

PCG Pressure Case Gamma Ray
PCD Pressure Case Directional

| | | | | | | |
|---|--|-------------|---------------------|----------------------------|-----------|---------|
| Country : USA | | | | | | |
| Field : Wildcat | | | | | | |
| Location : | Lat: 40° 37' 36.44" North | | | | | |
| | Long: 104° 28' 8.44" West | | | | | |
| Well : Bethyl GW30-16 | | | | | | |
| Company : Noble Energy | | | | | | |
| Rig : PD 829 | | | | | | |
| LOCATION | Company : Noble Energy Rig : PD 829 Well : Bethyl GW30-16 Field : Wildcat Country : USA API Number : 05-123-35855 | | | | | |
| | | | | | | |
| Latitude : 40° 37' 36.44" North | | | | Other Services | | |
| Longitude : 104° 28' 8.44" West | | | | | | |
| UTM Easting = 3,286,174.339 ft | | | | | | |
| UTM Northing = 1,472,845.189 ft | | | | | | |
| Permanent Datum : Ground Level | | | | Elev. KB N/A | | |
| Log Measured From : Drill Floor | | | | DF 4954.00 ft | | |
| Drilling Measured From : Drill Floor | | | | GL 4938.00 ft | | |
| TVD LOG | | | | WD N/A | | |
| Depth Logged : 873.99 ft To 9,108.29 ft | | | | Unit No. : 11703725 | | |
| Date Logged : 21-Aug-13 To 27-Aug-13 | | | | Job No. : CA-XX-0900671434 | | |
| Total Depth MD : 9,150.00 ft | | | | Plot Type : Final | | |
| Spud Date : 20-Aug-13 | | | | Plot Date : 28-Aug-13 | | |
| Run No. | | | | Borehole Record (TVD) | | Run No. |
| | | | | Size | To | |
| 02 | | | | 8.750 in | 873.99 ft | Size |
| | 8.750 in | 7,676.30 ft | | | | |
| 03 | 8.750 in | 7,676.30 ft | Casing Record (TVD) | | | |
| | | 9,108.29 ft | | | | |
| | | | Size | | | |
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| | | | Weight | | | |
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|-------------------------------|------------------|------------------|--|--|--|
| Max Tool Temp (degF) / Source | 151.50 / PCM | 189.99 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ 151.50 | NA @ 189.99 | | | |
| Lead MWD Engineer | Scott Trowbridge | Scott Trowbridge | | | |
| Customer Representative | Kevin Campbell | Kevin Campbell | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.84 | 5.84 | | | |
| Sub Serial Number | 11633608 | 11633608 | | | |
| Insert Serial Number | 10744813 | 11620268 | | | |
| Date and Time Initialized | 21-Aug-13 14:03 | 24-Aug-13 12:43 | | | |
| Date and Time Read | 24-Aug-13 16:27 | 28-Aug-13 08:50 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 79.00 | 79.00 | | | |
| Software Version | 6.21 | 6.21 | | | |
| Sub Serial Number | 11633608 | 11633608 | | | |
| Sonde Serial Number | 11478007 | 11478177 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 0 | 0 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 82.04 | 82.04 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11633608 | 11633608 | | | |
| Insert/Sonde Serial Number | 11681026 | 11681038 | | | |

REMARKS

1. All depths are true vertical bit depths, referenced to the Drillers Driller's pipe tally and are measured from the Drill Floor, 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" for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.

4. All data is stored data unless otherwise specified.

5. The following smoothing parameters have been applied to the data:

PCG GR XHI-Range (Gamma Ray Cor)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

ROPA (Average Rate of Penetration)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: .3

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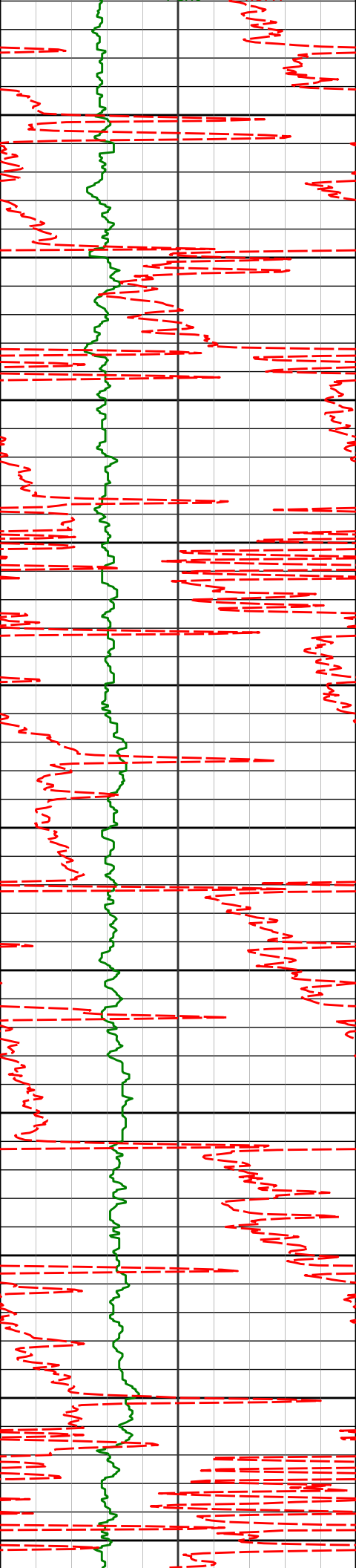
HALLIBURTON

Sperry Drilling Services

TVD Detail Log 1:600

Noble Energy
Bethyl GW30-16
PD 829
Sec 30-T8N-R63W

| | | | | | | | |
|--|--|-------------|--------------------------------|-------------|-------------|------------|-------------|
| Avg Rate of Penetration feet per hr | | | | | | | |
| 500 | | 0 | | | | | |
| PCG GR XHi-Range RT BCor api | | | | | | | |
| 0 | | 300 | | | | | |
| | | Depth ft | <i>Depth</i> | <i>Inc.</i> | <i>Azi.</i> | <i>TVD</i> | <i>V.S.</i> |
| | | | | | | | |
| | | 850 | | | | | |
| | | | 9 5/8" casing shoe at 864ft MD | | | | |
| | | | 882' | 0.09° | 107.77° | 881.99' | 2.65' |
| | | 900 | | | | | |
| | | 950 | | | | | |
| | | | 972' | 0.13° | 114.56° | 971.99' | 2.54' |
| | | 1000 | | | | | |



1050

1061'

0.14°

89.30°

1060.99'

2.38'

1100

1150

1151'

0.25°

31.00°

1150.99'

2.11'

1200

1250

1241'

0.14°

348.65°

1240.98'

1.92'

1300

1350

1330'

0.11°

245.20°

1329.98'

1.98'

1400

1450

1420'

0.18°

354.04°

1419.98'

2.02'

1500

1550

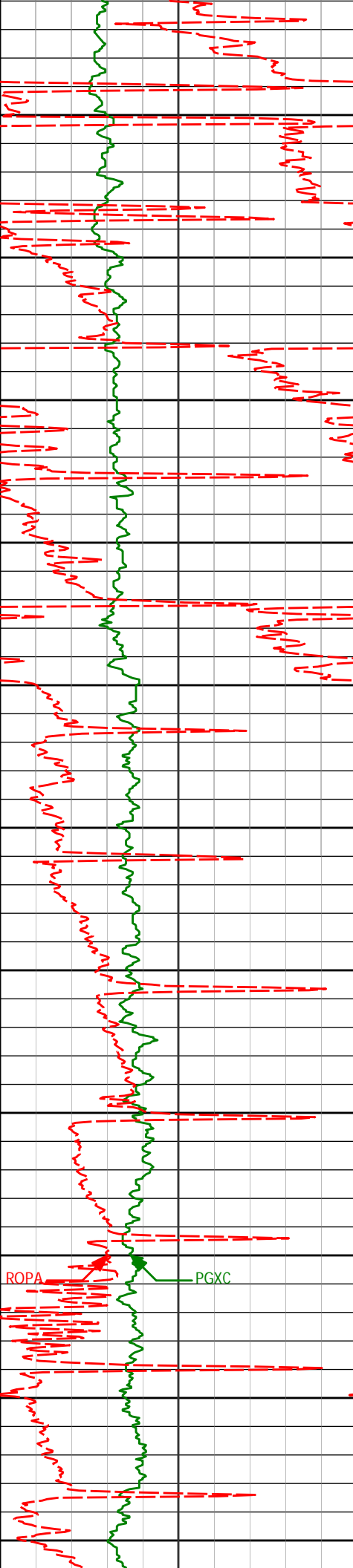
1510'

0.06°

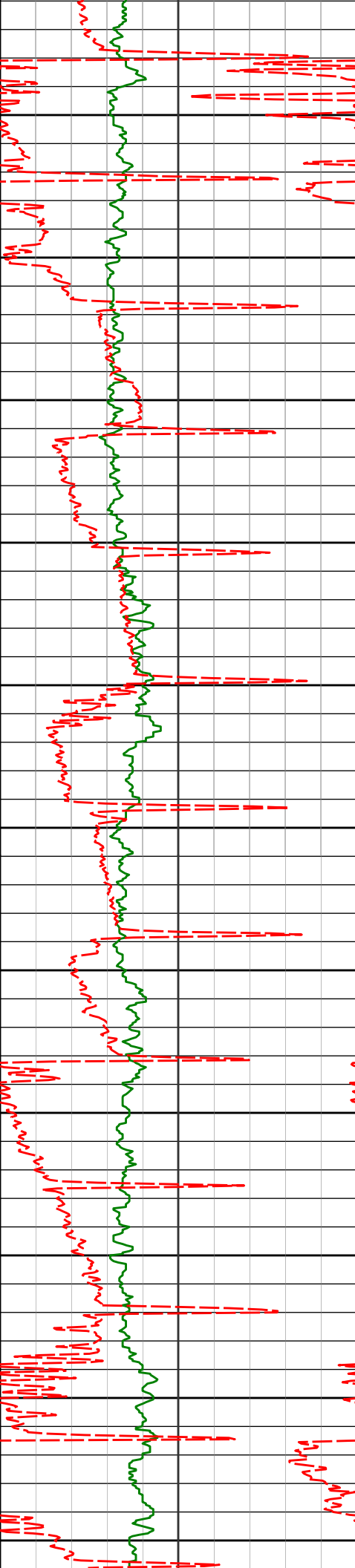
117.73°

1509.98'

1.95'



| | | | | | |
|------|-------|-------|---------|----------|--------|
| 1600 | 1599' | 0.20° | 169.33° | 1598.98' | 1.95' |
| 1650 | | | | | |
| 1700 | 1689' | 0.31° | 205.78° | 1688.98' | 2.18' |
| 1750 | | | | | |
| 1800 | 1779' | 0.91° | 195.09° | 1778.98' | 2.83' |
| 1850 | | | | | |
| 1900 | 1868' | 1.75° | 221.85° | 1867.95' | 4.54' |
| 1950 | | | | | |
| 2000 | 1958' | 3.38° | 242.34° | 1957.86' | 8.45' |
| 2050 | 2048' | 4.64° | 247.50° | 2047.64' | 14.74' |
| 2100 | | | | | |



| | | | | |
|-------|-------|---------|----------|--------|
| 2137' | 5.75° | 245.67° | 2136.27' | 22.79' |
|-------|-------|---------|----------|--------|

2150

2200

| | | | | |
|-------|-------|---------|----------|--------|
| 2227' | 6.96° | 248.62° | 2225.72' | 32.73' |
|-------|-------|---------|----------|--------|

2250

2300

| | | | | |
|-------|-------|---------|----------|--------|
| 2317' | 8.82° | 247.02° | 2314.86' | 45.08' |
|-------|-------|---------|----------|--------|

2350

2400

| | | | | |
|-------|--------|---------|----------|--------|
| 2406' | 11.17° | 245.61° | 2402.51' | 60.52' |
|-------|--------|---------|----------|--------|

2450

2500

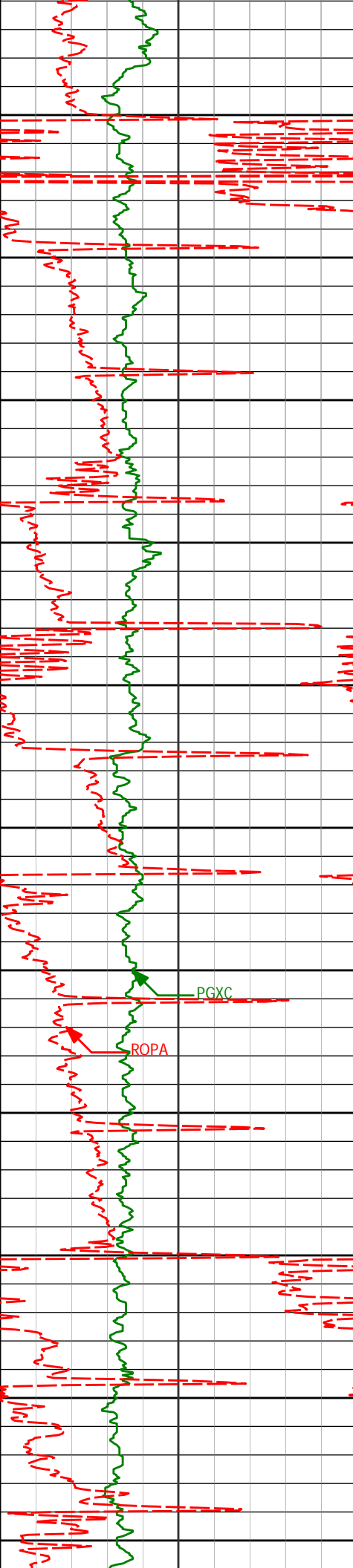
| | | | | |
|-------|--------|---------|----------|--------|
| 2496' | 11.14° | 243.06° | 2490.81' | 77.93' |
|-------|--------|---------|----------|--------|

2550

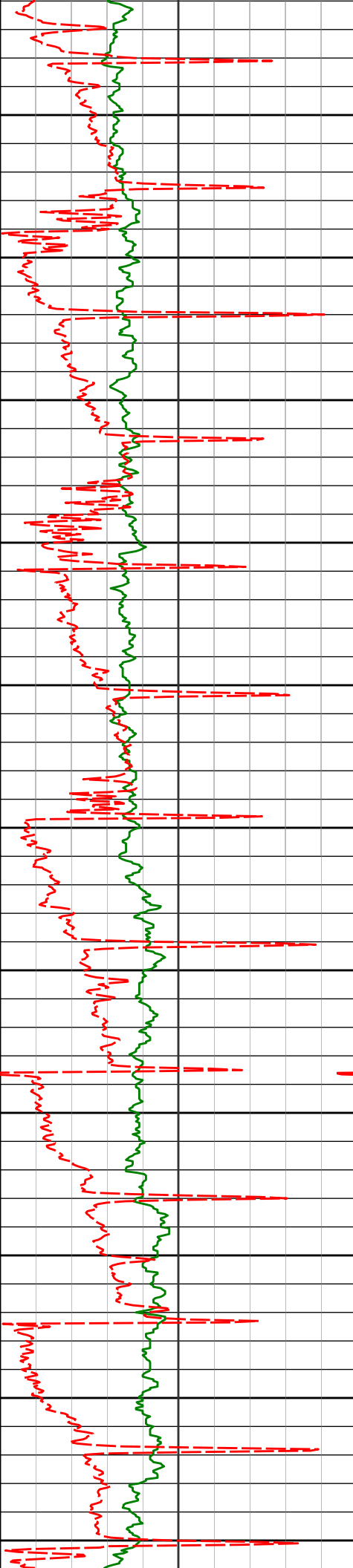
2600

| | | | | |
|-------|--------|---------|----------|--------|
| 2585' | 10.95° | 240.71° | 2578.16' | 94.96' |
|-------|--------|---------|----------|--------|

2650



| | | | | | |
|------|-------|-------|---------|----------|---------|
| | 2675' | 9.56° | 243.35° | 2666.72' | 110.96' |
| 2700 | | | | | |
| 2750 | 2765' | 9.83° | 250.00° | 2755.43' | 126.08' |
| 2800 | | | | | |
| 2850 | 2854' | 9.81° | 258.57° | 2843.14' | 141.01' |
| 2900 | | | | | |
| 2950 | 2944' | 9.82° | 256.55° | 2931.82' | 155.96' |
| 3000 | | | | | |
| 3034 | 3034' | 9.72° | 252.22° | 3020.52' | 171.00' |
| 3050 | | | | | |
| 3100 | 3123' | 9.69° | 250.35° | 3108.24' | 185.90' |
| 3150 | | | | | |
| 3200 | 3213' | 9.77° | 246.74° | 3196.95' | 201.07' |



3250

3303'

10.14°

246.12°

3285.59'

216.62'

3300

3350

3392'

9.69°

240.56°

3373.27'

231.93'

3400

3450

3482'

9.60°

238.92°

3461.99'

246.95'

3500

3550

3571'

9.27°

228.99°

3549.80'

261.22'

3600

3650

3661'

9.40°

223.63°

3638.61'

275.05'

3700

3750

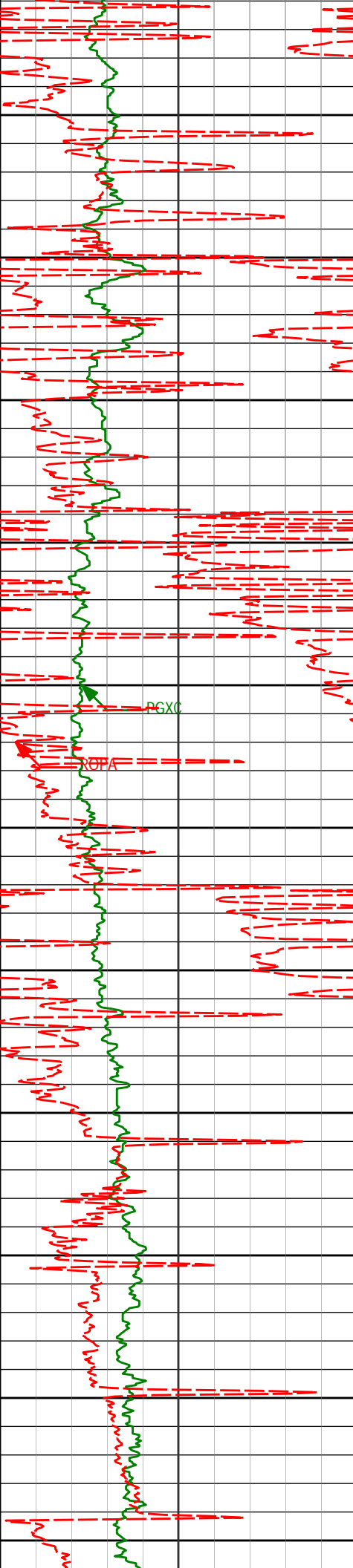
3750'

9.56°

224.82°

3726.39'

288.78'



3800

3840'

9.85°

224.95°

3815.11'

303.04'

3850

3900

3930'

9.34°

225.99°

3903.85'

317.20'

3950

4019'

10.18°

226.70°

3991.56'

331.52'

4000

4050

4109'

10.02°

233.72°

4080.17'

346.76'

4100

4150

4199'

9.94°

238.48°

4168.81'

362.16'

4200

4250

4288'

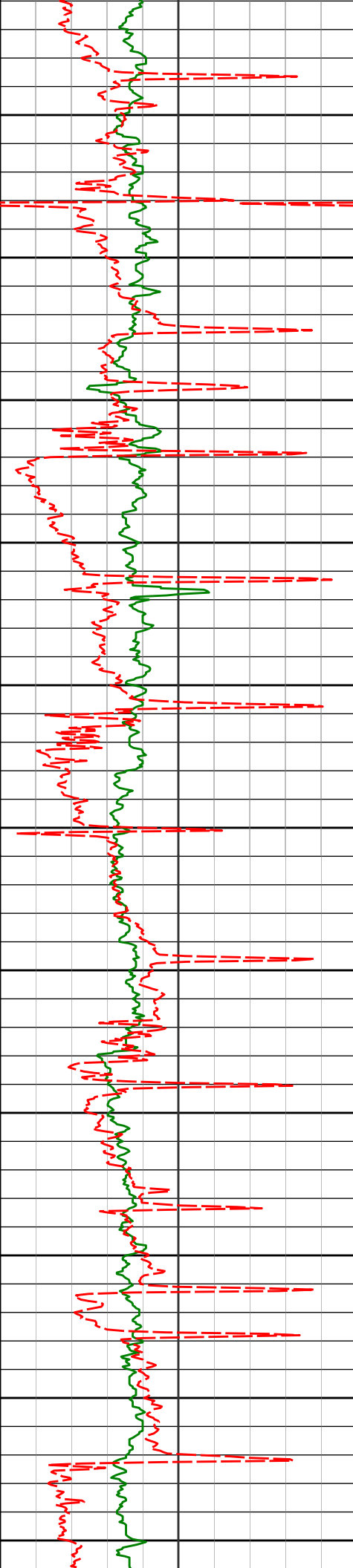
9.68°

241.03°

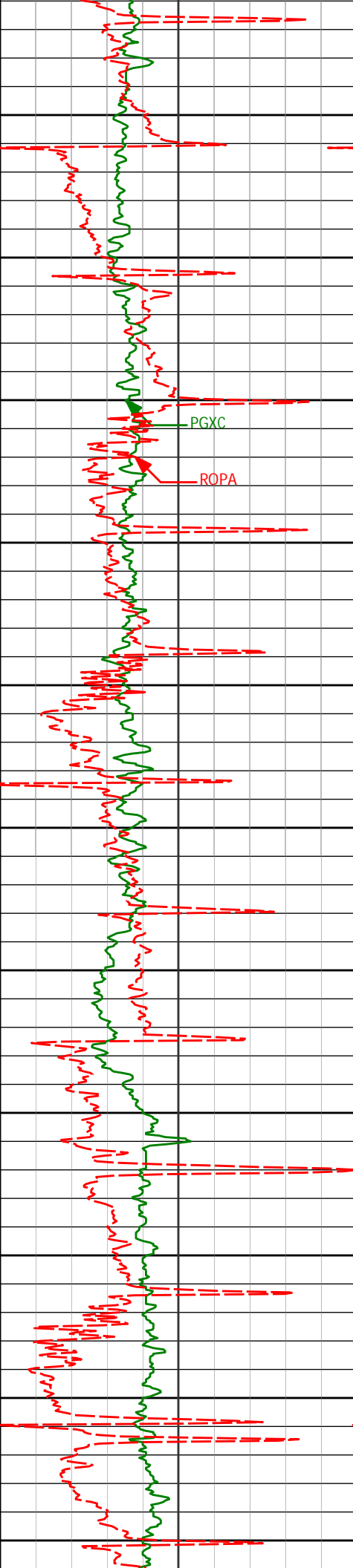
4256.51'

377.26'

4300



| | | | | | |
|------|-------|-------|---------|----------|---------|
| 4350 | 4378' | 9.97° | 241.13° | 4345.19' | 392.59' |
| 4400 | | | | | |
| 4450 | 4468' | 9.61° | 241.92° | 4433.88' | 407.86' |
| 4500 | | | | | |
| 4550 | 4557' | 9.62° | 246.40° | 4521.63' | 422.71' |
| 4600 | 4647' | 9.72° | 247.65° | 4610.35' | 437.81' |
| 4650 | | | | | |
| 4700 | 4736' | 9.71° | 248.74° | 4698.07' | 452.80' |
| 4750 | | | | | |
| 4800 | 4826' | 9.22° | 250.83° | 4786.85' | 467.55' |
| 4850 | | | | | |



4916' 8.03° 255.62° 4875.83' 480.89'

4900

4950

5005' 6.46° 253.23° 4964.12' 491.95'

5000

PGXC

ROPA

5050

5095' 4.74° 256.53° 5053.68' 500.59'

5100

5150

5184' 3.06° 255.41° 5142.48' 506.52'

5200

5250

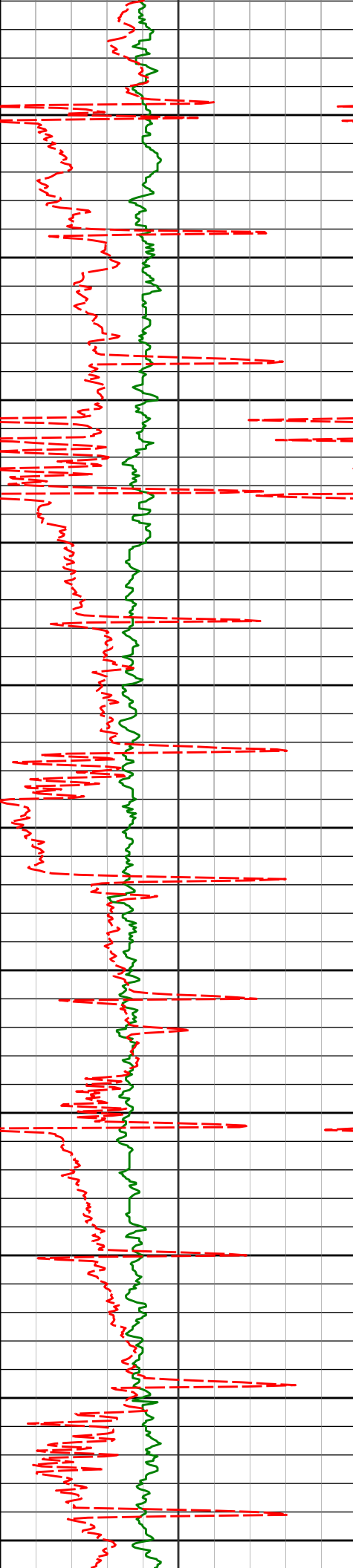
5274' 2.52° 264.22° 5232.37' 510.75'

5300

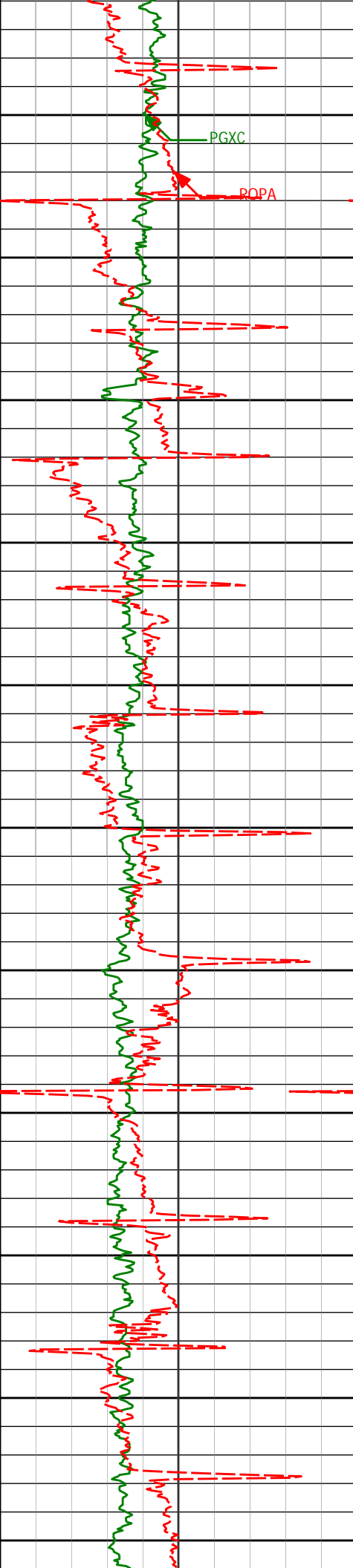
5350

5364' 1.20° 280.12° 5322.32' 513.39'

5400



| | | | | | |
|------|-------|-------|---------|----------|---------|
| | 5453' | 0.20° | 272.62° | 5411.31' | 514.28' |
| 5450 | | | | | |
| 5500 | 5543' | 0.09° | 350.93° | 5501.31' | 514.40' |
| 5550 | | | | | |
| 5600 | 5633' | 0.66° | 223.64° | 5591.31' | 514.86' |
| 5650 | | | | | |
| 5700 | 5722' | 0.30° | 318.85° | 5680.31' | 515.40' |
| 5750 | | | | | |
| 5800 | 5812' | 0.22° | 105.49° | 5770.31' | 515.34' |
| 5850 | 5901' | 0.43° | 0.15° | 5859.31' | 515.07' |
| 5900 | | | | | |
| 5950 | 5991' | 0.11° | 9.94° | 5949.31' | 514.87' |



6000

PGXC

ROPA

6080'

0.07°

355.67°

6038.31'

514.80'

6050

6100

6170'

0.40°

317.18°

6128.30'

514.88'

6150

6200

6260'

0.11°

65.65°

6218.30'

514.89'

6250

6300

6349'

0.17°

202.35°

6307.30'

514.90'

6350

6400

6439'

0.03°

312.69°

6397.30'

515.00'

6450

6528'

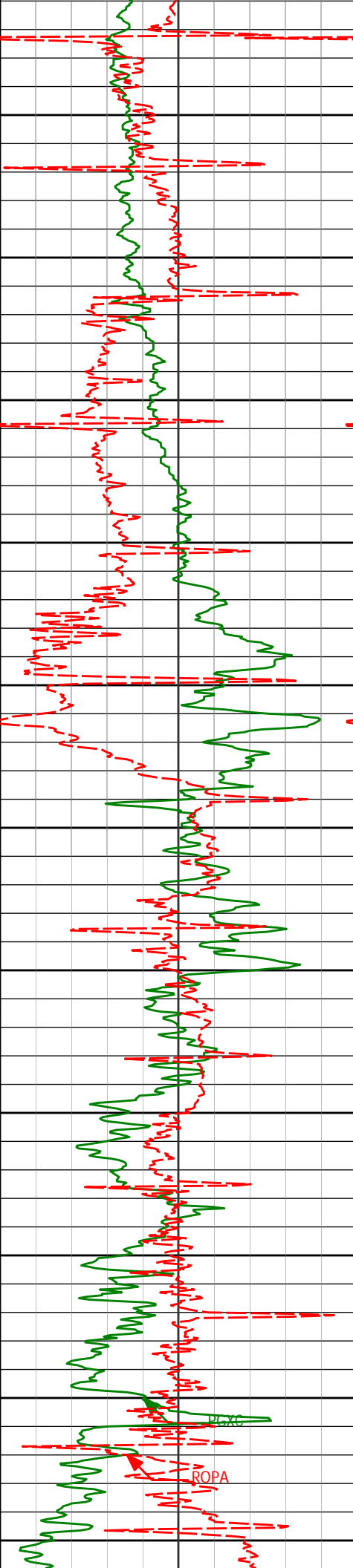
0.16°

182.27°

6486.30'

515.07'

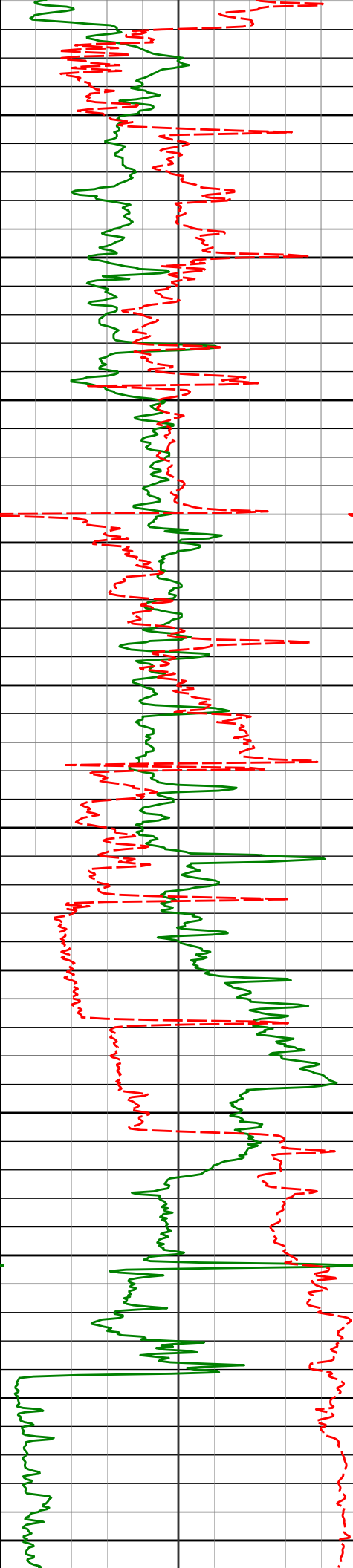
6500



6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050

| | | | | |
|-------|-------|---------|----------|---------|
| 6618' | 0.04° | 39.40° | 6576.30' | 515.09' |
| 6708' | 0.10° | 237.21° | 6666.30' | 515.14' |
| 6797' | 0.20° | 128.09° | 6755.30' | 515.15' |
| 6887' | 0.17° | 83.50° | 6845.30' | 514.95' |
| 6977' | 0.15° | 154.73° | 6935.30' | 514.82' |
| 7066' | 0.13° | 216.43° | 7024.30' | 514.91' |

ROPA



7100

7156'

0.28°

202.20°

7114.30'

515.16'

7150

7200

7246'

0.43°

313.80°

7204.30'

515.44'

7250

7300

7335'

0.18°

301.66°

7293.30'

515.63'

7350

7400

7425'

0.20°

242.49°

7383.30'

515.86'

7450

7500

7515'

0.34°

338.30°

7473.30'

516.00'

7550

7600

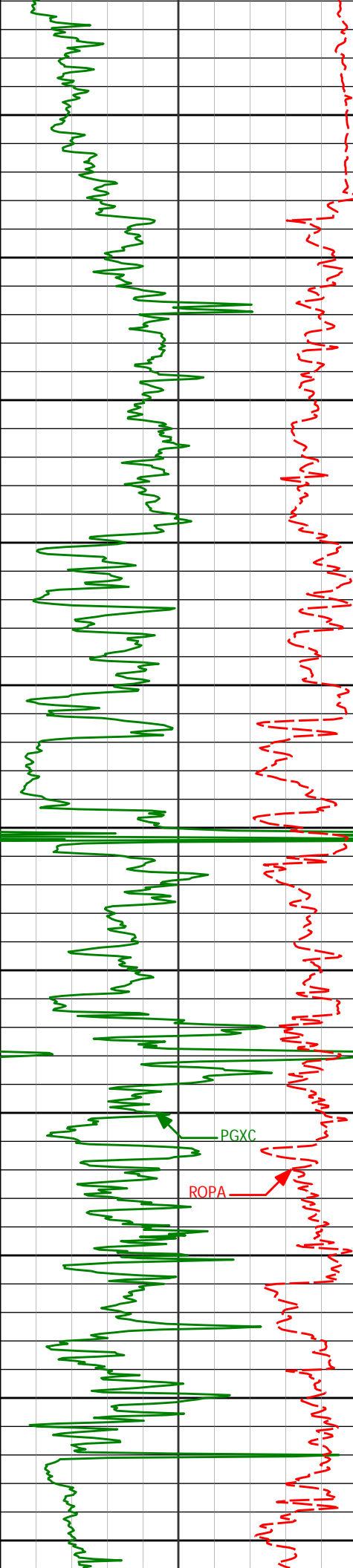
7604'

0.34°

250.89°

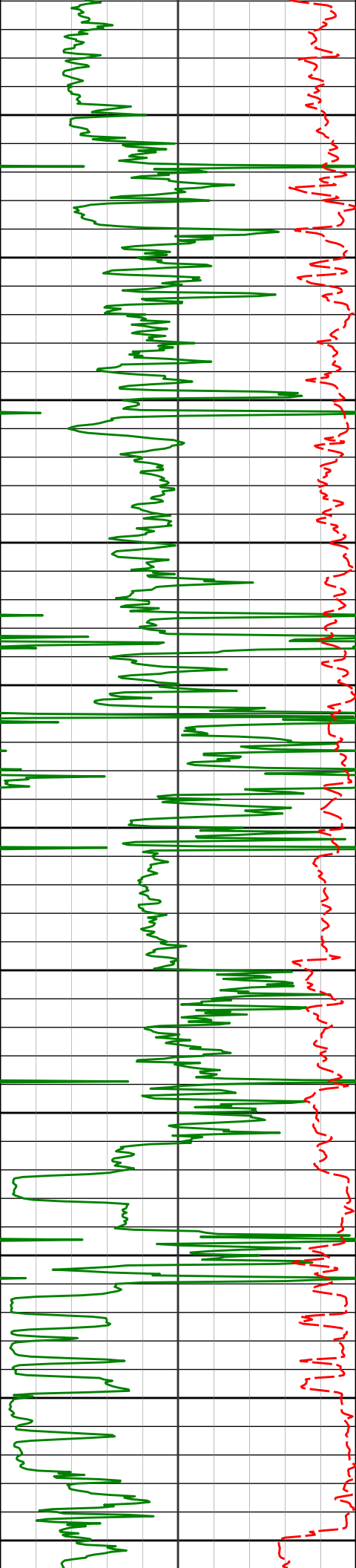
7562.30'

516.25'

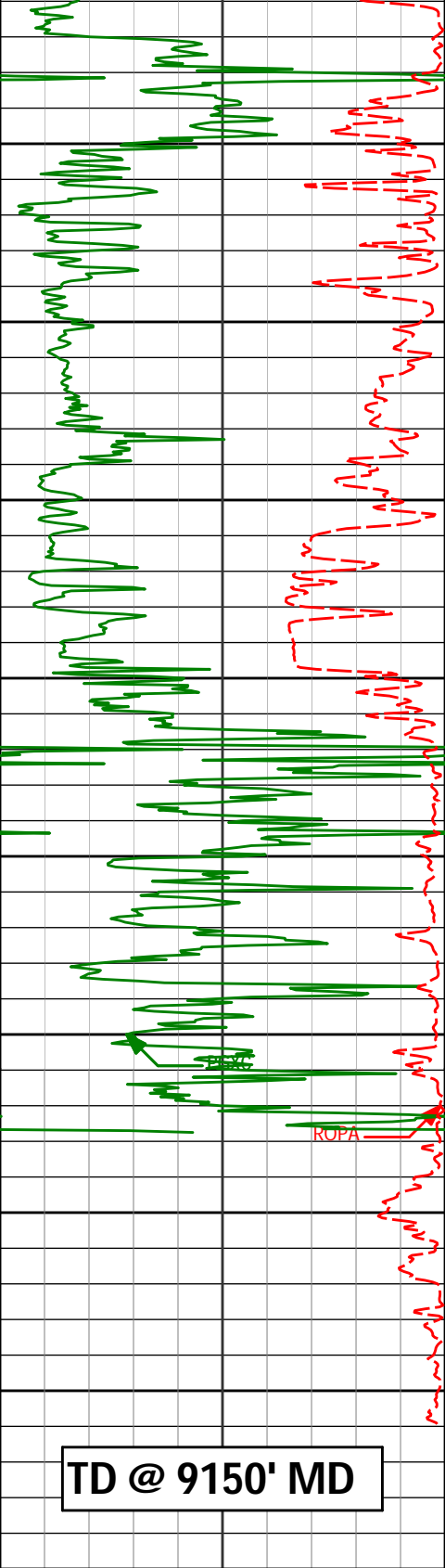


Run 200

| | | | | | |
|------|-------|-------|---------|----------|---------|
| 7650 | 7694' | 0.09° | 39.52° | 7652.30' | 516.45' |
| 7700 | | | | | |
| 7750 | 7784' | 0.15° | 206.11° | 7742.30' | 516.48' |
| 7800 | | | | | |
| 7850 | 7874' | 0.10° | 60.39° | 7832.30' | 516.50' |
| 7900 | | | | | |
| 7950 | 7963' | 0.14° | 65.39° | 7921.30' | 516.32' |
| 8000 | 8053' | 0.06° | 97.99° | 8011.30' | 516.17' |
| 8050 | | | | | |
| 8100 | 8143' | 0.10° | 265.13° | 8101.30' | 516.20' |
| 8150 | | | | | |



| | | | | | |
|------|-------|-------|---------|----------|---------|
| 8200 | 8232' | 0.13° | 160.32° | 8190.30' | 516.28' |
| 8250 | | | | | |
| 8300 | 8322' | 0.20° | 290.85° | 8280.30' | 516.40' |
| 8350 | | | | | |
| 8400 | 8412' | 0.16° | 77.32° | 8370.30' | 516.39' |
| 8450 | | | | | |
| 8500 | 8501' | 0.10° | 164.57° | 8459.30' | 516.28' |
| 8550 | 8591' | 0.09° | 161.20° | 8549.30' | 516.30' |
| 8600 | | | | | |
| 8650 | 8681' | 0.07° | 55.57° | 8639.30' | 516.26' |
| 8700 | | | | | |



| | | | | |
|-------|-------|---------|----------|---------|
| 8770' | 0.10° | 228.97° | 8728.30' | 516.28' |
| 8750 | | | | |
| 8800 | | | | |
| 8860' | 0.22° | 22.29° | 8818.29' | 516.22' |
| 8850 | | | | |
| 8900 | | | | |
| 8950' | 0.07° | 259.51° | 8908.29' | 516.15' |
| 8950 | | | | |
| 9000 | | | | |
| 9039' | 0.06° | 109.94° | 8997.29' | 516.16' |
| 9071' | 0.09° | 176.49° | 9029.29' | 516.16' |
| 9050 | | | | |
| 9100 | | | | |
| 9150' | 0.09° | 176.49° | 9108.29' | 516.21' |

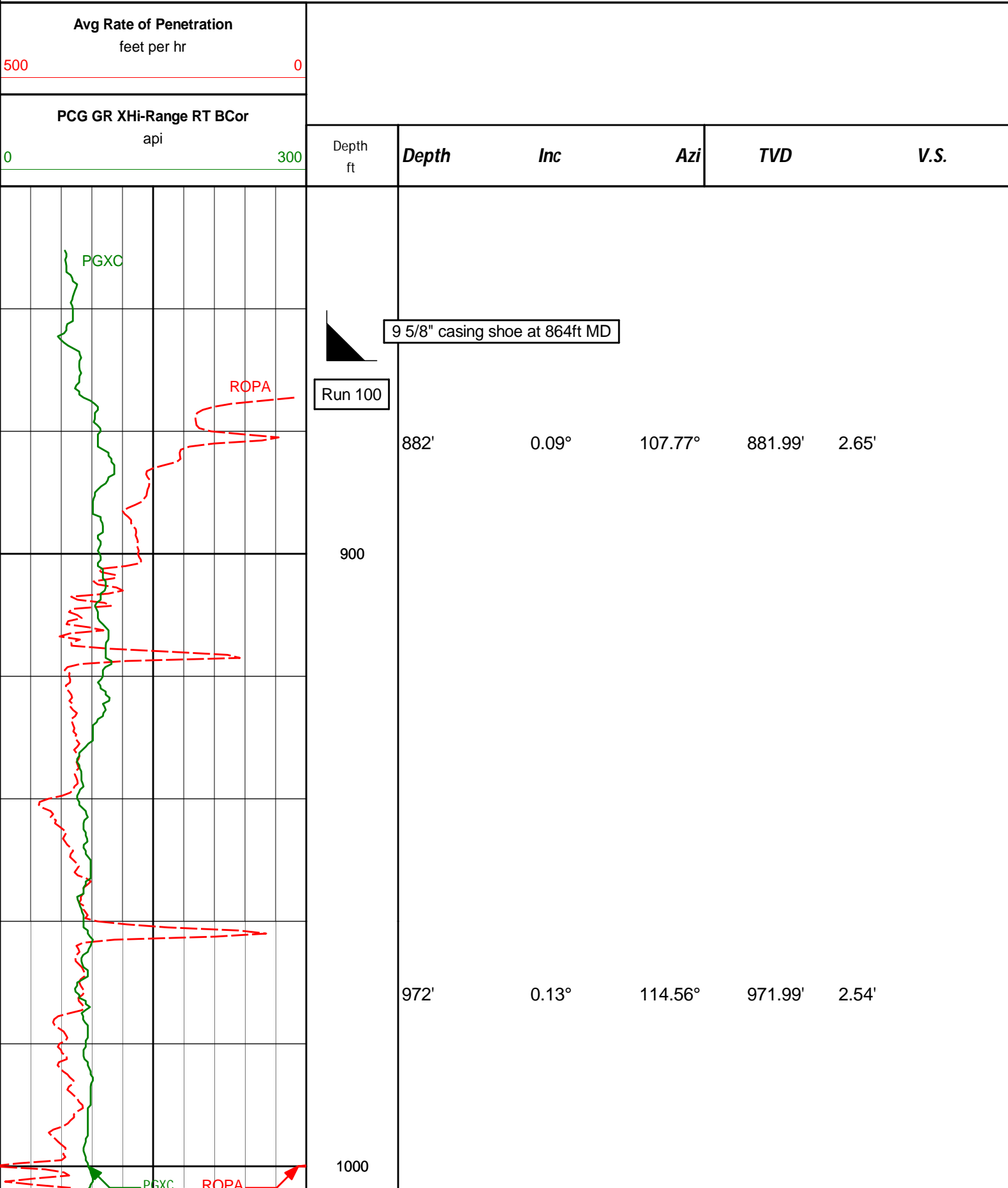
| PCG GR XHI-Range RT BCor api | Depth ft | Depth | Inc. | Azi. | TVD | V.S. |
|--|-------------|-------|------|------|-----|------|
| 0 | 300 | | | | | |
| Avg Rate of Penetration feet per hr | | | | | | |
| 500 | 0 | | | | | |

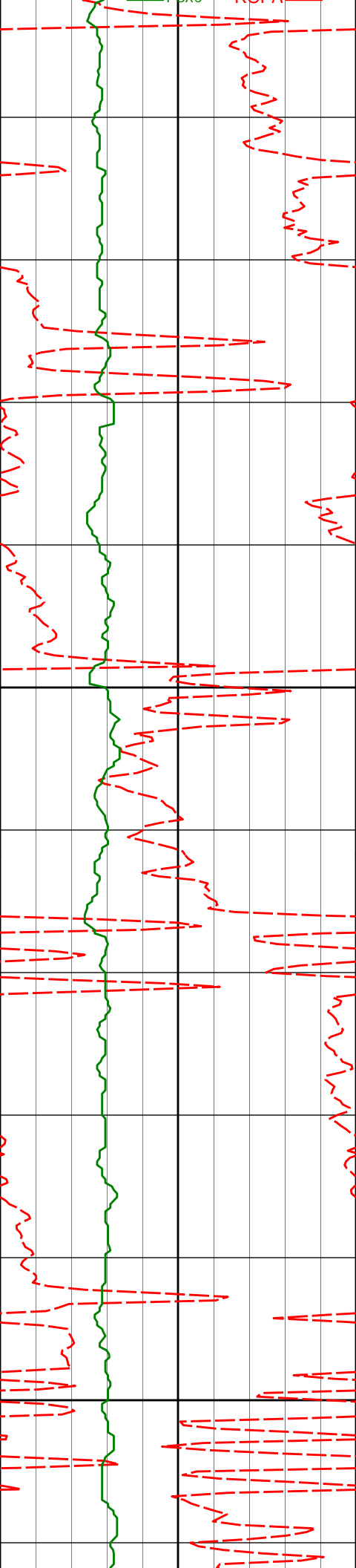
HALLIBURTON

Sperry Drilling Services

TVD Detail Log 1:240

Noble Energy
Bethyl GW30-16
PD 829
Sec 30-T8N-R63W





1061'

0.14°

89.30°

1060.99'

2.38'

1100

1151'

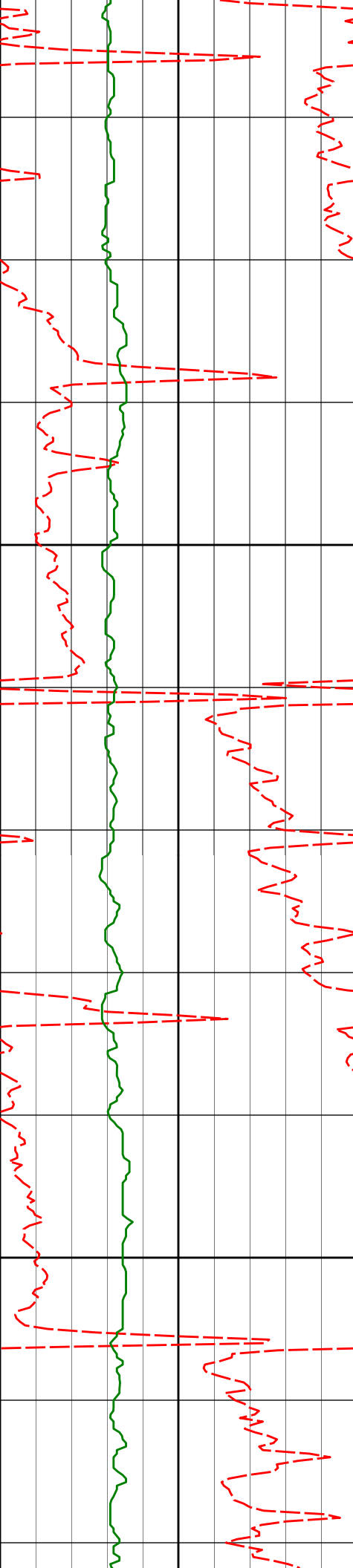
0.25°

31.00°

1150.99'

2.11'

1200



1241'

0.14°

348.65°

1240.98'

1.92'

1300

1330'

0.11°

245.20°

1329.98'

1.98'

1400

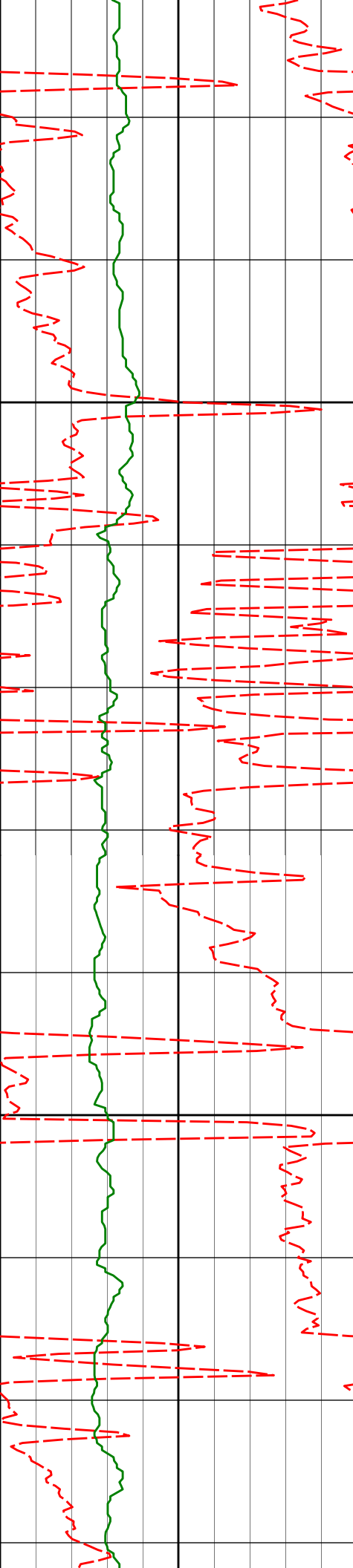
1420'

0.18°

354.04°

1419.98'

2.02'



1500

1510'

0.06°

117.73°

1509.98'

1.95'

1600

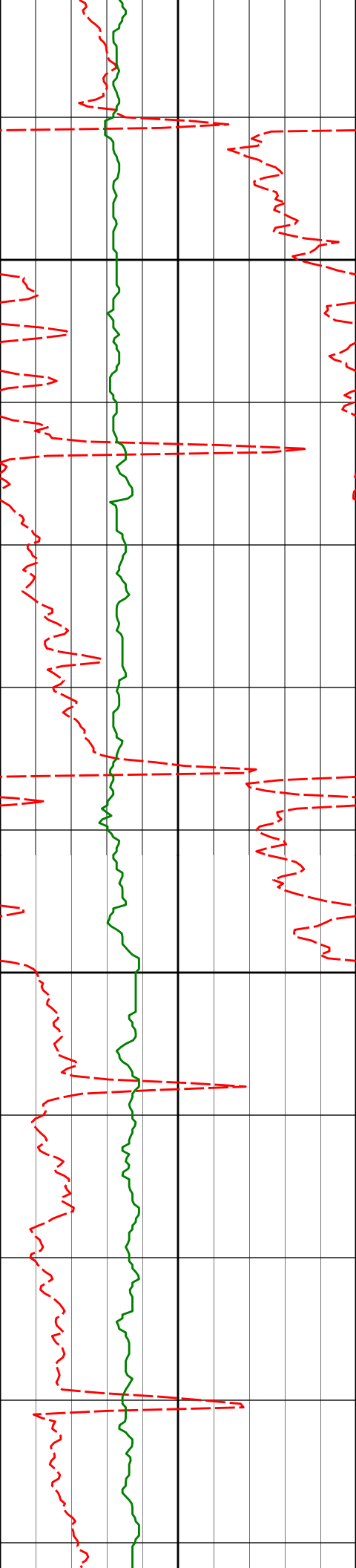
1599'

0.20°

169.33°

1598.98'

1.95'



1700

1800

1689'

0.31°

205.78°

1688.98'

2.18'

1779'

0.91°

195.09°

1778.98'

2.83'

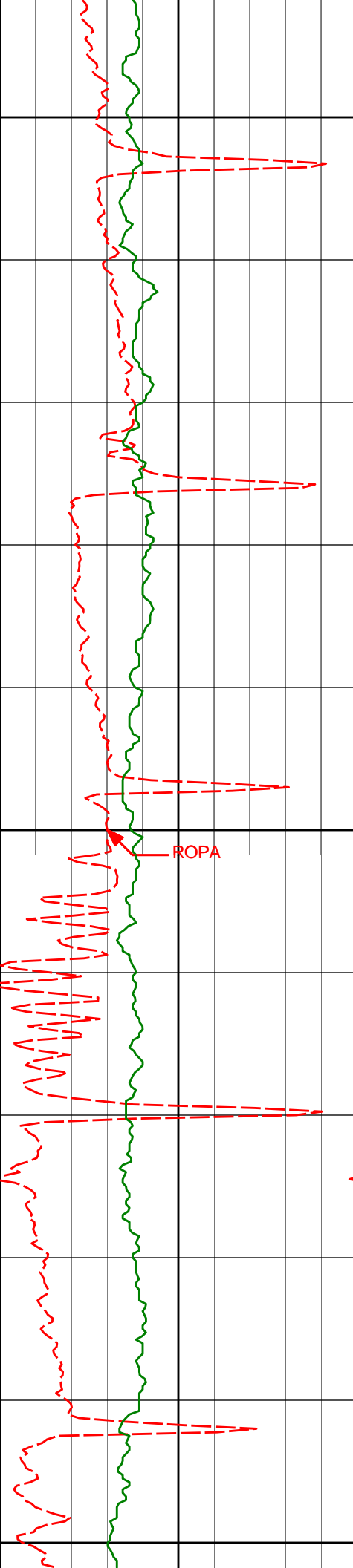
1868'

1.75°

221.85°

1867.95'

4.54'



1900

1958'

3.38°

242.34°

1957.86'

8.45'

2000

ROPA

2048'

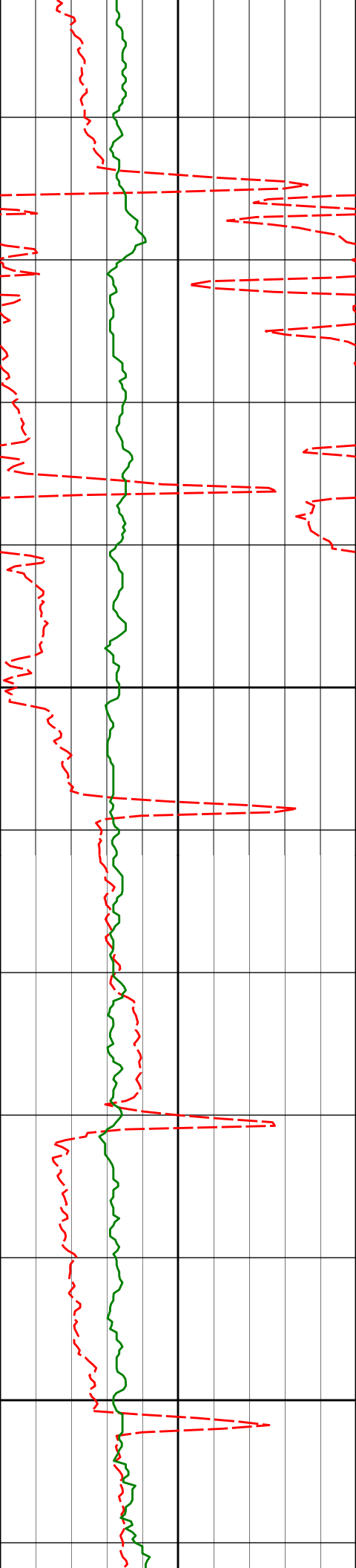
4.64°

247.50°

2047.64'

14.74'

2100



2137'

5.75°

245.67°

2136.27'

22.79'

2200

2227'

6.96°

248.62°

2225.72'

32.73'

2300

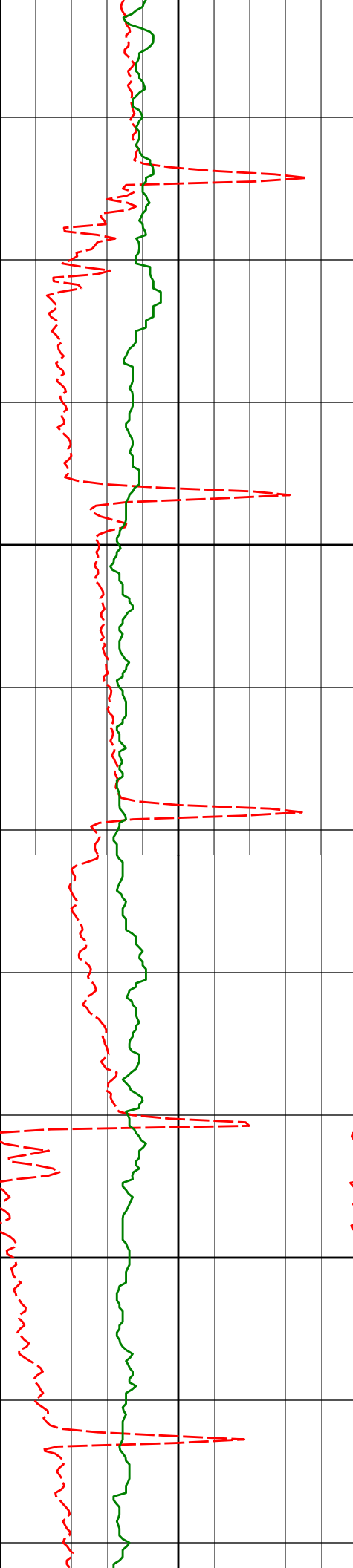
2317'

8.82°

247.02°

2314.86'

45.08'



2400

2406'

11.17°

245.61°

2402.51' 60.52'

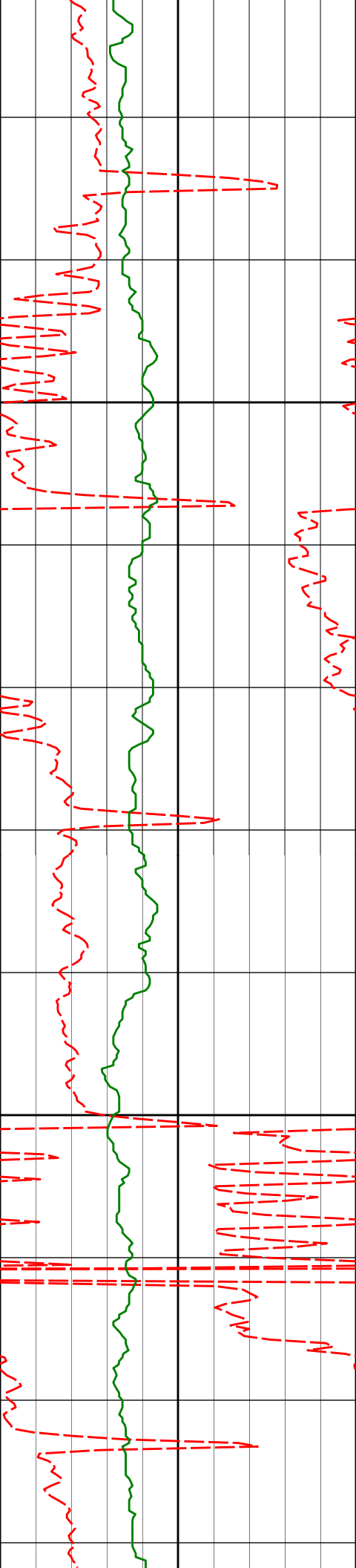
2500

2496'

11.14°

243.06°

2490.81' 77.93'



2600

2700

2585'

10.95°

240.71°

2578.16'

94.96'

2675'

9.56°

243.35°

2666.72'

110.96'

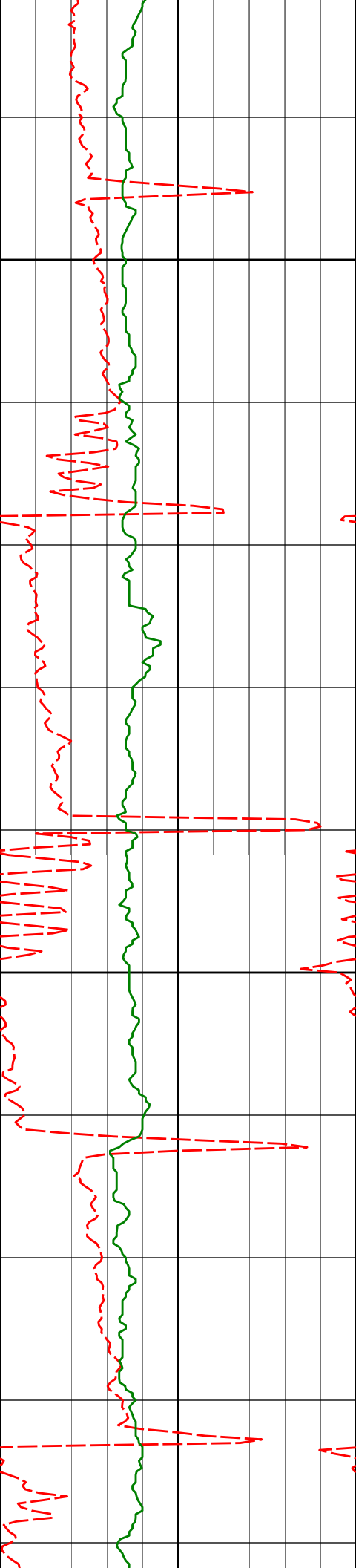
2765'

9.83°

250.00°

2755.43'

126.08'



2800

2854'

9.81°

258.57°

2843.14' 141.01'

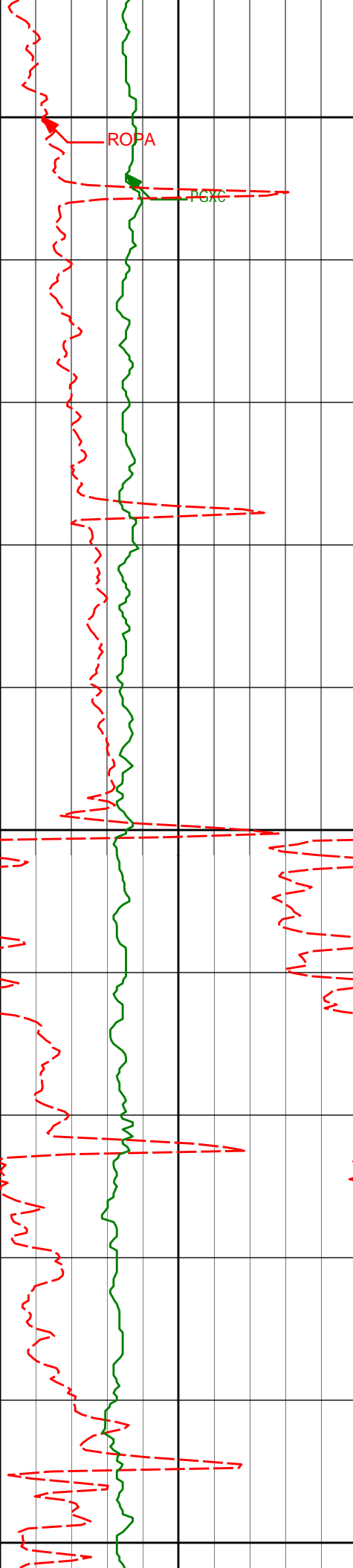
2900

2944'

9.82°

256.55°

2931.82' 155.96'



3000

ROPA

PGC

3034'

9.72°

252.22°

3020.52'

171.00'

3100

3123'

9.69°

250.35°

3108.24'

185.90'

3200

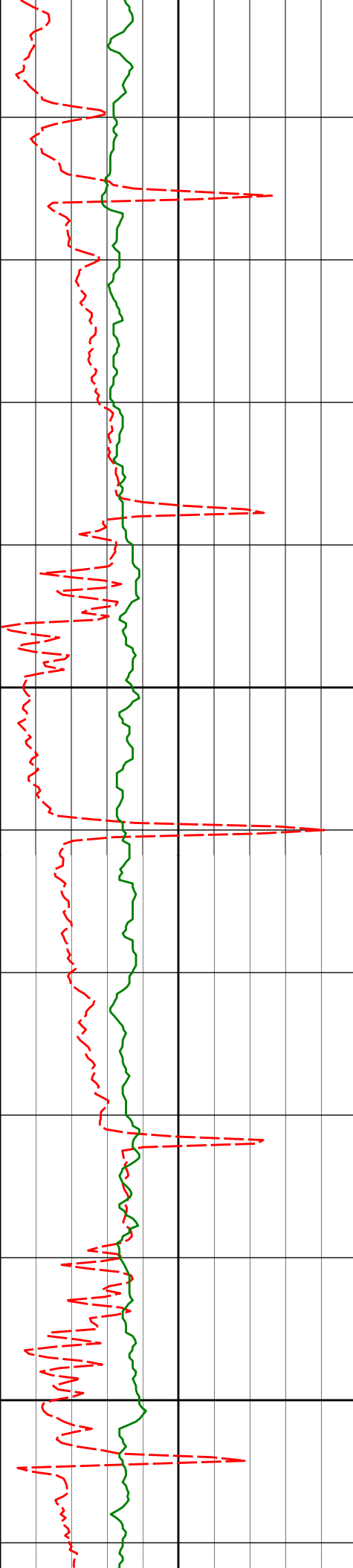
3213'

9.77°

246.74°

3196.95'

201.07'



3300

3400

3303'

10.14°

246.12°

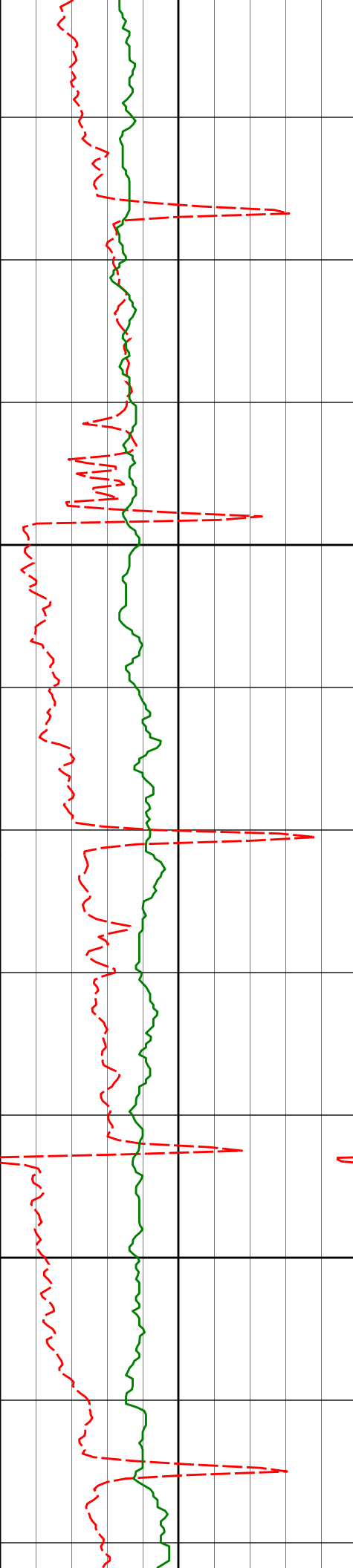
3285.59' 216.62'

3392'

9.69°

240.56°

3373.27' 231.93'



3500

3600

3482'

9.60°

238.92°

3461.99' 246.95'

3571'

9.27°

228.99°

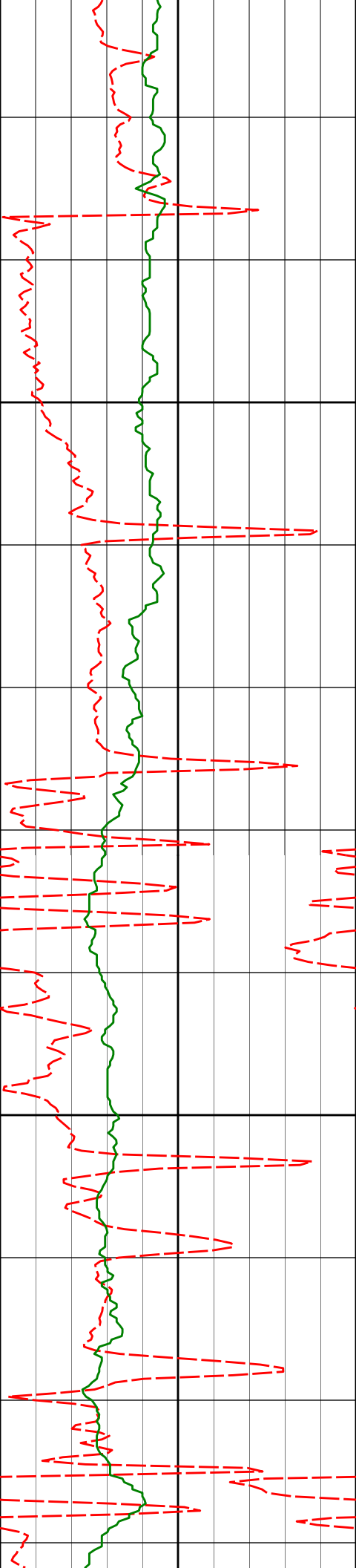
3549.80' 261.22'

3661'

9.40°

223.63°

3638.61' 275.05'



3700

3750'

9.56°

224.82°

3726.39' 288.78'

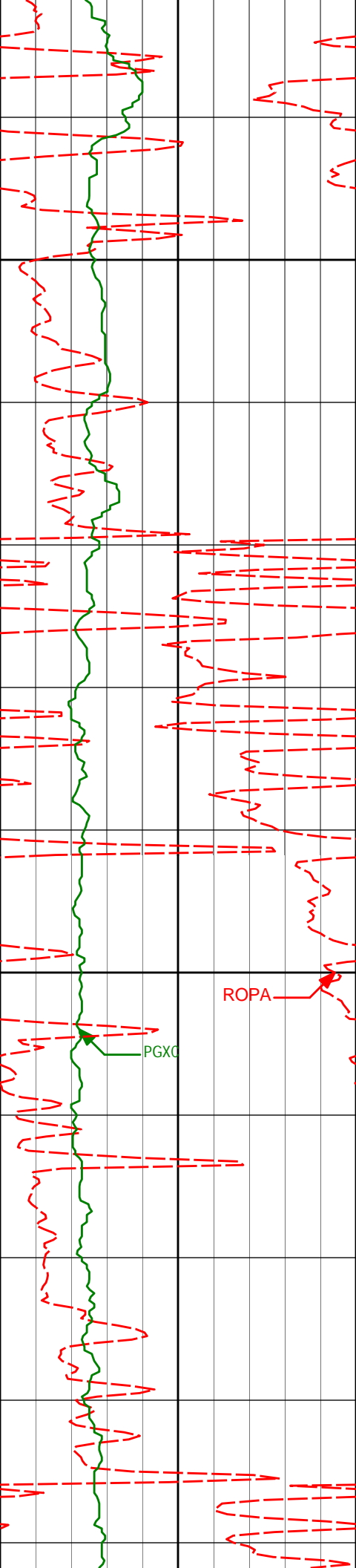
3800

3840'

9.85°

224.95°

3815.11' 303.04'



3900

3930'

9.34°

225.99°

3903.85' 317.20'

4019'

10.18°

226.70°

3991.56' 331.52'

4000

ROPA

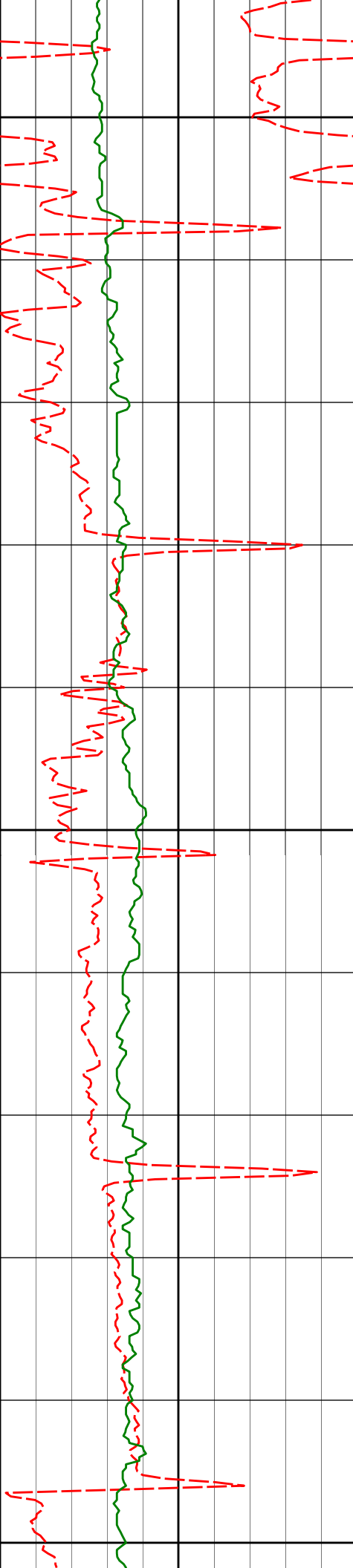
PGXC

4109'

10.02°

233.72°

4080.17' 346.76'



4100

4199'

9.94°

238.48°

4168.81' 362.16'

4200

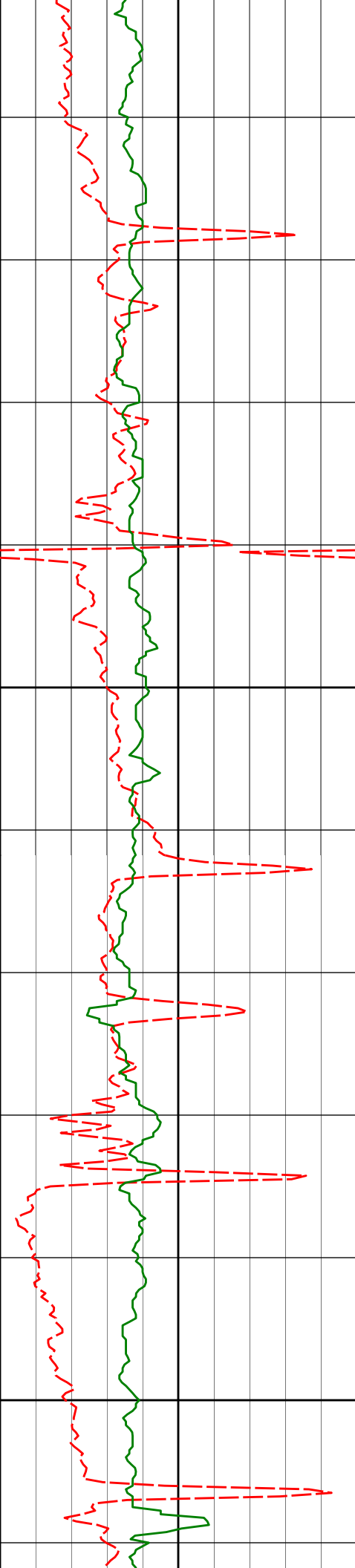
4288'

9.68°

241.03°

4256.51' 377.26'

4300



4400

4500

4378'

9.97°

241.13°

4345.19' 392.59'

4468'

9.61°

241.92°

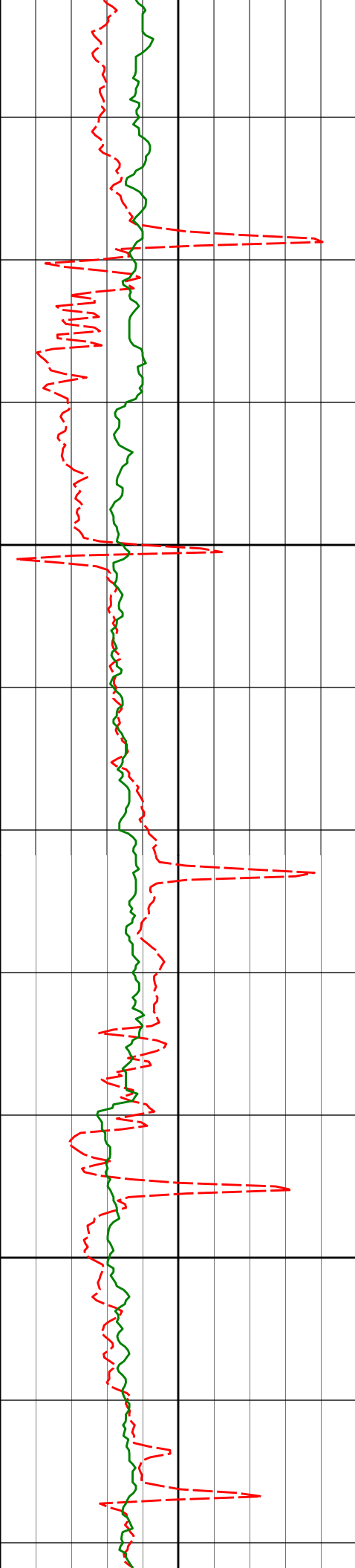
4433.88' 407.86'

4557'

9.62°

246.40°

4521.63' 422.71'



4600

4647'

9.72°

247.65°

4610.35' 437.81'

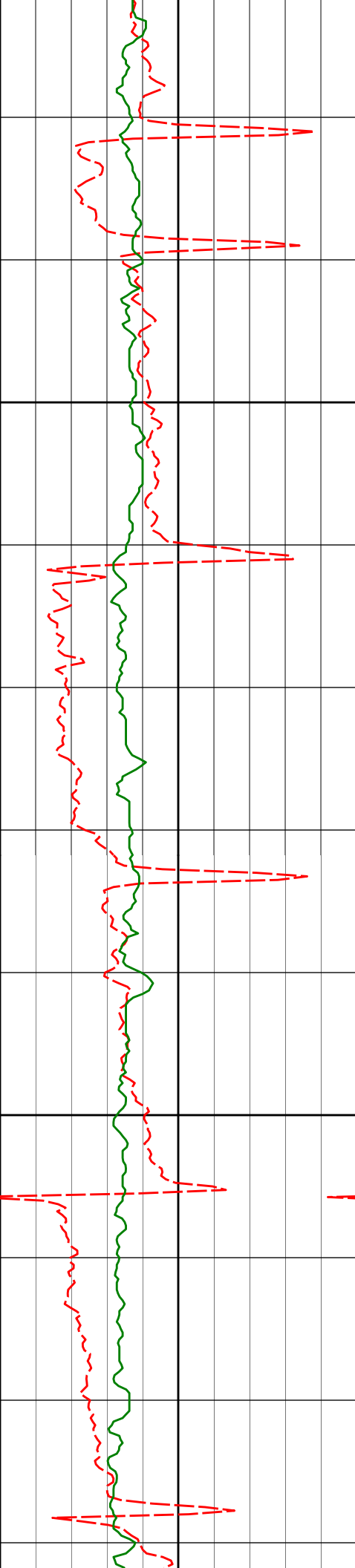
4700

4736'

9.71°

248.74°

4698.07' 452.80'



4800

4900

4826'

9.22°

250.83°

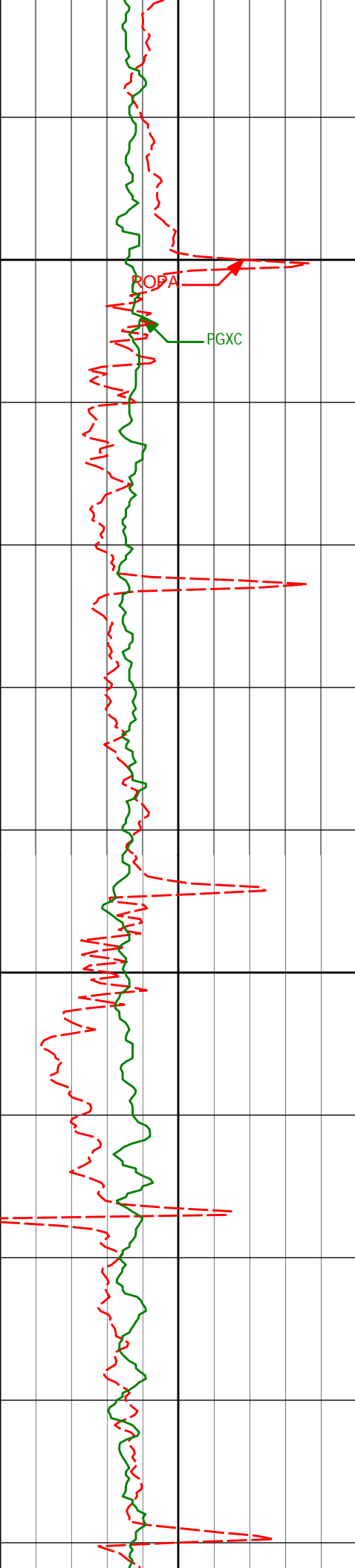
4786.85' 467.55'

4916'

8.03°

255.62°

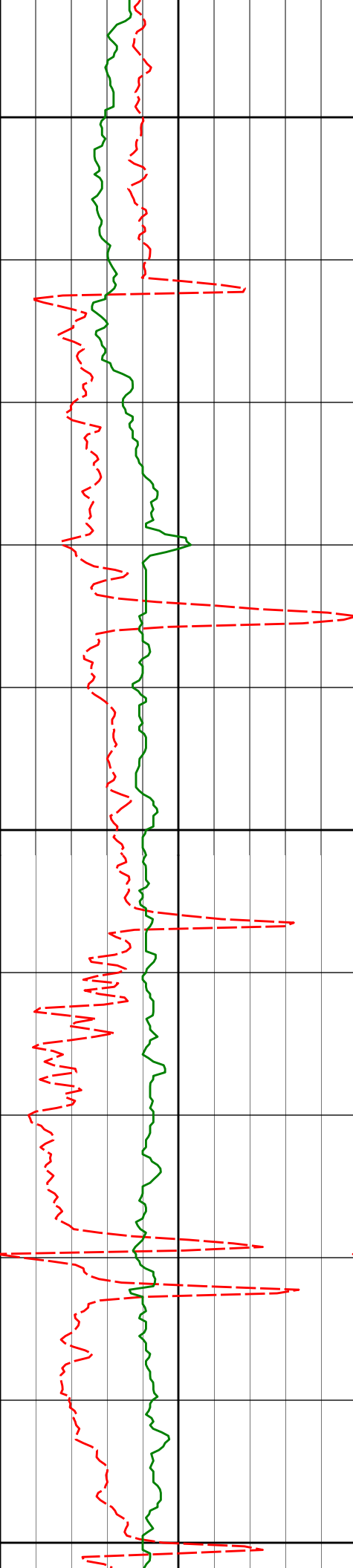
4875.83' 480.89'



5000

5100

| | | | | |
|-------|-------|---------|----------|---------|
| 5005 | 6.46° | 253.23° | 4964.12 | 491.95 |
| 5095' | 4.74° | 256.53° | 5053.68' | 500.59' |
| 5184' | 3.06° | 255.41° | 5142.48' | 506.52' |



5200

5274'

2.52°

264.22°

5232.37' 510.75'

5300

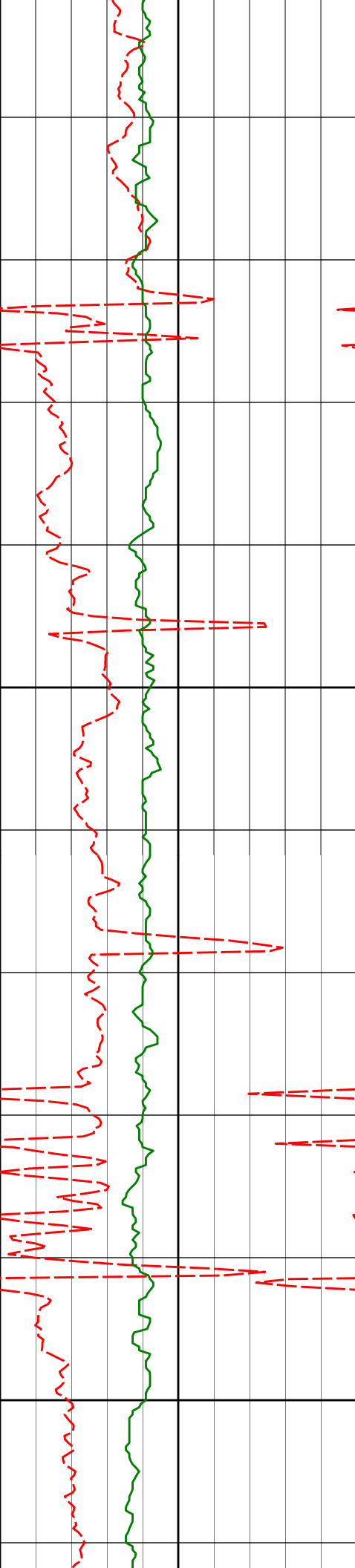
5364'

1.20°

280.12°

5322.32' 513.39'

5400



5500

5600

5453'

5543'

5633'

0.20°

0.09°

0.66°

272.62°

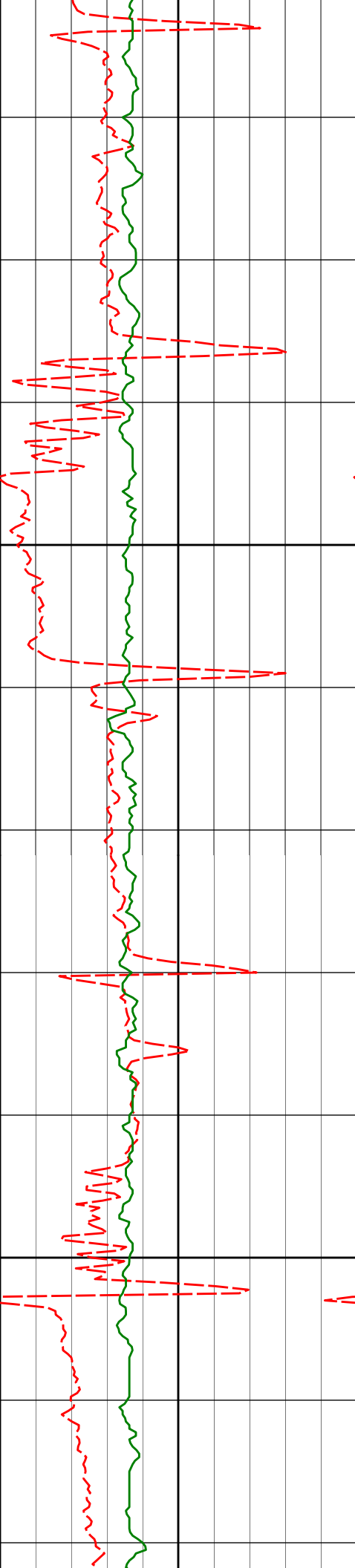
350.93°

223.64°

5411.31' 514.28'

5501.31' 514.40'

5591.31' 514.86'



5700

5800

5722'

0.30°

318.85°

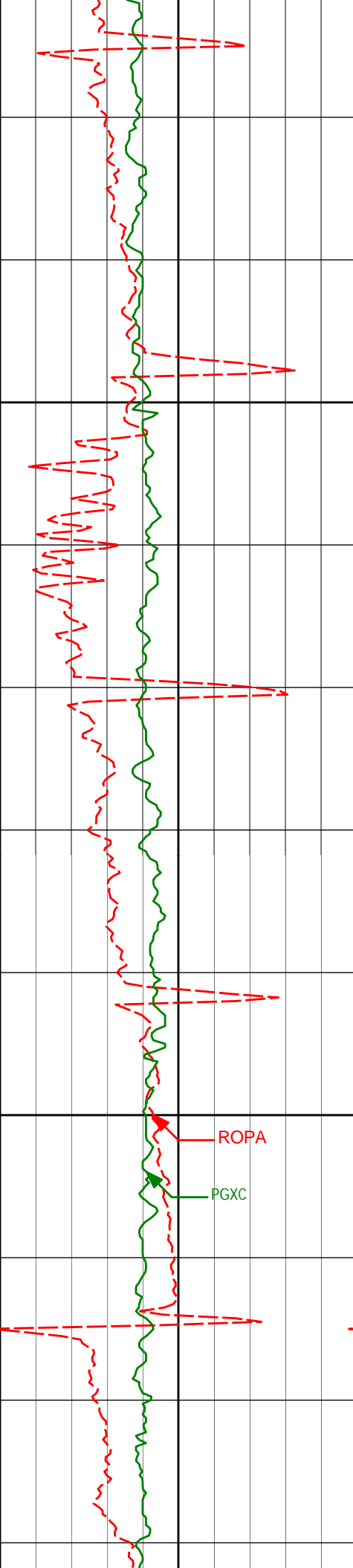
5680.31' 515.40'

5812'

0.22°

105.49°

5770.31' 515.34'



5900

6000

ROPA

PGXC

5901'

0.43°

0.15°

5859.31' 515.07'

5991'

0.11°

9.94°

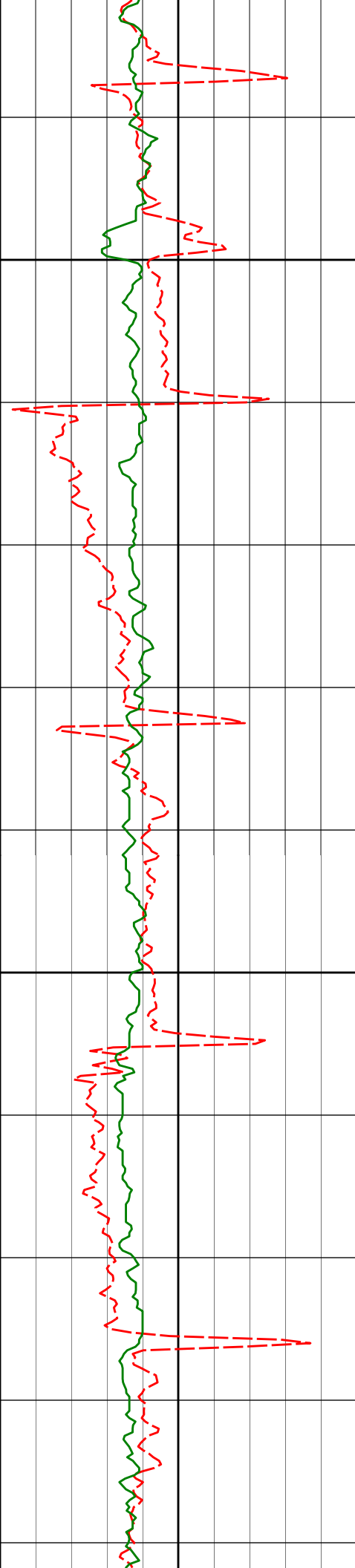
5949.31' 514.87'

6080'

0.07°

355.67°

6038.31' 514.80'



6100

6170'

0.40°

317.18°

6128.30' 514.88'

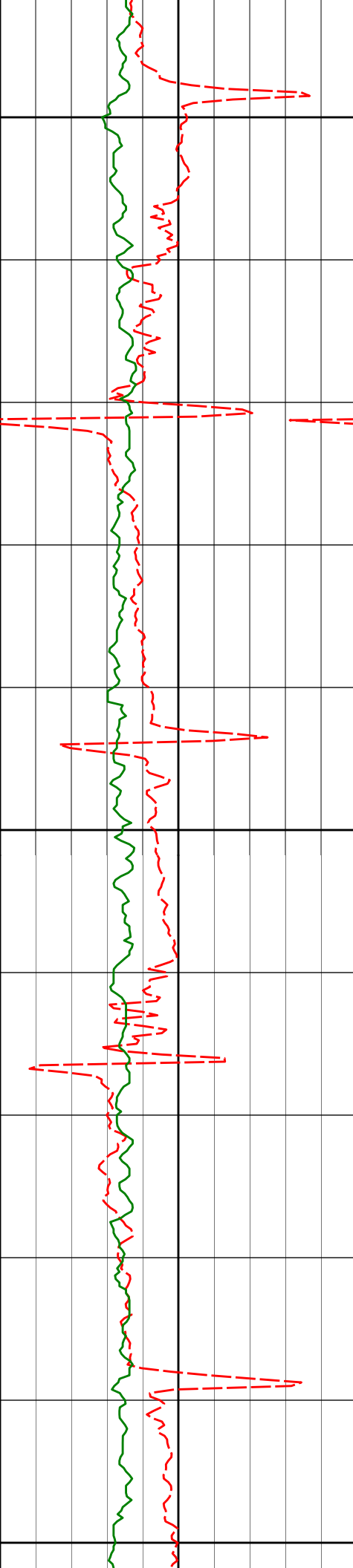
6200

6260'

0.11°

65.65°

6218.30' 514.89'



6300

6349'

0.17°

202.35°

6307.30' 514.90'

6400

6439'

0.03°

312.69°

6397.30' 515.00'

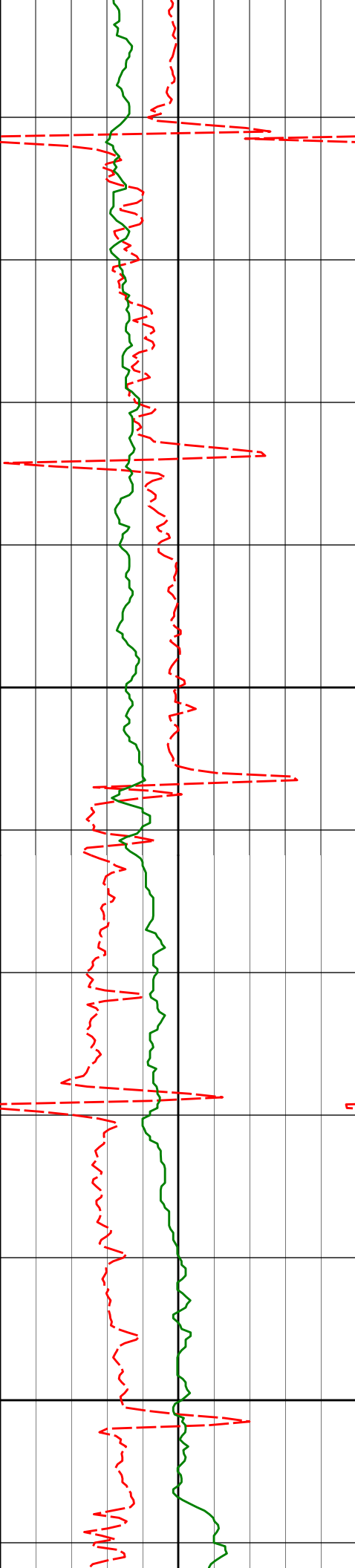
6500

6528'

0.16°

182.27°

6486.30' 515.07'



6600

6700

6618'

0.04°

39.40°

6576.30'

515.09'

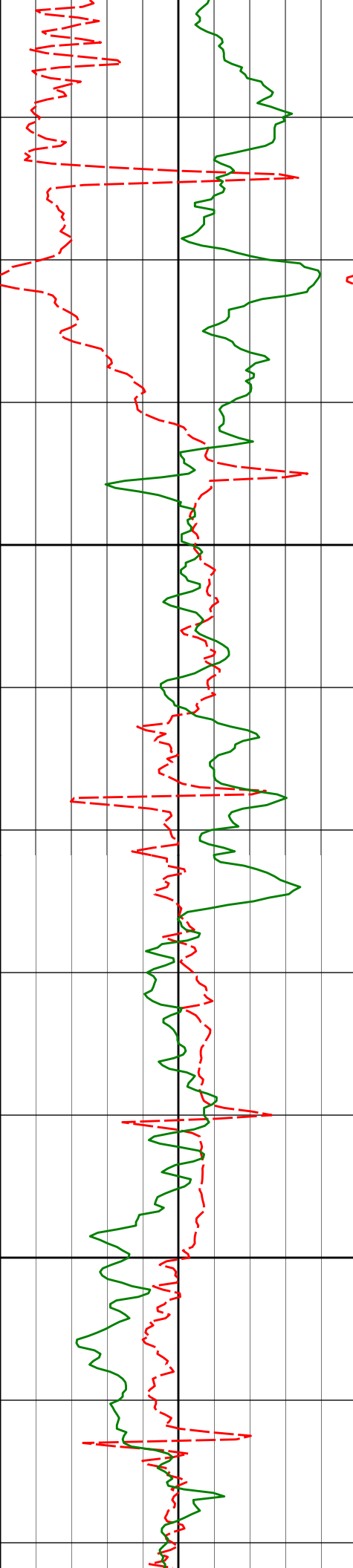
6708'

0.10°

237.21°

6666.30'

515.14'



6800

6900

6797'

0.20°

128.09°

6755.30' 515.15'

6887'

0.17°

83.50°

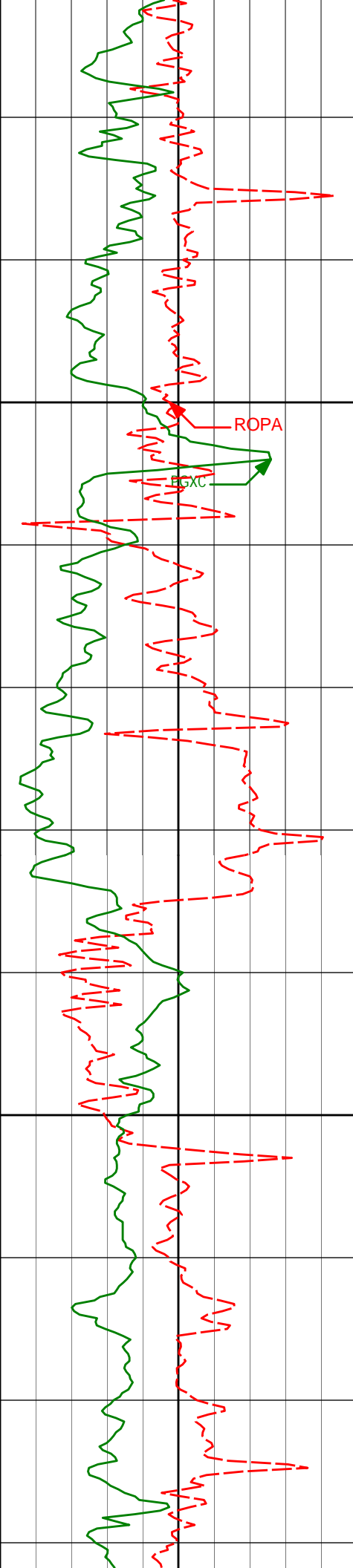
6845.30' 514.95'

6977'

0.15°

154.73°

6935.30' 514.82'



7000

7066'

0.13°

216.43°

7024.30' 514.91'

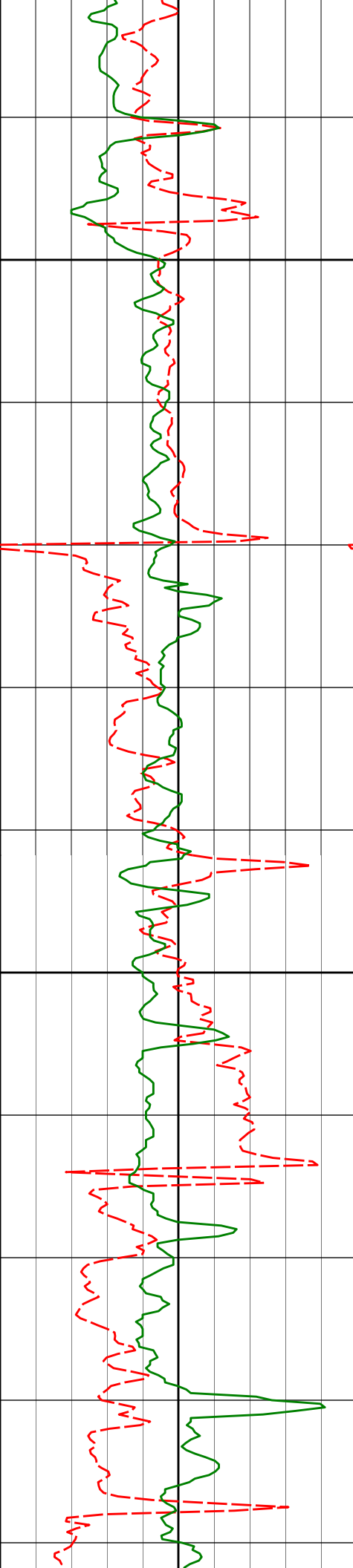
7100

7156'

0.28°

202.20°

7114.30' 515.16'



7200

7246'

0.43°

313.80°

7204.30' 515.44'

7300

7335'

0.18°

301.66°

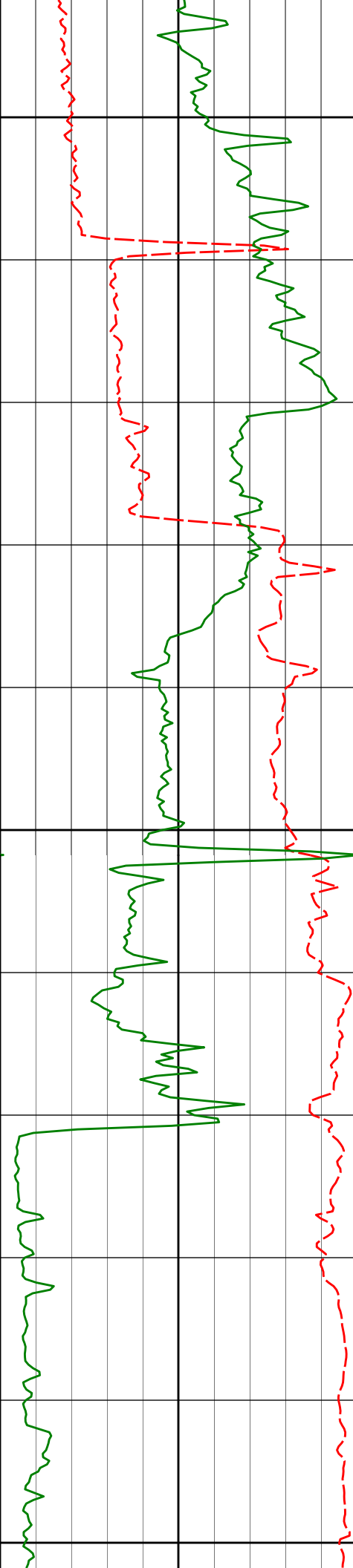
7293.30' 515.63'

7425'

0.20°

242.49°

7383.30' 515.86'



7400

7500

7600

7515'

0.34°

338.30°

7473.30'

516.00'

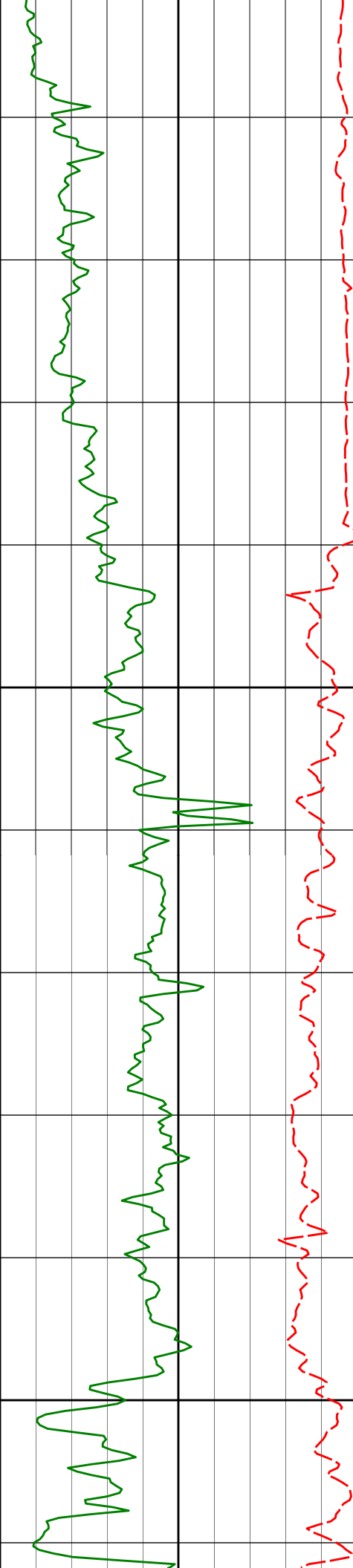
7604'

0.34°

250.89°

7562.30'

516.25'



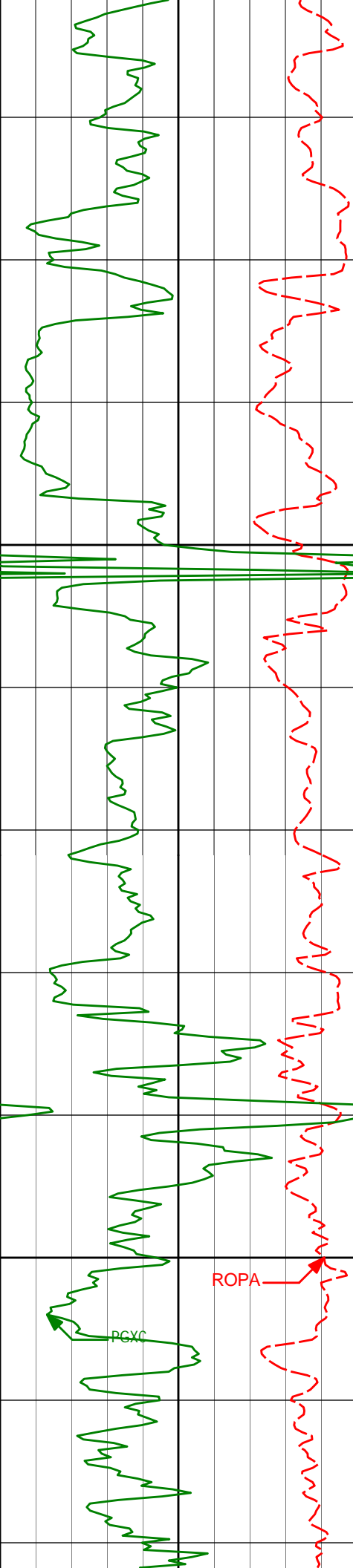
Run 200

7694' 0.09° 39.52° 7652.30' 516.45'

7700

7784' 0.15° 206.11° 7742.30' 516.48'

7800



7900

8000

7874'

0.10°

60.39°

7832.30'

516.50'

7963'

0.14°

65.39°

7921.30'

516.32'

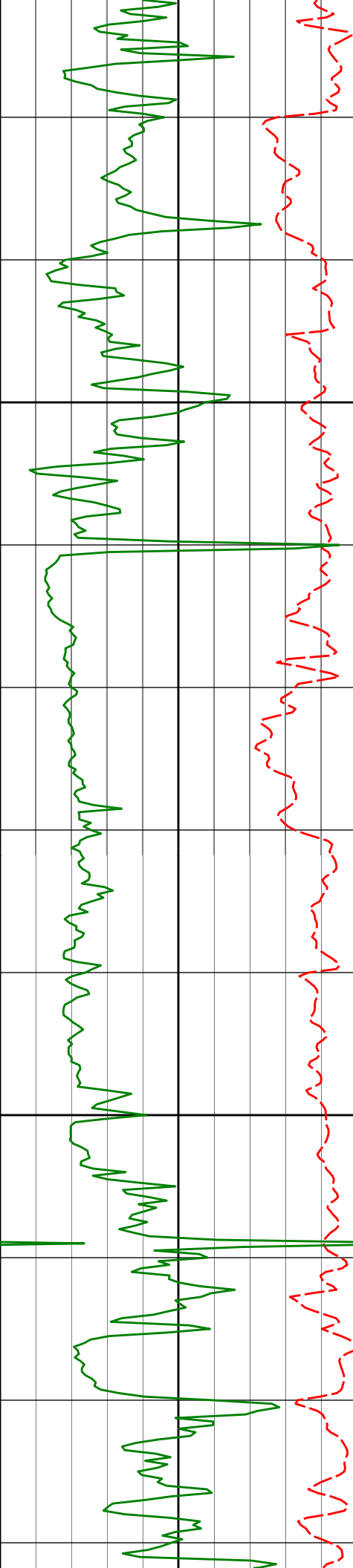
8053'

0.06°

97.99°

8011.30'

516.17'



8100

8143'

0.10°

265.13°

8101.30' 516.20'

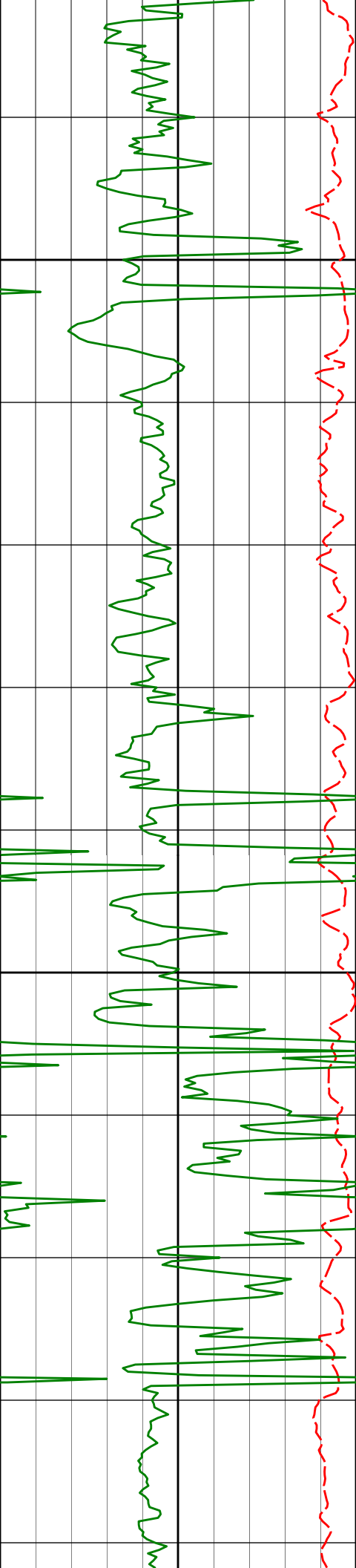
8200

8232'

0.13°

160.32°

8190.30' 516.28'



8322'

0.20°

290.85°

8280.30'

516.40'

8300

8412'

0.16°

77.32°

8370.30'

516.39'

8400

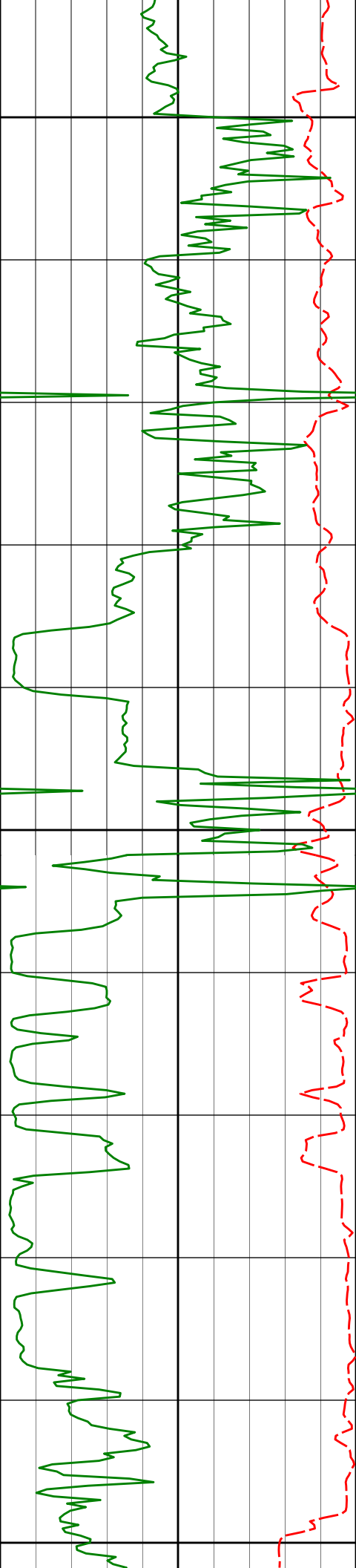
8501'

0.10°

164.57°

8459.30'

516.28'



8500

8591'

0.09°

161.20°

8549.30' 516.30'

8600

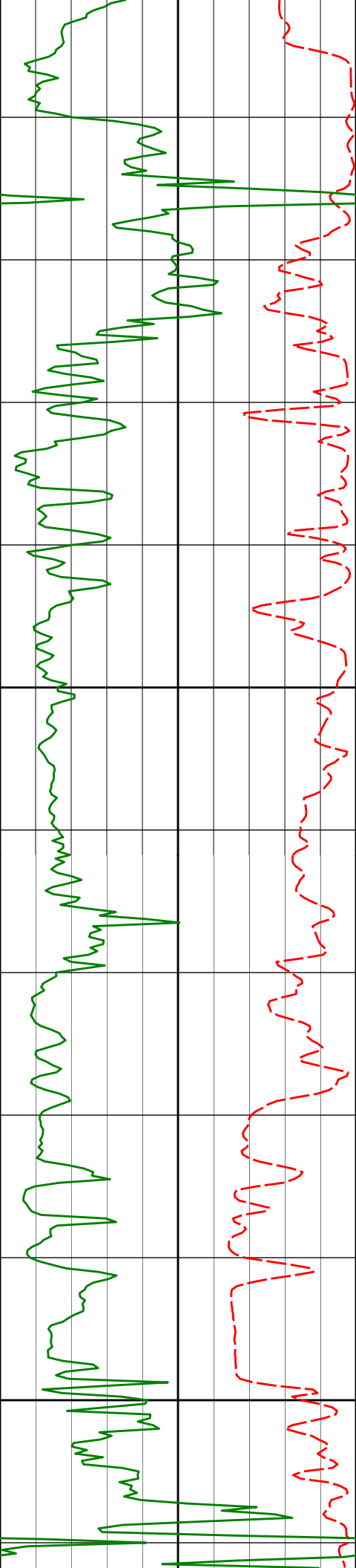
8681'

0.07°

55.57°

8639.30' 516.26'

8700



8770'

0.10°

228.97°

8728.30' 516.28'

8800

8860'

0.22°

22.29°

8818.29' 516.22'

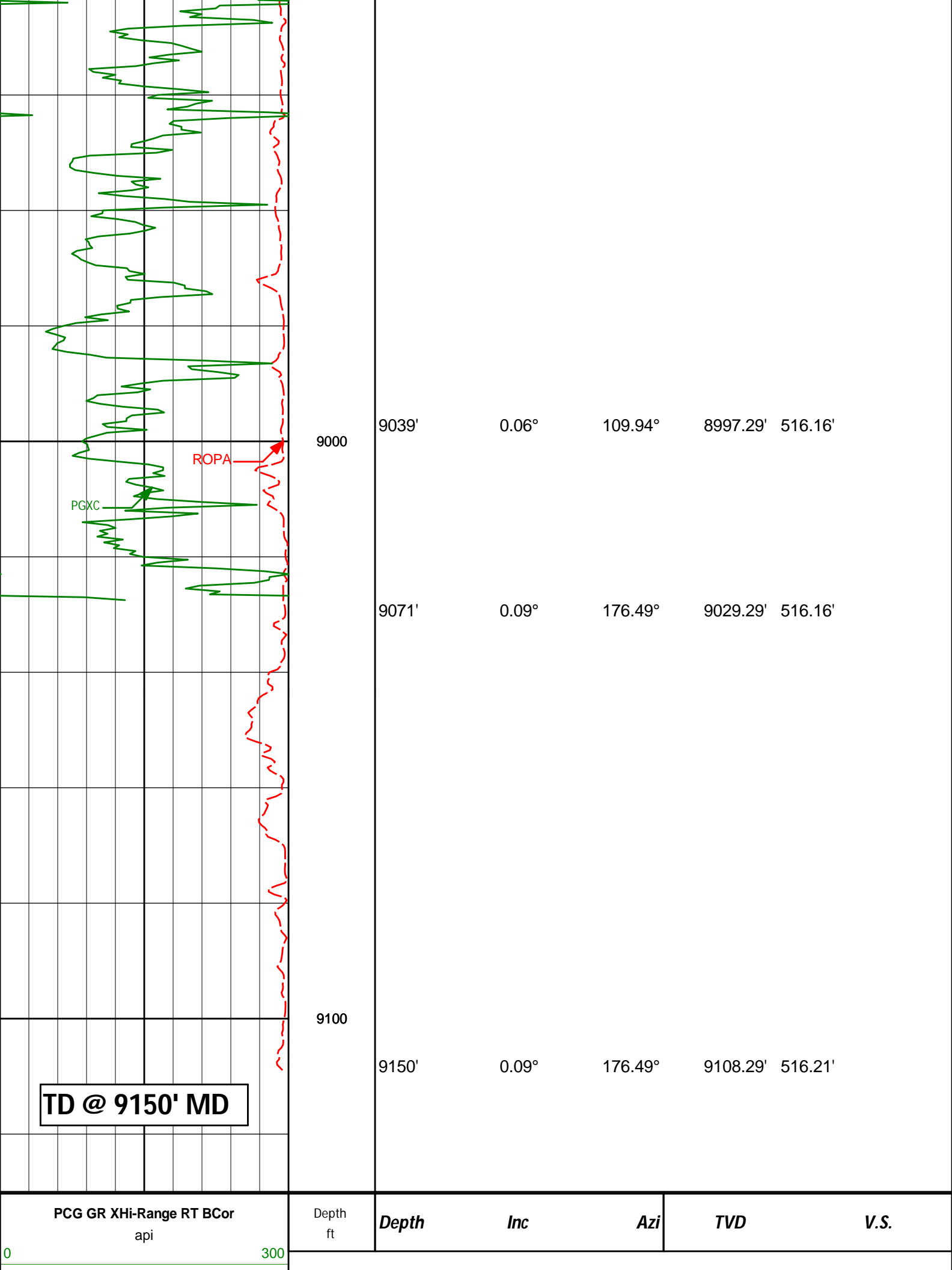
8900

8950'

0.07°

259.51°

8908.29' 516.15'



9000

9039'

0.06°

109.94°

8997.29'

516.16'

ROPA

PGXC

9071'

0.09°

176.49°

9029.29'

516.16'

9100

9150'

0.09°

176.49°

9108.29'

516.21'

TD @ 9150' MD

PCG GR XHi-Range RT BCor
api

Depth
ft

Depth

Inc

Azi

TVD

V.S.

0

300

Avg Rate of Penetration
feet per hr

500

0



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Bethyl GW30-16
Wildcat
Weld Colorado
USA
CA-XX-0900671434

| 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 |
| 131.00 | 0.20 | 262.00 | 131.00 | 0.03 S | 0.23 W | 0.22 | 0.15 |
| 207.00 | 0.50 | 309.00 | 207.00 | 0.16 N | 0.62 W | 0.49 | 0.52 |
| 319.00 | 0.60 | 318.00 | 318.99 | 0.90 N | 1.39 W | 0.87 | 0.12 |
| 414.00 | 0.30 | 284.00 | 413.99 | 1.33 N | 1.96 W | 1.21 | 0.41 |
| 510.00 | 0.20 | 198.90 | 509.99 | 1.23 N | 2.26 W | 1.52 | 0.36 |
| 605.00 | 0.20 | 279.00 | 604.99 | 1.10 N | 2.48 W | 1.77 | 0.27 |
| 699.00 | 0.40 | 278.90 | 698.99 | 1.18 N | 2.96 W | 2.18 | 0.21 |
| 794.00 | 0.20 | 302.70 | 793.99 | 1.32 N | 3.43 W | 2.54 | 0.24 |
| 857.00 | 0.20 | 307.20 | 856.99 | 1.45 N | 3.61 W | 2.65 | 0.02 |
| 882.00 | 0.09 | 107.77 | 881.99 | 1.47 N | 3.63 W | 2.65 | 1.16 |
| 972.00 | 0.13 | 114.56 | 971.99 | 1.40 N | 3.47 W | 2.54 | 0.04 |
| 1061.00 | 0.14 | 89.30 | 1060.99 | 1.36 N | 3.27 W | 2.38 | 0.07 |
| 1151.00 | 0.25 | 31.00 | 1150.99 | 1.54 N | 3.06 W | 2.11 | 0.24 |
| 1241.00 | 0.14 | 348.65 | 1240.98 | 1.81 N | 2.98 W | 1.92 | 0.20 |
| 1330.00 | 0.11 | 245.20 | 1329.98 | 1.88 N | 3.08 W | 1.98 | 0.22 |
| 1420.00 | 0.18 | 354.04 | 1419.98 | 1.99 N | 3.17 W | 2.02 | 0.27 |
| 1510.00 | 0.06 | 117.73 | 1509.98 | 2.10 N | 3.14 W | 1.95 | 0.24 |
| 1599.00 | 0.20 | 169.33 | 1598.98 | 1.93 N | 3.07 W | 1.95 | 0.19 |
| 1689.00 | 0.31 | 205.78 | 1688.98 | 1.56 N | 3.15 W | 2.18 | 0.21 |
| 1779.00 | 0.91 | 195.09 | 1778.98 | 0.65 N | 3.44 W | 2.83 | 0.68 |
| 1868.00 | 1.75 | 221.85 | 1867.95 | 1.04 S | 4.53 W | 4.54 | 1.14 |
| 1958.00 | 3.38 | 242.34 | 1957.86 | 3.29 S | 7.79 W | 8.45 | 2.05 |
| 2048.00 | 4.64 | 247.50 | 2047.64 | 5.92 S | 13.50 W | 14.74 | 1.45 |
| 2137.00 | 5.75 | 245.67 | 2136.27 | 9.13 S | 20.89 W | 22.79 | 1.26 |
| 2227.00 | 6.96 | 248.62 | 2225.72 | 12.97 S | 30.07 W | 32.73 | 1.40 |
| 2317.00 | 8.82 | 247.02 | 2314.86 | 17.66 S | 41.51 W | 45.08 | 2.08 |
| 2406.00 | 11.17 | 245.61 | 2402.51 | 23.89 S | 55.65 W | 60.52 | 2.65 |
| 2496.00 | 11.14 | 243.06 | 2490.81 | 31.43 S | 71.34 W | 77.93 | 0.55 |
| 2585.00 | 10.95 | 240.71 | 2578.16 | 39.46 S | 86.38 W | 94.96 | 0.55 |
| 2675.00 | 9.56 | 243.35 | 2666.72 | 46.99 S | 100.52 W | 110.96 | 1.63 |
| 2765.00 | 9.83 | 250.00 | 2755.43 | 52.97 S | 114.42 W | 126.08 | 1.28 |
| 2854.00 | 9.81 | 258.57 | 2843.14 | 57.08 S | 128.99 W | 141.01 | 1.64 |
| 2944.00 | 9.82 | 256.55 | 2931.82 | 60.38 S | 143.96 W | 155.96 | 0.38 |
| 3034.00 | 9.72 | 252.22 | 3020.52 | 64.48 S | 158.66 W | 171.00 | 0.82 |
| 3123.00 | 9.69 | 250.35 | 3108.24 | 69.29 S | 172.86 W | 185.90 | 0.35 |
| 3213.00 | 9.77 | 246.74 | 3196.95 | 74.85 S | 187.01 W | 201.07 | 0.68 |
| 3303.00 | 10.14 | 246.12 | 3285.59 | 81.08 S | 201.27 W | 216.62 | 0.43 |
| 3392.00 | 9.69 | 240.56 | 3373.27 | 87.93 S | 214.96 W | 231.93 | 1.19 |
| 3482.00 | 9.60 | 238.92 | 3461.99 | 95.53 S | 227.98 W | 246.95 | 0.32 |
| 3571.00 | 9.27 | 228.99 | 3549.80 | 104.06 S | 239.74 W | 261.22 | 1.86 |
| 3661.00 | 9.40 | 223.63 | 3638.61 | 114.13 S | 250.28 W | 275.05 | 0.98 |
| 3750.00 | 9.56 | 224.82 | 3726.39 | 124.64 S | 260.50 W | 288.78 | 0.28 |
| 3840.00 | 9.85 | 224.95 | 3815.11 | 135.38 S | 271.20 W | 303.04 | 0.32 |
| 3930.00 | 9.34 | 225.99 | 3903.85 | 145.90 S | 281.89 W | 317.20 | 0.59 |
| 4019.00 | 10.18 | 226.70 | 3991.56 | 156.31 S | 292.81 W | 331.52 | 0.95 |
| 4109.00 | 10.02 | 233.72 | 4080.17 | 166.40 S | 304.91 W | 346.76 | 1.38 |
| 4199.00 | 9.94 | 238.48 | 4168.81 | 175.09 S | 317.84 W | 362.16 | 0.92 |
| 4288.00 | 9.68 | 241.03 | 4256.51 | 182.73 S | 330.94 W | 377.26 | 0.57 |
| 4378.00 | 9.97 | 241.13 | 4345.19 | 190.16 S | 344.38 W | 392.59 | 0.32 |

| | | | | | | | |
|---------|------|--------|---------|----------|----------|--------|------|
| 4468.00 | 9.61 | 241.92 | 4433.88 | 197.45 S | 357.82 W | 407.86 | 0.43 |
| 4557.00 | 9.62 | 246.40 | 4521.63 | 203.92 S | 371.18 W | 422.71 | 0.84 |
| 4647.00 | 9.72 | 247.65 | 4610.35 | 209.82 S | 385.10 W | 437.81 | 0.26 |
| 4736.00 | 9.71 | 248.74 | 4698.07 | 215.40 S | 399.04 W | 452.80 | 0.21 |
| 4826.00 | 9.22 | 250.83 | 4786.85 | 220.52 S | 412.93 W | 467.55 | 0.67 |
| 4916.00 | 8.03 | 255.62 | 4875.83 | 224.45 S | 425.83 W | 480.89 | 1.54 |
| 5005.00 | 6.46 | 253.23 | 4964.12 | 227.44 S | 436.65 W | 491.95 | 1.80 |
| 5095.00 | 4.74 | 256.53 | 5053.68 | 229.77 S | 445.11 W | 500.59 | 1.94 |
| 5184.00 | 3.06 | 255.41 | 5142.48 | 231.22 S | 450.98 W | 506.52 | 1.89 |
| 5274.00 | 2.52 | 264.22 | 5232.37 | 232.02 S | 455.27 W | 510.75 | 0.76 |
| 5364.00 | 1.20 | 280.12 | 5322.32 | 232.06 S | 458.17 W | 513.39 | 1.56 |
| 5453.00 | 0.20 | 272.62 | 5411.31 | 231.89 S | 459.25 W | 514.28 | 1.13 |
| 5543.00 | 0.09 | 350.93 | 5501.31 | 231.81 S | 459.41 W | 514.40 | 0.22 |
| 5633.00 | 0.66 | 223.64 | 5591.31 | 232.11 S | 459.78 W | 514.86 | 0.80 |
| 5722.00 | 0.30 | 318.85 | 5680.31 | 232.30 S | 460.29 W | 515.40 | 0.84 |
| 5812.00 | 0.22 | 105.49 | 5770.31 | 232.17 S | 460.28 W | 515.34 | 0.56 |
| 5901.00 | 0.43 | 0.15 | 5859.31 | 231.88 S | 460.12 W | 515.07 | 0.60 |
| 5991.00 | 0.11 | 9.94 | 5949.31 | 231.46 S | 460.10 W | 514.87 | 0.36 |
| 6080.00 | 0.07 | 355.67 | 6038.31 | 231.32 S | 460.09 W | 514.80 | 0.05 |
| 6170.00 | 0.40 | 317.18 | 6128.30 | 231.03 S | 460.31 W | 514.88 | 0.39 |
| 6260.00 | 0.11 | 65.65 | 6218.30 | 230.77 S | 460.44 W | 514.89 | 0.50 |
| 6349.00 | 0.17 | 202.35 | 6307.30 | 230.85 S | 460.41 W | 514.90 | 0.29 |
| 6439.00 | 0.03 | 312.69 | 6397.30 | 230.95 S | 460.48 W | 515.00 | 0.20 |
| 6528.00 | 0.16 | 182.27 | 6486.30 | 231.06 S | 460.50 W | 515.07 | 0.20 |
| 6618.00 | 0.04 | 39.40 | 6576.30 | 231.16 S | 460.49 W | 515.09 | 0.21 |
| 6708.00 | 0.10 | 237.21 | 6666.30 | 231.17 S | 460.53 W | 515.14 | 0.15 |
| 6797.00 | 0.20 | 128.09 | 6755.30 | 231.31 S | 460.47 W | 515.15 | 0.28 |
| 6887.00 | 0.17 | 83.50 | 6845.30 | 231.39 S | 460.22 W | 514.95 | 0.16 |
| 6977.00 | 0.15 | 154.73 | 6935.30 | 231.48 S | 460.03 W | 514.82 | 0.21 |
| 7066.00 | 0.13 | 216.43 | 7024.30 | 231.67 S | 460.04 W | 514.91 | 0.17 |
| 7156.00 | 0.28 | 202.20 | 7114.30 | 231.95 S | 460.18 W | 515.16 | 0.17 |
| 7246.00 | 0.43 | 313.80 | 7204.30 | 231.92 S | 460.50 W | 515.44 | 0.65 |
| 7335.00 | 0.18 | 301.66 | 7293.30 | 231.62 S | 460.86 W | 515.63 | 0.29 |
| 7425.00 | 0.20 | 242.49 | 7383.30 | 231.62 S | 461.12 W | 515.86 | 0.21 |
| 7515.00 | 0.34 | 338.30 | 7473.30 | 231.44 S | 461.36 W | 516.00 | 0.45 |
| 7604.00 | 0.34 | 250.89 | 7562.30 | 231.28 S | 461.71 W | 516.25 | 0.53 |
| 7694.00 | 0.09 | 39.52 | 7652.30 | 231.32 S | 461.92 W | 516.45 | 0.47 |
| 7784.00 | 0.15 | 206.11 | 7742.30 | 231.37 S | 461.92 W | 516.48 | 0.27 |
| 7874.00 | 0.10 | 60.39 | 7832.30 | 231.44 S | 461.91 W | 516.50 | 0.27 |
| 7963.00 | 0.14 | 65.39 | 7921.30 | 231.36 S | 461.75 W | 516.32 | 0.05 |
| 8053.00 | 0.06 | 97.99 | 8011.30 | 231.32 S | 461.60 W | 516.17 | 0.10 |
| 8143.00 | 0.10 | 265.13 | 8101.30 | 231.33 S | 461.63 W | 516.20 | 0.18 |
| 8232.00 | 0.13 | 160.32 | 8190.30 | 231.43 S | 461.67 W | 516.28 | 0.20 |
| 8322.00 | 0.20 | 290.85 | 8280.30 | 231.47 S | 461.78 W | 516.40 | 0.33 |
| 8412.00 | 0.16 | 77.32 | 8370.30 | 231.39 S | 461.81 W | 516.39 | 0.38 |
| 8501.00 | 0.10 | 164.57 | 8459.30 | 231.43 S | 461.67 W | 516.28 | 0.20 |
| 8591.00 | 0.09 | 161.20 | 8549.30 | 231.58 S | 461.62 W | 516.30 | 0.01 |
| 8681.00 | 0.07 | 55.57 | 8639.30 | 231.61 S | 461.56 W | 516.26 | 0.14 |
| 8770.00 | 0.10 | 228.97 | 8728.30 | 231.63 S | 461.57 W | 516.28 | 0.19 |
| 8860.00 | 0.22 | 22.29 | 8818.29 | 231.52 S | 461.56 W | 516.22 | 0.35 |
| 8950.00 | 0.07 | 259.51 | 8908.29 | 231.37 S | 461.55 W | 516.15 | 0.29 |
| 9039.00 | 0.06 | 109.94 | 8997.29 | 231.40 S | 461.56 W | 516.16 | 0.14 |
| 9071.00 | 0.09 | 176.49 | 9029.29 | 231.43 S | 461.54 W | 516.16 | 0.26 |
| 9150.00 | 0.09 | 176.49 | 9108.29 | 231.55 S | 461.53 W | 516.21 | 0.00 |

CALCULATION BASED ON MINIMUM CURVATURE METHOD

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

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 244.75 DEGREES (GRID)
A TOTAL CORRECTION OF 7.79 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 9150.00 FEET
IS 516.36 FEET ALONG 243.36 DEGREES (GRID)**

Tie onto Vaughn ESS Rig Survey @ 857' MD

Final Survey is a projection to bit at TD