

HALLIBURTON

COMPENSATED SPECTRAL NATURAL GAMMA

COMPANY WINDY HILL GAS STORAGE

WELL WINDY HILL #7-17S

FIELD UNNAMED

COUNTY MORGAN STATE COLORADO

COMPANY WINDY HILL GAS STORAGE

WELL WINDY HILL #7-17S

FIELD UNNAMED

COUNTY MORGAN STATE COLORADO

API No. 05087081460000

Location NE/SW 1748' FNL 2622' FWL

Other Services RWQH/GR HR/SD/DSN BCS

Sect 17 Twp 3N Rge 55W

Elev. : 4499.0 K.B. 4515.5

D.F. -----

G.L. 4499.0

Permanent Datum G.L. Elev 4499.0

Log measured from K.B. 16.5 ft. above perm. datum

Drilling measured from K.B. G.L. 4499.0

Date	02-19-2007	04-05-2007		
Run No.	ONE	TWO		
Depth - Driller	490'	5520'		
Depth - Logger	490'	5517'		
Bottom - Logged Interval	483'	5486'		
Top - Logged Interval	60'	478'		
Casing - Driller	30" @ 60.5'	20" @ 465'		
Casing - Logger	60'	478'		
Bit Size	26"	12.25"		
Type Fluid in Hole	WATER BASED	WATER BASED		
Dens. Visc.	9.1 55	9.2 50		
Ph Fluid Loss	9.0 N/A	9.0 7.0		
Source of Sample	FLOWLINE	FLOWLINE		
Rm @ Meas. Temp.	1.90 @ 61 F	0.60 @ 61 F	@	@
Rmf @ Meas. Temp.	1.36 @ 75 F	0.40 @ 75 F	@	@
Rmc @ Meas. Temp.	1.38 @ 75 F	0.49 @ 75 F	@	@
Source Rmf Rmc	CHART CHART	CHART CHART		
Rm @ BHT	1.331 @ 90 F	0.293 @ 132 F	@	@
Time Since Circ.	02-18 2345	04-04 1500		
Time on Bottom	02-19 0630	04-05 0140		
Max. Rec. Temp.	90 F @ TD	132 F @ TD	@	@
Equip. Location	9597 CASPER	9597 CASPER		
Recorded By	C. HEARN	E. KOON		
Witnessed By	J. KYLE	J. BROWNING		

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Service Ticket No.:	4957392	API Serial No.:	05087081460000	PGM Version:	XL v5.6		
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES			RESISTIVITY SCALE CHANGES				
Date Sample No.		Type Log	Depth	Scale Up Hole	Scale Down Hole		
Depth - Driller							
Type Fluid							
in Hole							
Dens. Visc.							
Ph Fluid Loss							
Source of Sample		RESISTIVITY EQUIPMENT DATA					
Rm @ Meas. Temp.	@	Run No.	Tool Type & No.	Pad Type	Tool Pos. Other		
Rmf @ Meas. Temp.	@	ONE	HRIDE #AB287	N/A	1.5" SO N/A		
Rmc @ Meas. Temp.	@	TWO	HRIDE #AB287	N/A	1.5" SO N/A		
Source Rmf Rmc							
Rm @ BHT	@						
Rmf @ BHT	@						
Rmc @ BHT	@						
EQUIPMENT DATA							
GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	TWO	Run No.	TWO	Run No.	TWO	Run No.	TWO
Serial No.	108646	Serial No.	350	Serial No.	A046	Serial No.	108722
Model No.	NGRT	Model No.	BCSD	Model No.	SDL-DC	Model No.	DSN II
Diameter	3.625"	No. of Cent.	2	Diameter	4.500"	Diameter	3.625"
Detector Model No.	102A	Spacing	2'	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs 137	Source Type	Am241Be
Length	4.000"	ISA / Y / NI	NO	Serial No	2370 GW	Serial No	DSN-83

Distance to Source	N/A	FWDA [Y/N]	NO	Strength	1.5 Ci	Strength	18.5 Ci							
LOGGING DATA														
GENERAL			GAMMA		ACOUSTIC			DENSITY			NEUTRON			
Run	Depth		Speed	Scale		Scale			Scale			Scale		
No.	From	To	Ft/Min	L	R	L	R	Matrix	L	R	Matrix	L	R	Matrix
ONE	490'	60'	REC	0	150	.60	0	55.5	.60	0	2.65	.60	0	SAND
TWO	5517	478'	REC	0	150	.60	0	55.5	.60	0	2.65	.60	0	SAND
DIRECTIONAL INFORMATION														
Maximum Deviation			deg. @			KOP								
Remarks:														
PRESENTATION AS PER CUSTOMER REQUEST.														
AHV USES 8 5/8" PRODUCTION CASING.														
LARGE HOLE SIZE AND HOLE RUGOSITY AFFECTS TOOL RESPONSE.														
RWCH/NGRT/CSNG/BCS RUN IN COMBINATION.														
CHLORIDES: 9000 PPM.														
LATITUDE: 40.217 DEGREES NORTH.														
LONGITUDE: 103.550 DEGREES WEST.														
YOUR EXCELL 2000 CREW: B. SHORT, G. BREED, AND A. HENNEMAN										RIG: UNIT #134				
THANK YOU FOR USING HALLIBURTON. CASPER, WY (307-473-8200)														
<p>HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.</p> <p style="text-align: right;">HALLIBURTON</p>														

Current EXCELL-2000 Parameter Values

Depth: 67.167

Date: 05-Apr-2007 07:45:

Service Number: 2100

Software Version: 5.6

Mnemonic	Tool	Parameter Description	Value	Units
PERF	DITSHD	PERFORATED INTERVAL	NO	
TD	DITSHD	TOTAL DEPTH	5517.	FT
CS_ANT	DITSHD	CASING DEPTH (FOR ANNOTATION)	478.	FT
D4IN	D4TS	USE D4TG FOR INCLINATION?	NO	
GR_OK	GAMMA	DO GAMMA CALCULATIONS?	YES	
CASED	SHARED	CASED HOLE?	NO	
CASEOD	SHARED	CASING DIAMETER (OD)	8.625	Inches
MUDWT	SHARED	BOREHOLE FLUID WEIGHT	9.2	Pounds/Gal.
GRSO	GAMMA	GAMMA RAY STANDOFF	0.	Inches
BS	SHARED	BIT SIZE	17.5	Inches
FWSTOK	BCS	DO FWST CALCULATIONS?	YES	
WYLIE	BCS	ACOUSTIC POROSITY EQUATION	WYLE	
DTSHA	BCS	DELTA T SHALE	100.	uSec/Ft.
DTMAT	BCS	DELTA T MATRIX	55.5	uSec/Ft.
DTFLU	BCS	DELTA T FLUID?	189.	uSec/Ft.
RHOMAT	BCS	MATRIX DENSITY	2.65	Grams/CC
RHOFLU	BCS	FLUID DENSITY	1.	Grams/CC
DTFT	BCS	USE 1 OR 2 FT DT FOR POROSITY	2	Feet
ARCHA	BCS	ARCHIE A	0.62	
ARCHM	BCS	ARCHIE M	2.15	
FSEL	BCS	POROSITY SELECTION FOR F	ACOU	
USEFIX	BCS	USE MINIMUM FIXED THRESHOLD.	NO	
USENOI	BCS	USE NOISE THRESHOLD FOR PICK.	NO	
TDU_OK	TDUF	USE TDU DISPLAY CONTROLS?	YES	
CSNGOK	CSNGDT	DO CSNG CALCULATIONS?	YES	
EPOXYC	CSNGDT	CSNG EPOXY CASE	NO	
MUDKCL	CSNGDT	MUD PERCENT KCL (EX: 5.3%)	0.	%

MAIN PASS 5"=100'

Version No: 5.6 | hc:3.0

Data File: awind_7_17_run2.2.cls

Format File: CSNG.spc

Plot Time: 2007-04-05 07:44:54

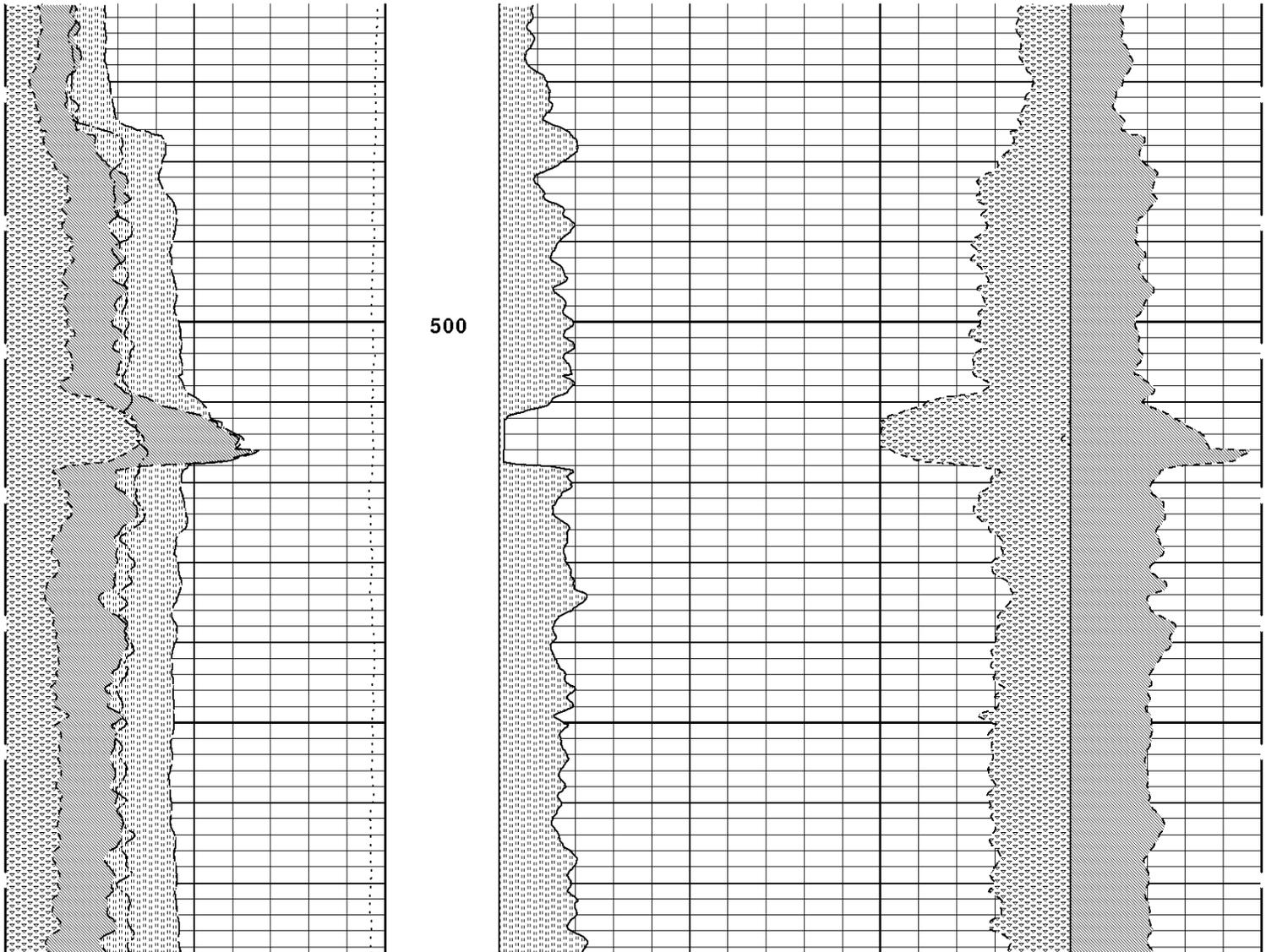
Log Time: 2007-04-05 01:39:16

Top Depth: 460.00

Bottom Depth: 5522.75

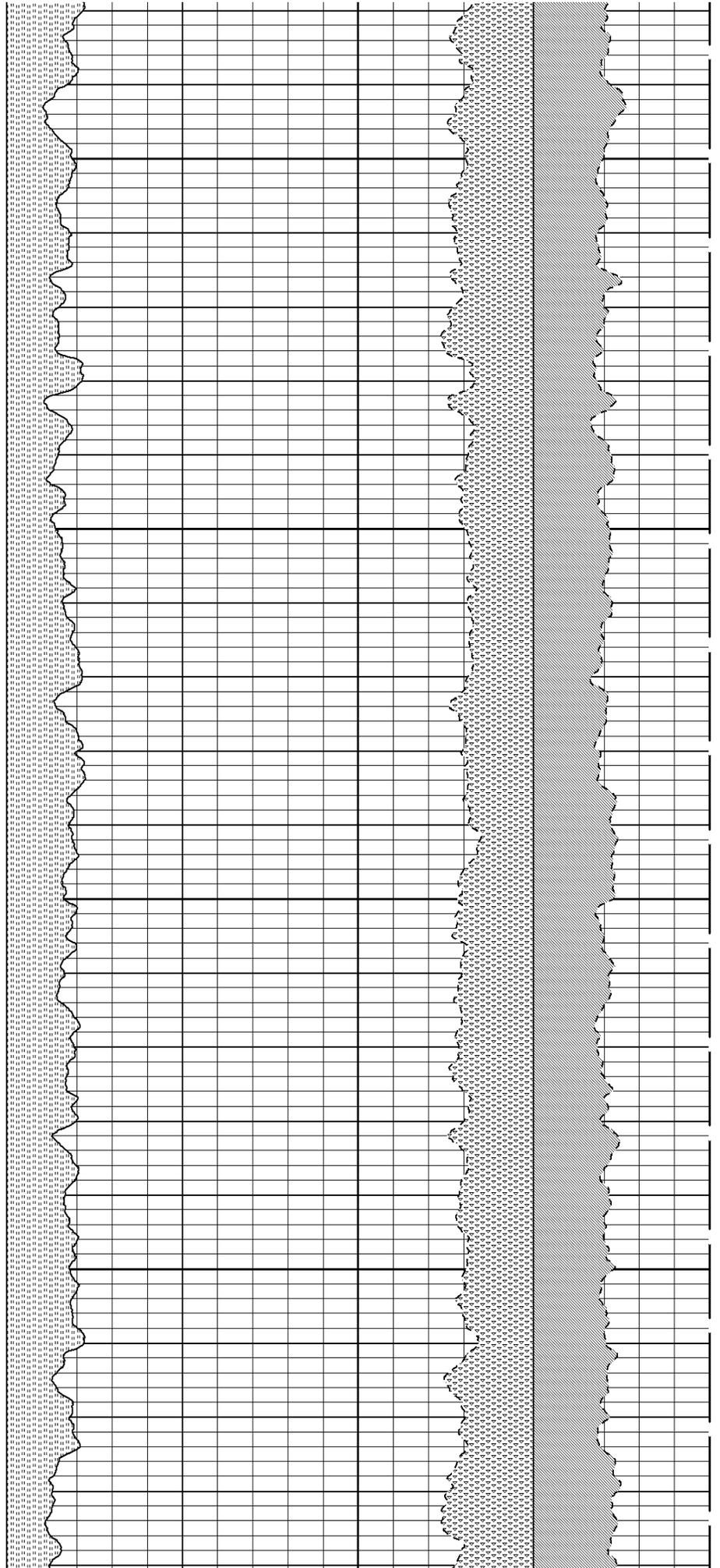
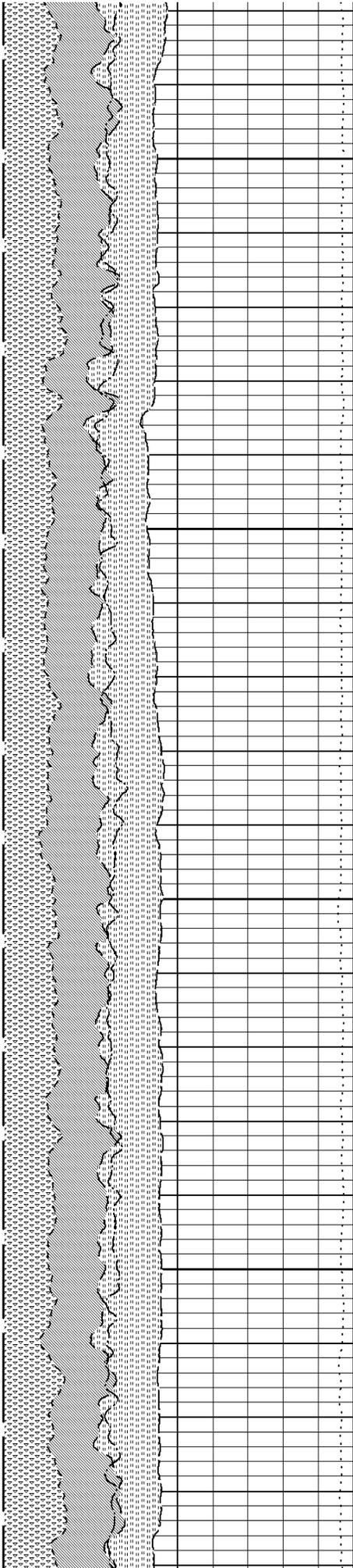
HALLIBURTON

GAMMA * TH 0 API 200 ----- GAMMA * KT 0 API 200 ----- GAMMA * KUT 0 API 200 ----- NOISE 100 COUNTS 0 ----- NGRT 0 API 200	1:240 FT.	URANIUM 0 PPM 20	THORIUM 0 PPM 0	POTASSIUM 0 PERCENT 5
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600

700



800

900
NOISE

1000

NGRT

GAMMA * KUT

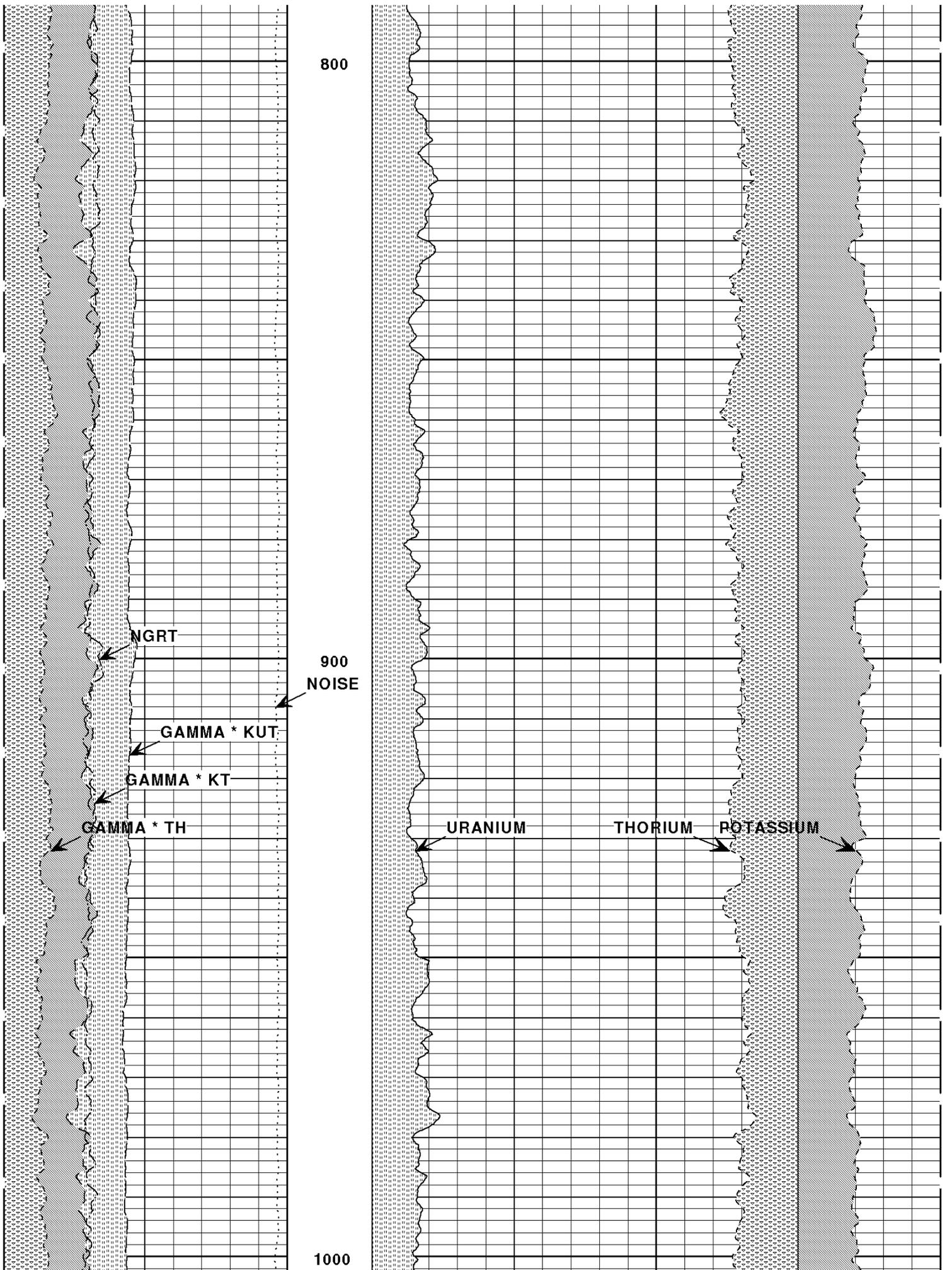
GAMMA * KT

GAMMA * TH

URANIUM

THORIUM

POTASSIUM



1100

1200

1300

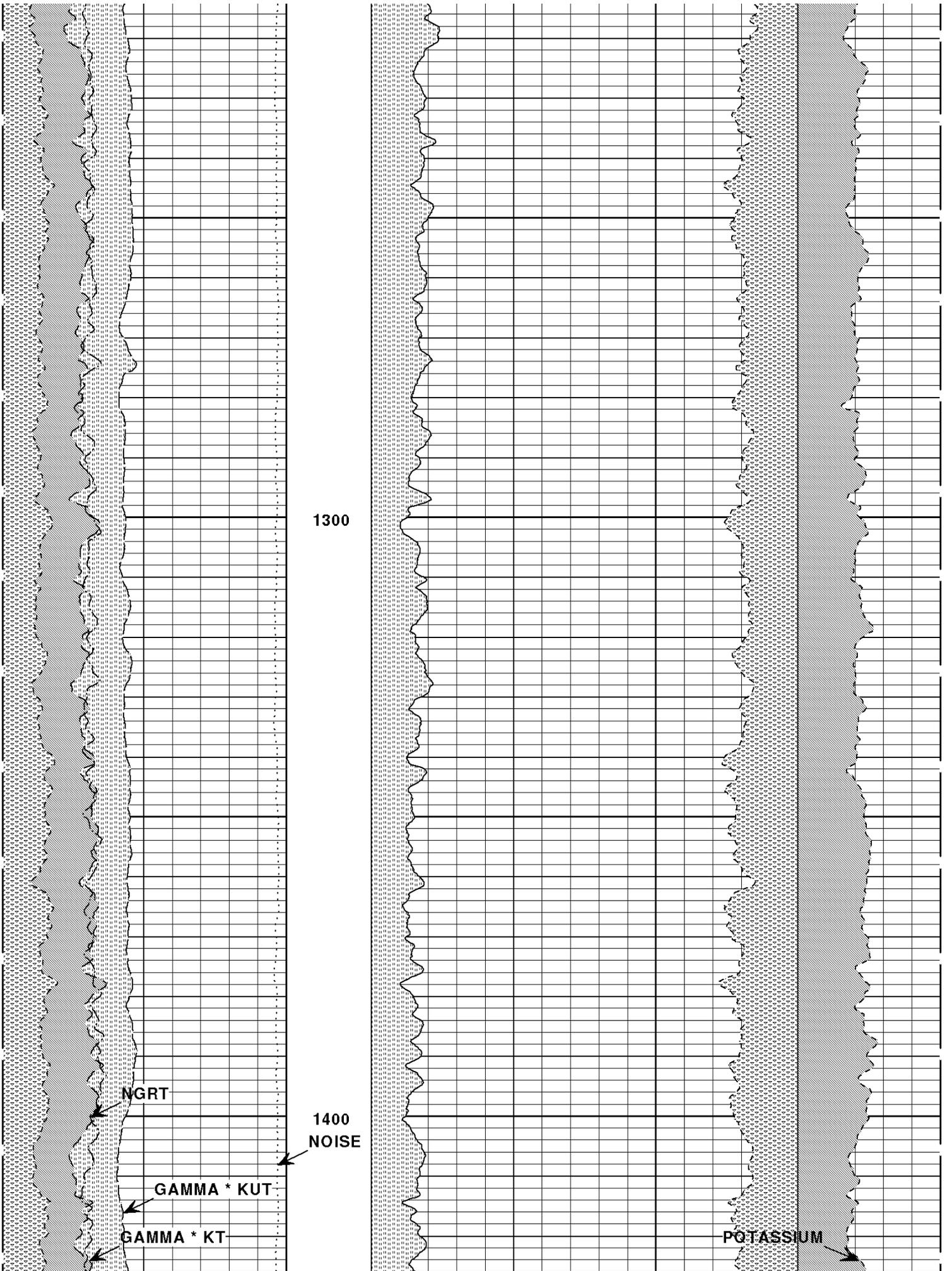
NGRT

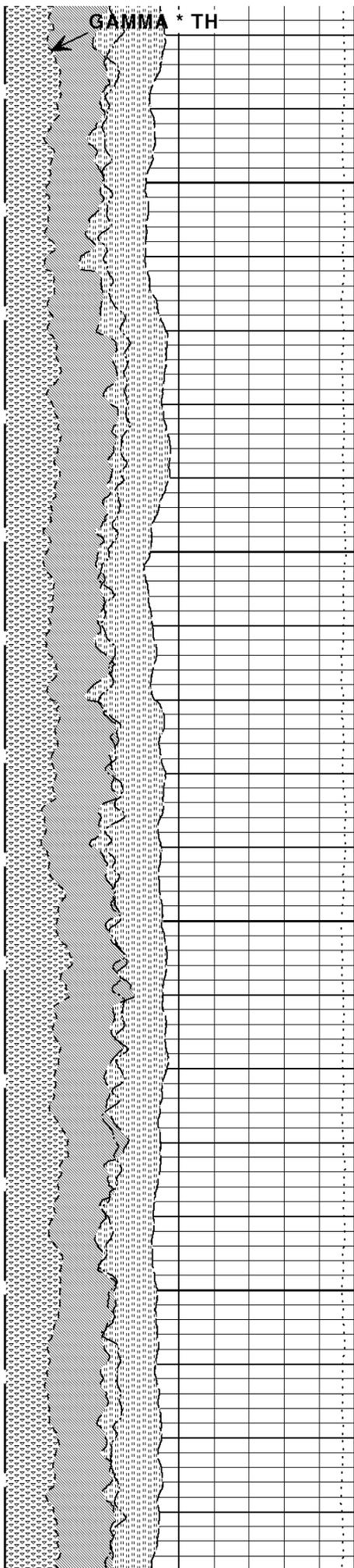
1400
NOISE

GAMMA * KUT

GAMMA * KT

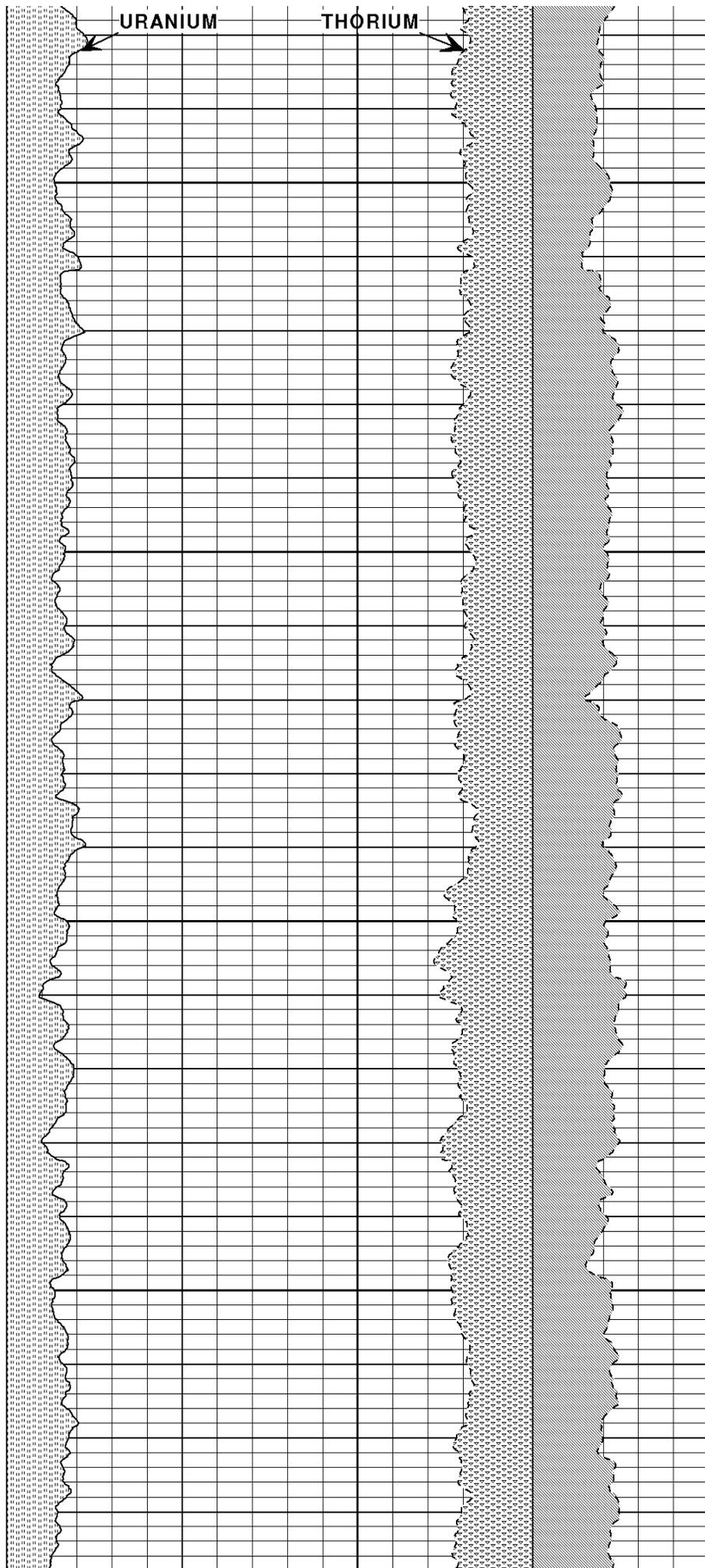
POTASSIUM





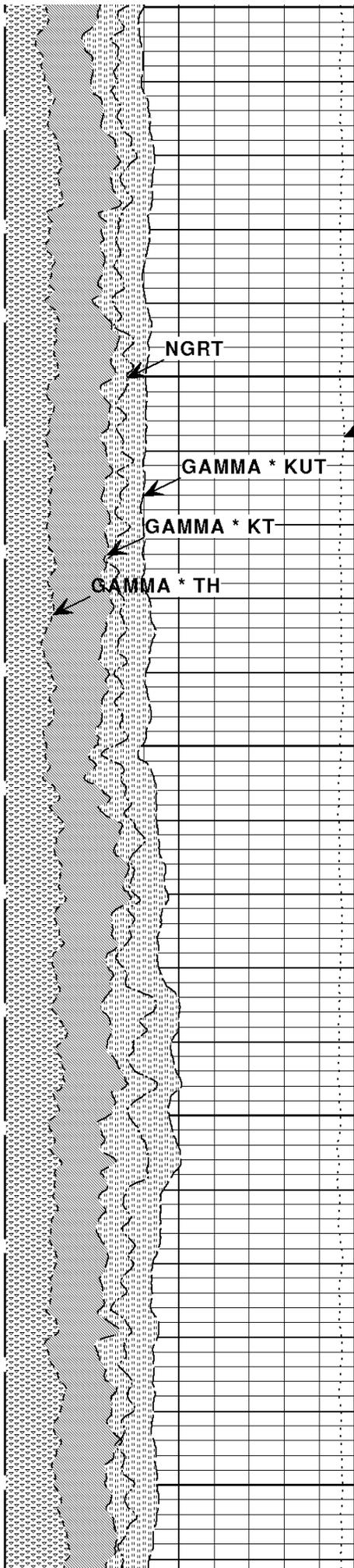
1500

1600



1700

1800



1900
NOISE

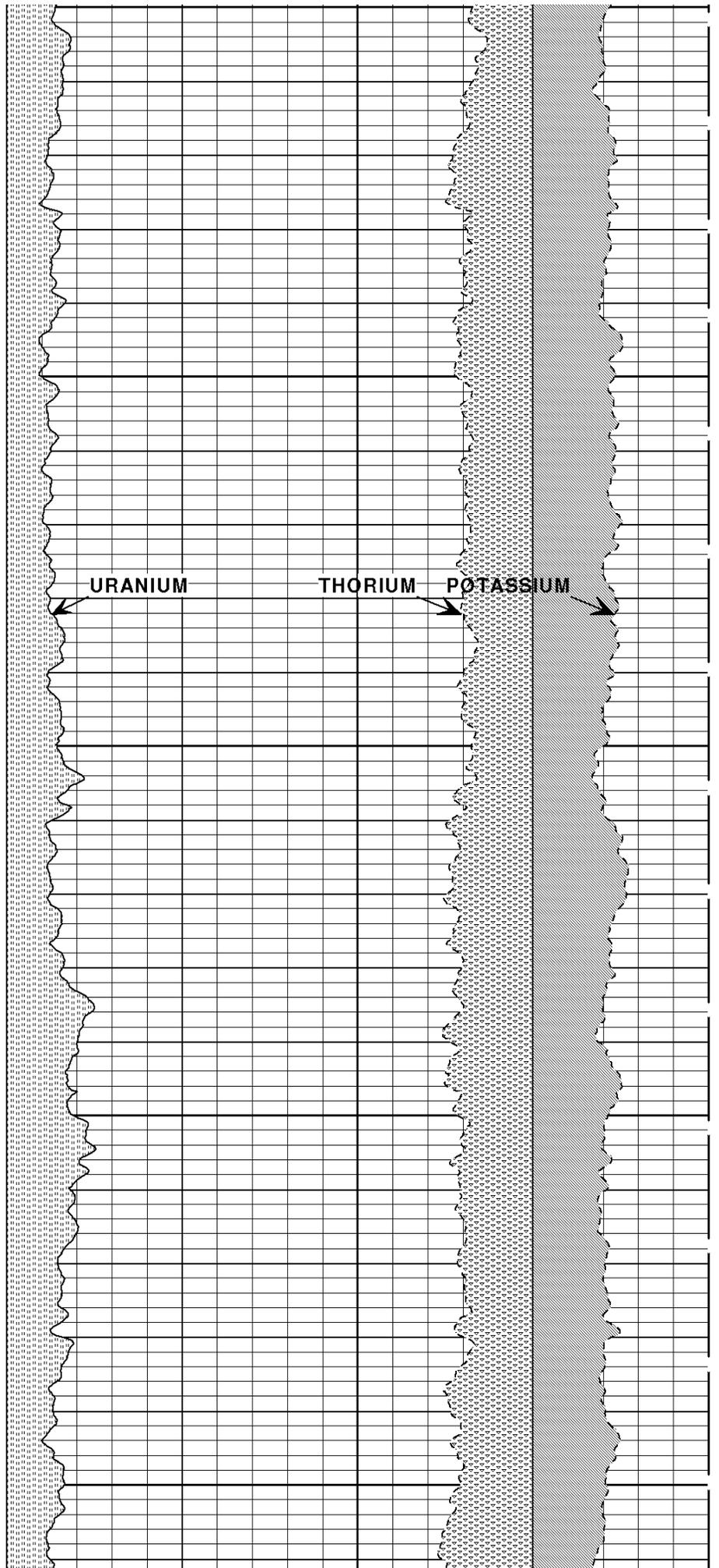
NGRT

GAMMA * KUT

GAMMA * KT

GAMMA * TH

2000



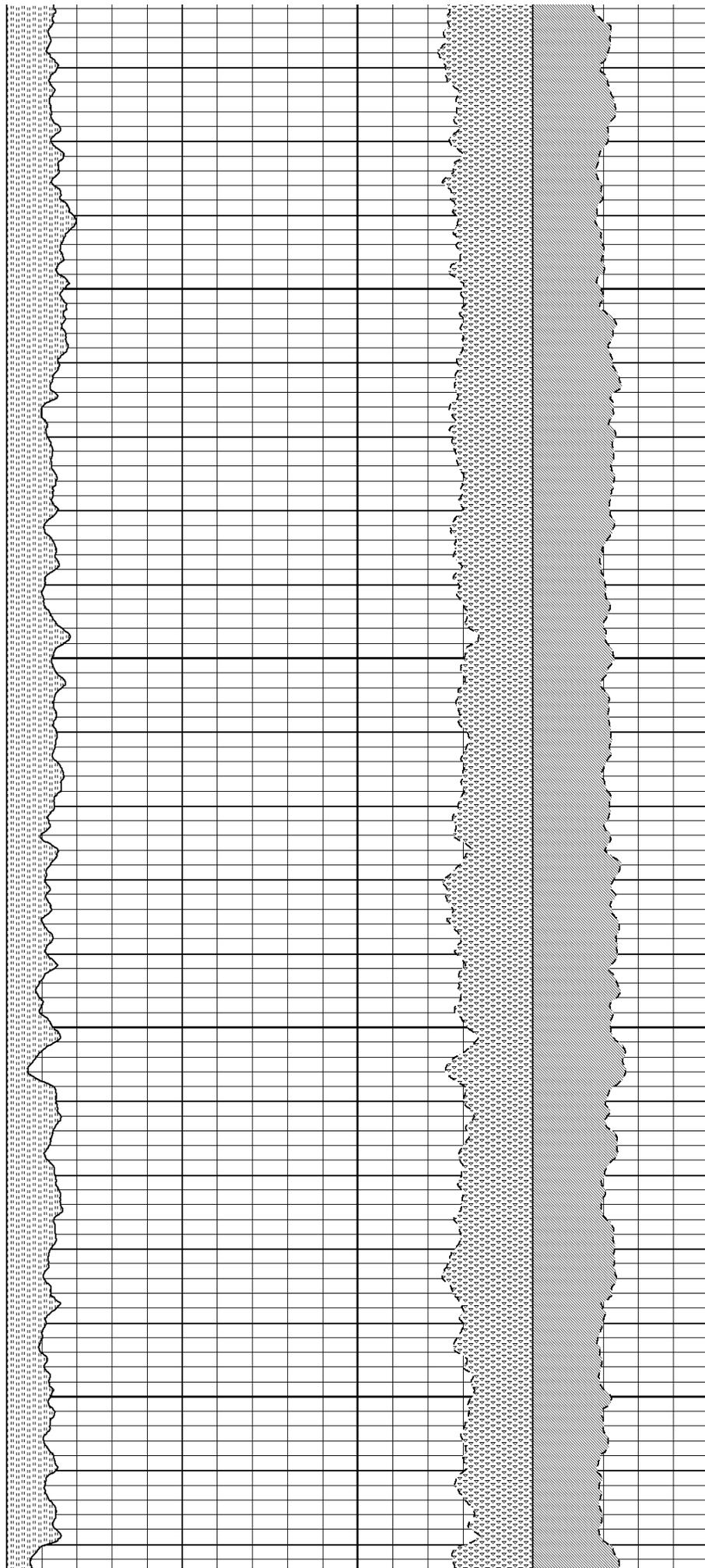
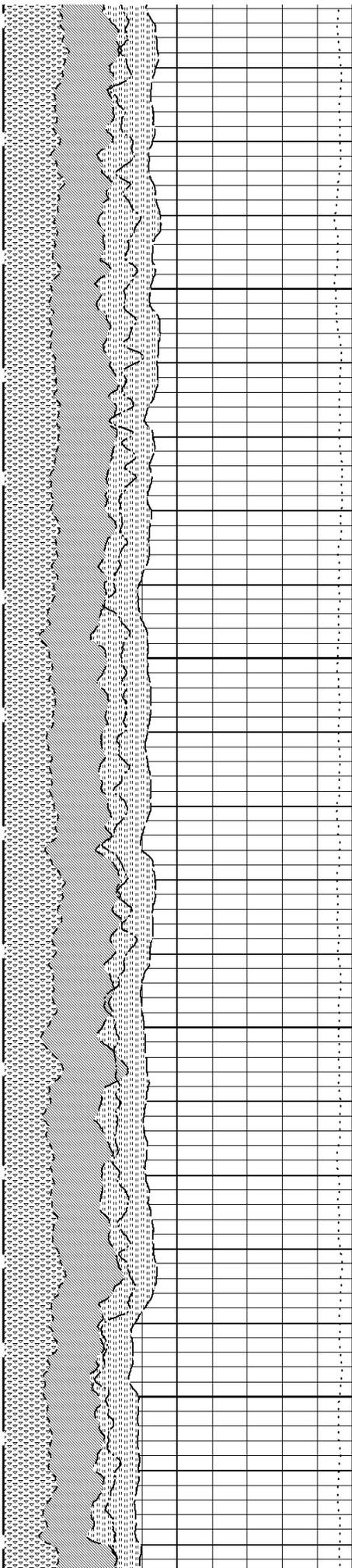
URANIUM

THORIUM

POTASSIUM

2100

2200



2300

2400
NOISE

NGRT

GAMMA * KUT

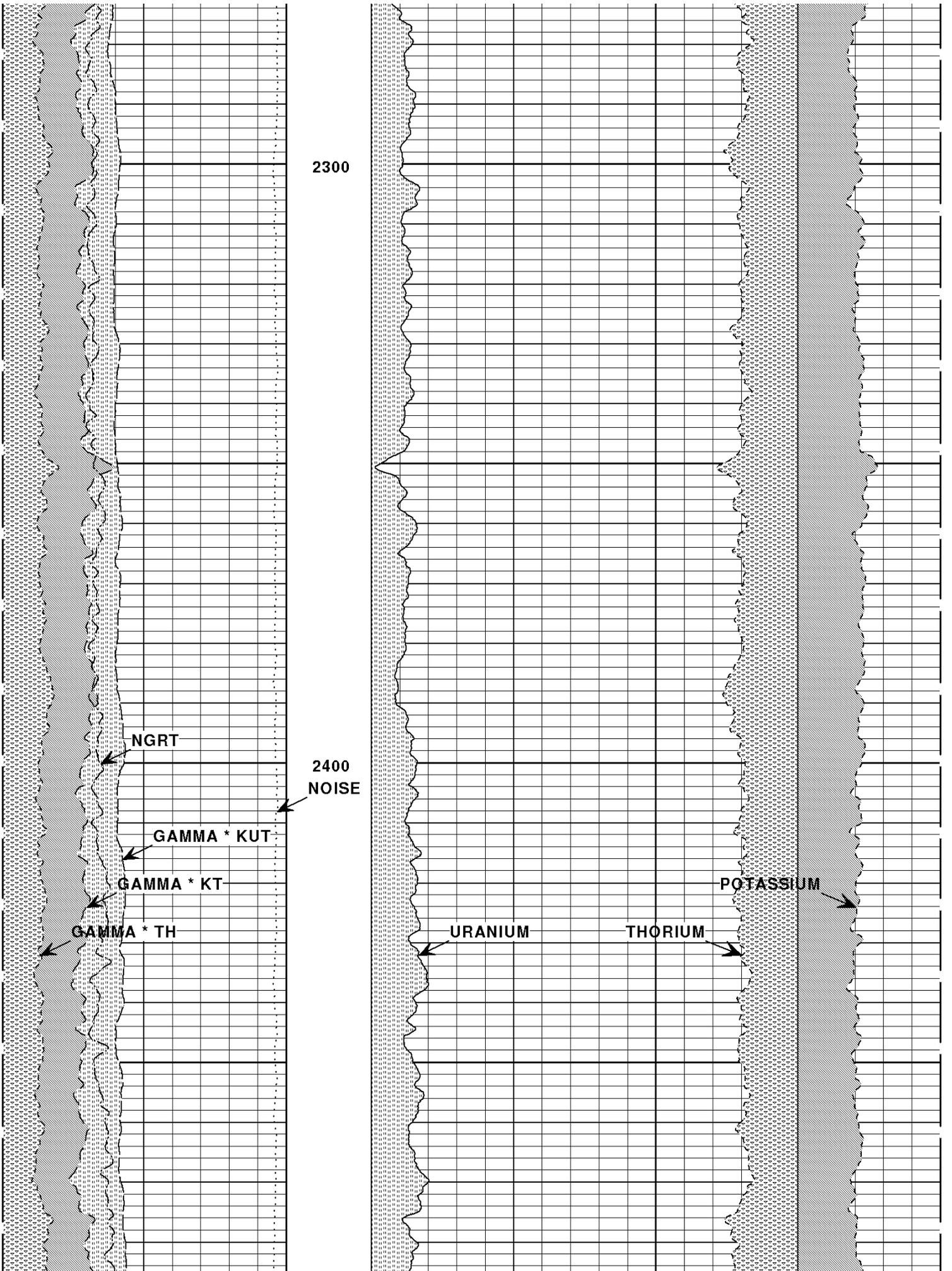
GAMMA * KT

GAMMA * TH

URANIUM

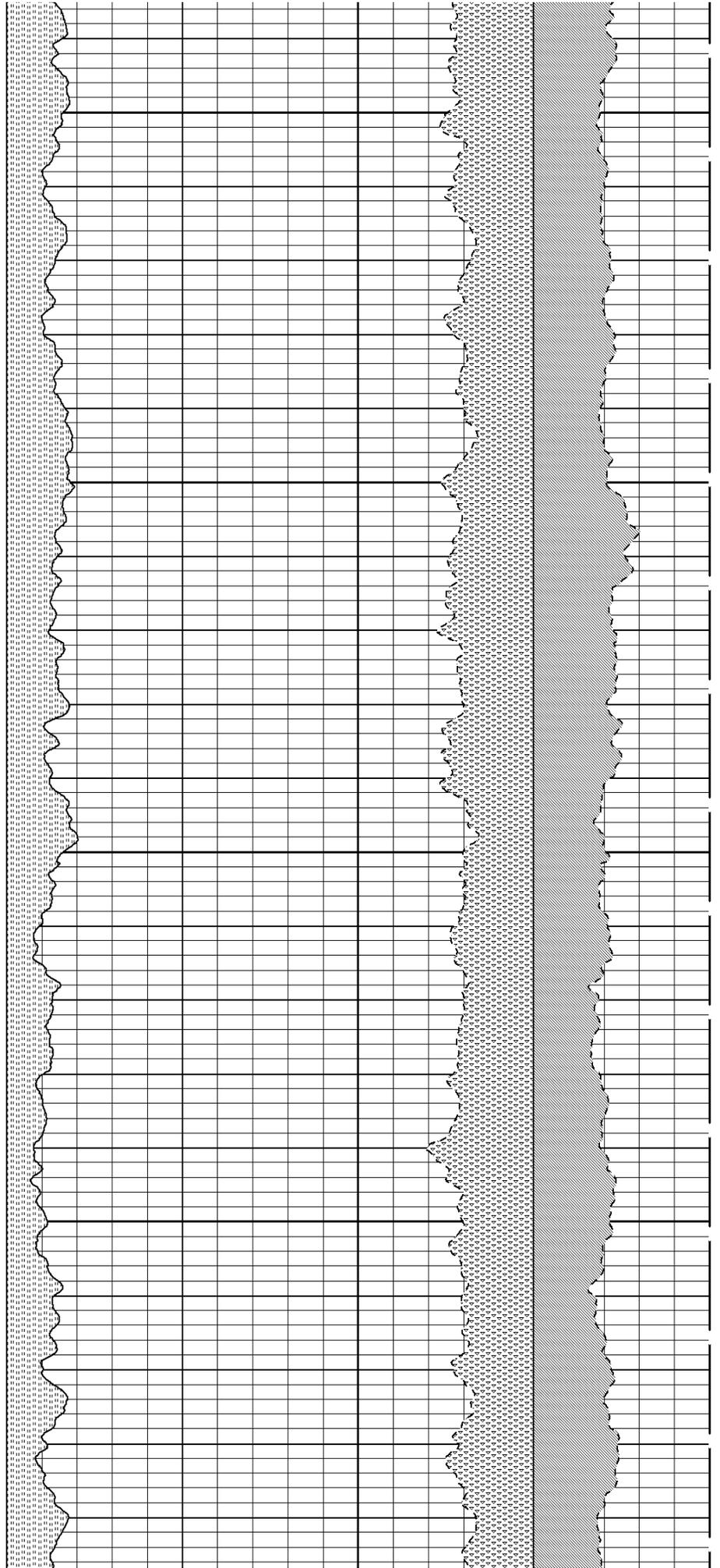
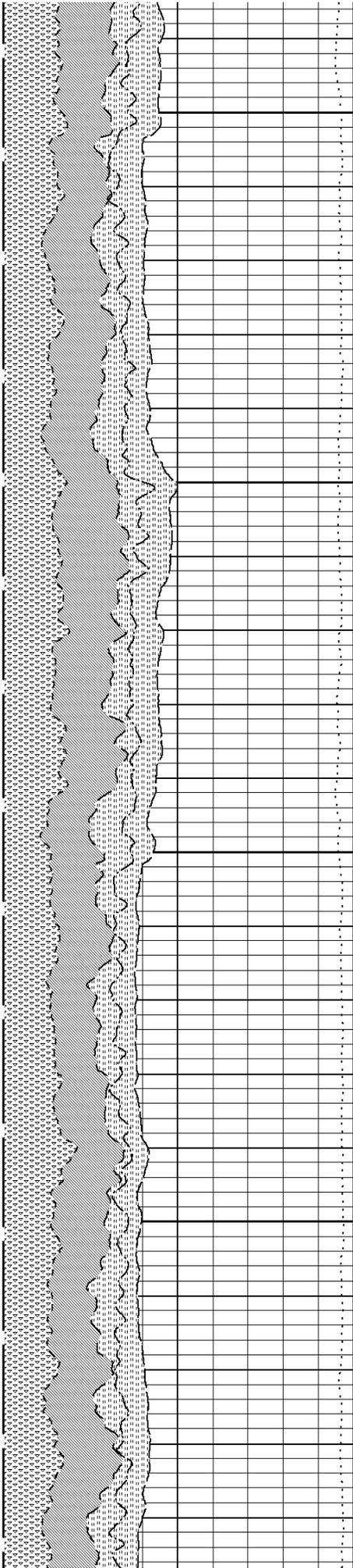
THORIUM

POTASSIUM



2500

2600

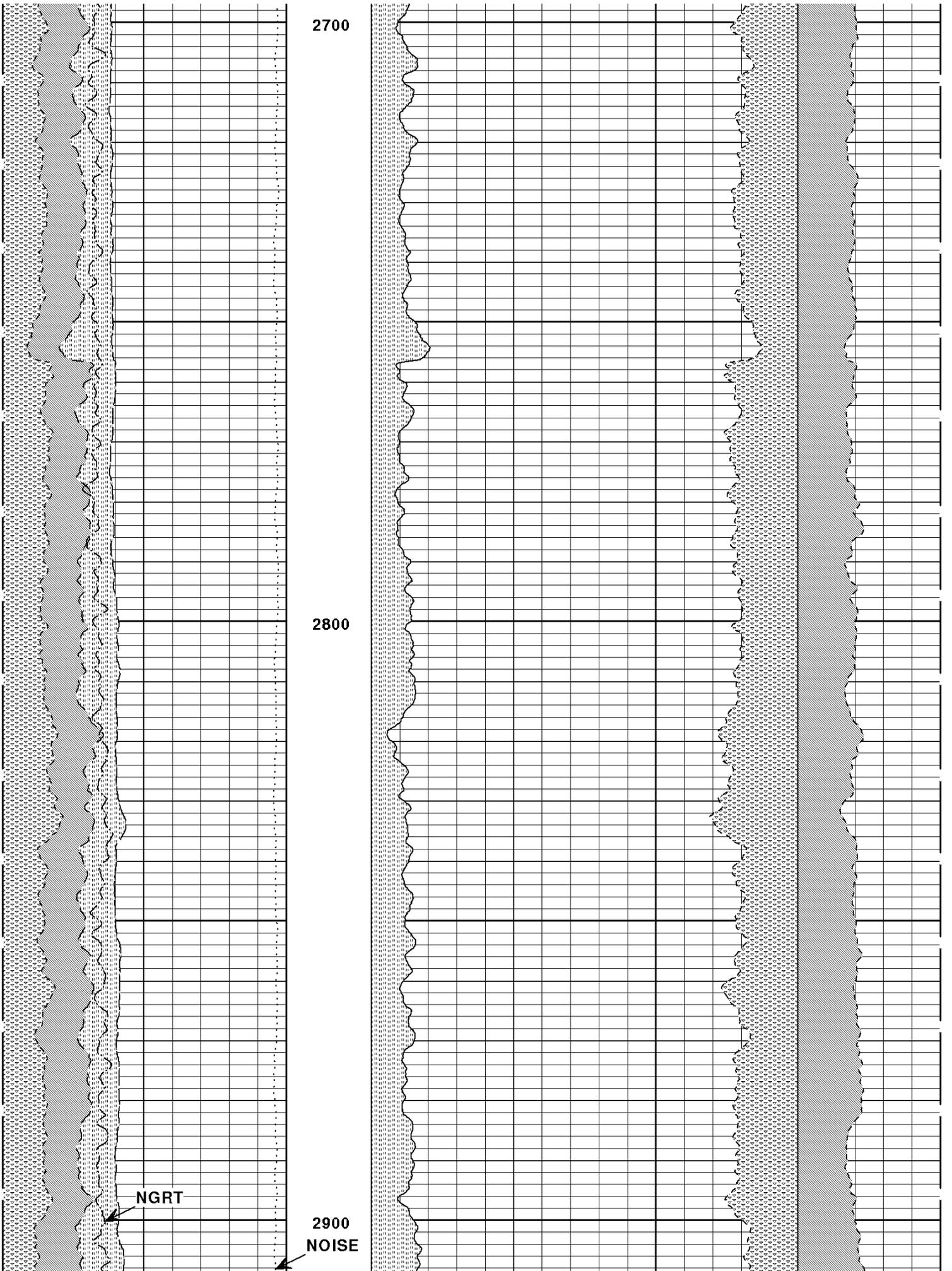


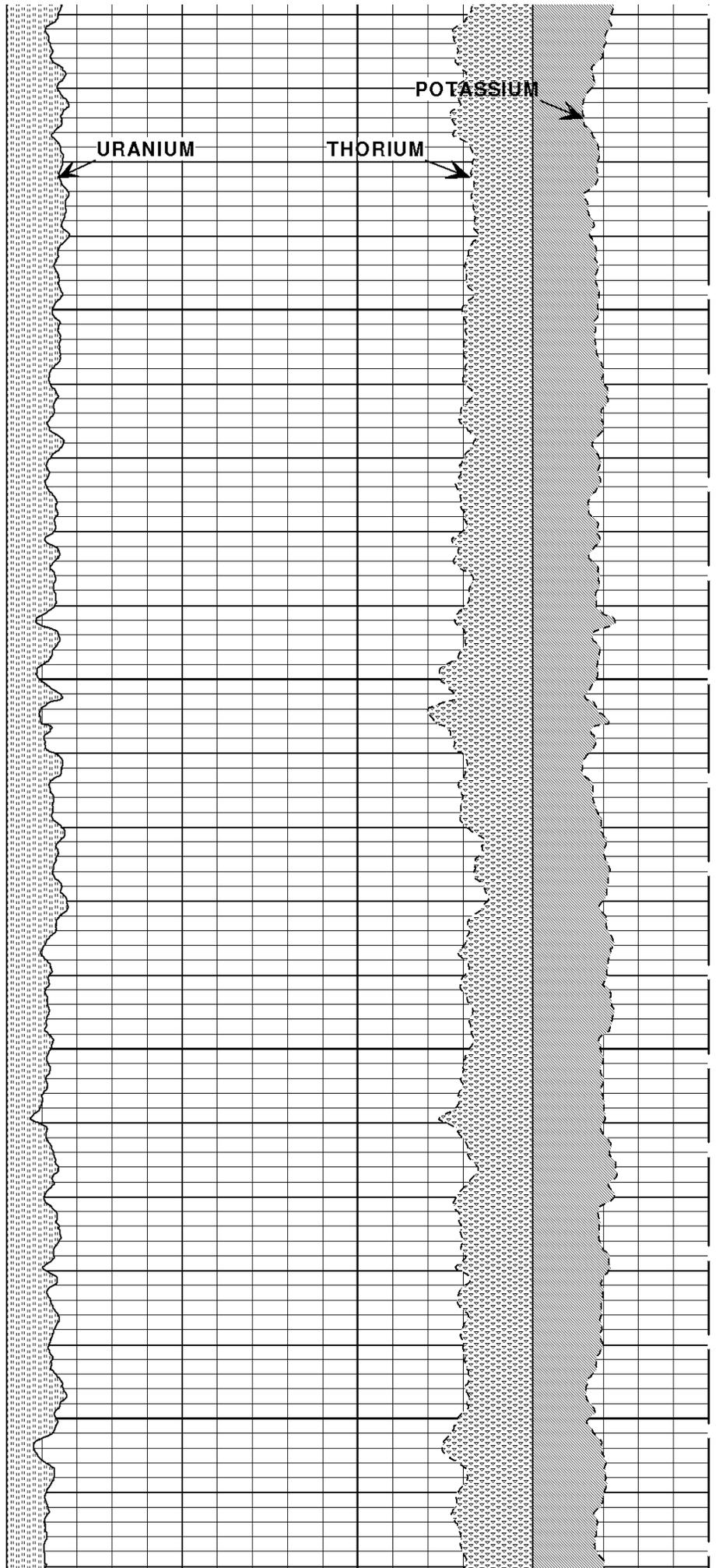
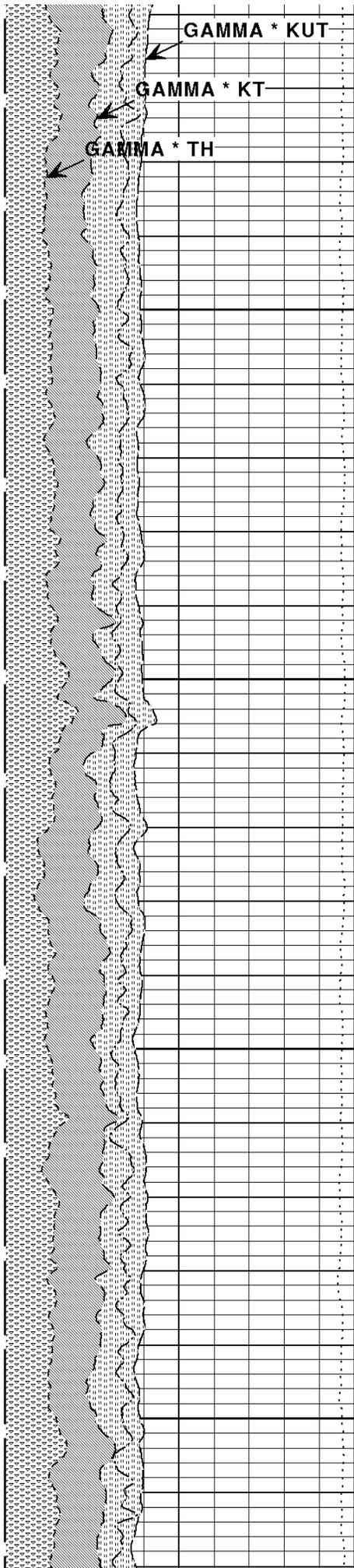
2700

2800

NGRT

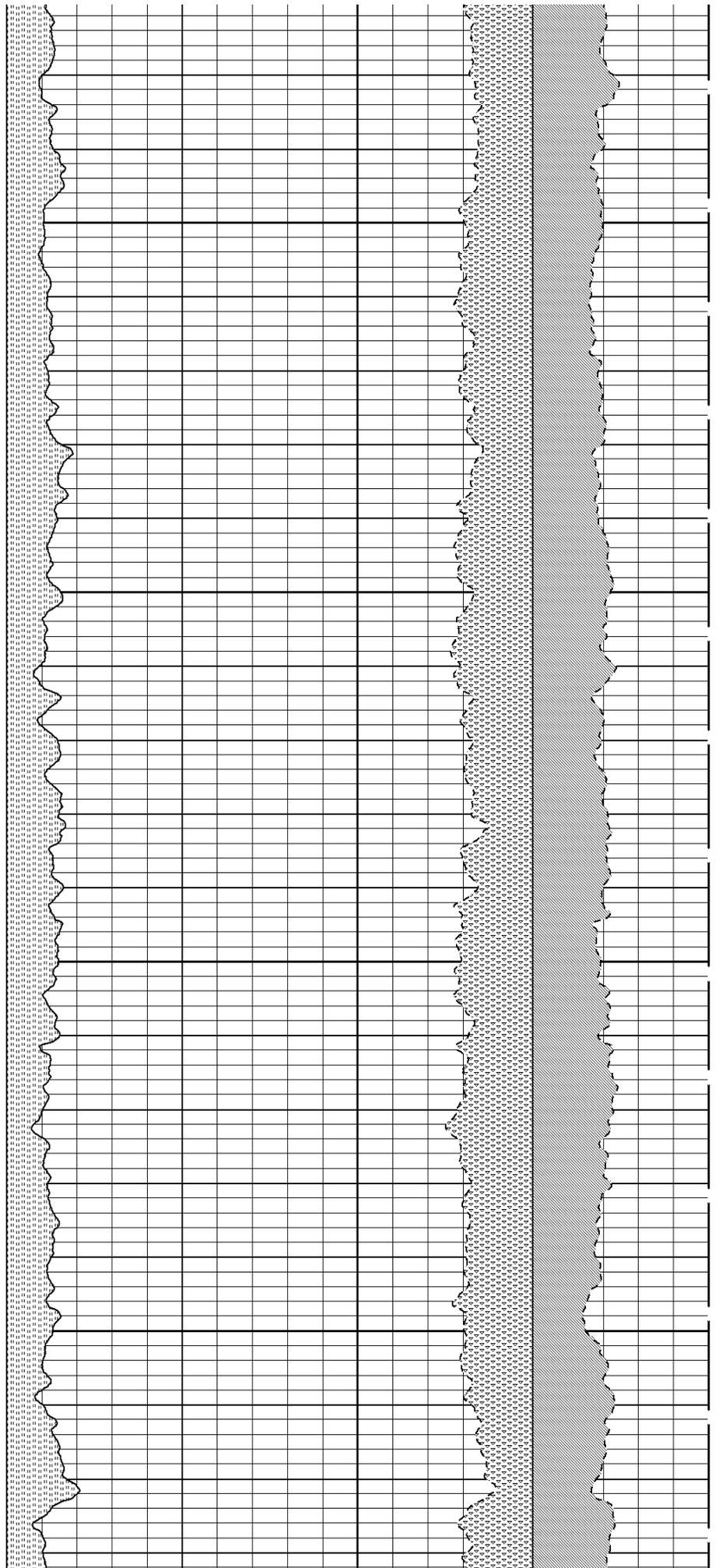
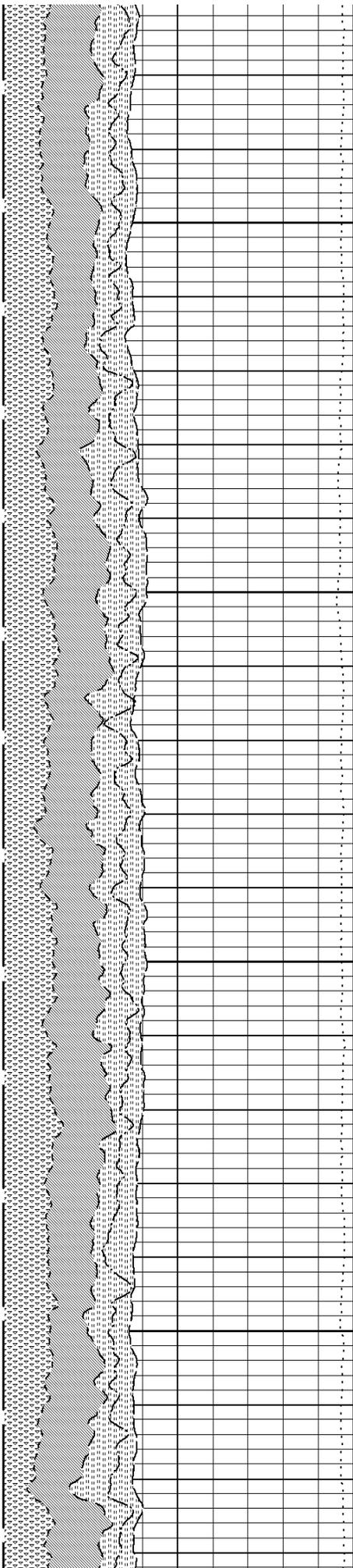
2900
NOISE

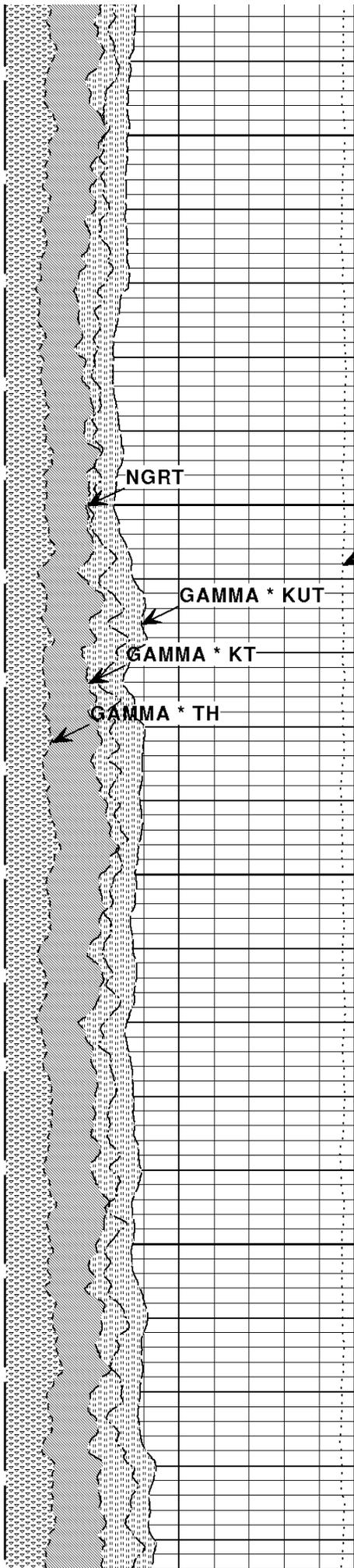




3200

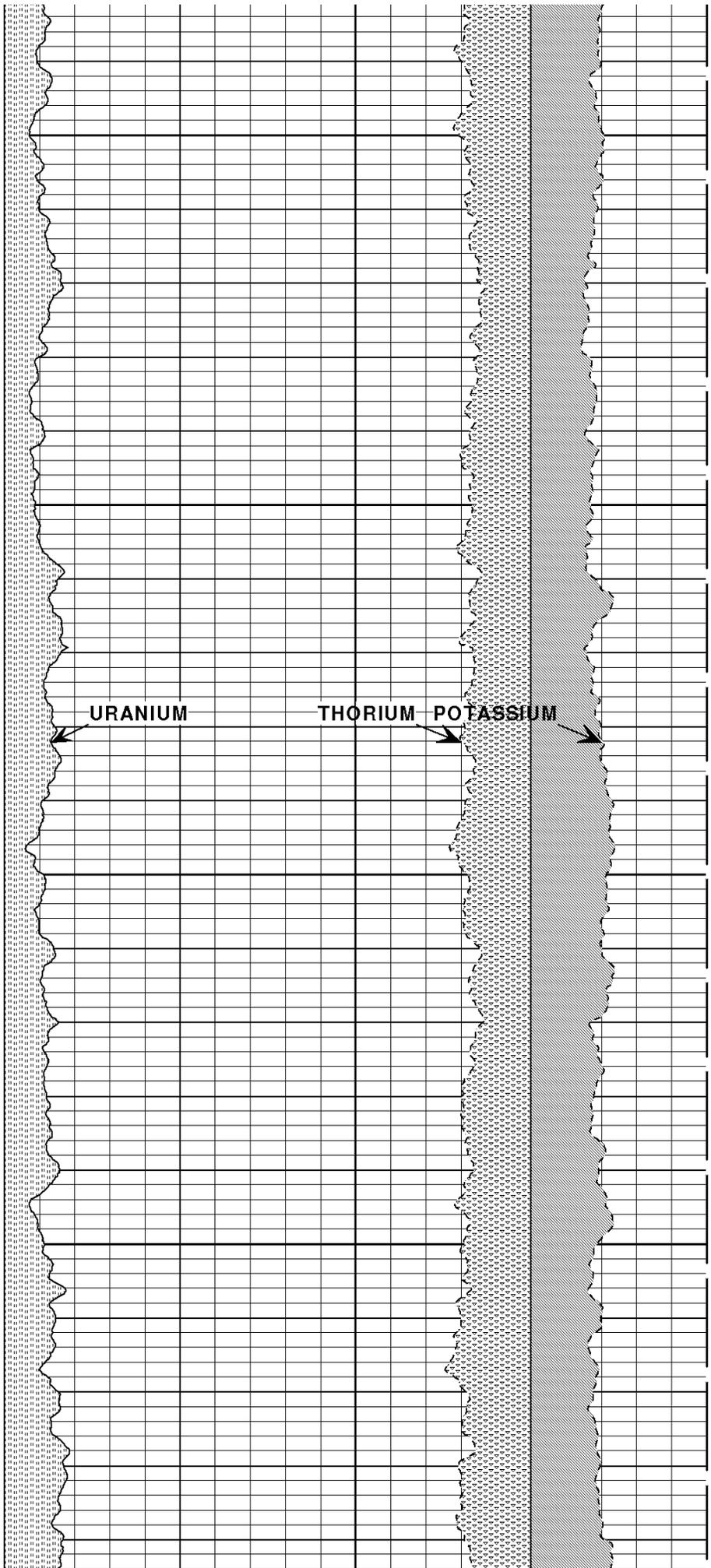
3300





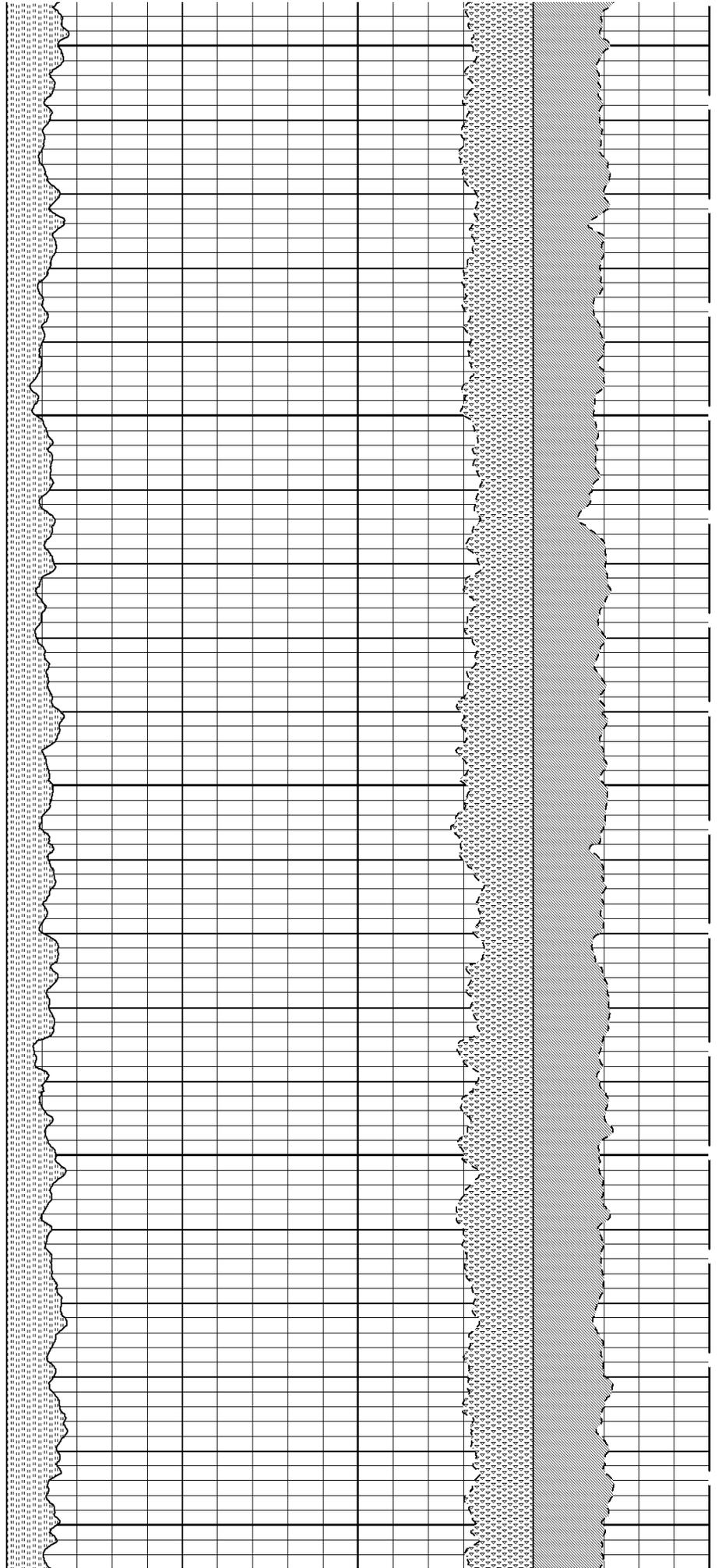
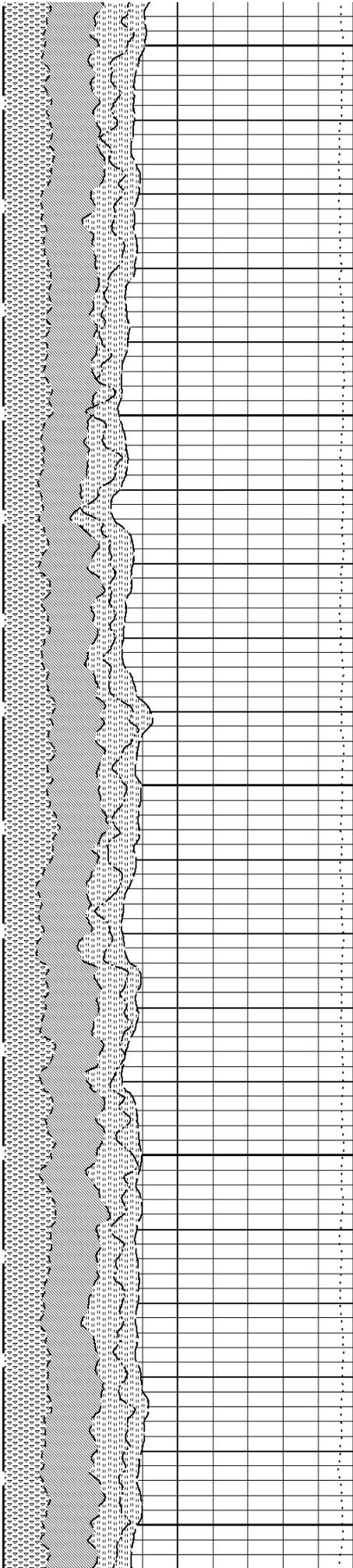
3400
NOISE

3500



3600

3700



3800

NGRT

3900
NOISE

GAMMA * KUT

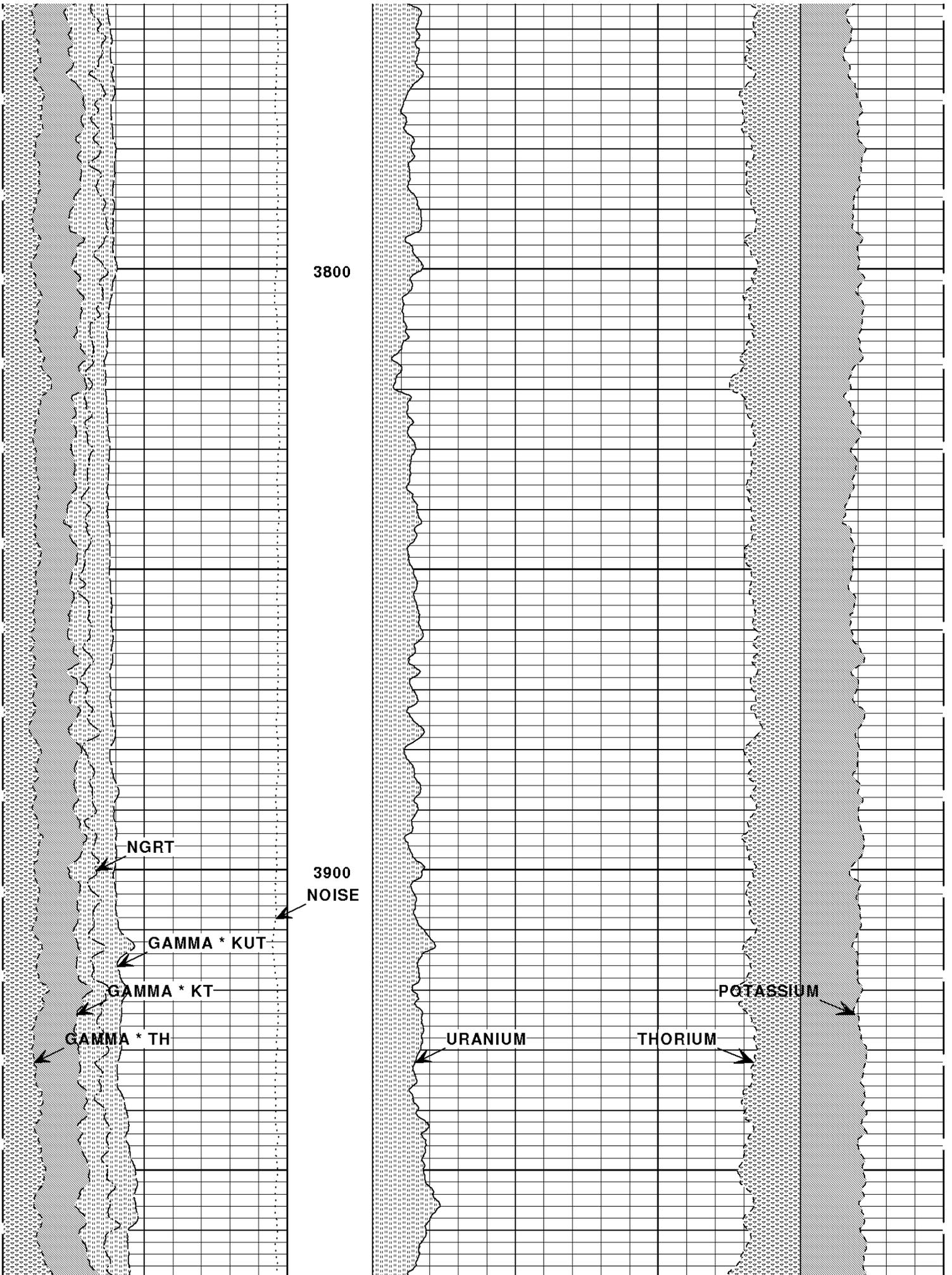
GAMMA * KT

GAMMA * TH

URANIUM

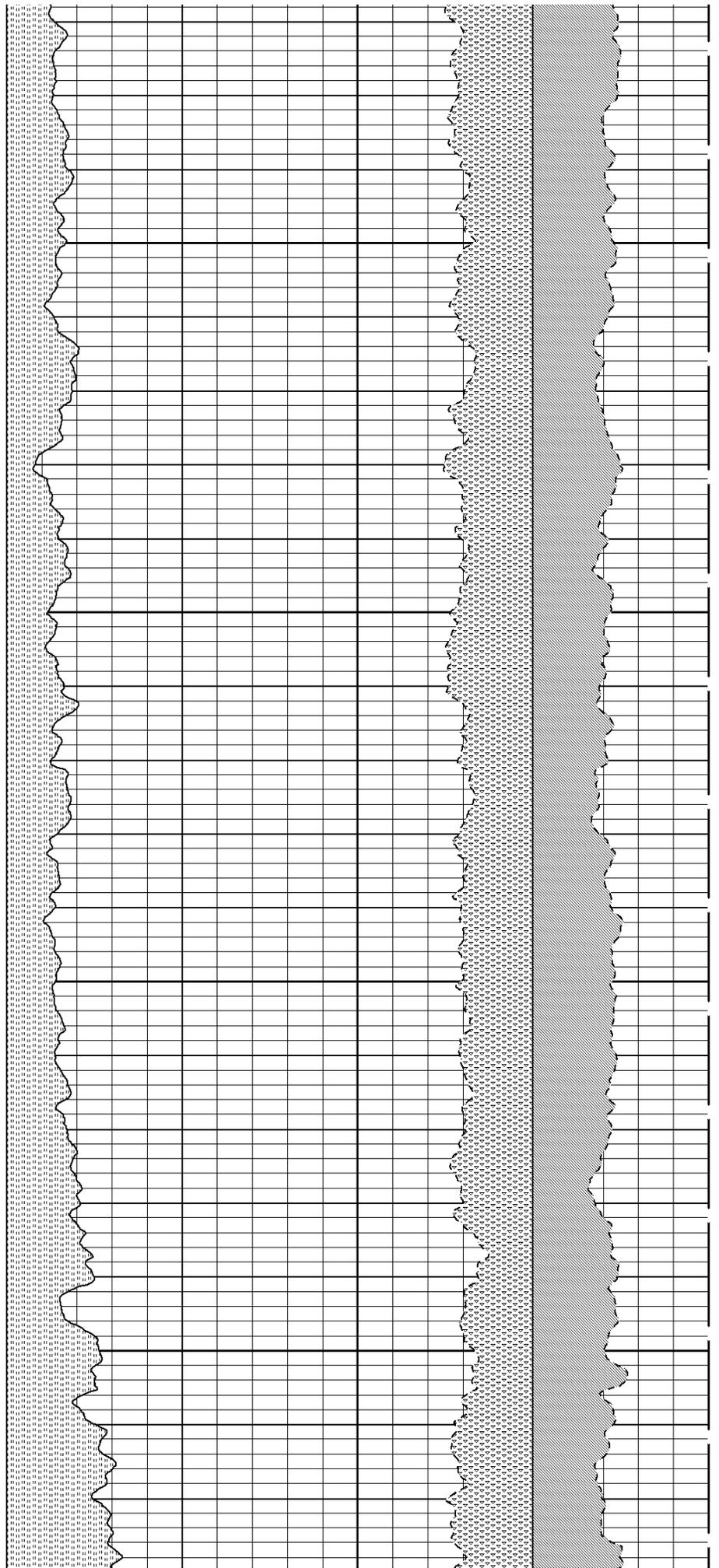
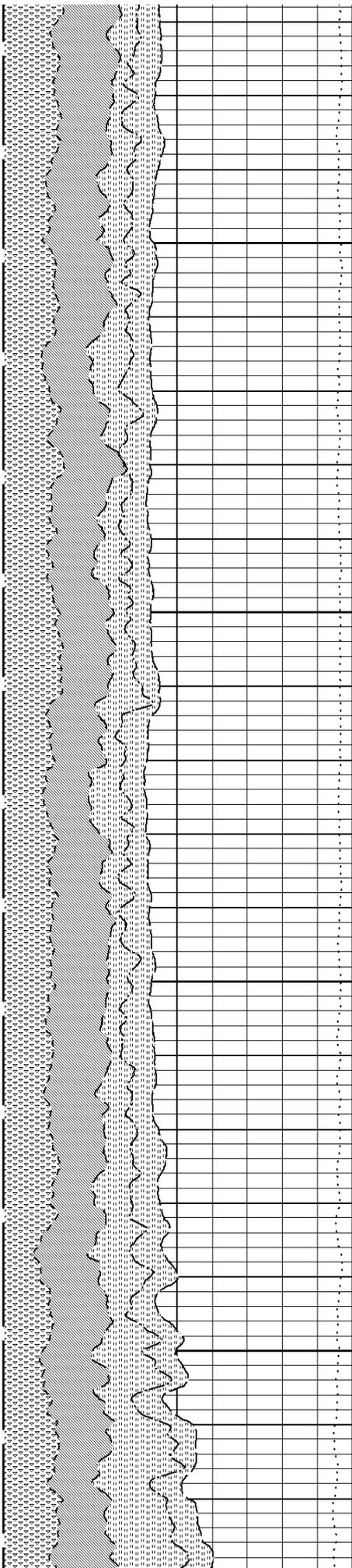
THORIUM

POTASSIUM



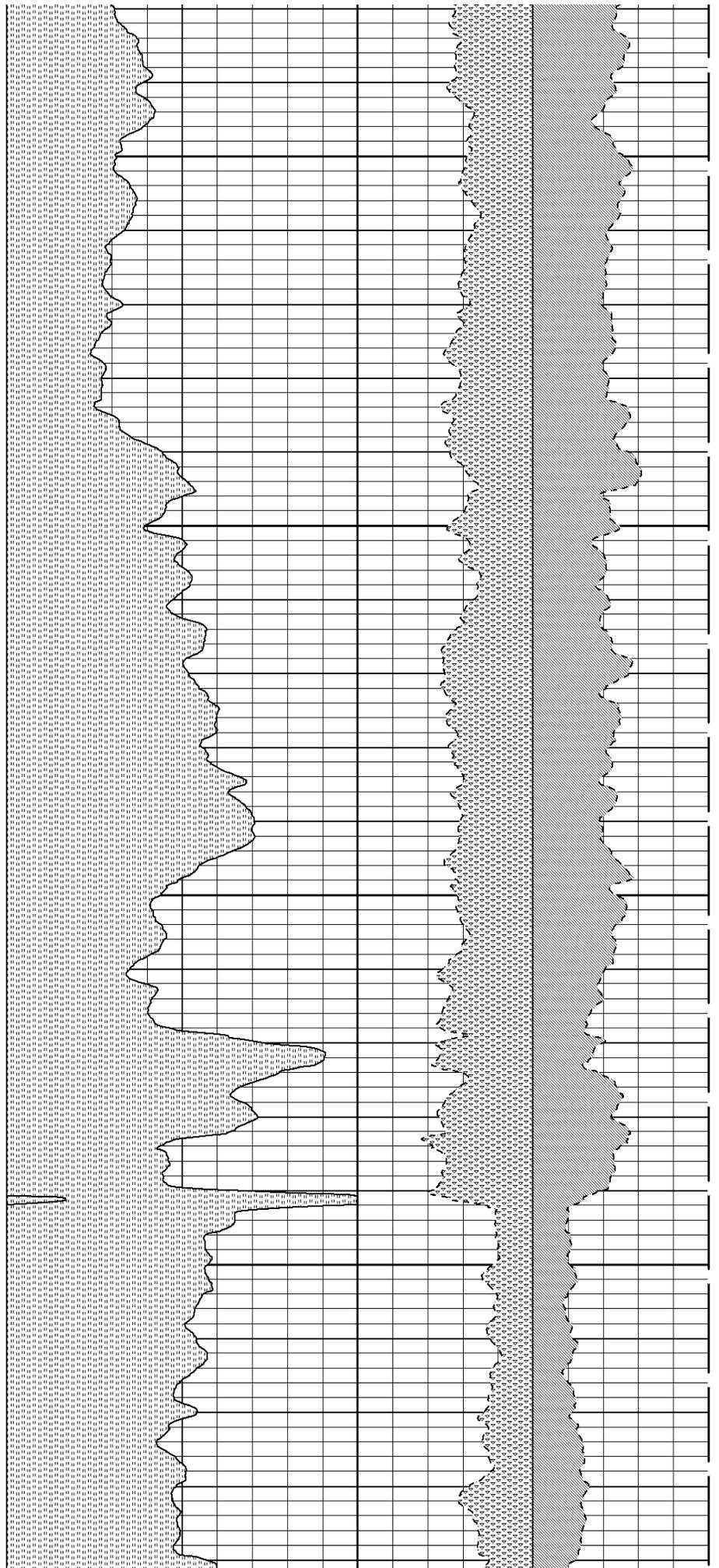
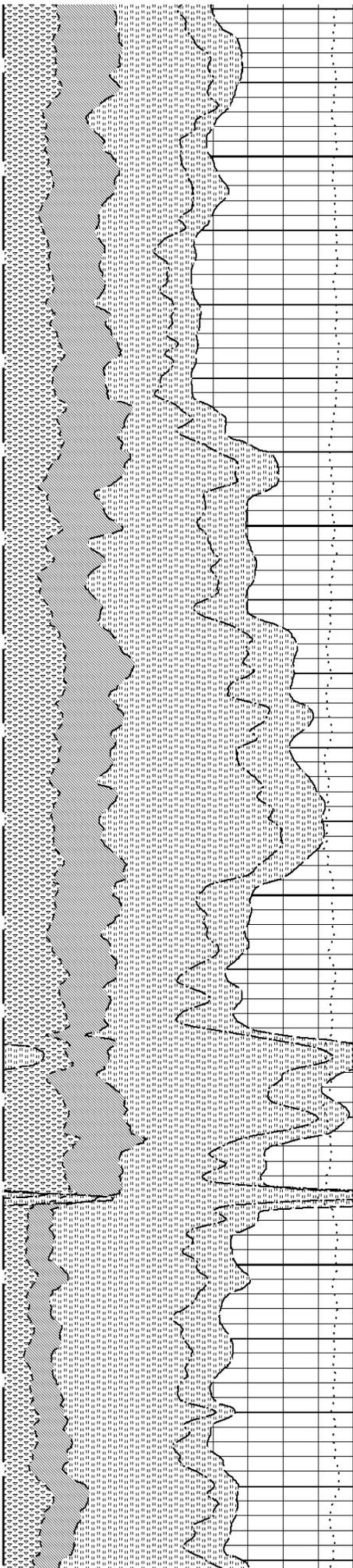
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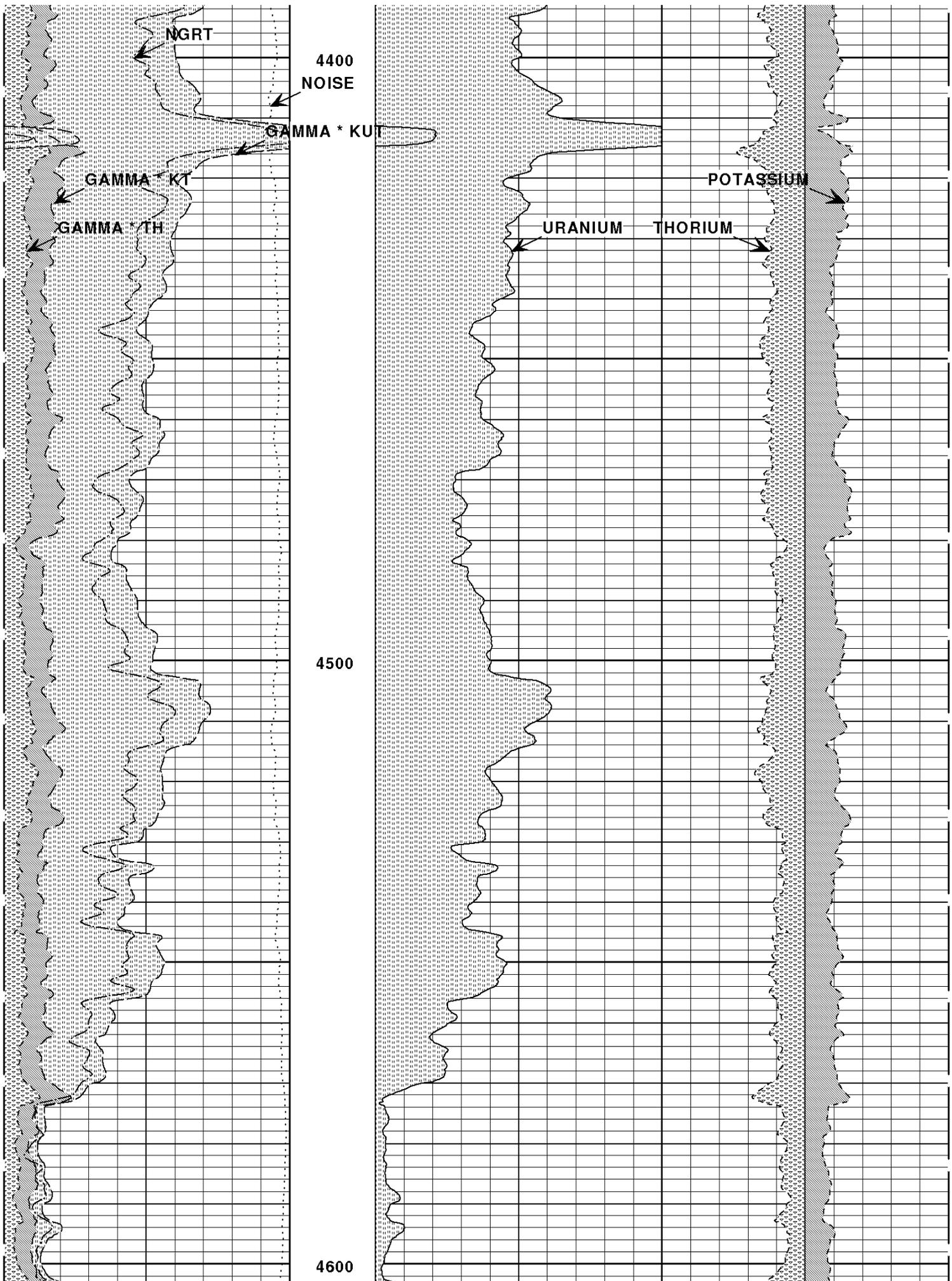
4100



4200

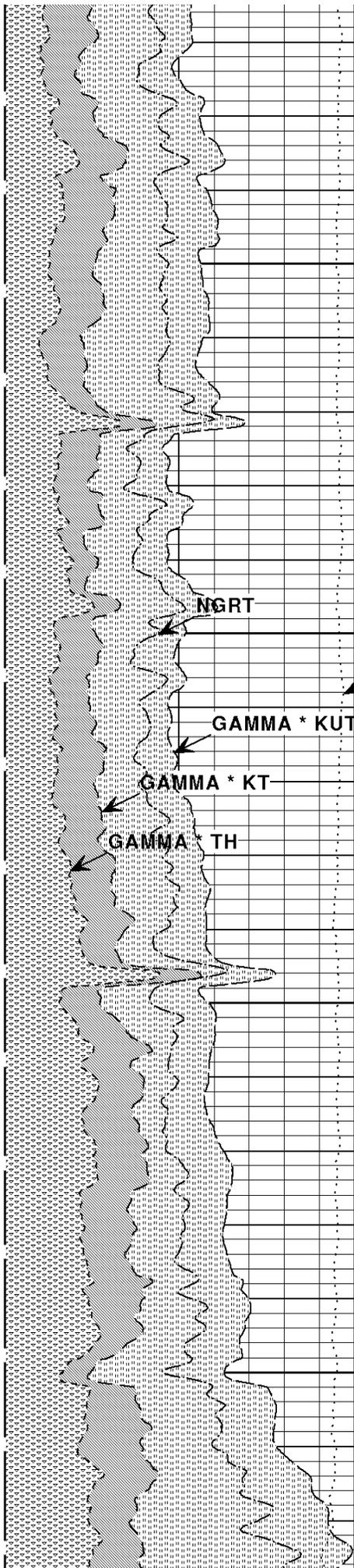
4300





4700

4800



NGRT

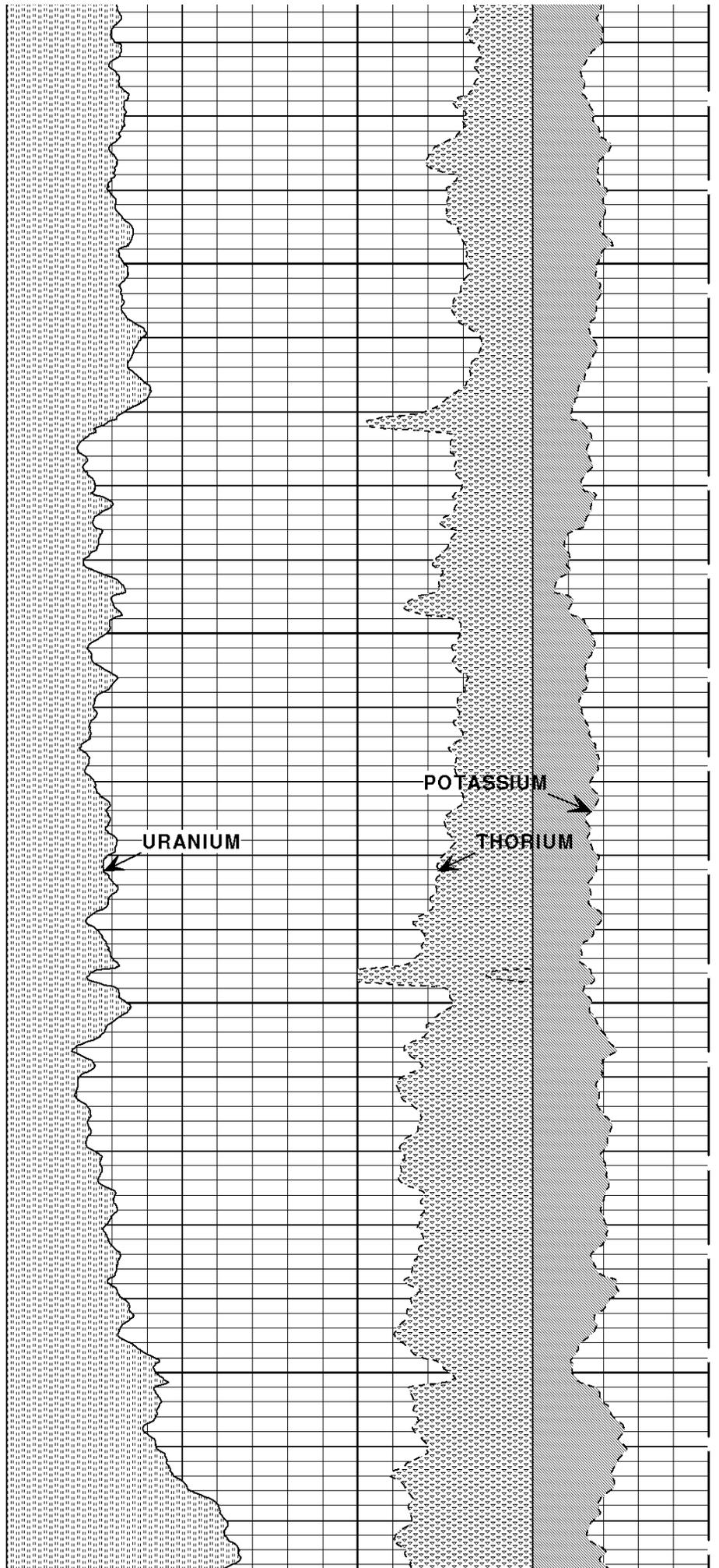
4900
NOISE

GAMMA * KUT

GAMMA * KT

GAMMA TH

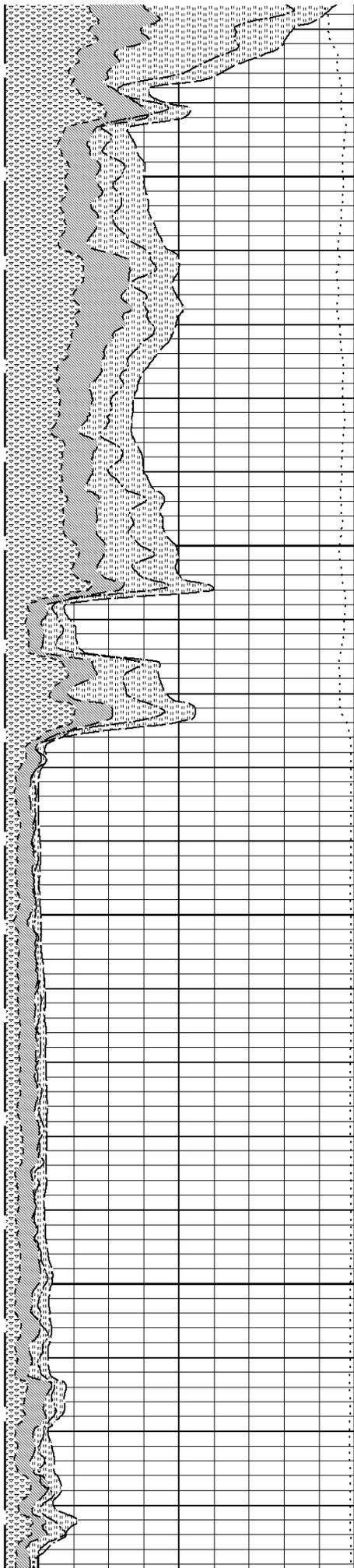
5000



URANIUM

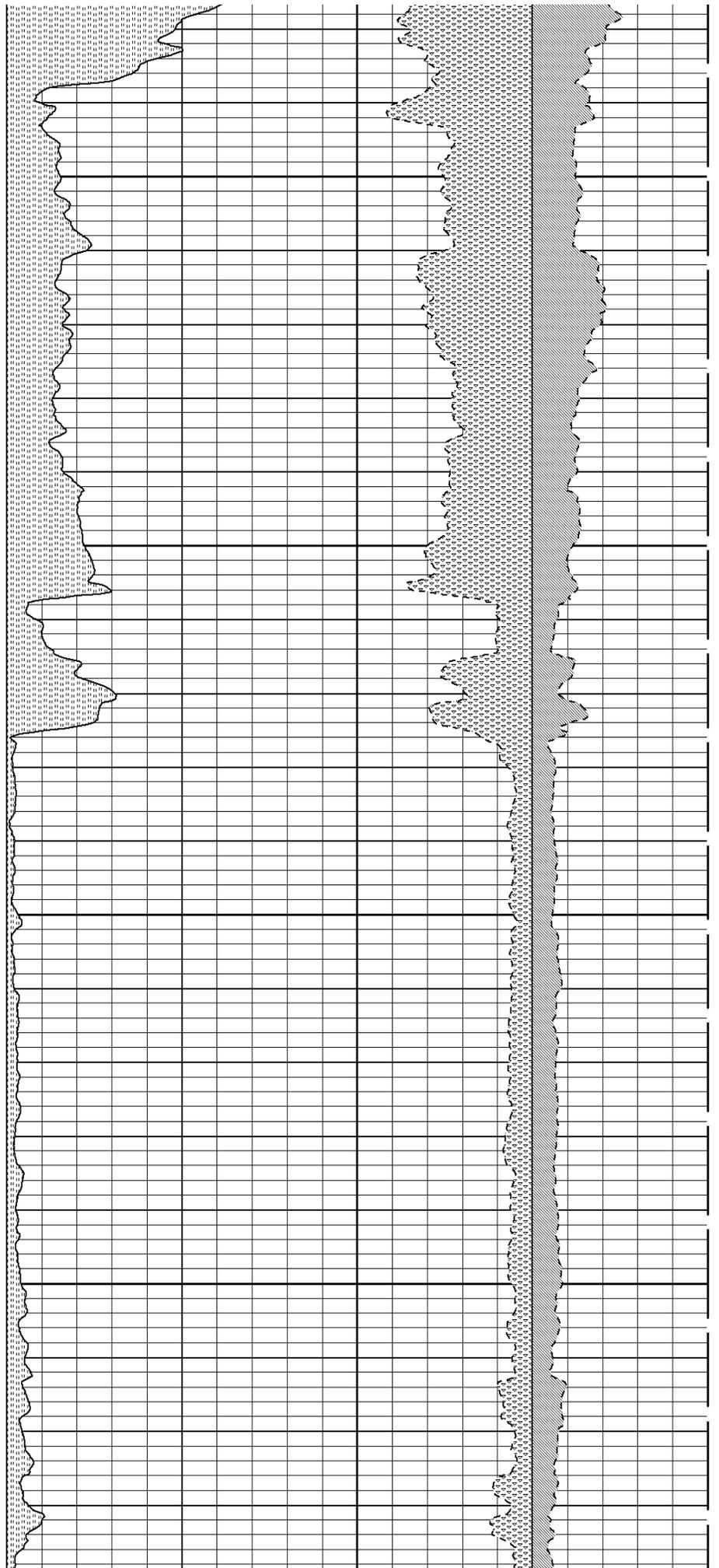
POTASSIUM

THORIUM



5100

5200



5300

5400
NOISE

NGRT

GAMMA * KUT

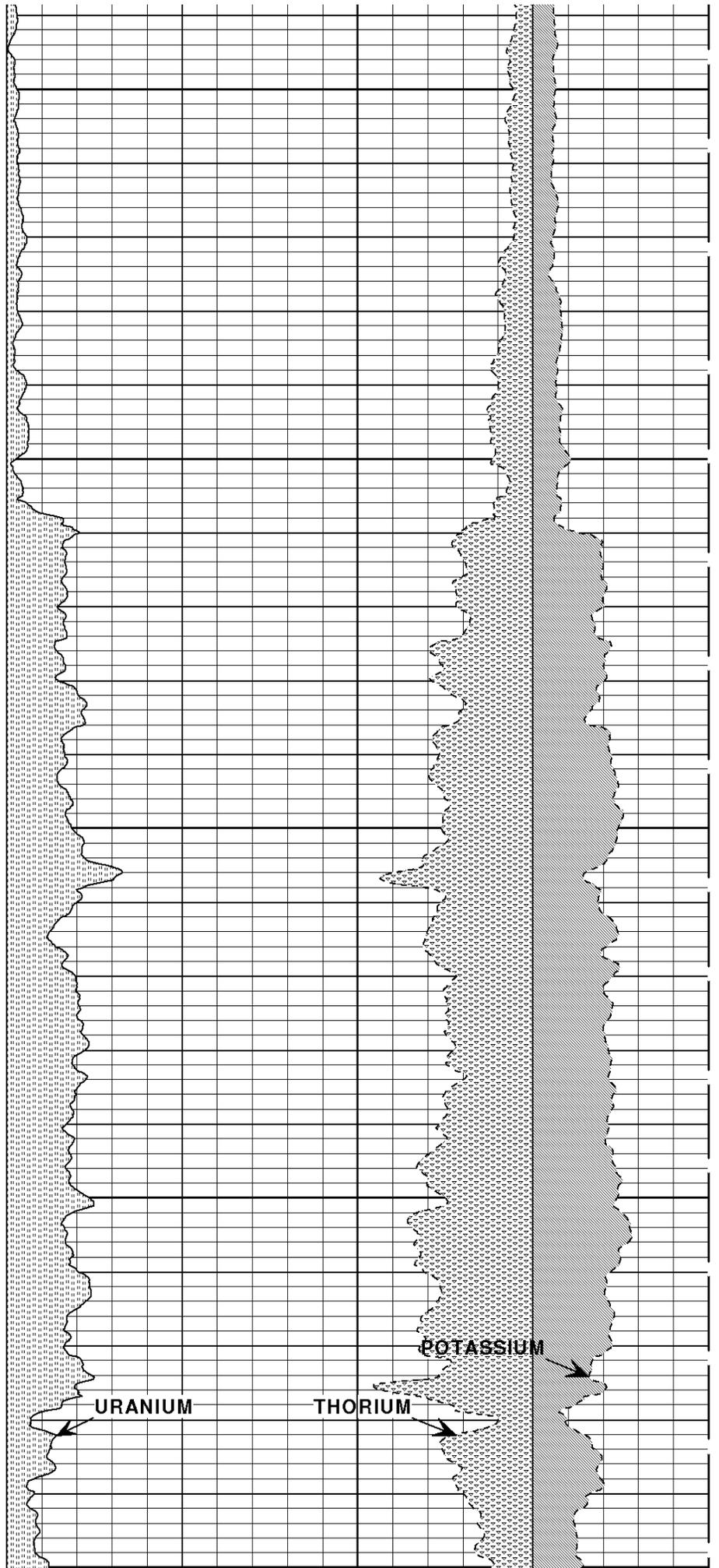
GAMMA * KT

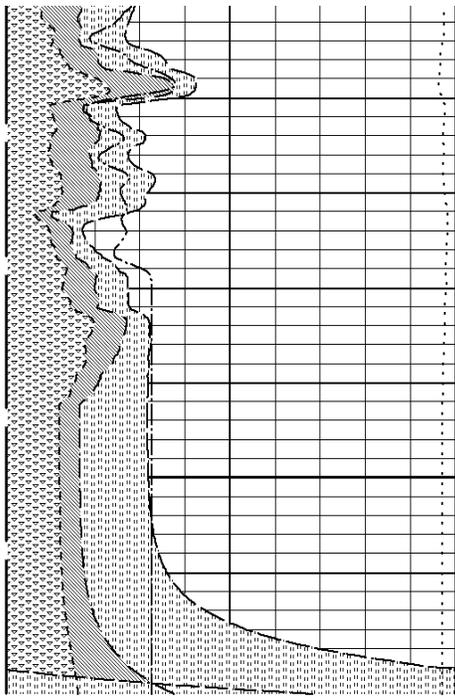
GAMMA * TH

URANIUM

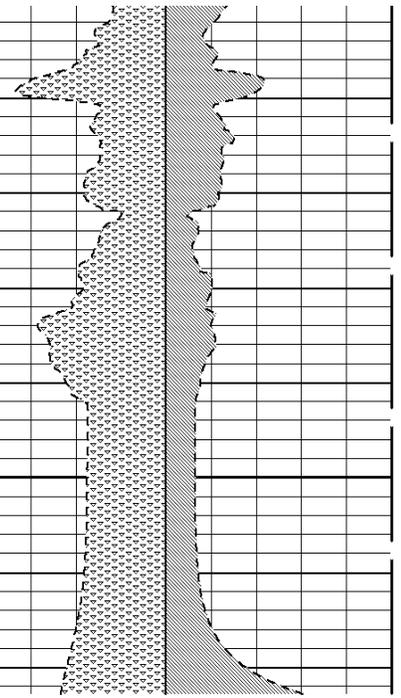
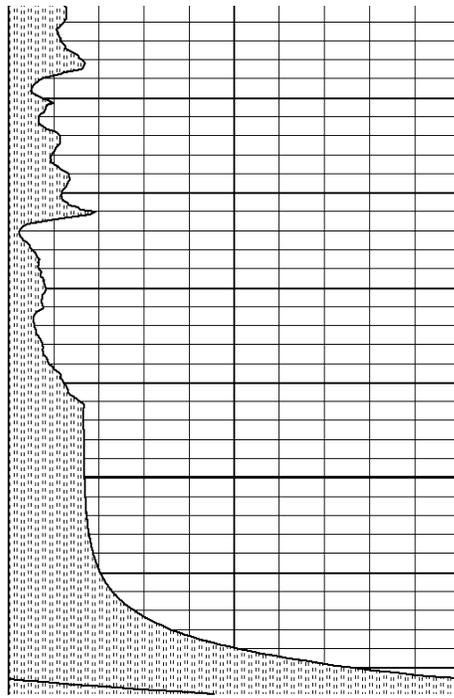
THORIUM

POTASSIUM





5500



<p>NGRT 0 API 200</p> <p>NOISE 100 COUNTS 0</p> <p>GAMMA * KUT 0 API 200</p> <p>GAMMA * KT 0 API 200</p> <p>GAMMA * TH 0 API 200</p>	<p>1:240 FT.</p>	<p>URANIUM 0 PPM 20</p>	<p>THORIUM 20 PPM 0</p>	<p>POTASSIUM 0 PERCENT 5</p>
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Version No: 5.6 | hc:3.0
 Data File: awind_7_17_run2.2.cls
 Format File: CSNG.spc
 Plot Time: 2007-04-05 07:44:30
 Log Time: 2007-04-05 01:39:16

HALLIBURTON

Top Depth: 460.00
 Bottom Depth: 5522.75

MAIN PASS 5"=100'

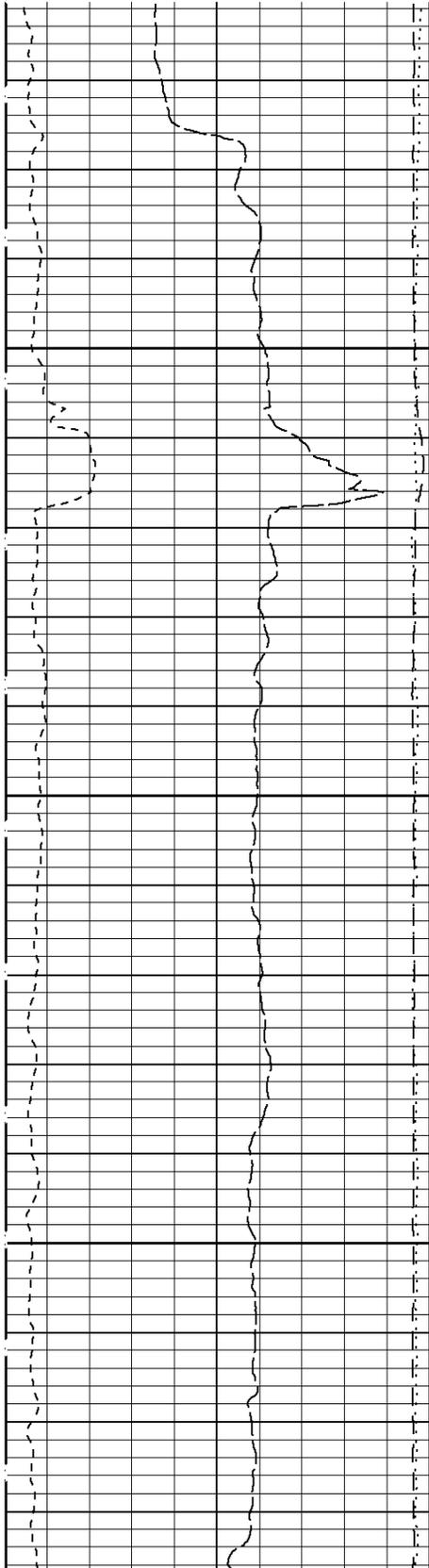
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HALLIBURTON

Top Depth: 461.00
 Bottom Depth: 5522.75

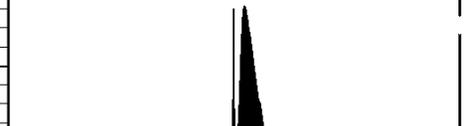
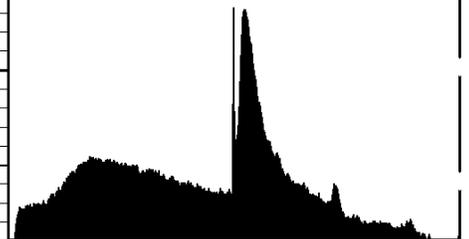
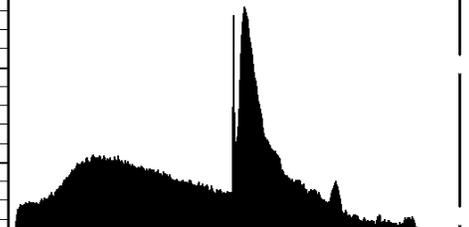
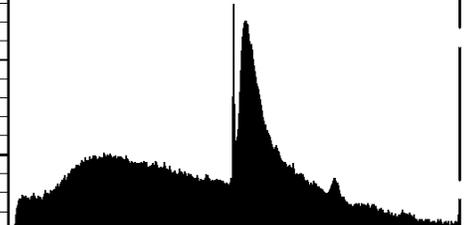
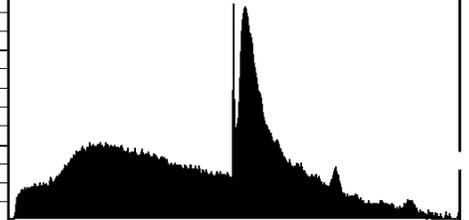
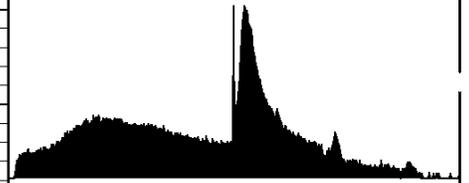
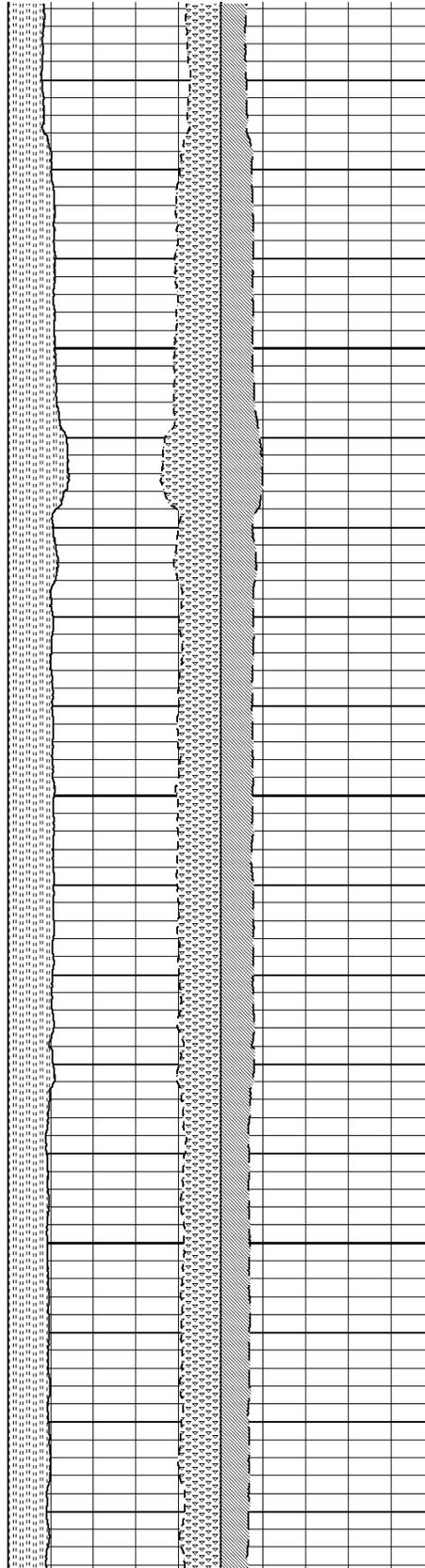
<p>GAMMA * KUT 0 API 150</p> <p>FIT ERROR 0 1</p> <p>AMERICIUM 1000 COUNTS 0</p>	<p>1:240 FT.</p>	<p>U ERROR 0 PPM 4</p> <p>TH ERROR 8 PPM 0</p>	<p>K ERROR 0 PERCENT 2</p>	<p>CSNG SPECTRA 512</p>
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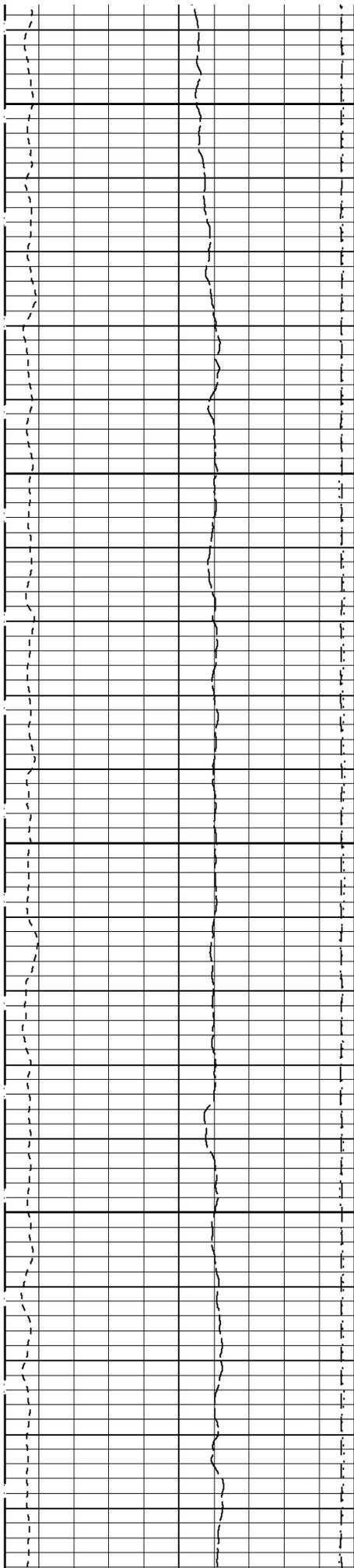
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0	GR KCL GAPI	150



500

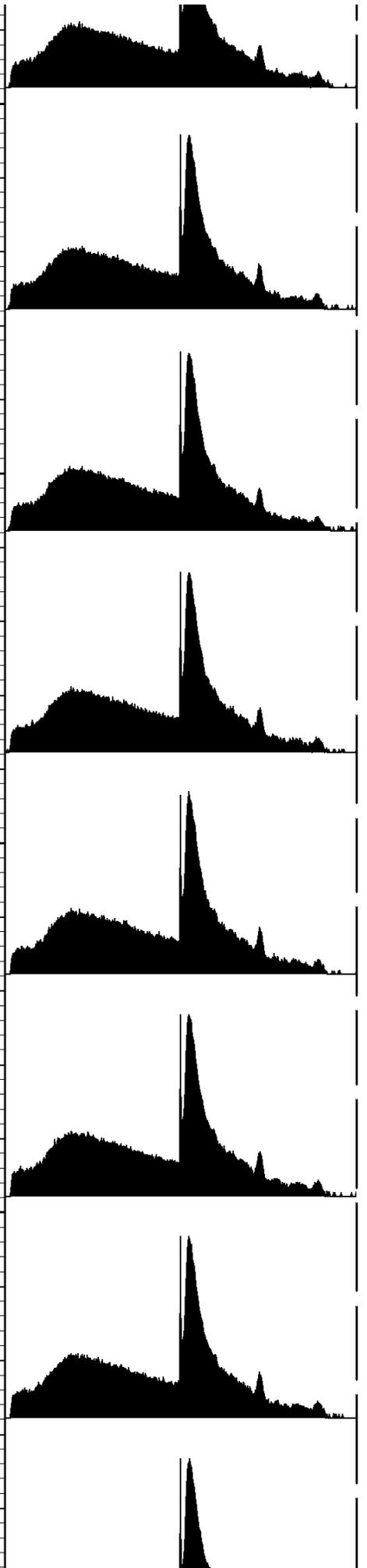
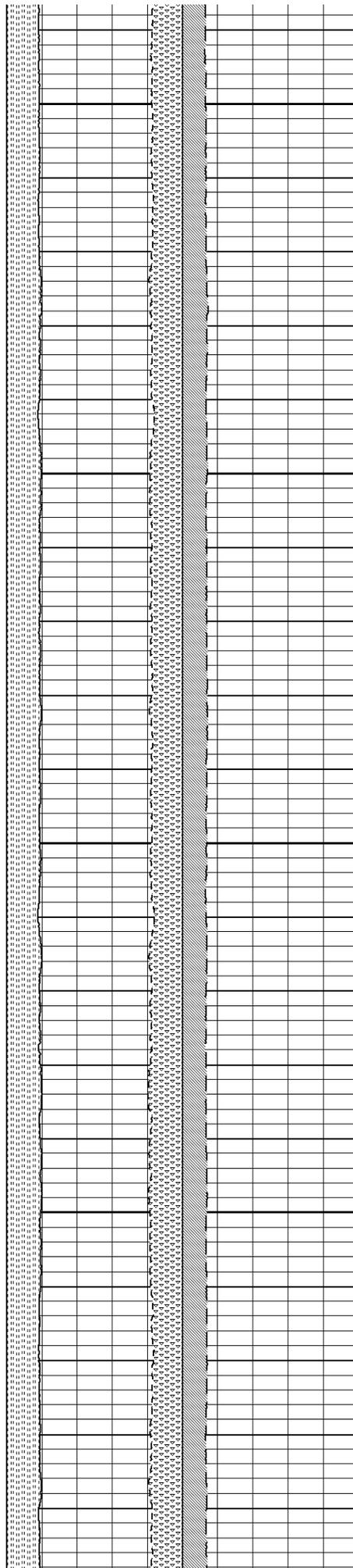
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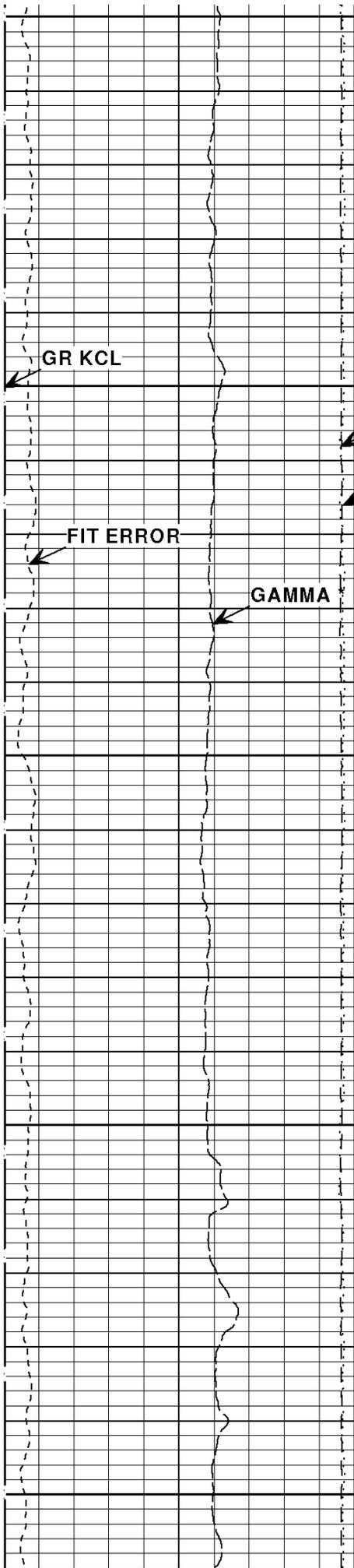




700

800



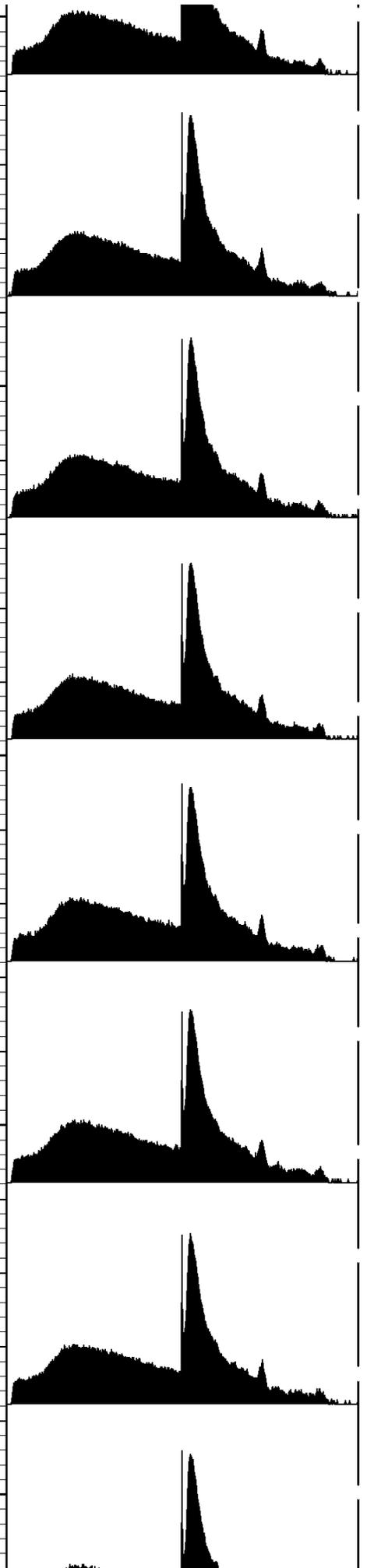
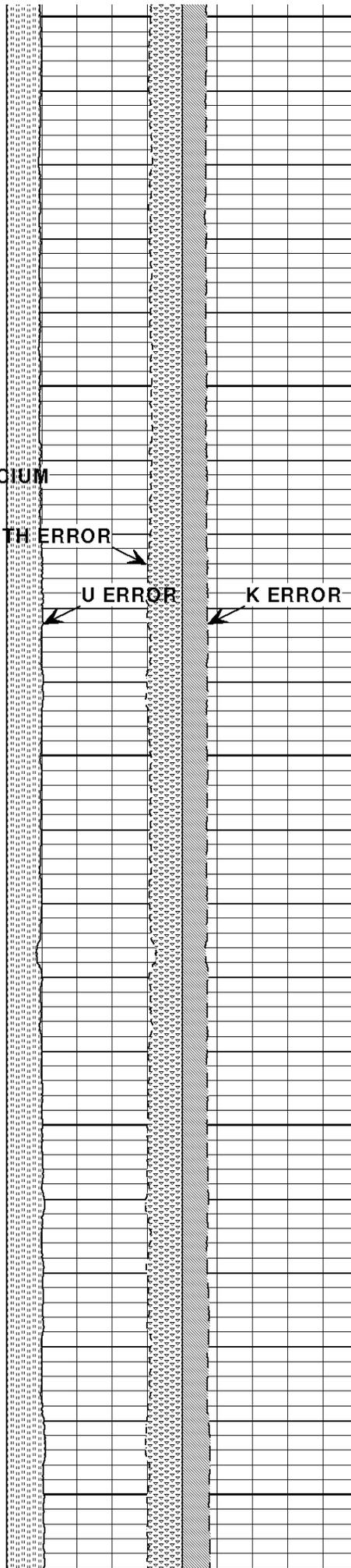


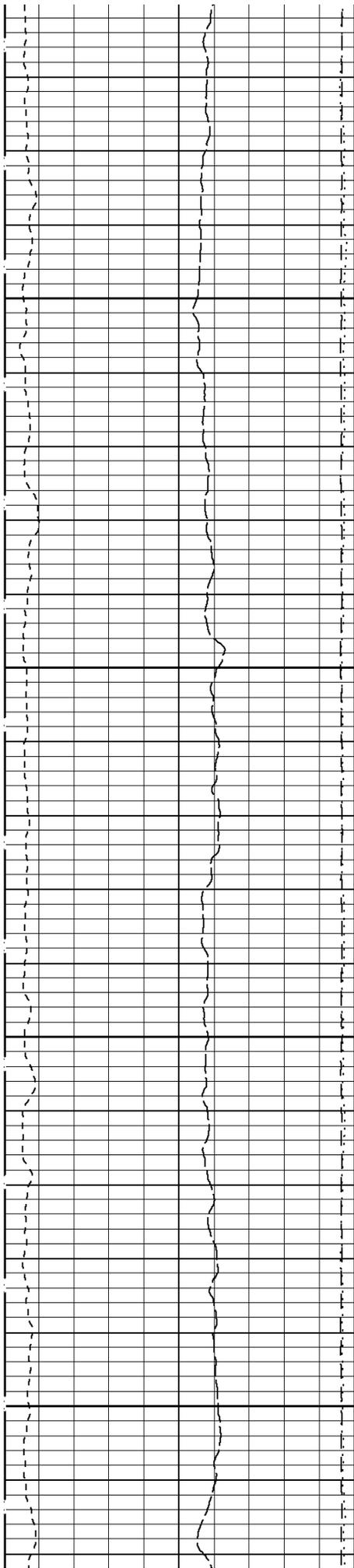
900
NOISE

AMERICIUM

KUT

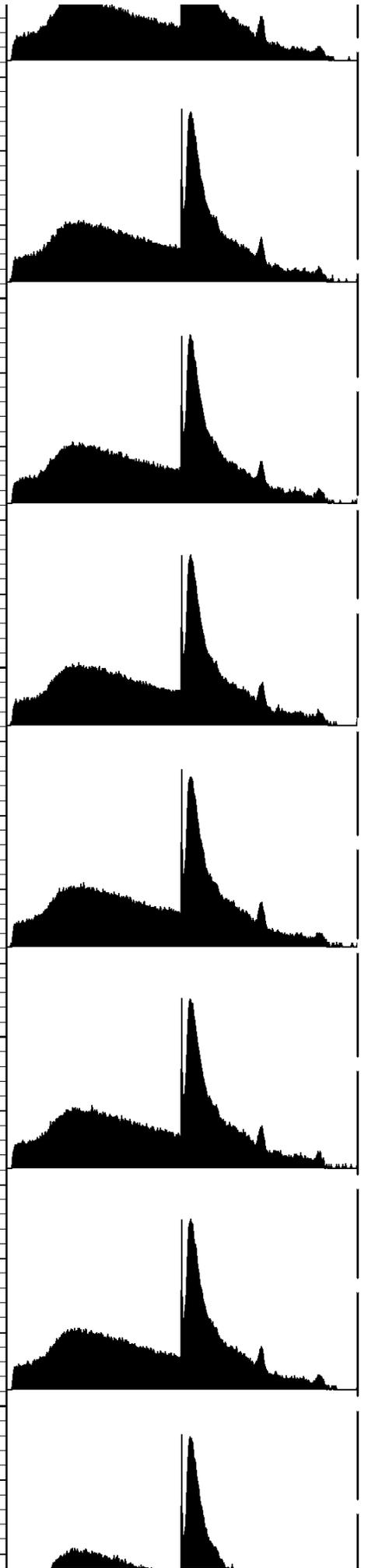
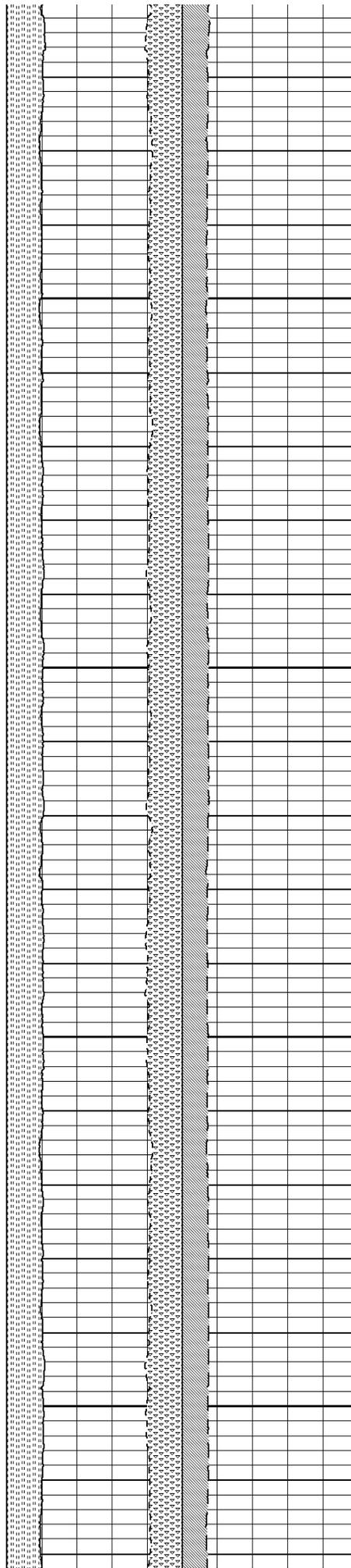
1000





1100

1200



1300

1400
NOISE

AMERICIUM

TH ERROR

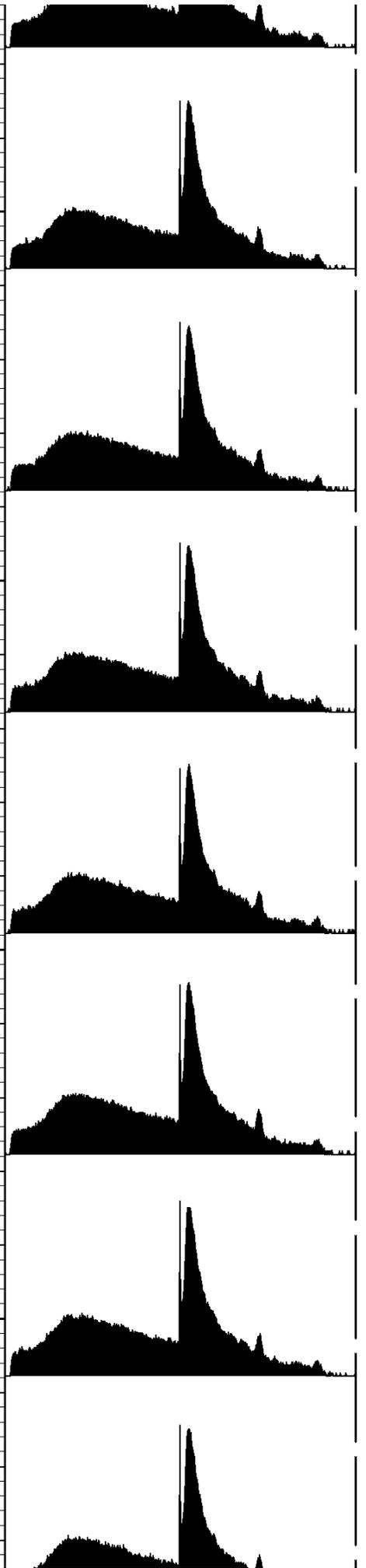
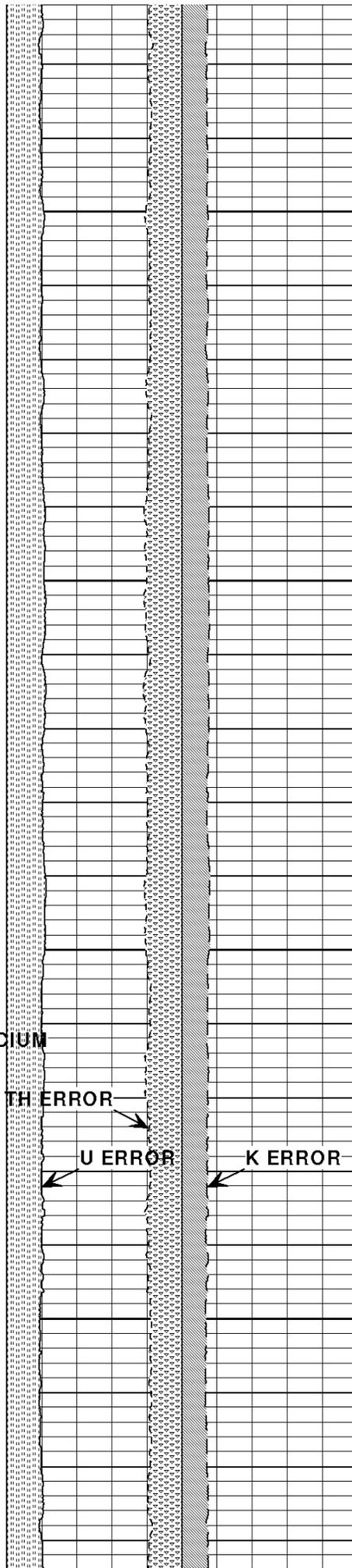
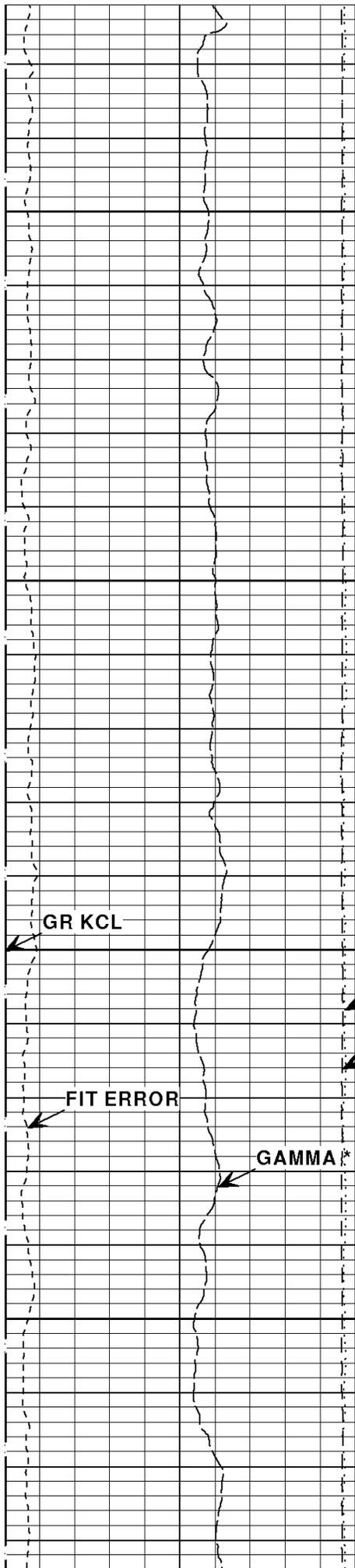
U ERROR

K ERROR

GR KCL

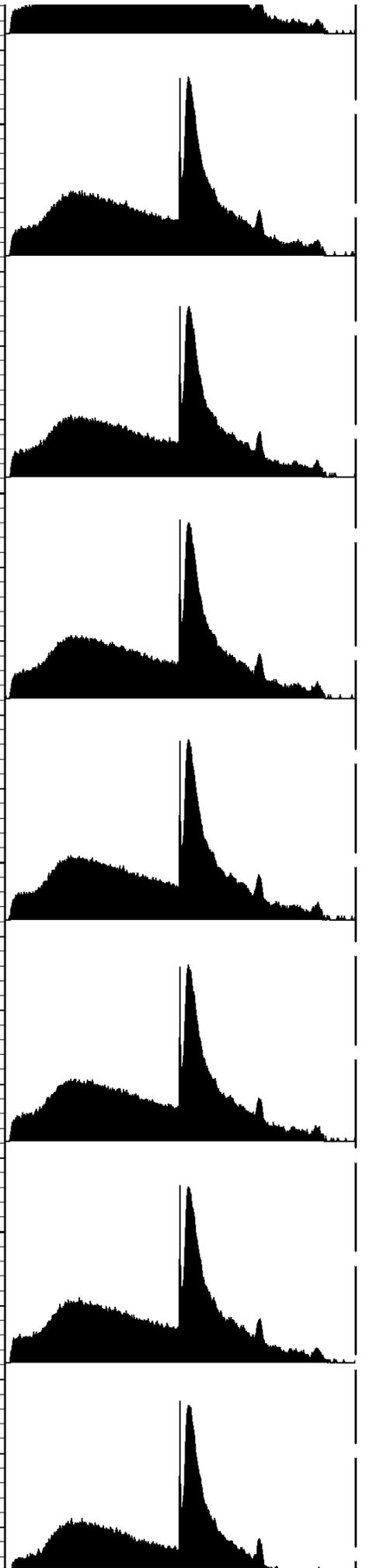
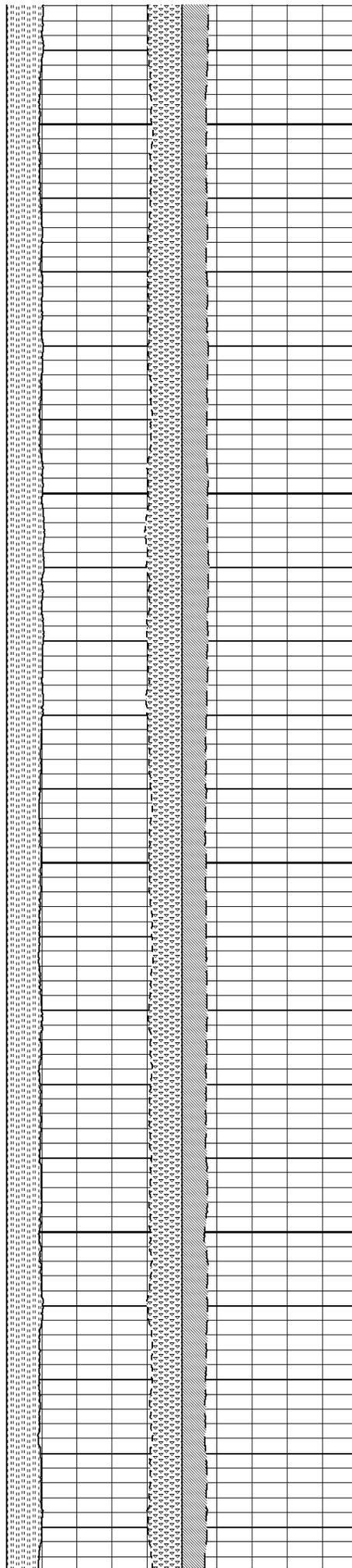
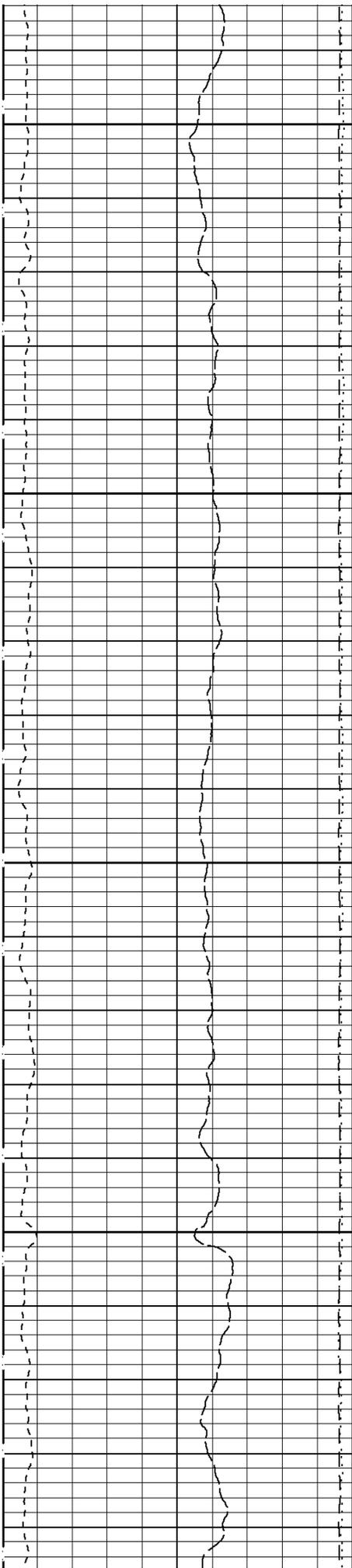
FIT ERROR

GAMMA KUT



1500

1600

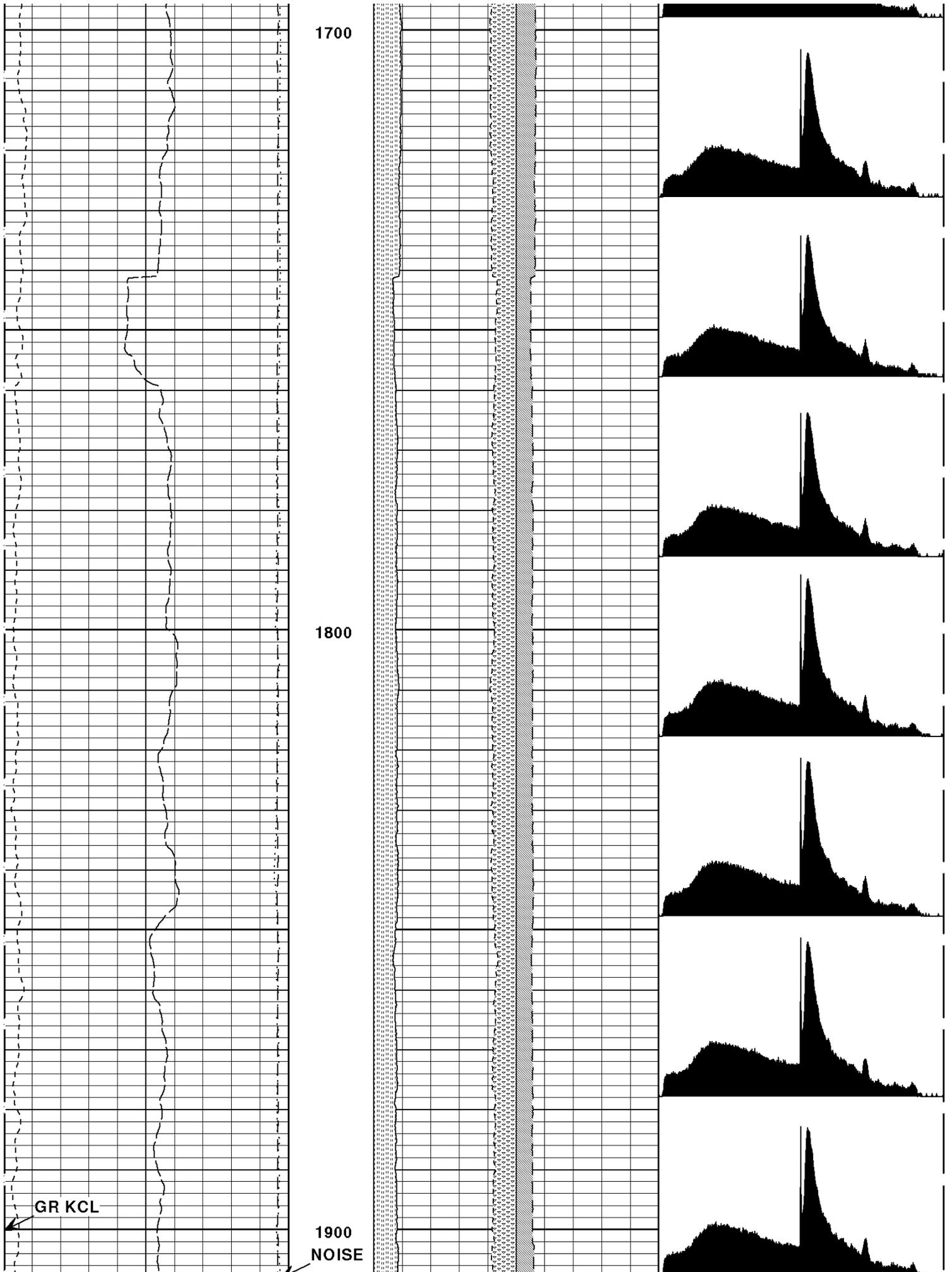


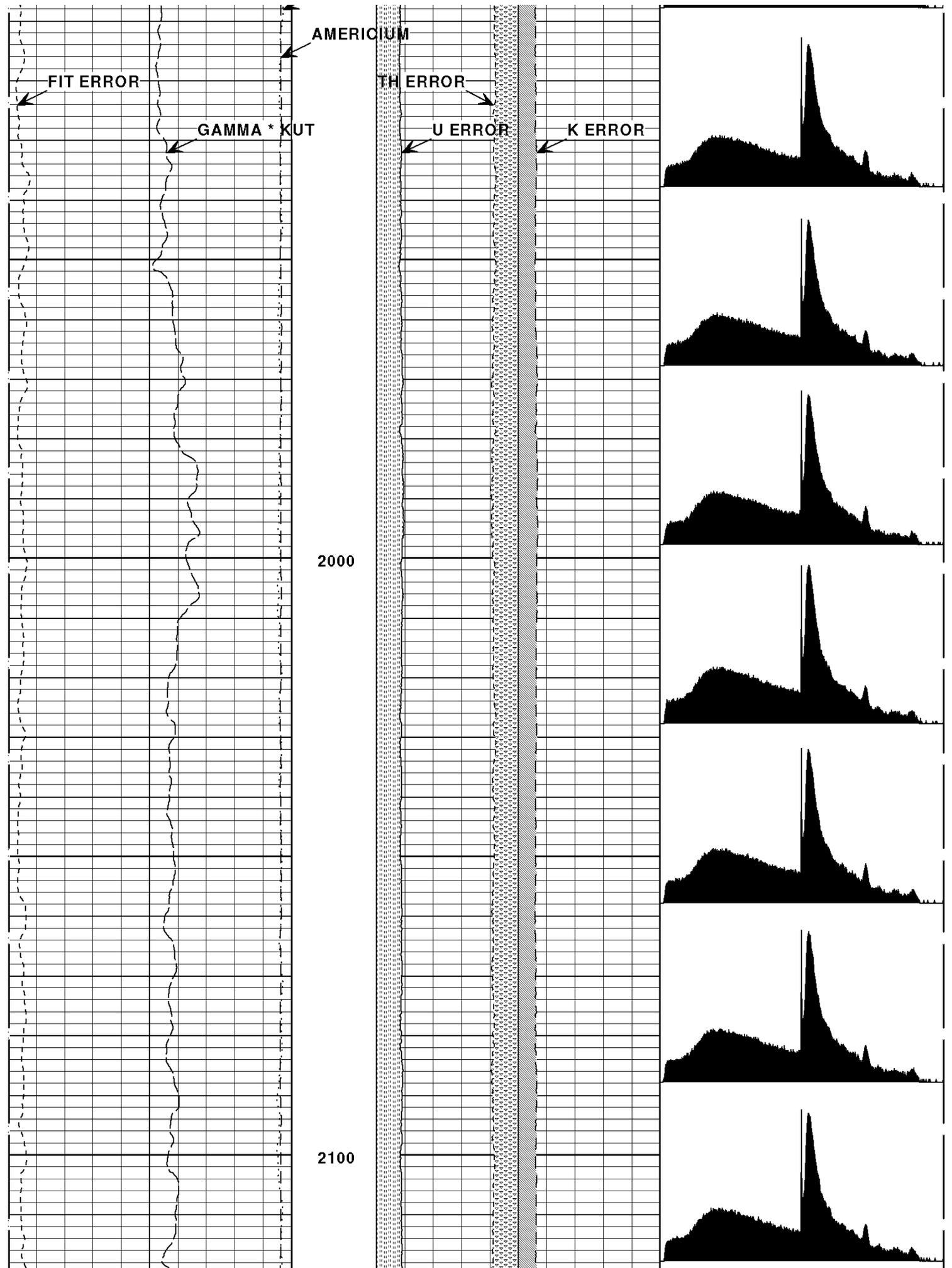
1700

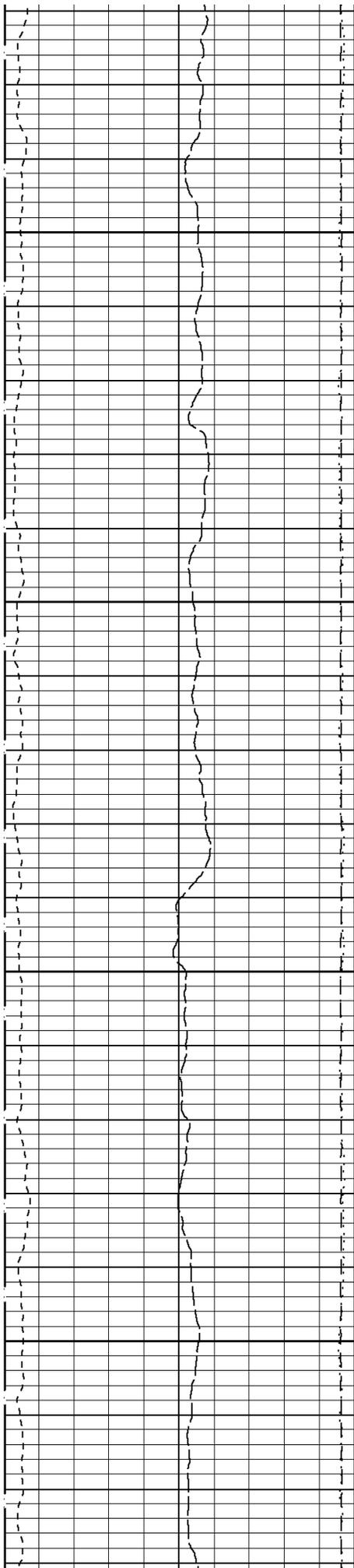
1800

GR KCL

1900
NOISE

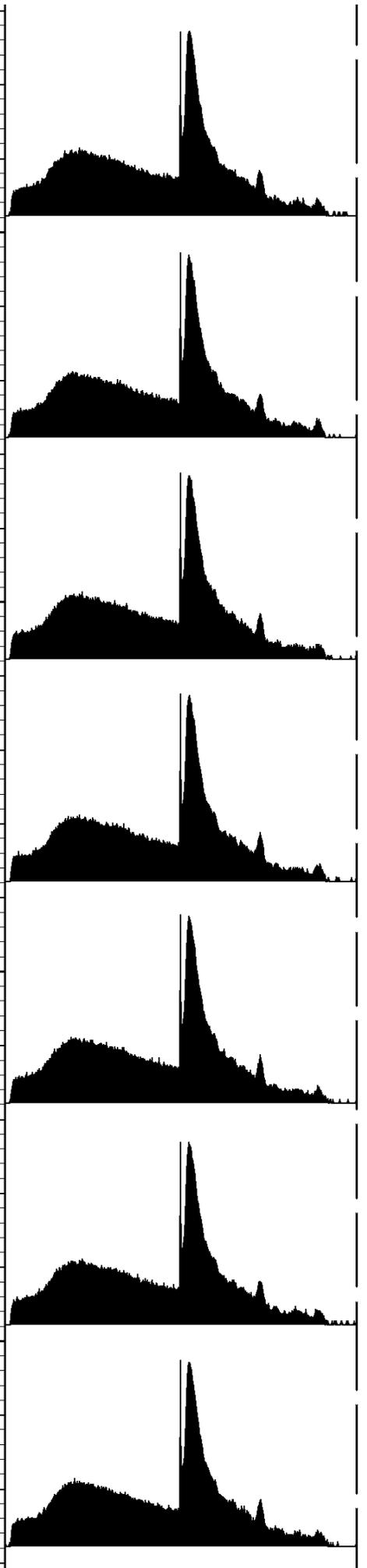
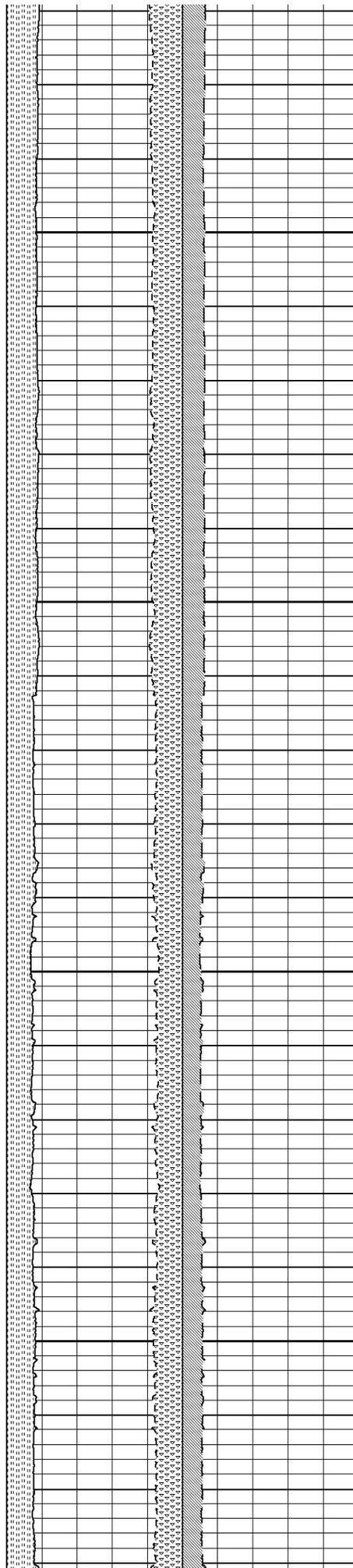


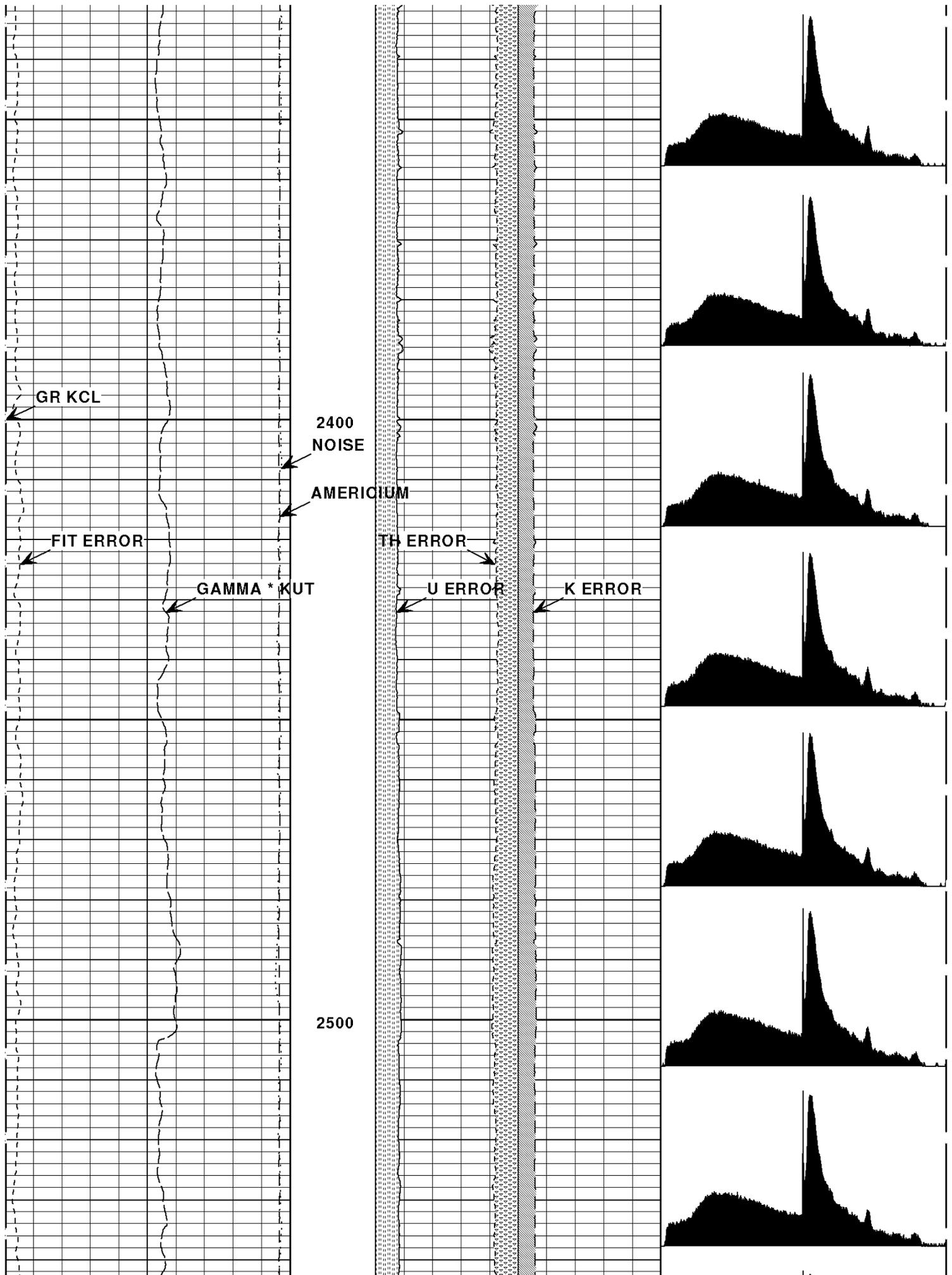


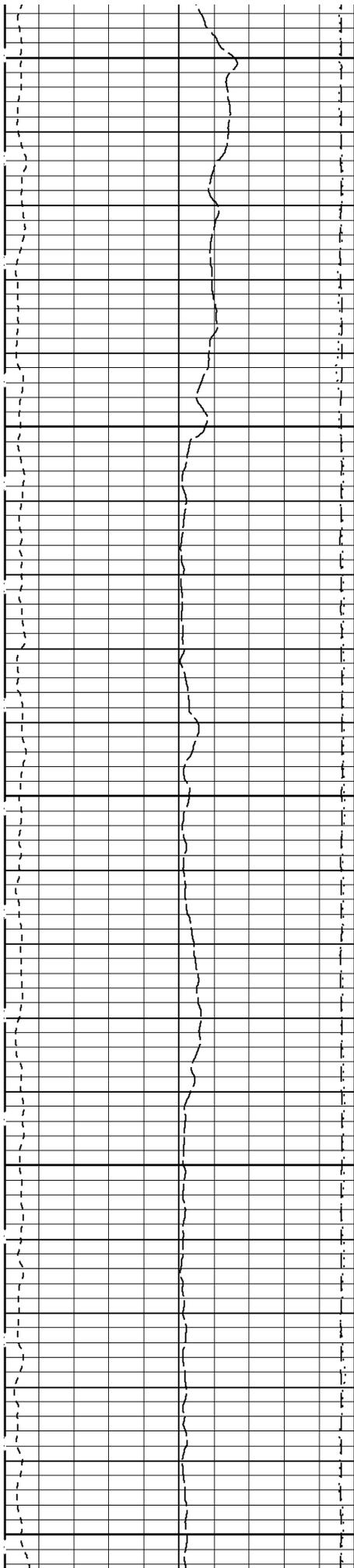


2200

2300

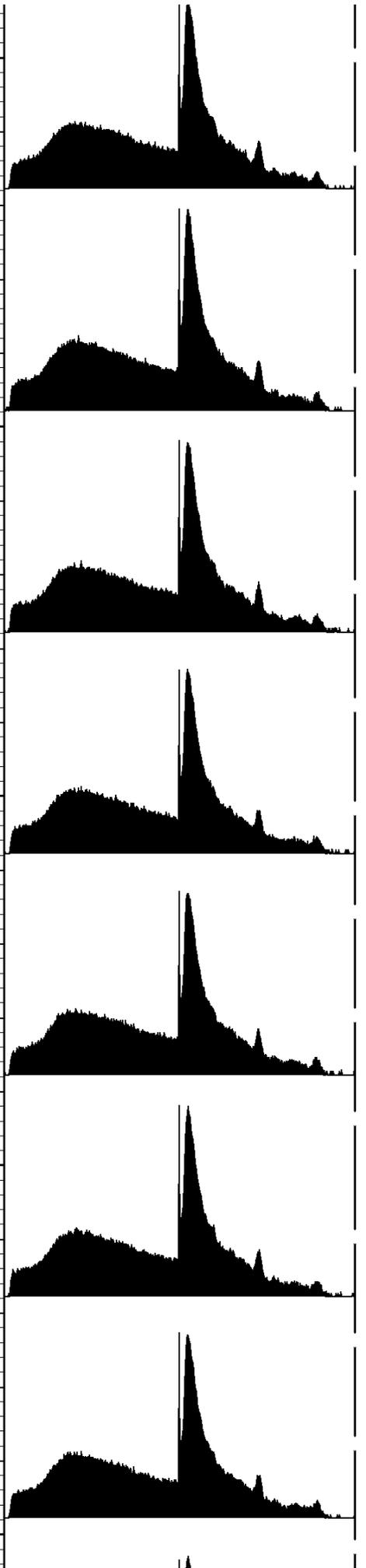
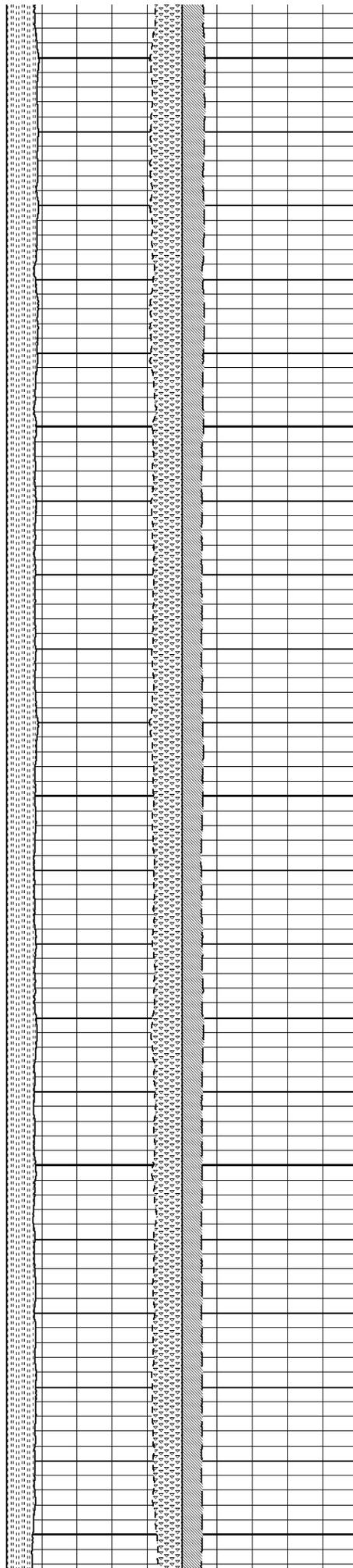






2600

2700



2800

GR KCL

2900
NOISE

AMERICIUM

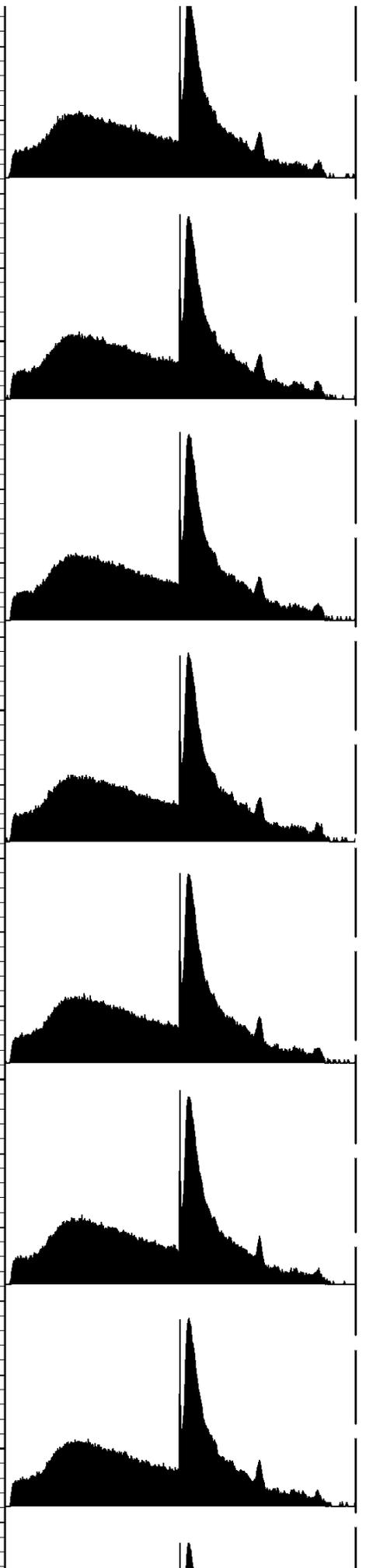
FIT ERROR

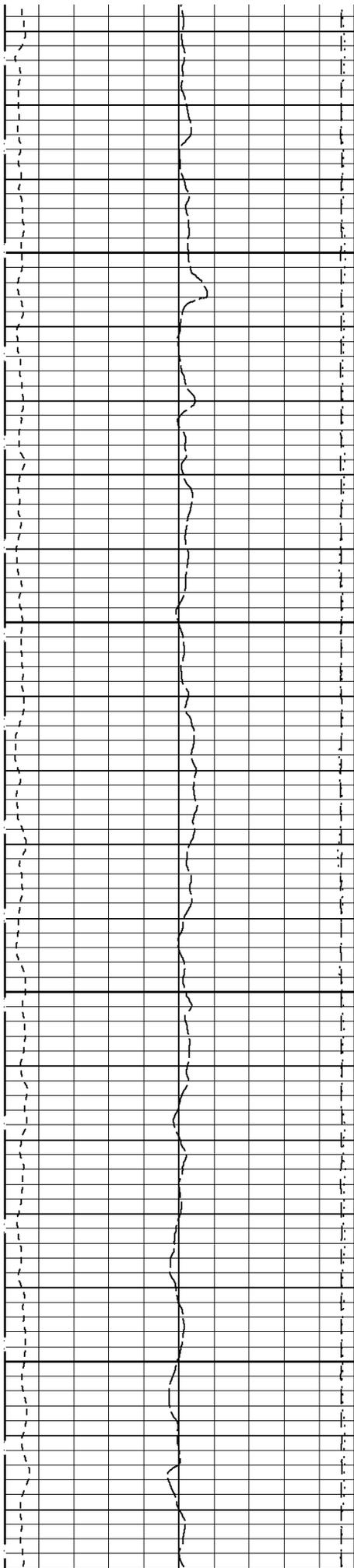
TH ERROR

GAMMA * KUT

U ERROR

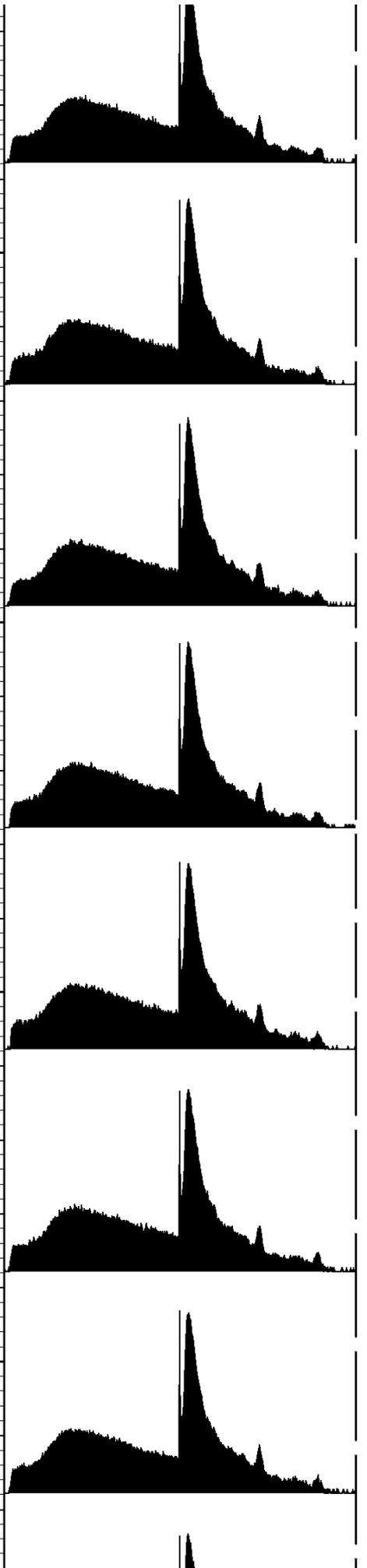
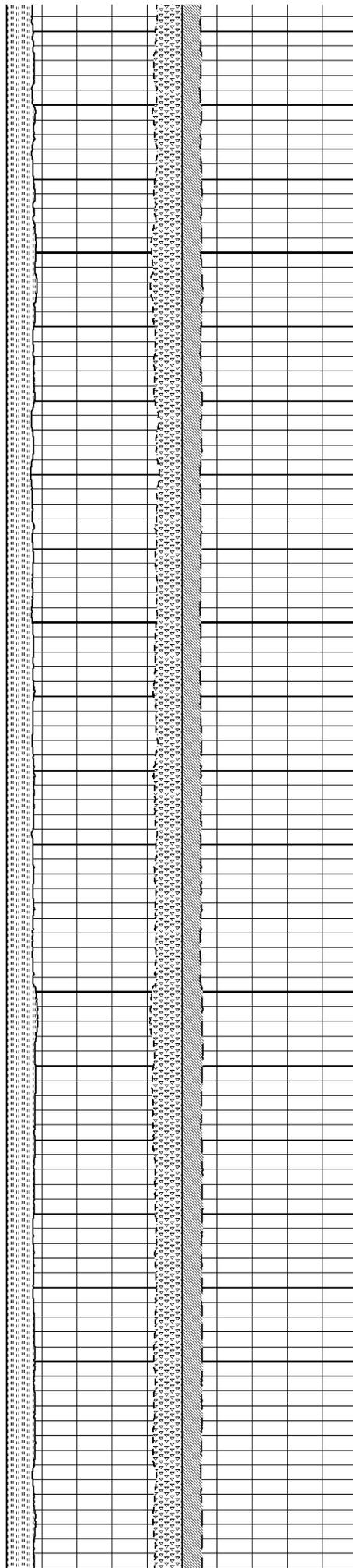
K ERROR

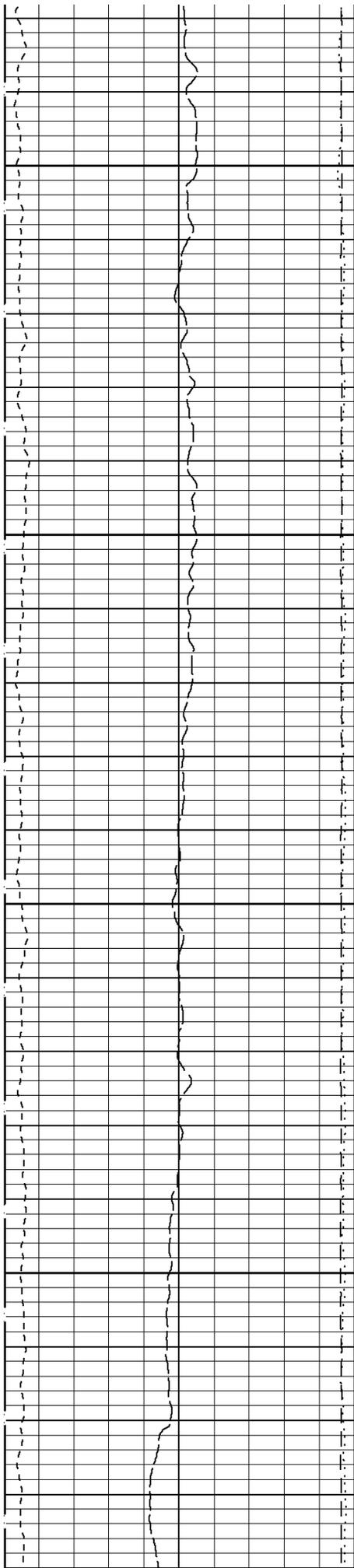




3000

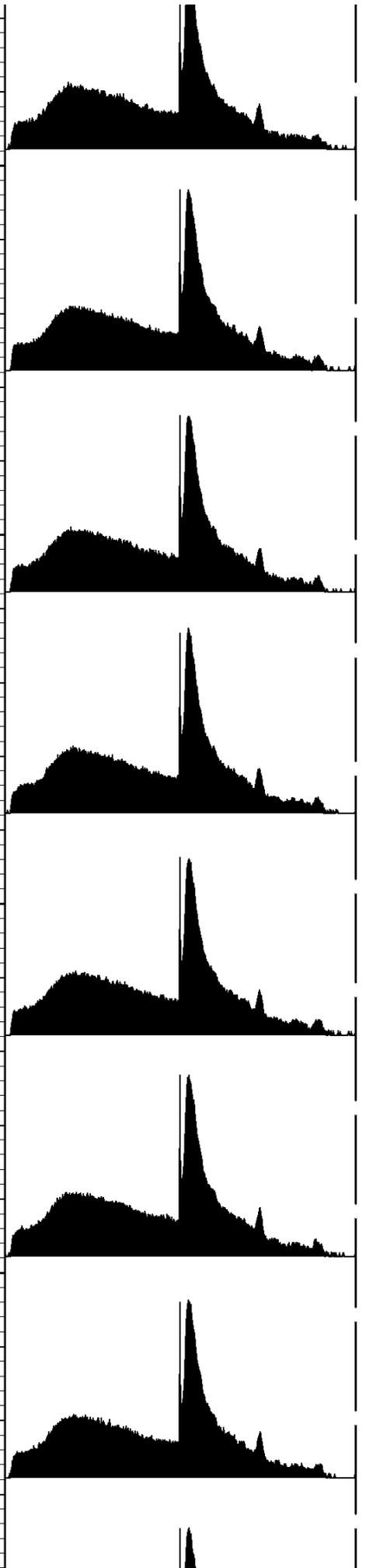
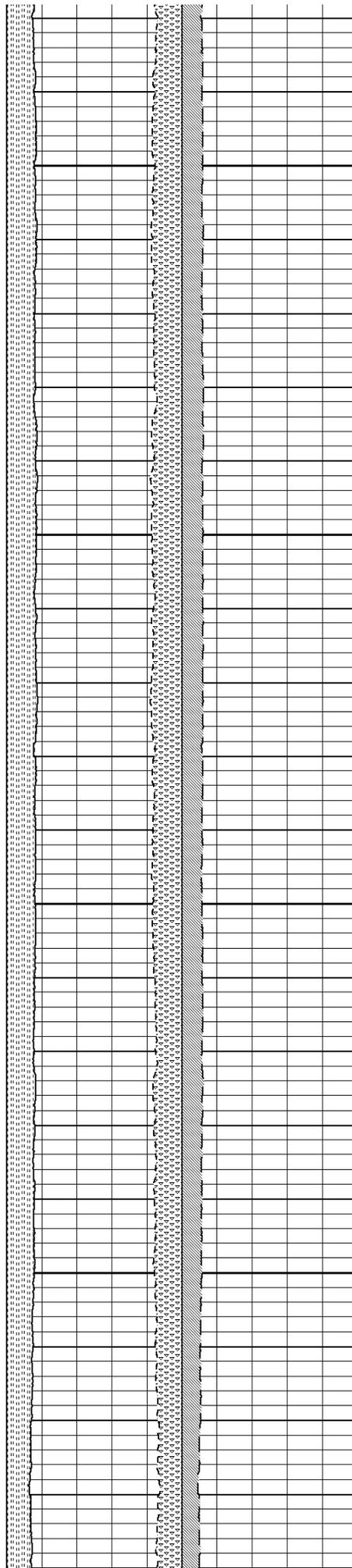
3100

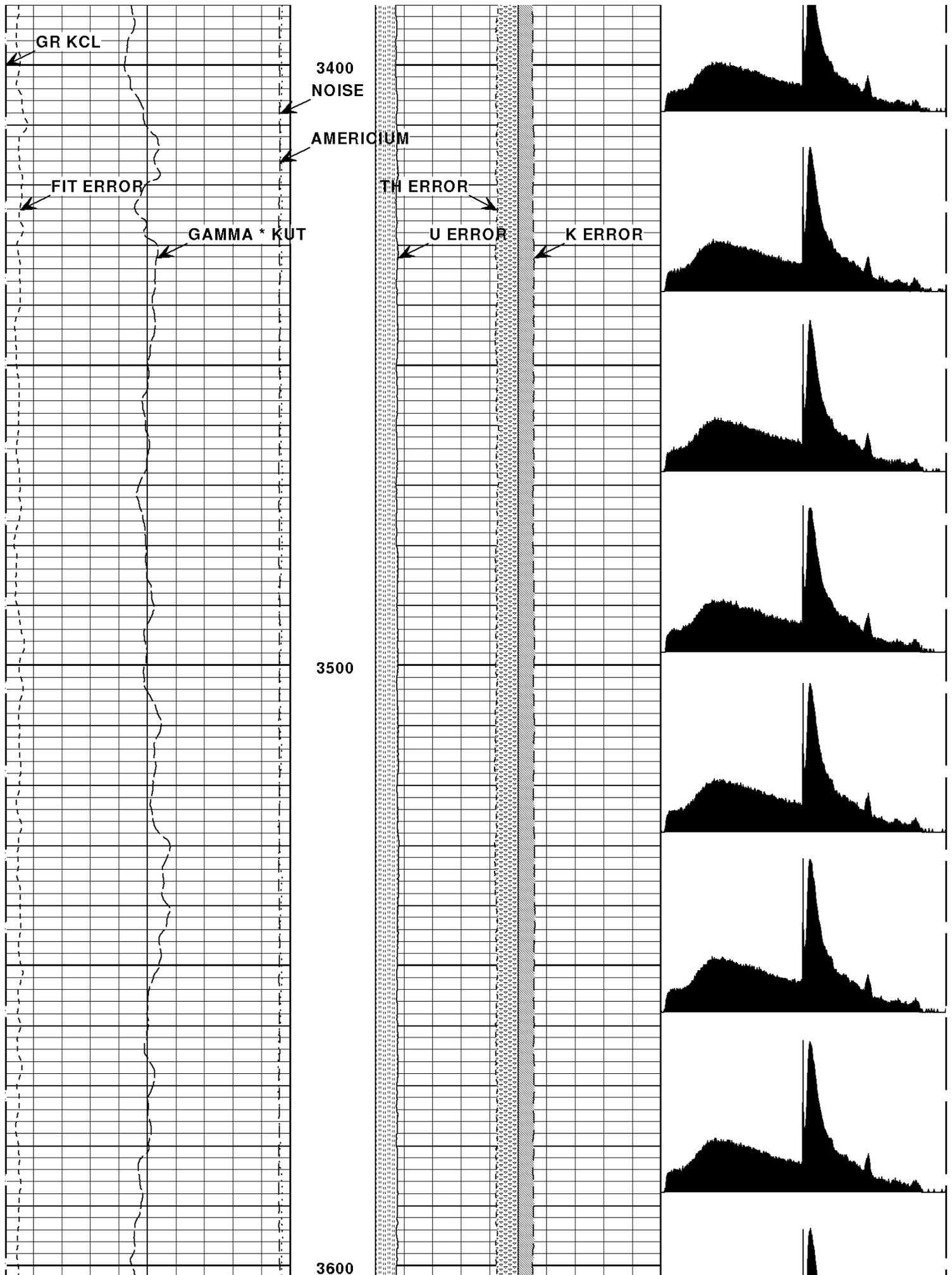


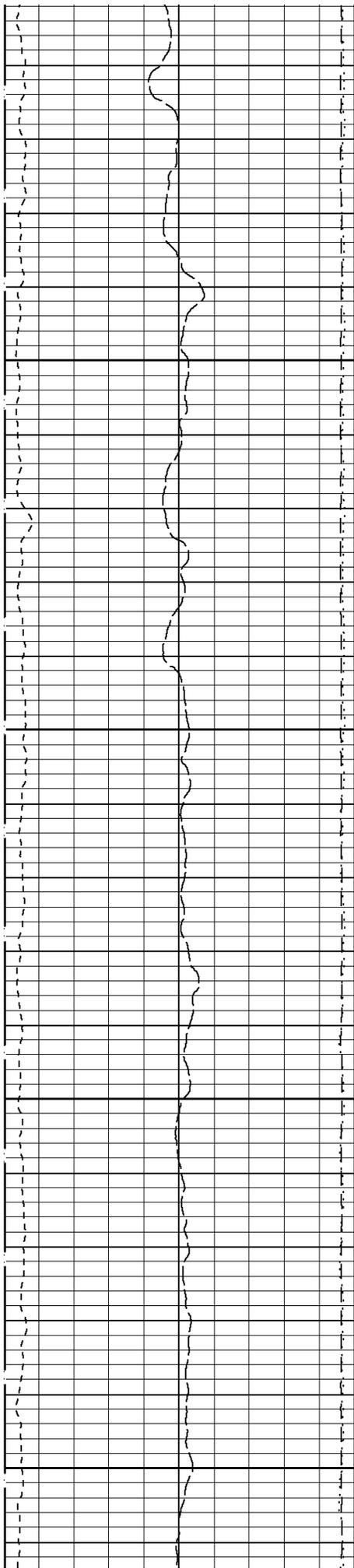


3200

3300

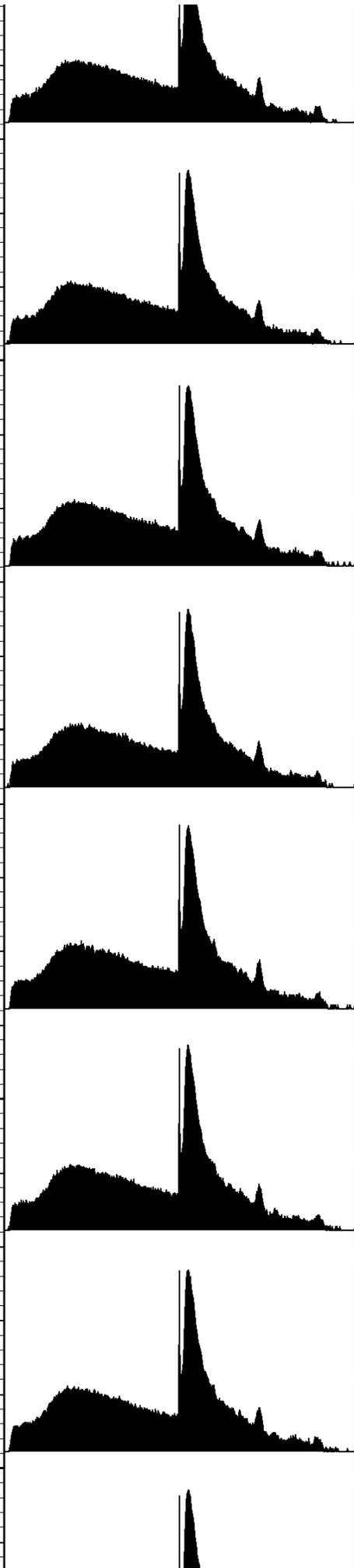
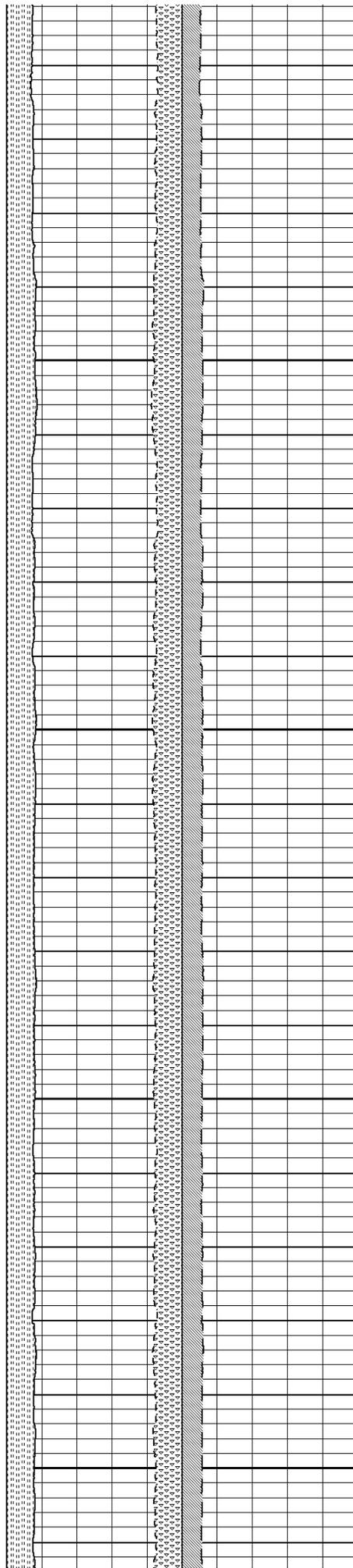


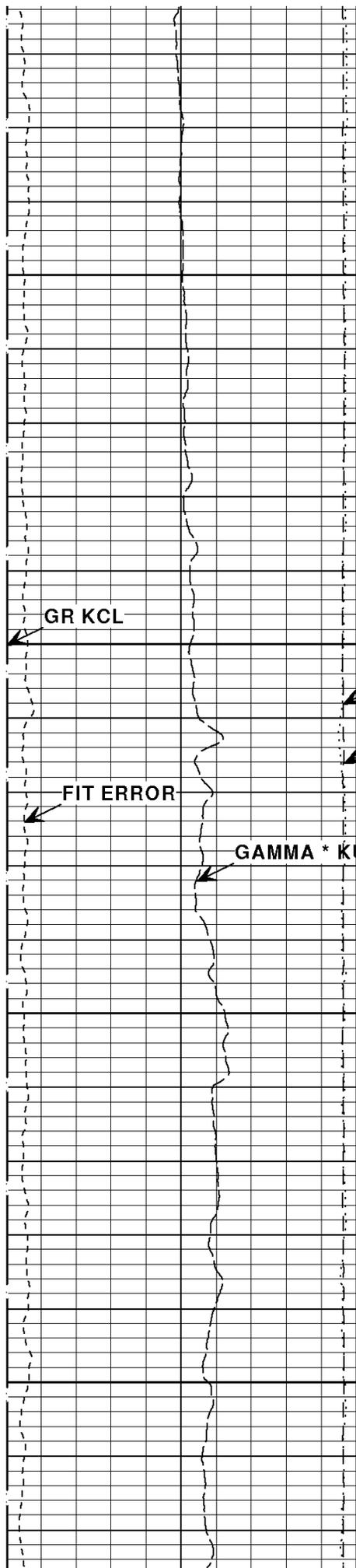




3700

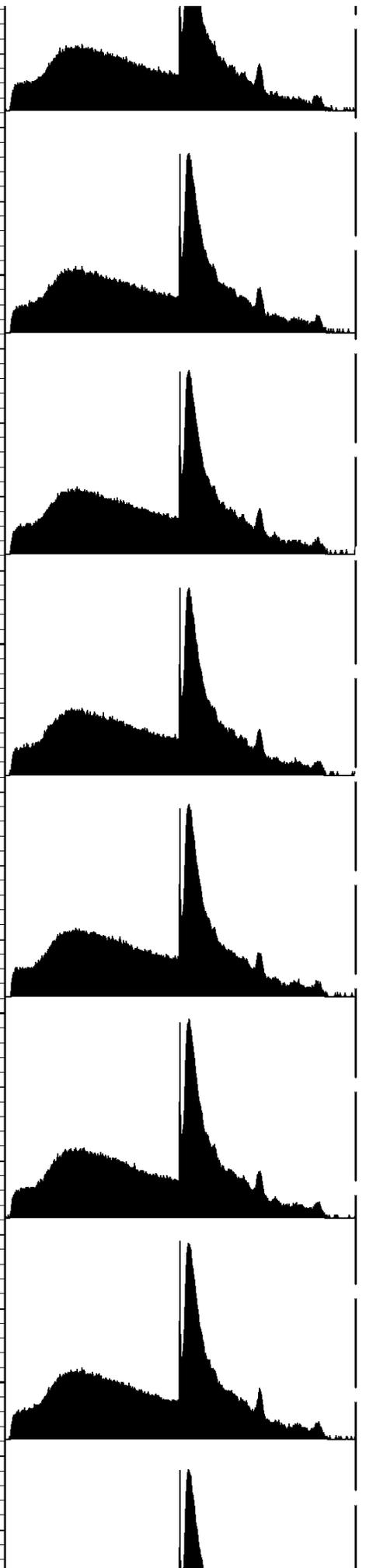
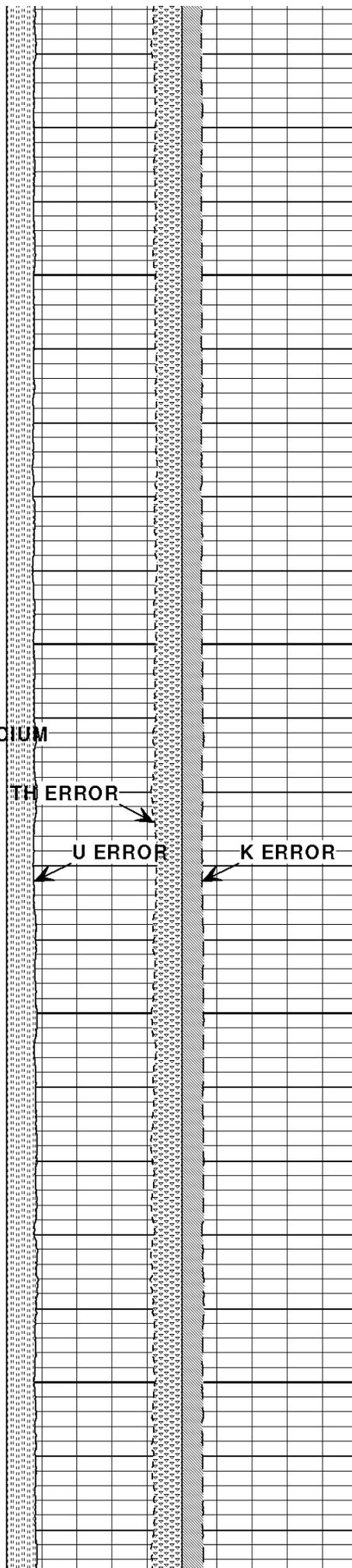
3800

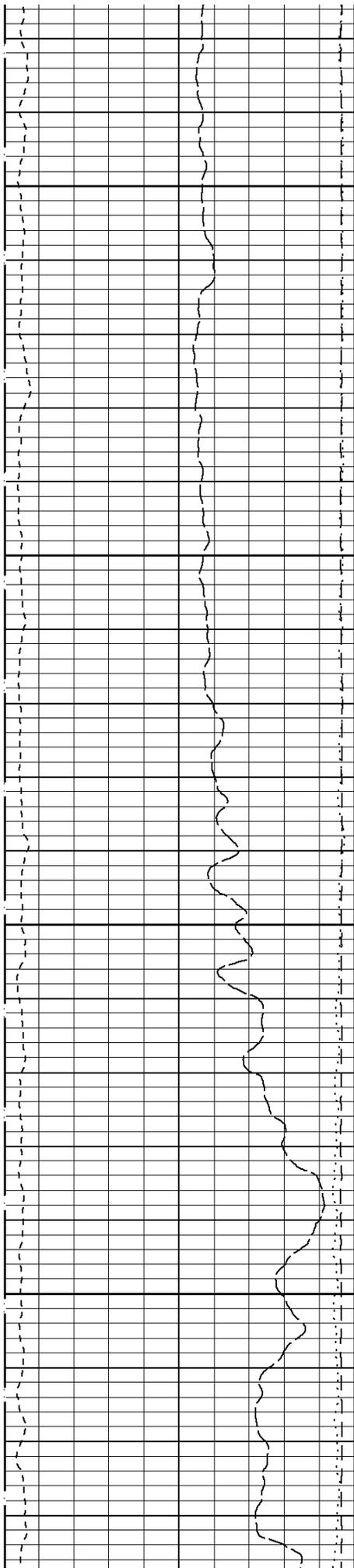




3900
NOISE
AMERICIUM

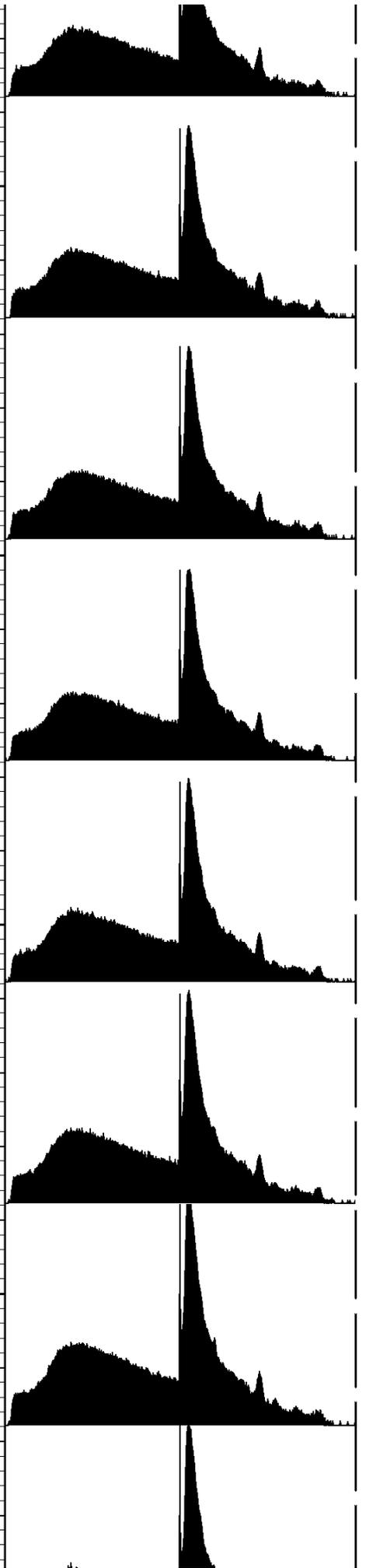
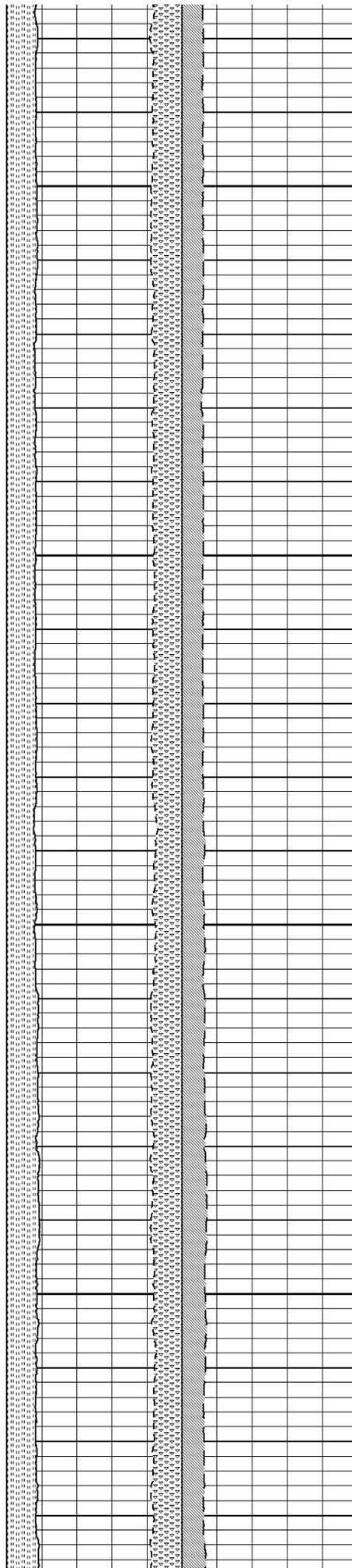
4000





4100

4200





4300

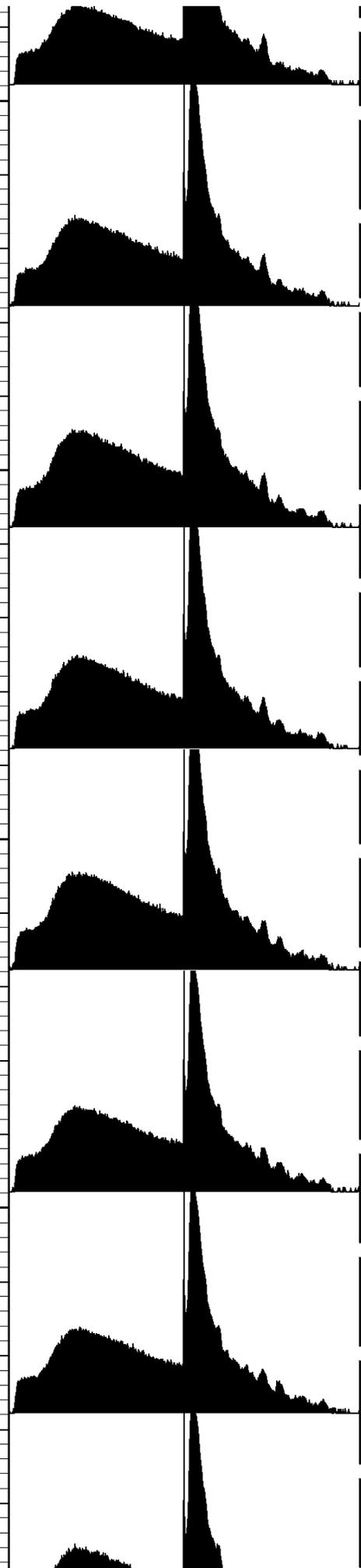
4400
NOISE

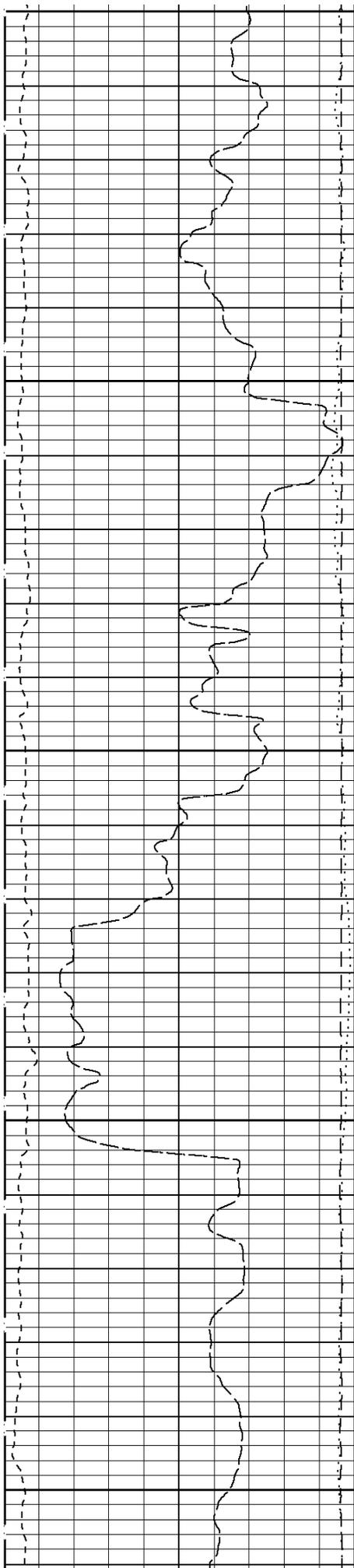
AMERICIUM

TH ERROR

U ERROR

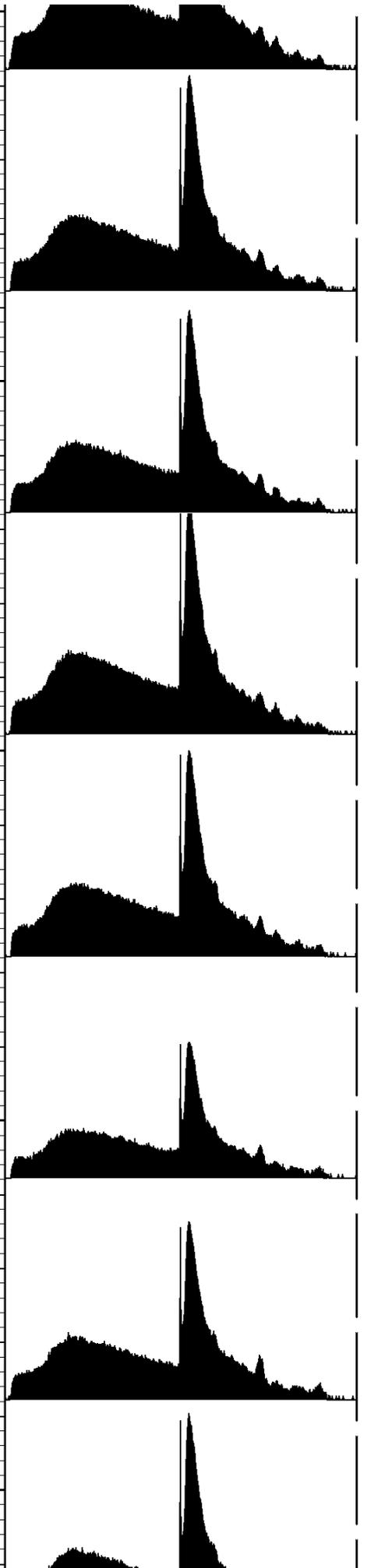
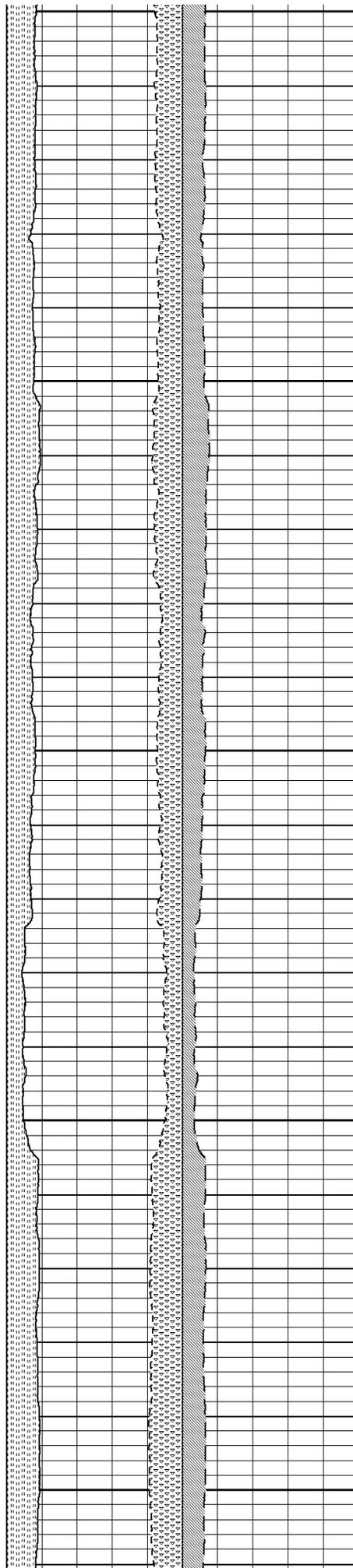
K ERROR

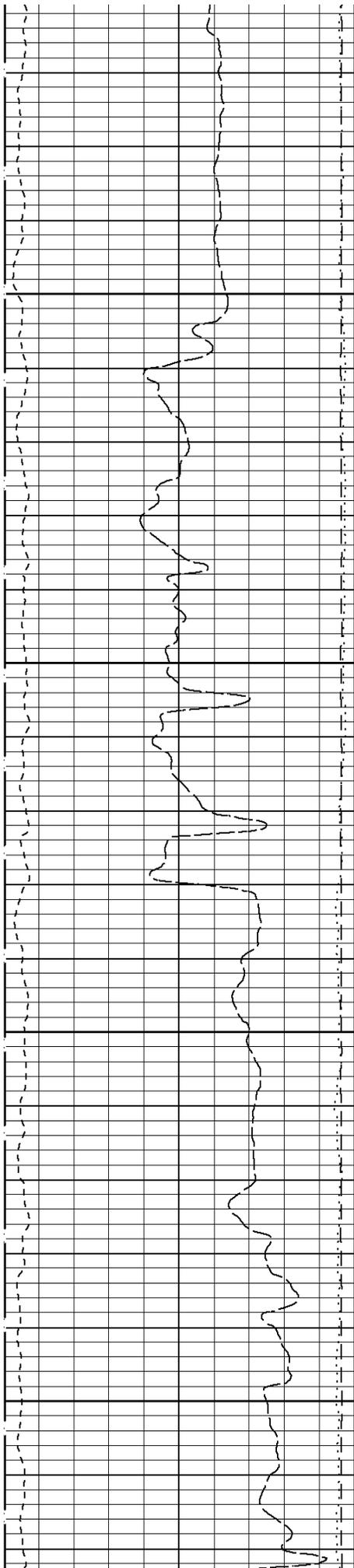




4500

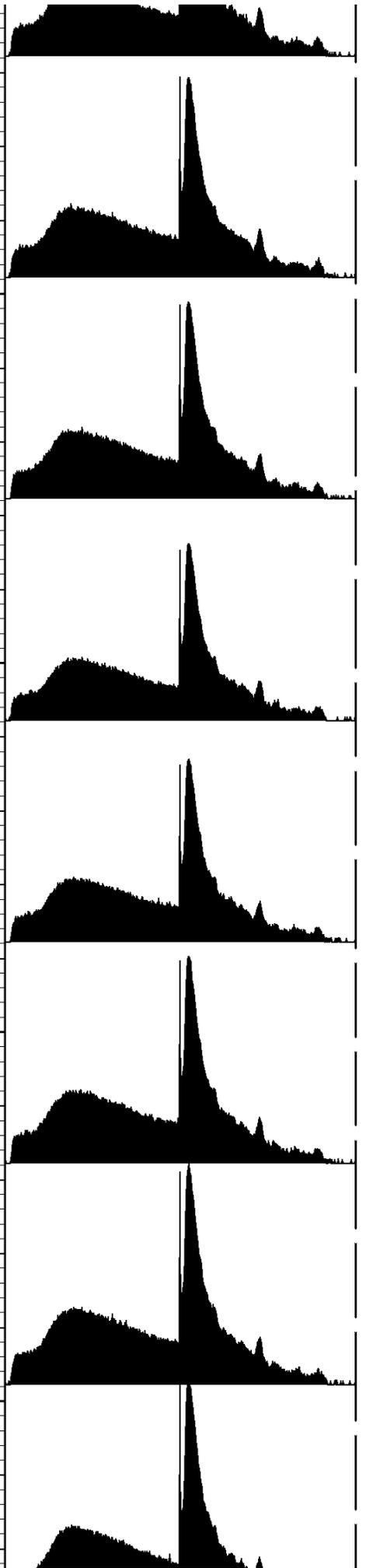
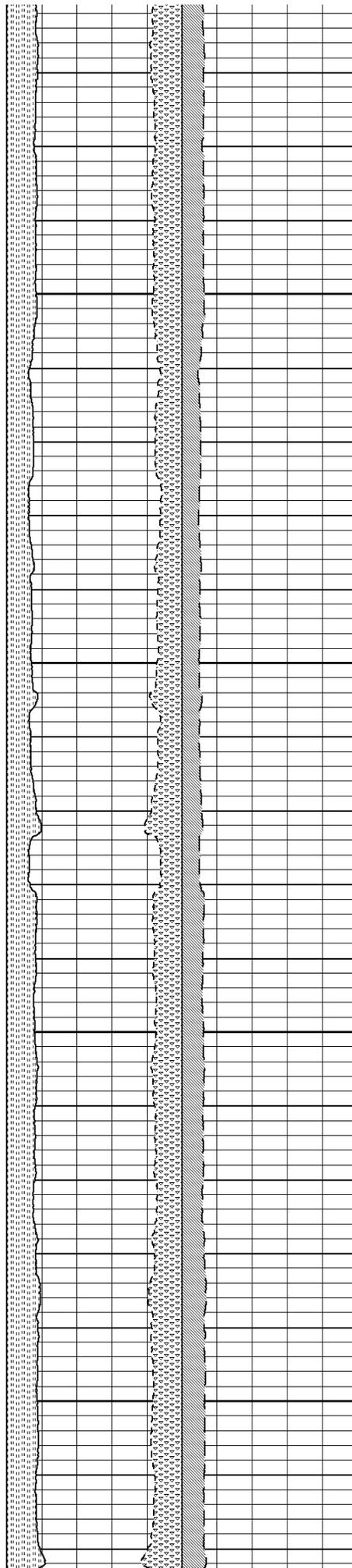
4600

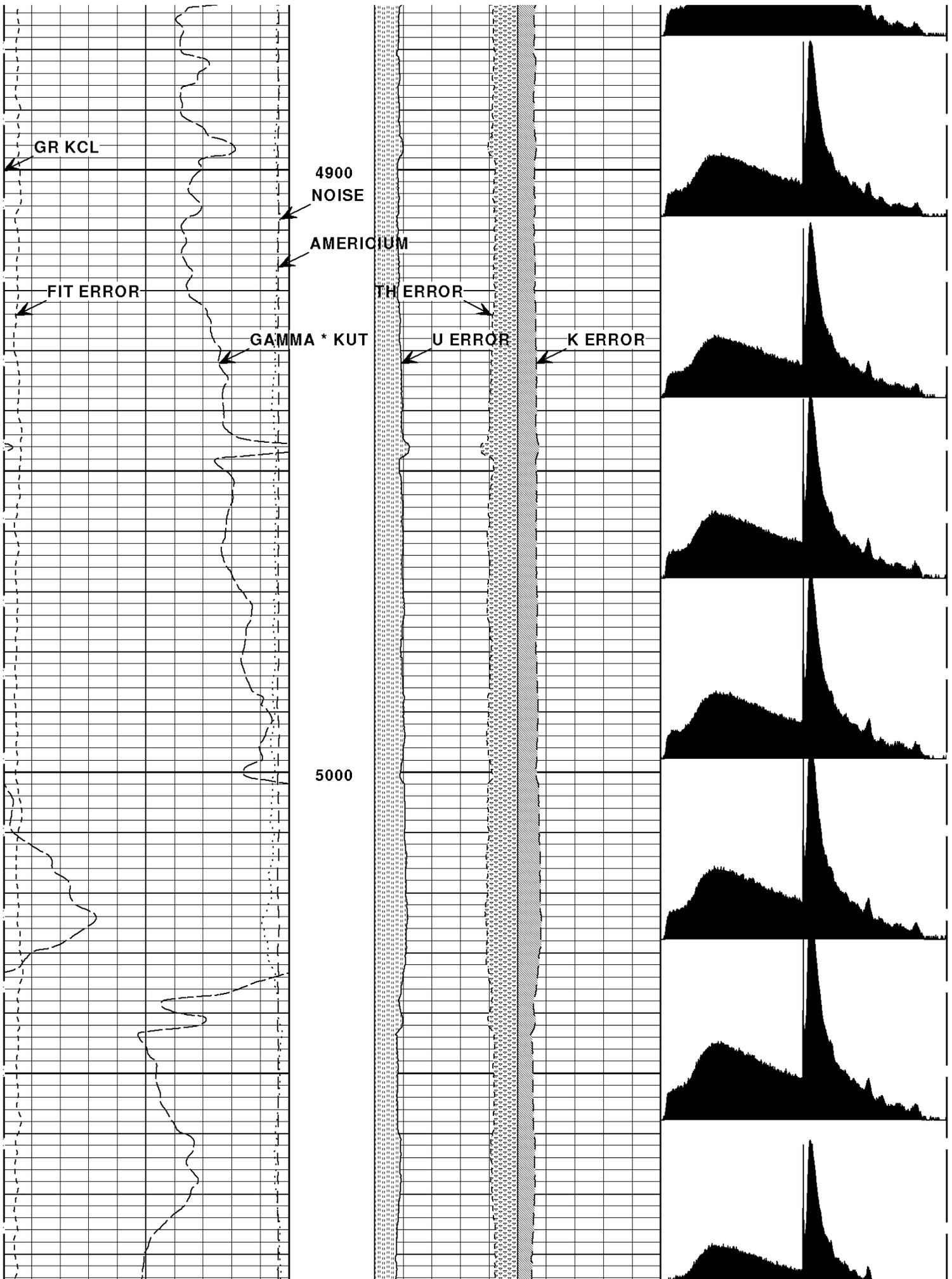




4700

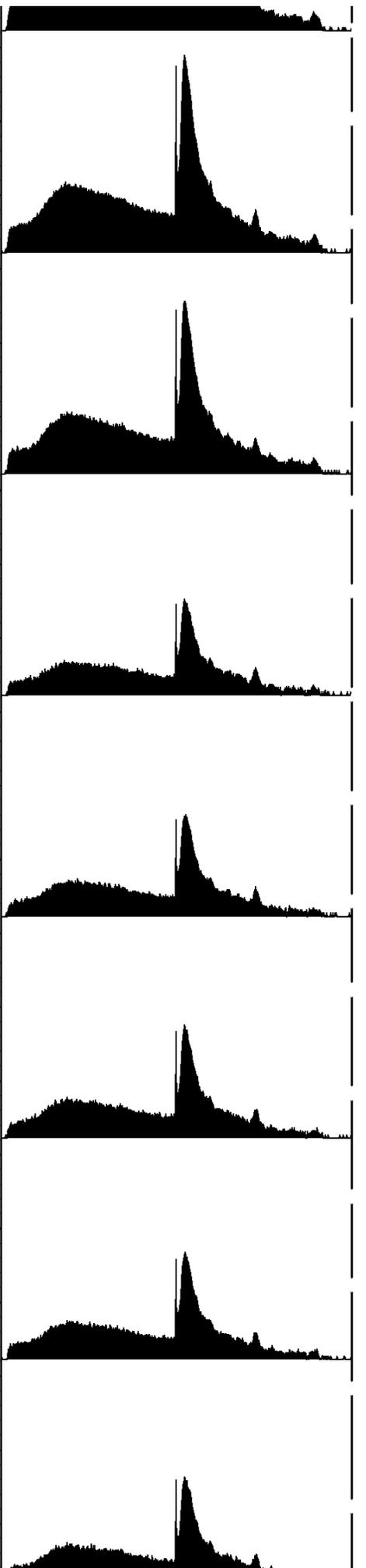
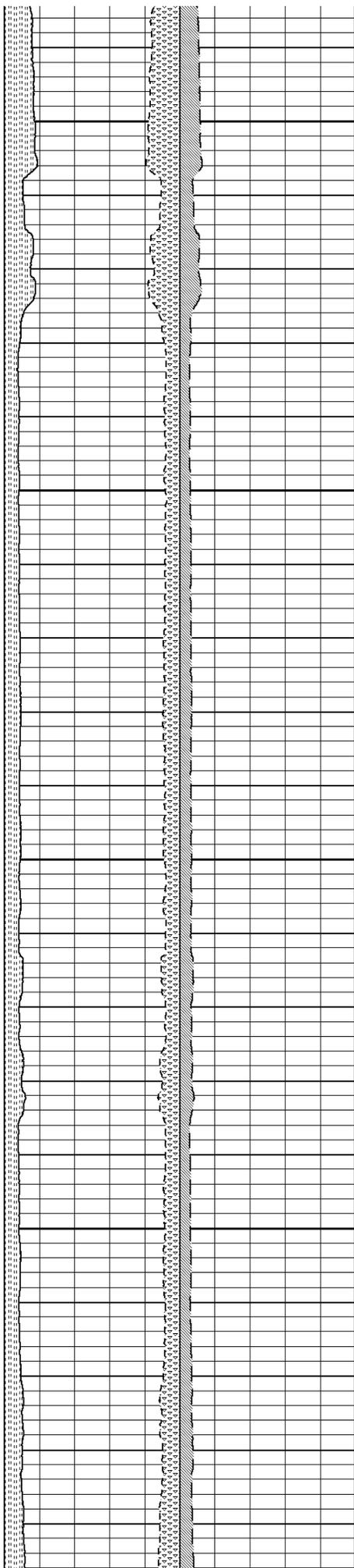
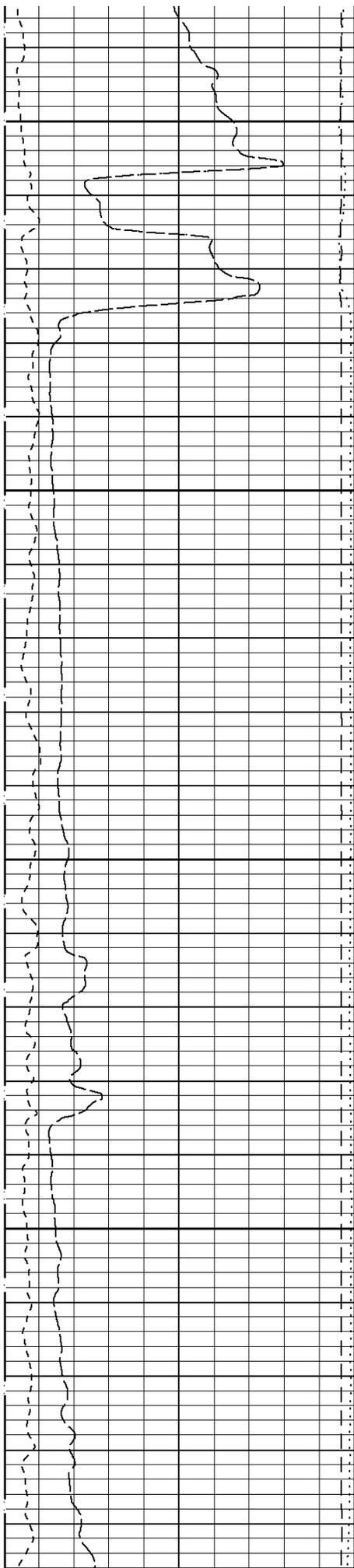
4800





5100

5200



5300

5400

NOISE

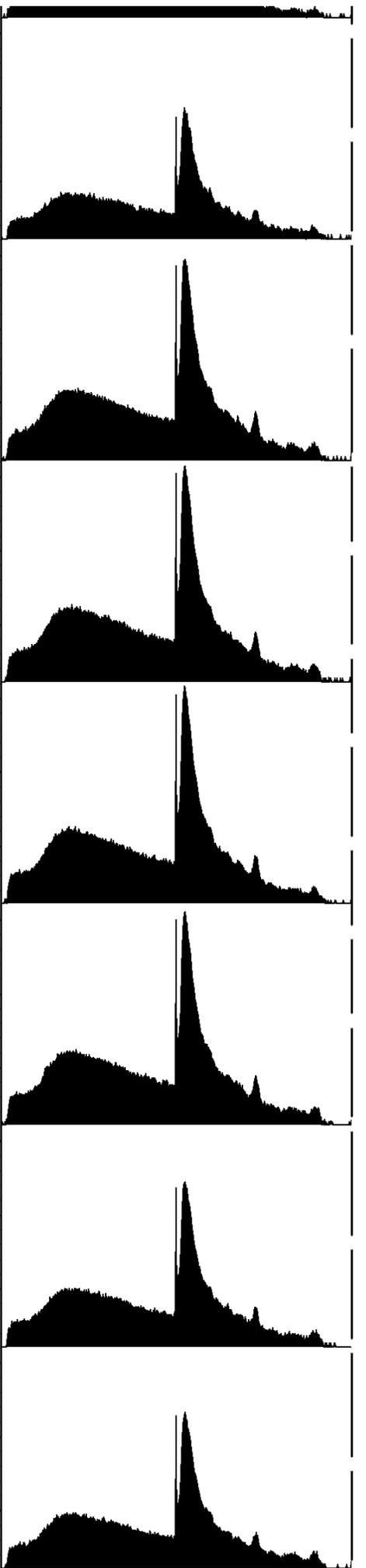
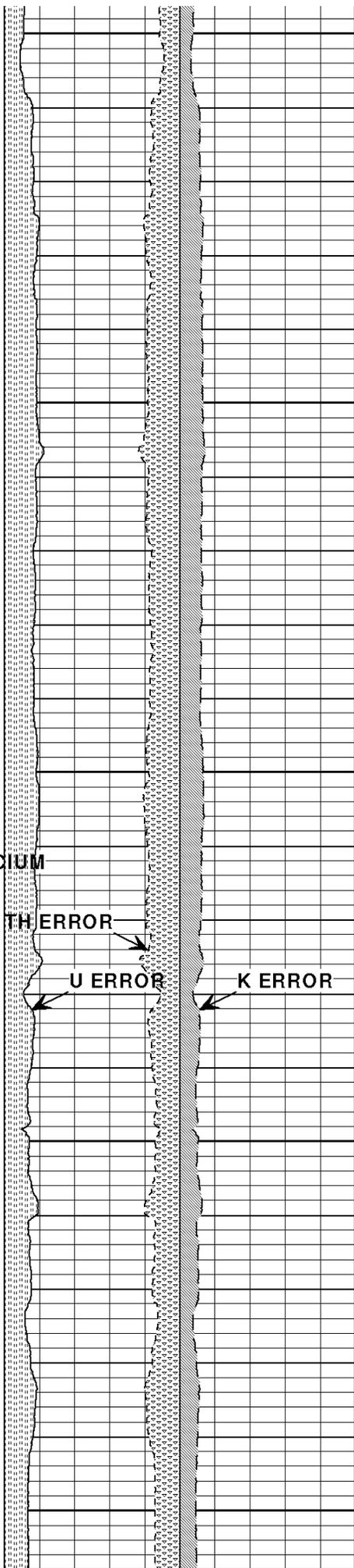
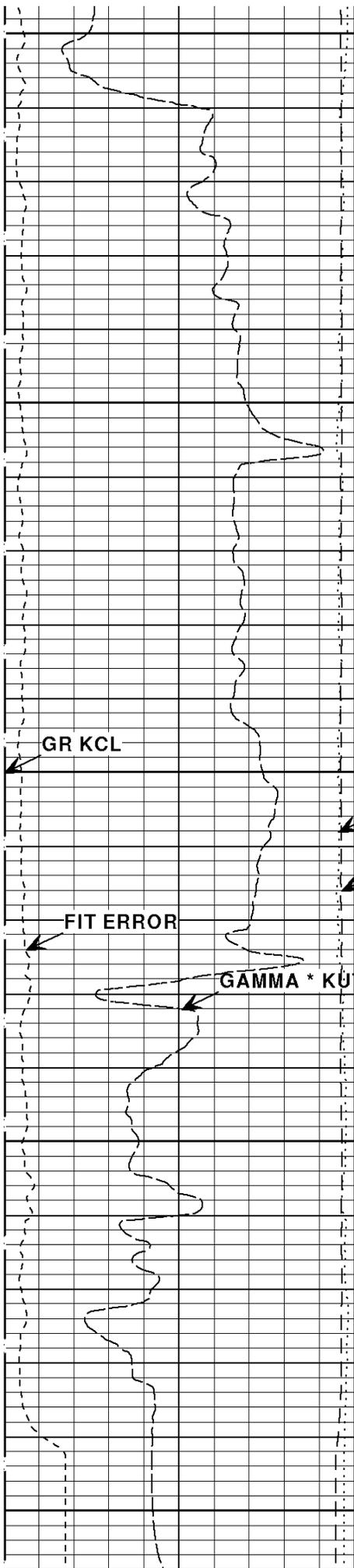
AMERICIUM

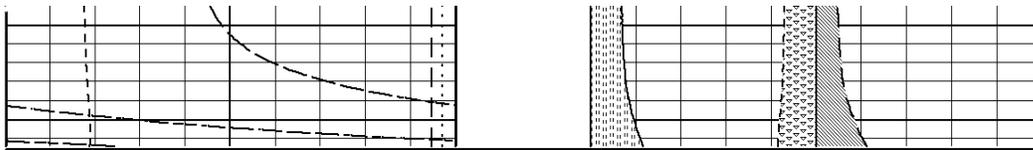
TH ERROR

U ERROR

K ERROR

5500





GR KCL GAPI 150 NOISE COUNTS 0 AMERICIUM COUNTS 0 FIT ERROR 0 1	1:240 FT.	TH ERROR PPM 8 0	K ERROR PERCENT 0 2 0	CSNG SPECTRA 512
GAMMA * KUT API 150		U ERROR PPM 0 4 0		

HALLIBURTON
 Version No: 5.6 | hc:3.0
 Data File: awind_7_17_run2.2.cls
 Format File: CSNG_2.spc
 Plot Time: 2007-04-05 07:42:46
 Log Time: 2007-04-05 01:39:16
 Top Depth: 461.00
 Bottom Depth: 5522.75

EXCELL-2000 Calibration Report
 Date: 05-Apr-2007 07:46:

CSNG - DITS - TITANIUM SHOP CALIBRATION SUMMARY
 PERFORMED: 28-Mar-2007 17:50 LAST SHOP CALIBRATION: 18-Feb-2007 09:03
 SERIAL NUMBER: I019S925 MODEL: CSNG-T
 CALIBR NUM: 230
 TRUCK UNIT NUMBER: 10549597 PROGRAM VERSION: 5.6
 PERFORMED BY: KOON

TITANIUM CASE	MEASURED	CALIBRATED	UNITS
60KEV PEAK CH#	48	48	CHANNELS
239KEV PEAK CH#	171	171	CHANNELS
583KEV PEAK CH#	49	49	CHANNELS
2614KEV PEAK CH#	202	202	CHANNELS
CALIBRATOR VALUE	229	229	GAPI

CSNG - DITS - TITANIUM BEFORE SURVEY FIELD CHECK SUMMARY
 PERFORMED: 05-Apr-2007 00:54 LAST SHOP CALIBRATION: 28-Mar-2007 17:50

	SHOP	FIELD	UNITS
60KEV PEAK CH#	48	48	CHANNELS
239KEV PEAK CH#	171	171	CHANNELS
583KEV PEAK CH#	49	49	CHANNELS
2614KEV PEAK CH#	202	202	CHANNELS
CALIBRATOR VALUE	229	237	GAPI

EXCELL-2000 Calibration Summary Table
Date: 05-Apr-2007 07:46:

Service or Signal	Shop	Before	After	Change	Tolerance
CSNG	229.13	237.05		-7.92	+/-9.0

EXCELL-2000 CUSTOMER EVENT LOG
Date: 05-Apr-2007 07:45

Event	Time	Section	Depth	Event Description	Data	Repeat
0001	00:05:33	0	0.00	Engineer is: KOON		
0002	00:30:43	0	60.08	Exiting EXCELL-2000 tool calibrations.	FIELD	
0003	00:56:27	0	98.91	Exiting EXCELL-2000 tool calibrations.	FIELD	
0004	01:11:00	0	576.75	TD PARAM CHANGE	0. -->FP	5517.0000
0005	01:11:03	0	588.66	CS_ANT PARAM CHANGE	0. -->FP	478.0000
0006	01:11:03	0	588.66	CASEOD PARAM CHANGE	5.5 -->FP	8.6250
0007	01:11:03	0	588.66	MUDWT PARAM CHANGE	9.5 -->FP	9.2000
0008	01:11:03	0	588.66	BS PARAM CHANGE	7.875 -->FP	12.2500
0009	01:11:21	1	600.50	Begining new Downlog section.		1
0010	01:37:01	1	5484.83	End logging section		1
0011	01:39:17	2	5524.00	Begining new Uplog section.		2
0012	01:56:45	2	5281.50	TTY framing error status a7 data 31	REPEATED:	1
0013	06:11:46	2	1741.00	BS PARAM CHANGE	12.2500 -->FP	17.5000
0014	07:40:28	2	450.33	End logging section		2

**BOREHOLE COMPENSATED
SONIC / COMPENSATED SPECTRAL
NATURAL GAMMA**

Excell 2000 Tool String Diagram

