



PIONEER

Pioneer Energy Services

DUAL INDUCTION LOG

Company MURFIN DRILLING COMPANY, INC.
Well CULWELL 'G' #1-20
Field WILDCAT
County CHEYENNE
State KANSAS

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County CHEYENNE State KANSAS

Location: API #: 15-023-21472-00-00
1320' FNL & 1980' FWL
SEC 20 TWP 2S RGE 37W
Permanent Datum GROUND LEVEL Elevation 3413'
Log Measured From KELLY BUSHING
Drilling Measured From KELLY BUSHING
Other Services
CNL/CDL
MEL/BHCS
Elevation
K.B. 3418'
D.F. N/A
G.L. 3413'

Date	11/17/2017
Run Number	ONE
Depth Driller	5100'
Depth Logger	5100'
Bottom Logged Interval	5099'
Top Log Interval	0'
Casing Driller	8.625" @ 348'
Casing Logger	341'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	1000
Density / Viscosity	9.2 72
pH / Fluid Loss	10.5 6.4
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.90 @ 55
Rmt @ Meas. Temp	0.68 @ 55
Rmc @ Meas. Temp	1.22 @ 55
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.39 @ 127
Operating Rig Time	5 HOURS
Max Rec. Temp. F	127
Equipment Number	91
Location	HAYS
Recorded By	D. SCHMIDT
Witnessed By	ROCKY MILFORD

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

BIRD CITY,
7 NORTH TO U RD, 2 EAST TO 30 RD, 1 NORTH,
EAST AND SOUTH TO LOCATION

Log Measured From: KELLY BUSHING 5 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

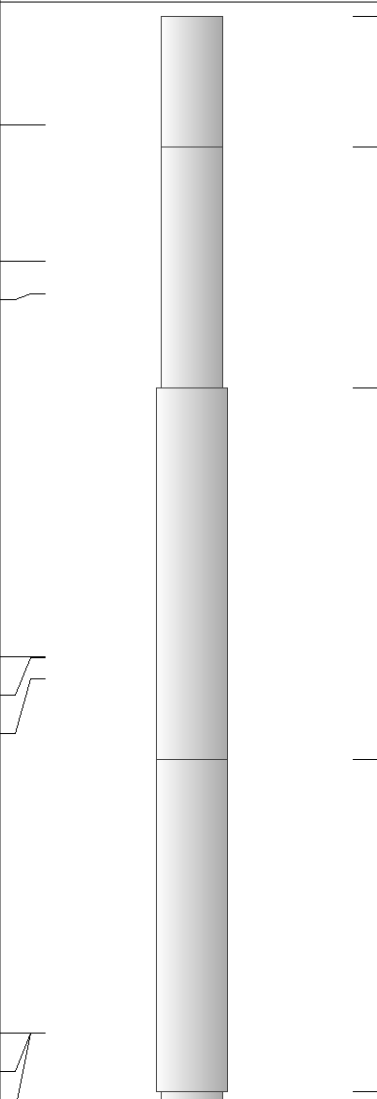
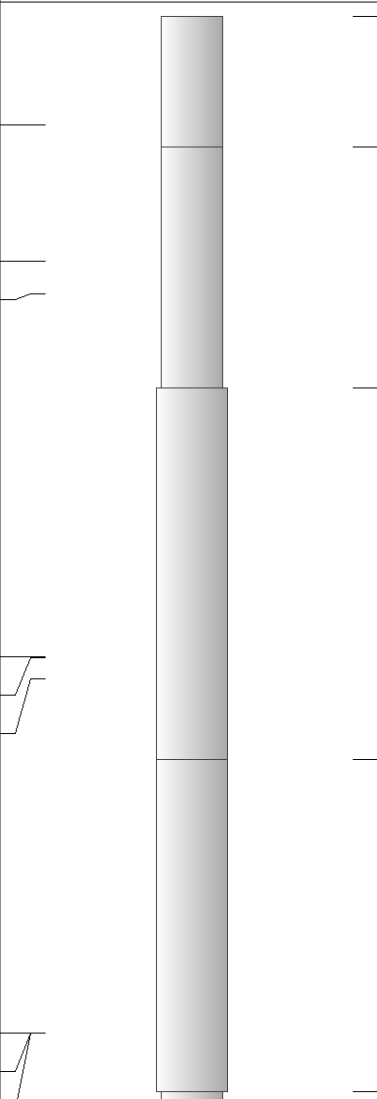
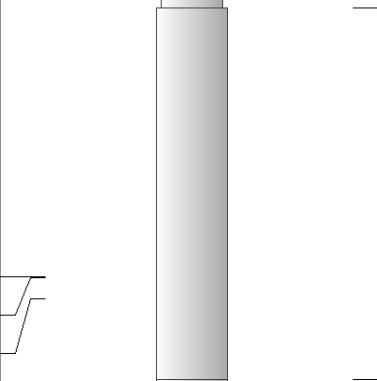
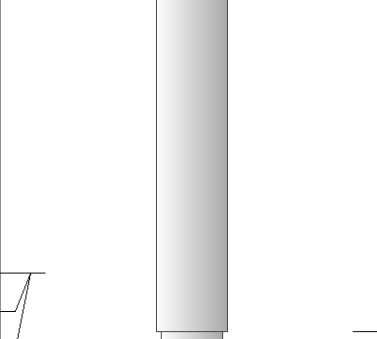
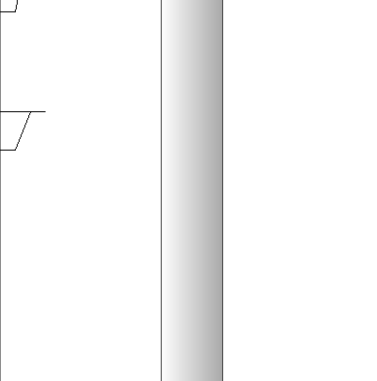
Your Pioneer Energy Services Crew	This Log Record Was Witnessed By
Engineer: D. SCHMIDT	Primary Witness: ROCKY MILFORD
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

Log Variables

Database C:\ProgramData\Warrior\Data\murfin_culwell g 1-20.db
 Dataset field/well/STKML/pass3.1/_vars_

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	475	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	50	0	5.5	0	5100	127	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (207-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (90-1031)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSIML (PSI-01) GO Micro log tools converted to Simplec electronics	7.58	4.00	65.00
RLL3F RLL3	15.80 15.80					

CILD 8.00

CILM 4.70

SP 0.20

DIL-M&W (PSI 91)

18.50

3.50

220.00

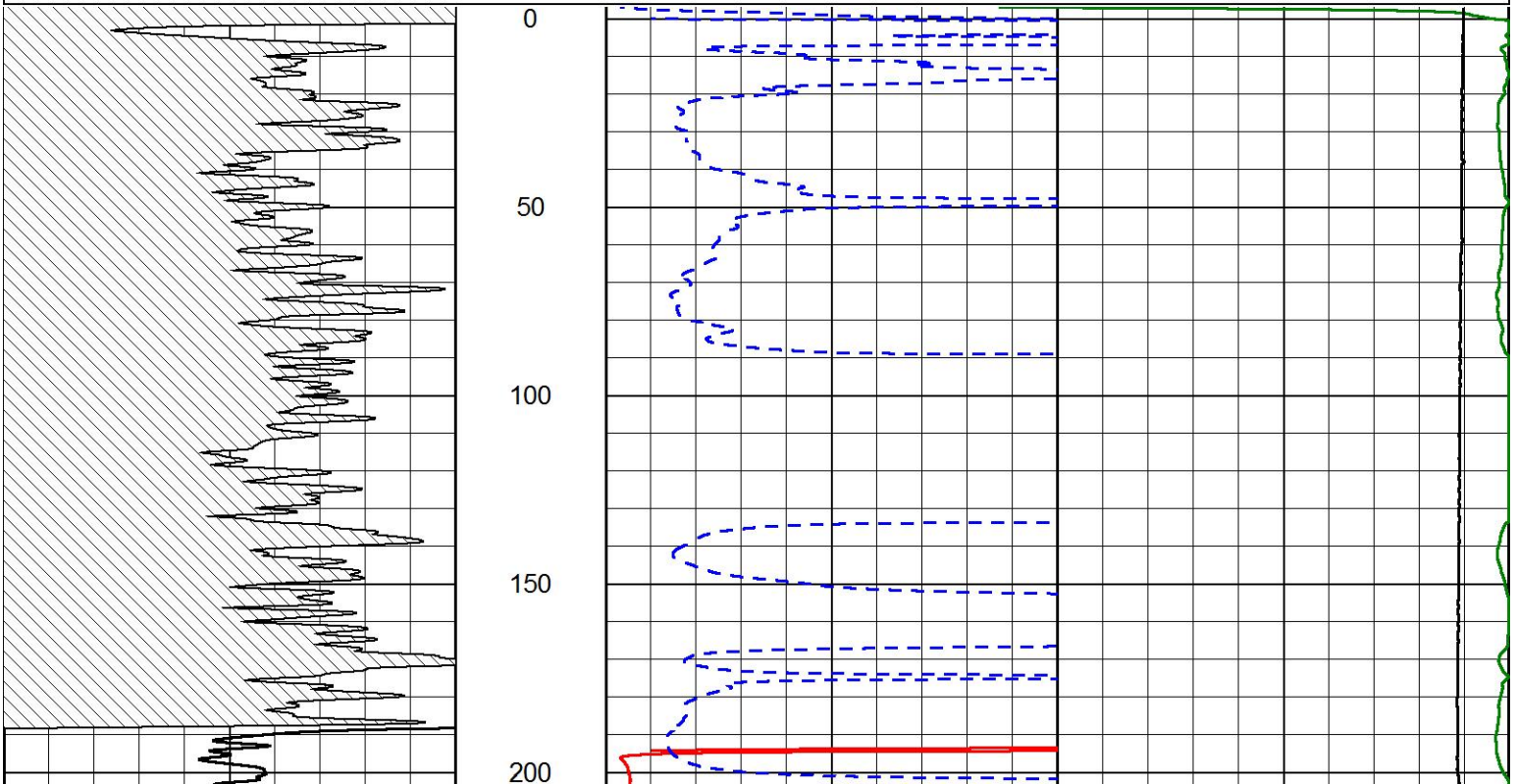
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 Total weight: 685.00 lb
 O.D.: 4.00 in

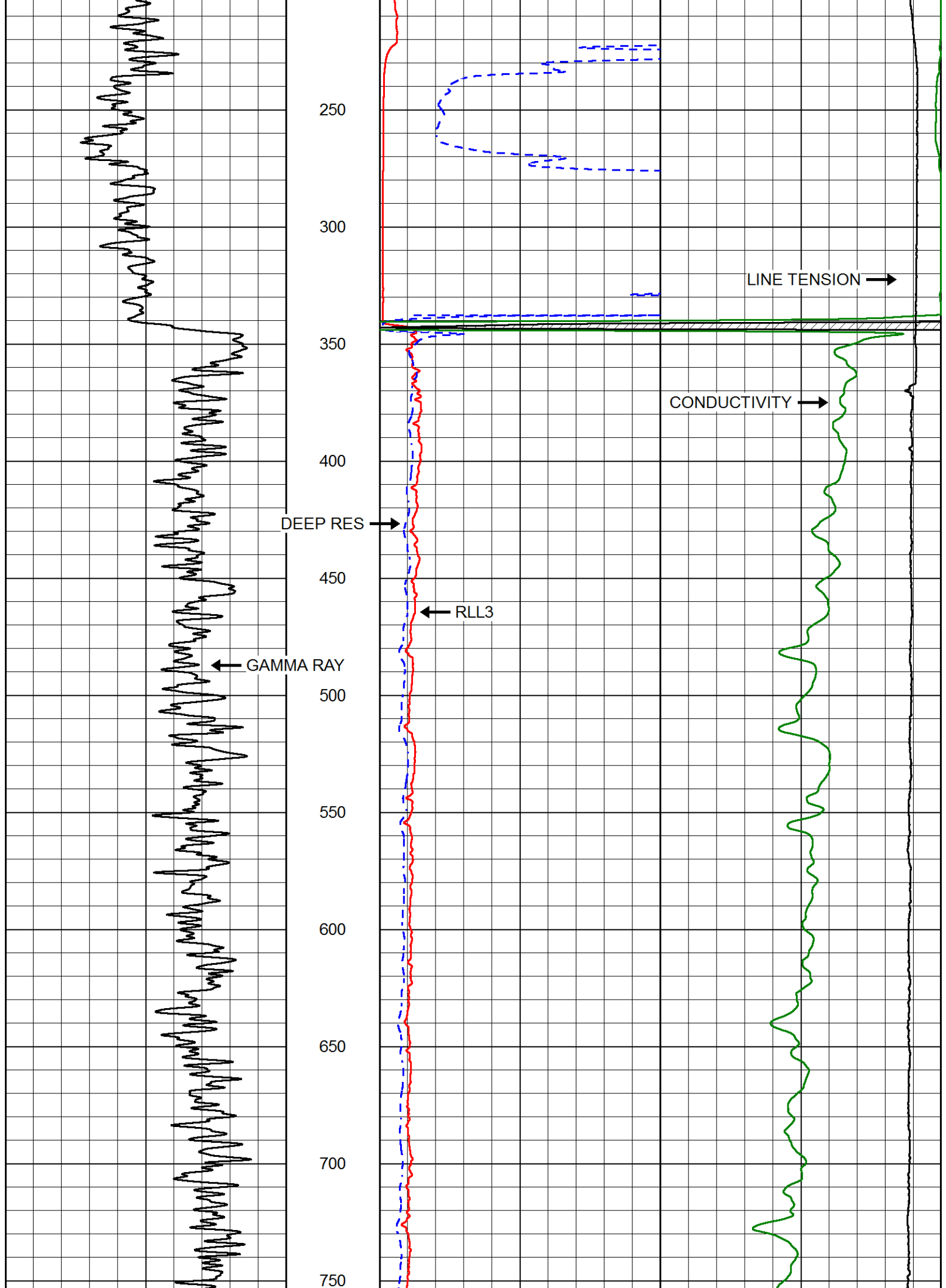


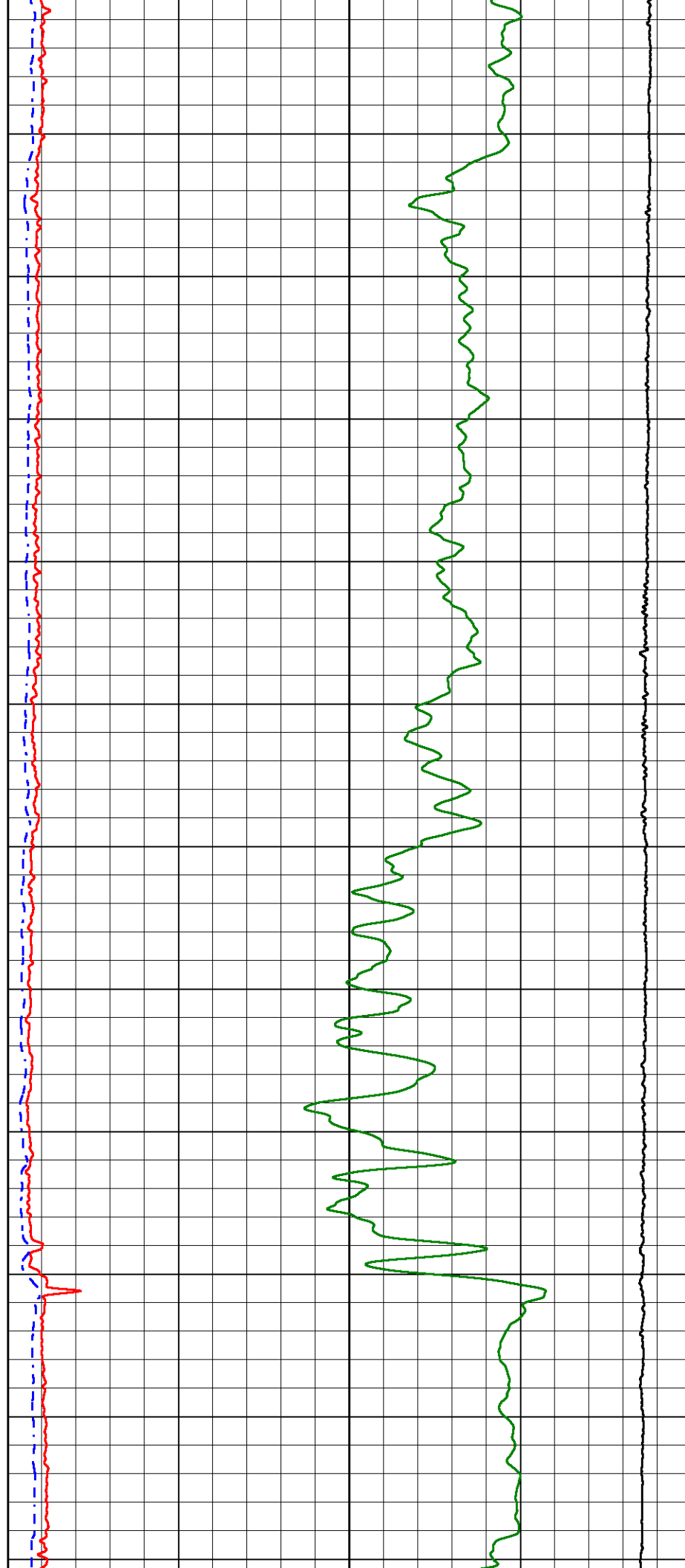
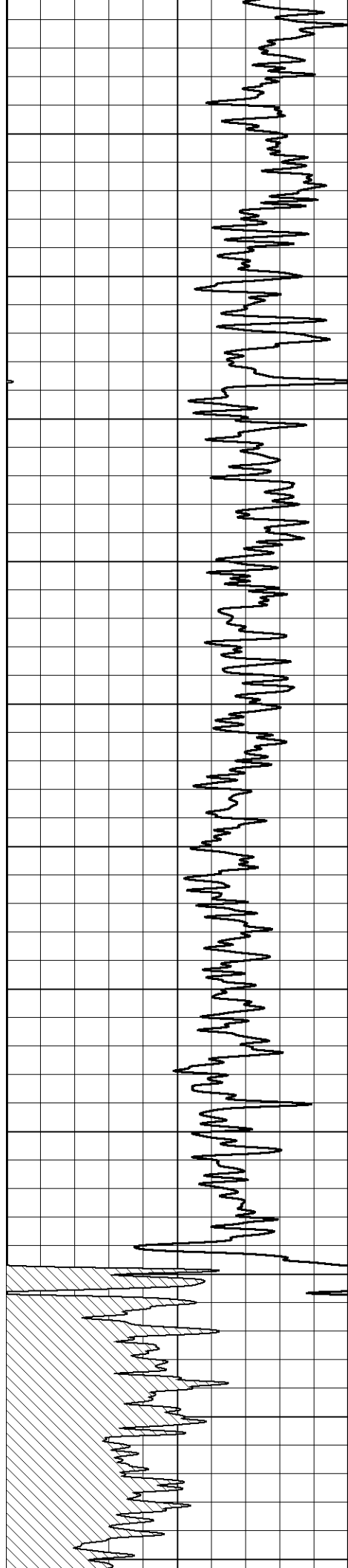
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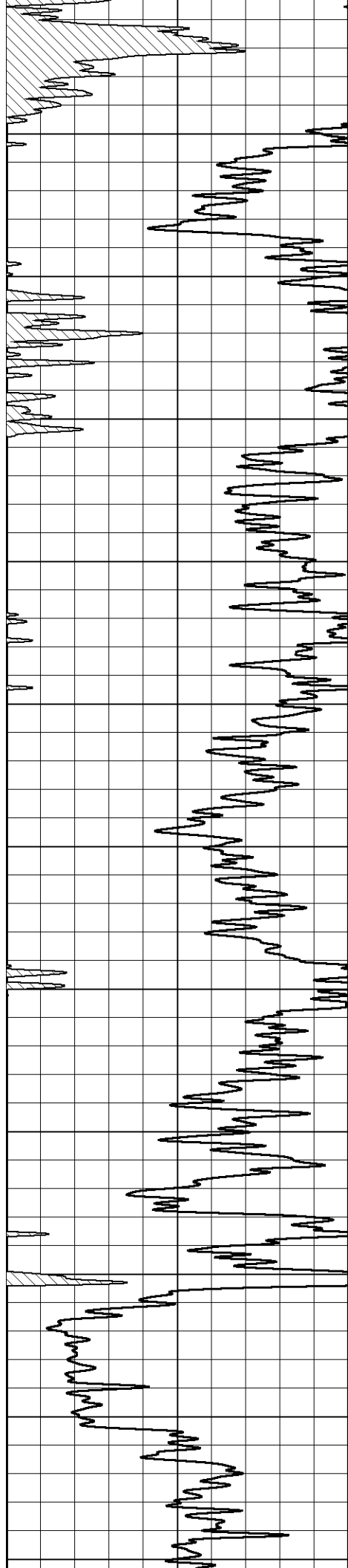
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 Dataset Pathname STKML/pass4.1
 Presentation Format dil2in
 Dataset Creation Fri Nov 17 03:30:59 2017
 Charted by Depth in Feet scaled 1:600

0	Gamma Ray (GAPI)	150	1000	Conductivity (mmho/m)	0
			15000	Line Tension (lb)	0
			0	RLL3 (Ohm-m)	50
			0	Deep Resistivity (Ohm-m)	50
			50	RLL3 (Ohm-m)	500
			50	Deep Resistivity (Ohm-m)	500

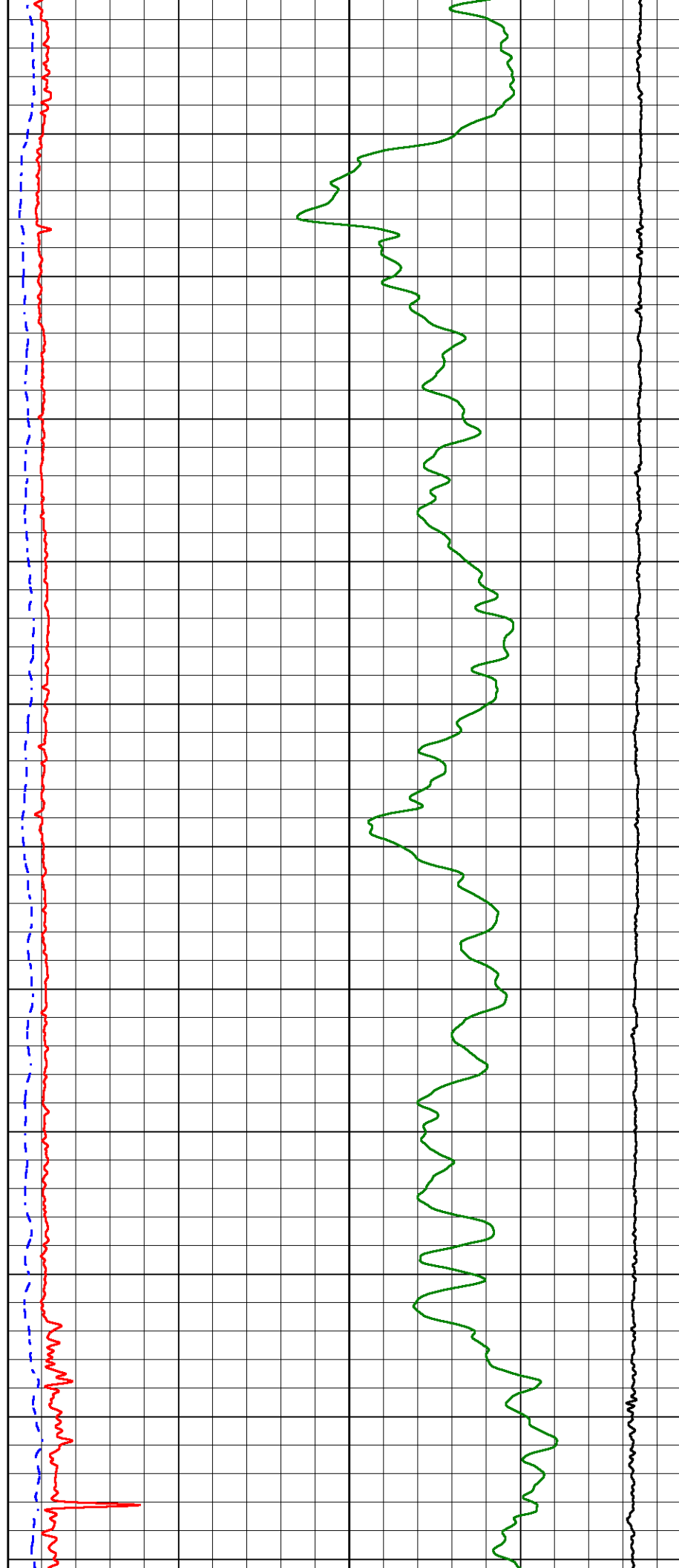


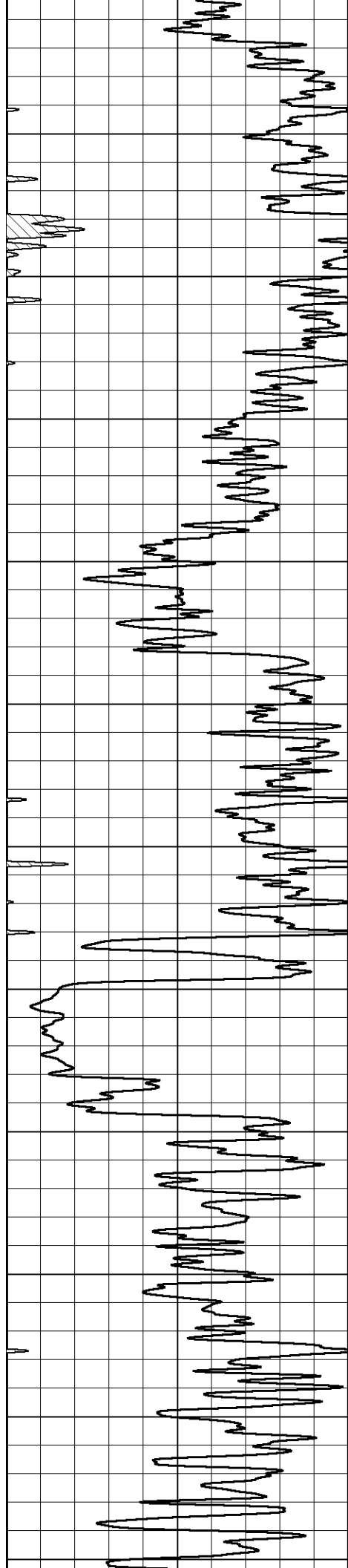




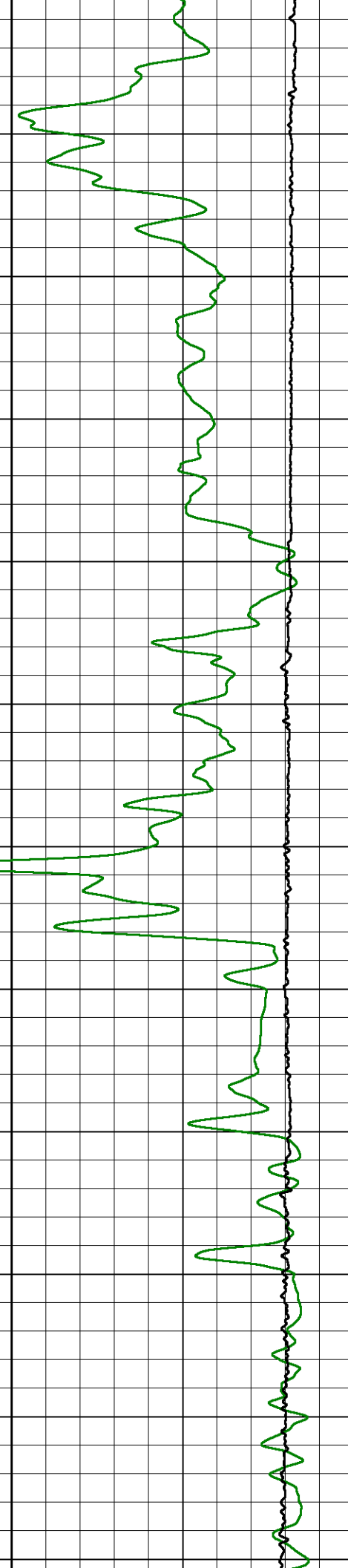
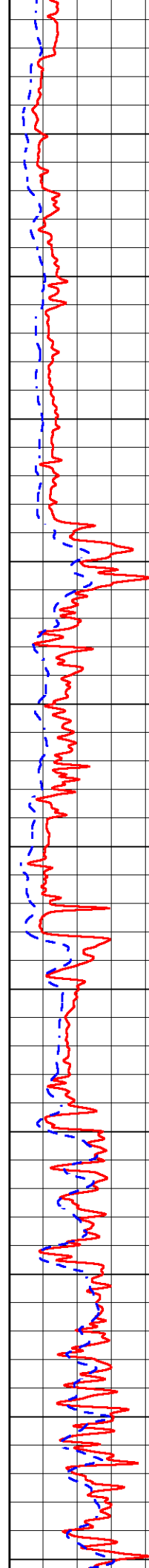


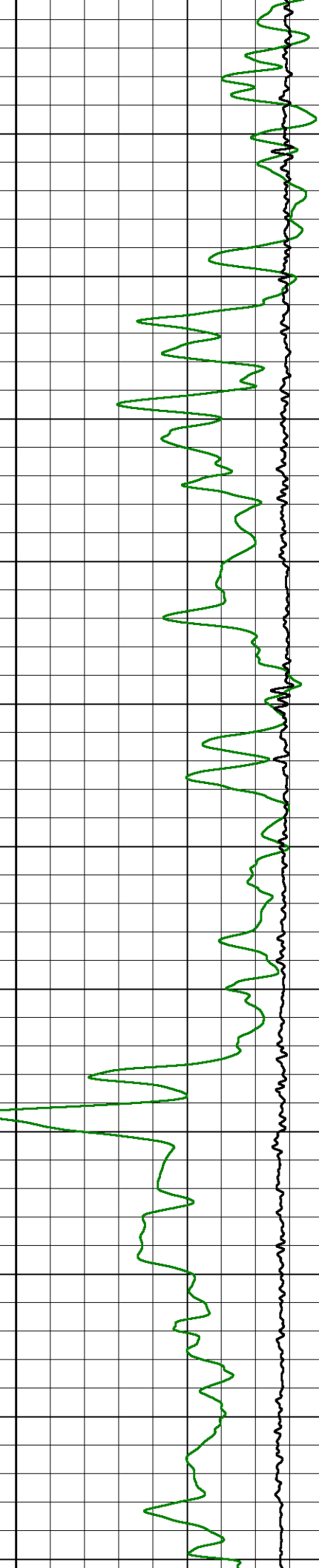
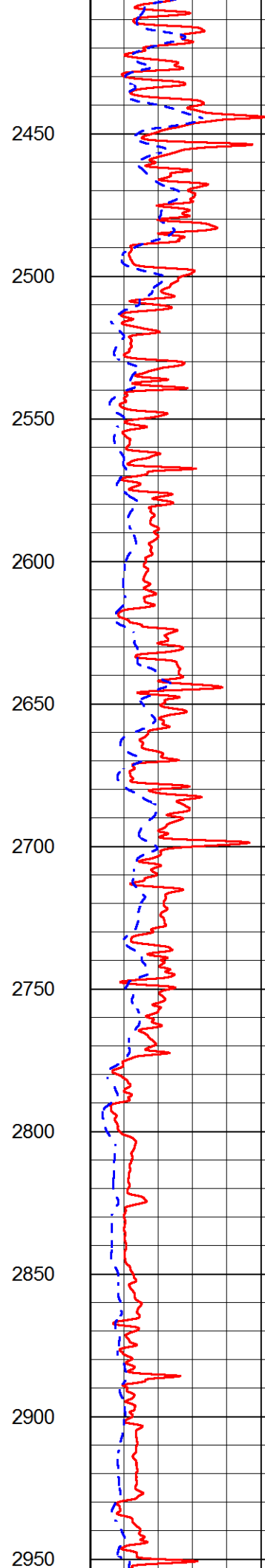
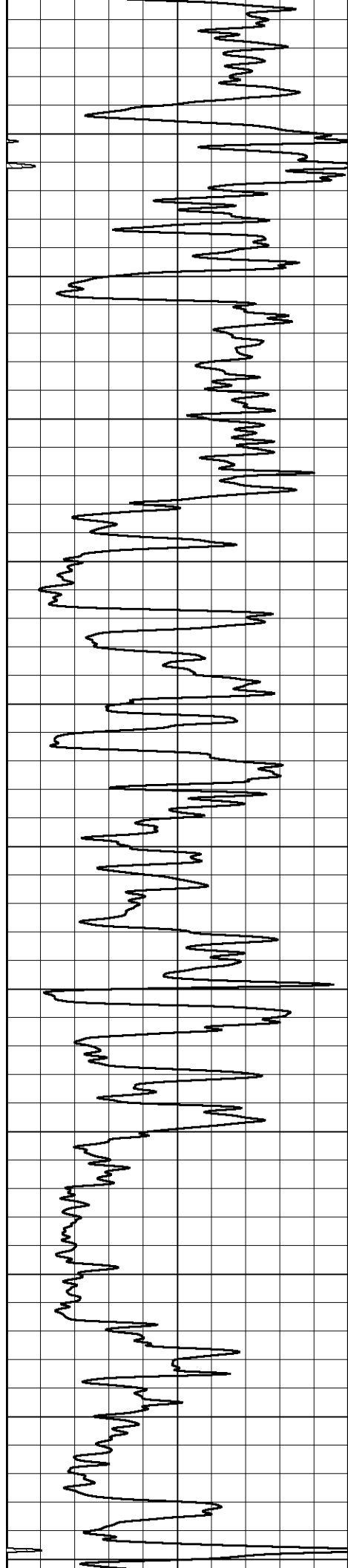
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1850

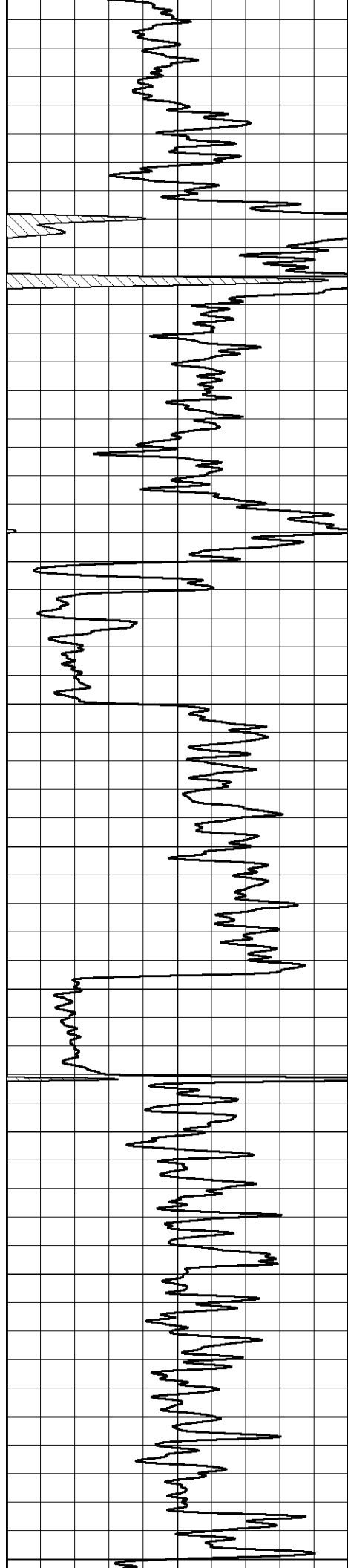




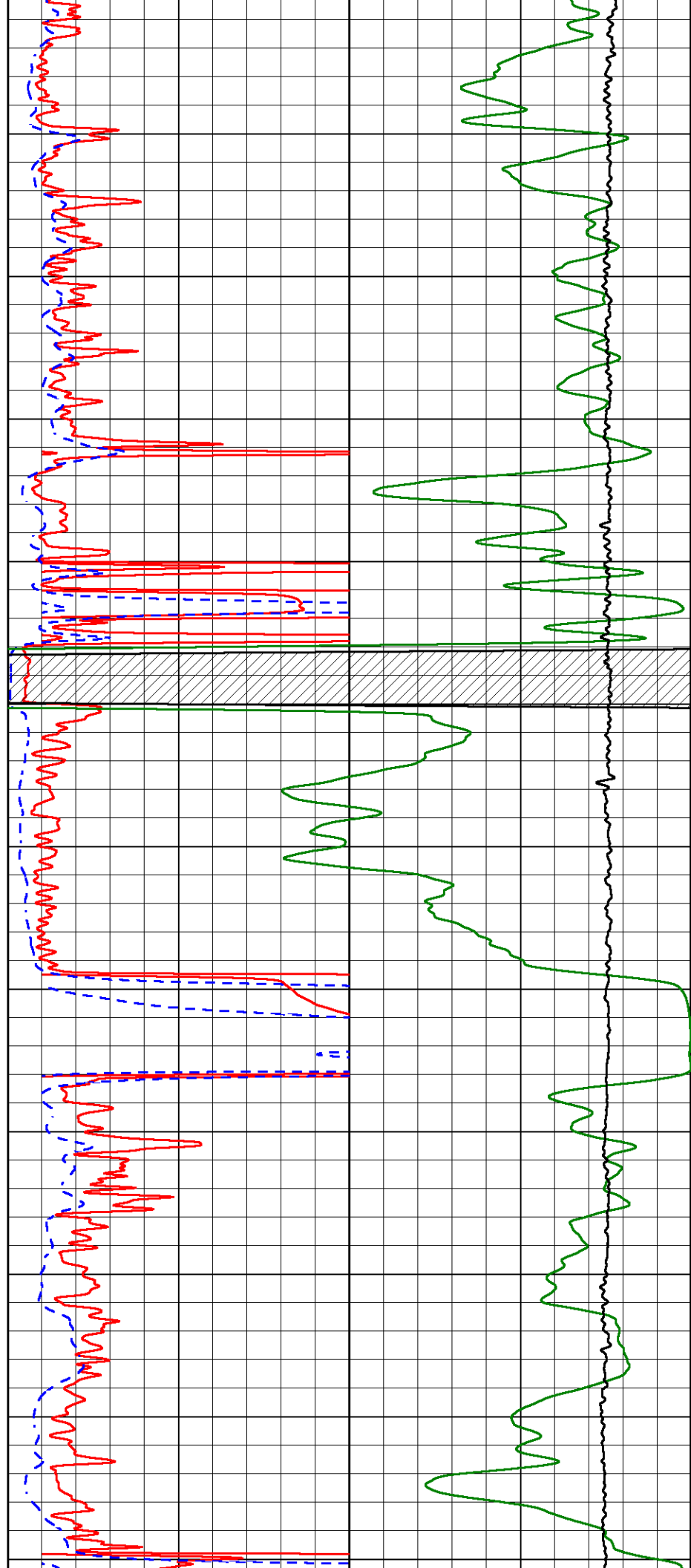
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2050
2100
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2200
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2300
2350
2400

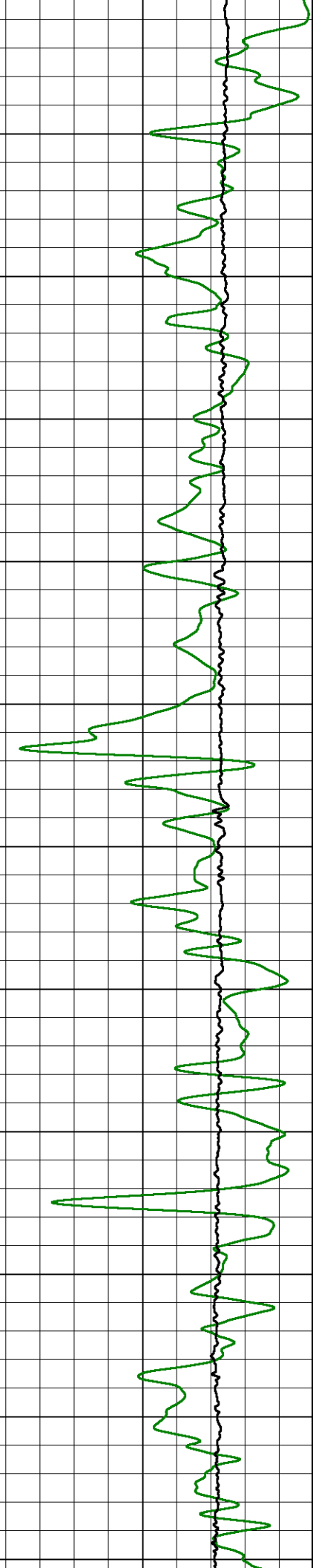
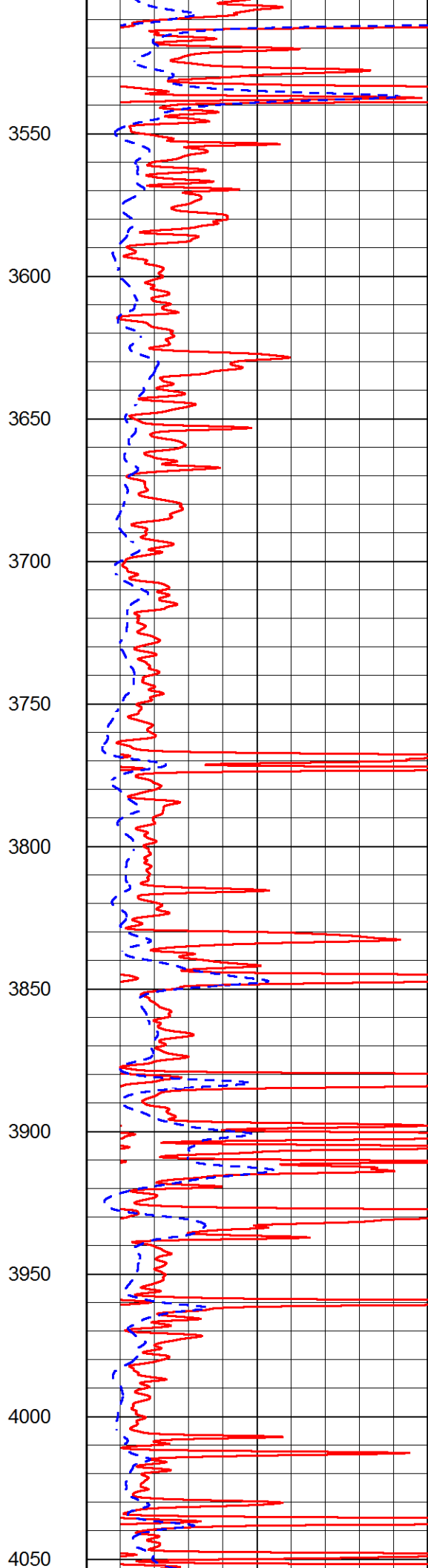
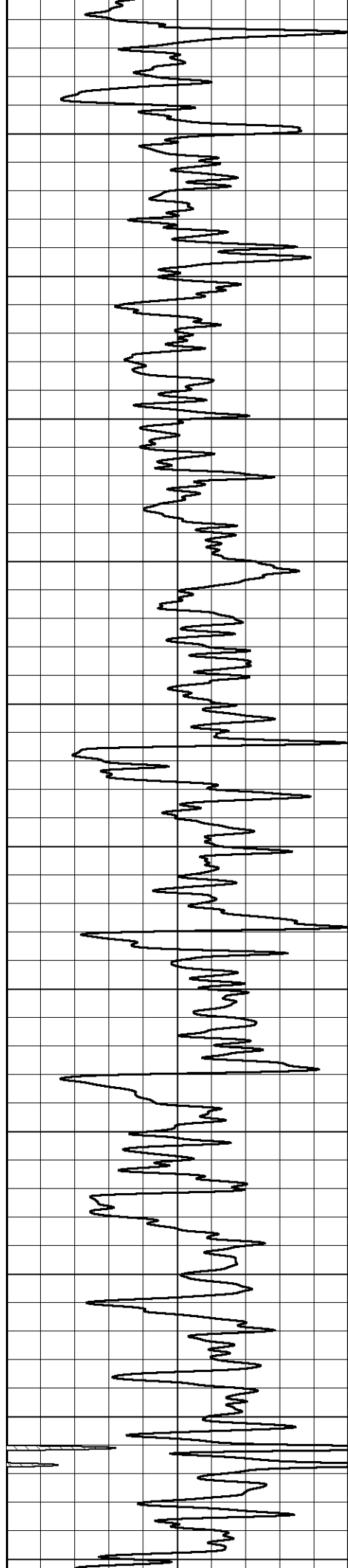


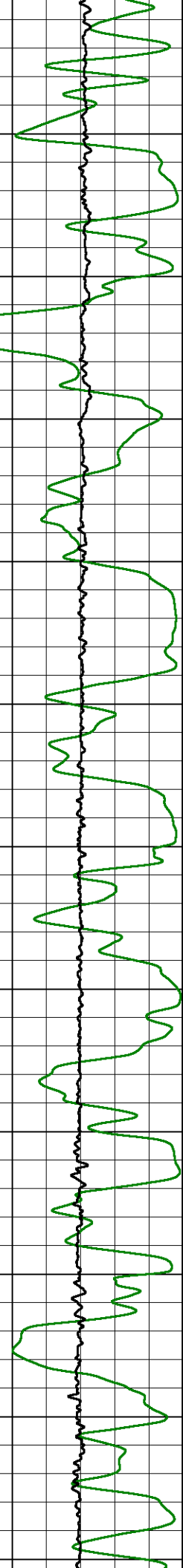
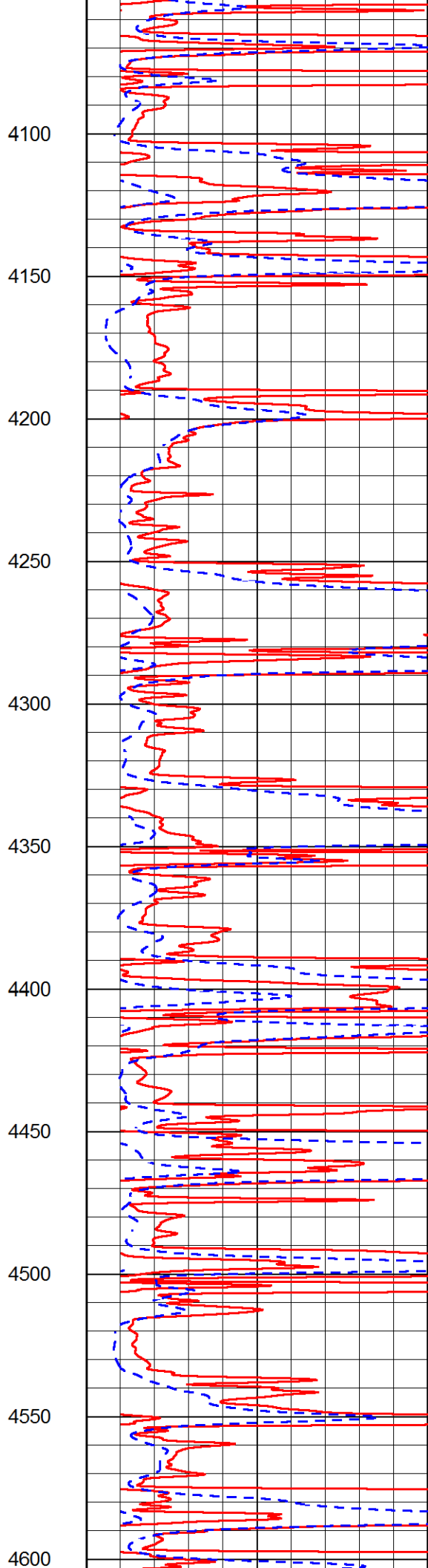
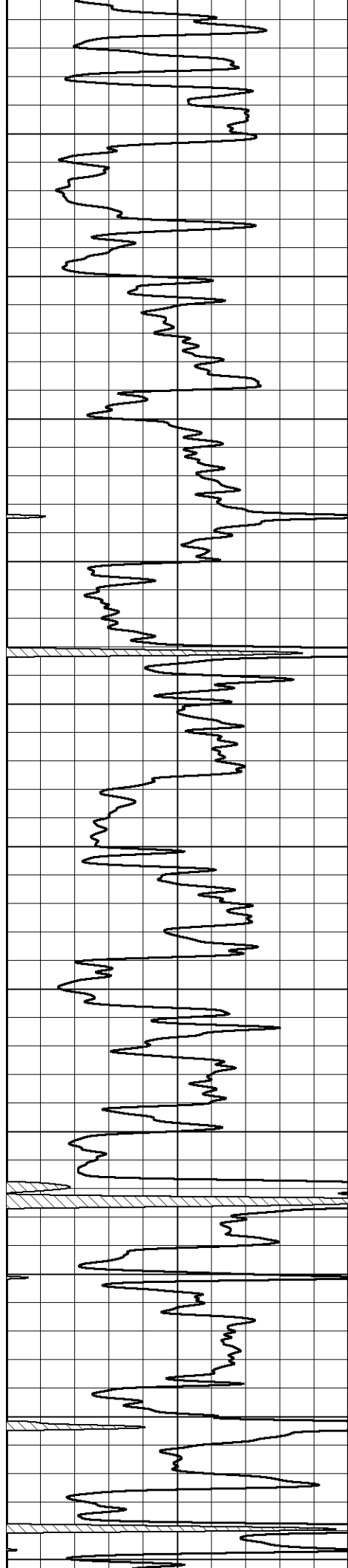


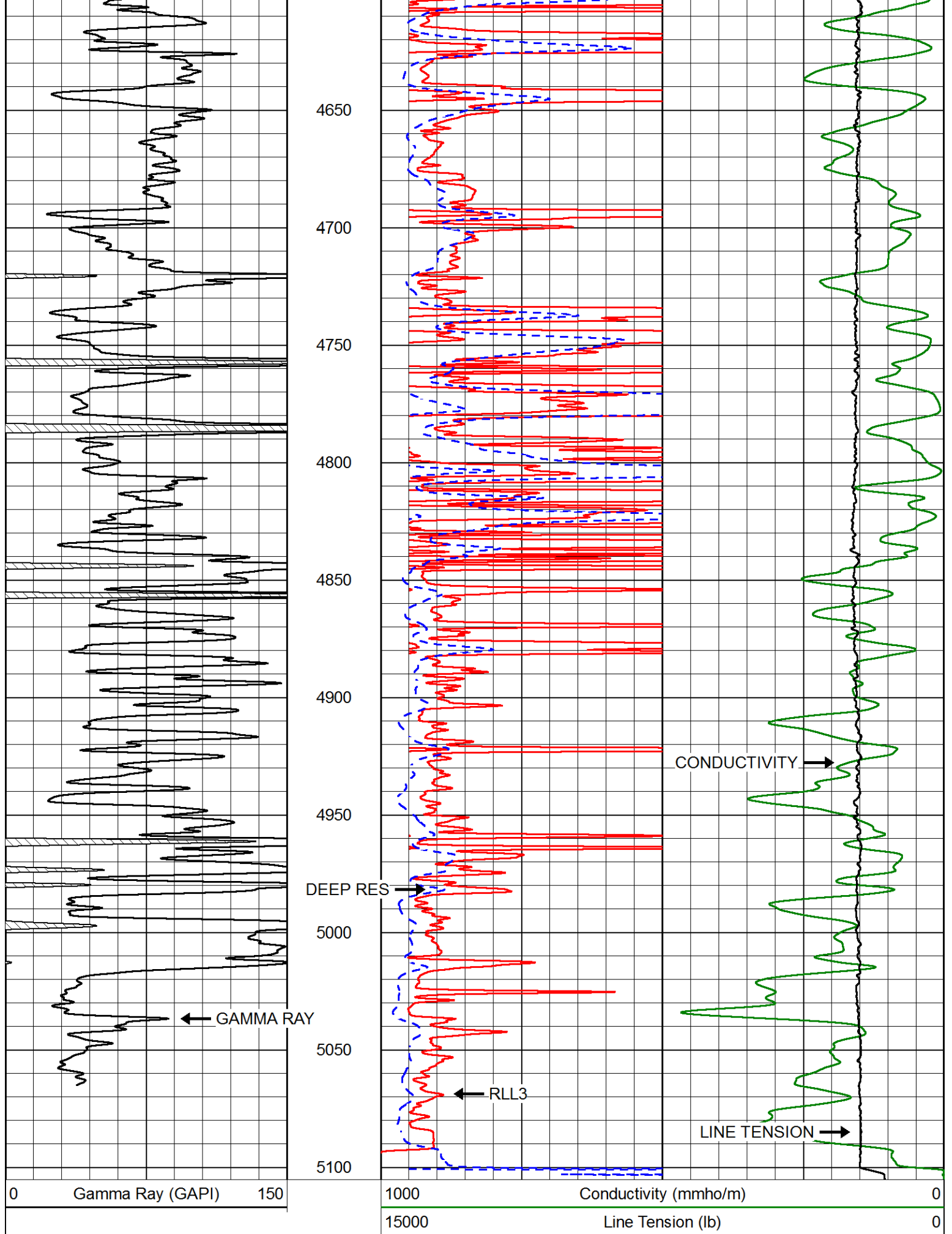


3000
3050
3100
3150
3200
3250
3300
3350
3400
3450
3500









0 Gamma Ray (GAPI) 150

1000 Conductivity (mmho/m) 0

15000 Line Tension (lb) 0

0 RLL3 (Ohm-m) 50

0 Deep Resistivity (Ohm-m) 50

50	RLL3 (Ohm-m)	500
50	Deep Resistivity (Ohm-m)	500

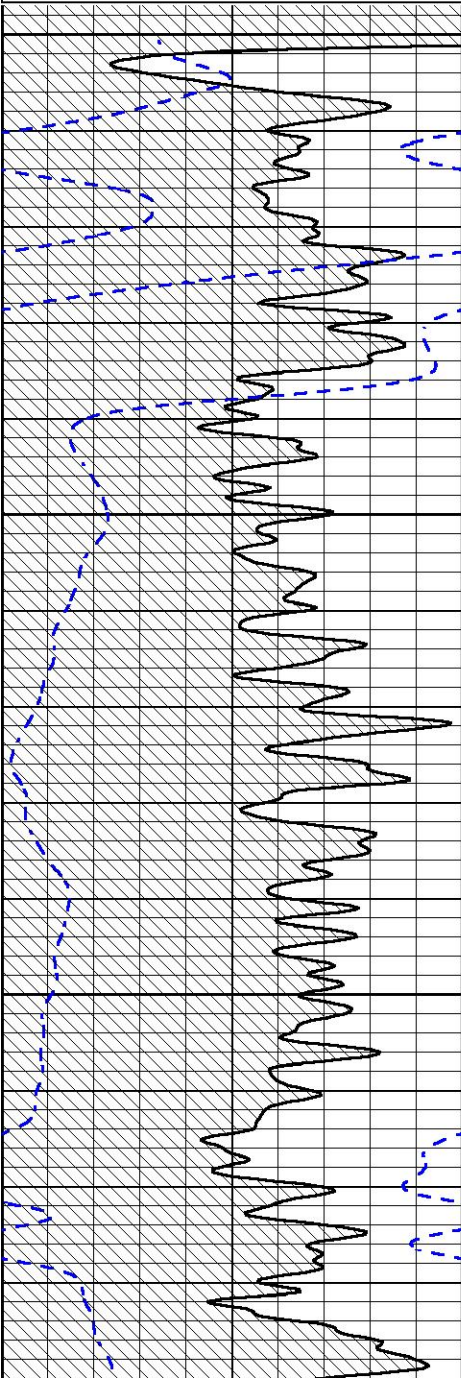


MAIN PASS

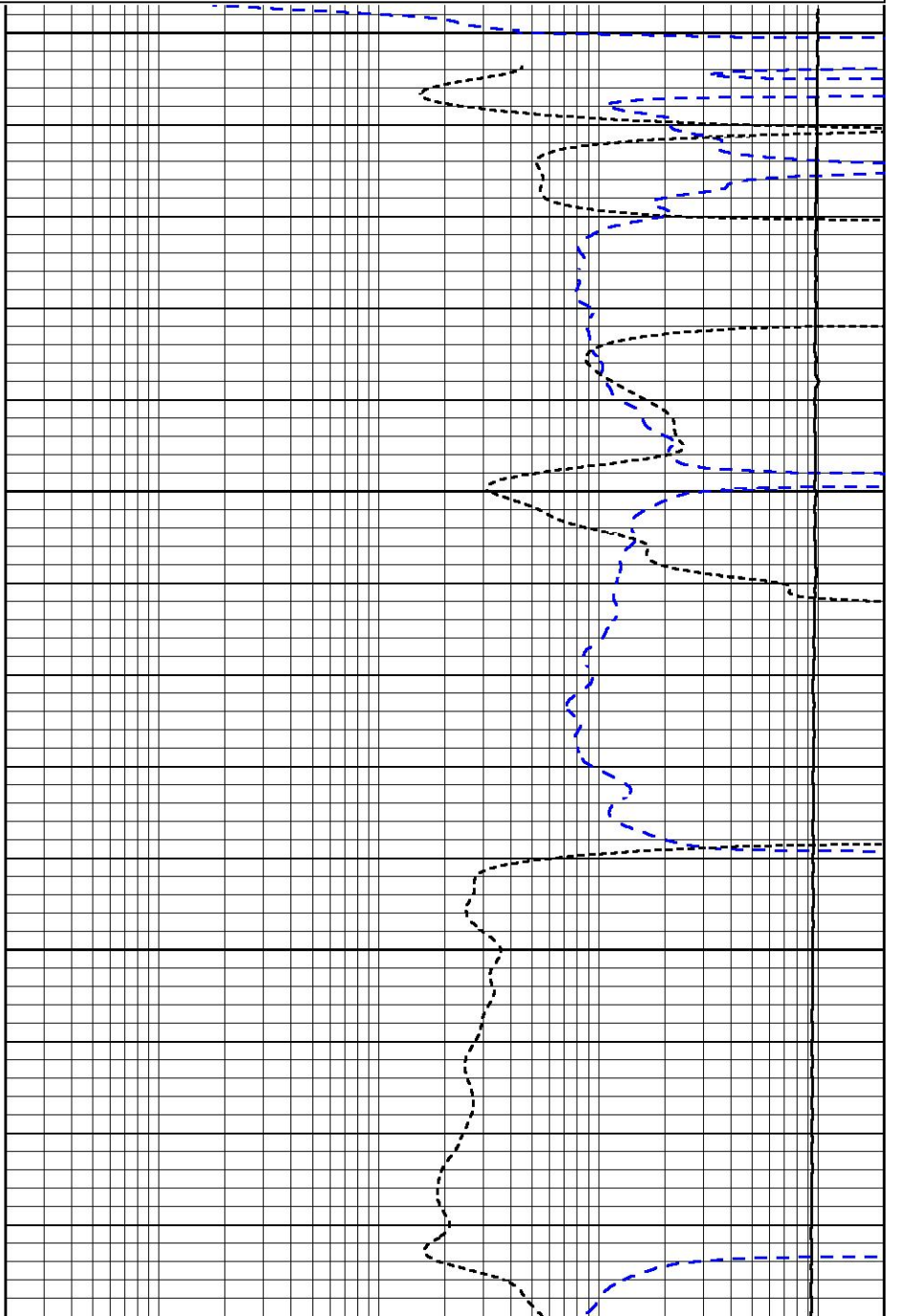
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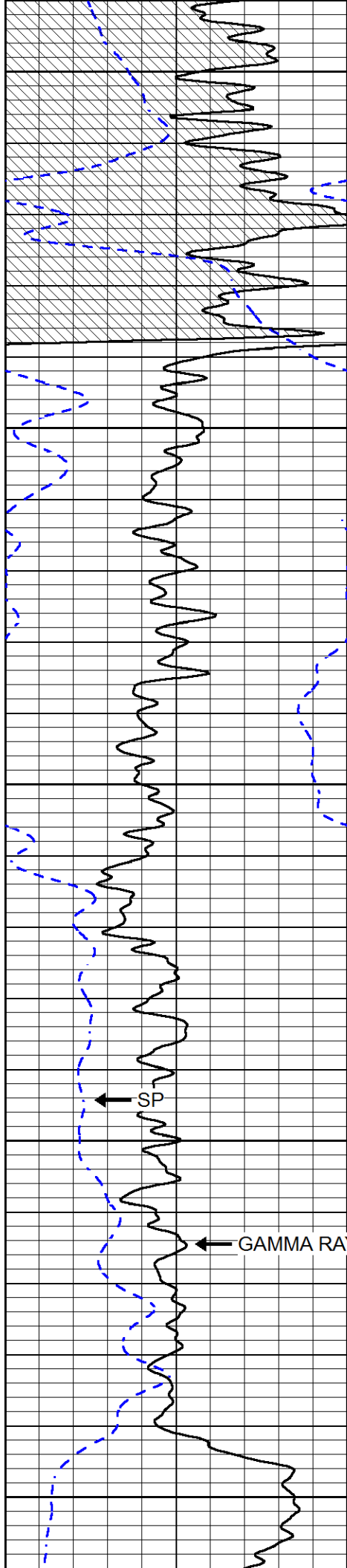
0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0



0
50
100





150

200

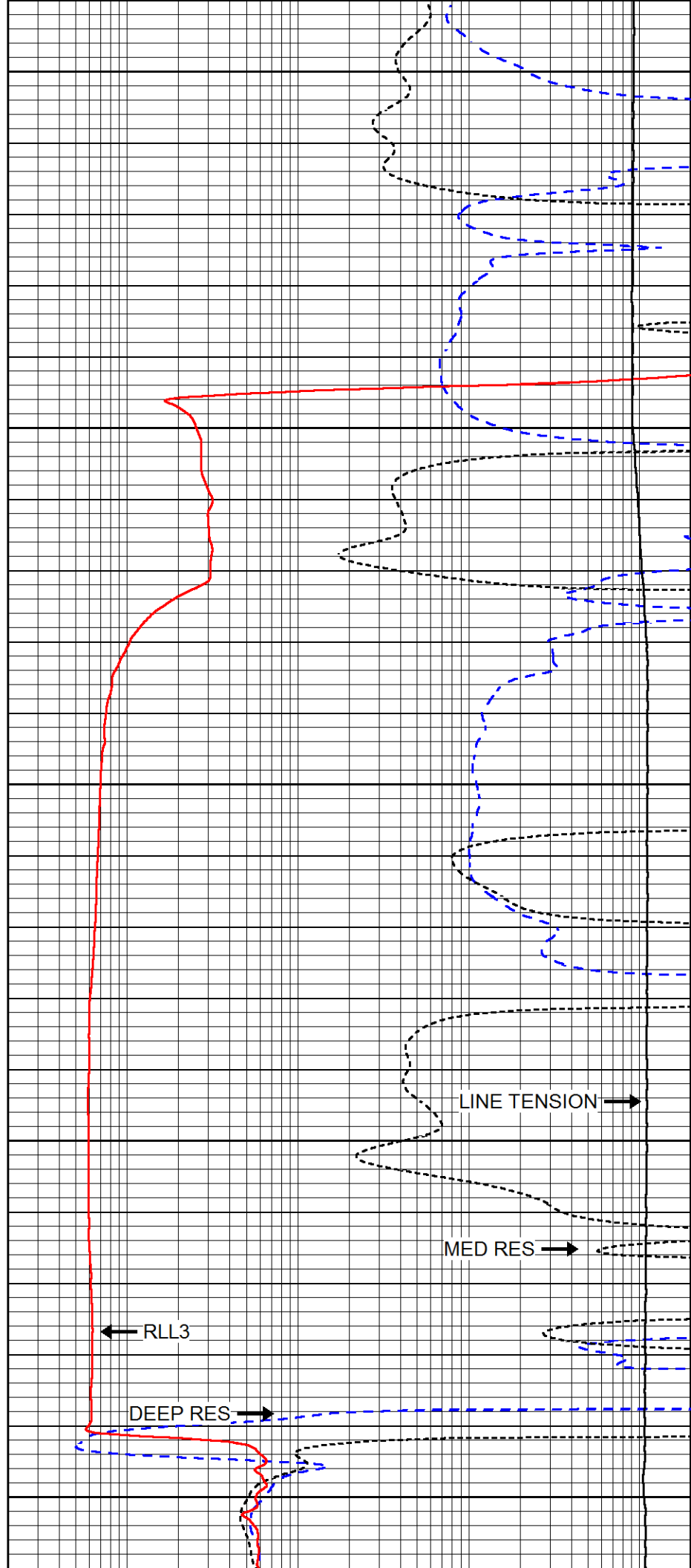
250

300

350

← SP

← GAMMA RAY

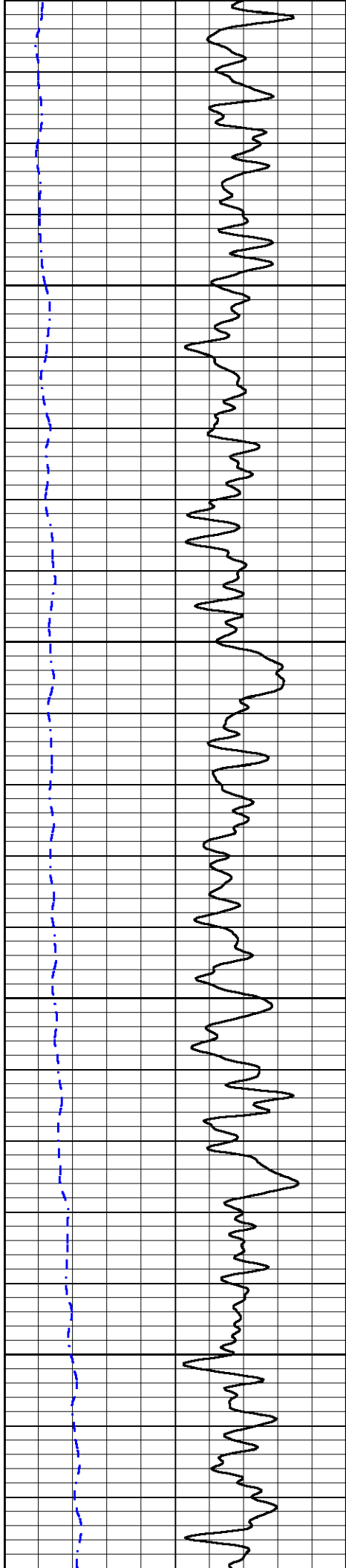


LINE TENSION →

MED RES →

← RLL3

DEEP RES →

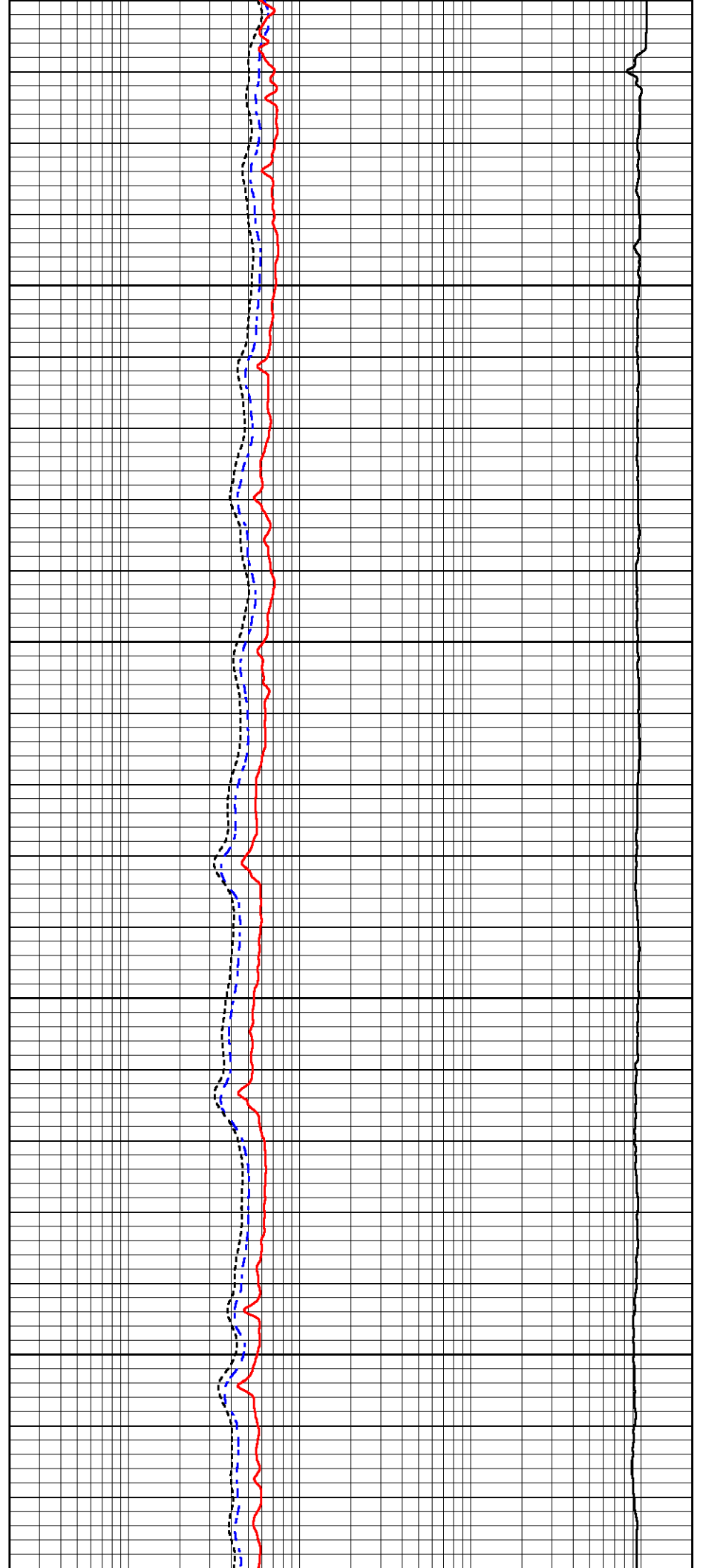


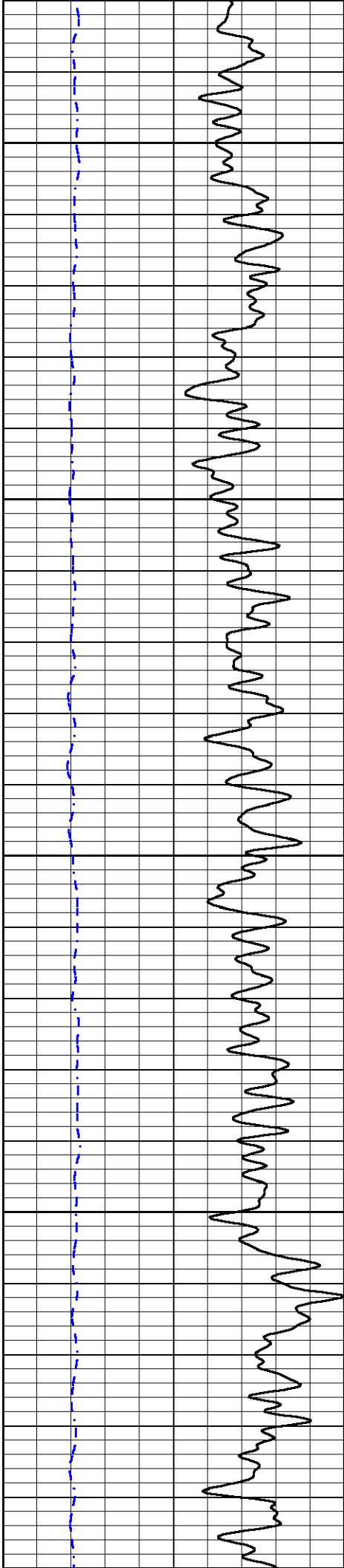
400

450

500

550





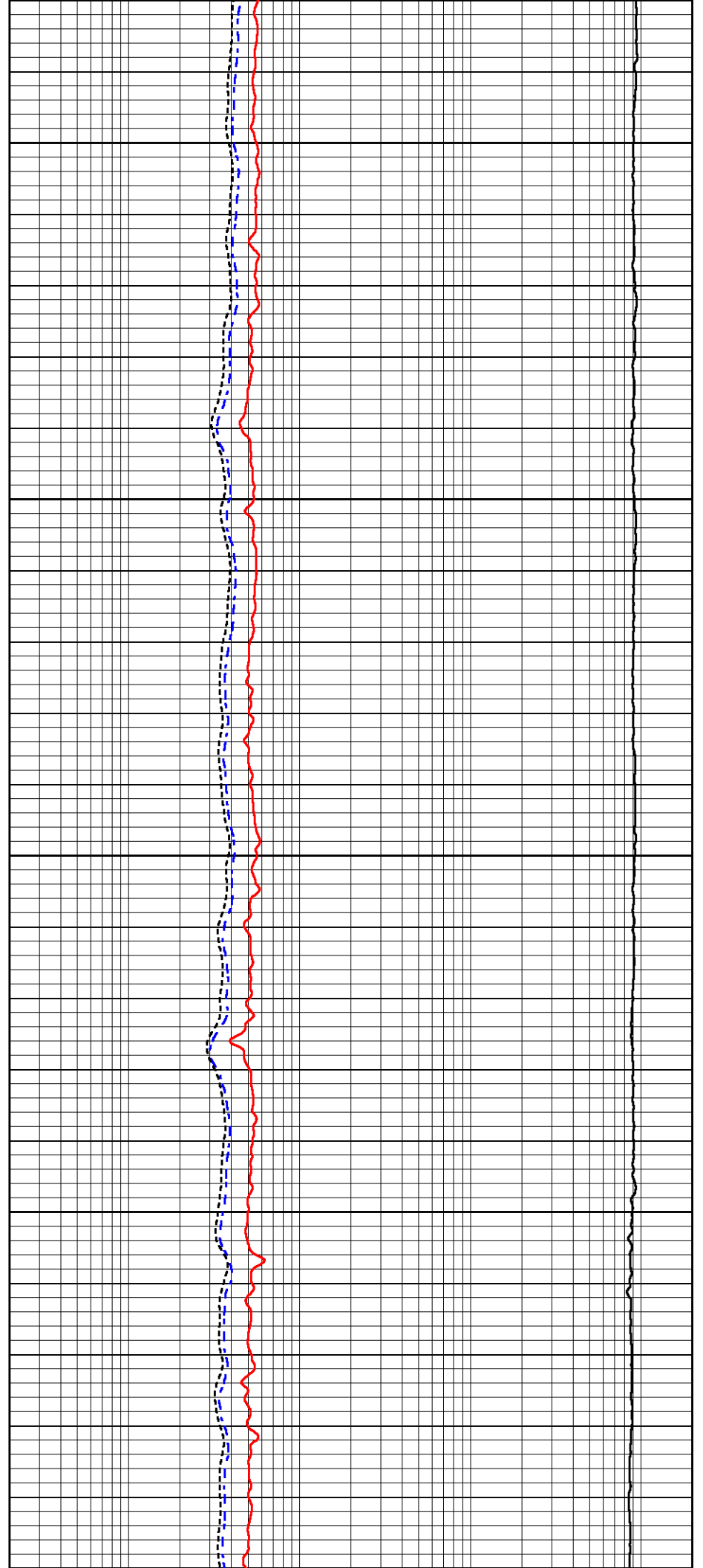
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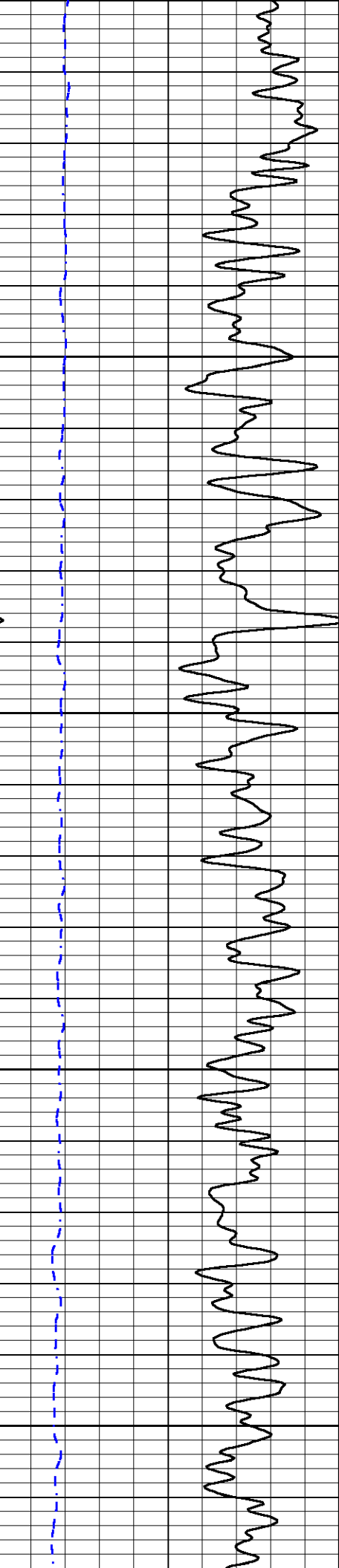
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700

750

800





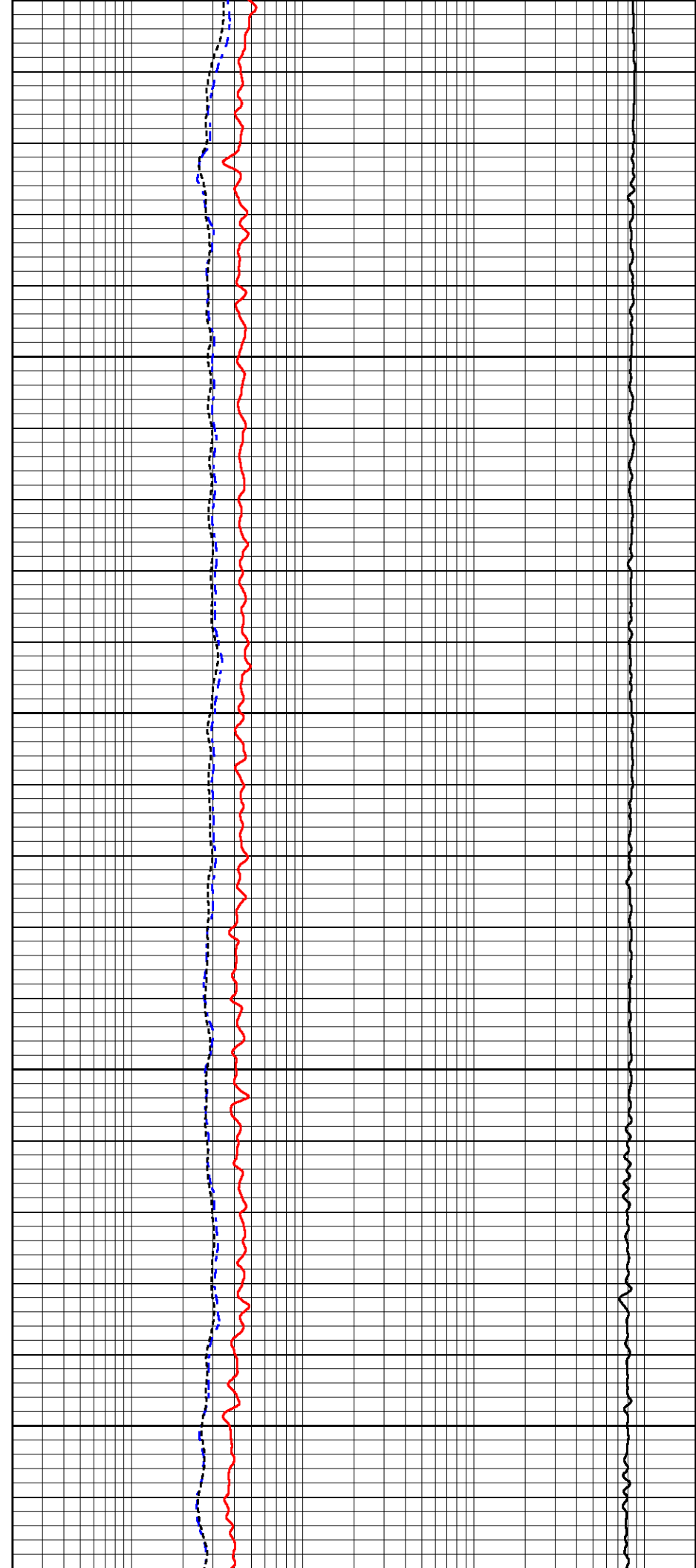
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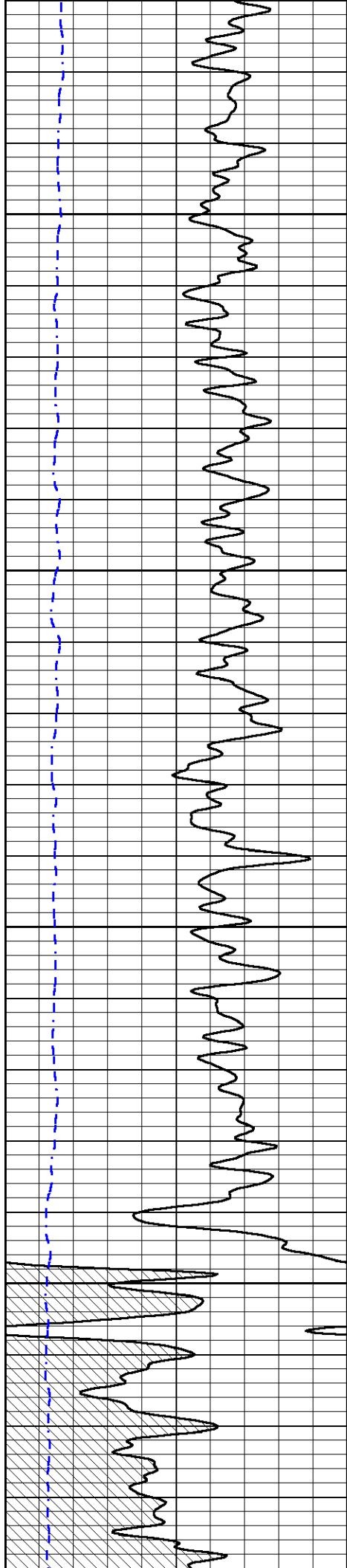
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900

950

1000



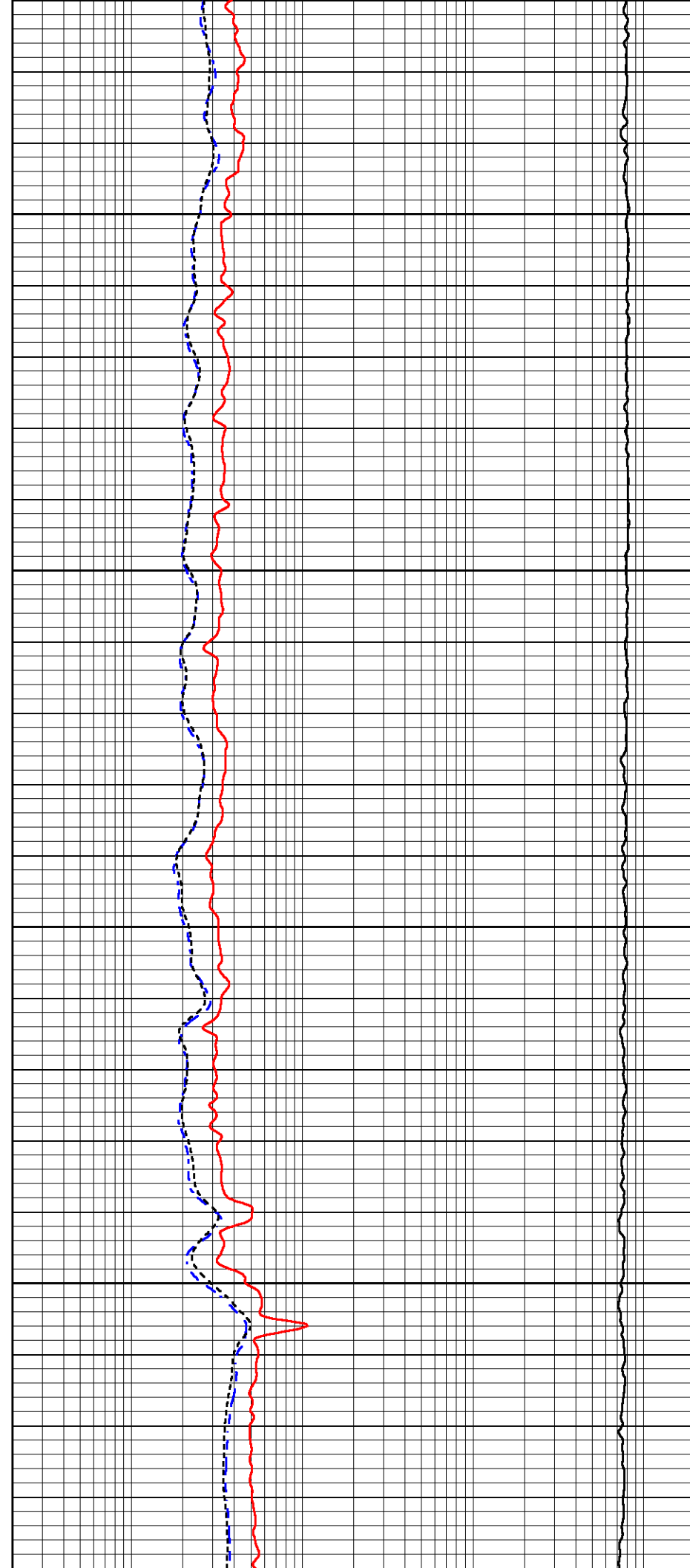


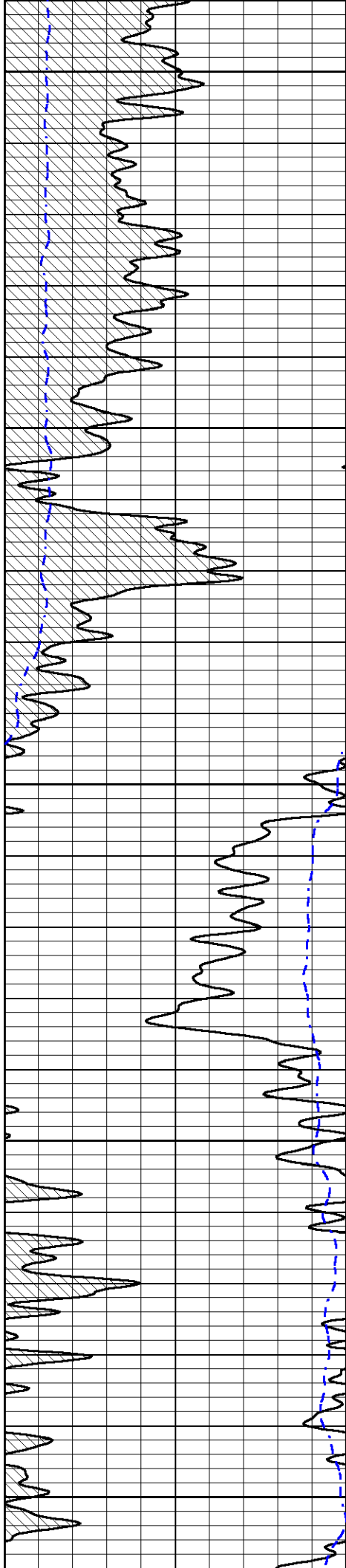
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1100

1150

1200





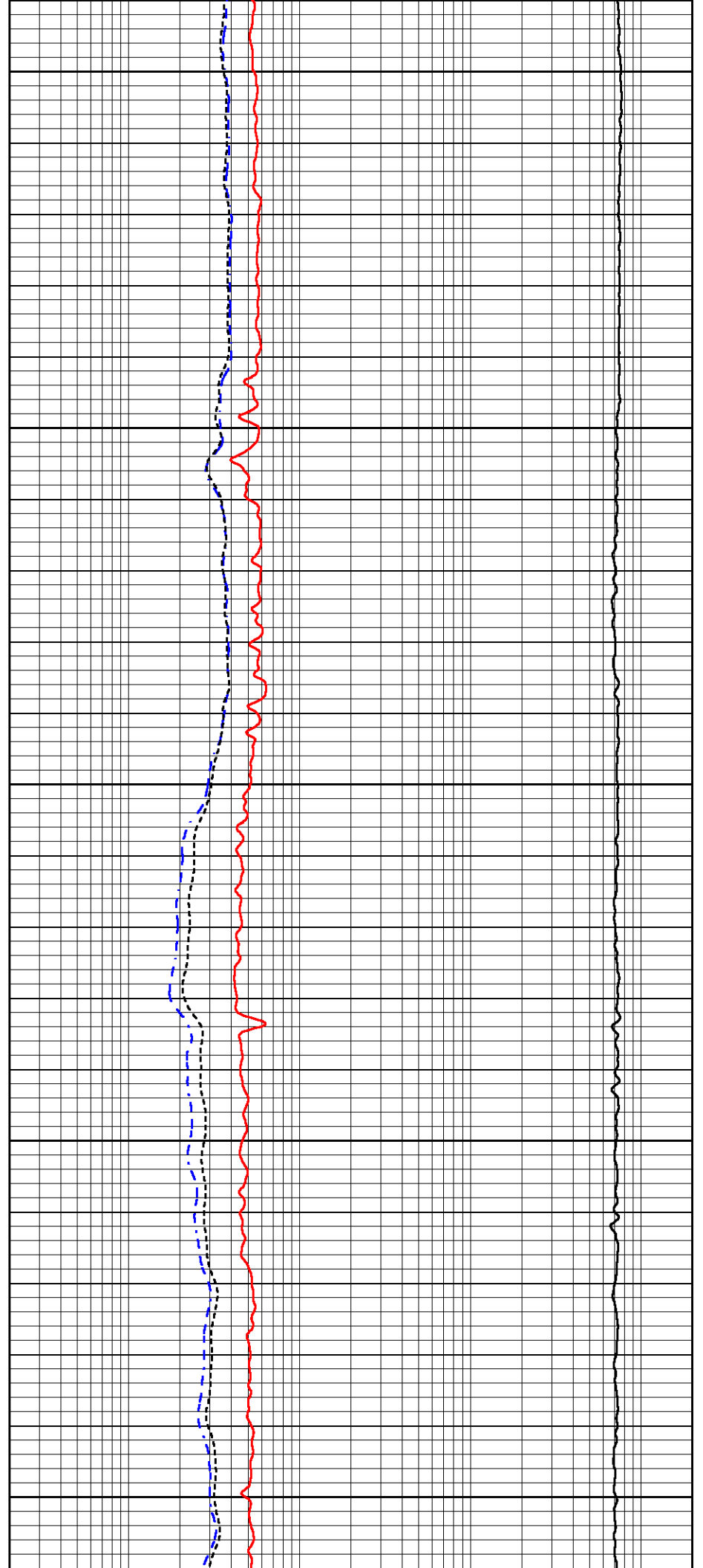
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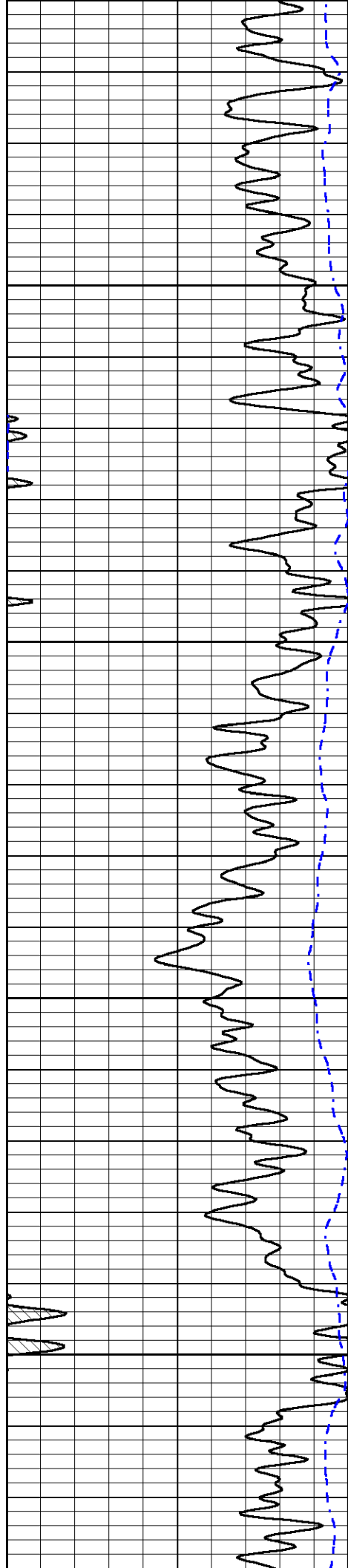
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1350

1400

1450



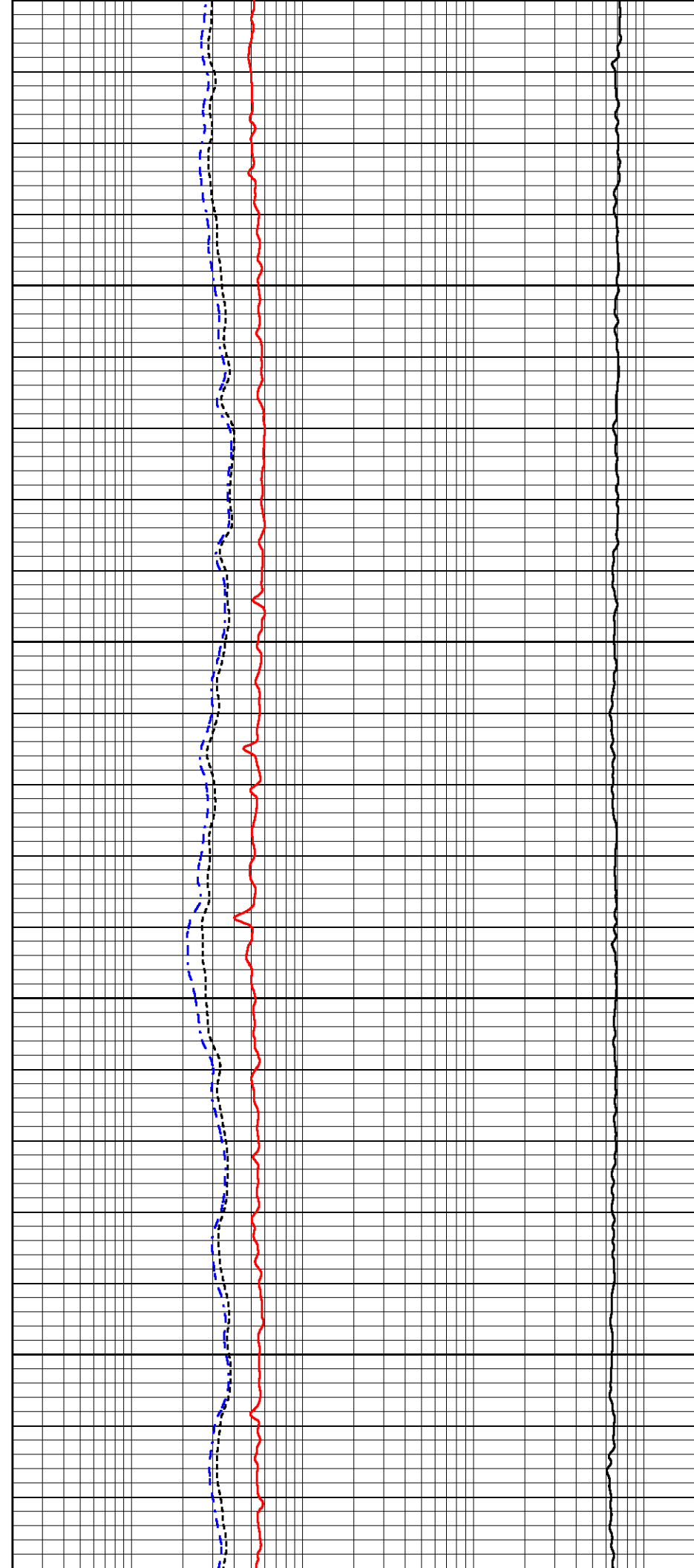


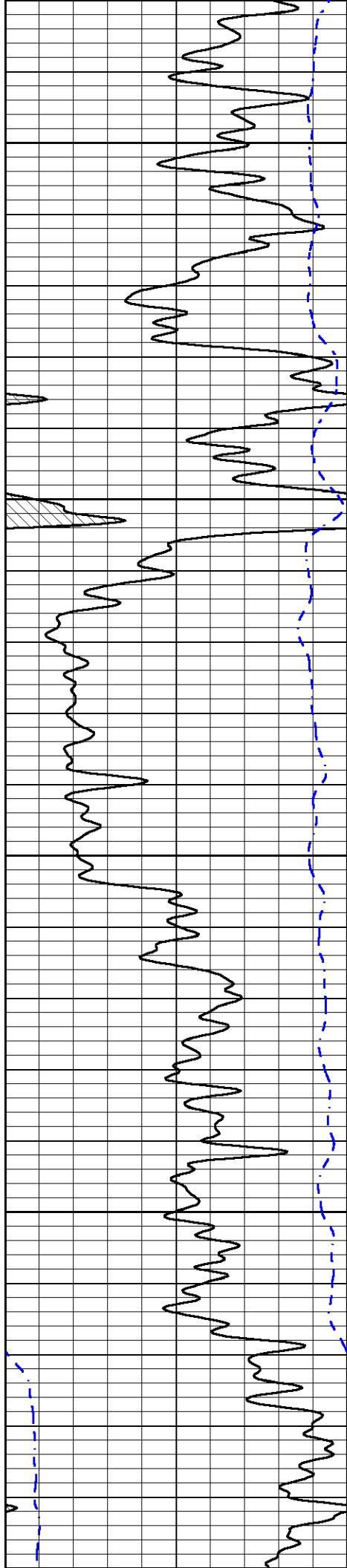
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1550

1600

1650





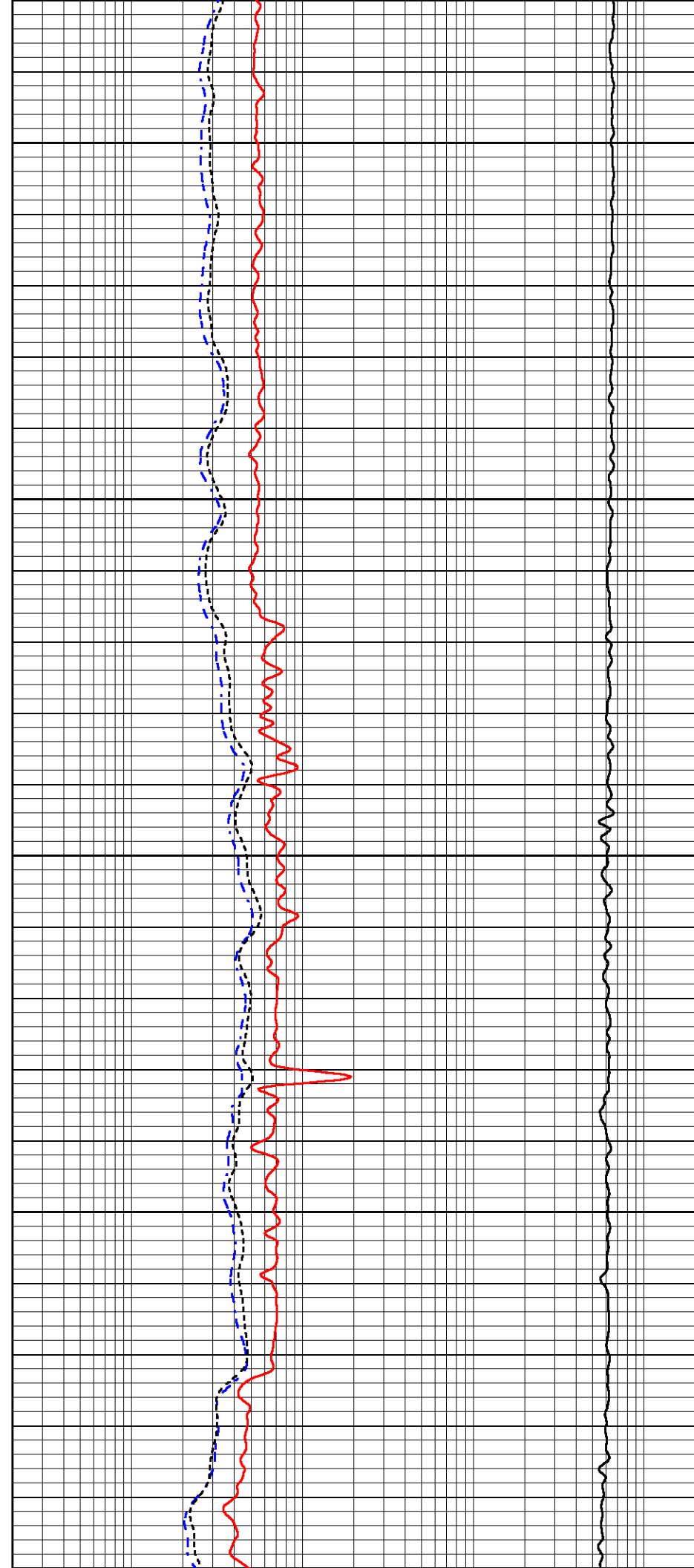
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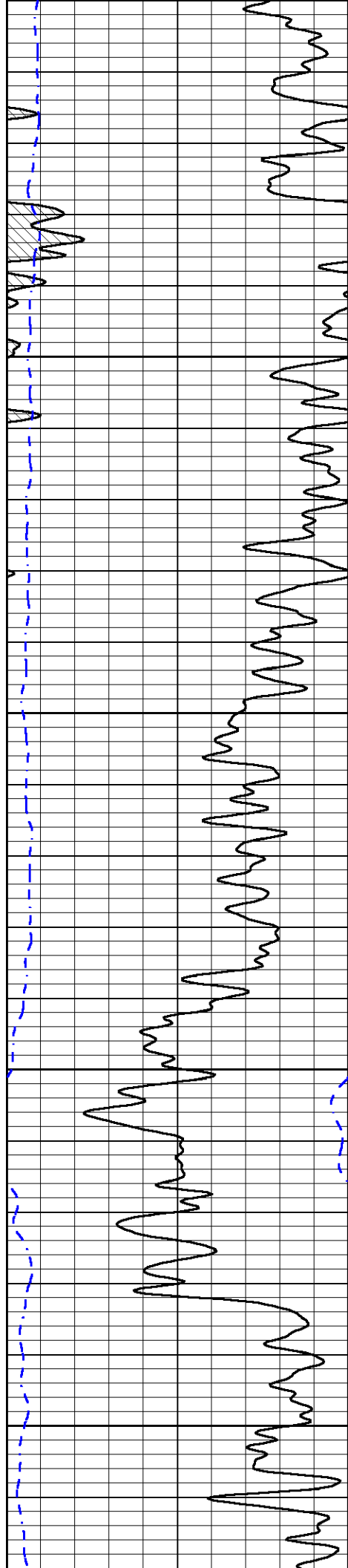
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1850

1900





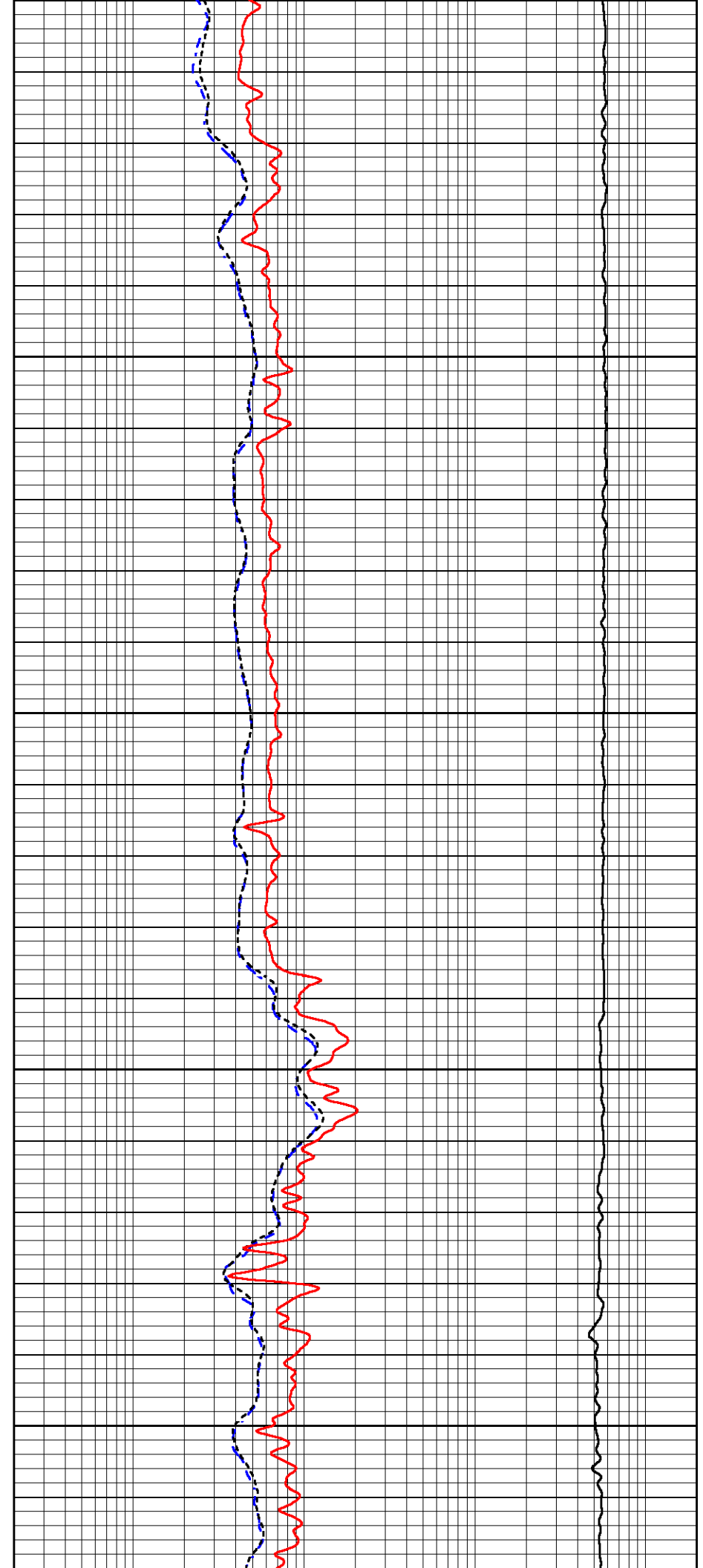
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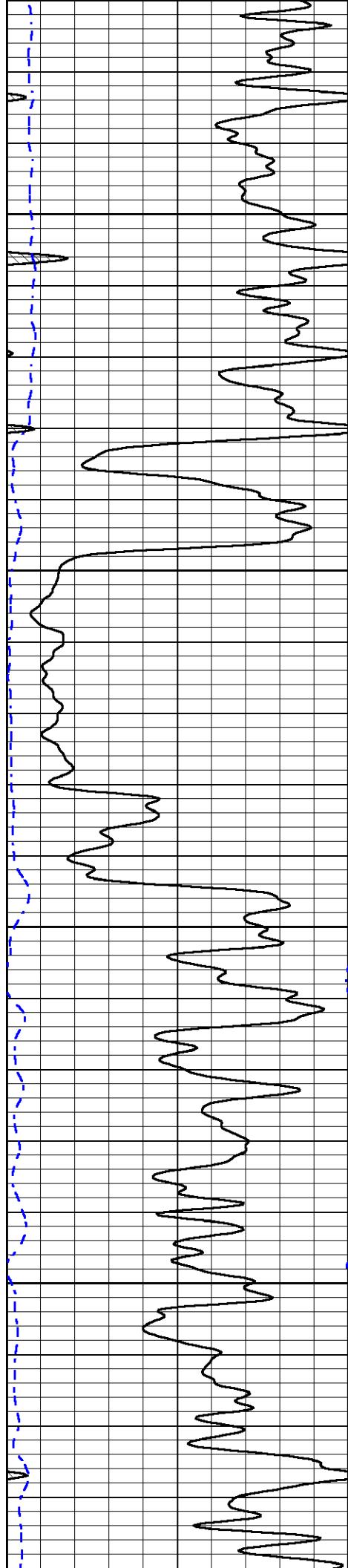
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2050

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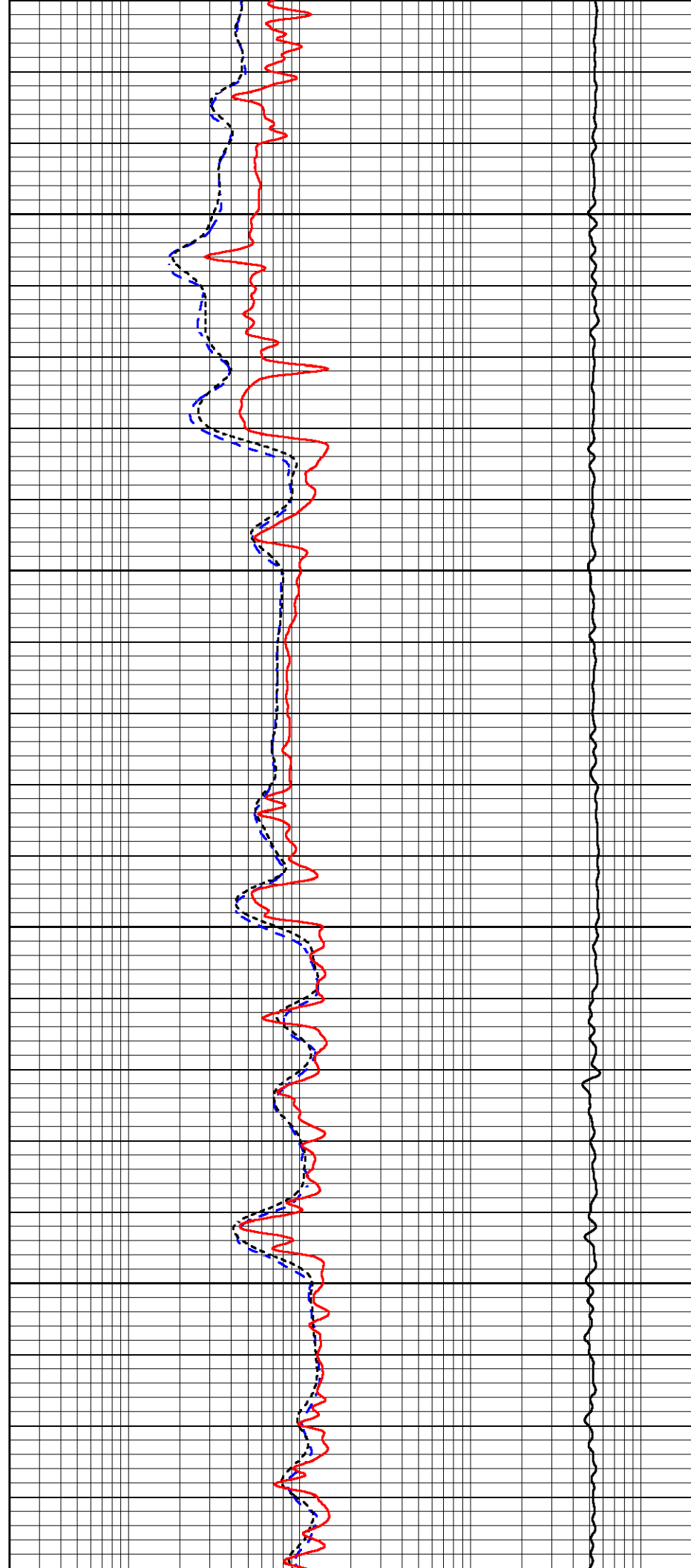


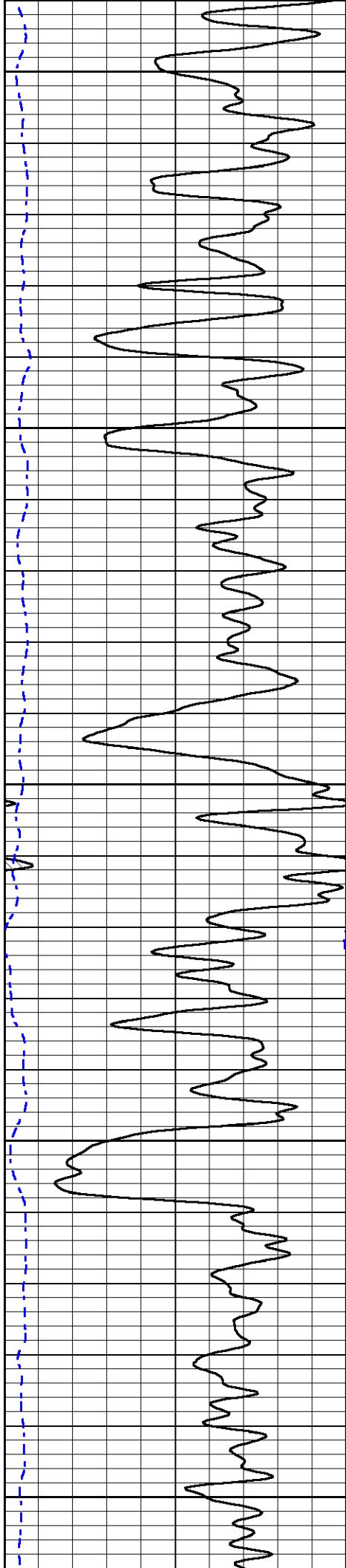
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2200

2250

2300





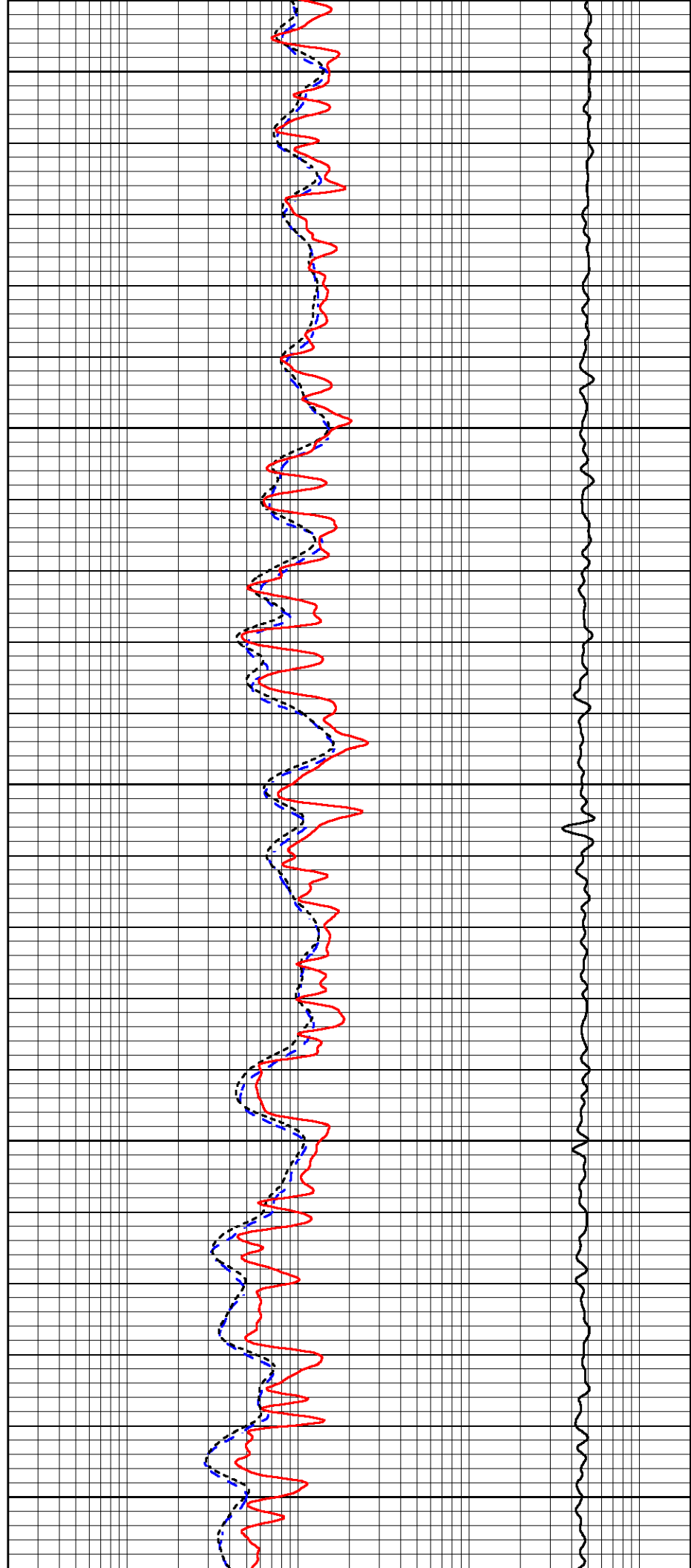
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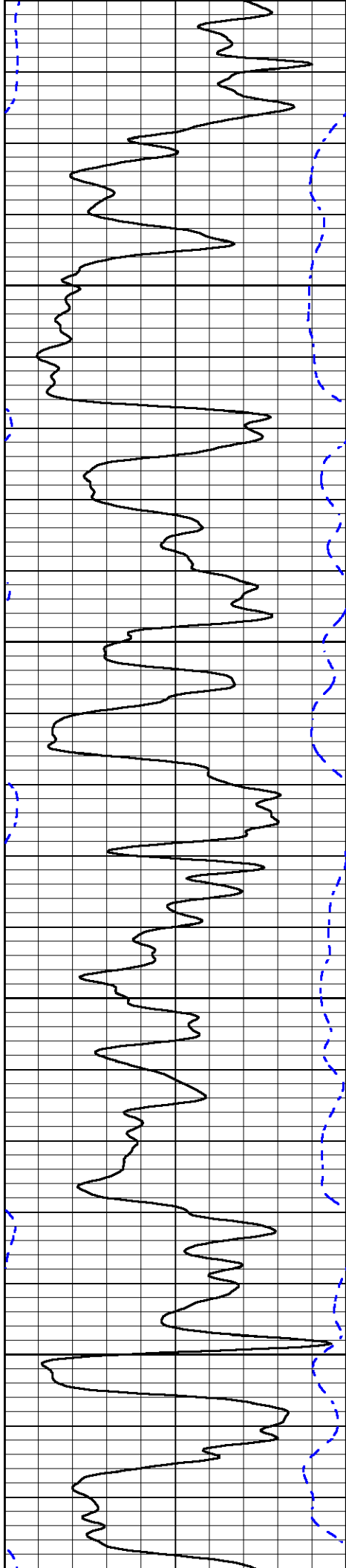
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2500

2550



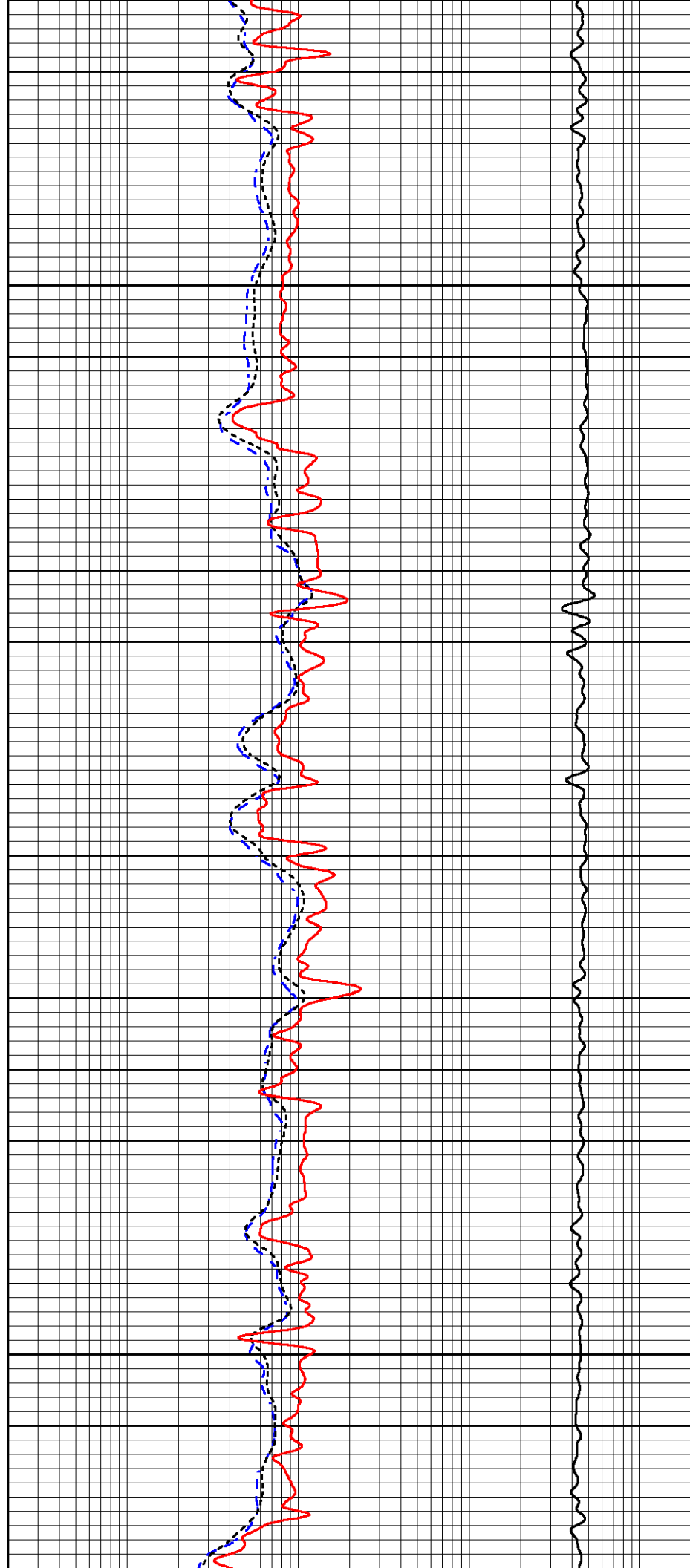


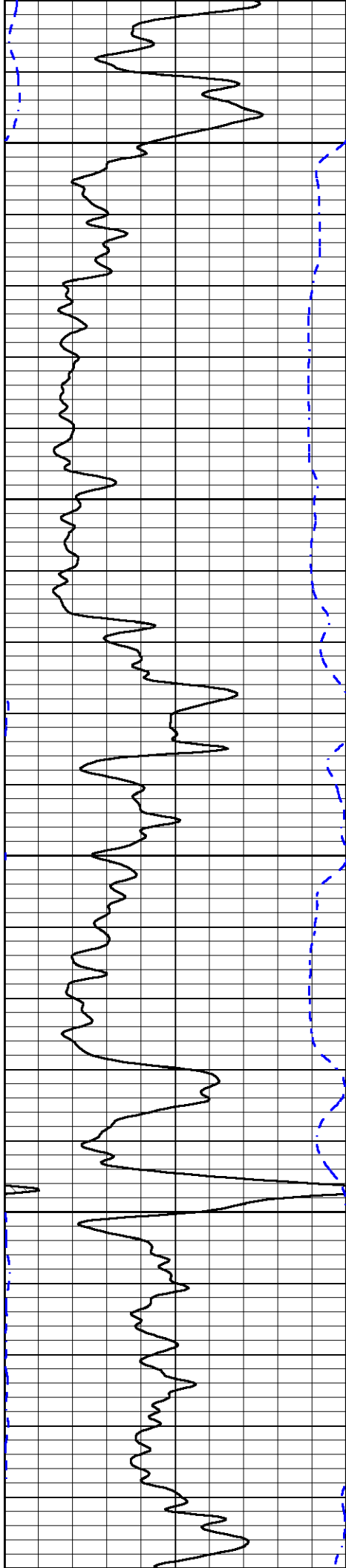
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2700

2750





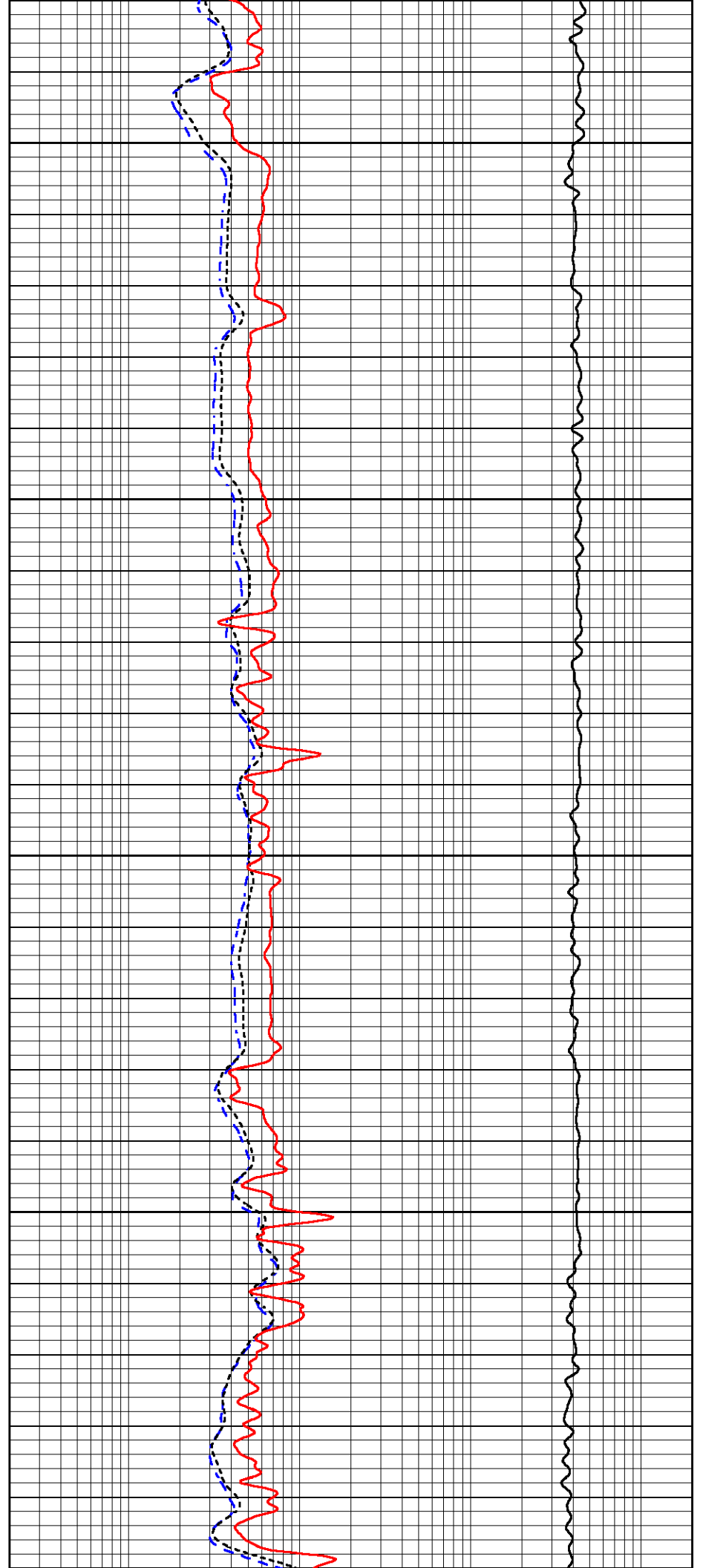
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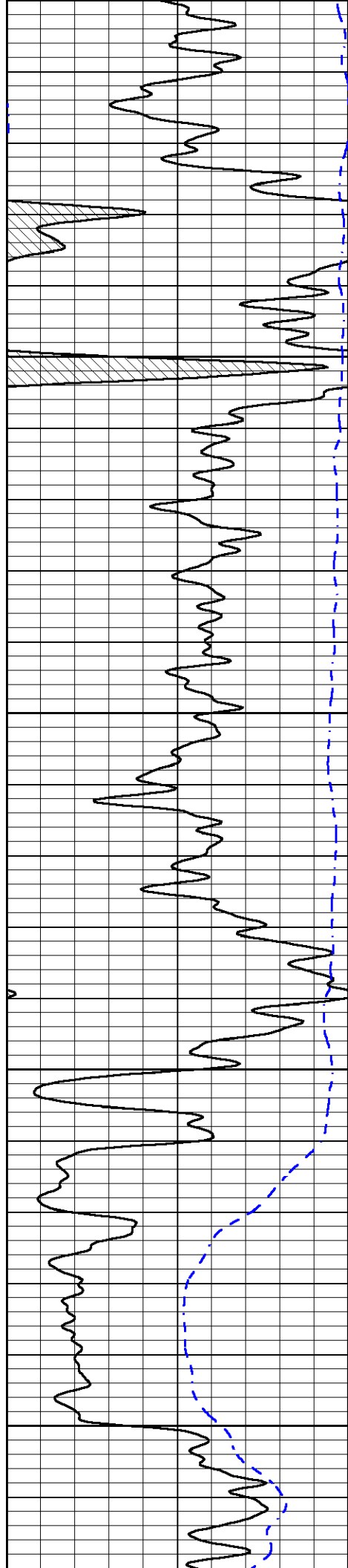
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2900

2950

3000





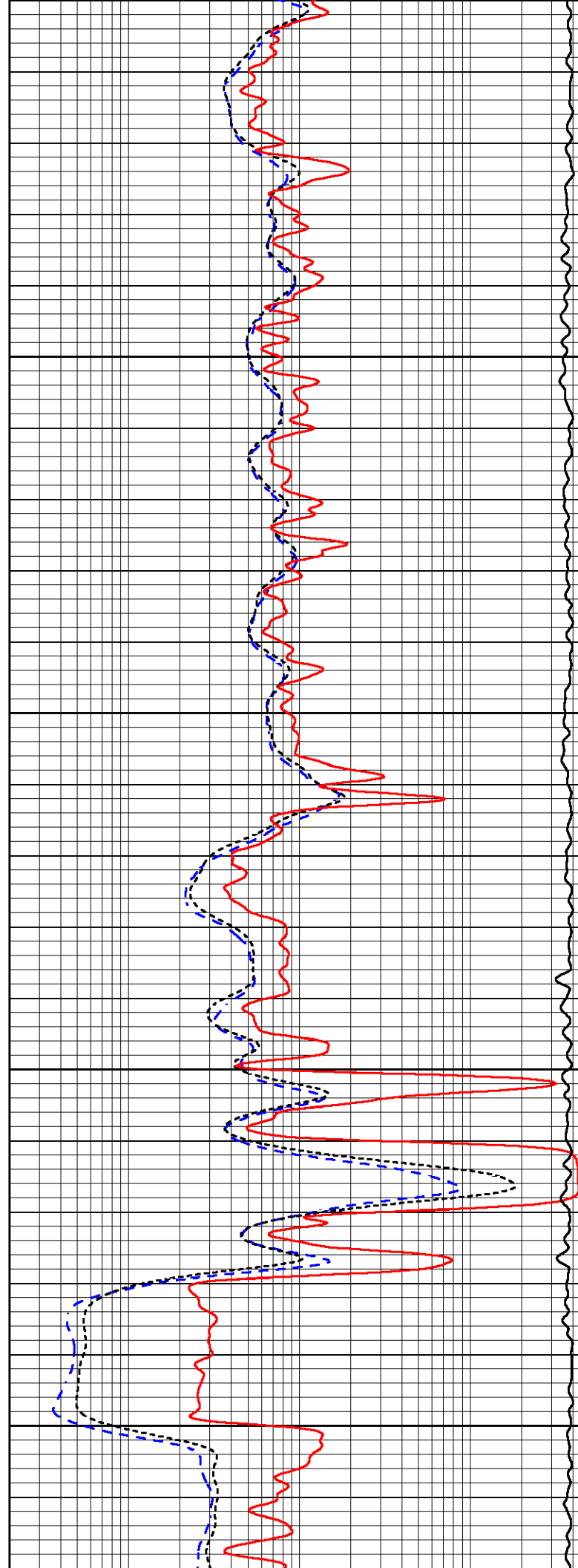
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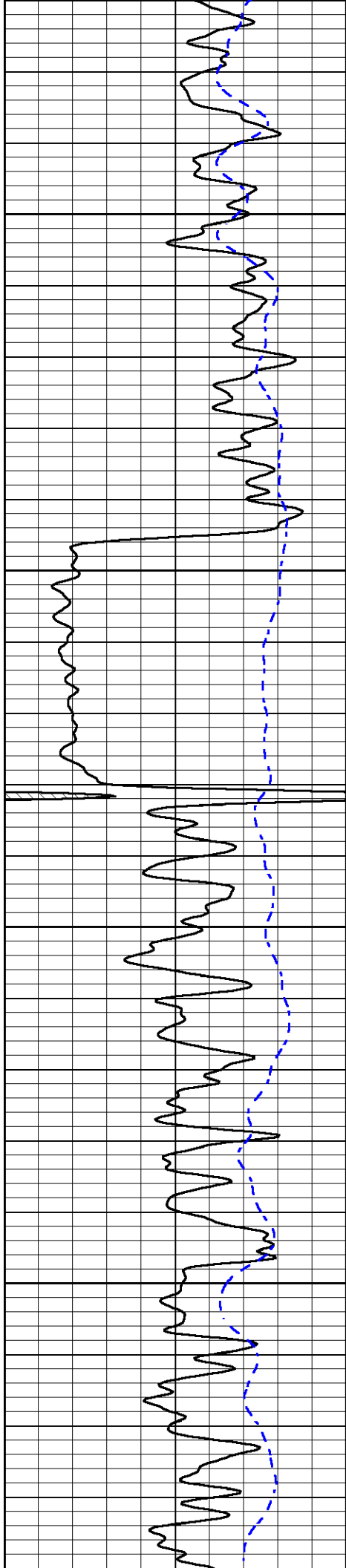
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3200



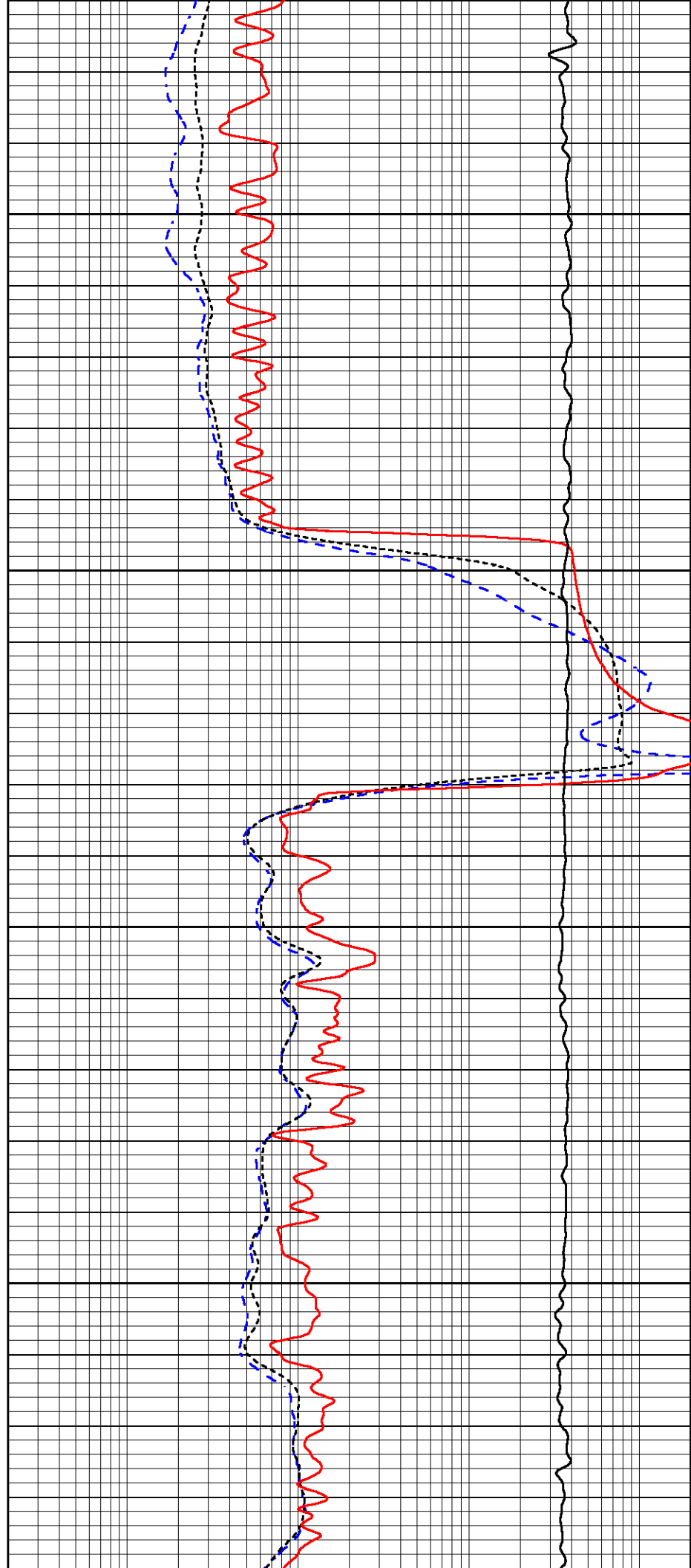


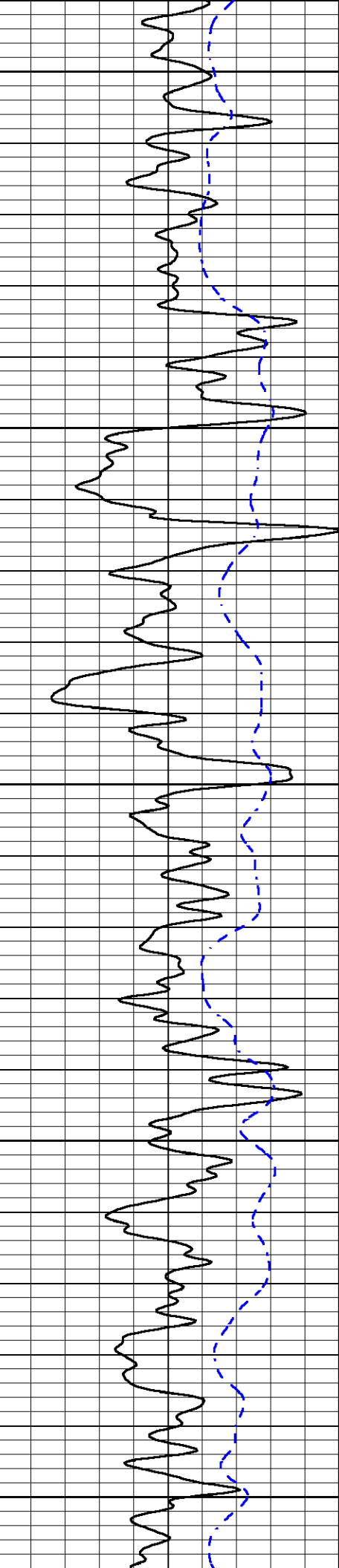
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3350

3400





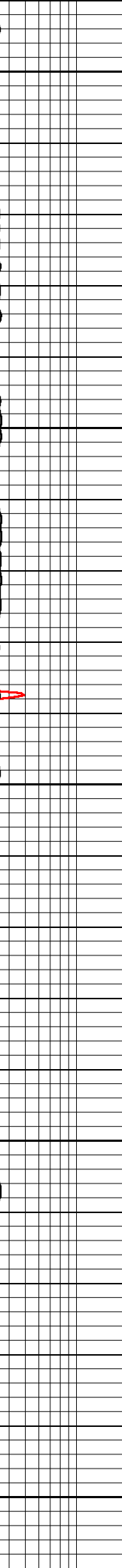
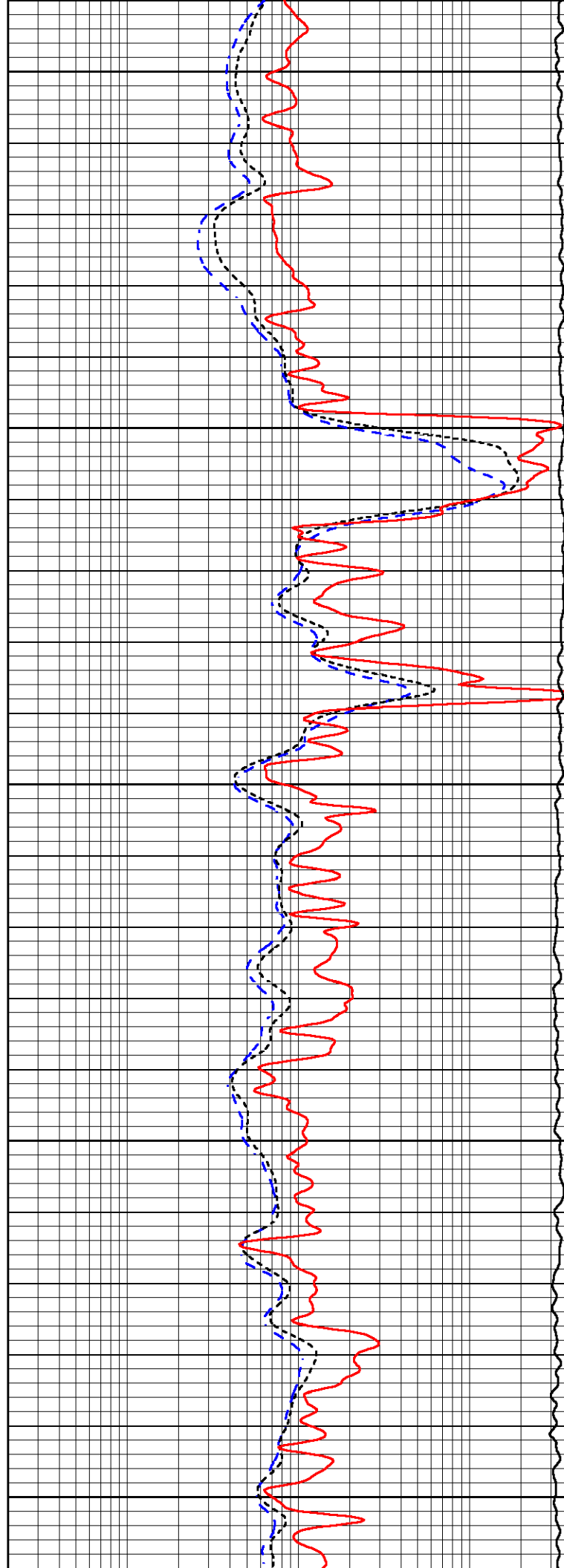
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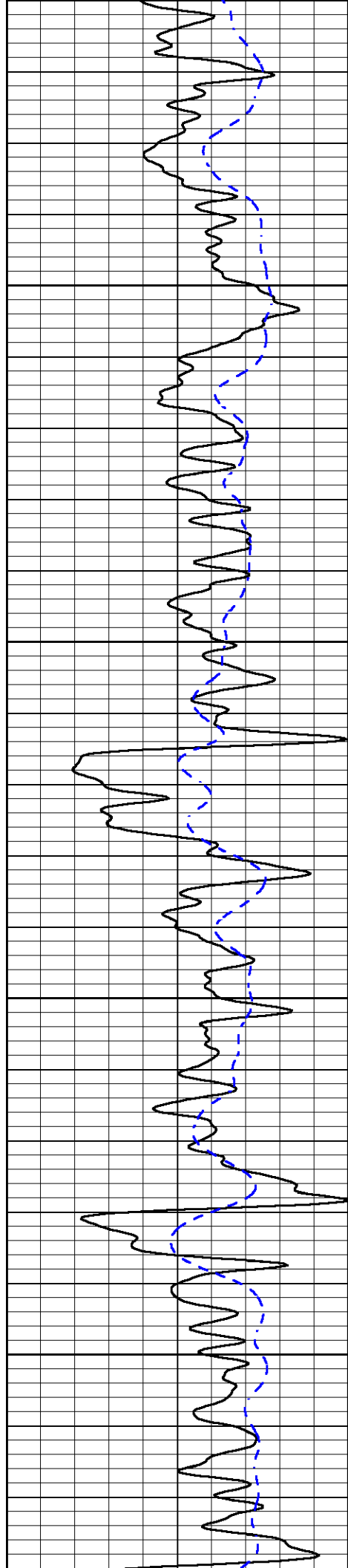
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3650



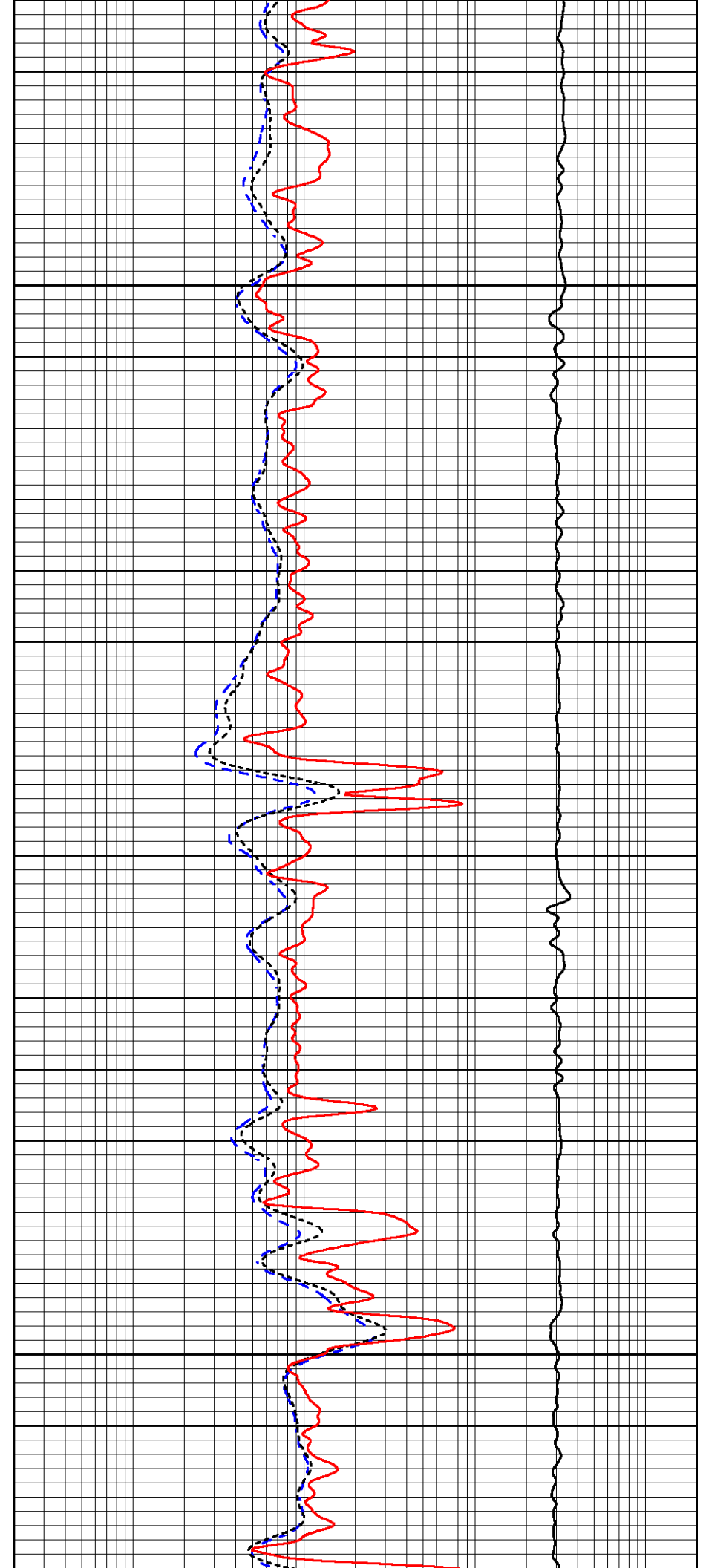


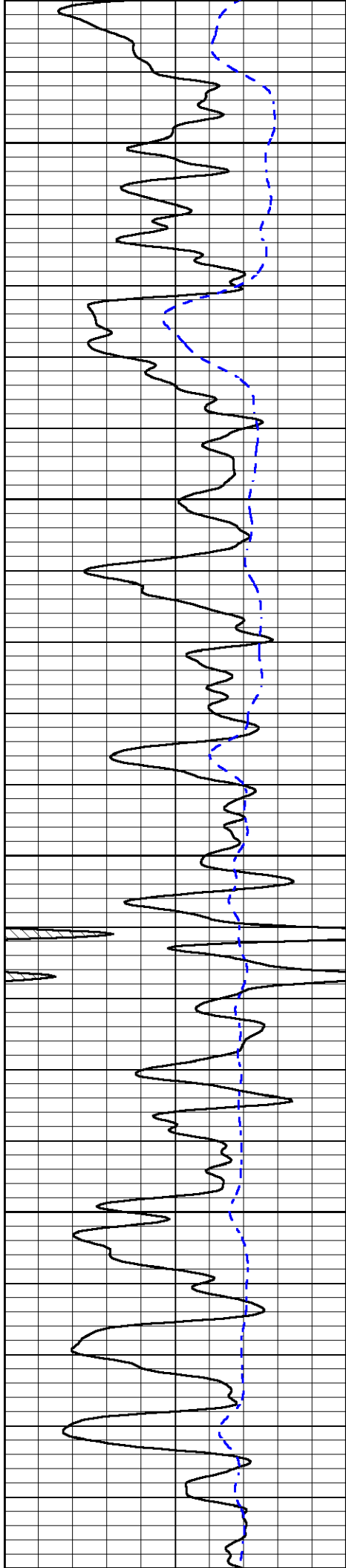
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3750

3800

3850





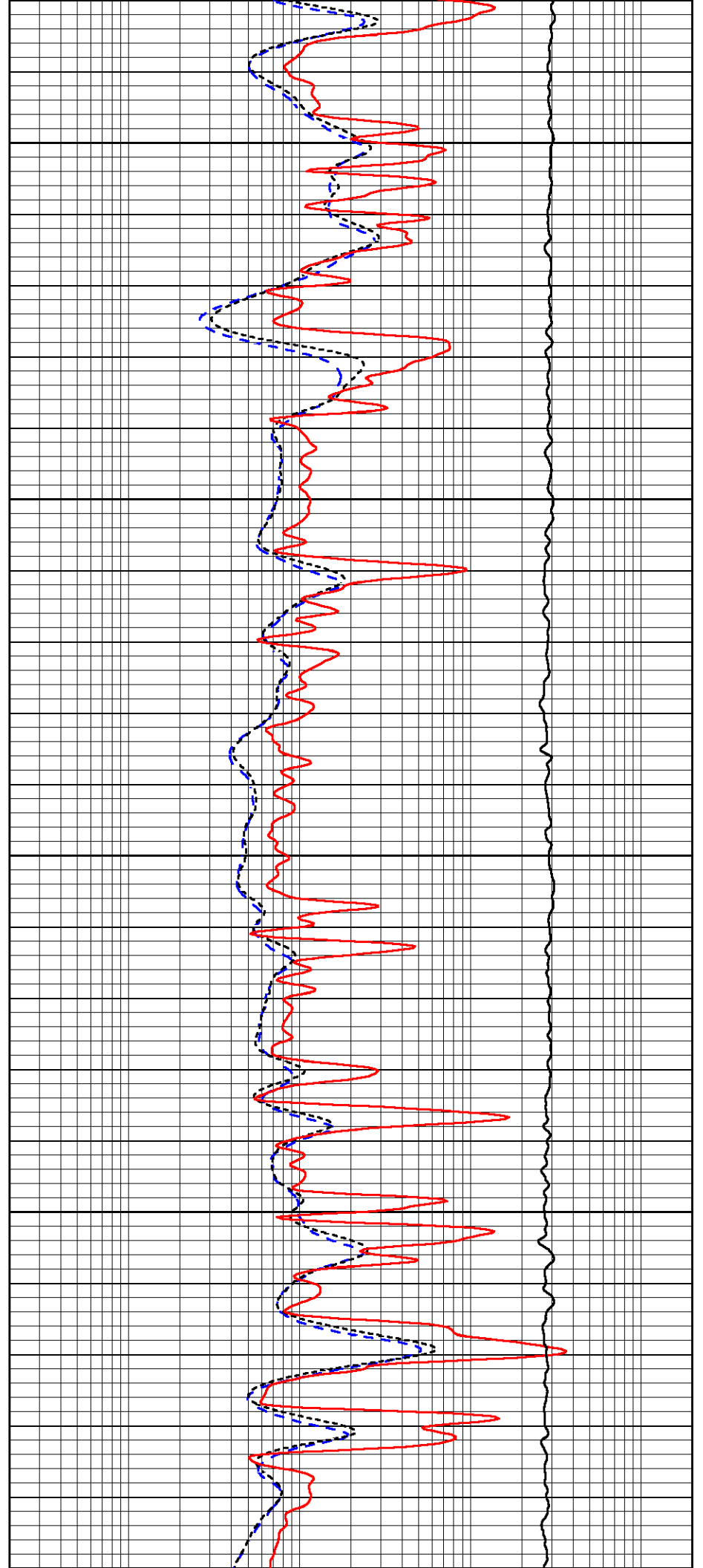
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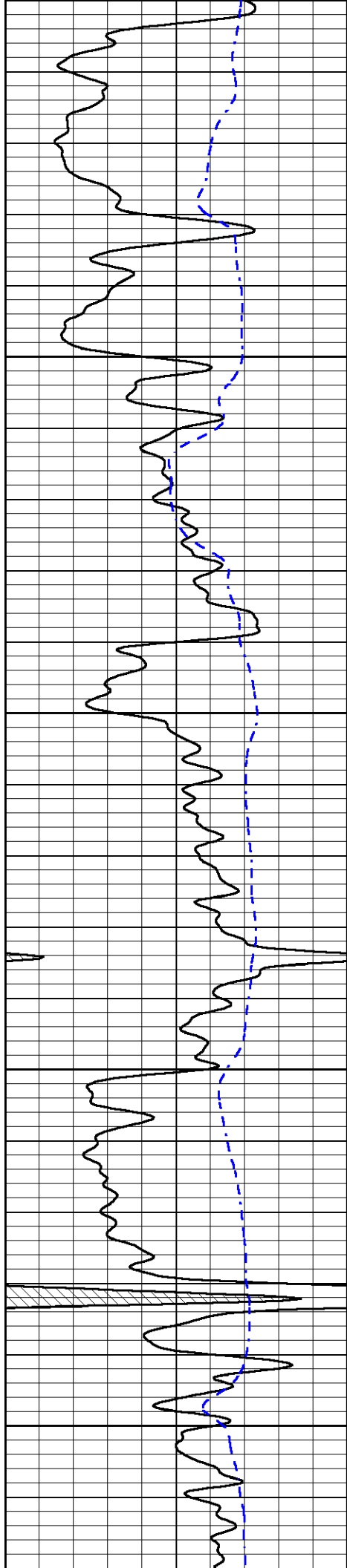
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4100





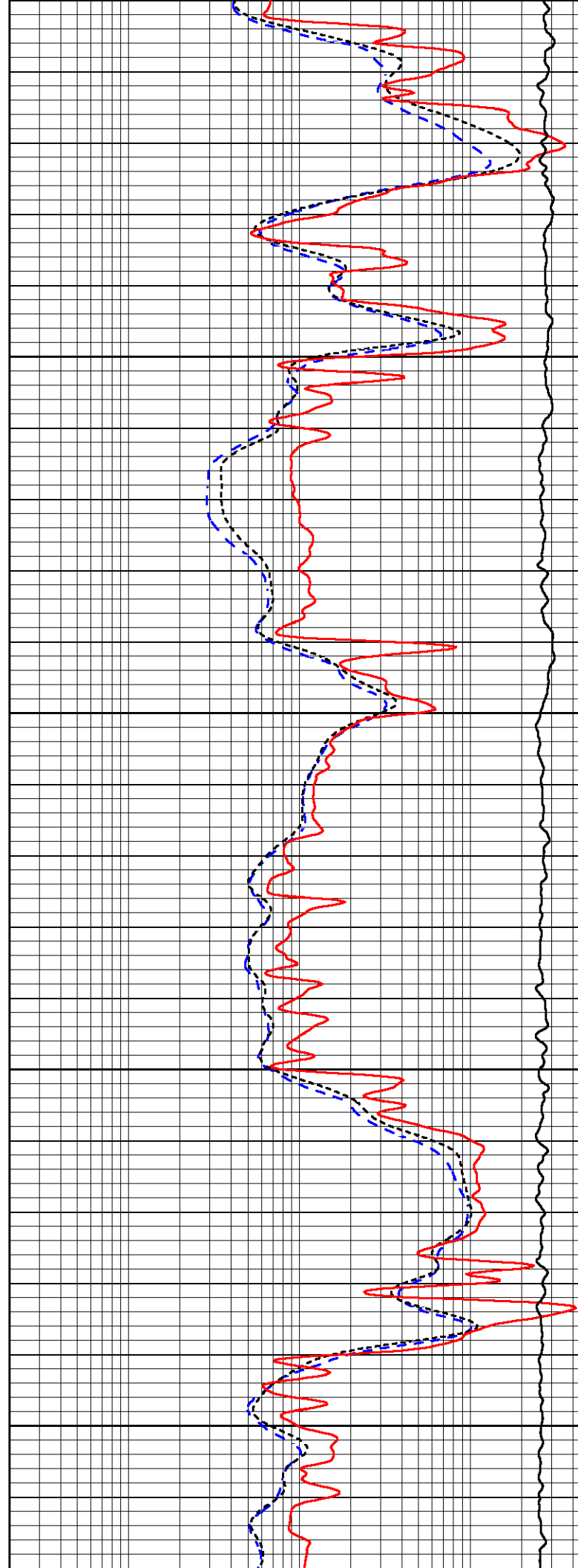
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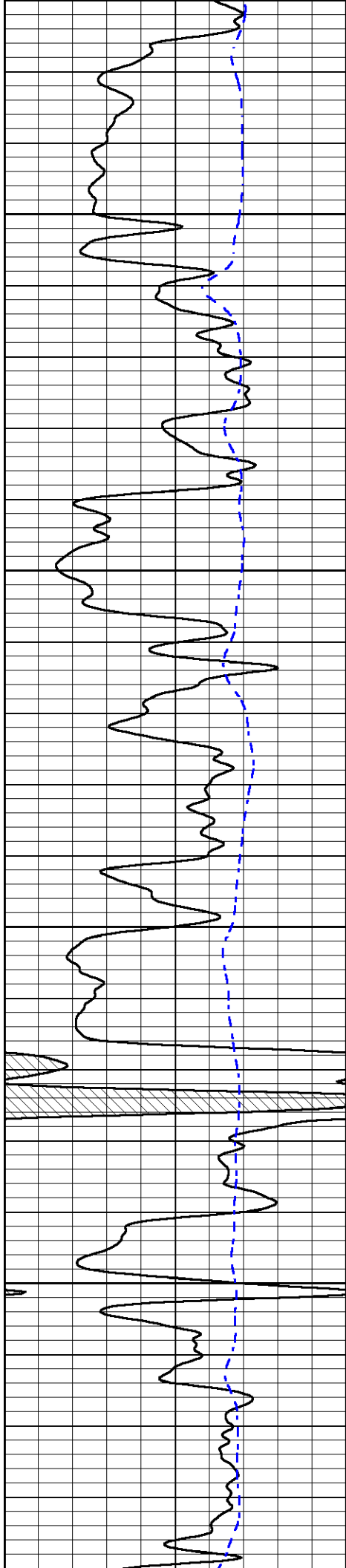
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4200

4250

4300



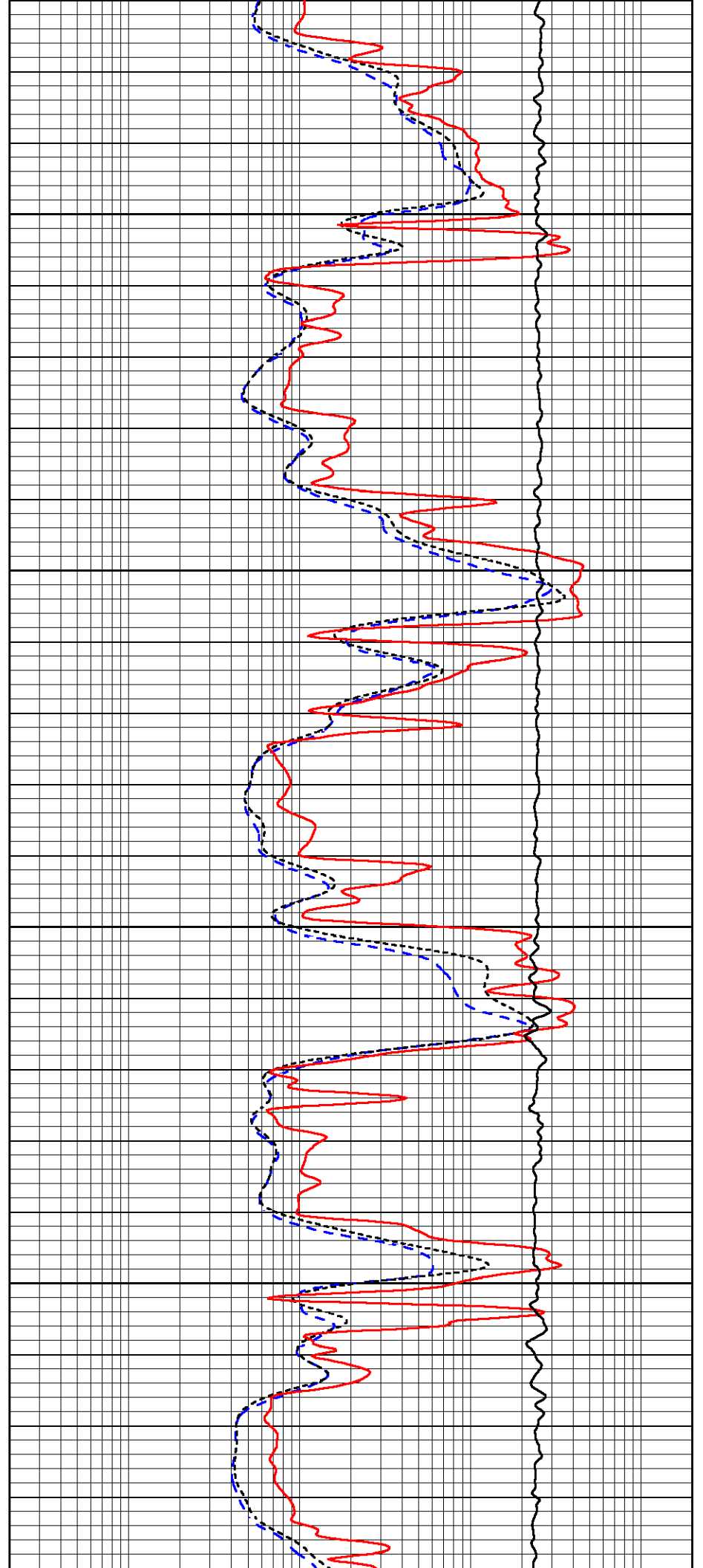


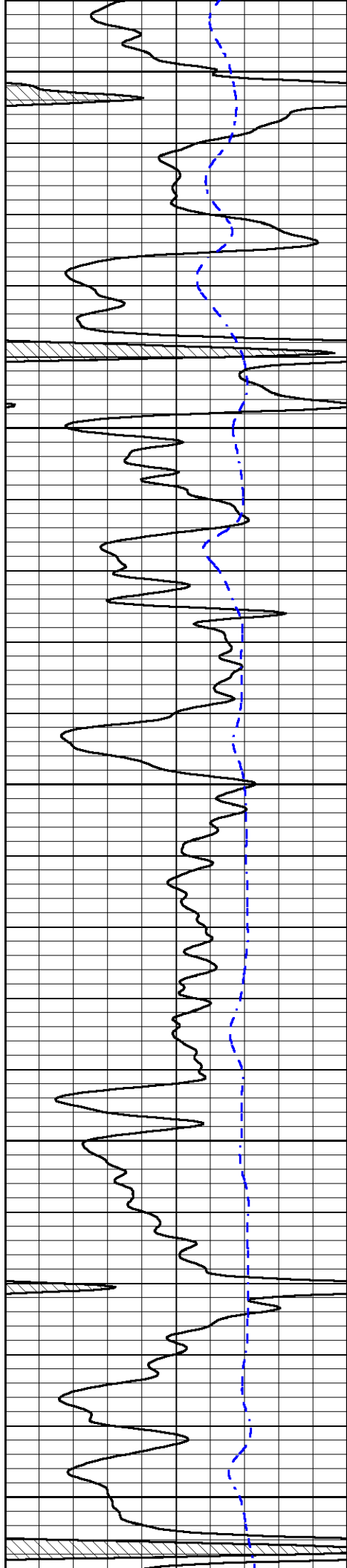
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4500





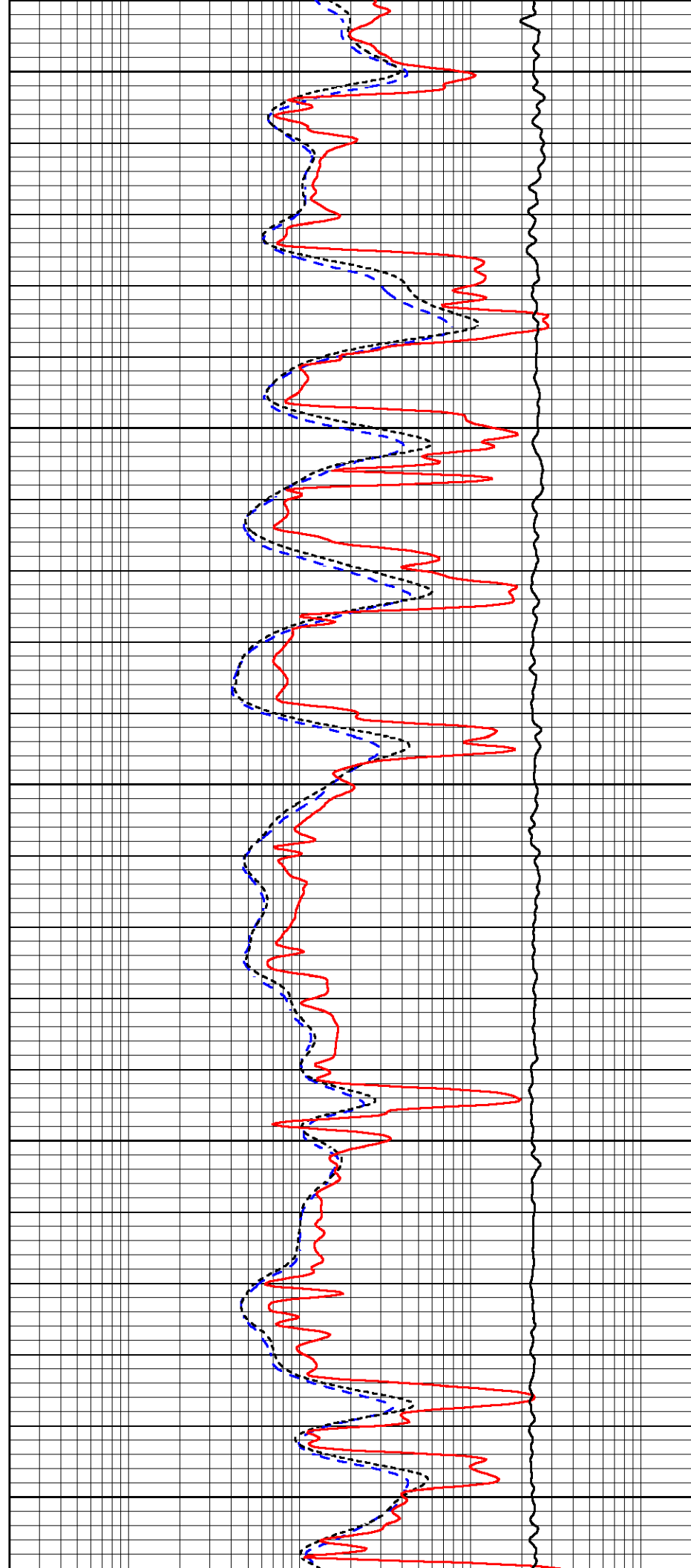
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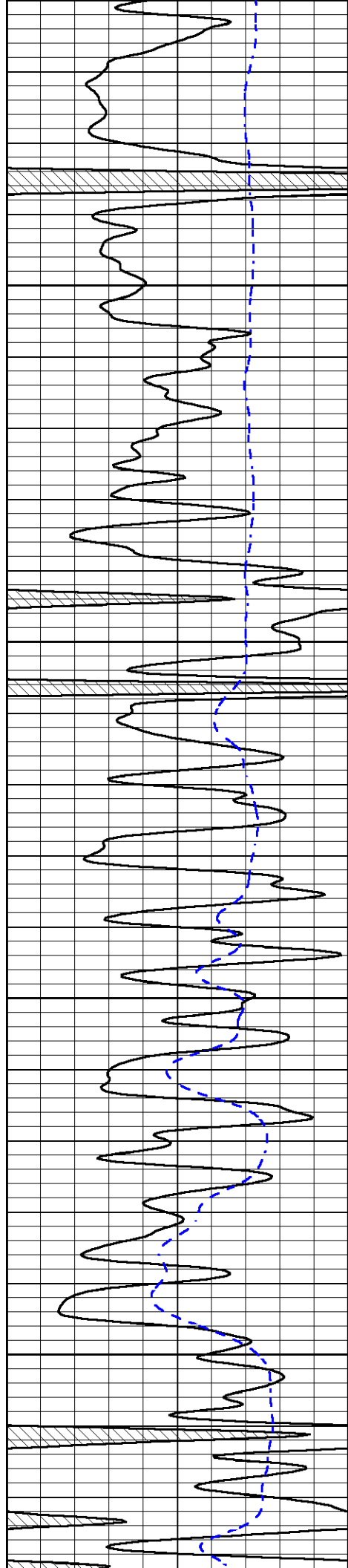
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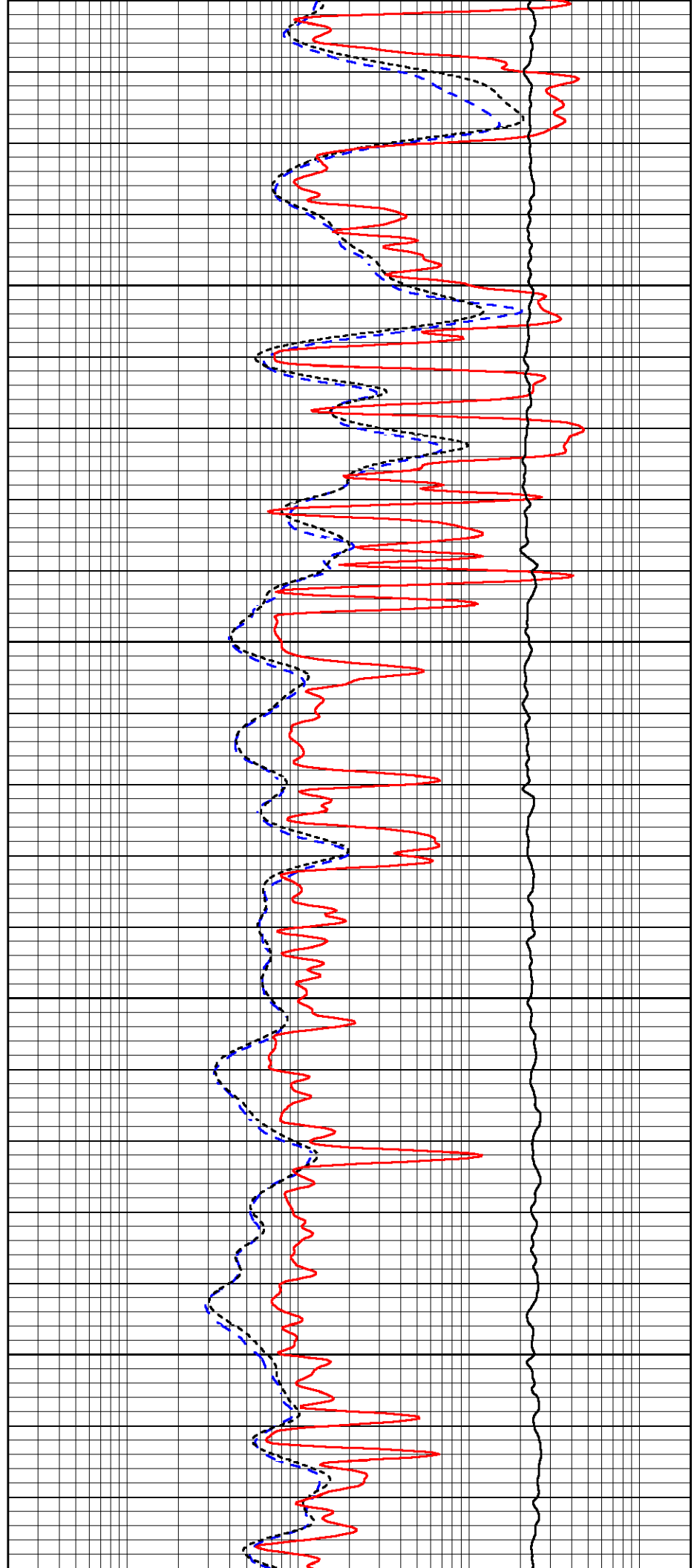


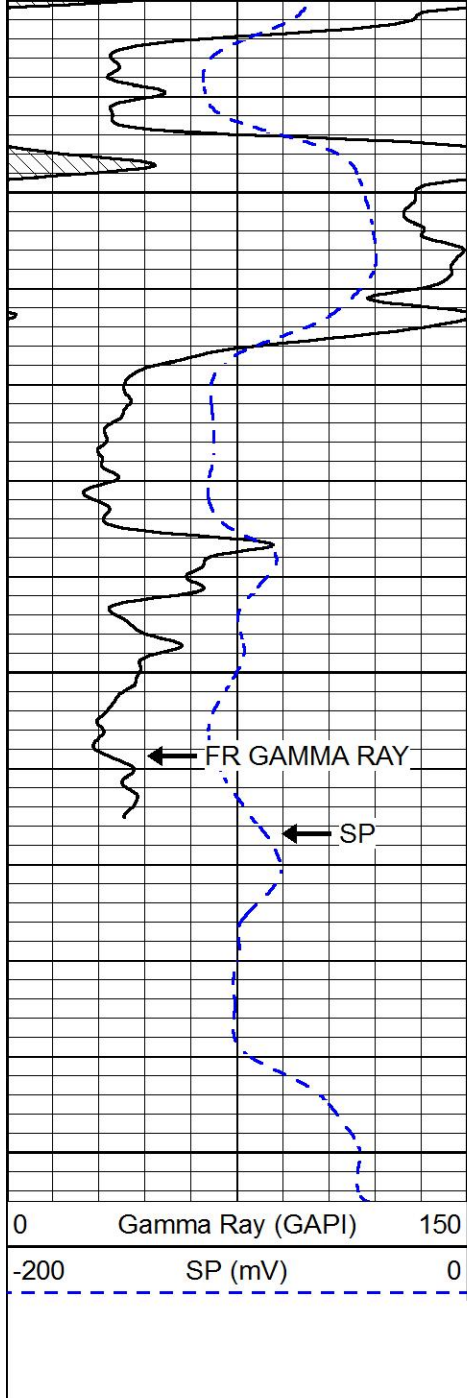
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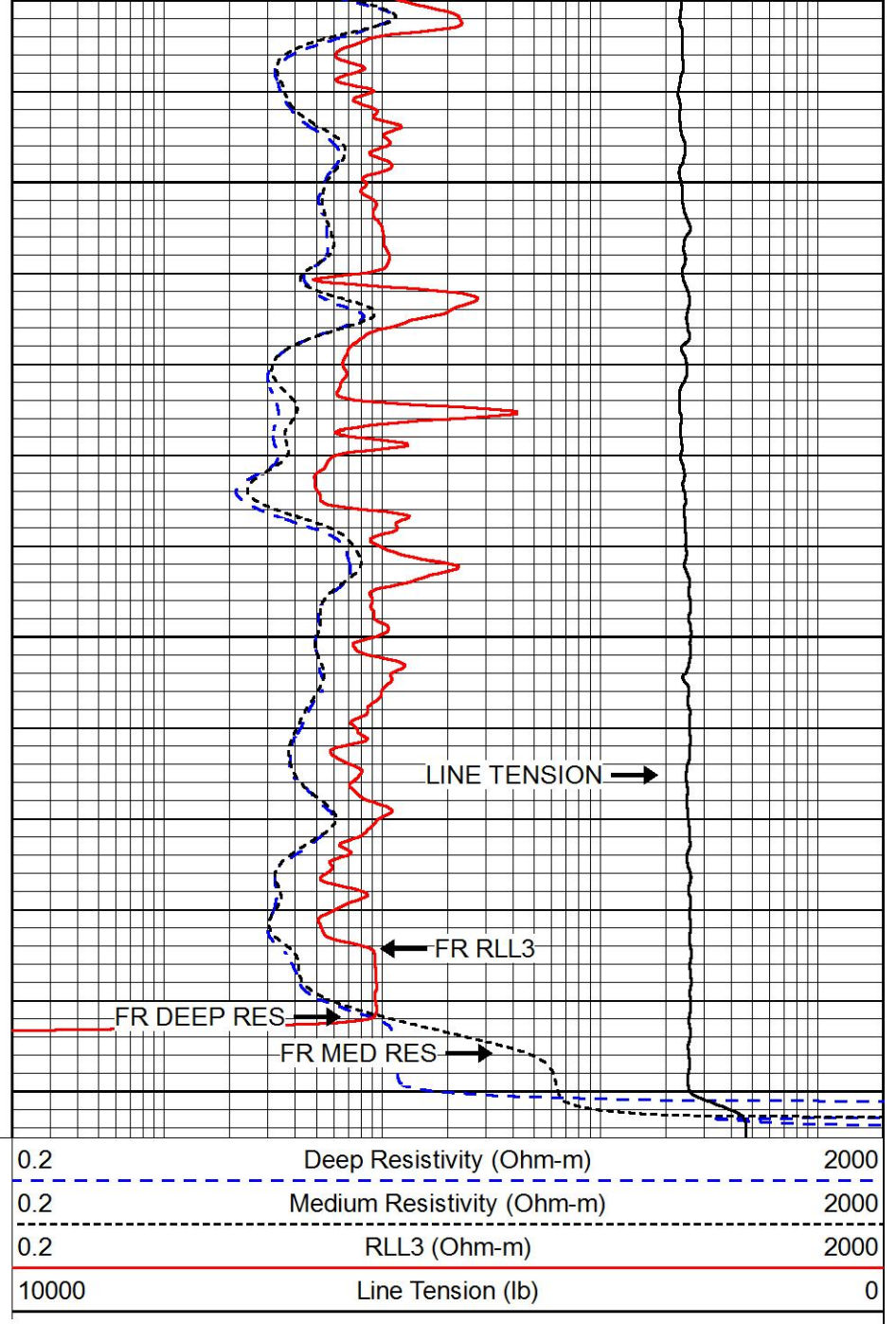




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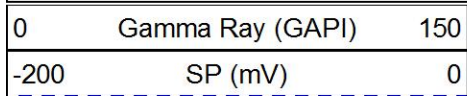
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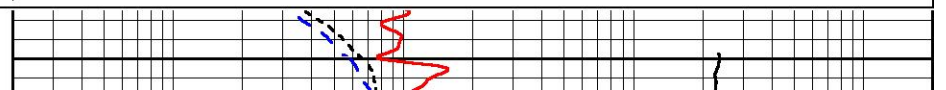
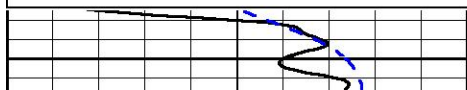
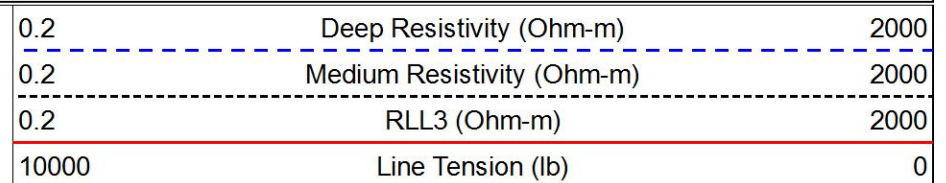


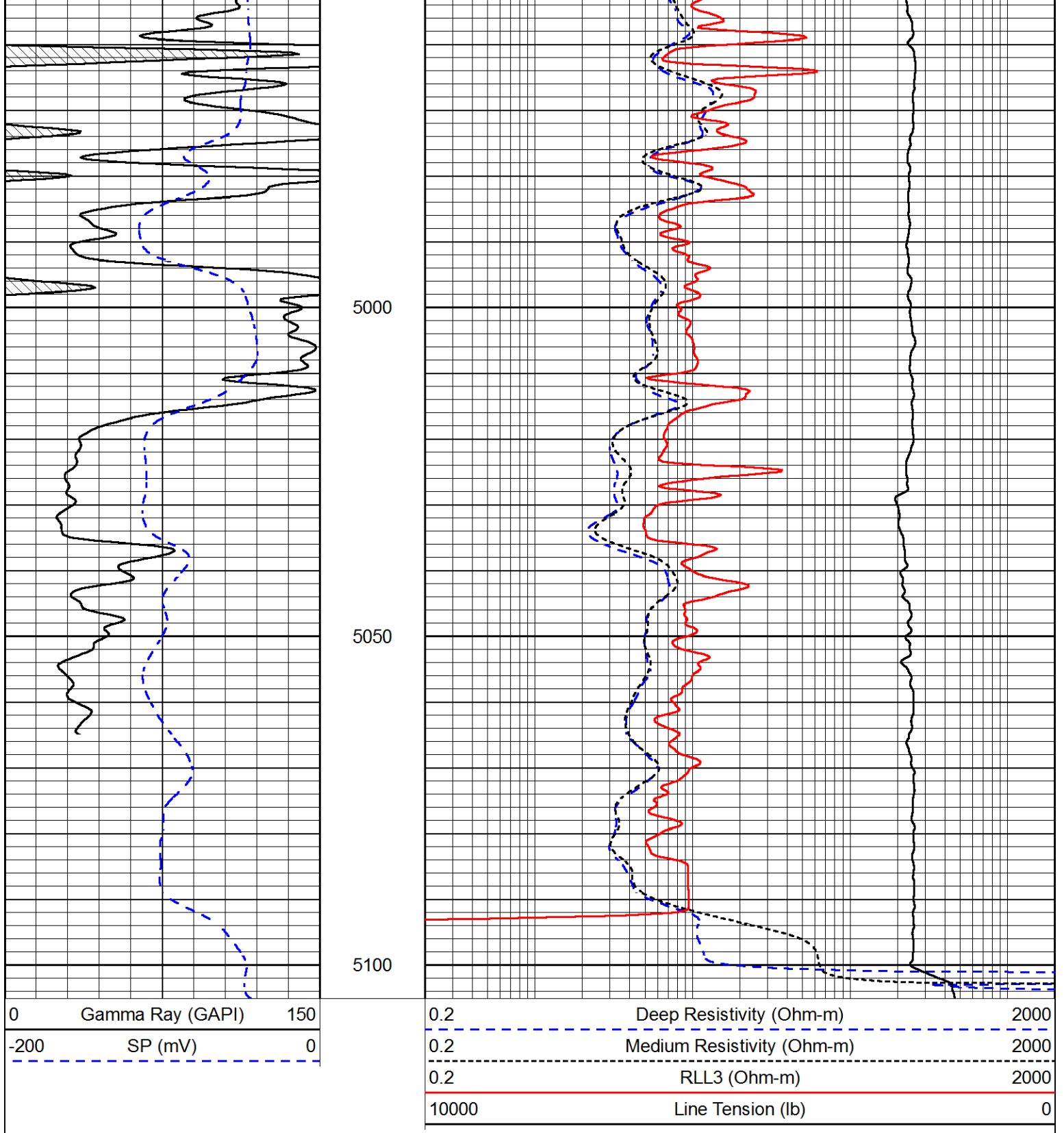
REPEAT SECTION

Database File murfin_culwell g 1-20.db
 Dataset Pathname STKML/pass2.1
 Presentation Format dil
 Dataset Creation Fri Nov 17 02:44:19 2017
 Charted by Depth in Feet scaled 1:240



4950





Calibration Report

Database File murfin_culwell g 1-20.db
Dataset Pathname STKML/pass3.1
Dataset Creation Fri Nov 17 02:45:35 2017

Dual Induction Calibration Report

Serial-Model: PSI 91-M&W
Calibration Performed: Thu Nov 09 00:57:24 2017

Readings

References

Results

Loop:	Air	Loop	Air	Loop		Gain	Offset
Deep	166.796	835.089	0.000	255.800	mmho/m	0.520	-14.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.360	-35.650

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Wed Nov 08 02:36:52 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	34000.0000	-1.6000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	39000.0000	-1.0000
Caliper	1.0001	1.1397	6.5000	18.5000	in	100.0000	-97.3000

Compensated Density Calibration Report

Serial-Model: 90-1031-M&W
 Source / Verifier: 16955B / 2ci
 Master Calibration Performed: Wed Nov 08 23:24:34 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	4903.44	6153.79	cps
Aluminum	2.640	g/cc	934.50	4021.31	cps
Spine Angle = 75.61			Density/Spine Ratio = 0.517		
	Size		Reading		
Small Ring	8.00	in	1.84		
Large Ring	22.00	in	1.46		

Compensated Neutron Calibration Report

Serial Number: 207-MW
 Tool Model: M&W
 Calibration Performed: WED SEP 6 10:30:30 2017

Detector	Readings	Target	Normalization
Short Space	6240.00 cps	1000.00 cps	1.6025
Long Space	460.00 cps	1000.00 cps	1.9500

Gamma Ray Calibration Report

Serial Number: 89
 Tool Model: M&W
 Calibration Performed: Wed Sep 06 19:51:14 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



PIONEER

Pioneer Energy Services

Company	MURFIN DRILLING COMPANY, INC.
Well	CULWELL 'G' #1-20
Field	WILDCAT
County	CHEYENNE
State	KANSAS