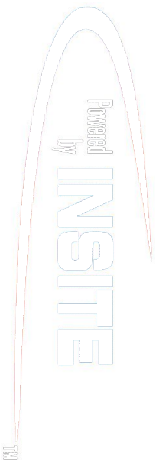


PCDC - Pressure Case Directional

PCGK - Pressure Case Gamma



1 : 240

Country : USA			
Field : Wattenberg			
Location : Lat: 40° 9' 42.16" North Long: 104° 38' 3.45" West			
Well : Greenleaf 29C-2HZ			
Company : Anadarko Petroleum Corp			
Rig : Ensign 145			
LOCATION		Other Services	
Latitude : 40° 9' 42.16" North Longitude : 104° 38' 3.45" West		Directional Drilling	
UTM Easting = 3,241,952.260 ft UTM Northing = 1,302,935.880 ft			
Permanent Datum : Ground Level		Elev. KB N/A	
Log Measured From : Drill Floor		DF 0.00 ft	
Drilling Measured From : Drill Floor		GL 4854.00 ft	
		WD N/A	
Depth Logged : 1,293.00 ft To 12,733.00 ft		Unit No. : 12540009	
Date Logged : 07-Jan-15 To 16-Jan-15		Job No. : CA-XX-0901929201	
Total Depth MD : 12,733.00 ft TVD: 7,101.66 ft		Plot Type : Final	
Spud Date : 07-Jan-15		Plot Date : 16-Jan-15	
Run No.	Borehole Record (MD)		Run No.
	Size	To	
0100	8.750 in	1,293.00 ft	5,033.00 ft
0200	8.750 in	5,033.00 ft	7,680.00 ft
0300	6.130 in	7,680.00 ft	10737.00 ft
0400	6.130 in	10737.00 ft	12733.00 ft
		Casing Record (MD)	
		Size	To
		Weight	From
		9.625 in	36.00 lbpf
		7.000 in	27.00 lbpf
			13.00 ft
			1,348.00 ft
			7,670.00 ft

WELL INFORMATION					
MWD Run Number	100	200	300	400	
Date run completed	09-Jan-15	11-Jan-15	14-Jan-15	16-Jan-15	
Rig Bit Number	0100	0200	0300	0400	
Bit Size (in)	8.750	8.750	6.130	6.130	
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	
Log Start Depth (MD, ft)	1,293.00	5,033.00	7,680.00	10,737.00	
Log End Depth (MD, ft)	5,033.00	7,680.00	10,737.00	12,733.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	07-Jan-15 18:52	09-Jan-15 14:00	12-Jan-15 21:49	15-Jan-15 00:15	
Drill/Wipe End Date and Time	08-Jan-15 13:05	10-Jan-15 22:45	14-Jan-15 05:24	15-Jan-15 18:20	
Min Inc (deg) @ Depth (MD, ft)	0.47 @ 1,373.00	0.62 @ 6,721.00	88.27 @ 9,705.00	89.14 @ 11,685.00	
Max Inc (deg) @ Depth (MD, ft)	21.36 @ 4,111.00	84.63 @ 7,634.00	91.60 @ 9,975.00	93.33 @ 12,691.00	
Bit TFA(in2) / Bit Type	1.37 / PDC	1.37 / PDC	1.2425 / PDC	1.2425 / PDC	
Flow Rate (gpm)	604.05	574.17	296.91	284.00	
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	/	/	
Fluid Type	Native/Spud Mud	Native/Spud Mud	Polymer	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.60 / 28.00	9.90 / 40.00	9.70 / 40.00	9.80 / 41.00	
Filtrate CL (ppm)	1,600.00	2,500.00	0.00	3,200.00	
pH / Fluid Loss (mptm)	9.30 / 0	6.00 / 7	9.00 / 0	9.00 / 0	
PV (cP) / YP (lhf2)	2 / 1.00	10 / 7.00	15 / 14.00	14 / 12.00	
% Solids / % Sand	4.00 / 0	11 / 0.2	7.00 / 0.25	3.60 / 0.25	
% Oil / Oil:Water Ratio	N/A / N/A	0 / N/A	2.00 / N/A	2.00 / N/A	
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A	N/A @ N/A	

Max Tool Temp (degF) / Source	142.25 / PCM	170.37 / PCM	218.14 / PCM	236.82 / PCM	
Rm @ Max Tool Temp (degF)	PCM @ 142.25	PCM @ 170.37	PCM @ 218.14	PCM @ 236.82	
Lead MWD Engineer	Matt Busche	Matt Busche	Aleksey Treskov	Aleksey Treskov	
Customer Representative	Kalib Ford	Kalib Ford	Vern Stewart	Vern Stewart	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.93	5.93	5.93	5.93	
Sub Serial Number	11341332	11341332	12310754	12310754	
Insert Serial Number	11619995	11680732	11619995	11227547	
Date and Time Initialized	07-Jan-15 09:15	09-Jan-15 04:06	12-Jan-15 02:17	14-Jan-15 11:27	
Date and Time Read	09-Jan-15 07:11	11-Jan-15 09:05	14-Jan-15 14:44	16-Jan-15 13:00	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	44.16	44.19	40.58	40.38	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341332	11341332	12310754	12310754	
Sonde Serial Number	11297590	11297555	11297555	11062073	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	99.86	23.61	142.26	237.46	

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG	PCG	
Distance From Bit (ft)	49.11	49.14	45.53	45.33	
Recorded Sample Period (sec)	10	10	10	10	
Software Version	8.15	8.15	8.15	8.15	
Sub Serial Number	11341332	11341332	12310754	12310754	
Insert/Sonde Serial Number	11293276	11579773	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 realtime data.
4. REMARK #1 Data gap between 3216' to 3302' 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

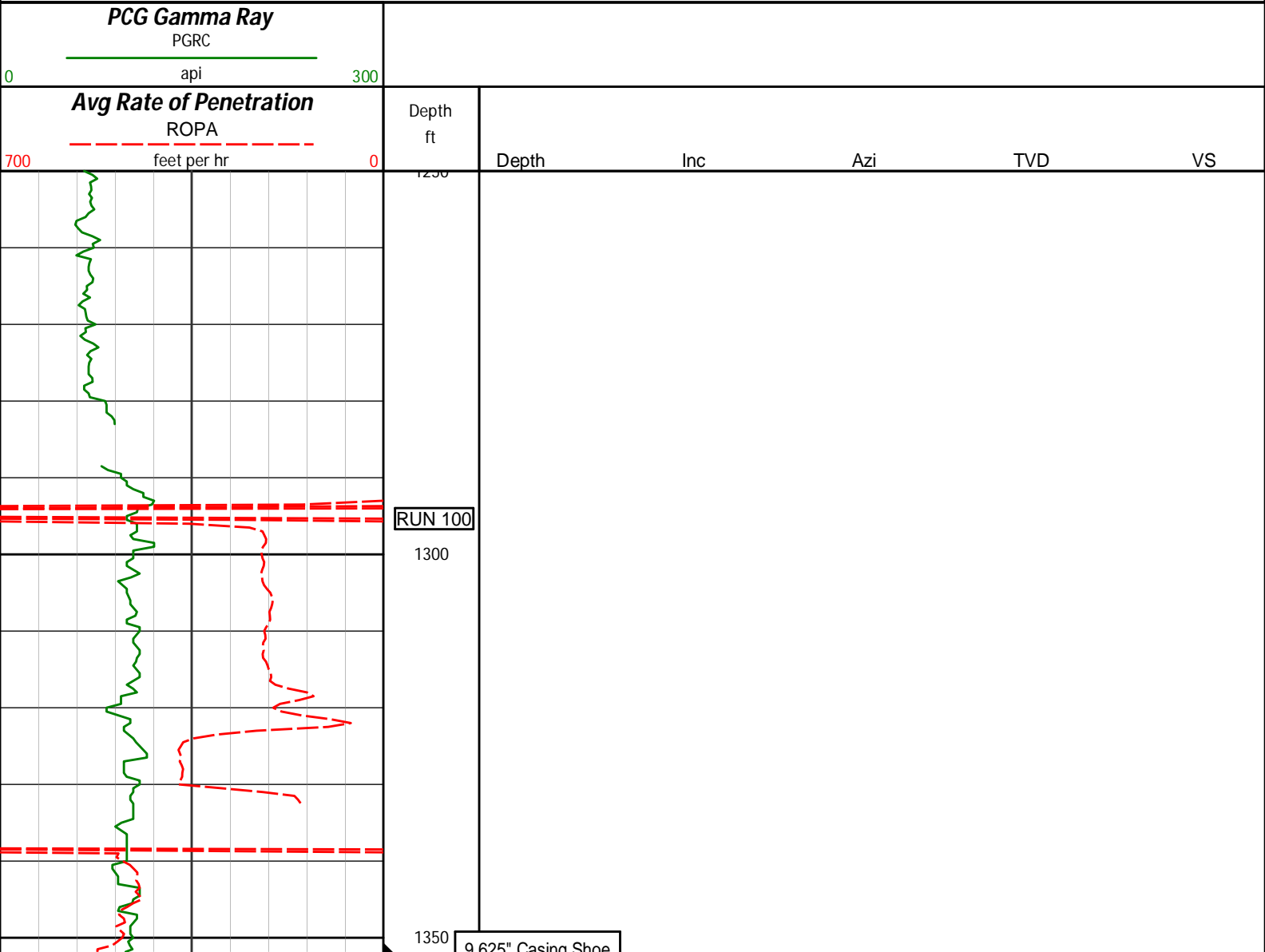
ROPA (Average Rate of Penetration):
Interval Resolution: 0.5 ft
Interval Distance: 1.2 ft
Gap Fill: 3.0 ft

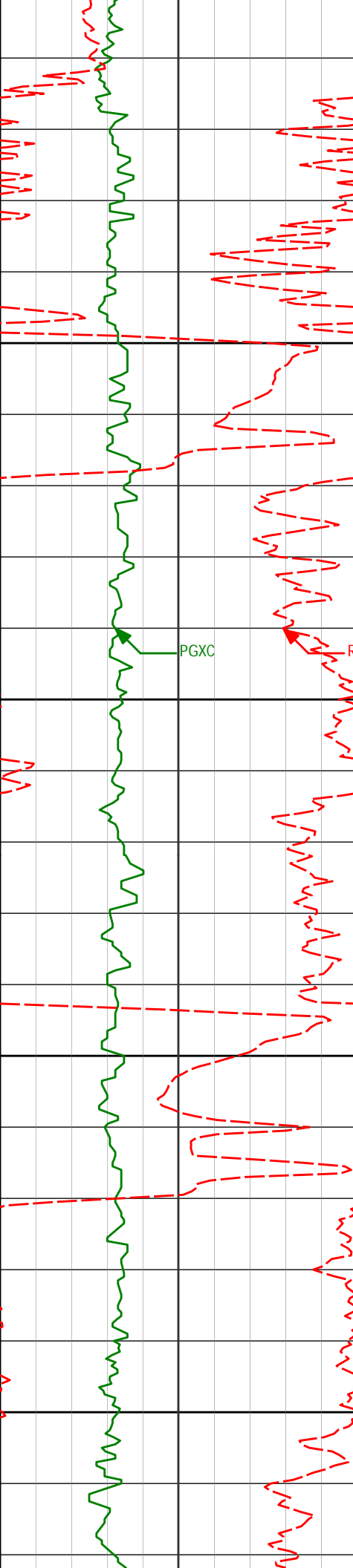
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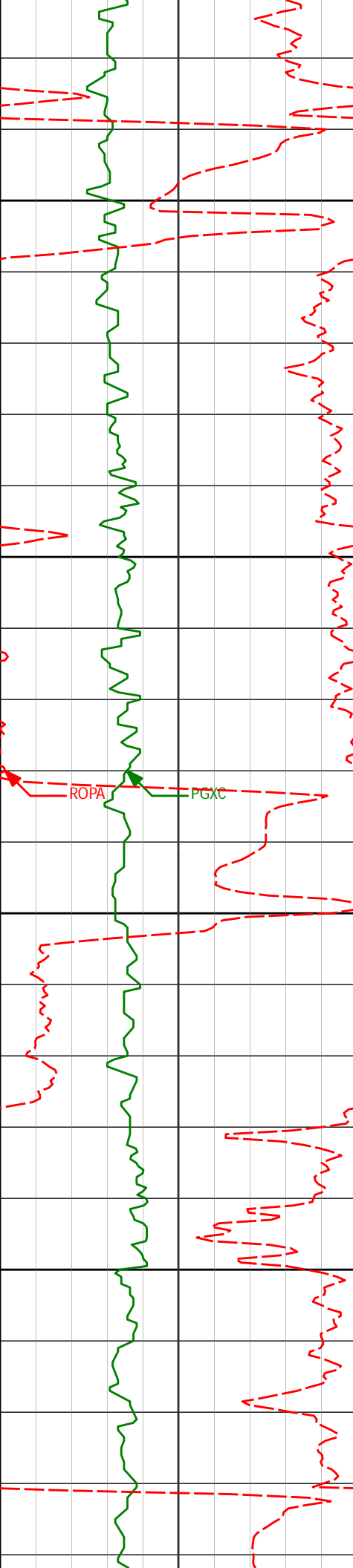
HALLIBURTON
Sperry Drilling Services

MD Detail Log 1:240





0.020" Casing Shoe				
1373'	0.47°	178.00°	1372.73'	-17.41'
1400				
1450				
1466'	2.21°	190.49°	1465.70'	-19.55'
1500				
1550				
1560'	4.04°	195.98°	1559.55'	-24.51'



1600

1650

1700

1750

1653'

6.19°

188.31°

1652.18'

-32.60'

1748'

8.38°

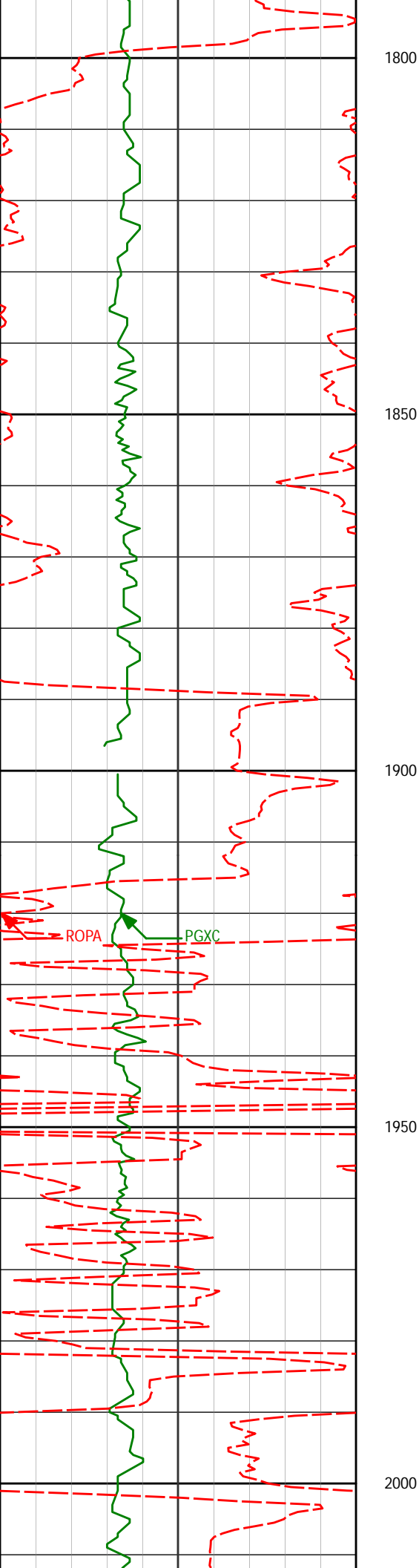
178.47°

1746.41'

-44.59'

ROPA

PGXC



1841'

10.00°

175.99°

1838.21'

-59.42'

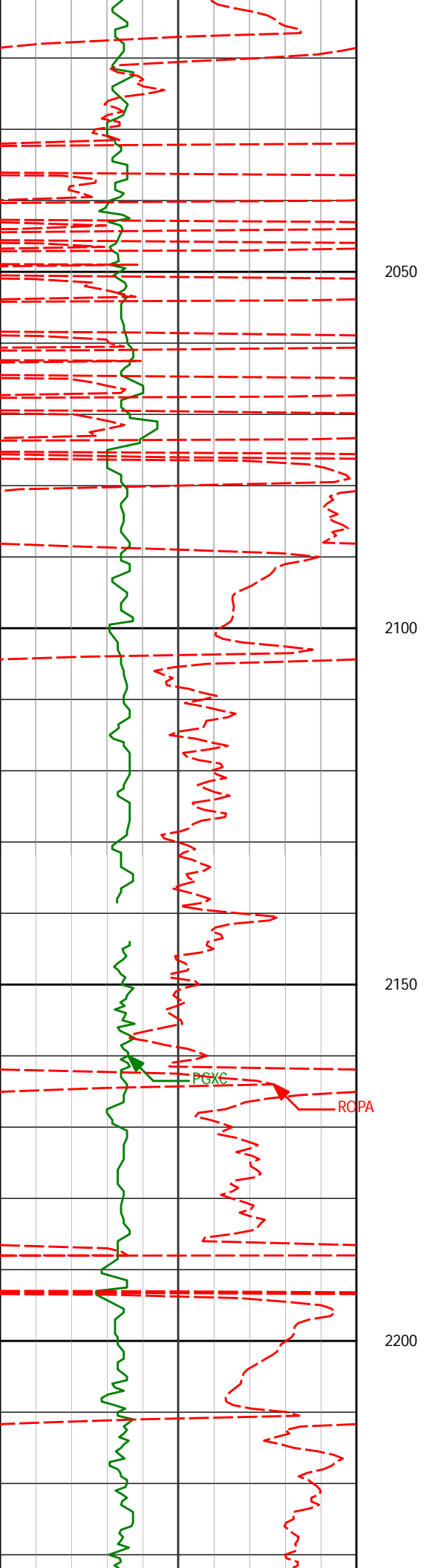
1934'

12.06°

180.15°

1929.49'

-77.20'



2028'

13.44°

176.88°

2021.17'

-97.93'

2050

2100

2121'

14.26°

181.68°

2111.47'

-120.18'

2150

PGXC

ROPA

2200

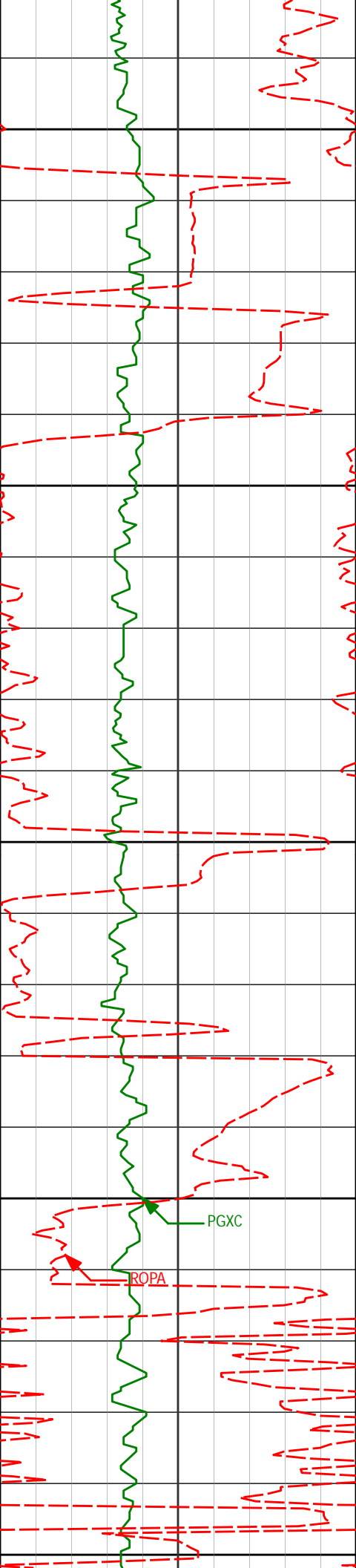
2214'

16.63°

180.55°

2201.11'

-144.93'



2250

2300

2350

2400

2450

2308'

18.40°

181.97°

2290.75'

-173.20'

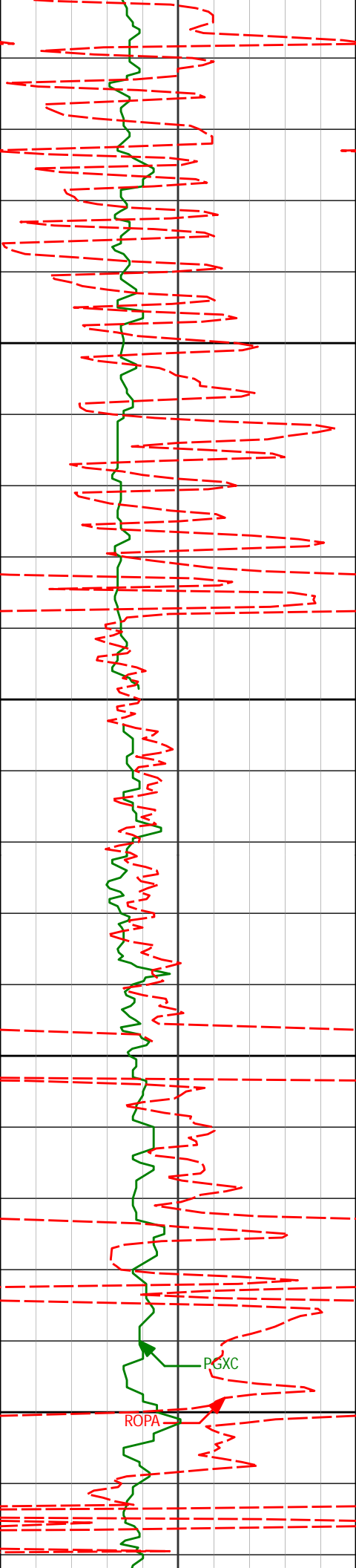
2401'

20.95°

183.78°

2378.31'

-204.45'



2491'	20.23°	182.44°	2462.56'	-236.04'
-------	--------	---------	----------	----------

2500

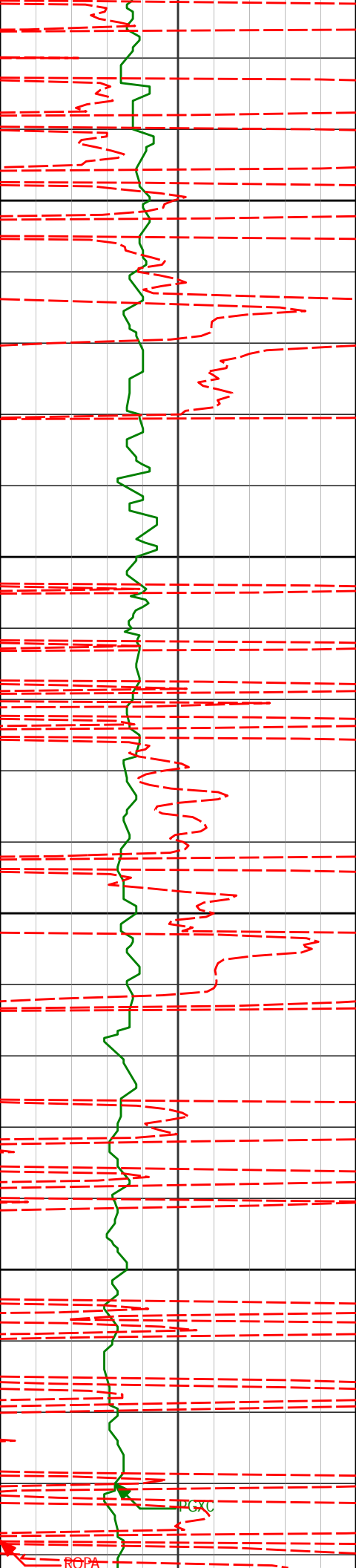
2550

2581'	19.56°	182.19°	2547.19'	-266.63'
-------	--------	---------	----------	----------

2600

2650

2671'	20.71°	181.47°	2631.69'	-297.58'
-------	--------	---------	----------	----------



2700

2750

2800

2850

2761'

20.08°

181.45°

2716.05'

-328.93'

2851'

19.55°

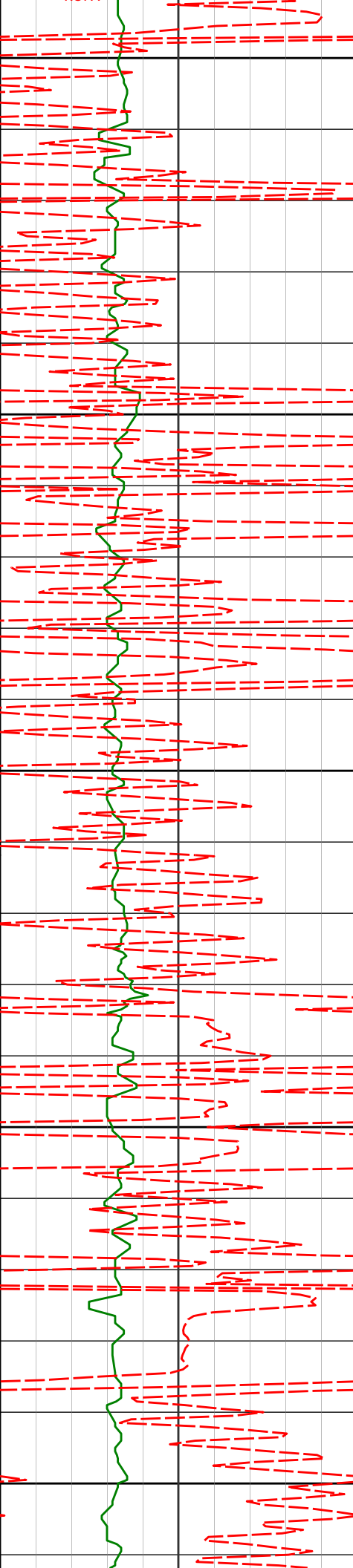
181.16°

2800.72'

-359.42'

PGXC

ROPA



2900

2941'

19.52°

180.23°

2885.54'

-389.51'

2950

3000

3031'

18.85°

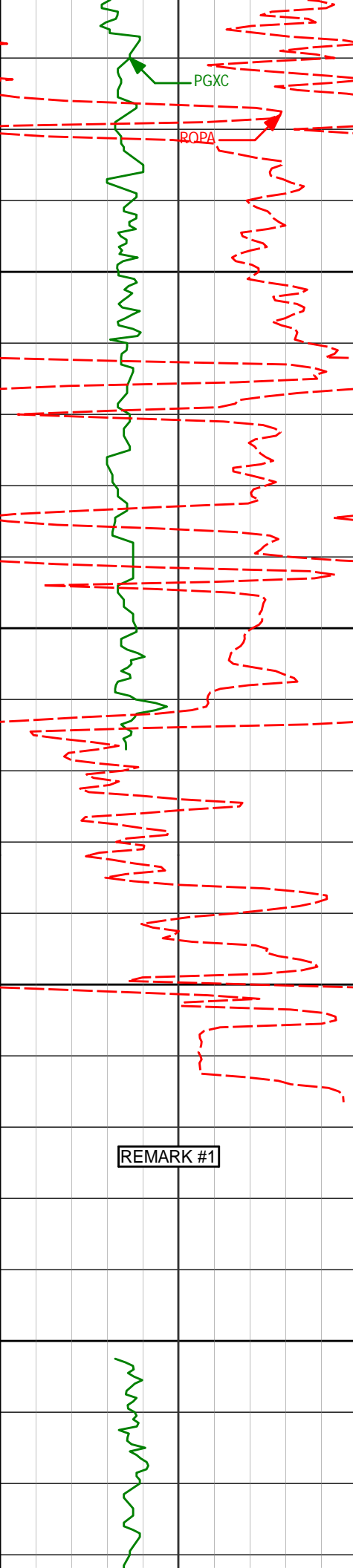
179.78°

2970.54'

-419.08'

3050

3100



3150

3200

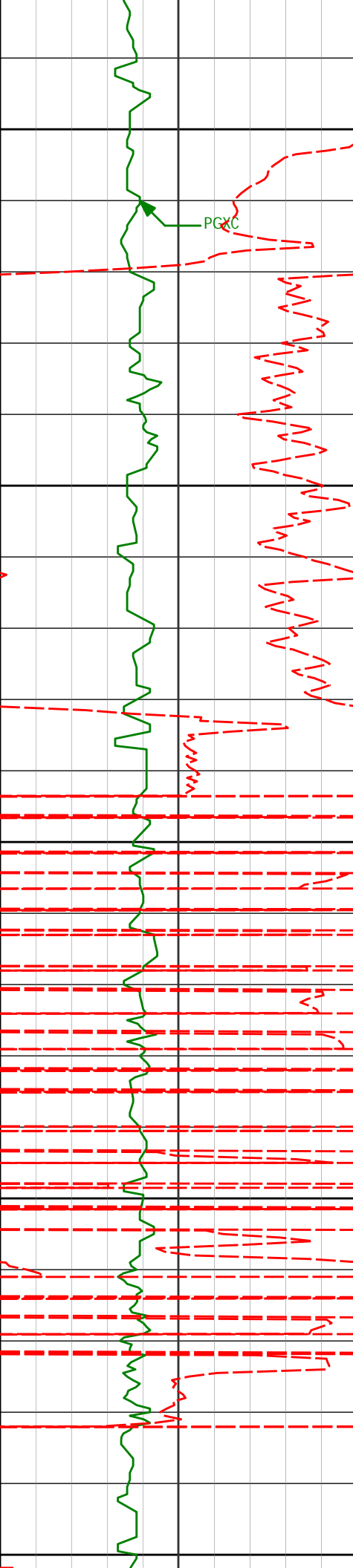
3250

3300

3121'	18.61°	178.15°	3055.77'	-447.98'
-------	--------	---------	----------	----------

3211'	19.69°	182.21°	3140.79'	-477.48'
-------	--------	---------	----------	----------

3301'	18.81°	182.12°	3225.76'	-507.12'
-------	--------	---------	----------	----------



3350

PGXC

3391'

19.90°

182.33°

3310.67'

-536.91'

3400

3450

3481'

18.29°

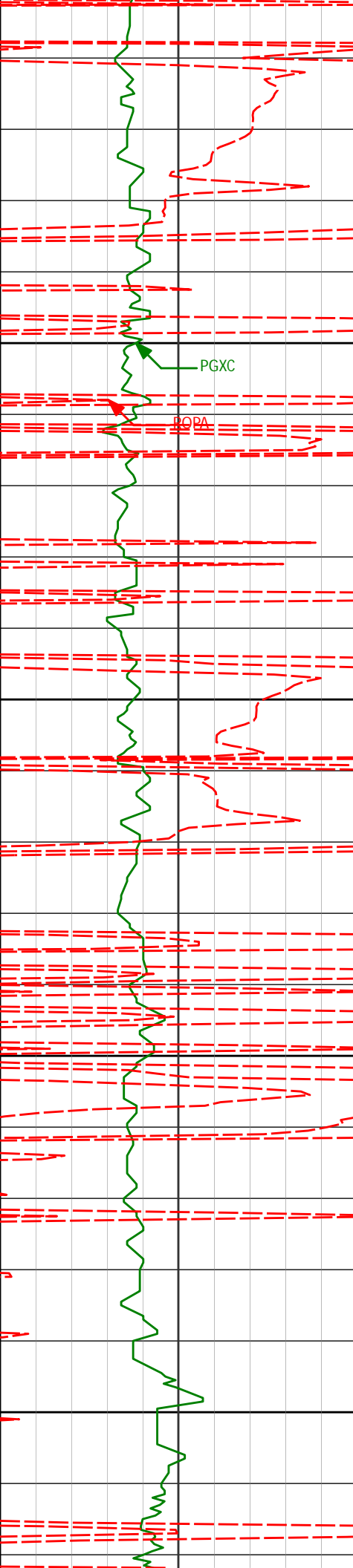
178.95°

3395.72'

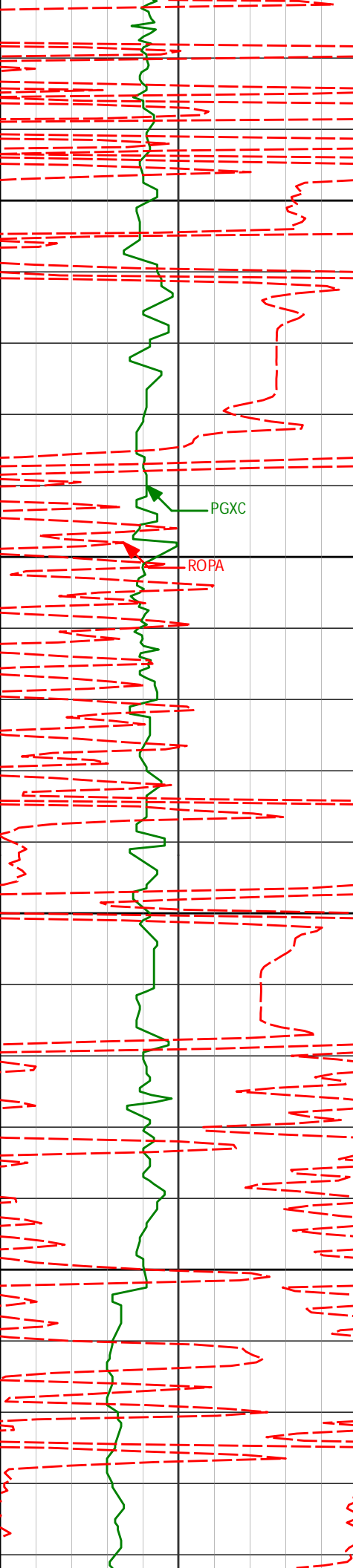
-566.33'

3500

3550



3571'	18.82°	180.26°	3481.04'	-594.97'
3600				
3650				
3661'	20.85°	181.75°	3565.70'	-625.50'
3700				
3750				
3751'	19.65°	181.05°	3650.14'	-656.63'



3800

3841'

20.21°

182.58°

3734.75'

-687.28'

PGXC

ROPA

3850

3900

3931'

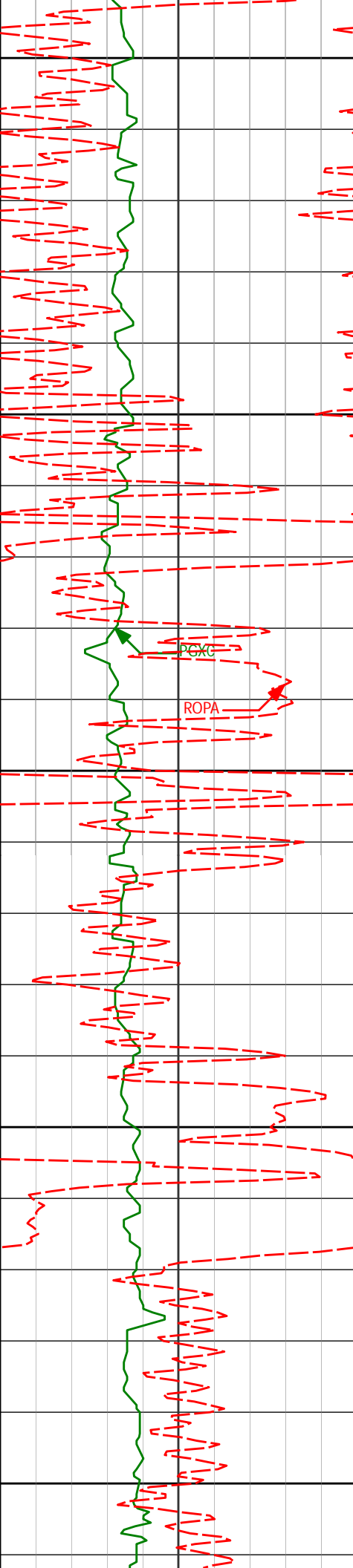
21.25°

182.77°

3818.92'

-719.08'

3950



4000

4021'

20.94°

183.19°

3902.89'

-751.42'

4050

4100

4111'

21.36°

182.67°

3986.82'

-783.83'

4150

4200

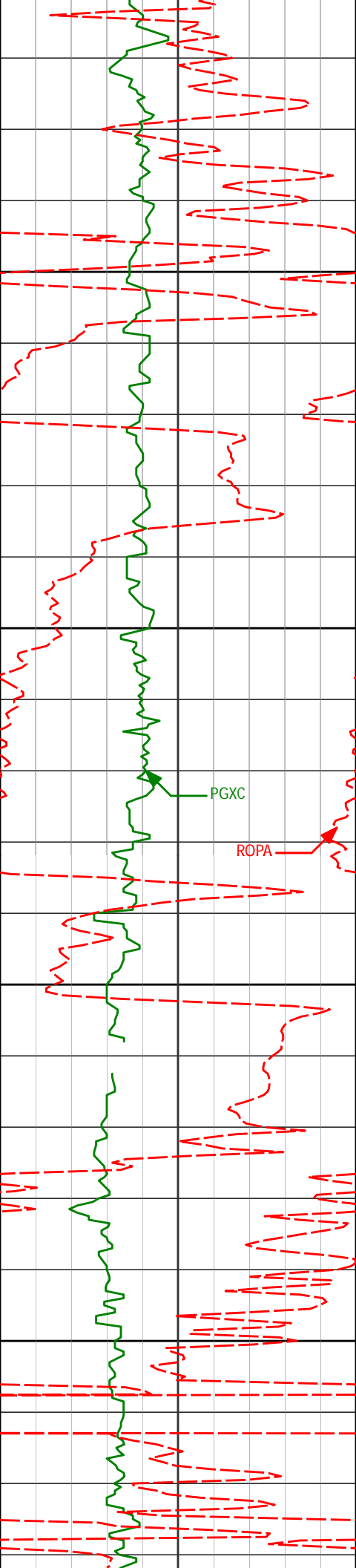
4201'

20.46°

183.09°

4070.90'

-815.89'



4250

4300

4350

4400

PGXC

ROPA

4291'

19.18°

182.16°

4155.56'

-846.36'

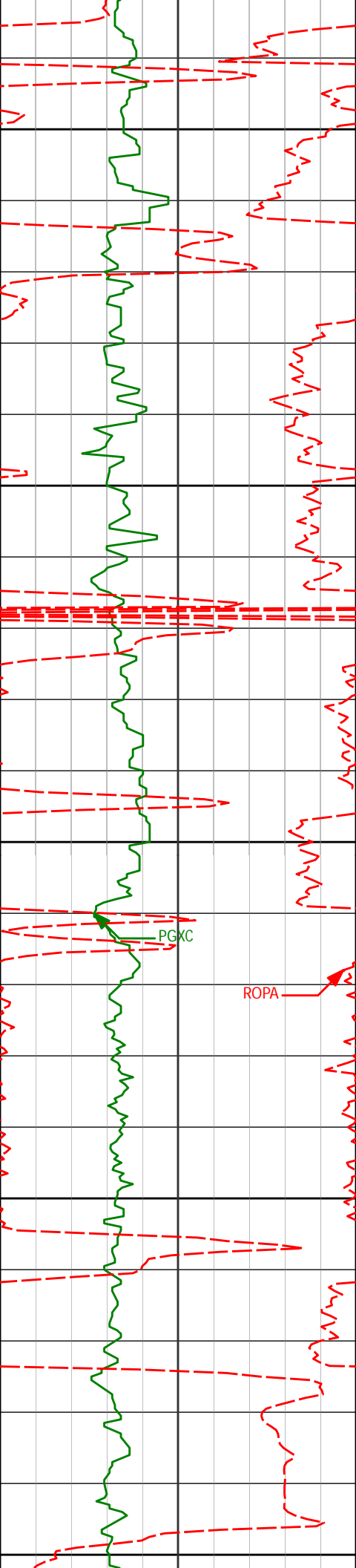
4382'

21.09°

183.66°

4241.00'

-877.63'



4450

4472'

20.23°

183.46°

4325.21'

-909.30'

4500

4550

4561'

19.02°

183.55°

4409.04'

-939.12'

4600

4650

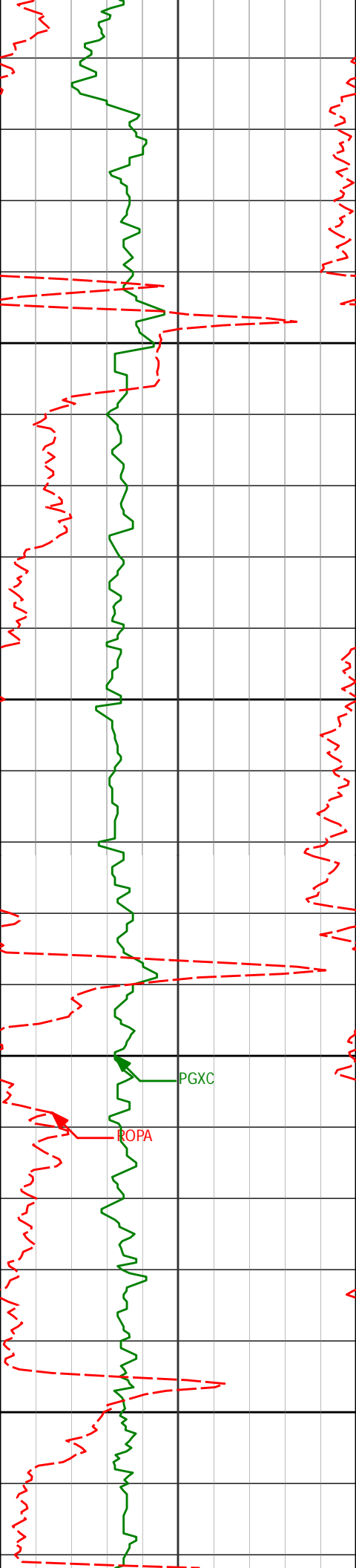
4651'

20.52°

183.39°

4493.73'

-969.48'



4700

4741'

20.64°

183.81°

4577.99'

-1001.04'

4750

4800

4831'

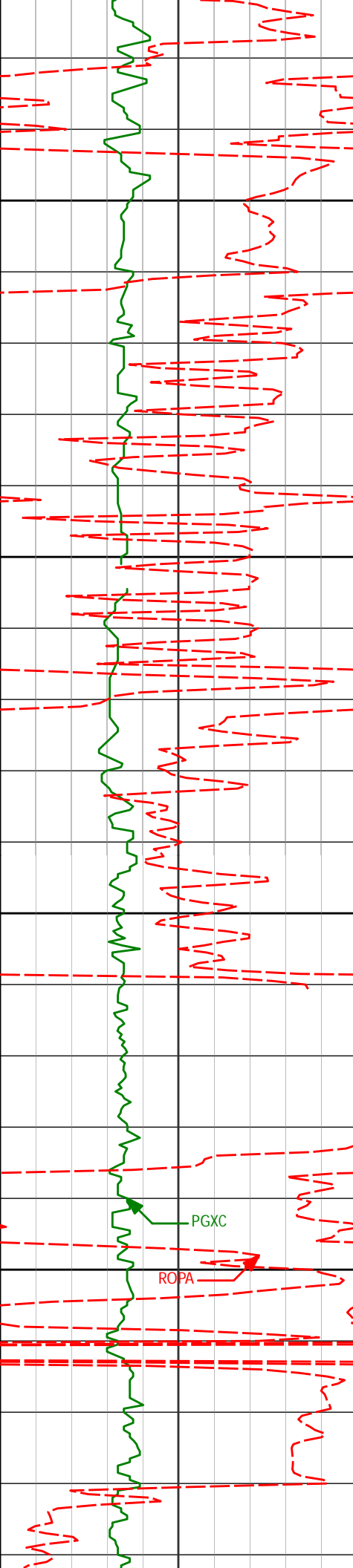
19.84°

183.28°

4662.43'

-1032.09'

4850



4900

4921'

20.49°

183.70°

4746.91'

-1063.04'

4950

5000

5012'

19.04°

183.32°

4832.55'

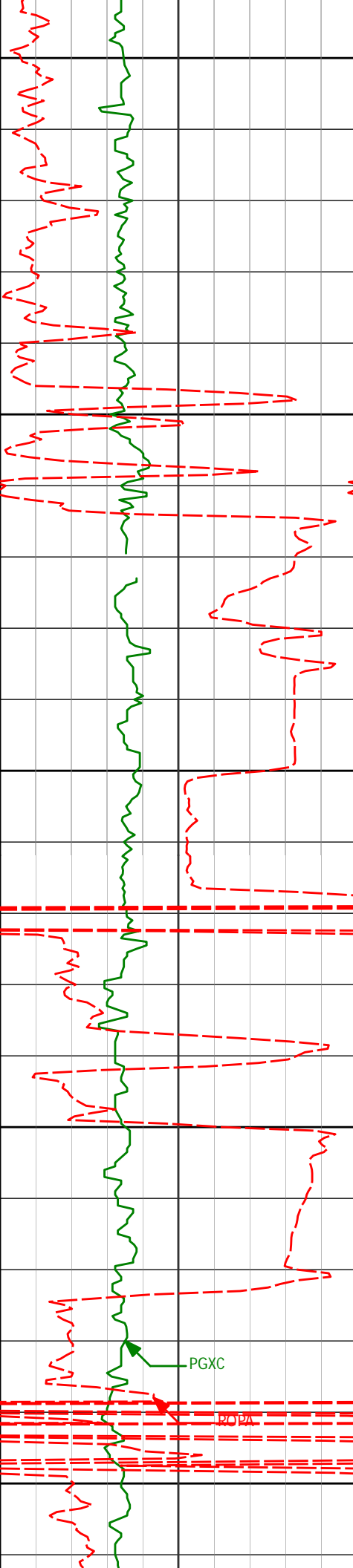
-1093.74'

Run 200

PGXC

ROPA

5050



5100

5101'

19.38°

182.45°

4916.59'

-1122.97'

5150

5192'

19.02°

181.76°

5002.53'

-1152.87'

5200

5250

5281'

20.50°

180.62°

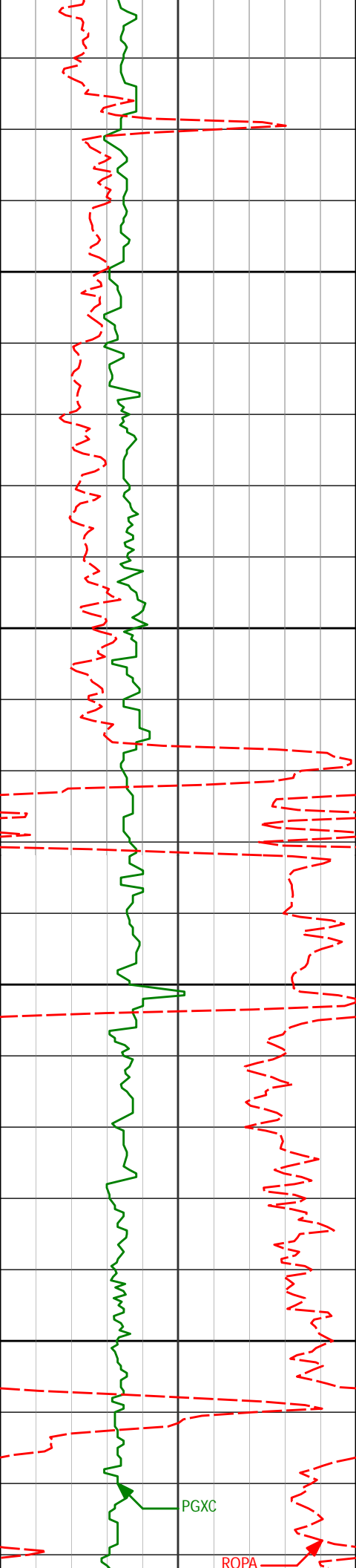
5086.29'

-1182.94'

5300

PGXC

BOPA



5350

5400

5450

5500

5371'

18.78°

180.60°

5171.05'

-1213.18'

5461'

18.18°

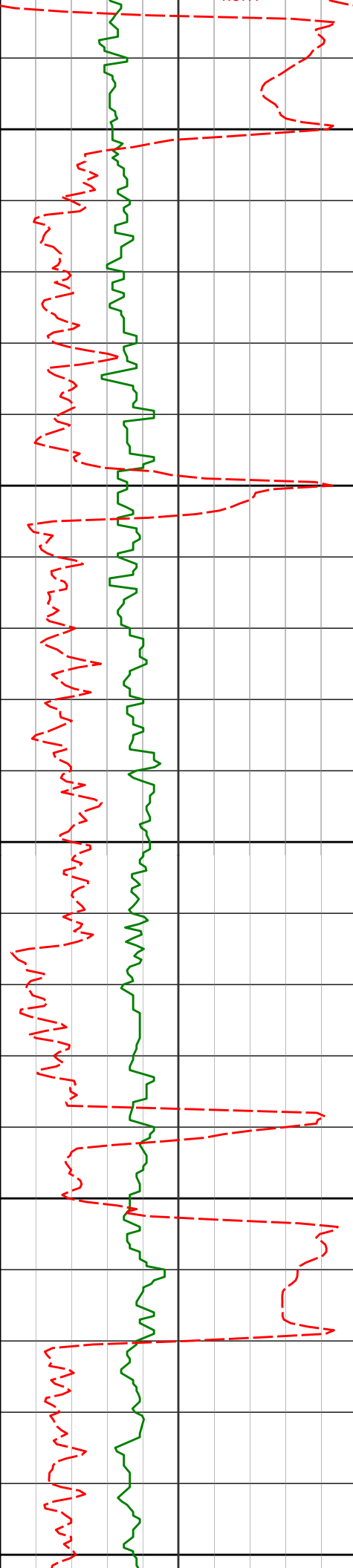
177.73°

5256.41'

-1241.70'

PGXC

ROPA



5550

5551'

18.60°

179.04°

5341.81'

-1270.09'

5600

5641'

16.38°

178.30°

5427.65'

-1297.13'

5650

5700

5731'

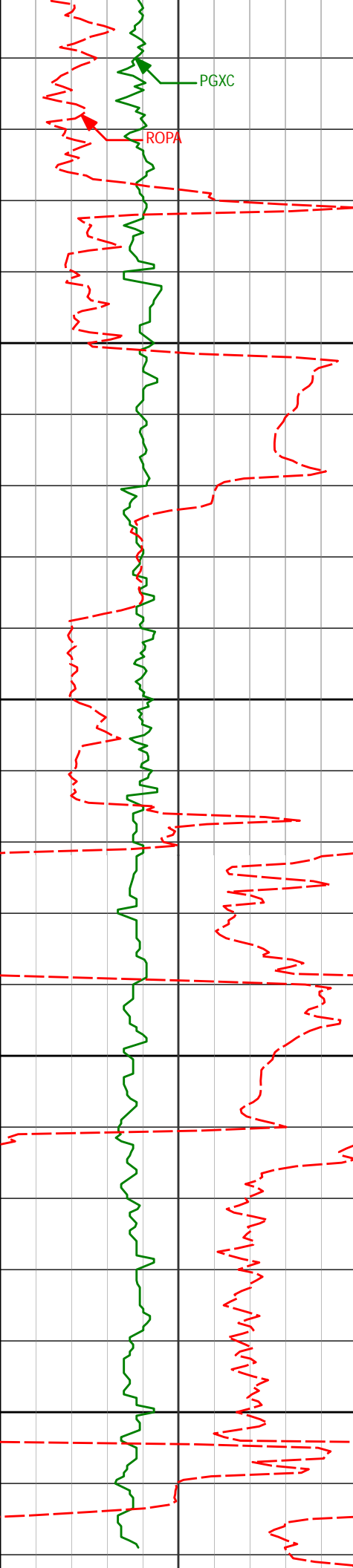
16.07°

180.19°

5514.06'

-1322.27'

5750



PGXC

ROPA

5800

5850

5900

5950

5821'

15.65°

181.49°

5600.64'

-1346.86'

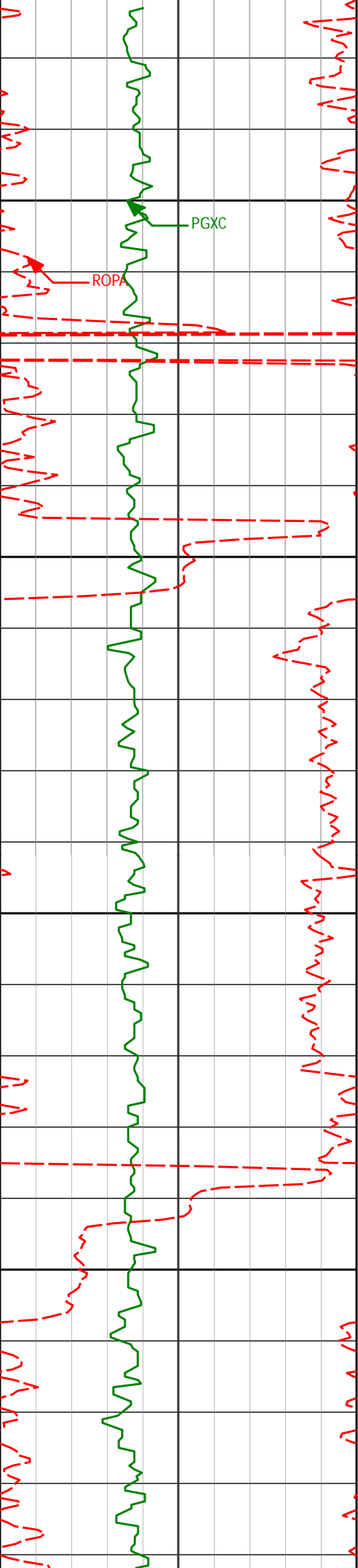
5911'

15.25°

183.37°

5687.39'

-1370.80'



6000

6001'

13.17°

181.92°

5774.63'

-1392.86'

PGXC

ROPA

6050

6091'

10.61°

179.58°

5862.69'

-1411.39'

6100

6150

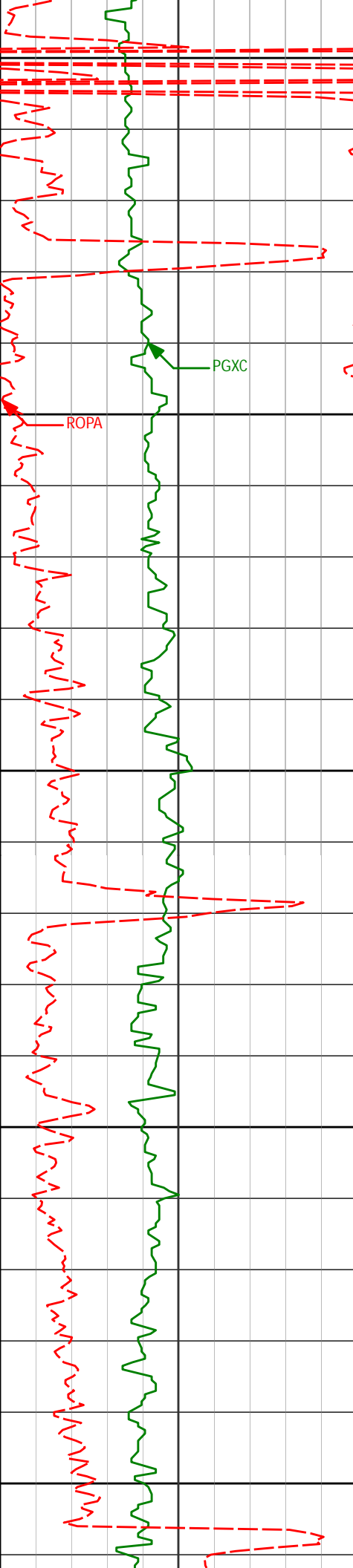
6181'

8.53°

175.99°

5951.43'

-1426.34'



6200

6250

6300

6350

6400

PGXC

ROPA

6271'

6.85°

174.15°

6040.62'

-1438.35'

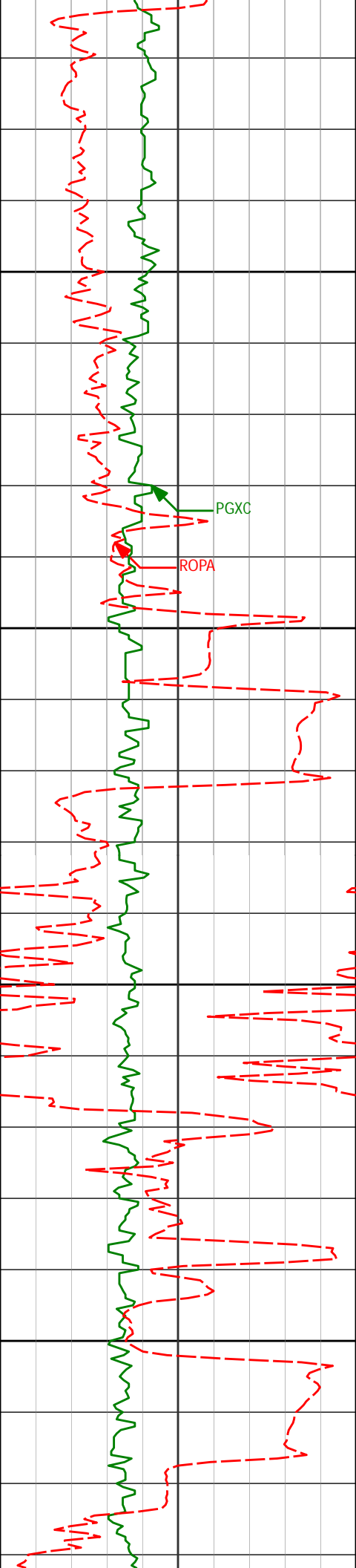
6361'

5.43°

168.93°

6130.10'

-1447.88'



6450

6451'

4.11°

161.86°

6219.79'

-1455.14'

PGXC

ROPA

6500

6541'

2.25°

164.42°

6309.65'

-1459.92'

6550

6600

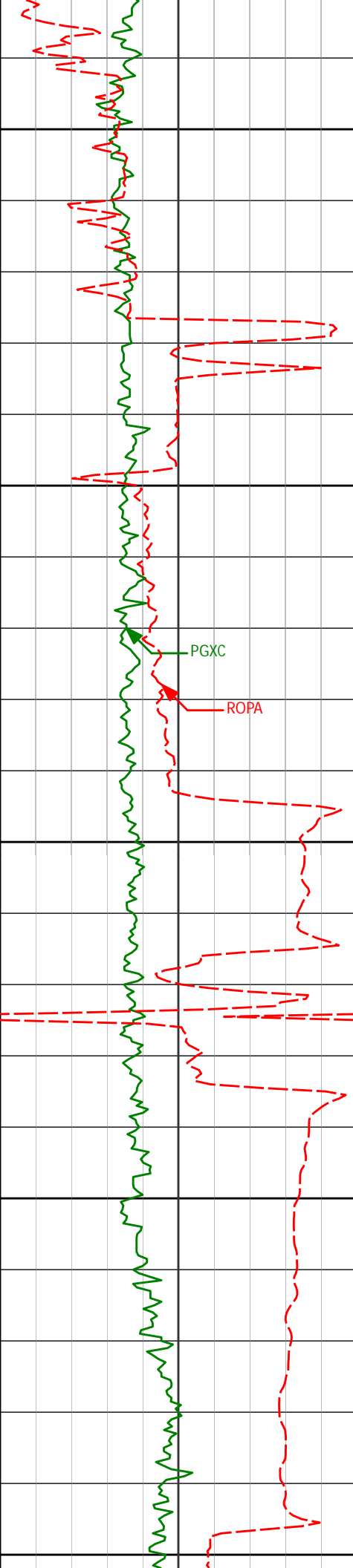
6631'

0.72°

153.49°

6399.61'

-1462.13'



6650

6700

6750

6800

6850

6721'

0.62°

136.43°

6489.61'

-1463.00'

PGXC

ROPA

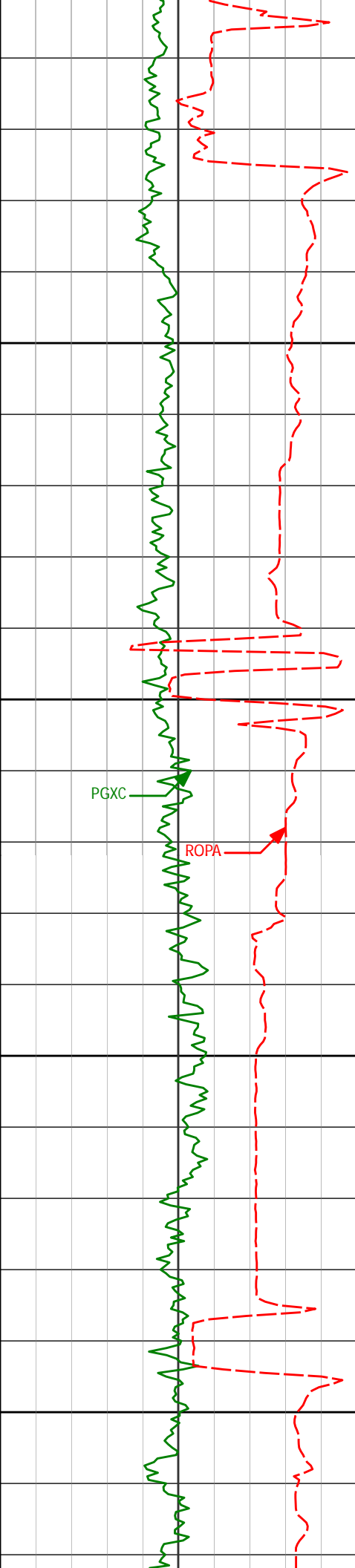
6811'

6.26°

356.36°

6579.44'

-1458.45'



6900

6901'

12.94°

354.91°

6668.13'

-1443.49'

6950

PGXC

ROPA

6991'

21.80°

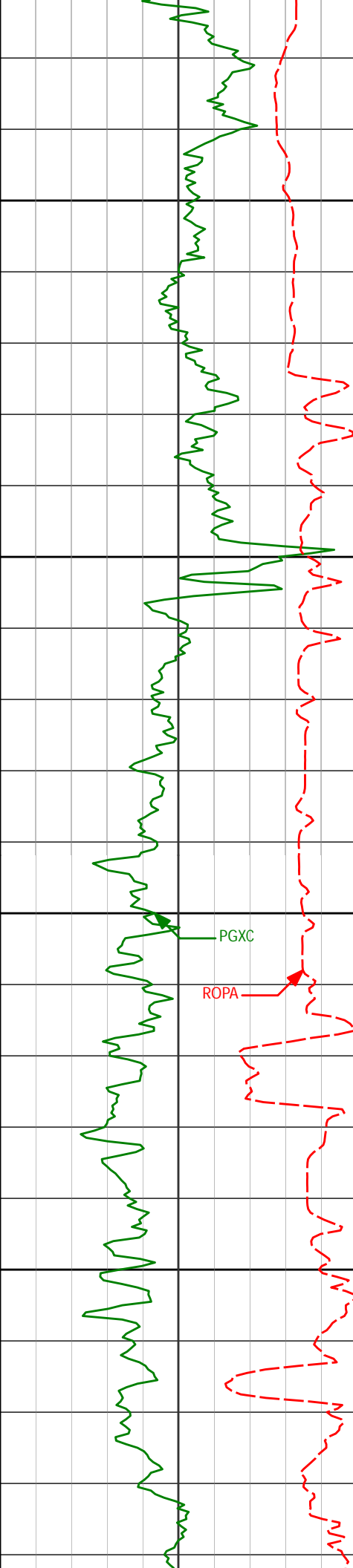
359.14°

6753.94'

-1416.68'

7000

7050



7081'

30.50°

356.25°

6834.66'

-1377.09'

7100

7150

7171'

39.49°

356.87°

6908.31'

-1325.59'

7200

PGXC

ROPA

7250

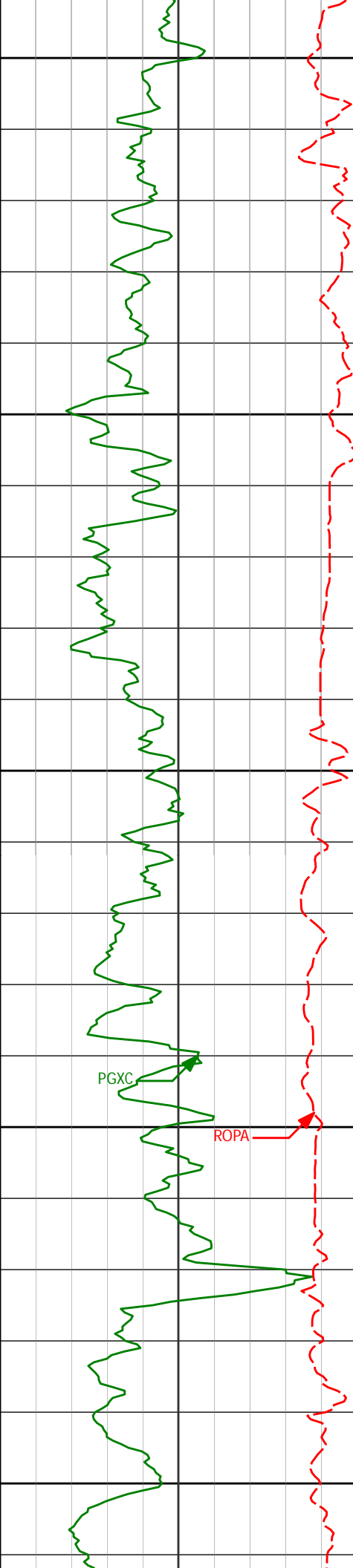
7261'

46.06°

355.82°

6974.34'

-1264.60'



7300

7307'

49.13°

356.74°

7005.35'

-1230.69'

7350

7352'

53.00°

357.68°

7033.63'

-1195.72'

7400

7442'

62.46°

357.69°

7081.63'

-1119.74'

7450

7487'

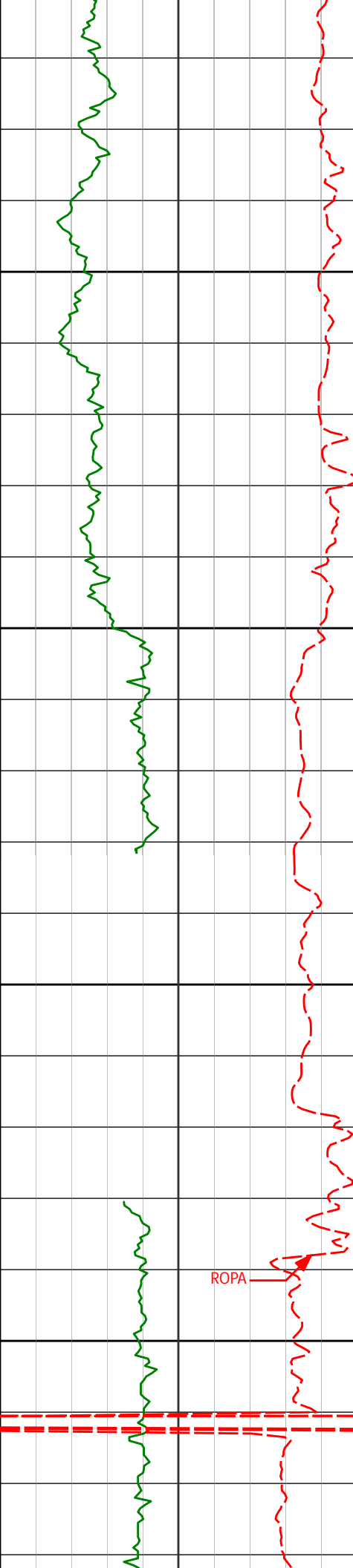
67.69°

357.18°

7100.58'

-1078.97'

7500



7550

7600

7650

7700

7" Casing Shoe

Run 300

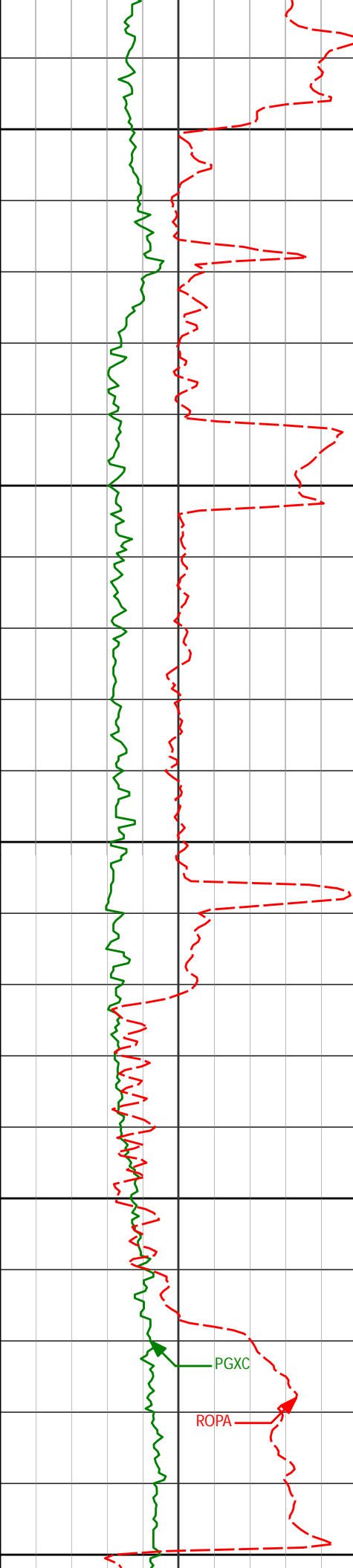
ROPA

7532'	72.42°	357.24°	7115.93'	-1036.72'
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7622'	82.83°	356.92°	7135.19'	-949.01'
-------	--------	---------	----------	----------

7634'	84.63°	357.19°	7136.50'	-937.09'
-------	--------	---------	----------	----------

7692'	88.95°	357.88°	7139.75'	-879.23'
-------	--------	---------	----------	----------



7750

7747'

89.63°

357.63°

7140.43'

-824.26'

7800

7814'

90.59°

358.25°

7140.30'

-757.28'

7850

7900

7904'

90.03°

357.69°

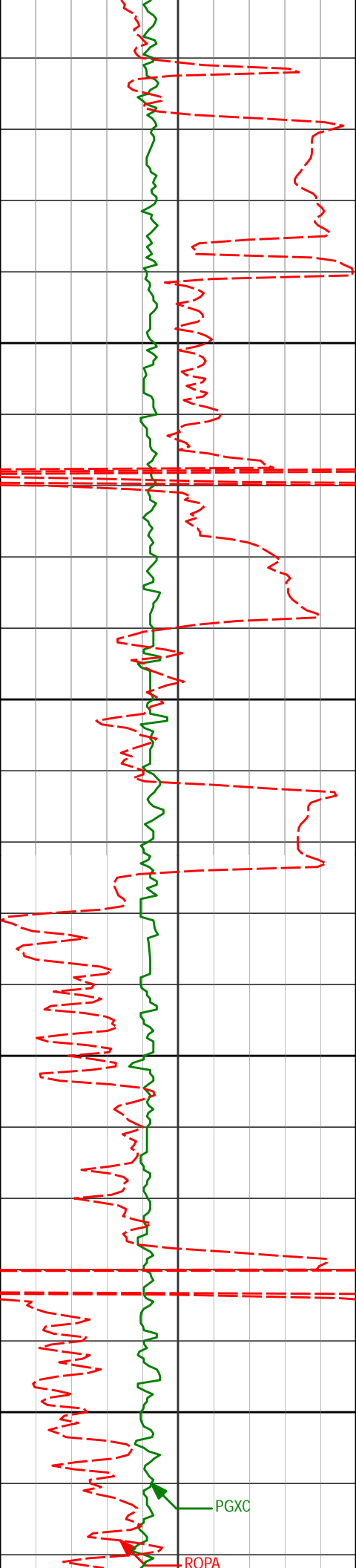
7139.82'

-667.32'

7950

PGXC

ROPA



8000

8050

8100

8150

PGXC

ROPA

7994'

91.11°

359.30°

7138.92'

-577.34'

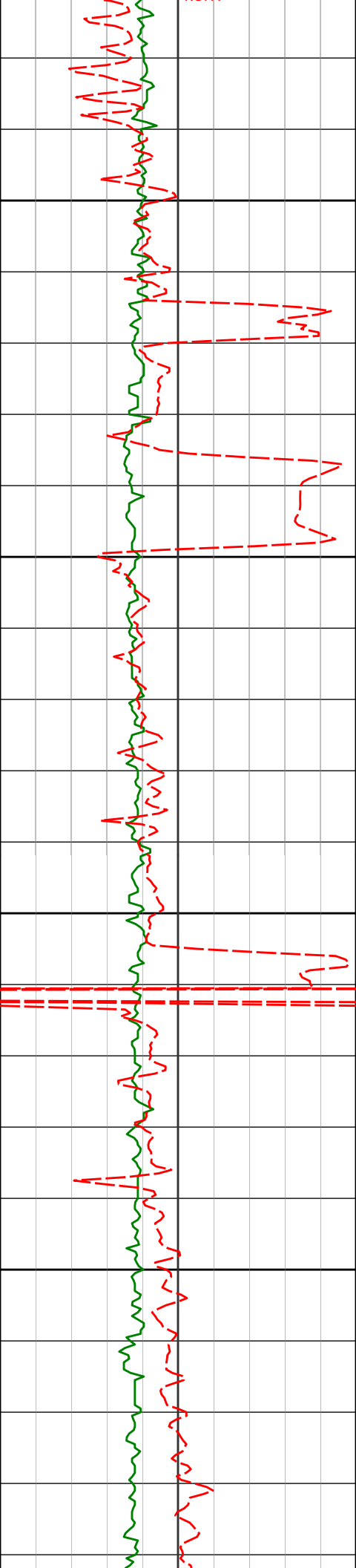
8085'

90.89°

0.01°

7137.33'

-486.35'



8200

8250

8300

8350

8174'

89.75°

0.03°

7136.84'

-397.36'

8265'

91.05°

0.82°

7136.20'

-306.38'

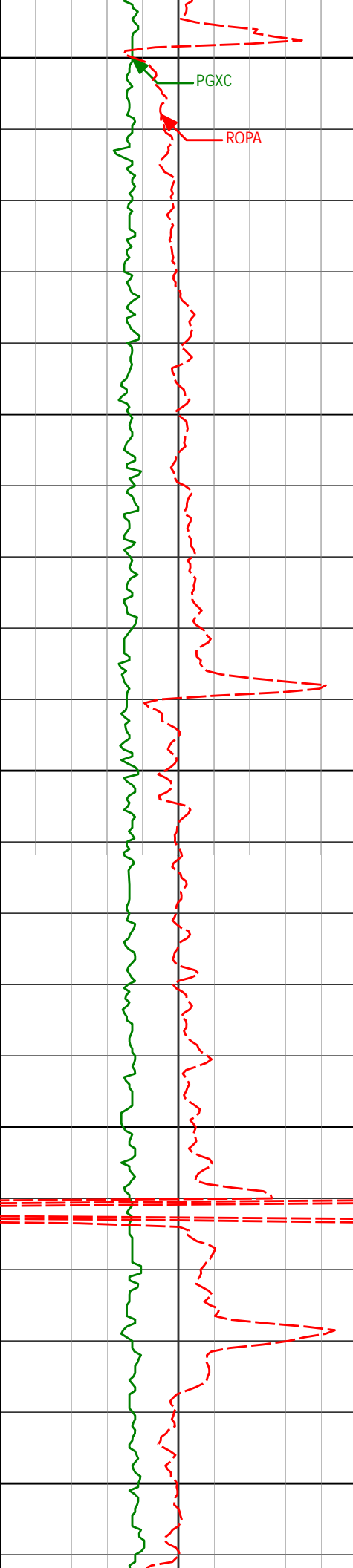
8354'

90.92°

0.61°

7134.67'

-217.41'



8400

8450

8500

8550

8600

8444'

90.89°

1.13°

7133.25'

-127.45'

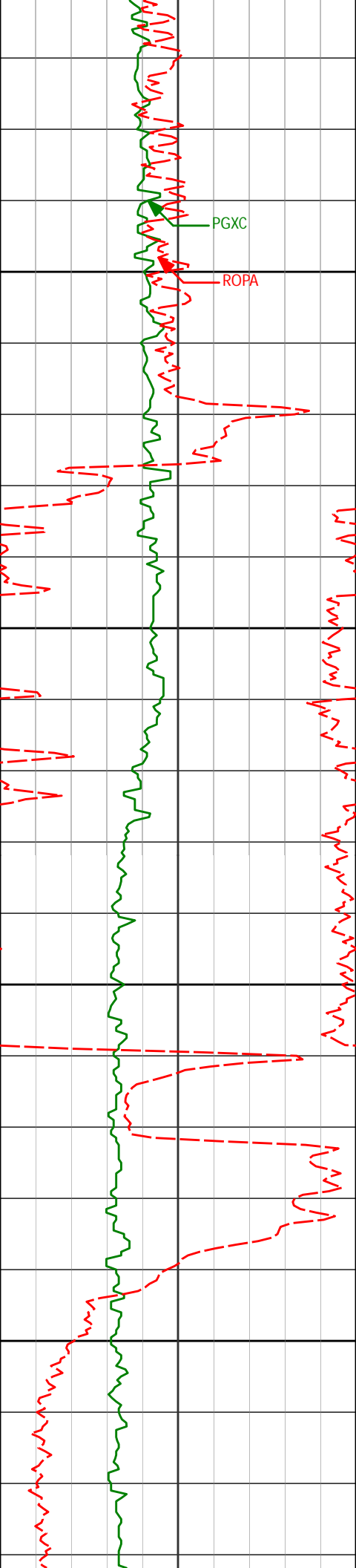
8534'

91.14°

1.35°

7131.65'

-37.51'



8650

8700

8750

8800

8624'

91.23°

1.33°

7129.79'

52.43'

8714'

91.23°

1.34°

7127.86'

142.36'

8804'

90.18°

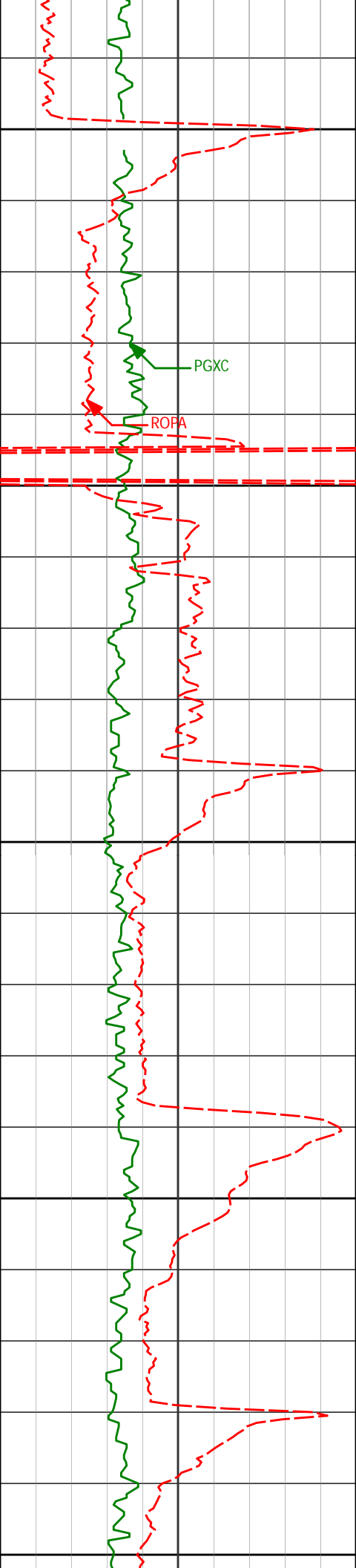
1.39°

7126.75'

232.30'

PGXC

ROPA



8850

PGXC

ROPA

8900

8950

9000

9050

8894'

90.19°

1.02°

7126.46'

322.26'

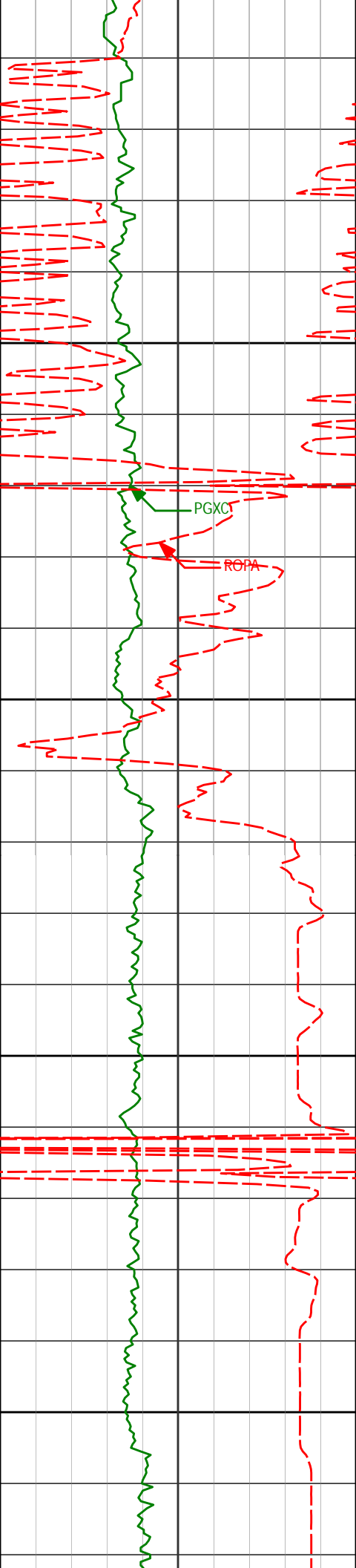
8985'

90.03°

0.62°

7126.29'

413.23'



9100

9150

9200

9250

9075'

90.15°

0.50°

7126.15'

503.22'

9165'

90.37°

0.40°

7125.74'

593.20'

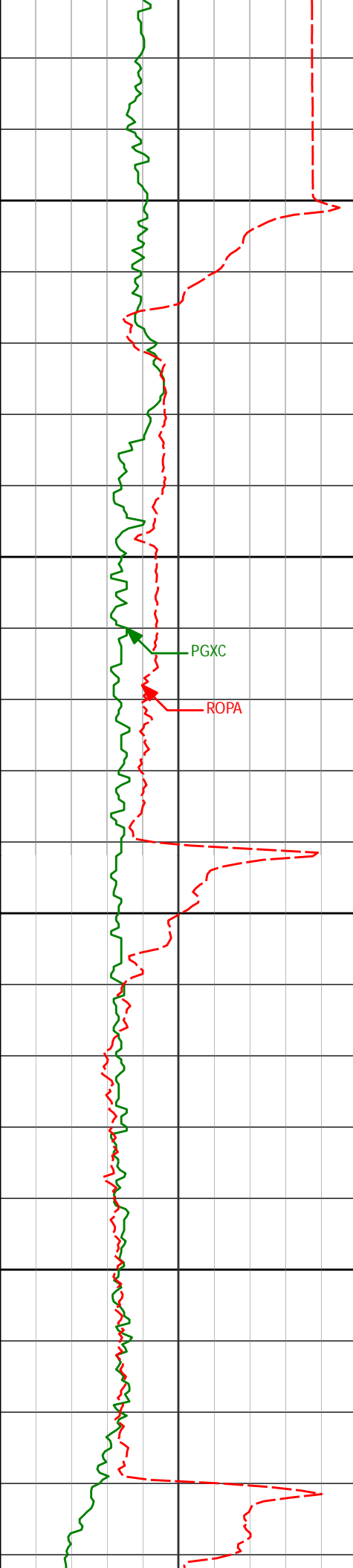
9255'

90.40°

359.94°

7125.13'

683.20'



9300

9350

9400

9450

9345'

90.09°

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7124.75'

773.19'

PGXC

ROPA

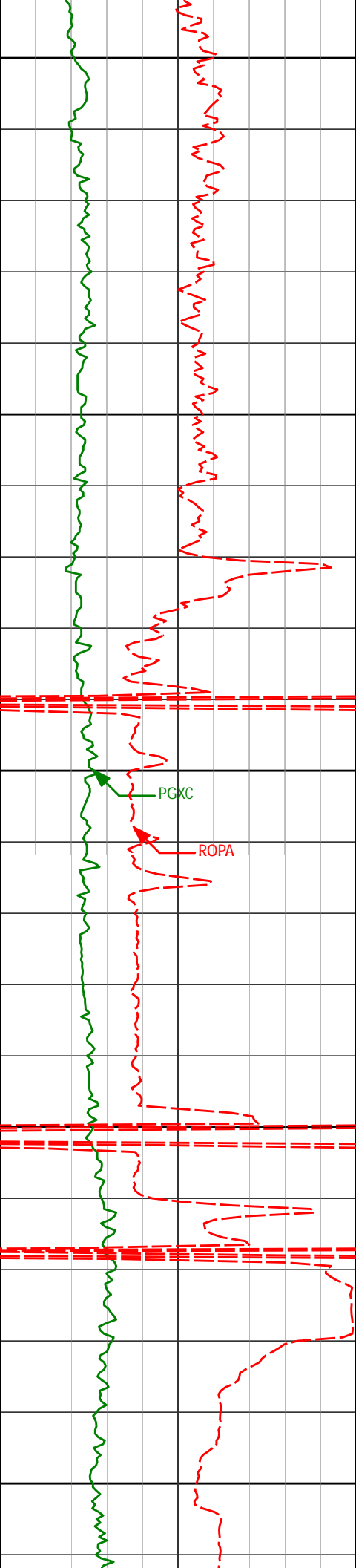
9435'

90.06°

0.05°

7124.63'

863.19'



9500

9525'

89.57°

0.08°

7124.92'

953.18'

9550

9600

PGXC

ROPA

9615'

88.64°

359.94°

7126.33'

1043.17'

9650

9700

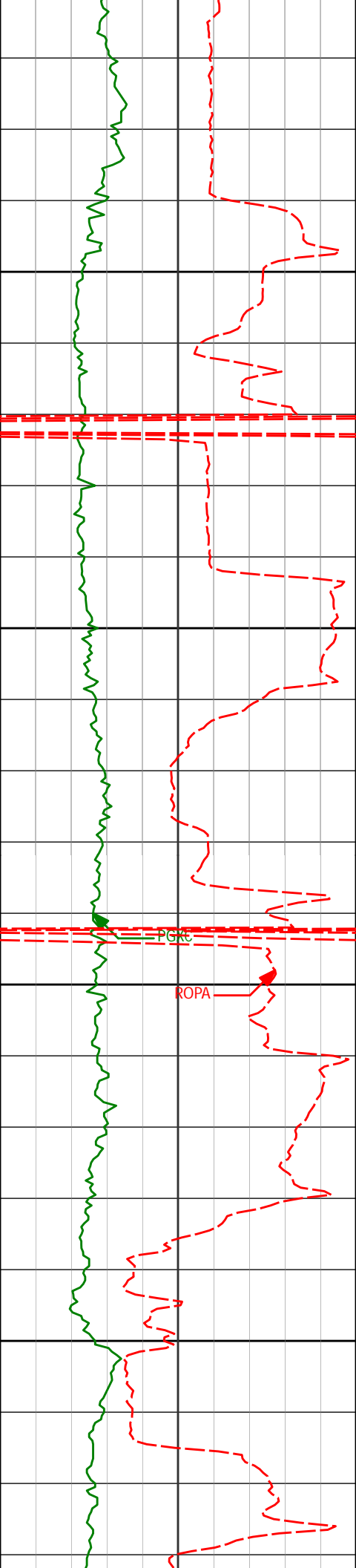
9705'

88.27°

0.28°

7128.75'

1133.13'



9750

9800

9850

9900

PGKc

ROPA

9795'

88.43°

359.54°

7131.35'

1223.09'

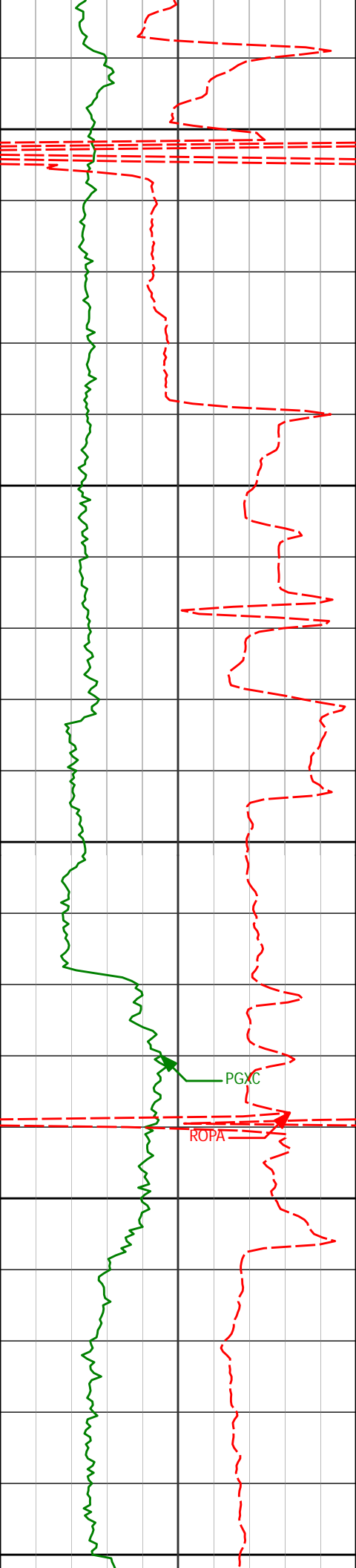
9885'

91.36°

0.02°

7131.51'

1313.08'



9950

9975'

91.60°

359.72°

7129.19'

1403.05'

10000

10050

10065'

90.43°

359.25°

7127.59'

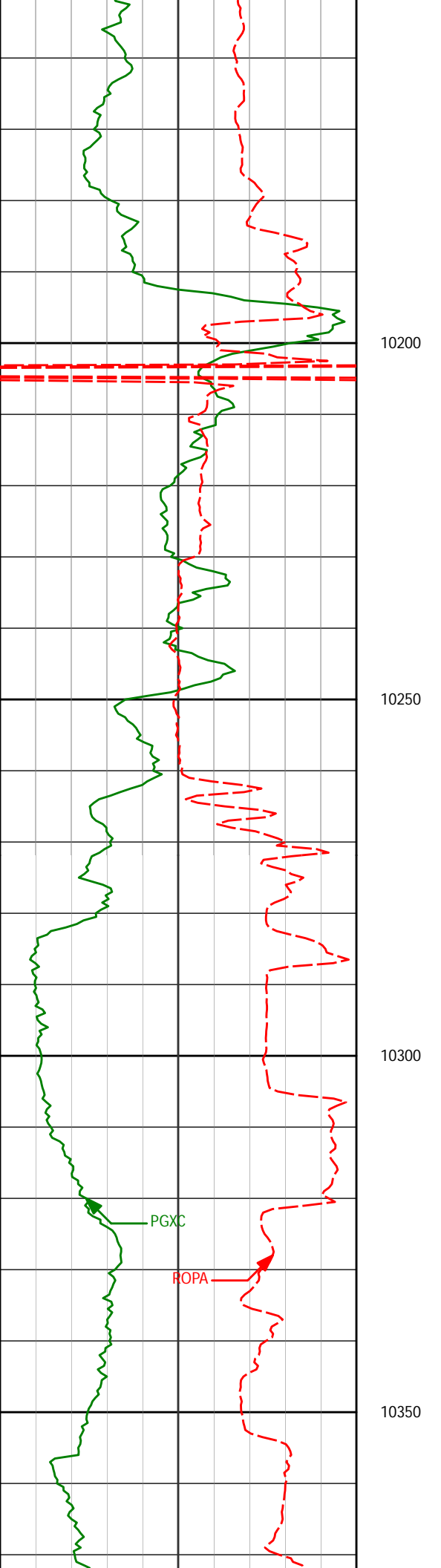
1493.03'

10100

10150

PGXC

ROPA



10155'

89.85°

358.74°

7127.37'

1583.03'

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90.59°

357.73°

7127.03'

1673.00'

10250

10300

PGXC

ROPA

10335'

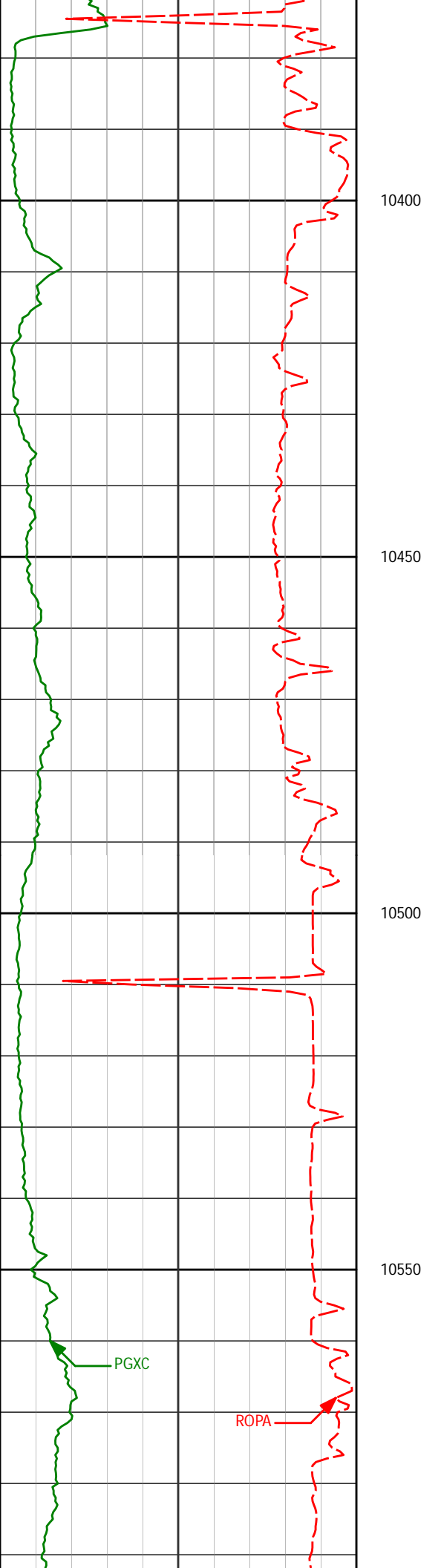
91.45°

359.13°

7125.42'

1762.97'

10350



10424'

89.38°

358.21°

7124.78'

1851.95'

10450

10500

10514'

90.31°

357.96°

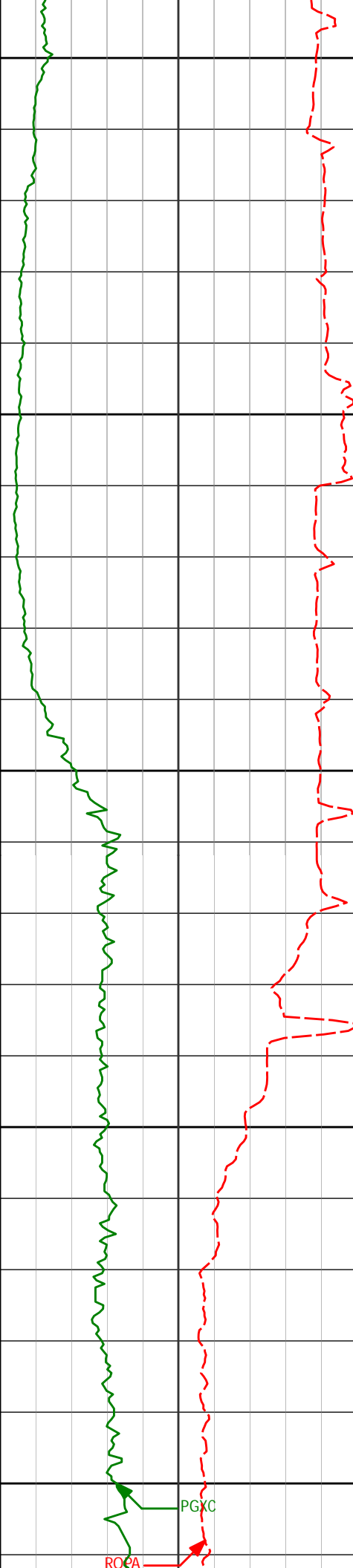
7125.02'

1941.92'

10550

PGXC

ROPA



10600

10604'

89.94°

359.29°

7124.83'

2031.91'

10650

Run 400

10750

10800

10694'

89.14°

359.59°

7125.55'

2121.91'

10700

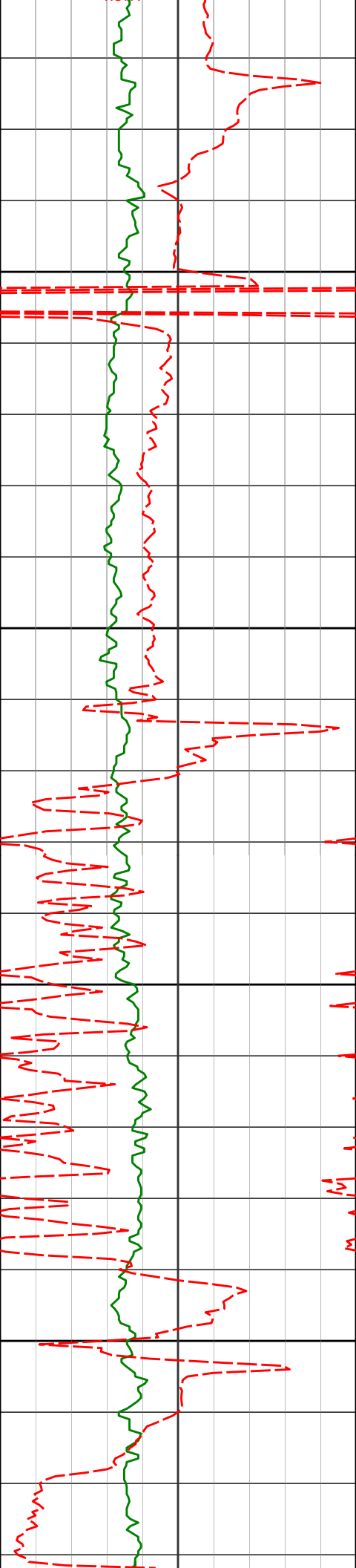
10784'

89.48°

358.94°

7126.63'

2211.90'



10850

10874'

90.49°

358.73°

7126.66'

2301.89'

10900

10950

10964'

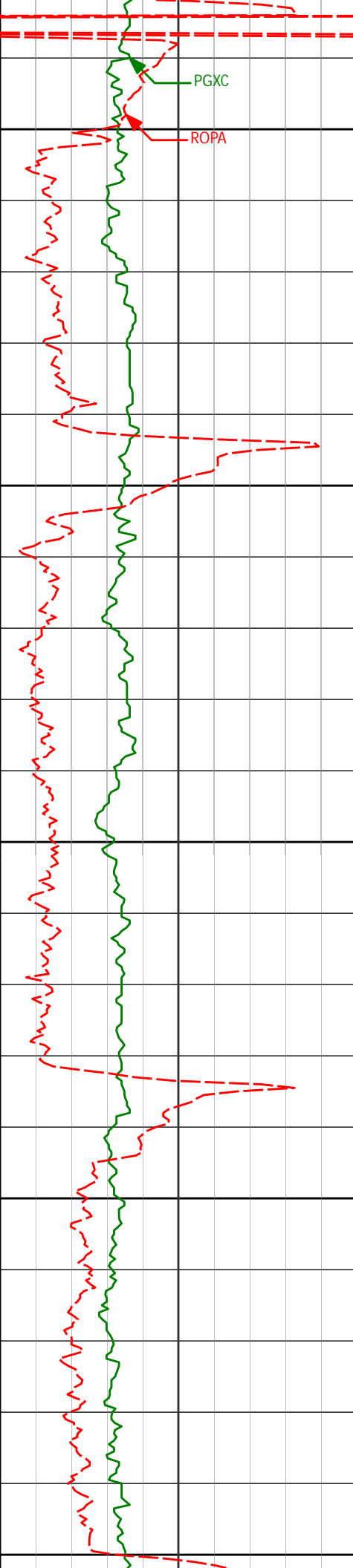
90.62°

358.77°

7125.79'

2391.88'

11000



11050

11055'

90.62°

358.58°

7124.80'

2482.87'

11100

11150

11144'

91.05°

358.80°

7123.50'

2571.85'

11200

11250

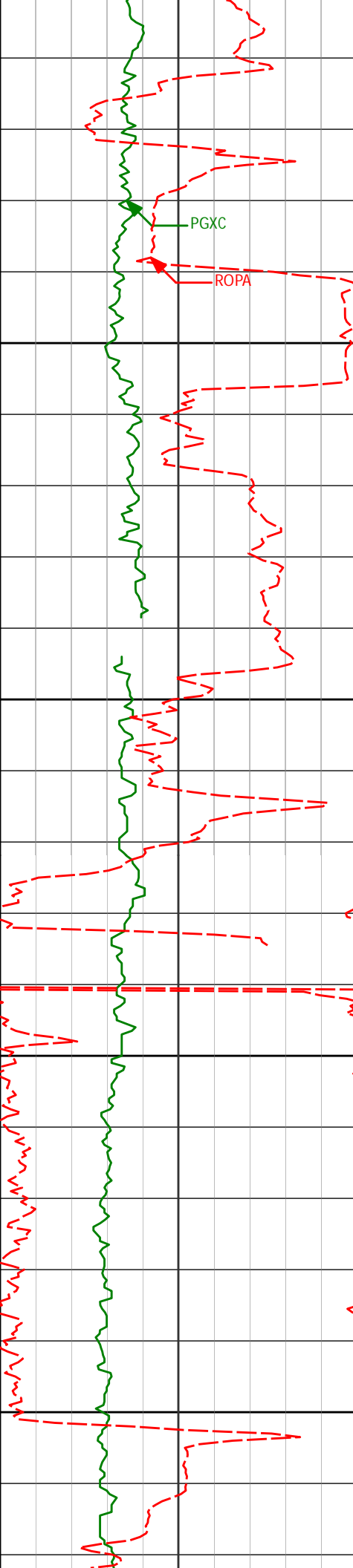
11234'

91.69°

358.74°

7121.35'

2661.82'



11300

11350

11400

11450

11325'

90.62°

358.82°

7119.52'

2752.79'

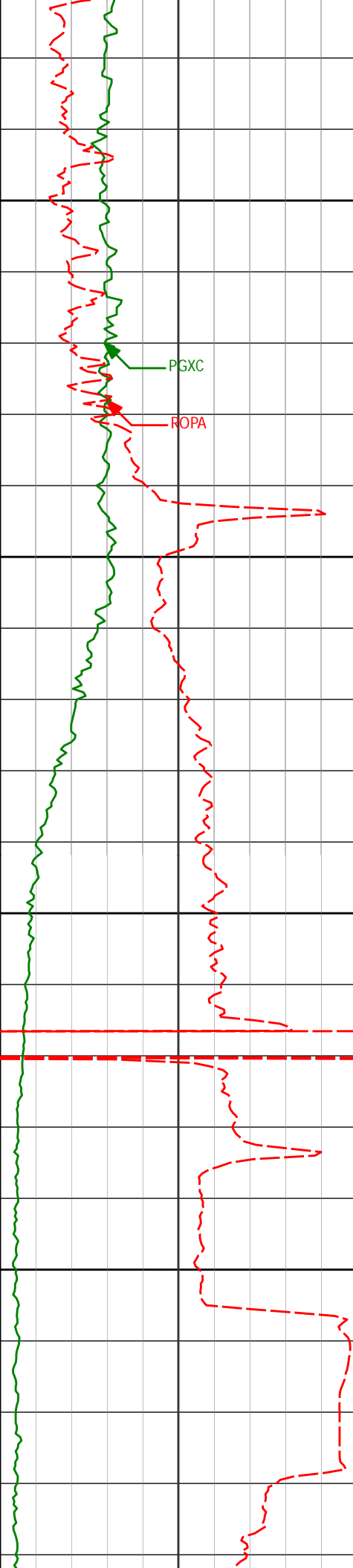
11415'

91.69°

359.26°

7117.70'

2842.77'



11500

11505'

91.79°

358.91°

7114.97'

2932.72'

PGXC

ROPA

11550

11600

11595'

91.36°

358.27°

7112.50'

3022.68'

11650

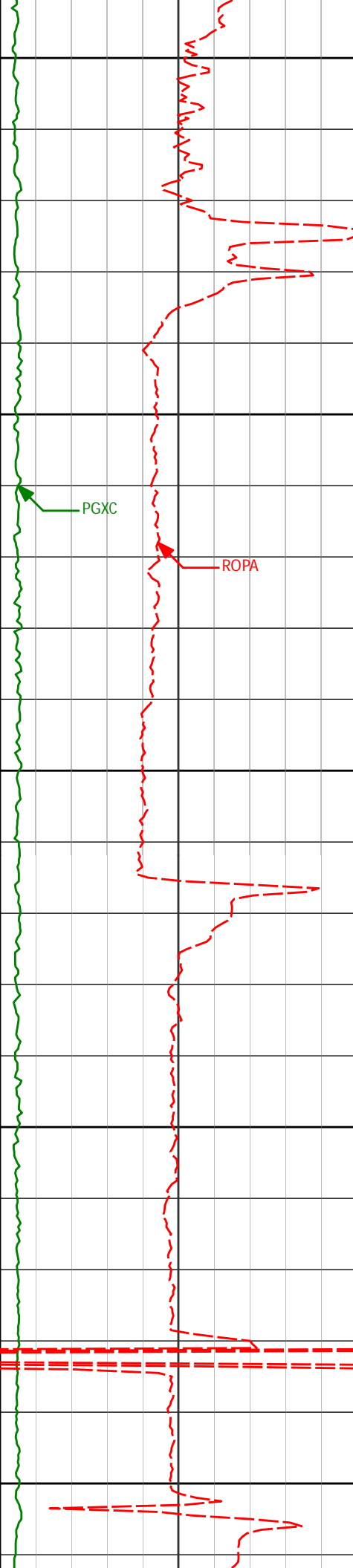
11685'

89.14°

358.64°

7112.10'

3112.66'



11700

11750

11800

11850

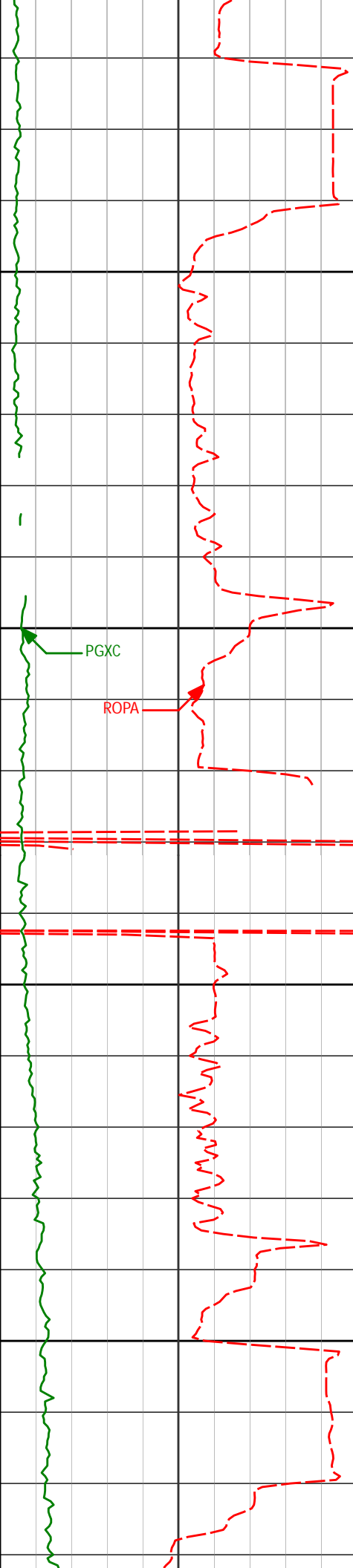
11900

PGXC

ROPA

11775'	89.26°	358.23°	7113.36'	3202.63'
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11865'	89.63°	357.88°	7114.23'	3292.60'
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11950

11955'

89.97°

359.43°

7114.55'

3382.59'

12000

PGXC

ROPA

12050

12045'

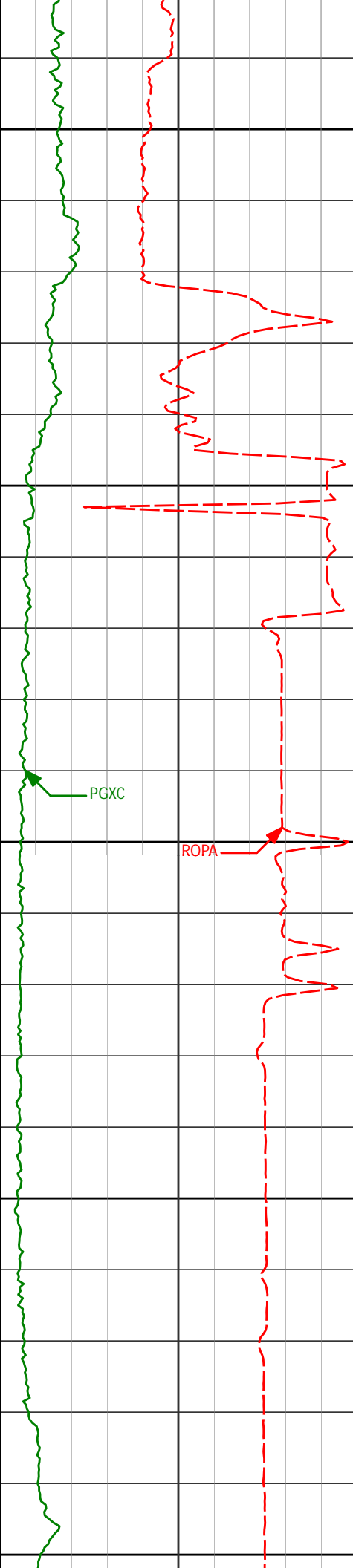
90.65°

359.28°

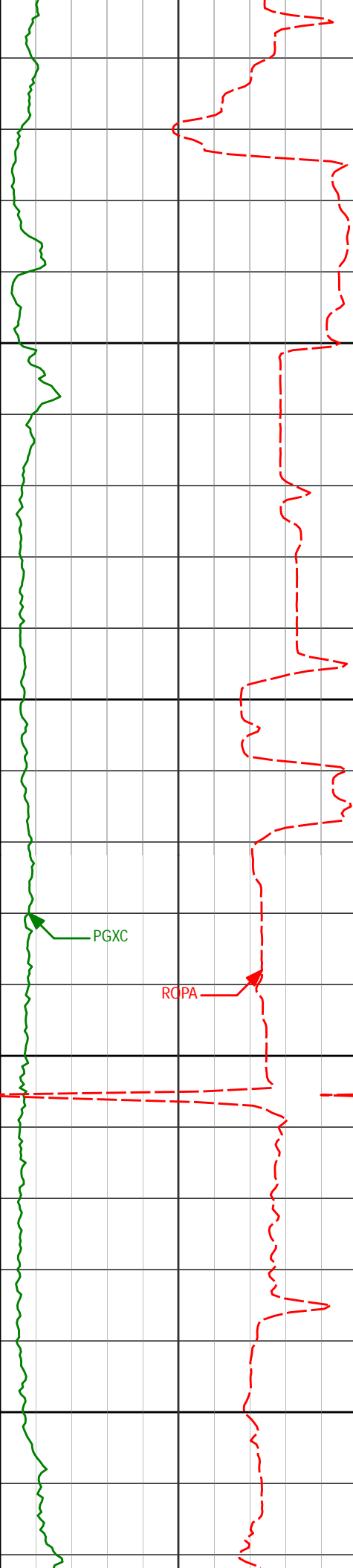
7114.06'

3472.59'

12100



12135'	90.71°	0.80°	7112.99'	3562.57'
12150				
12200				
12225'	89.97°	1.81°	7112.46'	3652.52'
12250				
12300				
12316'	91.17°	2.10°	7111.55'	3743.43'
12350				



12400

12450

12500

12550

12406'

90.22°

3.48°

7110.46'

3833.27'

12496'

90.15°

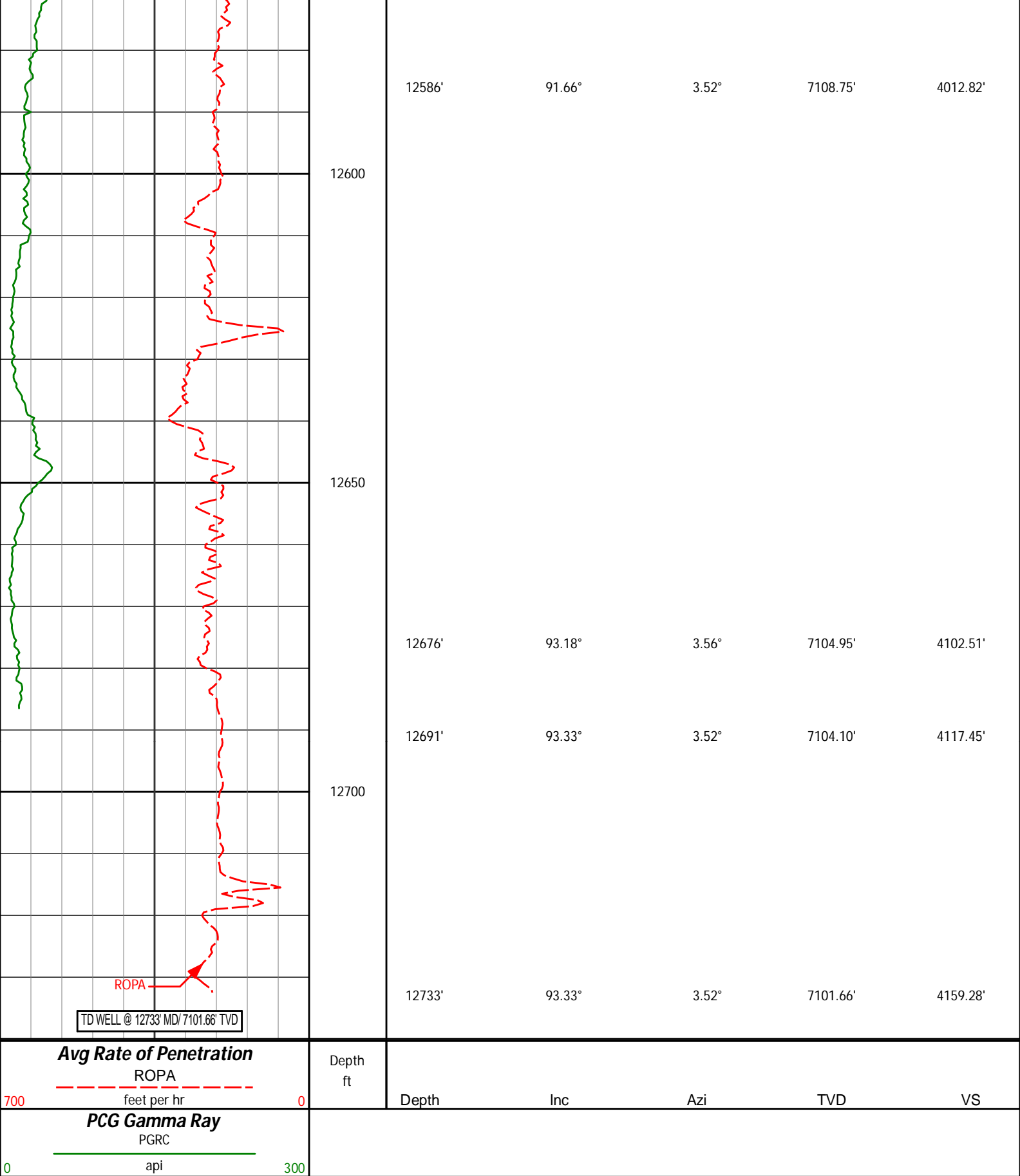
3.44°

7110.17'

3923.05'

PGXC

ROPA



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp

Greenleaf 29C-2HZ

1241.00	0.80	18.90	1240.73	17.80 S	6.69 W	-17.74	TIE-IN
1373.00	0.47	178.00	1372.73	17.47 S	6.37 W	-17.41	0.95
1466.00	2.21	190.49	1465.70	19.61 S	6.69 W	-19.55	1.89
1560.00	4.04	195.98	1559.55	24.58 S	7.93 W	-24.51	1.97
1653.00	6.19	188.31	1652.18	32.69 S	9.55 W	-32.60	2.42
1748.00	8.38	178.47	1746.41	44.68 S	10.11 W	-44.59	2.65
1841.00	10.00	175.99	1838.21	59.51 S	9.36 W	-59.42	1.79
1934.00	12.06	180.15	1929.49	77.28 S	8.82 W	-77.20	2.37
2028.00	13.44	176.88	2021.17	98.01 S	8.26 W	-97.93	1.66
2121.00	14.26	181.68	2111.47	120.26 S	8.00 W	-120.18	1.52
2214.00	16.63	180.55	2201.11	145.02 S	8.47 W	-144.93	2.57
2308.00	18.40	181.97	2290.75	173.29 S	9.11 W	-173.20	1.94
2401.00	20.95	183.78	2378.31	204.56 S	10.71 W	-204.45	2.82
2491.00	20.23	182.44	2462.56	236.16 S	12.43 W	-236.04	0.96
2581.00	19.56	182.19	2547.19	266.76 S	13.67 W	-266.63	0.75
2671.00	20.71	181.47	2631.69	297.73 S	14.65 W	-297.58	1.31
2761.00	20.08	181.45	2716.05	329.08 S	15.45 W	-328.93	0.70
2851.00	19.55	181.16	2800.72	359.58 S	16.15 W	-359.42	0.60
2941.00	19.52	180.23	2885.54	389.67 S	16.51 W	-389.51	0.35
3031.00	18.85	179.78	2970.54	419.25 S	16.52 W	-419.08	0.76
3121.00	18.61	178.15	3055.77	448.14 S	16.00 W	-447.98	0.64
3211.00	19.69	182.21	3140.79	477.65 S	16.12 W	-477.48	1.90
3301.00	18.81	182.12	3225.76	507.30 S	17.24 W	-507.12	0.98
3391.00	19.90	182.33	3310.67	537.10 S	18.40 W	-536.91	1.21
3481.00	18.29	178.95	3395.72	566.53 S	18.76 W	-566.33	2.17
3571.00	18.82	180.26	3481.04	595.17 S	18.57 W	-594.97	0.75
3661.00	20.85	181.75	3565.70	625.69 S	19.13 W	-625.50	2.32
3751.00	19.65	181.05	3650.14	656.83 S	19.89 W	-656.63	1.36
3841.00	20.21	182.58	3734.75	687.49 S	20.87 W	-687.28	0.85
3931.00	21.25	182.77	3818.92	719.32 S	22.36 W	-719.08	1.16
4021.00	20.94	183.19	3902.89	751.66 S	24.04 W	-751.42	0.38
4111.00	21.36	182.67	3986.82	784.09 S	25.70 W	-783.83	0.51
4201.00	20.46	183.09	4070.90	816.18 S	27.31 W	-815.89	1.01
4291.00	19.18	182.16	4155.56	846.66 S	28.72 W	-846.36	1.46
4382.00	21.09	183.66	4241.00	877.94 S	30.32 W	-877.63	2.17
4472.00	20.23	183.46	4325.21	909.63 S	32.30 W	-909.30	0.96
4561.00	19.02	183.55	4409.04	939.46 S	34.12 W	-939.12	1.36
4651.00	20.52	183.39	4493.73	969.85 S	35.96 W	-969.48	1.67
4741.00	20.64	183.81	4577.99	1001.42 S	37.95 W	-1001.04	0.21
4831.00	19.84	183.28	4662.43	1032.50 S	39.88 W	-1032.09	0.91
4921.00	20.49	183.70	4746.91	1063.47 S	41.77 W	-1063.04	0.74
5012.00	19.04	183.32	4832.55	1094.18 S	43.66 W	-1093.74	1.60
5101.00	19.38	182.45	4916.59	1123.43 S	45.13 W	-1122.97	0.50
5192.00	19.02	181.76	5002.53	1153.33 S	46.23 W	-1152.87	0.47
5281.00	20.50	180.62	5086.29	1183.41 S	46.84 W	-1182.94	1.72
5371.00	18.78	180.60	5171.05	1213.66 S	47.17 W	-1213.18	1.91
5461.00	18.18	177.73	5256.41	1242.18 S	46.76 W	-1241.70	1.21
5551.00	18.60	179.04	5341.81	1270.56 S	45.97 W	-1270.09	0.65
5641.00	16.38	178.30	5427.65	1297.60 S	45.35 W	-1297.13	2.48
5731.00	16.07	180.19	5514.06	1322.74 S	45.01 W	-1322.27	0.68
5821.00	15.65	181.49	5600.64	1347.33 S	45.37 W	-1346.86	0.61
5911.00	15.25	183.37	5687.39	1371.28 S	46.38 W	-1370.80	0.71
6001.00	13.17	181.92	5774.63	1393.35 S	47.42 W	-1392.86	2.34
6091.00	10.61	179.58	5862.69	1411.88 S	47.70 W	-1411.39	2.89
6181.00	8.53	175.99	5951.43	1426.83 S	47.18 W	-1426.34	2.40
6271.00	6.85	174.15	6040.62	1438.83 S	46.16 W	-1438.35	1.89
6361.00	5.43	168.93	6130.10	1448.34 S	44.80 W	-1447.88	1.69
6451.00	4.11	161.86	6219.79	1455.59 S	42.98 W	-1455.14	1.60
6541.00	2.25	164.42	6309.65	1460.36 S	41.50 W	-1459.92	2.07
6631.00	0.72	153.49	6399.61	1462.56 S	40.77 W	-1462.13	1.72
6721.00	0.62	136.43	6489.61	1463.42 S	40.18 W	-1463.00	0.25
6811.00	6.26	356.36	6579.44	1458.87 S	40.16 W	-1458.45	7.50
6901.00	12.94	354.91	6668.13	1443.92 S	41.36 W	-1443.49	7.43
6991.00	21.80	359.14	6753.94	1417.12 S	42.51 W	-1416.68	9.94
7081.00	30.50	356.25	6834.66	1377.54 S	44.26 W	-1377.09	9.77

7261.00	46.06	355.82	6974.34	1265.11 S	51.25 W	-1264.60	7.34
7307.00	49.13	356.74	7005.35	1231.22 S	53.45 W	-1230.69	6.84
7352.00	53.00	357.68	7033.63	1196.27 S	55.14 W	-1195.72	8.75
7442.00	62.46	357.69	7081.63	1120.32 S	58.21 W	-1119.74	10.51
7487.00	67.69	357.18	7100.58	1079.56 S	60.04 W	-1078.97	11.67
7532.00	72.42	357.24	7115.93	1037.33 S	62.10 W	-1036.72	10.51
7622.00	82.83	356.92	7135.19	949.65 S	66.58 W	-949.01	11.57
7634.00	84.63	357.19	7136.50	937.74 S	67.19 W	-937.09	15.17
7692.00	88.95	357.88	7139.75	879.90 S	69.68 W	-879.23	7.54
7747.00	89.63	357.63	7140.43	824.95 S	71.83 W	-824.26	1.32
7814.00	90.59	358.25	7140.30	757.99 S	74.24 W	-757.28	1.71
7904.00	90.03	357.69	7139.82	668.05 S	77.43 W	-667.32	0.88
7994.00	91.11	359.30	7138.92	578.09 S	79.80 W	-577.34	2.15
8085.00	90.89	0.01	7137.33	487.10 S	80.34 W	-486.35	0.82
8174.00	89.75	0.03	7136.84	398.11 S	80.31 W	-397.36	1.28
8265.00	91.05	0.82	7136.20	307.11 S	79.64 W	-306.38	1.67
8354.00	90.92	0.61	7134.67	218.13 S	78.53 W	-217.41	0.28
8444.00	90.89	1.13	7133.25	128.16 S	77.16 W	-127.45	0.58
8534.00	91.14	1.35	7131.65	38.19 S	75.21 W	-37.51	0.37
8624.00	91.23	1.33	7129.79	51.76 N	73.11 W	52.43	0.10
8714.00	91.23	1.34	7127.86	141.72 N	71.01 W	142.36	0.01
8804.00	90.18	1.39	7126.75	231.69 N	68.87 W	232.30	1.17
8894.00	90.19	1.02	7126.46	321.66 N	66.98 W	322.26	0.41
8985.00	90.03	0.62	7126.29	412.66 N	65.67 W	413.23	0.47
9075.00	90.15	0.50	7126.15	502.65 N	64.79 W	503.22	0.19
9165.00	90.37	0.40	7125.74	592.65 N	64.09 W	593.20	0.27
9255.00	90.40	359.94	7125.13	682.64 N	63.82 W	683.20	0.51
9345.00	90.09	359.79	7124.75	772.64 N	64.03 W	773.19	0.38
9435.00	90.06	0.05	7124.63	862.64 N	64.16 W	863.19	0.29
9525.00	89.57	0.08	7124.92	952.64 N	64.06 W	953.18	0.55
9615.00	88.64	359.94	7126.33	1042.63 N	64.04 W	1043.17	1.04
9705.00	88.27	0.28	7128.75	1132.60 N	63.87 W	1133.13	0.56
9795.00	88.43	359.54	7131.35	1222.56 N	64.01 W	1223.09	0.84
9885.00	91.36	0.02	7131.51	1312.55 N	64.35 W	1313.08	3.30
9975.00	91.60	359.72	7129.19	1402.52 N	64.56 W	1403.05	0.43
10065.00	90.43	359.25	7127.59	1492.50 N	65.37 W	1493.03	1.40
10155.00	89.85	358.74	7127.37	1582.48 N	66.95 W	1583.03	0.86
10245.00	90.59	357.73	7127.03	1672.44 N	69.72 W	1673.00	1.39
10335.00	91.45	359.13	7125.42	1762.39 N	72.18 W	1762.97	1.83
10424.00	89.38	358.21	7124.78	1851.35 N	74.25 W	1851.95	2.55
10514.00	90.31	357.96	7125.02	1941.30 N	77.26 W	1941.92	1.07
10604.00	89.94	359.29	7124.83	2031.27 N	79.42 W	2031.91	1.53
10694.00	89.14	359.59	7125.55	2121.27 N	80.30 W	2121.91	0.95
10784.00	89.48	358.94	7126.63	2211.25 N	81.45 W	2211.90	0.82
10874.00	90.49	358.73	7126.66	2301.23 N	83.28 W	2301.89	1.15
10964.00	90.62	358.77	7125.79	2391.21 N	85.24 W	2391.88	0.15
11055.00	90.62	358.58	7124.80	2482.18 N	87.35 W	2482.87	0.21
11144.00	91.05	358.80	7123.50	2571.14 N	89.38 W	2571.85	0.54
11234.00	91.69	358.74	7121.35	2661.10 N	91.31 W	2661.82	0.71
11325.00	90.62	358.82	7119.52	2752.06 N	93.25 W	2752.79	1.18
11415.00	91.69	359.26	7117.70	2842.02 N	94.76 W	2842.77	1.29
11505.00	91.79	358.91	7114.97	2931.97 N	96.20 W	2932.72	0.40
11595.00	91.36	358.27	7112.50	3021.91 N	98.41 W	3022.68	0.86
11685.00	89.14	358.64	7112.10	3111.87 N	100.84 W	3112.66	2.50
11775.00	89.26	358.23	7113.36	3201.83 N	103.29 W	3202.63	0.47
11865.00	89.63	357.88	7114.23	3291.77 N	106.35 W	3292.60	0.57
11955.00	89.97	359.43	7114.55	3381.74 N	108.46 W	3382.59	1.76
12045.00	90.65	359.28	7114.06	3471.74 N	109.47 W	3472.59	0.77
12135.00	90.71	0.80	7112.99	3561.73 N	109.41 W	3562.57	1.69
12225.00	89.97	1.81	7112.46	3651.70 N	107.36 W	3652.52	1.39
12316.00	91.17	2.10	7111.55	3742.64 N	104.26 W	3743.43	1.36
12406.00	90.22	3.48	7110.46	3832.52 N	99.88 W	3833.27	1.86
12496.00	90.15	3.44	7110.17	3922.36 N	94.45 W	3923.05	0.09
12586.00	91.66	3.52	7108.75	4012.18 N	88.98 W	4012.82	1.68
12676.00	93.18	3.56	7104.95	4101.92 N	83.43 W	4102.51	1.69
12691.00	93.33	3.52	7104.10	4116.87 N	82.51 W	4117.45	1.03
12733.00	93.33	3.52	7101.66	4158.72 N	79.93 W	4159.28	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 359.48 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 12733.00 FEET
IS 4159.49 FEET ALONG 358.90 DEGREES (TRUE)

Directional surveys tied onto Gyro's @ 1241' MD. Final Survey is a straight-line projection to the bit.

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