



Weatherford

**COMPENSATED DENSITY
COMPENSATED NEUTRON
LOG**

COMPANY

KINDER MORGAN C02 Co. L.P

WELL

DOE CANYON #15

FIELD

DOE CANYON

PROVINCE/COUNTY

DOLORES

COUNTRY/STATE

U.S.A. / COLORADO

LOCATION

1069' FSL & 1610' FWL

SEC 11

TWP 40N

RGE 18W

Other Services

API Number

05-033-06176

MIE

MGS

MDL/MMR

Permanent Datum GL, Elevation 7227 feet

Log Measured From KB

Drilling Measured From KB @ 23 FEET

Date

24-AUG-2013

Run Number

ONE

Service Order

3529587

Depth Driller

8710.00

Depth Logger

8705.00

First Reading

8585.00

Last Reading

6862.00

Casing Driller

8534.00

Casing Logger

8525.00

Bit Size

6.000

Hole Fluid Type

H2O

Density / Viscosity

8.40

lb/USg

29.00

CP

PH / Fluid Loss

7.00

Sample Source

PIT

Rm @ Measured Temp

0.95 @ 86.0

ohm-m

Rmf @ Measured Temp

0.76 @ 86.0

ohm-m

Rmc @ Measured Temp

1.14 @ 86.0

ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.49 @ 172.0

ohm-m

Time Since Circulation

8 HOURS

Max Recorded Temp

172.00

deg F

Equipment / Base

13045

GJ/CO

Recorded By

S.LACKEY

Witnessed By

D.MOORE

Elevations:
KB 7250.00
DF 7250.00
GL 7227.00

BOREHOLE RECORD

Last Edited: 24-AUG-2013 21:07

Bit Size
inches

6.000

Depth From
feet

8534.00

Depth To
feet

8710.00

CASING RECORD

Type

Size
inches

7.000

Depth From
feet

0.00

Shoe Depth
feet

8534.00

Weight
pounds/ft

29.00

REMARKS

WLS VERSION 13.06.9804

TOOLS IN THREE SEPERATE RUNS:

1ST RUN: SHA, MBE, MBE, MCG, MUG, MLE AND MMR

2ND RUN: SHA, MCG, MSG, MISD, MDN AND MPD

3RD RUN: SHA, MCG, MIM AND MIE

4TH RUN: SHA, MCG, MDM, MRD AND MTD

5TH RUN: SHA, MCG AND SGS

HARDWARE:

MUG: 0.5" STANDOFF

MMR: 0.5" STANDOFF

MDN: DUAL BOWSPRINGS

MPD: 8" PROFILE PLATE

MIM: NONMAGNETIC BASKET

MIE: NONMAGNETIC BASKET, 1.0" STANDOFF

2.71 GM/CC DENSITY MATRIX USED TO CALCULATE POROSITY

LEFT HAND DENSITY MATRIX USED TO CALCULATE POROSITY.

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

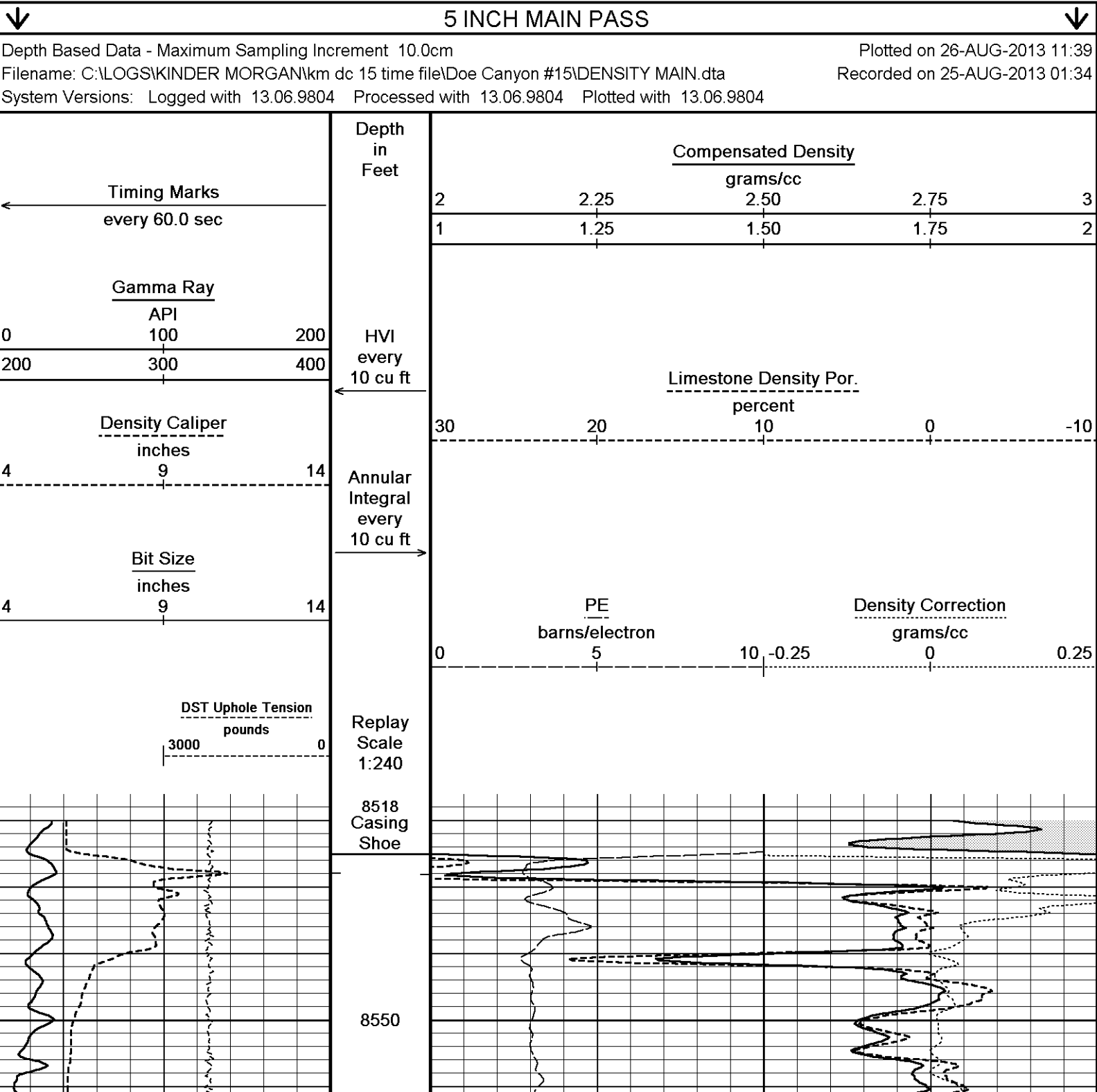
TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT DATA QUALITY.

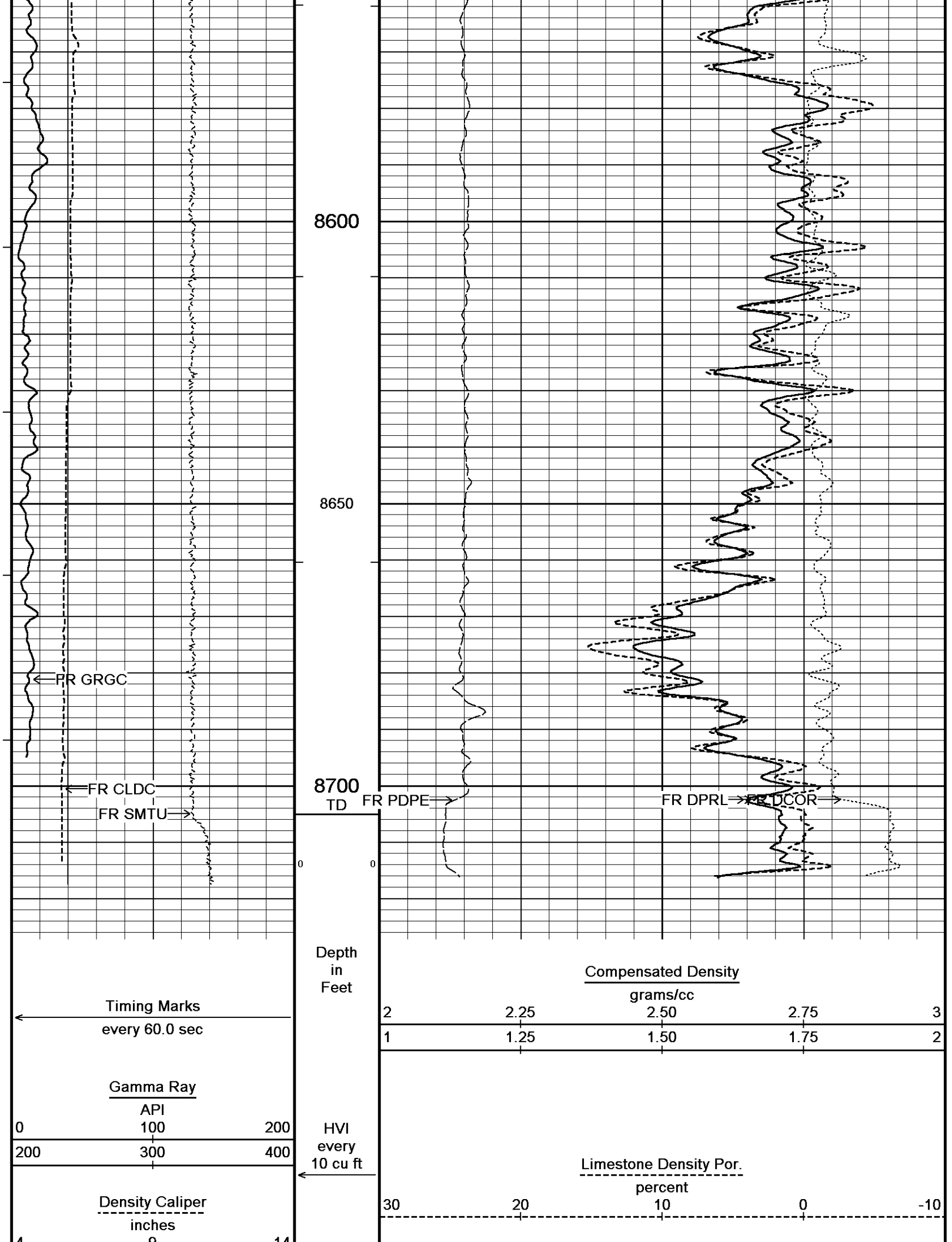
TOTAL HOLE VOLUME = 40 CUBIC FEET.

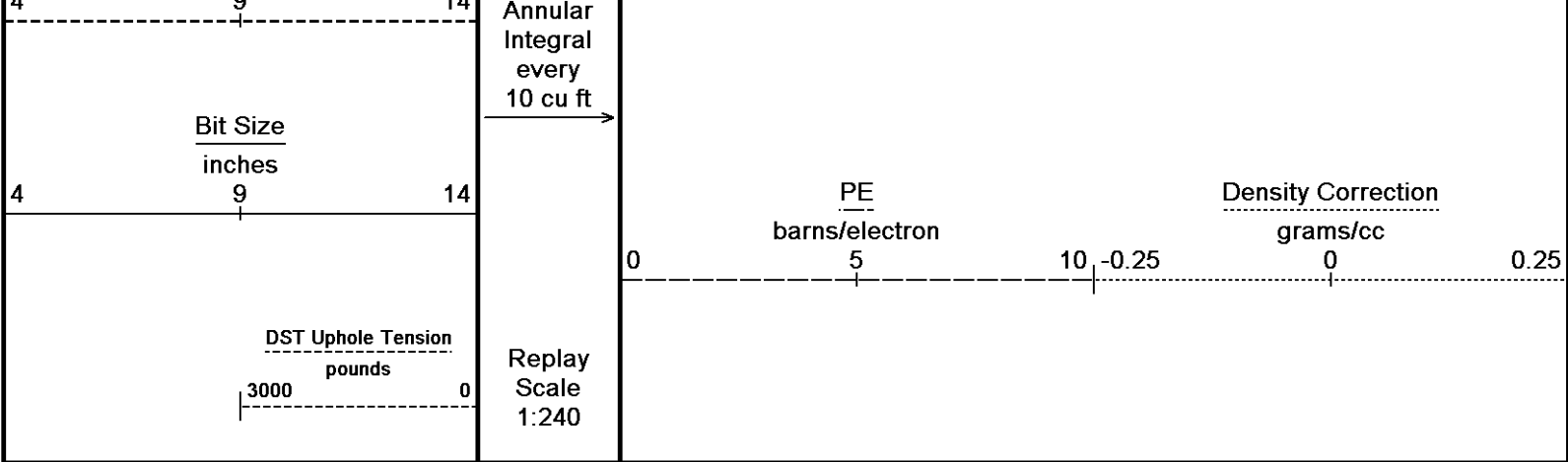
SERVICE ORDER: 3529587

RIG: NABORS M13

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.







Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 26-AUG-2013 11:39

Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY MAIN.dta

Recorded on 25-AUG-2013 01:34

System Versions: Logged with 13.06.9804 Processed with 13.06.9804 Plotted with 13.06.9804

5 INCH MAIN PASS

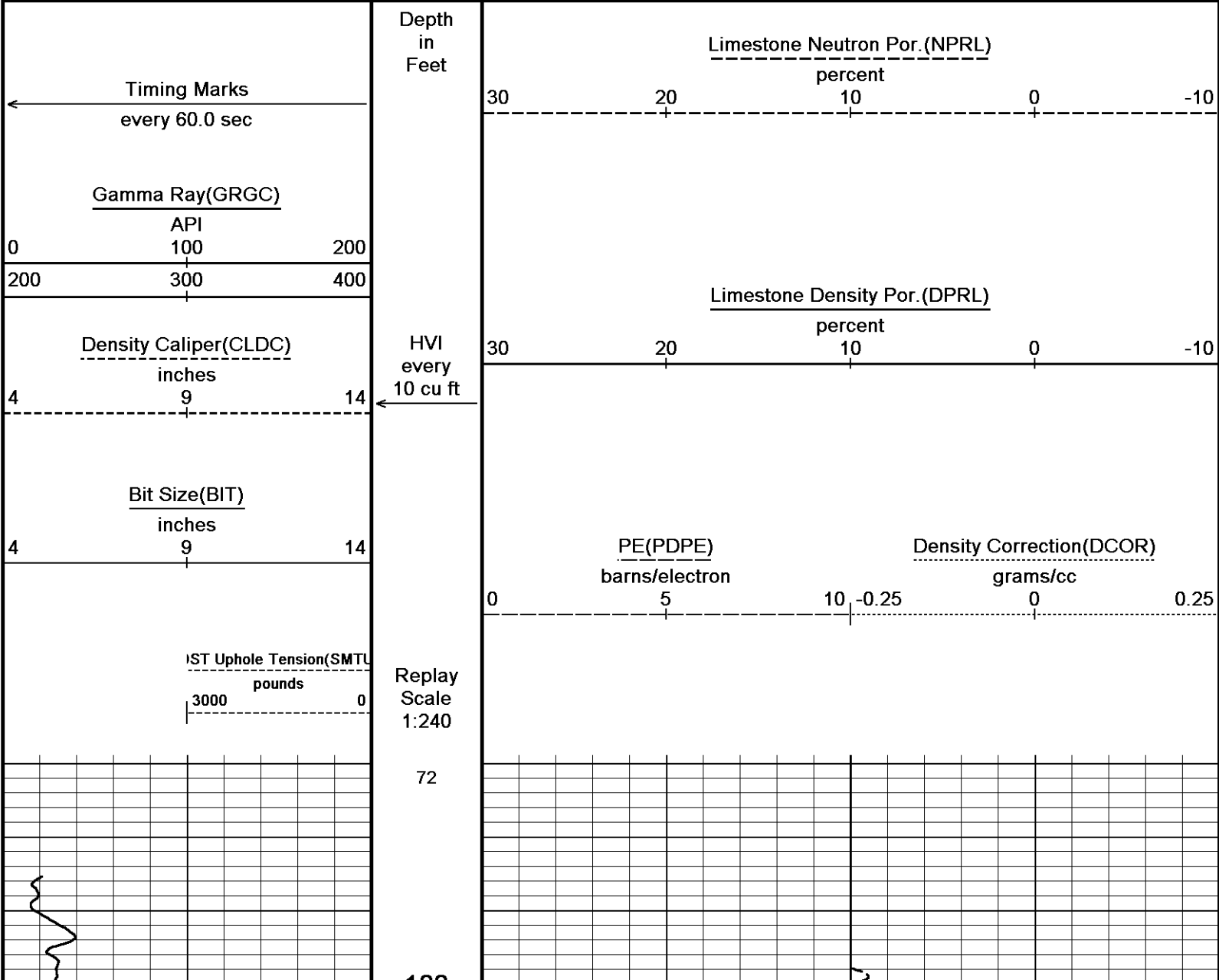
Depth Based Data - Maximum Sampling Increment 10.0cm

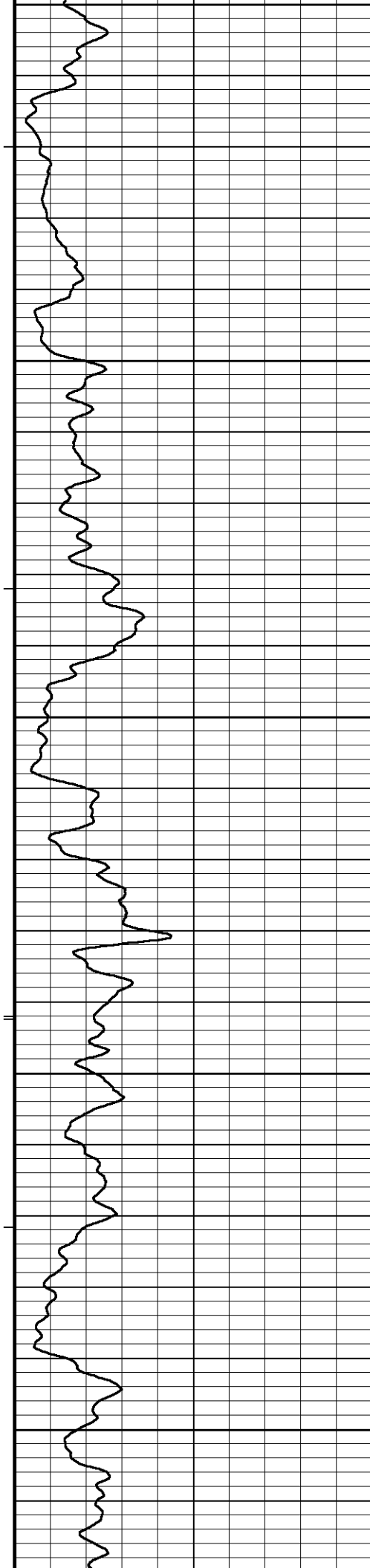
Plotted on 26-AUG-2013 11:39

Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY MAIN.dta

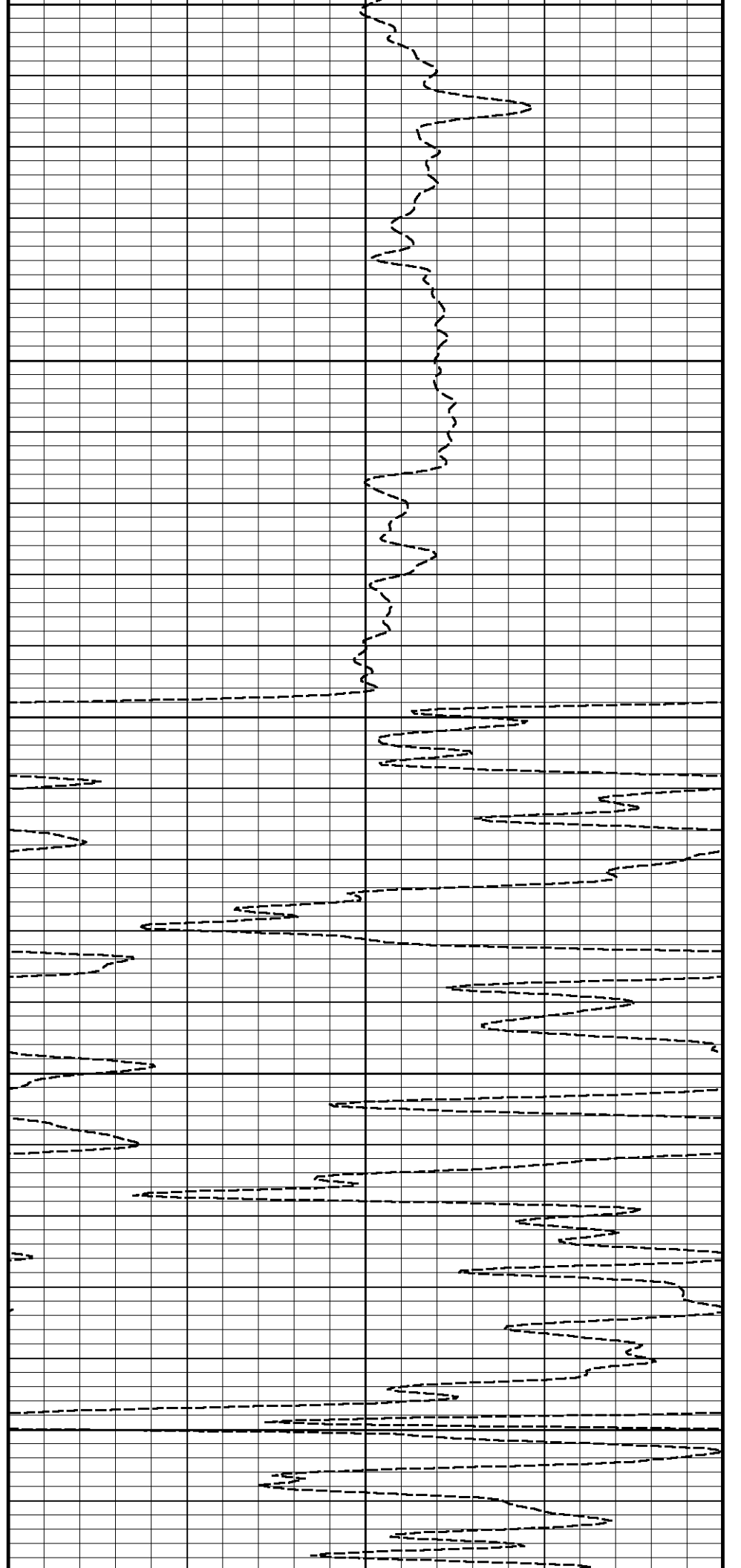
Recorded on 25-AUG-2013 01:34

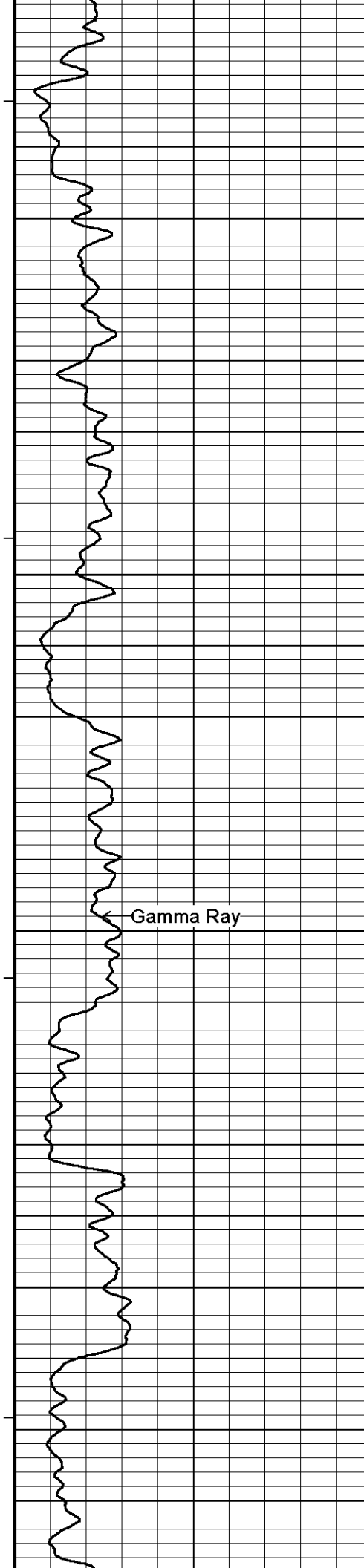
System Versions: Logged with 13.06.9804 Processed with 13.06.9804 Plotted with 13.06.9804





100
150
200
250
300





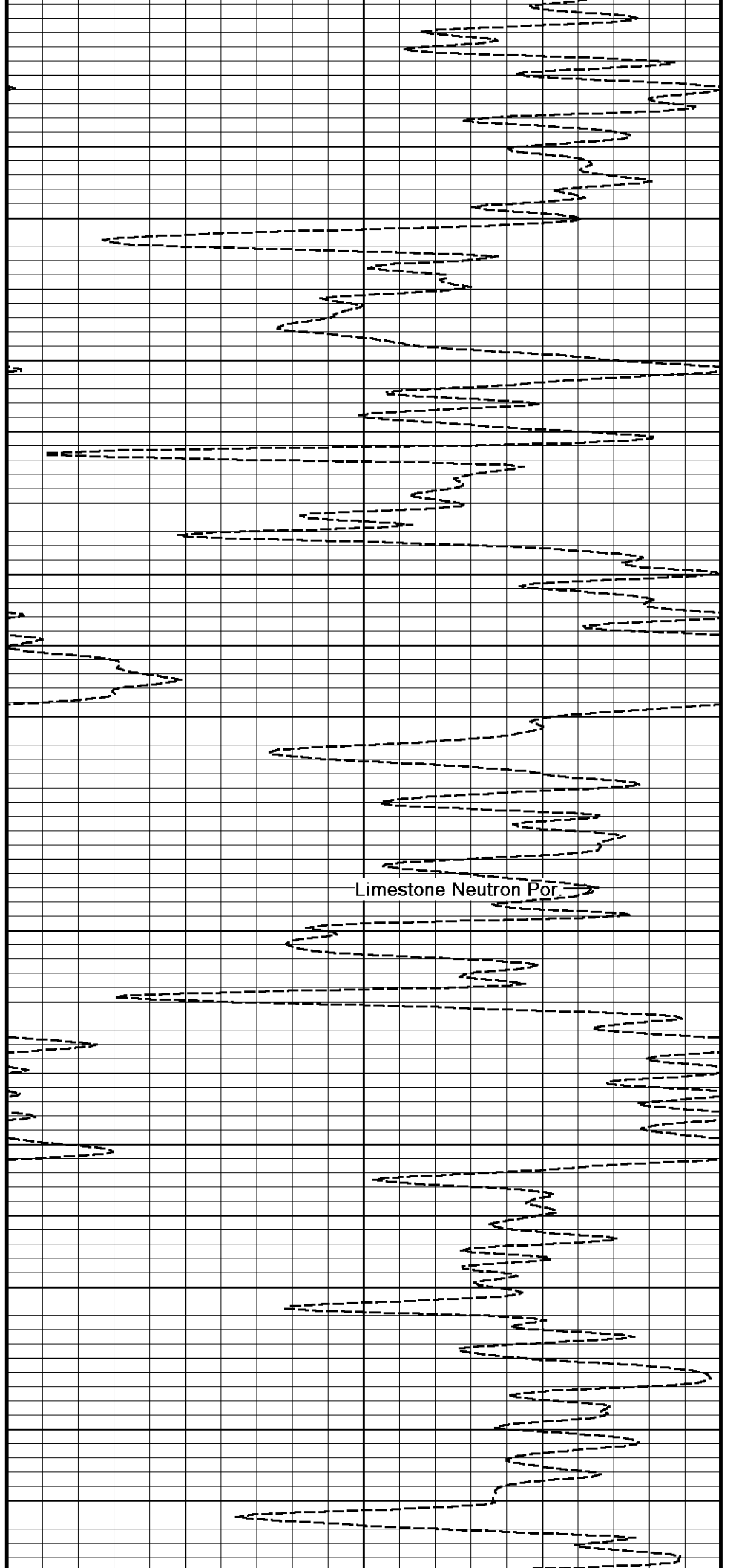
Gamma Ray

350

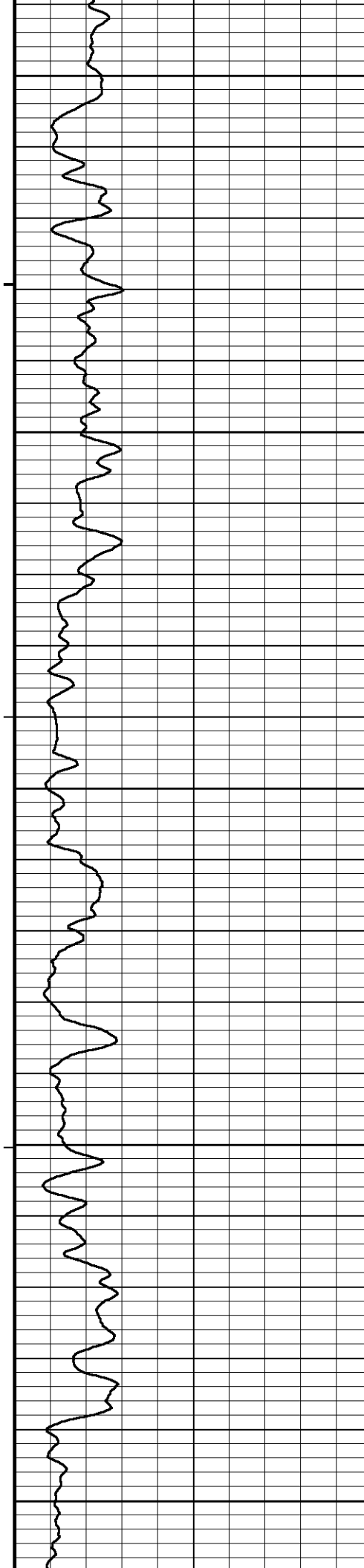
400

450

500



Limestone Neutron Por



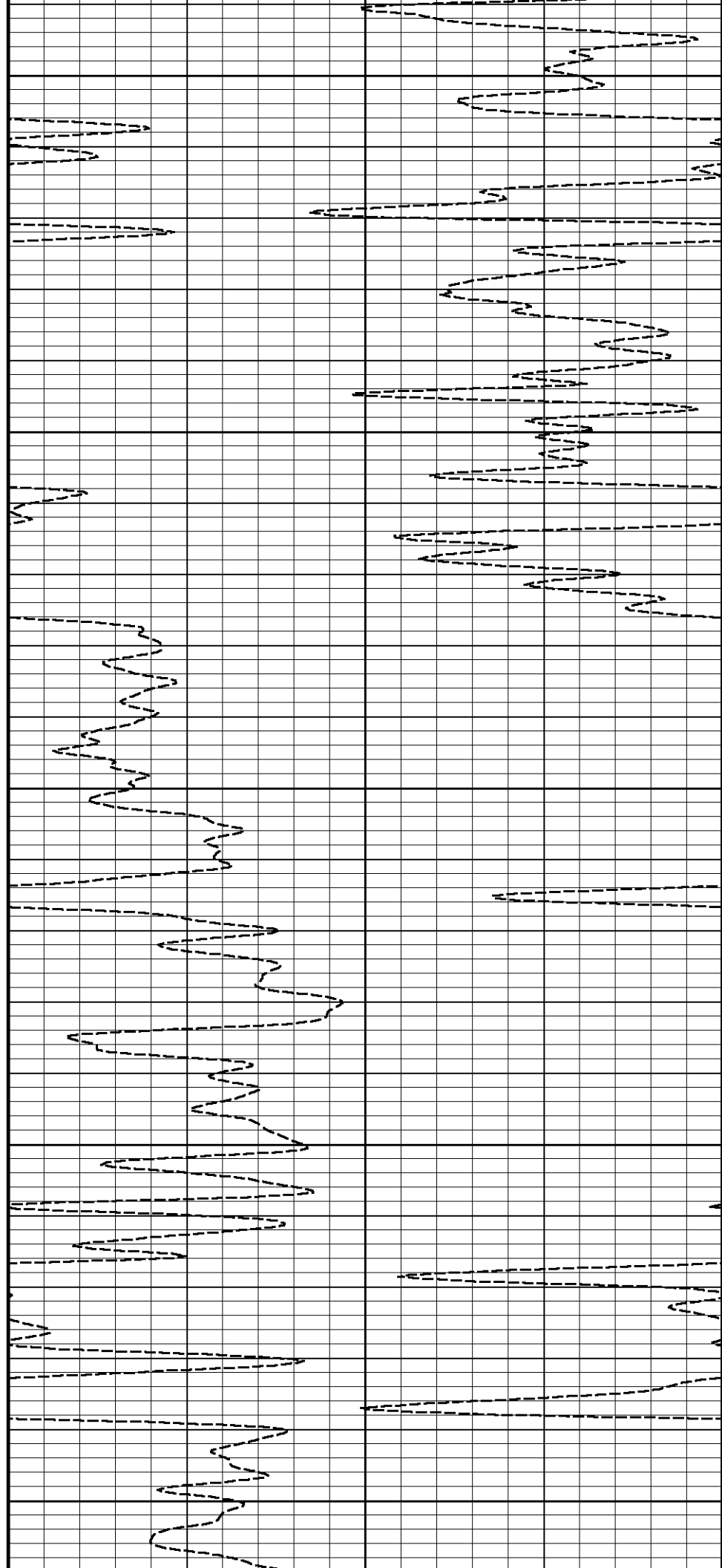
550

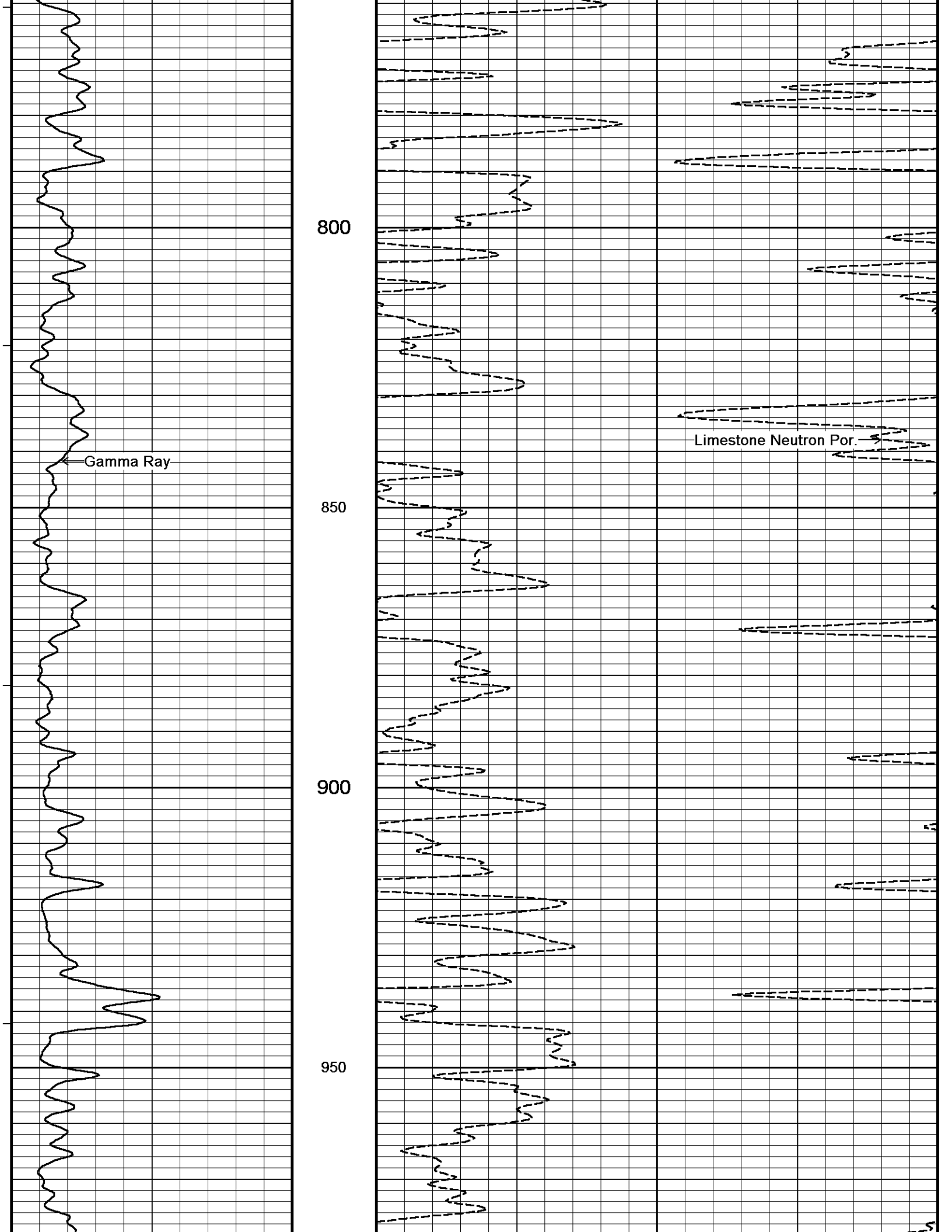
600

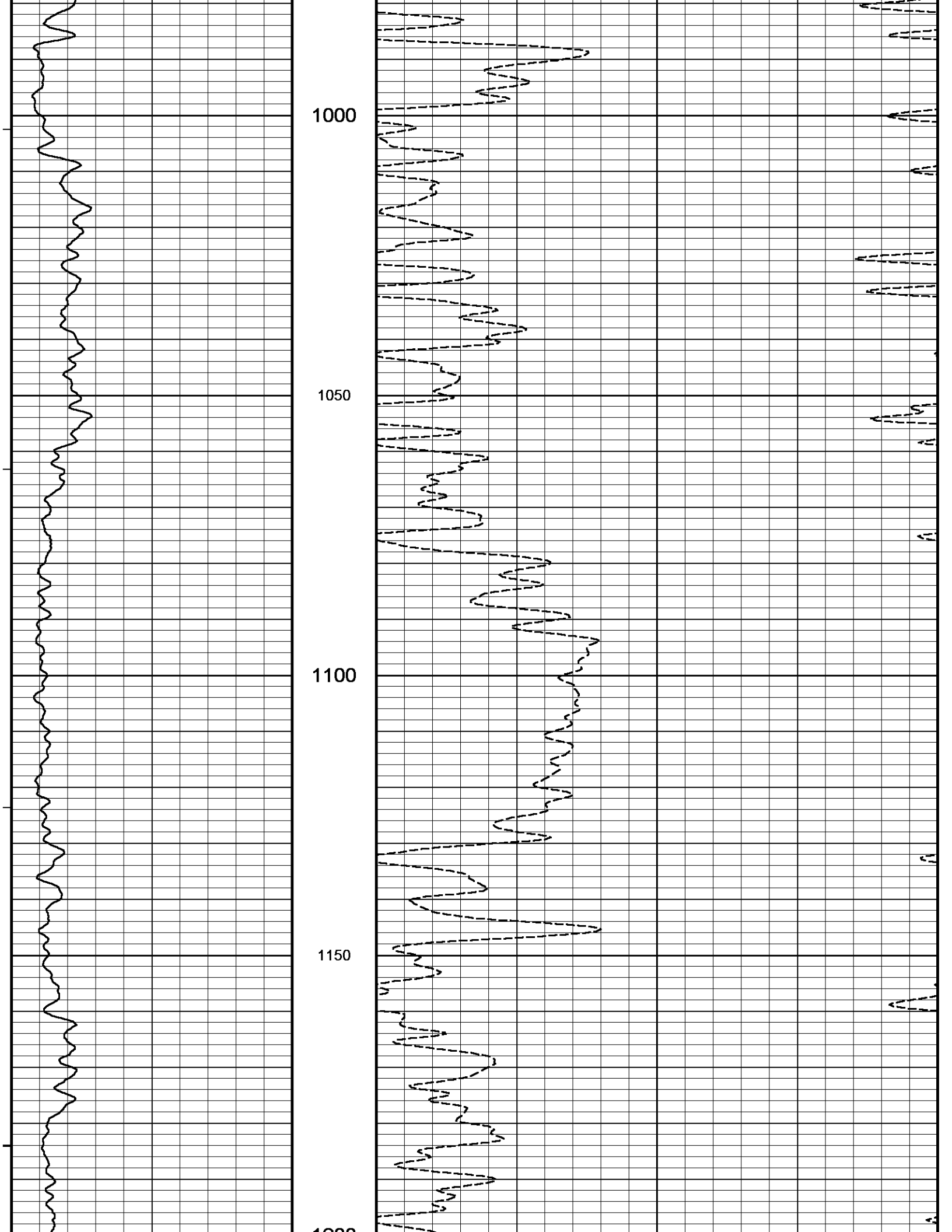
650

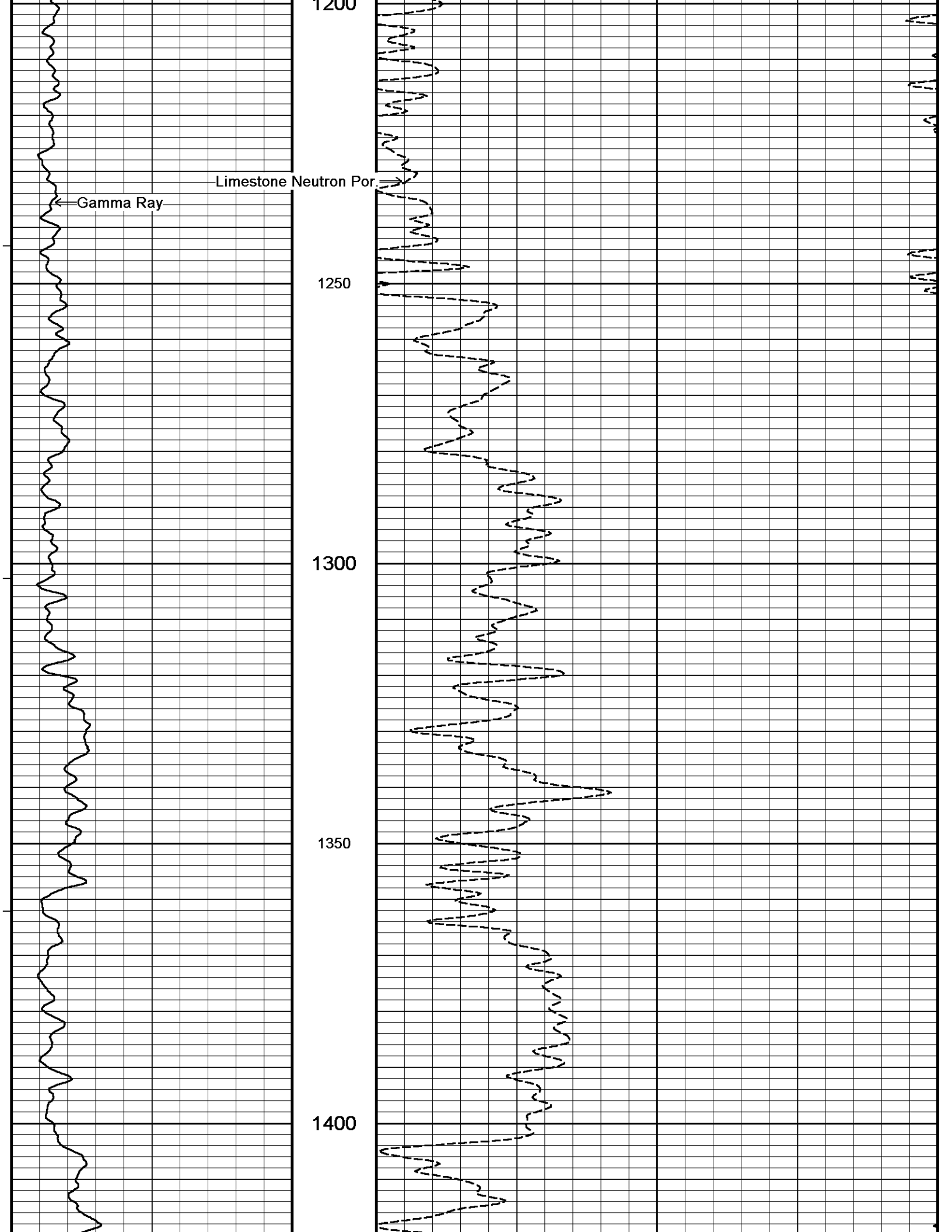
700

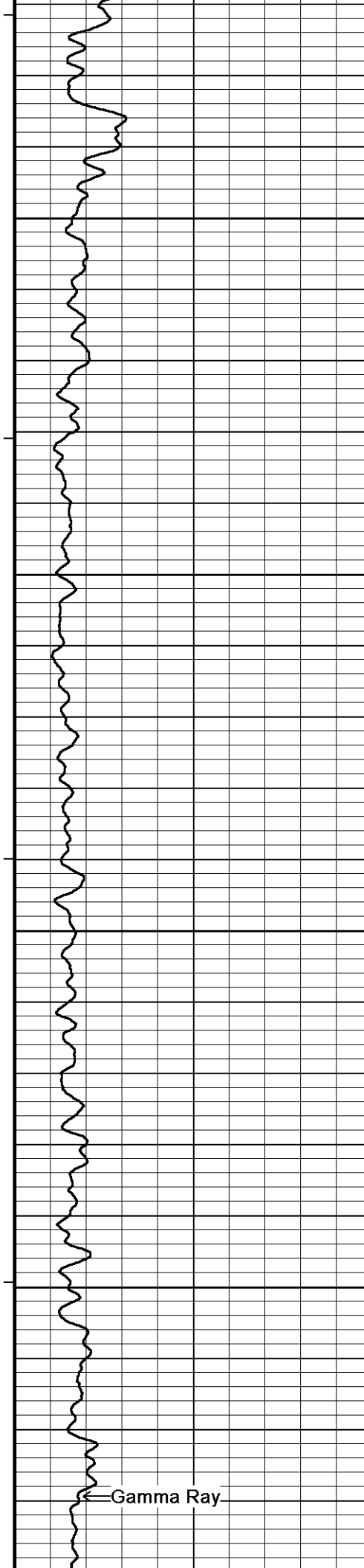
750











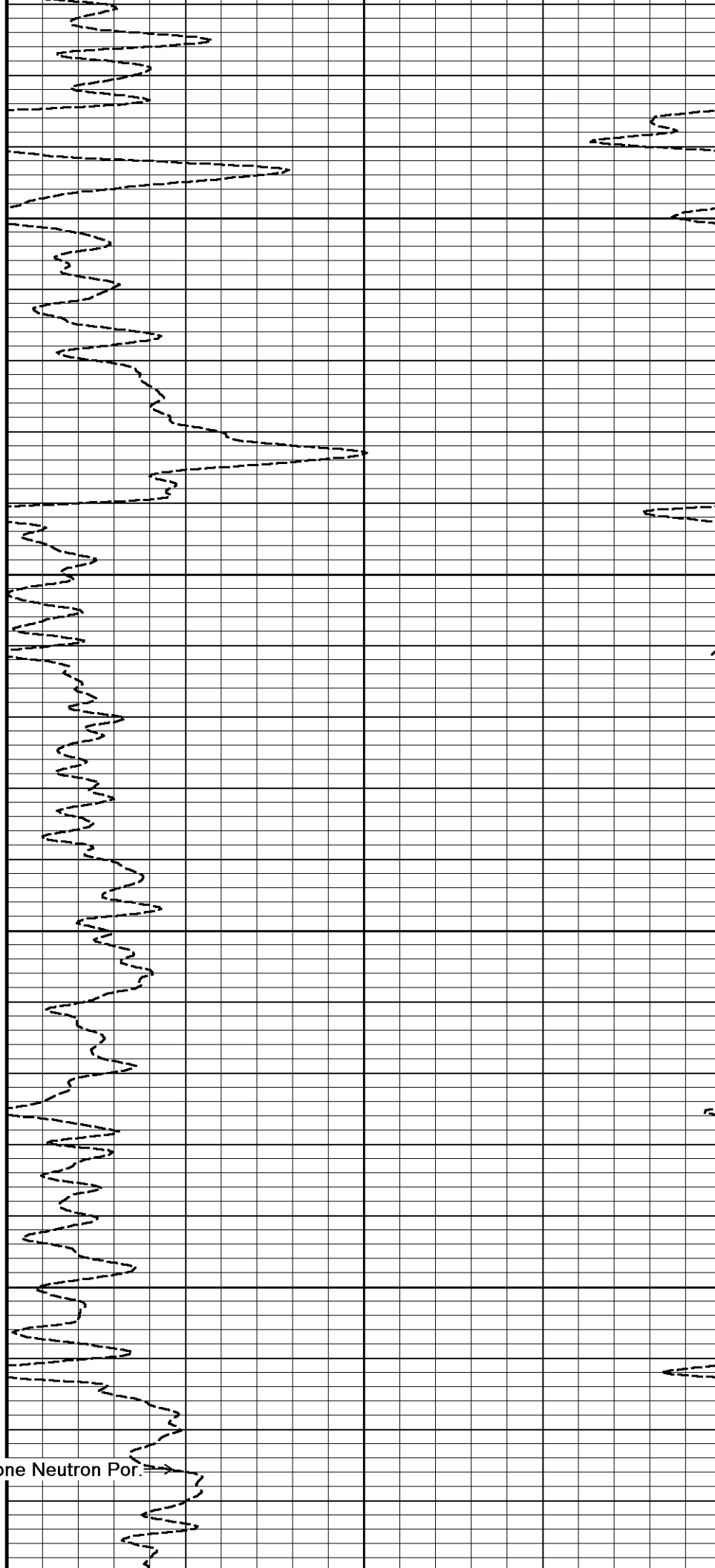
1450

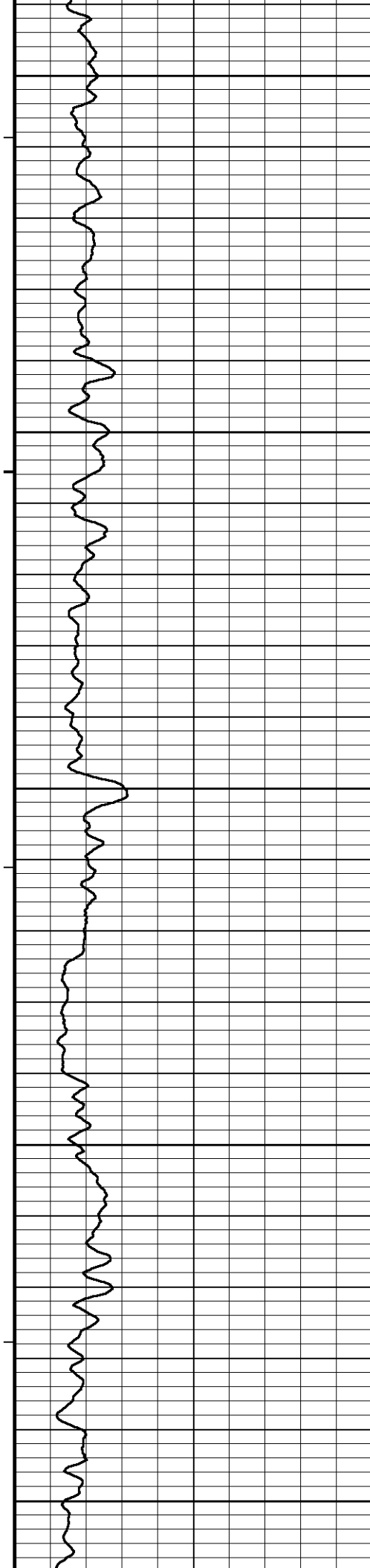
1500

1550

1600

Limestone Neutron Por.





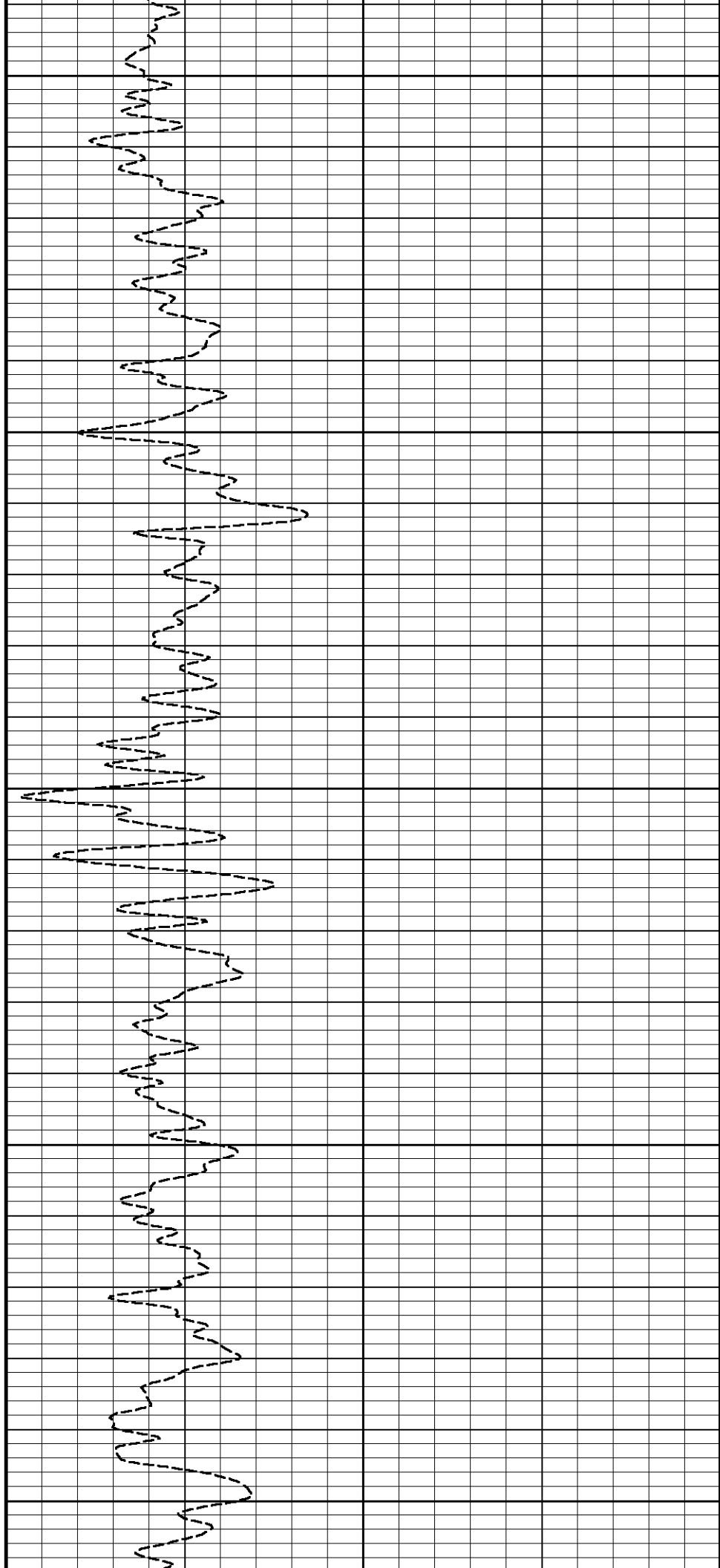
1650

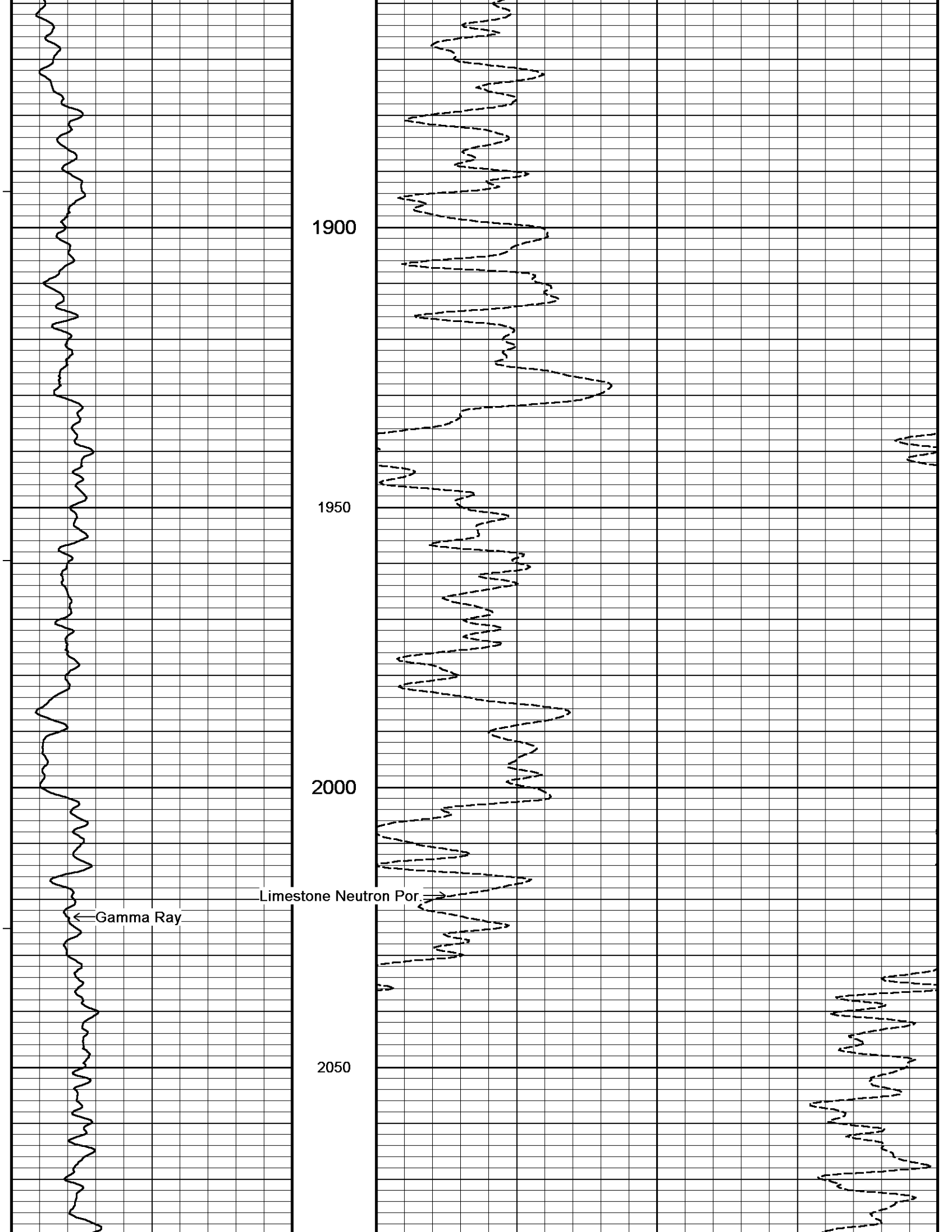
1700

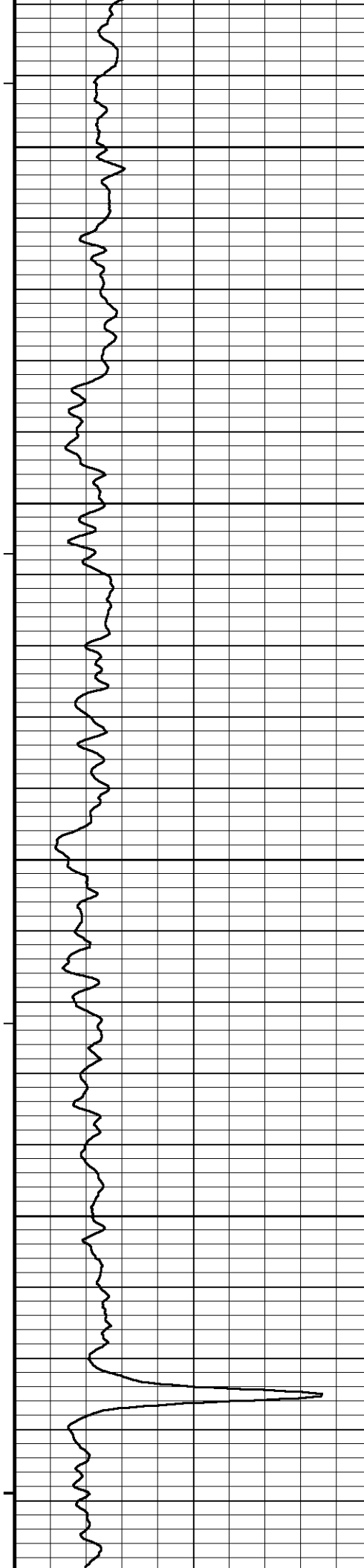
1750

1800

1850







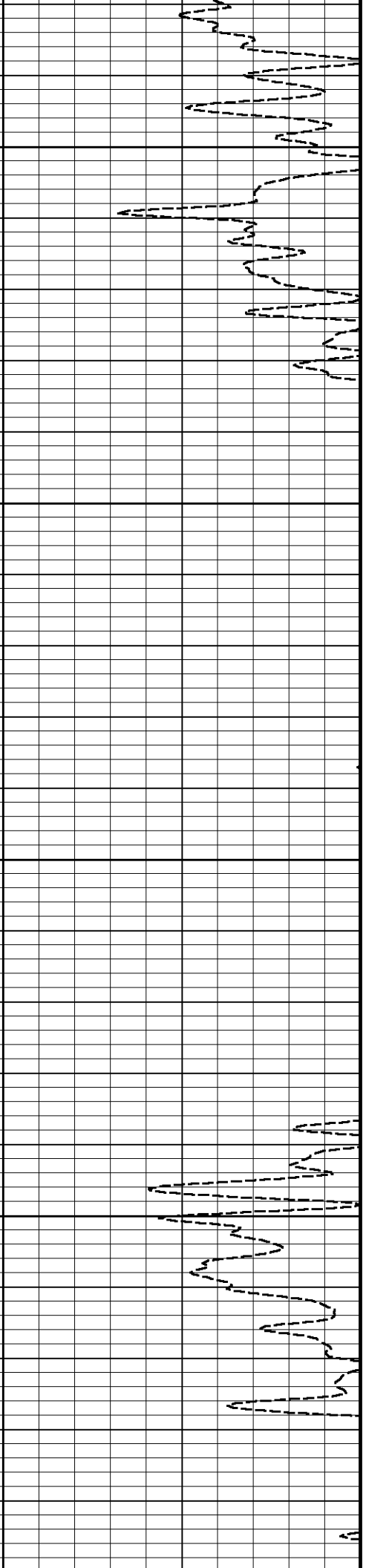
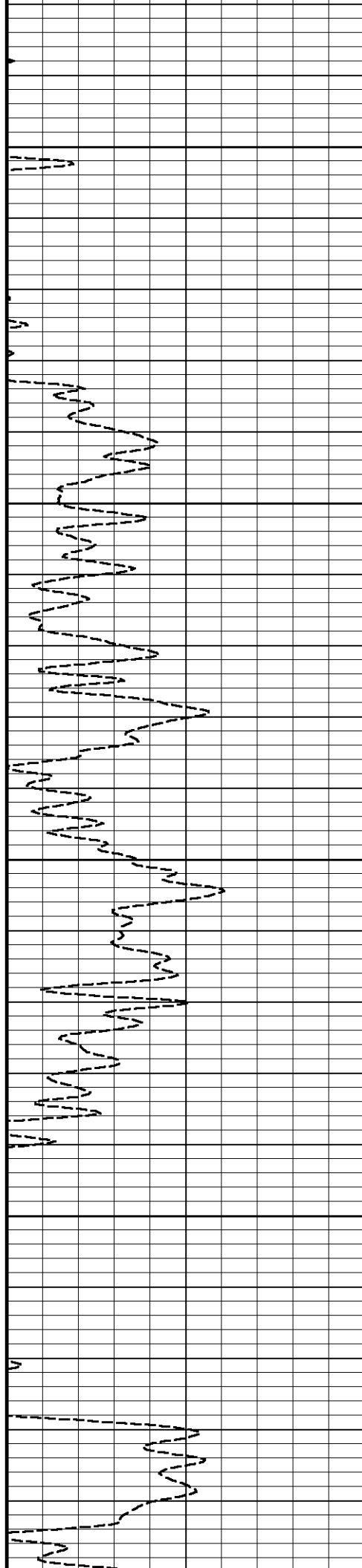
2100

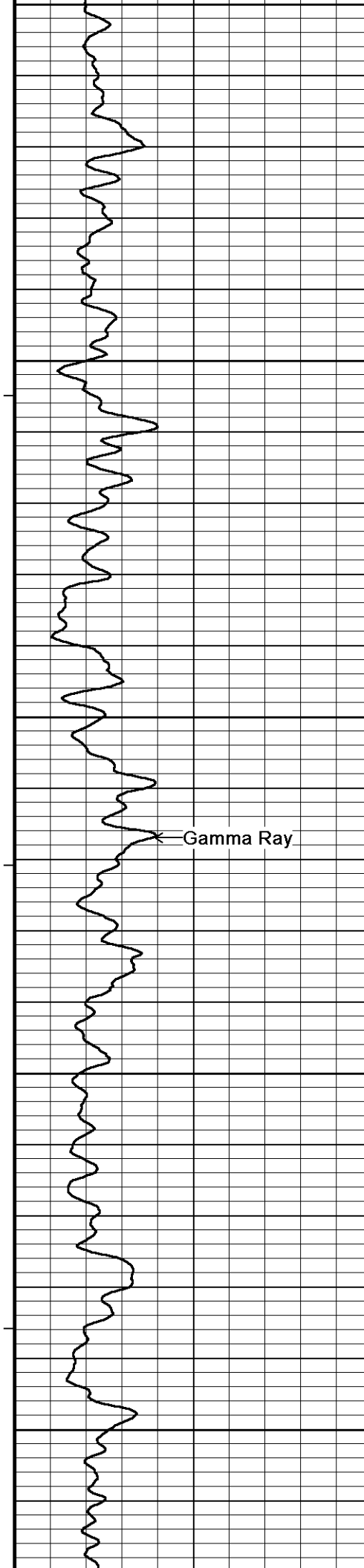
2150

2200

2250

2300





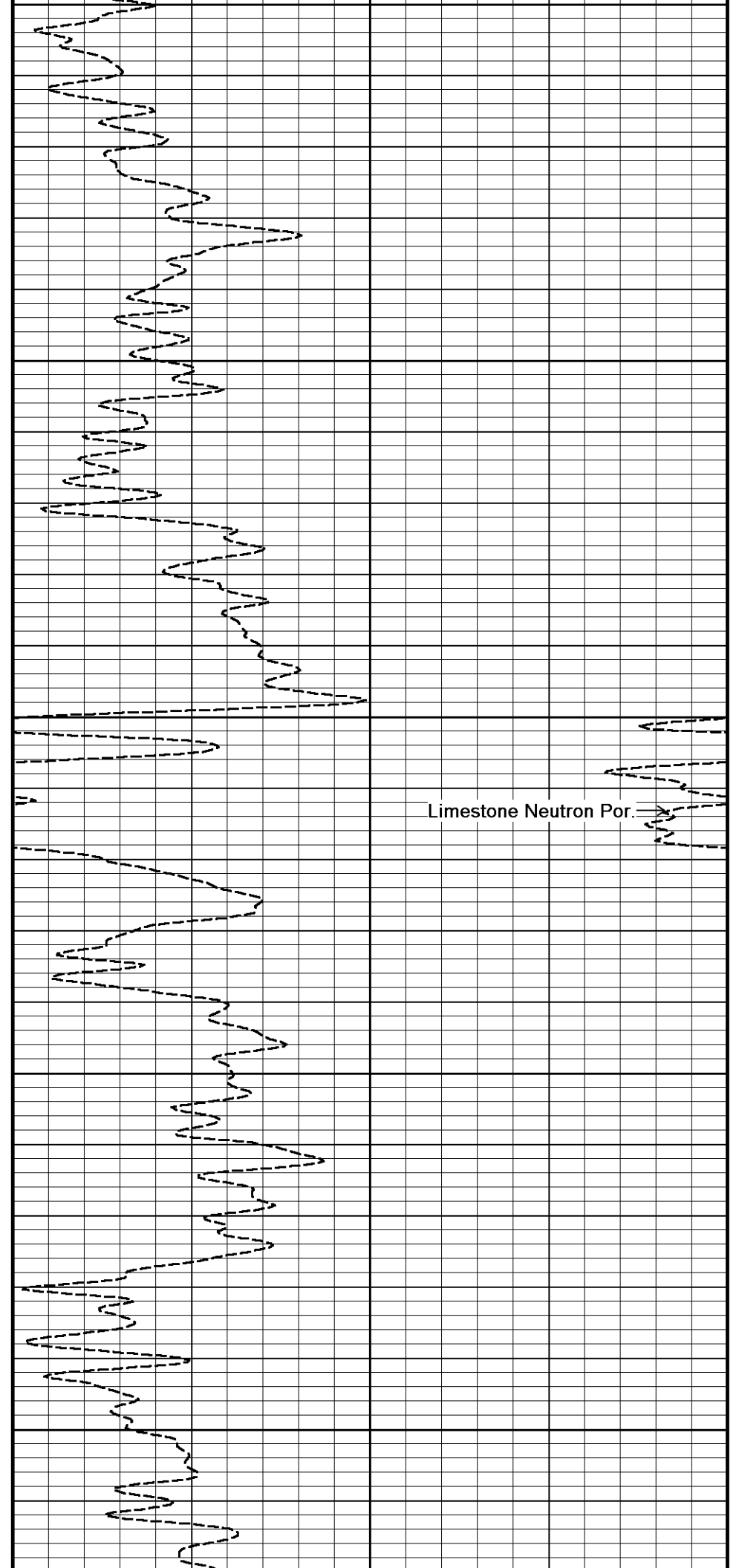
2300

2350

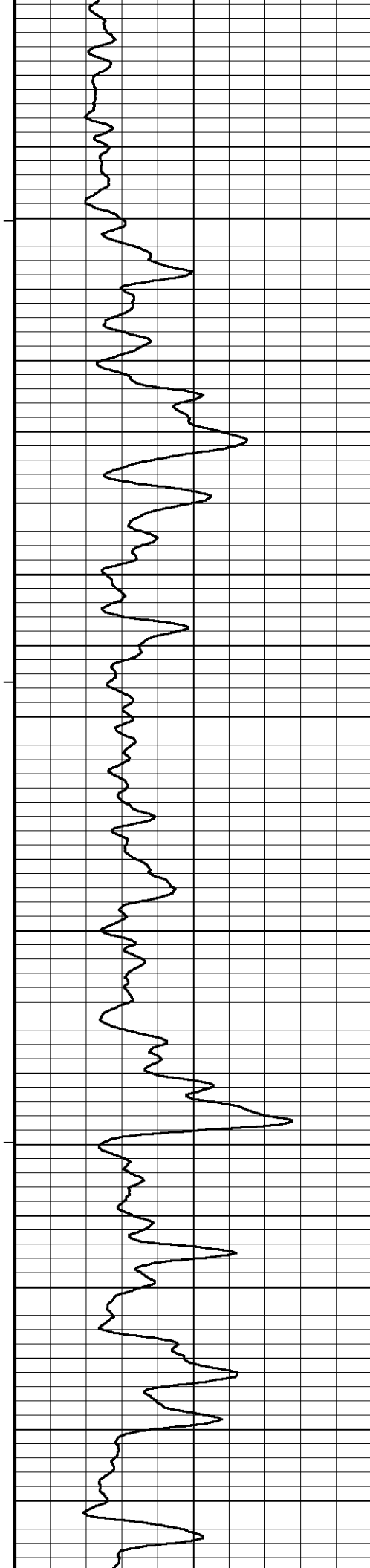
2400

2450

2500



Limestone Neutron Por.

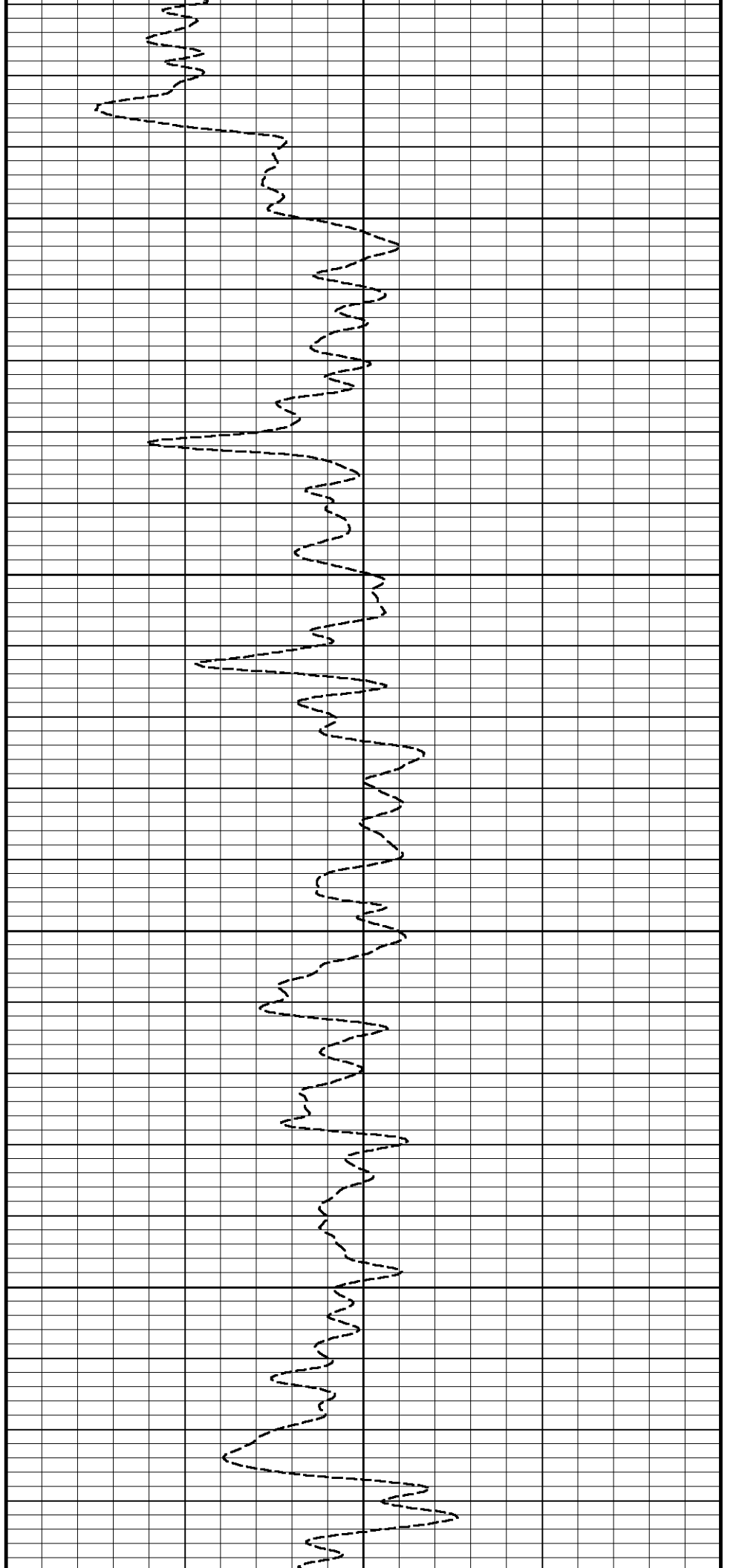


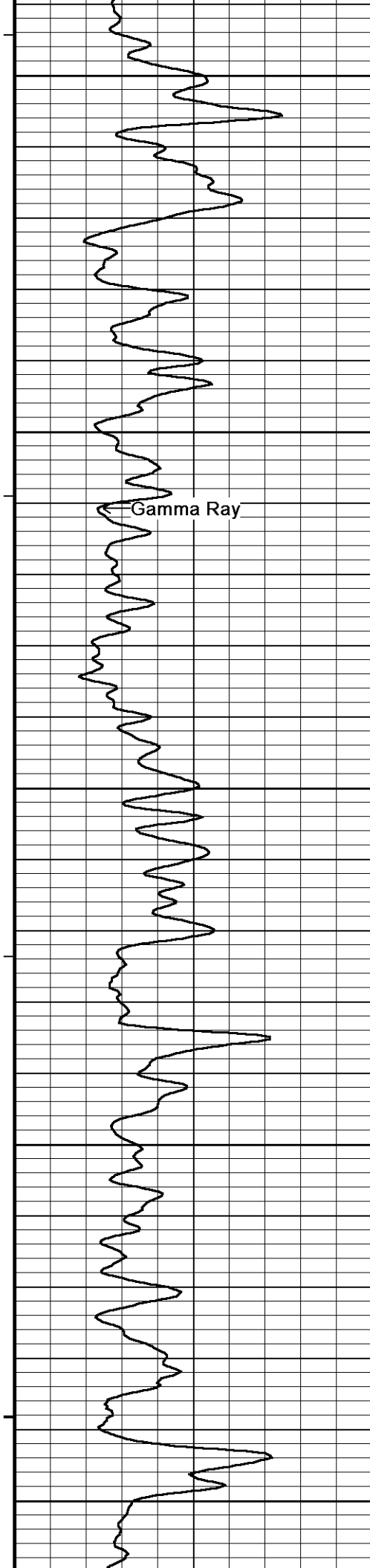
2550

2600

2650

2700





Gamma Ray

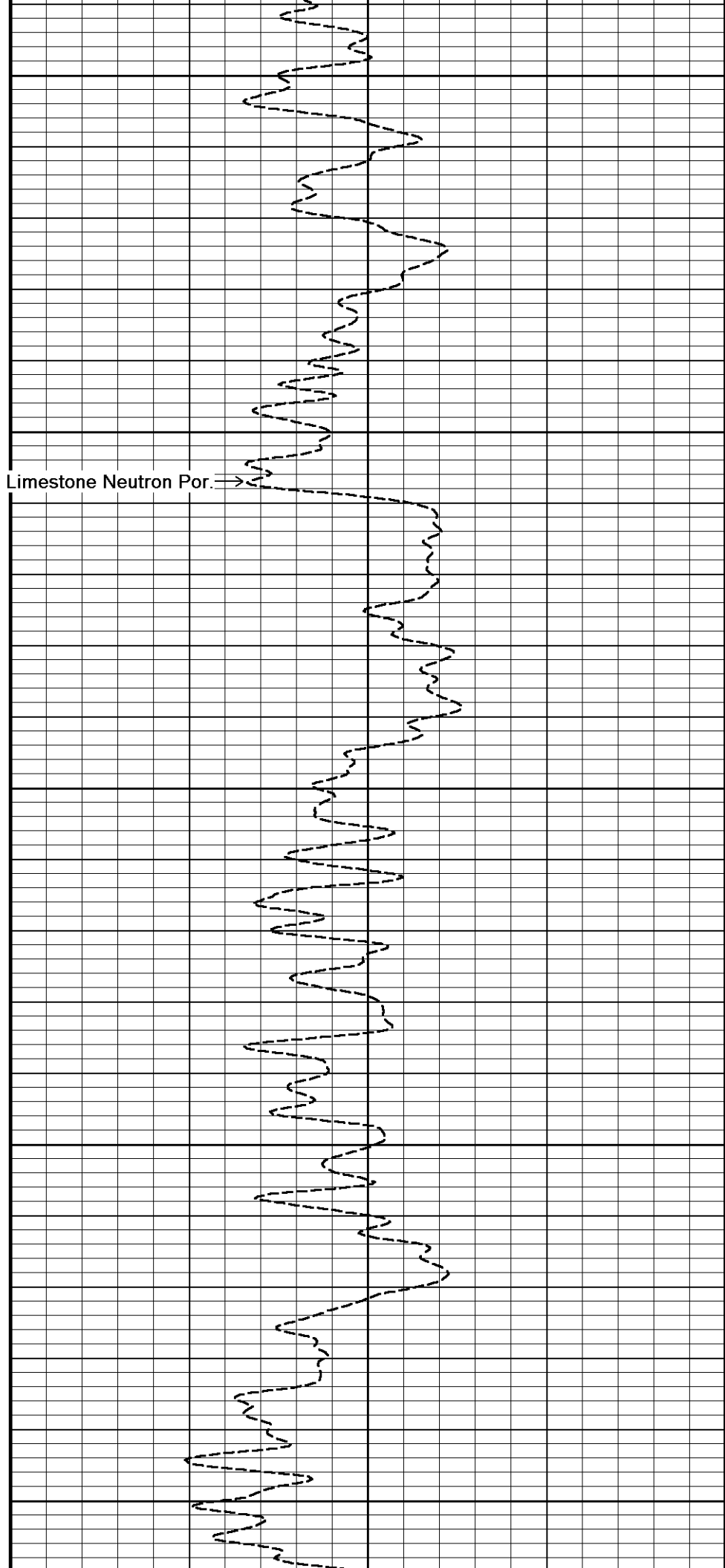
2750

2800

2850

2900

2950



Limestone Neutron Por. →

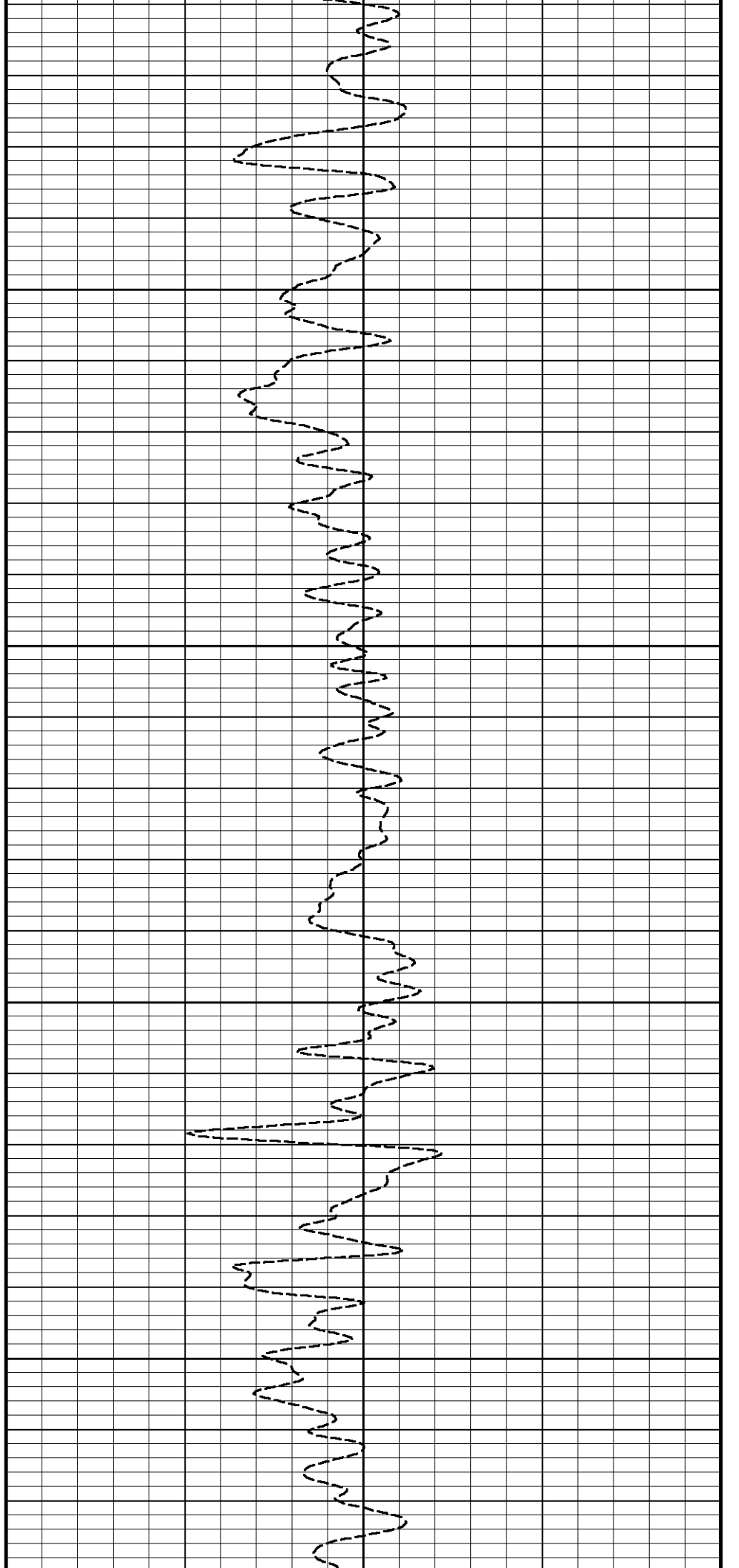


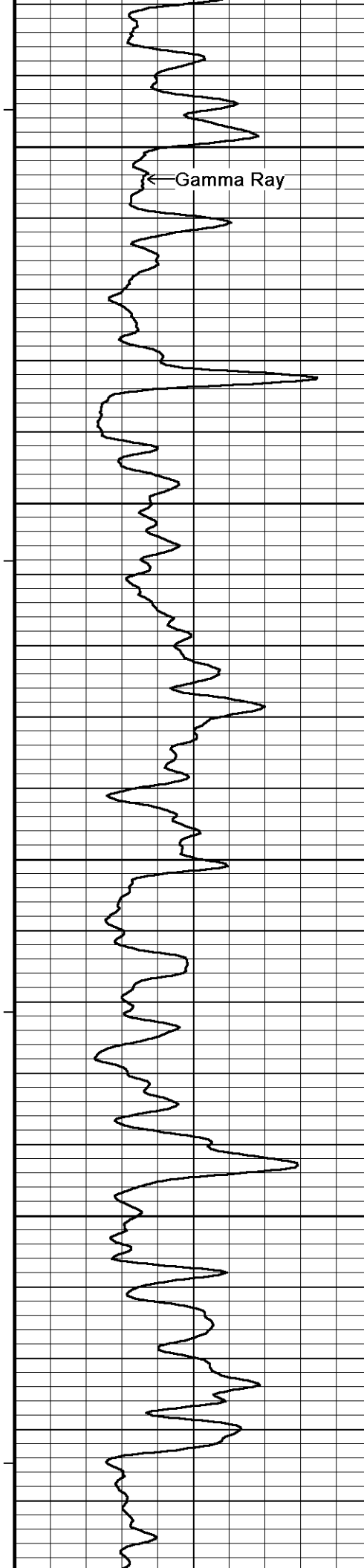
3000

3050

3100

3150





Gamma Ray

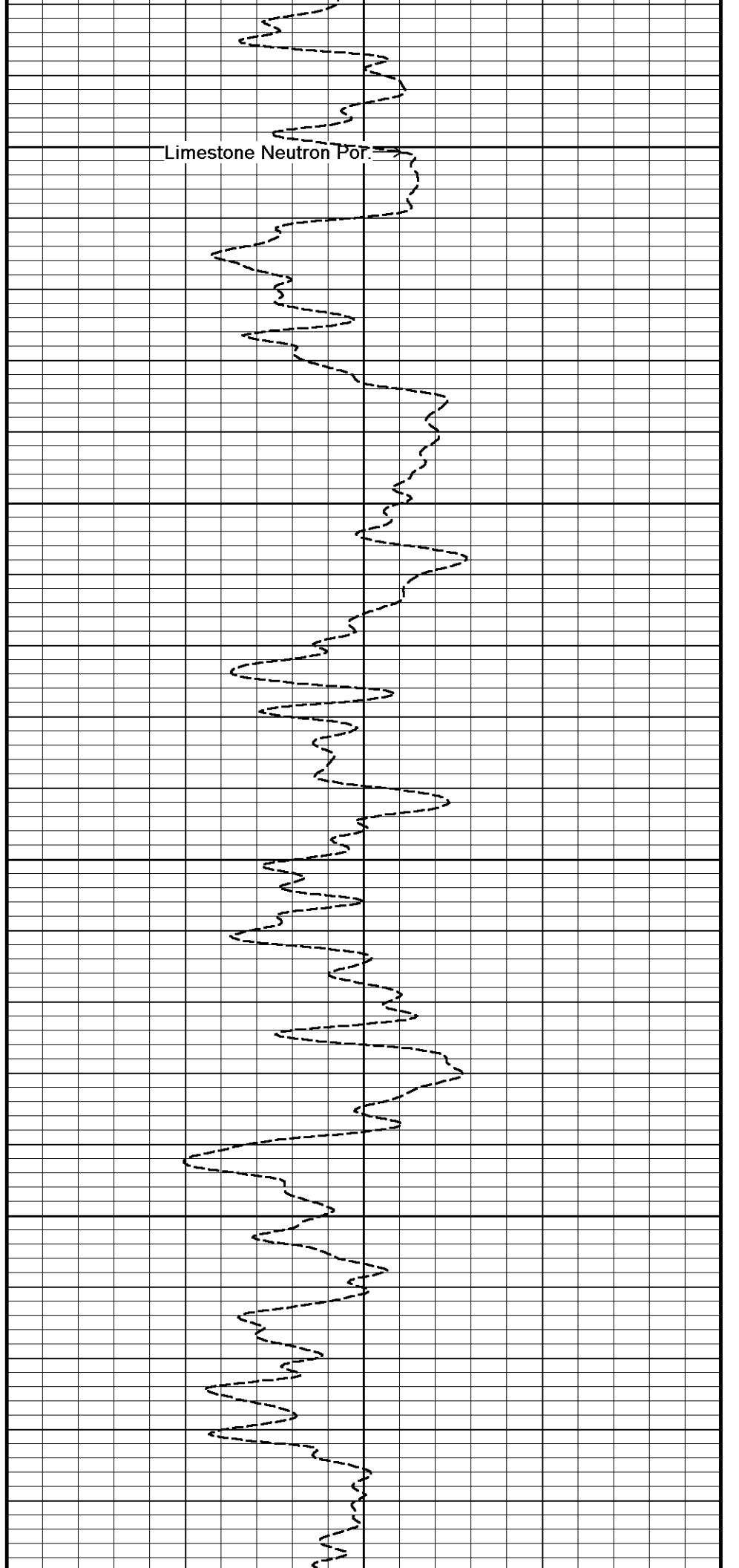
3200

3250

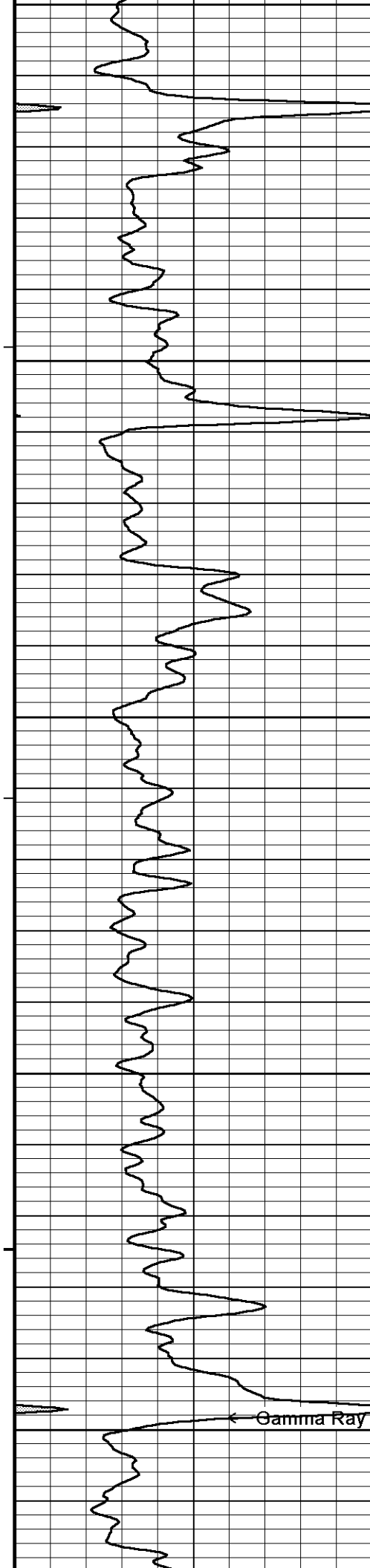
3300

3350

3400

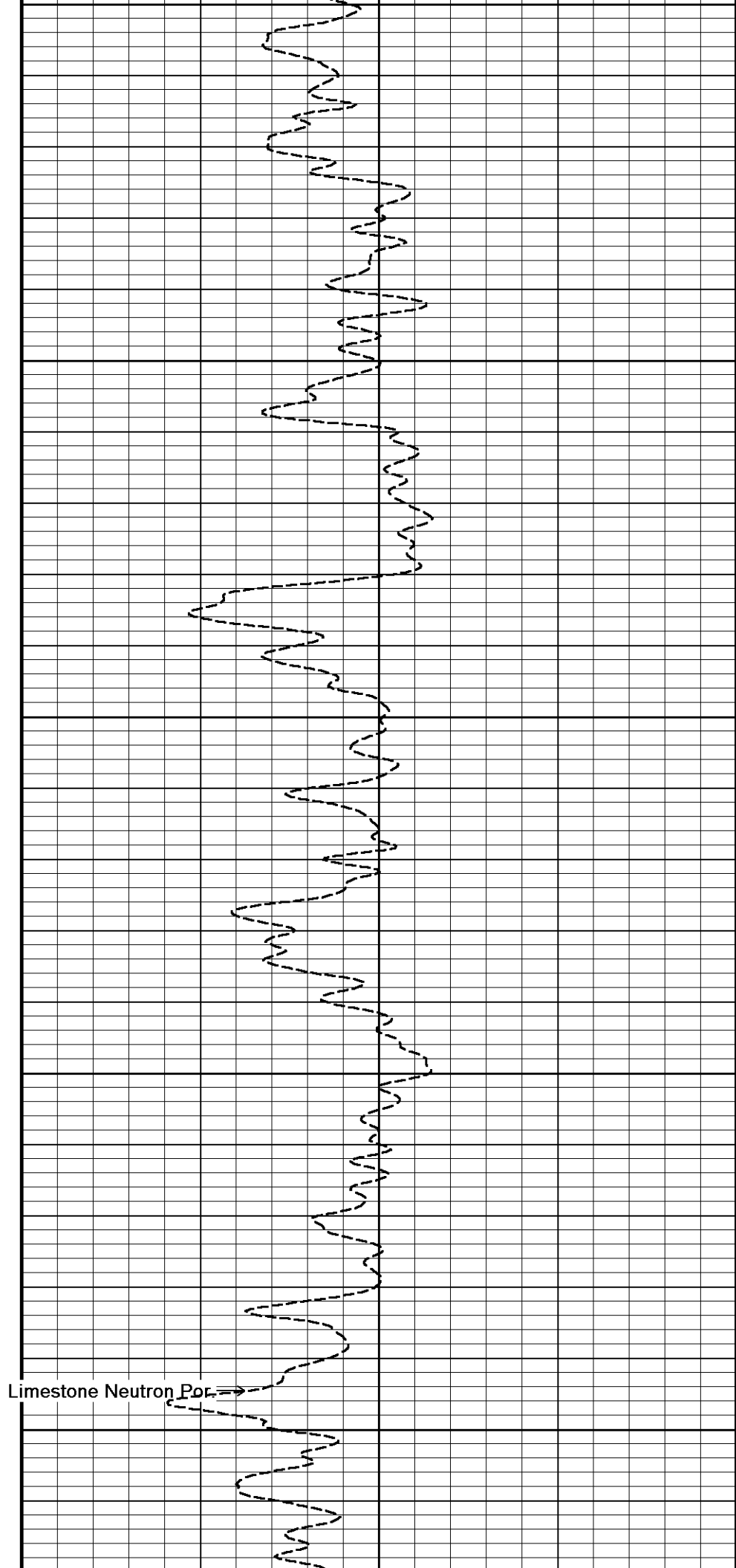


Limestone Neutron Por.

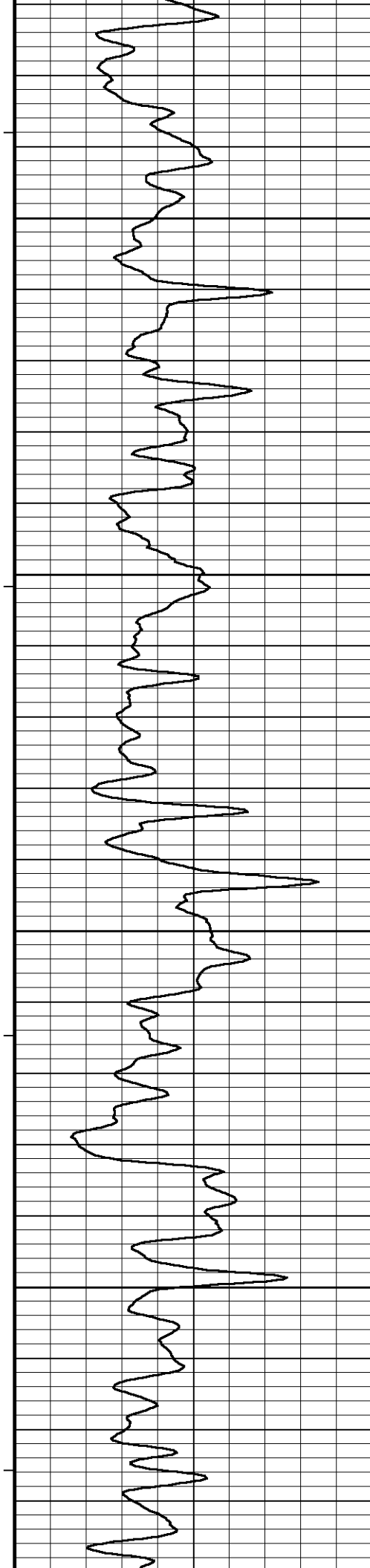


3400
3450
3500
3550
3600

← Gamma Ray



Limestone Neutron Por. →

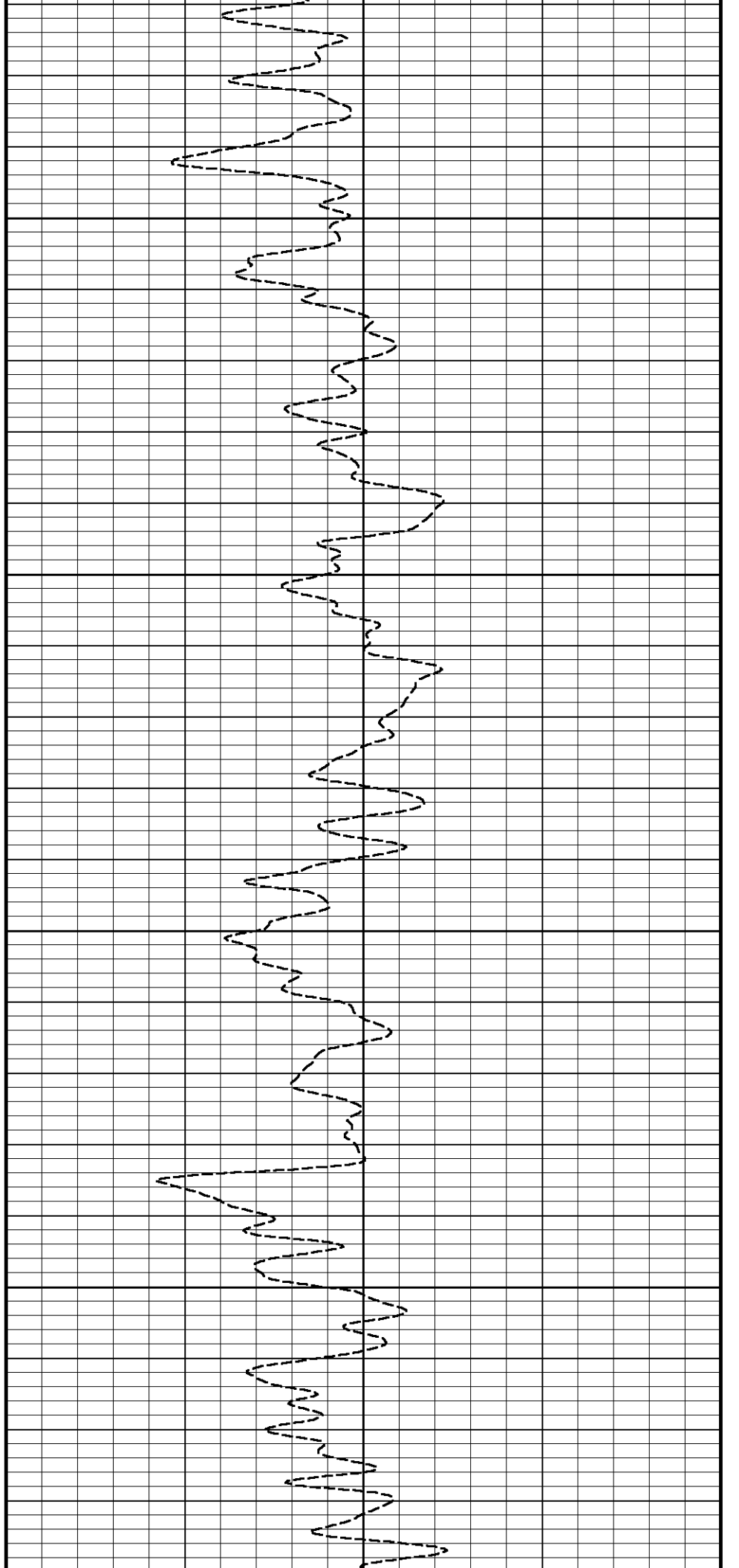


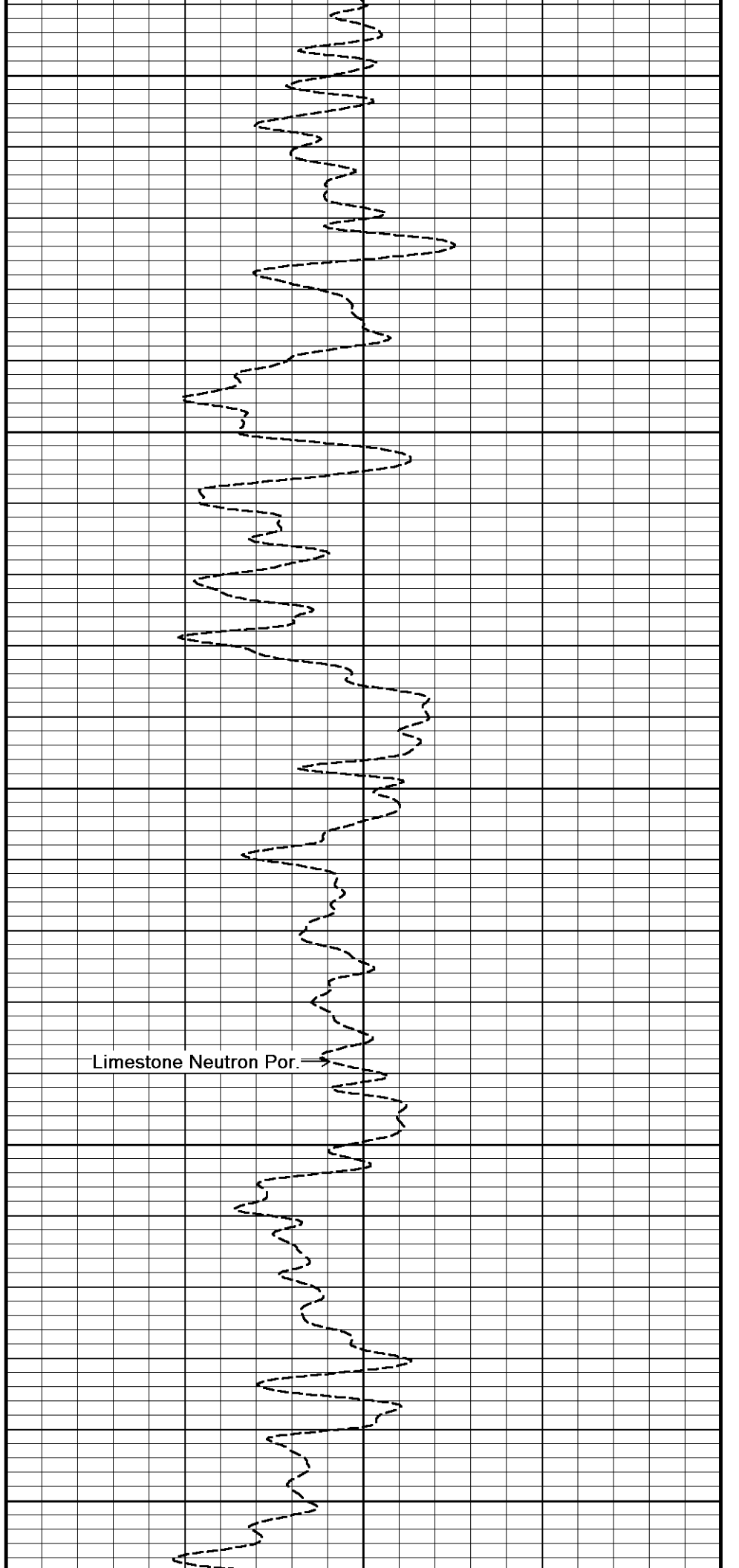
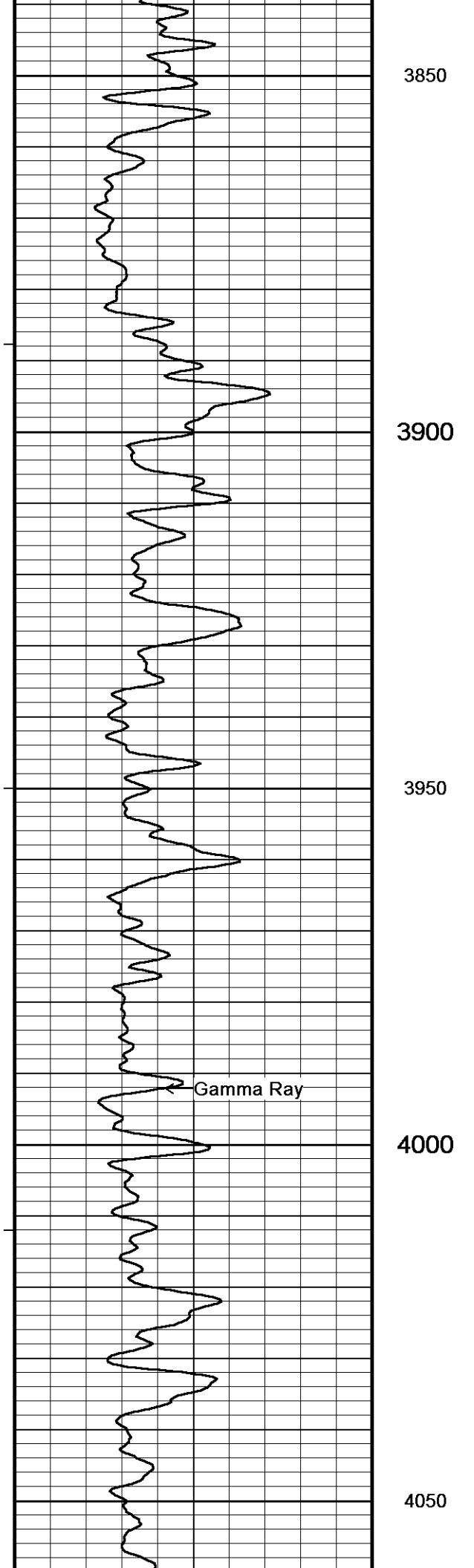
3650

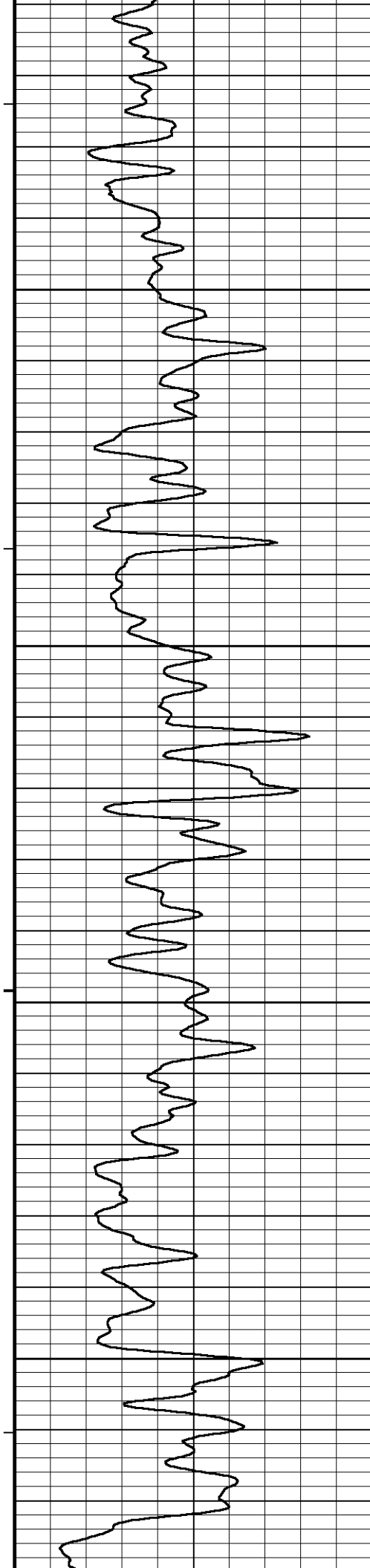
3700

3750

3800





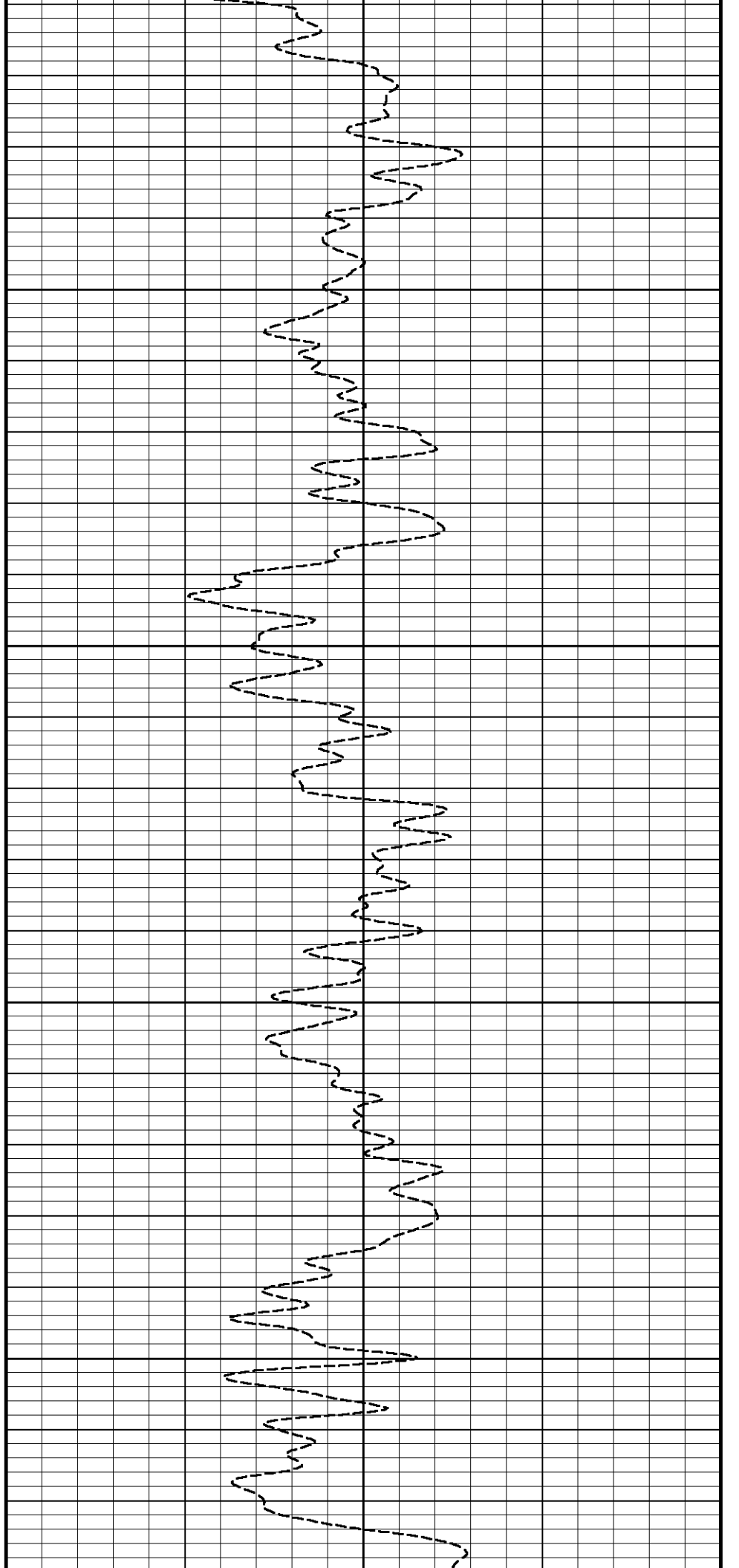


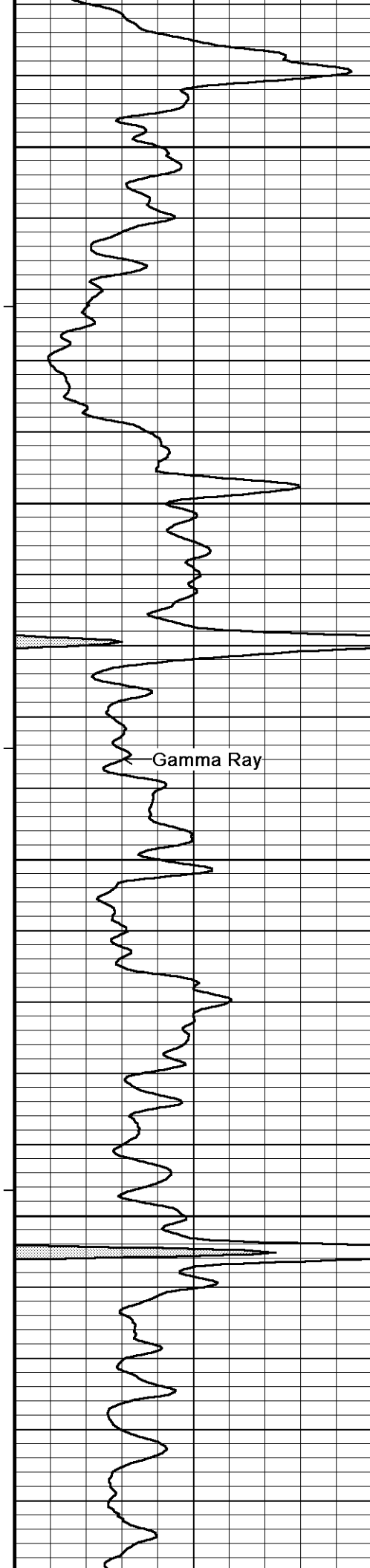
4100

4150

4200

4250





Gamma Ray

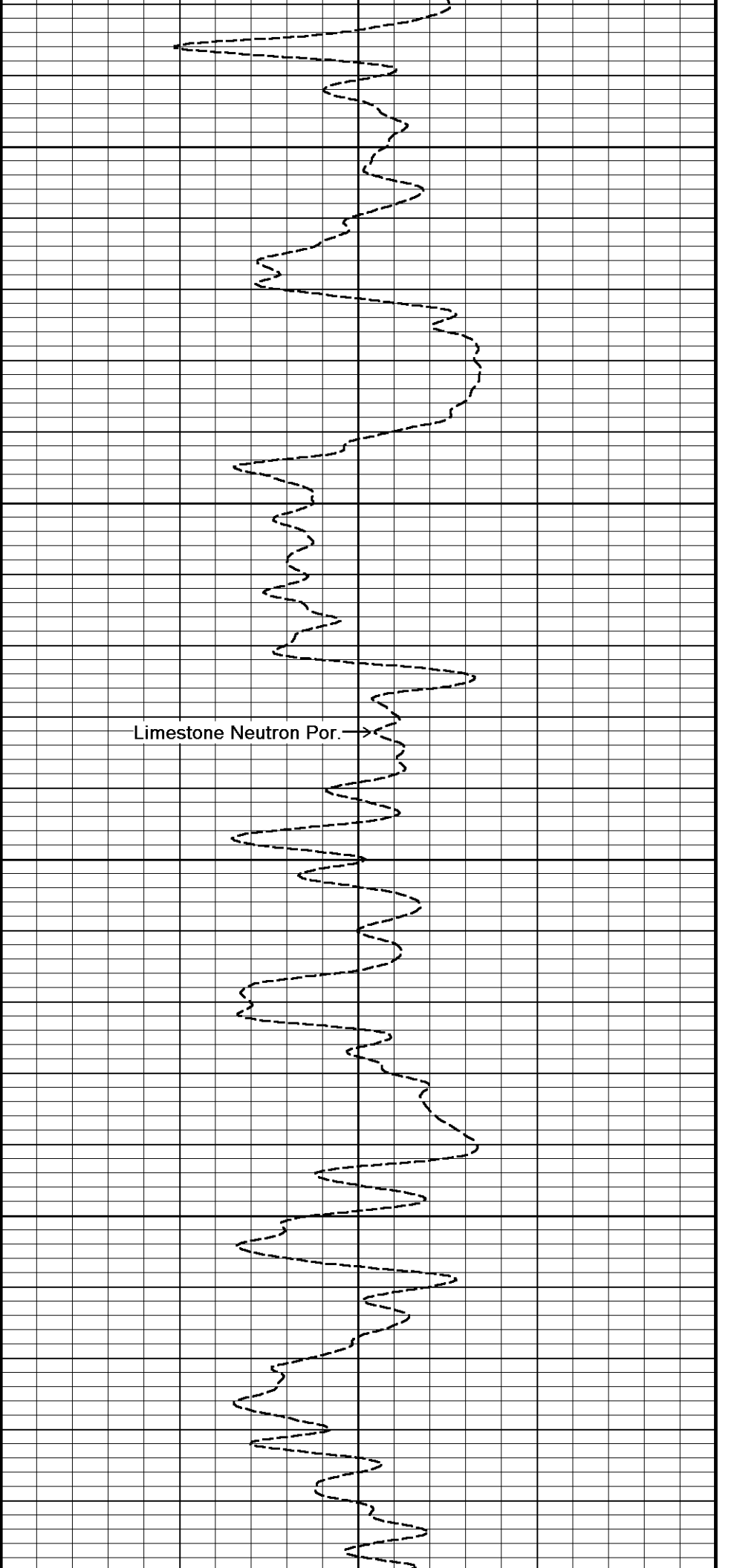
4300

4350

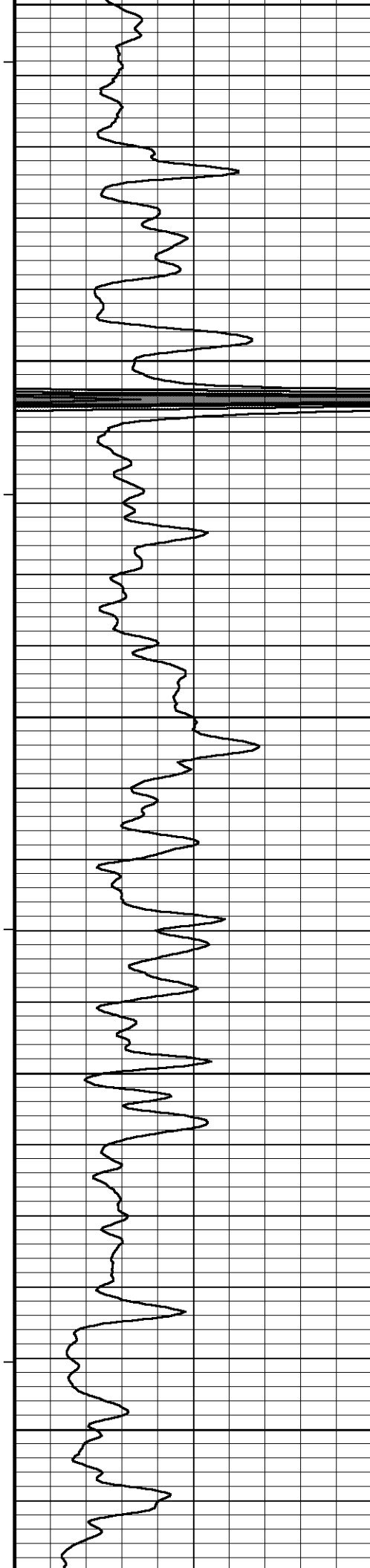
4400

4450

4500



Limestone Neutron Por.



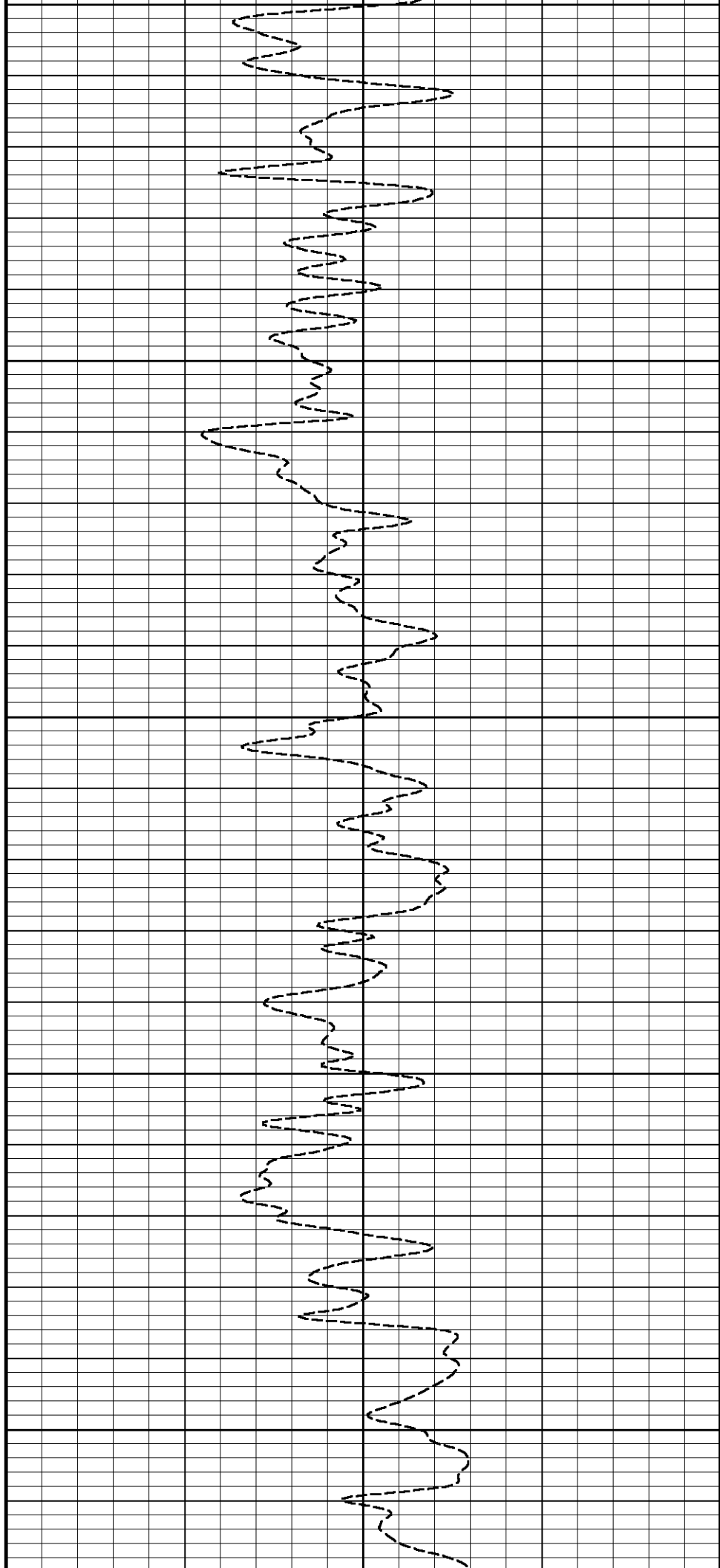
4500

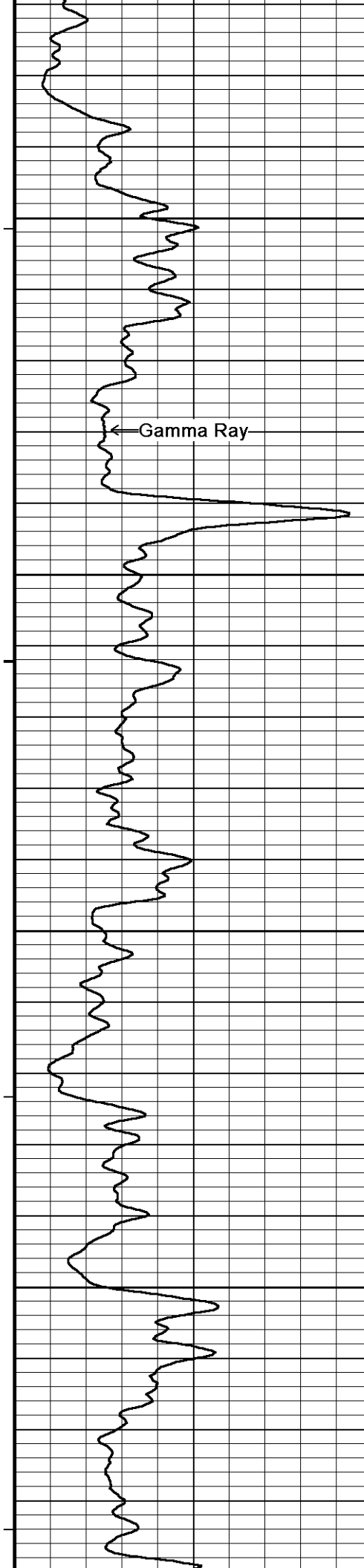
4550

4600

4650

4700





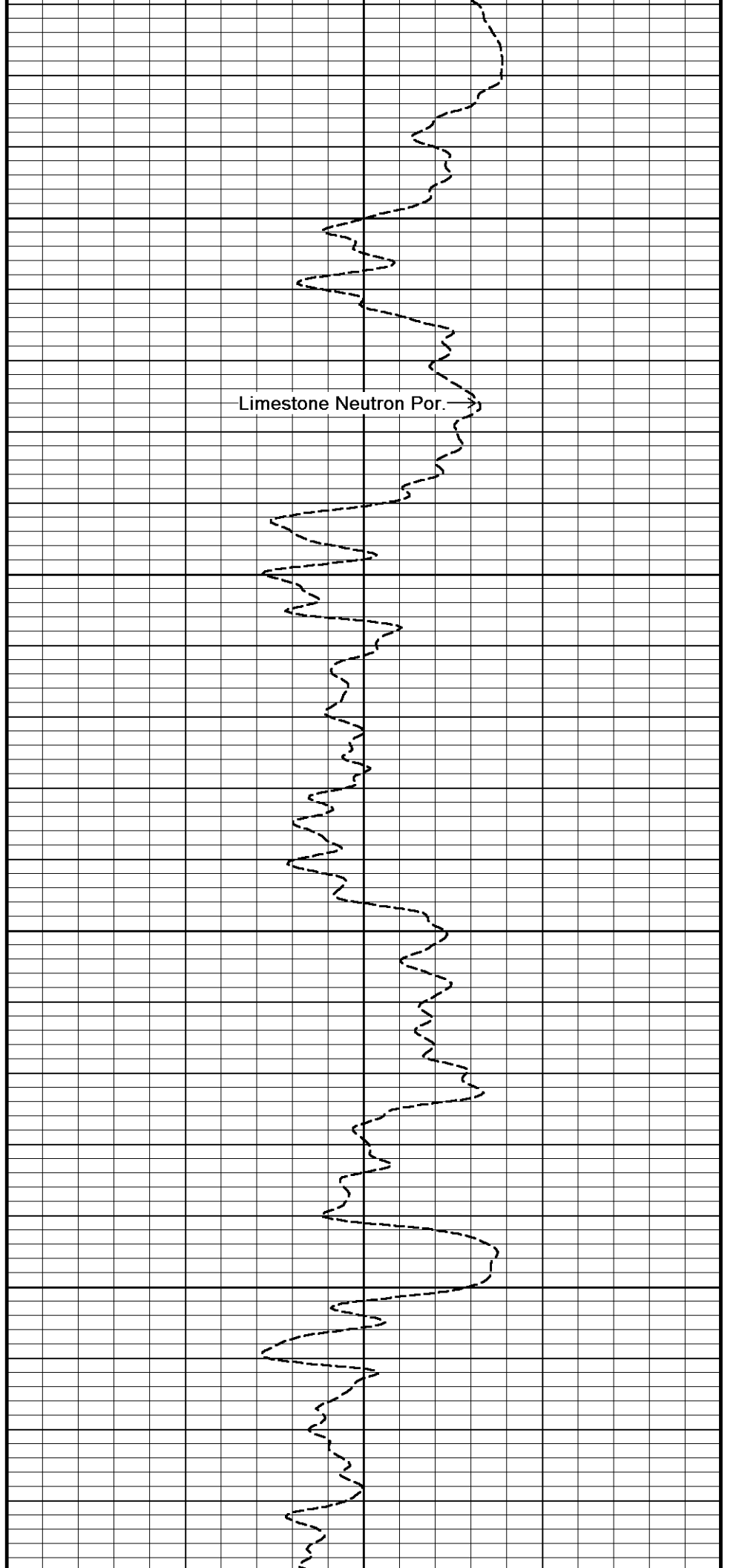
4750

4800

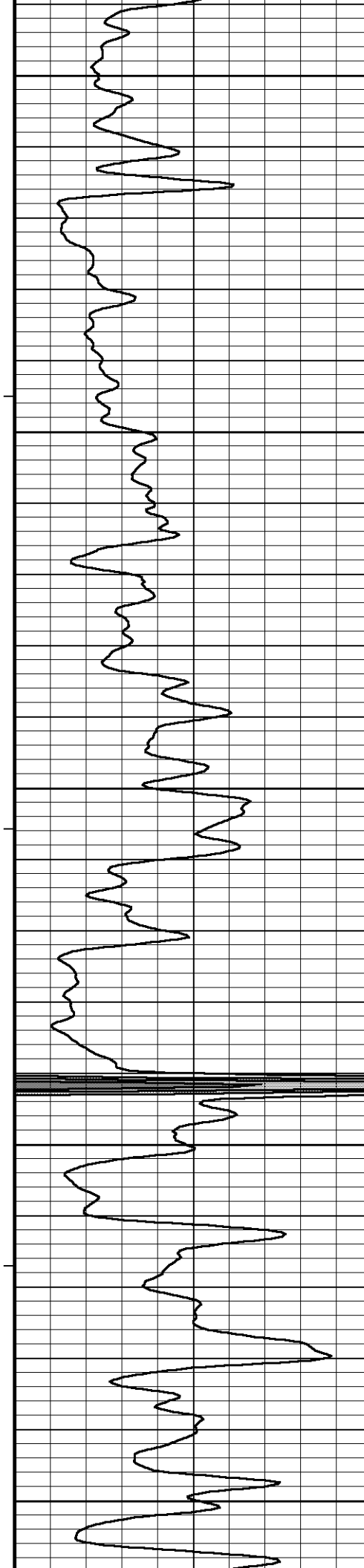
4850

4900

Gamma Ray



Limestone Neutron Por.



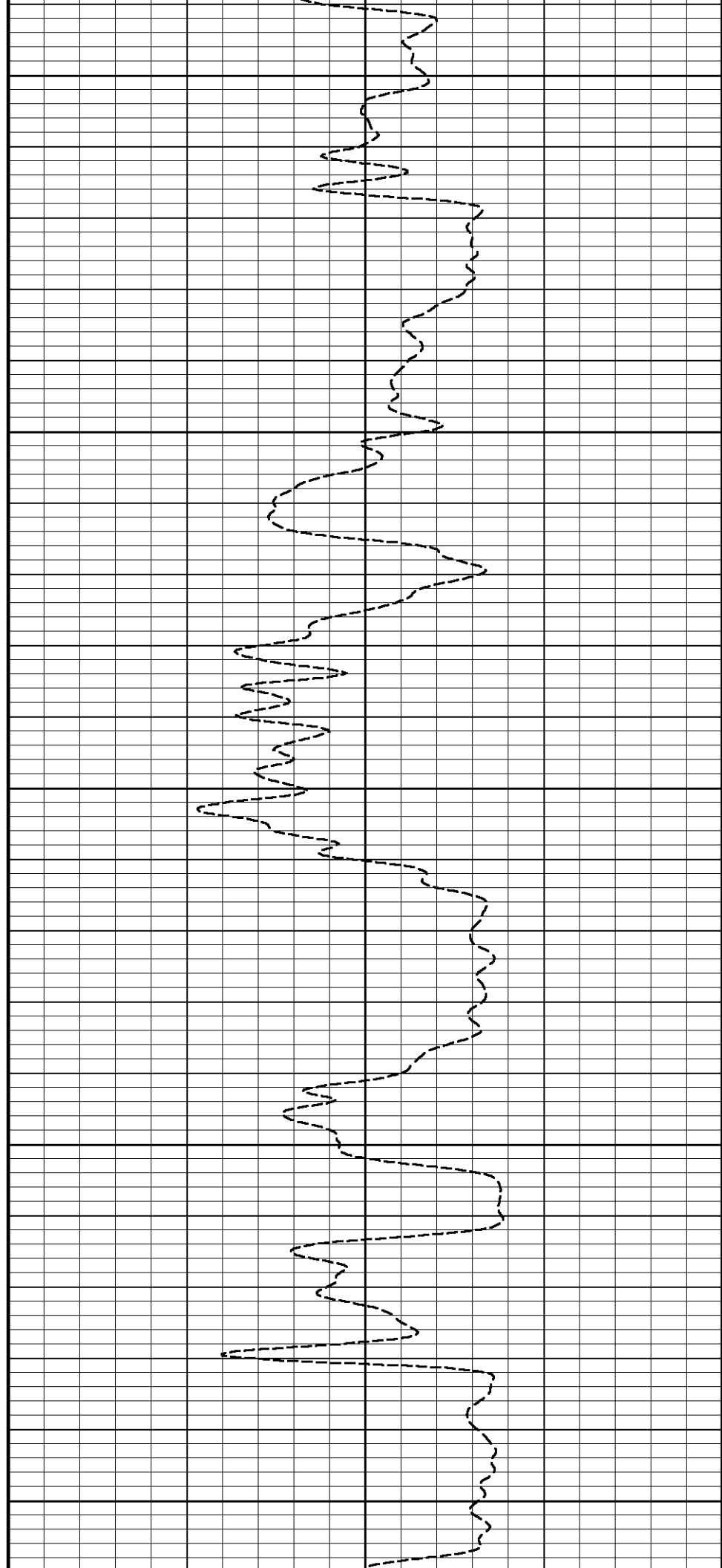
4950

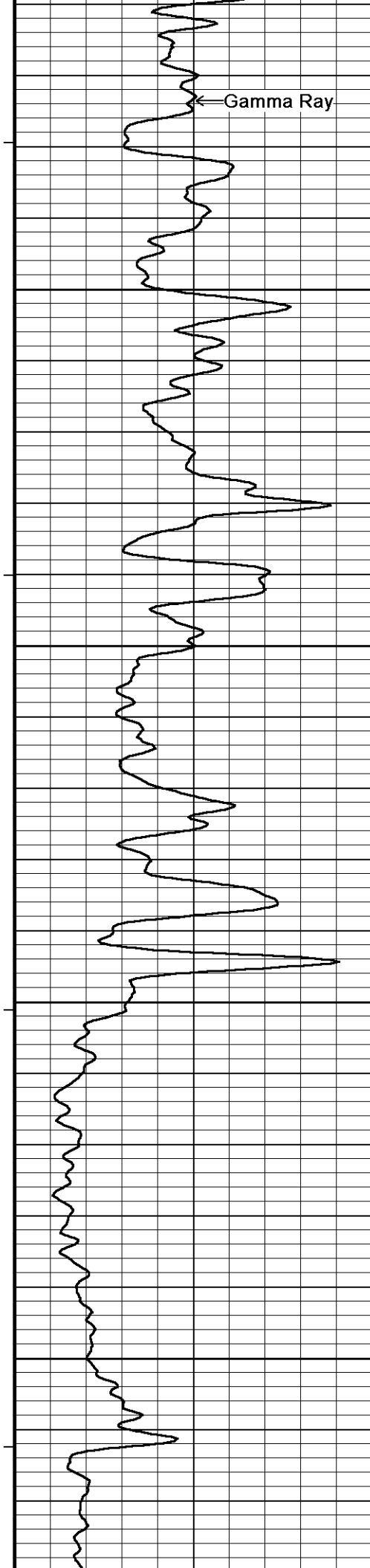
5000

5050

5100

5150





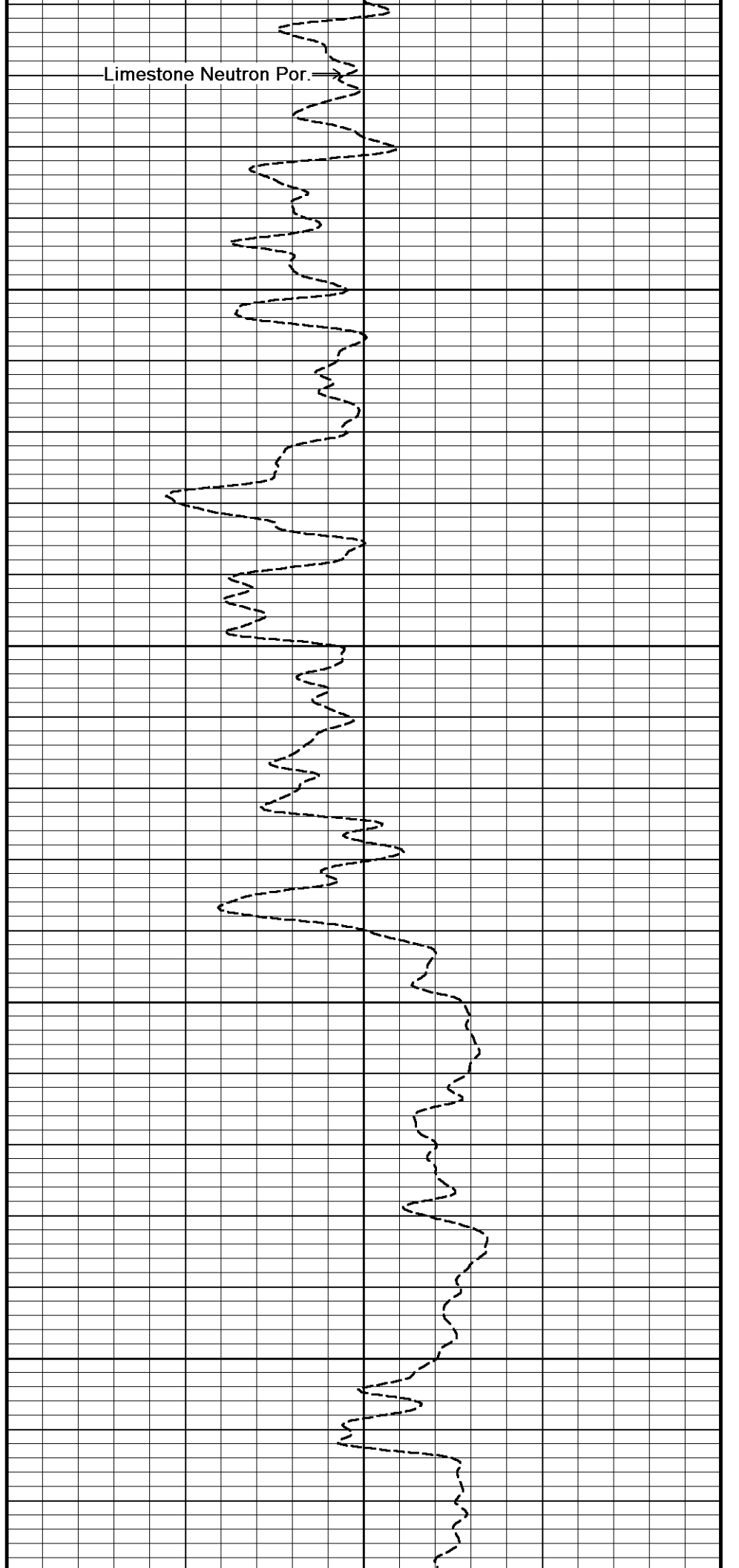
← Gamma Ray

5200

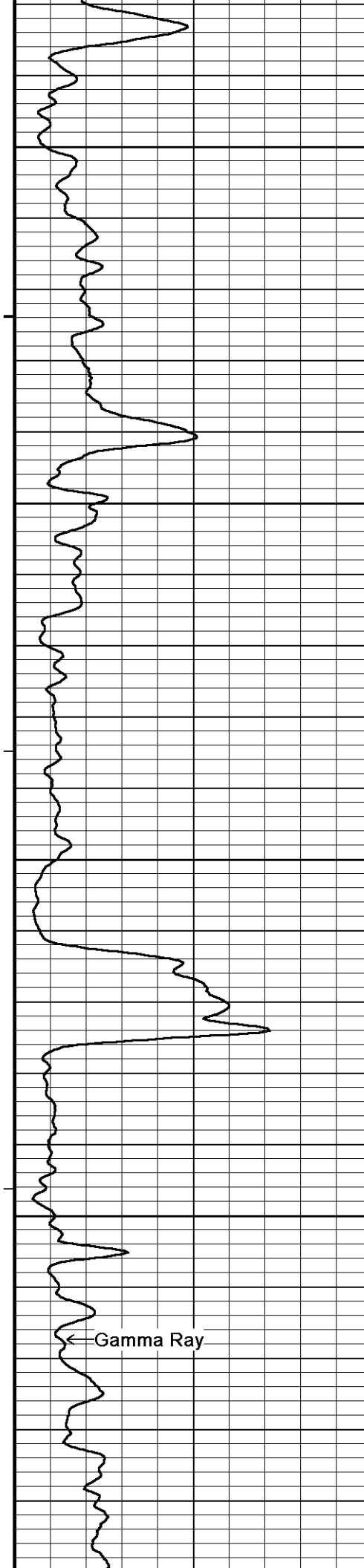
5250

5300

5350



→ Limestone Neutron Por.



5400

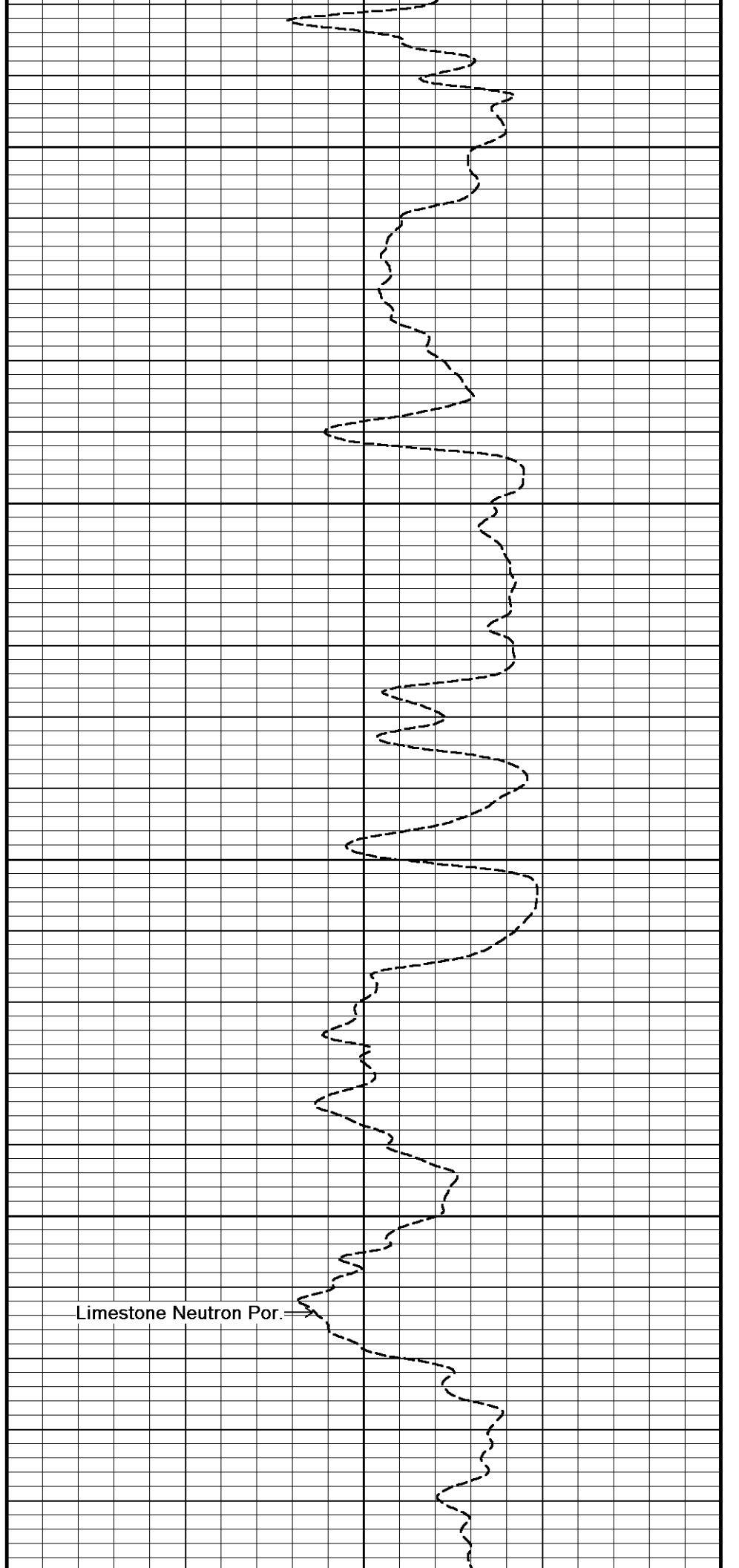
5450

5500

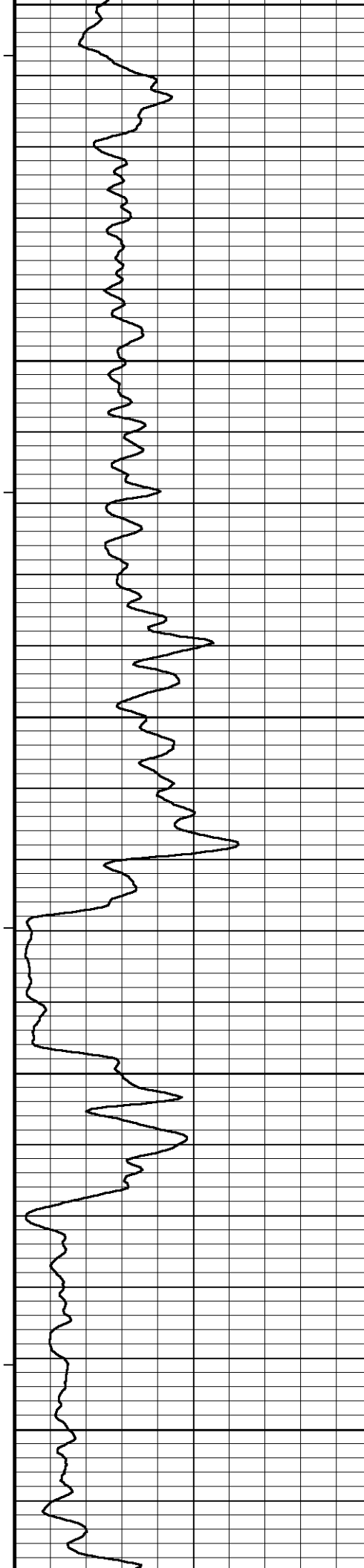
5550

← Gamma Ray

5600



Limestone Neutron Por. →



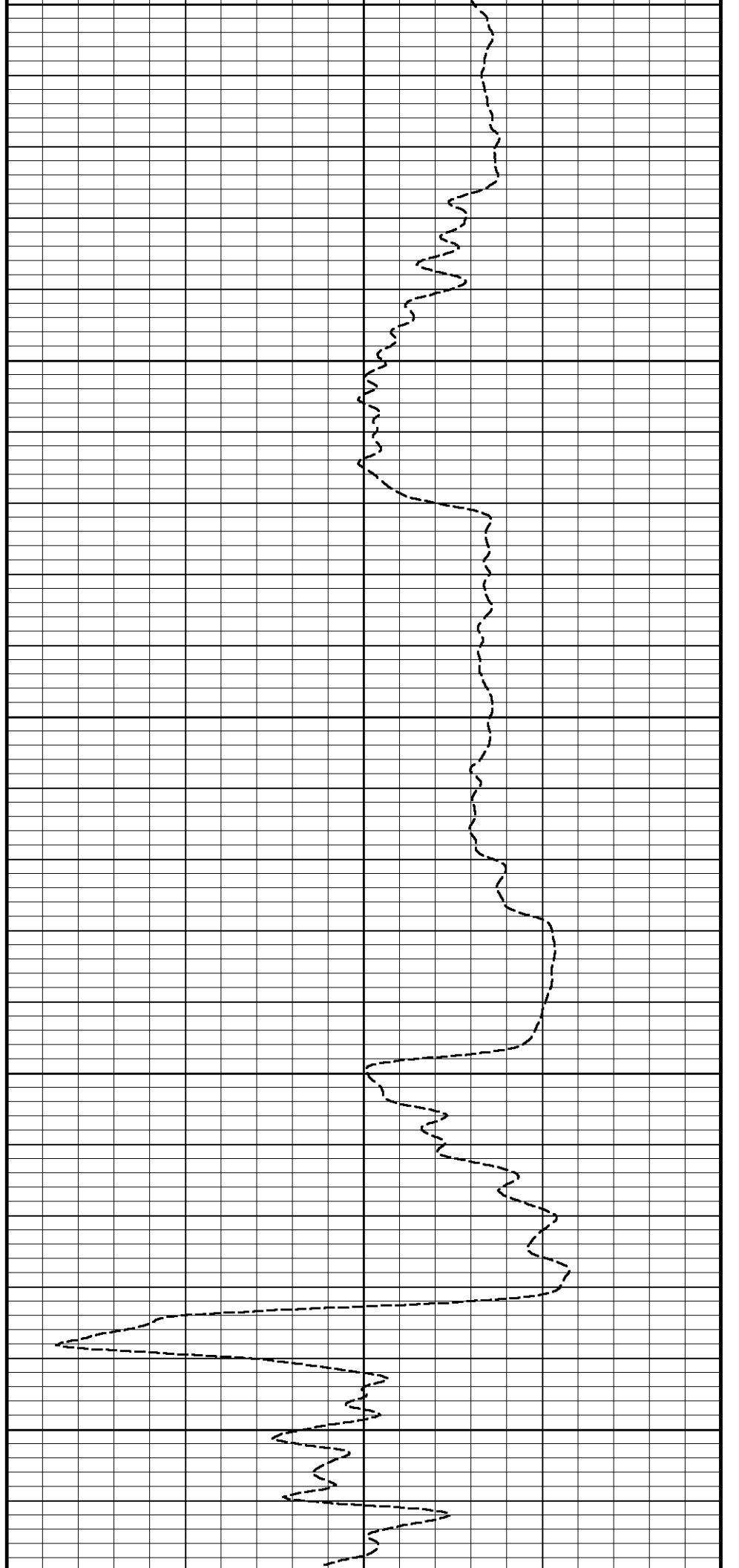
5600

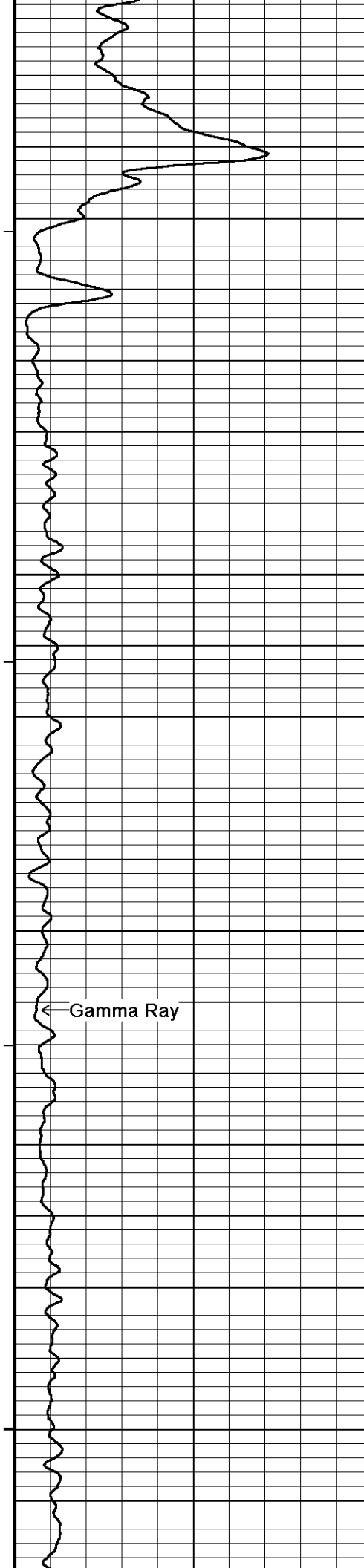
5650

5700

5750

5800





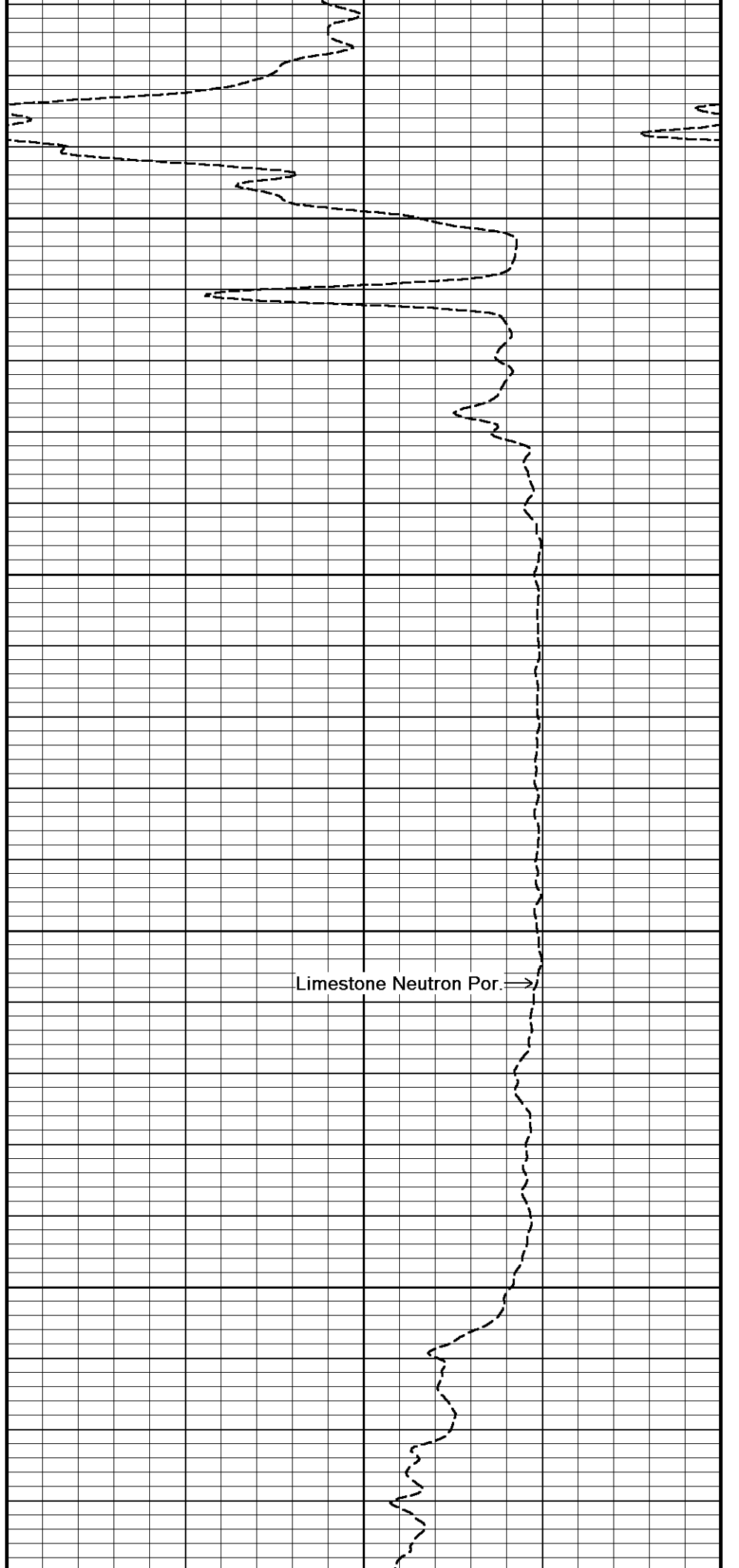
5850

5900

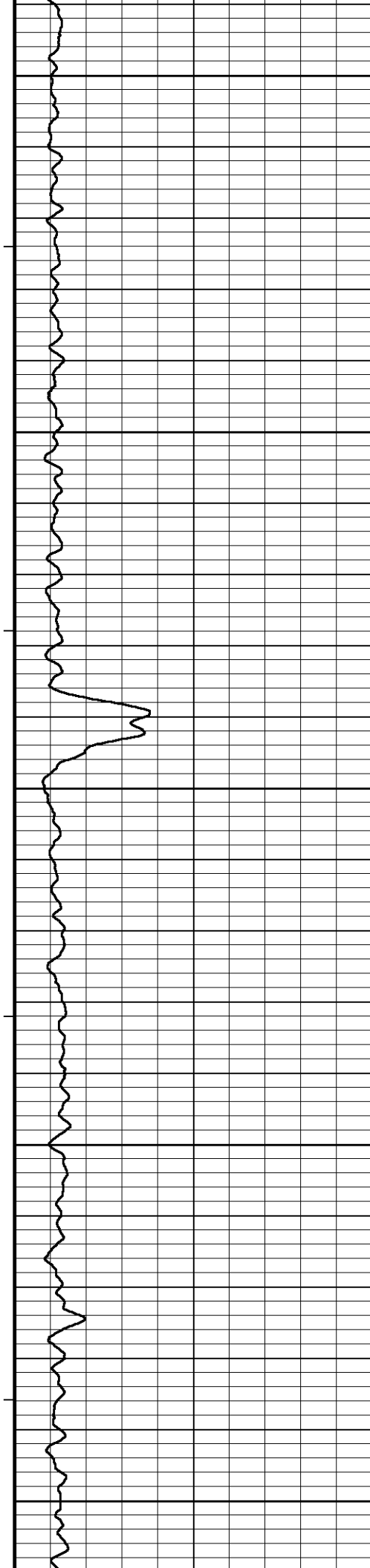
5950

6000

← Gamma Ray



Limestone Neutron Por. →



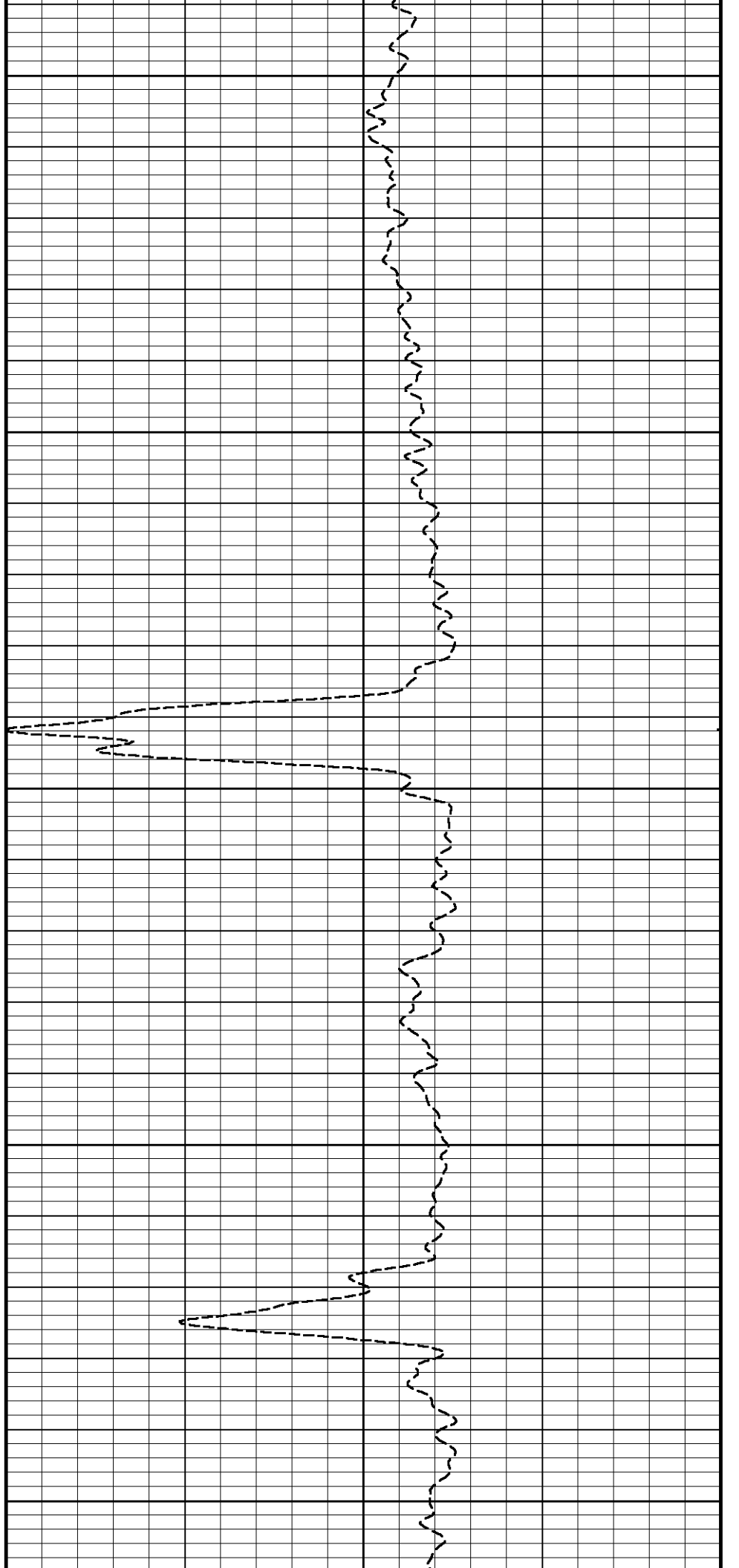
6050

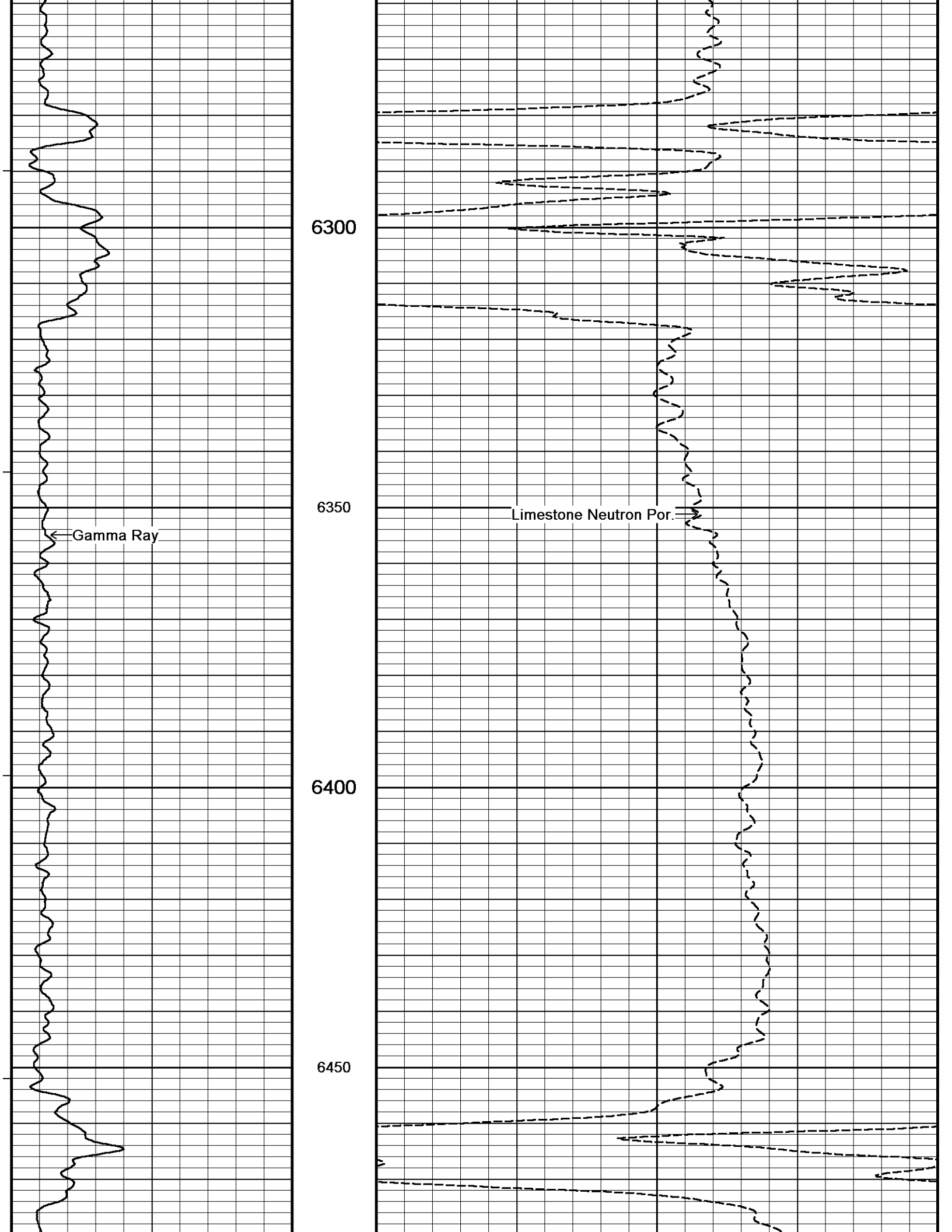
6100

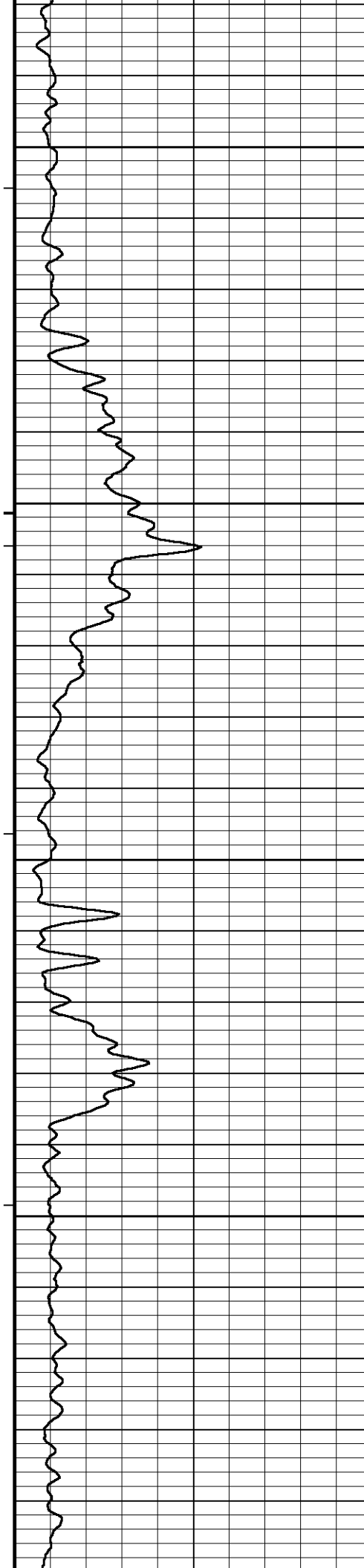
6150

6200

6250







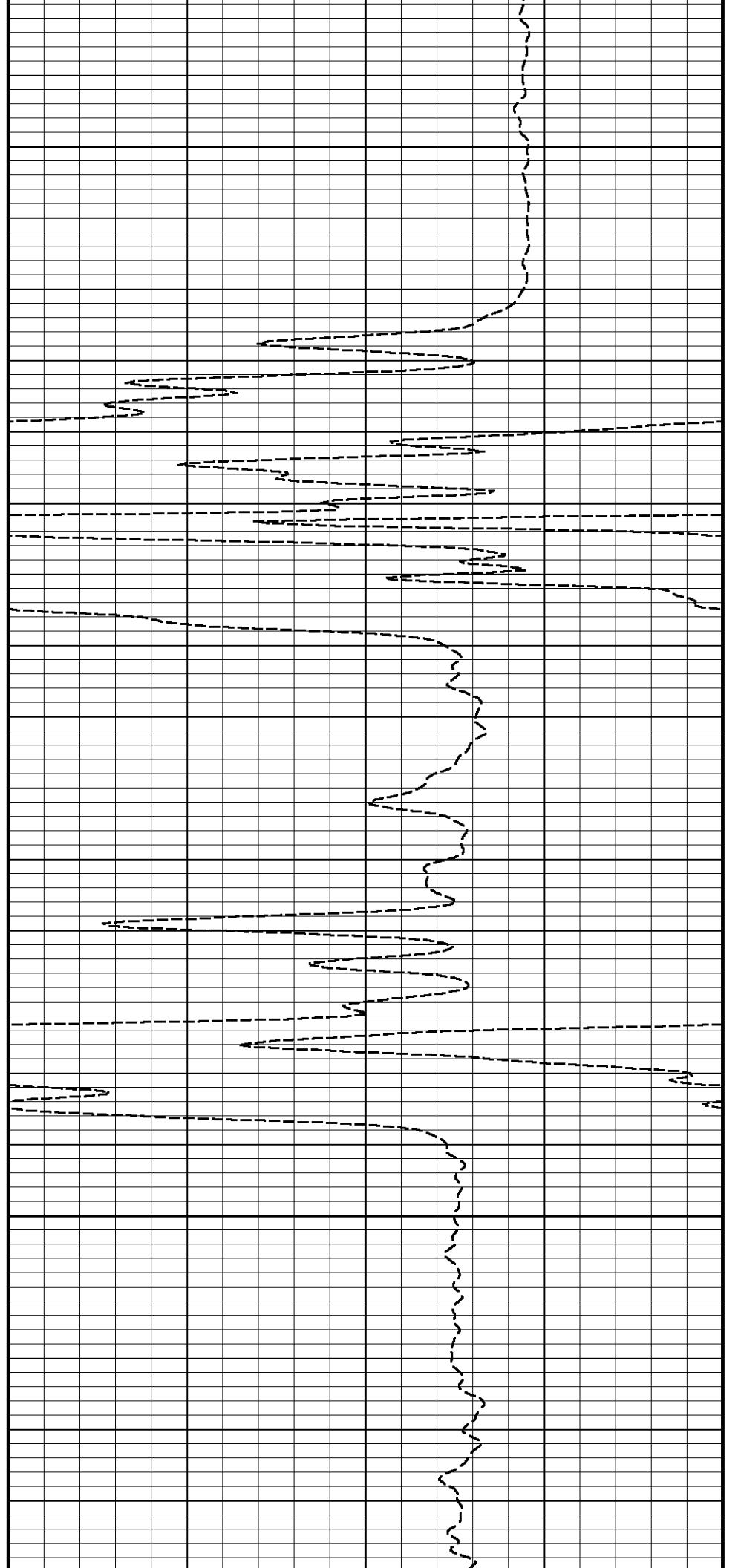
6500

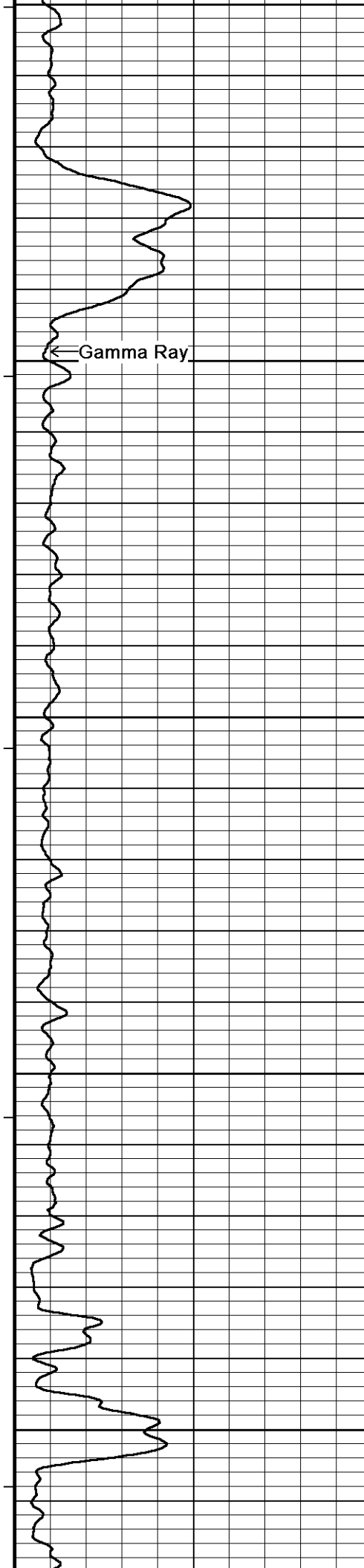
6550

6600

6650

6700





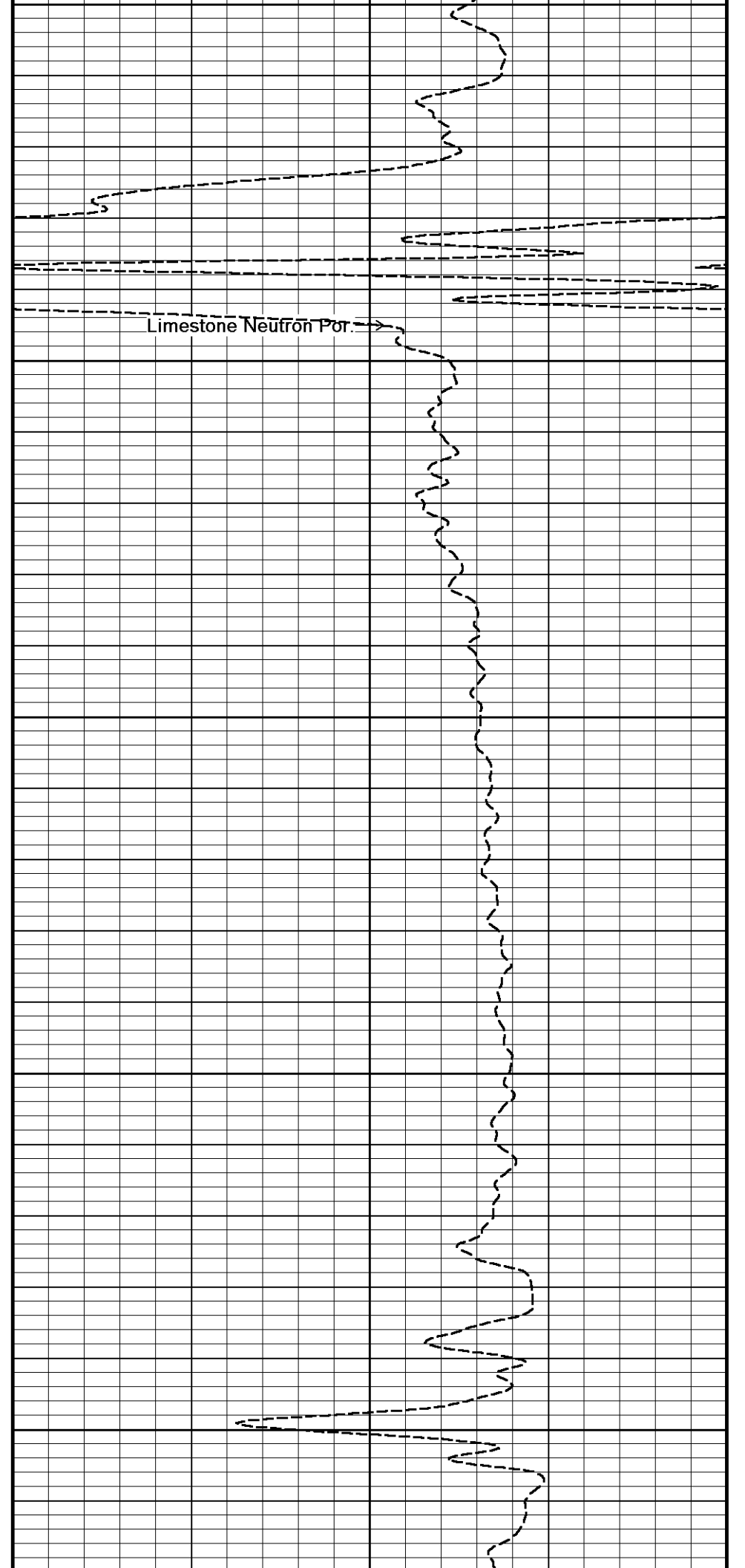
6700

6750

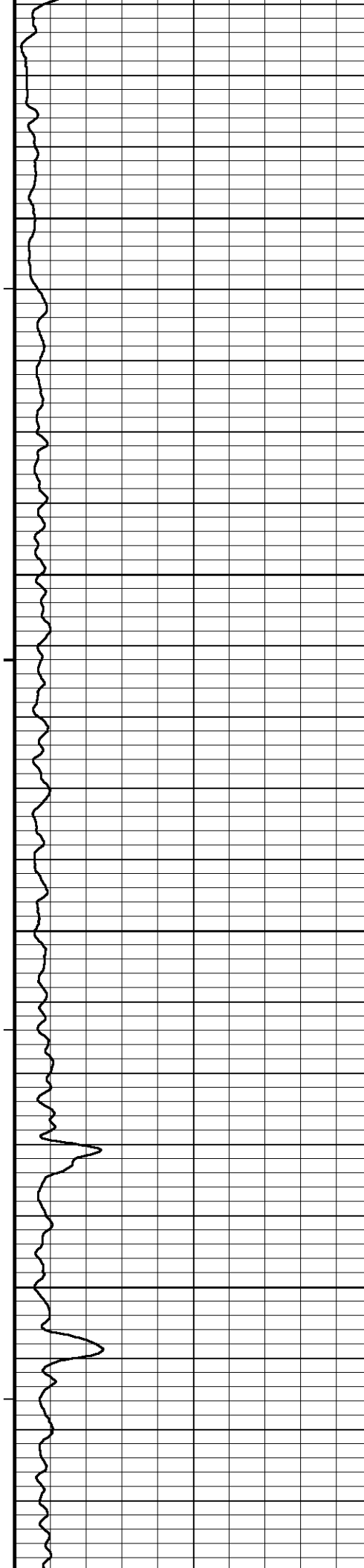
6800

6850

6900



Limestone Neutron Por.

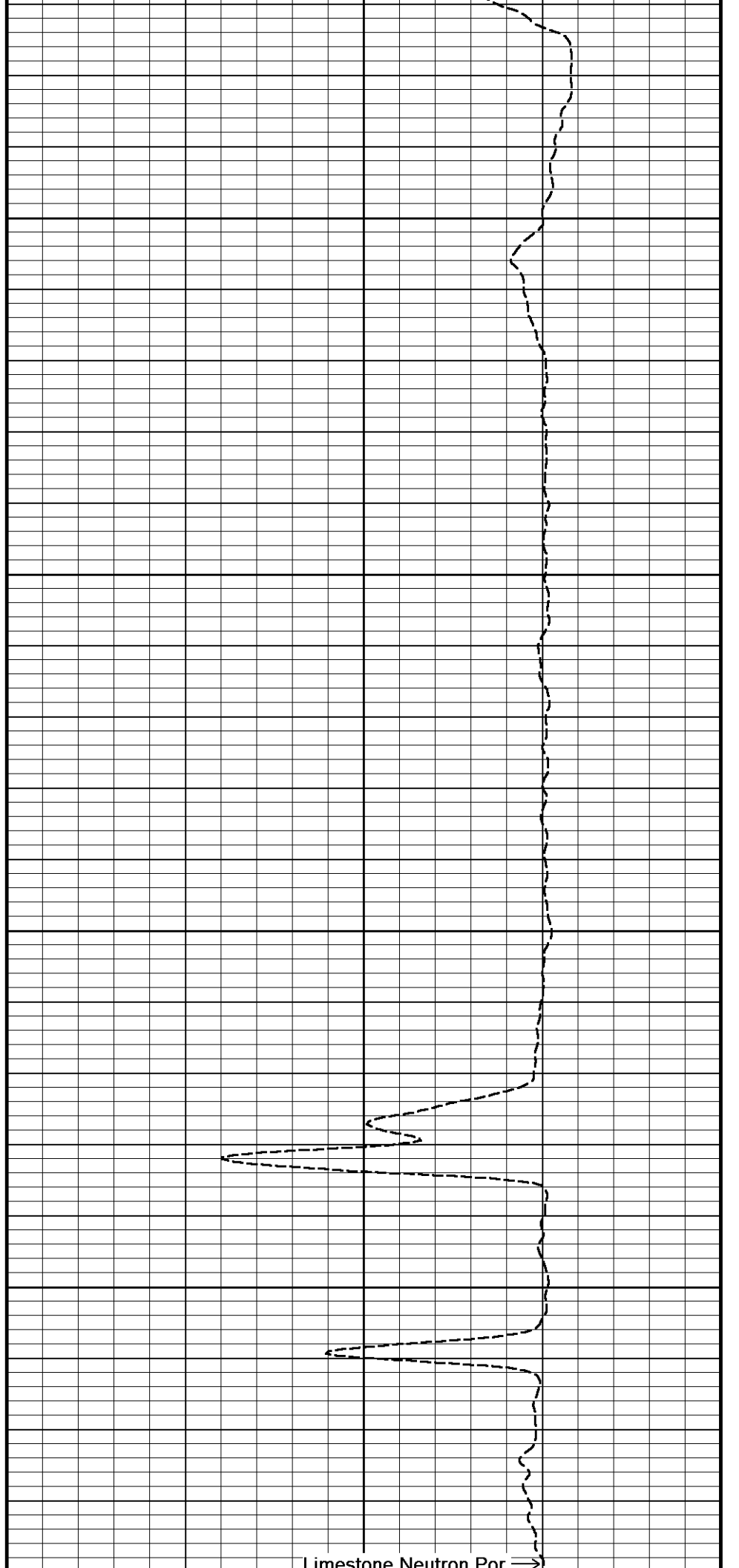


6950

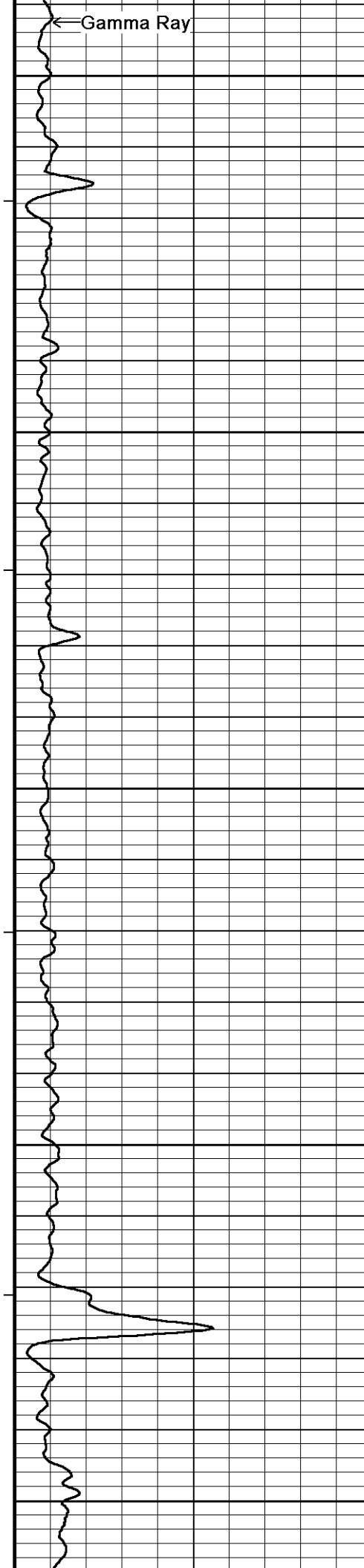
7000

7050

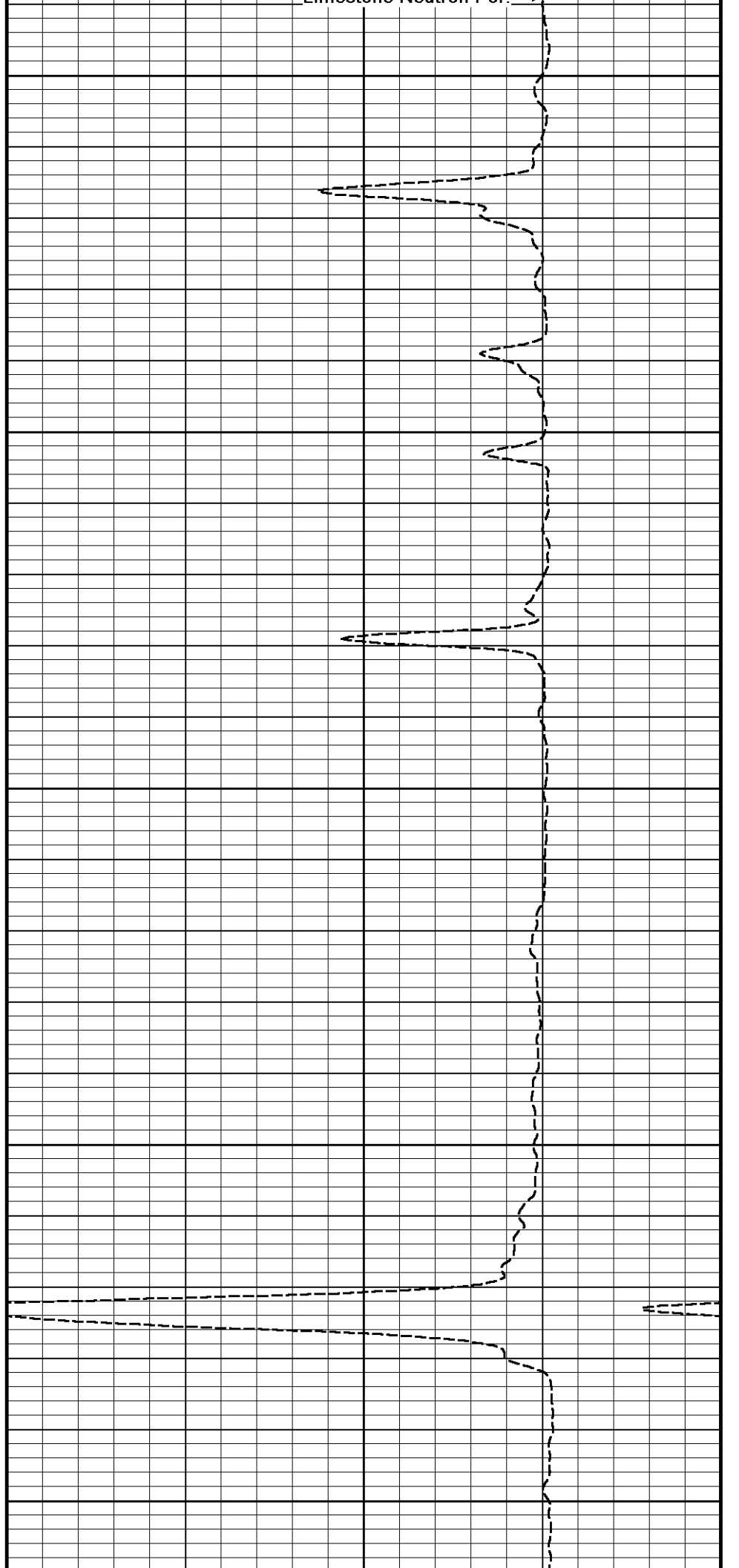
7100



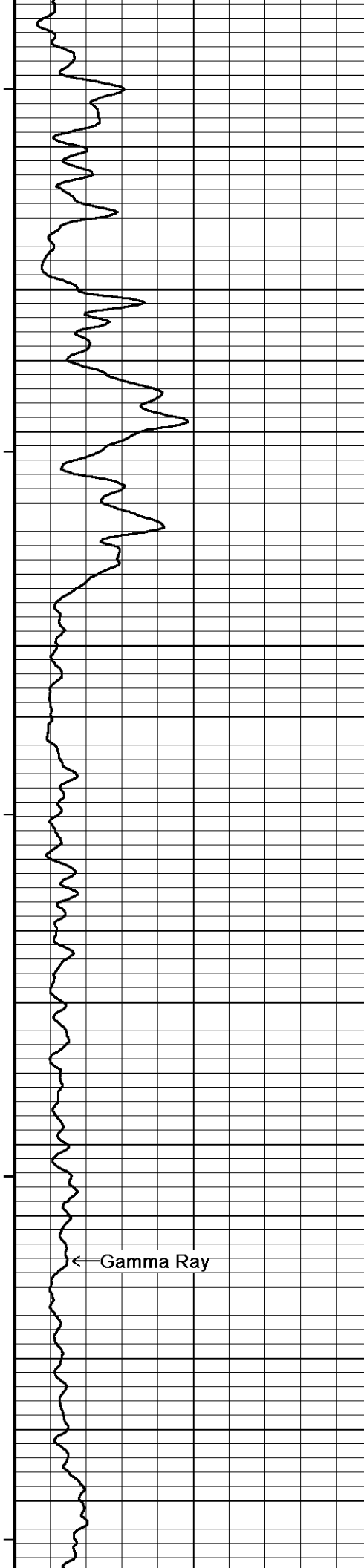
Limestone Neutron Por



7150
7200
7250
7300
7350



Limestone Neutron Porosity



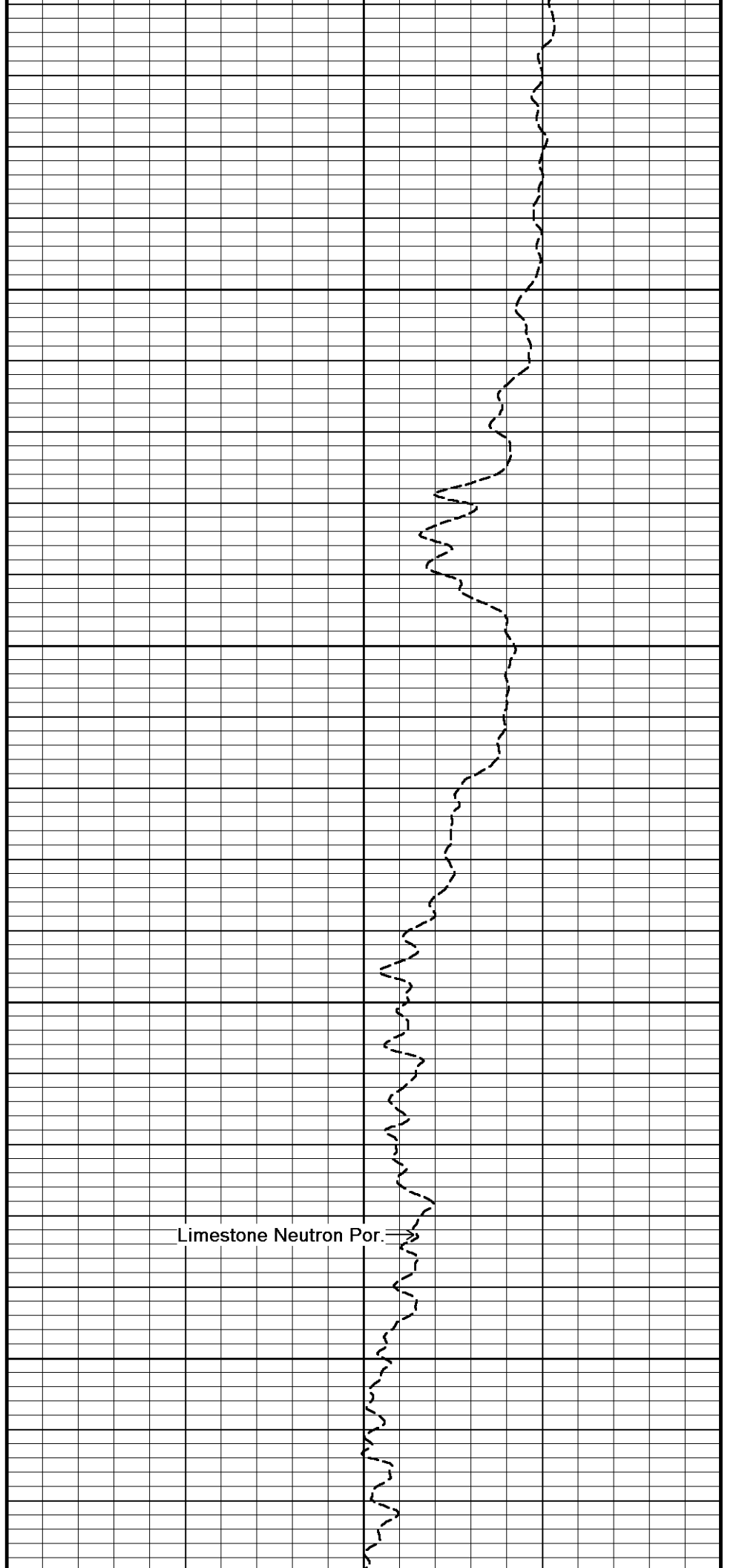
7400

7450

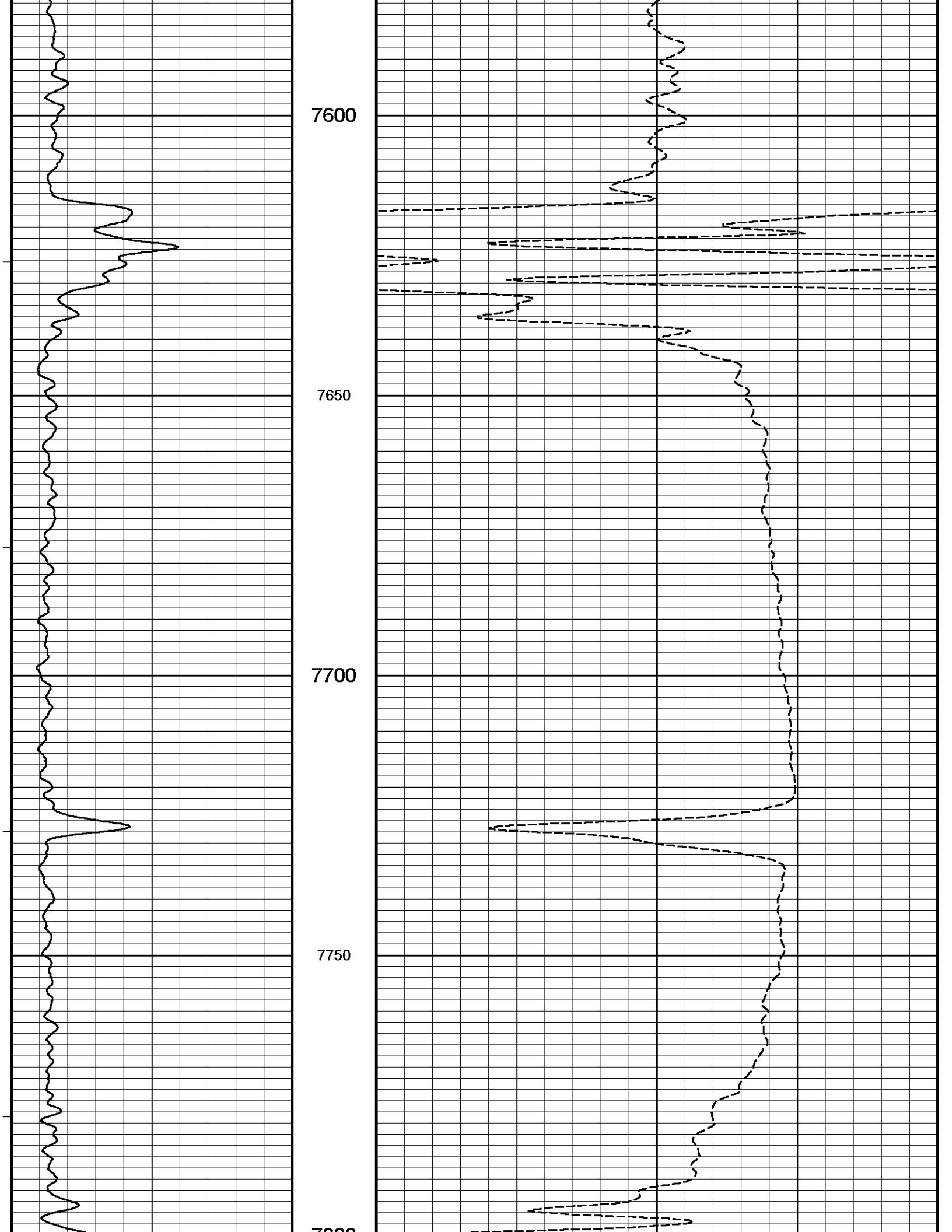
7500

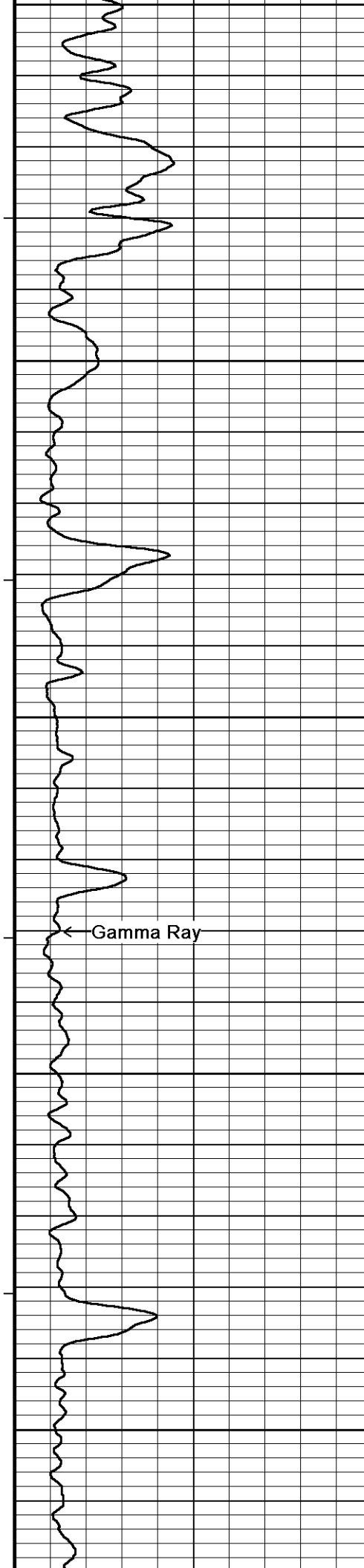
7550

← Gamma Ray



Limestone Neutron Por.





7800

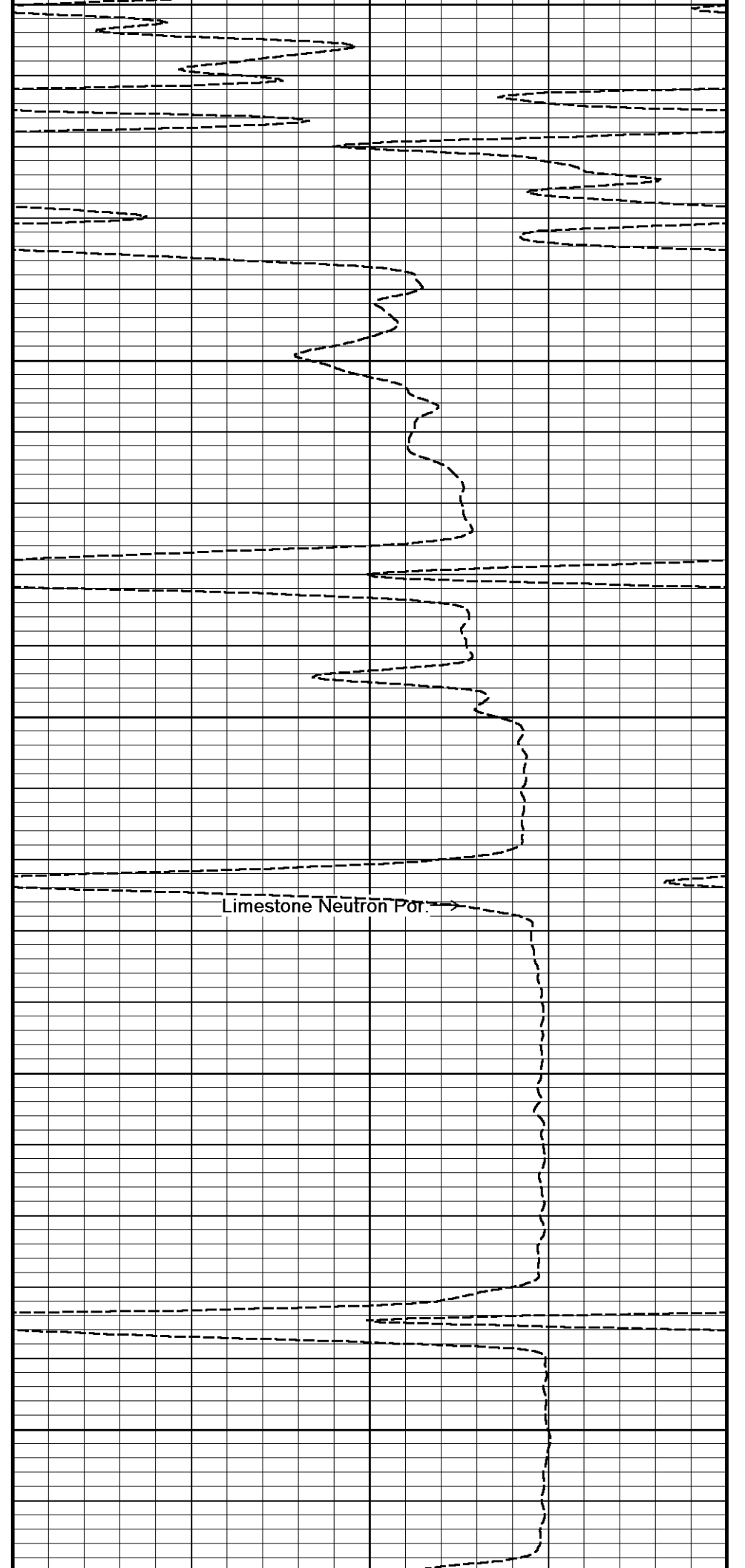
7850

7900

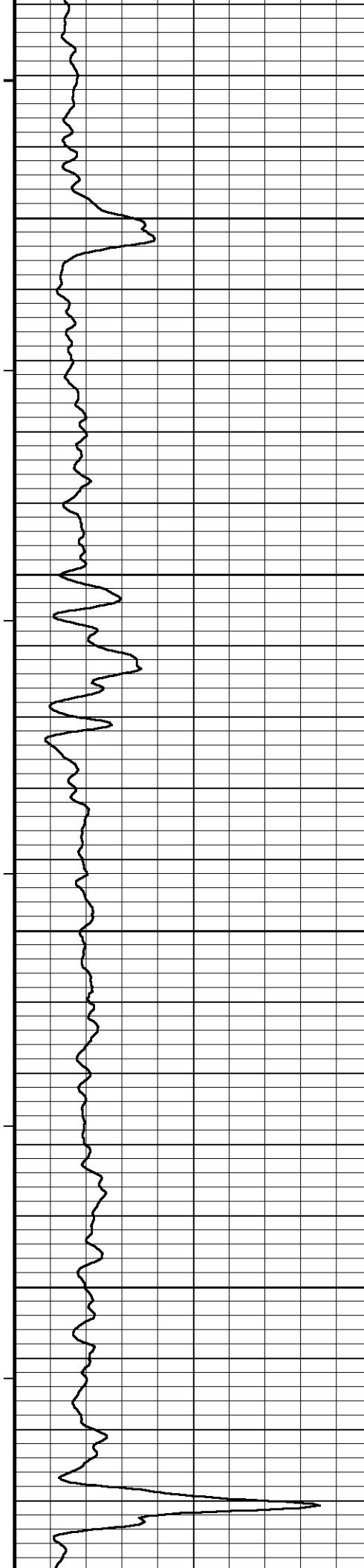
7950

8000

Gamma Ray



Limestone Neutron Por.

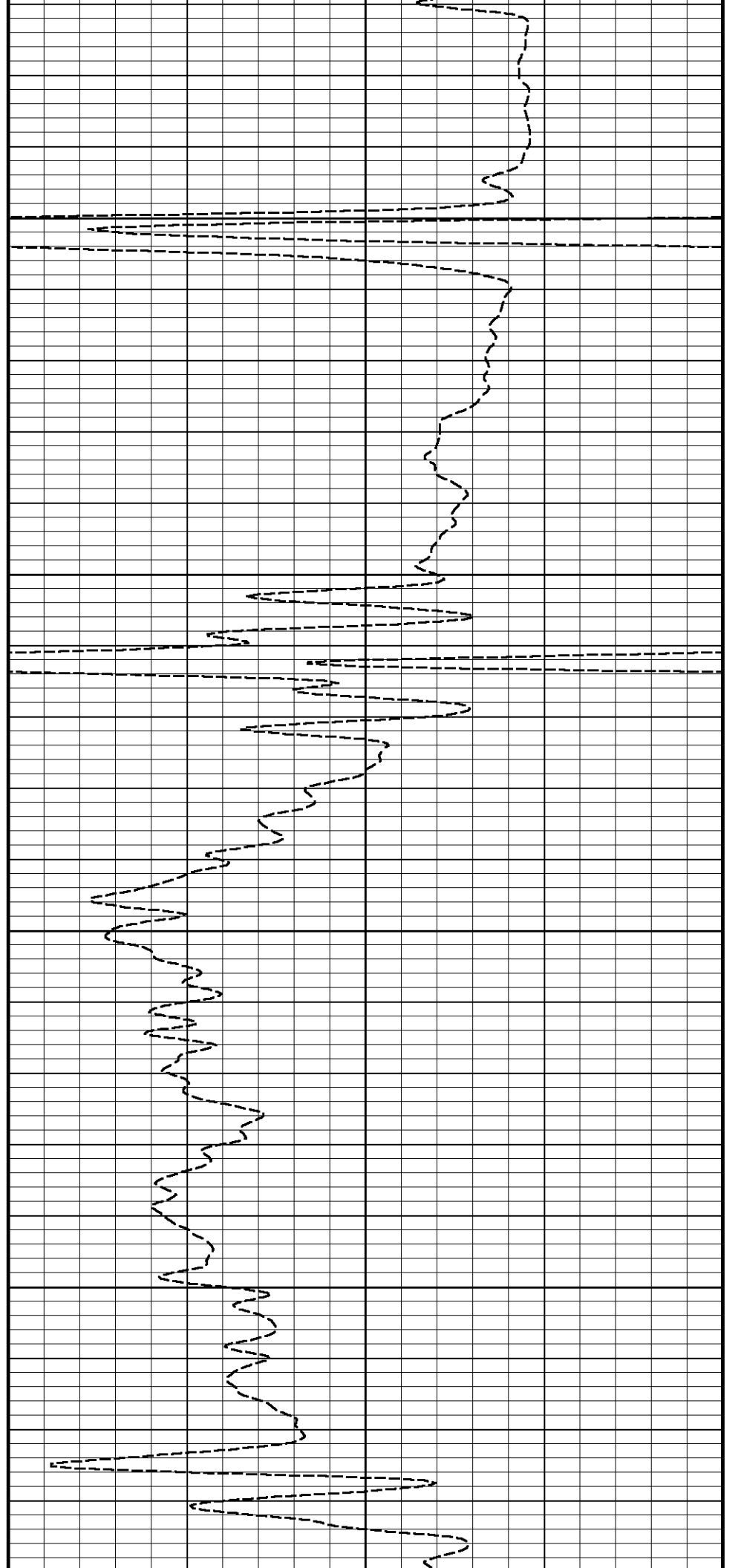


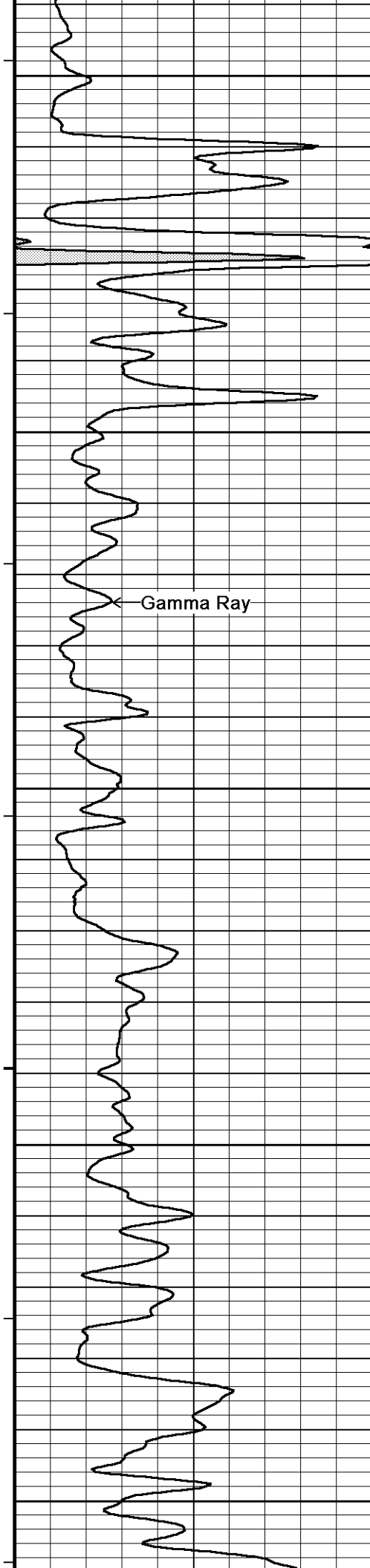
8050

8100

8150

8200





Gamma Ray

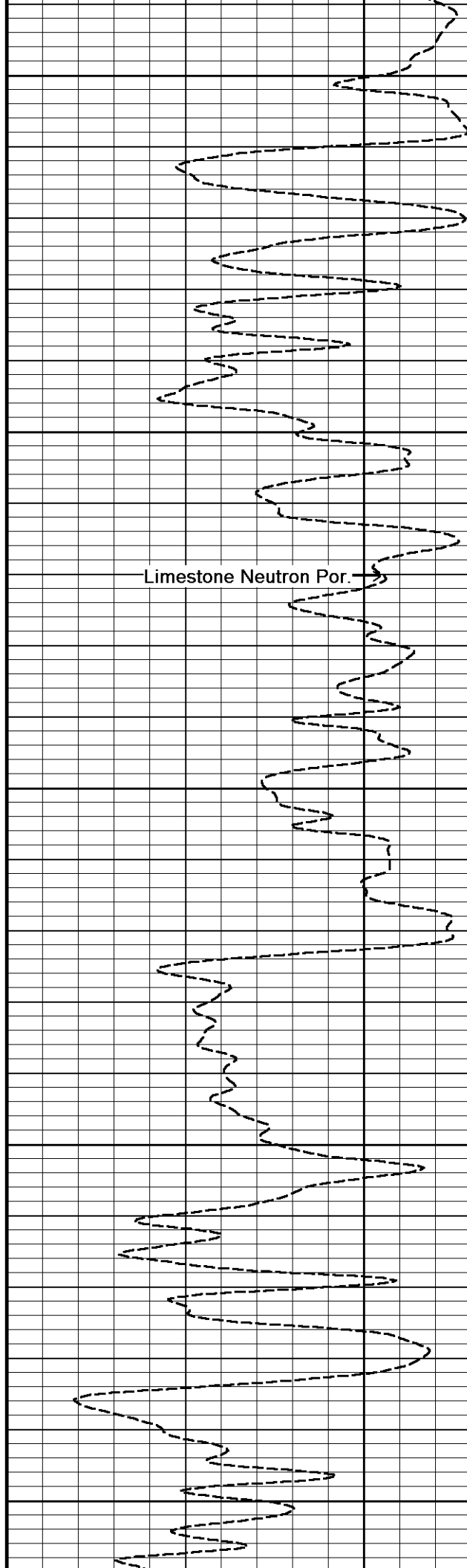
8250

8300

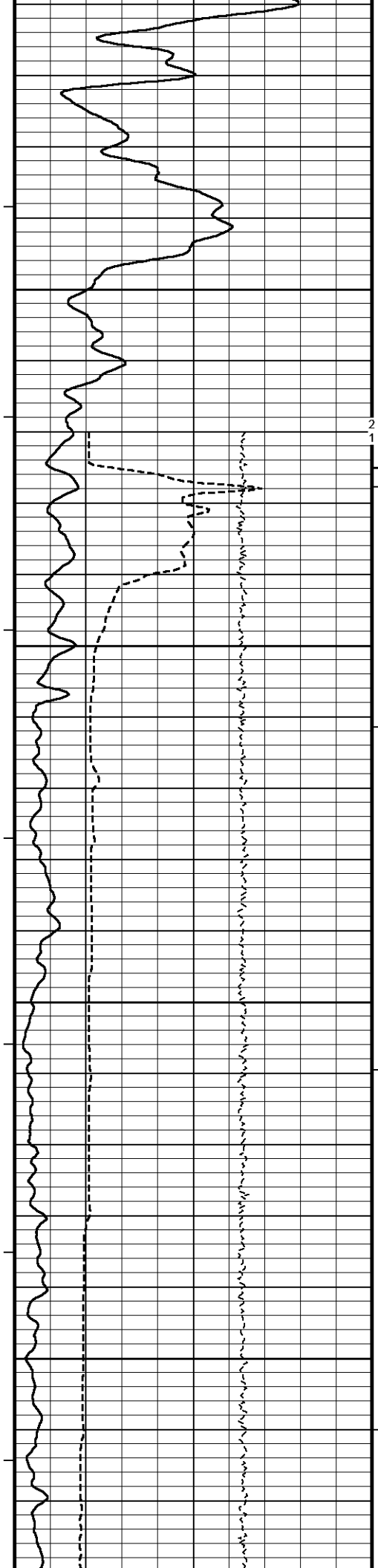
8350

8400

8450



Limestone Neutron Por.



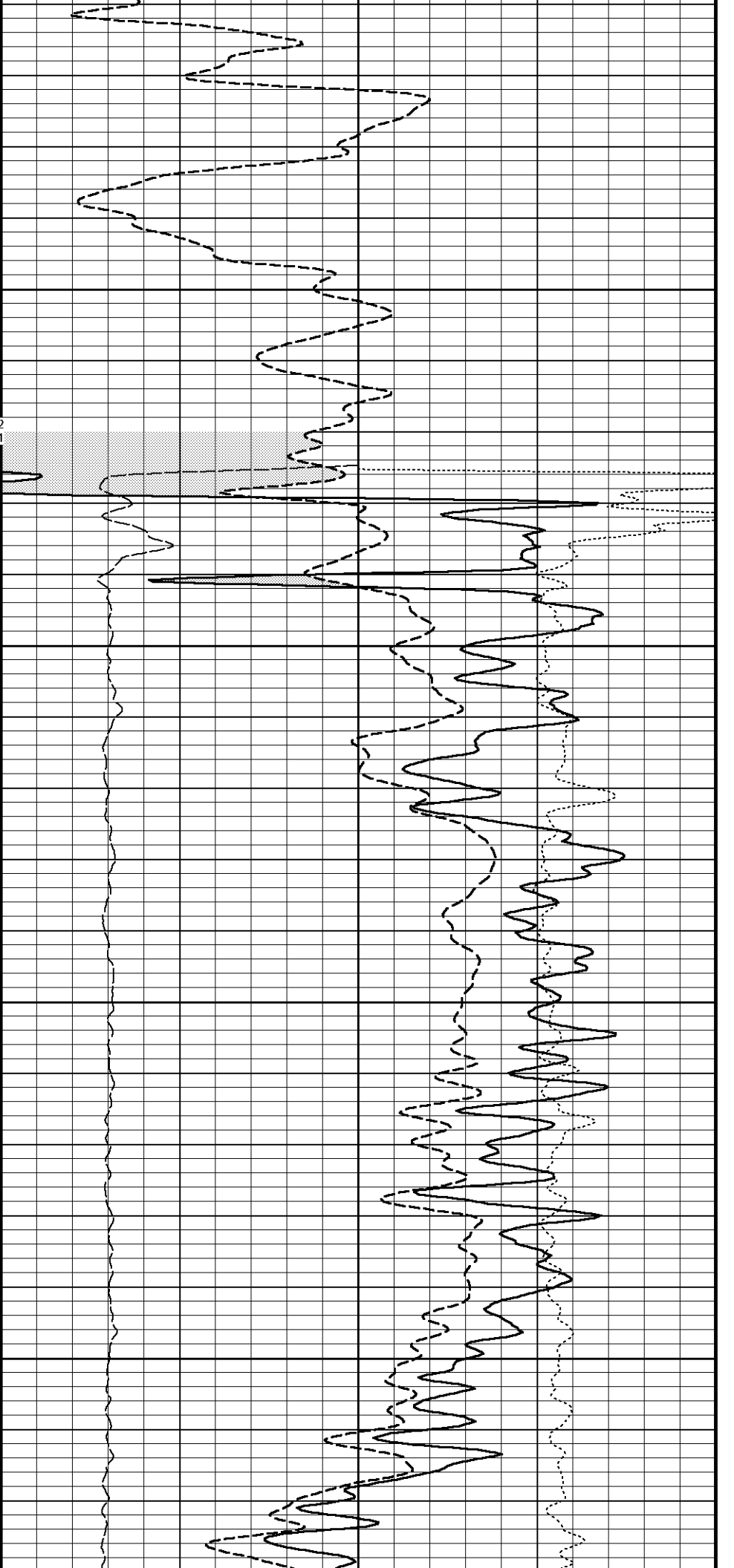
8500

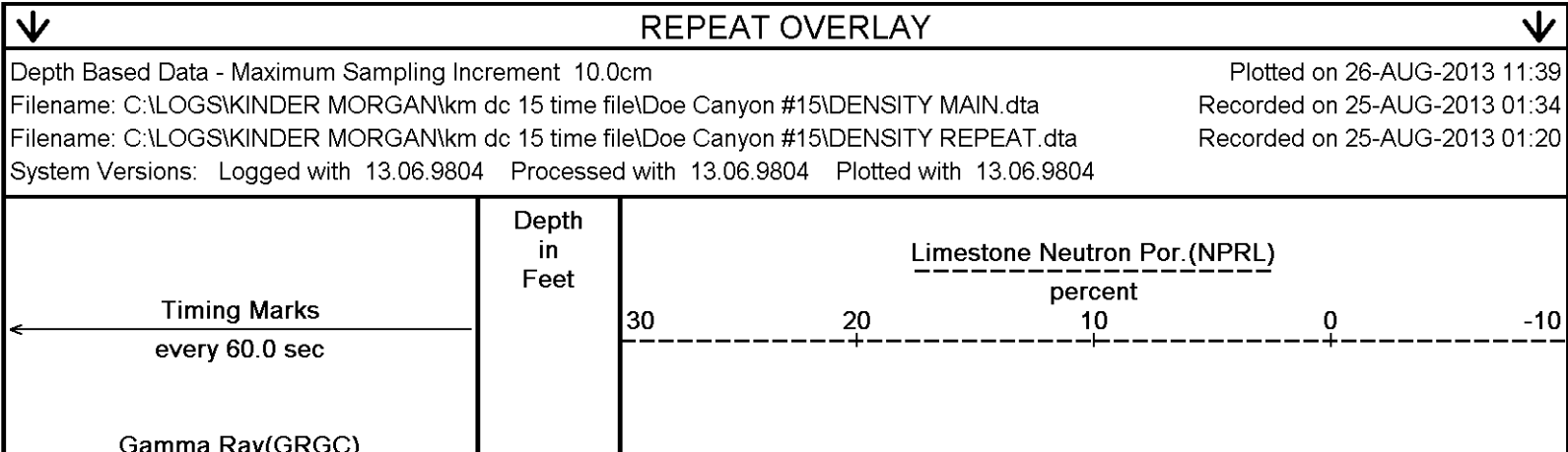
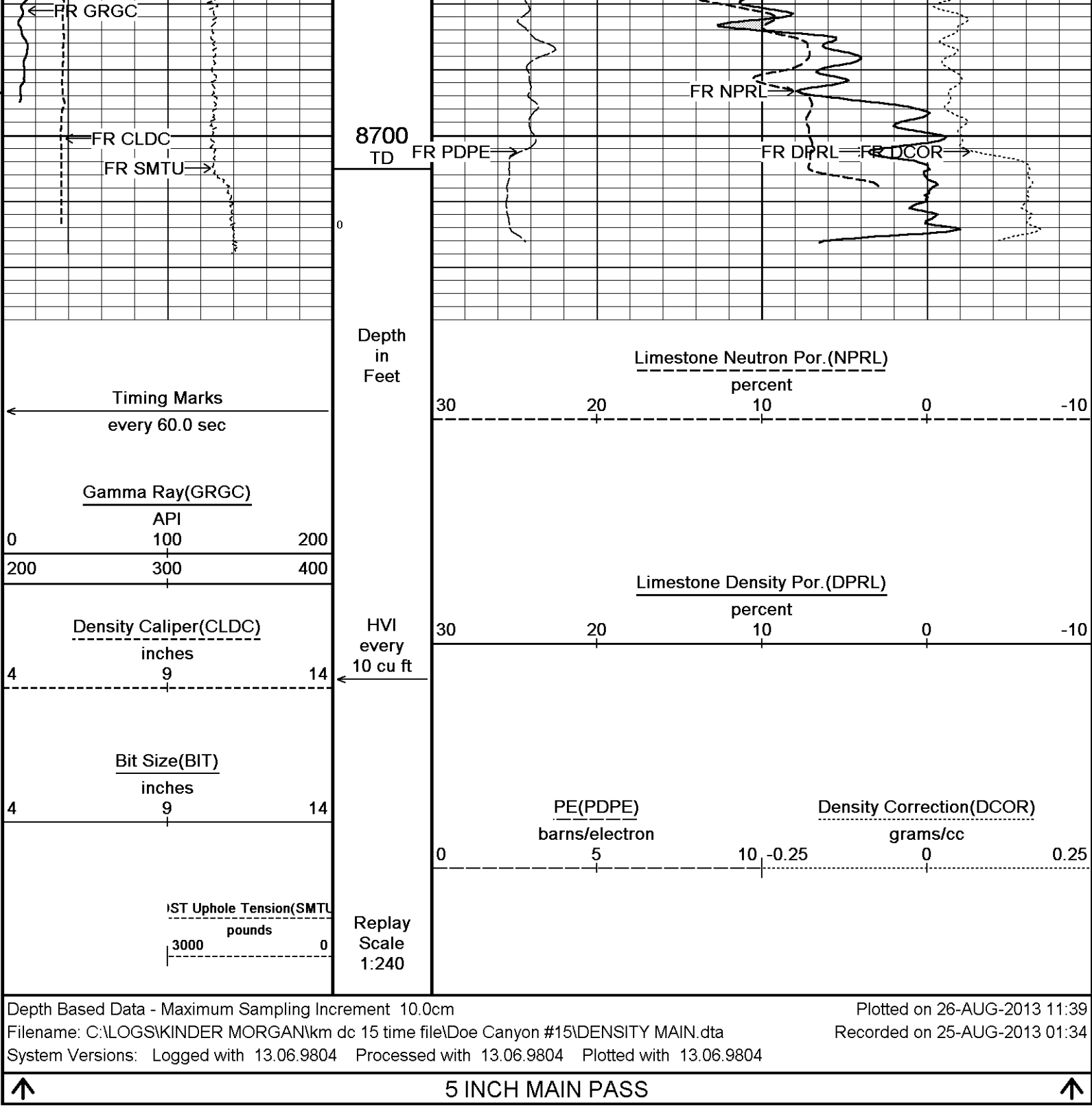
Casing Shoe

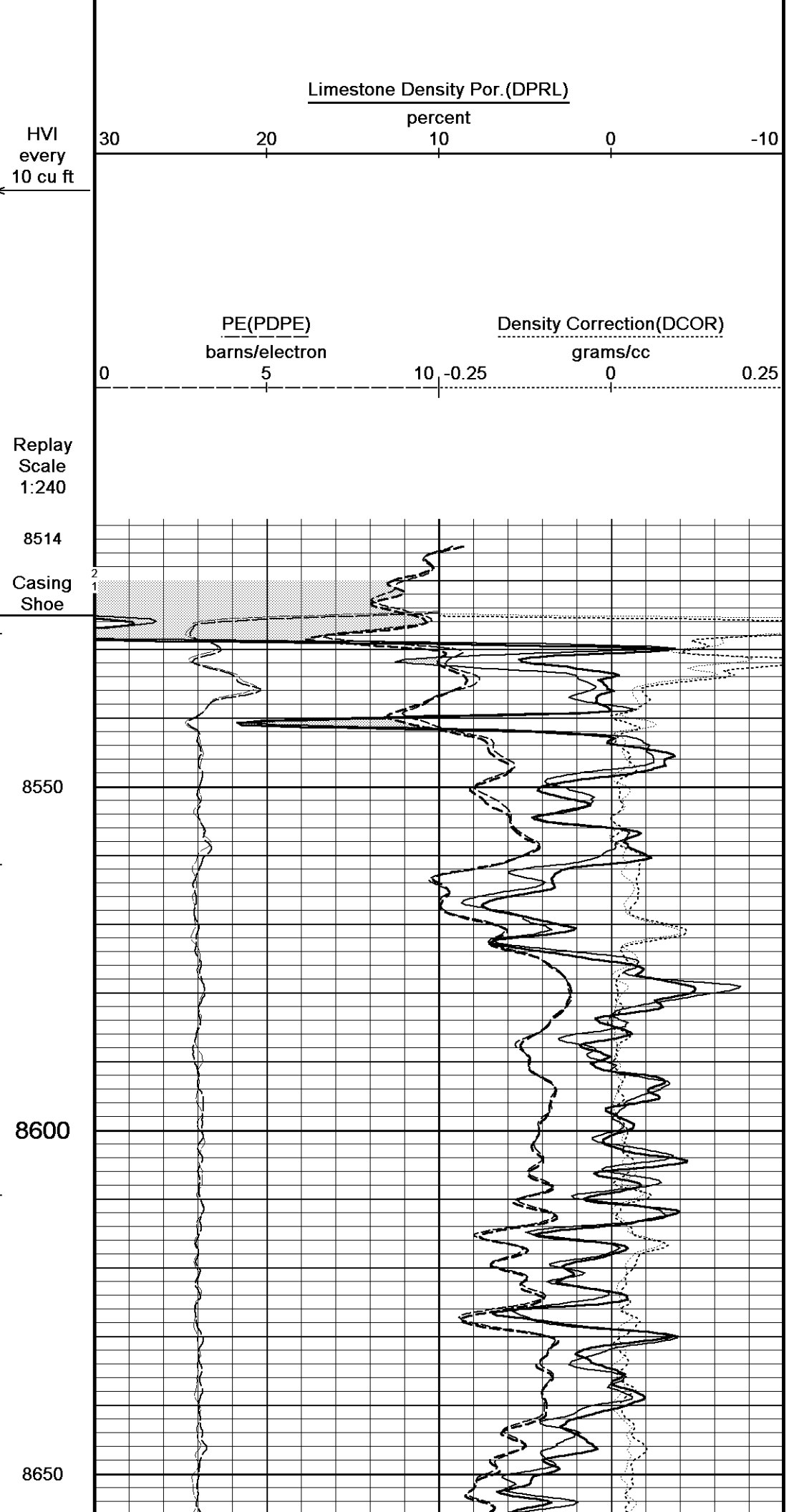
8550

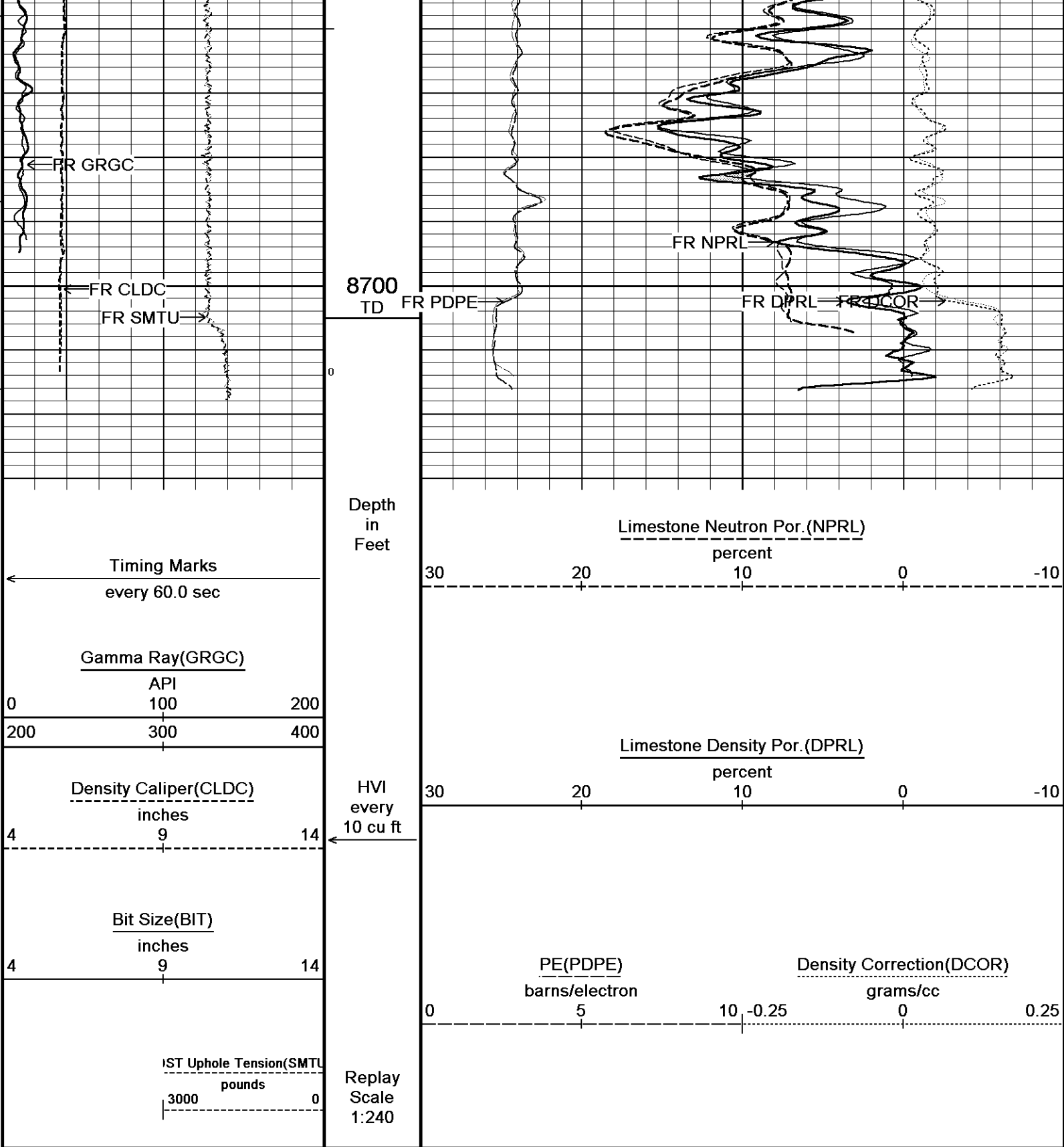
8600

8650









Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY MAIN.dta
Filename: C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY REPEAT.dta
System Versions: Logged with 13.06.9804 Processed with 13.06.9804 Plotted with 13.06.9804

↑ REPEAT OVERLAY ↑

BEFORE SURVEY CALIBRATION
C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY MAIN.dta

General Constants All 000 Last Edited on 25-AUG-2013,00:23

General Parameters		
Mud Resistivity	0.950	ohm-metres
Mud Resistivity Temperature	86.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	0.000	inches
Caliper for Differential Caliper	None	
Rwa Parameters		
Porosity used	N/A	
Resistivity used	N/A	
RWA Constant A	N/A	
RWA Constant M	N/A	
SW/APOR Tool Source		

Gamma Calibration MCG-D.A 287			Field Calibration on 24-AUG-2013,20:27
	Measured	Calibrated (API)	
Background	130	91	
Calibrator (Gross)	1028	717	
Calibrator (Net)	898	626	

Gamma Constants MCG-D.A 287			Last Edited on 19-AUG-2013,13:39
Gamma Calibrator Number	GRC005		
Mud Density	1.22	gm/cc	
Caliper Source for Processing	Bit Size		
Tool Position	Centred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	

Neutron Calibration MDN-B.J 428				Base Calibration on 06-AUG-2013 16:25	
				Field Check on 25-AUG-2013,00:20	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far		Near	Far
	3150	95		3714	110
Ratio	33.103			33.764	
Field Calibrator at Base					
				Calibrated (cps)	
				1529	2295
Ratio				0.666	
Field Check					
				Calibrated (cps)	
				1724	2493
Ratio				0.666	

Neutron Constants MDN-B.J 428			Last Edited on 25-AUG-2013,00:22
Neutron Source Id	PN 295		
Neutron Jig Number	6532NK		
Epithermal Neutron	No		
Caliper Source for Processing	Density Caliper		
Stand-off	0.00	inches	
Mud Density	1.00	gm/cc	
Limestone Sigma	7.10	cu	
Sandstone Sigma	7.00	cu	
Dolomite Sigma	4.70	cu	
Formation Pressure Source	None		
Formation Pressure	N/A	kpsi	
Temperature Source	Constant Value		
Temperature	68.00	degrees F	
Mud Salinity	0.00	kppm	
Salinity Correction	Not Applied		
Formation Fluid Salinity Source	None		
Formation Fluid Salinity	N/A		

Photo Density Calibration MPD-C.A 281				Base Calibration on 06-AUG-2013 15:57	
				Field Check on 25-AUG-2013,00:18	
Density Calibration					
Base Calibration		Measured		Calibrated (sdu)	
		Near	Far	Near	Far
Reference 1		52953	25232	59814	31141
Reference 2		21426	2444	24943	2546
Field Check at Base					
		1238.7	1321.2		
Field Check					
		1238.5	1322.9		
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background		215	1103		
Reference 1		20887	52754	0.400	0.368
Reference 2		5853	21283	0.279	0.272
Field Check at Base					
	215.2	1102.9			
Field Check					
	216.1	1103.4			

Density Constants MPD-C.A 281			Last Edited on 25-AUG-2013,00:19		
Density Source Id	DNCE 687				
Nylon Calibrator Number	DACD 696				
Aluminium Calibrator Number	271				
Density Shoe Profile	8 inch				
Caliper Source for Processing	Density Caliper				
PE Correction to Density	Not Applied				
Mud Density	1.00	gm/cc			
Mud Density Z/A Multiplier	1.11				
Mud Filtrate Density	1.00	gm/cc			
Dry Hole Mud Filtrate Density	1.00	gm/cc			
DNCT	0.00	gm/cc			
CRCT	0.00	gm/cc			
Density Z/A Correction	Hybrid				
Matrix Density (gm/cc)	Depth (ft)				
2.71	0.00				
0.00	0.00				
0.00	0.00				
0.00	0.00				
0.00	0.00				
0.00	0.00				
0.00	0.00				
0.00	0.00				

Caliper Calibration MPD-C.A 281			Base Calibration on 06-AUG-2013 16:05		
			Field Calibration on		
Base Calibration					
Reading No		Measured	Calibrator Size (in)		
1		17039	3.99		
2		25760	5.96		
3		34240	7.96		
4		42480	9.85		
5		51584	11.88		
6		N/A	N/A		
Field Calibration					
		Measured Caliper (in)	Actual Caliper (in)		

DOWNHOLE EQUIPMENT

C:\LOGS\KINDER MORGAN\km dc 15 time file\Doe Canyon #15\DENSITY MAIN.dta

3/8" Triple Cone Cable Head (MCB C A)
 MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
 SHA-J.A 313 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

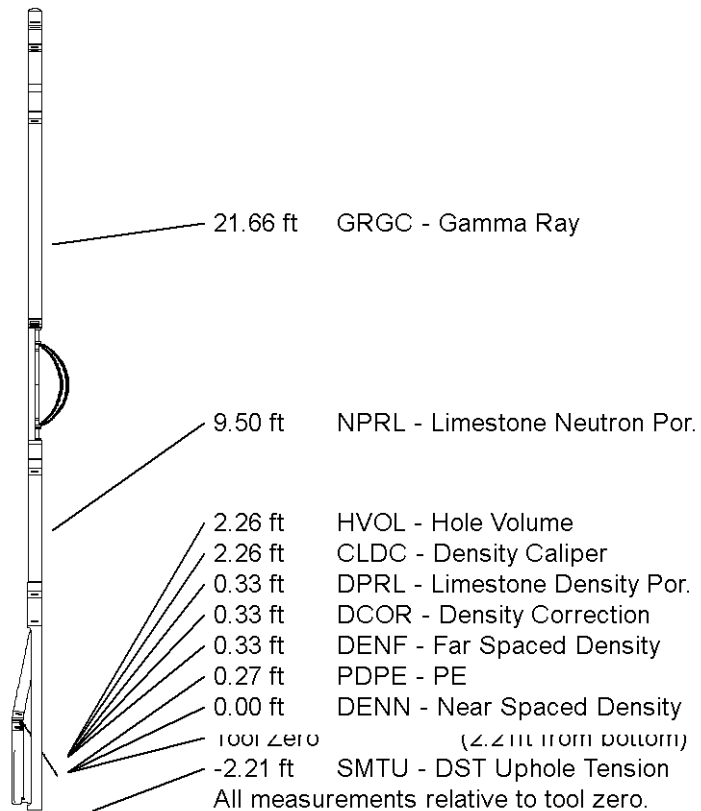
Compact Comms Gamma
 MCG-D.A 287 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
 MIS-D.B 702 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
 MDN-B.J 428 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
 MPD-C.A 281 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Total Length: 32.91 ft Weight: 275.6 lb



COMPANY KINDER MORGAN CO2 Co. L.P

WELL DOE CANYON #15

FIELD DOE CANYON

PROVINCE/COUNTY DOLORES

COUNTRY/STATE U.S.A. / COLORADO

Elevation Kelly Bushing	7250.00	feet	First Reading	8585.00	feet
Elevation Drill Floor	7250.00	feet	Depth Driller	8710.00	feet
Elevation Ground Level	7227.00	feet	Depth Logger	8705.00	feet



Weatherford®

COMPENSATED DENSITY
 COMPENSATED NEUTRON
 LOG