

1 : 600 / 1 : 240

| WELL INFORMATION | | | | | |
|----------------------------------|------------------|-------------------|--|--|--|
| MWD Run Number | 100 | 200 | | | |
| Date run completed | 20-Dec-14 | 27-Dec-14 | | | |
| Rig Bit Number | 2 | 3 | | | |
| Bit Size (in) | 8.750 | 6.125 | | | |
| Tool Nominal OD (in) | 6.750 | 4.750 | | | |
| Log Start Depth (MD, ft) | 697.00 | 7,046.00 | | | |
| Log End Depth (MD, ft) | 7,046.00 | 16,966.00 | | | |
| Drill or Wipe | Drill | Drill | | | |
| Drill/Wipe Start Date and Time | 18-Dec-14 10:11 | 21-Dec-14 23:37 | | | |
| Drill/Wipe End Date and Time | 19-Dec-14 22:58 | 26-Dec-14 16:10 | | | |
| Min Inc (deg) @ Depth (MD, ft) | 0.38 @ 819.00 | 85.31 @ 7,120.00 | | | |
| Max Inc (deg) @ Depth (MD, ft) | 79.25 @ 6,988.00 | 91.85 @ 13,234.00 | | | |
| Bit TFA(in2) / Bit Type | 0.91 / PDC | 0.65 / PDC | | | |
| Flow Rate (gpm) | 620.85 | 304.06 | | | |
| Max AV (fpm) / CV (fpm) @ MWD | N/A / N/A | N/A / N/A | | | |
| Fluid Type | Native/Spud Mud | Native/Spud Mud | | | |
| Density (ppg) / Viscosity (spqt) | 9.18 / 42.00 | 9.29 / 37.00 | | | |
| Filtrate CL (ppm) | 800.00 | 1,000.00 | | | |
| pH / Fluid Loss (mptm) | 9.30 / 7 | 9.00 / 7 | | | |
| PV (cP) / YP (lhf2) | 12 / 14.00 | 13 / 12.00 | | | |
| % Solids / % Sand | 8.80 / 0.25 | 6.20 / 0.60 | | | |
| % Oil / Oil:Water Ratio | N/A / N/A | N/A / N/A | | | |
| Rm @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Rmf @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Rmc @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Max Tool Temp (in F) / S | 105.50 / PGM | 215.00 / PGM | | | |

| | | | | | |
|-------------------------------|---------------|---------------|--|--|--|
| Max Tool Temp (degF) / Source | 165.58 / PCM | 245.03 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Lead MWD Engineer | Paul Sheets | Paul Sheets | | | |
| Customer Representative | Martin Suarez | Martin Suarez | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.93 | 5.93 | | | |
| Sub Serial Number | 11404272 | 12301676 | | | |
| Insert Serial Number | 11680742 | 11680742 | | | |
| Date and Time Initialized | 16-Dec-14 22:59 | 20-Dec-14 15:25 | | | |
| Date and Time Read | 20-Dec-14 08:32 | 27-Dec-14 09:16 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 55.74 | 58.69 | | | |
| Software Version | 6.21 | 6.21 | | | |
| Sub Serial Number | 11404272 | 12301676 | | | |
| Sonde Serial Number | 11638470 | 11638470 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 99.35 | 180.34 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 50.64 | 53.59 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11404272 | 12301676 | | | |
| Insert/Sonde Serial Number | 11293343 | 11293343 | | | |

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured from the rig 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. The following smoothing parameters have been applied to the data.
-All 2" (1:600) logs - 1ft. interval, 3 ft. coercion distance.
-All 5" (1:240) logs - .5ft interval, .6 ft. coercion distance.
5. INSITE version 8.1.10
6. Gamma presented inside casing/cement from 6992' MD to 7038' MD.

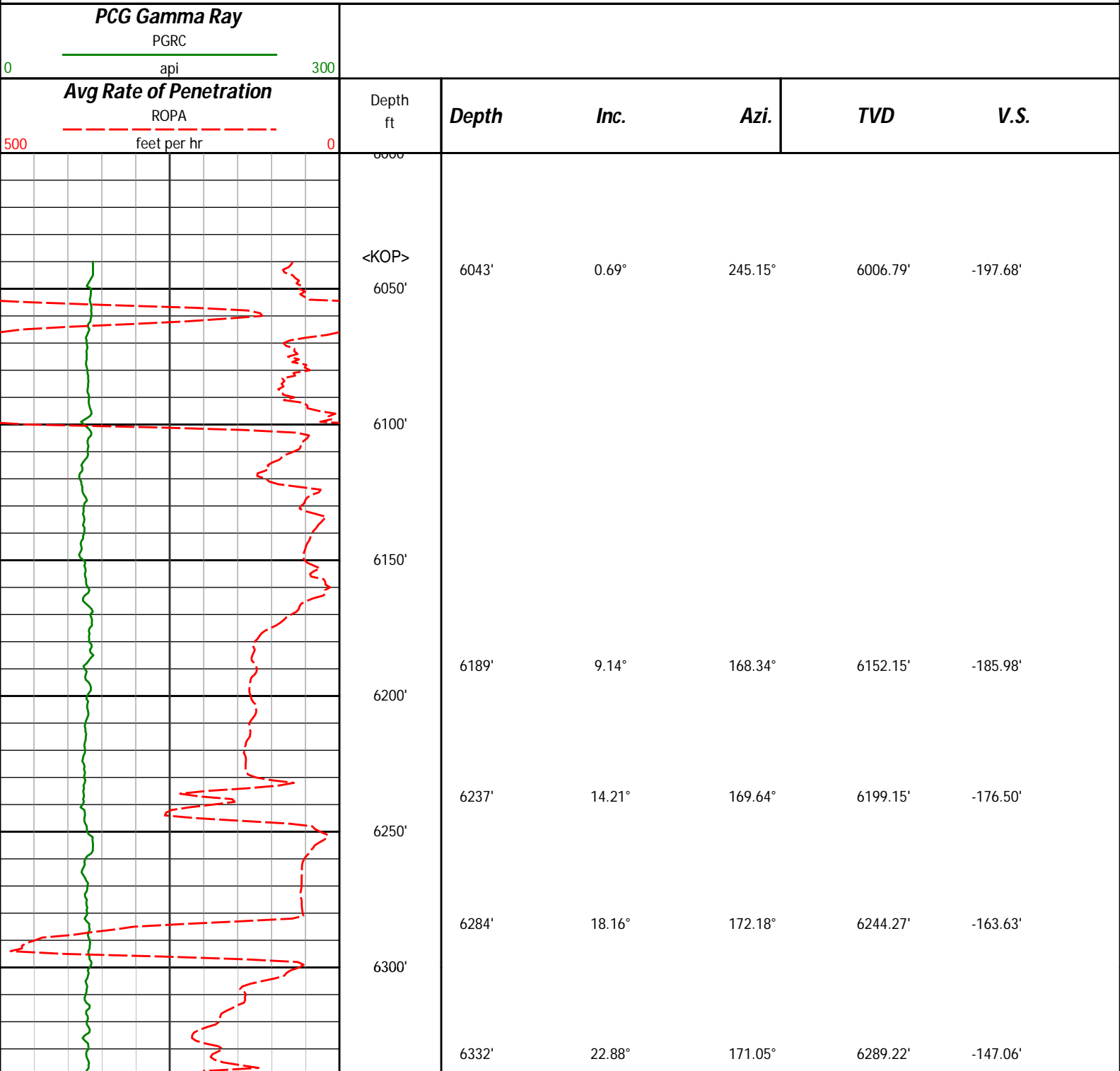
WARRANTY

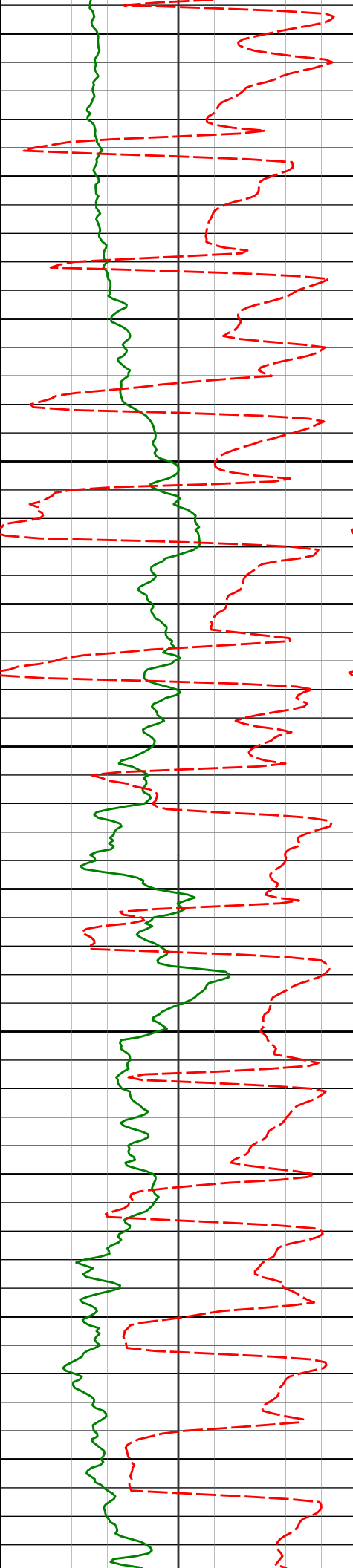
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HALLIBURTON
Sperry Drilling Services
MD Detail Log 1:600

Noble Energy, Inc
Crow Creek AA01-789
H&P 315
T6N R63W





6350'

6379'

6400'

6427'

6450'

6473'

6500'

6521'

6550'

6568'

6600'

6616'

6650'

6663'

6700'

6711'

6750'

6758'

6800'

6806'

6850'

6853'

27.60°

32.47°

35.16°

38.15°

42.51°

45.05°

49.17°

54.89°

60.47°

64.49°

67.66°

170.65°

175.49°

178.05°

178.28°

177.76°

179.17°

180.09°

179.90°

181.24°

182.34°

183.73°

6331.72'

6373.27'

6411.48'

6449.99'

6485.81'

6520.46'

6552.44'

6581.96'

6607.08'

6629.26'

6648.32'

-127.38'

-103.64'

-78.13'

-49.53'

-19.18'

13.98'

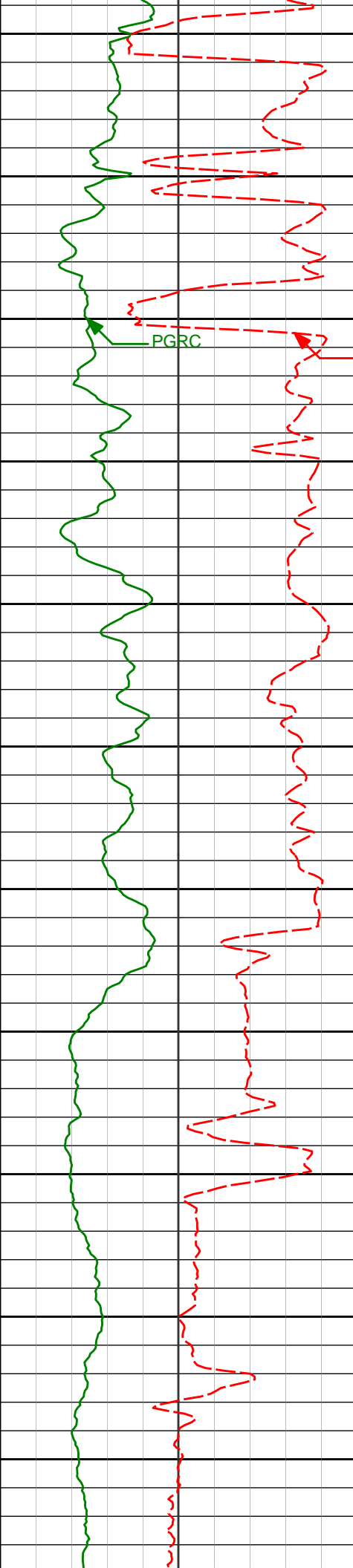
48.38'

86.19'

125.89'

168.45'

211.39'



6900'

6950'

7000'

7050'

7100'

7150'

7200'

7250'

7300'

7350'

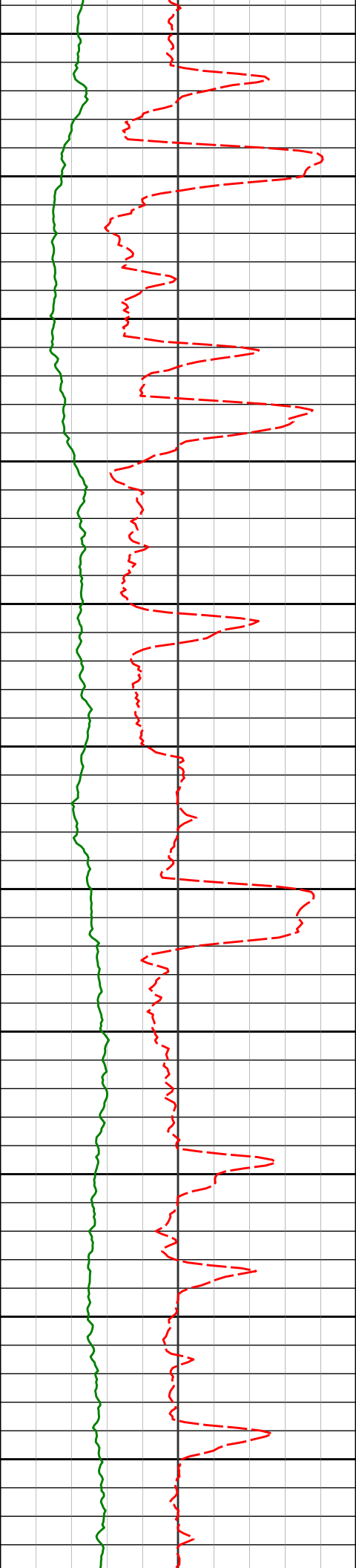
7400'

PGRC

ROPA

Run 200

| | | | | |
|-----------------------------|--------|---------|----------|---------|
| 6901' | 71.73° | 181.98° | 6664.97' | 256.38' |
| 6948' | 75.84° | 180.48° | 6678.09' | 301.50' |
| 6988' | 79.25° | 179.94° | 6686.72' | 340.54' |
| <7" casing set at 7038' MD> | | | | |
| 7120' | 85.31° | 178.88° | 6704.44' | 471.19' |
| 7215' | 87.93° | 179.42° | 6710.04' | 565.93' |
| 7310' | 89.14° | 179.20° | 6712.47' | 660.82' |
| 7404' | 89.01° | 178.90° | 6713.99' | 754.71' |



7450'

7500'

7550'

7600'

7650'

7700'

7750'

7800'

7850'

7900'

7950'

7499'

89.82°

177.90°

6714.96'

849.56'

7594'

91.11°

178.02°

6714.19'

944.36'

7689'

91.48°

177.78°

6712.04'

1039.14'

7784'

90.18°

178.94°

6710.66'

1133.97'

7878'

89.82°

178.51°

6710.66'

1227.85'

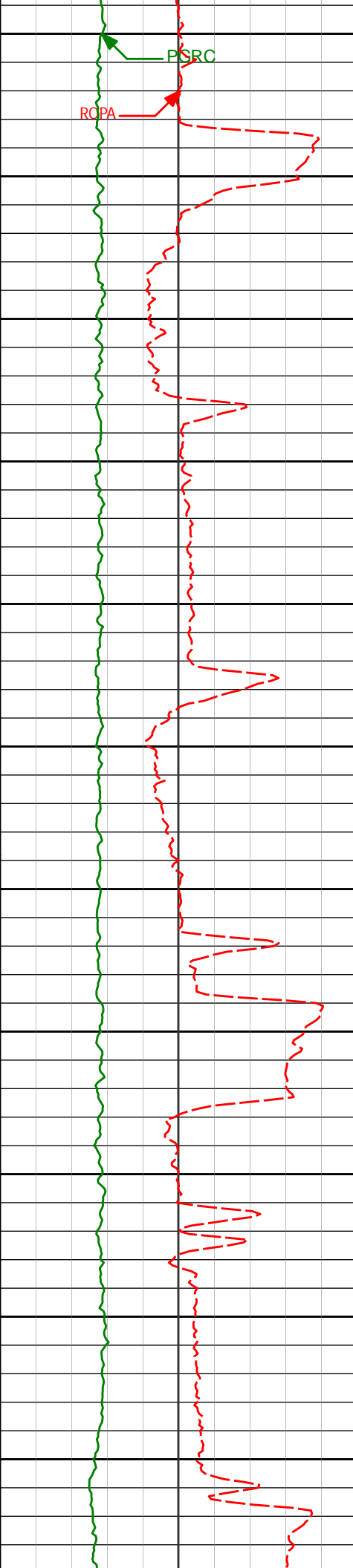
7973'

90.34°

178.31°

6710.53'

1322.71'



8000'

8050'

8100'

8150'

8200'

8250'

8300'

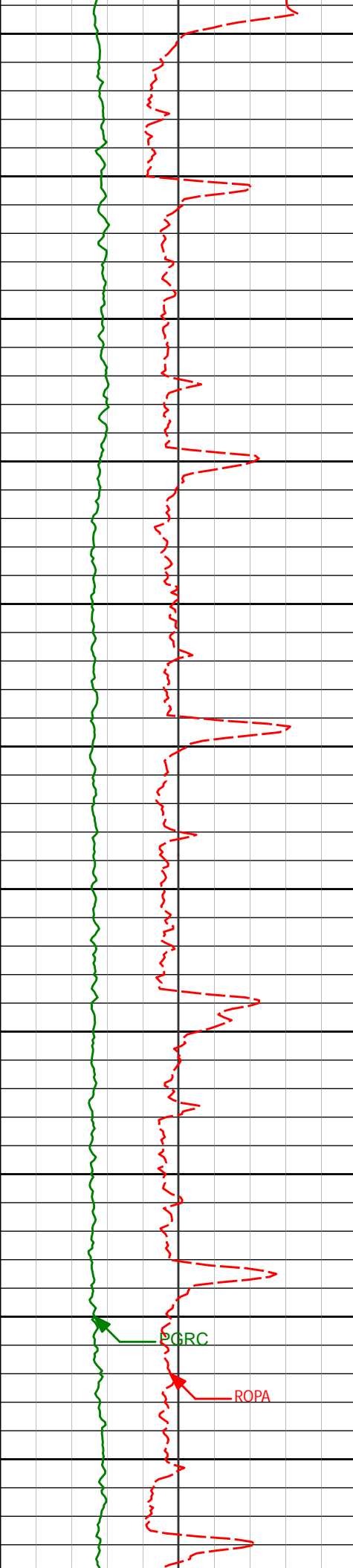
8350'

8400'

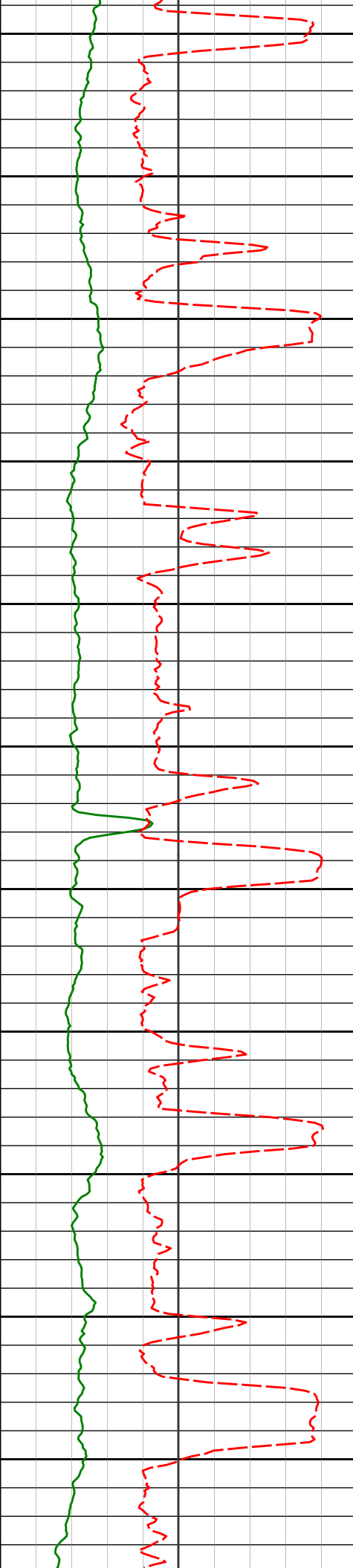
8450'

8500'

| | | | | |
|-------|--------|---------|----------|----------|
| 8068' | 89.63° | 178.85° | 6710.56' | 1417.57' |
| 8163' | 89.91° | 177.84° | 6710.94' | 1512.42' |
| 8258' | 89.75° | 176.92° | 6711.22' | 1607.16' |
| 8353' | 89.97° | 178.21° | 6711.45' | 1701.92' |
| 8447' | 89.85° | 178.73° | 6711.60' | 1795.78' |



| | | | | | |
|-------|-------|--------|---------|----------|----------|
| 8550' | 8542' | 90.28° | 181.27° | 6711.49' | 1890.73' |
| 8600' | | | | | |
| 8650' | 8637' | 89.97° | 180.68° | 6711.29' | 1985.73' |
| 8700' | | | | | |
| 8750' | 8732' | 90.89° | 180.33° | 6710.57' | 2080.71' |
| 8800' | | | | | |
| 8850' | 8827' | 90.37° | 180.02° | 6709.53' | 2175.67' |
| 8900' | | | | | |
| 8950' | 8922' | 90.74° | 179.63° | 6708.61' | 2270.62' |
| 9000' | | | | | |
| 9050' | 9017' | 91.05° | 179.51° | 6707.12' | 2365.55' |



9100'

9150'

9200'

9250'

9300'

9350'

9400'

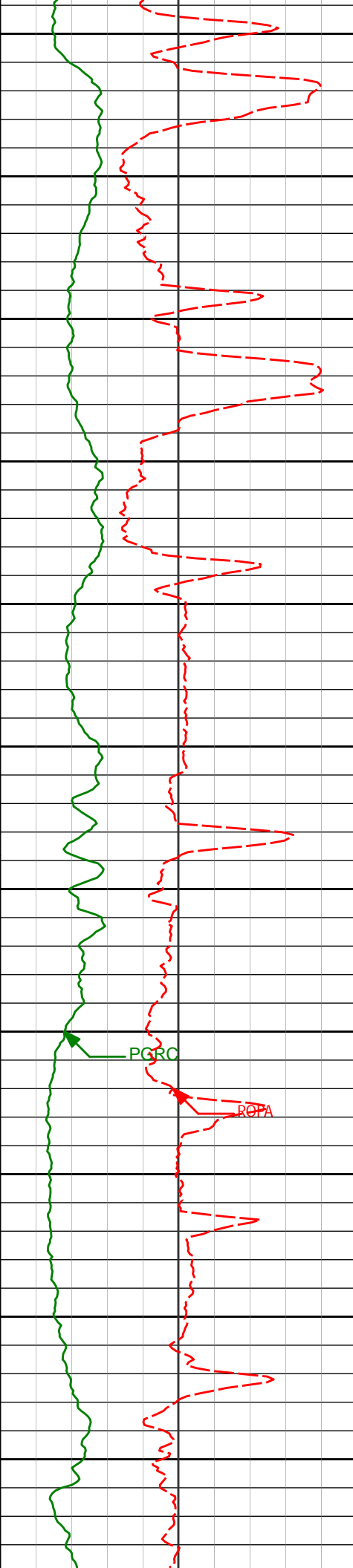
9450'

9500'

9550'

9600'

| | | | | |
|-------|--------|---------|----------|----------|
| 9112' | 91.39° | 179.04° | 6705.10' | 2460.45' |
| 9207' | 89.48° | 179.29° | 6704.38' | 2555.36' |
| 9301' | 90.15° | 179.01° | 6704.68' | 2649.27' |
| 9396' | 90.09° | 178.58° | 6704.48' | 2744.16' |
| 9491' | 88.06° | 178.16° | 6706.02' | 2838.99' |
| 9586' | 87.97° | 179.44° | 6709.31' | 2933.81' |



9650'

9681'

88.86°

179.04°

6711.94'

3028.70'

9700'

9750'

9776'

90.99°

180.63°

6712.06'

3123.64'

9800'

9850'

9871'

91.02°

180.59°

6710.39'

3218.61'

9900'

9950'

9966'

90.34°

180.38°

6709.27'

3313.59'

10000'

PGRC

RQPA

10050'

10061'

90.40°

180.19°

6708.65'

3408.56'

10100'

10150'

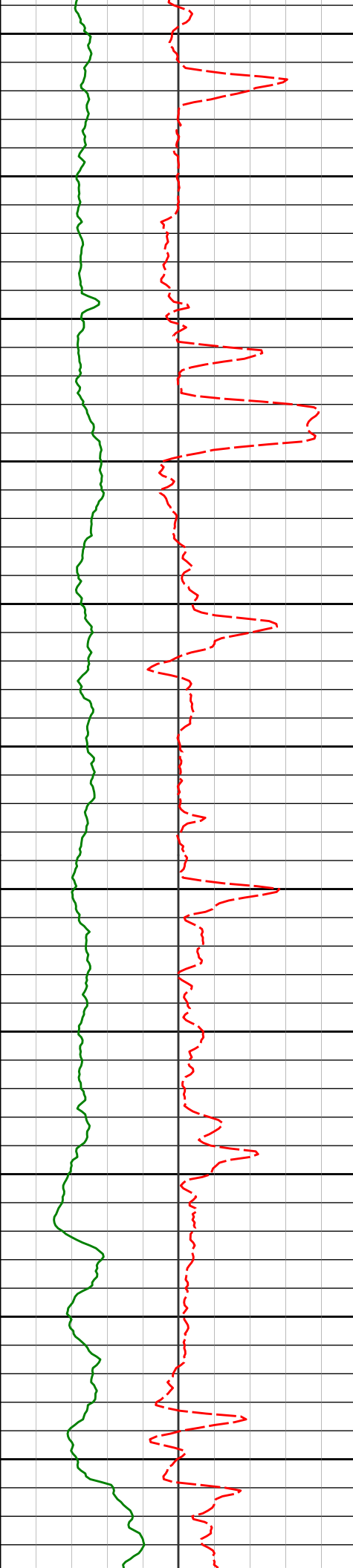
10156'

90.80°

180.24°

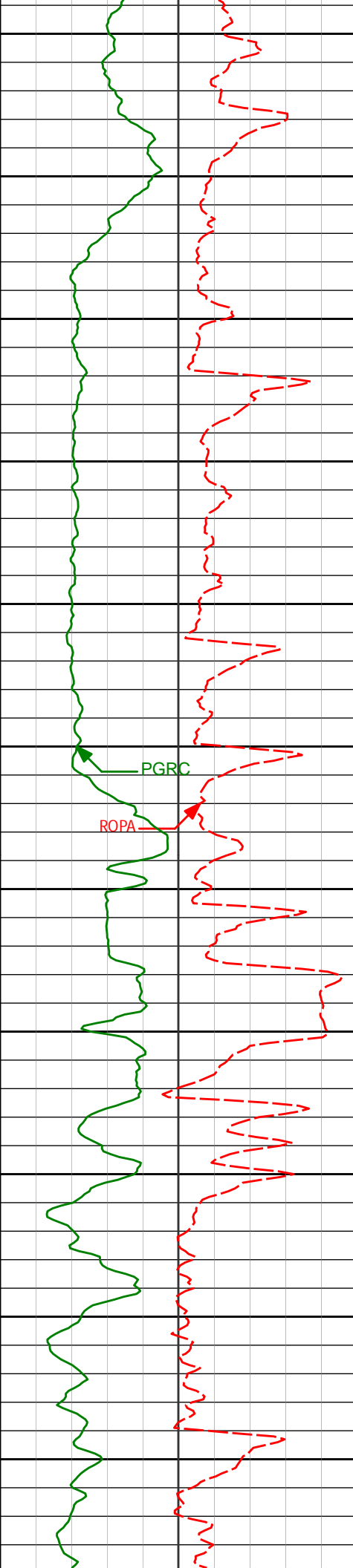
6707.66'

3503.53'



| | | | | | |
|--------|--------|--------|---------|----------|----------|
| 10200' | | | | | |
| 10250' | 10250' | 91.26° | 180.32° | 6705.97' | 3597.49' |
| 10300' | | | | | |
| 10350' | 10345' | 89.51° | 179.30° | 6705.33' | 3692.44' |
| 10400' | | | | | |
| 10450' | 10439' | 89.45° | 179.24° | 6706.18' | 3786.35' |
| 10500' | | | | | |
| 10550' | 10531' | 89.54° | 179.19° | 6706.99' | 3878.27' |
| 10600' | | | | | |
| 10650' | 10624' | 89.63° | 179.18° | 6707.67' | 3971.19' |
| 10700' | | | | | |
| | 10716' | 89.85° | 179.43° | 6708.09' | 4063.11' |

| | | | | | |
|--------|--------|--------|---------|----------|----------|
| | | | | | |
| 10250' | 10250' | 91.26° | 180.32° | 6705.97' | 3597.49' |
| | | | | | |
| 10350' | 10345' | 89.51° | 179.30° | 6705.33' | 3692.44' |
| | | | | | |
| 10450' | 10439' | 89.45° | 179.24° | 6706.18' | 3786.35' |
| | | | | | |
| 10550' | 10531' | 89.54° | 179.19° | 6706.99' | 3878.27' |
| | | | | | |
| 10650' | 10624' | 89.63° | 179.18° | 6707.67' | 3971.19' |
| | | | | | |
| 10716' | 10716' | 89.85° | 179.43° | 6708.09' | 4063.11' |



10750'

10800'

10850'

10900'

10950'

11000'

11050'

11100'

11150'

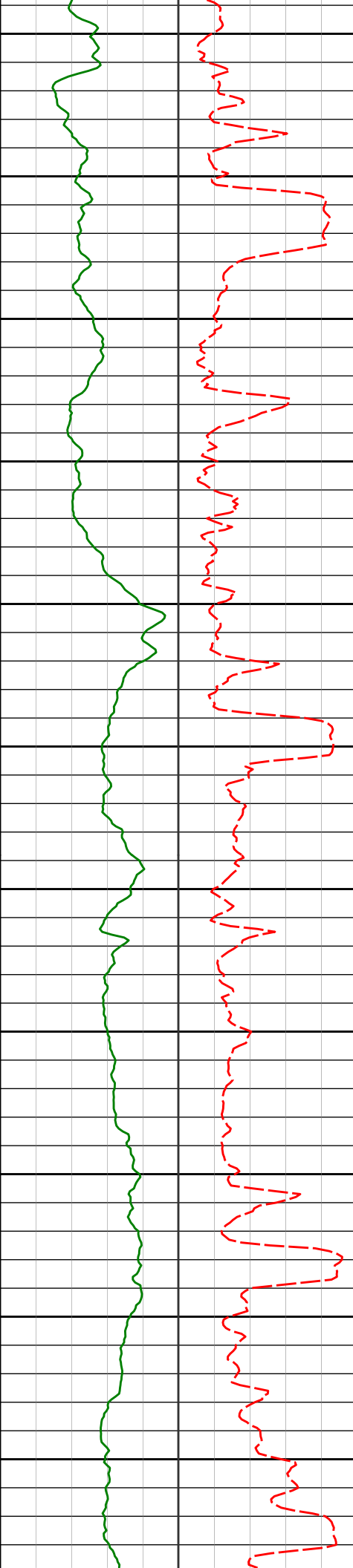
11200'

11250'

| | | | | |
|--------|--------|---------|----------|----------|
| 10810' | 89.57° | 179.33° | 6708.56' | 4157.04' |
| 10903' | 89.35° | 178.69° | 6709.44' | 4249.94' |
| 10996' | 89.23° | 177.45° | 6710.59' | 4342.75' |
| 11087' | 90.09° | 177.71° | 6711.13' | 4433.53' |
| 11180' | 90.77° | 178.96° | 6710.43' | 4526.37' |
| 11272' | 91.14° | 178.32° | 6708.90' | 4618.23' |

PGRC

ROPA



11300'

11350'

11400'

11450'

11500'

11550'

11600'

11650'

11700'

11750'

11800'

11365'

90.71°

179.01°

6707.40'

4711.10'

11458'

91.08°

178.97°

6705.95'

4803.99'

11551'

90.15°

179.60°

6704.95'

4896.91'

11646'

90.49°

179.43°

6704.42'

4991.84'

11740'

90.03°

180.30°

6703.99'

5085.80'

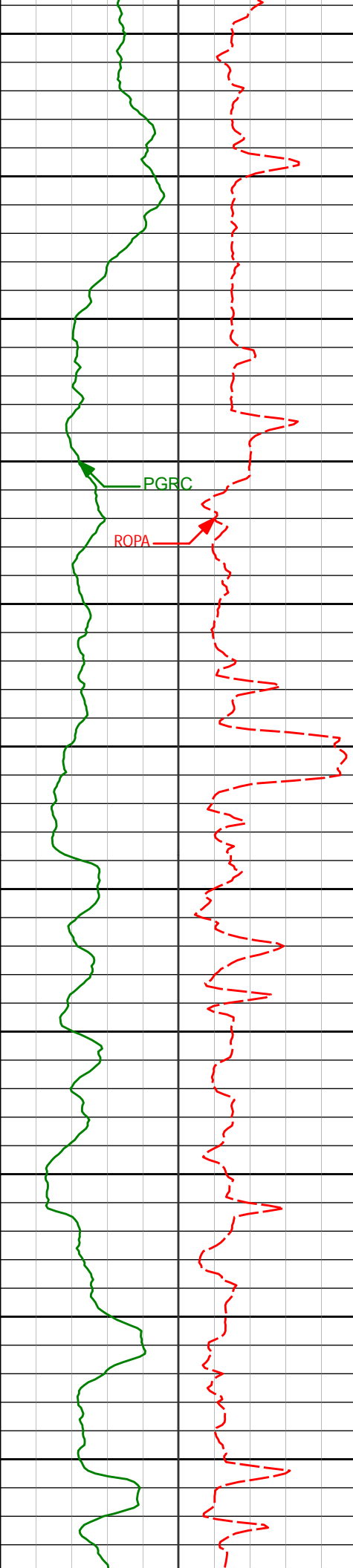
11832'

89.01°

180.78°

6704.76'

5177.78'



11850'

11900'

11950'

12000'

12050'

12100'

12150'

12200'

12250'

12300'

12350'

11924'

88.98°

180.77°

6706.37'

5269.76'

12016'

88.67°

180.47°

6708.26'

5361.72'

12108'

89.32°

179.31°

6709.87'

5453.67'

12201'

88.98°

179.12°

6711.25'

5546.57'

12294'

88.80°

178.93°

6713.06'

5639.46'

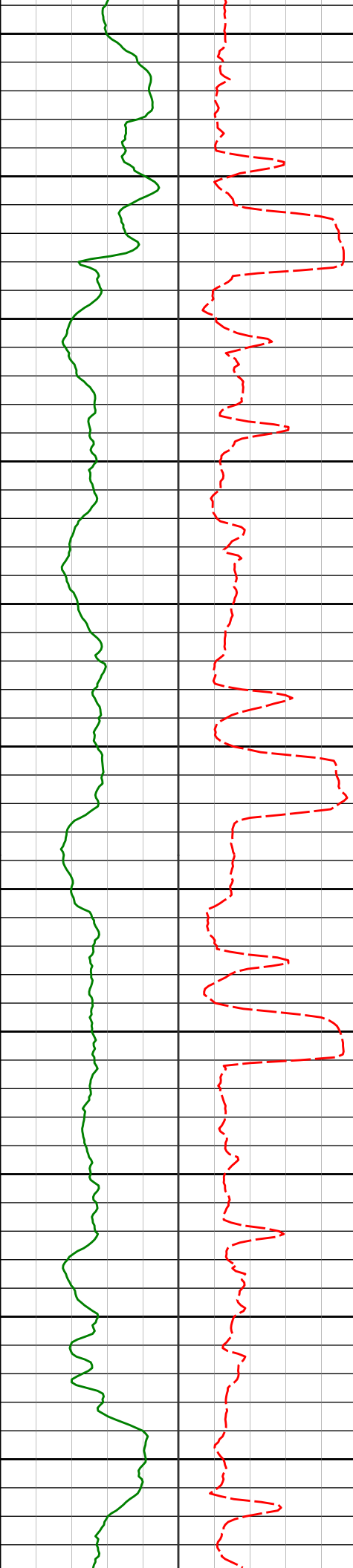
12385'

88.52°

179.24°

6715.18'

5730.35'



12400'

12450'

12478'

90.31°

177.06°

6716.13'

5823.17'

12500'

12550'

12572'

90.71°

176.65°

6715.30'

5916.84'

12600'

12650'

12665'

91.79°

177.74°

6713.27'

6009.54'

12700'

12750'

12759'

90.28°

179.19°

6711.57'

6103.38'

12800'

12850'

12854'

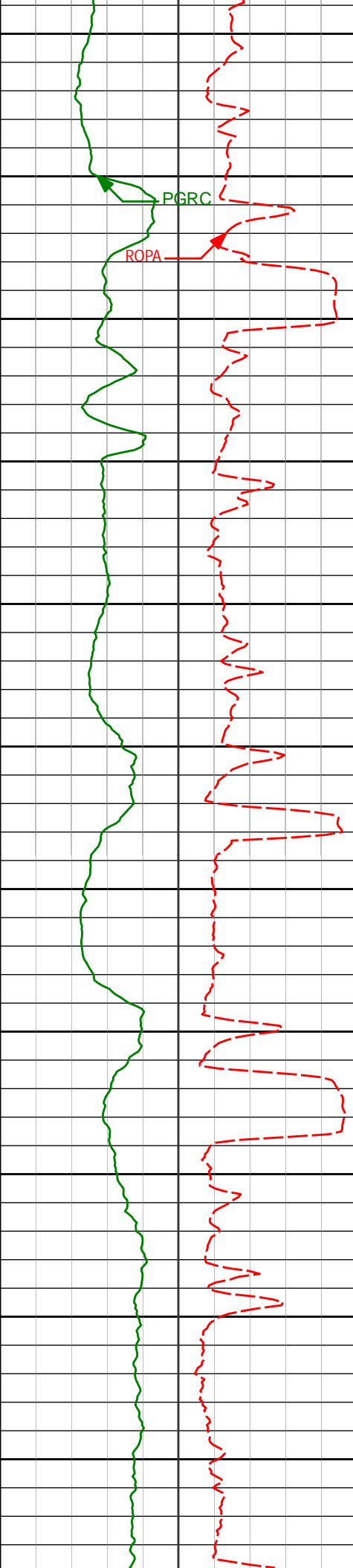
90.34°

178.59°

6711.06'

6198.27'

12900'



12950'

12949'

89.97°

178.01°

6710.80'

6293.11'

13000'

13044'

91.48°

179.46°

6709.60'

6387.98'

13050'

13100'

13139'

91.57°

179.48°

6707.07'

6482.88'

13150'

13200'

13234'

91.85°

180.21°

6704.23'

6577.79'

13250'

13300'

13329'

88.98°

180.29°

6703.55'

6672.76'

13350'

13400'

13424'

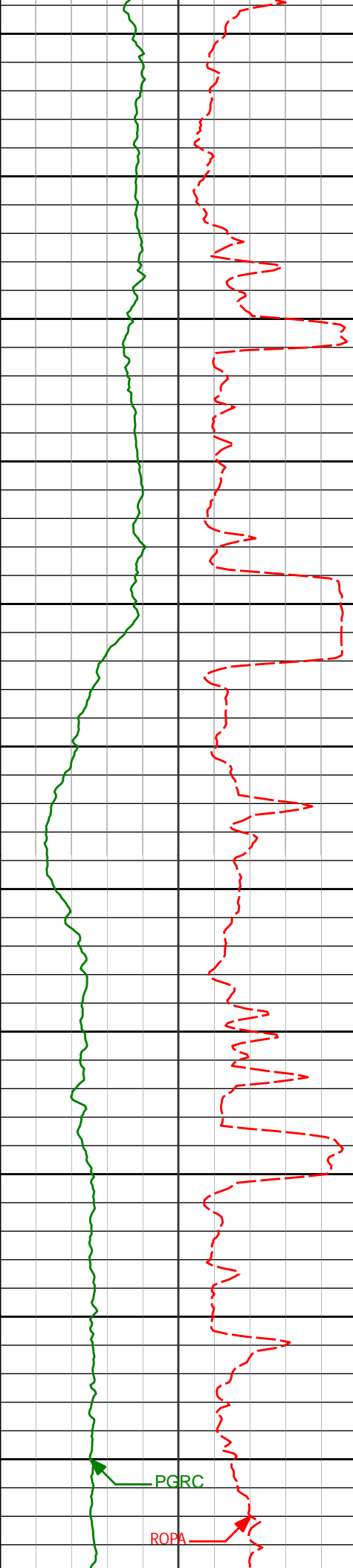
89.54°

179.42°

6704.77'

6767.70'

13450'



13500'

13550'

13600'

13650'

13700'

13750'

13800'

13850'

13900'

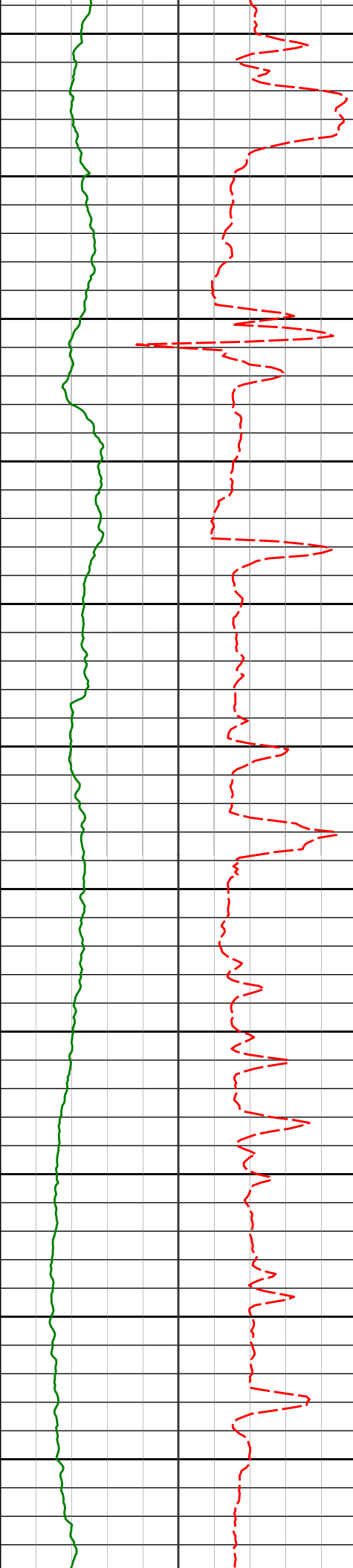
13950'

14000'

| | | | | |
|--------|--------|---------|----------|----------|
| 13519' | 88.89° | 178.08° | 6706.07' | 6862.57' |
| 13614' | 89.32° | 176.57° | 6707.56' | 6957.29' |
| 13709' | 90.89° | 178.84° | 6707.38' | 7052.07' |
| 13804' | 91.32° | 178.79° | 6705.55' | 7146.94' |
| 13899' | 90.43° | 179.21° | 6704.10' | 7241.83' |
| 13994' | 90.93° | 179.14° | 6702.97' | 7336.73' |

PGRC

ROPA



14050'

14088'

89.41°

179.01°

6702.70'

7430.64'

14100'

14150'

14183'

89.11°

178.69°

6703.92'

7525.52'

14200'

14250'

14278'

89.72°

179.00°

6704.89'

7620.41'

14300'

14350'

14373'

89.57°

178.55°

6705.48'

7715.29'

14400'

14450'

14468'

90.15°

179.00°

6705.71'

7810.17'

14500'

14550'

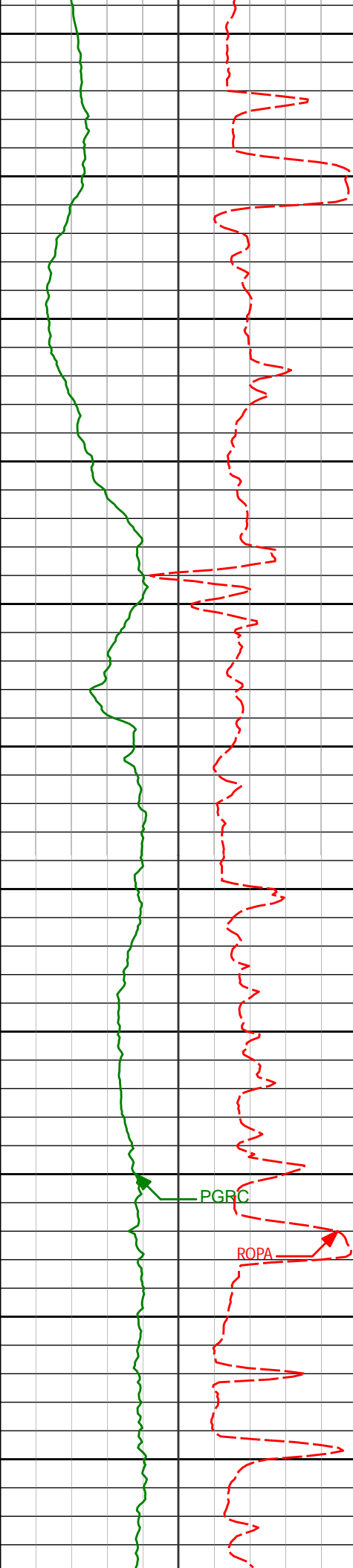
14563'

90.99°

178.97°

6704.77'

7905.07'



14600'

14650'

14700'

14750'

14800'

14850'

14900'

14950'

15000'

15050'

15100'

14658'

89.35°

179.14°

6704.49'

7999.97'

14753'

89.66°

179.07°

6705.31'

8094.88'

14848'

90.06°

178.90°

6705.54'

8189.78'

14943'

91.14°

179.03°

6704.54'

8284.67'

15037'

90.00°

178.96°

6703.61'

8378.57'

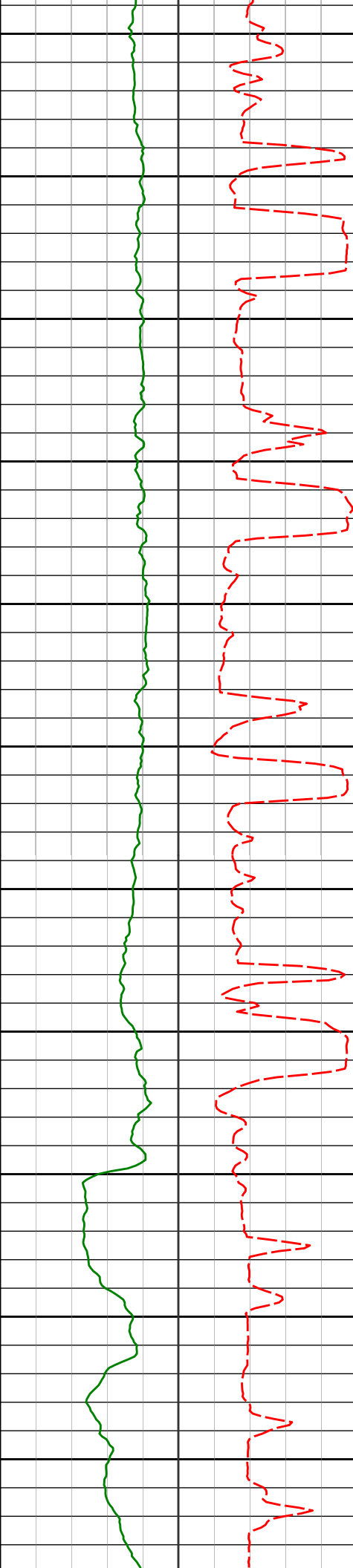
15132'

90.34°

177.65°

6703.33'

8473.41'



15150'

15200'

15227'

90.09°

178.35°

6702.97'

8568.22'

15250'

15300'

15322'

89.91°

178.82°

6702.97'

8663.09'

15350'

15400'

15417'

90.49°

180.93°

6702.64'

8758.04'

15450'

15500'

15511'

88.12°

180.21°

6703.78'

8852.01'

15550'

15600'

15606'

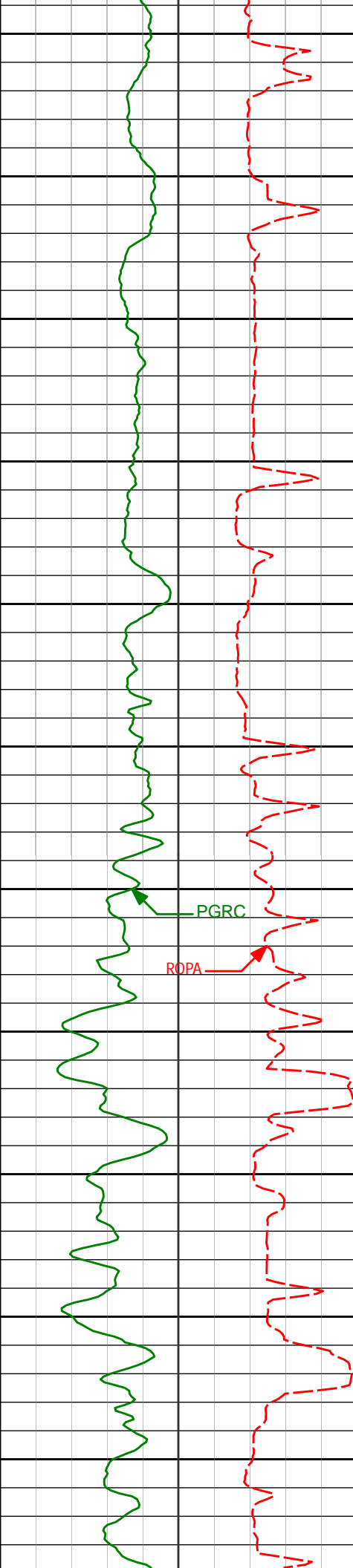
88.46°

179.96°

6706.61'

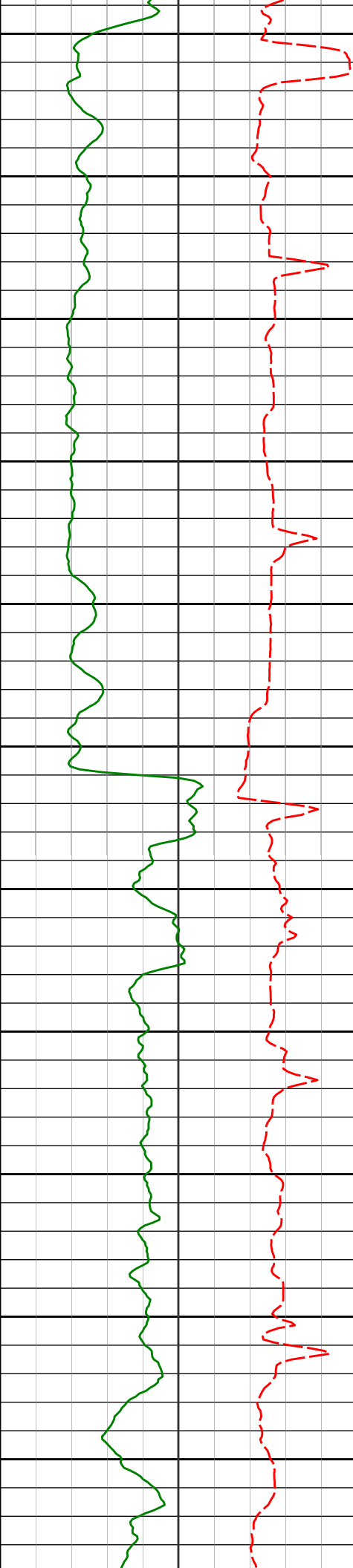
8946.93'

15650'



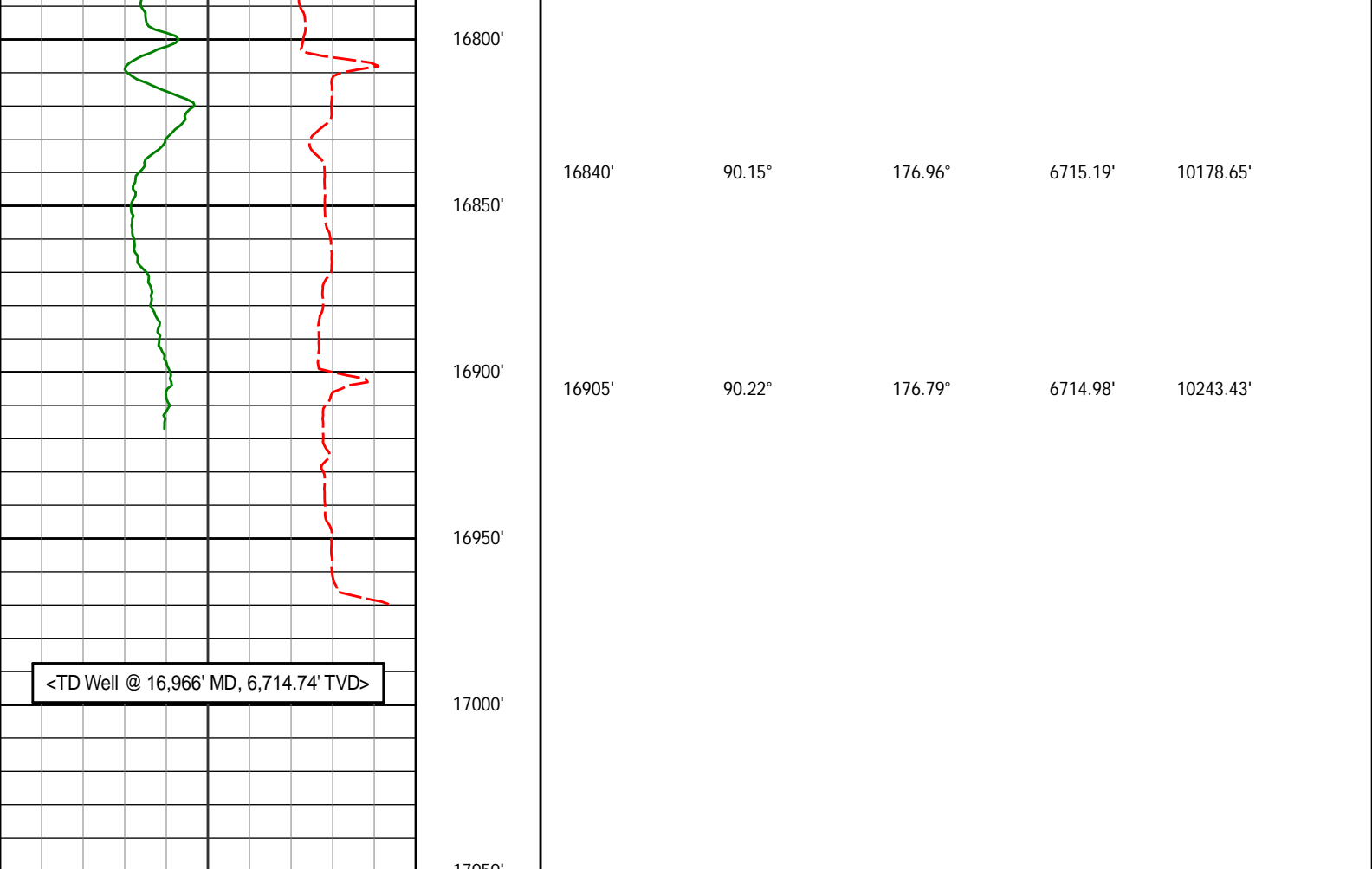
| |
|--------|
| 15700' |
| 15750' |
| 15800' |
| 15850' |
| 15900' |
| 15950' |
| 16000' |
| 16050' |
| 16100' |
| 16150' |
| 16200' |

| | | | | |
|--------|--------|---------|----------|----------|
| 15701' | 88.71° | 179.83° | 6708.96' | 9041.86' |
| 15796' | 89.29° | 179.71° | 6710.62' | 9136.80' |
| 15891' | 88.55° | 178.50° | 6712.41' | 9231.69' |
| 15986' | 88.58° | 177.89° | 6714.79' | 9326.49' |
| 16081' | 88.80° | 178.48° | 6716.96' | 9421.30' |
| 16176' | 89.38° | 178.35° | 6718.47' | 9516.14' |



16250'
16271'
16300'
16350'
16400'
16450'
16500'
16550'
16600'
16650'
16700'
16750'

| | | | | |
|--------|--------|---------|----------|-----------|
| 16271' | 89.82° | 178.30° | 6719.13' | 9610.98' |
| 16366' | 90.25° | 178.17° | 6719.07' | 9705.82' |
| 16460' | 90.89° | 178.20° | 6718.14' | 9799.64' |
| 16555' | 90.86° | 177.98° | 6716.69' | 9894.46' |
| 16650' | 90.46° | 177.56° | 6715.59' | 9989.24' |
| 16745' | 89.94° | 176.99° | 6715.26' | 10083.96' |



| | | | | | | |
|---|-------------|--------------|-------------|-------------|------------|-------------|
| Avg Rate of Penetration ROPA feet per hr | Depth ft | Depth | Inc. | Azi. | TVD | V.S. |
| 500 0 | | | | | | |

| | |
|-------------------------------------|--|
| PCG Gamma Ray PGRC api | |
| 0 300 | |

HALLIBURTON

Sperry Drilling Services

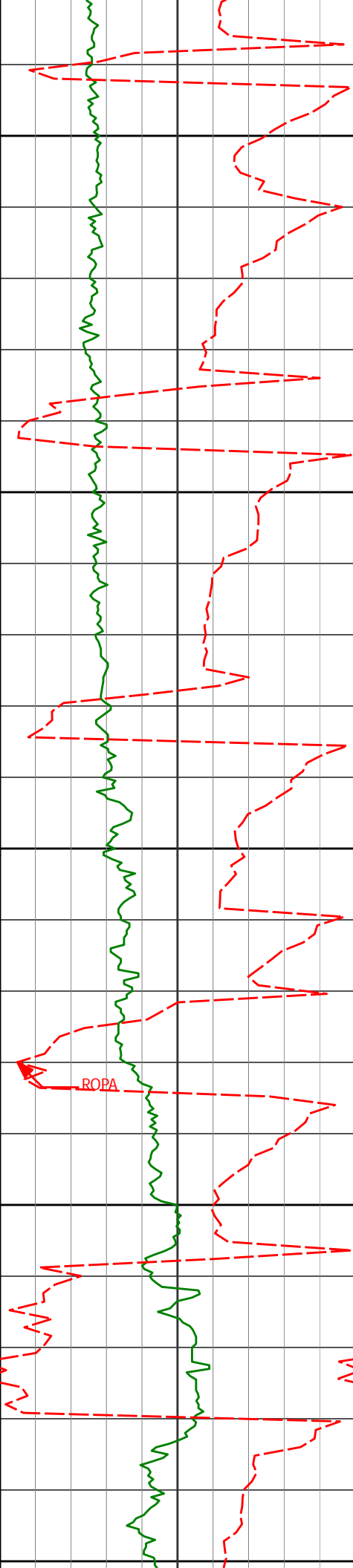
MD Detail Log 1:240

Noble Energy, Inc
Crow Creek AA01-789
H&P 315
T6N R63W

| | | | |
|-------------------------------------|--|------------|-------------|
| PCG Gamma Ray PGRC api | | TVD | V.S. |
| 0 300 | | | |

| | | | | |
|---|-------------|--------------|-------------|-------------|
| Avg Rate of Penetration ROPA feet per hr | Depth ft | Depth | Inc. | Azi. |
| 500 0 | | | | |





6350'

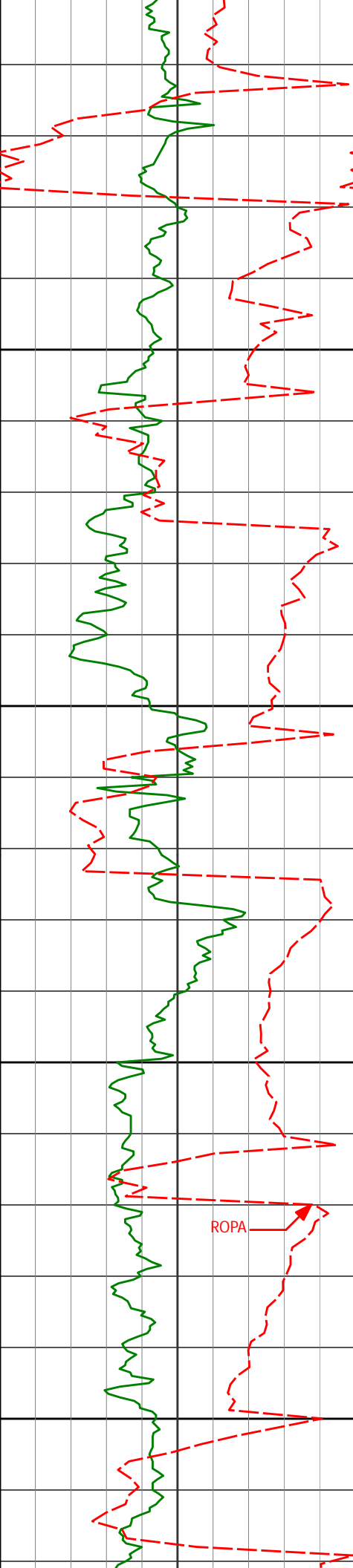
6400'

6450'

6500'

6550'

| | | | | |
|-------|--------|---------|----------|----------|
| 6332' | 22.88° | 171.05° | 6289.22' | -147.06' |
| 6379' | 27.60° | 170.65° | 6331.72' | -127.38' |
| 6427' | 32.47° | 175.49° | 6373.27' | -103.64' |
| 6473' | 35.16° | 178.05° | 6411.48' | -78.13' |
| 6521' | 38.15° | 178.28° | 6449.99' | -49.53' |



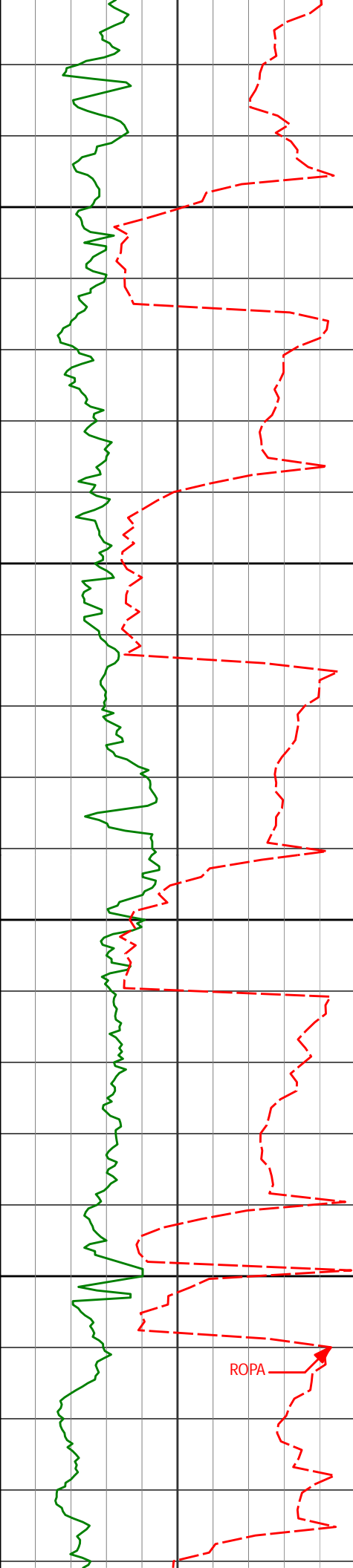
6600'

6650'

6700'

6750'

| | | | | |
|-------|--------|---------|----------|---------|
| 6568' | 42.51° | 177.76° | 6485.81' | -19.18' |
| 6616' | 45.05° | 179.17° | 6520.46' | 13.98' |
| 6663' | 49.17° | 180.09° | 6552.44' | 48.38' |
| 6711' | 54.89° | 179.90° | 6581.96' | 86.19' |
| 6758' | 60.47° | 181.24° | 6607.08' | 125.89' |



6800'

6806'

64.49°

182.34°

6629.26'

168.45'

6850'

6853'

67.66°

183.73°

6648.32'

211.39'

6900'

6901'

71.73°

181.98°

6664.97'

256.38'

6950'

6948'

75.84°

180.48°

6678.09'

301.50'

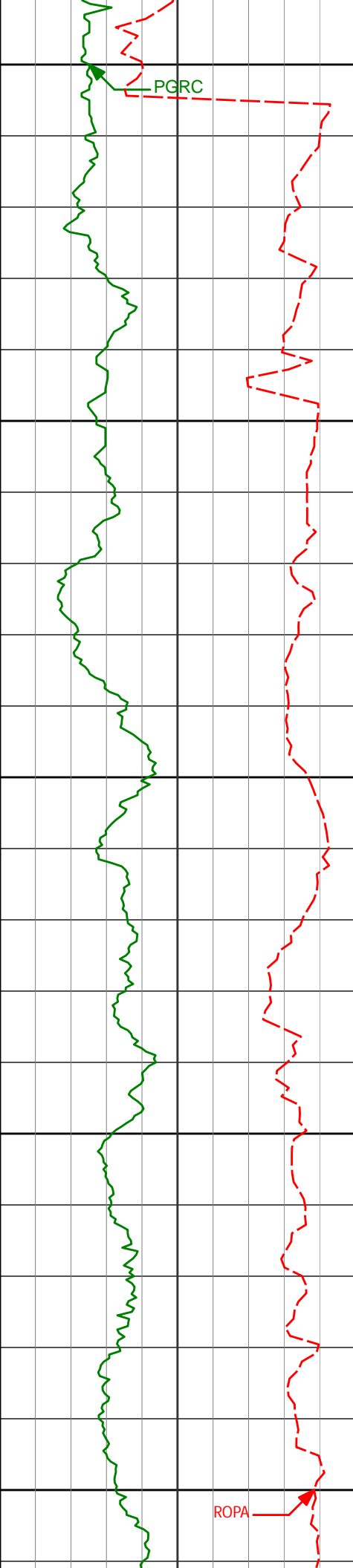
6988'

79.25°

179.94°

6686.72'

340.54'



Run 200

<7" casing set at 7038' MD>

7120'

85.31°

178.88°

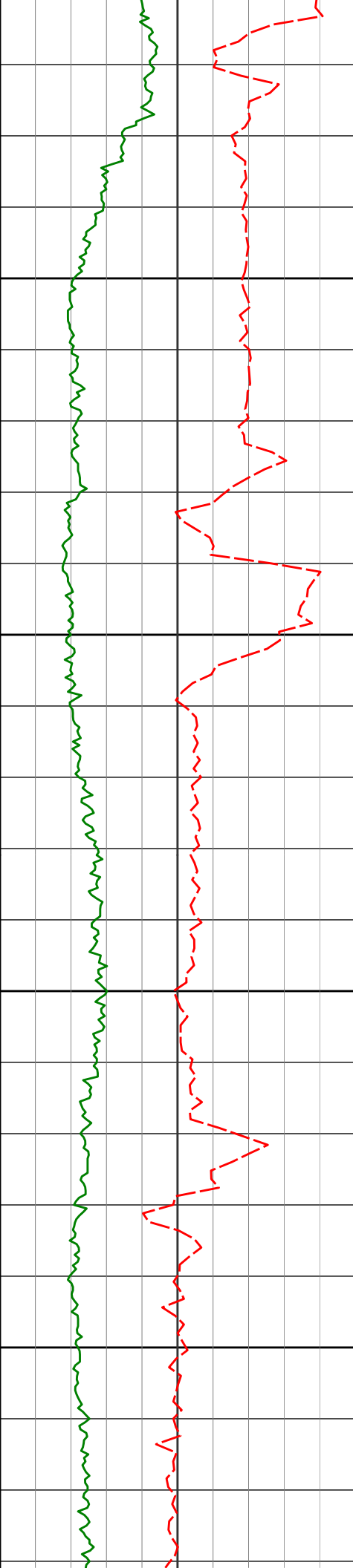
6704.44'

471.19'

7150'

7200'

ROPA



7250'

7300'

7350'

7400'

7215'

87.93°

179.42°

6710.04'

565.93'

7310'

89.14°

179.20°

6712.47'

660.82'

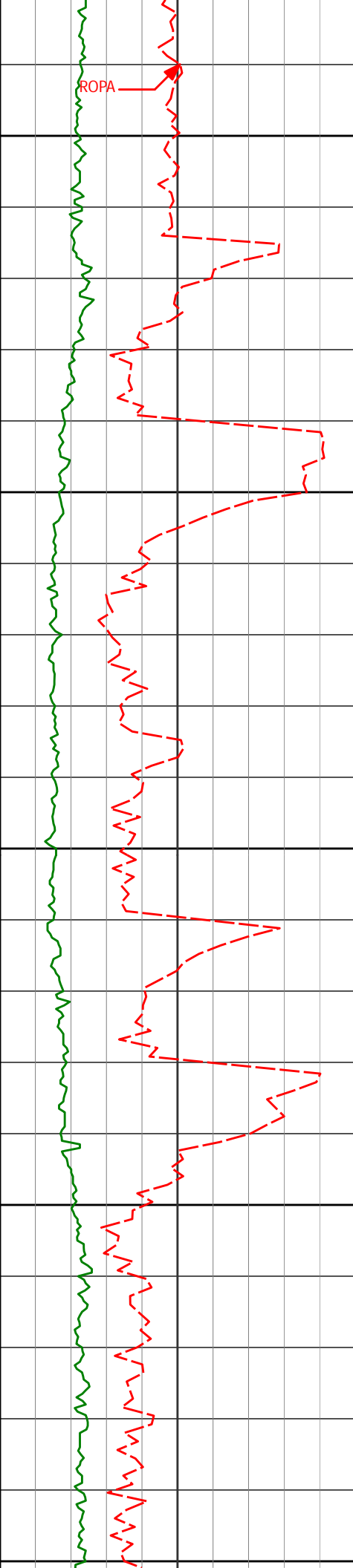
7404'

89.01°

178.90°

6713.99'

754.71'



7450'

7500'

7550'

7600'

7650'

7499'

89.82°

177.90°

6714.96'

849.56'

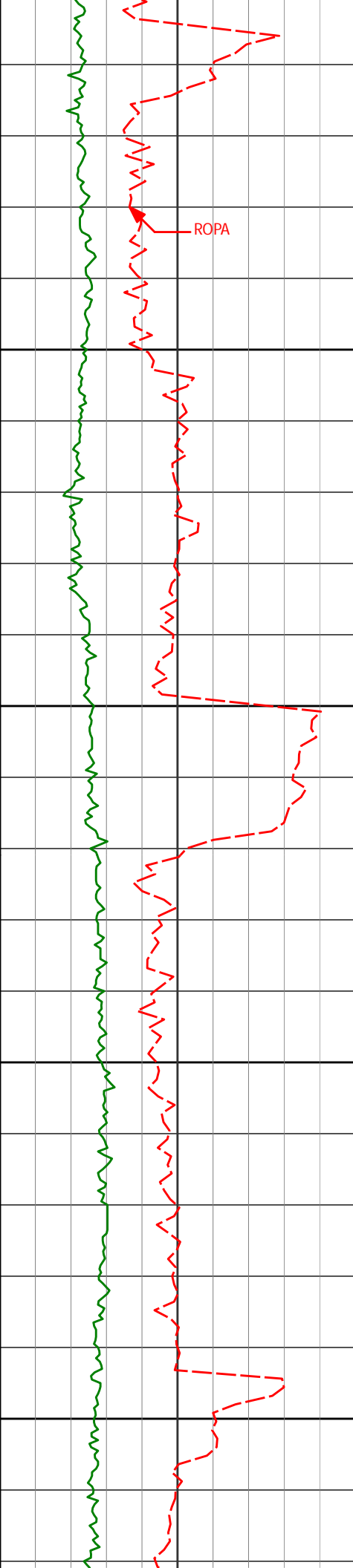
7594'

91.11°

178.02°

6714.19'

944.36'



7700'

7750'

7800'

7850'

7689'

91.48°

177.78°

6712.04'

1039.14'

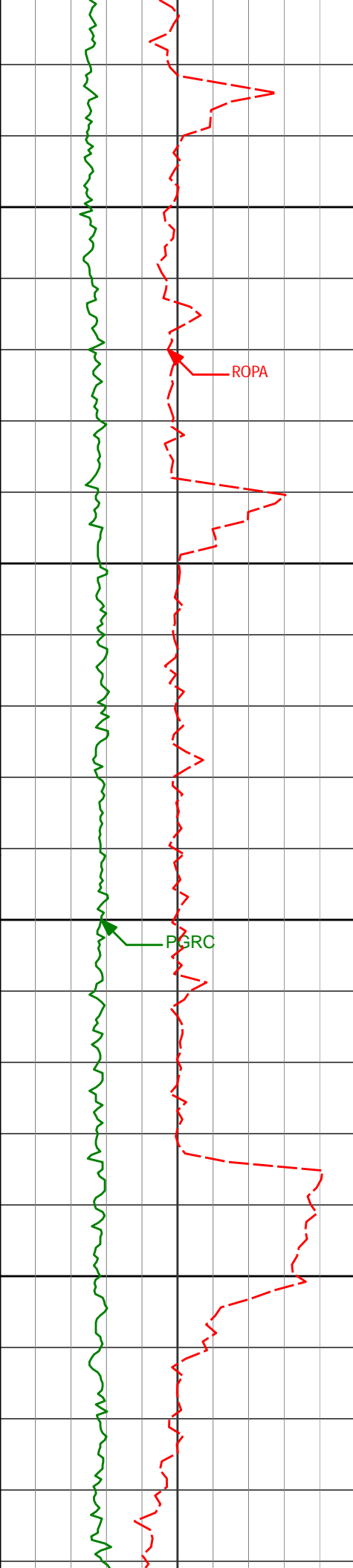
7784'

90.18°

178.94°

6710.66'

1133.97'



7900'

ROPA

7950'

8000'

PGRC

8050'

7878'

89.82°

178.51°

6710.66'

1227.85'

7973'

90.34°

178.31°

6710.53'

1322.71'

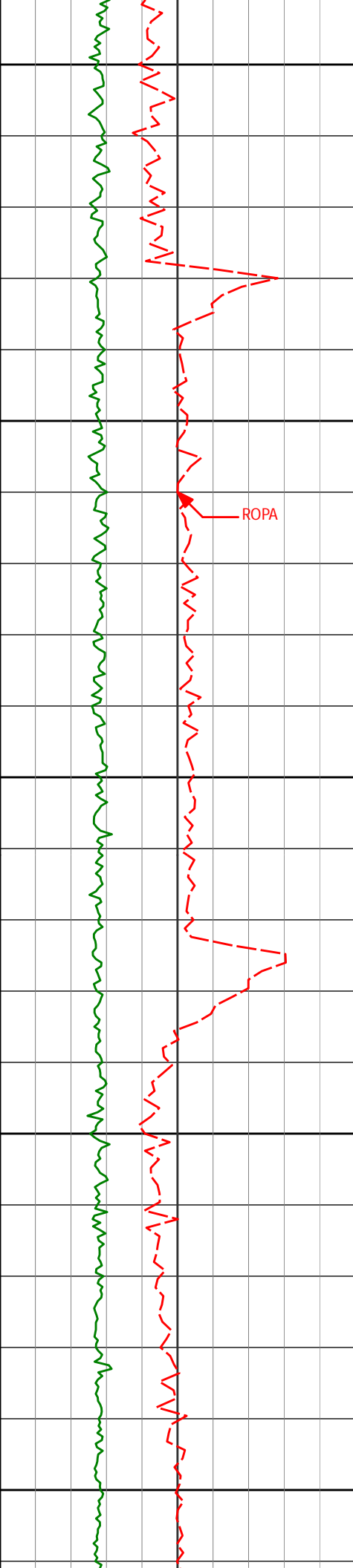
8068'

89.63°

178.85°

6710.56'

1417.57'



8100'

8150'

8163'

89.91°

177.84°

6710.94'

1512.42'

8200'

8250'

8258'

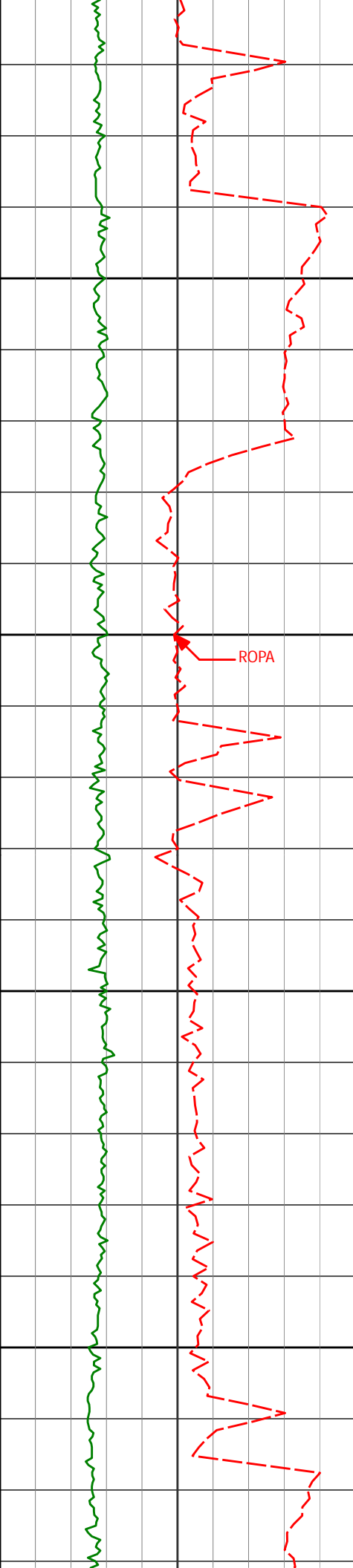
89.75°

176.92°

6711.22'

1607.16'

8300'



8350'

8353'

89.97°

178.21°

6711.45'

1701.92'

8400'

ROPA

8450'

8447'

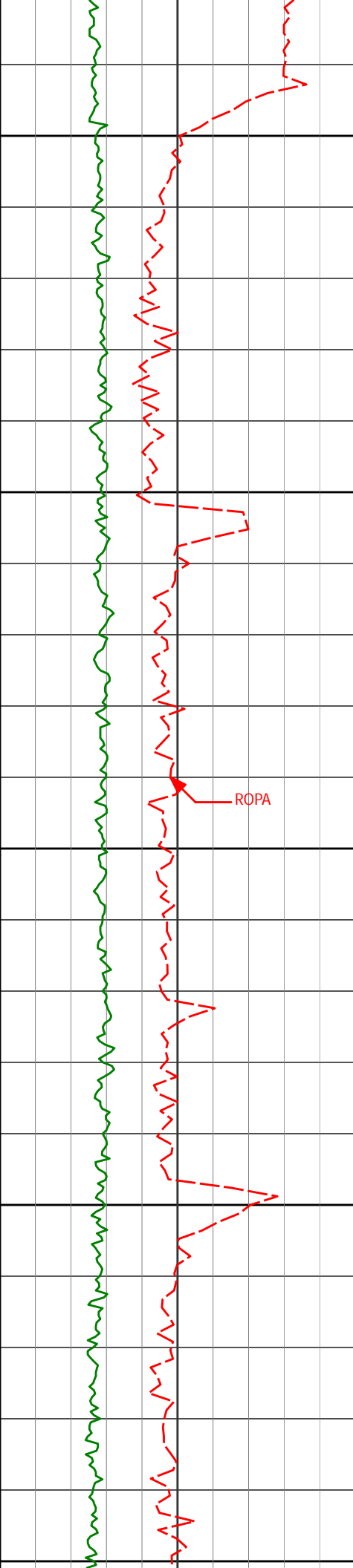
89.85°

178.73°

6711.60'

1795.78'

8500'



8550'

8600'

8650'

8700'

8750'

8542'

90.28°

181.27°

6711.49'

1890.73'

8637'

89.97°

180.68°

6711.29'

1985.73'

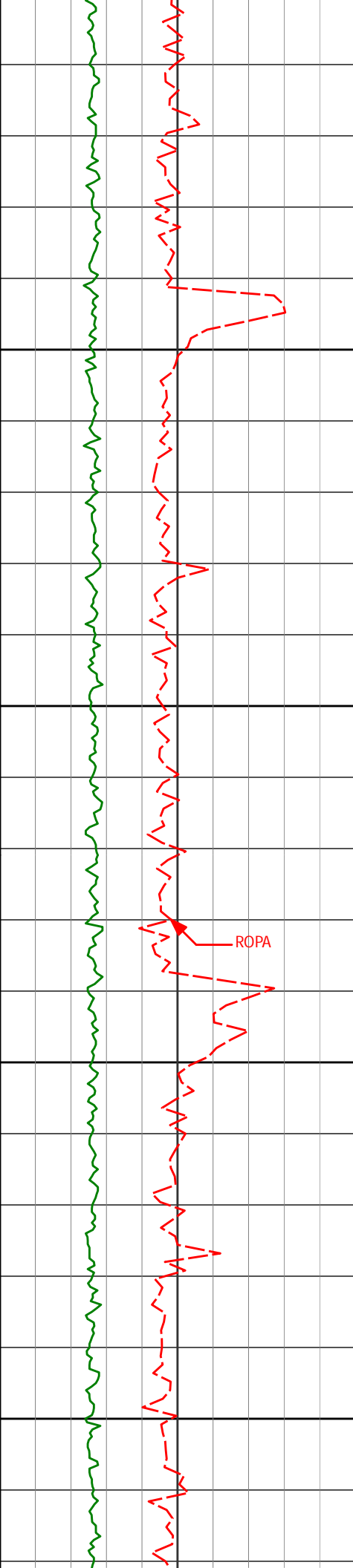
8732'

90.89°

180.33°

6710.57'

2080.71'



8800'

8827'

90.37°

180.02°

6709.53'

2175.67'

8850'

8900'

8922'

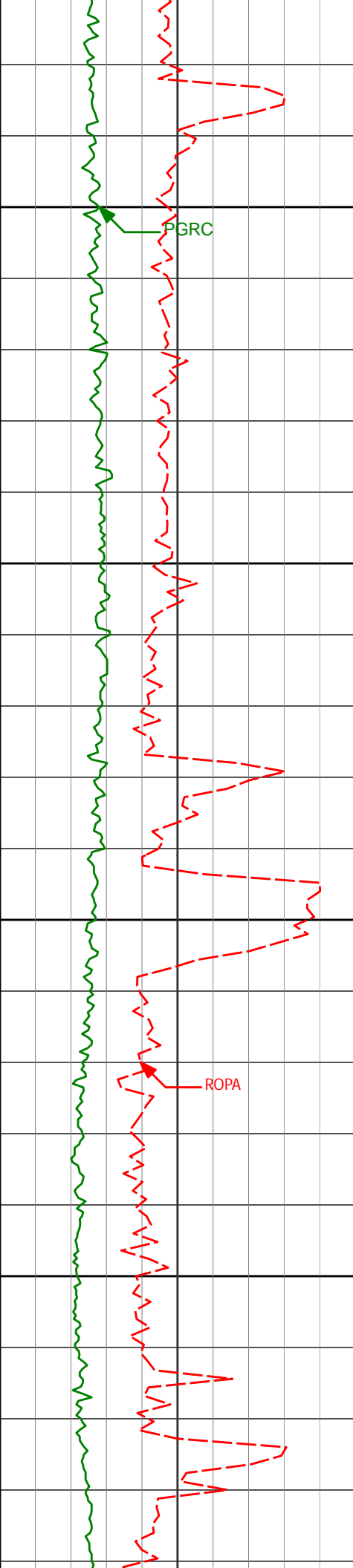
90.74°

179.63°

6708.61'

2270.62'

8950'



9000'

9017'

91.05°

179.51°

6707.12'

2365.55'

9050'

9100'

9112'

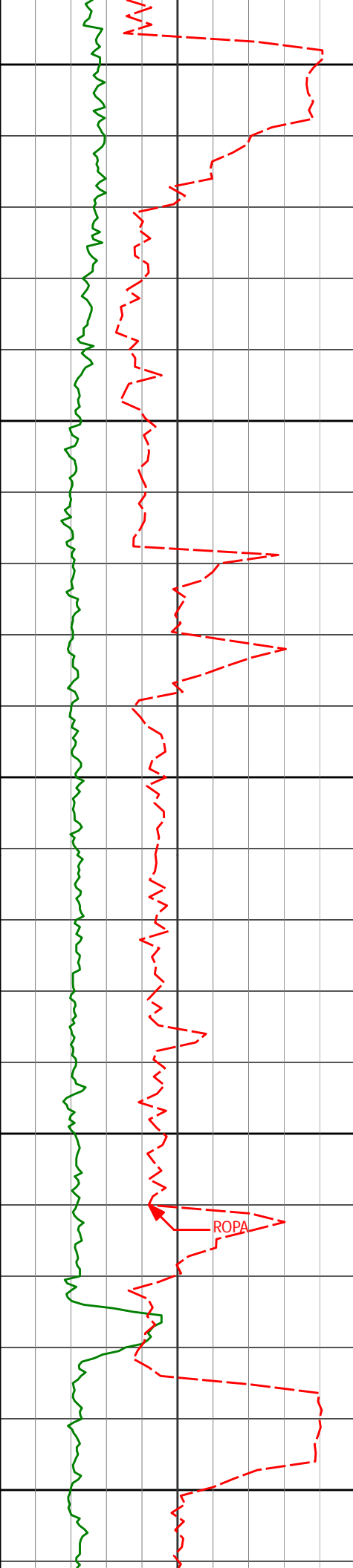
91.39°

179.04°

6705.10'

2460.45'

9150'



9200'

9207'

89.48°

179.29°

6704.38'

2555.36'

9250'

9300'

9301'

90.15°

179.01°

6704.68'

2649.27'

9350'

ROPA

9400'

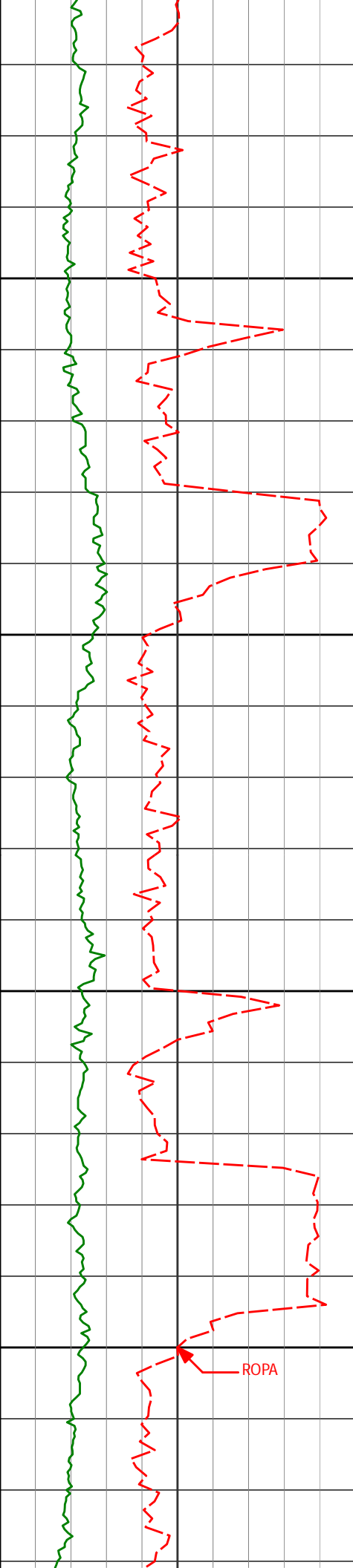
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2744.16'



9450'

9491'

88.06°

178.16°

6706.02'

2838.99'

9500'

9550'

9586'

87.97°

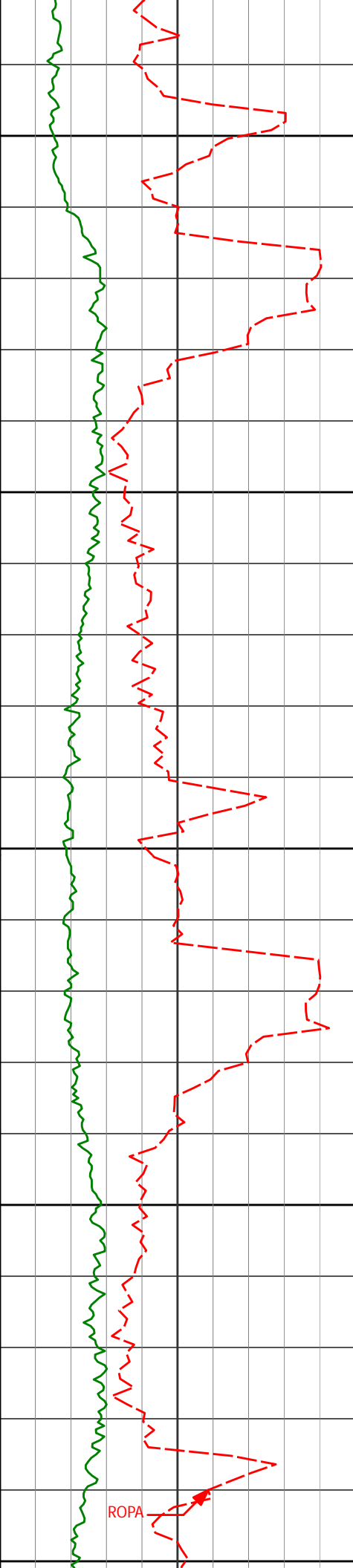
179.44°

6709.31'

2933.81'

9600'

ROPA



9650'

9681'

88.86°

179.04°

6711.94'

3028.70'

9700'

9750'

9776'

90.99°

180.63°

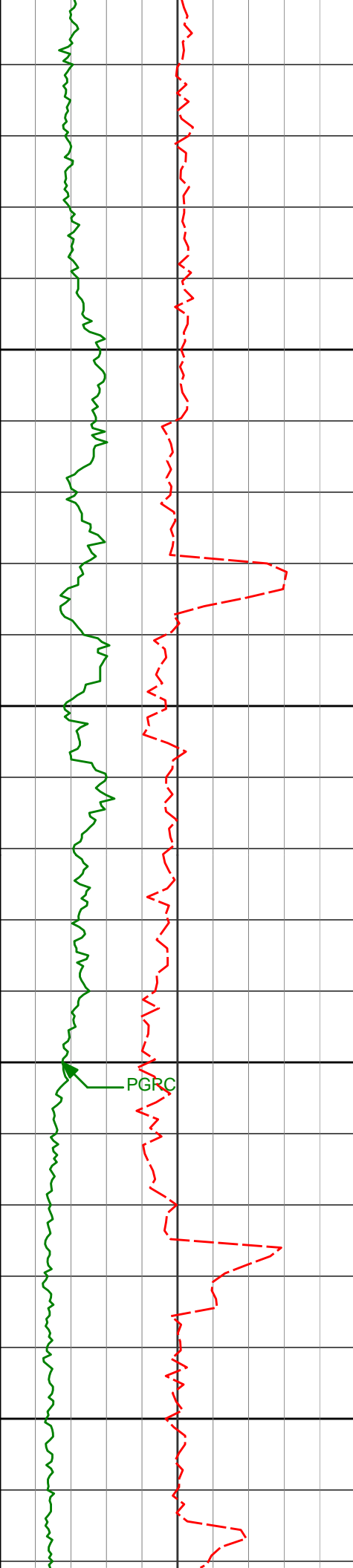
6712.06'

3123.64'

9800'

ROPA

9850'



9900'

9950'

10000'

10050'

9871'

91.02°

180.59°

6710.39'

3218.61'

9966'

90.34°

180.38°

6709.27'

3313.59'

10061'

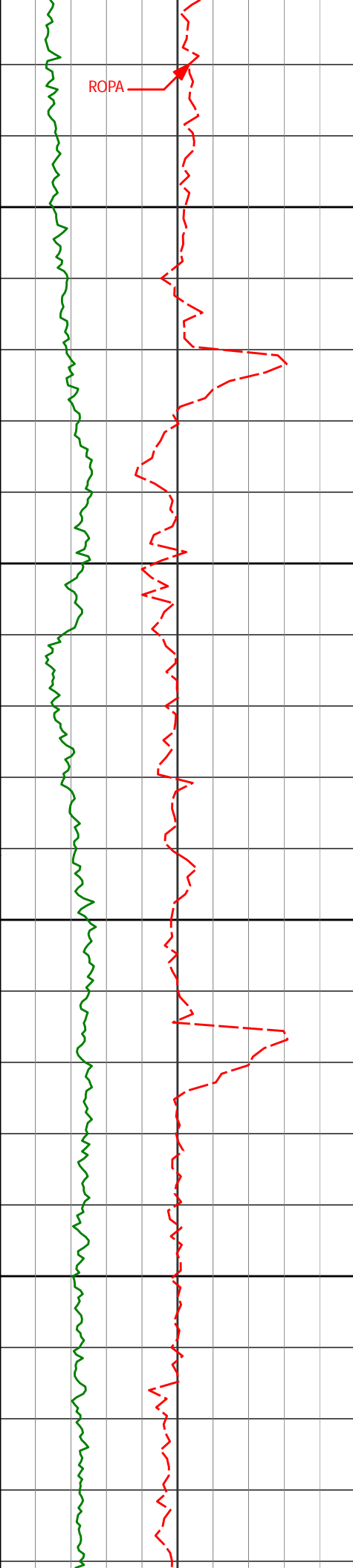
90.40°

180.19°

6708.65'

3408.56'

PGRC



ROPA

10100'

10150'

10200'

10250'

10156'

90.80°

180.24°

6707.66'

3503.53'

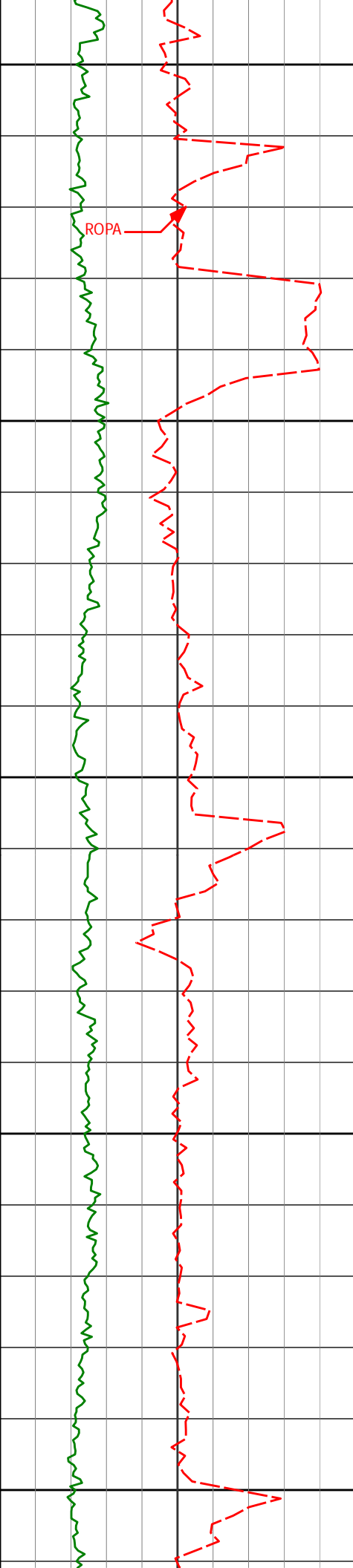
10250'

91.26°

180.32°

6705.97'

3597.49'



10300'

ROPA

10350'

10400'

10450'

10500'

10345'

89.51°

179.30°

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3692.44'

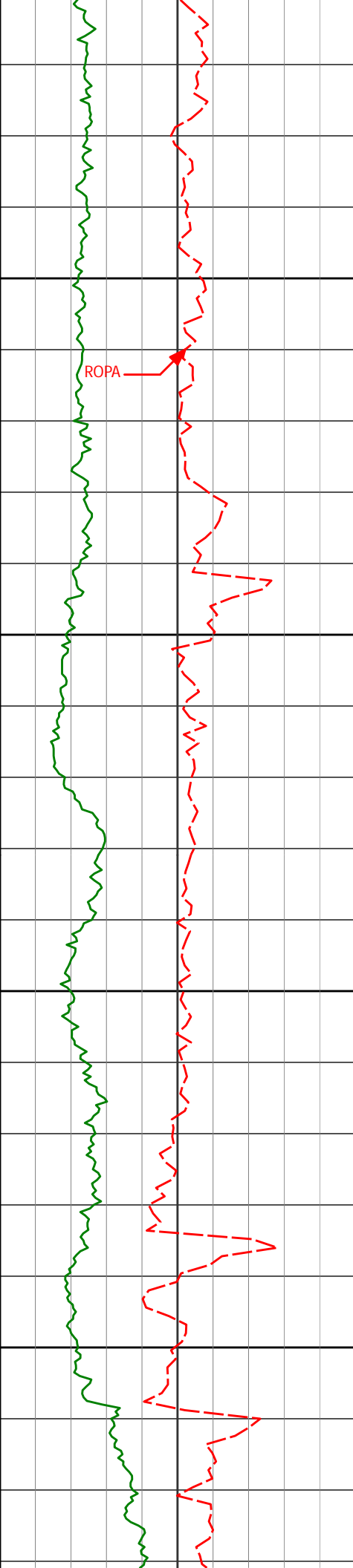
10439'

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179.24°

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3786.35'



10550'

10600'

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10700'

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89.63°

179.18°

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3971.19'

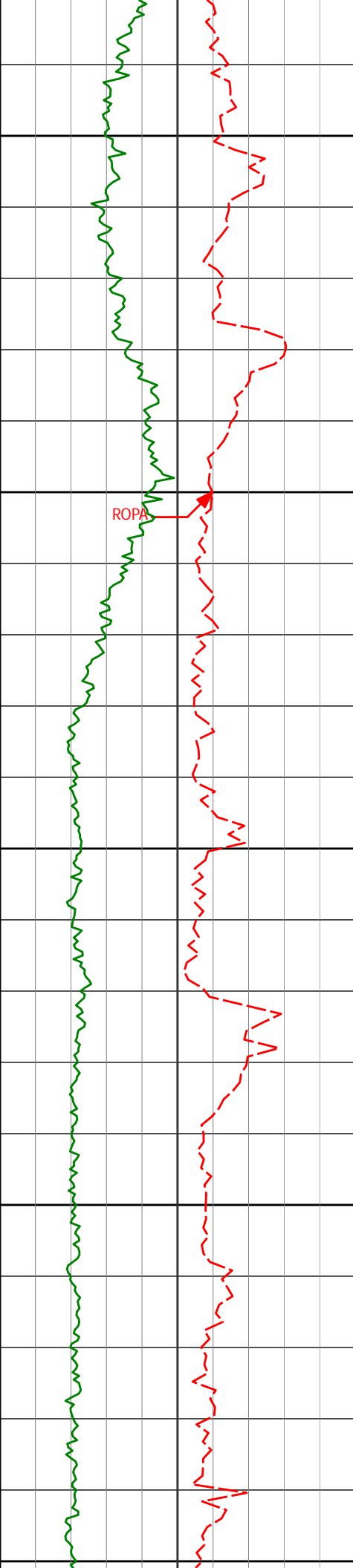
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179.43°

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4063.11'



10750'

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10900'

10950'

10810'

89.57°

179.33°

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4157.04'

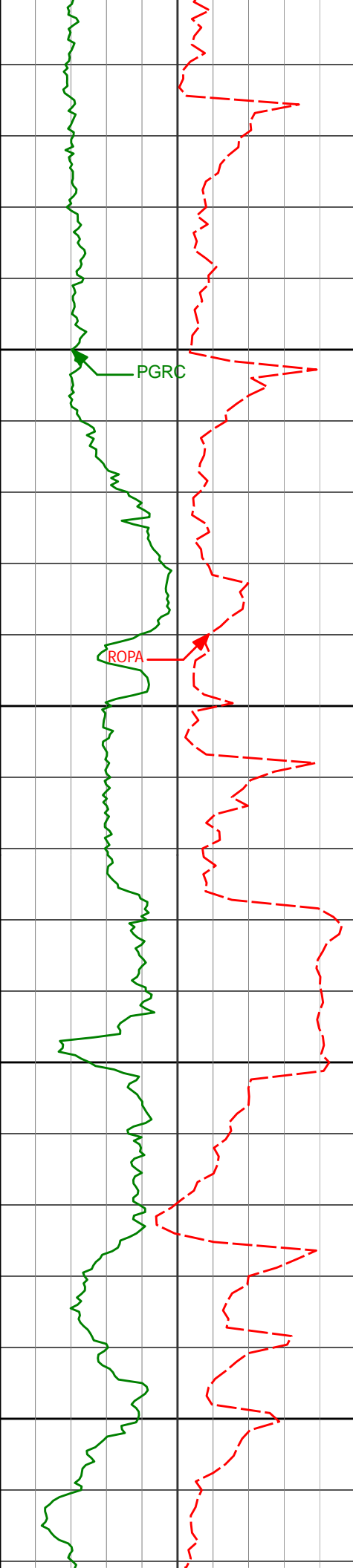
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178.69°

6709.44'

4249.94'



11000'

11050'

11100'

11150'

10996'

89.23°

177.45°

6710.59'

4342.75'

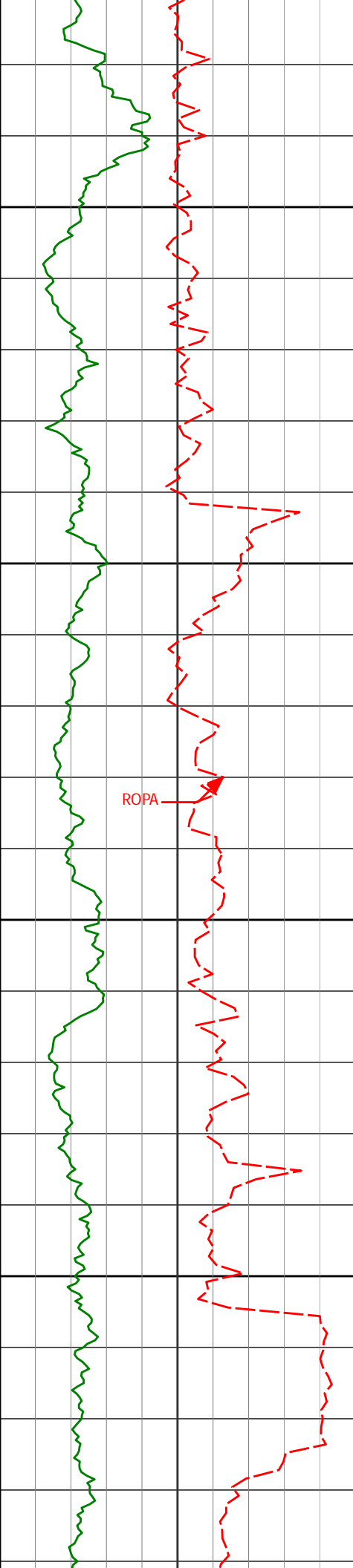
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177.71°

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4433.53'



11200'

11250'

11300'

11350'

11180'

90.77°

178.96°

6710.43'

4526.37'

11272'

91.14°

178.32°

6708.90'

4618.23'

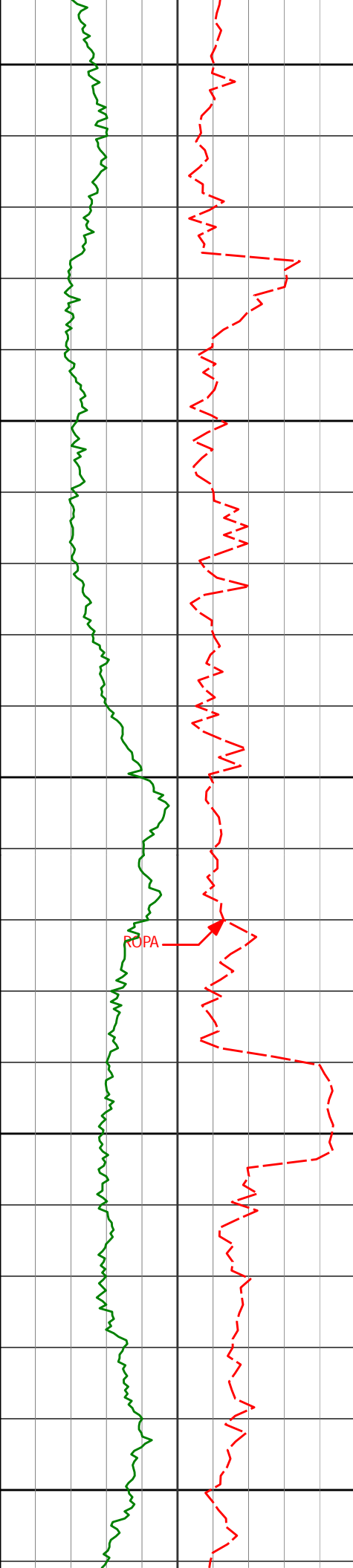
11365'

90.71°

179.01°

6707.40'

4711.10'



11400'

11450'

11500'

11550'

11600'

ROPA

11458'

91.08°

178.97°

6705.95'

4803.99'

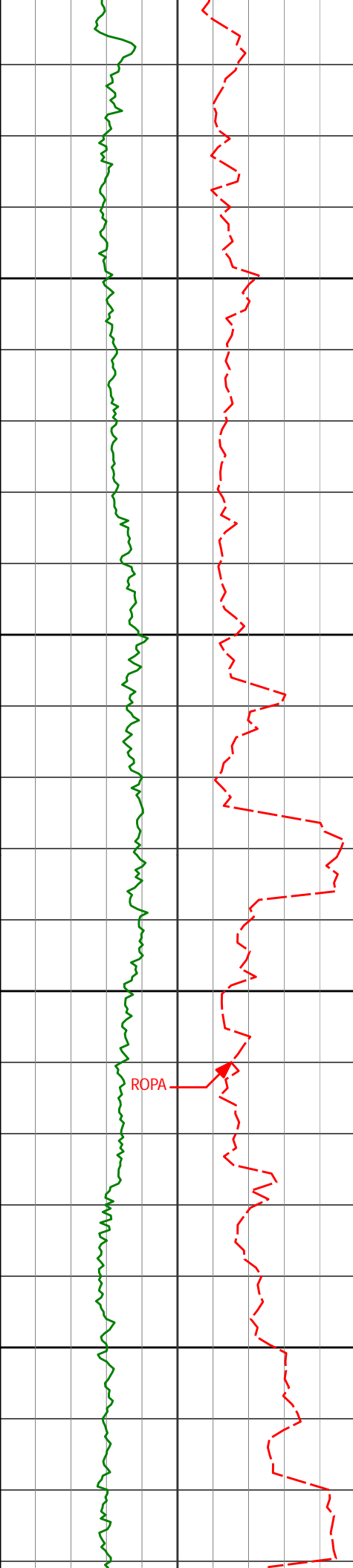
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179.60°

6704.95'

4896.91'



11650'

11700'

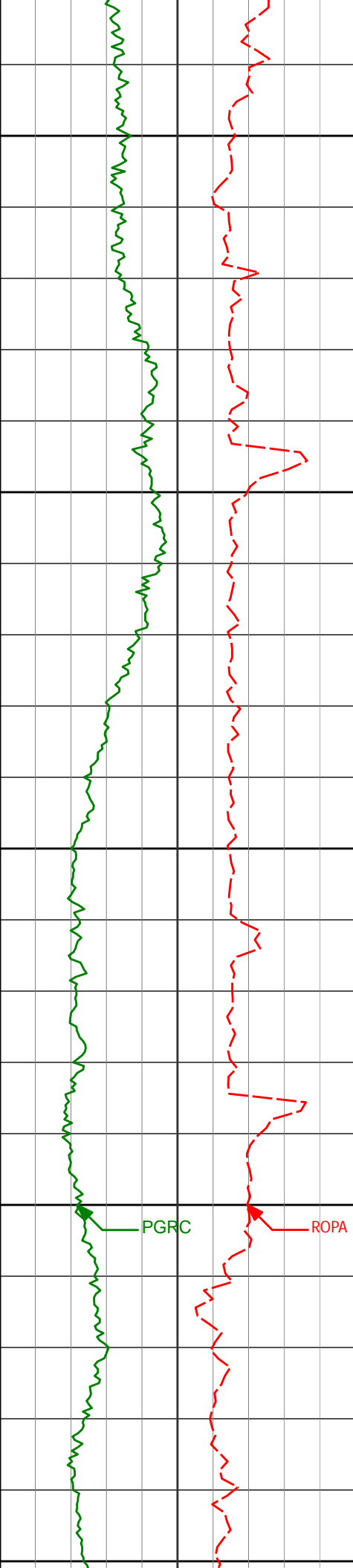
11750'

11800'

ROPA

| | | | | |
|--------|--------|---------|----------|----------|
| 11646' | 90.49° | 179.43° | 6704.42' | 4991.84' |
|--------|--------|---------|----------|----------|

| | | | | |
|--------|--------|---------|----------|----------|
| 11740' | 90.03° | 180.30° | 6703.99' | 5085.80' |
|--------|--------|---------|----------|----------|



11850'

11900'

11950'

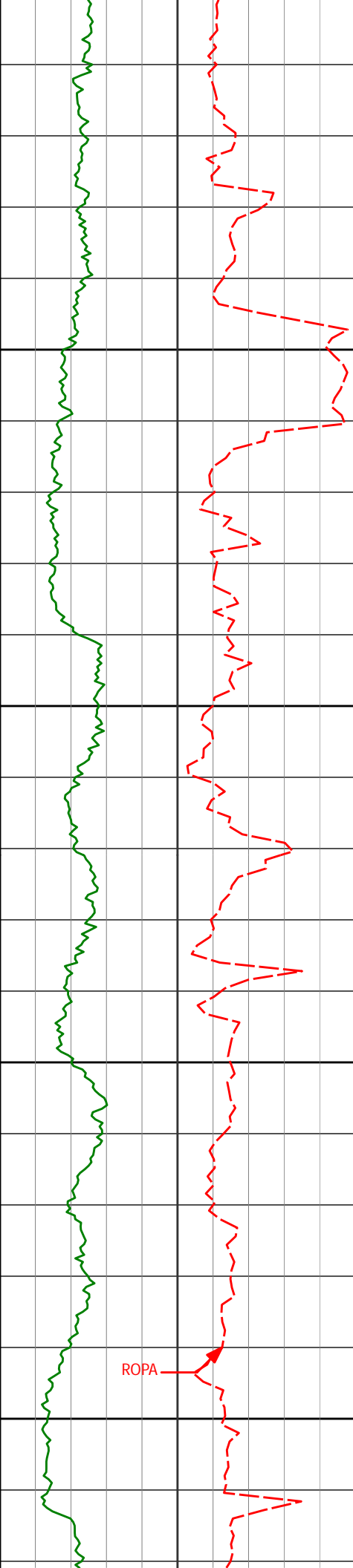
12000'

12050'

PGRC

ROPA

| | | | | |
|--------|--------|---------|----------|----------|
| 11832' | 89.01° | 180.78° | 6704.76' | 5177.78' |
| 11924' | 88.98° | 180.77° | 6706.37' | 5269.76' |
| 12016' | 88.67° | 180.47° | 6708.26' | 5361.72' |



12100'

12108'

89.32°

179.31°

6709.87'

5453.67'

12150'

12200'

12201'

88.98°

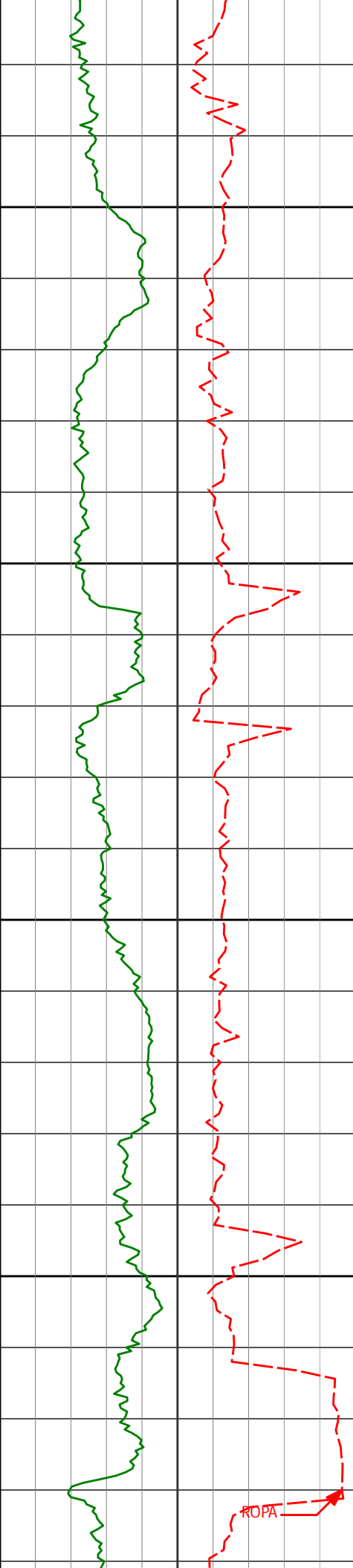
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5546.57'

12250'

ROPA



12300'

12350'

12400'

12450'

12294'

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178.93°

6713.06'

5639.46'

12385'

88.52°

179.24°

6715.18'

5730.35'

12478'

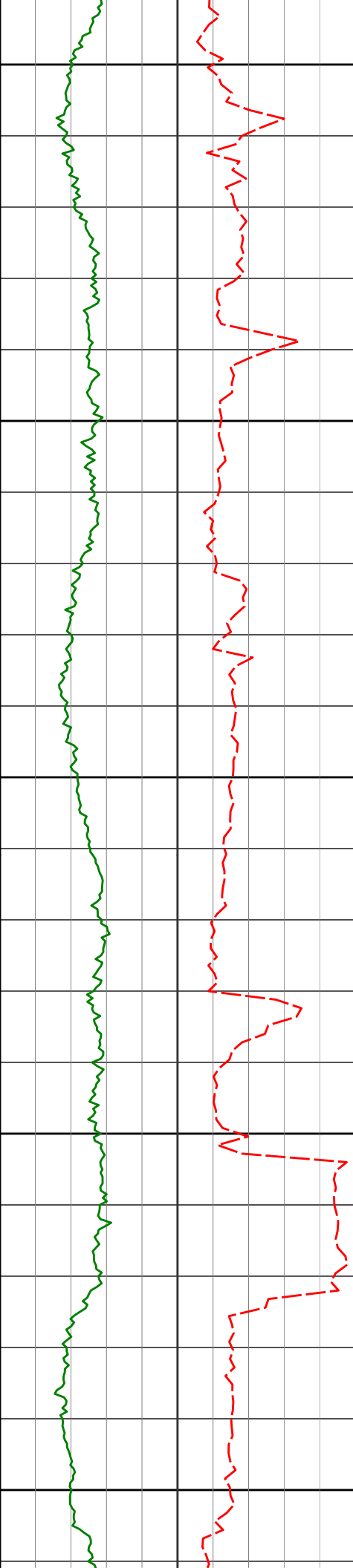
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5823.17'

ROPA



12500'

12550'

12600'

12650'

12700'

12572'

90.71°

176.65°

6715.30'

5916.84'

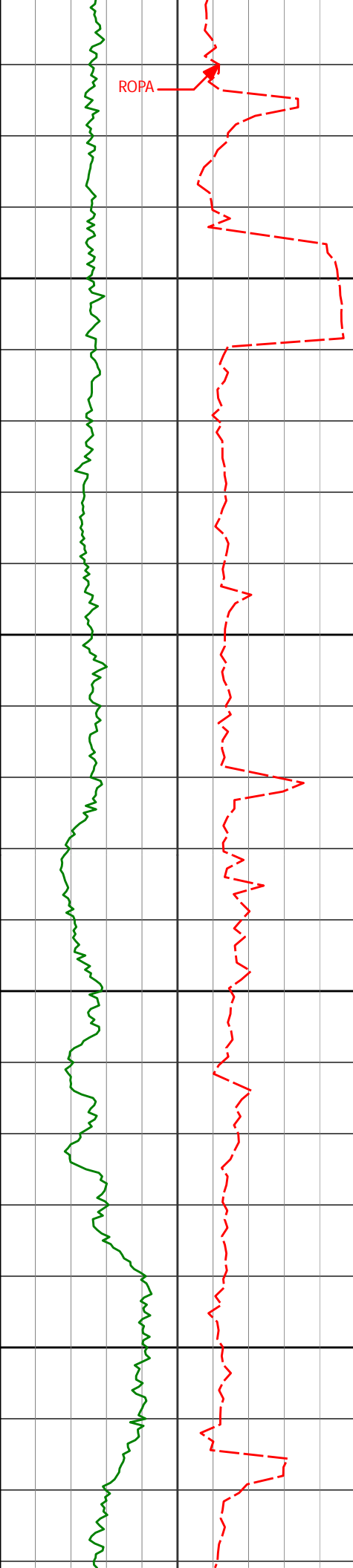
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177.74°

6713.27'

6009.54'



ROPA

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179.19°

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6103.38'

12800'

12850'

12854'

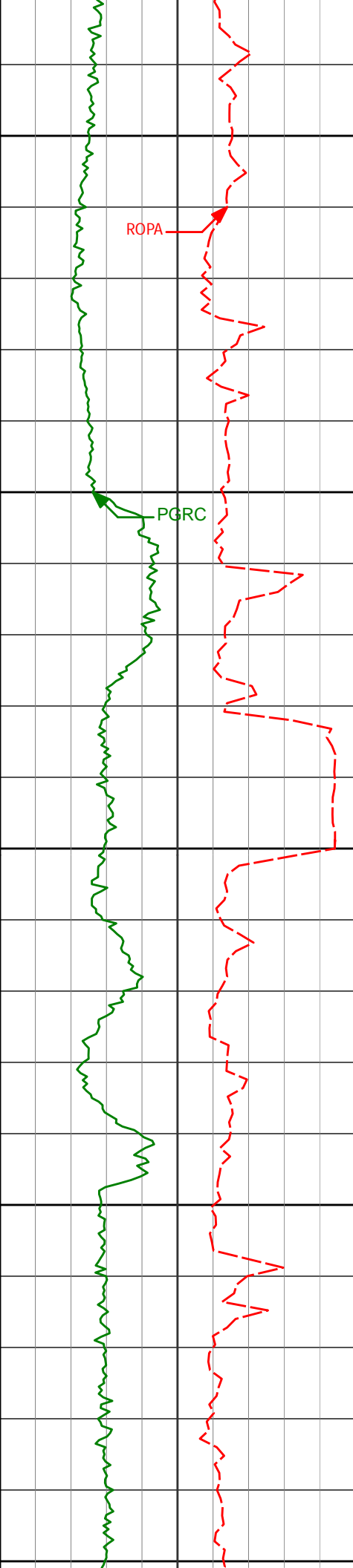
90.34°

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6198.27'

12900'



12950'

12949'

89.97°

178.01°

6710.80'

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13000'

13044'

91.48°

179.46°

6709.60'

6387.98'

13050'

13100'

13139'

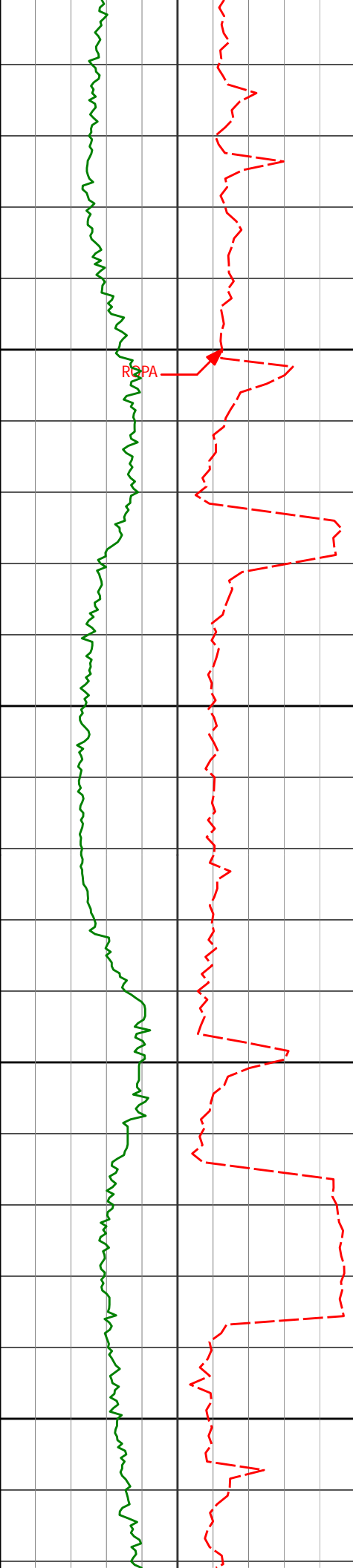
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13150'



13200'

13234'

91.85°

180.21°

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6577.79'

13250'

13300'

13329'

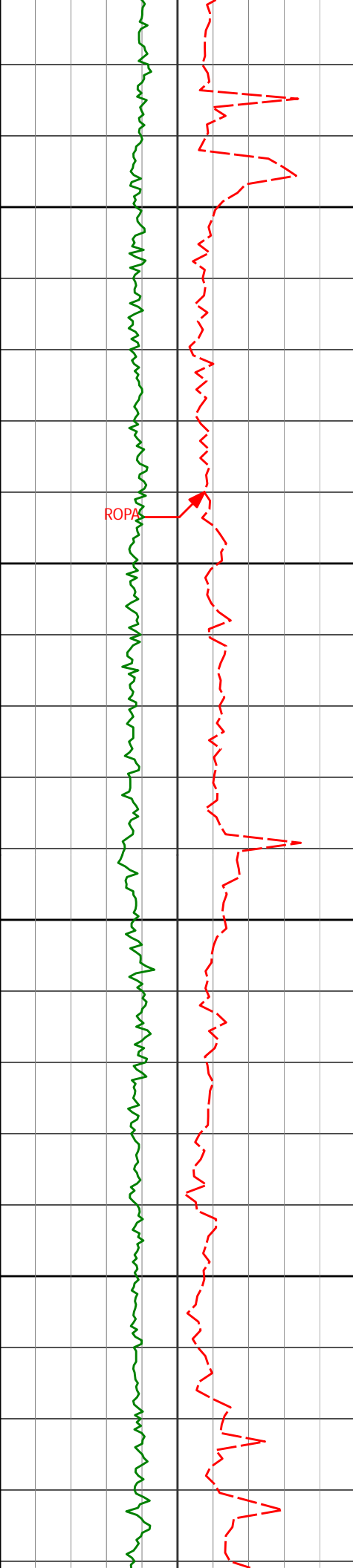
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13350'



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179.42°

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6767.70'

13450'

13500'

13519'

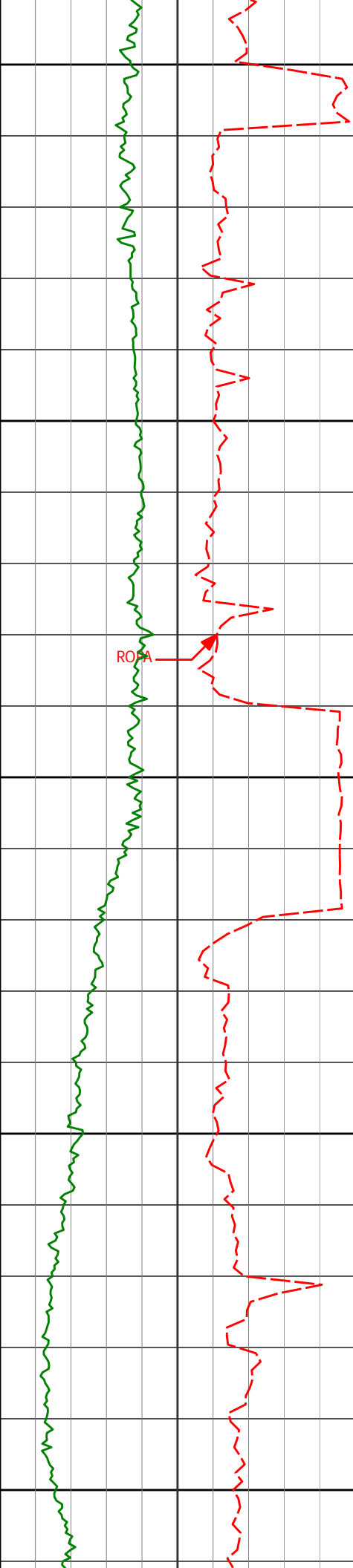
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6706.07'

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13550'



13600'

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176.57°

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13709'

90.89°

178.84°

6707.38'

7052.07'

13750'

13800'

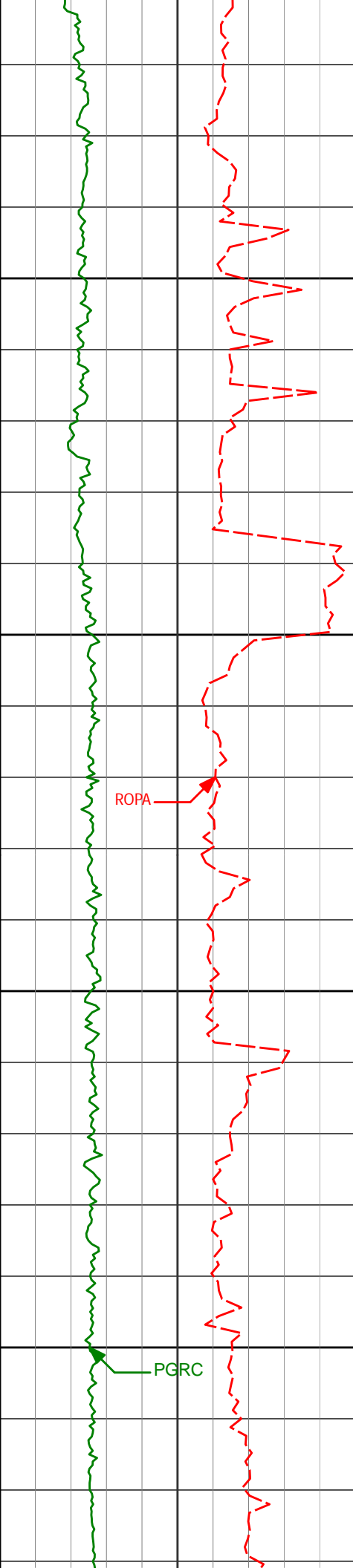
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178.79°

6705.55'

7146.94'



13850'

13900'

13950'

14000'

ROPA

PGRC

13899'

90.43°

179.21°

6704.10'

7241.83'

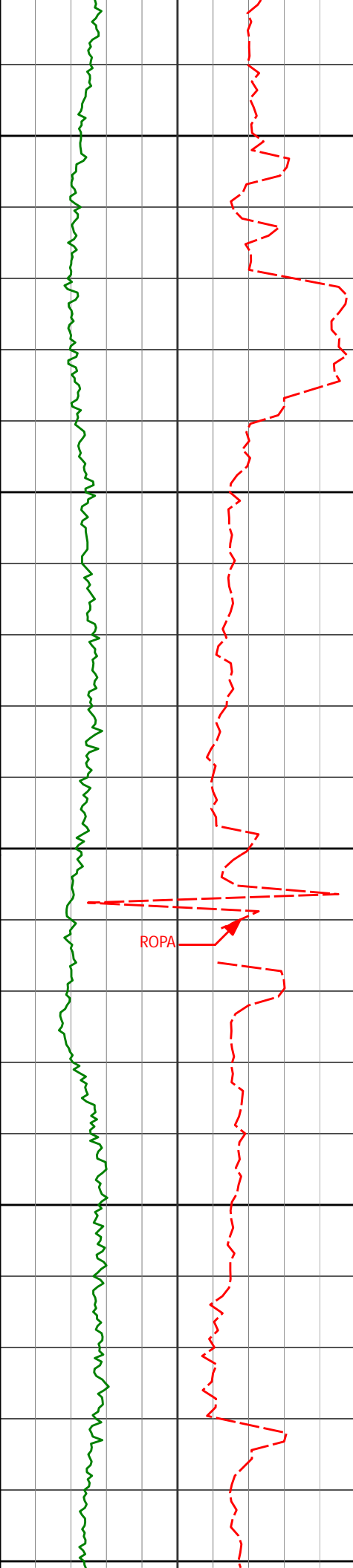
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179.14°

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7336.73'



14050'

14088'

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179.01°

6702.70'

7430.64'

14100'

14150'

ROPA



14183'

89.11°

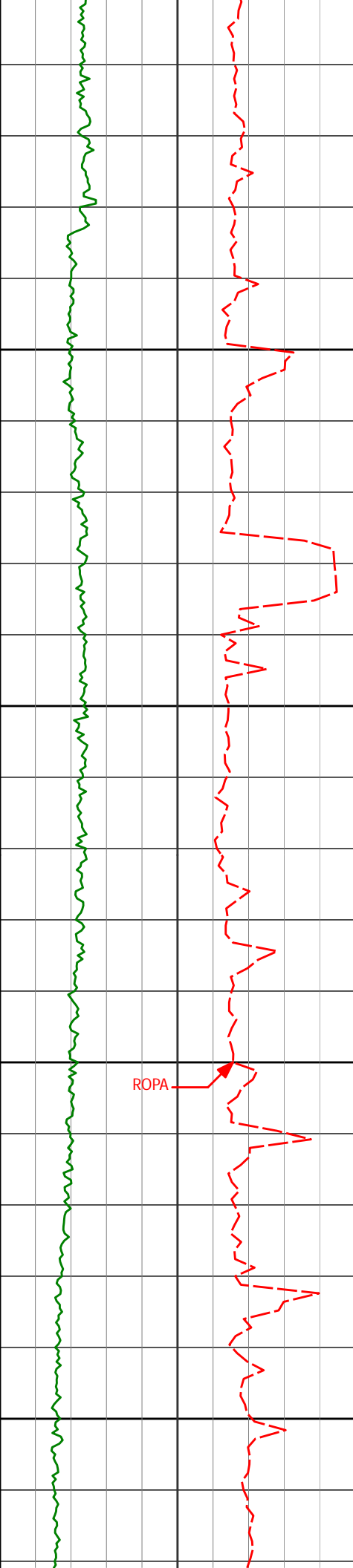
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6703.92'

7525.52'

14200'

14250'



14300'

14350'

14400'

14450'

14278'

89.72°

179.00°

6704.89'

7620.41'

14373'

89.57°

178.55°

6705.48'

7715.29'

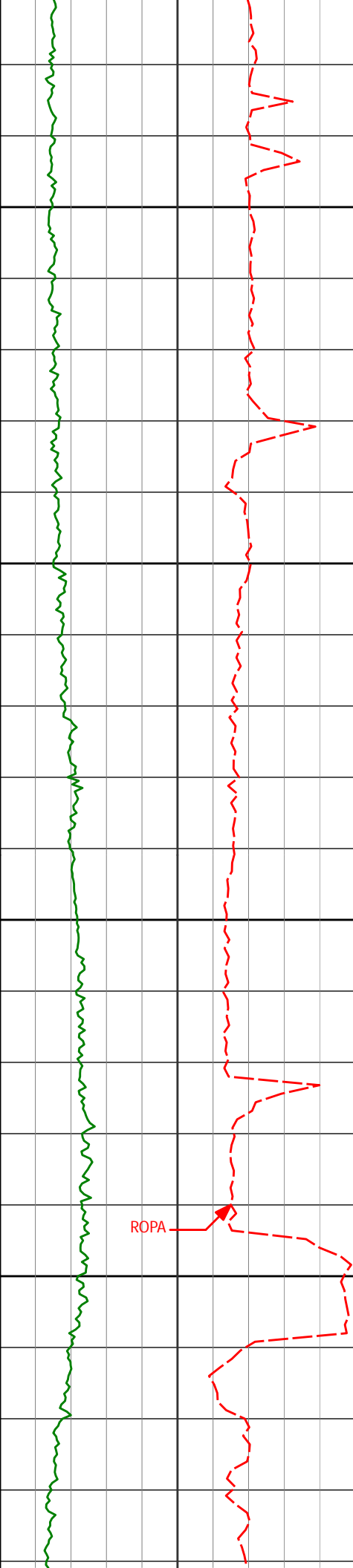
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179.00°

6705.71'

7810.17'



14500'

14550'

14600'

14650'

14563'

90.99°

178.97°

6704.77'

7905.07'

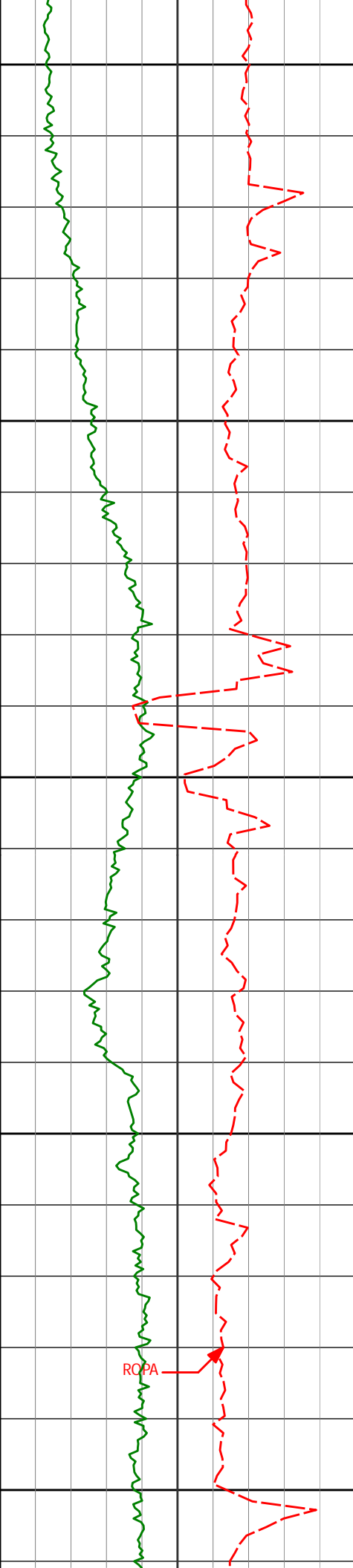
14658'

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179.14°

6704.49'

7999.97'



14700'

14750'

14800'

14850'

14900'

14753'

89.66°

179.07°

6705.31'

8094.88'

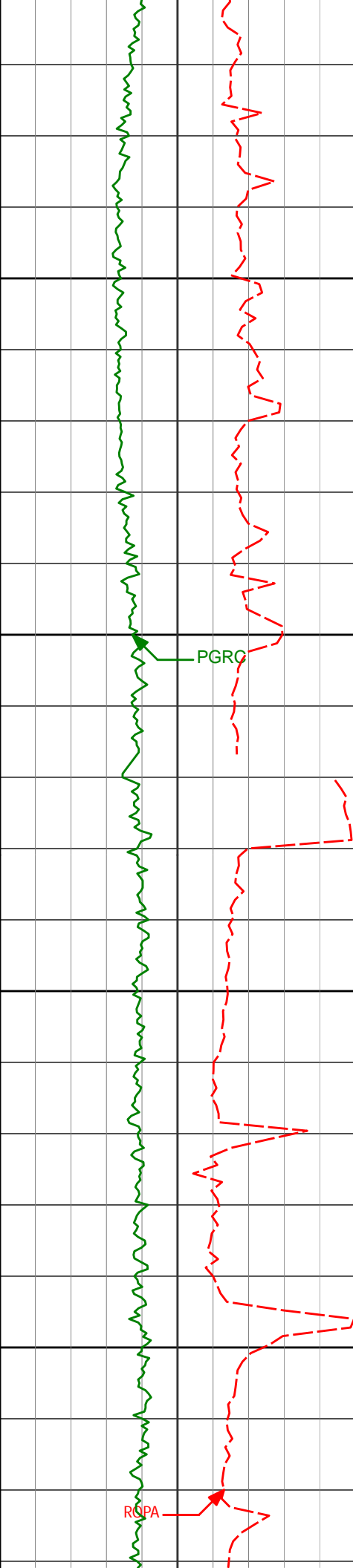
14848'

90.06°

178.90°

6705.54'

8189.78'



| | | | | |
|--------|--------|---------|----------|----------|
| 14943' | 91.14° | 179.03° | 6704.54' | 8284.67' |
|--------|--------|---------|----------|----------|

14950'

15000'

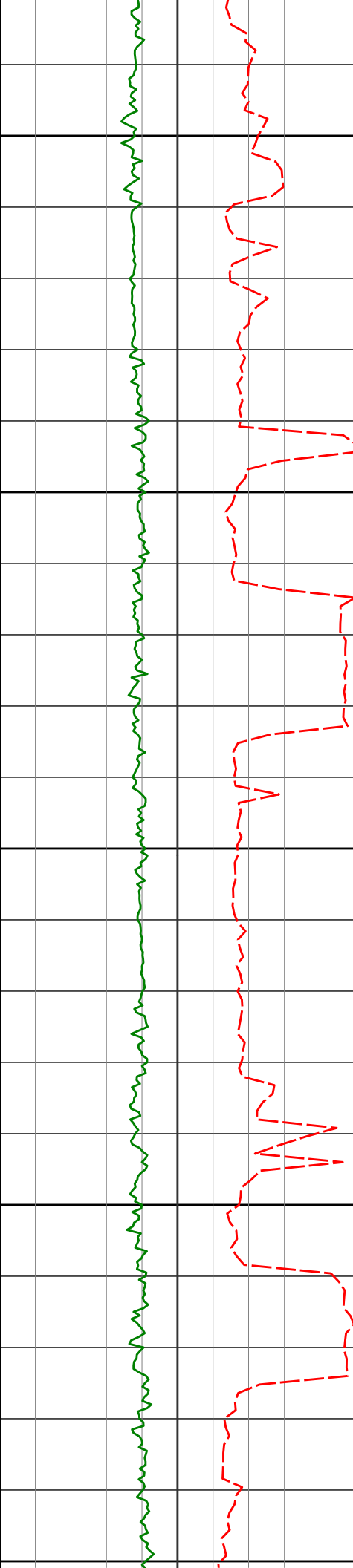
PGRC

| | | | | |
|--------|--------|---------|----------|----------|
| 15037' | 90.00° | 178.96° | 6703.61' | 8378.57' |
|--------|--------|---------|----------|----------|

15050'

15100'

RUPA



15150'

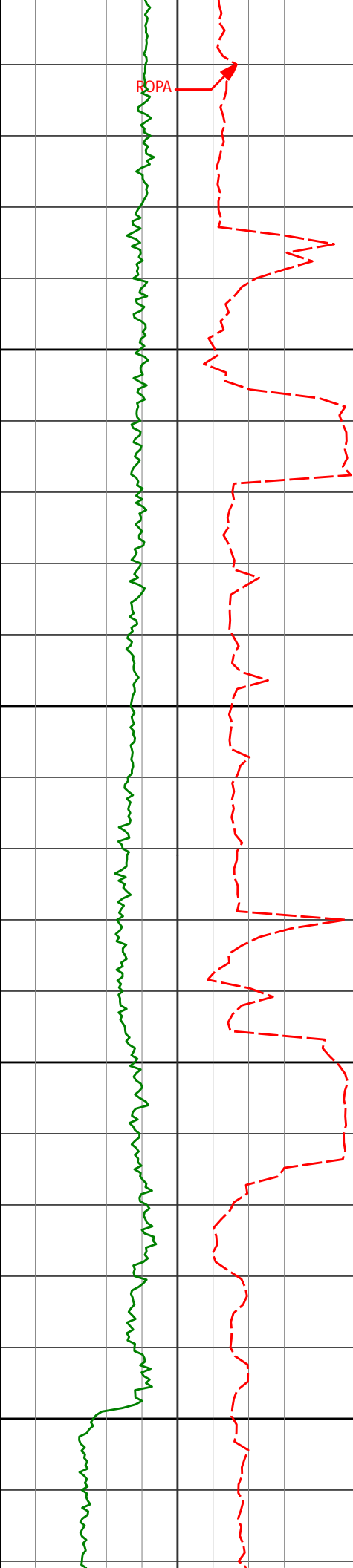
15200'

15250'

15300'

15350'

| | | | | |
|--------|--------|---------|----------|----------|
| 15132' | 90.34° | 177.65° | 6703.33' | 8473.41' |
| 15227' | 90.09° | 178.35° | 6702.97' | 8568.22' |
| 15322' | 89.91° | 178.82° | 6702.97' | 8663.09' |



15400'

15417'

90.49°

180.93°

6702.64'

8758.04'

15450'

15500'

15511'

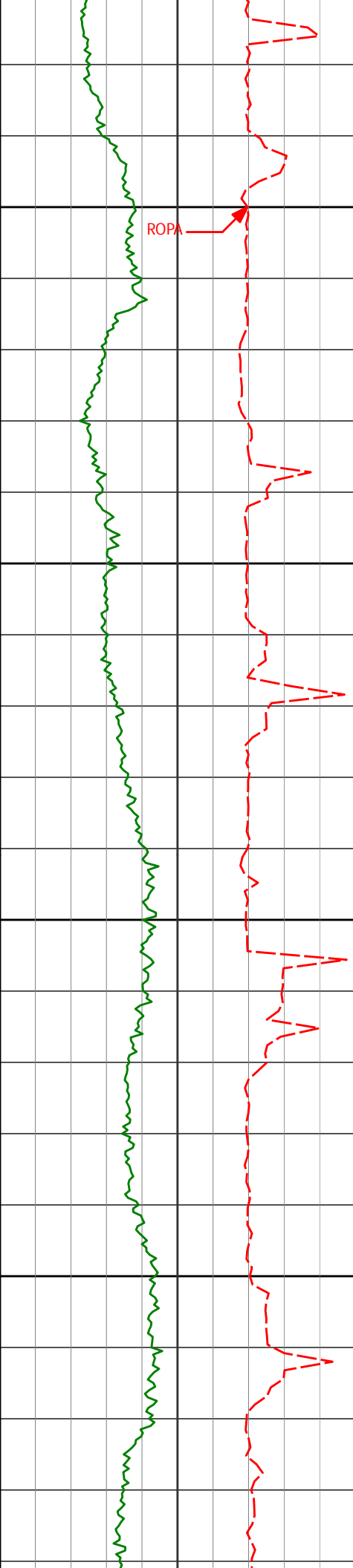
88.12°

180.21°

6703.78'

8852.01'

15550'



15600'

15606'

88.46°

179.96°

6706.61'

8946.93'

15650'

15700'

15701'

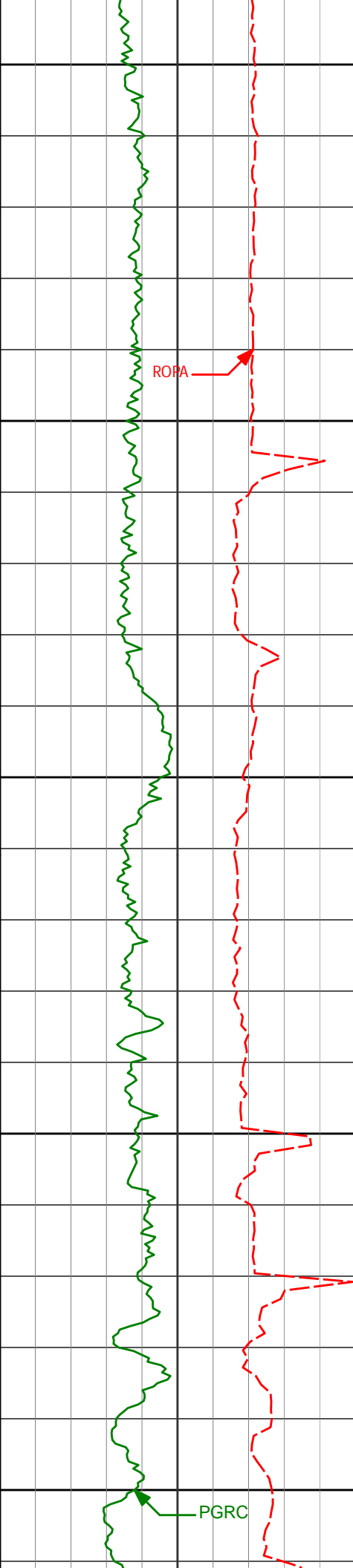
88.71°

179.83°

6708.96'

9041.86'

15750'



15800'

15850'

15900'

15950'

16000'

ROPA

PGRC

15796'

89.29°

179.71°

6710.62'

9136.80'

15891'

88.55°

178.50°

6712.41'

9231.69'

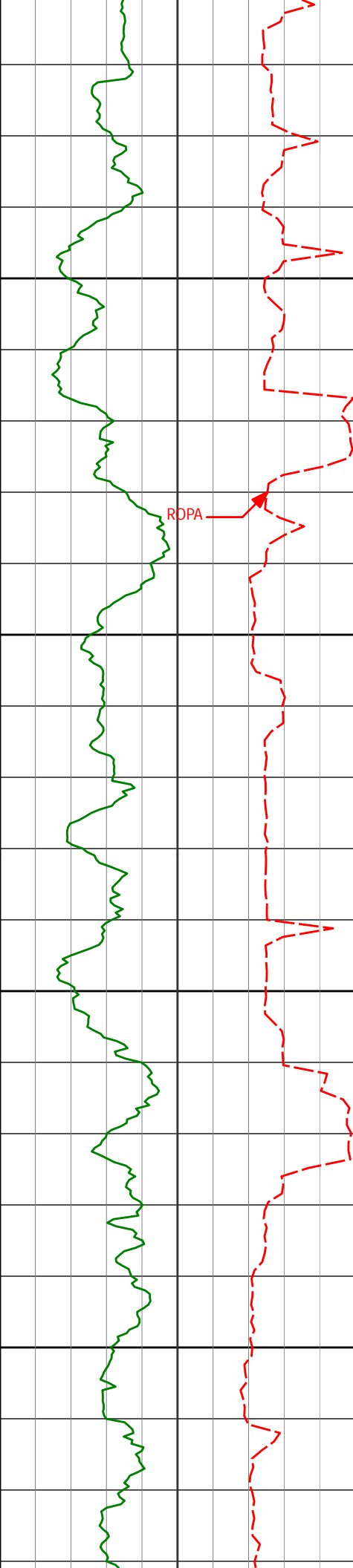
15986'

88.58°

177.89°

6714.79'

9326.49'



16050'

16081'

88.80°

178.48°

6716.96'

9421.30'

16100'

16150'

16176'

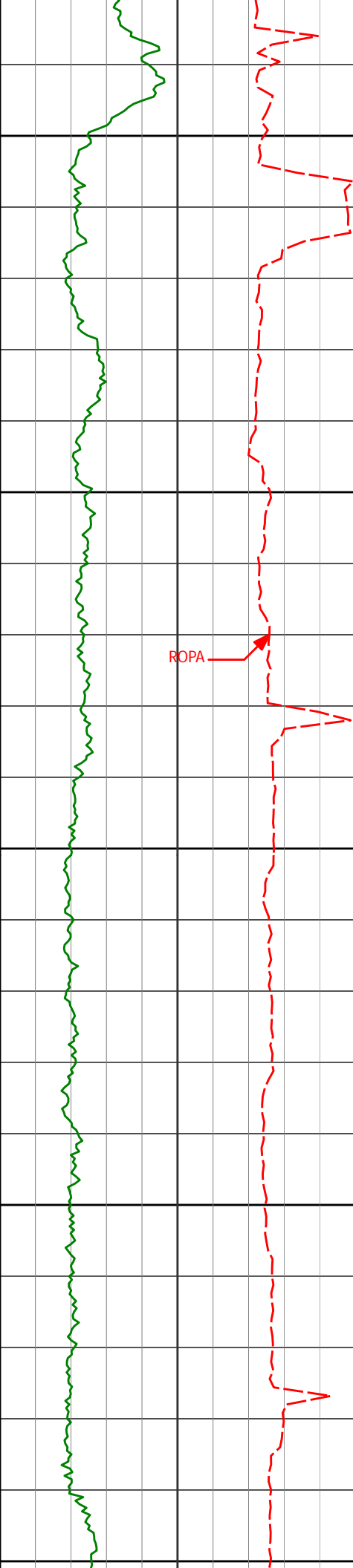
89.38°

178.35°

6718.47'

9516.14'

16200'



16250'

16271'

89.82°

178.30°

6719.13'

9610.98'

16300'

ROPA

16350'

16366'

90.25°

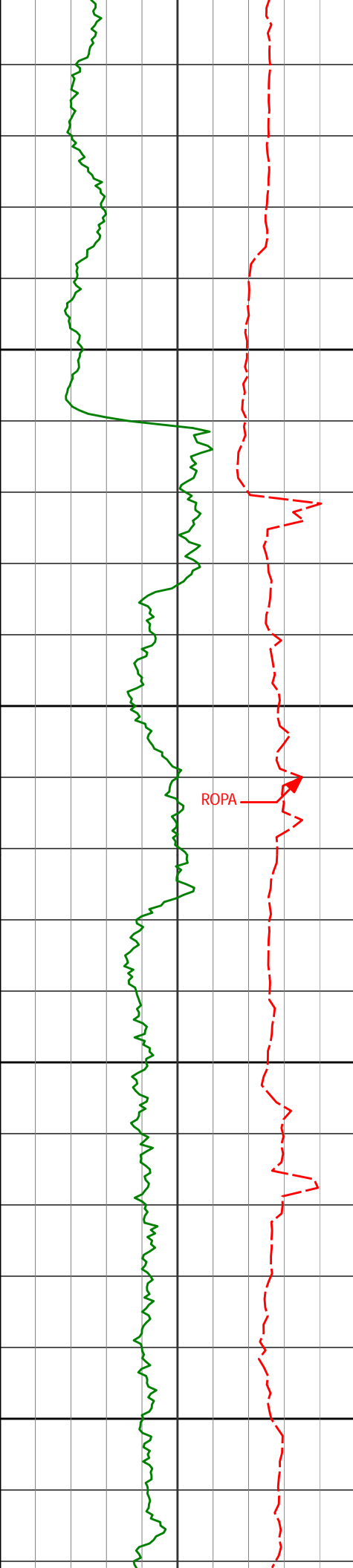
178.17°

6719.07'

9705.82'

16400'

16450'



16500'

16550'

16600'

16650'

16460'

90.89°

178.20°

6718.14'

9799.64'

16555'

90.86°

177.98°

6716.69'

9894.46'

ROPA

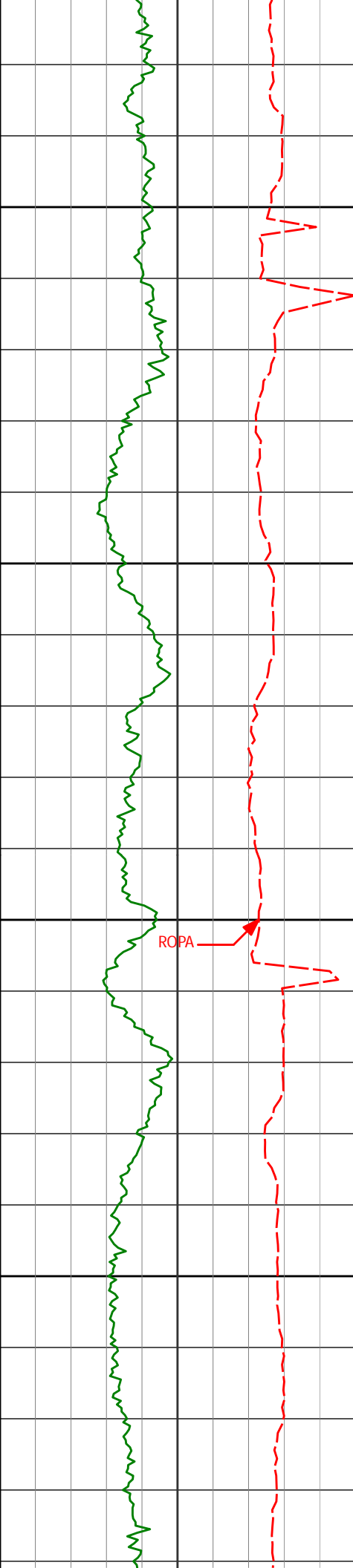
16650'

90.46°

177.56°

6715.59'

9989.24'



16700'

16750'

16800'

16850'

16745'

89.94°

176.99°

6715.26'

10083.96'

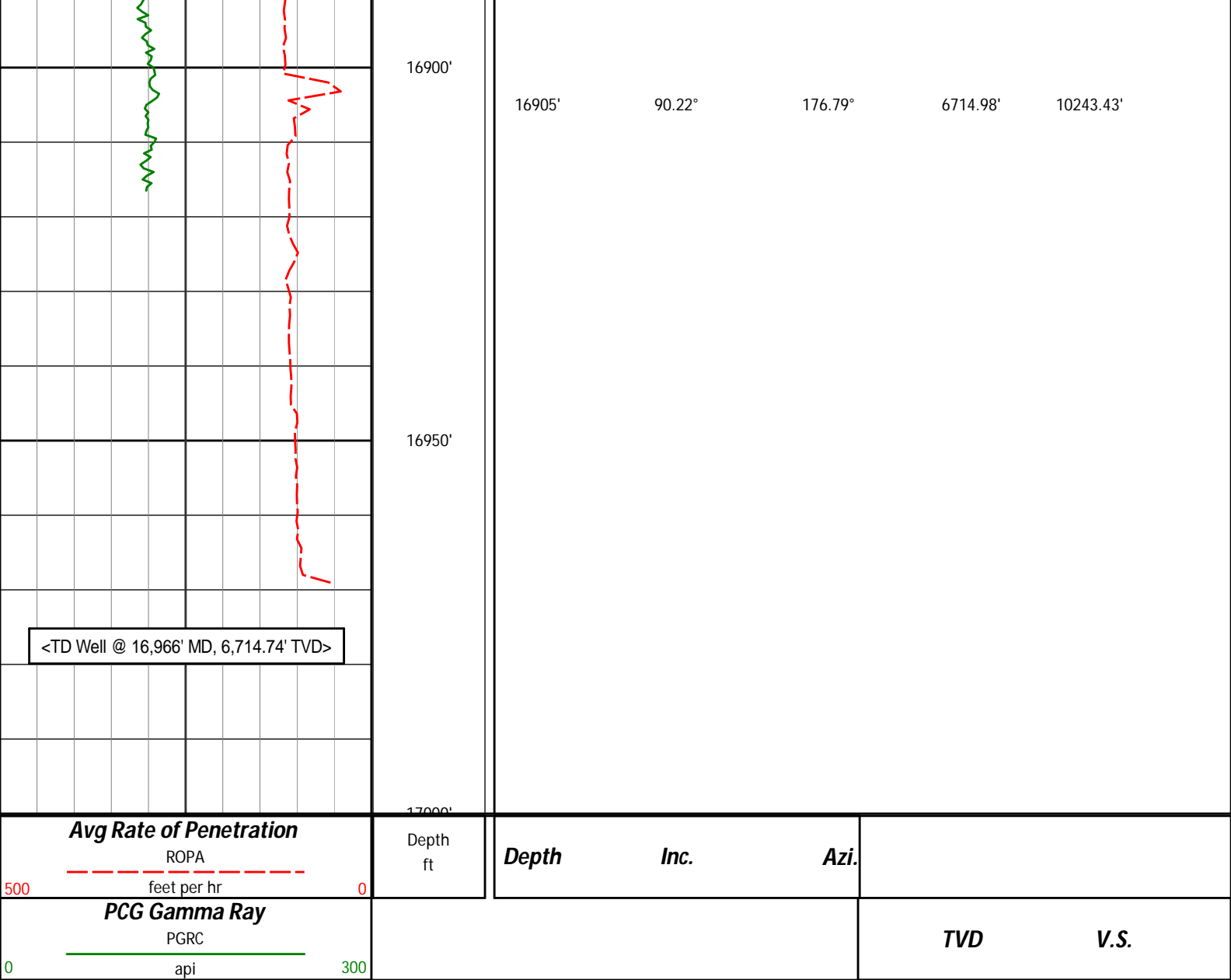
16840'

90.15°

176.96°

6715.19'

10178.65'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Crow Creek AA01-789
Wattenberg
Weld Colorado
USA
CA-XX-0901850044

| 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 |
| 253.00 | 1.00 | 175.75 | 252.99 | 2.20 S | 0.16 E | 2.20 | 0.40 |
| 506.00 | 0.30 | 142.35 | 505.97 | 4.93 S | 0.73 E | 4.91 | 0.30 |
| 726.00 | 0.42 | 181.39 | 725.97 | 6.19 S | 1.06 E | 6.16 | 0.12 |
| 819.00 | 0.38 | 166.84 | 818.96 | 6.83 S | 1.13 E | 6.80 | 0.12 |
| 912.00 | 0.46 | 167.24 | 911.96 | 7.50 S | 1.28 E | 7.46 | 0.09 |
| 1006.00 | 0.67 | 317.71 | 1005.96 | 7.46 S | 0.99 E | 7.43 | 1.16 |
| 1098.00 | 0.63 | 333.24 | 1097.95 | 6.61 S | 0.40 E | 6.59 | 0.20 |
| 1191.00 | 0.68 | 341.69 | 1190.95 | 5.63 S | 0.00 W | 5.62 | 0.12 |
| 1283.00 | 0.83 | 333.33 | 1282.94 | 4.51 S | 0.47 W | 4.52 | 0.20 |
| 1376.00 | 0.77 | 342.57 | 1375.93 | 3.32 S | 0.96 W | 3.34 | 0.15 |
| 1468.00 | 0.97 | 353.59 | 1467.93 | 1.95 S | 1.35 W | 1.98 | 0.37 |

| | | | | | | | |
|---------|-------|--------|---------|-----------|----------|---------|-------|
| 1468.00 | 0.97 | 332.90 | 1467.92 | 1.93 S | 1.23 W | 1.99 | 0.27 |
| 1560.00 | 0.83 | 349.12 | 1559.91 | 0.53 S | 1.48 W | 0.57 | 0.16 |
| 1653.00 | 0.90 | 334.82 | 1652.90 | 0.80 N | 1.91 W | -0.74 | 0.24 |
| 1747.00 | 0.81 | 322.52 | 1746.89 | 1.99 N | 2.63 W | -1.92 | 0.22 |
| 1841.00 | 0.75 | 332.91 | 1840.88 | 3.07 N | 3.32 W | -2.97 | 0.16 |
| 1935.00 | 0.79 | 325.87 | 1934.87 | 4.15 N | 3.96 W | -4.04 | 0.11 |
| 2028.00 | 3.66 | 295.68 | 2027.79 | 5.97 N | 7.00 W | -5.77 | 3.23 |
| 2119.00 | 5.68 | 294.73 | 2118.49 | 9.11 N | 13.70 W | -8.72 | 2.22 |
| 2212.00 | 5.58 | 290.78 | 2211.04 | 12.64 N | 22.11 W | -12.02 | 0.43 |
| 2304.00 | 7.24 | 295.36 | 2302.46 | 16.71 N | 31.53 W | -15.82 | 1.89 |
| 2397.00 | 6.86 | 296.90 | 2394.76 | 21.73 N | 41.78 W | -20.56 | 0.46 |
| 2492.00 | 8.77 | 289.11 | 2488.87 | 26.67 N | 53.69 W | -25.16 | 2.29 |
| 2587.00 | 8.51 | 289.48 | 2582.79 | 31.39 N | 67.16 W | -29.50 | 0.28 |
| 2681.00 | 8.91 | 292.38 | 2675.71 | 36.48 N | 80.44 W | -34.22 | 0.63 |
| 2776.00 | 8.60 | 290.66 | 2769.60 | 41.78 N | 93.89 W | -39.15 | 0.43 |
| 2871.00 | 8.51 | 289.35 | 2863.55 | 46.62 N | 107.17 W | -43.61 | 0.23 |
| 2966.00 | 8.95 | 295.94 | 2957.45 | 52.18 N | 120.45 W | -48.80 | 1.15 |
| 3061.00 | 9.08 | 294.67 | 3051.27 | 58.54 N | 133.91 W | -54.78 | 0.25 |
| 3156.00 | 9.19 | 299.36 | 3145.07 | 65.39 N | 147.33 W | -61.25 | 0.79 |
| 3251.00 | 8.81 | 297.97 | 3238.90 | 72.52 N | 160.37 W | -68.02 | 0.46 |
| 3346.00 | 8.10 | 296.49 | 3332.87 | 78.92 N | 172.78 W | -74.07 | 0.78 |
| 3441.00 | 7.23 | 296.07 | 3427.02 | 84.53 N | 184.14 W | -79.36 | 0.92 |
| 3536.00 | 8.45 | 299.12 | 3521.13 | 90.56 N | 195.61 W | -85.06 | 1.36 |
| 3631.00 | 8.01 | 298.93 | 3615.15 | 97.16 N | 207.50 W | -91.32 | 0.46 |
| 3726.00 | 9.55 | 296.42 | 3709.03 | 103.86 N | 220.35 W | -97.67 | 1.67 |
| 3820.00 | 10.20 | 296.16 | 3801.64 | 111.00 N | 234.81 W | -104.40 | 0.69 |
| 3915.00 | 10.45 | 296.76 | 3895.10 | 118.59 N | 250.05 W | -111.56 | 0.29 |
| 4010.00 | 10.90 | 296.28 | 3988.46 | 126.45 N | 265.80 W | -118.98 | 0.48 |
| 4105.00 | 10.34 | 294.98 | 4081.83 | 134.02 N | 281.58 W | -126.11 | 0.64 |
| 4200.00 | 10.13 | 294.08 | 4175.32 | 141.03 N | 296.93 W | -132.69 | 0.28 |
| 4295.00 | 9.22 | 292.63 | 4268.97 | 147.37 N | 311.59 W | -138.61 | 0.99 |
| 4389.00 | 8.00 | 291.80 | 4361.91 | 152.70 N | 324.61 W | -143.57 | 1.30 |
| 4483.00 | 7.48 | 288.54 | 4455.05 | 157.07 N | 336.48 W | -147.62 | 0.72 |
| 4578.00 | 7.35 | 292.44 | 4549.26 | 161.36 N | 347.96 W | -151.58 | 0.55 |
| 4672.00 | 7.01 | 294.46 | 4642.52 | 166.03 N | 358.74 W | -155.95 | 0.45 |
| 4767.00 | 8.24 | 295.41 | 4736.68 | 171.35 N | 370.17 W | -160.95 | 1.30 |
| 4861.00 | 8.69 | 301.18 | 4829.66 | 177.92 N | 382.33 W | -167.17 | 1.02 |
| 4956.00 | 7.66 | 298.32 | 4923.69 | 184.64 N | 394.04 W | -173.56 | 1.17 |
| 5051.00 | 8.78 | 296.40 | 5017.71 | 190.86 N | 406.11 W | -179.45 | 1.21 |
| 5146.00 | 7.92 | 296.00 | 5111.70 | 196.96 N | 418.49 W | -185.20 | 0.91 |
| 5240.00 | 6.49 | 293.67 | 5204.96 | 201.93 N | 429.18 W | -189.87 | 1.55 |
| 5335.00 | 5.28 | 293.62 | 5299.46 | 205.84 N | 438.10 W | -193.52 | 1.27 |
| 5430.00 | 4.29 | 295.67 | 5394.12 | 209.13 N | 445.31 W | -196.61 | 1.06 |
| 5525.00 | 3.08 | 297.40 | 5488.93 | 211.84 N | 450.77 W | -199.17 | 1.28 |
| 5620.00 | 1.42 | 280.90 | 5583.85 | 213.24 N | 454.20 W | -200.47 | 1.86 |
| 5714.00 | 1.11 | 247.75 | 5677.83 | 213.11 N | 456.18 W | -200.29 | 0.83 |
| 5809.00 | 1.04 | 240.63 | 5772.81 | 212.34 N | 457.79 W | -199.48 | 0.16 |
| 5904.00 | 0.85 | 238.46 | 5867.80 | 211.55 N | 459.14 W | -198.65 | 0.20 |
| 5999.00 | 0.73 | 240.23 | 5962.79 | 210.88 N | 460.26 W | -197.95 | 0.13 |
| 6043.00 | 0.69 | 245.15 | 6006.79 | 210.63 N | 460.75 W | -197.68 | 0.17 |
| 6189.00 | 9.14 | 168.34 | 6152.15 | 198.88 N | 459.20 W | -185.98 | 6.17 |
| 6237.00 | 14.21 | 169.64 | 6199.15 | 189.35 N | 457.37 W | -176.50 | 10.58 |
| 6284.00 | 18.16 | 172.18 | 6244.27 | 176.41 N | 455.33 W | -163.63 | 8.54 |
| 6332.00 | 22.88 | 171.05 | 6289.22 | 159.77 N | 452.86 W | -147.06 | 9.87 |
| 6379.00 | 27.60 | 170.65 | 6331.72 | 139.99 N | 449.67 W | -127.38 | 10.05 |
| 6427.00 | 32.47 | 175.49 | 6373.27 | 116.16 N | 446.85 W | -103.64 | 11.32 |
| 6473.00 | 35.16 | 178.05 | 6411.48 | 90.61 N | 445.43 W | -78.13 | 6.62 |
| 6521.00 | 38.15 | 178.28 | 6449.99 | 61.97 N | 444.51 W | -49.53 | 6.24 |
| 6568.00 | 42.51 | 177.76 | 6485.81 | 31.58 N | 443.45 W | -19.18 | 9.30 |
| 6616.00 | 45.05 | 179.17 | 6520.46 | 1.62 S | 442.57 W | 13.98 | 5.67 |
| 6663.00 | 49.17 | 180.09 | 6552.44 | 36.05 S | 442.36 W | 48.38 | 8.88 |
| 6711.00 | 54.89 | 179.90 | 6581.96 | 73.87 S | 442.35 W | 86.19 | 11.92 |
| 6758.00 | 60.47 | 181.24 | 6607.08 | 113.57 S | 442.76 W | 125.89 | 12.11 |
| 6806.00 | 64.49 | 182.34 | 6629.26 | 156.11 S | 444.10 W | 168.45 | 8.62 |
| 6853.00 | 67.66 | 183.73 | 6648.32 | 199.00 S | 446.38 W | 211.39 | 7.27 |
| 6901.00 | 71.73 | 181.98 | 6664.97 | 243.95 S | 448.61 W | 256.38 | 9.14 |
| 6948.00 | 75.84 | 180.48 | 6678.09 | 289.06 S | 449.58 W | 301.50 | 9.27 |
| 6988.00 | 79.25 | 179.94 | 6686.72 | 328.11 S | 449.72 W | 340.54 | 8.63 |
| 7120.00 | 85.31 | 178.88 | 6704.44 | 458.85 S | 448.36 W | 471.19 | 4.66 |
| 7215.00 | 87.93 | 179.42 | 6710.04 | 553.66 S | 446.96 W | 565.93 | 2.82 |
| 7310.00 | 89.14 | 179.20 | 6712.47 | 648.62 S | 445.81 W | 660.82 | 1.29 |
| 7404.00 | 89.01 | 178.90 | 6713.99 | 742.60 S | 444.25 W | 754.71 | 0.35 |
| 7499.00 | 89.82 | 177.90 | 6714.96 | 837.55 S | 441.60 W | 849.56 | 1.35 |
| 7594.00 | 91.11 | 178.02 | 6714.19 | 932.49 S | 438.22 W | 944.36 | 1.36 |
| 7689.00 | 91.48 | 177.78 | 6712.04 | 1027.40 S | 434.74 W | 1039.14 | 0.46 |

| | | | | | | | |
|----------|-------|--------|---------|-----------|----------|---------|------|
| 7784.00 | 90.18 | 178.94 | 6710.66 | 1122.35 S | 432.02 W | 1133.97 | 1.83 |
| 7878.00 | 89.82 | 178.51 | 6710.66 | 1216.32 S | 429.93 W | 1227.85 | 0.60 |
| 7973.00 | 90.34 | 178.31 | 6710.53 | 1311.29 S | 427.29 W | 1322.71 | 0.59 |
| 8068.00 | 89.63 | 178.85 | 6710.56 | 1406.26 S | 424.94 W | 1417.57 | 0.94 |
| 8163.00 | 89.91 | 177.84 | 6710.94 | 1501.21 S | 422.20 W | 1512.42 | 1.10 |
| 8258.00 | 89.75 | 176.92 | 6711.22 | 1596.11 S | 417.85 W | 1607.16 | 0.98 |
| 8353.00 | 89.97 | 178.21 | 6711.45 | 1691.03 S | 413.82 W | 1701.92 | 1.38 |
| 8447.00 | 89.85 | 178.73 | 6711.60 | 1784.99 S | 411.31 W | 1795.78 | 0.57 |
| 8542.00 | 90.28 | 181.27 | 6711.49 | 1879.98 S | 411.31 W | 1890.73 | 2.71 |
| 8637.00 | 89.97 | 180.68 | 6711.29 | 1974.97 S | 412.92 W | 1985.73 | 0.70 |
| 8732.00 | 90.89 | 180.33 | 6710.57 | 2069.96 S | 413.76 W | 2080.71 | 1.04 |
| 8827.00 | 90.37 | 180.02 | 6709.53 | 2164.95 S | 414.05 W | 2175.67 | 0.64 |
| 8922.00 | 90.74 | 179.63 | 6708.61 | 2259.95 S | 413.76 W | 2270.62 | 0.57 |
| 9017.00 | 91.05 | 179.51 | 6707.12 | 2354.94 S | 413.05 W | 2365.55 | 0.35 |
| 9112.00 | 91.39 | 179.04 | 6705.10 | 2449.91 S | 411.85 W | 2460.45 | 0.61 |
| 9207.00 | 89.48 | 179.29 | 6704.38 | 2544.89 S | 410.46 W | 2555.36 | 2.03 |
| 9301.00 | 90.15 | 179.01 | 6704.68 | 2638.88 S | 409.07 W | 2649.27 | 0.77 |
| 9396.00 | 90.09 | 178.58 | 6704.48 | 2733.86 S | 407.07 W | 2744.16 | 0.46 |
| 9491.00 | 88.06 | 178.16 | 6706.02 | 2828.80 S | 404.37 W | 2838.99 | 2.18 |
| 9586.00 | 87.97 | 179.44 | 6709.31 | 2923.72 S | 402.38 W | 2933.81 | 1.35 |
| 9681.00 | 88.86 | 179.04 | 6711.94 | 3018.67 S | 401.12 W | 3028.70 | 1.03 |
| 9776.00 | 90.99 | 180.63 | 6712.06 | 3113.66 S | 400.85 W | 3123.64 | 2.80 |
| 9871.00 | 91.02 | 180.59 | 6710.39 | 3208.64 S | 401.86 W | 3218.61 | 0.05 |
| 9966.00 | 90.34 | 180.38 | 6709.27 | 3303.63 S | 402.66 W | 3313.59 | 0.75 |
| 10061.00 | 90.40 | 180.19 | 6708.65 | 3398.63 S | 403.13 W | 3408.56 | 0.21 |
| 10156.00 | 90.80 | 180.24 | 6707.66 | 3493.62 S | 403.49 W | 3503.53 | 0.42 |
| 10250.00 | 91.26 | 180.32 | 6705.97 | 3587.61 S | 403.95 W | 3597.49 | 0.50 |
| 10345.00 | 89.51 | 179.30 | 6705.33 | 3682.60 S | 403.63 W | 3692.44 | 2.13 |
| 10439.00 | 89.45 | 179.24 | 6706.18 | 3776.59 S | 402.44 W | 3786.35 | 0.09 |
| 10531.00 | 89.54 | 179.19 | 6706.99 | 3868.58 S | 401.18 W | 3878.27 | 0.11 |
| 10624.00 | 89.63 | 179.18 | 6707.67 | 3961.57 S | 399.85 W | 3971.19 | 0.10 |
| 10716.00 | 89.85 | 179.43 | 6708.09 | 4053.56 S | 398.74 W | 4063.11 | 0.36 |
| 10810.00 | 89.57 | 179.33 | 6708.56 | 4147.55 S | 397.72 W | 4157.04 | 0.32 |
| 10903.00 | 89.35 | 178.69 | 6709.44 | 4240.53 S | 396.11 W | 4249.94 | 0.73 |
| 10996.00 | 89.23 | 177.45 | 6710.59 | 4333.47 S | 392.98 W | 4342.75 | 1.34 |
| 11087.00 | 90.09 | 177.71 | 6711.13 | 4424.39 S | 389.14 W | 4433.53 | 0.99 |
| 11180.00 | 90.77 | 178.96 | 6710.43 | 4517.34 S | 386.44 W | 4526.37 | 1.53 |
| 11272.00 | 91.14 | 178.32 | 6708.90 | 4609.30 S | 384.25 W | 4618.23 | 0.80 |
| 11365.00 | 90.71 | 179.01 | 6707.40 | 4702.26 S | 382.09 W | 4711.10 | 0.87 |
| 11458.00 | 91.08 | 178.97 | 6705.95 | 4795.24 S | 380.45 W | 4803.99 | 0.40 |
| 11551.00 | 90.15 | 179.60 | 6704.95 | 4888.22 S | 379.29 W | 4896.91 | 1.21 |
| 11646.00 | 90.49 | 179.43 | 6704.42 | 4983.22 S | 378.48 W | 4991.84 | 0.40 |
| 11740.00 | 90.03 | 180.30 | 6703.99 | 5077.22 S | 378.26 W | 5085.80 | 1.05 |
| 11832.00 | 89.01 | 180.78 | 6704.76 | 5169.21 S | 379.13 W | 5177.78 | 1.23 |
| 11924.00 | 88.98 | 180.77 | 6706.37 | 5261.19 S | 380.37 W | 5269.76 | 0.03 |
| 12016.00 | 88.67 | 180.47 | 6708.26 | 5353.16 S | 381.37 W | 5361.72 | 0.47 |
| 12108.00 | 89.32 | 179.31 | 6709.87 | 5445.14 S | 381.19 W | 5453.67 | 1.45 |
| 12201.00 | 88.98 | 179.12 | 6711.25 | 5538.13 S | 379.92 W | 5546.57 | 0.42 |
| 12294.00 | 88.80 | 178.93 | 6713.06 | 5631.09 S | 378.34 W | 5639.46 | 0.28 |
| 12385.00 | 88.52 | 179.24 | 6715.18 | 5722.06 S | 376.88 W | 5730.35 | 0.46 |
| 12478.00 | 90.31 | 177.06 | 6716.13 | 5815.00 S | 373.88 W | 5823.17 | 3.03 |
| 12572.00 | 90.71 | 176.65 | 6715.30 | 5908.85 S | 368.72 W | 5916.84 | 0.61 |
| 12665.00 | 91.79 | 177.74 | 6713.27 | 6001.71 S | 364.17 W | 6009.54 | 1.65 |
| 12759.00 | 90.28 | 179.19 | 6711.57 | 6095.66 S | 361.66 W | 6103.38 | 2.23 |
| 12854.00 | 90.34 | 178.59 | 6711.06 | 6190.64 S | 359.82 W | 6198.27 | 0.63 |
| 12949.00 | 89.97 | 178.01 | 6710.80 | 6285.60 S | 357.00 W | 6293.11 | 0.72 |
| 13044.00 | 91.48 | 179.46 | 6709.60 | 6380.56 S | 354.90 W | 6387.98 | 2.20 |
| 13139.00 | 91.57 | 179.48 | 6707.07 | 6475.52 S | 354.02 W | 6482.88 | 0.10 |
| 13234.00 | 91.85 | 180.21 | 6704.23 | 6570.48 S | 353.77 W | 6577.79 | 0.82 |
| 13329.00 | 88.98 | 180.29 | 6703.55 | 6665.47 S | 354.18 W | 6672.76 | 3.02 |
| 13424.00 | 89.54 | 179.42 | 6704.77 | 6760.46 S | 353.94 W | 6767.70 | 1.09 |
| 13519.00 | 88.89 | 178.08 | 6706.07 | 6855.42 S | 351.87 W | 6862.57 | 1.57 |
| 13614.00 | 89.32 | 176.57 | 6707.56 | 6950.30 S | 347.43 W | 6957.29 | 1.65 |
| 13709.00 | 90.89 | 178.84 | 6707.38 | 7045.22 S | 343.63 W | 7052.07 | 2.91 |
| 13804.00 | 91.32 | 178.79 | 6705.55 | 7140.18 S | 341.67 W | 7146.94 | 0.46 |
| 13899.00 | 90.43 | 179.21 | 6704.10 | 7235.15 S | 340.01 W | 7241.83 | 1.04 |
| 13994.00 | 90.93 | 179.14 | 6702.97 | 7330.14 S | 338.64 W | 7336.73 | 0.53 |
| 14088.00 | 89.41 | 179.01 | 6702.70 | 7424.12 S | 337.12 W | 7430.64 | 1.62 |
| 14183.00 | 89.11 | 178.69 | 6703.92 | 7519.09 S | 335.22 W | 7525.52 | 0.46 |
| 14278.00 | 89.72 | 179.00 | 6704.89 | 7614.07 S | 333.30 W | 7620.41 | 0.72 |
| 14373.00 | 89.57 | 178.55 | 6705.48 | 7709.05 S | 331.27 W | 7715.29 | 0.50 |
| 14468.00 | 90.15 | 179.00 | 6705.71 | 7804.02 S | 329.24 W | 7810.17 | 0.77 |
| 14563.00 | 90.99 | 178.97 | 6704.77 | 7899.00 S | 327.56 W | 7905.07 | 0.88 |
| 14658.00 | 89.35 | 179.14 | 6704.49 | 7993.99 S | 325.99 W | 7999.97 | 1.74 |
| 14753.00 | 89.33 | 178.97 | 6705.94 | 8088.97 S | 324.54 W | 8084.93 | 2.22 |

| | | | | | | | |
|----------|-------|--------|---------|------------|----------|----------|------|
| 14753.00 | 89.66 | 179.07 | 6705.31 | 8088.97 S | 324.51 W | 8094.88 | 0.33 |
| 14848.00 | 90.06 | 178.90 | 6705.54 | 8183.96 S | 322.82 W | 8189.78 | 0.46 |
| 14943.00 | 91.14 | 179.03 | 6704.54 | 8278.93 S | 321.11 W | 8284.67 | 1.15 |
| 15037.00 | 90.00 | 178.96 | 6703.61 | 8372.91 S | 319.46 W | 8378.57 | 1.22 |
| 15132.00 | 90.34 | 177.65 | 6703.33 | 8467.87 S | 316.65 W | 8473.41 | 1.42 |
| 15227.00 | 90.09 | 178.35 | 6702.97 | 8562.81 S | 313.33 W | 8568.22 | 0.78 |
| 15322.00 | 89.91 | 178.82 | 6702.97 | 8657.78 S | 310.99 W | 8663.09 | 0.53 |
| 15417.00 | 90.49 | 180.93 | 6702.64 | 8752.77 S | 310.78 W | 8758.04 | 2.30 |
| 15511.00 | 88.12 | 180.21 | 6703.78 | 8846.75 S | 311.71 W | 8852.01 | 2.64 |
| 15606.00 | 88.46 | 179.96 | 6706.61 | 8941.71 S | 311.86 W | 8946.93 | 0.44 |
| 15701.00 | 88.71 | 179.83 | 6708.96 | 9036.68 S | 311.68 W | 9041.86 | 0.30 |
| 15796.00 | 89.29 | 179.71 | 6710.62 | 9131.67 S | 311.30 W | 9136.80 | 0.62 |
| 15891.00 | 88.55 | 178.50 | 6712.41 | 9226.64 S | 309.82 W | 9231.69 | 1.49 |
| 15986.00 | 88.58 | 177.89 | 6714.79 | 9321.56 S | 306.83 W | 9326.49 | 0.64 |
| 16081.00 | 88.80 | 178.48 | 6716.96 | 9416.49 S | 303.82 W | 9421.30 | 0.66 |
| 16176.00 | 89.38 | 178.35 | 6718.47 | 9511.44 S | 301.19 W | 9516.14 | 0.63 |
| 16271.00 | 89.82 | 178.30 | 6719.13 | 9606.39 S | 298.41 W | 9610.98 | 0.47 |
| 16366.00 | 90.25 | 178.17 | 6719.07 | 9701.35 S | 295.49 W | 9705.82 | 0.47 |
| 16460.00 | 90.89 | 178.20 | 6718.14 | 9795.30 S | 292.51 W | 9799.64 | 0.68 |
| 16555.00 | 90.86 | 177.98 | 6716.69 | 9890.23 S | 289.34 W | 9894.46 | 0.23 |
| 16650.00 | 90.46 | 177.56 | 6715.59 | 9985.15 S | 285.65 W | 9989.24 | 0.61 |
| 16745.00 | 89.94 | 176.99 | 6715.26 | 10080.04 S | 281.13 W | 10083.96 | 0.81 |
| 16840.00 | 90.15 | 176.96 | 6715.19 | 10174.91 S | 276.12 W | 10178.65 | 0.22 |
| 16905.00 | 90.22 | 176.79 | 6714.98 | 10239.82 S | 272.57 W | 10243.43 | 0.28 |
| 16966.00 | 90.22 | 176.79 | 6714.74 | 10300.72 S | 269.16 W | 10304.22 | 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 181.60 DEGREES (GRID)
A TOTAL CORRECTION OF 7.45 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16966.00 FEET
IS 10304.23 FEET ALONG 181.50 DEGREES (GRID)**

Surface surveys at 253' and 506' MD have had azimuth corrections to grid north, but were not taken by Halliburton.

Last survey is a projection from 16905' MD to bit at 16966' MD.