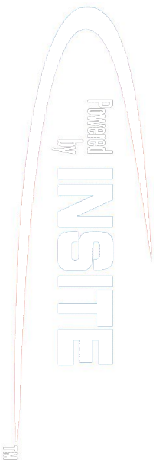


**PCG Pressure Case Gamma Ray
PCDC Pressure Case Directional**


Country	: USA
Field	: Redtail
Location	: Lat: 40° 48' 30.40" North Long: 103° 50' 55.35" West
Well	: Razor 27J-2212B
Company	: Whiting Oil and Gas
Rig	: Frontier 26
LOCATION	Company : Whiting Oil and Gas
	Rig : Frontier 26
Latitude : 40° 48' 30.40" North Longitude : 103° 50' 55.35" West	Well : Razor 27J-2212B
	Field : Redtail
UTM Easting = 3,457,104.501 ft UTM Northing = 1,541,619.336 ft	Country : USA
	API Number : 05-123-38060
Permanent Datum : Ground Level	Elevation : 4764.00 ft
Log Measured From : Drill Floor	22.00 ft Above Permanent Datum
Drilling Measured From : Drill Floor	MD LOG
Depth Logged : 81.00 ft To 13,686.00 ft	Unit No. : Command Center Job No. : CA-XX-0901566507
Date Logged : 06-Aug-14 To 15-Aug-14	Plot Type : Final
Total Depth MD : 13,686.00 ft TVD : 5,767.32 ft	Plot Date : 15-Aug-14
Spud Date : 07-Aug-14	
Run No.	Borehole Record (MD)
Size	From To
0100	13,500 in 81.00 ft 1,641.00 ft
0200	8,750 in 1,641.00 ft 6,215.00 ft
0300	6,125 in 6,215.00 ft 9,912.00 ft
0400	6,125 in 9,912.00 ft 13,686.00 ft
	Size
	9.625 in 36.00 lbpf SURFACE 1,622.00 ft
	7.000 in 29.00 lbpf SURFACE 6,203.00 ft

WELL INFORMATION

MWD Run Number	100	200	300	400	
Date run completed	07-Aug-14	09-Aug-14	12-Aug-14	15-Aug-14	
Rig Bit Number	0100	0200	0300	0400	
Bit Size (in)	13.500	8.750	6.125	6.125	
Tool Nominal OD (in)	6.750	6.750	4.750	4.750	
Log Start Depth (MD, ft)	81.00	1,641.00	6,215.00	9,912.00	
Log End Depth (MD, ft)	1,641.00	6,215.00	9,912.00	13,686.00	
Drill or Wipe	Drill	Drill	Drill	Drill	
Drill/Wipe Start Date and Time	07-Aug-14 03:08	08-Aug-14 07:35	10-Aug-14 23:10	13-Aug-14 02:57	
Drill/Wipe End Date and Time	07-Aug-14 11:10	09-Aug-14 15:03	12-Aug-14 15:15	14-Aug-14 12:37	
Min Inc (deg) @ Depth (MD, ft)	0.58 @ 177.00	0.72 @ 5,020.00	87.44 @ 9,496.00	86.49 @ 11,870.00	
Max Inc (deg) @ Depth (MD, ft)	6.18 @ 1,186.00	83.64 @ 6,162.00	92.28 @ 8,386.00	91.97 @ 10,684.00	
Bit TFA(in2) / Bit Type	1.84 / PDC	0.74 / PDC	0.98 / PDC	0.98 / PDC	
Flow Rate (gpm)	740.00	461.66	267.39	259.17	
Max AV (fpm) / CV (fpm) @ MWD	NA / NA	217.0 / NA	NA / NA	NA / NA	
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel	
Density (ppg) / Viscosity (spqt)	8.60 / 0.00	9.50 / 52.00	10.10 / 47.00	10.20 / 48.00	
Filtrate CL (ppm)	0.00	2,000.00	2,000.00	2,000.00	
pH / Fluid Loss (mptm)	8.30 / 0	8.90 / 0	9.00 / 0	9.00 / 0	
PV (cP) / YP (lbf2)	NA / NA	19 / 12.00	18 / 17.00	18 / 16.00	
% Solids / % Sand	0 / 0	12.5 / 0.25	12.5 / 0.25	11.5 / 0.25	
% Oil / Oil:Water Ratio	NA / NA	NA / NA	NA / NA	NA / NA	
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA	NA @ NA	

Max Tool Temp (degF) / Source	130.96 / PCM	177.64 / PCM	212.92 / PCM	228.74 / PCM	
Rm @ Max Tool Temp (degF)	NA @ 130.96	NA @ 177.64	NA @ 212.92	NA @ 228.74	
Lead MWD Engineer	Scott Trowbridge	Scott Trowbridge	Scott Trowbridge	Scott Trowbridge	
Customer Representative	Kennith Wilkerson	Kennith Wilkerson	Kennith Wilkerson	Kennith Wilkerson	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM	PCM	
Software Version	5.93	5.93	5.93	5.93	
Sub Serial Number	11341319	11341319	12463936	12463936	
Insert Serial Number	10996900	11400991	10996900	11400991	
Date and Time Initialized	06-Aug-14 16:28	07-Aug-14 21:54	10-Aug-14 06:08	12-Aug-14 19:34	
Date and Time Read	07-Aug-14 15:13	09-Aug-14 23:53	01-Jan-70 00:00	01-Jan-70 00:00	
ECMB SW Version	N/A	N/A	N/A	N/A	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	PCDC	
Distance From Bit (ft)	56.04	51.16	47.07	47.03	
Software Version	6.21	6.21	6.21	6.21	
Sub Serial Number	11341319	11341319	12463936	12463936	
Sonde Serial Number	11638472	11478070	11638472	11478070	
Sensor ID Number	N/A	N/A	N/A	N/A	
Toolface Offset (deg)	331.34	354.11	38.65	348.63	

Gamma Ray Sensor Information

Tool Type		PCG	PCG	PCG	
Distance From Bit (ft)		46.06	36.47	36.43	
Recorded Sample Period (sec)		10	10	10	
Software Version		8.15	8.15	8.15	
Sub Serial Number		1134319	12463936	12463936	
Insert/Sonde Serial Number		12071301	11293268	12071301	

REMARKS

1. All depths are measured bit depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.

2. No depth corrections have been made for pipe stretch or compression.

3. Critical annular velocities are calculated using the "Power Law" for water based fluids and the "Bingham Plastic" model for oil and synthetic based fluids.

4. All data is stored unless otherwise specified.

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

PCG Gamma Ray BCorr (PGRC)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

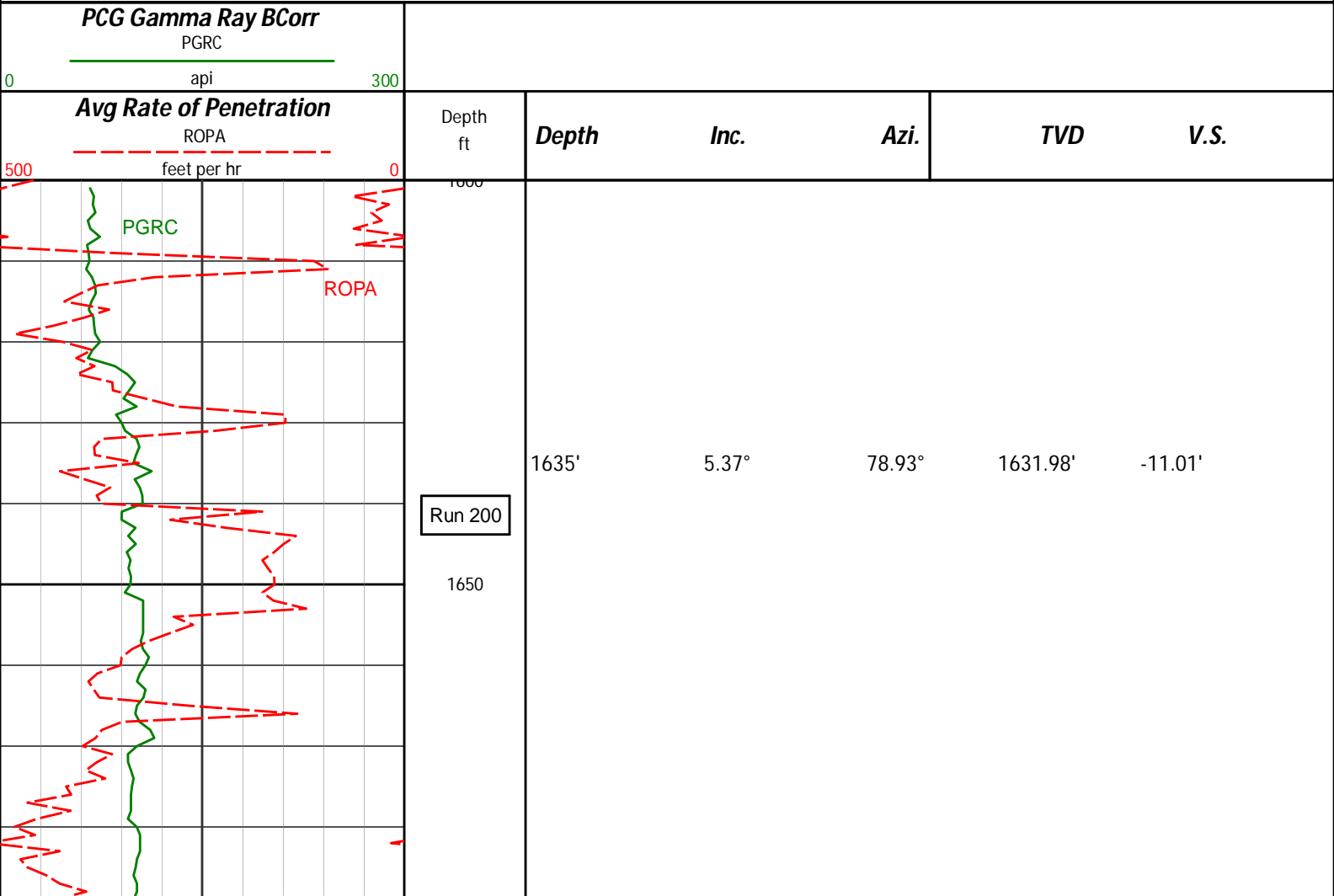
Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

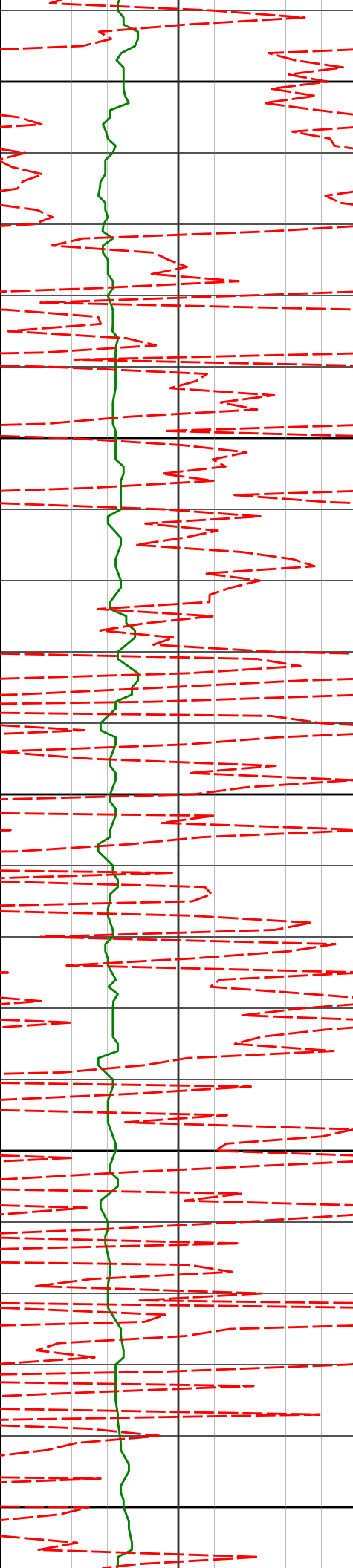
WARRANTY

HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

HALLIBURTON
Sperry Drilling Services
MD Main Log 1:240

Whiting Oil and Gas
Razor 27J-2212B
Frontier 26
Sec. 27-T10N-R58W





1700

1726'

4.88°

72.09°

1722.62'

-8.71'

1750

1800

1817'

4.71°

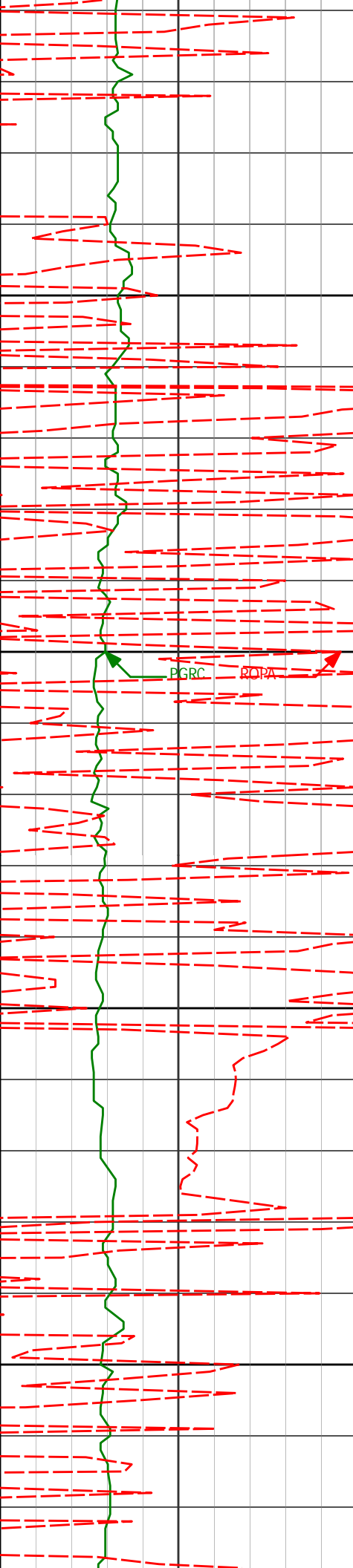
63.10°

1813.30'

-5.57'

1850

1900



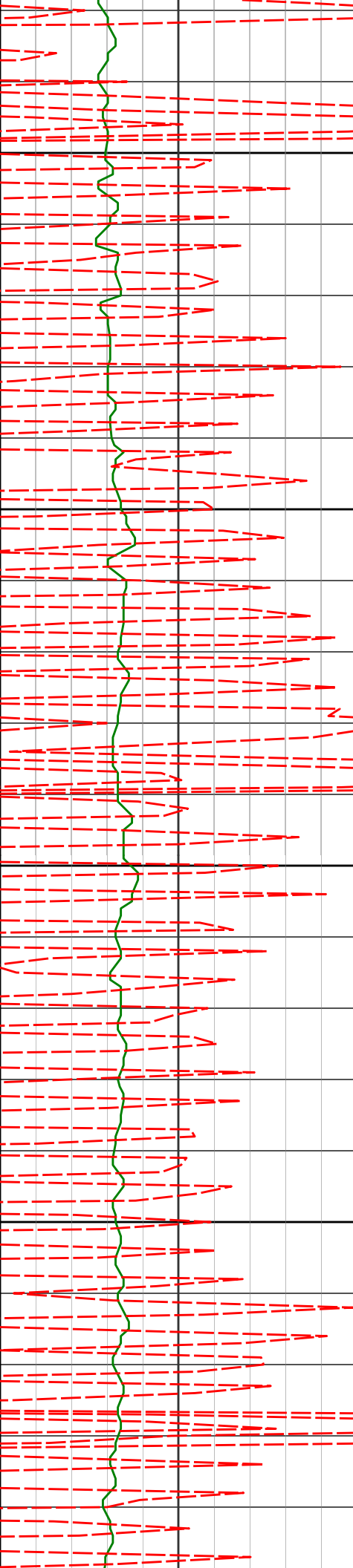
1950

2000

2050

2100

1909	4.81°	61.02°	1904.98	-1.74
2000'	4.63°	54.52°	1995.67'	2.47'
2092'	6.12°	97.85°	2087.30'	4.25'



2150

2200

2250

2300

2183'

5.37°

97.95°

2177.85'

3.34'

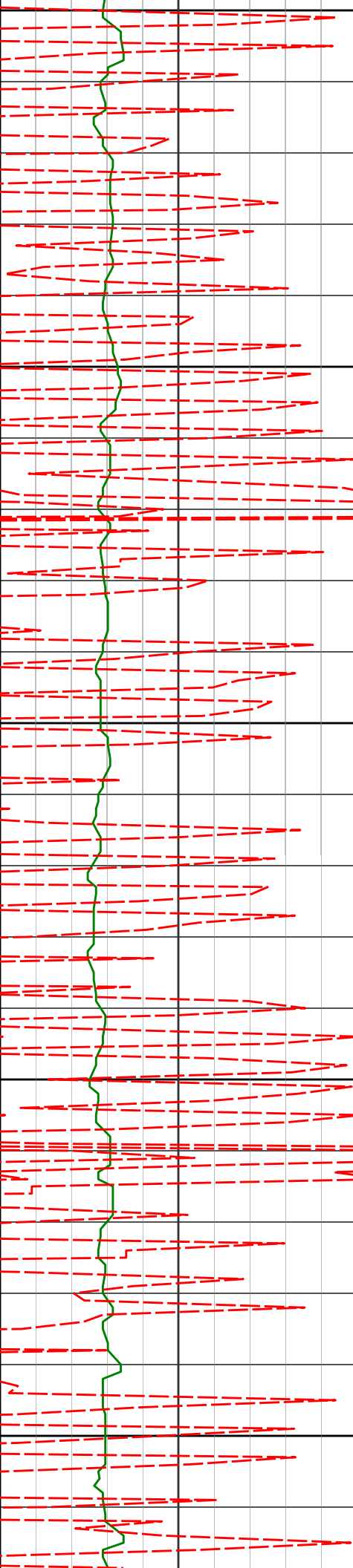
2275'

5.29°

98.88°

2269.45'

2.40'



2350

2366'

4.75°

100.91°

2360.10'

1.34'

2400

2450

2458'

4.75°

104.90°

2451.78'

-0.09'

2500

2550

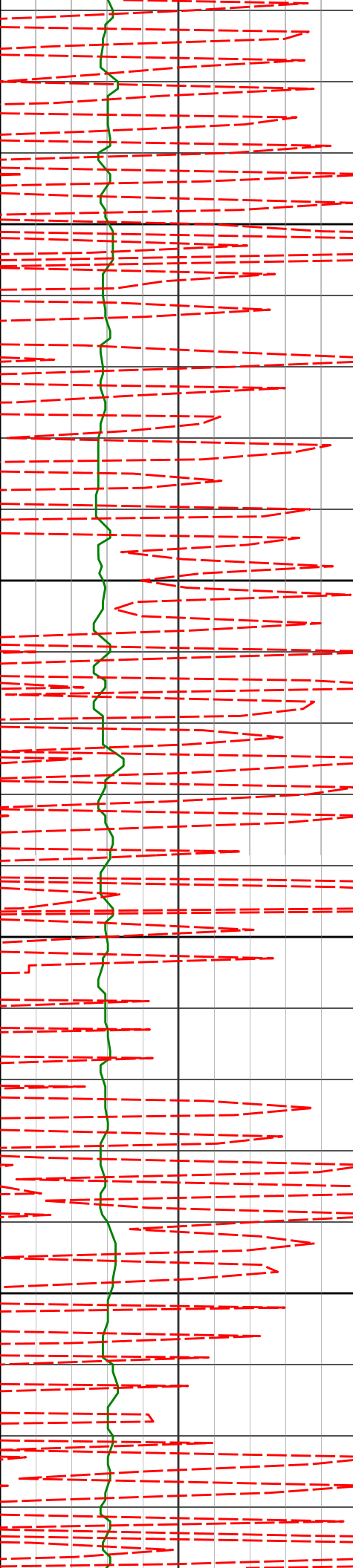
2549'

5.33°

100.81°

2542.43'

-1.56'



2600

2650

2700

2750

2641'

5.56°

83.04°

2634.02'

-1.49'

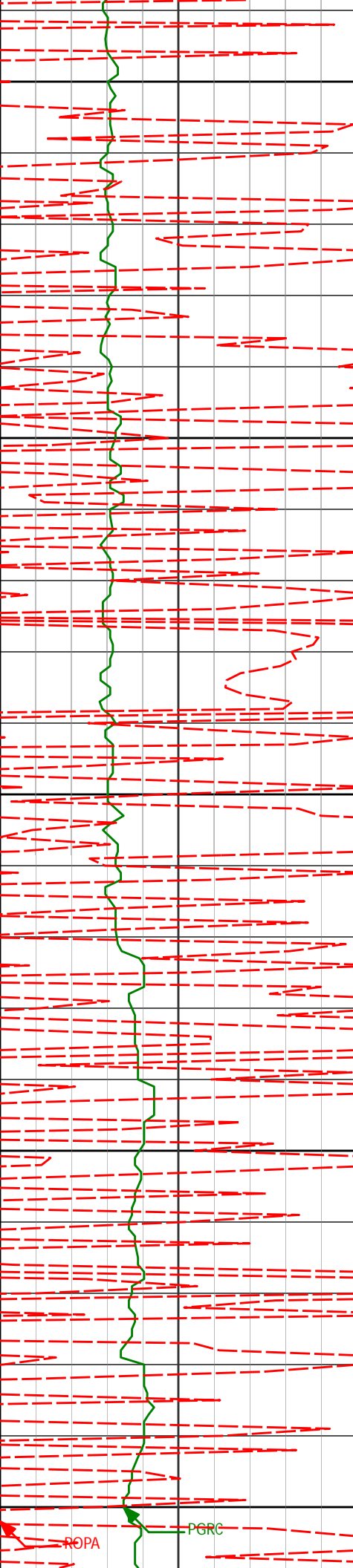
2732'

5.22°

78.55°

2724.62'

0.18'



2800

2823'

4.61°

79.72°

2815.28'

1.93'

2850

2900

2915'

5.35°

79.04°

2906.94'

3.70'

2950

3000

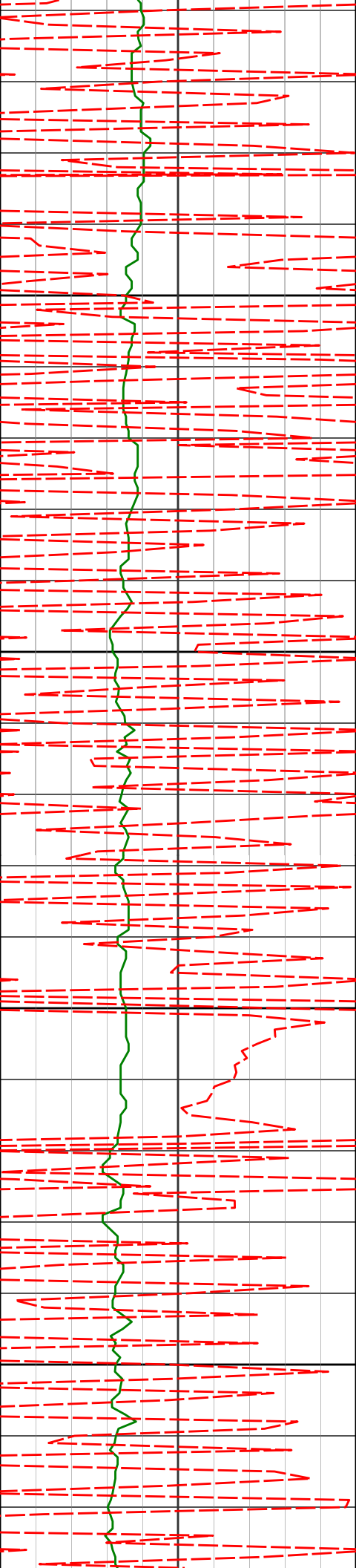
3007'

4.79°

70.91°

2998.58'

6.06'



3050

3100

3150

3200

3098'

4.21°

64.30°

3089.30'

9.00'

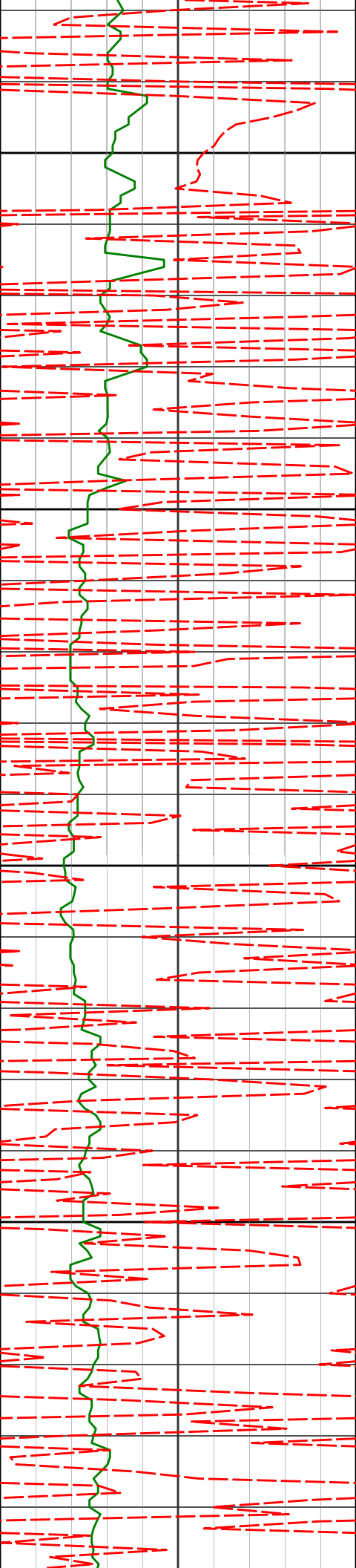
3189'

4.41°

94.50°

3180.05'

10.42'



3250

3281'

6.30°

96.71°

3271.65'

9.87'

3300

3350

3373'

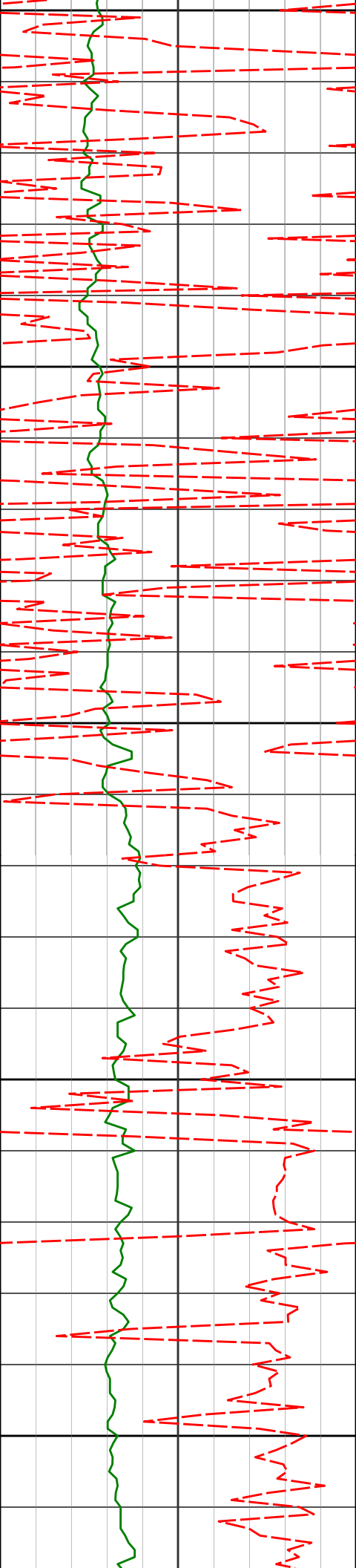
6.53°

97.20°

3363.07'

9.01'

3400



3450

3465'

6.66°

96.87°

3454.46'

8.10'

3500

3550

3556'

7.26°

97.49°

3544.79'

7.13'

3600

3650

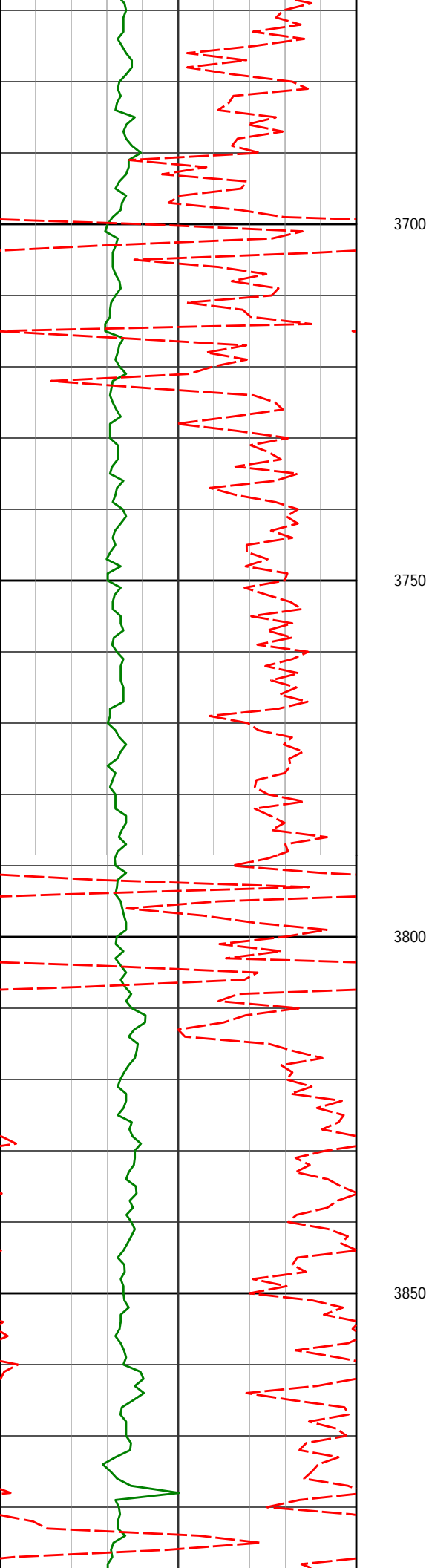
3648'

5.75°

88.57°

3636.20'

6.88'



3739'

5.59°

90.68°

3726.75'

7.27'

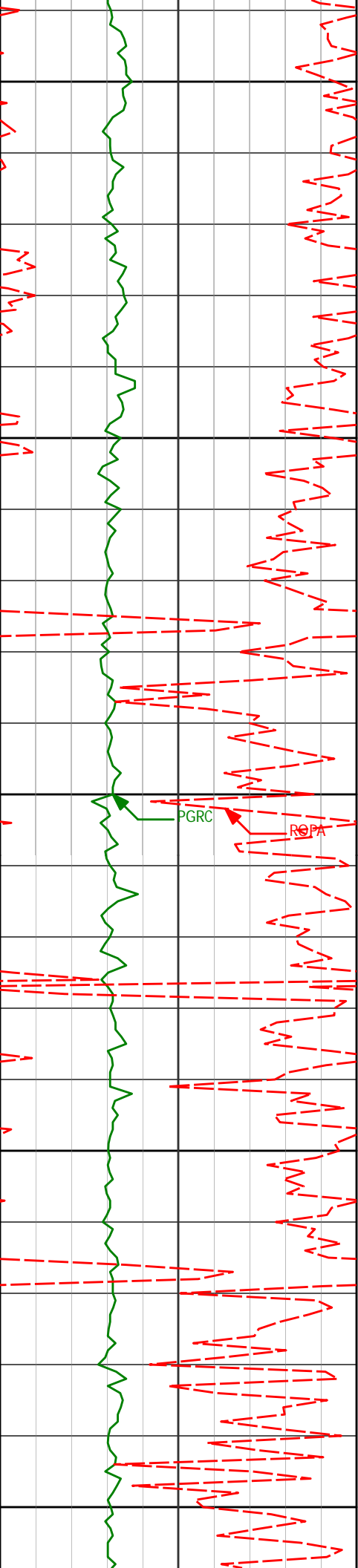
3830'

5.03°

94.18°

3817.36'

7.25'



3900

3922'

4.92°

95.03°

3909.02'

6.90'

3950

4000

PGRC

ROPA

4013'

5.40°

95.86°

3999.65'

6.43'

4050

4100

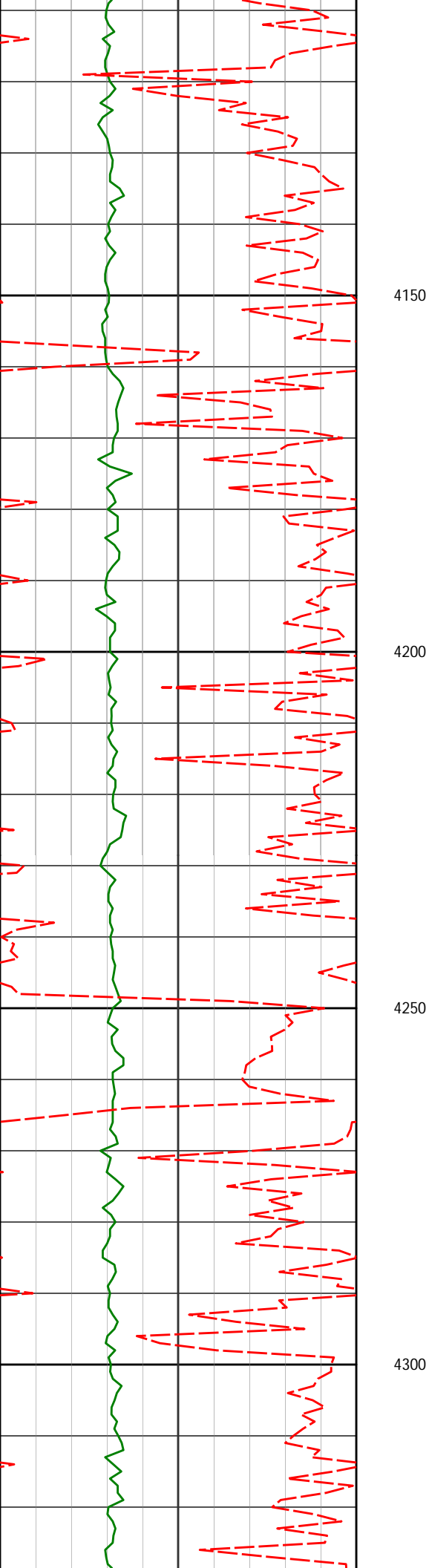
4105'

5.37°

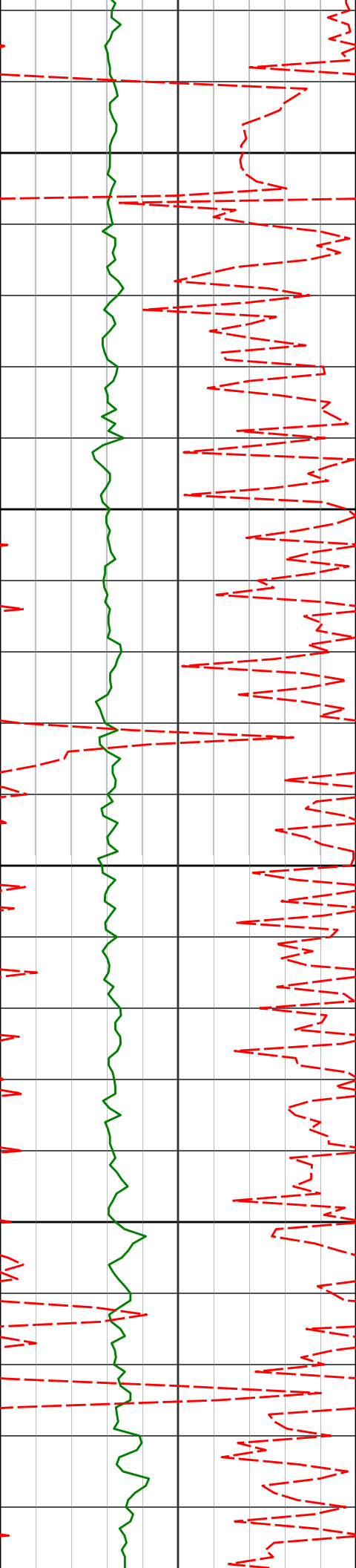
95.42°

4091.24'

5.90'



4150				
4196'	4.91°	93.48°	4181.87'	5.57'
4200				
4250				
4287'	3.29°	78.80°	4272.64'	6.08'
4300				



4350

4378'

0.95°

80.79°

4363.57'

6.83'

4400

4450

4470'

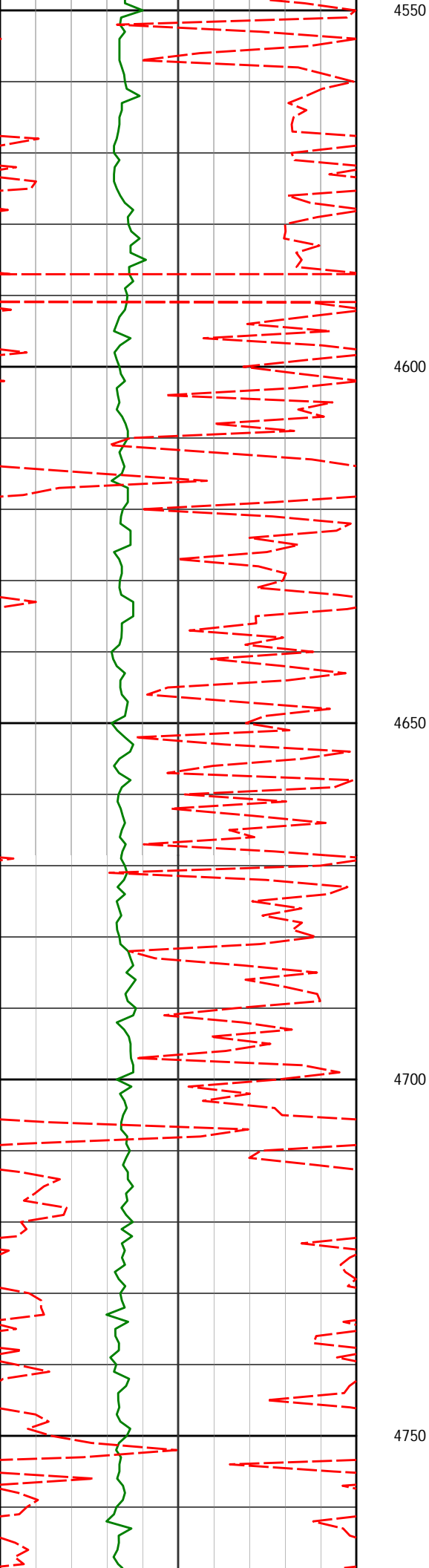
0.88°

93.67°

4455.56'

6.96'

4500



4563'

0.80°

73.30°

4548.55'

7.15'

4600

4650

4653'

1.27°

87.82°

4638.54'

7.43'

4700

4750

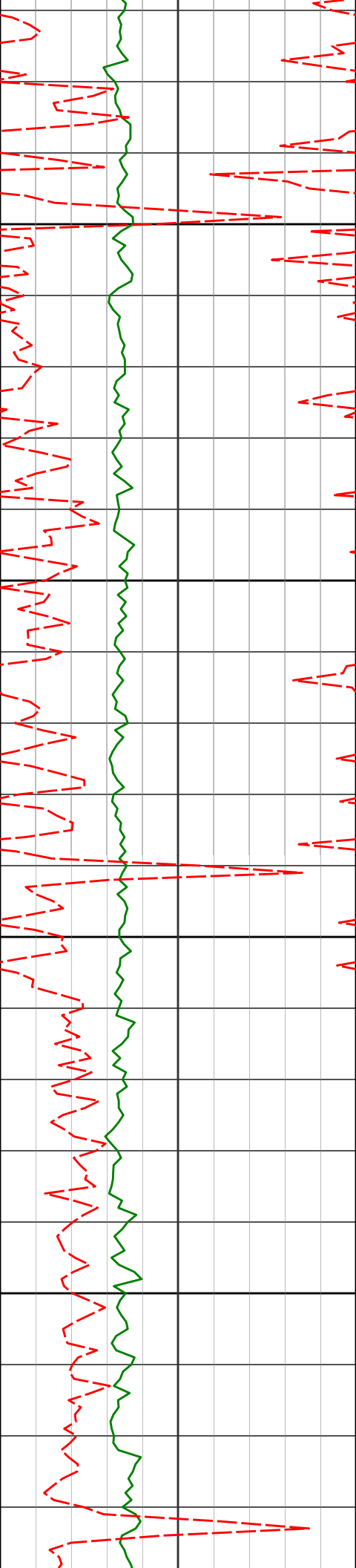
4745'

1.03°

82.74°

4730.52'

7.64'



4800

4837'

1.33°

75.28°

4822.50'

8.09'

4850

4900

4929'

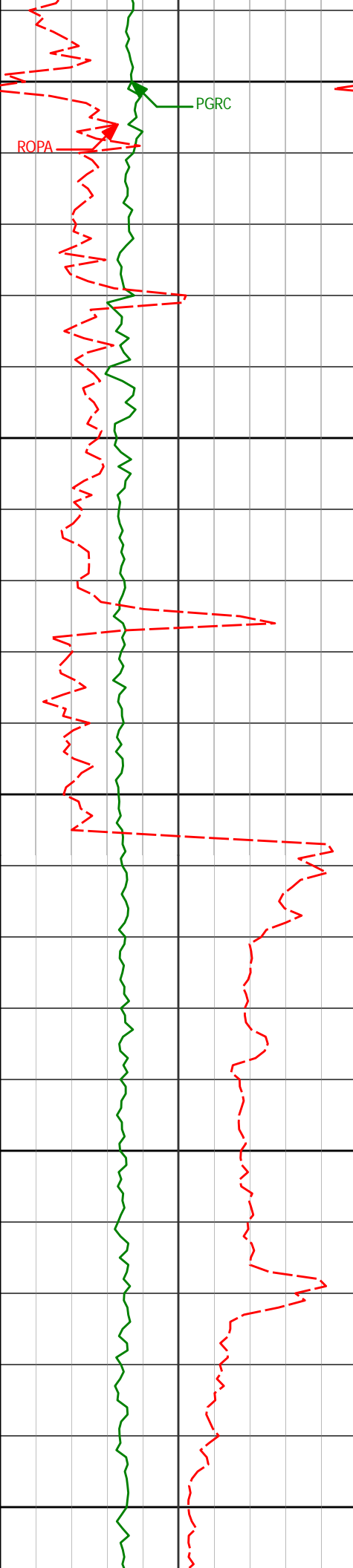
0.95°

66.28°

4914.48'

8.73'

4950



5000

PGRC

ROPA

5020'

0.72°

95.37°

5005.47'

9.02'

5050

5100

5112'

1.85°

55.83°

5097.45'

9.87'

5143'

6.84°

22.40°

5128.35'

11.90'

5150

5174'

10.80°

21.52°

5158.98'

16.37'

5200

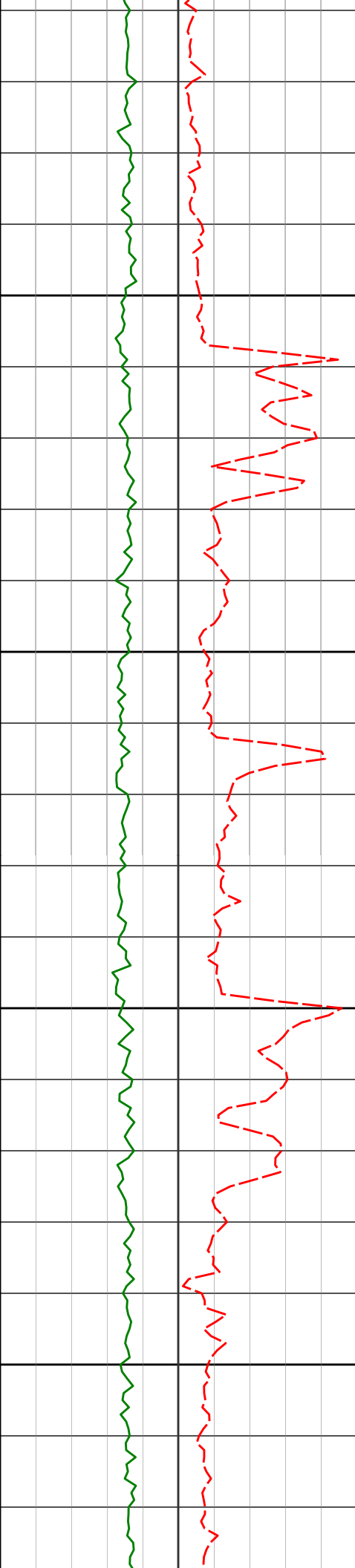
5204'

14.56°

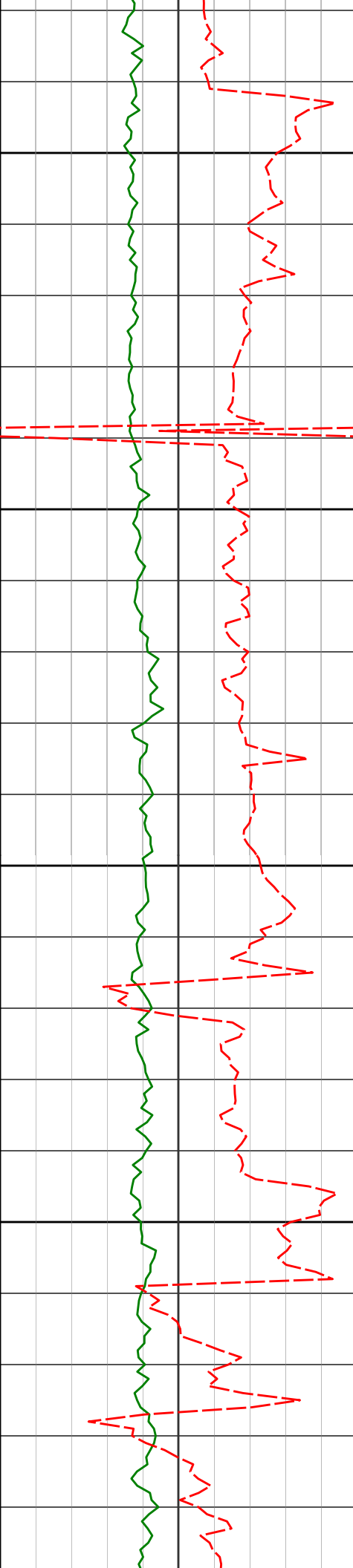
29.15°

5188.24'

22.39'



5250	5235'	21.58°	29.98°	5217.70'	30.91'
	5266'	23.54°	30.16°	5246.32'	41.42'
5300	5296'	25.99°	27.21°	5273.56'	52.66'
	5327'	31.44°	26.10°	5300.74'	66.21'
5350	5358'	34.36°	24.96°	5326.77'	81.67'
	5388'	37.12°	21.47°	5351.12'	98.02'
5400	5419'	41.73°	13.53°	5375.07'	116.98'



5450

5449'

45.80°

8.13°

5396.74'

137.48'

5479'

49.26°

3.87°

5417.00'

159.55'

5500

5510'

53.35°

357.92°

5436.39'

183.71'

5541'

55.12°

354.95°

5454.51'

208.73'

5550

5571'

55.26°

354.60°

5471.63'

233.16'

5600

5602'

56.48°

352.61°

5489.03'

258.54'

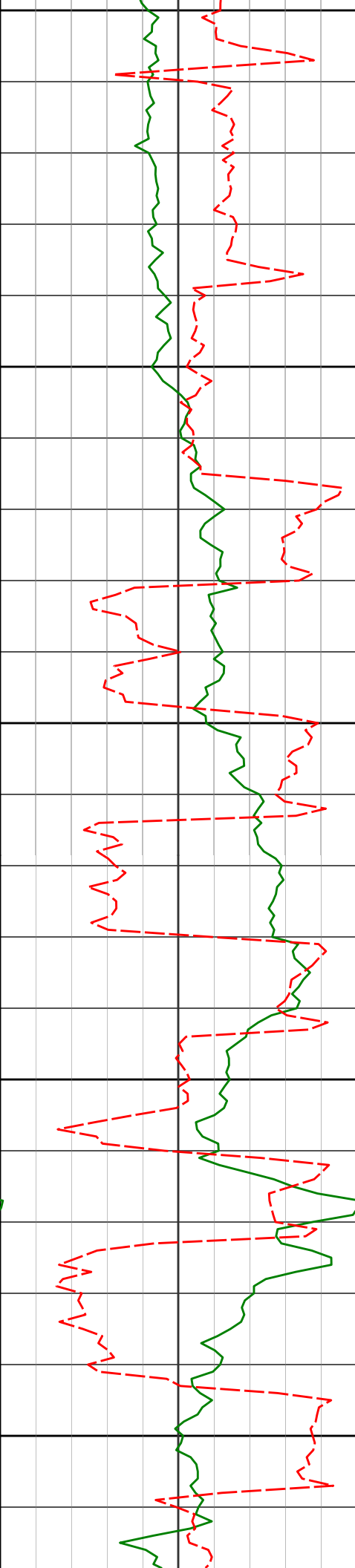
5633'

56.91°

351.79°

5506.05'

284.06'



5650

5663'

57.16°

351.20°

5522.37'

308.79'

5700

5695'

57.19°

350.92°

5539.72'

335.18'

5726'

58.87°

350.80°

5556.13'

360.97'

5750

5758'

60.70°

351.76°

5572.23'

388.13'

5789'

61.46°

352.93°

5587.23'

414.86'

5800

5821'

62.96°

353.20°

5602.15'

442.82'

5850

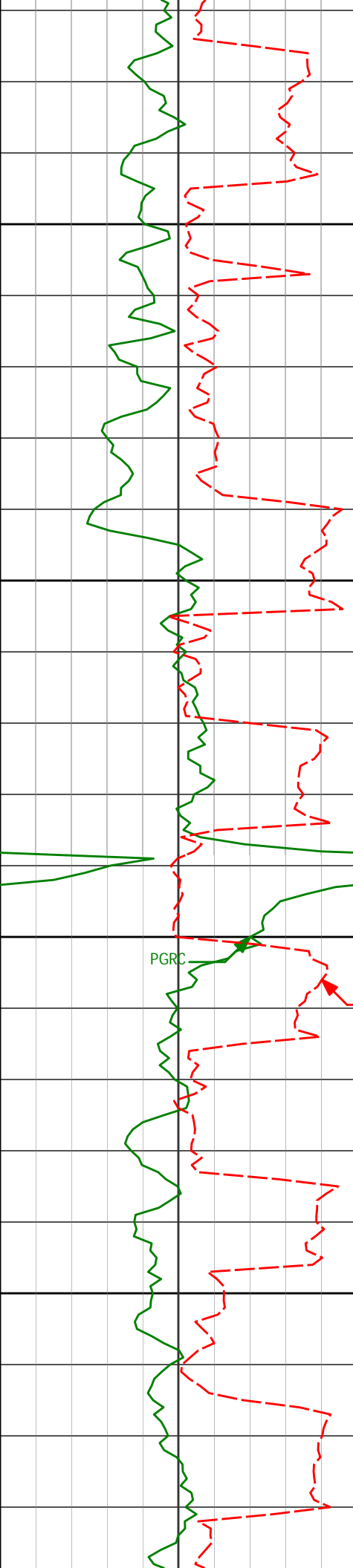
5853'

65.08°

353.32°

5616.16'

471.24'



5900

5950

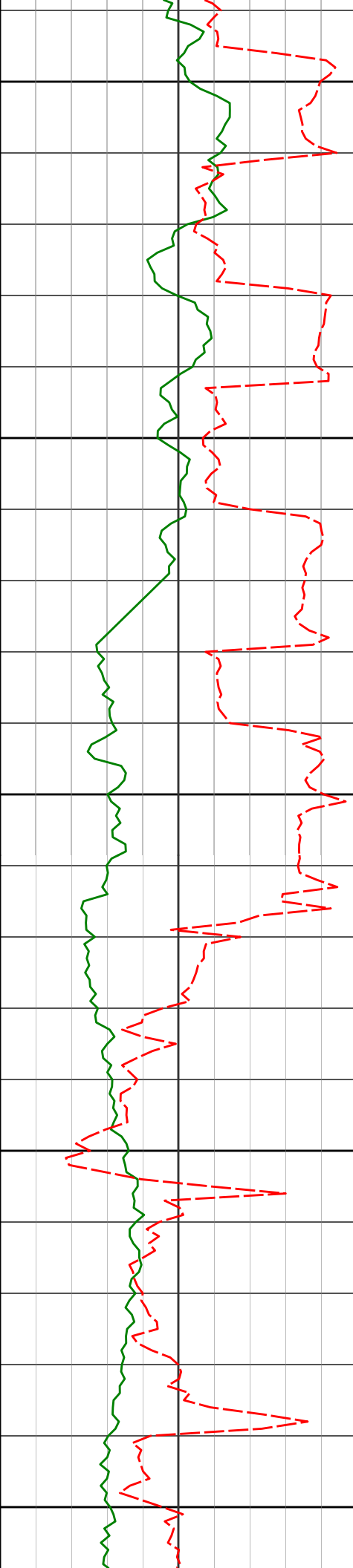
6000

6050

5884'	66.08°	355.52°	5628.98'	499.21'
5916'	66.33°	356.71°	5641.89'	528.32'
5948'	68.29°	357.33°	5654.23'	557.73'
5979'	70.22°	358.09°	5665.21'	586.63'
6011'	72.25°	358.58°	5675.51'	616.86'
6043'	74.09°	358.90°	5684.77'	647.44'
6074'	76.69°	359.42°	5692.59'	677.39'

PGRC

ROPA



6100

6106'

79.50°

359.72°

5699.19'

708.67'

6137'

81.47°

0.09°

5704.32'

739.22'

6150

6162'

83.64°

359.71°

5707.55'

763.98'

6200



Casing at 6203' MD

Run 300

6239'

87.90°

0.53°

5713.23'

840.71'

6250

6300

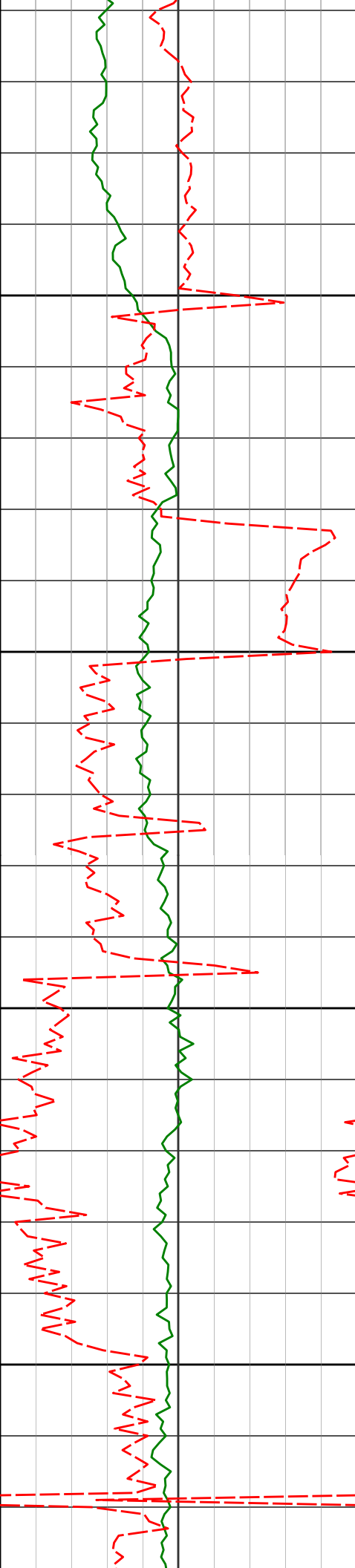
6302'

87.90°

0.09°

5715.54'

903.63'



6350

6400

6450

6500

6397'

89.43°

359.01°

5717.76'

998.51'

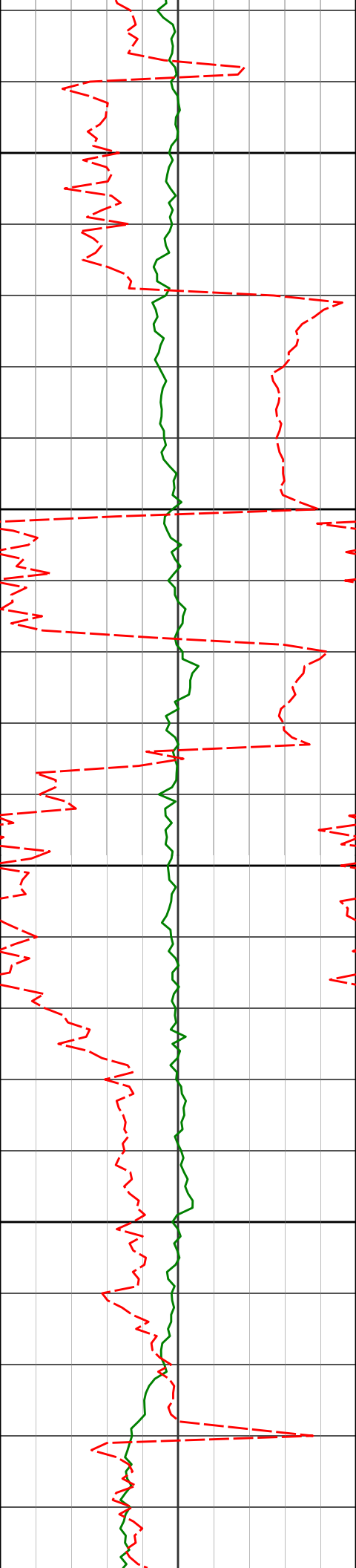
6491'

90.06°

357.03°

5718.17'

1092.26'



6550

6586'

89.97°

355.53°

5718.15'

1186.76'

6600

6650

6680'

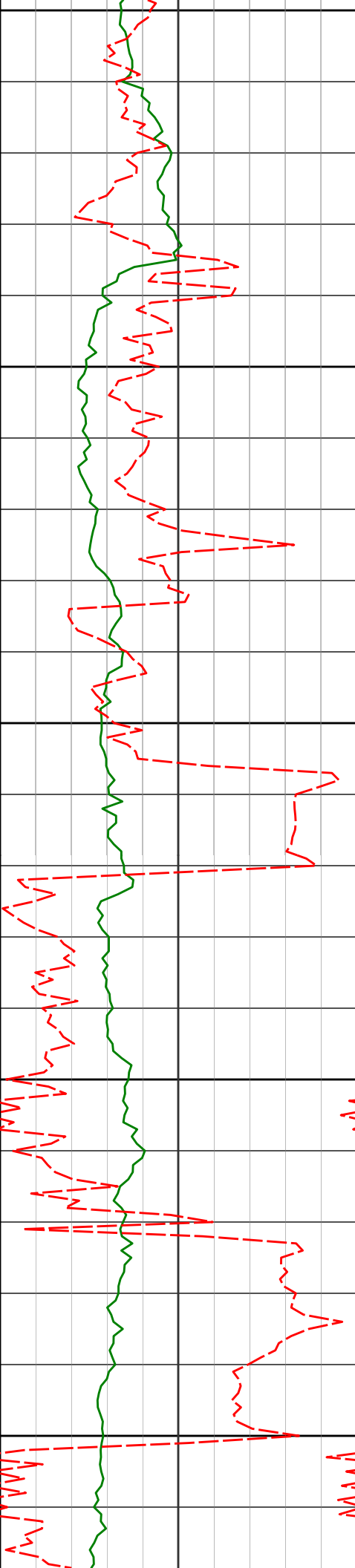
89.59°

2.50°

5718.51'

1280.56'

6700



6775'

88.64°

0.31°

5719.98'

1375.53'

6800

6850

6870'

88.79°

0.10°

5722.11'

1470.46'

6900

6950

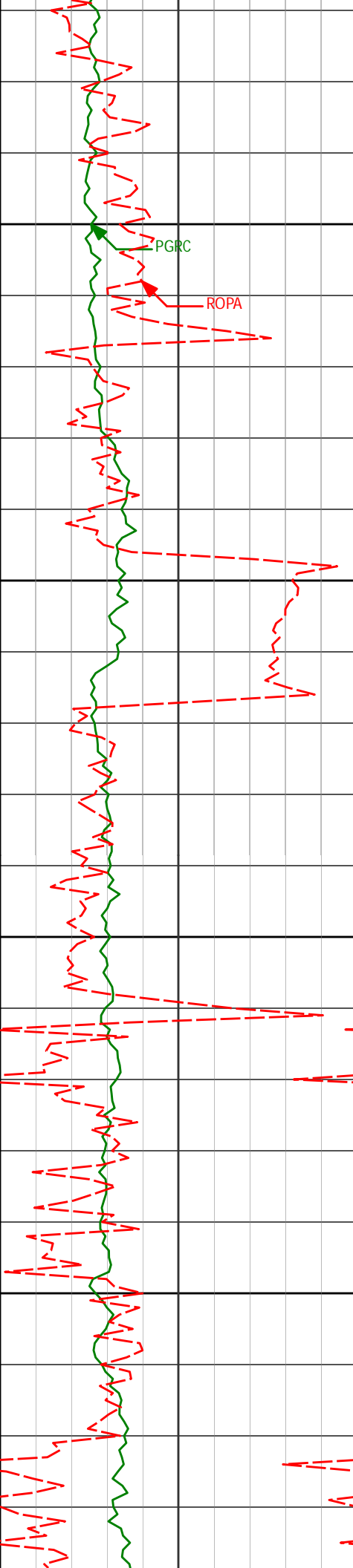
6964'

89.26°

359.99°

5723.71'

1564.38'



7000

PGRC

ROPA

7050

7059'

89.82°

0.83°

5724.47'

1659.33'

7100

7150

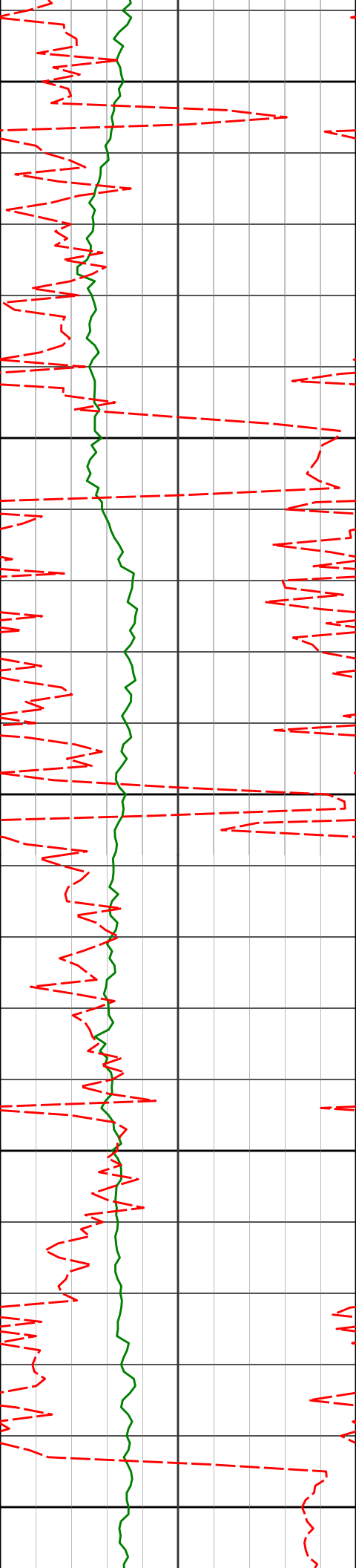
7153'

91.09°

1.23°

5723.72'

1753.31'



7200

7250

7300

7350

7400

7248'

89.96°

1.70°

5722.85'

1848.30'

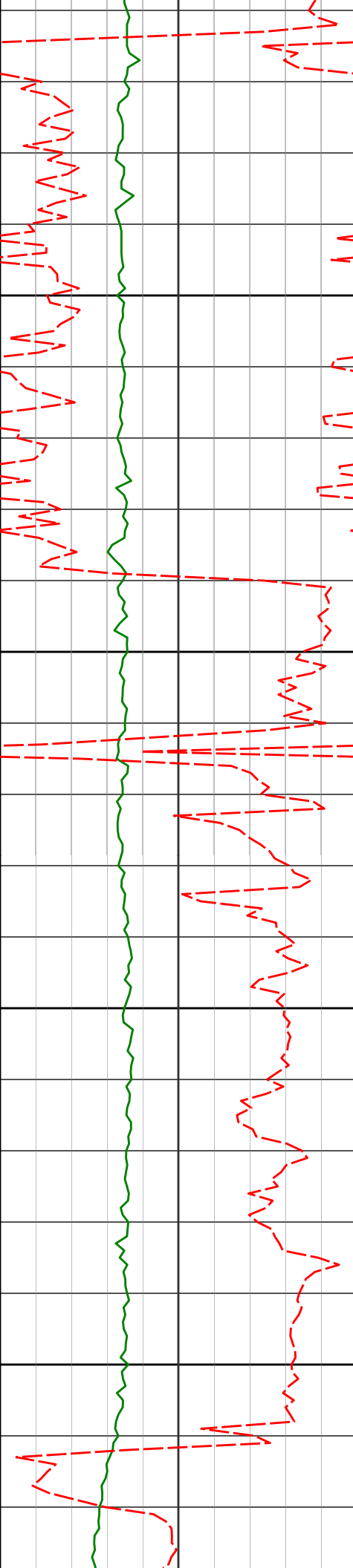
7343'

90.68°

3.05°

5722.32'

1943.29'



7438'

90.03°

2.56°

5721.73'

2038.28'

7450

7500

7533'

90.31°

3.31°

5721.45'

2133.27'

7550

7600

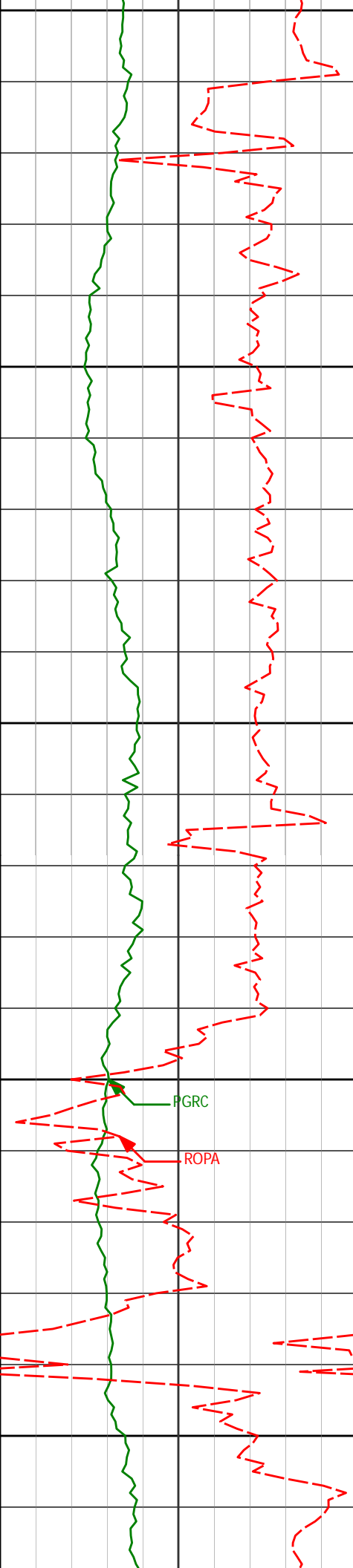
7628'

89.14°

1.03°

5721.91'

2228.26'



7850

7900

7950

8000

8050

7912'

90.96°

357.68°

5725.98'

2511.45'

8007'

89.16°

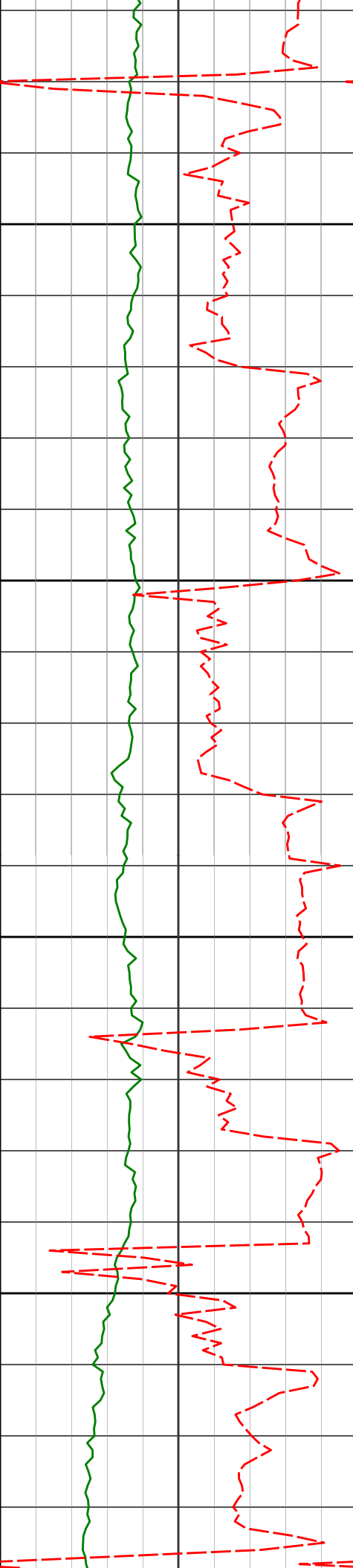
356.80°

5725.88'

2606.10'

PGRC

ROPA



8100

8102'

88.18°

353.72°

5728.09'

2700.38'

8150

8200

8197'

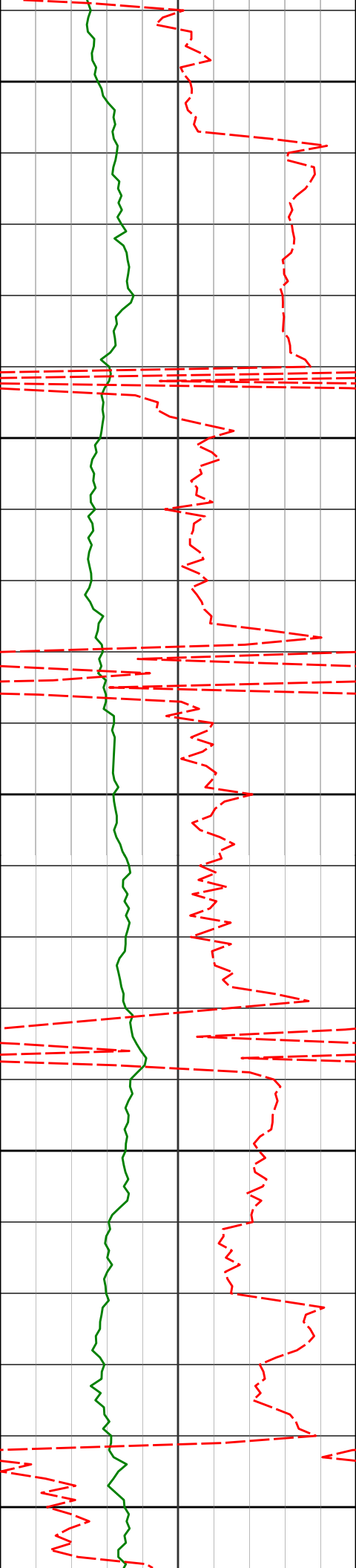
90.12°

352.02°

5729.50'

2794.12'

8250



8292'

91.39°

355.67°

5728.25'

2888.10'

8300

8350

8386'

92.28°

359.54°

5725.23'

2981.74'

8400

8450

8481'

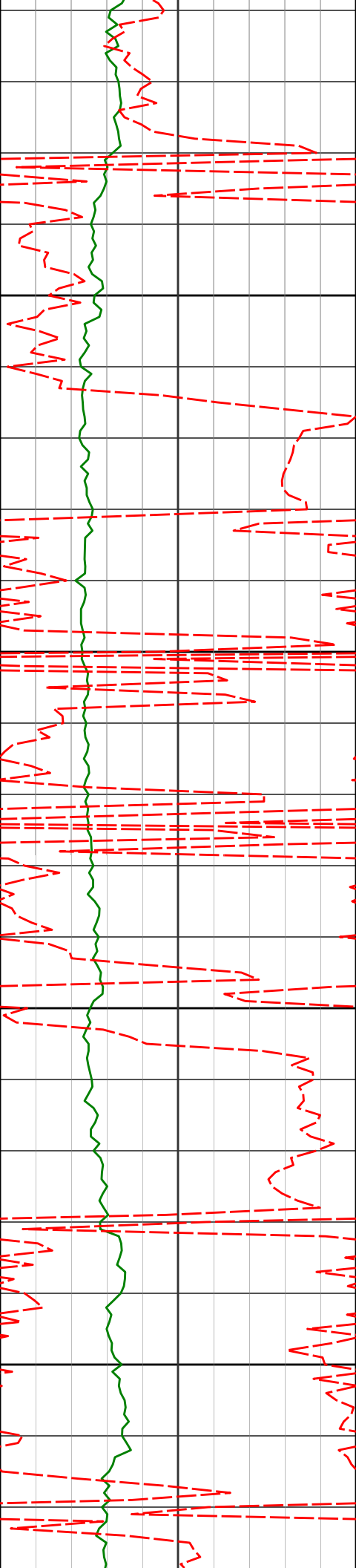
92.10°

0.20°

5721.60'

3076.59'

8500



8550

8576'

91.01°

0.06°

5719.03'

3171.50'

8600

8650

8670'

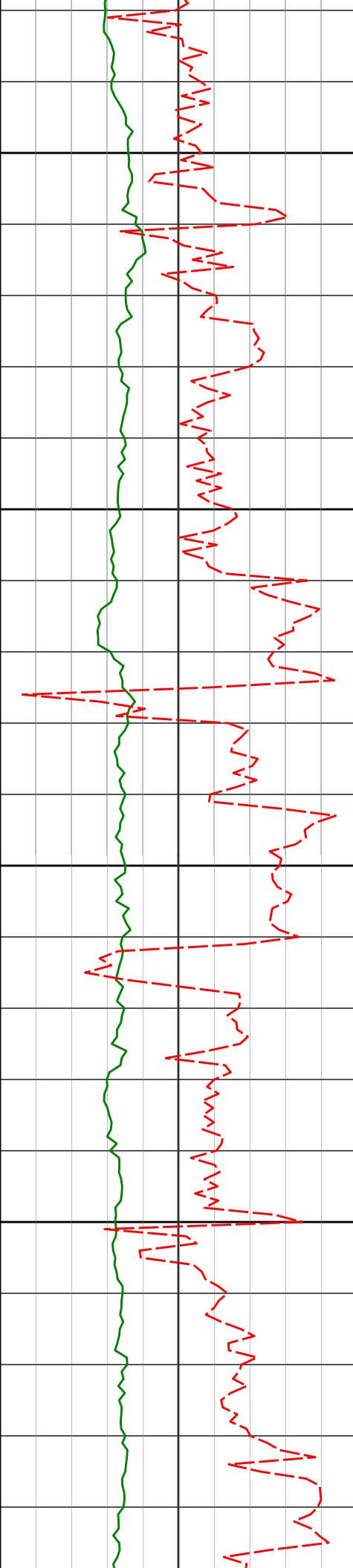
89.66°

0.71°

5718.48'

3265.45'

8700



8750

8763'

88.21°

0.49°

5720.21'

3358.40'

8800

8850

8853'

89.10°

2.40°

5722.32'

3448.36'

8900

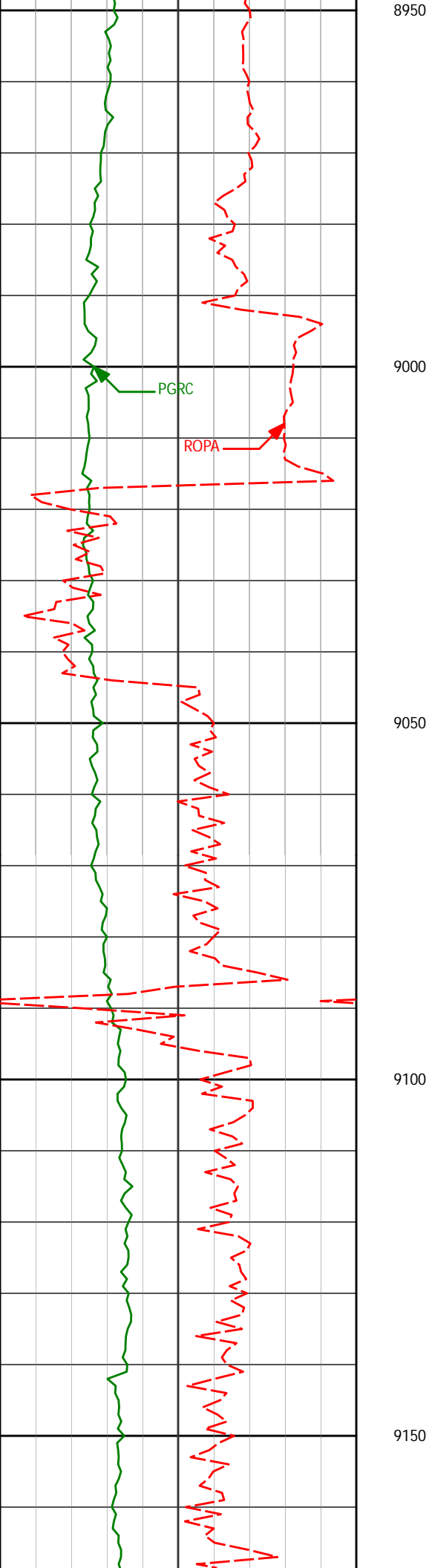
8945'

90.96°

5.24°

5722.27'

3540.31'



9037'

89.32°

3.03°

5722.04'

3632.24'

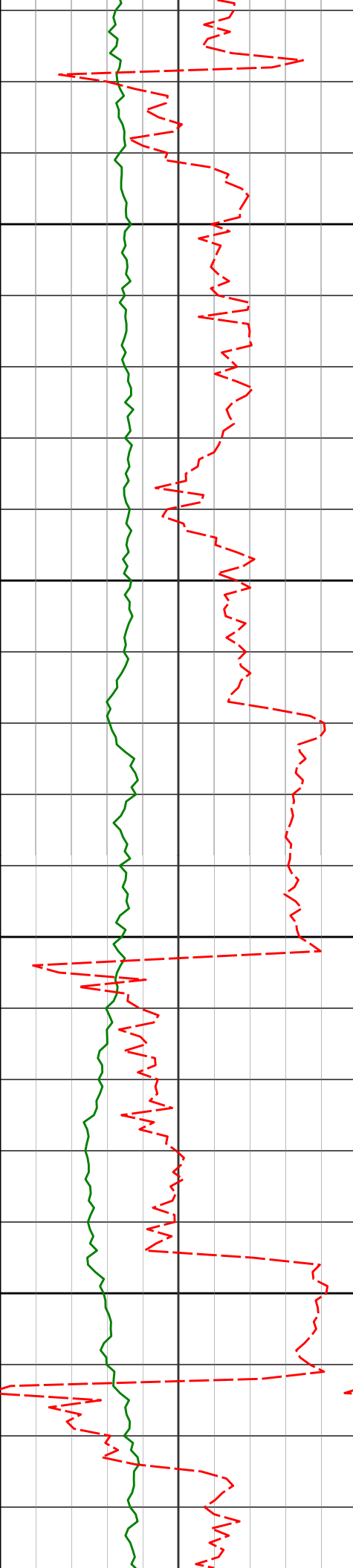
9129'

89.43°

2.01°

5723.05'

3724.23'



9200

9221'

90.28°

5.97°

5723.28'

3816.17'

9250

9300

9312'

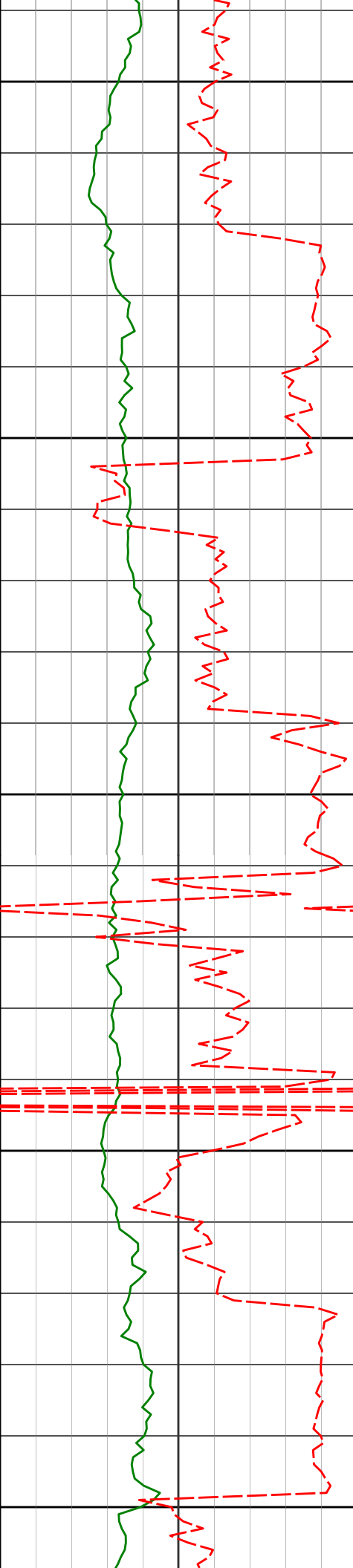
88.40°

3.76°

5724.33'

3907.05'

9350



9400

9404'

88.30°

2.49°

5726.98'

3999.00'

9450

9500

9496'

87.44°

359.73°

5730.40'

4090.91'

9550

9588'

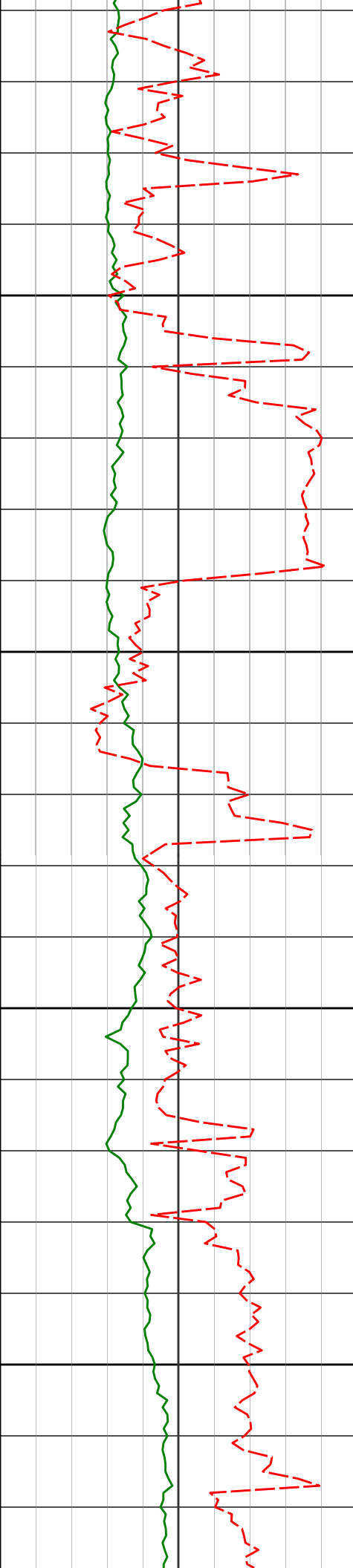
88.21°

357.92°

5733.89'

4182.68'

9600



9650

9700

9750

9800

9679'

89.60°

357.38°

5735.63'

4273.38'

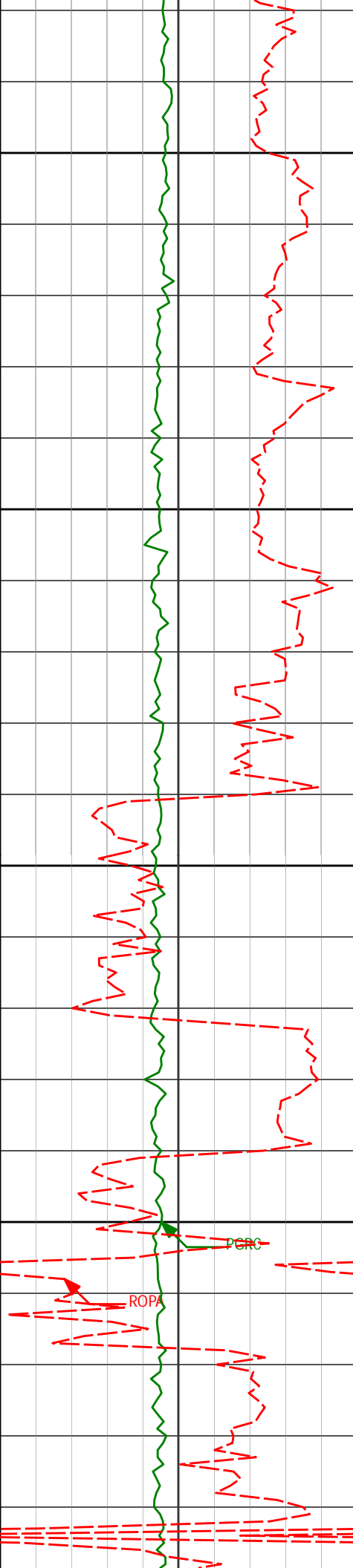
9771'

89.57°

356.80°

5736.30'

4365.02'



Run 400

9850

9900

9950

10000

9863'

88.61°

355.56°

5737.76'

4456.51'

9954'

90.31°

357.16°

5738.62'

4547.04'

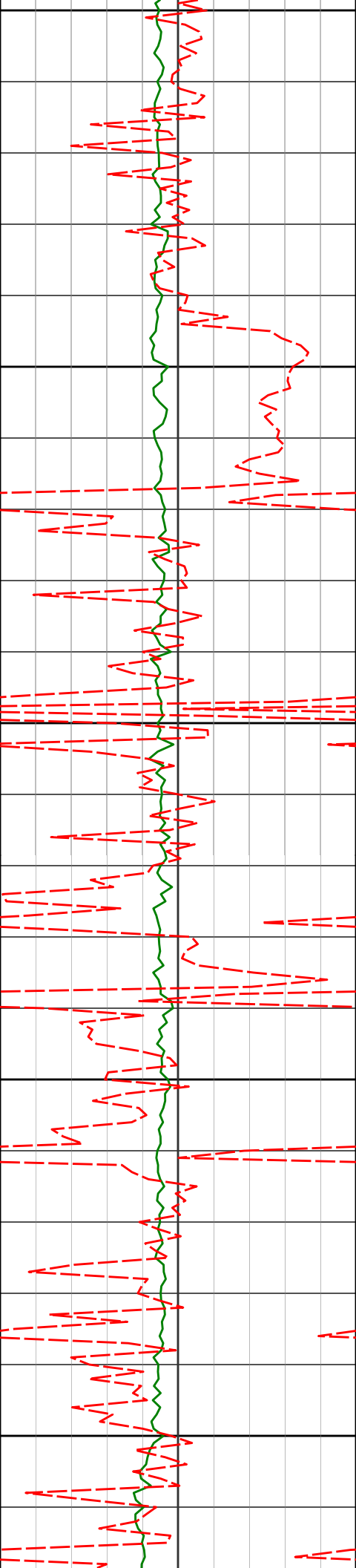
10046'

90.12°

358.59°

5738.27'

4638.78'



10050

10100

10150

10200

10250

10138'

90.99°

0.29°

5737.38'

4730.67'

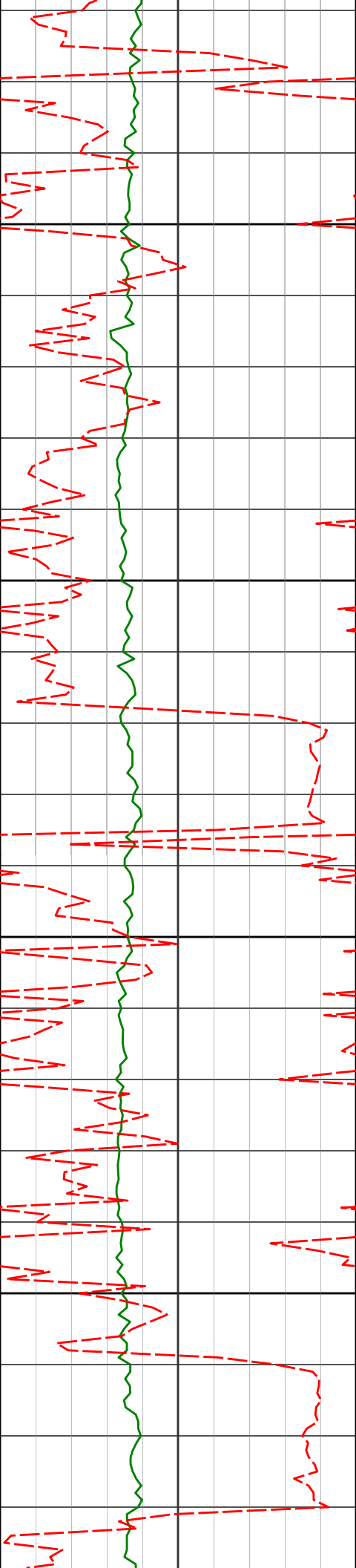
10229'

91.02°

359.68°

5735.78'

4821.59'



10300

10320'

90.37°

359.06°

5734.68'

4912.48'

10350

10400

10410'

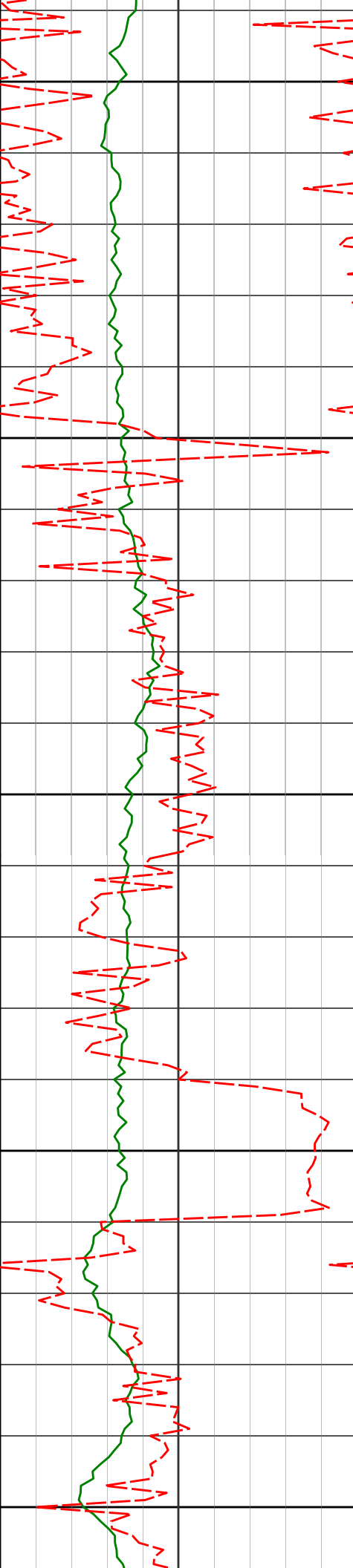
88.24°

359.15°

5735.77'

5002.34'

10450



10500

10502'

90.68°

0.80°

5736.64'

5094.26'

10550

10592'

90.12°

0.58°

5736.01'

5184.23'

10600

10650

10684'

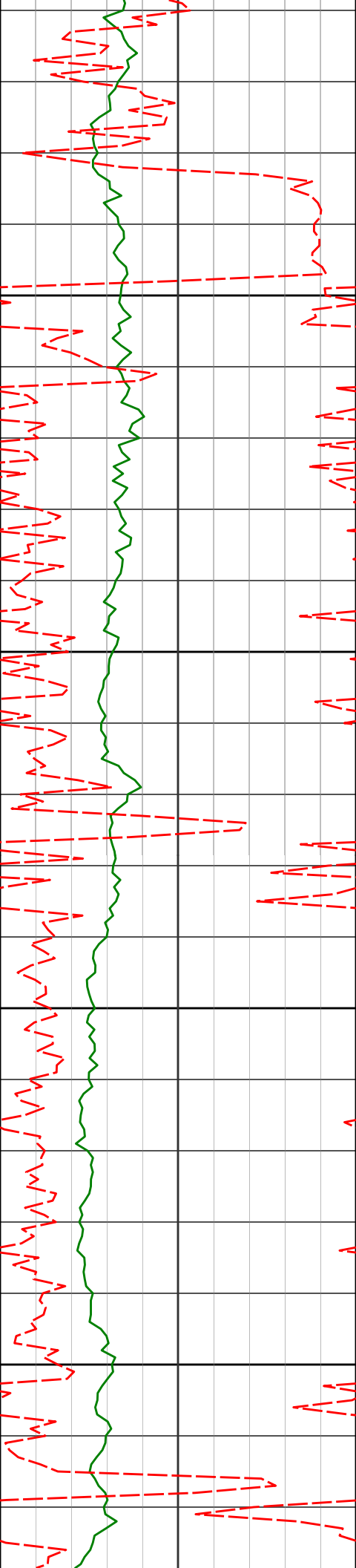
91.97°

0.65°

5734.33'

5276.18'

10700



10750

10775'

90.59°

1.30°

5732.30'

5367.13'

10800

10850

10867'

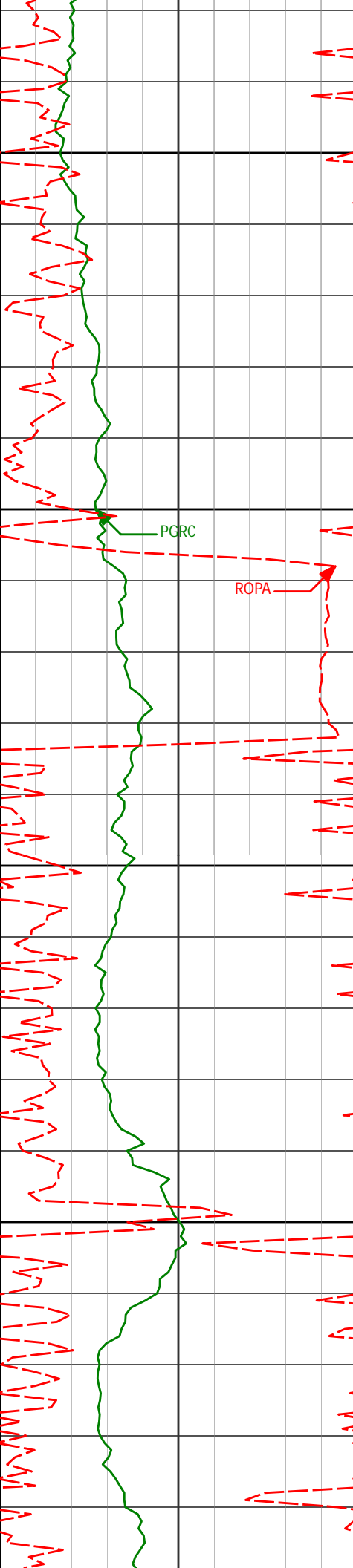
90.25°

0.20°

5731.62'

5459.10'

10900



10950

10958'

90.61°

358.73°

5730.94'

5550.00'

11000

PGRC

ROPA

11050

11049'

88.73°

1.06°

5731.41'

5640.92'

11100

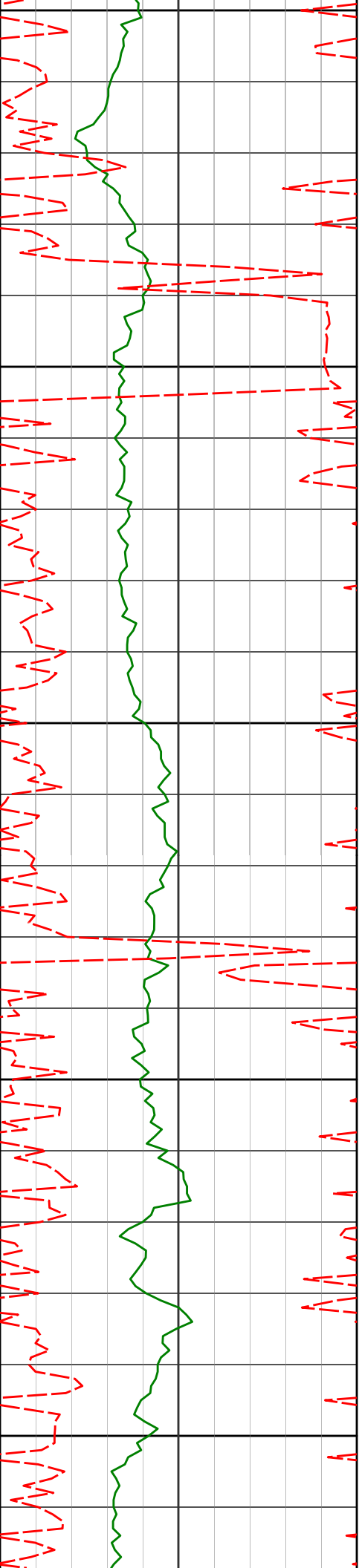
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89.54°

0.83°

5732.85'

5732.88'



11150

11200

11232'

88.12°

0.77°

5734.71'

5823.84'

11250

11300

11323'

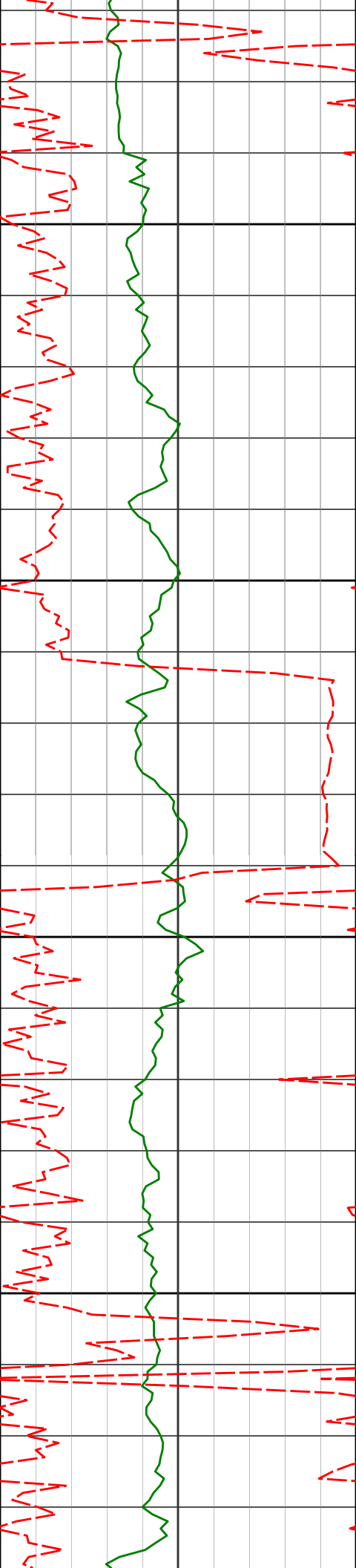
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0.43°

5737.58'

5914.76'

11350



11400

11413'

86.91°

359.10°

5741.36'

6004.60'

11450

11500

11504'

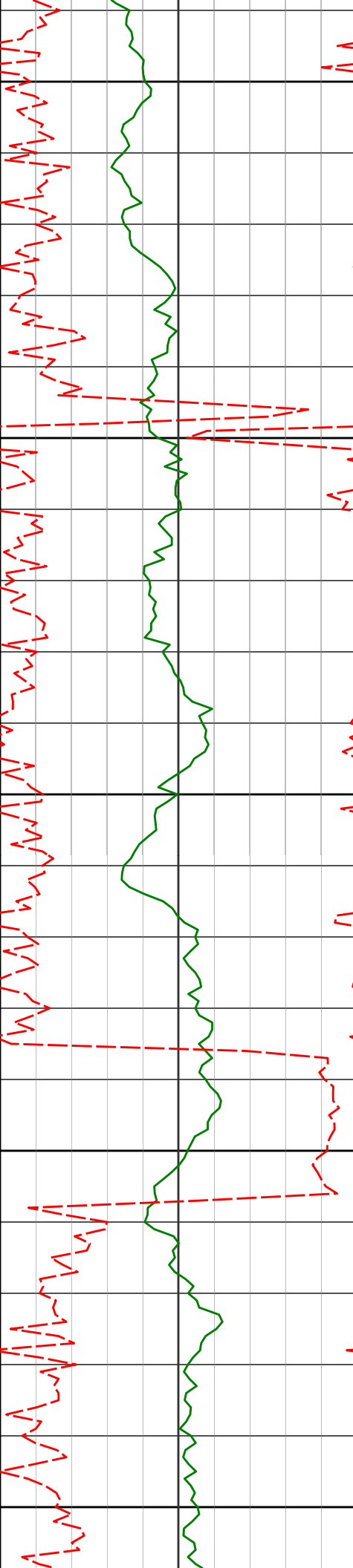
89.85°

1.13°

5743.94'

6095.49'

11550



11600

11650

11700

11750

11800

11596'

89.79°

0.40°

5744.23'

6187.46'

11687'

90.65°

359.84°

5743.88'

6278.40'

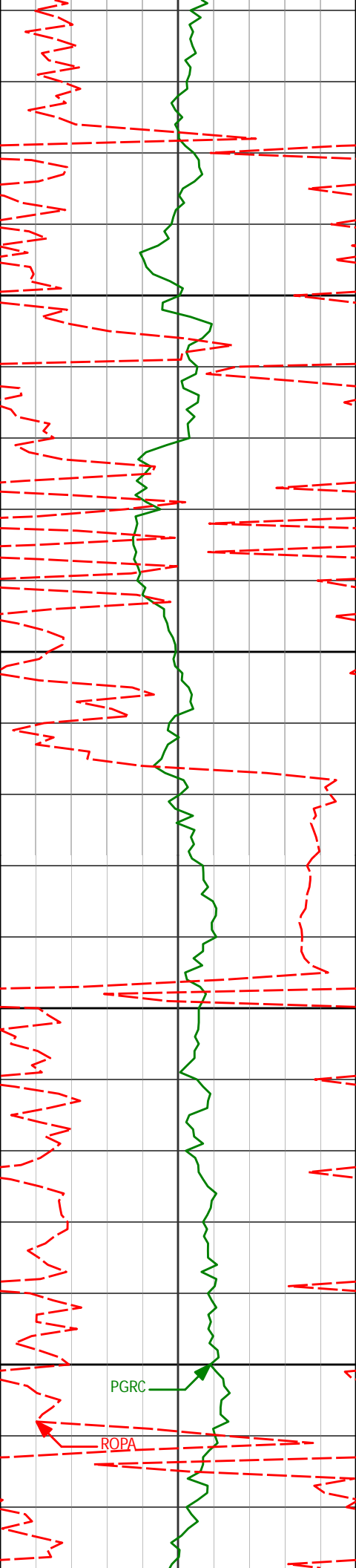
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89.11°

1.46°

5744.07'

6369.37'



11850

11870'

86.49°

359.94°

5747.60'

6461.26'

11900

11950

11961'

88.68°

3.15°

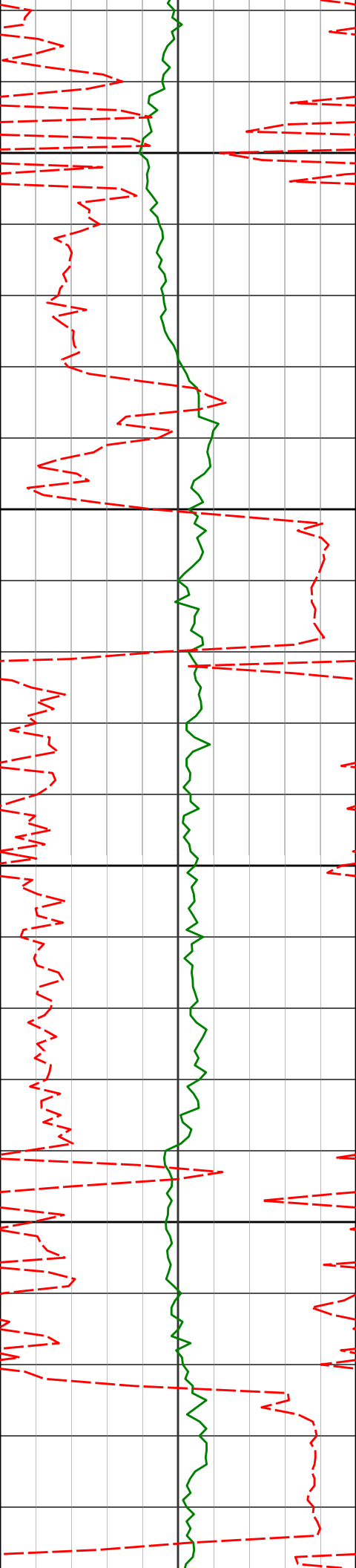
5751.43'

6552.16'

12000

PGRC

ROPA



12050

12053'

87.66°

2.12°

5754.37'

6644.10'

12100

12150

12145'

88.36°

3.02°

5757.57'

6736.04'

12200

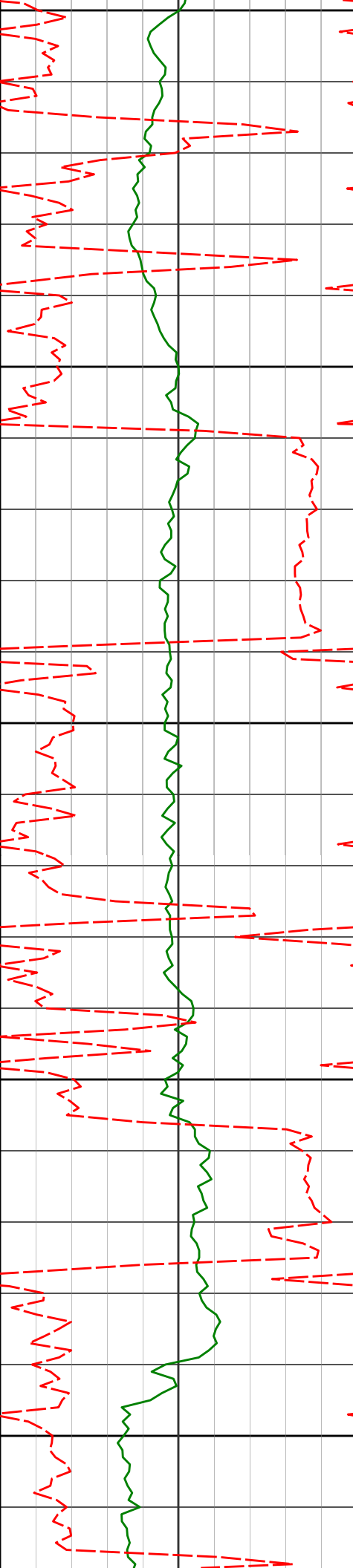
12236'

90.12°

3.01°

5758.77'

6827.02'



12250

12300

12350

12400

12450

12327'

90.03°

1.29°

5758.65'

6918.02'

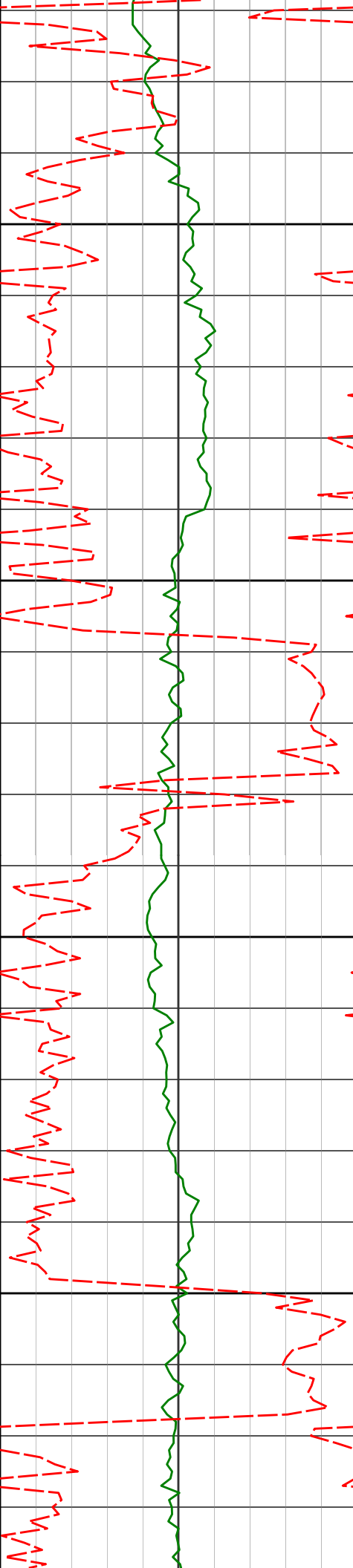
12419'

88.89°

358.85°

5759.52'

7009.95'



12500

12510'

87.50°

357.43°

5762.39'

7100.68'

12550

12600

12601'

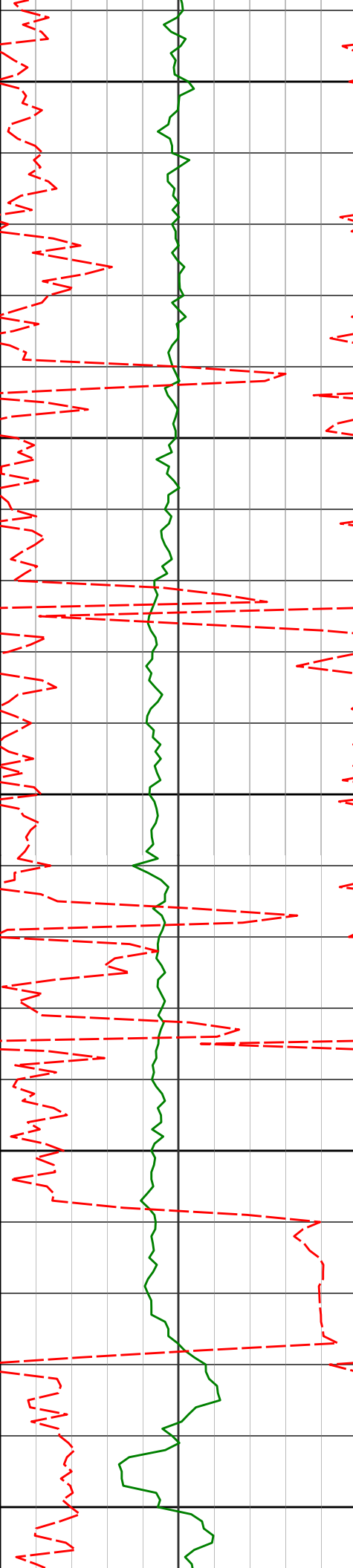
87.96°

358.19°

5765.99'

7191.34'

12650



12700

12750

12800

12850

12900

12693'

88.65°

358.77°

5768.71'

7283.11'

12785'

88.74°

359.51°

5770.81'

7374.96'

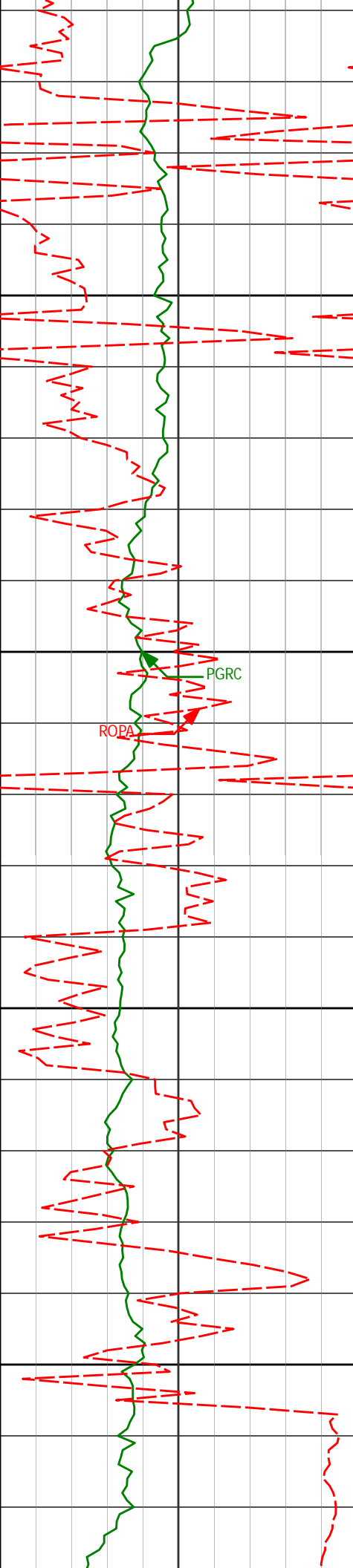
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89.61°

359.31°

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7465.85'



12950

12967'

90.37°

358.08°

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7556.68'

13000

PGRC

ROPA

13050

13060'

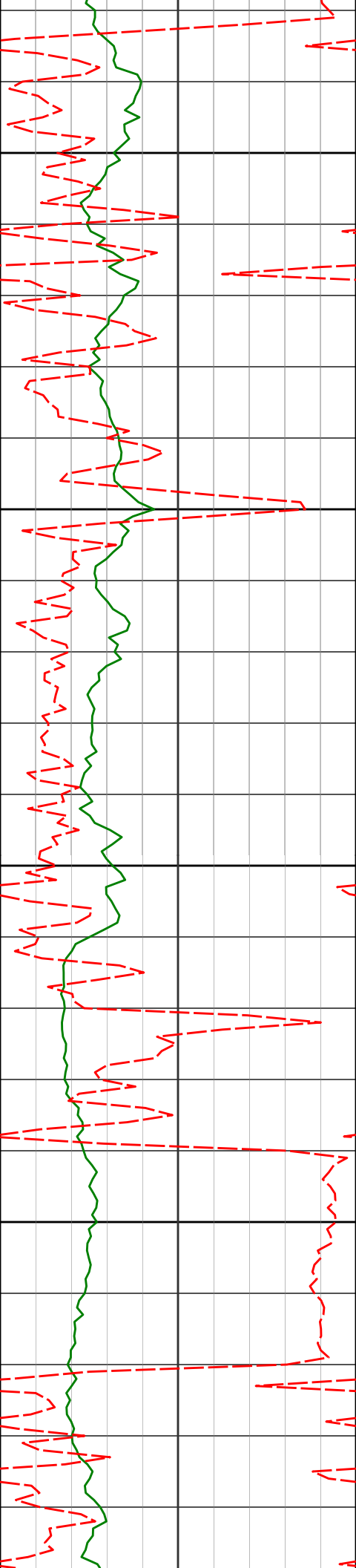
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357.89°

5771.17'

7649.43'

13100



13150

13151'

90.92°

0.17°

5769.79'

7740.28'

13200

13243'

91.79°

359.25°

5767.61'

7832.17'

13250

13300

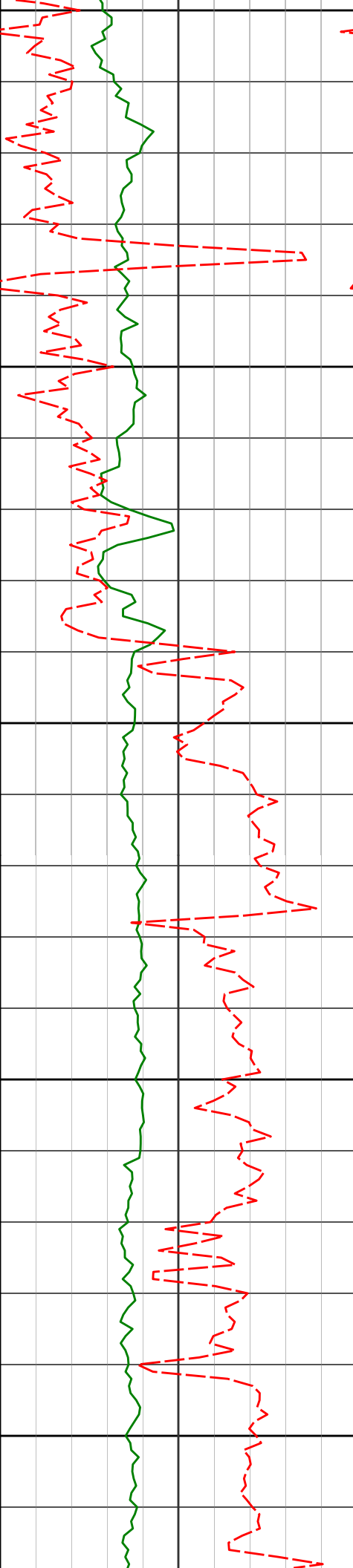
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90.03°

1.62°

5766.15'

7924.11'



13350

13400

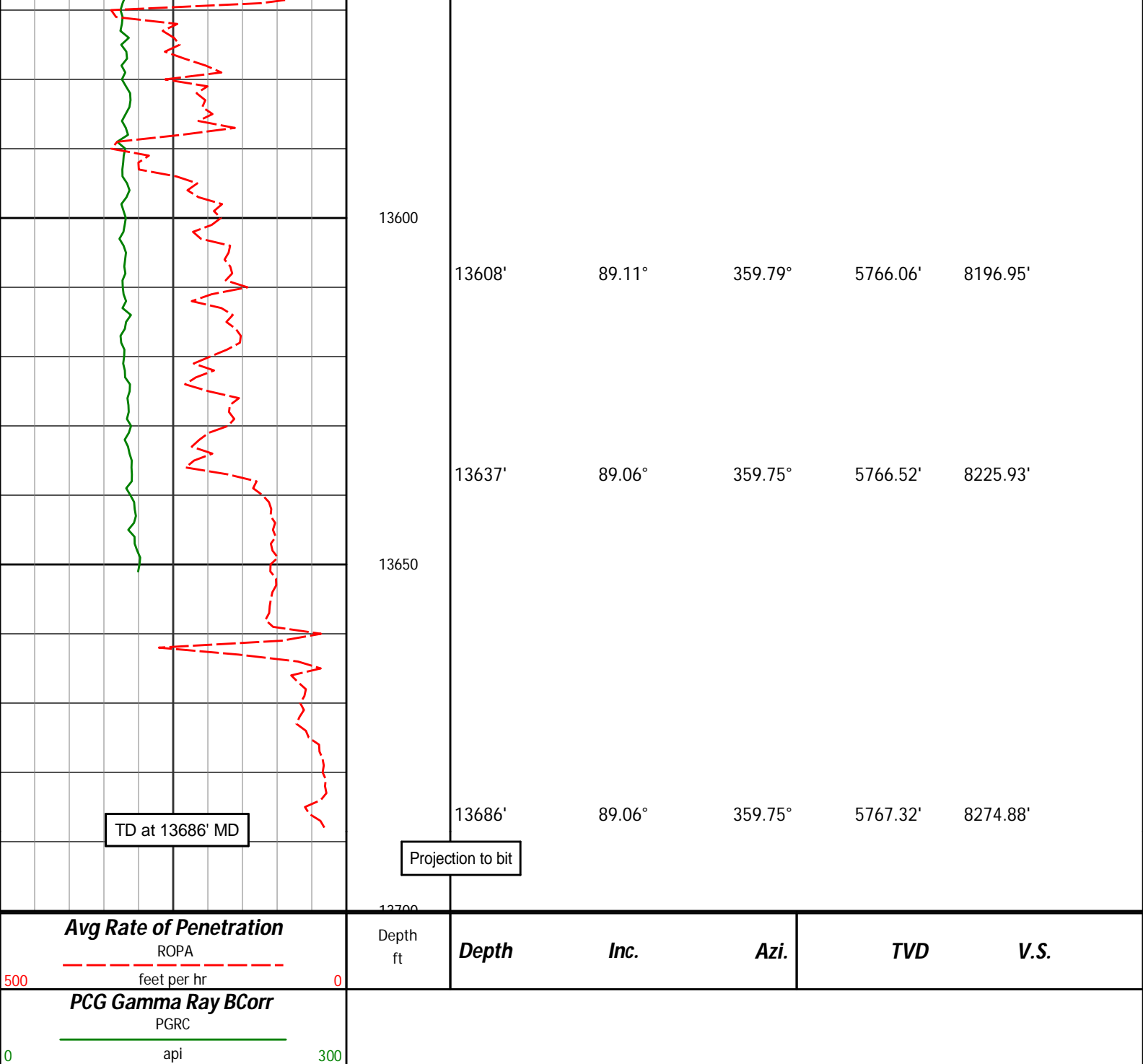
13450

13500

13550

13426'	90.55°	0.33°	5765.69'	8015.09'
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13517'	89.94°	359.91°	5765.30'	8106.03'
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HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 27J-2212B
Redtail
Weld Colorado
USA
CA-XX-0901566507
Surveys are Sag, IFR and MS corrected.

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
177.00	0.58	233.78	177.00	0.53 S	0.72 W	-0.56	0.33
268.00	0.62	228.85	267.99	1.13 S	1.47 W	-1.18	0.07

359.00	0.80	234.60	358.98	1.82 S	2.35 W	-1.90	0.21
451.00	0.82	246.47	450.98	2.45 S	3.48 W	-2.58	0.18
544.00	0.78	240.92	543.97	3.03 S	4.64 W	-3.20	0.09
635.00	0.87	239.70	634.96	3.68 S	5.78 W	-3.89	0.10
727.00	0.97	179.93	726.95	4.81 S	6.38 W	-5.04	1.00
819.00	2.21	164.18	818.91	7.29 S	5.90 W	-7.51	1.42
911.00	2.37	135.72	910.84	10.36 S	4.09 W	-10.51	1.23
1003.00	3.83	116.52	1002.71	13.09 S	0.01 W	-13.09	1.93
1094.00	5.73	106.19	1093.39	15.72 S	7.07 E	-15.44	2.28
1186.00	6.18	93.77	1184.89	17.32 S	16.43 E	-16.70	1.48
1278.00	4.95	86.79	1276.46	17.43 S	25.33 E	-16.47	1.52
1369.00	5.36	89.25	1367.09	17.15 S	33.50 E	-15.89	0.51
1461.00	5.43	81.68	1458.68	16.47 S	42.10 E	-14.88	0.78
1552.00	5.02	78.44	1549.31	15.05 S	50.26 E	-13.16	0.55
1583.00	4.94	71.33	1580.19	14.35 S	52.86 E	-12.36	2.01
1635.00	5.37	78.93	1631.98	13.16 S	57.37 E	-11.01	1.55
1726.00	4.88	72.09	1722.62	11.15 S	65.23 E	-8.71	0.86
1817.00	4.71	63.10	1813.30	8.27 S	72.24 E	-5.57	0.85
1909.00	4.81	61.02	1904.98	4.70 S	78.99 E	-1.74	0.22
2000.00	4.63	54.52	1995.67	0.72 S	85.32 E	2.47	0.62
2092.00	6.12	97.85	2087.30	0.77 N	93.20 E	4.25	4.56
2183.00	5.37	97.95	2177.85	0.48 S	102.22 E	3.34	0.82
2275.00	5.29	98.88	2269.45	1.73 S	110.68 E	2.40	0.13
2366.00	4.75	100.91	2360.10	3.09 S	118.52 E	1.34	0.62
2458.00	4.75	104.90	2451.78	4.79 S	125.94 E	-0.09	0.36
2549.00	5.33	100.81	2542.43	6.55 S	133.74 E	-1.56	0.75
2641.00	5.56	83.04	2634.02	6.82 S	142.36 E	-1.49	1.84
2732.00	5.22	78.55	2724.62	5.46 S	150.79 E	0.18	0.60
2823.00	4.61	79.72	2815.28	3.99 S	158.45 E	1.93	0.68
2915.00	5.35	79.04	2906.94	2.51 S	166.30 E	3.70	0.81
3007.00	4.79	70.91	2998.58	0.44 S	174.14 E	6.06	0.99
3098.00	4.21	64.30	3089.30	2.25 N	180.74 E	9.00	0.85
3189.00	4.41	94.50	3180.05	3.43 N	187.24 E	10.42	2.47
3281.00	6.30	96.71	3271.65	2.56 N	195.78 E	9.87	2.07
3373.00	6.53	97.20	3363.07	1.31 N	205.98 E	9.01	0.26
3465.00	6.66	96.87	3454.46	0.02 N	216.47 E	8.10	0.15
3556.00	7.26	97.49	3544.79	1.36 S	227.41 E	7.13	0.66
3648.00	5.75	88.57	3636.20	2.00 S	237.78 E	6.88	1.97
3739.00	5.59	90.68	3726.75	1.94 S	246.77 E	7.27	0.29
3830.00	5.03	94.18	3817.36	2.29 S	255.18 E	7.25	0.71
3922.00	4.92	95.03	3909.02	2.92 S	263.13 E	6.90	0.14
4013.00	5.40	95.86	3999.65	3.70 S	271.28 E	6.43	0.53
4105.00	5.37	95.42	4091.24	4.55 S	279.87 E	5.90	0.06
4196.00	4.91	93.48	4181.87	5.19 S	287.99 E	5.57	0.54
4287.00	3.29	78.80	4272.64	4.92 S	294.44 E	6.08	2.11
4378.00	0.95	80.79	4363.57	4.29 S	297.75 E	6.83	2.57
4470.00	0.88	93.67	4455.56	4.22 S	299.21 E	6.96	0.24
4563.00	0.80	73.30	4548.55	4.07 S	300.54 E	7.15	0.33
4653.00	1.27	87.82	4638.54	3.86 S	302.14 E	7.43	0.59
4745.00	1.03	82.74	4730.52	3.71 S	303.98 E	7.64	0.28
4837.00	1.33	75.28	4822.50	3.34 S	305.83 E	8.09	0.37
4929.00	0.95	66.28	4914.48	2.76 S	307.56 E	8.73	0.46
5020.00	0.72	95.37	5005.47	2.51 S	308.82 E	9.02	0.52
5112.00	1.85	55.83	5097.45	1.73 S	310.63 E	9.87	1.49
5143.00	6.84	22.40	5128.35	0.26 N	311.75 E	11.90	17.40
5174.00	10.80	21.52	5158.98	4.67 N	313.52 E	16.37	12.78
5204.00	14.56	29.15	5188.24	10.58 N	316.38 E	22.39	13.69
5235.00	21.58	29.98	5217.70	18.93 N	321.14 E	30.91	22.66
5266.00	23.54	30.16	5246.32	29.22 N	327.10 E	41.42	6.33
5296.00	25.99	27.21	5273.56	40.25 N	333.11 E	52.66	9.14
5327.00	31.44	26.10	5300.74	53.56 N	339.78 E	66.21	17.66
5358.00	34.36	24.96	5326.77	68.76 N	347.03 E	81.67	9.63
5388.00	37.12	21.47	5351.12	84.86 N	353.92 E	98.02	11.43
5419.00	41.73	13.53	5375.07	103.62 N	359.76 E	116.98	22.02
5449.00	45.80	8.13	5396.74	123.99 N	363.62 E	137.48	18.40
5479.00	49.26	3.87	5417.00	145.99 N	365.91 E	159.55	15.58
5510.00	53.35	357.92	5436.39	170.15 N	366.25 E	183.71	19.95
5541.00	55.12	354.95	5454.51	195.25 N	364.68 E	208.73	9.64
5571.00	55.26	354.60	5471.63	219.78 N	362.44 E	233.16	1.07
5602.00	56.48	352.61	5489.03	245.28 N	359.58 E	258.54	6.61
5633.00	56.91	351.79	5506.05	270.95 N	356.06 E	284.06	2.61
5663.00	57.16	351.20	5522.37	295.84 N	352.34 E	308.79	1.85
5695.00	57.19	350.92	5539.72	322.41 N	348.16 E	335.18	0.74
5726.00	58.87	350.80	5556.13	348.37 N	343.98 E	360.97	5.43
5758.00	60.70	351.76	5572.23	375.70 N	339.79 E	388.13	6.28

5738.00	60.78	351.78	5572.23	315.78 N	333.73 E	338.13	0.28
5789.00	61.46	352.93	5587.23	402.59 N	336.18 E	414.86	4.11
5821.00	62.96	353.20	5602.15	430.69 N	332.76 E	442.82	4.75
5853.00	65.08	353.32	5616.16	459.26 N	329.39 E	471.24	6.63
5884.00	66.08	355.52	5628.98	487.35 N	326.64 E	499.21	7.22
5916.00	66.33	356.71	5641.89	516.56 N	324.66 E	528.32	3.49
5948.00	68.29	357.33	5654.23	546.04 N	323.13 E	557.73	6.38
5979.00	70.22	358.09	5665.21	575.01 N	321.97 E	586.63	6.63
6011.00	72.25	358.58	5675.51	605.29 N	321.09 E	616.86	6.51
6043.00	74.09	358.90	5684.77	635.91 N	320.42 E	647.44	5.83
6074.00	76.69	359.42	5692.59	665.91 N	319.98 E	677.39	8.54
6106.00	79.50	359.72	5699.19	697.21 N	319.74 E	708.67	8.83
6137.00	81.47	0.09	5704.32	727.79 N	319.69 E	739.22	6.46
6162.00	83.64	359.71	5707.55	752.57 N	319.65 E	763.98	8.81
6239.00	87.90	0.53	5713.23	829.34 N	319.81 E	840.71	5.63
6302.00	87.90	0.09	5715.54	892.30 N	320.15 E	903.63	0.70
6397.00	89.43	359.01	5717.76	987.27 N	319.41 E	998.51	1.97
6491.00	90.06	357.03	5718.17	1081.21 N	316.16 E	1092.26	2.21
6586.00	89.97	355.53	5718.15	1176.00 N	310.00 E	1186.76	1.58
6680.00	89.59	2.50	5718.51	1269.93 N	308.38 E	1280.56	7.43
6775.00	88.64	0.31	5719.98	1364.88 N	310.71 E	1375.53	2.51
6870.00	88.79	0.10	5722.11	1459.86 N	311.05 E	1470.46	0.27
6964.00	89.26	359.99	5723.71	1553.85 N	311.12 E	1564.38	0.51
7059.00	89.82	0.83	5724.47	1648.84 N	311.80 E	1659.33	1.06
7153.00	91.09	1.23	5723.72	1742.82 N	313.49 E	1753.31	1.42
7248.00	89.96	1.70	5722.85	1837.78 N	315.92 E	1848.30	1.29
7343.00	90.68	3.05	5722.32	1932.70 N	319.86 E	1943.29	1.61
7438.00	90.03	2.56	5721.73	2027.58 N	324.51 E	2038.28	0.86
7533.00	90.31	3.31	5721.45	2122.45 N	329.37 E	2133.27	0.84
7628.00	89.14	1.03	5721.91	2217.38 N	332.97 E	2228.26	2.70
7723.00	88.45	358.09	5723.91	2312.34 N	332.24 E	2323.14	3.18
7817.00	89.03	356.87	5725.97	2406.23 N	328.11 E	2416.80	1.44
7912.00	90.96	357.68	5725.98	2501.11 N	323.59 E	2511.45	2.20
8007.00	89.16	356.80	5725.88	2596.00 N	319.02 E	2606.10	2.11
8102.00	88.18	353.72	5728.09	2690.63 N	311.17 E	2700.38	3.40
8197.00	90.12	352.02	5729.50	2784.88 N	299.38 E	2794.12	2.72
8292.00	91.39	355.67	5728.25	2879.31 N	289.20 E	2888.10	4.07
8386.00	92.28	359.54	5725.23	2973.16 N	285.27 E	2981.74	4.22
8481.00	92.10	0.20	5721.60	3068.09 N	285.05 E	3076.59	0.72
8576.00	91.01	0.06	5719.03	3163.05 N	285.27 E	3171.50	1.16
8670.00	89.66	0.71	5718.48	3257.05 N	285.90 E	3265.45	1.59
8763.00	88.21	0.49	5720.21	3350.02 N	286.88 E	3358.40	1.58
8853.00	89.10	2.40	5722.32	3439.96 N	289.14 E	3448.36	2.34
8945.00	90.96	5.24	5722.27	3531.75 N	295.27 E	3540.31	3.69
9037.00	89.32	3.03	5722.04	3623.50 N	301.91 E	3632.24	2.99
9129.00	89.43	2.01	5723.05	3715.40 N	305.95 E	3724.23	1.12
9221.00	90.28	5.97	5723.28	3807.16 N	312.35 E	3816.17	4.40
9312.00	88.40	3.76	5724.33	3897.82 N	320.07 E	3907.05	3.19
9404.00	88.30	2.49	5726.98	3989.64 N	325.08 E	3999.00	1.38
9496.00	87.44	359.73	5730.40	4081.55 N	326.86 E	4090.91	3.14
9588.00	88.21	357.92	5733.89	4173.46 N	324.98 E	4182.68	2.14
9679.00	89.60	357.38	5735.63	4264.36 N	321.25 E	4273.38	1.64
9771.00	89.57	356.80	5736.30	4356.24 N	316.58 E	4365.02	0.63
9863.00	88.61	355.56	5737.76	4448.02 N	310.45 E	4456.51	1.70
9954.00	90.31	357.16	5738.62	4538.83 N	304.67 E	4547.04	2.57
10046.00	90.12	358.59	5738.27	4630.76 N	301.26 E	4638.78	1.57
10138.00	90.99	0.29	5737.38	4722.75 N	300.36 E	4730.67	2.08
10229.00	91.02	359.68	5735.78	4813.73 N	300.34 E	4821.59	0.67
10320.00	90.37	359.06	5734.68	4904.72 N	299.34 E	4912.48	0.99
10410.00	88.24	359.15	5735.77	4994.70 N	297.93 E	5002.34	2.37
10502.00	90.68	0.80	5736.64	5086.68 N	297.89 E	5094.26	3.20
10592.00	90.12	0.58	5736.01	5176.67 N	298.97 E	5184.23	0.67
10684.00	91.97	0.65	5734.33	5268.65 N	299.96 E	5276.18	2.01
10775.00	90.59	1.30	5732.30	5359.61 N	301.51 E	5367.13	1.68
10867.00	90.25	0.20	5731.62	5451.60 N	302.71 E	5459.10	1.25
10958.00	90.61	358.73	5730.94	5542.59 N	301.86 E	5550.00	1.66
11049.00	88.73	1.06	5731.47	5633.58 N	301.70 E	5640.92	3.29
11141.00	89.54	0.83	5732.85	5725.55 N	303.21 E	5732.88	0.92
11232.00	88.12	0.77	5734.71	5816.52 N	304.48 E	5823.84	1.56
11323.00	88.27	0.43	5737.58	5907.47 N	305.44 E	5914.76	0.41
11413.00	86.91	359.10	5741.36	5997.39 N	305.07 E	6004.60	2.11
11504.00	89.85	1.13	5743.94	6088.34 N	305.25 E	6095.49	3.93
11596.00	89.79	0.40	5744.23	6180.33 N	306.48 E	6187.46	0.80
11687.00	90.65	359.84	5743.88	6271.33 N	306.67 E	6278.40	1.13
11778.00	89.11	1.46	5744.07	6362.32 N	307.70 E	6369.37	2.46

11870.00	86.49	359.94	5747.60	6454.23 N	308.83 E	6461.26	3.29
11961.00	88.68	3.15	5751.43	6545.10 N	311.28 E	6552.16	4.27
12053.00	87.66	2.12	5754.37	6636.95 N	315.51 E	6644.10	1.58
12145.00	88.36	3.02	5757.57	6728.80 N	319.63 E	6736.04	1.24
12236.00	90.12	3.01	5758.77	6819.66 N	324.42 E	6827.02	1.93
12327.00	90.03	1.29	5758.65	6910.60 N	327.83 E	6918.02	1.89
12419.00	88.89	358.85	5759.52	7002.58 N	327.94 E	7009.95	2.93
12510.00	87.50	357.43	5762.39	7093.49 N	324.99 E	7100.68	2.18
12601.00	87.96	358.19	5765.99	7184.35 N	321.52 E	7191.34	0.98
12693.00	88.65	358.77	5768.71	7276.27 N	319.08 E	7283.11	0.98
12785.00	88.74	359.51	5770.81	7368.24 N	317.70 E	7374.96	0.81
12876.00	89.61	359.31	5772.12	7459.22 N	316.76 E	7465.85	0.98
12967.00	90.37	358.08	5772.13	7550.20 N	314.69 E	7556.68	1.59
13060.00	90.82	357.89	5771.17	7643.14 N	311.42 E	7649.43	0.53
13151.00	90.92	0.17	5769.79	7734.11 N	309.88 E	7740.28	2.51
13243.00	91.79	359.25	5767.61	7826.08 N	309.41 E	7832.17	1.38
13335.00	90.03	1.62	5766.15	7918.05 N	310.11 E	7924.11	3.21
13426.00	90.55	0.33	5765.69	8009.04 N	311.66 E	8015.09	1.53
13517.00	89.94	359.91	5765.30	8100.03 N	311.85 E	8106.03	0.81
13608.00	89.11	359.79	5766.06	8191.03 N	311.61 E	8196.95	0.92
13637.00	89.06	359.75	5766.52	8220.03 N	311.49 E	8225.93	0.22
13686.00	89.06	359.75	5767.32	8269.02 N	311.28 E	8274.88	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 2.14 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.54 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13686.00 FEET
IS 8274.88 FEET ALONG 2.16 DEGREES (TRUE)**

**Tie onto surface at 0' MD
Final Survey is a projection to bit at TD**