



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100	200			
Date run completed	13-Jul-15	17-Jul-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.75	4.750			
Log Start Depth (MD, ft)	758.00	6,870.00			
Log End Depth (MD, ft)	6,870.00	16,491.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	11-Jul-15 17:50	14-Jul-15 02:00			
Drill/Wipe End Date and Time	12-Jul-15 21:30	16-Jul-15 18:30			
Min Inc (deg) @ Depth (MD, ft)	0.52 @ 845.00	87.94 @ 7,541.00			
Max Inc (deg) @ Depth (MD, ft)	85.84 @ 6,804.00	91.72 @ 11,493.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC			
Flow Rate (gpm)	595.24	327.82			
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)	11.10 / 37.00	9.60 / 34.00			
Filtrate CL (ppm)	1,700.00	1,700.00			
pH / Fluid Loss (mptm)	9.70 / 5	9.80 / 6			
PV (cP) / YP (lhf2)	13 / 12.00	9 / 13.00			
% Solids / % Sand	12.60 / 0.35	6.70 / 0.30			
% 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	108.55 / PCM	217.70 / PCM			

Max Tool Temp (degF) / Source	182.55 / PCM	247.78 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Jim Boyd	Jim Boyd			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	11342292	12301677			
Insert Serial Number	11680771	11680742			
Date and Time Initialized	10-Jul-15 18:43	13-Jul-15 12:47			
Date and Time Read	12-Jul-15 06:38	17-Jul-15 11:24			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	65.00	68.00			
Software Version	6.33	6.33			
Sub Serial Number	11342292	12301677			
Sonde Serial Number	11477975	11062074			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	143.20	187.20			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	58.19	61.12			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11342292	12301677			
Insert/Sonde Serial Number	11120592	11579811			

REMARKS

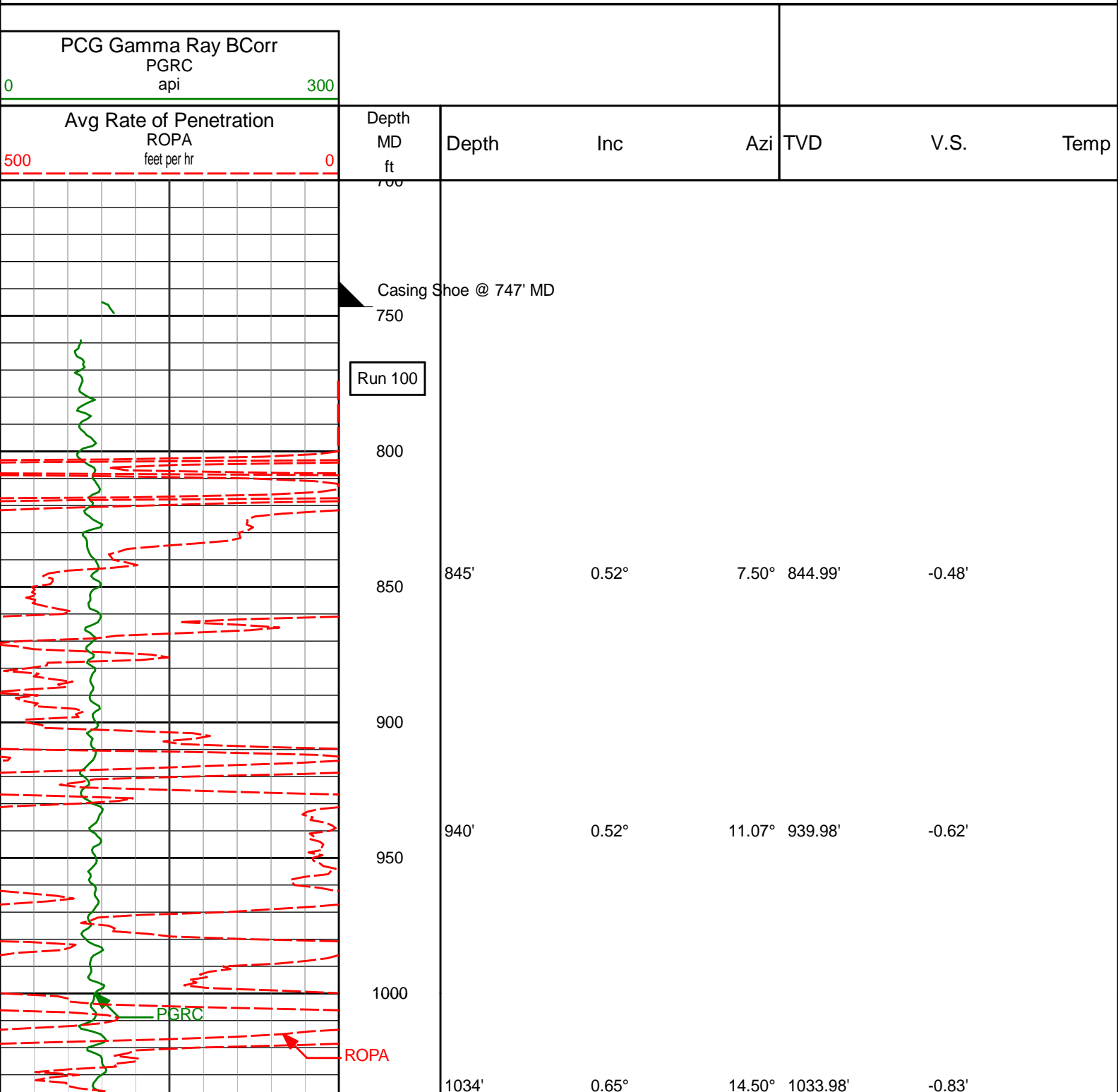
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance processing:
Hole Size: 6.125"
Mud Density: 9.9-10.3
5. The following smoothing parameters have been applied to the data:
Interval: 0.5 ft
Coercion Distance: 1.2 ft (ROPA)
Interval: 0.5 ft
Coercion Distance: 0.6 ft (Gamma Ray)

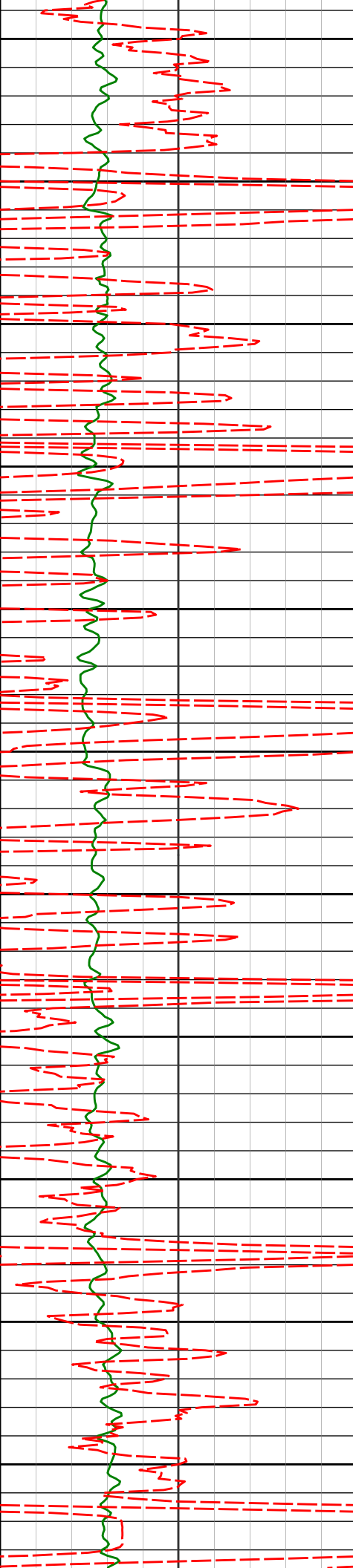
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MD Detail 1:600 Scale





1050

1100

1150

1200

1250

1300

1350

1400

1450

1500

1550

1127'

0.71°

16.00°

1126.97'

-1.12'

1220'

0.81°

25.88°

1219.96'

-1.56'

1313'

0.89°

22.29°

1312.95'

-2.12'

1406'

0.86°

17.51°

1405.94'

-2.60'

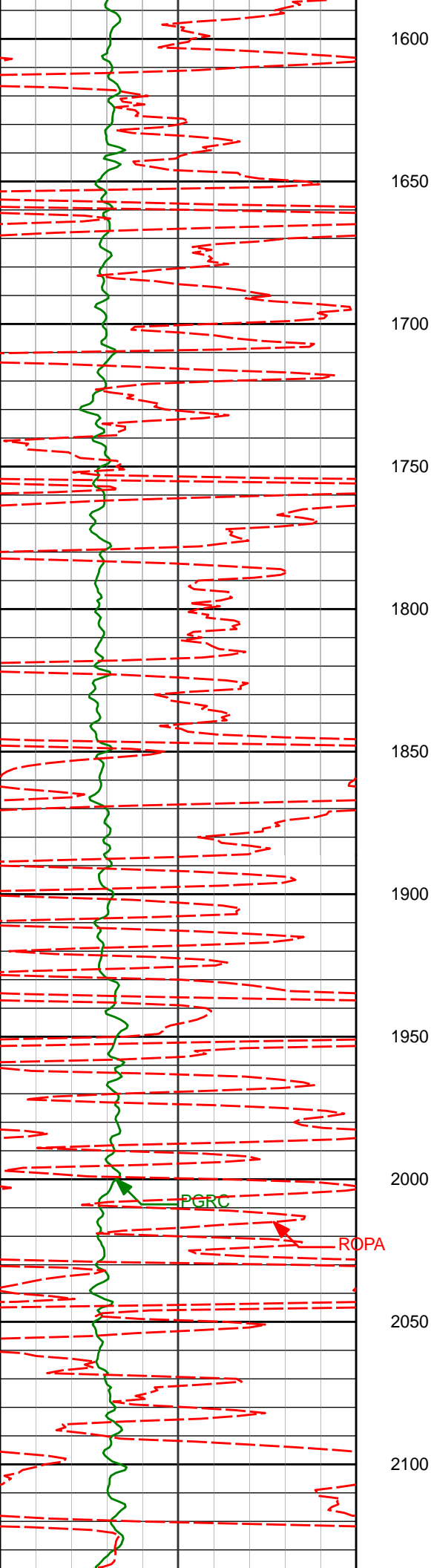
1499'

0.91°

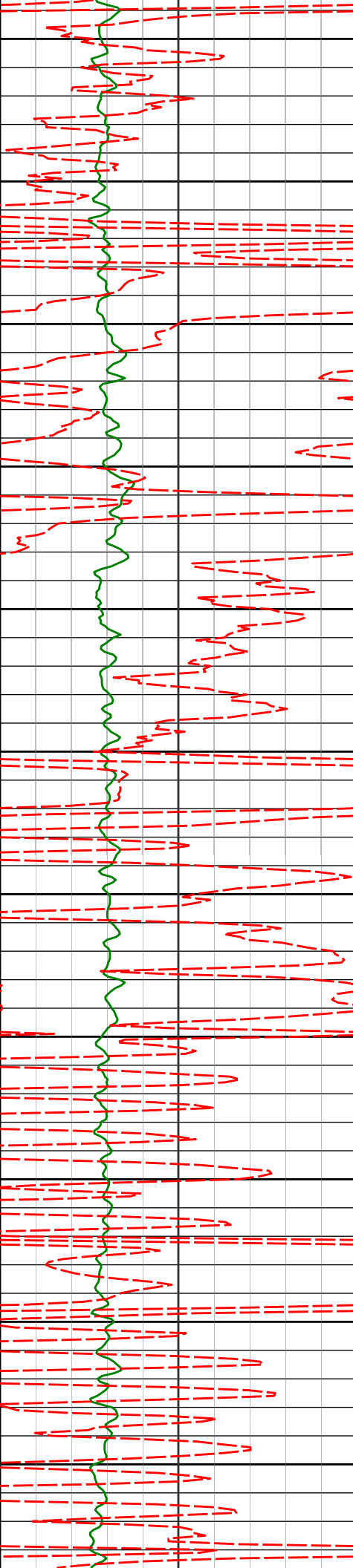
18.05°

1498.93'

-3.04'

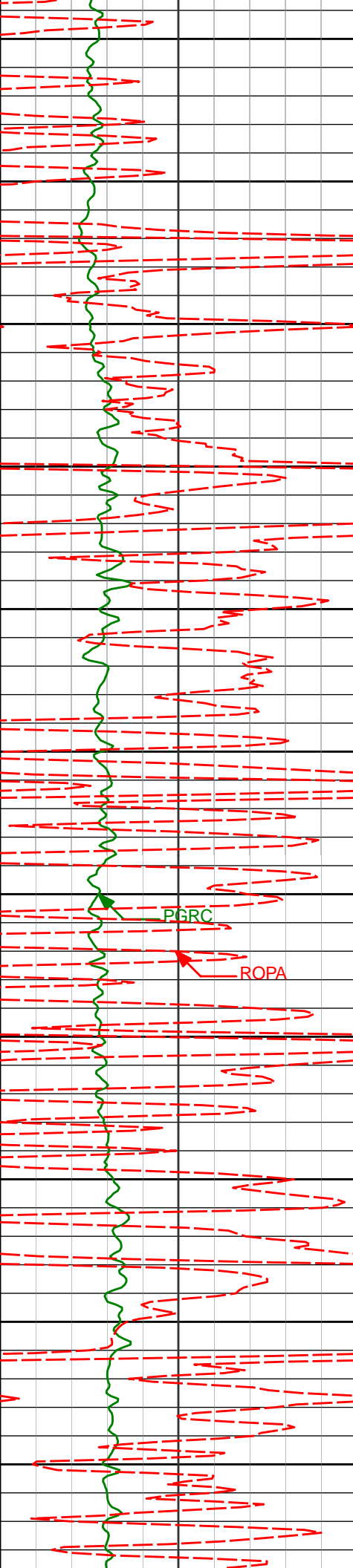


1683'	0.79°	21.48°	1682.91'	-3.94'
1776'	0.66°	30.68°	1775.91'	-4.45'
1869'	4.42°	71.27°	1868.80'	-8.11'
1962'	6.51°	71.26°	1961.37'	-16.48'



2150
2200
2250
2300
2350
2400
2450
2500
2550
2600
2650

2146'	6.88°	79.08°	2144.12'	-37.16'
2240'	8.60°	75.30°	2237.26'	-49.48'
2333'	8.27°	75.61°	2329.26'	-62.67'
2425'	8.06°	74.05°	2420.32'	-75.27'
2517'	7.28°	69.43°	2511.50'	-86.92'
2610'	8.53°	58.38°	2603.62'	-98.29'



2700

2750

2800

2850

2900

2950

3000

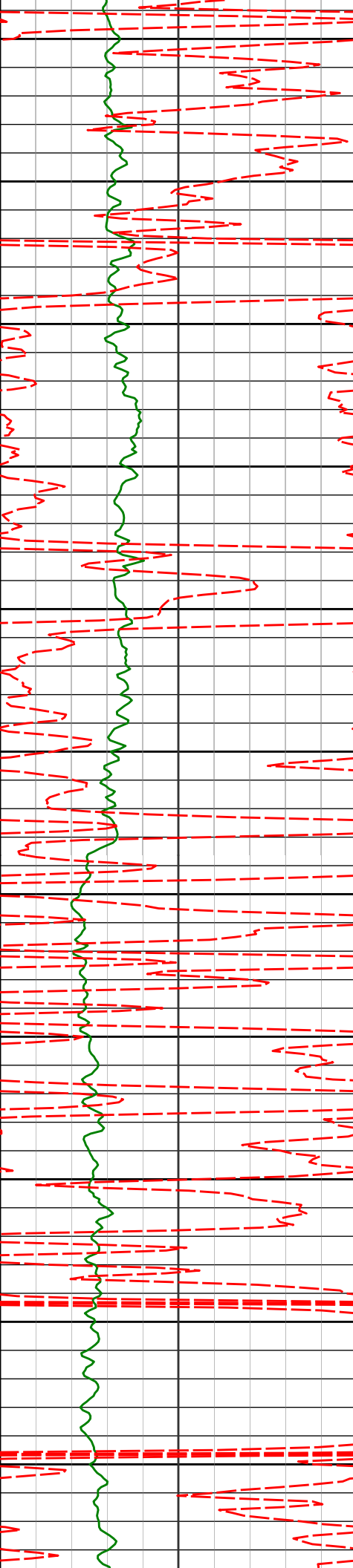
3050

3100

3150

3200

2796'	8.31°	55.42°	2787.62'	-121.05'
2890'	8.58°	61.09°	2880.60'	-132.75'
2984'	7.91°	58.60°	2973.63'	-144.38'
3079'	7.08°	57.75°	3067.82'	-154.89'
3174'	7.67°	58.43°	3162.03'	-165.22'



3250

3268'

5.97°

58.28°

3255.36'

-174.70'

3300

3350

3363'

6.13°

66.14°

3349.83'

-183.52'

3400

3450

3500

3550

3552'

7.41°

71.43°

3537.52'

-204.27'

3600

3650

3646'

7.82°

69.85°

3630.69'

-216.00'

3700

3750

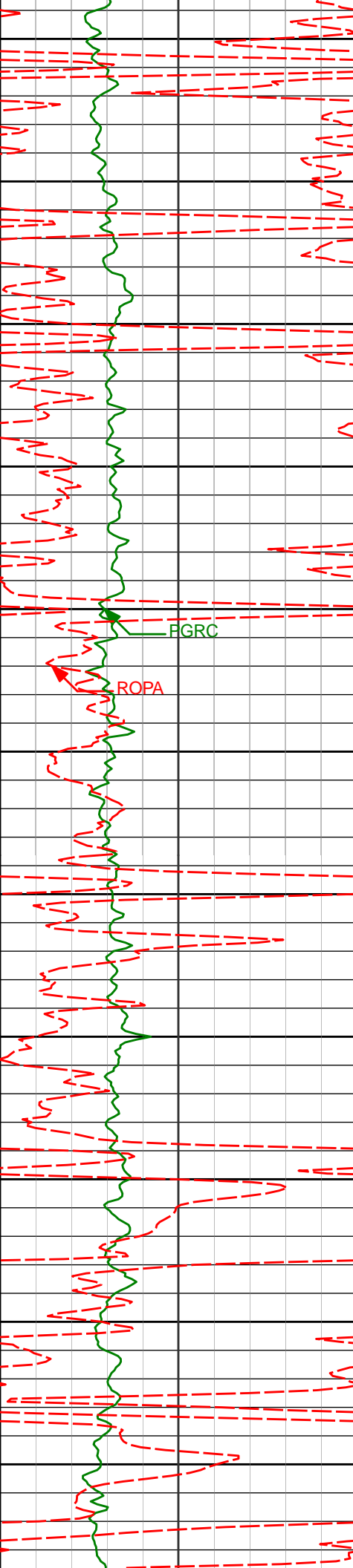
3741'

8.33°

67.82°

3724.75'

-228.42'



3800

3836'

8.49°

66.85°

3818.72'

-241.22'

3850

3900

3930'

7.52°

66.24°

3911.81'

-253.22'

3950

4000

FGRC

ROPA

4050

4100

4120'

5.36°

63.62°

4100.60'

-272.52'

4150

4200

4214'

6.57°

87.00°

4194.10'

-281.82'

4250

4300

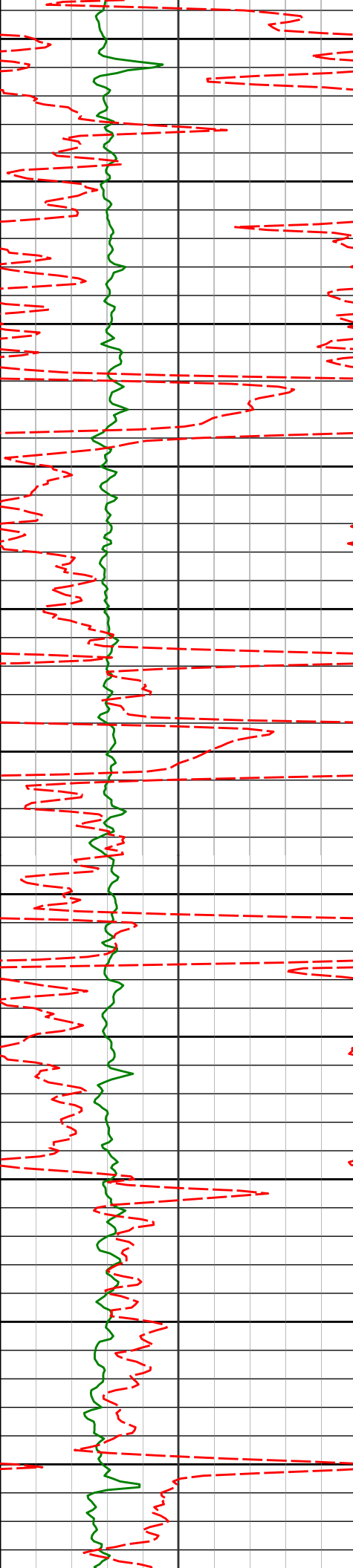
4309'

8.95°

89.40°

4288.22'

-294.64'



4350

4400

4450

4500

4550

4600

4650

4700

4750

4800

4850

4404'

9.02°

86.53° 4382.06'

-309.47'

4498'

7.78°

77.02° 4475.05'

-323.02'

4688'

8.31°

69.74° 4663.18'

-348.41'

4783'

7.02°

65.11° 4757.33'

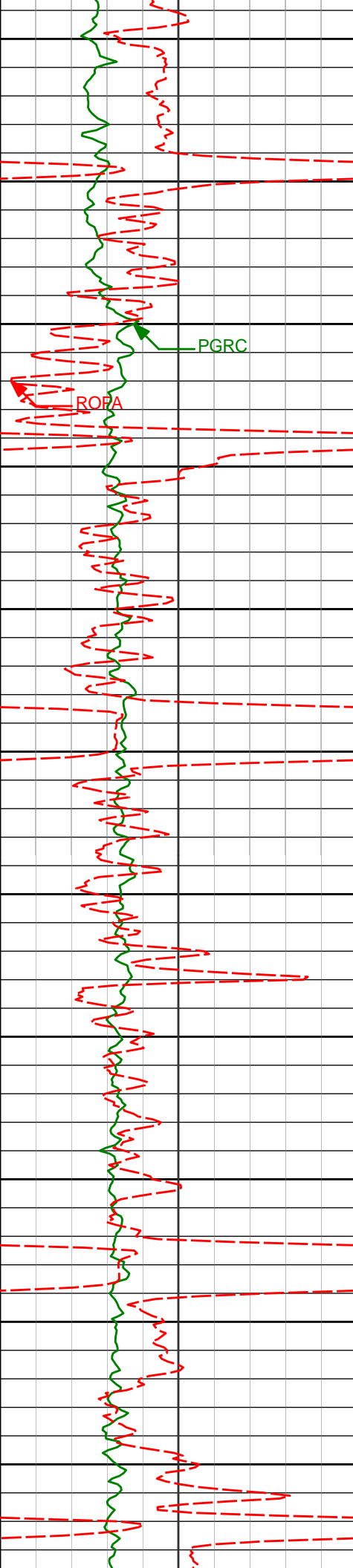
-360.10'

4877'

6.67°

62.53° 4850.66'

-370.14'



4900

4950

5000

5050

5100

5150

5200

5250

5300

5350

5400

5067'

4.78°

56.29°

5039.71'

-386.48'

5161'

3.96°

53.89°

5133.44'

-392.35'

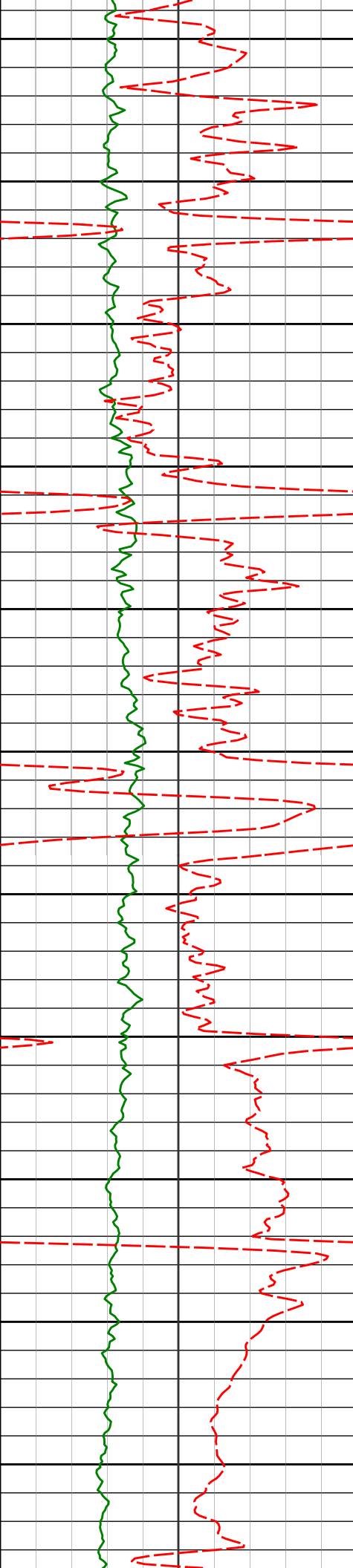
5351'

1.97°

50.96°

5323.17'

-400.17'



5450

5500

5550

5600

5650

5700

5750

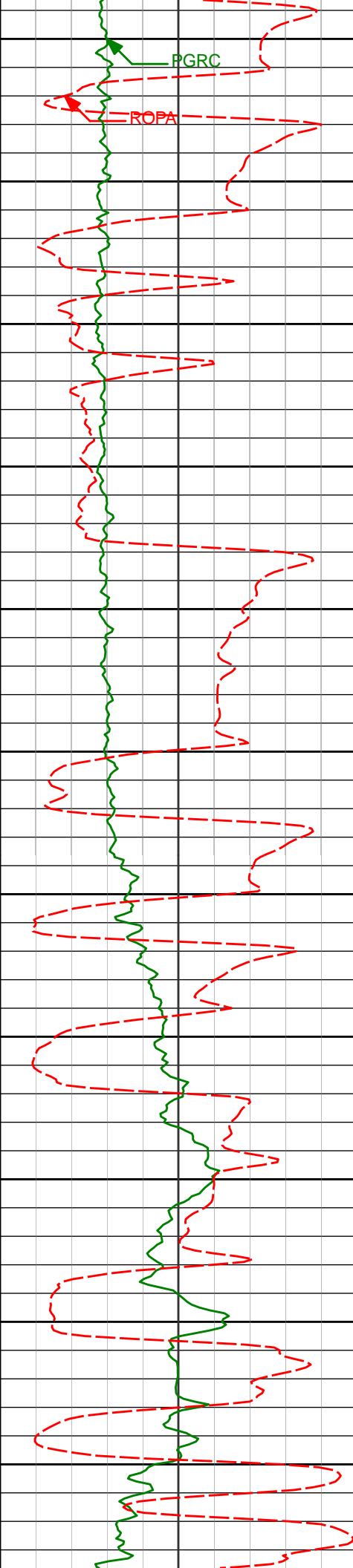
5800

5850

5900

5950

5445'	2.27°	25.49°	5417.11'	-402.22'
5540'	1.89°	12.49°	5512.05'	-403.35'
5634'	2.10°	12.02°	5605.99'	-404.04'
5729'	1.64°	346.96°	5700.94'	-404.08'
5824'	2.43°	27.27°	5795.88'	-404.68'
5918'	6.35°	285.15°	5889.68'	-400.56'



6000

6013'

19.33°

277.95° 5982.11'

-379.82'

6050

6100

6107'

23.06°

269.19° 6069.76'

-345.97'

6150

6200

6202'

26.83°

267.82° 6155.88'

-305.94'

6250

6300

6296'

36.08°

268.38° 6235.98'

-256.97'

6350

6400

6391'

44.93°

272.03° 6308.15'

-195.35'

6450

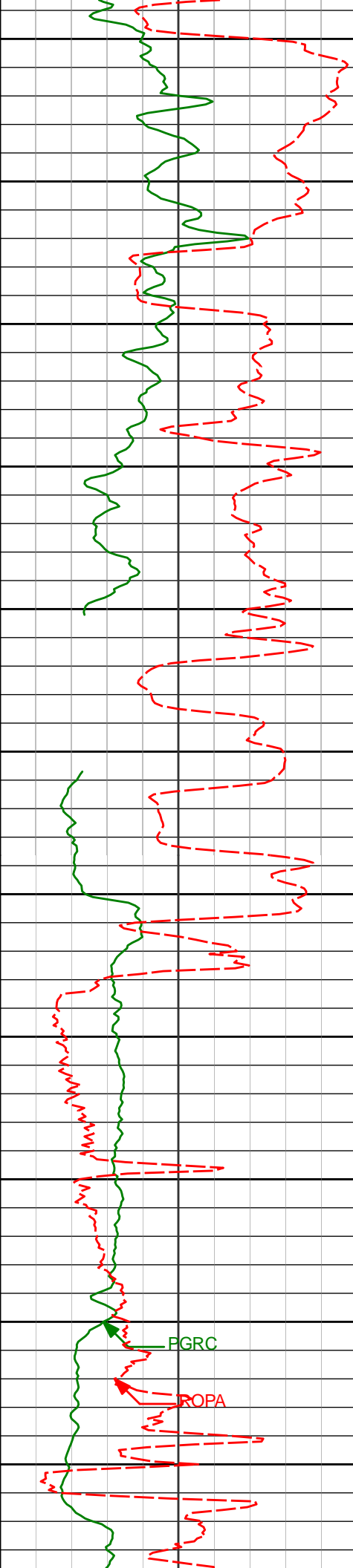
6500

6485'

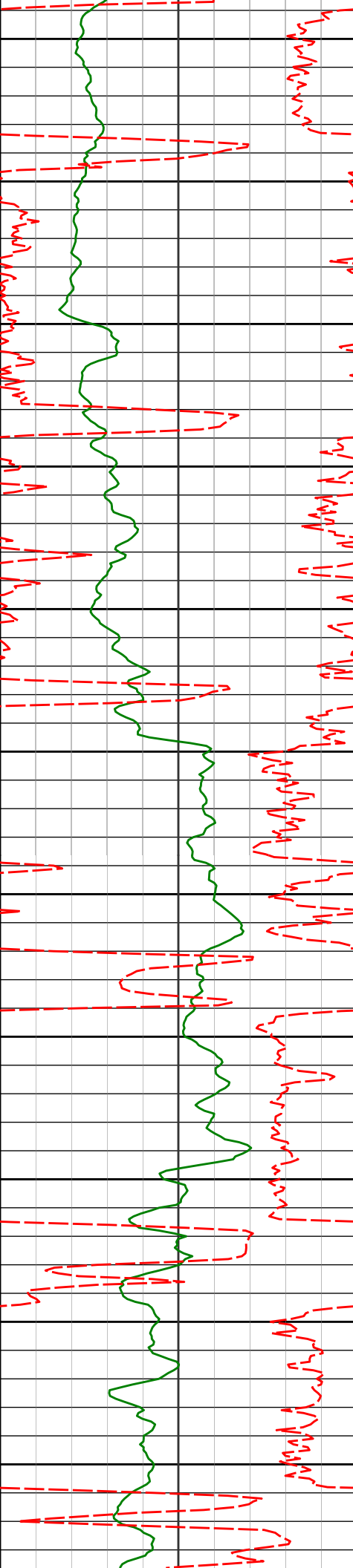
54.16°

273.82° 6369.08'

-123.99'



6550				
6580'	59.00°	271.70°	6421.39'	-44.81'
6600				
6627'	63.94°	270.60°	6443.83'	-3.53'
6650				
6674'	69.64°	269.79°	6462.34'	39.65'
6700				
6721'	76.07°	271.25°	6476.19'	84.53'
6750				
6769'	82.05°	270.23°	6485.30'	131.63'
6800				
6804'	85.84°	268.33°	6489.00'	166.43'
6850				
Casing Shoe @ 6859'				
Run 200				
6900				
6950				
6974'	89.60°	264.78°	6492.87'	335.93'
7000				
7050				
7068'	89.91°	265.53°	6493.27'	429.56'



7100

7150

7200

7250

7300

7350

7400

7450

7500

7550

7600

7163'

90.22°

267.58° 6493.16'

524.37'

7258'

90.03°

267.33° 6492.95'

619.26'

7353'

90.28°

267.16° 6492.70'

714.13'

7447'

88.34°

268.75° 6493.83'

808.04'

7541'

87.94°

268.48° 6496.88'

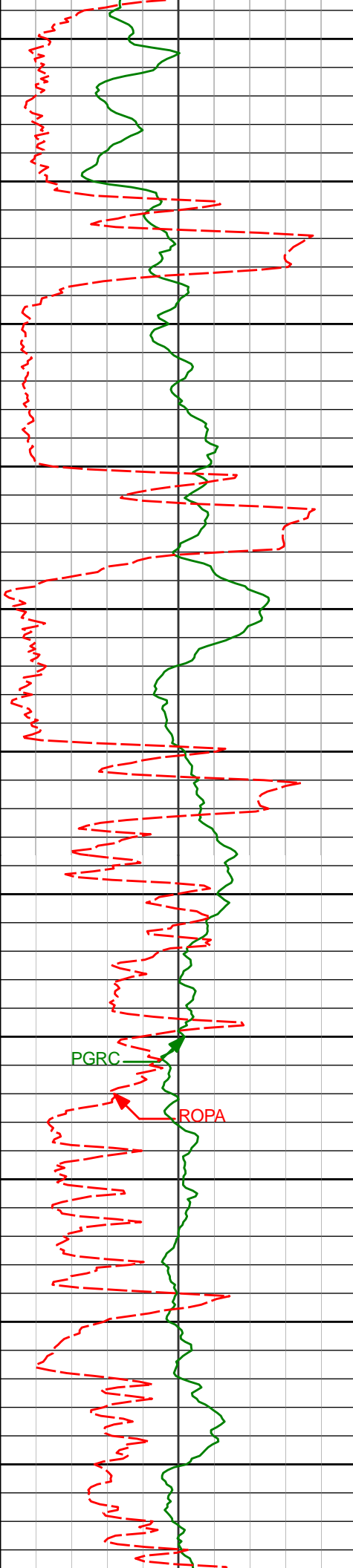
901.96'

7636'

88.31°

268.05° 6499.99'

996.85'



7650

7700

7750

7800

7850

7900

7950

8000

8050

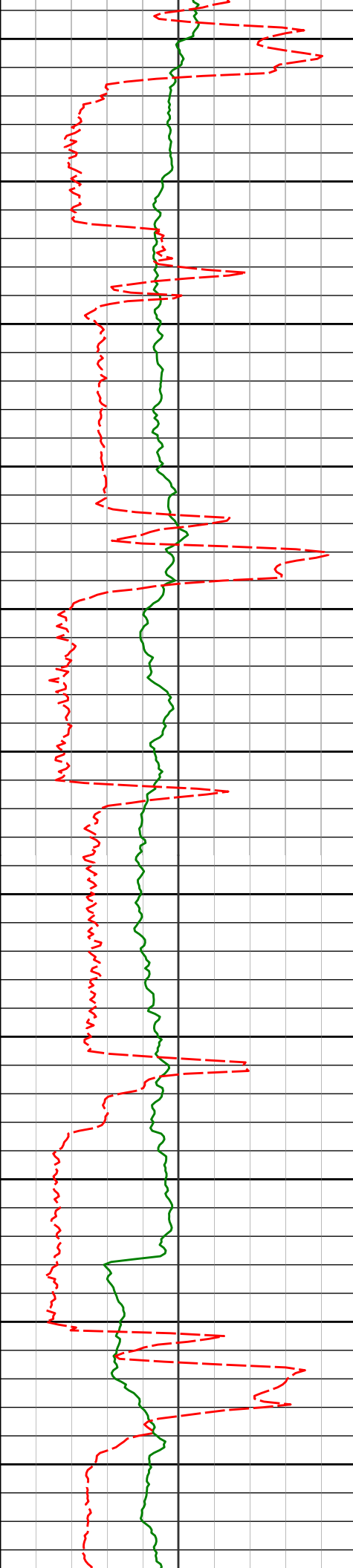
8100

8150

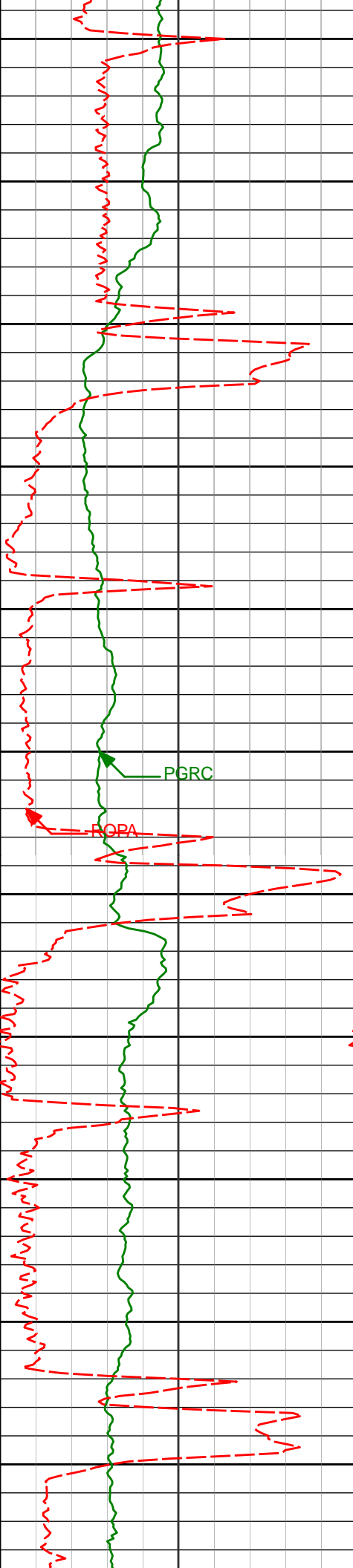
7731'	89.05°	268.84°	6502.18'	1091.78'
7826'	88.95°	269.53°	6503.83'	1186.75'
7920'	90.28°	268.78°	6504.47'	1280.73'
8015'	90.15°	268.54°	6504.11'	1375.70'
8110'	89.97°	267.97°	6504.01'	1470.64'

PGRC

ROPA

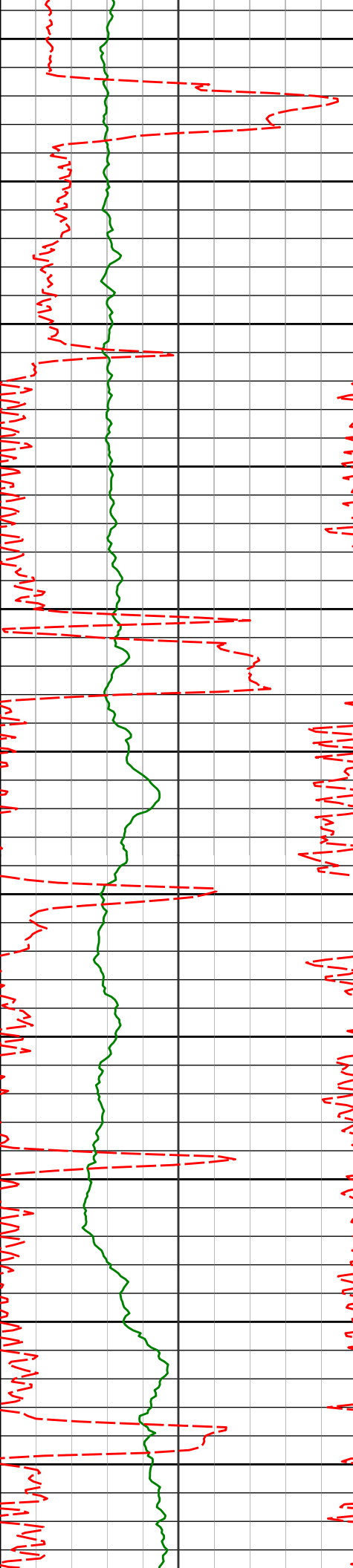


8200	8204'	90.46°	269.37°	6503.66'	1564.60'
8250					
8300	8299'	90.80°	268.67°	6502.61'	1659.58'
8350					
8400	8394'	89.91°	268.68°	6502.02'	1754.54'
8450					
8500	8488'	90.31°	268.73°	6501.84'	1848.51'
8550					
8600	8583'	91.05°	268.62°	6500.72'	1943.47'
8650					
8700	8677'	90.25°	269.25°	6499.65'	2037.44'



8750
8800
8850
8900
8950
9000
9050
9100
9150
9200
9250

8772'	90.95°	269.19°	6498.65'	2132.42'
8867'	90.06°	271.38°	6497.82'	2227.41'
8961'	90.74°	271.20°	6497.16'	2321.39'
9056'	89.51°	270.24°	6496.95'	2416.38'
9150'	90.18°	270.01°	6497.21'	2510.38'
9245'	90.09°	268.14°	6496.98'	2605.36'



9300

9339'

89.72°

268.96° 6497.14'

2699.32'

9350

9400

9434'

90.62°

268.22° 6496.86'

2794.28'

9450

9500

9529'

88.21°

268.07° 6497.83'

2889.20'

9550

9600

9623'

88.37°

268.26° 6500.63'

2983.10'

9650

9700

9718'

88.86°

268.87° 6502.93'

3078.04'

9750

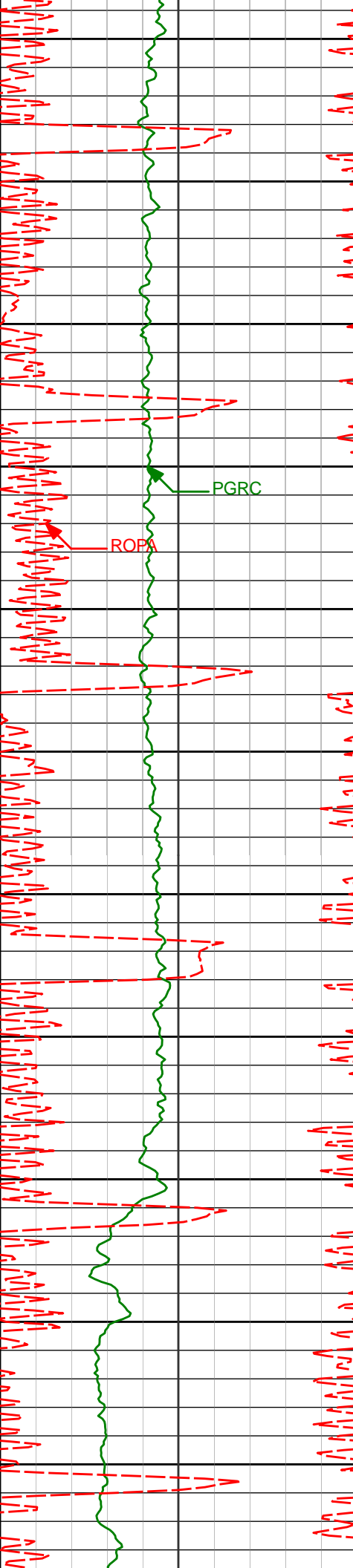
9800

9813'

88.95°

268.46° 6504.75'

3172.98'



9850

9900

9950

10000

10050

10100

10150

10200

10250

10300

10350

9908'

89.38°

268.09° 6506.13'

3267.92'

10003'

89.01°

268.69° 6507.46'

3362.86'

10097'

88.98°

270.42° 6509.11'

3456.84'

10192'

89.88°

271.12° 6510.06'

3551.83'

10286'

90.03°

271.13° 6510.13'

3645.82'

10380'

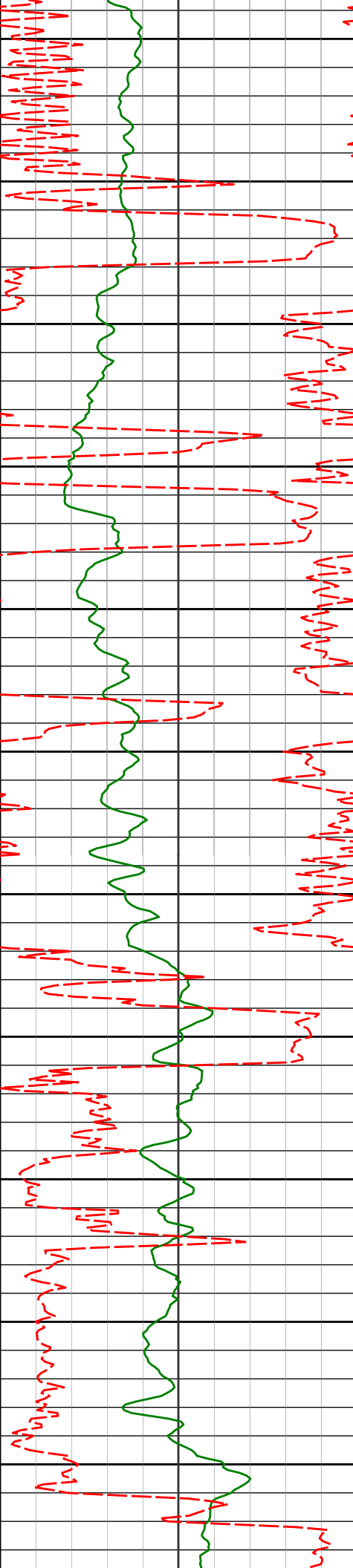
90.92°

272.28° 6509.35'

3739.78'

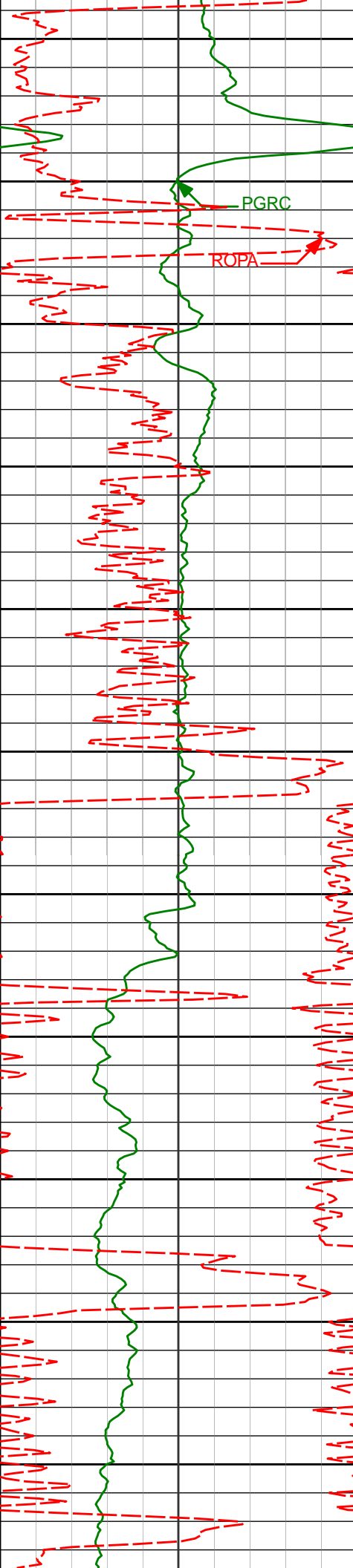
PGRC

ROPA



10400
10450
10500
10550
10600
10650
10700
10750
10800
10850
10900

10474'	89.38°	271.70°	6509.11'	3833.73'
10567'	88.15°	270.22°	6511.11'	3926.69'
10660'	87.94°	269.33°	6514.28'	4019.64'
10752'	89.01°	268.50°	6516.73'	4111.58'
10845'	88.61°	268.83°	6518.66'	4204.52'



10950

11000

11050

11100

11150

11200

11250

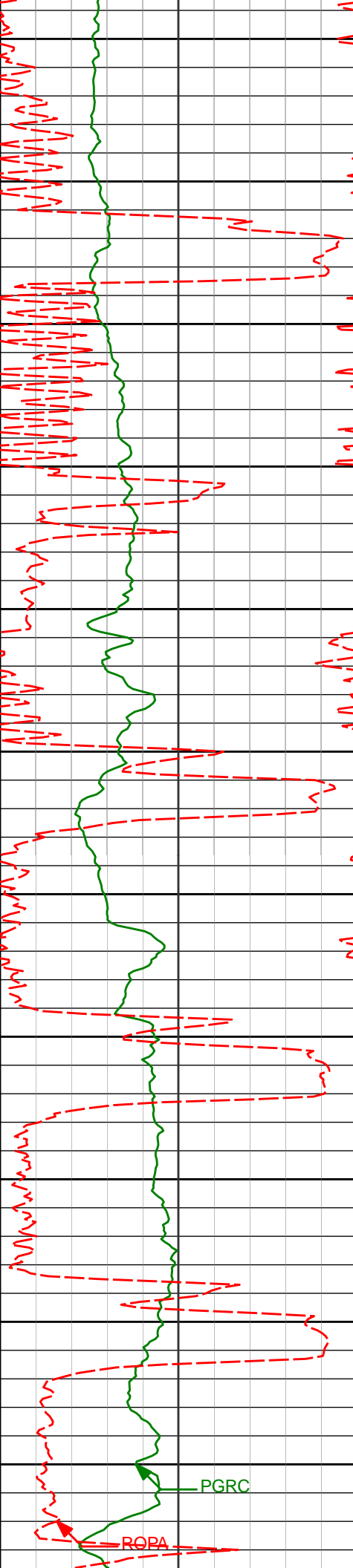
11300

11350

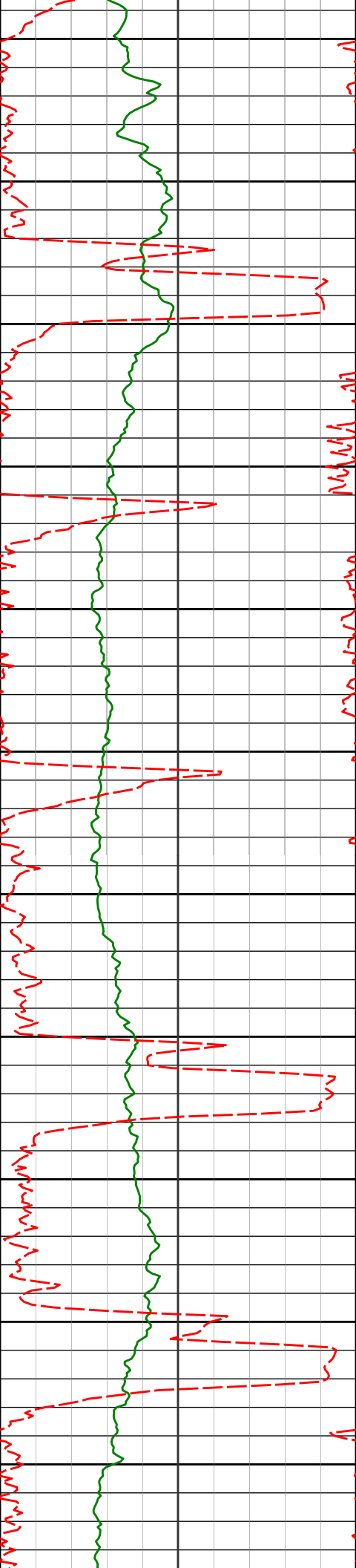
11400

11450

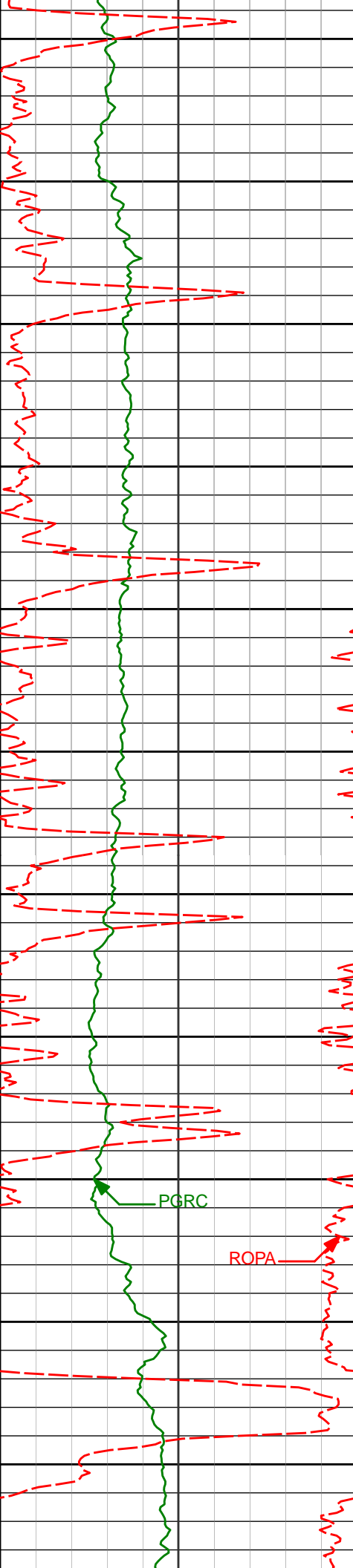
10939'	89.66°	266.57°	6520.08'	4298.42'
11029'	90.71°	266.54°	6519.79'	4388.23'
11122'	90.83°	266.62°	6518.54'	4481.04'
11216'	89.41°	267.41°	6518.35'	4574.89'
11309'	89.63°	267.66°	6519.13'	4667.79'
11401'	90.71°	268.16°	6518.85'	4759.71'



11493'	91.72°	268.36°	6516.90'	4851.64'
11586'	90.12°	269.30°	6515.41'	4944.59'
11679'	90.46°	269.93°	6514.94'	5037.59'
11771'	91.11°	268.96°	6513.68'	5129.57'
11864'	90.59°	270.66°	6512.30'	5222.55'
11956'	88.74°	270.18°	6512.84'	5314.55'



12050	12049'	88.58°	270.18°	6515.01'	5407.52'
12100					
12142'	89.51°	268.54°	6516.56'	5500.49'	
12150					
12200					
12236'	89.72°	267.98°	6517.19'	5594.44'	
12250					
12300					
12331'	90.89°	268.89°	6516.69'	5689.39'	
12350					
12400					
12425'	90.68°	269.68°	6515.40'	5783.37'	
12450					
12500					
12520'	89.11°	270.26°	6515.57'	5878.36'	
12550					



12600

12614' 89.42° 270.11° 6516.78' 5972.35'

12650

12700

12709' 89.72° 270.39° 6517.49' 6067.35'

12750

12800

12804' 90.12° 270.24° 6517.62' 6162.35'

12850

12900

12898' 90.28° 270.16° 6517.30' 6256.35'

12950

13000

12993' 90.92° 270.38° 6516.30' 6351.35'

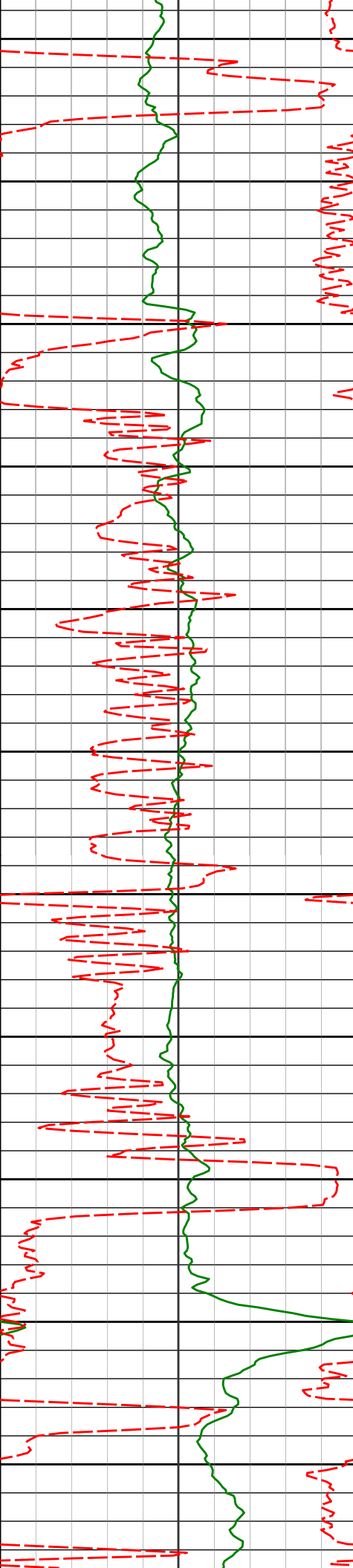
PGRC

ROPA

13050

13100

13088' 90.46° 269.97° 6515.16' 6446.34'



13150

13182'	89.45°	269.90°	6515.23'	6540.34'
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13200

13250

13277'	89.60°	269.50°	6516.02'	6635.33'
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13300

13350

13372'	89.63°	269.45°	6516.66'	6730.32'
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13400

13450

13466'	88.46°	269.24°	6518.22'	6824.29'
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13500

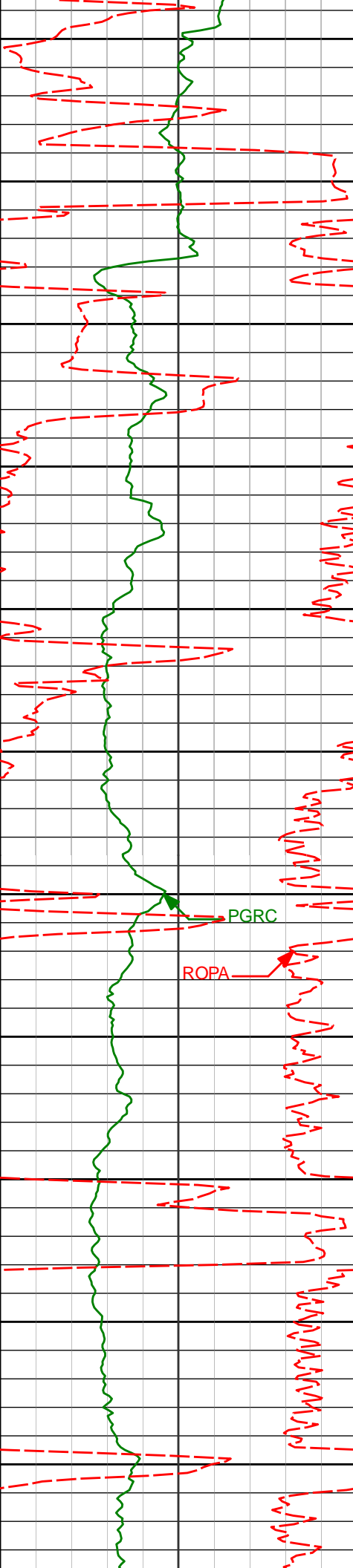
13550

13561'	89.14°	267.89°	6520.21'	6919.23'
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13600

13650

13656'	89.63°	267.67°	6521.23'	7014.14'
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13700

13750

13800

13850

13900

13950

14000

14050

14100

14150

14200

13750'

13845'

13939'

14034'

14129'

14224'

89.20°

90.03°

90.25°

90.62°

89.08°

89.08°

268.85° 6522.19'

269.00° 6522.83'

269.36° 6522.60'

268.69° 6521.88'

270.30° 6522.13'

270.21° 6523.65'

7108.08'

7203.05'

7297.04'

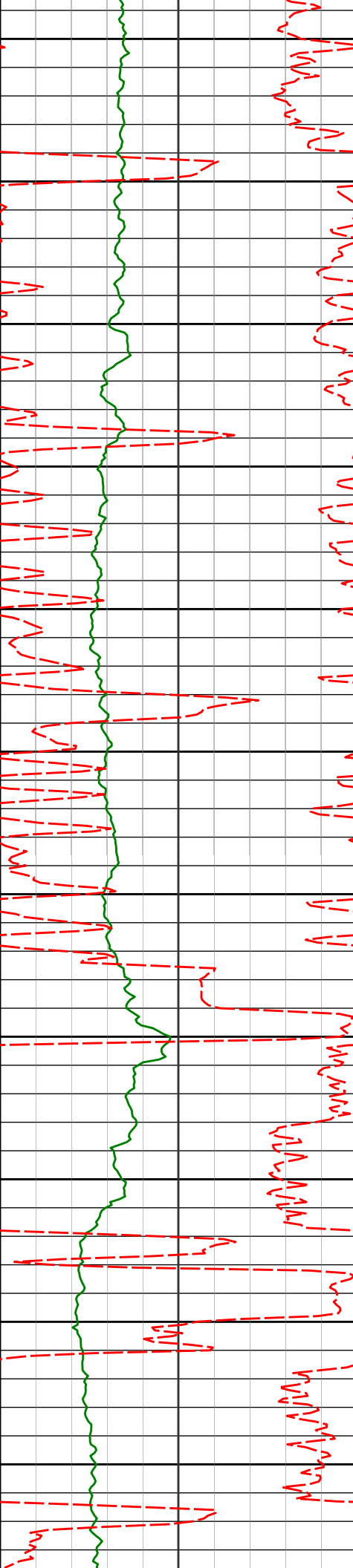
7392.01'

7487.00'

7581.99'

PGRC

ROPA



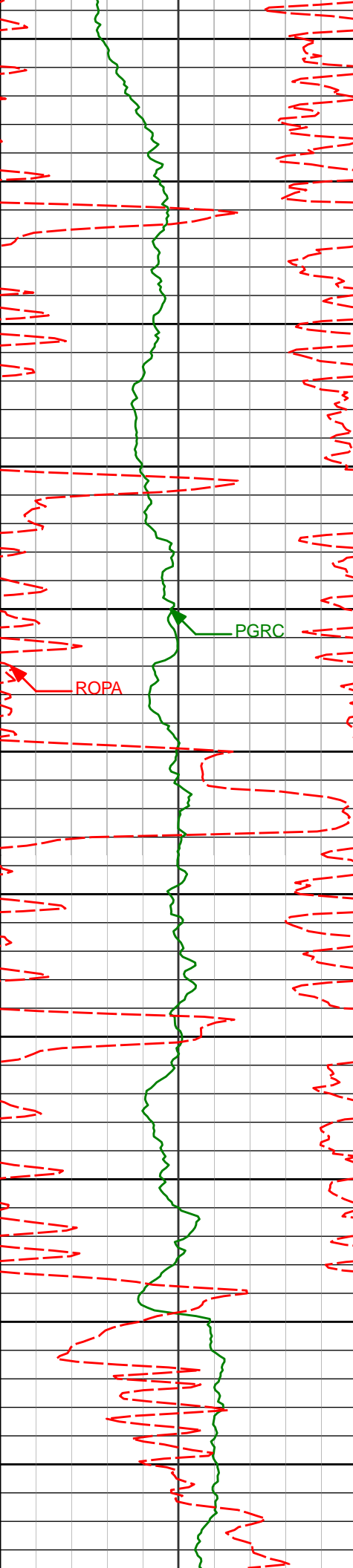
14250
14300
14350
14400
14450
14500
14550
14600
14650
14700
14750

14318'
14413'
14508'
14602'
14697'

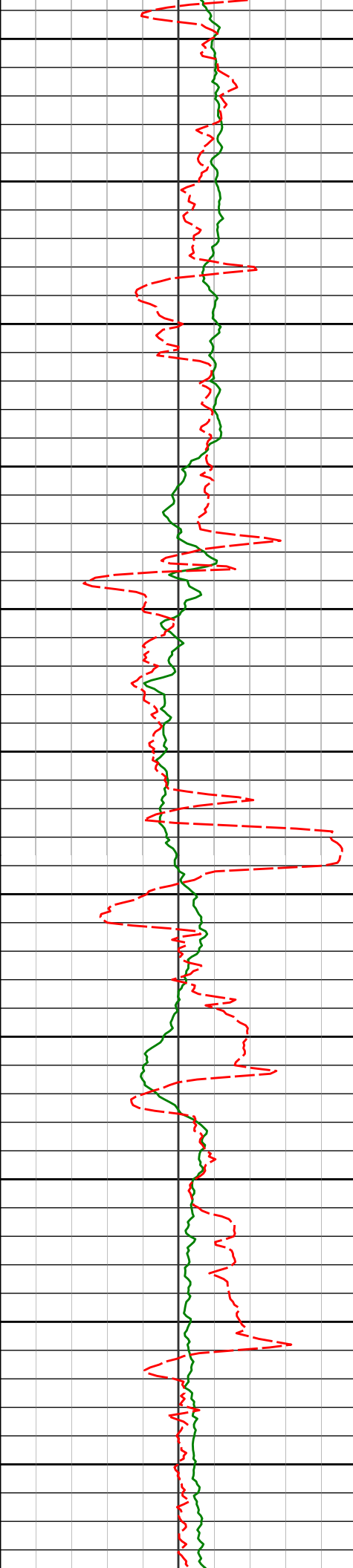
89.45°
89.42°
90.74°
91.17°
89.20°

269.63° 6524.86'
269.52° 6525.80'
270.72° 6525.66'
269.81° 6524.10'
270.40° 6523.79'

7675.98'
7770.97'
7865.96'
7959.95'
8054.94'



14800	14791'	89.69°	270.74°	6524.70'	8148.94'
14850					
14900	14886'	90.25°	270.02°	6524.75'	8243.94'
14950					
15000	14980'	90.68°	269.46°	6523.99'	8337.93'
15050					
15100	15075'	89.75°	270.18°	6523.63'	8432.93'
15150					
15200	15170'	89.78°	269.92°	6524.02'	8527.92'
15250					
15300	15264'	89.88°	269.49°	6524.30'	8621.92'



15350

15359'

90.06°

269.69° 6524.35'

8716.92'

15400

15450

15455'

90.06°

269.50° 6524.25'

8812.91'

15500

15550

15548'

90.37°

269.53° 6523.90'

8905.90'

15600

15650

15643'

89.35°

268.64° 6524.13'

9000.88'

15700

15750

15738'

90.03°

268.93° 6524.65'

9095.85'

15800

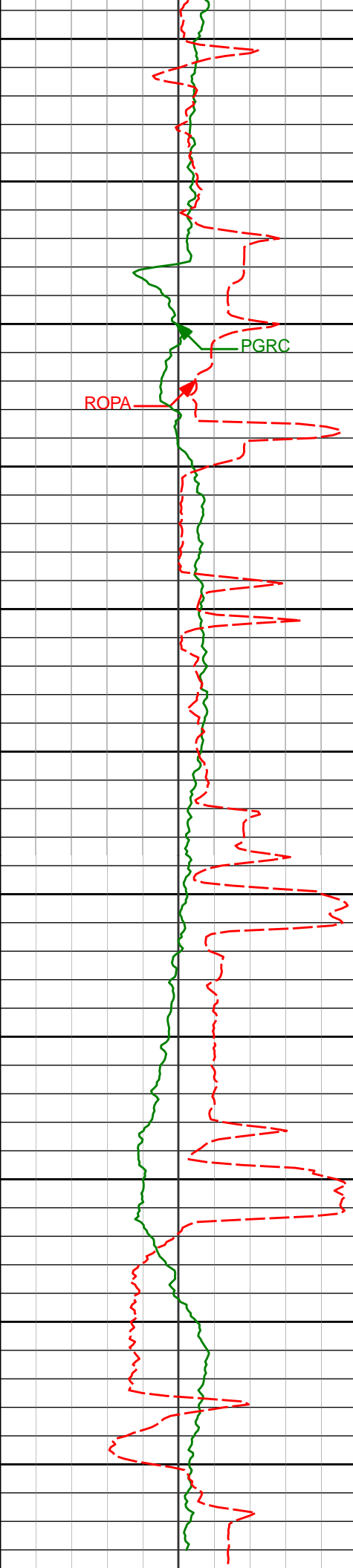
15850

15833'

90.09°

268.50° 6524.55'

9190.82'



15900

15928'	89.78°	268.15°	6524.66'	9285.77'
--------	--------	---------	----------	----------

15950

16000

16023'	90.15°	267.71°	6524.71'	9380.69'
--------	--------	---------	----------	----------

16050

16100

16118'	90.40°	267.34°	6524.26'	9475.59'
--------	--------	---------	----------	----------

16150

16200

16213'	90.59°	267.12°	6523.44'	9570.46'
--------	--------	---------	----------	----------

16250

16300

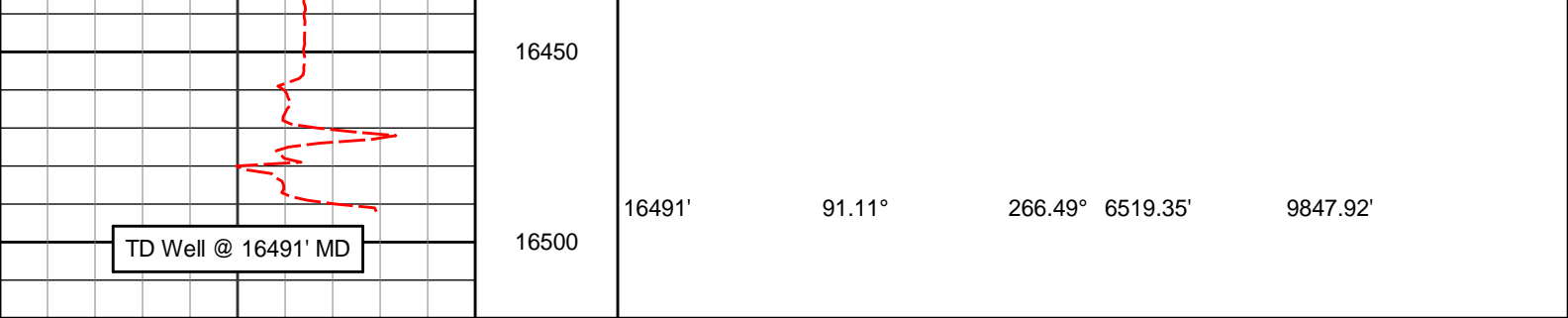
16308'	90.68°	266.72°	6522.38'	9665.29'
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16350

16400

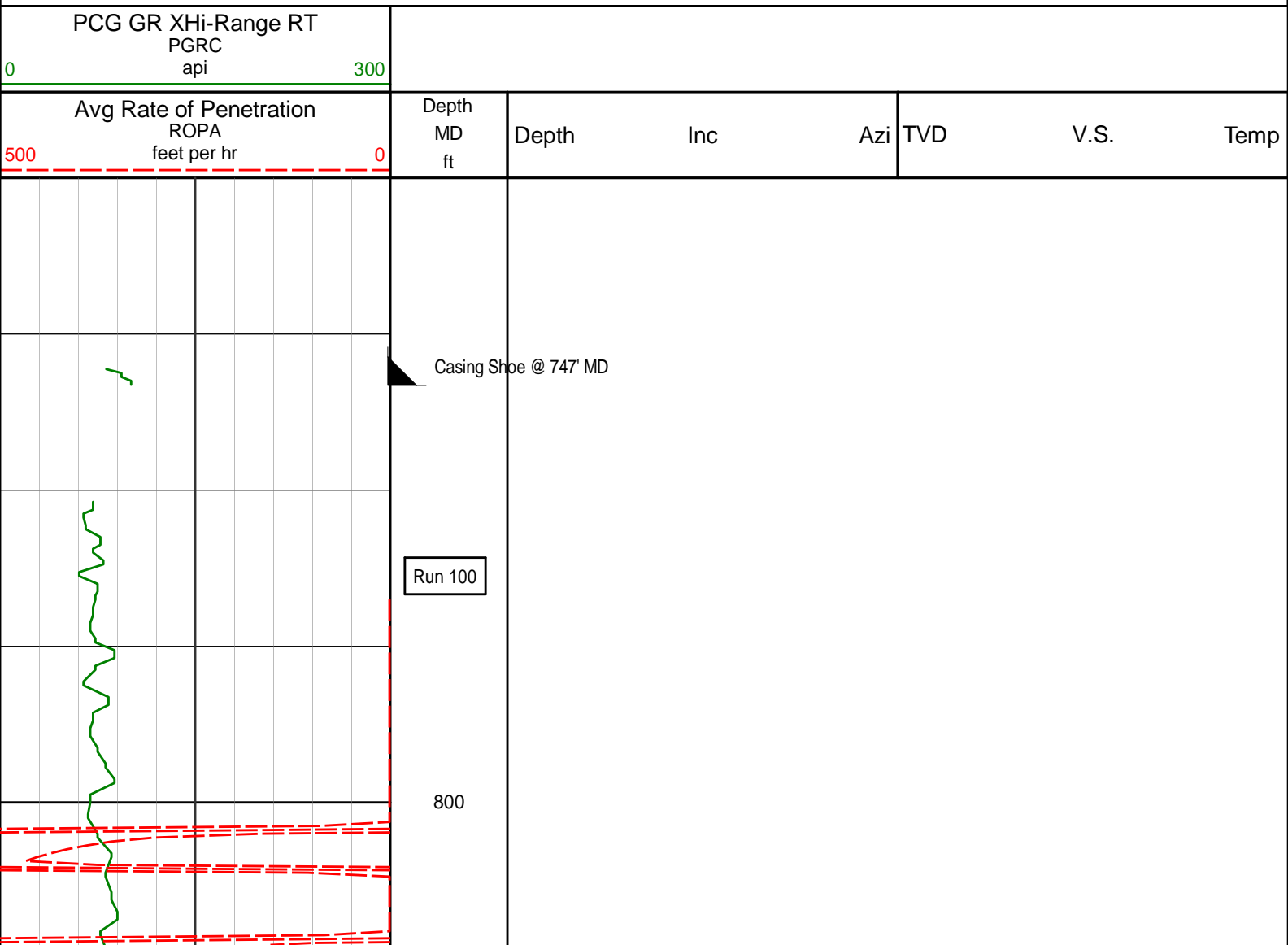
16403'	90.96°	266.86°	6521.02'	9760.12'
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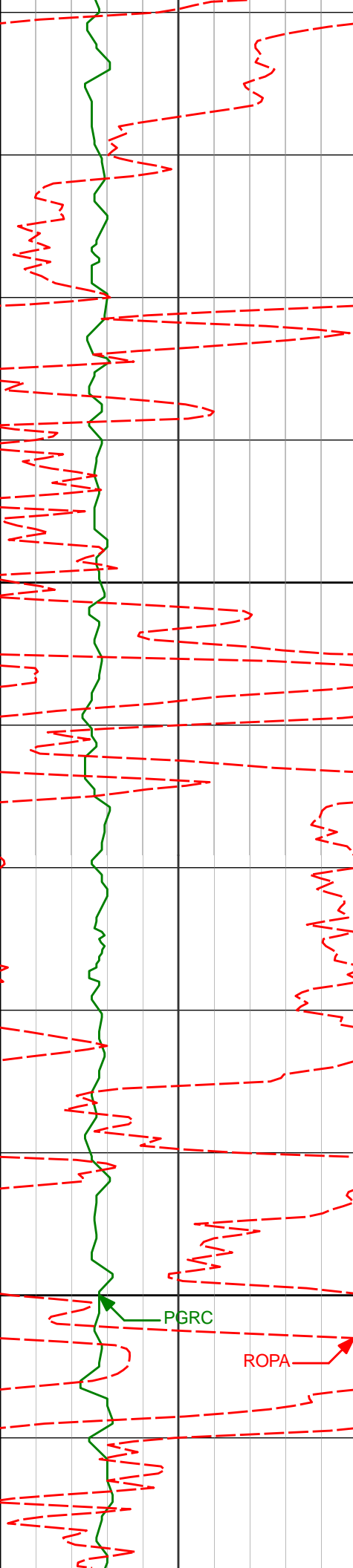
16423'	91.11°	266.49°	6520.66'	9780.08'
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Avg Rate of Penetration ROPA feet per hr	Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
500-----0							
PCG Gamma Ray BCorr PGRC api							
0-----300							

MD Detail 1:240 Scale





845'

0.52°

7.50° 844.99'

-0.48'

900

940'

0.52°

11.07° 939.98'

-0.62'

1000

PGRC

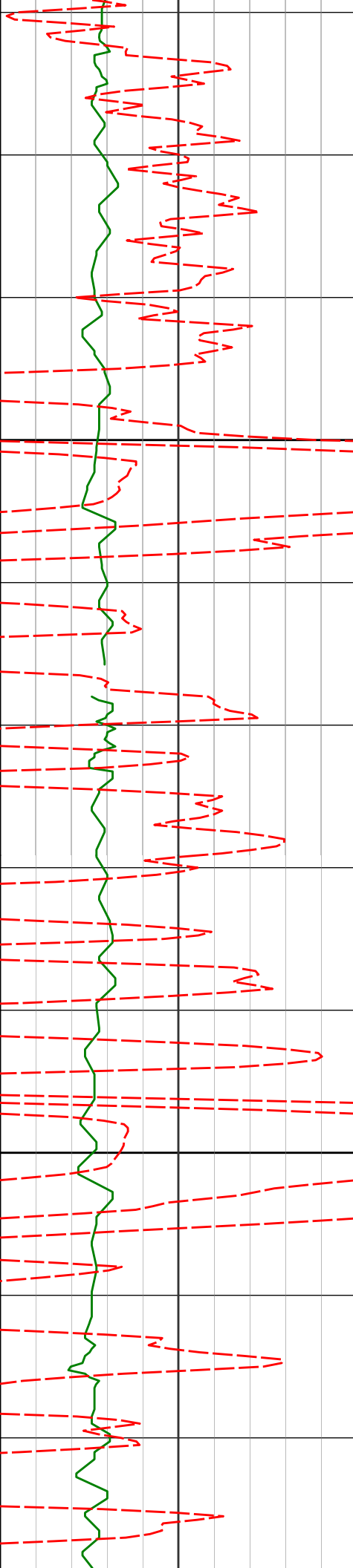
ROPA

1034'

0.65°

14.50° 1033.98'

-0.83'



1100

1127'

0.71°

16.00° 1126.97'

-1.12'

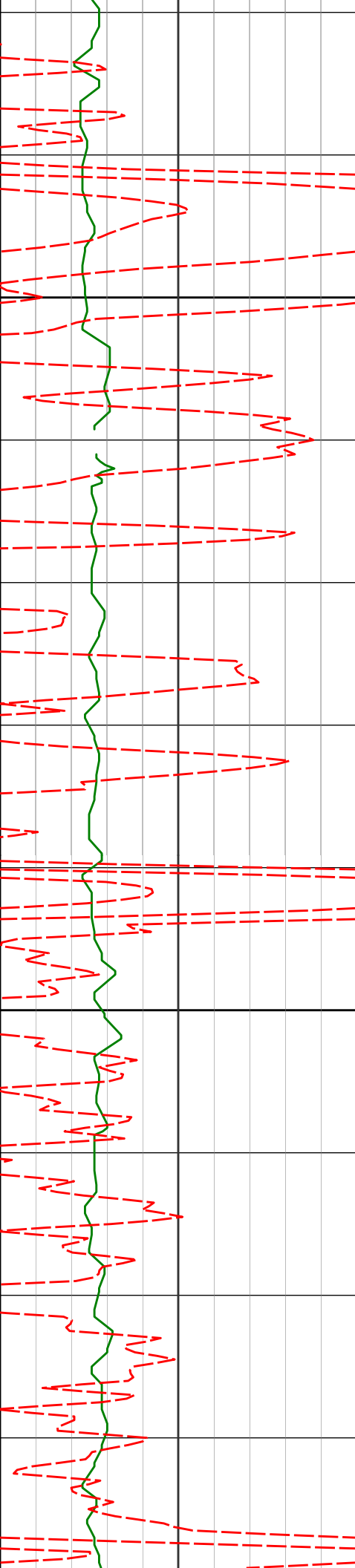
1200

1220'

0.81°

25.88° 1219.96'

-1.56'



1300

1313'

0.89°

22.29° 1312.95'

-2.12'

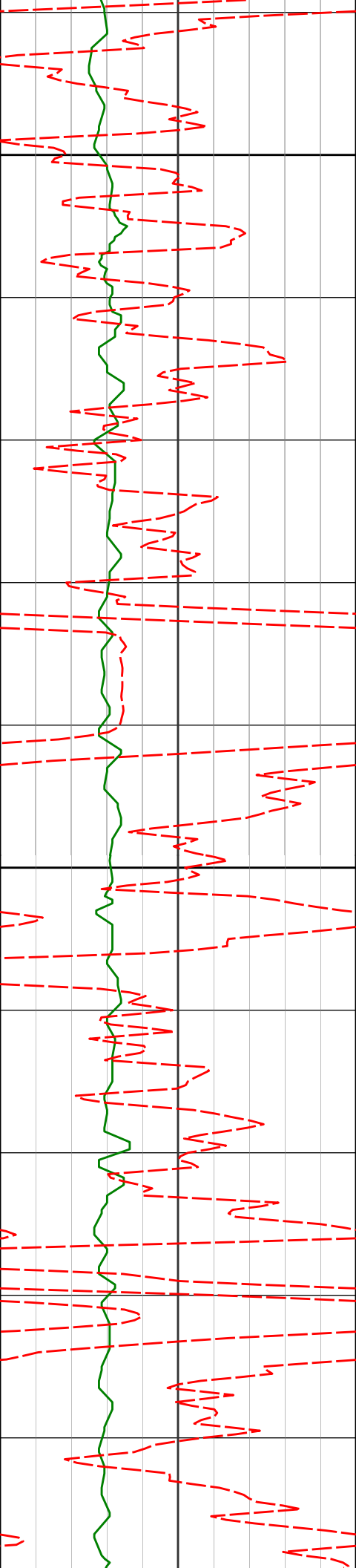
1400

1406'

0.86°

17.51° 1405.94'

-2.60'



1500

1600

1499'

1683'

0.91°

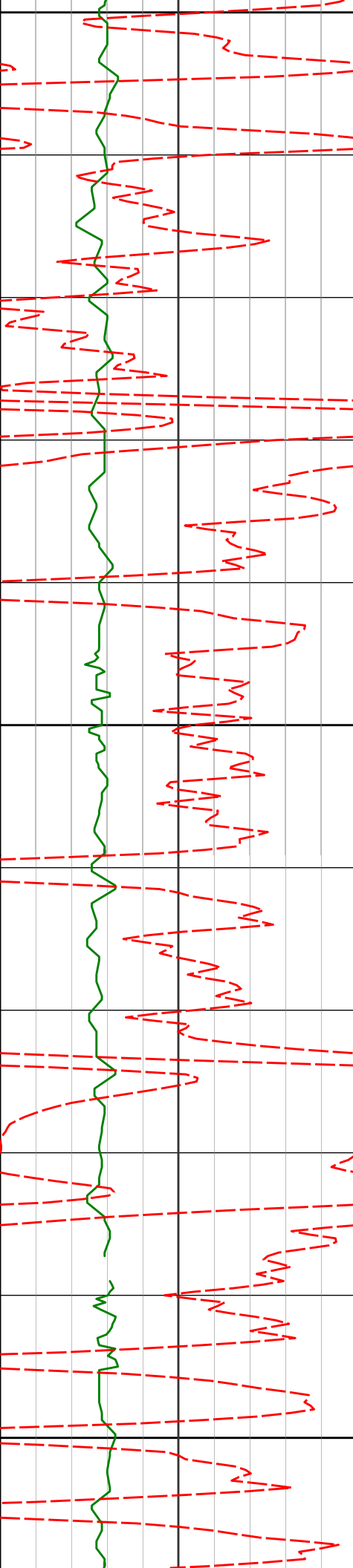
0.79°

18.05° 1498.93'

21.48° 1682.91'

-3.04'

-3.94'



1700

1776'

0.66°

30.68°

1775.91'

-4.45'

1800

1869'

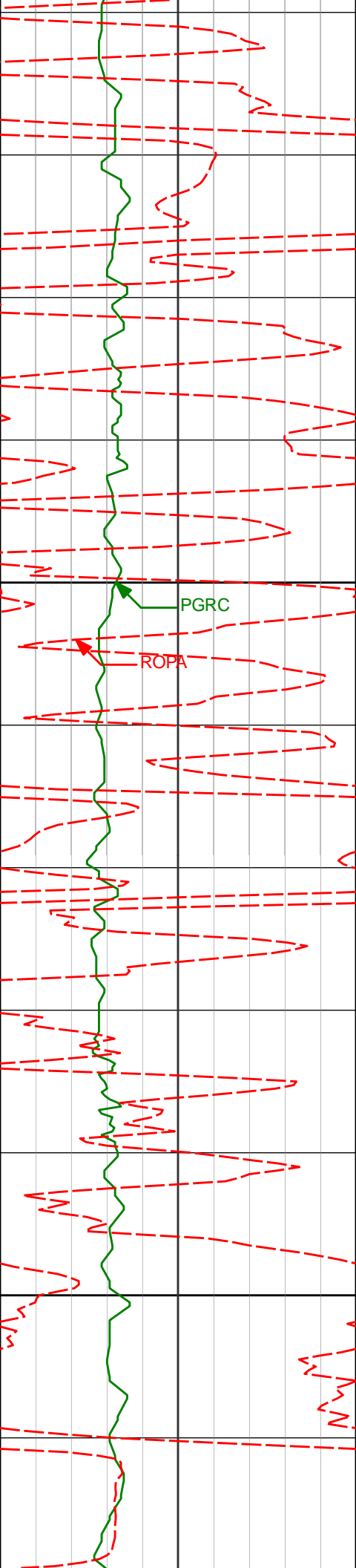
4.42°

71.27°

1868.80'

-8.11'

1900



2000

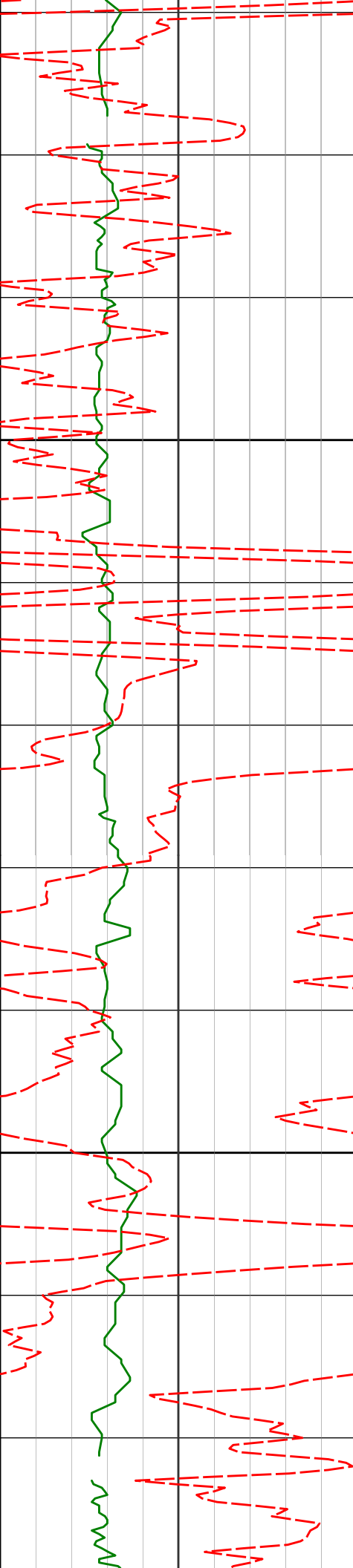
2100

1962'

6.51°

71.26° 1961.37'

-16.48'



2200

2300

2146'

6.88°

79.08° 2144.12'

-37.16'

2240'

8.60°

75.30° 2237.26'

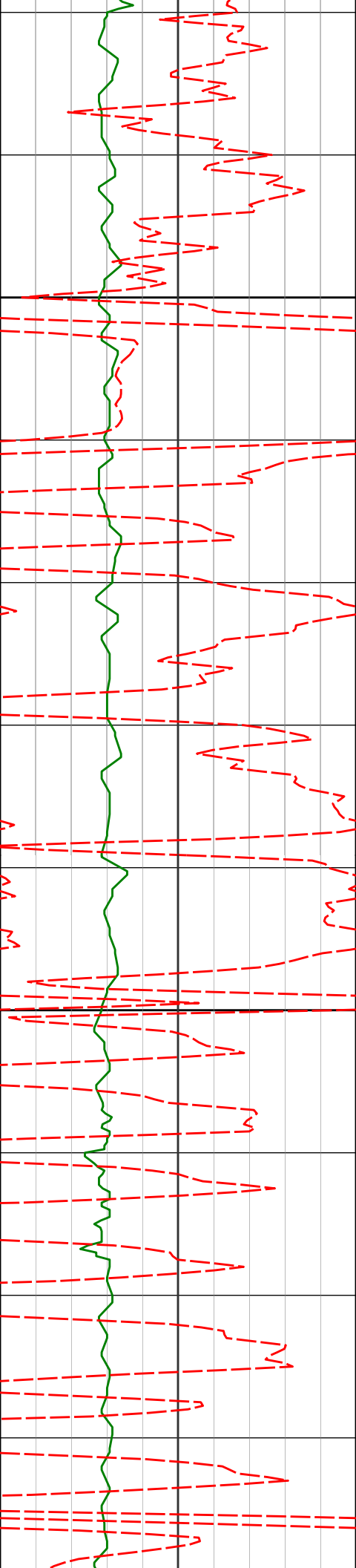
-49.48'

2333'

8.27°

75.61° 2329.26'

-62.67'



2400

2425'

8.06°

74.05° 2420.32'

-75.27'

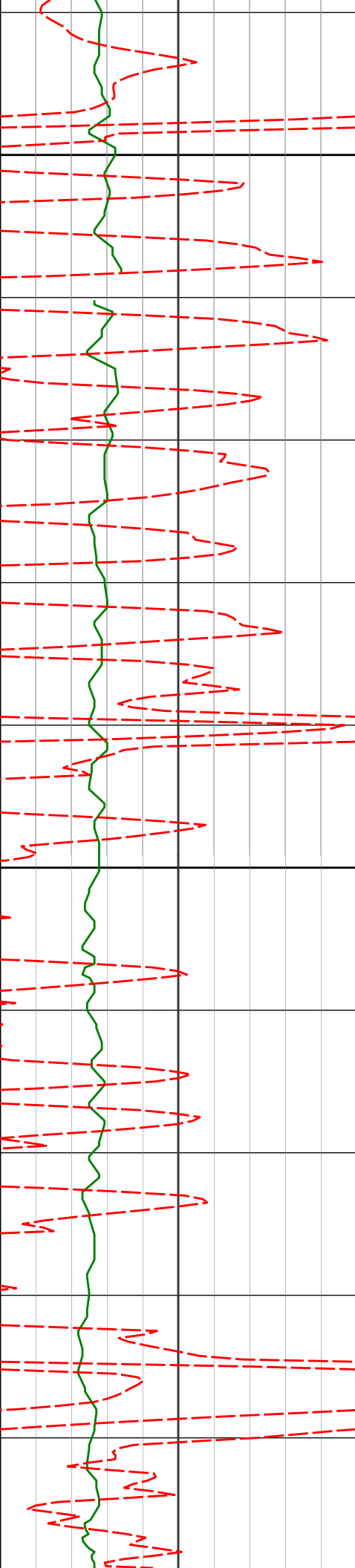
2500

2517'

7.28°

69.43° 2511.50'

-86.92'



2600

2610'

8.53°

58.38° 2603.62'

-98.29'

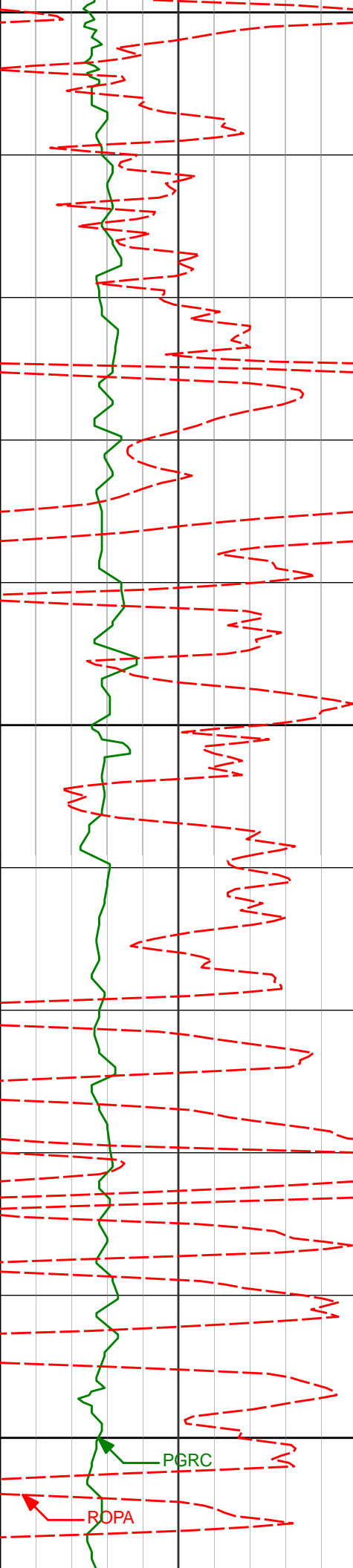
2700

2796'

8.31°

55.42° 2787.62'

-121.05'



2800

2900

3000

2890'

8.58°

61.09°

2880.60'

-132.75'

2984'

7.91°

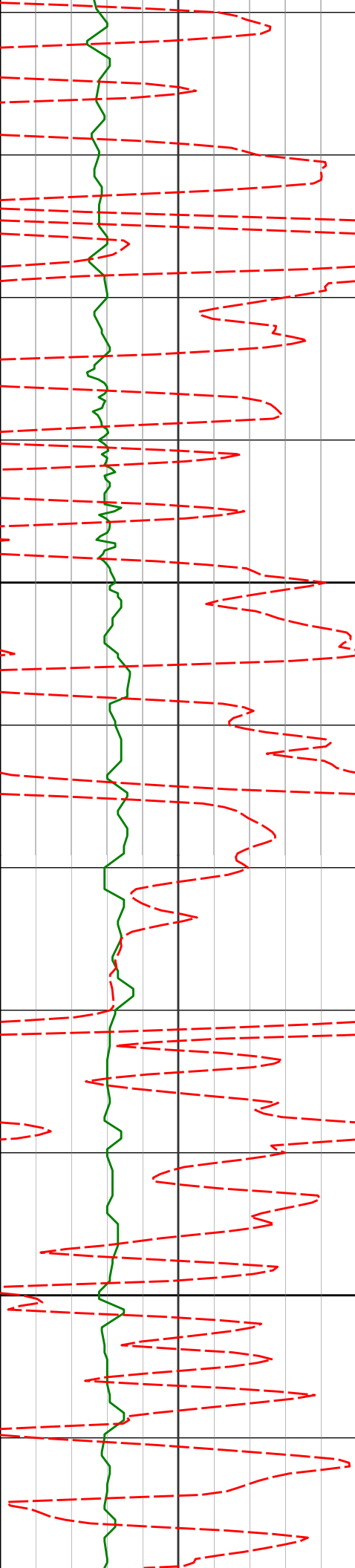
58.60°

2973.63'

-144.38'

PGRC

RDPA



3079'

7.08°

57.75° 3067.82'

-154.89'

3100

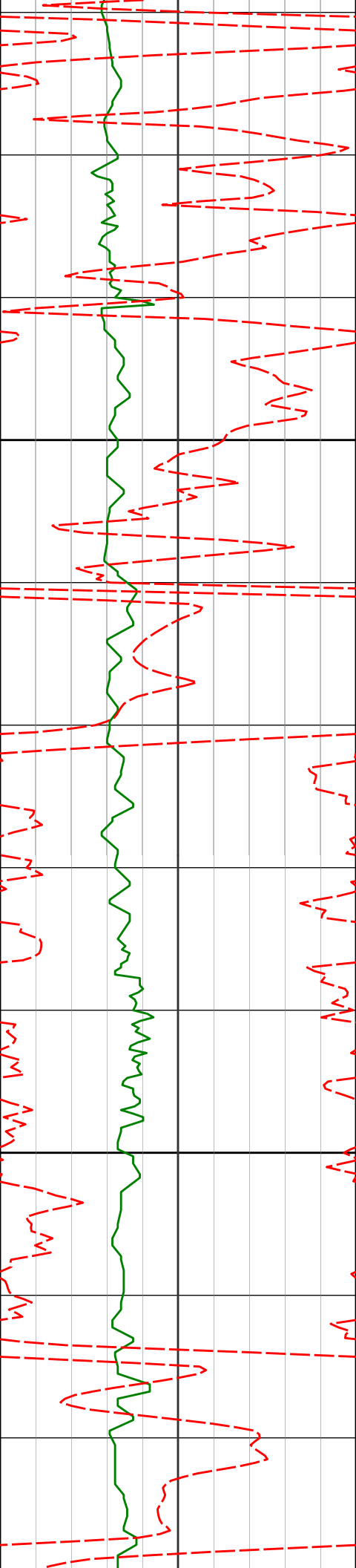
3174'

7.67°

58.43° 3162.03'

-165.22'

3200



3268'

5.97°

58.28° 3255.36'

-174.70'

3300

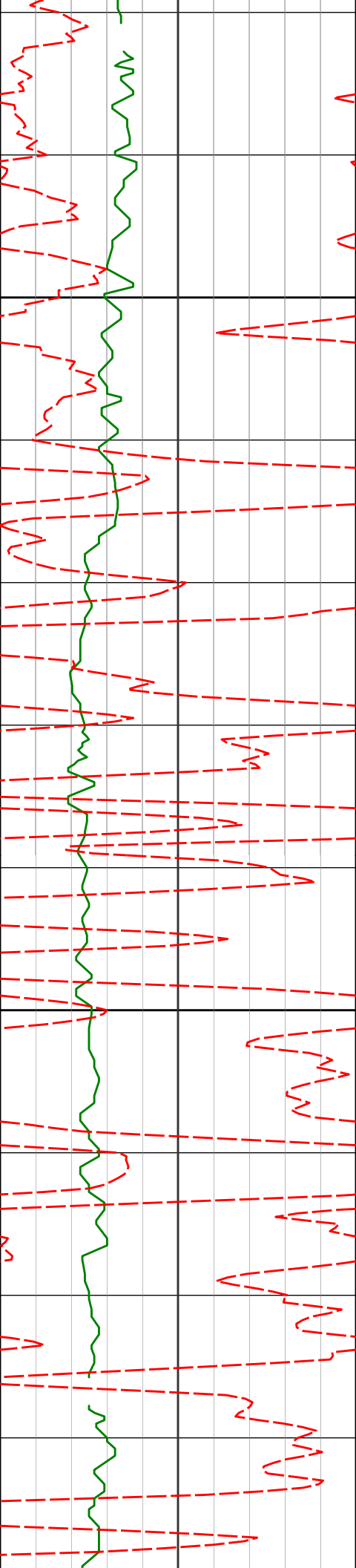
3363'

6.13°

66.14° 3349.83'

-183.52'

3400



3500

3552'

7.41°

71.43°

3537.52'

-204.27'

3600

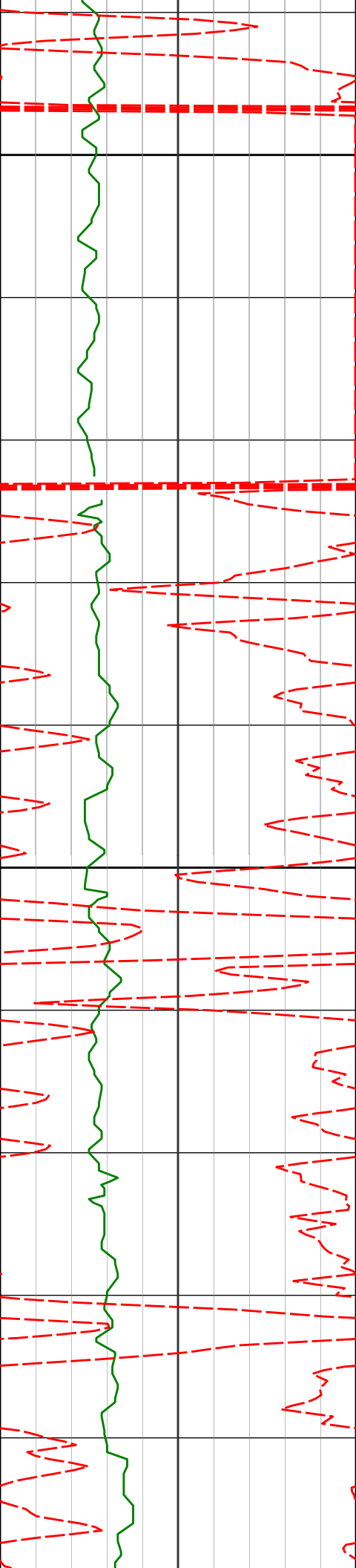
3646'

7.82°

69.85°

3630.69'

-216.00'



3700

3741'

8.33°

67.82° 3724.75'

-228.42'

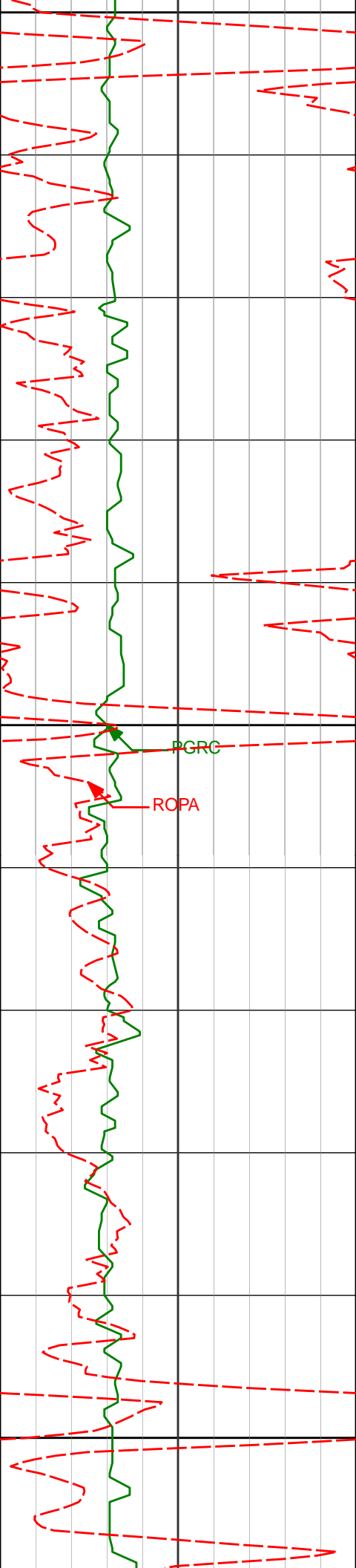
3800

3836'

8.49°

66.85° 3818.72'

-241.22'



3900

3930'

7.52°

66.24° 3911.81'

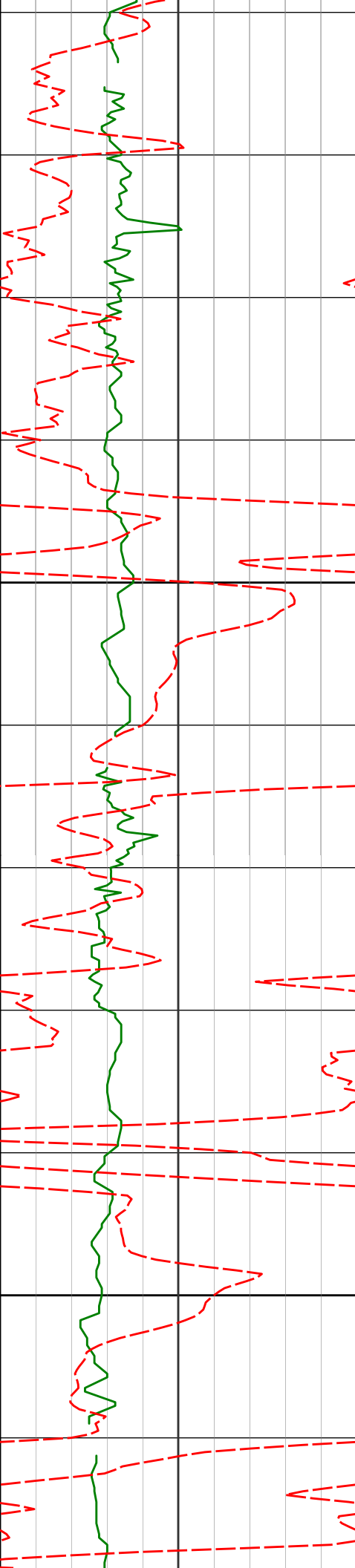
-253.22'

4000

PGRC

ROPA

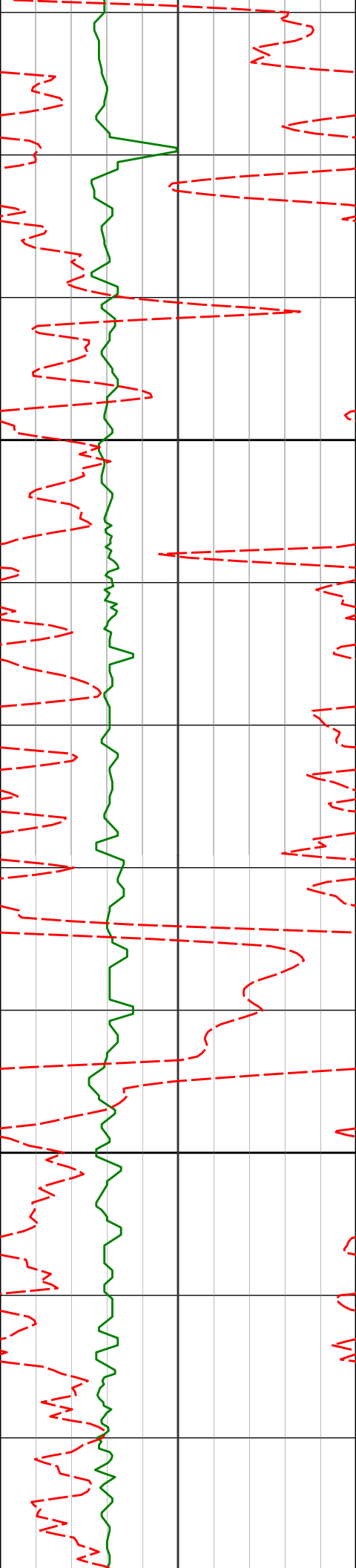
4100



4200

4300

4120'	5.36°	63.62°	4100.60'	-272.52'
4214'	6.57°	87.00°	4194.10'	-281.82'
4309'	8.95°	89.40°	4288.22'	-294.64'



4400

4404'

9.02°

86.53° 4382.06'

-309.47'

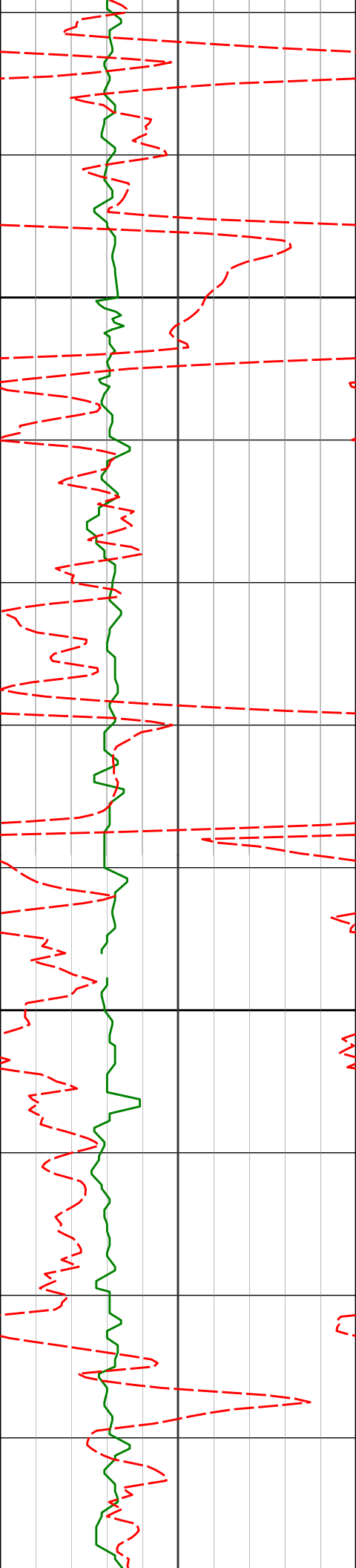
4500

4498'

7.78°

77.02° 4475.05'

-323.02'



4600

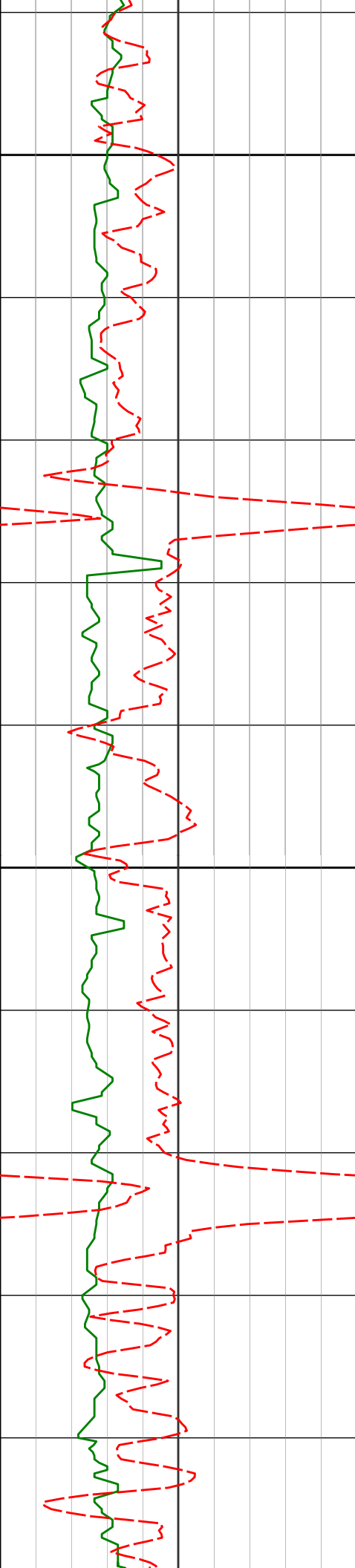
4688'

4700

8.31°

69.74° 4663.18'

-348.41'



4800

4900

4783'

7.02°

65.11° 4757.33'

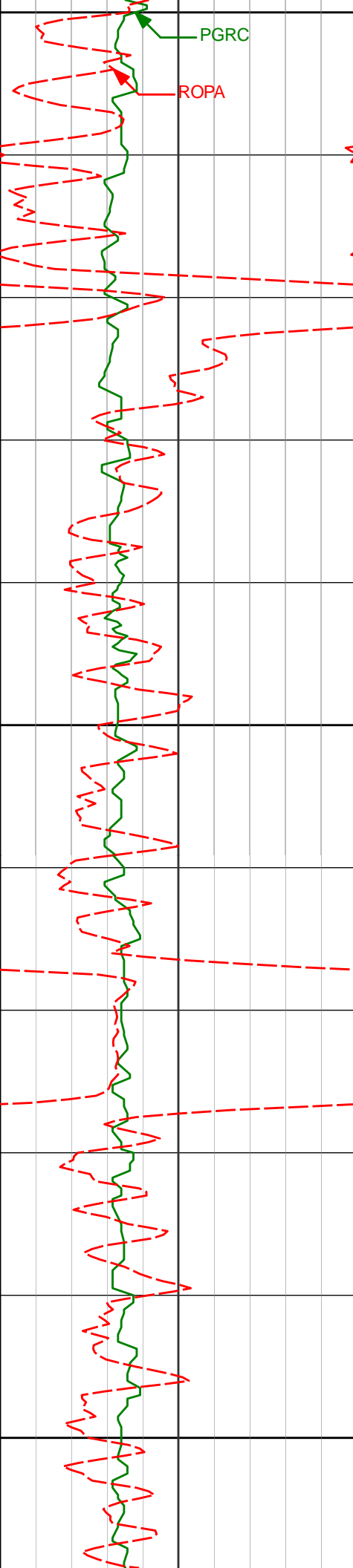
-360.10'

4877'

6.67°

62.53° 4850.66'

-370.14'



PGRC

ROPA

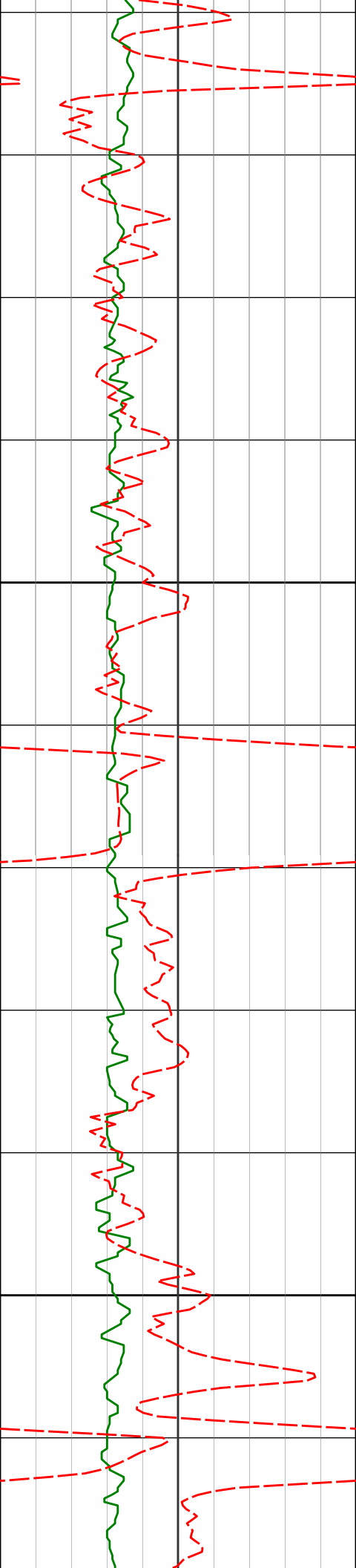
5000

5100

5200

5067'	4.78°	56.29°	5039.71'	-386.48'
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5161'	3.96°	53.89°	5133.44'	-392.35'
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5300

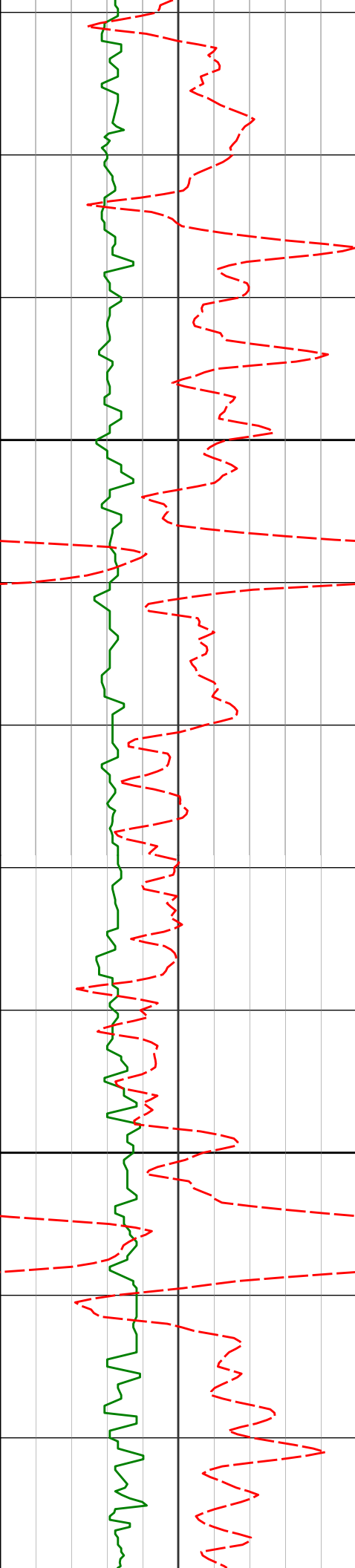
5351'

1.97°

50.96° 5323.17'

-400.17'

5400



5500

5600

5445'

2.27°

25.49° 5417.11'

-402.22'

5540'

1.89°

12.49° 5512.05'

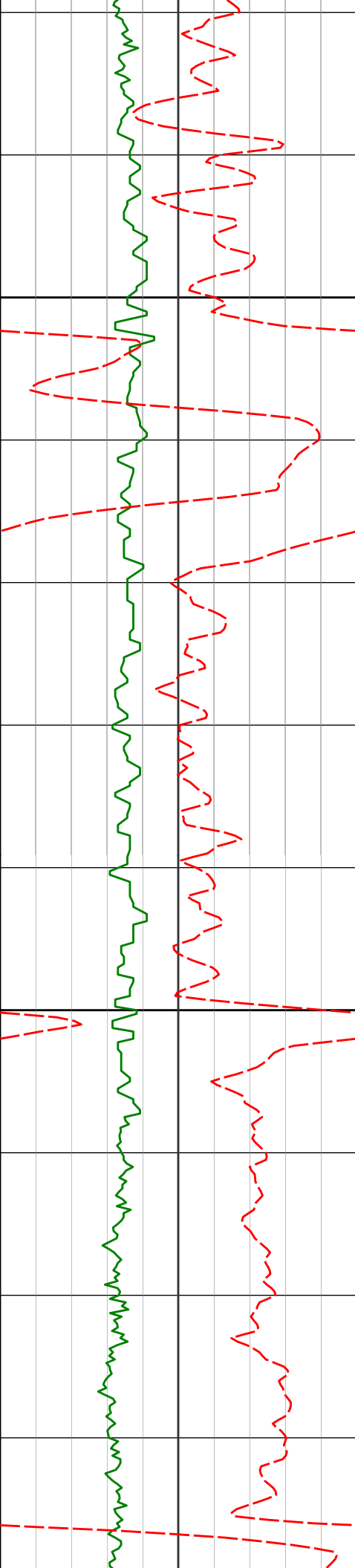
-403.35'

5634'

2.10°

12.02° 5605.99'

-404.04'



5700

5729'

1.64°

346.96° 5700.94'

-404.08'

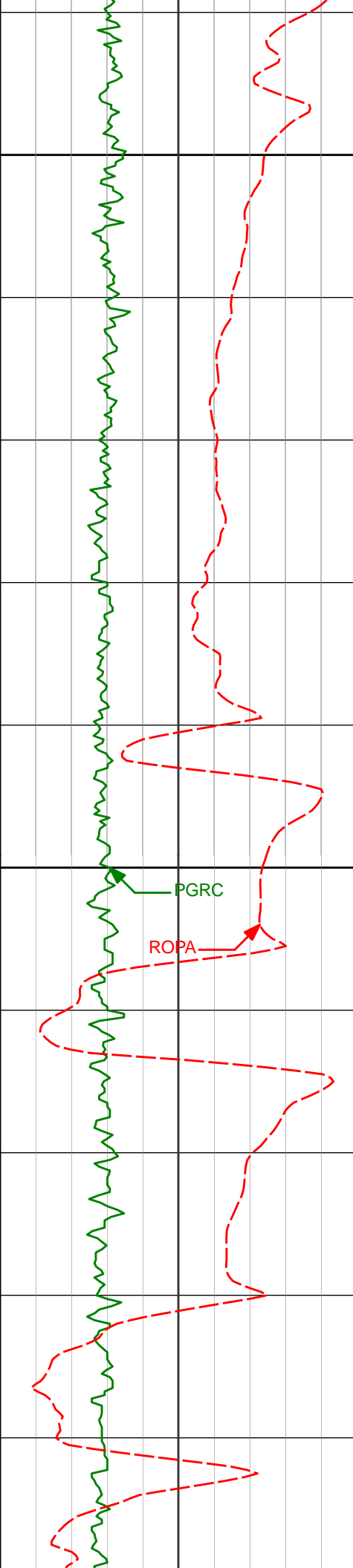
5800

5824'

2.43°

27.27° 5795.88'

-404.68'



5900

5918'

6.35°

285.15° 5889.68'

-400.56'

6000

6013'

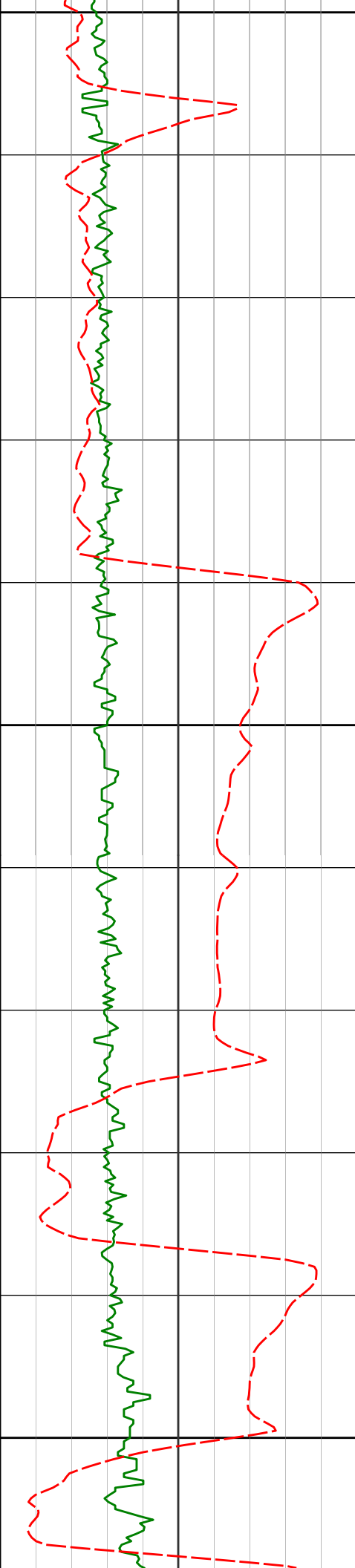
19.33°

277.95° 5982.11'

-379.82'

PGRC

ROPA



6100

6107'

23.06°

269.19° 6069.76'

-345.97'

6200

6202'

26.83°

267.82° 6155.88'

-305.94'

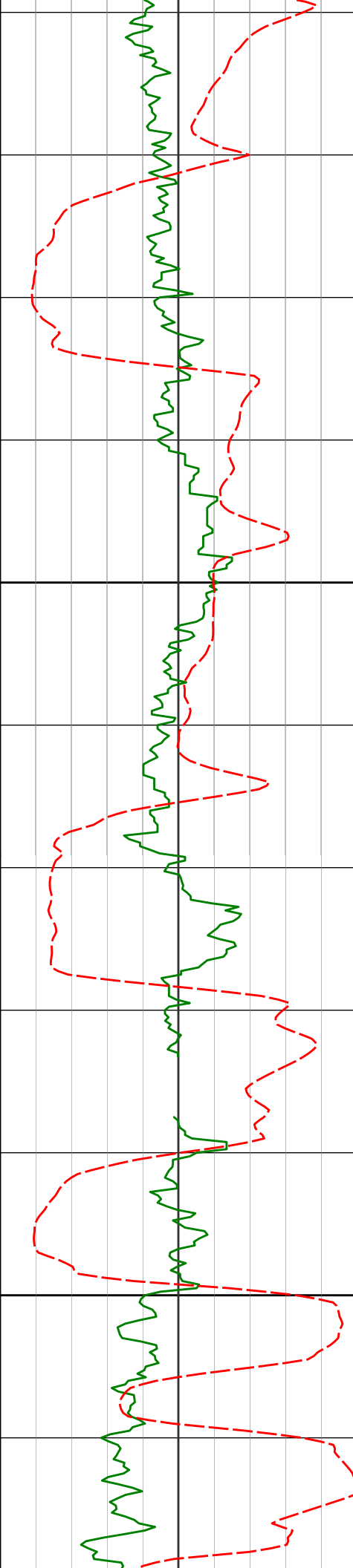
6300

6296'

36.08°

268.38° 6235.98'

-256.97'



6400

6500

6391'

44.93°

272.03° 6308.15'

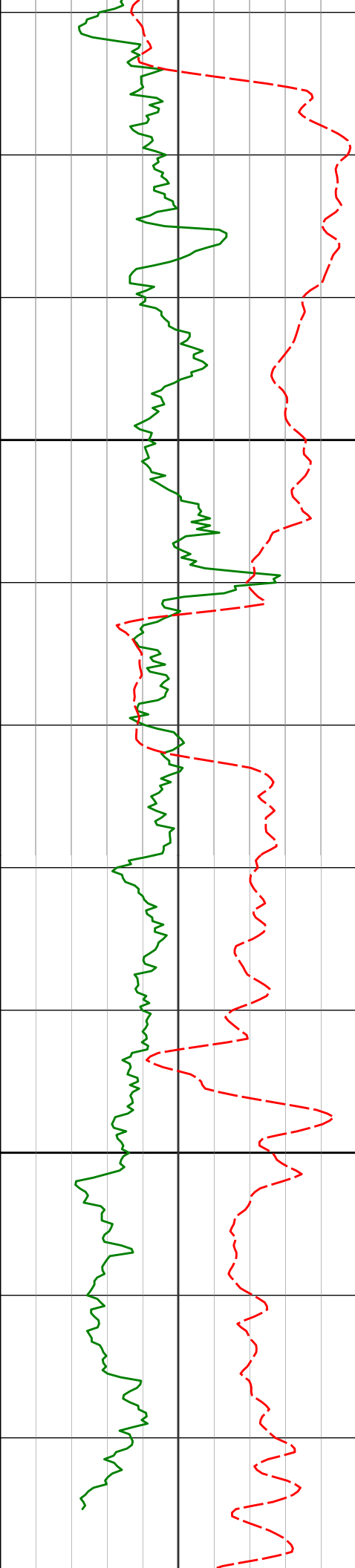
-195.35'

6485'

54.16°

273.82° 6369.08'

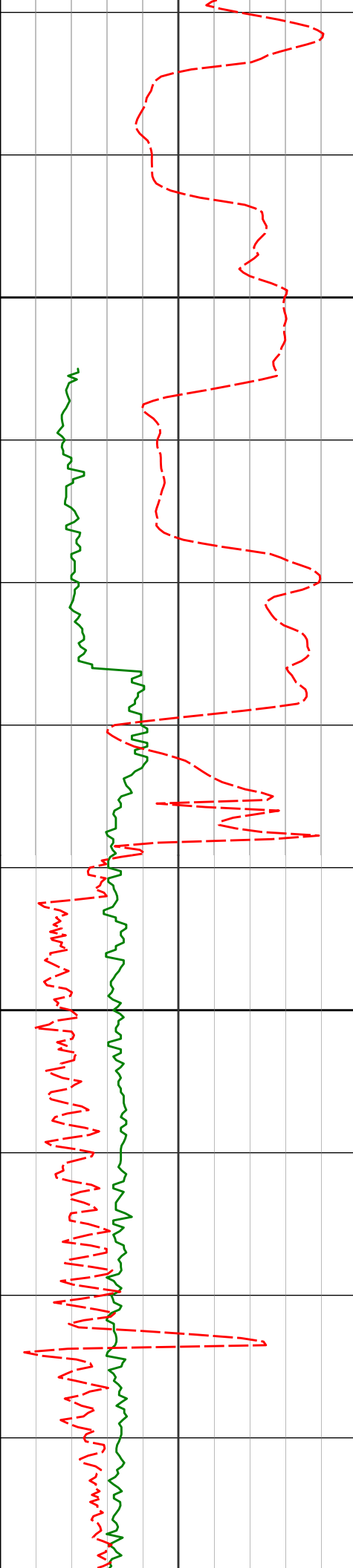
-123.99'



6600

6700

6580'	59.00°	271.70°	6421.39'	-44.81'
6627'	63.94°	270.60°	6443.83'	-3.53'
6674'	69.64°	269.79°	6462.34'	39.65'
6721'	76.07°	271.25°	6476.19'	84.53'



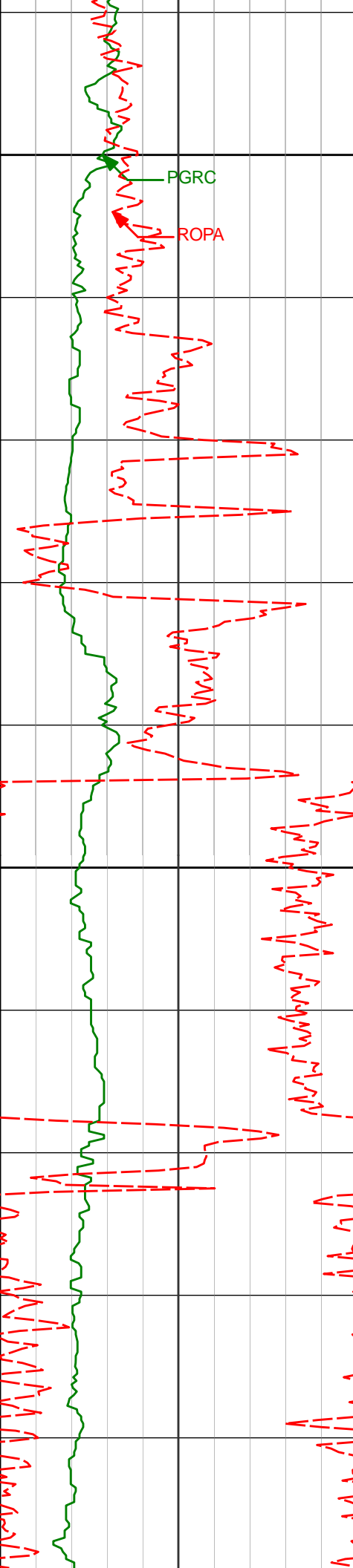
Run 200

6800

6900

Casing Shoe @ 6859'

6769'	82.05°	270.23°	6485.30'	131.63'
6804'	85.84°	268.33°	6489.00'	166.43'
6974'	89.60°	264.78°	6492.87'	335.93'



7000

PGRC

ROPA

7068'

89.91°

265.53° 6493.27'

429.56'

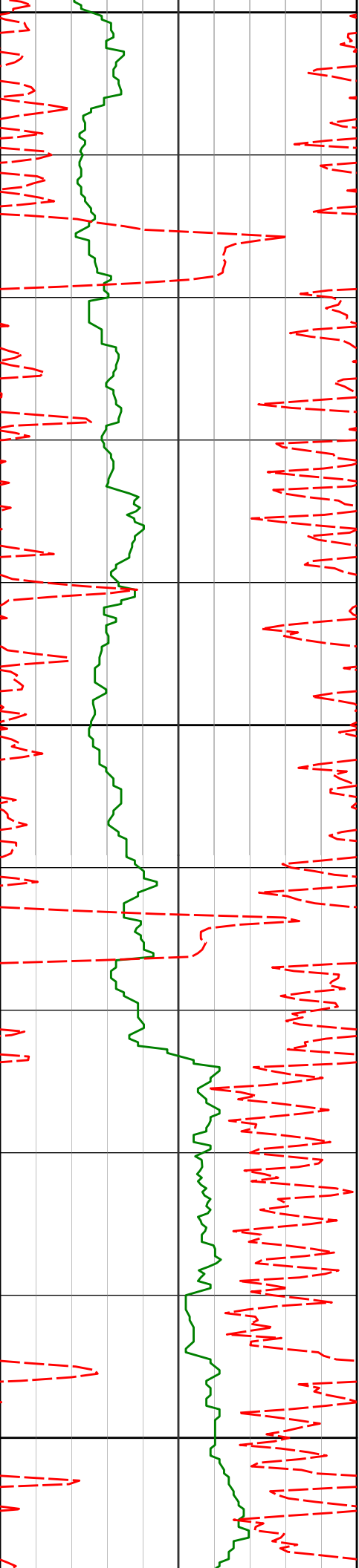
7100

7163'

90.22°

267.58° 6493.16'

524.37'



7200

7258'

90.03°

267.33° 6492.95'

619.26'

7300

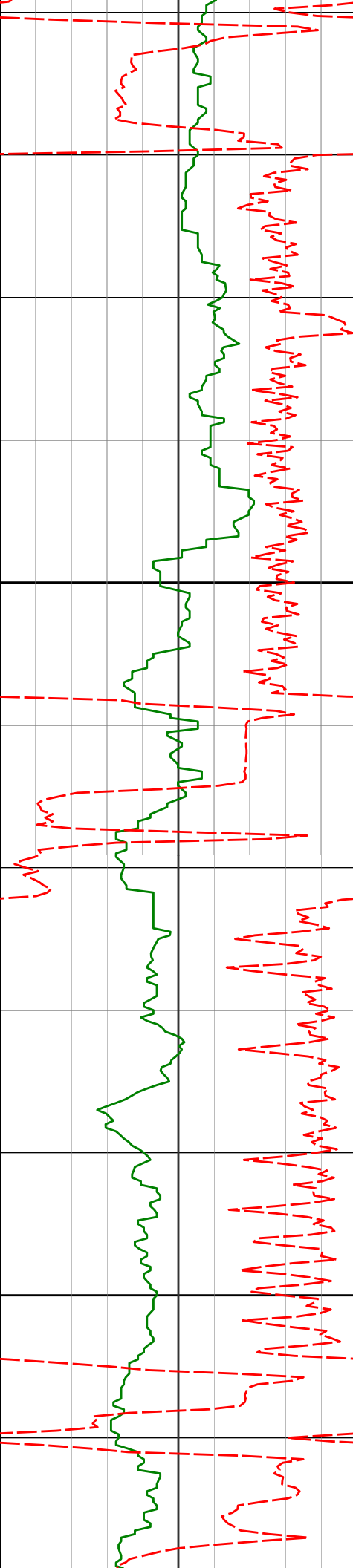
7353'

90.28°

267.16° 6492.70'

714.13'

7400



7500

7600

7447'

88.34°

268.75° 6493.83'

808.04'

7541'

87.94°

268.48° 6496.88'

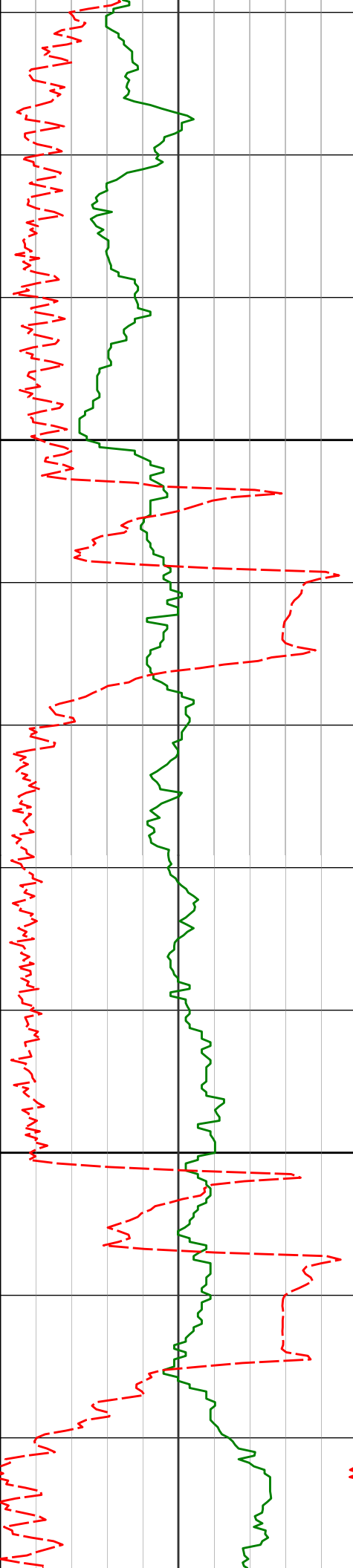
901.96'

7636'

88.31°

268.05° 6499.99'

996.85'



7700

7731'

89.05°

268.84° 6502.18'

1091.78'

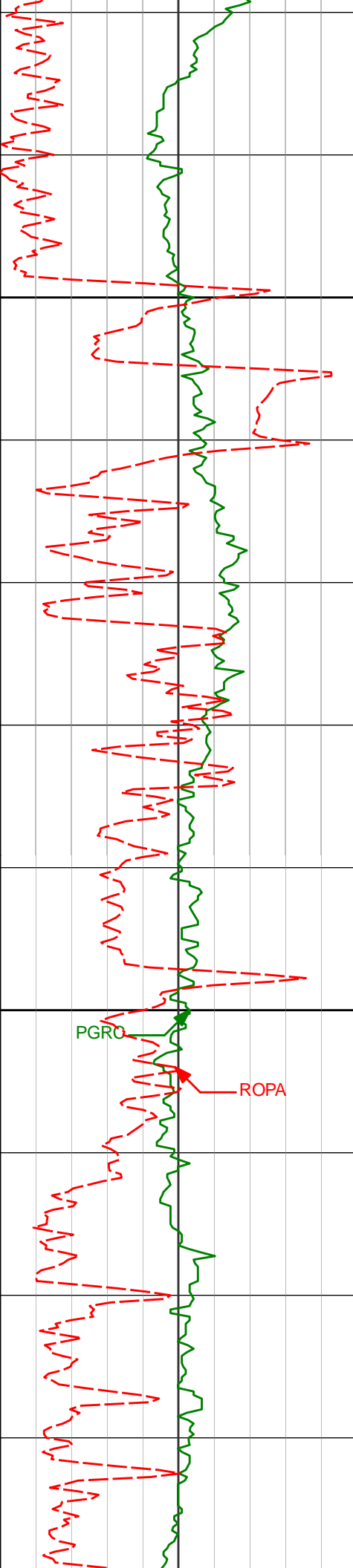
7800

7826'

88.95°

269.53° 6503.83'

1186.75'



7900

7920'

90.28°

268.78° 6504.47'

1280.73'

8000

PGRO

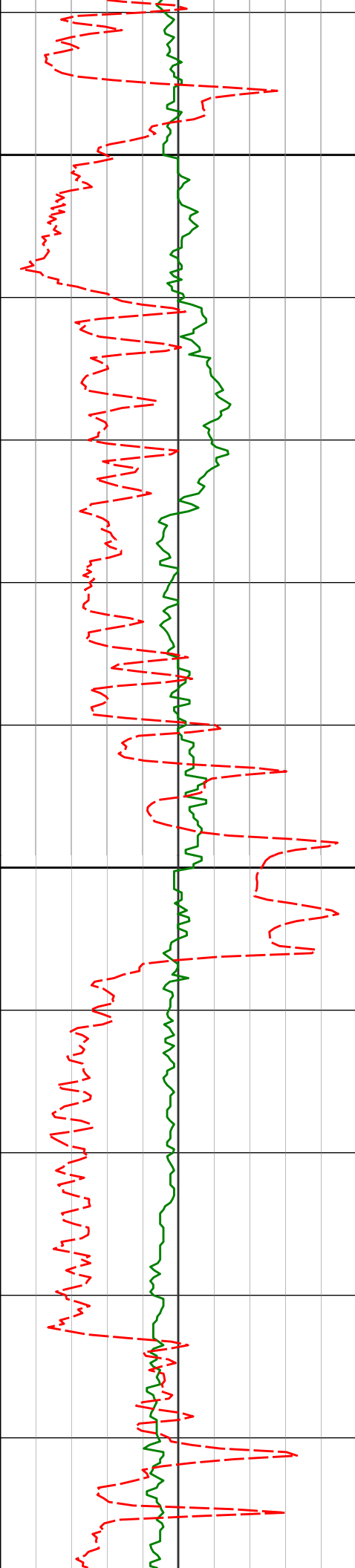
ROPA

8015'

90.15°

268.54° 6504.11'

1375.70'



8100

8110'

89.97°

267.97° 6504.01'

1470.64'

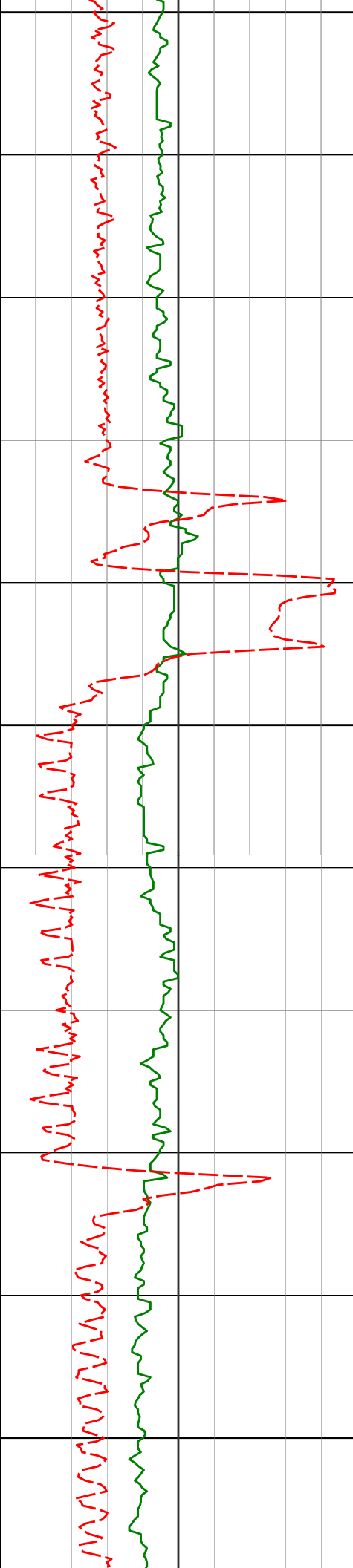
8200

8204'

90.46°

269.37° 6503.66'

1564.60'

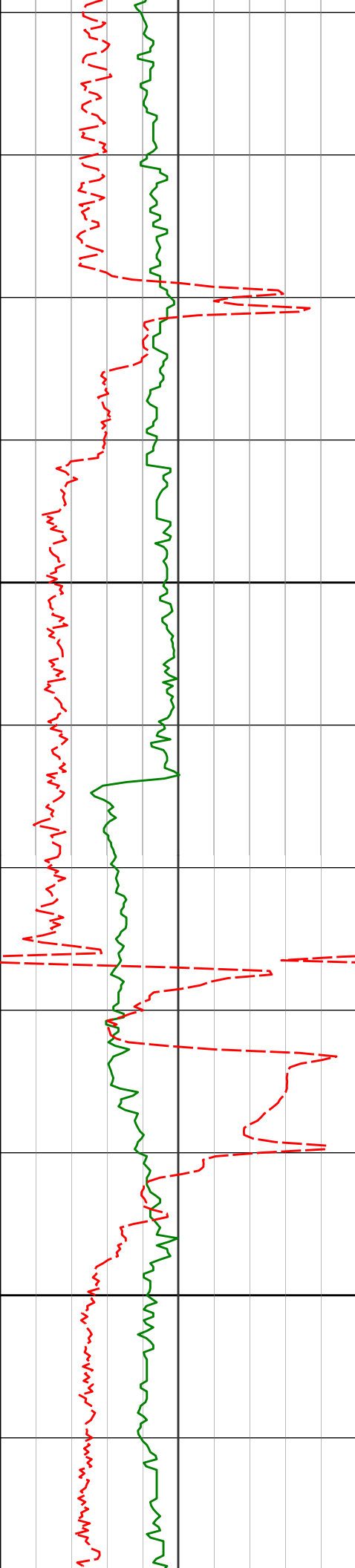


8300

8400

8500

8299'	90.80°	268.67°	6502.61'	1659.58'
8394'	89.91°	268.68°	6502.02'	1754.54'
8488'	90.31°	268.73°	6501.84'	1848.51'



8600

8583'

91.05°

268.62° 6500.72'

1943.47'

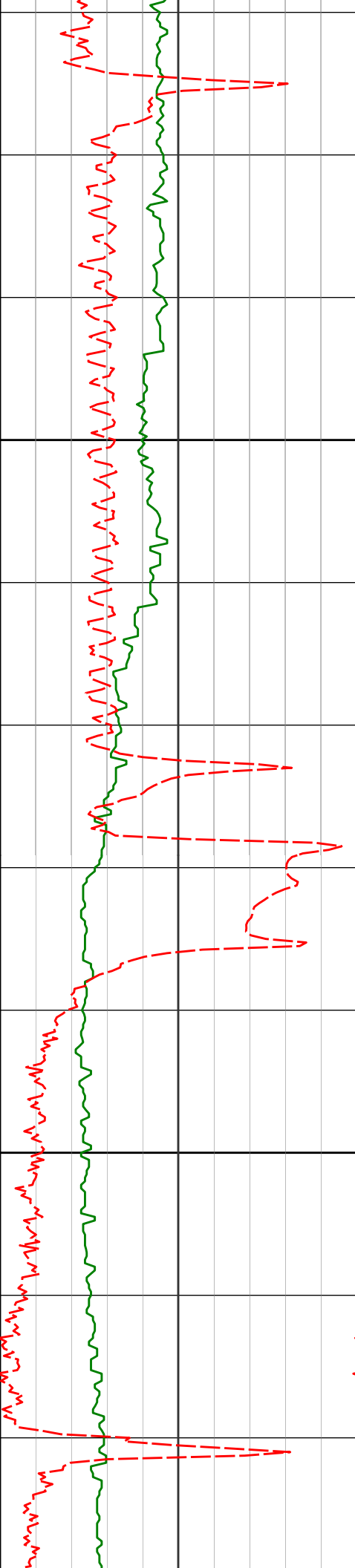
8700

8677'

90.25°

269.25° 6499.65'

2037.44'



8800

8772'

90.95°

269.19° 6498.65'

2132.42'

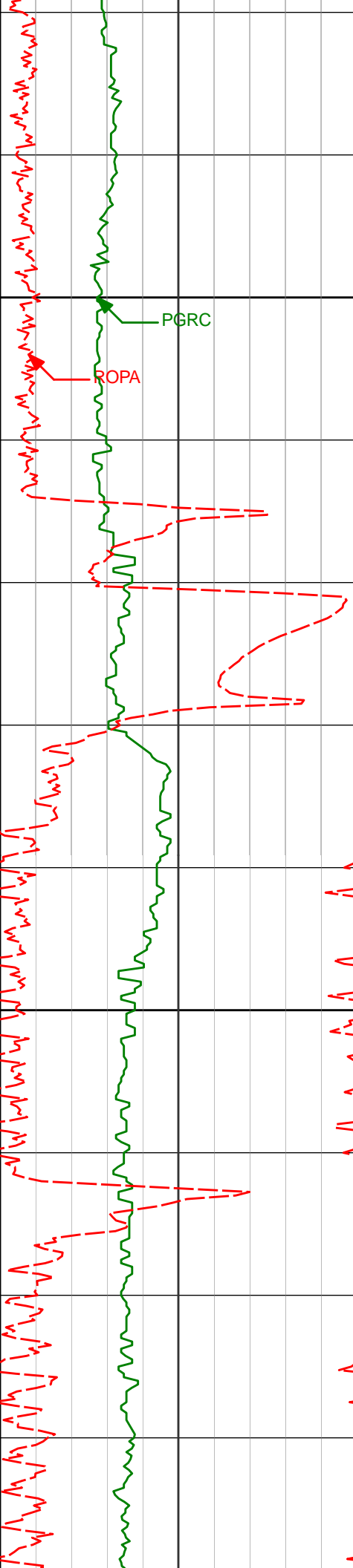
8867'

90.06°

271.38° 6497.82'

2227.41'

8900



9000

PGRC

ROPA

9100

8961'

90.74°

271.20° 6497.16'

2321.39'

9056'

89.51°

270.24° 6496.95'

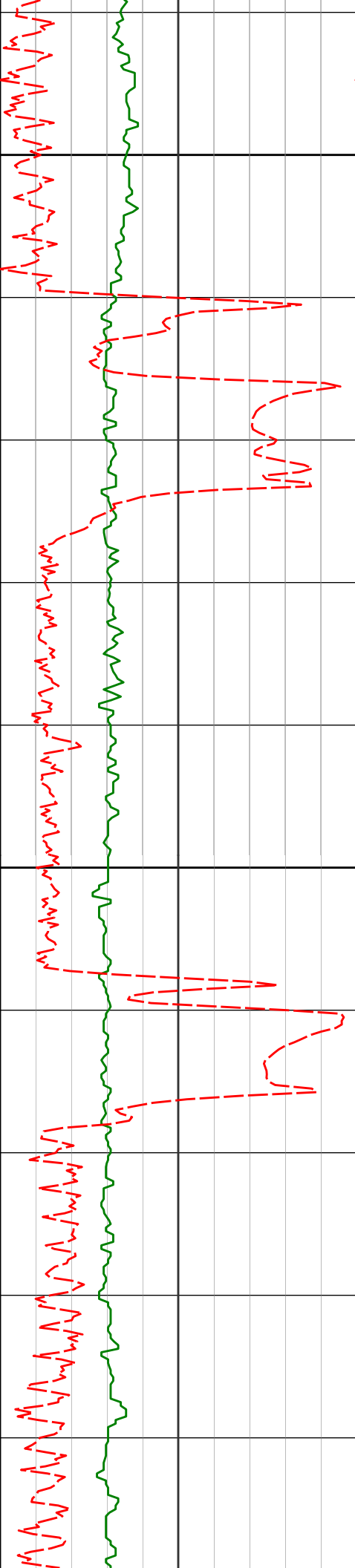
2416.38'

9150'

90.18°

270.01° 6497.21'

2510.38'



9200

9245'

90.09°

268.14° 6496.98'

2605.36'

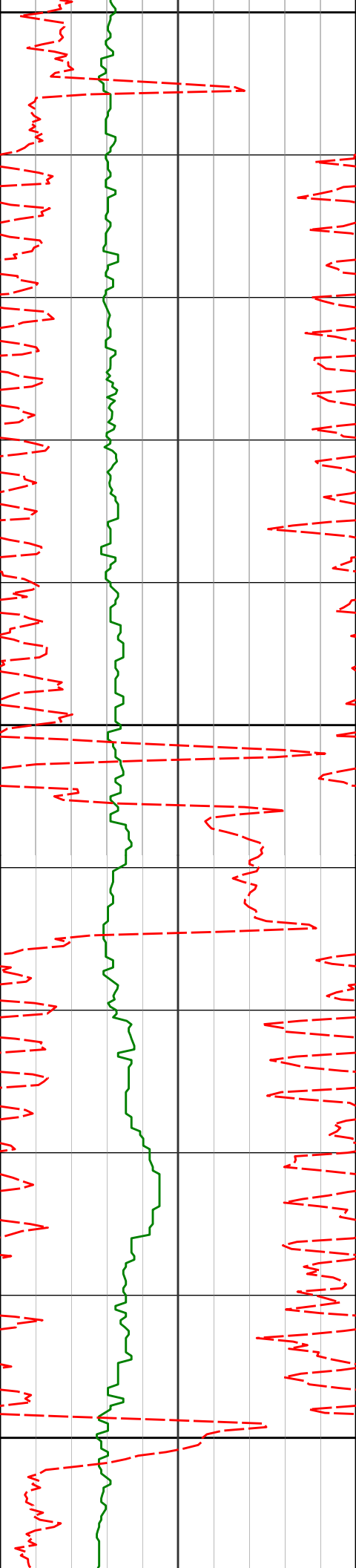
9300

9339'

89.72°

268.96° 6497.14'

2699.32'



9400

9434'

90.62°

268.22° 6496.86'

2794.28'

9500

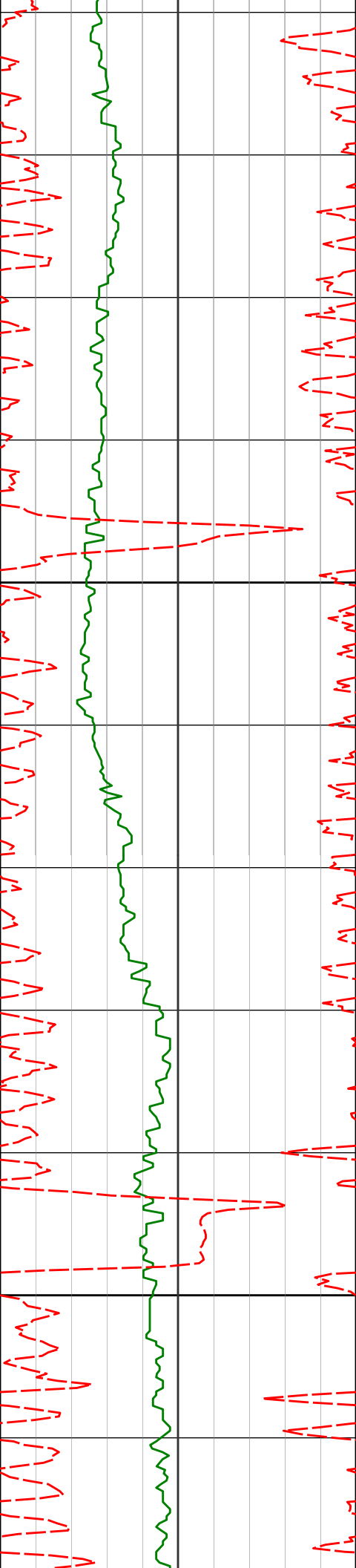
9529'

88.21°

268.07° 6497.83'

2889.20'

9600



9623'

88.37°

268.26° 6500.63'

2983.10'

9700

9718'

88.86°

268.87° 6502.93'

3078.04'

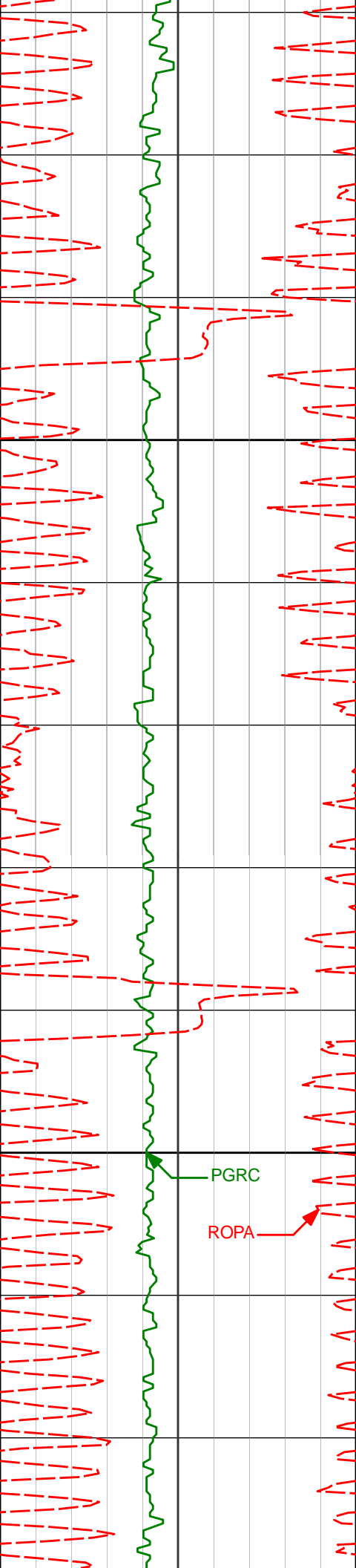
9800

9813'

88.95°

268.46° 6504.75'

3172.98'



9900

9908'

89.38°

268.09° 6506.13'

3267.92'

10000

10003'

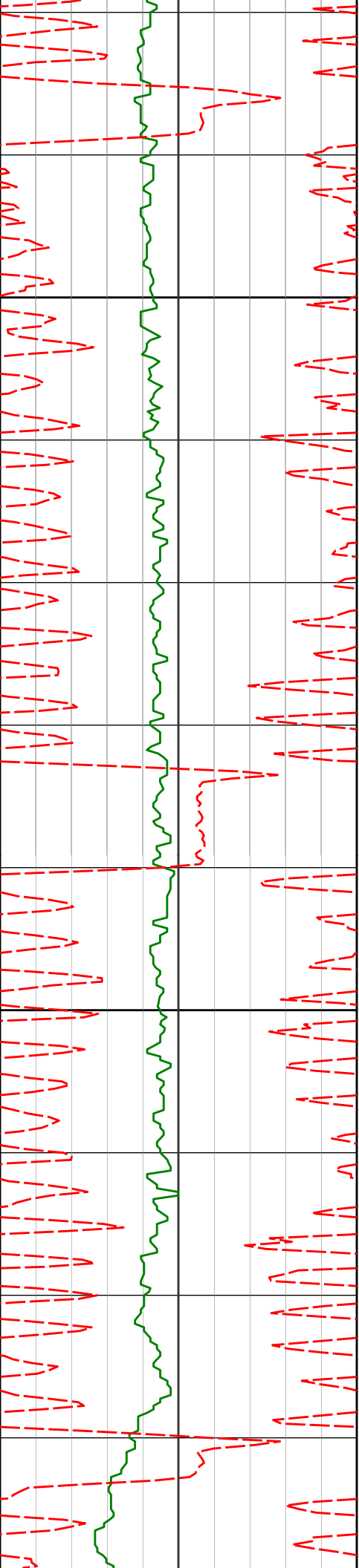
89.01°

268.69° 6507.46'

3362.86'

PGRC

ROPA



10100

10097'

88.98°

270.42° 6509.11'

3456.84'

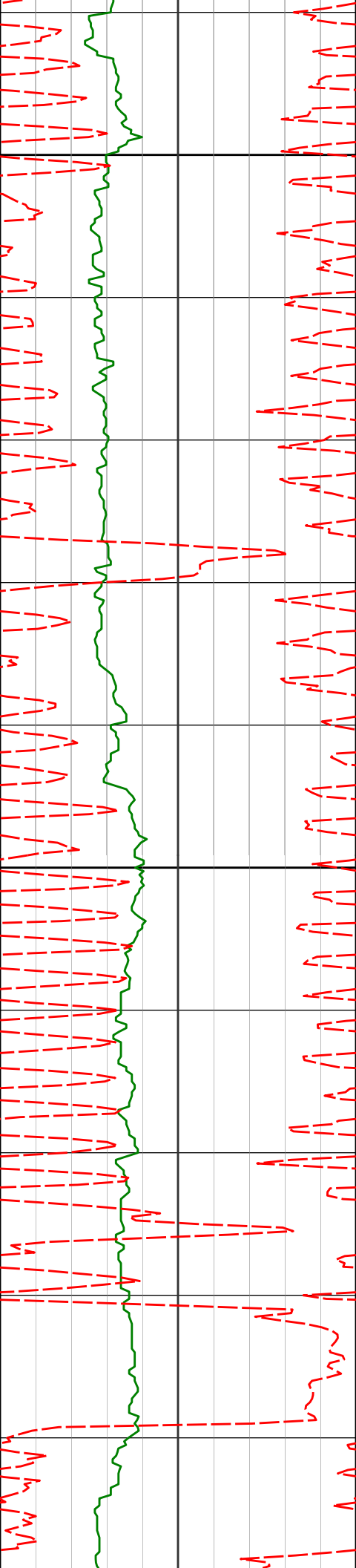
10200

10192'

89.88°

271.12° 6510.06'

3551.83'



10300

10400

10286'

90.03°

271.13° 6510.13'

3645.82'

10380'

90.92°

272.28° 6509.35'

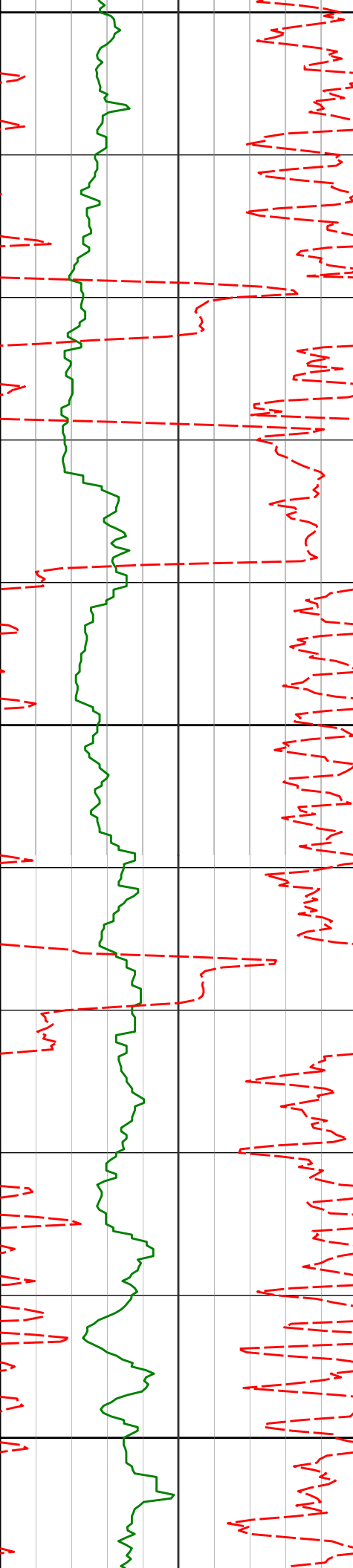
3739.78'

10474'

89.38°

271.70° 6509.11'

3833.73'



10500

10567'

88.15°

270.22° 6511.11'

3926.69'

10600

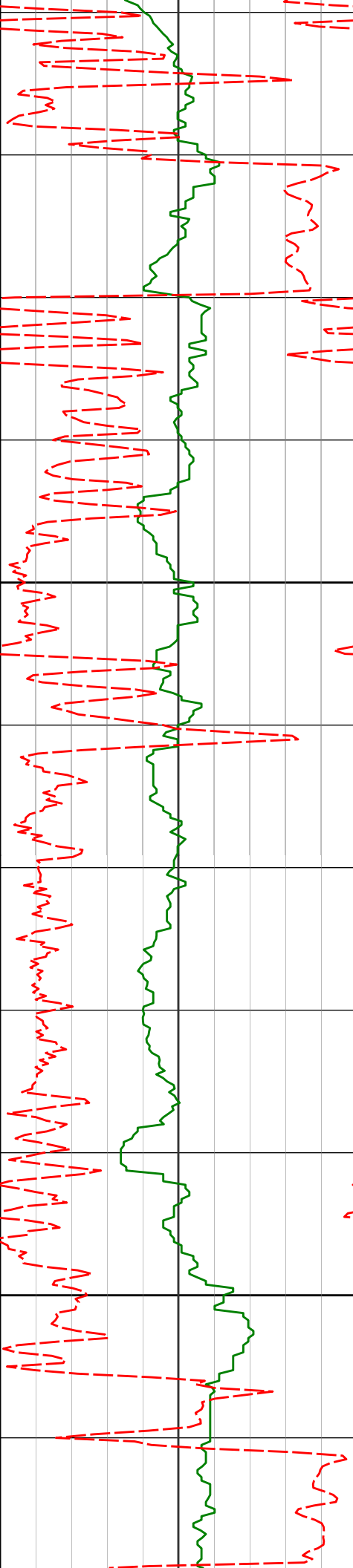
10660'

87.94°

269.33° 6514.28'

4019.64'

10700

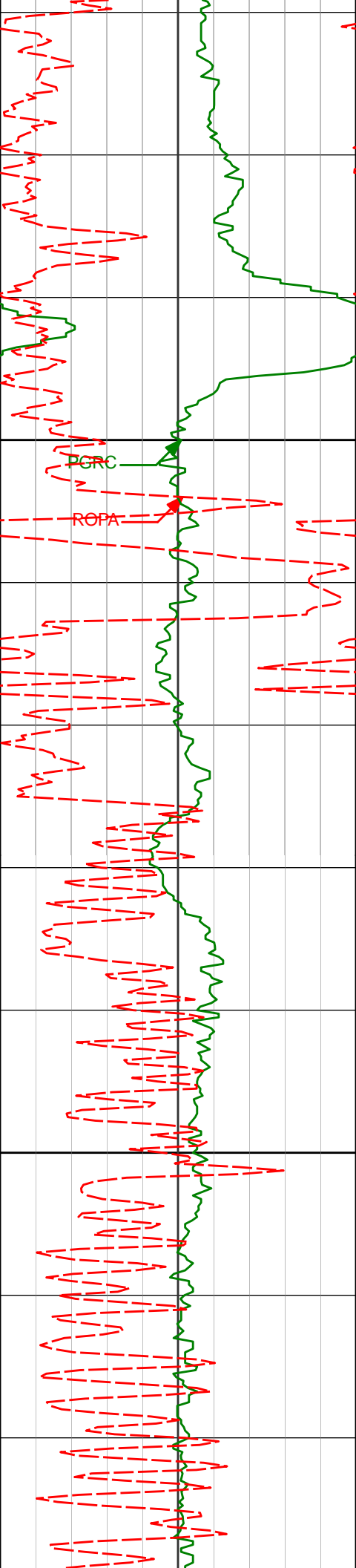


10800

10900

10752' 89.01° 268.50° 6516.73' 4111.58'

10845' 88.61° 268.83° 6518.66' 4204.52'



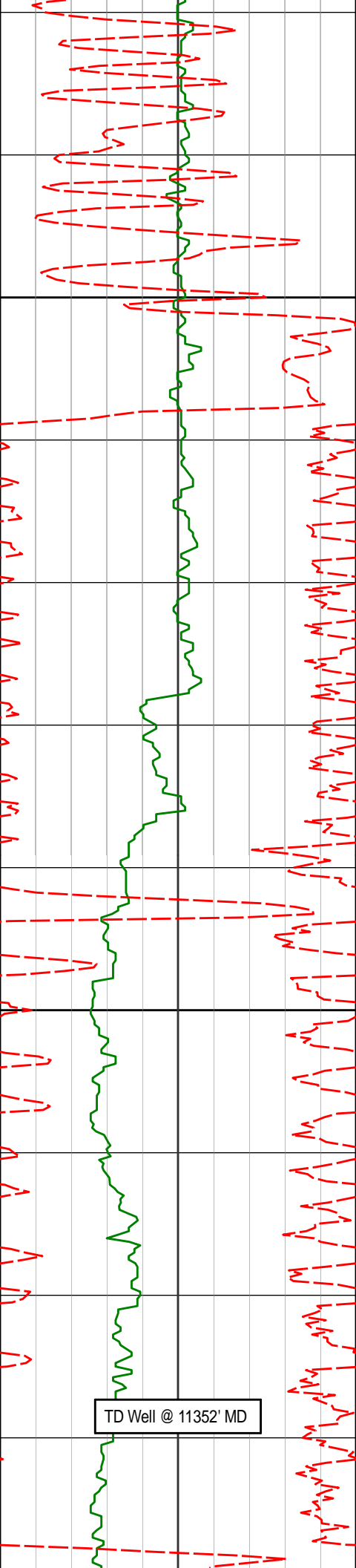
11000

PGRC

ROPA

11100

10939'	89.66°	266.57°	6520.08'	4298.42'
11029'	90.71°	266.54°	6519.79'	4388.23'
11122'	90.83°	266.62°	6518.54'	4481.04'



11200

11216'

89.41°

267.41° 6518.35'

4574.89'

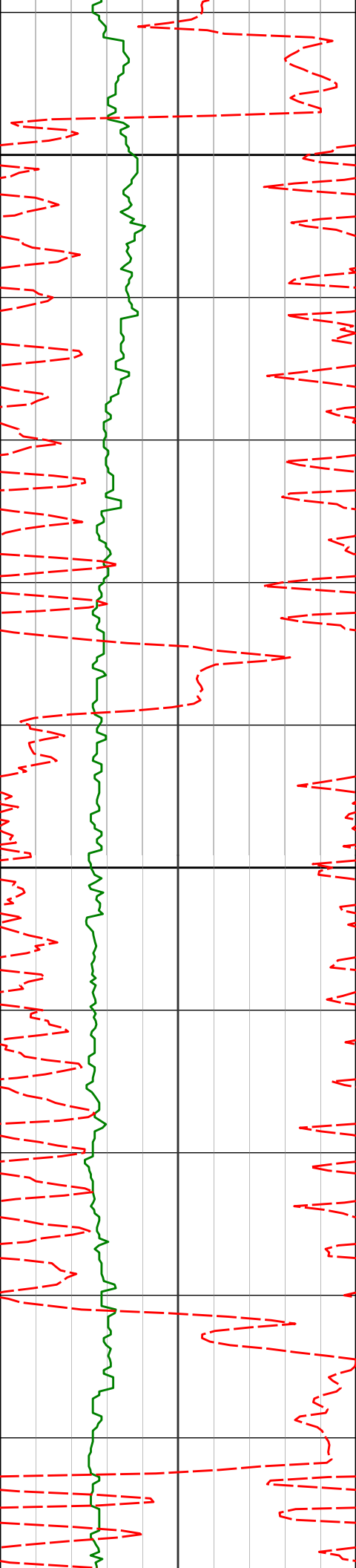
11300

11309'

89.63°

267.66° 6519.13'

4667.79'



11400

11401'

90.71°

268.16° 6518.85'

4759.71'

11500

11493'

91.72°

268.36° 6516.90'

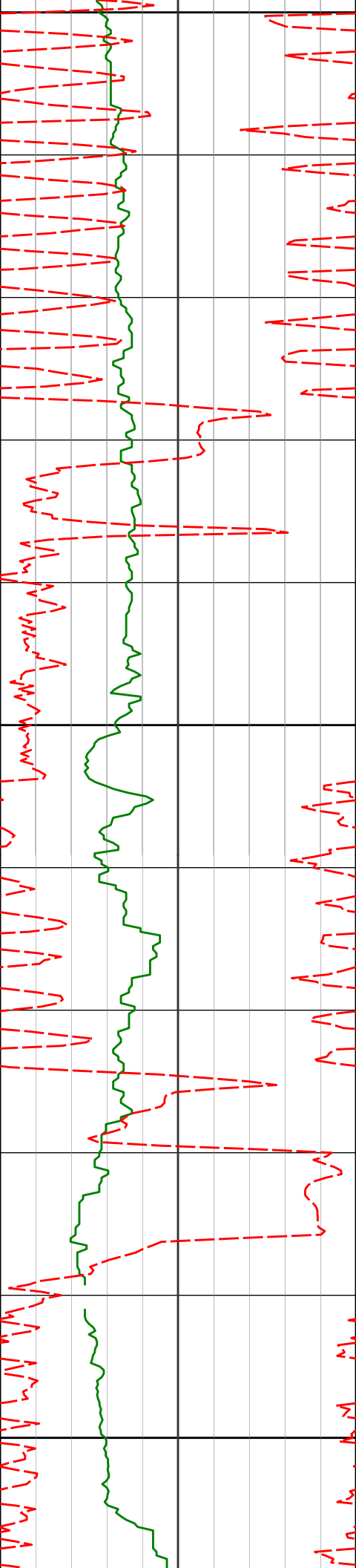
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11586'

90.12°

269.30° 6515.41'

4944.59'



11600

11679'

90.46°

269.93° 6514.94'

5037.59'

11700

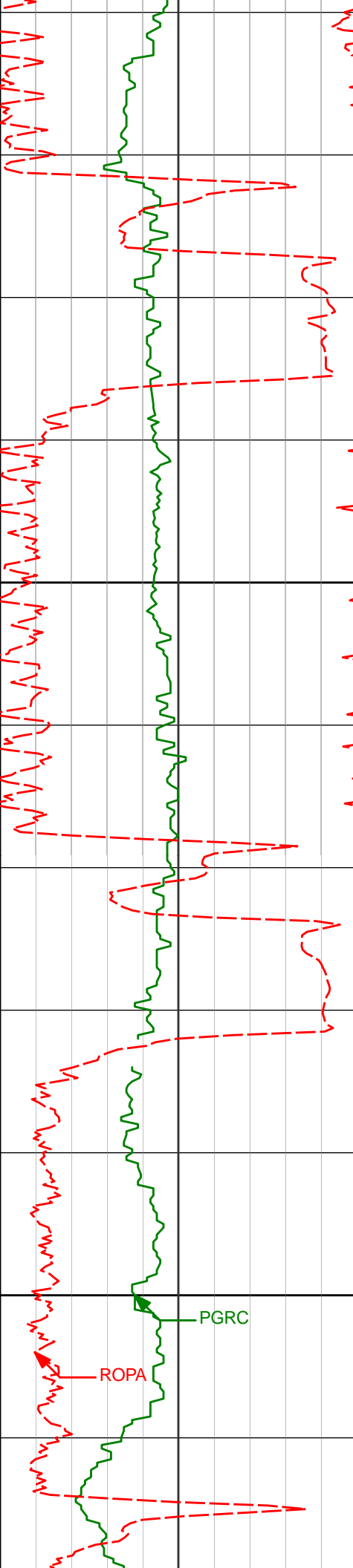
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91.11°

268.96° 6513.68'

5129.57'

11800



11864'

90.59°

270.66° 6512.30'

5222.55'

11900

11956'

88.74°

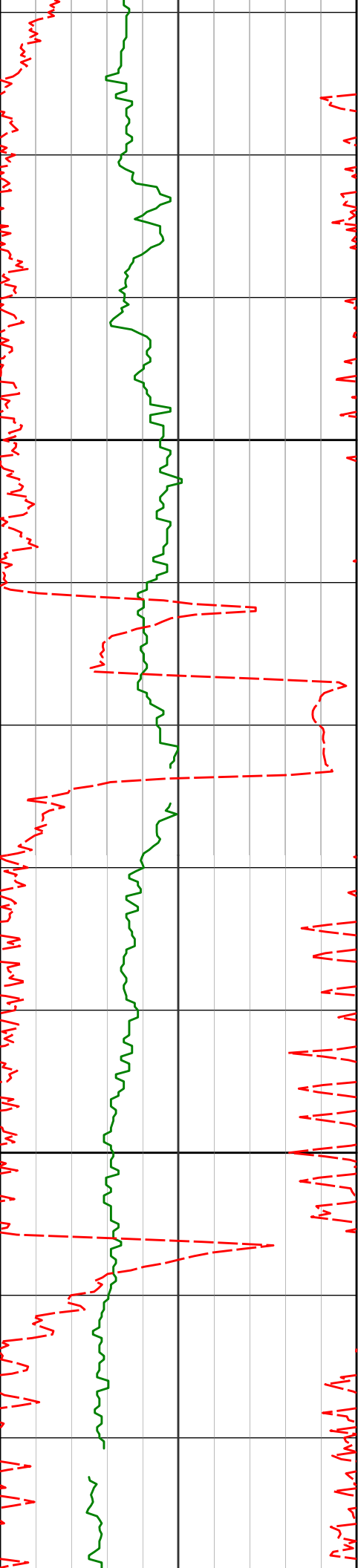
270.18° 6512.84'

5314.55'

12000

PGRC

ROPA



12100

12200

12049'

88.58°

270.18° 6515.01'

5407.52'

12142'

89.51°

268.54° 6516.56'

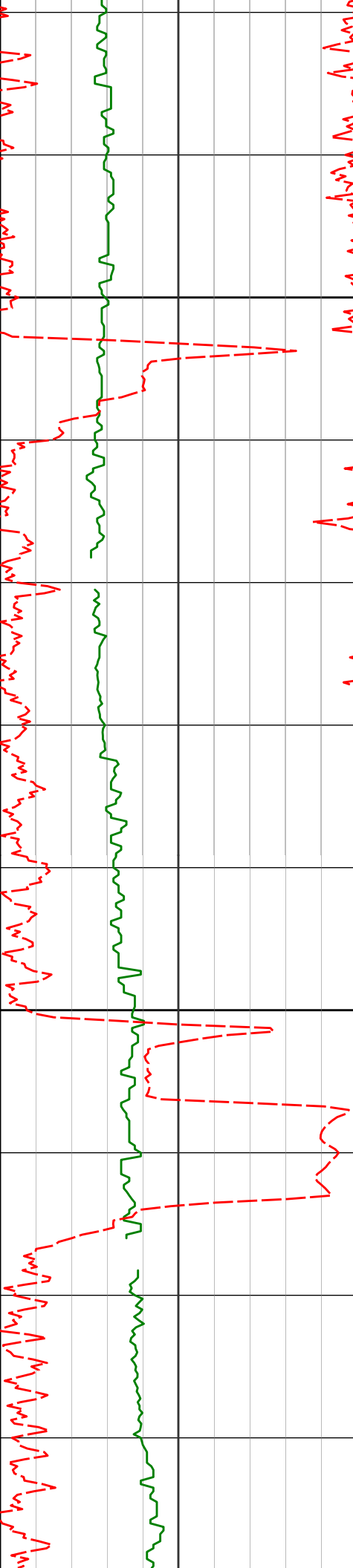
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89.72°

267.98° 6517.19'

5594.44'



12300

12331'

90.89°

268.89° 6516.69'

5689.39'

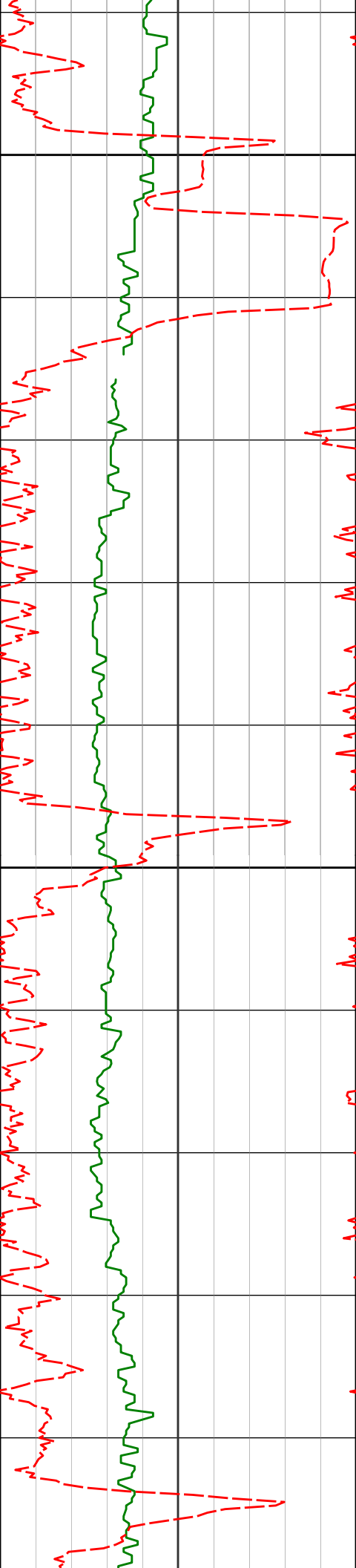
12400

12425'

90.68°

269.68° 6515.40'

5783.37'



12500

12520'

89.11°

270.26° 6515.57'

5878.36'

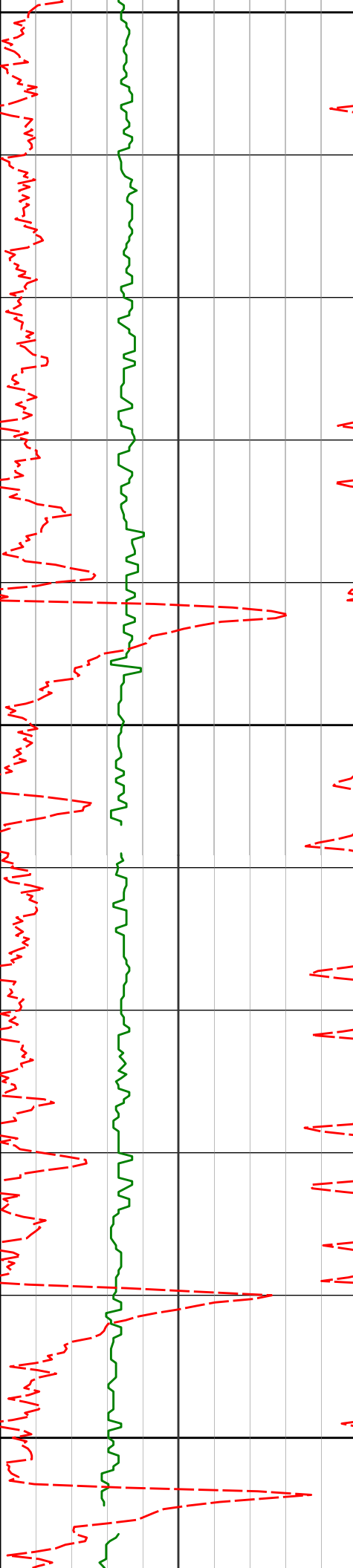
12600

12614'

89.42°

270.11° 6516.78'

5972.35'



12700

12709'

89.72°

270.39° 6517.49'

6067.35'

12800

12804'

90.12°

270.24° 6517.62'

6162.35'

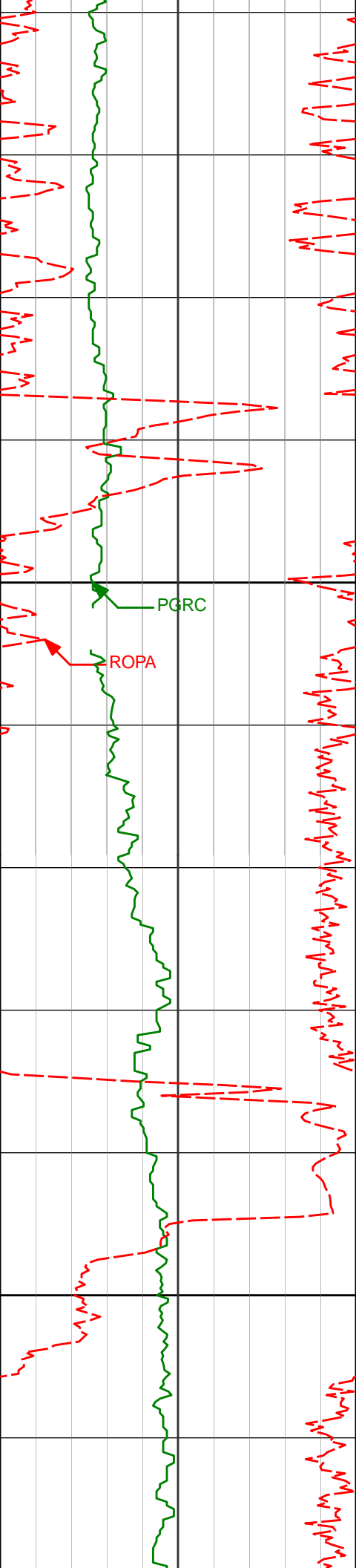
12900

12898'

90.28°

270.16° 6517.30'

6256.35'



13000

13100

12993'

90.92°

270.38° 6516.30'

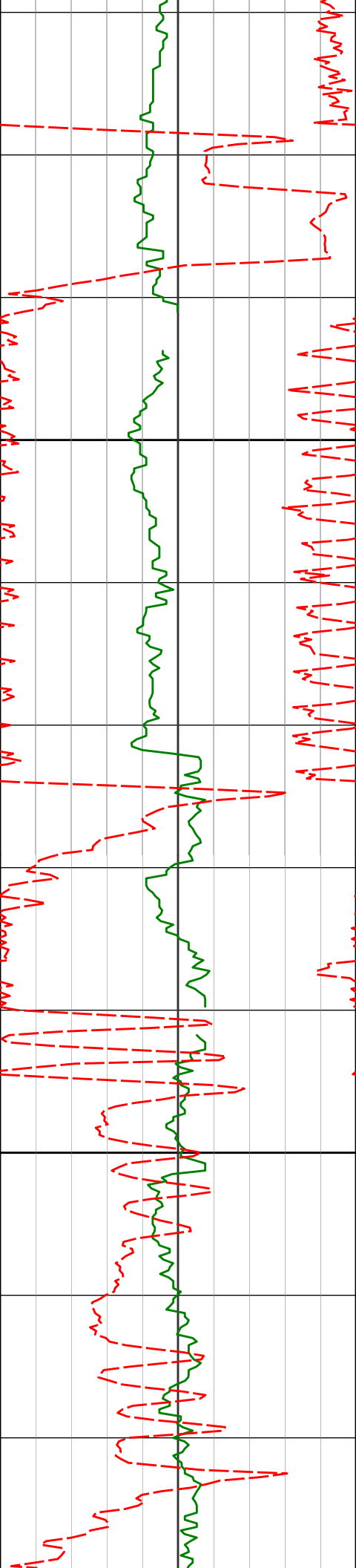
6351.35'

13088'

90.46°

269.97° 6515.16'

6446.34'



13200

13300

13182'

89.45°

269.90° 6515.23'

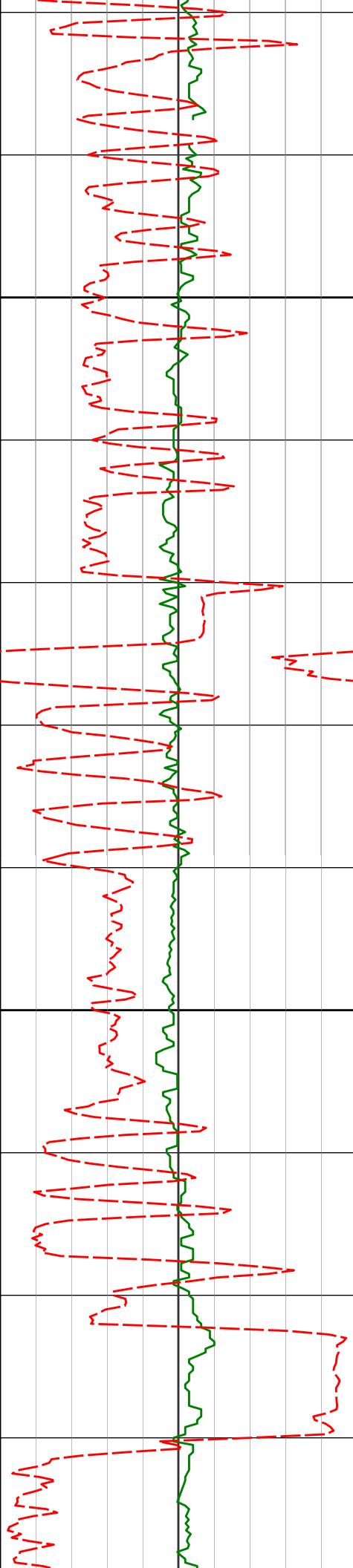
6540.34'

13277'

89.60°

269.50° 6516.02'

6635.33'



13400

13500

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89.63°

269.45° 6516.66'

6730.32'

13466'

88.46°

269.24° 6518.22'

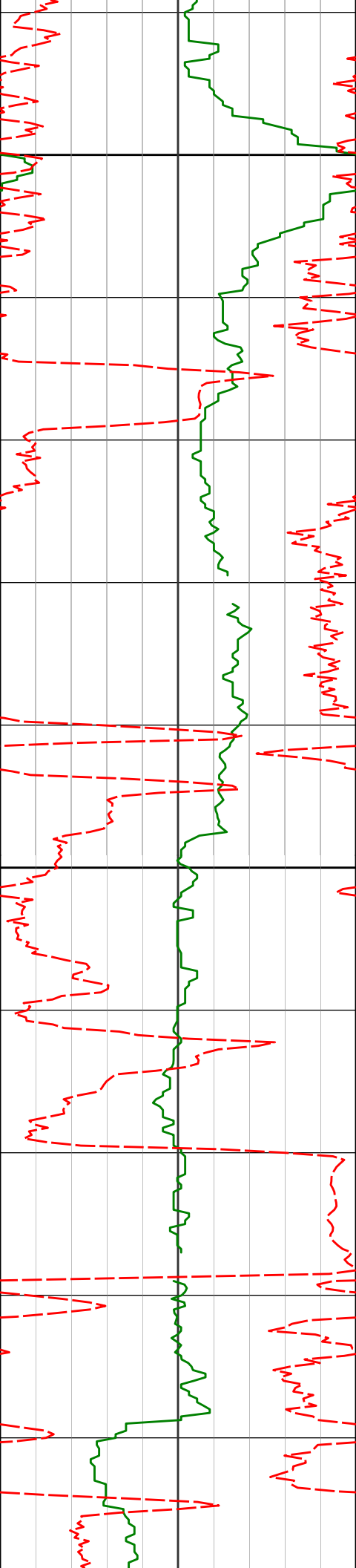
6824.29'

13561'

89.14°

267.89° 6520.21'

6919.23'



13600

13656'

89.63°

267.67° 6521.23'

7014.14'

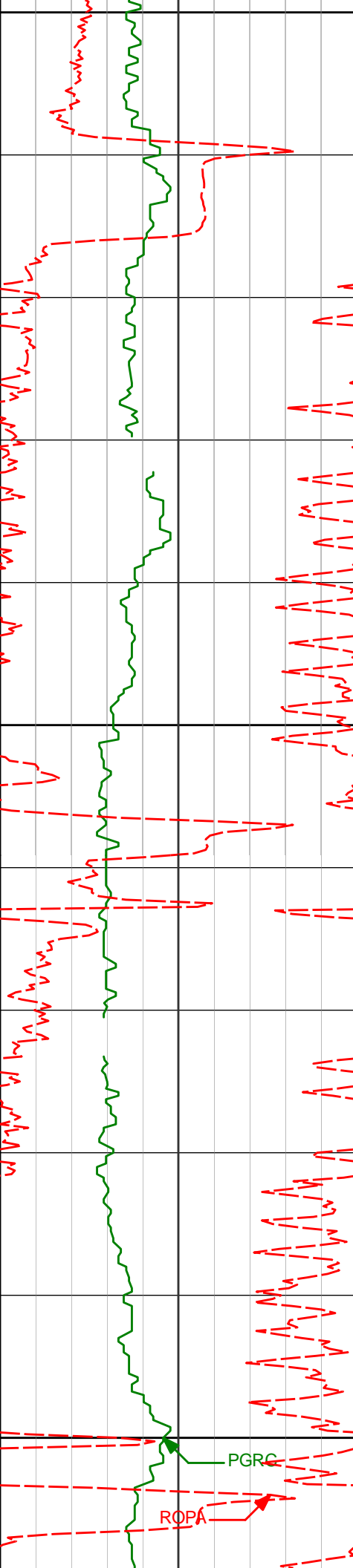
13700

13750'

89.20°

268.85° 6522.19'

7108.08'



13800

13845'

90.03°

269.00° 6522.83'

7203.05'

13900

13939'

90.25°

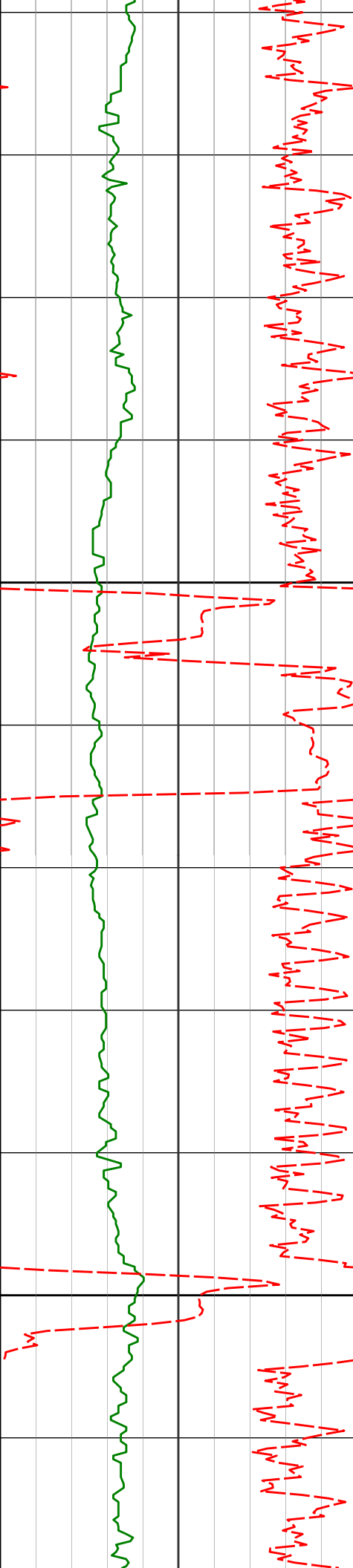
269.36° 6522.60'

7297.04'

14000

PGRC

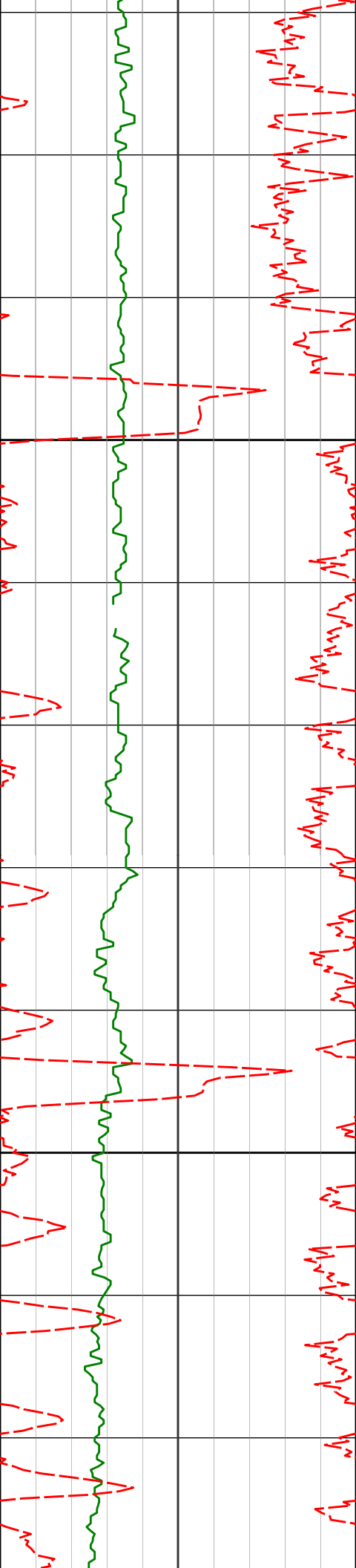
ROPÁ



14100

14200

14034'	90.62°	268.69°	6521.88'	7392.01'
14129'	89.08°	270.30°	6522.13'	7487.00'
14224'	89.08°	270.21°	6523.65'	7581.99'



14300

14318'

89.45°

269.63° 6524.86'

7675.98'

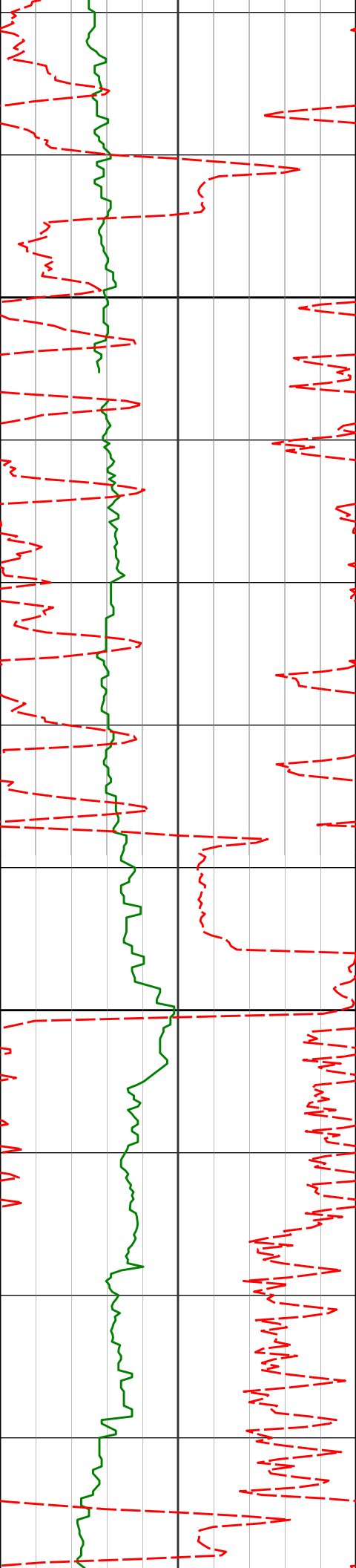
14400

14413'

89.42°

269.52° 6525.80'

7770.97'



14500

14508'

90.74°

270.72° 6525.66'

7865.96'

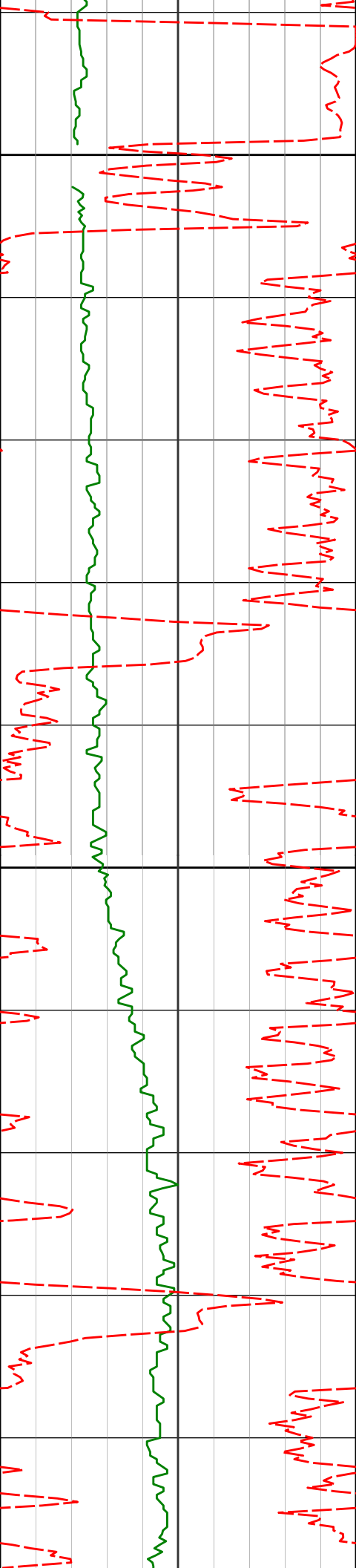
14600

14602'

91.17°

269.81° 6524.10'

7959.95'



14700

14800

14697'

14791'

14886'

89.20°

89.69°

90.25°

270.40° 6523.79'

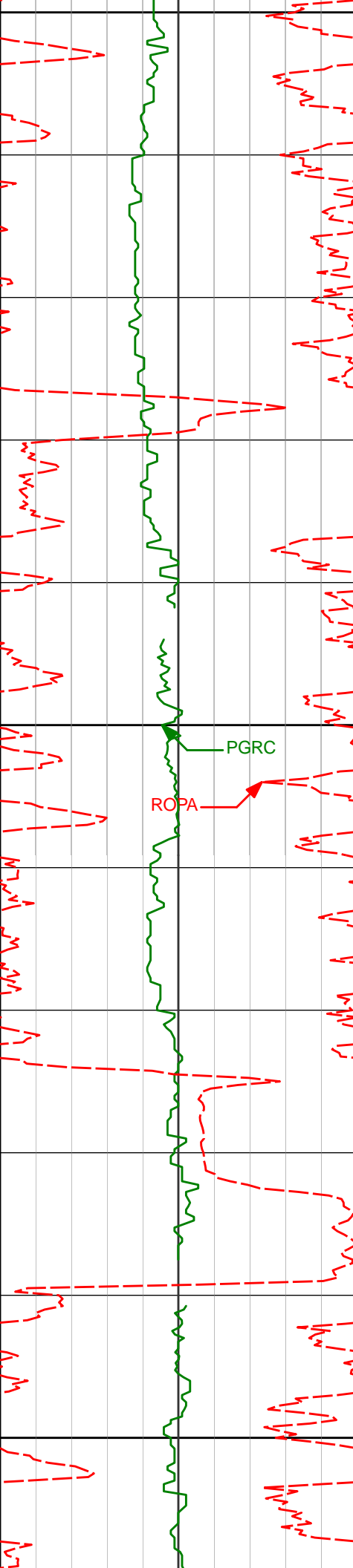
270.74° 6524.70'

270.02° 6524.75'

8054.94'

8148.94'

8243.94'



14900

14980'

90.68°

269.46° 6523.99'

8337.93'

15000

PGRC

ROPA

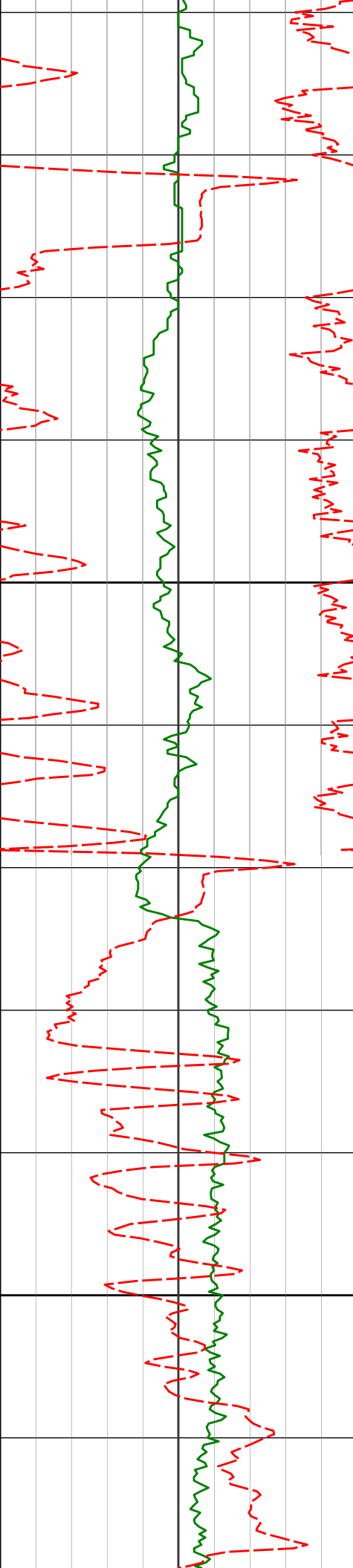
15075'

89.75°

270.18° 6523.63'

8432.93'

15100



15200

15300

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89.78°

269.92° 6524.02'

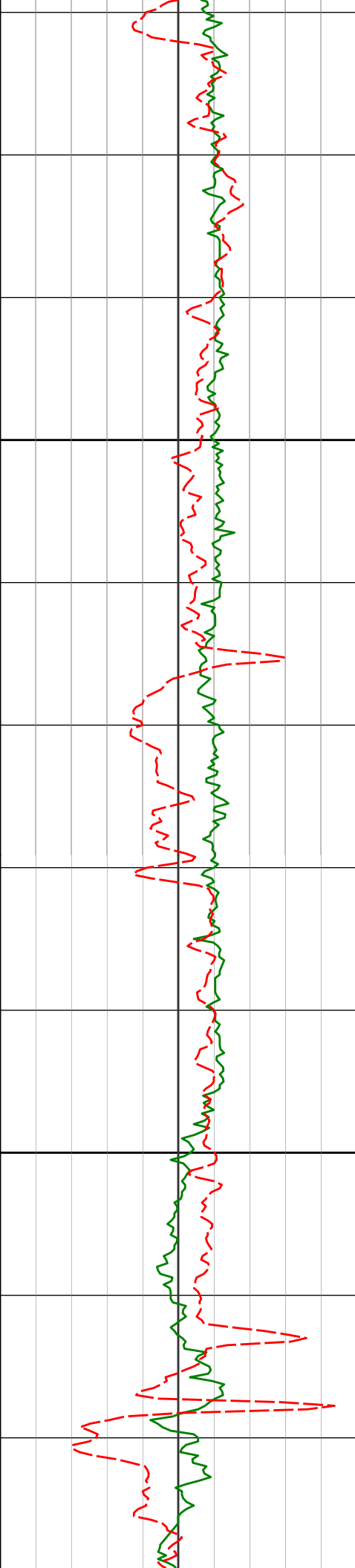
8527.92'

15264'

89.88°

269.49° 6524.30'

8621.92'



15400

15500

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90.06°

269.69° 6524.35'

8716.92'

15455'

90.06°

269.50° 6524.25'

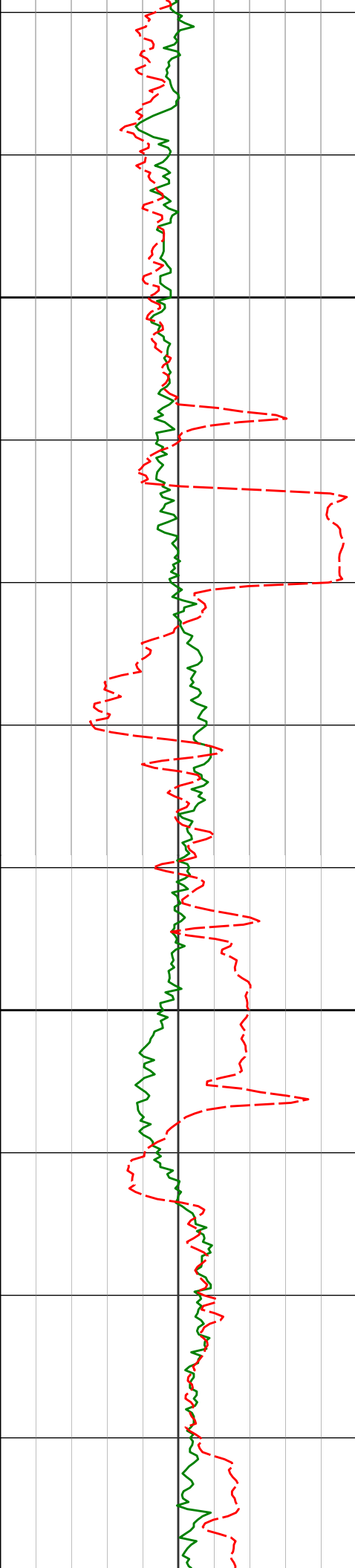
8812.91'

15548'

90.37°

269.53° 6523.90'

8905.90'



15600

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89.35°

268.64° 6524.13'

9000.88'

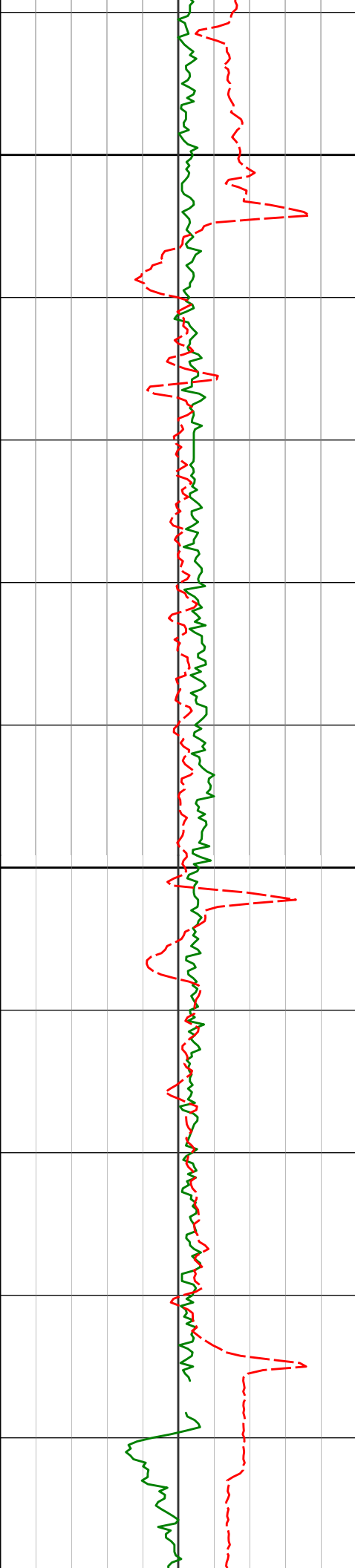
15700

15738'

90.03°

268.93° 6524.65'

9095.85'



15800

15833'

90.09°

268.50° 6524.55'

9190.82'

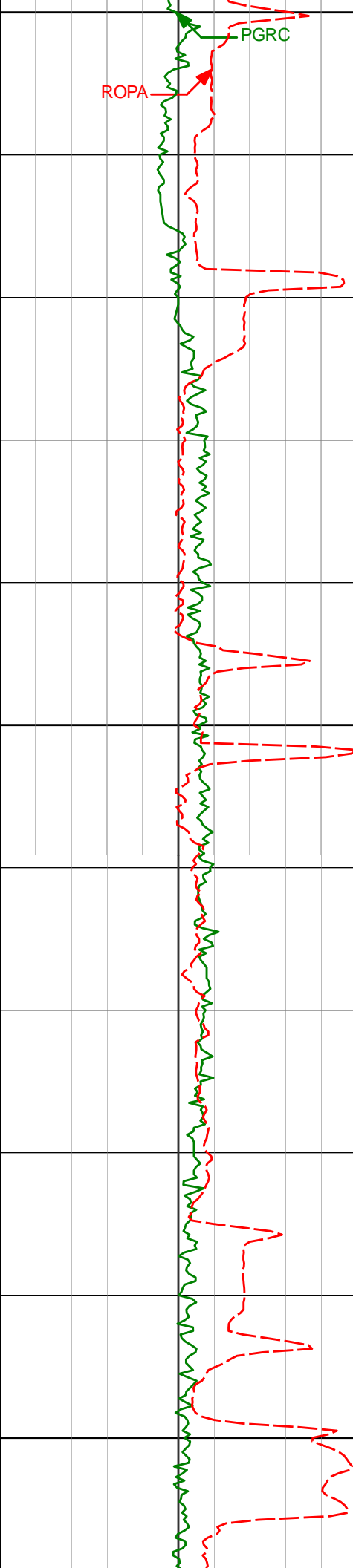
15900

15928'

89.78°

268.15° 6524.66'

9285.77'



16000

16023'

90.15°

267.71° 6524.71'

9380.69'

16100

16118'

90.40°

267.34° 6524.26'

9475.59'

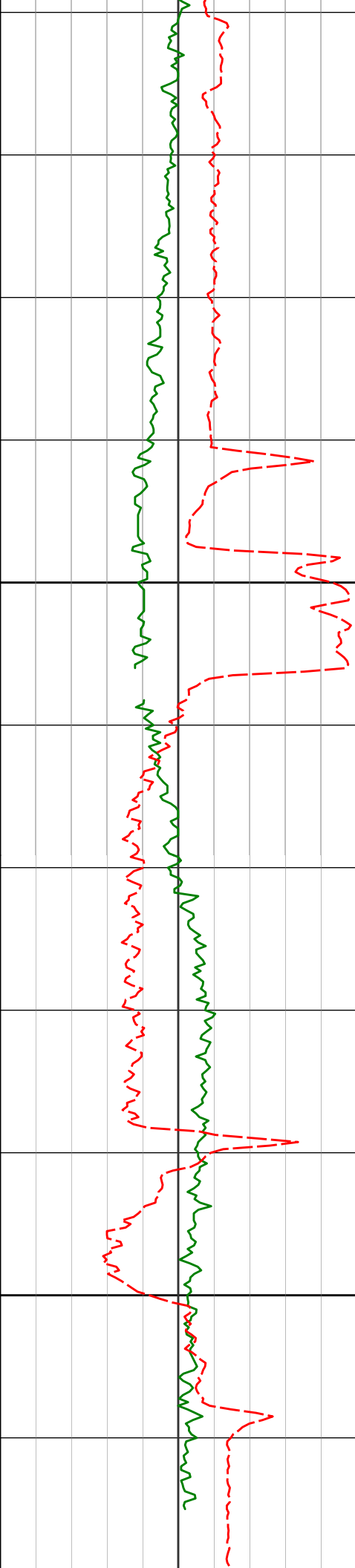
16200

16213'

90.59°

267.12° 6523.44'

9570.46'



16300

16308'

90.68°

266.72° 6522.38'

9665.29'

16400

16403'

90.96°

266.86° 6521.02'

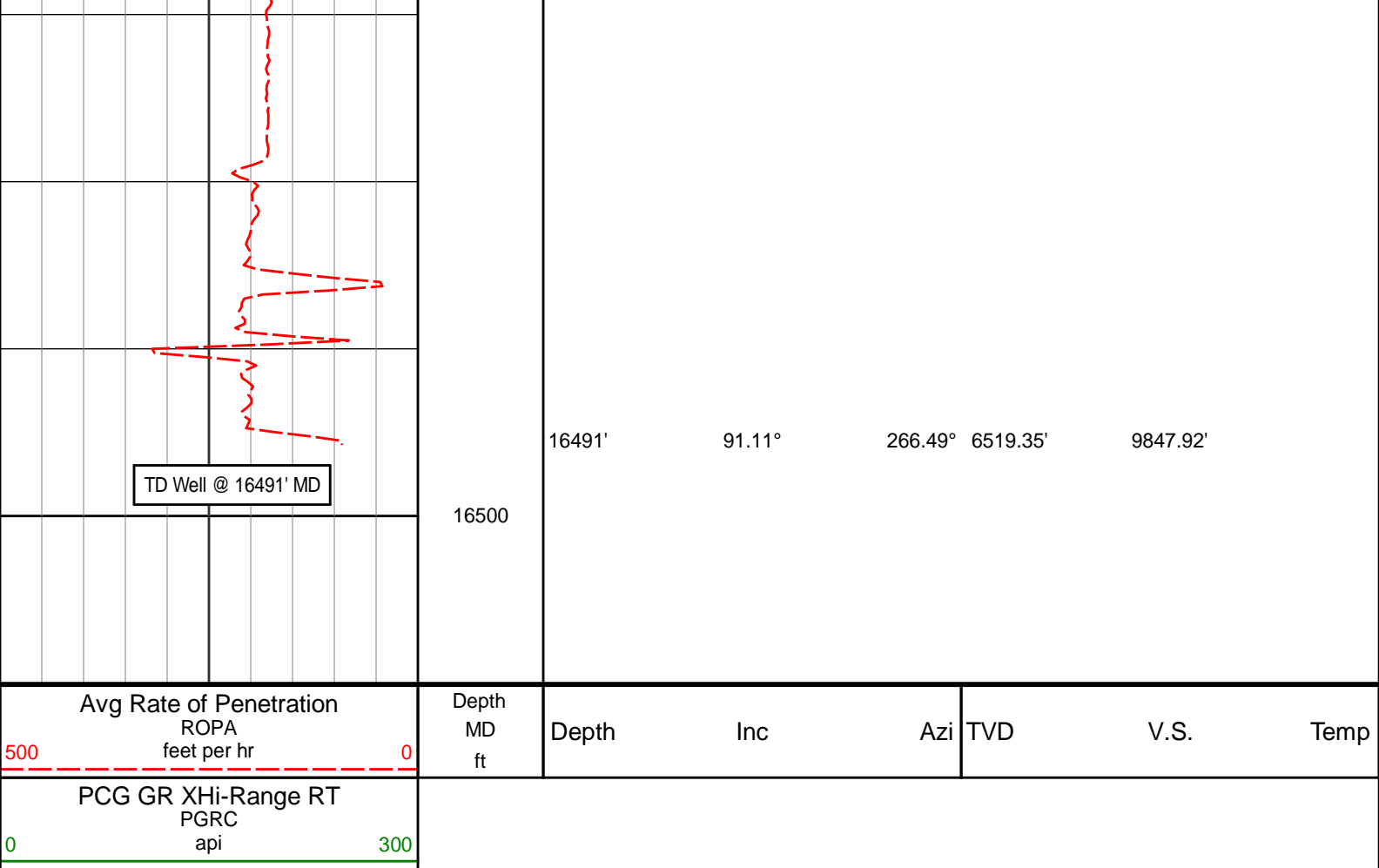
9760.12'

16423'

91.11°

266.49° 6520.66'

9780.08'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Engery
70 Ranch State BB18-622
Wattenburg
Weld Colorado
USA
CA-XX-0902500206

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
845.00	0.52	7.50	844.99	3.77 N	0.50 E	-0.48	0.06
940.00	0.52	11.07	939.98	4.63 N	0.64 E	-0.62	0.03
1034.00	0.65	14.50	1033.98	5.57 N	0.85 E	-0.83	0.14
1127.00	0.71	16.00	1126.97	6.63 N	1.14 E	-1.12	0.06
1220.00	0.81	25.88	1219.96	7.78 N	1.59 E	-1.56	0.18
1313.00	0.89	22.29	1312.95	9.04 N	2.15 E	-2.12	0.10
1406.00	0.86	17.51	1405.94	10.38 N	2.64 E	-2.60	0.08
1499.00	0.91	18.05	1498.93	11.75 N	3.08 E	-3.04	0.05
1683.00	0.79	21.48	1682.91	14.31 N	3.99 E	-3.94	0.07
1776.00	0.66	30.68	1775.91	15.37 N	4.50 E	-4.45	0.18
1869.00	4.42	71.27	1868.80	16.98 N	8.17 E	-8.11	4.23
1962.00	6.51	71.26	1961.37	19.83 N	16.55 E	-16.48	2.25
2146.00	6.88	79.08	2144.12	25.26 N	37.25 E	-37.16	0.53
2240.00	8.60	75.30	2237.26	28.11 N	49.58 E	-49.48	1.91
2333.00	8.27	75.61	2329.26	31.54 N	62.78 E	-62.67	0.36
2425.00	8.06	74.05	2420.32	34.96 N	75.40 E	-75.27	0.33
2517.00	7.28	69.43	2511.50	38.78 N	87.06 E	-86.92	1.09
2610.00	8.53	58.38	2603.62	44.47 N	98.45 E	-98.29	2.11
2796.00	8.31	55.42	2787.62	59.32 N	121.26 E	-121.05	0.26
2890.00	8.58	61.09	2880.60	66.57 N	132.99 E	-132.75	0.93

2890.00	8.58	61.09	2880.00	68.97 N	152.99 E	-152.75	0.93
2984.00	7.91	58.60	2973.63	73.33 N	144.64 E	-144.38	0.81
3079.00	7.08	57.75	3067.82	79.85 N	155.17 E	-154.89	0.88
3174.00	7.67	58.43	3162.03	86.30 N	165.52 E	-165.22	0.62
3268.00	5.97	58.28	3255.36	92.15 N	175.02 E	-174.70	1.81
3363.00	6.13	66.14	3349.83	96.80 N	183.86 E	-183.52	0.89
3552.00	7.41	71.43	3537.52	104.76 N	204.64 E	-204.27	0.75
3646.00	7.82	69.85	3630.69	108.89 N	216.38 E	-216.00	0.49
3741.00	8.33	67.82	3724.75	113.71 N	228.82 E	-228.42	0.61
3836.00	8.49	66.85	3818.72	119.07 N	241.64 E	-241.22	0.23
3930.00	7.52	66.24	3911.81	124.28 N	253.65 E	-253.22	1.04
4120.00	5.36	63.62	4100.60	133.23 N	272.99 E	-272.52	1.15
4214.00	6.57	87.00	4194.10	135.46 N	282.30 E	-281.82	2.86
4309.00	8.95	89.40	4288.22	135.82 N	295.12 E	-294.64	2.53
4404.00	9.02	86.53	4382.06	136.35 N	309.95 E	-309.47	0.48
4498.00	7.78	77.02	4475.05	138.23 N	323.50 E	-323.02	1.98
4688.00	8.31	69.74	4663.18	145.87 N	348.92 E	-348.41	0.60
4783.00	7.02	65.11	4757.33	150.69 N	360.62 E	-360.10	1.50
4877.00	6.67	62.53	4850.66	155.63 N	370.68 E	-370.14	0.49
5067.00	4.78	56.29	5039.71	165.12 N	387.06 E	-386.48	1.05
5161.00	3.96	53.89	5133.44	169.20 N	392.94 E	-392.35	0.89
5351.00	1.97	50.96	5323.17	175.13 N	400.78 E	-400.17	1.05
5445.00	2.27	25.49	5417.11	177.83 N	402.84 E	-402.22	1.04
5540.00	1.89	12.49	5512.05	181.06 N	403.99 E	-403.35	0.64
5634.00	2.10	12.02	5605.99	184.25 N	404.68 E	-404.04	0.22
5729.00	1.64	346.96	5700.94	187.27 N	404.74 E	-404.08	0.97
5824.00	2.43	27.27	5795.88	190.39 N	405.35 E	-404.68	1.67
5918.00	6.35	285.15	5889.68	193.52 N	401.24 E	-400.56	7.72
6013.00	19.33	277.95	5982.11	197.08 N	380.51 E	-379.82	13.74
6107.00	23.06	269.19	6069.76	198.97 N	346.67 E	-345.97	5.20
6202.00	26.83	267.82	6155.88	197.89 N	306.63 E	-305.94	4.00
6296.00	36.08	268.38	6235.98	196.30 N	257.66 E	-256.97	9.85
6391.00	44.93	272.03	6308.15	196.70 N	196.04 E	-195.35	9.63
6485.00	54.16	273.82	6369.08	200.42 N	124.70 E	-123.99	9.93
6580.00	59.00	271.70	6421.39	204.20 N	45.52 E	-44.81	5.42
6627.00	63.94	270.60	6443.83	205.01 N	4.25 E	-3.53	10.72
6674.00	69.64	269.79	6462.34	205.15 N	38.93 W	39.65	12.22
6721.00	76.07	271.25	6476.19	205.57 N	83.81 W	84.53	13.99
6769.00	82.05	270.23	6485.30	206.18 N	130.91 W	131.63	12.64
6804.00	85.84	268.33	6489.00	205.74 N	165.71 W	166.43	12.11
6879.00	89.45	266.30	6492.08	202.23 N	240.55 W	241.25	5.52
6974.00	89.60	264.78	6492.87	194.84 N	335.25 W	335.93	1.61
7068.00	89.91	265.53	6493.27	186.90 N	428.92 W	429.56	0.86
7163.00	90.22	267.58	6493.16	181.19 N	523.74 W	524.37	2.18
7258.00	90.03	267.33	6492.95	176.97 N	618.64 W	619.26	0.33
7353.00	90.28	267.16	6492.70	172.41 N	713.53 W	714.13	0.32
7447.00	88.34	268.75	6493.83	169.05 N	807.46 W	808.04	2.67
7541.00	87.94	268.48	6496.88	166.78 N	901.38 W	901.96	0.51
7636.00	88.31	268.05	6499.99	163.91 N	996.29 W	996.85	0.60
7731.00	89.05	268.84	6502.18	161.33 N	1091.23 W	1091.78	1.14
7826.00	88.95	269.53	6503.83	159.98 N	1186.20 W	1186.75	0.73
7920.00	90.28	268.78	6504.47	158.59 N	1280.19 W	1280.73	1.62
8015.00	90.15	268.54	6504.11	156.37 N	1375.16 W	1375.70	0.29
8110.00	89.97	267.97	6504.01	153.48 N	1470.12 W	1470.64	0.63
8204.00	90.46	269.37	6503.66	151.30 N	1564.09 W	1564.60	1.58
8299.00	90.80	268.67	6502.61	149.67 N	1659.07 W	1659.58	0.82
8394.00	89.91	268.68	6502.02	147.48 N	1754.04 W	1754.54	0.94
8488.00	90.31	268.73	6501.84	145.35 N	1848.01 W	1848.51	0.43
8583.00	91.05	268.62	6500.72	143.15 N	1942.98 W	1943.47	0.79
8677.00	90.25	269.25	6499.65	141.41 N	2036.96 W	2037.44	1.08
8772.00	90.95	269.19	6498.65	140.11 N	2131.94 W	2132.42	0.74
8867.00	90.06	271.38	6497.82	140.59 N	2226.93 W	2227.41	2.49
8961.00	90.74	271.20	6497.16	142.70 N	2320.90 W	2321.39	0.75
9056.00	89.51	270.24	6496.95	143.90 N	2415.89 W	2416.38	1.64
9150.00	90.18	270.01	6497.21	144.10 N	2509.89 W	2510.38	0.75
9245.00	90.09	268.14	6496.98	142.57 N	2604.88 W	2605.36	1.97
9339.00	89.72	268.96	6497.14	140.19 N	2698.84 W	2699.32	0.96
9434.00	90.62	268.22	6496.86	137.85 N	2793.81 W	2794.28	1.23
9529.00	88.21	268.07	6497.83	134.78 N	2888.75 W	2889.20	2.54
9623.00	88.37	268.26	6500.63	131.77 N	2982.66 W	2983.10	0.26
9718.00	88.86	268.87	6502.93	129.39 N	3077.60 W	3078.04	0.82
9813.00	88.95	268.46	6504.75	127.18 N	3172.56 W	3172.98	0.44
9908.00	89.38	268.09	6506.13	124.32 N	3267.51 W	3267.92	0.60
10003.00	89.01	268.69	6507.46	121.65 N	3362.46 W	3362.86	0.74
10097.00	88.98	270.42	6509.11	120.92 N	3456.44 W	3456.84	1.84

10192.00	89.88	271.12	6510.06	122.19 N	3551.42 W	3551.83	1.20
10286.00	90.03	271.13	6510.13	124.04 N	3645.41 W	3645.82	0.16
10380.00	90.92	272.28	6509.35	126.84 N	3739.36 W	3739.78	1.55
10474.00	89.38	271.70	6509.11	130.10 N	3833.30 W	3833.73	1.75
10567.00	88.15	270.22	6511.11	131.66 N	3926.26 W	3926.69	2.07
10660.00	87.94	269.33	6514.28	131.29 N	4019.20 W	4019.64	0.98
10752.00	89.01	268.50	6516.73	129.55 N	4111.15 W	4111.58	1.47
10845.00	88.61	268.83	6518.66	127.39 N	4204.11 W	4204.52	0.56
10939.00	89.66	266.57	6520.08	123.61 N	4298.01 W	4298.42	2.65
11029.00	90.71	266.54	6519.79	118.21 N	4387.85 W	4388.23	1.17
11122.00	90.83	266.62	6518.54	112.66 N	4480.67 W	4481.04	0.16
11216.00	89.41	267.41	6518.35	107.76 N	4574.54 W	4574.89	1.73
11309.00	89.63	267.66	6519.13	103.76 N	4667.45 W	4667.79	0.36
11401.00	90.71	268.16	6518.85	100.41 N	4759.39 W	4759.71	1.29
11493.00	91.72	268.36	6516.90	97.62 N	4851.33 W	4851.64	1.12
11586.00	90.12	269.30	6515.41	95.72 N	4944.29 W	4944.59	2.00
11679.00	90.46	269.93	6514.94	95.09 N	5037.29 W	5037.59	0.77
11771.00	91.11	268.96	6513.68	94.20 N	5129.27 W	5129.57	1.27
11864.00	90.59	270.66	6512.30	93.89 N	5222.26 W	5222.55	1.91
11956.00	88.74	270.18	6512.84	94.57 N	5314.25 W	5314.55	2.08
12049.00	88.58	270.18	6515.01	94.86 N	5407.22 W	5407.52	0.17
12142.00	89.51	268.54	6516.56	93.82 N	5500.20 W	5500.49	2.03
12236.00	89.72	267.98	6517.19	90.97 N	5594.15 W	5594.44	0.64
12331.00	90.89	268.89	6516.69	88.37 N	5689.11 W	5689.39	1.56
12425.00	90.68	269.68	6515.40	87.20 N	5783.10 W	5783.37	0.87
12520.00	89.11	270.26	6515.57	87.15 N	5878.09 W	5878.36	1.76
12614.00	89.42	270.11	6516.78	87.45 N	5972.09 W	5972.35	0.37
12709.00	89.72	270.39	6517.49	87.87 N	6067.08 W	6067.35	0.43
12804.00	90.12	270.24	6517.62	88.39 N	6162.08 W	6162.35	0.45
12898.00	90.28	270.16	6517.30	88.72 N	6256.08 W	6256.35	0.19
12993.00	90.92	270.38	6516.30	89.16 N	6351.07 W	6351.35	0.71
13088.00	90.46	269.97	6515.16	89.45 N	6446.06 W	6446.34	0.65
13182.00	89.45	269.90	6515.23	89.35 N	6540.06 W	6540.34	1.08
13277.00	89.60	269.50	6516.02	88.85 N	6635.06 W	6635.33	0.45
13372.00	89.63	269.45	6516.66	87.98 N	6730.05 W	6730.32	0.06
13466.00	88.46	269.24	6518.22	86.91 N	6824.03 W	6824.29	1.26
13561.00	89.14	267.89	6520.21	84.53 N	6918.98 W	6919.23	1.59
13656.00	89.63	267.67	6521.23	80.85 N	7013.90 W	7014.14	0.57
13750.00	89.20	268.85	6522.19	77.99 N	7107.85 W	7108.08	1.34
13845.00	90.03	269.00	6522.83	76.21 N	7202.83 W	7203.05	0.89
13939.00	90.25	269.36	6522.60	74.87 N	7296.82 W	7297.04	0.45
14034.00	90.62	268.69	6521.88	73.25 N	7391.80 W	7392.01	0.81
14129.00	89.08	270.30	6522.13	72.41 N	7486.79 W	7487.00	2.35
14224.00	89.08	270.21	6523.65	72.83 N	7581.78 W	7581.99	0.09
14318.00	89.45	269.63	6524.86	72.70 N	7675.77 W	7675.98	0.73
14413.00	89.42	269.52	6525.80	72.00 N	7770.77 W	7770.97	0.12
14508.00	90.74	270.72	6525.66	72.20 N	7865.76 W	7865.96	1.88
14602.00	91.17	269.81	6524.10	72.63 N	7959.75 W	7959.95	1.07
14697.00	89.20	270.40	6523.79	72.81 N	8054.74 W	8054.94	2.16
14791.00	89.69	270.74	6524.70	73.74 N	8148.73 W	8148.94	0.63
14886.00	90.25	270.02	6524.75	74.37 N	8243.73 W	8243.94	0.96
14980.00	90.68	269.46	6523.99	73.94 N	8337.72 W	8337.93	0.75
15075.00	89.75	270.18	6523.63	73.65 N	8432.72 W	8432.93	1.24
15170.00	89.78	269.92	6524.02	73.73 N	8527.72 W	8527.92	0.28
15264.00	89.88	269.49	6524.30	73.24 N	8621.72 W	8621.92	0.47
15359.00	90.06	269.69	6524.35	72.56 N	8716.71 W	8716.92	0.28
15455.00	90.06	269.50	6524.25	71.89 N	8812.71 W	8812.91	0.20
15548.00	90.37	269.53	6523.90	71.10 N	8905.71 W	8905.90	0.33
15643.00	89.35	268.64	6524.13	69.58 N	9000.69 W	9000.88	1.42
15738.00	90.03	268.93	6524.65	67.57 N	9095.67 W	9095.85	0.78
15833.00	90.09	268.50	6524.55	65.44 N	9190.65 W	9190.82	0.46
15928.00	89.78	268.15	6524.66	62.66 N	9285.60 W	9285.77	0.49
16023.00	90.15	267.71	6524.71	59.23 N	9380.54 W	9380.69	0.61
16118.00	90.40	267.34	6524.26	55.13 N	9475.45 W	9475.59	0.47
16213.00	90.59	267.12	6523.44	50.53 N	9570.34 W	9570.46	0.31
16308.00	90.68	266.72	6522.38	45.43 N	9665.19 W	9665.29	0.43
16403.00	90.96	266.86	6521.02	40.11 N	9760.04 W	9760.12	0.33
16423.00	91.11	266.49	6520.66	38.95 N	9780.00 W	9780.08	2.00
16491.00	91.11	266.49	6519.35	34.79 N	9847.86 W	9847.92	0.00

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 270.20 DEGREES (GRID)
A TOTAL CORRECTION OF 7.58 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 16491.00 FEET
IS 9847.92 FEET ALONG 270.20 DEGREES (GRID)

Run 200 is IFR corrected. Final survey is a straight line projection to TD.

Date Printed: 17 July 2015