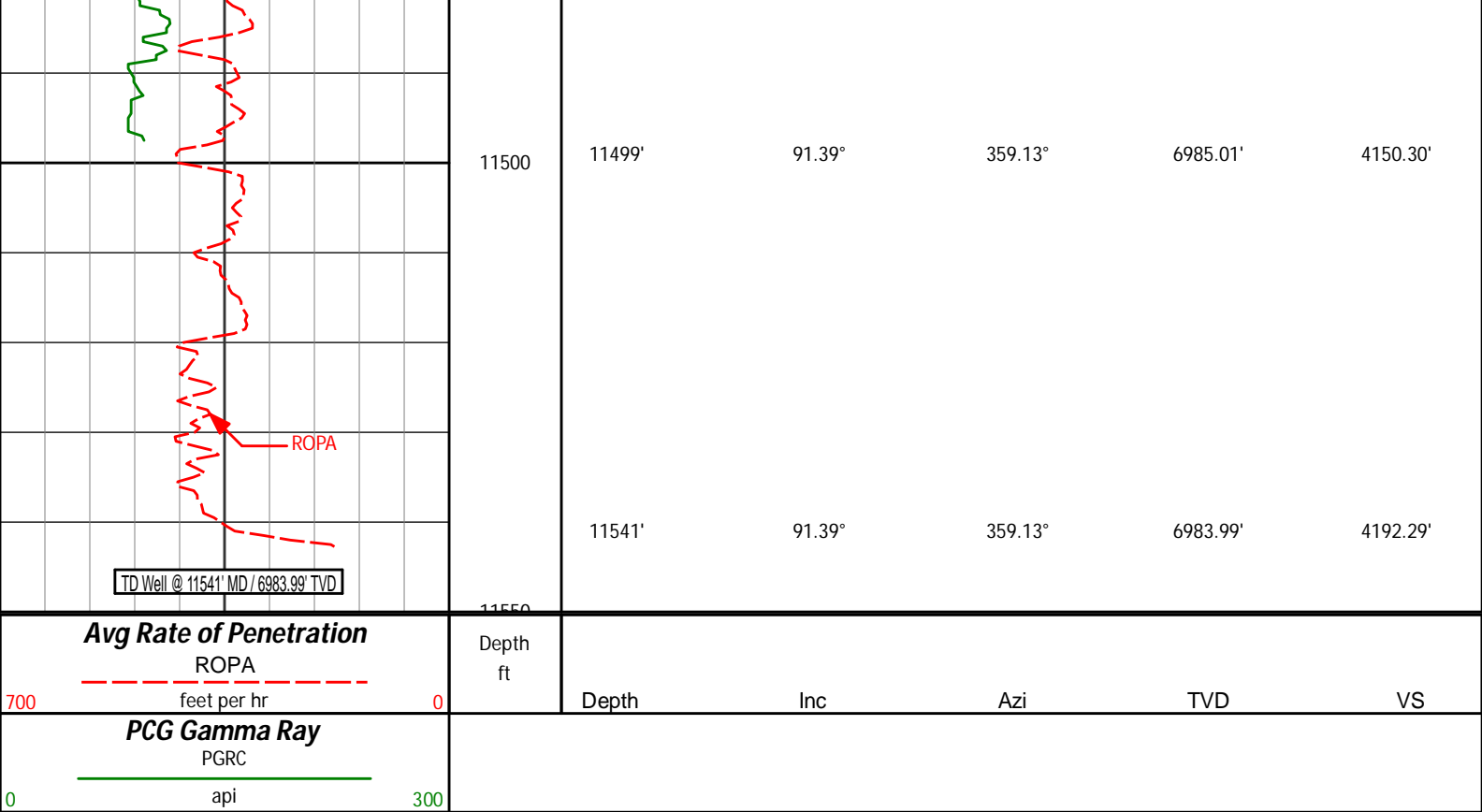
11416'

90.71°

359.51°

6986.53'

4067.32'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
Greenleaf 30N-2HZ
Wattenberg
Weld Colorado
USA
CA-XX-0901929404

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1279.00	0.40	8.50	1278.88	1.00 N	3.76 W	1.00	TIE-IN
1372.00	1.00	15.41	1371.87	2.10 N	3.50 W	2.10	0.65
1466.00	1.78	312.07	1465.85	3.87 N	4.36 W	3.87	1.71
1559.00	3.50	290.05	1558.75	5.81 N	8.10 W	5.81	2.11
1653.00	5.59	275.24	1652.45	7.22 N	15.36 W	7.22	2.53
1746.00	6.88	264.73	1744.90	7.12 N	25.42 W	7.12	1.85
1840.00	8.11	252.83	1838.10	4.64 N	37.36 W	4.64	2.10
1933.00	9.79	251.18	1929.97	0.16 N	51.11 W	0.16	1.83
2027.00	11.29	249.39	2022.38	5.66 S	67.29 W	-5.66	1.63
2120.00	13.82	254.71	2113.15	11.80 S	86.53 W	-11.80	2.99
2214.00	15.71	253.97	2204.04	18.27 S	109.59 W	-18.27	2.02
2308.00	17.93	252.85	2294.02	26.05 S	135.65 W	-26.05	2.39
2401.00	20.31	252.68	2381.88	35.08 S	164.74 W	-35.08	2.56
2491.00	19.38	251.44	2466.53	44.48 S	193.81 W	-44.48	1.13
2581.00	20.06	253.73	2551.26	53.56 S	222.78 W	-53.56	1.14
2671.00	19.03	253.48	2636.07	62.06 S	251.67 W	-62.06	1.15
2761.00	21.28	251.27	2720.55	71.48 S	281.21 W	-71.48	2.64
2851.00	20.96	251.31	2804.51	81.88 S	311.92 W	-81.88	0.36
2941.00	20.57	250.59	2888.66	92.29 S	342.08 W	-92.29	0.52
3031.00	19.78	251.11	2973.14	102.48 S	371.40 W	-102.48	0.90
3121.00	18.62	251.07	3058.13	112.07 S	399.40 W	-112.07	1.29
3211.00	19.48	252.79	3143.20	121.17 S	427.33 W	-121.17	1.14
3301.00	21.60	252.53	3227.48	130.58 S	457.47 W	-130.58	2.36
3391.00	19.76	252.62	3311.67	140.10 S	487.79 W	-140.10	2.04
3481.00	21.09	254.03	3396.01	149.10 S	517.88 W	-149.10	1.58

3571.00	19.11	252.90	3480.53	157.89 S	547.53 W	-157.89	2.24
3661.00	20.27	253.10	3565.27	166.76 S	576.53 W	-166.76	1.29
3751.00	18.73	252.94	3650.10	175.53 S	605.26 W	-175.53	1.71
3841.00	20.25	252.97	3734.94	184.33 S	633.97 W	-184.33	1.69
3931.00	20.23	255.79	3819.39	192.71 S	663.95 W	-192.71	1.08
4021.00	19.05	256.87	3904.15	199.87 S	693.34 W	-199.87	1.37
4111.00	20.28	255.13	3988.90	207.21 S	722.72 W	-207.21	1.51
4201.00	21.51	252.19	4072.98	216.26 S	753.50 W	-216.26	1.80
4291.00	20.89	252.70	4156.89	226.07 S	784.53 W	-226.07	0.72
4381.00	20.41	251.77	4241.11	235.76 S	814.76 W	-235.76	0.65
4471.00	19.78	251.07	4325.63	245.61 S	844.07 W	-245.61	0.75
4561.00	18.93	250.90	4410.54	255.32 S	872.27 W	-255.32	0.95
4651.00	21.04	252.84	4495.12	264.87 S	901.51 W	-264.87	2.46
4741.00	20.33	252.40	4579.31	274.36 S	931.85 W	-274.36	0.81
4831.00	19.99	252.61	4663.80	283.69 S	961.43 W	-283.69	0.39
4921.00	18.22	251.78	4748.84	292.68 S	989.48 W	-292.68	1.99
5011.00	18.61	255.14	4834.23	300.77 S	1016.72 W	-300.77	1.26
5101.00	19.12	260.94	4919.41	306.77 S	1045.16 W	-306.77	2.16
5191.00	19.23	260.44	5004.41	311.55 S	1074.33 W	-311.55	0.22
5371.00	21.18	257.63	5173.33	323.44 S	1135.33 W	-323.44	1.21
5461.00	20.01	252.44	5257.59	331.57 S	1165.90 W	-331.57	2.41
5551.00	18.72	251.73	5342.49	340.75 S	1194.29 W	-340.75	1.46
5641.00	16.18	251.55	5428.34	349.25 S	1219.91 W	-349.25	2.82
5730.00	16.28	250.03	5513.80	357.43 S	1243.39 W	-357.43	0.49
5820.00	14.53	250.64	5600.56	365.48 S	1265.90 W	-365.48	1.95
5910.00	12.55	250.89	5688.06	372.43 S	1285.80 W	-372.43	2.20
6000.00	10.76	250.49	5776.20	378.43 S	1302.96 W	-378.43	1.99
6090.00	9.45	251.36	5864.80	383.60 S	1317.88 W	-383.60	1.47
6180.00	7.78	251.13	5953.78	387.93 S	1330.64 W	-387.93	1.86
6270.00	6.40	244.70	6043.09	392.05 S	1340.94 W	-392.05	1.77
6360.00	4.50	248.35	6132.68	395.49 S	1348.76 W	-395.49	2.14
6450.00	2.23	253.31	6222.52	397.30 S	1353.72 W	-397.30	2.54
6540.00	0.42	291.86	6312.49	397.68 S	1355.70 W	-397.68	2.13
6631.00	0.86	316.46	6403.49	397.06 S	1356.48 W	-397.06	0.56
6721.00	12.97	9.05	6492.69	386.56 S	1355.35 W	-386.56	13.85
6811.00	25.99	10.70	6577.35	357.08 S	1350.08 W	-357.08	14.48
6901.00	28.20	9.83	6657.47	316.74 S	1342.79 W	-316.74	2.49
6991.00	37.75	8.70	6732.89	268.44 S	1334.97 W	-268.44	10.63
7081.00	43.24	1.18	6801.34	210.31 S	1330.16 W	-210.31	8.16
7171.00	50.76	358.72	6862.68	144.55 S	1330.31 W	-144.55	8.59
7261.00	56.81	0.45	6915.83	71.97 S	1330.79 W	-71.97	6.90
7351.00	69.87	0.18	6956.13	8.28 N	1330.36 W	8.28	14.51
7441.00	74.79	1.70	6983.44	93.99 N	1328.94 W	93.99	5.70
7530.00	88.77	0.06	6996.13	181.85 N	1327.61 W	181.85	15.81
7636.00	91.26	0.77	6996.11	287.84 N	1326.85 W	287.84	2.44
7726.00	90.46	0.97	6994.76	377.82 N	1325.48 W	377.82	0.92
7816.00	90.80	0.89	6993.77	467.80 N	1324.02 W	467.80	0.39
7906.00	89.88	0.04	6993.23	557.79 N	1323.29 W	557.79	1.39
7996.00	89.14	359.40	6994.00	647.79 N	1323.73 W	647.79	1.09
8086.00	89.78	359.29	6994.85	737.78 N	1324.76 W	737.78	0.72
8176.00	89.69	358.69	6995.27	827.76 N	1326.34 W	827.76	0.67
8266.00	90.18	358.56	6995.37	917.73 N	1328.50 W	917.73	0.56
8356.00	89.41	359.57	6995.69	1007.72 N	1329.97 W	1007.72	1.41
8446.00	89.60	358.96	6996.47	1097.71 N	1331.13 W	1097.71	0.71
8536.00	89.88	358.76	6996.88	1187.69 N	1332.92 W	1187.69	0.38
8626.00	90.46	357.94	6996.61	1277.65 N	1335.51 W	1277.65	1.12
8716.00	89.69	359.61	6996.49	1367.63 N	1337.43 W	1367.63	2.04
8806.00	89.91	359.28	6996.81	1457.62 N	1338.30 W	1457.62	0.44
8896.00	89.26	0.55	6997.46	1547.62 N	1338.44 W	1547.62	1.59
9076.00	90.15	0.36	6998.38	1727.61 N	1337.01 W	1727.61	0.51
9166.00	91.05	0.12	6997.44	1817.60 N	1336.63 W	1817.60	1.03
9256.00	90.18	0.02	6996.48	1907.59 N	1336.52 W	1907.59	0.97
9346.00	90.59	359.98	6995.87	1997.59 N	1336.52 W	1997.59	0.46
9436.00	91.26	359.56	6994.42	2087.58 N	1336.88 W	2087.58	0.88
9525.00	89.75	359.62	6993.63	2176.57 N	1337.52 W	2176.57	1.70
9615.00	90.49	359.12	6993.45	2266.56 N	1338.51 W	2266.56	0.99
9705.00	90.22	359.51	6992.89	2356.56 N	1339.59 W	2356.56	0.53
9885.00	90.15	359.55	6992.31	2536.55 N	1341.06 W	2536.55	0.04
9975.00	90.62	358.86	6991.70	2626.54 N	1342.31 W	2626.54	0.93
10065.00	89.66	0.26	6991.48	2716.53 N	1343.00 W	2716.53	1.89
10155.00	88.95	359.47	6992.57	2806.52 N	1343.21 W	2806.52	1.18
10245.00	89.72	359.75	6993.62	2896.51 N	1343.83 W	2896.51	0.91
10335.00	88.49	358.80	6995.02	2986.49 N	1344.96 W	2986.49	1.73
10426.00	89.82	359.49	6996.37	3077.47 N	1346.32 W	3077.47	1.65
10516.00	91.26	0.22	6995.52	3167.46 N	1346.55 W	3167.46	1.79

10606.00	91.85	0.15	6993.08	3257.43 N	1346.26 W	3257.43	0.66
10696.00	90.99	359.54	6990.85	3347.40 N	1346.50 W	3347.40	1.17
10786.00	89.23	0.68	6990.67	3437.39 N	1346.33 W	3437.39	2.33
10876.00	90.06	0.58	6991.23	3527.39 N	1345.34 W	3527.39	0.93
10966.00	90.25	0.64	6990.99	3617.38 N	1344.38 W	3617.38	0.22
11056.00	90.15	359.93	6990.67	3707.38 N	1343.94 W	3707.38	0.80
11146.00	90.95	0.27	6989.81	3797.37 N	1343.78 W	3797.37	0.97
11236.00	91.17	359.94	6988.14	3887.36 N	1343.61 W	3887.36	0.44
11326.00	90.09	358.51	6987.15	3977.34 N	1344.83 W	3977.34	1.99
11416.00	90.71	359.51	6986.53	4067.32 N	1346.39 W	4067.32	1.31
11499.00	91.39	359.13	6985.01	4150.30 N	1347.37 W	4150.30	0.94
11541.00	91.39	359.13	6983.99	4192.29 N	1348.01 W	4192.29	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 0.00 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.40 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11541.00 FEET
IS 4403.68 FEET ALONG 342.18 DEGREES (TRUE)**

Directional surveys tied onto Gyro's @ 1279' MD. Final Survey is a straight-line projection to the bit.