

PCGK - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	20-Jan-15	24-Jan-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	1,295.00	7,580.00			
Log End Depth (MD, ft)	7,580.00	12,533.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	18-Jan-15 12:34	22-Jan-15 03:35			
Drill/Wipe End Date and Time	20-Jan-15 01:50	24-Jan-15 04:58			
Min Inc (deg) @ Depth (MD, ft)	0.38 @ 1,372.00	88.37 @ 8,085.00			
Max Inc (deg) @ Depth (MD, ft)	89.40 @ 7,580.00	91.82 @ 11,955.00			
Bit TFA(in2) / Bit Type	1.37 / PDC	1.37 / PDC			
Flow Rate (gpm)	573.87	291.90			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	9.80 / 47.00	9.60 / 38.00			
Filtrate CL (ppm)	3,000.00	3,000.00			
pH / Fluid Loss (mptm)	9.00 / 5	9.00 / 4			
PV (cP) / YP (lbf2)	13 / 14.00	10 / 9.00			
% Solids / % Sand	9 / 0.3	8.50 / 0.15			
% 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 (in F) / C	175.01 / 79.45	221.40 / 83.56			

Max Tool Temp (degF) / Source	175.21 / PCM	234.12 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Matt Busche	Matt Busche			
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	11619995	11227547			
Date and Time Initialized	17-Jan-15 22:32	21-Jan-15 11:39			
Date and Time Read	20-Jan-15 11:20	25-Jan-15 00:53			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	44.23	40.54			
Software Version	6.21	6.21			
Sub Serial Number	11341332	12310754			
Sonde Serial Number	11297555	11062073			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	46.55	221.65			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.18	45.49			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11341332	12310754			
Insert/Sonde Serial Number	11293276	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 is real time data.
4. Data gap here is due to a loss of depth tracking due to problems with WITS.
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):

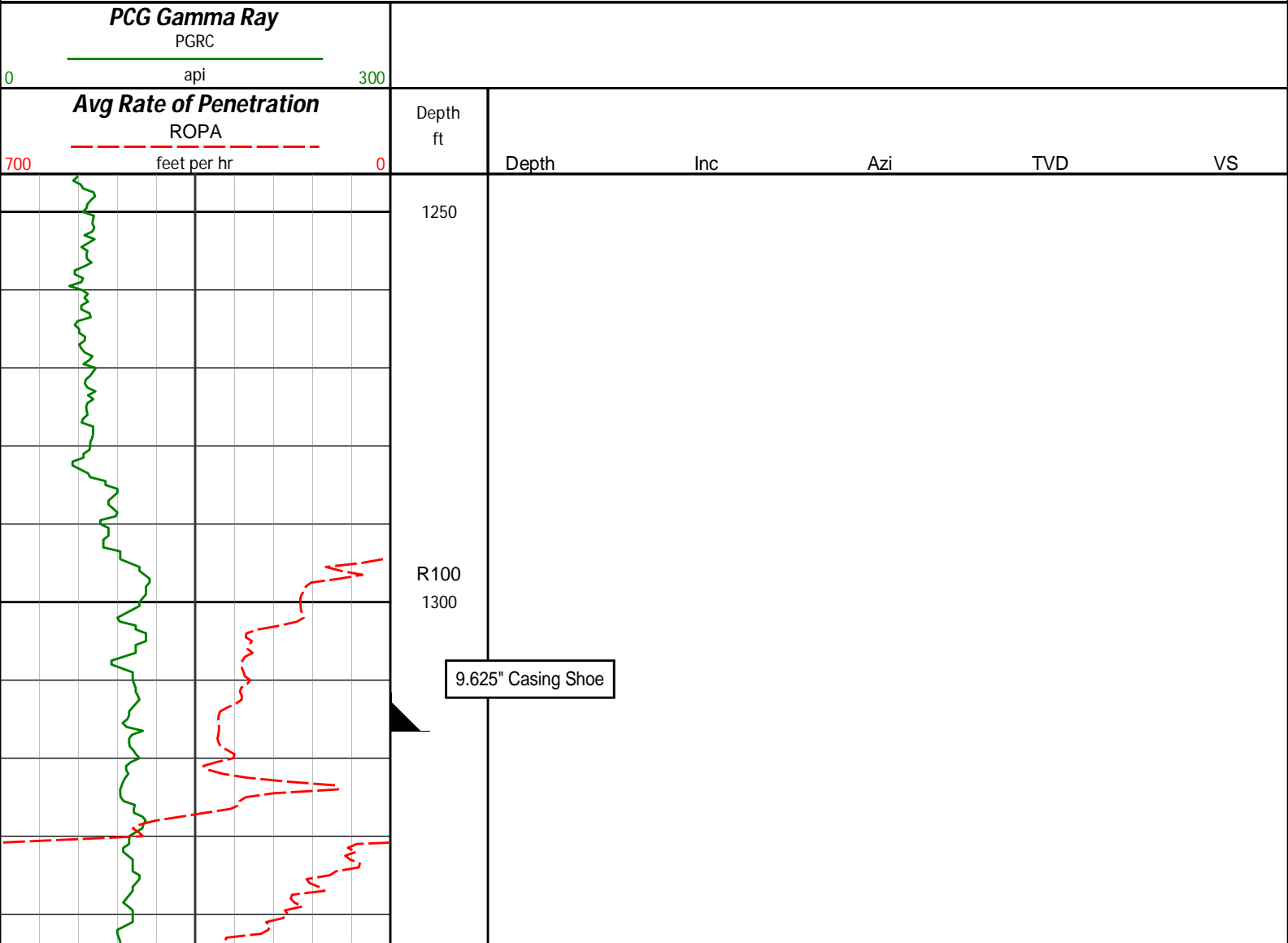
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

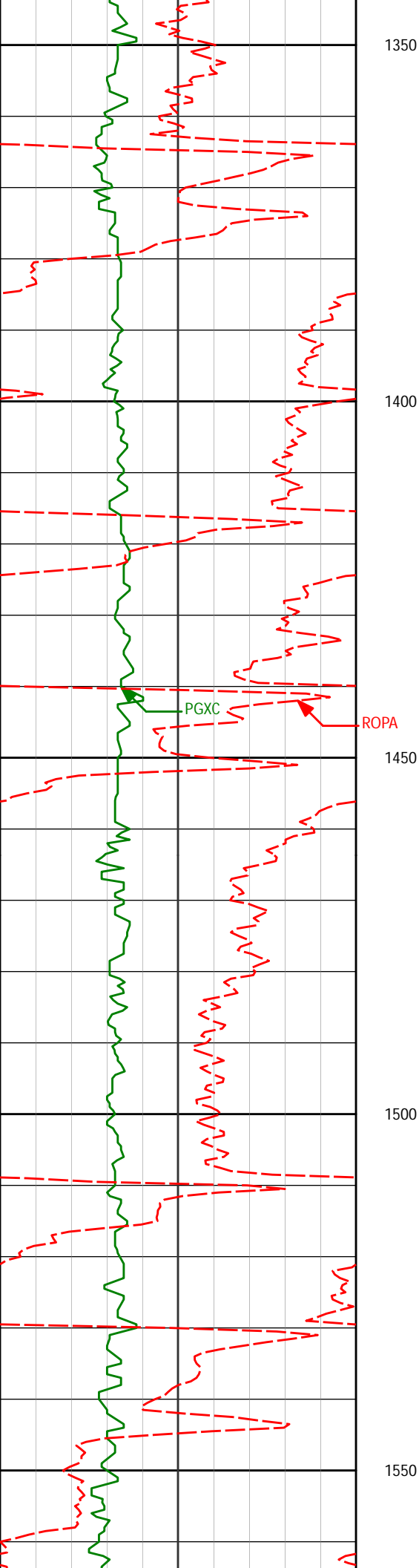
WARRANTY

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HALLIBURTON
Sperry Drilling Services

MD Detail Log 1:240





1372'

0.38°

146.00°

1371.87'

4.35'

1400

1450

1466'

1.30°

182.94°

1465.86'

3.02'

1500

1550

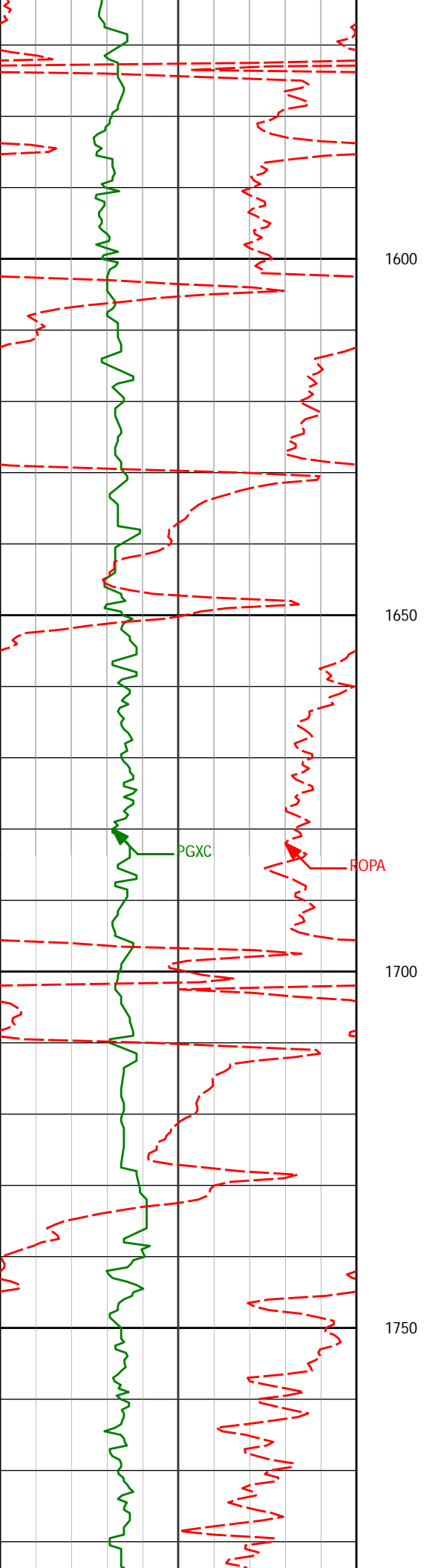
1559'

2.33°

185.28°

1558.81'

0.09'



1653'

4.60°

191.46°

1652.63'

-5.52'

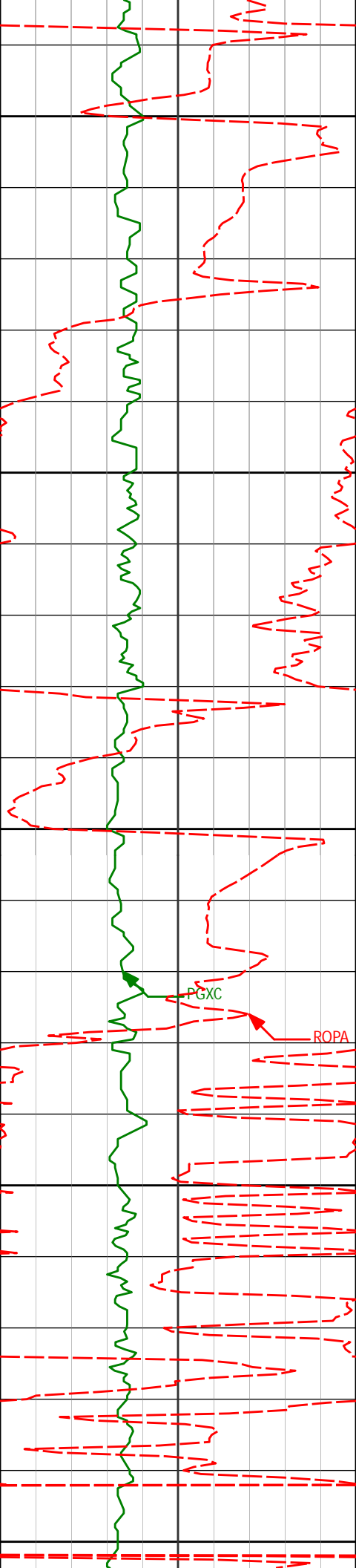
1747'

6.11°

195.53°

1746.22'

-14.04'



1800

1850

1900

1950

2000

1841'

7.36°

193.90°

1839.57'

-24.72'

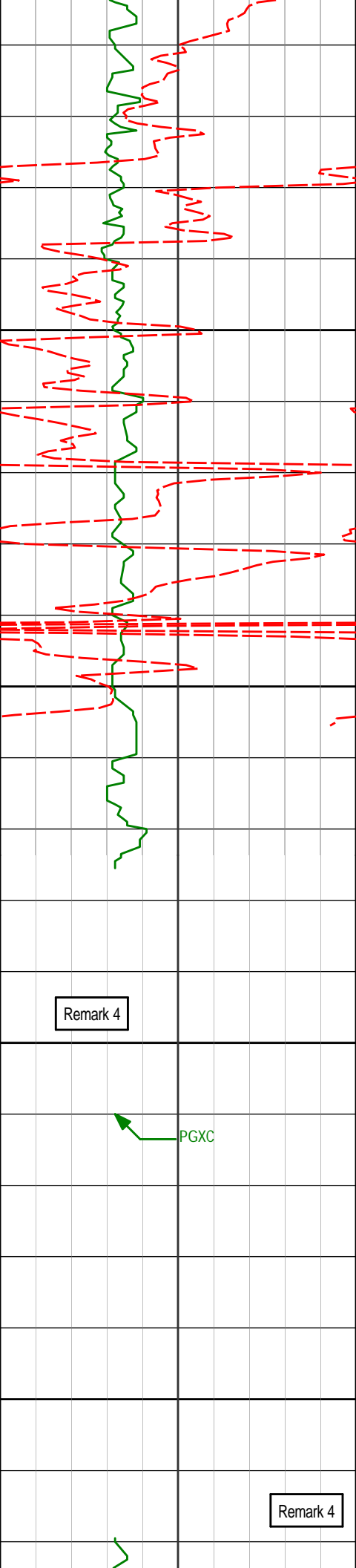
1934'

10.80°

192.47°

1931.39'

-39.03'



2028'

13.55°

191.88°

2023.27'

-58.43'

2050

2100

2121'

15.61°

188.61°

2113.27'

-81.49'

Remark 4

2150

PGXC

2200

Remark 4

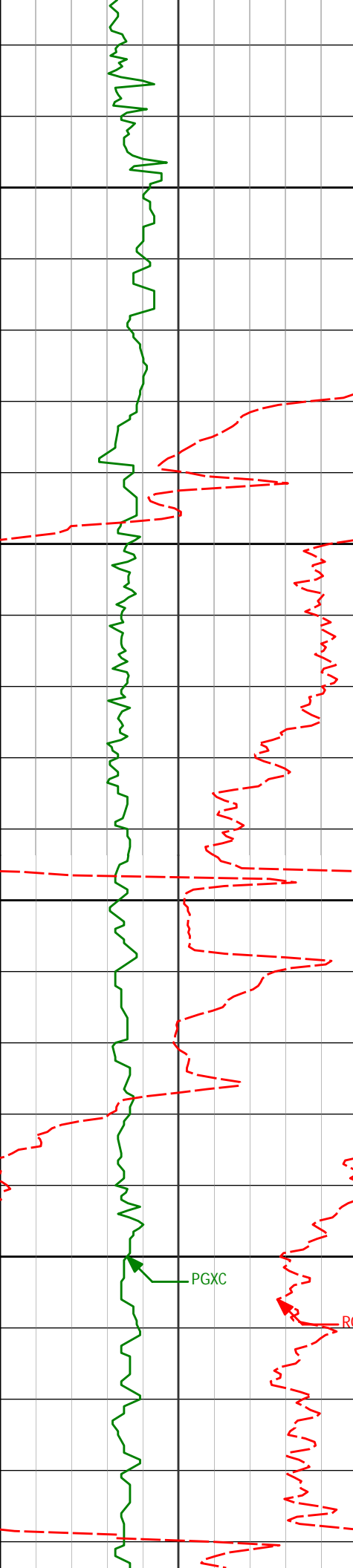
2214'

17.97°

189.30°

2202.30'

-108.04'



2250

2300

2350

2400

2307'

18.29°

187.10°

2290.68'

-136.70'

2401'

20.77°

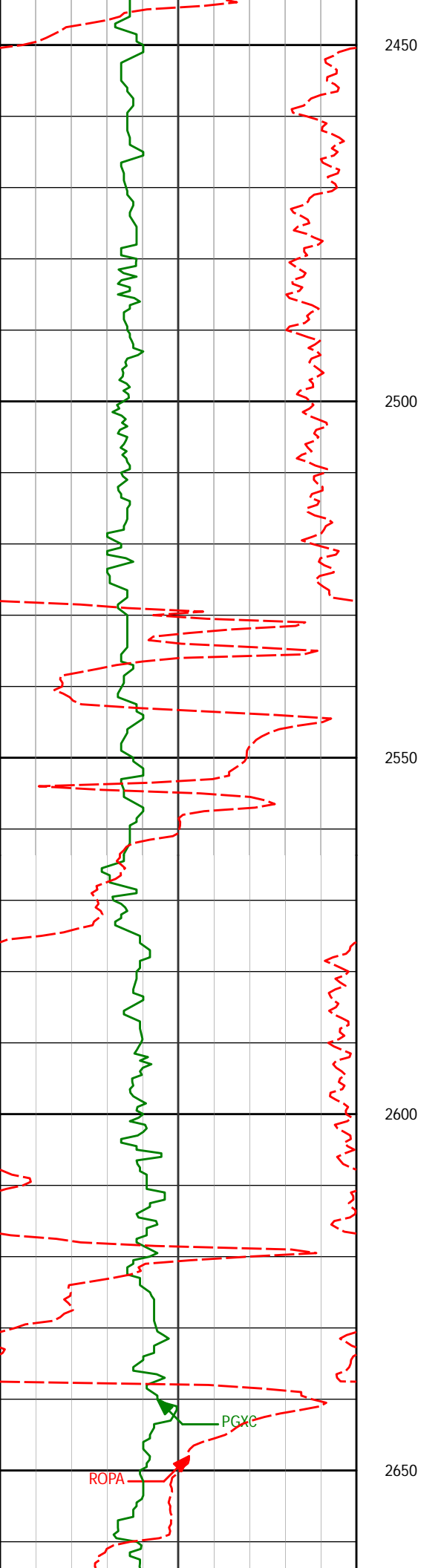
191.02°

2379.27'

-167.73'

PGXC

ROPA



2491'

19.60°

189.24°

2463.74'

-198.33'

2581'

20.55°

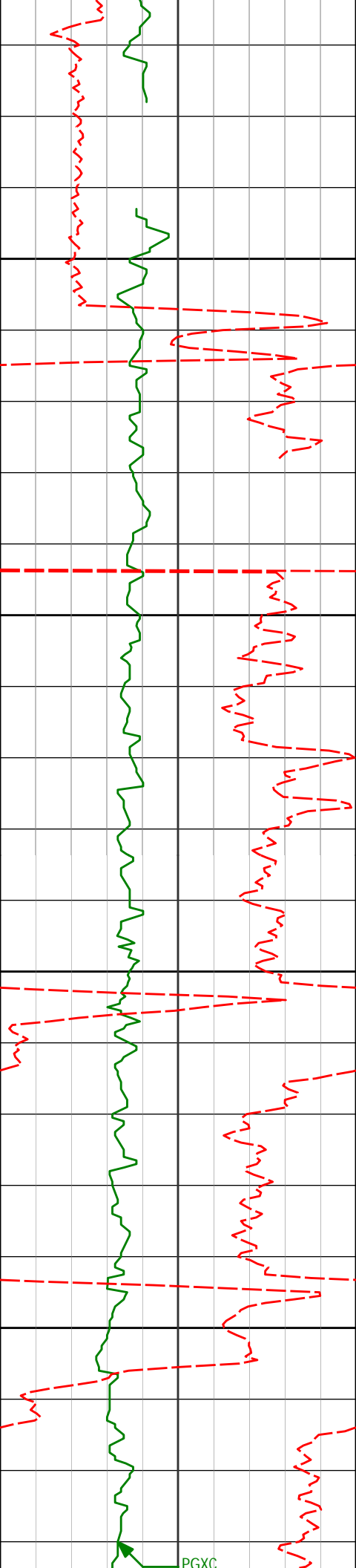
191.71°

2548.27'

-228.72'

ROPA

PGXC



2671'

20.56°

195.73°

2632.55'

-259.44'

2700

2750

2761'

19.84°

195.70°

2717.01'

-289.40'

2800

2850

2851'

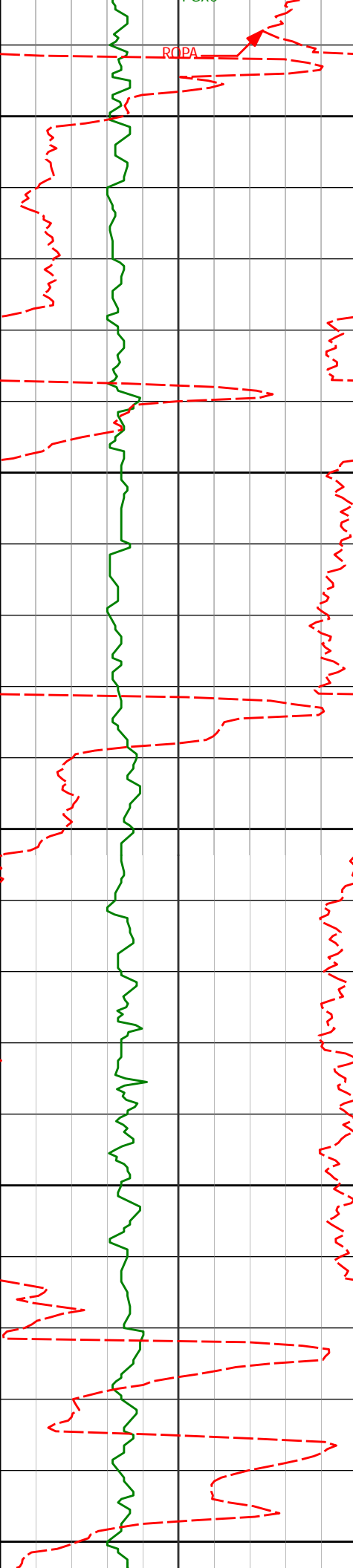
20.34°

193.68°

2801.54'

-319.34'

PGXC



2900

2941'

20.71°

192.20°

2885.82'

-350.13'

2950

3000

3031'

20.44°

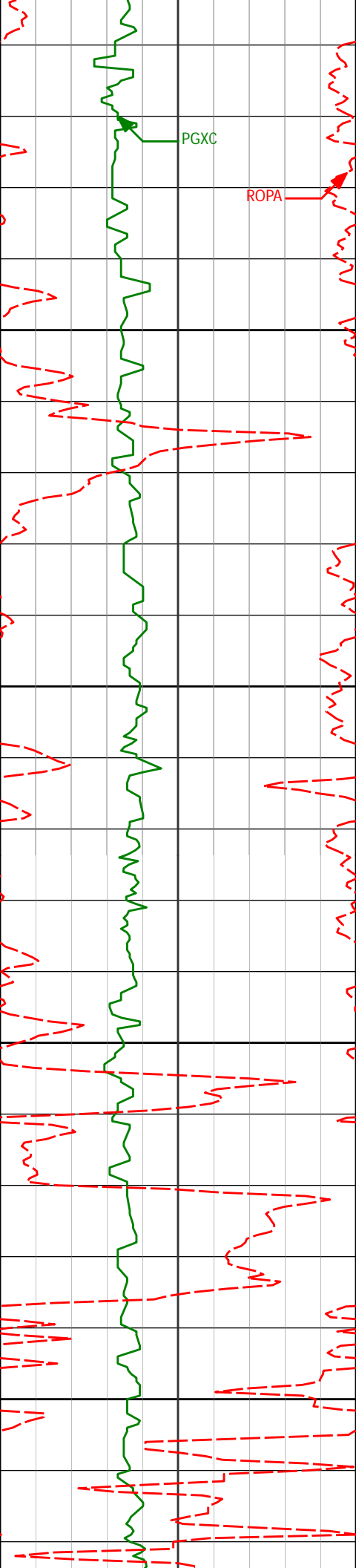
191.07°

2970.08'

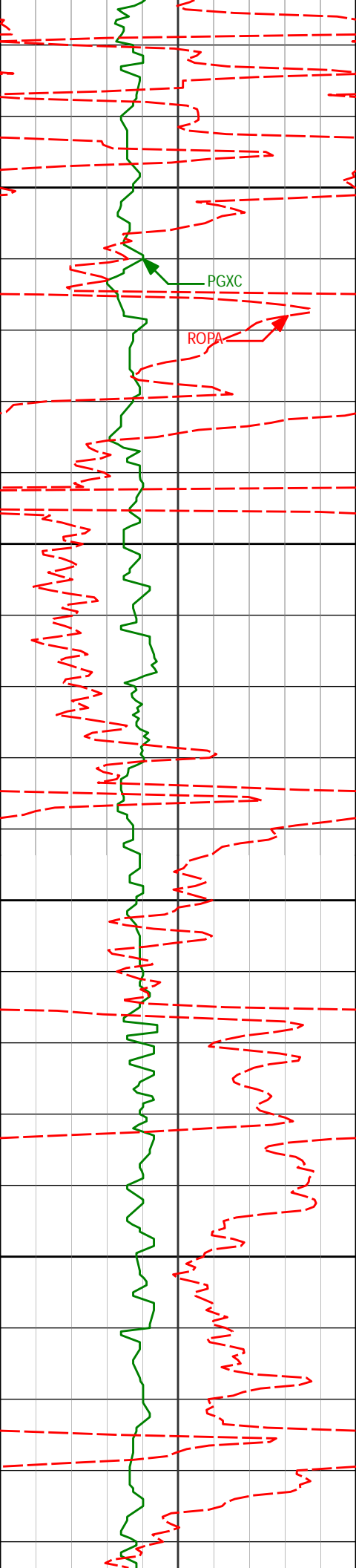
-381.14'

3050

3100



3121'	20.55°	194.88°	3054.39'	-411.87'
3150				
3200				
3211'	19.11°	193.35°	3139.05'	-441.51'
3250				
3300				
3301'	20.16°	192.62°	3223.82'	-471.01'



3350

3391'

19.91°

197.17°

3308.38'

-500.83'

3400

3450

3481'

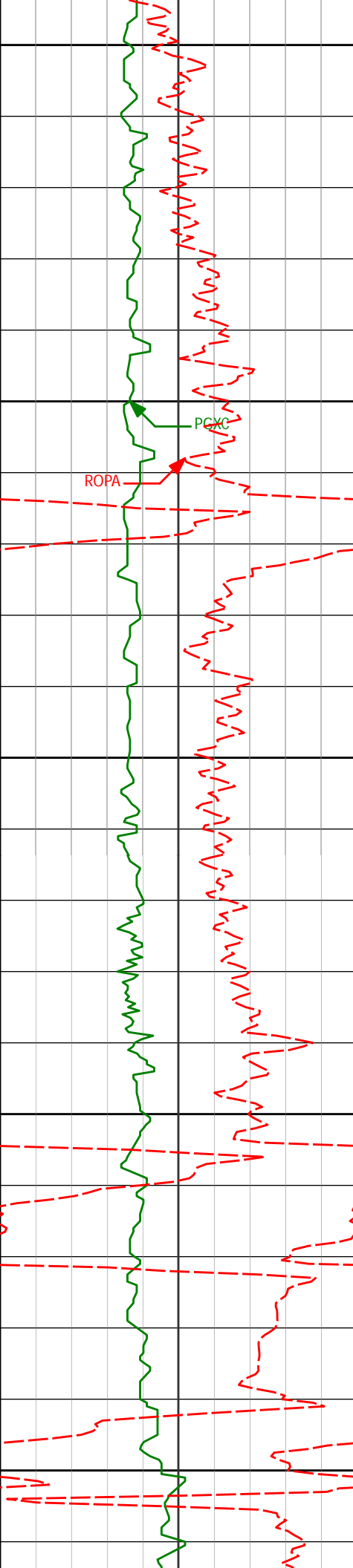
20.43°

194.43°

3392.86'

-530.73'

3500



3550

3571'

19.95°

193.02°

3477.33'

-560.94'

3600

3650

3700

3750

3661'

18.75°

190.90°

3562.25'

-590.14'

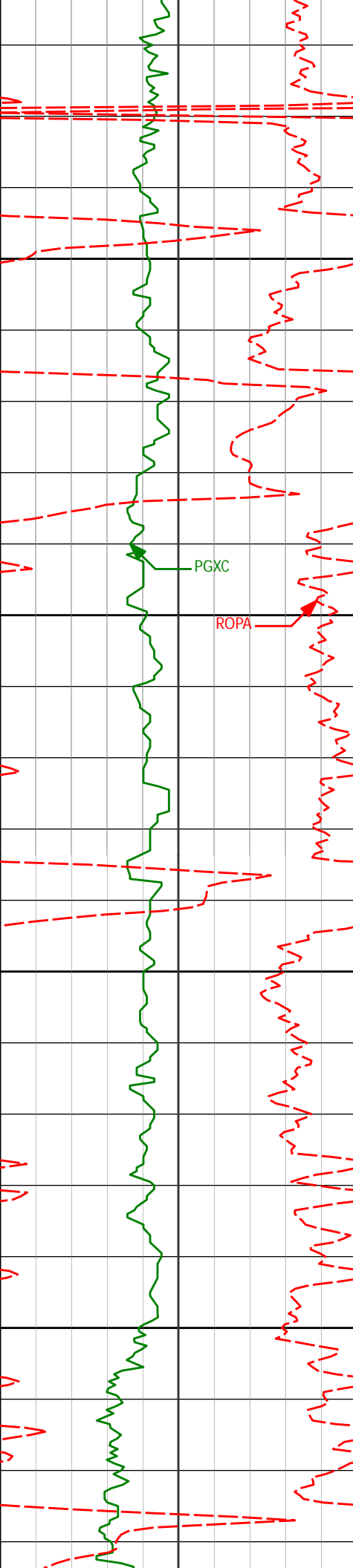
3751'

19.96°

191.19°

3647.16'

-619.44'



3800

3841'

20.44°

194.38°

3731.62'

-649.77'

3850

ROPA

3900

3931'

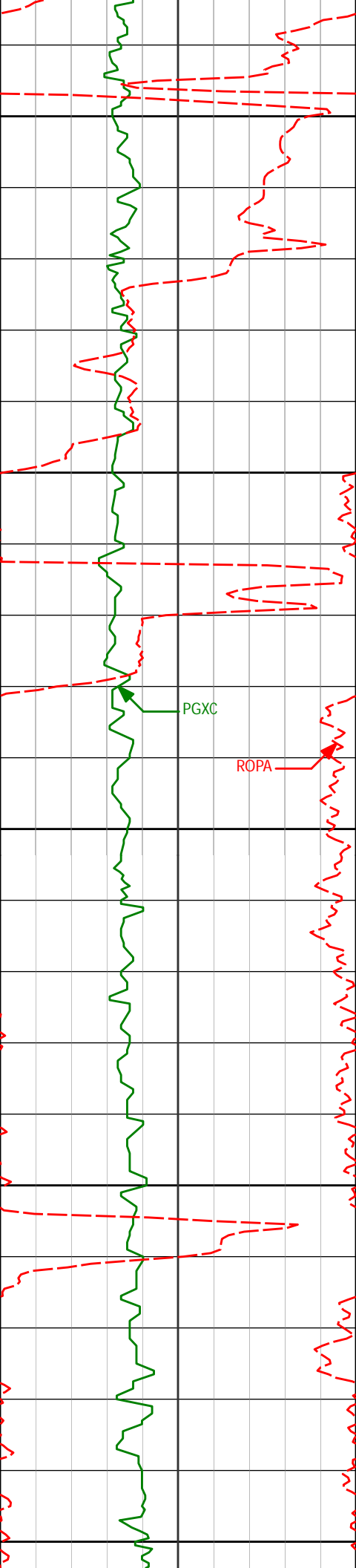
19.13°

193.81°

3816.31'

-679.35'

3950



4000

4050

4100

4150

4200

4021'

21.76°

195.27°

3900.63'

-709.81'

4111'

22.08°

195.07°

3984.13'

-742.29'

4201'

21.36°

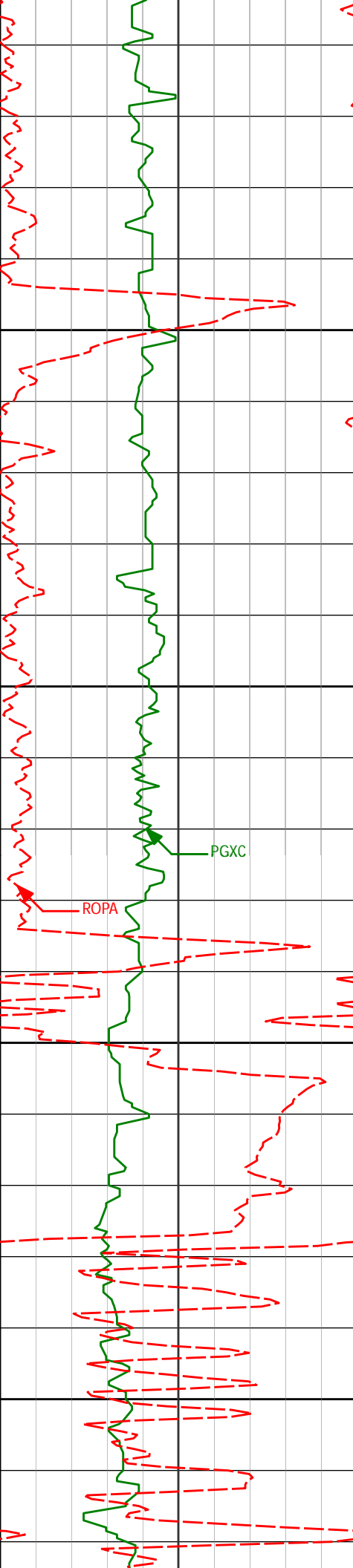
194.07°

4067.74'

-774.56'

PGXC

ROPA



4250

4300

4350

4400

4291'

19.90°

193.70°

4151.96'

-805.38'

PGXC

ROPA

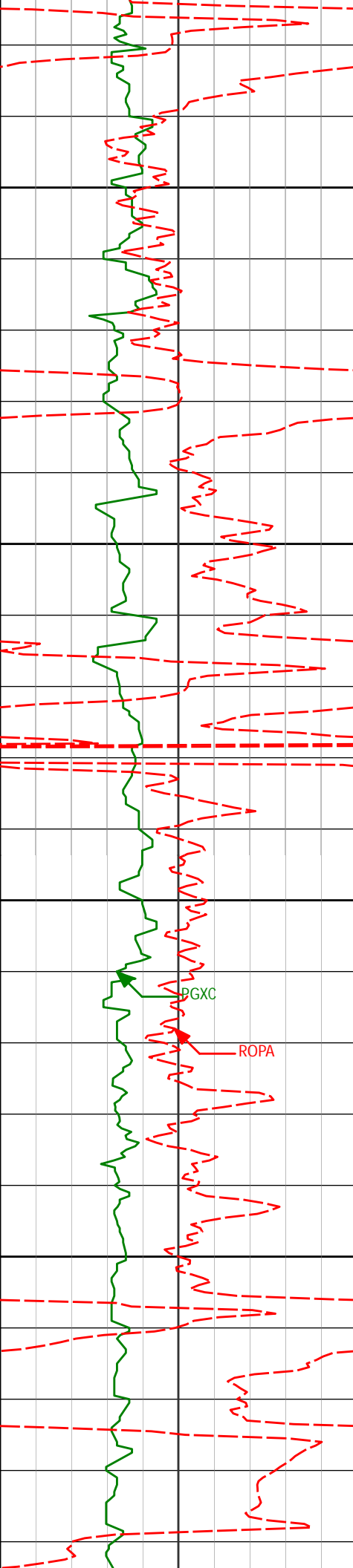
4381'

21.79°

192.62°

4236.07'

-836.61'



4450

4471'

20.94°

192.66°

4319.88'

-868.64'

4500

4550

4561'

19.82°

191.47°

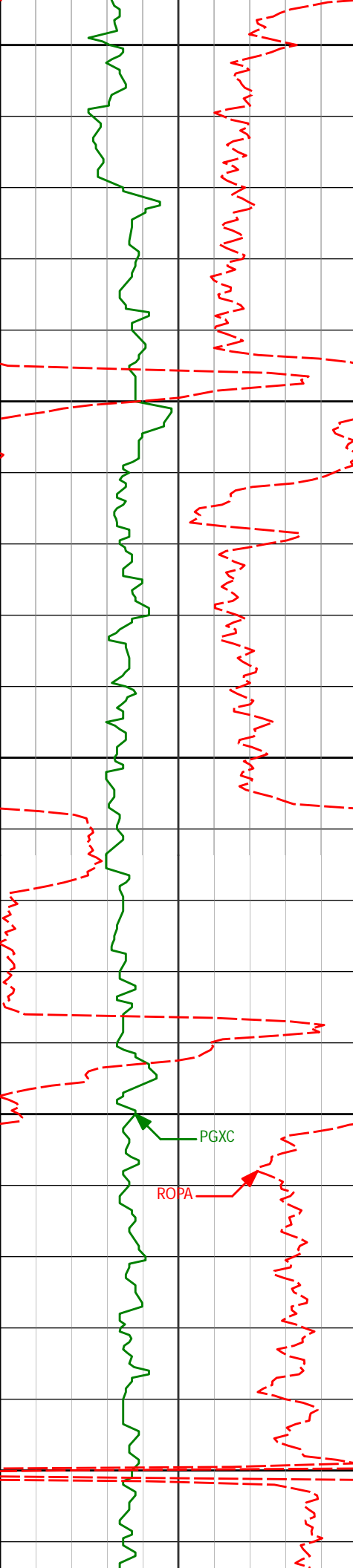
4404.25'

-899.32'

4600

BGXC

ROPA



4650

4651'

21.76°

194.83°

4488.39'

-930.44'

4700

4741'

21.58°

194.78°

4572.03'

-962.61'

4750

4800

PGXC

ROPA

4831'

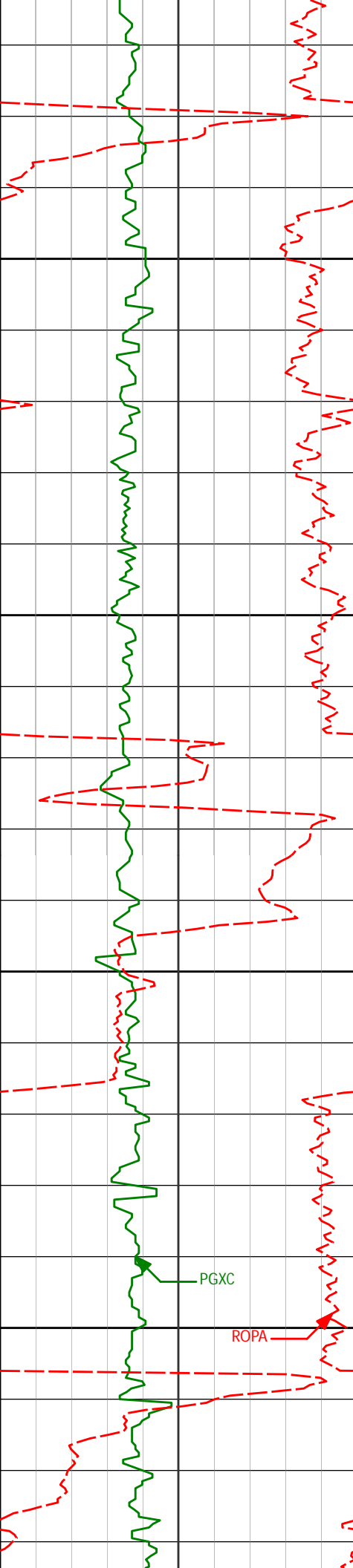
20.75°

193.83°

4655.96'

-994.14'

4850



4900

4950

5000

5050

4921'

18.93°

193.17°

4740.61'

-1023.87'

5011'

20.51°

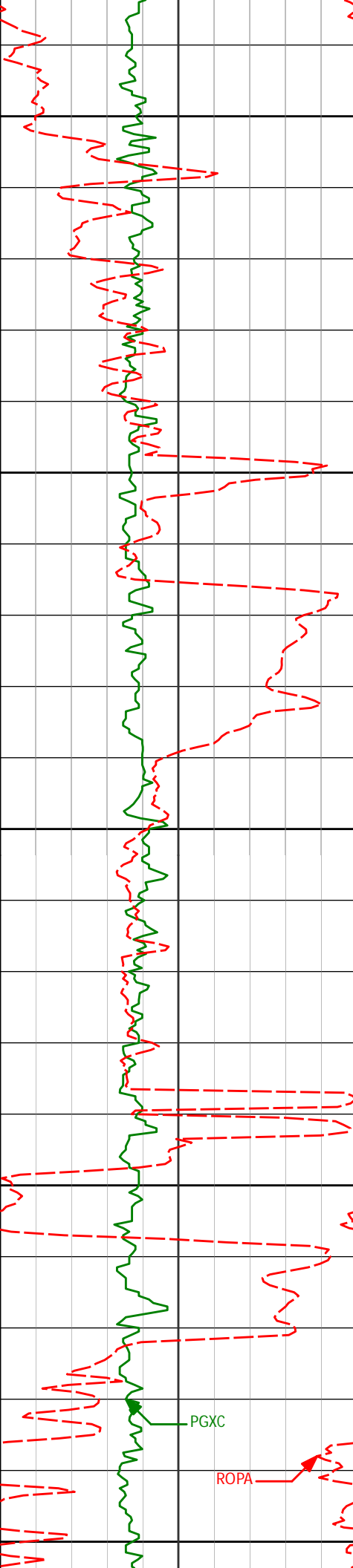
193.70°

4825.33'

-1053.45'

PGXC

ROPA



5100

5101'

18.46°

193.52°

4910.17'

-1082.66'

5150

5191'

19.78°

195.48°

4995.20'

-1111.23'

5200

5250

5281'

20.38°

194.32°

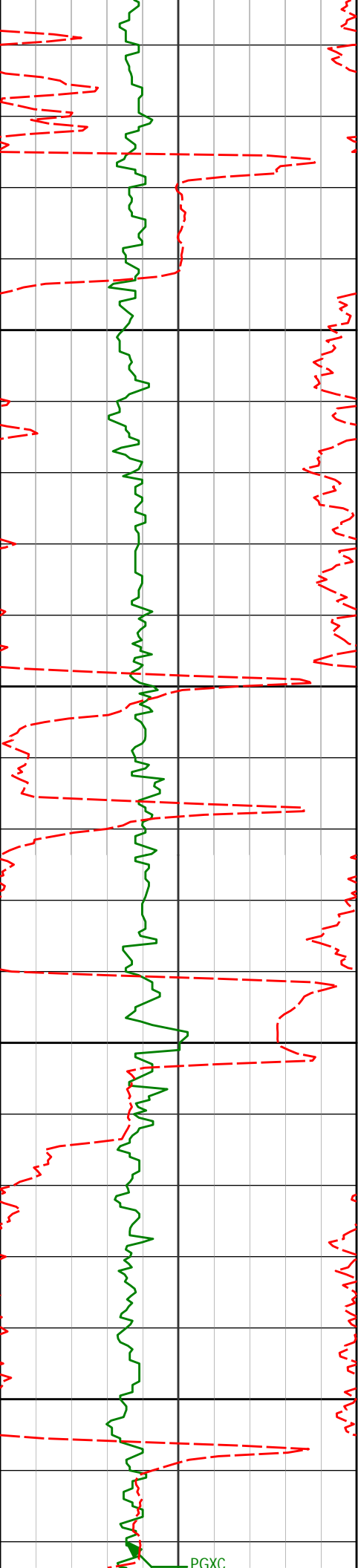
5079.73'

-1141.13'

5300

PGXC

ROPA



5350

5371'

19.69°

193.64°

5164.29'

-1171.09'

5400

5450

5461'

20.12°

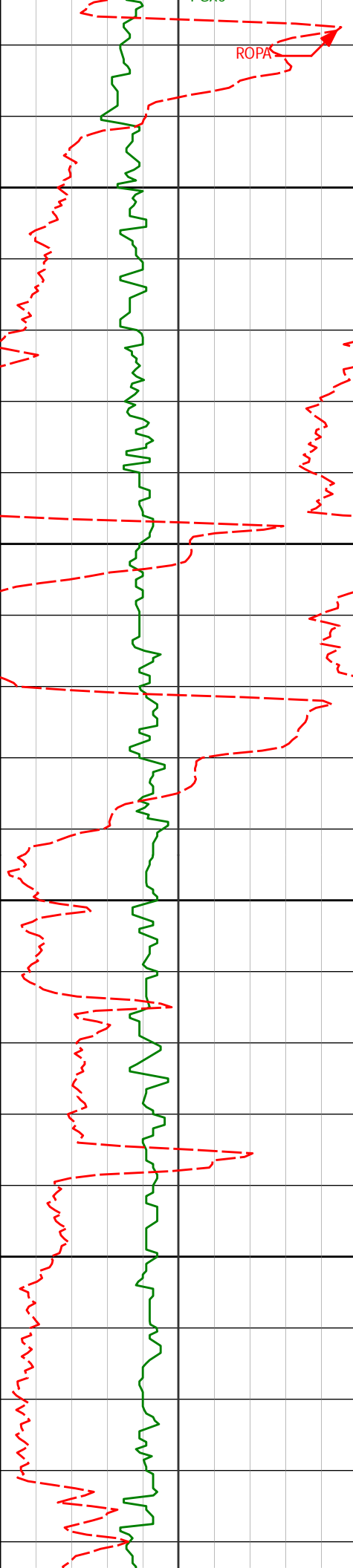
194.68°

5248.91'

-1200.83'

5500

PGXC



ROPA

5550

5550'

17.70°

196.51°

5333.10'

-1228.66'

5600

5640'

15.38°

191.60°

5419.38'

-1253.50'

5650

5700

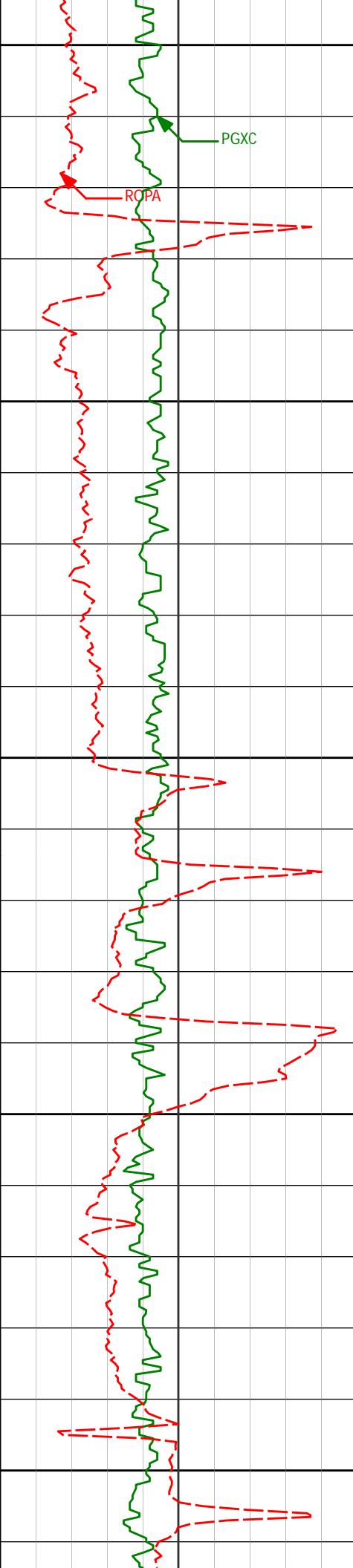
5731'

13.70°

190.80°

5507.46'

-1275.93'



5750

PGXC

ROPA

5800

5820'

11.85°

189.50°

5594.25'

-1295.32'

5850

5900

5910'

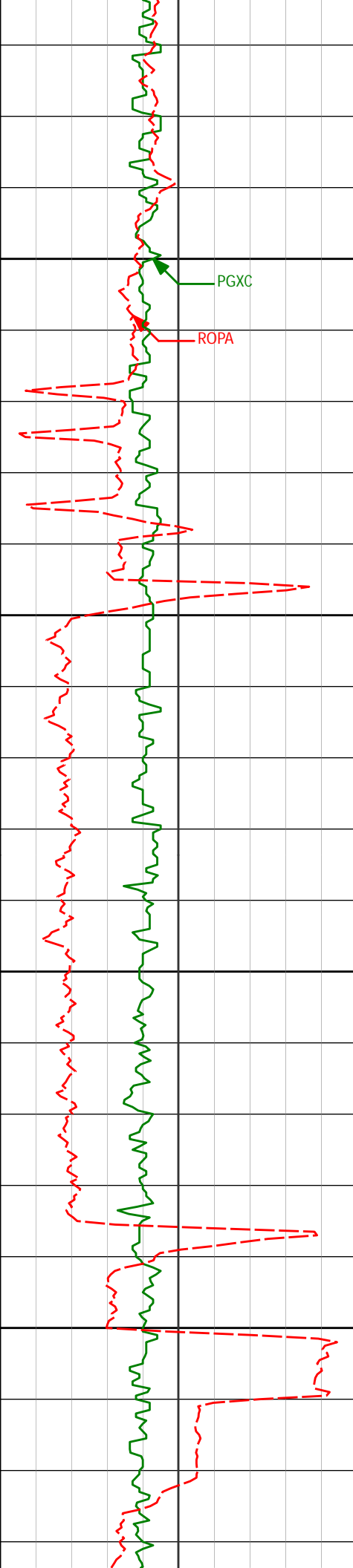
11.93°

188.19°

5682.32'

-1313.66'

5950



6000

6001'

10.43°

187.74°

5771.59'

-1331.14'

PGXC

ROPA

6050

6100

6150

6091'

9.43°

186.65°

5860.24'

-1346.55'

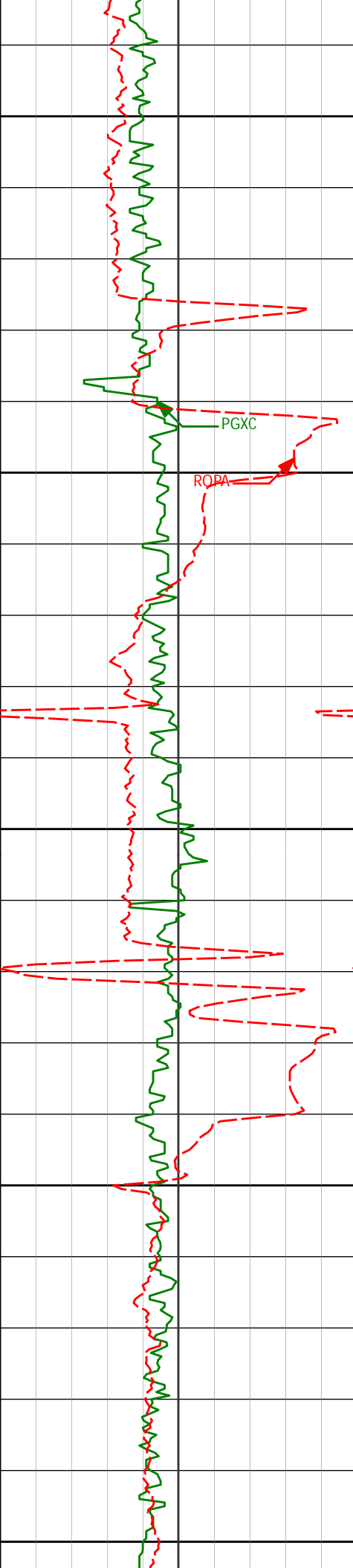
6181'

7.73°

192.34°

5949.23'

-1359.80'



6200

6250

6300

6350

6400

PGXC

RQPA

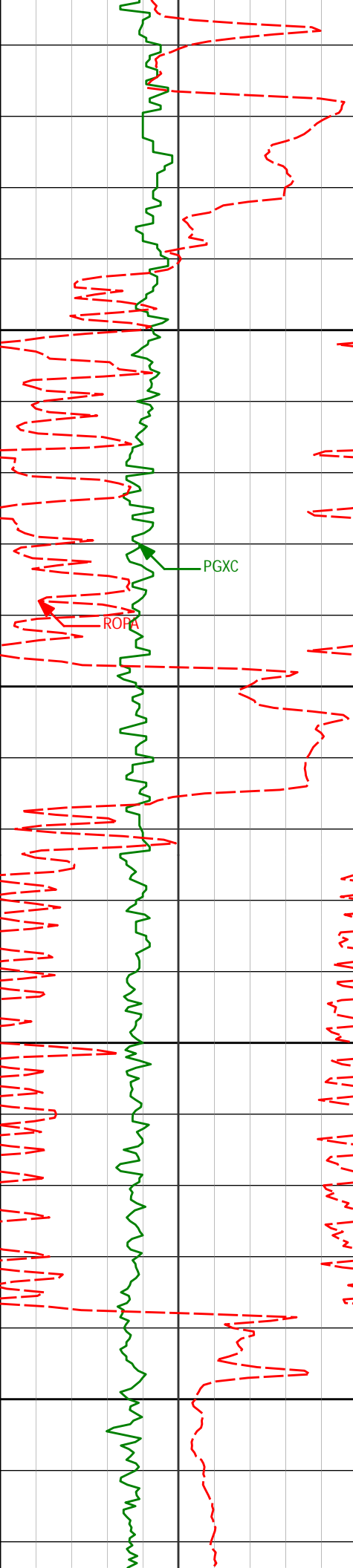
6361'

3.53°

206.41°

6128.33'

-1376.62'



6450

6451'

1.48°

236.55°

6218.24'

-1379.75'

6500

6550

6600

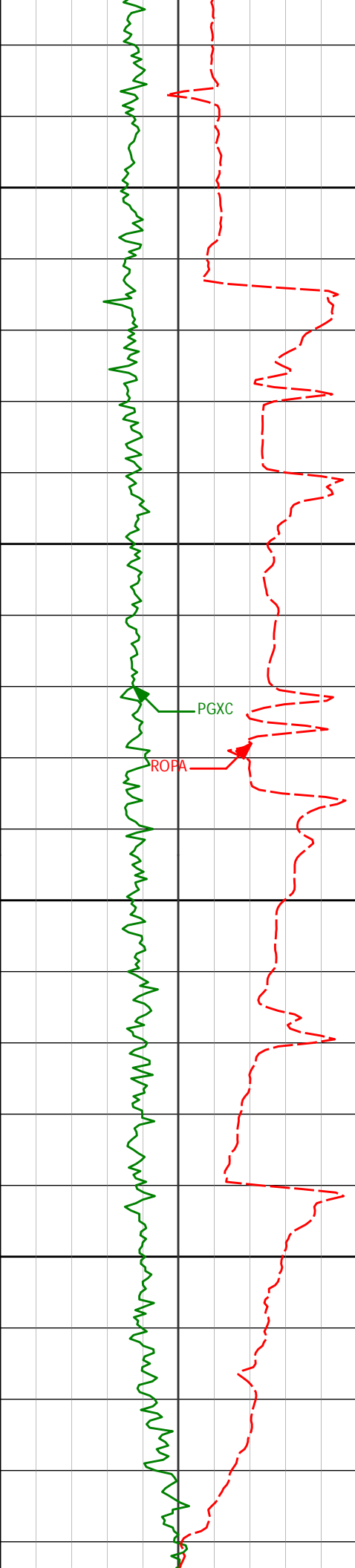
6541'

1.26°

57.03°

6308.24'

-1379.86'



6650

6700

6750

6800

6631'

1.12°

68.57°

6398.22'

-1378.99'

6676'

2.23°

23.14°

6443.20'

-1378.02'

6721'

6.23°

349.87°

6488.07'

-1374.81'

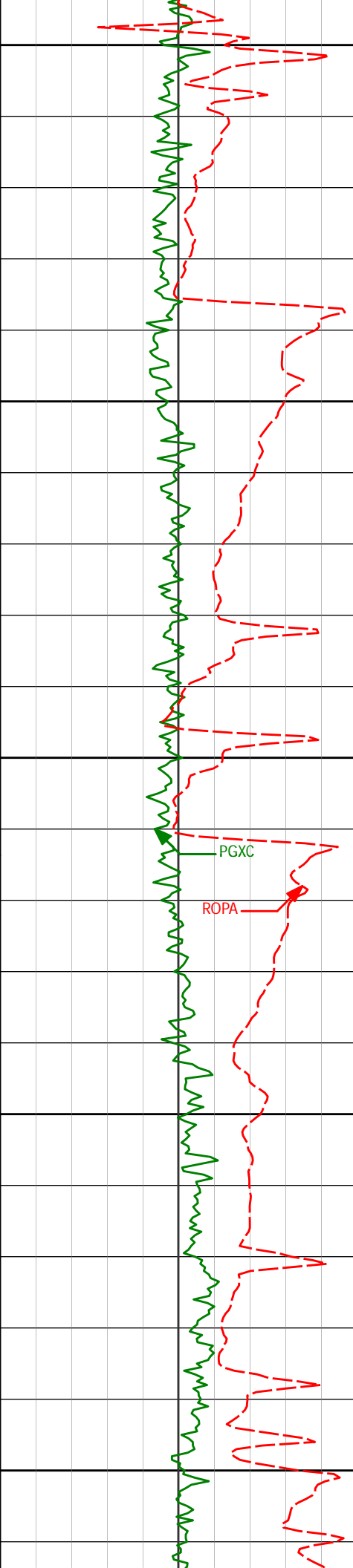
6811'

15.79°

356.29°

6576.31'

-1357.75'



6850

6900

6950

7000

7050

6901'

23.25°

358.38°

6661.08'

-1327.74'

6991'

32.59°

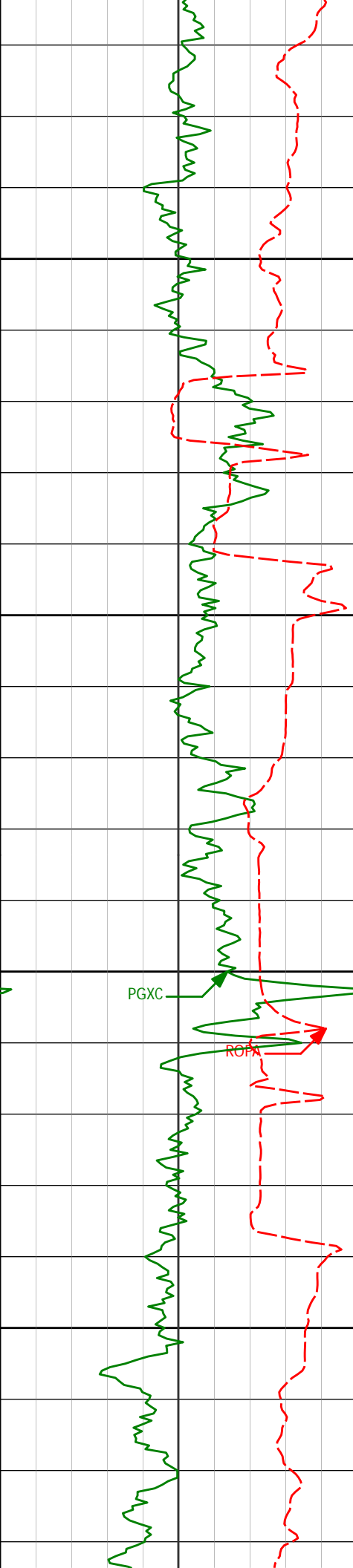
355.62°

6740.52'

-1285.73'

PGXC

ROPA



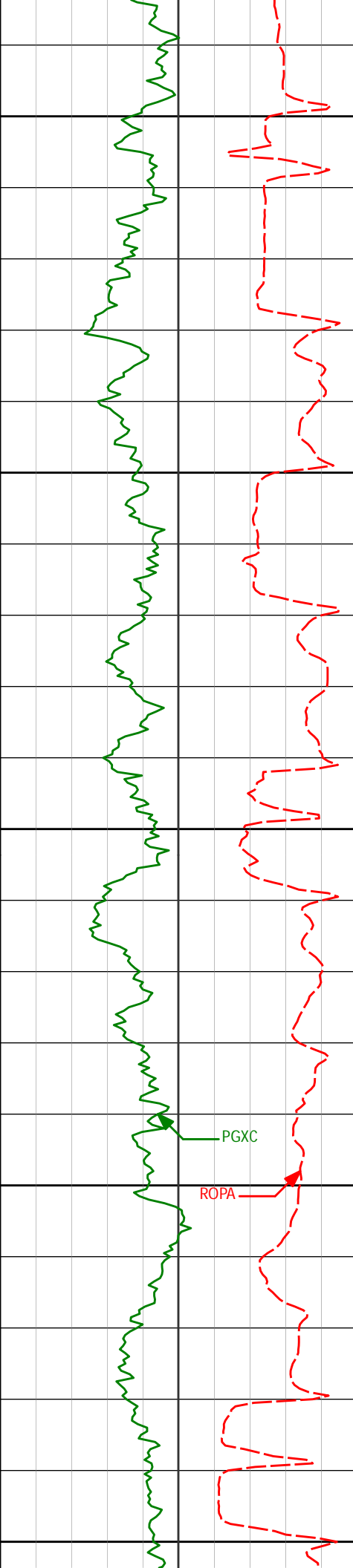
7100

7150

7200

7250

7081'	40.43°	358.16°	6812.81'	-1232.33'
7171'	49.93°	0.58°	6876.18'	-1168.58'
7261'	60.25°	359.86°	6927.62'	-1094.87'



7300

7350

7400

7450

7500

7352'

68.63°

357.14°

6966.85'

-1012.90'

7442'

78.44°

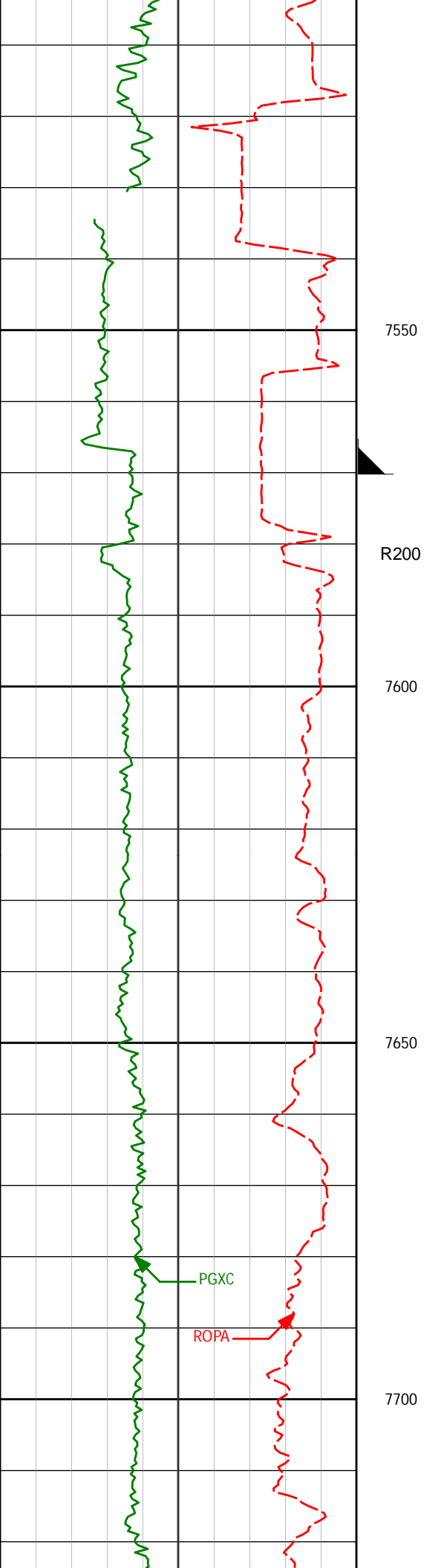
0.02°

6992.33'

-926.75'

PGXC

ROPA



7532' 86.85° 359.50° 7003.84' -837.57'

7550

R200

7600

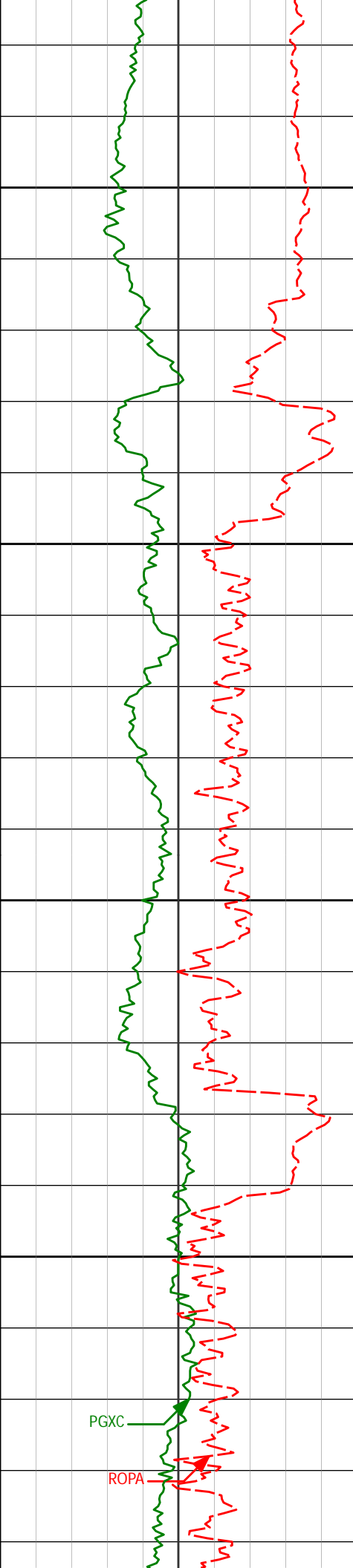
7635' 90.15° 359.34° 7006.54' -734.63'

7650

PGXC

ROPA

7700



7750

7800

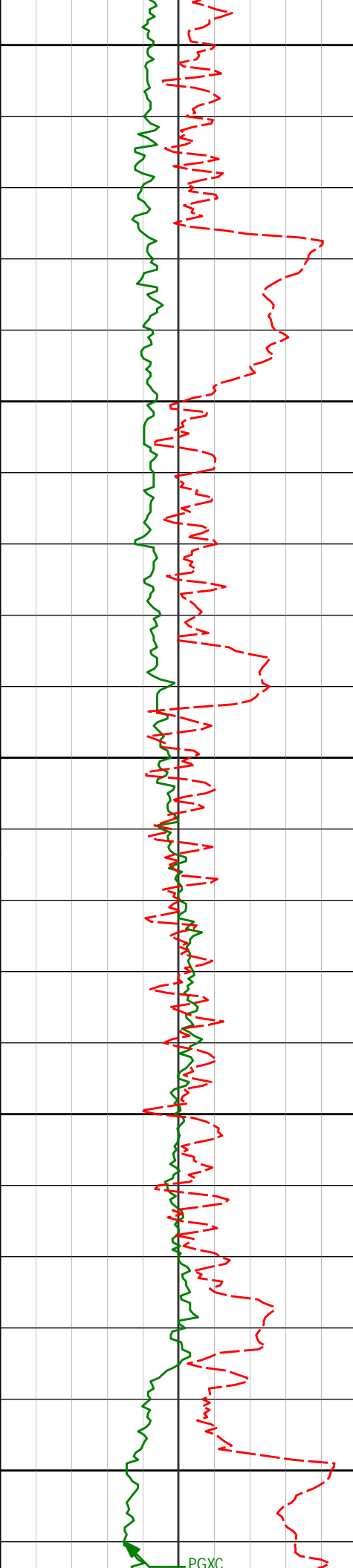
7850

7900

PGXC

ROPA

7725'	89.82°	358.40°	7006.56'	-644.66'
7815'	89.69°	358.94°	7006.95'	-554.70'
7905'	89.14°	0.25°	7007.87'	-464.72'



7950

7995'

89.35°

1.83°

7009.05'

-374.73'

8000

8050

8085'

88.37°

1.66°

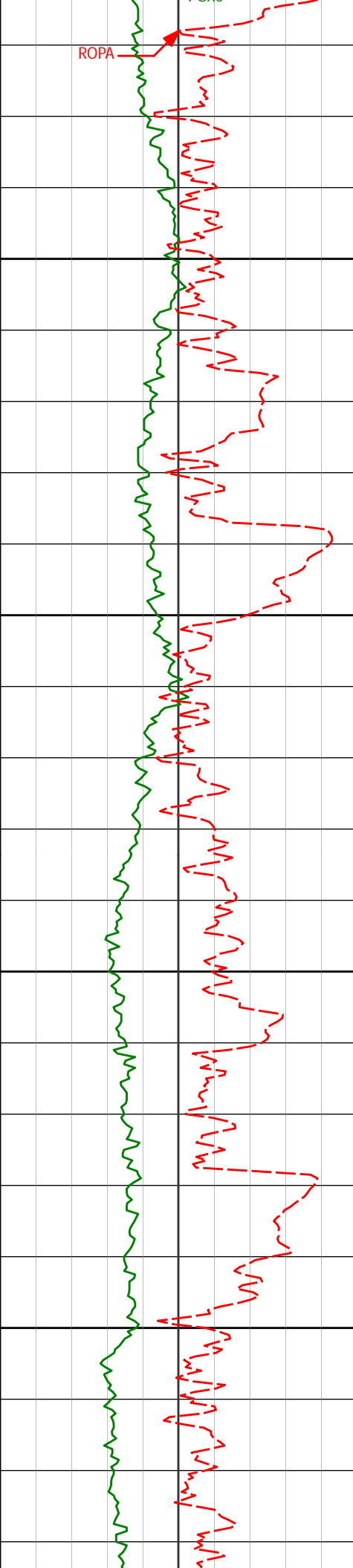
7010.84'

-284.78'

8100

8150

PGXC



8200

8250

8300

8350

8175'

89.20°

1.98°

7012.75'

-194.83'

8265'

89.32°

2.16°

7013.91'

-104.88'

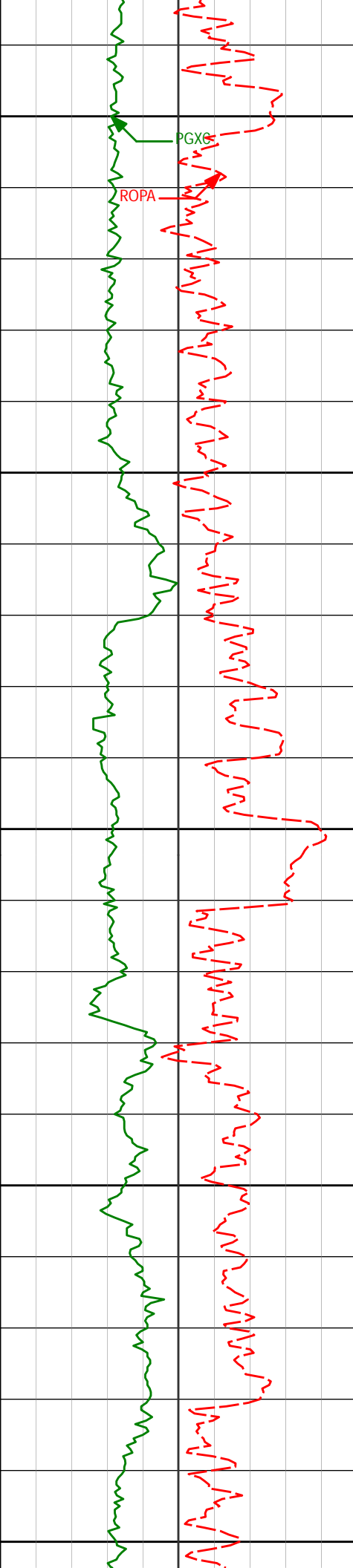
8355'

90.49°

3.03°

7014.06'

-14.96'



8400

8450

8500

8550

8600

8445'

89.91°

2.50°

7013.75'

74.96'

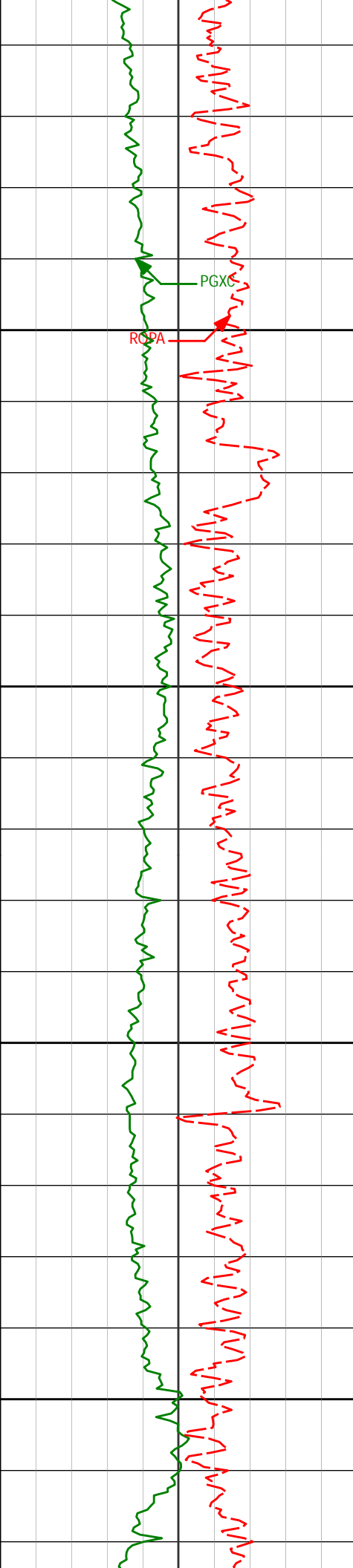
8535'

91.02°

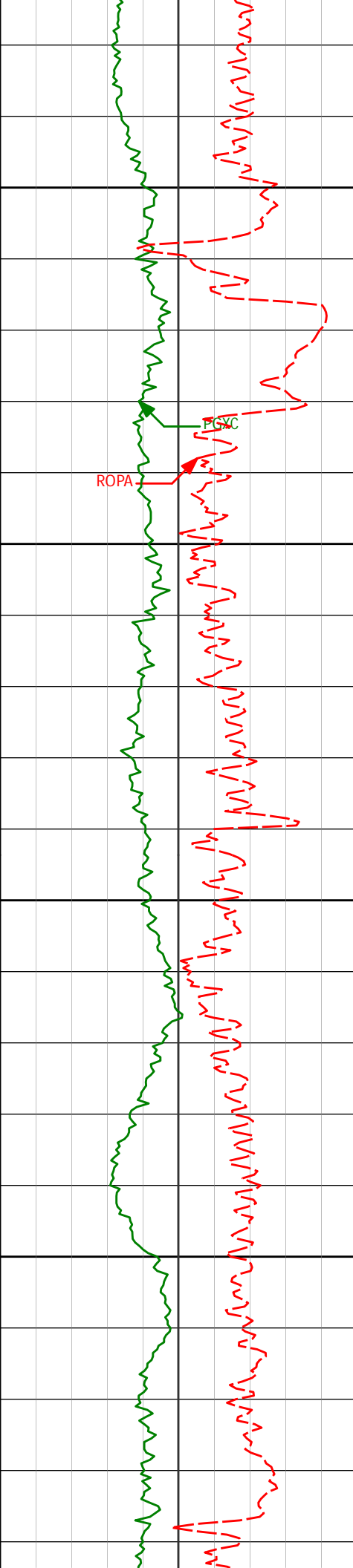
2.98°

7013.02'

164.87'



	8625'	90.52°	2.35°	7011.81'	254.78'
8650					
8700					
8715'		90.09°	2.46°	7011.33'	344.72'
8750					
8800					
8805'		89.48°	1.94°	7011.67'	434.67'



8850

ROPA

PGWC

8900

8950

9000

8895'

90.77°

1.74°

7011.47'

524.64'

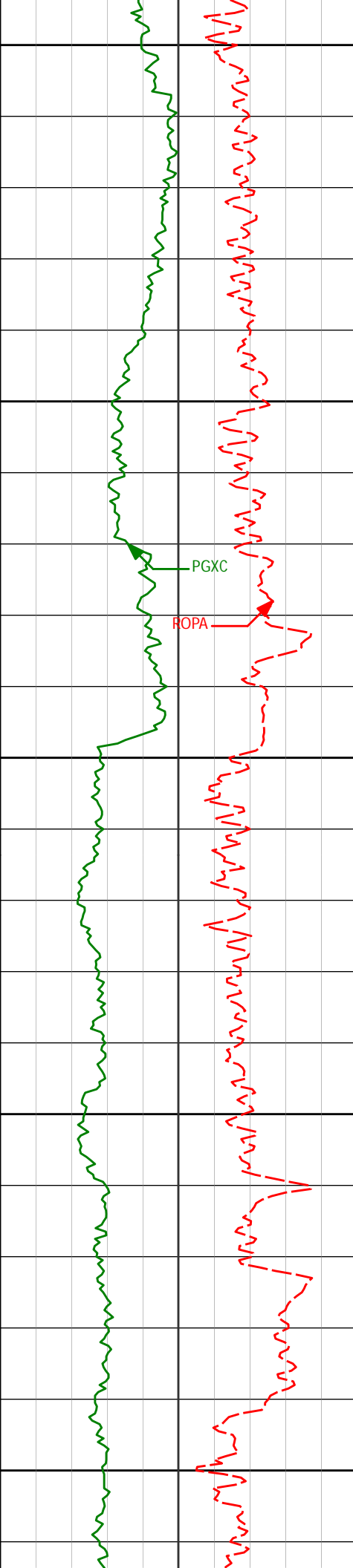
8985'

90.55°

0.60°

7010.44'

614.62'



9050

9075'

90.06°

359.73°

7009.96'

704.62'

9100

PGXC

ROPA

9150

9165'

90.40°

359.79°

7009.60'

794.61'

9200

9250

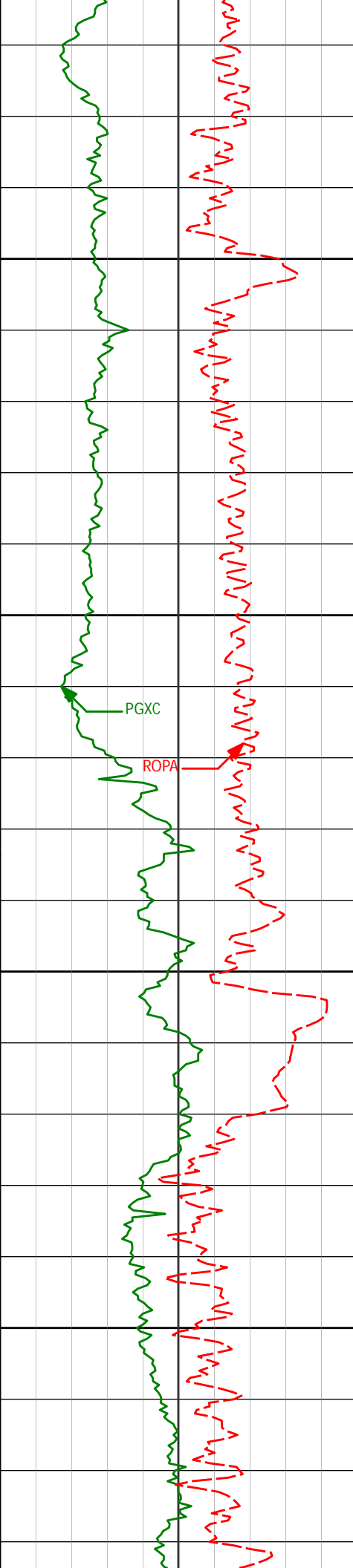
9255'

89.85°

0.59°

7009.40'

884.61'



9300

9350

9400

9450

9345'

88.98°

359.13°

7010.32'

974.60'

9435'

89.35°

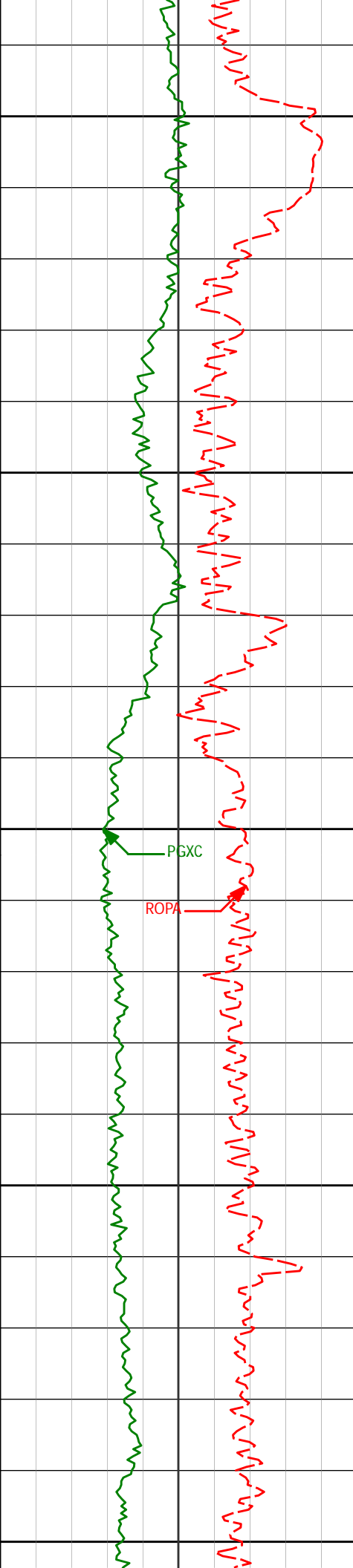
0.65°

7011.63'

1064.58'

PGXC

ROPA



9500

9525'

90.15°

0.97°

7012.02'

1154.58'

9550

9600

PGXC

ROPA

9615'

89.54°

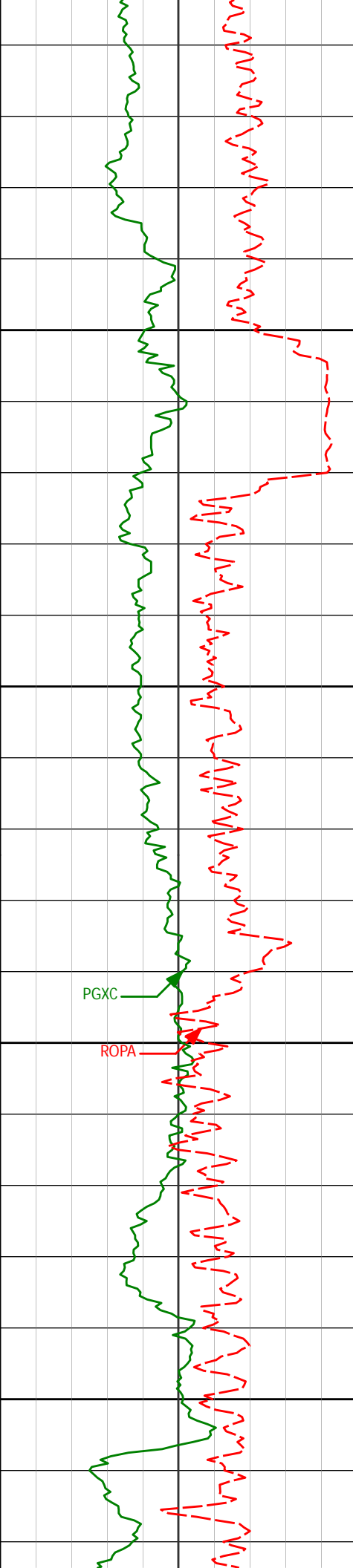
0.64°

7012.27'

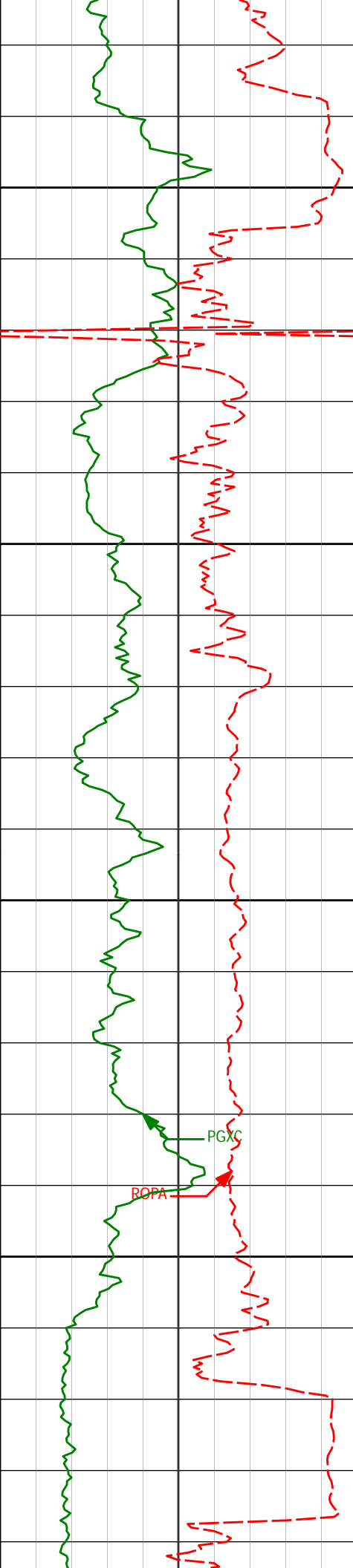
1244.58'

9650

9700



	9705'	88.46°	359.63°	7013.84'	1334.56'
9750					
9795'	9795'	89.66°	0.15°	7015.31'	1424.54'
9800					
9850					
9885'	9885'	88.77°	0.33°	7016.55'	1514.53'
9900					



9950

10000

10050

10100

9975'

90.49°

0.44°

7017.13'

1604.53'

10065'

91.30°

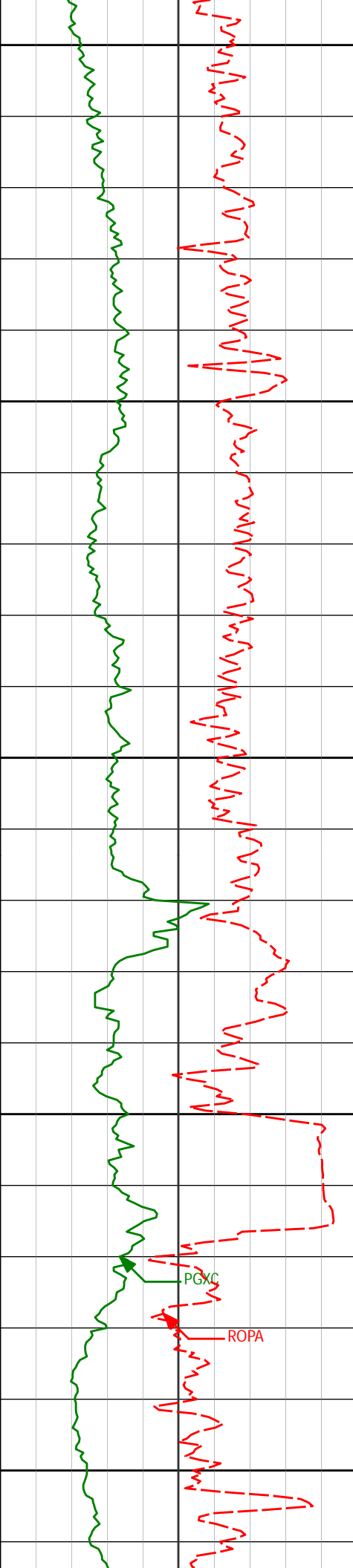
359.68°

7015.72'

1694.51'

PGXC

ROPA



10150

10155'

89.94°

0.31°

7014.75'

1784.51'

10200

10250

10245'

89.05°

359.50°

7015.54'

1874.50'

10300

10350

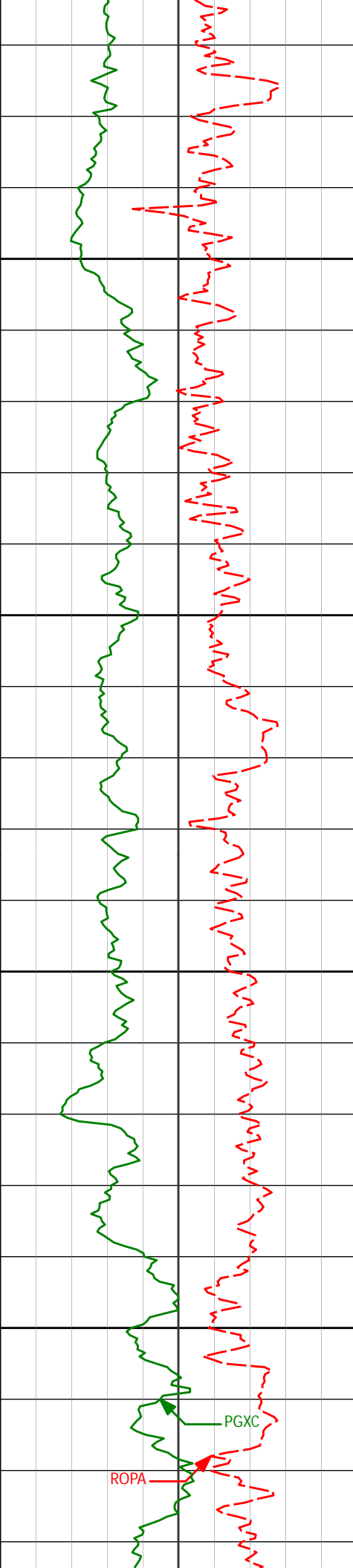
10335'

89.69°

0.50°

7016.53'

1964.49'



10400

10424'

89.75°

0.34°

7016.97'

2053.49'

10450

10500

10514'

90.12°

359.76°

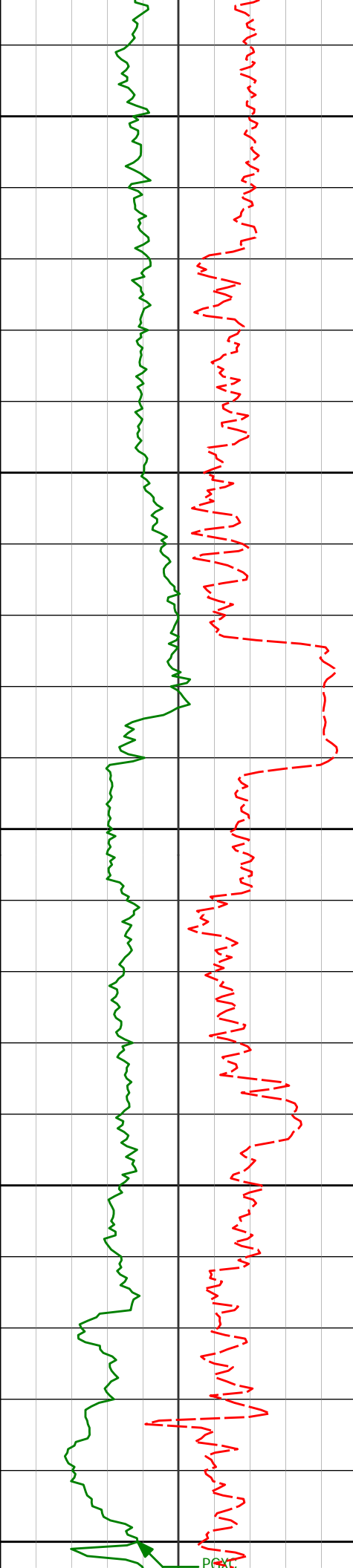
7017.07'

2143.49'

10550

PGXC

ROPA



10600

10604'

90.00°

358.76°

7016.97'

2233.47'

10650

10694'

90.25°

0.44°

7016.78'

2323.46'

10700

10750

10784'

89.72°

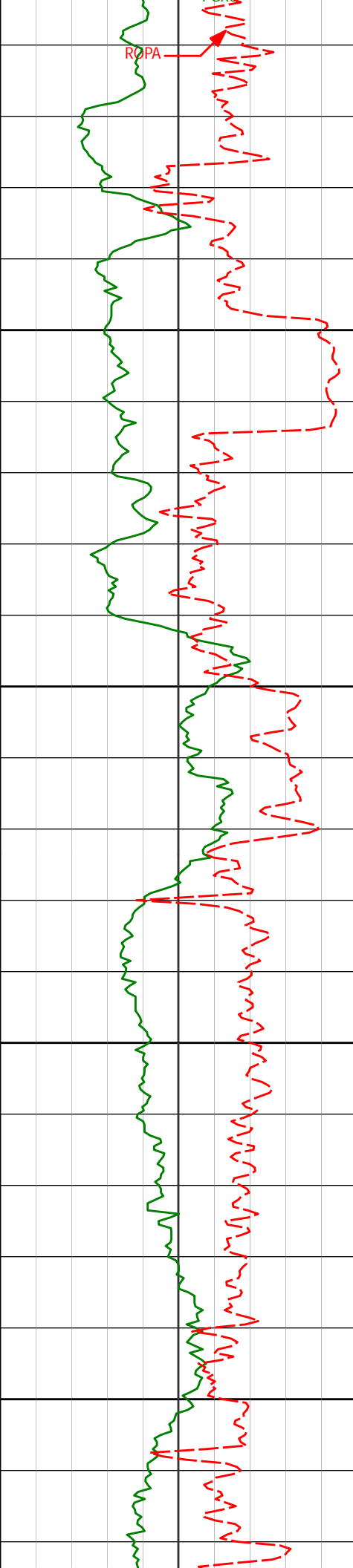
359.89°

7016.80'

2413.46'

10800

Point



10850

10874'

91.11°

1.42°

7016.15'

2503.45'

10900

10950

10964'

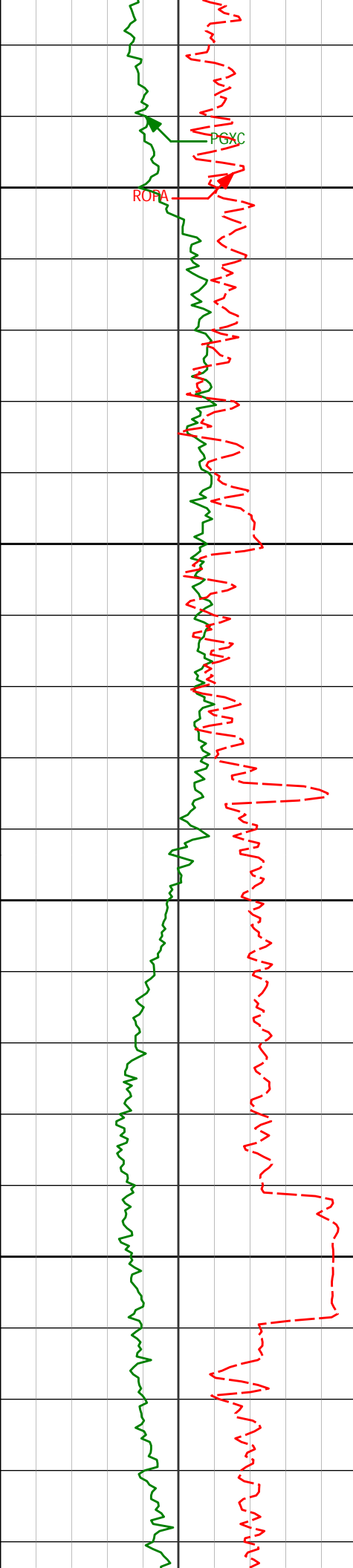
90.96°

0.78°

7014.52'

2593.43'

11000



11050

11054'

90.06°

0.39°

7013.72'

2683.42'

11100

11150

11144'

88.86°

358.29°

7014.51'

2773.40'

11200

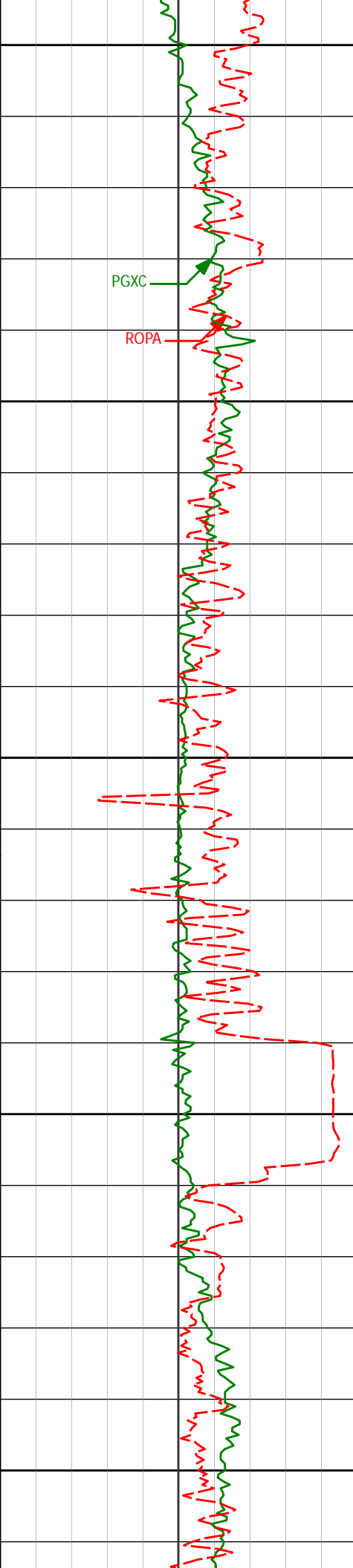
11234'

90.74°

358.92°

7014.88'

2863.35'



11250

PGXC

ROPA

11300

11324'

89.48°

357.54°

7014.71'

2953.29'

11350

11400

11414'

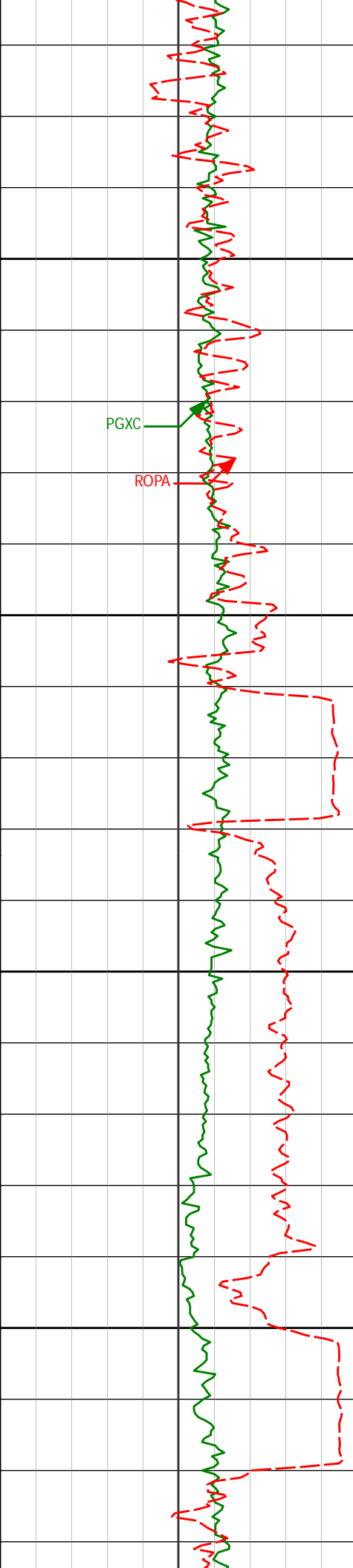
90.55°

1.46°

7014.68'

3043.26'

11450



11500

11504'

89.17°

0.48°

7014.90'

3133.25'

PGXC

ROPA

11550

11600

11650

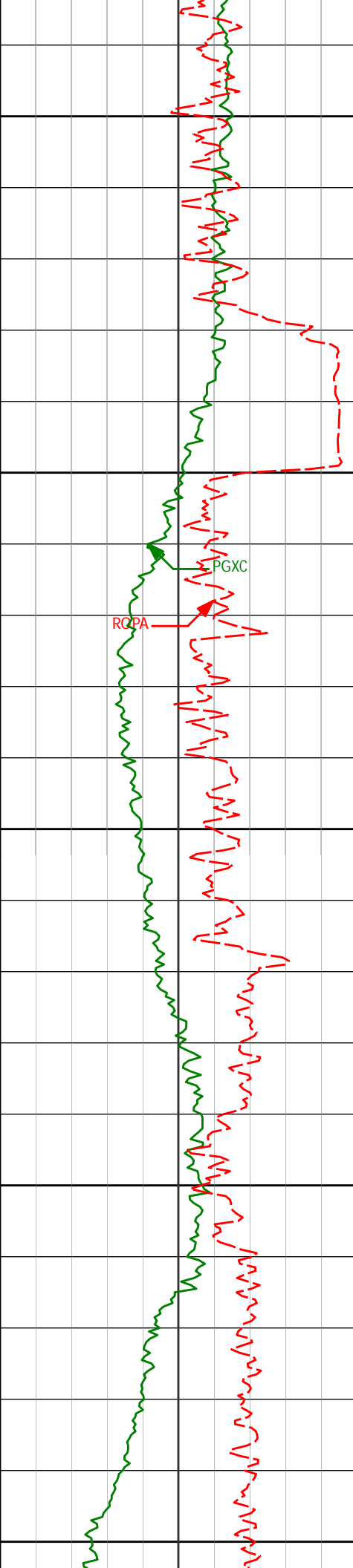
11595'

89.20°

0.90°

7016.20'

3224.24'



11700

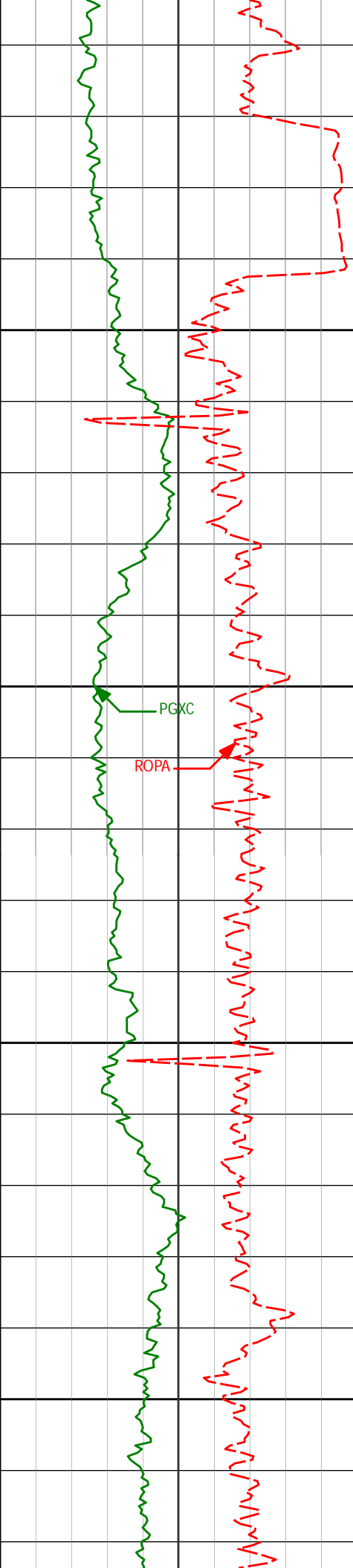
11750

11800

11850

11900

11685'	90.09°	0.15°	7016.76'	3314.24'
11775'	91.23°	0.65°	7015.72'	3404.23'
11865'	90.68°	359.63°	7014.22'	3494.22'



11950

11955'

91.82°

1.52°

7012.25'

3584.19'

12000

PGXC

ROPA

12050

12045'

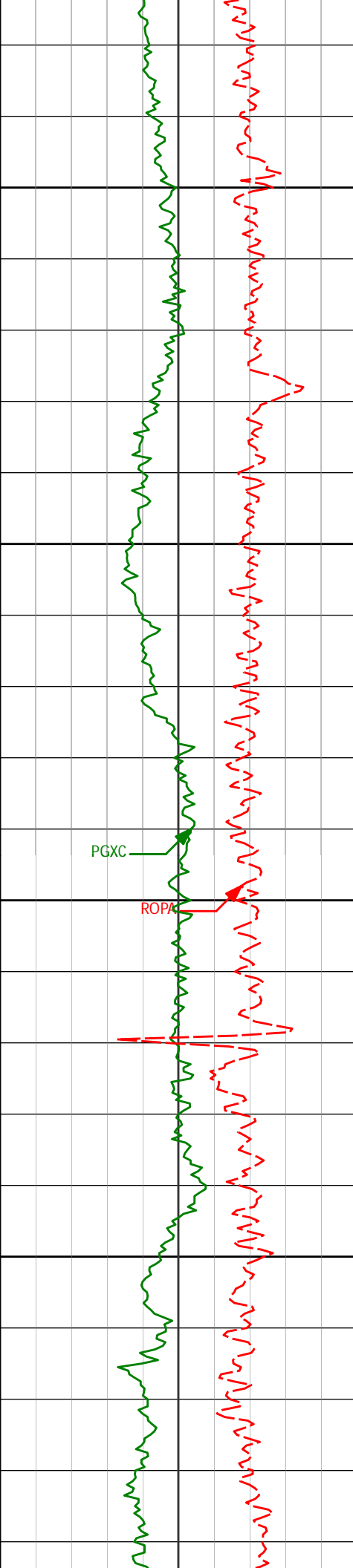
91.66°

0.55°

7009.52'

3674.14'

12100



12150

12200

12250

12300

12135'

90.80°

0.17°

7007.59'

3764.12'

PGXC

ROPA

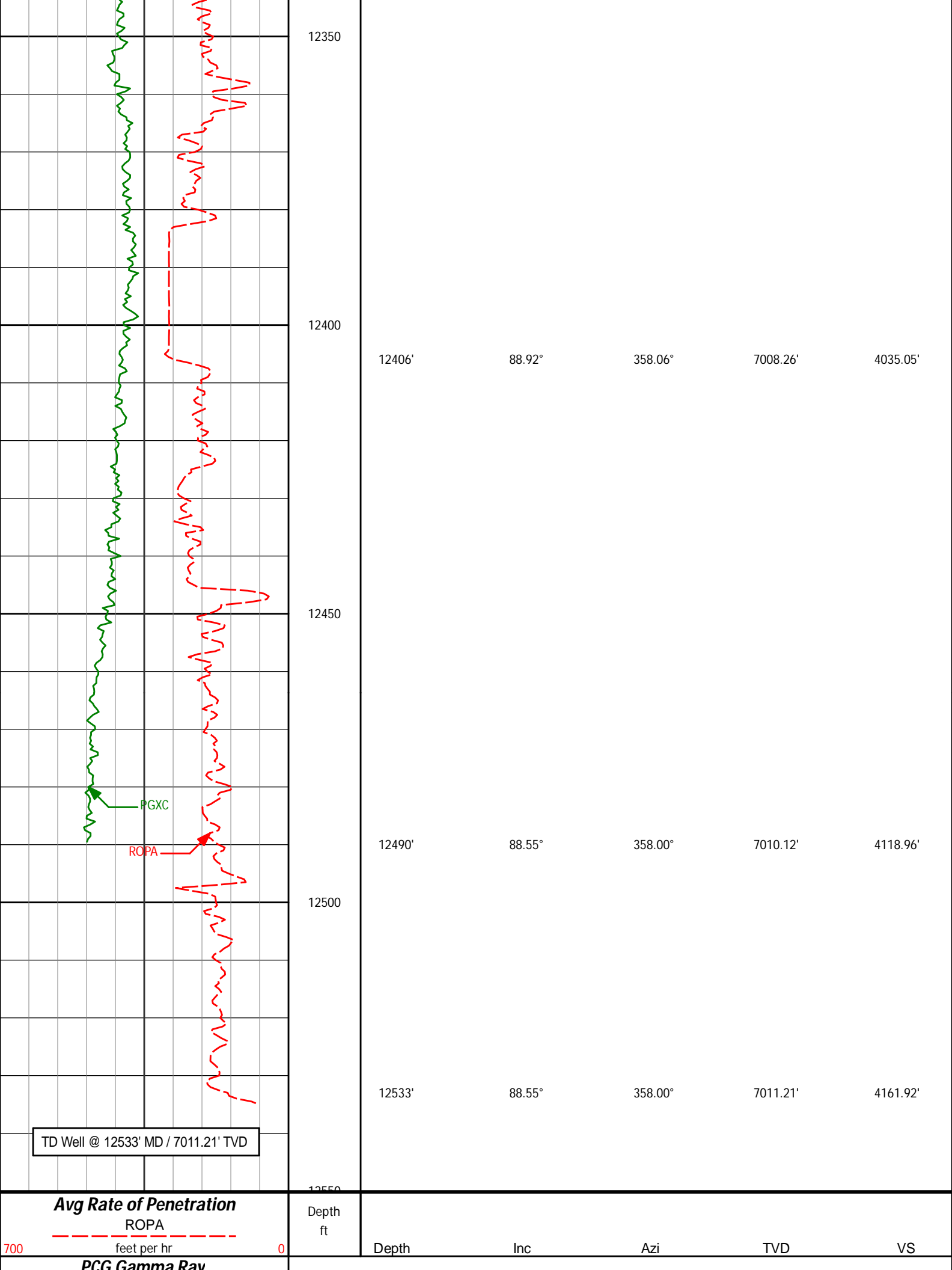
12316'

89.54°

359.21°

7007.05'

3945.10'



12350

12400

12450

12500

12550

Depth
ft

Depth

Inc

Azi

TVD

VS

TD Well @ 12533' MD / 7011.21' TVD

Avg Rate of Penetration
ROPA

700 feet per hr 0

PCG Gamma Ray

PGXC

ROPA

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
GreenLeaf 29N-2HZ
Wattenberg
Weld Colorado
USA
CA-XX-0901929301

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1288.00	0.50	59.60	1287.87	4.37 N	3.75 E	4.39	TIE-IN
1372.00	0.38	146.00	1371.87	4.32 N	4.22 E	4.35	0.72
1466.00	1.30	182.94	1465.86	3.00 N	4.34 E	3.02	1.09
1559.00	2.33	185.28	1558.81	0.07 N	4.11 E	0.09	1.11
1653.00	4.60	191.46	1652.63	5.53 S	3.19 E	-5.52	2.44
1747.00	6.11	195.53	1746.22	14.05 S	1.10 E	-14.04	1.66
1841.00	7.36	193.90	1839.57	24.71 S	1.69 W	-24.72	1.35
1934.00	10.80	192.47	1931.39	39.01 S	5.00 W	-39.03	3.71
2028.00	13.55	191.88	2023.27	58.39 S	9.17 W	-58.43	2.93
2121.00	15.61	188.61	2113.27	81.42 S	13.29 W	-81.49	2.38
2214.00	17.97	189.30	2202.30	107.95 S	17.48 W	-108.04	2.55
2307.00	18.29	187.10	2290.68	136.59 S	21.60 W	-136.70	0.81
2401.00	20.77	191.02	2379.27	167.60 S	26.61 W	-167.73	2.98
2491.00	19.60	189.24	2463.74	198.16 S	32.08 W	-198.33	1.47
2581.00	20.55	191.71	2548.27	228.53 S	37.71 W	-228.72	1.41
2671.00	20.56	195.73	2632.55	259.21 S	45.20 W	-259.44	1.57
2761.00	19.84	195.70	2717.01	289.12 S	53.62 W	-289.40	0.80
2851.00	20.34	193.68	2801.54	319.02 S	61.45 W	-319.34	0.95
2941.00	20.71	192.20	2885.82	349.78 S	68.52 W	-350.13	0.71
3031.00	20.44	191.07	2970.08	380.75 S	74.90 W	-381.14	0.53
3121.00	20.55	194.88	3054.39	411.45 S	81.97 W	-411.87	1.49
3211.00	19.11	193.35	3139.05	441.05 S	89.43 W	-441.51	1.70
3301.00	20.16	192.62	3223.82	470.52 S	96.22 W	-471.01	1.20
3391.00	19.91	197.17	3308.38	500.29 S	104.13 W	-500.83	1.75
3481.00	20.43	194.43	3392.86	530.15 S	112.57 W	-530.73	1.20
3571.00	19.95	193.02	3477.33	560.32 S	119.94 W	-560.94	0.76
3661.00	18.75	190.90	3562.25	589.49 S	126.14 W	-590.14	1.54
3751.00	19.96	191.19	3647.16	618.76 S	131.86 W	-619.44	1.35
3841.00	20.44	194.38	3731.62	649.05 S	138.74 W	-649.77	1.33
3931.00	19.13	193.81	3816.31	678.60 S	146.16 W	-679.35	1.47
4021.00	21.76	195.27	3900.63	709.02 S	154.08 W	-709.81	2.98
4111.00	22.08	195.07	3984.13	741.44 S	162.87 W	-742.29	0.37
4201.00	21.36	194.07	4067.74	773.68 S	171.25 W	-774.56	0.90
4291.00	19.90	193.70	4151.96	804.46 S	178.87 W	-805.38	1.63
4381.00	21.79	192.62	4236.07	835.64 S	186.14 W	-836.61	2.14
4471.00	20.94	192.66	4319.88	867.64 S	193.32 W	-868.64	0.94
4561.00	19.82	191.47	4404.25	898.28 S	199.88 W	-899.32	1.33
4651.00	21.76	194.83	4488.39	929.37 S	207.18 W	-930.44	2.53
4741.00	21.58	194.78	4572.03	961.50 S	215.67 W	-962.61	0.20
4831.00	20.75	193.83	4655.96	992.98 S	223.71 W	-994.14	1.00
4921.00	18.93	193.17	4740.61	1022.68 S	230.85 W	-1023.87	2.04
5011.00	20.51	193.70	4825.33	1052.21 S	237.91 W	-1053.45	1.77
5101.00	18.46	193.52	4910.17	1081.39 S	244.97 W	-1082.66	2.28
5191.00	19.78	195.48	4995.20	1109.92 S	252.37 W	-1111.23	1.63
5281.00	20.38	194.32	5079.73	1139.78 S	260.31 W	-1141.13	0.80
5371.00	19.69	193.64	5164.29	1169.70 S	267.76 W	-1171.09	0.81
5461.00	20.12	194.68	5248.91	1199.41 S	275.26 W	-1200.83	0.62
5550.00	17.70	196.51	5333.10	1227.19 S	282.98 W	-1228.66	2.80
5640.00	15.38	191.60	5419.38	1252.01 S	289.27 W	-1253.50	3.01
5731.00	13.70	190.80	5507.46	1274.41 S	293.72 W	-1275.93	1.86
5820.00	11.85	189.50	5594.25	1293.78 S	297.20 W	-1295.32	2.10
5910.00	11.93	188.19	5682.32	1312.10 S	300.05 W	-1313.66	0.31
6001.00	10.43	187.74	5771.59	1329.58 S	302.50 W	-1331.14	1.65
6091.00	10.43	187.74	5860.88	1348.07 S	304.95 W	-1348.62	1.42

6091.00	9.43	186.65	5860.24	1344.97 S	304.45 W	-1346.55	1.13
6181.00	7.73	192.34	5949.23	1358.21 S	306.60 W	-1359.80	2.11
6361.00	3.53	206.41	6128.33	1375.01 S	311.66 W	-1376.62	2.44
6451.00	1.48	236.55	6218.24	1378.13 S	313.86 W	-1379.75	2.63
6541.00	1.26	57.03	6308.24	1378.23 S	314.00 W	-1379.86	3.04
6631.00	1.12	68.57	6398.22	1377.37 S	312.35 W	-1378.99	0.31
6676.00	2.23	23.14	6443.20	1376.40 S	311.59 W	-1378.02	3.67
6721.00	6.23	349.87	6488.07	1373.19 S	311.68 W	-1374.81	10.07
6811.00	15.79	356.29	6576.31	1356.13 S	313.34 W	-1357.75	10.69
6901.00	23.25	358.38	6661.08	1326.11 S	314.63 W	-1327.74	8.32
6991.00	32.59	355.62	6740.52	1284.09 S	316.99 W	-1285.73	10.47
7081.00	40.43	358.16	6812.81	1230.67 S	319.78 W	-1232.33	8.87
7171.00	49.93	0.58	6876.18	1166.91 S	320.37 W	-1168.58	10.72
7261.00	60.25	359.86	6927.62	1093.21 S	320.12 W	-1094.87	11.49
7352.00	68.63	357.14	6966.85	1011.23 S	322.33 W	-1012.90	9.59
7442.00	78.44	0.02	6992.33	925.06 S	324.42 W	-926.75	11.32
7532.00	86.85	359.50	7003.84	835.88 S	324.79 W	-837.57	9.36
7635.00	90.15	359.34	7006.54	732.94 S	325.83 W	-734.63	3.21
7725.00	89.82	358.40	7006.56	642.96 S	327.61 W	-644.66	1.11
7815.00	89.69	358.94	7006.95	552.98 S	329.70 W	-554.70	0.62
7905.00	89.14	0.25	7007.87	462.99 S	330.34 W	-464.72	1.58
7995.00	89.35	1.83	7009.05	373.02 S	328.70 W	-374.73	1.77
8085.00	88.37	1.66	7010.84	283.08 S	325.96 W	-284.78	1.11
8175.00	89.20	1.98	7012.75	193.14 S	323.10 W	-194.83	0.99
8265.00	89.32	2.16	7013.91	103.21 S	319.85 W	-104.88	0.24
8355.00	90.49	3.03	7014.06	13.31 S	315.78 W	-14.96	1.62
8445.00	89.91	2.50	7013.75	76.59 N	311.44 W	74.96	0.87
8535.00	91.02	2.98	7013.02	166.48 N	307.14 W	164.87	1.34
8625.00	90.52	2.35	7011.81	256.37 N	302.95 W	254.78	0.89
8715.00	90.09	2.46	7011.33	346.29 N	299.17 W	344.72	0.49
8805.00	89.48	1.94	7011.67	436.23 N	295.72 W	434.67	0.89
8895.00	90.77	1.74	7011.47	526.18 N	292.83 W	524.64	1.45
8985.00	90.55	0.60	7010.44	616.15 N	290.99 W	614.62	1.29
9075.00	90.06	359.73	7009.96	706.15 N	290.73 W	704.62	1.11
9165.00	90.40	359.79	7009.60	796.15 N	291.11 W	794.61	0.38
9255.00	89.85	0.59	7009.40	886.14 N	290.81 W	884.61	1.08
9345.00	88.98	359.13	7010.32	976.14 N	291.03 W	974.60	1.89
9435.00	89.35	0.65	7011.63	1066.12 N	291.20 W	1064.58	1.74
9525.00	90.15	0.97	7012.02	1156.11 N	289.93 W	1154.58	0.96
9615.00	89.54	0.64	7012.27	1246.10 N	288.67 W	1244.58	0.77
9705.00	88.46	359.63	7013.84	1336.09 N	288.46 W	1334.56	1.64
9795.00	89.66	0.15	7015.31	1426.07 N	288.63 W	1424.54	1.45
9885.00	88.77	0.33	7016.55	1516.06 N	288.25 W	1514.53	1.01
9975.00	90.49	0.44	7017.13	1606.06 N	287.65 W	1604.53	1.92
10065.00	91.30	359.68	7015.72	1696.04 N	287.55 W	1694.51	1.23
10155.00	89.94	0.31	7014.75	1786.04 N	287.56 W	1784.51	1.67
10245.00	89.05	359.50	7015.54	1876.03 N	287.71 W	1874.50	1.34
10335.00	89.69	0.50	7016.53	1966.02 N	287.71 W	1964.49	1.32
10424.00	89.75	0.34	7016.97	2055.02 N	287.06 W	2053.49	0.19
10514.00	90.12	359.76	7017.07	2145.02 N	286.98 W	2143.49	0.76
10604.00	90.00	358.76	7016.97	2235.01 N	288.14 W	2233.47	1.12
10694.00	90.25	0.44	7016.78	2325.00 N	288.77 W	2323.46	1.89
10784.00	89.72	359.89	7016.80	2415.00 N	288.51 W	2413.46	0.85
10874.00	91.11	1.42	7016.15	2504.99 N	287.48 W	2503.45	2.30
10964.00	90.96	0.78	7014.52	2594.96 N	285.75 W	2593.43	0.73
11054.00	90.06	0.39	7013.72	2684.95 N	284.84 W	2683.42	1.09
11144.00	88.86	358.29	7014.57	2774.93 N	285.87 W	2773.40	2.69
11234.00	90.74	358.92	7014.88	2864.90 N	288.06 W	2863.35	2.21
11324.00	89.48	357.54	7014.71	2954.85 N	290.84 W	2953.29	2.08
11414.00	90.55	1.46	7014.68	3044.83 N	291.63 W	3043.26	4.51
11504.00	89.17	0.48	7014.90	3134.81 N	290.10 W	3133.25	1.88
11595.00	89.20	0.90	7016.20	3225.80 N	289.01 W	3224.24	0.46
11685.00	90.09	0.15	7016.76	3315.79 N	288.18 W	3314.24	1.29
11775.00	91.23	0.65	7015.72	3405.78 N	287.56 W	3404.23	1.38
11865.00	90.68	359.63	7014.22	3495.77 N	287.34 W	3494.22	1.29
11955.00	91.82	1.52	7012.25	3585.74 N	286.43 W	3584.19	2.45
12045.00	91.66	0.55	7009.52	3675.68 N	284.81 W	3674.14	1.09
12135.00	90.80	0.17	7007.59	3765.66 N	284.24 W	3764.12	1.04
12316.00	89.54	359.21	7007.05	3946.65 N	285.22 W	3945.10	0.88
12406.00	88.92	358.06	7008.26	4036.61 N	287.37 W	4035.05	1.45
12490.00	88.55	358.00	7010.12	4120.54 N	290.25 W	4118.96	0.45
12533.00	88.55	358.00	7011.21	4163.50 N	291.75 W	4161.92	0.00

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 0.30 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.41 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12533.00 FEET
IS 4173.71 FEET ALONG 355.99 DEGREES (TRUE)

Directional surveys tied onto Gyro's @ 1288' MD. Final Survey is a straight-line projection to the bit.

Date Printed:28 January 2015