HALLIBURTON | Sperry Drilling

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

Powered by INSITE™

1 : 600 / 1 : 240

Country	: USA
Field	: Wattenburg
Location	: Lat: 40° 28' 41.30" North Long: 104° 21' 20.48" West
Well	: Wells Ranch AE19-689
Company	: Noble Energy
Rig	: H&P 321

Company : **Noble Energy**
Rig : **H&P 321**
Well : **Wells Ranch AE19-689**
Field : **Wattenburg**
Country : **USA**
API Number : **05-123-39895**

LOCATION

Latitude : **40° 28' 41.30" North**
Longitude : **104° 21' 20.48" West**
UTM Easting = **3,318,326.000 ft**
UTM Northing = **1,419,080.740 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4842.00 ft**
Log Measured From : **Drill Floor** **30.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4872.00 ft**
GL **4842.00 ft**
WD **N/A**

Depth Logged : **759.00 ft** To **17,296.00 ft**
Date Logged : **12-Dec-14** To **15-Dec-14**
Total Depth MD : **17,296.00 ft** TVD : **6,709.28 ft**
Spud Date : **12-Dec-14**

Unit No. : **11210424** Job No. :**CA-XX-0901853575**
Plot Type : **Final**
Plot Date : **22-Dec-14**

Run No.	Borehole Record (MD)			Run No.	Borehole Record (MD)		
	Size	From	To		Size	From	To
100	8.750 in	759.00 ft	1,250.00 ft				
200	8.750 in	1,250.00 ft	7,090.00 ft				
300	6.125 in	7,090.00 ft	17,296.00 ft				

Casing Record (MD)			
Size	Weight	From	To
9.625 in	34.90 lbpf	SURFACE	749.00 ft
7.000 in	25.70 lbpf	SURFACE	7,080.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	13-Dec-14	15-Dec-14	21-Dec-14		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.820	6.820	5.010		
Log Start Depth (MD, ft)	759.00	1,255.00	7,090.00		
Log End Depth (MD, ft)	1,255.00	7,090.00	17,296.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	13-Dec-14 05:16	13-Dec-14 10:22	16-Dec-14 04:54		
Drill/Wipe End Date and Time	13-Dec-14 06:51	14-Dec-14 21:26	21-Dec-14 07:19		
Min Inc (deg) @ Depth (MD, ft)	0.66 @ 920.00	0.22 @ 2,035.00	86.05 @ 15,991.00		
Max Inc (deg) @ Depth (MD, ft)	0.85 @ 1,195.00	83.27 @ 7,030.00	93.21 @ 15,612.00		
Bit TFA(in2) / Bit Type	1.04 / PDC	1.74 / PDC	0.65 / PDC		
Flow Rate (gpm)	566.67	582.31	314.60		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.50 / 32.00	9.80 / 11.00	9.38 / 36.00		
Filtrate CL (ppm)	1,200.00	1,700.00	2,100.00		
pH / Fluid Loss (mptm)	8.10 / 12	9.40 / 7	8.60 / 8		
PV (cP) / YP (lhf2)	2 / 2.00	11 / 9.00	8 / 16.00		
% Solids / % Sand	1.20 / 0.20	12.50 / 0.25	5.20 / 0.35		
% Oil / Oil:Water Ratio	N/A / N/A	0.50 / N/A	2.30 / 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		

Max Tool Temp (degF) / Source	74.20 / PCM	160.83 / PCM	238.70 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ 74.20	N/A @ 160.83	N/A @ 238.70		
Lead MWD Engineer	Robert Barnes	Robert Barnes	Robert Barnes		
Customer Representative	Stetson Nielsen	Stetson Nielsen	Jim Turner		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11341320	11341320	12463929		
Insert Serial Number	11400994	11400994	11400994		
Date and Time Initialized	12-Dec-14 17:04	01-Jan-70 00:00	15-Dec-14 10:36		
Date and Time Read	15-Dec-14 04:10	15-Dec-14 04:15	21-Dec-14 21:17		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	60.00	60.00	66.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341320	11341320	12463929		
Sonde Serial Number	11833222	11833222	11638576		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	62.98	59.01	204.75		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	53.18	53.18	69.03		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11341320	11341320	12463929		
Insert/Sonde Serial Number	11579773	11579773	11120594		

REMARKS

1. All depths are calibrated to driller's pipe tally and are measured depth's from the Drill Floor.

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

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

4. All data presented is recorded data unless otherwice specified.

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

1:600 Log
PGRC (Gamma CG) and ROPA (Average Rate of Penetration)
Interval Resolution: 1.0 ft
Interval Distance: 3.0 ft

1:240 Log
PGRC (Gamma CG):
Interval Resolution: 0.5 ft
Interval Distance: 0.6 ft

ROPA (Average Rate Of Penetration):
Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

6. Insite Version V8.0.20

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 Correlation Log 1:600

Noble Energy
Wells Ranch AE19-689
H&P 321
Sec.20-T6N-R62W

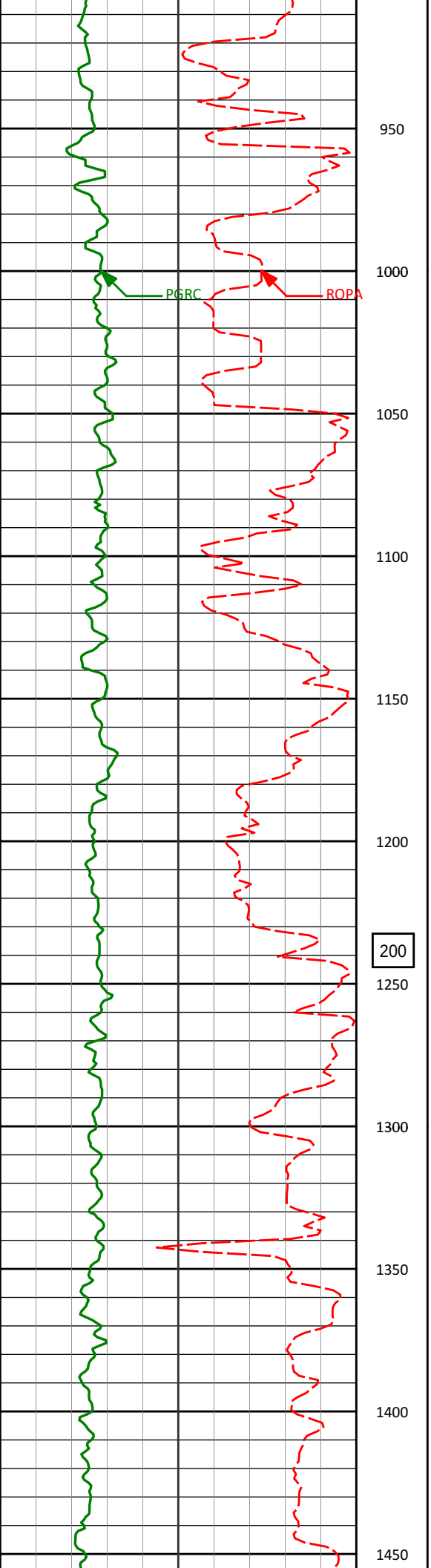
PCG Gamma Ray BCorr
PGRC
0 api 300

Avg Rate of Penetration
ROPA
1K feet per hr 0

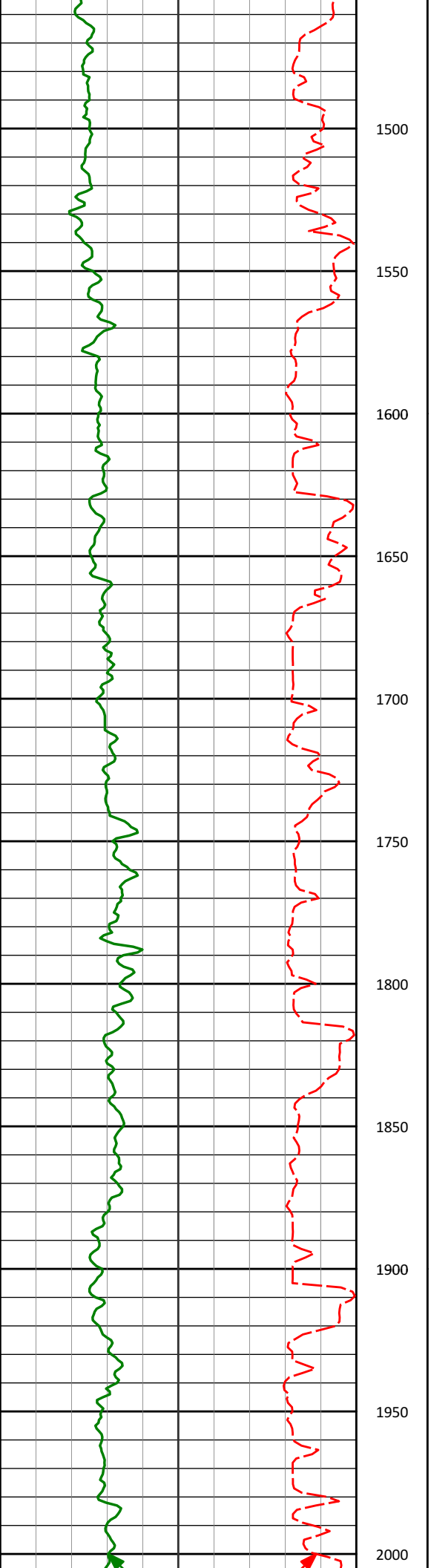
Depth ft

Depth	*Inc.*	*Azi.*	*TVD*	*V.S.*
828'	0.78°	44.93°	827.90'	-8.23'

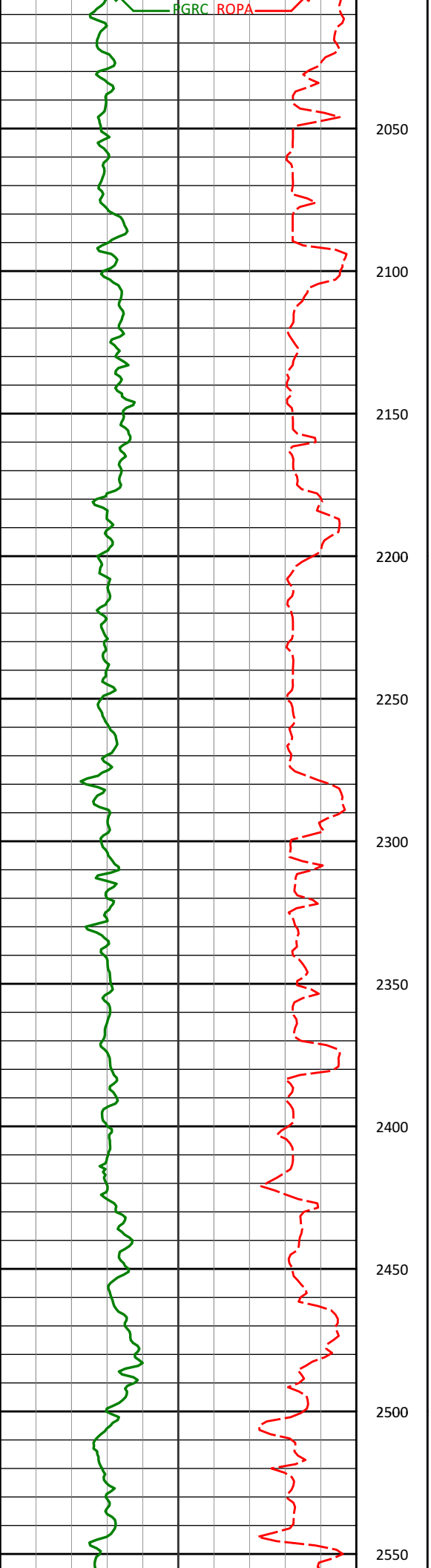
750
800
850
900



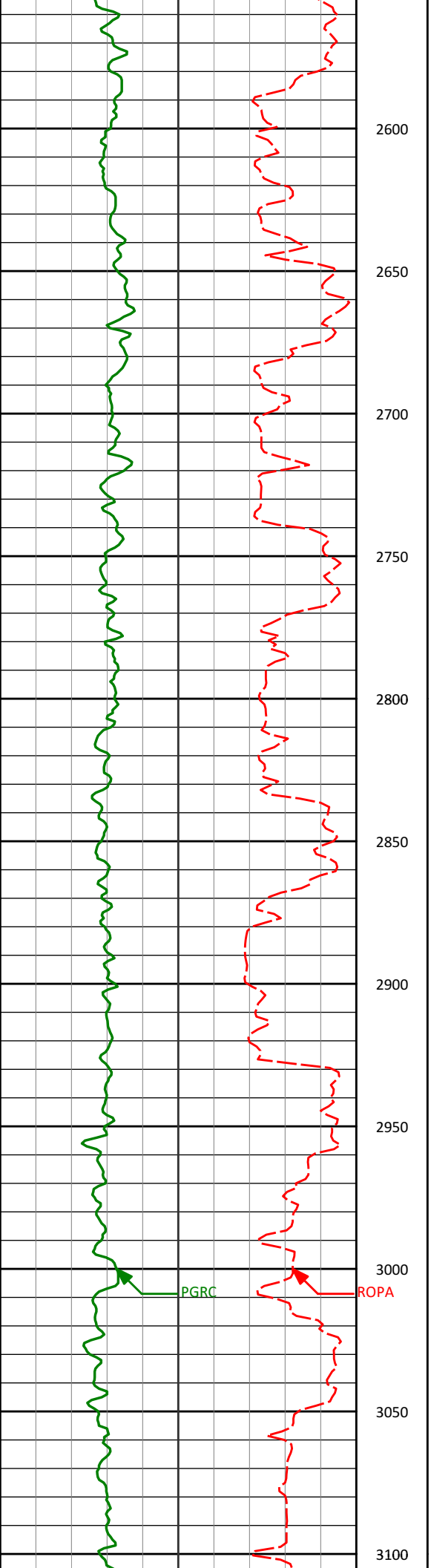
920'	0.66°	43.17°	919.89'	-9.01'
1012'	0.78°	33.73°	1011.88'	-9.70'
1104'	0.73°	37.69°	1103.87'	-10.38'
1195'	0.85°	62.41°	1194.87'	-11.31'
1301'	0.51°	270.35°	1300.86'	-11.53'
1394'	0.58°	321.53°	1393.86'	-10.81'



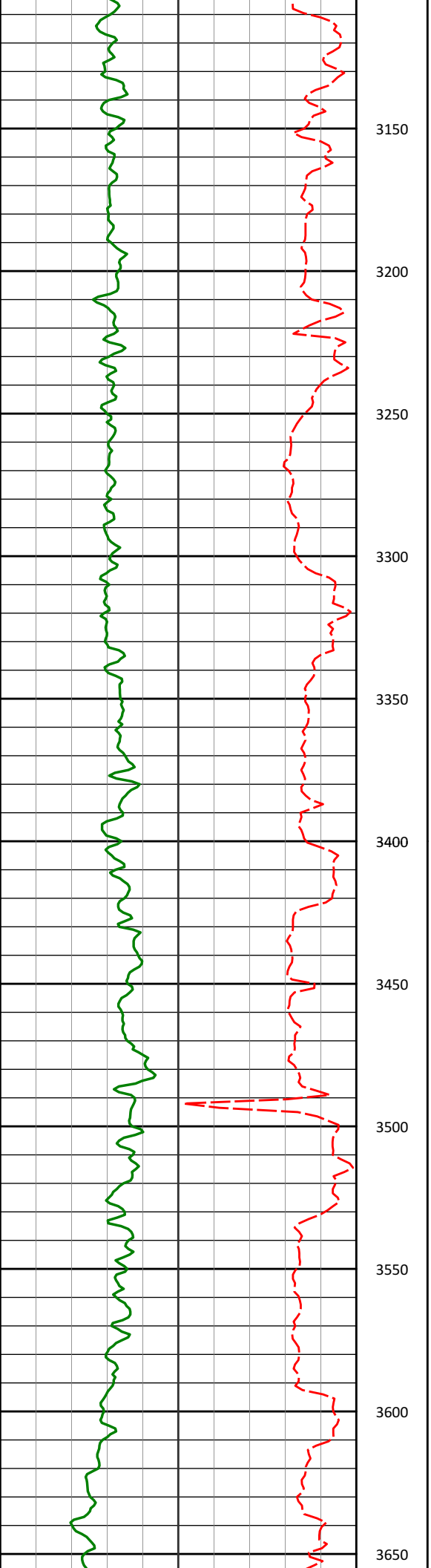
1485'	1.26°	302.17°	1484.85'	-9.66'
1577'	1.57°	256.77°	1576.82'	-7.57'
1760'	1.12°	275.65°	1759.77'	-3.36'
1852'	0.85°	285.63°	1851.76'	-1.80'
1943'	0.88°	303.81°	1942.75'	-0.55'



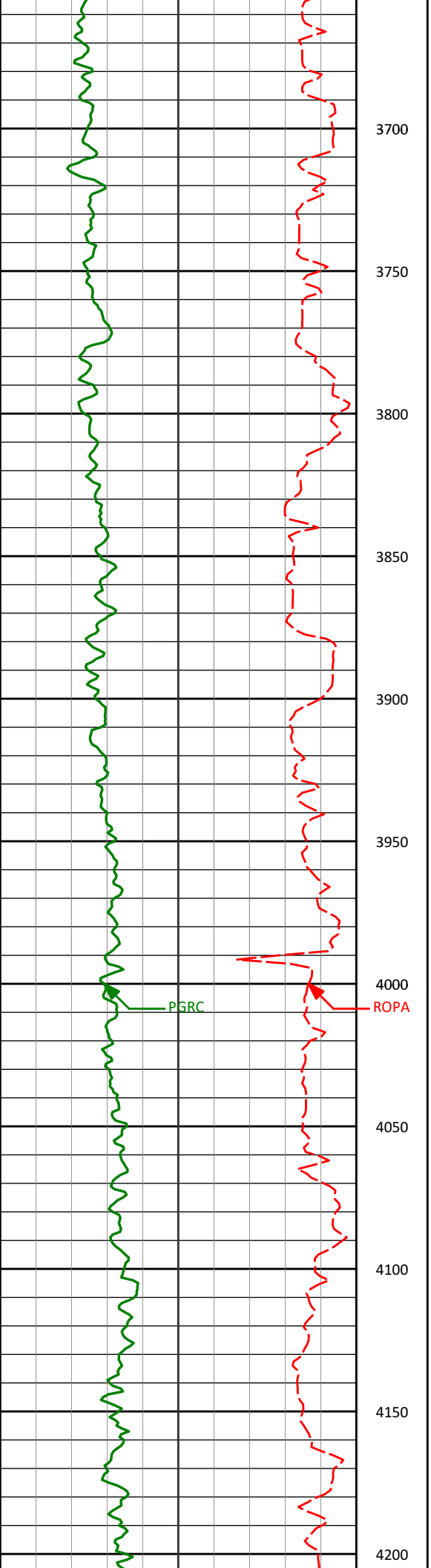
2035'	0.22°	103.17°	2034.75'	-0.13'
2221'	0.29°	100.59°	2220.74'	-0.95'
2313'	0.22°	69.68°	2312.74'	-1.34'
2405'	0.24°	36.81°	2404.74'	-1.61'
2497'	0.50°	6.03°	2496.74'	-1.76'



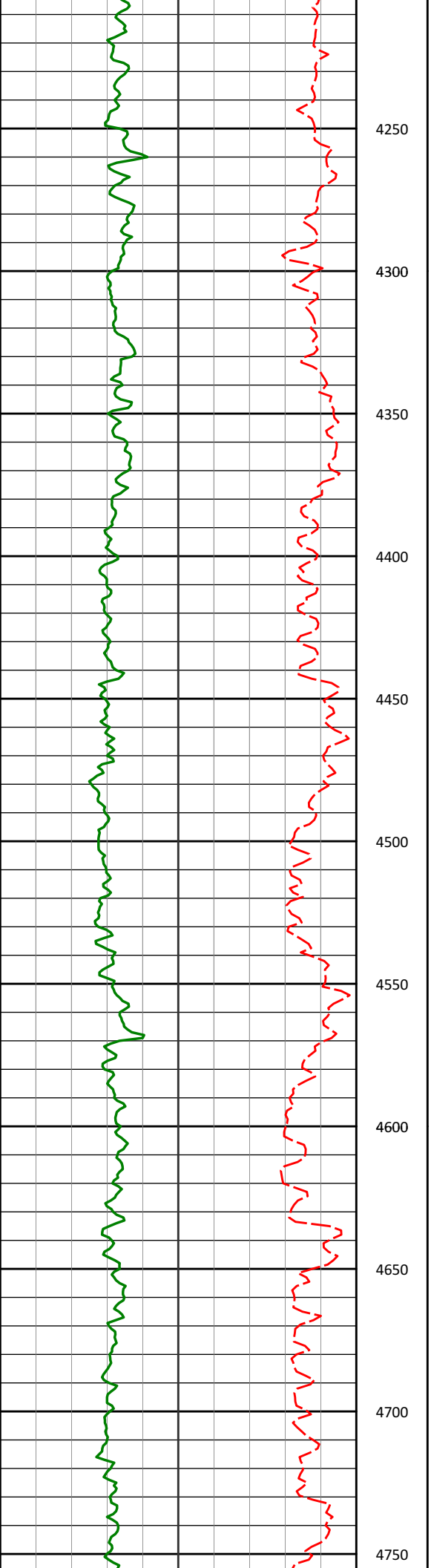
2590'	1.55°	351.19°	2589.72'	-1.57'
2681'	2.92°	348.71°	2680.65'	-0.83'
2775'	4.39°	351.32°	2774.46'	0.33'
2869'	5.09°	351.43°	2868.14'	1.69'
2963'	7.34°	348.38°	2961.58'	3.77'
3057'	8.02°	343.93°	3054.74'	7.11'



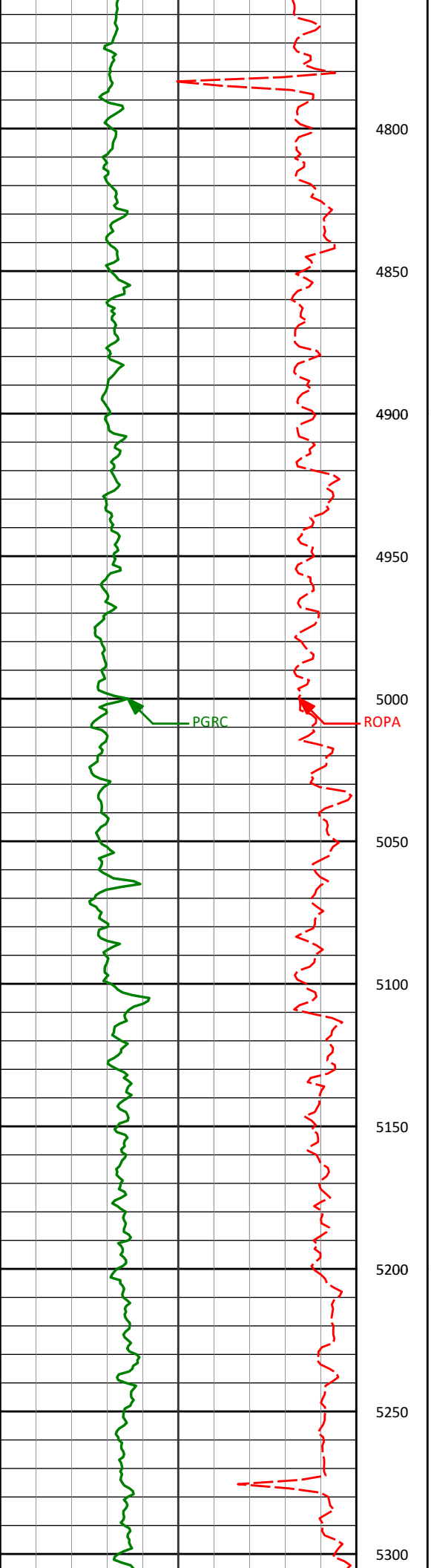
3152'	7.54°	345.10°	3148.86'	10.86'
3247'	8.23°	344.23°	3242.96'	14.63'
3342'	8.98°	343.28°	3336.89'	18.95'
3531'	8.67°	338.50°	3523.66'	29.11'
3626'	8.83°	336.83°	3617.55'	34.95'



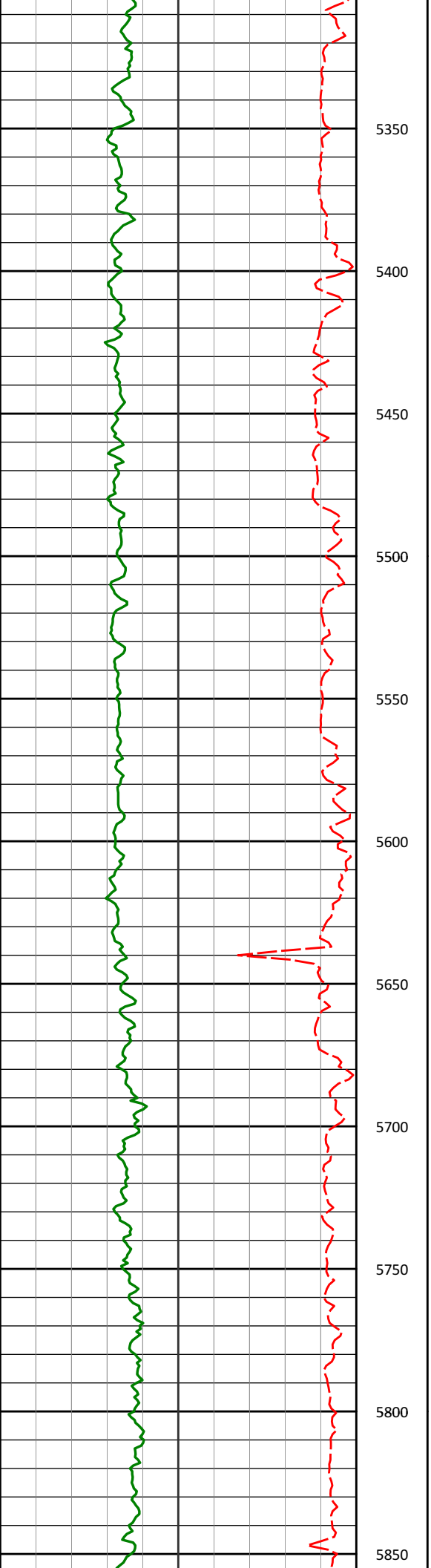
3721'	8.73°	332.52°	3711.44'	41.47'
3815'	8.75°	337.12°	3804.35'	47.87'
3910'	8.97°	336.04°	3898.22'	54.03'
4005'	8.54°	336.57°	3992.11'	60.18'
4100'	7.98°	335.59°	4086.12'	66.02'
4195'	7.69°	336.55°	4180.24'	71.58'



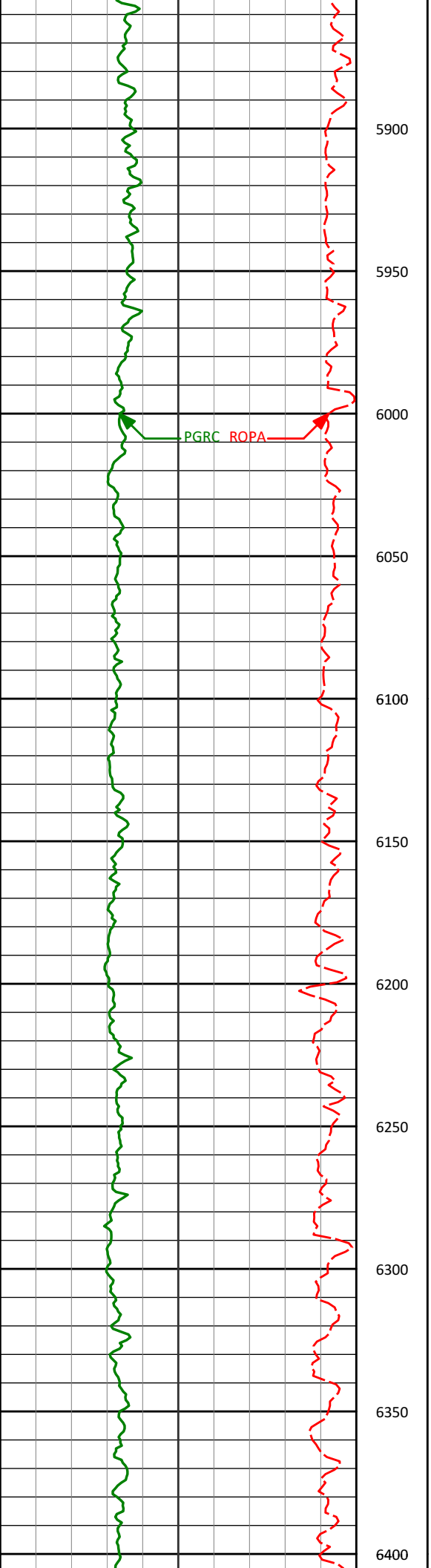
4289'	6.98°	335.71°	4273.47'	76.71'
4384'	6.85°	344.12°	4367.78'	80.90'
4479'	7.74°	339.92°	4462.01'	84.94'
4574'	8.62°	345.01°	4556.04'	89.31'
4669'	8.33°	346.59°	4650.00'	93.09'



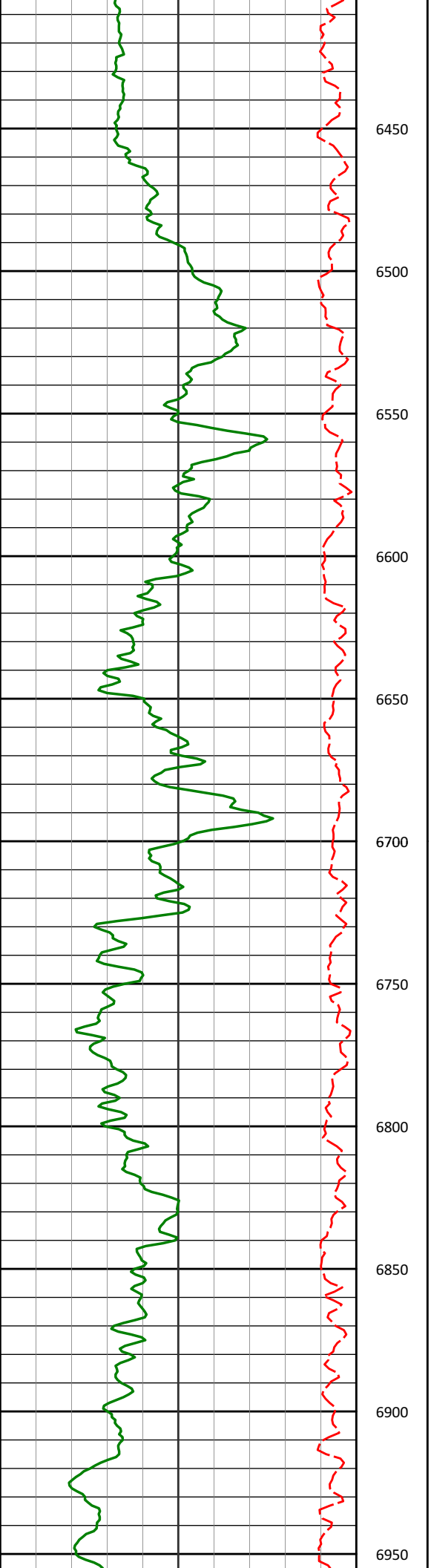
4763'	8.39°	347.78°	4743.01'	96.46'
4858'	7.90°	348.57°	4837.05'	99.55'
4953'	6.93°	348.26°	4931.25'	102.32'
5048'	8.57°	351.29°	5025.38'	104.88'
5142'	7.45°	349.53°	5118.46'	107.37'
5237'	5.67°	345.61°	5212.84'	109.93'



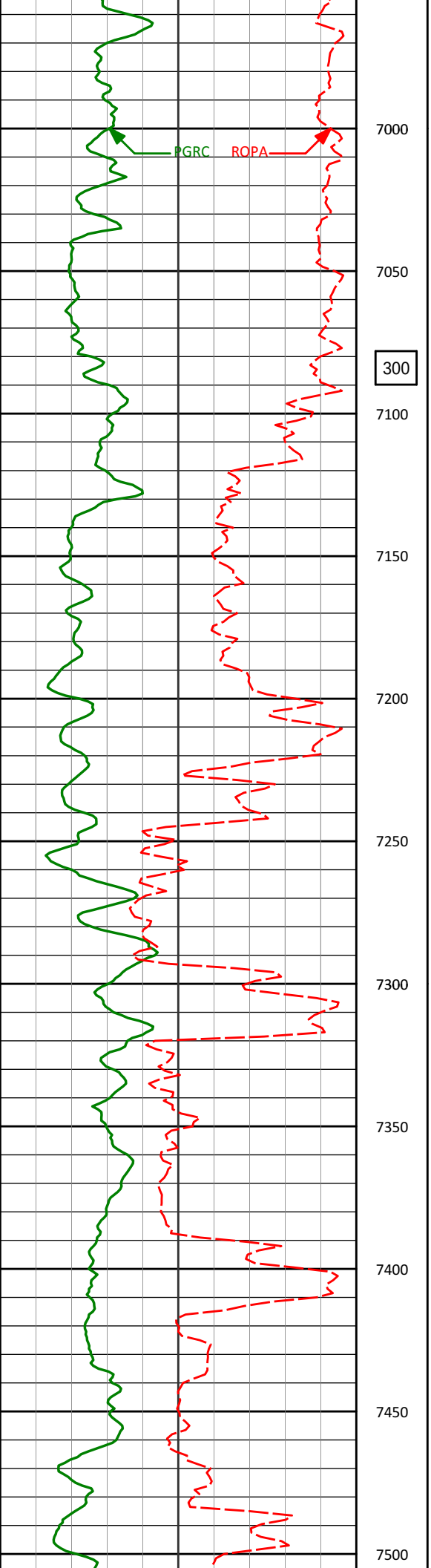
5332'	6.33°	338.17°	5307.32'	113.28'
5427'	6.55°	342.76°	5401.72'	117.09'
5521'	7.31°	345.24°	5495.03'	120.48'
5616'	7.78°	351.34°	5589.21'	123.30'
5711'	9.15°	352.44°	5683.17'	125.61'
5806'	7.60°	349.78°	5777.16'	128.07'



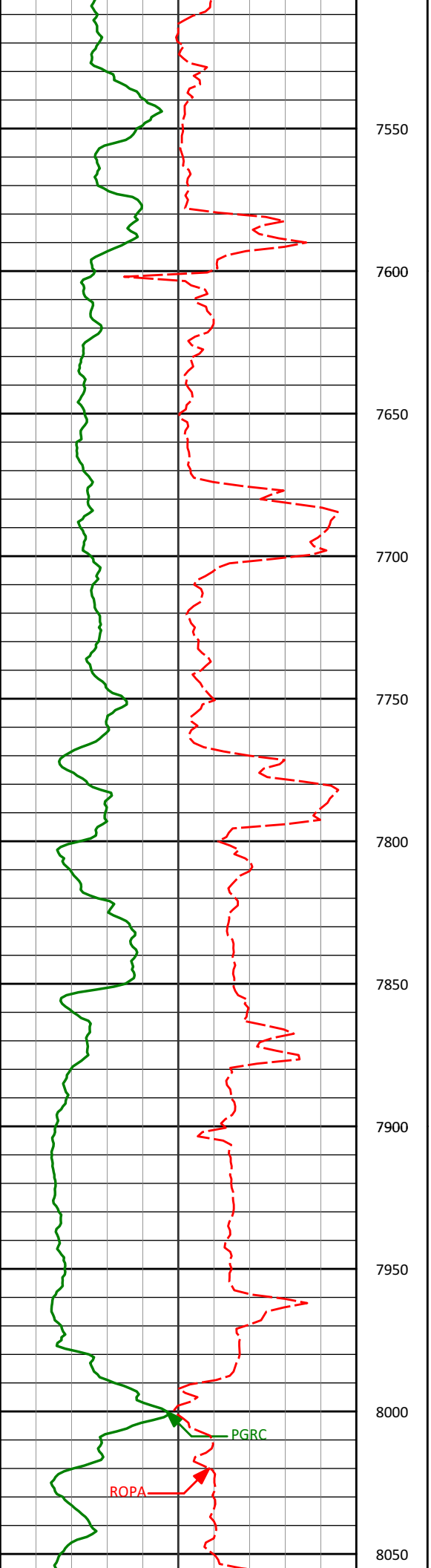
5901'	7.06°	339.57°	5871.38'	131.52'
5996'	6.25°	338.52°	5965.74'	135.71'
6044'	7.85°	320.94°	6013.38'	138.86'
6090'	13.64°	319.95°	6058.56'	144.50'
6138'	18.64°	317.79°	6104.65'	153.55'
6185'	21.33°	311.50°	6148.82'	165.29'
6233'	23.92°	301.57°	6193.14'	180.39'
6280'	26.30°	291.12°	6235.72'	198.45'
6328'	27.29°	281.76°	6278.58'	219.30'
6375'	28.61°	273.41°	6320.12'	241.16'



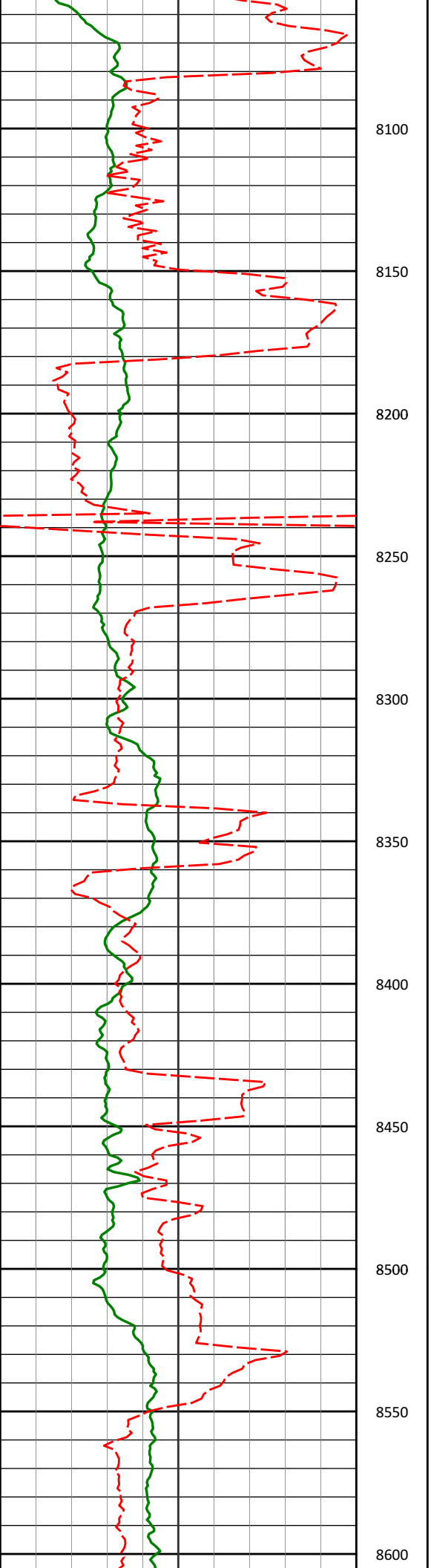
6423'	28.83°	275.05°	6362.21'	264.20'
6470'	31.10°	273.90°	6402.93'	287.64'
6518'	36.17°	271.66°	6442.88'	314.21'
6565'	41.27°	270.09°	6479.54'	343.59'
6613'	45.82°	267.16°	6514.33'	376.60'
6659'	50.39°	265.31°	6545.04'	410.69'
6707'	55.71°	264.99°	6573.88'	448.80'
6754'	59.97°	266.42°	6598.89'	488.38'
6802'	64.64°	268.02°	6621.20'	530.75'
6849'	69.45°	268.94°	6639.52'	573.96'
6897'	72.77°	269.64°	6655.06'	619.33'
6944'	75.95°	268.69°	6667.73'	664.55'



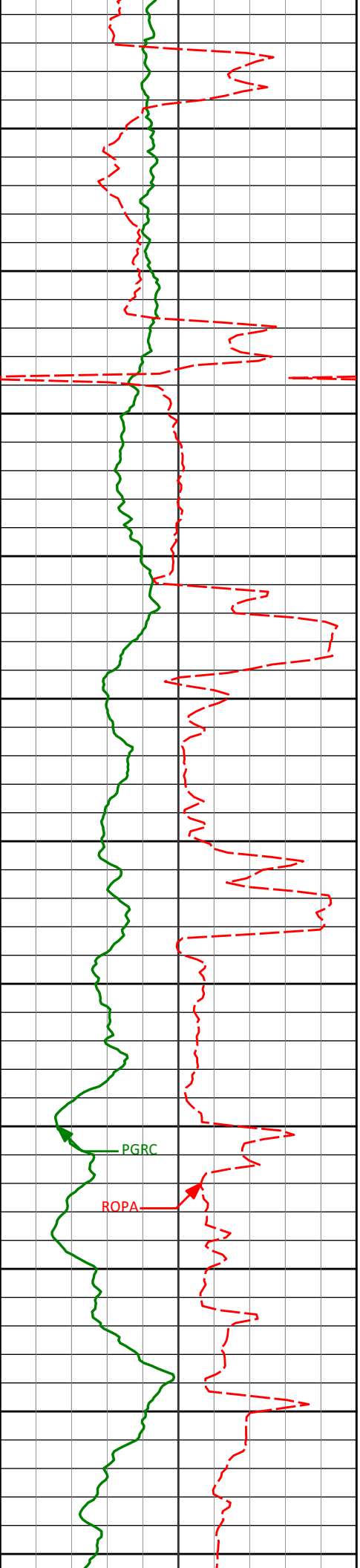
6992'	80.68°	267.04°	6677.45'	711.45'
7030'	83.27°	265.87°	6682.75'	748.93'
7137'	86.76°	269.66°	6692.05'	855.27'
7231'	88.12°	267.80°	6696.25'	949.06'
7326'	89.29°	268.31°	6698.40'	1043.87'
7421'	91.05°	268.84°	6698.12'	1138.74'



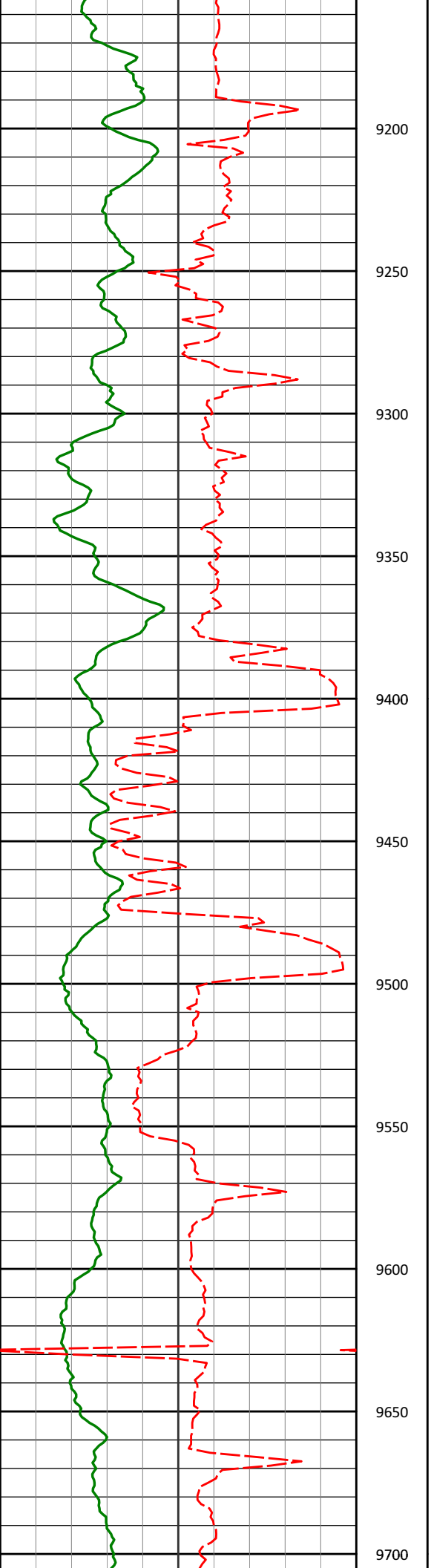
7515'	91.26°	268.92°	6696.22'	1232.63'
7610'	92.77°	269.27°	6692.88'	1327.48'
7705'	91.54°	269.57°	6689.31'	1422.35'
7800'	90.15°	269.75°	6687.91'	1517.29'
7895'	89.72°	269.07°	6688.02'	1612.23'
7989'	91.48°	269.24°	6687.03'	1706.15'



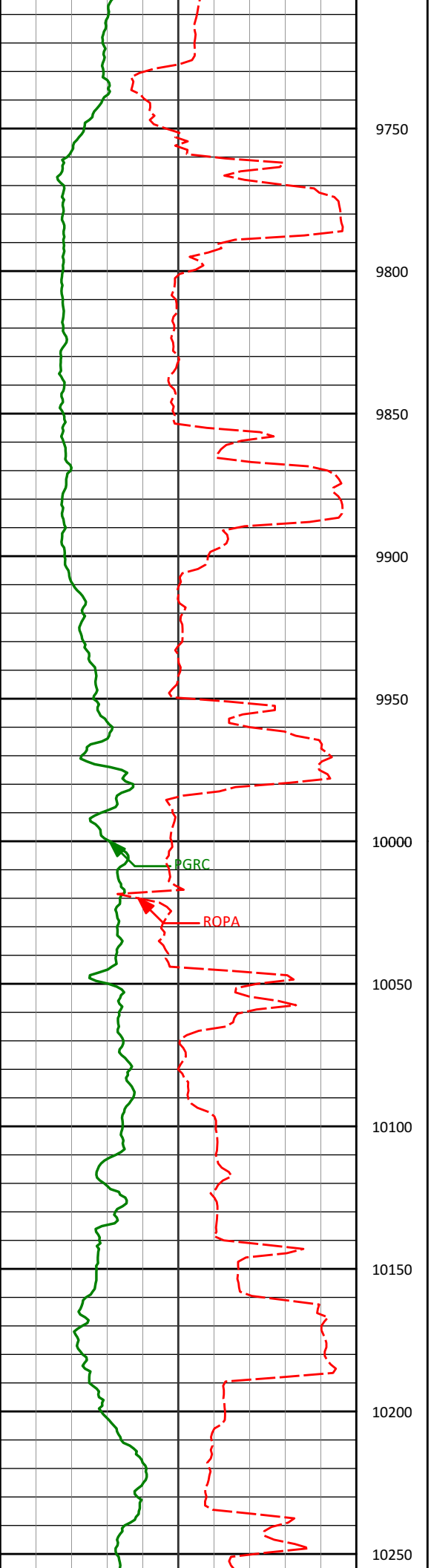
8084'	91.08°	269.36°	6684.91'	1801.06'
8179'	90.00°	268.37°	6684.01'	1895.95'
8273'	88.64°	267.55°	6685.13'	1989.77'
8368'	88.74°	267.23°	6687.30'	2084.50'
8463'	88.98°	266.87°	6689.19'	2179.20'
8557'	89.20°	267.77°	6690.68'	2272.94'



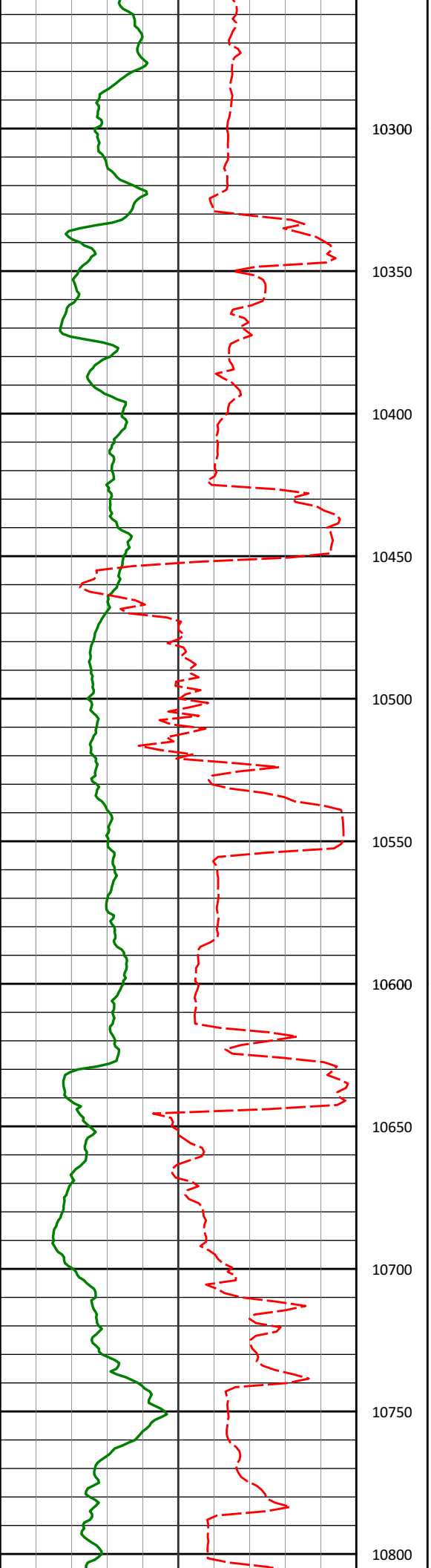
8652'	89.29°	267.49°	6691.94'	2367.72'
8747'	90.46°	267.82°	6692.14'	2462.51'
8842'	88.98°	268.19°	6692.61'	2557.34'
8937'	89.60°	269.15°	6693.79'	2652.21'
9032'	89.75°	269.25°	6694.32'	2747.14'
9127'	89.69°	268.76°	6694.79'	2842.05'



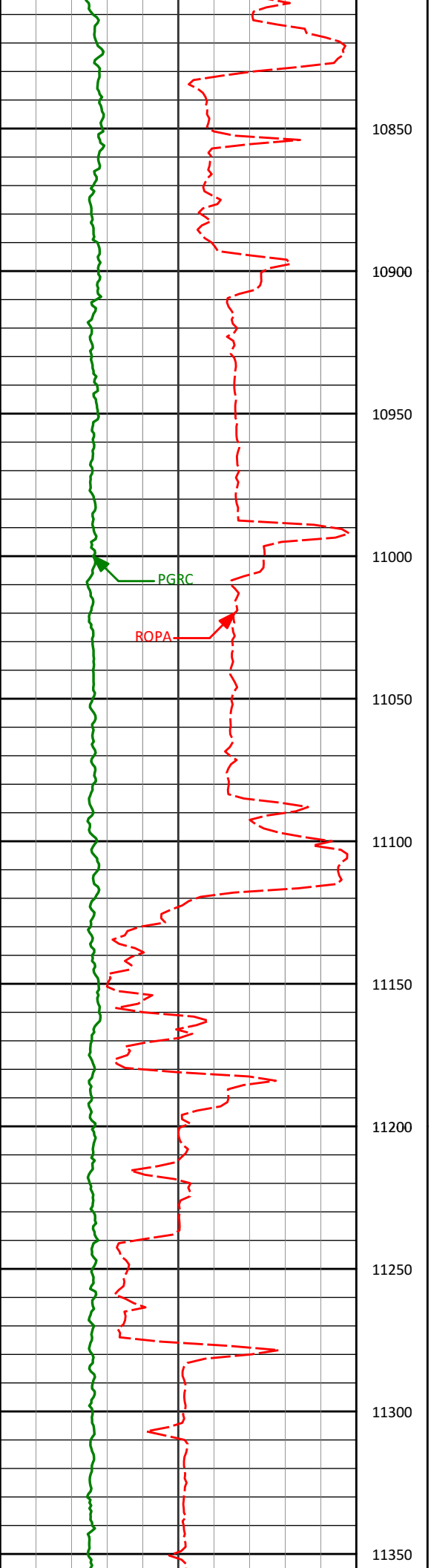
9221'	89.20°	268.99°	6695.70'	2935.95'
9316'	88.49°	269.19°	6697.61'	3030.85'
9411'	88.89°	269.64°	6699.79'	3125.76'
9506'	90.25°	269.03°	6700.50'	3220.69'
9600'	90.55°	268.92°	6699.84'	3314.60'
9695'	92.19°	269.33°	6697.57'	3409.49'



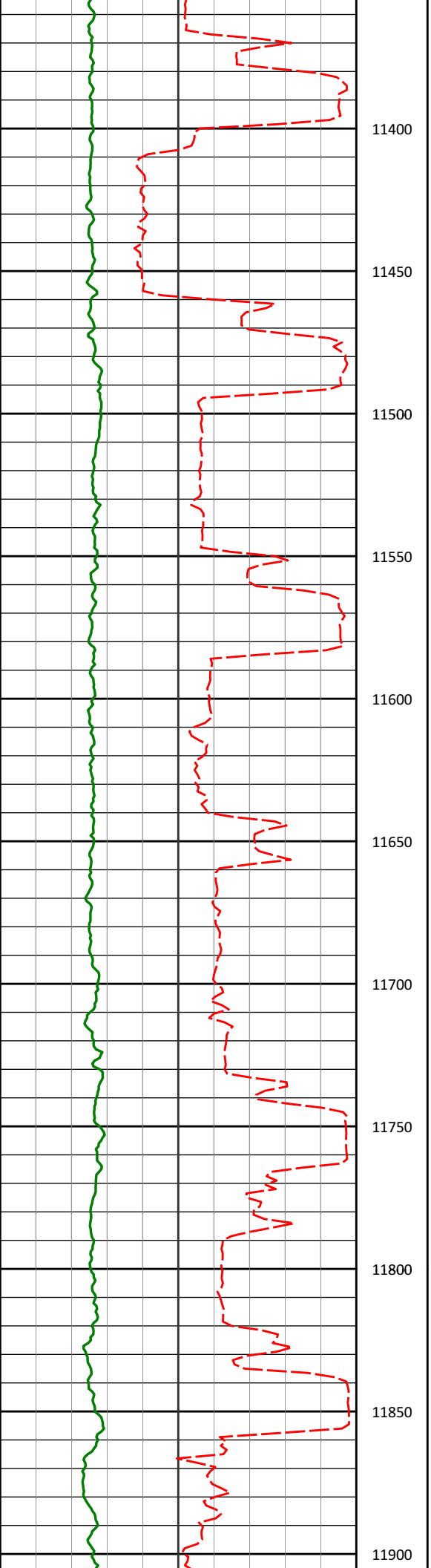
9790'	91.39°	269.56°	6694.60'	3504.39'
9885'	90.74°	270.29°	6692.84'	3599.33'
9980'	87.87°	269.53°	6693.99'	3694.28'
10074'	86.45°	266.26°	6698.65'	3787.97'
10169'	89.78°	267.42°	6701.77'	3882.60'



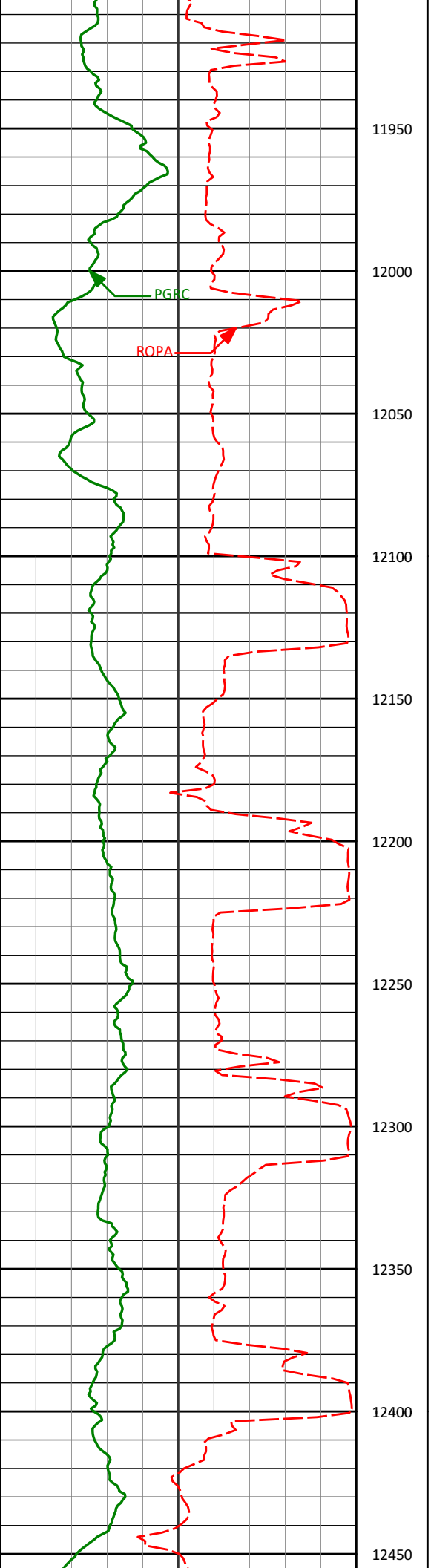
10263'	92.00°	267.61°	6700.31'	3976.36'
10358'	92.28°	267.83°	6696.77'	4071.09'
10453'	91.76°	268.25°	6693.42'	4165.86'
10547'	90.83°	269.80°	6691.29'	4259.75'
10642'	88.24°	269.14°	6692.06'	4354.68'
10736'	87.81°	268.68°	6695.30'	4448.53'



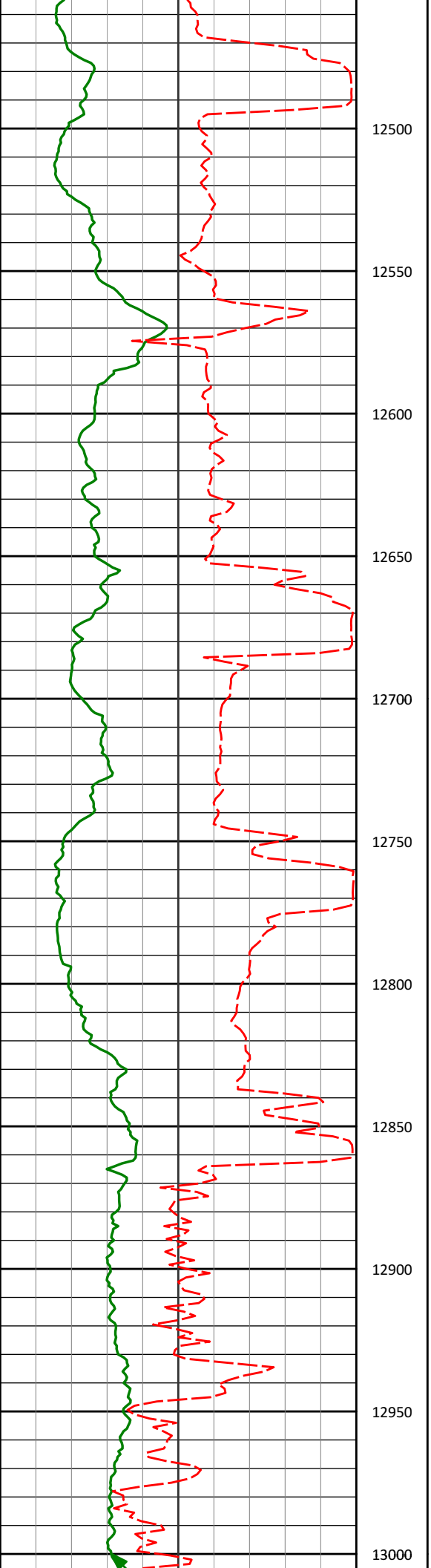
10831'	89.44°	268.89°	6697.58'	4543.39'
10925'	89.72°	268.10°	6698.27'	4637.26'
11020'	89.97°	267.87°	6698.53'	4732.09'
11115'	90.00°	269.57°	6698.55'	4826.98'
11210'	89.97°	269.32°	6698.58'	4921.92'
11302'	90.00°	267.76°	6698.60'	5013.80'



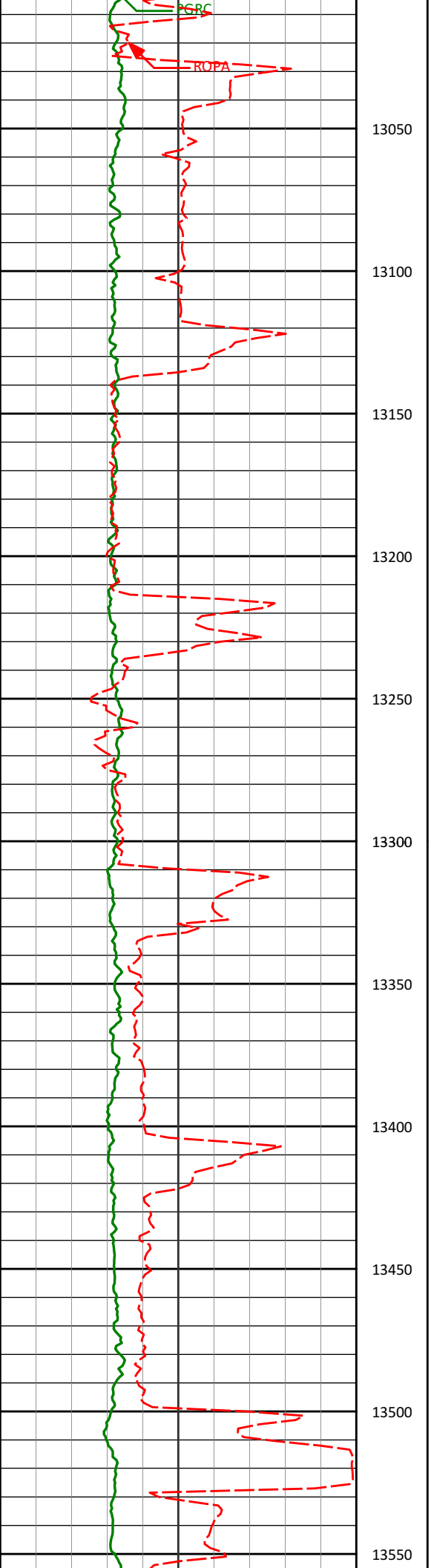
11394'	89.85°	267.34°	6698.72'	5105.58'
11487'	90.59°	267.71°	6698.37'	5198.36'
11578'	90.18°	269.87°	6697.76'	5289.25'
11670'	89.88°	268.07°	6697.71'	5381.16'
11762'	89.66°	268.49°	6698.08'	5473.02'
11853'	90.31°	271.69°	6698.10'	5563.98'



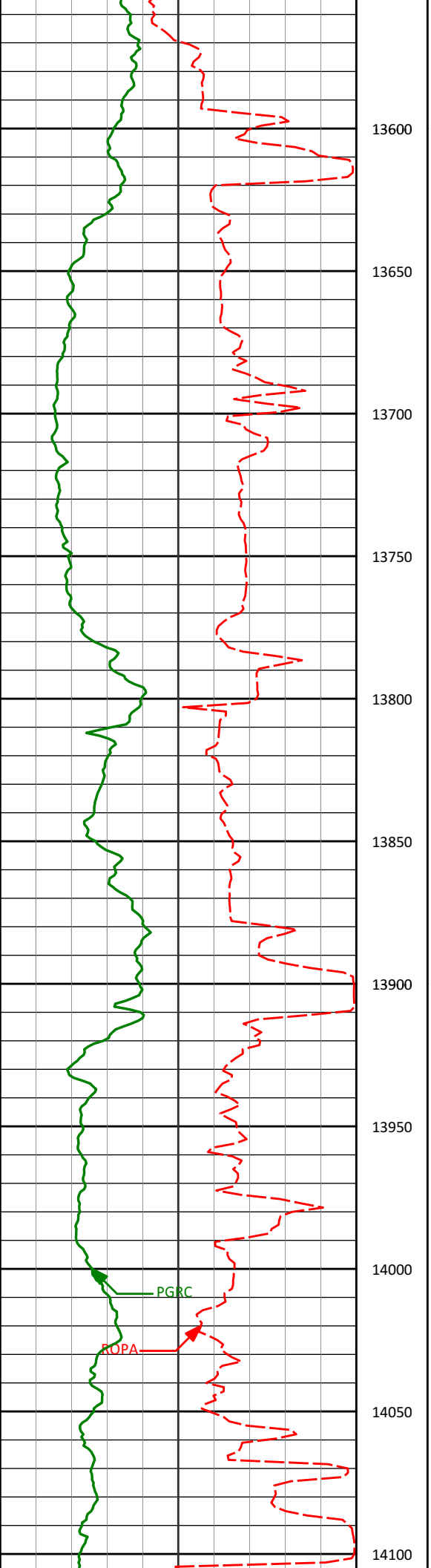
11945'	91.70°	271.59°	6696.49'	5655.96'
12037'	92.90°	271.11°	6692.79'	5747.89'
12128'	92.16°	272.41°	6688.78'	5838.80'
12221'	89.78°	272.39°	6687.20'	5931.76'
12314'	87.78°	273.72°	6689.18'	6024.70'
12406'	86.45°	272.70°	6693.81'	6116.54'



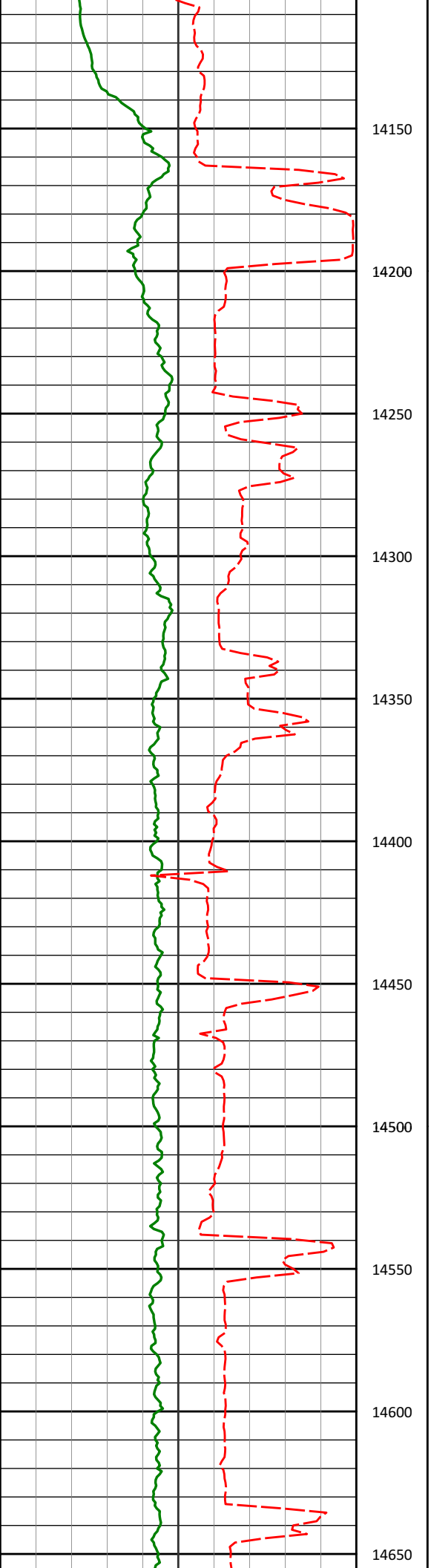
12498'	87.19°	271.06°	6698.92'	6208.39'
12590'	86.94°	270.90°	6703.63'	6300.27'
12683'	88.00°	269.25°	6707.73'	6393.14'
12774'	89.01°	268.31°	6710.11'	6484.01'
12869'	90.31°	268.40°	6710.67'	6578.87'
12963'	90.46°	268.86°	6710.04'	6672.75'



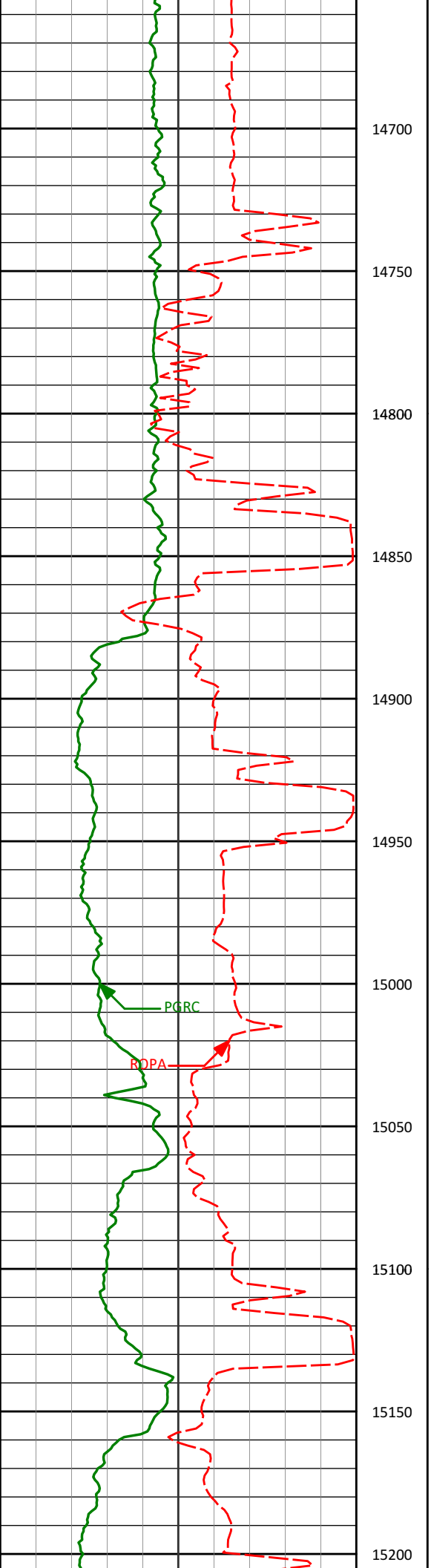
13056'	90.18°	269.10°	6709.52'	6765.66'
13151'	89.91°	269.02°	6709.45'	6860.58'
13246'	89.94°	267.68°	6709.57'	6955.44'
13340'	89.94°	266.97°	6709.67'	7049.19'
13435'	89.72°	266.52°	6709.95'	7143.87'
13530'	89.48°	270.01°	6710.61'	7238.70'



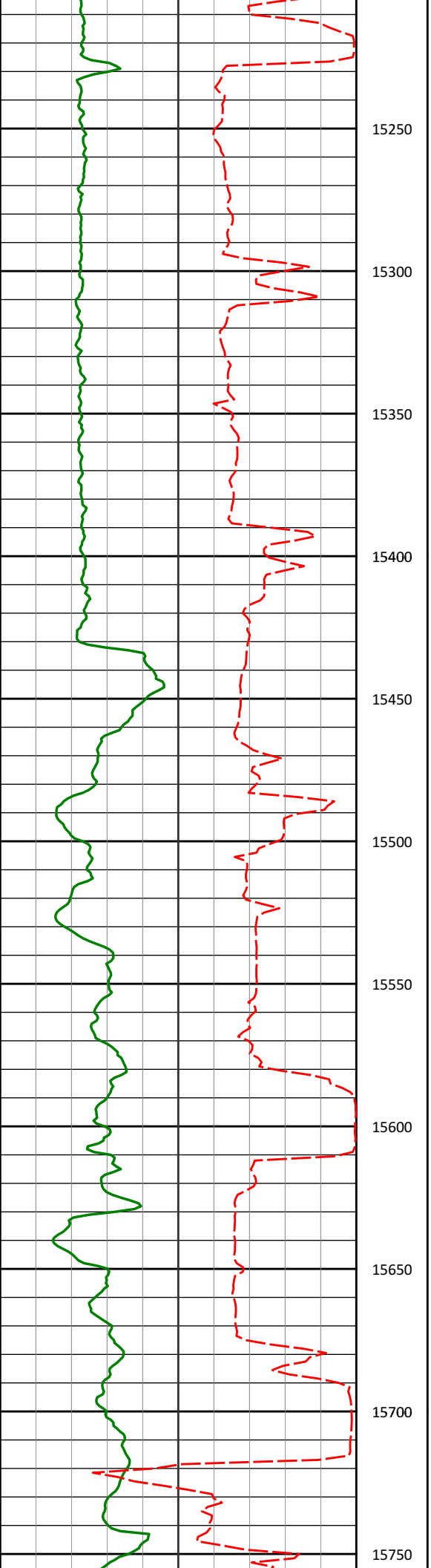
13625'	90.68°	269.85°	6710.48'	7333.67'
13720'	90.34°	268.94°	6709.64'	7428.60'
13814'	88.92°	267.75°	6710.24'	7522.46'
13909'	90.34°	267.67°	6710.86'	7617.25'
14003'	91.97°	268.21°	6708.96'	7711.05'
14098'	91.20°	268.52°	6706.33'	7805.87'



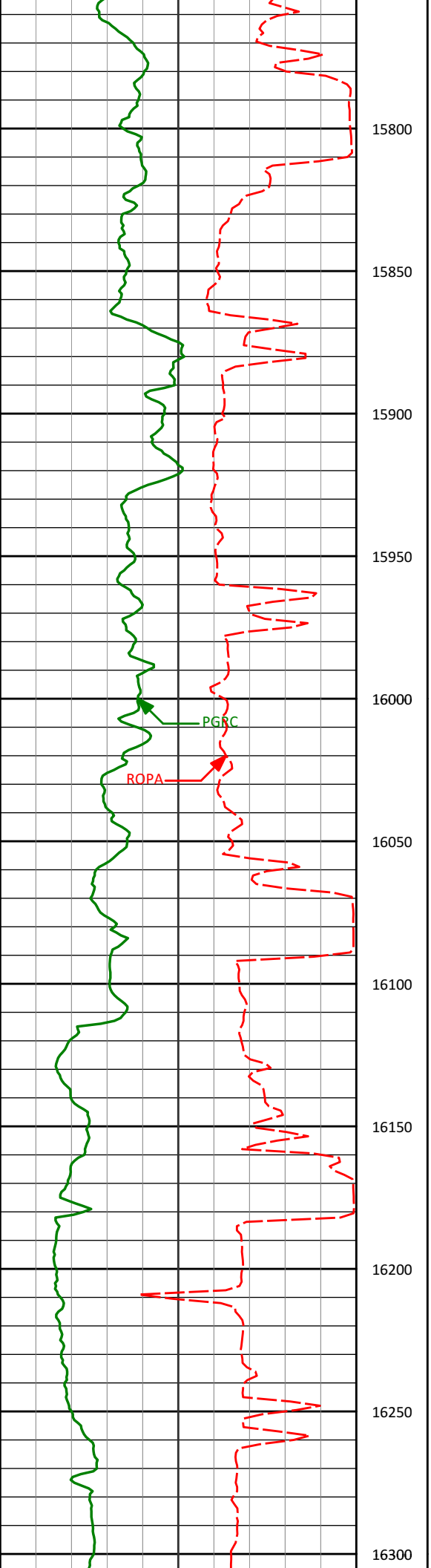
14193'	89.75°	269.62°	6705.55'	7900.78'
14287'	90.12°	269.96°	6705.65'	7994.74'
14382'	89.88°	269.72°	6705.65'	8089.70'
14477'	89.75°	270.09°	6705.96'	8184.67'
14571'	90.03°	270.55°	6706.14'	8278.65'



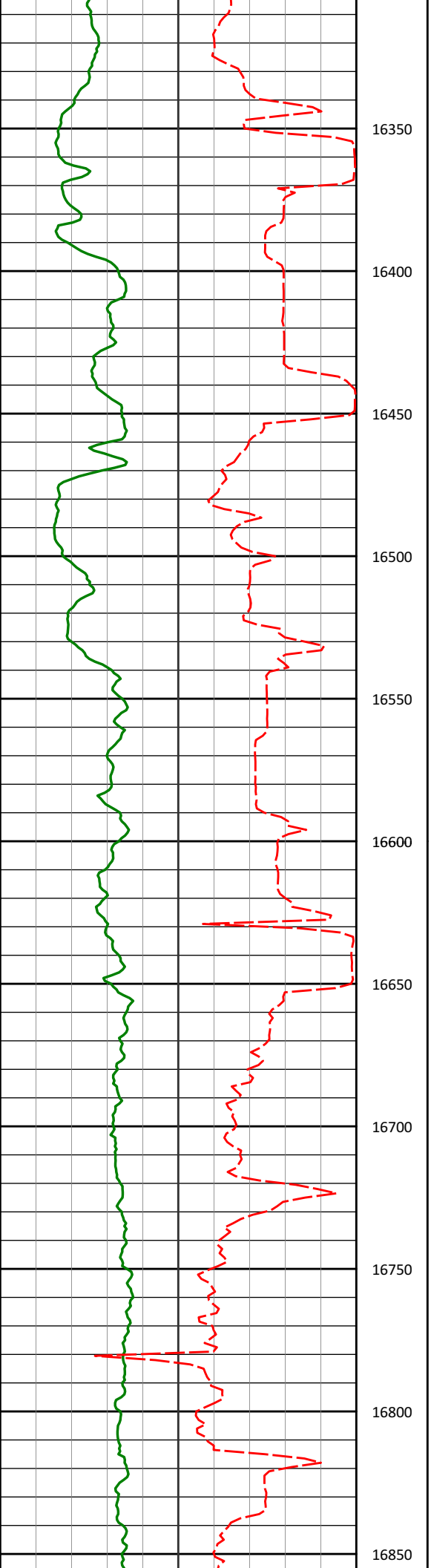
14665'	89.97°	270.85°	6706.14'	8372.64'
14760'	89.75°	271.18°	6706.37'	8467.64'
14855'	88.55°	269.11°	6707.78'	8562.60'
14949'	90.22°	268.48°	6708.79'	8656.48'
15044'	91.48°	268.79°	6707.38'	8751.36'
15139'	87.96°	267.06°	6707.85'	8846.16'



15234'	90.46°	267.06°	6709.16'	8940.86'
15328'	90.19°	265.67°	6708.62'	9034.48'
15423'	91.39°	265.80°	6707.31'	9129.00'
15517'	92.56°	265.76°	6704.07'	9222.48'
15612'	93.21°	267.89°	6699.29'	9317.04'
15707'	92.78°	269.31°	6694.33'	9411.79'



15802'	89.60°	269.15°	6692.35'	9506.69'
15897'	87.50°	268.05°	6694.76'	9601.53'
15991'	86.05°	268.57°	6700.05'	9695.24'
16086'	86.88°	268.10°	6705.90'	9789.92'
16181'	88.24°	268.13°	6709.95'	9884.67'
16276'	88.27°	267.67°	6712.84'	9979.44'



16370'	91.48°	268.25°	6713.05'	10073.25'
16465'	90.77°	268.82°	6711.18'	10168.11'
16560'	91.66°	268.31°	6709.17'	10262.96'
16655'	90.15°	267.98°	6707.67'	10357.79'
16750'	88.83°	266.14°	6708.51'	10452.50'
16844'	89.38°	265.34°	6709.98'	10546.02'

Depth ft	Depth	Inc.	Azi.	TVD	V.S.
16900					
	16939'	90.31°	265.95°	6710.24'	10640.53'
16950					
17000					
	17033'	90.62°	265.40°	6709.48'	10734.05'
17050					
17100					
	17128'	90.15°	263.90°	6708.84'	10828.37'
17150					
17200					
	17230'	89.72°	262.43°	6708.95'	10929.30'
17250					
	17296'	89.72°	262.43°	6709.28'	10994.48'
17300					

Avg Rate of Penetration
ROPA
1K feet per hr 0

PCG Gamma Ray BCorr
PGRC
0 api 300

HALLIBURTON

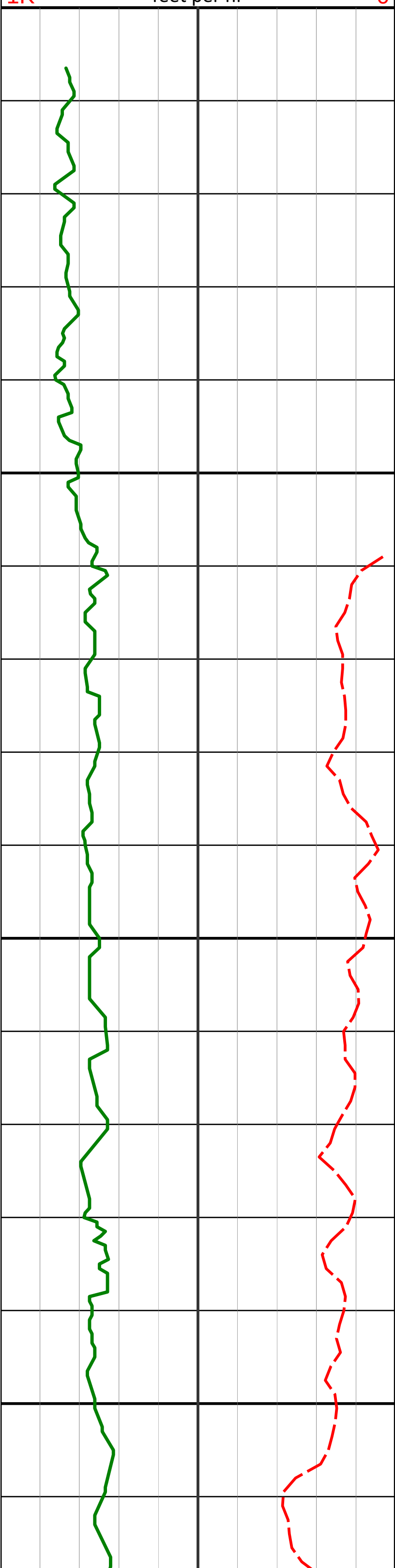
Sperry Drilling Services

MD Detail Log 1:240

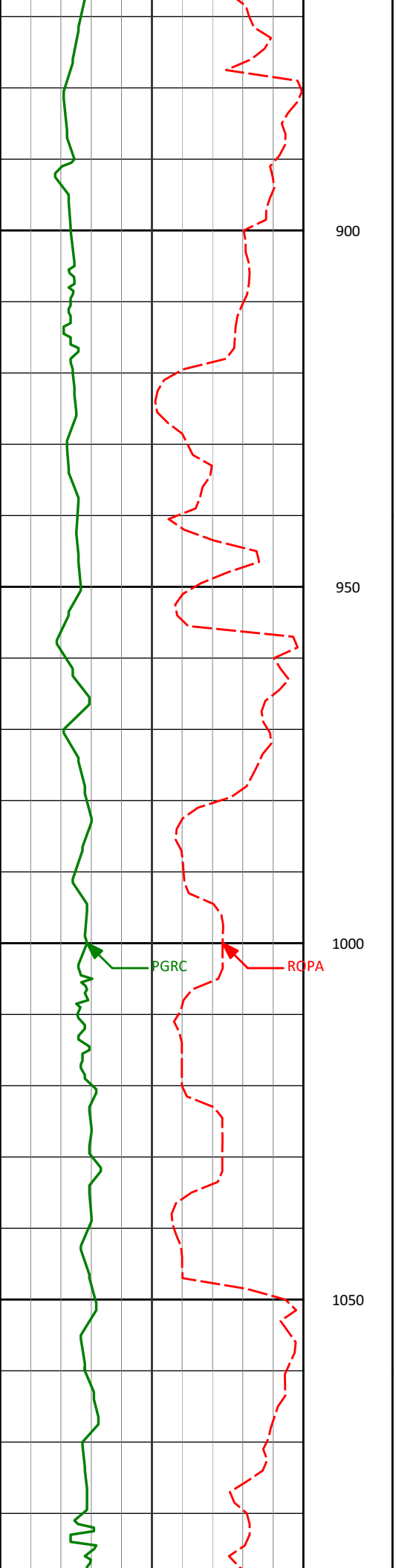
Noble Energy
Wells Ranch AE19-689
H&P 321
Sec. 20-T6N-R62W

PCG Gamma Ray BCorr
PGRC
0 api 300

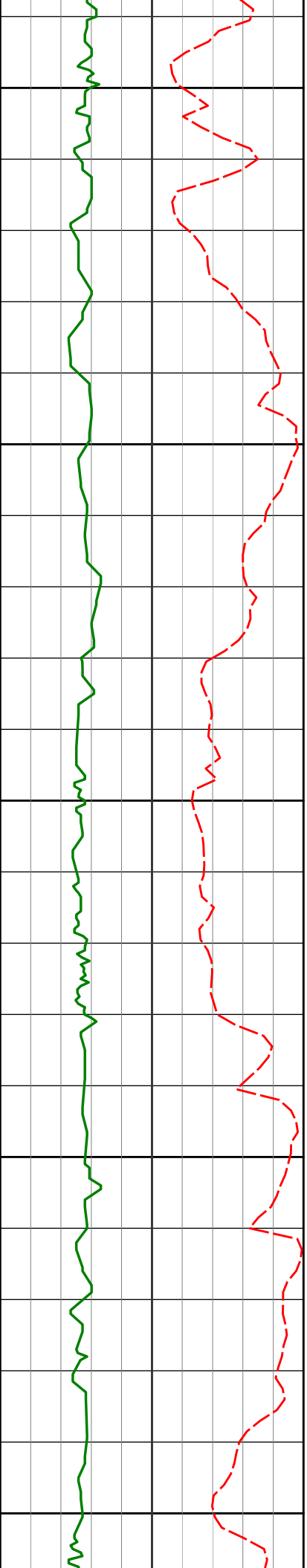
Avg Rate of Penetration
ROPA
1K feet per hr 0



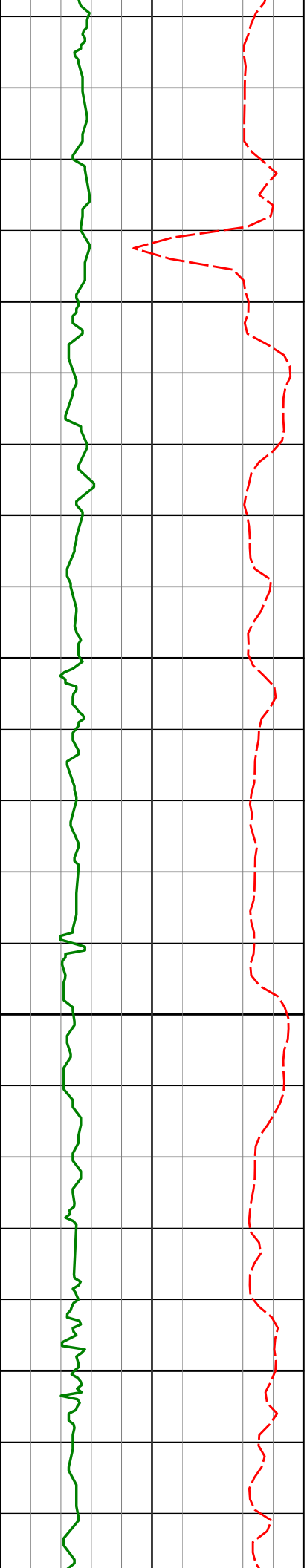
Depth ft	Depth	Inc.	Azi.	TVD	V.S.
750					
Run 100					
800					
	828'	0.78°	44.93°	827.90'	-8.23'
850					



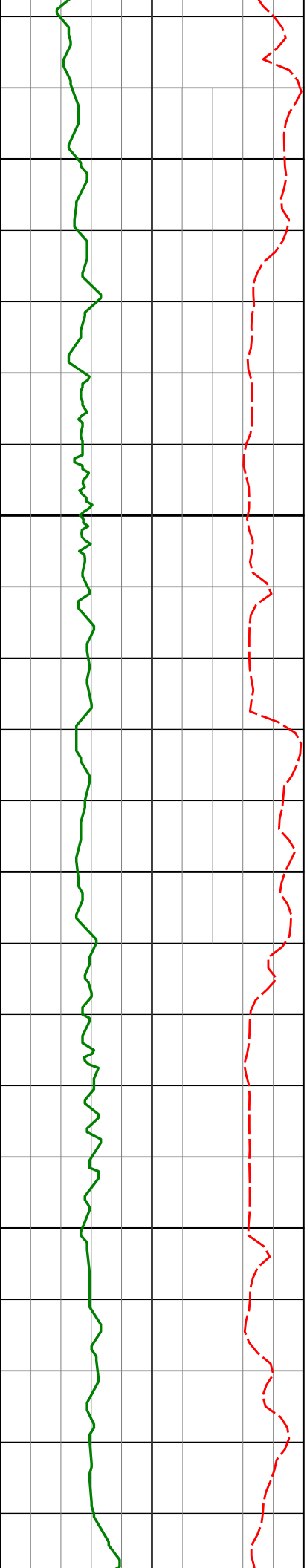
920'	0.66°	43.17°	919.89'	-9.01'
1012'	0.78°	33.73°	1011.88'	-9.70'



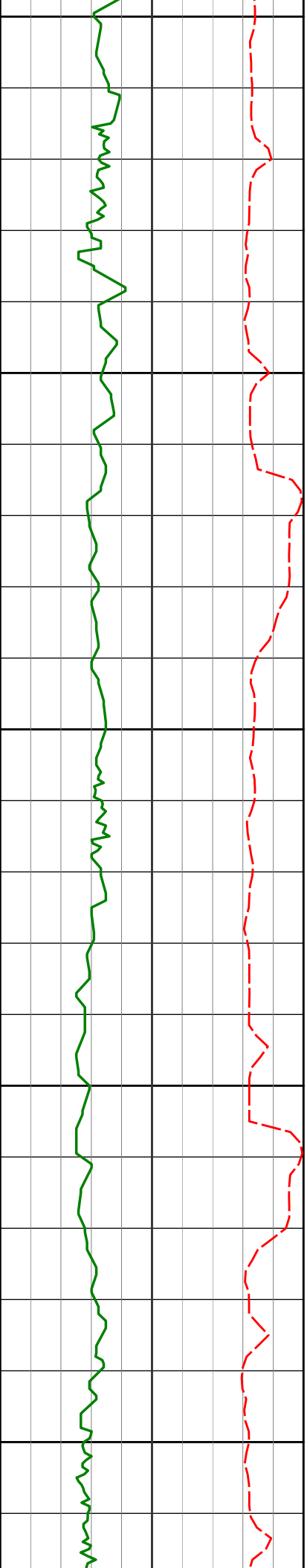
1104'	0.73°	37.69°	1103.87'	-10.38'
1195'	0.85°	62.41°	1194.87'	-11.31'
1301'	0.51°	270.35°	1300.86'	-11.53'



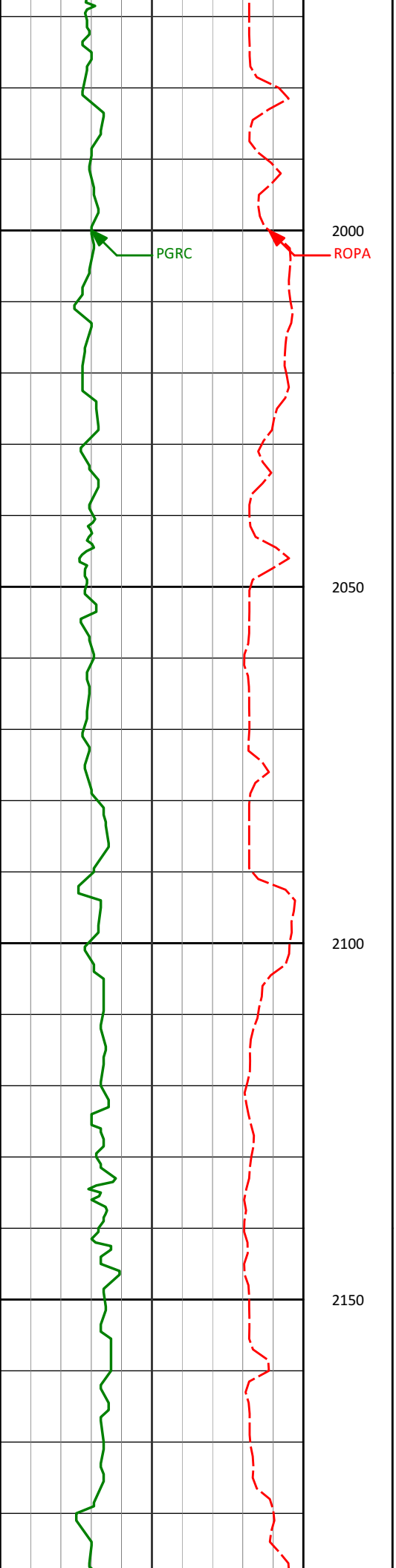
1394'	0.58°	321.53°	1393.86'	-10.81'
1485'	1.26°	302.17°	1484.85'	-9.66'



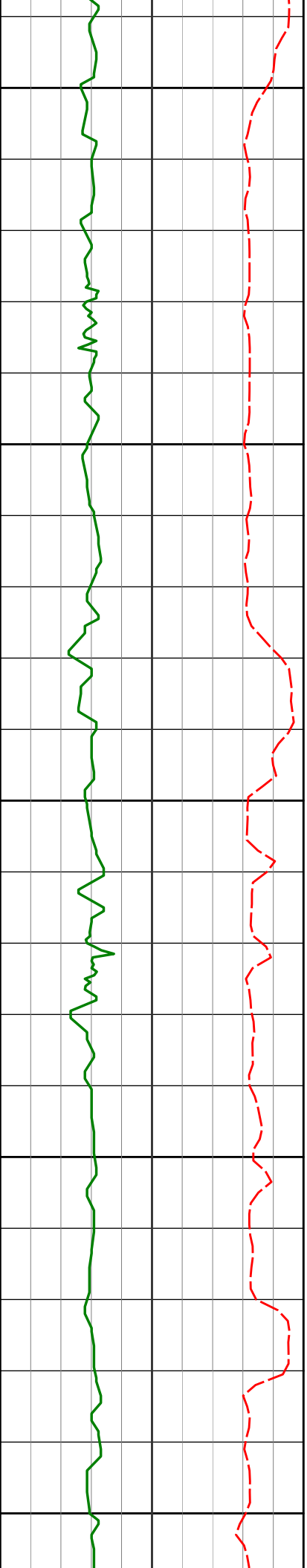
1577'	1.57°	256.77°	1576.82'	-7.57'



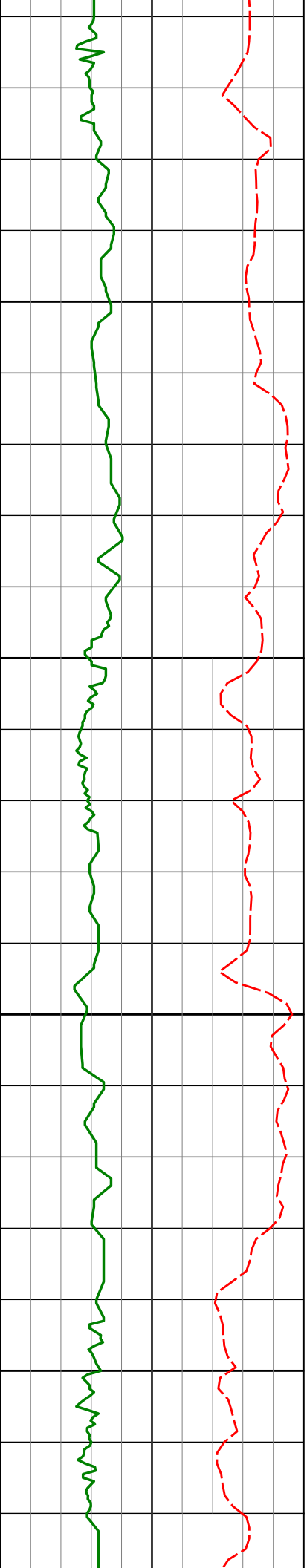
1760'	1.12°	275.65°	1759.77'	-3.36'
1852'	0.85°	285.63°	1851.76'	-1.80'
1943'	0.88°	303.81°	1942.75'	-0.55'



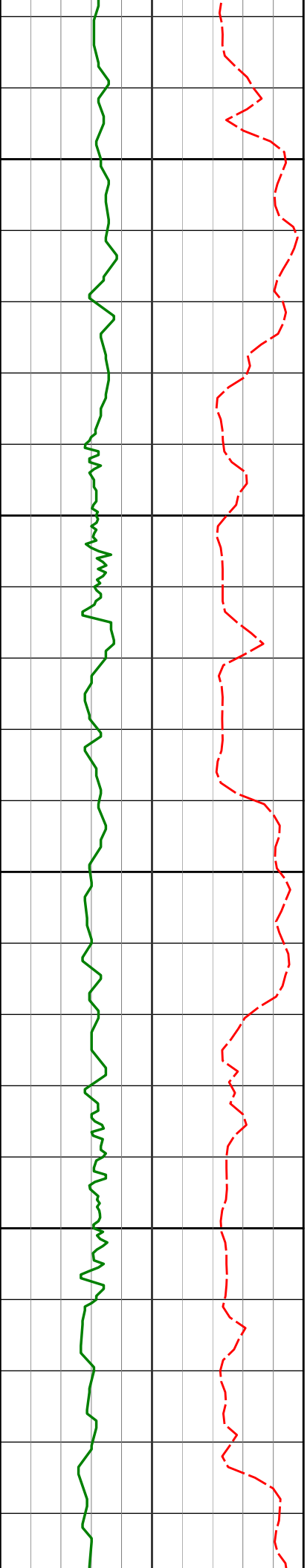
2035'	0.22°	103.17°	2034.75'	-0.13'



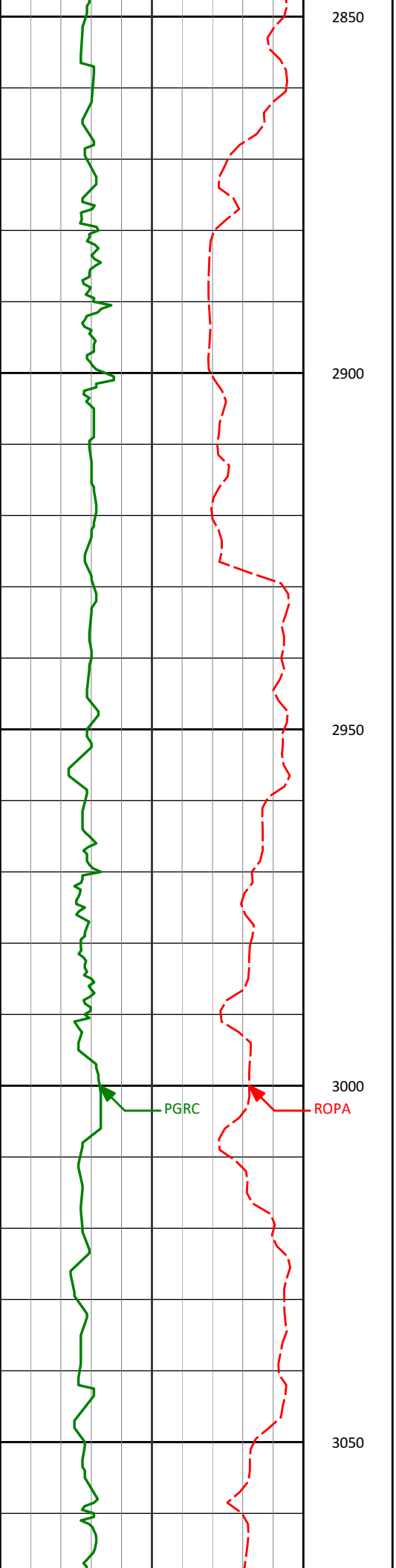
2221'	0.29°	100.59°	2220.74'	-0.95'
2313'	0.22°	69.68°	2312.74'	-1.34'
2405'	0.24°	36.81°	2404.74'	-1.61'



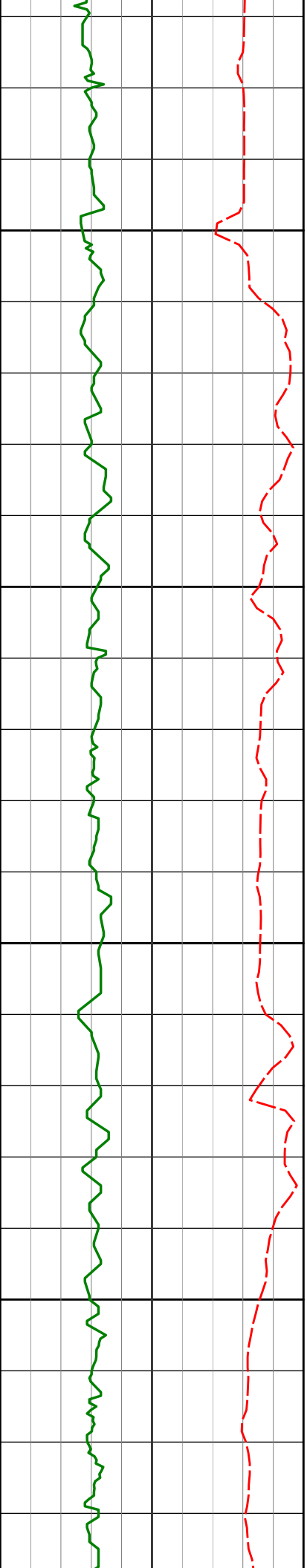
2497'	0.50°	6.03°	2496.74'	-1.76'
2590'	1.55°	351.19°	2589.72'	-1.57'



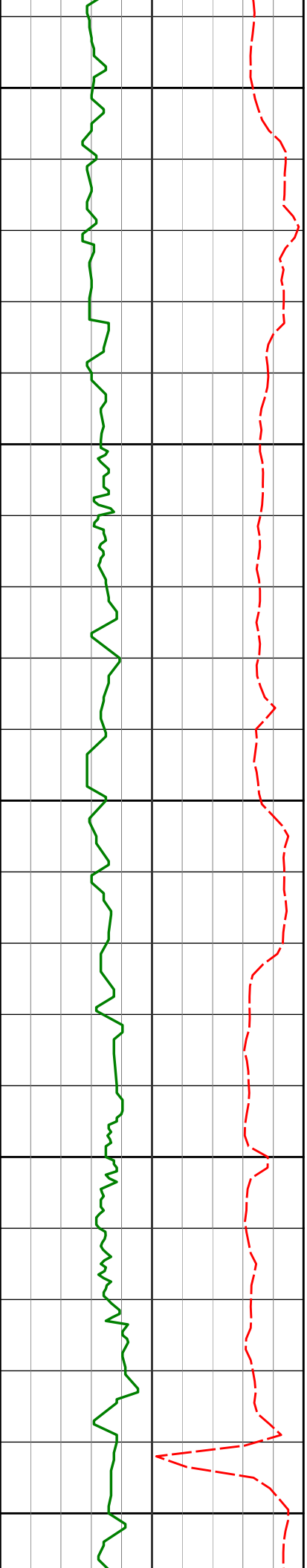
2681'	2.92°	348.71°	2680.65'	-0.83'
2775'	4.39°	351.32°	2774.46'	0.33'



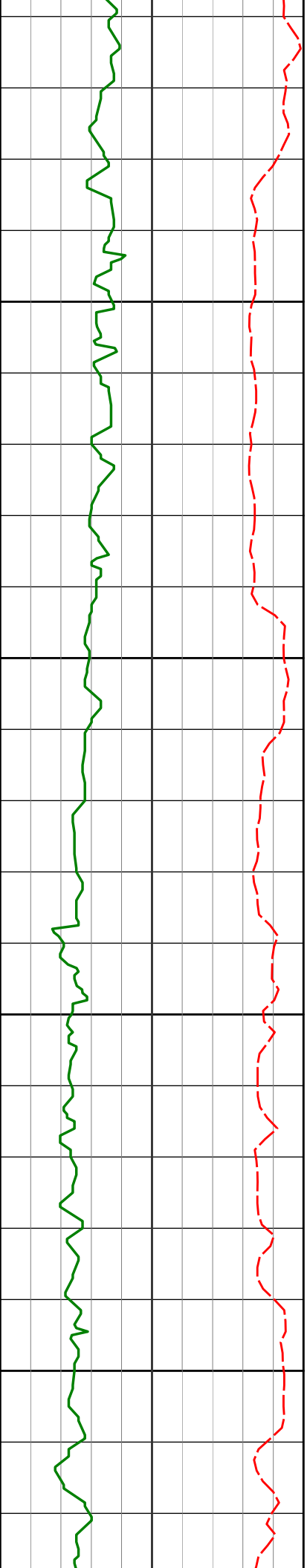
2869'	5.09°	351.43°	2868.14'	1.69'
2963'	7.34°	348.38°	2961.58'	3.77'
3057'	8.02°	343.93°	3054.74'	7.11'



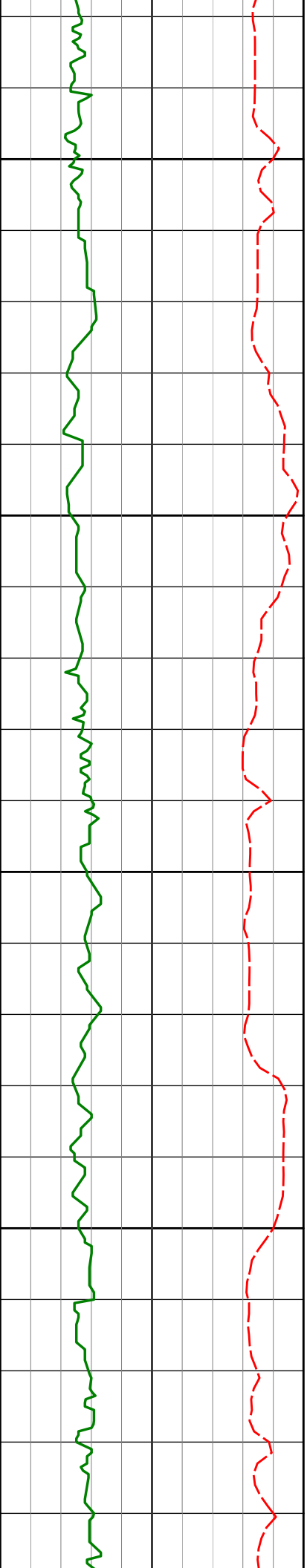
3152'	7.54°	345.10°	3148.86'	10.86'
3247'	8.23°	344.23°	3242.96'	14.63'



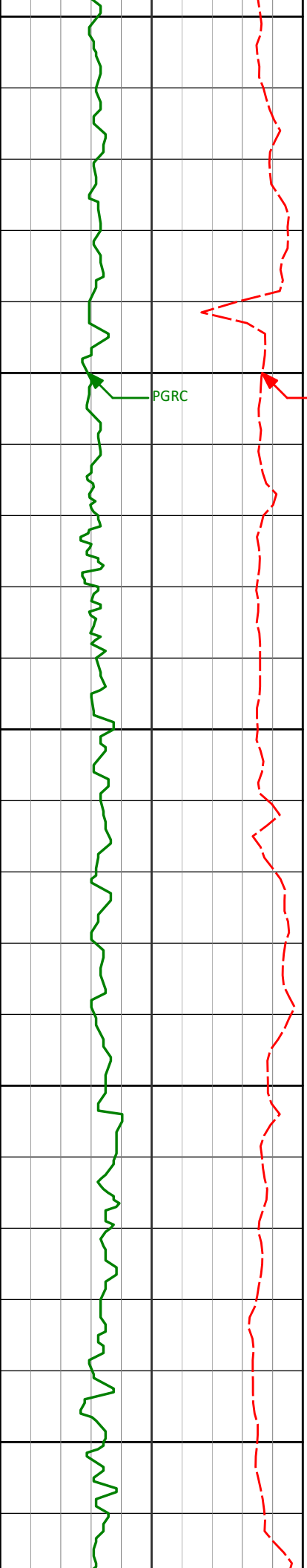
3342'	8.98°	343.28°	3336.89'	18.95'



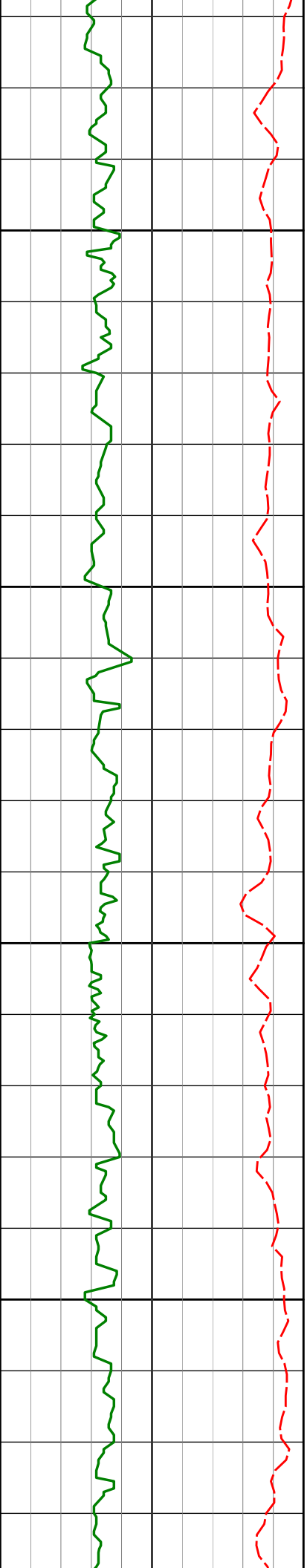
3531'	8.67°	338.50°	3523.66'	29.11'
3626'	8.83°	336.83°	3617.55'	34.95'
3721'	8.73°	332.52°	3711.44'	41.47'



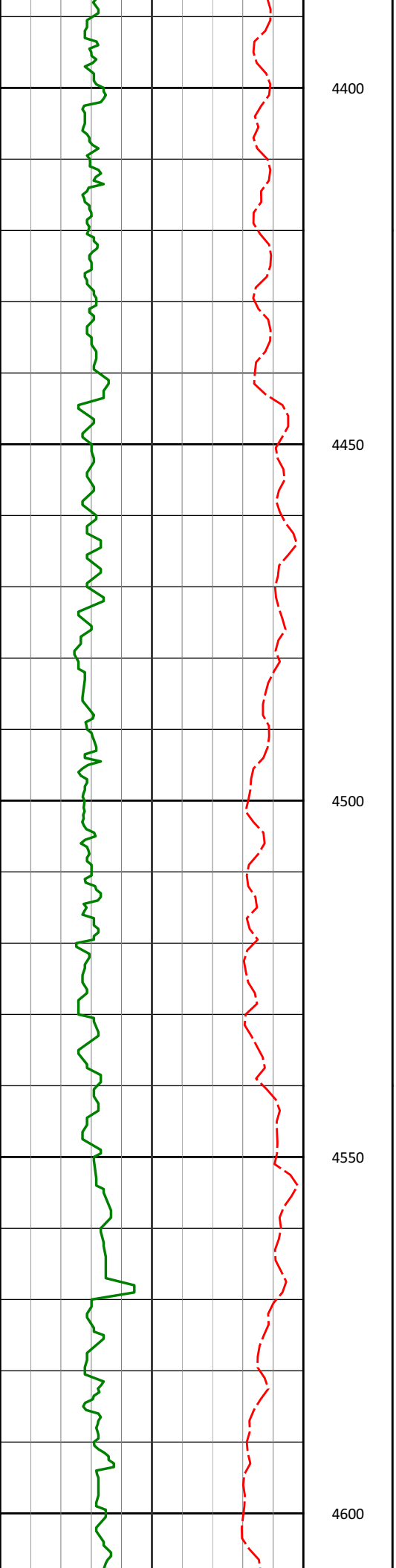
3815'	8.75°	337.12°	3804.35'	47.87'
3910'	8.97°	336.04°	3898.22'	54.03'



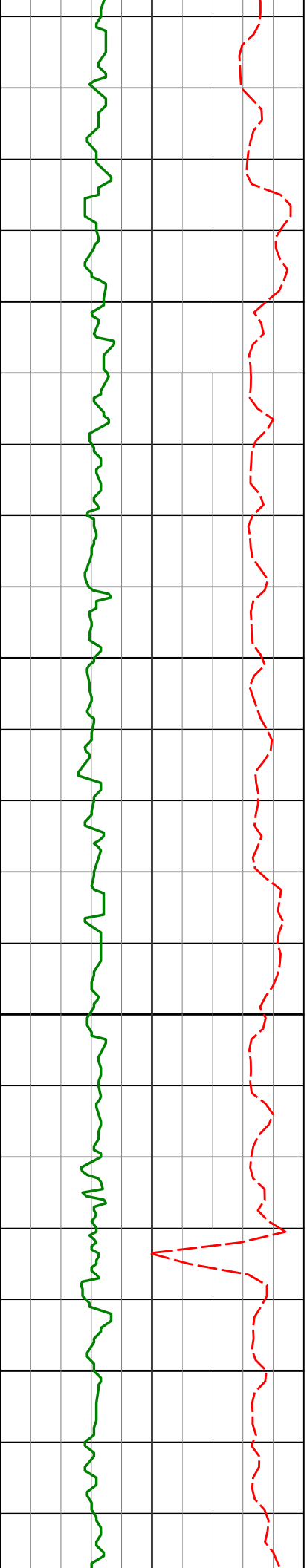
4005'	8.54°	336.57°	3992.11'	60.18'
4100'	7.98°	335.59°	4086.12'	66.02'



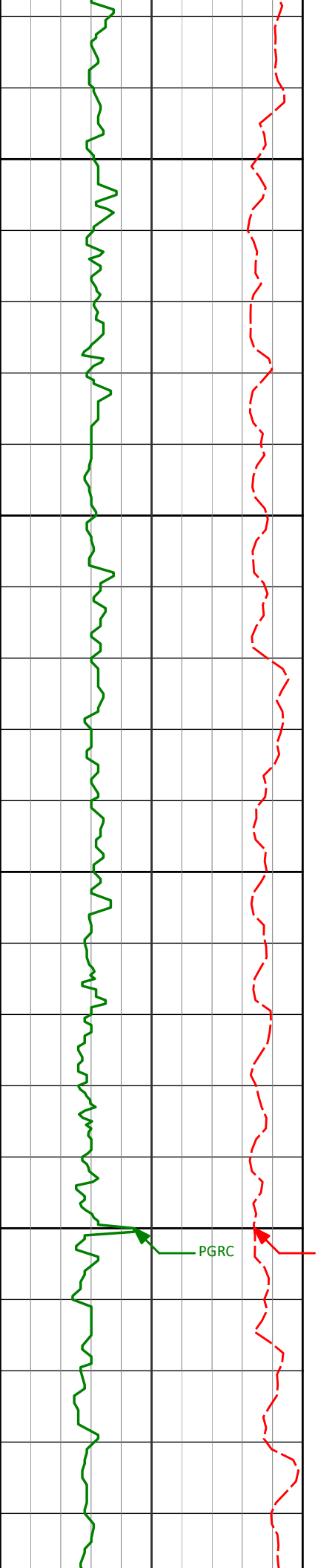
4195'	7.69°	336.55°	4180.24'	71.58'
4289'	6.98°	335.71°	4273.47'	76.71'
4384'	6.85°	344.12°	4367.78'	80.90'



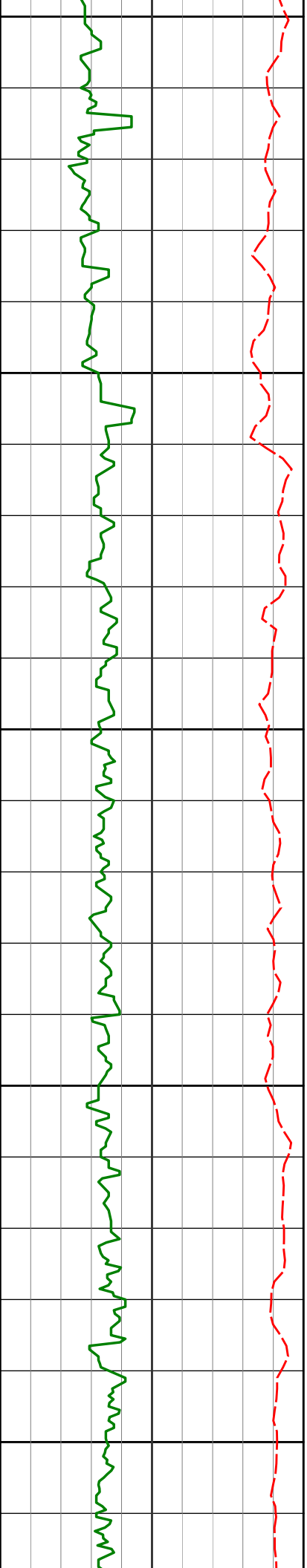
4479'	7.74°	339.92°	4462.01'	84.94'
4574'	8.62°	345.01°	4556.04'	89.31'



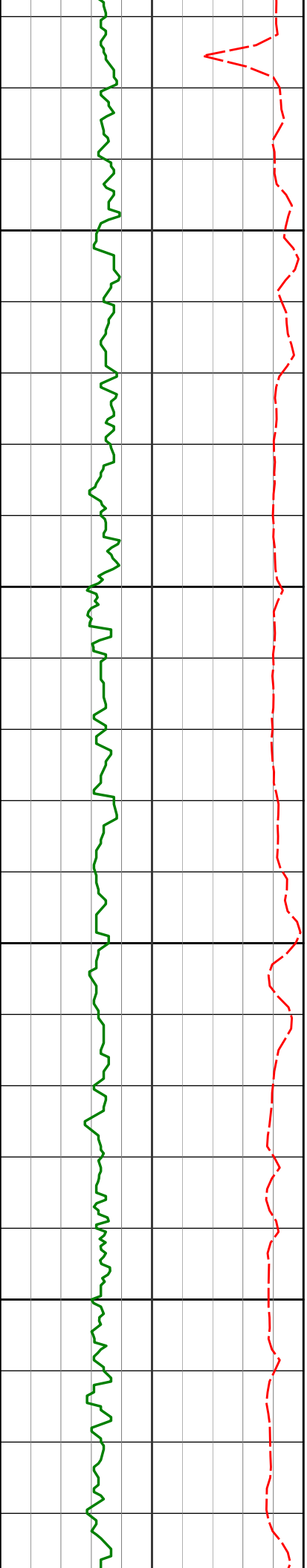
4669'	8.33°	346.59°	4650.00'	93.09'
4763'	8.39°	347.78°	4743.01'	96.46'



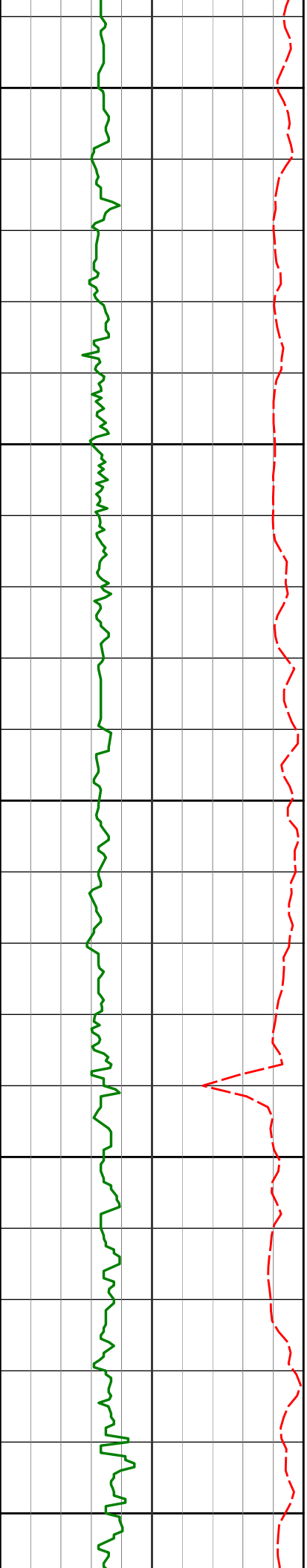
4858'	7.90°	348.57°	4837.05'	99.55'
4953'	6.93°	348.26°	4931.25'	102.32'



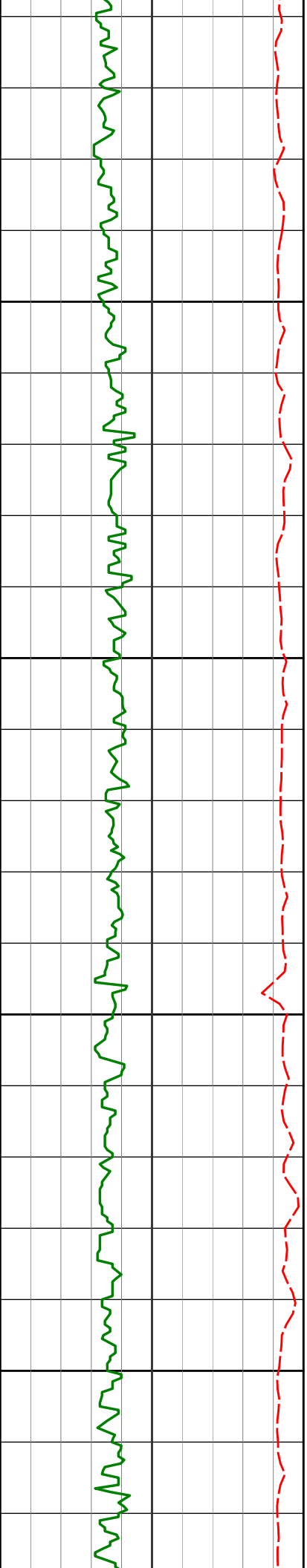
5048'	8.57°	351.29°	5025.38'	104.88'
5142'	7.45°	349.53°	5118.46'	107.37'
5237'	5.67°	345.61°	5212.84'	109.93'



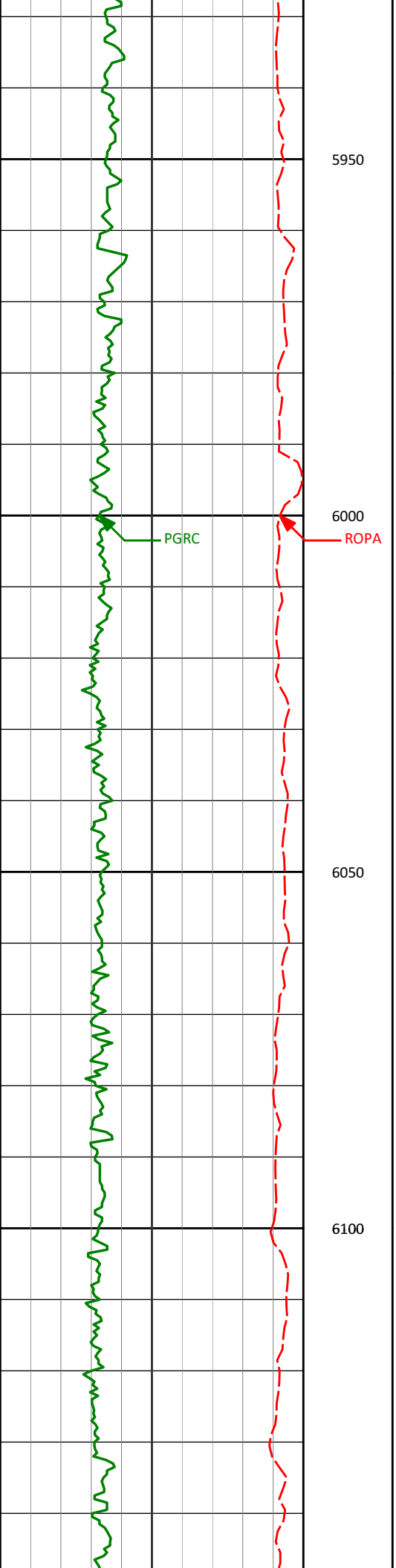
5332'	6.33°	338.17°	5307.32'	113.28'
5427'	6.55°	342.76°	5401.72'	117.09'



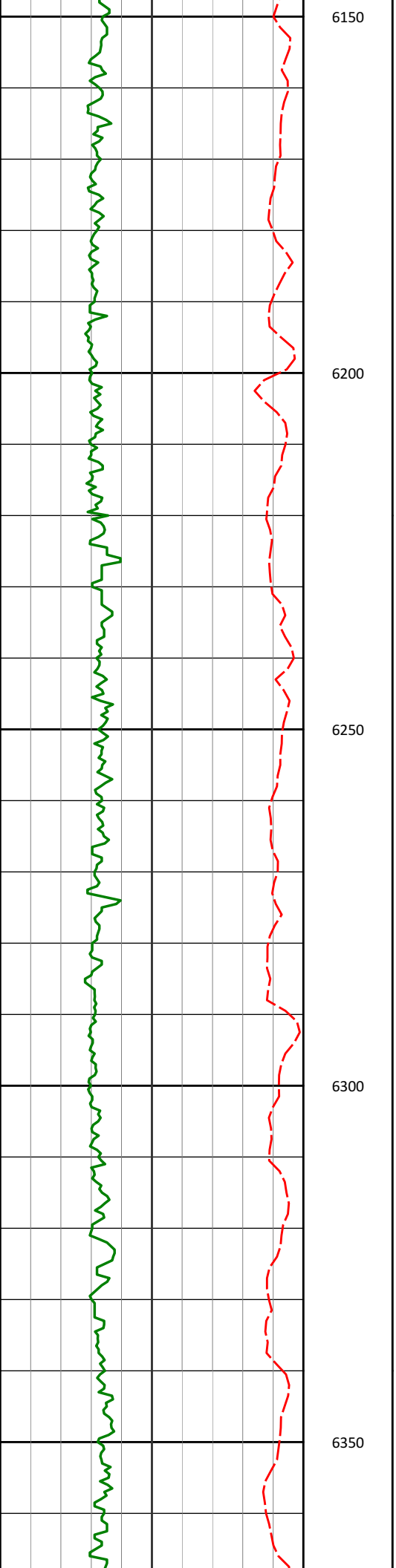
5521'	7.31°	345.24°	5495.03'	120.48'
5616'	7.78°	351.34°	5589.21'	123.30'



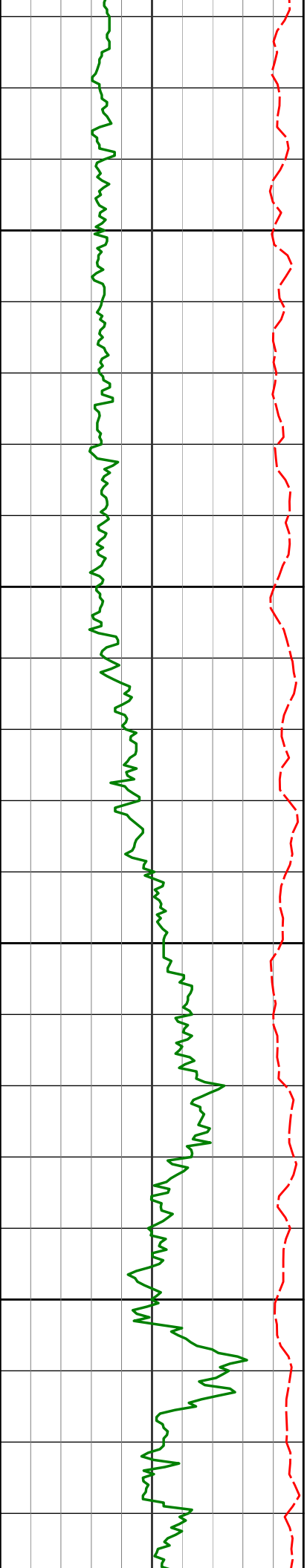
5711'	9.15°	352.44°	5683.17'	125.61'
5806'	7.60°	349.78°	5777.16'	128.07'
5901'	7.06°	339.57°	5871.38'	131.52'



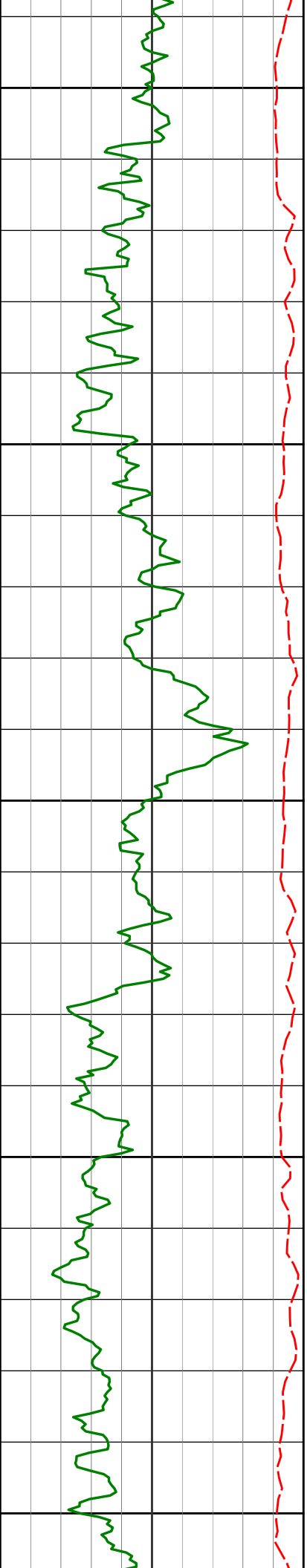
5996'	6.25°	338.52°	5965.74'	135.71'
6044'	7.85°	320.94°	6013.38'	138.86'
6090'	13.64°	319.95°	6058.56'	144.50'
6138'	18.64°	317.79°	6104.65'	153.55'



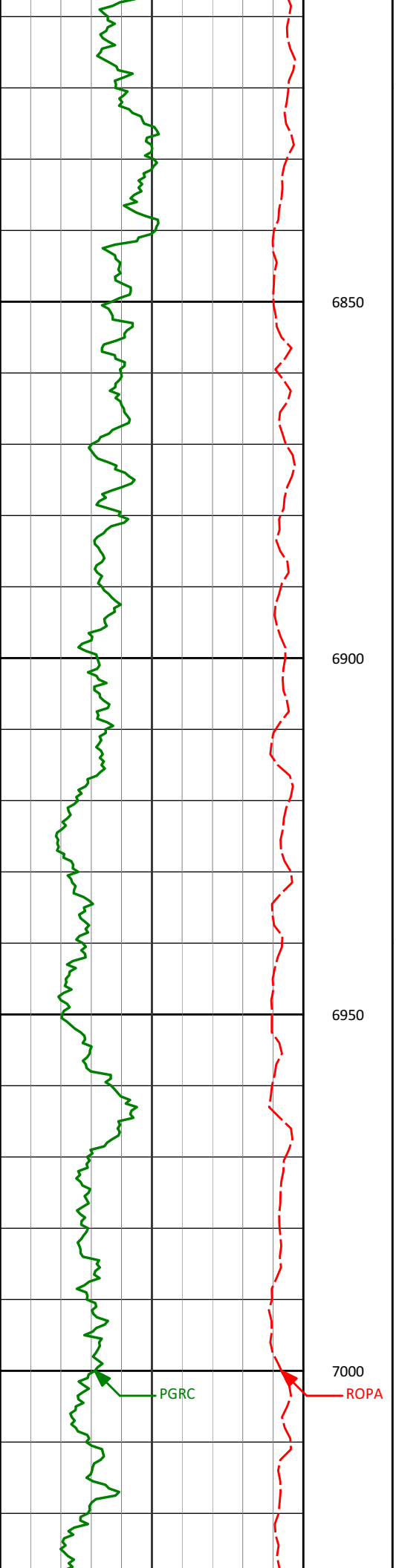
6185'	21.33°	311.50°	6148.82'	165.29'
6233'	23.92°	301.57°	6193.14'	180.39'
6280'	26.30°	291.12°	6235.72'	198.45'
6328'	27.29°	281.76°	6278.58'	219.30'



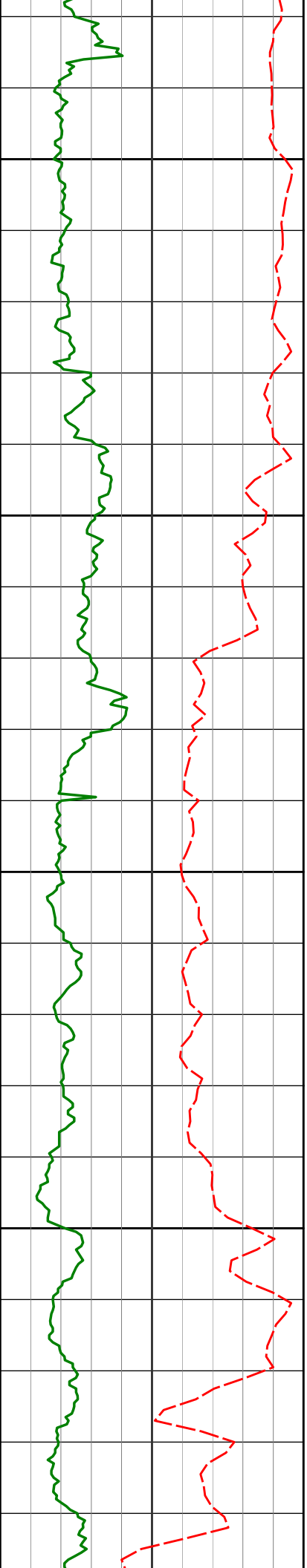
6375'	28.61°	273.41°	6320.12'	241.16'
6423'	28.83°	275.05°	6362.21'	264.20'
6470'	31.10°	273.90°	6402.93'	287.64'
6518'	36.17°	271.66°	6442.88'	314.21'
6565'	41.27°	270.09°	6479.54'	343.59'



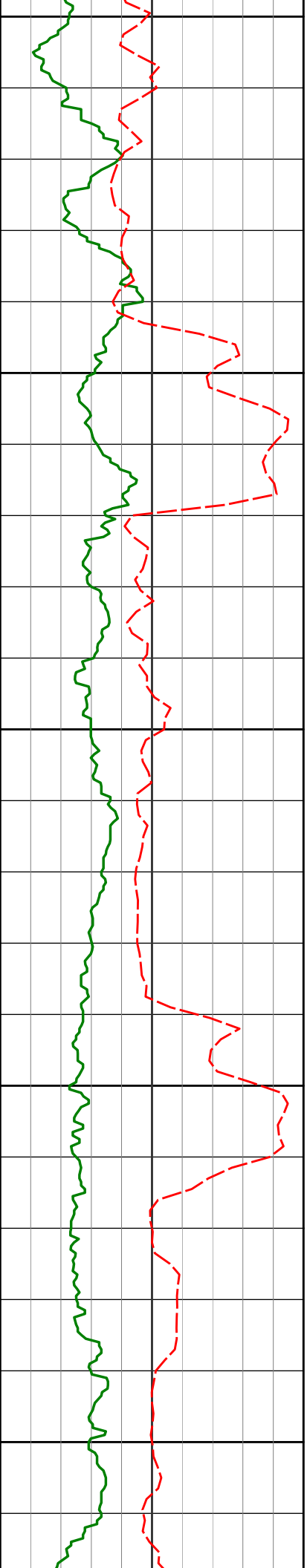
6613'	45.82°	267.16°	6514.33'	376.60'
6659'	50.39°	265.31°	6545.04'	410.69'
6707'	55.71°	264.99°	6573.88'	448.80'
6754'	59.97°	266.42°	6598.89'	488.38'
6802'	64.64°	268.02°	6621.20'	530.75'



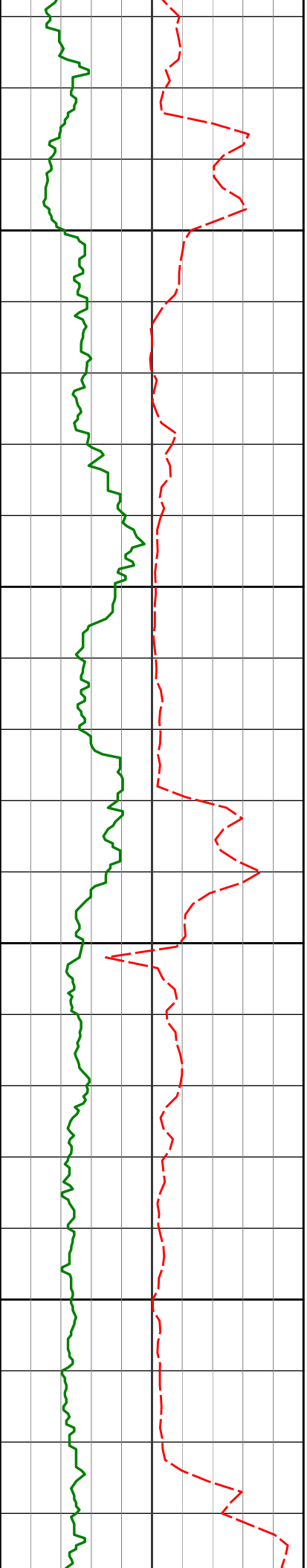
6849'	69.45°	268.94°	6639.52'	573.96'
6897'	72.77°	269.64°	6655.06'	619.33'
6944'	75.95°	268.69°	6667.73'	664.55'
6992'	80.68°	267.04°	6677.45'	711.45'



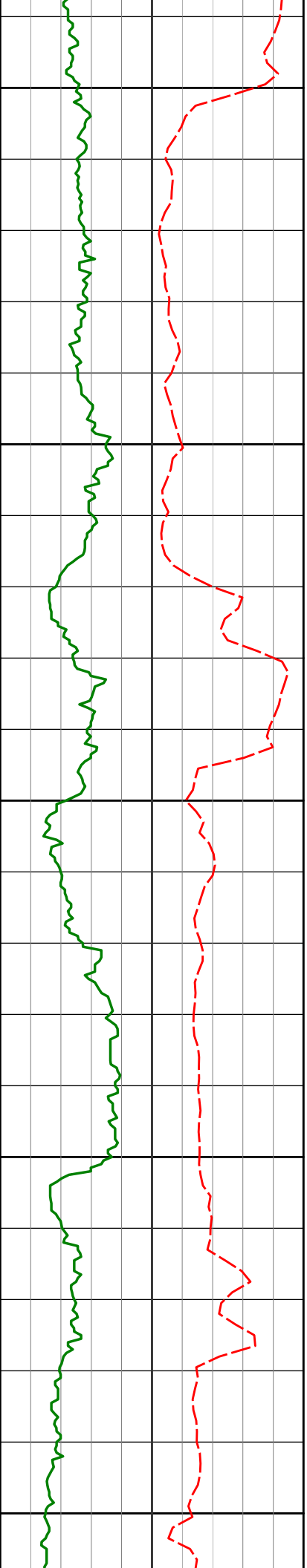
7030'	83.27°	265.87°	6682.75'	748.93'
7137'	86.76°	269.66°	6692.05'	855.27'
7231'	88.12°	267.80°	6696.25'	949.06'



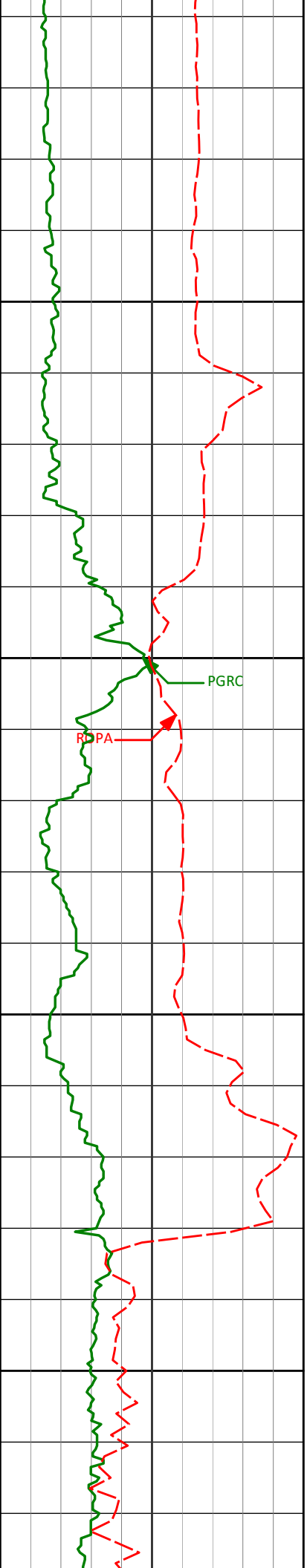
7326'	89.29°	268.31°	6698.40'	1043.87'
7421'	91.05°	268.84°	6698.12'	1138.74'



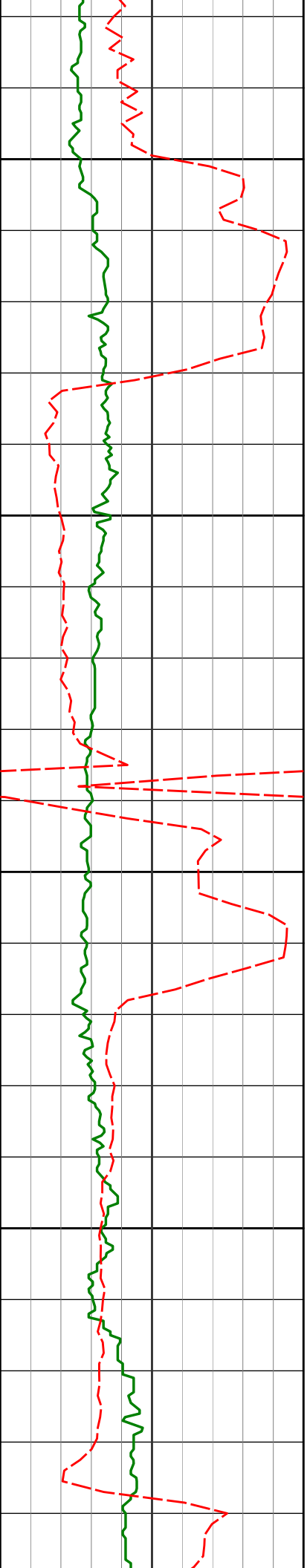
7515'	91.26°	268.92°	6696.22'	1232.63'
7610'	92.77°	269.27°	6692.88'	1327.48'



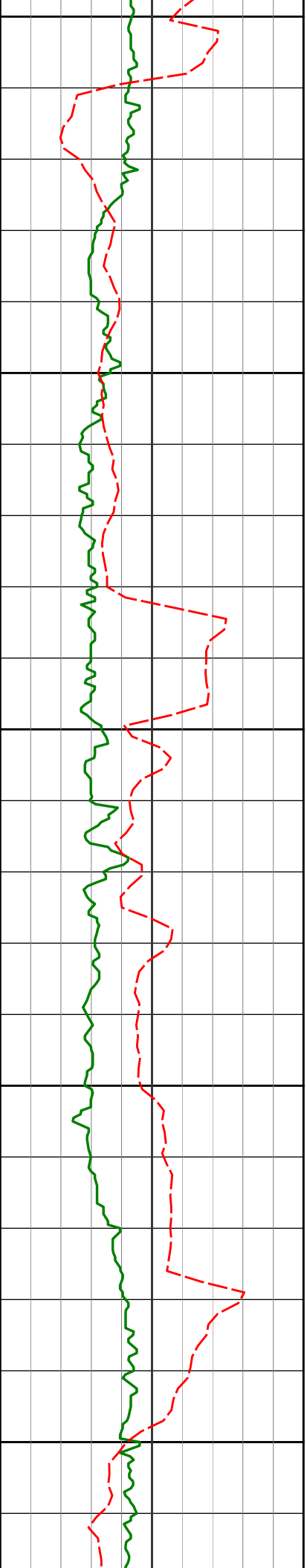
7705'	91.54°	269.57°	6689.31'	1422.35'
7800'	90.15°	269.75°	6687.91'	1517.29'
7895'	89.72°	269.07°	6688.02'	1612.23'



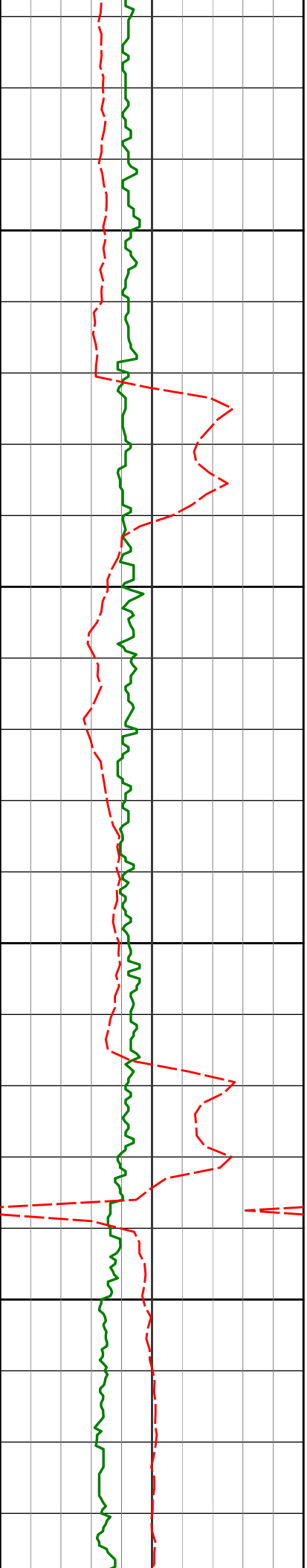
7989'	91.48°	269.24°	6687.03'	1706.15'
8084'	91.08°	269.36°	6684.91'	1801.06'



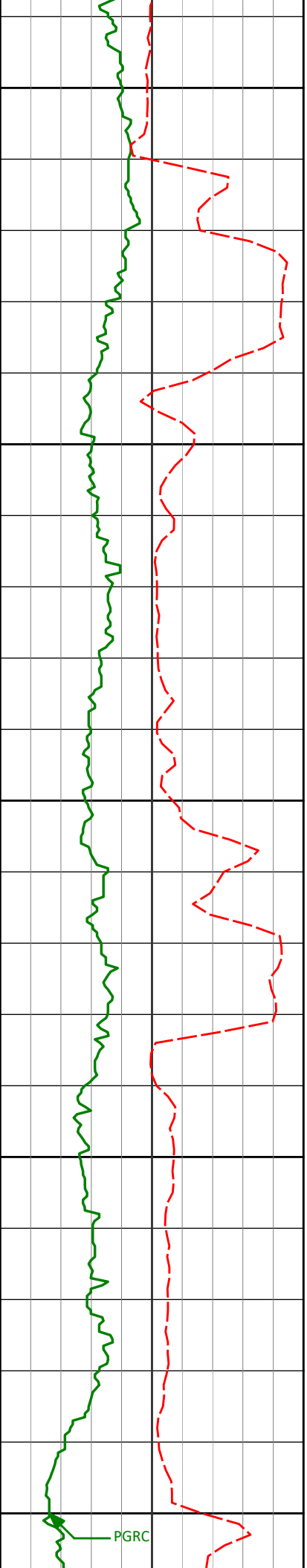
8179'	90.00°	268.37°	6684.01'	1895.95'
8273'	88.64°	267.55°	6685.13'	1989.77'



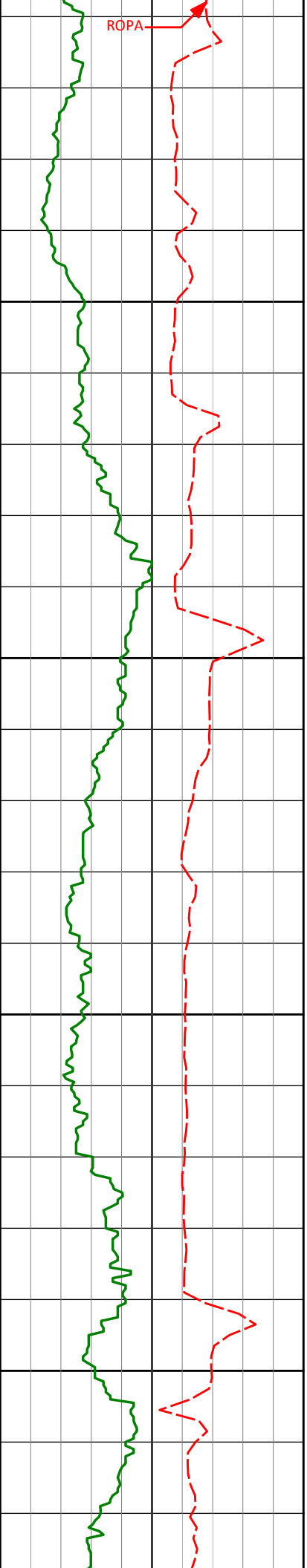
8368'	88.74°	267.23°	6687.30'	2084.50'
8463'	88.98°	266.87°	6689.19'	2179.20'
8557'	89.20°	267.77°	6690.68'	2272.94'



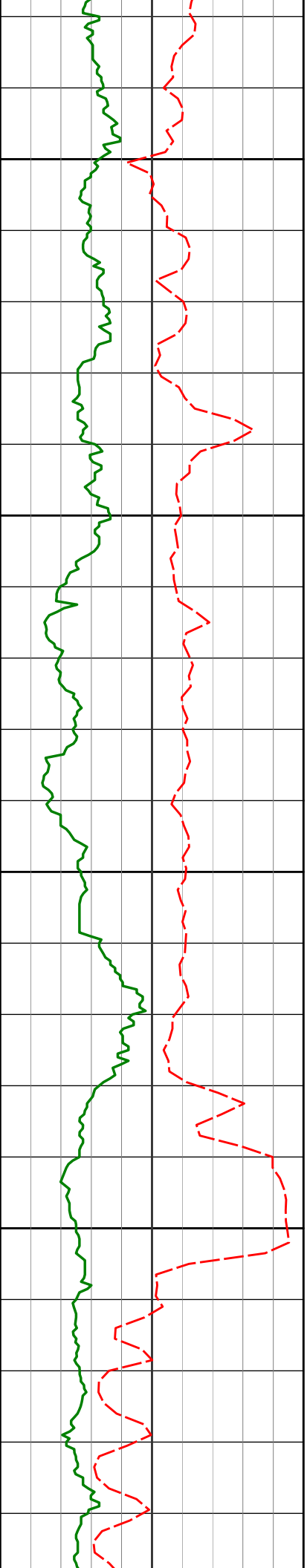
8652'	89.29°	267.49°	6691.94'	2367.72'
8747'	90.46°	267.82°	6692.14'	2462.51'



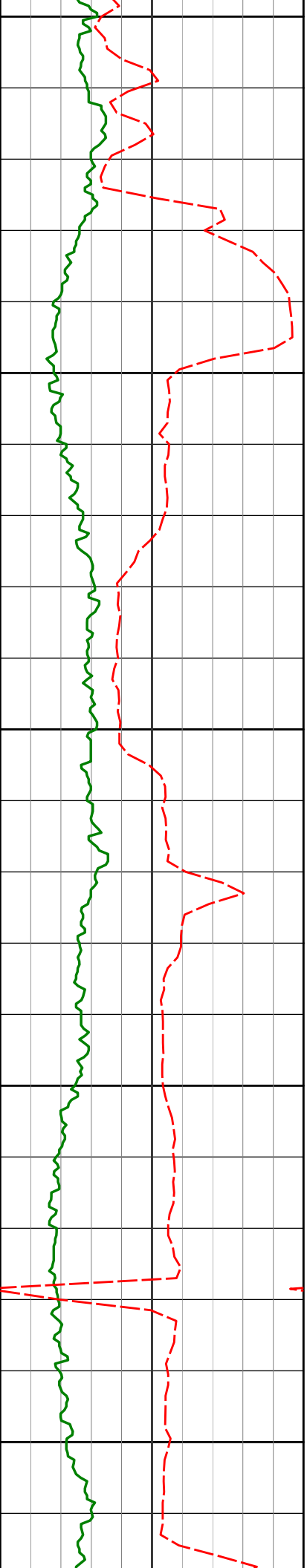
8842'	88.98°	268.19°	6692.61'	2557.34'
8937'	89.60°	269.15°	6693.79'	2652.21'



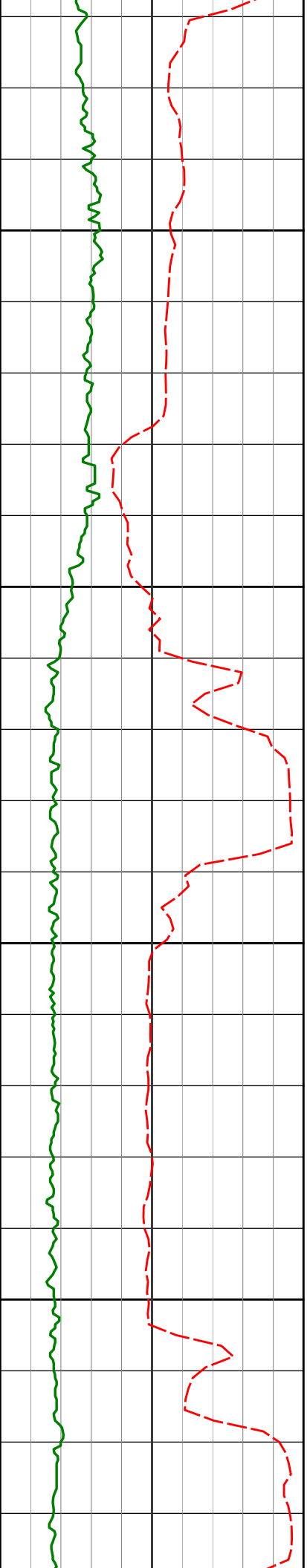
9032'	89.75°	269.25°	6694.32'	2747.14'
9127'	89.69°	268.76°	6694.79'	2842.05'
9221'	89.20°	268.99°	6695.70'	2935.95'



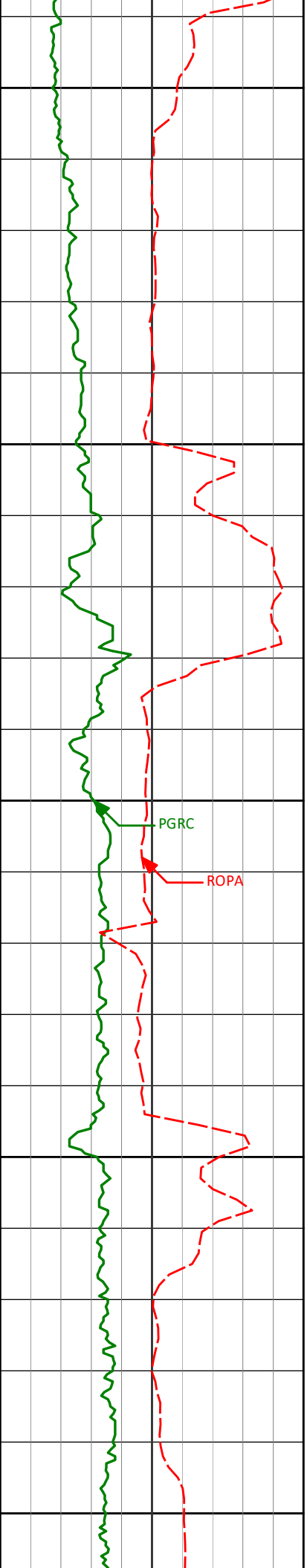
9316'	88.49°	269.19°	6697.61'	3030.85'
9411'	88.89°	269.64°	6699.79'	3125.76'



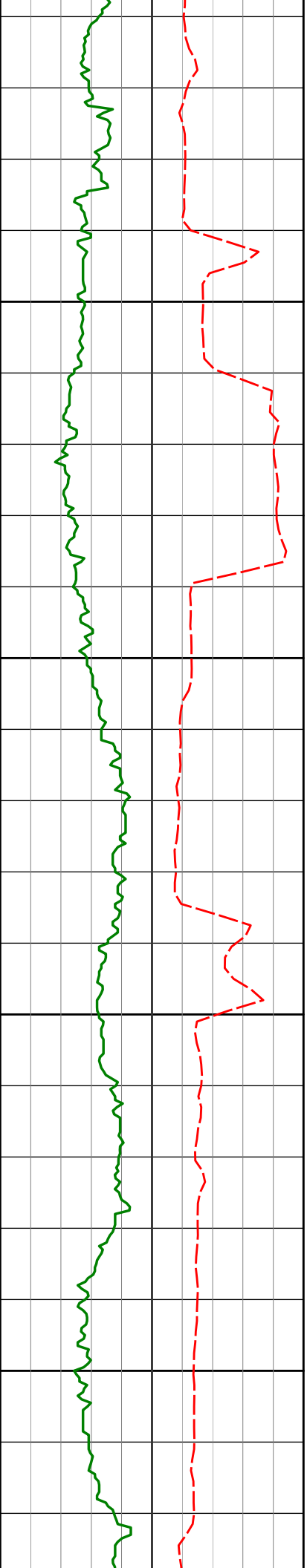
9506'	90.25°	269.03°	6700.50'	3220.69'
9600'	90.55°	268.92°	6699.84'	3314.60'



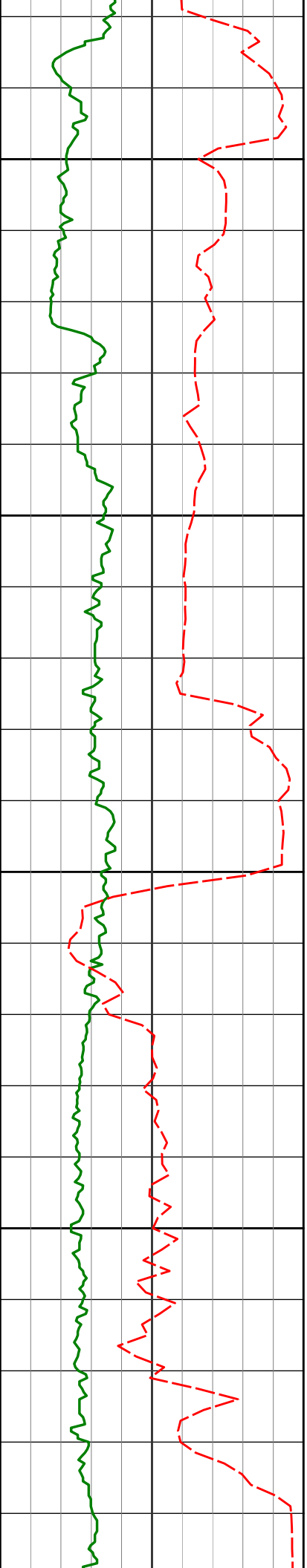
9695'	92.19°	269.33°	6697.57'	3409.49'
9790'	91.39°	269.56°	6694.60'	3504.39'
9885'	90.74°	270.29°	6692.84'	3599.33'



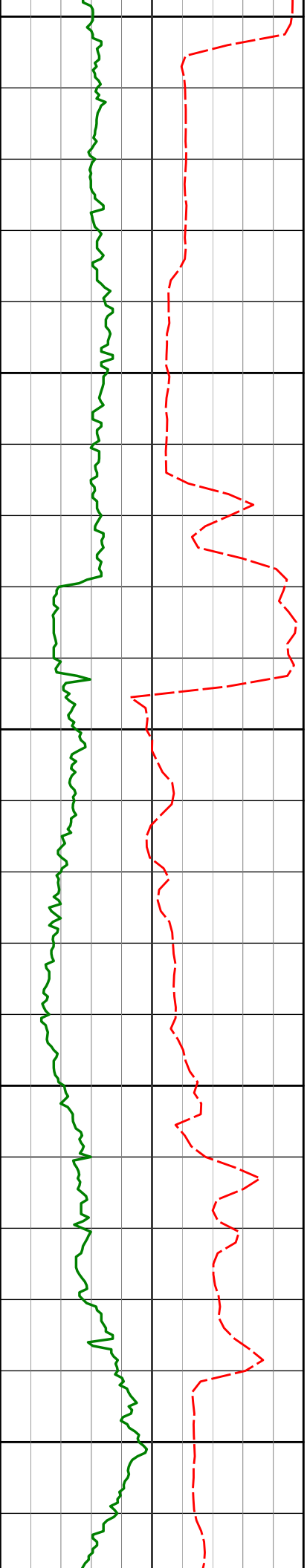
9980'	87.87°	269.53°	6693.99'	3694.28'
10074'	86.45°	266.26°	6698.65'	3787.97'



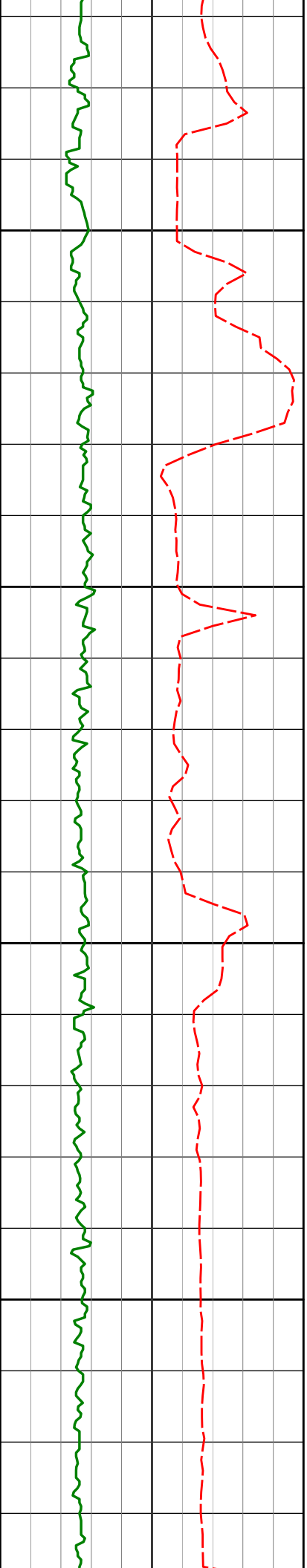
10169'	89.78°	267.42°	6701.77'	3882.60'
10263'	92.00°	267.61°	6700.31'	3976.36'



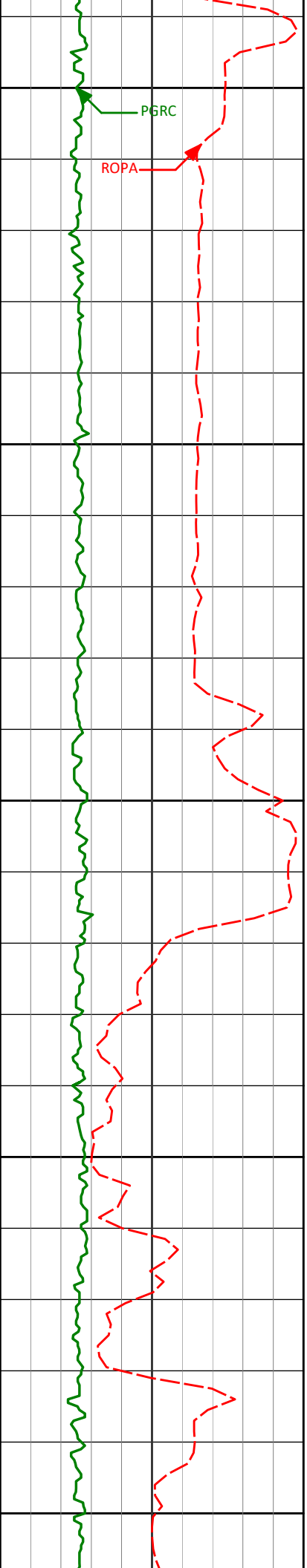
10358'	92.28°	267.83°	6696.77'	4071.09'
10453'	91.76°	268.25°	6693.42'	4165.86'
10547'	90.83°	269.80°	6691.29'	4259.75'



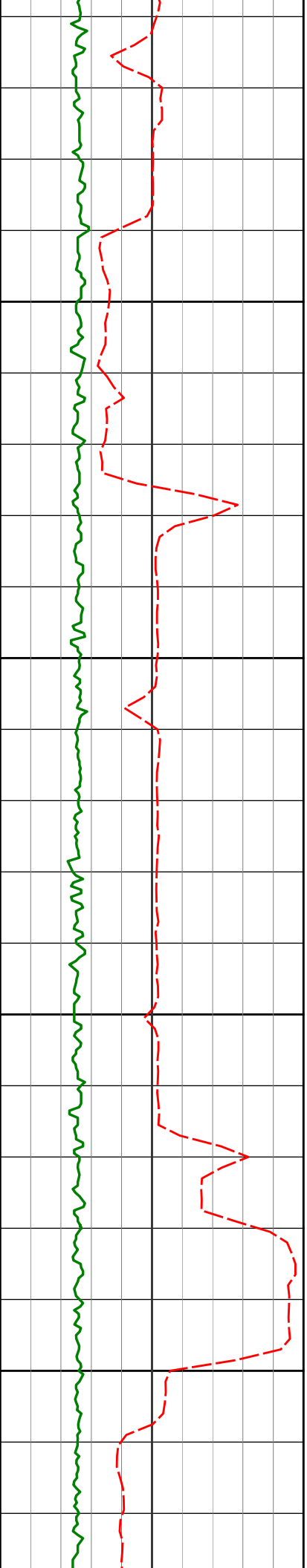
10642'	88.24°	269.14°	6692.06'	4354.68'
10736'	87.81°	268.68°	6695.30'	4448.53'



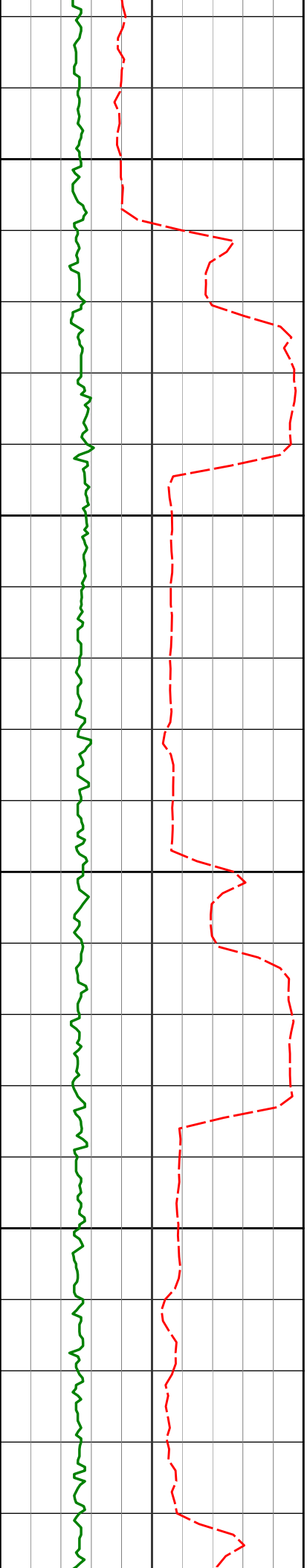
10831'	89.44°	268.89°	6697.58'	4543.39'
10925'	89.72°	268.10°	6698.27'	4637.26'



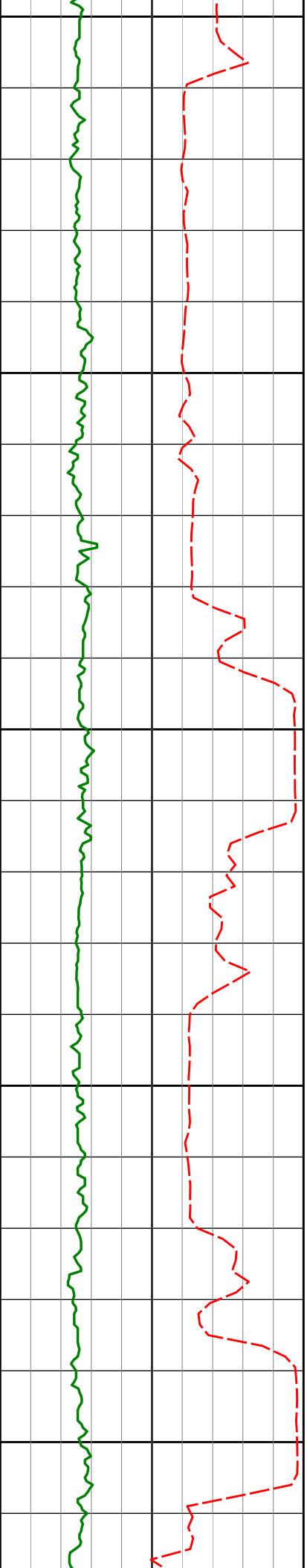
11020'	89.97°	267.87°	6698.53'	4732.09'
11115'	90.00°	269.57°	6698.55'	4826.98'



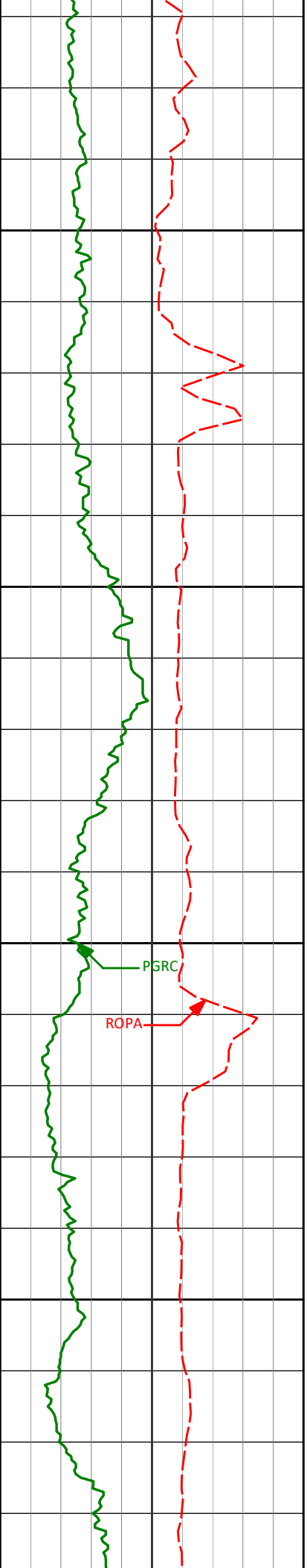
11210'	89.97°	269.32°	6698.58'	4921.92'
11302'	90.00°	267.76°	6698.60'	5013.80'
11394'	89.85°	267.34°	6698.72'	5105.58'



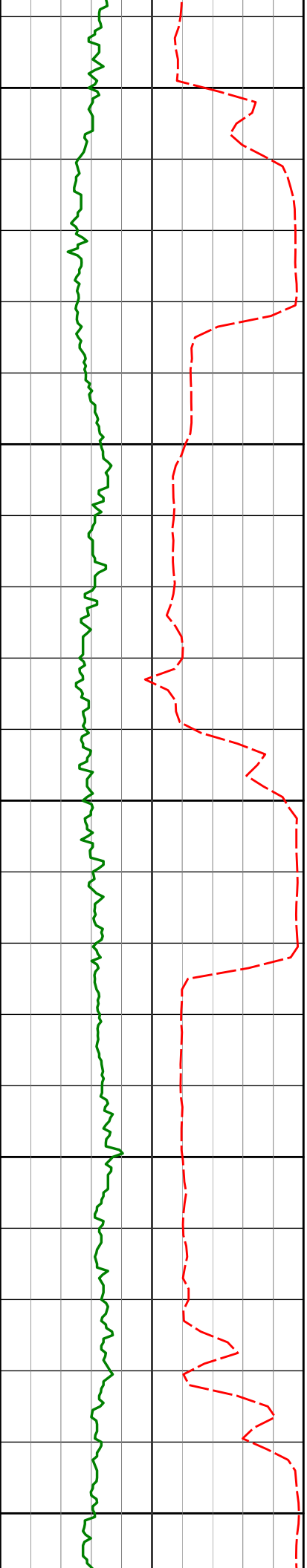
11487'	90.59°	267.71°	6698.37'	5198.36'
11578'	90.18°	269.87°	6697.76'	5289.25'



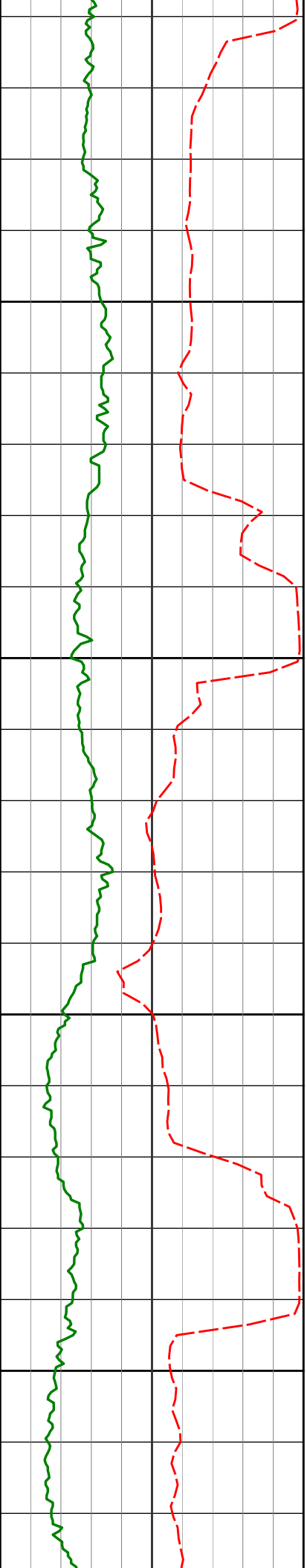
11670'	89.88°	268.07°	6697.71'	5381.16'
11762'	89.66°	268.49°	6698.08'	5473.02'
11853'	90.31°	271.69°	6698.10'	5563.98'



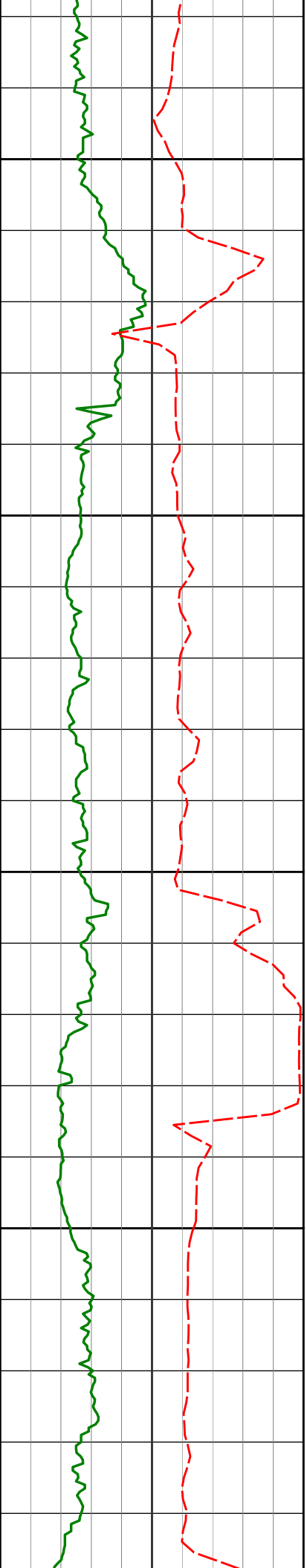
11945'	91.70°	271.59°	6696.49'	5655.96'
12037'	92.90°	271.11°	6692.79'	5747.89'



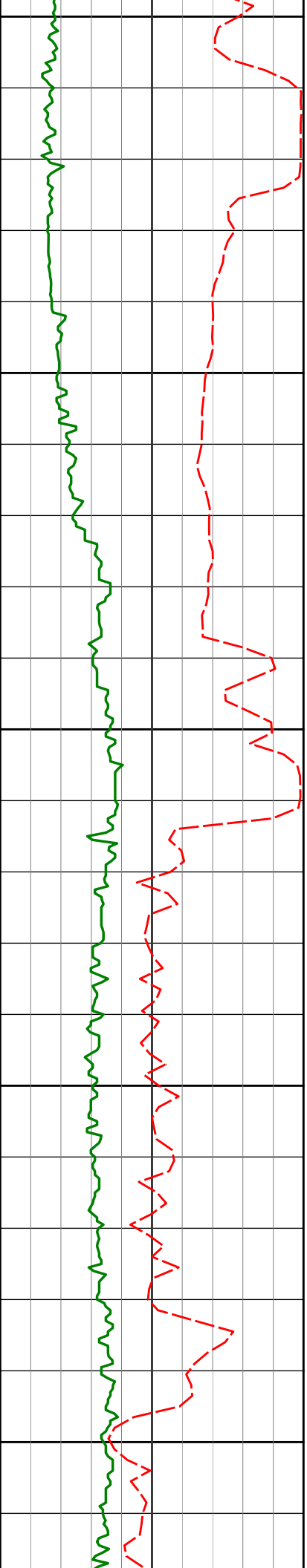
12128'	92.16°	272.41°	6688.78'	5838.80'
12221'	89.78°	272.39°	6687.20'	5931.76'



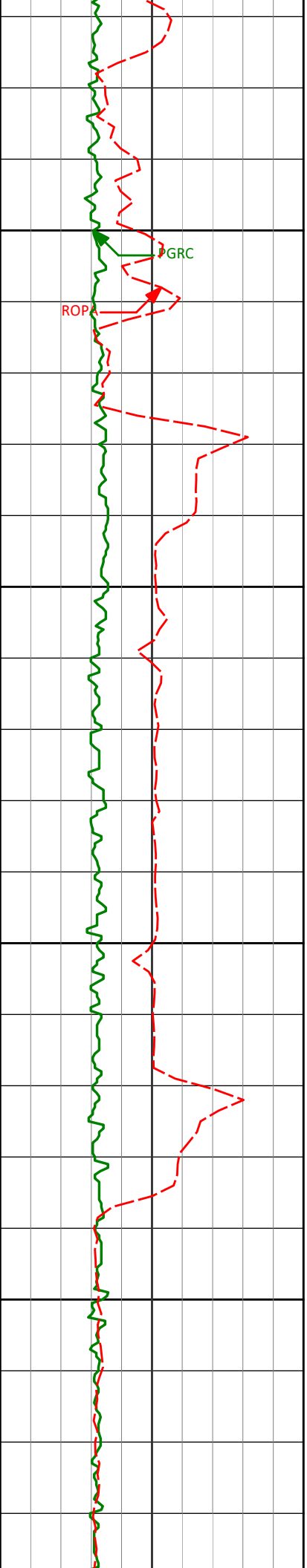
12314'	87.78°	273.72°	6689.18'	6024.70'
12406'	86.45°	272.70°	6693.81'	6116.54'
12498'	87.19°	271.06°	6698.92'	6208.39'



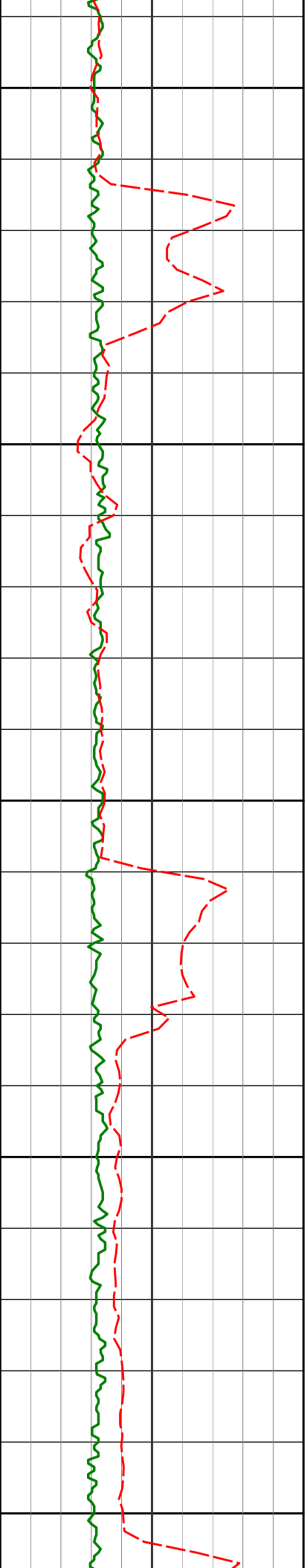
12590'	86.94°	270.90°	6703.63'	6300.27'
12683'	88.00°	269.25°	6707.73'	6393.14'



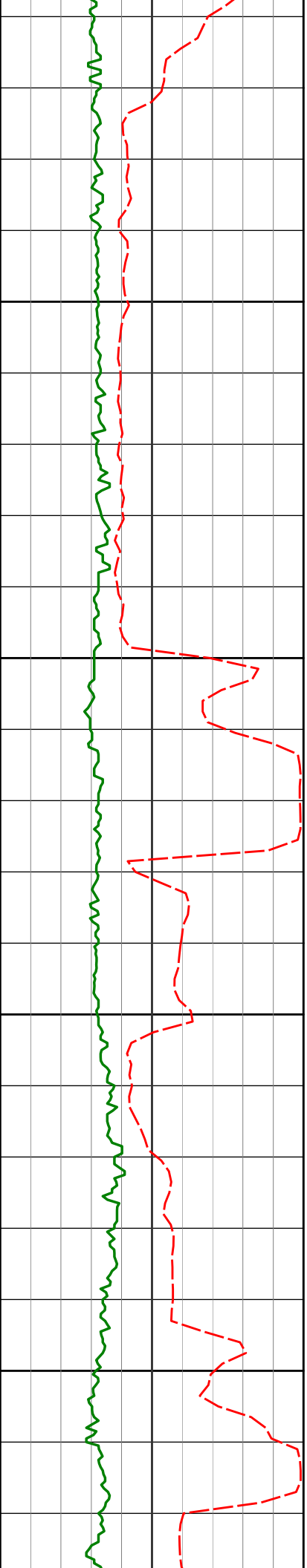
12774'	89.01°	268.31°	6710.11'	6484.01'
12869'	90.31°	268.40°	6710.67'	6578.87'
12963'	90.46°	268.86°	6710.04'	6672.75'



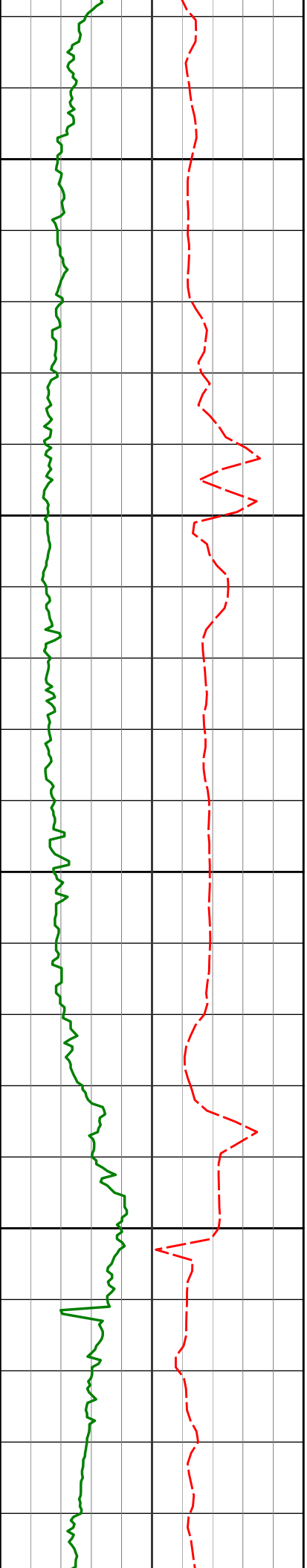
13056'	90.18°	269.10°	6709.52'	6765.66'
13151'	89.91°	269.02°	6709.45'	6860.58'



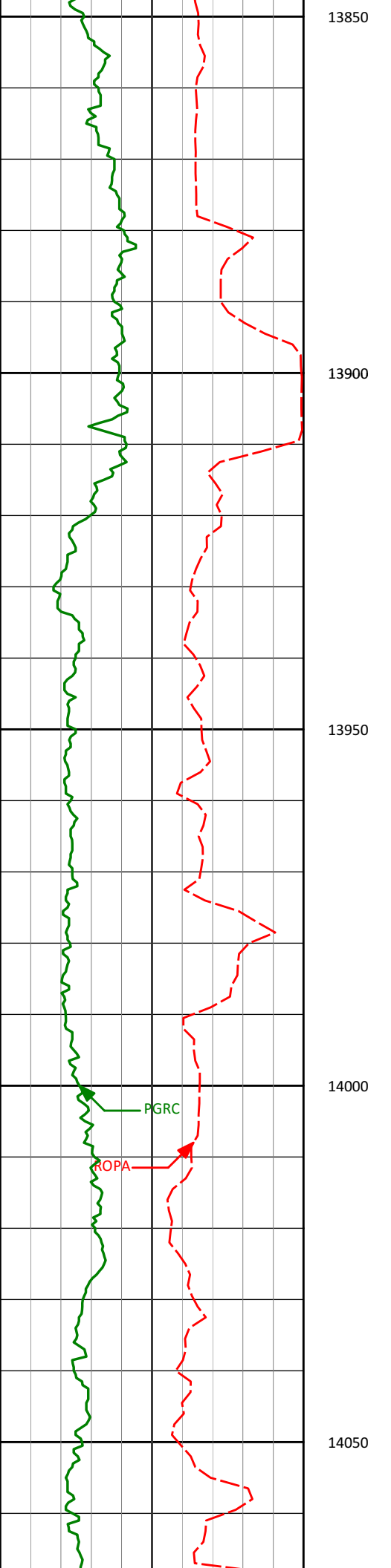
13246'	89.94°	267.68°	6709.57'	6955.44'
13340'	89.94°	266.97°	6709.67'	7049.19'



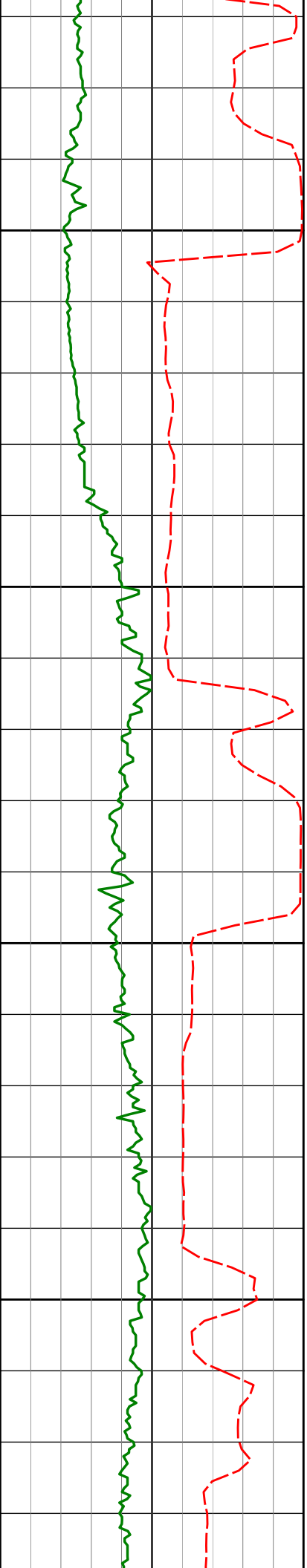
13435'	89.72°	266.52°	6709.95'	7143.87'
13530'	89.48°	270.01°	6710.61'	7238.70'
13625'	90.68°	269.85°	6710.48'	7333.67'



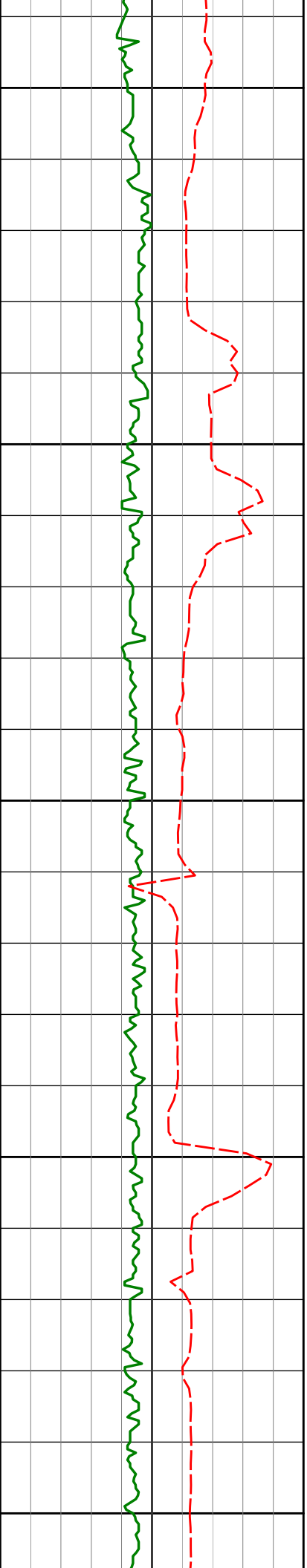
13720'	90.34°	268.94°	6709.64'	7428.60'
13814'	88.92°	267.75°	6710.24'	7522.46'



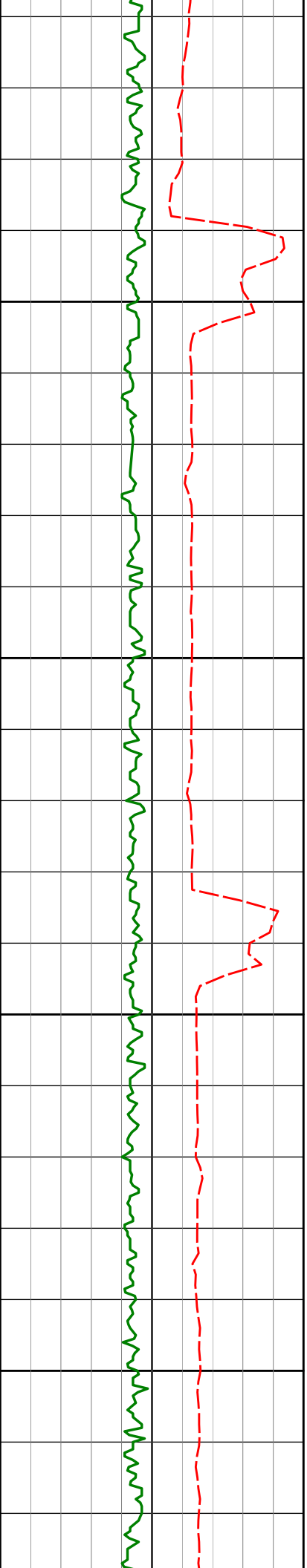
13909'	90.34°	267.67°	6710.86'	7617.25'
14003'	91.97°	268.21°	6708.96'	7711.05'



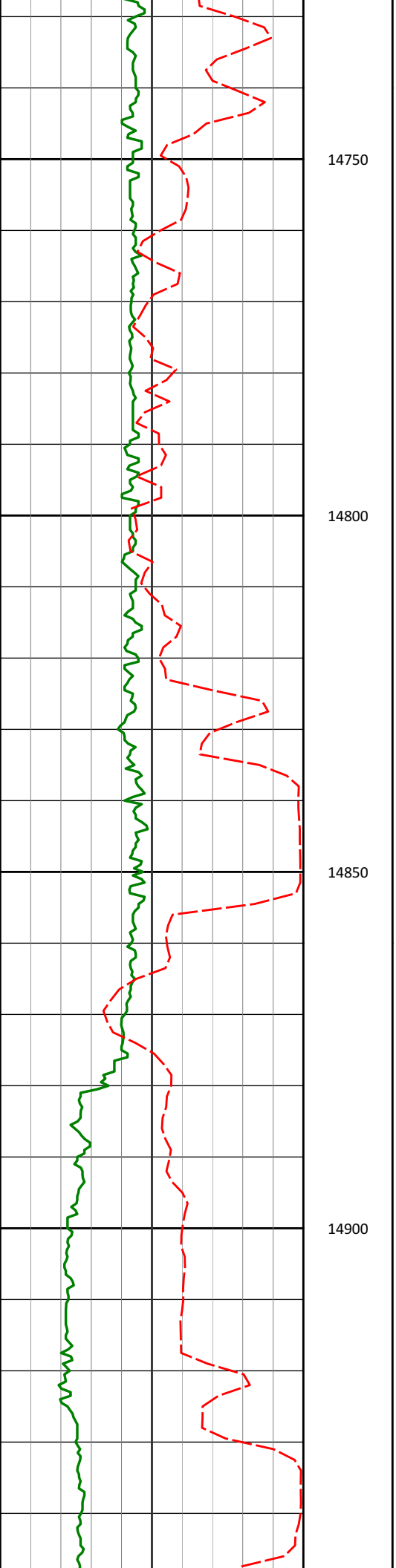
14098'	91.20°	268.52°	6706.33'	7805.87'
14193'	89.75°	269.62°	6705.55'	7900.78'
14287'	90.12°	269.96°	6705.65'	7994.74'



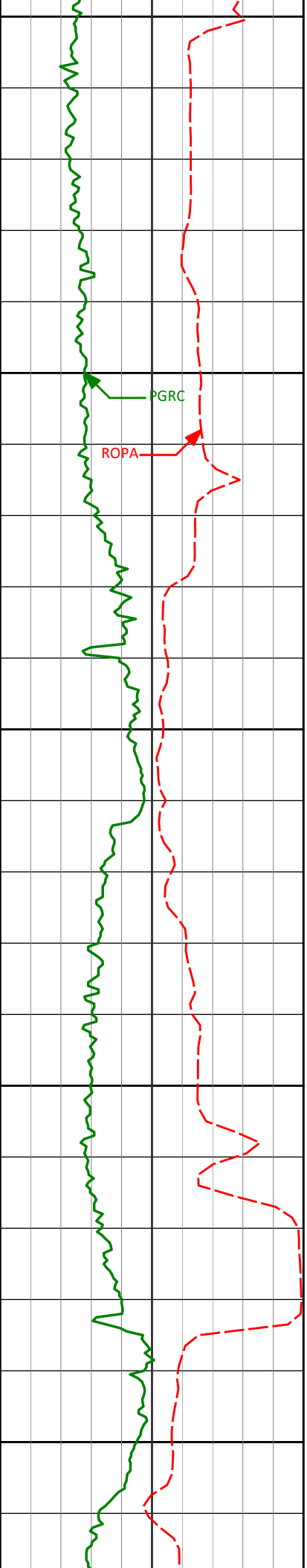
14382'	89.88°	269.72°	6705.65'	8089.70'
14477'	89.75°	270.09°	6705.96'	8184.67'



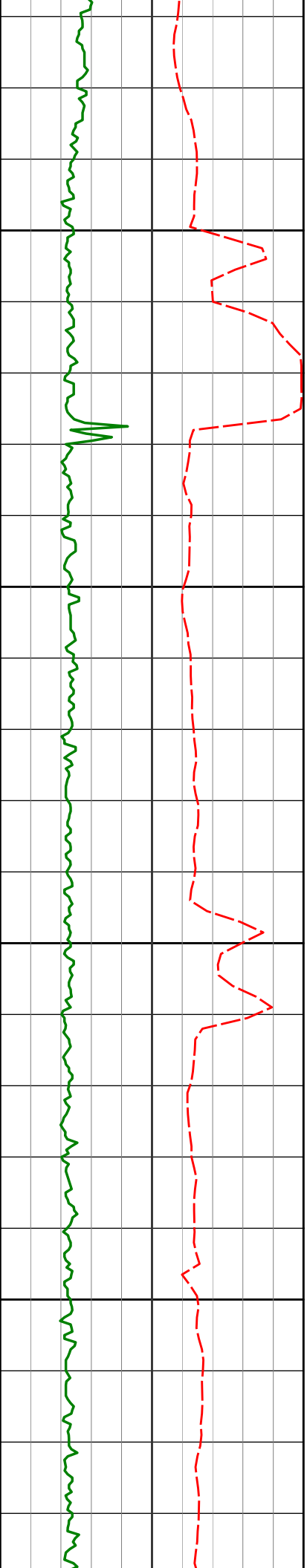
14571'	90.03°	270.55°	6706.14'	8278.65'
14665'	89.97°	270.85°	6706.14'	8372.64'



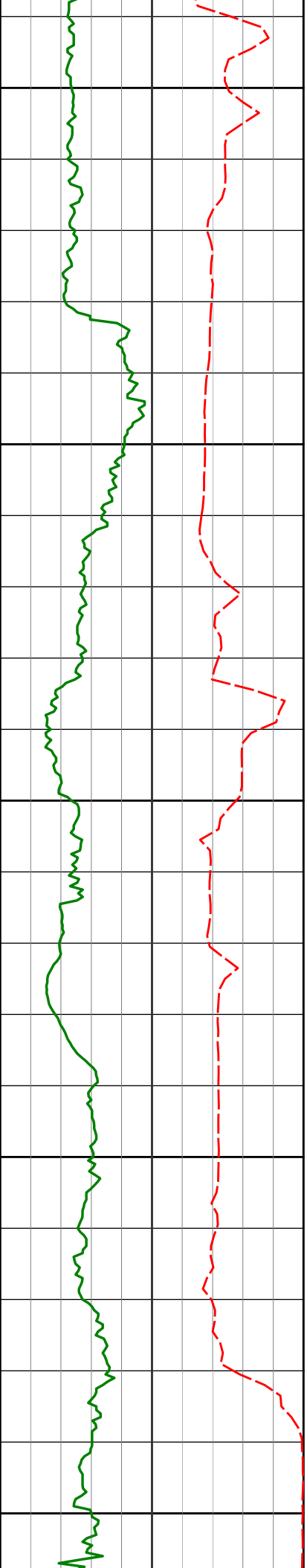
14760'	89.75°	271.18°	6706.37'	8467.64'
14855'	88.55°	269.11°	6707.78'	8562.60'



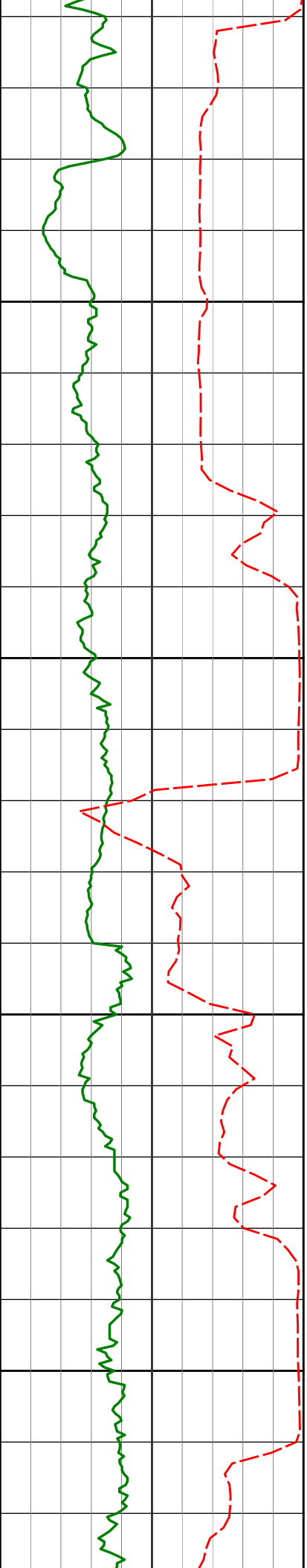
14949'	90.22°	268.48°	6708.79'	8656.48'
15044'	91.48°	268.79°	6707.38'	8751.36'
15139'	87.96°	267.06°	6707.85'	8846.16'



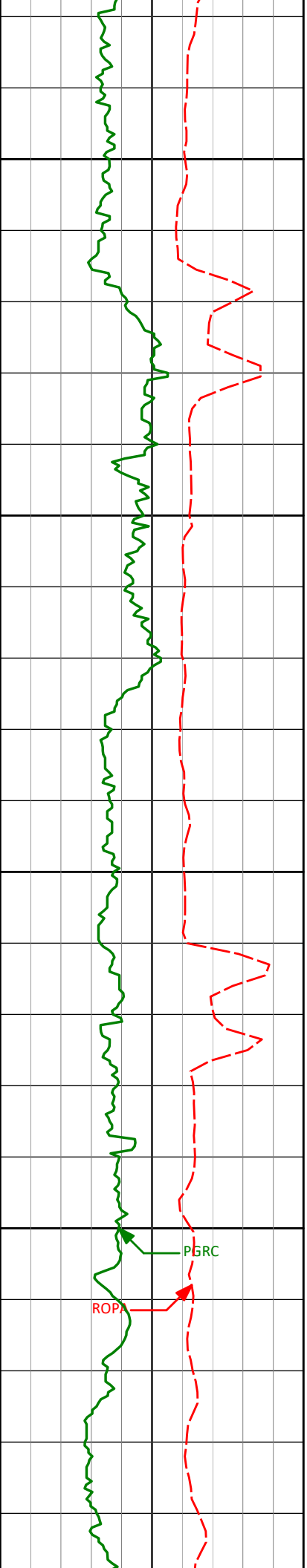
15234'	90.46°	267.06°	6709.16'	8940.86'
15328'	90.19°	265.67°	6708.62'	9034.48'



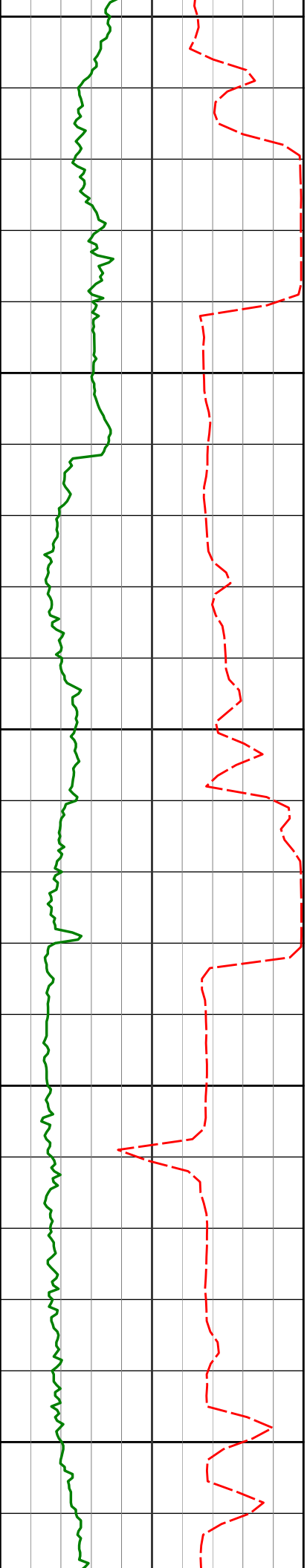
15423'	91.39°	265.80°	6707.31'	9129.00'
15517'	92.56°	265.76°	6704.07'	9222.48'



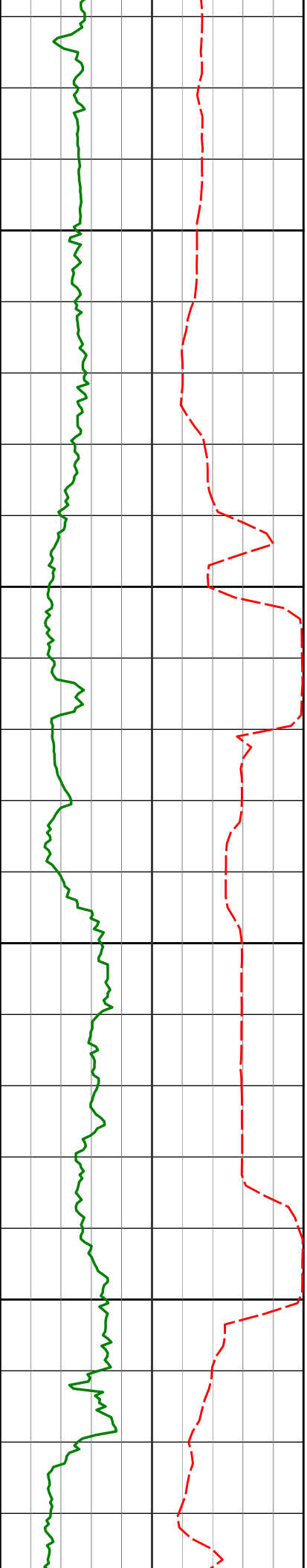
15612'	93.21°	267.89°	6699.29'	9317.04'
15707'	92.78°	269.31°	6694.33'	9411.79'
15802'	89.60°	269.15°	6692.35'	9506.69'



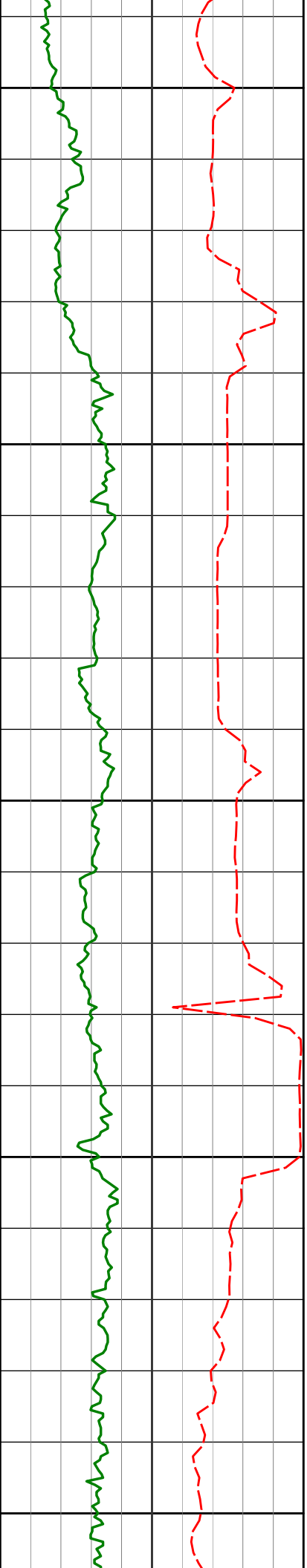
15897'	87.50°	268.05°	6694.76'	9601.53'
15991'	86.05°	268.57°	6700.05'	9695.24'



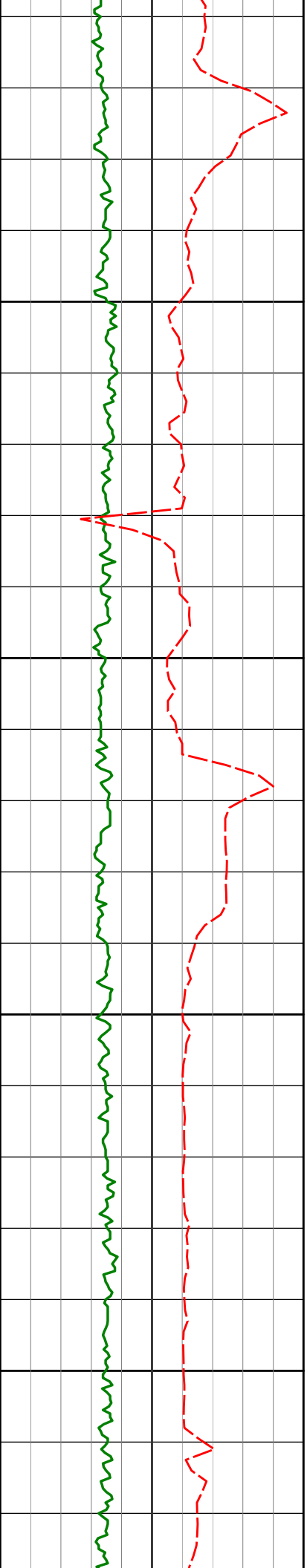
16086'	86.88°	268.10°	6705.90'	9789.92'
16181'	88.24°	268.13°	6709.95'	9884.67'



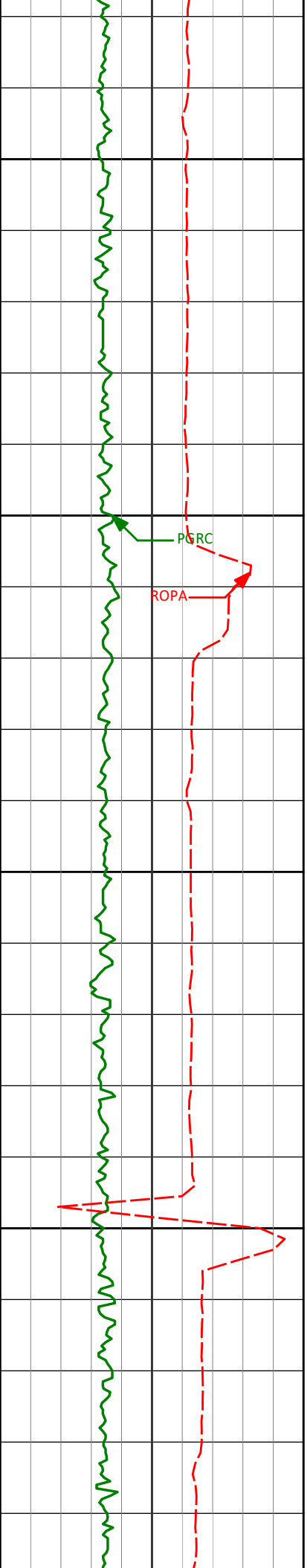
16276'	88.27°	267.67°	6712.84'	9979.44'
16370'	91.48°	268.25°	6713.05'	10073.25'
16465'	90.77°	268.82°	6711.18'	10168.11'



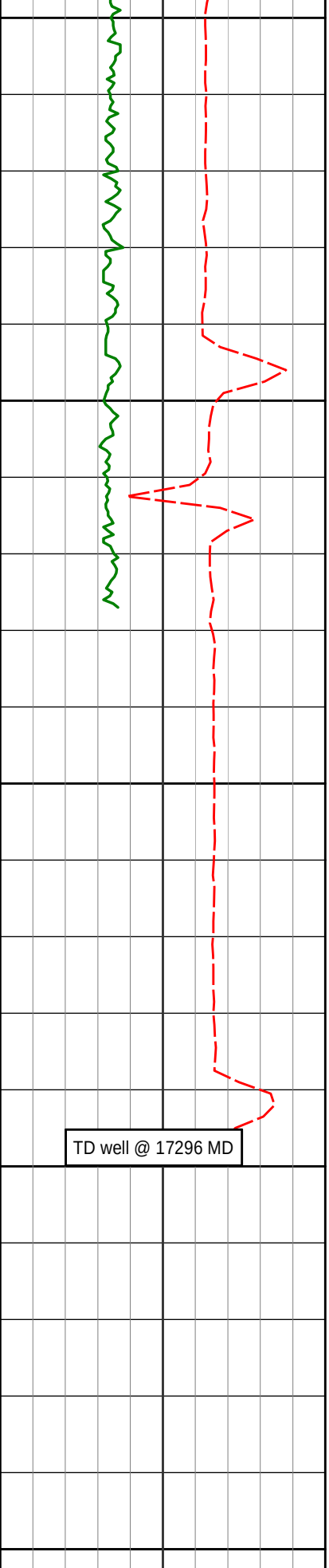
16560'	91.66°	268.31°	6709.17'	10262.96'
16655'	90.15°	267.98°	6707.67'	10357.79'



16750	16750'	88.83°	266.14°	6708.51'	10452.50'
	16844'	89.38°	265.34°	6709.98'	10546.02'



16939'	90.31°	265.95°	6710.24'	10640.53'
17033'	90.62°	265.40°	6709.48'	10734.05'
17128'	90.15°	263.90°	6708.84'	10828.37'



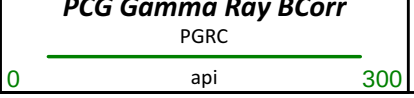
Depth	Inc.	Azi.	TVD	V.S.
17230'	89.72°	262.43°	6708.95'	10929.30'
17296'	89.72°	262.43°	6709.28'	10994.48'

Avg Rate of Penetration

ROPA

1K feet per hr 0

Depth ft



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AE19-689
Wattenburg
Weld Colorado
USA
CA-XX-0901853575

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
238.00	0.50	228.60	238.00	0.69 S	0.78 W	0.76	0.21
481.00	1.60	82.70	480.97	0.96 S	1.79 E	-1.81	0.84
828.00	0.78	44.93	827.90	1.33 N	8.26 E	-8.23	0.32
920.00	0.66	43.17	919.89	2.16 N	9.07 E	-9.01	0.13
1012.00	0.78	33.73	1011.88	3.07 N	9.78 E	-9.70	0.18
1104.00	0.73	37.69	1103.87	4.05 N	10.49 E	-10.38	0.08
1195.00	0.85	62.41	1194.87	4.82 N	11.44 E	-11.31	0.39
1301.00	0.51	270.35	1300.86	5.19 N	11.66 E	-11.53	1.25
1394.00	0.58	321.53	1393.86	5.56 N	10.96 E	-10.81	0.51
1485.00	1.26	302.17	1484.85	6.46 N	9.82 E	-9.66	0.81
1577.00	1.57	256.77	1576.82	6.71 N	7.74 E	-7.57	1.23
1760.00	1.12	275.65	1759.77	6.31 N	3.52 E	-3.36	0.34
1852.00	0.85	285.63	1851.76	6.58 N	1.97 E	-1.80	0.35
1943.00	0.88	303.81	1942.75	7.15 N	0.74 E	-0.55	0.30
2035.00	0.22	103.17	2034.75	7.50 N	0.32 E	-0.13	1.18
2221.00	0.29	100.59	2220.74	7.34 N	1.13 E	-0.95	0.04
2313.00	0.22	69.68	2312.74	7.35 N	1.53 E	-1.34	0.16
2405.00	0.24	36.81	2404.74	7.57 N	1.81 E	-1.61	0.14
2497.00	0.50	6.03	2496.74	8.12 N	1.97 E	-1.76	0.35
2590.00	1.55	351.19	2589.72	9.77 N	1.82 E	-1.57	1.16
2681.00	2.92	348.71	2680.65	13.26 N	1.17 E	-0.83	1.51
2775.00	4.39	351.32	2774.46	19.16 N	0.16 E	0.33	1.57
2869.00	5.09	351.43	2868.14	26.84 N	1.00 W	1.69	0.74
2963.00	7.34	348.38	2961.58	36.85 N	2.83 W	3.77	2.42
3057.00	8.02	343.93	3054.74	49.03 N	5.86 W	7.11	0.96
3152.00	7.54	345.10	3148.86	61.42 N	9.30 W	10.86	0.53
3247.00	8.23	344.23	3242.96	73.99 N	12.75 W	14.63	0.74
3342.00	8.98	343.28	3336.89	87.64 N	16.73 W	18.95	0.80
3531.00	8.67	338.50	3523.66	115.02 N	26.19 W	29.11	0.42
3626.00	8.83	336.83	3617.55	128.38 N	31.69 W	34.95	0.32
3721.00	8.73	332.52	3711.44	141.48 N	37.88 W	41.47	0.70
3815.00	8.75	337.12	3804.35	154.40 N	43.95 W	47.87	0.74
3910.00	8.97	336.04	3898.22	167.82 N	49.77 W	54.03	0.29
4005.00	8.54	336.57	3992.11	181.06 N	55.58 W	60.18	0.46
4100.00	7.98	335.59	4086.12	193.54 N	61.11 W	66.02	0.61
4195.00	7.69	336.55	4180.24	205.38 N	66.37 W	71.58	0.33
4289.00	6.98	335.71	4273.47	216.35 N	71.22 W	76.71	0.76
4384.00	6.85	344.12	4367.78	227.06 N	75.14 W	80.90	1.07
4479.00	7.74	339.92	4462.01	238.52 N	78.89 W	84.94	1.09
4574.00	8.62	345.01	4556.04	251.41 N	82.93 W	89.31	1.20
4669.00	8.33	346.59	4650.00	264.98 N	86.37 W	93.09	0.39
4763.00	8.39	347.78	4743.01	278.30 N	89.40 W	96.46	0.19
4858.00	7.90	348.57	4837.05	291.48 N	92.16 W	99.55	0.53
4953.00	6.93	348.26	4931.25	303.49 N	94.62 W	102.32	1.02
5048.00	8.57	351.29	5025.38	316.10 N	96.86 W	104.88	1.78
5142.00	7.45	349.53	5118.46	329.01 N	99.02 W	107.37	1.22
5237.00	5.67	345.61	5212.84	339.62 N	101.31 W	109.93	1.93
5332.00	6.33	338.17	5307.32	349.02 N	104.42 W	113.28	1.07
5427.00	6.55	342.76	5401.72	359.06 N	107.98 W	117.09	0.59

5521.00	7.31	345.24	5495.03	369.96 N	111.09 W	120.48	0.87
5616.00	7.78	351.34	5589.21	382.16 N	113.60 W	123.30	0.98
5711.00	9.15	352.44	5683.17	396.01 N	115.56 W	125.61	1.45
5806.00	7.60	349.78	5777.16	409.68 N	117.67 W	128.07	1.68
5901.00	7.06	339.57	5871.38	421.33 N	120.82 W	131.52	1.48
5996.00	6.25	338.52	5965.74	431.62 N	124.75 W	135.71	0.86
6044.00	7.85	320.94	6013.38	436.60 N	127.77 W	138.86	5.56
6090.00	13.64	319.95	6058.56	443.19 N	133.25 W	144.50	12.59
6138.00	18.64	317.79	6104.65	453.21 N	142.05 W	153.55	10.49
6185.00	21.33	311.50	6148.82	464.44 N	153.50 W	165.29	7.32
6233.00	23.92	301.57	6193.14	475.33 N	168.34 W	180.39	9.60
6280.00	26.30	291.12	6235.72	484.07 N	186.18 W	198.45	10.69
6328.00	27.29	281.76	6278.58	490.15 N	206.88 W	219.30	9.02
6375.00	28.61	273.41	6320.12	493.02 N	228.67 W	241.16	8.78
6423.00	28.83	275.05	6362.21	494.72 N	251.67 W	264.20	1.70
6470.00	31.10	273.90	6402.93	496.54 N	275.08 W	287.64	4.98
6518.00	36.17	271.66	6442.88	497.80 N	301.62 W	314.21	10.87
6565.00	41.27	270.09	6479.54	498.22 N	331.01 W	343.59	11.05
6613.00	45.82	267.16	6514.33	497.40 N	364.05 W	376.60	10.37
6659.00	50.39	265.31	6545.04	495.13 N	398.20 W	410.69	10.38
6707.00	55.71	264.99	6573.88	491.88 N	436.41 W	448.80	11.10
6754.00	59.97	266.42	6598.89	488.91 N	476.08 W	488.38	9.42
6802.00	64.64	268.02	6621.20	486.87 N	518.51 W	530.75	10.17
6849.00	69.45	268.94	6639.52	485.73 N	561.76 W	573.96	10.39
6897.00	72.77	269.64	6655.06	485.17 N	607.17 W	619.33	7.05
6944.00	75.95	268.69	6667.73	484.50 N	652.42 W	664.55	7.04
6992.00	80.68	267.04	6677.45	482.75 N	699.37 W	711.45	10.41
7030.00	83.27	265.87	6682.75	480.42 N	736.93 W	748.93	7.47
7137.00	86.76	269.66	6692.05	476.27 N	843.40 W	855.27	4.80
7231.00	88.12	267.80	6696.25	474.19 N	937.28 W	949.06	2.45
7326.00	89.29	268.31	6698.40	470.97 N	1032.20 W	1043.87	1.34
7421.00	91.05	268.84	6698.12	468.60 N	1127.17 W	1138.74	1.93
7515.00	91.26	268.92	6696.22	466.77 N	1221.13 W	1232.63	0.24
7610.00	92.77	269.27	6692.88	465.27 N	1316.06 W	1327.48	1.63
7705.00	91.54	269.57	6689.31	464.31 N	1410.98 W	1422.35	1.33
7800.00	90.15	269.75	6687.91	463.74 N	1505.97 W	1517.29	1.48
7895.00	89.72	269.07	6688.02	462.77 N	1600.96 W	1612.23	0.85
7989.00	91.48	269.24	6687.03	461.38 N	1694.94 W	1706.15	1.88
8084.00	91.08	269.36	6684.91	460.22 N	1789.91 W	1801.06	0.44
8179.00	90.00	268.37	6684.01	458.34 N	1884.89 W	1895.95	1.54
8273.00	88.64	267.55	6685.13	454.99 N	1978.82 W	1989.77	1.69
8368.00	88.74	267.23	6687.30	450.67 N	2073.69 W	2084.50	0.35
8463.00	88.98	266.87	6689.19	445.78 N	2168.55 W	2179.20	0.46
8557.00	89.20	267.77	6690.68	441.38 N	2262.43 W	2272.94	0.99
8652.00	89.29	267.49	6691.94	437.45 N	2357.34 W	2367.72	0.31
8747.00	90.46	267.82	6692.14	433.57 N	2452.26 W	2462.51	1.28
8842.00	88.98	268.19	6692.61	430.26 N	2547.20 W	2557.34	1.61
8937.00	89.60	269.15	6693.79	428.06 N	2642.17 W	2652.21	1.20
9032.00	89.75	269.25	6694.32	426.73 N	2737.16 W	2747.14	0.19
9127.00	89.69	268.76	6694.79	425.08 N	2832.14 W	2842.05	0.52
9221.00	89.20	268.99	6695.70	423.23 N	2926.12 W	2935.95	0.58
9316.00	88.49	269.19	6697.61	421.73 N	3021.08 W	3030.85	0.78
9411.00	88.89	269.64	6699.79	420.76 N	3116.05 W	3125.76	0.63
9506.00	90.25	269.03	6700.50	419.65 N	3211.04 W	3220.69	1.57
9600.00	90.55	268.92	6699.84	417.97 N	3305.03 W	3314.60	0.34
9695.00	92.19	269.33	6697.57	416.52 N	3399.98 W	3409.49	1.78
9790.00	91.39	269.56	6694.60	415.60 N	3494.93 W	3504.39	0.88
9885.00	90.74	270.29	6692.84	415.48 N	3589.91 W	3599.33	1.03
9980.00	87.87	269.53	6693.99	415.33 N	3684.90 W	3694.28	3.13
10074.00	86.45	266.26	6698.65	411.88 N	3778.70 W	3787.97	3.79
10169.00	89.78	267.42	6701.77	406.65 N	3873.49 W	3882.60	3.71
10263.00	92.00	267.61	6700.31	402.57 N	3967.39 W	3976.36	2.37
10358.00	92.28	267.83	6696.77	398.80 N	4062.24 W	4071.09	0.37
10453.00	91.76	268.25	6693.42	395.55 N	4157.13 W	4165.86	0.70
10547.00	90.83	269.80	6691.29	393.95 N	4251.09 W	4259.75	1.92
10642.00	88.24	269.14	6692.06	393.07 N	4346.07 W	4354.68	2.81
10736.00	87.81	268.68	6695.30	391.29 N	4440.00 W	4448.53	0.67
10831.00	89.44	268.89	6697.58	389.27 N	4534.95 W	4543.39	1.73
10925.00	89.72	268.10	6698.27	386.80 N	4628.91 W	4637.26	0.89
11020.00	89.97	267.87	6698.53	383.46 N	4723.85 W	4732.09	0.36
11115.00	90.00	269.57	6698.55	381.34 N	4818.82 W	4826.98	1.79

11210.00	89.97	269.32	6698.58	380.42 N	4913.82 W	4921.92	0.27
11302.00	90.00	267.76	6698.60	378.08 N	5005.79 W	5013.80	1.70
11394.00	89.85	267.34	6698.72	374.14 N	5097.70 W	5105.58	0.48
11487.00	90.59	267.71	6698.37	370.13 N	5190.61 W	5198.36	0.89
11578.00	90.18	269.87	6697.76	368.21 N	5281.59 W	5289.25	2.42
11670.00	89.88	268.07	6697.71	366.55 N	5373.57 W	5381.16	1.98
11762.00	89.66	268.49	6698.08	363.79 N	5465.53 W	5473.02	0.52
11853.00	90.31	271.69	6698.10	363.93 N	5556.51 W	5563.98	3.59
11945.00	91.70	271.59	6696.49	366.57 N	5648.46 W	5655.96	1.51
12037.00	92.90	271.11	6692.79	368.73 N	5740.36 W	5747.89	1.40
12128.00	92.16	272.41	6688.78	371.52 N	5831.22 W	5838.80	1.64
12221.00	89.78	272.39	6687.20	375.42 N	5924.12 W	5931.76	2.56
12314.00	87.78	273.72	6689.18	380.37 N	6016.96 W	6024.70	2.58
12406.00	86.45	272.70	6693.81	385.52 N	6108.70 W	6116.54	1.82
12498.00	87.19	271.06	6698.92	388.53 N	6200.50 W	6208.39	1.95
12590.00	86.94	270.90	6703.63	390.10 N	6292.37 W	6300.27	0.32
12683.00	88.00	269.25	6707.73	390.22 N	6385.27 W	6393.14	2.11
12774.00	89.01	268.31	6710.11	388.29 N	6476.22 W	6484.01	1.52
12869.00	90.31	268.40	6710.67	385.56 N	6571.18 W	6578.87	1.37
12963.00	90.46	268.86	6710.04	383.31 N	6665.15 W	6672.75	0.51
13056.00	90.18	269.10	6709.52	381.66 N	6758.13 W	6765.66	0.40
13151.00	89.91	269.02	6709.45	380.10 N	6853.12 W	6860.58	0.30
13246.00	89.94	267.68	6709.57	377.36 N	6948.08 W	6955.44	1.41
13340.00	89.94	266.97	6709.67	372.97 N	7041.97 W	7049.19	0.76
13435.00	89.72	266.52	6709.95	367.58 N	7136.82 W	7143.87	0.53
13530.00	89.48	270.01	6710.61	364.70 N	7231.76 W	7238.70	3.68
13625.00	90.68	269.85	6710.48	364.59 N	7326.76 W	7333.67	1.27
13720.00	90.34	268.94	6709.64	363.59 N	7421.75 W	7428.60	1.02
13814.00	88.92	267.75	6710.24	360.87 N	7515.70 W	7522.46	1.97
13909.00	90.34	267.67	6710.86	357.07 N	7610.62 W	7617.25	1.50
14003.00	91.97	268.21	6708.96	353.70 N	7704.54 W	7711.05	1.83
14098.00	91.20	268.52	6706.33	350.99 N	7799.46 W	7805.87	0.87
14193.00	89.75	269.62	6705.55	349.45 N	7894.44 W	7900.78	1.92
14287.00	90.12	269.96	6705.65	349.10 N	7988.44 W	7994.74	0.53
14382.00	89.88	269.72	6705.65	348.84 N	8083.44 W	8089.70	0.36
14477.00	89.75	270.09	6705.96	348.68 N	8178.44 W	8184.67	0.41
14571.00	90.03	270.55	6706.14	349.20 N	8272.44 W	8278.65	0.57
14665.00	89.97	270.85	6706.14	350.35 N	8366.43 W	8372.64	0.33
14760.00	89.75	271.18	6706.37	352.03 N	8461.42 W	8467.64	0.42
14855.00	88.55	269.11	6707.78	352.27 N	8556.40 W	8562.60	2.52
14949.00	90.22	268.48	6708.79	350.30 N	8650.37 W	8656.48	1.90
15044.00	91.48	268.79	6707.38	348.03 N	8745.33 W	8751.36	1.37
15139.00	87.96	267.06	6707.85	344.60 N	8840.25 W	8846.16	4.13
15234.00	90.46	267.06	6709.16	339.72 N	8935.10 W	8940.86	2.63
15328.00	90.19	265.67	6708.62	333.76 N	9028.91 W	9034.48	1.51
15423.00	91.39	265.80	6707.31	326.70 N	9123.64 W	9129.00	1.27
15517.00	92.56	265.76	6704.07	319.79 N	9217.33 W	9222.48	1.25
15612.00	93.21	267.89	6699.29	314.53 N	9312.05 W	9317.04	2.34
15707.00	92.78	269.31	6694.33	312.21 N	9406.89 W	9411.79	1.56
15802.00	89.60	269.15	6692.35	310.94 N	9501.85 W	9506.69	3.35
15897.00	87.50	268.05	6694.76	308.62 N	9596.79 W	9601.53	2.50
15991.00	86.05	268.57	6700.05	305.85 N	9690.59 W	9695.24	1.64
16086.00	86.88	268.10	6705.90	303.09 N	9785.37 W	9789.92	1.00
16181.00	88.24	268.13	6709.95	299.97 N	9880.23 W	9884.67	1.43
16276.00	88.27	267.67	6712.84	296.49 N	9975.12 W	9979.44	0.49
16370.00	91.48	268.25	6713.05	293.15 N	10069.05 W	10073.25	3.47
16465.00	90.77	268.82	6711.18	290.72 N	10164.00 W	10168.11	0.96
16560.00	91.66	268.31	6709.17	288.34 N	10258.95 W	10262.96	1.08
16655.00	90.15	267.98	6707.67	285.27 N	10353.88 W	10357.79	1.63
16750.00	88.83	266.14	6708.51	280.39 N	10448.75 W	10452.50	2.38
16844.00	89.38	265.34	6709.98	273.41 N	10542.48 W	10546.02	1.03
16939.00	90.31	265.95	6710.24	266.20 N	10637.20 W	10640.53	1.17
17033.00	90.62	265.40	6709.48	259.11 N	10730.93 W	10734.05	0.67
17128.00	90.15	263.90	6708.84	250.25 N	10825.51 W	10828.37	1.65
17230.00	89.72	262.43	6708.95	238.11 N	10926.78 W	10929.30	1.50
17296.00	89.72	262.43	6709.28	229.42 N	10992.21 W	10994.48	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 271.46 DEGREES (GRID)
A TOTAL CORRECTION OF 7.40 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 17296.00 FEET
IS 10994.60 FEET ALONG 271.20 DEGREES (GRID)

Tied in @ Surface
First two Survey's from 3rd party source (Muilti Shot EMS)

Final survey projected to bit.

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