

# HALLIBURTON

## ARRAY COMPENSATED TRUE RESISTIVITY LOG

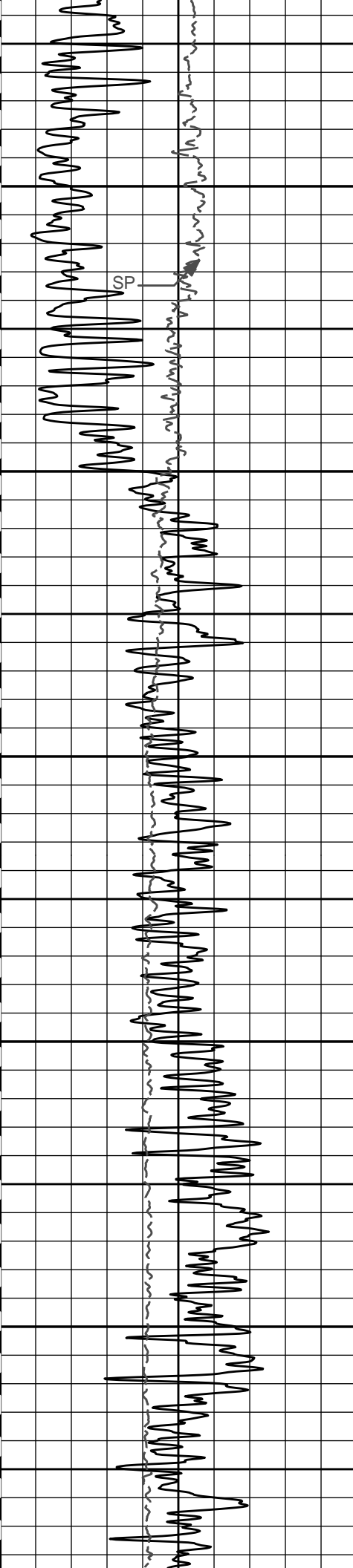
COMPANY	<b>SANDRIDGE ENERGY</b>		
WELL	<b>SALT SWD 3419 1-4</b>		
FIELD	<b>SADDLE</b>		
COUNTY	<b>COMANCHE</b>		
STATE	<b>KANSAS</b>		
COMPANY	<b>SANDRIDGE ENERGY</b>	WELL	<b>SALT SWD 3419 1-4</b>
FIELD	<b>SADDLE</b>	COUNTY	<b>COMANCHE</b>
COUNTY	<b>COMANCHE</b>	STATE	<b>KANSAS</b>
API No.	15-033-21640-01-00	Location	233' FNL & 353' FEL
Other Services:	MICROLOG MRIL DSNT, SDLT WSTT XRM1		
Sec. 4	Twp. 34S	Rge. 19W	Elev. 1992.0 ft
Log measured from	KB		12.0 ft above perm. Datum
Drilling measured from	KB		G.L. 1992.0 ft

Date	15-Jun-12	Run No.	ONE
Depth - Driller	6770.00 ft	Depth - Logger	6744.0 ft
Bottom - Logged Interval	6734.0 ft	Top - Logged Interval	1002.0 ft
Casing - Driller	9.625 in	Casing - Logger	1002.0 ft
Bit Size	8.750 in	Type Fluid in Hole	WATER BASED MUD
Density	9.0 ppg	Viscosity	43.00 s/qt
PH	9.50 pH	Fluid Loss	8.0 cpm
Source of Sample	FLOW LINE		
Rm @ Meas. Temperature	0.250 ohmm	Rmf @ Meas. Temperature	0.22 ohmm
Rmc @ Meas. Temperature	0.300 ohmm	Source Rmf	MEAS
Rm @ BHT	0.26 ohmm	Rmf @ BHT	0.26 ohmm
Time Since Circulation	16.0 hr	Time on Bottom	15-Jun-12 12:08
Max. Rec. Temperature	157.0 degF	Equipment Location	10546696 LIBERAL
Recorded By	J. BOLLOW	Witnessed By	L. SOLIZ

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Service Ticket No.: 9576213		API Serial No.: 15-033-21640-01-00		PGM Version: WL INSITE R3.4.2 (Build 2)	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE			RESISTIVITY SCALE CHANGES		
Date	Sample No.		Type Log	Depth	Scale Up Hole
Depth-Driller					Scale Down Hole
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample			RESISTIVITY EQUIPMENT DATA		
Rm @ Meas. Temp	@	@	Run No.	Tool Type & No.	Pad Type
Rmf @ Meas. Temp.	@	@	ONE	ACRT	N/A
Rmc @ Meas. Temp.	@	@		I962_S909	
Source Rmf	Rmc				
Rm @ BHT	@	@			
Rmf @ BHT	@	@			
Rmc @ BHT	@	@			
EQUIPMENT DATA					
GAMMA		ACOUSTIC		DENSITY	
Run No.	ONE	Run No.		Run No.	
Serial No.	11039640	Serial No.		Serial No.	
Model No.	GTET	Model No.		Model No.	
Diameter	3.625"	No. of Cent.		Diameter	
Detector Model No.	GTET	Spacing		Log Type	
Type	SCINT			Source Type	
Length	8'	LSA [Y/N]		Serial No.	
Distance to Source	18'	FWDA [Y/N ]		Strength	
LOGGING DATA					
GENERAL		GAMMA		ACOUSTIC	
DENSITY		ACOUSTIC		NEUTRON	





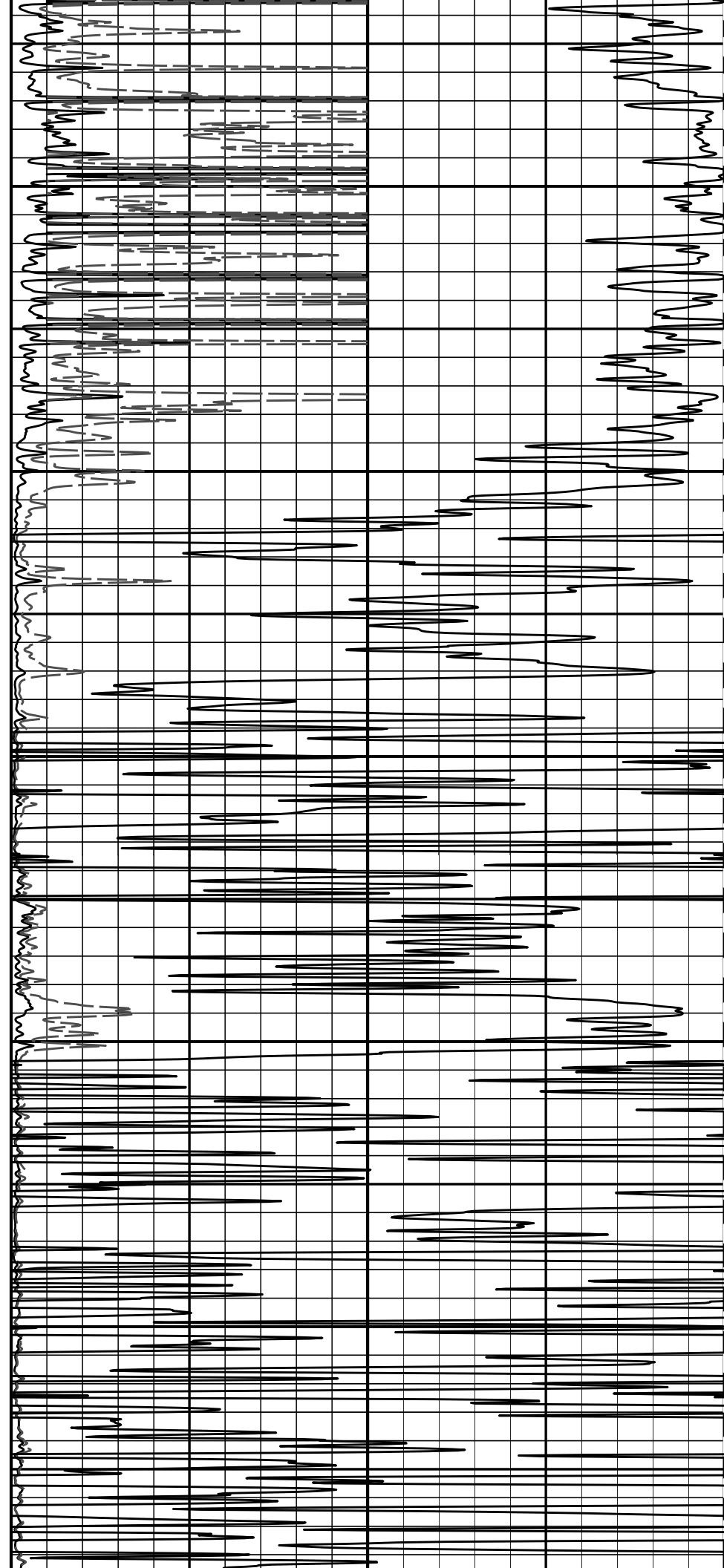
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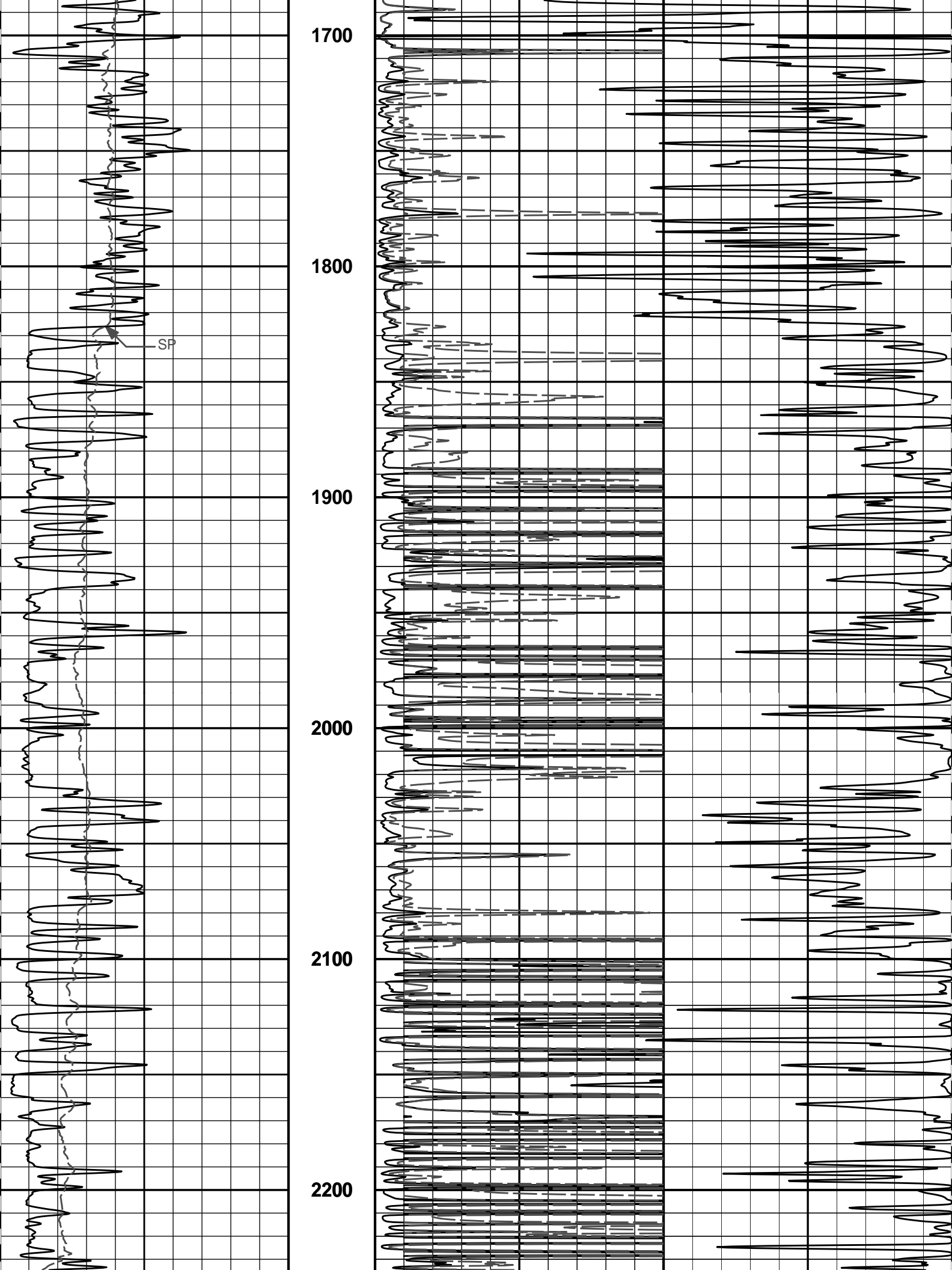
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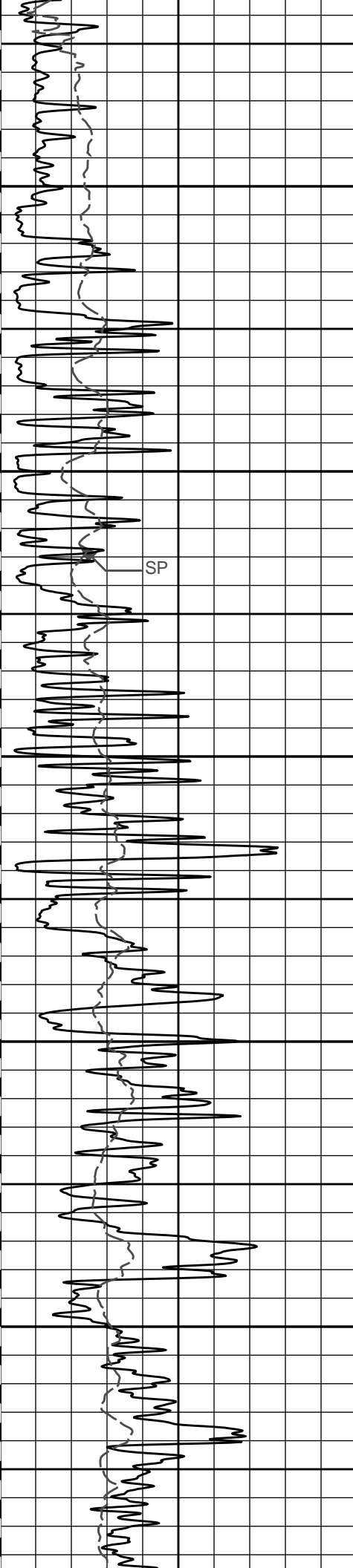
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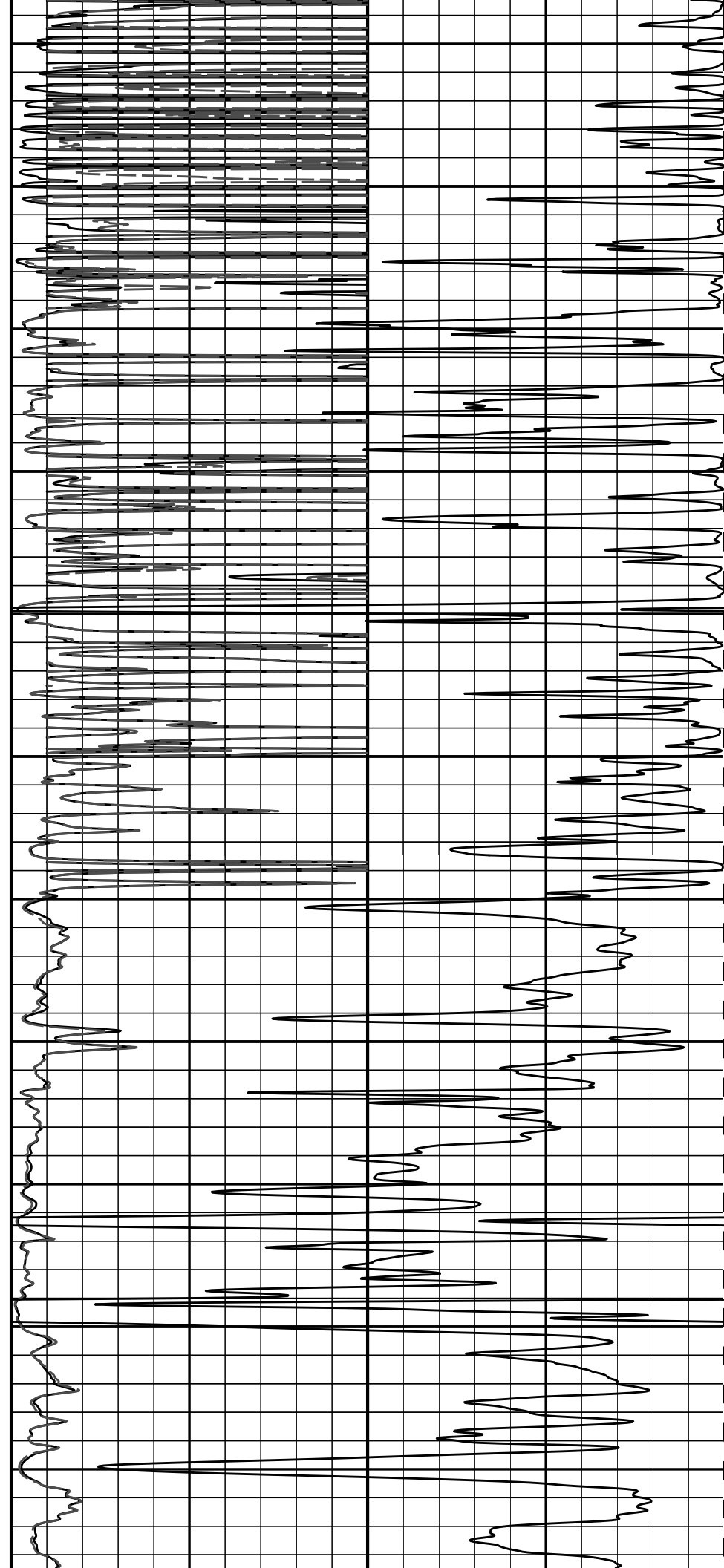
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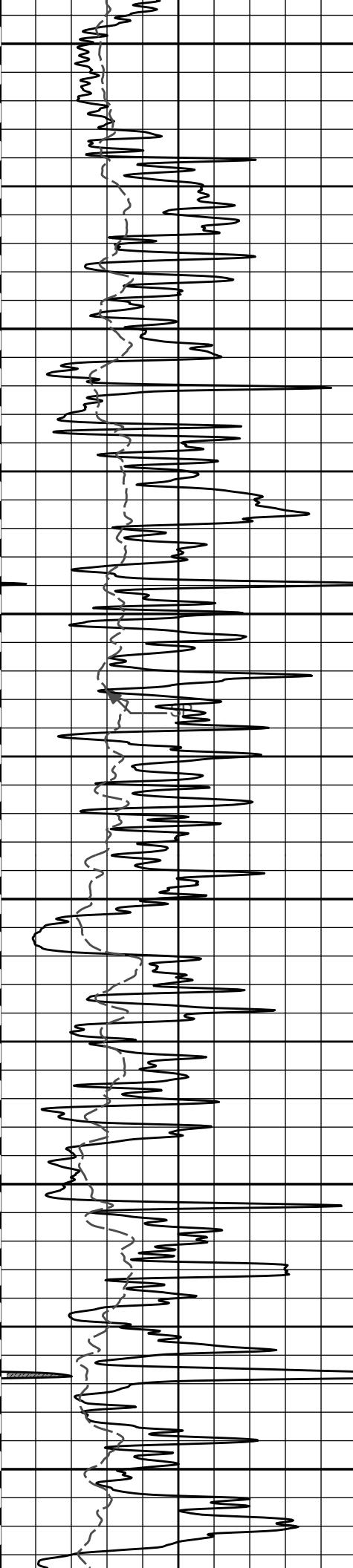
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2700





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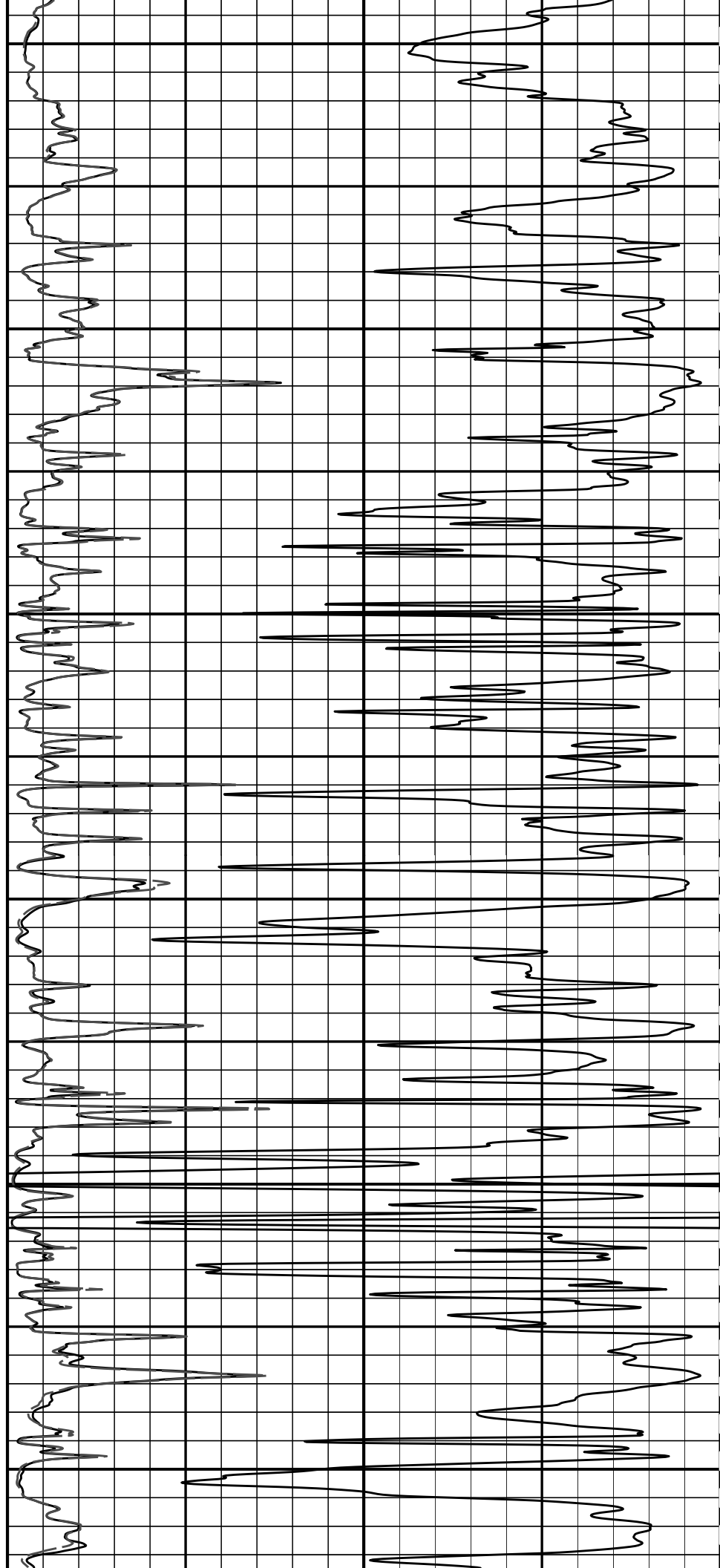
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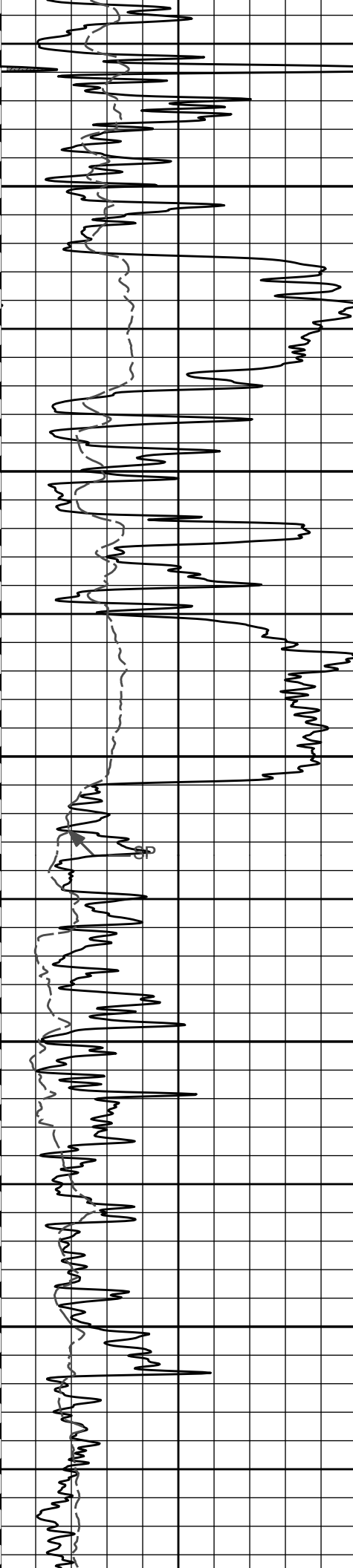
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3100

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3300





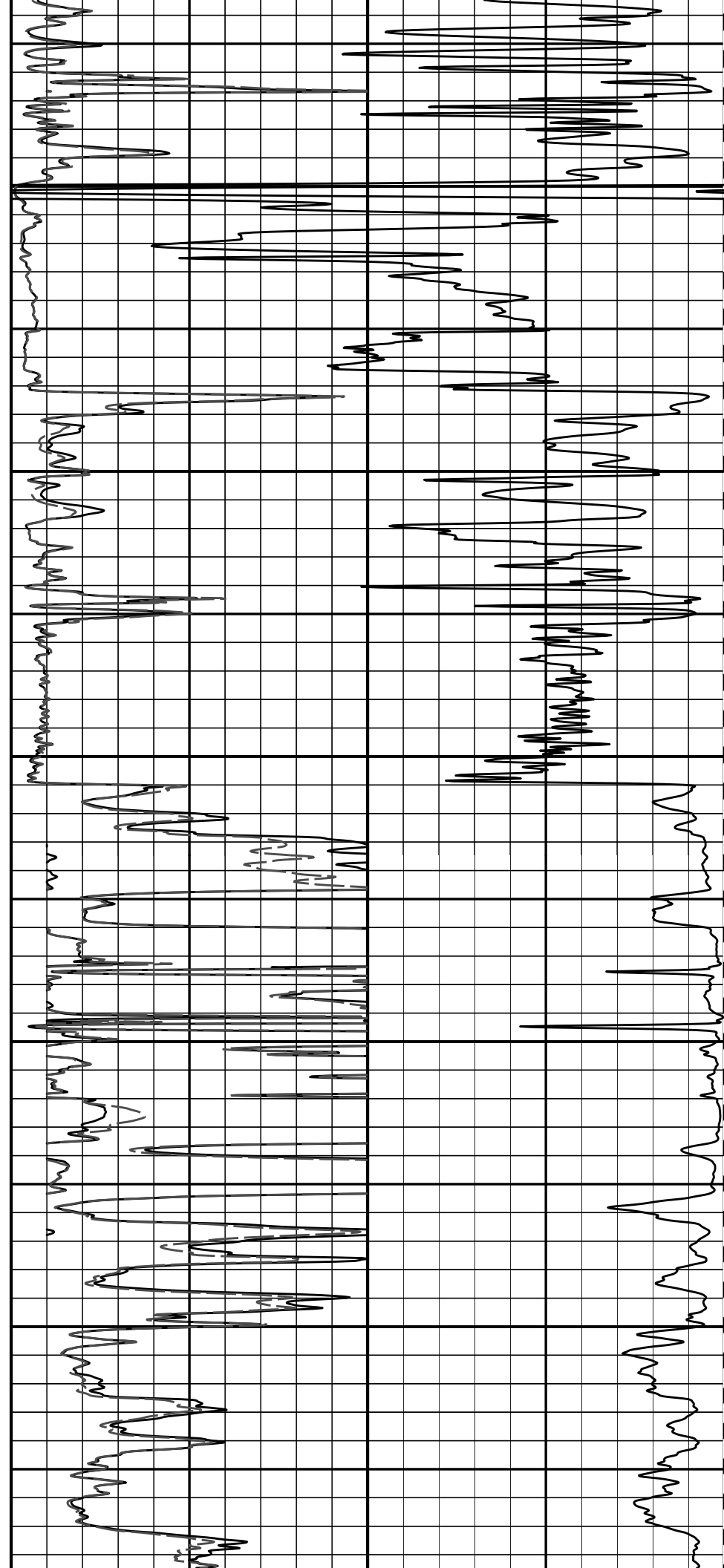
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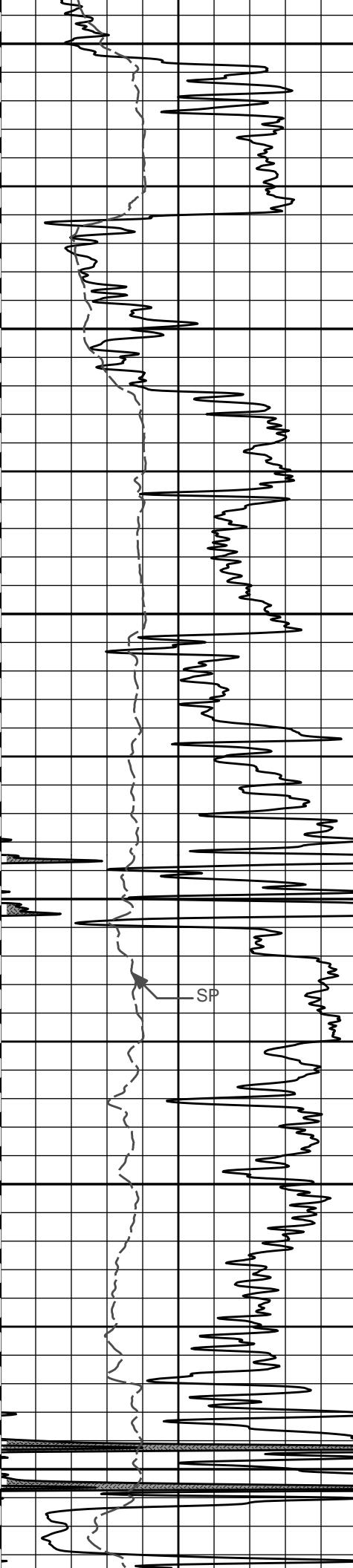
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3700

3800





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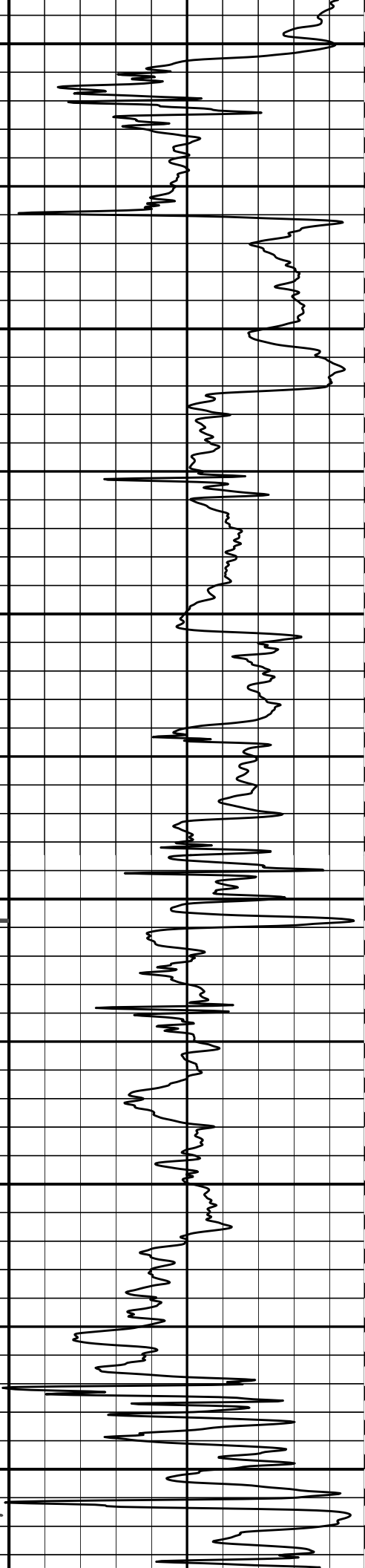
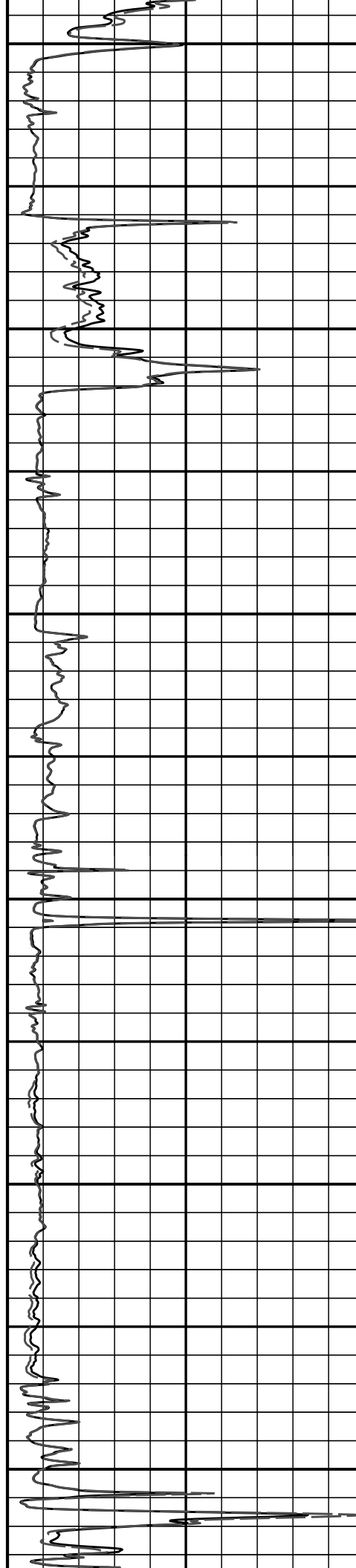
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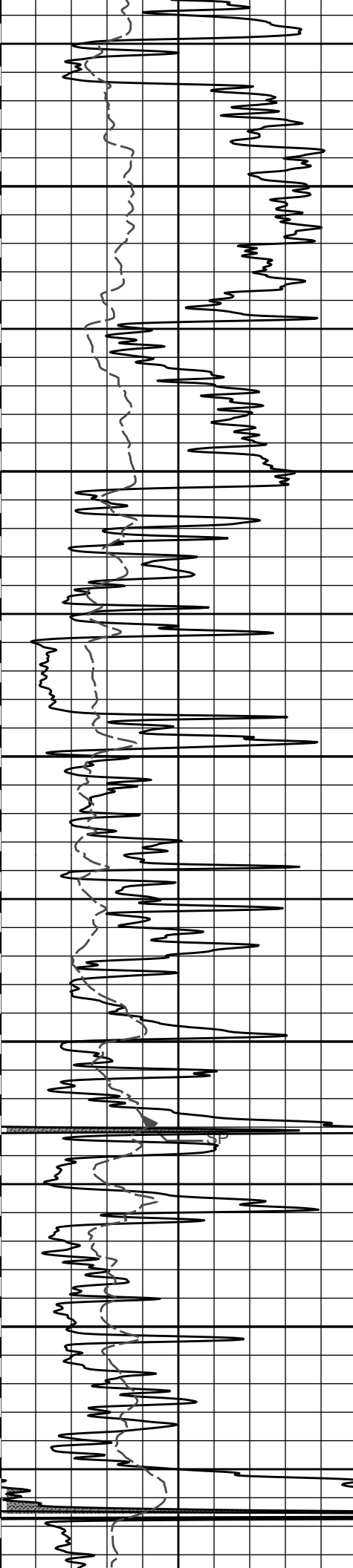
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4400





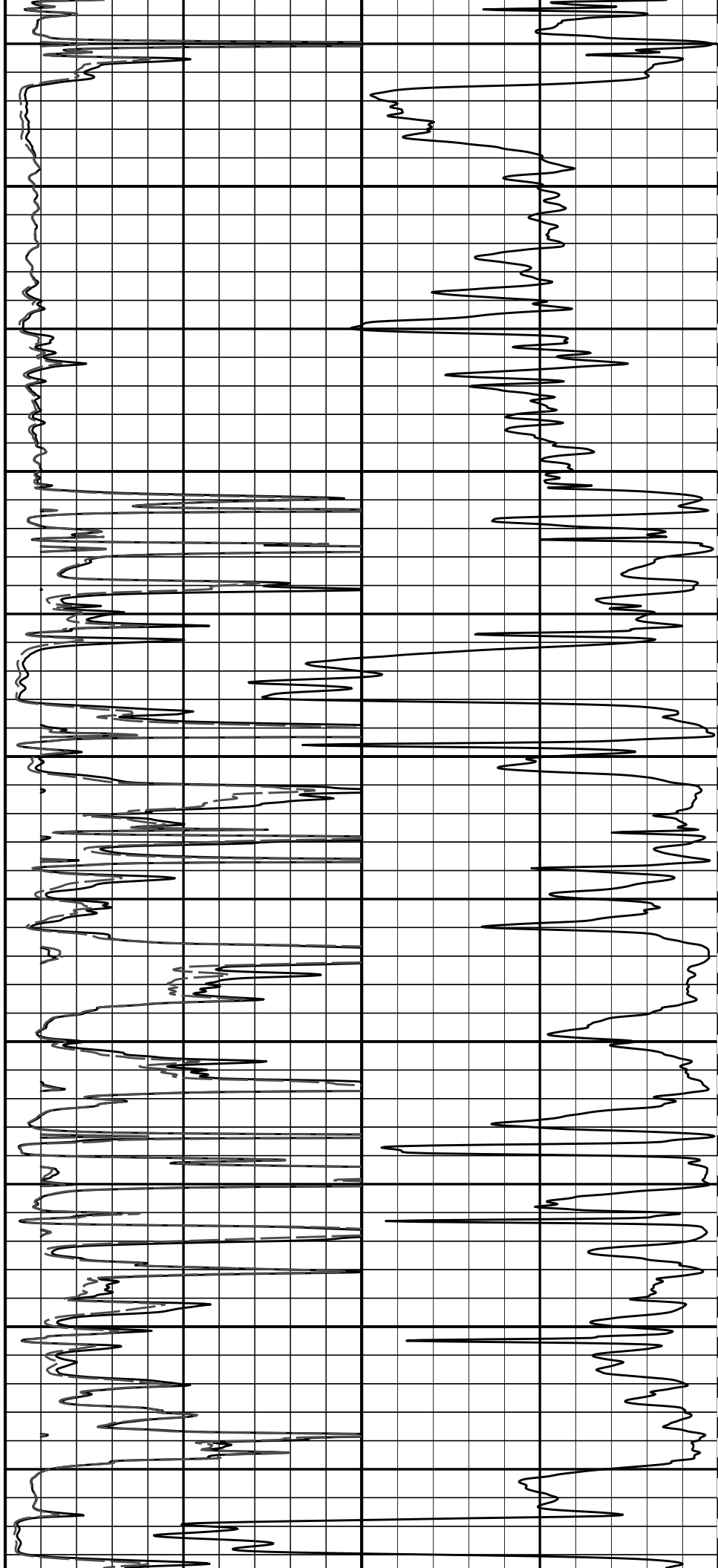
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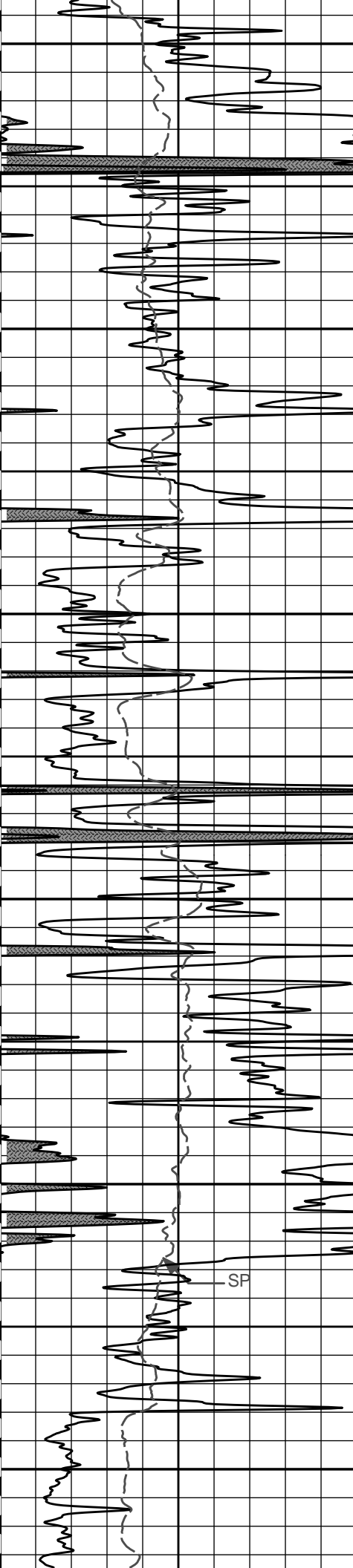
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4900





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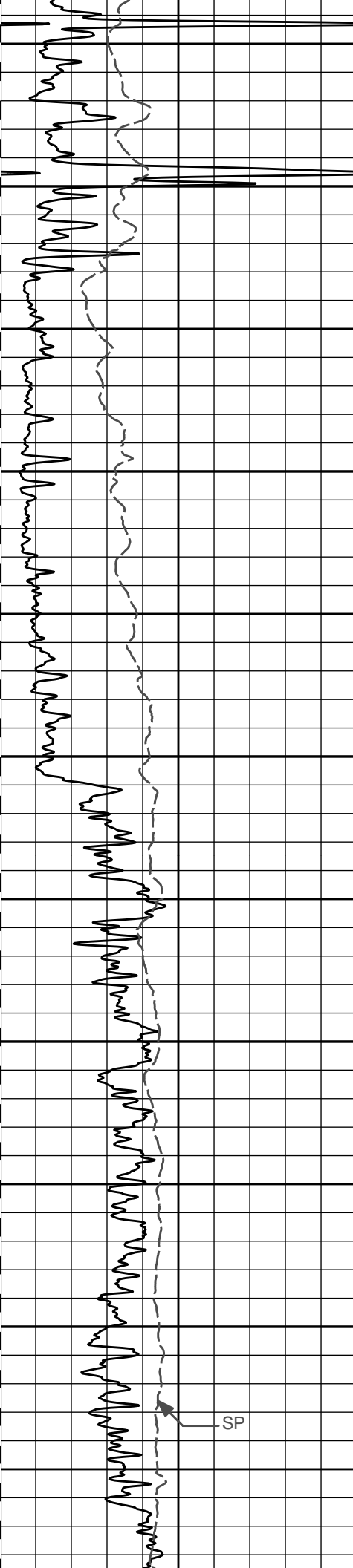
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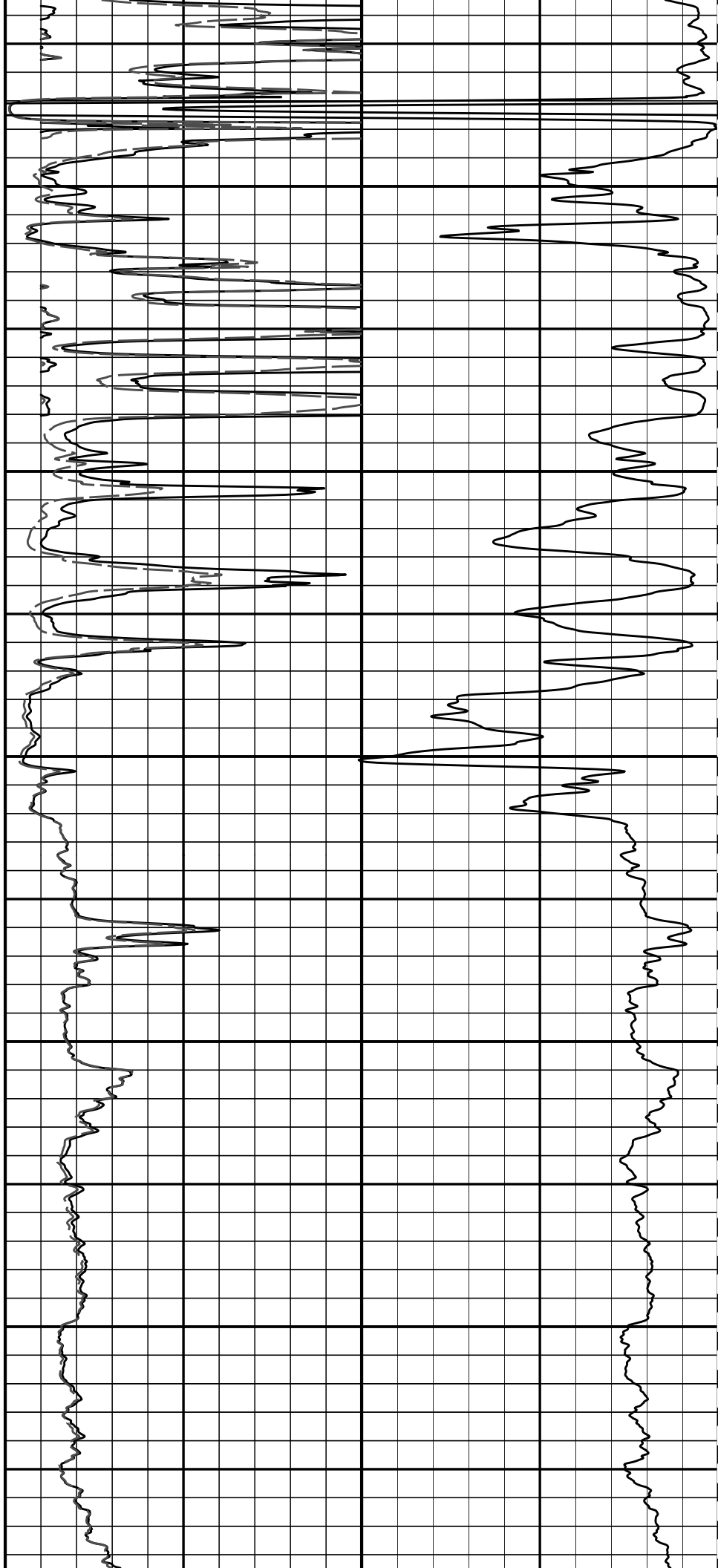
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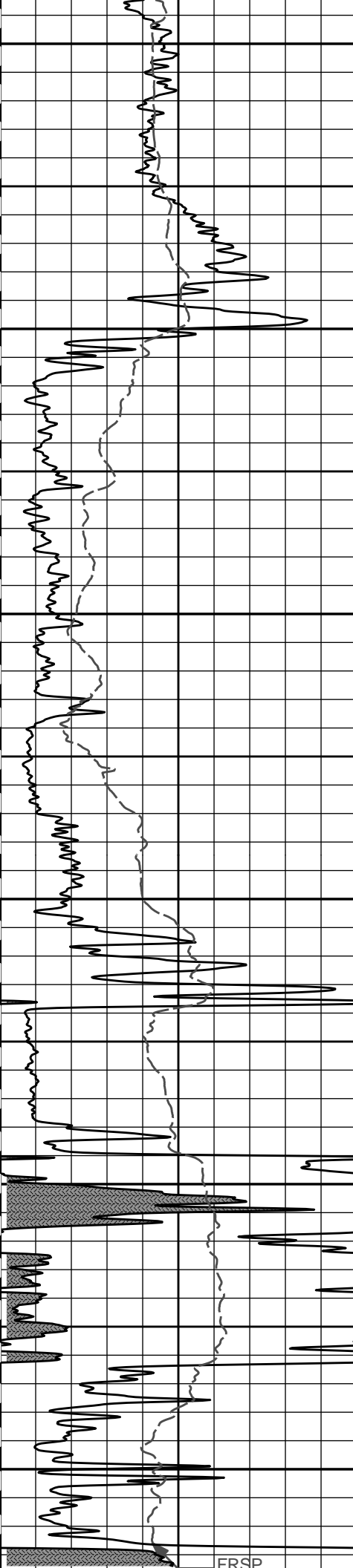
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5900

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SP





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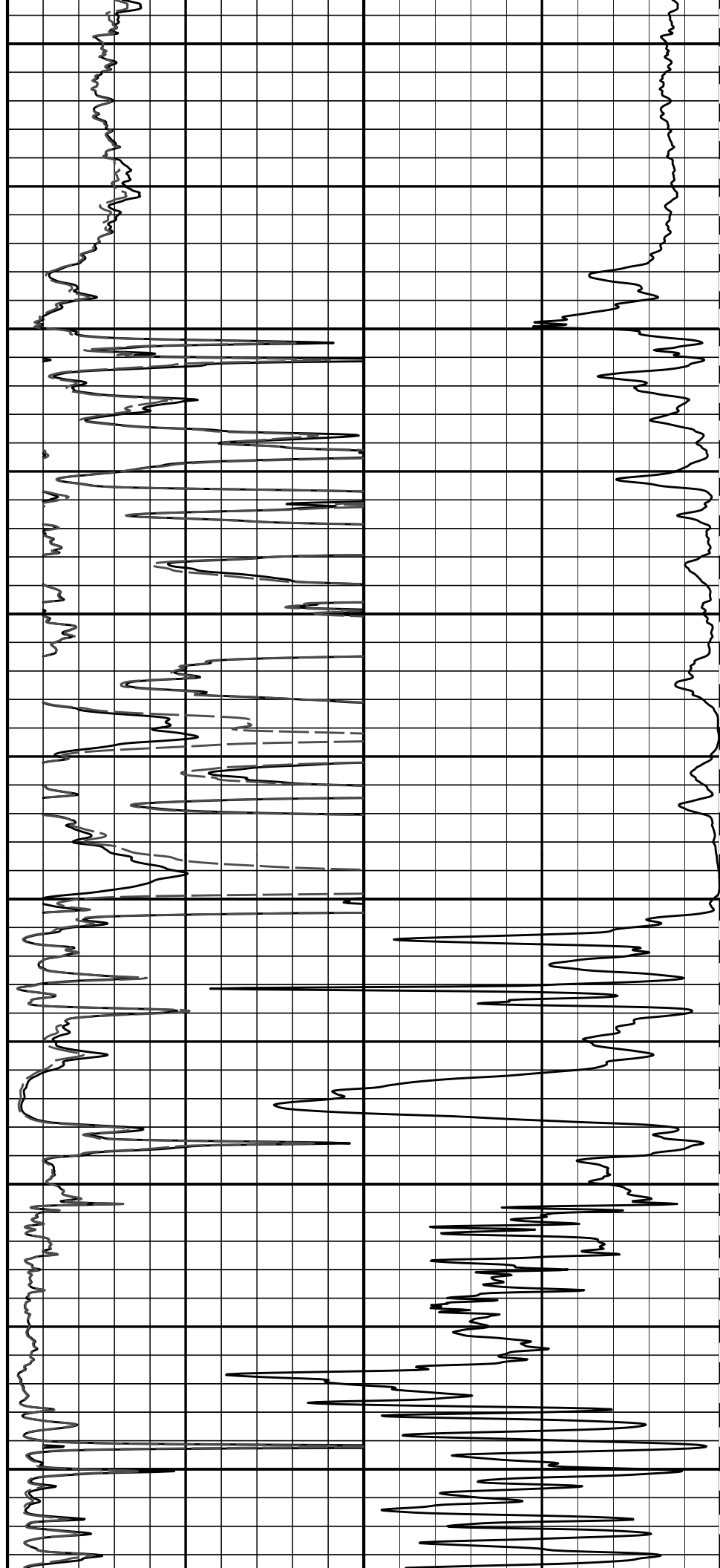
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6400

6500

6600



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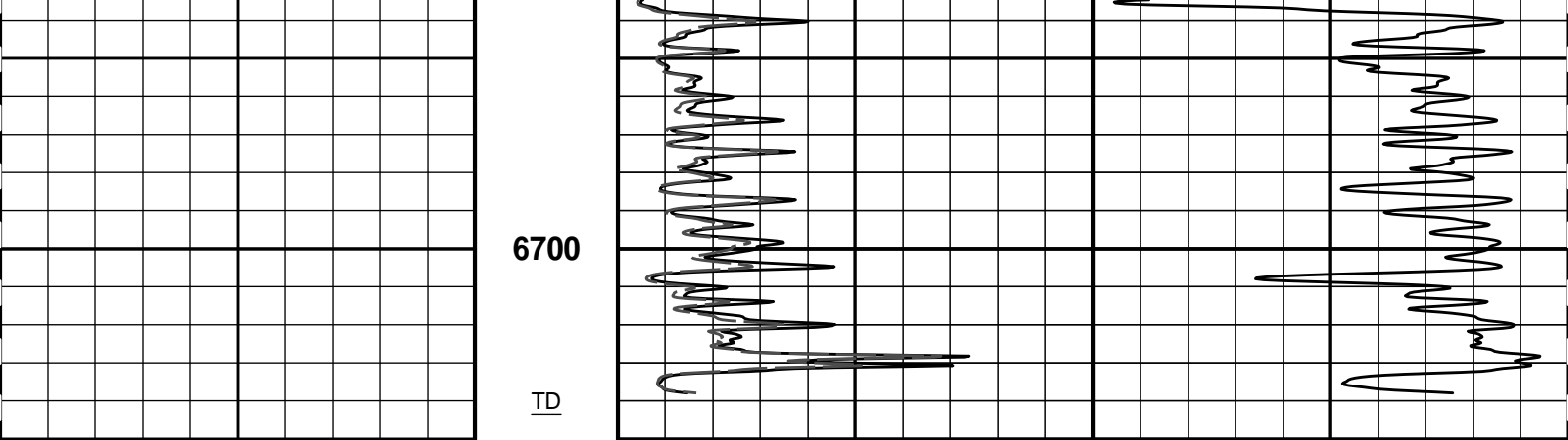
6200

6300

6400

6500

6600



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**

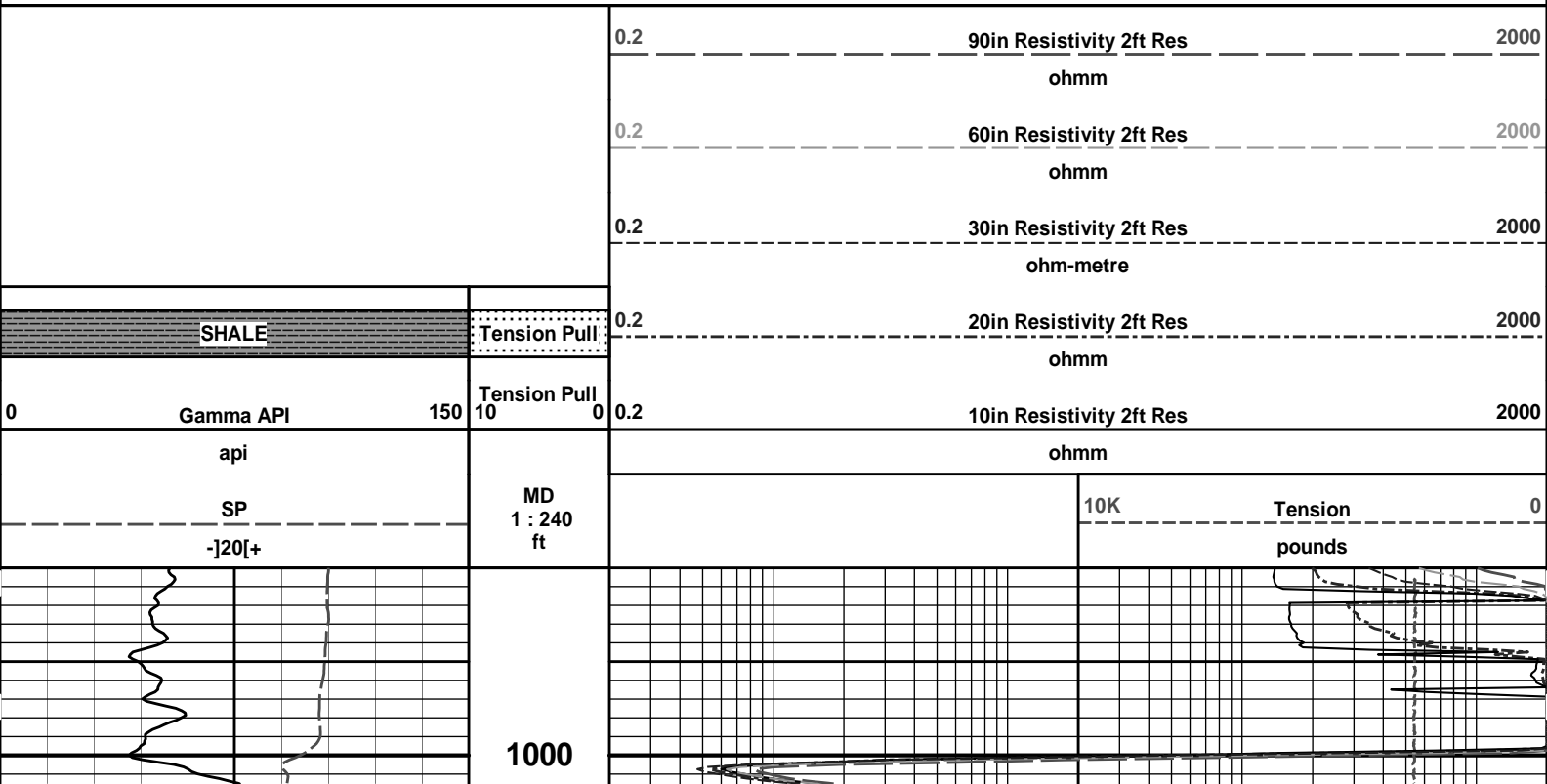
Plot Time: 15-Jun-12 22:08:02  
 Plot Range: 980 ft to 6751.17 ft  
 Data: SALT\_3419\_SWD14\Well Based\CASING\  
 Plot File: \\-LOCAL-ISALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHACRTACRT\_2.lib

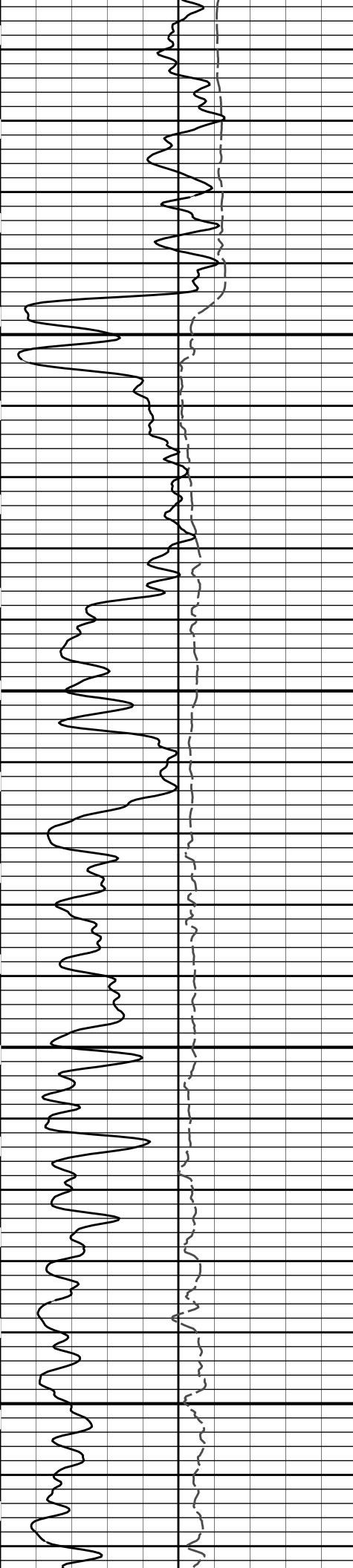
## 2 INCH MAIN LOG

**HALLIBURTON**

Plot Time: 15-Jun-12 22:08:02  
 Plot Range: 980 ft to 6751.17 ft  
 Data: SALT\_3419\_SWD14\Well Based\CASING\  
 Plot File: \\-LOCAL-ISALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHACRTACRT\_5\_main.lib

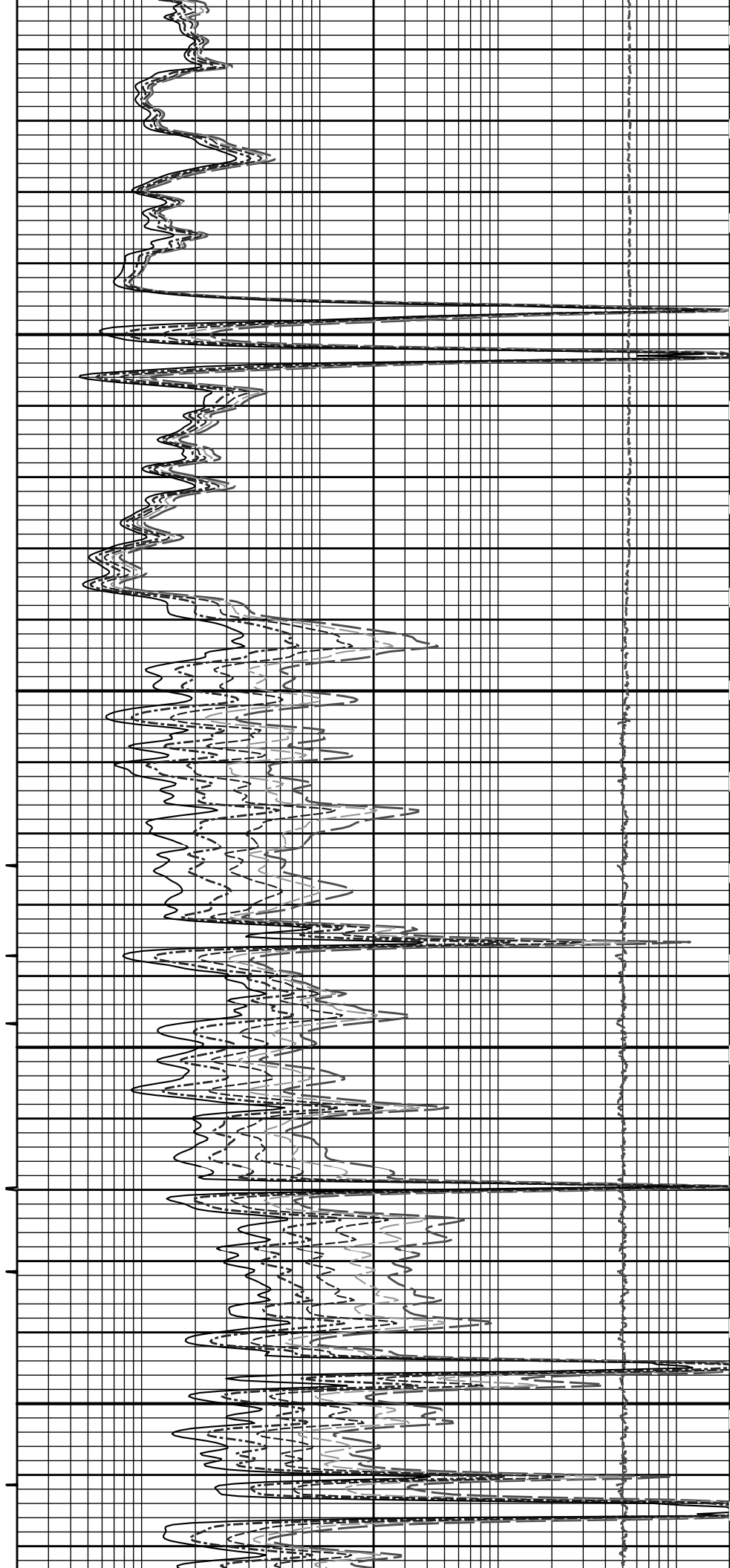
## 5 INCH MAIN LOG

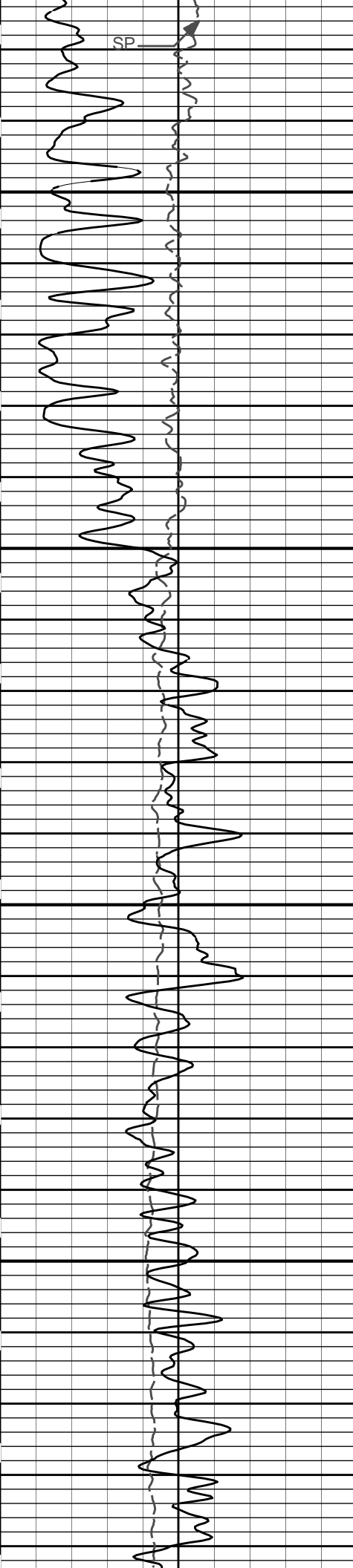




1100

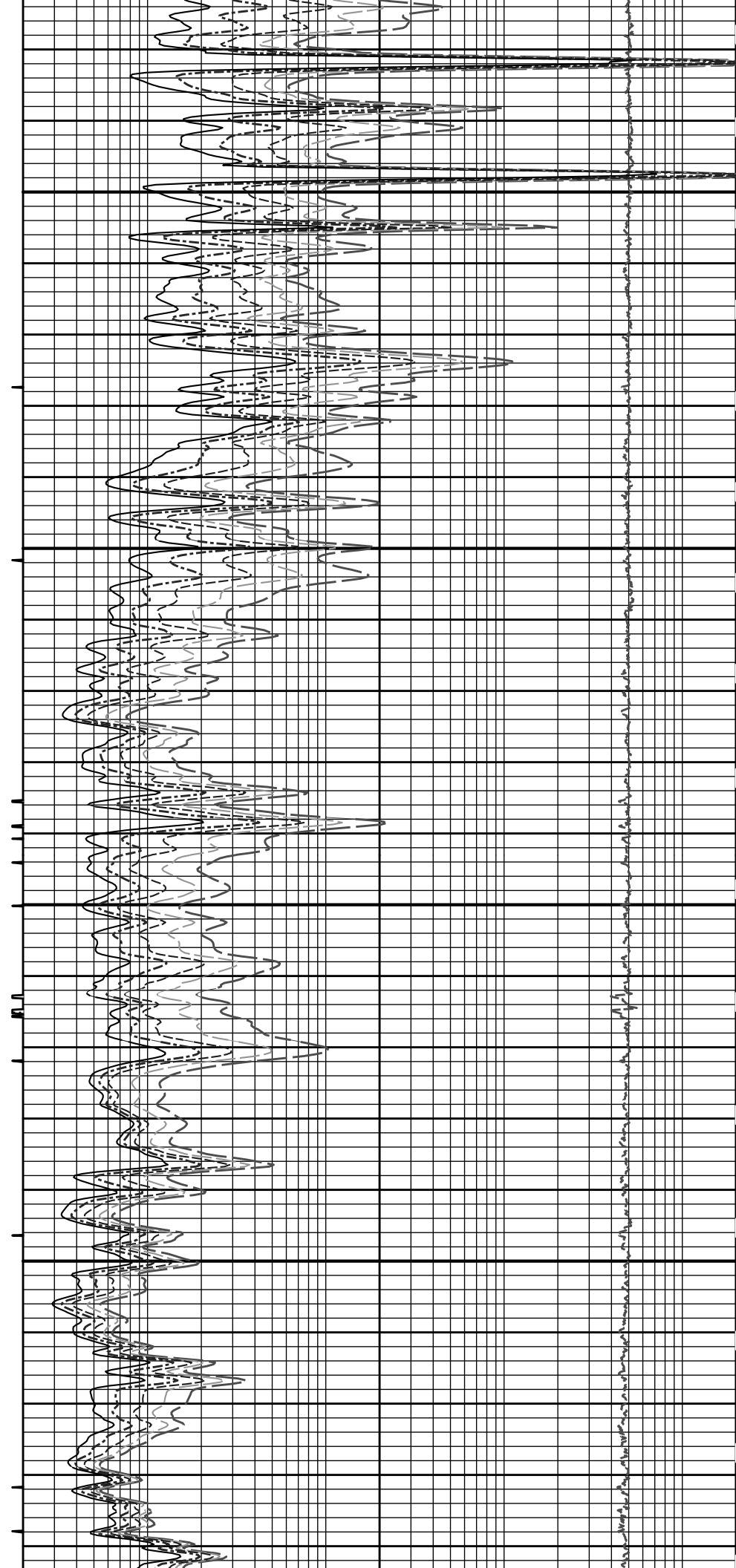
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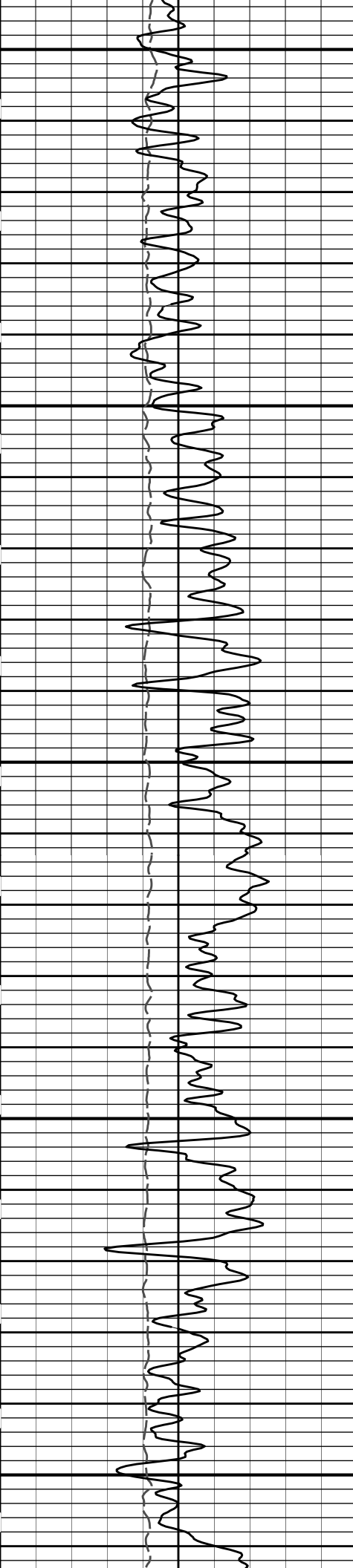




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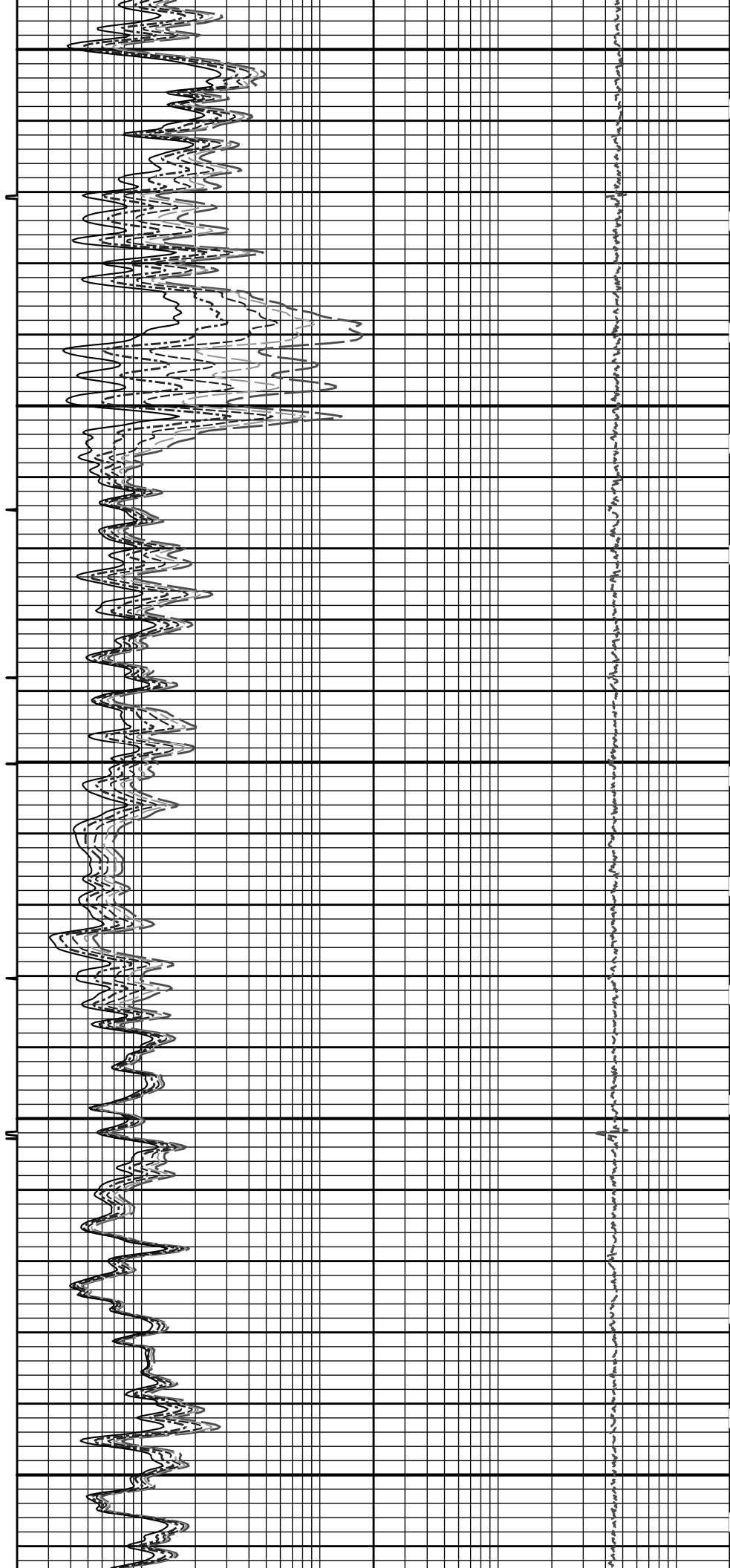
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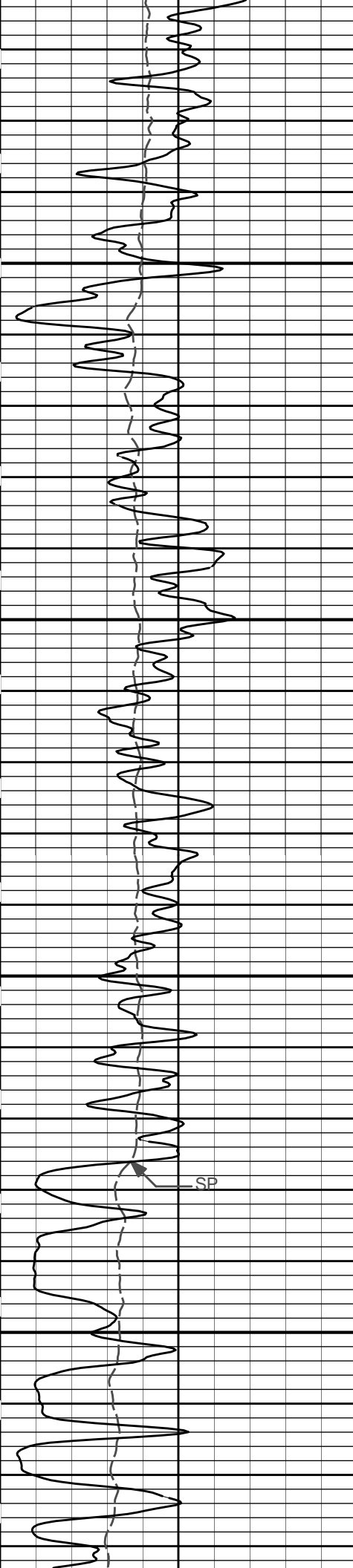




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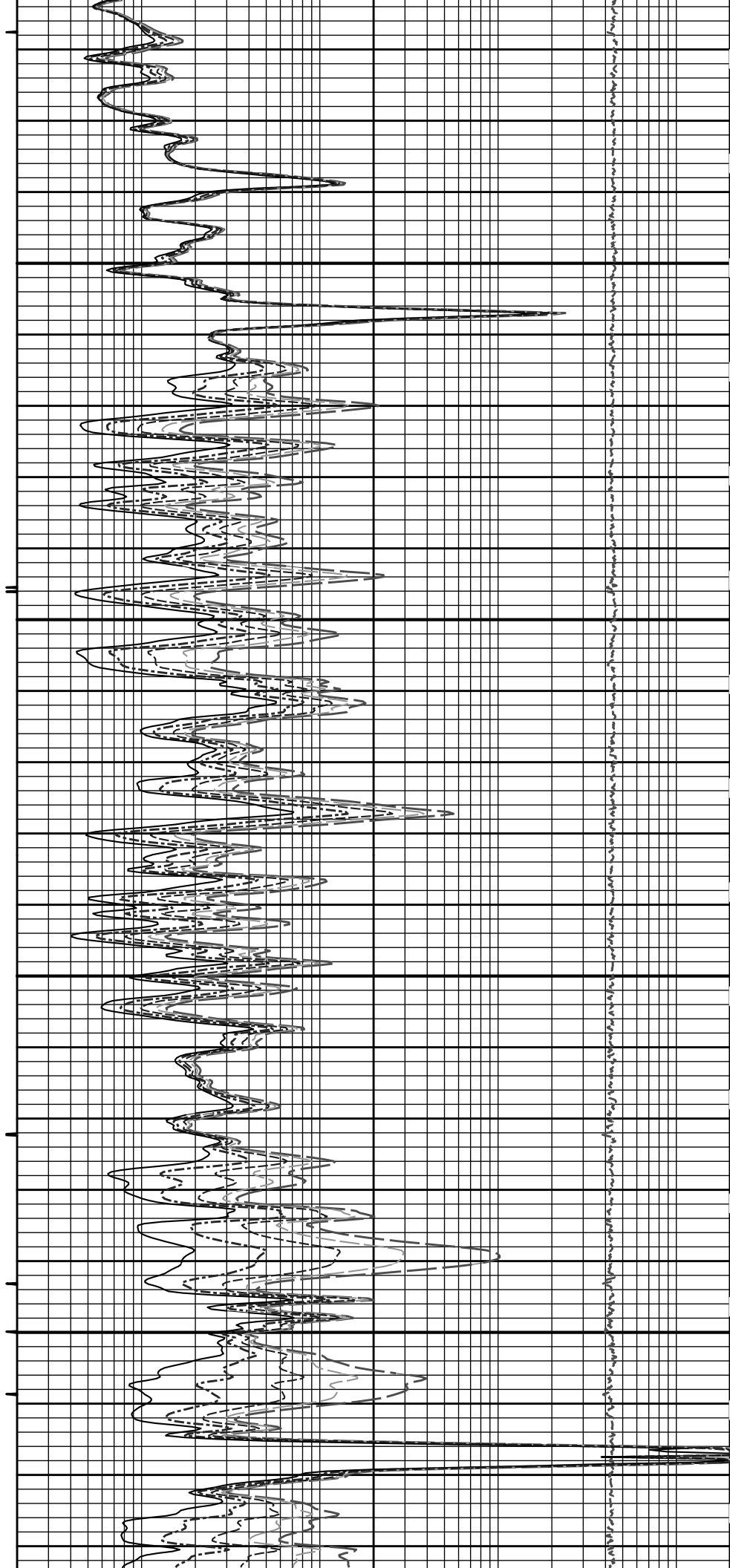
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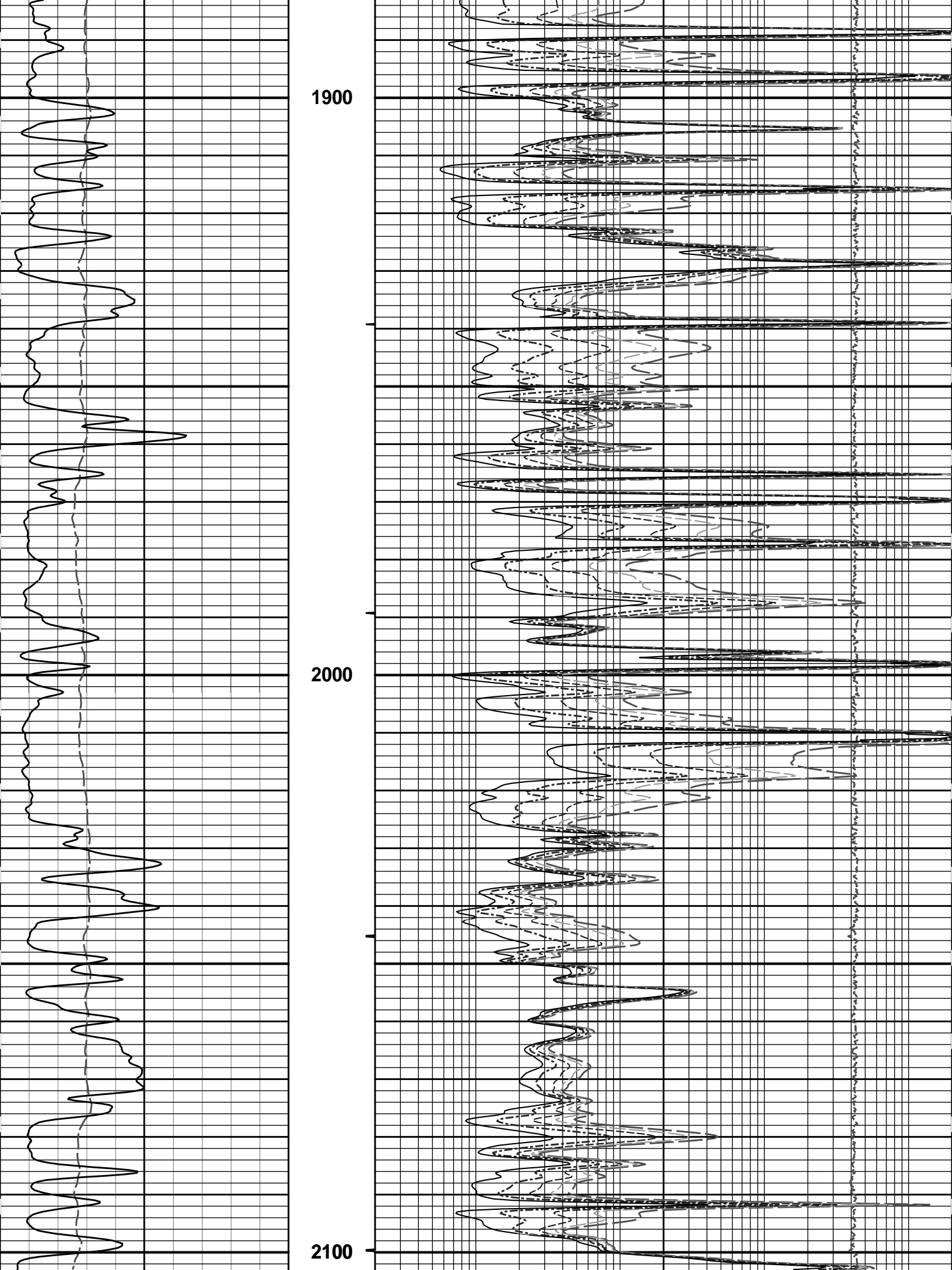


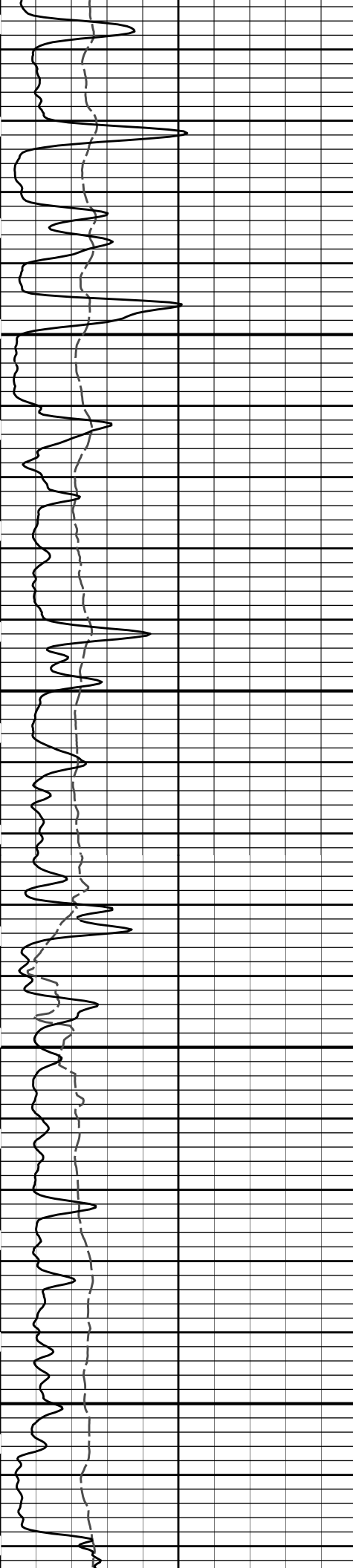


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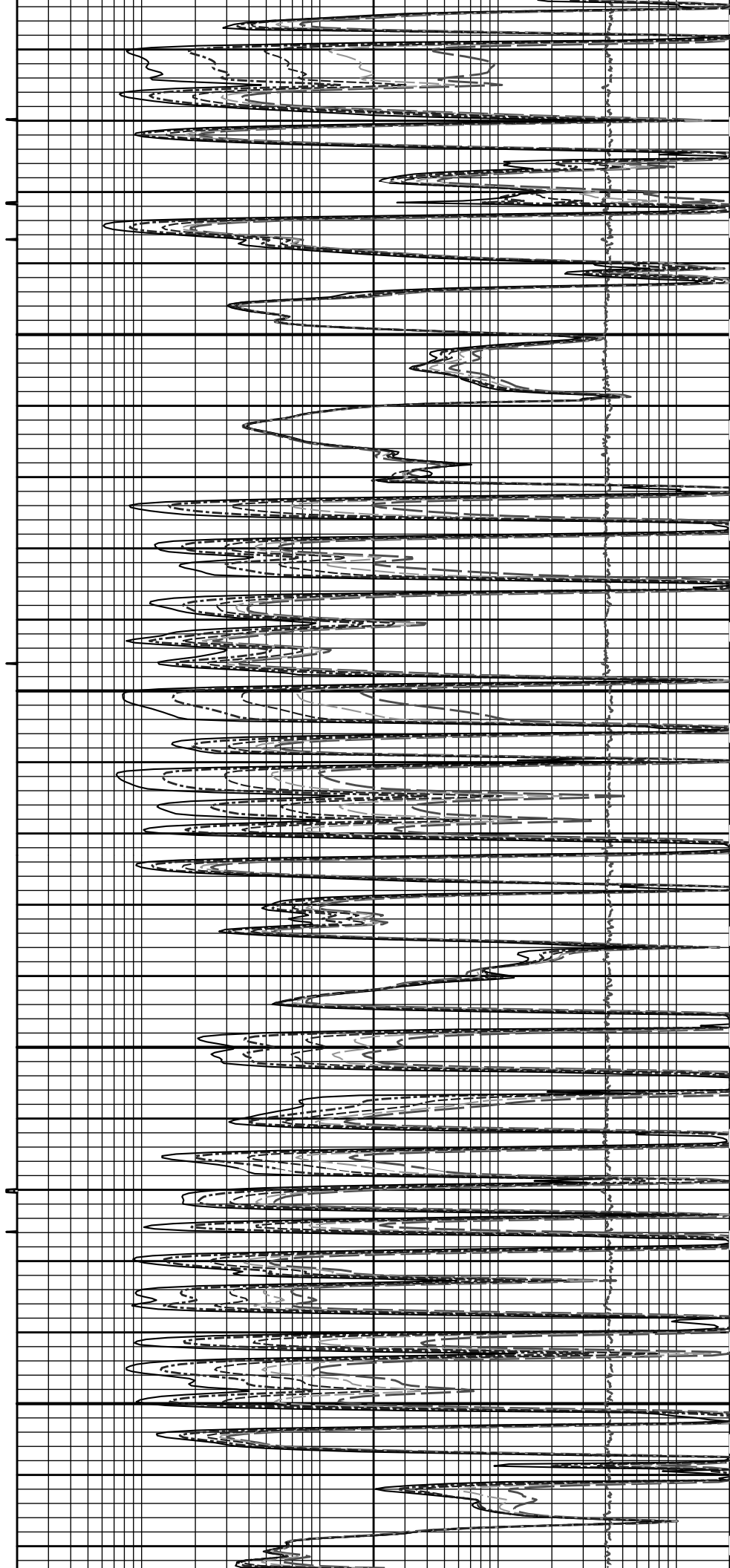


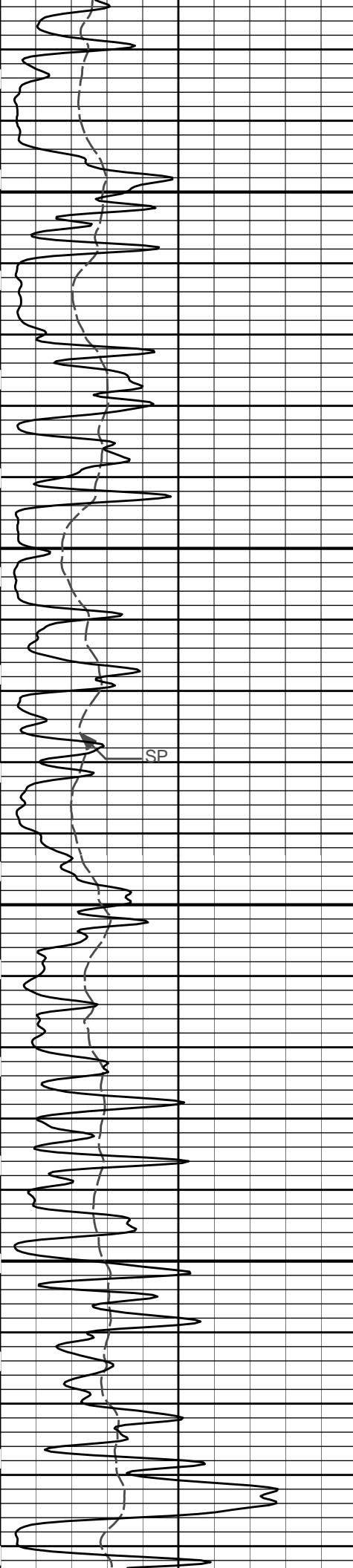




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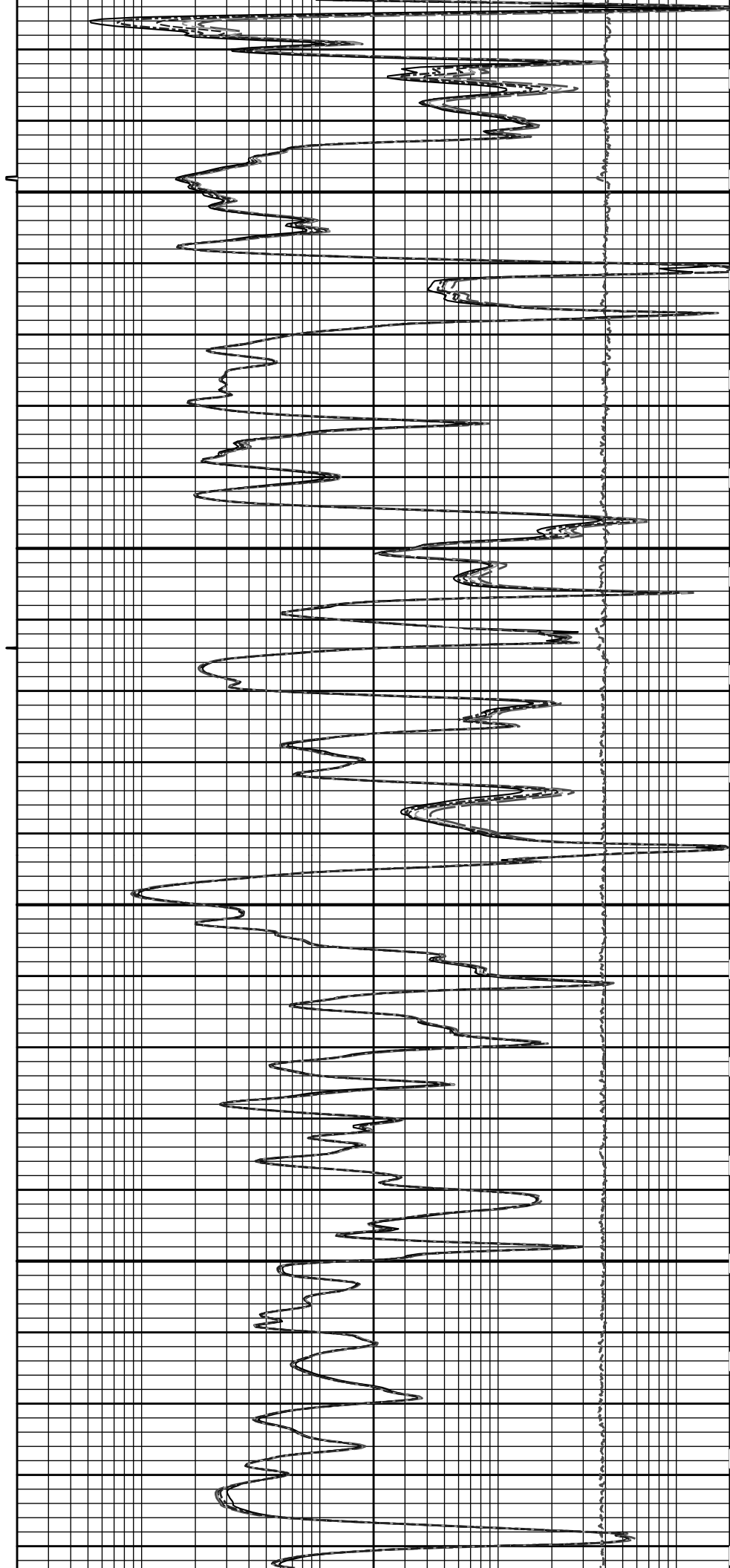
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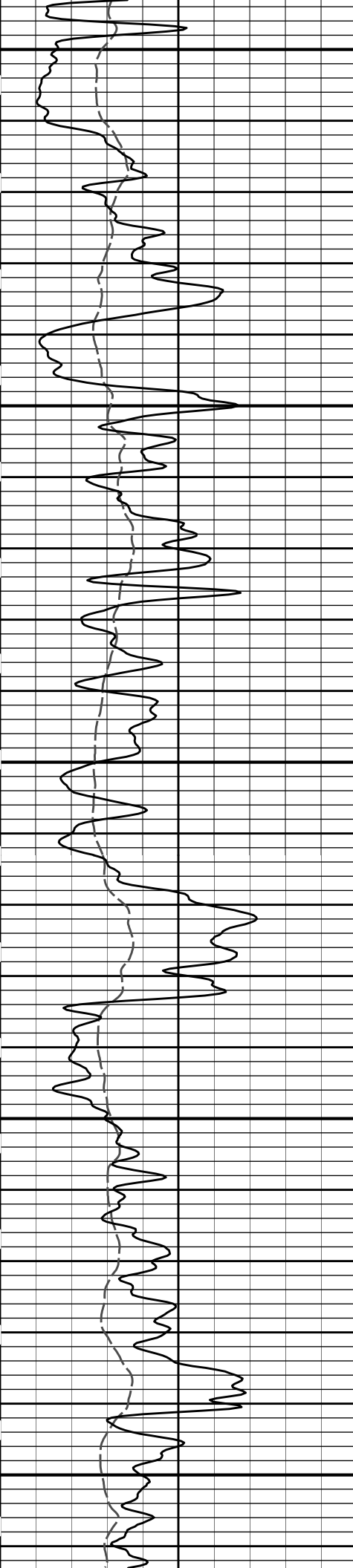




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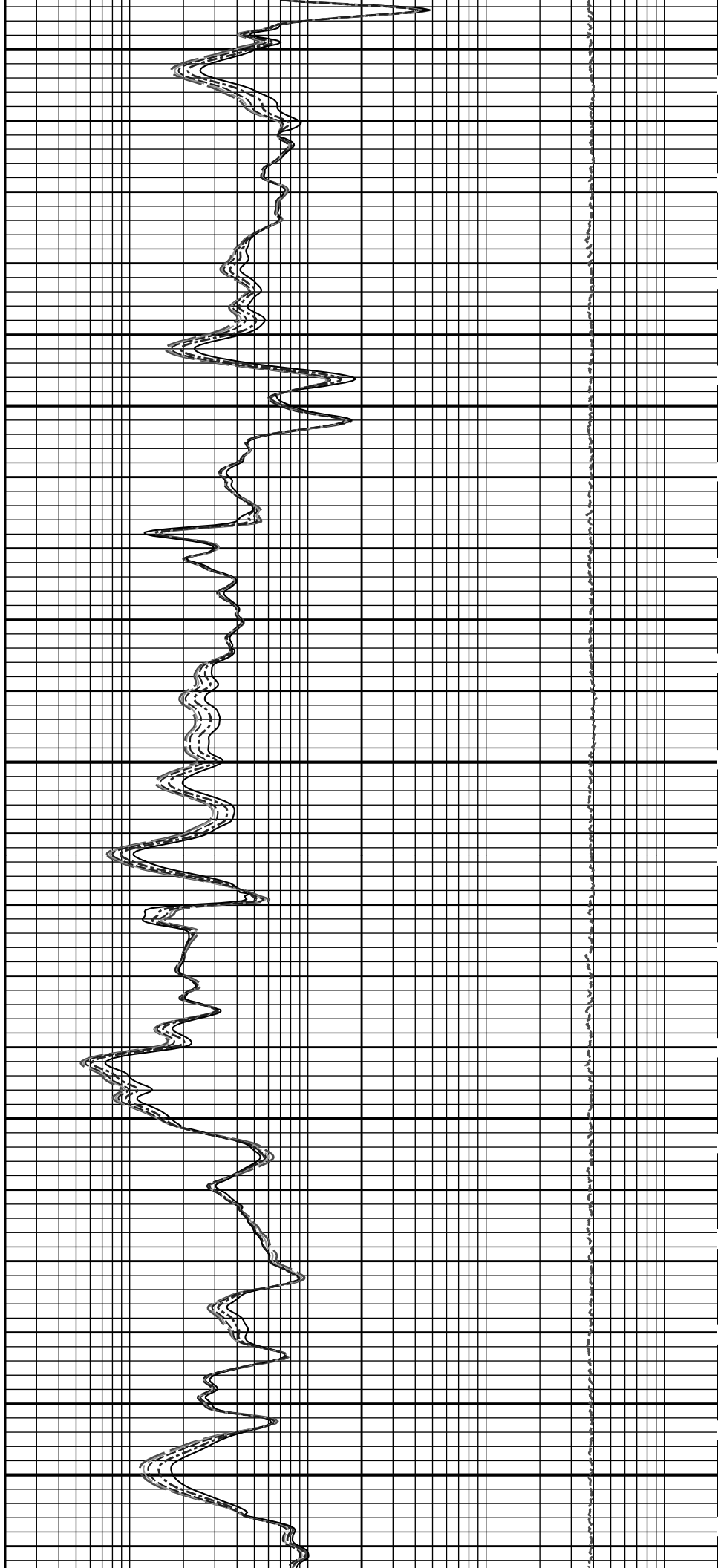
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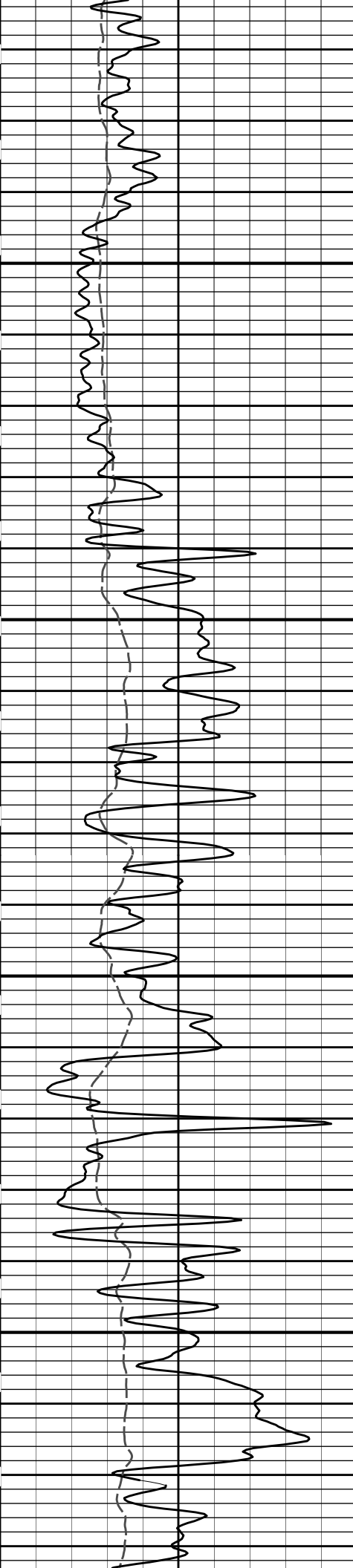




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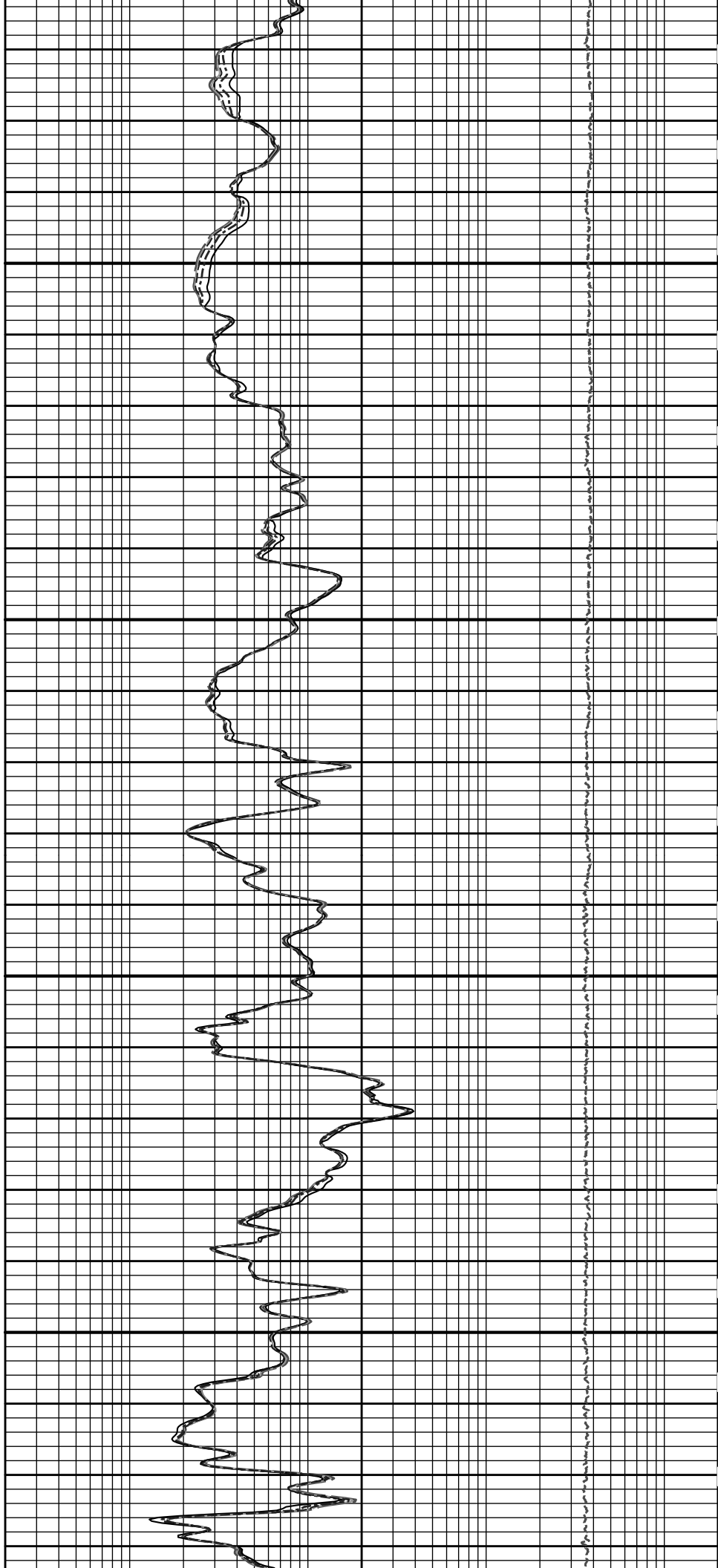
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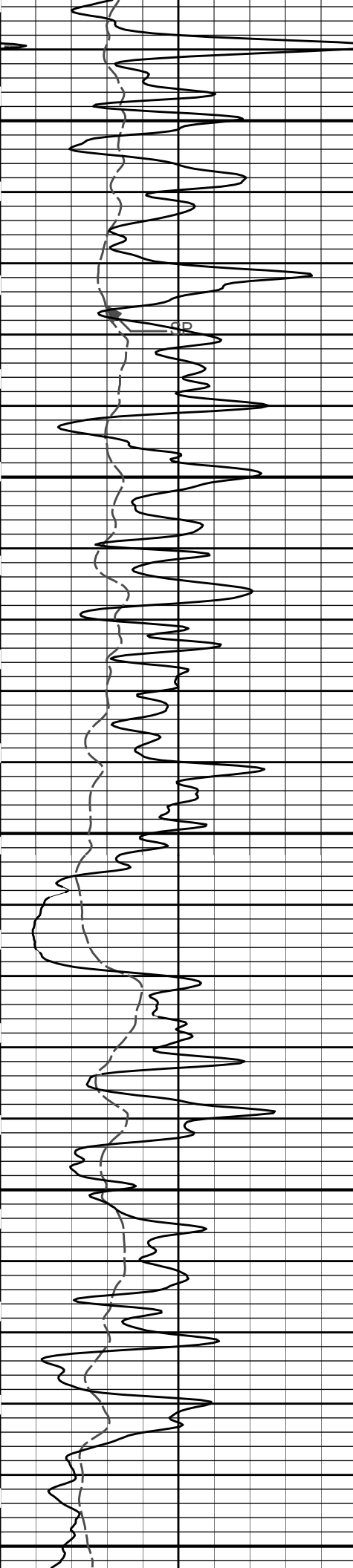




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2900

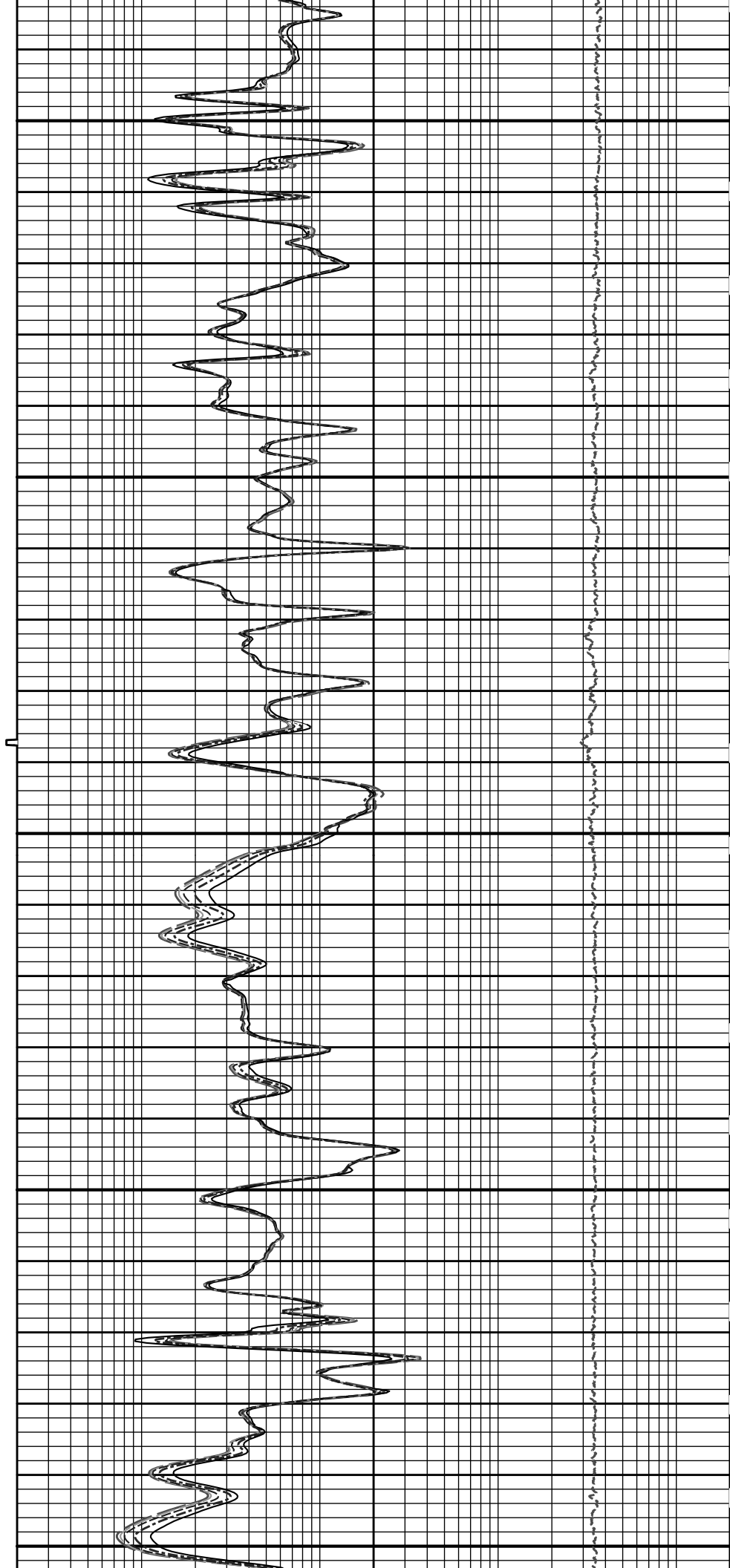


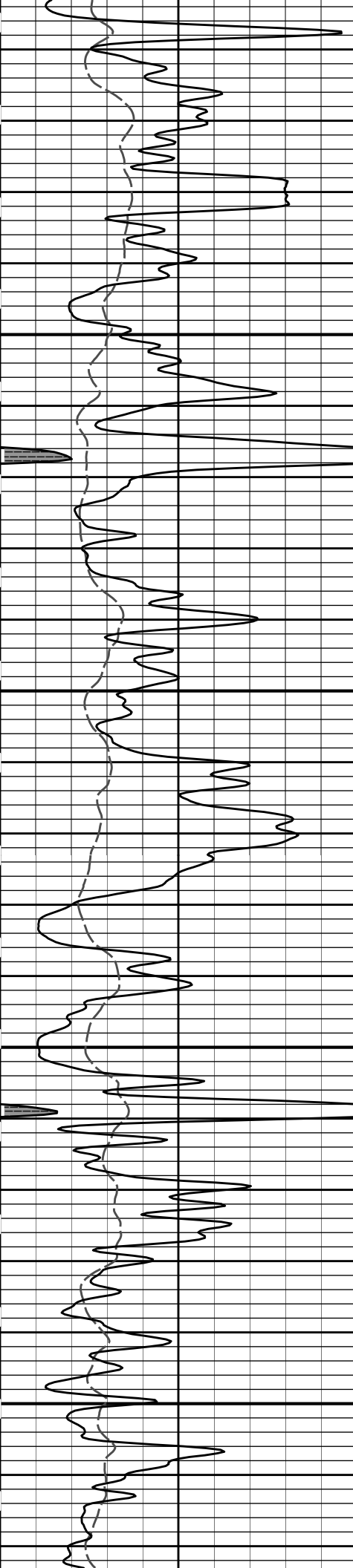


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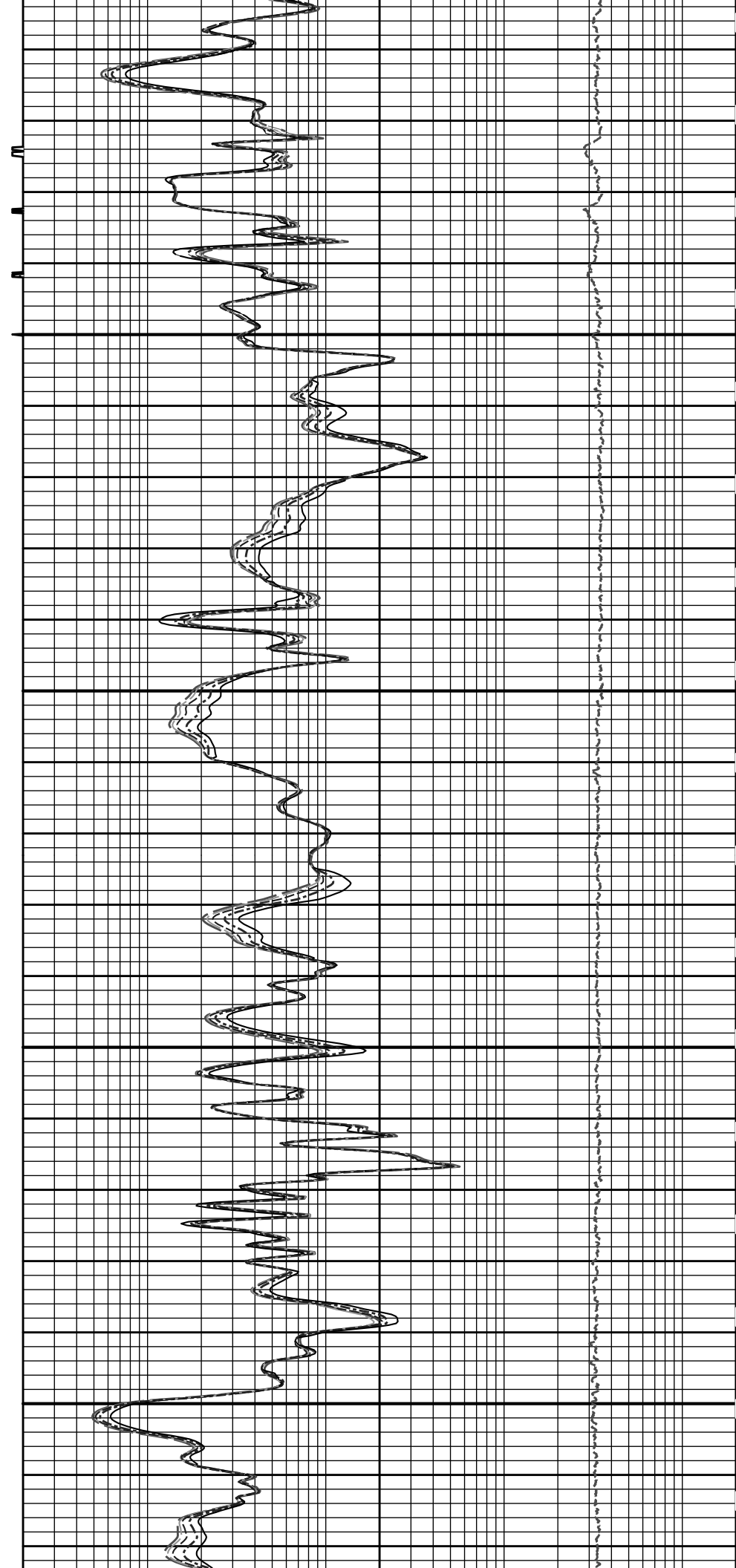
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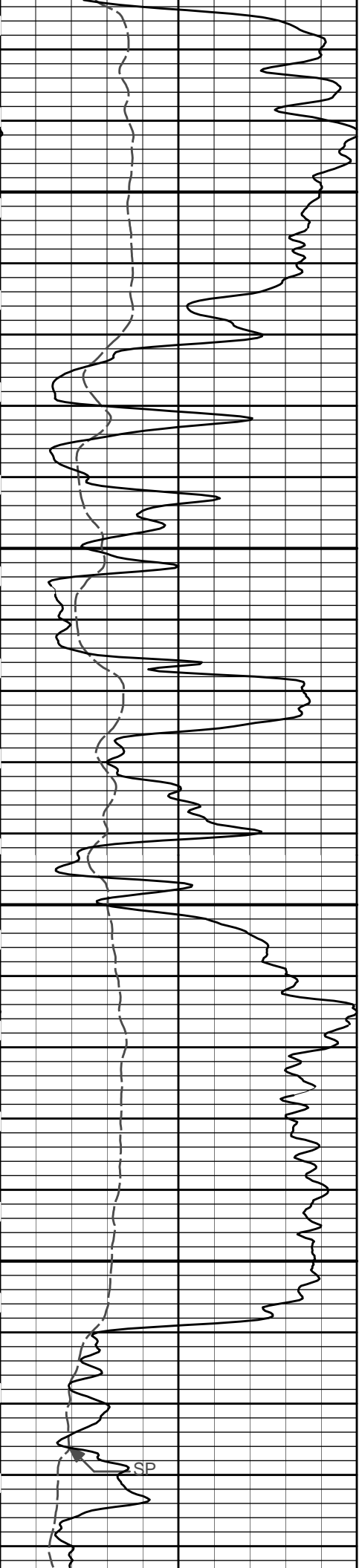




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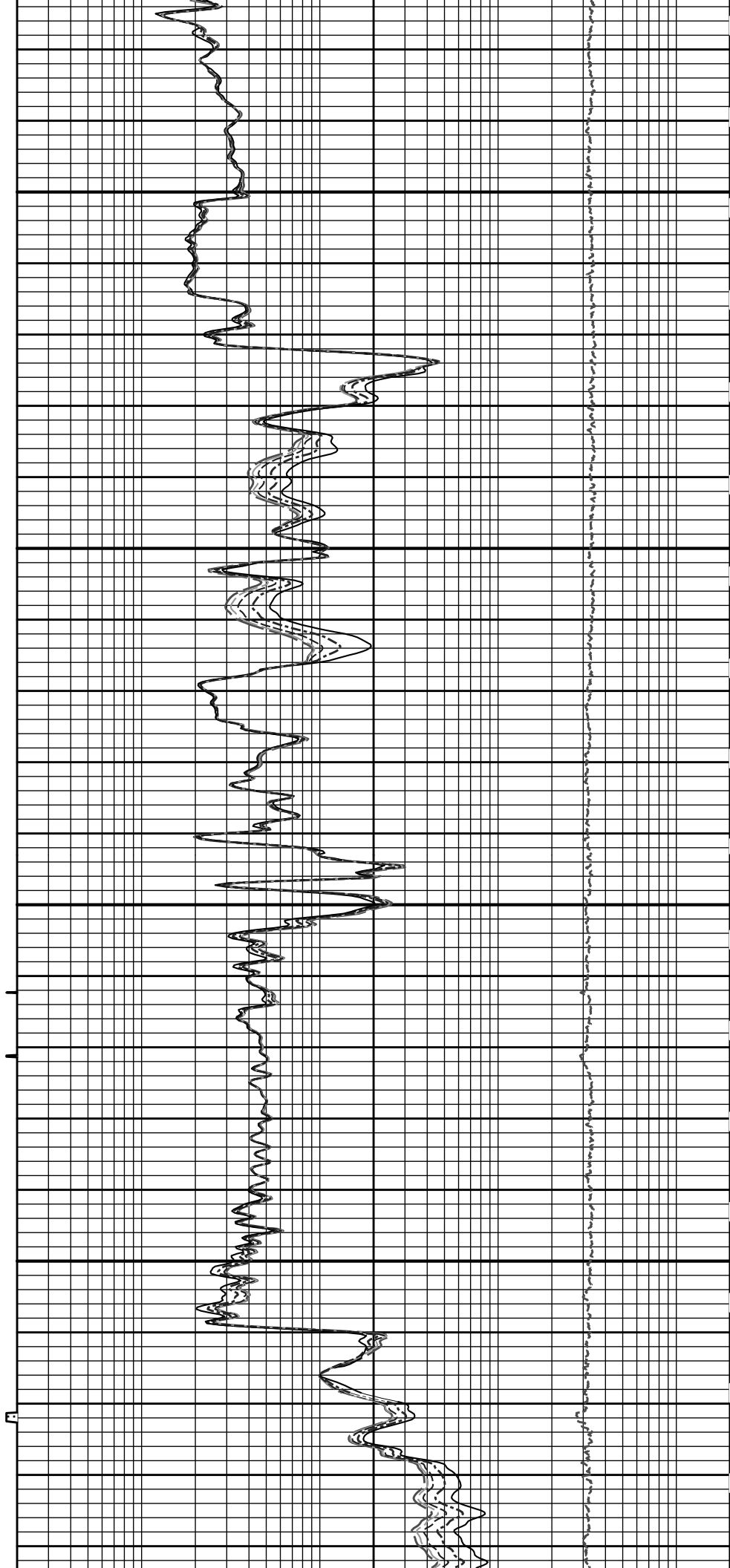
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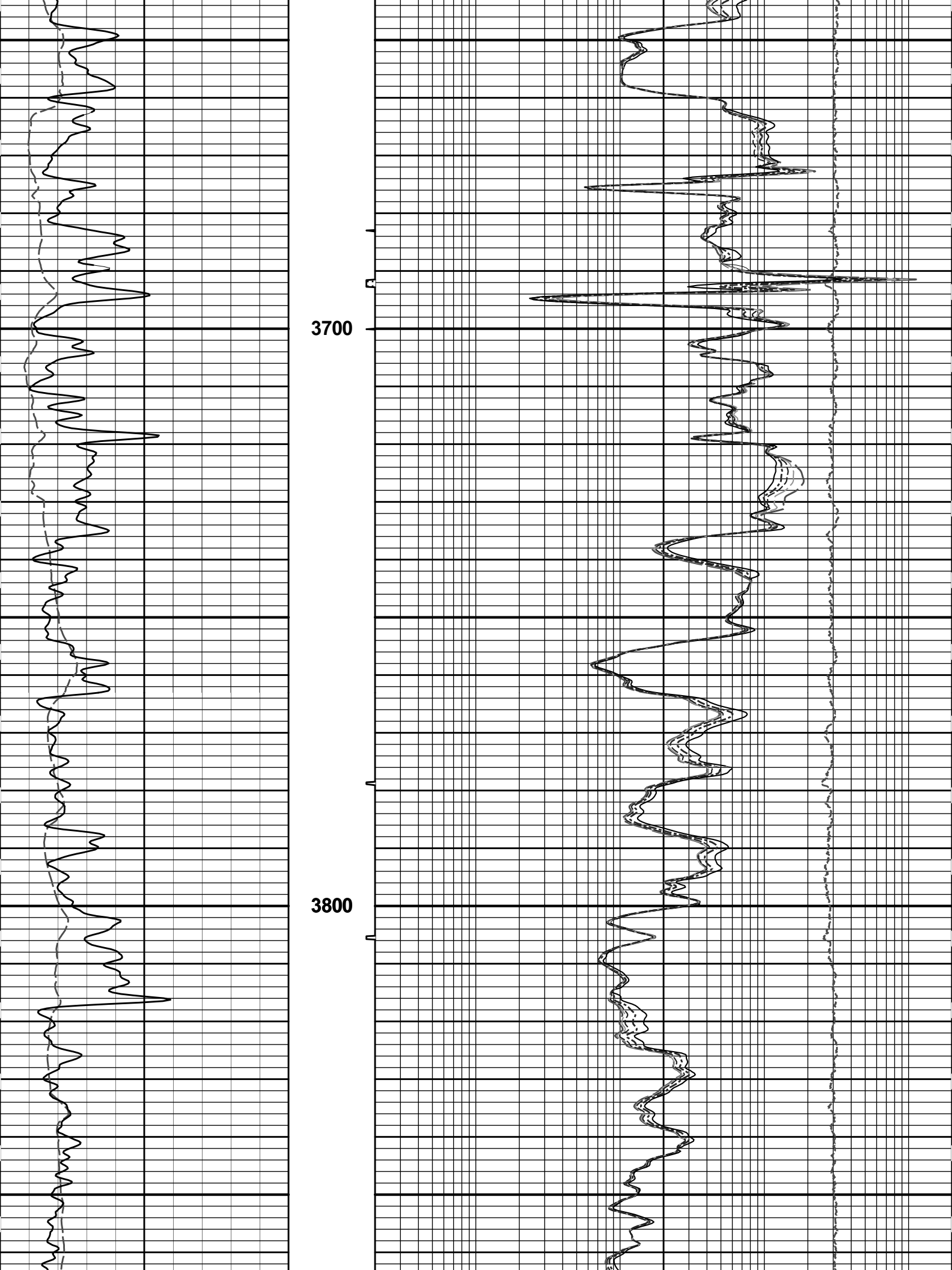


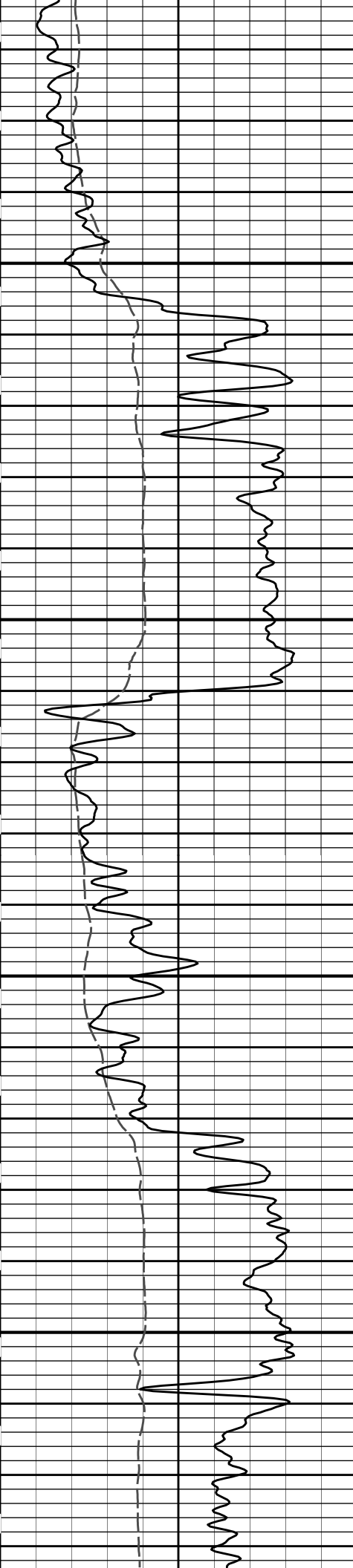


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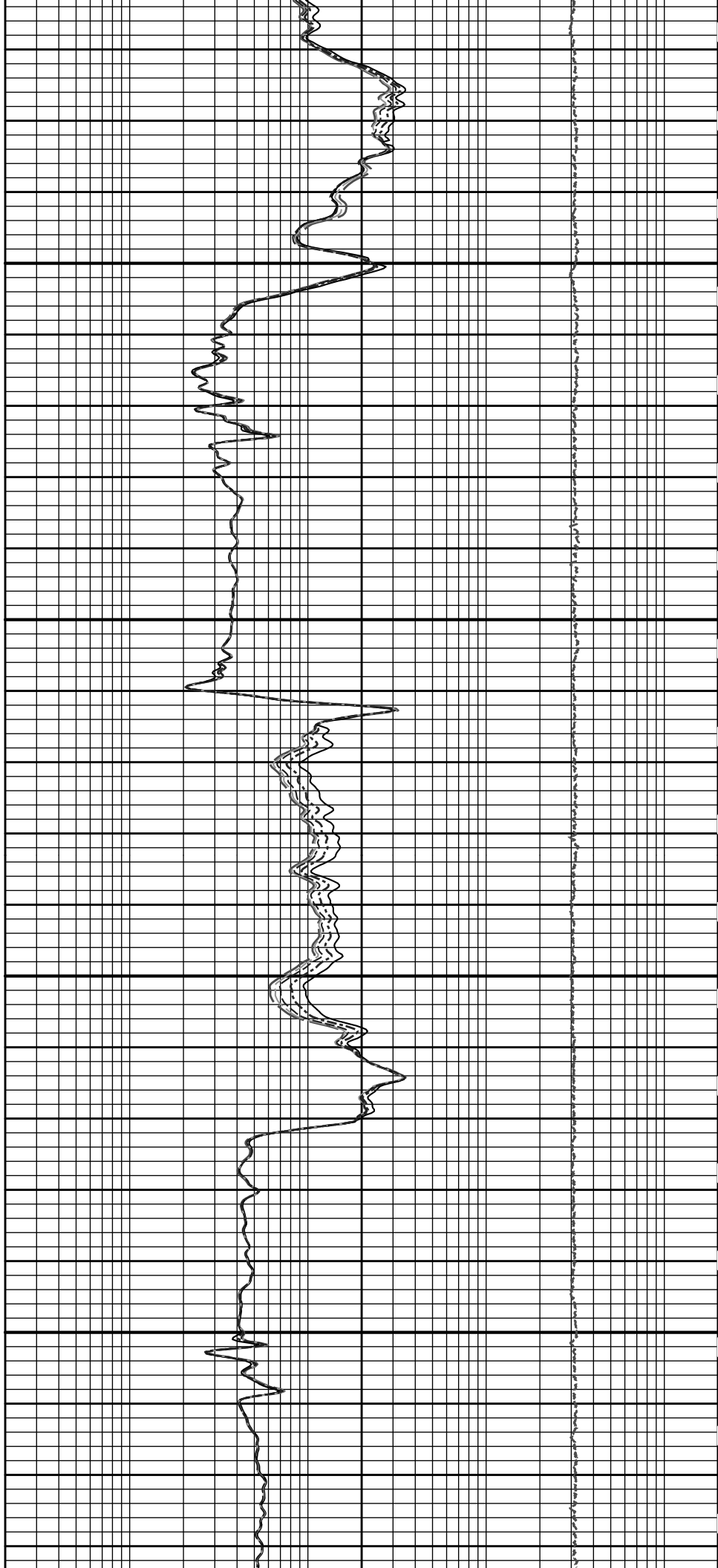


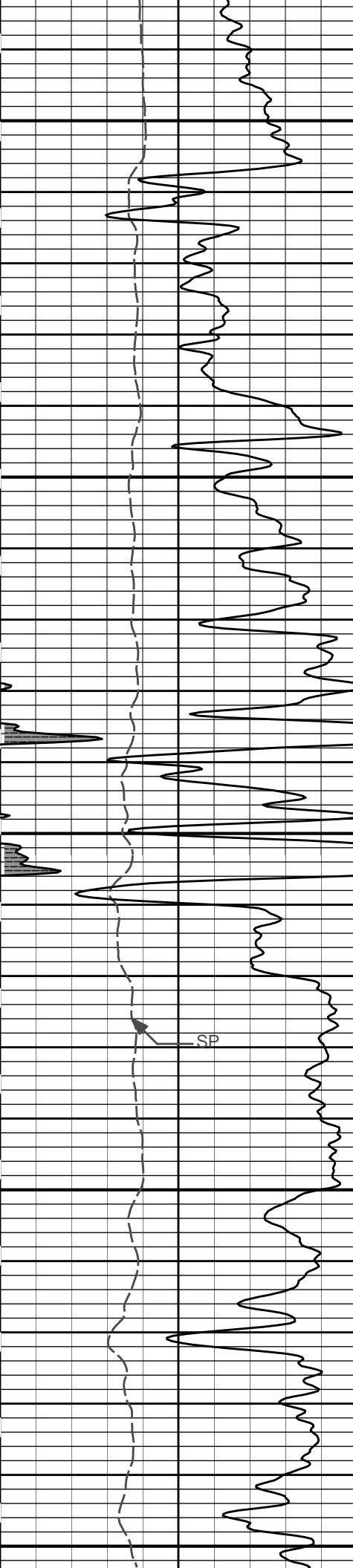




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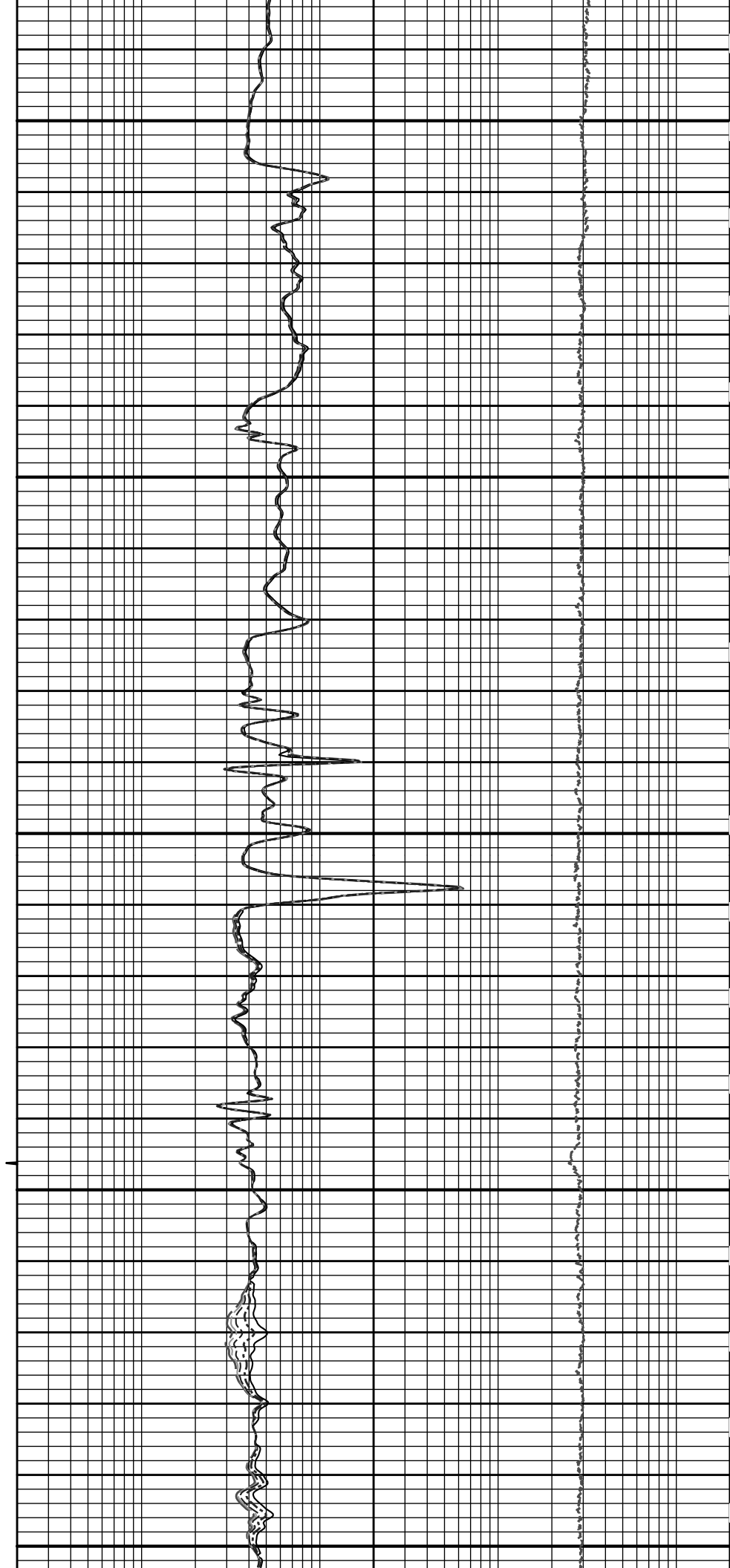


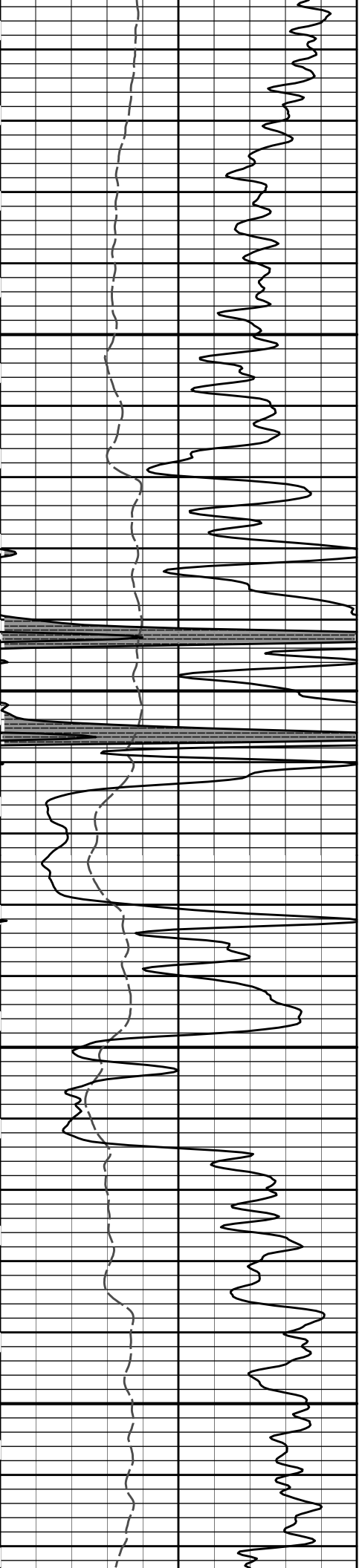


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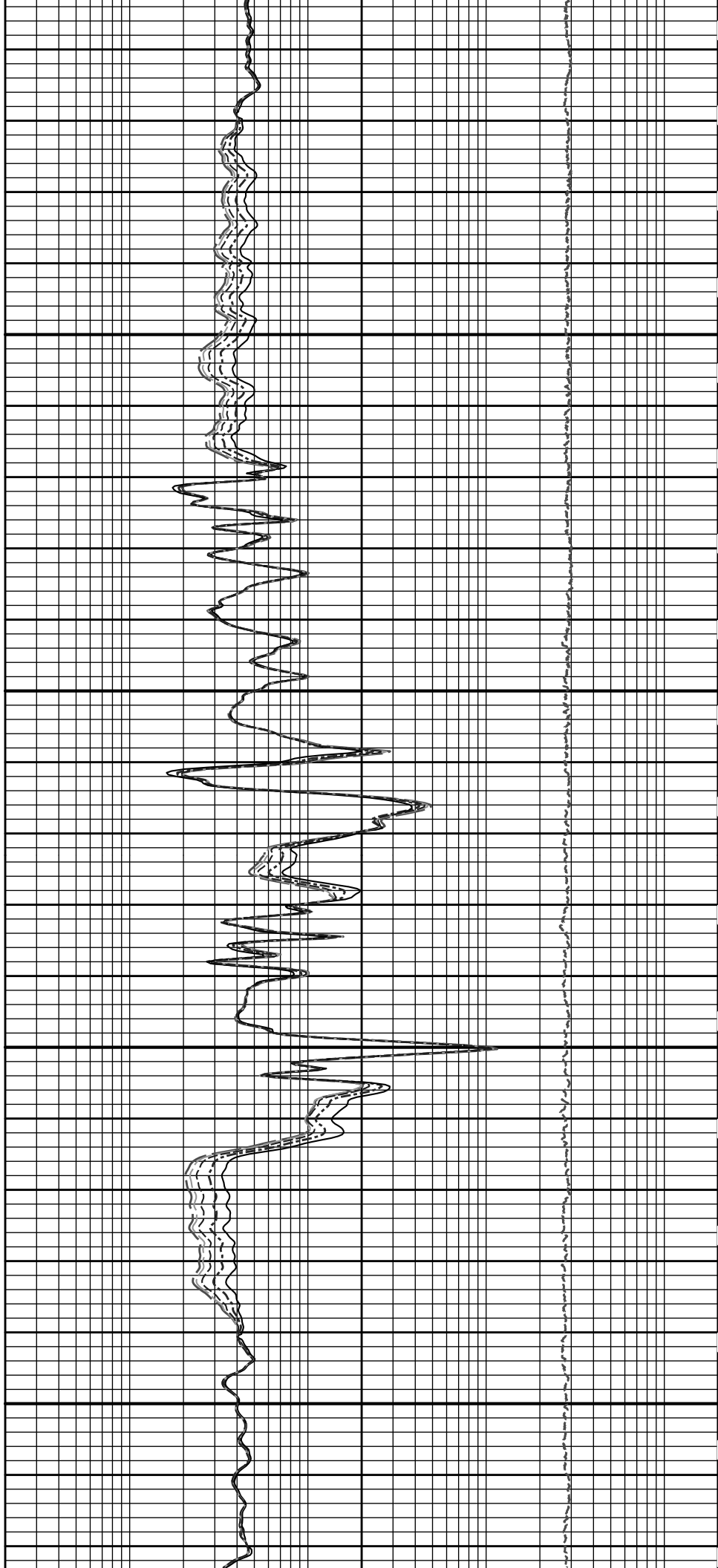
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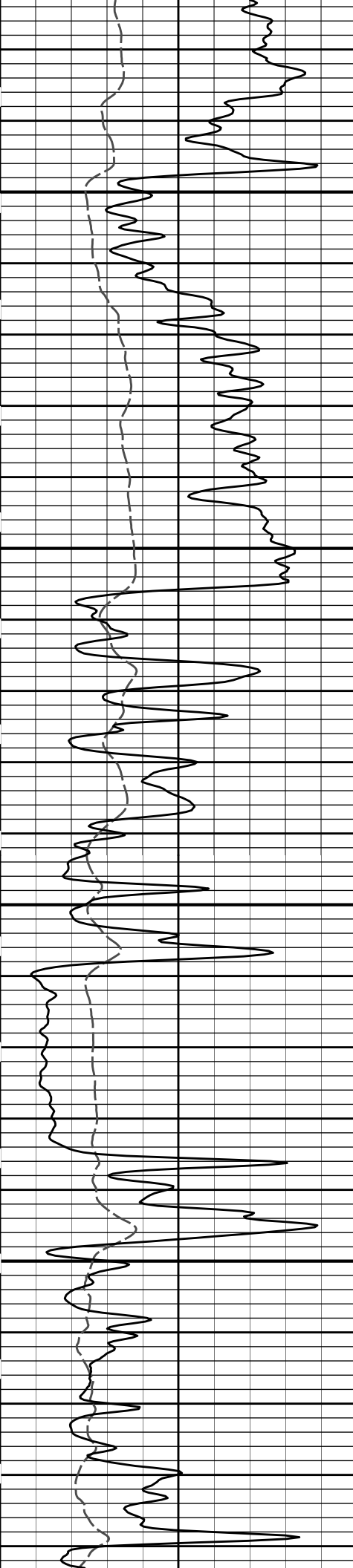




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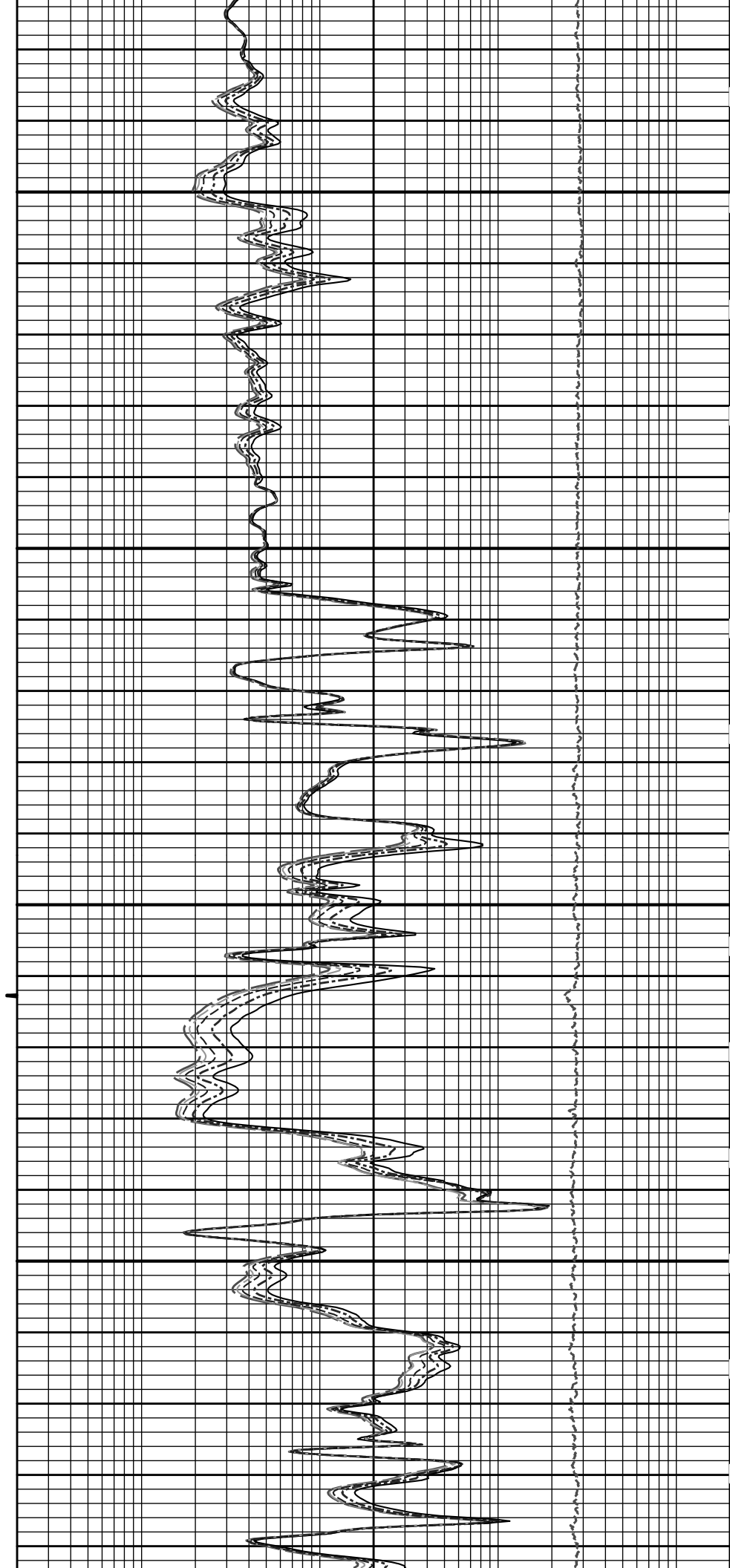
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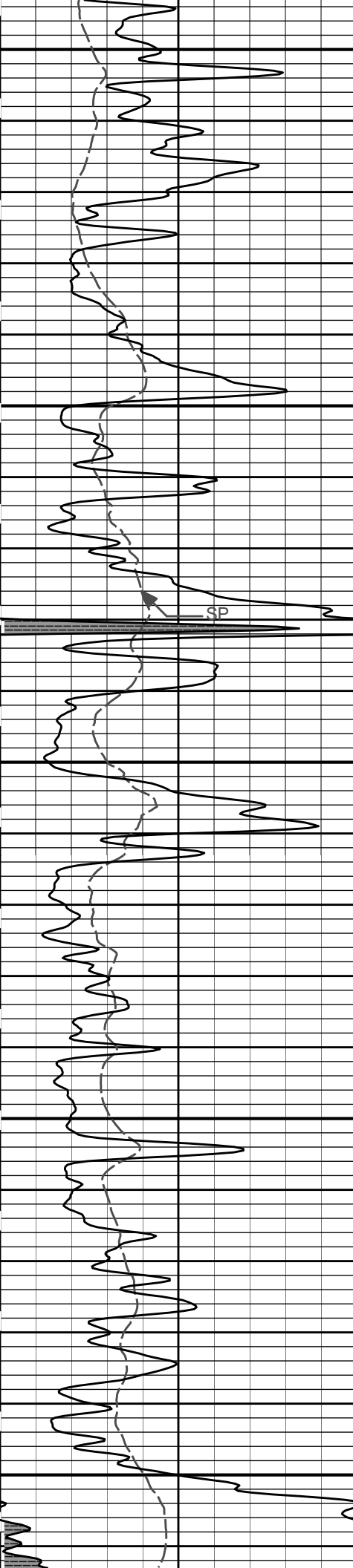




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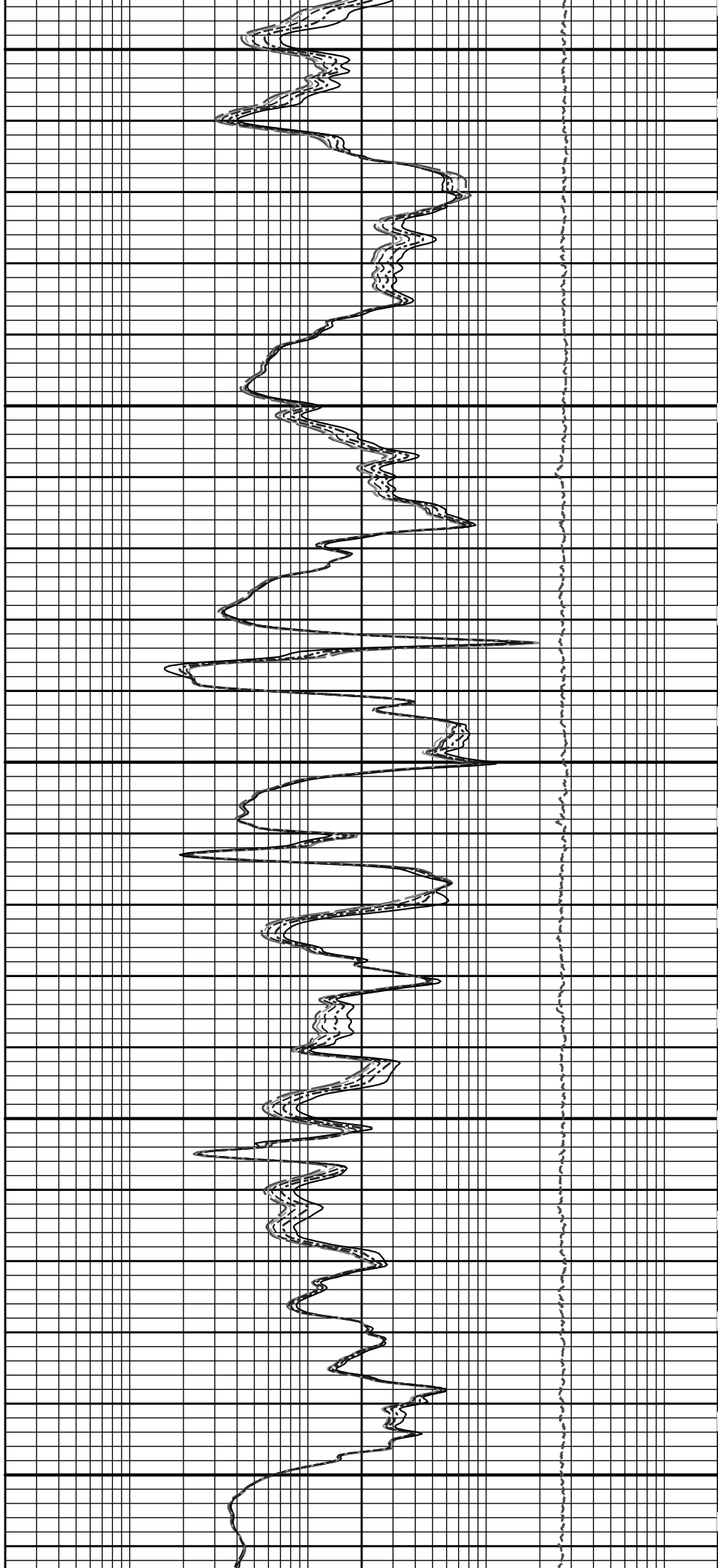
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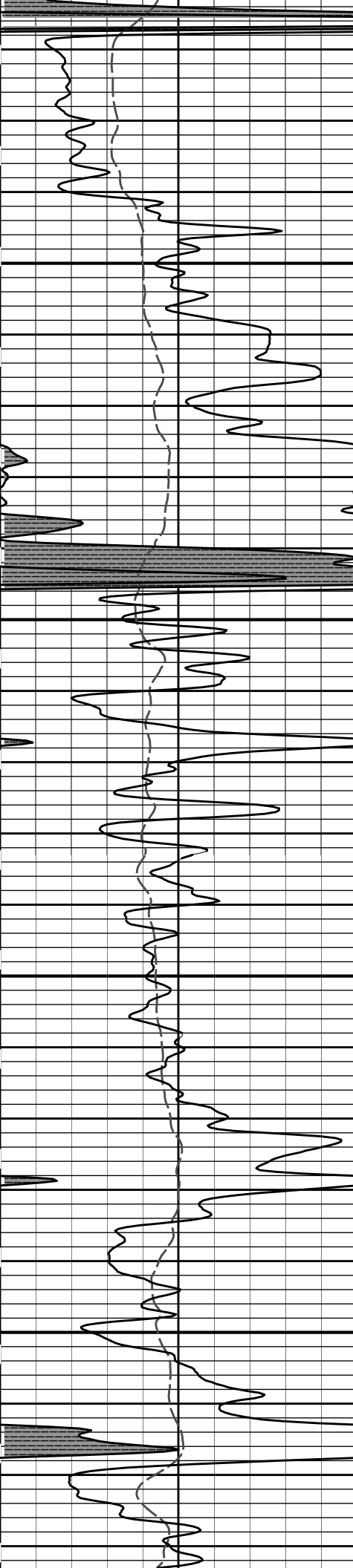




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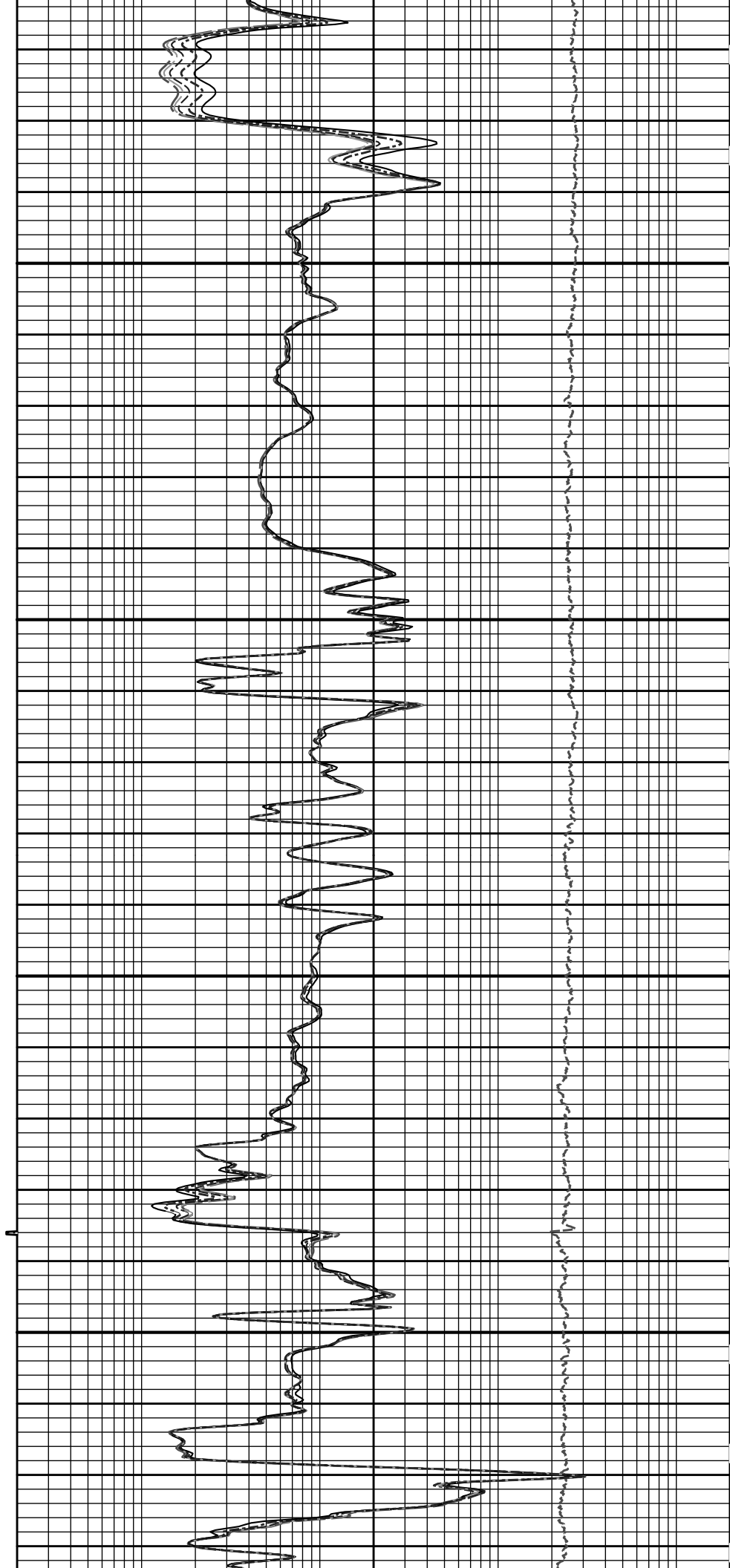
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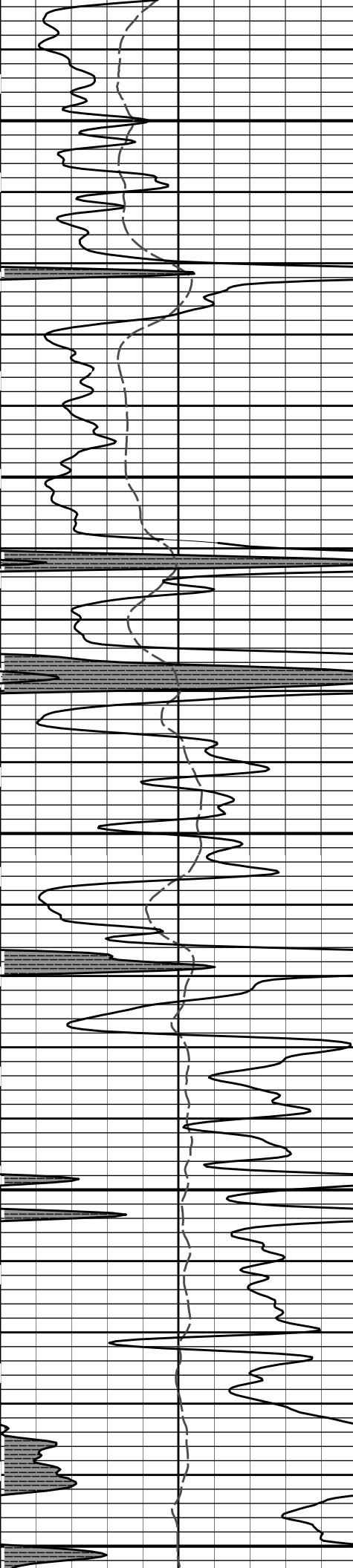




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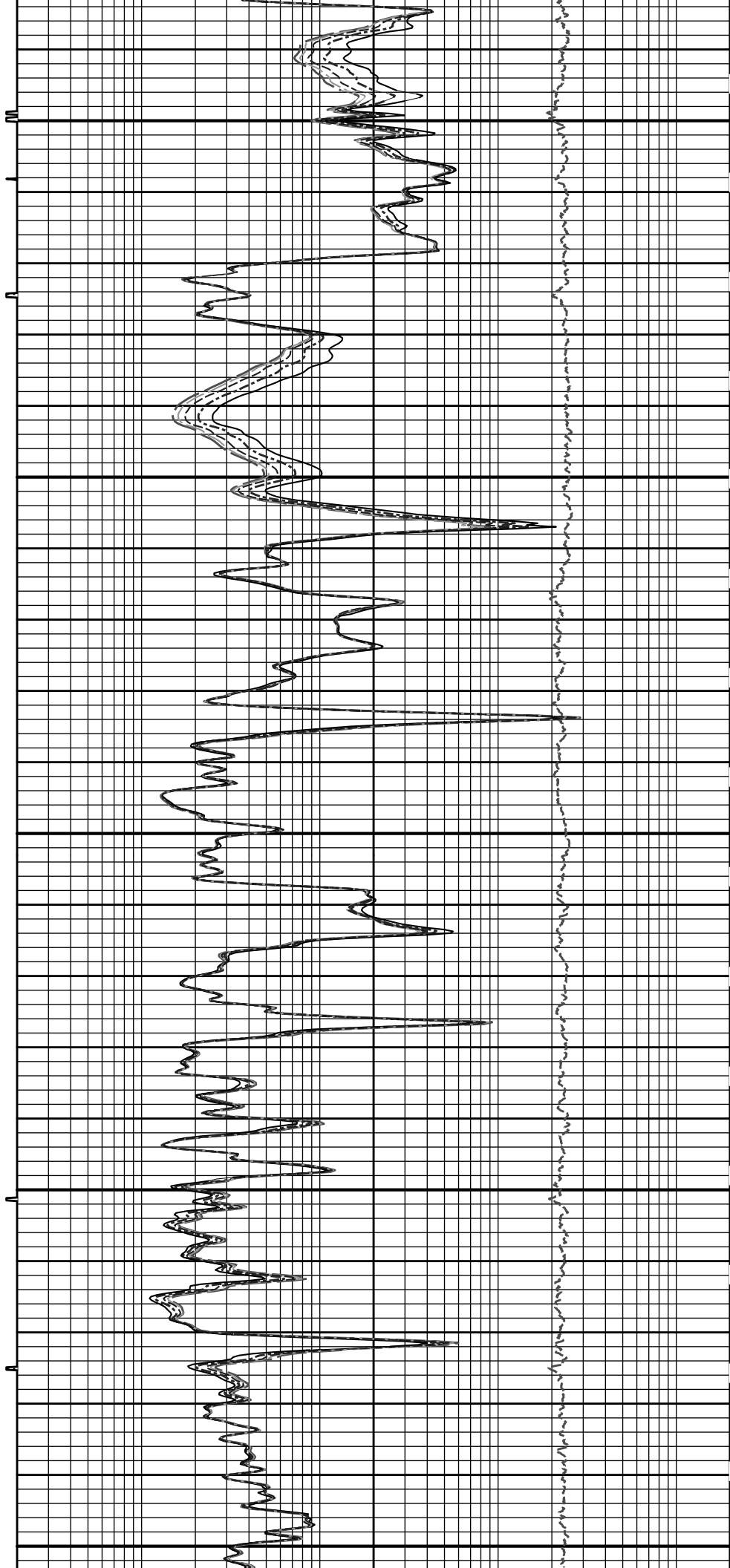


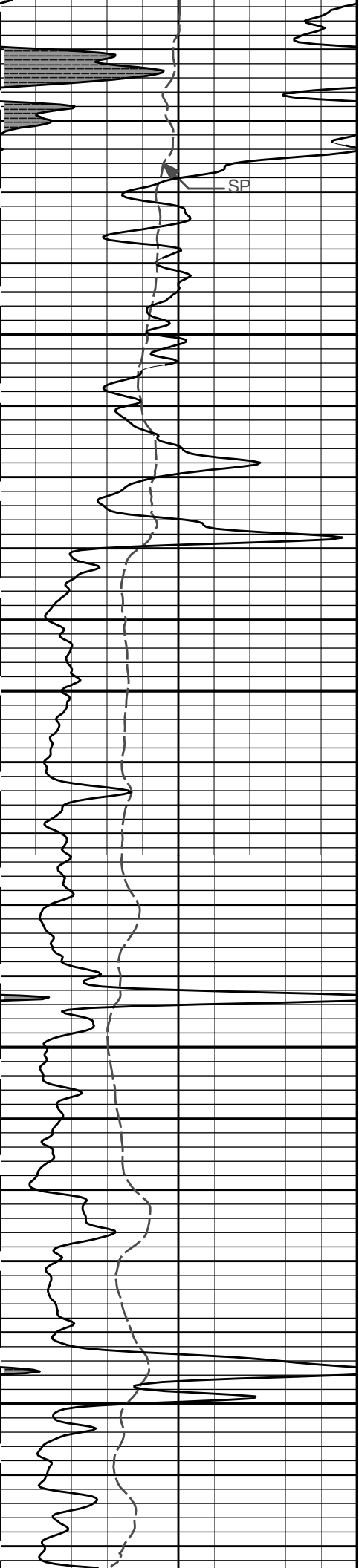


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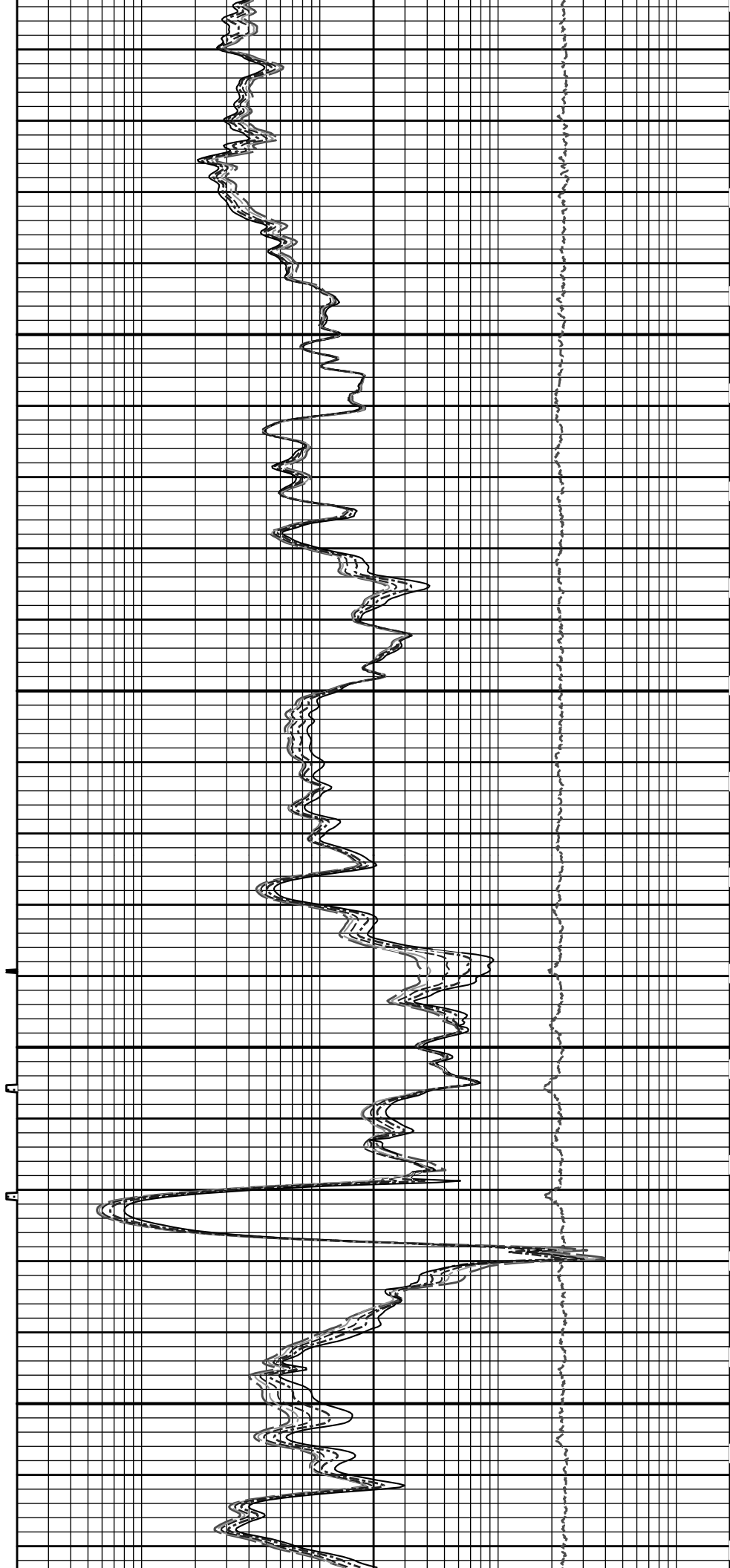
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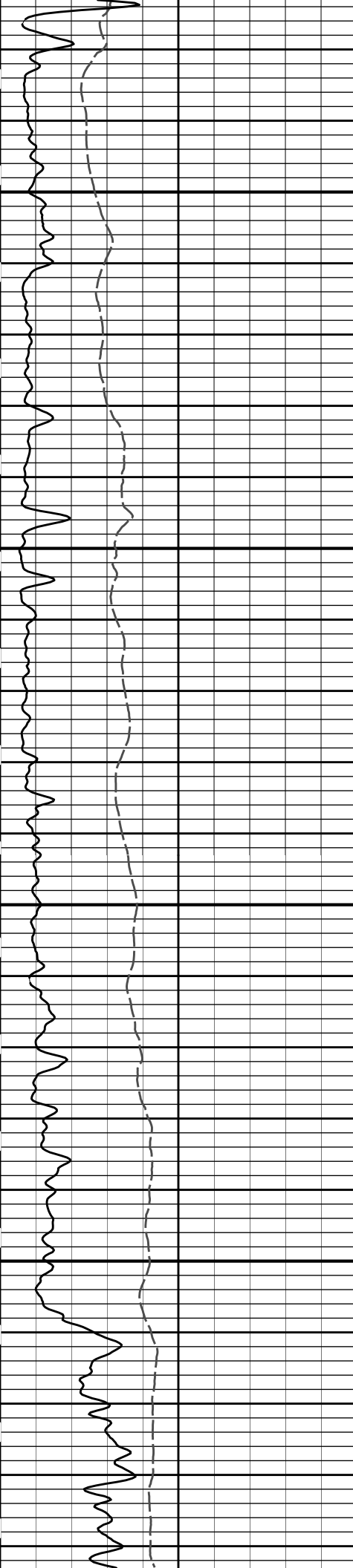




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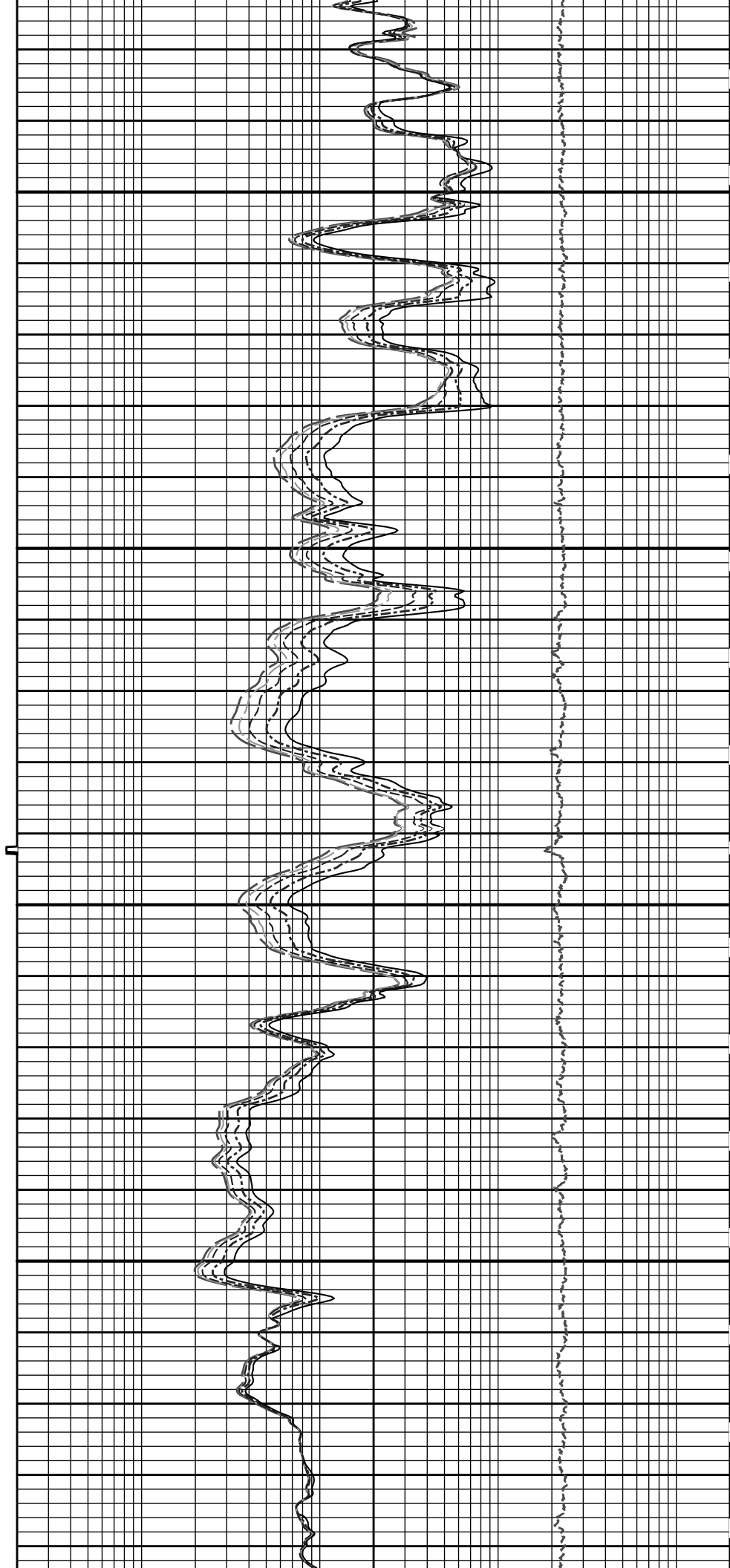
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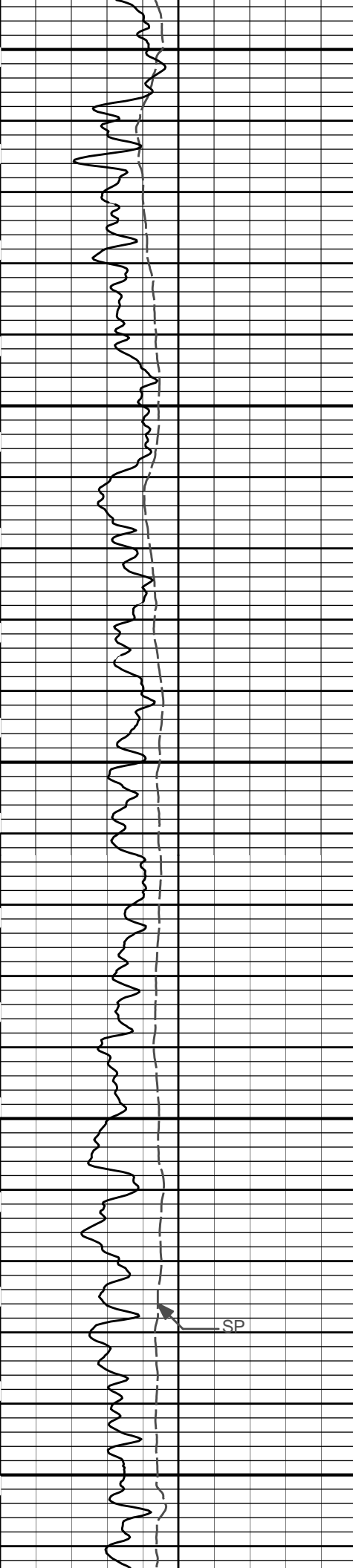




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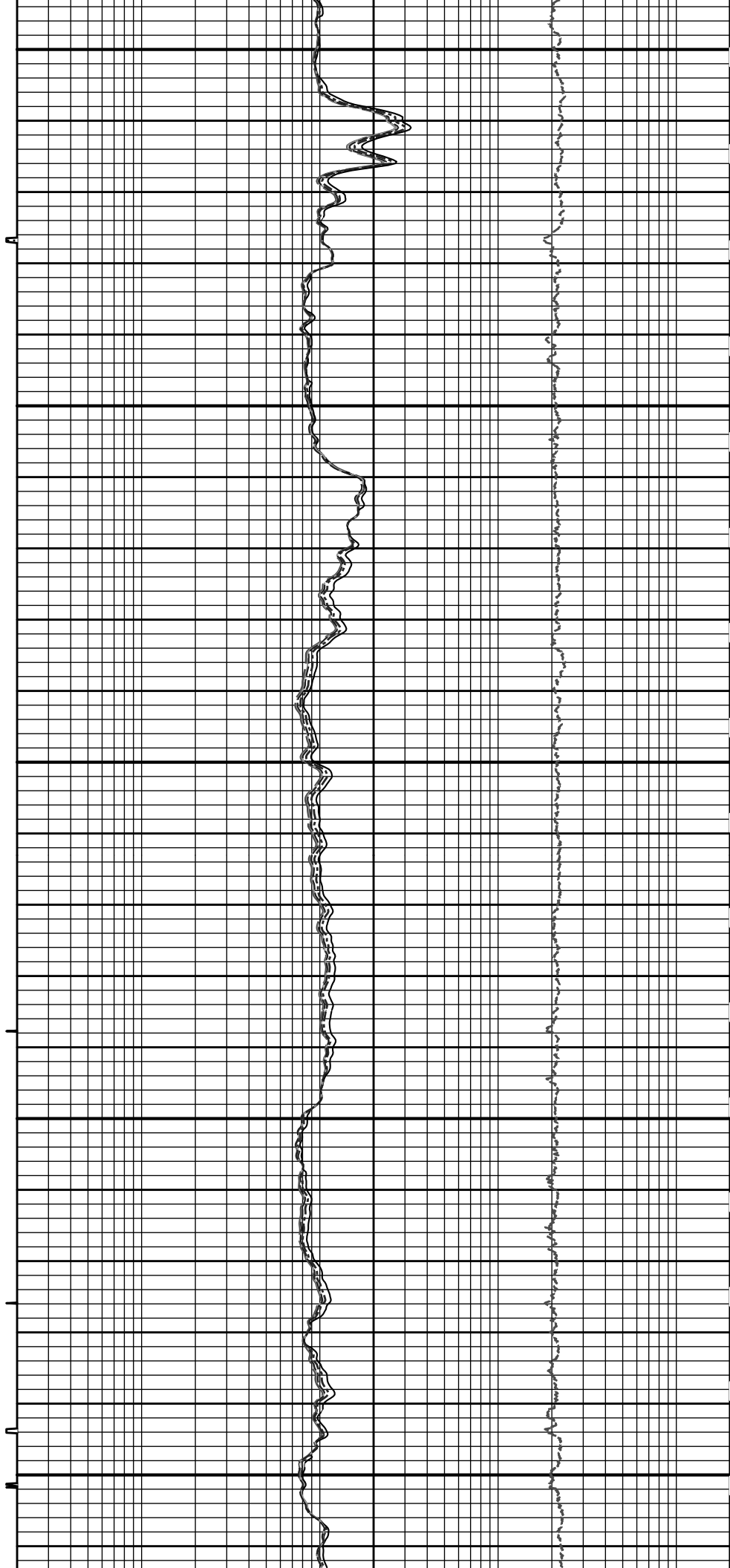
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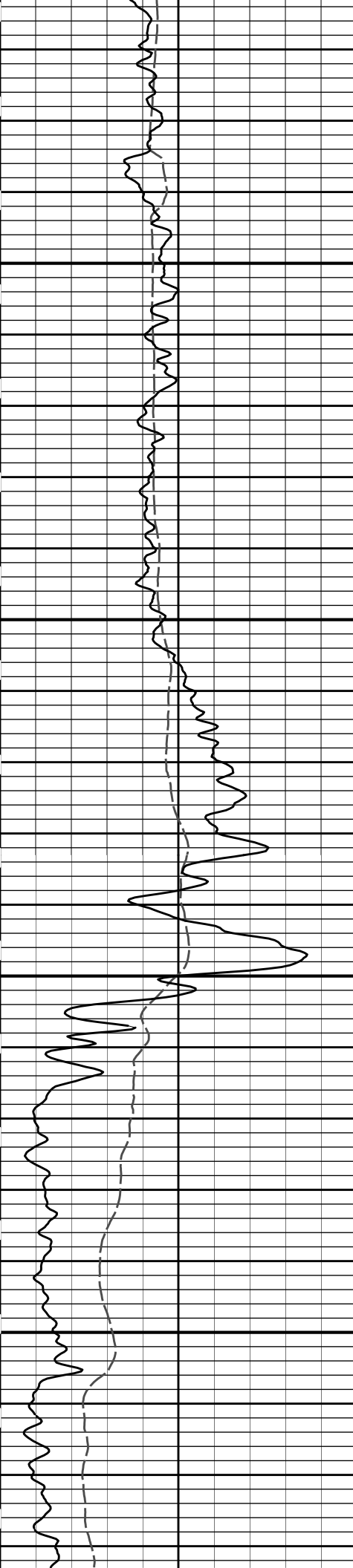




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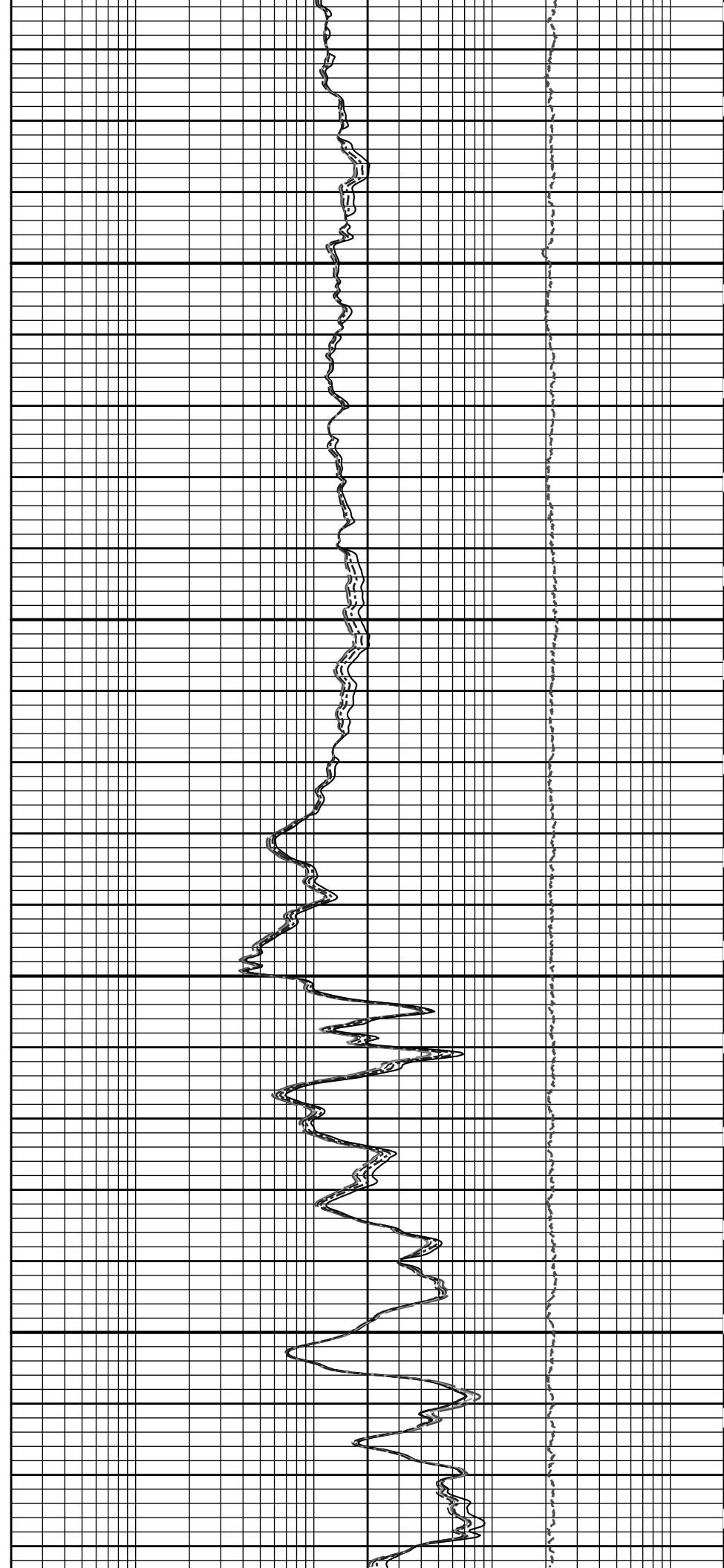
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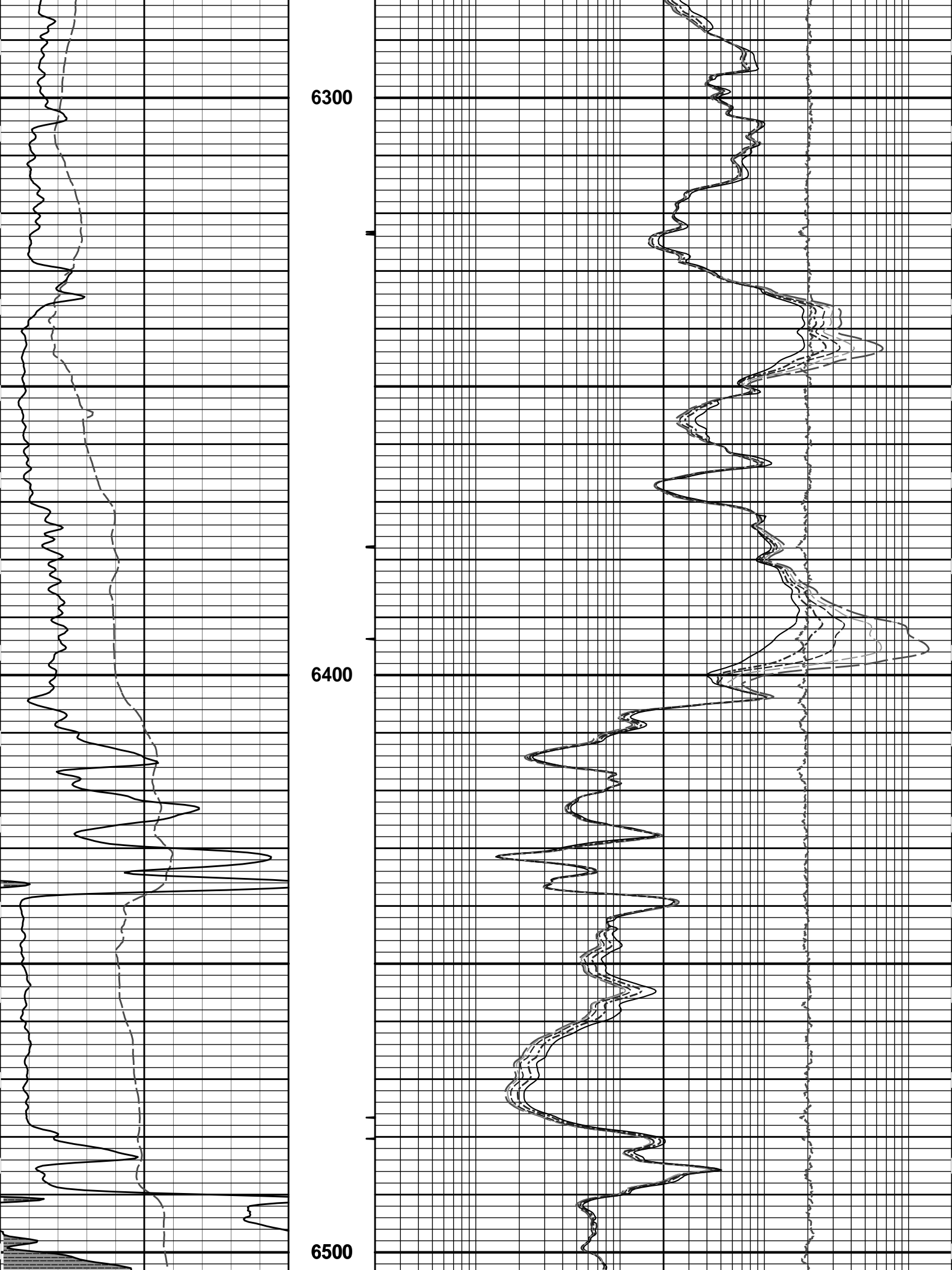




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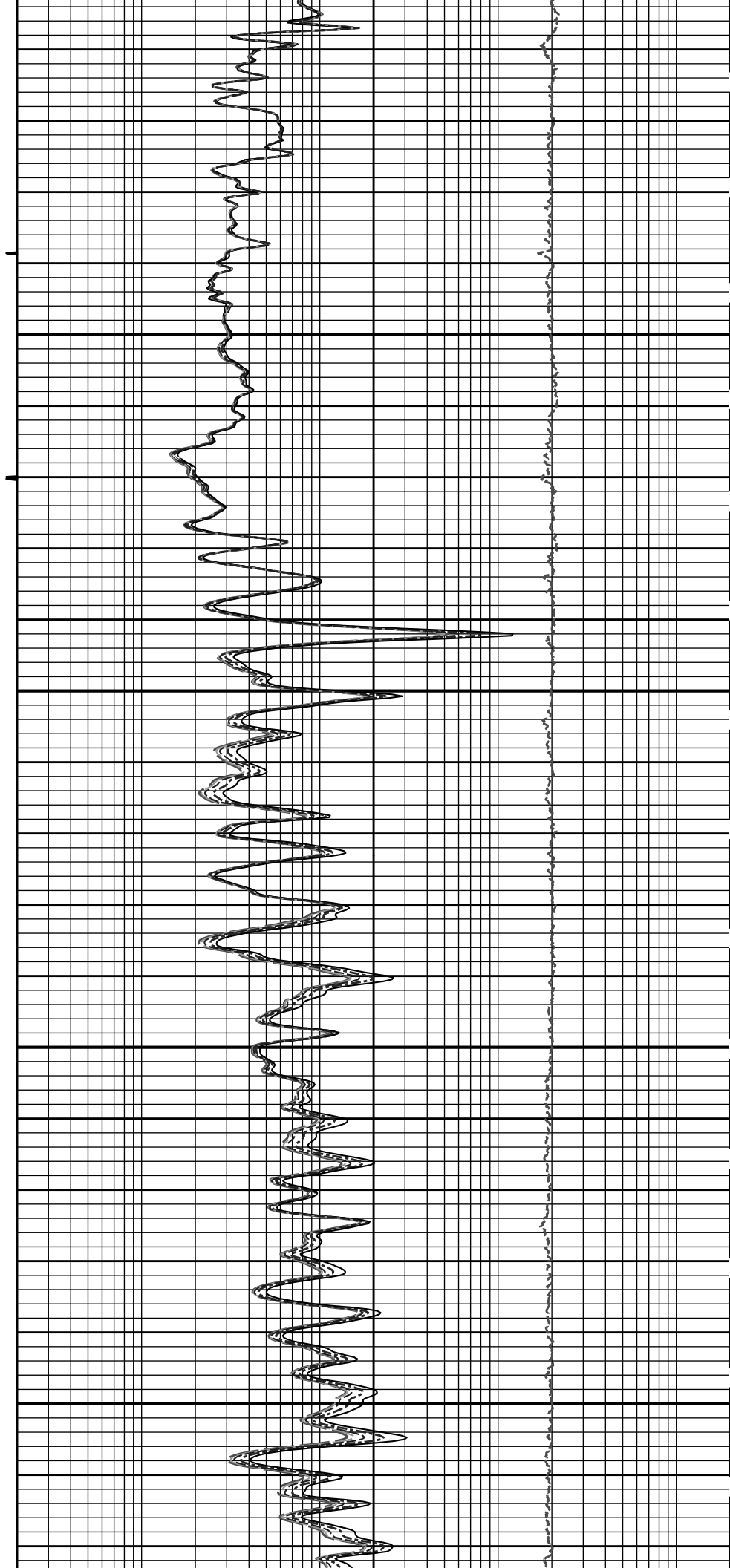


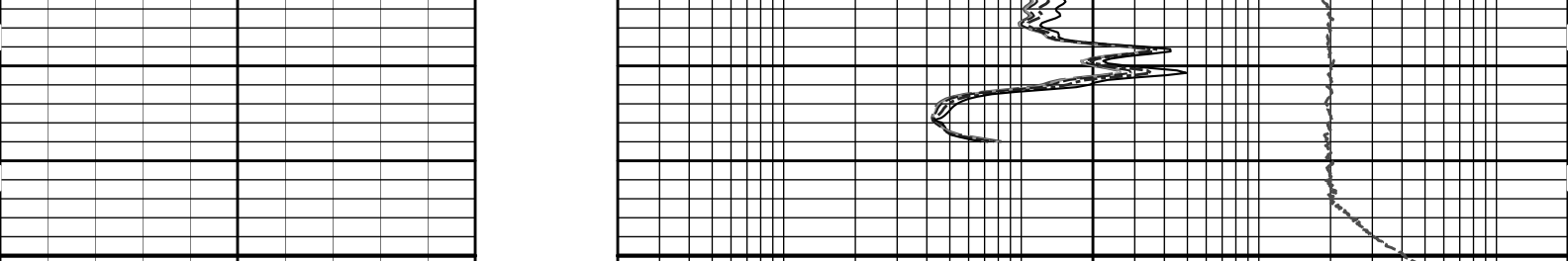




6600

6700





SP -]20[+	MD 1 : 240 ft	10K	Tension pounds	0
0	Gamma API	150	Tension Pull	0
api		0.2	10in Resistivity 2ft Res	2000
			ohmm	
SHALE	Tension Pull	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: 15-Jun-12 22:08:07  
 Plot Range: 980 ft to 6751.17 ft  
 Data: SALT\_3419\_SWD14\Well Based\CASING\  
 Plot File: \\-LOCAL-ISALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHIACRTIACRT\_5\_main\_lib

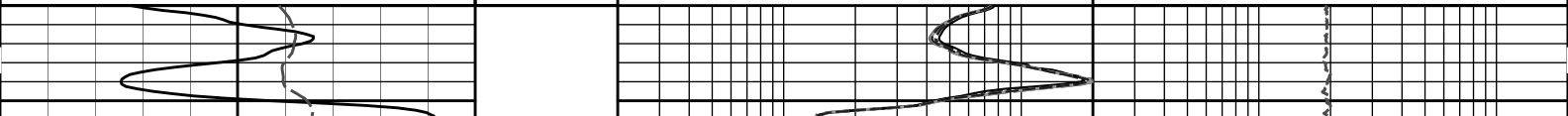
## 5 INCH MAIN LOG

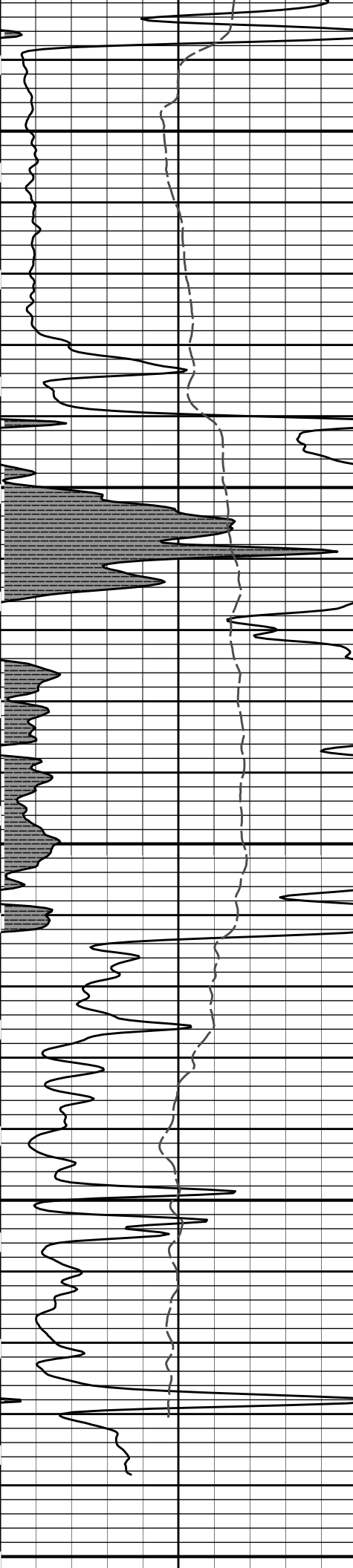
**HALLIBURTON**

Plot Time: 15-Jun-12 22:08:08  
 Plot Range: 6420 ft to 6755.67 ft  
 Data: SALT\_3419\_SWD14\Well Based\REPEAT\  
 Plot File: \\-LOCAL-ISALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHIACRTIACRT\_5\_repeat\_lib

## REPEAT SECTION

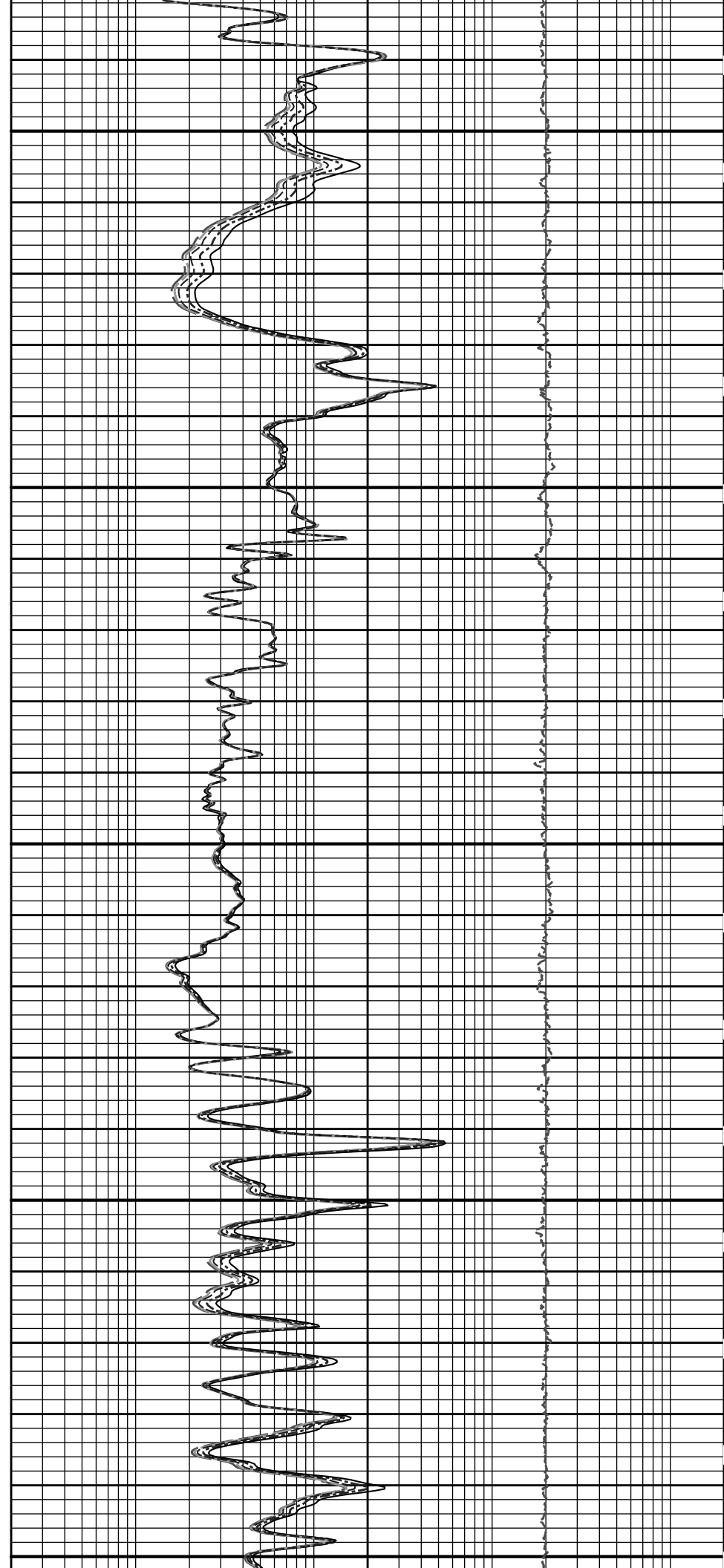
		0.2	90in Resistivity 2ft Res	2000
			ohmm	
		0.2	60in Resistivity 2ft Res	2000
			ohmm	
		0.2	30in Resistivity 2ft Res	2000
			ohm-metre	
		0.2	20in Resistivity 2ft Res	2000
			ohmm	
0	Gamma API	150	10in Resistivity 2ft Res	2000
	api		ohmm	
	SP	MD 1 : 240 ft	10K	Tension pounds
	-]20[+			0

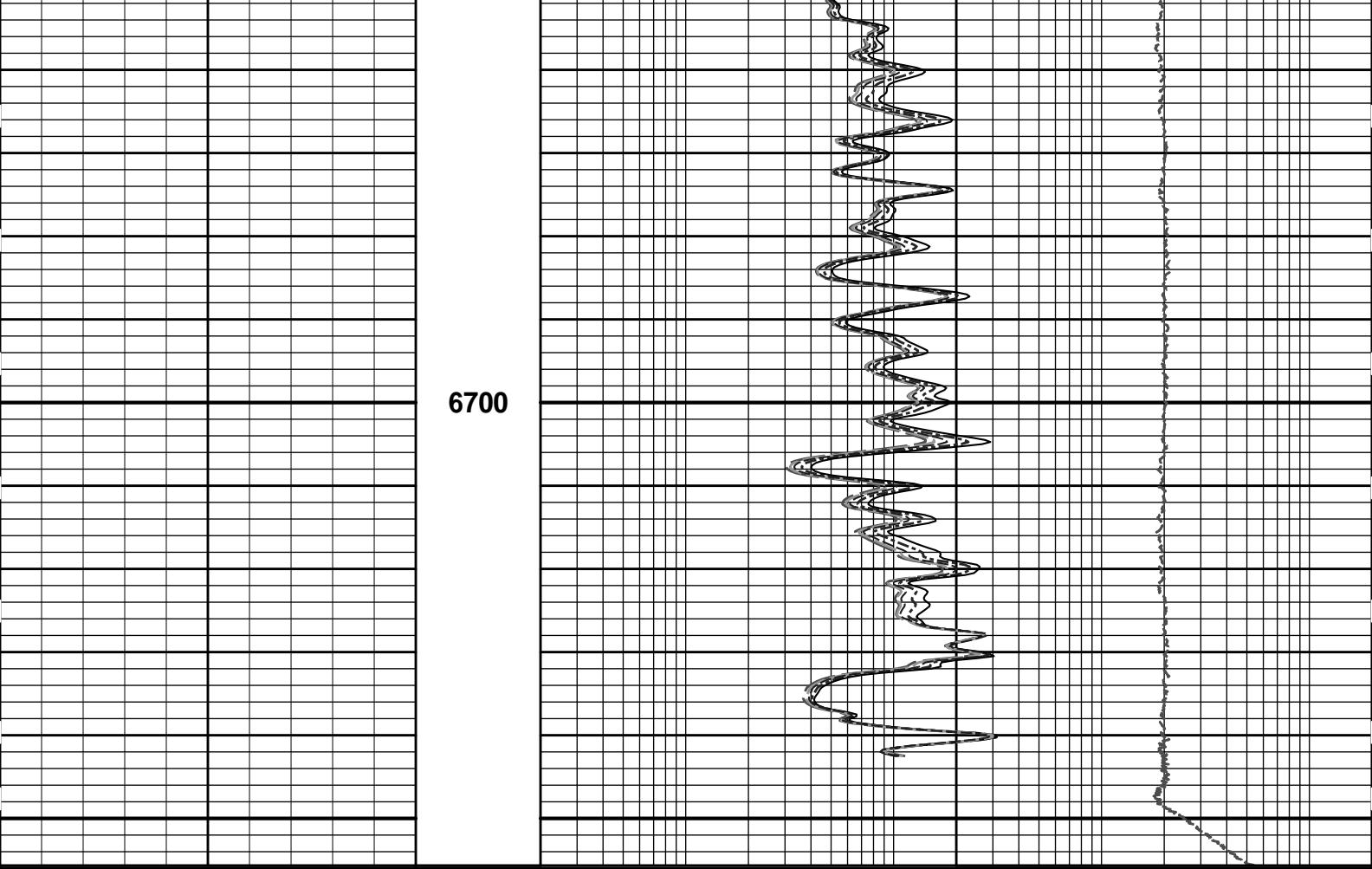




6500

6600





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

**HALLIBURTON**

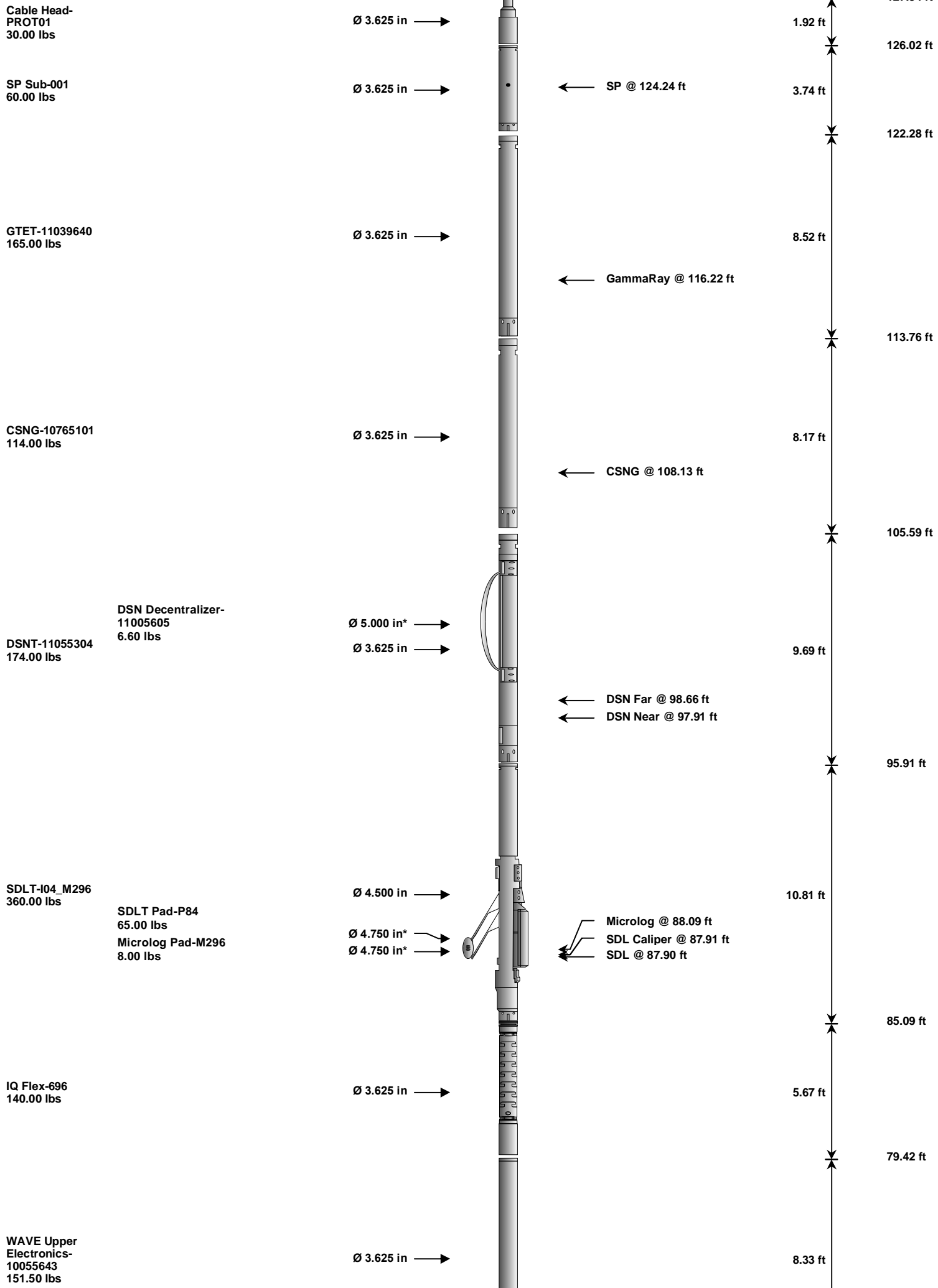
Plot Time: 15-Jun-12 22:08:09  
 Plot Range: 6420 ft to 6755.67 ft  
 Data: SALT\_3419\_SWD14\Well Based\REPEAT\  
 Plot File: \\LOCAL-ASALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHIACRTIACRT\_5\_repeat\_lib

## REPEAT SECTION

**HALLIBURTON**

### TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
-------------	----------------------	------	---------	------------------	--------	--------------------



WAVE Trans-Isolator - Std-10055645  
277.00 lbs

Ø 3.625 in →

10.88 ft

71.09 ft

WAVE Receivers-10055644  
135.00 lbs

Ø 3.625 in →

← Wavesonic Delay @ 56.79 ft

6.67 ft

60.21 ft

WAVE Lower Electronics-10055646  
146.50 lbs

Ø 3.625 in →

8.25 ft

53.54 ft

XRMI Isolator-001  
32.50 lbs

Ø 4.500 in →

1.30 ft

45.29 ft

43.99 ft

XRMI-I Instrument-11682412  
290.00 lbs

Ø 4.500 in →

13.00 ft

30.99 ft

XRMI-I Mandrel-11682413  
206.00 lbs

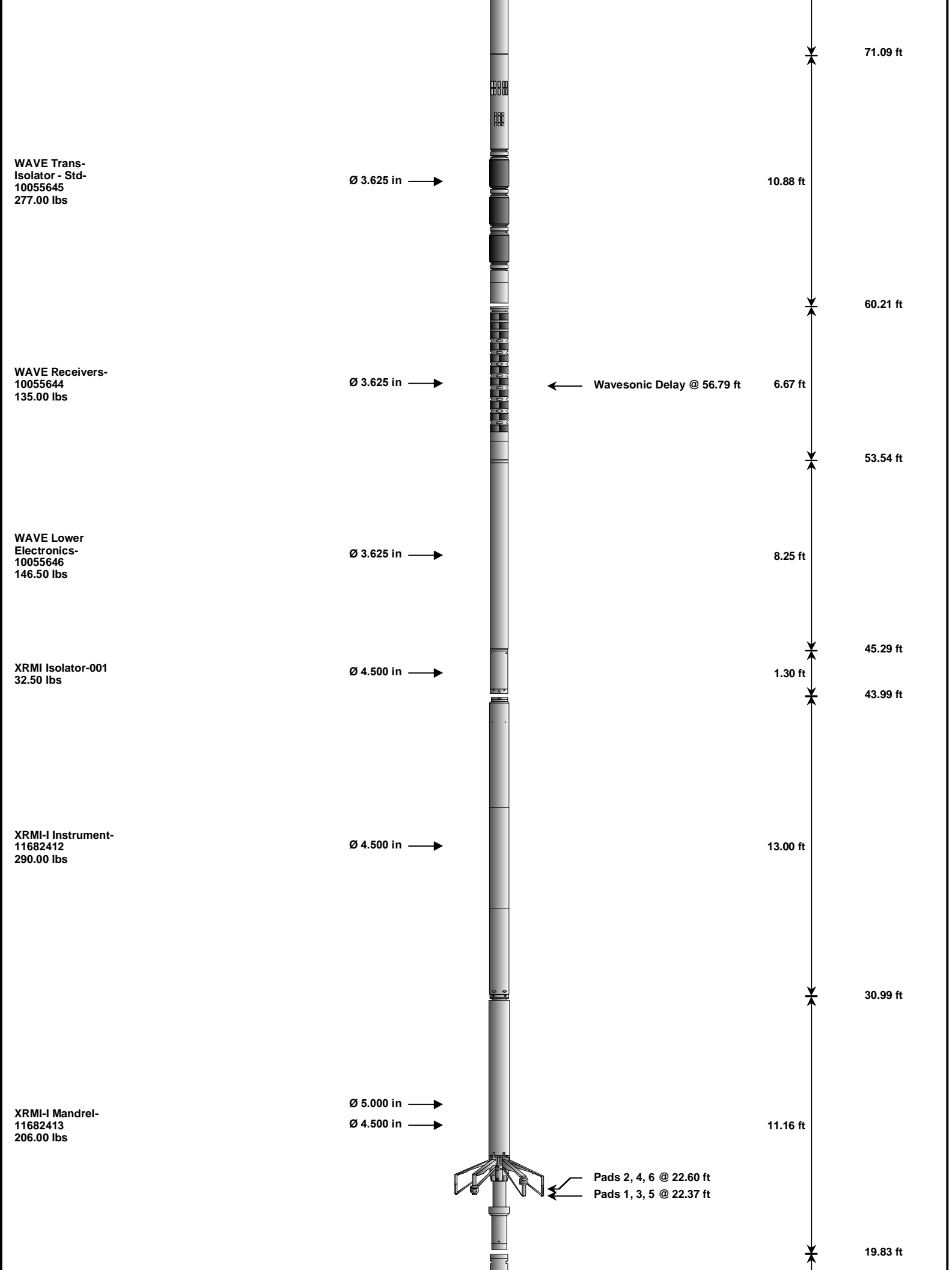
Ø 5.000 in →

Ø 4.500 in →

11.16 ft

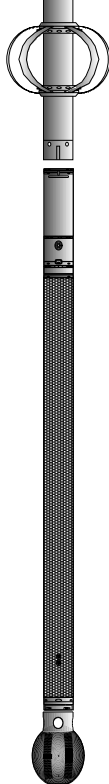
19.83 ft

Pads 2, 4, 6 @ 22.60 ft  
Pads 1, 3, 5 @ 22.37 ft



ACRt Instrument- Centralizer 25-003  
 I962 8.00 lbs  
 50.00 lbs

Ø 4.000 in\*  
 Ø 3.625 in



5.03 ft

14.80 ft

← Mud Resistivity @ 13.44 ft

← ACRt @ 9.46 ft

ACRt Sonde- I962\_S909  
 200.00 lbs

Ø 3.625 in

14.22 ft

Cabbage Head- TRK696  
 10.00 lbs

Ø 3.625 in  
 Ø 6.000 in

0.58 ft

0.58 ft

0.00 ft

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH	Standard OH Cable Head	PROT01	30.00	1.92	126.02	300.00
SP	SP Sub	001	60.00	3.74	122.28	300.00
GTET	Gamma Telemetry Tool	11039640	165.00	8.52	113.76	60.00
CSNG	Compensated Spectral Natural Gamma	10765101	114.00	8.17	105.59	15.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	95.91	60.00
DCNT	DSN Decentralizer	11005605	6.60	5.13	* 99.24	300.00
SDLT	Spectral Density Tool	I04_M296	360.00	10.81	85.09	60.00
SDLP	Density Insite Pad	P84	65.00	2.55	* 87.30	60.00
MICP	Microlog Pad	M296	8.00	1.00	* 87.59	60.00
IQF	IQ Flex tool	696	140.00	5.67	79.42	300.00
WSTT	WAVE Transmitter Electronics - Insite	10055643	151.50	8.33	71.09	100.00
WTIS	WAVE Standard Transmitter - Standard Isolator	10055645	277.00	10.88	60.21	100.00
WSTT	WAVE Receiver Section - Offset Dipole	10055644	135.00	6.67	53.54	30.00
WSTT	WAVE Lower Electronics - Insite	10055646	146.50	8.25	45.29	100.00
	Isolator for the XRMI tool	001	32.50	1.30	43.99	300.00
XRMI	XRMI Navigation - Insite	11682412	290.00	13.00	30.99	30.00
XRMI-I	XRMI Imager - Insite	11682413	206.00	11.16	19.83	30.00
ACRt	Array Compensated True Resistivity Instrument Section	I962	50.00	5.03	14.80	300.00
OBCEN	Centralizer - 25 in. Overbody	003	8.00	2.08	* 16.51	300.00
ACRt	Array Compensated True Resistivity	I962_S909	200.00	14.22	0.58	300.00
CBHD	Cabbage Head	TRK696	10.00	0.58	0.00	300.00

**Total** **2,629.10** **127.94**

\* Not included in Total Length and Length Accumulation.

Data: SALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHMDLE Date: 15-Jun-12 13:18:06

# HALLIBURTON

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: **GTET - 11039640** Reference Calibration Date: **17-May-12 09:57:29**

Engineer: **THOMAS HYDE** Calibration Date: **14-Jun-12 08:57:44**

Software Version: **WL INSITE R3.4.2 (Build 2)** Calibration Version: **1**

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Measurement	Measured	Calibrated	Units
Background	51.3	51.0	api
Background + Calibrator	322.2	320.7	api
Calibrator	270.9	269.6	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 14-Jun-12 08:57:44

Engineer: THOMAS HYDE

Calibration Date: 14-Jun-12 09:00:06

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Field Verification	Shop	Field	Units
Background	51.0	50.7	api
Background + Calibrator	320.7	320.3	api
Calibrator	269.6	269.6	api

Shop	Field	Difference	Tolerance
269.6	269.6	0.0	+/- 9.00

### ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - I962\_S909

Reference Calibration Date: 08-Jun-12 17:51:17

Engineer: J. BOLLLOM

Calibration Date: 08-Jun-12 18:05:05

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

### TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0098	1.05	0.95	1.0128	1.05	0.95	1.0009	1.05
A2 (50")	0.95	1.0134	1.05	0.95	1.0168	1.05	0.95	1.0077	1.05
A3 (29")	0.95	1.0211	1.05	0.95	1.0235	1.05	0.95	1.0136	1.05
A4 (17")	0.95	1.0183	1.05	0.95	1.0191	1.05	0.95	1.0096	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0081	1.05	0.95	0.9974	1.05
A6 (6")	N/A	N/A	N/A	0.95	1.0123	1.05	0.95	1.0032	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	-0.678	2	-6	-3.664	-2	-8	-5.215	-2
A2 (50")	-7	-1.790	-1	-6	-3.802	-2	-7	-5.010	-2
A3 (29")	-27	-14.170	-9	-9	-4.123	-3	-7	-2.045	-1
A4 (17")	-180	-99.817	-60	-45	-27.402	-15	-39	-20.822	-13
A5 (10")	N/A	N/A	N/A	-150	-78.467	-50	-80	-15.641	-10
A6 (6")	N/A	N/A	N/A	175	374.926	525	90	266.897	270

### TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.9107	1.3

### R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.002	1.05

36K	1.0	1.3721	2.0
72K	1.0	1.6436	2.0

### CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-11039640</b>						
Gamma Ray Calibrator	269.6	269.6	-----	0.0	+/- 9.00	api
<b>ACRt Sonde-1962_S909</b>						
Mud Cell	1.002	-----	-----	0.000	-----	ohm-m

Data: SALT\_3419\_SWD14\0001 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHIDLE Date: 15-Jun-12 11:42:36

## HALLIBURTON

### PARAMETERS REPORT

Depth ((ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	8.750	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.000	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	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	7.000	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	6748.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	XRMI-I Instrument	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	XRMI-I Instrument	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	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?	No	
	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	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
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	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
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
WAVE Receivers	WSOK	Process WSTT?	Yes	
WAVE Receivers	AFIL	Adaptive Filtering?	No	
WAVE Receivers	PINT	Process 1 Sample and Skip	0	
WAVE Receivers	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
WAVE Receivers	DTSH	Delta -T Shale	100.00	uspf
WAVE Receivers	DTMT	Delta -T Matrix Type	User define	
WAVE Receivers	DTMA	Delta -T Matrix	47.60	uspf
WAVE Receivers	DTFL	Delta -T Fluid	189.00	uspf
WAVE Receivers	RHOM	Matrix Density	2.7100	g/cc
WAVE Receivers	RHOF	Fluid Density	1.0000	g/cc
WAVE Receivers	SMTL	Semblance Threshold	0.25	
WAVE Receivers	VPVS	VPVS Ratio for Porosity	1.40	
WAVE Receivers	APEQ	Acoustic Porosity Equation	Wylie	
WAVE Receivers	NAVS	Navigation Source Tool	XRMI-I Instrument	
XRMI-I Instrument	WRTI	Survey Writing Interval	30	ft
XRMI-I Instrument	SOPT	Smoothing Option	None	
XRMI-I Mandrel	DIMG	Process XRMI?	Yes	
XRMI-I Mandrel	ROTI	Rotate Image (N-E-S-W-N)?	Yes	
XRMI-I Mandrel	AGN	Use Button Auto Gain?	Yes	
XRMI-I Mandrel	BCLR	Button Auto Gain Color	127	
XRMI-I Mandrel	BFIL	Button Auto Gain Filter	0.020	

Mandrel	XRMI-I Mandrel	BGAN	Button Gain Value	0.001	
	XRMI-I Mandrel	BOFF	Button Offset	0	
	XRMI-I Mandrel	DIPE	Process Dipmeter Calculations?	Yes	
	XRMI-I Mandrel	BHCS	Process Borehole Corrections?	Yes	
	XRMI-I Mandrel	CLOK	Process Caliper Outputs?	Yes	
	XRMI-I Mandrel	CMAX	Caliper Maximum Limit	100.0	in
	XRMI-I Mandrel	CMIN	Caliper Mimimum Limit	3.5	in
	XRMI-I Mandrel	NAVS	Navigation Source Tool	XRMI-I Instrument	
	ACRt Sonde	RTOK	Process ACRt?	Yes	
	ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
	ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
	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	

## HALLIBURTON

### INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
<b>Depth Panel</b>				
TENS	Tension	0.00	NO	
<b>SP Sub</b>				
PLTC	Plot Control Mask	124.24	NO	
SP	Spontaneous Potential	124.24	BLK	1.250
SPR	Raw Spontaneous Potential	124.24	NO	
SPO	Spontaneous Potential Offset	124.24	NO	
<b>GTET</b>				
TPUL	Tension Pull	116.22	NO	
GR	Natural Gamma Ray API	116.22	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	116.22	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	116.22	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
<b>CSNG</b>				
TPUL	Tension Pull	108.13	NO	
STAT	Status	108.13	NO	
FRMC	Tool Frame Count	108.13	BLK	0.250
TFRM	Total Frames	108.13	NO	
LSPD	Line Speed	108.13	BLK	0.250
CTIM	Accumulation time for sample	108.13	BLK	0.250
NOIS	Spectral Noise	108.13	BLK	0.250
STAB	Stabilizer Voltage in mv	108.13	BLK	0.250
STBP	Stabilizer 60 KEV Peak	108.13	BLK	0.250
AMER	Americium	108.13	BLK	0.250
FTMP	Flask PCB Temperature	108.13	BLK	0.250

SPEL	Low Energy Spectrum	108.13	BLK	0.250
SPEH	High Energy Spectrum	108.13	BLK	0.250
SSP	Stabilization Energy Spectrum	108.13	BLK	0.250
CSPC	CSNG Lo Hi Spectrum Data	108.13	NO	
DSNT				
TPUL	Tension Pull	97.81	NO	
RNDS	Near Detector Telemetry Counts	97.91	BLK	1.417
RFDS	Far Detector Telemetry Counts	98.66	TRI	0.583
DNTT	DSN Tool Temperature	97.91	NO	
DSNS	DSN Tool Status	97.81	NO	
ERND	Near Detector Telemetry Counts EVR	97.91	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	98.66	BLK	0.000
ENTM	DSN Tool Temperature EVR	97.91	NO	
SDLT				
TPUL	Tension Pull	87.91	NO	
PCAL	Pad Caliper	87.91	TRI	0.250
ACAL	Arm Caliper	87.91	TRI	0.250
WAVE Receivers				
TPUL	Tension Pull	56.79	NO	
XMS1	Wave Sonic Status Word 1	53.54	NO	
XMS2	Wave Sonic Status Word 2	53.54	NO	
XMS1	Wave Sonic XMITStatus Word 1	53.54	NO	
XMS1	Wave Sonic XMITStatus Word 2	53.54	NO	
F1HA	Dipole 1 HV After	53.54	NO	
F1HB	Dipole 1 HV Before	53.54	NO	
F2HA	Dipole 2 HV After	53.54	NO	
F2HB	Dipole 2 HV Before	53.54	NO	
F3HA	Monopole HV After	53.54	NO	
F3HB	Monopole HV Before	53.54	NO	
F4HA	Monopole 2 HV After	53.54	NO	
F4HB	Monopole 2 HV Before	53.54	NO	
INVT	Input Voltage	53.54	NO	
5VOL	5 Volts	53.54	NO	
MI5A	Minus 5 Volts Analog	53.54	NO	
ITMP	Instrument Temperature	53.54	NO	
PL5A	Plus 5 Volts Analog	53.54	NO	
5VD	Plus 5 Volts Digital	53.54	NO	
TCUR	Tool Current	53.54	NO	
SUPV	Supply Voltage	53.54	NO	
PRVT	Preregulated voltage	53.54	NO	
PRVT	Pre-regulated voltage Xmter	53.54	NO	
TEMP	Temperature	53.54	NO	
ACQN	Acquisition Number	53.54	NO	
XDP	Delay Reference	56.79	NO	
MITM	MIT Mode	56.79	NO	
VERS	Version	53.54	NO	
SEQN	Sequence Number	53.54	NO	
FREV	Firmware Revision	53.54	NO	
WVST	Wavesonic Compressed Data	56.79	NO	
WVS4	Wavesonic Monopole 2 Compressed Data	56.79	NO	
TPUL	Tension Pull	56.79	NO	
WMP	Summed array of Monopole for SIDES - A,B,C,D	56.79	NO	
WM2P	Summed array of Monopole 2 for SIDES - A,B,C,D	56.79	NO	

WXX	Dipole X for SIDES - A-C	56.79	NO
WYY	Dipole Y for SIDES - B-D	56.79	NO
WXY	Dipole X for SIDES - B-D	56.79	NO
WYX	Dipole Y for SIDES - A-C	56.79	NO
TPUL	Tension Pull	56.79	NO
WMA	Monopole Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WMB	Monopole Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WMC	Monopole Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WMD	Monopole Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
WM2A	Monopole 2 Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WM2B	Monopole 2 Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WM2C	Monopole 2 Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WM2D	Monopole 2 Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
WXA	Dipole X Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WXB	Dipole X Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WXC	Dipole X Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WXD	Dipole X Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
WYA	Dipole Y Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WYB	Dipole Y Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WYC	Dipole Y Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WYD	Dipole Y Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO

<b>XRMI-I Mandrel</b>			
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TPUL	Tension Pull	22.60	NO
PAD1	XRMI Pad 1 values	22.36	NO
PAD2	XRMI Pad 2 values	22.36	NO
PAD3	XRMI Pad 3 values	22.36	NO
PAD4	XRMI Pad 4 values	22.36	NO
PAD5	XRMI Pad 5 values	22.36	NO
PAD6	XRMI Pad 6 values	22.36	NO
OD1	EMI Odd Button Values Pad 1	22.36	NO
OD2	EMI Odd Button Values Pad 2	22.60	NO
OD3	EMI Odd Button Values Pad 3	22.36	NO
OD4	EMI Odd Button Values Pad 4	22.60	NO
OD5	EMI Odd Button Values Pad 5	22.36	NO
OD6	EMI Odd Button Values Pad 6	22.60	NO
EV1	EMI Even Button Values Pad 1	22.39	NO
EV2	EMI Even Button Values Pad 2	22.57	NO
EV3	EMI Even Button Values Pad 3	22.39	NO
EV4	EMI Even Button Values Pad 4	22.57	NO
EV5	EMI Even Button Values Pad 5	22.39	NO
EV6	EMI Even Button Values Pad 6	22.57	NO
ITMP	Instrument Temperature	19.83	NO
EMIM	Tool Mode	19.83	NO
HAZI	Hole Azimuth	22.11	NO
HAZI	Hole Azimuth - Down Delay	22.61	NO
ZACC	Accelerometer Z	22.36	NO
EMU	Tool Mode	22.60	NO

IPUL	Tension Pull	22.60	NO	
FIR1	Current Button R - Pad 1	22.36	NO	
FIR2	Current Button R - Pad 2	22.60	NO	
FIR3	Current Button R - Pad 3	22.36	NO	
FIR4	Current Button R - Pad 4	22.60	NO	
FIR5	Current Button R - Pad 5	22.36	NO	
FIR6	Current Button R - Pad 6	22.60	NO	
FIX1	Current Button X - Pad 1	22.36	NO	
FIX2	Current Button X - Pad 2	22.60	NO	
FIX3	Current Button X - Pad 3	22.36	NO	
FIX4	Current Button X - Pad 4	22.60	NO	
FIX5	Current Button X - Pad 5	22.36	NO	
FIX6	Current Button X - Pad 6	22.60	NO	
SIR1	Current Slow Button R - Pad 1	22.36	BLK	3.000
SIR2	Current Slow Button R - Pad 2	22.60	BLK	3.000
SIR3	Current Slow Button R - Pad 3	22.36	BLK	3.000
SIR4	Current Slow Button R - Pad 4	22.60	BLK	3.000
SIR5	Current Slow Button R - Pad 5	22.36	BLK	3.000
SIR6	Current Slow Button R - Pad 6	22.60	BLK	3.000
SIX1	Current Slow Button X - Pad 1	22.36	BLK	3.000
SIX2	Current Slow Button X - Pad 2	22.60	BLK	3.000
SIX3	Current Slow Button X - Pad 3	22.36	BLK	3.000
SIX4	Current Slow Button X - Pad 4	22.60	BLK	3.000
SIX5	Current Slow Button X - Pad 5	22.36	BLK	3.000
SIX6	Current Slow Button X - Pad 6	22.60	BLK	3.000
EMMR	Phasor Voltage - Real Part	22.36	NO	
EMMX	Phasor Voltage - Imaginary Part	22.36	NO	
PADV	Pad Voltage	19.83	BLK	0.250
ITMP	Instrument Temperature	19.83	BLK	0.000
CON1	Conductivity Pad 1	22.36	BLK	3.000
CON2	Conductivity Pad 2	22.60	BLK	3.000
CON3	Conductivity Pad 3	22.36	BLK	3.000
CON4	Conductivity Pad 4	22.60	BLK	3.000
CON5	Conductivity Pad 5	22.36	BLK	3.000
CON6	Conductivity Pad 6	22.60	BLK	3.000
UIR2	Current Button R No Delay - Pad 2	22.36	NO	
UIR4	Current Button R No Delay - Pad 4	22.36	NO	
UIR6	Current Button R No Delay - Pad 6	22.36	NO	
UIX2	Current Button X No Delay - Pad 2	22.36	NO	
UIX4	Current Button X No Delay - Pad 4	22.36	NO	
UIX6	Current Button X No Delay - Pad 6	22.36	NO	
TPUL	Tension Pull	22.60	NO	
ARM1	Caliper 1 measurement	22.36	BLK	0.000
ARM2	Caliper 2 measurement	22.36	BLK	0.000
ARM3	Caliper 3 measurement	22.36	BLK	0.000
ARM4	Caliper 4 measurement	22.36	BLK	0.000
ARM5	Caliper 5 measurement	22.36	BLK	0.000
ARM6	Caliper 6 measurement	22.36	BLK	0.000
MOTV	Motor Voltage Monitor 1	22.36	BLK	0.000
PRES	Caliper percentage of total compression of the spring	19.83	BLK	0.000
HAZI	Hole Azimuth	22.36	NO	
RB	Relative Bearing	22.36	NO	
AZI1	PAD1 Azimuth	22.36	NO	
DEVI	Inclination	22.36	NO	

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 Reference 12 KHz Real Signal	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	
<b>Microlog Pad</b>				
TPUL	Tension Pull	88.09	NO	
MINV	Microlog Lateral	88.09	BLK	0.750

MNOR	Microlog Normal	88.09	BLK	0.750
<b>SDLT Pad</b>				
TPUL	Tension Pull	87.90	NO	
NAB	Near Above	87.72	BLK	0.920
NHI	Near Cesium High	87.72	BLK	0.920
NLO	Near Cesium Low	87.72	BLK	0.920
NVA	Near Valley	87.72	BLK	0.920
NBA	Near Barite	87.72	BLK	0.920
NDE	Near Density	87.72	BLK	0.920
NPK	Near Peak	87.72	BLK	0.920
NLI	Near Lithology	87.72	BLK	0.920
NBAU	Near Barite Unfiltered	87.72	BLK	0.250
NLIU	Near Lithology Unfiltered	87.72	BLK	0.250
FAB	Far Above	88.07	BLK	0.250
FHI	Far Cesium High	88.07	BLK	0.250
FLO	Far Cesium Low	88.07	BLK	0.250
FVA	Far Valley	88.07	BLK	0.250
FBA	Far Barite	88.07	BLK	0.250
FDE	Far Density	88.07	BLK	0.250
FPK	Far Peak	88.07	BLK	0.250
FLI	Far Lithology	88.07	BLK	0.250
PTMP	Pad Temperature	87.91	BLK	0.920
NHV	Near Detector High Voltage	87.30	NO	
FHV	Far Detector High Voltage	87.30	NO	
ITMP	Instrument Temperature	87.30	NO	
DDHV	Detector High Voltage	87.30	NO	

Data: SALT\_3419\_SWD140001 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHVDLE Date: 15-Jun-12 13:29:09

COMPANY	<b>SANDRIDGE ENERGY</b>		
WELL	<b>SALT SWD 3419 1-4</b>		
FIELD	<b>SADDLE</b>		
COUNTY	<b>COMANCHE</b>	STATE	<b>KANSAS</b>
<b>HALLIBURTON</b>		<b>ARRAY COMPENSATED TRUE RESISTIVITY LOG</b>	

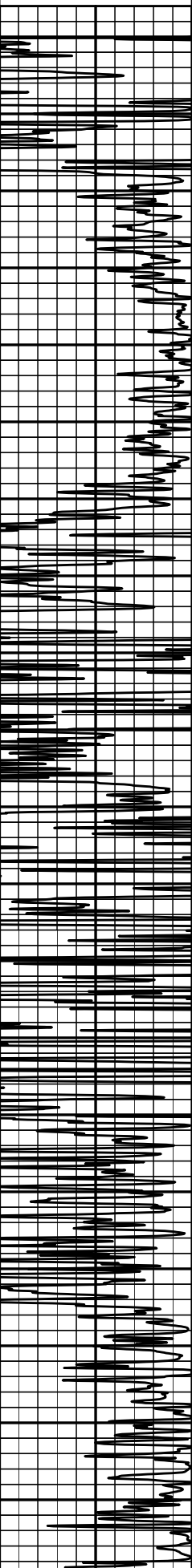
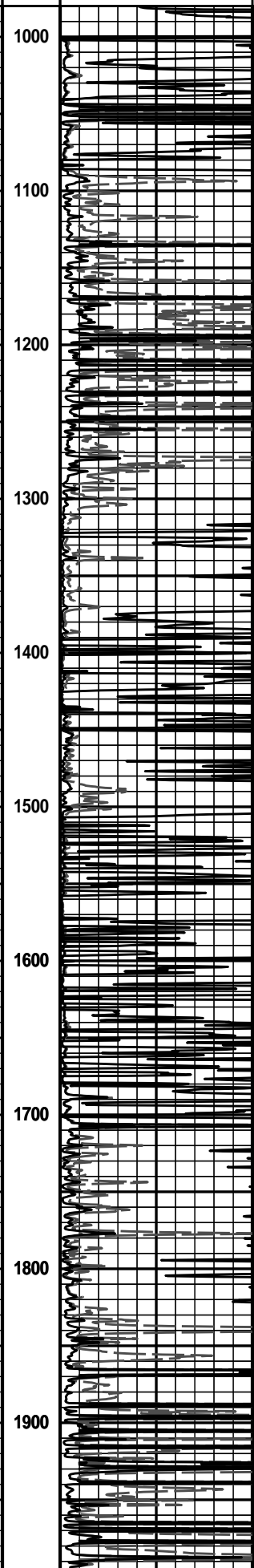
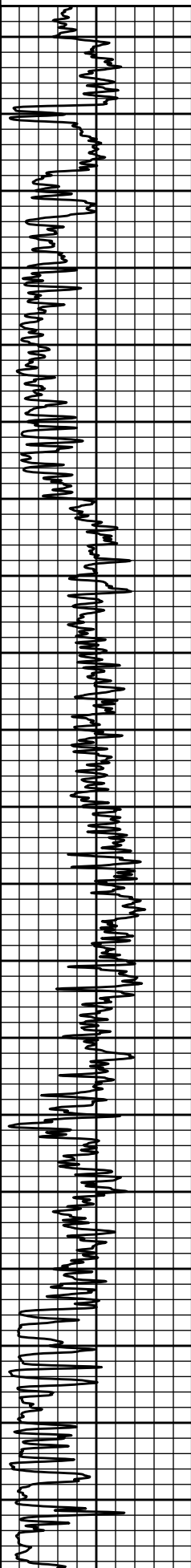
**HALLIBURTON**  
Plot Time: 15-Jun-12 22:08:16  
Plot Range: 980 ft to 6738 ft  
Data: SALT\_3419\_SWD14Well Based\CASING\  
Plot File: \\LOCAL\SALT\_3419\_SWD140002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHL...ACRT\_1.lib

## 1 INCH MAIN LOG

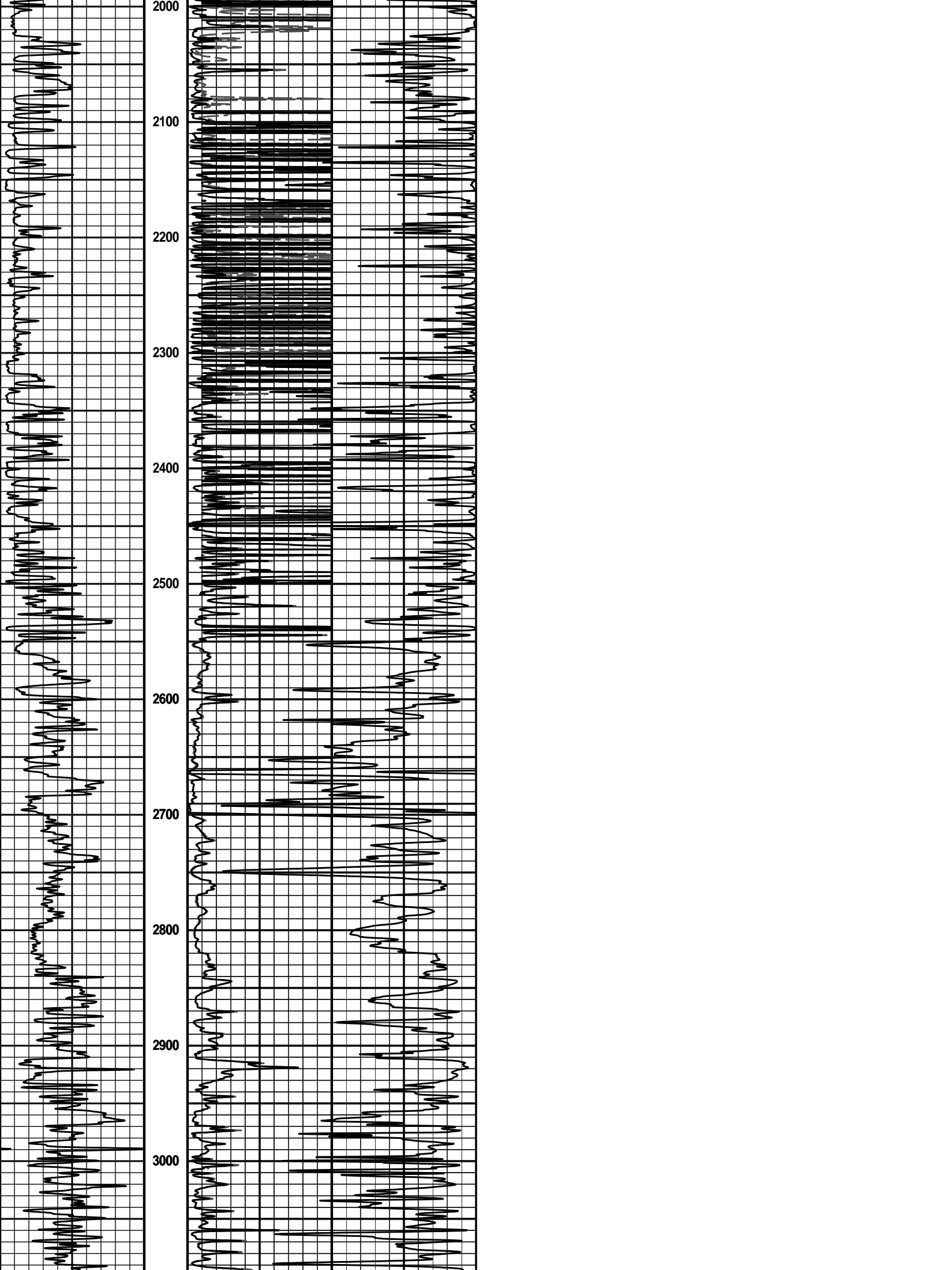
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	mmho per metre		
	90in Resistivity 2ft Res		

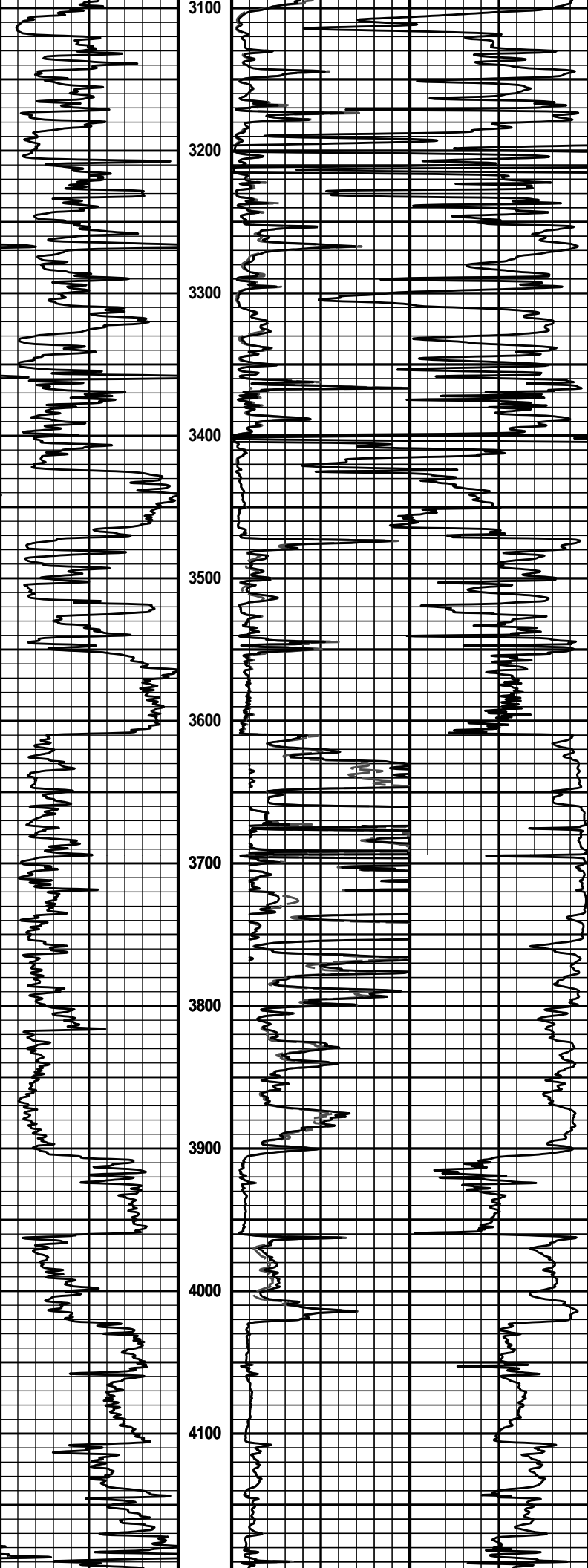
SP  
-20[+  
0 Gamma API 150  
api

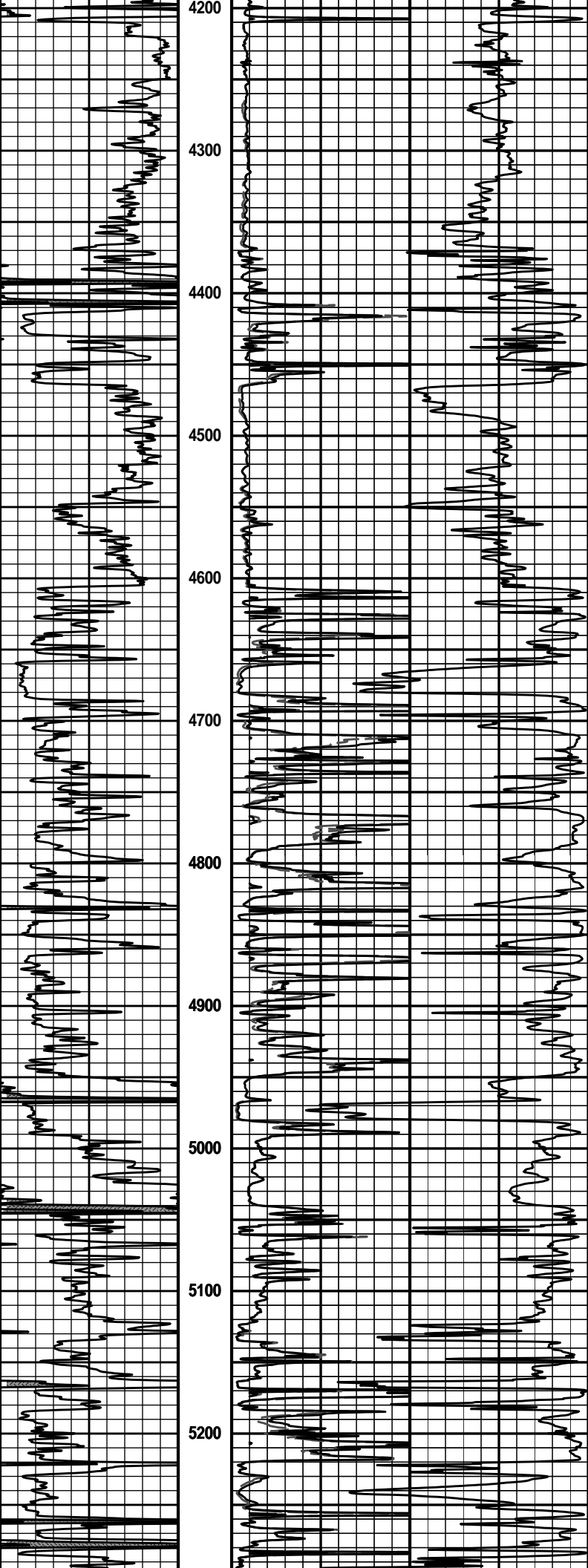
MD  
1 : 1200  
ft  
ohm-metre  
20in Resistivity 2ft Res  
0 50  
ohm-metre

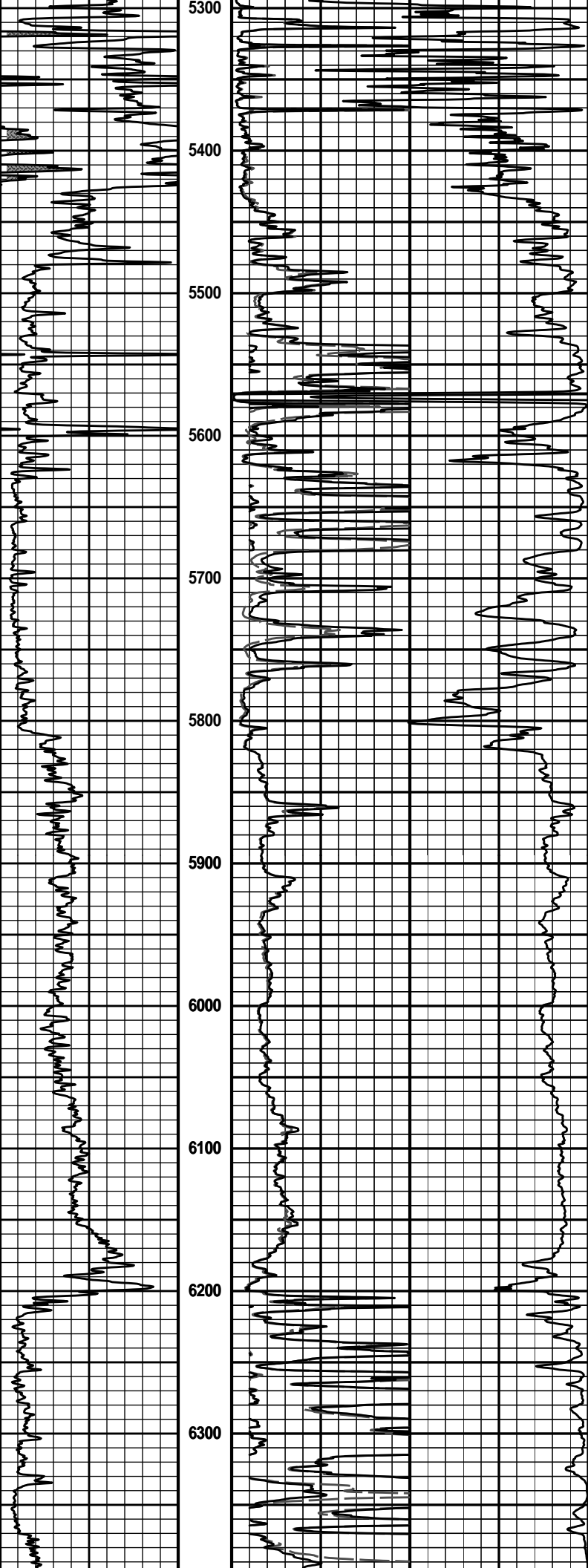


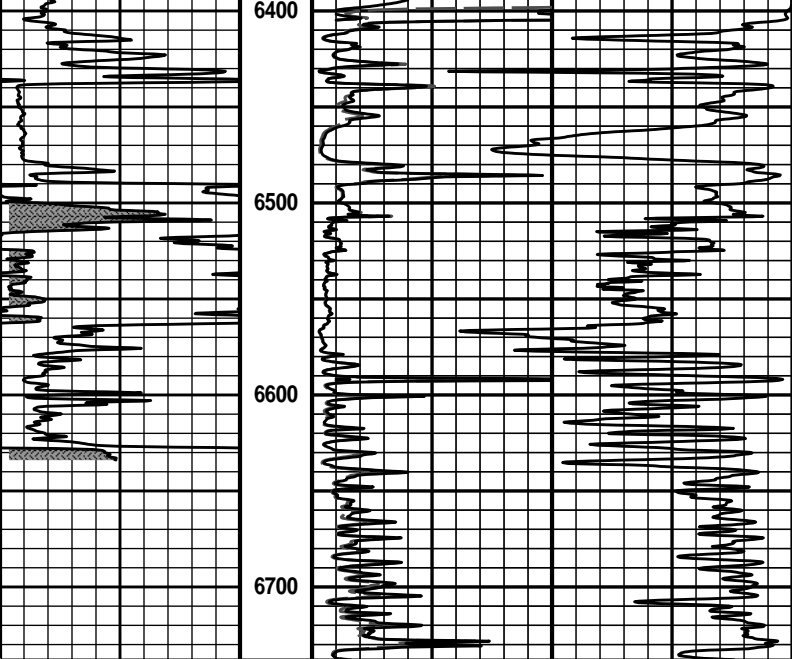
1000  
1100  
1200  
1300  
1400  
1500  
1600  
1700  
1800  
1900











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

**HALLIBURTON**

Plot Time: 15-Jun-12 22:08:37  
 Plot Range: 980 ft to 6738 ft  
 Data: SALT\_3419\_SWD14\Well Based\CASING\  
 Plot File: \\LOCAL\SALT\_3419\_SWD14\0002 SP-GTET-CSNG-DSN-SDLT-FLEX-WSTT-XRMI-ACRT-CHL...ACRT\_1.lib

**1 INCH MAIN LOG**