

PCGK - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	29-Jan-15	01-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)	1,322.00	7,659.00			
Log End Depth (MD, ft)	7,659.00	12,764.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	27-Jan-15 14:55	30-Jan-15 13:15			
Drill/Wipe End Date and Time	29-Jan-15 11:30	01-Feb-15 05:00			
Min Inc (deg) @ Depth (MD, ft)	0.40 @ 6,722.00	88.67 @ 9,077.00			
Max Inc (deg) @ Depth (MD, ft)	25.40 @ 2,942.00	92.03 @ 8,087.00			
Bit TFA(in2) / Bit Type	1.37 / PDC	1.24 / PDC			
Flow Rate (gpm)	585.18	297.16			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Polymer	Polymer			
Density (ppg) / Viscosity (spqt)	8.60 / 28.00	9.75 / 39.00			
Filtrate CL (ppm)	3,800.00	0.00			
pH / Fluid Loss (mptm)	7.50 / 0	8.80 / 0			
PV (cP) / YP (lbf2)	1 / 1.00	14 / 12.00			
% Solids / % Sand	2 / .25	3.80 / 0.18			
% Oil / Oil:Water Ratio	1 / N/A	3.00 / 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			
Min Tool Temp (in F) / S	475.01 / PCM	334.40 / PCM			

Max Tool Temp (degF) / Source	175.21 / PCM	234.12 / PCM			
Rm @ Max Tool Temp (degF)	PCM @ 175.21	PCM @ 234.12			
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	27-Jan-15 01:49	30-Jan-15 05:35			
Date and Time Read	29-Jan-15 12:13	01-Feb-15 16:41			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	44.24	40.50			
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)	147.39	167.43			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	49.19	45.45			
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 is realtime data.
4. REMARK #4 Data gap between 4108' to 4157' 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

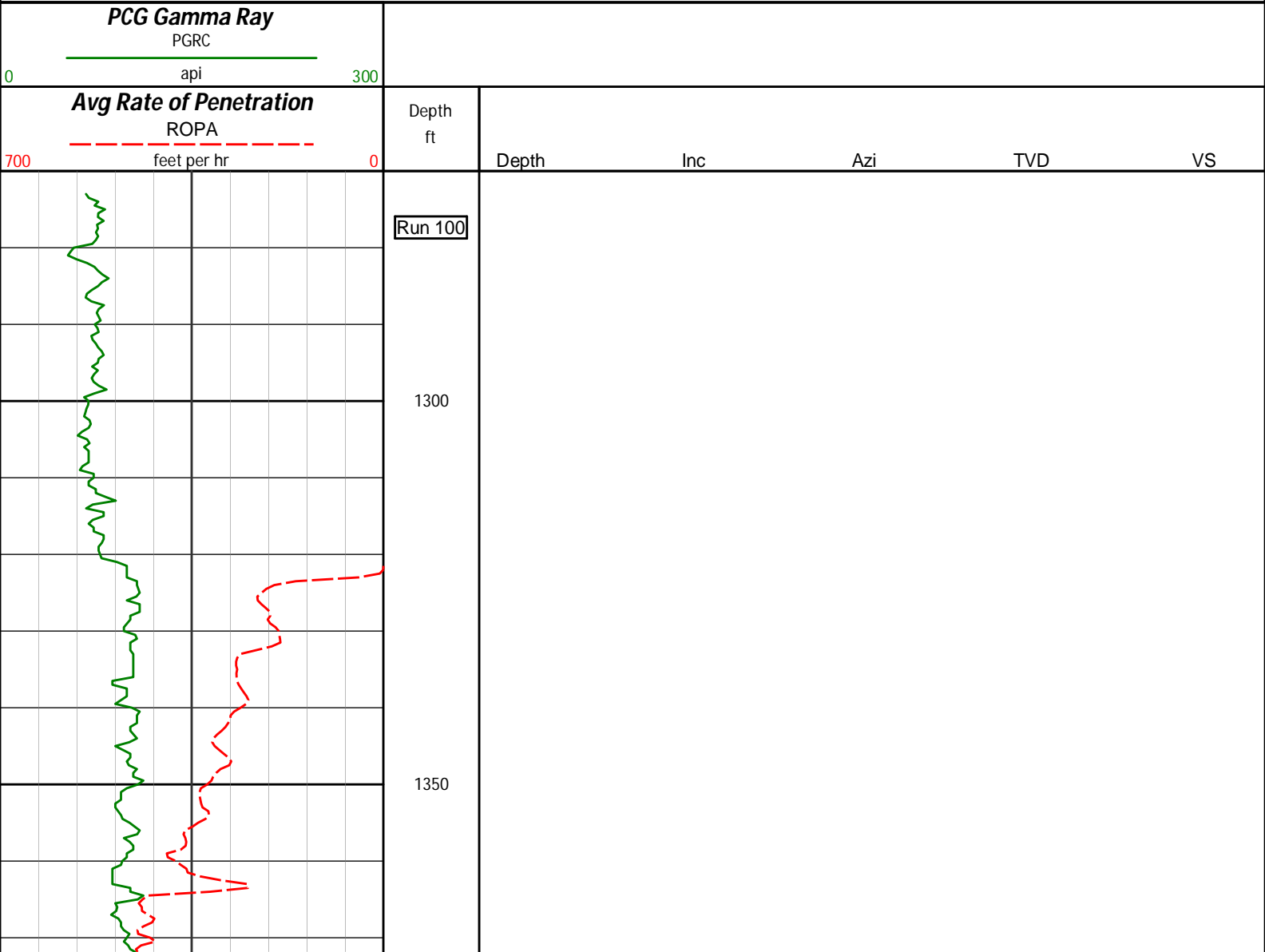
ROPA (Average Rate of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

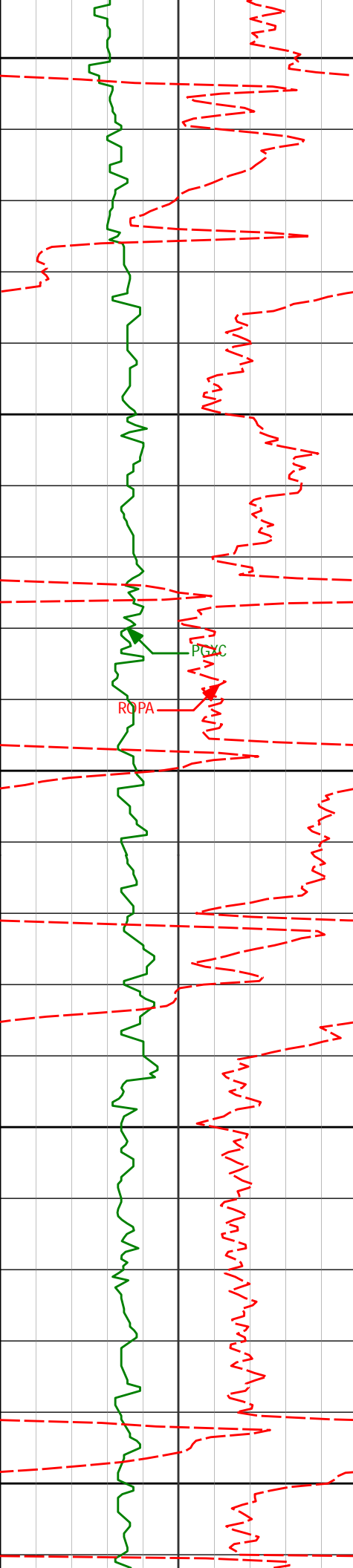
WARRANTY

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HALLIBURTON
Sperry Drilling Services

MD Detail Log 1:240





1600

1650

1700

1750

1800

1653'

6.94°

205.99°

1652.35'

-5.88'

1747'

8.43°

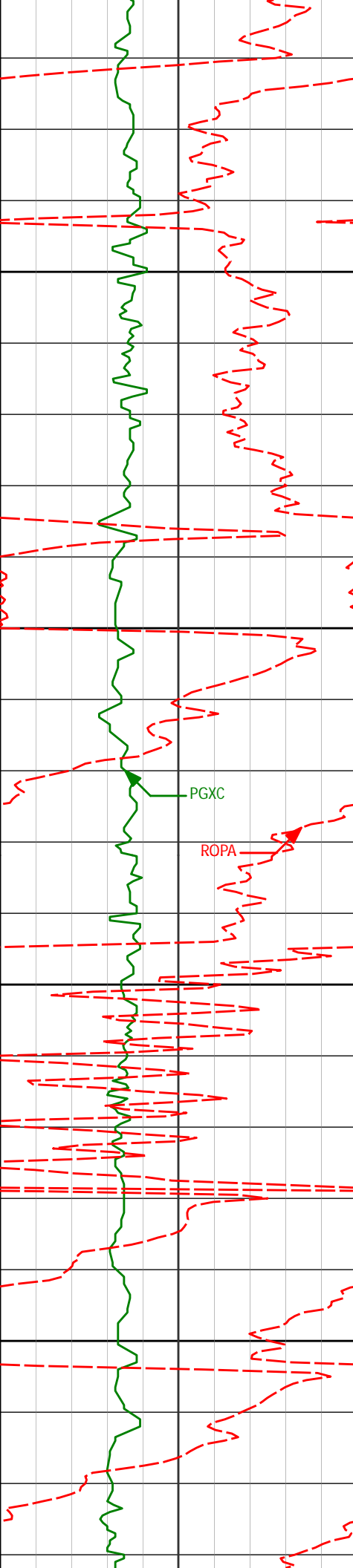
203.93°

1745.50'

-17.40'

POC

ROPA



1850

1900

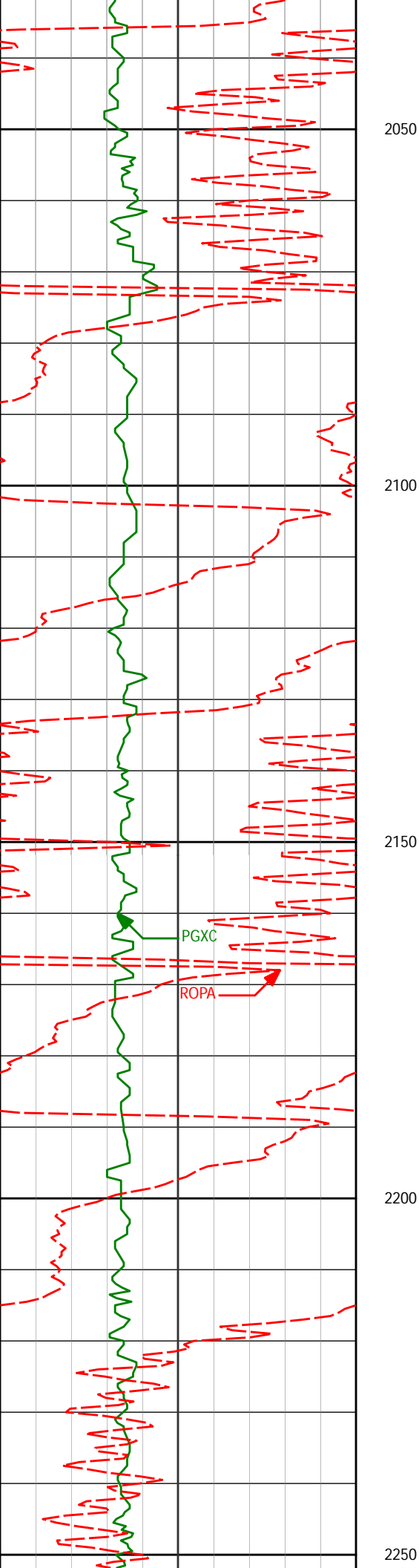
1950

2000

1841'	9.63°	205.10°	1838.34'	-30.96'
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1934'	11.48°	201.49°	1929.76'	-46.77'
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2028'	13.73°	203.74°	2021.49'	-65.87'
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2121'

15.69°

205.55°

2111.44'

-87.54'

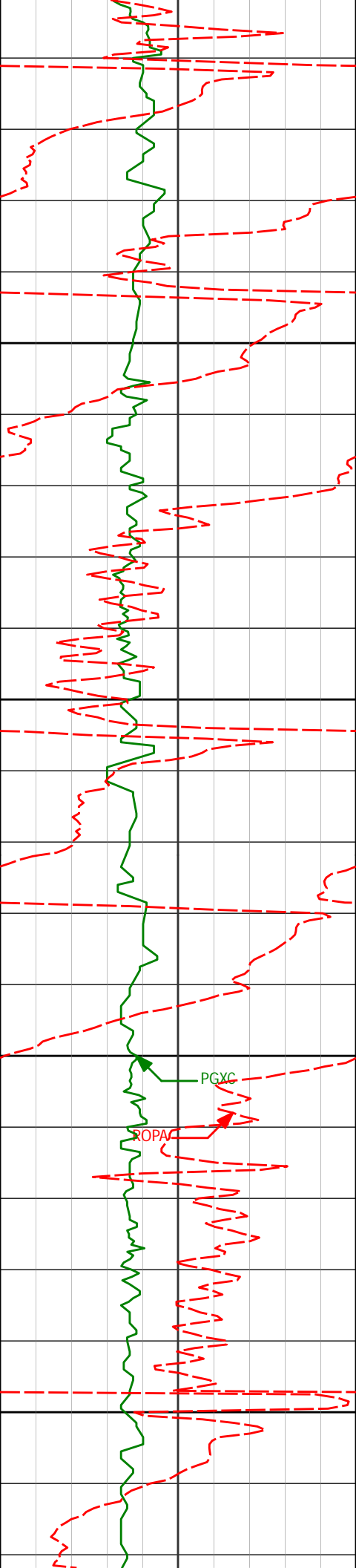
2215'

16.77°

203.71°

2201.69'

-111.67'



2300

2308'

18.51°

203.22°

2290.31'

-137.78'

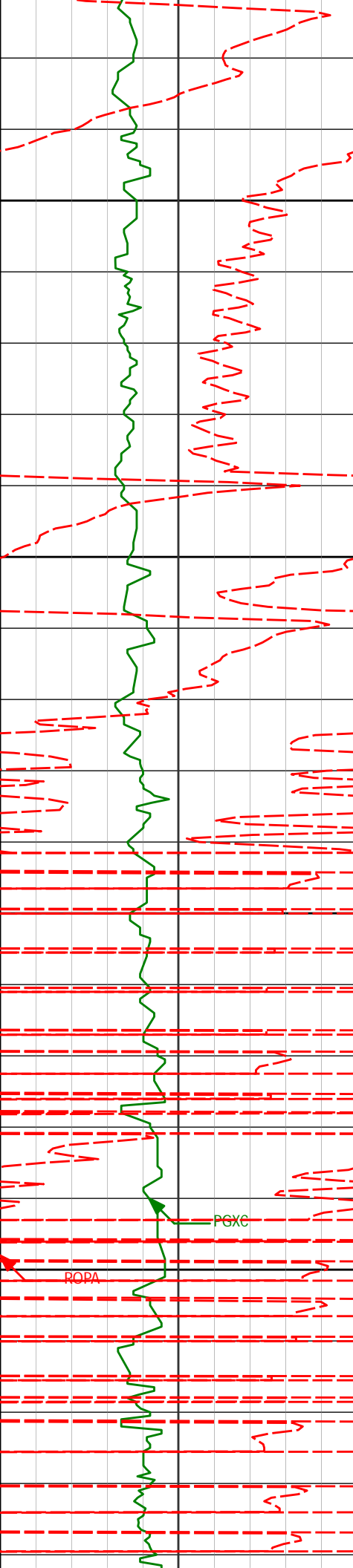
2350

2400

2450

PGXC

ROPAV



2500

2550

2600

2650

2492'

22.59°

206.05°

2462.57'

-197.02'

2582'

24.14°

204.61°

2545.19'

-229.63'

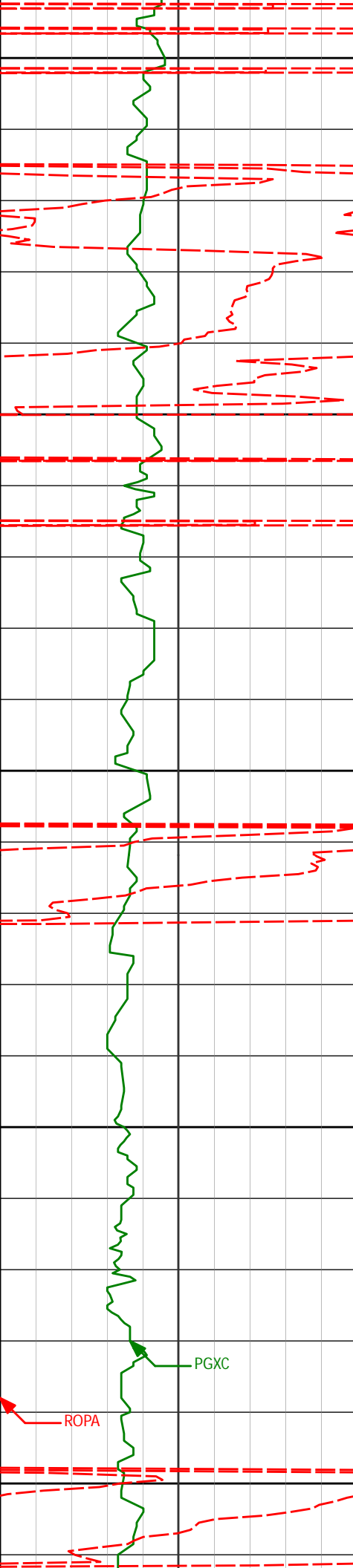
2672'

22.79°

203.94°

2627.75'

-262.63'



2700

2750

2800

2850

2900

2762'

24.83°

206.89°

2710.09'

-295.78'

2852'

24.23°

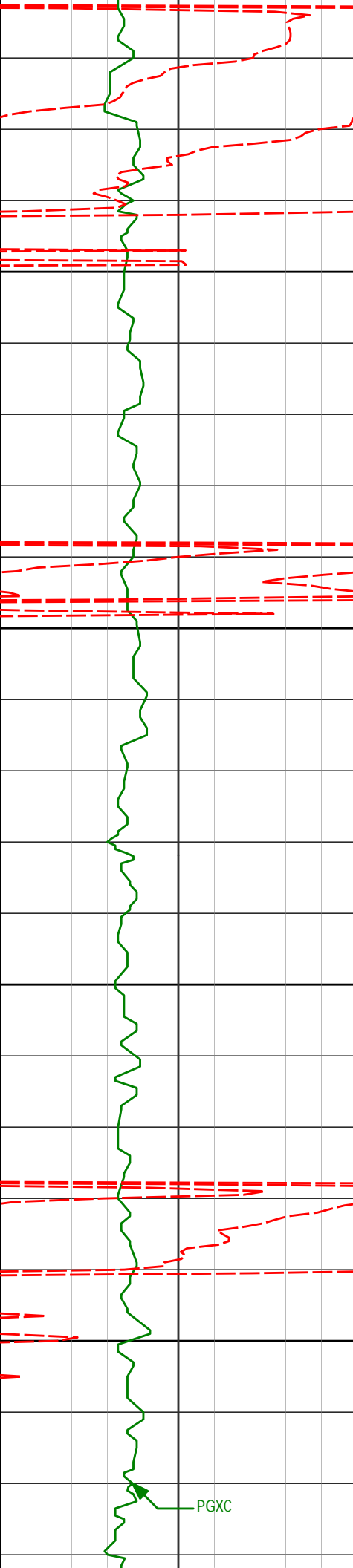
207.21°

2791.96'

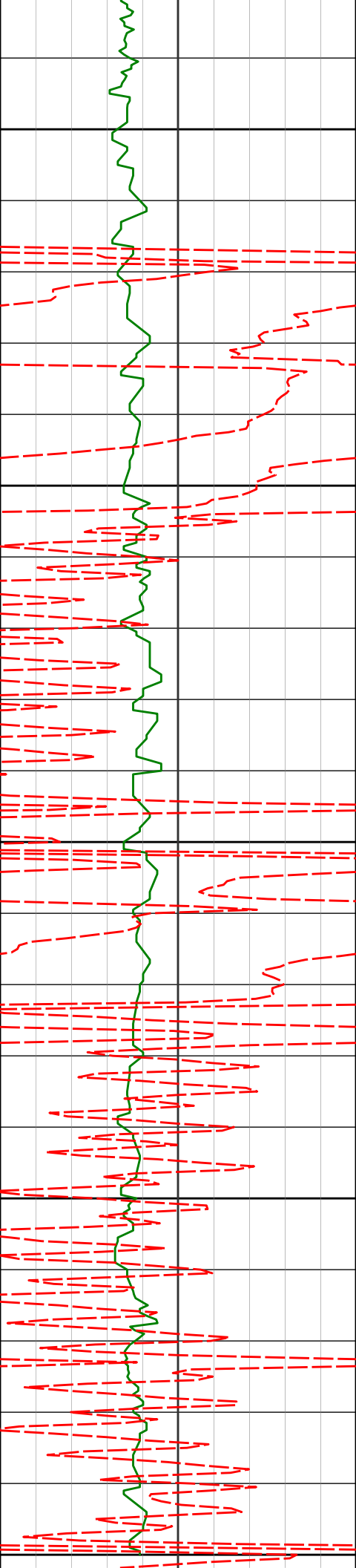
-329.44'

PGXC

ROPA



2942'	25.40°	206.14°	2873.65'	-363.58'
2950				
3000				
3032	24.80	205.95	2955.15	-398.21
3050				
3100				
3122'	23.52°	204.49°	3037.27'	-431.94'



3150

3200

3250

3300

3350

3212'

25.11°

205.32°

3119.28'

-465.90'

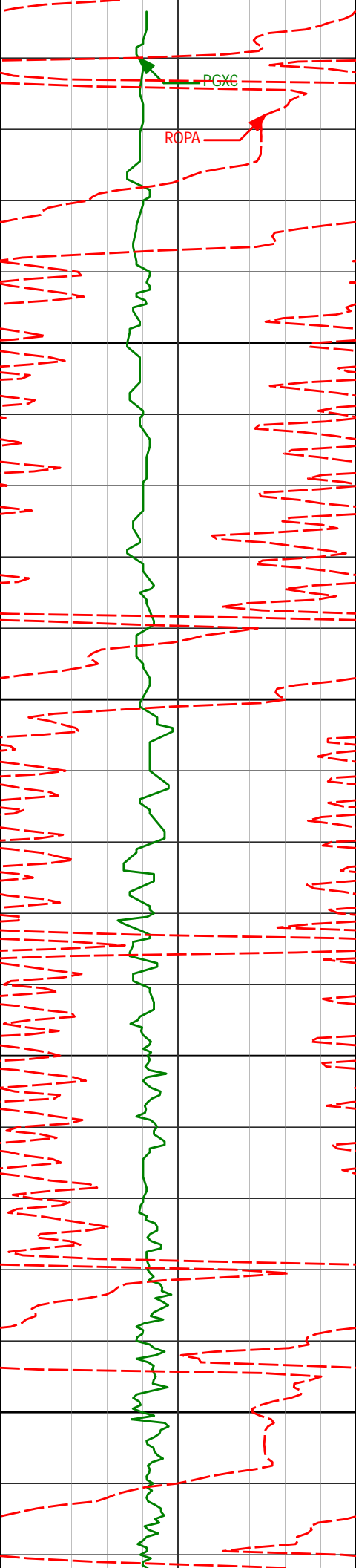
3302'

23.67°

204.49°

3201.25'

-499.96'



3392'

24.64°

203.15°

3283.37'

-533.99'

3400

3450

3482'

22.89°

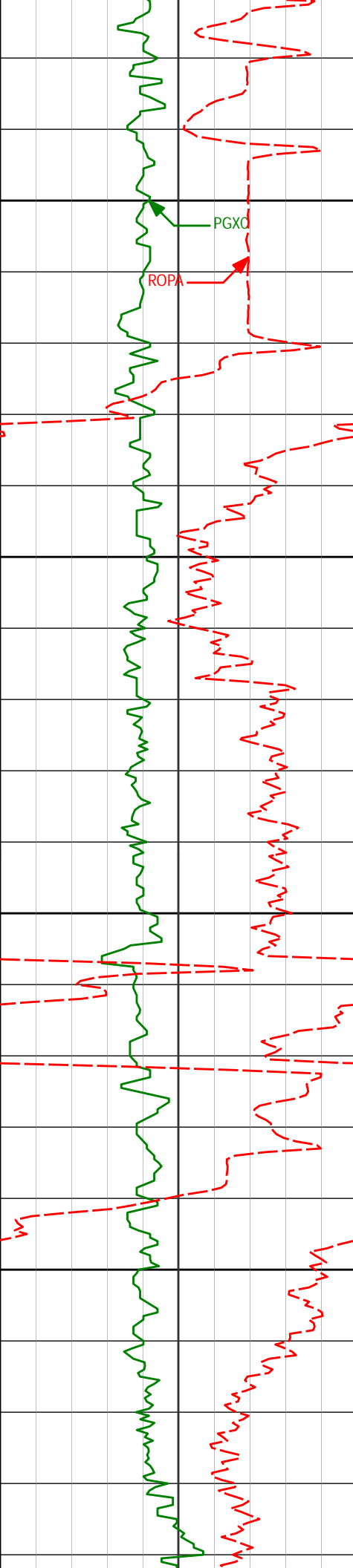
201.26°

3365.73'

-567.87'

3500

3550



3600

3650

3700

3750

3662'

24.01°

200.18°

3530.10'

-636.82'

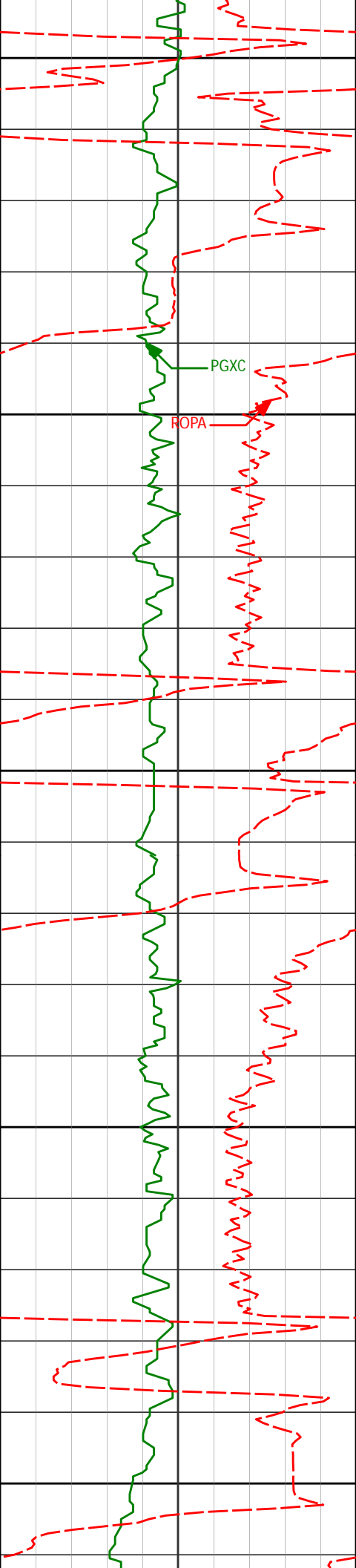
3752'

23.61°

203.14°

3612.44'

-670.89'



3800

3842'

22.79°

205.01°

3695.16'

-703.59'

3850

PGXC

ROPA

3900

3932'

22.39°

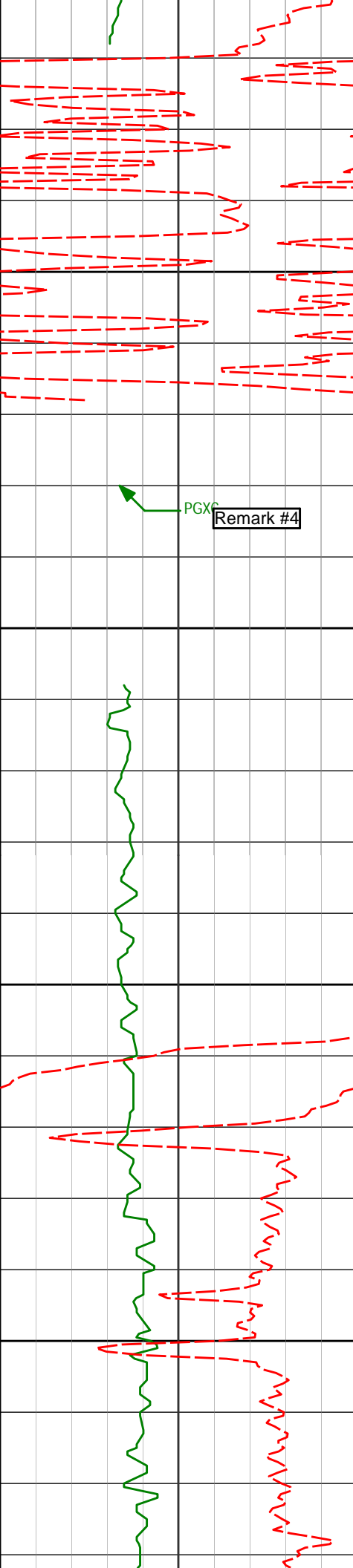
206.44°

3778.26'

-735.07'

3950

4000



4022'

24.19°

206.57°

3860.92'

-767.28'

4050

PGXC

Remark #4

4100

4112'

24.34°

205.43°

3942.97'

-800.89'

4150

4200

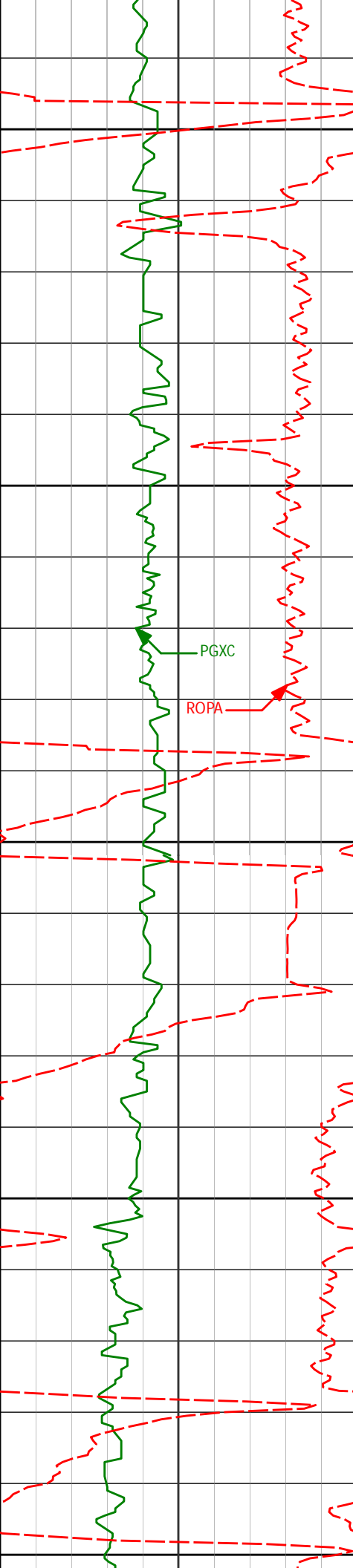
4202'

24.31°

205.33°

4024.98'

-834.75'



4250

4292'

22.91°

204.85°

4107.45'

-867.74'

4300

PGXC

ROPA

4350

4382'

23.18°

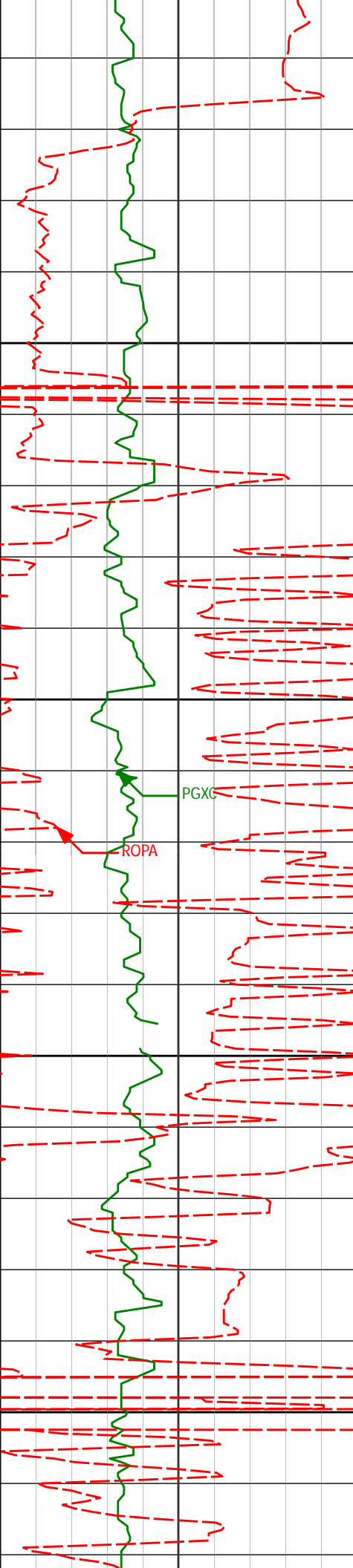
207.33°

4190.27'

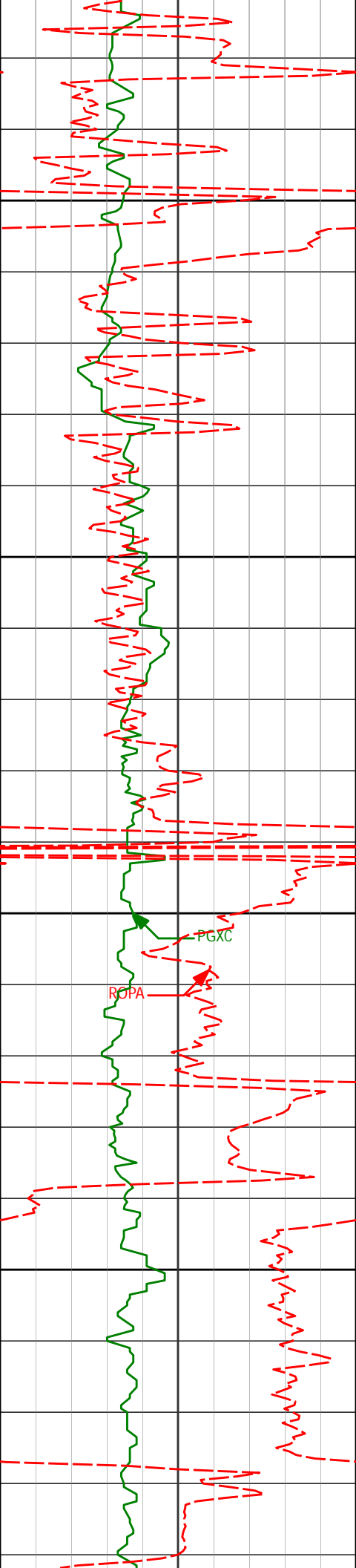
-899.72'

4400

4450



4472'	25.35°	207.67°	4272.31'	-932.92'
4500				
4550				
4562'	24.98°	205.58°	4353.77'	-967.51'
4600				
4650				
4652'	24.16°	204.68°	4435.62'	-1001.75'



4700

4742'

23.66°

204.54°

4517.90'

-1035.26'

4750

4800

PGXC

ROPA

4832'

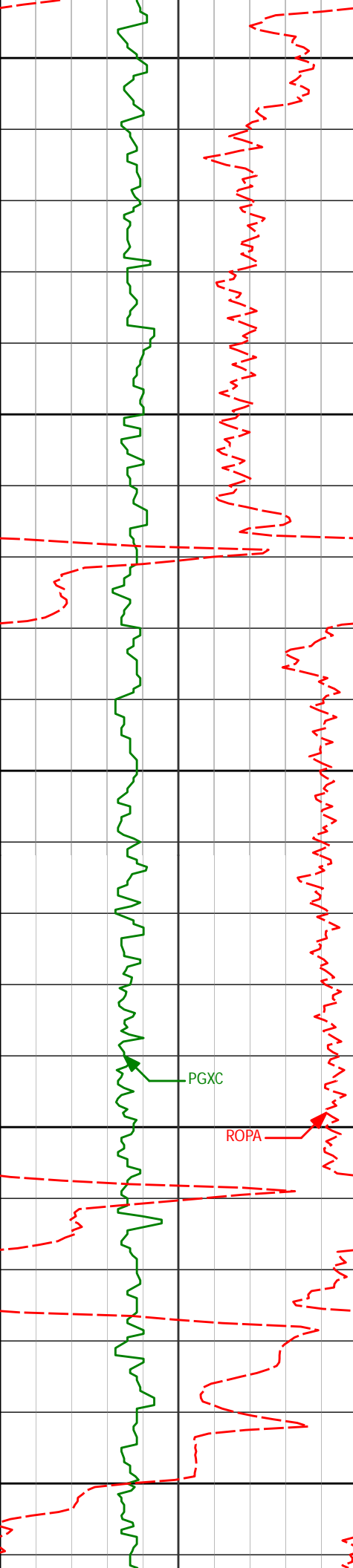
25.19°

204.34°

4599.84'

-1069.49'

4850



4900

4922'

25.37°

204.54°

4681.22'

-1104.85'

4950

5000

5012'

23.82°

203.92°

4703.05'

-1139.35'

PGXC

ROPA

5050

5100

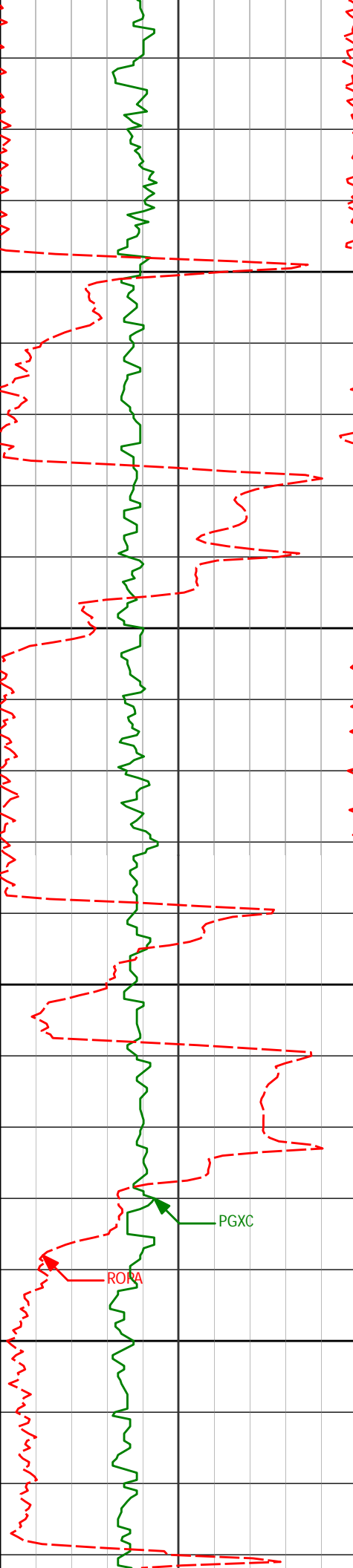
5102'

24.03°

207.87°

4845.32'

-1172.53'



5150

5192'

23.97°

210.71°

4927.55'

-1204.86'

5200

5250

5282'

24.68°

206.83°

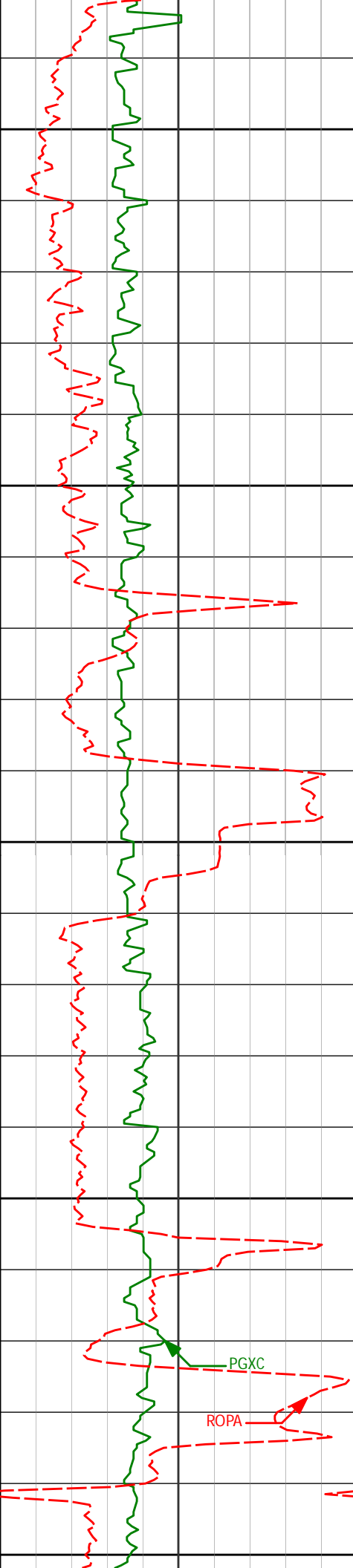
5009.56'

-1237.75'

5300

PGXC

ROBA



5350

5372'

24.24°

206.30°

5091.48'

-1271.46'

5400

5450

5461'

22.34°

206.51°

5173.23'

-1303.34'

5500

PGXC

ROPA

5550

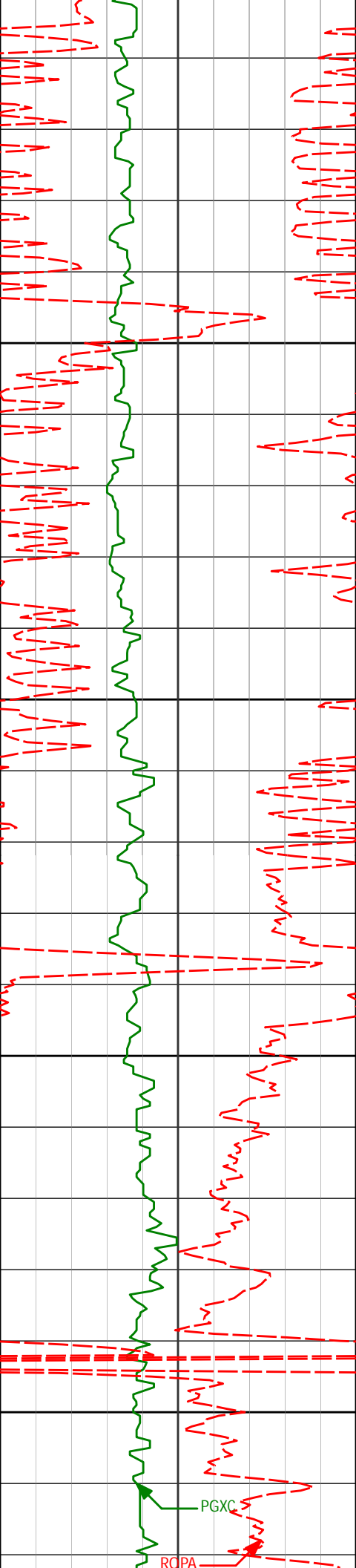
5551'

19.51°

203.60°

5257.28'

-1332.73'



5600

5641'

18.58°

203.76°

5342.36'

-1359.90'

5650

5700

5732'

16.34°

201.84°

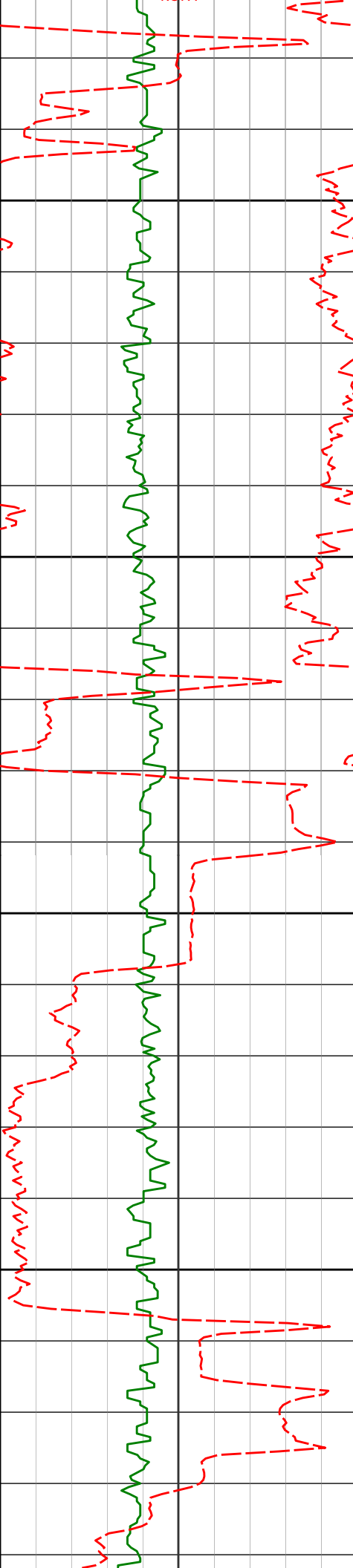
5429.16'

-1385.29'

5750

PGXC

RCPA



5800

5821'

13.53°

200.91°

5515.15'

-1406.83'

5850

5900

5912'

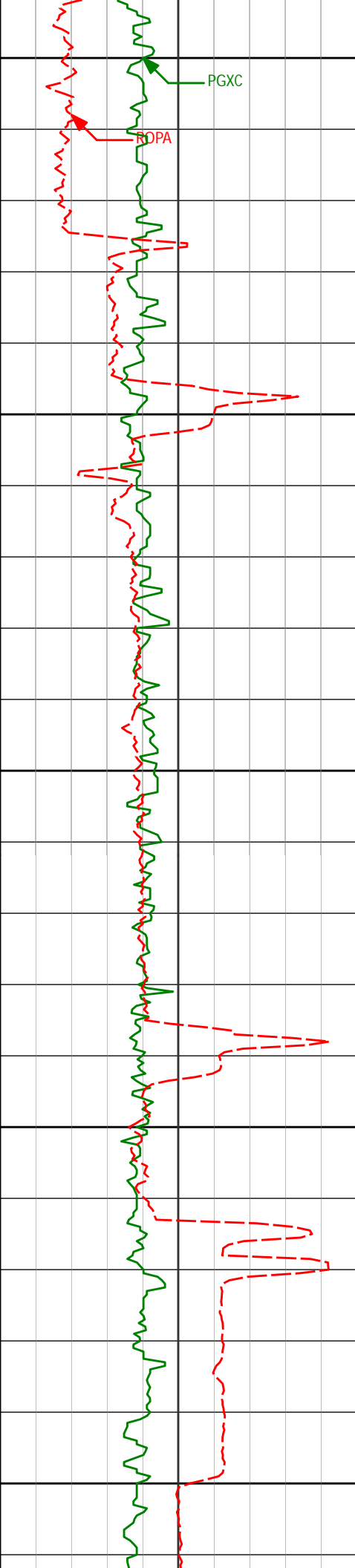
12.36°

200.97°

5603.83'

-1426.04'

5950



6000

6002'

12.05°

200.09°

5691.80'

-1444.01'

6050

6092'

10.54°

198.60°

5780.05'

-1460.76'

6100

6150

6182'

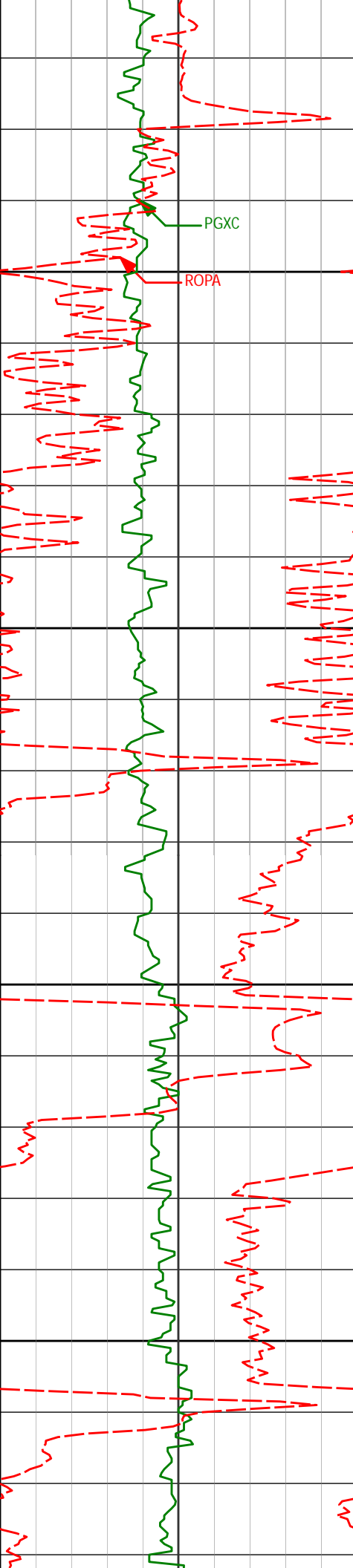
9.09°

195.60°

5868.73'

-1475.52'

6200



6250

6272'

7.89°

191.11°

5957.75'

-1488.49'

6300

6350

6362'

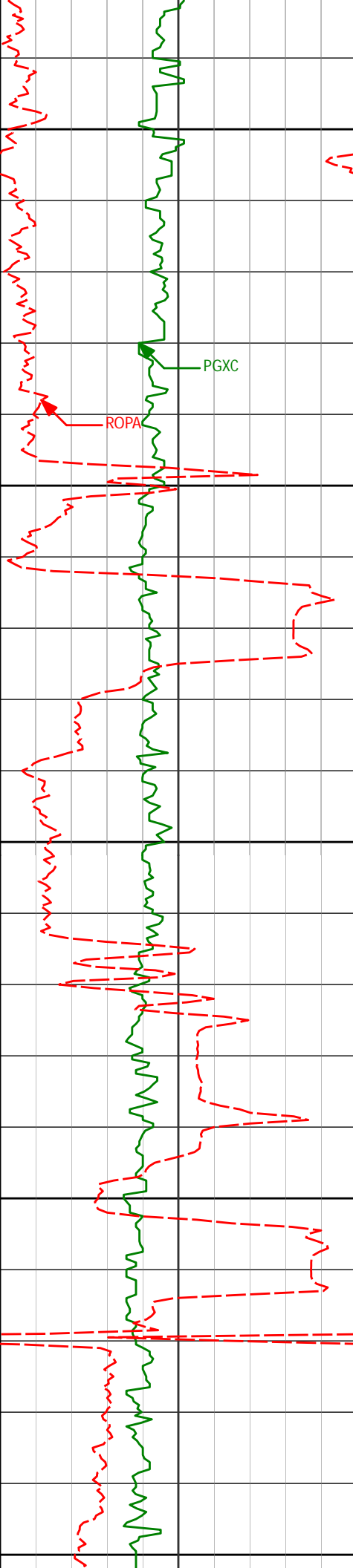
6.00°

196.75°

6047.08'

-1499.12'

6400



6450

6452'

5.04°

194.91°

6136.66'

-1507.50'

6500

6542'

2.75°

190.11°

6226.45'

-1513.47'

6550

6600

6632'

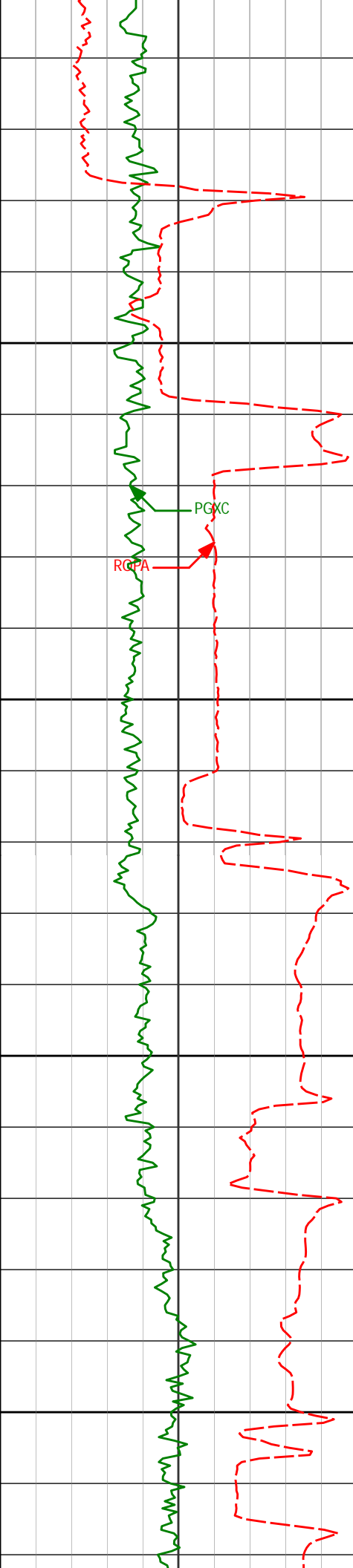
0.82°

203.94°

6316.40'

-1516.20'

6650



6700

6722'

0.40°

31.54°

6406.40'

-1516.52'

6750

6800

6812'

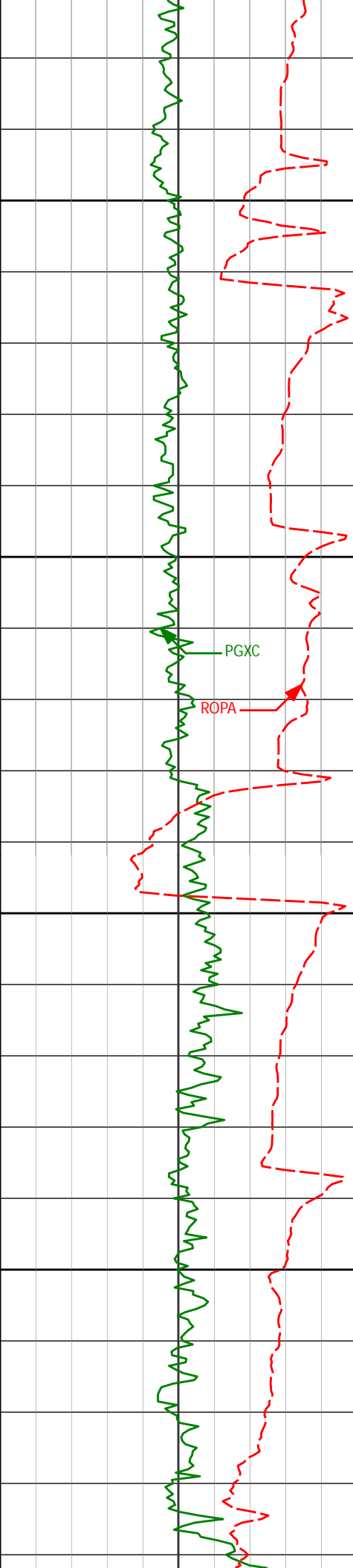
5.27°

350.80°

6496.27'

-1512.19'

6850



6900

6902'

13.06°

357.77°

6585.05'

-1497.95'

6950

PGXC

ROPA

7000

6992'

20.90

1.50

6671.00

-1471.71

7050

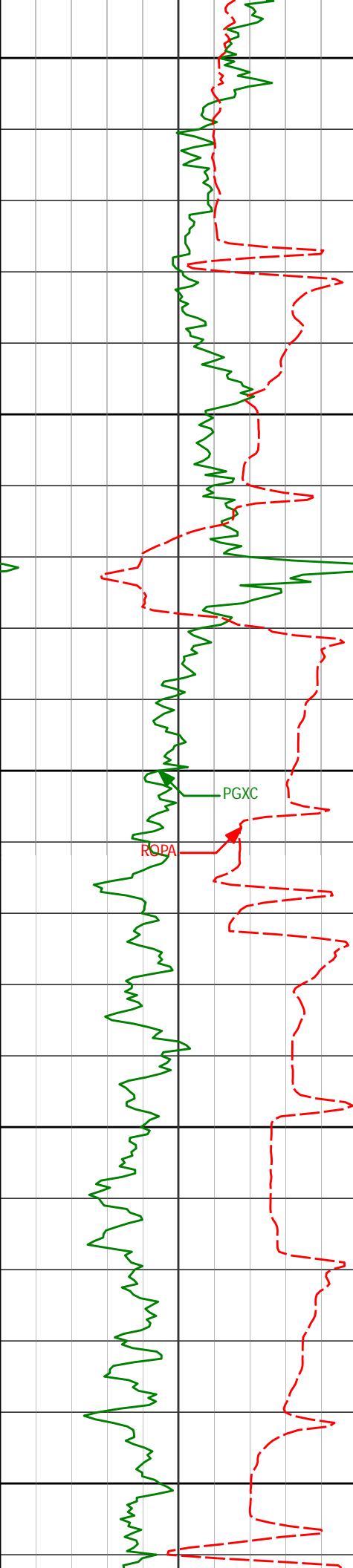
7082'

32.80°

2.81°

6751.22'

-1431.14'



7100

7150

7200

7250

7300

7172'

44.33°

358.18°

6821.48'

-1375.17'

ROPA

PGXC

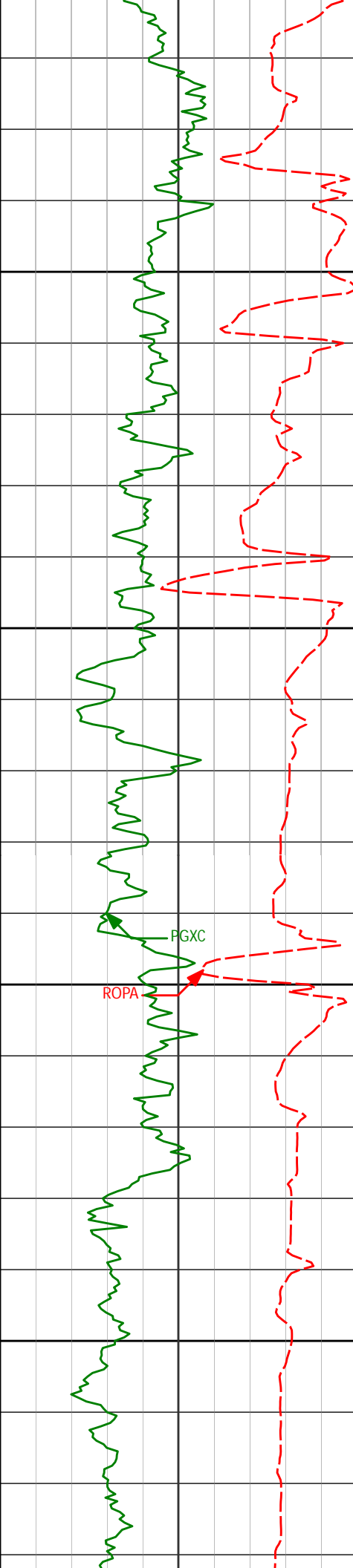
7262'

50.53°

0.32°

6882.34'

-1308.97'



7350

7352'

55.65°

0.98°

6936.37'

-1237.04'

7400

7397'

60.26°

1.64°

6960.24'

-1198.91'

7450

PGXC

ROPA

7487'

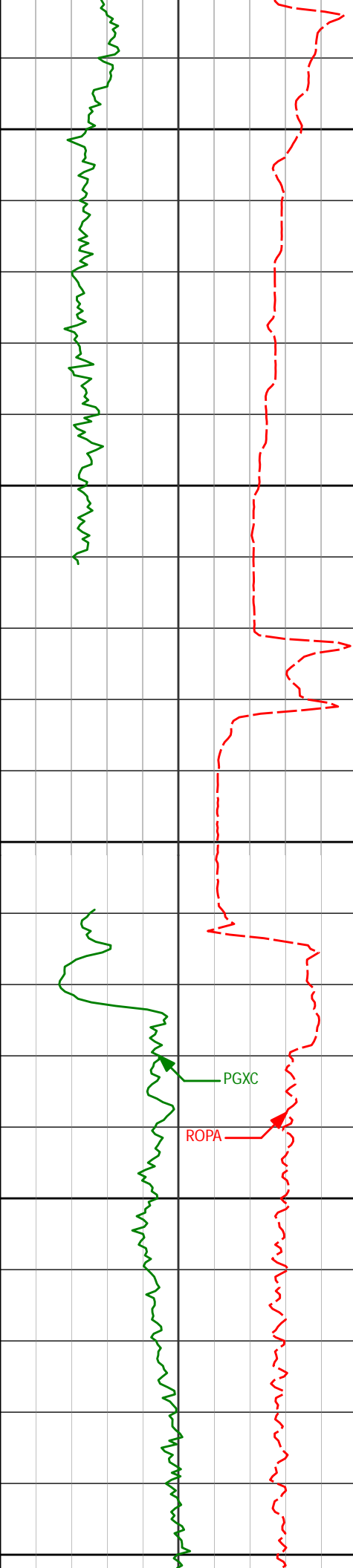
70.94°

1.65°

6997.37'

-1117.06'

7500



7550

7577'

82.90°

0.88°

7017.70'

-1029.56'

7600

7613'

88.67°

0.14°

7020.34'

-993.68'

7650

Run 200

7" Casing Shoe

PGXC

ROPA

7700

7726'

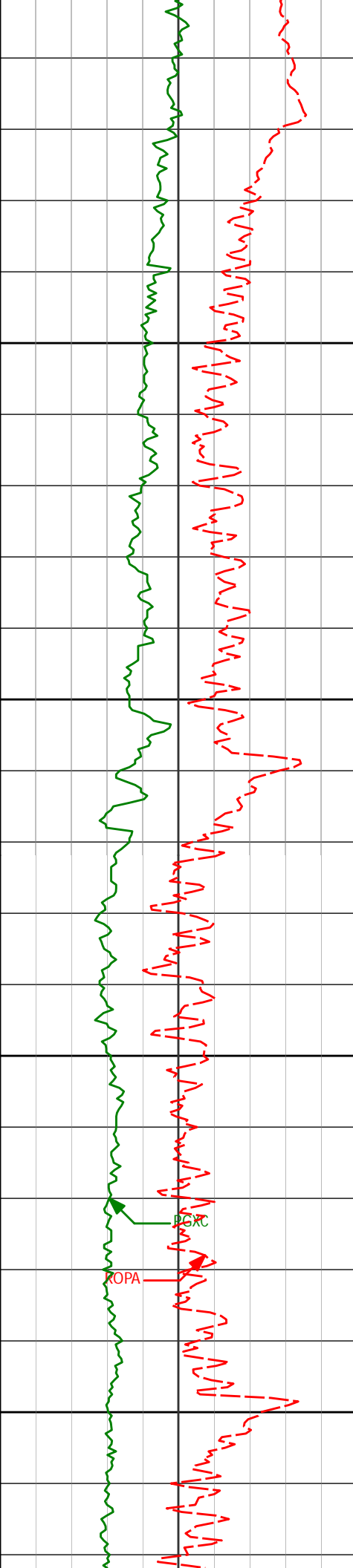
90.31°

0.53°

7021.35'

-880.70'

7750



7800

7816'

90.71°

0.54°

7020.55'

-790.72'

7850

7900

7906'

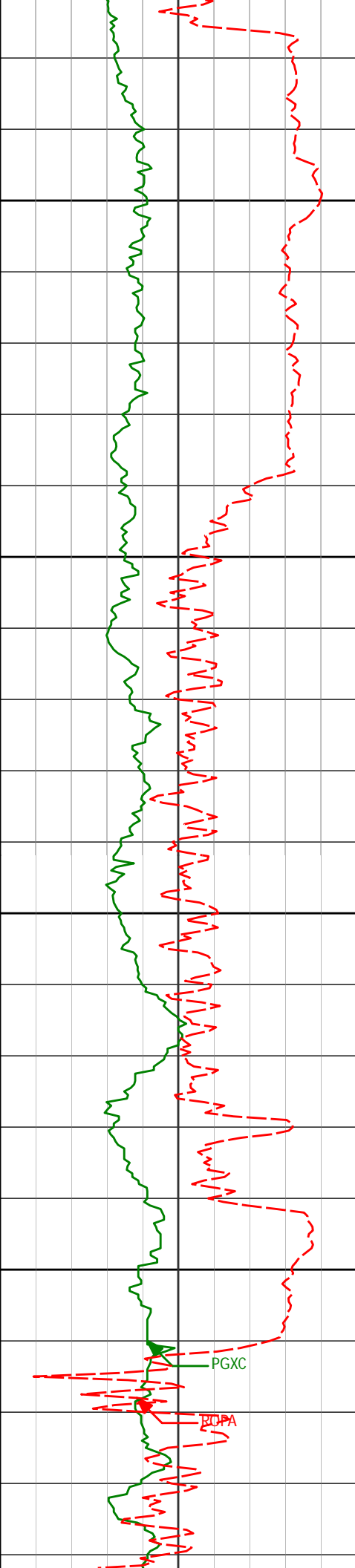
91.23°

0.31°

7019.02'

-700.74'

7950



8000

8050

8100

8150

7997'

91.32°

0.18°

7017.00'

-609.78'

8087'

92.03°

359.60°

7014.37'

-519.85'

8177'

91.91°

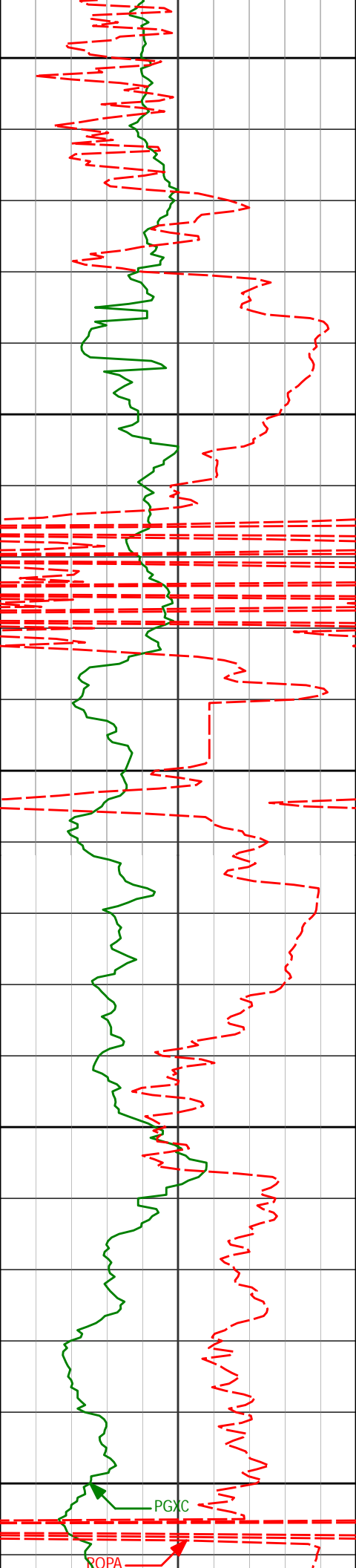
0.95°

7011.27'

-429.92'

PGXC

BCPA



8200

8250

8300

8350

8400

8267'

91.88°

1.93°

7008.29'

-339.97'

8356'

91.23°

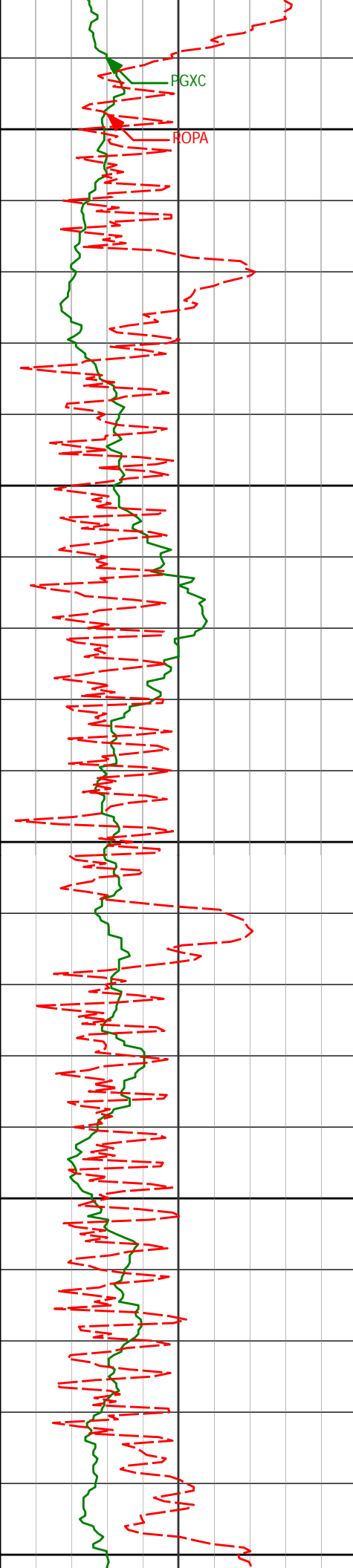
1.09°

7005.88'

-251.00'

PGXC

ROPA



PGXC

ROPA

8650

8700

8750

8800

8850

8717'

88.98°

1.83°

7004.50'

109.92'

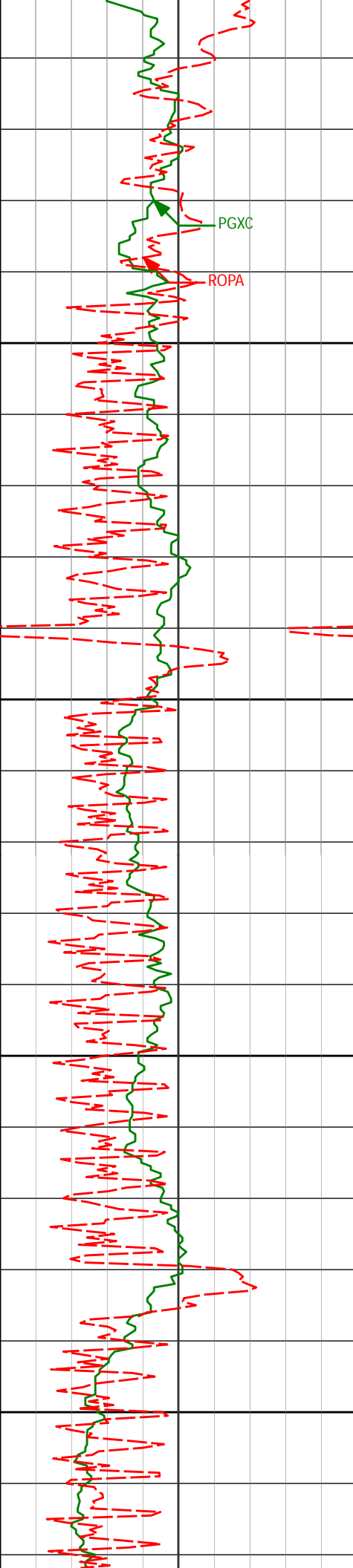
8807'

89.05°

1.62°

7006.05'

199.91'



8900

8950

9000

9050

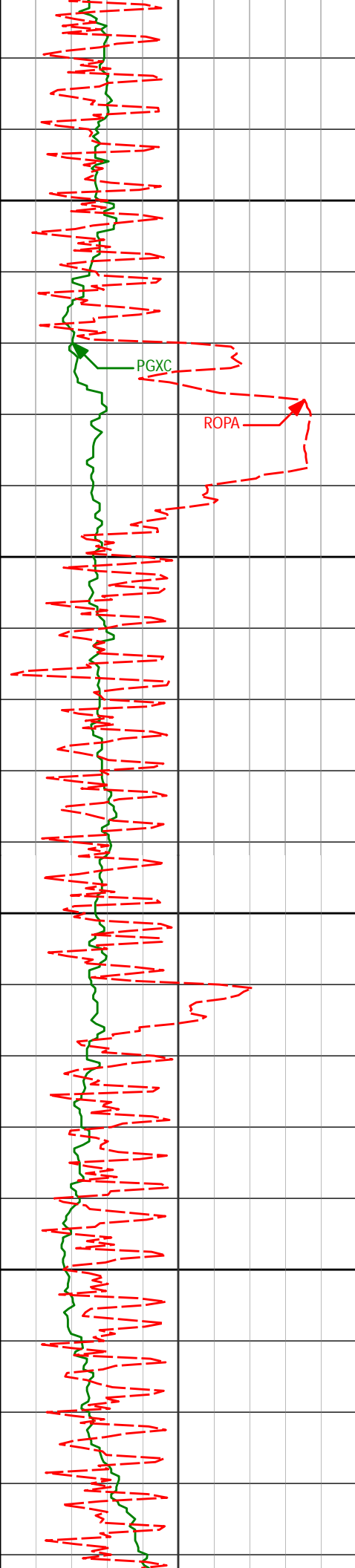
8897'

89.01°

1.59°

7007.58'

289.89'



9100

9150

9200

9250

9077'

88.67°

1.13°

7011.22'

469.86'

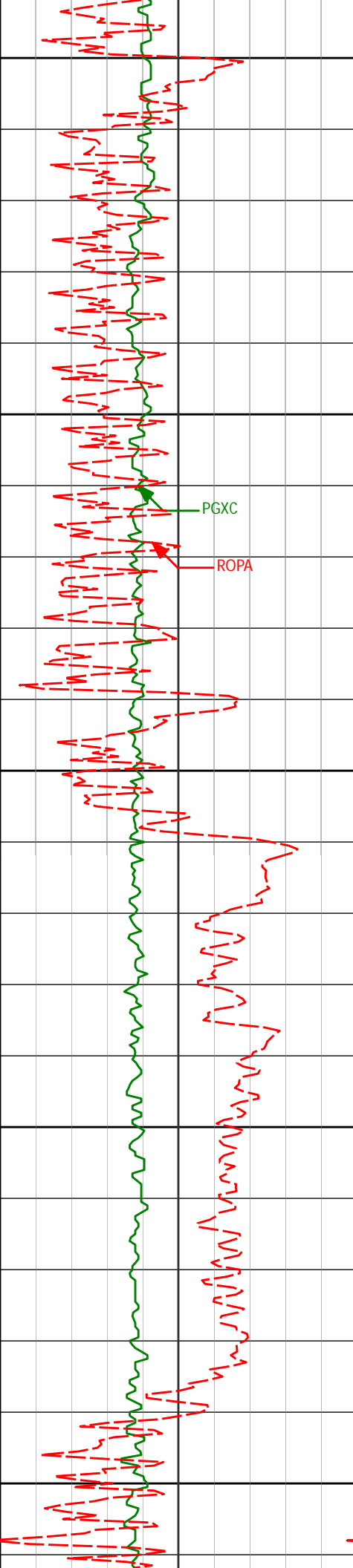
9257'

90.31°

1.08°

7012.82'

649.84'



9300

9350

9400

9450

9500

9347'

90.43°

1.18°

7012.24'

739.84'

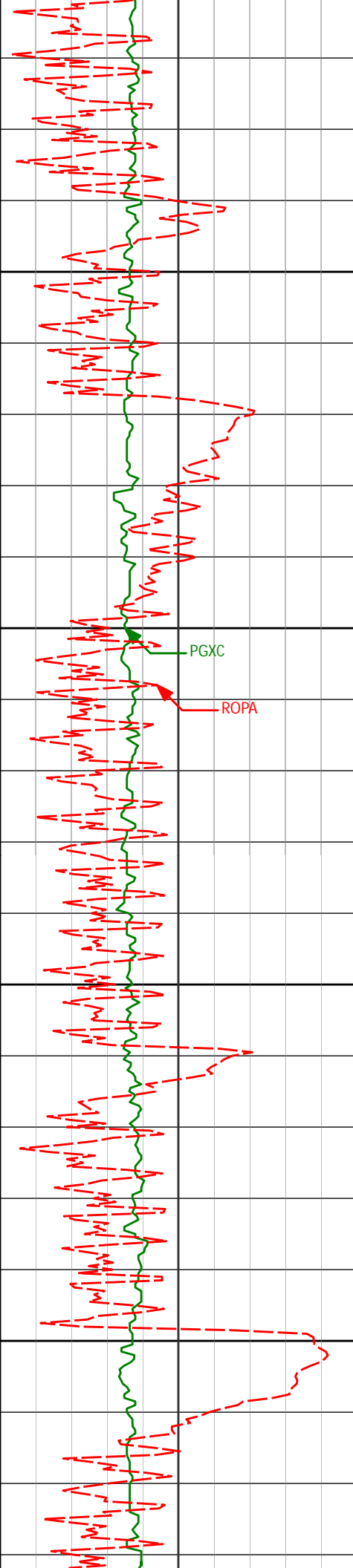
9437'

91.42°

1.28°

7010.79'

829.83'



9550

9600

9650

9700

9527'

91.14°

1.50°

7008.78'

919.80'

9617'

91.39°

2.00°

7006.79'

1009.78'

9707'

91.36°

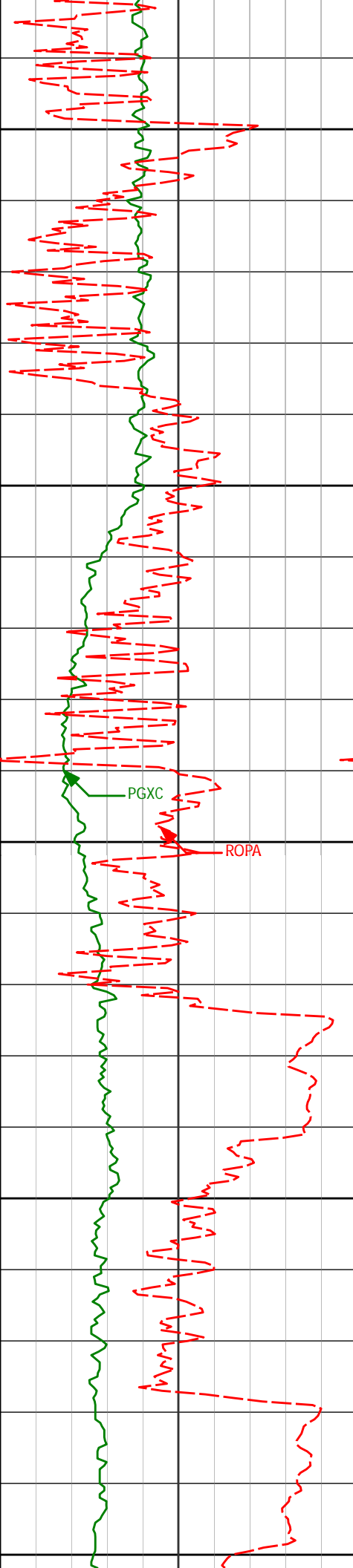
2.71°

7004.63'

1099.74'

PGXC

ROPA



9750

9800

9850

9900

9950

PGXC

ROPA

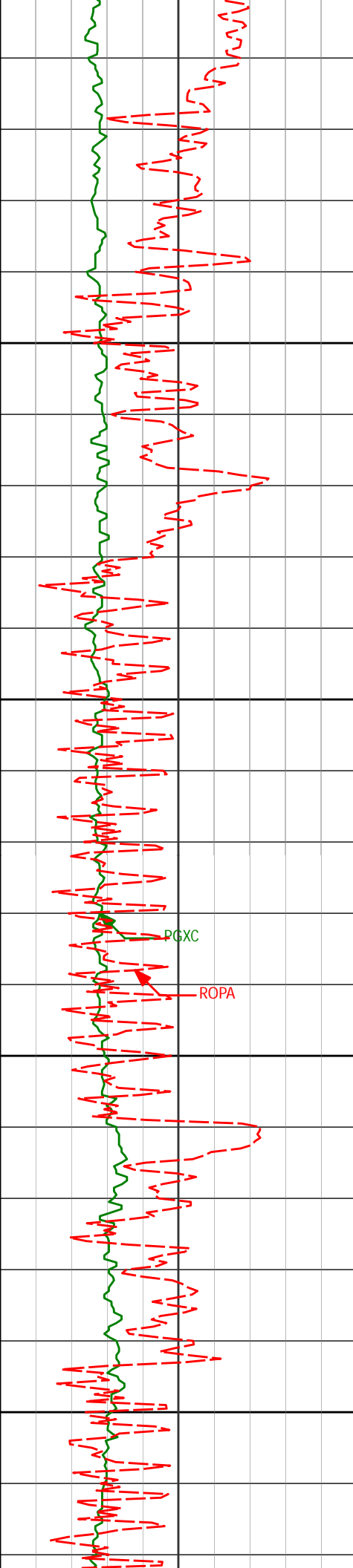
9887'

91.88°

2.95°

6999.54'

1279.60'



10000

10050

10100

10150

9977'

89.78°

1.54°

6998.24'

1369.58'

10067'

89.78°

1.22°

6998.58'

1459.58'

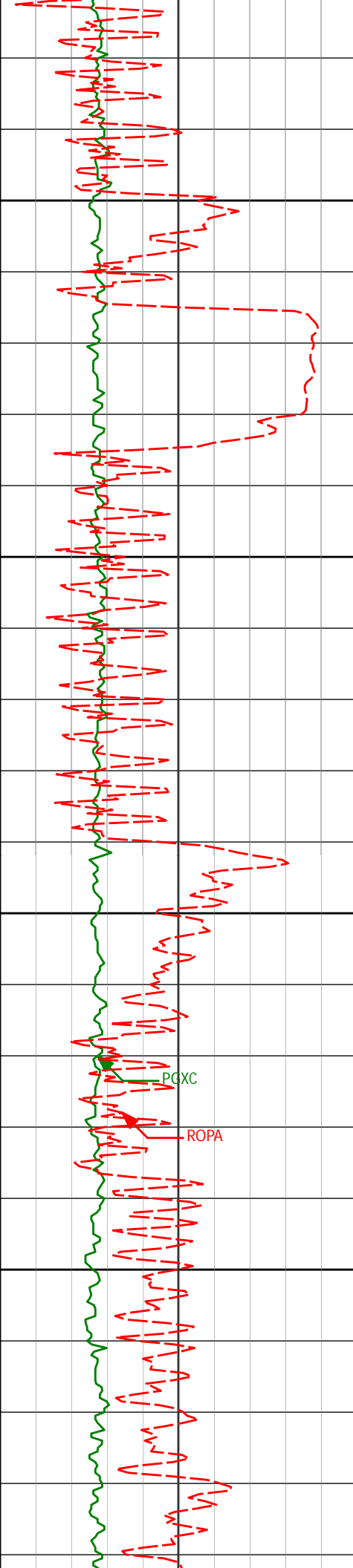
10157'

90.86°

0.91°

6998.08'

1549.57'



10200

10250

10300

10350

10247'

89.38°

1.87°

6997.89'

1639.57'

PGXC

ROPA

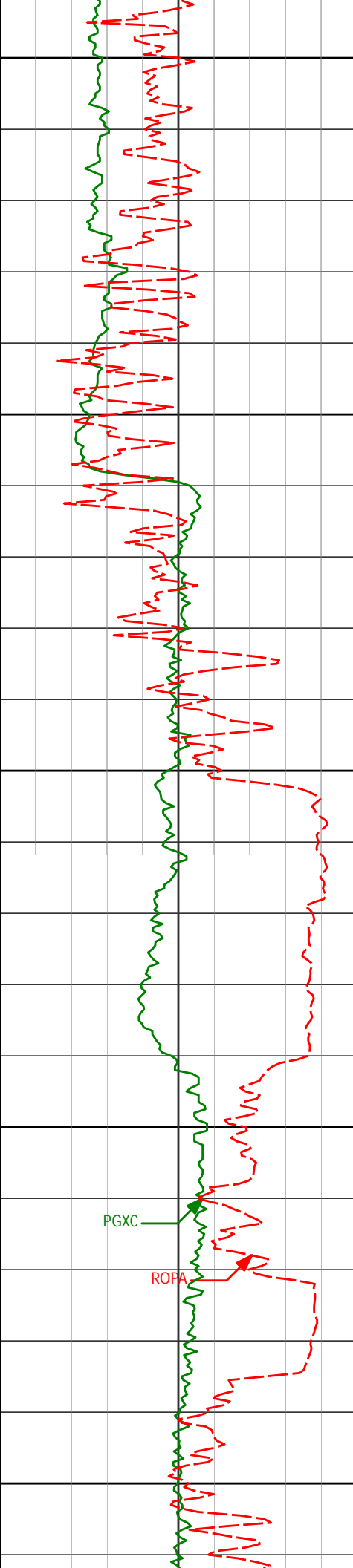
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89.66°

1.63°

6998.65'

1729.56'



10400

10426'

90.09°

1.40°

6998.84'

1818.56'

10450

10500

10550

PGXC

ROPA

10600

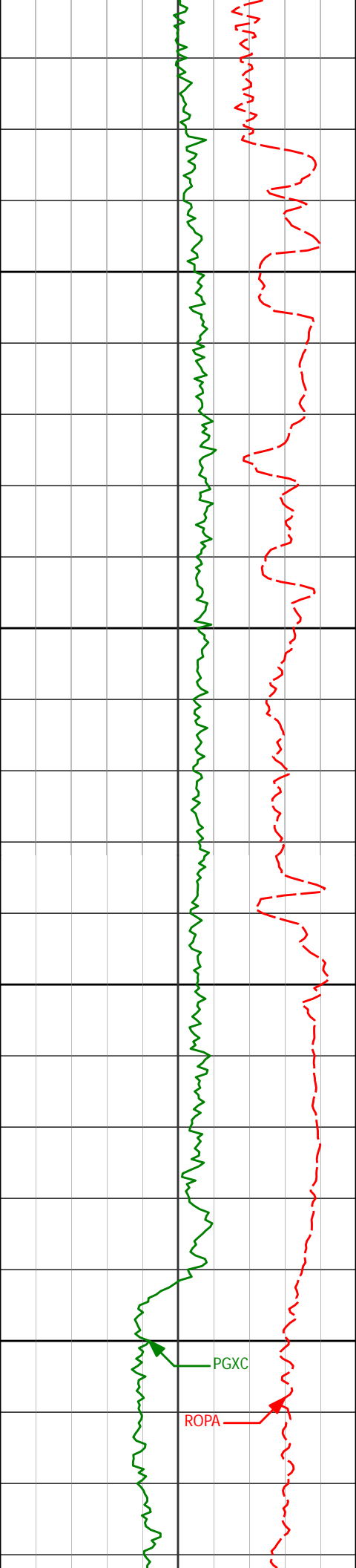
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0.74°

6998.31'

1998.56'



10650

10700

10750

10800

10696'

90.43°

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2088.55'

10786'

90.98°

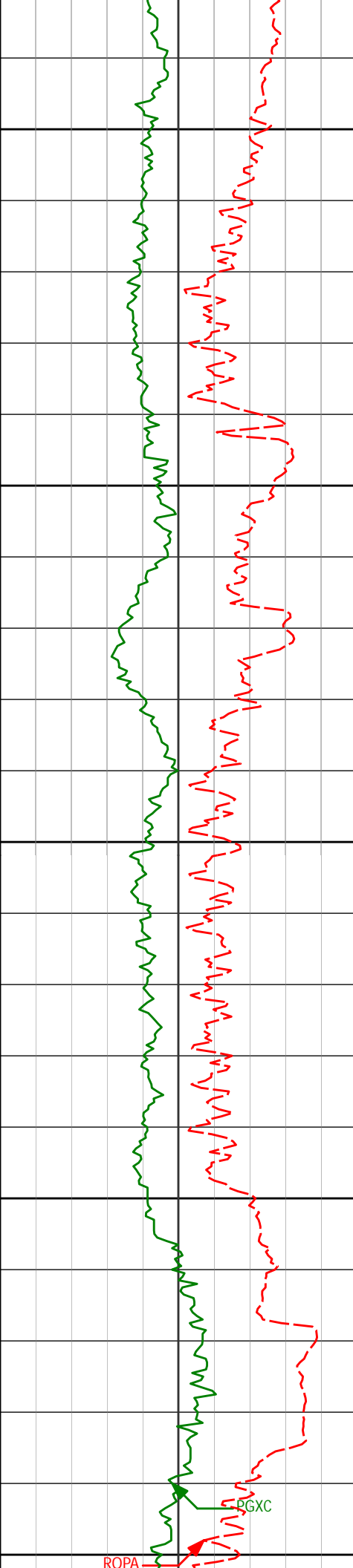
1.63°

6996.67'

2178.55'

PGXC

ROPA



10850

10876'

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1.75°

6995.17'

2268.53'

10900

10950

10966'

91.36°

1.50°

6993.38'

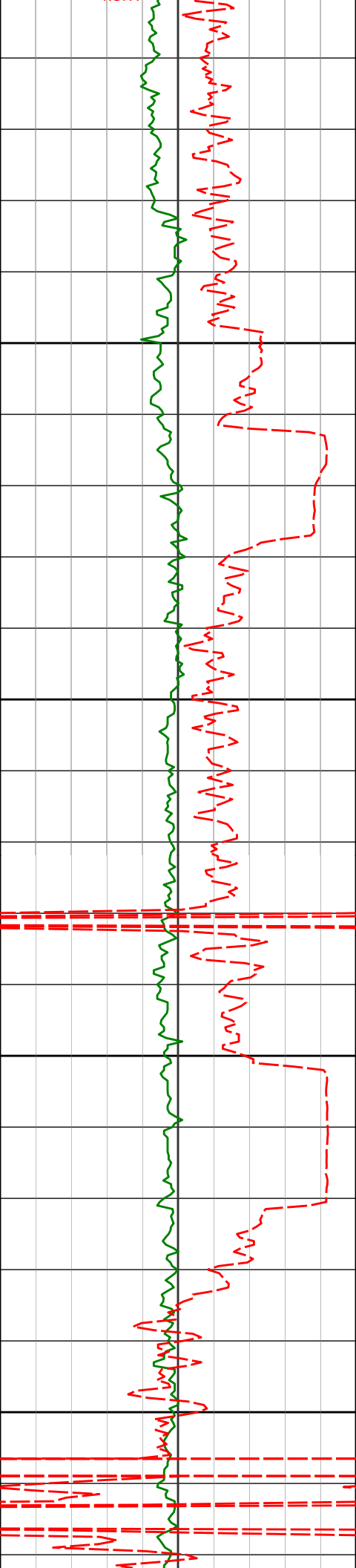
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11050

ROPA

PGXC



11100

11150

11200

11250

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1.39°

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2448.50'

11146'

90.25°

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6991.58'

2538.48'

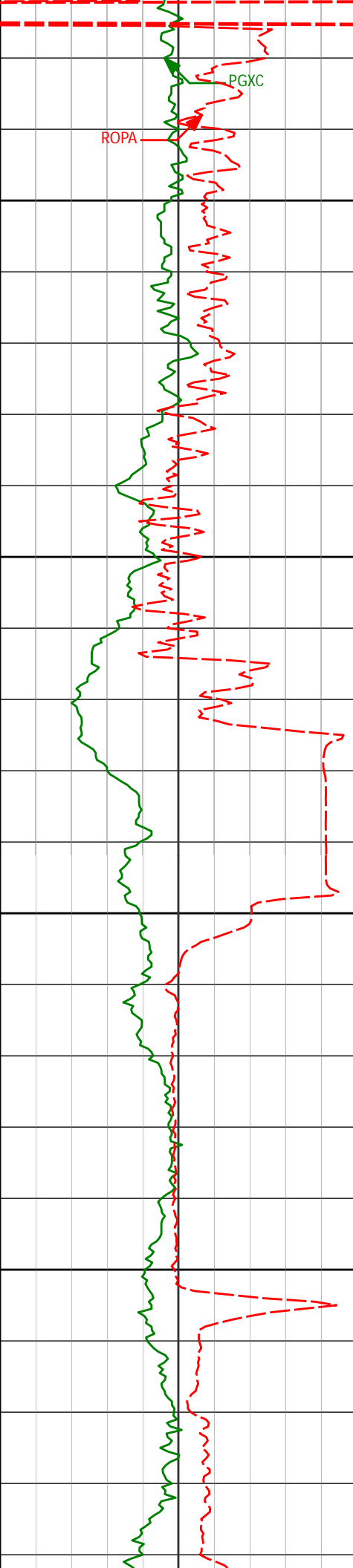
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1.30°

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2628.47'



11300

11350

11400

11450

11326'

90.71°

1.31°

6991.22'

2718.47'

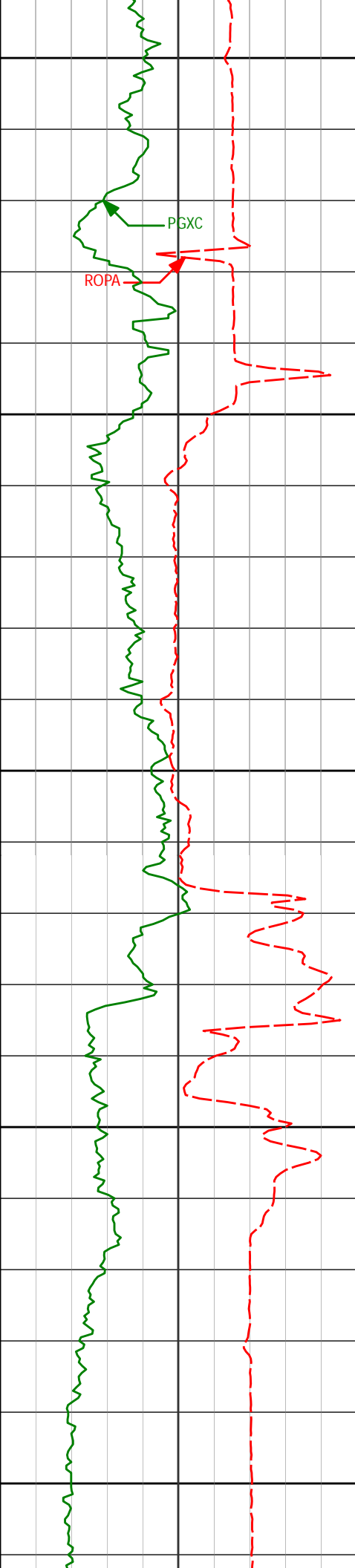
11416'

89.11°

2.78°

6991.36'

2808.45'



11500

11506'

89.42°

2.60°

6992.52'

2898.42'

11550

11600

11596'

90.00°

2.50°

6992.97'

2988.40'

11650

11700

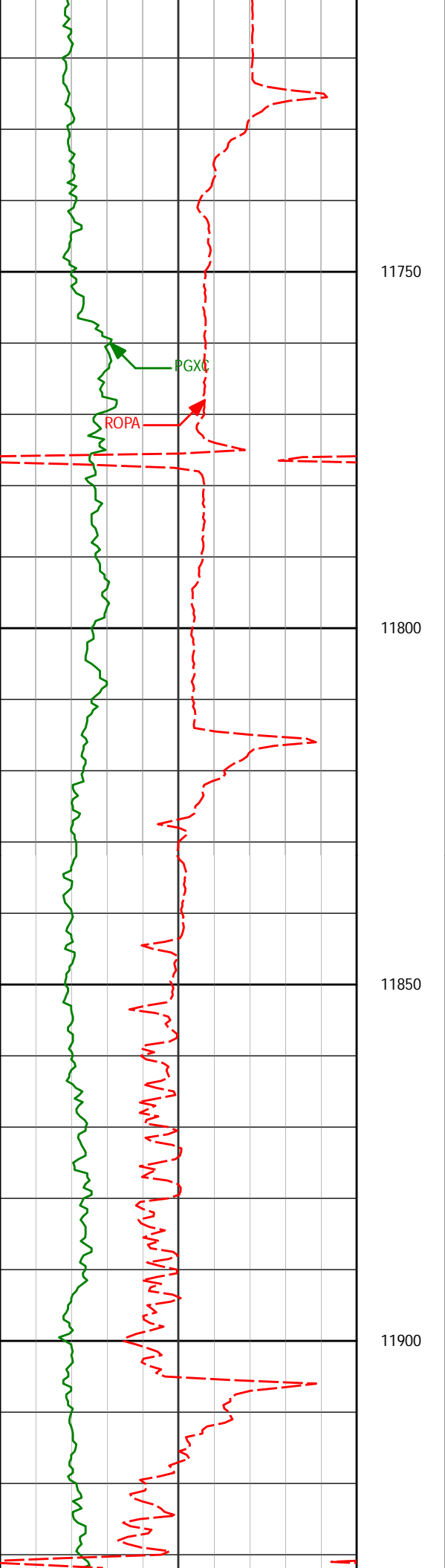
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2.47°

6992.68'

3078.38'



11776'

90.00°

1.67°

6992.39'

3168.37'

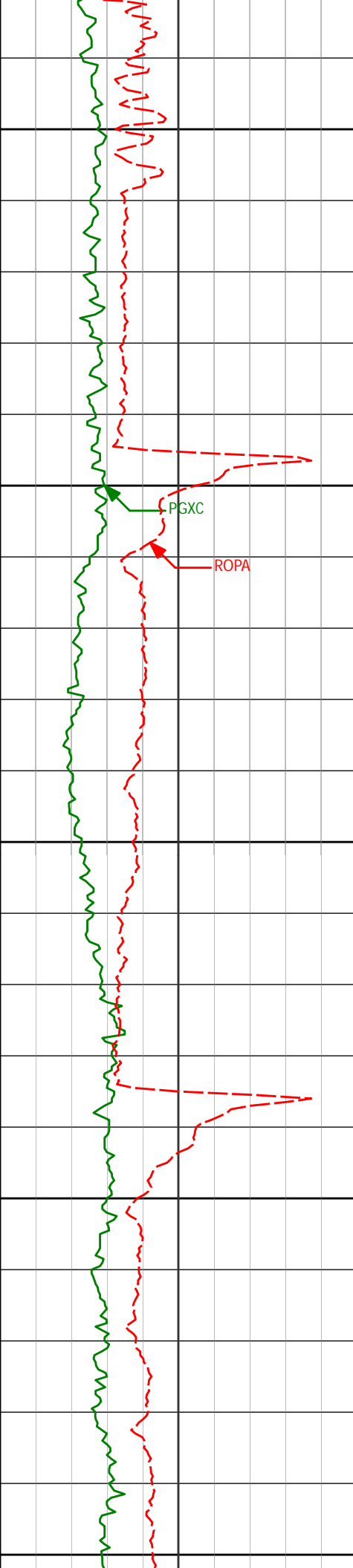
11866'

90.15°

1.18°

6992.28'

3258.37'



11950

11956'

89.72°

0.79°

6992.38'

3348.37'

12000

12050

12100

12150

12046'

90.12°

0.30°

6992.50'

3438.36'

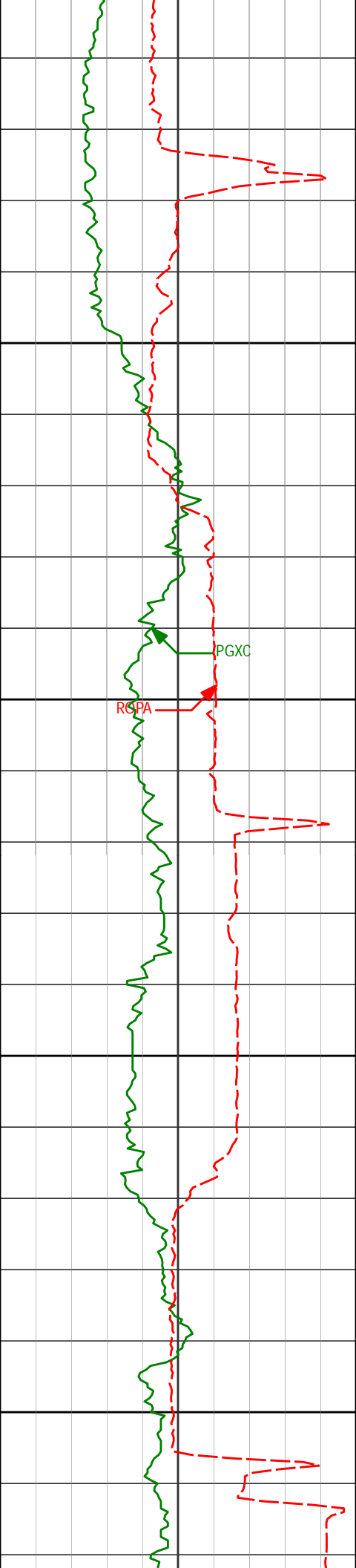
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0.45°

6992.05'

3528.35'



12200

12250

12300

12350

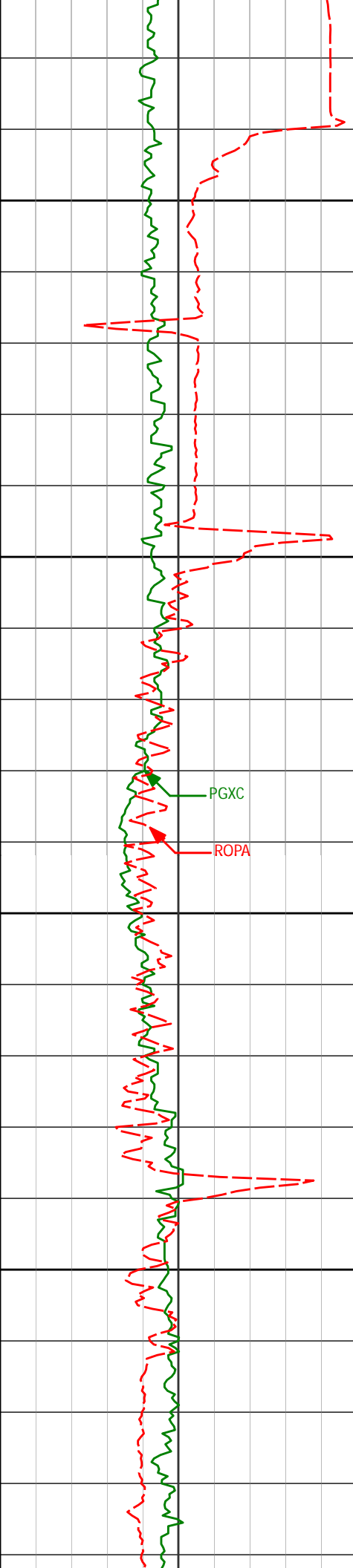
12316'

91.29°

0.32°

6989.30'

3708.30'



12400

12406'

89.69°

1.28°

6988.53'

3798.29'

12450

12500

12550

PGXC

ROPA

12496'

90.06°

0.82°

6988.73'

3888.29'

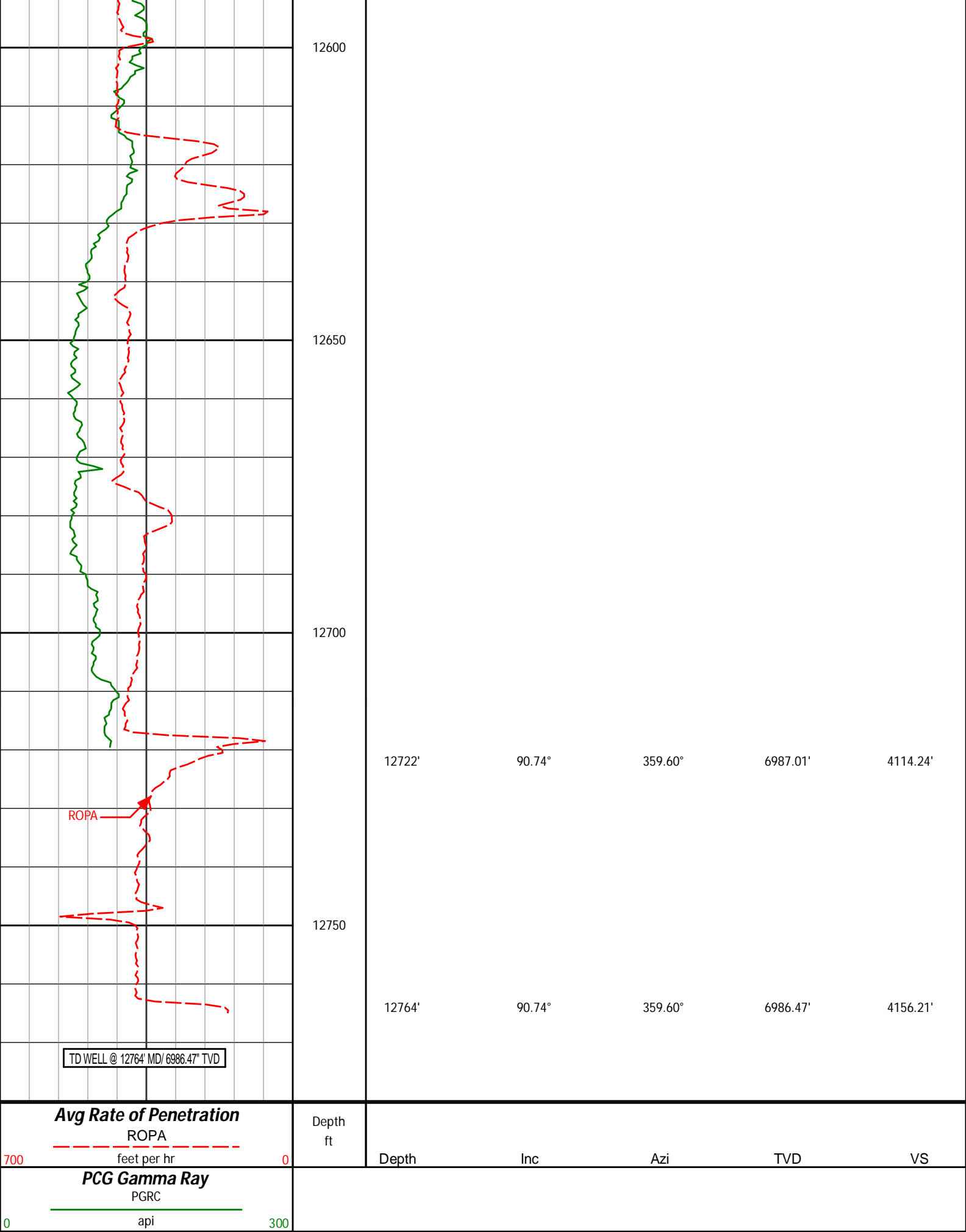
12586'

90.40°

0.53°

6988.36'

3978.28'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
GreenLeaf 4N-2HZ
Wattenberg
Weld Colorado
USA
CA-XX-0901928155

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
1277.00	1.30	289.40	1276.91	5.06 N	1.19 W	5.03	TIE-IN
1373.00	1.16	304.78	1372.89	5.98 N	3.02 W	5.90	0.37
1467.00	1.71	223.03	1466.87	5.49 N	4.75 W	5.38	2.05
1560.00	3.66	211.90	1559.76	1.96 N	7.27 W	1.79	2.16
1653.00	6.94	205.99	1652.35	5.61 S	11.30 W	-5.88	3.57
1747.00	8.43	203.93	1745.50	17.02 S	16.59 W	-17.40	1.61
1841.00	9.63	205.10	1838.34	30.44 S	22.72 W	-30.96	1.29
1934.00	11.48	201.49	1929.76	46.09 S	29.41 W	-46.77	2.11
2028.00	13.73	203.74	2021.49	65.01 S	37.33 W	-65.87	2.45
2121.00	15.69	205.55	2111.44	86.46 S	47.19 W	-87.54	2.16
2215.00	16.77	203.71	2201.69	110.35 S	58.13 W	-111.67	1.27
2308.00	18.51	203.22	2290.31	136.20 S	69.34 W	-137.78	1.88
2492.00	22.59	206.05	2462.57	194.82 S	96.39 W	-197.02	2.28
2582.00	24.14	204.61	2545.19	227.08 S	111.65 W	-229.63	1.84
2672.00	22.79	203.94	2627.75	259.74 S	126.39 W	-262.63	1.53
2762.00	24.83	206.89	2710.09	292.53 S	142.01 W	-295.78	2.62
2852.00	24.23	207.21	2791.96	325.81 S	159.00 W	-329.44	0.68
2942.00	25.40	206.14	2873.65	359.57 S	175.95 W	-363.58	1.39
3032.00	24.80	205.95	2955.15	393.87 S	192.71 W	-398.27	0.67
3122.00	23.52	204.49	3037.27	427.18 S	208.42 W	-431.94	1.57
3212.00	25.11	205.32	3119.28	460.79 S	224.03 W	-465.90	1.81
3302.00	23.67	204.49	3201.25	494.49 S	239.69 W	-499.96	1.64
3392.00	24.64	203.15	3283.37	528.19 S	254.55 W	-533.99	1.24
3482.00	22.89	201.26	3365.73	561.75 S	268.27 W	-567.87	2.12
3572.00	24.66	201.89	3448.09	595.49 S	281.62 W	-601.91	1.99
3662.00	24.01	200.18	3530.10	630.10 S	294.94 W	-636.82	1.07
3752.00	23.61	203.14	3612.44	663.86 S	308.34 W	-670.89	1.40
3842.00	22.79	205.01	3695.16	696.23 S	322.79 W	-703.59	1.22
3932.00	22.39	206.44	3778.26	727.37 S	337.79 W	-735.07	0.75
4022.00	24.19	206.57	3860.92	759.22 S	353.67 W	-767.28	2.00
4112.00	24.34	205.43	3942.97	792.46 S	369.89 W	-800.89	0.55
4202.00	24.31	205.33	4024.98	825.95 S	385.78 W	-834.75	0.06
4292.00	22.91	204.85	4107.45	858.59 S	401.06 W	-867.74	1.57
4382.00	23.18	207.33	4190.27	890.23 S	416.56 W	-899.72	1.12
4472.00	25.35	207.67	4272.31	923.03 S	433.64 W	-932.92	2.42
4562.00	24.98	205.58	4353.77	957.23 S	450.79 W	-967.51	1.07
4652.00	24.16	204.68	4435.62	991.11 S	466.69 W	-1001.75	1.00
4742.00	23.66	204.54	4517.90	1024.27 S	481.88 W	-1035.26	0.56
4832.00	25.19	204.34	4599.84	1058.15 S	497.27 W	-1069.49	1.70
4922.00	25.37	204.54	4681.22	1093.14 S	513.18 W	-1104.85	0.22
5012.00	23.82	203.92	4763.05	1127.30 S	528.55 W	-1139.35	1.75
5102.00	24.03	207.87	4845.32	1160.11 S	544.49 W	-1172.53	1.79
5192.00	23.97	210.71	4927.55	1192.03 S	562.39 W	-1204.86	1.29
5282.00	24.68	206.83	5009.56	1224.52 S	580.21 W	-1237.75	1.94
5372.00	24.24	206.30	5091.48	1257.85 S	596.88 W	-1271.46	0.55
5461.00	22.34	206.51	5173.23	1289.37 S	612.52 W	-1303.34	2.14
5551.00	19.51	203.60	5257.28	1318.45 S	626.18 W	-1332.73	3.35
5641.00	18.58	203.76	5342.36	1345.35 S	637.97 W	-1359.90	1.03
5732.00	16.34	201.84	5429.16	1370.50 S	648.58 W	-1385.29	2.54
5821.00	13.53	200.91	5515.15	1391.85 S	656.95 W	-1406.83	3.17
5912.00	12.36	200.97	5603.83	1410.89 S	664.24 W	-1426.04	1.29
6002.00	12.05	200.09	5691.80	1428.71 S	670.91 W	-1444.01	0.40
6092.00	10.54	198.60	5780.05	1445.33 S	676.76 W	-1460.76	1.71
6182.00	9.09	195.60	5868.73	1459.98 S	681.30 W	-1475.52	1.71
6272.00	7.89	191.11	5957.75	1472.89 S	684.40 W	-1488.49	1.52
6362.00	6.00	196.75	6047.08	1483.46 S	686.95 W	-1499.12	2.23
6452.00	5.04	194.04	6126.66	1491.78 S	689.22 W	-1507.59	1.08

6432.00	5.04	194.91	6136.66	1491.78 S	689.32 W	-1507.30	1.08
6542.00	2.75	190.11	6226.45	1497.73 S	690.72 W	-1513.47	2.57
6632.00	0.82	203.94	6316.40	1500.44 S	691.36 W	-1516.20	2.18
6722.00	0.40	31.54	6406.40	1500.76 S	691.46 W	-1516.52	1.35
6812.00	5.27	350.80	6496.27	1496.41 S	691.95 W	-1512.19	5.53
6902.00	13.06	357.77	6585.05	1482.15 S	693.01 W	-1497.95	8.73
6992.00	20.90	1.56	6671.06	1455.90 S	692.97 W	-1471.71	8.79
7082.00	32.80	2.81	6751.22	1415.36 S	691.33 W	-1431.14	13.24
7172.00	44.33	358.18	6821.48	1359.38 S	691.13 W	-1375.17	13.20
7262.00	50.53	0.32	6882.34	1293.15 S	691.94 W	-1308.97	7.11
7352.00	55.65	0.98	6936.37	1221.21 S	691.11 W	-1237.04	5.72
7397.00	60.26	1.64	6960.24	1183.09 S	690.23 W	-1198.91	10.33
7487.00	70.94	1.65	6997.37	1101.28 S	687.88 W	-1117.06	11.86
7577.00	82.90	0.88	7017.70	1013.80 S	685.97 W	-1029.56	13.31
7613.00	88.67	0.14	7020.34	977.91 S	685.65 W	-993.68	16.16
7726.00	90.31	0.53	7021.35	864.92 S	684.99 W	-880.70	1.49
7816.00	90.71	0.54	7020.55	774.93 S	684.15 W	-790.72	0.44
7906.00	91.23	0.31	7019.02	684.94 S	683.48 W	-700.74	0.63
7997.00	91.32	0.18	7017.00	593.97 S	683.09 W	-609.78	0.17
8087.00	92.03	359.60	7014.37	504.01 S	683.26 W	-519.85	1.02
8177.00	91.91	0.95	7011.27	414.06 S	682.83 W	-429.92	1.51
8267.00	91.88	1.93	7008.29	324.14 S	680.57 W	-339.97	1.09
8356.00	91.23	1.09	7005.88	235.21 S	678.23 W	-251.00	1.19
8446.00	90.86	1.01	7004.24	145.24 S	676.58 W	-161.02	0.42
8536.00	90.25	2.89	7003.36	55.30 S	673.51 W	-71.03	2.20
8627.00	89.66	2.55	7003.44	35.60 N	669.20 W	19.94	0.75
8717.00	88.98	1.83	7004.50	125.53 N	665.76 W	109.92	1.10
8807.00	89.05	1.62	7006.05	215.47 N	663.05 W	199.91	0.25
8897.00	89.01	1.59	7007.58	305.42 N	660.53 W	289.89	0.06
9077.00	88.67	1.13	7011.22	485.34 N	656.26 W	469.86	0.32
9257.00	90.31	1.08	7012.82	665.29 N	652.79 W	649.84	0.91
9347.00	90.43	1.18	7012.24	755.27 N	651.01 W	739.84	0.17
9437.00	91.42	1.28	7010.79	845.24 N	649.08 W	829.83	1.11
9527.00	91.14	1.50	7008.78	935.19 N	646.90 W	919.80	0.40
9617.00	91.39	2.00	7006.79	1025.12 N	644.15 W	1009.78	0.62
9707.00	91.36	2.71	7004.63	1115.02 N	640.45 W	1099.74	0.79
9887.00	91.88	2.95	6999.54	1294.73 N	631.57 W	1279.60	0.32
9977.00	89.78	1.54	6998.24	1384.64 N	628.04 W	1369.58	2.81
10067.00	89.78	1.22	6998.58	1474.61 N	625.88 W	1459.58	0.36
10157.00	90.86	0.91	6998.08	1564.60 N	624.20 W	1549.57	1.25
10247.00	89.38	1.87	6997.89	1654.57 N	622.02 W	1639.57	1.96
10337.00	89.66	1.63	6998.65	1744.52 N	619.27 W	1729.56	0.41
10426.00	90.09	1.40	6998.84	1833.49 N	616.92 W	1818.56	0.55
10606.00	90.25	0.74	6998.31	2013.46 N	613.56 W	1998.56	0.38
10696.00	90.43	1.80	6997.77	2103.43 N	611.56 W	2088.55	1.19
10786.00	90.98	1.63	6996.67	2193.38 N	608.87 W	2178.55	0.64
10876.00	90.92	1.75	6995.17	2283.33 N	606.22 W	2268.53	0.15
10966.00	91.36	1.50	6993.38	2373.28 N	603.66 W	2358.51	0.56
11056.00	90.34	1.39	6992.05	2463.24 N	601.39 W	2448.50	1.14
11146.00	90.25	359.49	6991.58	2553.23 N	600.70 W	2538.48	2.11
11236.00	89.75	1.30	6991.58	2643.22 N	600.08 W	2628.47	2.09
11326.00	90.71	1.31	6991.22	2733.20 N	598.03 W	2718.47	1.07
11416.00	89.11	2.78	6991.36	2823.14 N	594.82 W	2808.45	2.41
11506.00	89.42	2.60	6992.52	2913.03 N	590.60 W	2898.42	0.40
11596.00	90.00	2.50	6992.97	3002.94 N	586.59 W	2988.40	0.65
11686.00	90.37	2.47	6992.68	3092.85 N	582.69 W	3078.38	0.41
11776.00	90.00	1.67	6992.39	3182.79 N	579.44 W	3168.37	0.98
11866.00	90.15	1.18	6992.28	3272.76 N	577.20 W	3258.37	0.57
11956.00	89.72	0.79	6992.38	3362.75 N	575.66 W	3348.37	0.65
12046.00	90.12	0.30	6992.50	3452.75 N	574.80 W	3438.36	0.70
12136.00	90.46	0.45	6992.05	3542.74 N	574.21 W	3528.35	0.41
12316.00	91.29	0.32	6989.30	3722.72 N	573.00 W	3708.30	0.47
12406.00	89.69	1.28	6988.53	3812.70 N	571.75 W	3798.29	2.07
12496.00	90.06	0.82	6988.73	3902.68 N	570.10 W	3888.29	0.66
12586.00	90.40	0.53	6988.36	3992.68 N	569.04 W	3978.28	0.50
12722.00	90.74	359.60	6987.01	4128.67 N	568.88 W	4114.24	0.73
12764.00	90.74	359.60	6986.47	4170.66 N	569.17 W	4156.21	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 1.34 DEGREES (TRUE)

VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 104 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 12764.00 FEET
IS 4209.32 FEET ALONG 352.23 DEGREES (TRUE)

Directional surveys tied onto Gyro's @ 1277' MD. Final Survey is a straight-line projection to the bit.

Date Printed:02 February 2015