HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	SANDRIDGE ENERGY
WELL	EASTON 3419 1-21
FIELD/BLOCK	COMANCHE COUNTY
COUNTY	COMANCHE
STATE	KANSAS

COMPANY **SANDRIDGE ENERGY**
WELL **EASTON 3419 1-21**
FIELD/BLOCK **COMANCHE COUNTY**
COUNTY **COMANCHE** STATE **KANSAS**

API No. 15-033-21706
Location (SHL) 350' FNL & 1980' FEL

Other Services:
SDL / DSN
CSNG
WSTT
ICT / IDT
ACRT
MRIL

Sect. 21 Twp. 34S Rge. 19W

Permanent Datum	GL	Elev. 1875.0 ft	Elev.: K.B.	1887.5 ft
Log measured from	KB	12.5 ft above perm. Datum	D.F.	1886.5 ft
Drilling measured from	KB		G.L.	1875.0 ft

Date	10-May-13		
Run No.	ONE		
Depth - Driller	6140.00 ft		
Depth - Logger	6122.0 ft		
Bottom - Logged Interval	6112		
Top - Logged Interval	836		
Casing - Driller	8.625 in @ 834.0 ft	@	@
Casing - Logger	836.0 ft		
Bit Size	7.875 in	@	@
Type Fluid in Hole	WATER BASED		
Density / Viscosity	8.8 ppg / 65.00 s/qt		
PH / Fluid Loss	11.00 pH / 4.4 cptm		
Source of Sample	MUD PIT		
Rm @ Meas. Temperature	0.370 ohmm @ 75.00 degF	@	@
Rmf @ Meas. Temperature	0.31 ohmm @ 70.00 degF	@	@
Rmc @ Meas. Temperature	0.420 ohmm @ 70.00 degF	@	@
Source Rmf / Rmc	MEASURED / MEASURED		
Rm @ BHT	0.20 ohmm @ 142.0 degF	@	@
Time Since Circulation	12.5 hr		
Time on Bottom	11-May-13 03:26		
Max. Rec. Temperature	142.0 degF @ 6122.0 ft	@	@
Equipment / Location	10782954 / LIBERAL		
Recorded By	S. INGERSOLL		
Witnessed By	NAKOA WILLIAMS		

Fold here

Service Ticket No.: 900424243 API Serial No.: 15-033-21706 PGM Version: WL INSITE R3.8.4 (Build 5)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE					
Date	Sample No.				
Depth-Driller					
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample					
Rm @ Meas. Temp		@		@	
Rmf @ Meas. Temp.		@		@	
Rmc @ Meas. Temp.		@		@	
Source Rmf	Rmc				
Rm @ BHT		@		@	
Rmf @ BHT		@		@	
Rmc @ BHT		@		@	

RESISTIVITY SCALE CHANGES			
Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA				
Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
ONE	ACRT	N/A	1.5" S.O.	
	10929775			

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	10811258	Serial No.	10855599	Serial No.	10673803	Serial No.	10735145
Model No.	GTET	Model No.	WSTT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	5.3"	Diameter	3.625"
Detector Model No.	T-102	Spacing	.5'	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	CS-137	Source Type	AM-241BE
Length	8"	LSA [Y/N]	YES	Serial No.	5073GW	Serial No.	DSN-436
Distance to Source	N/A	FWDA [Y/N]	YES	Strength	1.5 CI	Strength	15 CI

LOGGING DATA

GENERAL			GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	6122	836	REC	0	150	30	-10	47.6 us/ft	30	-10	2.71 gm/cc	30	-10	LIME

DIRECTIONAL INFORMATION

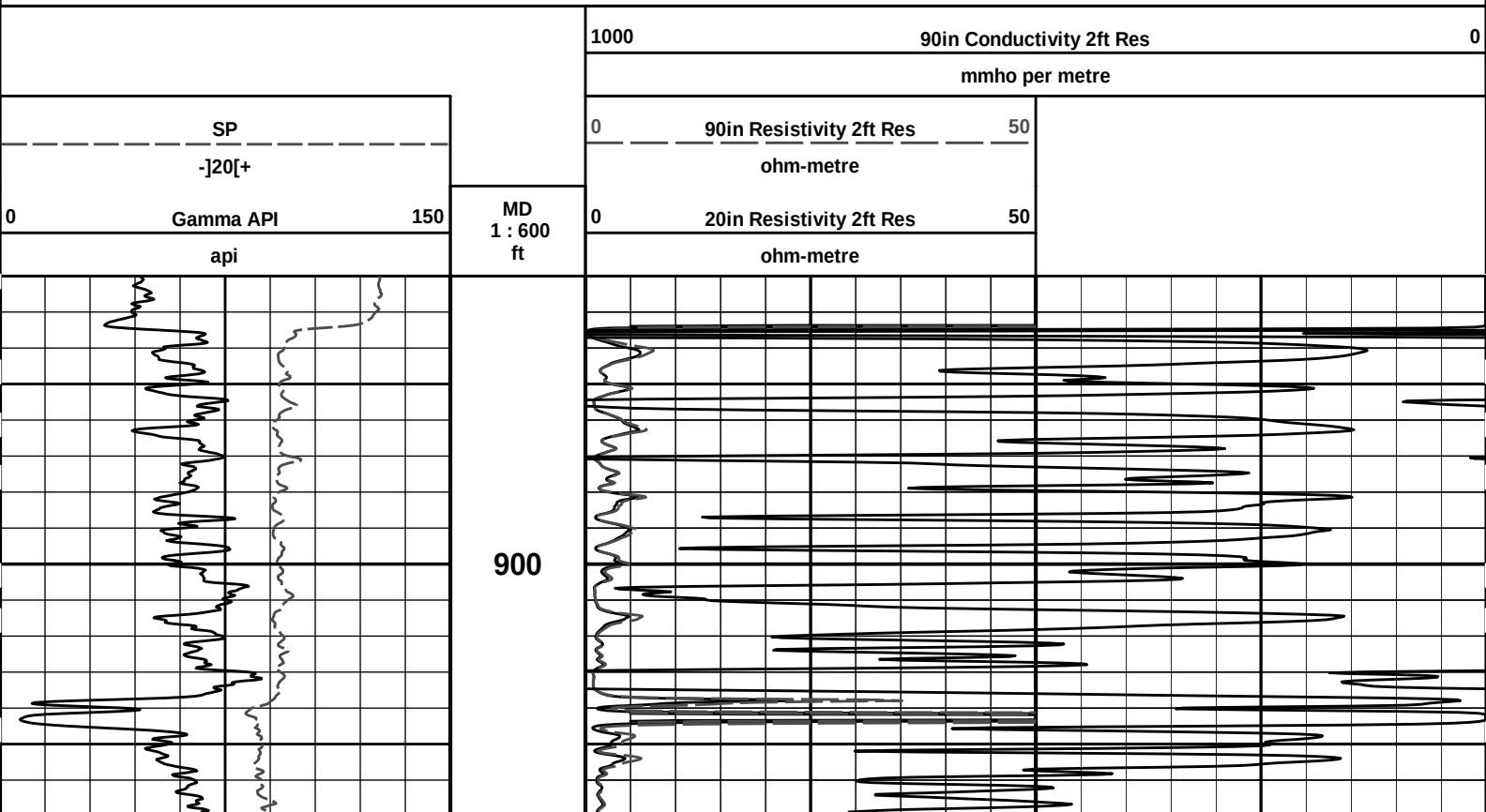
Maximum Deviation	@	KOP	@

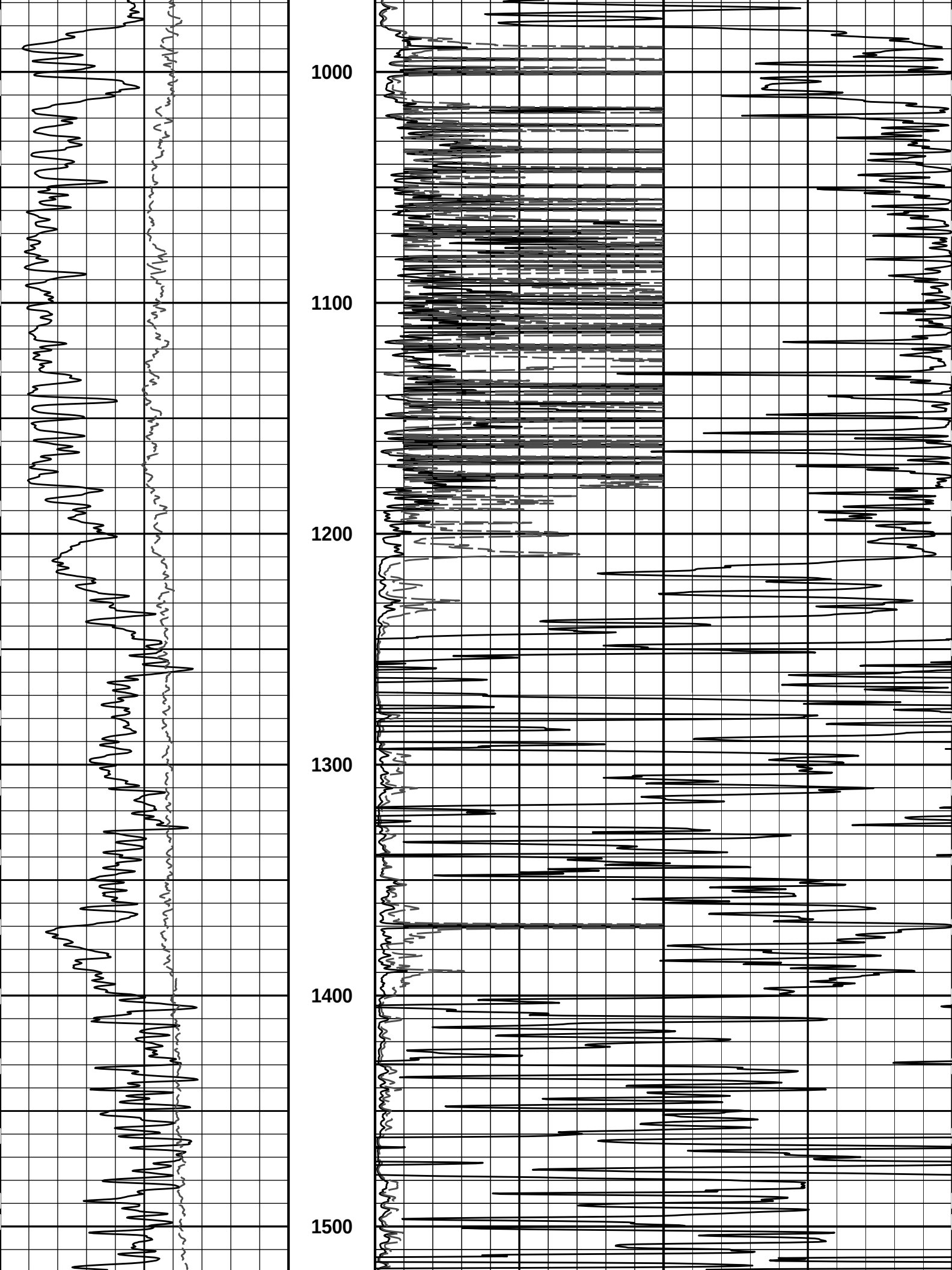
Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING.

HALLIBURTON

Plot Time: 11-May-13 12:56:22
Plot Range: 820 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\CASING
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_2_lib

2 INCH MAIN LOG

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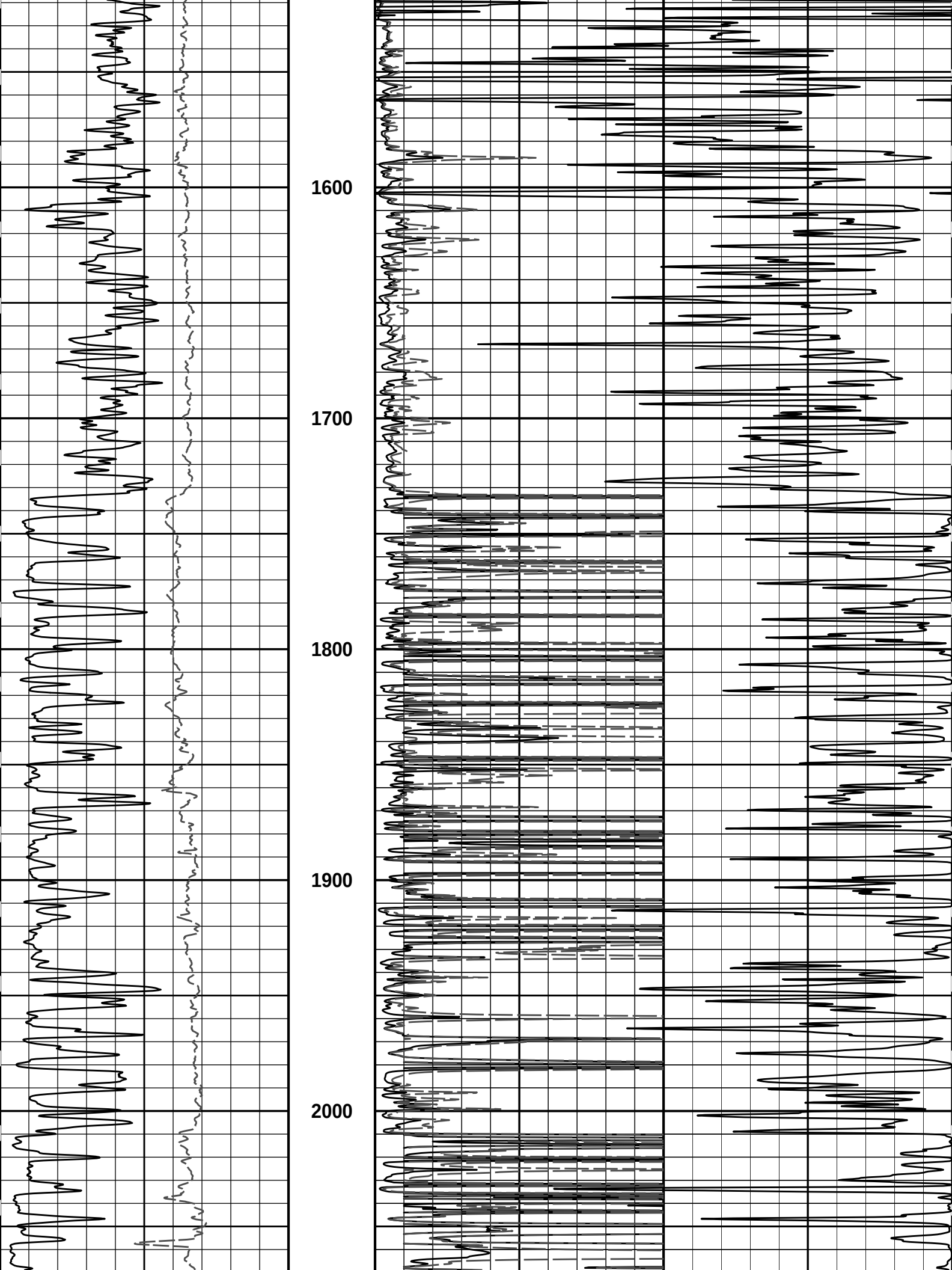
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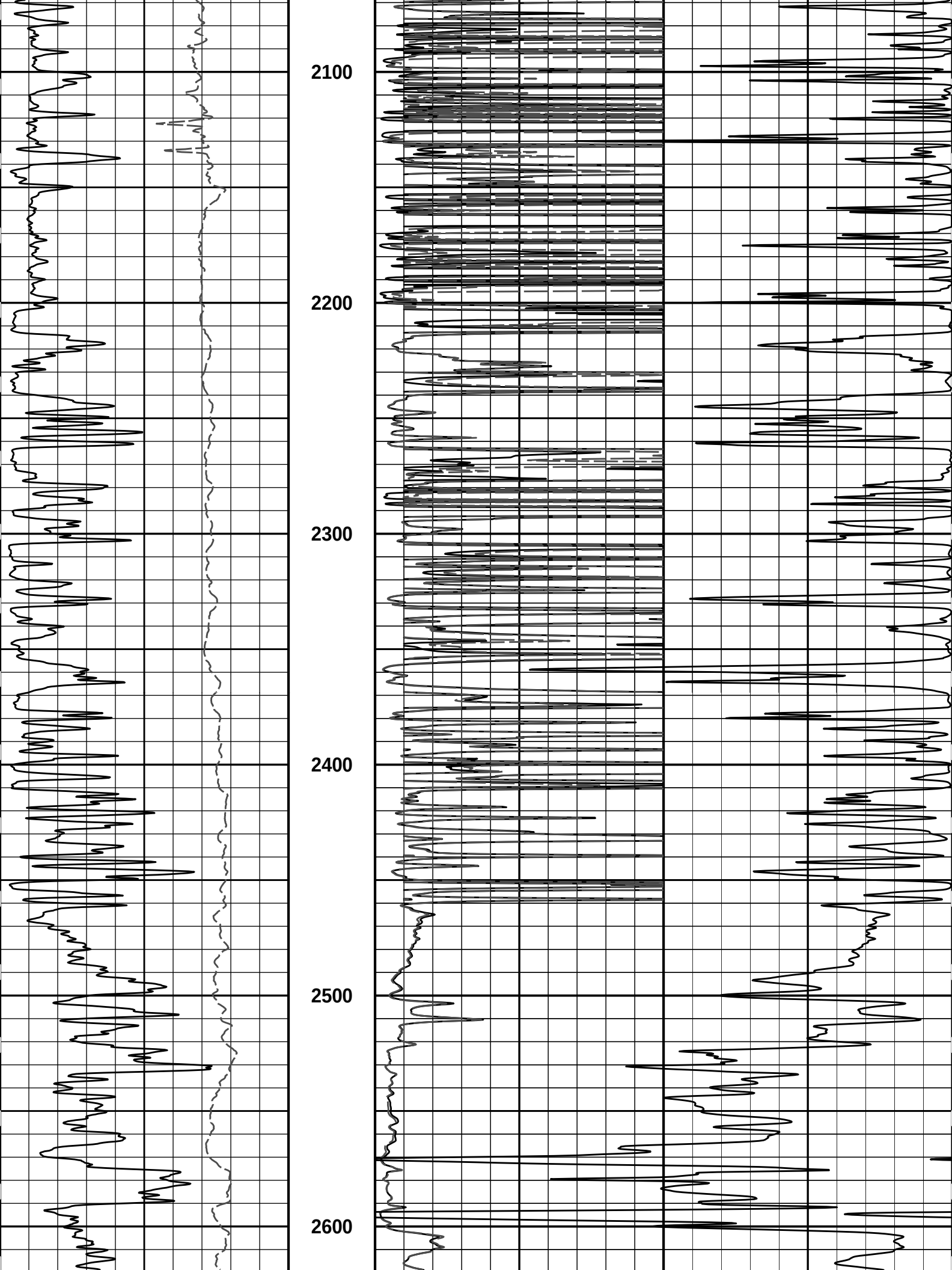
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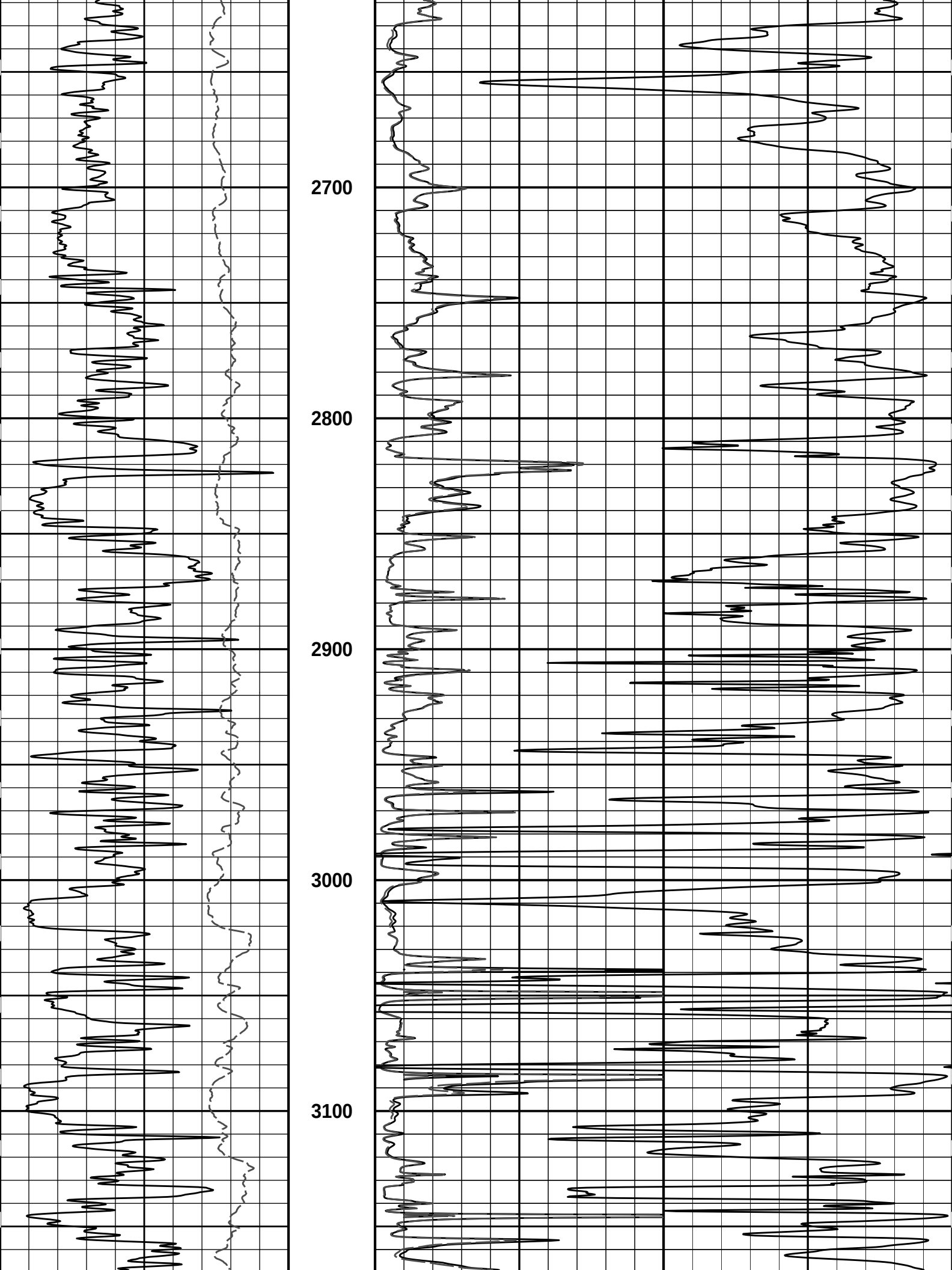
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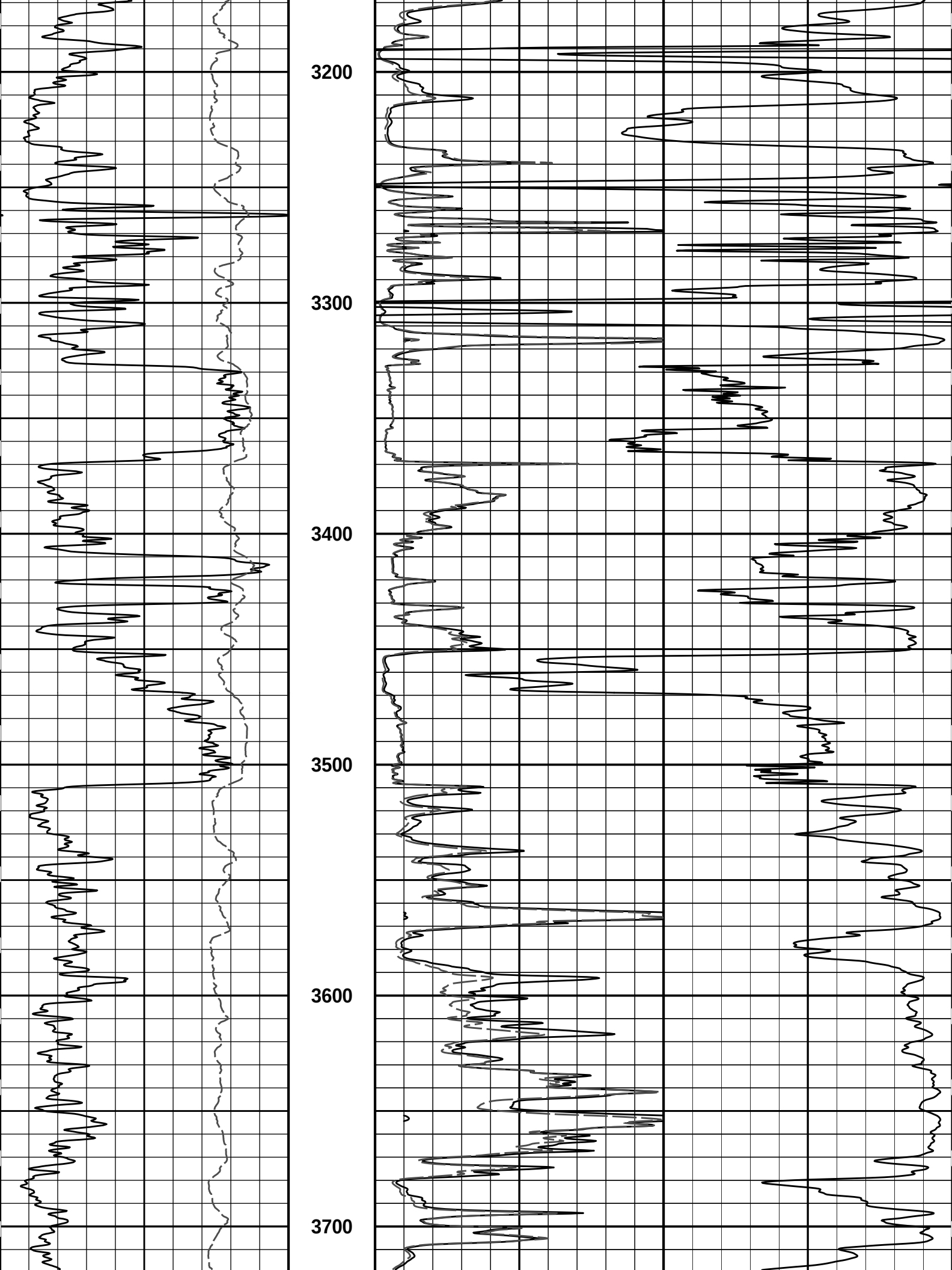
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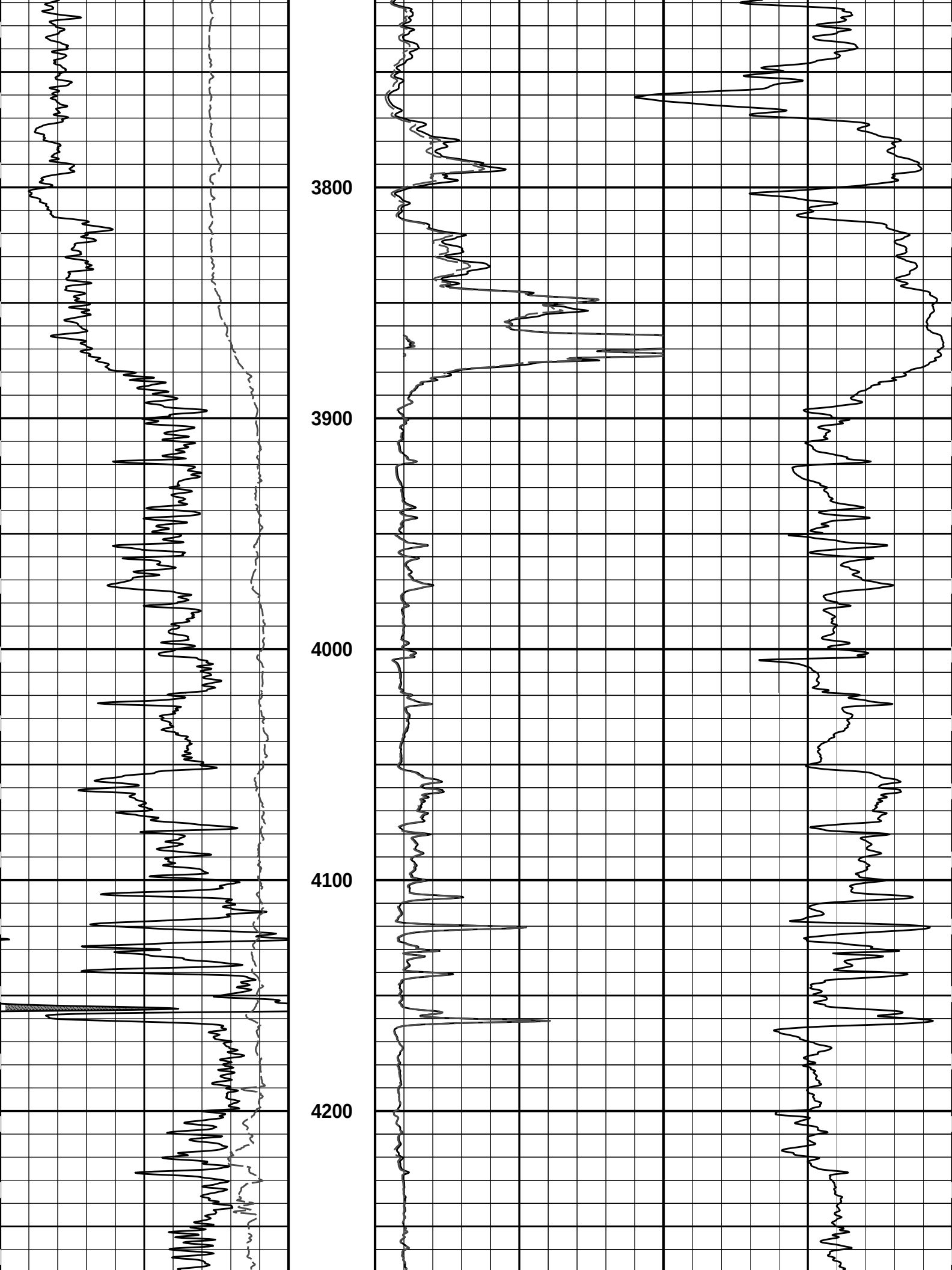
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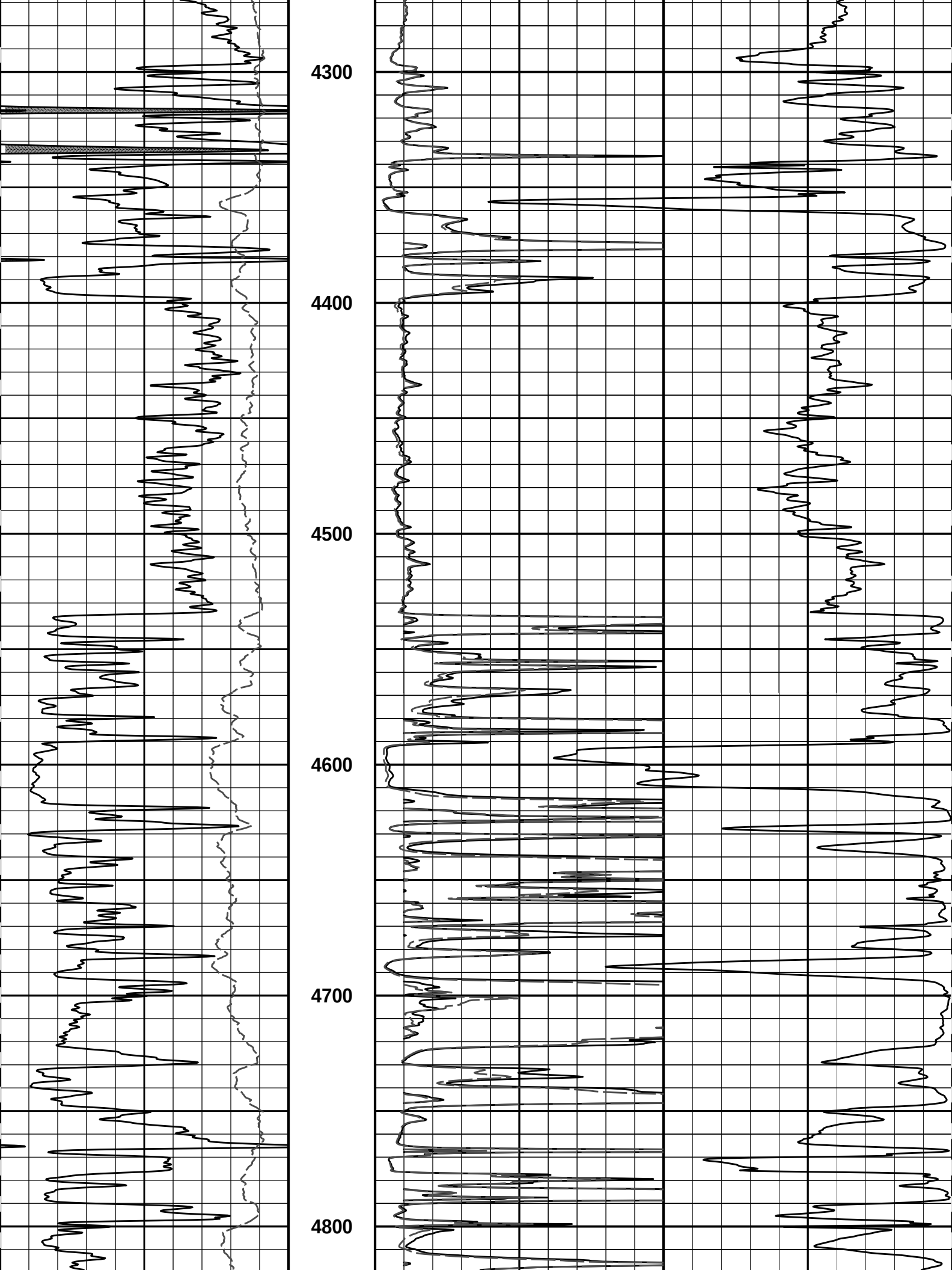
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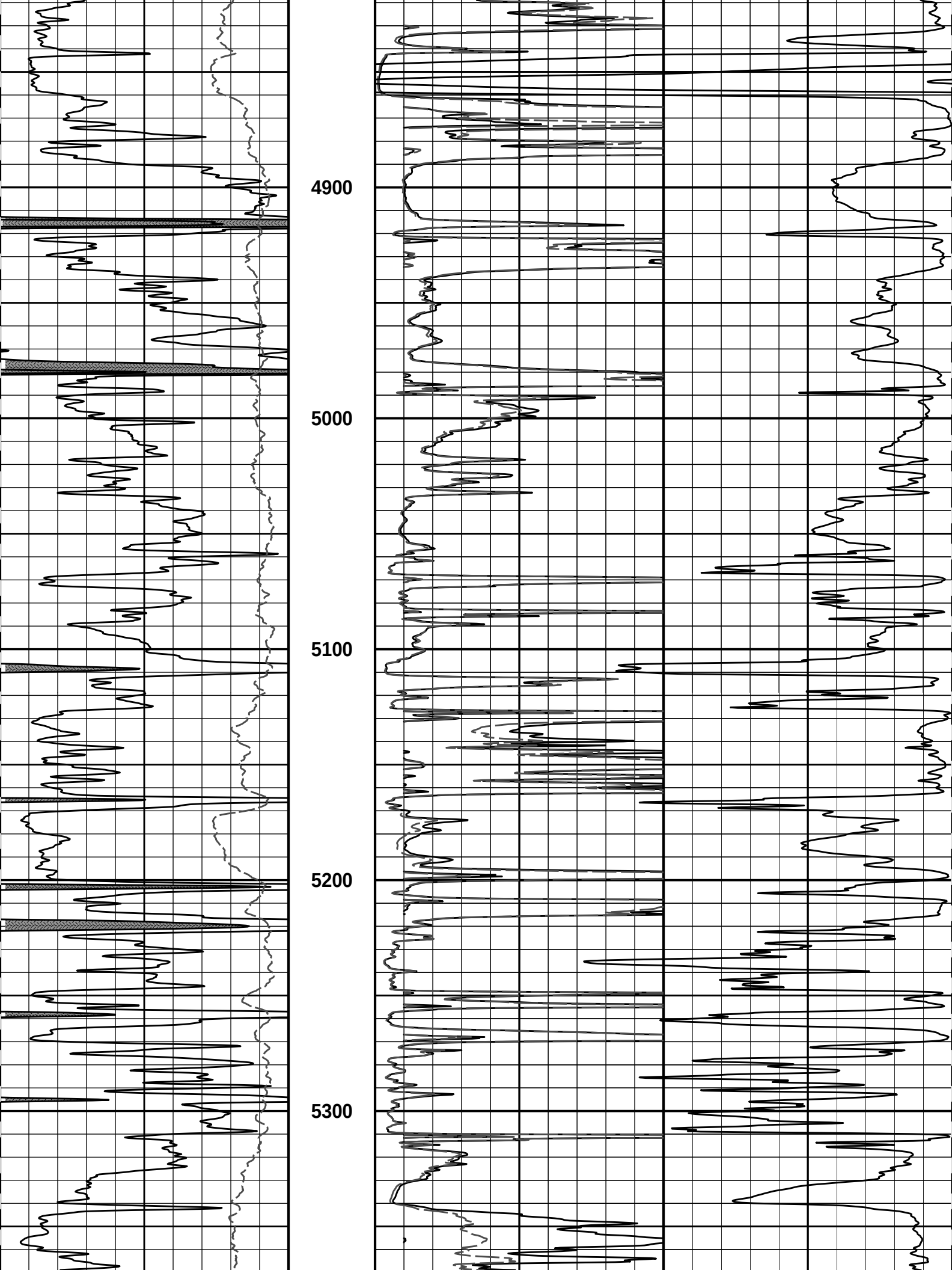
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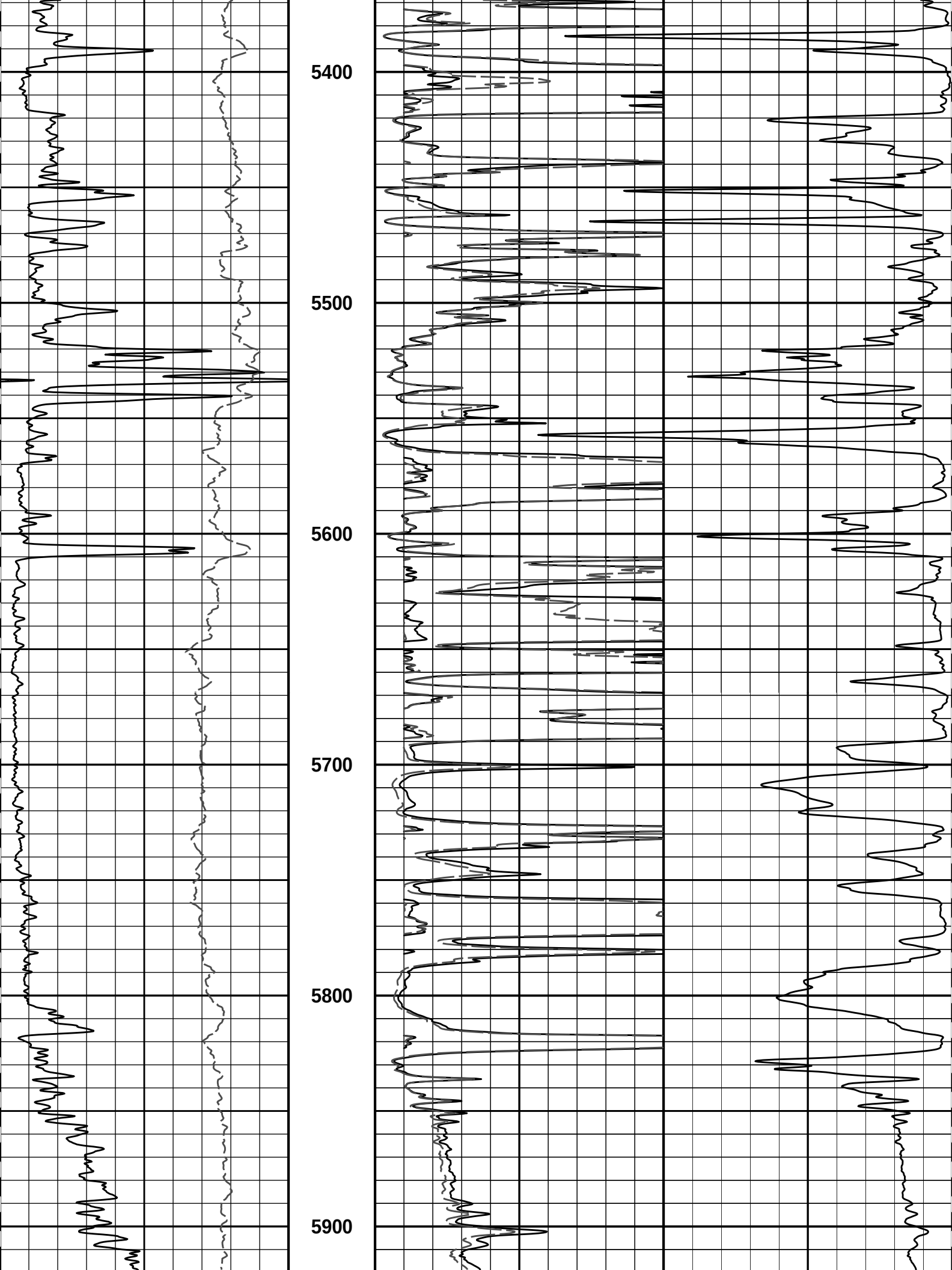
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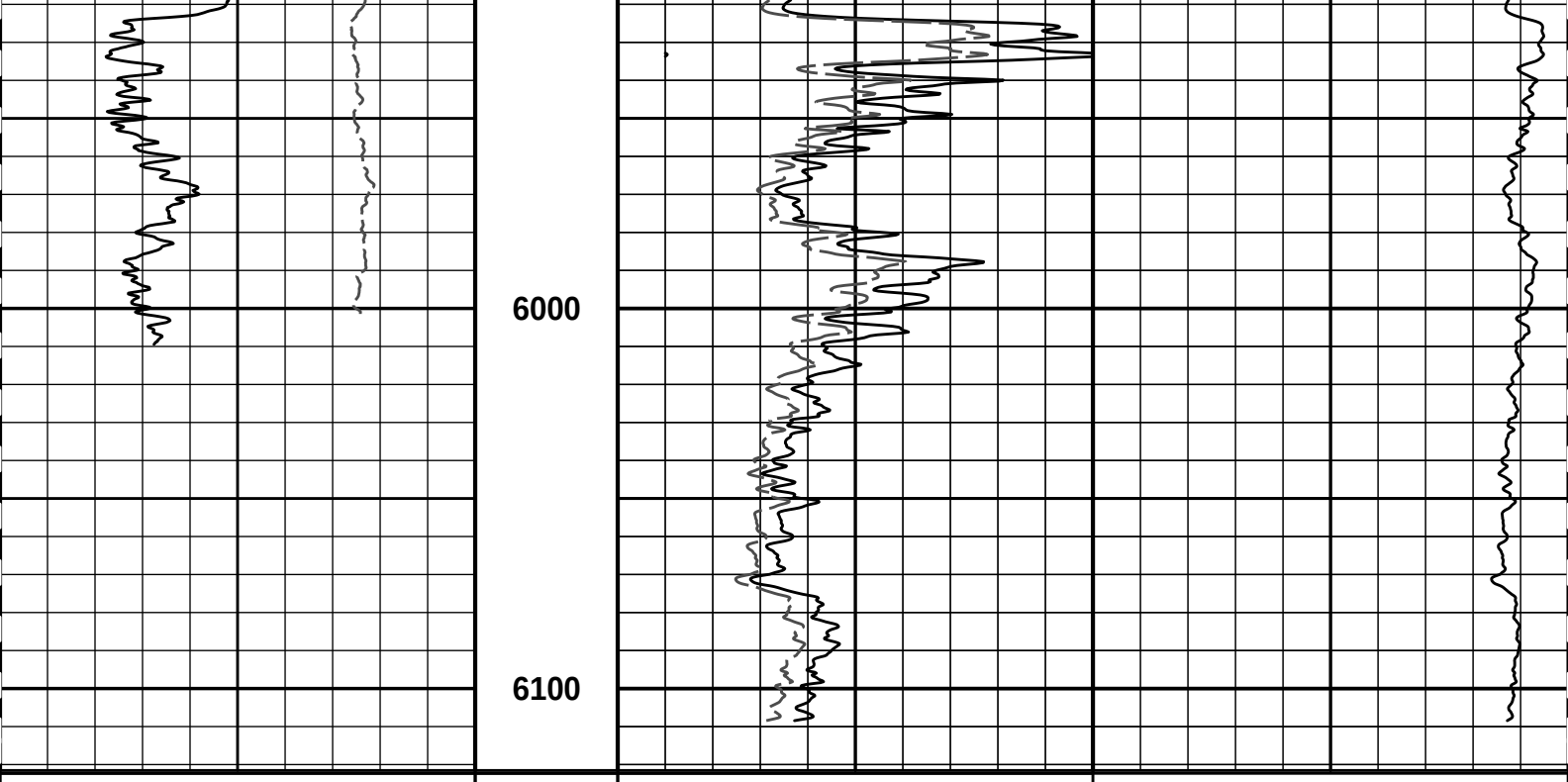


0 Gamma API 150	MD 1 : 600 ft	0 20in Resistivity 2ft Res 50
api		ohm-metre
SP		0 90in Resistivity 2ft Res 50
-]20[+		ohm-metre
		1000 90in Conductivity 2ft Res 0
		mmho per metre

HALLIBURTON

Plot Time: 11-May-13 12:57:01
Plot Range: 820 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\CASING\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_2_lib

2 INCH MAIN LOG

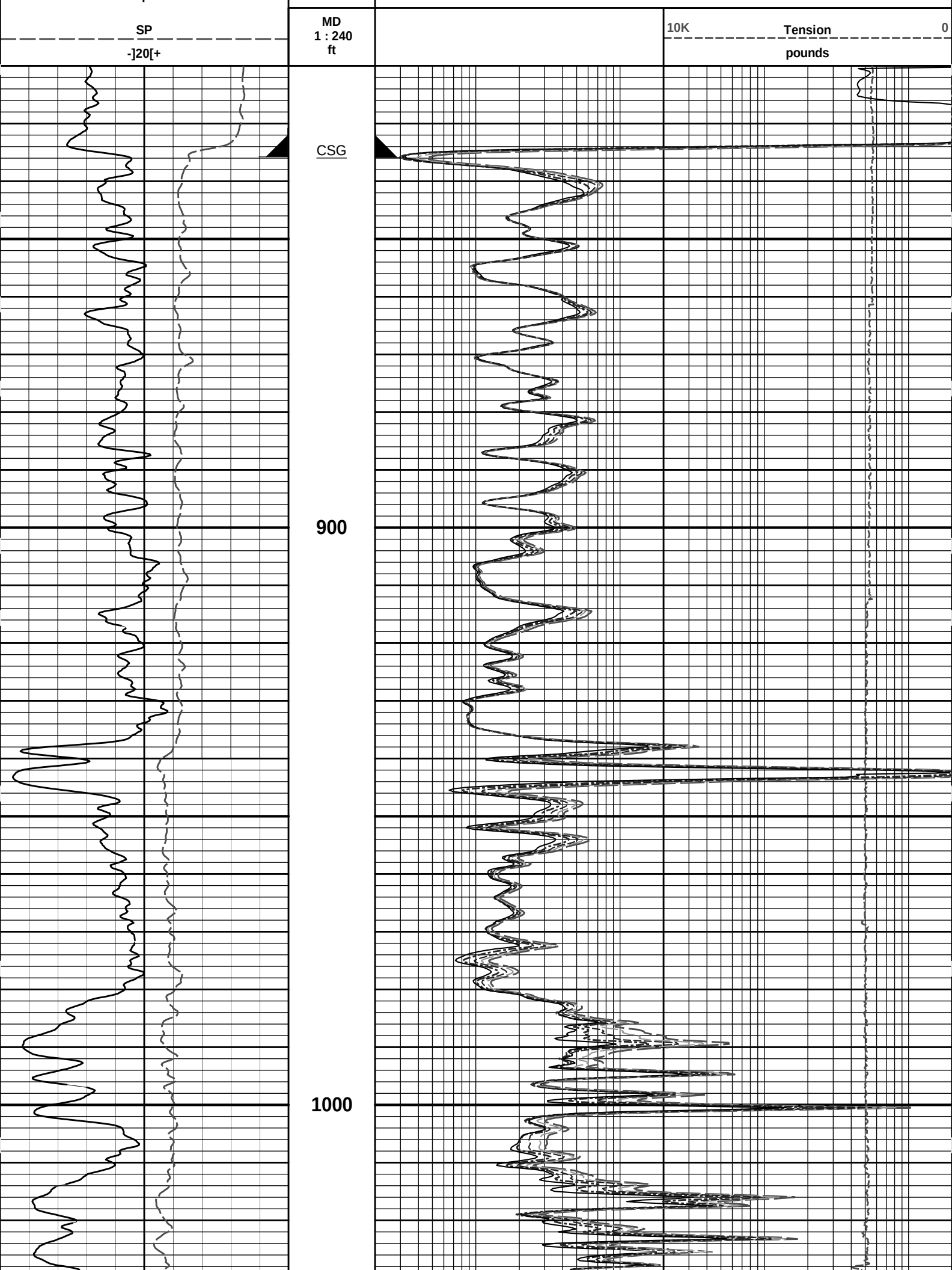
HALLIBURTON

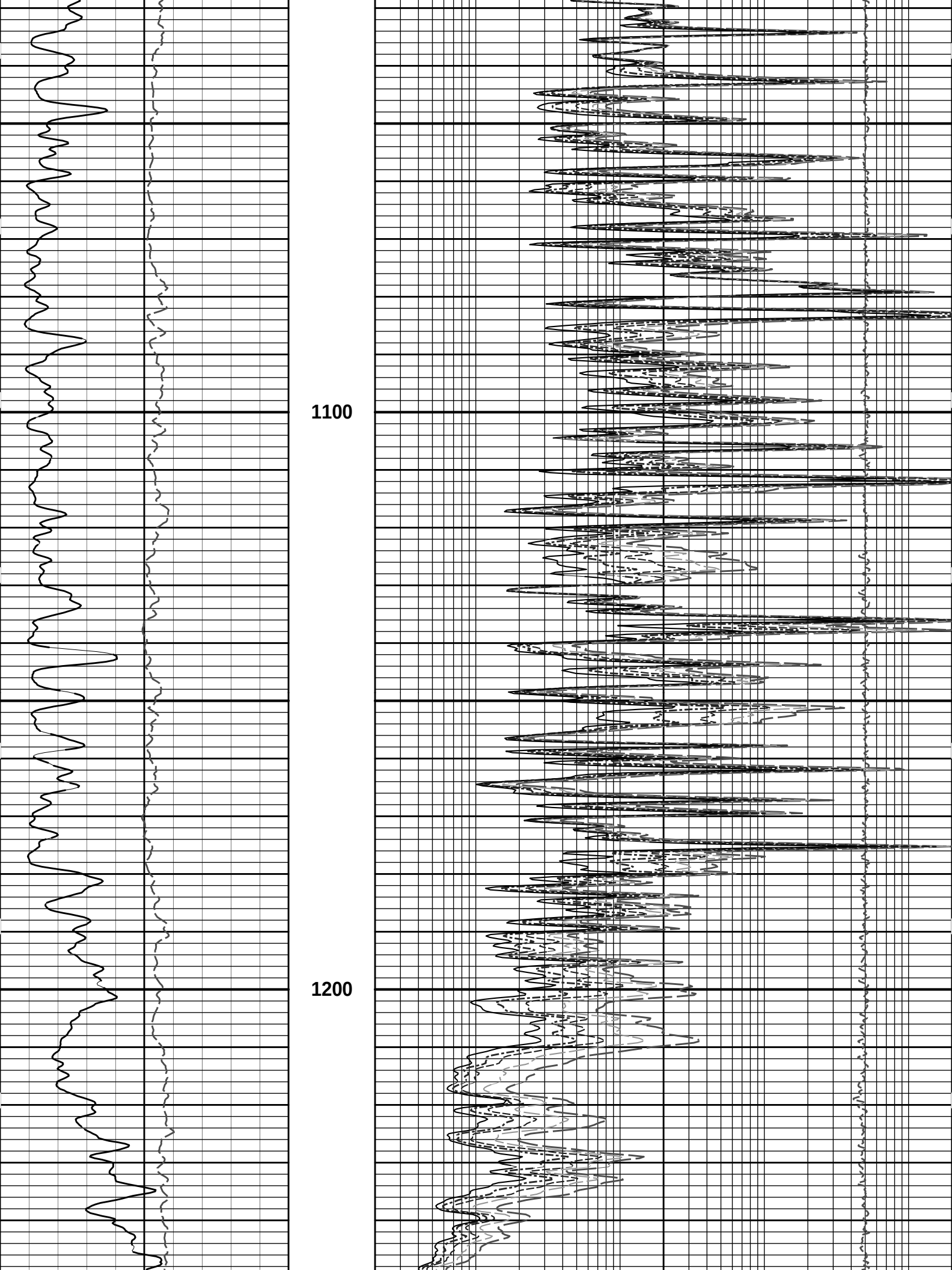
Plot Time: 11-May-13 12:57:01
Plot Range: 820 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\CASING\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_main_lib

5 INCH MAIN LOG

SHALE

0 Gamma API 150	0.2 90in Resistivity 2ft Res 2000
api	ohmm
	0.2 60in Resistivity 2ft Res 2000
	ohmm
	0.2 30in Resistivity 2ft Res 2000
	ohm-metre
	0.2 20in Resistivity 2ft Res 2000
	ohmm
	0.2 10in Resistivity 2ft Res 2000
	ohmm


SP
-]20[+
MD
1 : 240
ft
10K
Tension
0
pounds
CSG
900
1000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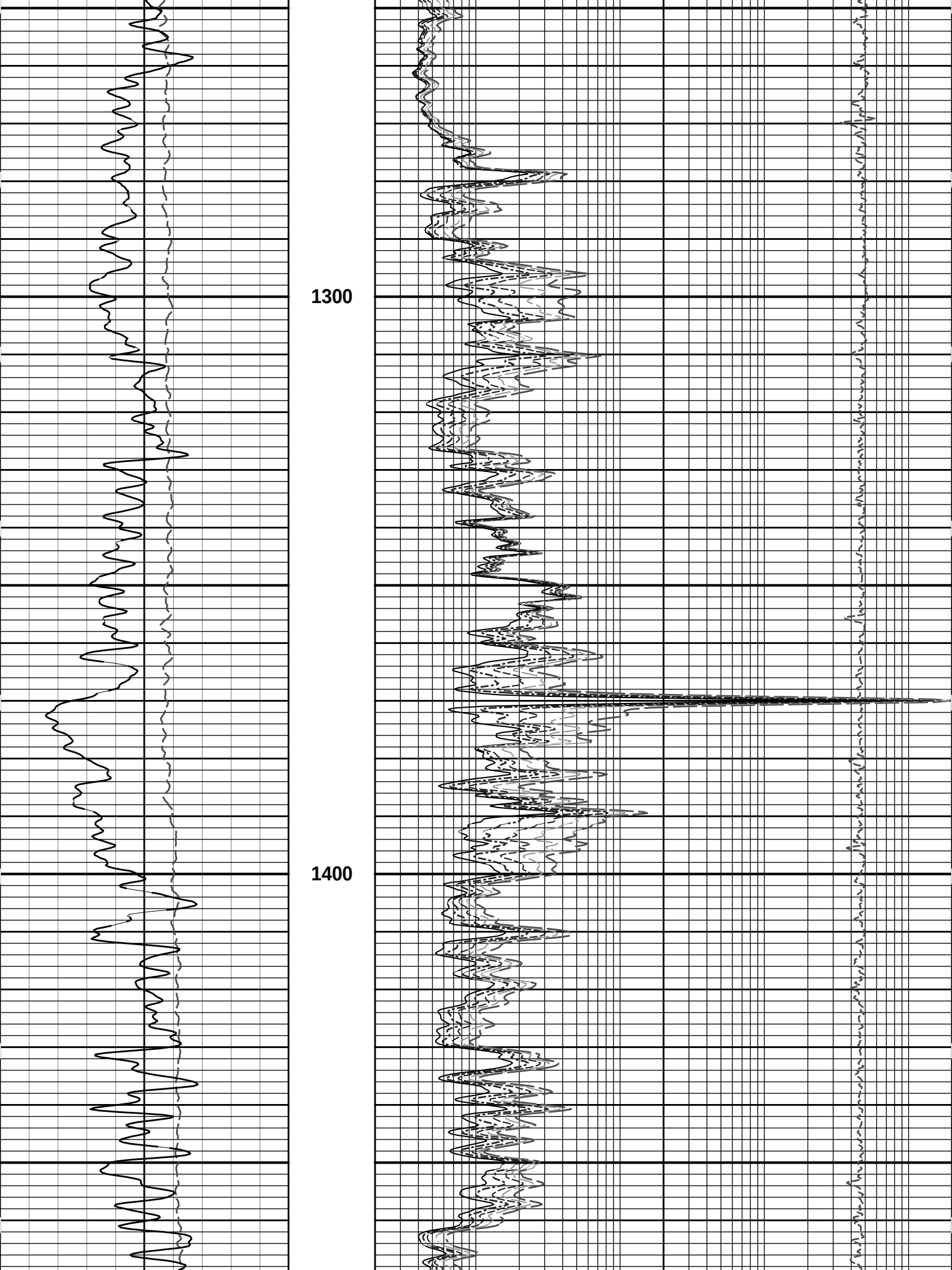
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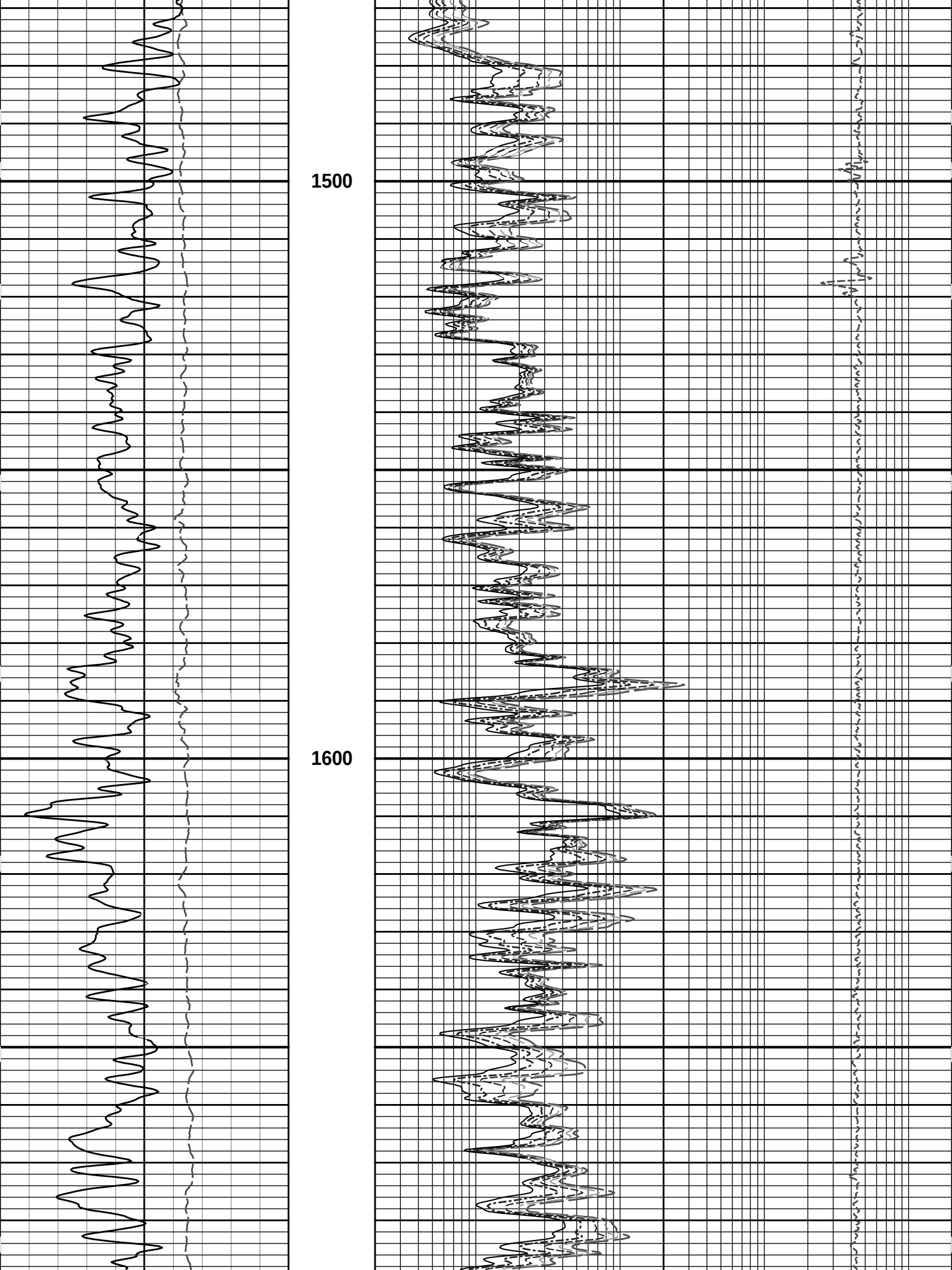
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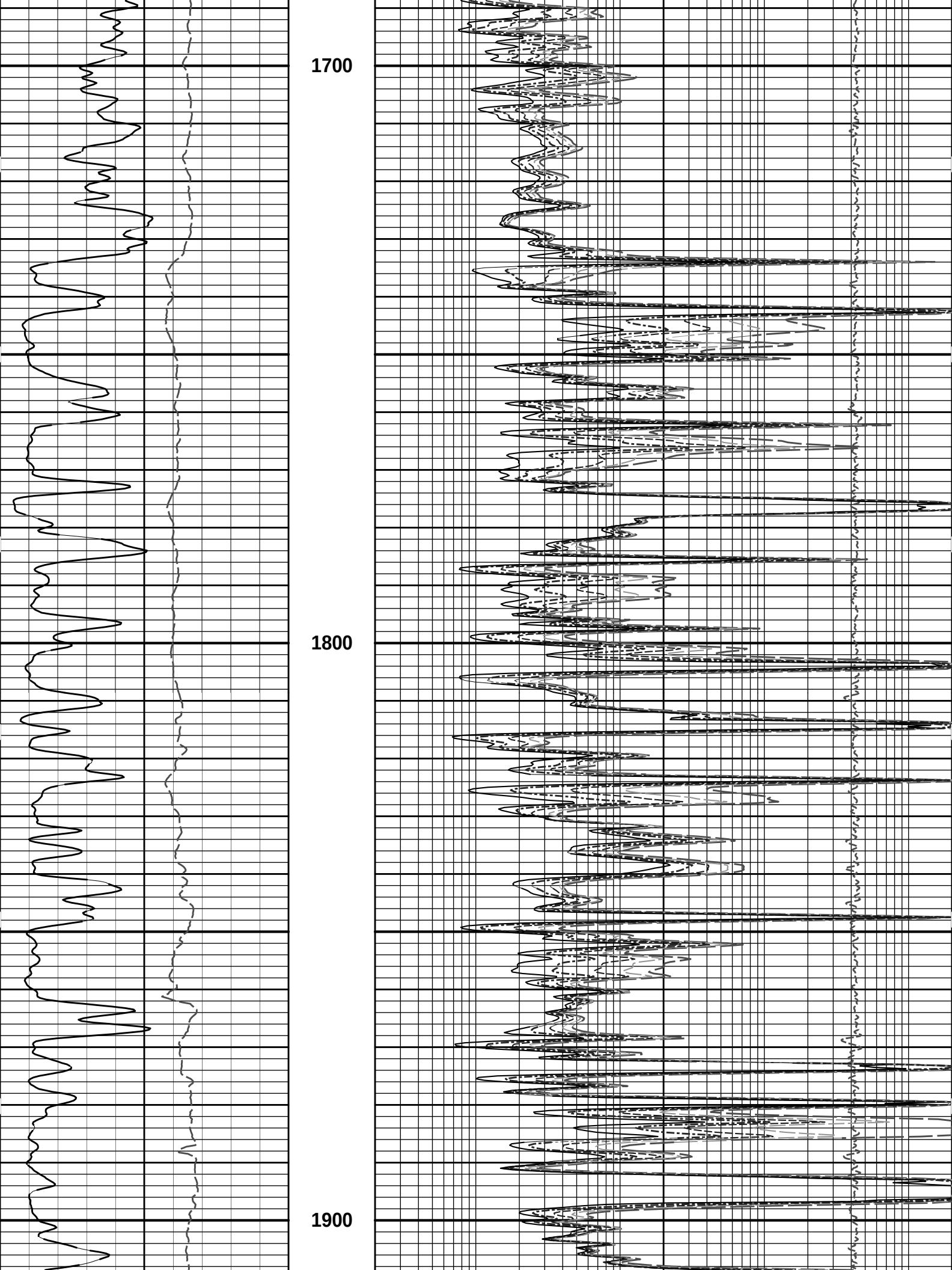
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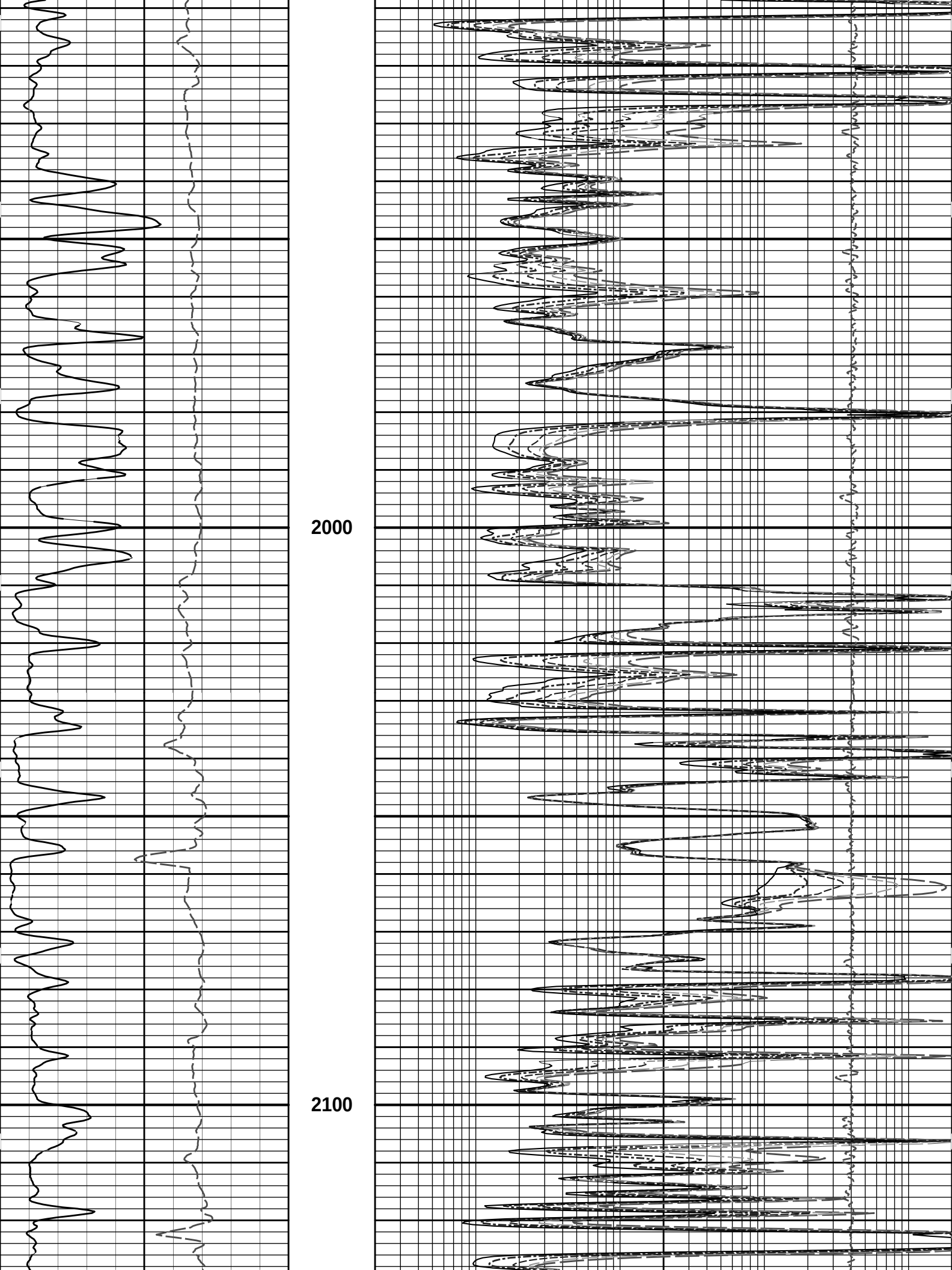
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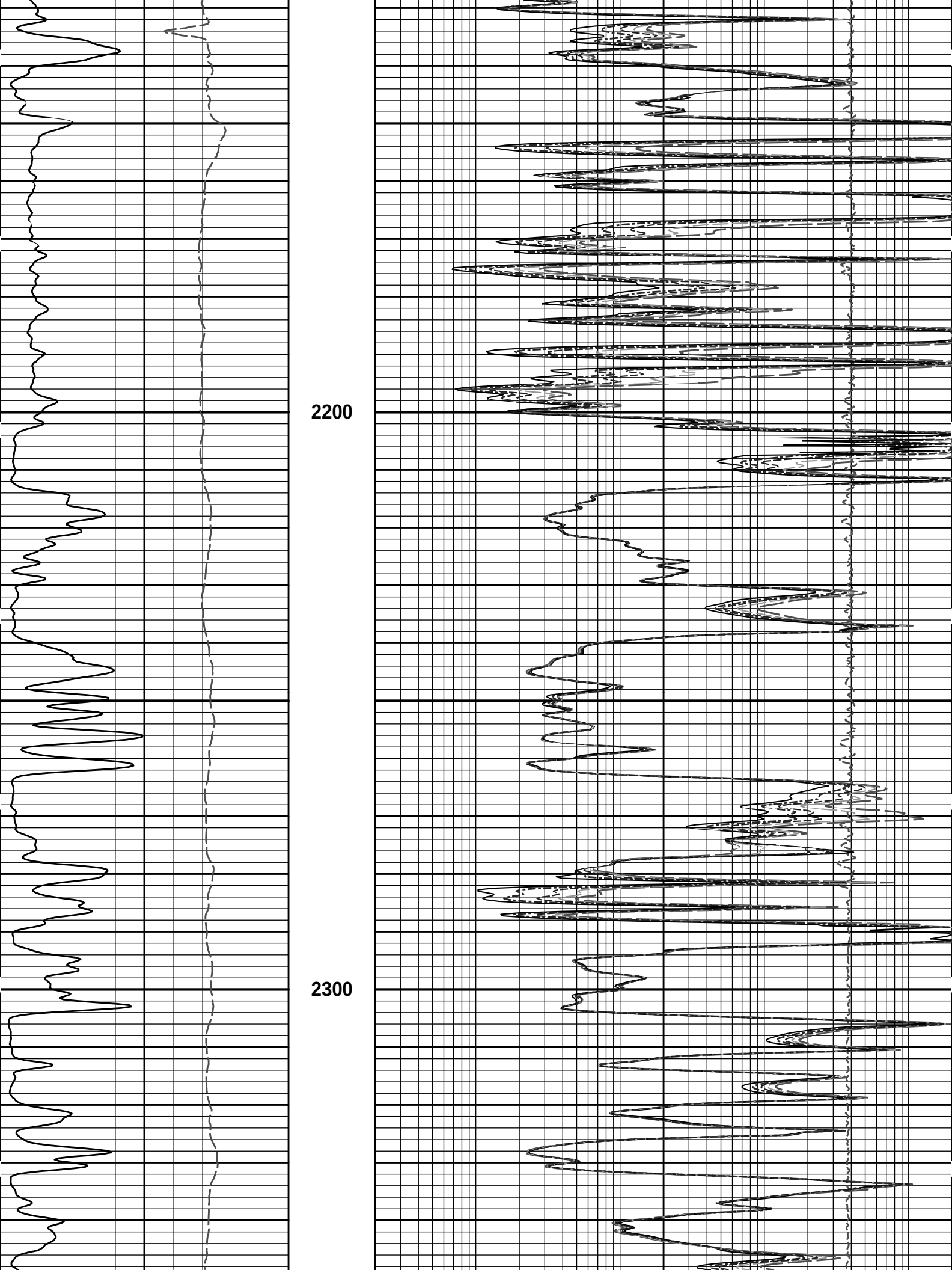
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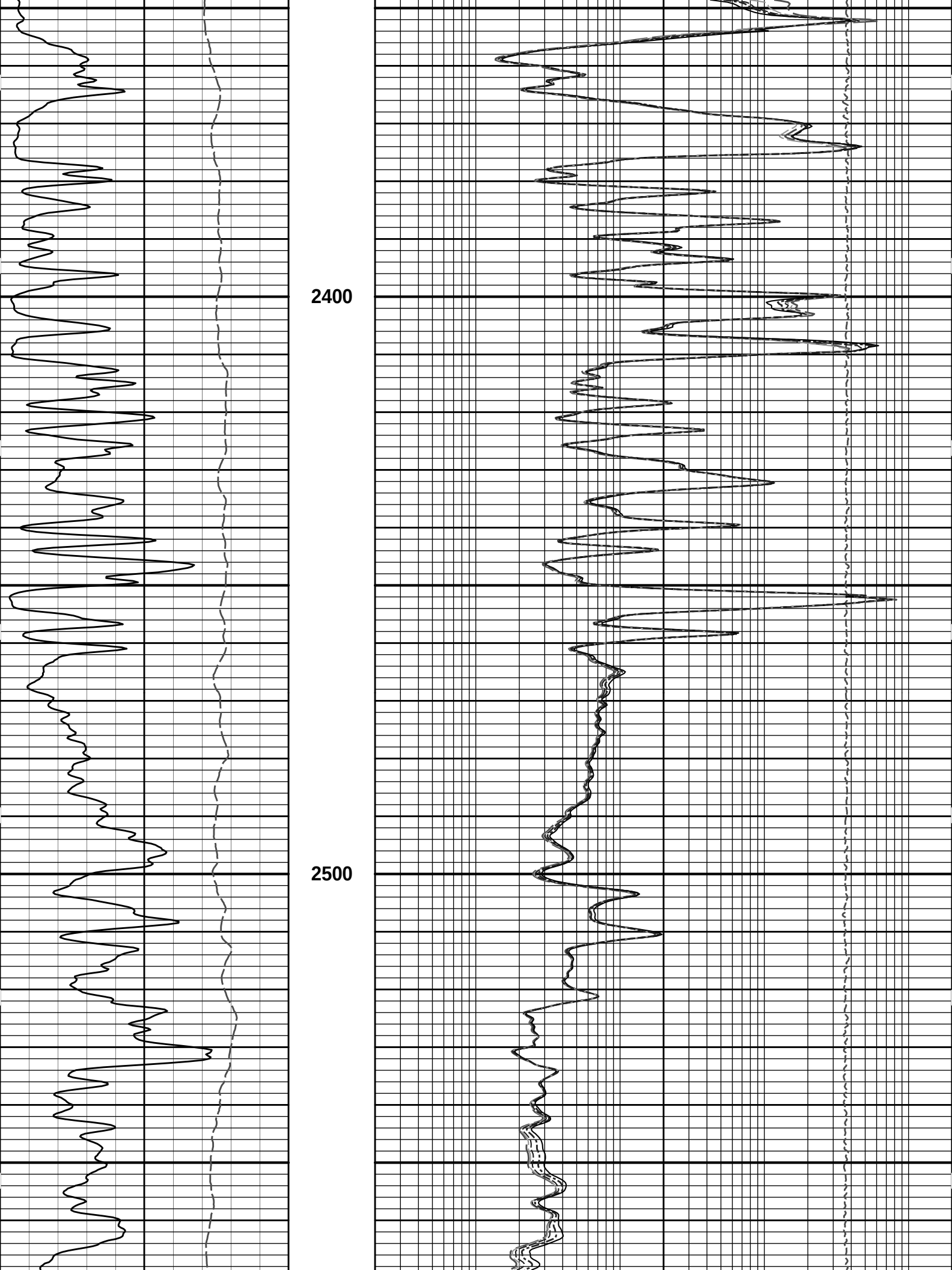
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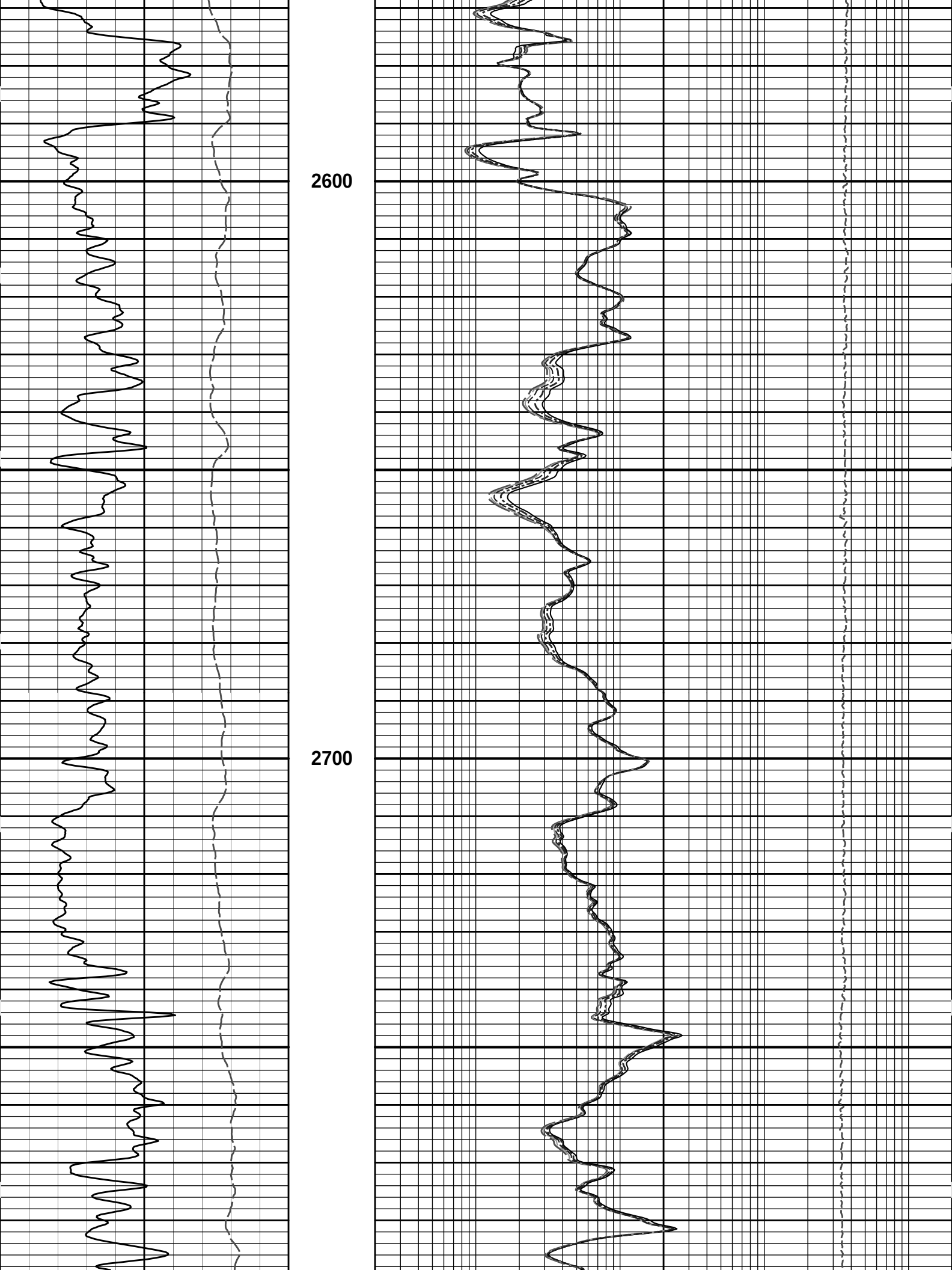
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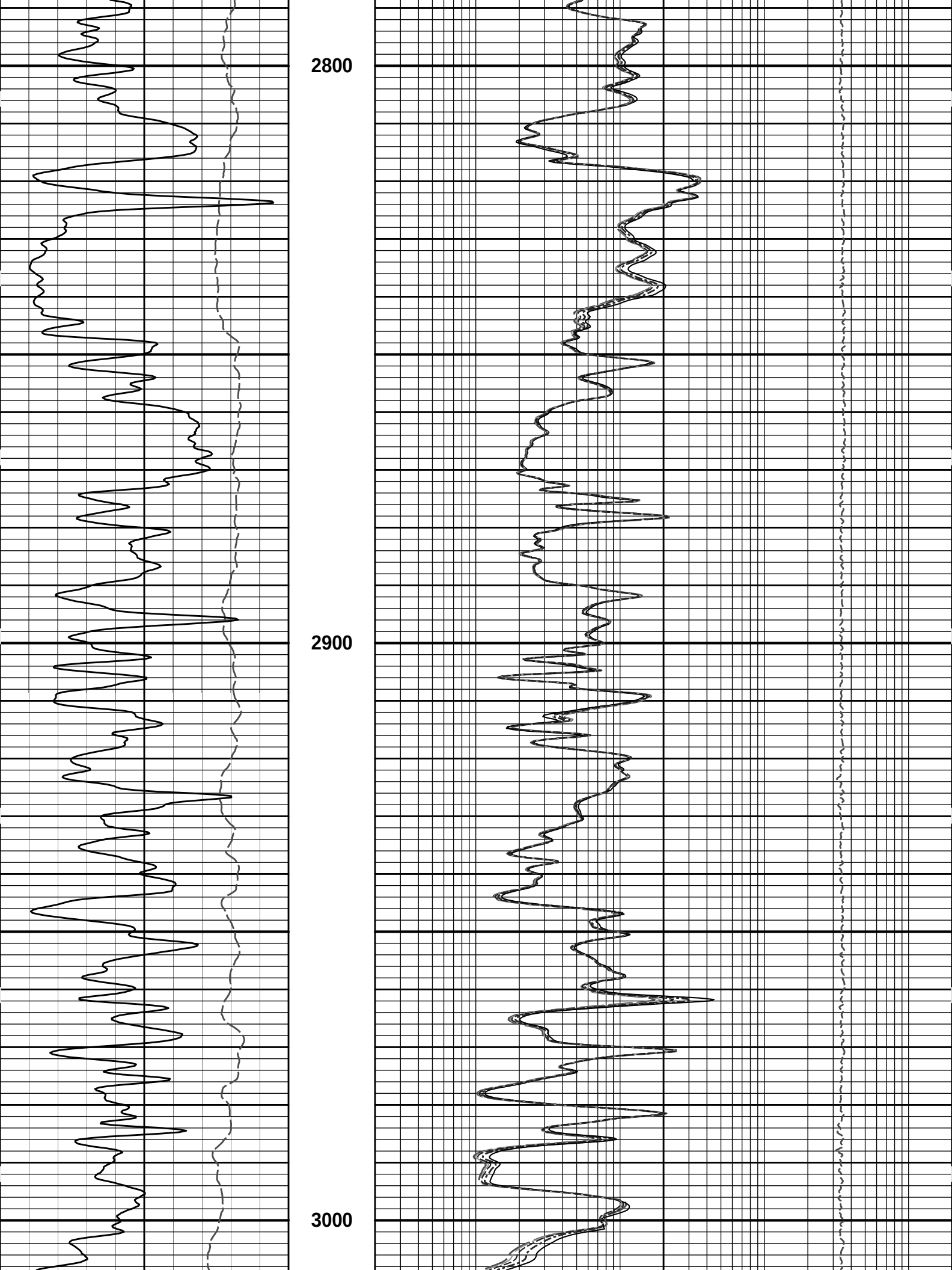
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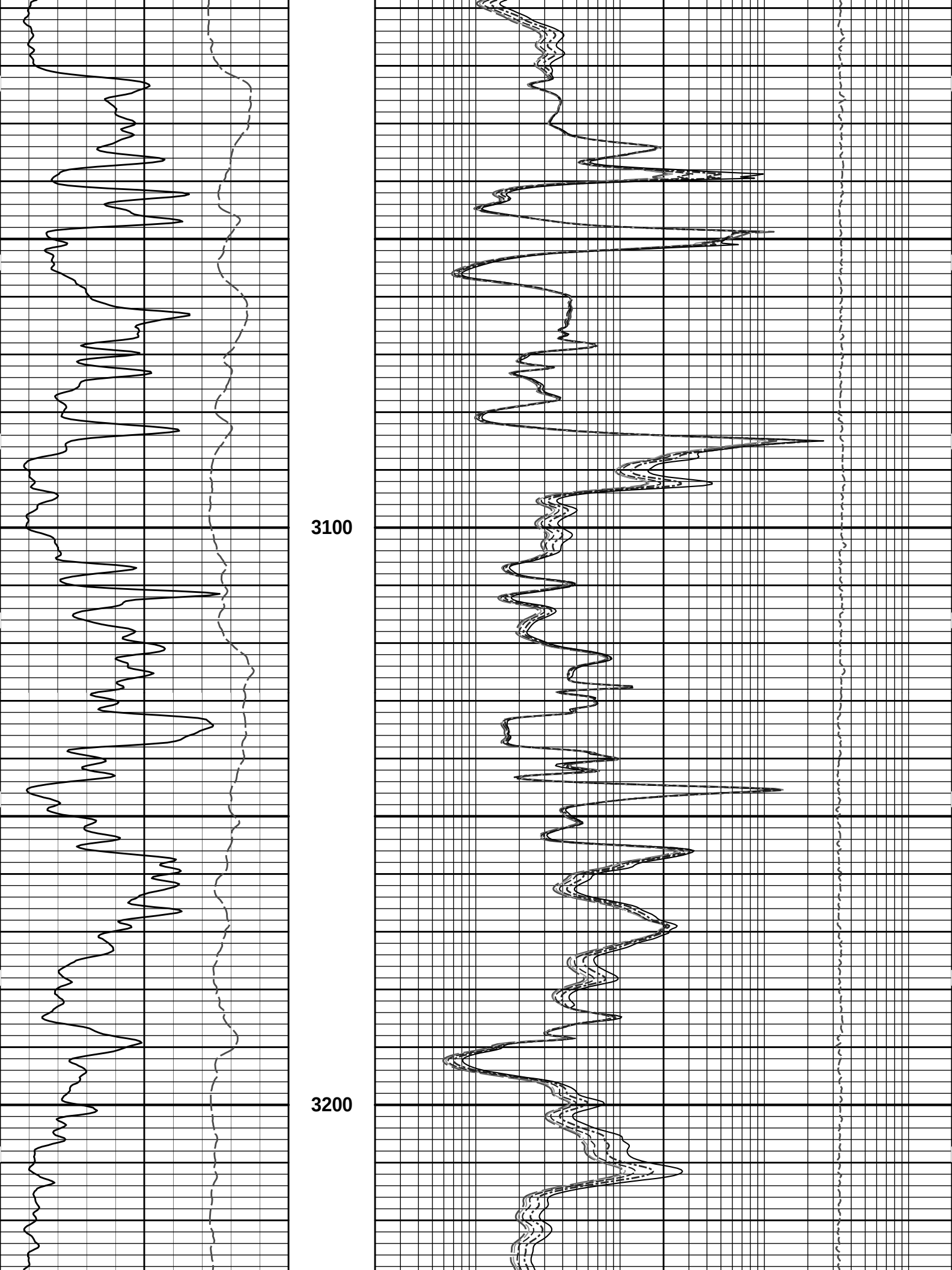
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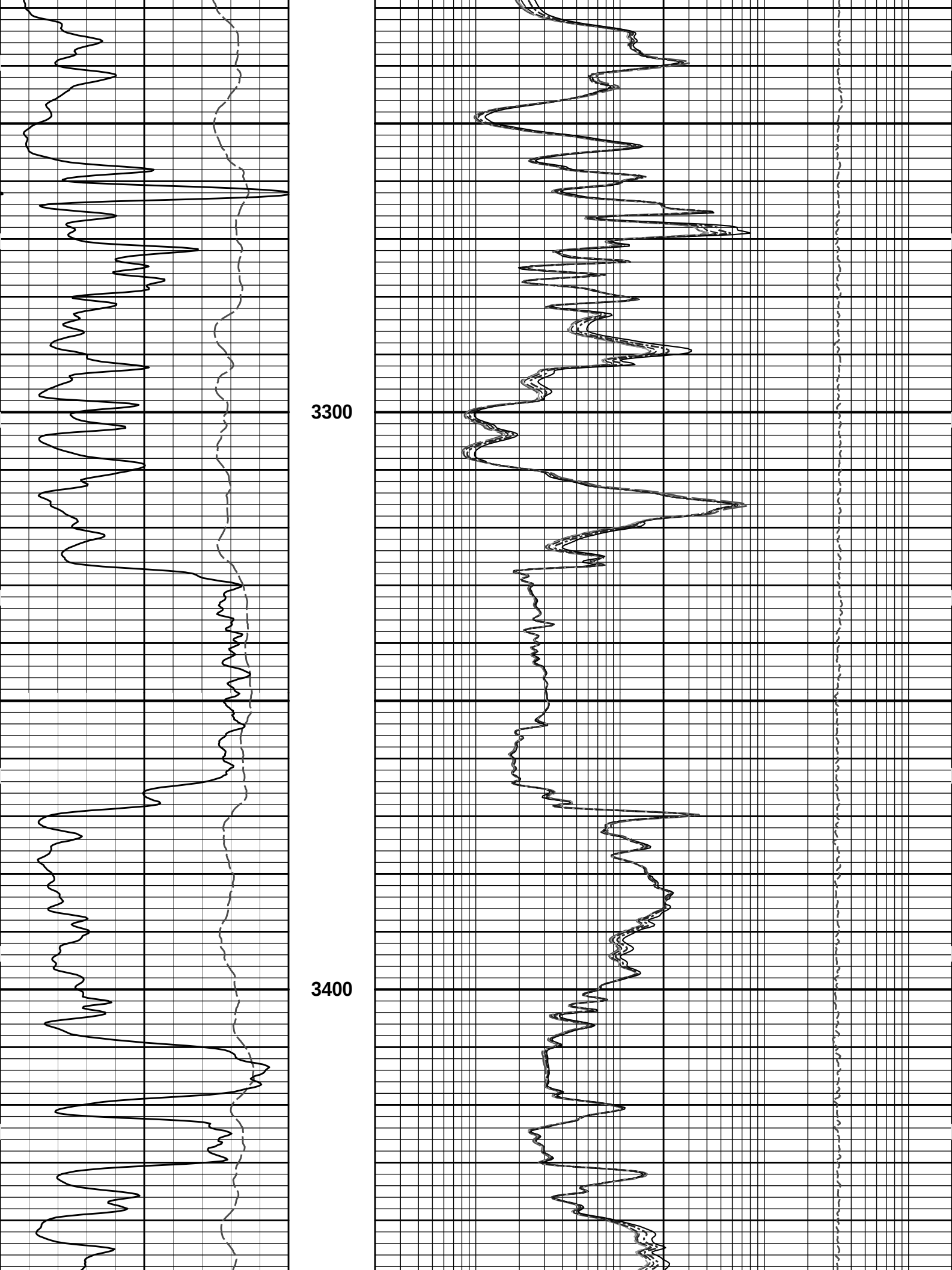
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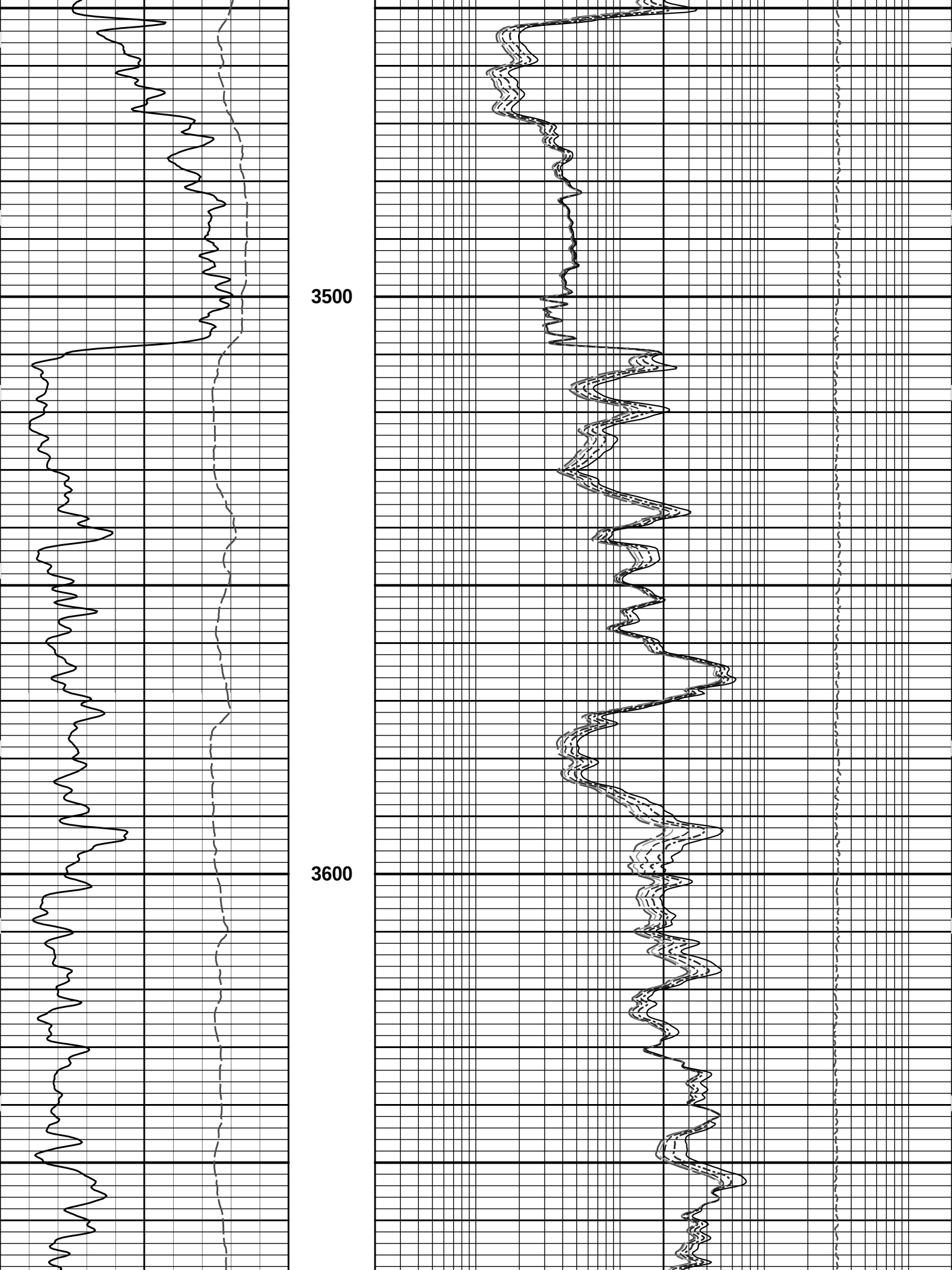
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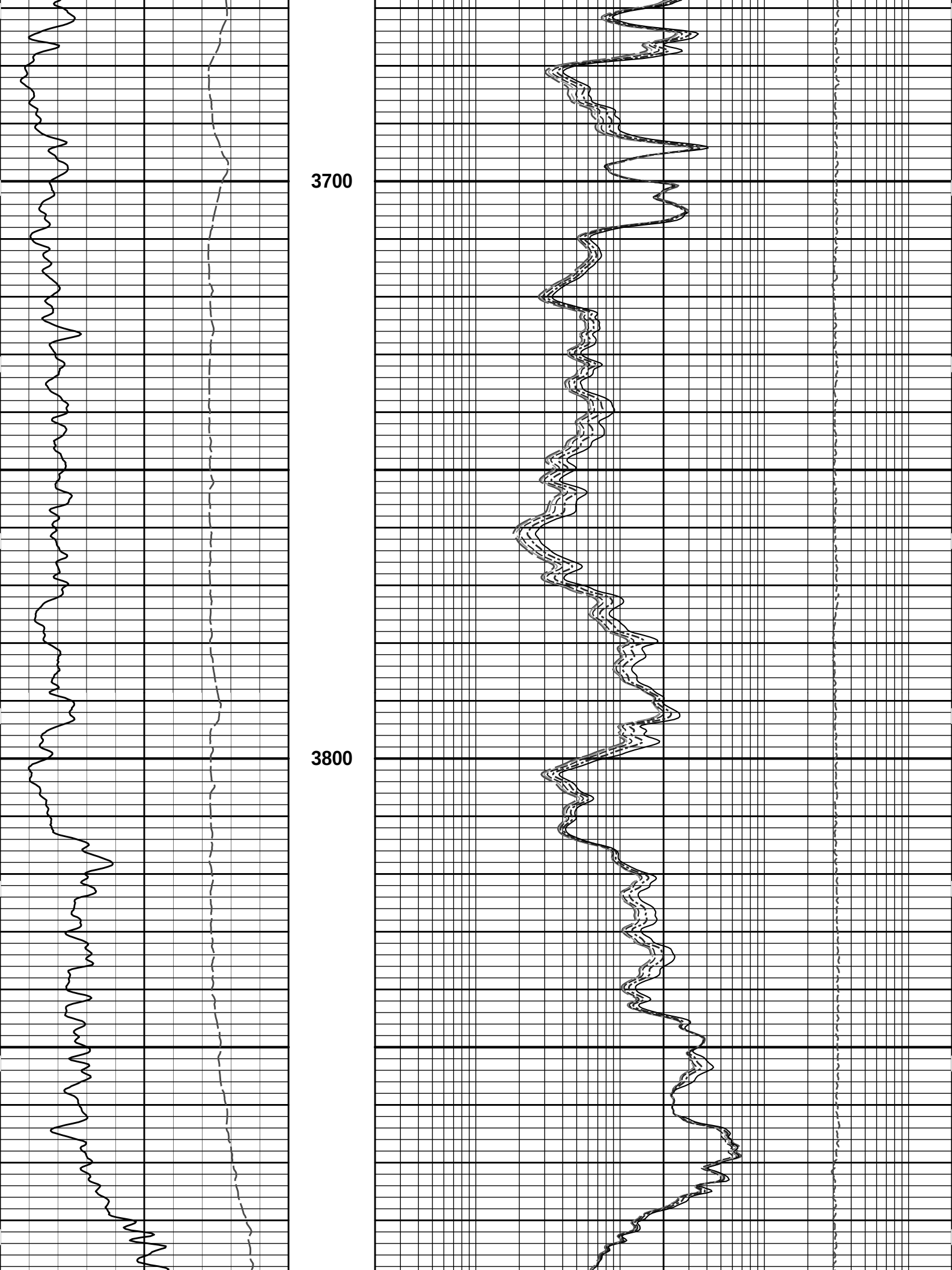
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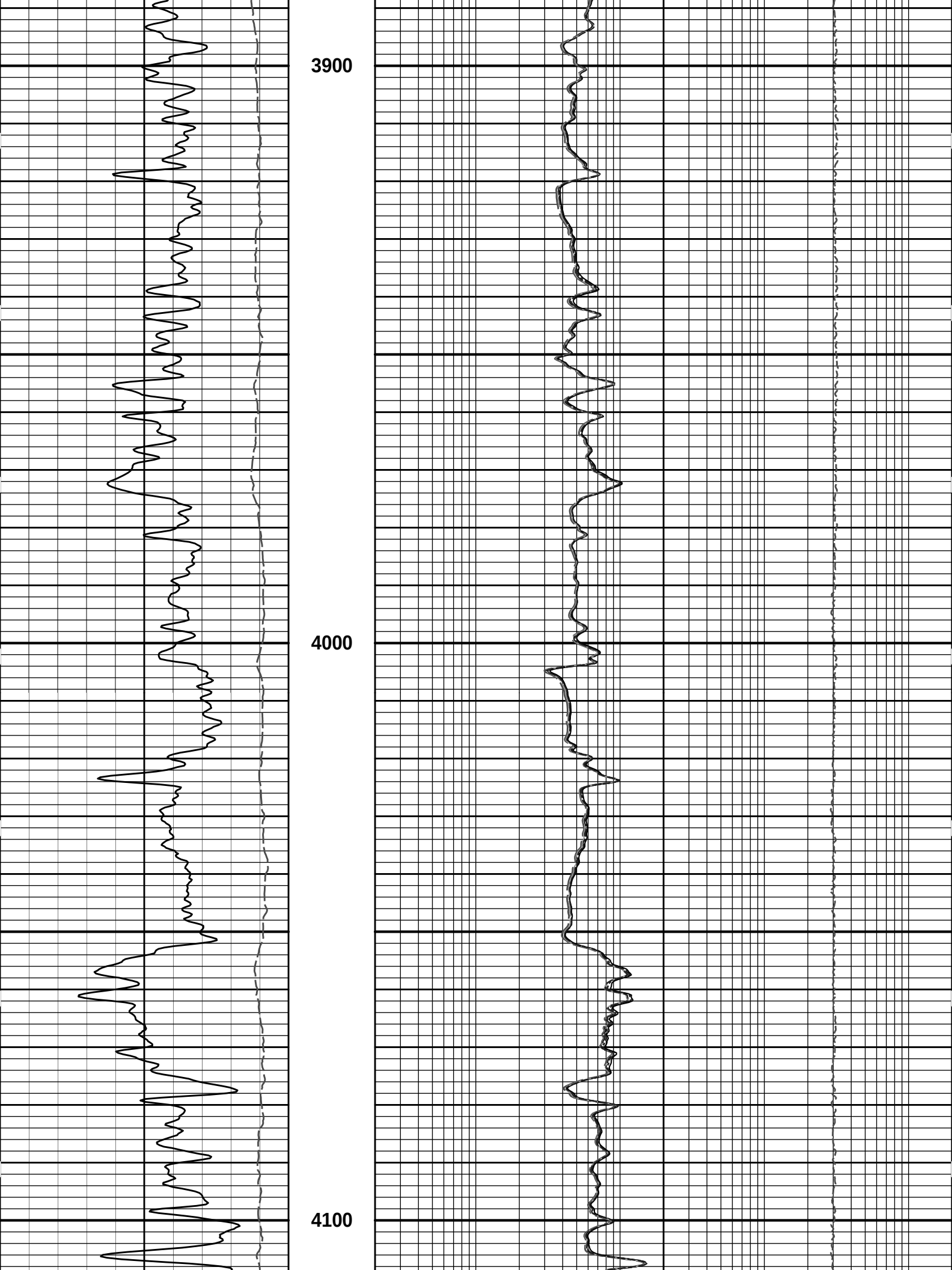
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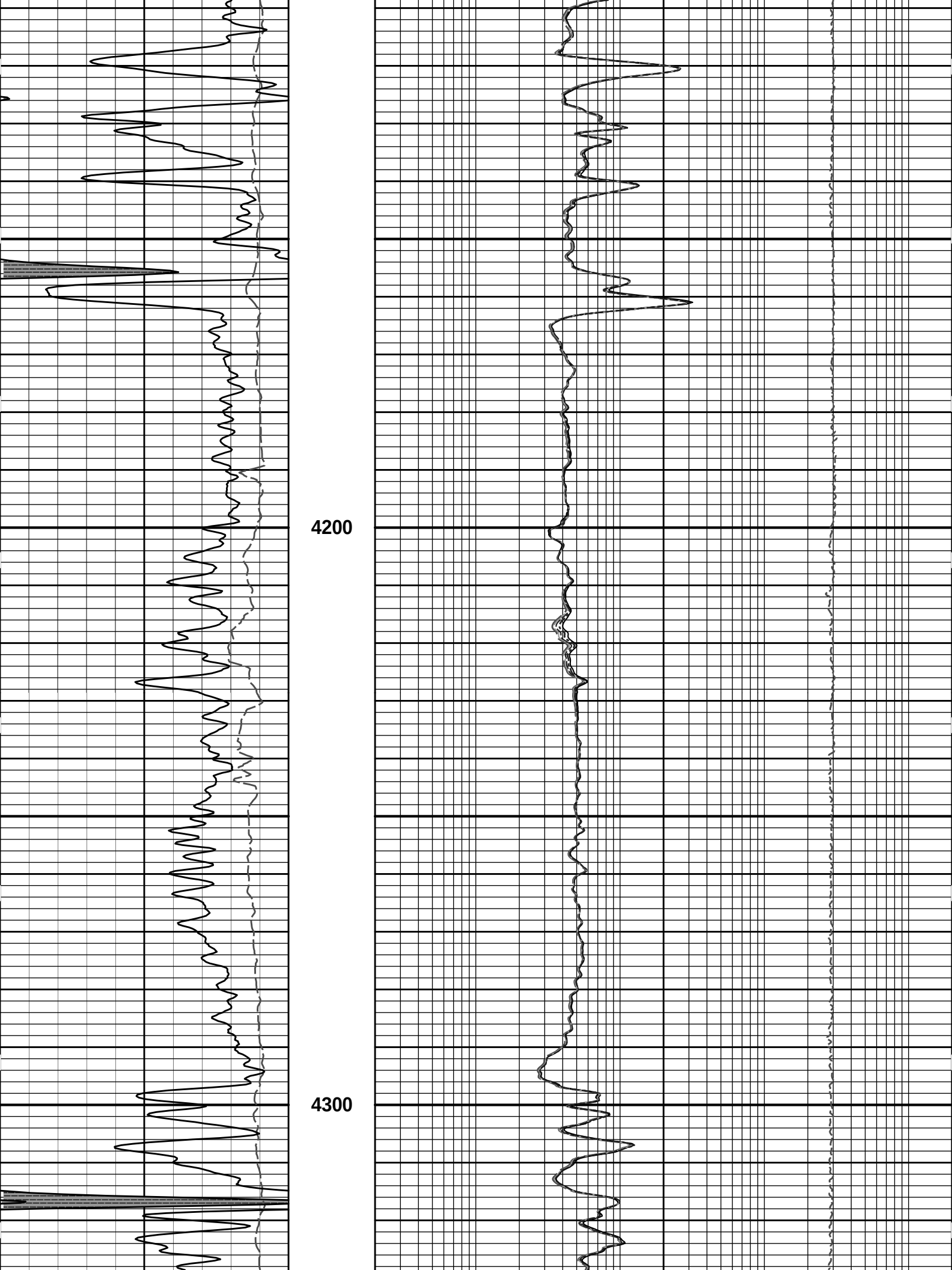
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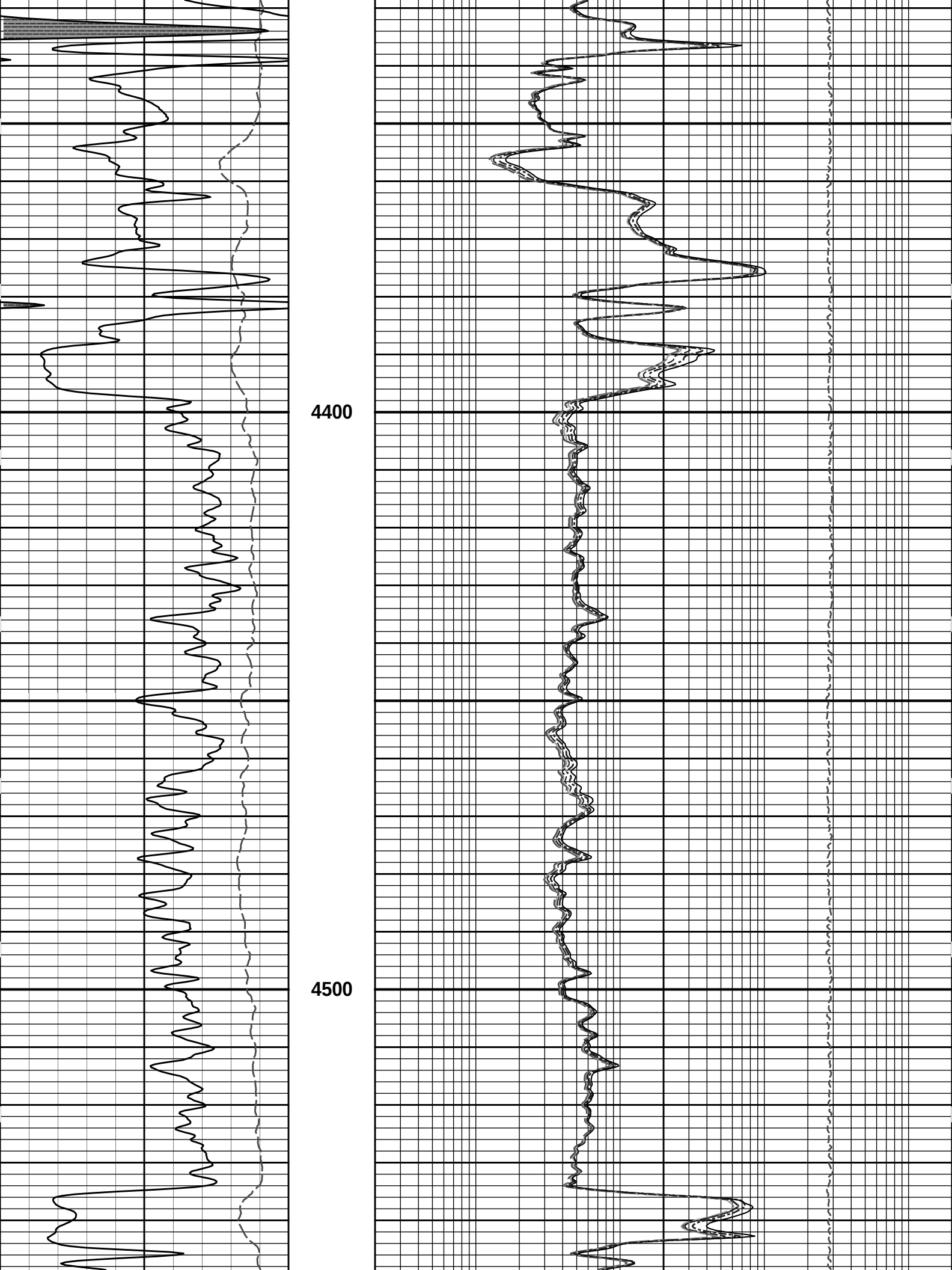
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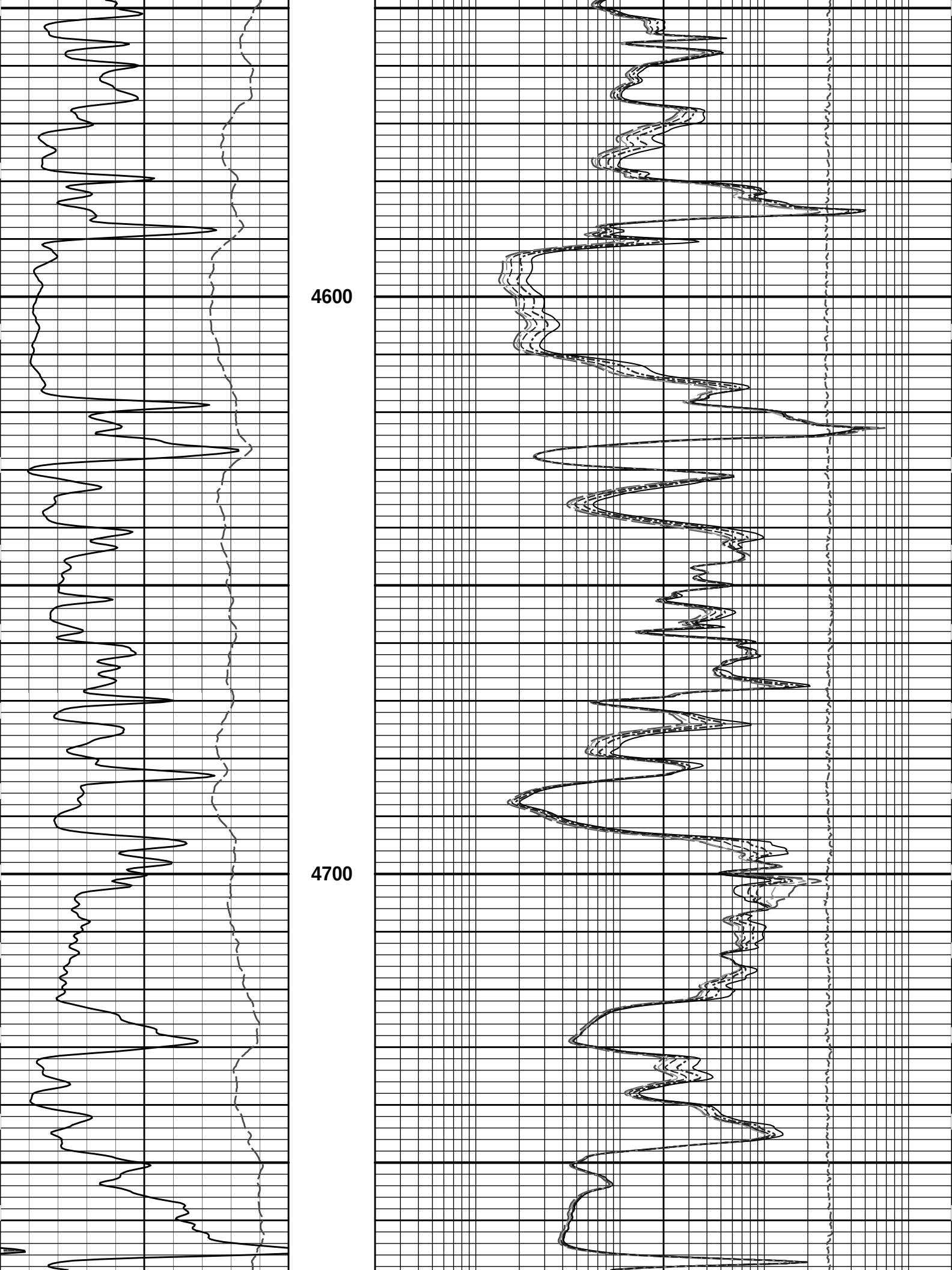
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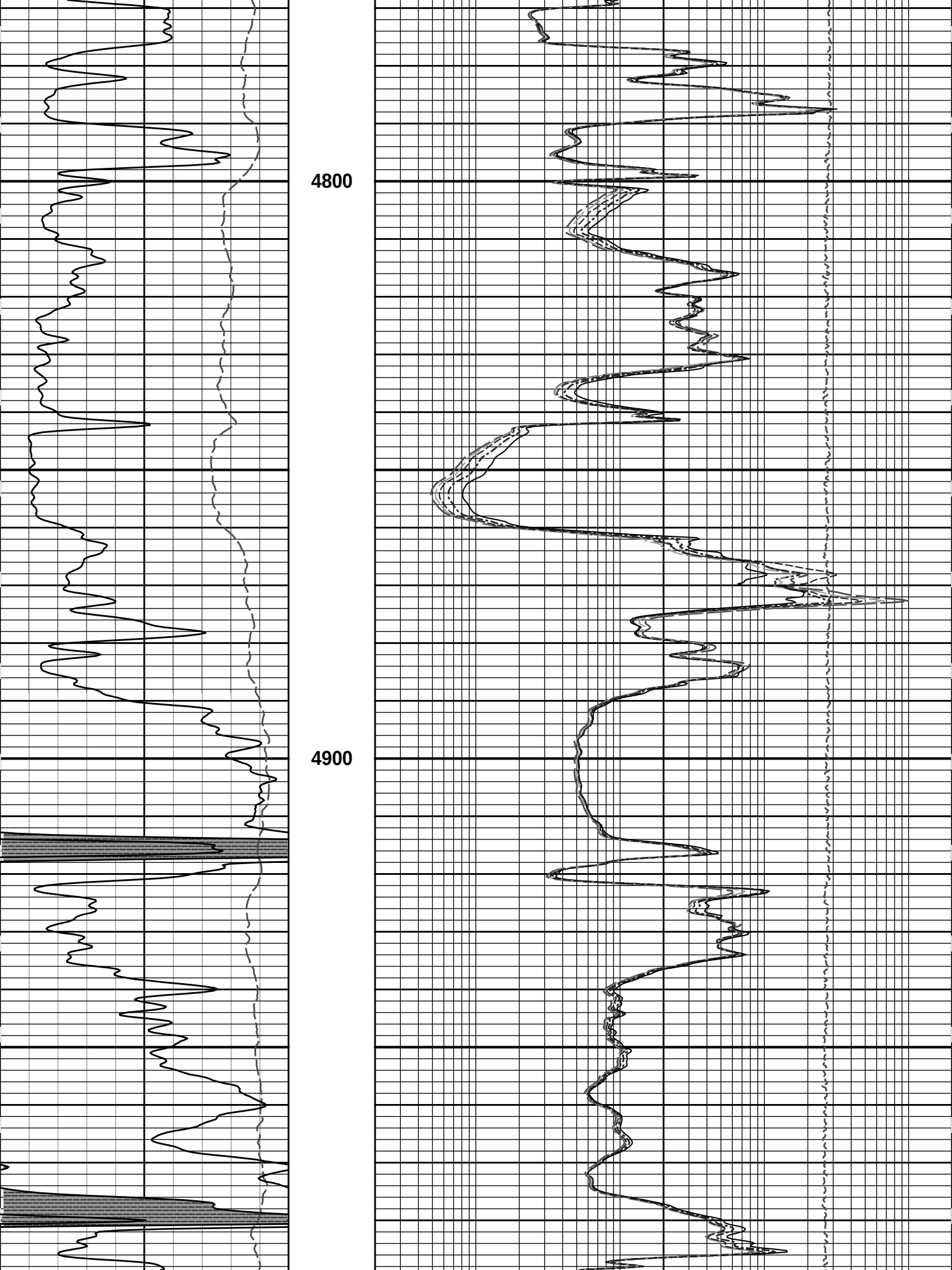
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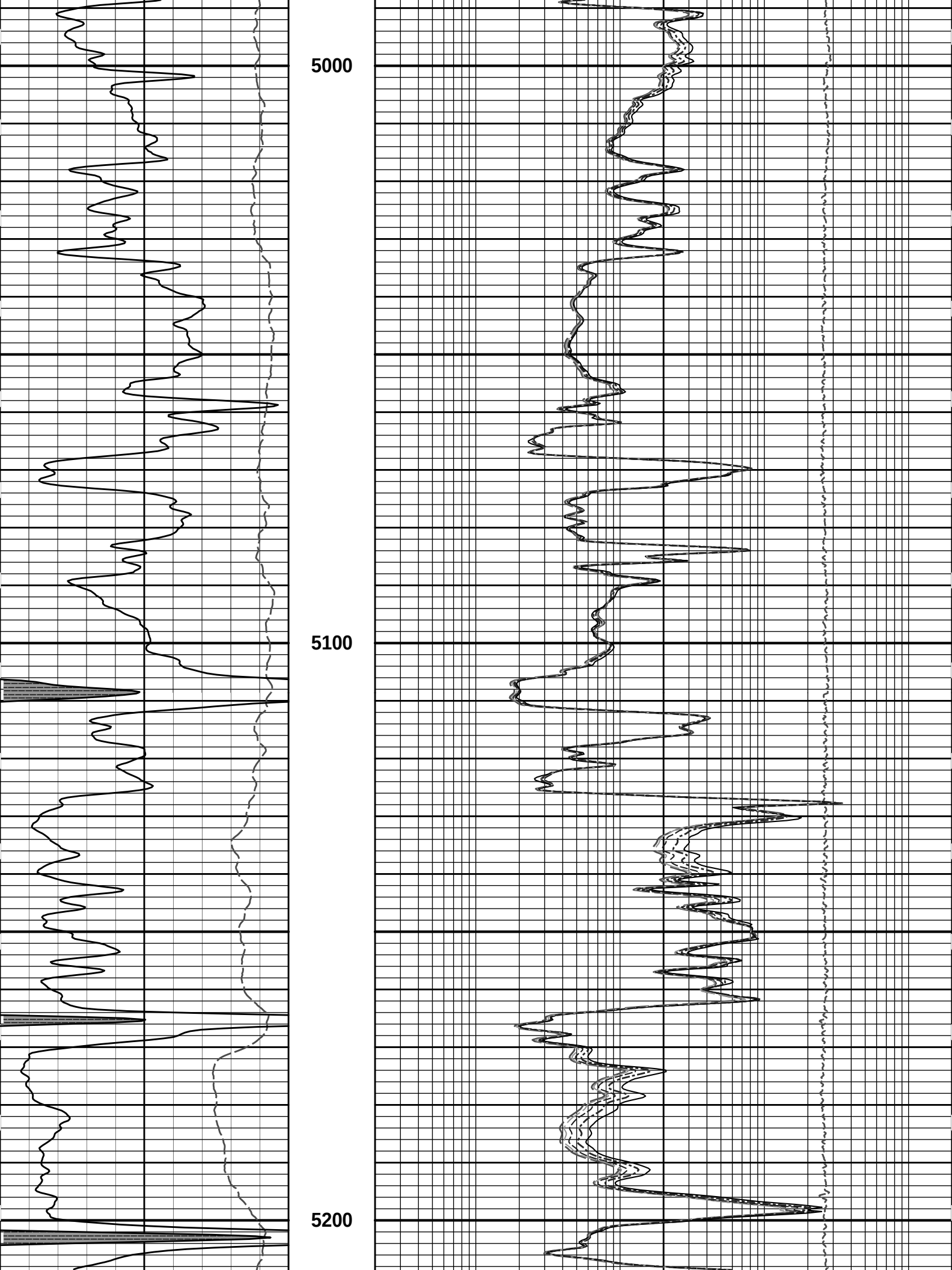
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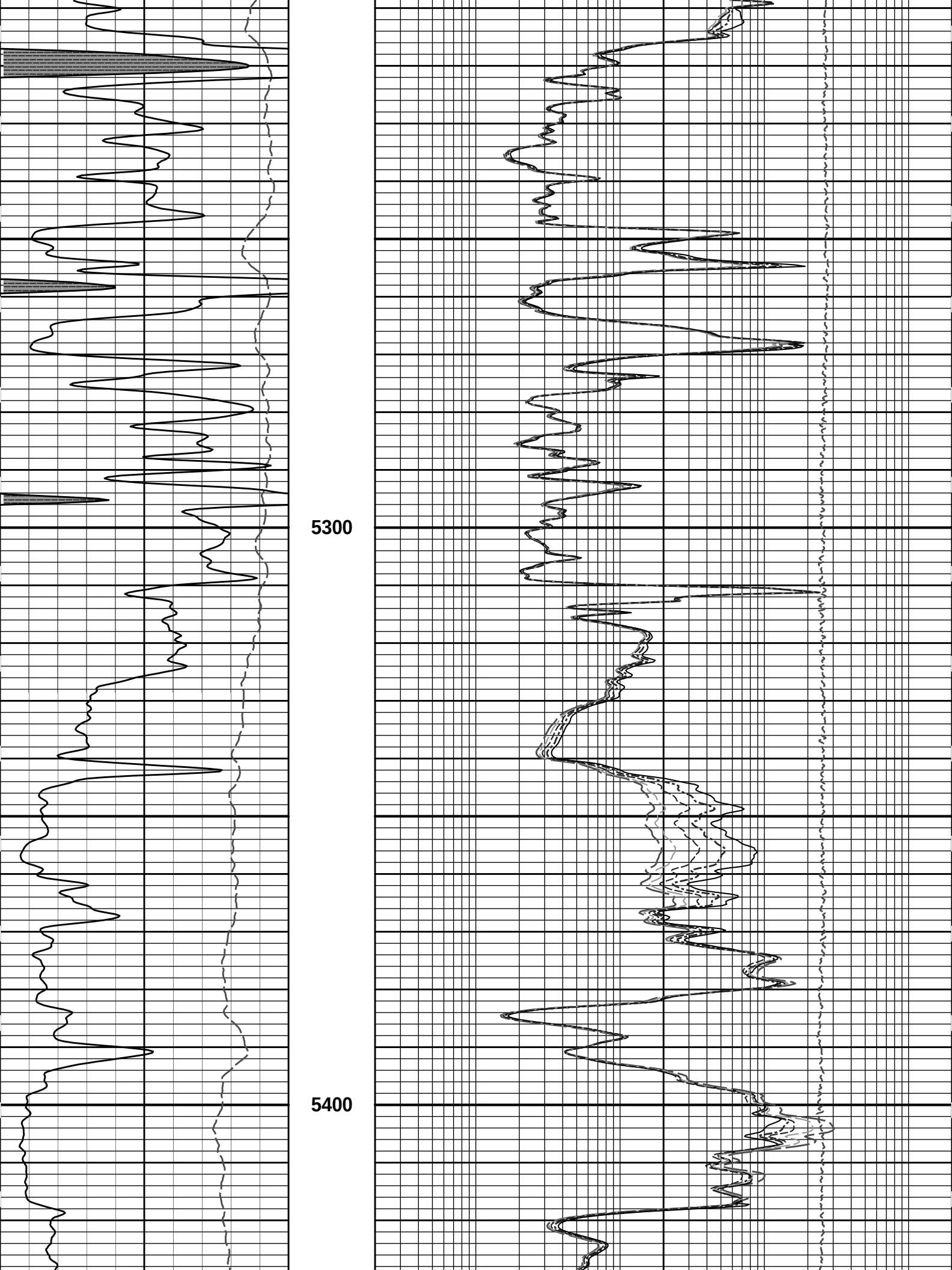
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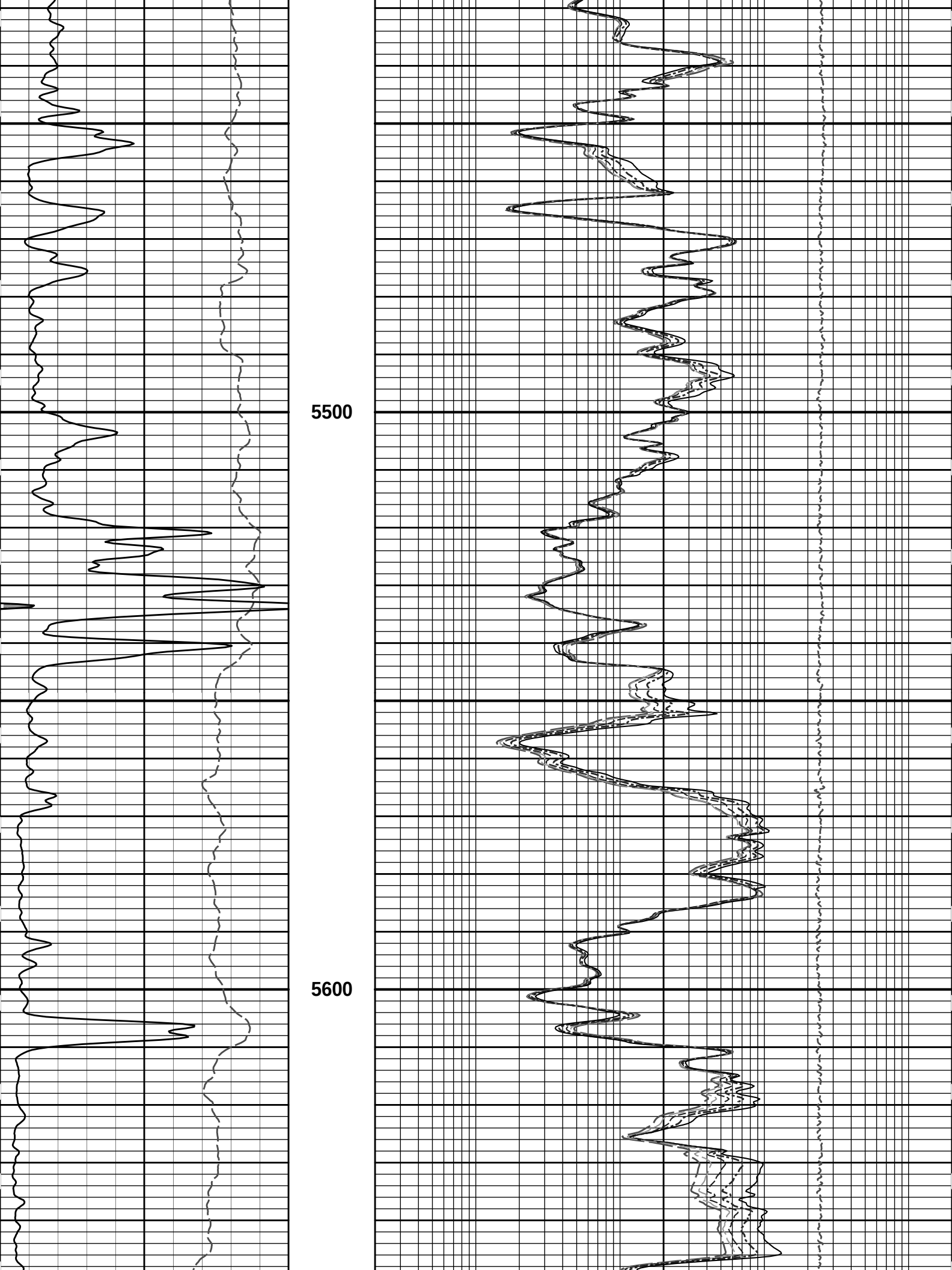
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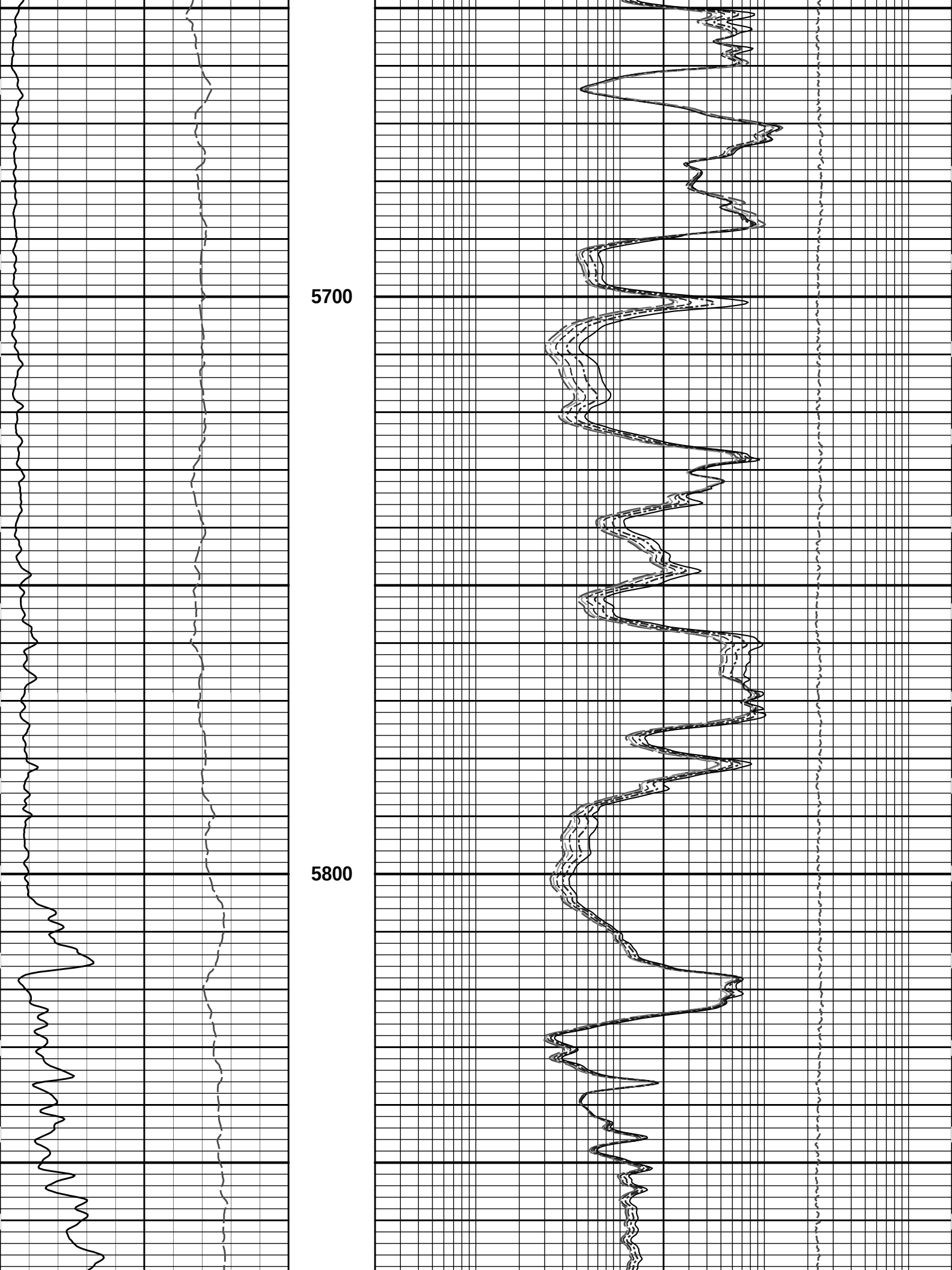
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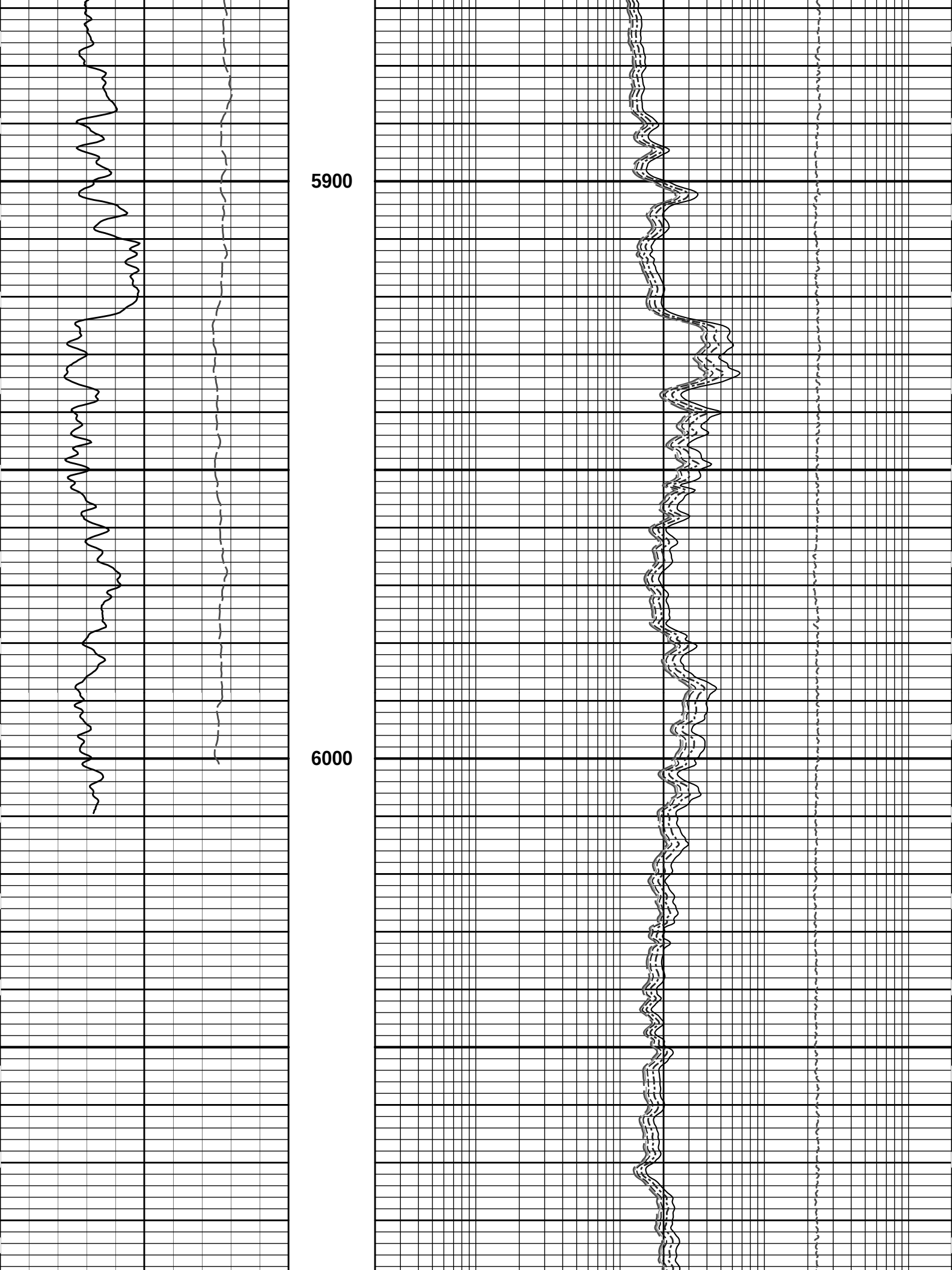
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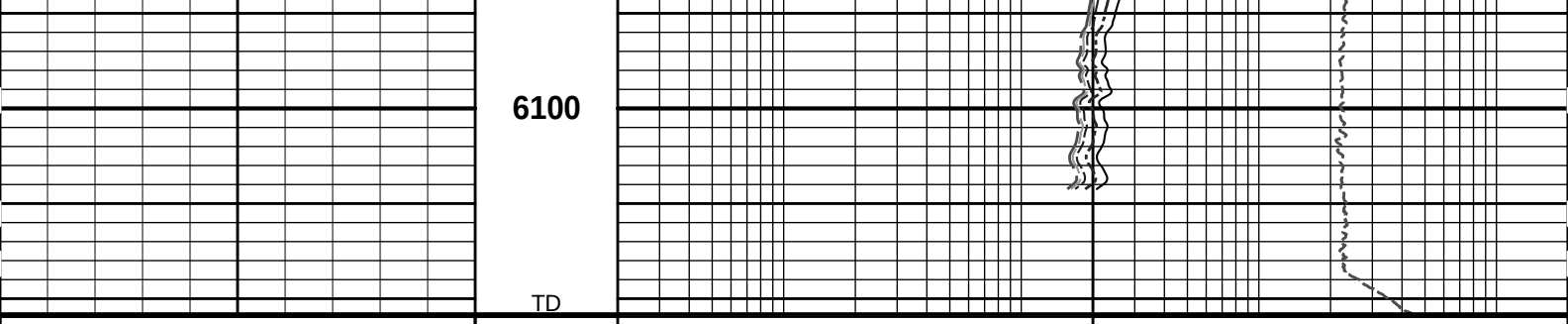


SP
-]20[+
0 Gamma API 150
api
SHALE

MD
1 : 240
ft

10K Tension 0
pounds

0.2 10in Resistivity 2ft Res 2000
ohmm
0.2 20in Resistivity 2ft Res 2000
ohmm
0.2 30in Resistivity 2ft Res 2000
ohm-metre
0.2 60in Resistivity 2ft Res 2000
ohmm
0.2 90in Resistivity 2ft Res 2000
ohmm

HALLIBURTON

Plot Time: 11-May-13 12:57:13
Plot Range: 820 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\CASING\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_main_lib

5 INCH MAIN LOG

HALLIBURTON

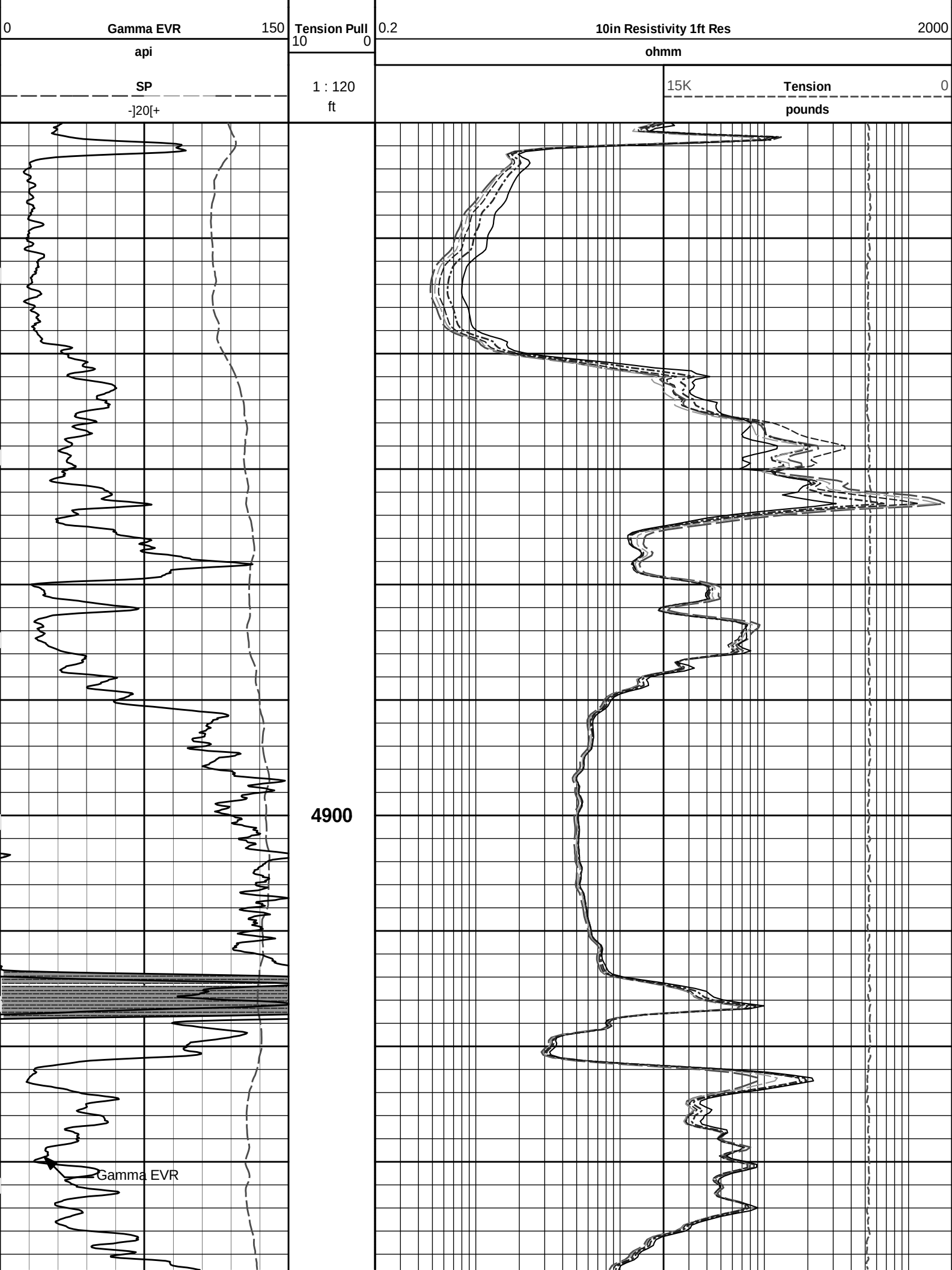
Plot Time: 11-May-13 12:57:14
Plot Range: 4840 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\EVR\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_EVR_LIB

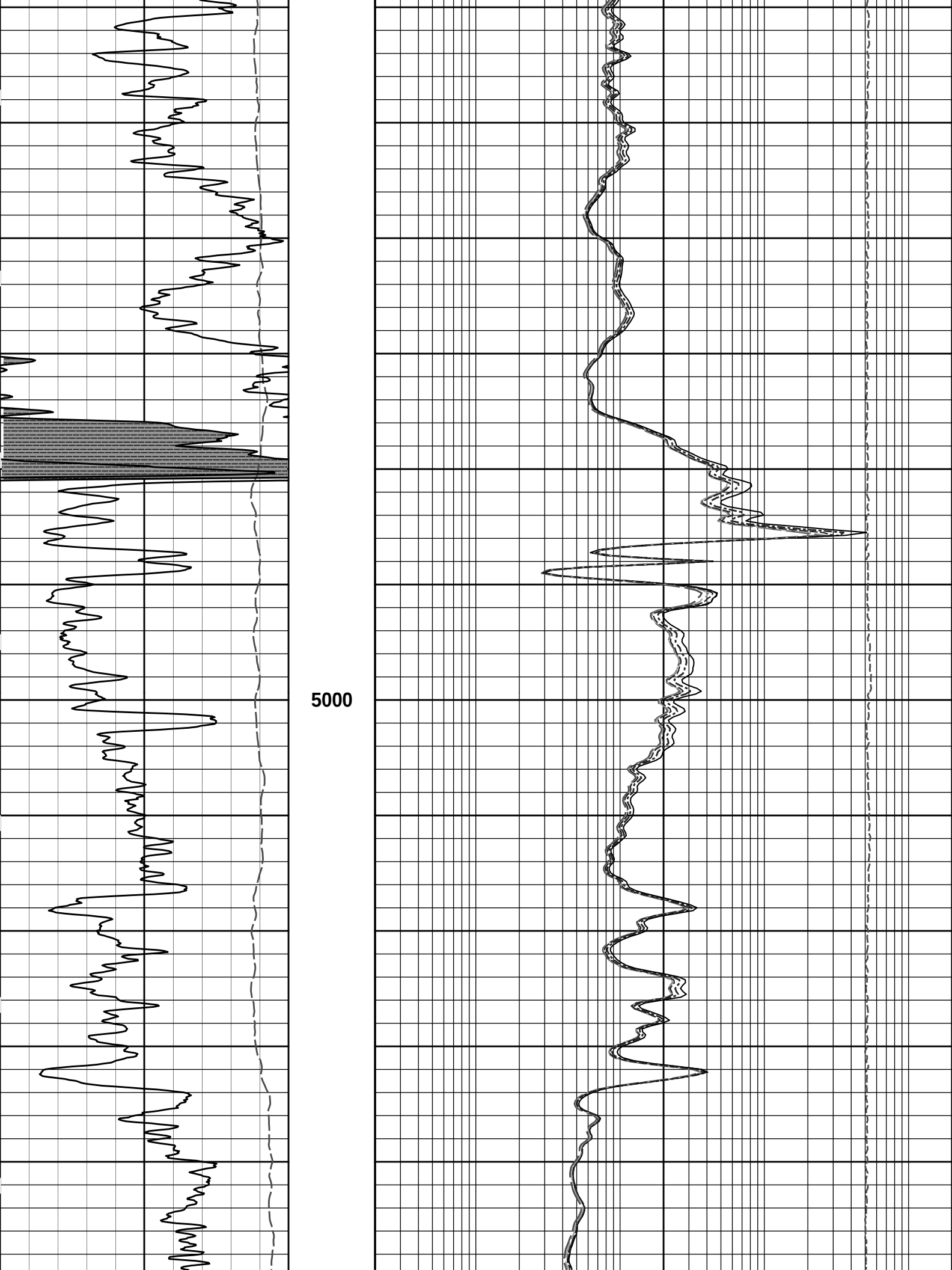
MAIN SECTION 10" PER 100'

MAIN SECTION 10" PER 100'
EVR TD - 4850'

0.2 90in Resistivity 1ft Res 2000
ohmm
0.2 60in Resistivity 1ft Res 2000
ohmm
0.2 30in Resistivity 1ft Res 2000
ohm-metre
0.2 20in Resistivity 1ft Res 2000
ohmm

SHALE
Tension Pull


0
Gamma EVR
150
api
SP
-]20[+
Tension Pull
10
0
1 : 120
ft
4900
0.2
10in Resistivity 1ft Res
2000
ohmm
15K
Tension
0
pounds
Gamma EVR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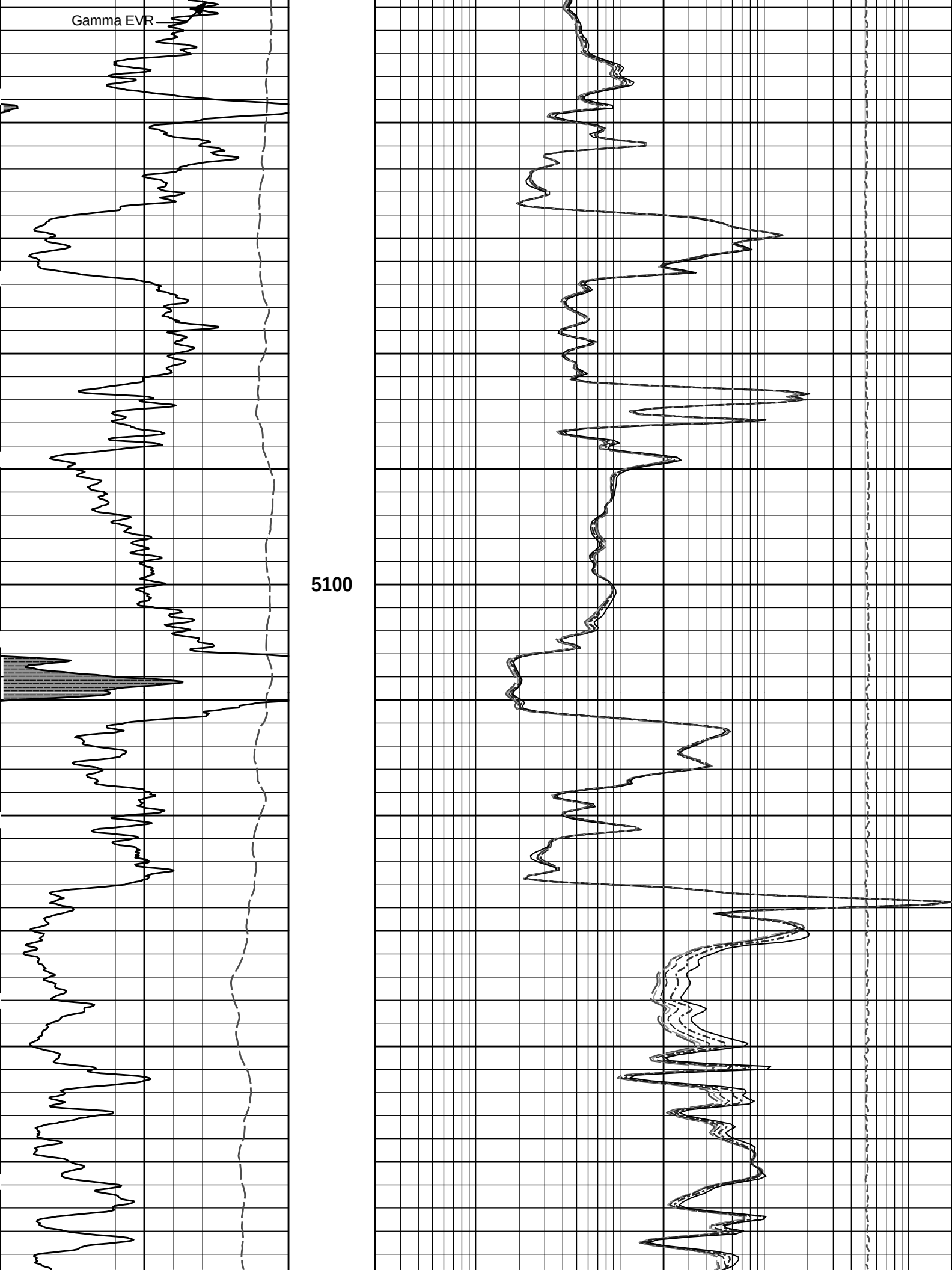
Gamma EVR
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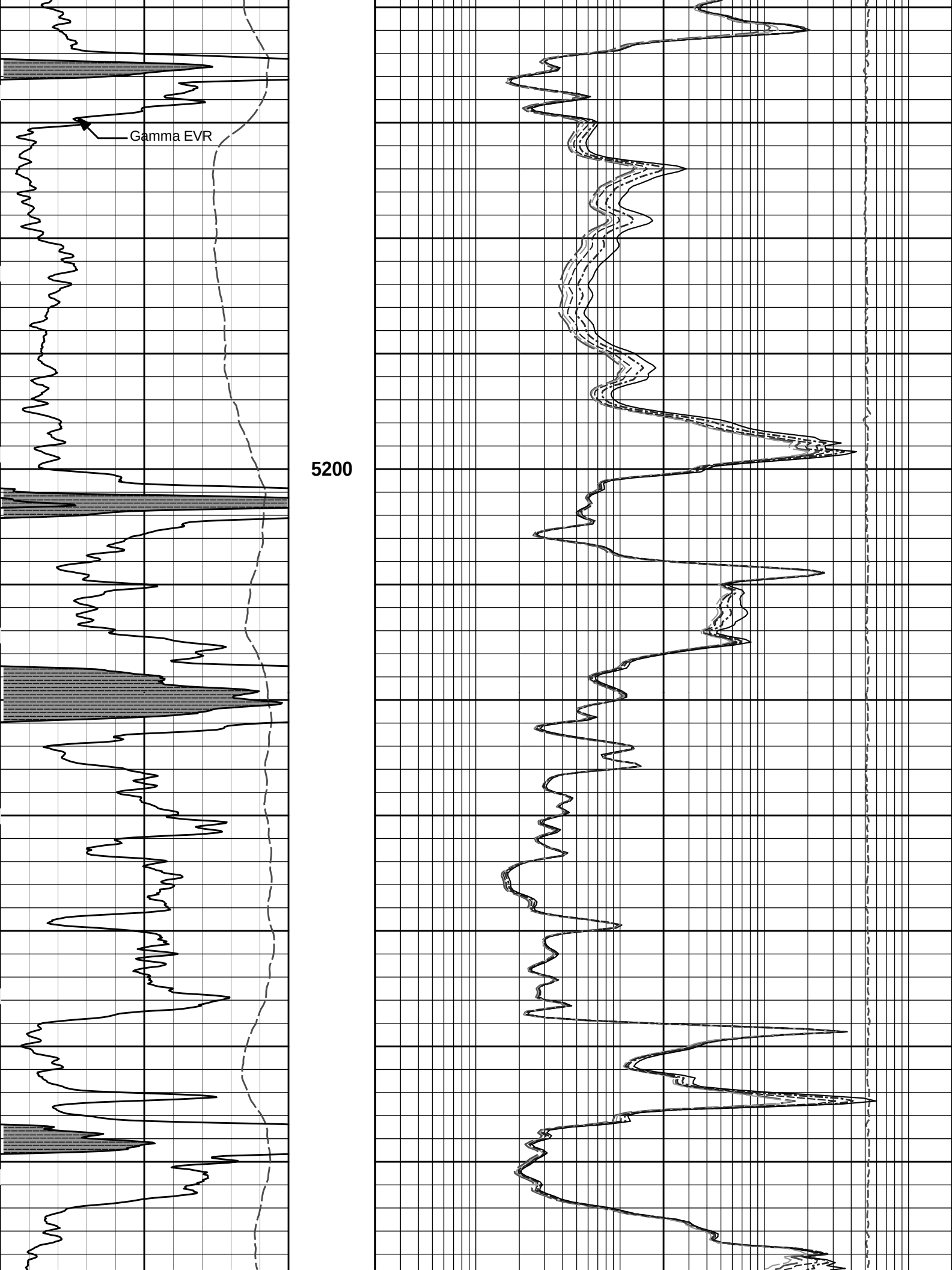
Gamma EVR
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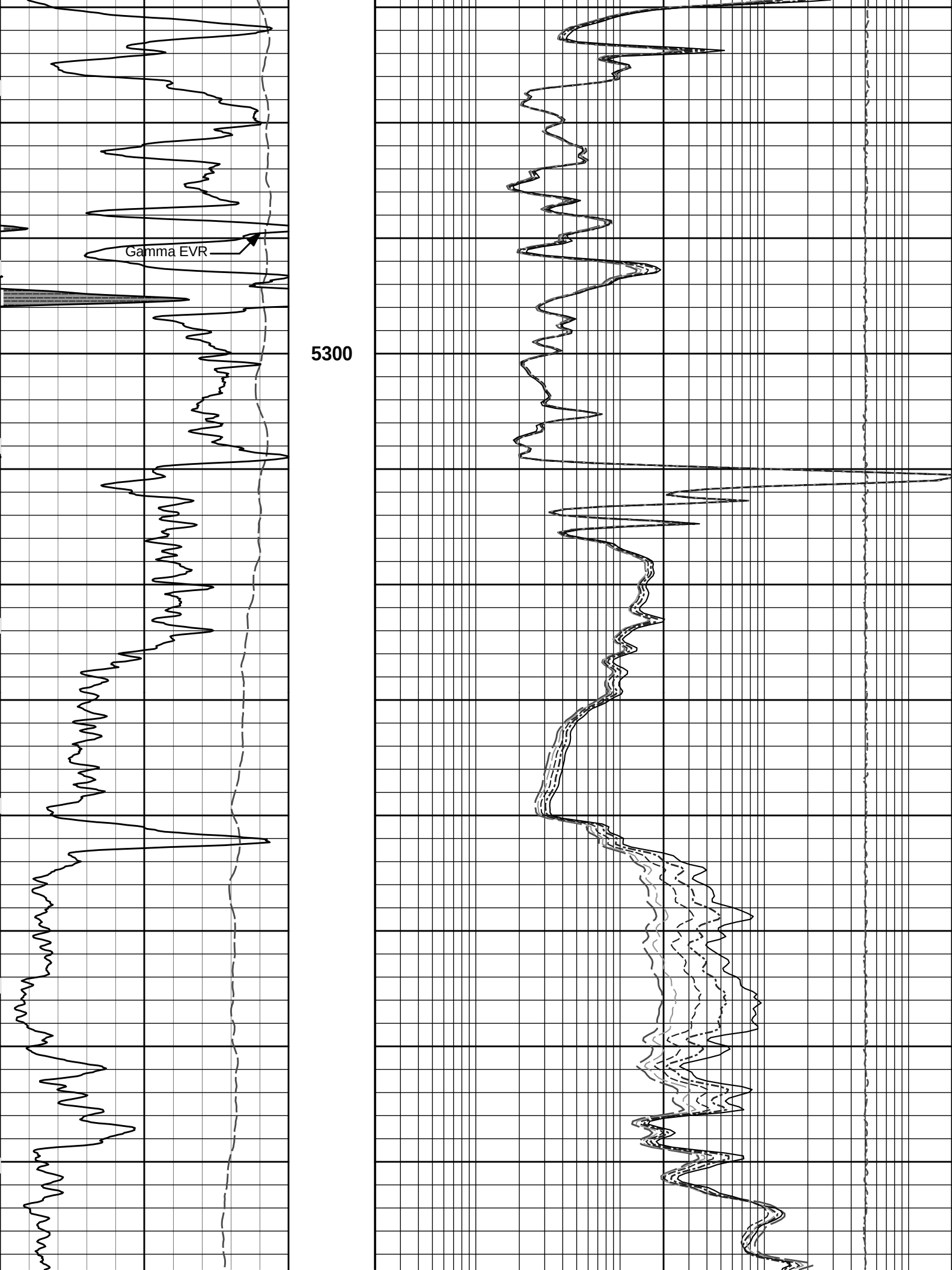
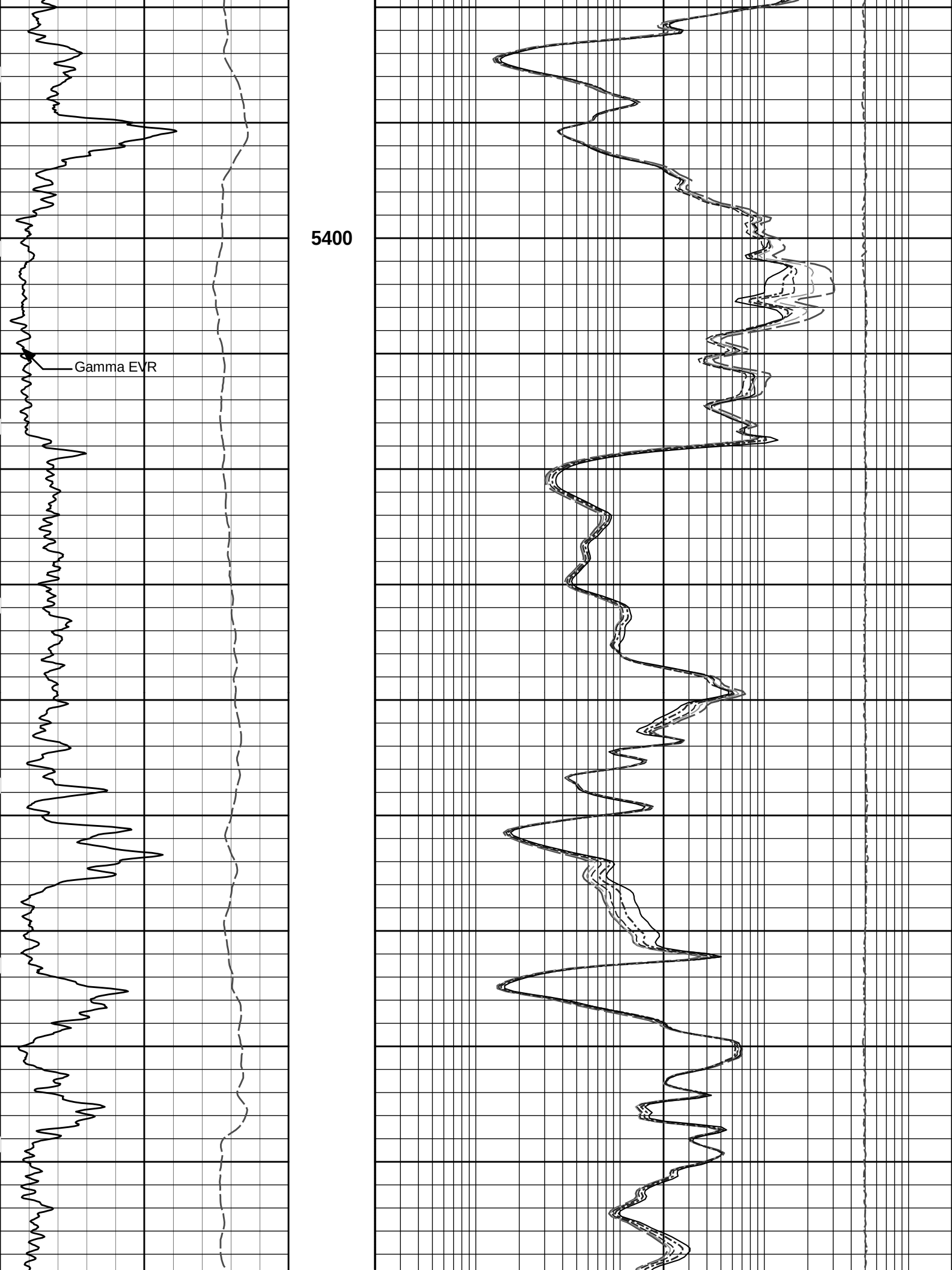
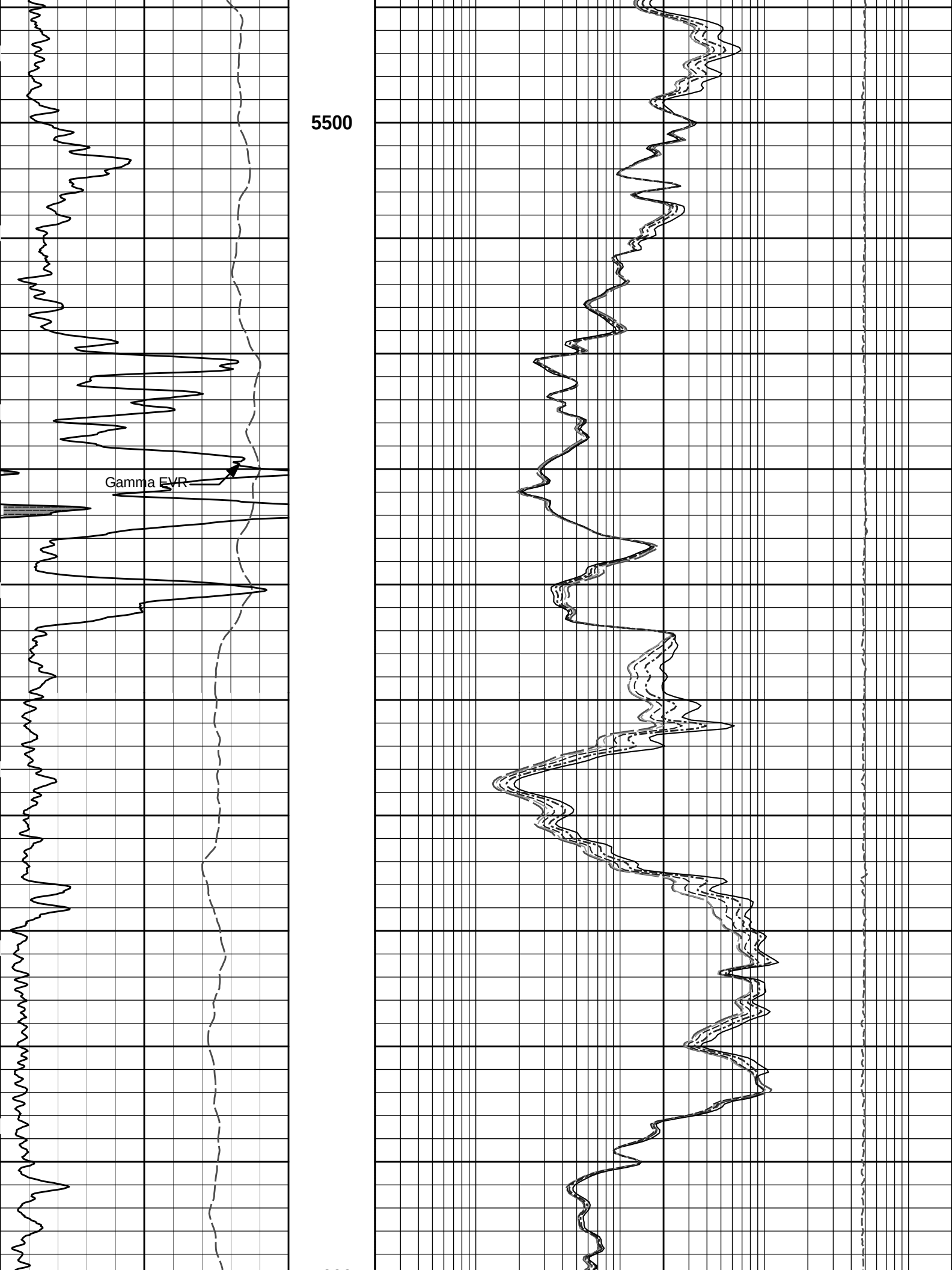
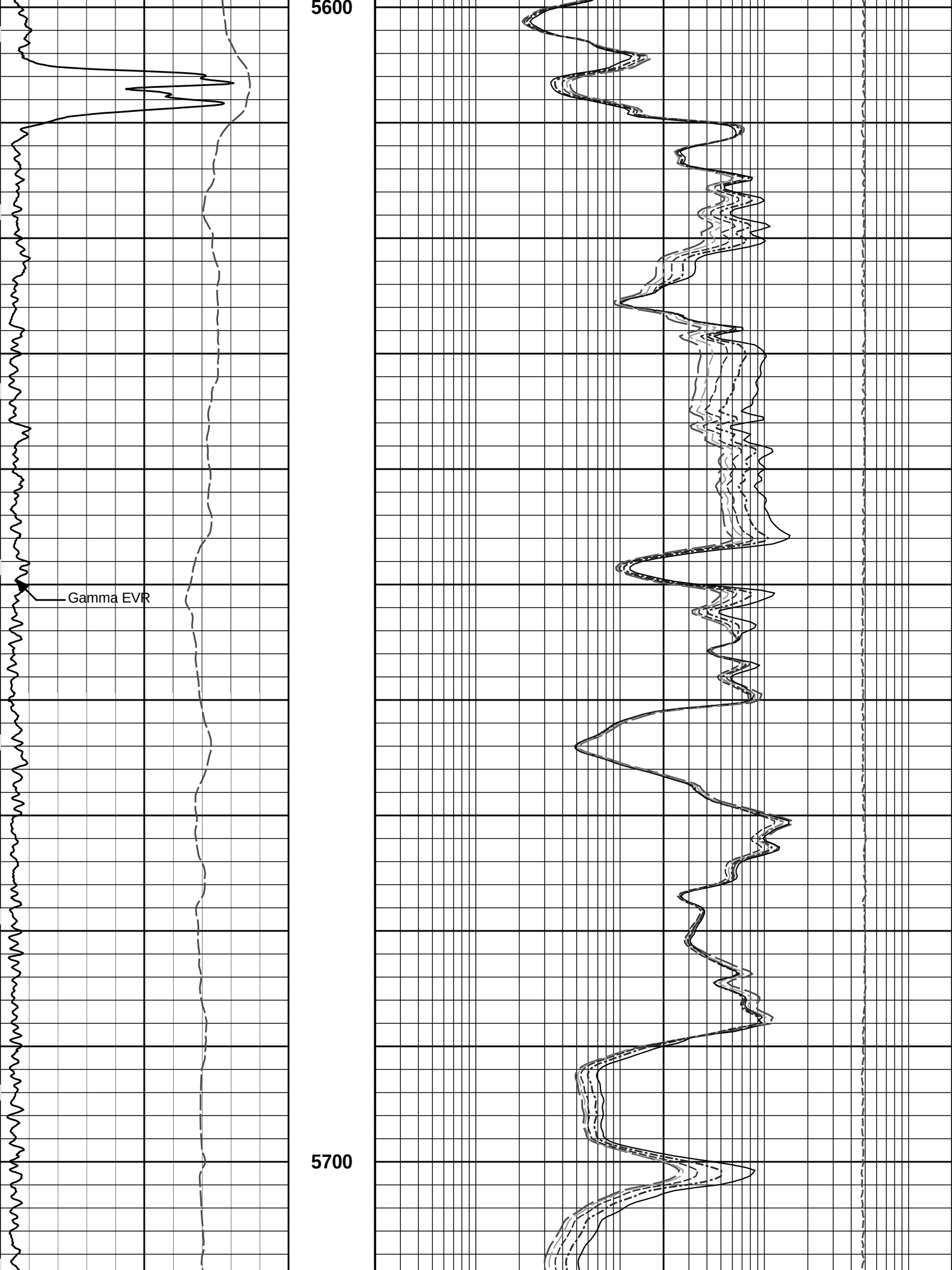
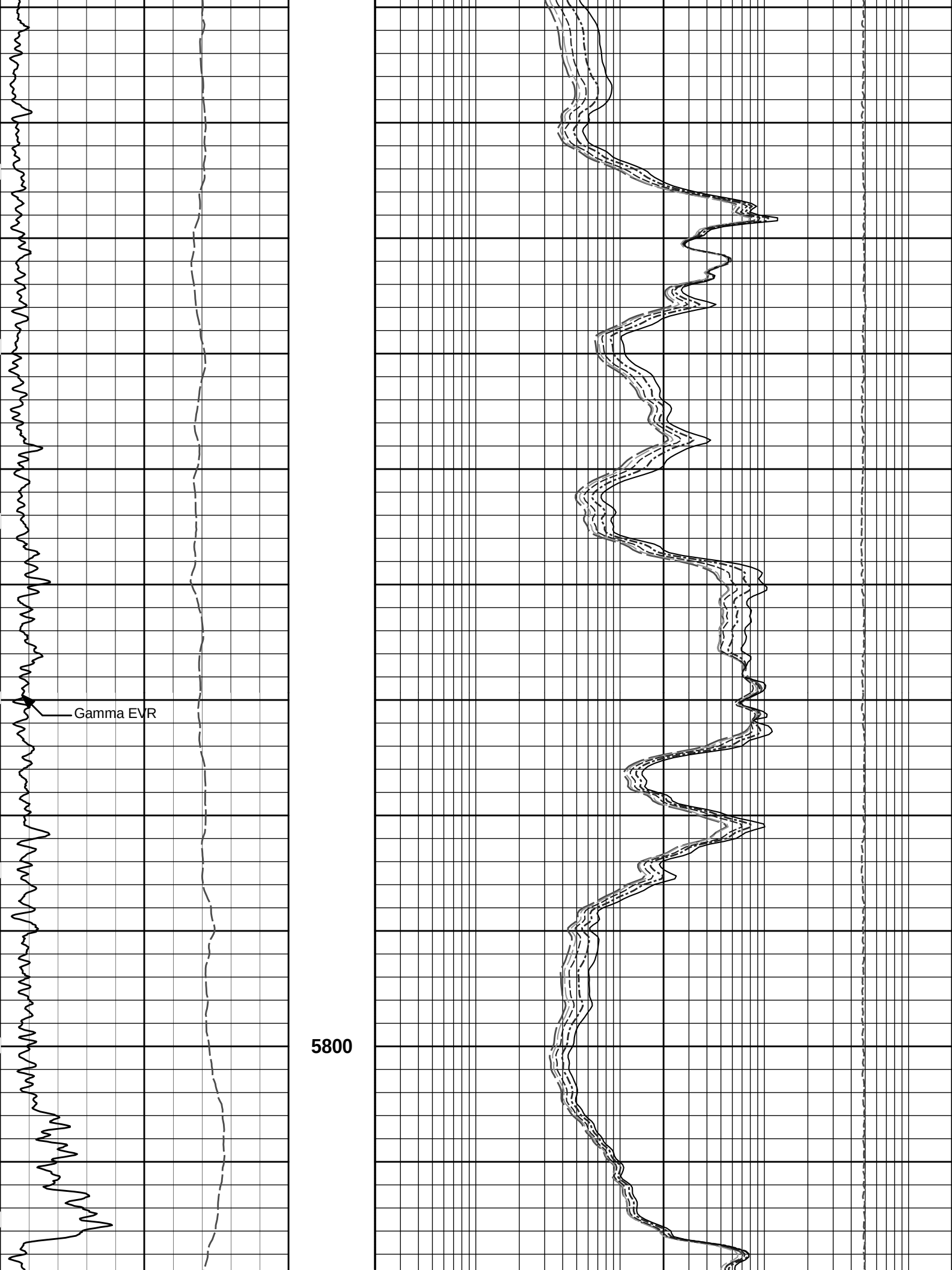
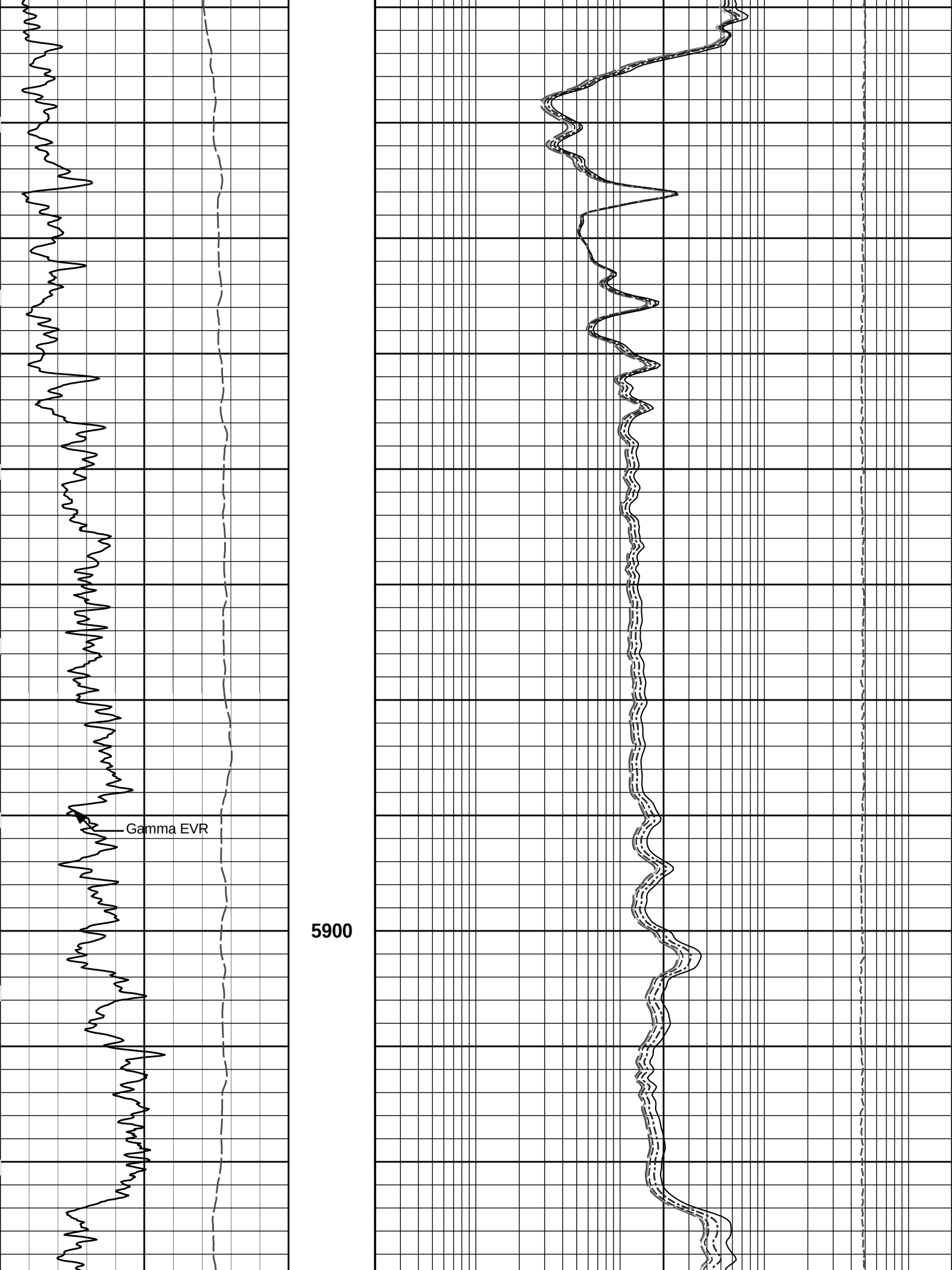

Gamma EVR
5300

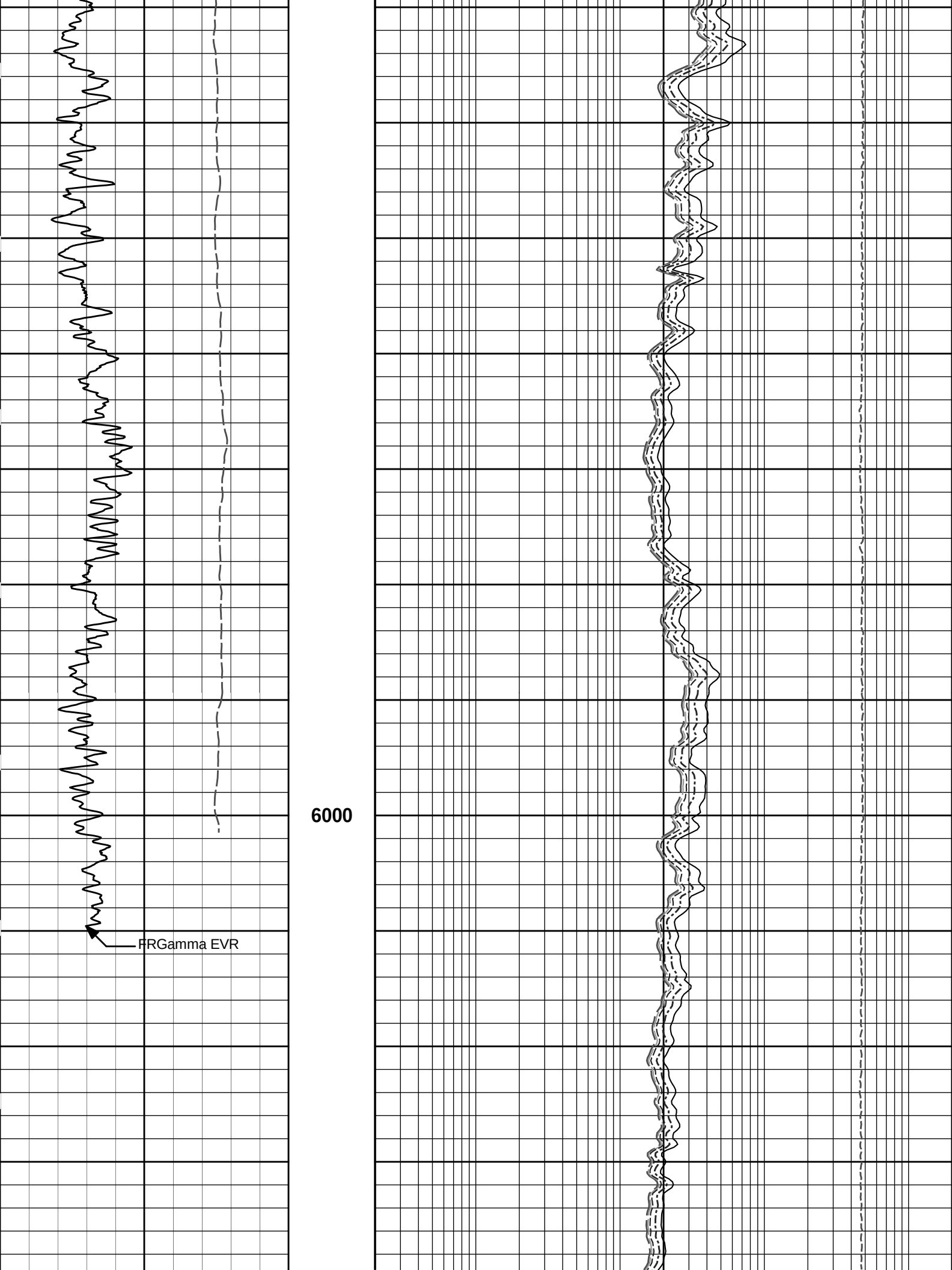

5400
Gamma EVR

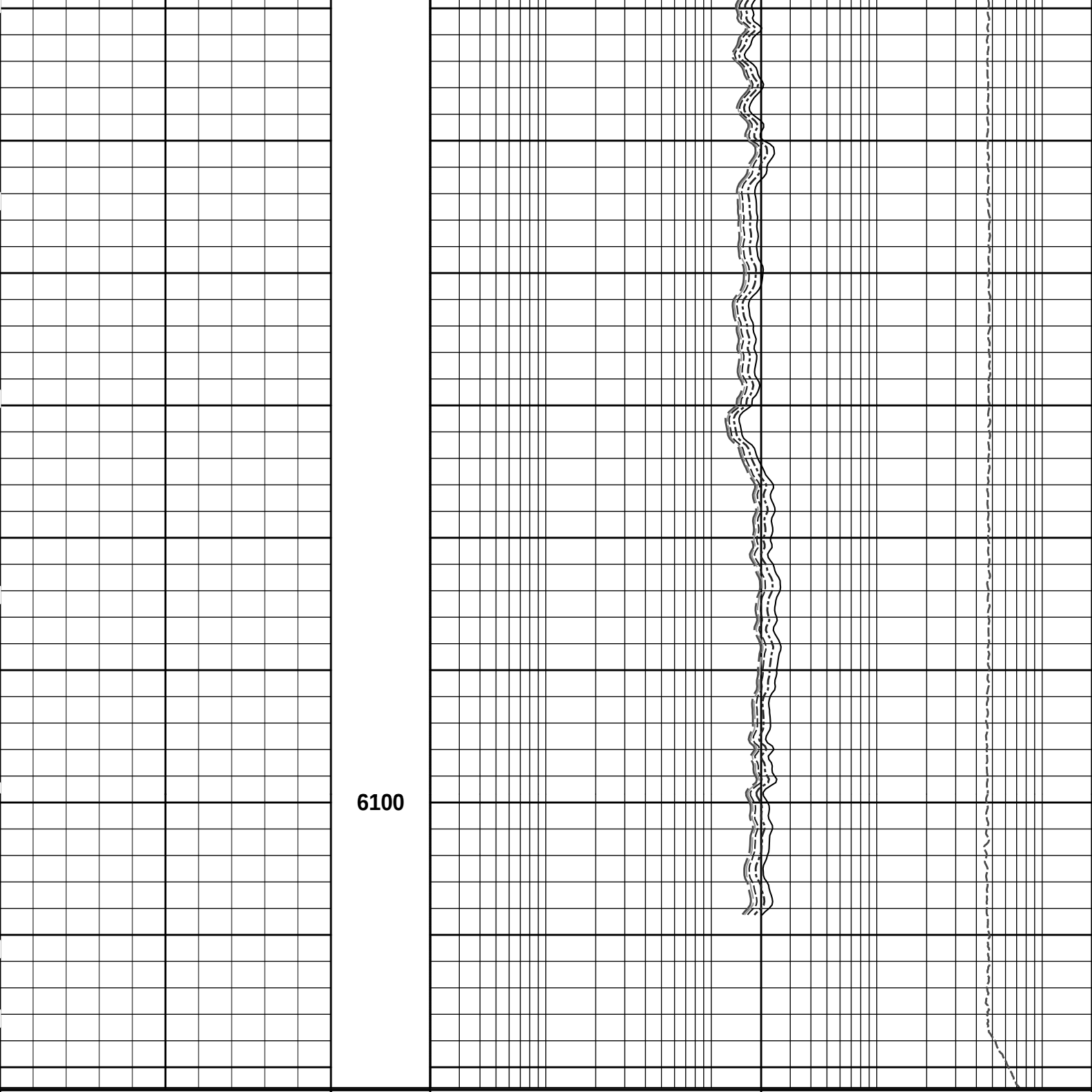

5500
Gamma EVR


5600
Gamma EVR
5700


Gamma EVR
5800


Gamma EVR
5900


6000
FRGamma EVR



SP
-]20[+
0 Gamma EVR 150
api
SHALE

1 : 120
ft
Tension Pull
10 0
Tension Pull

15K Tension 0
pounds

0.2 10in Resistivity 1ft Res 2000
ohmm
0.2 20in Resistivity 1ft Res 2000
ohmm
0.2 30in Resistivity 1ft Res 2000
ohm-metre
0.2 60in Resistivity 1ft Res 2000
ohmm
0.2 90in Resistivity 1ft Res 2000

ohmm

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Plot Time: 11-May-13 12:57:24
Plot Range: 4840 ft to 6121.58 ft
Data: EASTON3419_1-21\Well Based\EVR\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_EVR_LIB

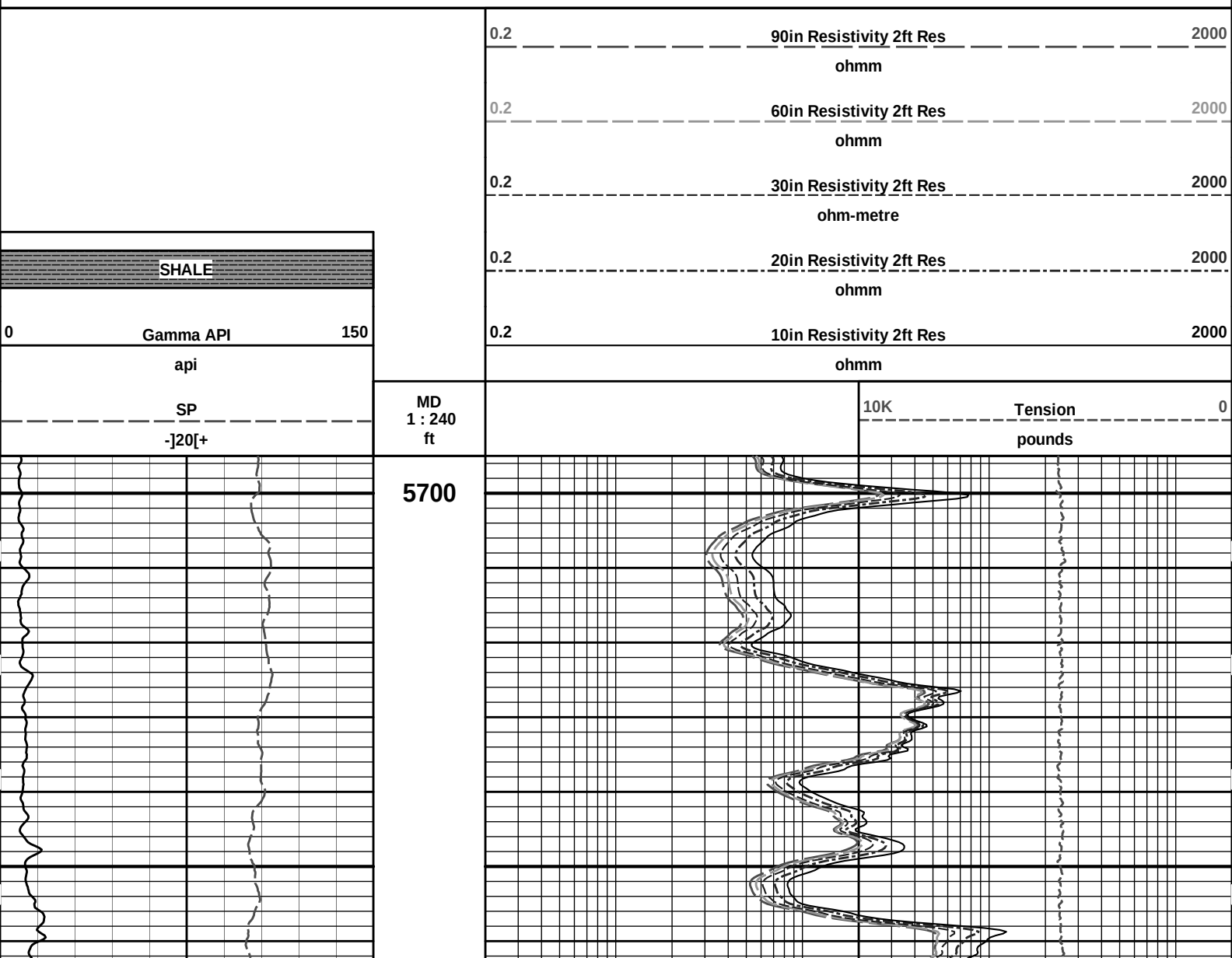
MAIN SECTION 10" PER 100'

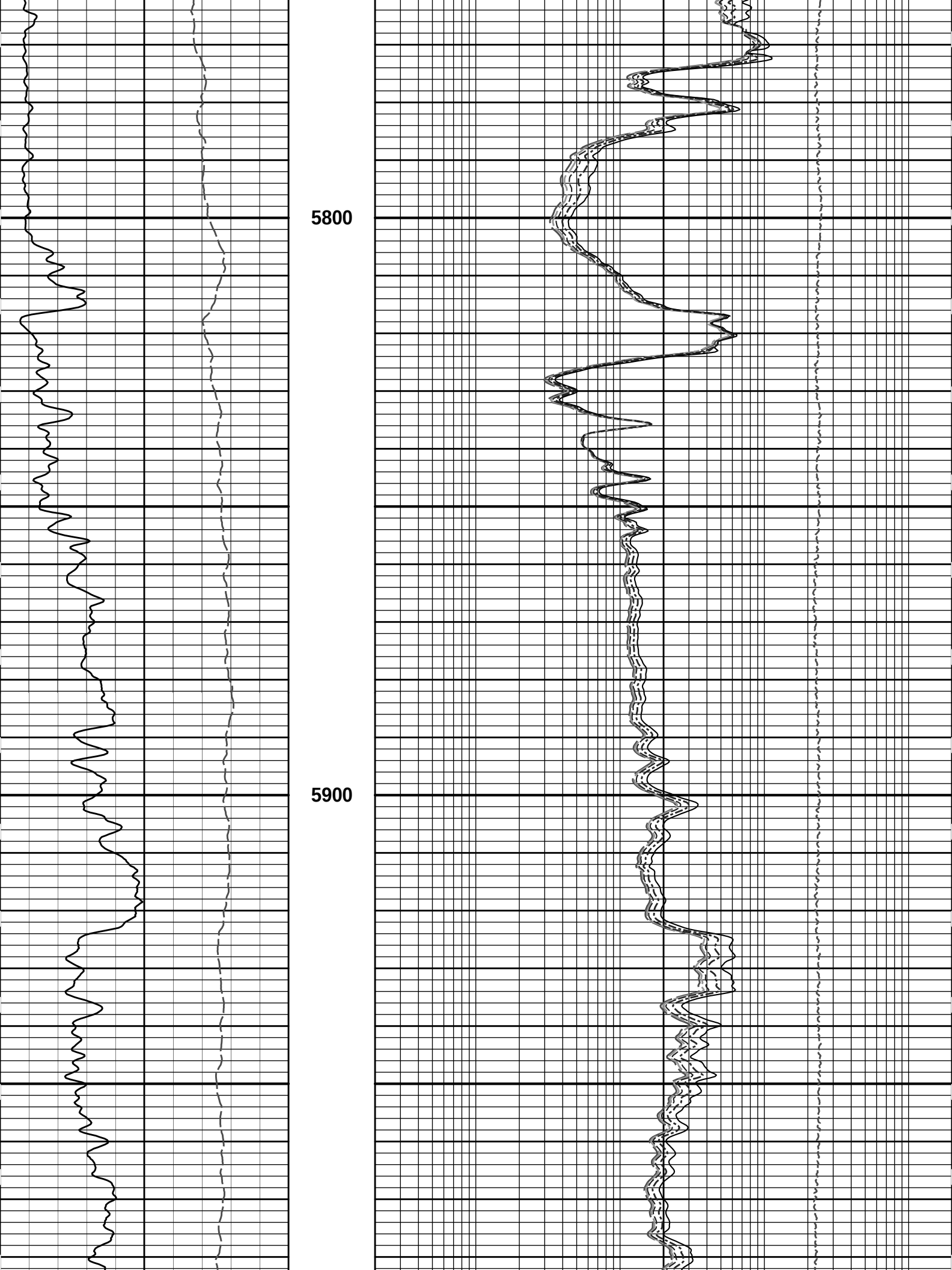
MAIN SECTION 10" PER 100'
EVR TD - 4850'

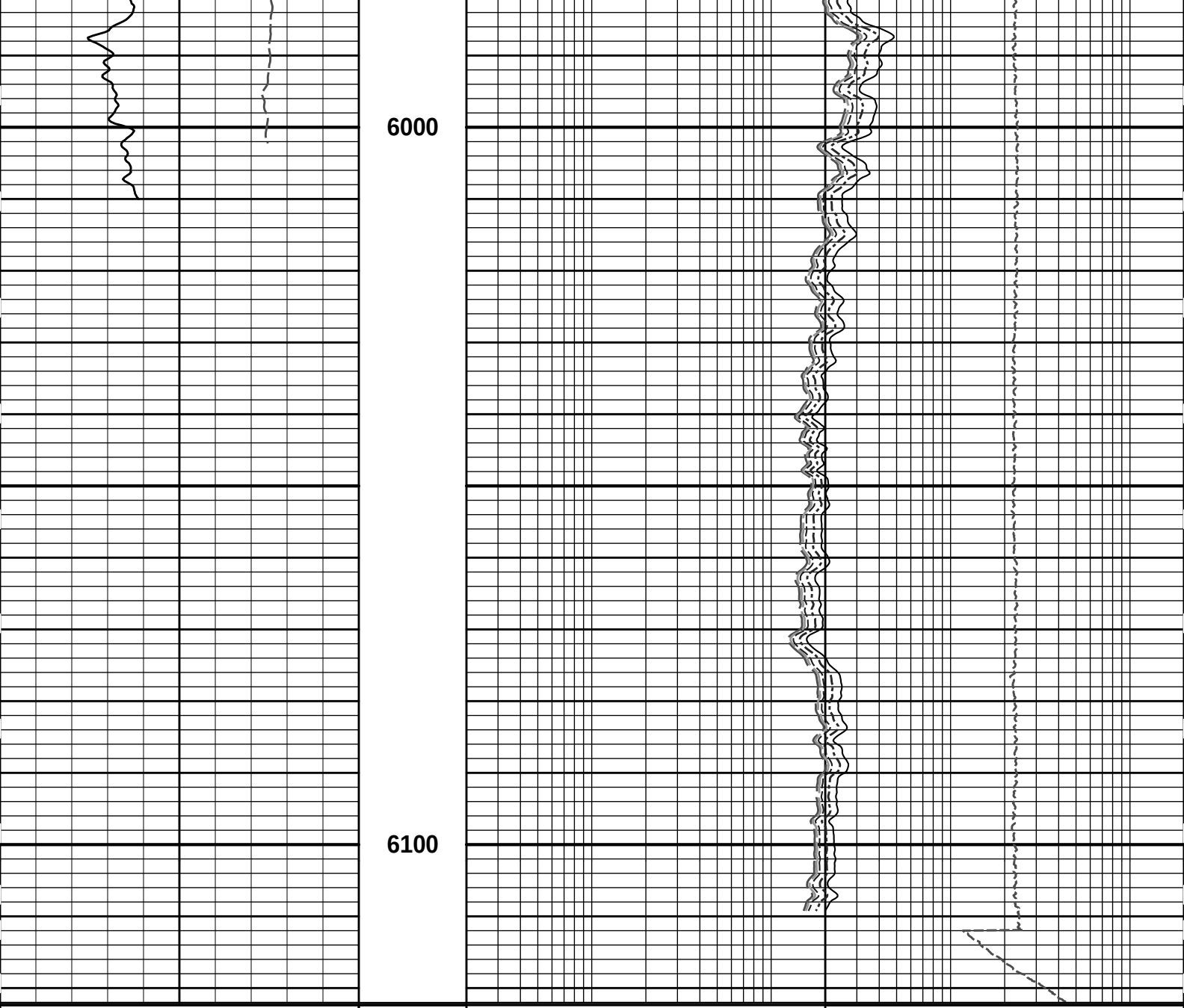
HALLIBURTON

Plot Time: 11-May-13 12:57:24
Plot Range: 5695 ft to 6122.08 ft
Data: EASTON3419_1-21\Well Based\REPEAT\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_repeat_lib

REPEAT SECTION




5800
5900



SP	MD 1 : 240 ft	10K Tension 0
-]20[+		pounds
0 Gamma API 150		0.2 10in Resistivity 2ft Res 2000
api		ohmm
SHALE		0.2 20in Resistivity 2ft Res 2000
		ohmm
		0.2 30in Resistivity 2ft Res 2000
		ohm-metre
		0.2 60in Resistivity 2ft Res 2000
		ohmm
		0.2 90in Resistivity 2ft Res 2000
		ohmm

HALLIBURTON

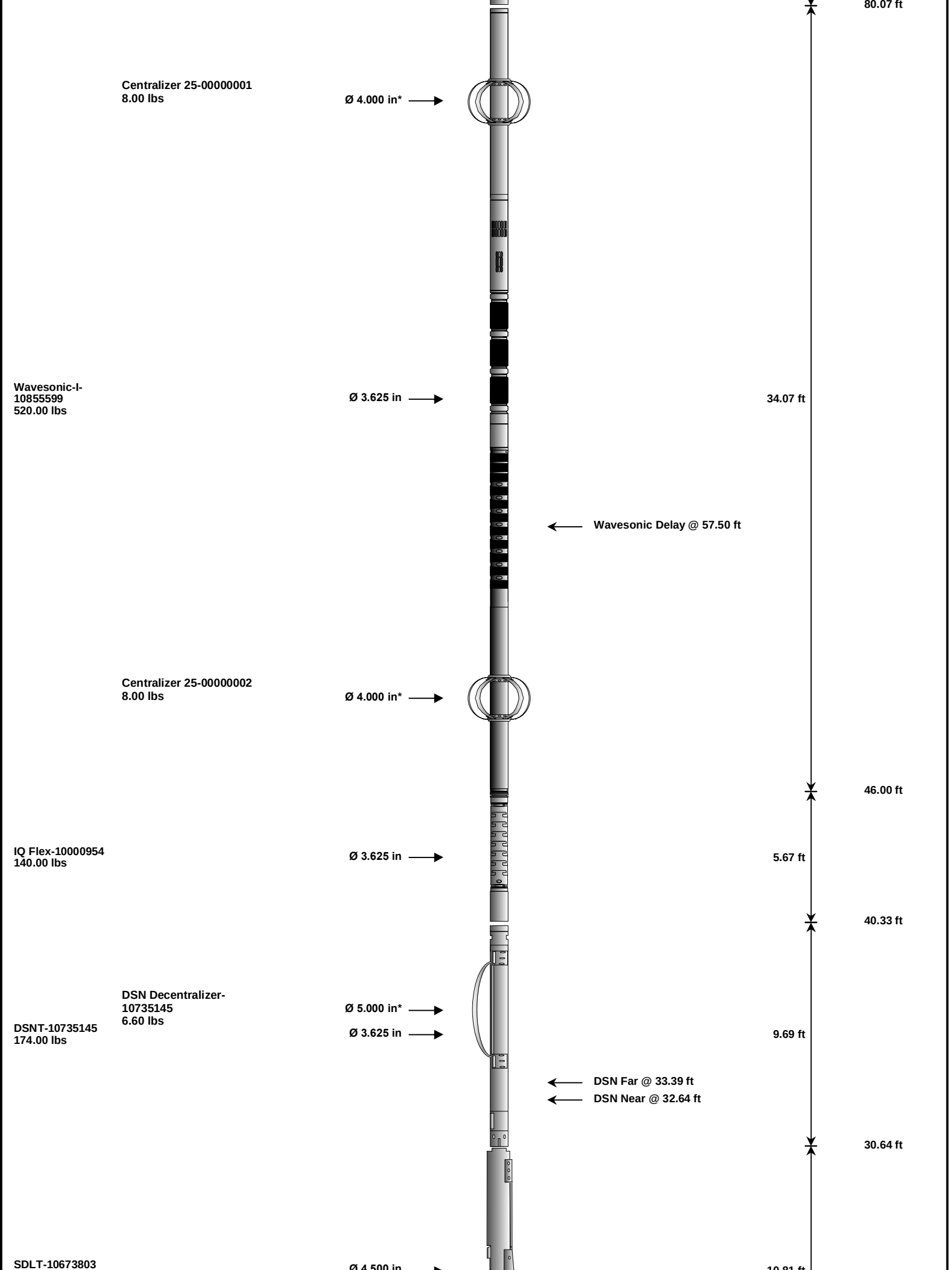
Plot Time: 11-May-13 12:57:29
Plot Range: 5695 ft to 6122.08 ft
Data: EASTON3419_1-21\Well Based\REPEAT\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_5_repeat_lib

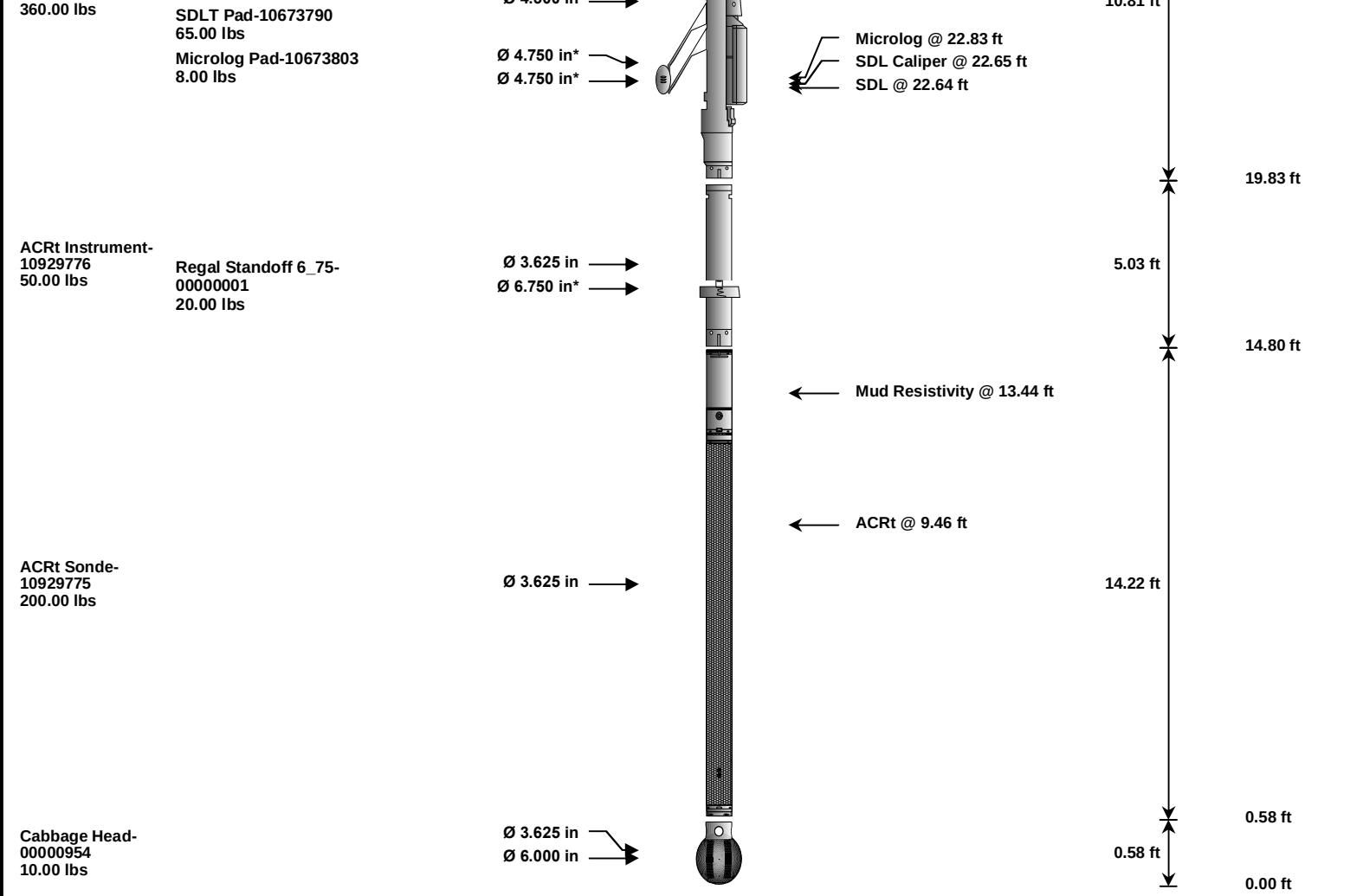
REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						124.89 ft
CH_HOS-954 37.50 lbs		Ø 2.750 in		Temperature @ 123.86 ft	3.03 ft	
		Ø 2.750 in Ø 3.625 in				121.86 ft
XOHD-00000001 20.00 lbs					0.95 ft	
						120.91 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in		SP @ 119.13 ft	3.74 ft	
						117.17 ft
GTET-10811258 165.00 lbs		Ø 3.625 in			8.52 ft	
				GammaRay @ 111.11 ft		
						108.65 ft
CSNG-10965402 114.00 lbs		Ø 3.625 in			8.17 ft	
				CSNG @ 103.02 ft		
						100.48 ft
IDT-1094 150.00 lbs		Ø 3.625 in			7.58 ft	
						92.90 ft
ICT-11204020 330.00 lbs		Ø 3.625 in			12.83 ft	
				ICT Caliper @ 82.86 ft		
						80.07 ft


80.07 ft
Centralizer 25-00000001
8.00 lbs
Ø 4.000 in*
Wavesonic-I-
10855599
520.00 lbs
Ø 3.625 in
34.07 ft
Wavesonic Delay @ 57.50 ft
Centralizer 25-00000002
8.00 lbs
Ø 4.000 in*
46.00 ft
IQ Flex-10000954
140.00 lbs
Ø 3.625 in
5.67 ft
40.33 ft
DSN Decentralizer-
10735145
6.60 lbs
Ø 5.000 in*
DSNT-10735145
174.00 lbs
Ø 3.625 in
9.69 ft
DSN Far @ 33.39 ft
DSN Near @ 32.64 ft
30.64 ft
SDLT-10673803
Ø 4.500 in
10.81 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	954	37.50	3.03		121.86	300.00
XOHD	Hostile to Dits Cross Over	00000001	20.00	0.95		120.91	300.00
SP	SP Sub	12345678	60.00	3.74		117.17	300.00
GTET	Gamma Telemetry Tool	10811258	165.00	8.52		108.65	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17		100.48	15.00
IDT	Insite Directional Tool	1094	150.00	7.58		92.90	30.00
ICT	Six Independent Arm Caliper	11204020	330.00	12.83		80.07	30.00
WSTT	WaveSonic Insite	10855599	520.00	34.07		46.00	30.00
OBCEN	Centralizer - 25 in. Overbody	00000001	8.00	2.08	*	74.91	300.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	*	49.02	300.00
IQF	IQ Flex tool	10000954	140.00	5.67		40.33	300.00
DSNT	Dual Spaced Neutron	10735145	174.00	9.69		30.64	60.00
DCNT	DSN Decentralizer	10735145	6.60	5.13	*	33.97	300.00
SDLT	Spectral Density Tool	10673803	360.00	10.81		19.83	60.00
SDLP	Density Insite Pad	10673790	65.00	2.55	*	22.04	60.00
MICP	Microlog Pad	10673803	8.00	1.00	*	22.33	60.00
ACRt	Array Compensated True Resistivity Instrument Section	10929776	50.00	5.03		14.80	300.00
RSOF	Regal Standoff 6.75in	00000001	20.00	0.52	*	16.33	300.00
ACRt	Array Compensated True Resistivity Sonde Section	10929775	200.00	14.22		0.58	300.00
CBHD	Cabbage Head	00000954	10.00	0.58		0.00	300.00
Total			**2,446.10**	**124.89**			

* Not included in Total Length and Length Accumulation.

Data: EASTON3419_1-21\0001 SP-GTET-CSNG-IDT-ICT-WAVE-FLEX-DSN-SDL-ACRT-CH\IDLE **Date: 10-May-13 03:16:12**

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PARAMETERS REPORT

PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	GTET	GEOK	Process Gamma Ray EVR?	No	
	DSNT	DEOK	Process DSN EVR?	No	
	SDLT Pad	DNOK	Process Density EVR?	No	
4840.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	8.800	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	1.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	6040.00	ft
	SHARED	BHT	Bottom Hole Temperature	135.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	IDT	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	ICT	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GRSO	Gamma Tool Standoff	0.000	in
	GTET	GEOK	Process Gamma Ray EVR?	Yes	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	CSNG	CGOK	Process CSNG Data?	Yes	
	CSNG	CENT	Is Tool Centralized?	No	
	CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
	CSNG	BARF	Barite Correction Factor	1.00	
	CSNG	ORDG	Use Fixed Gain	No	
	CSNG	ORDO	Use Fixed Offset	No	
	CSNG	ORDR	Use Fixed Resolution Degradation Factor	No	
	IDT	WRTI	Survey Writing Interval	30	ft
	IDT	SOPT	Smoothing Option	None	
	ICT	CLOK	Process Caliper Outputs?	Yes	
	ICT	DARM	Disable Caliper Arm	No	
	ICT	ATDS	Arm To Disable	0	

ICT	REPM	Method to replace arm?	Caliper Average	
ICT	ARMV	Diameter to use for disabled arm	0.00	in
ICT	DARM	Disable Second Caliper Arm	No	
ICT	ATDS	Second Arm To Disable	0	
ICT	REPM	Method to replace second arm?	Caliper Average	
ICT	ARMV	Diameter to use for second disabled arm	0.00	in
ICT	NAVS	Navigation Source Tool	IDT	
ICT	CL1O	Radius 1 Offset	0.0	in
ICT	CL2O	Radius 2 Offset	0.0	in
ICT	CL3O	Radius 3 Offset	0.0	in
ICT	CL4O	Radius 4 Offset	0.0	in
ICT	CL5O	Radius 5 Offset	0.0	in
ICT	CL6O	Radius 6 Offset	0.0	in
ICT	BHVC	Radius type for borehole volume calcuations	Elliptical	
Wavesonic-I	WSOK	Process WSTT?	Yes	
Wavesonic-I	AFIL	Adaptive Filtering?	No	
Wavesonic-I	PINT	Process 1 Sample and Skip	0	
Wavesonic-I	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
Wavesonic-I	DTSH	Delta -T Shale	100.00	uspf
Wavesonic-I	DTMT	Delta -T Matrix Type	User define	
Wavesonic-I	DTMA	Delta -T Matrix	47.60	uspf
Wavesonic-I	DTFL	Delta -T Fluid	189.00	uspf
Wavesonic-I	RHOM	Matrix Density	2.7100	g/cc
Wavesonic-I	RHOF	Fluid Density	1.0000	g/cc
Wavesonic-I	SMTH	Semblance Threshold	0.25	
Wavesonic-I	VPVS	VPVS Ratio for Porosity	1.40	
Wavesonic-I	APEQ	Acoustic Porosity Equation	Wylie	
Wavesonic-I	NAVS	Navigation Source Tool	IDT	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	Yes	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	Yes	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm

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CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 10811258**	**Reference Calibration Date:**	**15-Apr-13 13:29:21**
Engineer:	**S. INGERSOLL**	**Calibration Date:**	**28-Apr-13 06:43:47**
Software Version:	**WL INSITE R3.8.4 (Build 5)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-185

Calibrator API Reference:228.00 api

Equivalent Calibrator API Reference:232.0 api

Measurement	Measured	Calibrated	Units
Background	21.8	21.9	api
Background + Calibrator	252.7	253.9	api
Calibrator	230.9	232.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 10811258**	**Reference Calibration Date:**	**28-Apr-13 06:43:47**
Engineer:	**S. INGERSOLL**	**Calibration Date:**	**09-May-13 13:07:32**
Software Version:	**WL INSITE R3.8.4 (Build 5)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-185

Calibrator API Reference:228.00 api

Equivalent Calibrator API Reference:232.0 api

Field Verification	Shop	Field	Units
Background	21.9	50.8	api
Background + Calibrator	253.9	281.4	api
Calibrator	232.0	230.6	api

Shop	Field	Difference	Tolerance
232.0	230.6	1.4	+/- 9.00

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	**ACRt Sonde - 10929775**	**Reference Calibration Date:**	**07-Mar-13 15:26:52**
Engineer:	**S. INGERSOLL**	**Calibration Date:**	**04-May-13 10:38:01**
Software Version:	**WL INSITE R3.8.4 (Build 5)**	**Calibration Version:**	**1**
Host Tool Name:	**ACRt Instrument - 10929776**		

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.03	1.05	0.95	1.03	1.05	0.95	1.02	1.05
A2 (50")	0.95	1.02	1.05	0.95	1.03	1.05	0.95	1.02	1.05
A3 (29")	0.95	1.00	1.05	0.95	1.01	1.05	0.95	1.00	1.05
A4 (17")	0.95	1.01	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.00	1.05	0.95	1.00	1.05
A6 (6")	N/A	N/A	N/A	0.95	1.01	1.05	0.95	1.01	1.05

TYPICAL SONDE OFFSET RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-2.11	2	-6	-4.70	-2	-8	-4.78	-2
A2 (50")	-7	-3.07	0	-7	-4.40	0	-7	-4.53	0
A3 (29")	-27	-15.03	-9	-9	-4.72	-3	-7	-2.87	-1
A4 (17")	-180	-103.09	-60	-45	-32.31	-15	-39	-25.18	-13
A5 (10")	N/A	N/A	N/A	-150	-118.23	-50	-80	-54.78	-10
A6 (6")	N/A	N/A	N/A	175	280.66	525	90	139.71	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.85	1.3
36K	1.0	1.18	2.0
72K	1.0	1.46	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	0.99	1.05

PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET RANGE CHK	PASS
Tx CURRENT GAIN	PASS
Rmud VERIFICATION	PASS

TOOL OK TO LOG

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-10811258						
Gamma Ray Calibrator	232.0	230.6	----------	1.4	+/- 9.00	api
ACRt Sonde-10929775						
Mud Cell	0.99	----------	----------	0.00	----------	ohm-m

Data: EASTON3419_1-21\0001 SP-GTET-CSNG-IDT-ICT-WAVE-FLEX-DSN-SDL-ACRT-CH\008 11-May-13 03:26 Up @6121.8f **Date: 11-May-13 07:00:59**

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INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
CH_HOS				
DHTN	DownholeTension	0.00	BLK	0.000
SP Sub				
PLTC	Plot Control Mask	119.13	NO	
SP	Spontaneous Potential	119.13	BLK	1.250
SPR	Raw Spontaneous Potential	119.13	NO	
SPO	Spontaneous Potential Offset	119.13	NO	
GTET				
TPUL	Tension Pull	111.11	NO	
GR	Natural Gamma Ray API	111.11	TRI	1.750

GRU	Unfiltered Natural Gamma Ray API	111.11	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	111.11	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	

	CSNG			
TPUL	Tension Pull	103.02	NO	
STAT	Status	103.02	NO	
FRMC	Tool Frame Count	103.02	BLK	0.250
TFRM	Total Frames	103.02	NO	
LSPD	Line Speed	103.02	BLK	0.250
CTIM	Accumulation time for sample	103.02	BLK	0.250
NOIS	Spectral Noise	103.02	BLK	0.250
STAB	Stabilizer Voltage in mv	103.02	BLK	0.250
STBP	Stabilizer 60 KEV Peak	103.02	BLK	0.250
AMER	Americium	103.02	BLK	0.250
FTMP	Flask PCB Temperature	103.02	BLK	0.250
SPEL	Low Energy Spectrum	103.02	BLK	0.250
SPEH	High Energy Spectrum	103.02	BLK	0.250
SSP	Stabilization Energy Spectrum	103.02	BLK	0.250
CSPC	CSNG Lo Hi Spectrum Data	103.02	NO	

	IDT			
TPUL	Tension Pull	93.90	NO	
ACCX	Accelerometer X	93.90	NO	
ACCY	Accelerometer Y	93.90	NO	
ACCZ	Accelerometer Z	93.90	NO	
MAGX	magnetometer x with unit	93.90	NO	
MAGY	Magnetometer Y with unit	93.90	NO	
MAGZ	magnetometer z with unit	93.90	NO	
IAMP	Accelerometer Temperature	93.90	NO	
MTMP	Magnetometer Temperature	93.90	NO	

	ICT			
TPUL	Tension Pull	82.86	NO	
	Arm Potentiometer excitation V	80.07	NO	
	Caliper 1 measurement	82.86	BLK	1.250
	Caliper 2 measurement	82.86	BLK	1.250
	Caliper 3 measurement	82.86	BLK	1.250
	Caliper 4 measurement	82.86	BLK	1.250
	Caliper 5 measurement	82.86	BLK	1.250
	Caliper 6 measurement	82.86	BLK	1.250
	Caliper Global measurement	82.86	BLK	1.250
MOTI	Motor Current	80.07	NO	
MOT1	Motor Voltage Monitor 1	80.07	NO	
STA1	Status word #1	80.07	NO	
STA2	Status word #2	80.07	NO	
PRES	Caliper percentage of total compression of the spring	80.07	NO	
HAZI	Hole Azimuth	82.86	NO	
RB	Relative Bearing	82.86	NO	
AZI1	PAD1 Azimuth	82.86	NO	
DEVI	Inclination	82.86	NO	

	Wavesonic-I			
TPUL	Tension Pull	57.50	NO	
DPSX	Dipole Source X Structurel	46.00	NO	

DPSY	Dipole Source Y Structurel	46.00	NO
DPSM	Monopole Source Structure	46.00	NO
WVST	Wavesonic Compressed Data	57.50	NO
TPUL	Tension Pull	57.50	NO
XMS1	Wave Sonic Status Word 1	46.00	NO
XMS2	Wave Sonic Status Word 2	46.00	NO
XMS1	Wave Sonic XMITStatus Word 1	46.00	NO
XMS1	Wave Sonic XMITStatus Word 2	46.00	NO
F1HA	Dipole 1 HV After	46.00	NO
F1HB	Dipole 1 HV Before	46.00	NO
F2HA	Dipole 2 HV After	46.00	NO
F2HB	Dipole 2 HV Before	46.00	NO
F3HA	Monopole HV After	46.00	NO
F3HB	Monopole HV Before	46.00	NO
INVT	Input Voltage	46.00	NO
5VOL	5 Volts	46.00	NO
MI5A	Minus 5 Volts Analog	46.00	NO
ITMP	Instrument Temperature	46.00	NO
PL5A	Plus 5 Volts Analog	46.00	NO
5VD	Plus 5 Volts Digital	46.00	NO
TCUR	Tool Current	46.00	NO
SUPV	Supply Voltage	46.00	NO
PRVT	Preregulated voltage	46.00	NO
PRVT	Pre-regulated voltage Xmter	46.00	NO
TEMP	Temperature	46.00	NO
ACQN	Acquisition Number	46.00	NO
XDP	Delay Reference	57.50	NO
MITM	MIT Mode	57.50	NO
VERS	Version	46.00	NO
D1CT	Dipole 1 Compressed Word Count	57.50	NO
D2CT	Dipole 2 Compressed Word Count	57.50	NO
MCNT	Monopole Compressed Word Count	57.50	NO
SEQN	Sequence Number	46.00	NO
FREV	Firmware Revision	46.00	NO
MSMP	Monopole Sample Rate	46.00	NO
MSMP	Dipole Sample Rate	46.00	NO
MFWF	Monopole Firing Waveform	46.00	NO
MFRQ	Monopole Frequency	46.00	NO
MDLY	Monopole Delay	46.00	NO
DXWF	Dipole X Firing Waveform	46.00	NO
XFRQ	Dipole X Frequency	46.00	NO
XDLY	Dipole X Delay	46.00	NO
DYWF	Dipole Y Firing Waveform	46.00	NO
YFRQ	Dipole Y Frequency	46.00	NO
YDLY	Dipole Y Delay	46.00	NO
DPSX	Dipole Source X Structurel	46.00	NO
DPSY	Dipole Source Y Structurel	46.00	NO
DPSM	Monopole Source Structure	46.00	NO
WVST	Wavesonic Compressed Data	57.50	NO
AUTM	Auto Mode	46.00	NO
SONM	tool mode for sonic - 0 for normal or 3 for calibration	46.00	NO
MSL	Monopole Lower Travel Time	57.50	NO
MSH	Monopole Upper Travel Time	57.50	NO
MLFC	Monopole-1 Lower Filter Bandpass Frequency Cut-off	46.00	NO
MUFC	Monopole-1 Upper Filter Bandpass Frequency Cut-off	46.00	NO

DLTT	Dipole Lower Travel Time	46.00	NO
DUTT	Dipole Upper Travel Time	46.00	NO
DLFC	Dipole Lower Filter Bandpass Frequency Cut-off	46.00	NO
DUFC	Dipole Upper Filter Bandpass Frequency Cut-off	46.00	NO
MUTE	WaveSonic Mute/Enable Channels and Sides map	46.00	NO
MUTS	Mute/Enable Sides	46.00	NO
WSRB	Relative Bearing	57.50	NO
WSAZ	WSX Azimuth Pad 1	57.50	NO
TPUL	Tension Pull	57.50	NO
WMP	Summed array of Monopole for SIDES - A,B,C,D	57.50	NO
WXX	Dipole X for SIDES - A-C	57.50	NO
WYY	Dipole Y for SIDES - B-D	57.50	NO
WXY	Dipole X for SIDES - B-D	57.50	NO
WYX	Dipole Y for SIDES - A-C	57.50	NO
TPUL	Tension Pull	57.50	NO
WMA	Monopole Waveform Side A - Channel 1 to Channel 8 Receivers	57.50	NO
WMB	Monopole Waveform Side B - Channel 1 to Channel 8 Receivers	57.50	NO
WMC	Monopole Waveform Side C - Channel 1 to Channel 8 Receivers	57.50	NO
WMD	Monopole Waveform Side D - Channel 1 to Channel 8 Receivers	57.50	NO
WXA	Dipole X Waveform Side A - Channel 1 to Channel 8 Receivers	57.50	NO
WXB	Dipole X Waveform Side B - Channel 1 to Channel 8 Receivers	57.50	NO
WXC	Dipole X Waveform Side C - Channel 1 to Channel 8 Receivers	57.50	NO
WXD	Dipole X Waveform Side D - Channel 1 to Channel 8 Receivers	57.50	NO
WYA	Dipole Y Waveform Side A - Channel 1 to Channel 8 Receivers	57.50	NO
WYB	Dipole Y Waveform Side B - Channel 1 to Channel 8 Receivers	57.50	NO
WYC	Dipole Y Waveform Side C - Channel 1 to Channel 8 Receivers	57.50	NO
WYD	Dipole Y Waveform Side D - Channel 1 to Channel 8 Receivers	57.50	NO
GAR1	Gain Side A Receiver 1	46.00	NO
GAR2	Gain Side A Receiver 2	46.00	NO
GAR3	Gain Side A Receiver 3	46.00	NO
GAR4	Gain Side A Receiver 4	46.00	NO
GAR5	Gain Side A Receiver 5	46.00	NO
GAR6	Gain Side A Receiver 6	46.00	NO
GAR7	Gain Side A Receiver 7	46.00	NO
GAR8	Gain Side A Receiver 8	46.00	NO
GBR1	Gain Side B Receiver 1	46.00	NO
GBR2	Gain Side B Receiver 2	46.00	NO
GBR3	Gain Side B Receiver 3	46.00	NO
GBR4	Gain Side B Receiver 4	46.00	NO
GBR5	Gain Side B Receiver 5	46.00	NO
GBR6	Gain Side B Receiver 6	46.00	NO
GBR7	Gain Side B Receiver 7	46.00	NO
GBR8	Gain Side B Receiver 8	46.00	NO
GCR1	Gain Side C Receiver 1	46.00	NO
GCR2	Gain Side C Receiver 2	46.00	NO
GCR3	Gain Side C Receiver 3	46.00	NO
GCR4	Gain Side C Receiver 4	46.00	NO
GCR5	Gain Side C Receiver 5	46.00	NO
GCR6	Gain Side C Receiver 6	46.00	NO

GCR7	Gain Side C Receiver 7	46.00	NO	
GCR8	Gain Side C Receiver 8	46.00	NO	
GDR1	Gain Side D Receiver 1	46.00	NO	
GDR2	Gain Side D Receiver 2	46.00	NO	
GDR3	Gain Side D Receiver 3	46.00	NO	
GDR4	Gain Side D Receiver 4	46.00	NO	
GDR5	Gain Side D Receiver 5	46.00	NO	
GDR6	Gain Side D Receiver 6	46.00	NO	
GDR7	Gain Side D Receiver 7	46.00	NO	
GDR8	Gain Side D Receiver 8	46.00	NO	
	DSNT			
TPUL	Tension Pull	32.54	NO	
RNDS	Near Detector Telemetry Counts	32.64	BLK	1.417
RFDS	Far Detector Telemetry Counts	33.39	TRI	0.583
DNTT	DSN Tool Temperature	32.64	NO	
DSNS	DSN Tool Status	32.54	NO	
ERND	Near Detector Telemetry Counts EVR	32.64	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	33.39	BLK	0.000
ENTM	DSN Tool Temperature EVR	32.64	NO	
	SDLT			
TPUL	Tension Pull	22.65	NO	
PCAL	Pad Caliper	22.65	TRI	0.250
ACAL	Arm Caliper	22.65	TRI	0.250
	ACRt Sonde			
TPUL	Tension Pull	2.97	NO	
F1R1	ACRT 12KHz - 80in R value	9.22	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	9.22	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.72	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.72	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	5.22	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	5.22	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	4.22	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	4.22	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.72	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.72	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.47	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.47	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	9.22	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	9.22	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.72	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.72	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	5.22	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	5.22	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	4.22	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	4.22	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.72	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.72	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.47	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.47	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	9.22	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	9.22	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.72	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.72	BLK	0.000

F3R3	ACRT 72KHz - 29in R value	5.22	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	5.22	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	4.22	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	4.22	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.72	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.72	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.47	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.47	BLK	0.000
RMUD	Mud Resistivity	12.76	BLK	0.000
F1RT	Transmitter Current Raw 12K X Receiver	2.97	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.97	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.97	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.97	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.97	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.97	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.97	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.97	BLK	0.000
ITMP	Instrument Temperature	2.97	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.97	NO	
TIDV	Instrument Temperature Derivative	2.97	NO	
TUDV	Upper Temperature Derivative	2.97	NO	
TLDV	Lower Temperature Derivative	2.97	NO	
TRBD	Receiver Board Temperature	2.97	NO	

SDLT Pad

TPUL	Tension Pull	22.64	NO	
NAB	Near Above	22.46	BLK	0.920
NHI	Near Cesium High	22.46	BLK	0.920
NLO	Near Cesium Low	22.46	BLK	0.920
NVA	Near Valley	22.46	BLK	0.920
NBA	Near Barite	22.46	BLK	0.920
NDE	Near Density	22.46	BLK	0.920
NPK	Near Peak	22.46	BLK	0.920
NLI	Near Lithology	22.46	BLK	0.920
NBAU	Near Barite Unfiltered	22.46	BLK	0.250
NLIU	Near Lithology Unfiltered	22.46	BLK	0.250
FAB	Far Above	22.81	BLK	0.250
FHI	Far Cesium High	22.81	BLK	0.250
FLO	Far Cesium Low	22.81	BLK	0.250
FVA	Far Valley	22.81	BLK	0.250
FBA	Far Barite	22.81	BLK	0.250
FDE	Far Density	22.81	BLK	0.250
FPK	Far Peak	22.81	BLK	0.250
FLI	Far Lithology	22.81	BLK	0.250
PTMP	Pad Temperature	22.65	BLK	0.920
NHV	Near Detector High Voltage	22.04	NO	
FHV	Far Detector High Voltage	22.04	NO	
ITMP	Instrument Temperature	22.04	NO	
DDHV	Detector High Voltage	22.04	NO	

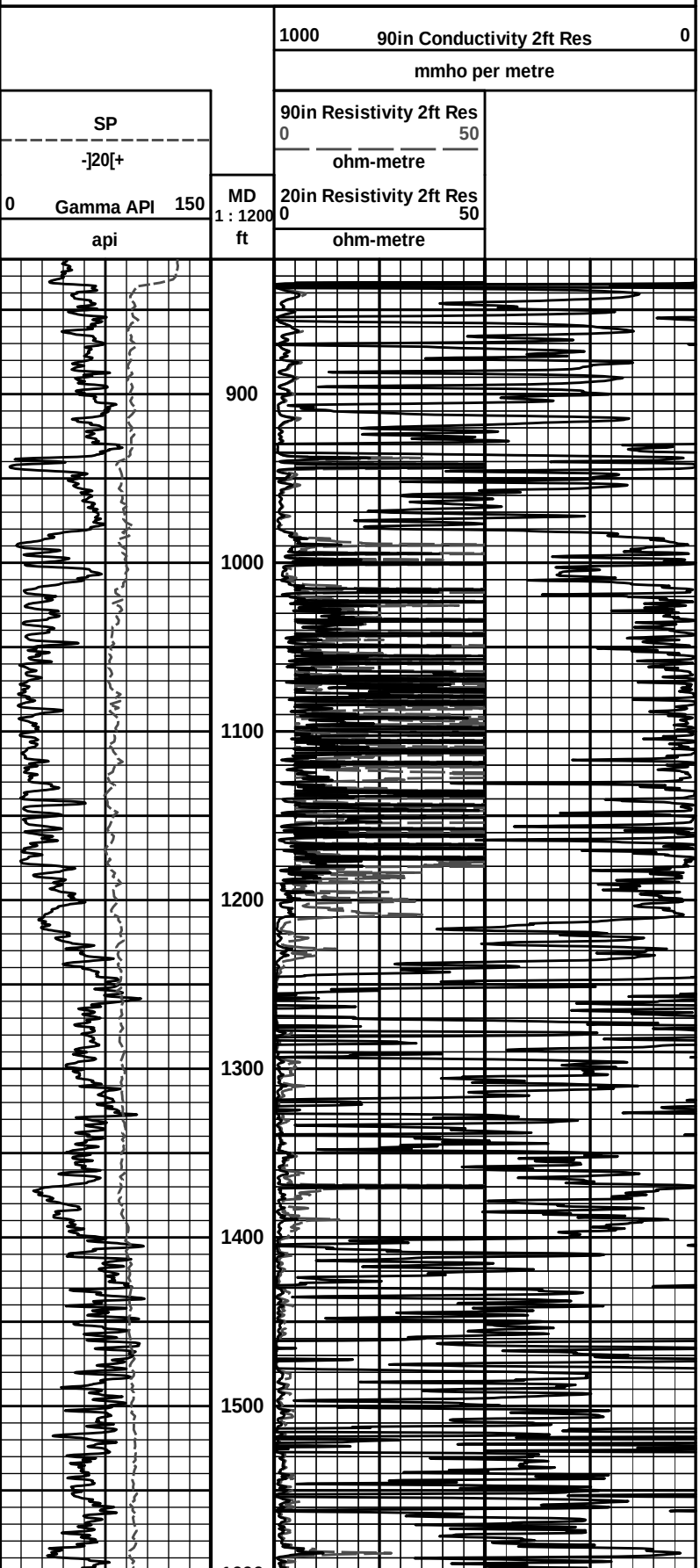
Microlog Pad

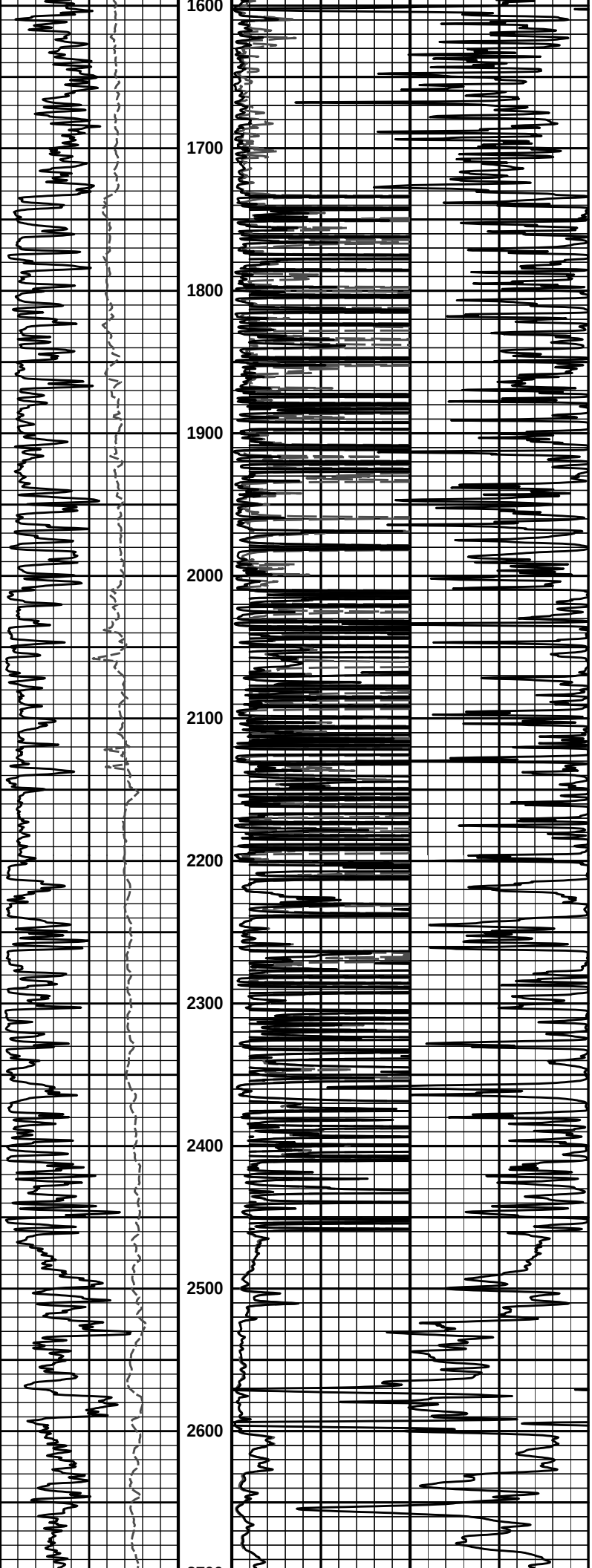
TPUL	Tension Pull	22.83	NO	
MINV	Microlog Lateral	22.83	BLK	0.750
MNOR	Microlog Normal	22.83	BLK	0.750

HALLIBURTON

Plot Time: 11-May-13 12:57:30
Plot Range: 820 ft to 6108.5 ft
Data: {ActiveWell}\Well Based\CASING\
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_1_lib

1 INCH MAIN LOG

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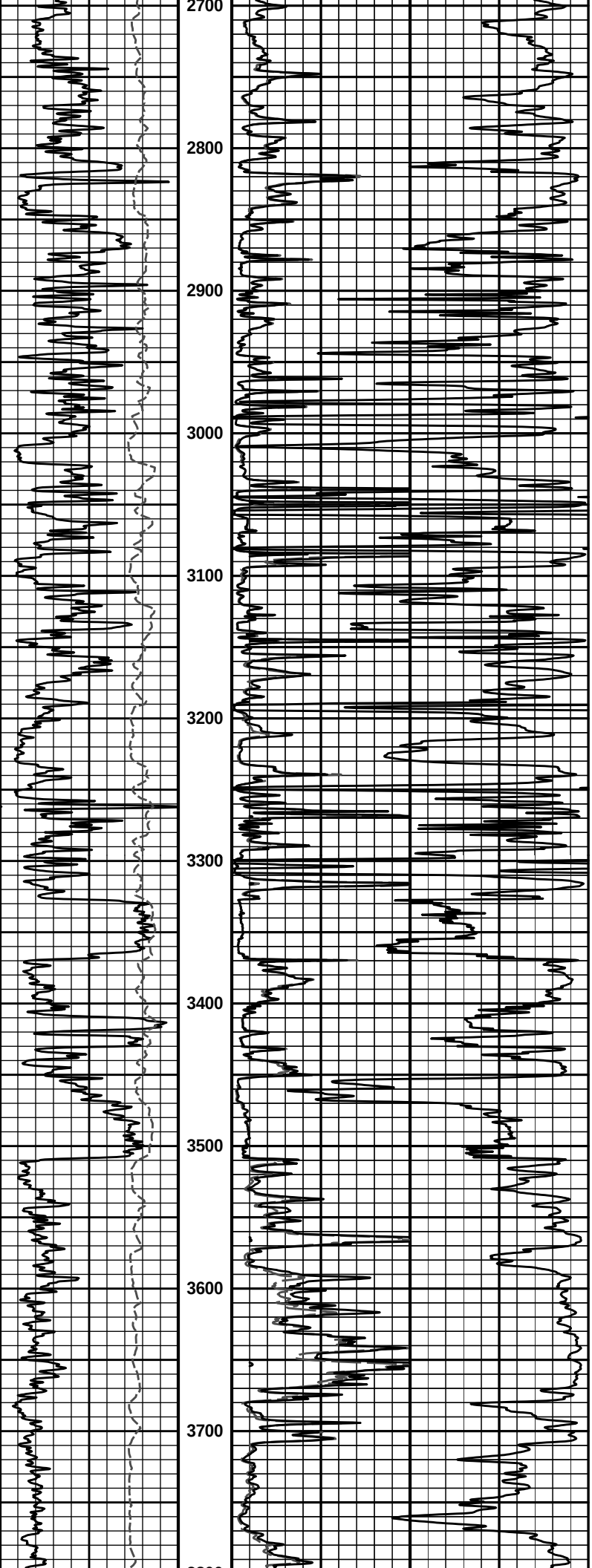
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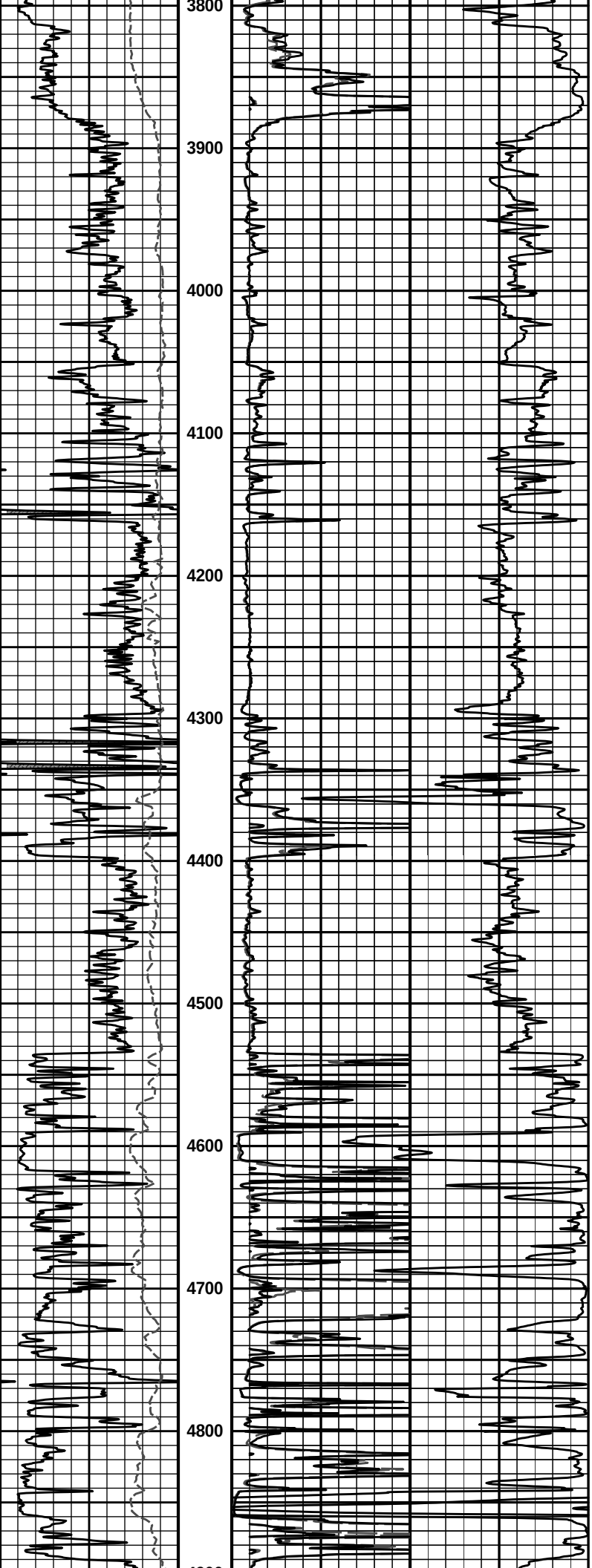
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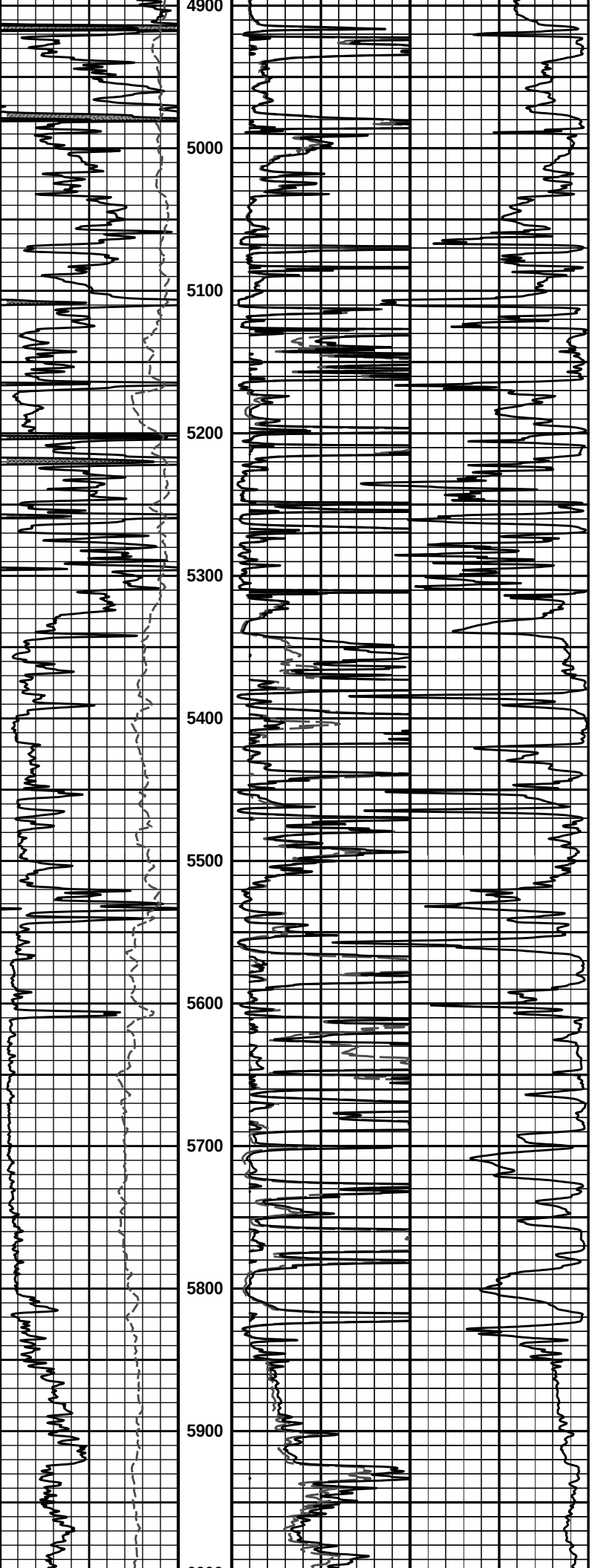
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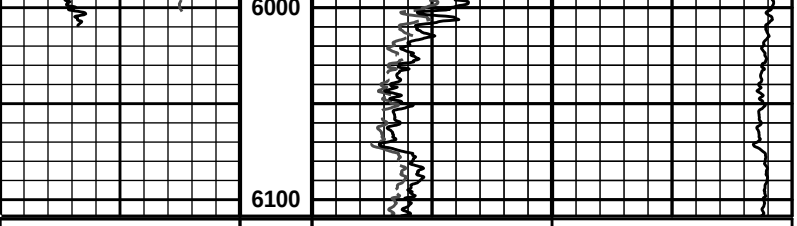

0 Gamma API 150	MD 1 : 1200 ft	20in Resistivity 2ft Res 0 50 ohm-metre	
api		90in Resistivity 2ft Res 0 50 ohm-metre	
SP -]20[+			
		1000 90in Conductivity 2ft Res 0 mmho per metre	

HALLIBURTON

Plot Time: 11-May-13 12:57:35
Plot Range: 820 ft to 6108.5 ft
Data: {ActiveWell}\Well Based\CASING
Plot File: \\-LOCAL-\EASTON3419_1-21\Well Based\ACRT\ACRT_1_lib

1 INCH MAIN LOG

COMPANY	**SANDRIDGE ENERGY**		
WELL	**EASTON 3419 1-21**		
FIELD	**COMANCHE COUNTY**		
COUNTY	**COMANCHE**	STATE	**KANSAS**

HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY LOG