



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	14-Dec-13	17-Dec-13	04-Jan-14		
Rig Bit Number	01	02	03		
Bit Size (in)	13.500	8.750	6.000		
Tool Nominal OD (in)	8.000	6.750	4.800		
Log Start Depth (MD, ft)	81.00	1,675.00	6,290.00		
Log End Depth (MD, ft)	1,675.00	6,290.00	12,727.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	13-Dec-13 21:30	15-Dec-13 14:45	31-Dec-13 01:15		
Drill/Wipe End Date and Time	14-Dec-13 10:50	17-Dec-13 00:30	03-Jan-14 04:30		
Min Inc (deg) @ Depth (MD, ft)	0 @ 0	2.11 @ 5,129.00	83.44 @ 7,065.00		
Max Inc (deg) @ Depth (MD, ft)	4.16 @ 1,370.00	93.83 @ 6,236.00	97.30 @ 7,572.00		
Bit TFA(in2) / Bit Type	2.23 / PDC	.90 / PDC	.98 / PDC		
Flow Rate (gpm)	510.00	525.00	270.00		
Max AV (fpm) / CV (fpm) @ MWD	0 / 0	395.0 / 257.0	492.0 / 414.0		
Fluid Type	Native/Spud Mud	Polymer	Polymer		
Density (ppg) / Viscosity (spqt)	9.00 / 30.00	9.05 / 45.00	10.40 / 44.00		
Filtrate CL (ppm)	0	2,500.00	3,000.00		
pH / Fluid Loss (mptm)	7.00 / 0	8.80 / 10	9.50 / 0		
PV (cP) / YP (Ihf2)	1 / 1.00	8 / 9.00	12 / 21.00		
% Solids / % Sand	0 / 0	7.00 / 0.05	9 / 0.21		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Mud Tool Temp (in) F / C	81.00 / 28.00	127.00 / 53.00	217.00 / 81.00		

Max Tool Temp (degF) / Source	84.06 / PCM	167.00 / PCM	217.6 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 84.06	N/A @ 167.00	N/A @ 217.6		
Lead MWD Engineer	Cody Wurdeman	Cody Wurdeman	Cody Wurdeman		
Customer Representative	Kenneth Wilkerson	Kenneth Wilkerson	Kenneth Wilkerson		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11812727	11303519	12134685		
Insert Serial Number	11400992	11400937	11400992		
Date and Time Initialized	11-Dec-13 15:40	15-Dec-13 03:02	30-Dec-13 06:02		
Date and Time Read	14-Dec-13 13:41	17-Dec-13 11:44	01-Jan-70 00:00		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	53.14	51.39	45.40		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11812727	11303519	12134685		
Sonde Serial Number	11297623	11638595	11297623		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	65.58	334.25	153.09		

Gamma Ray Sensor Information

Tool Type		PCG	PCG		
Distance From Bit (ft)		59.89	40.30		
Recorded Sample Period (sec)		10	10		
Software Version		8.15	8.15		
Sub Serial Number		11303519	12134685		
Insert/Sonde Serial Number		11680944	11293409		

REMARKS

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

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

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

4. All data is stored data unless otherwise specified.

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

PCG 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

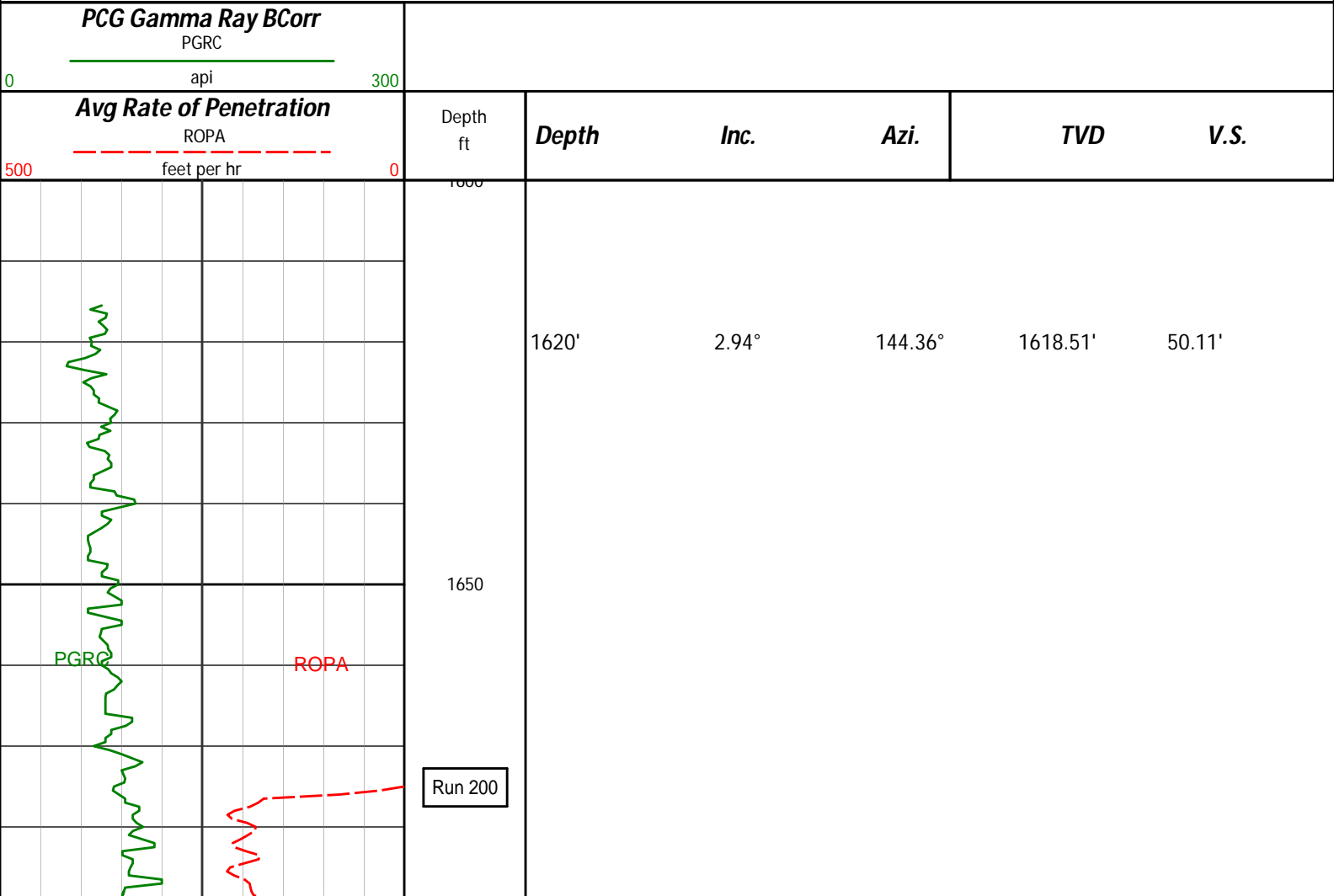
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES 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.

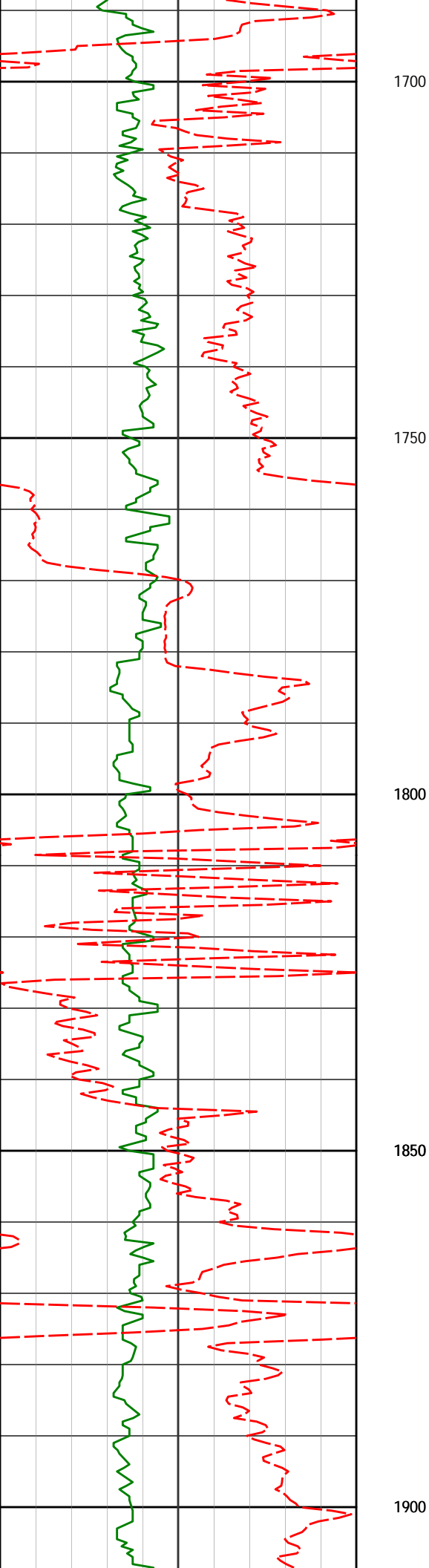
HALLIBURTON

Sperry Drilling Services

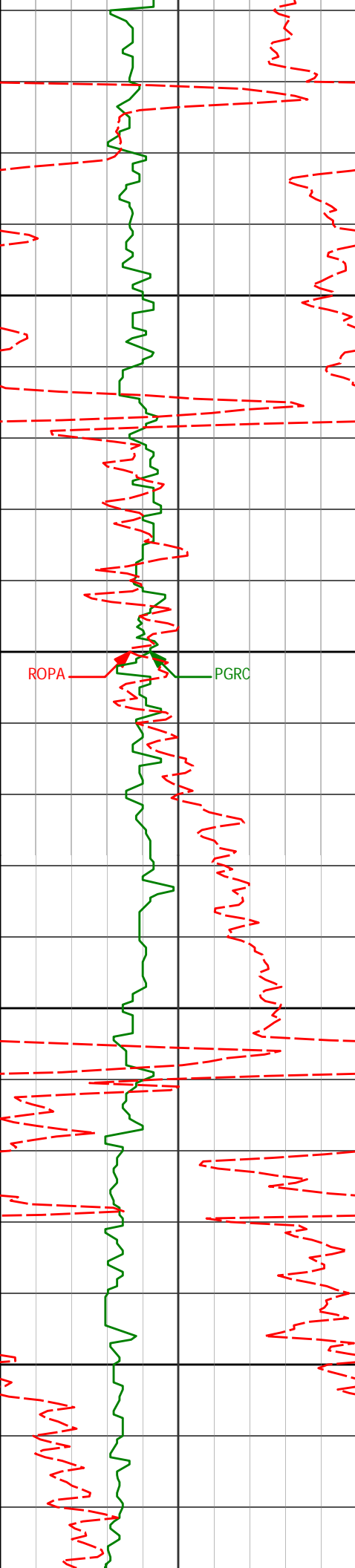
MD Main Log 1:240

Whiting Oil and Gas
Razor 21B-2809A
Frontier 26
Sec. 21-T10N-R58W





1730'	2.73°	141.40°	1728.38'	54.54'
1820'	5.29°	152.49°	1818.15'	59.99'



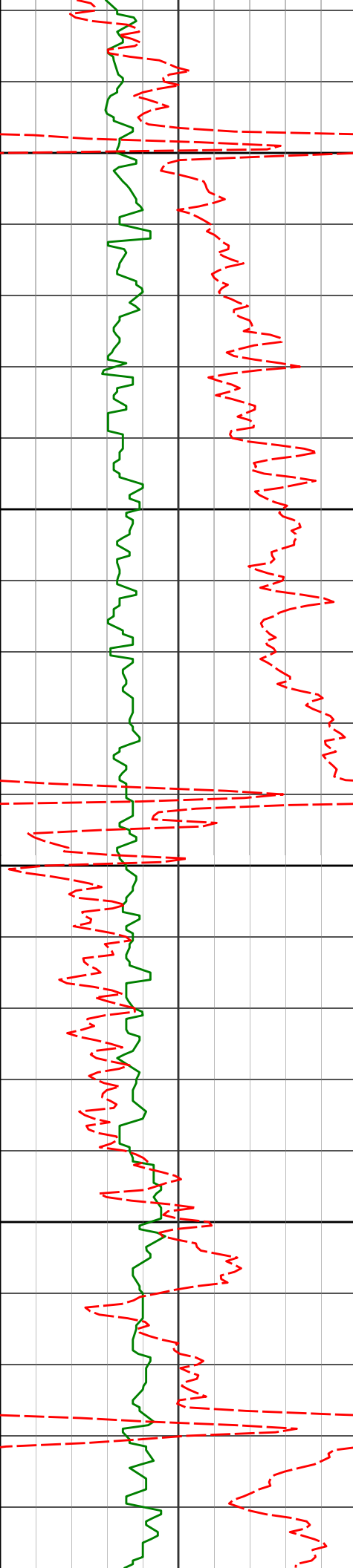
1950

2000

2050

2100

1911'	4.94°	159.63°	1908.79'	67.48'
2002'	5.02°	158.86°	1999.45'	74.94'
2094'	5.06°	159.85°	2091.09'	82.58'



2150

2185'

5.15°

160.43°

2181.73'

90.27'

2200

2250

2277'

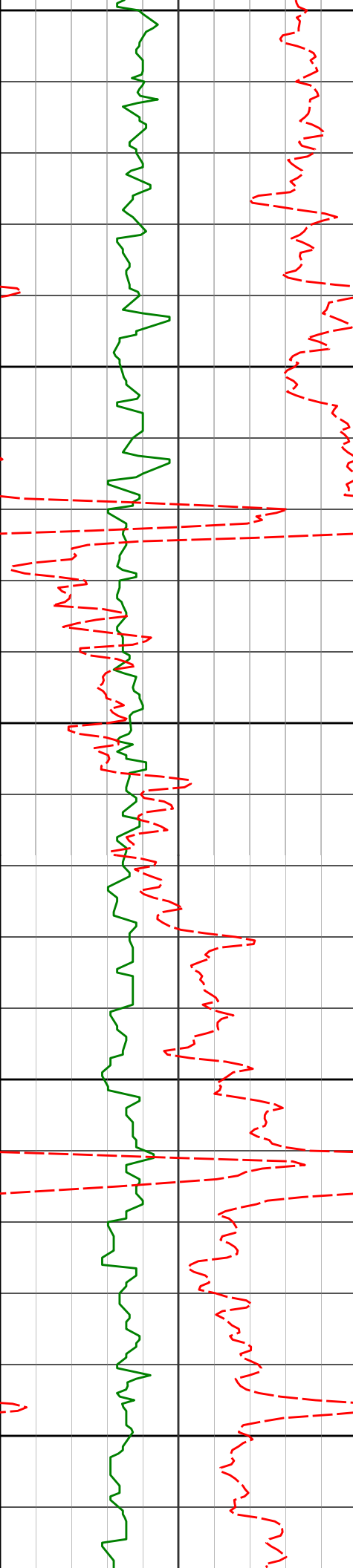
5.07°

159.13°

2273.36'

98.04'

2300



2350

2369'

4.91°

159.39°

2365.02'

105.60'

2400

2450

2460'

5.04°

160.23°

2455.67'

113.08'

2500

2550

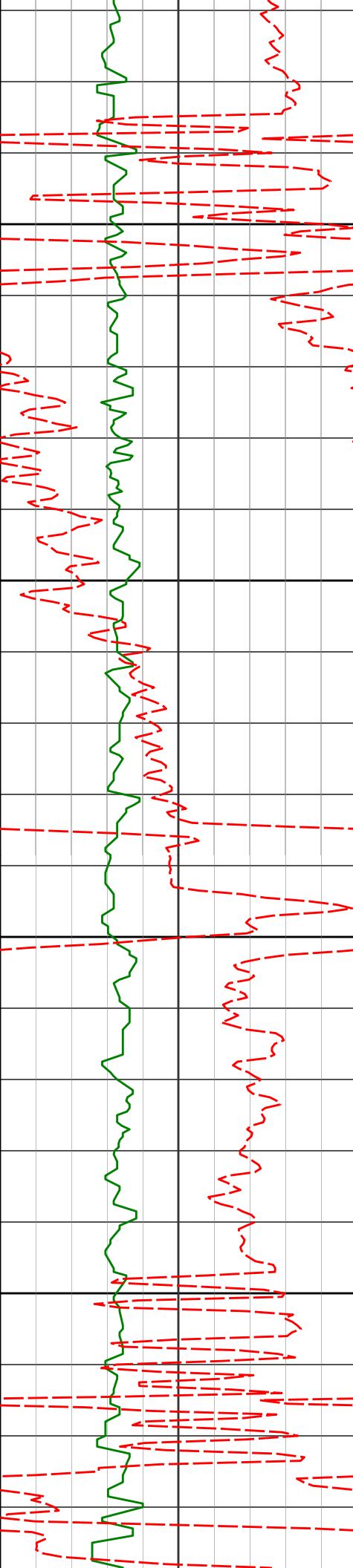
2552'

4.88°

157.65°

2547.33'

120.58'



2600

2650

2700

2750

2644'

5.04°

158.46°

2638.98'

128.04'

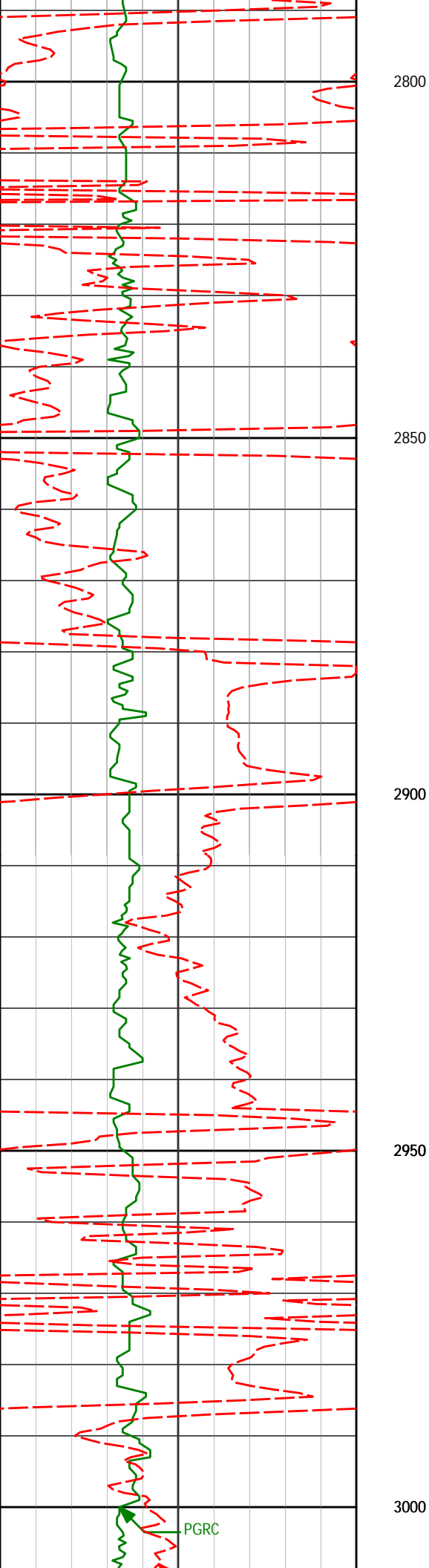
2735'

4.86°

158.55°

2729.64'

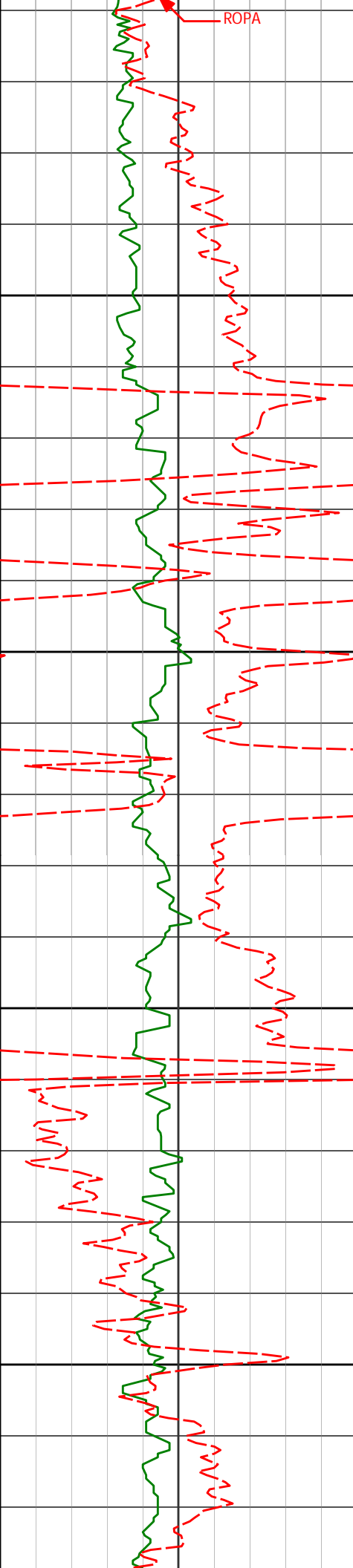
135.42'



2826' 4.74° 153.74° 2820.33' 142.47'

2917' 5.40° 154.36° 2910.97' 149.80'

PGRC



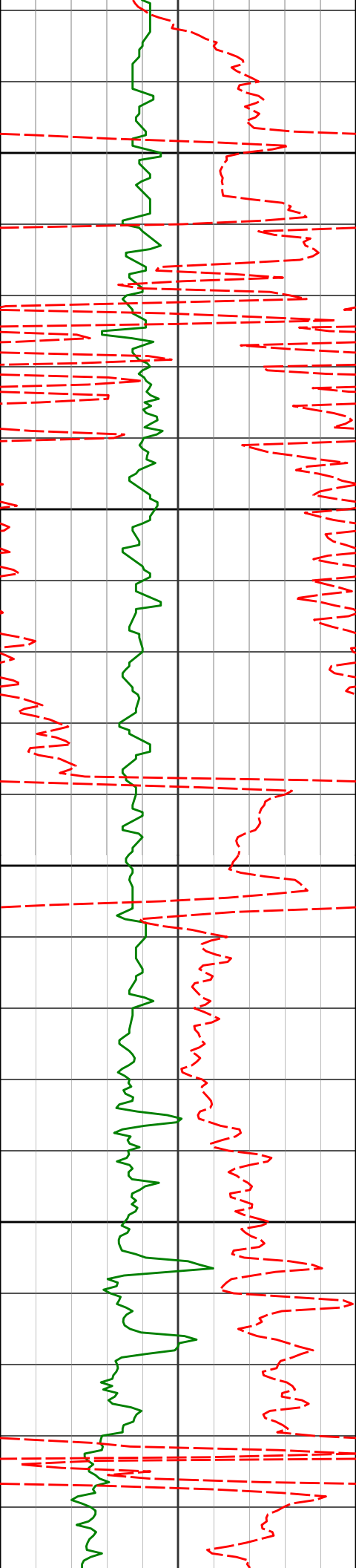
3050

3100

3150

3200

3009	3.45°	131.61°	3002.70'	155.65'
3101'	4.05°	144.78°	3094.50'	160.25'
3192'	2.96°	143.90°	3185.33'	164.87'



3250

3300

3350

3400

3283'

4.45°

156.28°

3276.14'

170.08'

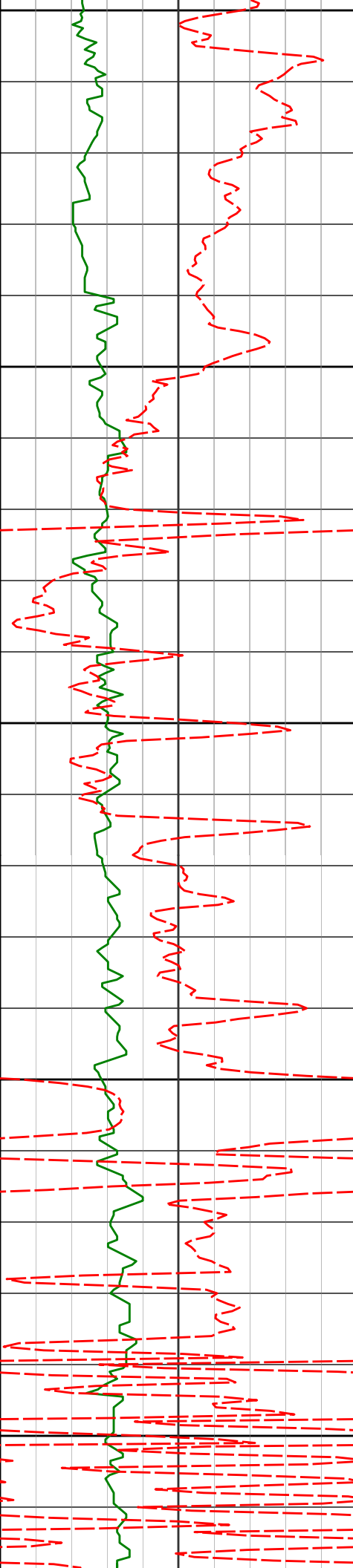
3375'

3.91°

187.26°

3367.90'

176.48'



3450

3466'

3.87°

189.49°

3458.70'

182.56'

3500

3550

3558'

3.94°

193.41°

3550.48'

188.66'

3600

3650

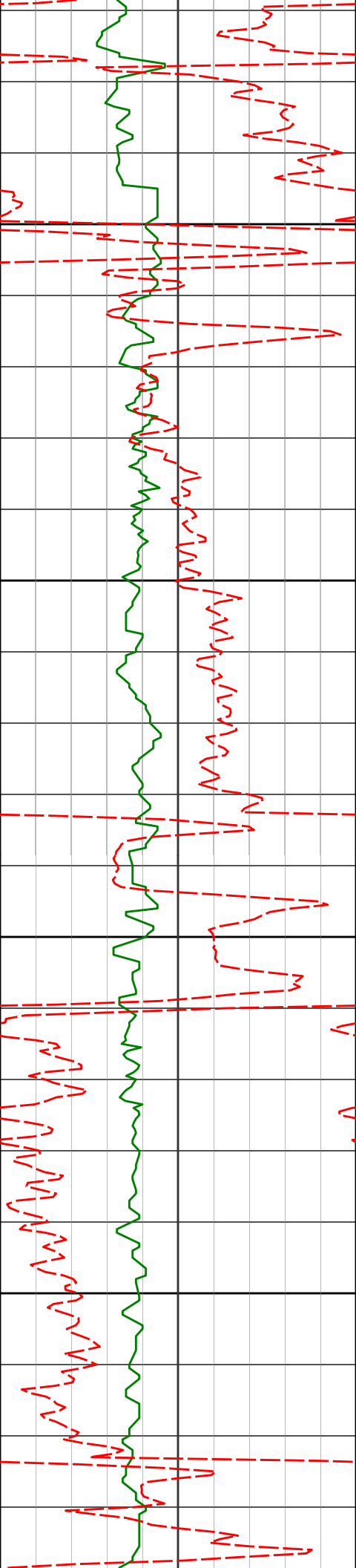
3649'

4.21°

190.53°

3641.25'

194.94'



3700

3740'

3.64°

186.27°

3732.04'

201.07'

3750

3800

3831'

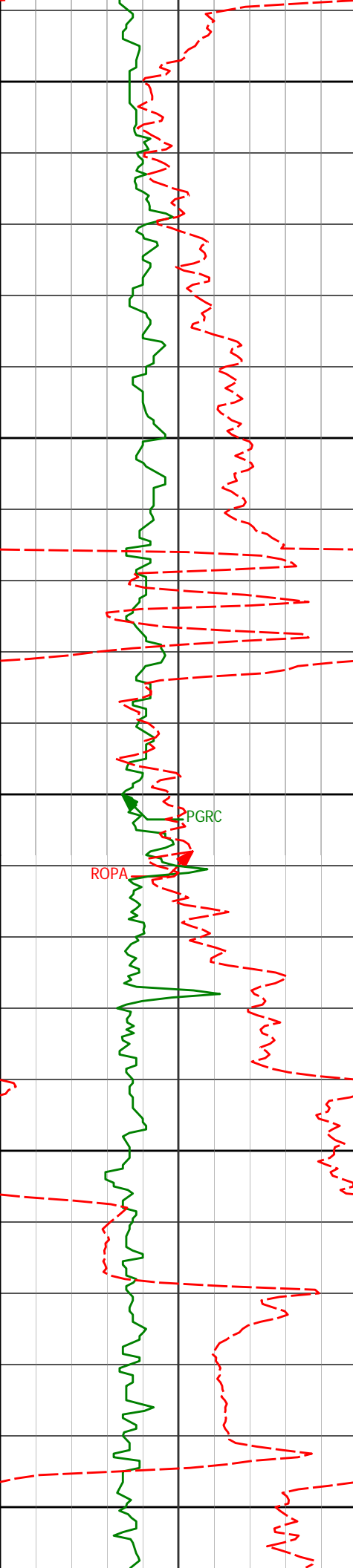
4.91°

172.83°

3822.79'

207.81'

3850



3900

3923'

3.40°

173.04°

3914.54'

214.44'

3950

4000

PGRC

ROPA

4013'

2.12°

178.99°

4004.43'

218.77'

4050

4100

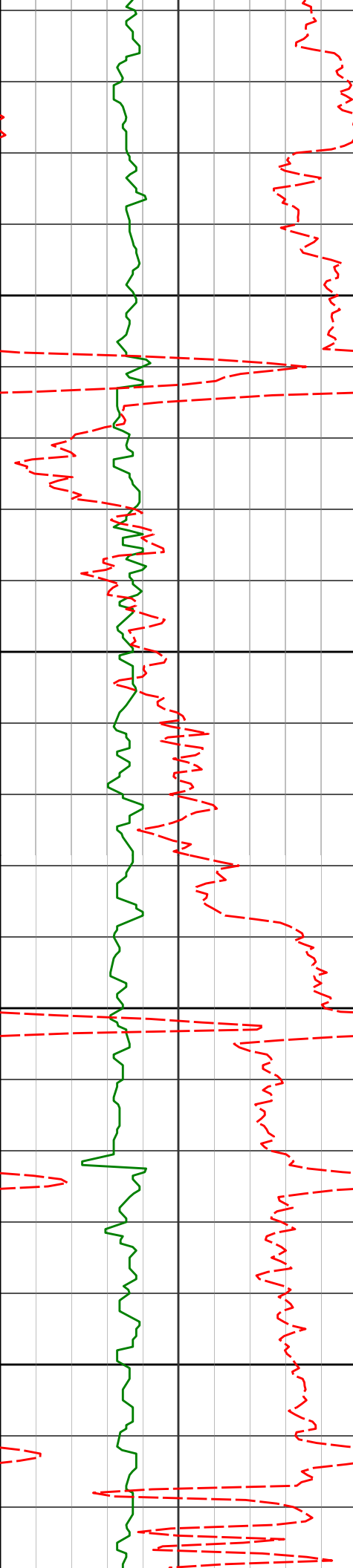
4106'

4.03°

150.47°

4097.30'

223.38'



4150

4200

4250

4300

4196'

4.12°

153.63°

4187.07'

229.11'

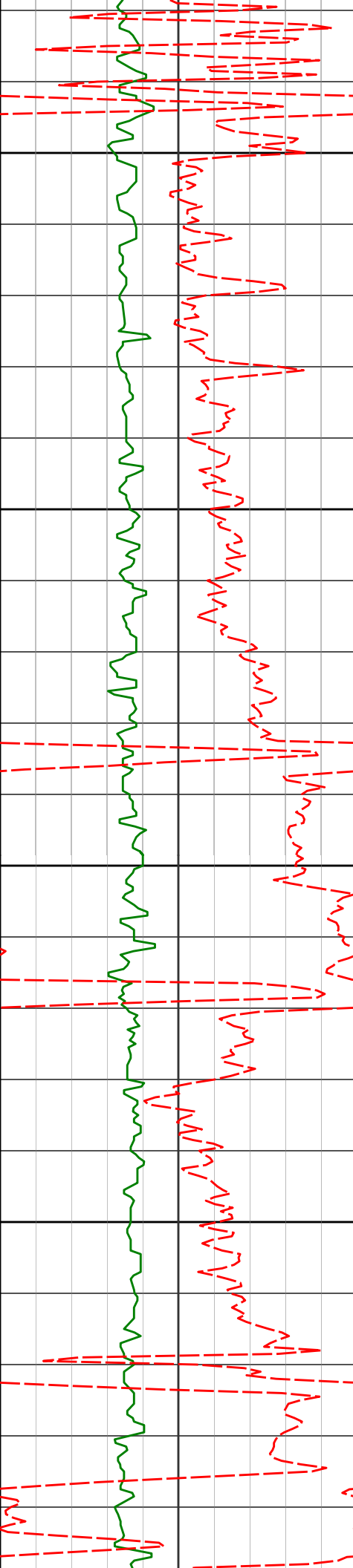
4288'

4.37°

151.39°

4278.82'

235.23'



4350

4380'

3.80°

150.05°

4370.59'

241.04'

4400

4450

4472'

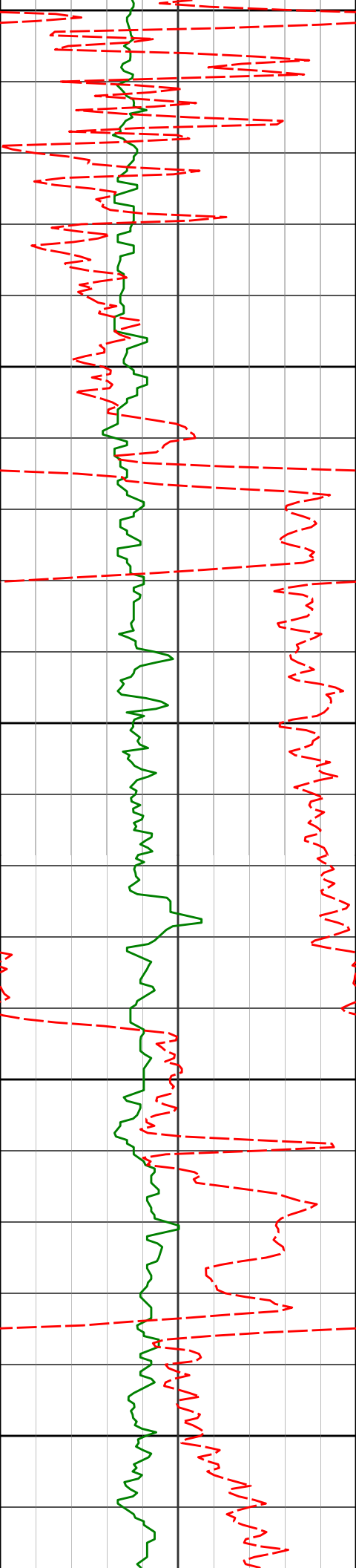
3.46°

156.19°

4462.40'

246.29'

4500



4563'

3.18°

172.76°

4553.25'

251.35'

4600

4650

4655'

3.25°

174.04°

4645.11'

256.49'

4700

4750

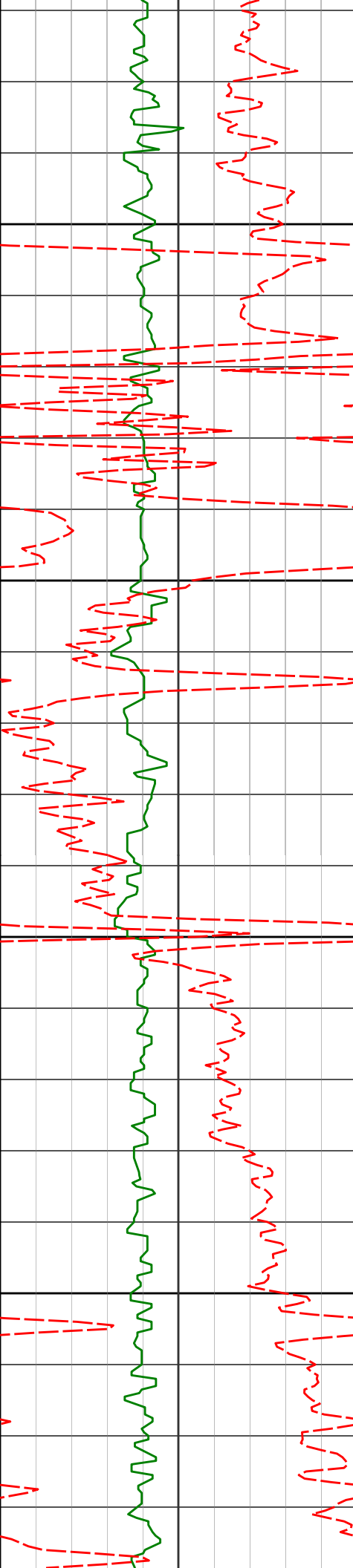
4750'

5.26°

179.80°

4739.84'

263.53'



4800

4844'

3.79°

174.85°

4833.55'

270.94'

4850

4900

4939'

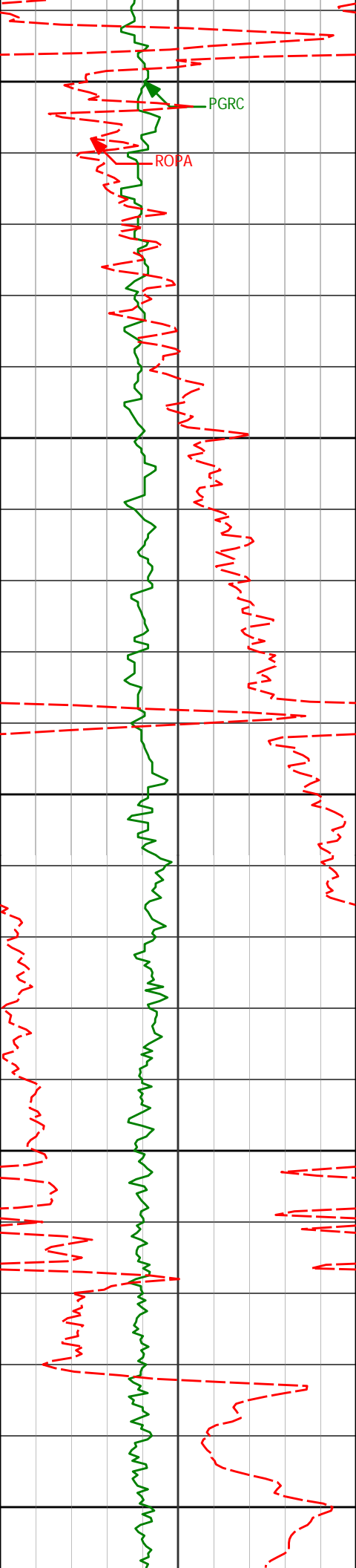
2.92°

167.11°

4928.38'

276.44'

4950



5000

5034'

2.65°

169.06°

5023.27'

280.98'

5050

5100

5129'

2.11°

161.50°

5118.19'

284.82'

5150

5192'

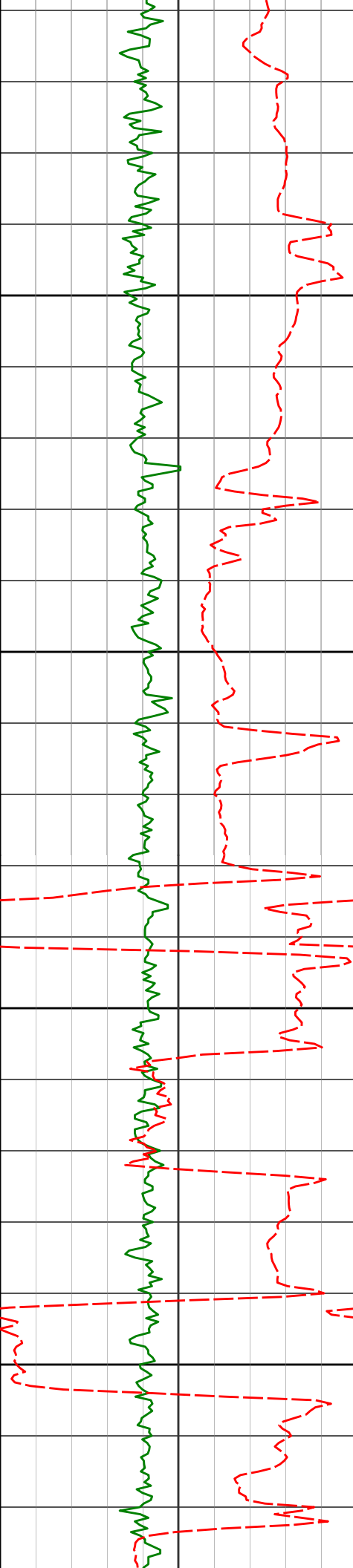
2.96°

168.91°

5181.13'

287.54'

5200

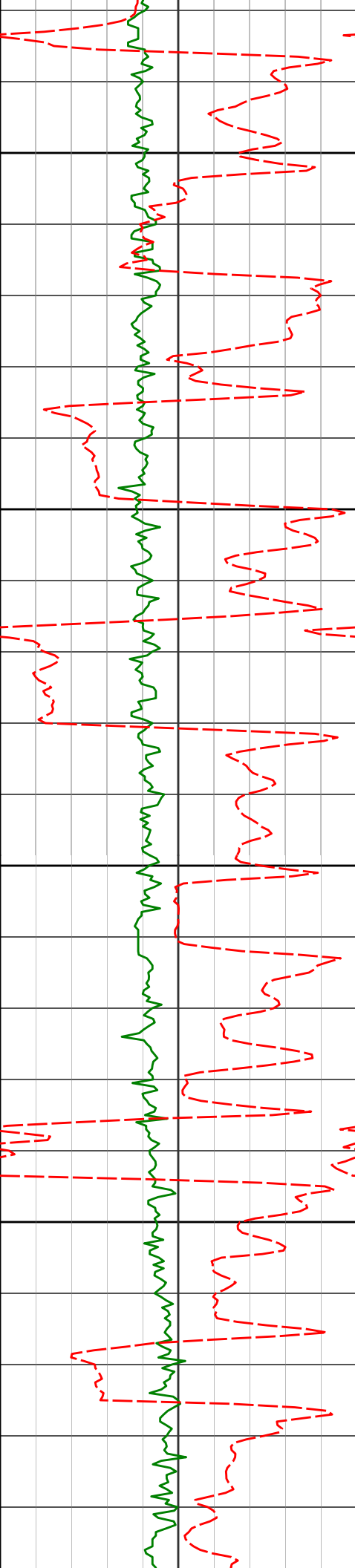


5250

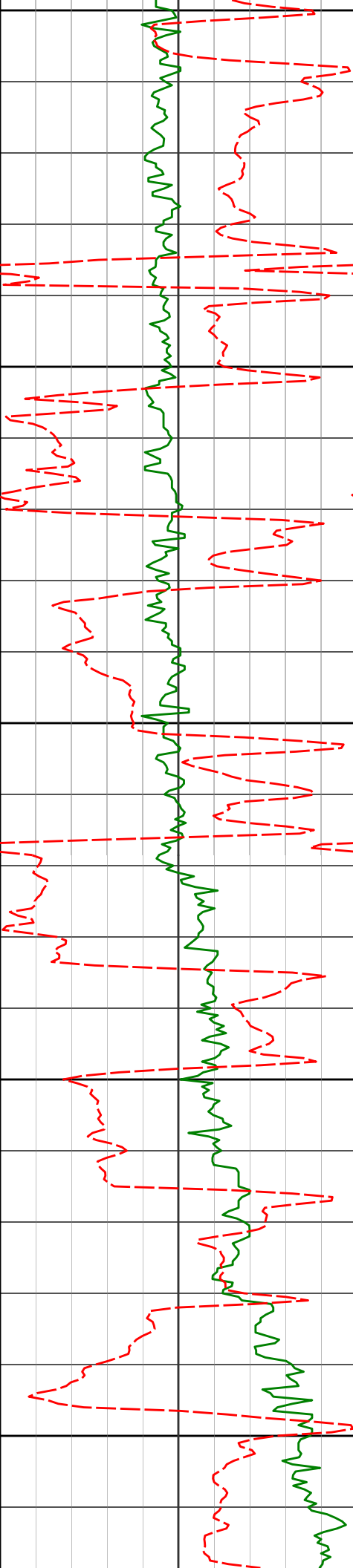
5350

5400

5224'	7.19°	167.33°	5212.99'	290.32'
5256'	12.17°	176.13°	5244.53'	295.66'
5287'	17.18°	173.95°	5274.51'	303.49'
5319'	22.50°	171.56°	5304.60'	314.29'
5351'	24.55°	166.77°	5333.94'	326.89'
5382'	26.81°	163.42°	5361.88'	339.95'
5414'	28.83°	159.86°	5390.18'	354.25'



5445'	31.48°	160.40°	5416.98'	369.03'
5477'	32.86°	160.19°	5444.07'	385.23'
5509'	33.99°	160.73°	5470.78'	402.00'
5540'	35.52°	163.67°	5496.25'	418.97'
5572'	37.45°	164.83°	5521.97'	437.43'
5604'	39.79°	166.97°	5546.98'	456.93'
5635'	43.53°	169.25°	5570.13'	477.20'



5650

5667'

47.85°

170.15°

5592.48'

499.83'

5700

5699'

50.94°

172.70°

5613.31'

523.94'

5750

5730'

52.39°

172.56°

5632.54'

548.14'

5800

5762'

53.96°

172.47°

5651.71'

573.62'

5850

5794'

55.70°

172.83°

5670.15'

599.64'

5825'

58.23°

172.79°

5687.04'

625.51'

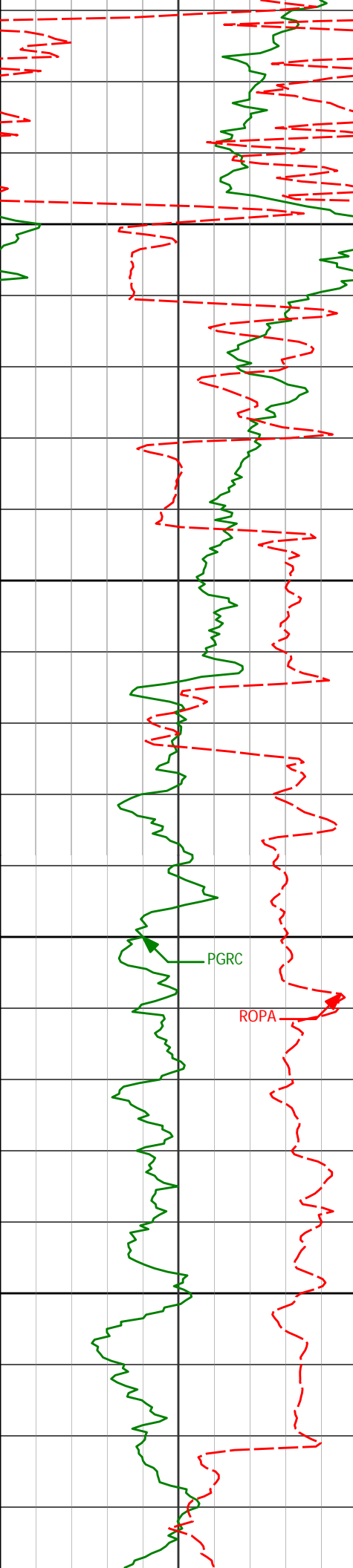
5857'

61.63°

174.34°

5703.08'

653.10'



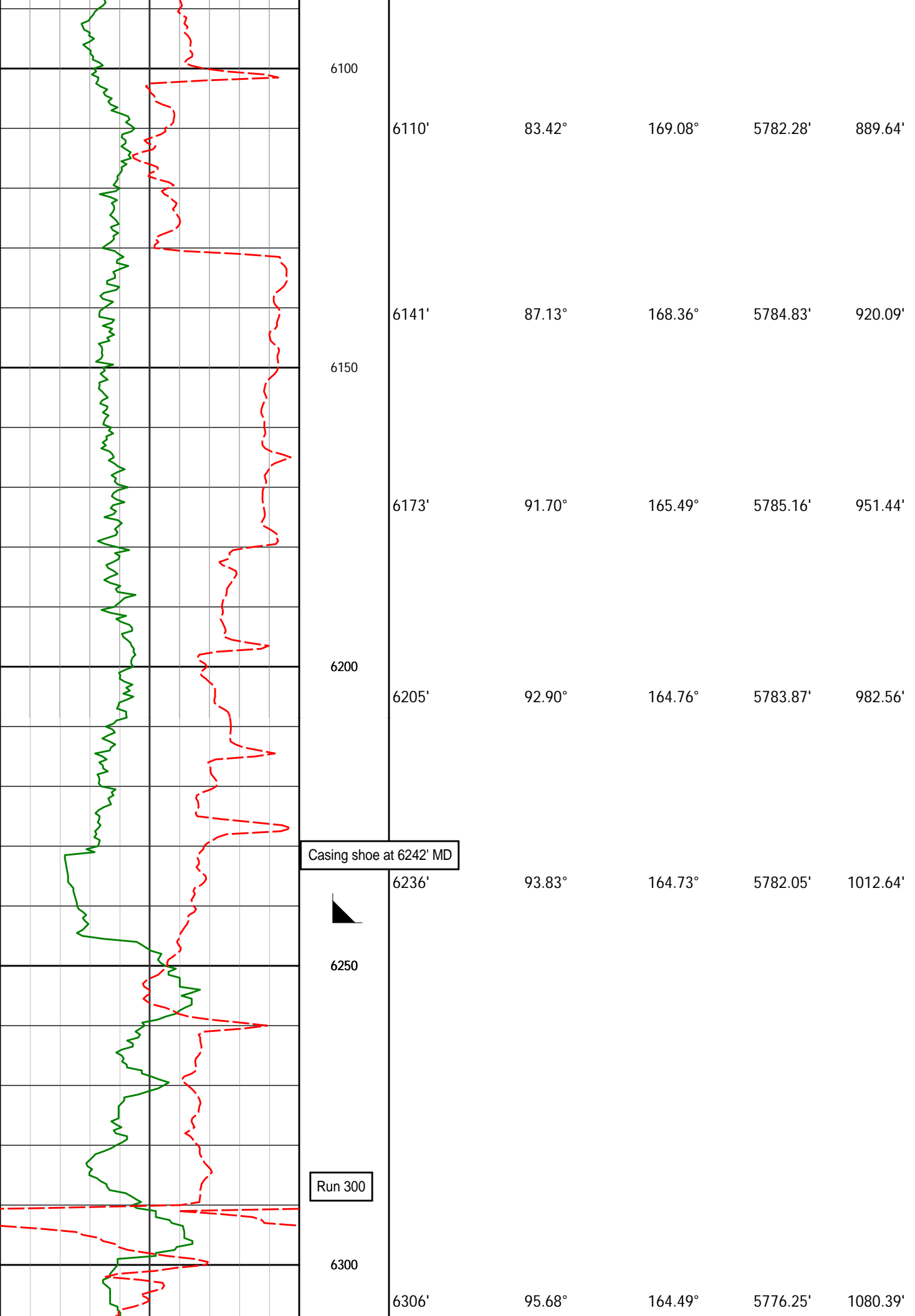
5900

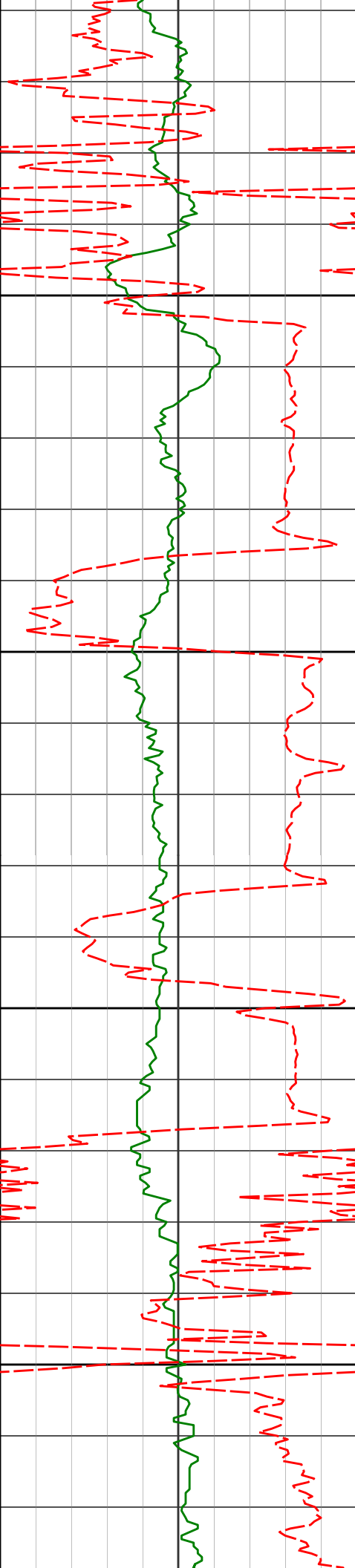
5950

6000

6050

5889'	63.21°	174.58°	5717.89'	681.40'
5920'	63.93°	174.96°	5731.69'	709.10'
5952'	66.31°	175.68°	5745.15'	738.09'
5984'	69.47°	174.42°	5757.20'	767.68'
6015'	75.76°	170.84°	5766.46'	797.09'
6047'	79.39°	170.26°	5773.34'	828.05'
6078'	82.25°	169.19°	5778.29'	858.30'





6350

6369'

94.49°

164.85°

5770.67'

1141.36'

6400

6400'

92.50°

165.23°

5768.78'

1171.46'

6450

6448'

90.03°

169.29°

5767.72'

1218.54'

6500

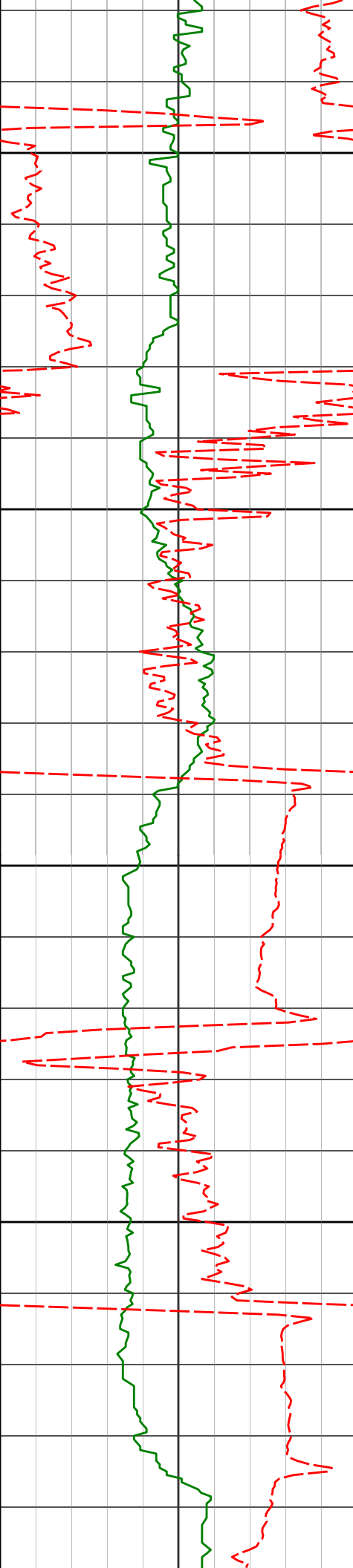
6495'

89.17°

168.91°

5768.04'

1264.92'



6550

6590'

91.14°

169.94°

5767.79'

1358.76'

6600

6650

6685'

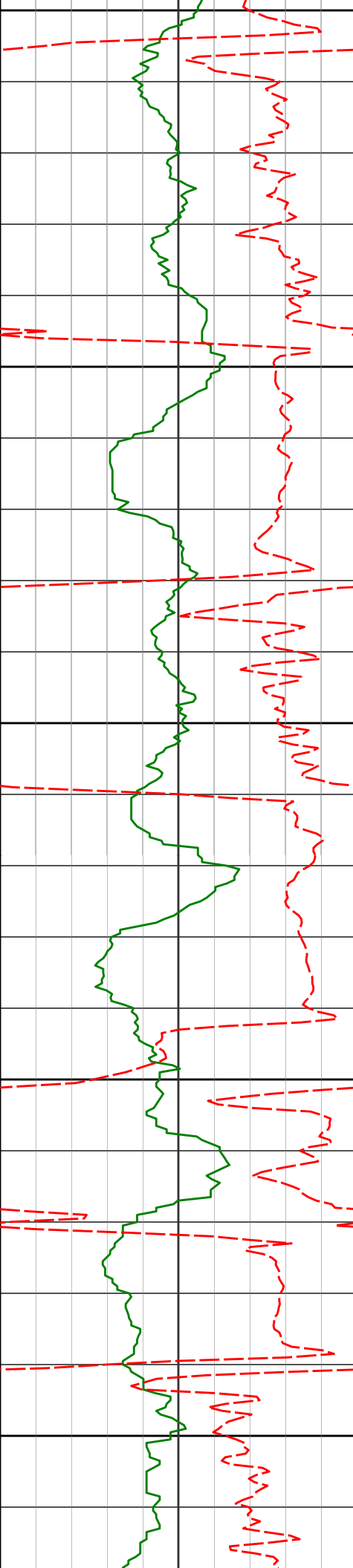
90.00°

172.01°

5766.84'

1452.96'

6700



6750

6780'

86.26°

174.64°

5769.94'

1547.52'

6800

6850

6875'

84.01°

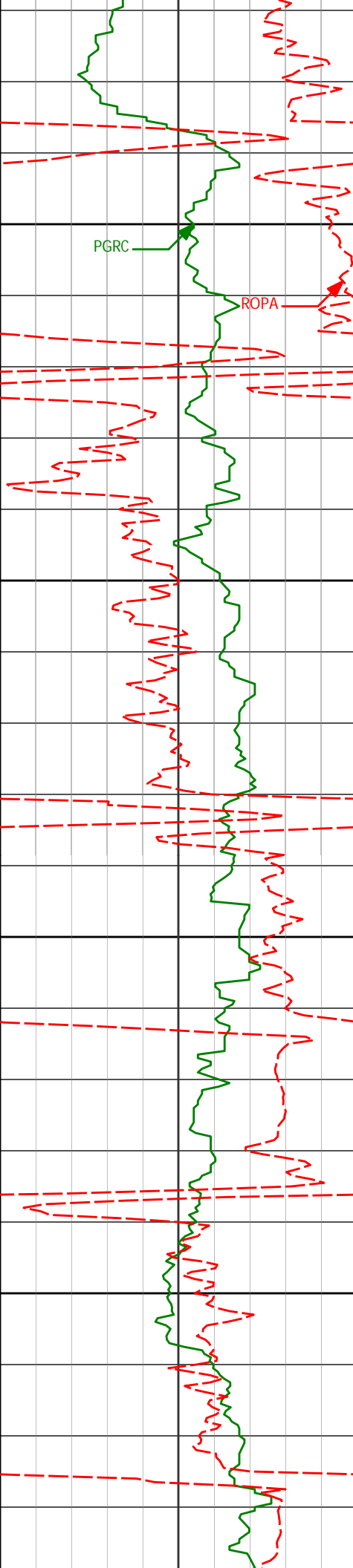
179.15°

5778.00'

1642.11'

6900

6950



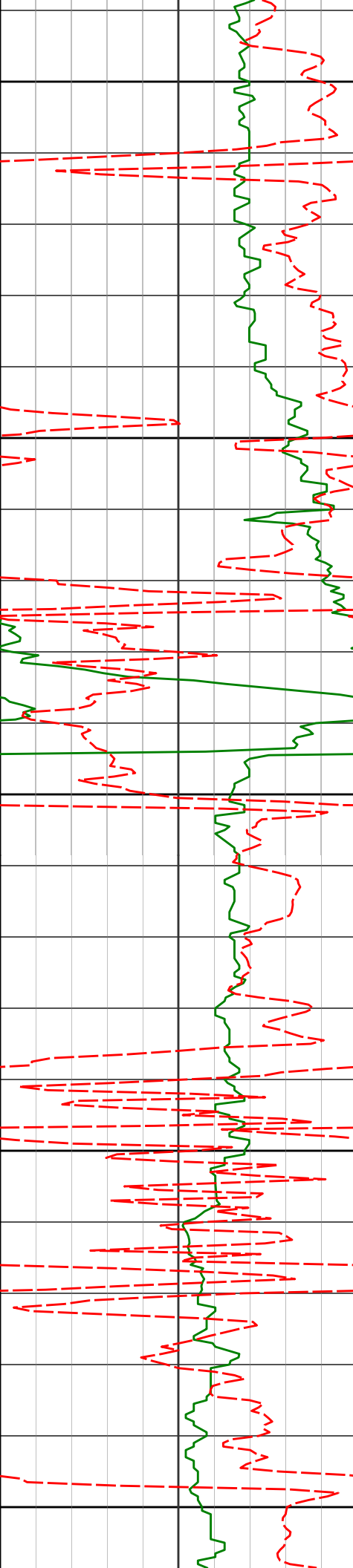
7000

7050

7100

7150

6970'	83.45°	182.11°	5788.38'	1736.46'
7065'	83.44°	181.56°	5799.23'	1830.67'
7160'	86.88°	182.11°	5807.24'	1925.14'



7200

7250

7300

7350

7400

7255'

90.28°

182.37°

5809.59'

2019.88'

7318'

92.13°

180.84°

5808.27'

2082.76'

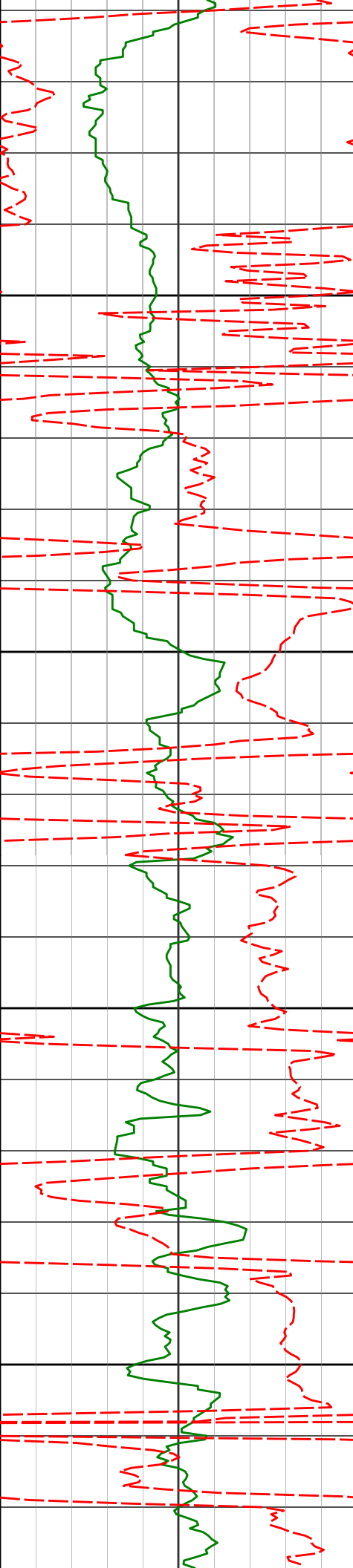
7382'

94.56°

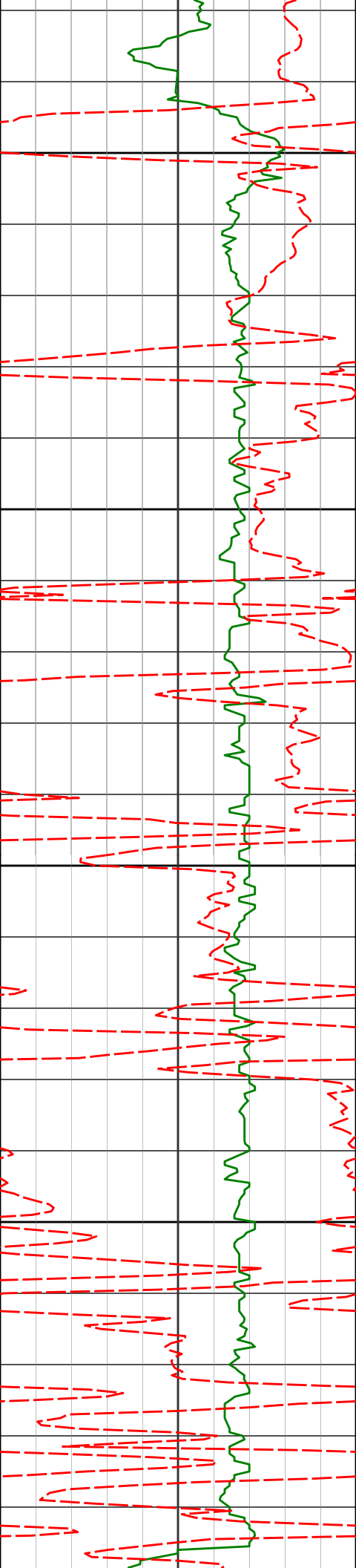
181.50°

5804.54'

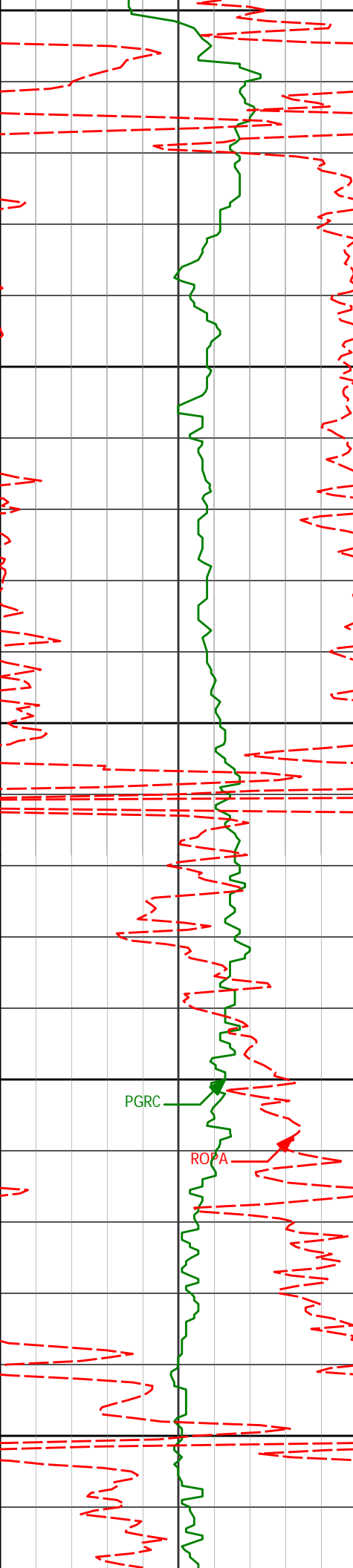
2146.57'



7445'	94.44°	182.31°	5799.59'	2209.26'
7477'	95.07°	182.15°	5796.94'	2241.07'
7508'	95.74°	180.06°	5794.02'	2271.90'
7540'	96.27°	179.31°	5790.67'	2303.72'
7572'	97.30°	179.32°	5786.89'	2335.49'
7603'	96.33°	179.38°	5783.21'	2366.26'



7635'	94.56°	180.25°	5780.18'	2398.11'
7650				
7665'	92.52°	181.87°	5778.32'	2428.01'
7700				
7726'	88.64°	184.11°	5777.82'	2488.78'
7750				
7757'	87.96°	183.00°	5778.74'	2519.64'
7800				
7818'	88.34°	183.15°	5780.71'	2580.40'



7850

7900

7950

8000

8050

7910'

88.55°

183.11°

5783.20'

2672.05'

8001'

88.43°

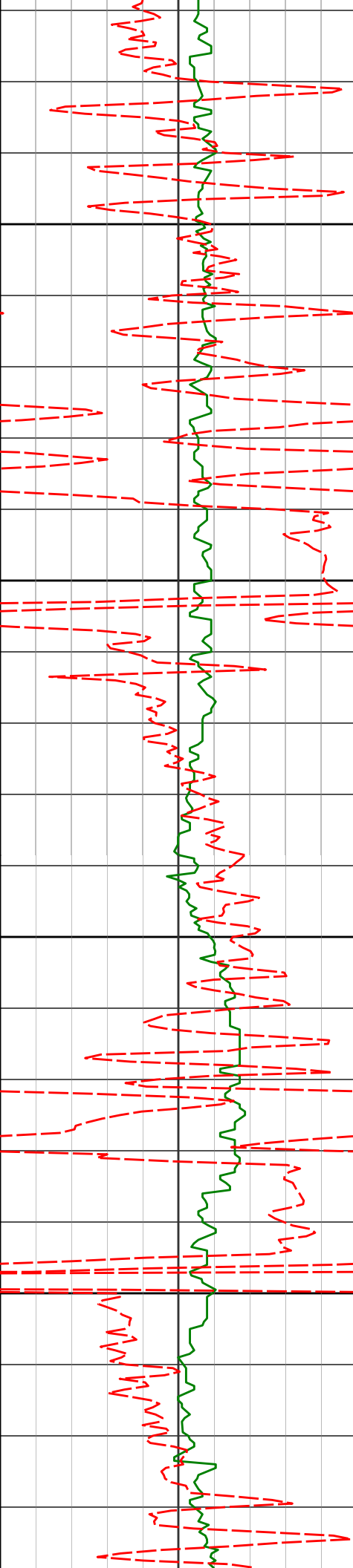
182.26°

5785.60'

2762.76'

PGRC

ROPA



8092'

89.45°

182.69°

5787.28'

2853.51'

8100

8150

8184'

89.63°

183.97°

5788.02'

2945.16'

8200

8250

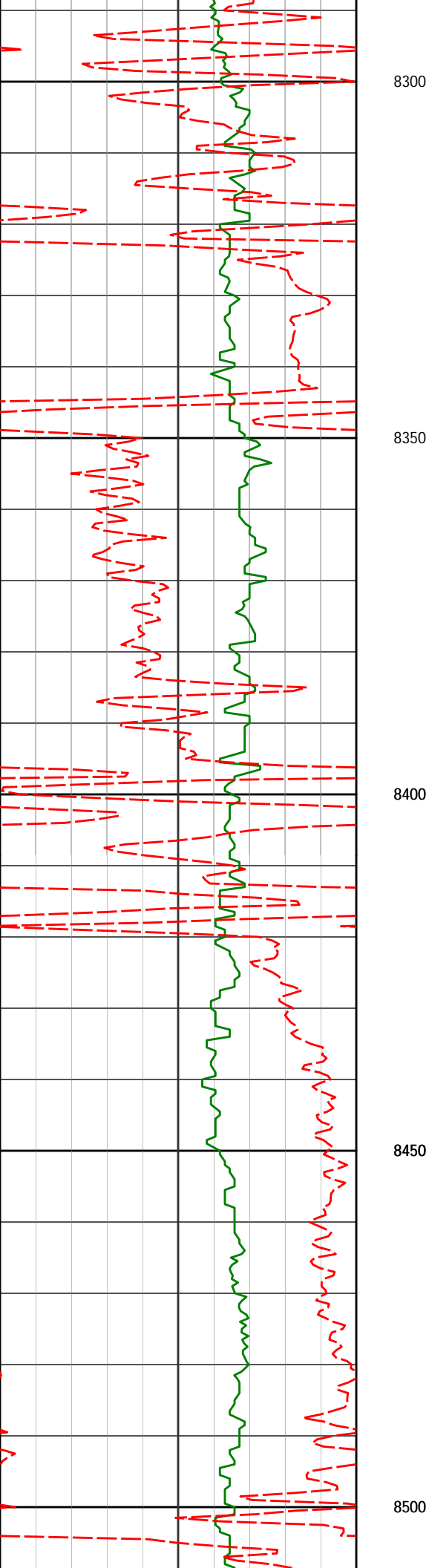
8275'

89.78°

183.90°

5788.49'

3035.73'



8367'

88.80°

181.83°

5789.63'

3127.43'

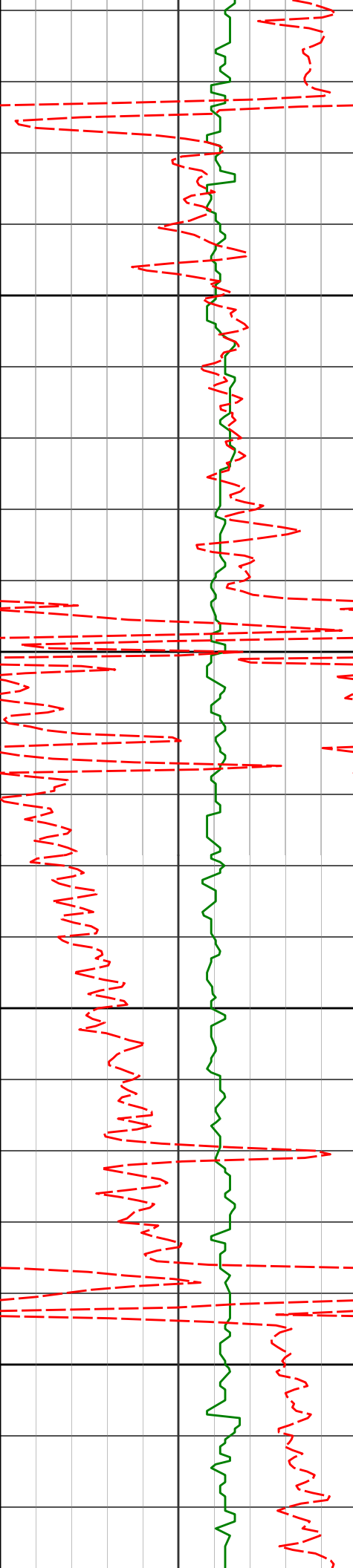
8458'

88.95°

181.87°

5791.42'

3218.25'



8550

8550'

90.37°

180.55°

5791.96'

3310.13'

8600

8641'

90.89°

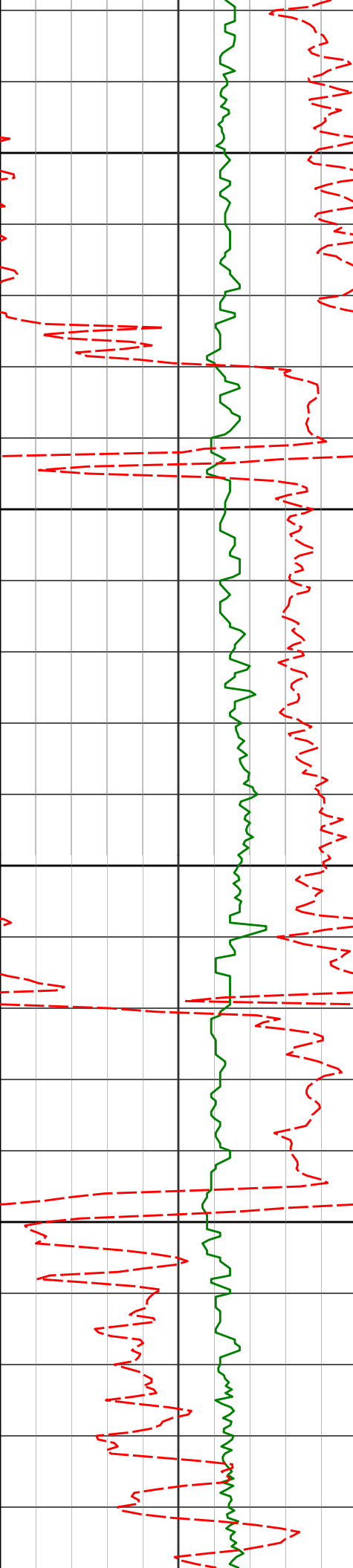
179.50°

5790.96'

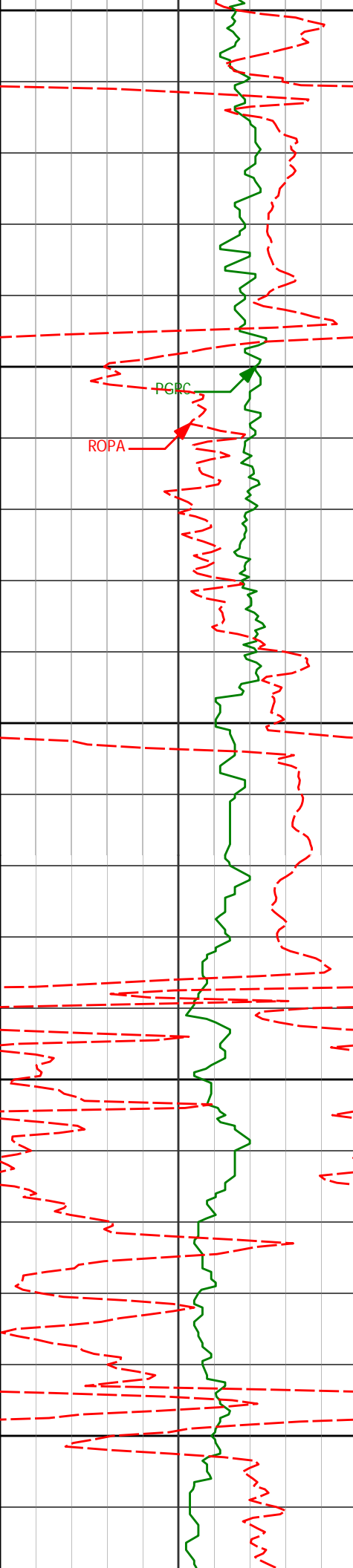
3401.08'

8650

8700



8732'	90.59°	177.60°	5789.79'	3492.07'
8750				
8800				
8823'	91.79°	177.77°	5787.90'	3583.04'
8850				
8900				
8914'	91.63°	180.08°	5785.18'	3673.99'



8950

9000

9050

9100

9150

9005'

91.33°

183.17°

5782.83'

3764.81'

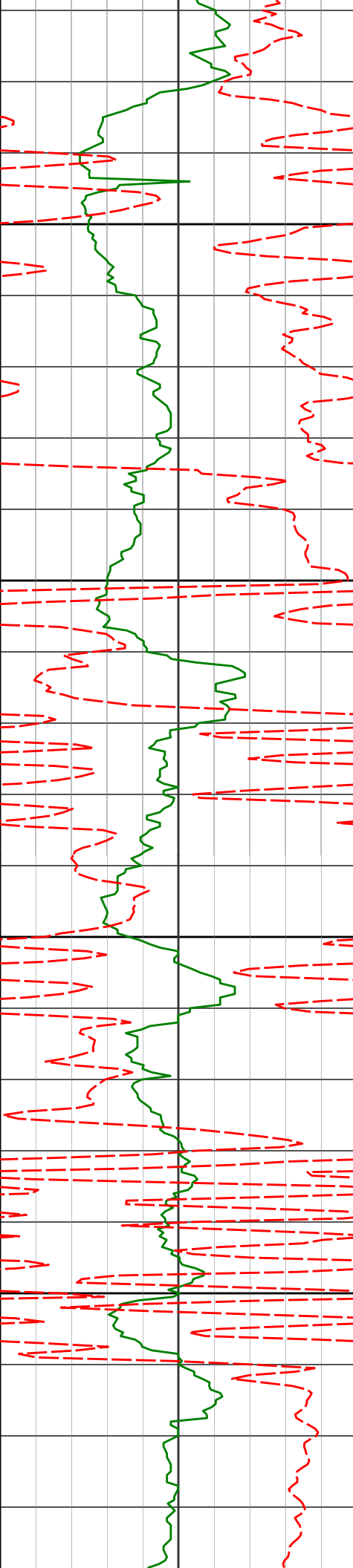
9097'

93.51°

185.82°

5778.95'

3856.19'



9188'

94.75°

186.13°

5772.39'

3946.15'

9200

9250

9279'

95.50°

186.07°

5764.26'

4035.96'

9300

9350

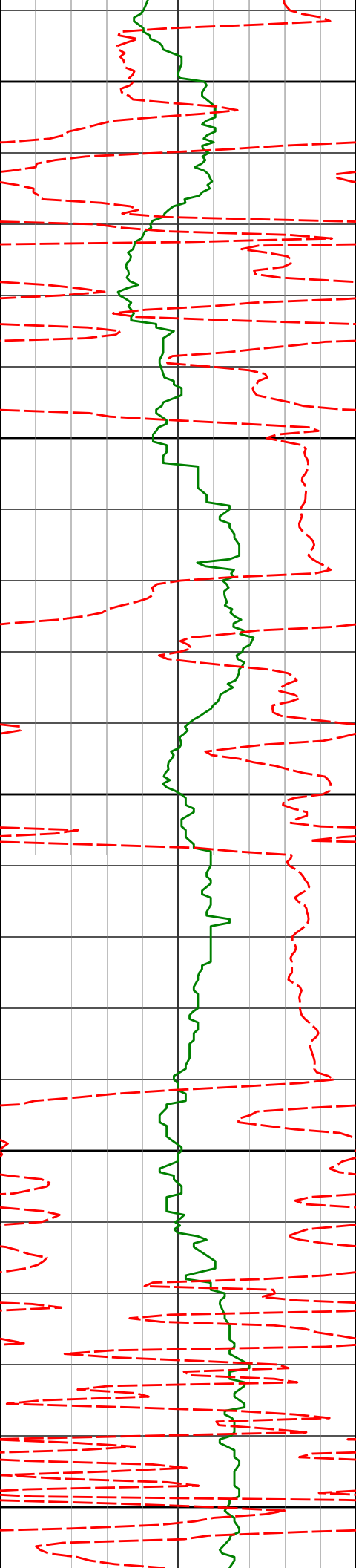
9371'

94.63°

187.17°

5756.14'

4126.65'



9400

9450

9500

9550

9600

9461'

92.28°

186.54°

5750.72'

4215.50'

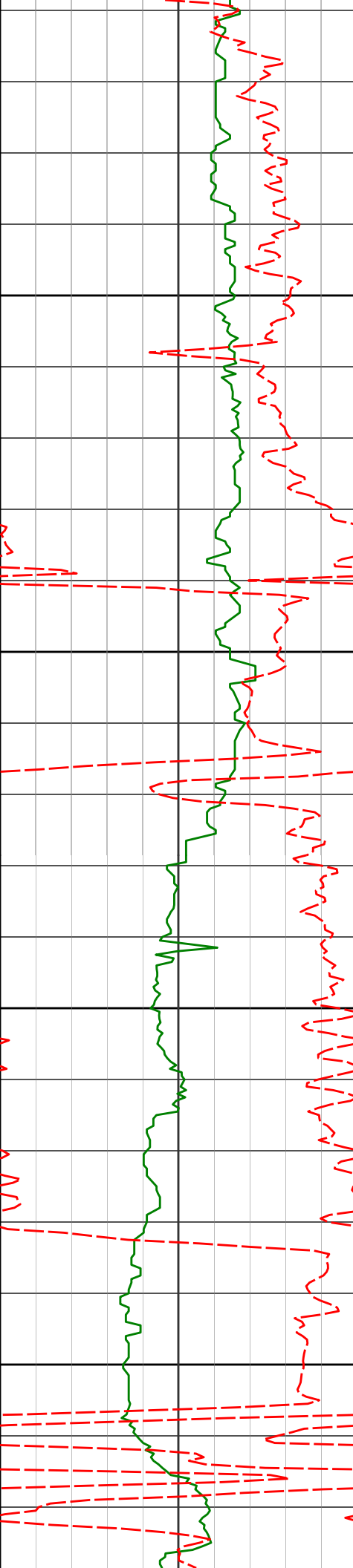
9552'

88.55°

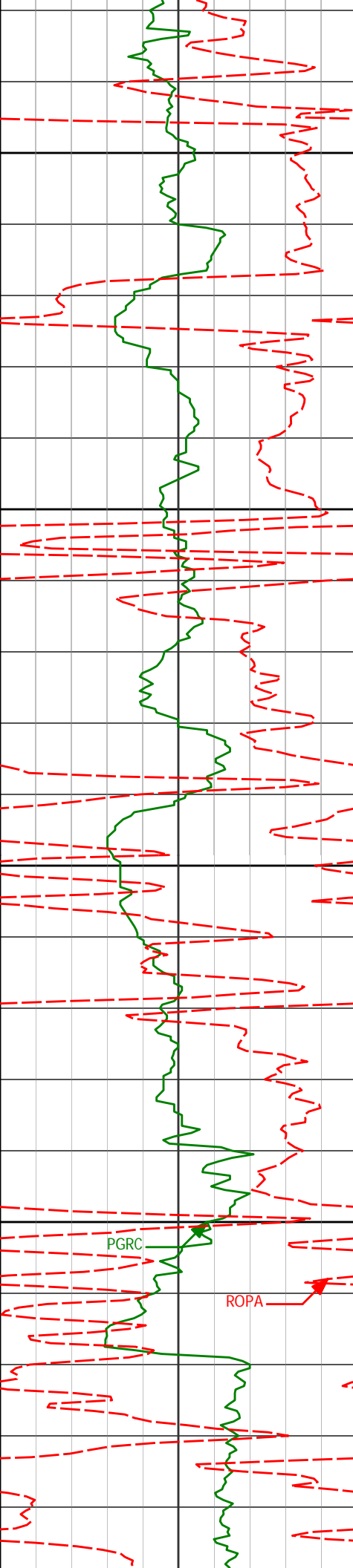
185.52°

5750.06'

4305.67'



9650	9644'	90.25°	186.76°	5751.02'	4396.81'
9700					
9750	9736'	88.15°	184.29°	5752.31'	4488.07'
	9766'	88.27°	184.07°	5753.24'	4517.90'
9800	9797'	87.53°	183.04°	5754.38'	4548.76'
	9827'	86.76°	182.59°	5755.87'	4578.63'



9850

9858'	86.79°	180.91°	5757.62'	4609.52'
-------	--------	---------	----------	----------

9888'	88.15°	178.44°	5758.94'	4639.48'
-------	--------	---------	----------	----------

9900

9919'	88.58°	177.05°	5759.83'	4670.47'
-------	--------	---------	----------	----------

9950

9949'	88.58°	177.31°	5760.57'	4700.45'
-------	--------	---------	----------	----------

9980'	88.74°	176.75°	5761.30'	4731.44'
-------	--------	---------	----------	----------

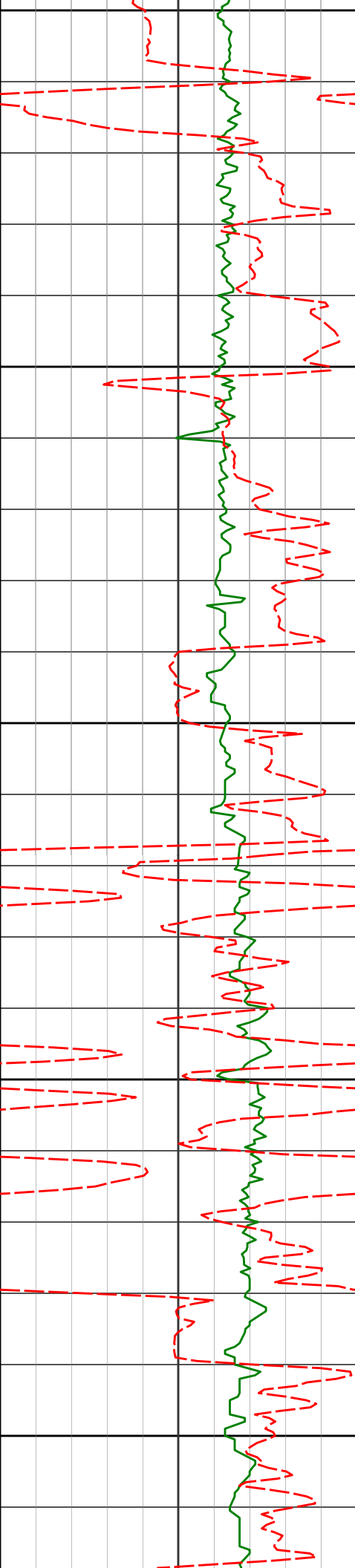
10000

PGRC

ROPA

10010'	88.89°	176.17°	5761.92'	4761.41'
--------	--------	---------	----------	----------

10041'	89.04°	176.43°	5762.48'	4792.39'
--------	--------	---------	----------	----------



10050

10071'

88.80°

176.38°

5763.04'

4822.36'

10100

10101'

87.38°

175.52°

5764.04'

4852.32'

10150

10200

10250

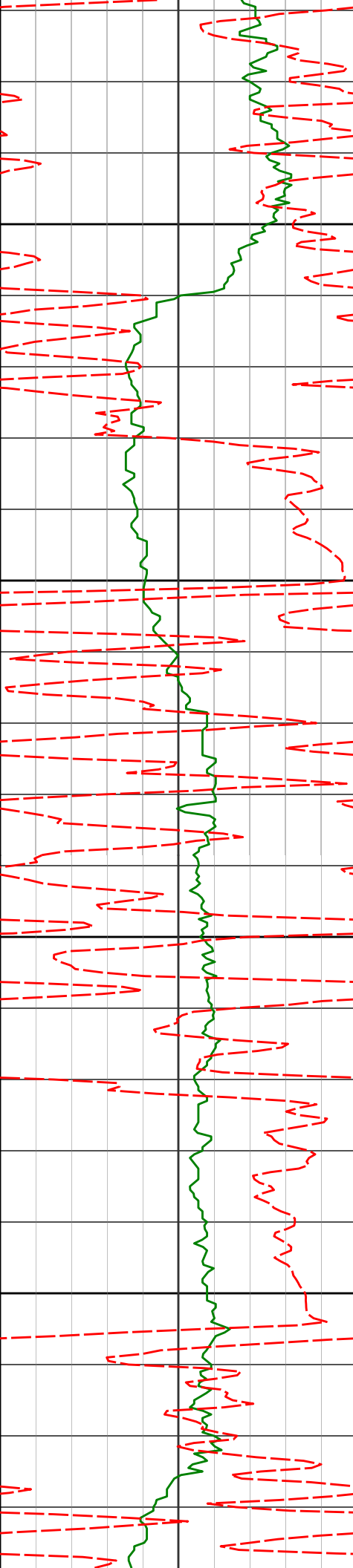
10193'

85.86°

176.76°

5769.47'

4944.09'



10300

10350

10400

10450

10284'

88.15°

176.95°

5774.22'

5034.92'

10376'

88.95°

177.79°

5776.55'

5126.88'

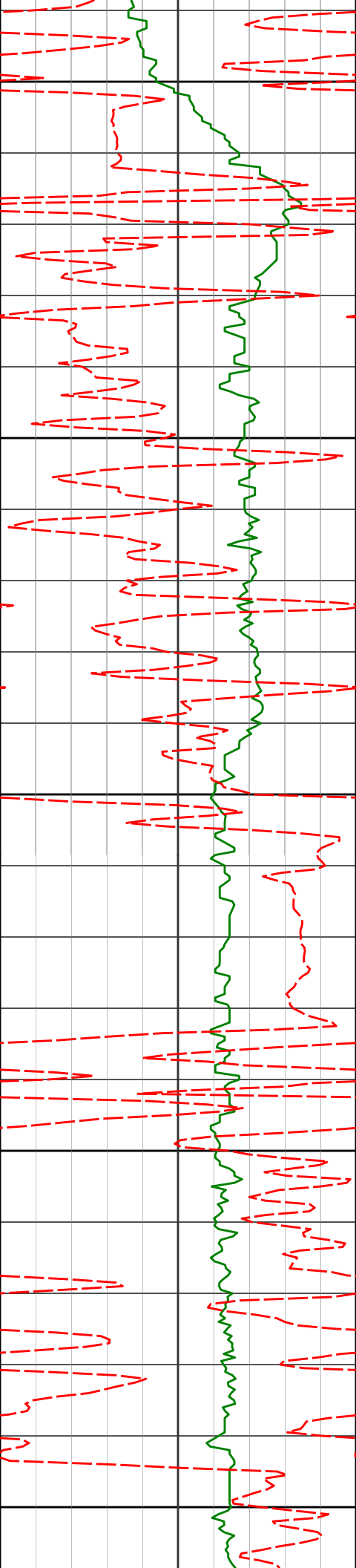
10468'

91.17°

180.87°

5776.45'

5218.85'



10500

10550

10560'

91.94°

179.69°

5773.96'

5310.76'

10600

10650

10651'

89.29°

182.09°

5772.98'

5401.65'

10681'

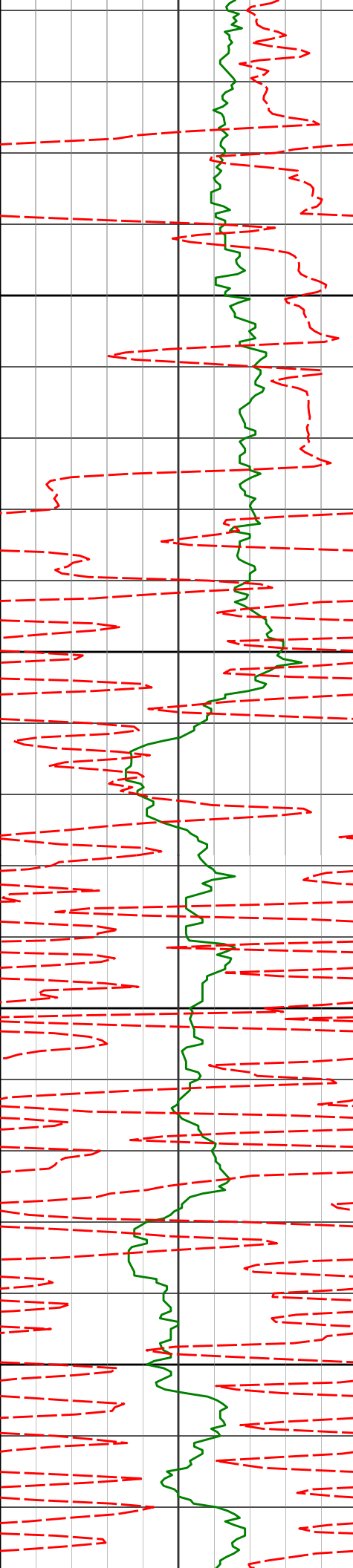
89.72°

181.68°

5773.24'

5431.60'

10700



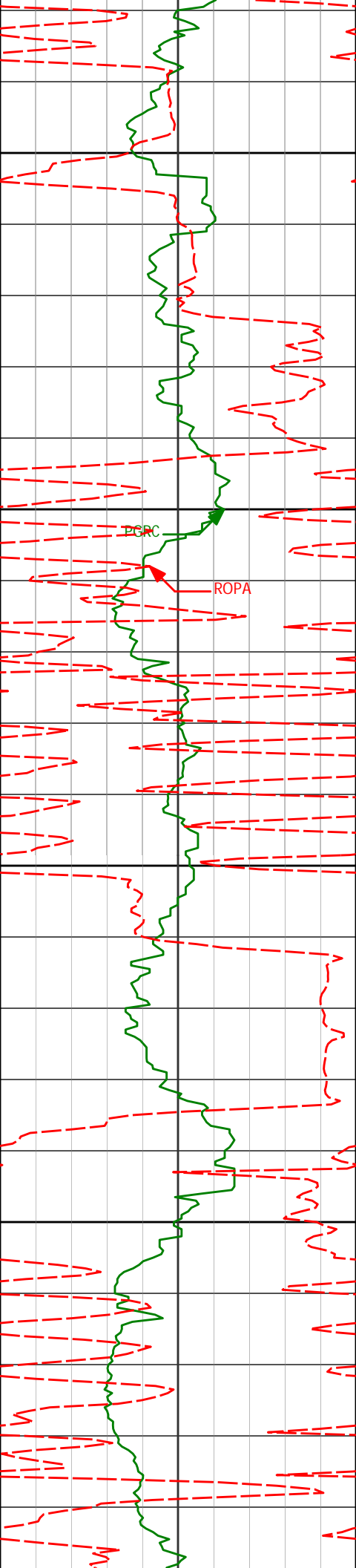
10750

10800

10850

10900

10712'	88.99°	181.51°	5773.59'	5462.54'
10742'	87.38°	182.33°	5774.54'	5492.47'
10772'	85.15°	181.04°	5776.49'	5522.35'
10833'	85.00°	180.85°	5781.73'	5583.07'
10924'	84.26°	179.44°	5790.25'	5673.62'



10950

11000

11050

11100

11016'

86.15°

178.99°

5797.94'

5765.29'

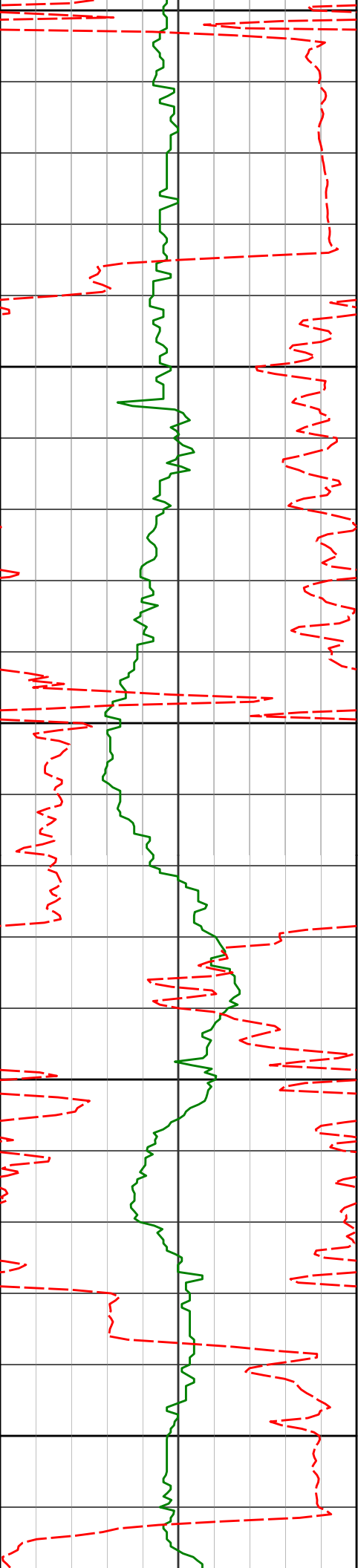
11108'

88.15°

178.72°

5802.51'

5857.16'



11150

11200

11250

11300

11350

11199'

11291'

91.42°

92.41°

180.43°

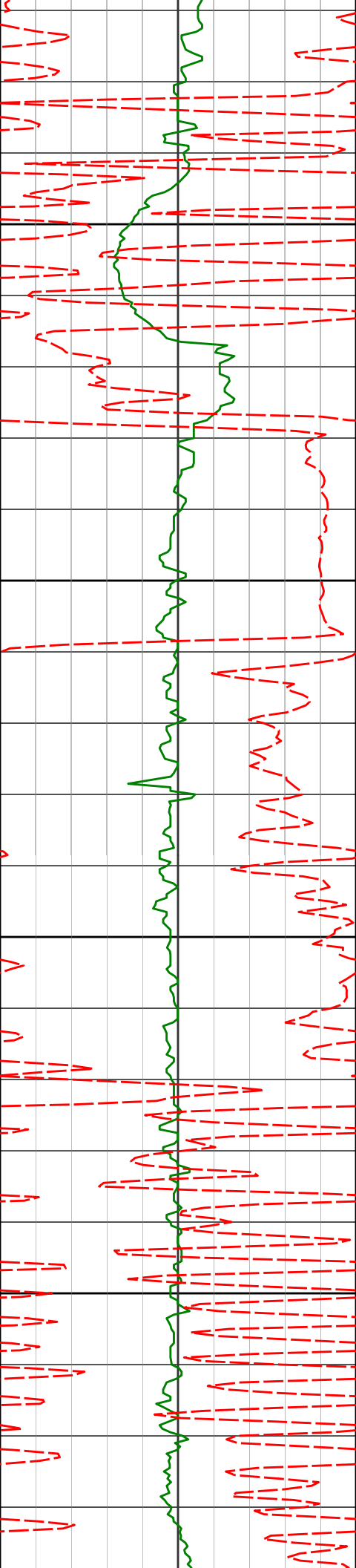
179.06°

5802.85'

5799.78'

5948.13'

6040.05'



11382' 92.38° 179.88° 5795.97' 6130.95'

11400

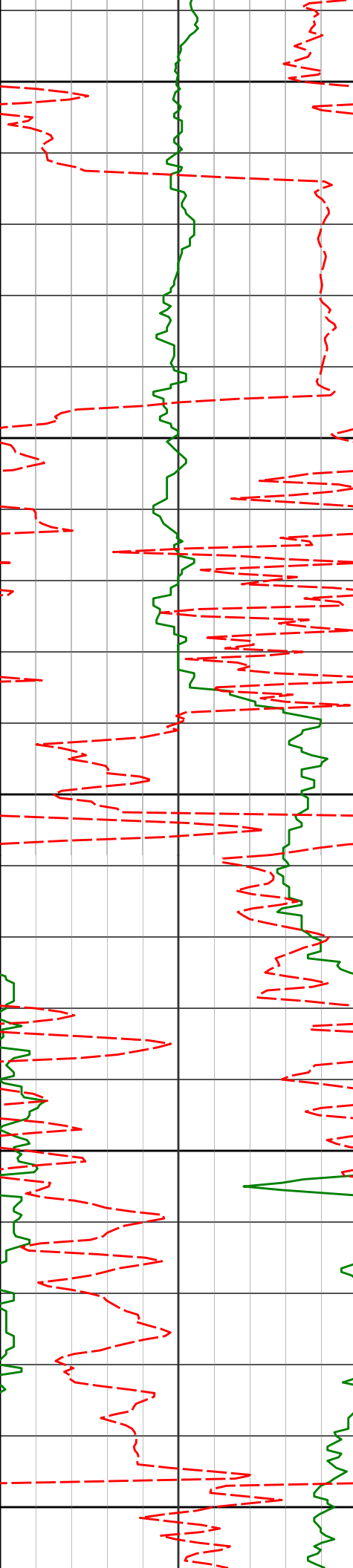
11450

11473' 90.40° 181.20° 5793.77' 6221.85'

11500

11550

11564' 91.76° 181.25° 5792.05' 6312.72'



11600

11650

11700

11750

11800

11656'

88.80°

181.27°

5791.60'

6404.59'

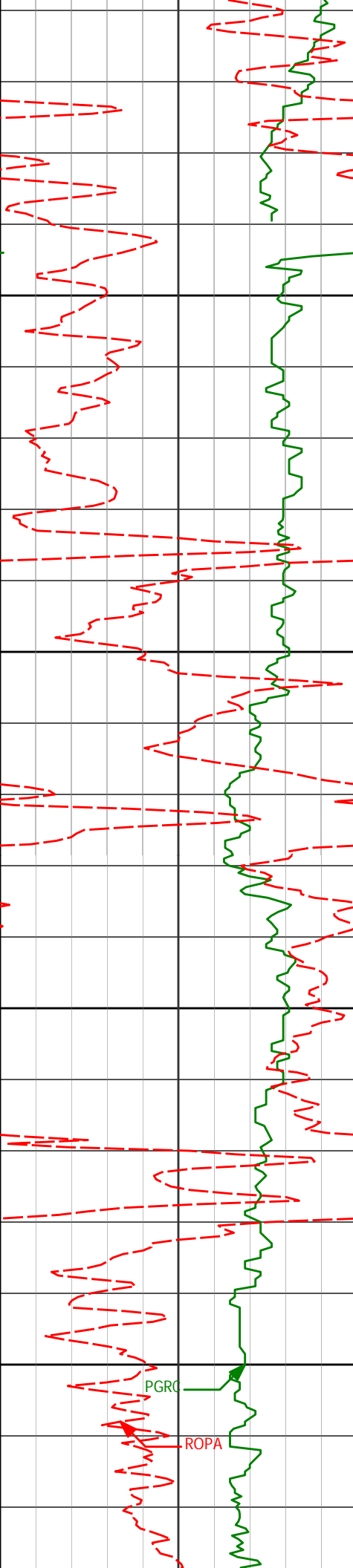
11747'

89.20°

180.84°

5793.19'

6495.48'



11838'	88.64°	180.13°	5794.90'	6586.40'
--------	--------	---------	----------	----------

11850

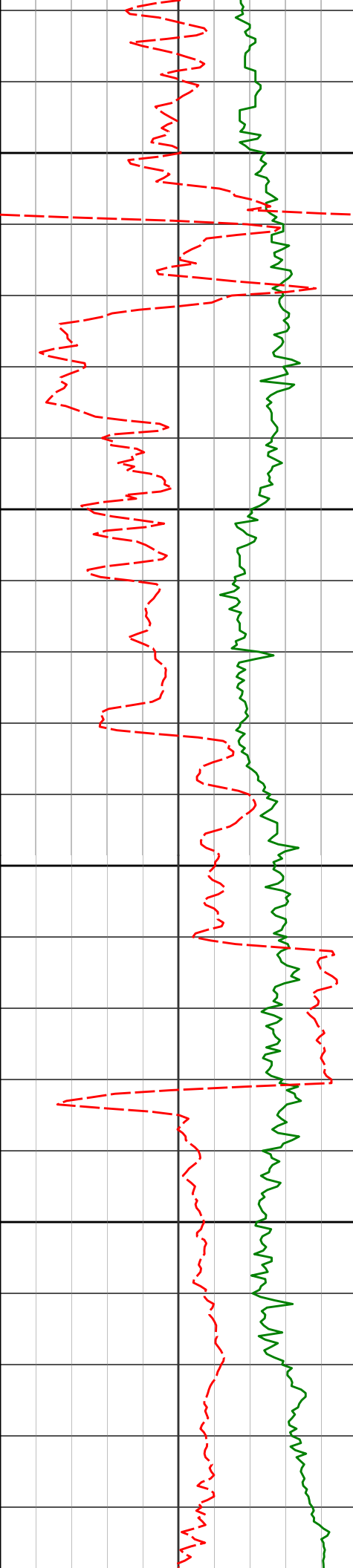
11900

11930'	88.18°	179.44°	5797.46'	6678.33'
--------	--------	---------	----------	----------

11950

12000

12022'	88.74°	179.47°	5799.93'	6770.28'
--------	--------	---------	----------	----------



12050

12100

12150

12200

12114'

89.41°

179.19°

5801.42'

6862.26'

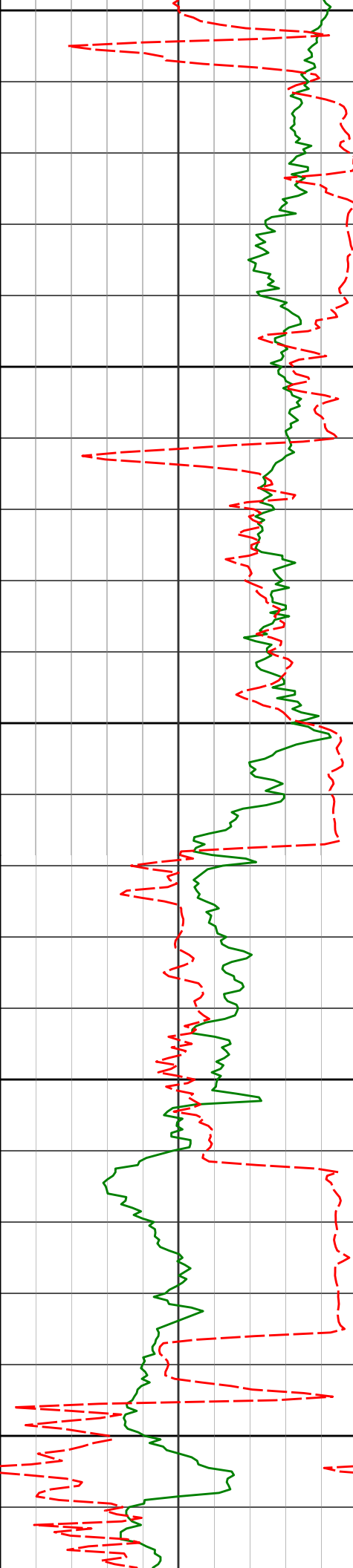
12205'

90.65°

180.00°

5801.37'

6953.23'



12250

12300

12350

12400

12450

12299'

12363'

12426'

88.06°

85.15°

85.53°

178.56°

178.39°

178.90°

5802.43'

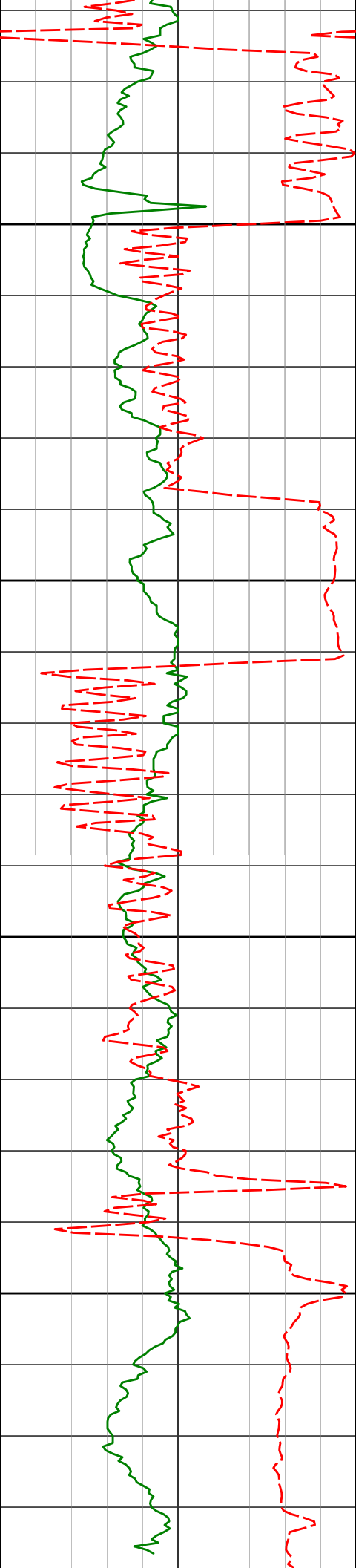
5806.22'

5811.33'

7047.21'

7111.09'

7173.88'



12489'

85.50°

178.54°

5816.26'

7236.68'

12500

12550

12584'

86.30°

180.62°

5823.05'

7331.41'

12600

12650

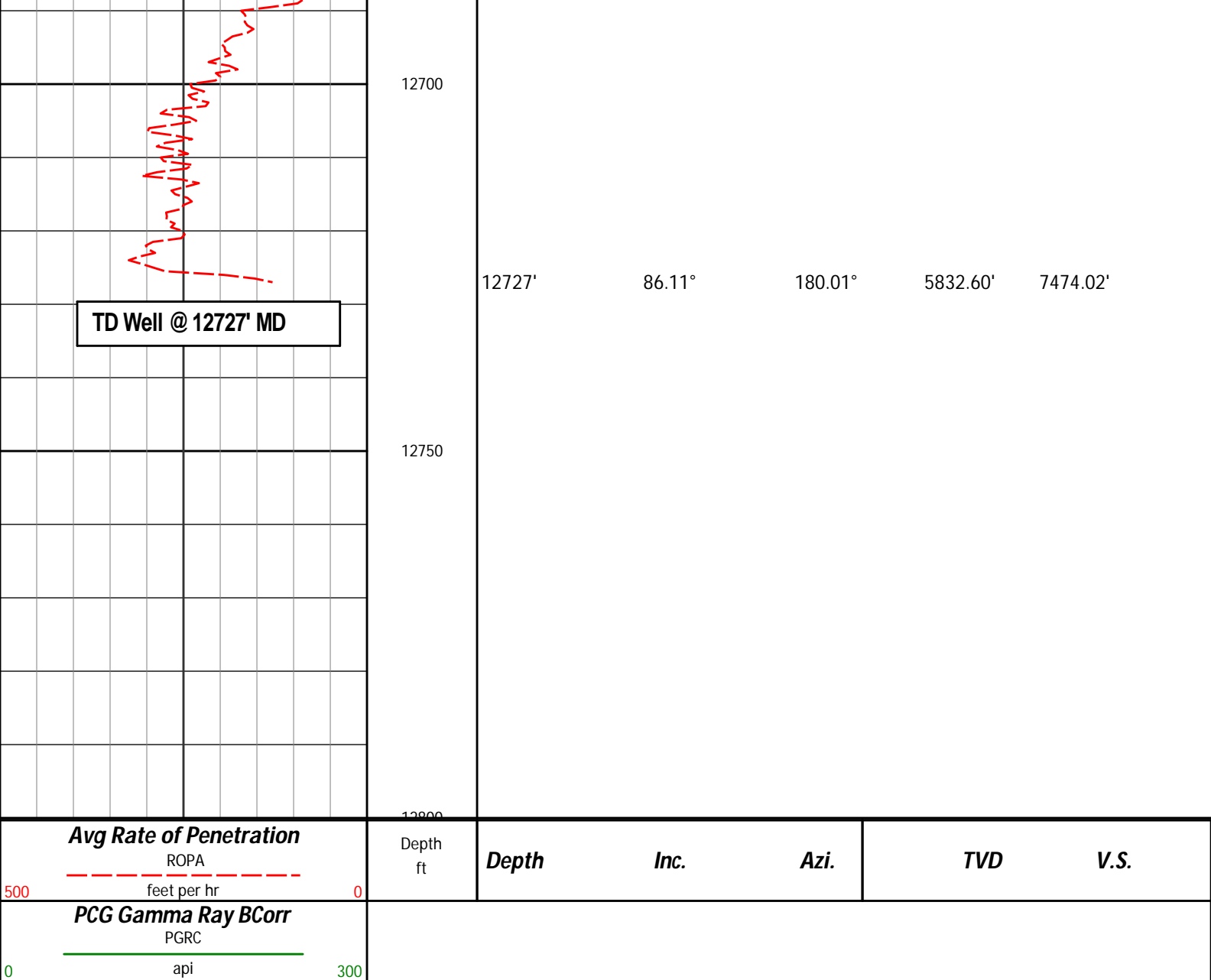
12680'

86.11°

180.01°

5829.41'

7427.15'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 21B-2811A
Redtail
Weld Colorado
USA
CA-XX-0900910695
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
166.00	0.18	355.49	166.00	0.26 N	0.02 W	-0.26	0.11
258.00	0.51	318.99	258.00	0.71 N	0.30 W	-0.72	0.41
350.00	0.07	313.86	350.00	1.06 N	0.61 W	-1.08	0.48
441.00	0.06	243.11	441.00	1.08 N	0.69 W	-1.10	0.08
503.00	0.36	227.02	503.00	0.93 N	0.86 W	-0.95	0.49
564.00	0.64	192.65	563.99	0.47 N	1.08 W	-0.50	0.65
625.00	0.88	186.90	624.99	0.33 S	1.21 W	0.30	0.41
686.00	1.63	192.32	685.97	1.64 S	1.45 W	1.60	1.24
747.00	2.06	191.84	746.94	3.56 S	1.86 W	3.51	0.71

809.00	2.40	194.58	808.89	5.91 S	2.42 W	5.84	0.57
870.00	2.37	180.51	869.84	8.41 S	2.75 W	8.33	0.96
962.00	2.47	181.30	961.76	12.29 S	2.81 W	12.21	0.11
1053.00	3.30	173.97	1052.64	16.86 S	2.58 W	16.78	1.00
1147.00	3.67	169.65	1146.47	22.51 S	1.76 W	22.45	0.48
1243.00	3.57	155.03	1242.28	28.24 S	0.06 E	28.23	0.96
1370.00	4.15	157.16	1368.99	36.06 S	3.51 E	36.14	0.47
1465.00	3.68	160.45	1463.77	42.10 S	5.87 E	42.25	0.55
1560.00	3.23	145.98	1558.60	47.19 S	8.38 E	47.41	1.03
1620.00	2.94	144.36	1618.51	49.84 S	10.23 E	50.11	0.50
1730.00	2.73	141.40	1728.38	54.18 S	13.50 E	54.54	0.23
1820.00	5.29	152.49	1818.15	59.54 S	16.76 E	59.99	2.96
1911.00	4.94	159.63	1908.79	66.93 S	20.06 E	67.48	0.80
2002.00	5.02	158.86	1999.45	74.32 S	22.86 E	74.94	0.11
2094.00	5.06	159.85	2091.09	81.88 S	25.71 E	82.58	0.10
2185.00	5.15	160.43	2181.73	89.50 S	28.46 E	90.27	0.11
2277.00	5.07	159.13	2273.36	97.19 S	31.29 E	98.04	0.15
2369.00	4.91	159.39	2365.02	104.67 S	34.12 E	105.60	0.18
2460.00	5.04	160.23	2455.67	112.08 S	36.85 E	113.08	0.16
2552.00	4.88	157.65	2547.33	119.50 S	39.70 E	120.58	0.30
2644.00	5.04	158.46	2638.98	126.88 S	42.67 E	128.04	0.19
2735.00	4.86	158.55	2729.64	134.18 S	45.55 E	135.42	0.20
2826.00	4.74	153.74	2820.33	141.14 S	48.62 E	142.47	0.46
2917.00	5.40	154.36	2910.97	148.37 S	52.14 E	149.80	0.73
3009.00	3.45	131.61	3002.70	154.12 S	56.08 E	155.65	2.81
3101.00	4.05	144.78	3094.50	158.61 S	60.03 E	160.25	1.14
3192.00	2.96	143.90	3185.33	163.13 S	63.27 E	164.87	1.20
3283.00	4.45	156.28	3276.14	168.26 S	66.07 E	170.08	1.85
3375.00	3.91	187.26	3367.90	174.64 S	67.11 E	176.48	2.49
3466.00	3.87	189.49	3458.70	180.75 S	66.21 E	182.56	0.17
3558.00	3.94	193.41	3550.48	186.89 S	64.97 E	188.66	0.30
3649.00	4.21	190.53	3641.25	193.21 S	63.63 E	194.94	0.37
3740.00	3.64	186.27	3732.04	199.37 S	62.70 E	201.07	0.70
3831.00	4.91	172.83	3822.79	206.10 S	62.88 E	207.81	1.77
3923.00	3.40	173.04	3914.54	212.72 S	63.70 E	214.44	1.64
4013.00	2.12	178.99	4004.43	217.03 S	64.05 E	218.77	1.46
4106.00	4.03	150.47	4097.30	221.60 S	65.69 E	223.38	2.57
4196.00	4.12	153.63	4187.07	227.24 S	68.69 E	229.11	0.27
4288.00	4.37	151.39	4278.82	233.28 S	71.83 E	235.23	0.33
4380.00	3.80	150.05	4370.59	239.00 S	75.03 E	241.04	0.63
4472.00	3.46	156.19	4462.40	244.18 S	77.68 E	246.29	0.56
4563.00	3.18	172.76	4553.25	249.20 S	79.10 E	251.35	1.09
4655.00	3.25	174.04	4645.11	254.32 S	79.69 E	256.49	0.11
4750.00	5.26	179.80	4739.84	261.36 S	79.99 E	263.53	2.16
4844.00	3.79	174.85	4833.55	268.76 S	80.28 E	270.94	1.62
4939.00	2.92	167.11	4928.38	274.25 S	81.11 E	276.44	1.03
5034.00	2.65	169.06	5023.27	278.76 S	82.06 E	280.98	0.30
5129.00	2.11	161.50	5118.19	282.58 S	83.03 E	284.82	0.66
5192.00	2.96	168.91	5181.13	285.27 S	83.71 E	287.54	1.44
5224.00	7.19	167.33	5212.99	288.04 S	84.31 E	290.32	13.22
5256.00	12.17	176.13	5244.53	293.36 S	84.98 E	295.66	16.19
5287.00	17.18	173.95	5274.51	301.18 S	85.68 E	303.49	16.26
5319.00	22.50	171.56	5304.60	311.94 S	87.08 E	314.29	16.81
5351.00	24.55	166.77	5333.94	324.47 S	89.50 E	326.89	8.76
5382.00	26.81	163.42	5361.88	337.45 S	92.97 E	339.95	8.66
5414.00	28.83	159.86	5390.18	351.61 S	97.69 E	354.25	8.17
5445.00	31.48	160.40	5416.98	366.25 S	102.98 E	369.03	8.59
5477.00	32.86	160.19	5444.07	382.29 S	108.72 E	385.23	4.33
5509.00	33.99	160.73	5470.78	398.91 S	114.62 E	402.00	3.65
5540.00	35.52	163.67	5496.25	415.73 S	120.01 E	418.97	7.32
5572.00	37.45	164.83	5521.97	434.04 S	125.17 E	437.43	6.40
5604.00	39.79	166.97	5546.98	453.41 S	130.03 E	456.93	8.42
5635.00	43.53	169.25	5570.13	473.57 S	134.26 E	477.20	13.02
5667.00	47.85	170.15	5592.48	496.10 S	138.34 E	499.83	13.65
5699.00	50.94	172.70	5613.31	520.12 S	141.95 E	523.94	11.39
5730.00	52.39	172.56	5632.54	544.23 S	145.07 E	548.14	4.69
5762.00	53.96	172.47	5651.71	569.63 S	148.41 E	573.62	4.91
5794.00	55.70	172.83	5670.15	595.57 S	151.75 E	599.64	5.51
5825.00	58.23	172.79	5687.04	621.35 S	155.01 E	625.51	8.16
5857.00	61.63	174.34	5703.08	648.86 S	158.10 E	653.10	11.42
5889.00	63.21	174.58	5717.89	677.09 S	160.84 E	681.40	4.98
5920.00	63.93	174.96	5731.69	704.74 S	163.37 E	709.10	2.57
5952.00	66.31	175.68	5745.15	733.67 S	165.74 E	738.09	7.71
5984.00	69.47	174.42	5757.20	763.20 S	168.30 E	767.68	10.53
6015.00	75.76	170.84	5766.46	792.52 S	172.11 E	797.09	23.09

	6047.00	79.39	170.26	5773.34	823.34 S	177.24 E	828.05
	6078.00	82.25	169.19	5778.29	853.45 S	182.70 E	858.30
	6110.00	83.42	169.08	5782.28	884.63 S	188.68 E	889.64
	6141.00	87.13	168.36	5784.83	914.92 S	194.72 E	920.09
	6173.00	91.70	165.49	5785.16	946.08 S	201.96 E	951.44
	6205.00	92.90	164.76	5783.87	976.98 S	210.17 E	982.56
	6236.00	93.83	164.73	5782.05	1006.84 S	218.31 E	1012.64
	6306.00	95.68	164.49	5776.25	1074.09 S	236.82 E	1080.39
	6369.00	94.49	164.85	5770.67	1134.61 S	253.41 E	1141.36
	6400.00	92.50	165.23	5768.78	1164.50 S	261.40 E	1171.46
	6448.00	90.03	169.29	5767.72	1211.29 S	271.98 E	1218.54
	6495.00	89.17	168.91	5768.04	1257.44 S	280.87 E	1264.92
	6590.00	91.14	169.94	5767.79	1350.82 S	298.30 E	1358.76
	6685.00	90.00	172.01	5766.84	1444.64 S	313.20 E	1452.96
	6780.00	86.26	174.64	5769.94	1538.92 S	324.24 E	1547.52
	6875.00	84.01	179.15	5778.00	1633.41 S	329.37 E	1642.11
	6970.00	83.45	182.11	5788.38	1727.82 S	328.33 E	1736.46
	7065.00	83.44	181.56	5799.23	1822.15 S	325.31 E	1830.67
	7160.00	86.88	182.11	5807.24	1916.75 S	322.28 E	1925.14
	7255.00	90.28	182.37	5809.59	2011.63 S	318.57 E	2019.88
	7318.00	92.13	180.84	5808.27	2074.59 S	316.80 E	2082.76
	7382.00	94.56	181.50	5804.54	2138.46 S	315.50 E	2146.57
	7445.00	94.44	182.31	5799.59	2201.23 S	313.41 E	2209.26
	7477.00	95.07	182.15	5796.94	2233.10 S	312.17 E	2241.07
	7508.00	95.74	180.06	5794.02	2263.95 S	311.57 E	2271.90
	7540.00	96.27	179.31	5790.67	2295.78 S	311.75 E	2303.72
	7572.00	97.30	179.32	5786.89	2327.55 S	312.13 E	2335.49
	7603.00	96.33	179.38	5783.21	2358.33 S	312.48 E	2366.26
	7635.00	94.56	180.25	5780.18	2390.18 S	312.58 E	2398.11
	7665.00	92.52	181.87	5778.32	2420.12 S	312.02 E	2428.01
	7696.00	90.34	183.40	5777.55	2451.07 S	310.60 E	2458.92
	7726.00	88.64	184.11	5777.82	2481.00 S	308.64 E	2488.78
	7757.00	87.96	183.00	5778.74	2511.93 S	306.71 E	2519.64
	7818.00	88.34	183.15	5780.71	2572.81 S	303.44 E	2580.40
	7910.00	88.55	183.11	5783.20	2664.64 S	298.42 E	2672.05
	8001.00	88.43	182.26	5785.60	2755.51 S	294.16 E	2762.76
	8092.00	89.45	182.69	5787.28	2846.41 S	290.23 E	2853.51
	8184.00	89.63	183.97	5788.02	2938.25 S	284.89 E	2945.16
	8275.00	89.78	183.90	5788.49	3029.03 S	278.64 E	3035.73
	8367.00	88.80	181.83	5789.63	3120.90 S	274.05 E	3127.43
	8458.00	88.95	181.87	5791.42	3211.84 S	271.11 E	3218.25
	8550.00	90.37	180.55	5791.96	3303.81 S	269.17 E	3310.13
	8641.00	90.89	179.50	5790.96	3394.80 S	269.13 E	3401.08
	8732.00	90.59	177.60	5789.79	3485.76 S	271.43 E	3492.07
	8823.00	91.79	177.77	5787.90	3576.67 S	275.10 E	3583.04
	8914.00	91.63	180.08	5785.18	3667.60 S	276.81 E	3673.99
	9005.00	91.33	183.17	5782.83	3758.53 S	274.23 E	3764.81
	9097.00	93.51	185.82	5778.95	3850.15 S	267.03 E	3856.19
	9188.00	94.75	186.13	5772.39	3940.42 S	257.58 E	3946.15
	9279.00	95.50	186.07	5764.26	4030.54 S	247.95 E	4035.96
	9371.00	94.63	187.17	5756.14	4121.57 S	237.39 E	4126.65
	9461.00	92.28	186.54	5750.72	4210.75 S	226.66 E	4215.50
	9552.00	88.55	185.52	5750.06	4301.23 S	217.11 E	4305.67
	9644.00	90.25	186.76	5751.02	4392.69 S	207.27 E	4396.81
	9736.00	88.15	184.29	5752.31	4484.24 S	198.41 E	4488.07
	9766.00	88.27	184.07	5753.24	4514.15 S	196.23 E	4517.90
	9797.00	87.53	183.04	5754.38	4545.07 S	194.31 E	4548.76
	9827.00	86.76	182.59	5755.87	4574.99 S	192.83 E	4578.63
	9858.00	86.79	180.91	5757.62	4605.93 S	191.89 E	4609.52
	9888.00	88.15	178.44	5758.94	4635.90 S	192.06 E	4639.48
	9919.00	88.58	177.05	5759.83	4666.86 S	193.28 E	4670.47
	9949.00	88.58	177.31	5760.57	4696.81 S	194.75 E	4700.45
	9980.00	88.74	176.75	5761.30	4727.76 S	196.36 E	4731.44
	10010.00	88.89	176.17	5761.92	4757.70 S	198.21 E	4761.41
	10041.00	89.04	176.43	5762.48	4788.63 S	200.21 E	4792.39
	10071.00	88.80	176.38	5763.04	4818.57 S	202.09 E	4822.36
	10101.00	87.38	175.52	5764.04	4848.47 S	204.21 E	4852.32
	10193.00	85.86	176.76	5769.47	4940.10 S	210.39 E	4944.09
	10284.00	88.15	176.95	5774.22	5030.83 S	215.38 E	5034.92
	10376.00	88.95	177.79	5776.55	5122.71 S	219.60 E	5126.88
	10468.00	91.17	180.87	5776.45	5214.68 S	220.67 E	5218.85
	10560.00	91.94	179.69	5773.96	5306.65 S	220.22 E	5310.76
	10651.00	89.29	182.09	5772.98	5397.61 S	218.81 E	5401.65
	10681.00	89.72	181.68	5773.24	5427.60 S	217.82 E	5431.60

10712.00	88.99	181.51	5773.59	5458.58 S	216.96 E	5462.54	2.42
10742.00	87.38	182.33	5774.54	5488.55 S	215.96 E	5492.47	6.02
10772.00	85.15	181.04	5776.49	5518.47 S	215.08 E	5522.35	8.58
10833.00	85.00	180.85	5781.73	5579.24 S	214.07 E	5583.07	0.40
10924.00	84.26	179.44	5790.25	5669.83 S	213.84 E	5673.62	1.74
11016.00	86.15	178.99	5797.94	5761.50 S	215.10 E	5765.29	2.11
11108.00	88.15	178.72	5802.51	5853.36 S	216.94 E	5857.16	2.19
11199.00	91.42	180.43	5802.85	5944.34 S	217.61 E	5948.13	4.05
11291.00	92.41	179.06	5799.78	6036.29 S	218.02 E	6040.05	1.84
11382.00	92.38	179.88	5795.97	6127.20 S	218.86 E	6130.95	0.90
11473.00	90.40	181.20	5793.77	6218.17 S	218.00 E	6221.85	2.61
11564.00	91.76	181.25	5792.05	6309.13 S	216.06 E	6312.72	1.50
11656.00	88.80	181.27	5791.60	6401.09 S	214.04 E	6404.59	3.22
11747.00	89.20	180.84	5793.19	6492.06 S	212.36 E	6495.48	0.65
11838.00	88.64	180.13	5794.90	6583.04 S	211.59 E	6586.40	0.99
11930.00	88.18	179.44	5797.46	6675.01 S	211.94 E	6678.33	0.90
12022.00	88.74	179.47	5799.93	6766.97 S	212.81 E	6770.28	0.61
12114.00	89.41	179.19	5801.42	6858.95 S	213.89 E	6862.26	0.79
12205.00	90.65	180.00	5801.37	6949.94 S	214.53 E	6953.23	1.63
12299.00	88.06	178.56	5802.43	7043.92 S	215.71 E	7047.21	3.15
12363.00	85.15	178.39	5806.22	7107.78 S	217.41 E	7111.09	4.55
12426.00	85.53	178.90	5811.33	7170.55 S	218.90 E	7173.88	1.01
12489.00	85.50	178.54	5816.26	7233.34 S	220.30 E	7236.68	0.57
12584.00	86.30	180.62	5823.05	7328.09 S	220.99 E	7331.41	2.34
12680.00	86.11	180.01	5829.41	7423.88 S	220.47 E	7427.15	0.66
12727.00	86.11	180.01	5832.60	7470.77 S	220.46 E	7474.02	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 178.37 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.10 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 12727.00 FEET
IS 7474.02 FEET ALONG 178.31 DEGREES (TRUE)**

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