



**PIONEER**  
Pioneer Energy Services

## MICRORESISTIVITY LOG

Company MURFIN DRILLING, INC.  
Well RED POLL #10-21  
Field WILDCAT  
County LINCOLN  
State COLORADO

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County LINCOLN State COLORADO

Location: API #: 05-073-06720

2200' FSL & 1500' FEL

SEC 21 TWP 10S RGE 56W

Permanent Datum GROUND LEVEL Elevation 5492'  
Log Measured From KELLY BUSHING  
Drilling Measured From KELLY BUSHING

Other Services  
CNL/CDL  
DIL/BHCS  
Elevation  
K.B. 5505'  
D.F. N/A  
G.L. 5492'

Date 9/1/2017

Run Number ONE

Depth Driller 8500'

Depth Logger 8499'

Bottom Logged Interval 8498'

Top Log Interval 4400'

Casing Driller 8.625" @ 476'

Casing Logger 470'

Bit Size 7.875"

Type Fluid in Hole CHEMICAL

Salinity, ppm CL 500

Density / Viscosity 9.3 52

pH / Fluid Loss 9.3 6.2

Source of Sample FLOWLINE

Rm @ Meas. Temp 0.90 @ 80

Rmt @ Meas. Temp 0.68 @ 80

Rmc @ Meas. Temp 1.22 @ 80

Source of Rmf / Rmc CHARTS

Rm @ BHT 0.45 @ N/A

Operating Rig Time 7 HOURS

Max Rec. Temp. F N/A

Equipment Number 91

Location HAYS

Recorded By D. SCHMIDT

Witnessed By WES HANSEN

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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.

LIMON, COLORADO,  
SOUTH ON HWY 71 TO 2Z RD, 1 EAST, 1/2 SOUTH,  
EAST INTO

NO REPEAT DUE TO HOLE CONDITIONS

Log Measured From: KELLY BUSHING 13 Ft. Above Permanent Datum

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

Your Pioneer Energy Services Crew


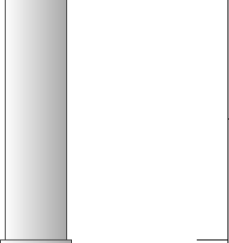
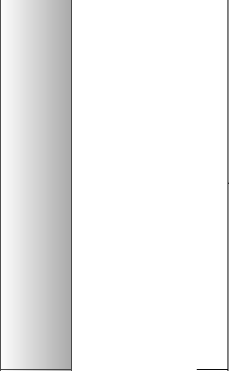
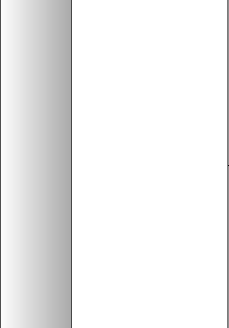
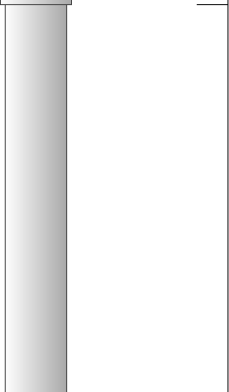
Engineer: D. SCHMIDT  
Operator:  
Operator:  
Operator:

This Log Record Was Witnessed By

Primary Witness: WES HANSEN  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	0	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	80	0	5.5	0	8499	100	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					

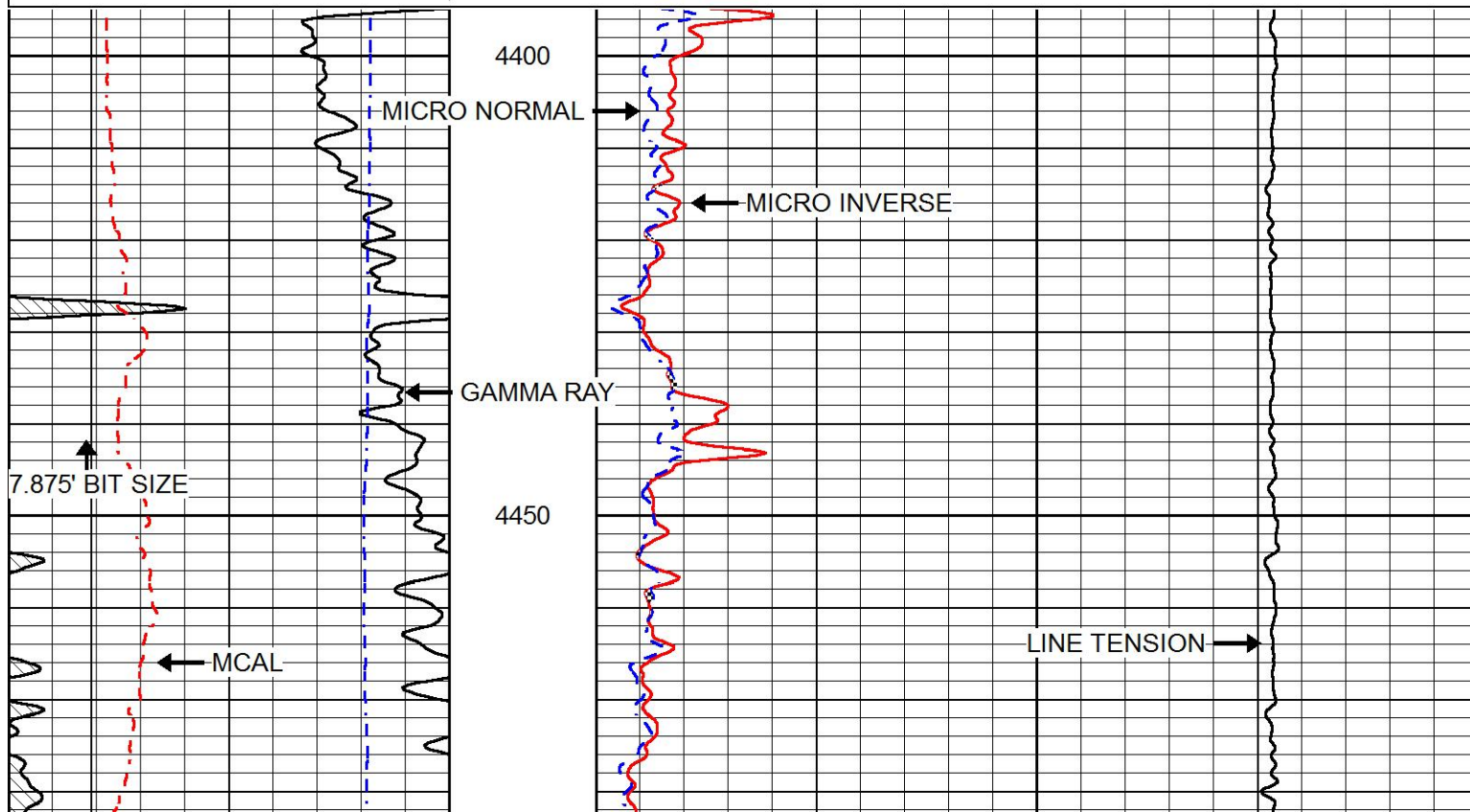
			DIL-M&W (PSI 91)	18.50	3.50	220.00
CILD	8.00					
CILM	4.70					
SP	0.20					
Dataset: murfin_red poll_10-21.db: field/well/STKML/pass5.8 Total length: 43.08 ft Total weight: 685.00 lb O.D.: 4.00 in						

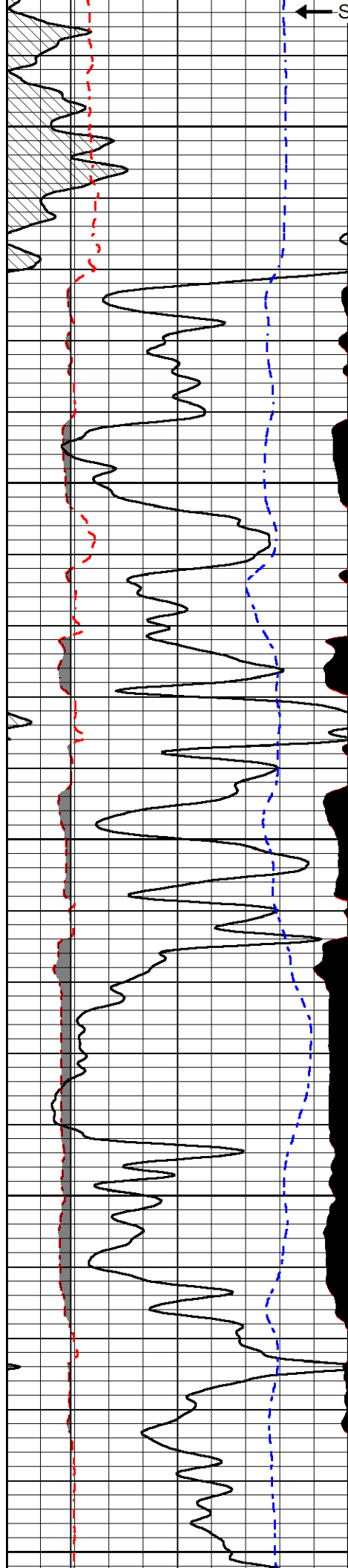


# MAIN PASS

Database File	murfin_red poll_10-21.db
Dataset Pathname	STKML/pass6.1
Presentation Format	micro
Dataset Creation	Sat Sep 02 01:41:11 2017
Charted by	Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150	0	Micro Inverse 1 X 1 (Ohm-m)	40
6	MCAL (in)	16	0	Micro Normal 2" (Ohm-m)	40
2.875	mcals (in)	7.875	10000	Line Weight (lb)	0
6	Bit Size (in)	16			
-200	SP (mV)	0			





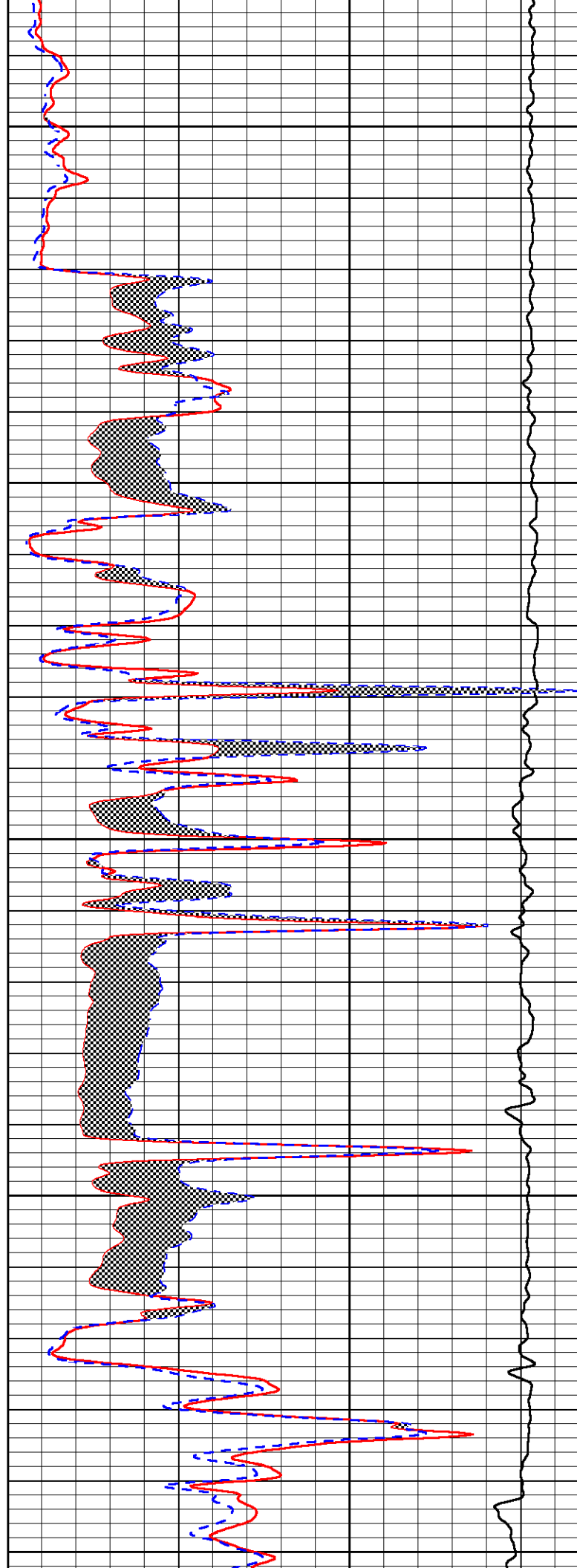
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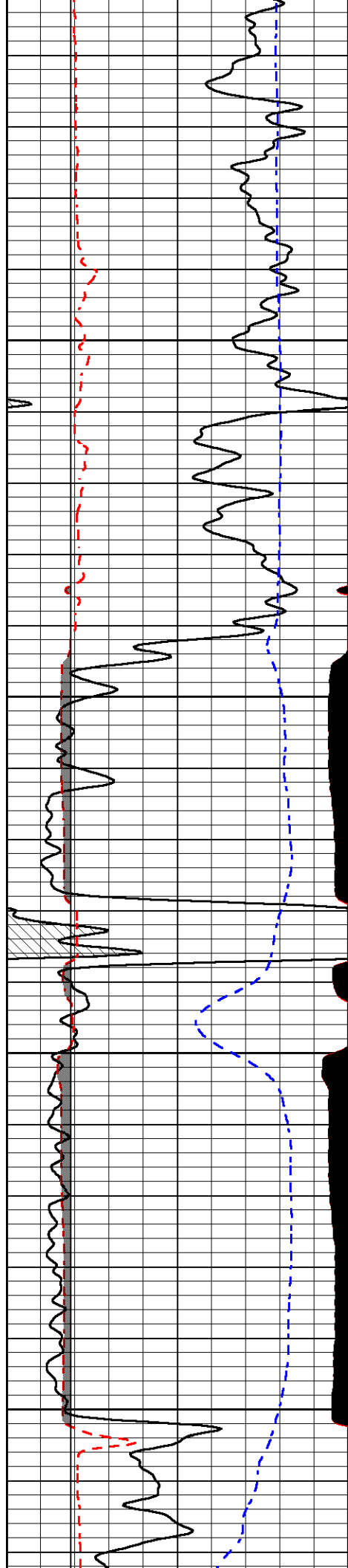
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4600

4650

4700



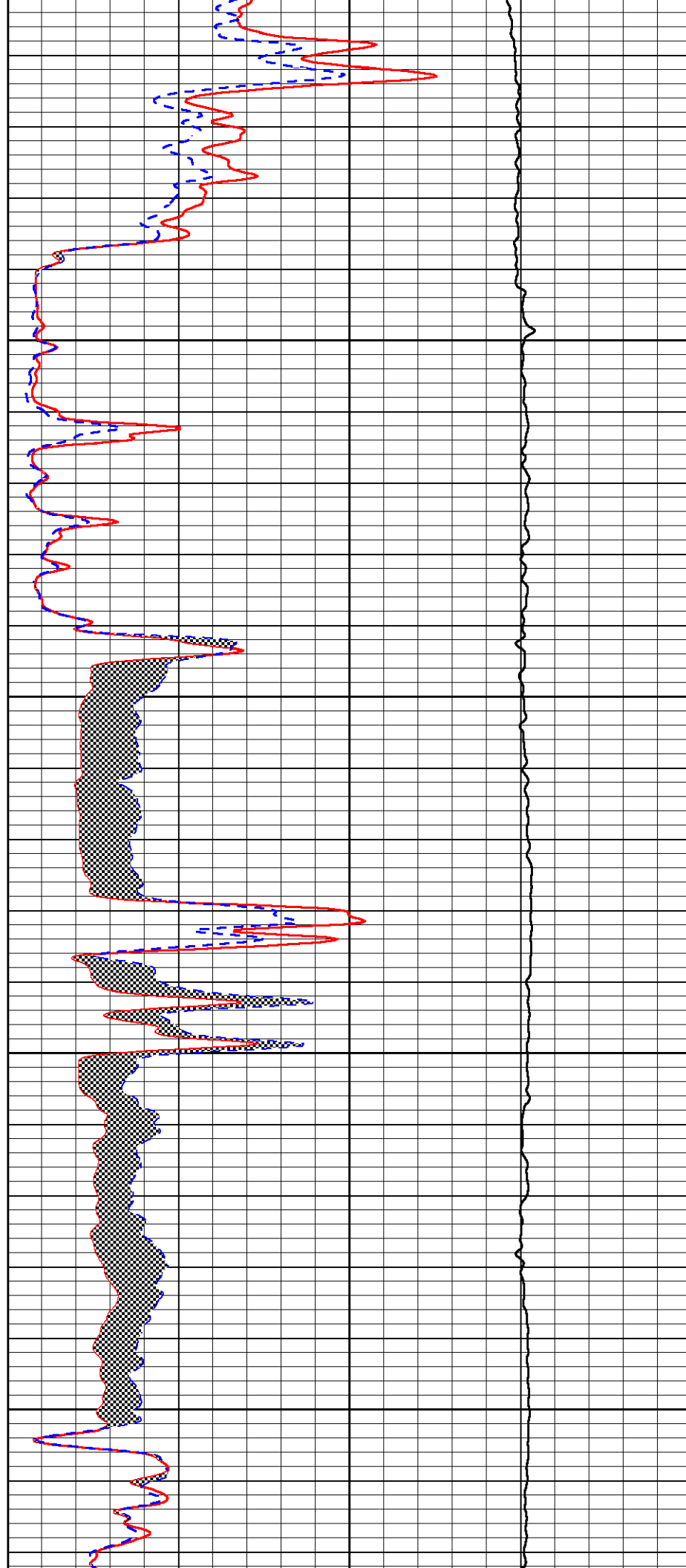


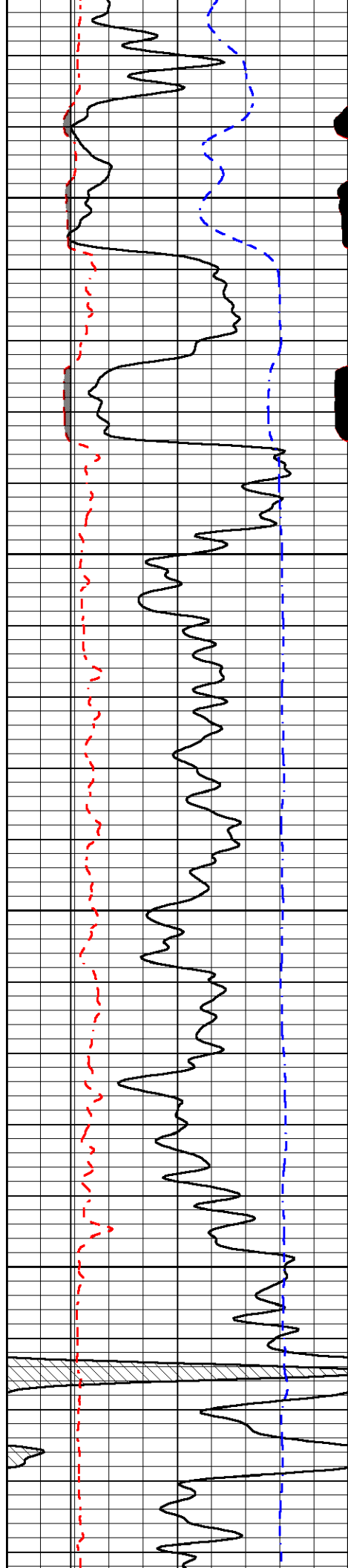
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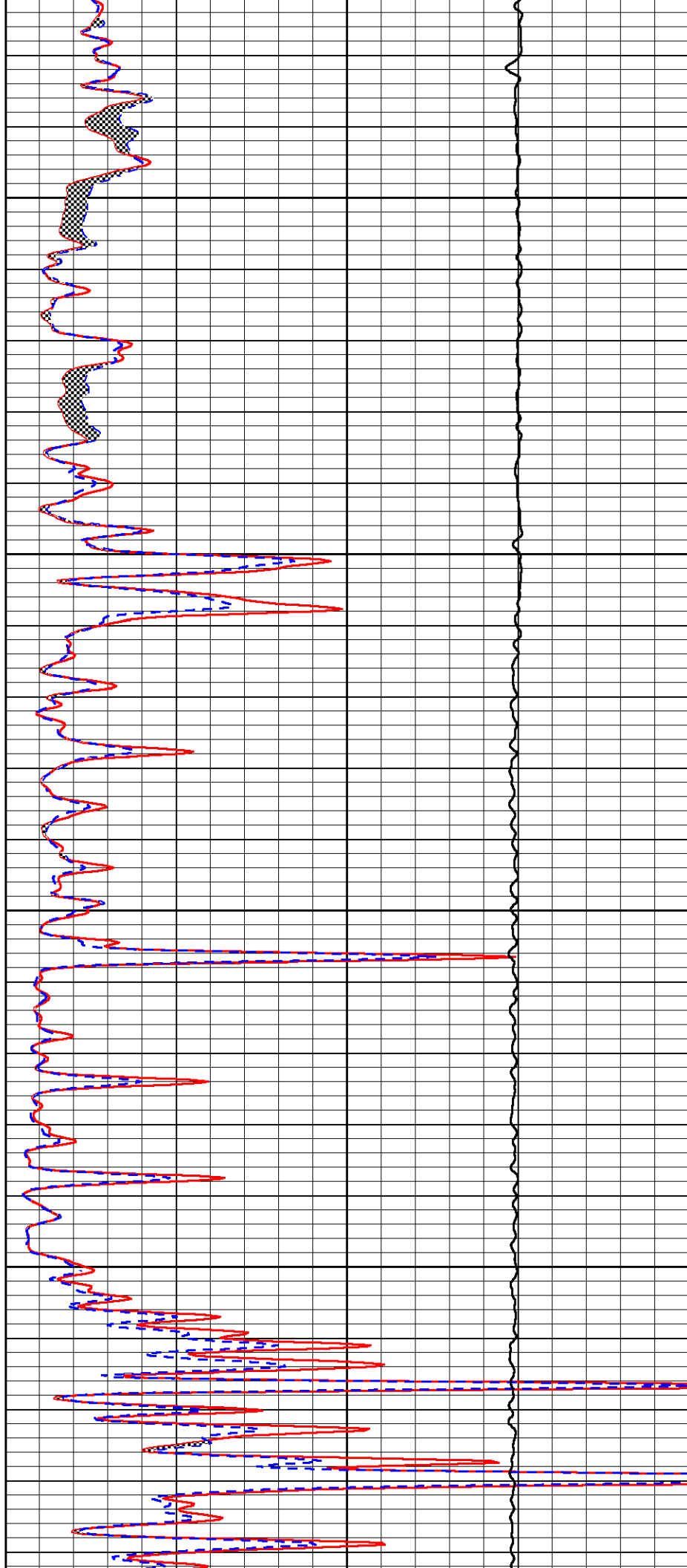


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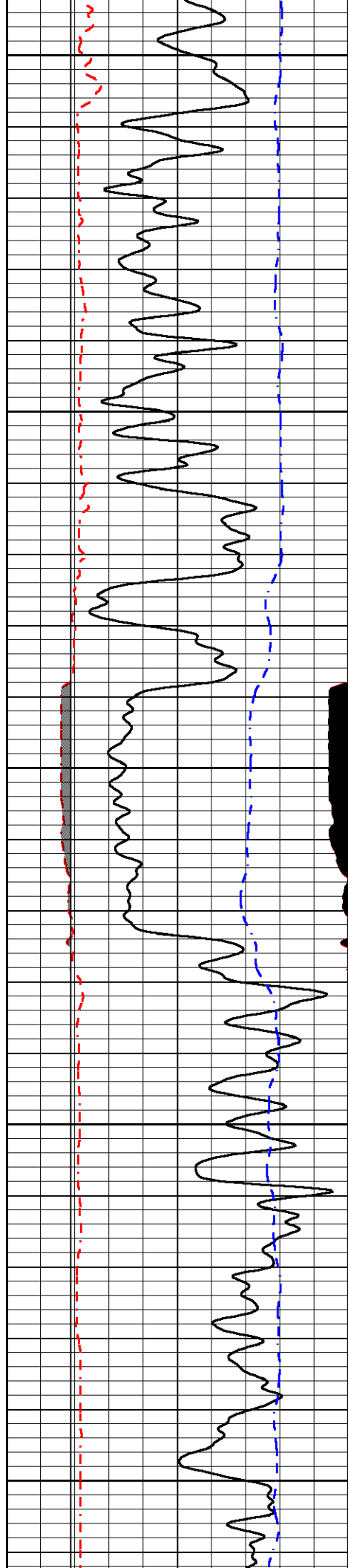
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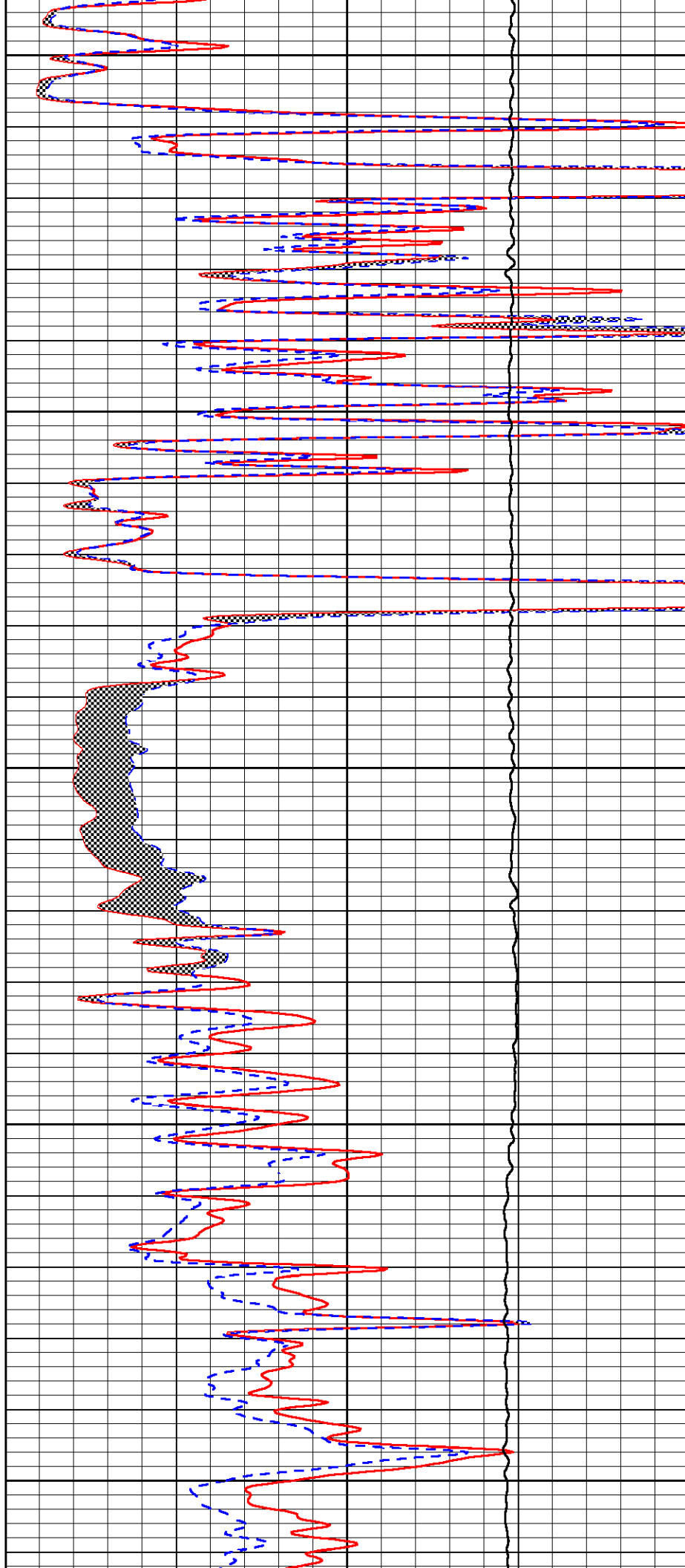
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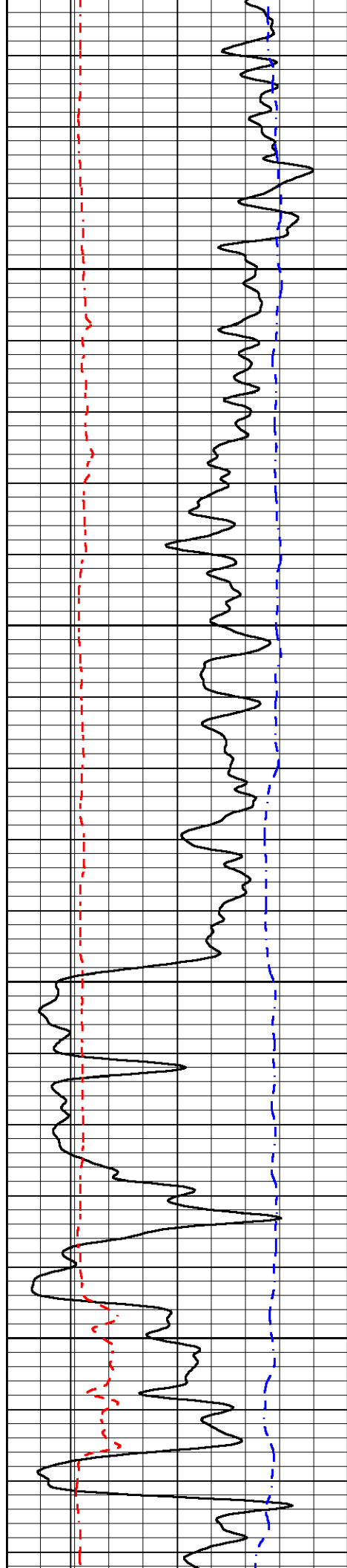
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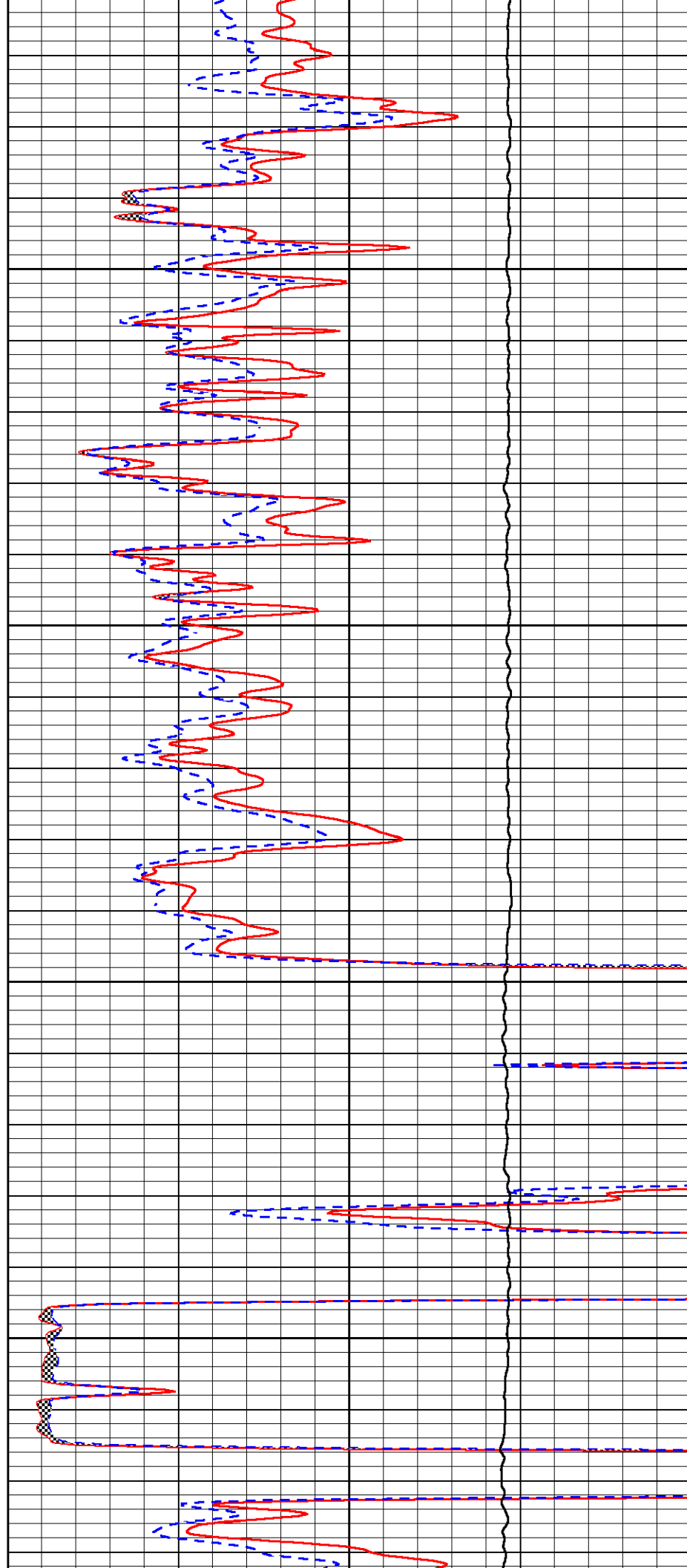


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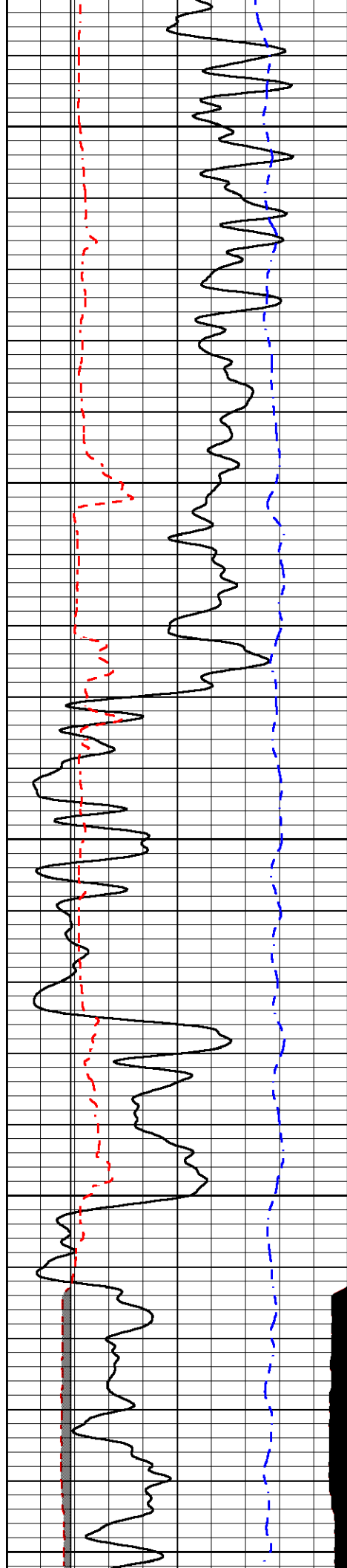
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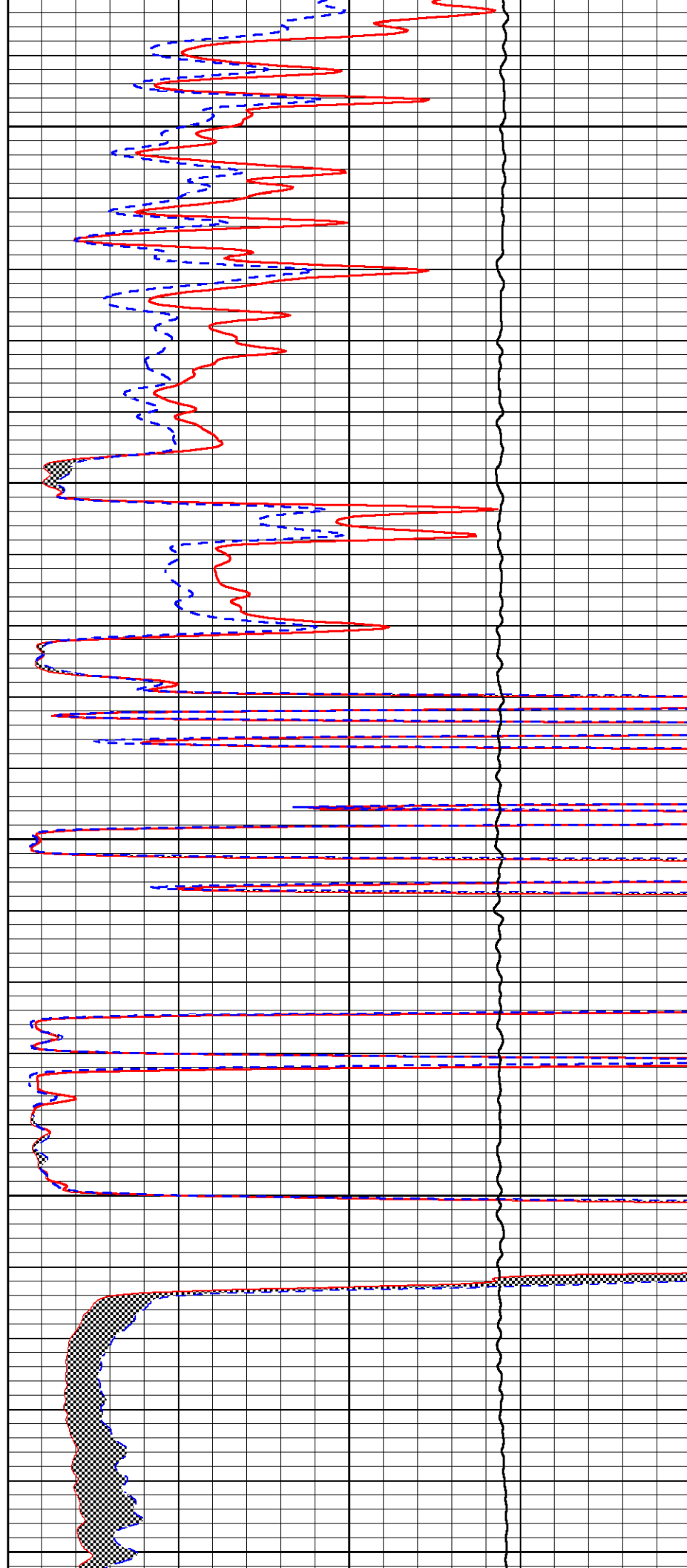
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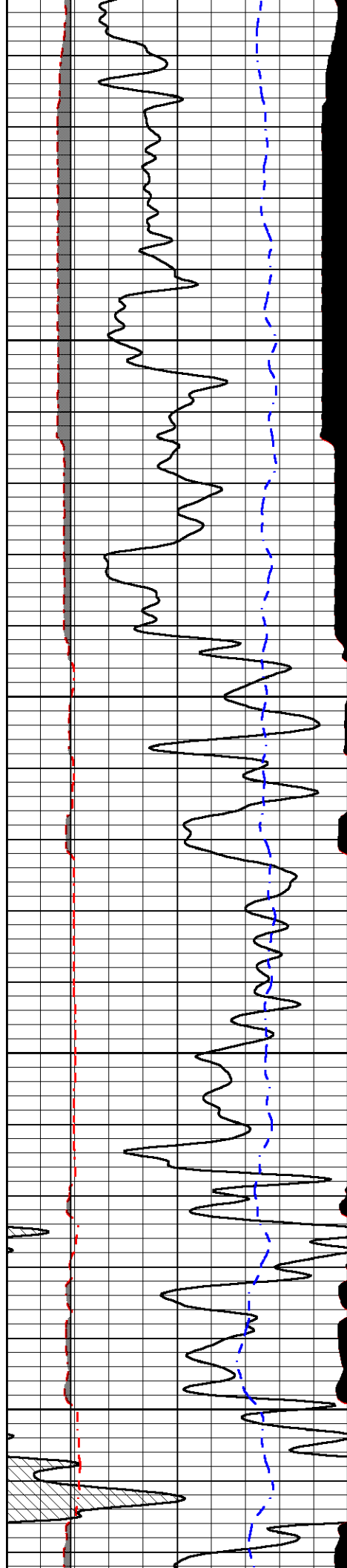
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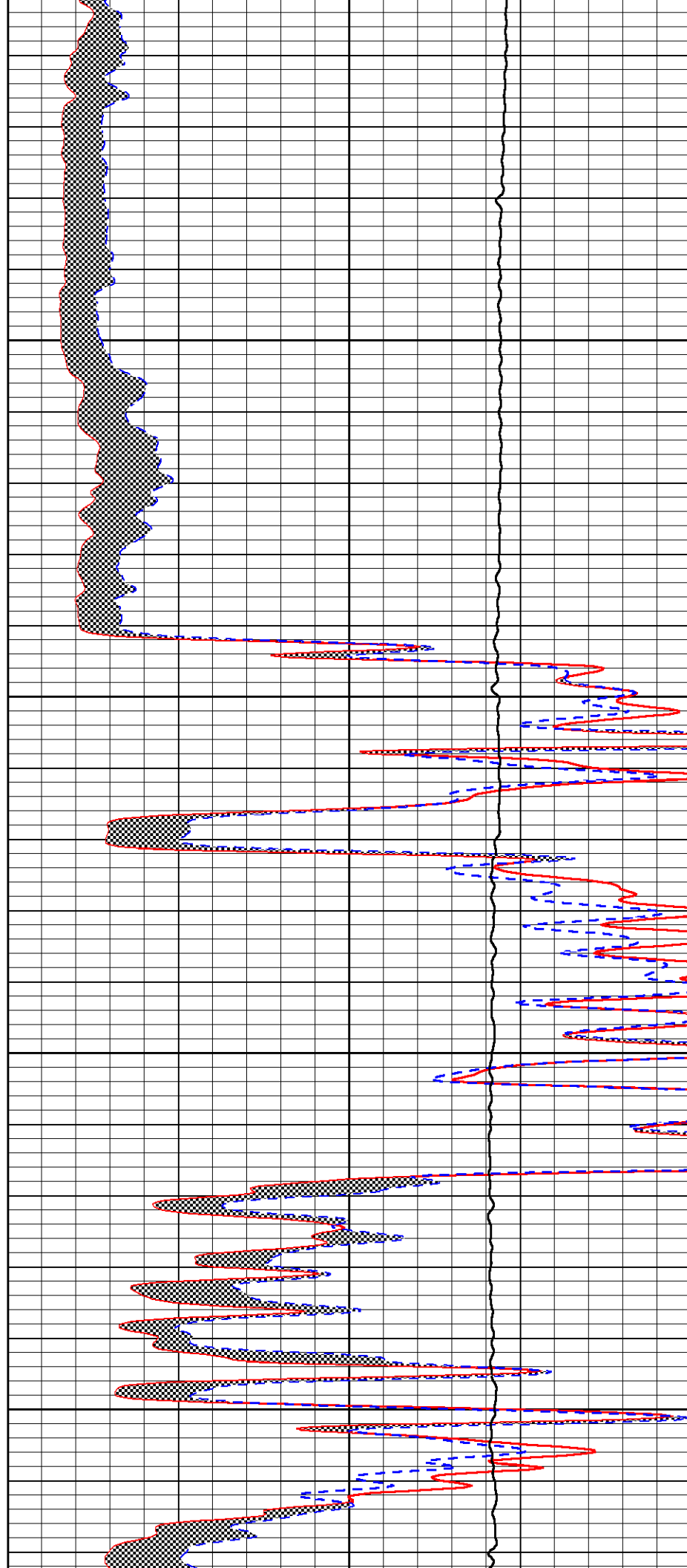


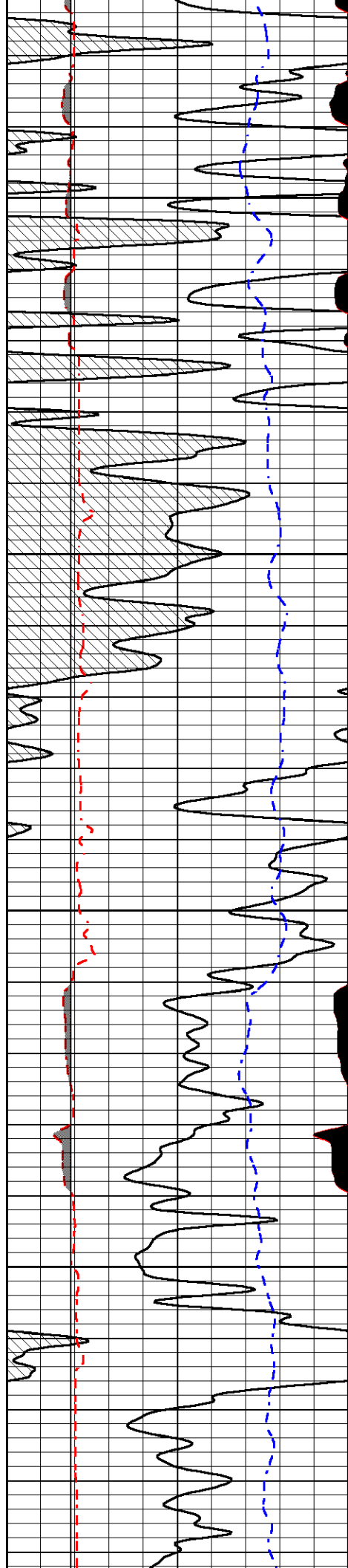
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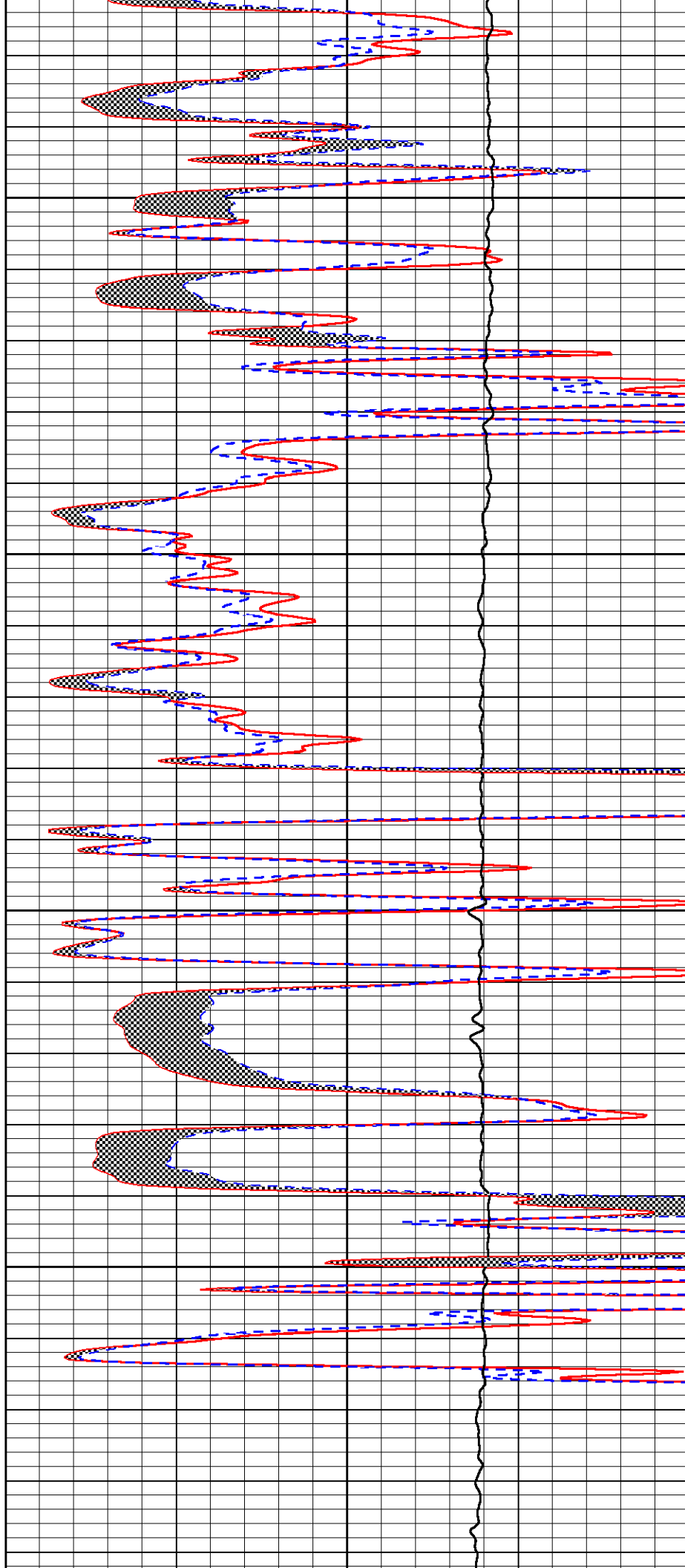


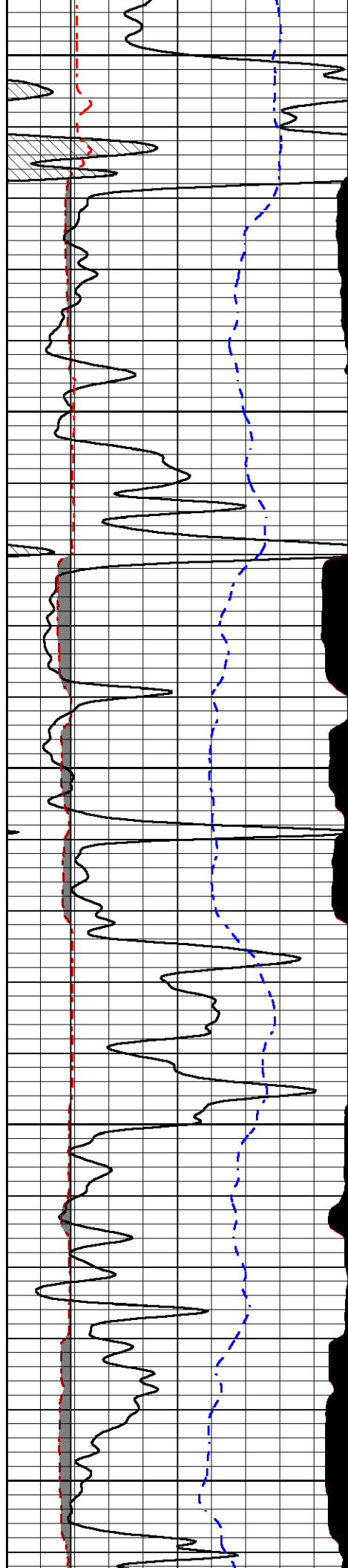
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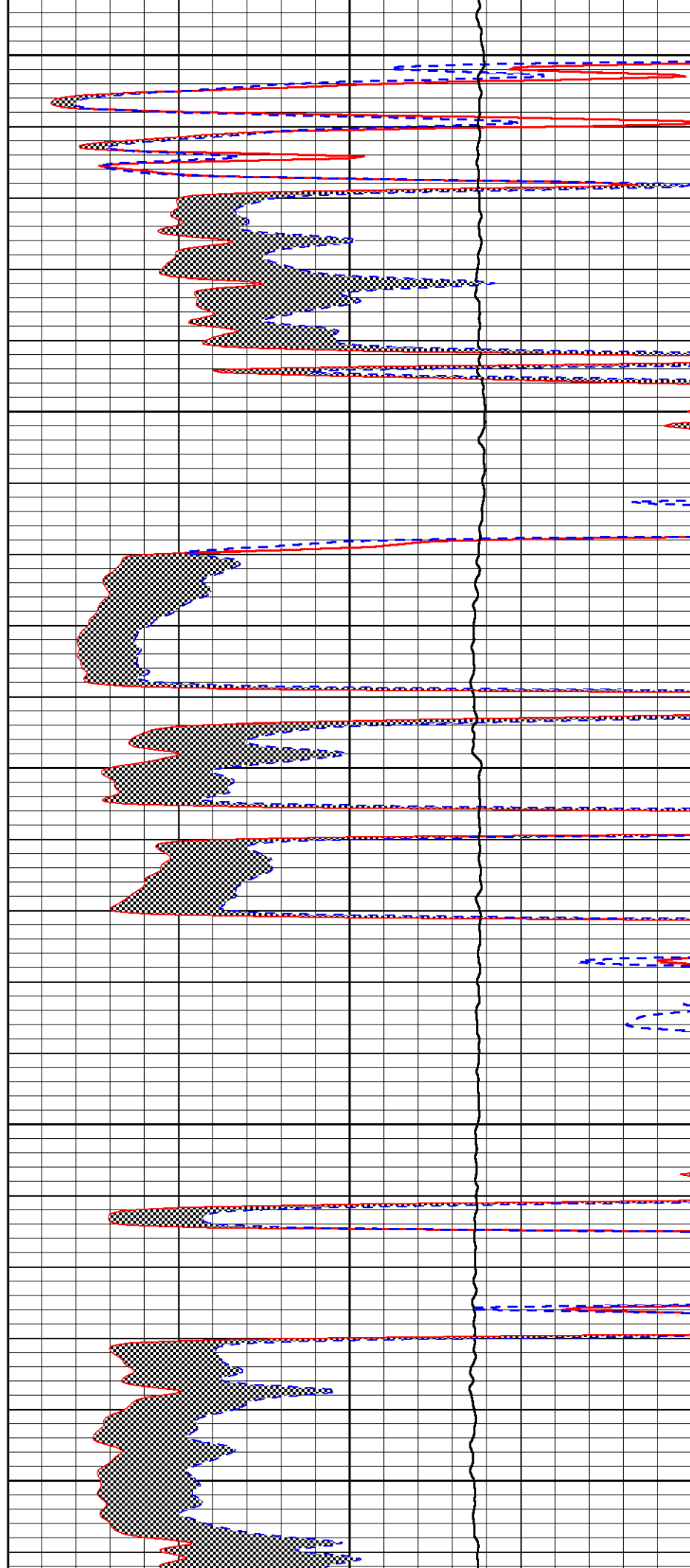
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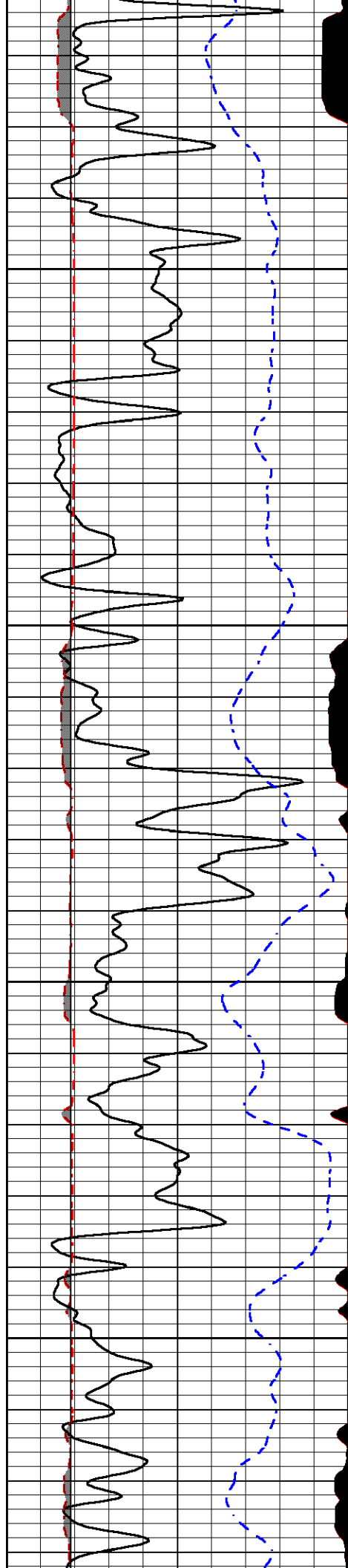
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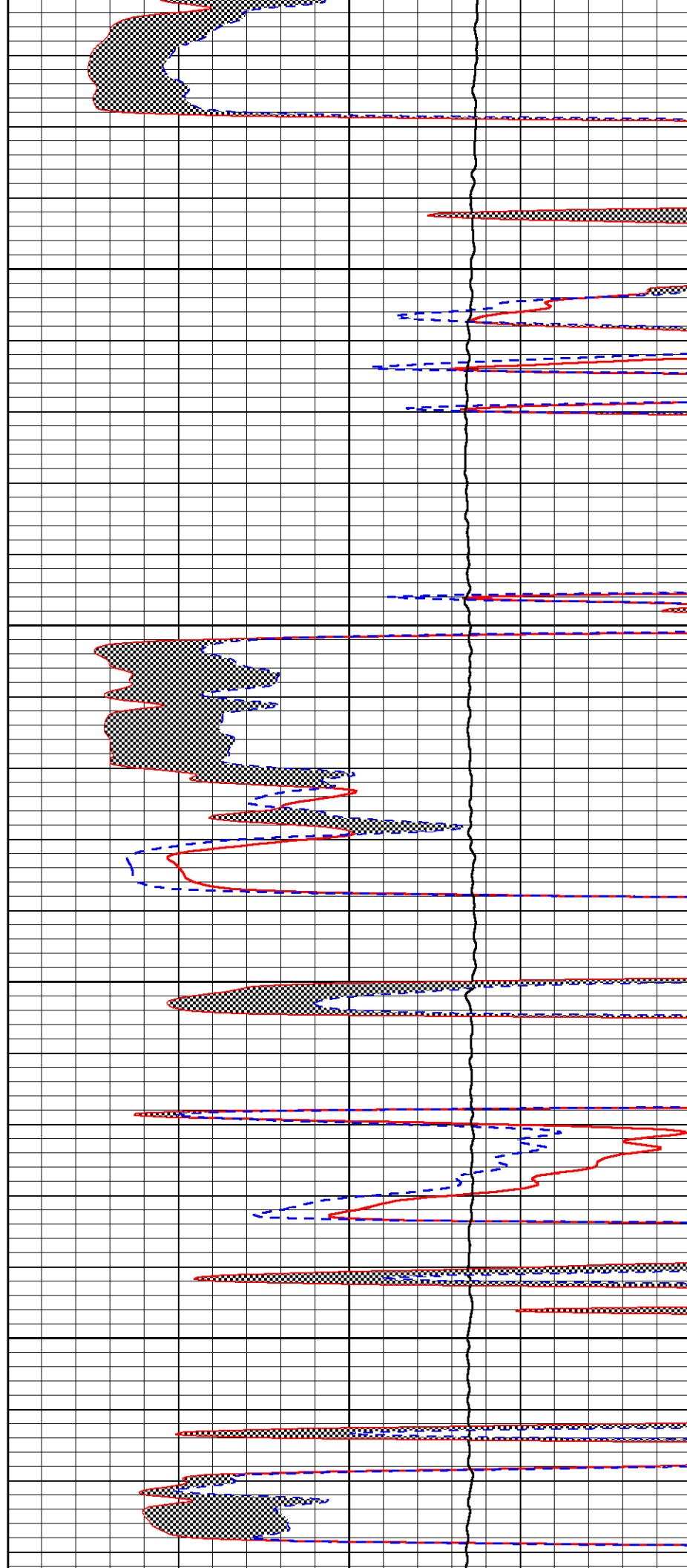


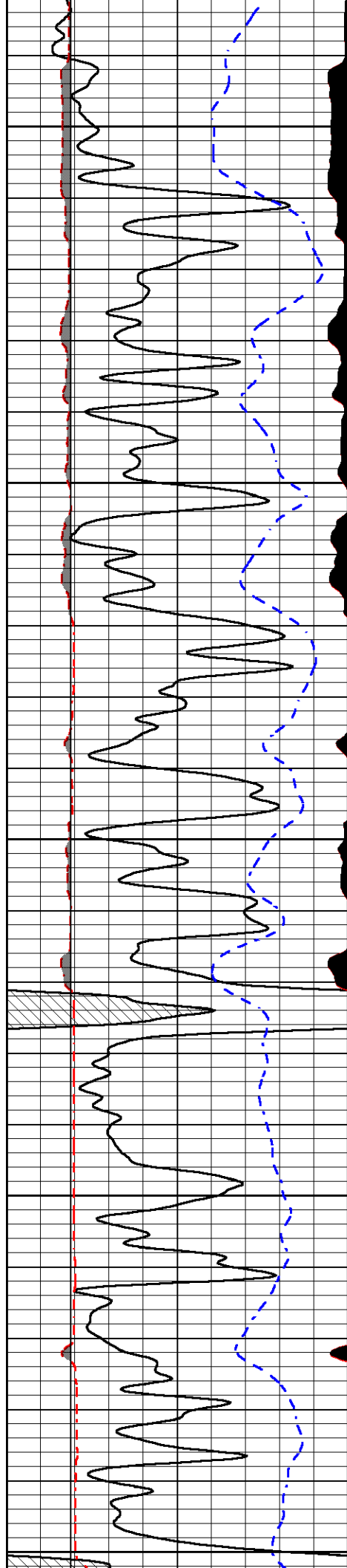
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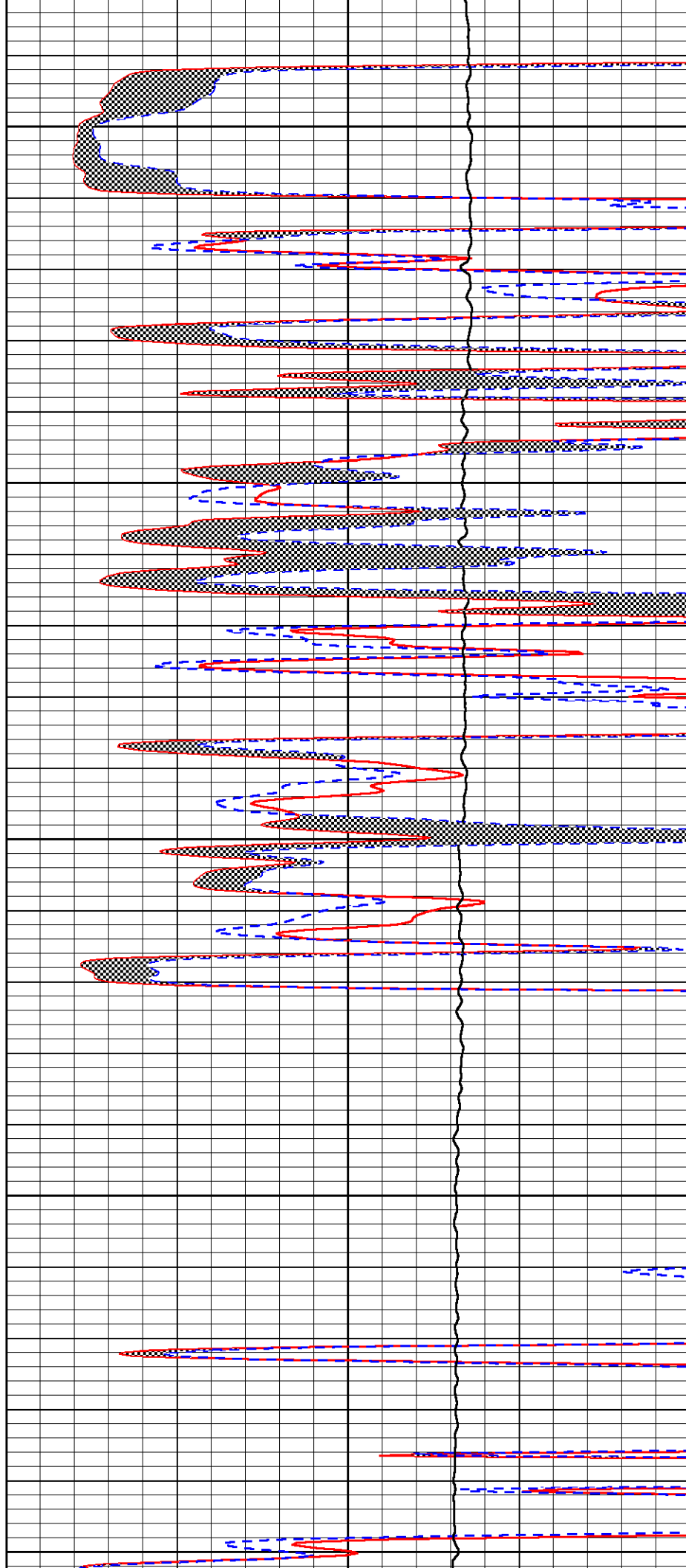
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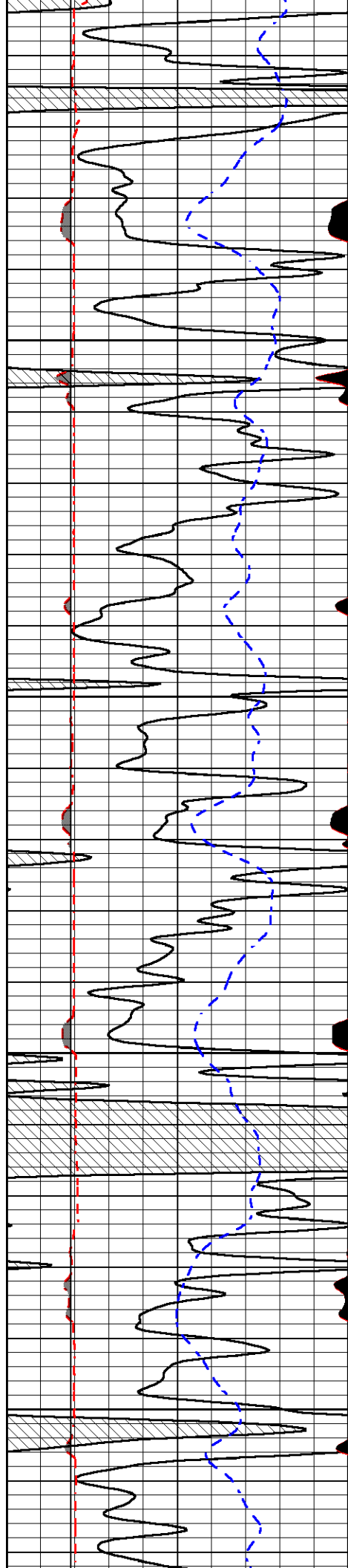
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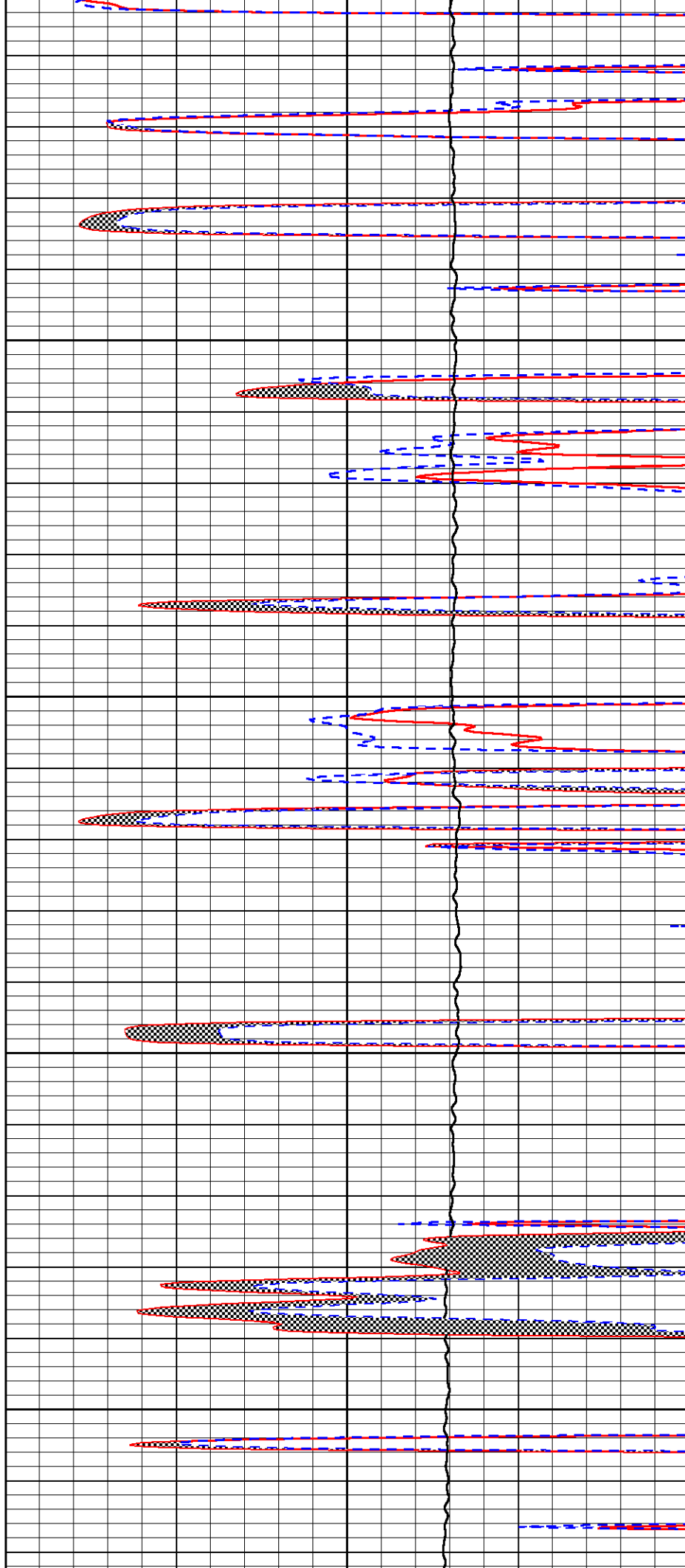


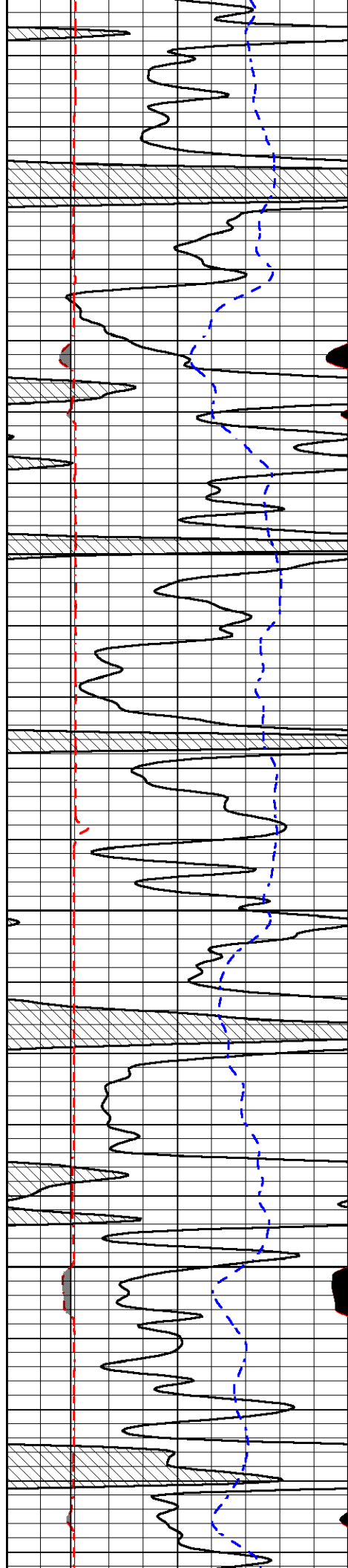
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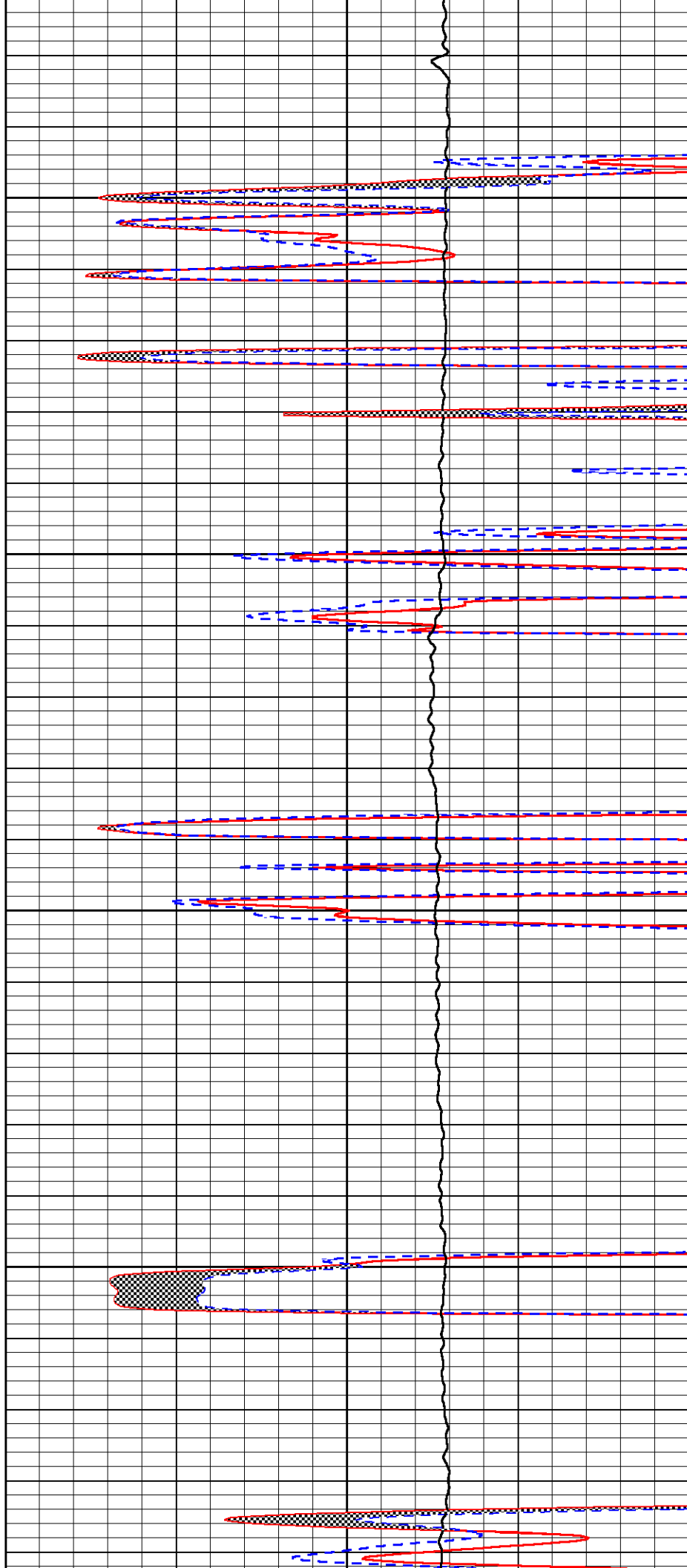


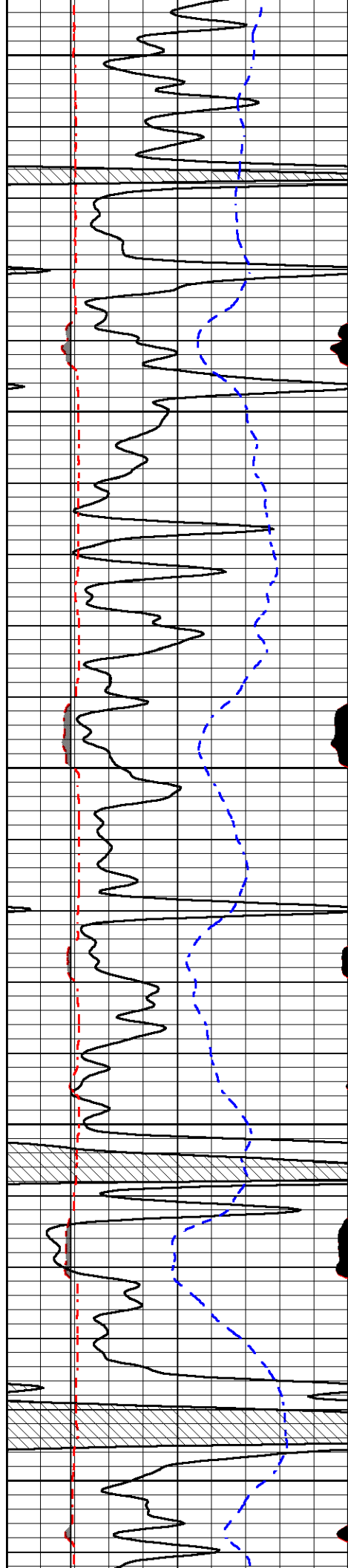
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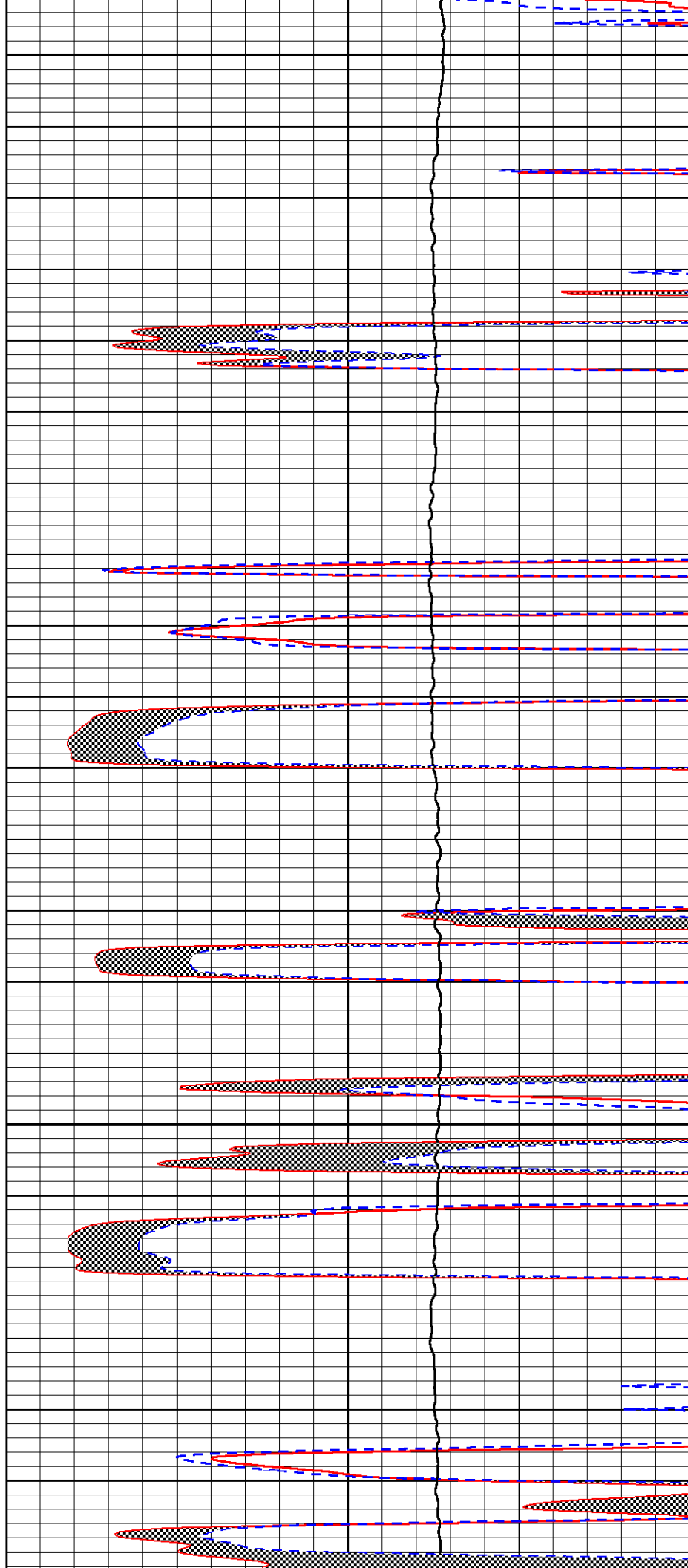
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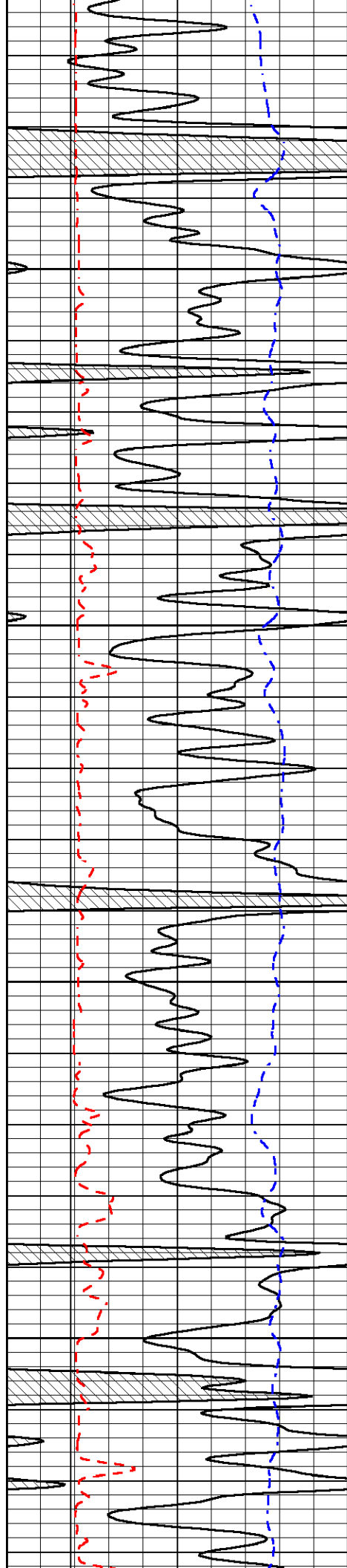
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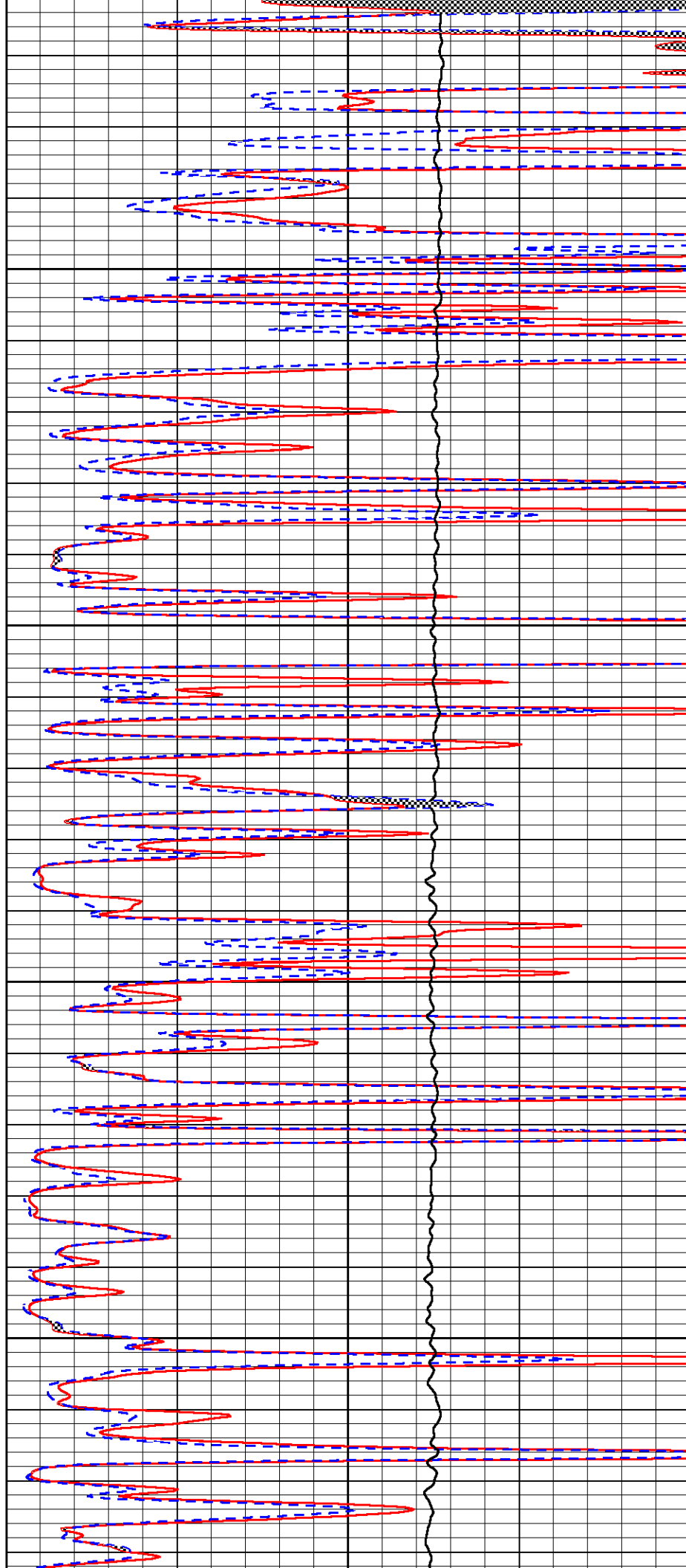


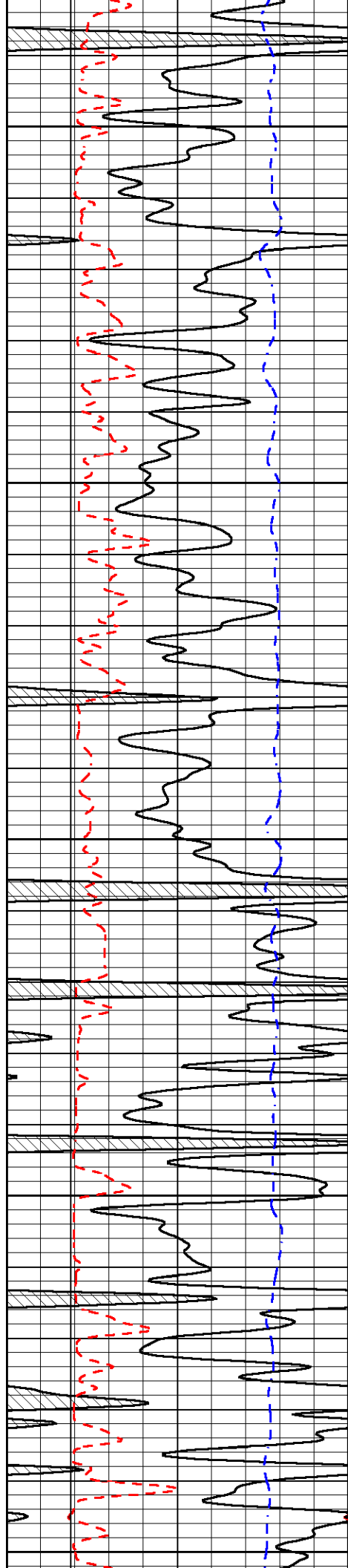
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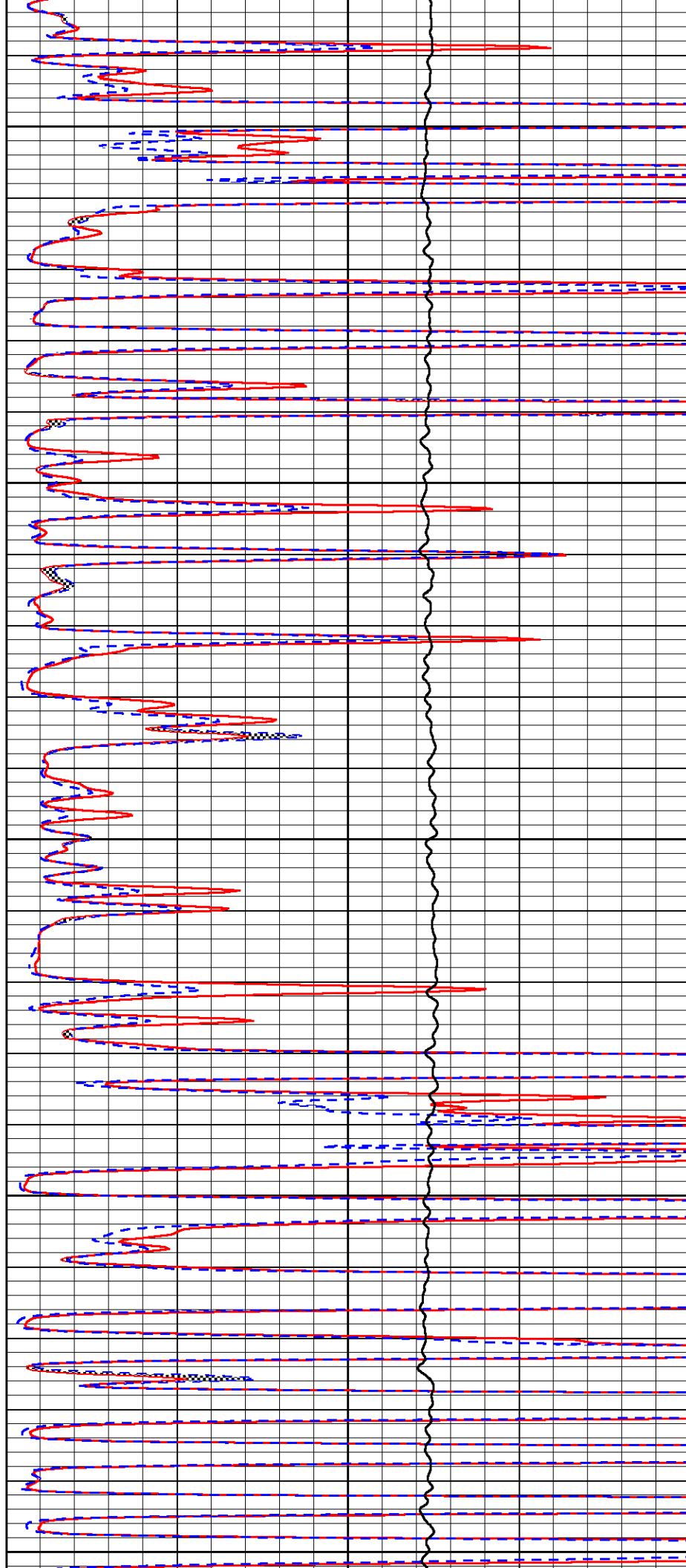
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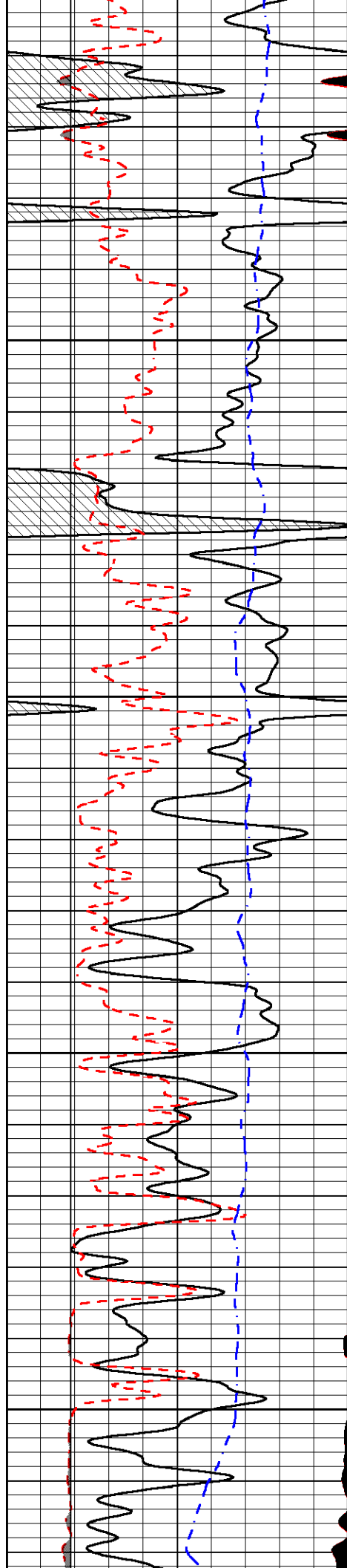
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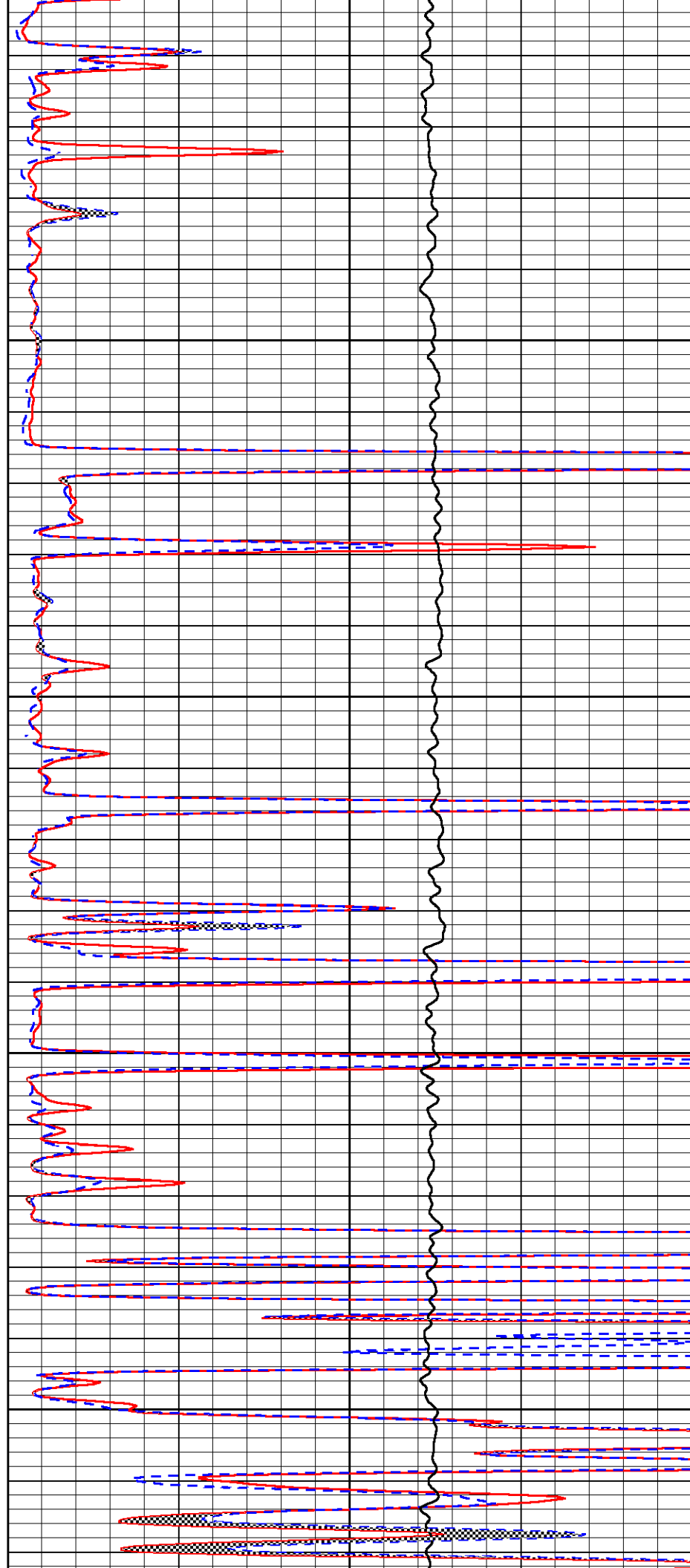


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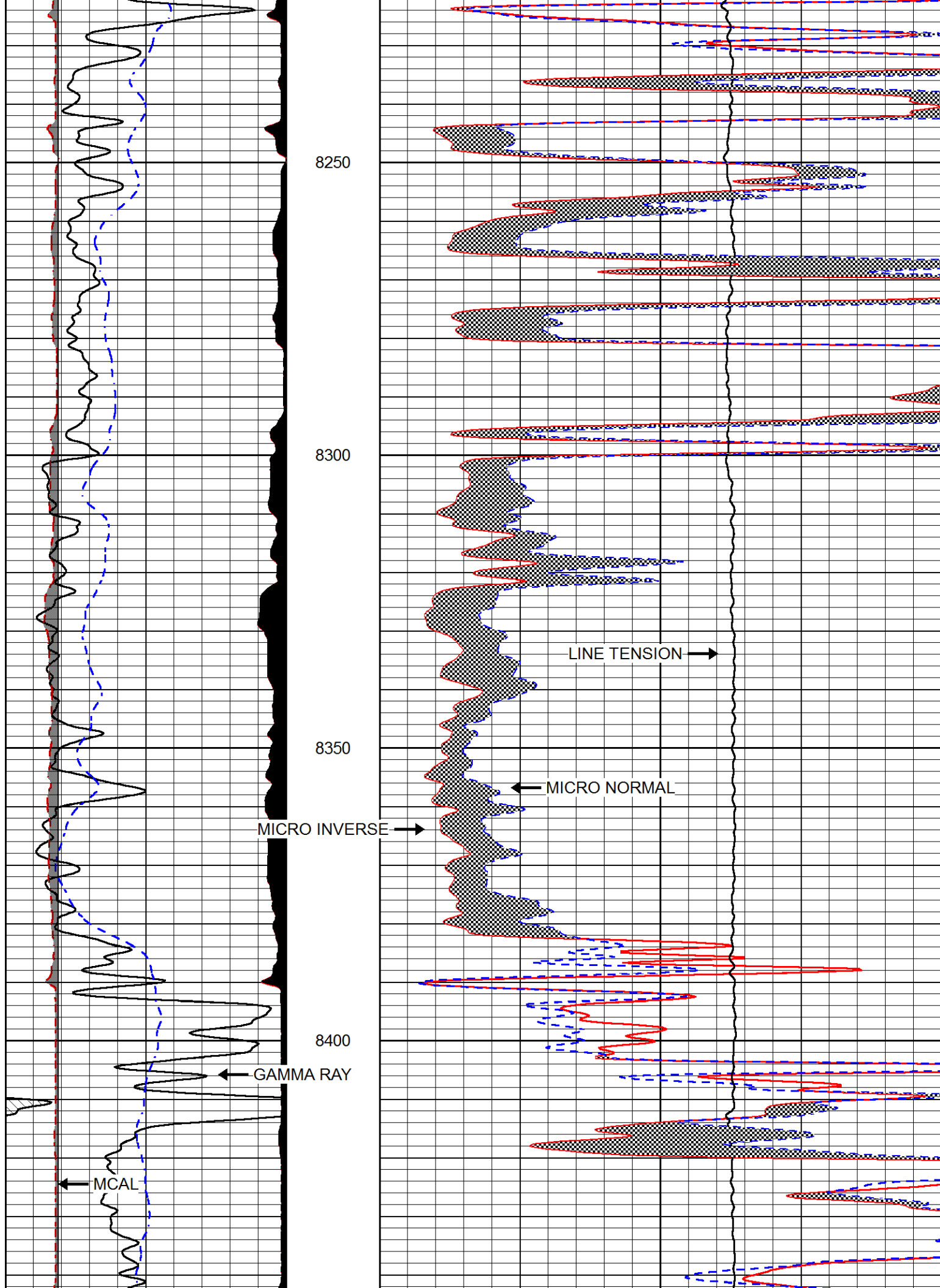
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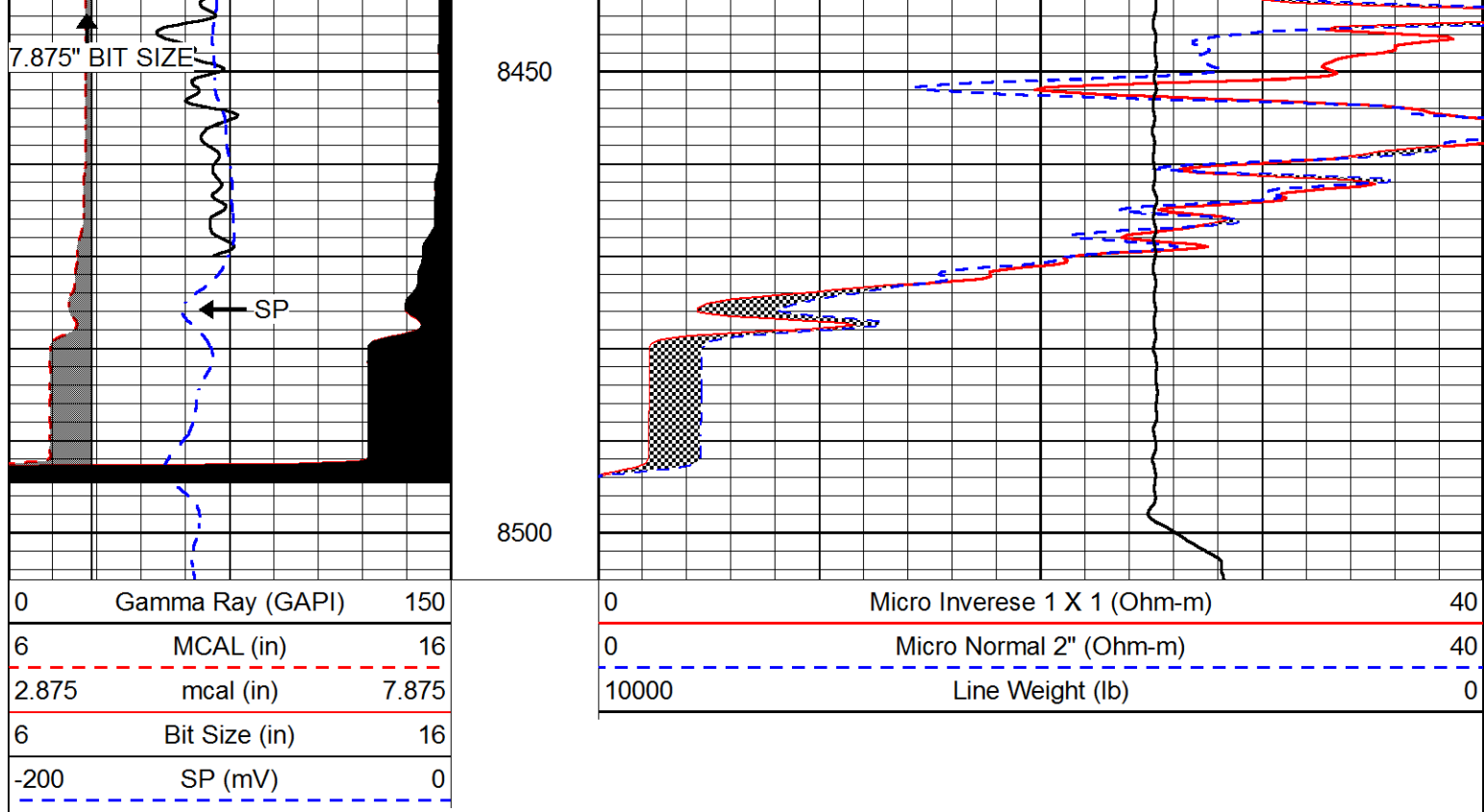
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8200









#### Calibration Report

Database File: murfin\_red poll\_10-21.db  
 Dataset Pathname: STKML/pass5.8  
 Dataset Creation: Sat Sep 02 00:34:08 2017

#### Dual Induction Calibration Report

Serial-Model: PSI 91-M&W  
 Calibration Performed: Thu Aug 10 08:41:25 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	166.796	835.089	0.000	255.800	mmho/m	0.430	-32.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.360	-27.000

#### Microlog Calibration Report

Serial-Model: PSI-01-PSIML  
 Performed: Fri Aug 11 11:41:38 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	35000.0000	-0.8000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	35000.0000	-0.4000
Caliper	1.0001	1.1397	6.5000	18.5000	in	100.0000	-97.1750

#### Compensated Density Calibration Report

Serial-Model: 90-1031-M&W  
 Source / Verifier: 16955B / 2ci  
 Master Calibration Performed: Wed Aug 02 00:28:57 2017

## Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	4903.44	6153.79	cps
Aluminum	2.685	g/cc	934.50	4021.31	cps
Spine Angle = 75.61			Density/Spine Ratio = 0.543		
	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: Tues Aug 1 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 Aug 02 00:29:15 2017  
  
 Calibrator Value: 1.0 GAPI  
  
 Background Reading: 0.0 cps  
 Calibrator Reading: 1.0 cps  
  
 Sensitivity: 0.6000 GAPI/cps



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