



WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	24-Mar-15	26-Mar-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	925.00	7,115.00			
Log End Depth (MD, ft)	7,115.00	11,642.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	22-Mar-15 19:20	25-Mar-15 03:00			
Drill/Wipe End Date and Time	24-Mar-15 03:00	26-Mar-15 04:15			
Min Inc (deg) @ Depth (MD, ft)	0.40 @ 1,018.00	84.32 @ 7,156.00			
Max Inc (deg) @ Depth (MD, ft)	78.04 @ 7,050.00	93.79 @ 8,664.00			
Bit TFA(in2) / Bit Type	1.21 / PDC	0.98 / PDC			
Flow Rate (gpm)	647.81	329.13			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Polymer			
Density (ppg) / Viscosity (spqt)	9.50 / 41.00	10.70 / 34.00			
Filtrate CL (ppm)	1,800.00	2,200.00			
pH / Fluid Loss (mptm)	9.10 / 0	8.50 / 6			
PV (cP) / YP (lhf2)	15 / 16.00	11 / 9.00			
% Solids / % Sand	12 / .20	11.50 / 0.20			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (in F) / S	178.05 / PDM	200.00 / PDM			

Max Tool Temp (degF) / Source	170.37 / PCM	226.08 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 170.37	N/A @ 226.08			
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman			
Customer Representative	Clifford Kester	Clifford Kester			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11404272	12310753			
Insert Serial Number	11680773	11680801			
Date and Time Initialized	22-Mar-15 07:01	24-Mar-15 17:57			
Date and Time Read	24-Mar-15 08:43	26-Mar-15 13:39			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	65.00	67.00			
Software Version	6.21	6.33			
Sub Serial Number	11404272	12310753			
Sonde Serial Number	10919505	11297623			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	63.04	274.49			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	58.50	60.38			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11404272	12310753			
Insert/Sonde Serial Number	11293388	11579843			

REMARKS

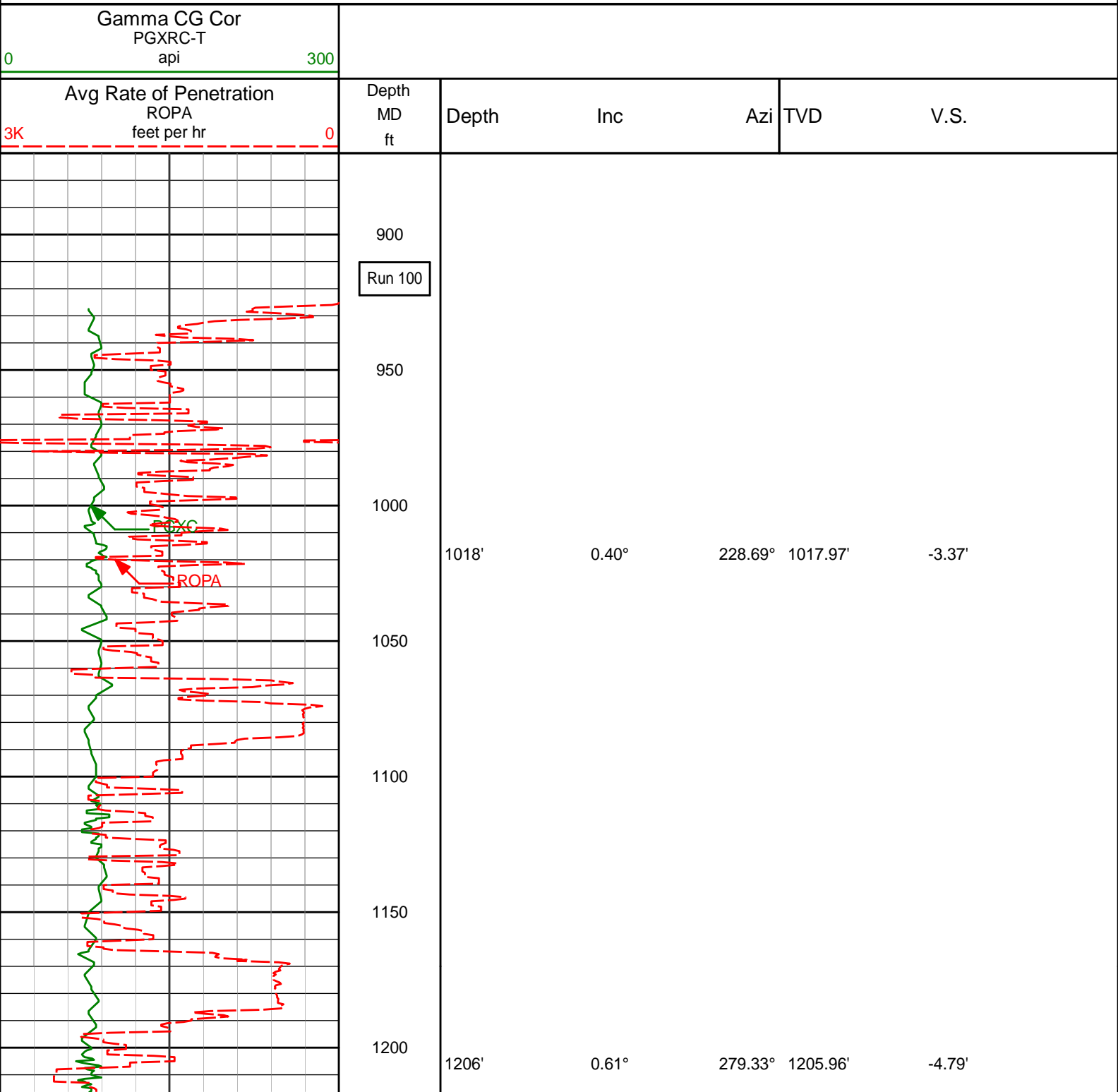
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 8.75"
Mud Density: 9.9-11.0
5. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

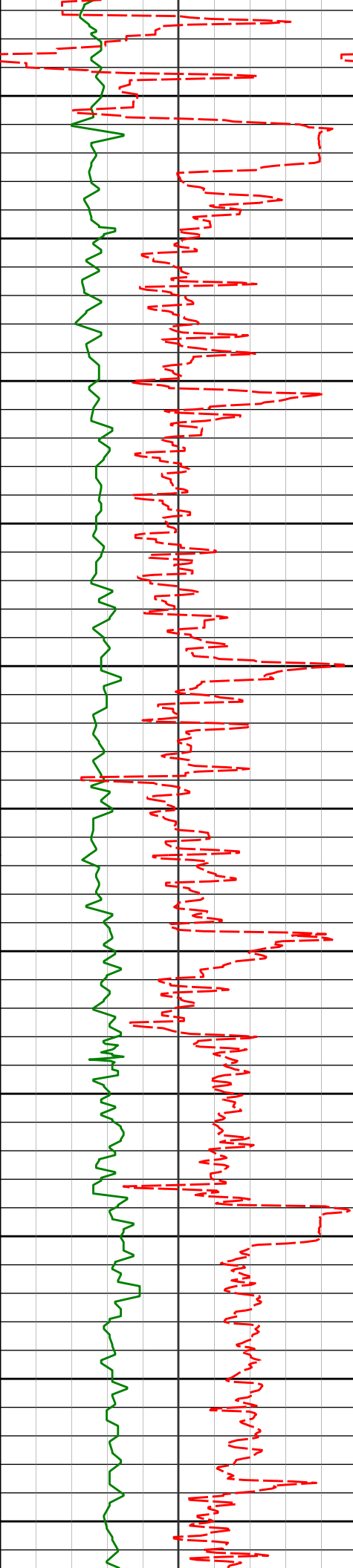
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MD Detail 1:600 Scale





1250

1300

1350

1400

1450

1500

1550

1600

1650

1700

1750

1298'

0.61°

311.18° 1297.95'

-5.69'

1577'

0.62°

308.66° 1576.94'

-8.27'

1669'

0.62°

331.24° 1668.93'

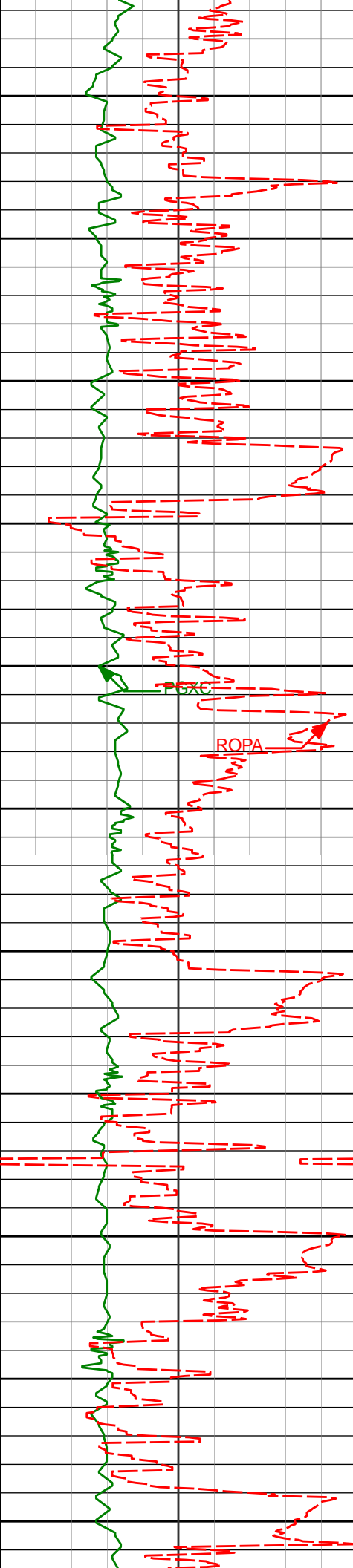
-9.01'

1763'

0.56°

329.69° 1762.93'

-9.62'



1800

1850

1900

1950

2000

2050

2100

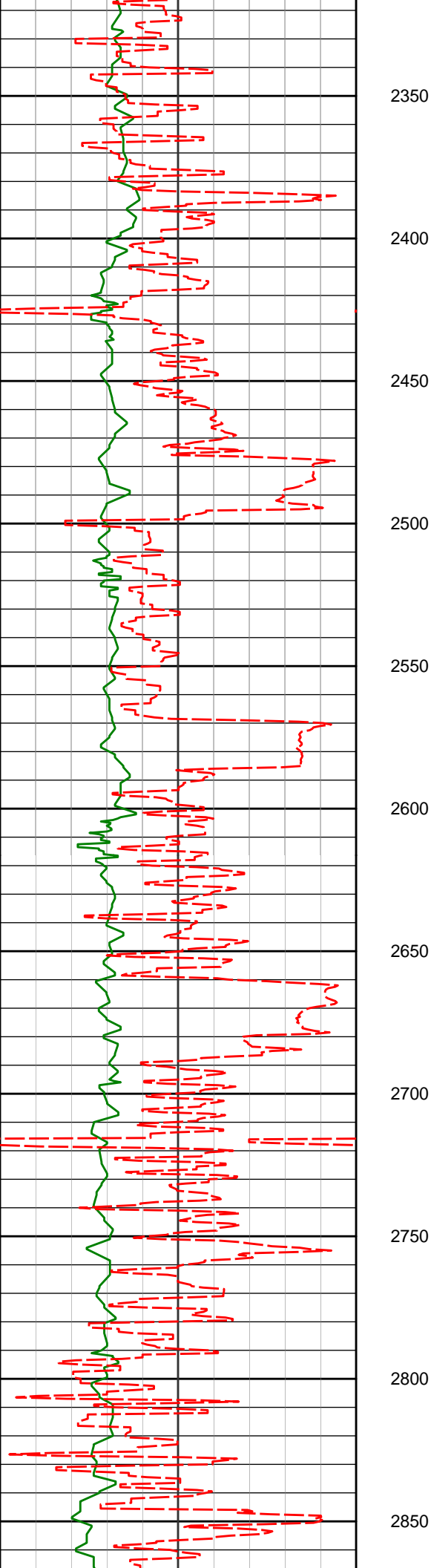
2150

2200

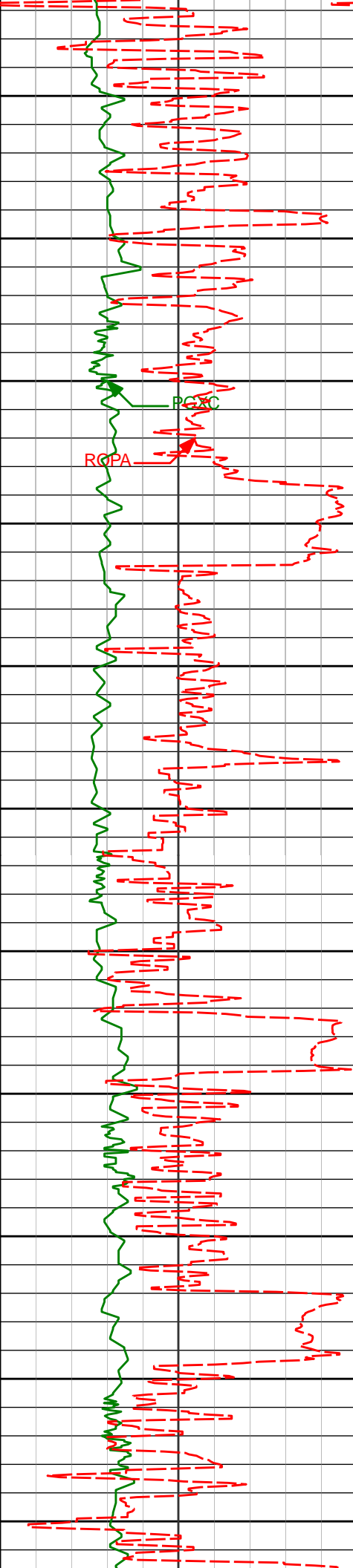
2250

2300

1855'	0.54°	352.94°	1854.92'	-10.03'
1948'	1.71°	202.23°	1947.91'	-10.46'
2040'	3.32°	212.86°	2039.82'	-11.83'
2133'	6.28°	197.86°	2132.49'	-13.65'
2225'	7.88°	188.41°	2223.79'	-14.27'

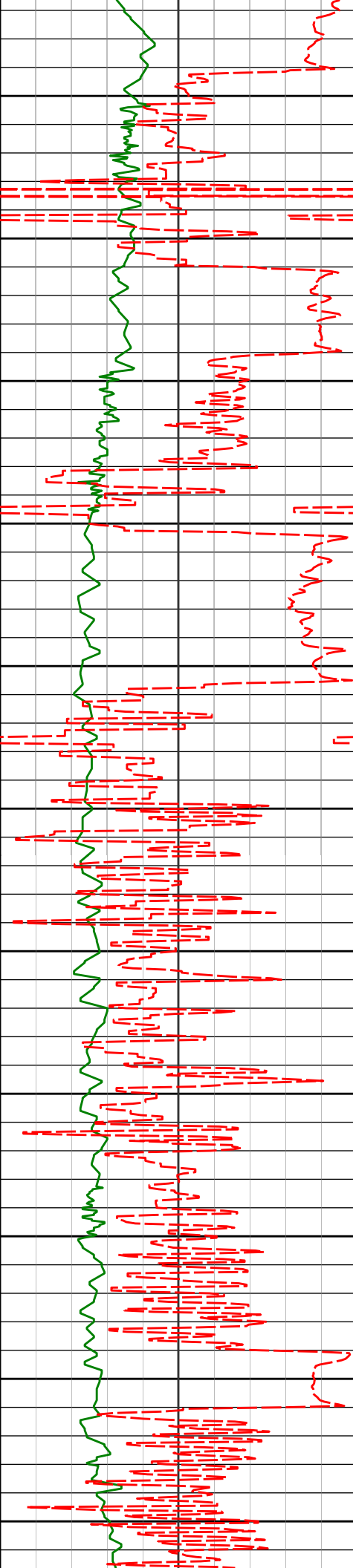


2318'	10.35°	185.51°	2315.61'	-13.59'
2410'	9.74°	184.16°	2406.19'	-12.31'
2502'	11.18°	179.34°	2496.67'	-10.03'
2594'	11.71°	187.83°	2586.84'	-8.21'
2687'	12.77°	192.77°	2677.73'	-8.54'
2781'	11.95°	192.82°	2769.55'	-9.72'



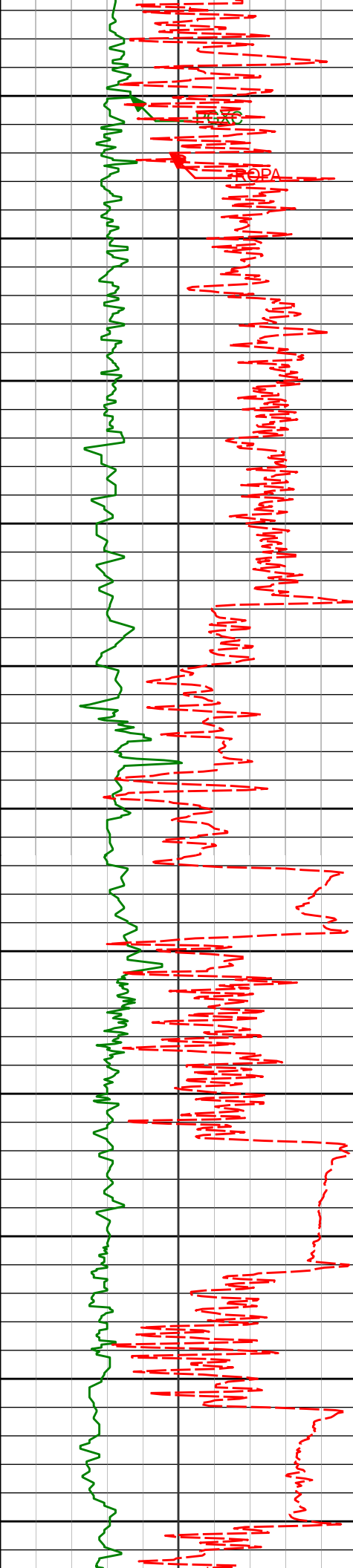
2900
2950
3000
3050
3100
3150
3200
3250
3300
3350
3400

2874'	12.03°	193.12°	2860.52'	-10.91'
2969'	11.03°	194.00°	2953.60'	-12.28'
3064'	11.01°	200.25°	3046.85'	-14.70'
3159'	10.61°	192.12°	3140.17'	-16.82'
3254'	9.17°	194.70°	3233.76'	-17.92'
3349'	8.83°	206.35°	3327.60'	-20.74'



3450
3500
3550
3600
3650
3700
3750
3800
3850
3900
3950

3444'	9.84°	200.63°	3421.34'	-24.44'
3539'	9.36°	205.43°	3515.01'	-28.14'
3634'	11.08°	213.09°	3608.51'	-33.94'
3729'	14.65°	210.70°	3701.11'	-41.96'
3824'	15.48°	209.17°	3792.84'	-50.60'
3919'	13.88°	204.95°	3884.74'	-57.93'



4000

4015'

12.73°

205.63° 3978.16'

-63.97'

4050

4100

4109'

11.69°

206.14° 4070.03'

-69.59'

4150

4200

4204'

9.93°

200.64° 4163.35'

-73.95'

4250

4300

4299'

7.28°

201.37° 4257.27'

-76.79'

4350

4400

4394'

9.70°

204.24° 4351.22'

-80.08'

4450

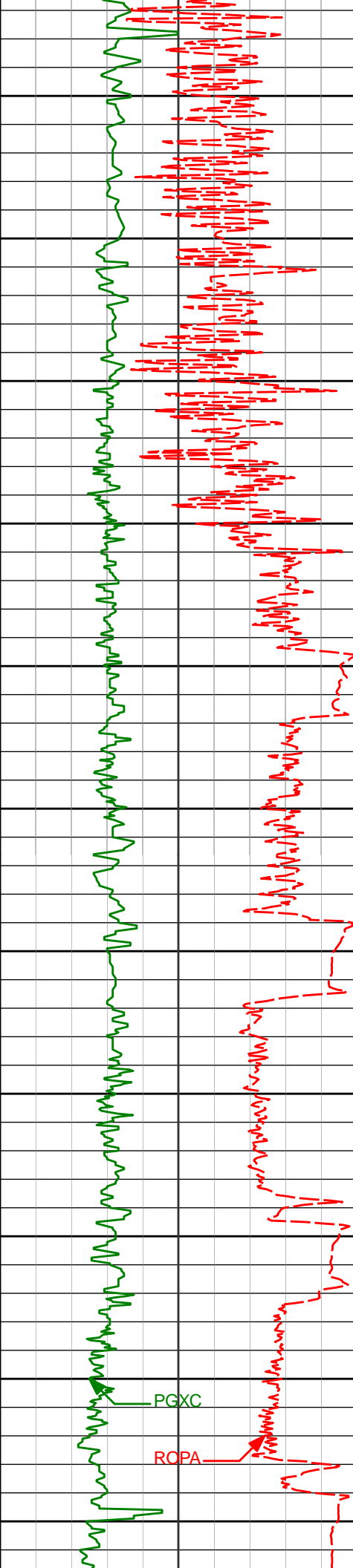
4500

4489'

14.14°

215.89° 4444.16'

-87.30'



4550

4584'

12.80°

213.07°

4536.55'

-96.70'

4600

4650

4678'

9.51°

208.92°

4628.76'

-103.46'

4700

4750

4774'

9.78°

195.71°

4723.42'

-107.00'

4800

4850

4868'

10.45°

200.12°

4815.96'

-109.46'

4900

4950

4964'

10.00°

196.24°

4910.43'

-112.06'

5000

5050

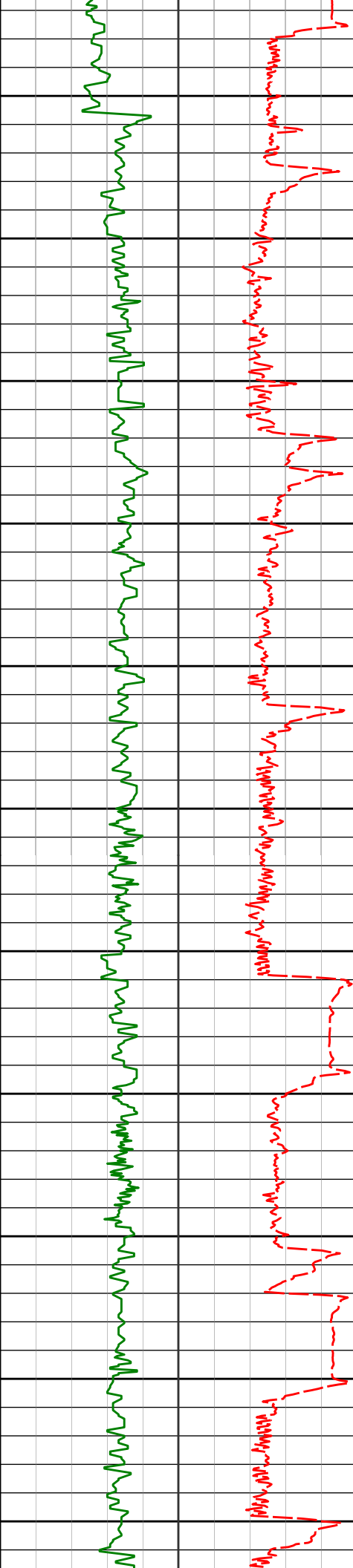
5058'

11.88°

187.14°

5002.73'

-112.64'



5100

5150

5200

5250

5300

5350

5400

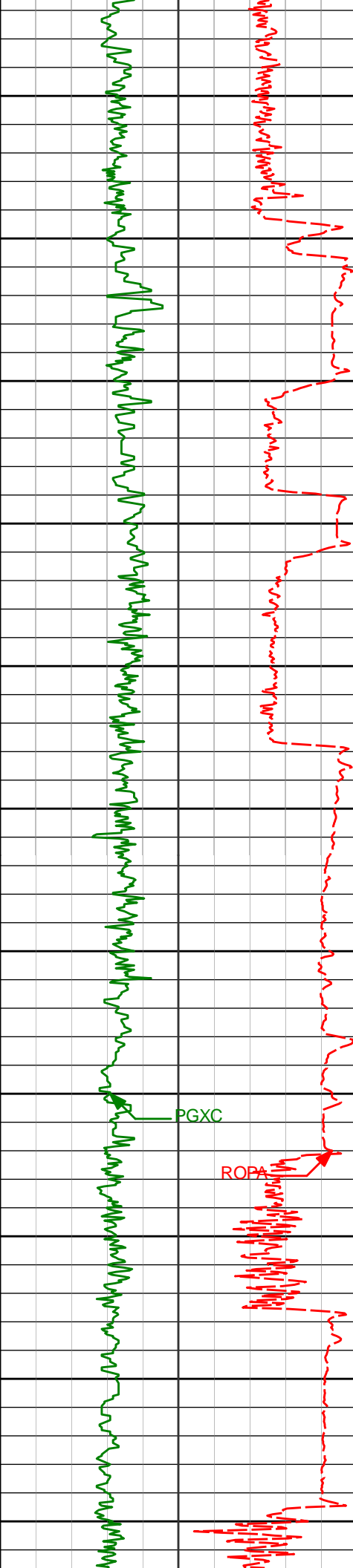
5450

5500

5550

5600

5153'	13.43°	187.37°	5095.42'	-111.85'
5248'	12.18°	187.22°	5188.05'	-111.07'
5344'	9.88°	183.58°	5282.27'	-109.84'
5439'	11.43°	182.79°	5375.63'	-107.92'
5534'	12.03°	181.86°	5468.65'	-105.53'



5650

5700

5750

5800

5850

5900

5950

6000

6050

6100

6150

5629'

10.38°

182.71° 5561.83'

-103.22'

5724'

9.54°

187.98° 5655.40'

-102.02'

5819'

10.54°

195.00° 5748.95'

-102.67'

5914'

16.12°

187.23° 5841.36'

-103.00'

6009'

27.24°

184.55° 5929.50'

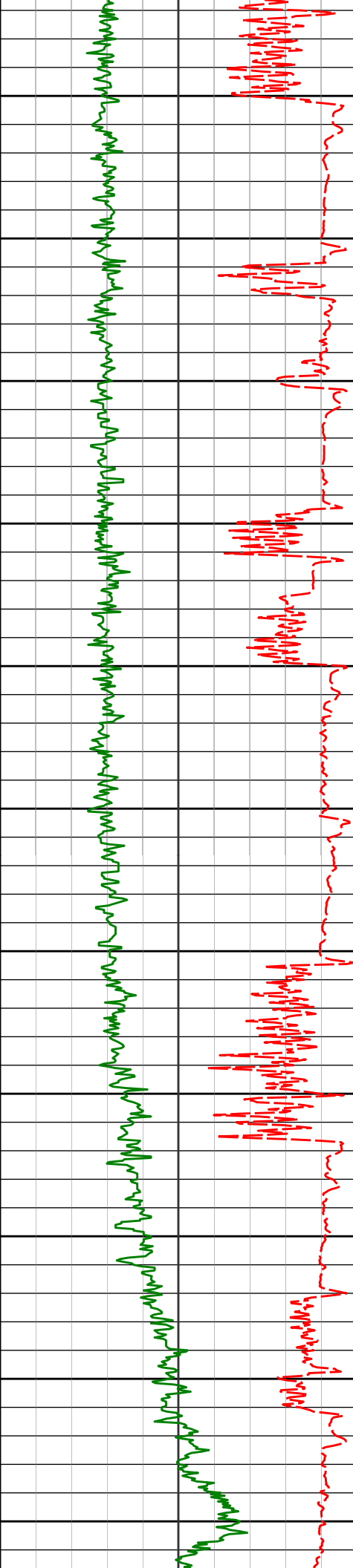
-100.64'

6104'

25.66°

168.73° 6014.66'

-91.51'



6200
6250
6300
6350
6400
6450
6500
6550
6600
6650
6700

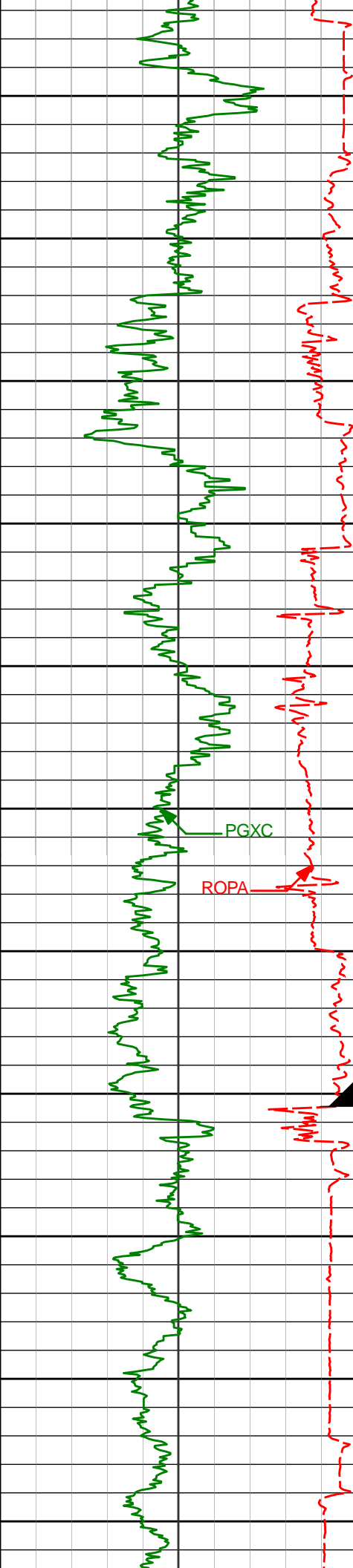
6199'
6294'
6389'
6484'
6579'
6674'

24.97°
26.27°
27.07°
38.44°
42.78°
50.85°

149.88°
137.64°
125.03°
109.59°
103.63°
100.62°

6100.68'
6186.40'
6271.36'
6351.26'
6423.39'
6488.36'

-71.44'
-42.13'
-6.08'
42.72'
104.02'
173.14'



6750				
6769'	59.15°	97.75°	6542.81'	250.88'
6800				
6850				
6864'	67.96°	94.58°	6585.08'	335.70'
6900				
6950				
6959'	74.56°	93.70°	6615.59'	425.23'
7000				
7050				
7050'	78.04°	93.37°	6637.14'	513.15'
7100				
7150				
7156'	84.32°	89.08°	6653.39'	616.75'
7200				
7250				
7248'	84.78°	90.03°	6662.13'	706.97'

Run 200

7100

Casing Shoe @ 7105' MD



7300

7340'

86.36°

90.23° 6669.23'

797.49'

7350

7400

7433'

87.72°

88.25° 6674.04'

888.89'

7450

7500

7526'

91.85°

87.68° 6674.39'

980.02'

7550

7600

7619'

92.90°

87.78° 6670.53'

1071.01'

7650

7700

7714'

91.94°

88.86° 6666.52'

1164.14'

7750

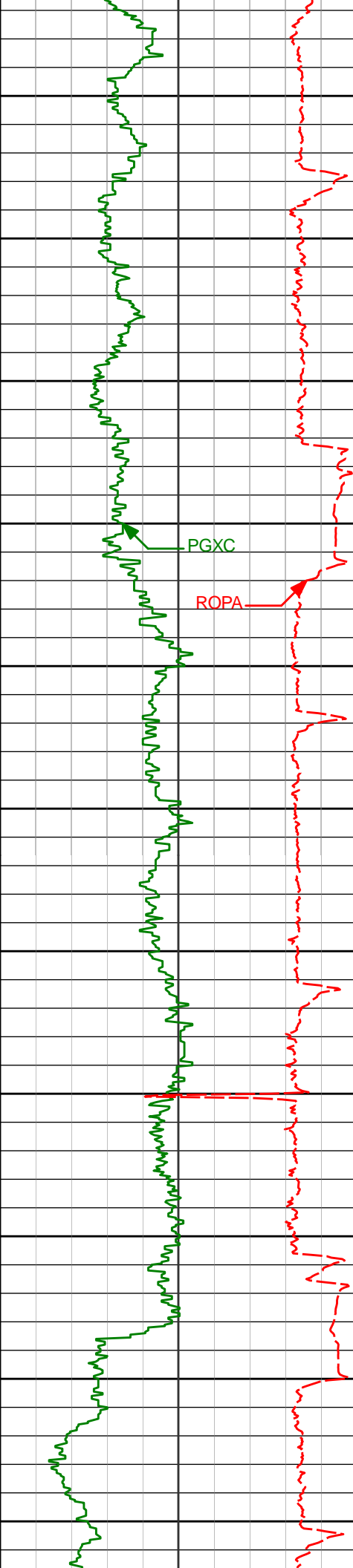
7800

7809'

88.34°

87.95° 6666.29'

1257.37'



7850

7900

7950

8000

8050

8100

8150

8200

8250

8300

8350

7904'

87.97°

88.06° 6669.35'

1350.44'

7999'

90.52°

87.54° 6670.60'

1443.47'

8094'

91.29°

87.30° 6669.10'

1536.38'

8189'

89.20°

86.74° 6668.69'

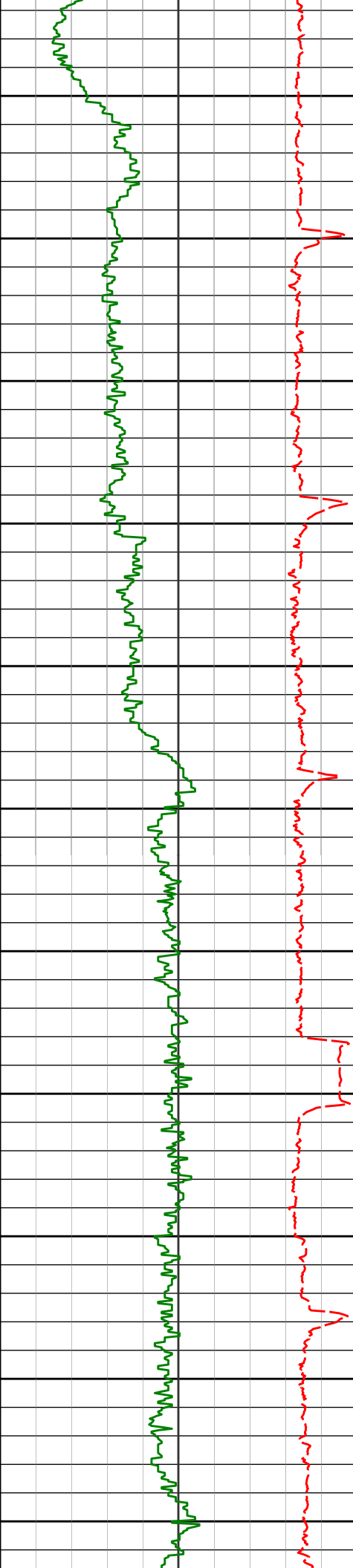
1629.15'

8284'

91.72°

86.43° 6667.93'

1721.77'



8400

8450

8500

8550

8600

8650

8700

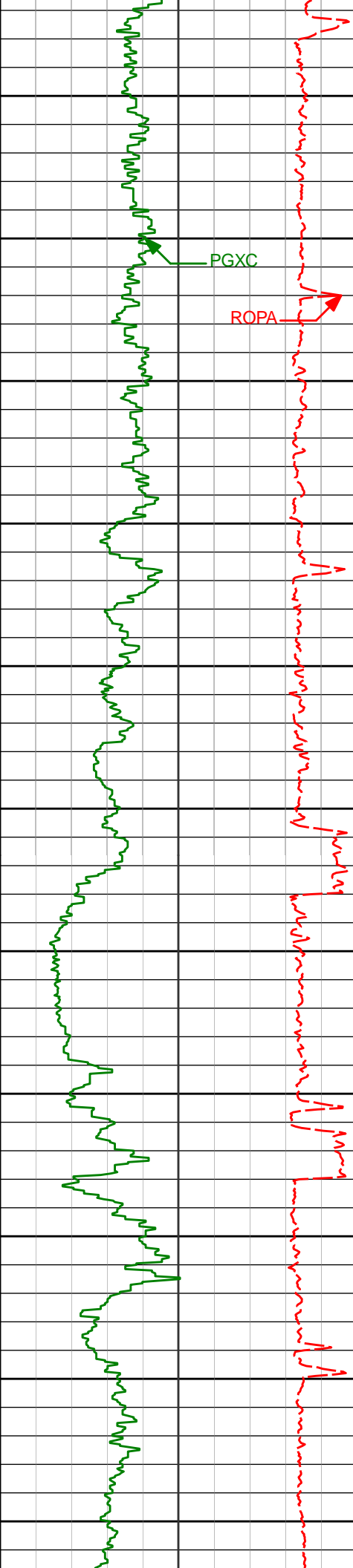
8750

8800

8850

8900

8379'	92.80°	86.44°	6664.18'	1814.26'
8474'	93.23°	86.66°	6659.19'	1906.74'
8569'	93.21°	87.13°	6653.85'	1999.33'
8664'	93.79°	87.31°	6648.05'	2092.01'
8759'	90.06°	87.88°	6644.86'	2184.92'
8854'	90.46°	88.25°	6644.43'	2278.05'



8950

8949'

90.18°

88.17° 6643.90'

2371.24'

9000

PGXC

ROPA

9050

9044'

89.57°

88.12° 6644.11'

2464.40'

9100

9150

9139'

89.17°

88.54° 6645.15'

2557.62'

9200

9250

9234'

89.72°

88.82° 6646.07'

2650.95'

9300

9350

9329'

92.74°

89.05° 6644.03'

2744.32'

9400

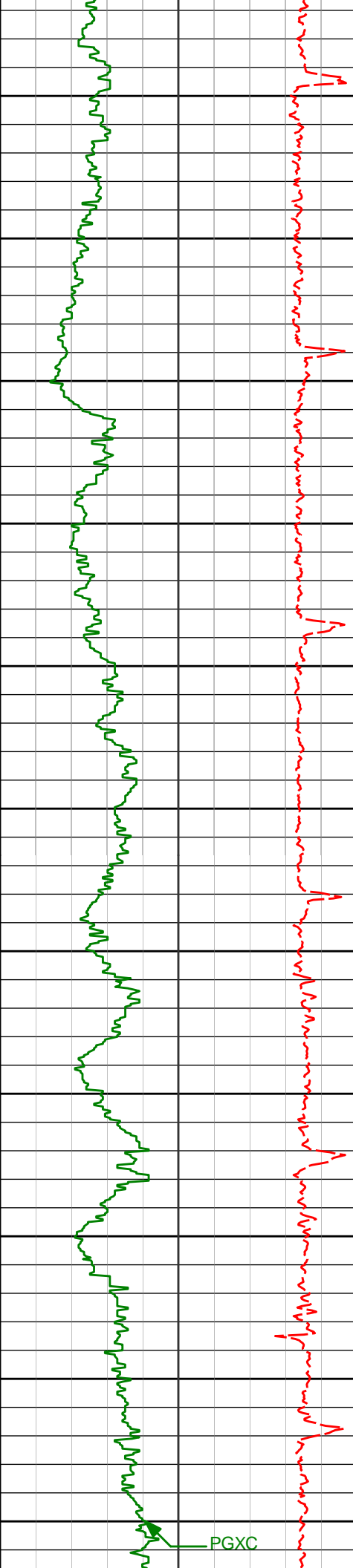
9450

9425'

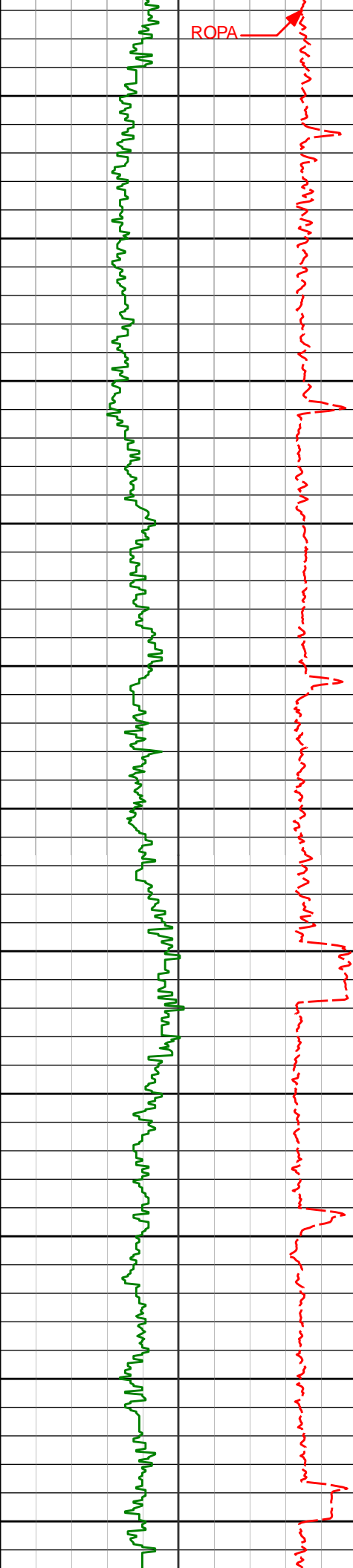
92.28°

89.03° 6639.83'

2838.66'



9500				
9520'	92.06°	88.79°	6636.23'	2931.99'
9550				
9600				
9615'	91.60°	88.87°	6633.20'	3025.33'
9650				
9700				
9709'	91.39°	88.94°	6630.75'	3117.71'
9750				
9800				
9804'	90.80°	89.03°	6628.93'	3211.12'
9850				
9900				
9950				
9994'	90.43°	89.07°	6626.89'	3398.00'
10000				



10050

10089'

89.82°

89.01° 6626.68'

3491.44'

10100

10150

10184'

89.82°

88.99° 6626.98'

3584.87'

10200

10250

10279'

89.85°

88.92° 6627.26'

3678.29'

10300

10350

10373'

91.32°

87.63° 6626.30'

3770.50'

10400

10450

10500

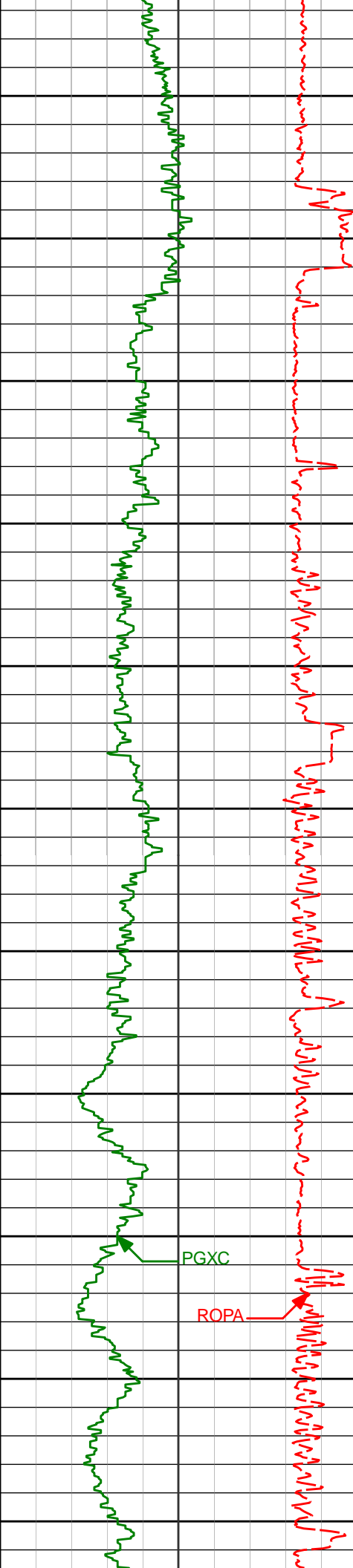
10550

10564'

90.03°

87.29° 6624.05'

3957.33'



10600

10650

10700

10750

10800

10850

10900

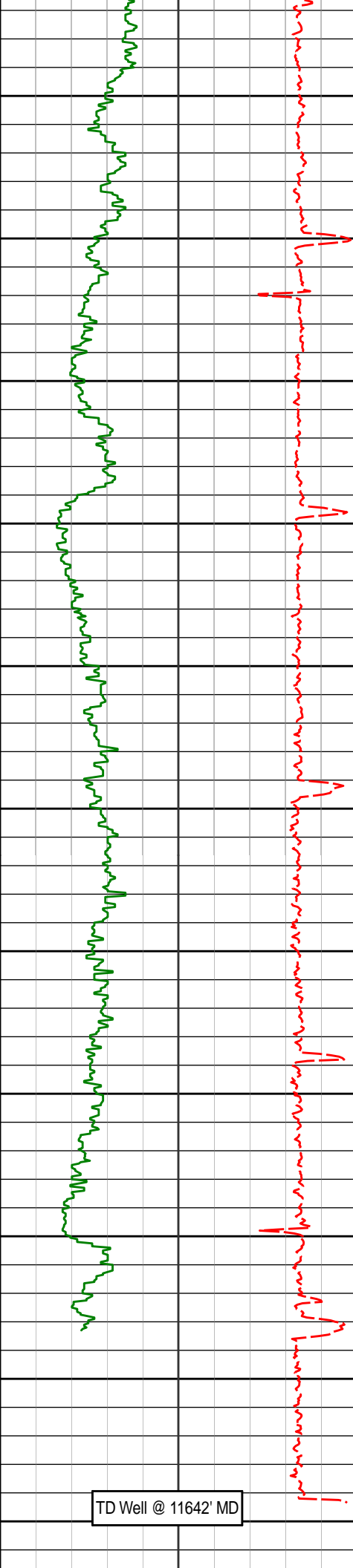
10950

11000

11050

11100

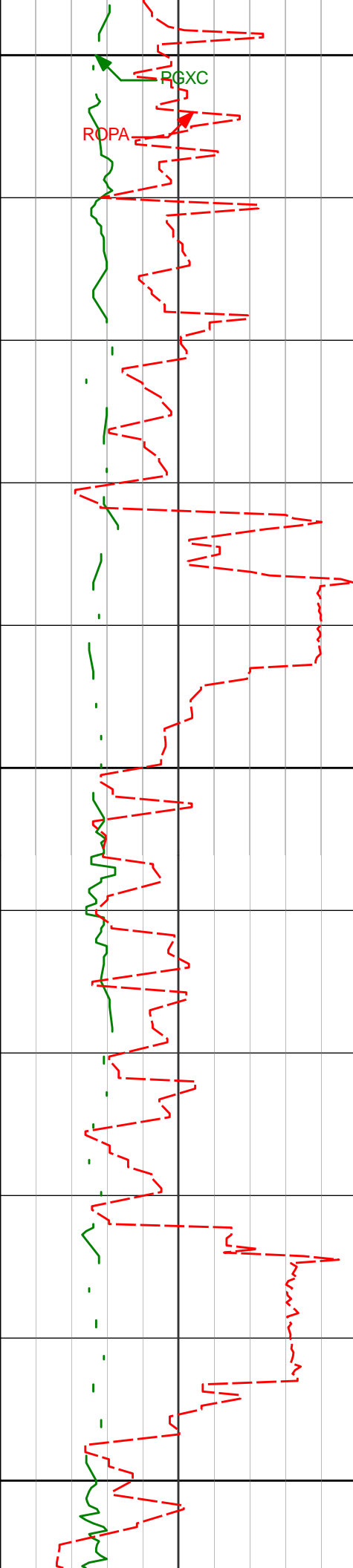
10659'	92.13°	87.34°	6622.26'	4050.20'
10754'	92.49°	87.04°	6618.43'	4142.96'
10848'	92.31°	86.95°	6614.49'	4234.67'
10943'	92.03°	86.89°	6610.89'	4327.35'
11038'	92.13°	86.87°	6607.44'	4420.02'



11133'	92.37°	86.77°	6603.71'	4512.66'
11150				
11200				
11228'	91.79°	86.66°	6600.27'	4605.27'
11250				
11300				
11323'	91.73°	86.53°	6597.35'	4697.85'
11350				
11400				
11418'	90.31°	86.00°	6595.66'	4790.34'
11450				
11500				
11513'	89.82°	85.84°	6595.55'	4882.71'
11550				
11575'	89.72°	85.89°	6595.80'	4942.98'
11600				
PTB				
<u>TD</u>				
11642'	89.72°	85.89°	6596.13'	5008.11'
11650				

TD Well @ 11642' MD

Avg Rate of Penetration ROPA feet per hr										Depth MD ft									
3K 0										Depth Inc Azi TVD V.S.									
Gamma CG Cor PGXRC-T api																			
0 300																			
MD Detail 1:240 Scale																			
Gamma CG Cor PGXRC-T api																			
0 300																			
Avg Rate of Penetration ROPA feet per hr										Depth MD ft									
3K 0										Depth Inc Azi TVD V.S.									



1000

1018'

0.40°

228.69° 1017.97'

-3.37'

1100

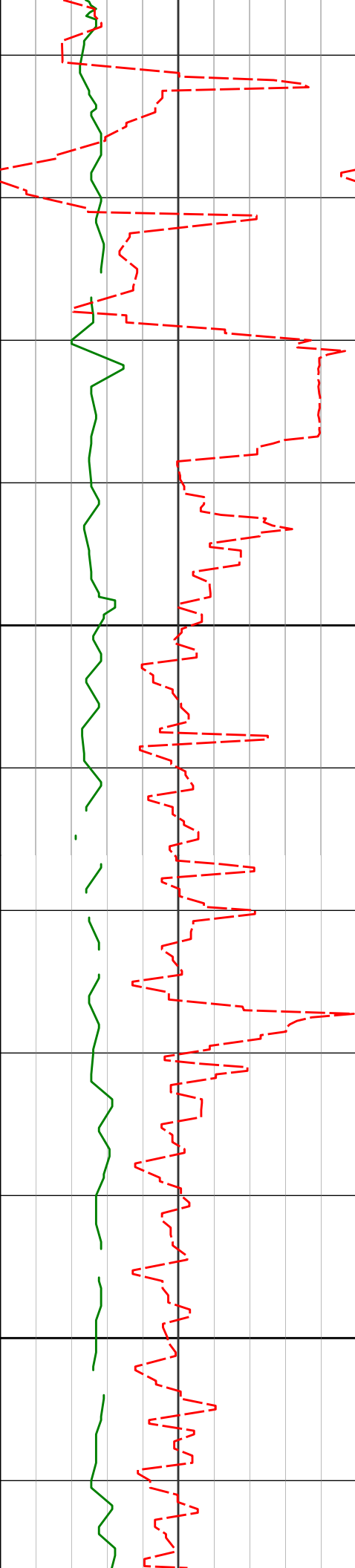
1200

1206'

0.61°

279.33° 1205.96'

-4.79'



1300

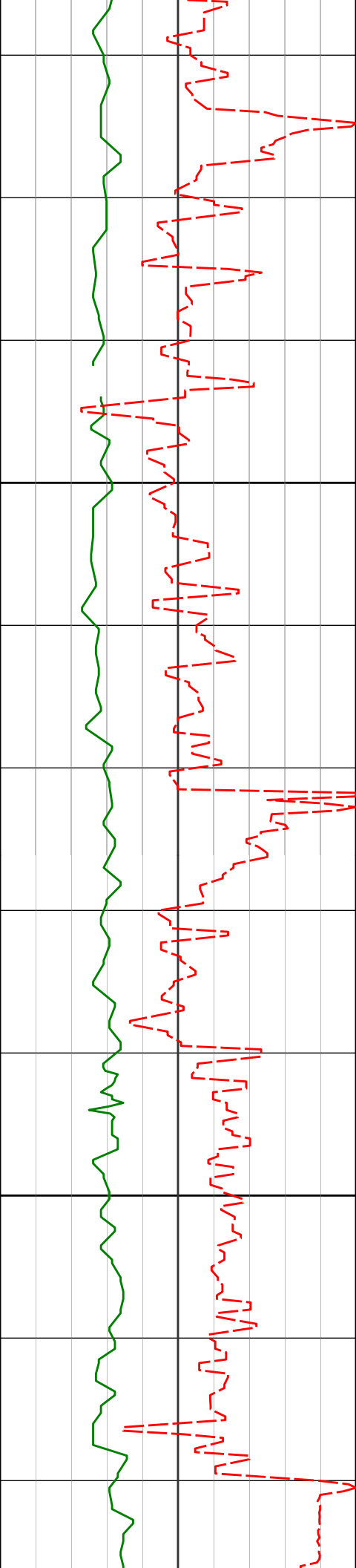
1400

1298'

0.61°

311.18° 1297.95'

-5.69'



1500

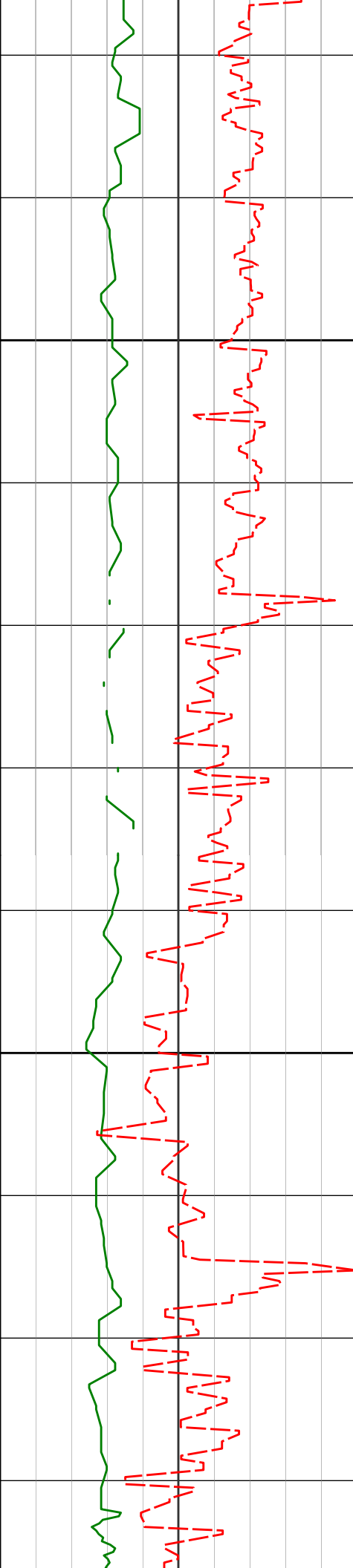
1577'

0.62°

308.66° 1576.94'

-8.27'

1600



1700

1800

1669'

0.62°

331.24° 1668.93'

-9.01'

1763'

0.56°

329.69° 1762.93'

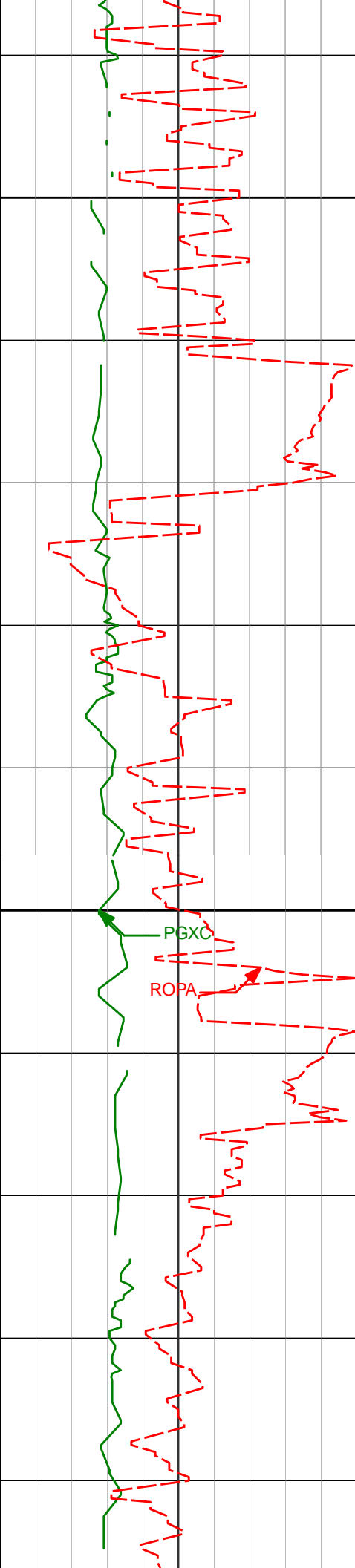
-9.62'

1855'

0.54°

352.94° 1854.92'

-10.03'



1900

1948'

1.71°

202.23° 1947.91'

-10.46'

2000

PGXC

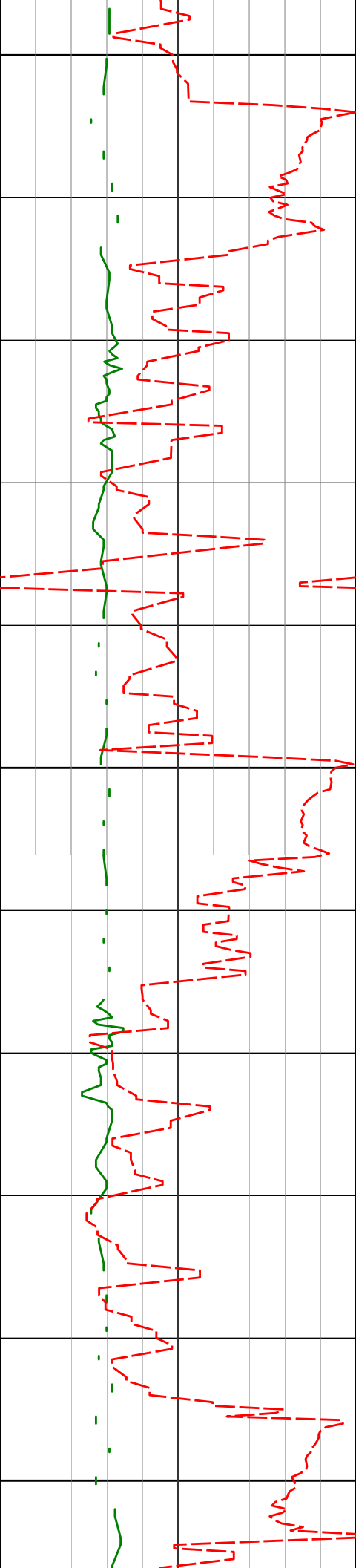
ROPA

2040'

3.32°

212.86° 2039.82'

-11.83'



2100

2133'

6.28°

197.86° 2132.49'

-13.65'

2200

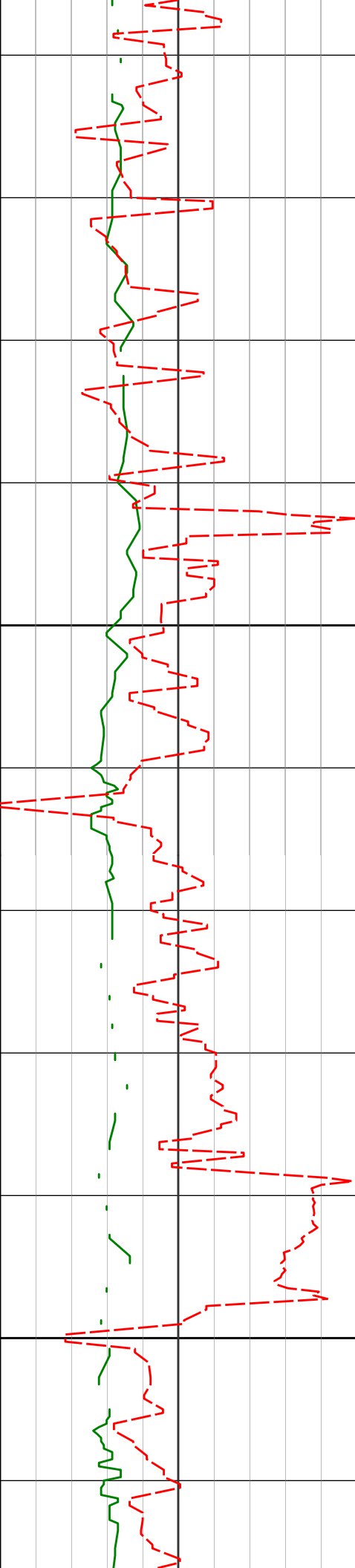
2225'

7.88°

188.41° 2223.79'

-14.27'

2300



2400

2500

2318'

2410'

2502'

10.35°

9.74°

11.18°

185.51° 2315.61'

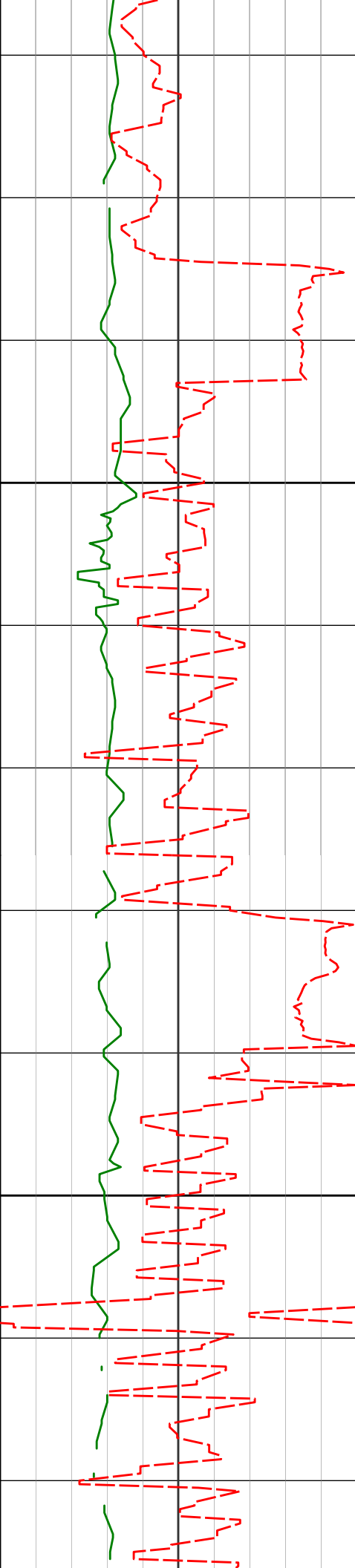
184.16° 2406.19'

179.34° 2496.67'

-13.59'

-12.31'

-10.03'



2600

2700

2594'

11.71°

187.83° 2586.84'

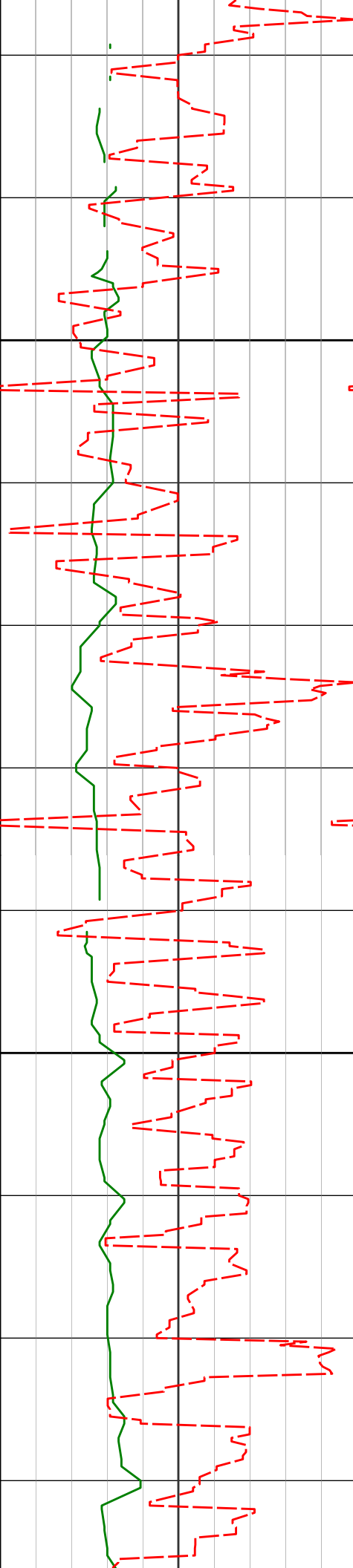
-8.21'

2687'

12.77°

192.77° 2677.73'

-8.54'



2800

2900

2781'

11.95°

192.82° 2769.55'

-9.72'

2874'

12.03°

193.12° 2860.52'

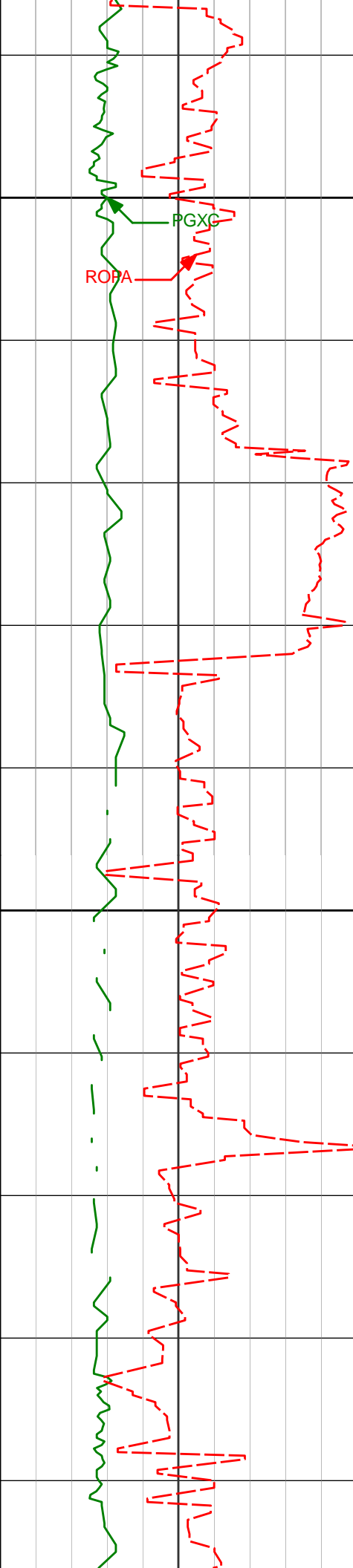
-10.91'

2969'

11.03°

194.00° 2953.60'

-12.28'



3000

3064'

11.01°

200.25° 3046.85'

-14.70'

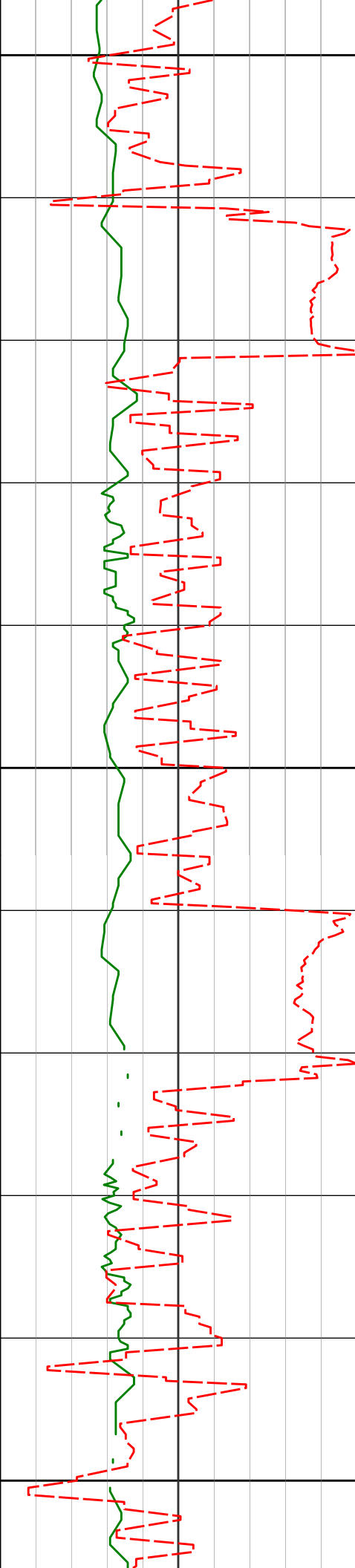
3100

3159'

10.61°

192.12° 3140.17'

-16.82'



3200

3254'

9.17°

194.70° 3233.76'

-17.92'

3300

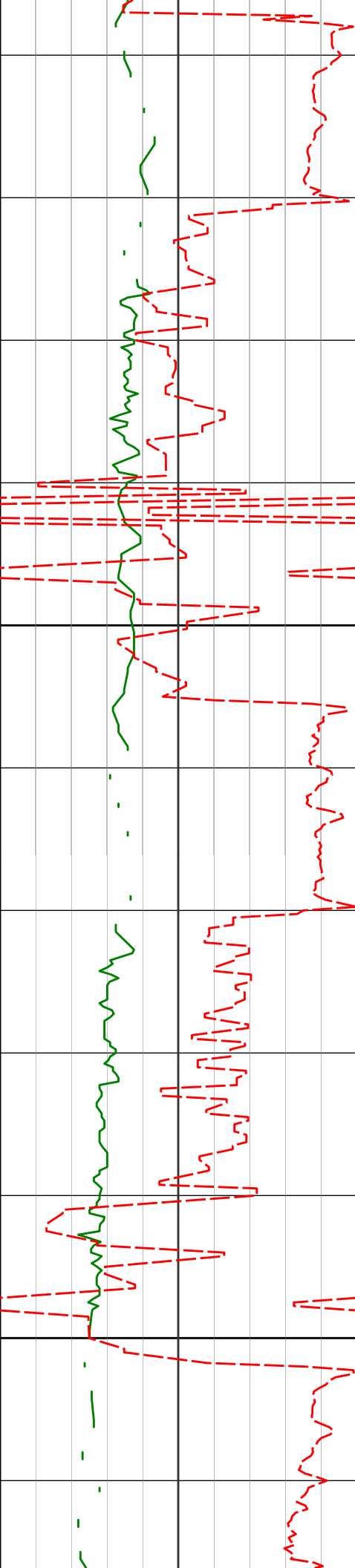
3349'

8.83°

206.35° 3327.60'

-20.74'

3400



3444'

9.84°

200.63° 3421.34'

-24.44'

3500

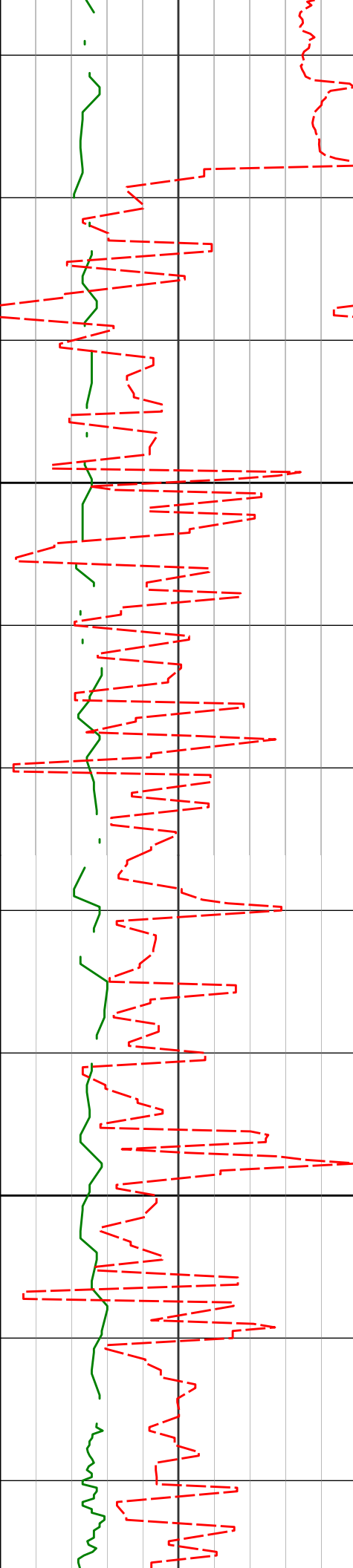
3539'

9.36°

205.43° 3515.01'

-28.14'

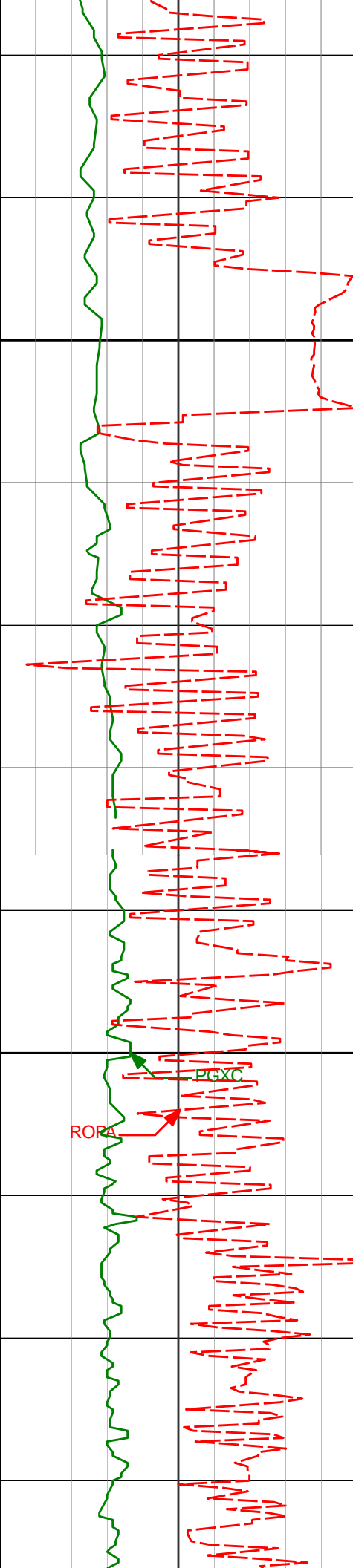
3600



3700

3800

3634'	11.08°	213.09°	3608.51'	-33.94'
3729'	14.65°	210.70°	3701.11'	-41.96'
3824'	15.48°	209.17°	3792.84'	-50.60'



3900

3919'

13.88°

204.95° 3884.74'

-57.93'

4000

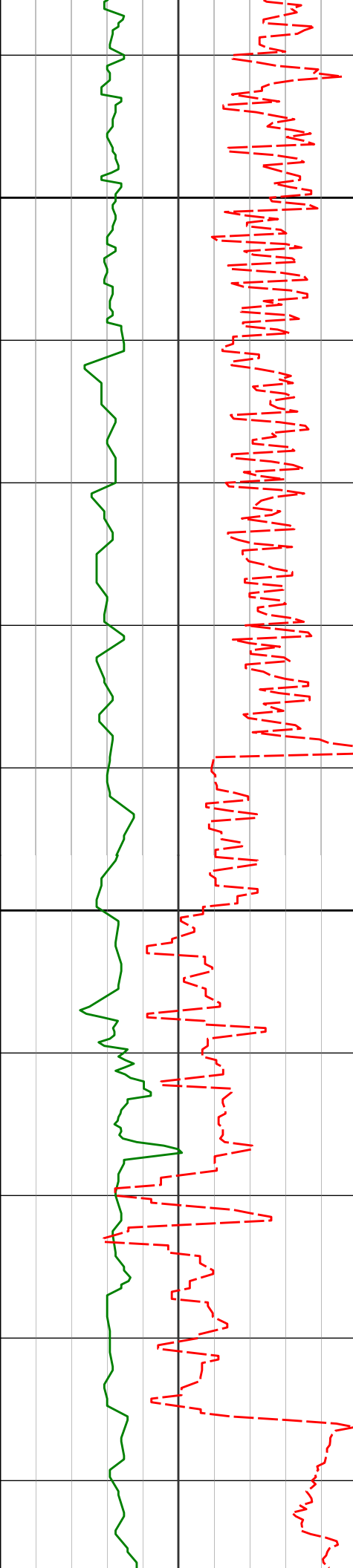
PGXC
ROPA

4015'

12.73°

205.63° 3978.16'

-63.97'



4100

4109'

11.69°

206.14° 4070.03'

-69.59'

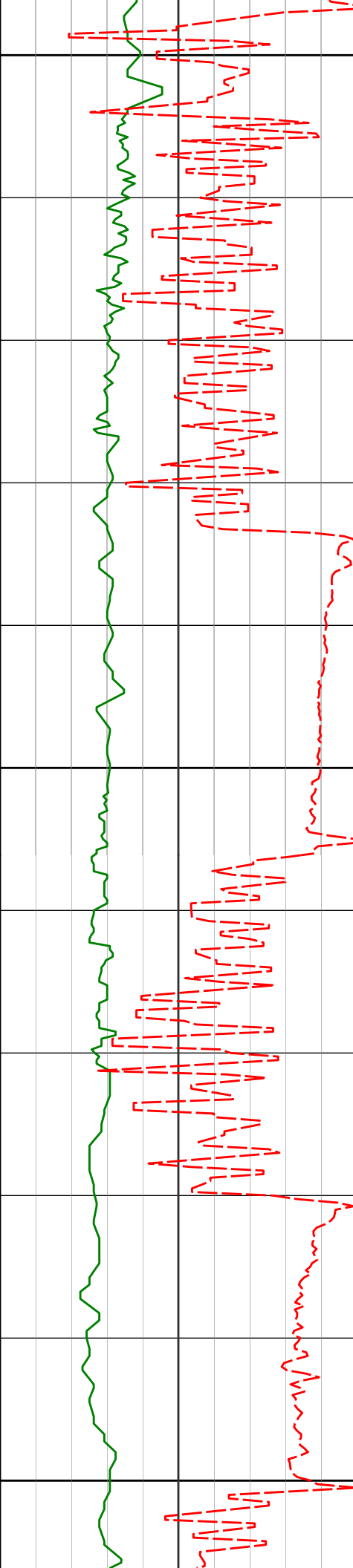
4200

4204'

9.93°

200.64° 4163.35'

-73.95'



4300

4299'

7.28°

201.37° 4257.27'

-76.79'

4400

4394'

9.70°

204.24° 4351.22'

-80.08'

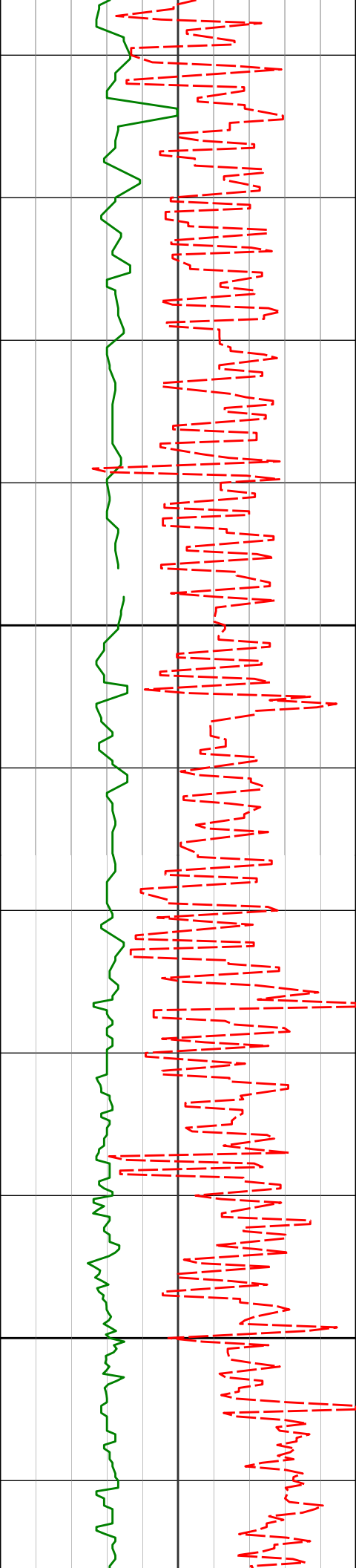
4500

4489'

14.14°

215.89° 4444.16'

-87.30'



4584'

12.80°

213.07° 4536.55'

-96.70'

4600

4678'

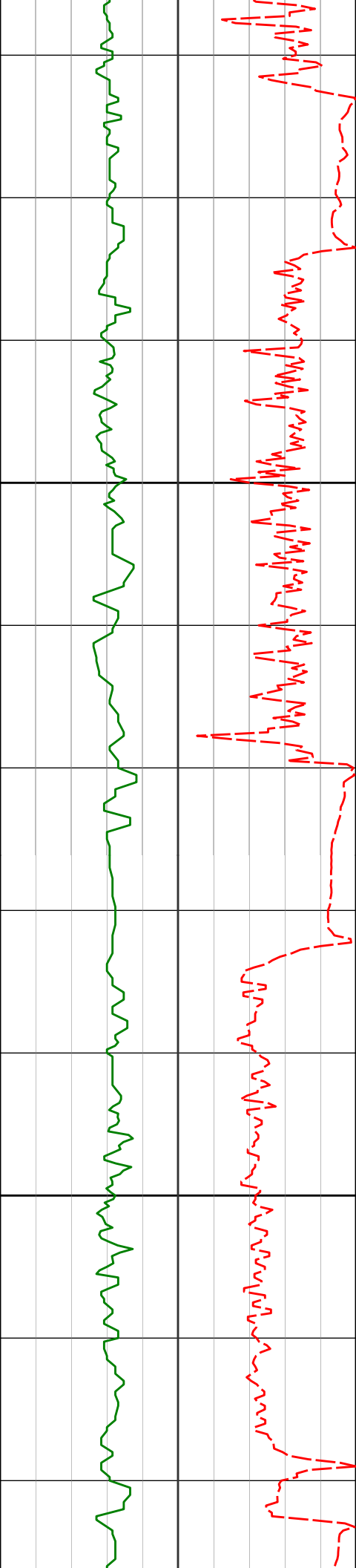
9.51°

208.92° 4628.76'

-103.46'

4700

4800



4774'

9.78°

195.71° 4723.42'

-107.00'

4800

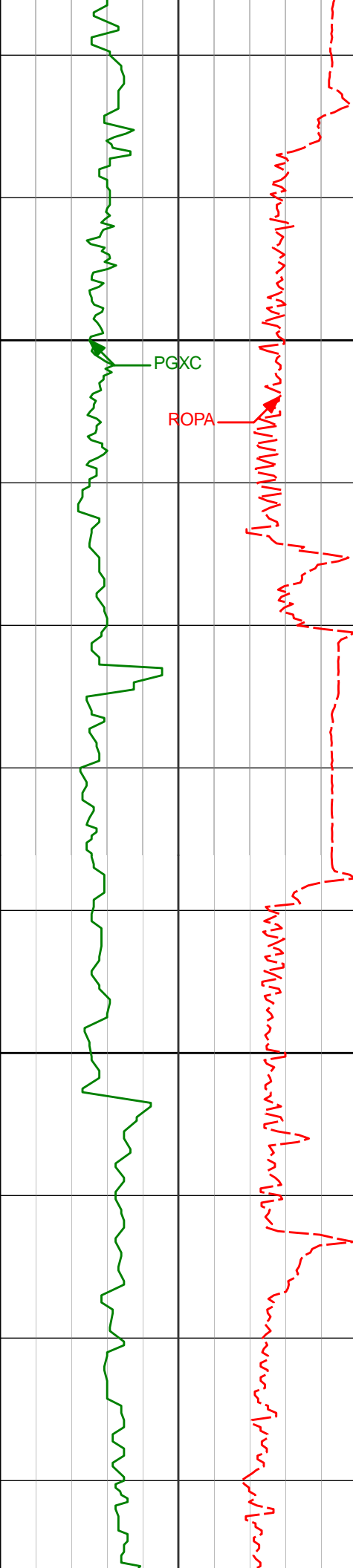
4868'

10.45°

200.12° 4815.96'

-109.46'

4900



5000

PGXC

ROPA

5100

4964'

10.00°

196.24° 4910.43'

-112.06'

5058'

11.88°

187.14° 5002.73'

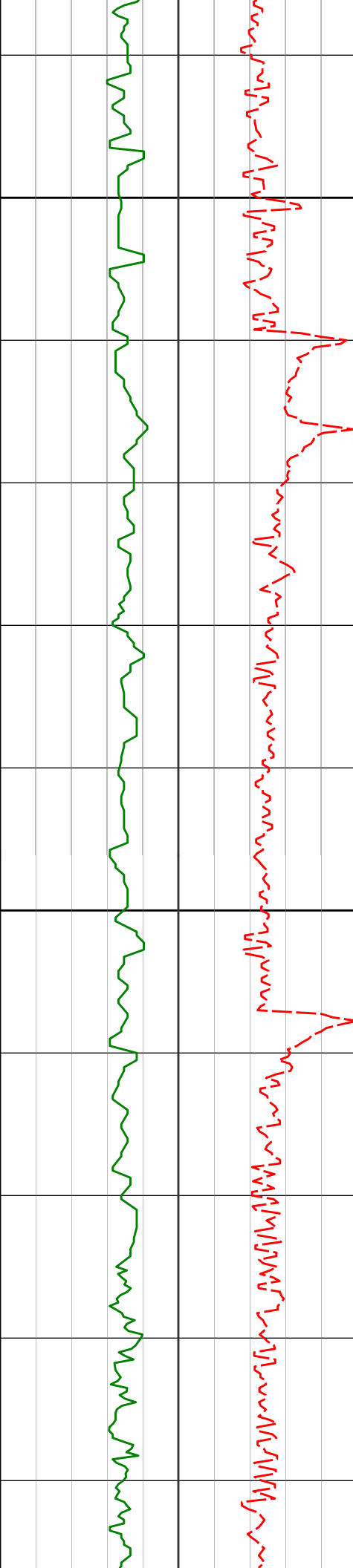
-112.64'

5153'

13.43°

187.37° 5095.42'

-111.85'



5200

5248'

12.18°

187.22° 5188.05'

-111.07'

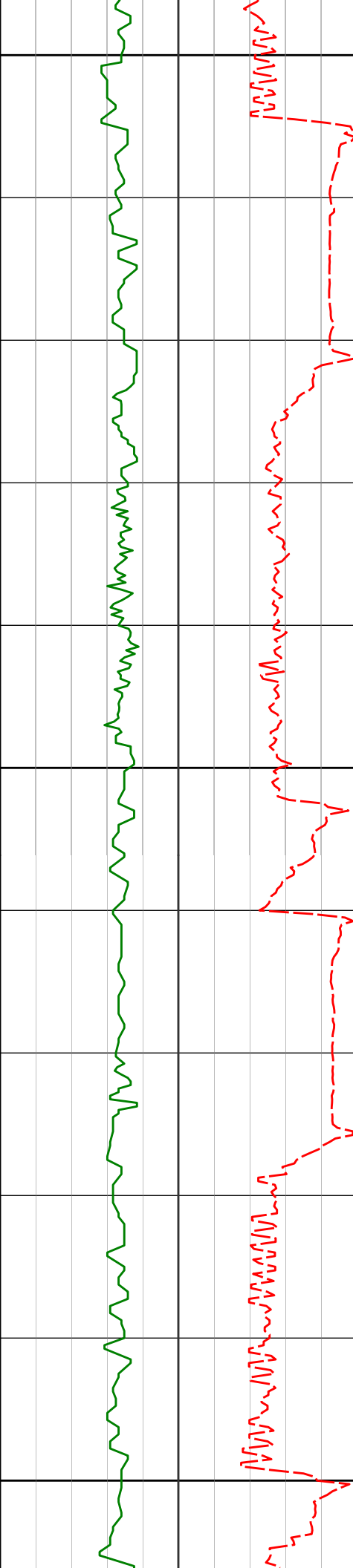
5300

5344'

9.88°

183.58° 5282.27'

-109.84'



5400

5439'

11.43°

182.79° 5375.63'

-107.92'

5500

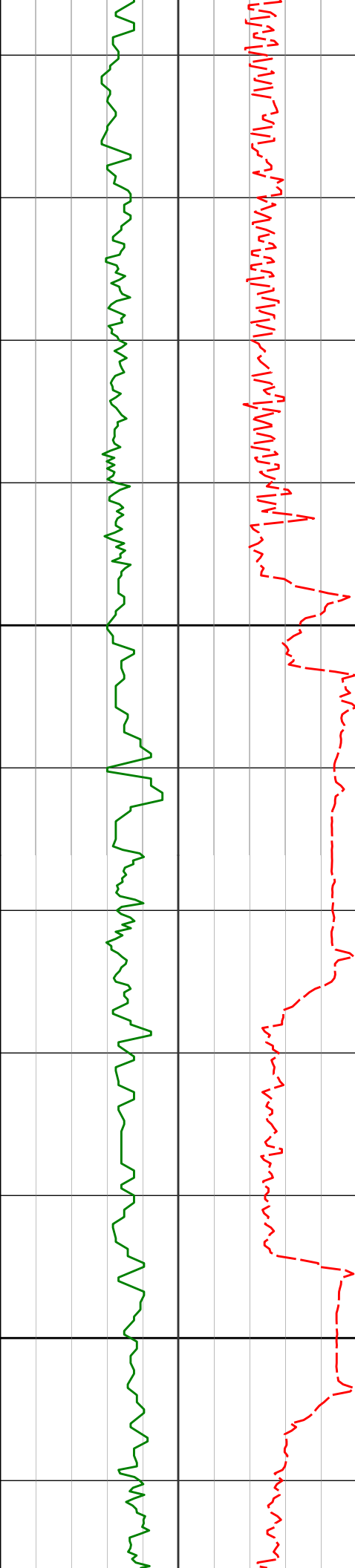
5534'

12.03°

181.86° 5468.65'

-105.53'

5600



5700

5800

5629'

10.38°

182.71° 5561.83'

-103.22'

5724'

9.54°

187.98° 5655.40'

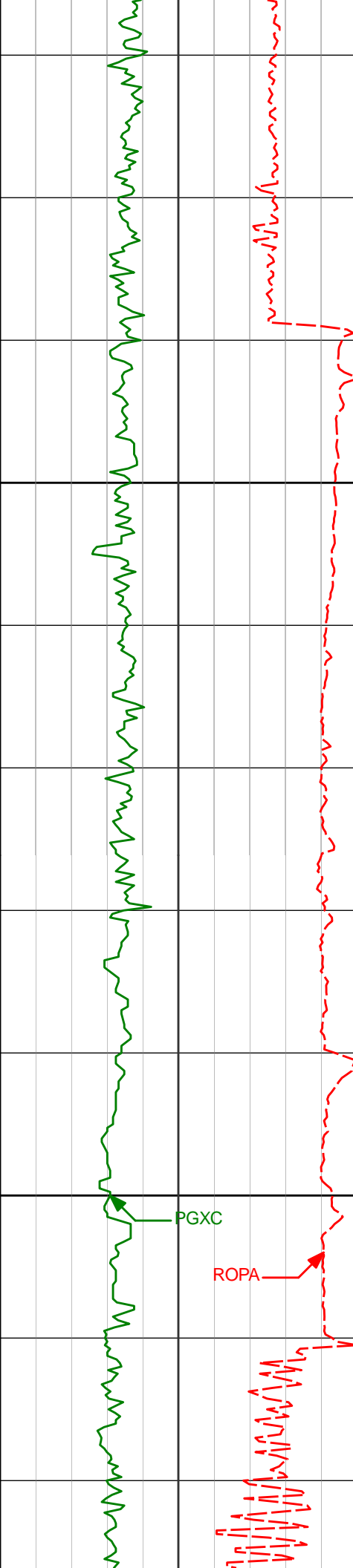
-102.02'

5819'

10.54°

195.00° 5748.95'

-102.67'



5900

5914'

16.12°

187.23° 5841.36'

-103.00'

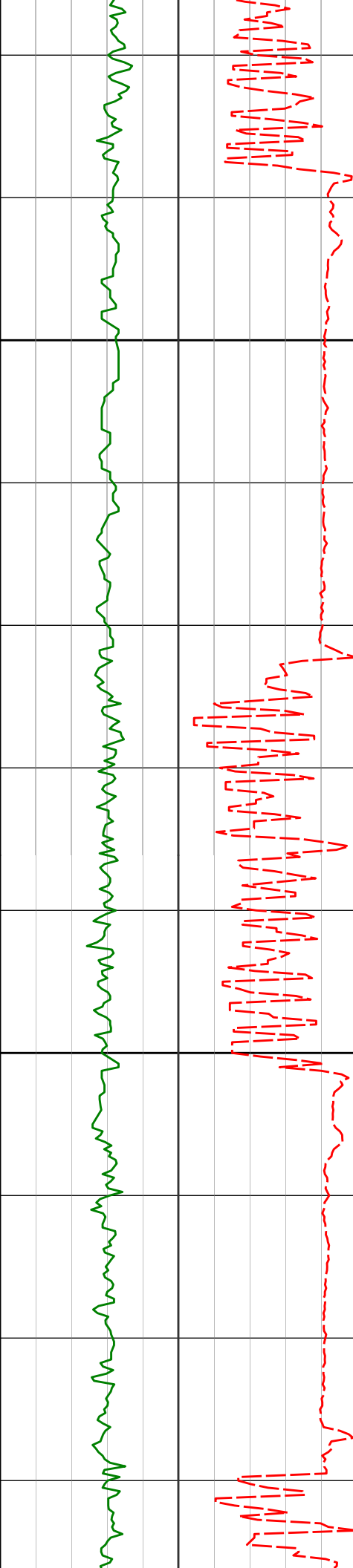
6000

6009'

27.24°

184.55° 5929.50'

-100.64'



6100

6104'

25.66°

168.73° 6014.66'

-91.51'

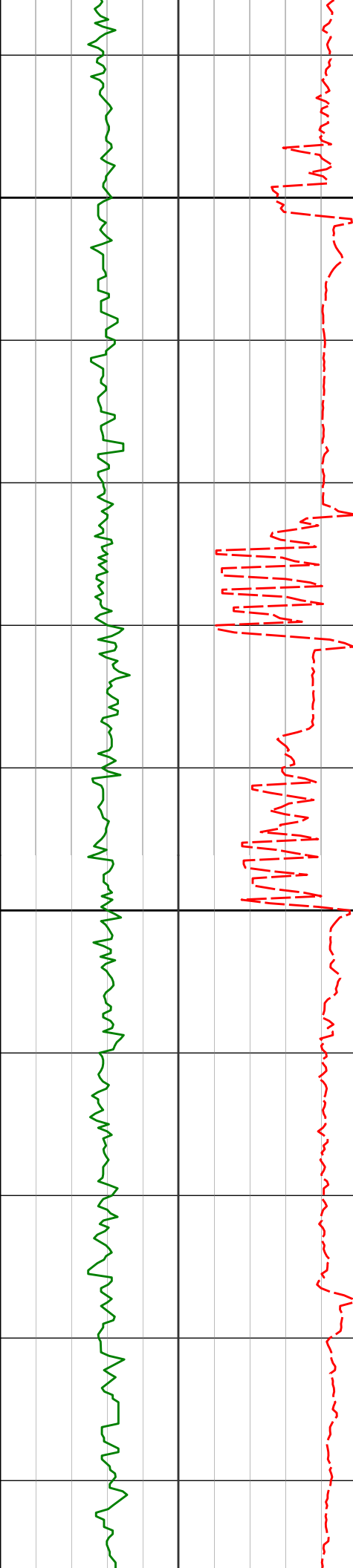
6200

6199'

24.97°

149.88° 6100.68'

-71.44'



6300

6400

6294'

26.27°

137.64° 6186.40'

-42.13'

6389'

27.07°

125.03° 6271.36'

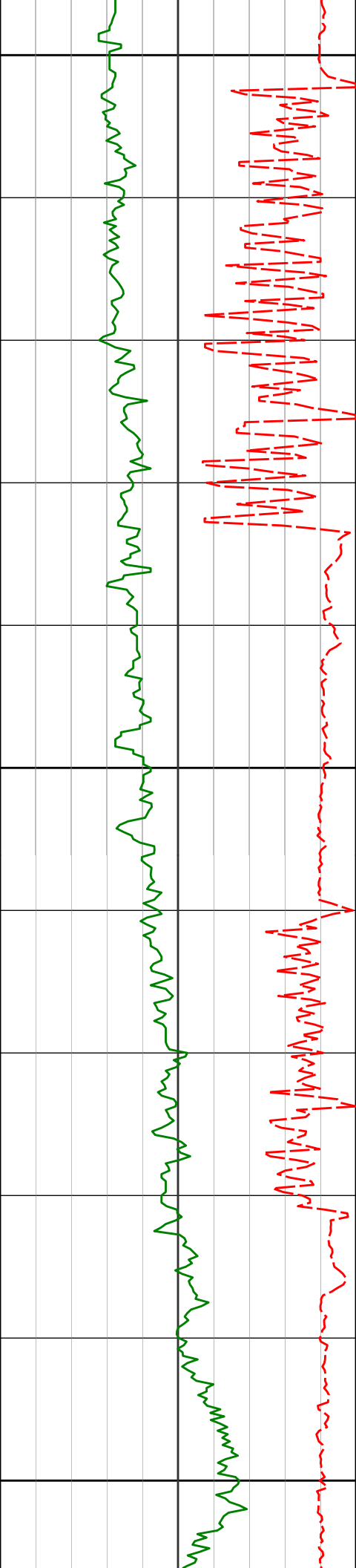
-6.08'

6484'

38.44°

109.59° 6351.26'

42.72'



6500

6579'

42.78°

103.63° 6423.39'

104.02'

6600

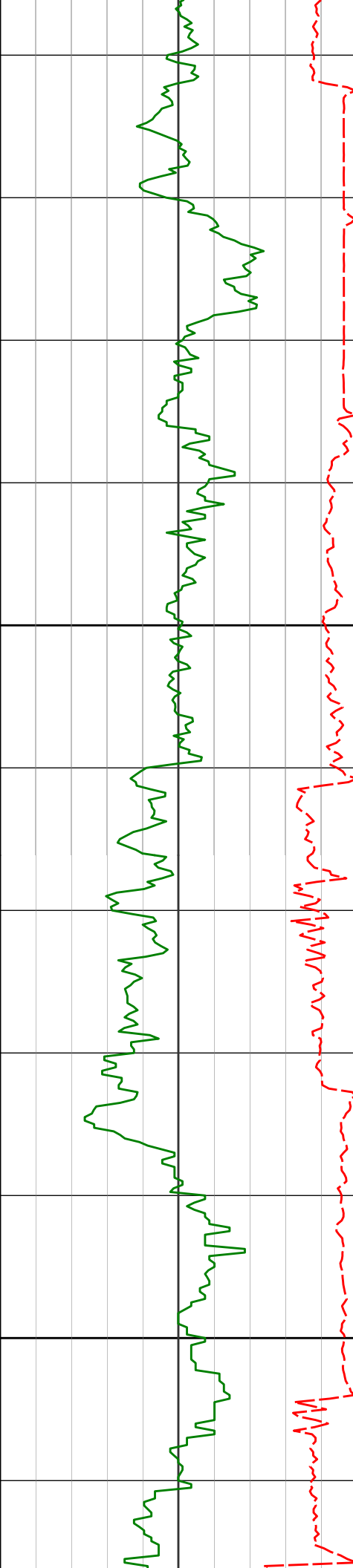
6674'

50.85°

100.62° 6488.36'

173.14'

6700



6800

6900

6769'

59.15°

97.75° 6542.81'

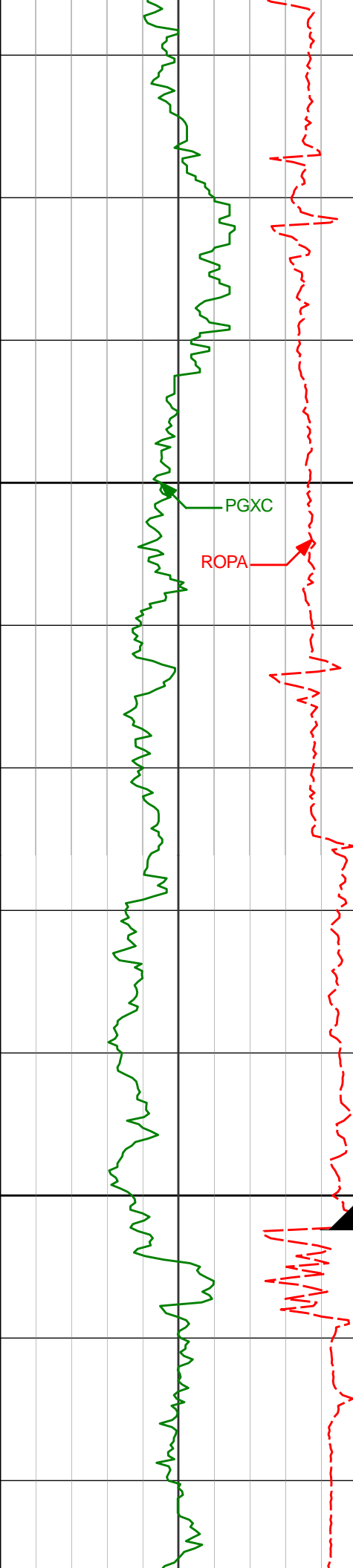
250.88'

6864'

67.96°

94.58° 6585.08'

335.70'



6959'	74.56°	93.70°	6615.59'	425.23'
Run 200				

7000

PGXC

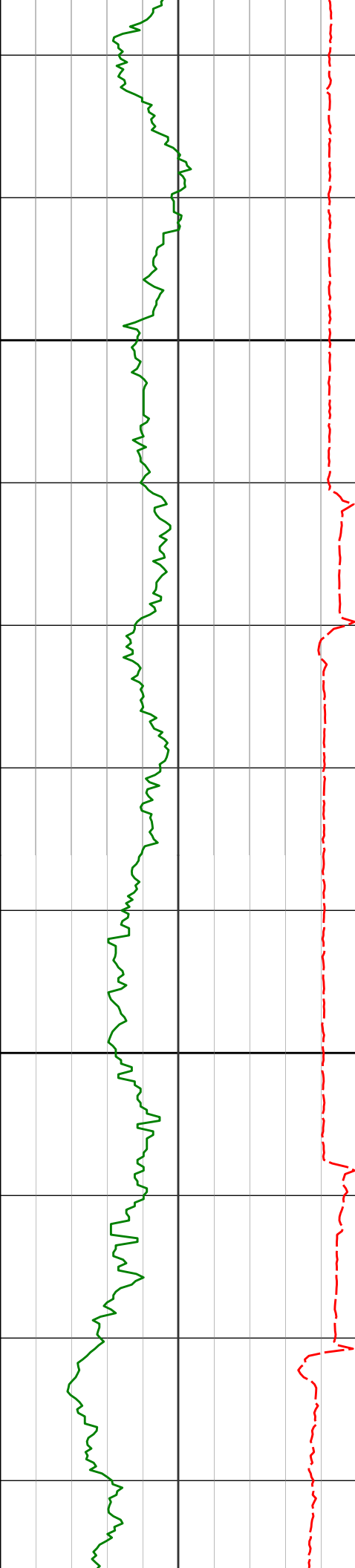
ROPA

7050'	78.04°	93.37°	6637.14'	513.15'
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Run 300

Casing Shoe @ 7105'

7100
CSG



7200

7300

7156'

84.32°

89.08° 6653.39'

616.75'

7248'

84.78°

90.03° 6662.13'

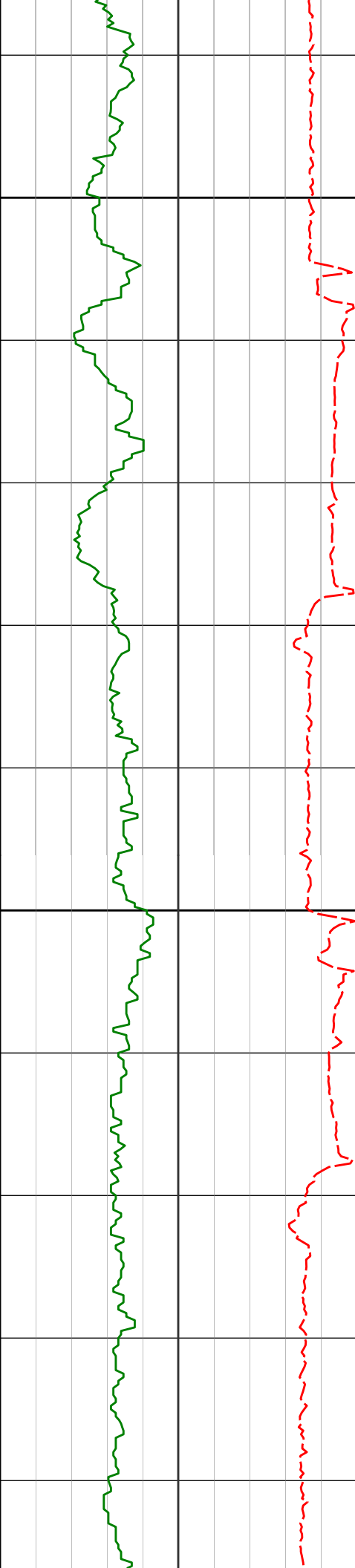
706.97'

7340'

86.36°

90.23° 6669.23'

797.49'



7400

7433'

87.72°

88.25° 6674.04'

888.89'

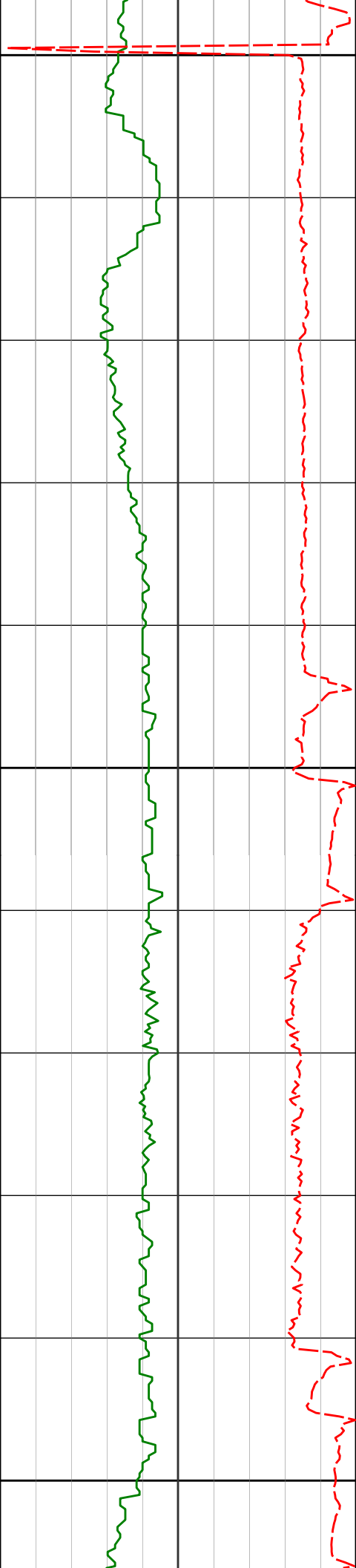
7500

7526'

91.85°

87.68° 6674.39'

980.02'



7600

7619'

92.90°

87.78° 6670.53'

1071.01'

7700

7714'

91.94°

88.86° 6666.52'

1164.14'

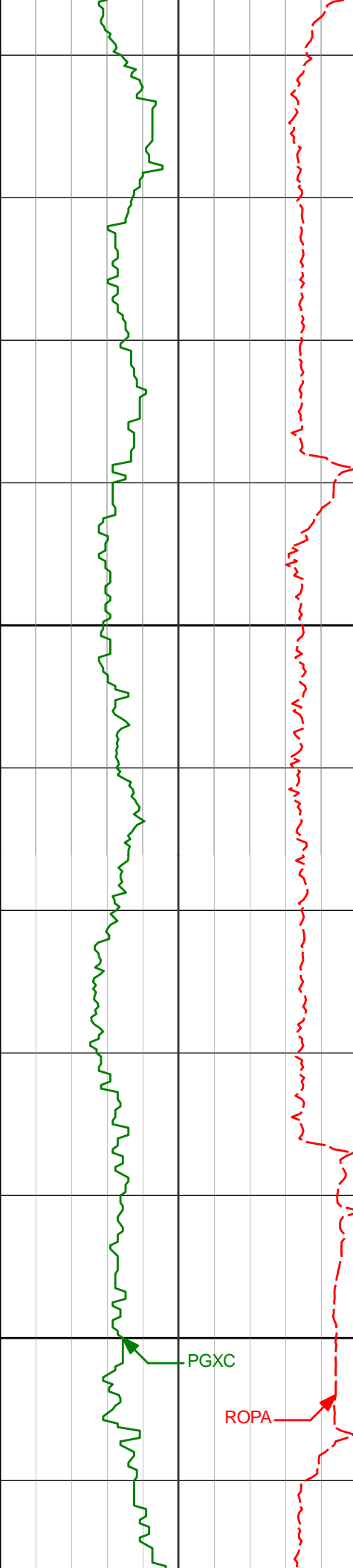
7800

7809'

88.34°

87.95° 6666.29'

1257.37'



7900

7904'

87.97°

88.06° 6669.35'

1350.44'

8000

7999'

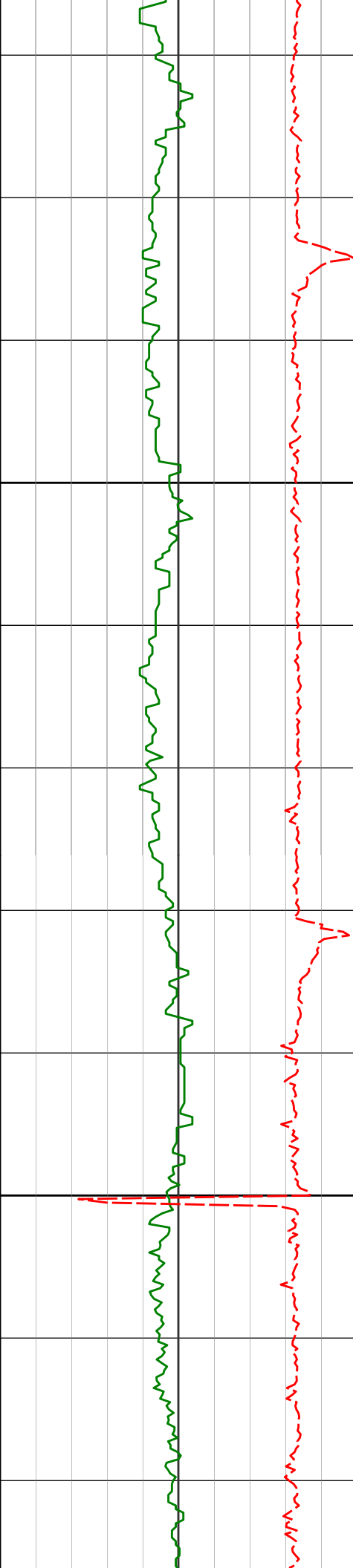
90.52°

87.54° 6670.60'

1443.47'

PGXC

ROPA



8100

8094'

91.29°

87.30° 6669.10'

1536.38'

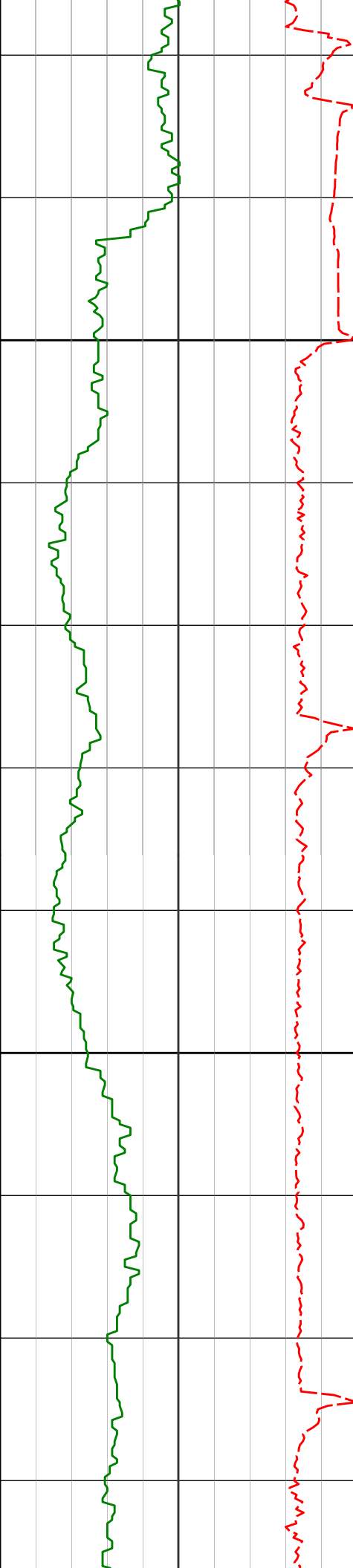
8200

8189'

89.20°

86.74° 6668.69'

1629.15'



8284'

91.72°

86.43° 6667.93'

1721.77'

8300

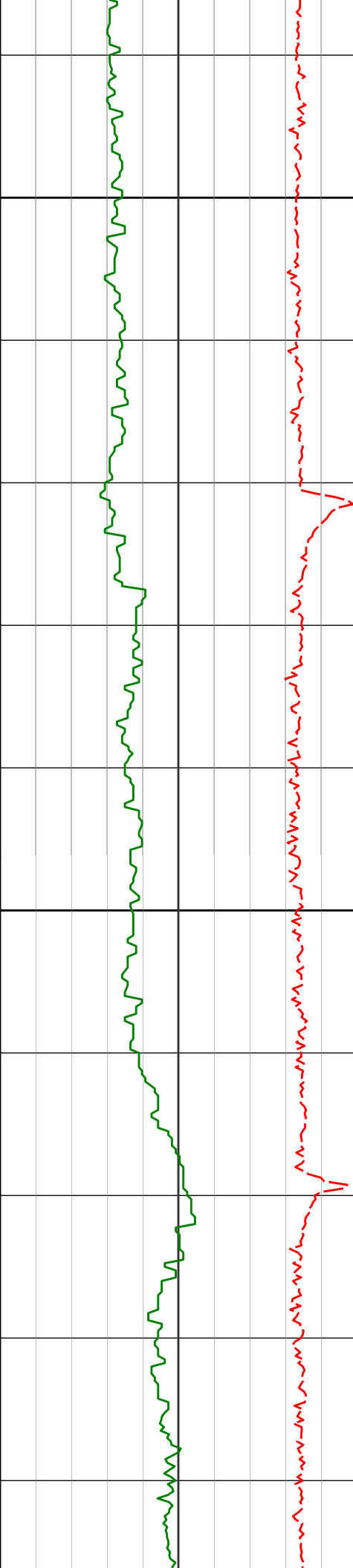
8379'

92.80°

86.44° 6664.18'

1814.26'

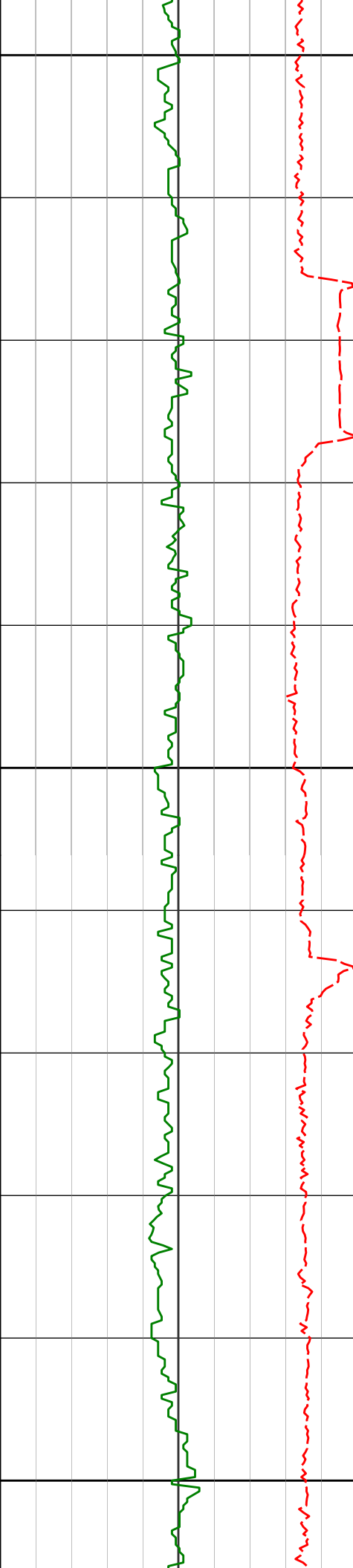
8400



8500

8600

8474'	93.23°	86.66°	6659.19'	1906.74'
8569'	93.21°	87.13°	6653.85'	1999.33'
8664'	93.79°	87.31°	6648.05'	2092.01'



8700

8800

8900

8759'

90.06°

87.88° 6644.86'

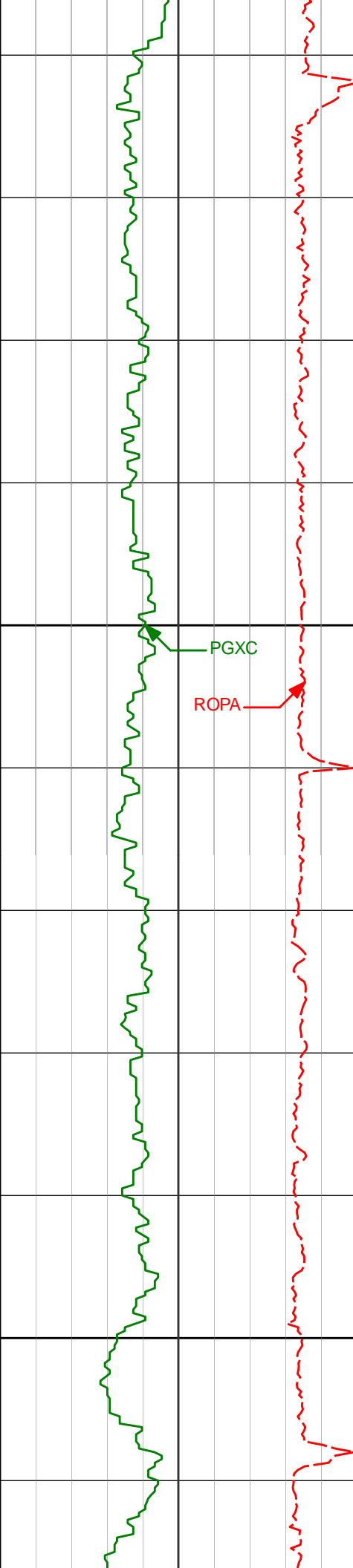
2184.92'

8854'

90.46°

88.25° 6644.43'

2278.05'



9000

8949'

90.18°

88.17° 6643.90'

2371.24'

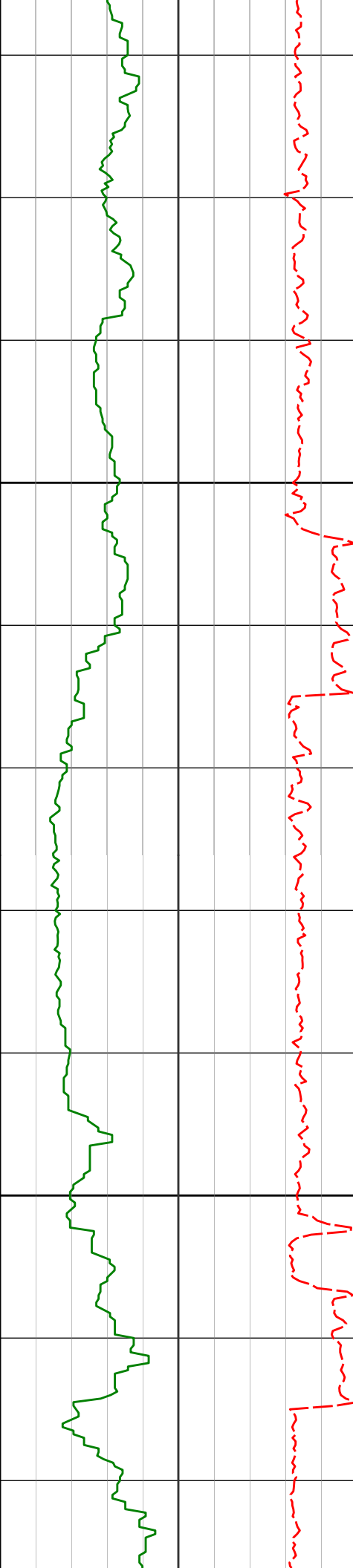
9044'

89.57°

88.12° 6644.11'

2464.40'

9100



9200

9300

9139'

89.17°

88.54° 6645.15'

2557.62'

9234'

89.72°

88.82° 6646.07'

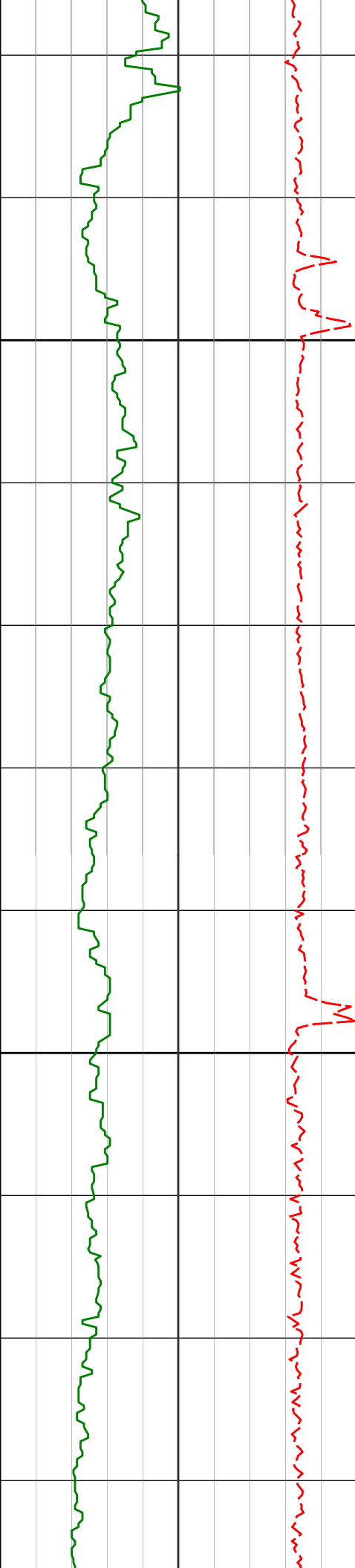
2650.95'

9329'

92.74°

89.05° 6644.03'

2744.32'



9400

9425'

92.28°

89.03° 6639.83'

2838.66'

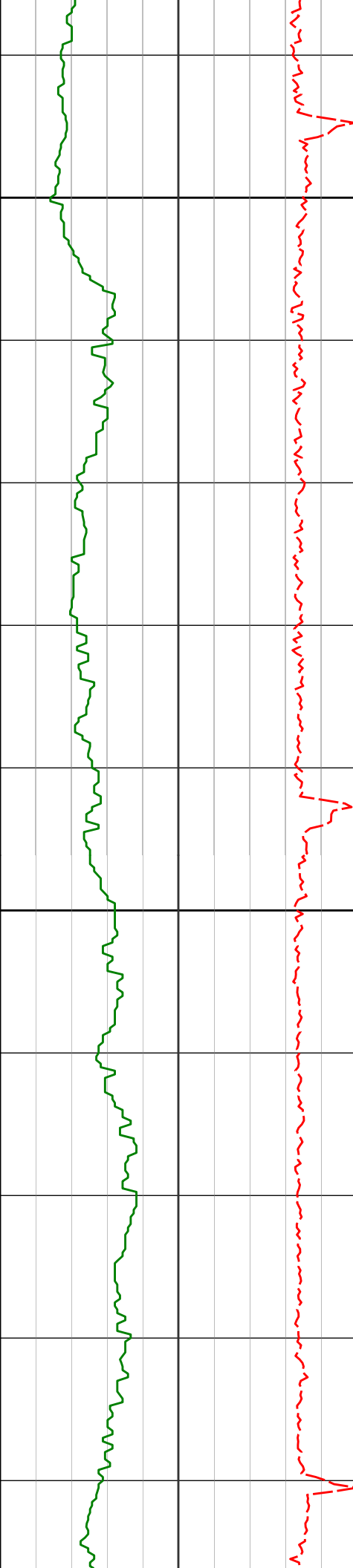
9500

9520'

92.06°

88.79° 6636.23'

2931.99'



9600

9615'

91.60°

88.87° 6633.20'

3025.33'

9700

9709'

91.39°

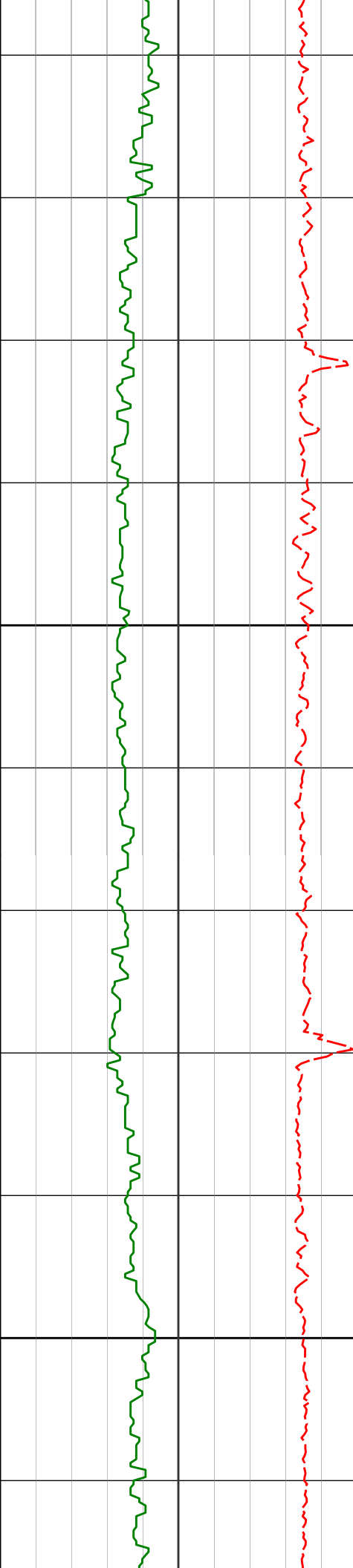
88.94° 6630.75'

3117.71'

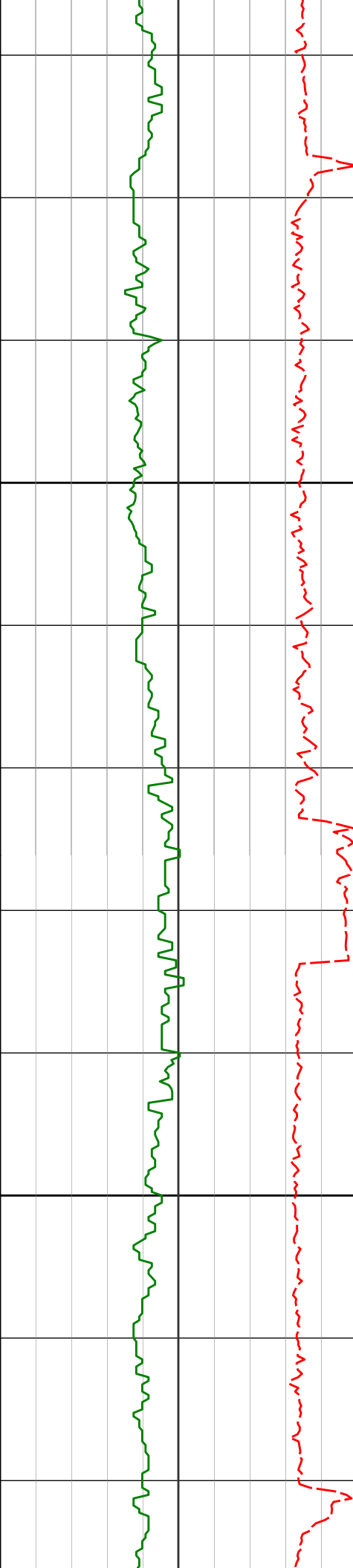


3398.00'

ROPA



10089'	89.82°	89.01°	6626.68'	3491.44'
10100				
10184'	89.82°	88.99°	6626.98'	3584.87'
10200				



10300

10400

10279'

89.85°

88.92° 6627.26'

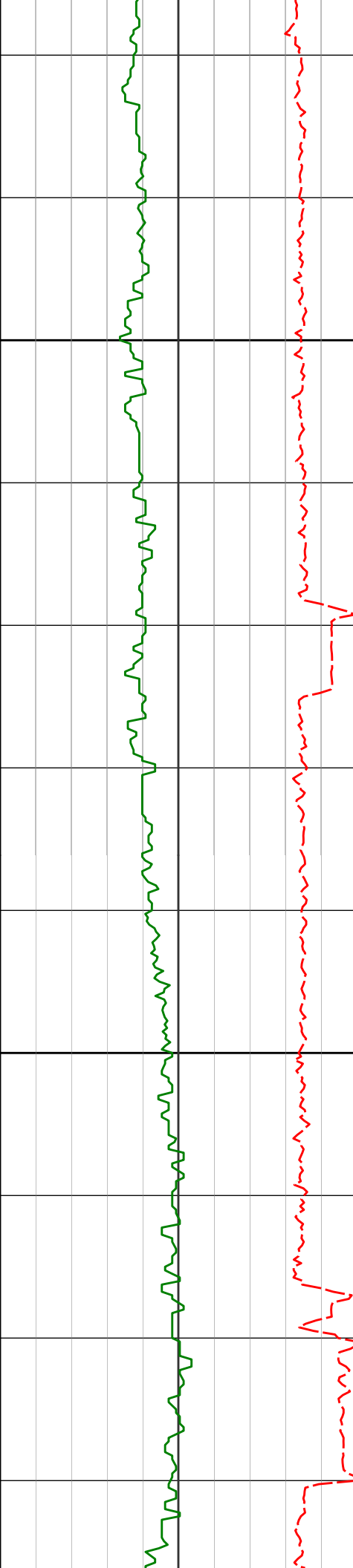
3678.29'

10373'

91.32°

87.63° 6626.30'

3770.50'



10500

10564'

90.03°

87.29° 6624.05'

3957.33'

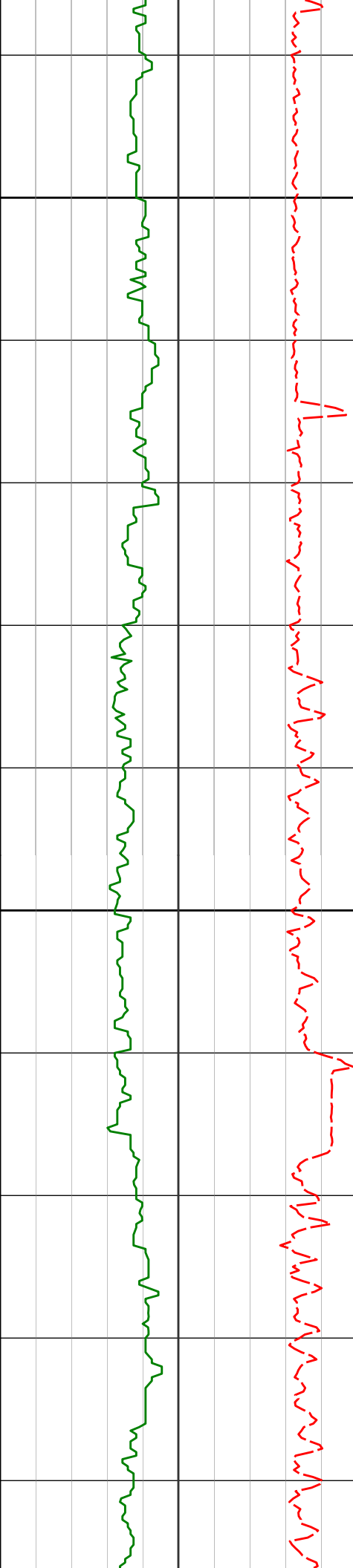
10600

10659'

92.13°

87.34° 6622.26'

4050.20'



10700

10754'

92.49°

87.04° 6618.43'

4142.96'

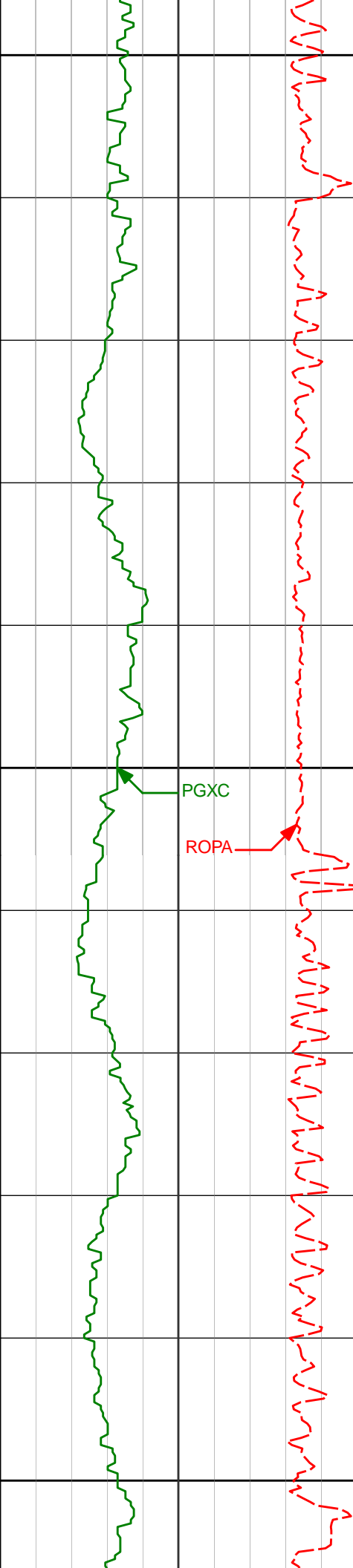
10800

10848'

92.31°

86.95° 6614.49'

4234.67'



10900

10943'

92.03°

86.89° 6610.89'

4327.35'

11000

PGXC

ROPA

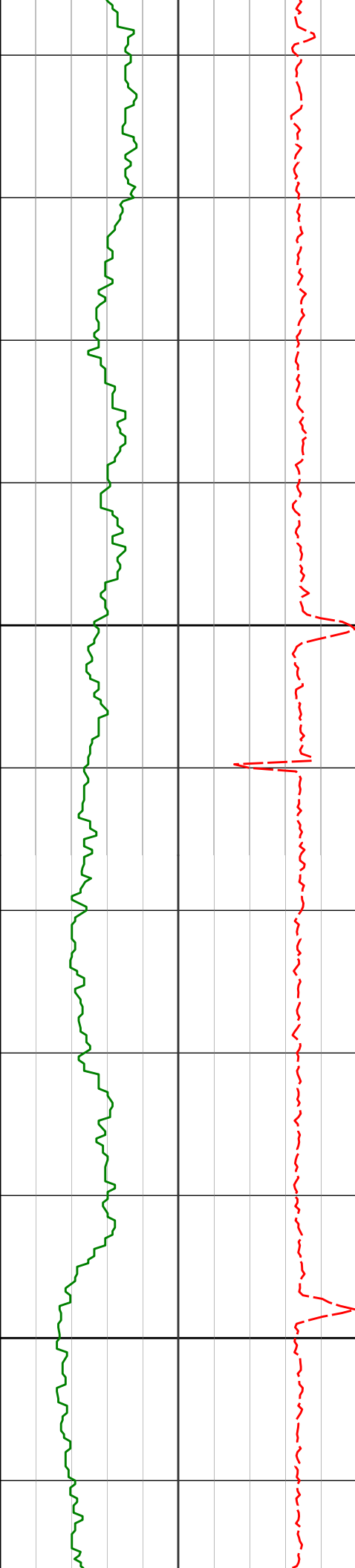
11038'

92.13°

86.87° 6607.44'

4420.02'

11100



11200

11300

11133'

92.37°

86.77° 6603.71'

4512.66'

11228'

91.79°

86.66° 6600.27'

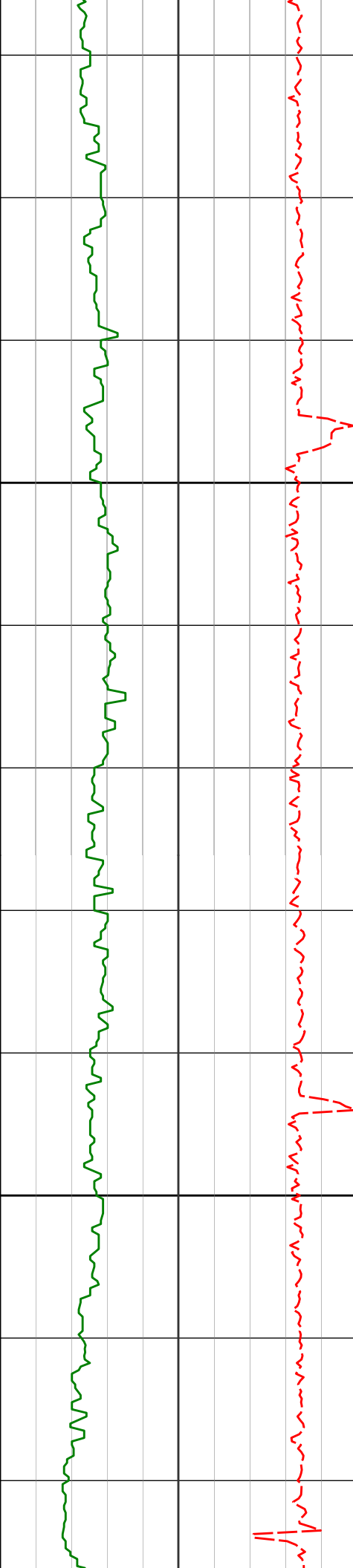
4605.27'

11323'

91.73°

86.53° 6597.35'

4697.85'



11400

11418'

90.31°

86.00° 6595.66'

4790.34'

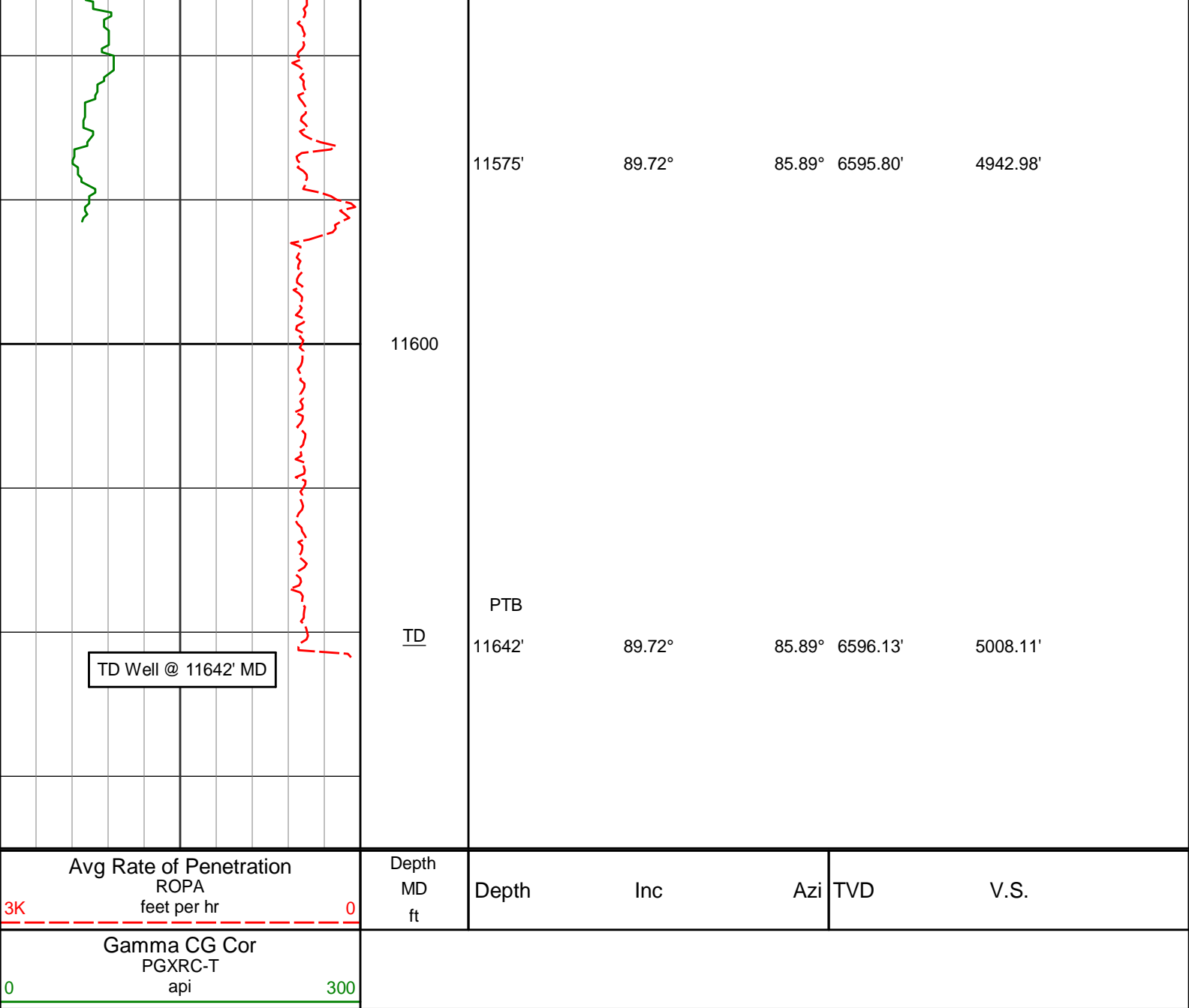
11500

11513'

89.82°

85.84° 6595.55'

4882.71'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Engery
Aggie State AA17-643
Wattenburg
Weld Colorado
USA

CA-XX-0902179661

First two surveys were provided by HP.

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
377.00	0.20	23.30	377.00	0.60 N	0.26 E	0.16	0.05
655.00	0.90	223.80	654.99	0.53 S	1.06 W	-0.96	0.39
1018.00	0.40	228.69	1017.97	3.42 S	3.98 W	-3.37	0.14
1206.00	0.61	279.33	1205.96	3.69 S	5.46 W	-4.79	0.25
1298.00	0.61	311.18	1297.95	3.29 S	6.32 W	-5.69	0.36
1577.00	0.62	308.66	1576.94	1.37 S	8.61 W	-8.27	0.01
1669.00	0.62	331.24	1668.93	0.62 S	9.24 W	-9.01	0.26

1763.00	0.56	329.69	1762.93	0.22 N	9.72 W	-9.62	0.07
1855.00	0.54	352.94	1854.92	1.04 N	10.00 W	-10.03	0.24
1948.00	1.71	202.23	1947.91	0.19 N	10.58 W	-10.46	2.36
2040.00	3.32	212.86	2039.82	3.32 S	12.54 W	-11.83	1.81
2133.00	6.28	197.86	2132.49	10.42 S	15.56 W	-13.65	3.43
2225.00	7.88	188.41	2223.79	21.45 S	18.03 W	-14.27	2.15
2318.00	10.35	185.51	2315.61	36.08 S	19.76 W	-13.59	2.70
2410.00	9.74	184.16	2406.19	52.07 S	21.12 W	-12.31	0.71
2502.00	11.18	179.34	2496.67	68.75 S	21.58 W	-10.03	1.83
2594.00	11.71	187.83	2586.84	86.92 S	22.75 W	-8.21	1.92
2687.00	12.77	192.77	2677.73	106.29 S	26.31 W	-8.54	1.60
2781.00	11.95	192.82	2769.55	125.91 S	30.77 W	-9.72	0.87
2874.00	12.03	193.12	2860.52	144.74 S	35.10 W	-10.91	0.11
2969.00	11.03	194.00	2953.60	163.20 S	39.55 W	-12.28	1.07
3064.00	11.01	200.25	3046.85	180.53 S	44.89 W	-14.70	1.26
3159.00	10.61	192.12	3140.17	197.59 S	49.86 W	-16.82	1.66
3254.00	9.17	194.70	3233.76	213.46 S	53.62 W	-17.92	1.59
3349.00	8.83	206.35	3327.60	227.32 S	58.78 W	-20.74	1.95
3444.00	9.84	200.63	3421.34	241.45 S	64.88 W	-24.44	1.44
3539.00	9.36	205.43	3515.01	256.03 S	71.05 W	-28.14	0.98
3634.00	11.08	213.09	3608.51	270.65 S	79.36 W	-33.94	2.30
3729.00	14.65	210.70	3701.11	288.64 S	90.48 W	-41.96	3.80
3824.00	15.48	209.17	3792.84	310.04 S	102.79 W	-50.60	0.97
3919.00	13.88	204.95	3884.74	331.44 S	113.78 W	-57.93	2.02
4015.00	12.73	205.63	3978.16	351.42 S	123.21 W	-63.97	1.21
4109.00	11.69	206.14	4070.03	369.31 S	131.88 W	-69.59	1.11
4204.00	9.93	200.64	4163.35	385.61 S	139.01 W	-73.95	2.15
4299.00	7.28	201.37	4257.27	398.89 S	144.09 W	-76.79	2.79
4394.00	9.70	204.24	4351.22	411.79 S	149.57 W	-80.08	2.59
4489.00	14.14	215.89	4444.16	428.50 S	159.67 W	-87.30	5.29
4584.00	12.80	213.07	4536.55	446.72 S	172.21 W	-96.70	1.57
4678.00	9.51	208.92	4628.76	462.25 S	181.65 W	-103.46	3.60
4774.00	9.78	195.71	4723.42	477.04 S	187.70 W	-107.00	2.32
4868.00	10.45	200.12	4815.96	492.73 S	192.79 W	-109.46	1.09
4964.00	10.00	196.24	4910.43	508.91 S	198.12 W	-112.06	0.86
5058.00	11.88	187.14	5002.73	526.35 S	201.60 W	-112.64	2.71
5153.00	13.43	187.37	5095.42	546.99 S	204.23 W	-111.85	1.63
5248.00	12.18	187.22	5188.05	567.88 S	206.91 W	-111.07	1.32
5344.00	9.88	183.58	5282.27	586.15 S	208.70 W	-109.84	2.50
5439.00	11.43	182.79	5375.63	603.68 S	209.66 W	-107.92	1.64
5534.00	12.03	181.86	5468.65	622.98 S	210.44 W	-105.53	0.66
5629.00	10.38	182.71	5561.83	641.43 S	211.17 W	-103.22	1.75
5724.00	9.54	187.98	5655.40	657.77 S	212.67 W	-102.02	1.30
5819.00	10.54	195.00	5748.95	673.96 S	216.01 W	-102.67	1.66
5914.00	16.12	187.23	5841.36	695.46 S	219.92 W	-103.00	6.16
6009.00	27.24	184.55	5929.50	730.32 S	223.32 W	-100.64	11.75
6104.00	25.66	168.73	6014.66	772.22 S	221.02 W	-91.51	7.58
6199.00	24.97	149.88	6100.68	809.80 S	206.91 W	-71.44	8.48
6294.00	26.27	137.64	6186.40	842.71 S	182.67 W	-42.13	5.73
6389.00	27.07	125.03	6271.36	870.67 S	150.77 W	-6.08	6.01
6484.00	38.44	109.59	6351.26	893.09 S	105.02 W	42.72	14.77
6579.00	42.78	103.63	6423.39	910.61 S	45.80 W	104.02	6.12
6674.00	50.85	100.62	6488.36	925.03 S	21.88 E	173.14	8.80
6769.00	59.15	97.75	6542.81	937.34 S	98.64 E	250.88	9.08
6864.00	67.96	94.58	6585.08	946.37 S	183.12 E	335.70	9.74
6959.00	74.56	93.70	6615.59	952.85 S	272.79 E	425.23	7.00
7050.00	78.04	93.37	6637.14	958.30 S	361.02 E	513.15	3.84
7156.00	84.32	89.08	6653.39	960.50 S	465.67 E	616.75	7.15
7248.00	84.78	90.03	6662.13	959.79 S	557.25 E	706.97	1.14
7340.00	86.36	90.23	6669.23	960.00 S	648.97 E	797.49	1.73
7433.00	87.72	88.25	6674.04	958.77 S	741.83 E	888.89	2.58
7526.00	91.85	87.68	6674.39	955.47 S	834.75 E	980.02	4.48
7619.00	92.90	87.78	6670.53	951.79 S	927.60 E	1071.01	1.13
7714.00	91.94	88.86	6666.52	949.00 S	1022.47 E	1164.14	1.52
7809.00	88.34	87.95	6666.29	946.36 S	1117.42 E	1257.37	3.91
7904.00	87.97	88.06	6669.35	943.06 S	1212.31 E	1350.44	0.41
7999.00	90.52	87.54	6670.60	939.41 S	1307.22 E	1443.47	2.74
8094.00	91.29	87.30	6669.10	935.13 S	1402.11 E	1536.38	0.85
8189.00	89.20	86.74	6668.69	930.19 S	1496.98 E	1629.15	2.28
8284.00	91.72	86.43	6667.93	924.54 S	1591.80 E	1721.77	2.67
8379.00	92.80	86.44	6664.18	918.63 S	1686.54 E	1814.26	1.14
8474.00	93.23	86.66	6659.19	912.92 S	1781.24 E	1906.74	0.51
8569.00	93.21	87.13	6653.85	907.79 S	1875.95 E	1999.33	0.49
8664.00	93.79	87.31	6648.05	903.19 S	1970.66 E	2092.01	0.64

8759.00	90.06	87.88	6644.86	899.20 S	2065.50 E	2184.92	3.97
8854.00	90.46	88.25	6644.43	896.00 S	2160.45 E	2278.05	0.57
8949.00	90.18	88.17	6643.90	893.03 S	2255.40 E	2371.24	0.31
9044.00	89.57	88.12	6644.11	889.95 S	2350.35 E	2464.40	0.64
9139.00	89.17	88.54	6645.15	887.19 S	2445.30 E	2557.62	0.61
9234.00	89.72	88.82	6646.07	885.00 S	2540.27 E	2650.95	0.65
9329.00	92.74	89.05	6644.03	883.23 S	2635.22 E	2744.32	3.19
9425.00	92.28	89.03	6639.83	881.63 S	2731.12 E	2838.66	0.48
9520.00	92.06	88.79	6636.23	879.82 S	2826.03 E	2931.99	0.34
9615.00	91.60	88.87	6633.20	877.88 S	2920.96 E	3025.33	0.49
9709.00	91.39	88.94	6630.75	876.09 S	3014.91 E	3117.71	0.24
9804.00	90.80	89.03	6628.93	874.40 S	3109.88 E	3211.12	0.63
9994.00	90.43	89.07	6626.89	871.25 S	3299.84 E	3398.00	0.20
10089.00	89.82	89.01	6626.68	869.66 S	3394.83 E	3491.44	0.65
10184.00	89.82	88.99	6626.98	868.00 S	3489.82 E	3584.87	0.02
10279.00	89.85	88.92	6627.26	866.27 S	3584.80 E	3678.29	0.08
10373.00	91.32	87.63	6626.30	863.44 S	3678.75 E	3770.50	2.08
10564.00	90.03	87.29	6624.05	854.98 S	3869.54 E	3957.33	0.70
10659.00	92.13	87.34	6622.26	850.53 S	3964.42 E	4050.20	2.21
10754.00	92.49	87.04	6618.43	845.87 S	4059.22 E	4142.96	0.49
10848.00	92.31	86.95	6614.49	840.95 S	4153.01 E	4234.67	0.21
10943.00	92.03	86.89	6610.89	835.85 S	4247.81 E	4327.35	0.30
11038.00	92.13	86.87	6607.44	830.68 S	4342.60 E	4420.02	0.11
11133.00	92.37	86.77	6603.71	825.42 S	4437.38 E	4512.66	0.27
11228.00	91.79	86.66	6600.27	819.98 S	4532.17 E	4605.27	0.62
11323.00	91.73	86.53	6597.35	814.34 S	4626.95 E	4697.85	0.15
11418.00	90.31	86.00	6595.66	808.15 S	4721.73 E	4790.34	1.60
11513.00	89.82	85.84	6595.55	801.39 S	4816.49 E	4882.71	0.54
11575.00	89.72	85.89	6595.80	796.92 S	4878.33 E	4942.98	0.18
11642.00	89.72	85.89	6596.13	792.12 S	4945.16 E	5008.11	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 99.43 DEGREES (GRID)
A TOTAL CORRECTION OF 7.42 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11642.00 FEET
IS 5008.20 FEET ALONG 99.10 DEGREES (GRID)**

Final survey is a straight line projection to TD.