HALLIBURTON | Sperry Drilling

PCG Pressure Case Gamma
PCDC Pressure Case Directional

Powered by INSITE™

1 : 600 / 1 : 240

Country	: **USA**
Field	: **Wattenburg**
Location	: **Lat: 40° 42' 44.93" North** **Long: 103° 57' 24.98" West**
Well	: **Haley LC27-711**
Company	: **Noble Energy**
Rig	: **H&P 343**

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Rig : **H&P 343**
Well : **Haley LC27-711**
Field : **Wattenburg**
Country : **USA**
API Number : **05-123-40593**

LOCATION

Latitude : **40° 42' 44.93" North**
Longitude : **103° 57' 24.98" West**
UTM Easting = **3,427,755.940 ft**
UTM Northing = **1,506,122.399 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4814.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4838.00 ft**
GL **4814.00 ft**
WD **N/A**

Depth Logged : **628.00 ft** To **11,471.00 ft**
Date Logged : **11-May-15** To **17-May-15**
Total Depth MD : **11,471.00 ft** TVD : **5,995.95 ft**
Spud Date : **12-May-15**

Unit No. : **11610115**
Job No. : **CA-XX-0902281068**
Plot Type : **Final**
Plot Date : **18-May-15**

Run No.	Borehole Record (MD) Size	From	To	Casing Record (MD) Size	Weight	From	To
0100	8.750 in	628.00 ft	6,447.00 ft	9.625 in	36.60 lbpf	SURFACE	617.00 ft
0200	6.125 in	6,448.00 ft	11,471.00 ft	7.000 in	29.80 lbpf	SURFACE	6,437.00 ft

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	14-May-15	17-May-15			
Rig Bit Number	0100	0200			
Bit Size (in)	8.750	6.125			
Tool Nominal OD (in)	6.750	4.750			
Log Start Depth (MD, ft)	628.00	6,432.00			
Log End Depth (MD, ft)	6,432.00	11,471.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	13-May-15 15:30	15-May-15 20:45			
Drill/Wipe End Date and Time	14-May-15 18:00	17-May-15 11:00			
Min Inc (deg) @ Depth (MD, ft)	0.56 @ 630.00	88.70 @ 10,095.00			
Max Inc (deg) @ Depth (MD, ft)	85.87 @ 6,393.00	92.03 @ 10,474.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.65 / PDC			
Flow Rate (gpm)	599.62	295.00			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	10.20 / 40.00	10.20 / 36.00			
Filtrate CL (ppm)	2,100.00	2,500.00			
pH / Fluid Loss (mptm)	9.60 / 32	9.40 / 13			
PV (cP) / YP (lhf2)	14 / 14.00	10 / 10.00			
% Solids / % Sand	10.2 / .2	7.7 / 0.15			
% Oil / Oil:Water Ratio	0 / 0:0	.5 / 0:0			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Max Tool Temp (degF) / S[illegible]	171.00 / BCM	221.00 / BCM			

Max Tool Temp (degF) / Source	171.20 / PCM	221.80 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ 221.80			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	Johnny Sanchez	Johnny Sanchez			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.93	5.93			
Sub Serial Number	246470	12463933			
Insert Serial Number	11680801	11680771			
Date and Time Initialized	11-May-15 16:52	14-May-15 18:51			
Date and Time Read	14-May-15 22:17	17-May-15 21:03			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	54.00	67.00			
Software Version	6.21	6.21			
Sub Serial Number	246470	12463933			
Sonde Serial Number	11833212	10993273			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	49.70	280.20			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	47.47	60.22			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	246470	12463933			
Insert/Sonde Serial Number	11579761	11681055			

REMARKS

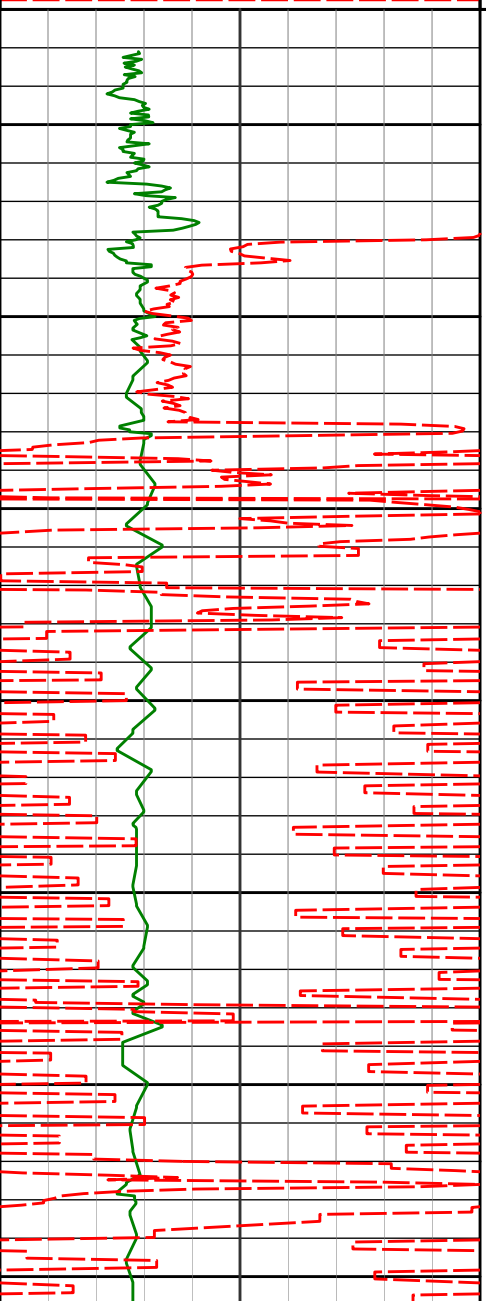
1. All depths are calibrated to driller's pipe tally and are total vertical depth from the drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. Environmental parameters used in gamma and resistance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

WARRANTY

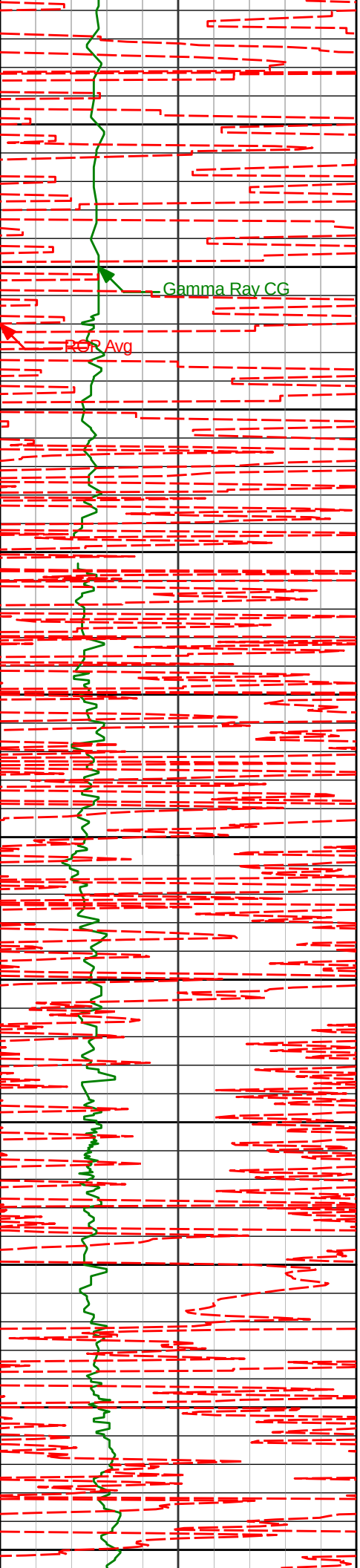
MD Detail 1:600 Scale

Gamma Ray CG
Gamma Ray CG
0 api 300

Avg Rate of Penetration
Avg Rate of Penetration
500 feet per hr 0

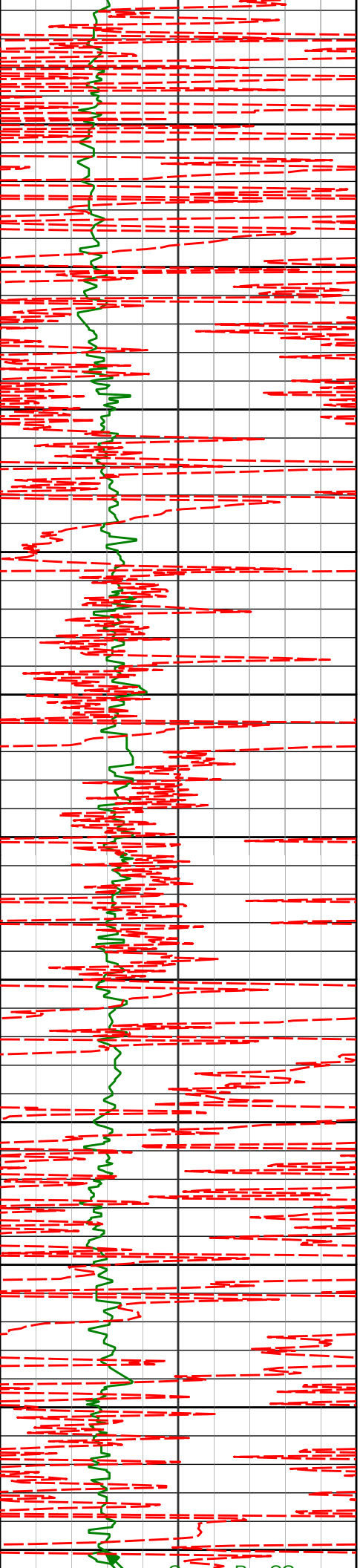


Depth MD ft	Depth	Inc	Azi	TVD	V.S.	Temp
						69.20°F
600	Surface Casing Shoe @ 617' MD					
	Run 100					
	630'	0.56°	244.49°	629.99'	-1.58'	72.00°F
650						
						72.46°F
700						
	725'	0.82°	225.96°	724.98'	-2.33'	73.51°F
750						
800						
	820'	0.94°	235.71°	819.97'	-3.35'	73.98°F
850						
						73.98°F
900						75.97°F

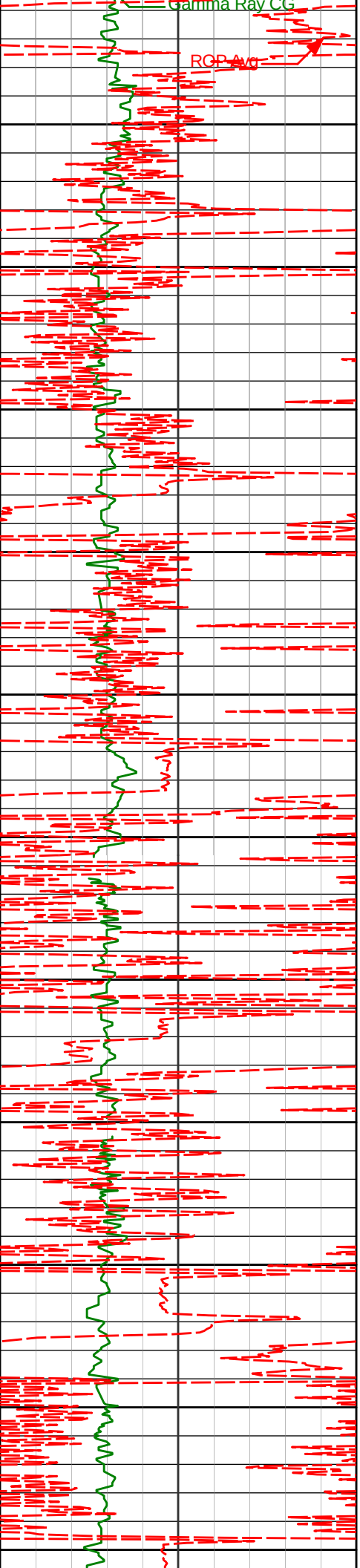


915'	0.88°	225.44°	914.96'	-4.41'	
					75.97°F
					77.99°F
1010'	0.63°	242.09°	1009.95'	-5.26'	
					77.99°F
					77.99°F
					78.74°F
					80.01°F
1194'	1.30°	238.83°	1193.93'	-7.06'	
					80.01°F
					80.01°F
1285'	1.28°	234.92°	1284.90'	-8.34'	
					82.02°F
1378'	1.78°	139.57°	1377.88'	-10.02'	
					82.02°F
					82.02°F

950
1000
1050
1100
1150
1200
1250
1300
1350
1400
1450

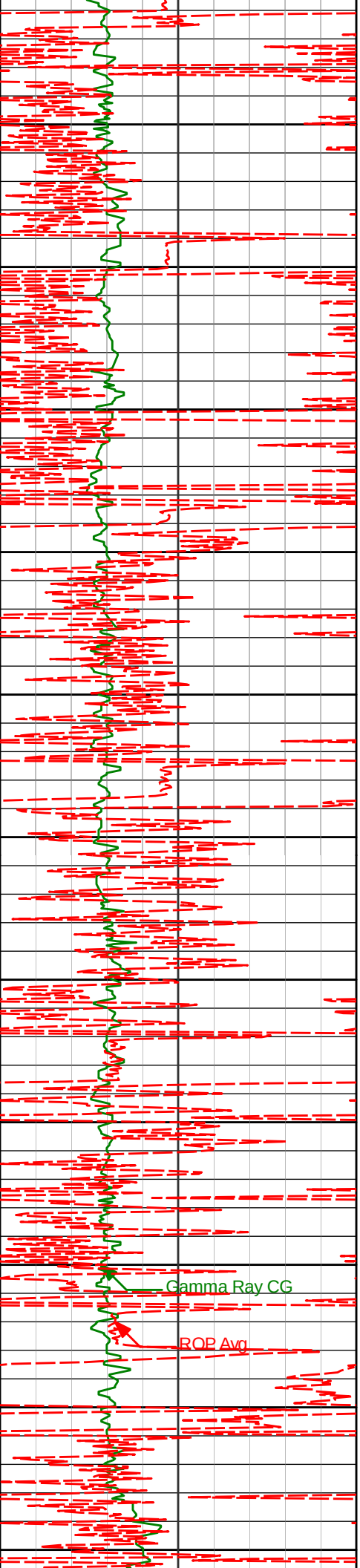


1471'	5.88°	135.49°	1470.65'	-14.08'	82.02°F
					84.06°F
					84.06°F
					85.36°F
1655'	11.83°	130.25°	1652.38'	-30.86'	87.02°F
					88.14°F
1749'	12.09°	124.93°	1744.34'	-41.16'	88.14°F
					88.14°F
1841'	14.57°	113.12°	1833.87'	-49.37'	89.17°F
					90.19°F
1934'	12.97°	95.84°	1924.24'	-52.94'	90.19°F
					90.19°F

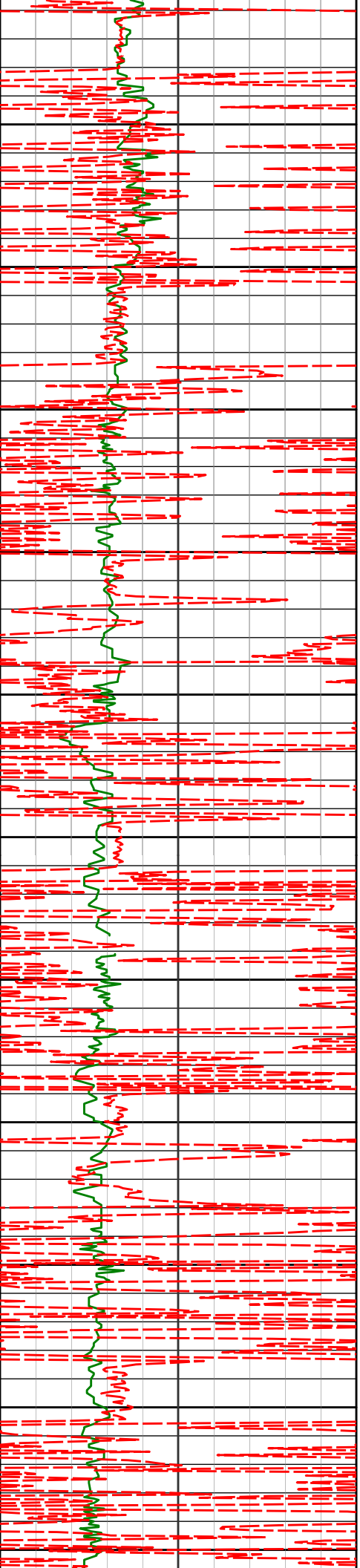


2027'	11.20°	73.77°	2015.22'	-49.62'	90.19°F
					90.19°F
2120'	10.26°	68.76°	2106.59'	-42.52'	90.55°F
					92.26°F
2214'	10.04°	68.04°	2199.12'	-34.94'	92.26°F
					94.33°F
2305'	9.95°	67.68°	2288.74'	-27.60'	94.33°F
					96.42°F
2398'	10.24°	66.50°	2380.30'	-19.81'	
					96.42°F
					96.42°F
2491'	7.83°	65.27°	2472.14'	-12.59'	
					96.42°F

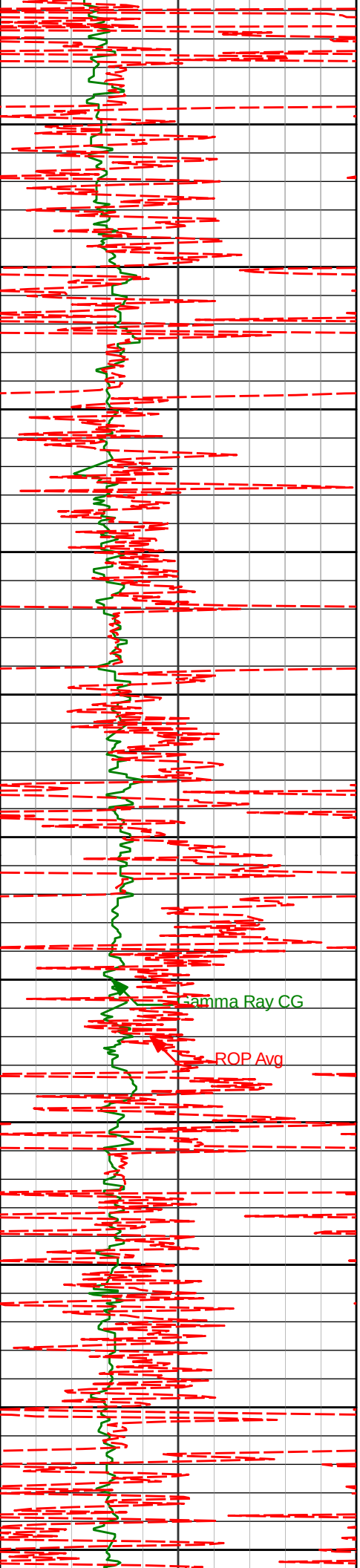
2050
2100
2150
2200
2250
2300
2350
2400
2450
2500
2550



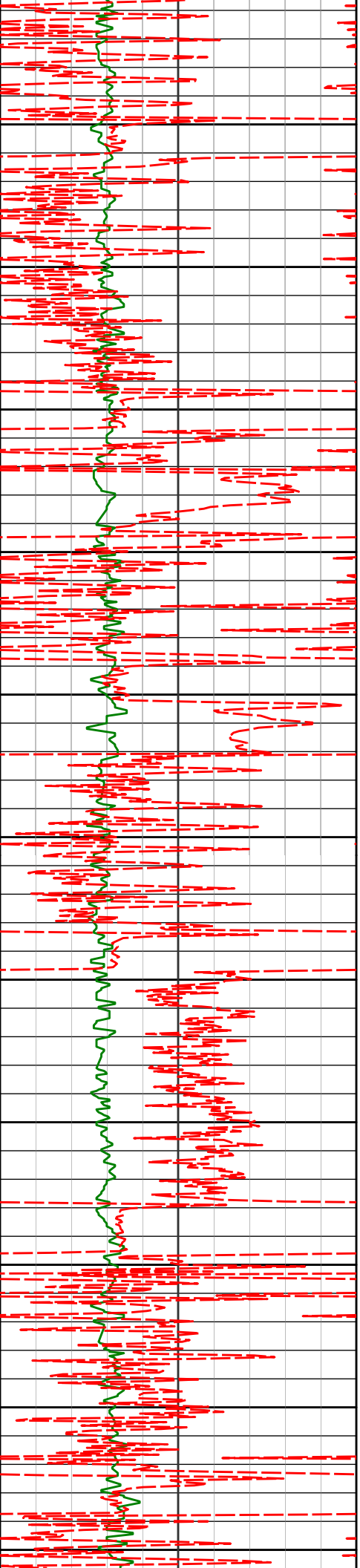
					98.51°F
2584'	7.20°	68.34°	2564.34'	-6.72'	
					98.51°F
					99.69°F
2676'	7.43°	68.37°	2655.59'	-1.35'	
					100.62°F
					100.62°F
2769'	7.43°	68.14°	2747.81'	4.17'	
					102.72°F
					103.08°F
2864'	7.52°	66.26°	2842.00'	10.05'	
					104.83°F
					104.83°F
2959'	7.46°	63.56°	2936.19'	16.36'	
					106.97°F
					106.97°F
3054'	9.45°	75.32°	3030.16'	22.34'	
					106.97°F
					106.97°F



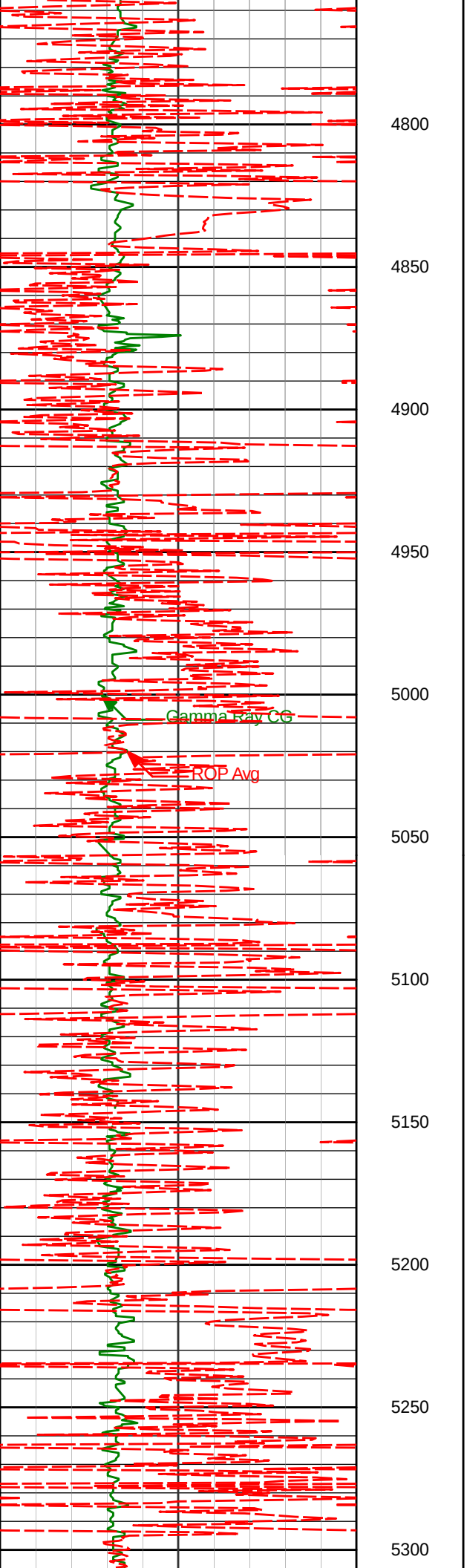
3148'	9.47°	75.53°	3122.88'	27.67'	108.69°F
					110.56°F
3243'	9.55°	75.31°	3216.58'	33.09'	111.24°F
					111.24°F
3338'	8.63°	87.20°	3310.39'	36.86'	111.24°F
					111.24°F
3433'	9.24°	92.73°	3404.24'	38.28'	111.24°F
					111.24°F
3528'	8.54°	82.52°	3498.11'	40.26'	112.14°F
					113.40°F
3623'	8.26°	78.26°	3592.09'	43.89'	113.40°F
					114.70°F



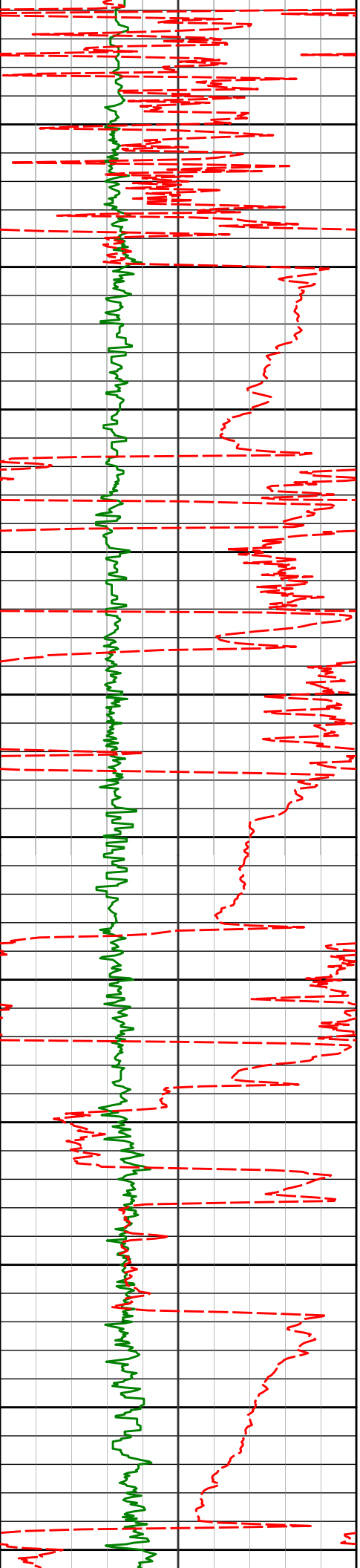
3700					115.56°F
	3718'	8.33°	78.00°	3686.09'	48.01'
					115.73°F
3750					
					117.57°F
3800					
	3813'	8.36°	77.71°	3780.09'	52.21'
					117.73°F
3850					
					117.73°F
3900					
	3908'	8.32°	77.80°	3874.08'	56.43'
					119.91°F
3950					
					119.91°F
4000					
	4003'	7.90°	77.82°	3968.13'	60.53'
					121.84°F
4050					
					120.95°F
4100					
	4098'	7.58°	77.05°	4062.27'	64.51'
					121.54°F
4150					
					122.11°F
					123.68°F
4200	4194'	7.55°	75.01°	4157.43'	68.74'



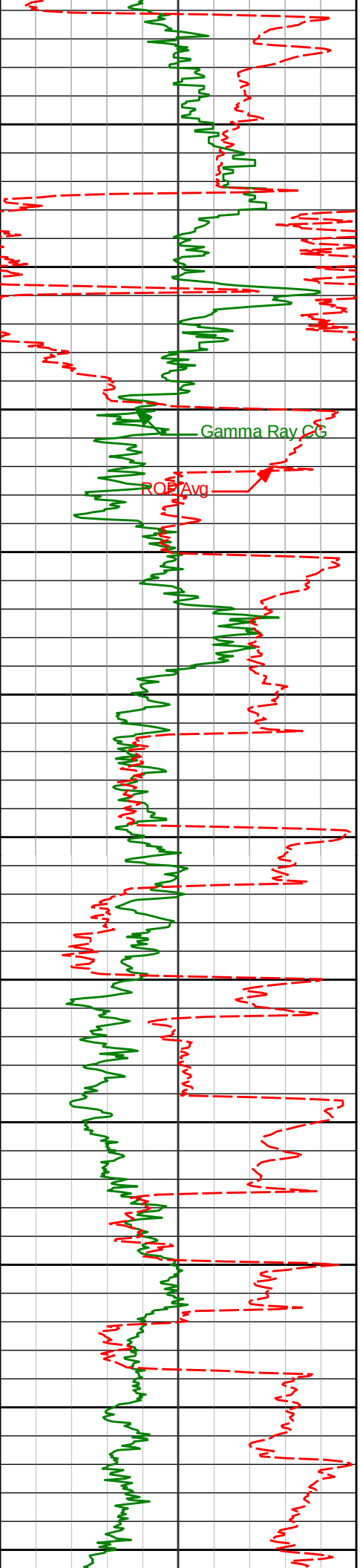
					124.30°F
					124.58°F
4288'	7.41°	72.67°	4250.63'	73.28'	
					125.75°F
					124.98°F
4383'	7.02°	66.09°	4344.88'	78.52'	
					126.91°F
					128.73°F
4478'	6.46°	87.21°	4439.24'	82.16'	
					128.73°F
					128.99°F
4573'	6.03°	83.62°	4533.68'	83.98'	
					130.96°F
					130.96°F
4668'	6.22°	77.79°	4628.13'	86.59'	
					131.65°F
					131.77°F



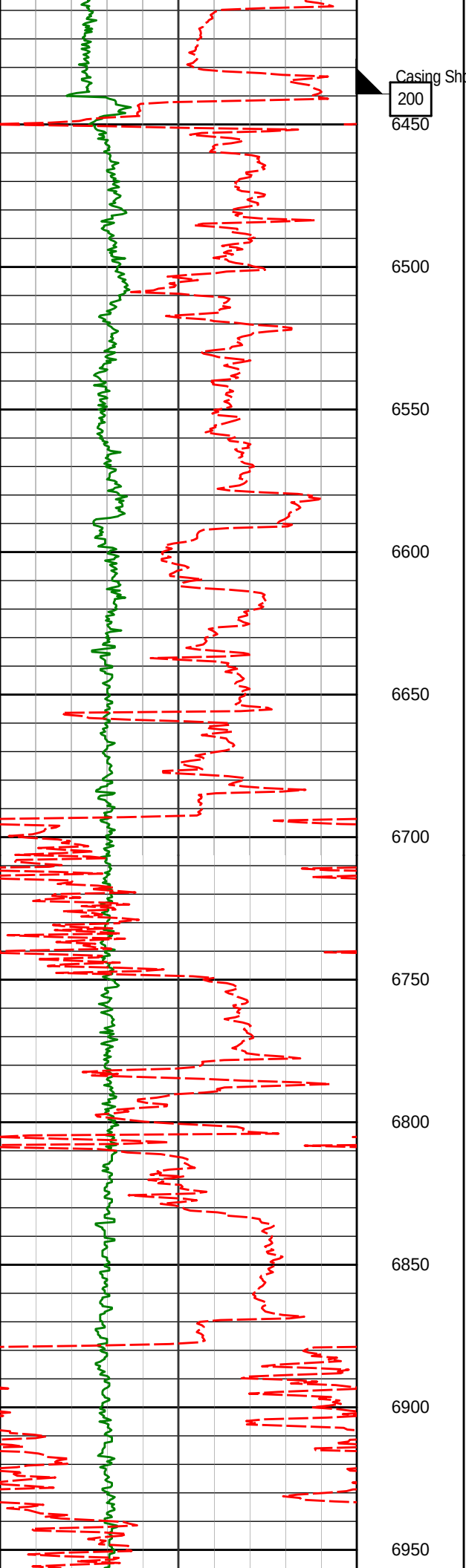
4763'	5.75°	76.36°	4722.62'	89.73'	133.20°F
					133.20°F
4858'	6.59°	89.25°	4817.07'	91.91'	133.00°F
					131.91°F
4953'	6.21°	82.57°	4911.48'	93.67'	130.96°F
					133.20°F
5048'	5.69°	78.77°	5005.97'	96.19'	133.20°F
					134.52°F
5143'	5.41°	76.53°	5100.52'	99.02'	135.45°F
					135.45°F
5238'	5.75°	75.11°	5195.07'	102.15'	135.45°F
					136.77°F



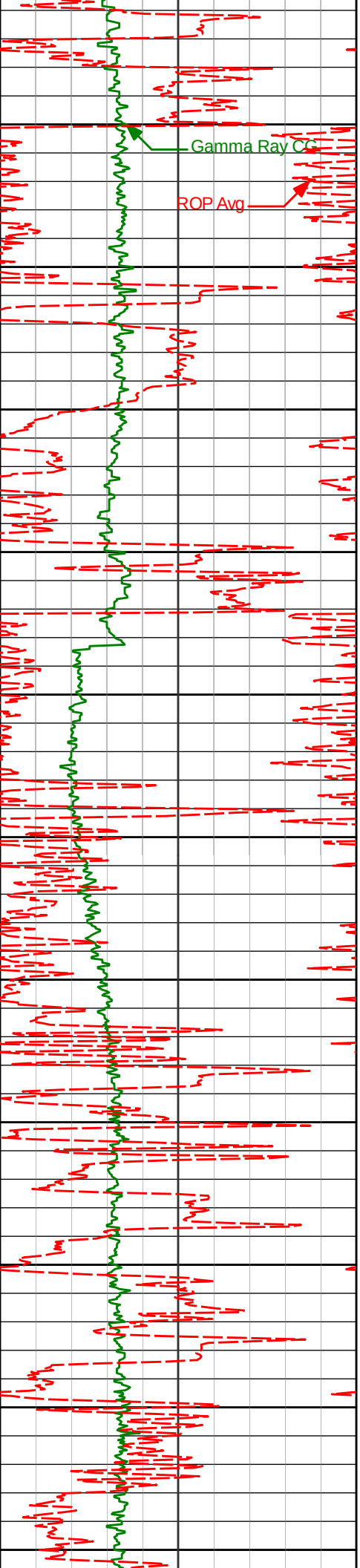
5333'	4.93°	73.14°	5289.66'	105.37'	136.10°F
					135.45°F
					136.36°F
5428'	10.36°	66.32°	5383.78'	111.12'	
					138.50°F
					140.46°F
5523'	18.36°	53.91°	5475.76'	125.27'	
					142.25°F
					144.36°F
5618'	26.28°	48.59°	5563.58'	150.65'	
					145.86°F
					146.84°F
5713'	29.10°	44.19°	5647.70'	184.10'	147.38°F
					148.30°F
5808'	36.39°	36.30°	5727.59'	226.46'	149.76°F
					151.47°F



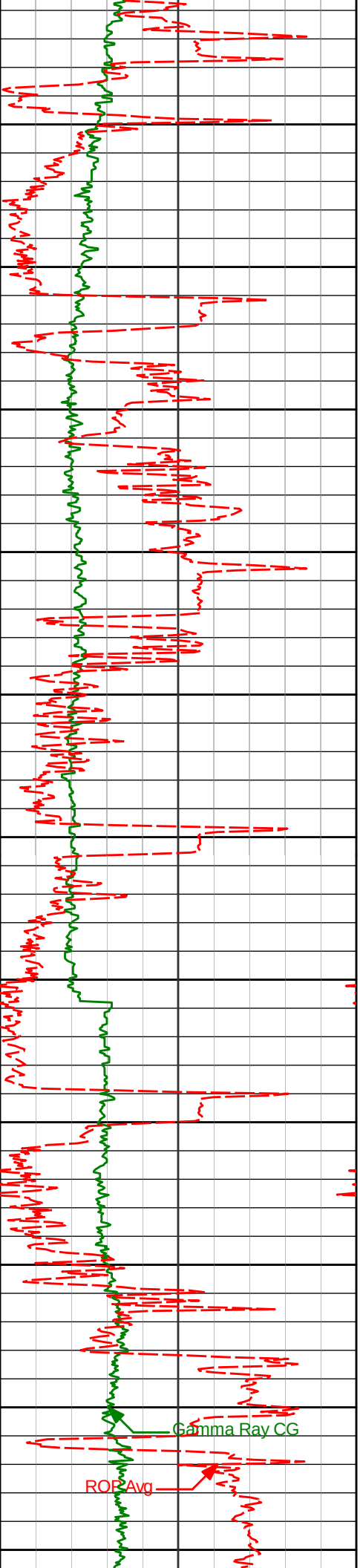
5900					
	5902'	47.79°	21.47°	5797.40'	284.25'
					139.25°F
5950					
					148.62°F
					154.17°F
6000	5998'	48.90°	17.23°	5861.22'	353.90'
					153.49°F
6050					
					156.04°F
	6093'	59.50°	7.99°	5916.79'	430.18'
6100					
					158.07°F
6150					
					158.52°F
	6188'	65.09°	3.80°	5960.95'	514.23'
6200					
					157.42°F
6250					
					155.24°F
	6283'	72.09°	3.04°	5995.61'	602.55'
6300					
					162.80°F
6350					
					167.69°F
	6378'	83.08°	3.00°	6016.01'	695.09'
	6393'	85.87°	2.79°	6017.45'	710.00'
6400					165.58°F



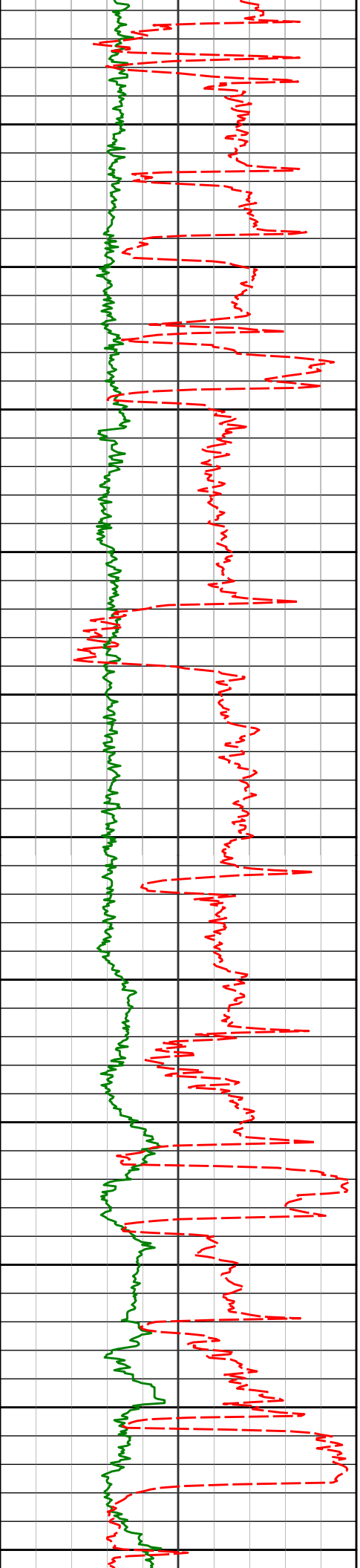
					164.55°F
					164.75°F
6523'	89.20°	2.00°	6023.05'	839.66'	166.17°F
					165.93°F
6616'	89.63°	2.02°	6024.00'	932.47'	168.86°F
					168.29°F
6708'	90.31°	2.21°	6024.04'	1024.30'	169.68°F
					169.83°F
6801'	89.63°	0.77°	6024.10'	1117.06'	171.21°F
					170.68°F
6894'	90.25°	0.46°	6024.20'	1209.71'	173.51°F
					175.39°F



6986'	90.77°	359.36°	6023.38'	1301.25'	177.28°F
7080'	90.46°	358.30°	6022.37'	1394.59'	175.81°F
7172'	89.38°	357.84°	6022.49'	1485.79'	178.60°F
7265'	89.54°	357.37°	6023.37'	1577.89'	178.53°F
7359'	90.12°	357.65°	6023.65'	1670.95'	179.54°F
7450'	90.34°	357.11°	6023.28'	1761.01'	179.66°F
					180.45°F
					183.79°F
					185.02°F
					185.82°F
					187.18°F
					185.20°F

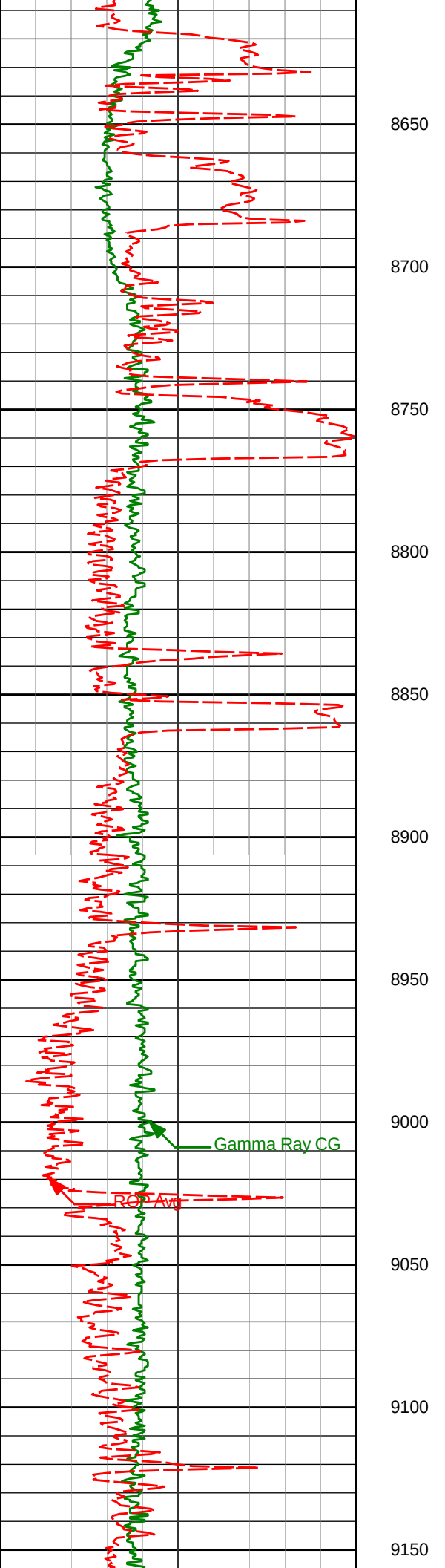


7543'	89.69°	356.30°	6023.25'	1852.89'	184.67°F
					185.60°F
					187.48°F
7636'	90.03°	356.59°	6023.48'	1944.71'	
					186.50°F
					186.26°F
7729'	90.37°	357.03°	6023.15'	2036.62'	
					187.34°F
					188.01°F
7821'	91.14°	357.58°	6021.94'	2127.64'	
					188.11°F
					189.66°F
7914'	91.73°	358.69°	6019.61'	2219.83'	
					191.80°F
					193.87°F
8009'	90.06°	358.07°	6018.13'	2314.06'	
					194.99°F
					194.99°F

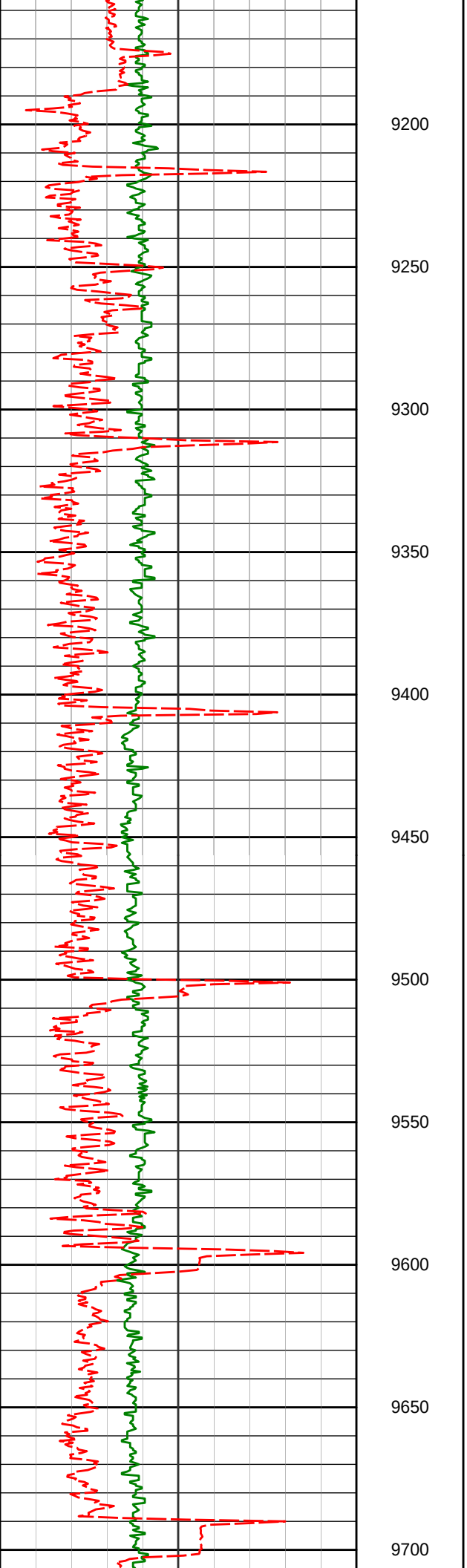


8100	8104'	89.35°	357.83°	6018.62'	2408.21'
8150					
8200	8199'	90.40°	357.86°	6018.82'	2502.34'
8250					
8300	8294'	91.08°	358.77°	6017.59'	2596.56'
8350					
8400	8389'	90.99°	358.27°	6015.88'	2690.82'
8450					
8500	8483'	91.60°	357.90°	6013.76'	2783.99'
8550					
8600	8578'	90.49°	357.35°	6012.02'	2878.05'

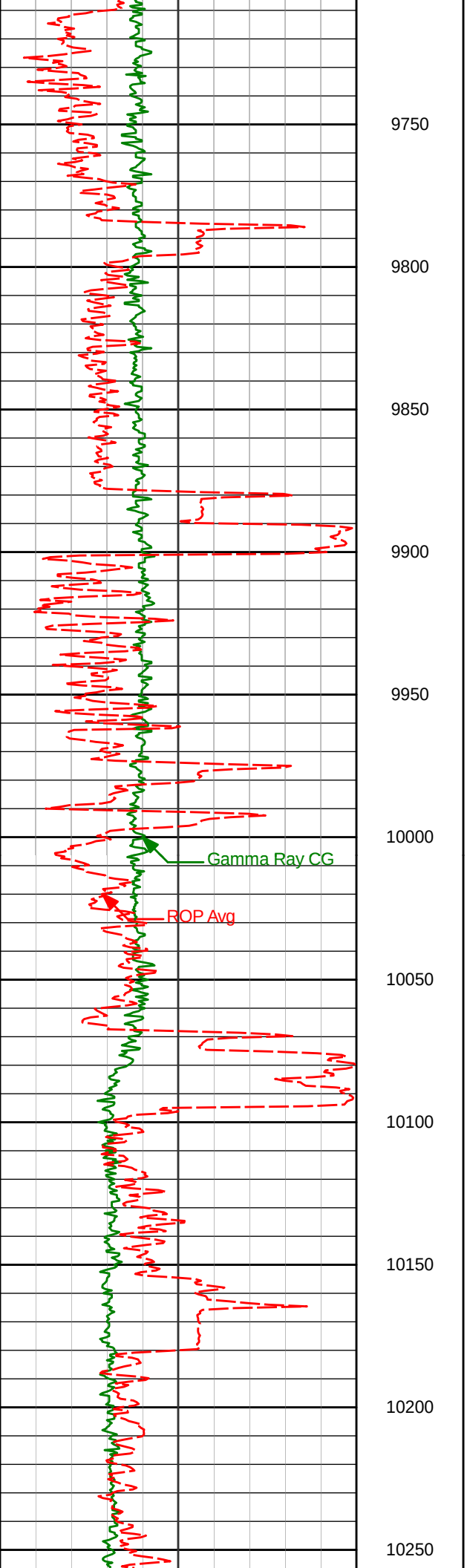
194.56°F
194.02°F
195.92°F
197.51°F
197.51°F
199.50°F
200.05°F
200.05°F
199.60°F
198.44°F
197.77°F
199.85°F



8650					201.93°F
	8673'	90.74°	357.28°	6011.00'	2972.06'
					200.71°F
8700					
					201.42°F
8750					
	8768'	90.37°	357.20°	6010.08'	3066.04'
					202.60°F
8800					
					202.60°F
8850					
	8863'	90.00°	357.56°	6009.77'	3160.06'
					200.52°F
8900					
					196.83°F
8950					
	8958'	89.72°	357.23°	6010.00'	3254.09'
					197.71°F
9000					
					199.84°F
					201.36°F
9050	9053'	90.59°	359.12°	6009.75'	3348.29'
					202.60°F
9100					
					202.60°F
9150	9148'	89.78°	357.71°	6009.44'	3442.54'

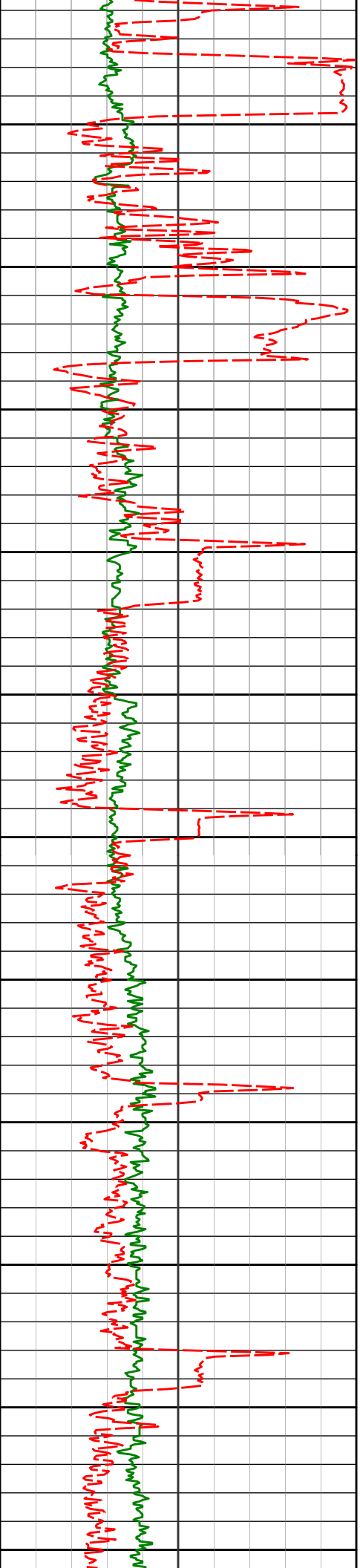


					204.81°F
					204.14°F
9243'	90.18°	358.98°	6009.47'	3536.78'	
					201.34°F
					202.44°F
9337'	89.88°	358.57°	6009.42'	3630.11'	
					204.92°F
					206.85°F
9432'	90.28°	359.02°	6009.29'	3724.44'	
					204.10°F
					202.84°F
9527'	89.78°	359.08°	6009.24'	3818.82'	
					204.66°F
					206.35°F
9622'	90.31°	359.34°	6009.16'	3913.23'	
					203.62°F
					203.24°F

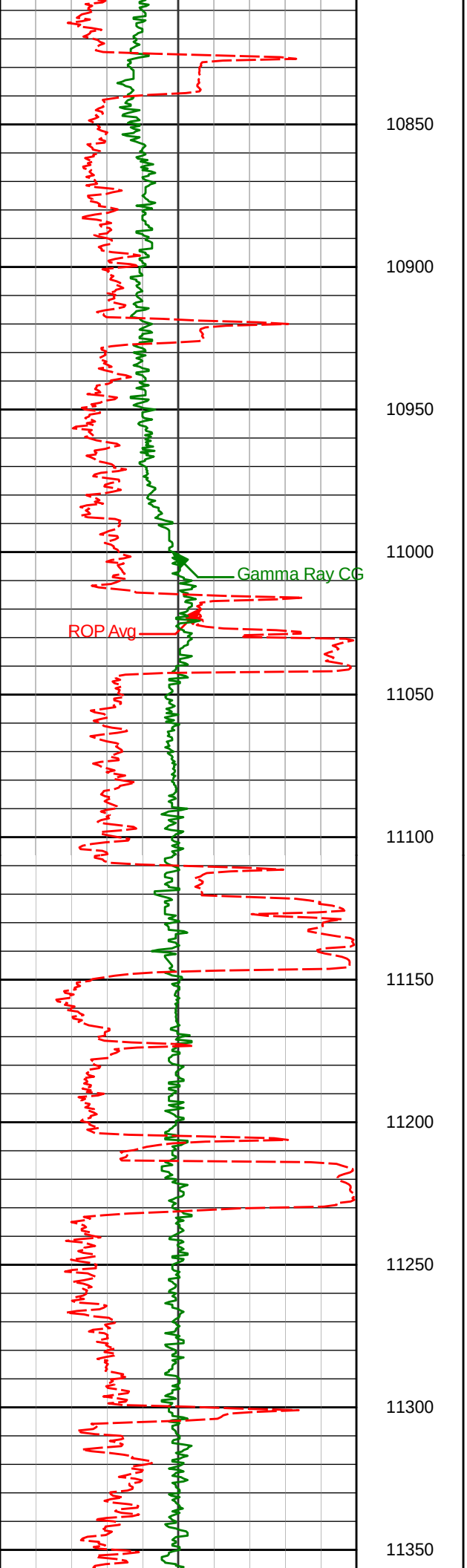


9716'	89.69°	359.41°	6009.16'	4006.67'	202.64°F
9811'	89.41°	359.70°	6009.90'	4101.14'	204.40°F
9906'	89.32°	358.69°	6010.95'	4195.54'	204.06°F
10000'	89.63°	359.54°	6011.81'	4288.93'	205.16°F
10095'	88.70°	356.98°	6013.19'	4383.14'	207.55°F
10189'	88.80°	357.47°	6015.24'	4476.11'	210.05°F

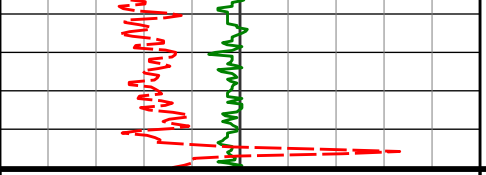
9750 202.38°F
9800
9850 205.16°F
9900
9950 203.90°F
10000
10050 205.38°F
10100 207.91°F
10150
10200 210.31°F
10250



					209.32°F
10284'	89.38°	356.40°	6016.75'	4570.01'	
					206.74°F
					205.81°F
10378'	91.97°	353.83°	6015.63'	4662.42'	
					203.87°F
					206.83°F
10474'	92.03°	353.95°	6012.28'	4756.37'	
					208.11°F
					210.31°F
10568'	91.60°	354.07°	6009.30'	4848.41'	
					210.63°F
					213.10°F
10663'	91.42°	353.24°	6006.79'	4941.31'	
					213.69°F
					214.33°F
10757'	91.51°	353.37°	6004.39'	5033.13'	
					215.51°F
					215.86°F



10850	10852'	91.60°	353.54°	6001.81'	5125.97'	218.14°F
10900						218.14°F
10950	10947'	91.36°	353.47°	5999.36'	5218.83'	215.06°F
11000						213.83°F
11050	11042'	91.88°	354.07°	5996.67'	5311.77'	215.17°F
11100						214.97°F
11150	11137'	90.62°	354.50°	5994.60'	5404.90'	216.96°F
11200						217.19°F
11250	11232'	90.40°	355.49°	5993.76'	5498.27'	217.43°F
11300						218.02°F
11350	11327'	89.41°	355.15°	5993.91'	5591.75'	



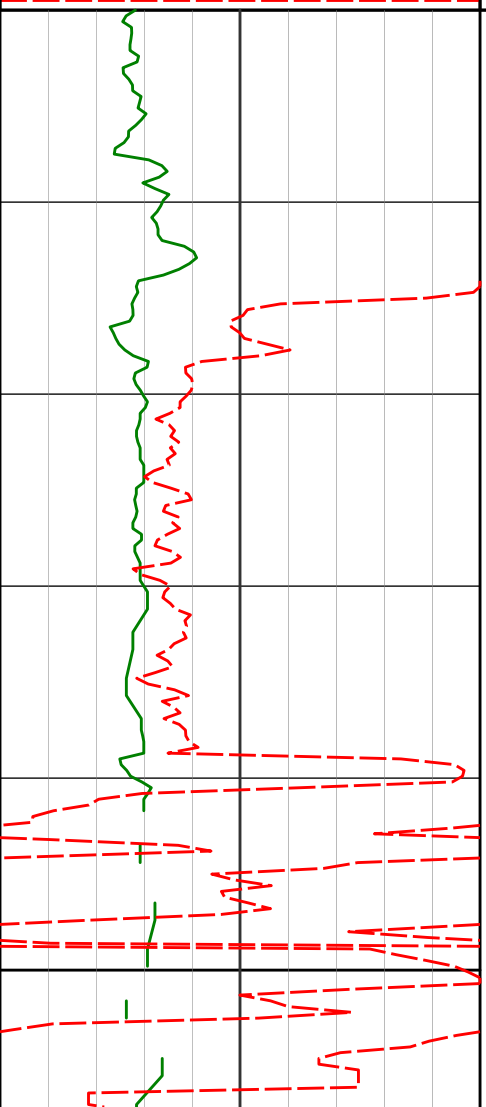
Avg Rate of Penetration	Depth MD	Depth	Inc	Azi	TVD	V.S.	Temp
Avg Rate of Penetration	ft						
500 feet per hr 0	11400						

Gamma Ray CG
Gamma Ray CG
0 api 300

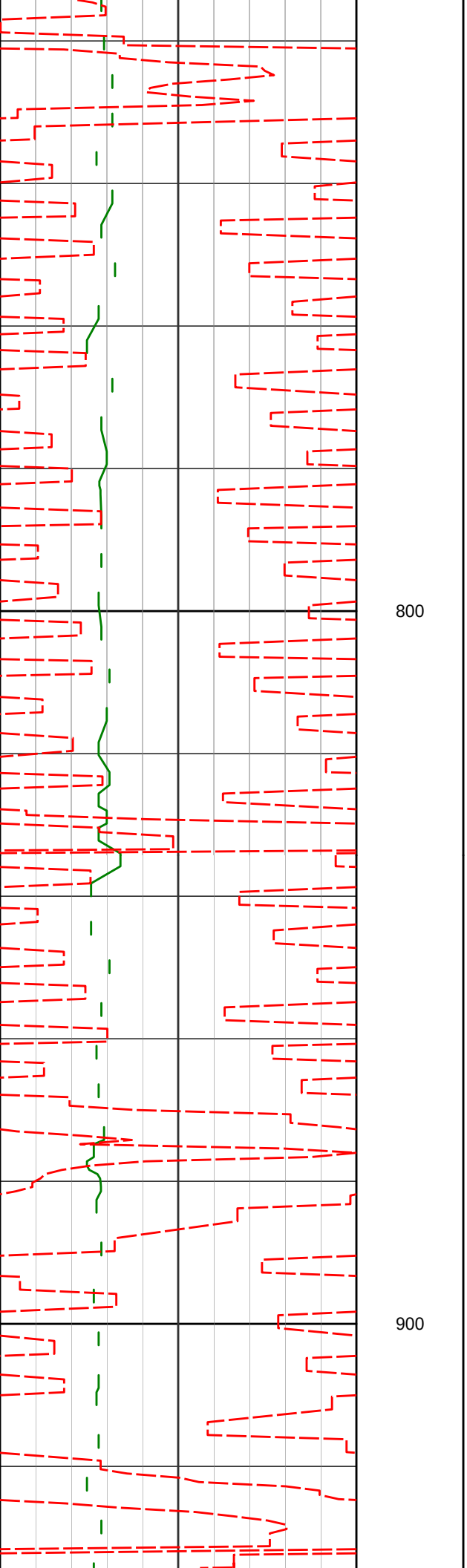
MD Detail 1:240 Scale

Gamma Ray CG
Gamma Ray CG
0 api 300

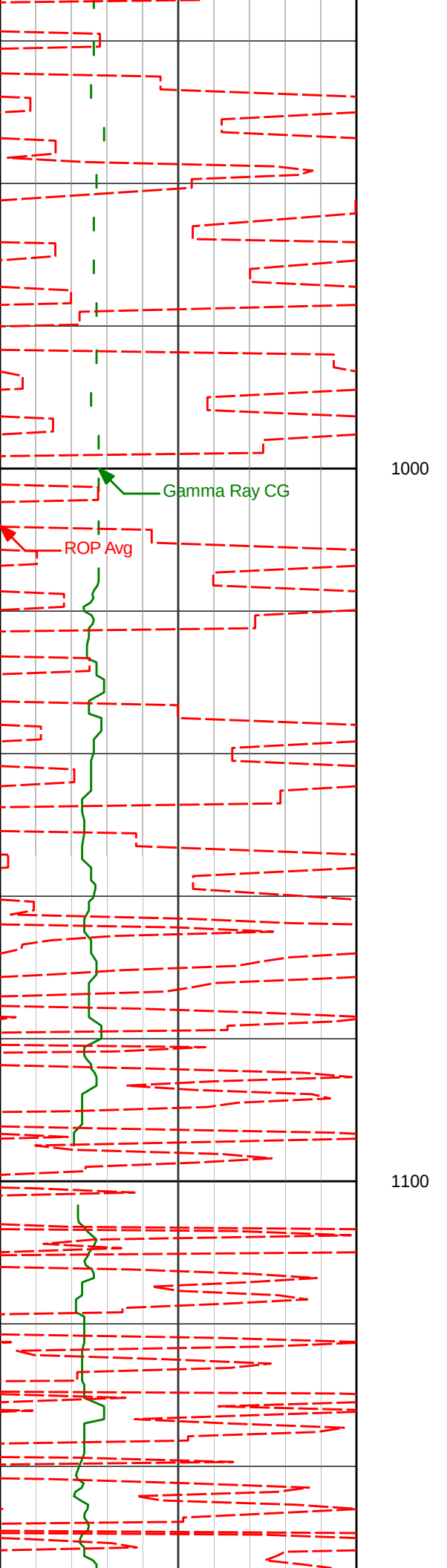
Avg Rate of Penetration	Depth MD	Depth	Inc	Azi	TVD	V.S.	Temp
Avg Rate of Penetration	ft						
500 feet per hr 0	600						



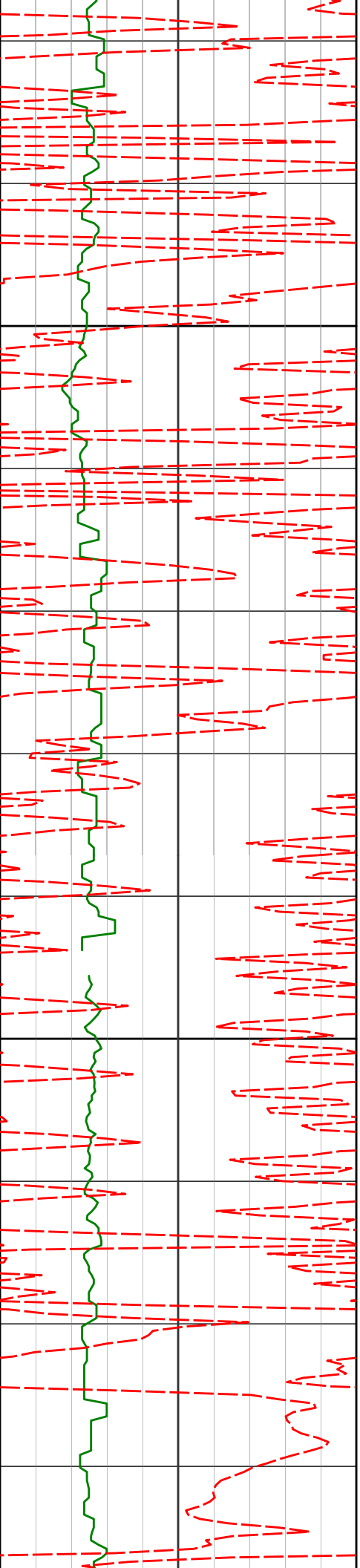
	Surface Casing Shoe @ 632' MD			244.49°	629.99'	-1.58'	
	Run 100						
	700						



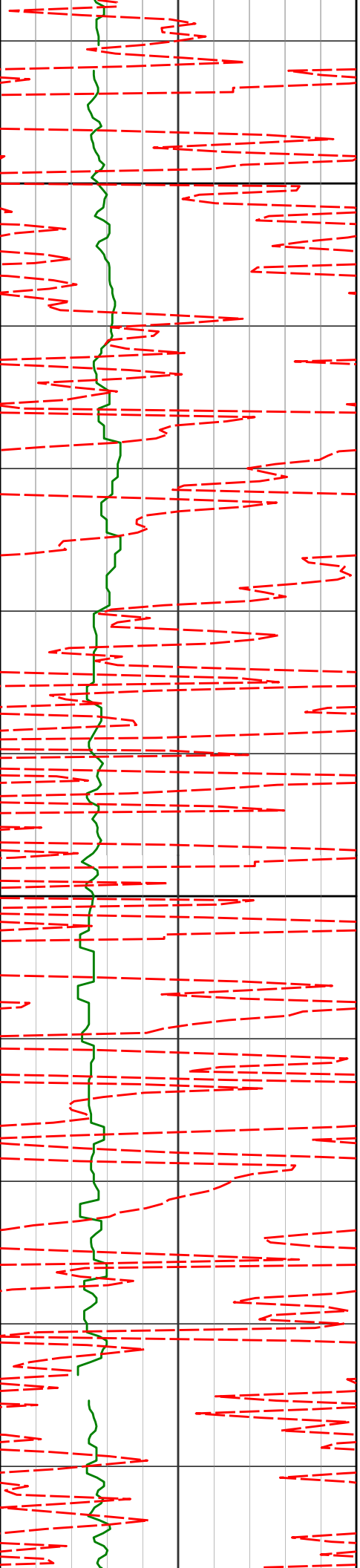
725'	0.82°	225.96°	724.98'	-2.33'
820'	0.94°	235.71°	819.97'	-3.35'
915'	0.88°	225.44°	914.96'	-4.41'



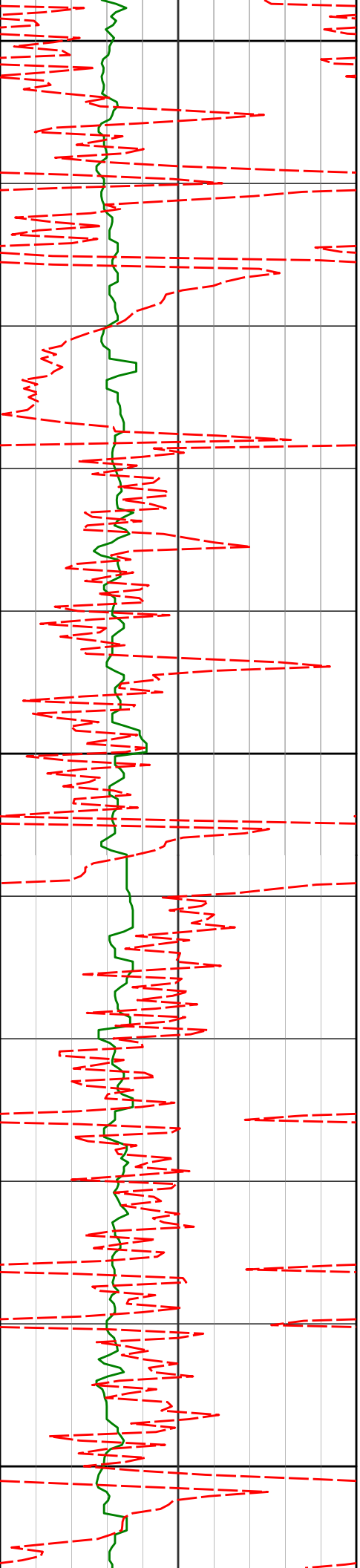
1010'	0.63°	242.09°	1009.95'	-5.26'



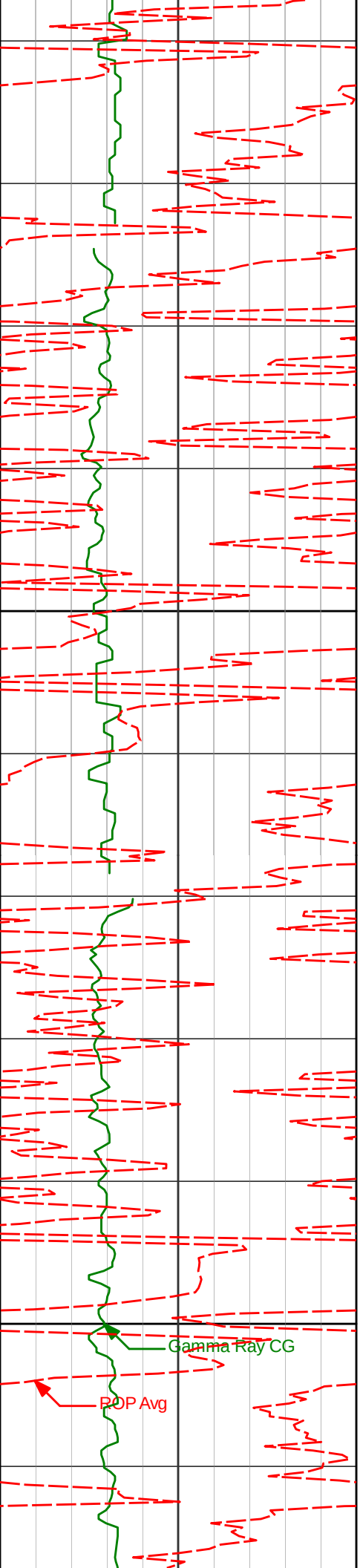
1194'	1.30°	238.83°	1193.93'	-7.06'
1285'	1.28°	234.92°	1284.90'	-8.34'



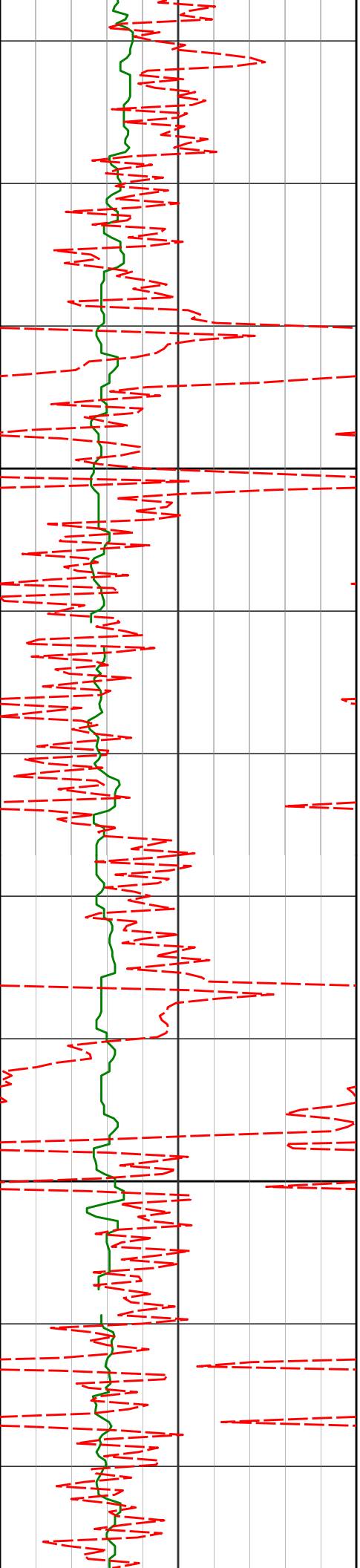
1378'	1.78°	139.57°	1377.88'	-10.02'
1471'	5.88°	135.49°	1470.65'	-14.08'



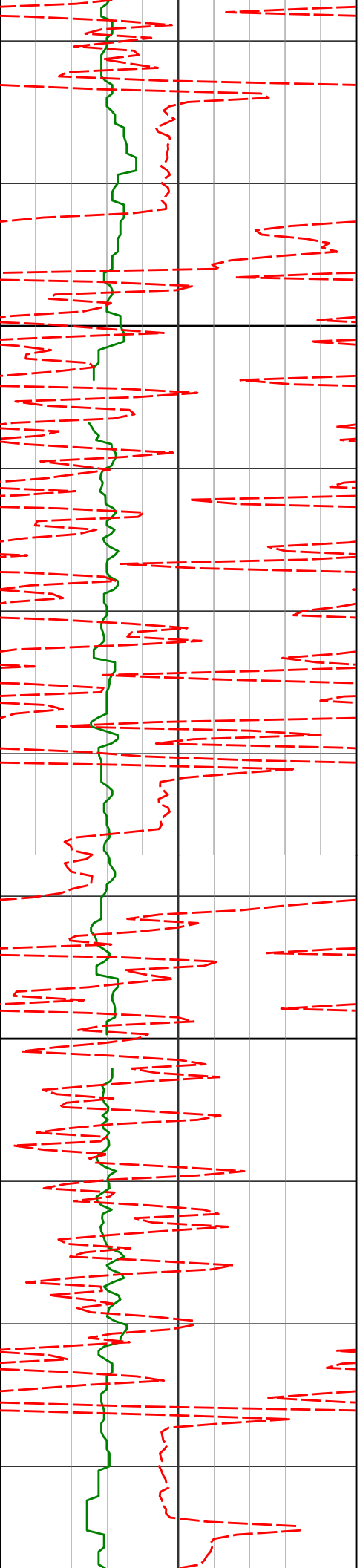
1655'	11.83°	130.25°	1652.38'	-30.86'
1749'	12.09°	124.93°	1744.34'	-41.16'



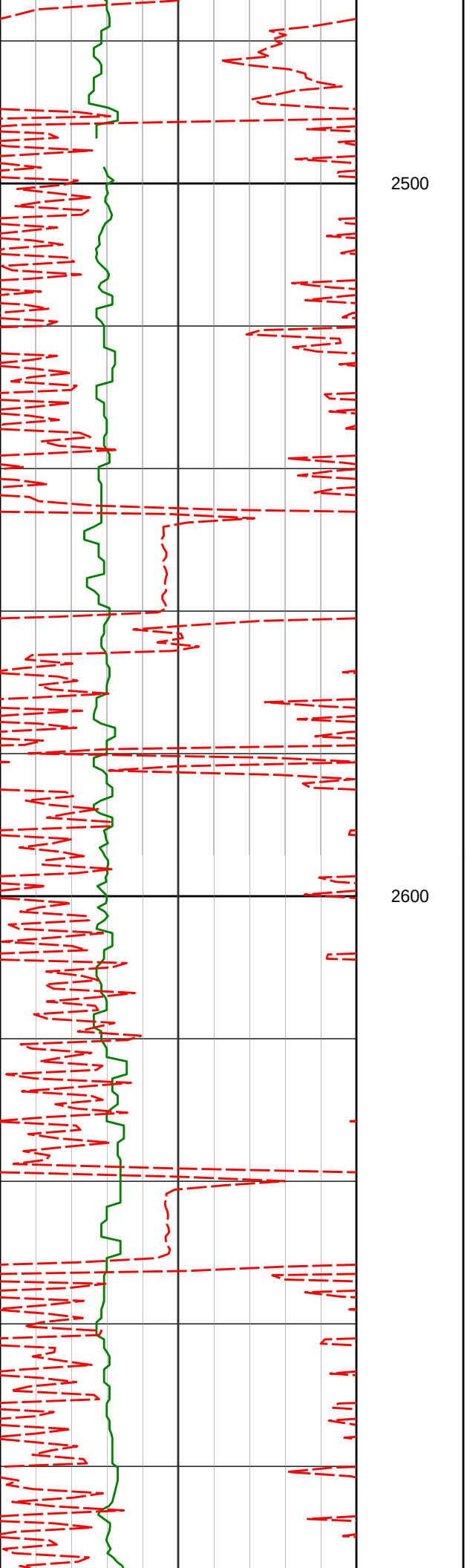
1841'	14.57°	113.12°	1833.87'	-49.37'
1934'	12.97°	95.84°	1924.24'	-52.94'
2027'	11.20°	73.77°	2015.22'	-49.62'



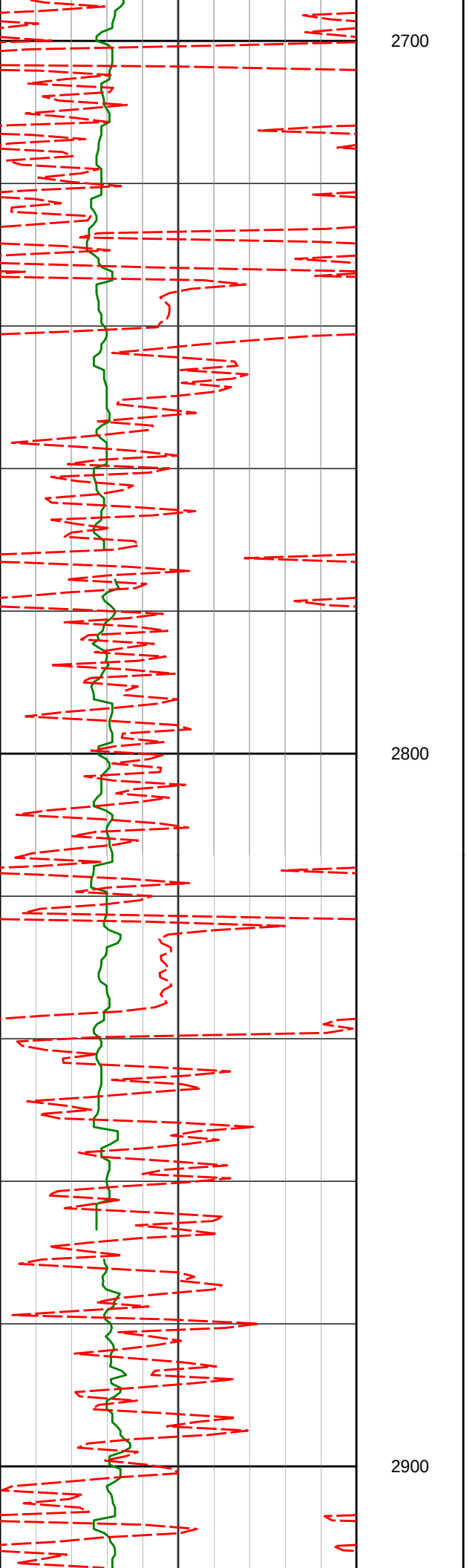
2120'	10.26°	68.76°	2106.59'	-42.52'
2214'	10.04°	68.04°	2199.12'	-34.94'



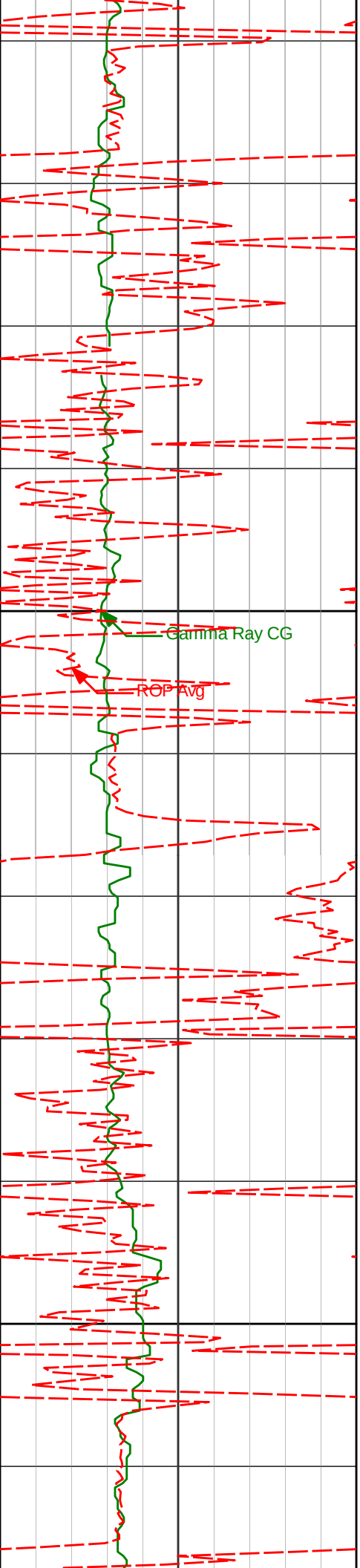
2300					
	2305'	9.95°	67.68°	2288.74'	-27.60'
2400					
	2398'	10.24°	66.50°	2380.30'	-19.81'



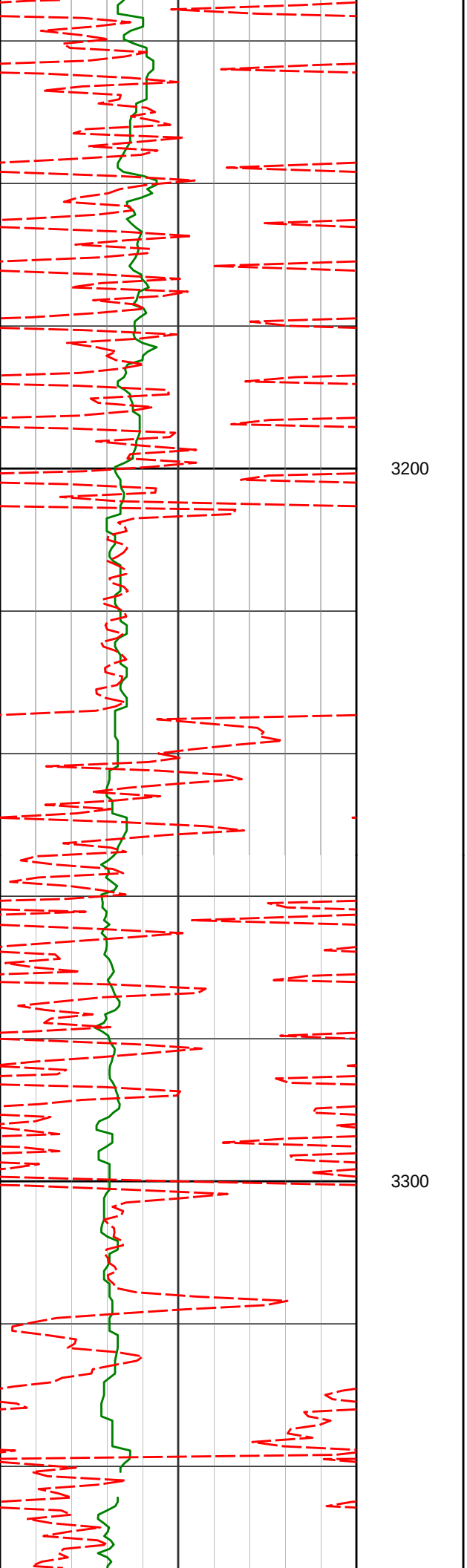
2491'	7.83°	65.27°	2472.14'	-12.59'
2584'	7.20°	68.34°	2564.34'	-6.72'
2676'	7.43°	68.37°	2655.59'	-1.35'



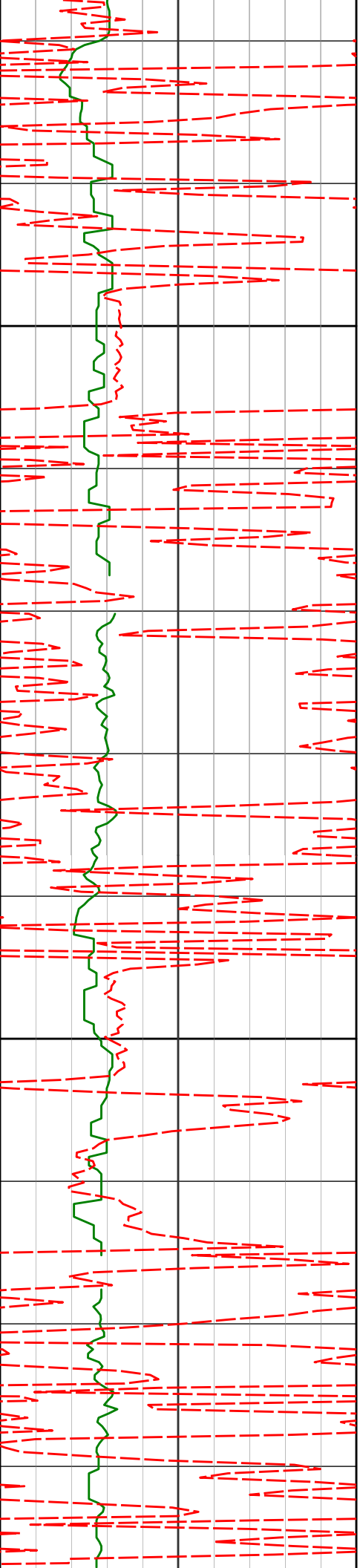
2769'	7.43°	68.14°	2747.81'	4.17'
2864'	7.52°	66.26°	2842.00'	10.05'



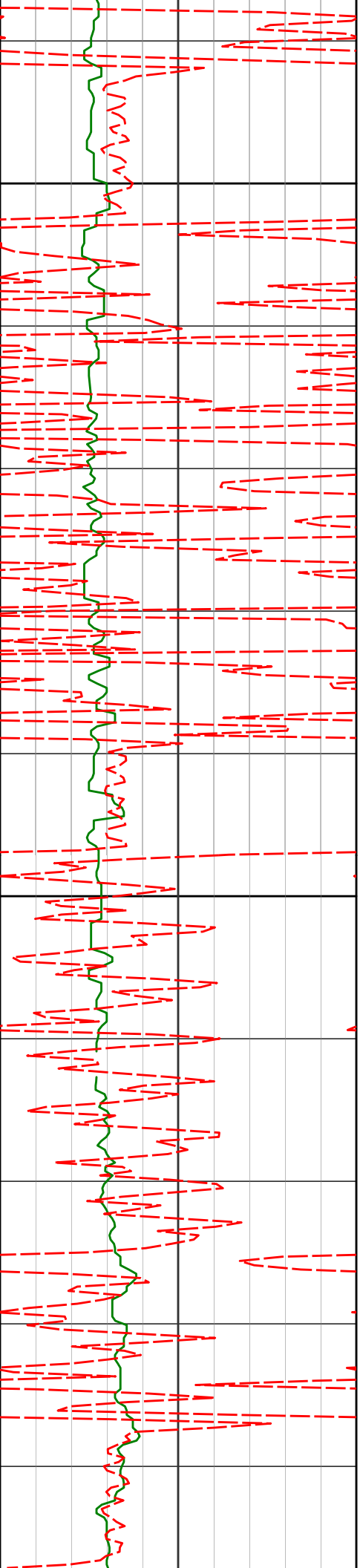
2959'	7.46°	63.56°	2936.19'	16.36'
3054'	9.45°	75.32°	3030.16'	22.34'



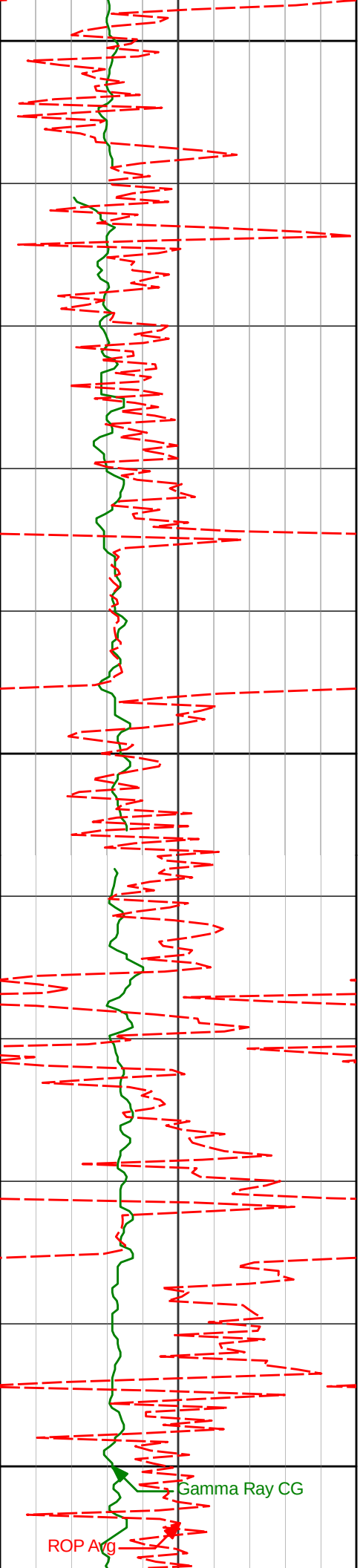
3148'	9.47°	75.53°	3122.88'	27.67'
3243'	9.55°	75.31°	3216.58'	33.09'
3338'	8.63°	87.20°	3310.39'	36.86'



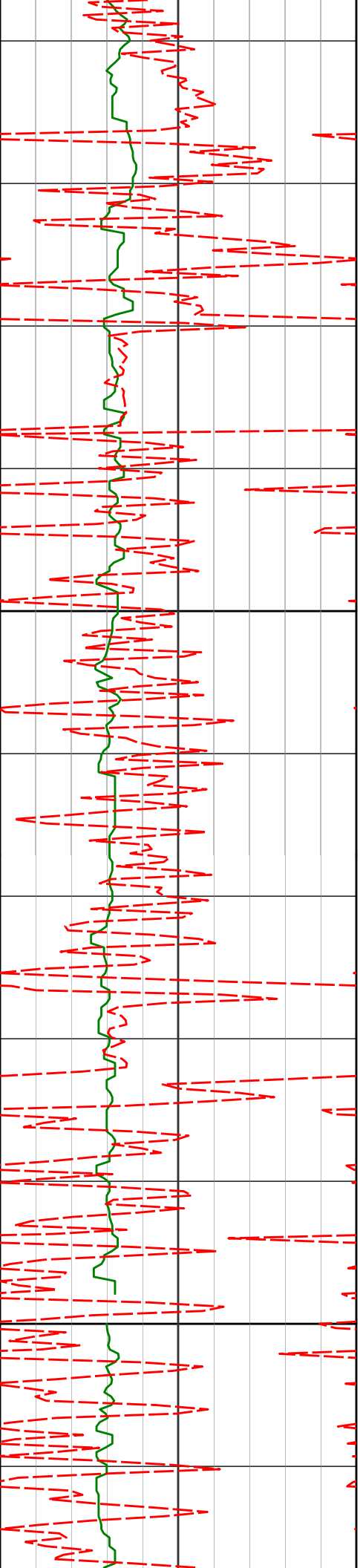
3433'	9.24°	92.73°	3404.24'	38.28'
3528'	8.54°	82.52°	3498.11'	40.26'



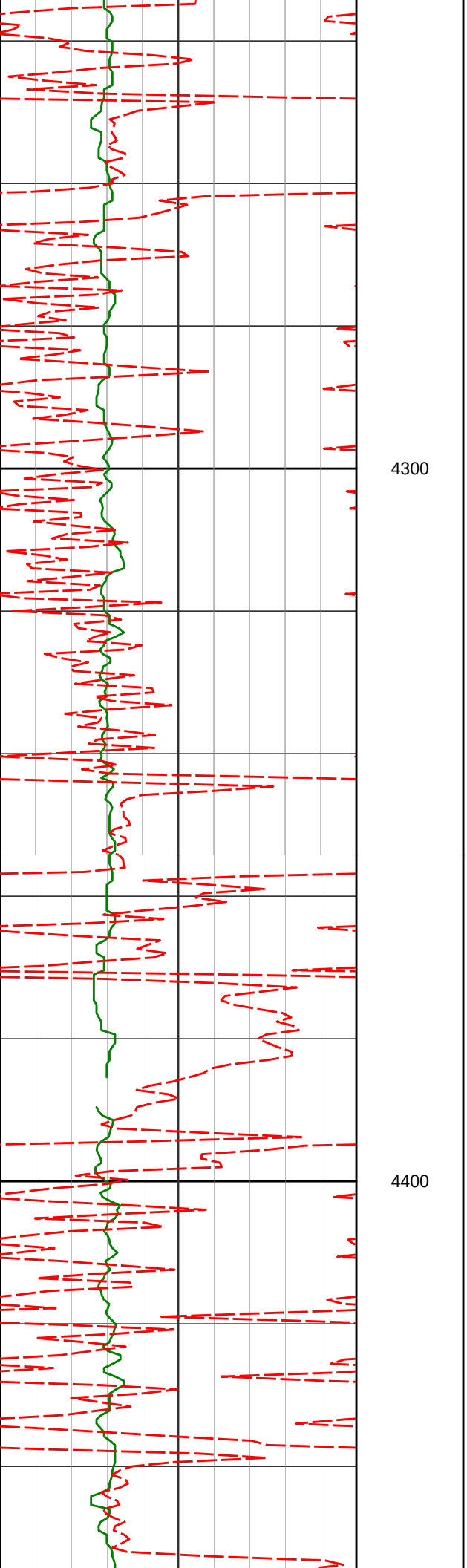
3623'	8.26°	78.26°	3592.09'	43.89'
3718'	8.33°	78.00°	3686.09'	48.01'



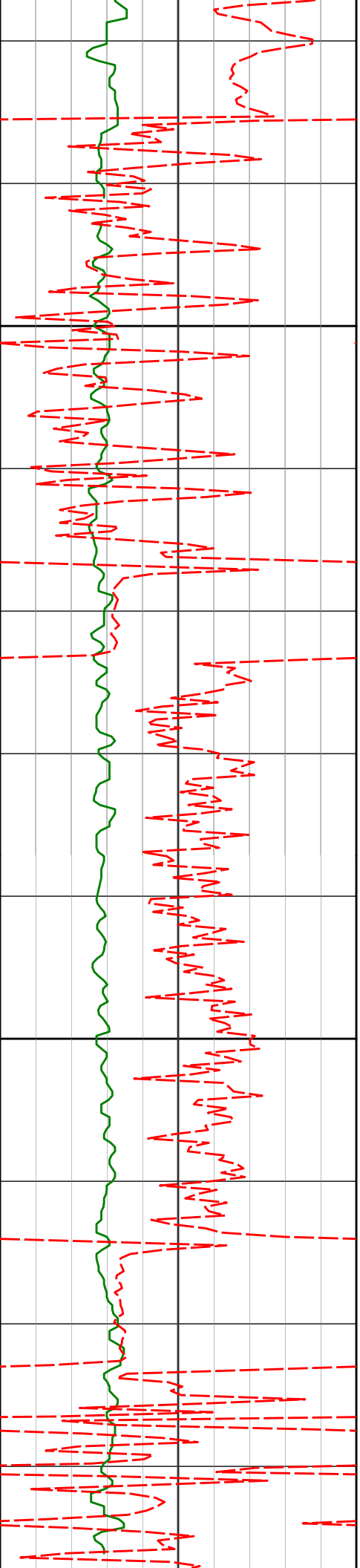
3813'	8.36°	77.71°	3780.09'	52.21'
3908'	8.32°	77.80°	3874.08'	56.43'
4003'	7.90°	77.82°	3968.13'	60.53'



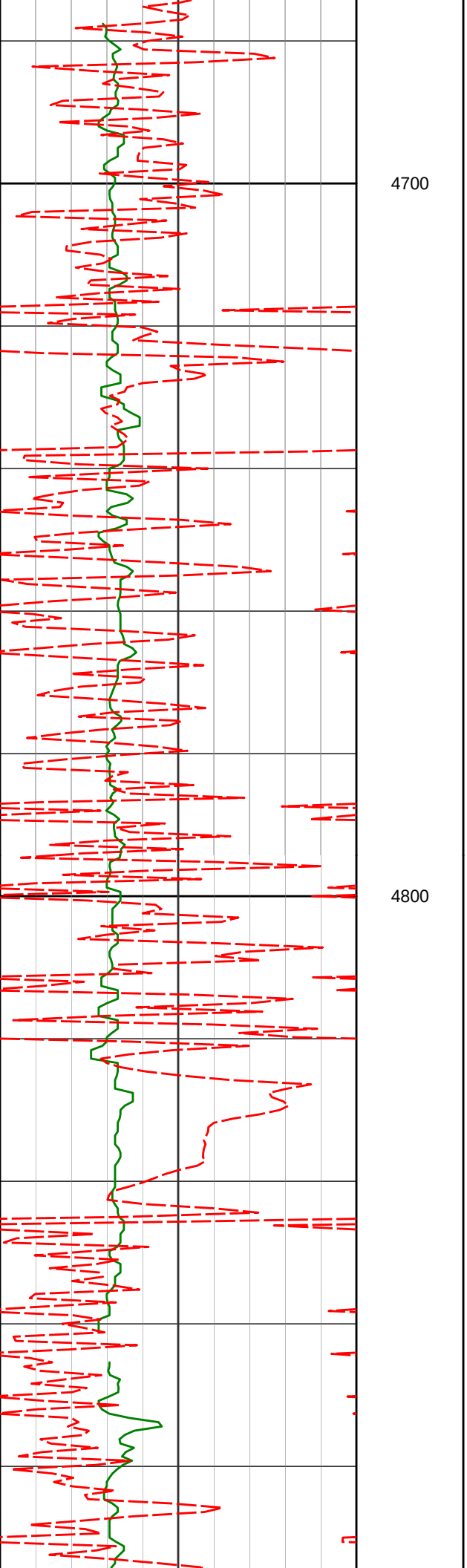
4100	4098'	7.58°	77.05°	4062.27'	64.51'
4200	4194'	7.55°	75.01°	4157.43'	68.74'



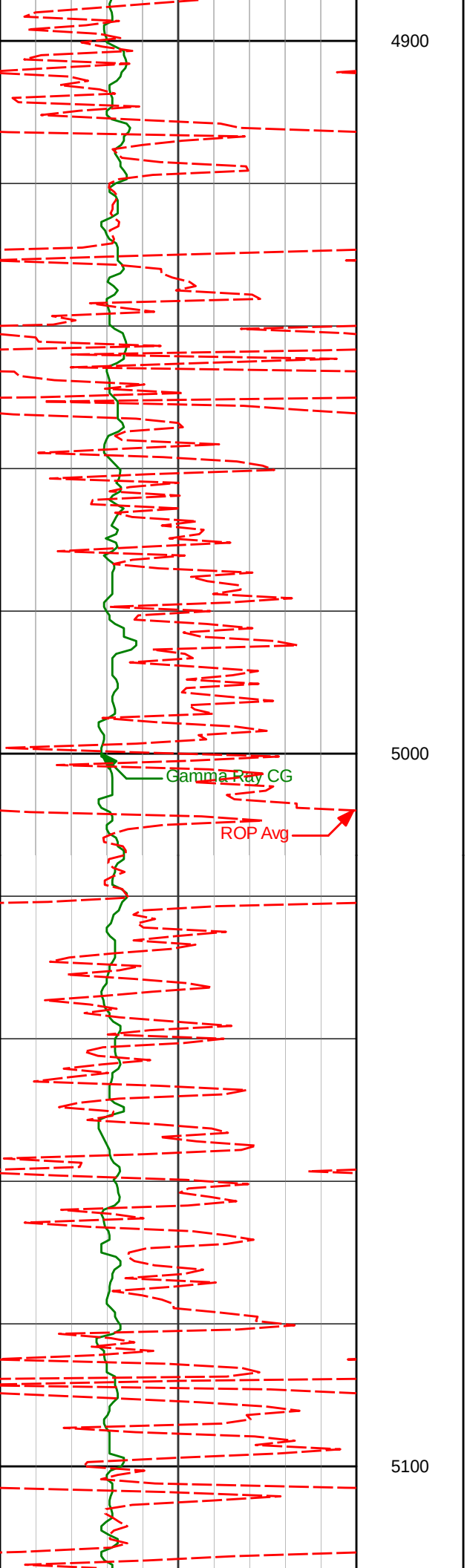
4288'	7.41°	72.67°	4250.63'	73.28'
4300				
4383'	7.02°	66.09°	4344.88'	78.52'
4400				



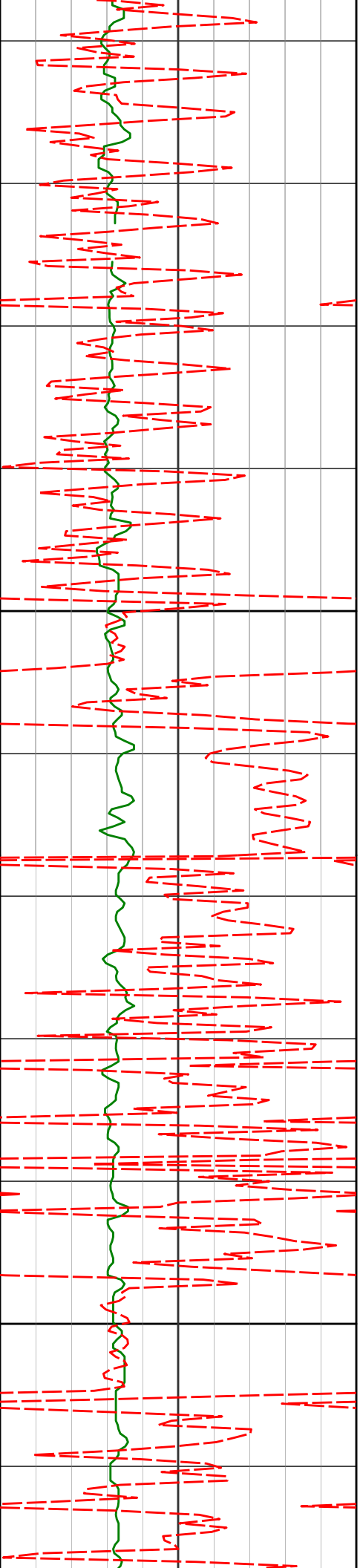
4478'	6.46°	87.21°	4439.24'	82.16'
4573'	6.03°	83.62°	4533.68'	83.98'
4668'	6.22°	77.79°	4628.13'	86.59'



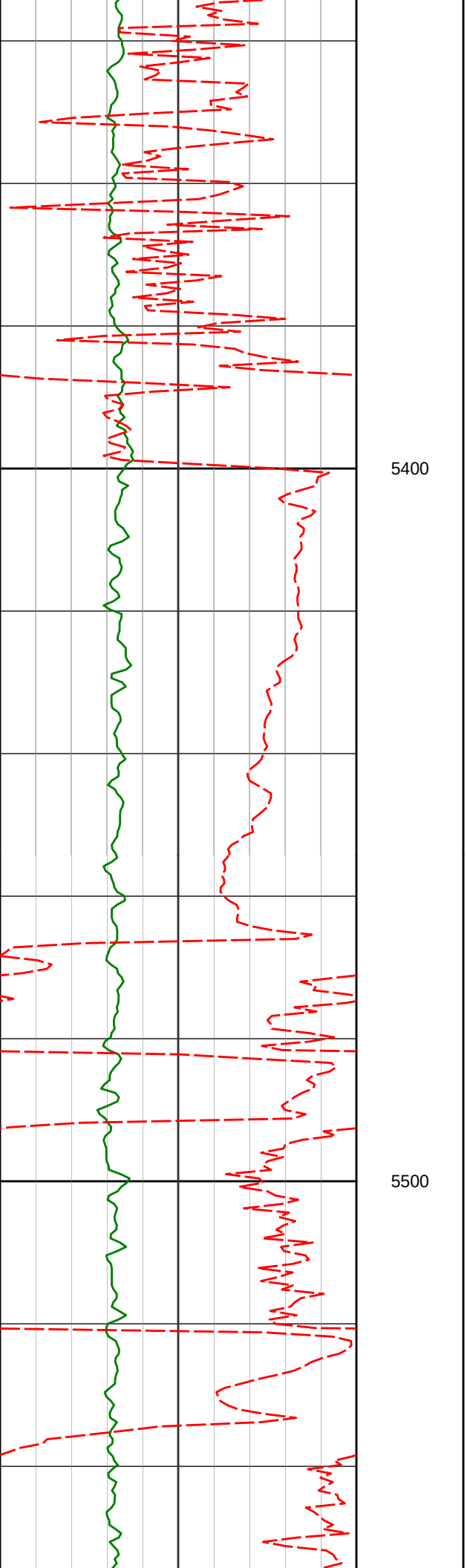
4763'	5.75°	76.36°	4722.62'	89.73'
4858'	6.59°	89.25°	4817.07'	91.91'



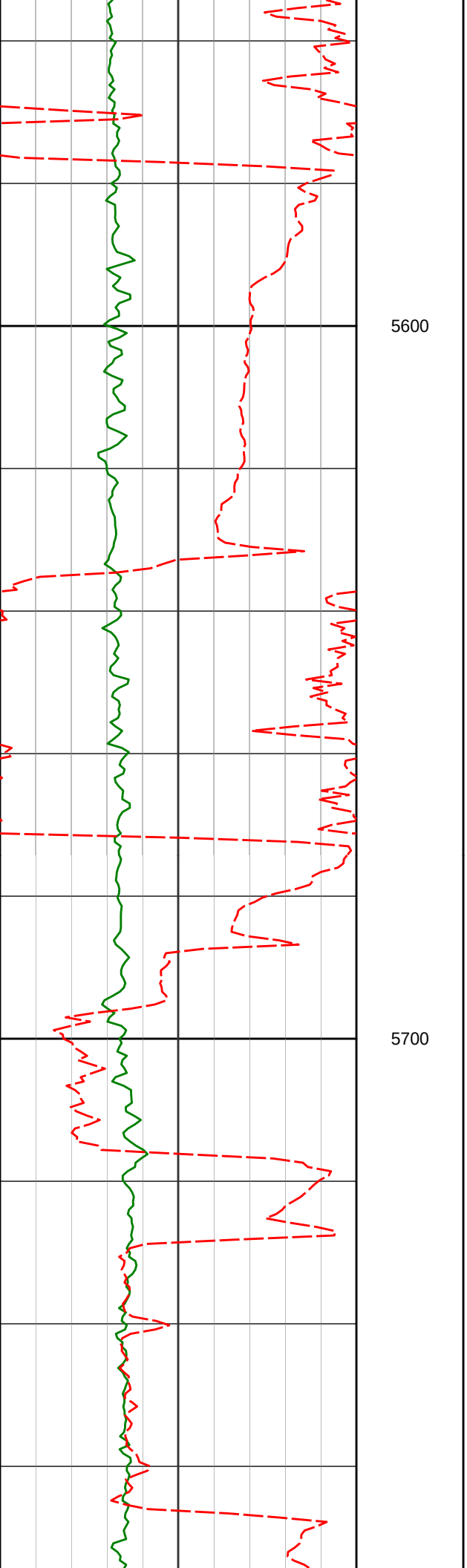
4953'	6.21°	82.57°	4911.48'	93.67'
5048'	5.69°	78.77°	5005.97'	96.19'



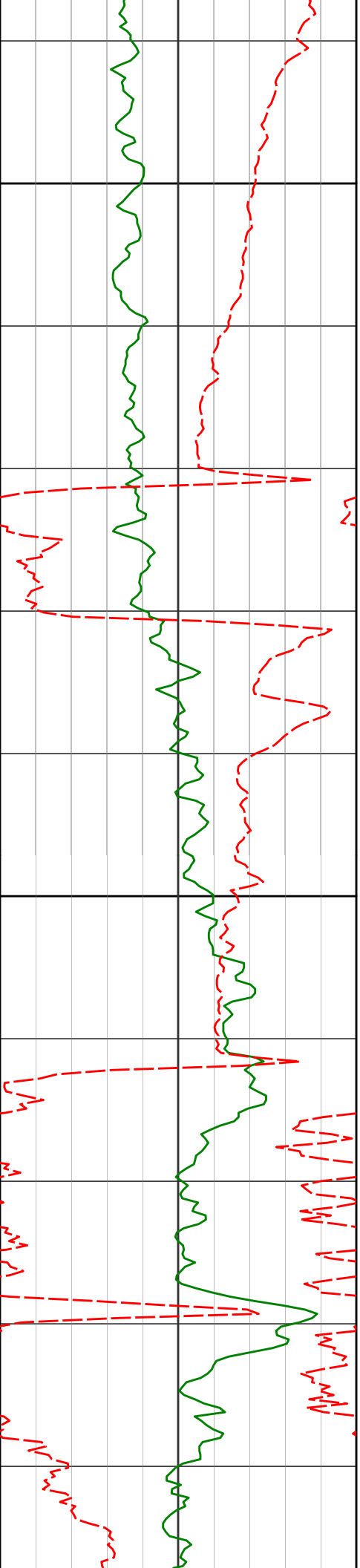
5143'	5.41°	76.53°	5100.52'	99.02'
5238'	5.75°	75.11°	5195.07'	102.15'
5333'	4.93°	73.14°	5289.66'	105.37'



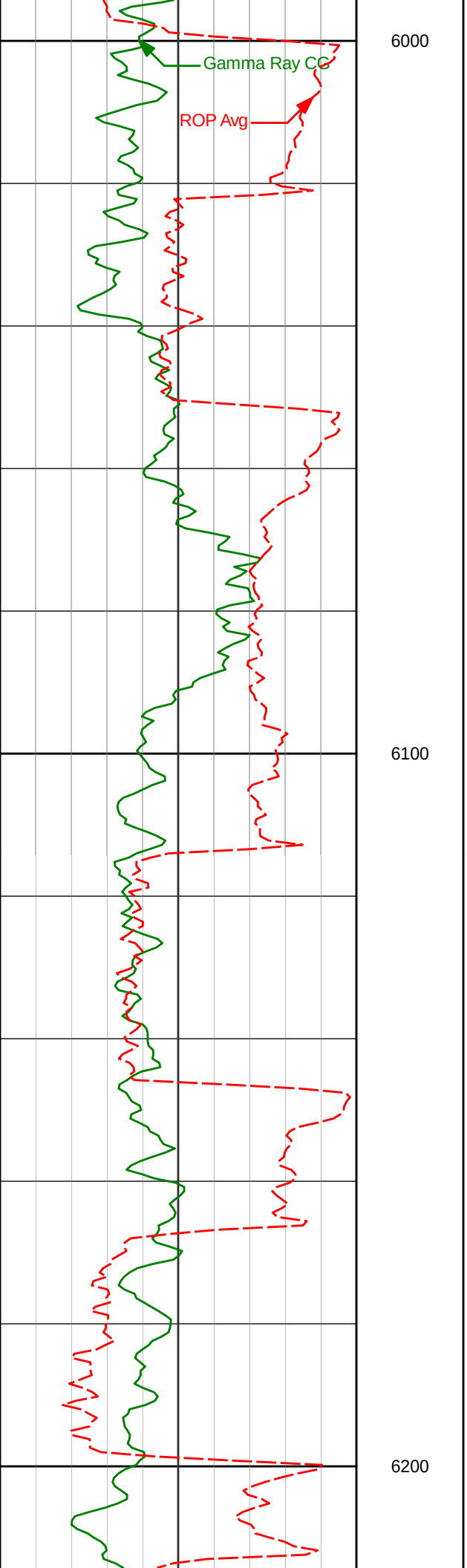
5428'	10.36°	66.32°	5383.78'	111.12'
5523'	18.36°	53.91°	5475.76'	125.27'



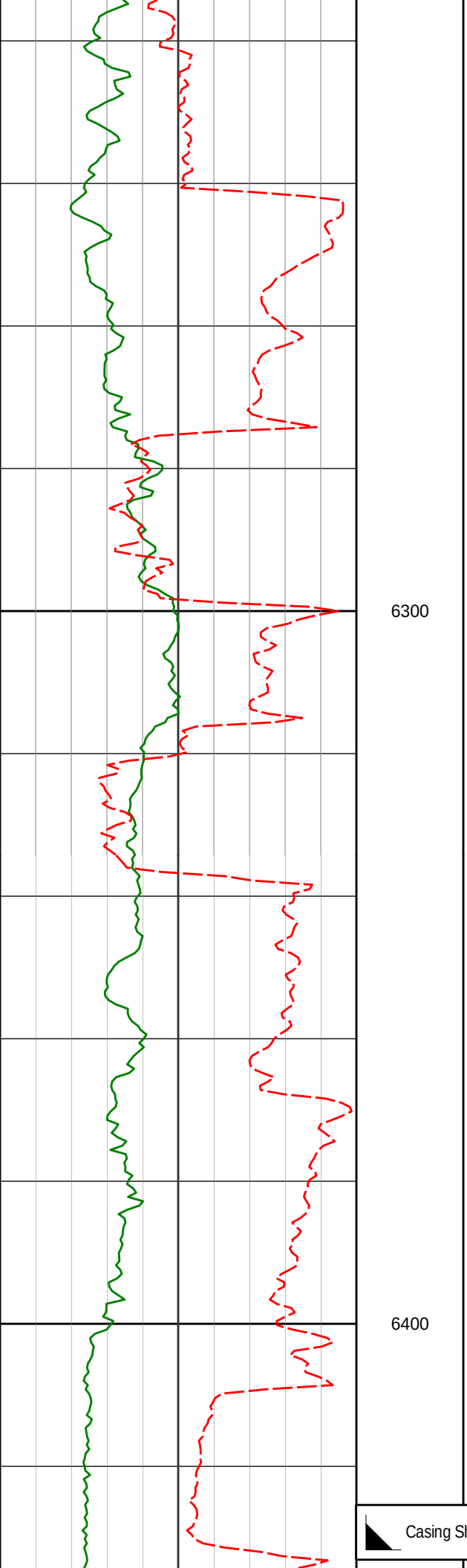
5618'	26.28°	48.59°	5563.58'	150.65'
5713'	29.10°	44.19°	5647.70'	184.10'



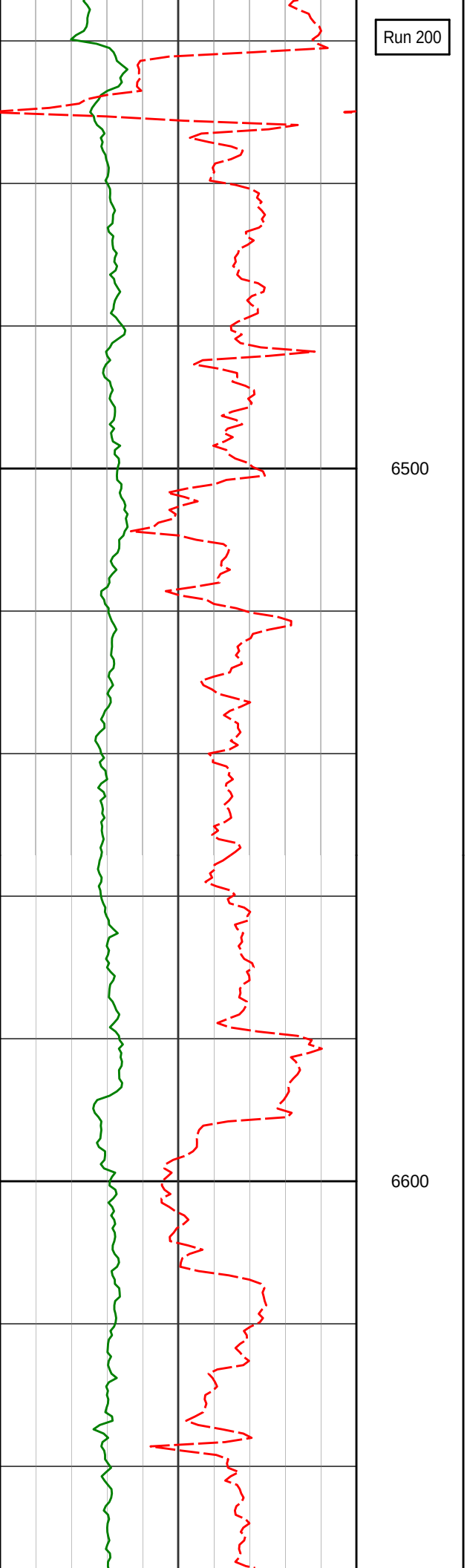
5808'	36.39°	36.30°	5727.59'	226.46'
5902'	47.79°	21.47°	5797.40'	284.25'



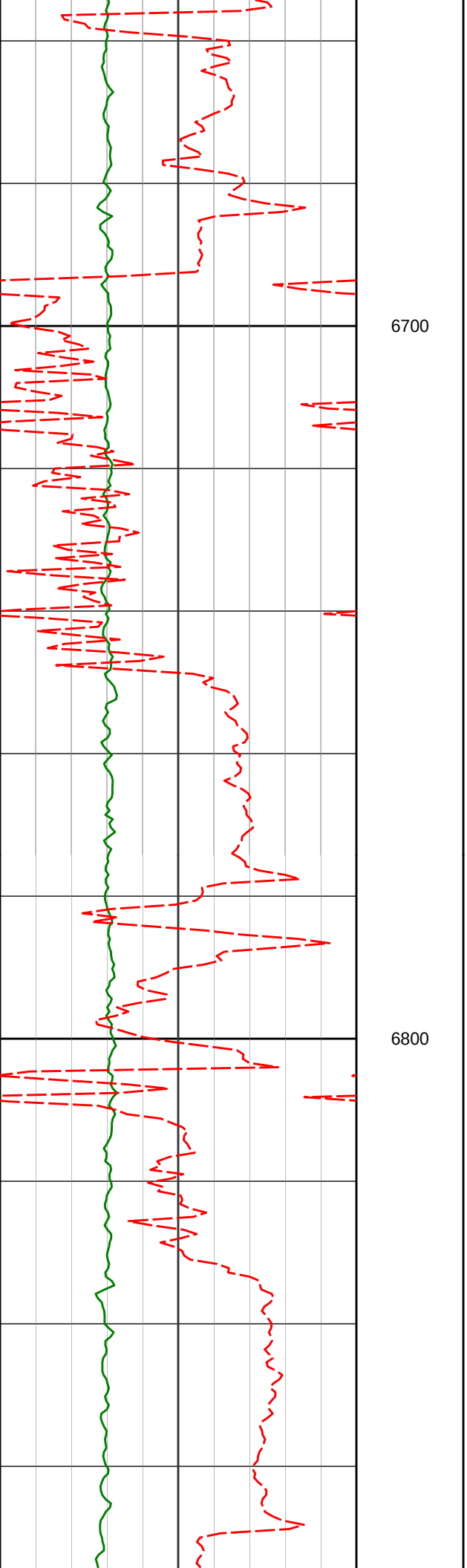
5998'	48.90°	17.23°	5861.22'	353.90'
6093'	59.50°	7.99°	5916.79'	430.18'
6188'	65.09°	3.80°	5960.95'	514.23'



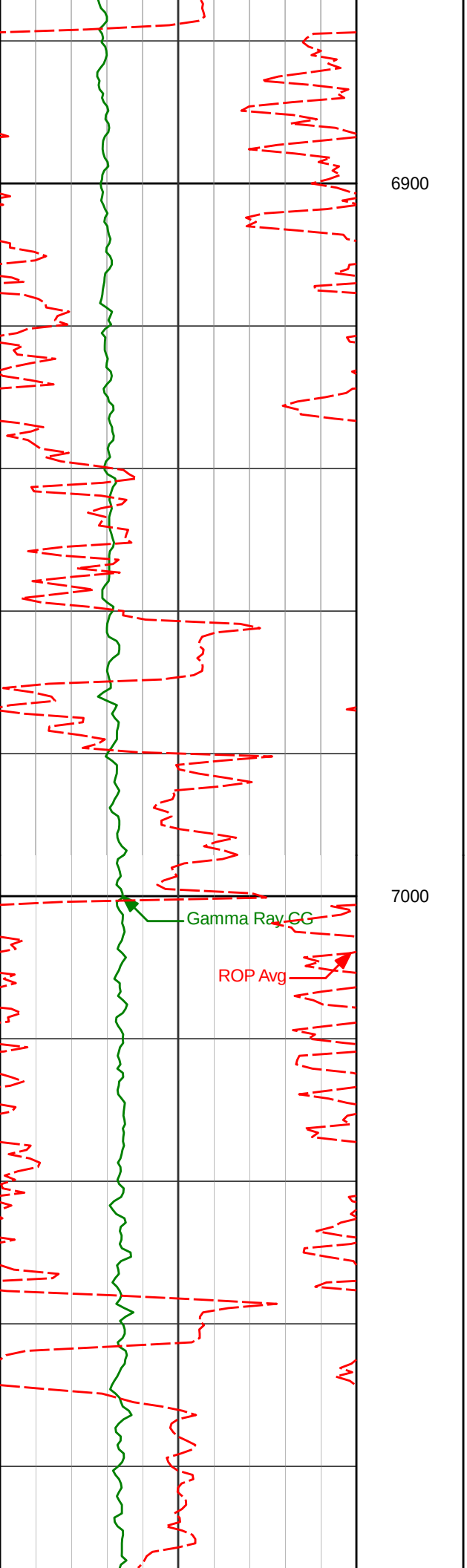
6283'	72.09°	3.04°	5995.61'	602.55'
6378'	83.08°	3.00°	6016.01'	695.09'
6393'	85.87°	2.79°	6017.45'	710.00'



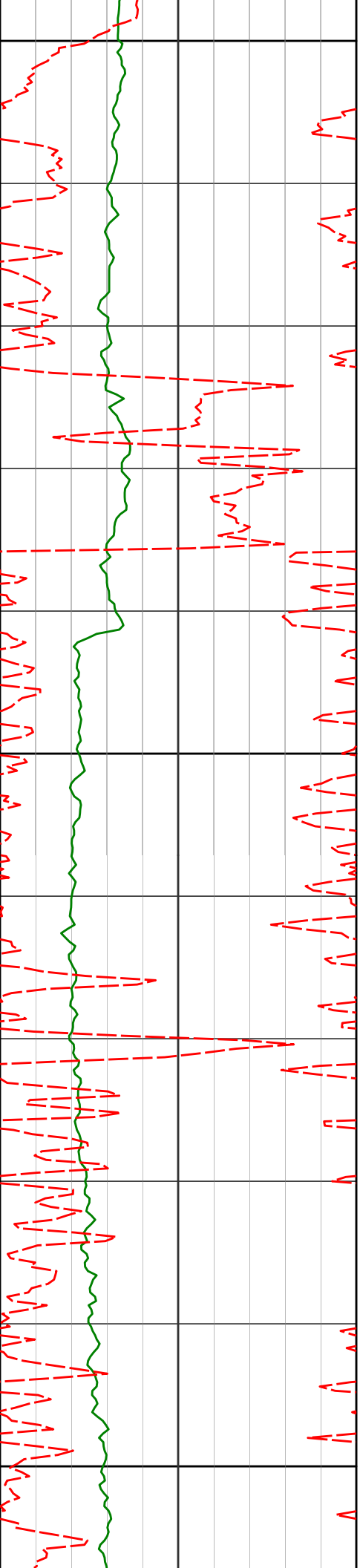
6523'	89.20°	2.00°	6023.05'	839.66'
6616'	89.63°	2.02°	6024.00'	932.47'



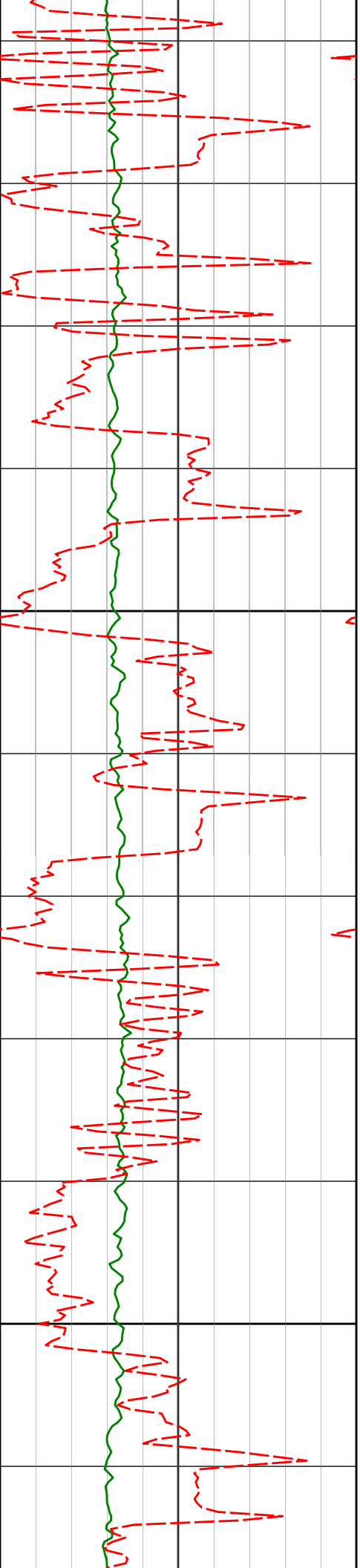
6700					
	6708'	90.31°	2.21°	6024.04'	1024.30'
6800	6801'	89.63°	0.77°	6024.10'	1117.06'



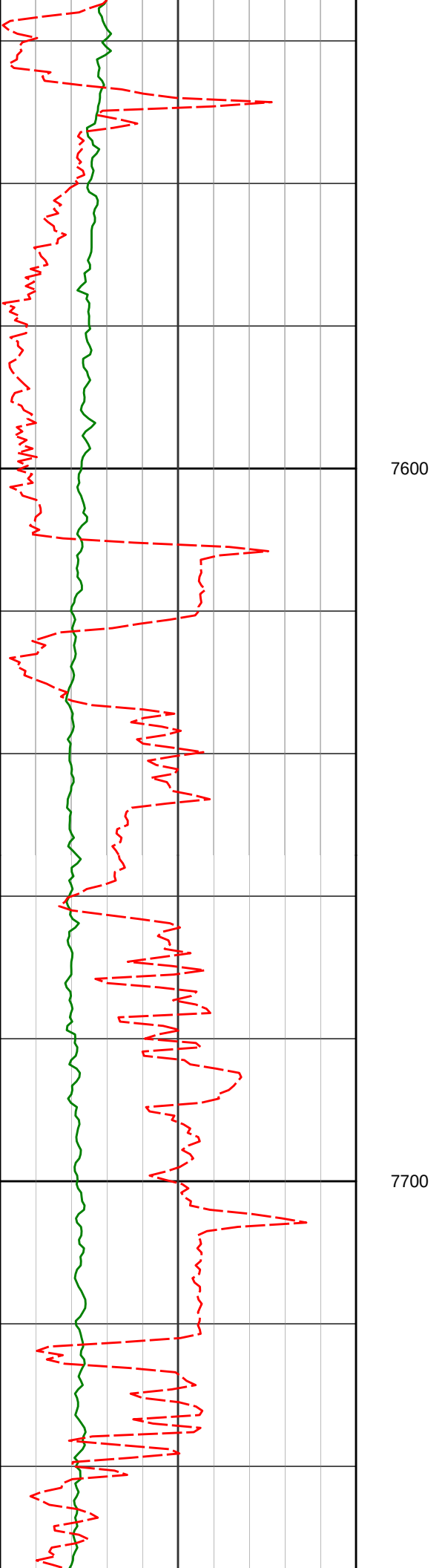
6894'	90.25°	0.46°	6024.20'	1209.71'
6986'	90.77°	359.36°	6023.38'	1301.25'
7080'	90.46°	358.30°	6022.37'	1394.59'



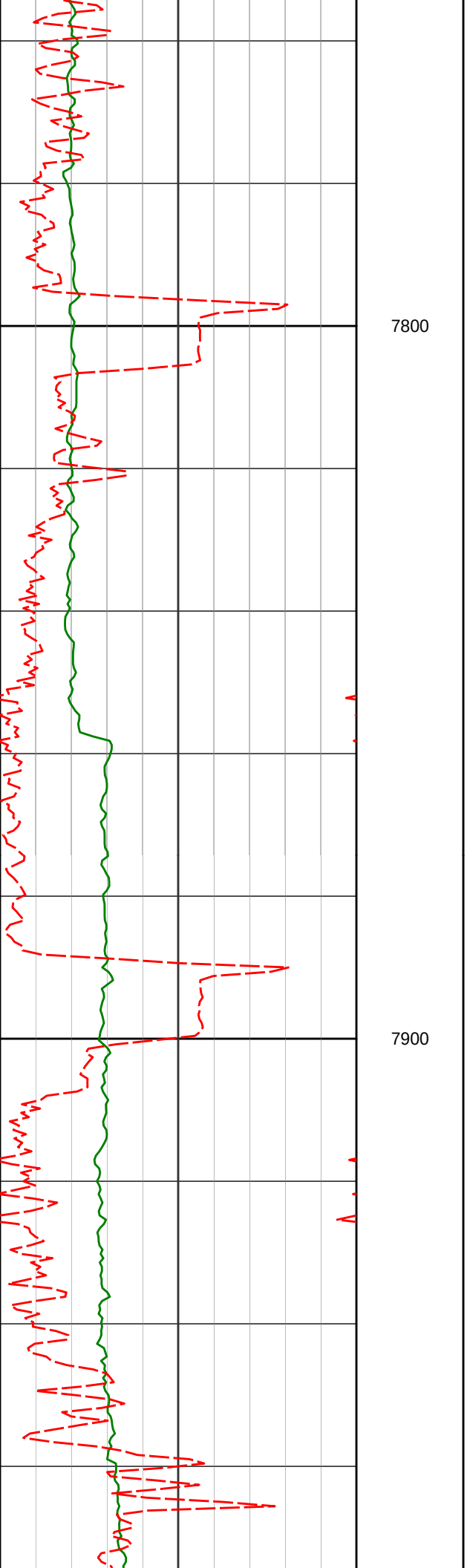
7172'	89.38°	357.84°	6022.49'	1485.79'
7265'	89.54°	357.37°	6023.37'	1577.89'



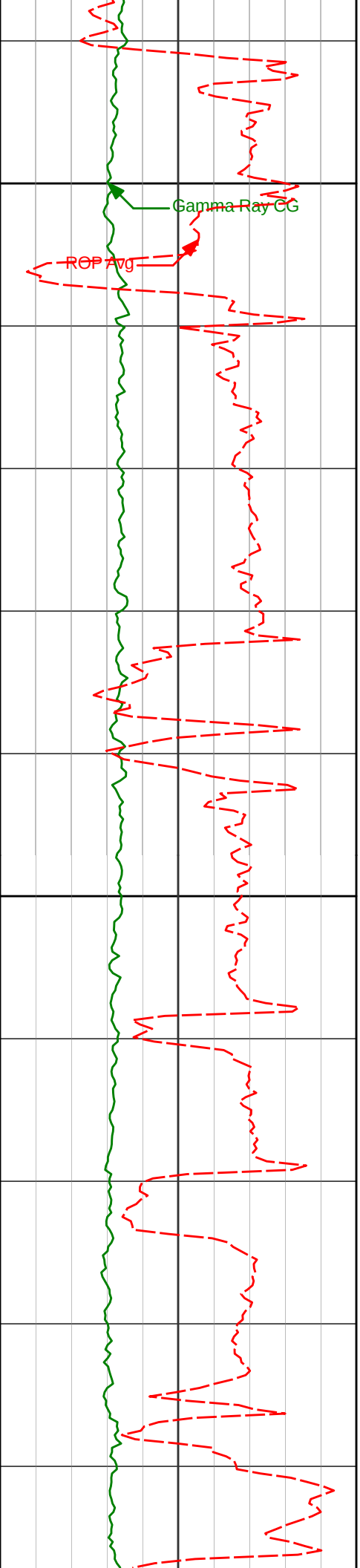
7359'	90.12°	357.65°	6023.65'	1670.95'
7450'	90.34°	357.11°	6023.28'	1761.01'



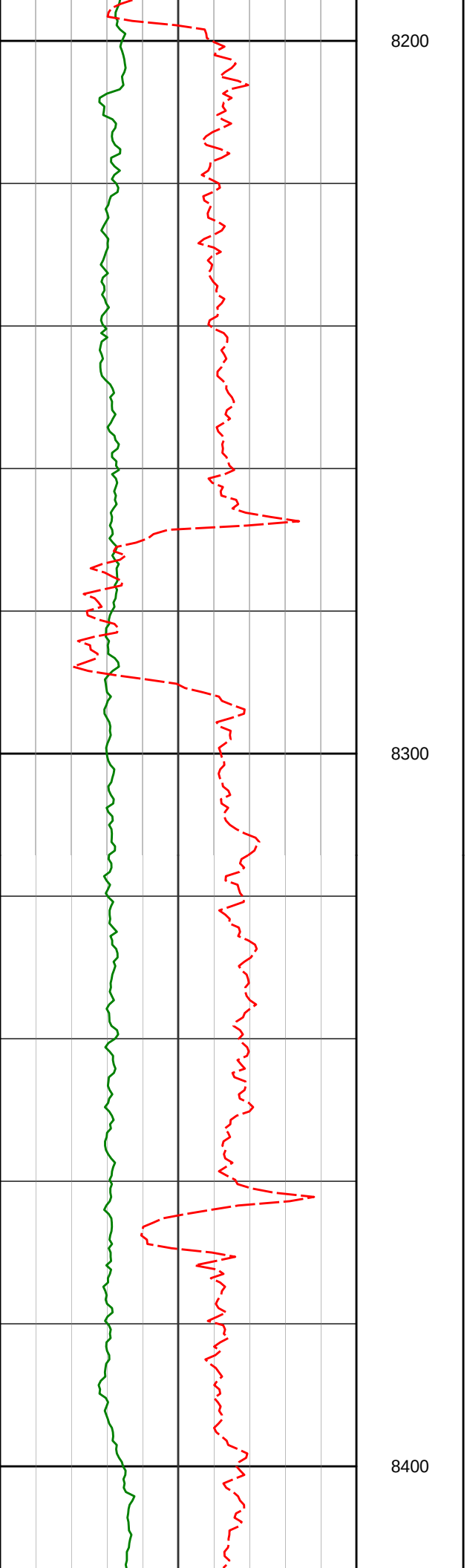
7543'	89.69°	356.30°	6023.25'	1852.89'
7636'	90.03°	356.59°	6023.48'	1944.71'
7729'	90.37°	357.03°	6023.15'	2036.62'



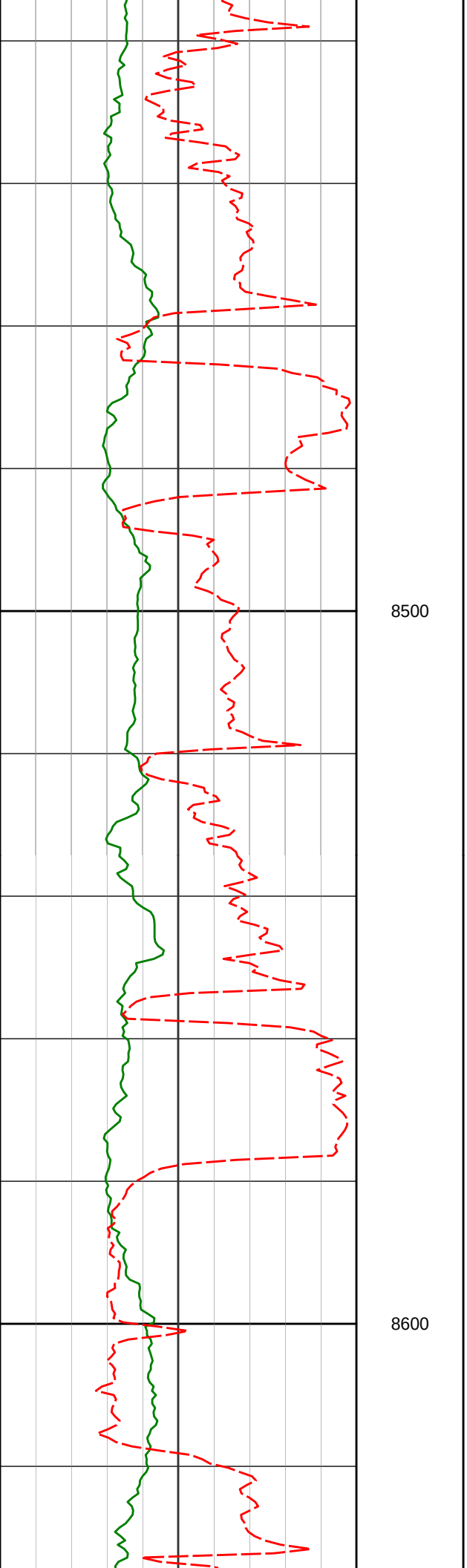
7821'	91.14°	357.58°	6021.94'	2127.64'
7914'	91.73°	358.69°	6019.61'	2219.83'



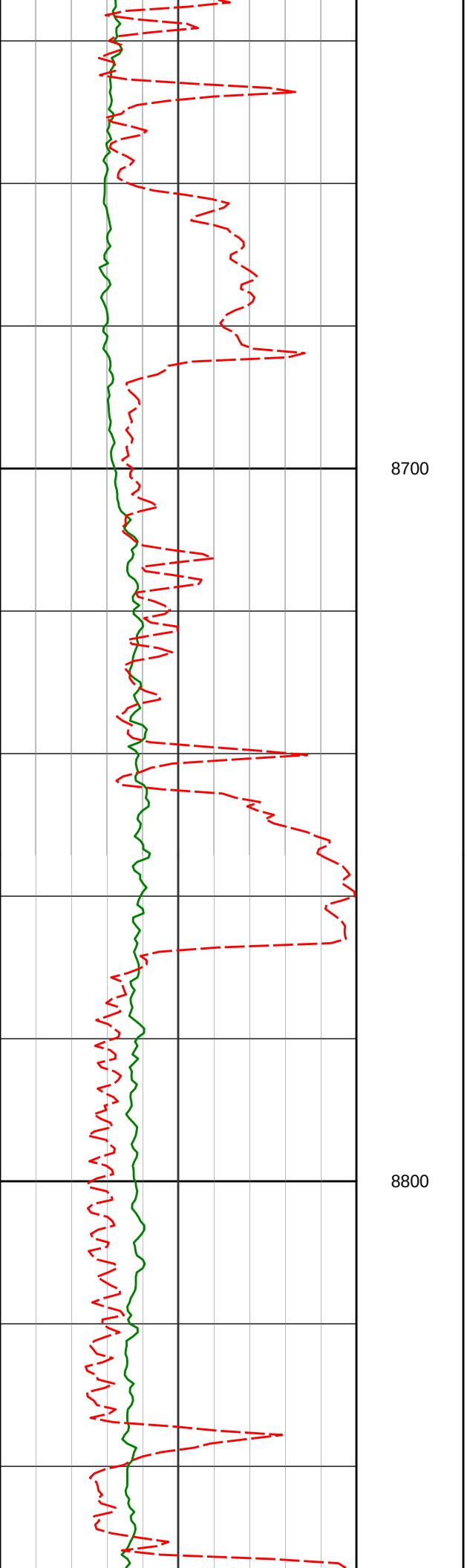
8000					
	8009'	90.06°	358.07°	6018.13'	2314.06'
8100					
	8104'	89.35°	357.83°	6018.62'	2408.21'



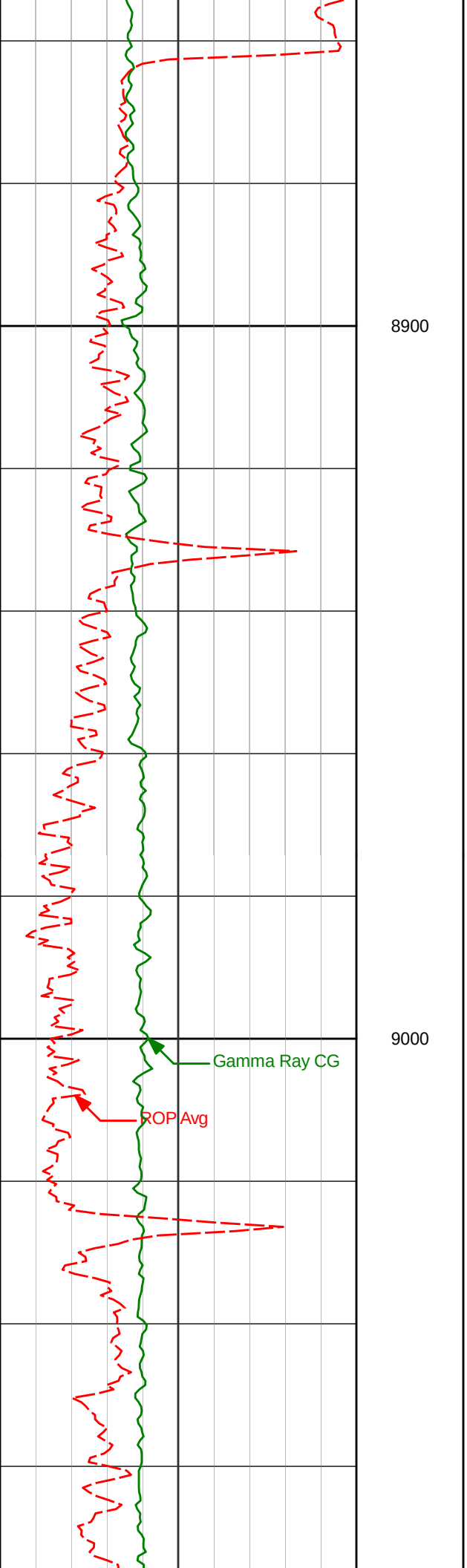
8199'	90.40°	357.86°	6018.82'	2502.34'
8294'	91.08°	358.77°	6017.59'	2596.56'
8389'	90.99°	358.27°	6015.88'	2690.82'



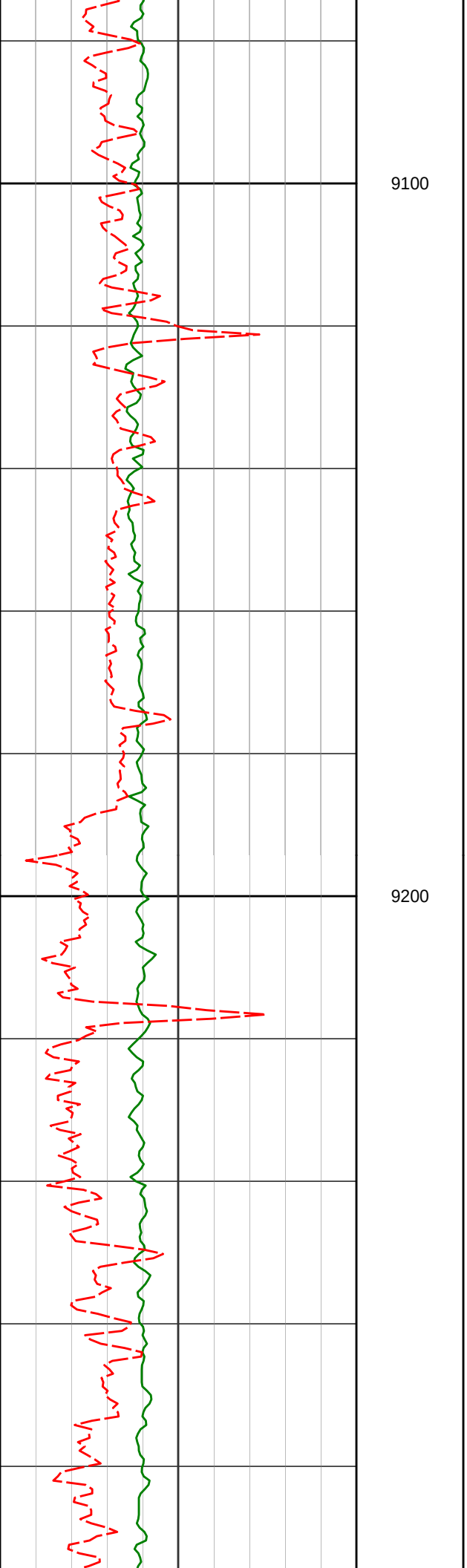
8483'	91.60°	357.90°	6013.76'	2783.99'
8578'	90.49°	357.35°	6012.02'	2878.05'



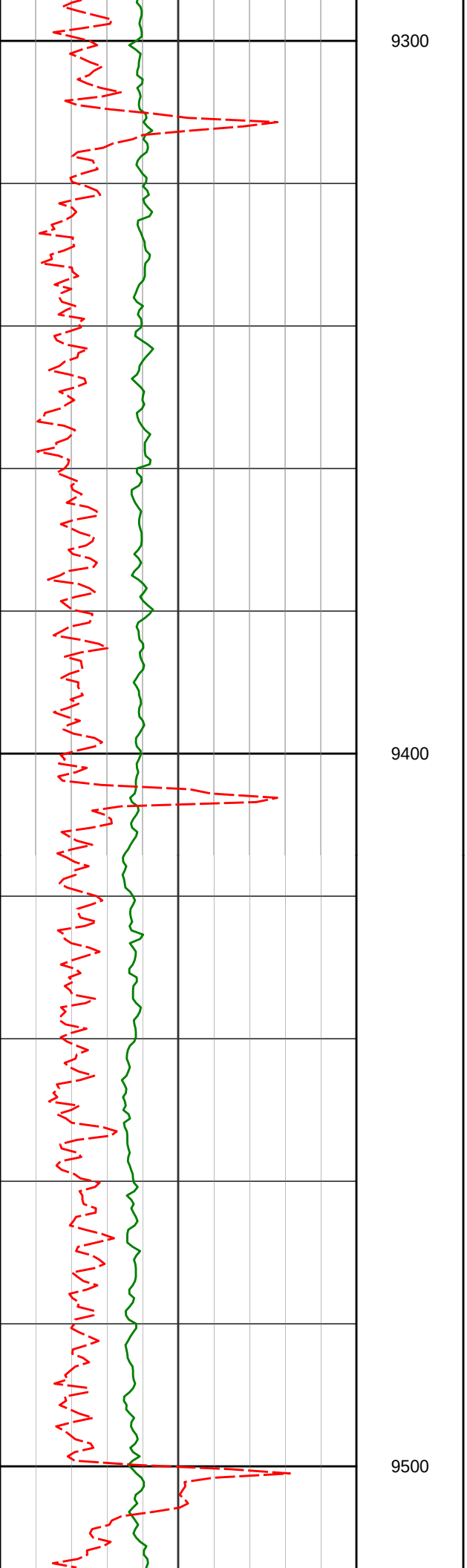
8673'	90.74°	357.28°	6011.00'	2972.06'
8768'	90.37°	357.20°	6010.08'	3066.04'



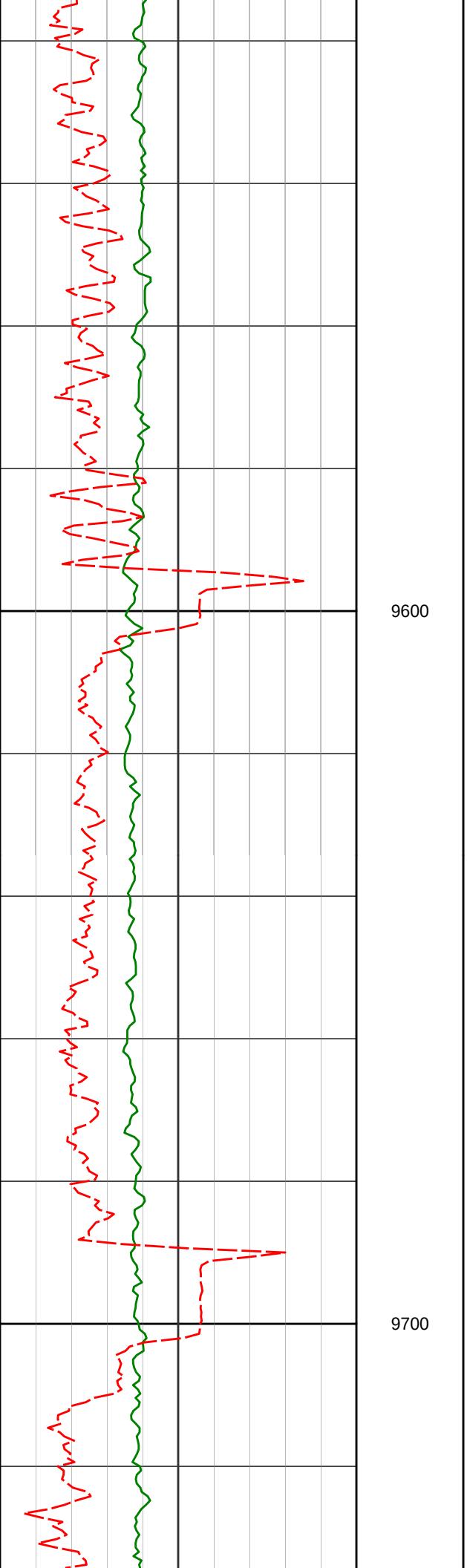
8863'	90.00°	357.56°	6009.77'	3160.06'
8958'	89.72°	357.23°	6010.00'	3254.09'
9053'	90.59°	359.12°	6009.75'	3348.29'



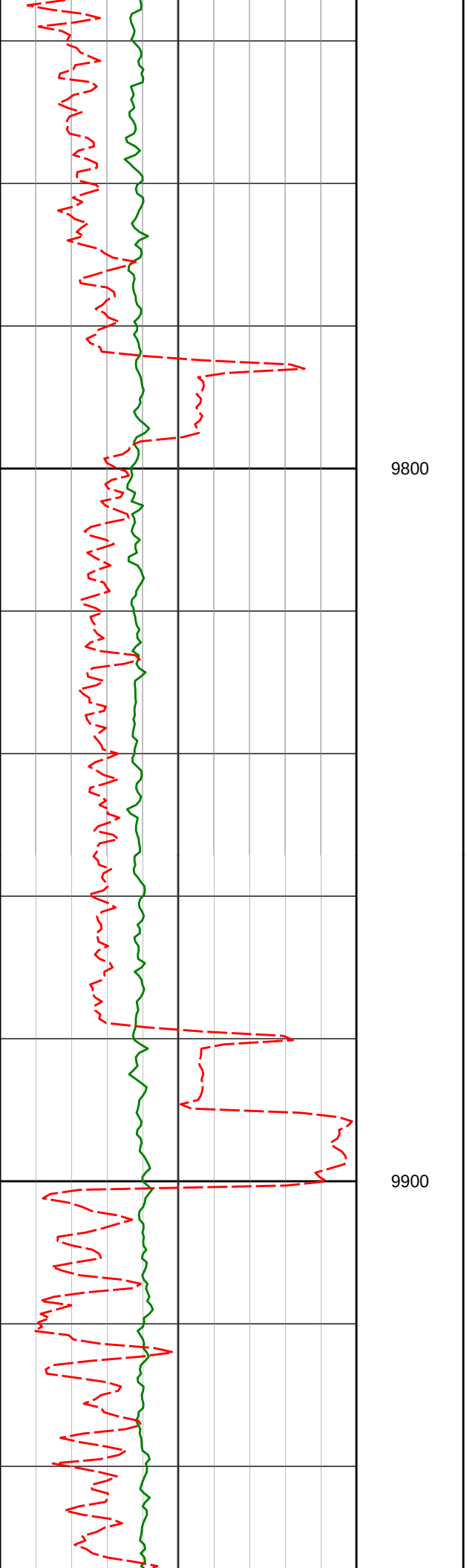
9148'	89.78°	357.71°	6009.44'	3442.54'
9243'	90.18°	358.98°	6009.47'	3536.78'



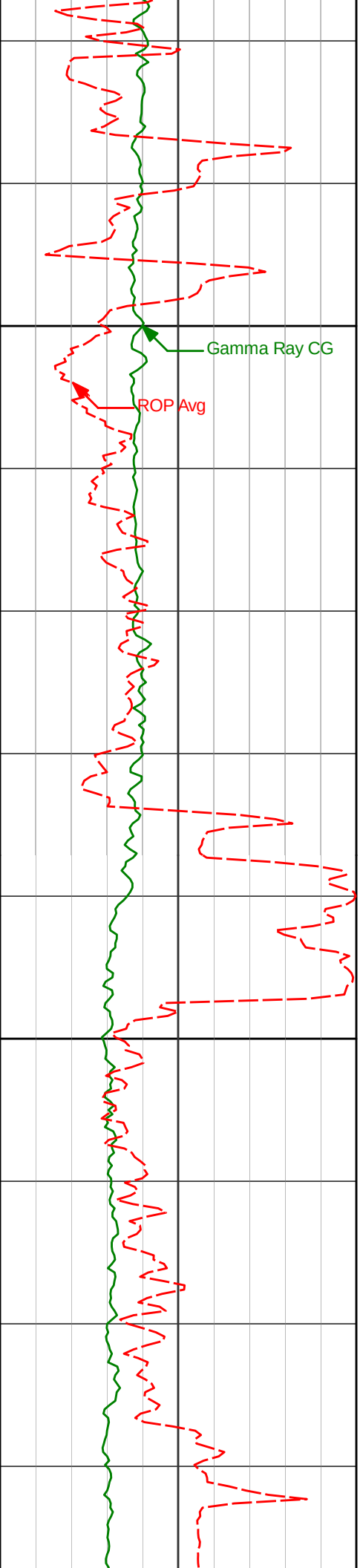
9337'	89.88°	358.57°	6009.42'	3630.11'
9432'	90.28°	359.02°	6009.29'	3724.44'



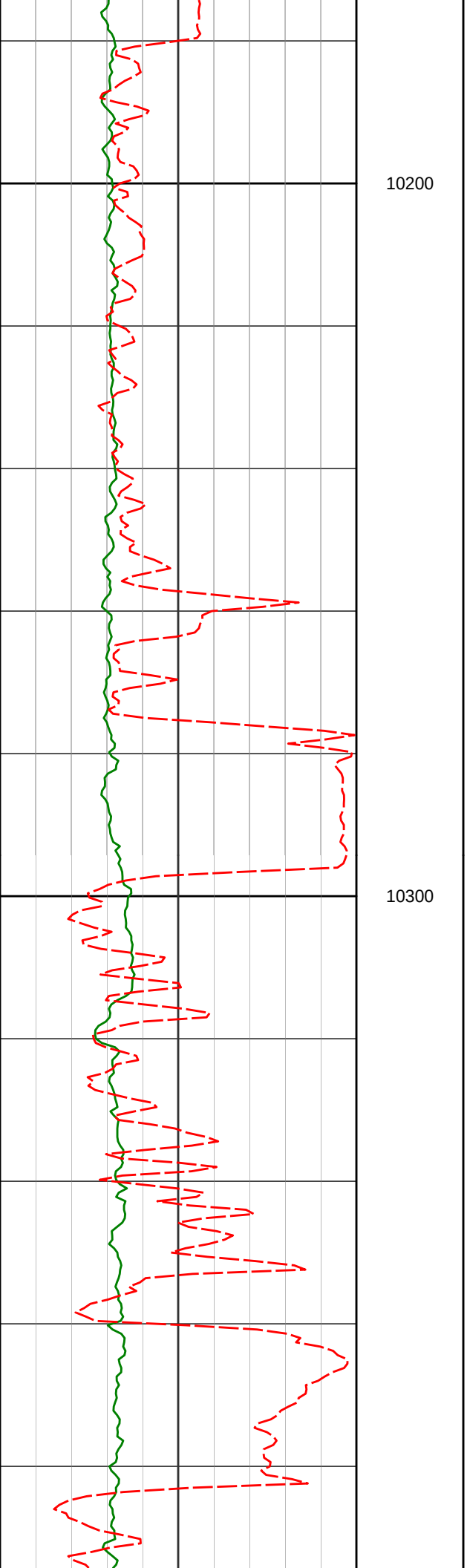
9527'	89.78°	359.08°	6009.24'	3818.82'
9622'	90.31°	359.34°	6009.16'	3913.23'
9716'	89.69°	359.41°	6009.16'	4006.67'



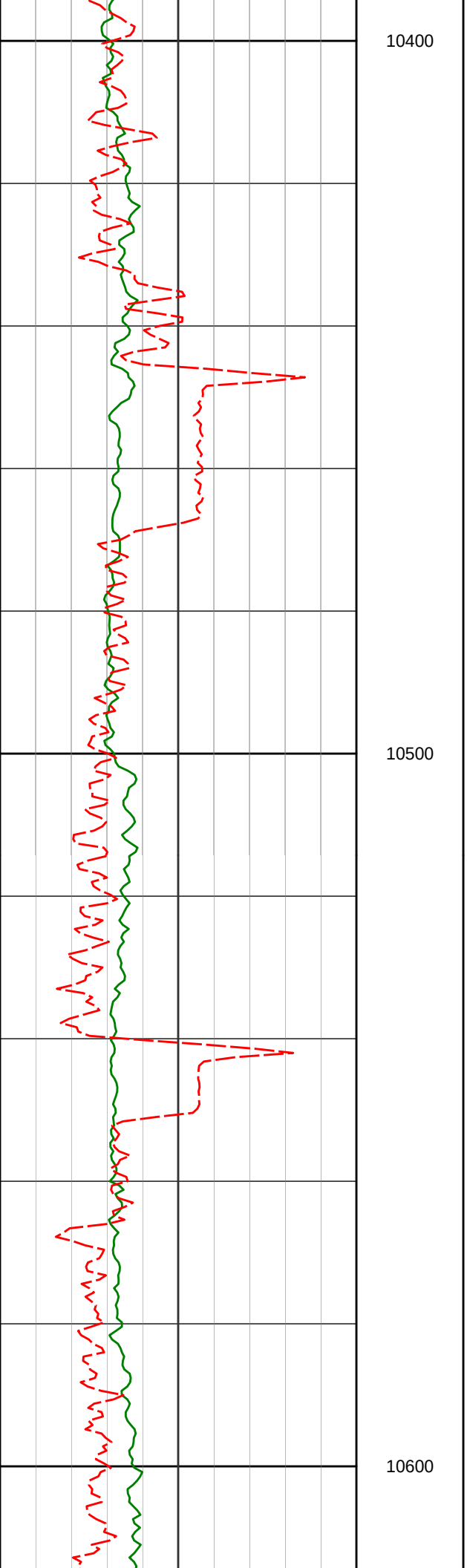
9800					
	9811'	89.41°	359.70°	6009.90'	4101.14'
9900					
	9906'	89.32°	358.69°	6010.95'	4195.54'



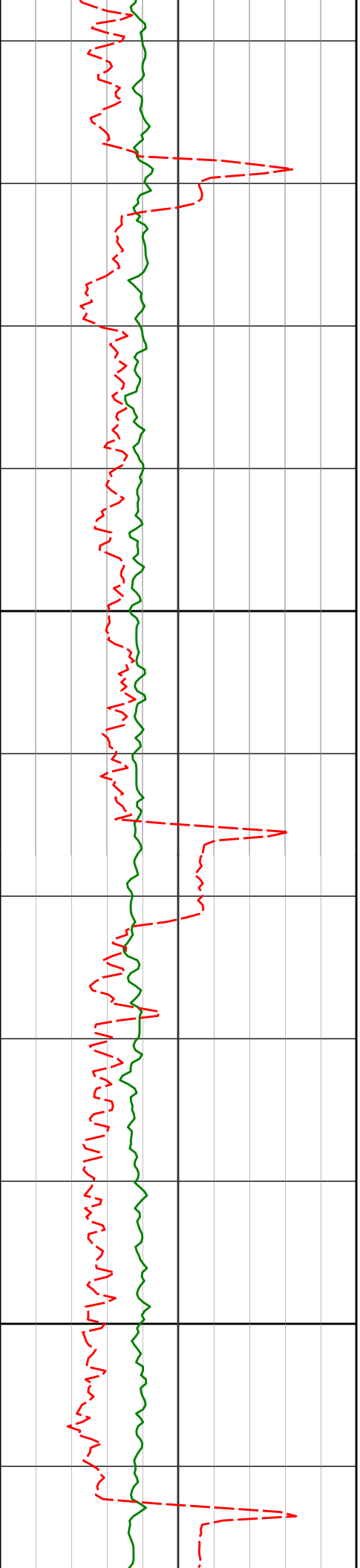
10000	10000'	89.63°	359.54°	6011.81'	4288.93'
	10095'	88.70°	356.98°	6013.19'	4383.14'
10100					



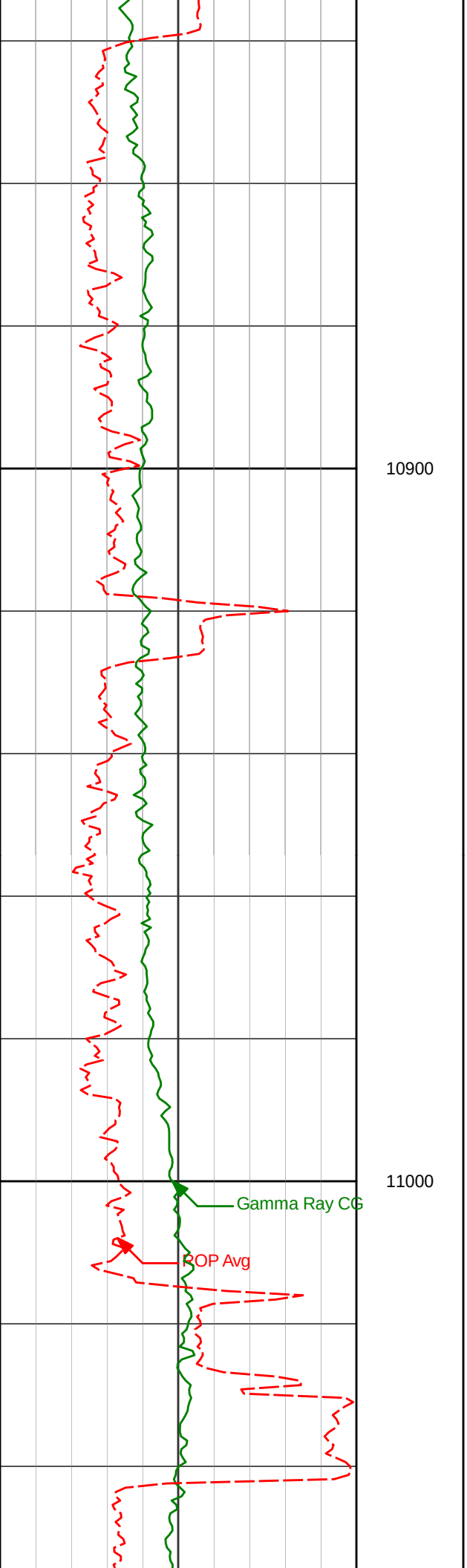
10189'	88.80°	357.47°	6015.24'	4476.11'
10284'	89.38°	356.40°	6016.75'	4570.01'
10378'	91.97°	353.83°	6015.63'	4662.42'



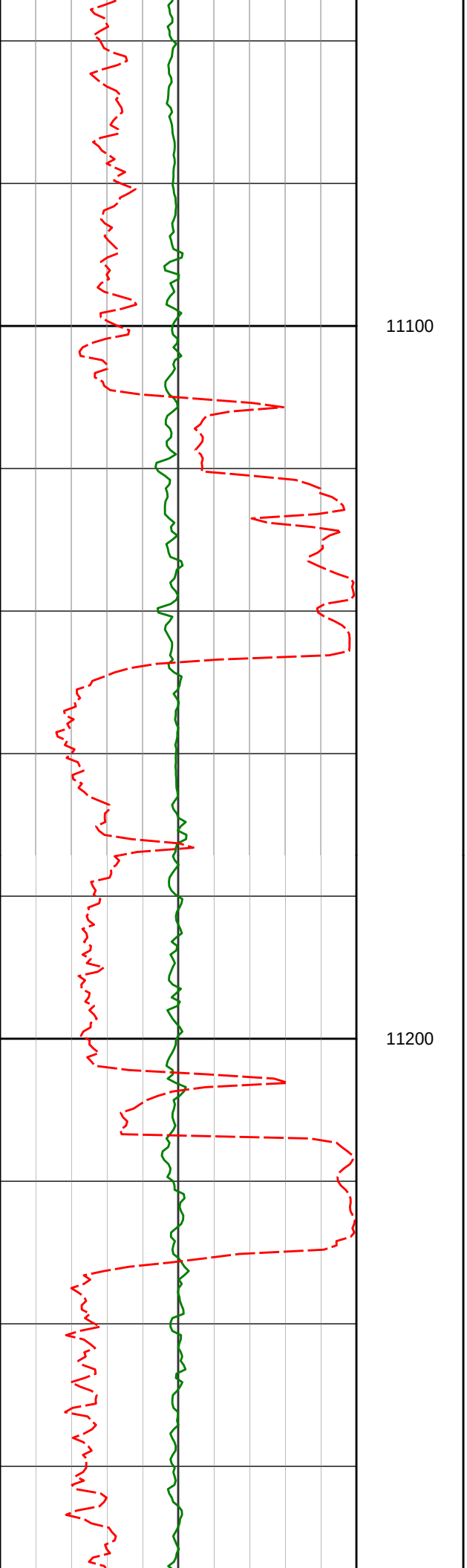
10474'	92.03°	353.95°	6012.28'	4756.37'
10568'	91.60°	354.07°	6009.30'	4848.41'



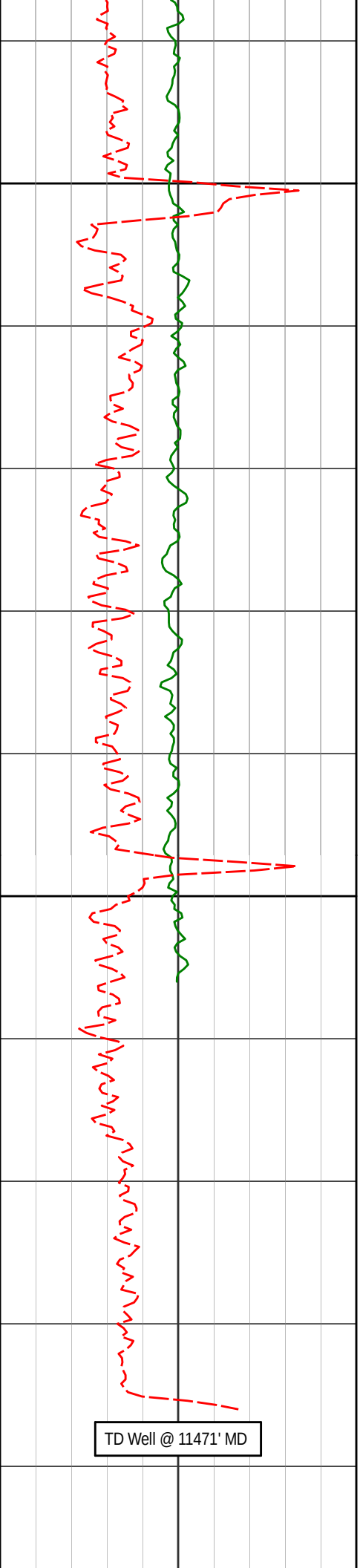
10663'	91.42°	353.24°	6006.79'	4941.31'
10757'	91.51°	353.37°	6004.39'	5033.13'



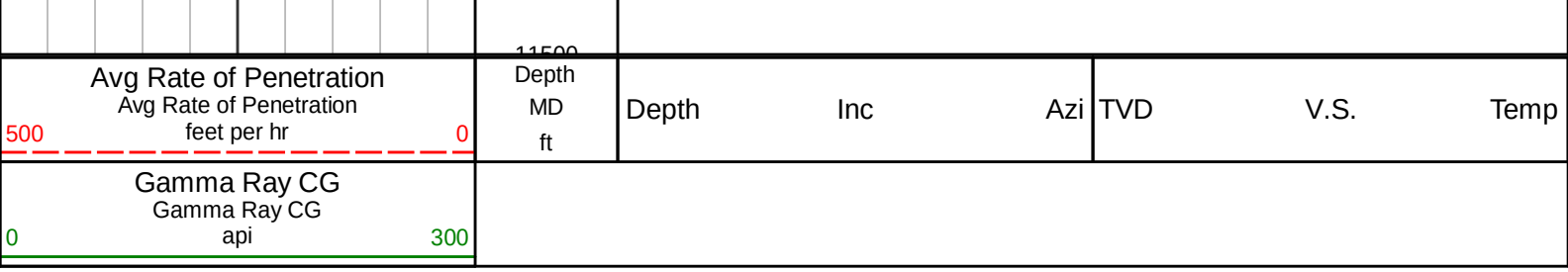
10852'	91.60°	353.54°	6001.81'	5125.97'
10947'	91.36°	353.47°	5999.36'	5218.83'
11042'	91.88°	354.07°	5996.67'	5311.77'



11137'	90.62°	354.50°	5994.60'	5404.90'
11232'	90.40°	355.49°	5993.76'	5498.27'



11327'	89.41°	355.15°	5993.91'	5591.75'
11404'	89.11°	355.32°	5994.91'	5667.48'
11471'	89.11°	355.32°	5995.95'	5733.40'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Haley LC27-711
Wattenburg
Weld Colorado
USA
CA-XX-0902281068

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
630.00	0.56	244.49	629.99	1.31 S	2.76 W	-1.58	0.09
725.00	0.82	225.96	724.98	1.98 S	3.66 W	-2.33	0.36
820.00	0.94	235.71	819.97	2.89 S	4.79 W	-3.35	0.21
915.00	0.88	225.44	914.96	3.85 S	5.96 W	-4.41	0.18
1010.00	0.63	242.09	1009.95	4.60 S	6.94 W	-5.26	0.35
1194.00	1.30	238.83	1193.93	6.15 S	9.61 W	-7.06	0.36
1285.00	1.28	234.92	1284.90	7.27 S	11.32 W	-8.34	0.10
1378.00	1.78	139.57	1377.88	8.96 S	11.23 W	-10.02	2.46
1471.00	5.88	135.49	1470.65	13.46 S	6.95 W	-14.08	4.41
1655.00	11.83	130.25	1652.38	32.39 S	14.07 E	-30.86	3.26
1749.00	12.09	124.93	1744.34	44.25 S	29.50 E	-41.16	1.20
1841.00	14.57	113.12	1833.87	54.32 S	48.05 E	-49.37	3.99
1934.00	12.97	95.84	1924.24	59.97 S	69.20 E	-52.94	4.73
2027.00	11.20	73.77	2015.22	58.51 S	88.26 E	-49.62	5.28
2120.00	10.26	68.76	2106.59	52.98 S	104.66 E	-42.52	1.42
2214.00	10.04	68.04	2199.12	46.88 S	120.06 E	-34.94	0.27
2305.00	9.95	67.68	2288.74	40.93 S	134.69 E	-27.60	0.12
2398.00	10.24	66.50	2380.30	34.59 S	149.70 E	-19.81	0.39
2491.00	7.83	65.27	2472.14	28.64 S	163.05 E	-12.59	2.60
2584.00	7.20	68.34	2564.34	23.83 S	174.22 E	-6.72	0.80
2676.00	7.43	68.37	2655.59	19.51 S	185.12 E	-1.35	0.25
2769.00	7.43	68.14	2747.81	15.05 S	196.29 E	4.17	0.03
2864.00	7.52	66.26	2842.00	10.27 S	207.67 E	10.05	0.27
2959.00	7.46	63.56	2936.19	5.02 S	218.88 E	16.36	0.37
3054.00	9.45	75.32	3030.16	0.30 S	231.95 E	22.34	2.76
3148.00	9.47	75.53	3122.88	3.59 N	246.90 E	27.67	0.05
3243.00	9.55	75.31	3216.58	7.55 N	262.10 E	33.09	0.09
3338.00	8.63	87.20	3310.39	9.89 N	276.84 E	36.86	2.20
3433.00	9.24	92.73	3404.24	9.88 N	291.58 E	38.28	1.11
3528.00	8.54	82.52	3498.11	10.43 N	306.19 E	40.26	1.82
3623.00	8.26	78.26	3592.09	12.74 N	319.86 E	43.89	0.71
3718.00	8.33	78.00	3686.09	15.56 N	333.28 E	48.01	0.08
3813.00	8.36	77.71	3780.09	18.46 N	346.76 E	52.21	0.05
3908.00	8.32	77.80	3874.08	21.38 N	360.22 E	56.43	0.04
4003.00	7.90	77.82	3968.13	24.21 N	373.32 E	60.53	0.44
4098.00	7.58	77.05	4062.27	26.99 N	385.81 E	64.51	0.36
4194.00	7.55	75.01	4157.43	30.04 N	398.07 E	68.74	0.28
4288.00	7.41	72.67	4250.63	33.45 N	409.82 E	73.28	0.36
4383.00	7.02	66.09	4344.88	37.62 N	420.98 E	78.52	0.96
4478.00	6.46	87.21	4439.24	40.24 N	431.62 E	82.16	2.66
4573.00	6.03	83.62	4533.68	41.05 N	441.92 E	83.98	0.60
4668.00	6.22	77.79	4628.13	42.70 N	451.91 E	86.59	0.68
4763.00	5.75	76.36	4722.62	44.91 N	461.57 E	89.73	0.52
4858.00	6.59	89.25	4817.07	46.10 N	471.64 E	91.91	1.70
4953.00	6.21	82.57	4911.48	46.84 N	482.18 E	93.67	0.88

5048.00	5.69	78.77	5005.97	48.42 N	491.90 E	96.19	0.69
5143.00	5.41	76.53	5100.52	50.38 N	500.87 E	99.02	0.37
5238.00	5.75	75.11	5195.07	52.65 N	509.83 E	102.15	0.39
5333.00	4.93	73.14	5289.66	55.05 N	518.34 E	105.37	0.89
5428.00	10.36	66.32	5383.78	59.67 N	530.08 E	111.12	5.79
5523.00	18.36	53.91	5475.76	71.94 N	550.03 E	125.27	8.97
5618.00	26.28	48.59	5563.58	94.70 N	577.94 E	150.65	8.60
5713.00	29.10	44.19	5647.70	125.19 N	609.83 E	184.10	3.66
5808.00	36.39	36.30	5727.59	164.53 N	642.67 E	226.46	8.87
5902.00	47.79	21.47	5797.40	219.71 N	672.09 E	284.25	16.03
5998.00	48.90	17.23	5861.22	287.37 N	695.83 E	353.90	3.50
6093.00	59.50	7.99	5916.79	362.41 N	712.19 E	430.18	13.65
6188.00	65.09	3.80	5960.95	446.02 N	720.75 E	514.23	7.06
6283.00	72.09	3.04	5995.61	534.25 N	726.01 E	602.55	7.40
6378.00	83.08	3.00	6016.01	626.76 N	730.89 E	695.09	11.57
6393.00	85.87	2.79	6017.45	641.67 N	731.64 E	710.00	18.63
6523.00	89.20	2.00	6023.05	771.42 N	737.06 E	839.66	2.63
6616.00	89.63	2.02	6024.00	864.36 N	740.32 E	932.47	0.46
6708.00	90.31	2.21	6024.04	956.29 N	743.71 E	1024.30	0.77
6801.00	89.63	0.77	6024.10	1049.26 N	746.13 E	1117.06	1.71
6894.00	90.25	0.46	6024.20	1142.25 N	747.12 E	1209.71	0.74
6986.00	90.77	359.36	6023.38	1234.25 N	746.98 E	1301.25	1.32
7080.00	90.46	358.30	6022.37	1328.22 N	745.06 E	1394.59	1.17
7172.00	89.38	357.84	6022.49	1420.17 N	741.97 E	1485.79	1.28
7265.00	89.54	357.37	6023.37	1513.08 N	738.09 E	1577.89	0.53
7359.00	90.12	357.65	6023.65	1606.99 N	734.00 E	1670.95	0.69
7450.00	90.34	357.11	6023.28	1697.90 N	729.84 E	1761.01	0.64
7543.00	89.69	356.30	6023.25	1790.74 N	724.50 E	1852.89	1.11
7636.00	90.03	356.59	6023.48	1883.56 N	718.74 E	1944.71	0.48
7729.00	90.37	357.03	6023.15	1976.42 N	713.57 E	2036.62	0.60
7821.00	91.14	357.58	6021.94	2068.31 N	709.24 E	2127.64	1.03
7914.00	91.73	358.69	6019.61	2161.23 N	706.22 E	2219.83	1.35
8009.00	90.06	358.07	6018.13	2256.17 N	703.53 E	2314.06	1.87
8104.00	89.35	357.83	6018.62	2351.11 N	700.14 E	2408.21	0.79
8199.00	90.40	357.86	6018.82	2446.04 N	696.56 E	2502.34	1.10
8294.00	91.08	358.77	6017.59	2540.99 N	693.77 E	2596.56	1.19
8389.00	90.99	358.27	6015.88	2635.94 N	691.32 E	2690.82	0.54
8483.00	91.60	357.90	6013.76	2729.87 N	688.17 E	2783.99	0.77
8578.00	90.49	357.35	6012.02	2824.77 N	684.23 E	2878.05	1.30
8673.00	90.74	357.28	6011.00	2919.66 N	679.78 E	2972.06	0.27
8768.00	90.37	357.20	6010.08	3014.54 N	675.20 E	3066.04	0.40
8863.00	90.00	357.56	6009.77	3109.44 N	670.85 E	3160.06	0.55
8958.00	89.72	357.23	6010.00	3204.34 N	666.53 E	3254.09	0.45
9053.00	90.59	359.12	6009.75	3299.29 N	663.51 E	3348.29	2.18
9148.00	89.78	357.71	6009.44	3394.25 N	660.88 E	3442.54	1.70
9243.00	90.18	358.98	6009.47	3489.21 N	658.13 E	3536.78	1.40
9337.00	89.88	358.57	6009.42	3583.18 N	656.12 E	3630.11	0.55
9432.00	90.28	359.02	6009.29	3678.16 N	654.12 E	3724.44	0.63
9527.00	89.78	359.08	6009.24	3773.15 N	652.54 E	3818.82	0.52
9622.00	90.31	359.34	6009.16	3868.14 N	651.23 E	3913.23	0.61
9716.00	89.69	359.41	6009.16	3962.13 N	650.21 E	4006.67	0.66
9811.00	89.41	359.70	6009.90	4057.13 N	649.47 E	4101.14	0.42
9906.00	89.32	358.69	6010.95	4152.11 N	648.12 E	4195.54	1.07
10000.00	89.63	359.54	6011.81	4246.10 N	646.66 E	4288.93	0.96
10095.00	88.70	356.98	6013.19	4341.03 N	643.78 E	4383.14	2.86
10189.00	88.80	357.47	6015.24	4434.90 N	639.23 E	4476.11	0.53
10284.00	89.38	356.40	6016.75	4529.75 N	634.15 E	4570.01	1.29
10378.00	91.97	353.83	6015.63	4623.39 N	626.15 E	4662.42	3.88
10474.00	92.03	353.95	6012.28	4718.78 N	615.94 E	4756.37	0.14
10568.00	91.60	354.07	6009.30	4812.22 N	606.14 E	4848.41	0.47
10663.00	91.42	353.24	6006.79	4906.61 N	595.64 E	4941.31	0.89
10757.00	91.51	353.37	6004.39	4999.94 N	584.69 E	5033.13	0.17
10852.00	91.60	353.54	6001.81	5094.28 N	573.87 E	5125.97	0.21
10947.00	91.36	353.47	5999.36	5188.64 N	563.12 E	5218.83	0.27
11042.00	91.88	354.07	5996.67	5283.04 N	552.82 E	5311.77	0.84
11137.00	90.62	354.50	5994.60	5377.54 N	543.36 E	5404.90	1.40
11232.00	90.40	355.49	5993.76	5472.18 N	535.06 E	5498.27	1.07
11327.00	89.41	355.15	5993.91	5566.86 N	527.30 E	5591.75	1.10
11404.00	89.11	355.32	5994.91	5643.58 N	520.90 E	5667.48	0.46
11471.00	89.11	355.32	5995.95	5710.35 N	515.44 E	5733.40	0.01

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 5.60 DEGREES (GRID)
A TOTAL CORRECTION OF 7.11 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11471.00 FEET
IS 5733.57 FEET ALONG 5.16 DEGREES (GRID)

Final survey is a straight line projection to TD.

Date Printed:17 May 2015