

COMPANYWINDY HILL GAS STORAGE

WELLWINDY HILL #7-17S

FIELDUNNAMED

COUNTYMORGANSTATECOLORADO

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WELLWINDY HILL #7-17S

FIELDUNNAMED

COUNTYMORGANSTATECOLORADO

API No.05087081460000

LocationNE/SW1748' FNL2622' FWL

Other ServicesRWCH/GRHRI/SD/DSNBCS

Sect17Twp3NRge55W

Permanent DatumG.L. _____ Elev.4499.0

Log measured fromK.B. _____, 16.5 _____ ft. above perm. datum

Drilling measured fromK.B. _____

Elev.:K.B.4515.5
D.F. _____
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		

Fold Here

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	Am241 Be	
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)														
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.														
HALLIBURTON														

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

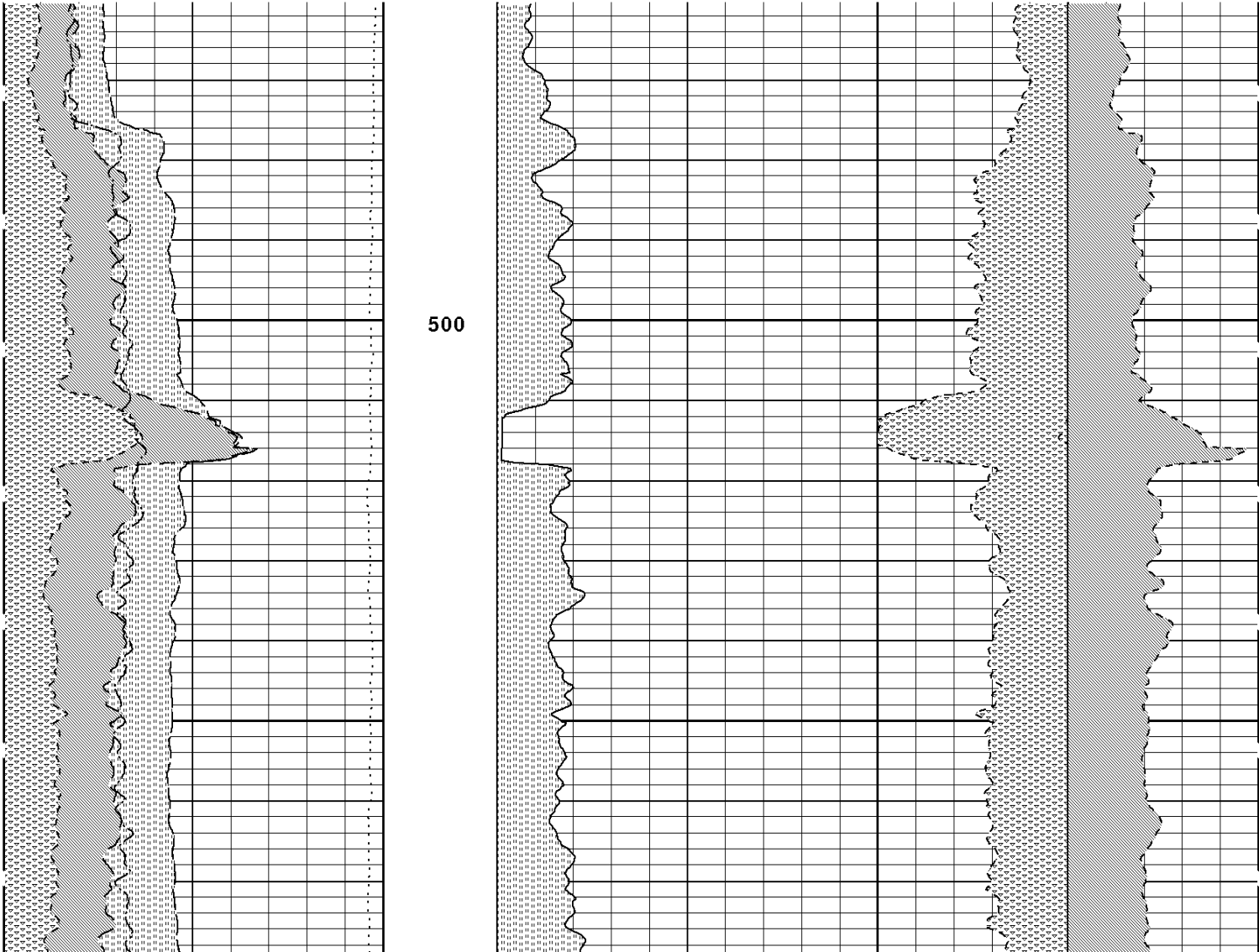
Log Time: 2007-04-05 01:39:16

Top Depth: 460.00

Bottom Depth: 5522.75

HALLIBURTON

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



600

700

800

900
NOISE

NGRT

GAMMA * KUT

GAMMA * KT

GAMMA * TH

URANIUM

THORIUM

POTASSIUM

1000

1100

1200

1300

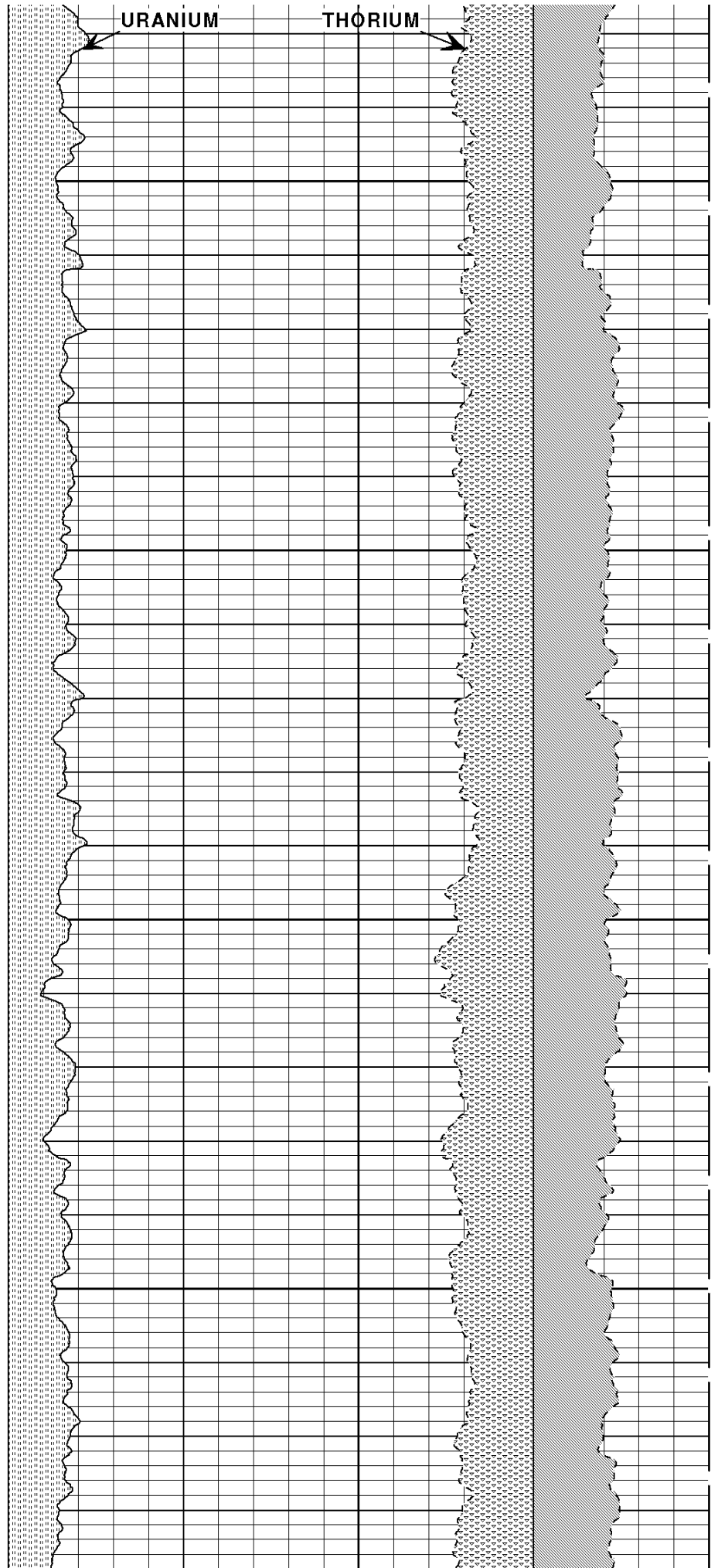
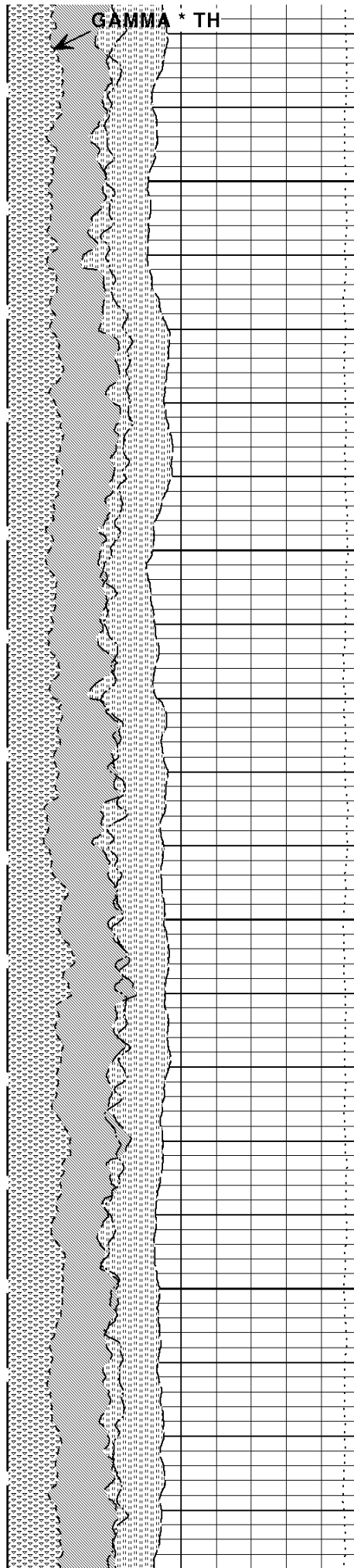
NGRT

1400
NOISE

GAMMA * KUT

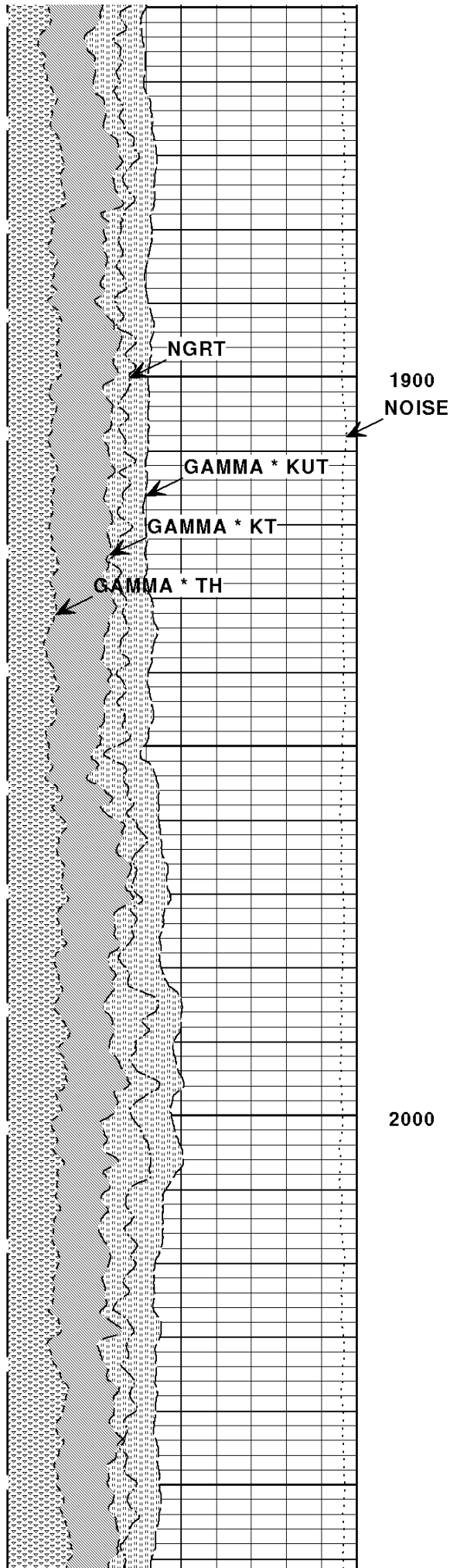
GAMMA * KT

POTASSIUM

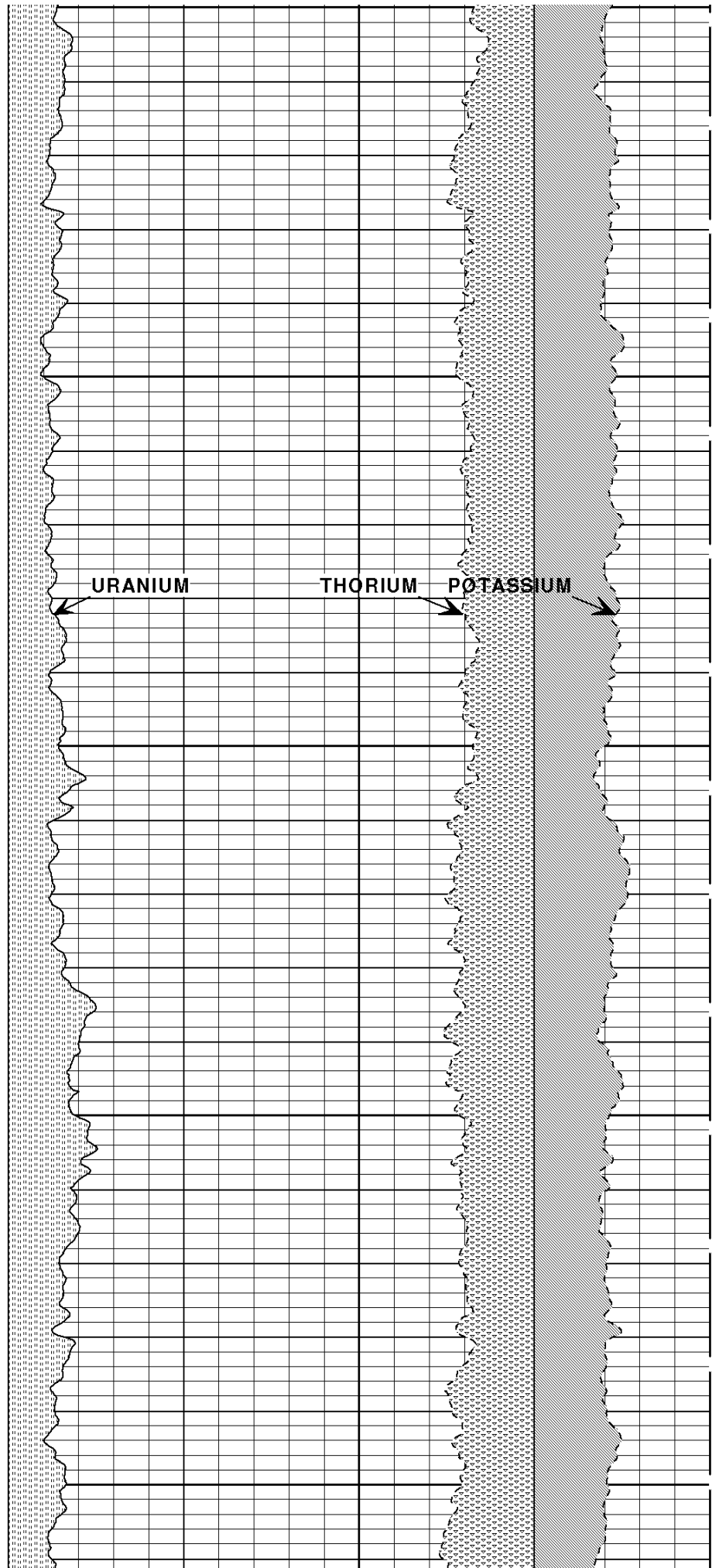


1700

1800



2000



2100

2200

2300

NGRT

2400
NOISE

GAMMA * KUT

GAMMA * KT

GAMMA * TH

URANIUM

THORIUM

POTASSIUM

2500

2600

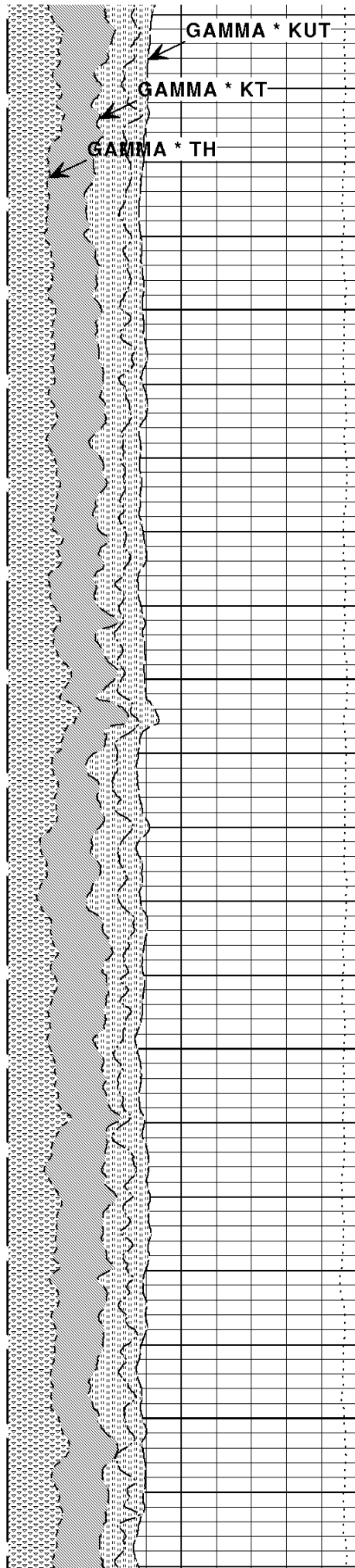
2700

2800

NGRT

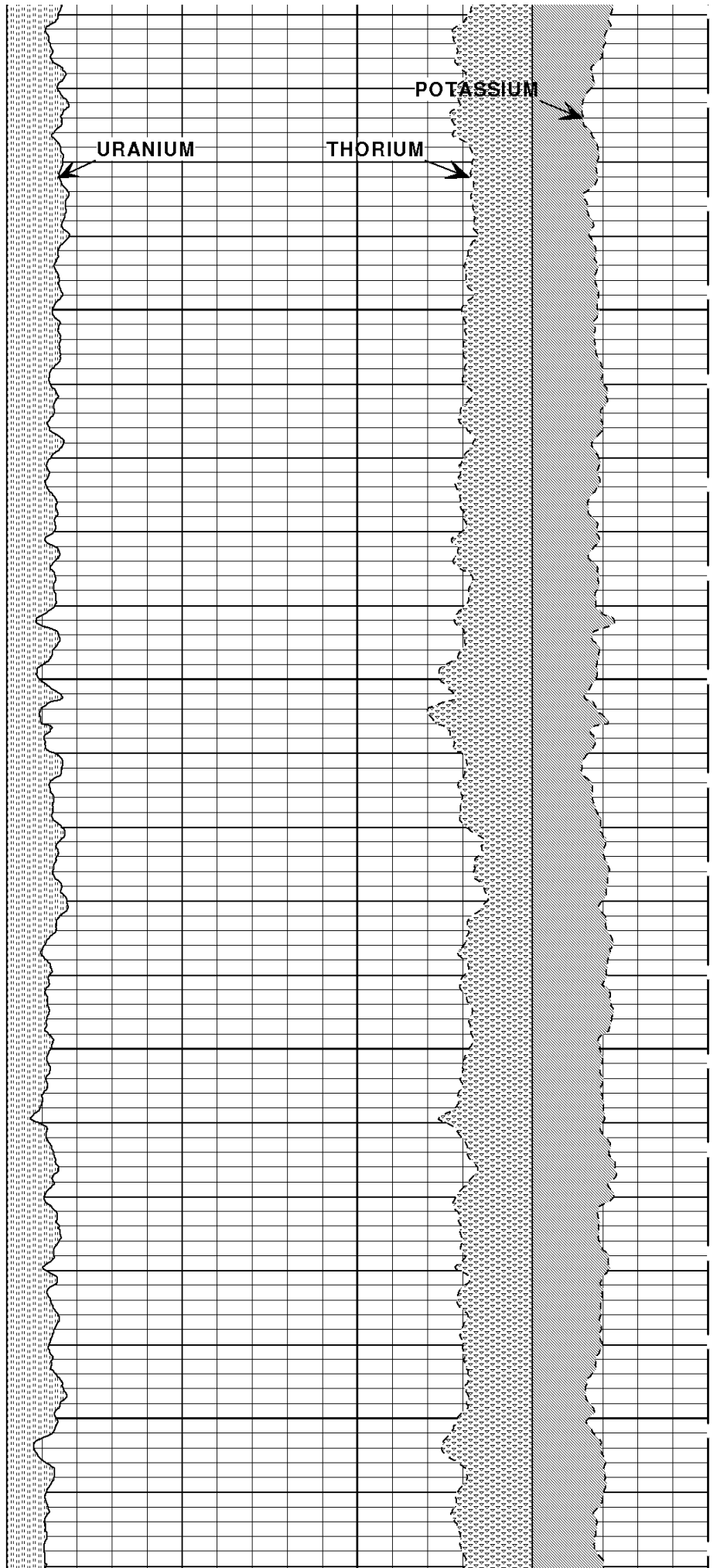
2900
NOISE





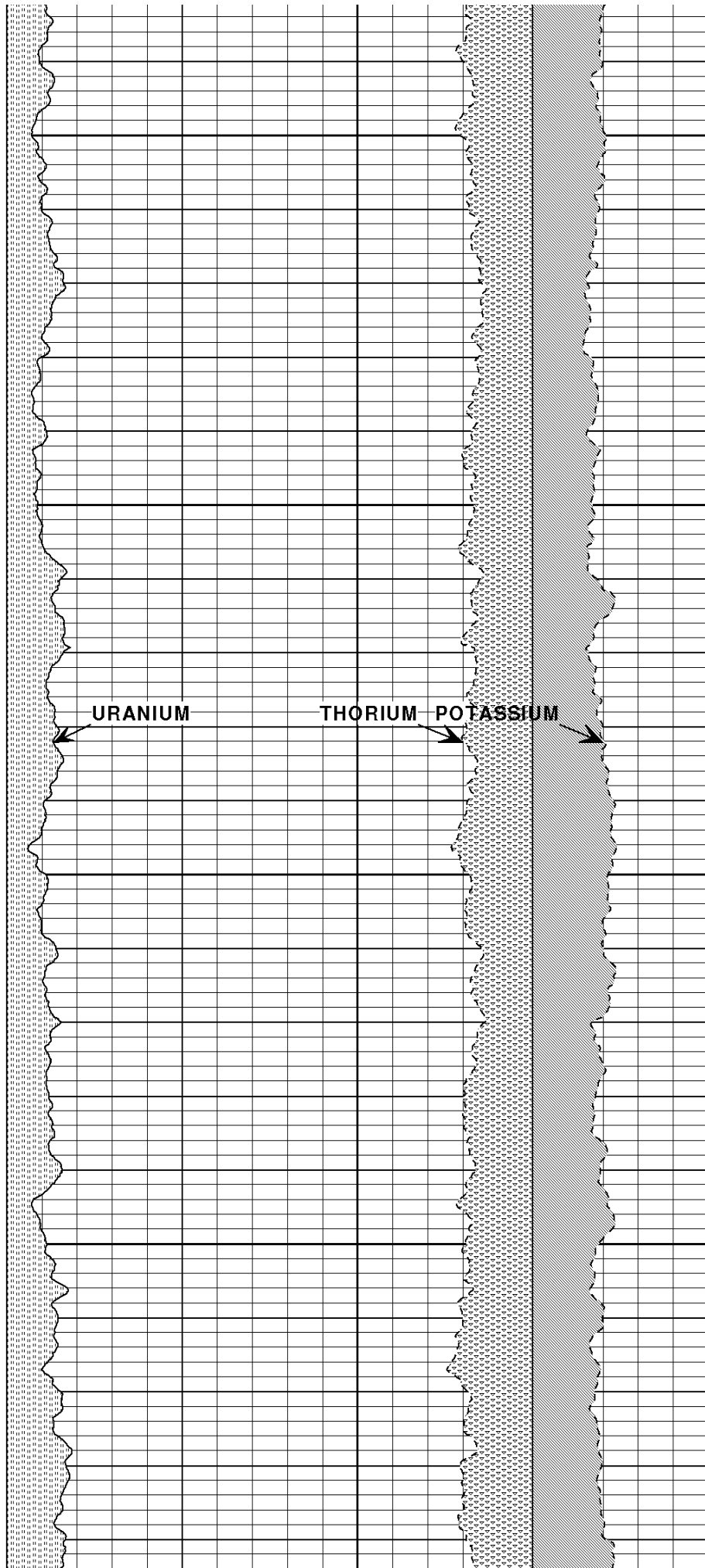
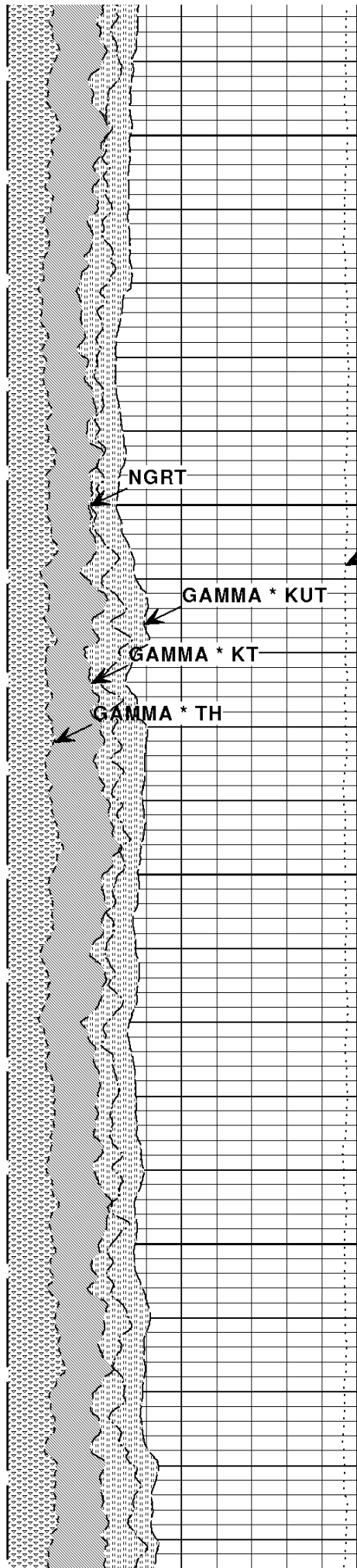
3000

3100



3200

3300



3600

3700

3800

NGRT

3900
NOISE

GAMMA * KUT

GAMMA * KT

GAMMA * TH

URANIUM

THORIUM

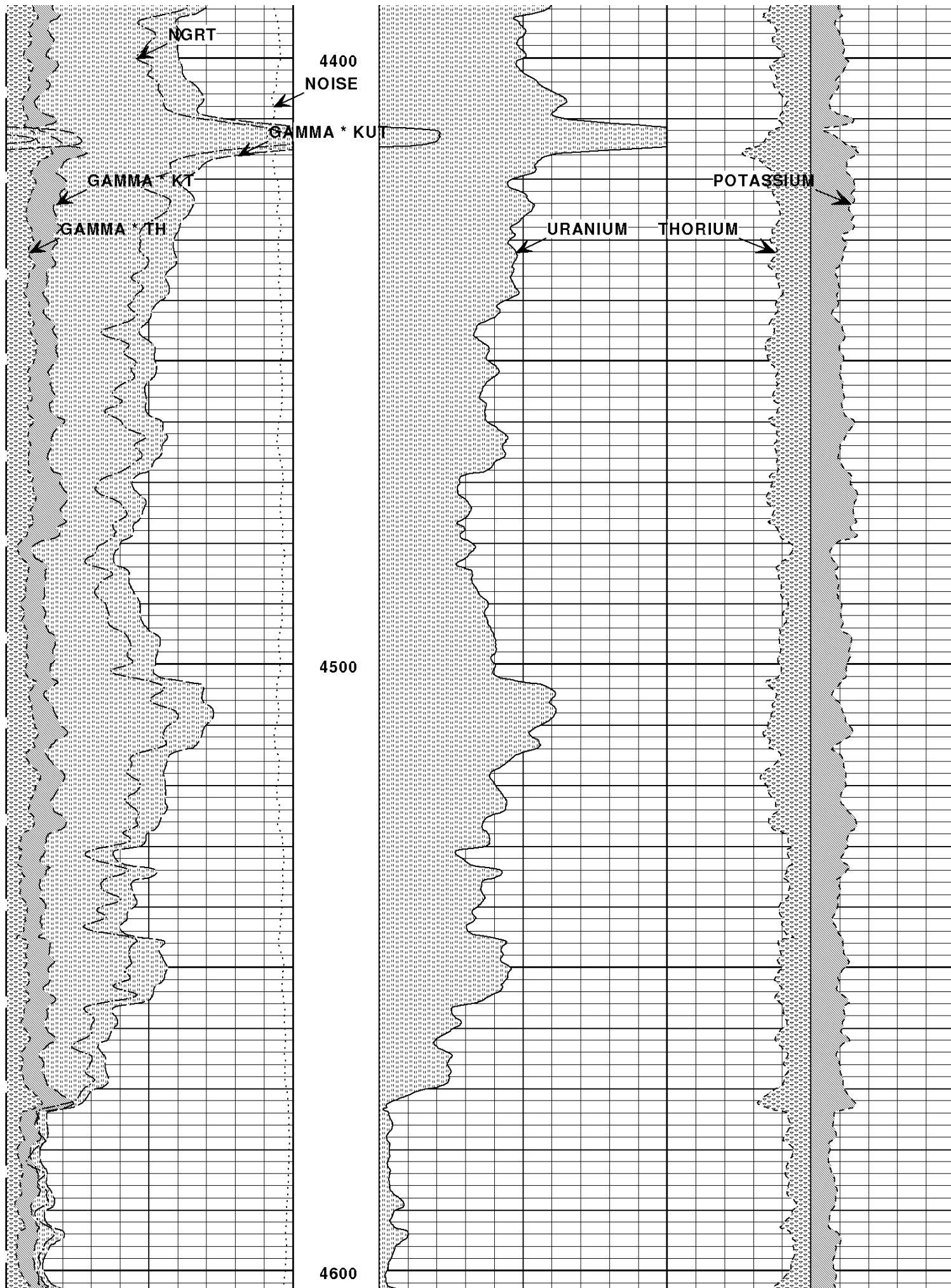
POTASSIUM

4000

4100

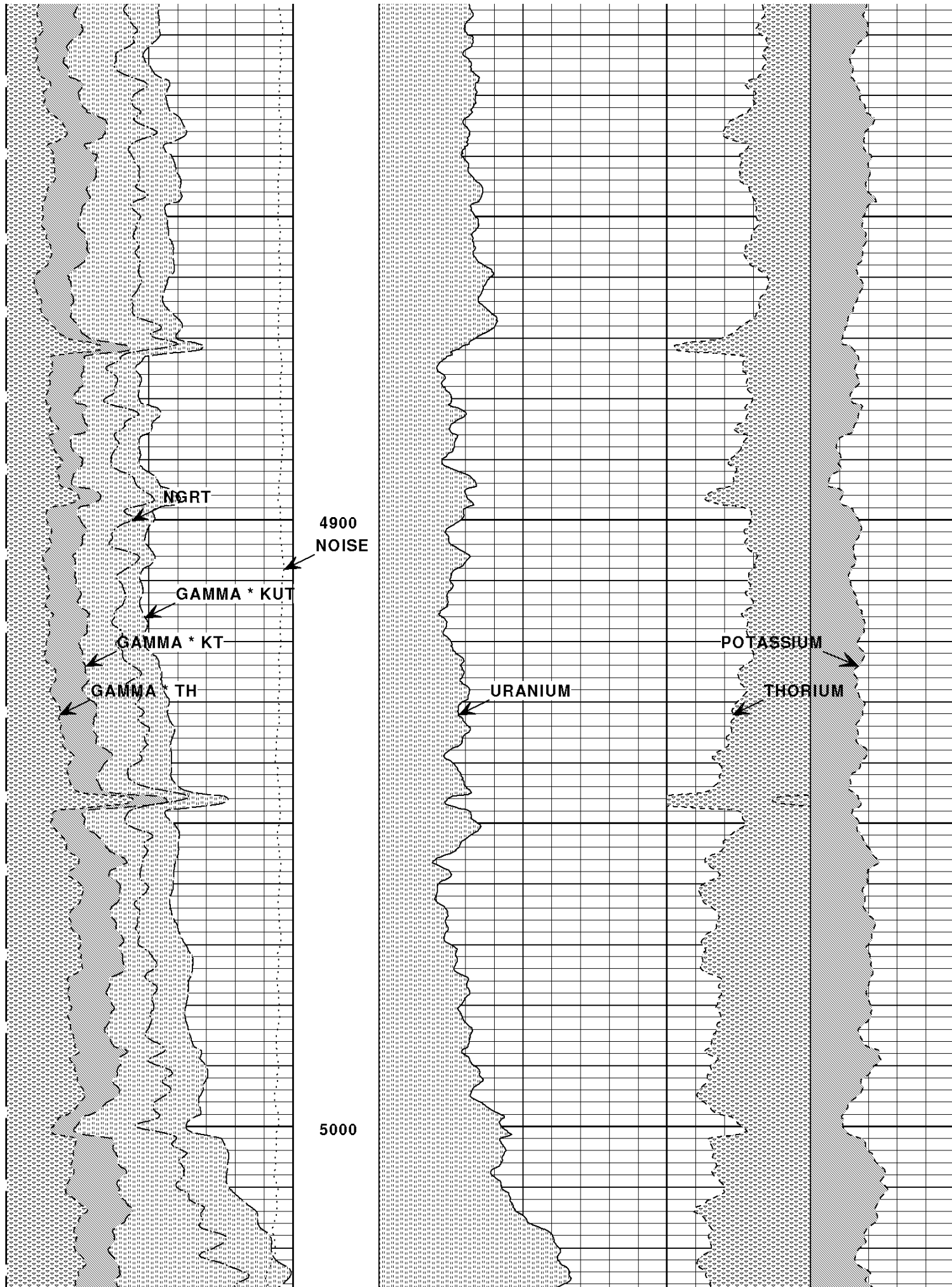
4200

4300



4700

4800



5100

5200

5300

NGRT

5400
NOISE

GAMMA * KUT

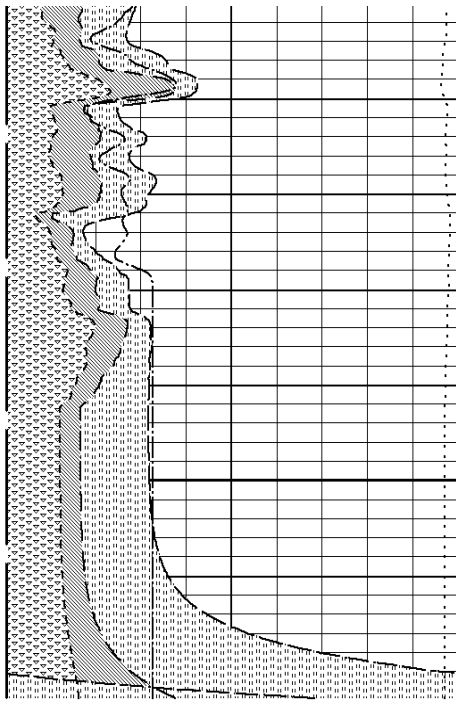
GAMMA * KT

GAMMA * TH

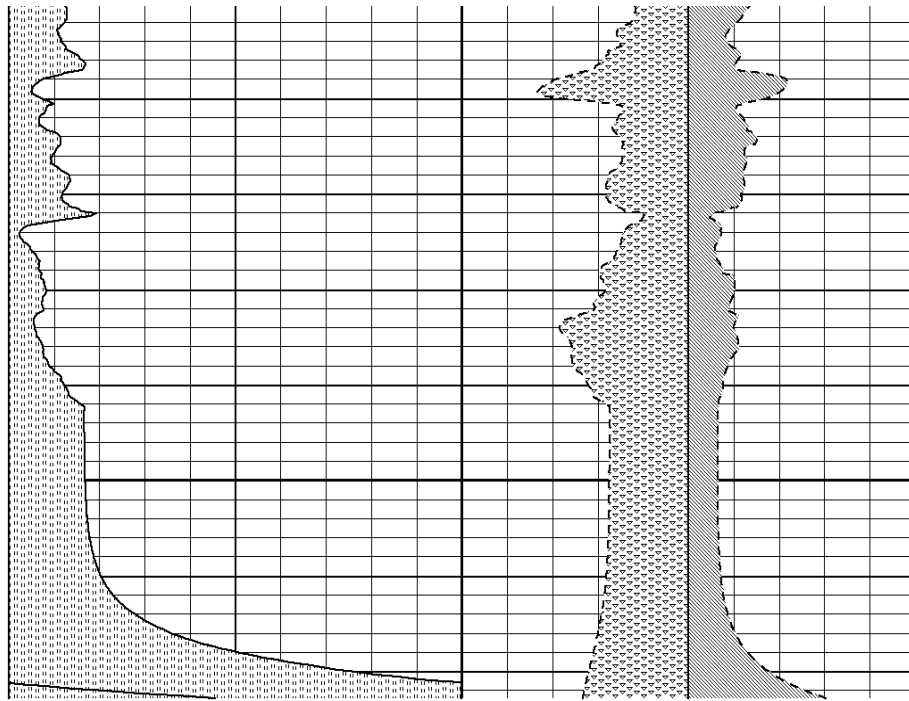
URANIUM

THORIUM

POTASSIUM



5500



NGRT API200					
100NOISE COUNTS0					
0GAMMA * KUT API200					
0GAMMA * KT API200					
0GAMMA * TH API200		1:240 FT.	URANIUM PPM020	THORIUM PPM200	POTASSIUM PERCENT05

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

Top Depth: 460.00

Bottom Depth: 5522.75

MAIN PASS 5"=100'

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 07:43:31

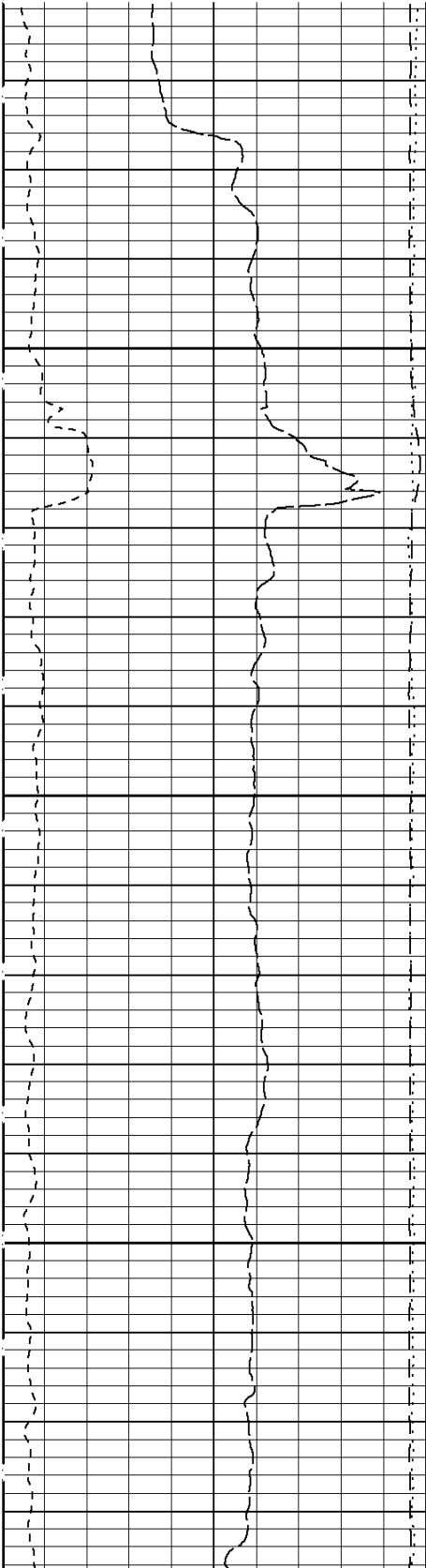
Log Time: 2007-04-05 01:39:16

Top Depth: 461.00

Bottom Depth: 5522.75

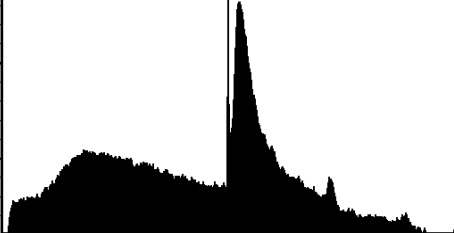
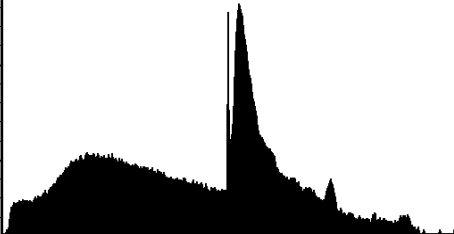
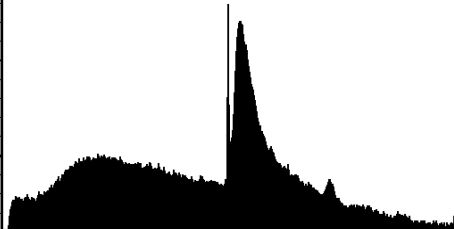
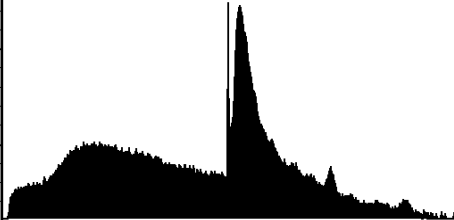
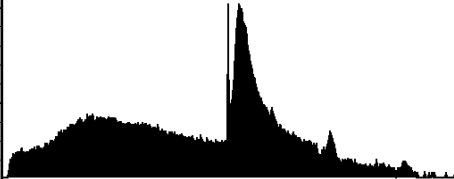
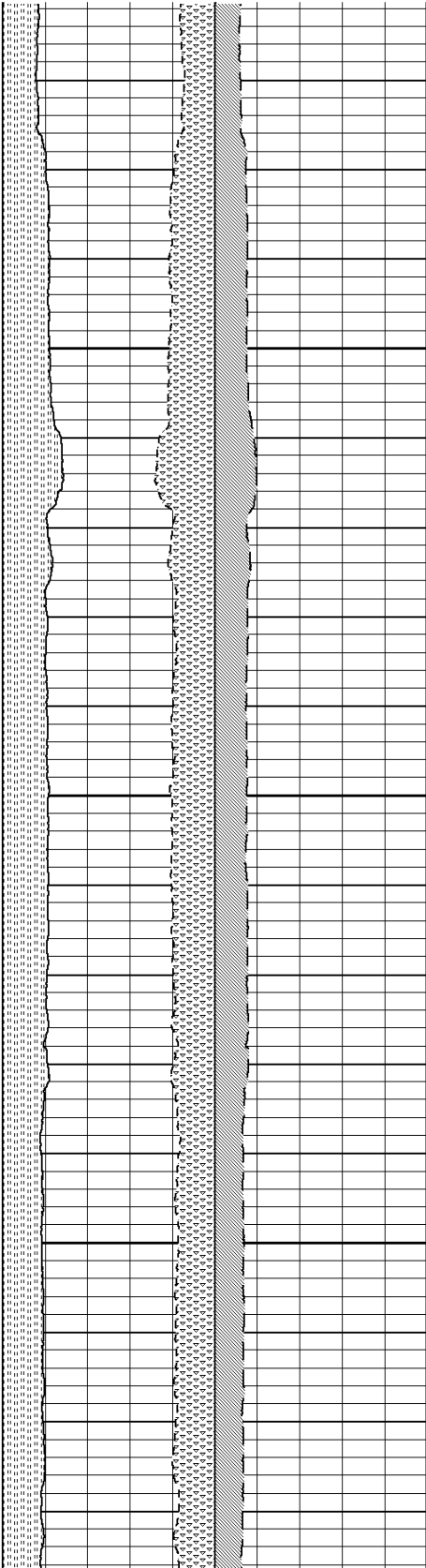
GAMMA * KUT			1:240 FT.	U ERROR		K ERROR		CSNG SPECTRA	
0 API 150				0 PPM 4 0		PERCENT 2 0		512	
FIT ERROR				TH ERROR					
0 1				8 PPM 0					
AMERICIUM									
1000 COUNTS 0									

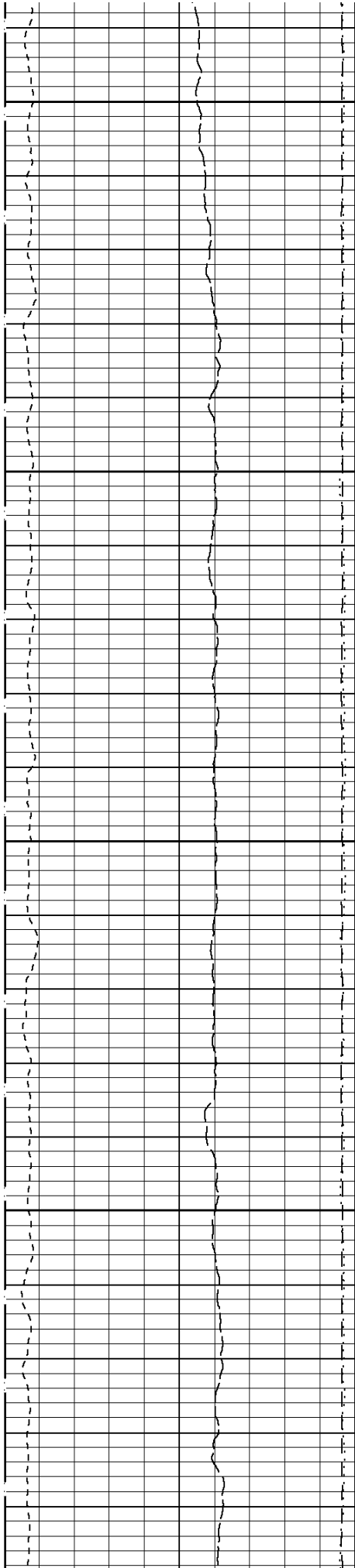
100	NOISE COUNTS	0
0	GR KCL GAPI	150



500

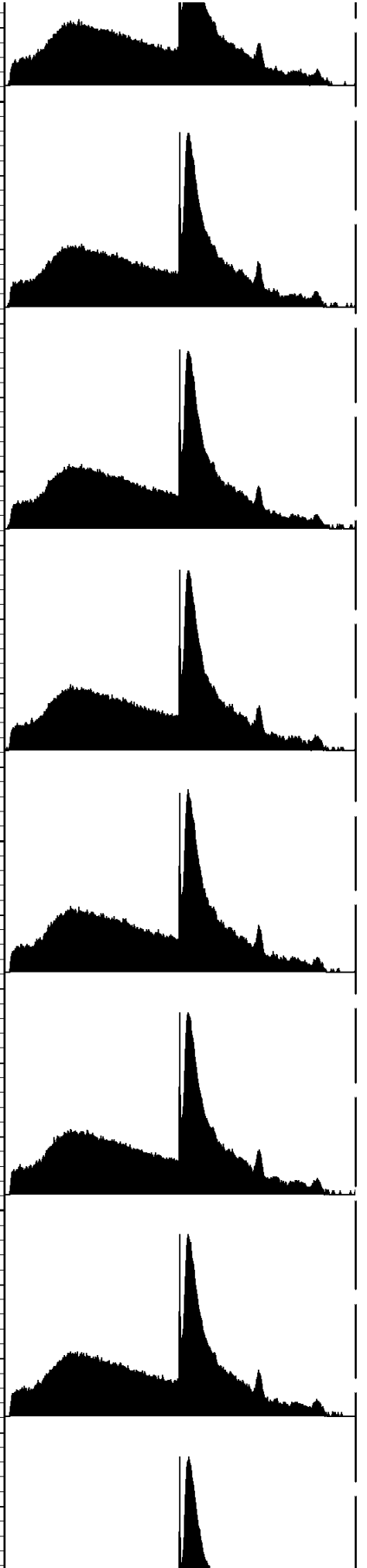
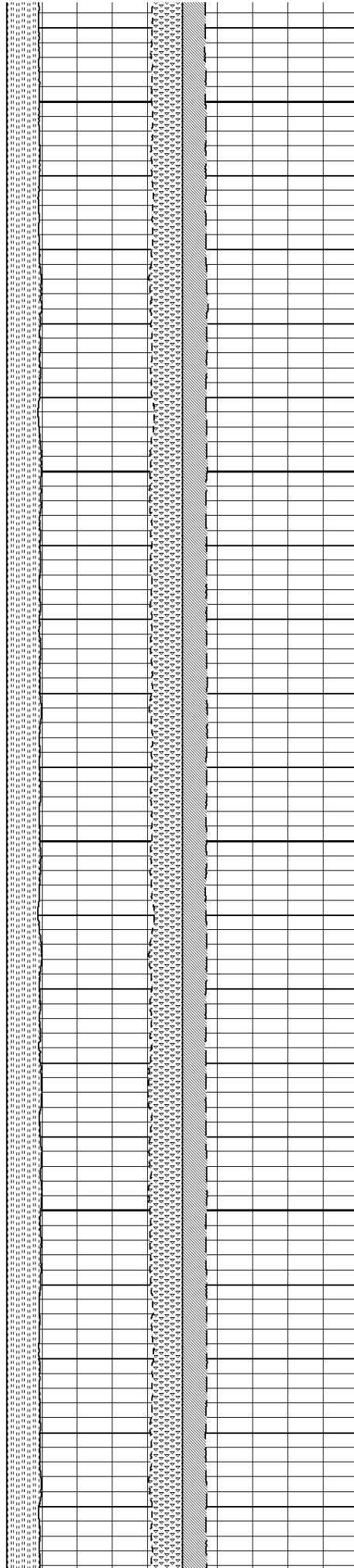
600

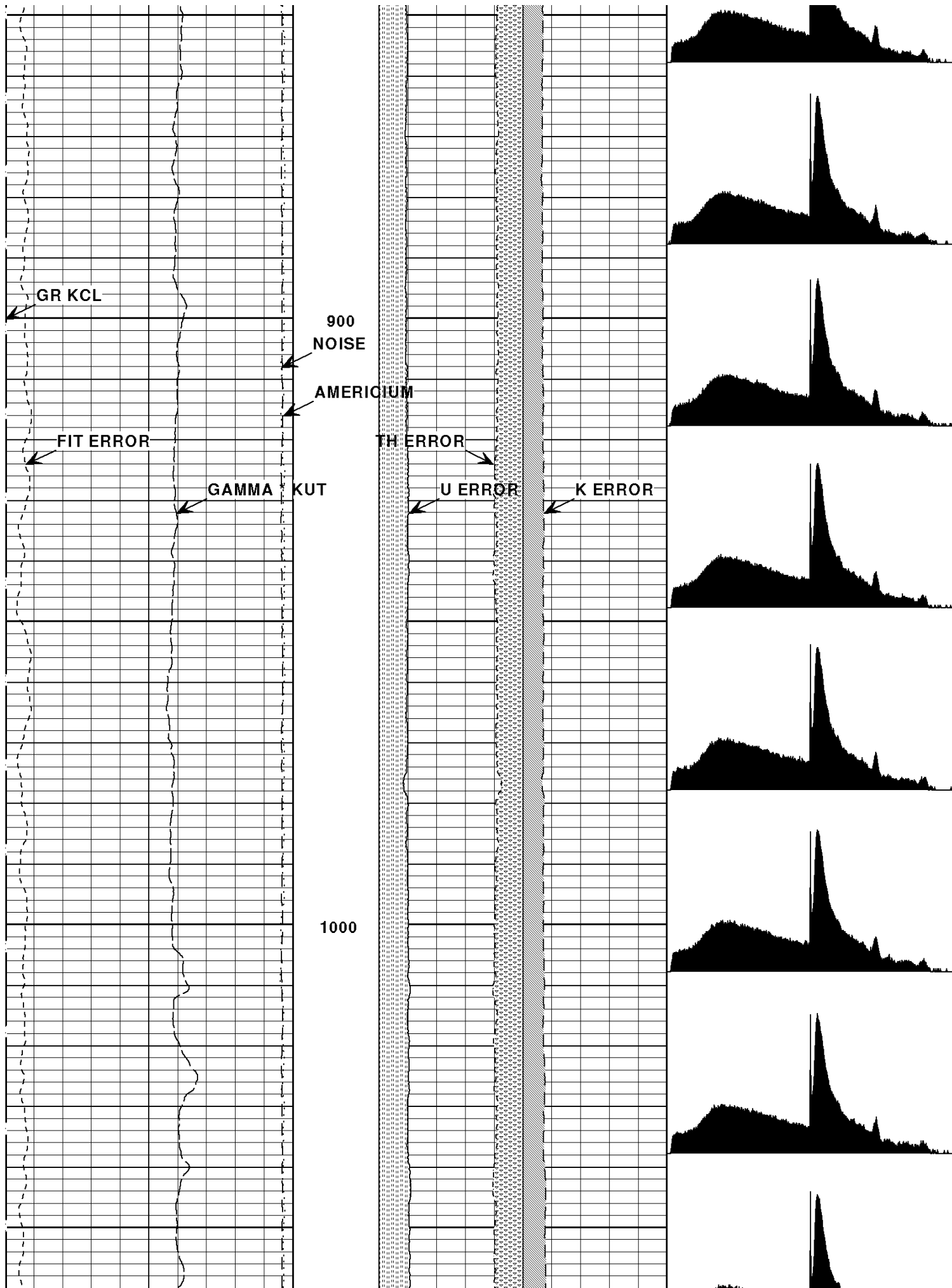


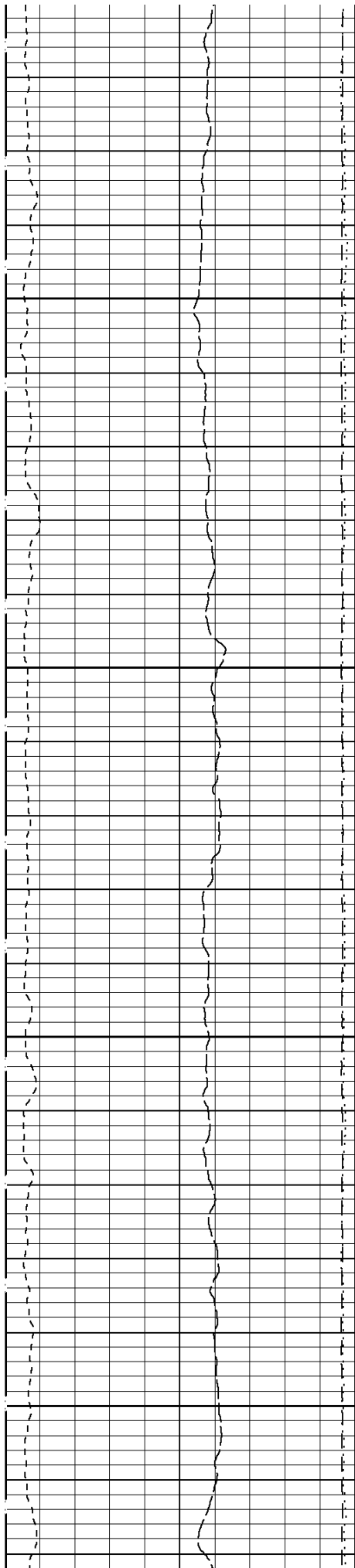


700

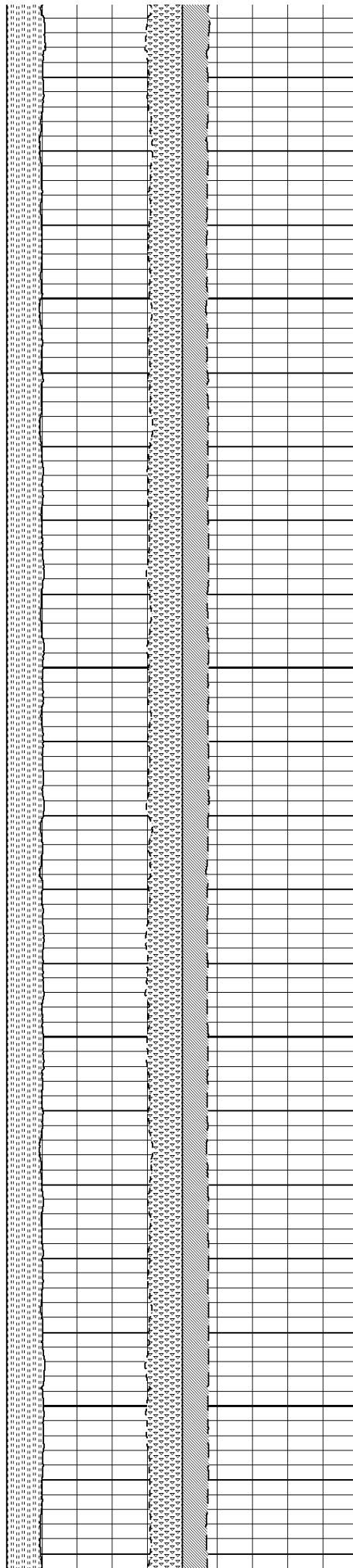
800



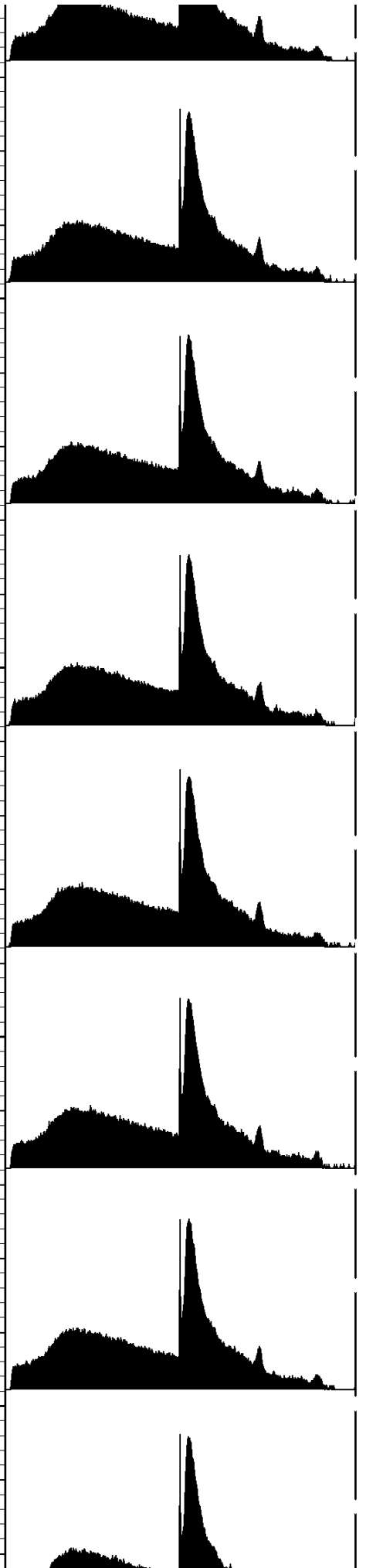




1100



1200



1300

GR KCL

1400
NOISE

AMERICIUM

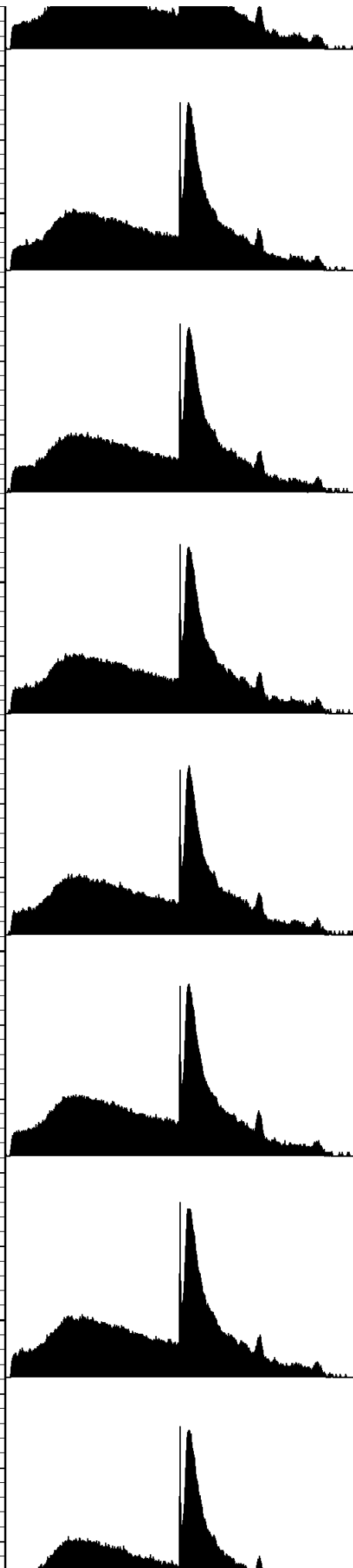
FIT ERROR

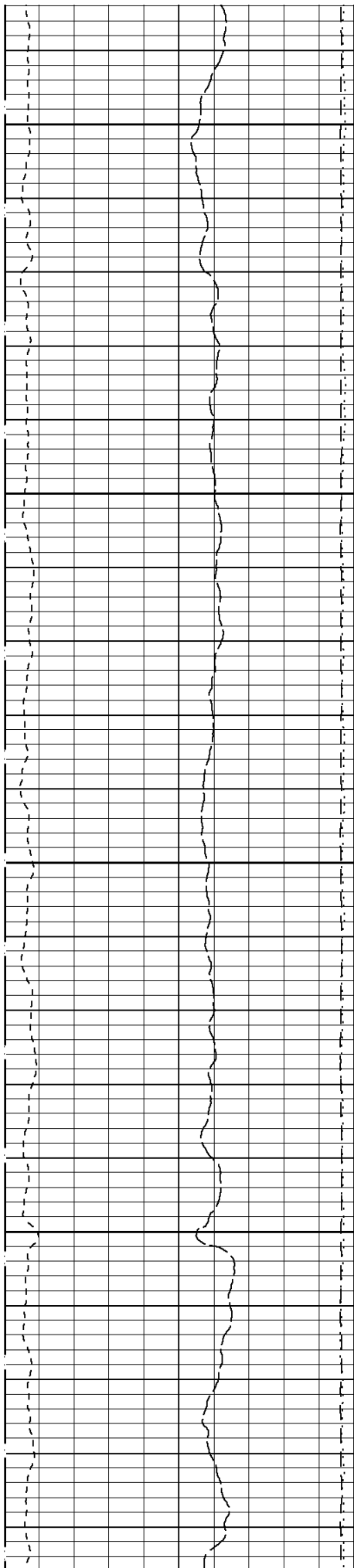
TH ERROR

GAMMA KUT

U ERROR

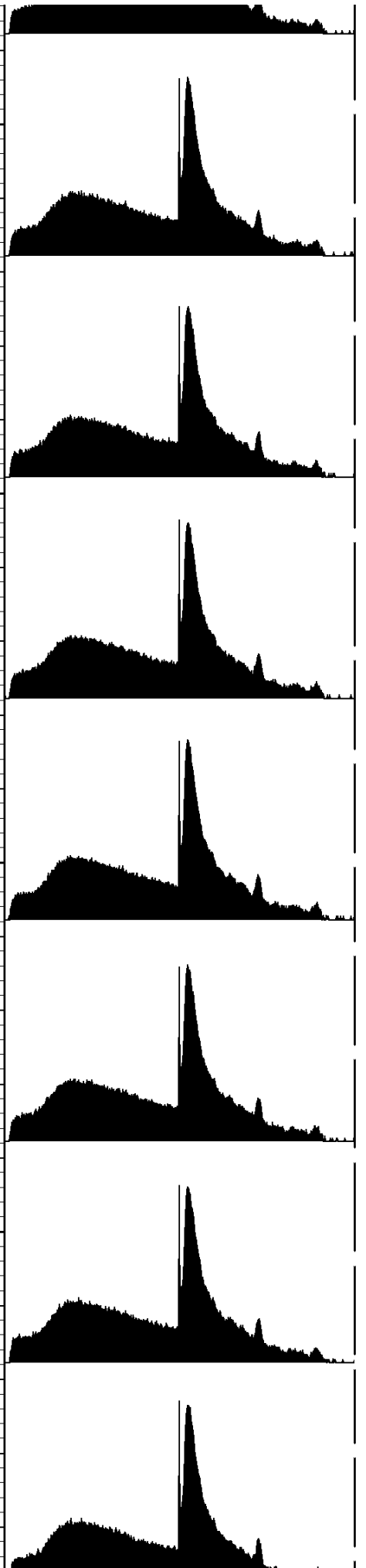
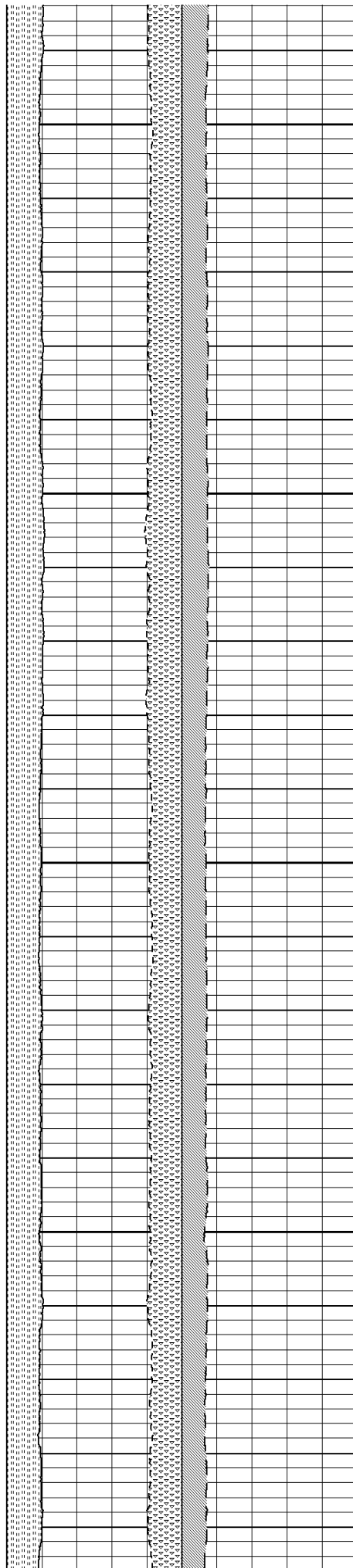
K ERROR





1500

1600

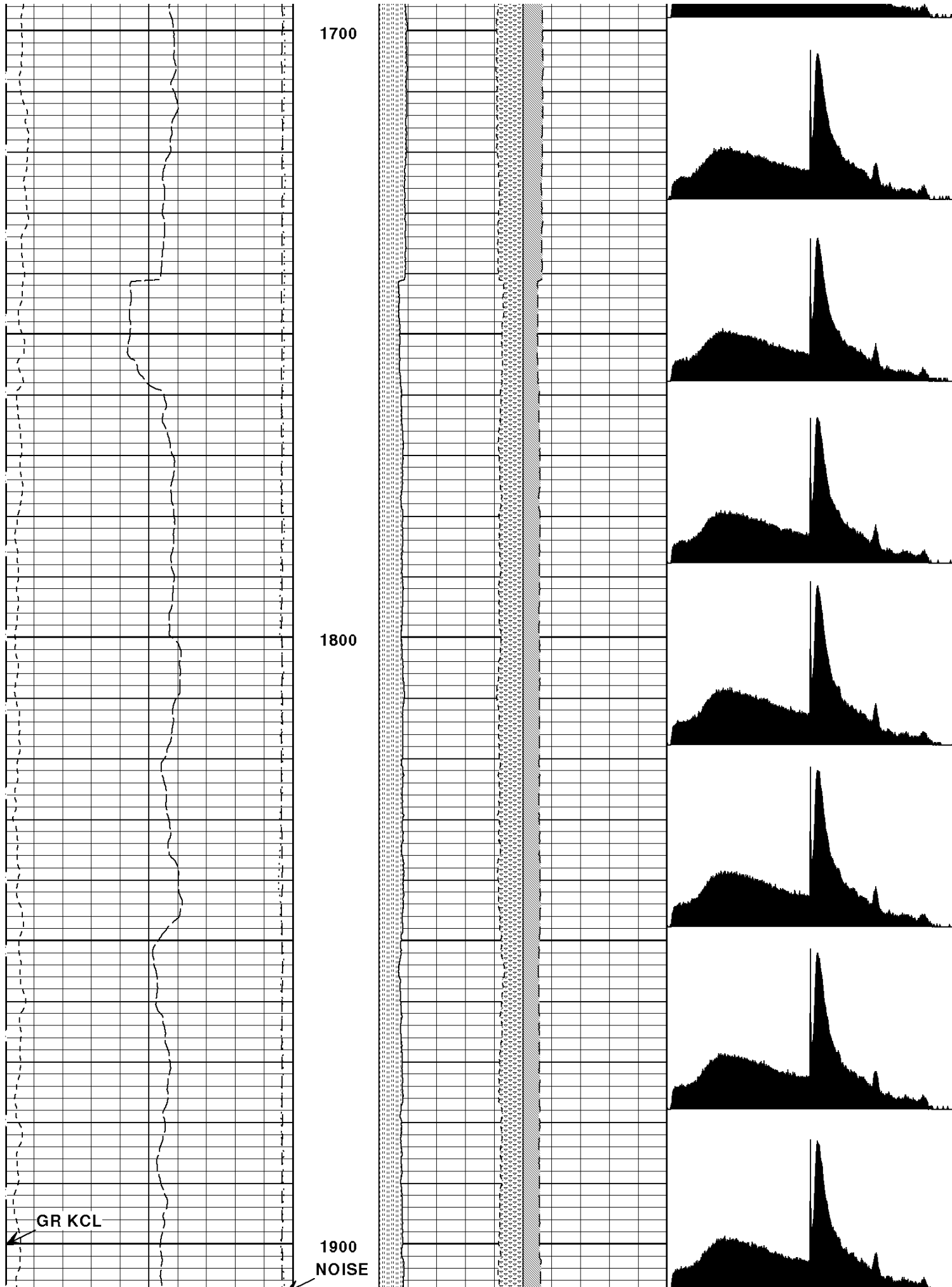


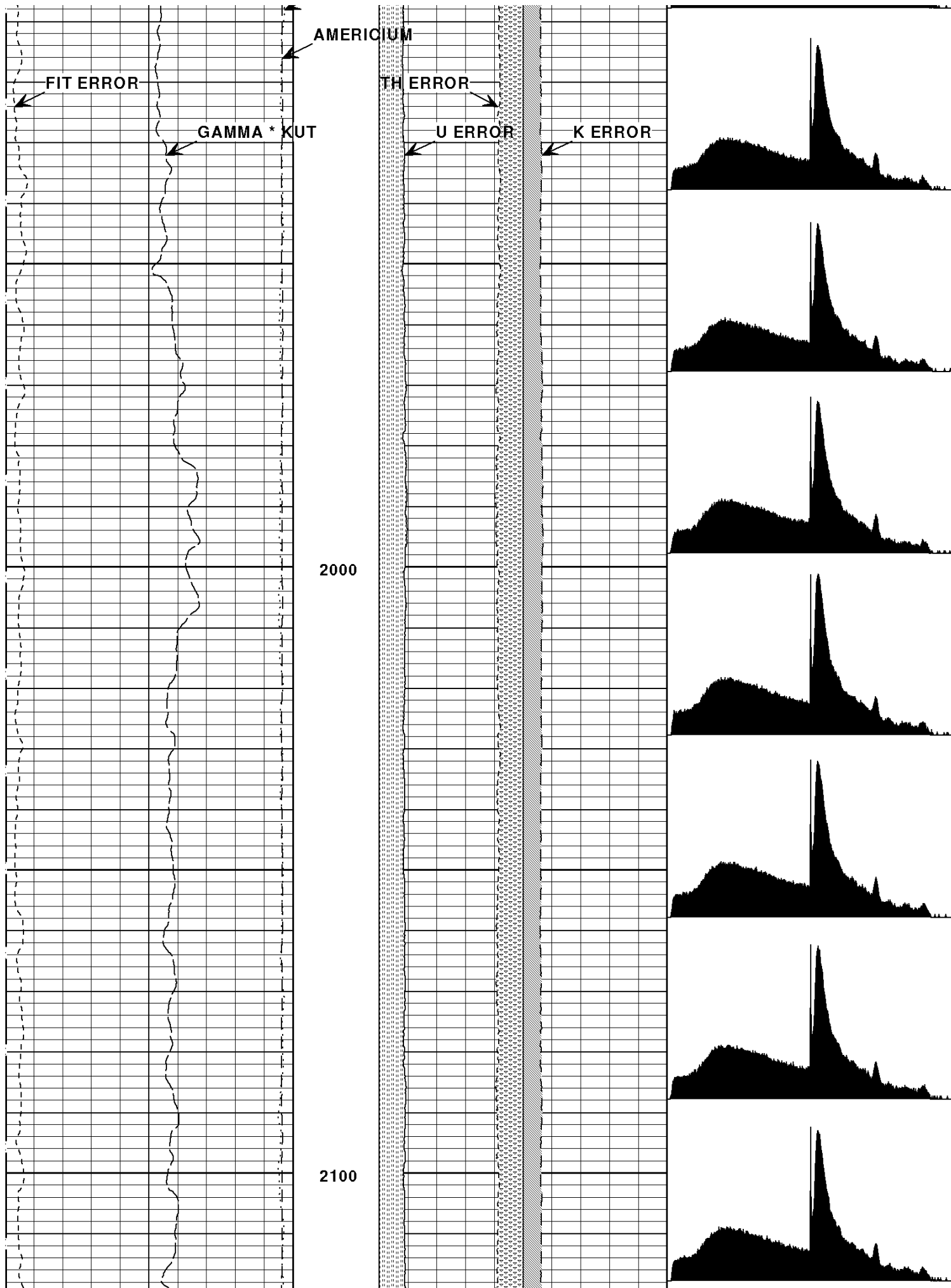
1700

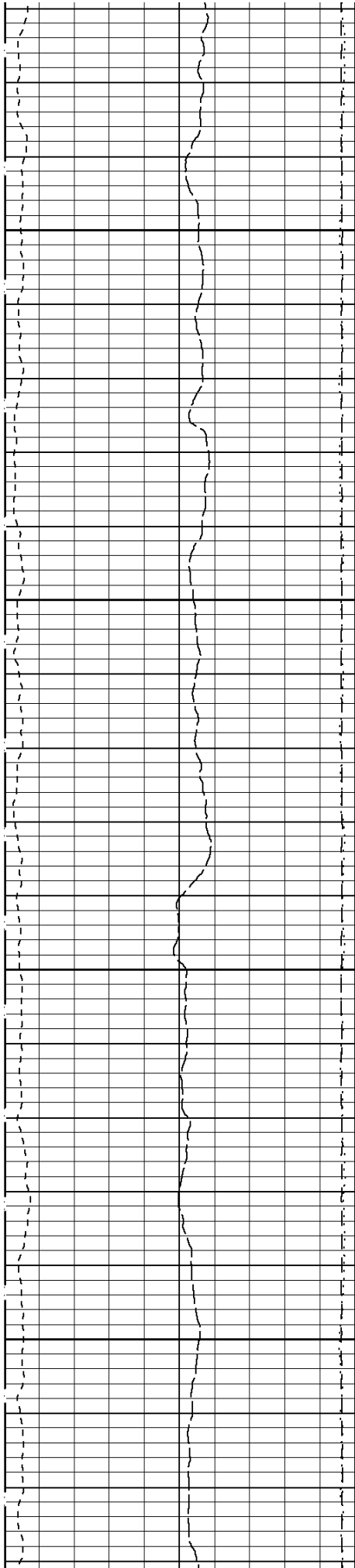
1800

1900
NOISE

GR KCL

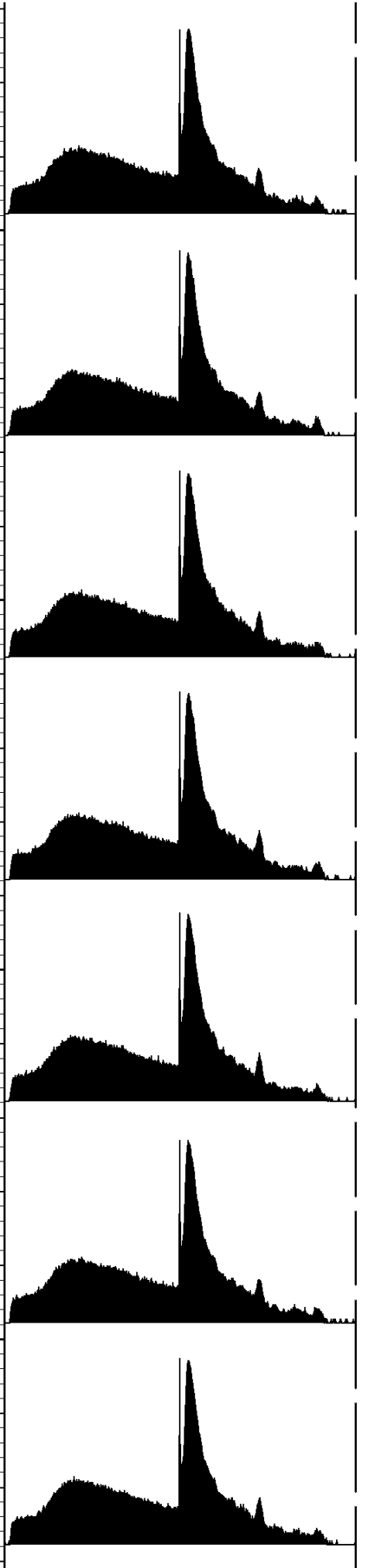
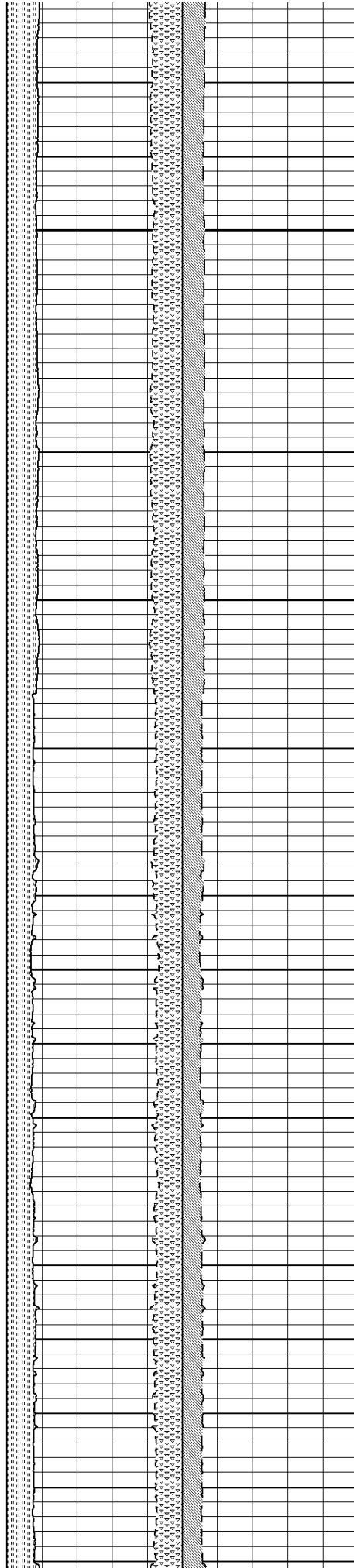


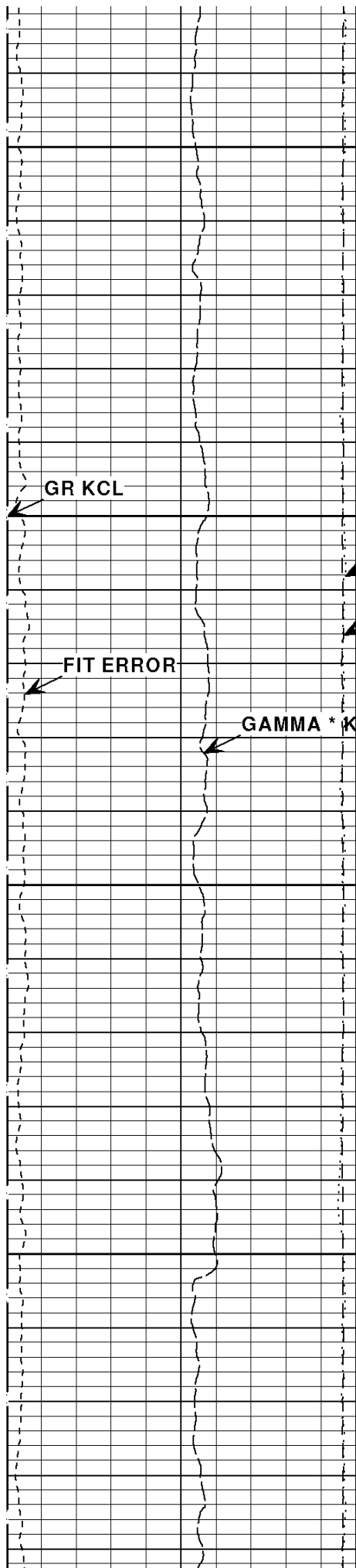




2200

2300



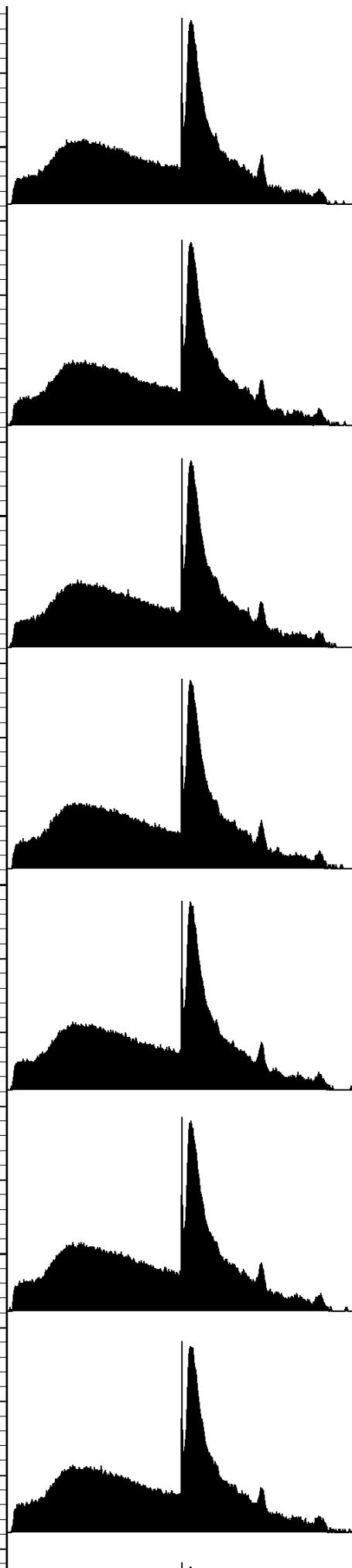
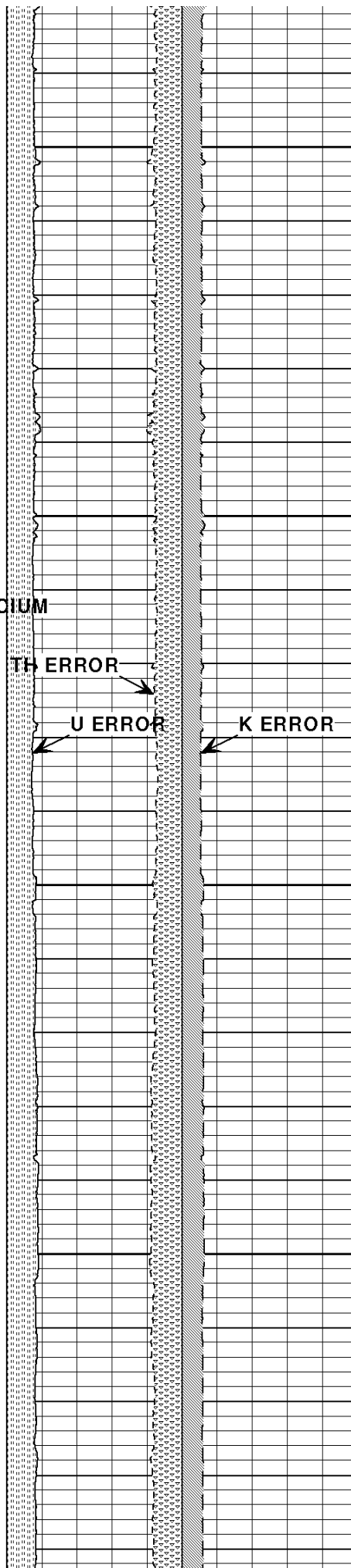


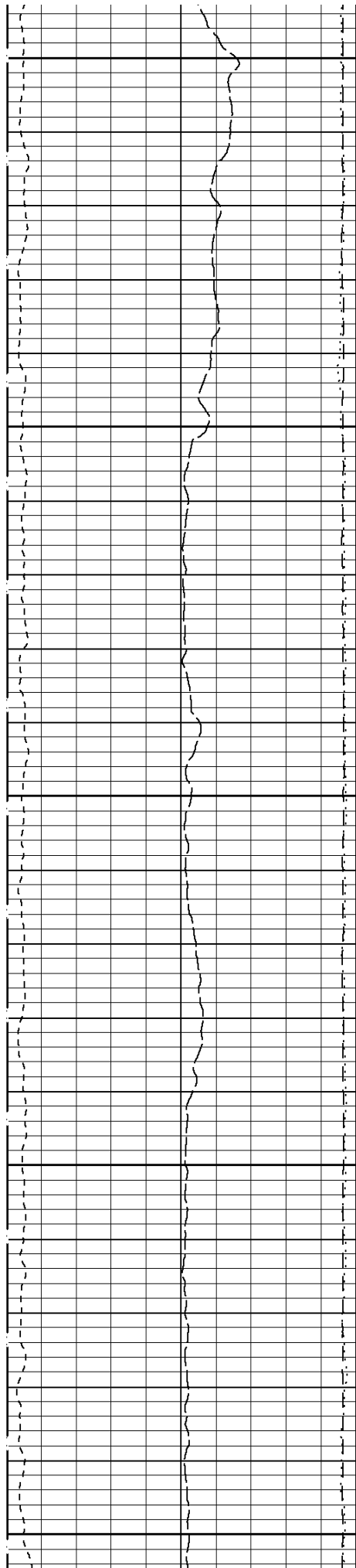
2400
NOISE

AMERICIUM

GAMMA * KUT

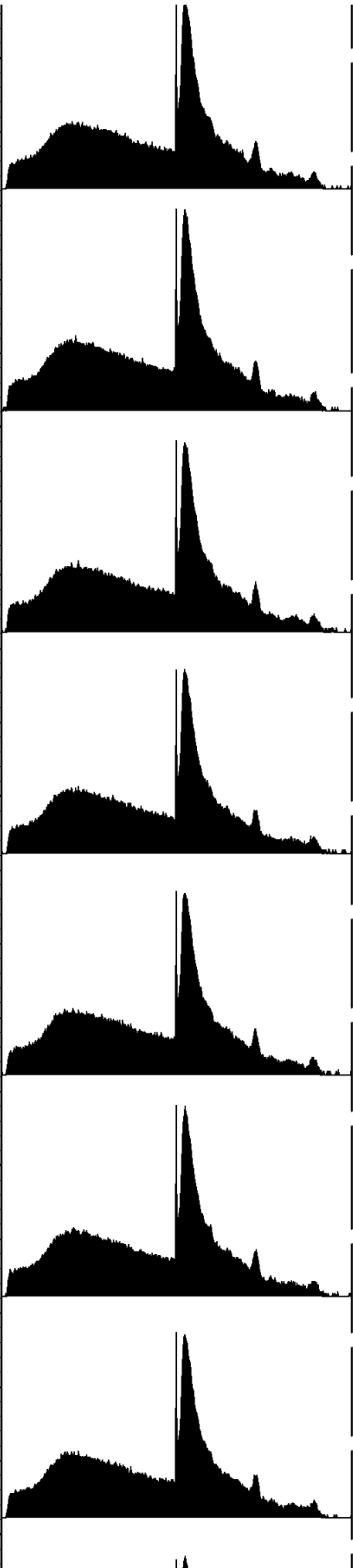
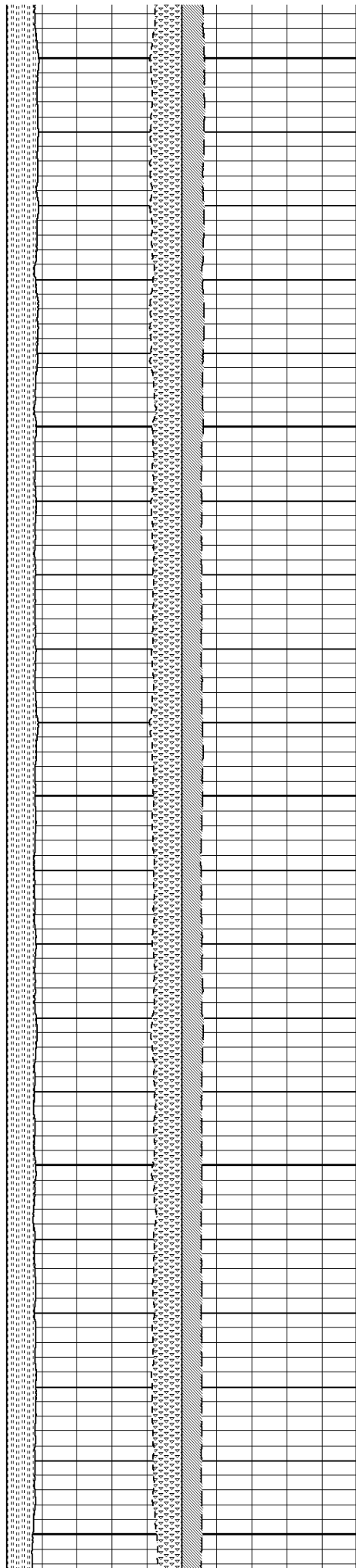
2500





2600

2700



2800

GR KCL

2900
NOISE

AMERICIUM

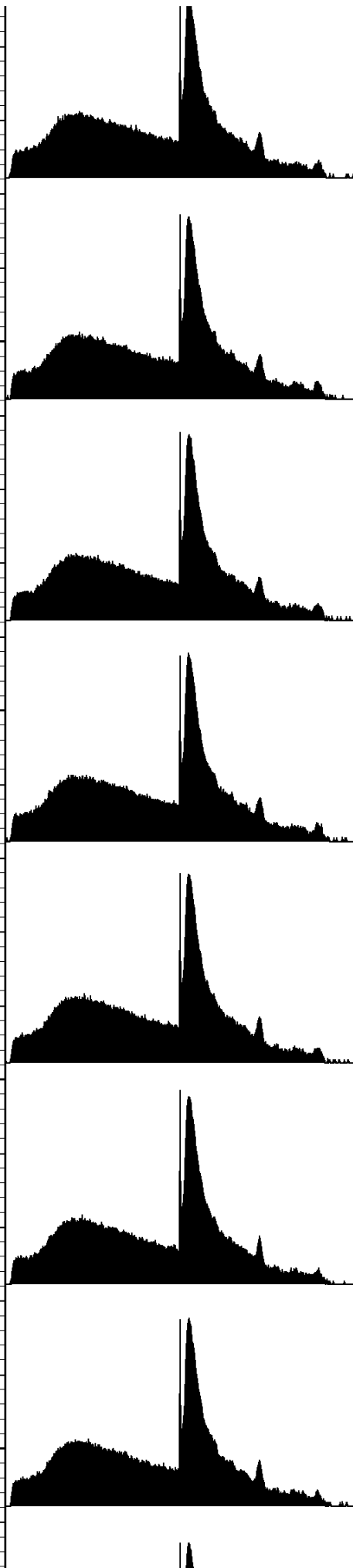
FIT ERROR

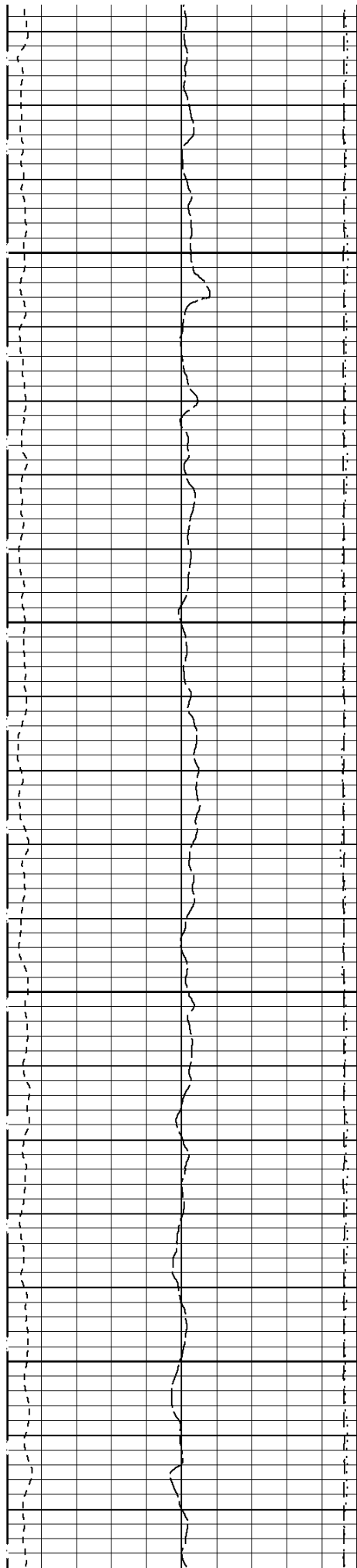
GAMMA * KUT

TH ERROR

U ERROR

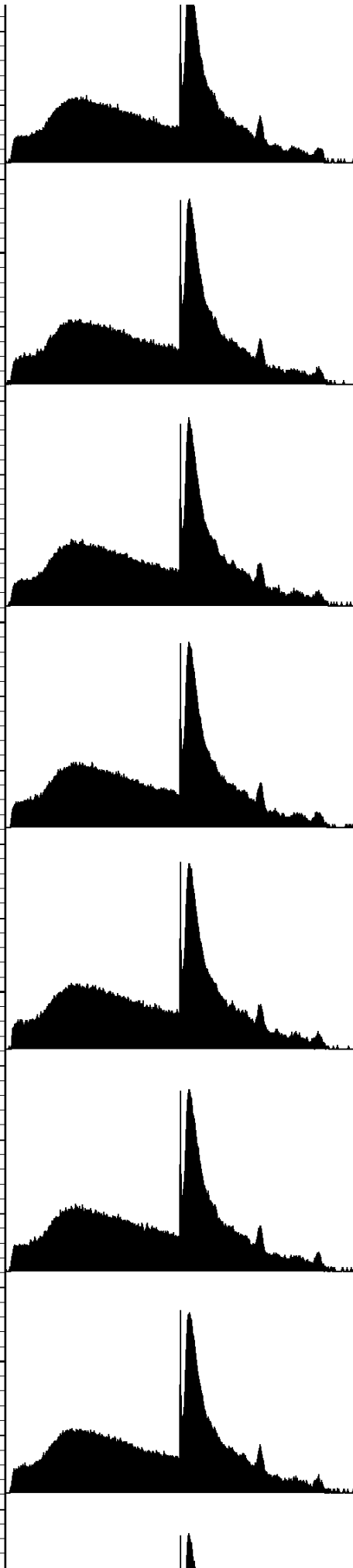
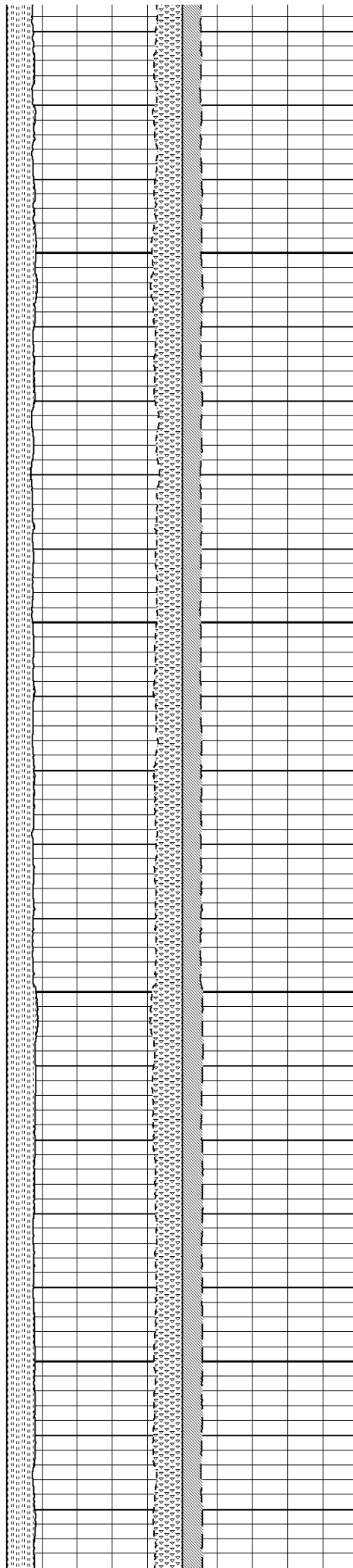
K ERROR

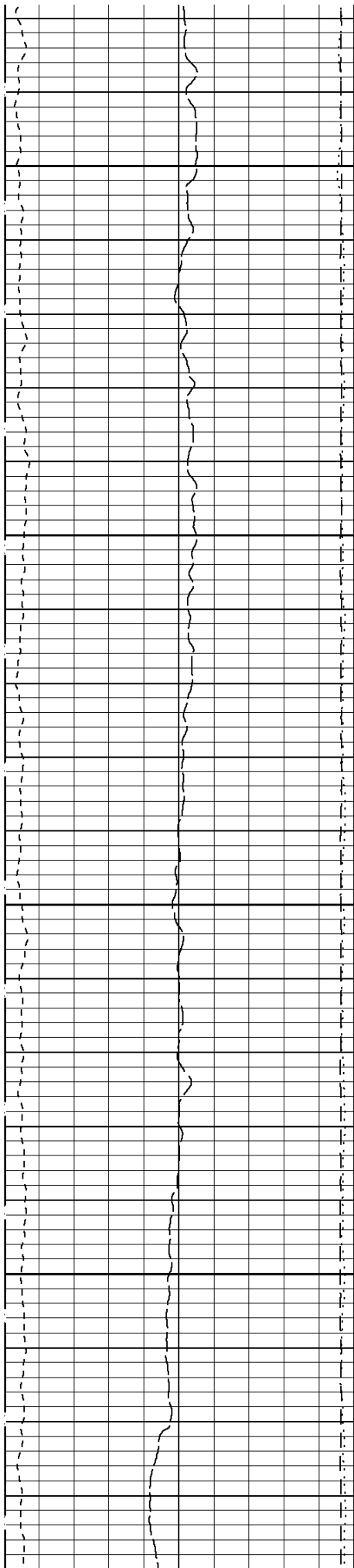




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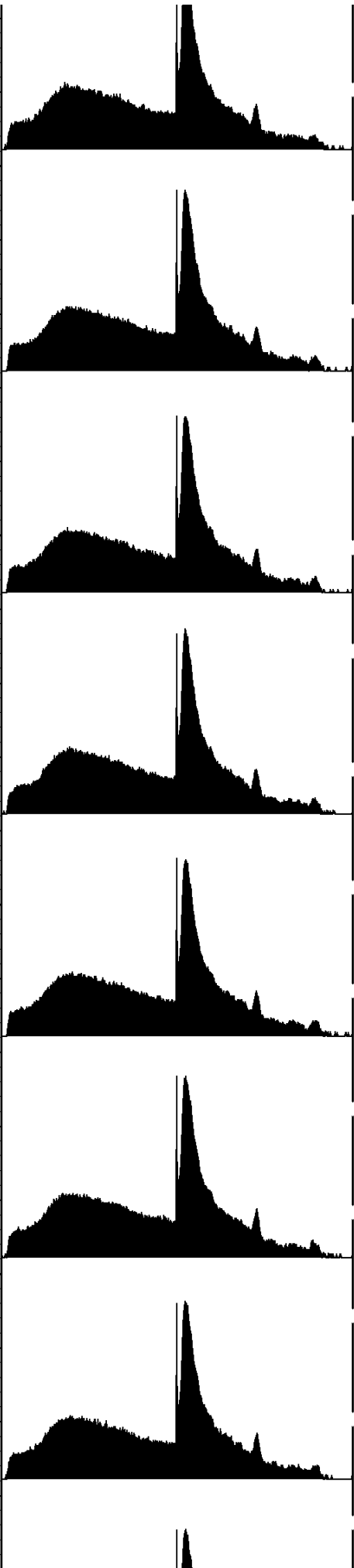
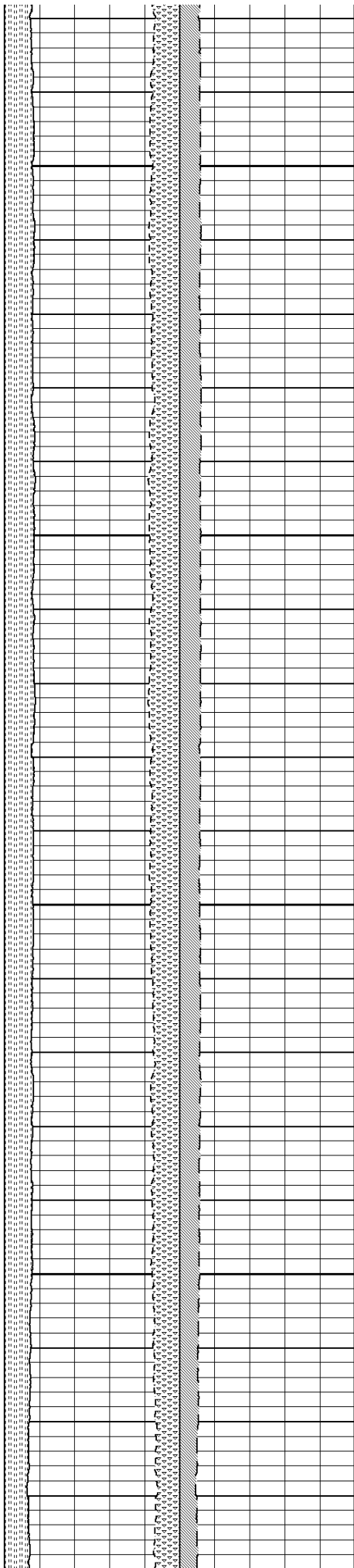
3100

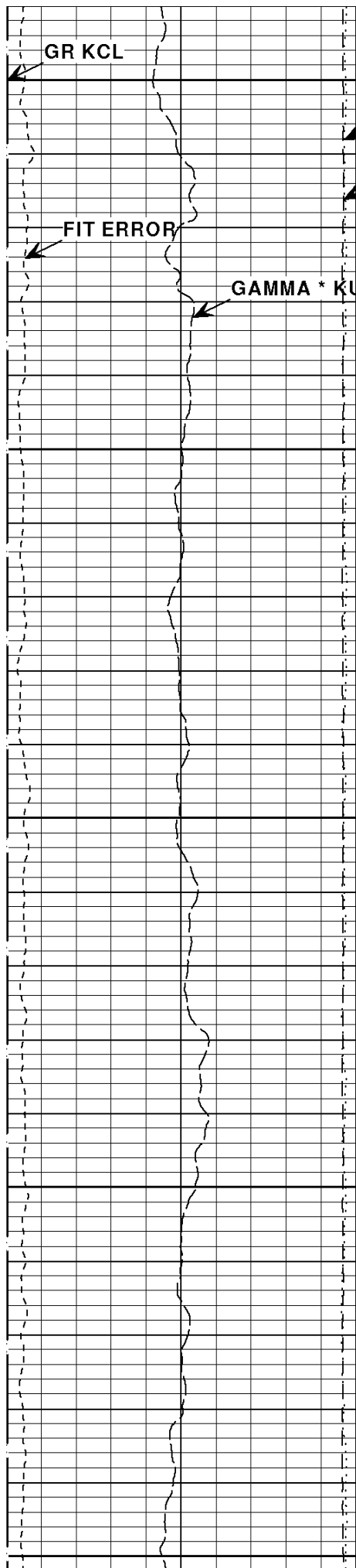




3200

3300





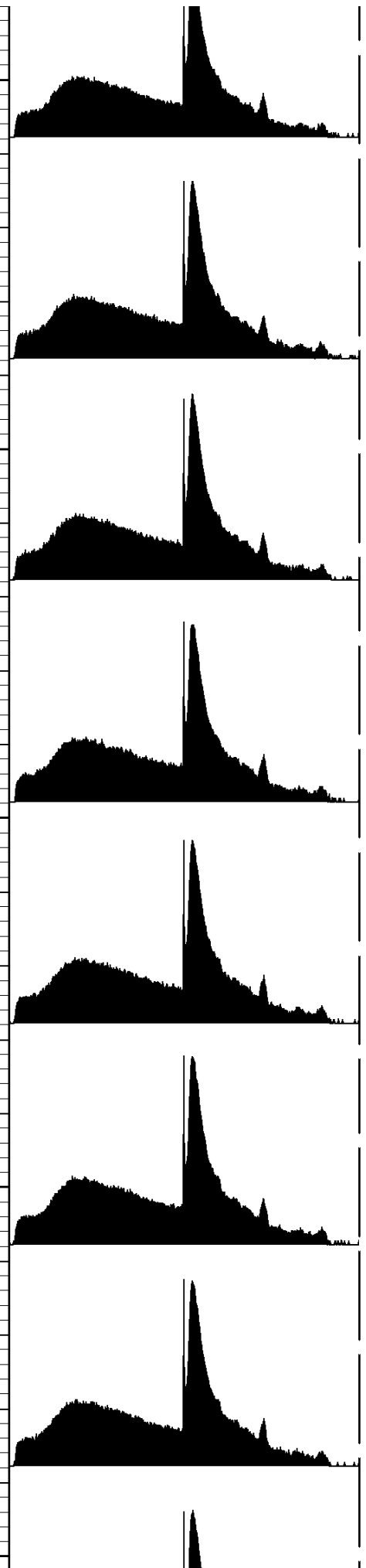
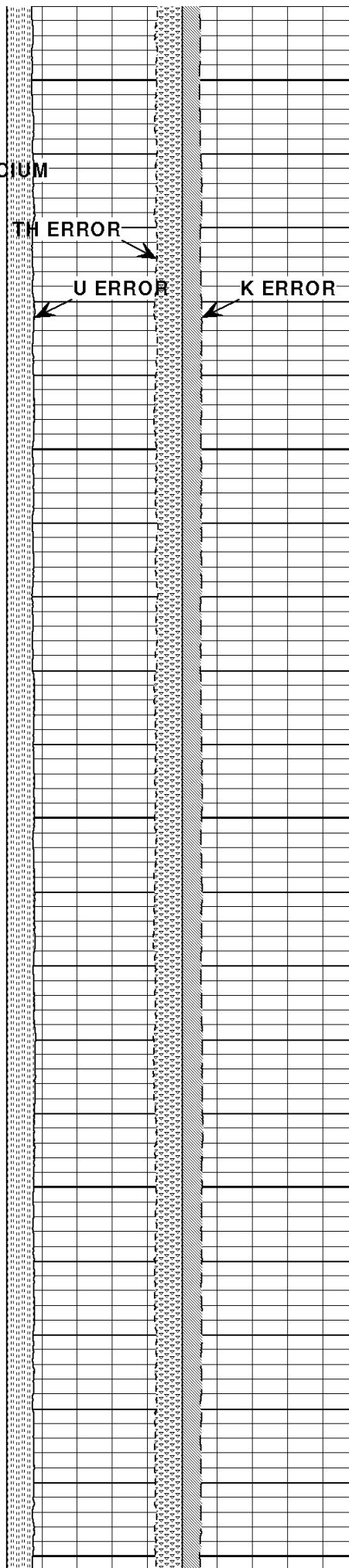
3400
NOISE

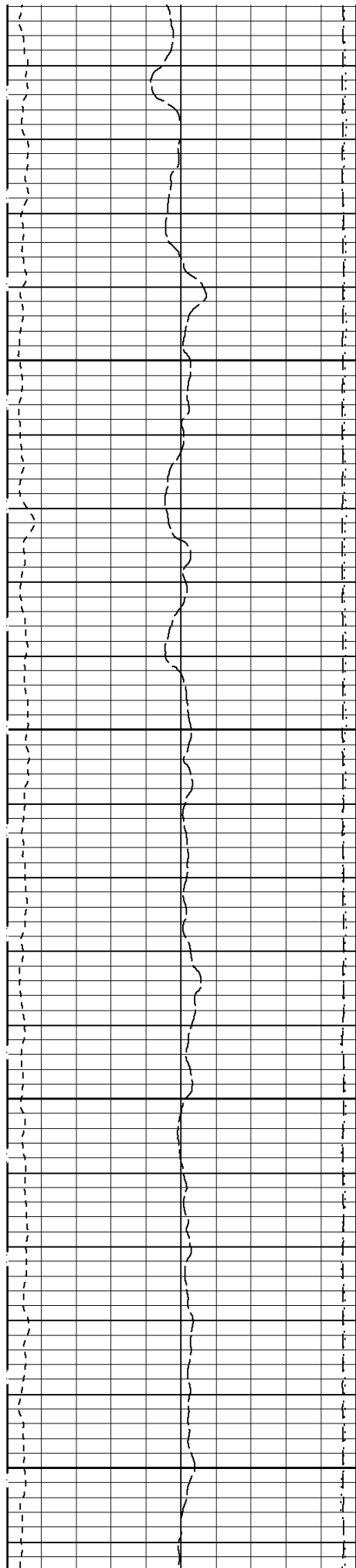
AMERICIUM

GAMMA * KUT

3500

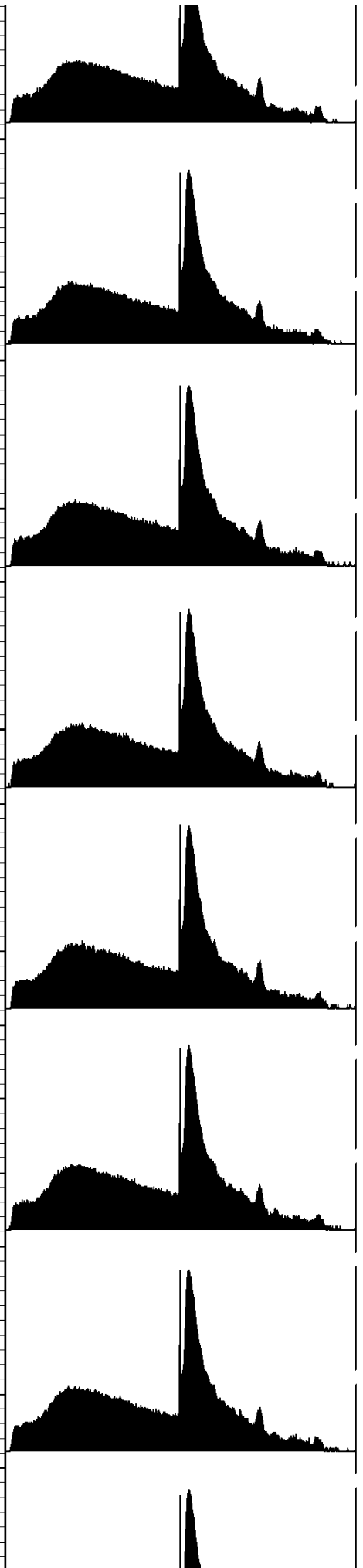
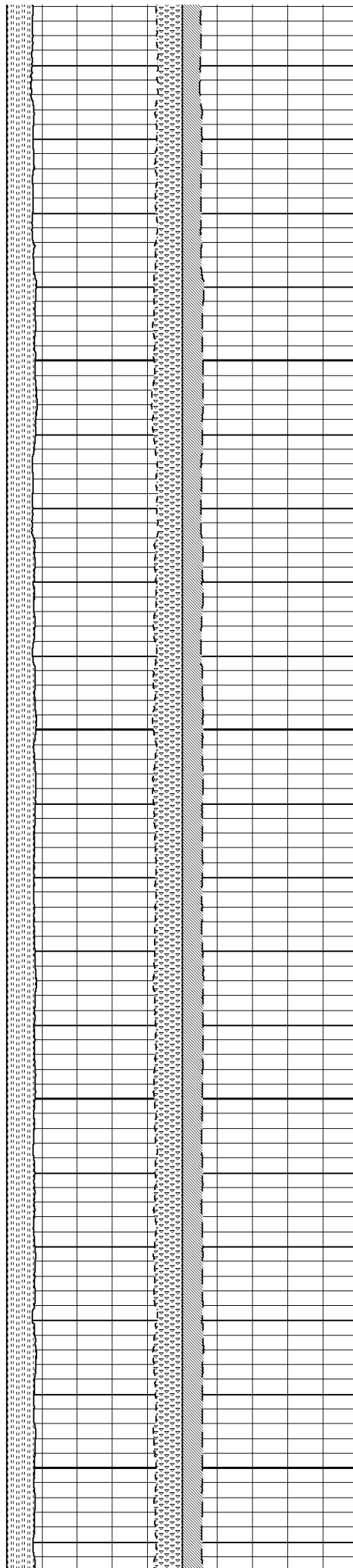
3600

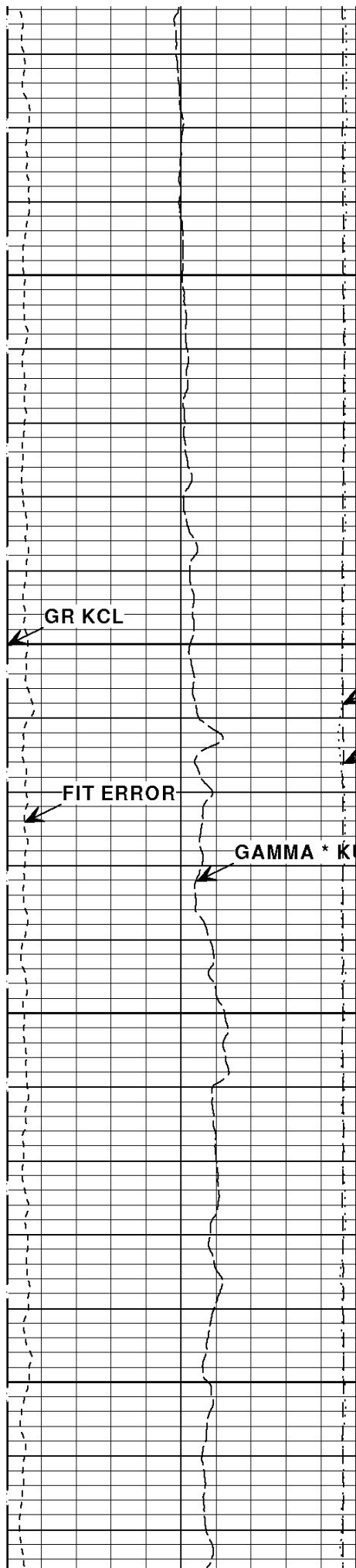




3700

3800

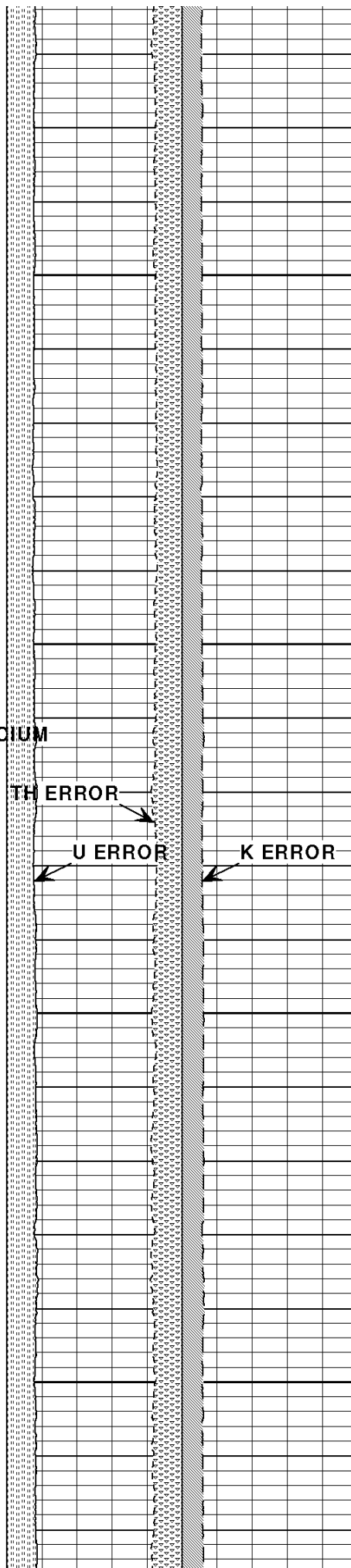




3900
NOISE

AMERICIUM

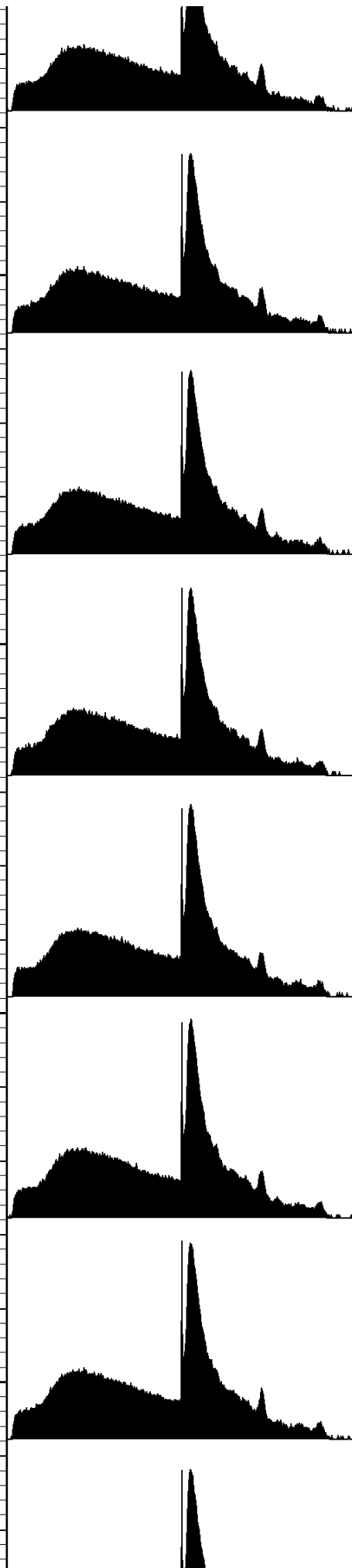
4000

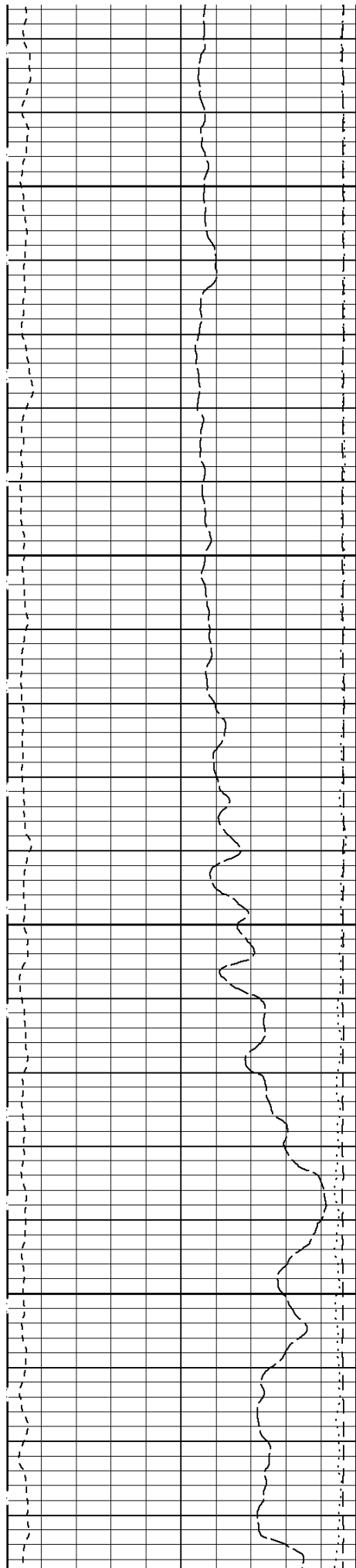


TH ERROR

U ERROR

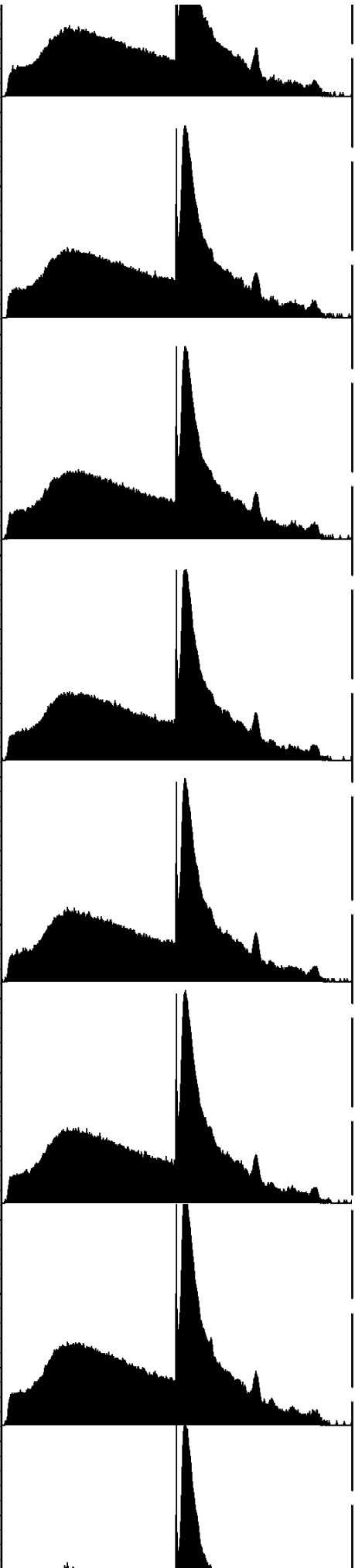
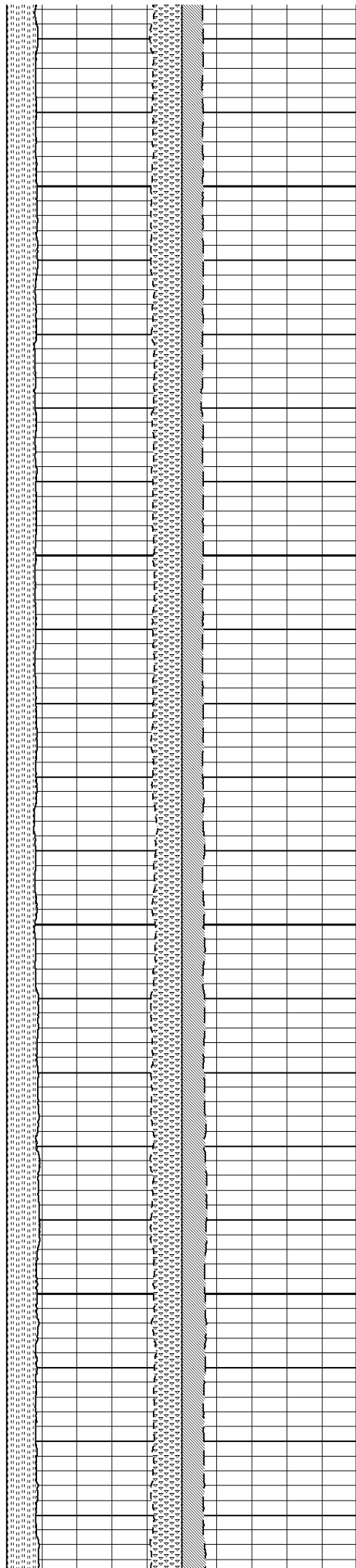
K ERROR

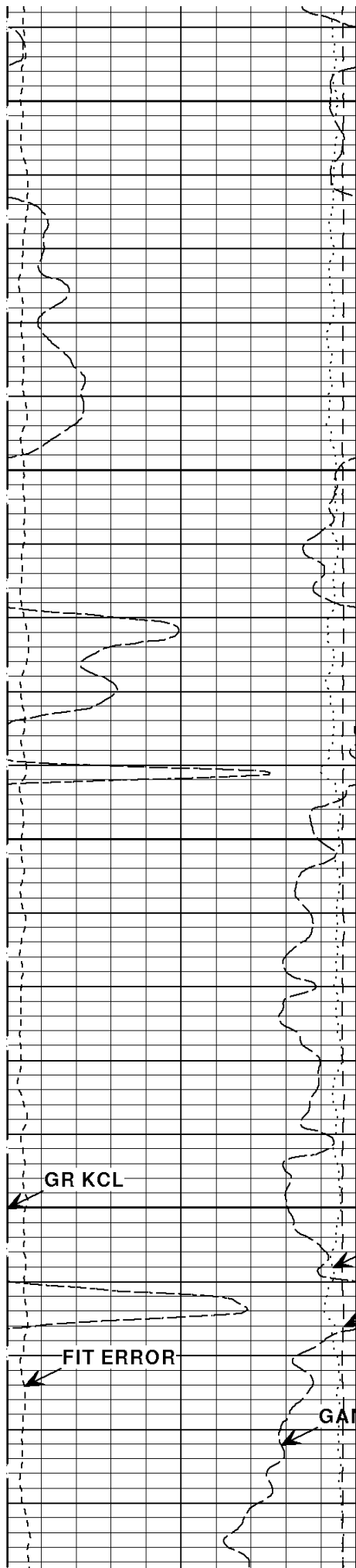




4100

4200





4300

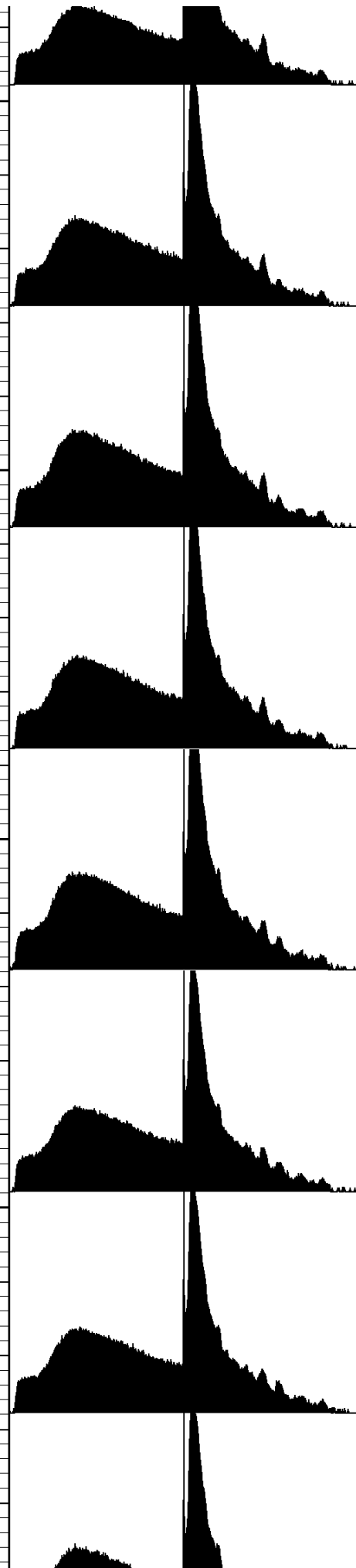
4400
NOISE

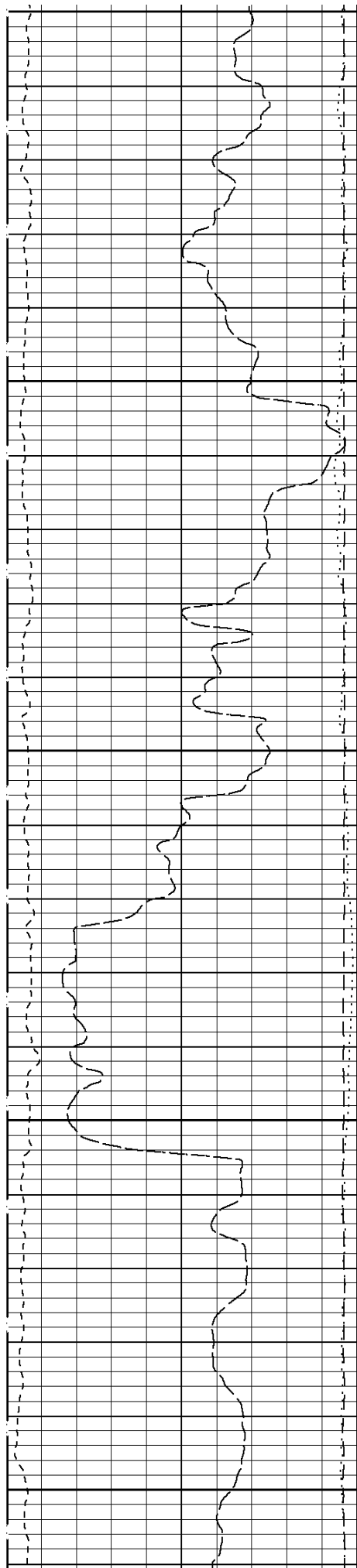
AMERICIUM

TH ERROR

U ERROR

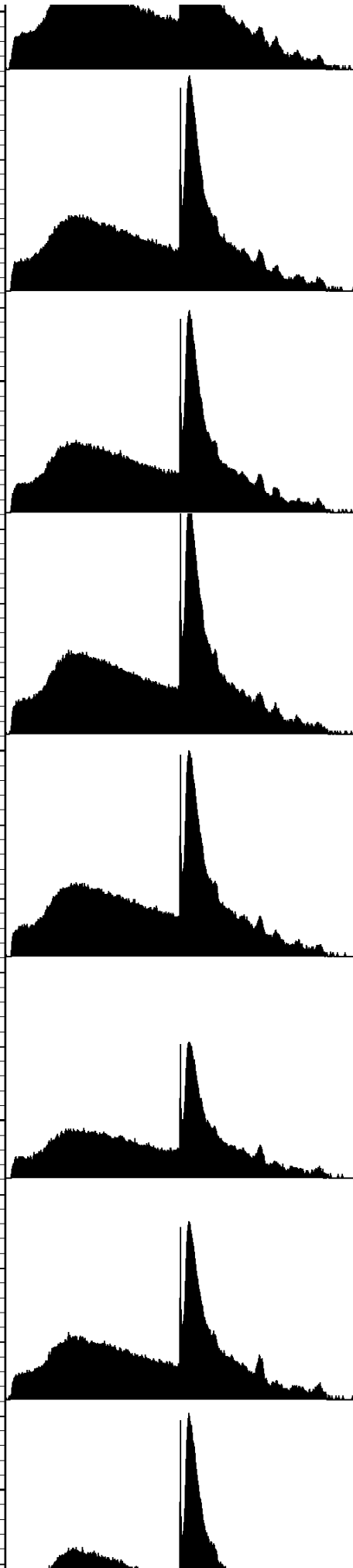
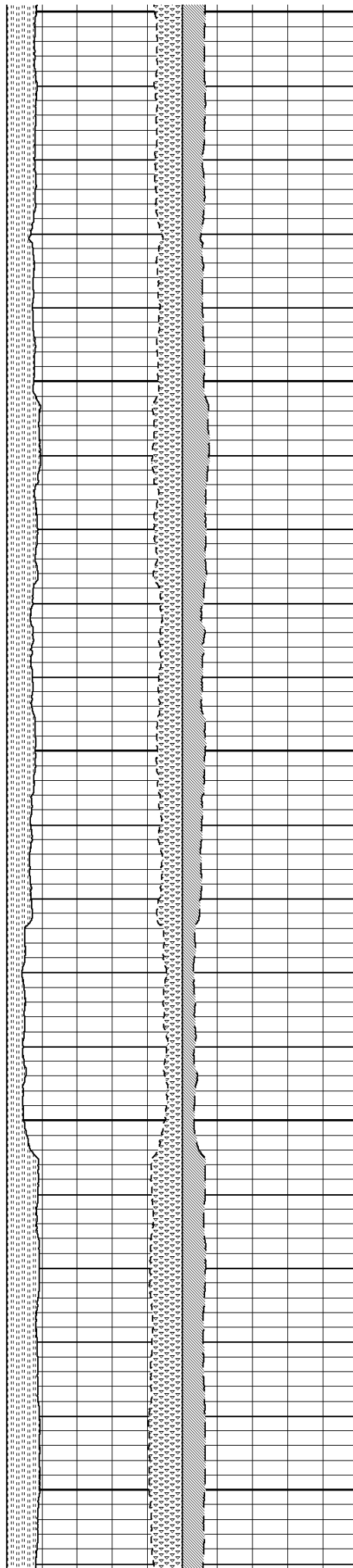
K ERROR

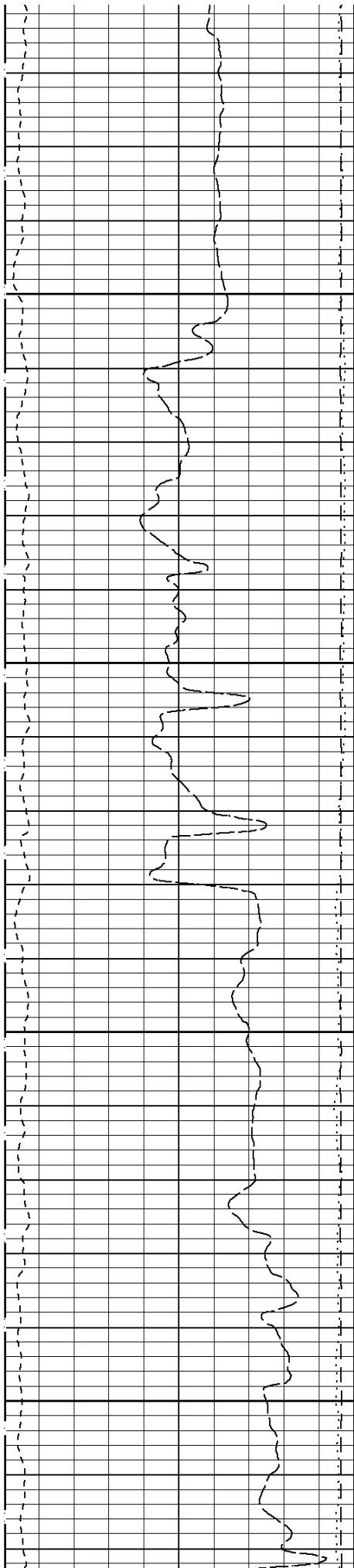




4500

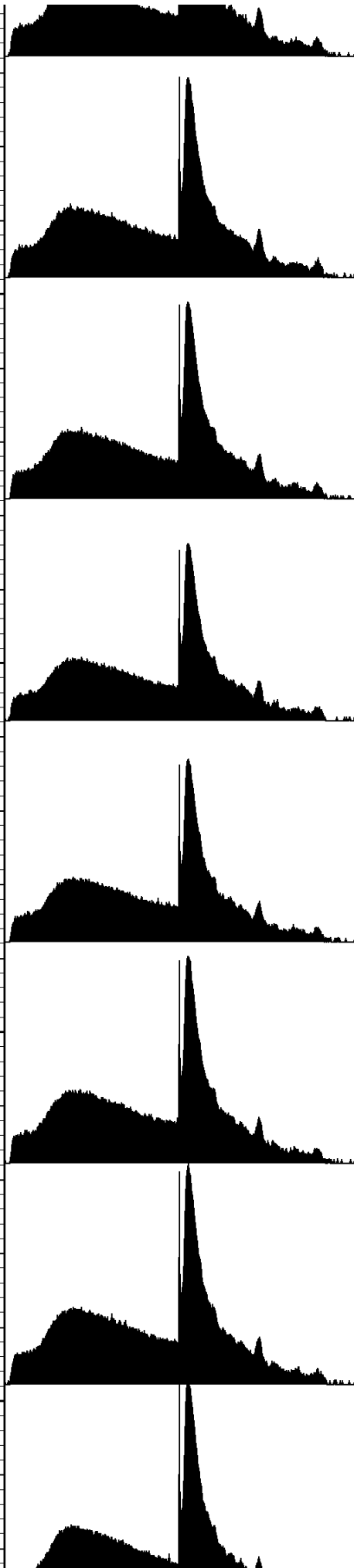
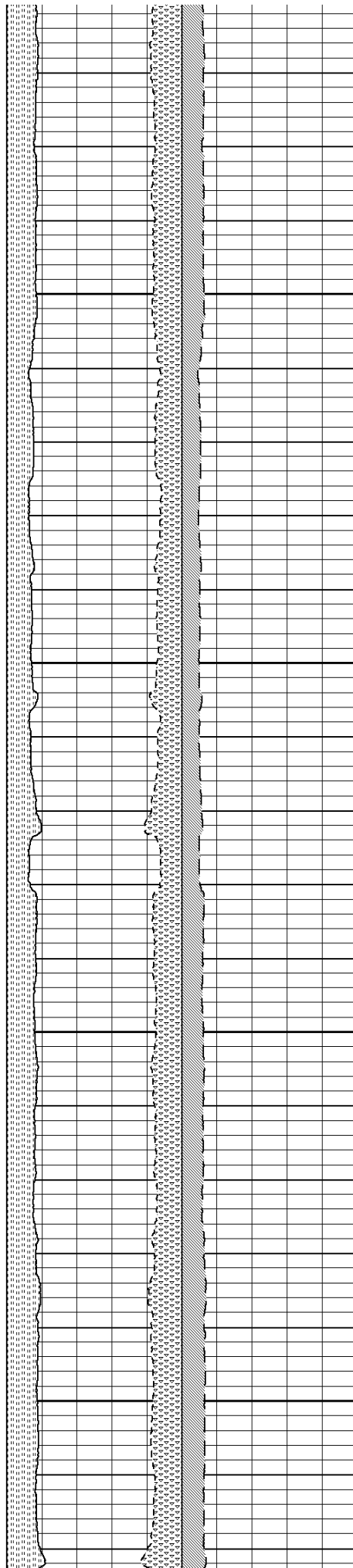
4600

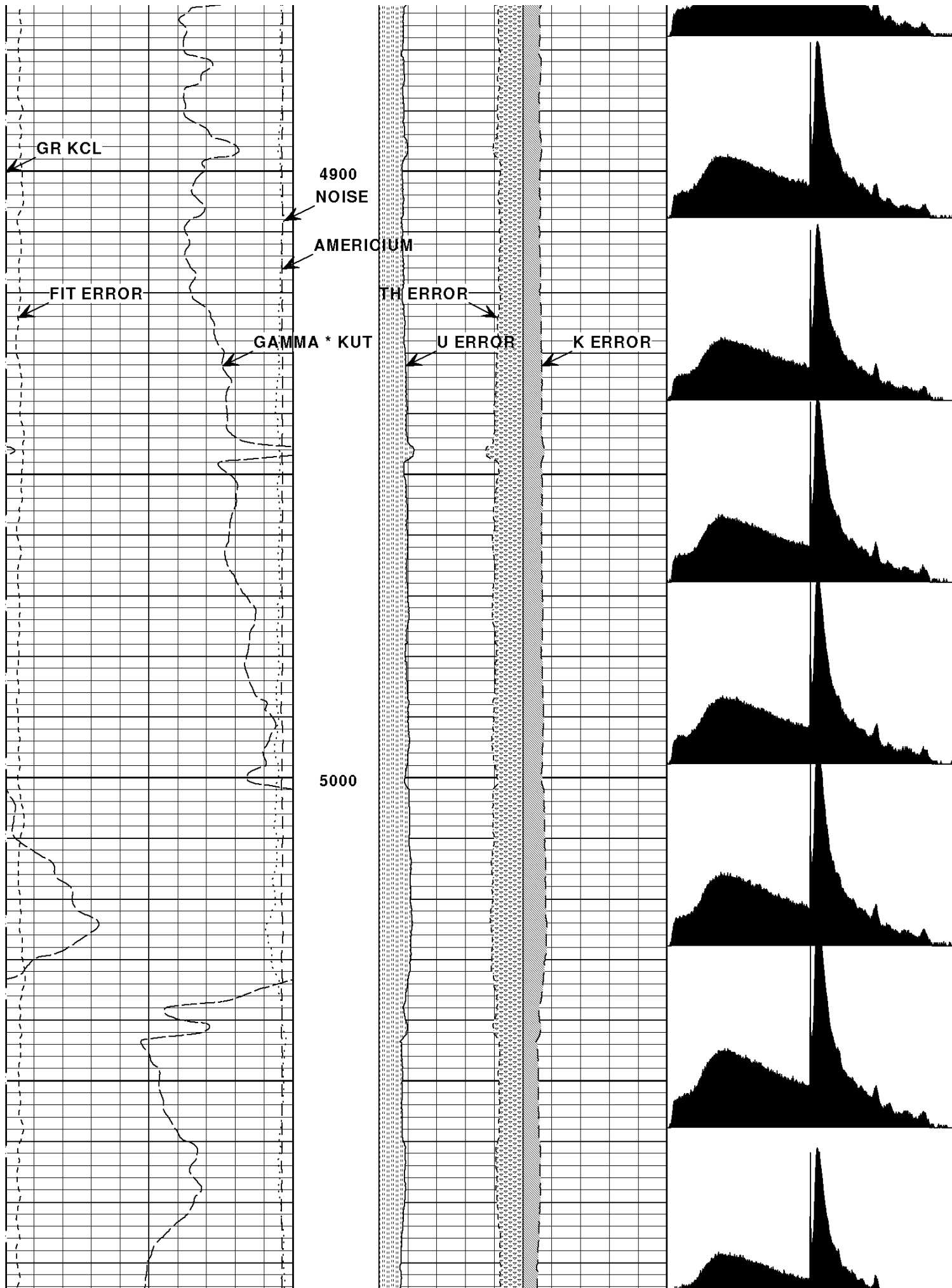


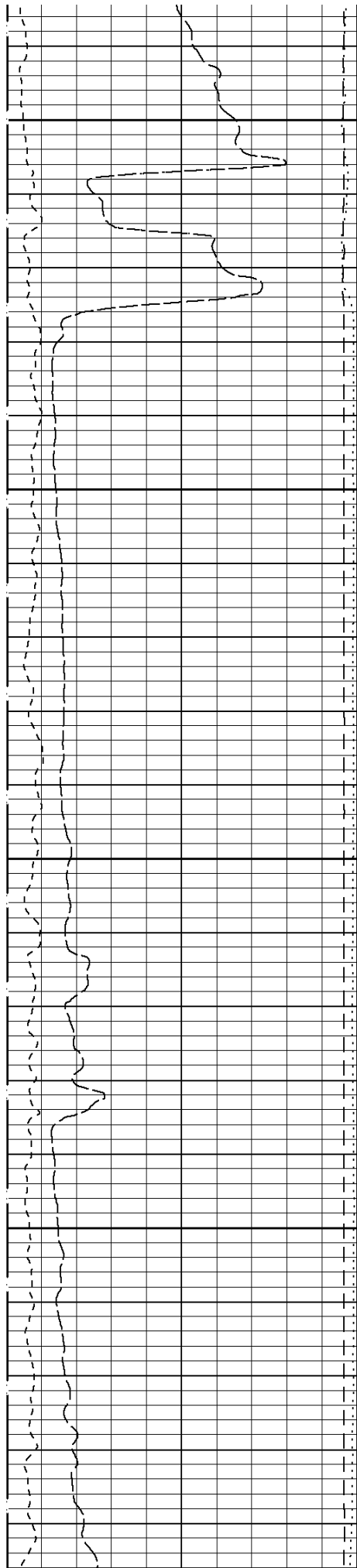


4700

4800

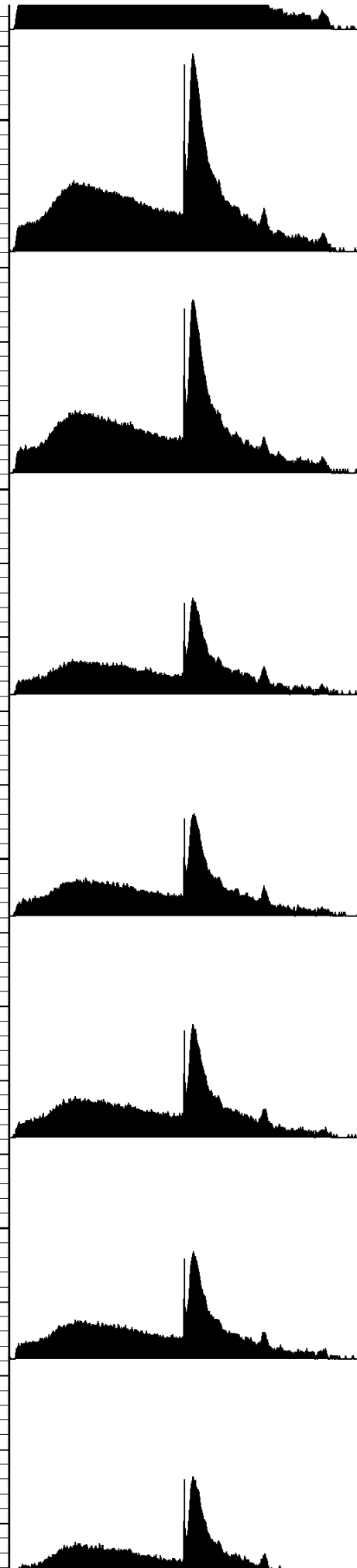
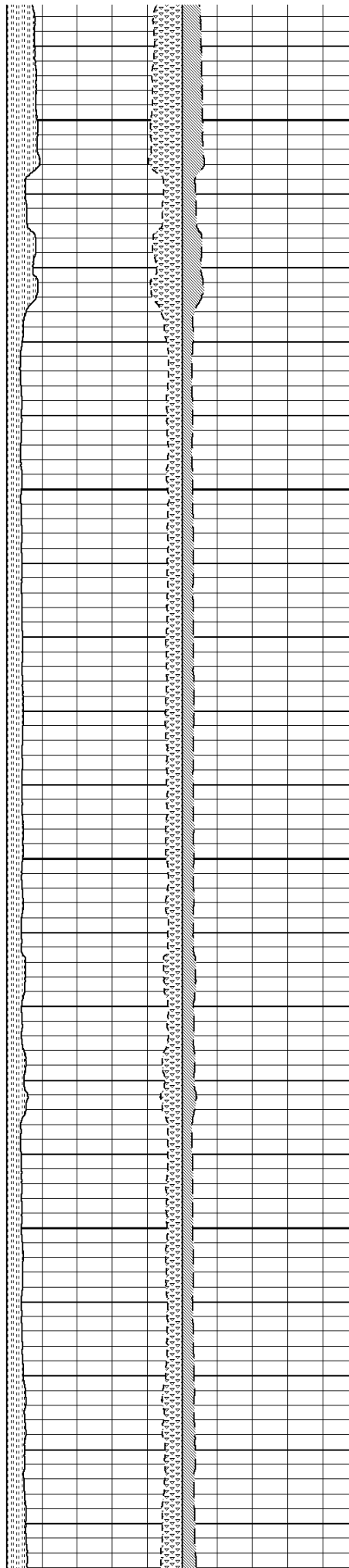






5100

5200



5300

5400
NOISE

AMERICIUM

5500

GR KCL

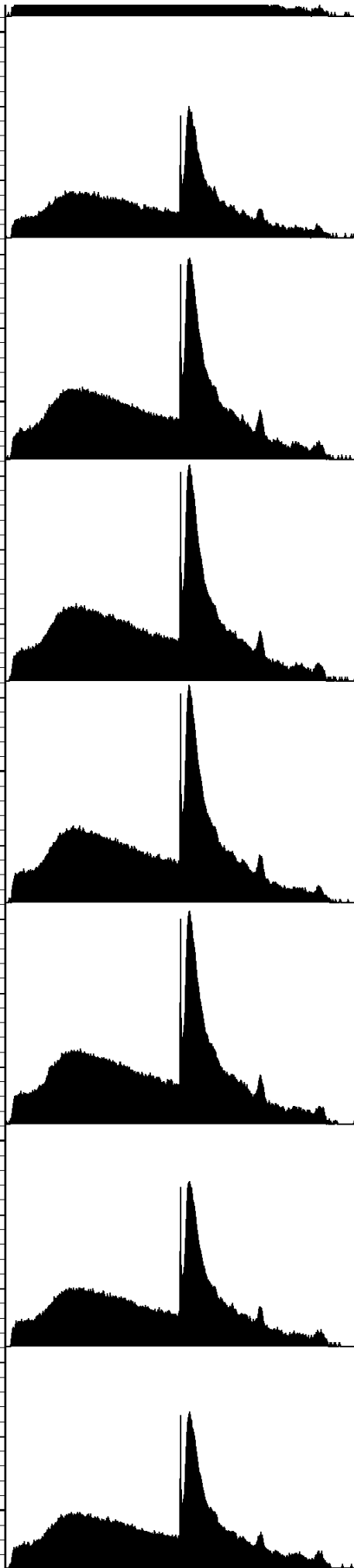
FIT ERROR

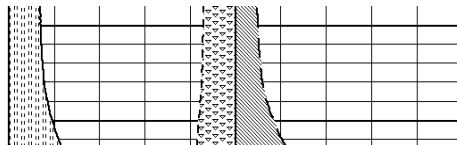
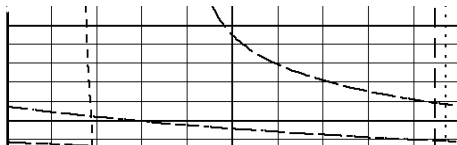
GAMMA * KUT

TH ERROR

U ERROR

K ERROR





GR KCL 0 GAPI 150 NOISE 100 COUNTS 0 AMERICIUM 1000 COUNTS 0 FIT ERROR 0 1 GAMMA * KUT 0 API 150	1:240 FT.	TH ERROR 8 PPM 0 U ERROR 0 PPM 4	K ERROR 0 PERCENT 2	CSNG SPECTRA 512
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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

HALLIBURTON

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

DDITS CABLE HEAD LOAD CELL
(CH4TEN) SN: OSPREY

DITS 4 TELEMETRY SUB
(D4TS) SN: 11548

GAMMA RAY TOOL
(NGRT-A) SN: 108646

O.D.
3.625 in

Temperature
59.92 Ft

64.17 Ft

62.25 Ft

57.92 Ft

51.42 Ft

CSNG – DITS – TITANIUM
(CSNG-T) SN: 1019S925

M305B BCS 2XMTR – 2RCVR
(BCSD) SN: 350

O.D.
3.625 in

O.D.
3.500 in

← Gamma
44.75 Ft

← Gamma Ray
30.75 Ft

43.42 Ft

28.75 Ft

← Delta-T
22.2 Ft