



**Weatherford**<sup>®</sup>

**CML MESSENGER SHUTTLE  
COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON**

COMPANY

Sandridge Energy

WELL

Lorimer 2330 1-9H

FIELD

Finney

PROVINCE/COUNTY

Finney

COUNTRY/STATE

U.S.A. / Kansas

LOCATION

200' FNL & 400' FWL

SEC

TWP

9

9

23s

30w

Permit Number

15-055-22174

Permanent Datum G.L., Elevation 2843 feet

Log Measured From KB

Drilling Measured From K.B. @ 20 FEET

Date

11-SEP-2012

Run Number

ONE

Depth Driller

9242.00

Depth Logger

9242.00

First Reading

9124.00

Last Reading

5189.00

Casing Driller

5189.00

Casing Logger

5189.00

Bit Size

6.125

Hole Fluid Type

WBM

Density / Viscosity

8.40

PH / Fluid Loss

8.50

Sample Source

flowline

Rm @ Measured Temp

0.75 @ 82.0

Rmf @ Measured Temp

0.60 @ 82.0

Rmc @ Measured Temp

0.90 @ 82.0

Source Rmf / Rmc

CALC

Rm @ BHT

0.46 @ 135.0

Time Since Circulation

1 HOUR

Max Recorded Temp

135.00

Equipment Name

COMPACT

Equipment / Base

18077

Recorded By

STEVEN TOTTEY

Witnessed By

OSCAR ESPARZA

S.O. # / JOB#

3536740

Elevations:  
KB 2863.00  
DF 2862.00  
GL 2843.00

### BOREHOLE RECORD

Last Edited: 11-SEP-2012 02:23

Bit Size inches	Depth From feet	Depth To feet
6.125	5189.00	9242.00

### CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
inter	7.000	0.00	5189.00	23.00

### REMARKS

DRILL PIPE DEPTH DURING DEPLOYMENT: 9077  
LOGGING TOOL DEPTH AFTER DEPLOYMENT: 9181

4'5" PRODUCTION CASING USED TO CALCULATE AHV

OPERATORS: S. WORLEY \_J. TURNER  
S.O: 3536740

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

5 inch main

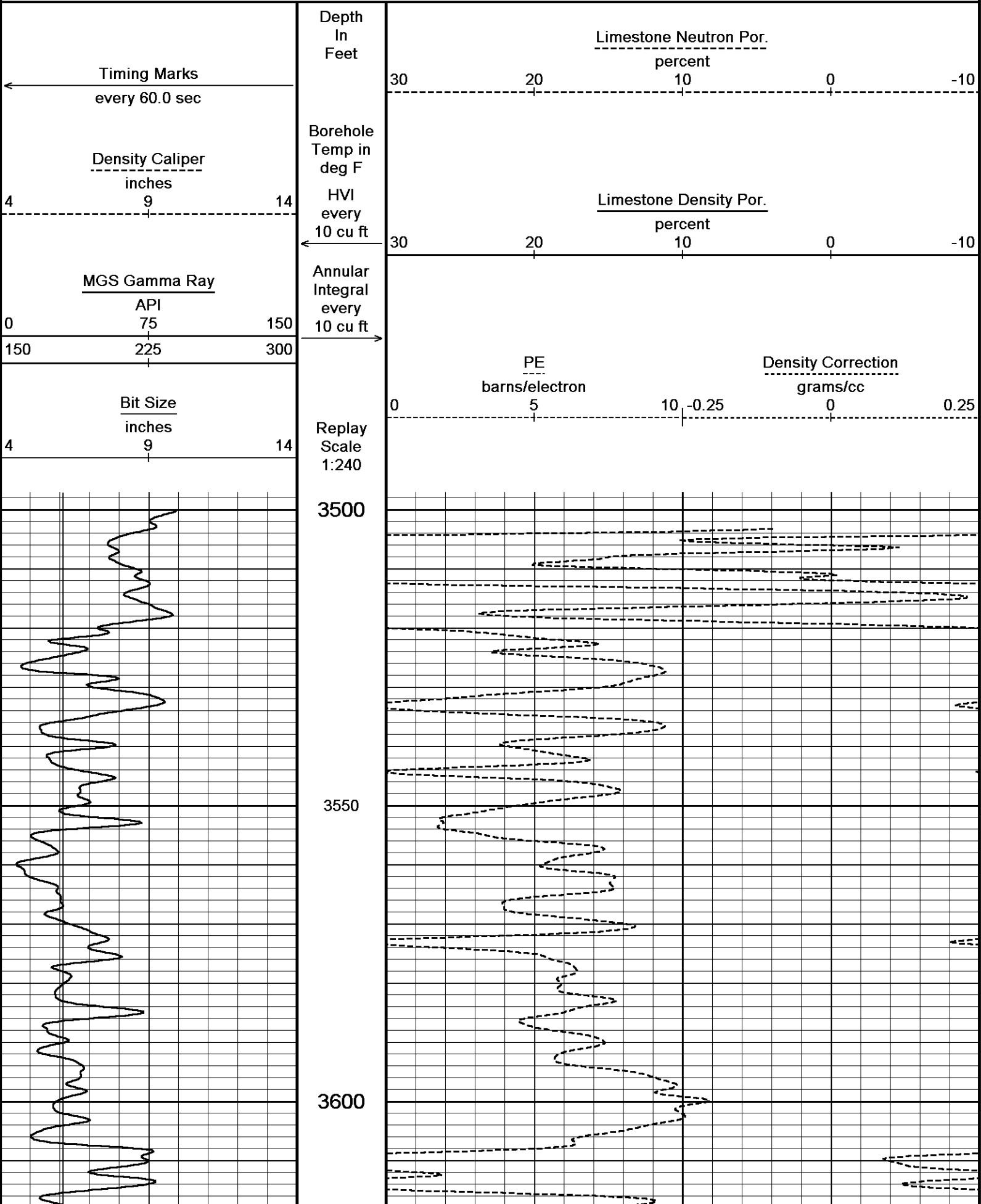
Depth Based Data - Maximum Sampling Increment 10.0cm

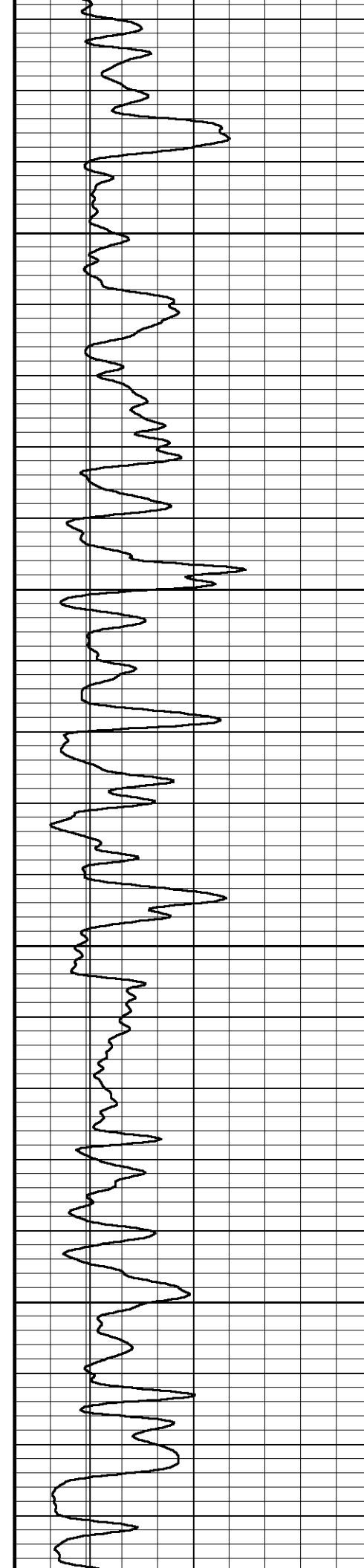
Plotted on 12-SEP-2012 19:25

Filename: C:\Program Files\Weatherford\WLS 13.02\lorimer\RTPA LORIMER.dta

Recorded on 11-SEP-2012 06:29

System Versions: Processed with 13.02.6600 Plotted with 13.02.6600



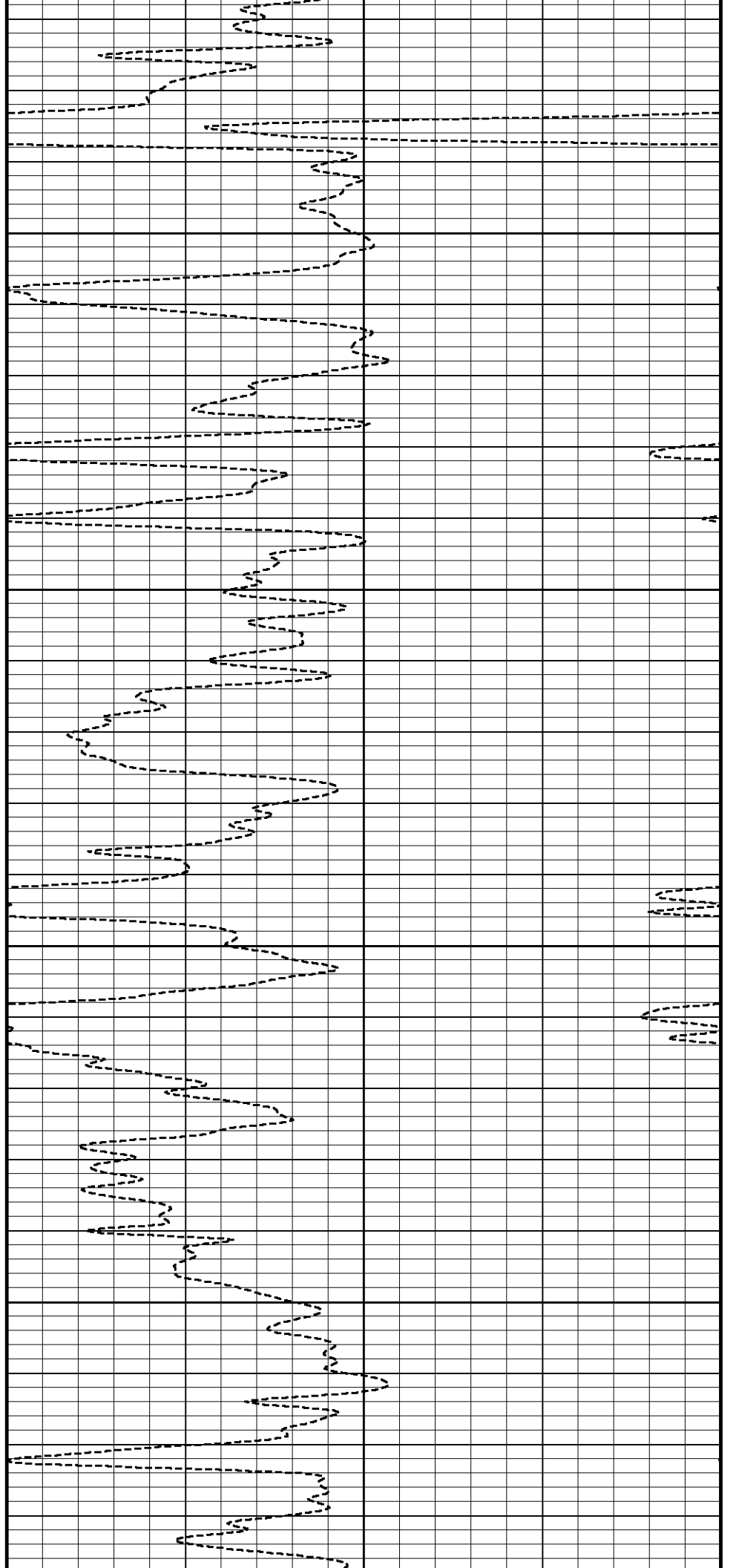


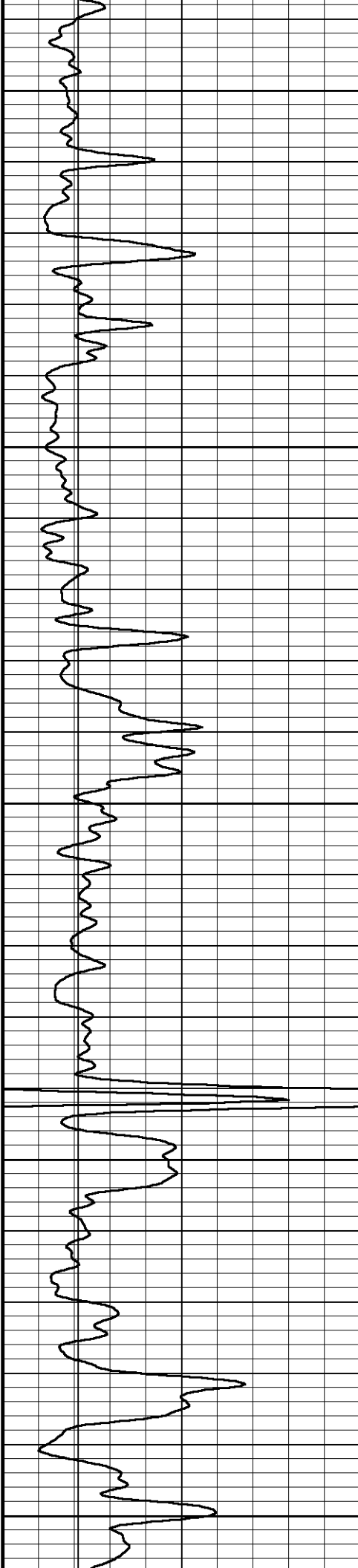
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3700

3750

3800





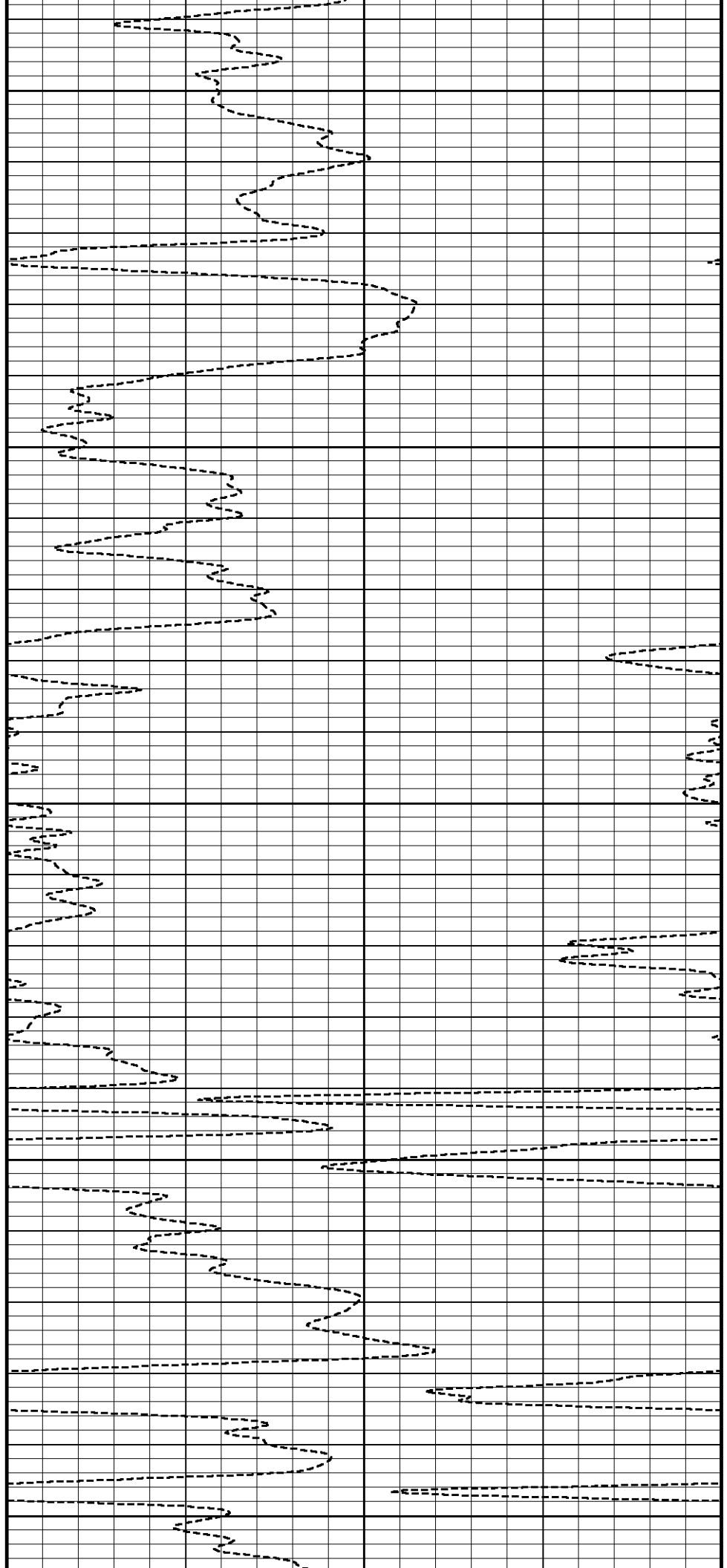
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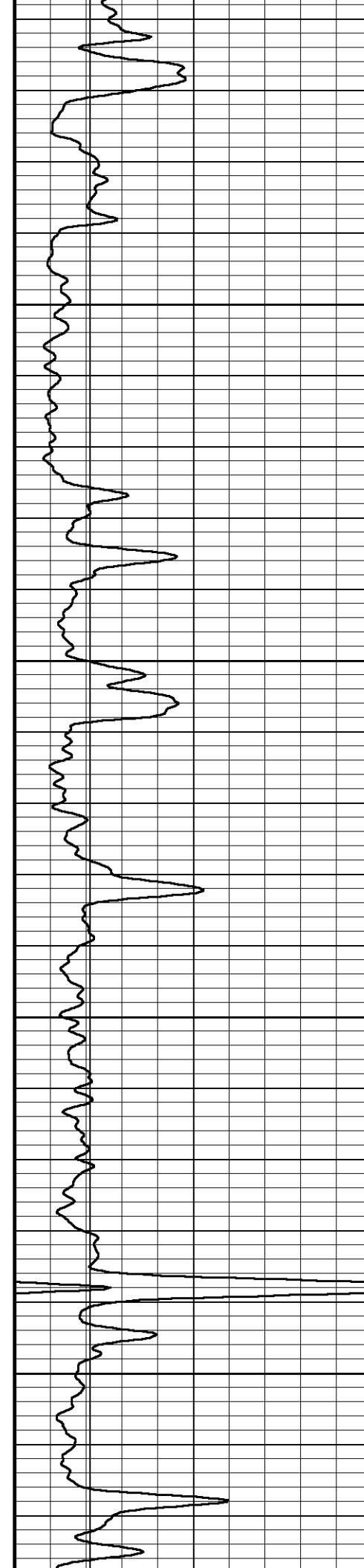
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3950

4000

4050



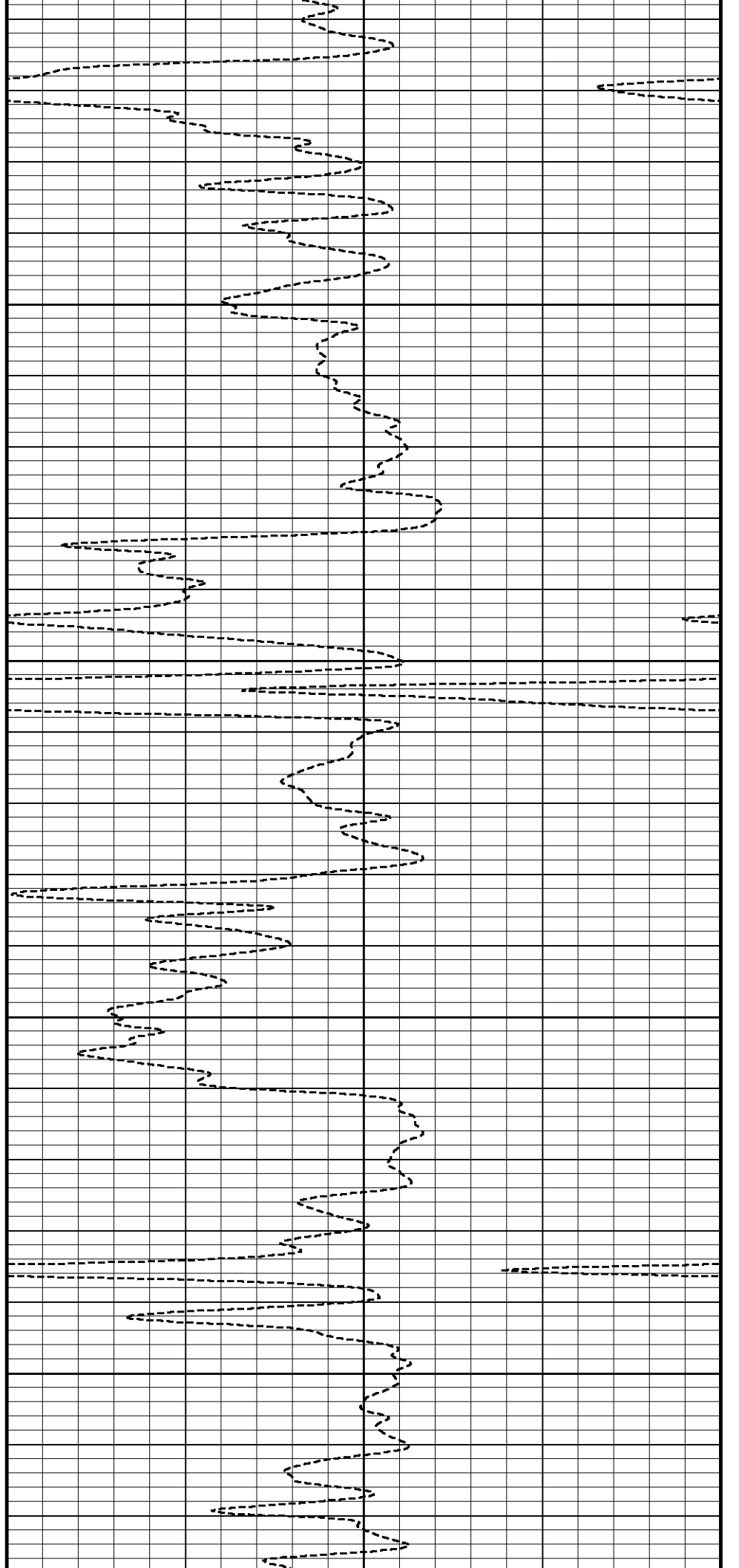


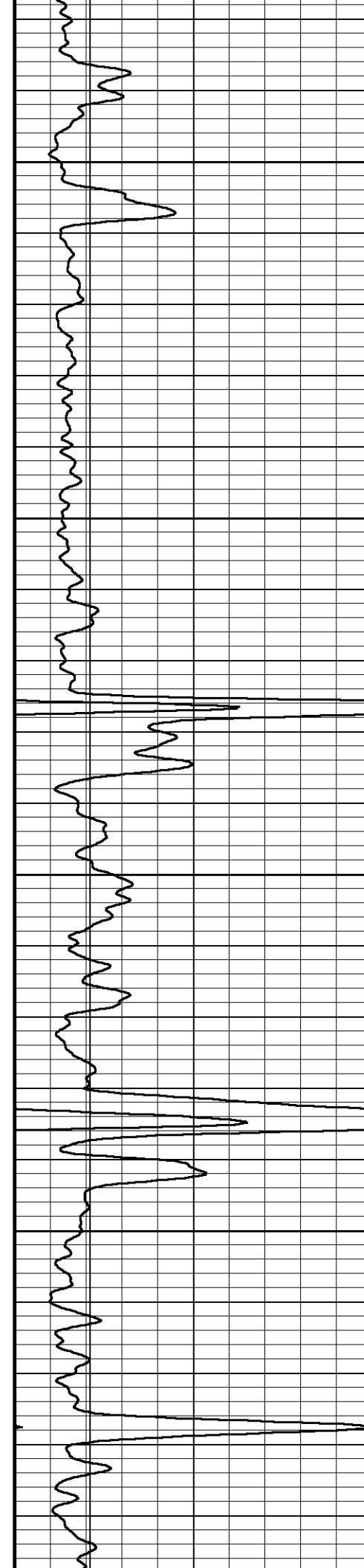
4100

4150

4200

4250



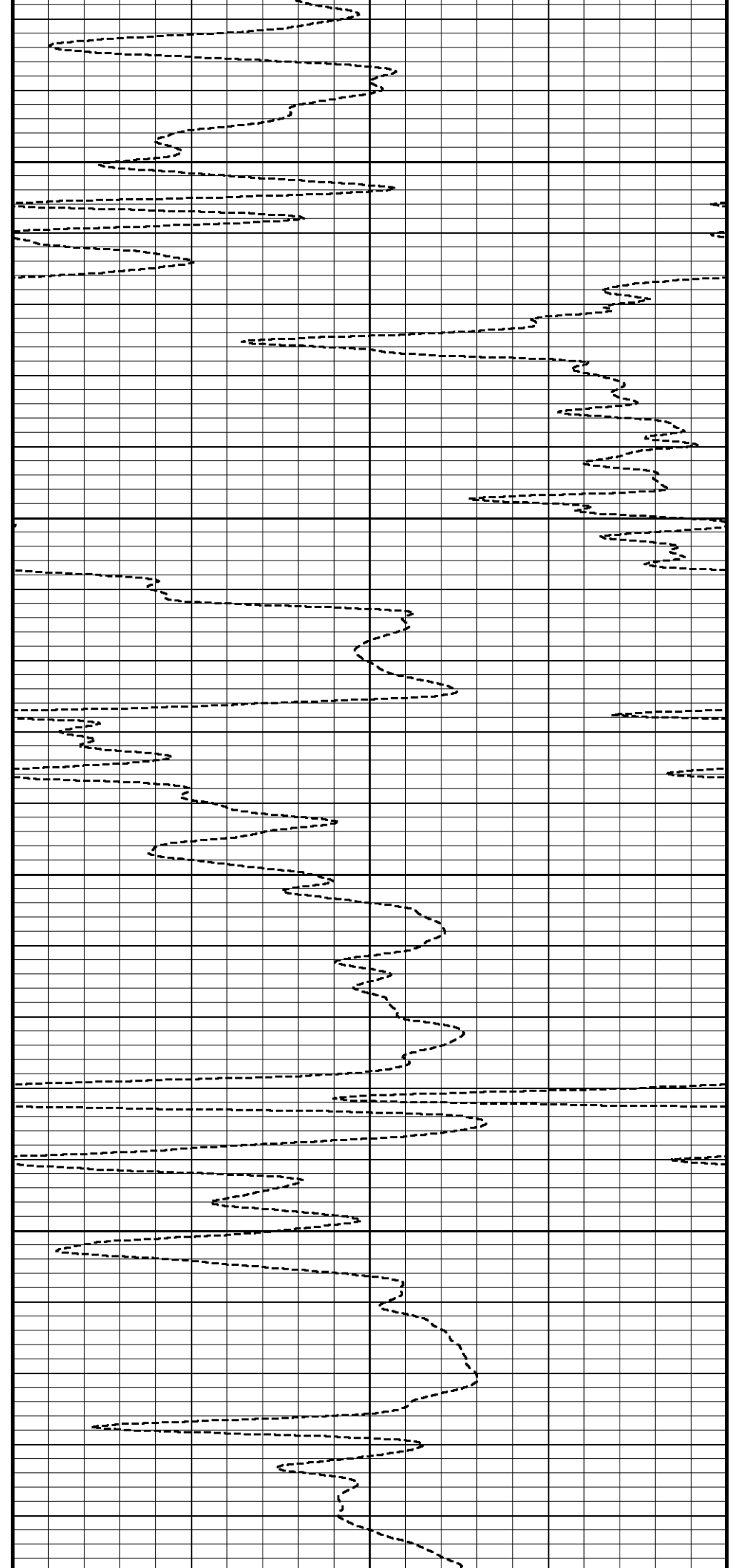


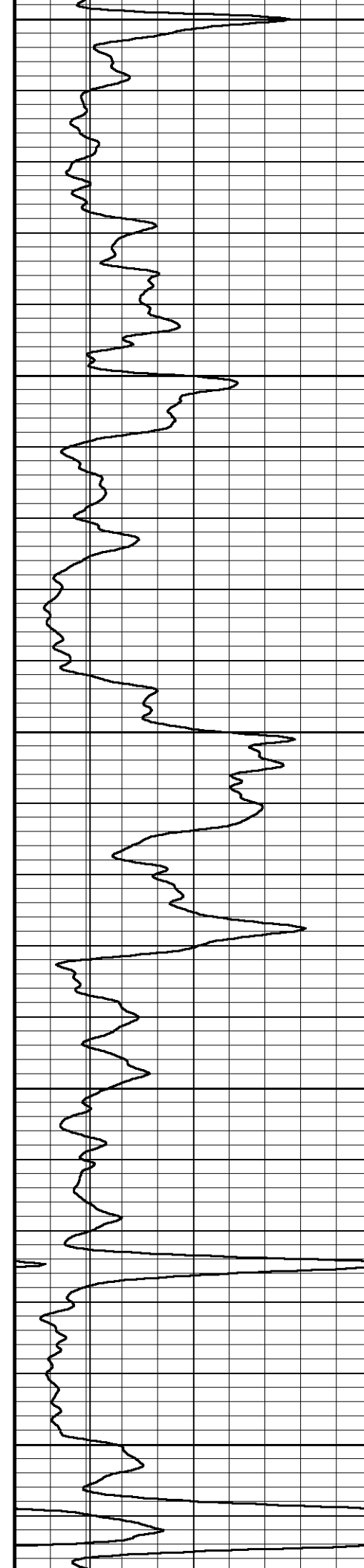
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4350

4400

4450





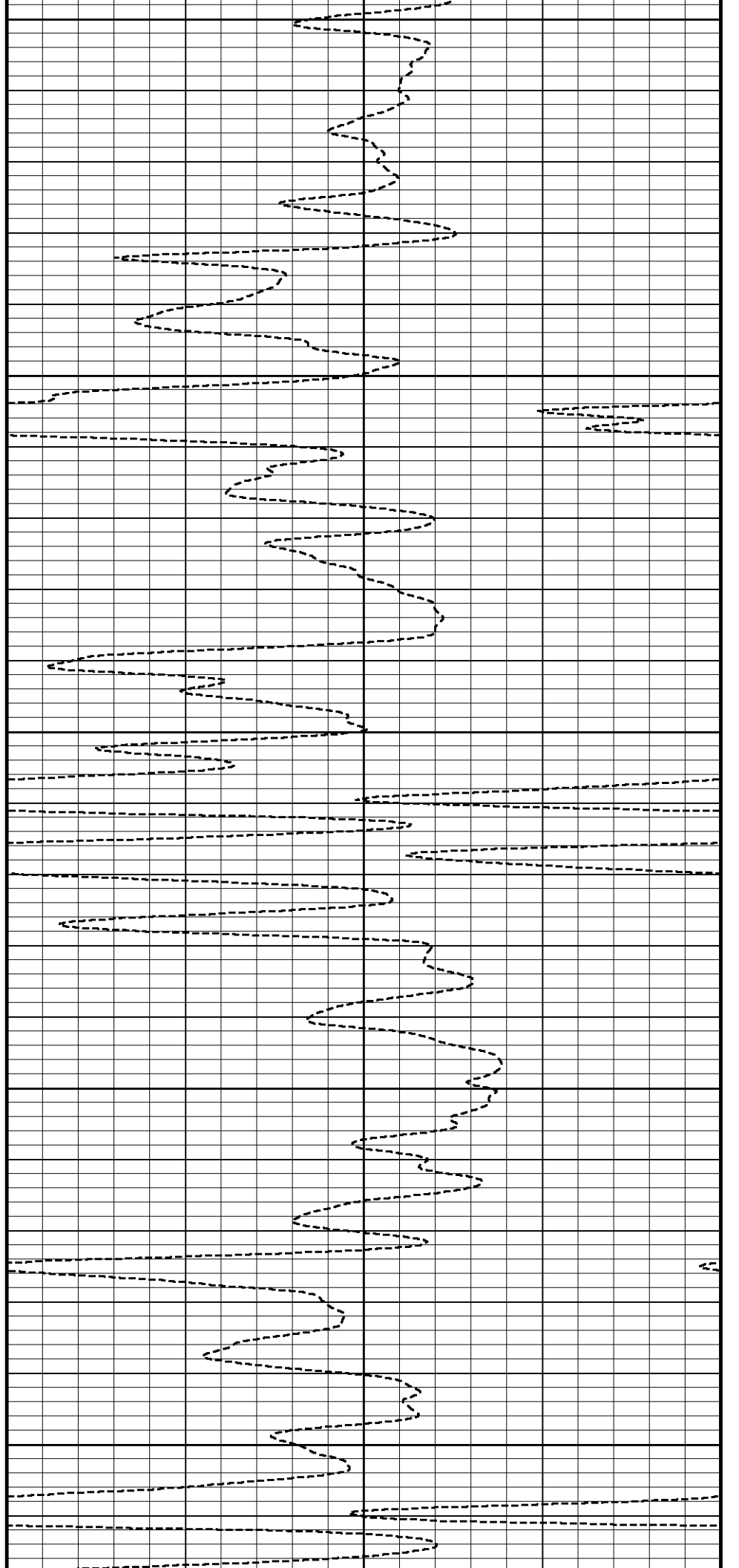
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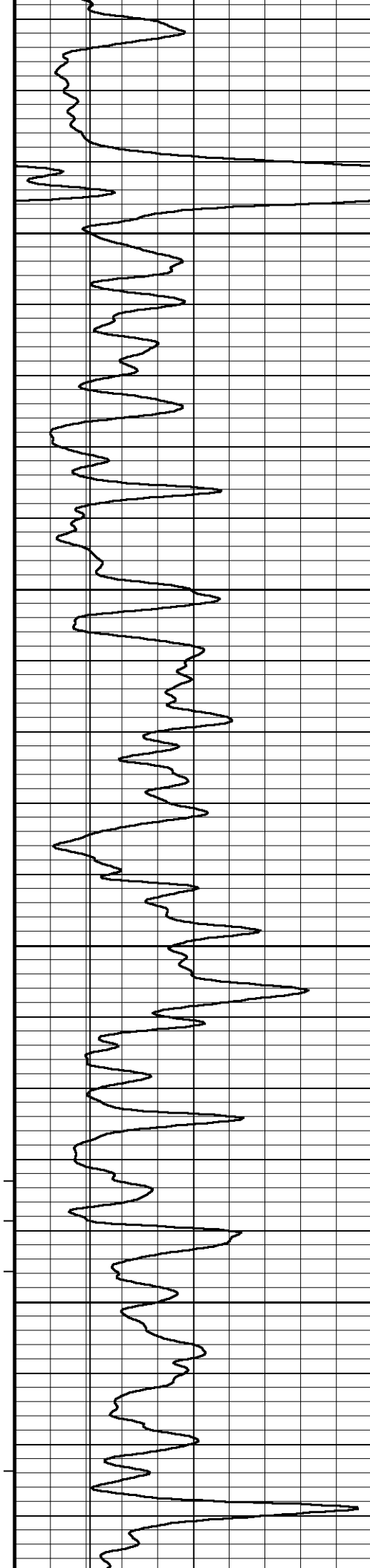
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4600

4650

4700



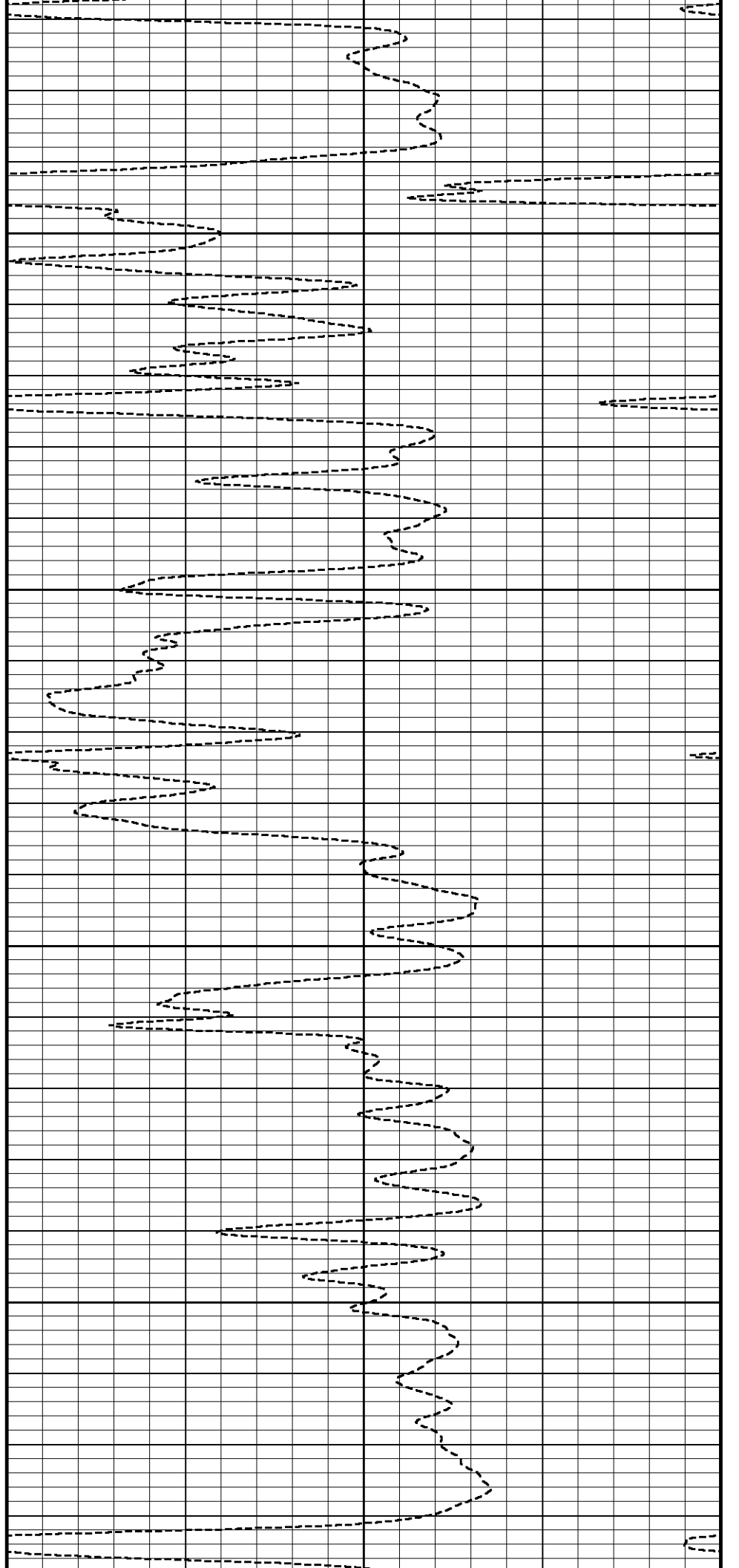


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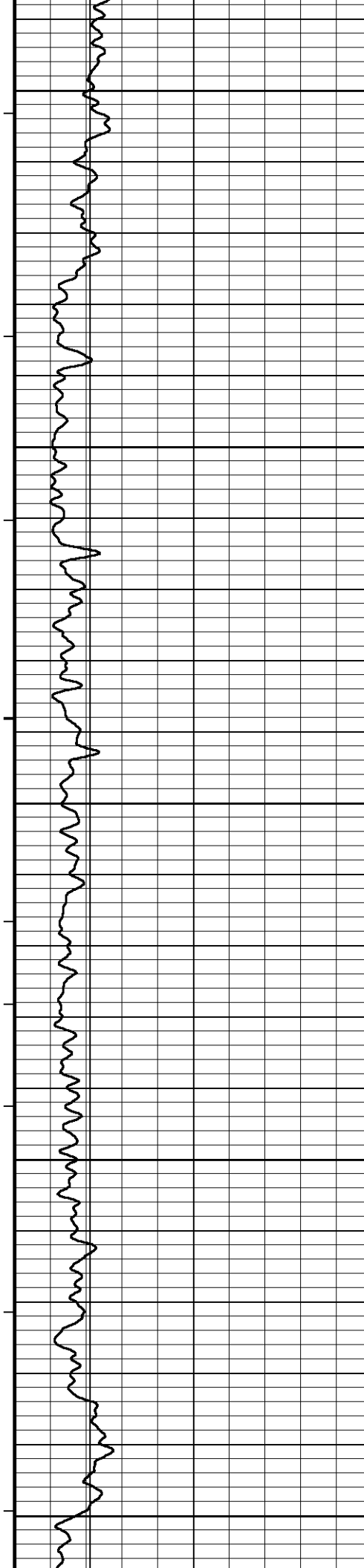
4800

4850

4900







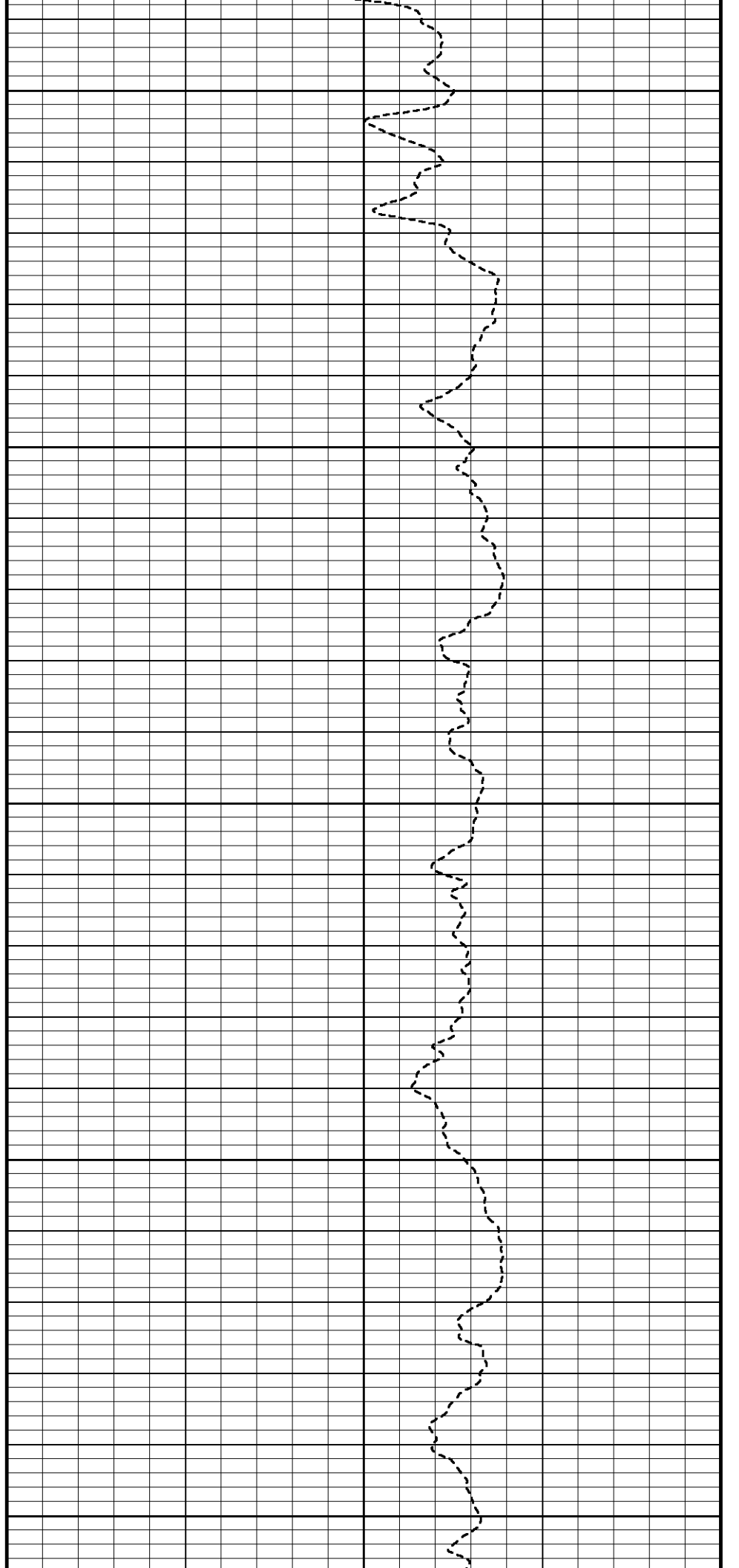
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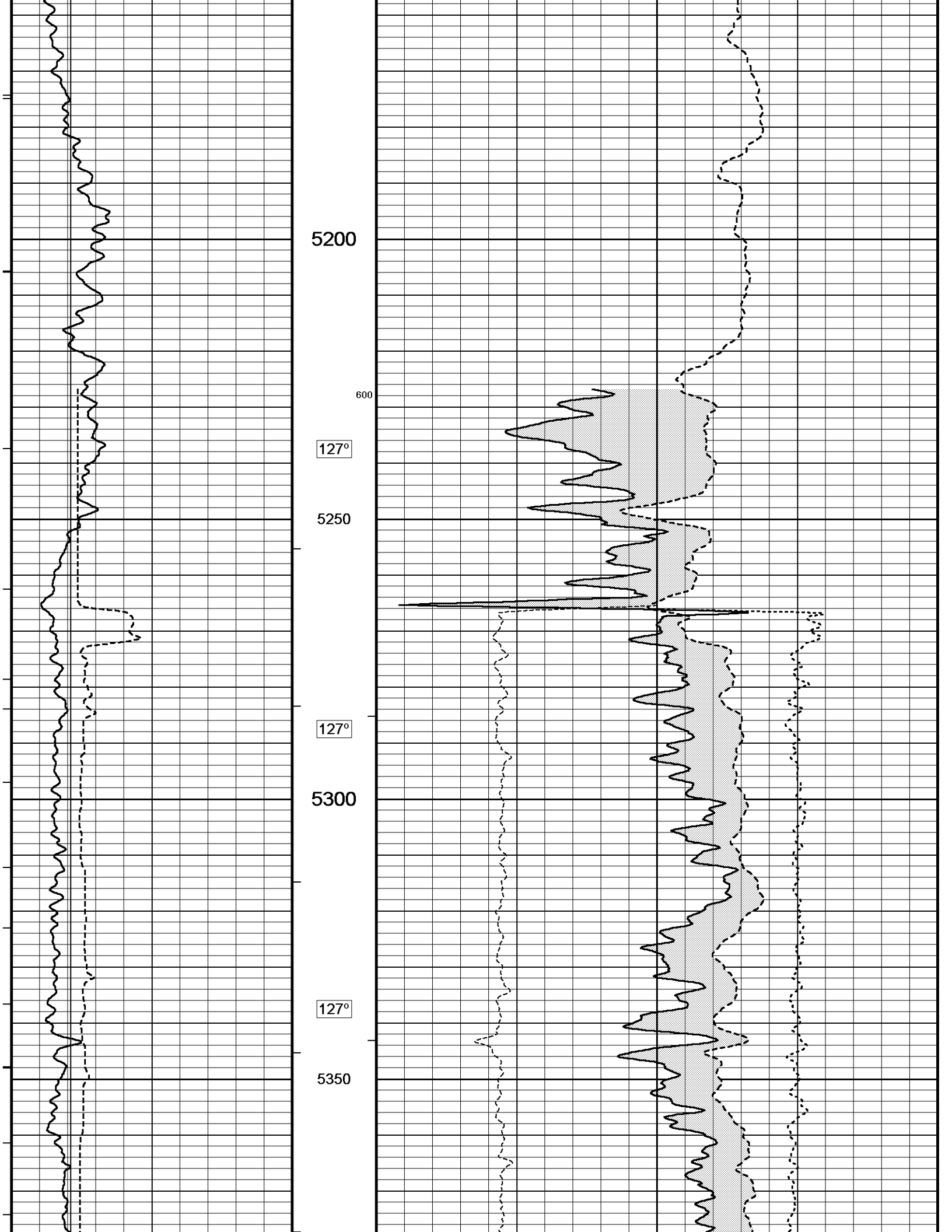
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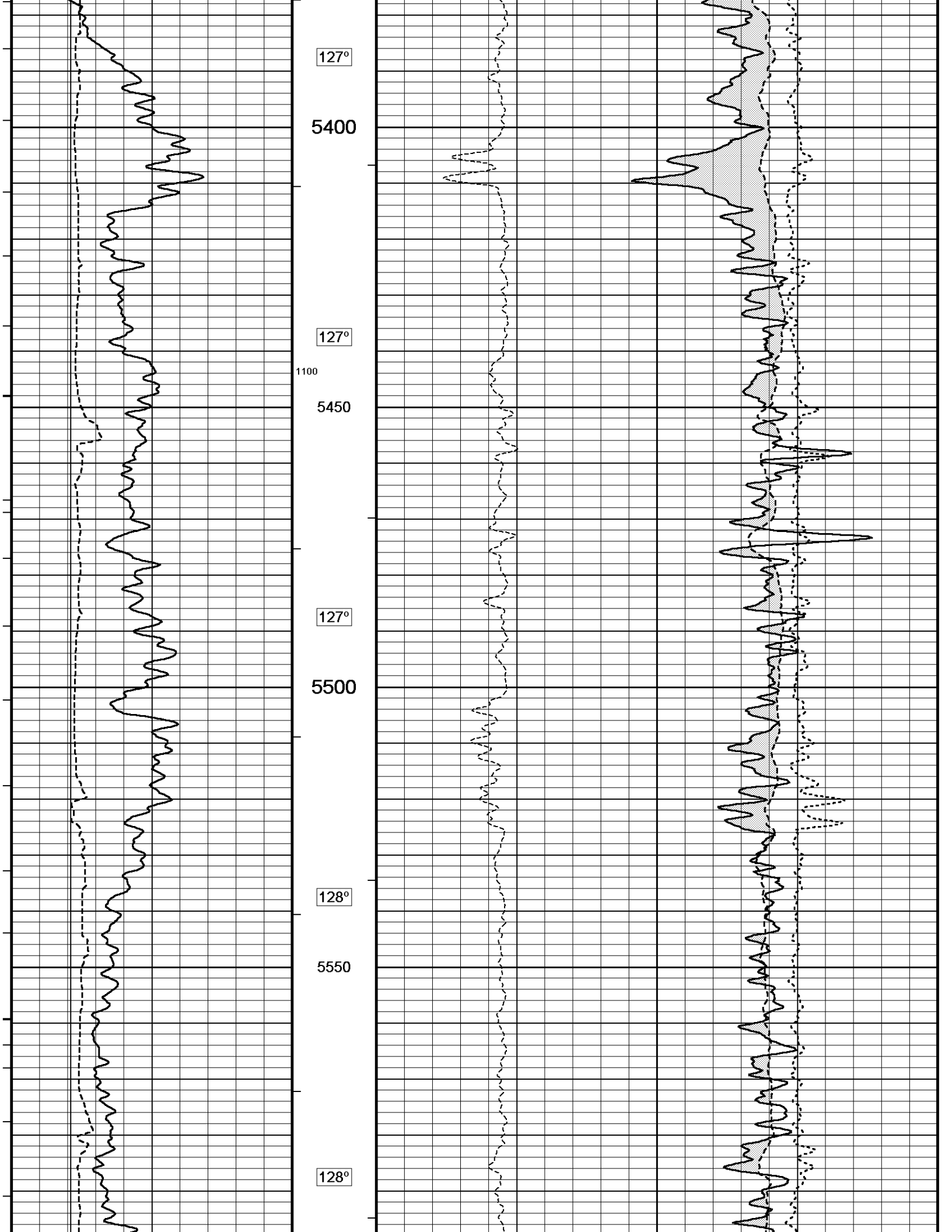
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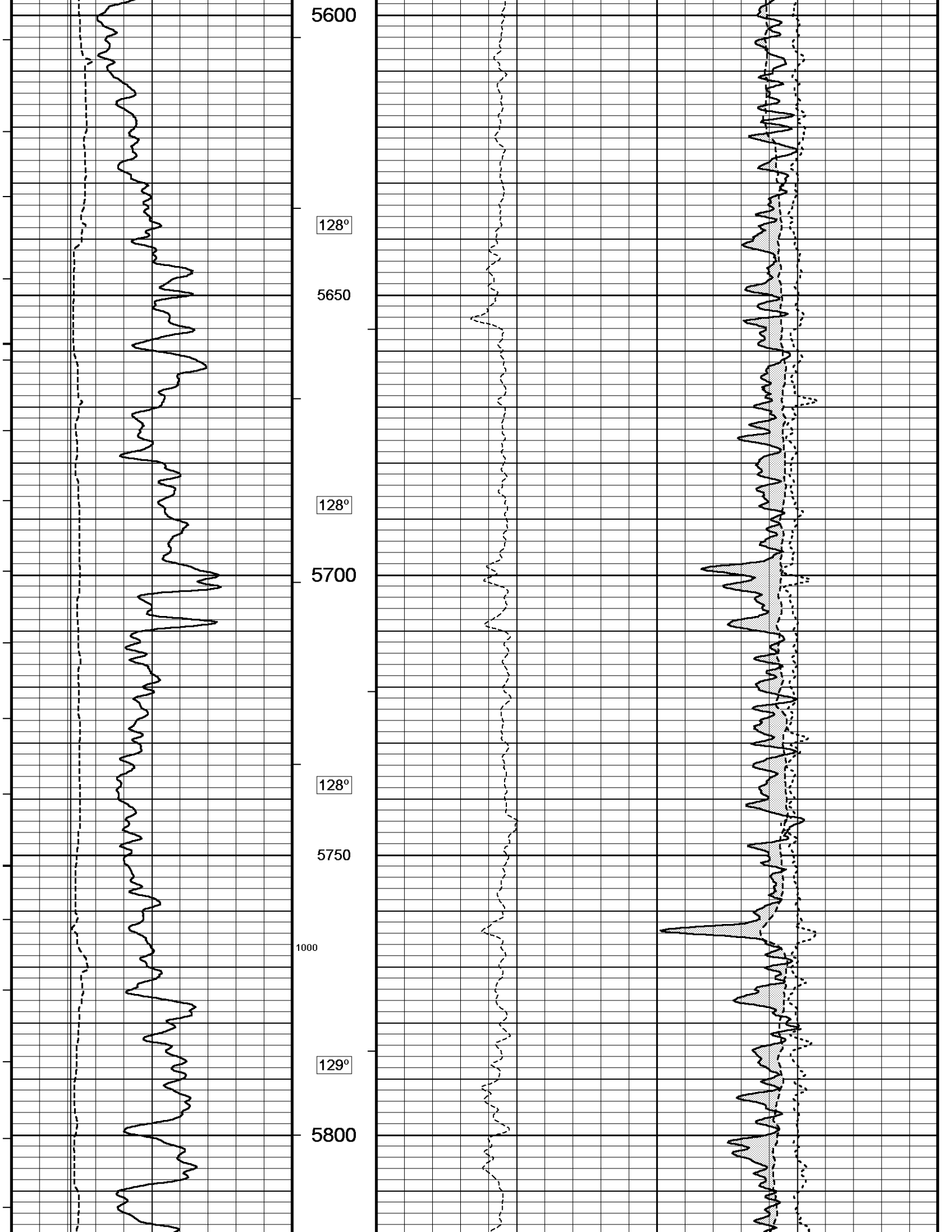
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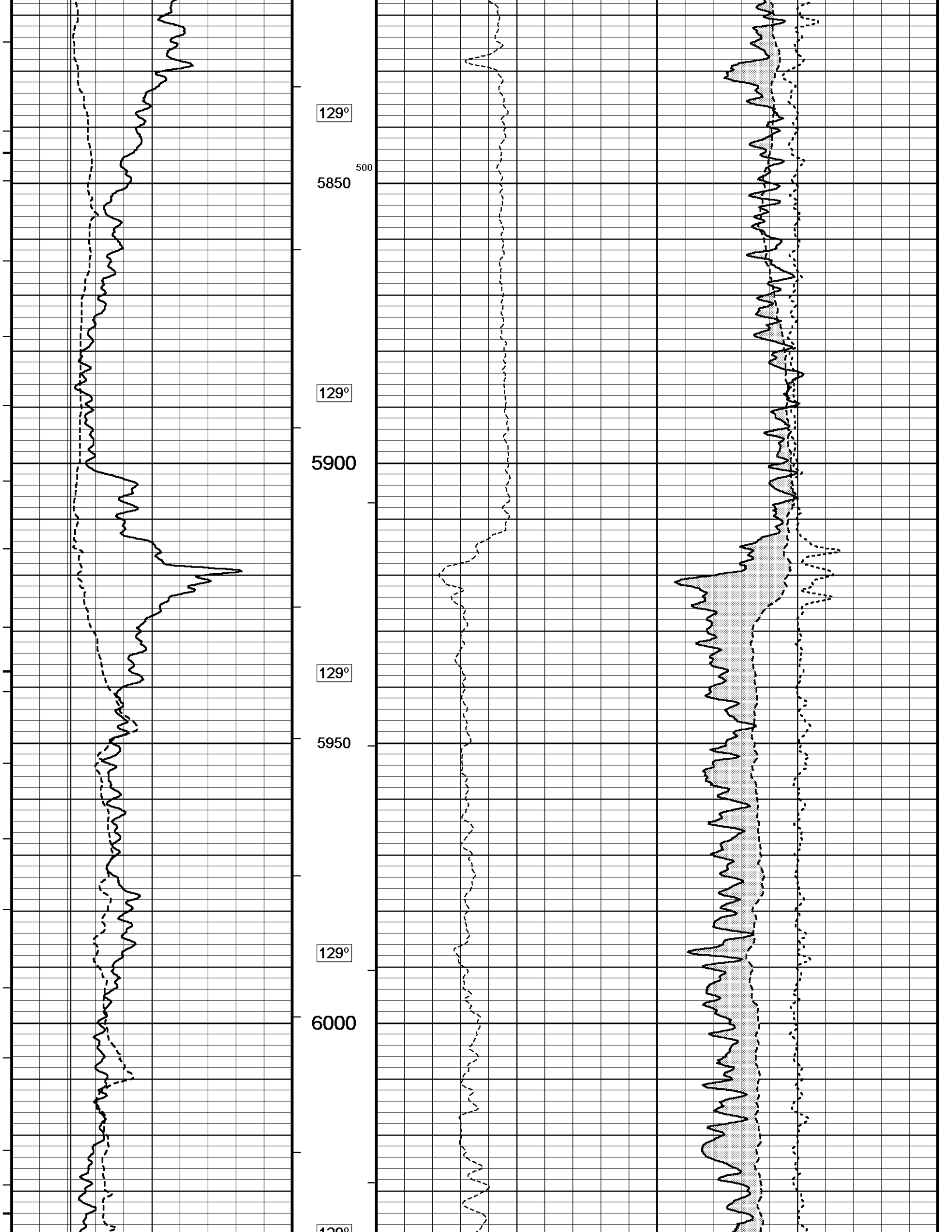
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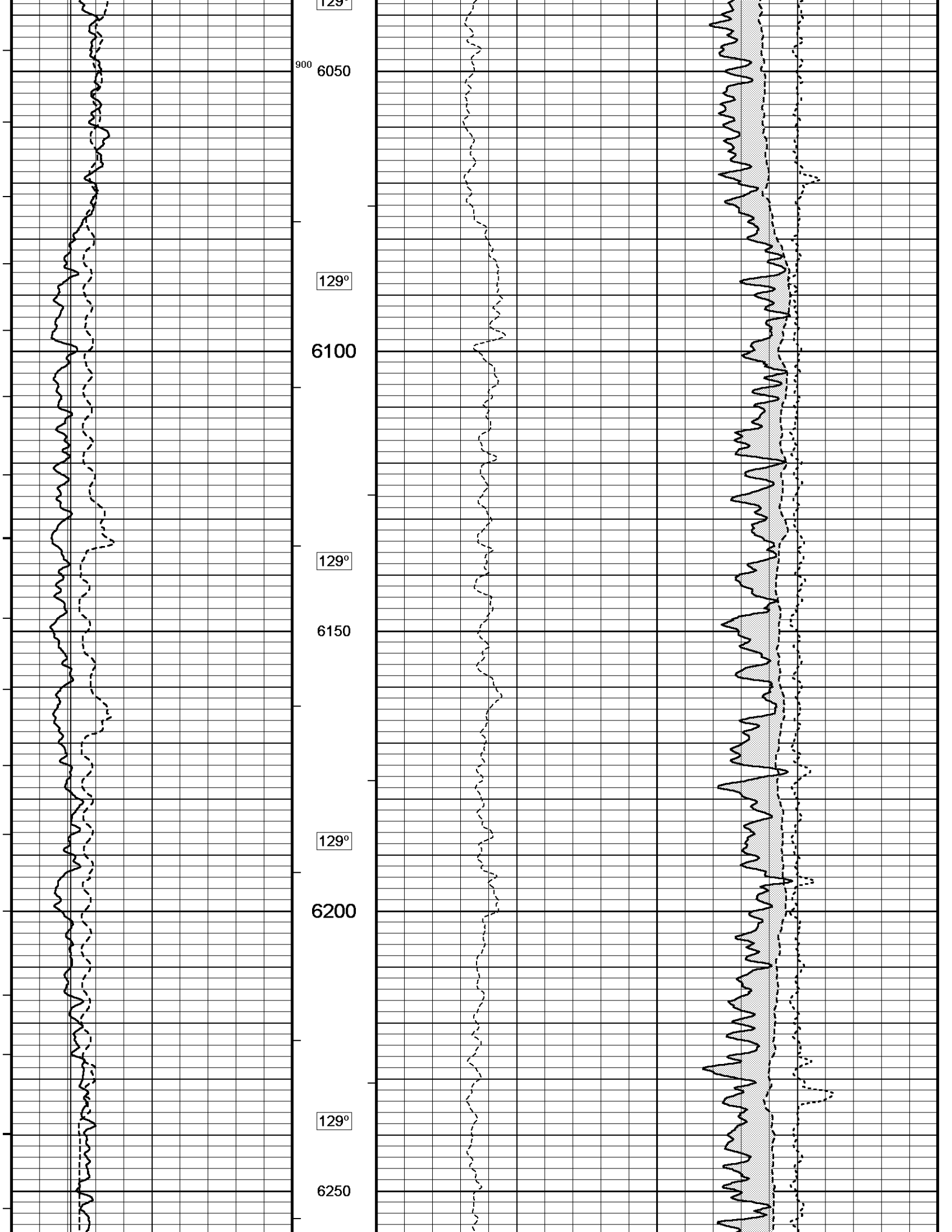


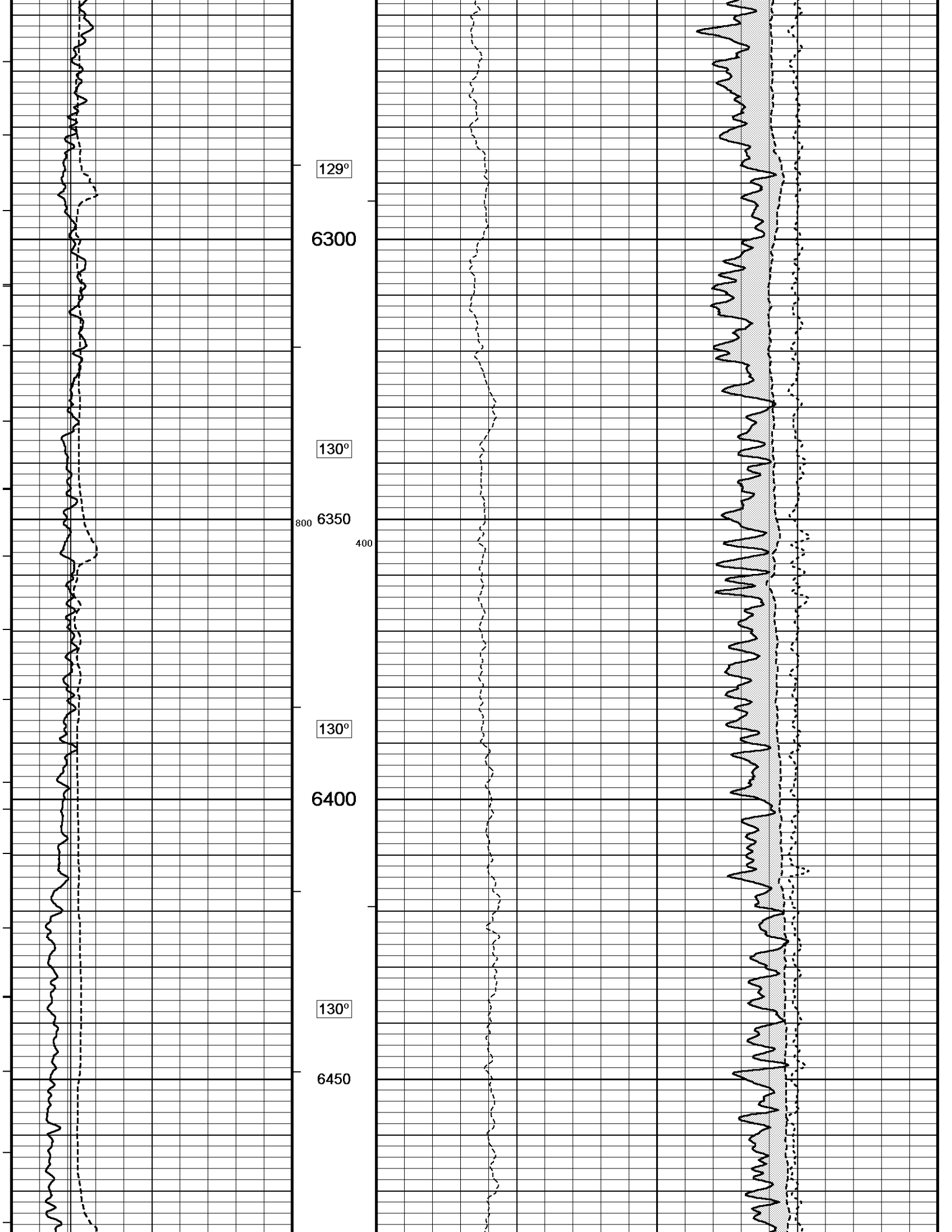


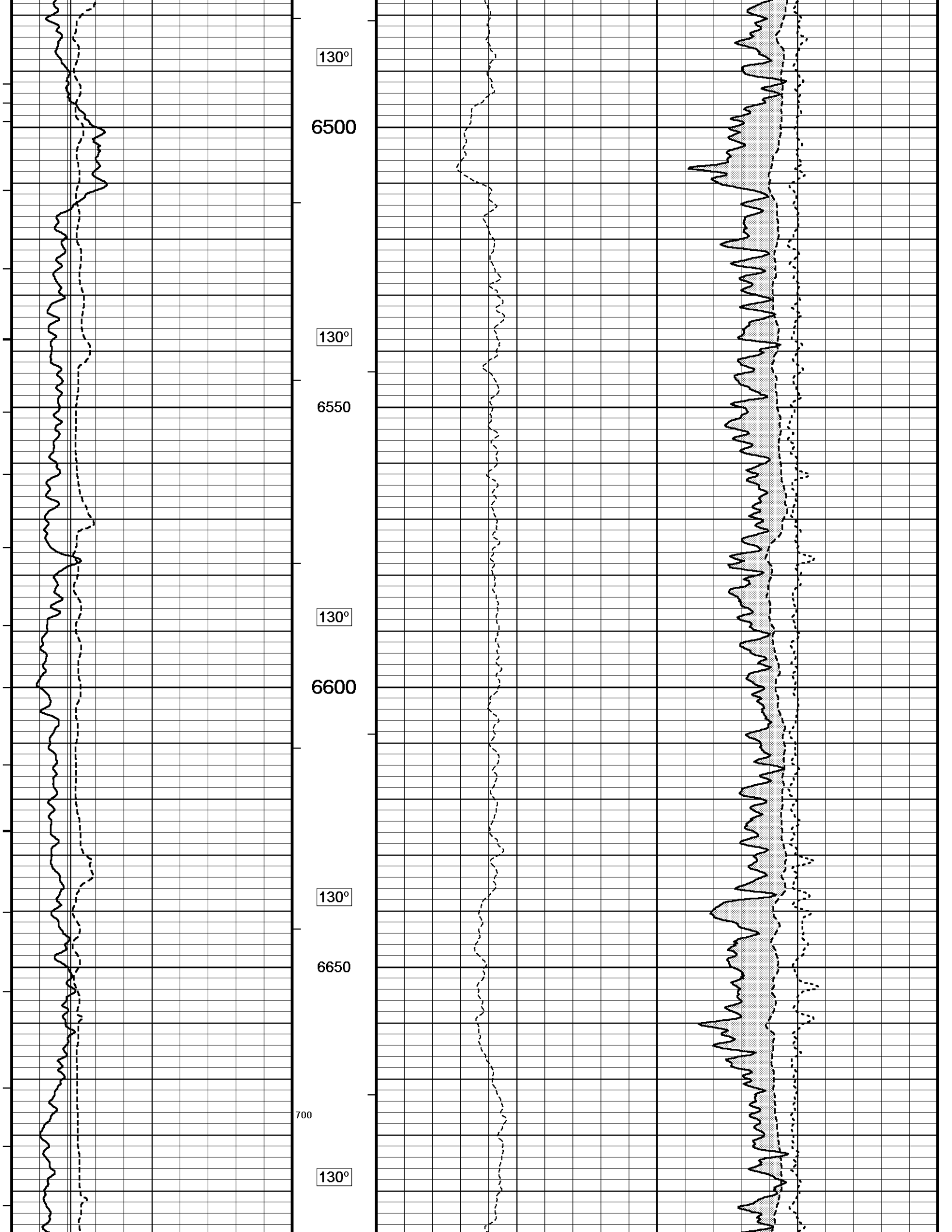




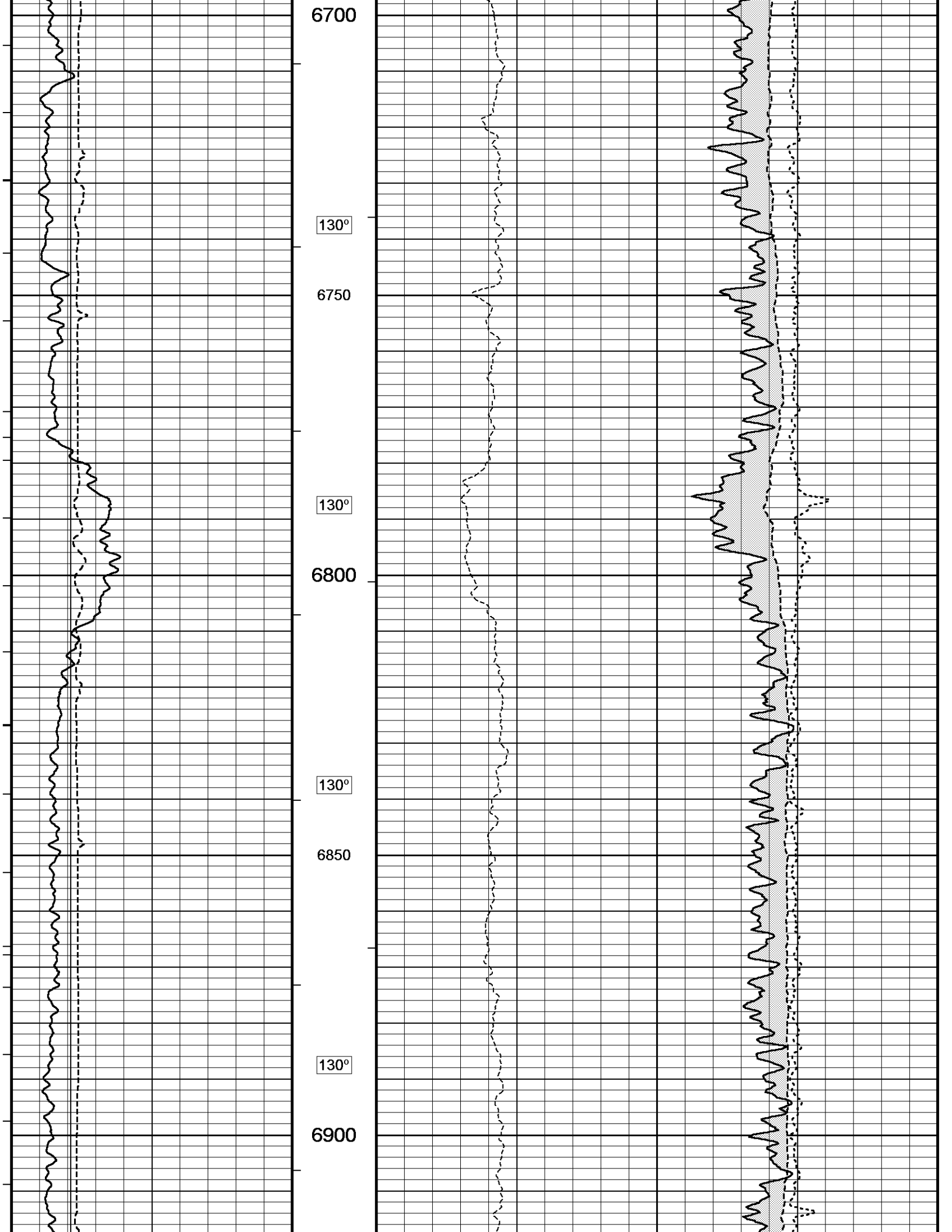


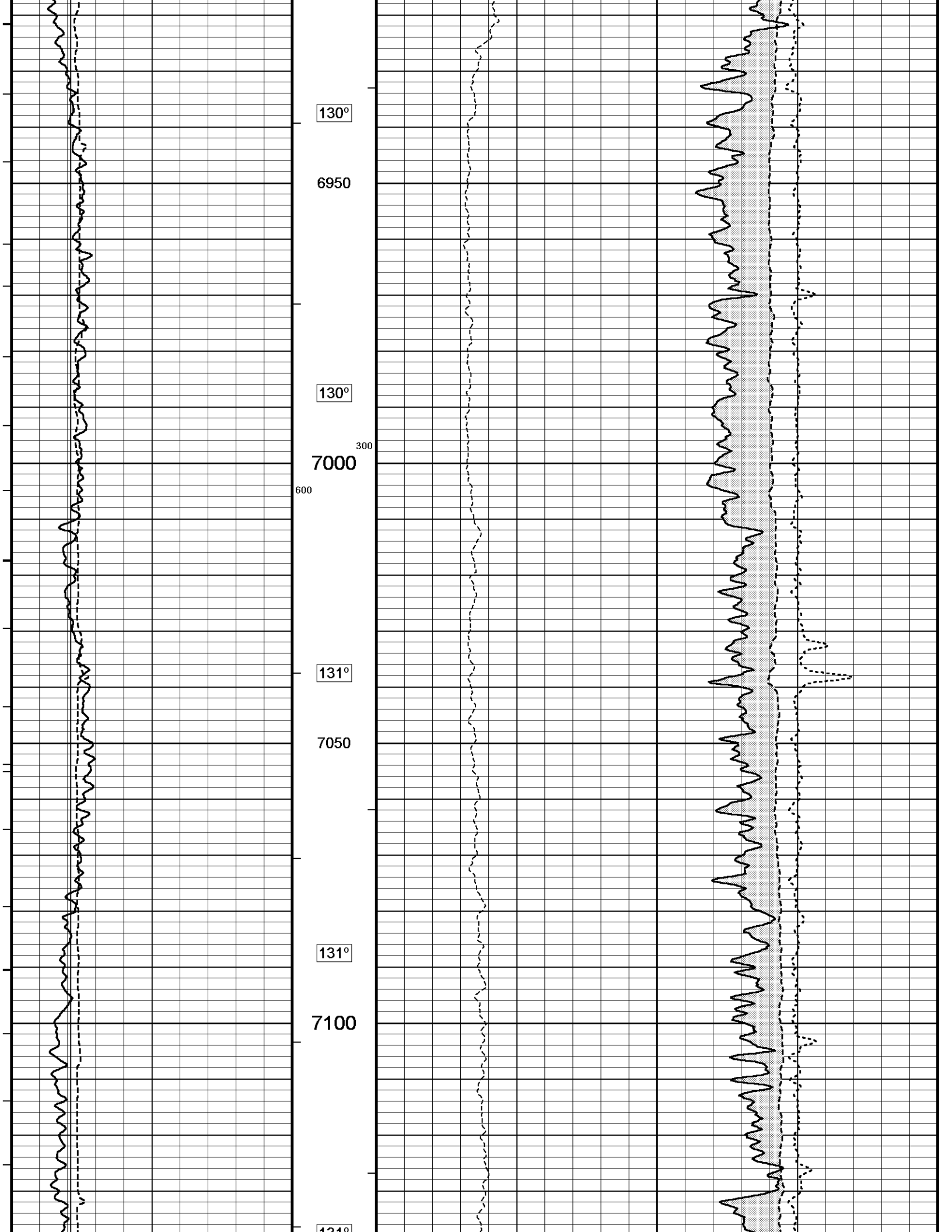


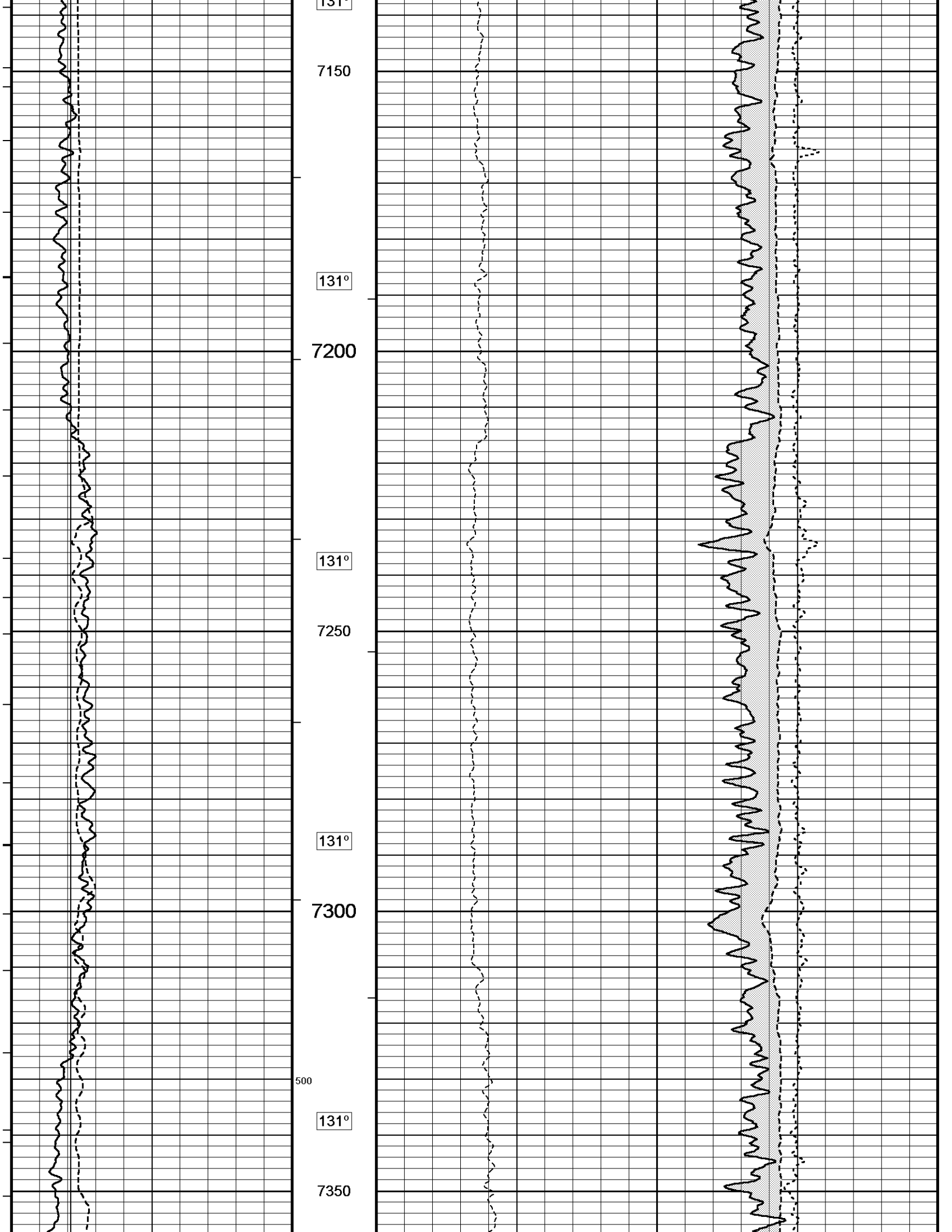


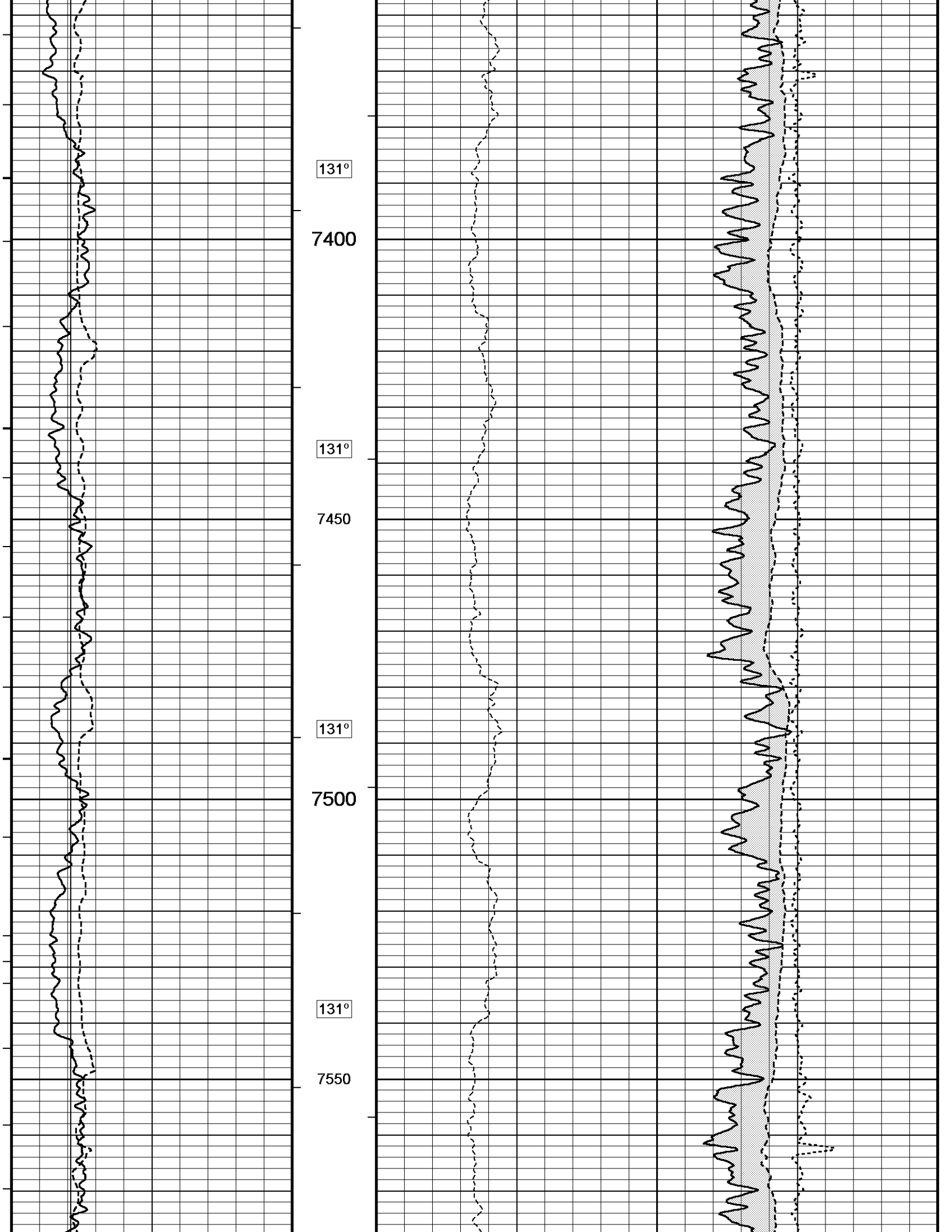


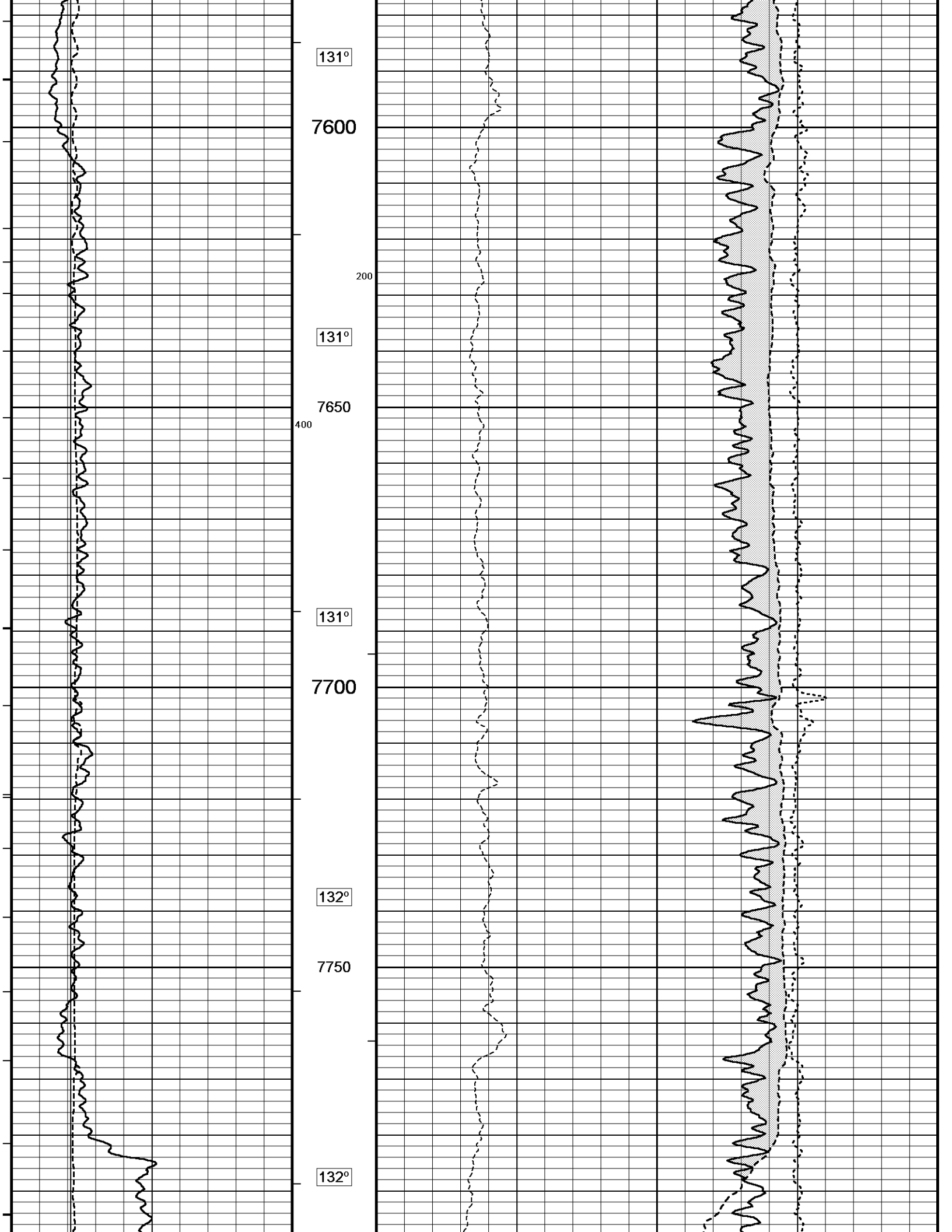


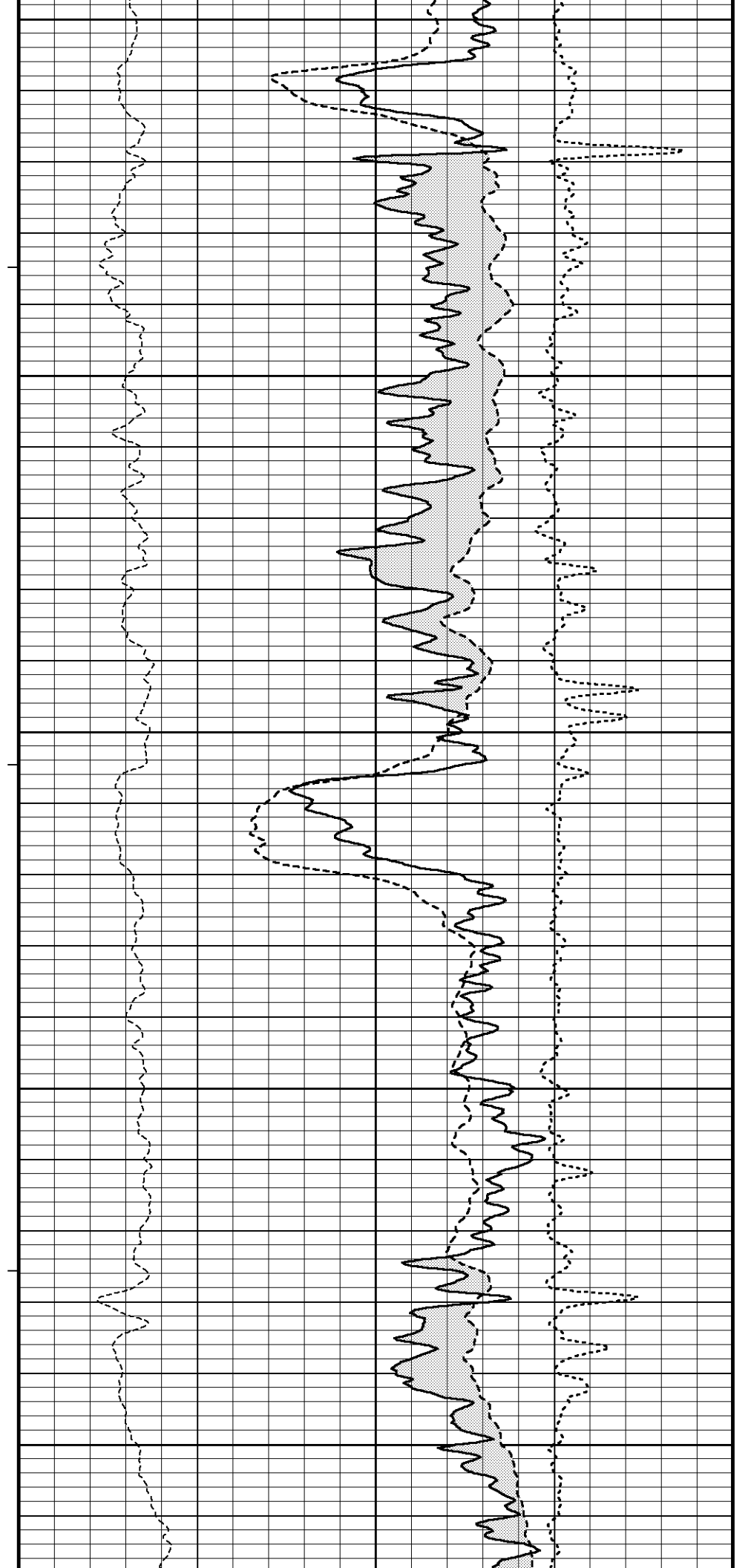
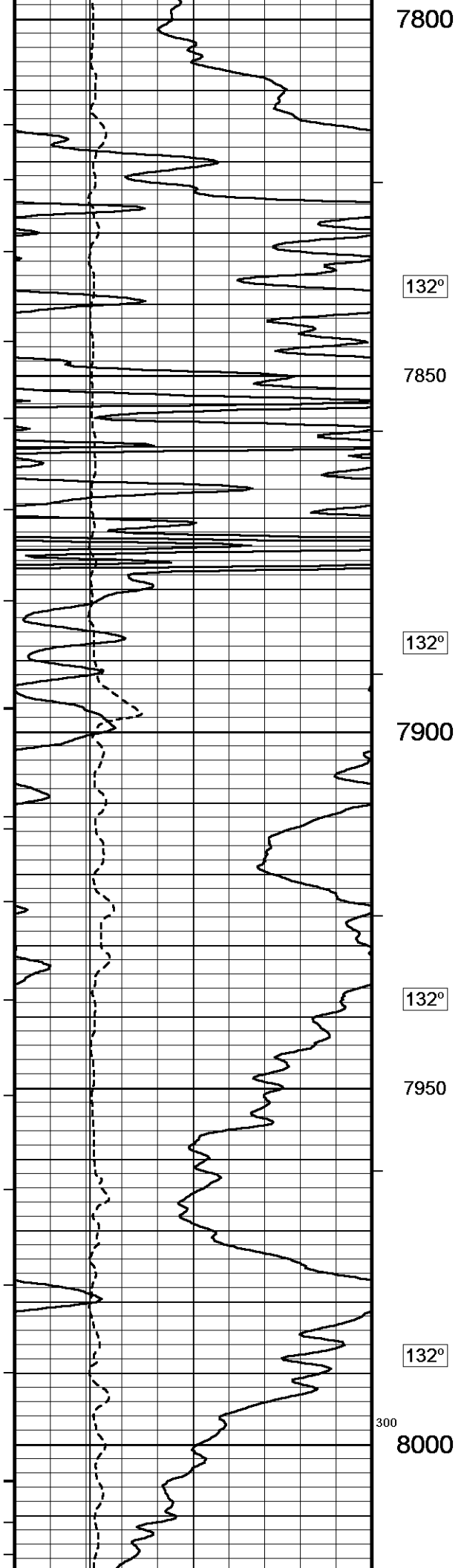


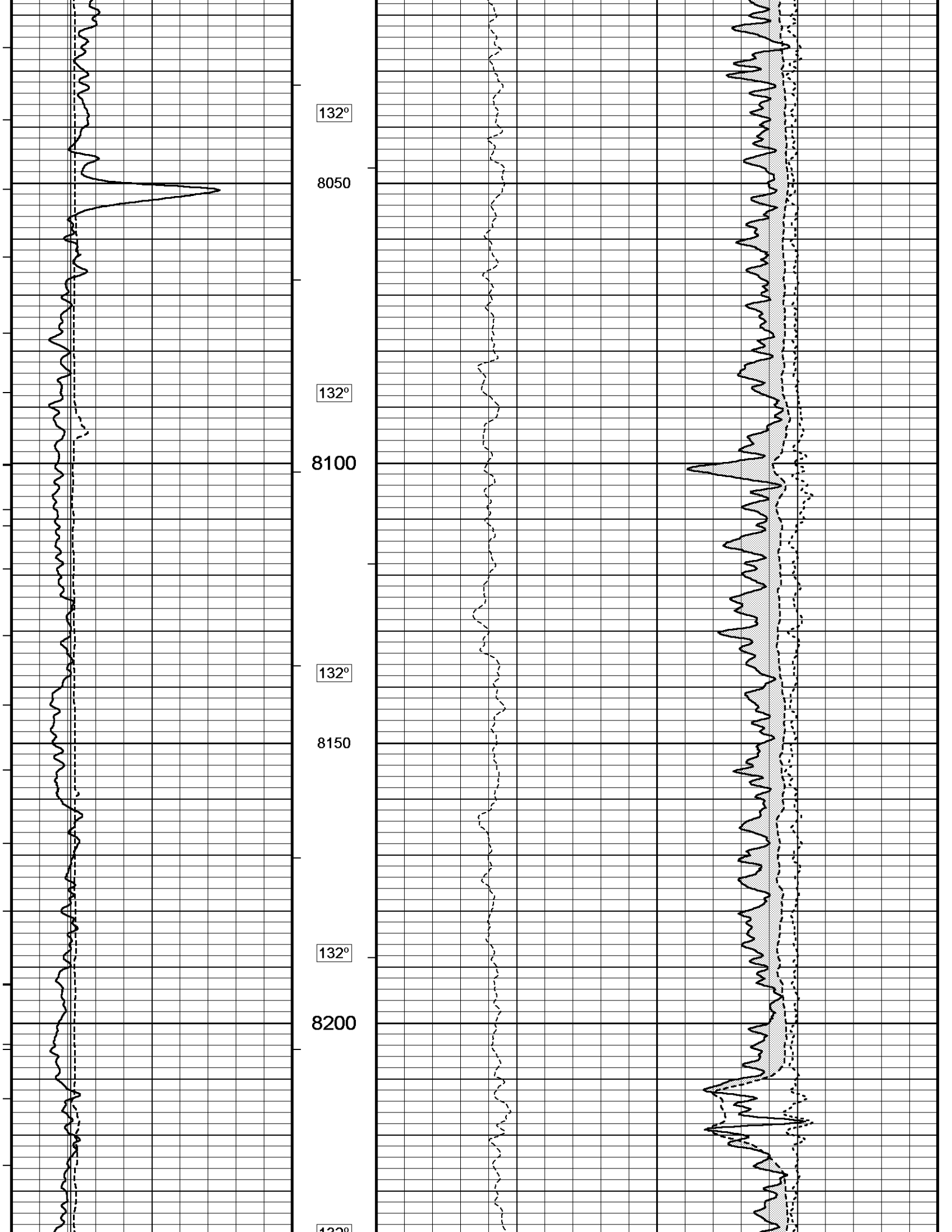


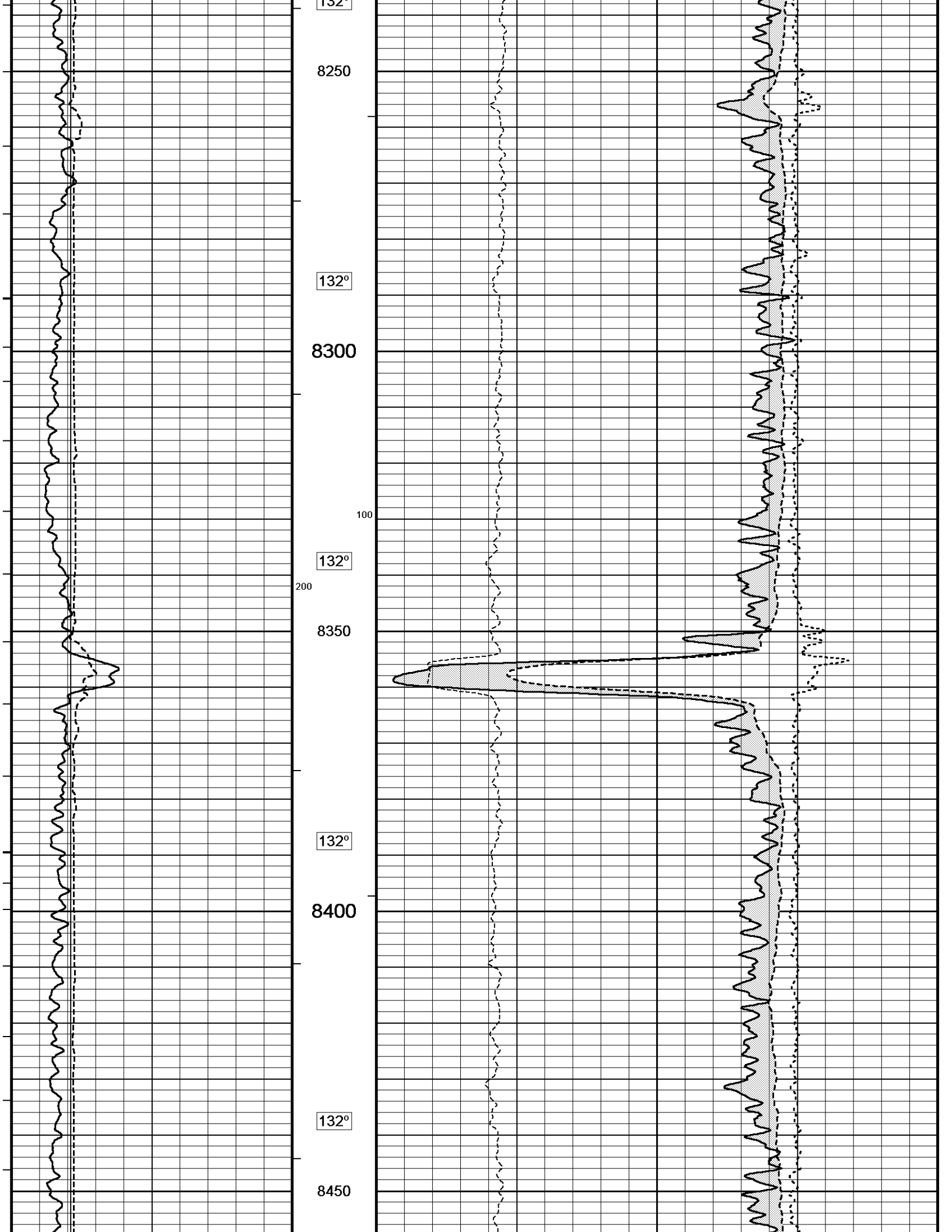




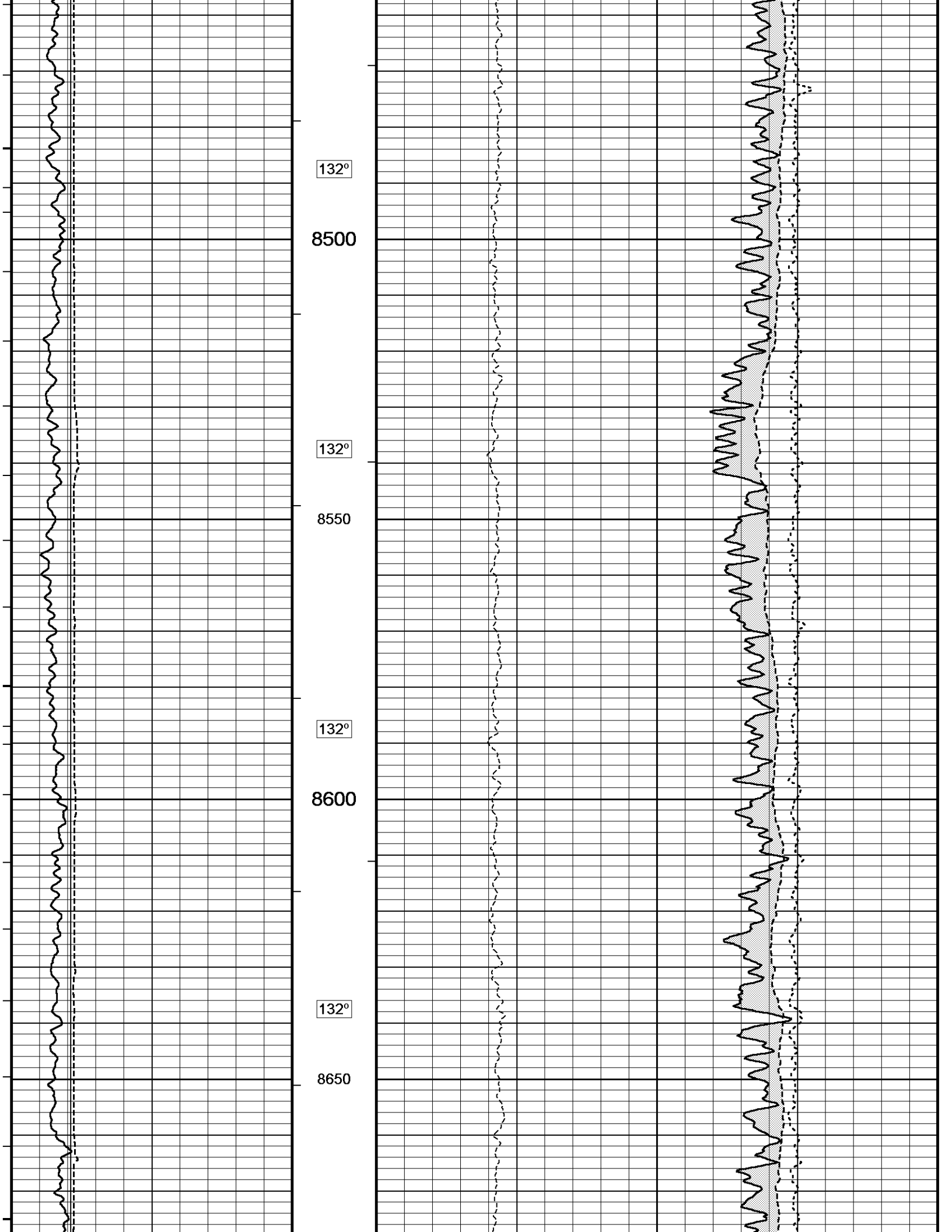


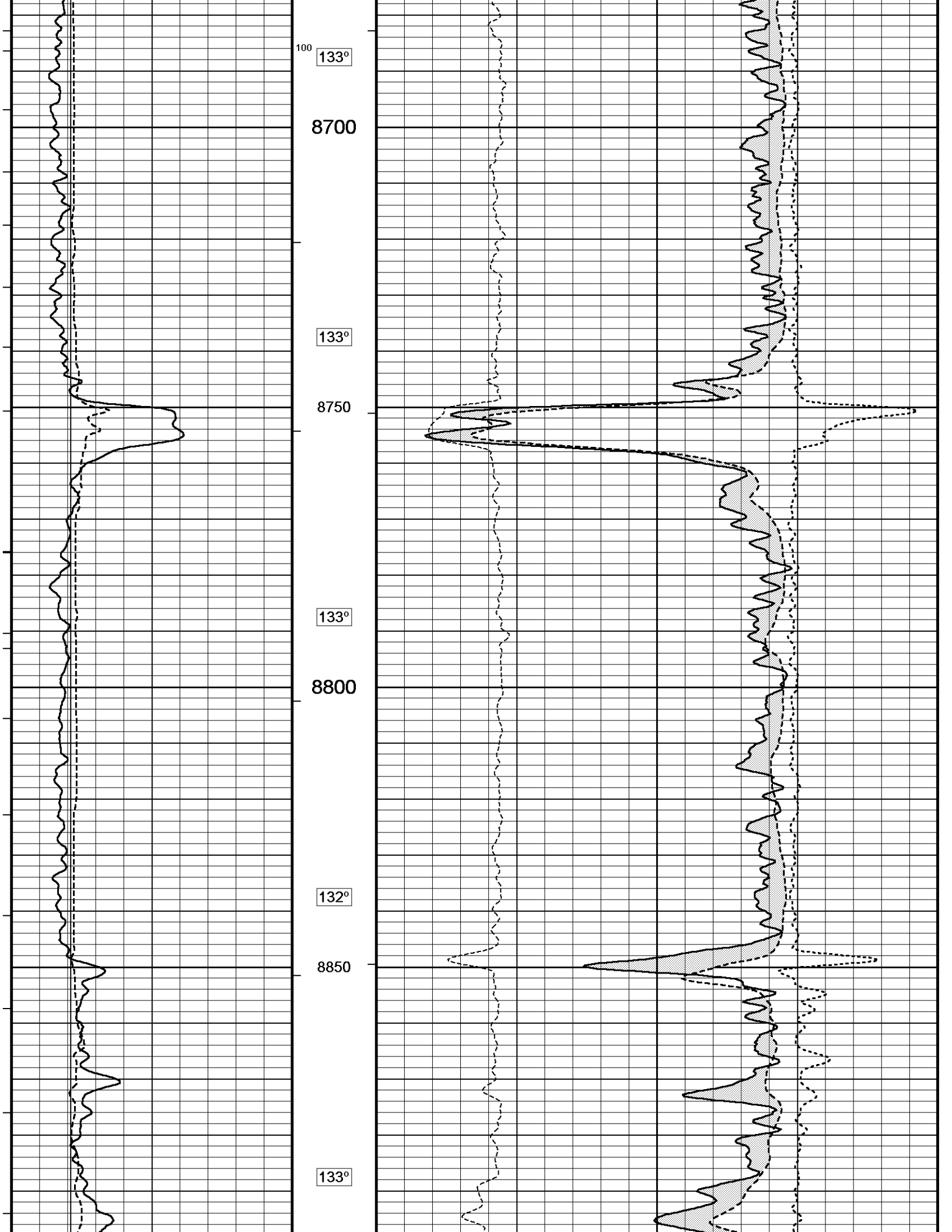


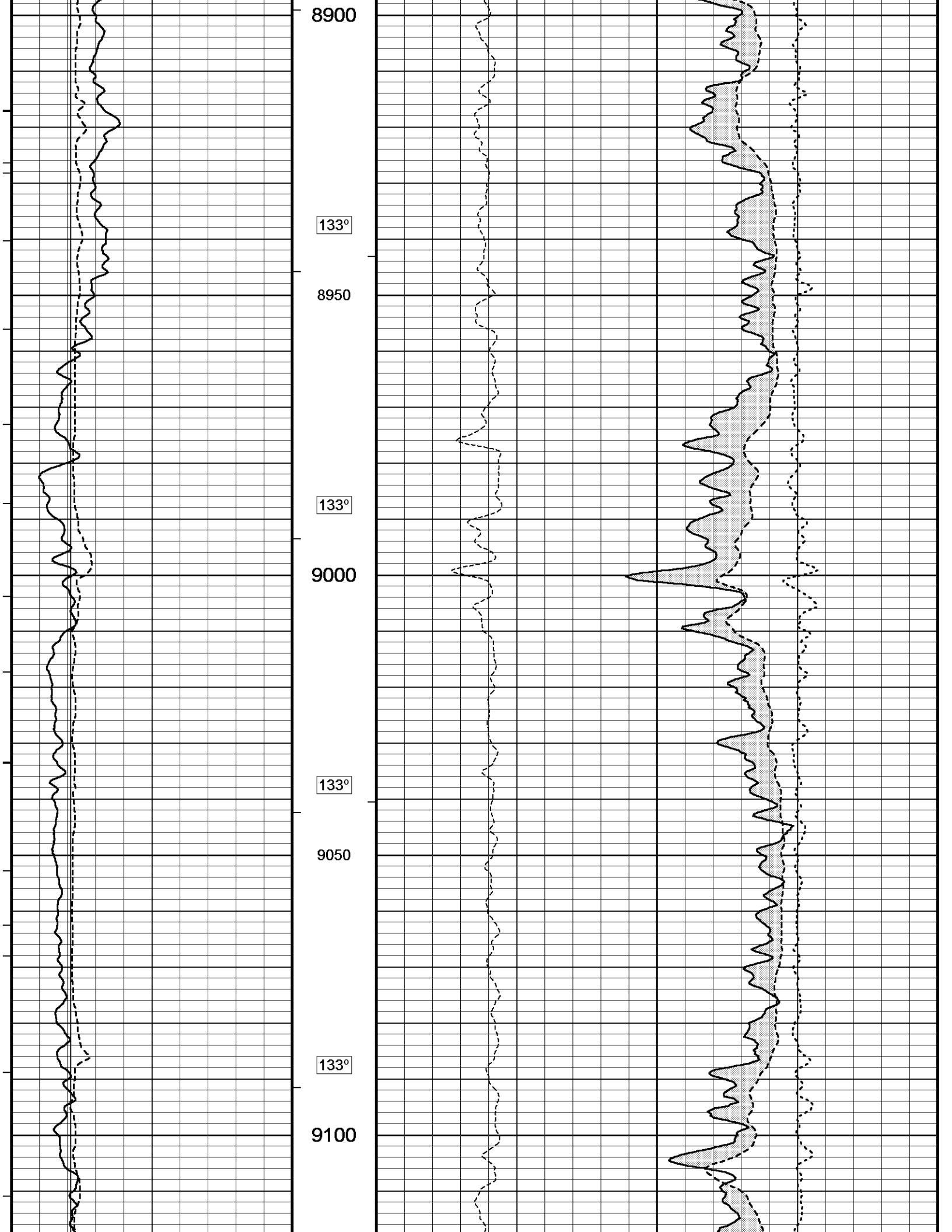


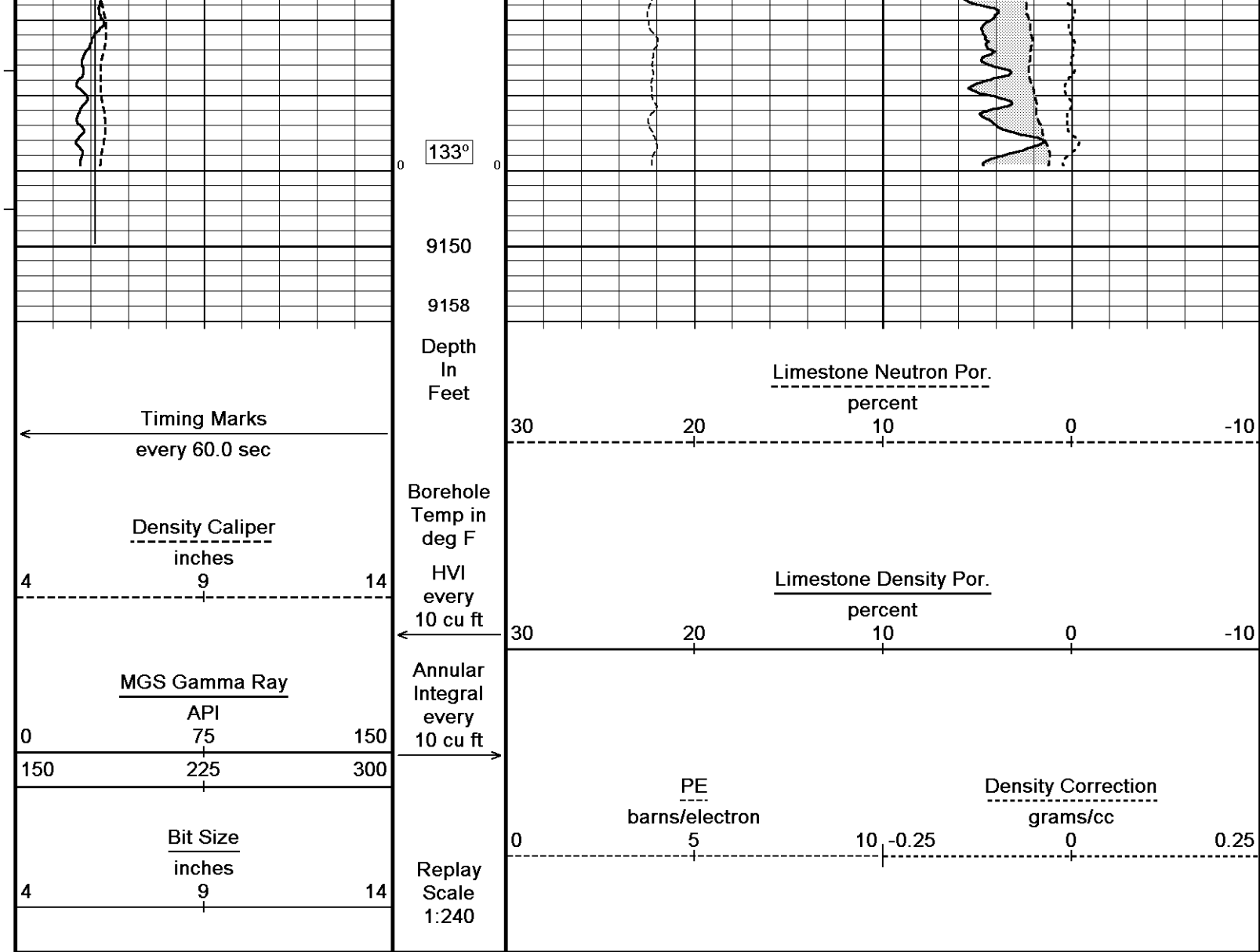










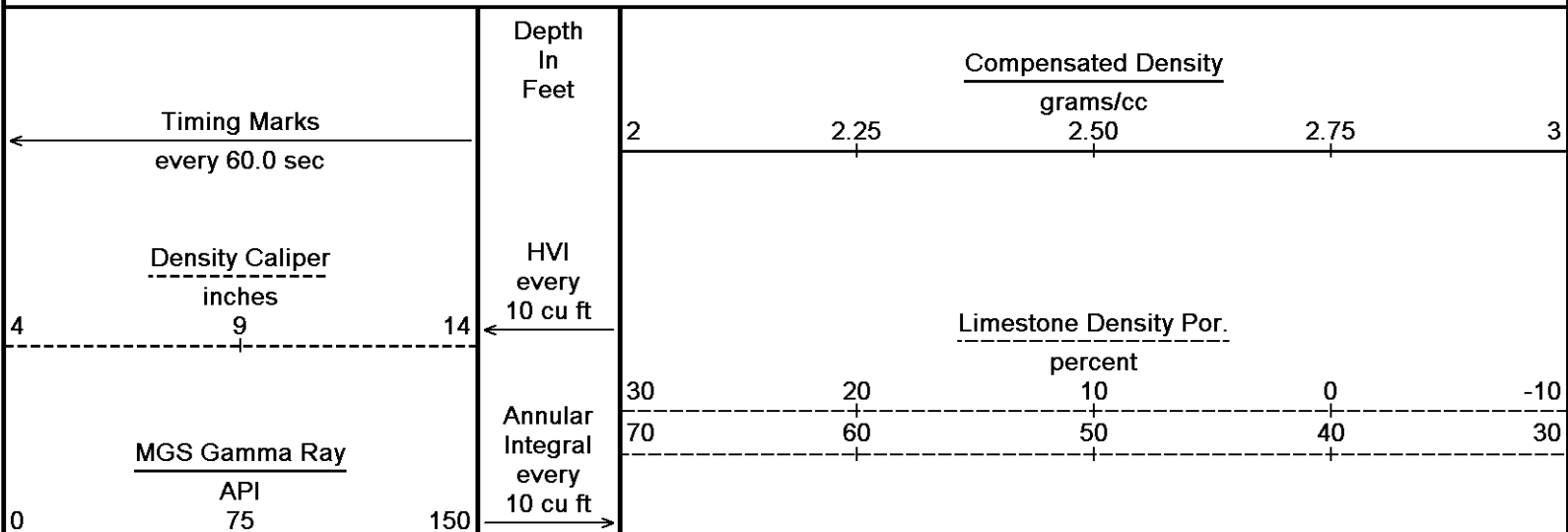


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 12-SEP-2012 19:25  
 Filename: C:\Program Files\Weatherford\WLS 13.02\lorimer\RTPA LORIMER.dta Recorded on 11-SEP-2012 06:29  
 System Versions: Processed with 13.02.6600 Plotted with 13.02.6600

↑ 5 inch main ↑

↓ 5 inch main ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 12-SEP-2012 19:25  
 Filename: C:\Program Files\Weatherford\WLS 13.02\lorimer\RTPA LORIMER.dta Recorded on 11-SEP-2012 06:29  
 System Versions: Processed with 13.02.6600 Plotted with 13.02.6600



150 225 300

Bit Size  
inches  
9

4 14

Replay  
Scale  
1:240

5200

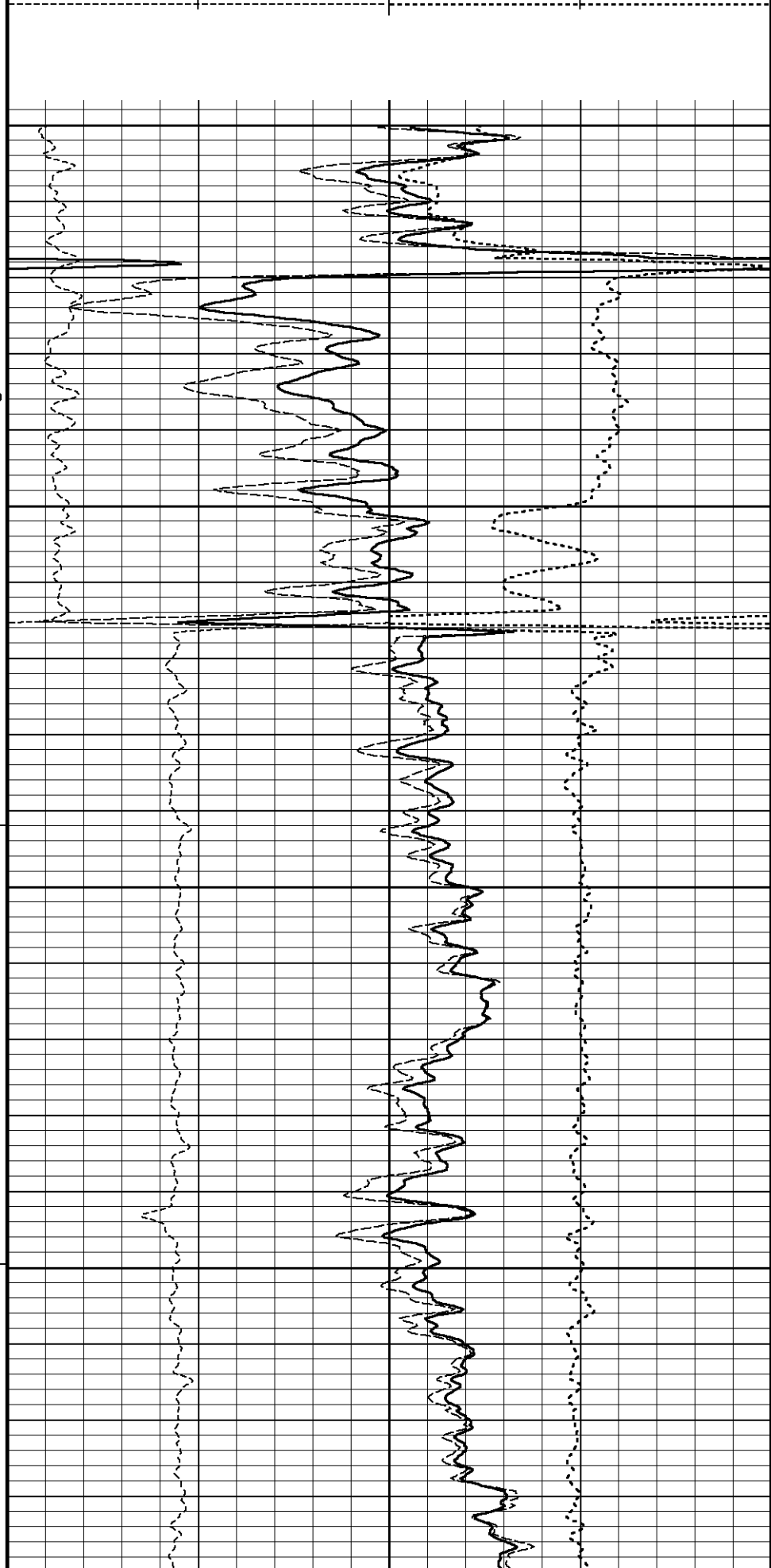
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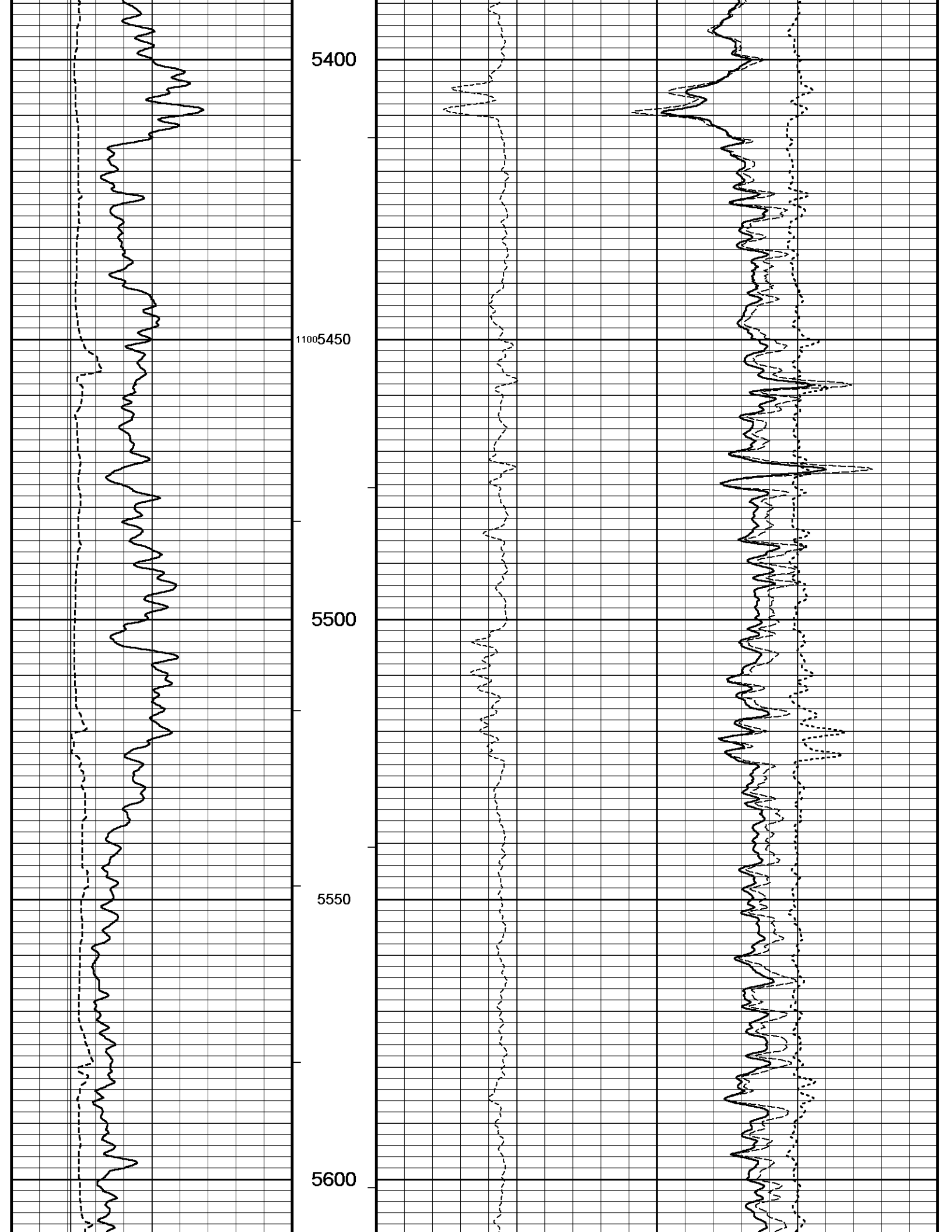
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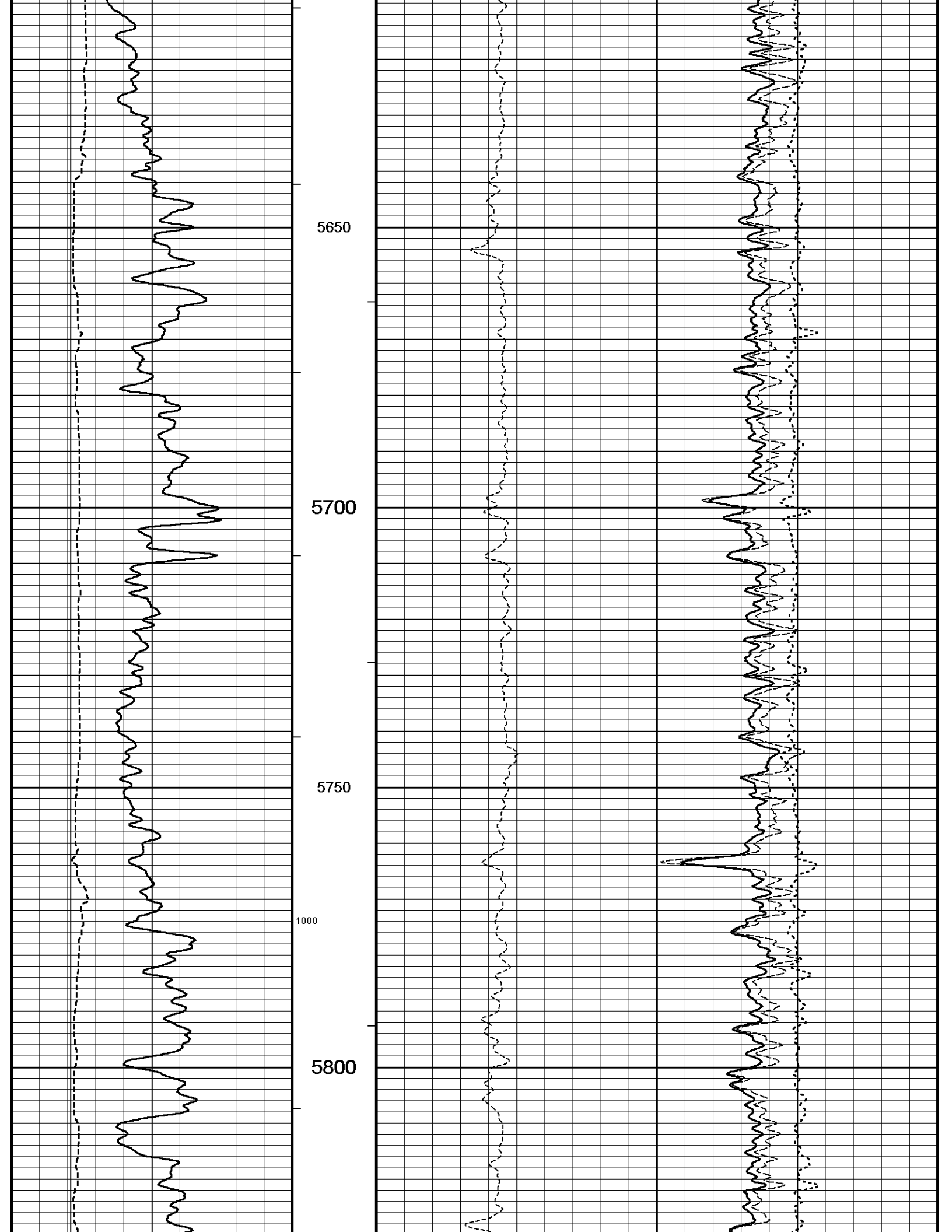
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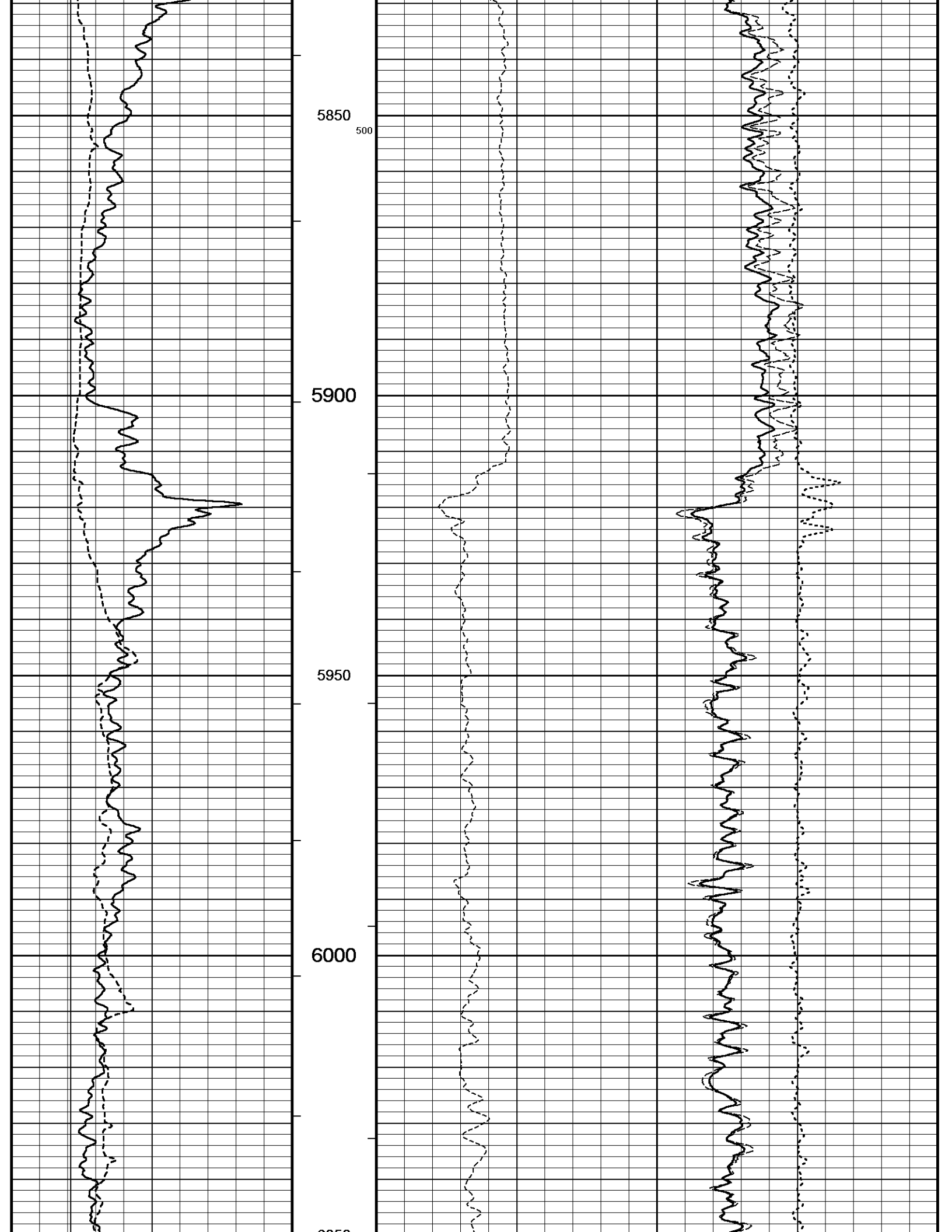
PE  
barns/electron  
0 5 10

Density Correction  
grams/cc  
-0.25 0 0.25

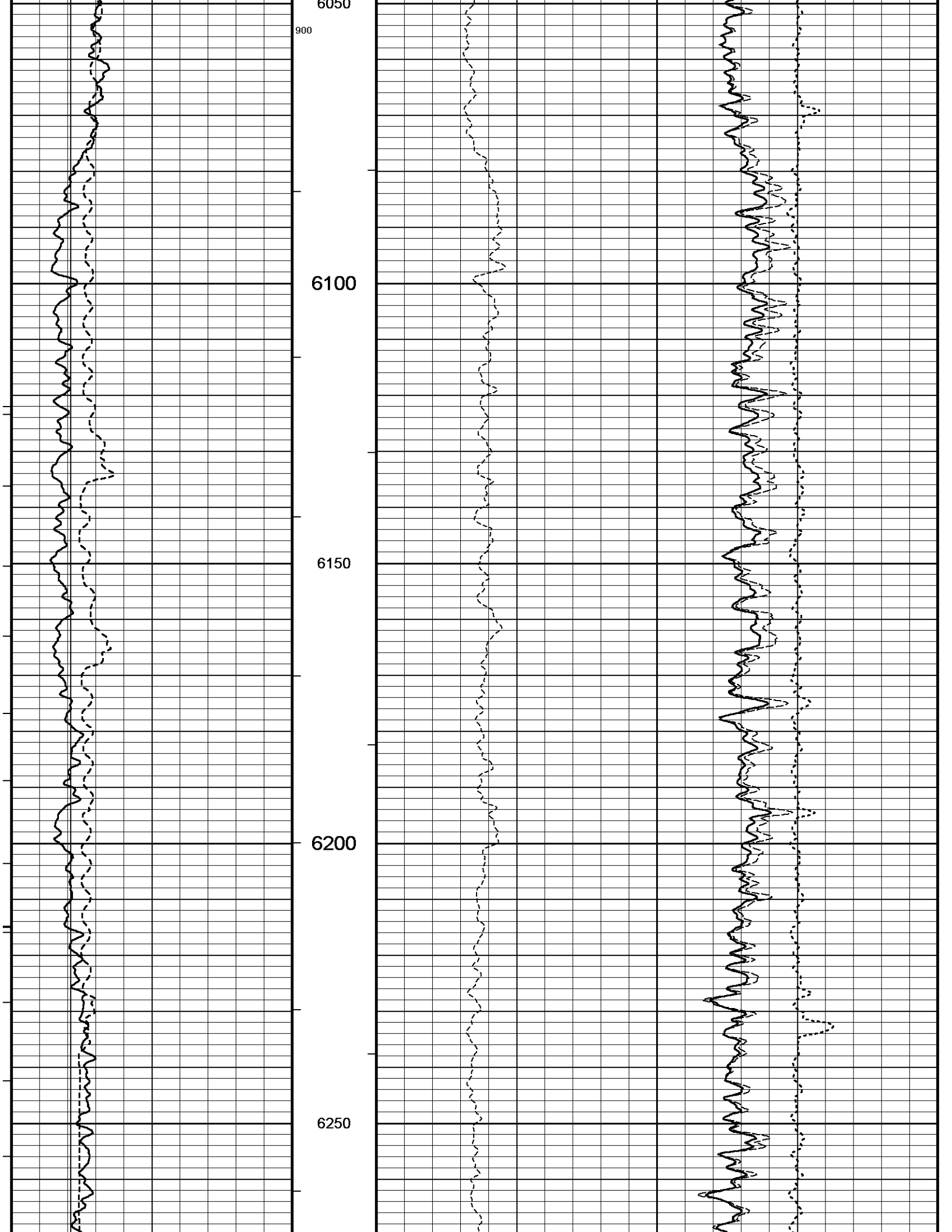


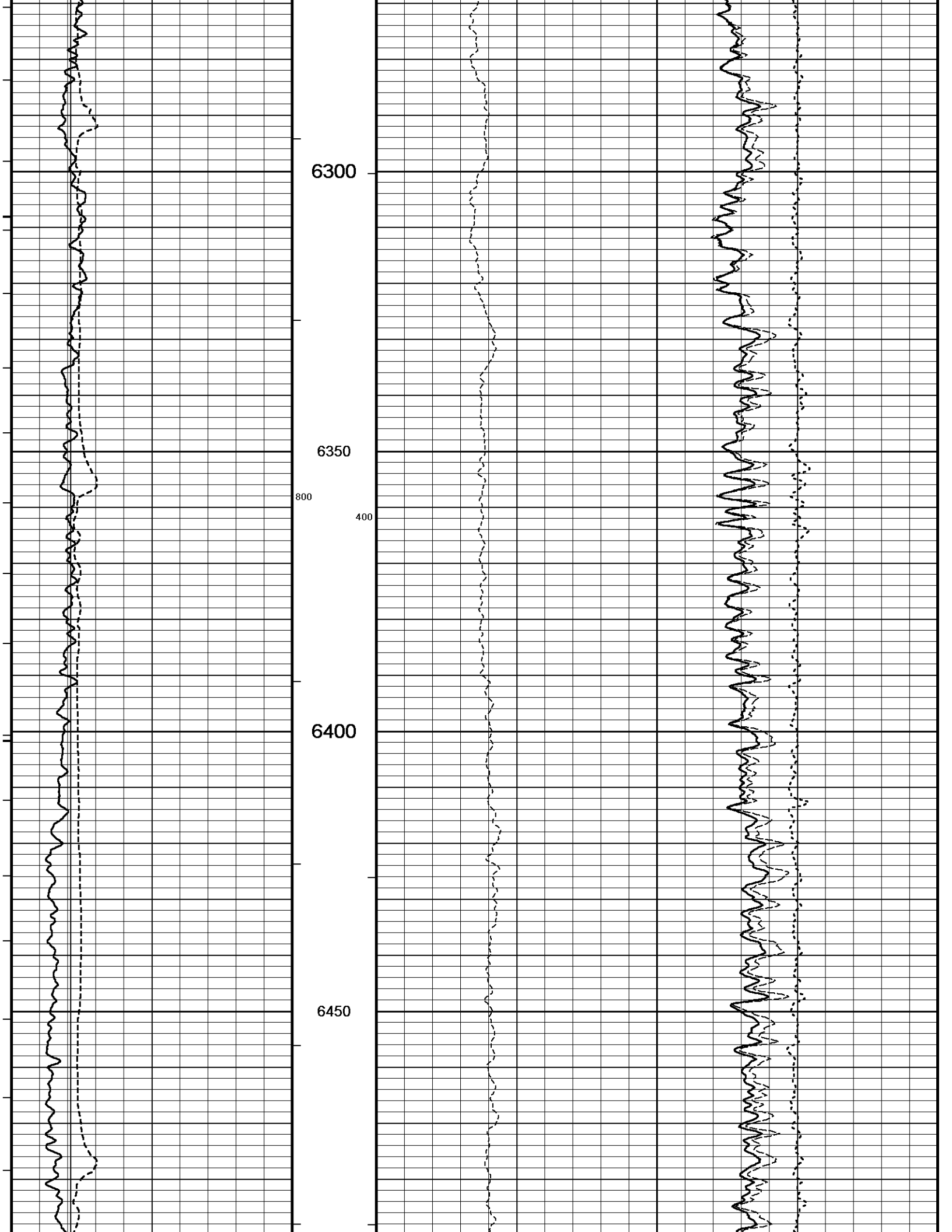


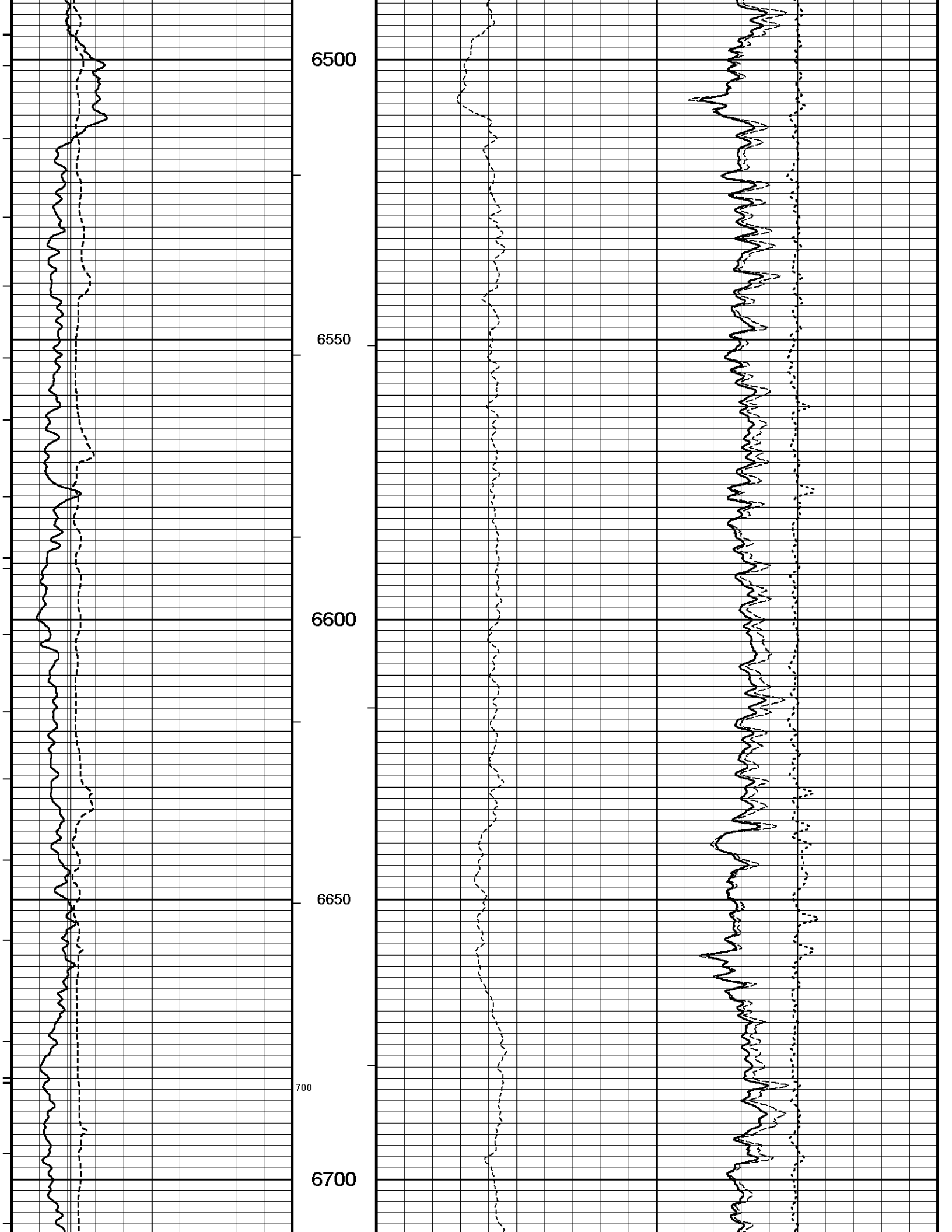


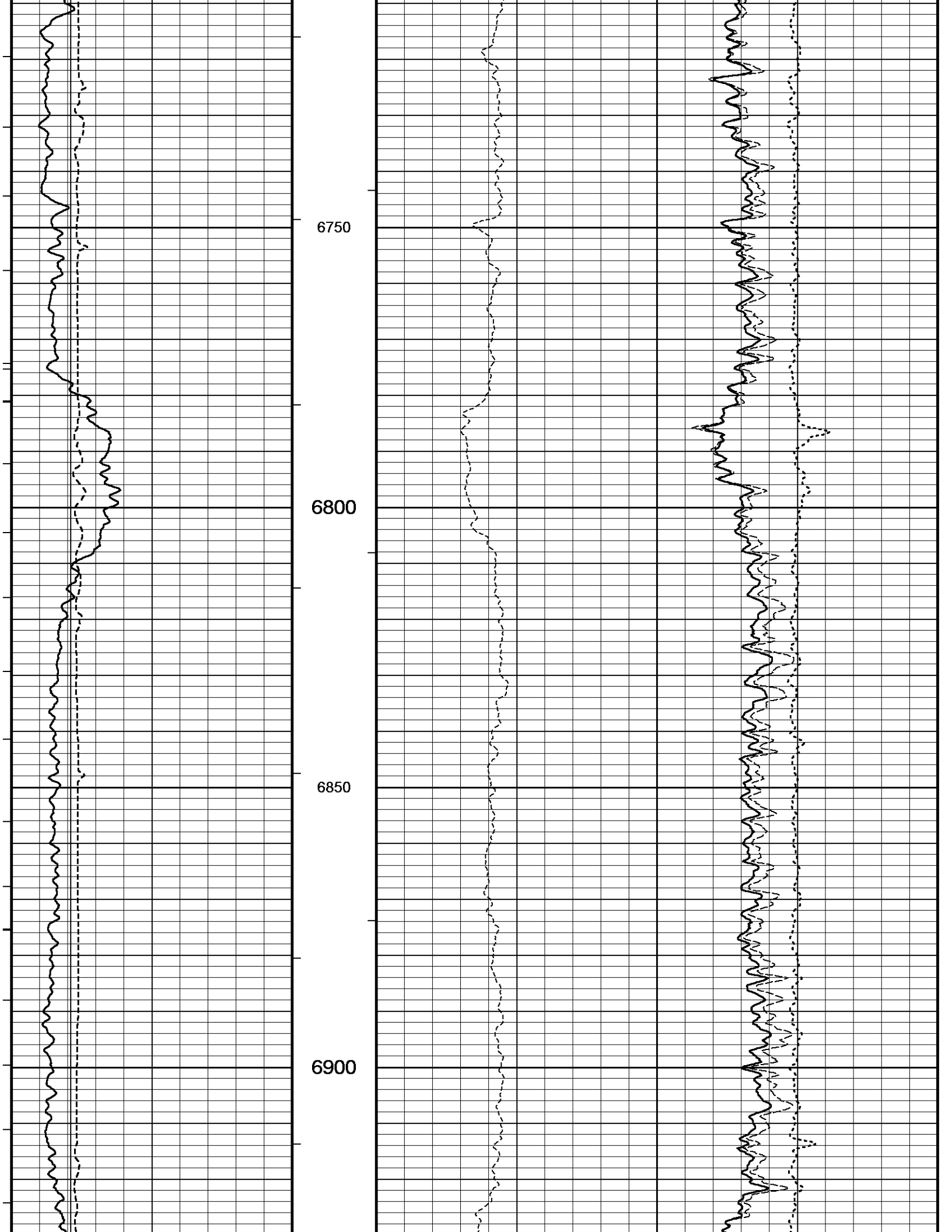


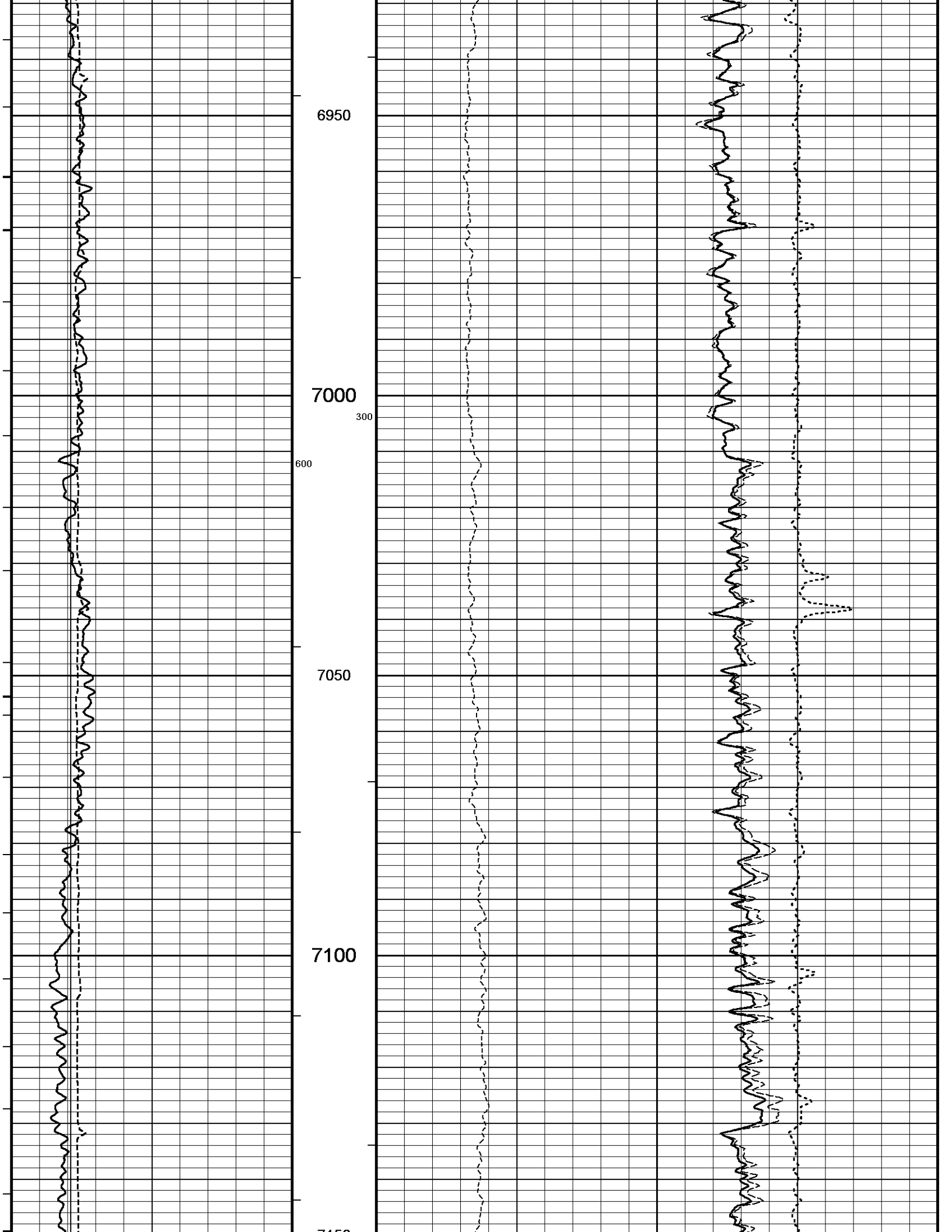


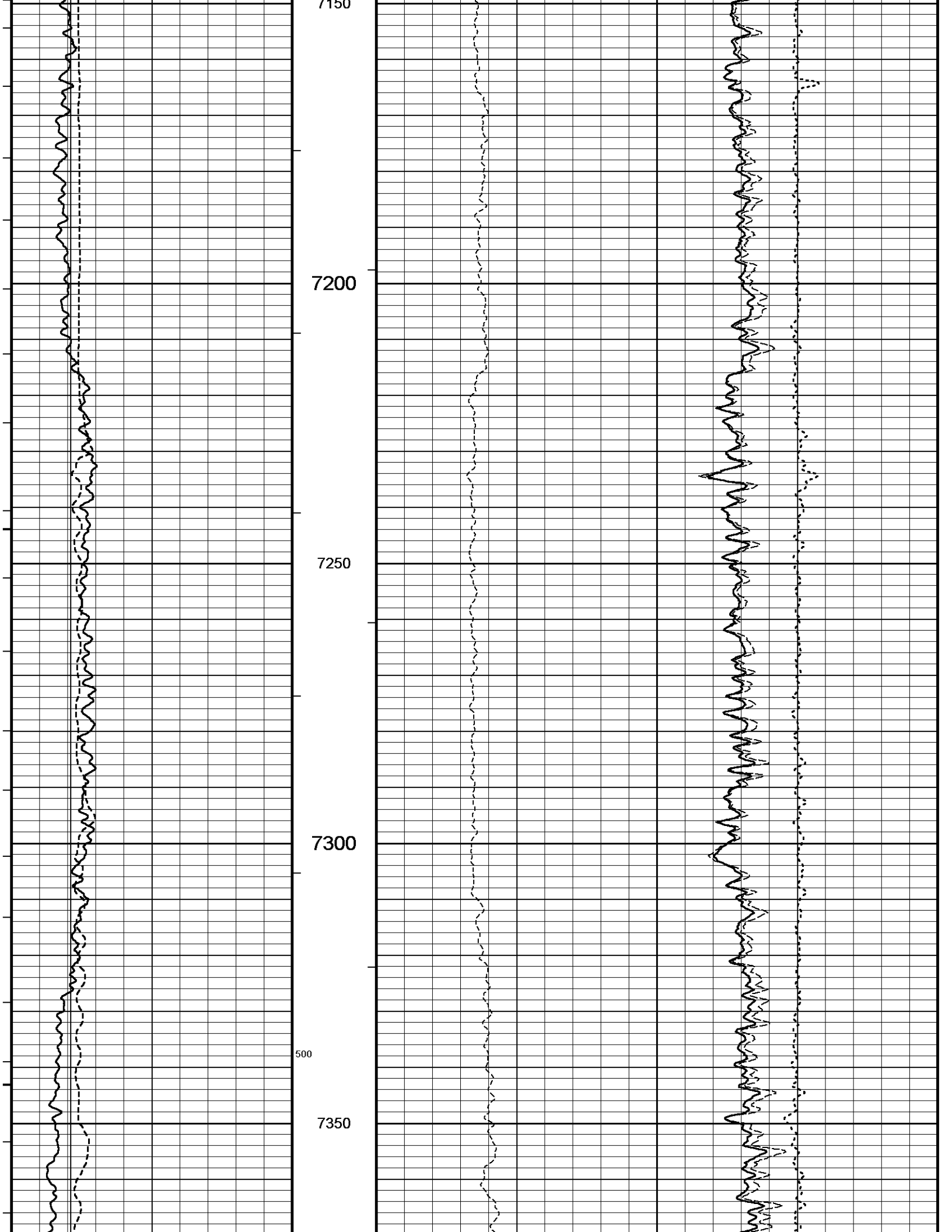


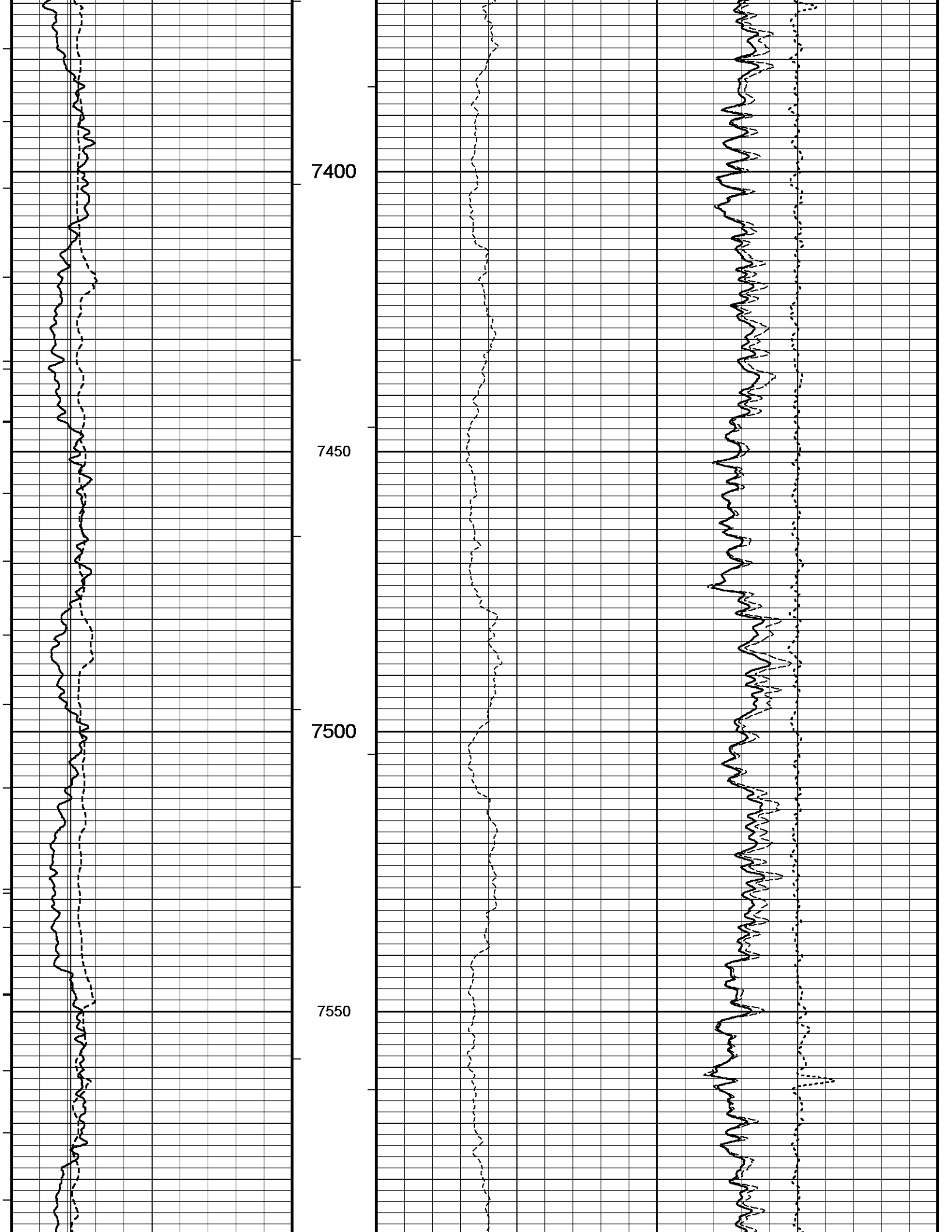


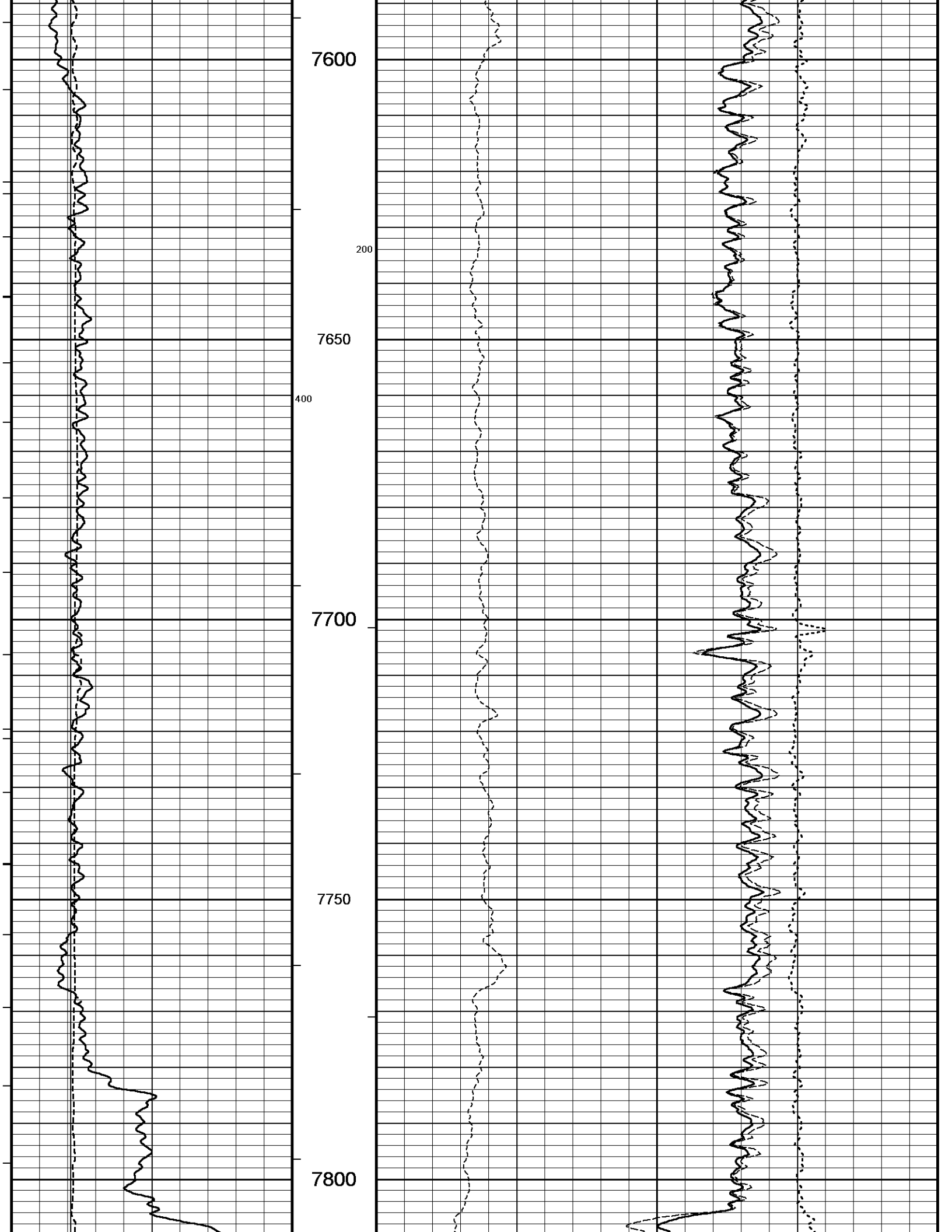




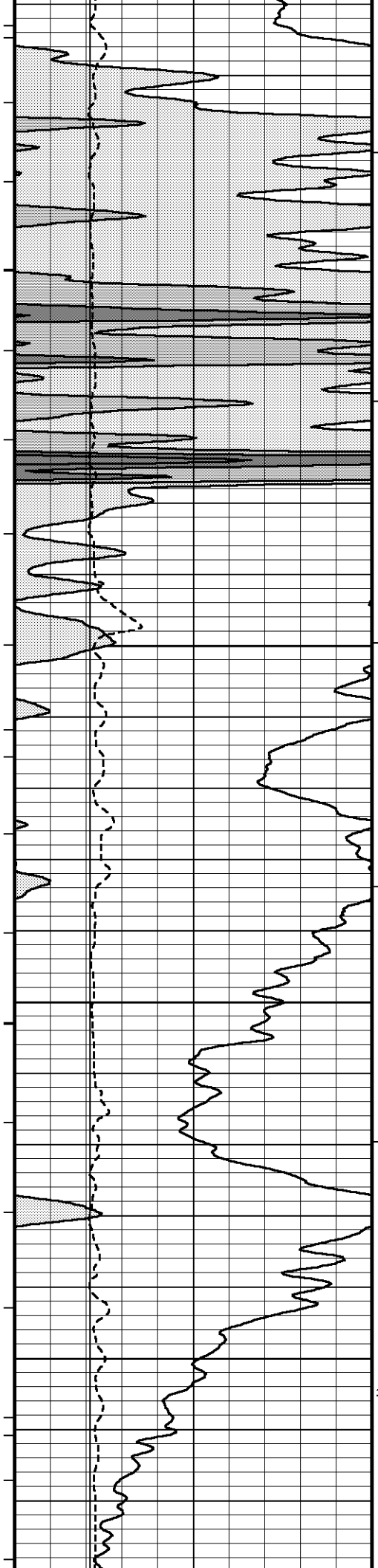












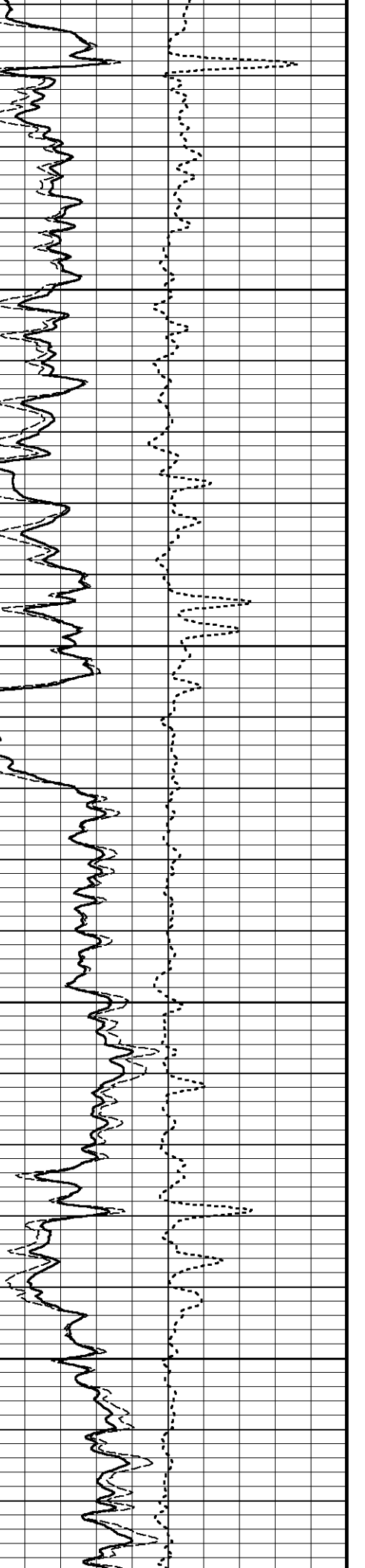
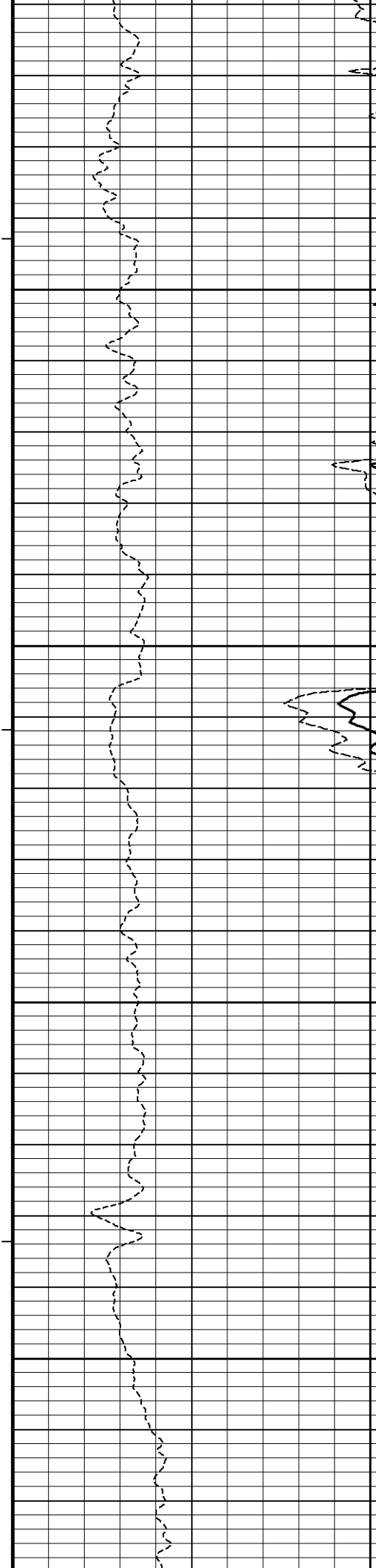
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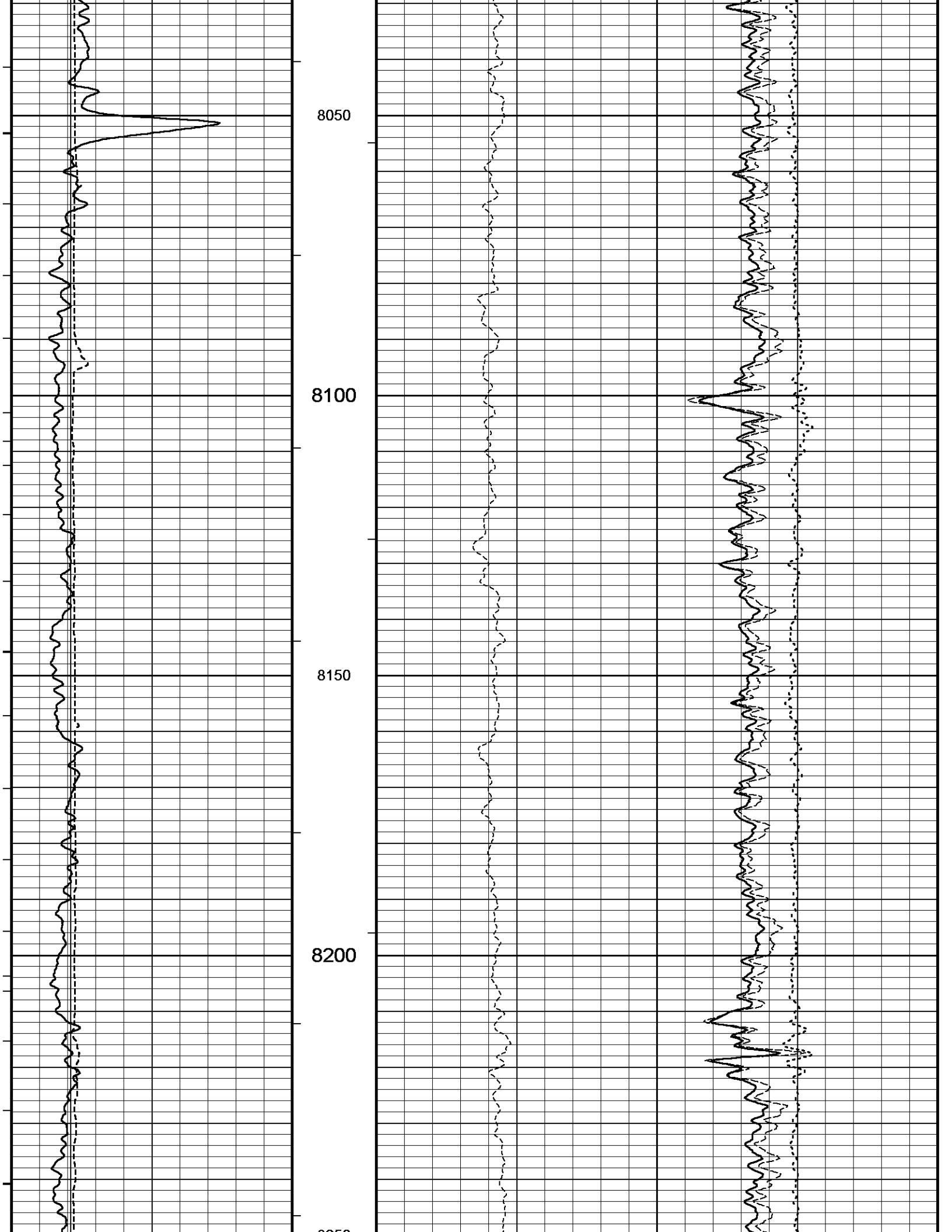
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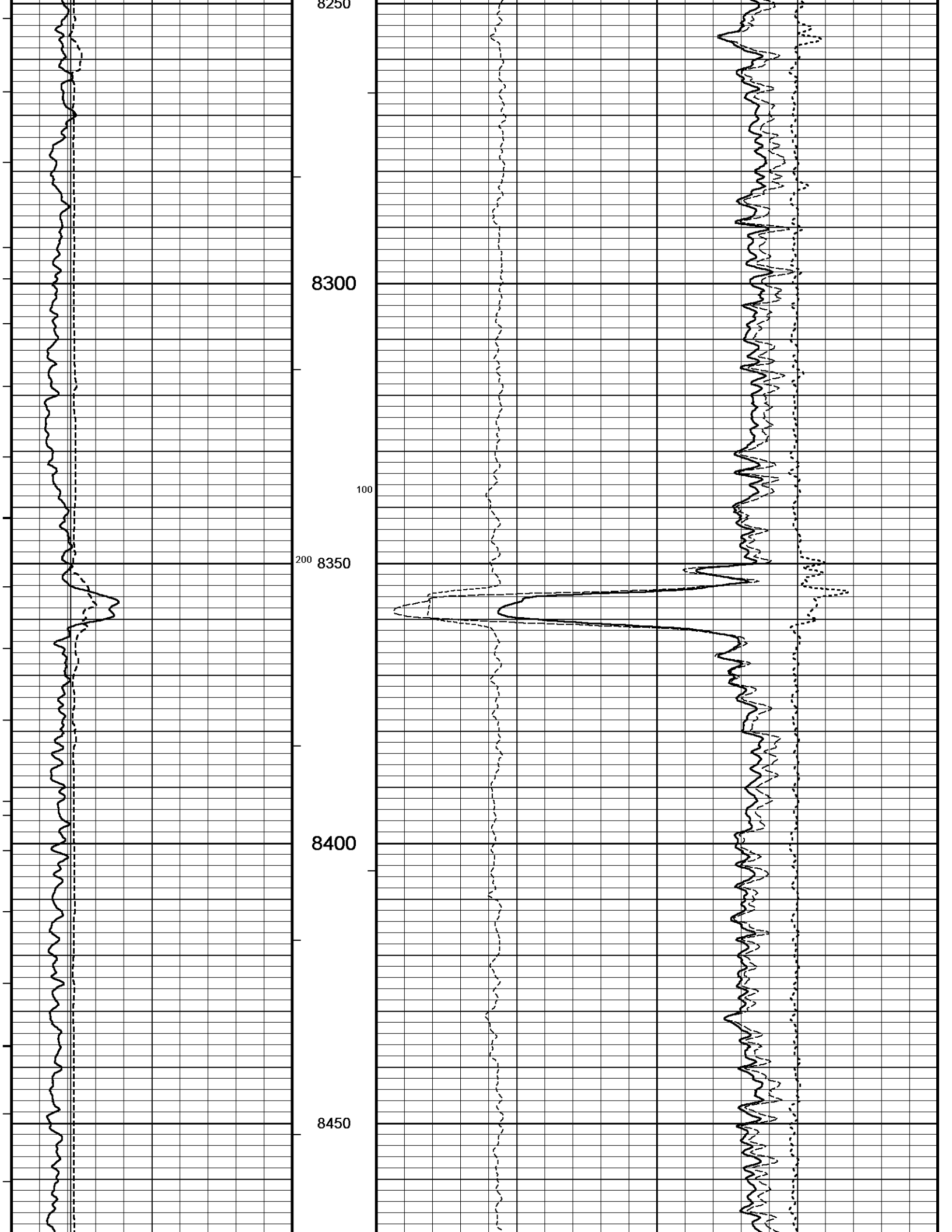
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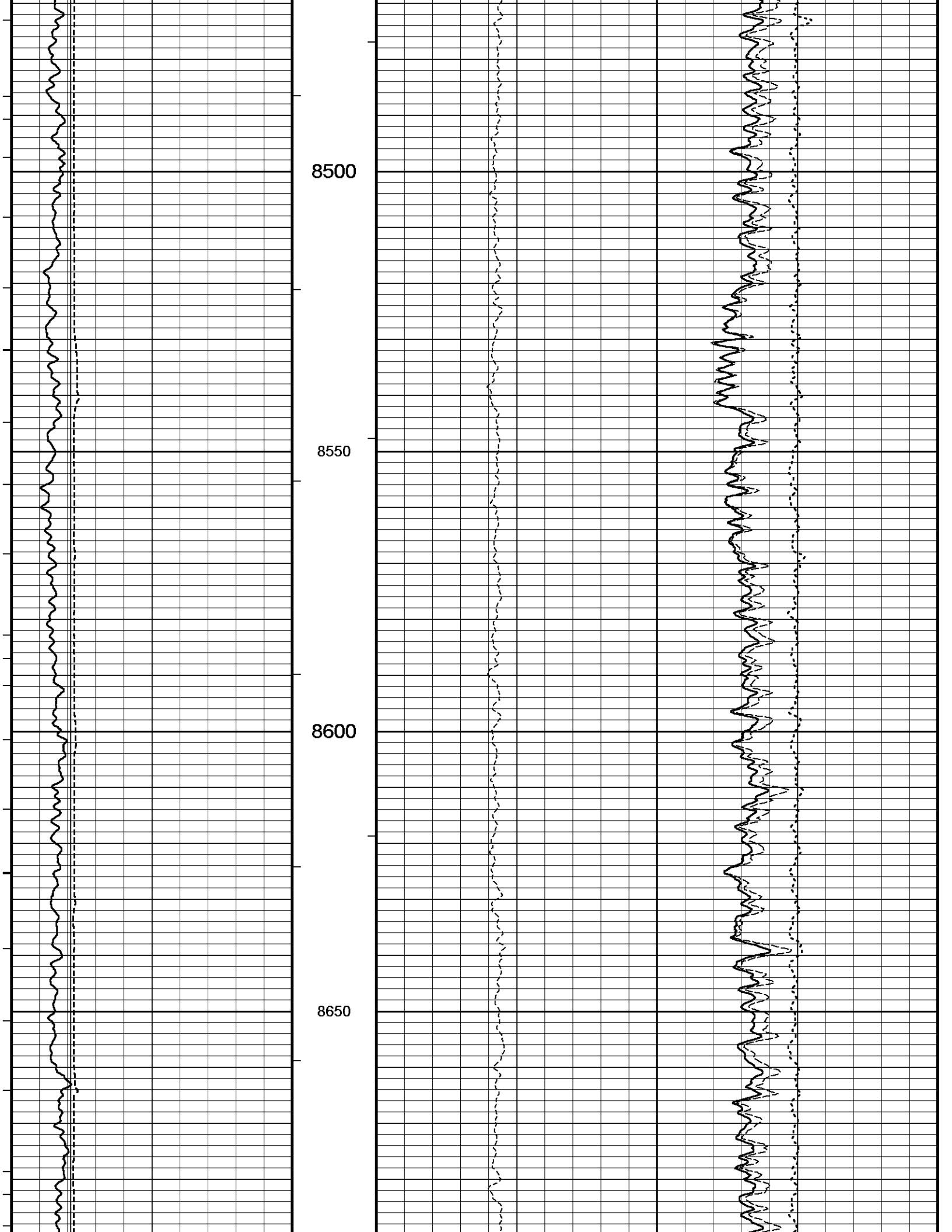
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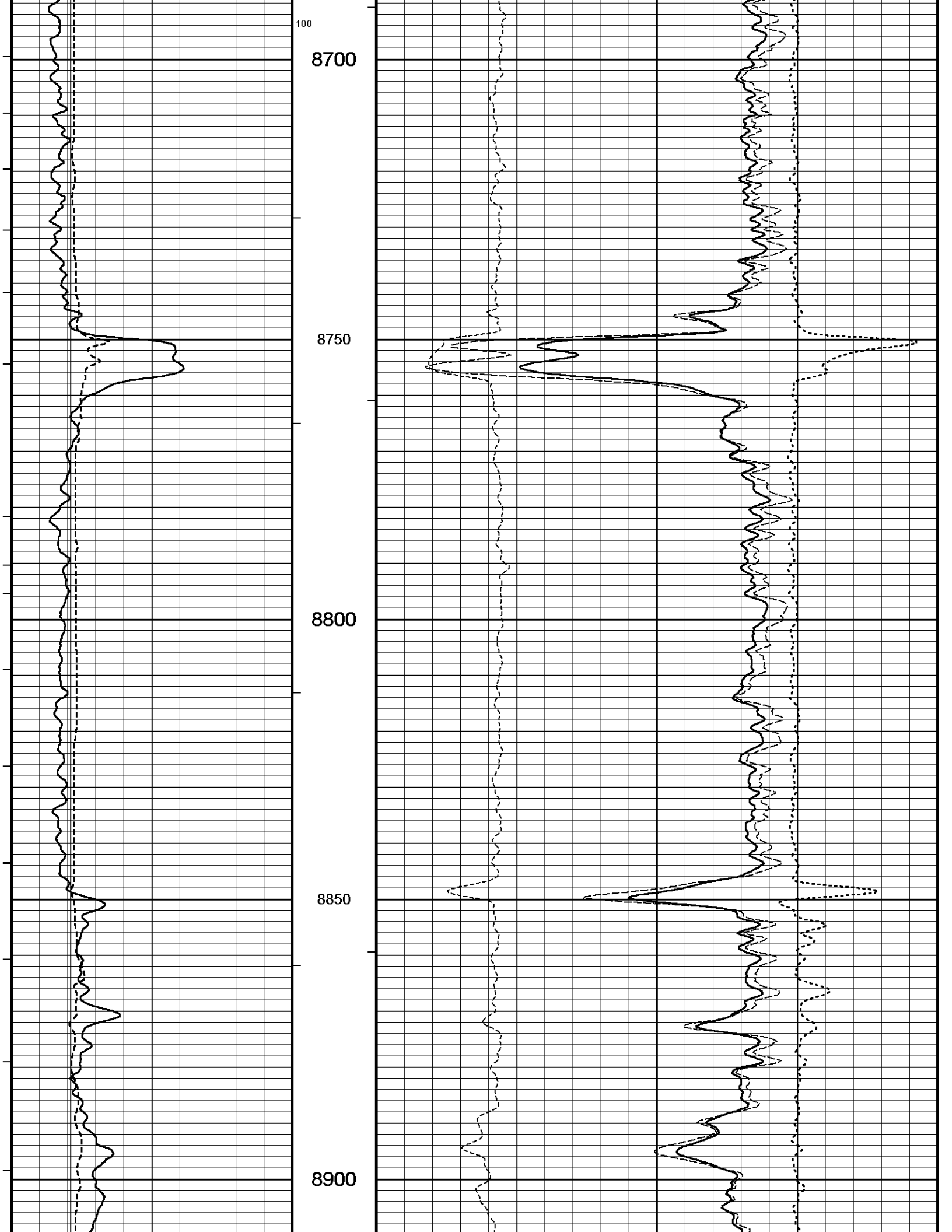
300

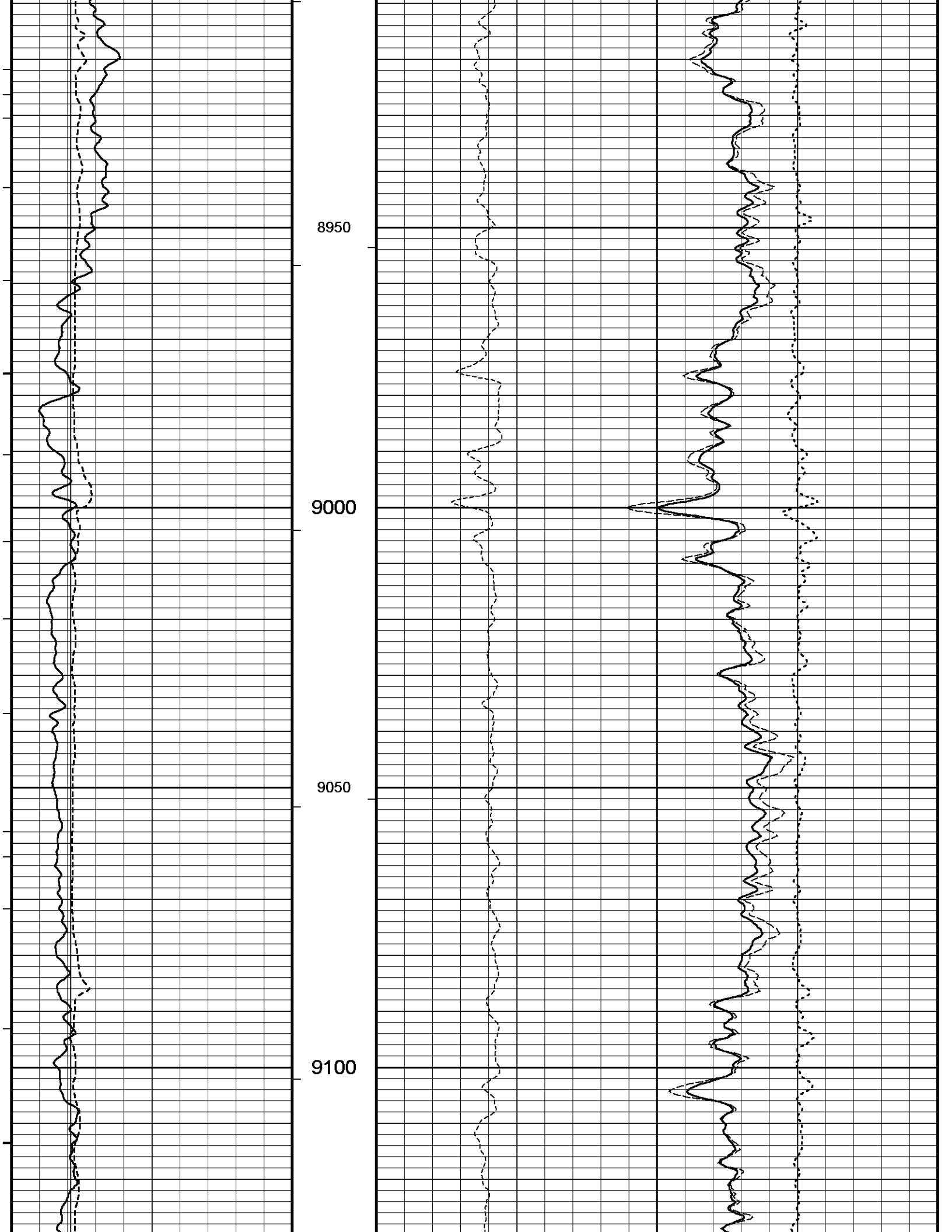


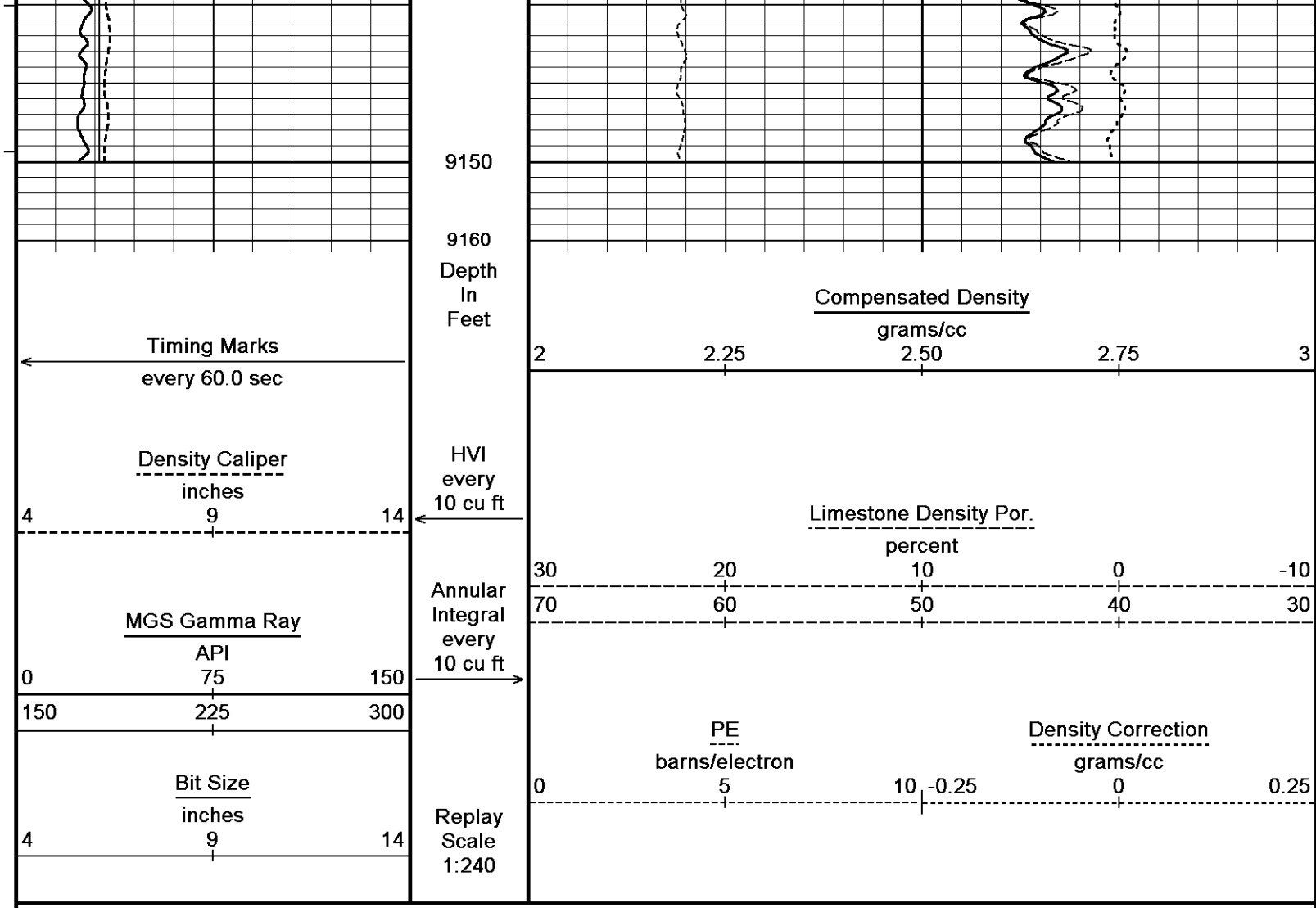












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↑ 5 inch main ↑

**BEFORE SURVEY CALIBRATION**  
 C:\Program Files\Weatherford\WLS 13.02\lorimer\LORIMER 2330 1-9h DEPTH RTAP2.dta

General Constants All 000 Last Edited on 29-AUG-2012,01:31

General Parameters  
 Mud Resistivity 0.800 ohm-metres  
 Mud Resistivity Temperature 80.000 degrees F  
 Water Level 0.000 feet  
 Density/Neutron Processing Wet Hole

Hole/Annular Volume and Differential Caliper Parameters  
 HVOL Method Single Caliper  
 HVOL Caliper 1 Density Caliper  
 HVOL Caliper 2 N/A  
 Annular Volume Diameter 4.500 inches  
 Caliper for Differential Caliper Density Caliper

Rwa Parameters  
 Porosity used Base Density Porosity  
 Resistivity used Array Ind. One Res Rt  
 RWA Constant A 0.610  
 RWA Constant M 2.150

Strain Gauge Constants MMS-E.B 166 Last Edited on 23-AUG-2012,00:24

Atmospheric Pressure 14.70 psi

Serial Number	262005								
Calibration Date	04-Jan-2011								
Base Check Date									
Dead Weight Serial Number	0								
Dead Weight Gravitational Correction	1.0								
Temperature	75.0		150.0		250.0		350.0		degrees F
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	
0.0	0.096	0.097	0.113	0.113	0.129	0.129	0.138	0.139	
3000.0	5.275	5.280	5.290	5.294	5.303	5.306	5.307	5.310	
6000.0	10.464	10.472	10.478	10.485	10.488	10.494	10.487	10.494	
9000.0	15.664	15.672	15.676	15.684	15.683	15.691	15.679	15.687	
12000.0	20.876	20.882	20.888	20.893	20.892	20.898	20.885	20.890	
15000.0	26.101		26.111		26.114		26.103		

MMS Parameters MMS-E.B 166

Last Edited on 31-AUG-2011 11:09

Logging Parameters

Firmware Version	2v40	
Caliper Open On	MAI	
Caliper Open Delay	0.0	minutes
Caliper Closed On	Unknown	
Caliper Closed Delay	N/A	minutes
Sample Rate	1.00	seconds
Use Deep Sleep	No	
Delay Deep Sleep	N/A	
Deep Sleep Wake Time	N/A	minutes
Deep Sleep Wake on Temperature	N/A	
Deep Sleep Wake Temperature	N/A	degrees C
Deep Sleep Wake on Pressure	N/A	
Deep Sleep Wake Pressure	N/A	psi
MMI Pad Pressure	0.0	

Release Parameters

Pulse Duration Base Level	10.0	seconds
Pulse Duration Transition Time	5.0	seconds
Pulse Duration Status Pulse From	10.0	seconds
Pulse Duration Caliper Close From	35.0	seconds
Pulse Duration Caliper Open From	50.0	seconds
Pulse Duration Release Pulse From	70.0	seconds
Pulse Duration Release Pulse To	100.0	seconds
Pulse Release Duration	30.0	seconds
Pulse Discriminator Pressure Band	96.0	seconds
Pulse Pressure Discriminator	213.0	seconds
Use Negative Pulsing	No	
Good Status Reply Open Hole	65535.0	seconds
Good Status Reply Cased Hole	10.0	seconds
Bad Status Reply	25.0	seconds
Status Pulse To	15.0	seconds
Caliper Close To	0.0	seconds
Caliper Open To	55.0	seconds

Configuration

MMS,MPD,MPD,MAI

High Resolution Temperature Calibration MGS-C.J 142

Field Calibration on 06-AUG-2012,04:44

	Measured	Calibrated(Deg F)
Lower	0.00	0.00
Upper	0.00	0.00

High Resolution Temperature Constants MGS-C.J 142

Last Edited on

Pre-filter Length	11
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SP Calibration MGS-C.J 142

Field Calibration on 06-AUG-2012,04:44

	Measured	Calibrated (mV)
Reference 1	100.0	100.0
Reference 2	-100.0	-100.0



## Gamma Calibration MGS-C.J 142

Field Calibration on 09-SEP-2012,21:04

	Measured	Calibrated (API)
Background	39	27
Calibrator (Gross)	1048	723
Calibrator (Net)	1009	696

## Gamma Constants MGS-C.J 142

Last Edited on 23-AUG-2012,05:22

Gamma Calibrator Number	036	
Mud Density	1.04	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

## Neutron Calibration MDN-B.J 391

Base Calibration on 09-SEP-2012,21:04  
Field Check on

## Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	3186	96	3714	110
	33.156		33.764	

## Field Calibrator at Base

	Calibrated (cps)
Ratio	2267 3463
	0.655

## Field Check

	Calibrated (cps)
Ratio	0 0
	0.000

## Neutron Constants MDN-B.J 391

Last Edited on 22-AUG-2012,23:24

Neutron Source Id	N1055	
Neutron Jig Number	N639	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	Constant Value	
Formation Pressure	1.80	kpsi
Temperature Source	MGS External Temperature	
Temperature	N/A	degrees F
Mud Salinity	3.67	kppm
Salinity Correction	Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	140.00	kppm
Barite Mud Correction	Not Applied	

## Accelerometer Parameters MIE-A.A 205

Date Of Last Accelerometer Calibration	22-OCT-2010,09:57		
	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.102577	-1.095892	-1.099279
Offset	0.005245	0.001380	-0.006964

## Accelerometer Constants MIE-A.A 205

Last Edited on 23-AUG-2011,16:00

Accelerometer Calibrator Number	000			
Accelerometer Temperature Characterisation				
X Accelerometer				
Serial Number	829			
Calibration Date	18-Mar-2009			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	3.85446e-005	-3.97712e-008	1.22710e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.75555e-004	4.16325e-007	4.80125e-010

**Y Accelerometer**

Serial Number 901  
 Calibration Date 12-Apr-2010

	B0	B1	B2	B3
Bias(g)	0.00000e+000	1.24151e-005	-6.79414e-009	7.96660e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.38432e-004	6.40058e-007	-1.92725e-010

**Z Accelerometer**

Serial Number 890  
 Calibration Date 10-Apr-2010

	B0	B1	B2	B3
Bias(g)	0.00000e+000	9.15265e-006	-6.81619e-009	1.46787e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.78599e-004	2.72844e-007	9.01795e-010

**Caliper Calibration MIE-A.A 205**

Base Calibration on 23-AUG-2011,16:16  
 Field Calibration on

**Base Calibration**

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)		
1	27006	26164	5.96		
2	37039	36625	7.97		
3	46872	46116	9.84		
4	58291	57849	11.91		
5	0	0	0.00		

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	25116	23882	25036	24789	5.96
2	33940	32930	33993	33467	7.97
3	41946	41141	42331	41802	9.84
4	51857	51034	52212	51630	11.91
5	0	0	0	0	0.00

**Field Calibration**

Measured Pads 1-5 Caliper(in)		Measured Pads 3-7 Caliper(in)		Actual Caliper(in)	
0.00		0.00		0.00	

Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
0.00	0.00	0.00	0.00	0.00

**Caliper Constants MIE-A.A 205**

Last Edited on 23-AUG-2011,15:34

Caliper Difference for BRKT 0.120 inches

**Magnetometer Parameters MIE-A.A 205**

Date Of Last Magnetometer Calibration 23-AUG-2011,16:14

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.009681	-1.005139
Offset	0.010971	-0.020272	0.014048

**Magnetometer Constants MIE-A.A 205**

Last Edited on

Magnetometer Calibrator Number 000

**Navigation Constants MIE-A.A 205**

Last Edited on 23-AUG-2011,16:02

Magnetic Declination 5.00 degrees East

**Compact Micro Imager Constants MIE-A.A 205**

Last Edited on

Sonde Configuration	Imager Mode	degrees
Arm-Pad Kit	Normal Pads (12.25 in)	
Centre Pad 1 Rotational Offset	0.00	
Image/Borehole Ovality Reference	Azimuth of Pad 1	degrees
Non Active Buttons	Omit	metres
Search Angle	0.00	metres
Correlation Interval	1.00	mAmp
Correlation Step	0.50	mAmp
Current Offset	0.0000	
Squasher Start	0.0500	
Image Processing	Enabled	

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	14.4	434.9	9.3	966.2
2	5.8	355.4	7.6	821.4
3	2.7	244.4	5.2	566.0
4	1.8	129.3	2.6	279.2

Array Temperature 75.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	18.4	4139.1
2	0.0	0.0	31.2	3767.8
3	0.0	0.0	30.4	3207.8
4	0.0	0.0	19.4	2121.8
Deep	0.0	0.0	19.0	2018.3
Medium	0.0	0.0	44.2	4286.7
Shallow	0.0	0.0	46.0	5675.6

Array Temperature 0.0 81.0 Deg F

Induction Constants MAI-B.J 427

Induction Model	RtAP-WBM		
Caliper for Borehole Corr.	Constant Value		
Hole Size for Borehole Correction	6.125	inches	
Tool Centred	No		
Stand-off Type	Fins		
Stand-off	0.00	inches	
Number of Fins on Stand-off	6.0000		
Stand-off Fin Angle	60.00	degrees	
Stand-off Fin Width	0.5000	inches	
Borehole Corr. Rm Source	Constant Value		
Temp. for Rm Corr.	N/A		
Squasher Start	0.0060	mhos/metre	
Squasher Offset	N/A		
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000
Calibration Site Corrections			
Channel 1	0.00	mmhos/metre	
Channel 2	0.00	mmhos/metre	
Channel 3	0.00	mmhos/metre	
Channel 4	0.00	mmhos/metre	
Apparent Porosity and Water Saturation Constants			
Archie Constant (A)	1.00		
Cementation Exponent (M)	2.00		
Saturation Exponent (N)	2.00		
Saturation of Water for Apor	100.00	percent	
Resistivity of Water for Apor and Sw	0.05	ohm-m	
Resistivity of Mud Filtrate for Sw	0.00	ohm-m	
Source for Rt	0.00		
Source for Rxo	0.00		

High Resolution Temperature Calibration MAI-B.J 427

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-B.J 427



# DOWNHOLE EQUIPMENT

C:\Program Files\Weatherford\WLS 13.02\lorimer\LORIMER 2330 1-9h DEPTH RTAP2.dta

Shuttle Running Tool 3.5" )  
SRT-A.A 69 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 459 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Spacer - Empty Battery  
MLK-A 2 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

Spacer - Empty Battery  
MLK-A 1 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

MBS-G.A 200v Compact Battery Sub  
MBS-G.A 119 LG: 17.06 ft WT: 123.5 lb OD: 2.24 in

Compact Memory Sub E.B  
MMS-E.B 166 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in



Compact Tool Isolator sub.  
MTI-B.A 68 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma  
MGS-C.J 142 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator  
MCL-B.J 63 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 479 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

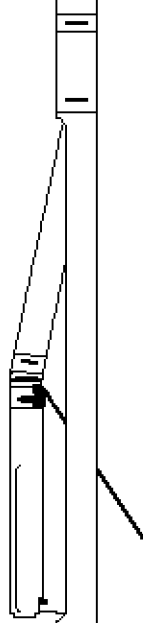
SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 431 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub  
MIS-D.A 310 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

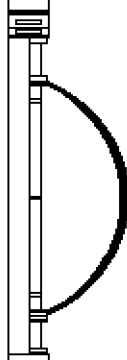
Compact Neutron  
MDN-B.J 391 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in



Compact Density/Caliper  
MPD-B 166 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in



MIS-A.A Compact Inline Bowspring sub  
MIS-A.A 275 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 434 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in



SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 474 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in



MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 593 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



Compact MMI Memory Section  
MIM-A.J 251 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in



Compact MMI Electrode Section  
MIE-A.A 205 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in



MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 603 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

MIS-E.A Compact Inline Standoff sub  
MIS-E.A 337 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction  
MAI-B.J 427 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in





Tool Zero

(1.84ft from bottom)

Total Length: 147.25 ft Weight: 903.9 lb

All measurements relative to tool zero.

COMPANY Sandridge Energy  
 WELL Lorimer 2330 1-9H  
 FIELD Finney  
 PROVINCE/COUNTY Finney  
 COUNTRY/STATE U,S,A, / Kansas

Elevation Kelly Bushing	2863.00	feet	First Reading	9124.00	feet
Elevation Drill Floor	2862.00	feet	Depth Driller	9242.00	feet
Elevation Ground Level	2843.00	feet	Depth Logger	9242.00	feet



**Weatherford**<sup>®</sup>

CML MESSENGER SHUTTLE  
 COMPACT PHOTO DENSITY  
 COMPENSATED NEUTRON