

PCGK - Pressure Case Gamma

1 : 240

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	09-Jun-14	18-Jul-14	21-Jul-14		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	6.125	6.125		
Tool Nominal OD (in)	6.750	4.750	4.750		
Log Start Depth (MD, ft)	1,263.00	8,217.00	16,916.00		
Log End Depth (MD, ft)	8,217.00	16,916.00	18,805.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	06-Jun-14 20:00	14-Jul-14 15:44	18-Jul-14 08:15		
Drill/Wipe End Date and Time	09-Jun-14 07:40	18-Jul-14 05:11	20-Jul-14 10:25		
Min Inc (deg) @ Depth (MD, ft)	0.17 @ 2,947.00	89.29 @ 11,703.00	89.41 @ 17,892.00		
Max Inc (deg) @ Depth (MD, ft)	89.96 @ 8,217.00	91.23 @ 15,502.00	91.70 @ 17,037.00		
Bit TFA(in2) / Bit Type	1.84 / PDC	1.86 / PDC	1.86 / PDC		
Flow Rate (gpm)	605.99	295.00	294.80		
Max AV (fpm) / CV (fpm) @ MWD	0.0 / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Mineral Oil Bas	Mineral Oil Bas		
Density (ppg) / Viscosity (spqt)	10.20 / 41.00	9.52 / 58.00	9.53 / 64.00		
Filtrate CL (ppm)	0.00	347,167.00	284,307.00		
pH / Fluid Loss (mptm)	9.50 / 4	N/A / N/A	N/A / 2		
PV (cP) / YP (lbf2)	13 / 12.00	16 / 10.00	17 / 11.00		
% Solids / % Sand	9.70 / 0.20	12.00 / 0.01	12.50 / 0.01		
% Oil / Oil:Water Ratio	2.10 / N/A	65.00 / 74:26	65.00 / 74:26		
Rm @ Measured Temp (degF)	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		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (in F) / S	478.70 / PGM	347.70 / PGM	350.05 / PGM		

Max Tool Temp (degF) / Source	179.70 / PCM	247.78 / PCM	253.35 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 179.70	N/A @ 297.8	N/A @ 253.35		
Lead MWD Engineer	Clay Wass	Clay Wass	Clay Wass		
Customer Representative	Luke Raines	Scott Hancock	Luke Raines		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.76	5.93	5.93		
Sub Serial Number	11341319	12365886	12365886		
Insert Serial Number	10997273	11400845	11680745		
Date and Time Initialized	05-Jun-14 05:20	13-Jul-14 23:37	18-Jul-14 14:24		
Date and Time Read	10-Jun-14 14:47	18-Jul-14 17:17	21-Jul-14 07:44		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	46.00	46.00	46.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341319	12365886	12365886		
Sonde Serial Number	11297564	11638625	11478164		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	5.89	28.80	23.81		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	49.62	39.26	39.62		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341319	12365886	12365886		
Insert/Sonde Serial Number	11681022	11579845	11293312		

REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. Critical annular velocities are calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.
4. all data presented is recorded data unless otherwise specified.
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

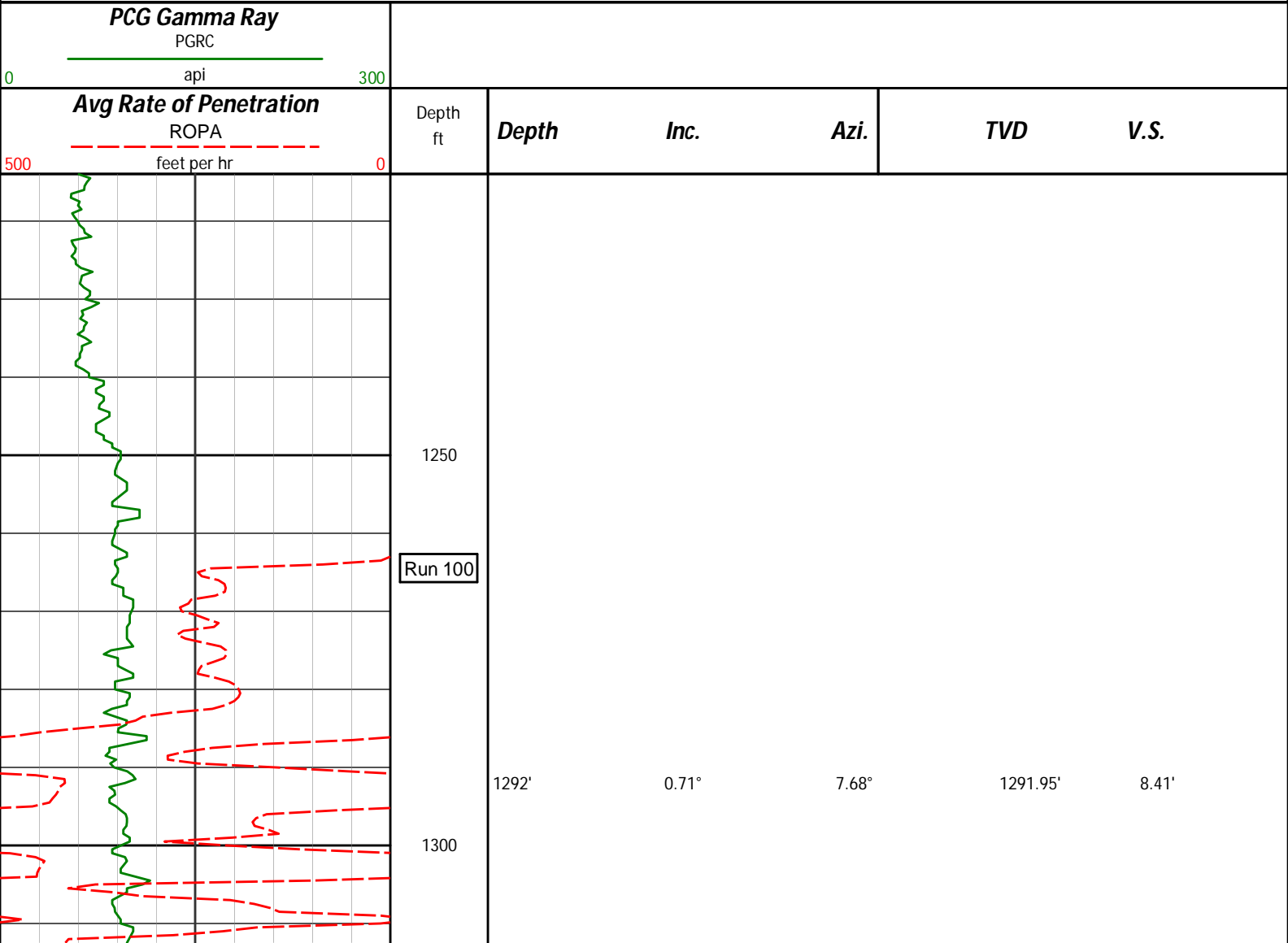
Insite version: 8.0.1

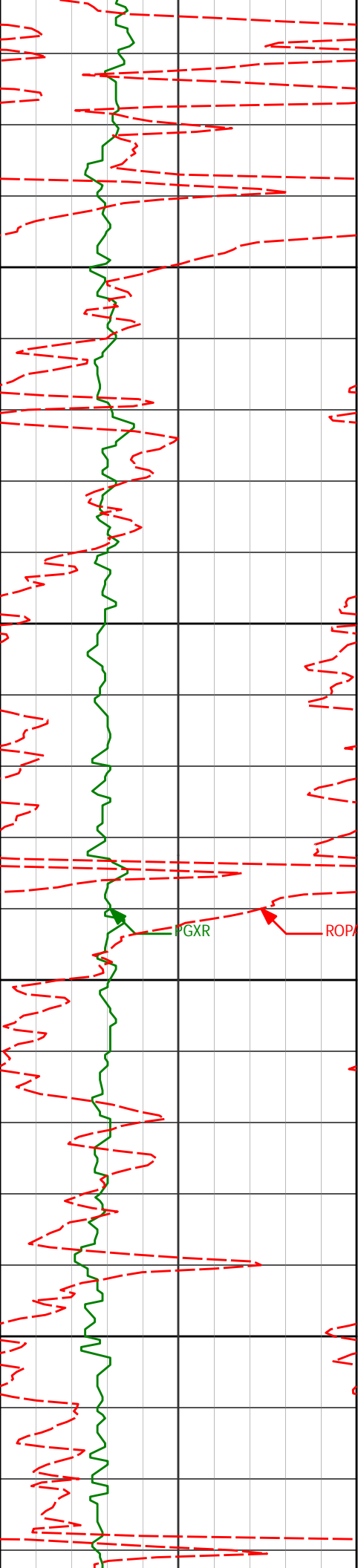
WARRANTY

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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:240

Anadarko Petroleum Corp.
NRC 30C-32HZ
Xtreme 22
Sec. 8-T1N-R67W





1350

1400

1450

1500

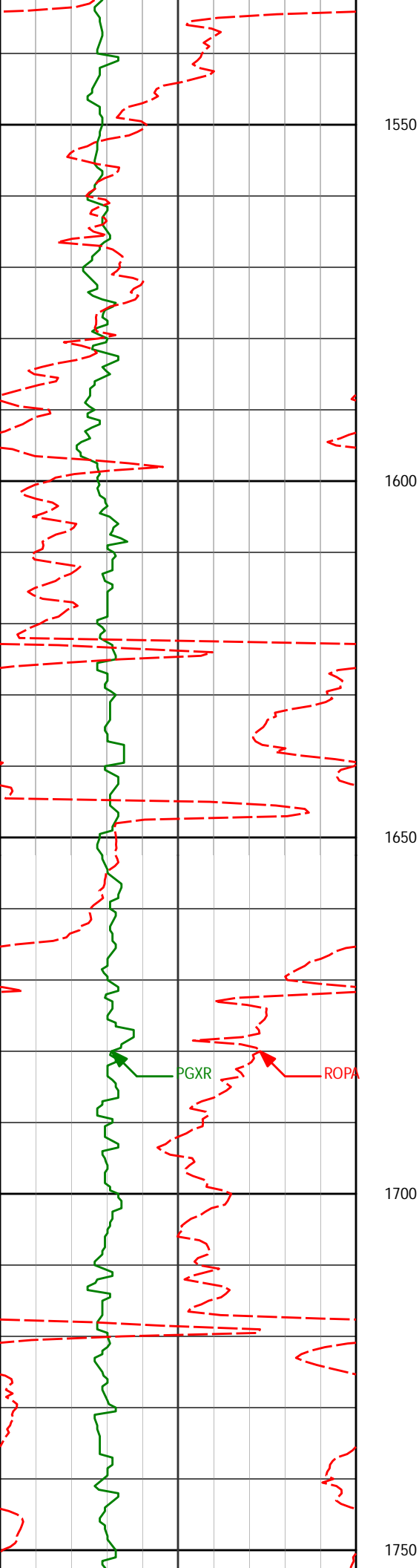
1481'

0.41°

348.20°

1480.94'

10.24'



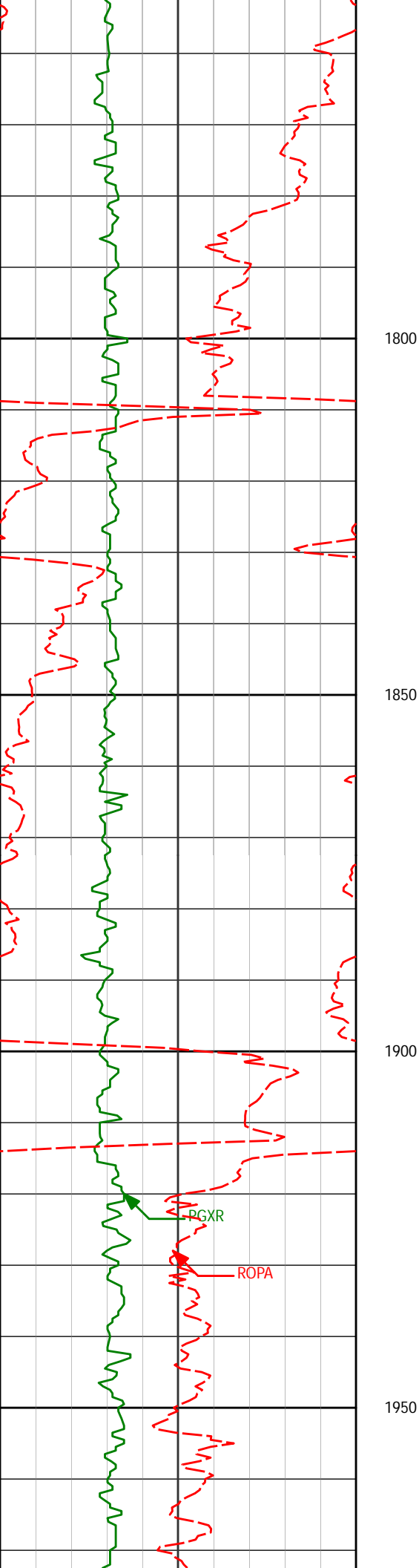
1671'

0.51°

345.90°

1670.93'

11.72'



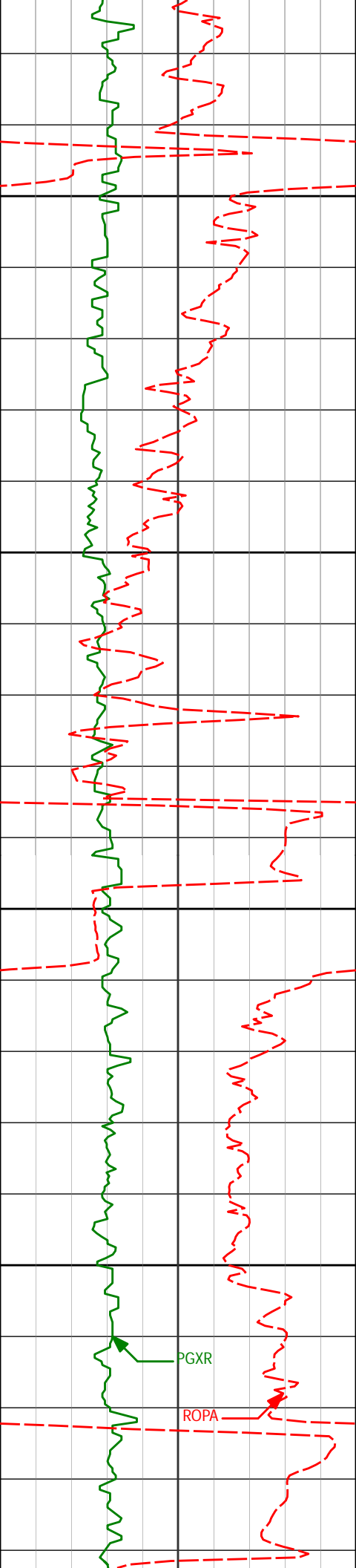
1854'

0.83°

315.56°

1853.92'

13.46'



2000

2050

2100

2150

PGXR

ROPA

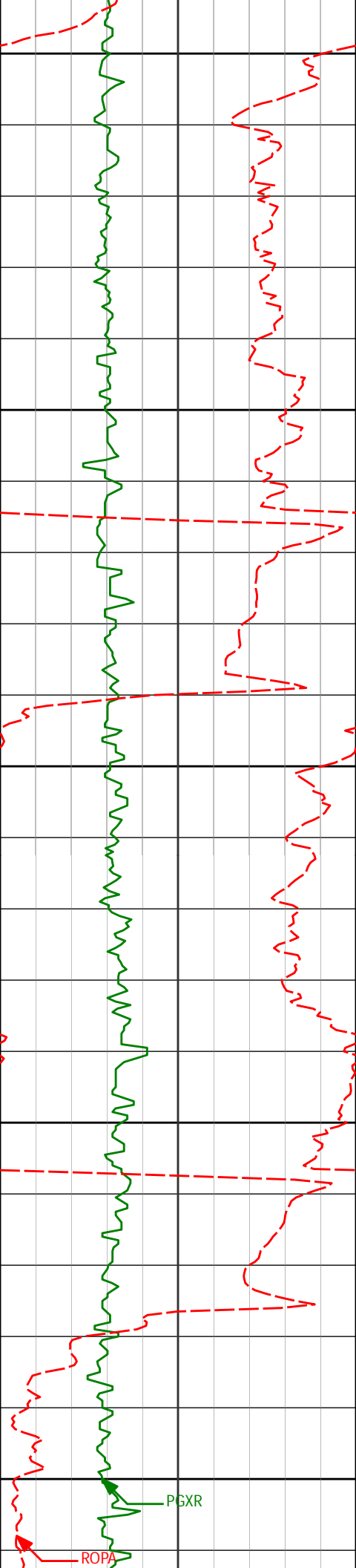
2036'

2.44°

261.94°

2035.85'

13.86'



2200

2219'

1.92°

201.59°

2218.73'

10.46'

2250

2300

2350

2400

2401'

0.75°

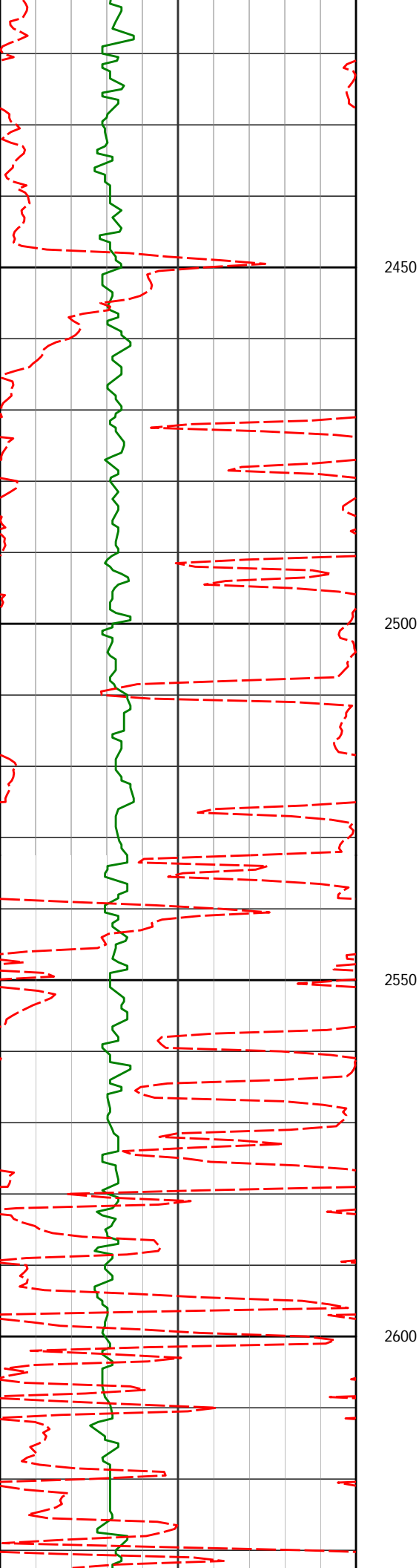
108.87°

2400.70'

7.24'

PGXR

ROPA



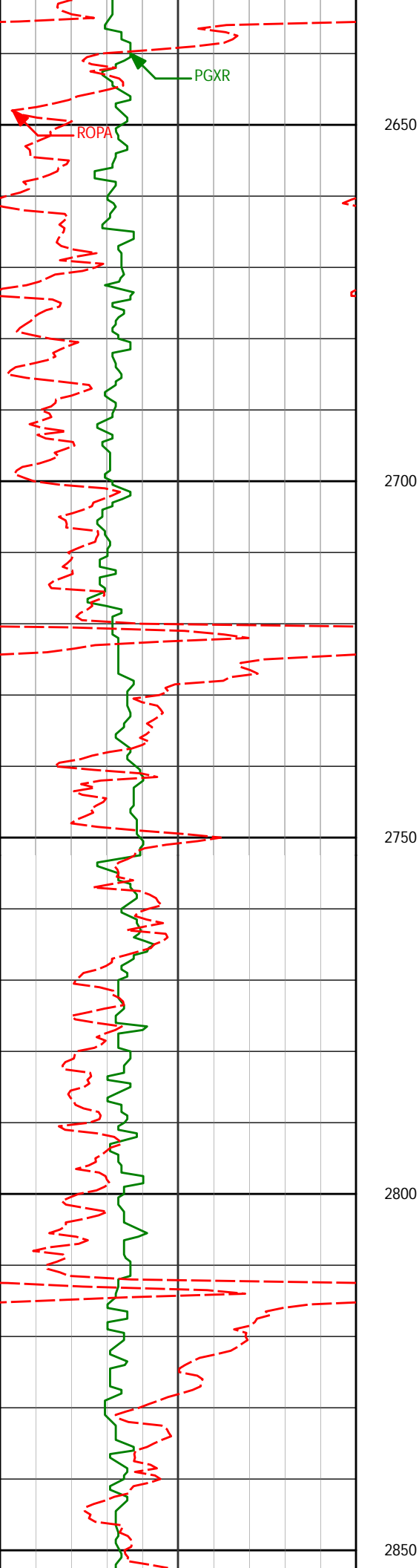
2584'

0.52°

139.80°

2583.69'

6.22'



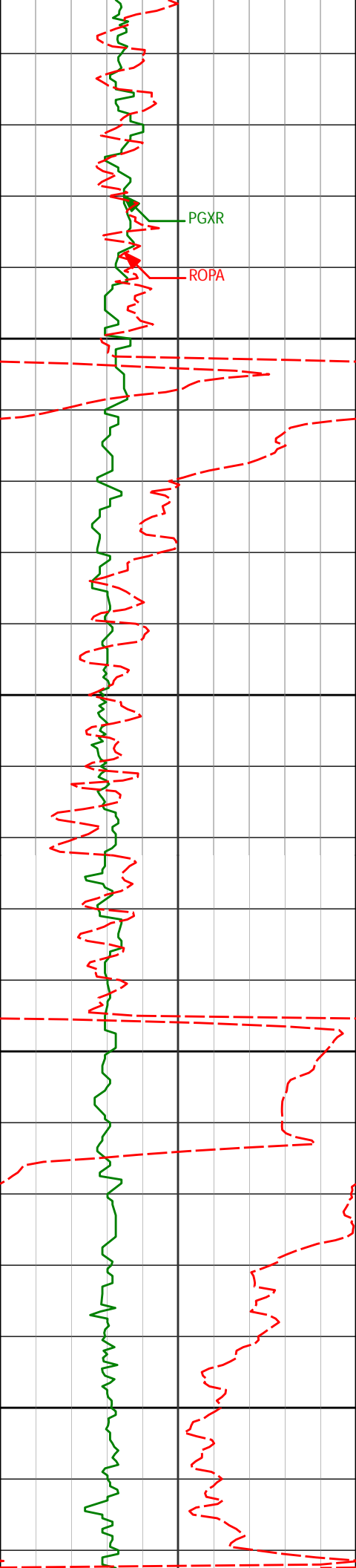
2765'

0.50°

99.51°

2764.68'

5.46'



2900

2950

3000

3050

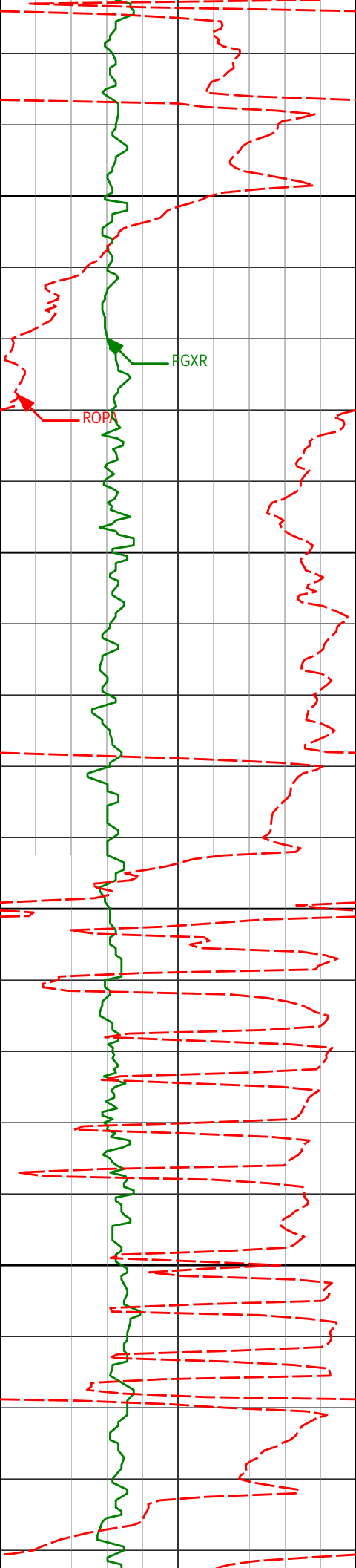
2947'

0.17°

100.22°

2946.68'

5.28'



3100

3129'

3.11°

289.68°

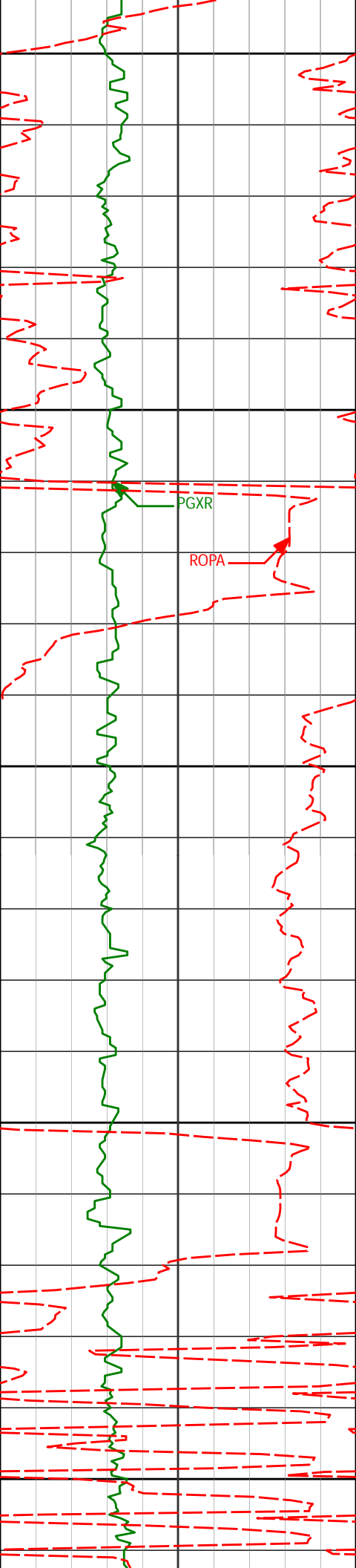
3128.59'

6.89'

3150

3200

3250



3300

3311'

5.77°

276.95°

3310.03'

9.66'

3350

PGXR

ROPA

3400

3450

3486'

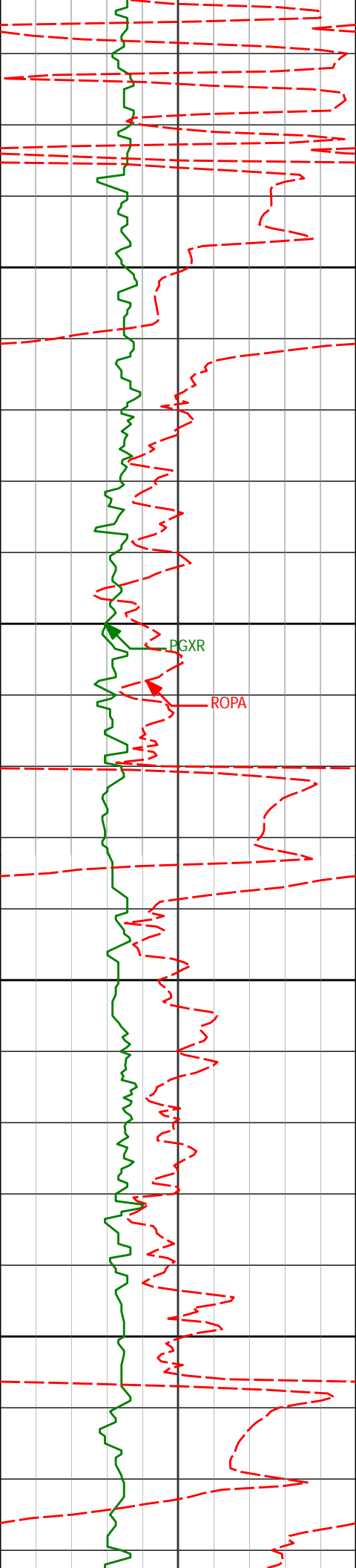
7.43°

269.39°

3483.87'

10.61'

3500



3550

3600

3650

3700

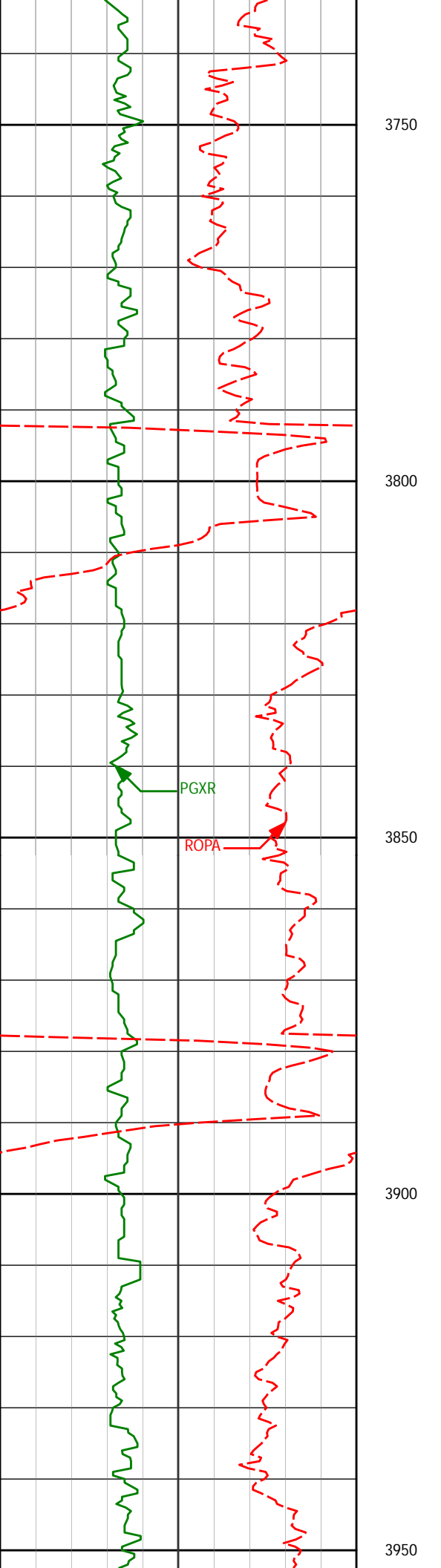
3658'

7.86°

265.65°

3654.34'

9.60'



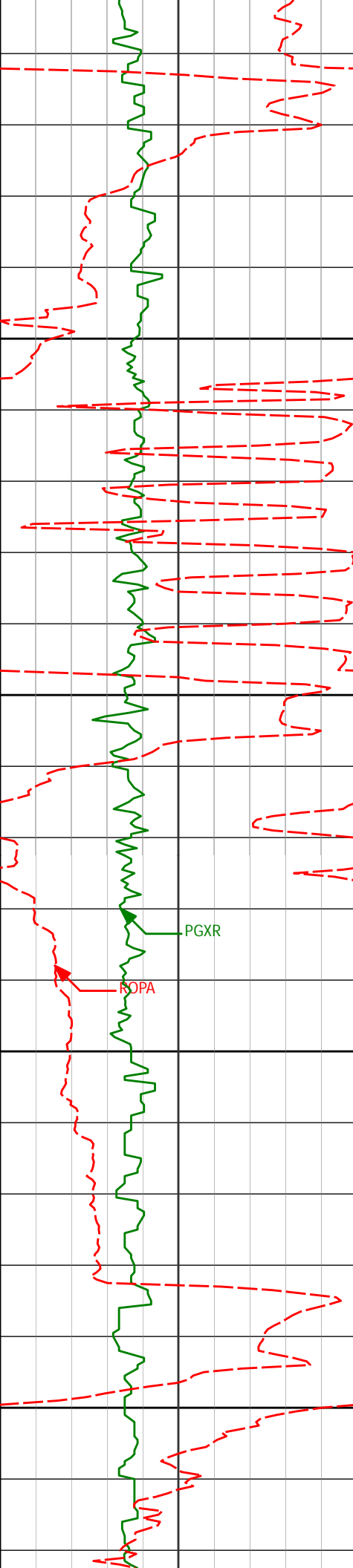
3829'

8.48°

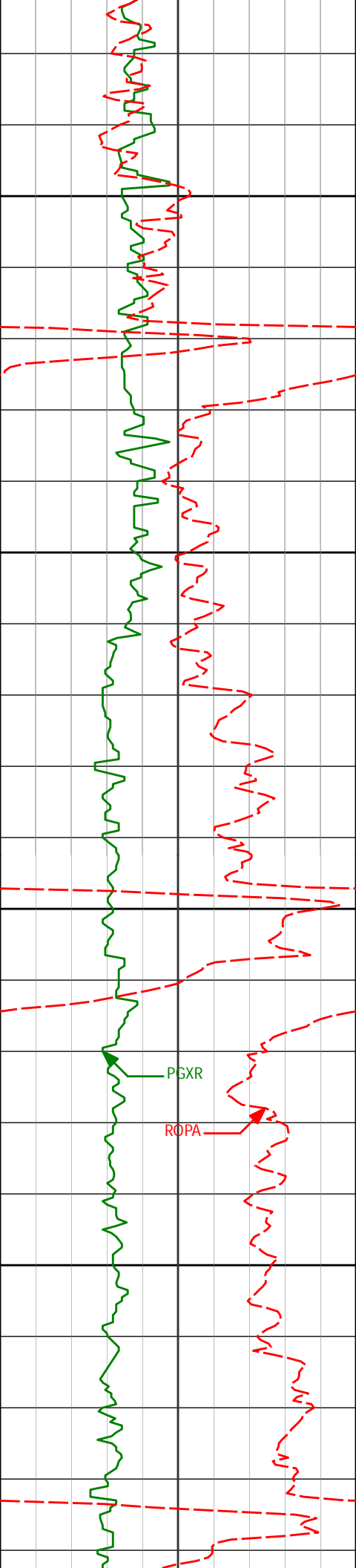
265.43°

3823.60'

7.71'



3996'	8.43°	263.26°	3988.79'	5.29'
4000				
4050				
4100				
4150				
4167'	8.53°	267.92°	4157.92'	3.36'



4200

4250

4300

4350

PGXR

ROPA

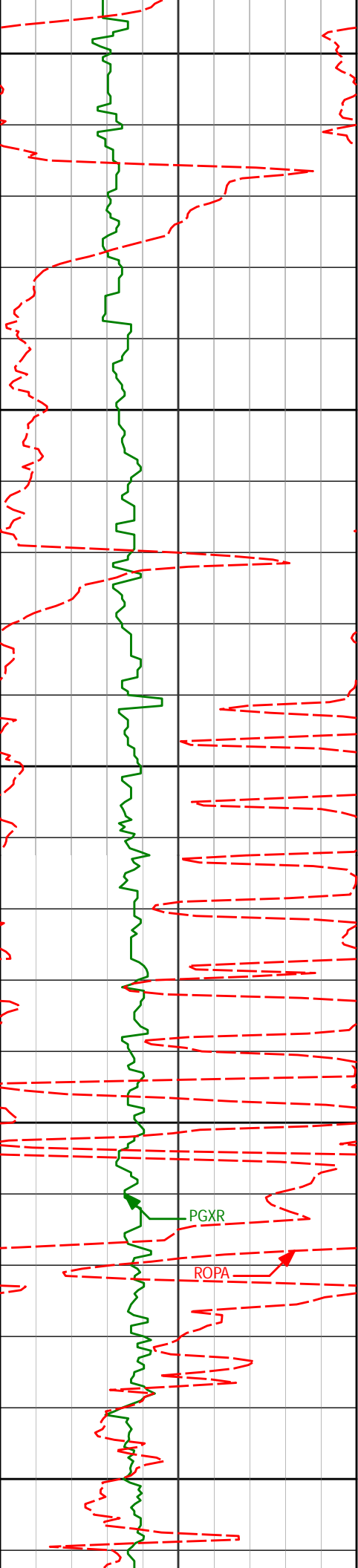
4338'

8.94°

270.75°

4326.94'

3.07'



4400

4450

4500

4550

4600

4509'

8.30°

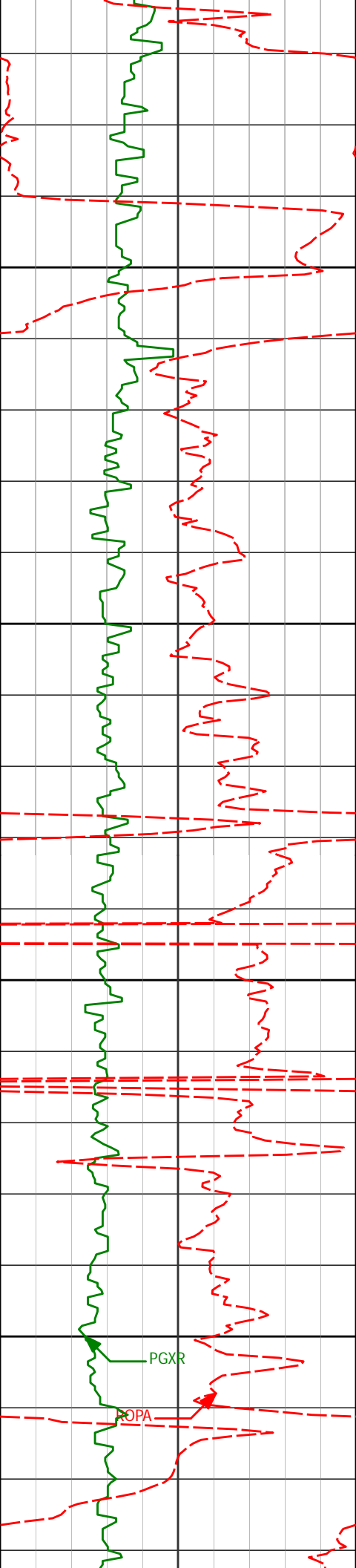
272.54°

4496.01'

3.79'

PGXR

ROPA



4650

4680'

8.54°

269.63°

4665.17'

4.26'

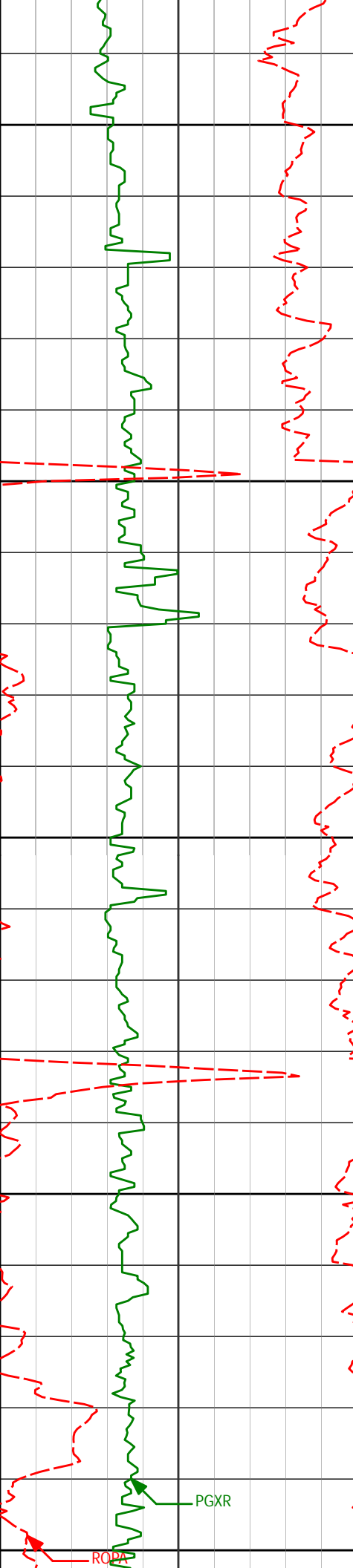
4700

4750

4800

PGXR

ROPA



4850

4851'

8.70°

270.05°

4834.23'

4.19'

4900

4950

5000

5022'

7.63°

270.88°

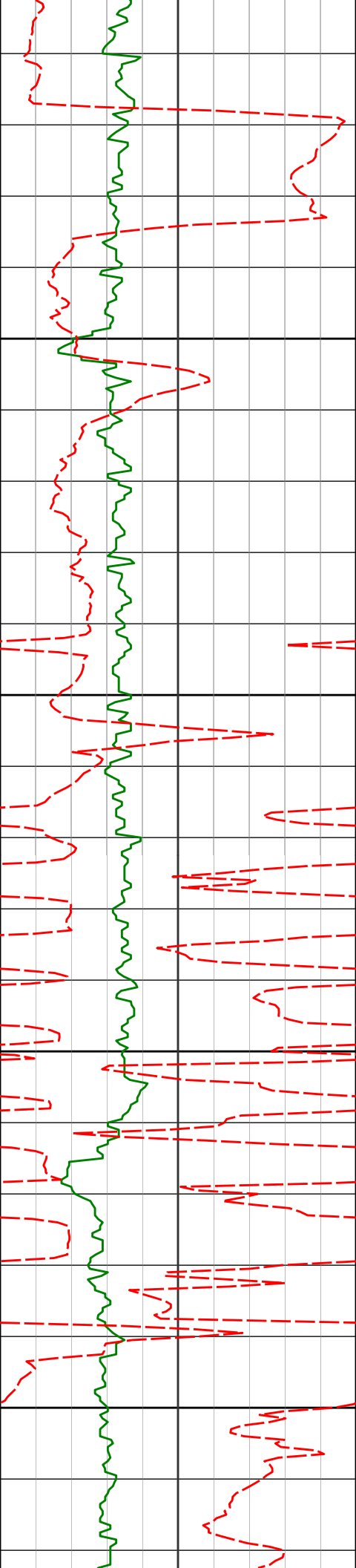
5003.50'

4.37'

PGXR

ROPA

5050



5100

5150

5200

5250

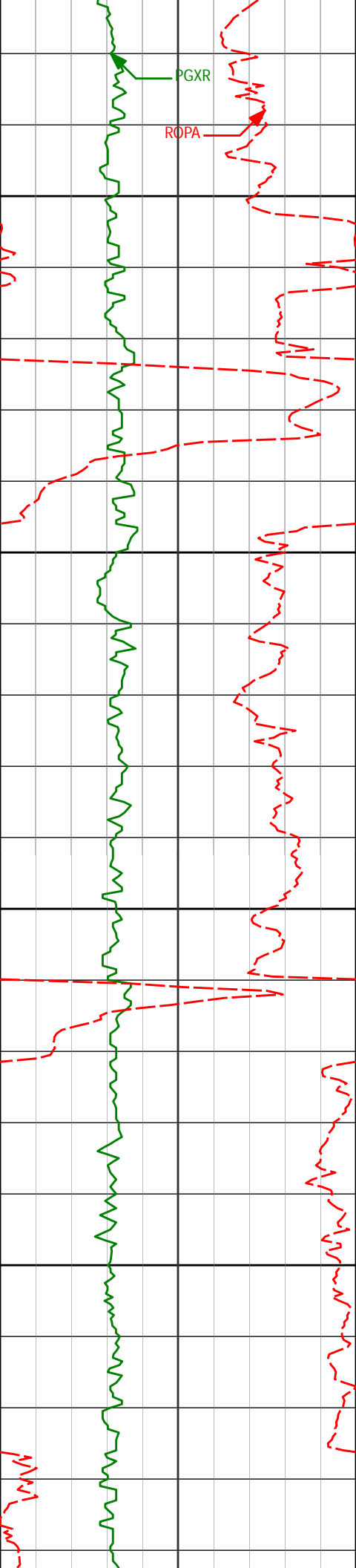
5193'

8.10°

266.71°

5172.89'

3.86'



PGXR

ROPA

5300

5350

5364'

8.06°

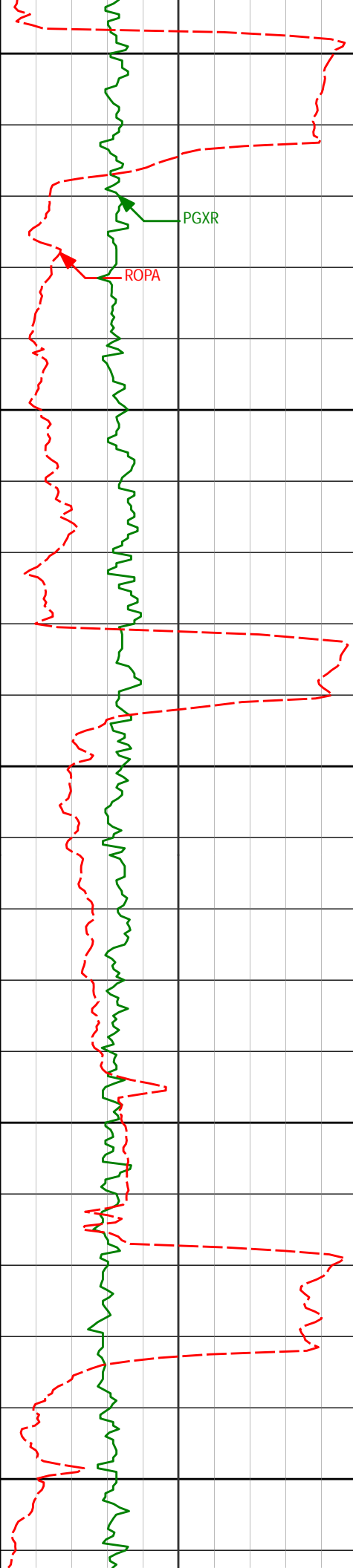
269.38°

5342.19'

3.03'

5400

5450



5500

5550

5600

5650

5700

5535'

8.01°

268.50°

5511.51'

2.59'

5707'

8.51°

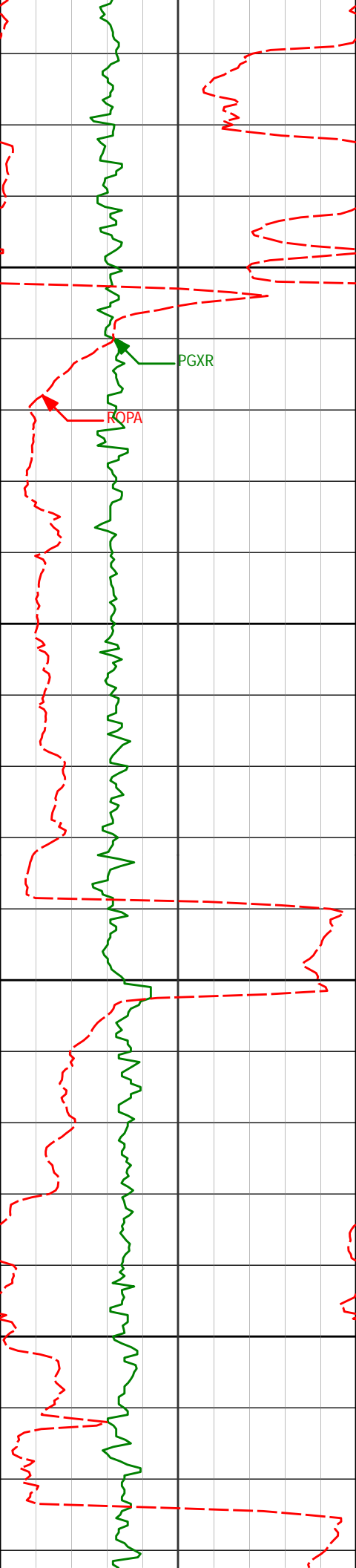
272.36°

5681.73'

2.80'

PGXR

ROPA



5750

5800

5850

5878'

5900

PGXR

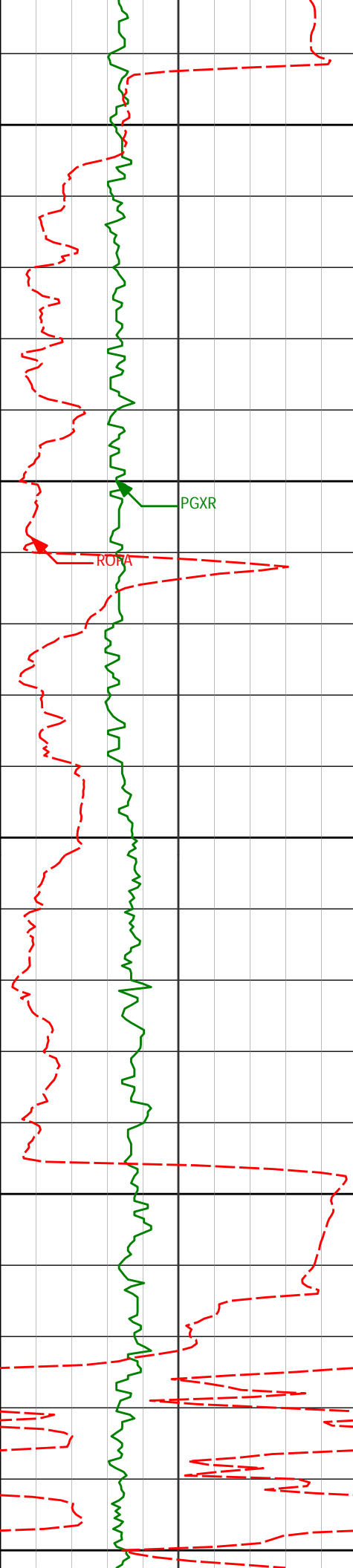
ROPA

7.84°

271.75°

5850.99'

3.68'



5950

6000

6050

6100

6150

PGXR

ROPA

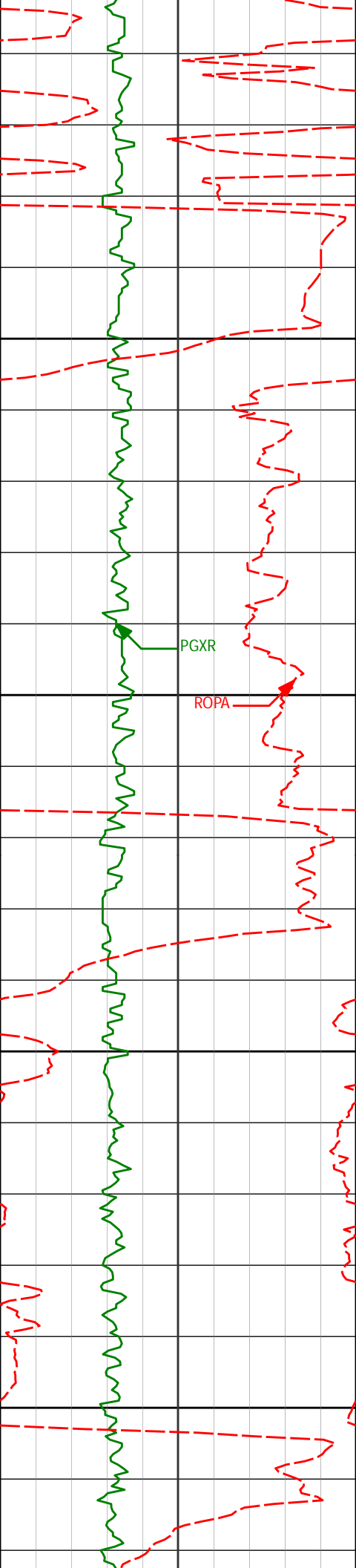
6050'

6.86°

269.36°

6021.58'

3.92'



6200

6221'

7.95°

268.27°

6191.15'

3.45'

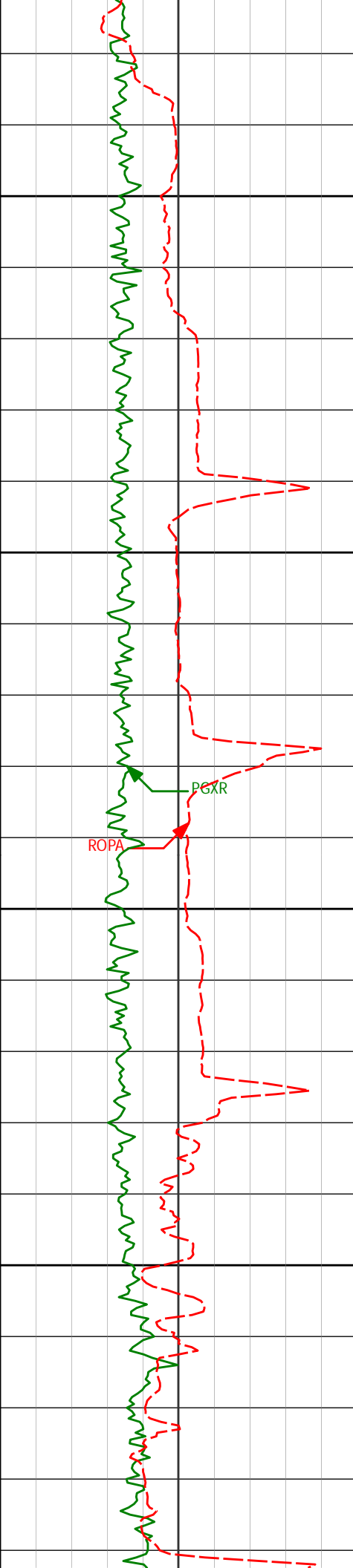
PGXR

ROPA

6250

6300

6350



6400

6450

6500

6550

6393'

6.32°

264.41°

6361.81'

2.17'

PGXR

ROPA

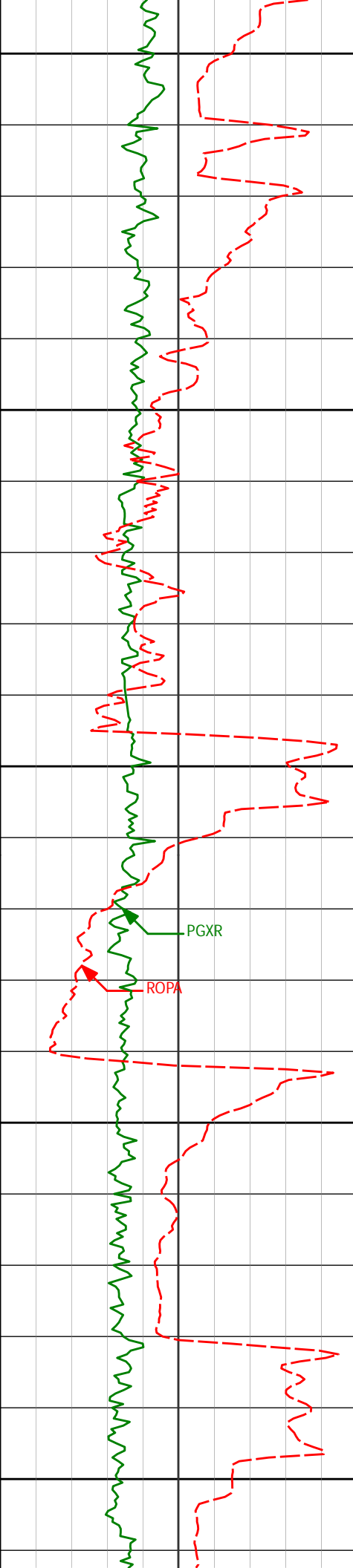
6563'

4.18°

273.38°

6531.09'

1.62'



6600

6650

6700

6750

6800

PGXR

ROPA

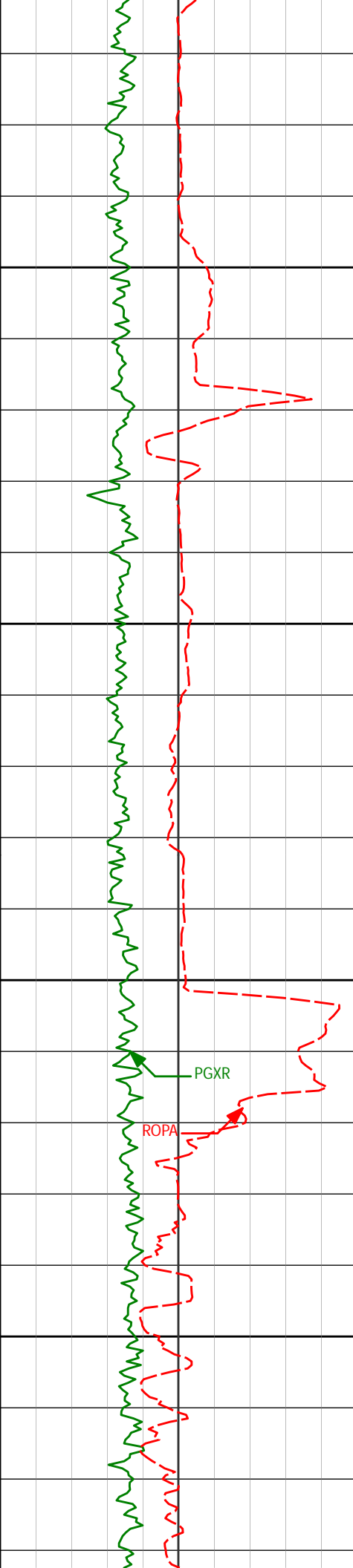
6734'

2.73°

261.30°

6701.78'

1.38'



6850

6900

6950

7000

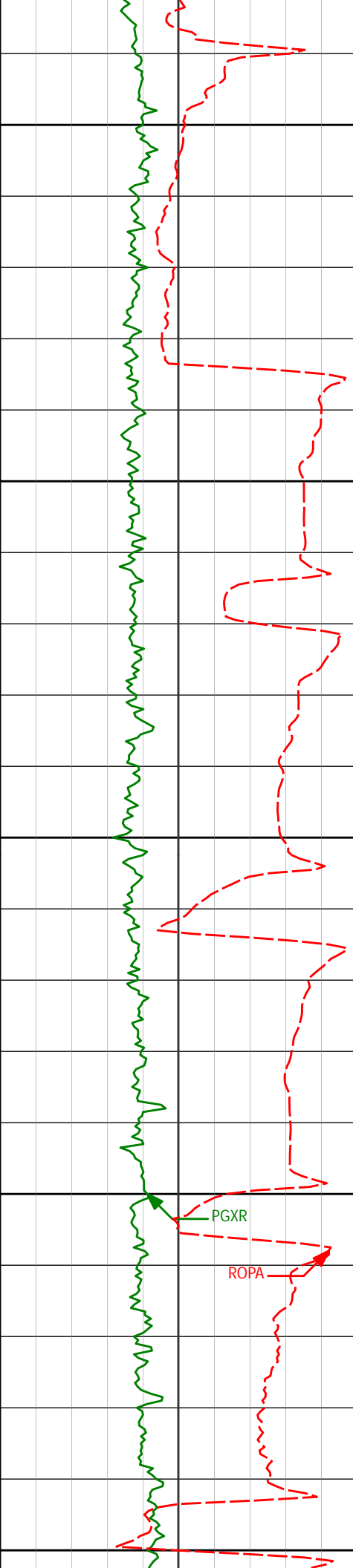
6904'

1.37°

294.03°

6871.67'

1.59'



7050

7075'

0.26°

122.38°

7042.66'

2.22'

7100

7117'

3.05°

5.99°

7084.64'

3.28'

7150

7160'

6.16°

13.64°

7127.49'

6.66'

7200

7203'

9.17°

11.74°

7170.11'

12.26'

7250

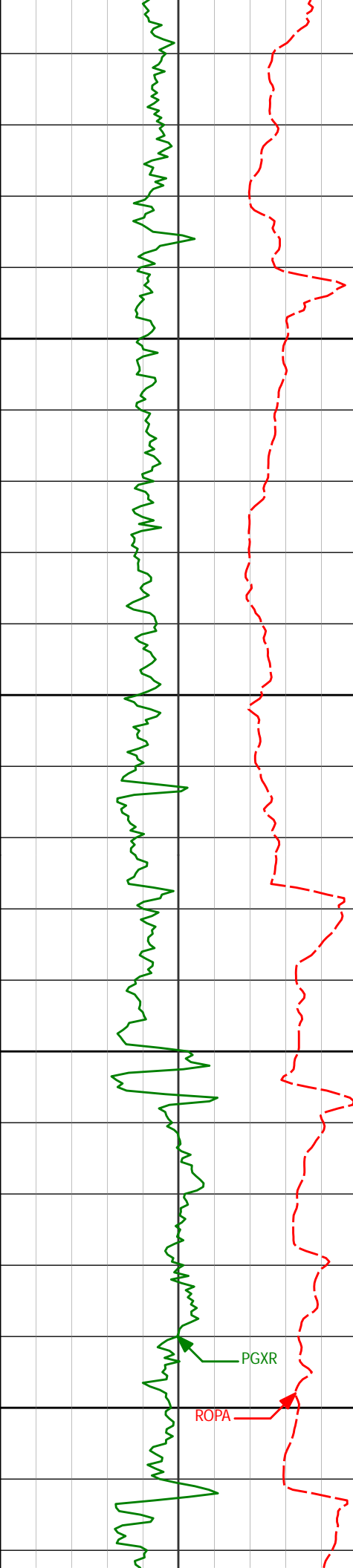
7246'

12.18°

10.23°

7212.36'

20.08'



7300

7289'

15.68°

8.20°

7254.09'

30.29'

7332'

19.85°

4.85°

7295.03'

43.33'

7350

7373'

23.71°

2.76°

7333.09'

58.50'

7400

7416'

27.08°

2.30°

7371.93'

76.92'

7450

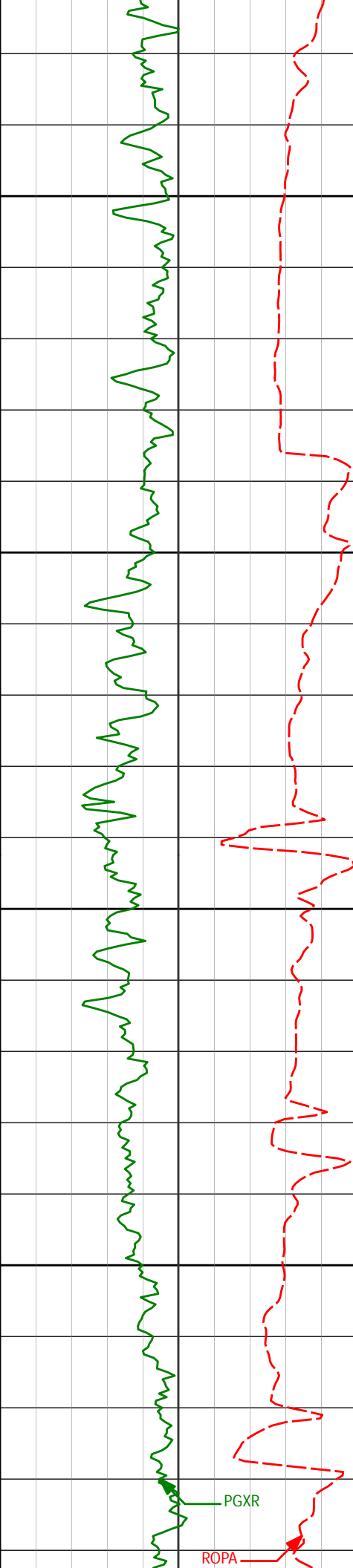
7458'

30.70°

1.19°

7408.70'

97.20'



7500

7501'

34.72°

0.18°

7444.87'

120.43'

7544'

39.34°

359.75°

7479.19'

146.32'

7550

7587'

42.81°

358.84°

7511.60'

174.56'

7600

7629'

46.19°

358.86°

7541.56'

203.99'

7650

7672'

49.67°

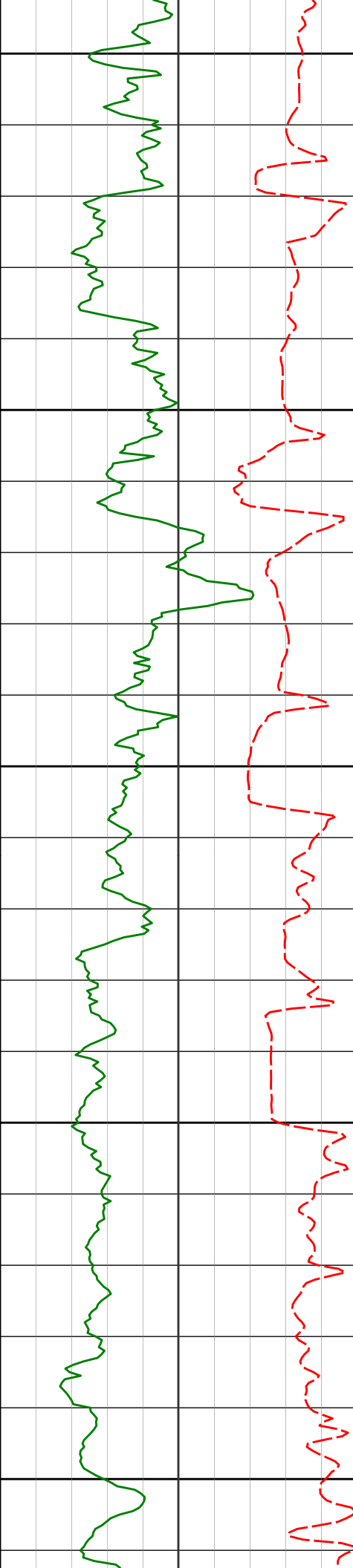
358.63°

7570.36'

235.90'

PGXR

ROPA



7700

7715'

53.59°

358.73°

7597.05'

269.60'

7750

7758'

57.27°

358.91°

7621.44'

304.99'

7800

7801'

59.83°

359.07°

7643.88'

341.67'

7850

7844'

62.54°

359.40°

7664.60'

379.33'

7900

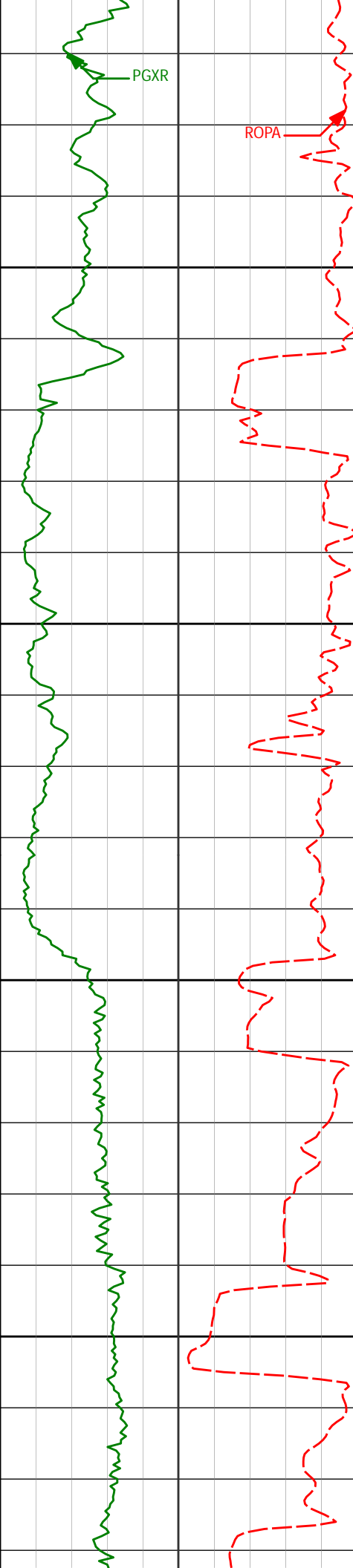
7886'

66.28°

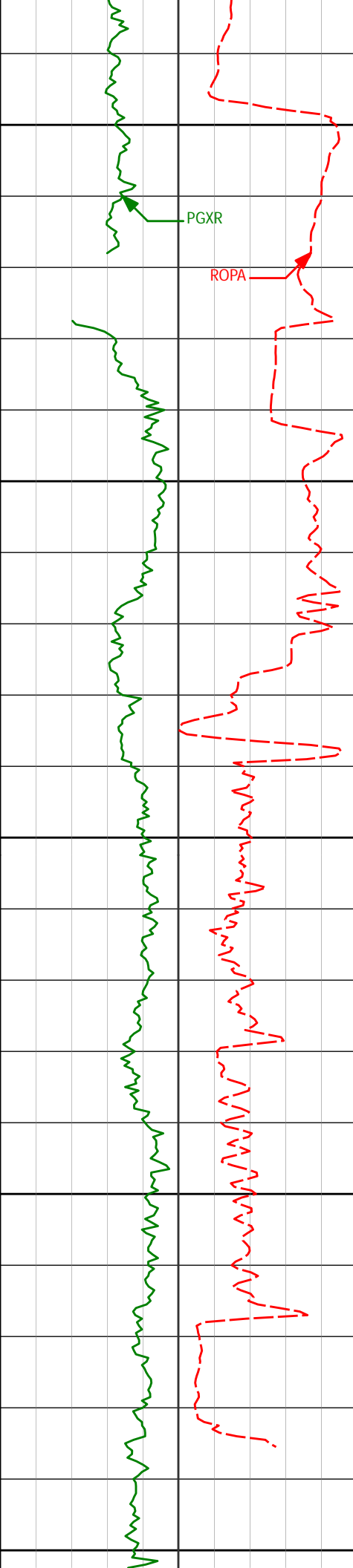
359.66°

7682.74'

417.21'



7929'	69.11°	359.93°	7699.06'	456.98'
7950				
7972'	72.08°	0.36°	7713.34'	497.54'
8000				
8015'	76.15°	0.90°	7725.11'	538.88'
8050				
8058'	79.94°	0.77°	7734.01'	580.94'
8100				
8101'	82.74°	1.09°	7740.49'	623.44'



8144'

8150

8171'

8200

Run 200

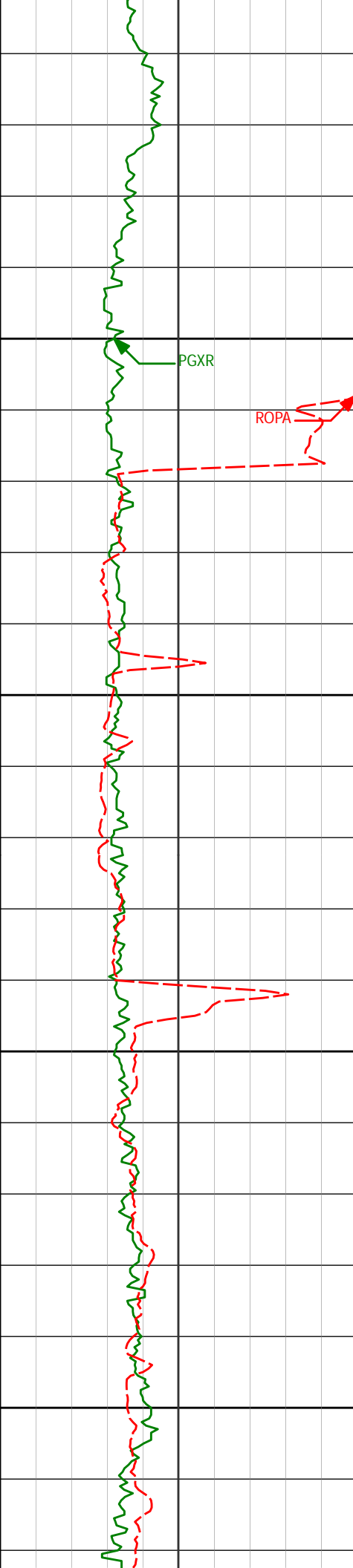
8250

8277'

8300

8350

8144'	84.69°	1.17°	7745.20'	666.17'
8171'	86.55°	0.79°	7747.26'	693.09'
8277'	90.71°	0.77°	7749.79'	799.02'



8400

PGXR

ROPA

8450

8448'

90.28°

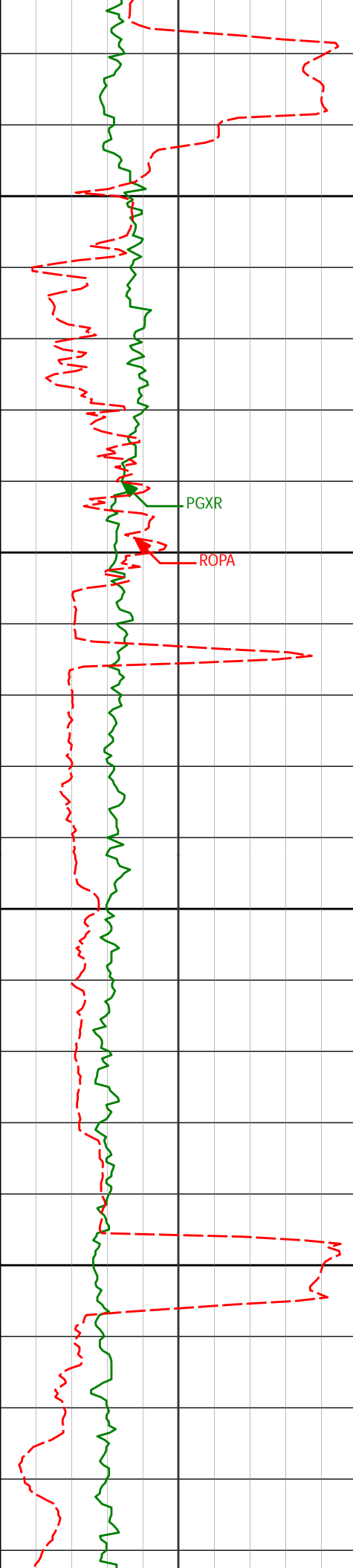
359.80°

7748.31'

970.01'

8500

8550



8600

8619'

90.06°

359.46°

7747.81'

1141.01'

PGXR

ROPA

8650

8700

8750

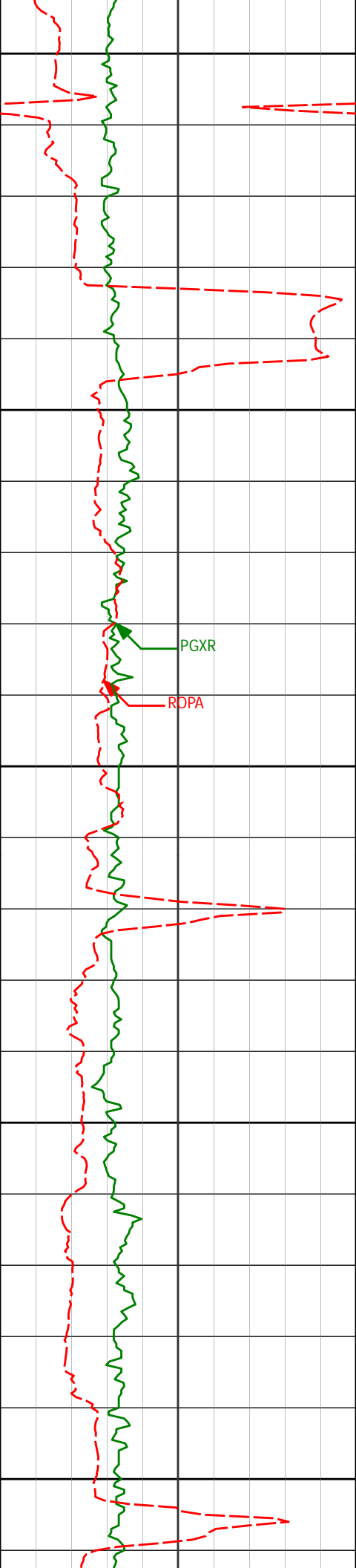
8790'

90.31°

359.70°

7747.25'

1312.00'



8800

8850

8900

8950

9000

PGXR

ROPA

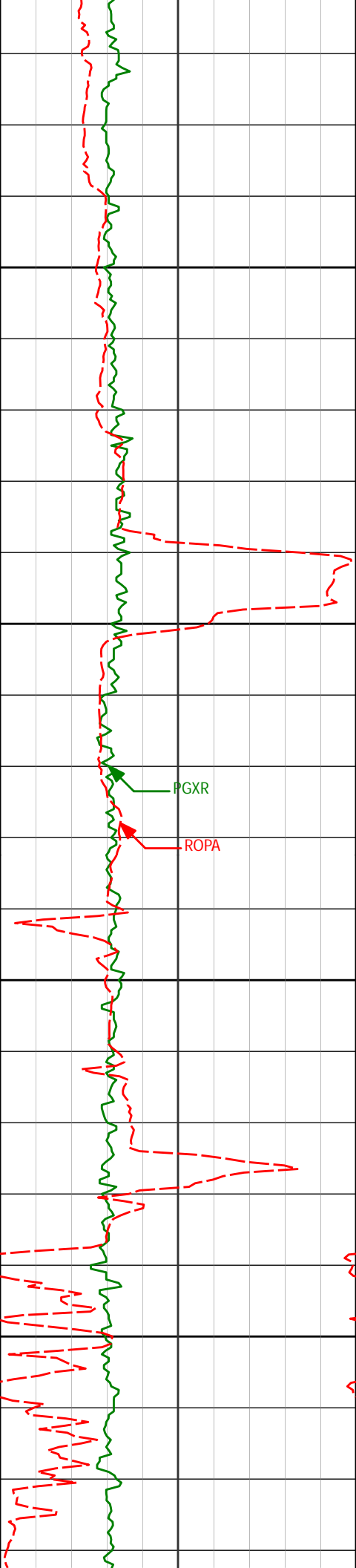
8961'

90.03°

0.26°

7746.75'

1483.00'



9050

9100

9150

9200

PGXR

ROPA

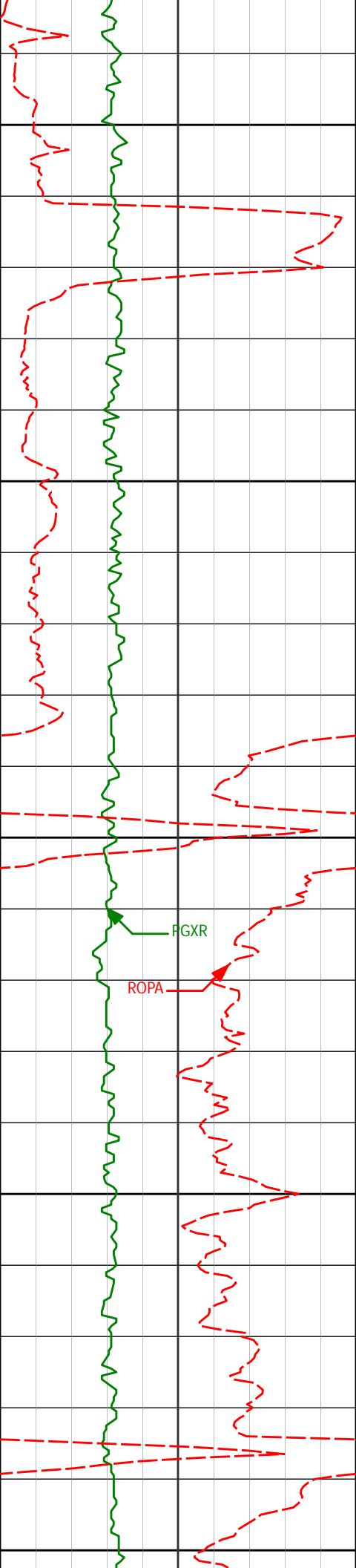
9132'

90.15°

1.43°

7746.48'

1653.98'



9250

9300

9350

9400

9450

9303'

90.09°

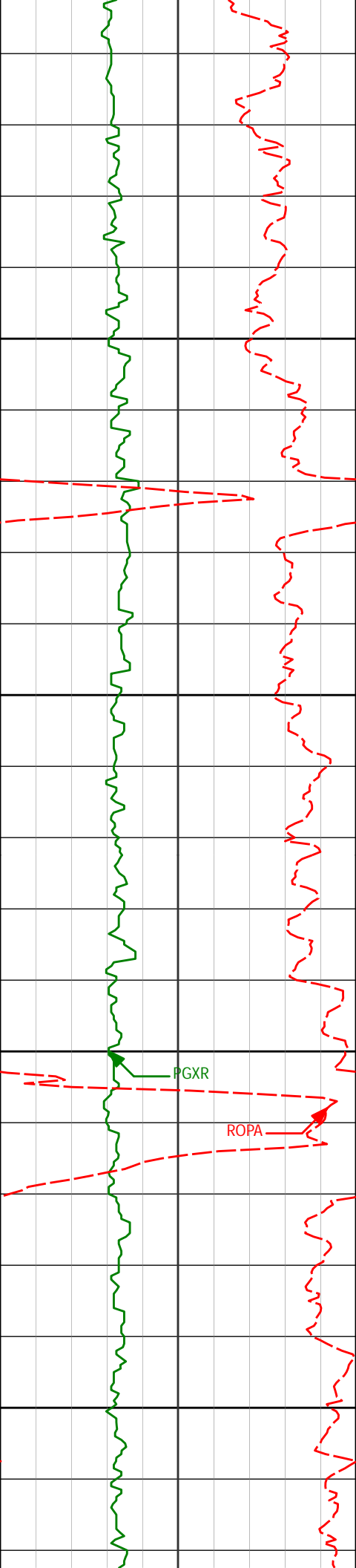
1.28°

7746.12'

1824.93'

FGXR

ROPA



9475'

90.28°

0.47°

7745.57'

1996.91'

9500

9550

9600

9645'

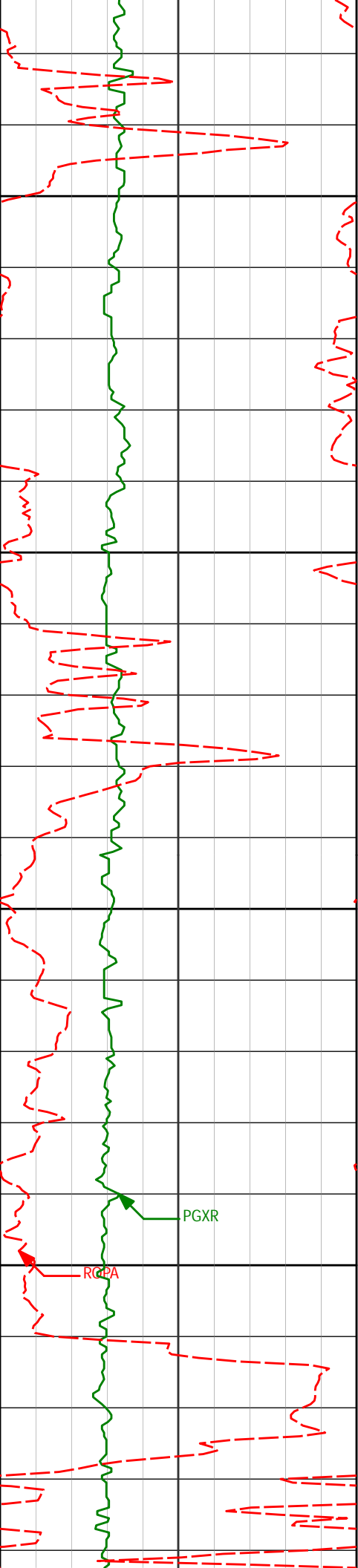
89.88°

0.47°

7745.33'

2166.90'

9650



9700

9750

9800

9850

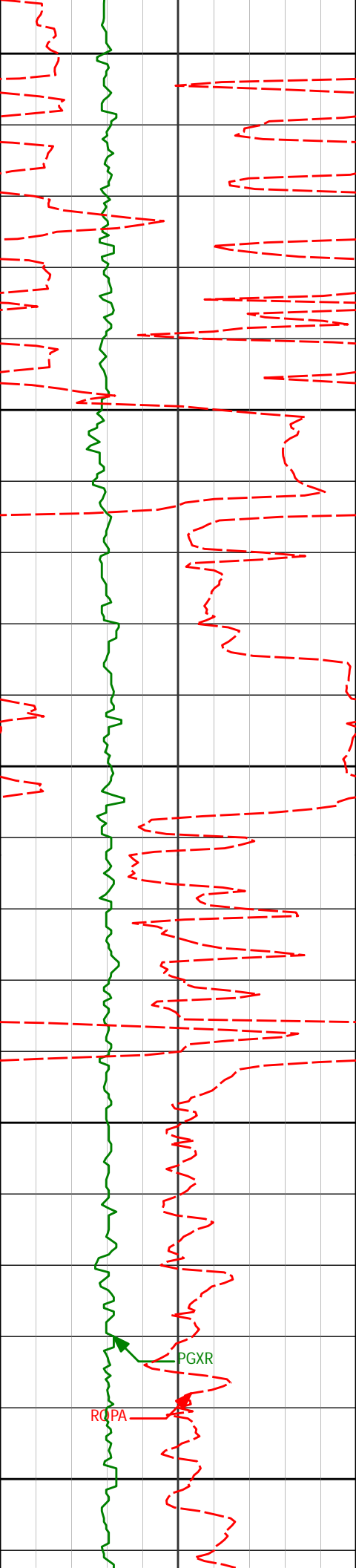
9816'

90.77°

0.33°

7744.36'

2337.89'



9900

9950

9987'

90.03°

359.43°

7743.16'

2508.88'

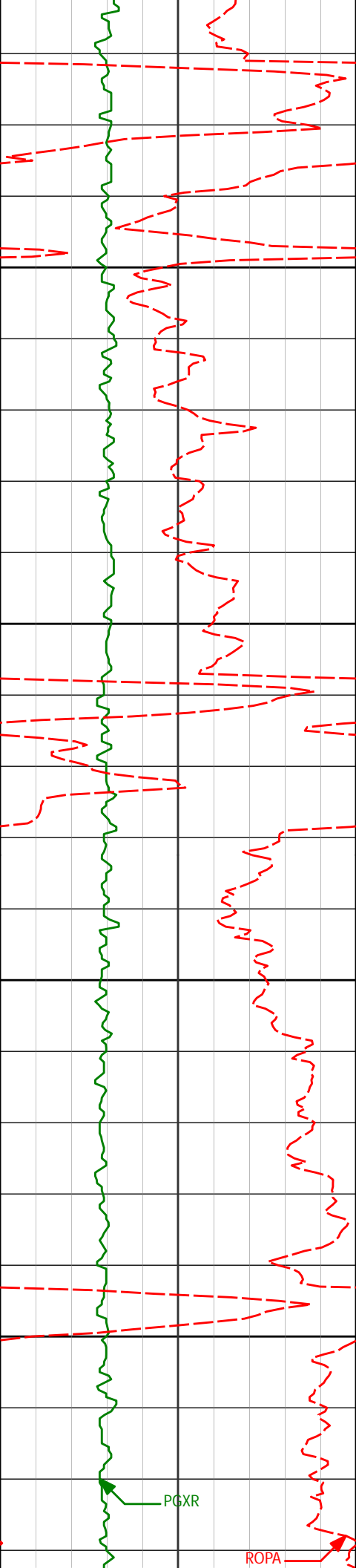
10000

10050

10100

PGXR

ROPA



10150

10158'

89.57°

359.90°

7743.76'

2679.88'

10200

10250

10300

10327'

90.59°

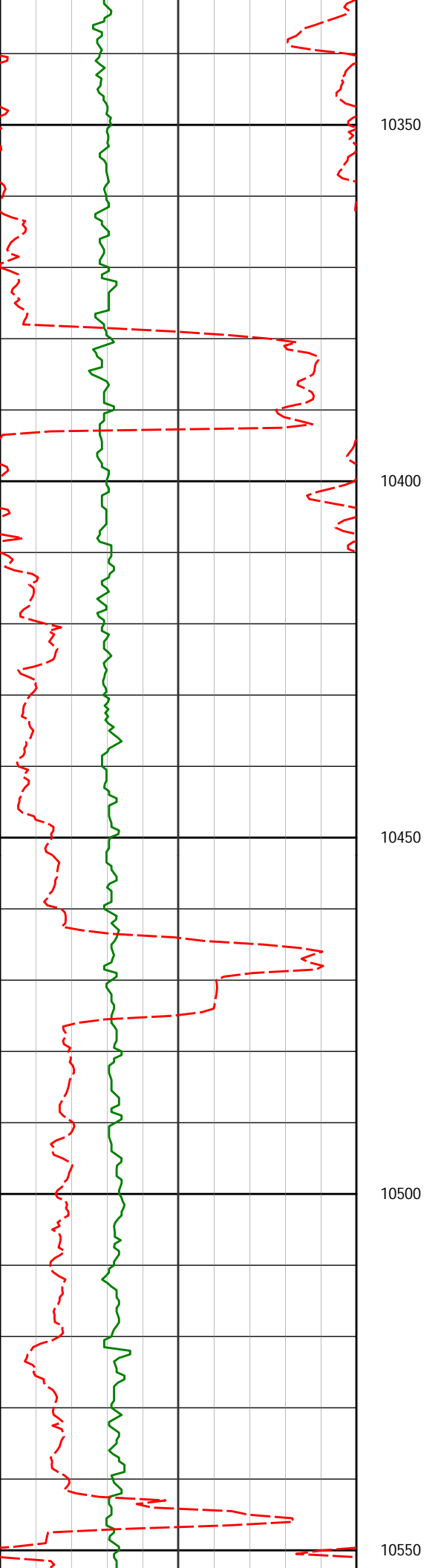
0.20°

7743.53'

2848.88'

PGXR

ROPA



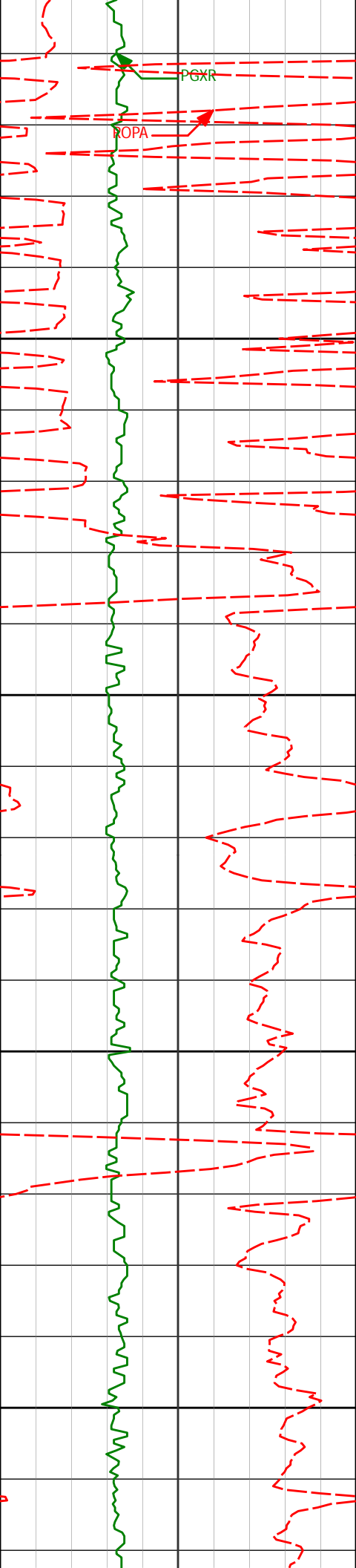
10495'

89.72°

359.55°

7743.07'

3016.87'



PGXR

ROPA

10600

10650

10700

10750

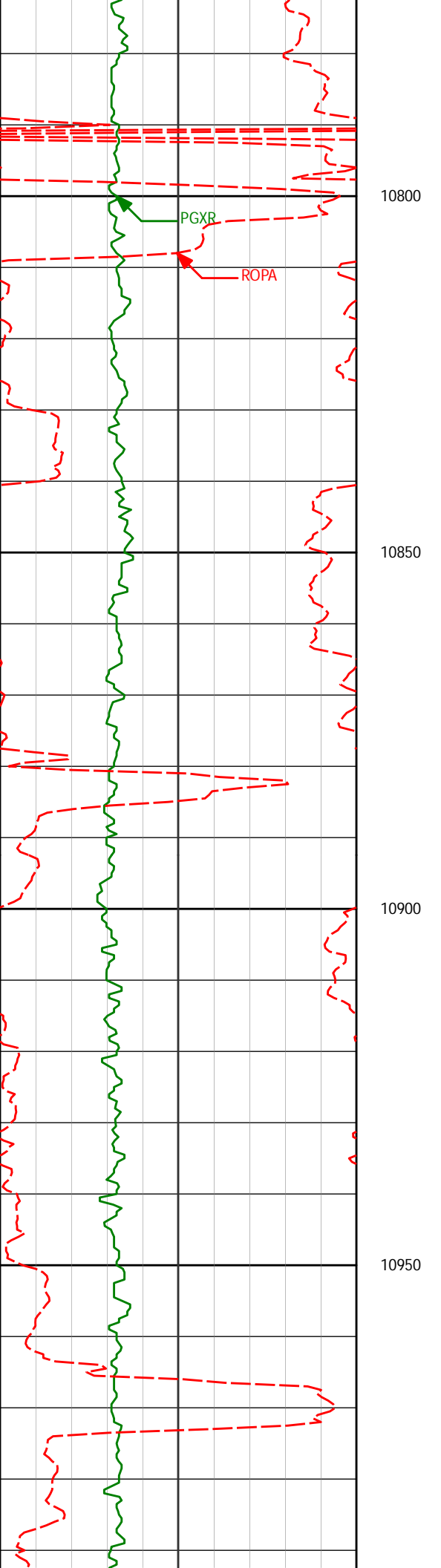
10663'

90.03°

0.02°

7743.44'

3184.87'



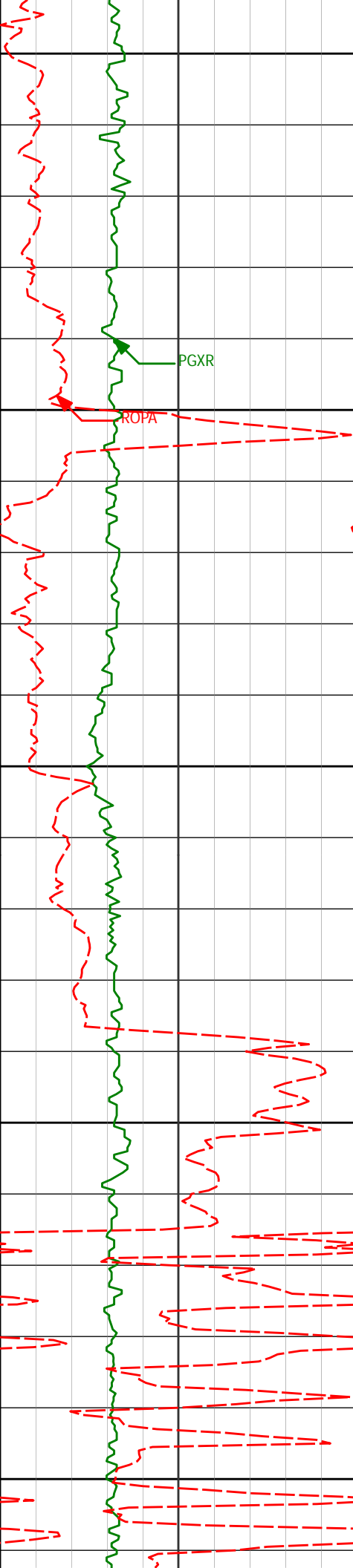
10831'

89.88°

359.27°

7743.57'

3352.87'



11000

11000'

89.85°

358.19°

7743.97'

3521.82'

PGXR

ROPA

11050

11100

11150

11169'

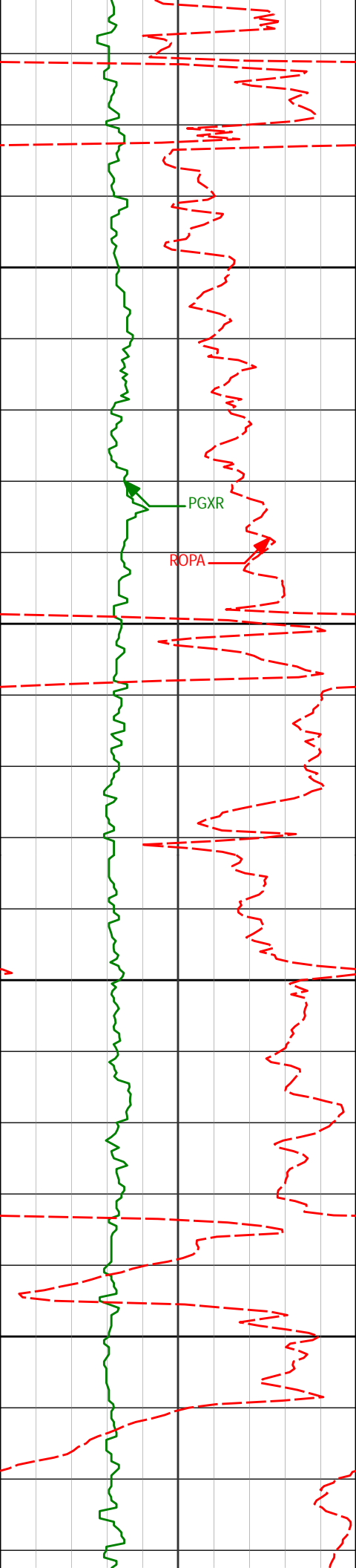
89.82°

358.25°

7744.45'

3690.74'

11200



11250

PGXR

ROPA

11300

11338'

90.62°

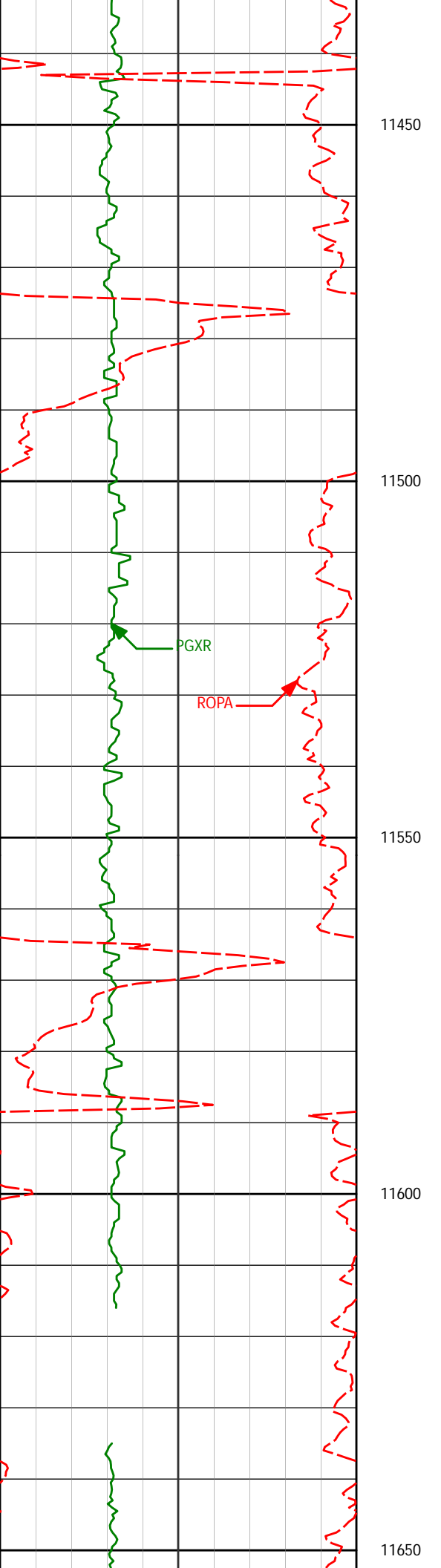
0.57°

7743.81'

3859.72'

11350

11400



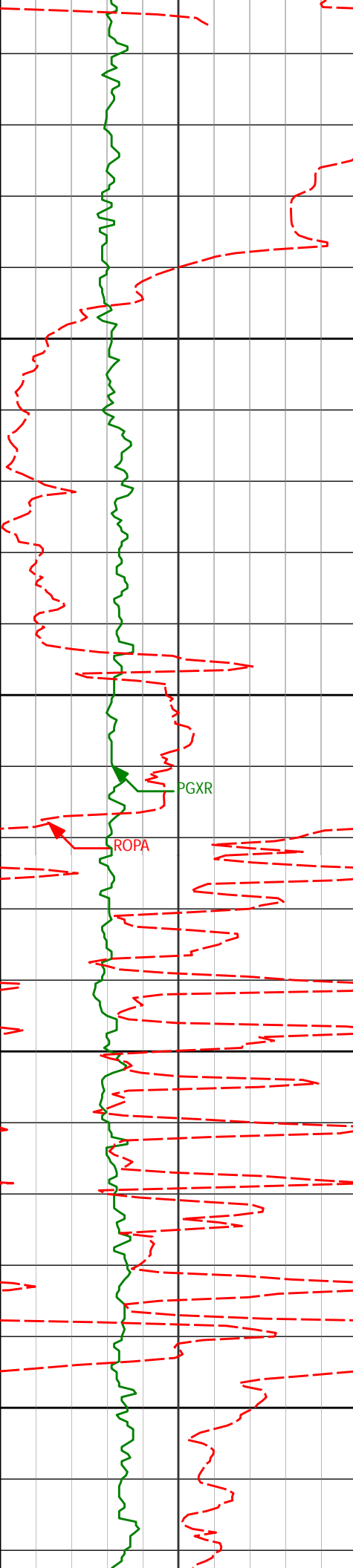
11519'

90.09°

359.53°

7742.68'

4040.71'



11700

11703'

89.29°

359.62°

7743.68'

4224.70'

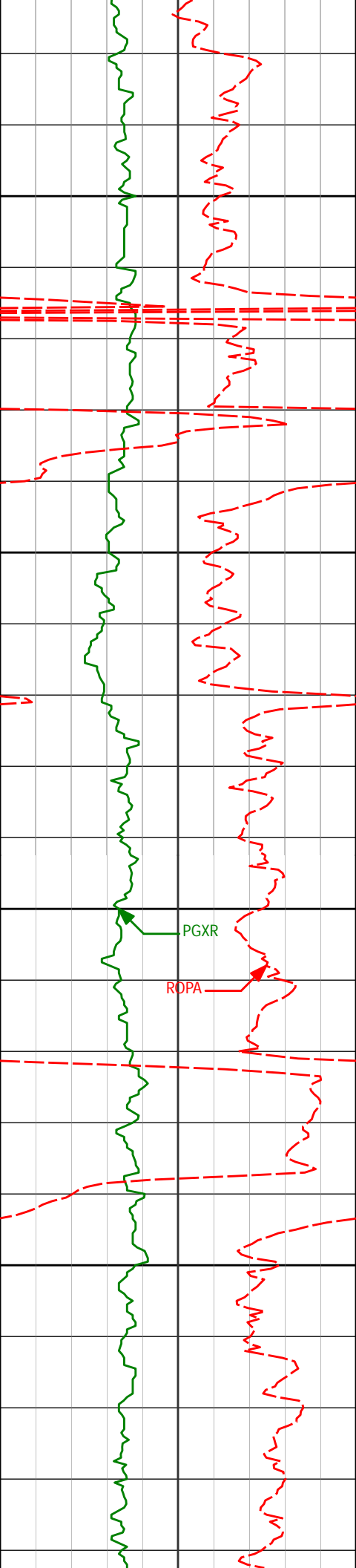
11750

PGXR

ROPA

11800

11850



11900

11950

12000

12050

11885'

90.12°

359.28°

7744.62'

4406.69'

PGXR

ROPA

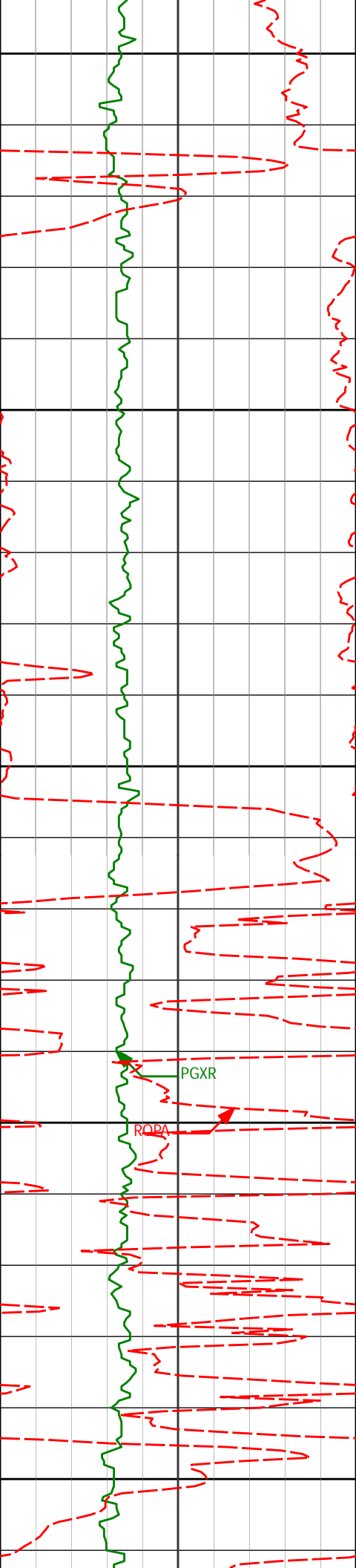
12069'

90.06°

359.29°

7744.33'

4590.67'



12100

12150

12200

12250

12300

PGXR

ROBA

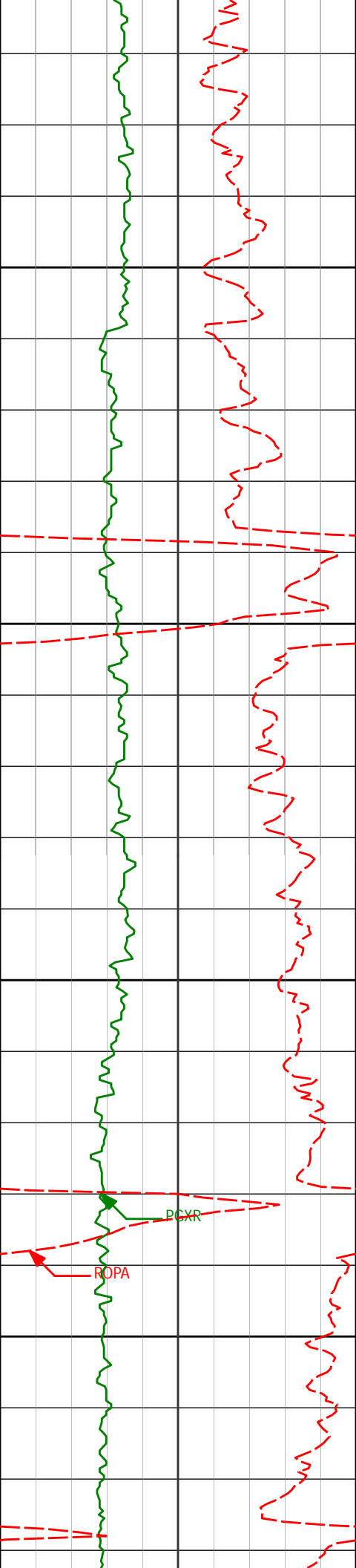
12252'

90.00°

0.57°

7744.23'

4773.67'



12350

12400

12434'

90.03°

0.53°

7744.18'

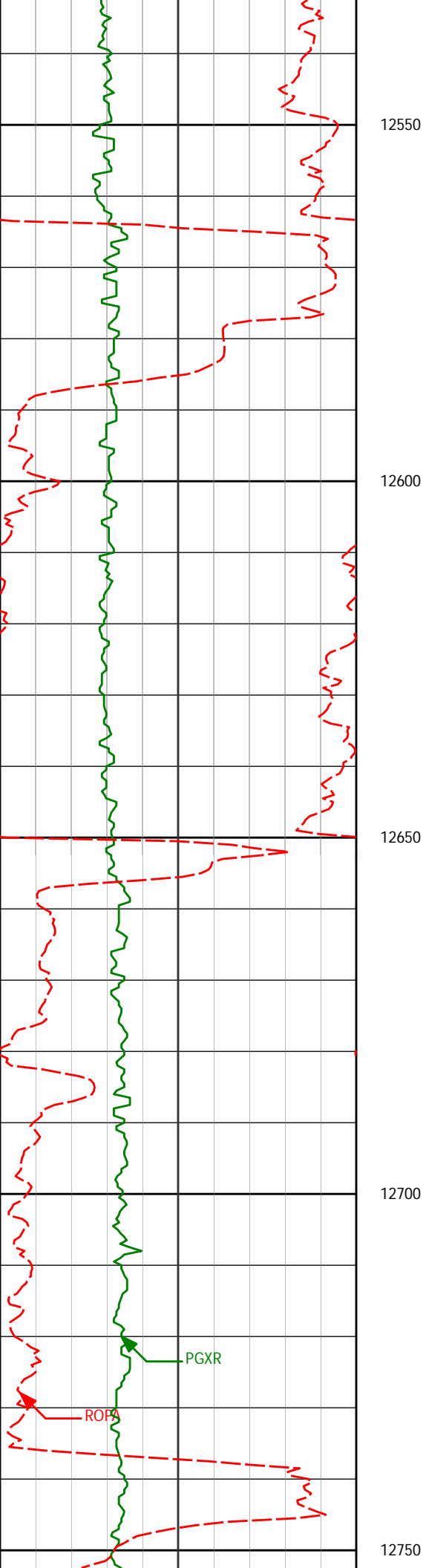
4955.66'

12450

12500

PCXR

ROPA



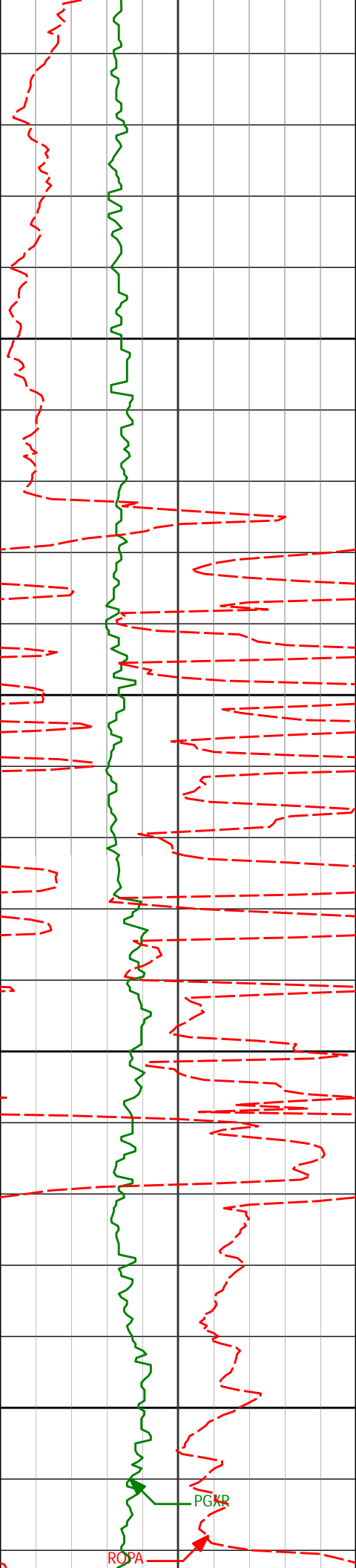
12605'

89.82°

0.33°

7744.41'

5126.66'



12776'

90.00°

359.73°

7744.68'

5297.65'

12800

12850

12900

12950

12947'

89.94°

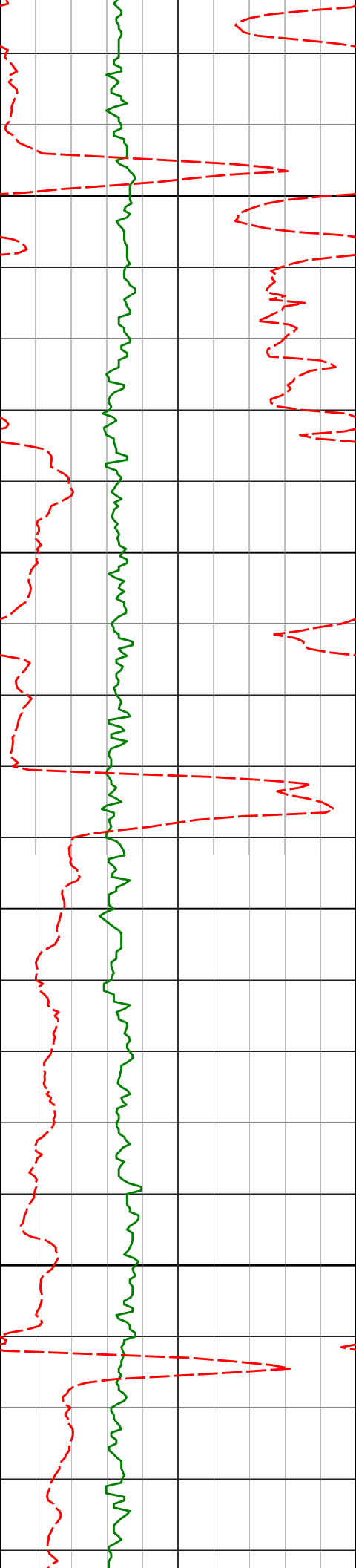
359.58°

7744.77'

5468.65'

PGXR

ROPA



13000

13050

13100

13117'

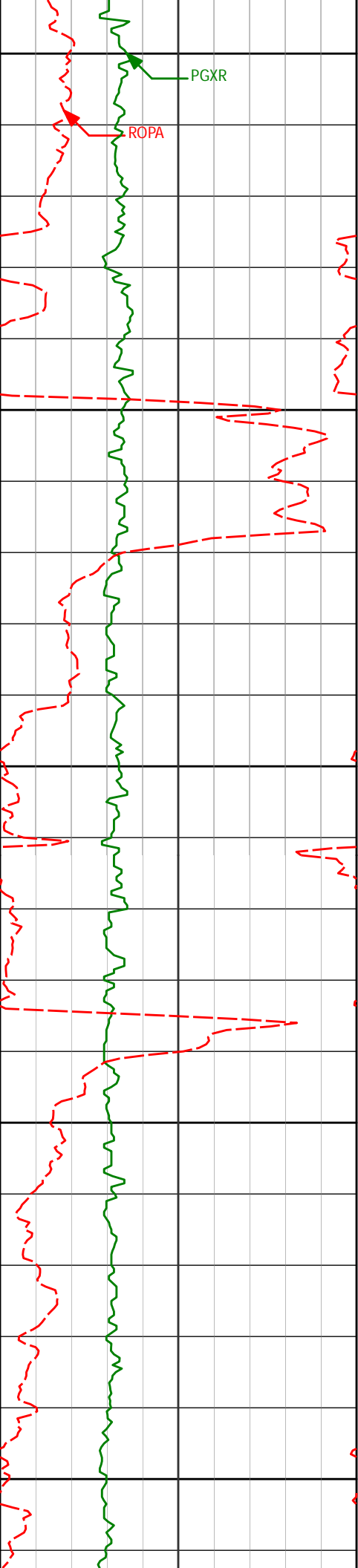
90.15°

359.18°

7744.63'

5638.64'

13150



13200

PGXR

ROPA

13250

13289'

90.12°

359.61°

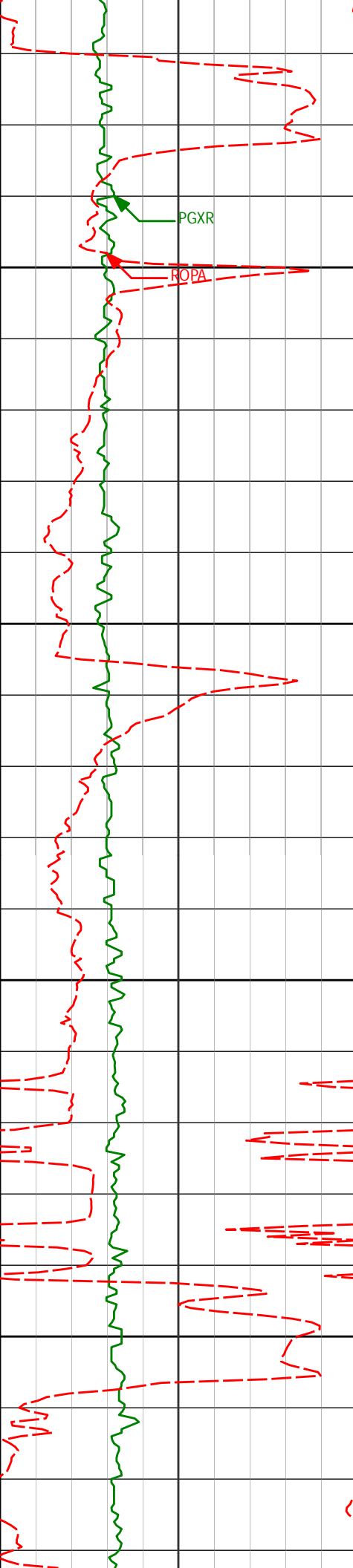
7744.23'

5810.63'

13300

13350

13400



13450

13460'

89.94°

0.37°

7744.14'

5981.63'

13500

13550

13600

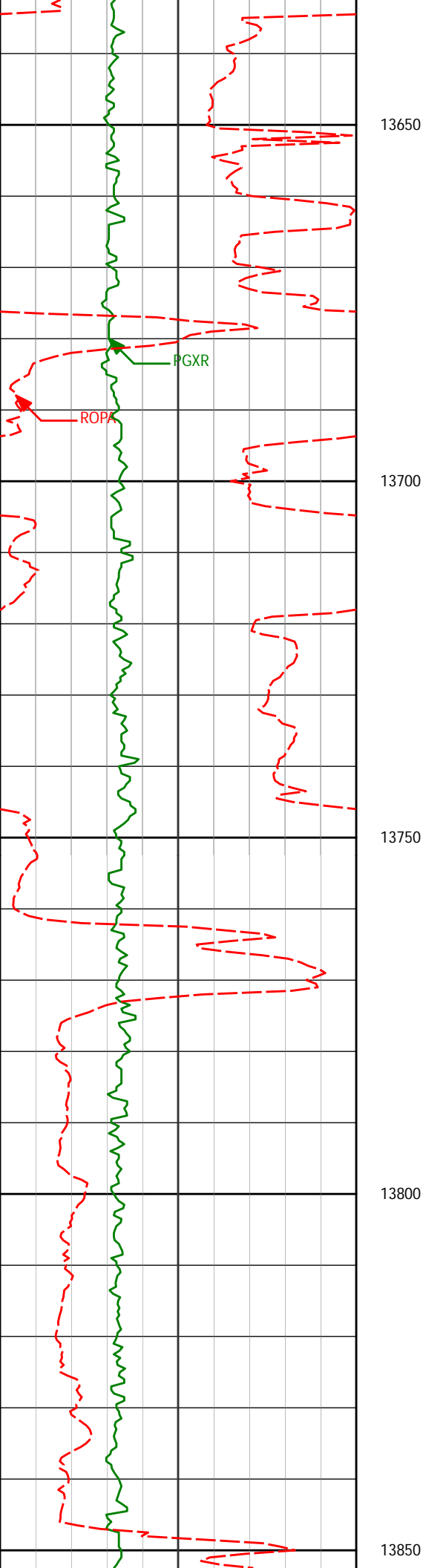
13631'

89.88°

0.54°

7744.41'

6152.62'



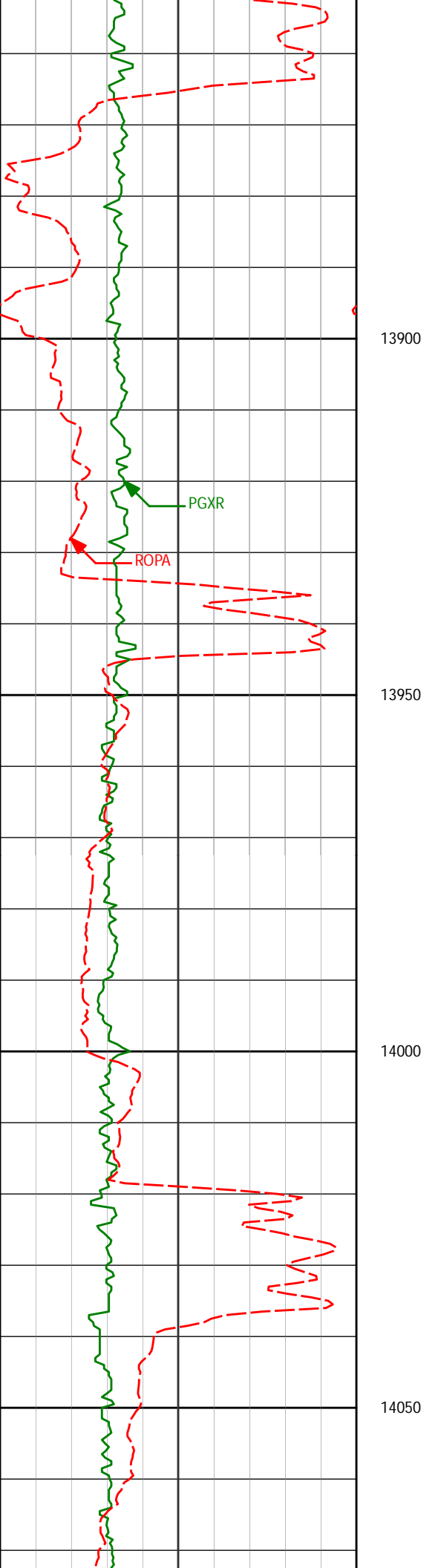
13802'

90.62°

1.11°

7743.66'

6323.60'



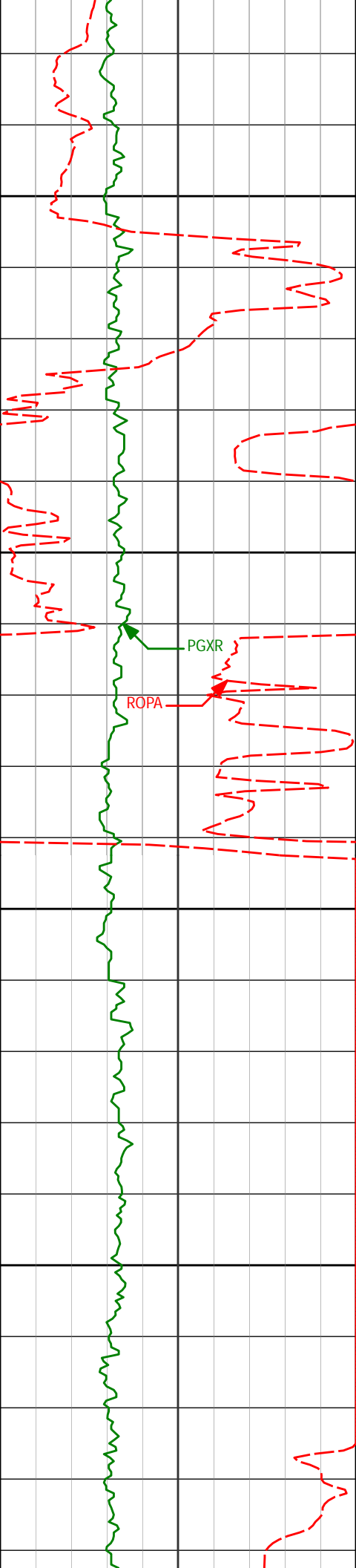
13972'

89.45°

1.36°

7743.56'

6493.56'



14100

14143'

90.18°

1.21°

7744.11'

6664.52'

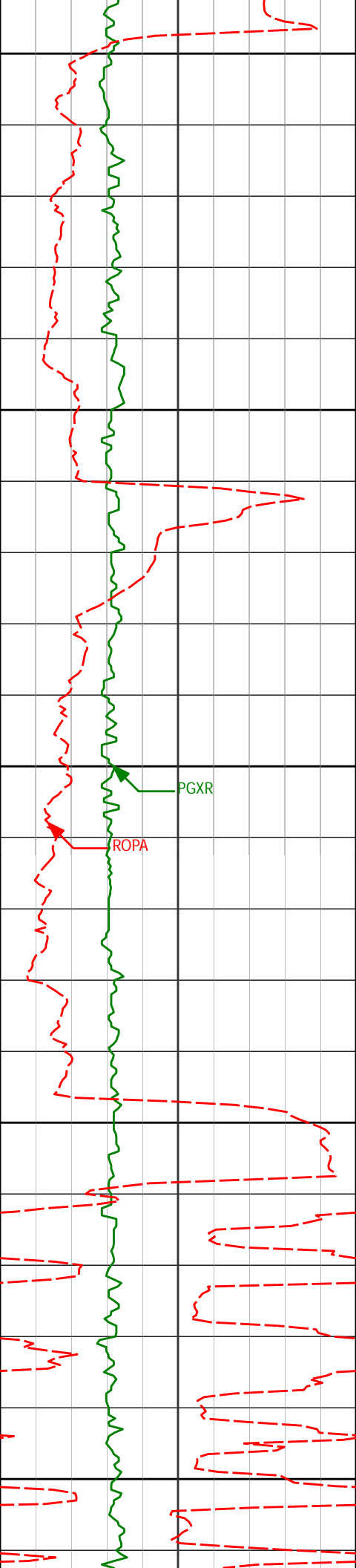
14150

PGXR

ROPA

14200

14250



14300

14314'

90.06°

0.27°

7743.75'

6835.50'

14350

14400

PGXR

ROPA

14450

14484'

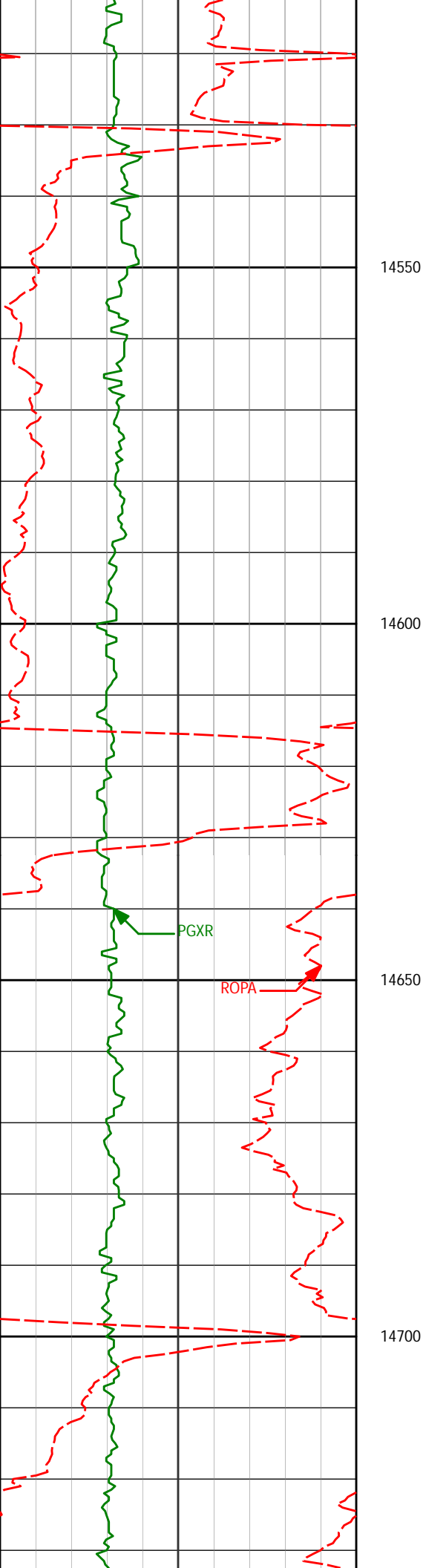
89.88°

359.05°

7743.84'

7005.49'

14500



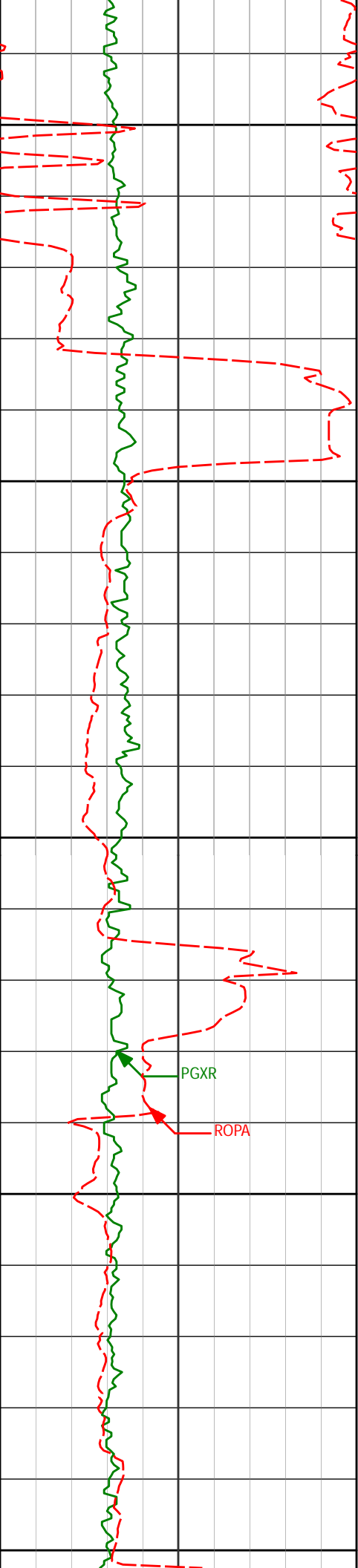
14654'

90.06°

359.57°

7743.93'

7175.48'



14750

14800

14825'

90.34°

0.47°

7743.33'

7346.48'

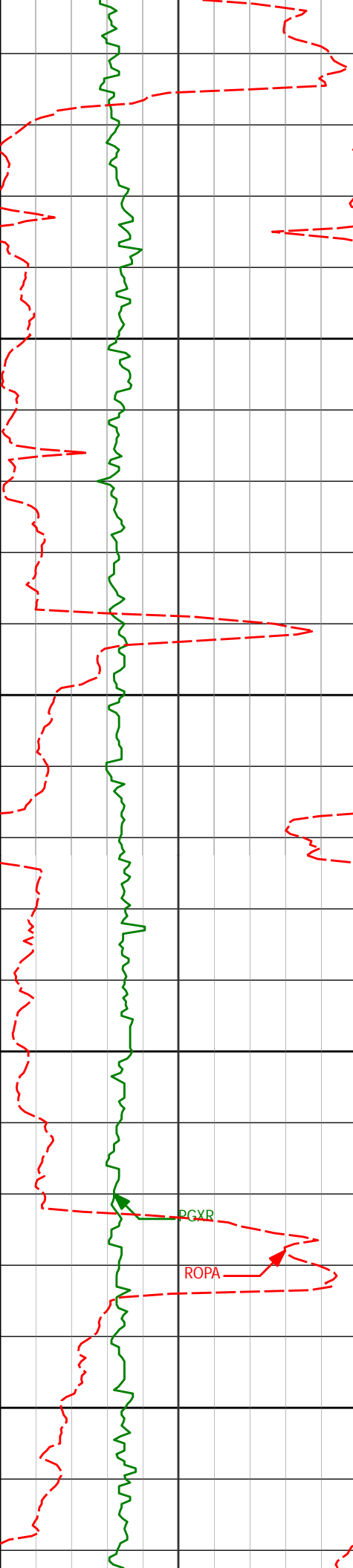
14850

PGXR

ROPA

14900

14950



15000

15050

15100

15150

14994'

90.06°

0.59°

7742.74'

7515.47'

PGXR

ROPA

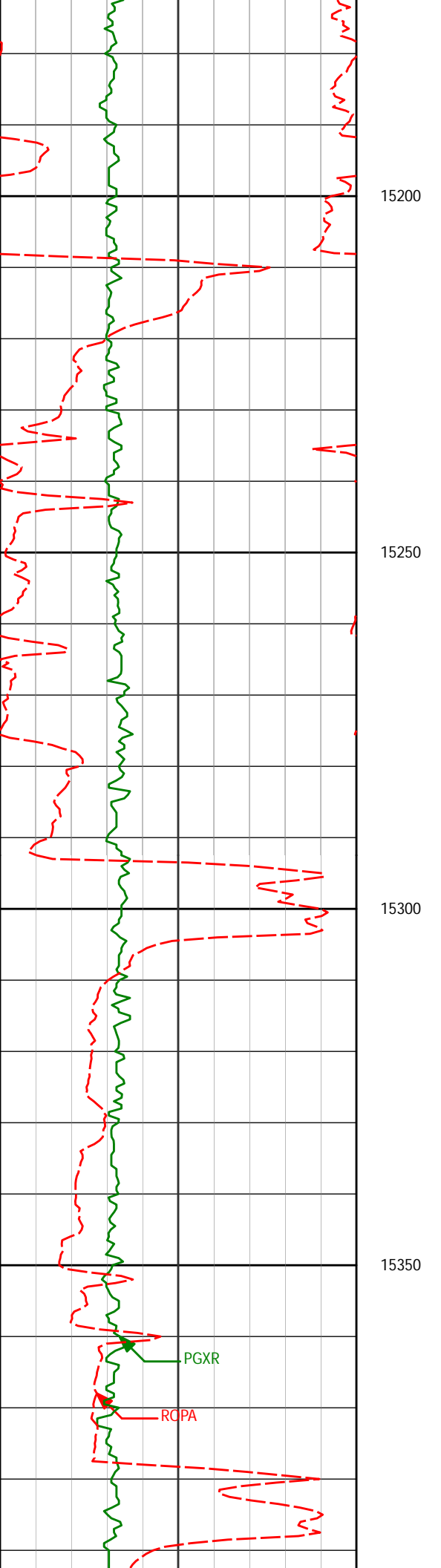
15164'

90.65°

0.77°

7741.69'

7685.45'



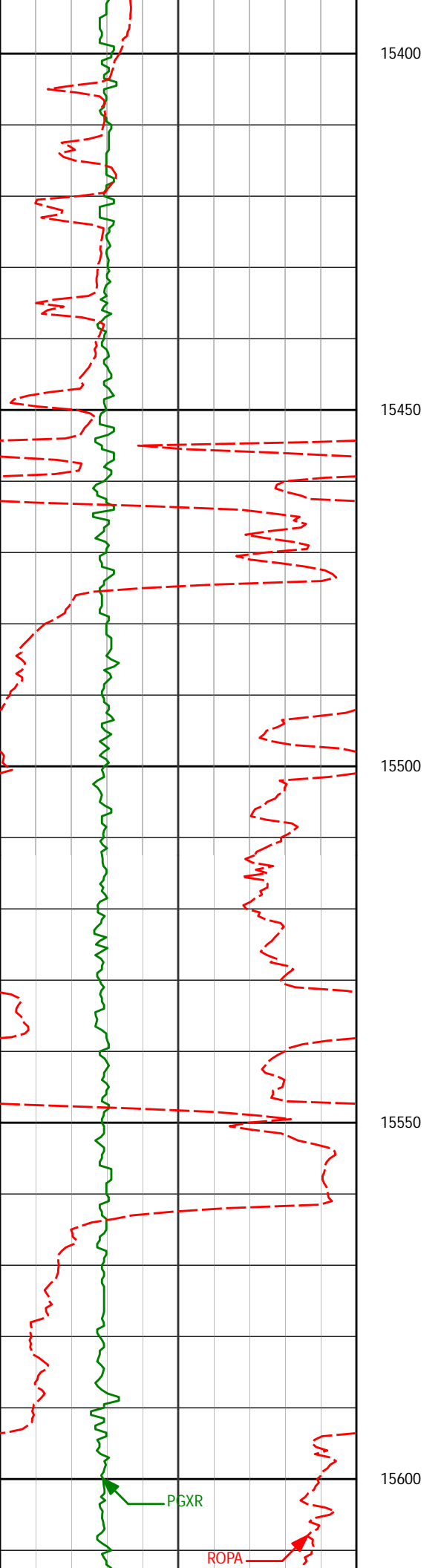
15332'

90.92°

359.98°

7739.39'

7853.43'



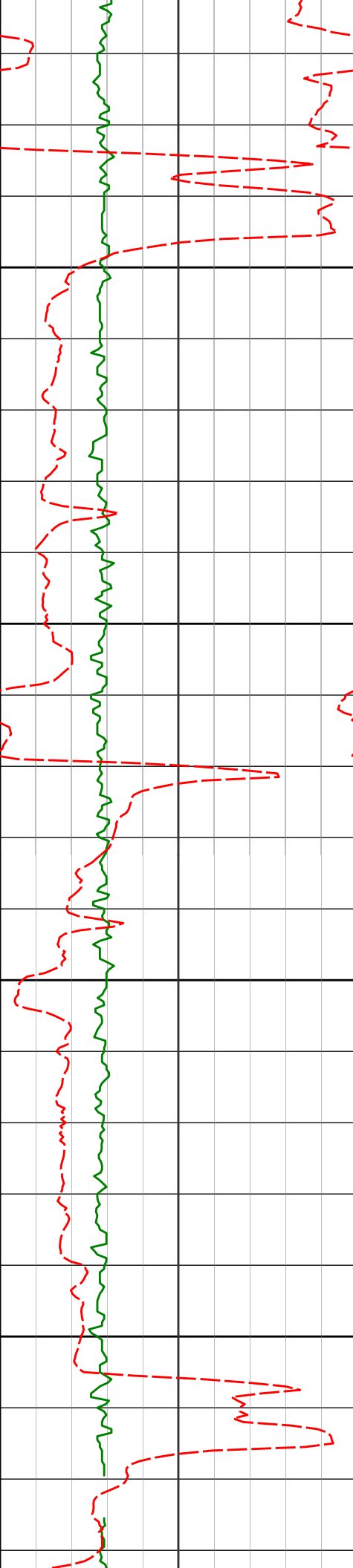
15502'

91.23°

359.58°

7736.20'

8023.40'



15650

15673'

90.37°

0.01°

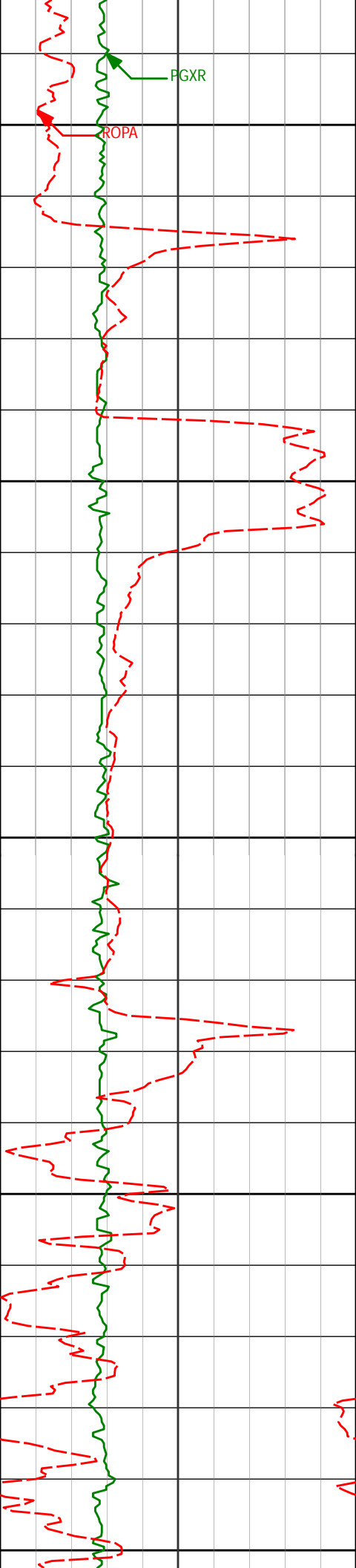
7733.81'

8194.38'

15700

15750

15800



PGXR

ROPA

15850

15900

15950

16000

16050

15844'

90.92°

359.59°

7731.89'

8365.37'

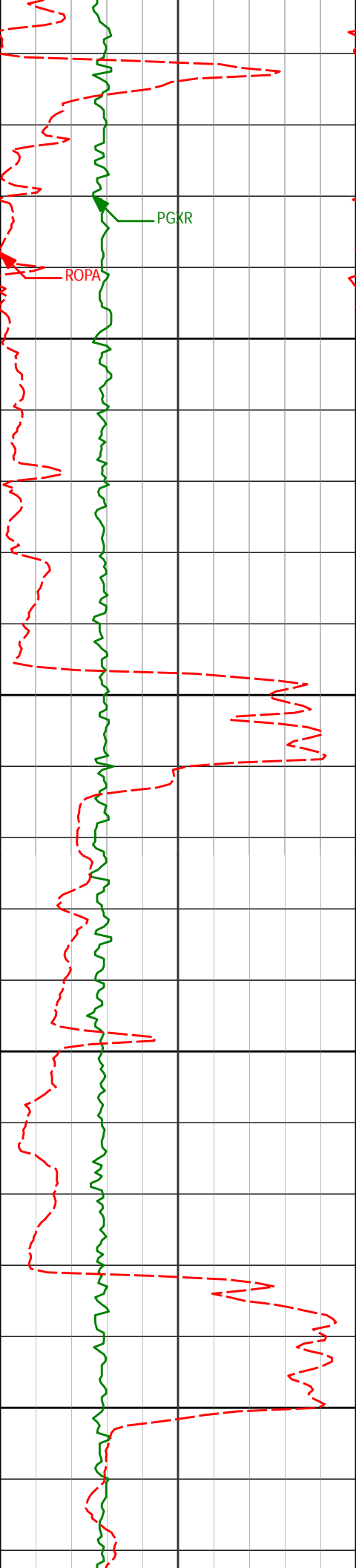
16015'

90.22°

359.08°

7730.19'

8536.34'



PGKR

ROPA

16100

16150

16185'

90.52°

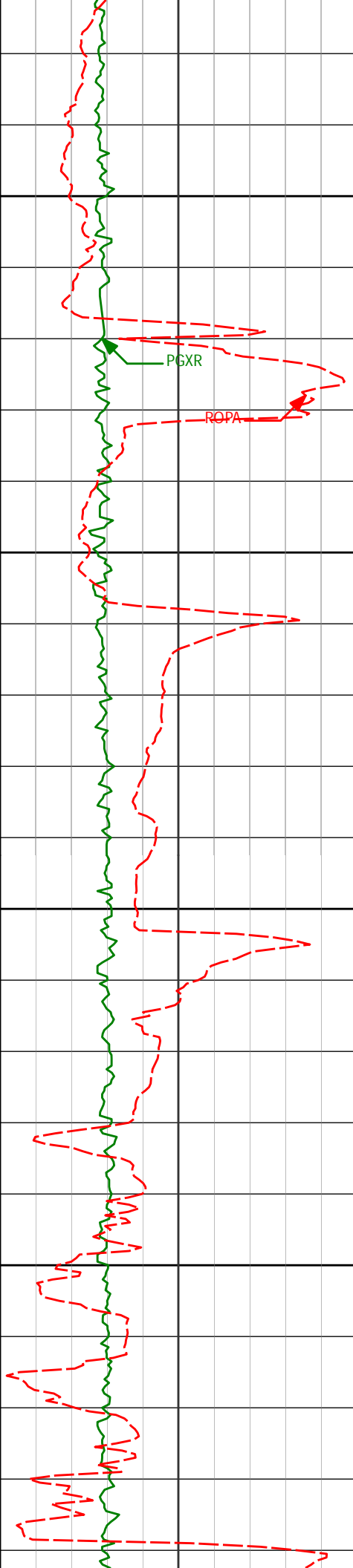
358.41°

7729.09'

8706.30'

16200

16250



16300

PGXR

ROPA

16350

16357'

90.40°

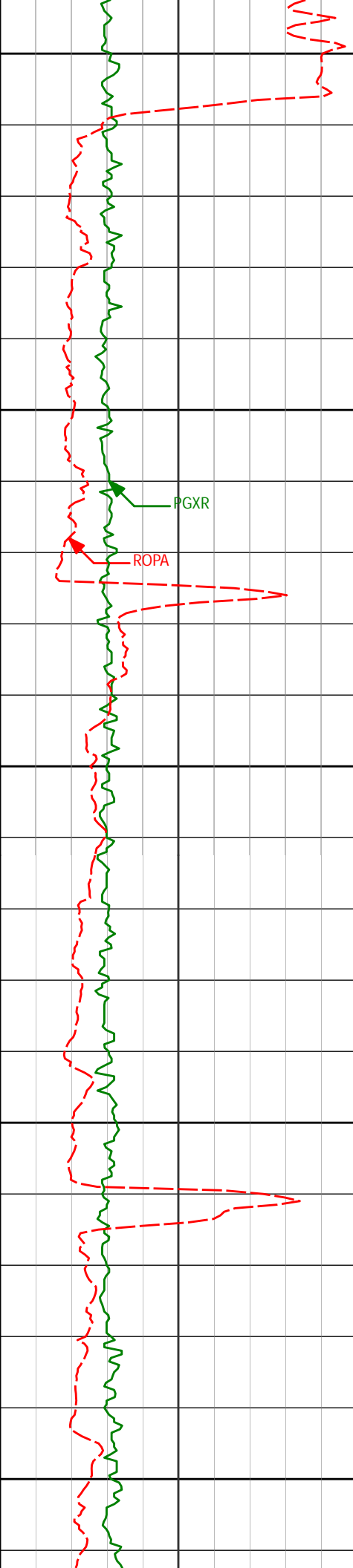
359.68°

7727.71'

8878.27'

16400

16450



16500

16528'

89.82°

0.12°

7727.38'

9049.26'

16550

PGXR

ROPA

16600

16650

16700

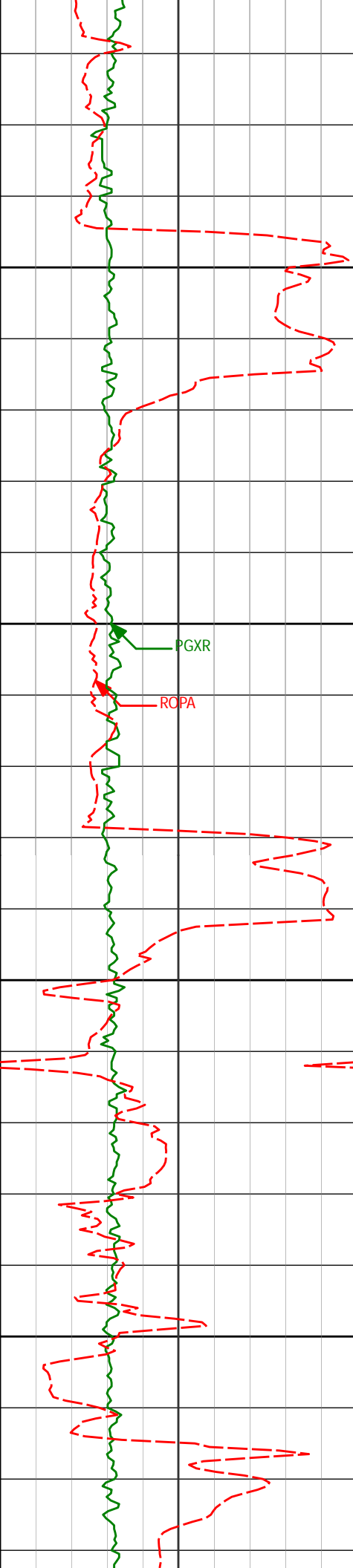
16699'

90.92°

359.86°

7726.27'

9220.26'



16750

16800

16850

16900

Run 300

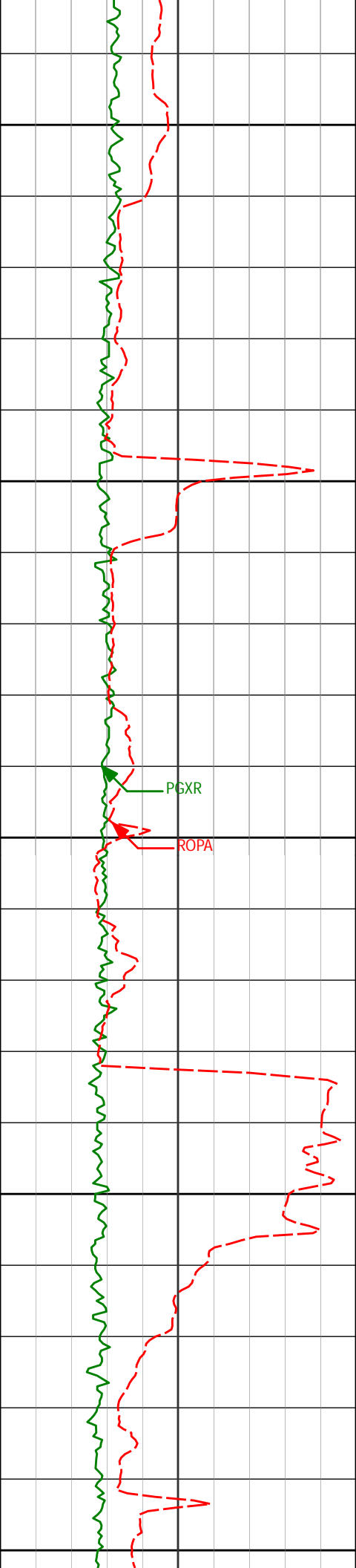
16870'

90.09°

1.06°

7724.77'

9391.24'



16950

17000

17050

17100

17150

17037'

91.70°

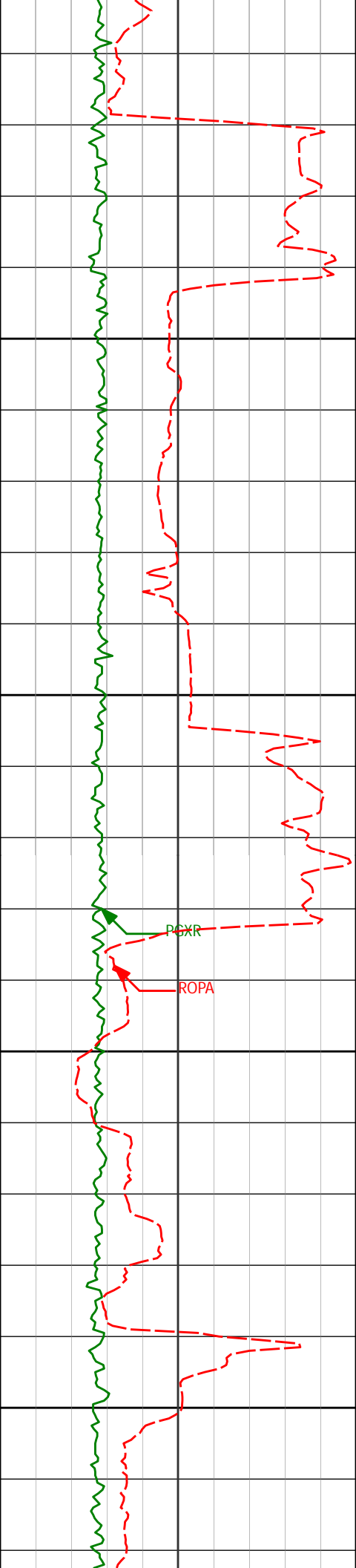
2.27°

7722.16'

9558.14'

PGXR

ROPA



17200

17208'

91.48°

0.48°

7717.41'

9729.02'

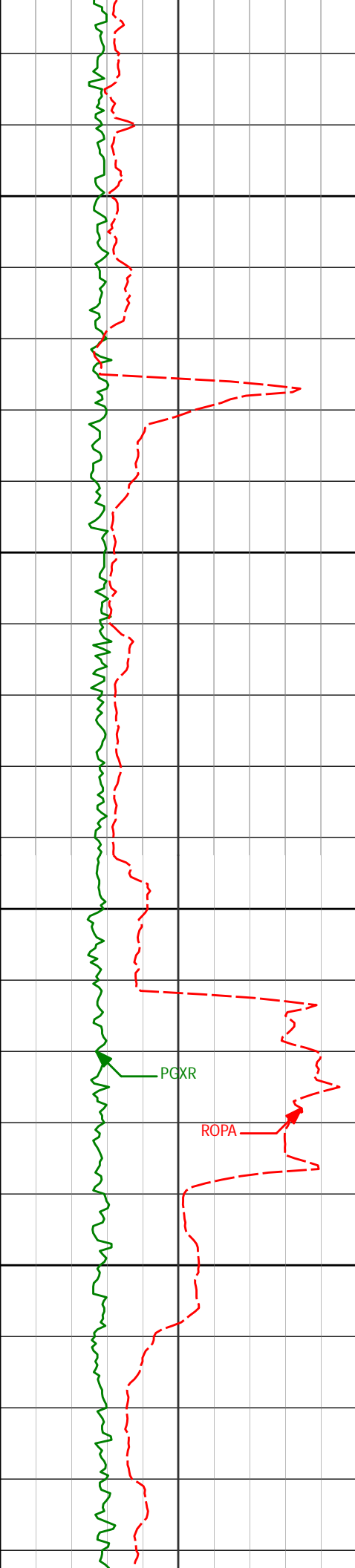
17250

17300

17350

PCXR

ROPA



17400

17450

17500

17550

17380'

90.00°

359.50°

7715.19'

9901.00'

PGXR

ROPA

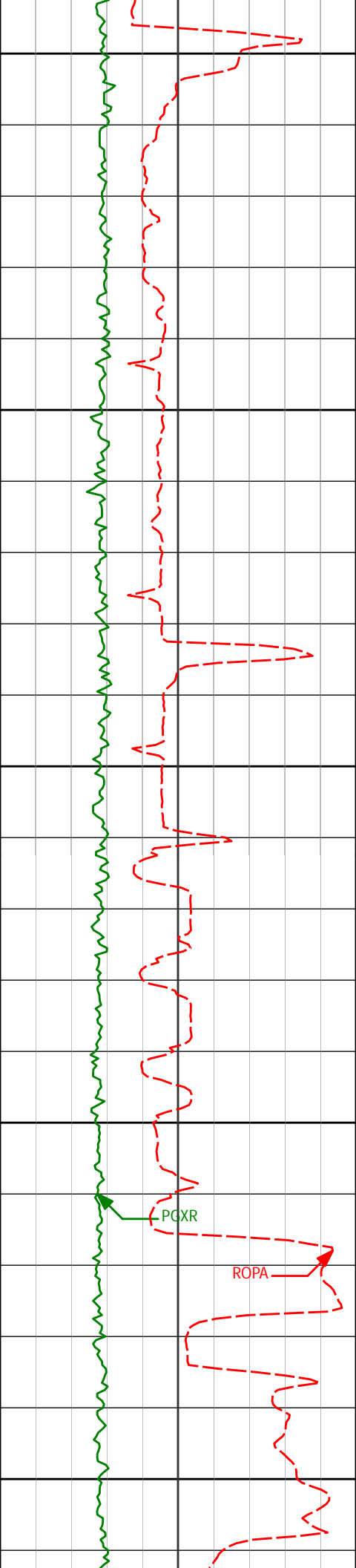
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89.72°

358.01°

7715.60'

10069.95'



17600

17650

17700

17720'

91.20°

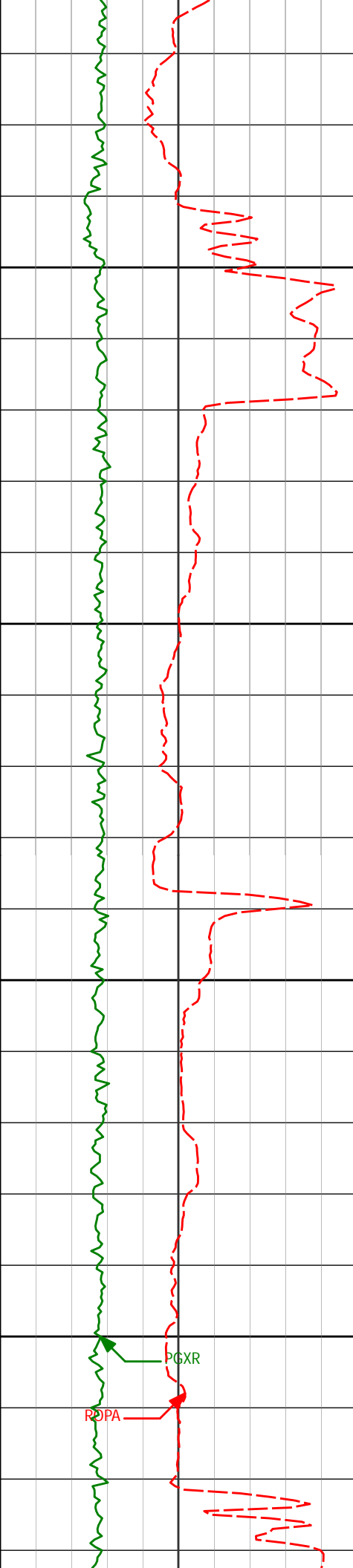
357.67°

7714.23'

10240.82'

17750

17800



17850

17892'

89.41°

358.66°

7713.32'

10412.72'

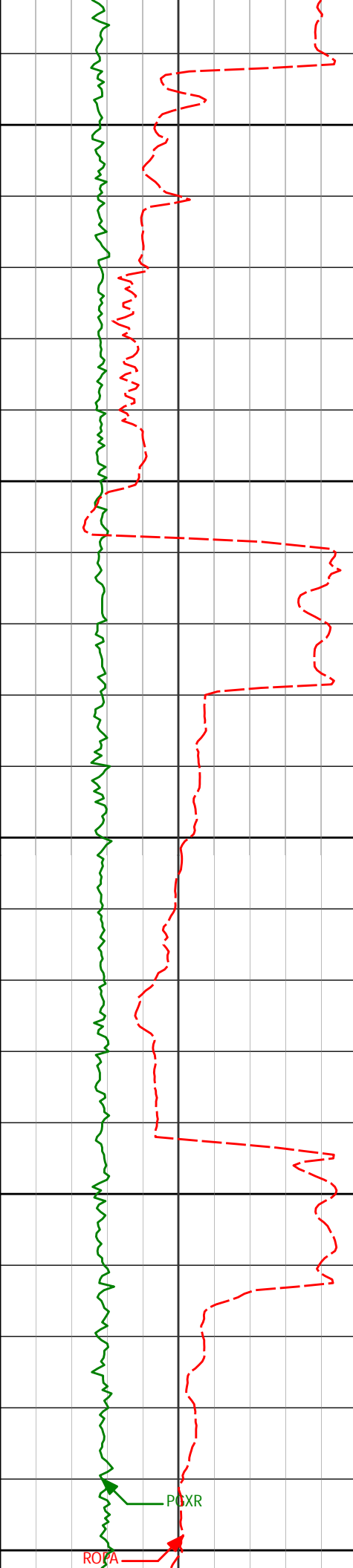
17900

17950

18000

PGXR

R2PA



18050

18063'

89.57°

357.55°

7714.84'

10583.62'

18100

18150

18200

18234'

89.63°

0.16°

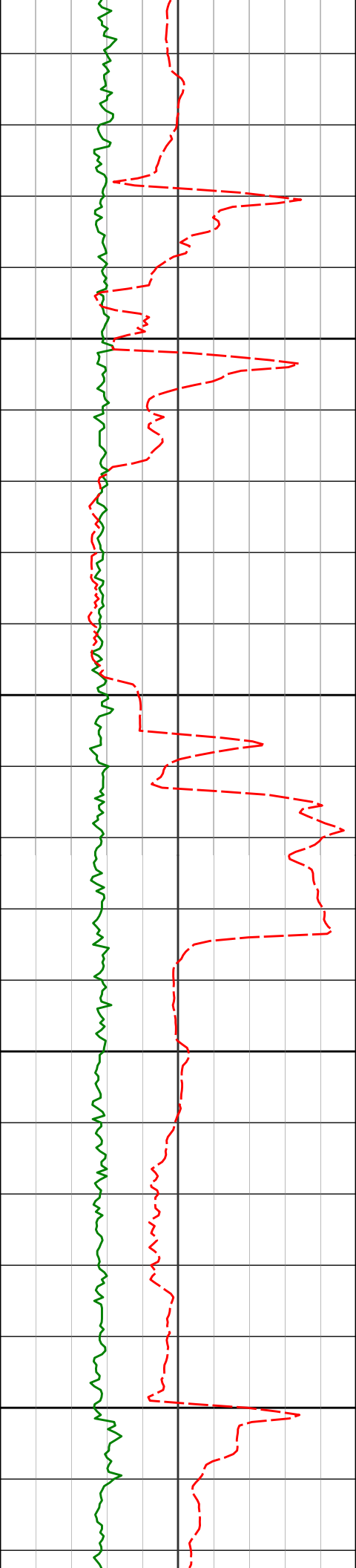
7716.03'

10754.57'

18250

POXR

ROPA



18300

18350

18400

18450

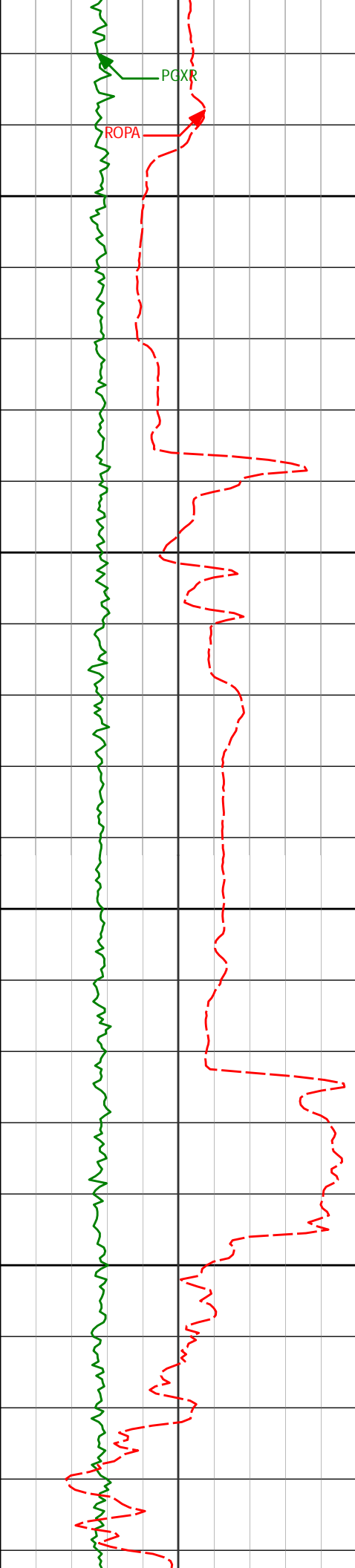
18405'

90.00°

0.82°

7716.58'

10925.56'



18500

18550

18576'

89.72°

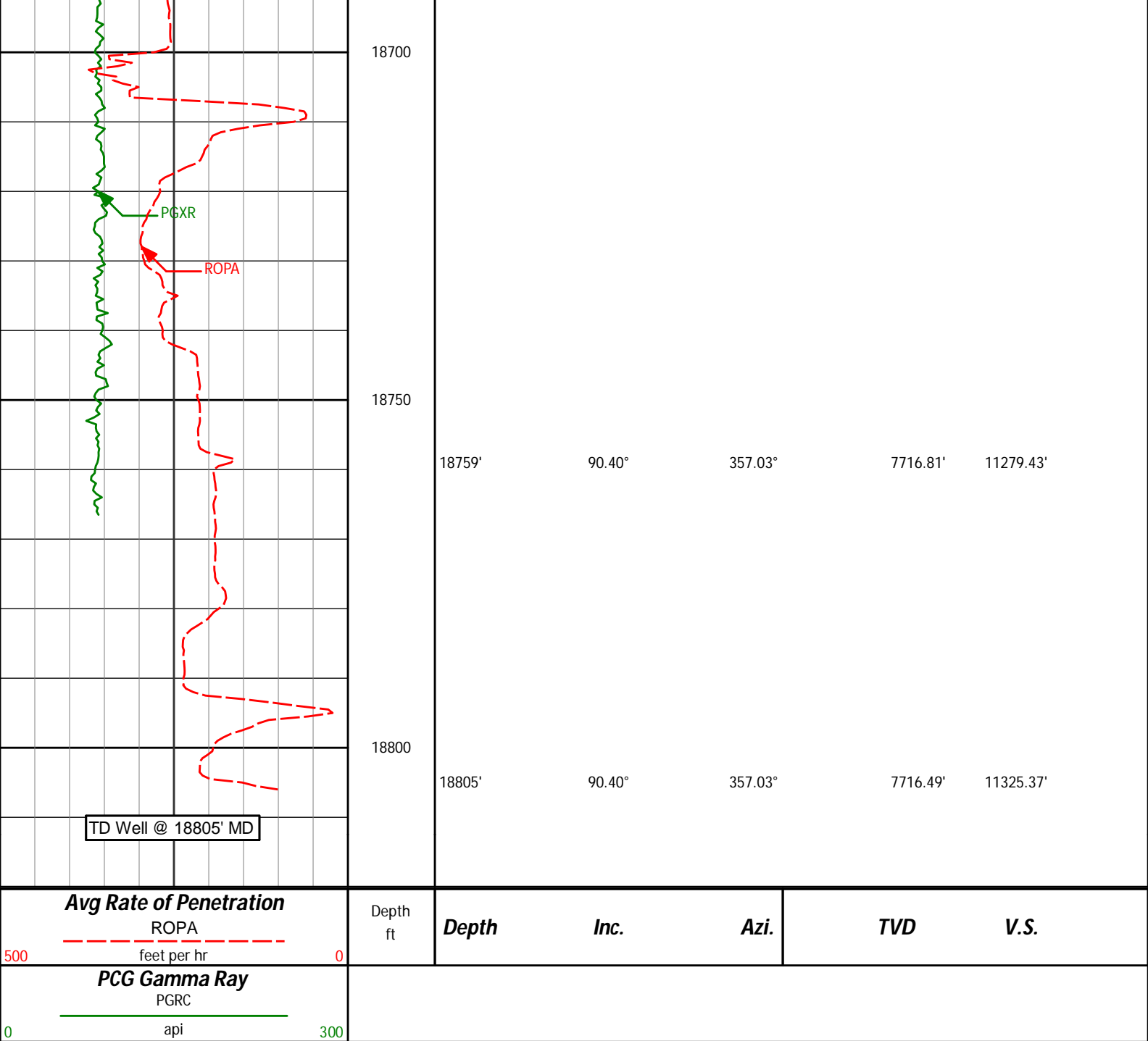
359.10°

7717.00'

11096.55'

18600

18650



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
NRC 30C-32HZ
Wattenburg
Weld Colorado
USA
CA-XX-0901338283

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1176.00	0.31	312.33	1175.95	7.49 N	3.09 W	7.49	TIE-IN
1292.00	0.71	7.68	1291.95	8.41 N	3.23 W	8.41	0.51
1481.00	0.41	348.20	1480.94	10.24 N	3.21 W	10.24	0.19
1671.00	0.51	345.90	1670.93	11.72 N	3.55 W	11.72	0.05
1854.00	0.83	315.56	1853.92	13.46 N	4.68 W	13.46	0.26

2036.00	2.44	261.94	2035.85	13.86 N	9.44 W	13.86	1.13
2219.00	1.92	201.59	2218.73	10.46 N	14.42 W	10.46	1.22
2401.00	0.75	108.87	2400.70	7.24 N	14.42 W	7.24	1.15
2584.00	0.52	139.80	2583.69	6.22 N	12.75 W	6.22	0.22
2765.00	0.50	99.51	2764.68	5.46 N	11.44 W	5.46	0.19
2947.00	0.17	100.22	2946.68	5.28 N	10.39 W	5.28	0.18
3129.00	3.11	289.68	3128.59	6.89 N	14.78 W	6.89	1.80
3311.00	5.77	276.95	3310.03	9.66 N	28.51 W	9.66	1.55
3486.00	7.43	269.39	3483.87	10.61 N	48.56 W	10.61	1.07
3658.00	7.86	265.65	3654.34	9.60 N	71.40 W	9.60	0.38
3829.00	8.48	265.43	3823.60	7.71 N	95.63 W	7.71	0.36
3996.00	8.43	263.26	3988.79	5.29 N	120.06 W	5.29	0.19
4167.00	8.53	267.92	4157.92	3.36 N	145.18 W	3.36	0.41
4338.00	8.94	270.75	4326.94	3.07 N	171.14 W	3.07	0.35
4509.00	8.30	272.54	4496.01	3.79 N	196.76 W	3.79	0.41
4680.00	8.54	269.63	4665.17	4.26 N	221.79 W	4.26	0.29
4851.00	8.70	270.05	4834.23	4.19 N	247.42 W	4.19	0.10
5022.00	7.63	270.88	5003.50	4.37 N	271.70 W	4.37	0.63
5193.00	8.10	266.71	5172.89	3.86 N	295.08 W	3.86	0.43
5364.00	8.06	269.38	5342.19	3.03 N	319.09 W	3.03	0.22
5535.00	8.01	268.50	5511.51	2.59 N	342.99 W	2.59	0.08
5707.00	8.51	272.36	5681.73	2.80 N	367.69 W	2.80	0.43
5878.00	7.84	271.75	5850.99	3.68 N	391.99 W	3.68	0.40
6050.00	6.86	269.36	6021.58	3.92 N	413.98 W	3.92	0.60
6221.00	7.95	268.27	6191.15	3.45 N	436.02 W	3.45	0.64
6393.00	6.32	264.41	6361.81	2.17 N	457.33 W	2.17	0.99
6563.00	4.18	273.38	6531.09	1.62 N	472.83 W	1.62	1.34
6734.00	2.73	261.30	6701.78	1.38 N	483.08 W	1.38	0.94
6904.00	1.37	294.03	6871.67	1.59 N	488.93 W	1.59	1.03
7075.00	0.26	122.38	7042.66	2.22 N	490.47 W	2.22	0.95
7117.00	3.05	5.99	7084.64	3.28 N	490.28 W	3.28	7.56
7160.00	6.16	13.64	7127.49	6.66 N	489.61 W	6.66	7.36
7203.00	9.17	11.74	7170.11	12.26 N	488.37 W	12.26	7.02
7246.00	12.18	10.23	7212.36	20.08 N	486.87 W	20.08	7.03
7289.00	15.68	8.20	7254.09	30.29 N	485.23 W	30.29	8.22
7332.00	19.85	4.85	7295.03	43.33 N	483.79 W	43.33	9.98
7373.00	23.71	2.76	7333.09	58.50 N	482.80 W	58.50	9.60
7416.00	27.08	2.30	7371.93	76.92 N	481.99 W	76.92	7.85
7458.00	30.70	1.19	7408.70	97.20 N	481.38 W	97.20	8.71
7501.00	34.72	0.18	7444.87	120.43 N	481.12 W	120.43	9.43
7544.00	39.34	359.75	7479.19	146.32 N	481.14 W	146.32	10.76
7587.00	42.81	358.84	7511.60	174.56 N	481.49 W	174.56	8.19
7629.00	46.19	358.86	7541.56	203.99 N	482.09 W	203.99	8.05
7672.00	49.67	358.63	7570.36	235.90 N	482.79 W	235.90	8.10
7715.00	53.59	358.73	7597.05	269.60 N	483.56 W	269.60	9.12
7758.00	57.27	358.91	7621.44	304.99 N	484.29 W	304.99	8.57
7801.00	59.83	359.07	7643.88	341.67 N	484.94 W	341.67	5.96
7844.00	62.54	359.40	7664.60	379.33 N	485.44 W	379.33	6.34
7886.00	66.28	359.66	7682.74	417.21 N	485.75 W	417.21	8.92
7929.00	69.11	359.93	7699.06	456.98 N	485.89 W	456.98	6.61
7972.00	72.08	0.36	7713.34	497.54 N	485.78 W	497.54	6.97
8015.00	76.15	0.90	7725.11	538.88 N	485.33 W	538.88	9.54
8058.00	79.94	0.77	7734.01	580.94 N	484.71 W	580.94	8.82
8101.00	82.74	1.09	7740.49	623.44 N	484.02 W	623.44	6.55
8144.00	84.69	1.17	7745.20	666.17 N	483.18 W	666.17	4.54
8171.00	86.55	0.79	7747.26	693.09 N	482.72 W	693.09	7.03
8277.00	90.71	0.77	7749.79	799.02 N	481.28 W	799.02	3.92
8448.00	90.28	359.80	7748.31	970.01 N	480.43 W	970.01	0.62
8619.00	90.06	359.46	7747.81	1141.01 N	481.53 W	1141.01	0.24
8790.00	90.31	359.70	7747.25	1312.00 N	482.79 W	1312.00	0.20
8961.00	90.03	0.26	7746.75	1483.00 N	482.85 W	1483.00	0.37
9132.00	90.15	1.43	7746.48	1653.98 N	480.32 W	1653.98	0.69
9303.00	90.09	1.28	7746.12	1824.93 N	476.28 W	1824.93	0.09
9475.00	90.28	0.47	7745.57	1996.91 N	473.65 W	1996.91	0.48
9645.00	89.88	0.47	7745.33	2166.90 N	472.26 W	2166.90	0.24
9816.00	90.77	0.33	7744.36	2337.89 N	471.07 W	2337.89	0.53
9987.00	90.03	359.43	7743.16	2508.88 N	471.42 W	2508.88	0.68
10158.00	89.57	359.90	7743.76	2679.88 N	472.42 W	2679.88	0.38
10327.00	90.59	0.20	7743.53	2848.88 N	472.28 W	2848.88	0.63
10495.00	89.72	359.55	7743.07	3016.87 N	472.64 W	3016.87	0.65
10663.00	90.03	0.02	7743.44	3184.87 N	473.27 W	3184.87	0.34
10831.00	89.88	359.27	7743.57	3352.87 N	474.31 W	3352.87	0.46
11000.00	89.85	358.19	7743.97	3521.82 N	478.06 W	3521.82	0.64
11169.00	89.82	358.25	7744.45	3690.74 N	483.31 W	3690.74	0.04
11338.00	90.62	0.57	7743.81	3859.72 N	485.05 W	3859.72	1.45

11519.00	90.09	359.53	7742.68	4040.71 N	484.89 W	4040.71	0.64
11703.00	89.29	359.62	7743.68	4224.70 N	486.26 W	4224.70	0.44
11885.00	90.12	359.28	7744.62	4406.69 N	488.00 W	4406.69	0.49
12069.00	90.06	359.29	7744.33	4590.67 N	490.30 W	4590.67	0.03
12252.00	90.00	0.57	7744.23	4773.67 N	490.52 W	4773.67	0.70
12434.00	90.03	0.53	7744.18	4955.66 N	488.78 W	4955.66	0.03
12605.00	89.82	0.33	7744.41	5126.66 N	487.49 W	5126.66	0.17
12776.00	90.00	359.73	7744.68	5297.66 N	487.40 W	5297.65	0.37
12947.00	89.94	359.58	7744.77	5468.65 N	488.43 W	5468.65	0.09
13117.00	90.15	359.18	7744.63	5638.64 N	490.27 W	5638.64	0.27
13289.00	90.12	359.61	7744.23	5810.63 N	492.09 W	5810.63	0.25
13460.00	89.94	0.37	7744.14	5981.63 N	492.12 W	5981.63	0.46
13631.00	89.88	0.54	7744.41	6152.62 N	490.76 W	6152.62	0.11
13802.00	90.62	1.11	7743.66	6323.60 N	488.30 W	6323.60	0.55
13972.00	89.45	1.36	7743.56	6493.56 N	484.64 W	6493.56	0.70
14143.00	90.18	1.21	7744.11	6664.51 N	480.80 W	6664.52	0.44
14314.00	90.06	0.27	7743.75	6835.50 N	478.59 W	6835.50	0.55
14484.00	89.88	359.05	7743.84	7005.49 N	479.60 W	7005.49	0.73
14654.00	90.06	359.57	7743.93	7175.48 N	481.65 W	7175.48	0.32
14825.00	90.34	0.47	7743.33	7346.48 N	481.59 W	7346.48	0.55
14994.00	90.06	0.59	7742.74	7515.47 N	480.03 W	7515.47	0.18
15164.00	90.65	0.77	7741.69	7685.45 N	478.01 W	7685.45	0.36
15332.00	90.92	359.98	7739.39	7853.43 N	476.91 W	7853.43	0.50
15502.00	91.23	359.58	7736.20	8023.40 N	477.56 W	8023.40	0.30
15673.00	90.37	0.01	7733.81	8194.38 N	478.17 W	8194.38	0.56
15844.00	90.92	359.59	7731.89	8365.37 N	478.77 W	8365.37	0.40
16015.00	90.22	359.08	7730.19	8536.34 N	480.76 W	8536.34	0.51
16185.00	90.52	358.41	7729.09	8706.30 N	484.48 W	8706.30	0.43
16357.00	90.40	359.68	7727.71	8878.27 N	487.35 W	8878.27	0.74
16528.00	89.82	0.12	7727.38	9049.26 N	487.64 W	9049.26	0.43
16699.00	90.92	359.86	7726.27	9220.26 N	487.67 W	9220.26	0.66
16870.00	90.09	1.06	7724.77	9391.24 N	486.30 W	9391.24	0.85
17037.00	91.70	2.27	7722.16	9558.14 N	481.45 W	9558.14	1.21
17208.00	91.48	0.48	7717.41	9729.02 N	477.35 W	9729.02	1.05
17380.00	90.00	359.50	7715.19	9901.00 N	477.38 W	9901.00	1.03
17549.00	89.72	358.01	7715.60	10069.95 N	481.05 W	10069.95	0.90
17720.00	91.20	357.67	7714.23	10240.82 N	487.50 W	10240.82	0.89
17892.00	89.41	358.66	7713.32	10412.72 N	493.00 W	10412.72	1.19
18063.00	89.57	357.55	7714.84	10583.62 N	498.66 W	10583.62	0.66
18234.00	89.63	0.16	7716.03	10754.57 N	502.08 W	10754.57	1.53
18405.00	90.00	0.82	7716.58	10925.56 N	500.61 W	10925.56	0.44
18576.00	89.72	359.10	7717.00	11096.55 N	500.73 W	11096.55	1.02
18759.00	90.40	357.03	7716.81	11279.43 N	506.91 W	11279.43	1.19
18805.00	90.40	357.03	7716.49	11325.37 N	509.29 W	11325.37	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.00 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.59 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 18805.00 FEET
IS 11336.82 FEET ALONG 357.43 DEGREES (TRUE)**

Directional surveys tied onto Gyro's @ 1176' MD. Final Survey is a straightline projection to bit.