



PIONEER
Pioneer Energy Services

**DUAL INDUCTION
LOG**

Company **MURFIN DRILLING COMPANY, INC**
Well **CWA 'E' #1-17**
Field **WILDCAT**
County **RAWLINS** State **KANSAS**

Location: **API #: 15-153-21200-00-00**
1100' FNL & 330' FWL
SEC 17 TWP 3S RGE 35W
Permanent Datum **GROUND LEVEL** Elevation **3253'**
Log Measured From **KELLY BUSHING**
Drilling Measured From **KELLY BUSHING**
Other Services **CNL/CDL
MEL/BHCS**

Date	9/20/2017
Run Number	ONE
Depth Driller	4900'
Depth Logger	4902'
Bottom Logged Interval	4901'
Top Log Interval	0'
Casing Driller	8.625" @ 345'
Casing Logger	434'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	3400
Density / Viscosity	9.2 64
pH / Fluid Loss	11.0 6.0
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.50 @ 80
Rmt @ Meas. Temp	0.38 @ 80
Rmc @ Meas. Temp	0.68 @ 80
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.32 @ 125
Operating Rig Time	5 HOURS
Max Rec. Temp. F	125
Equipment Number	91
Location	HAYS
Recorded By	D. SCHMIDT
Witnessed By	PAUL GUNZELMAN

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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.

**ATWOOD,
WEST TO 8 RD, 3/4 NORTH,
EAST INTO**

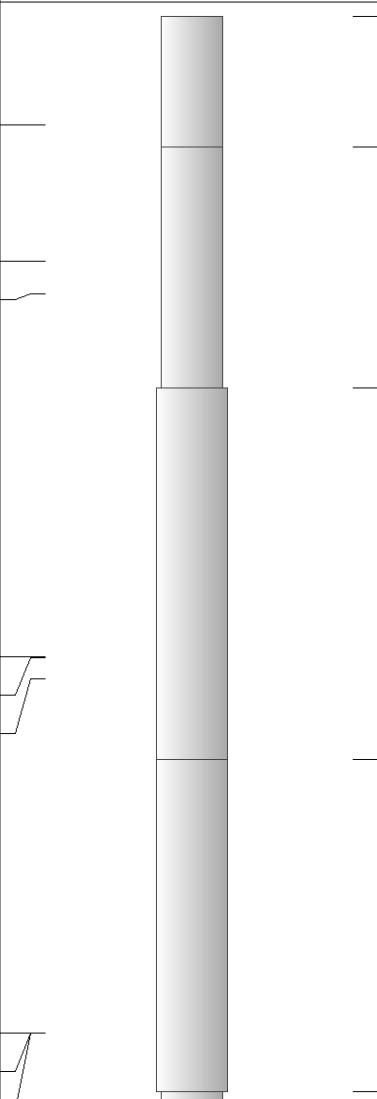
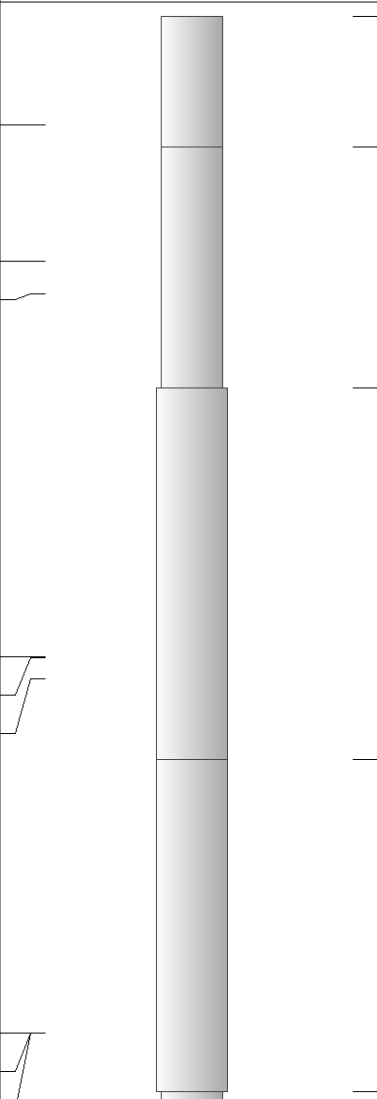
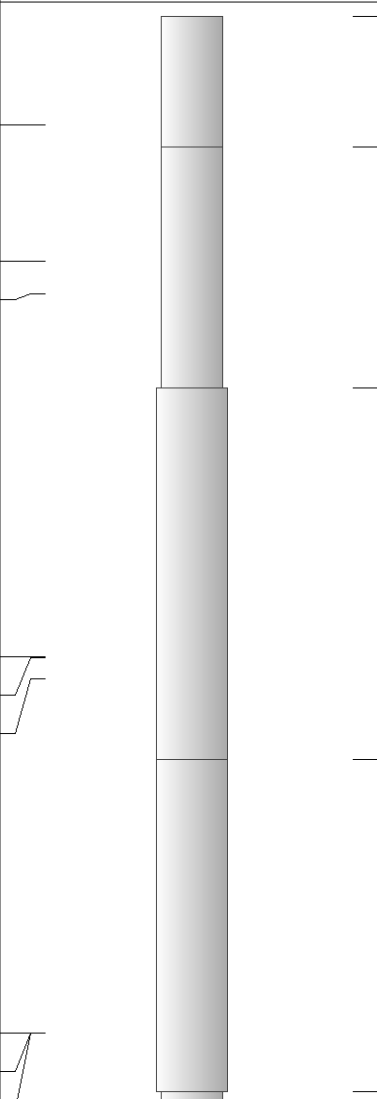
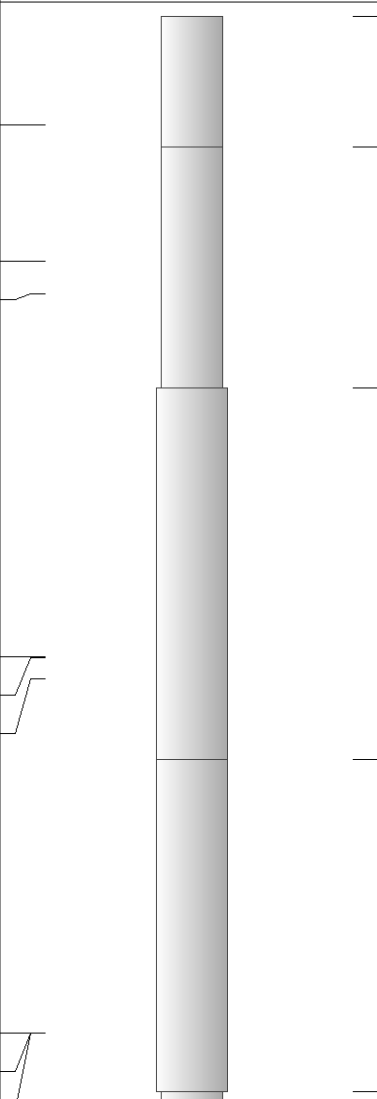
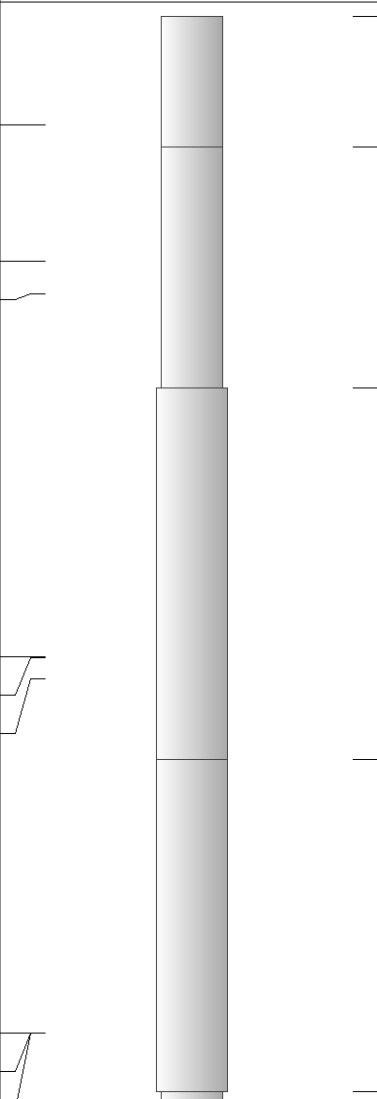
Log Measured From: KELLY BUSHING 5 Ft. Above Permanent Datum

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: PAUL GUNZELMAN
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

Top - Bottom

M	A	SPSHIFT mV	SNDERRM mmho/m	SNDERR mmho/m	SZCOR	NPORSEL	FLUIDDEN g/cc
2	1	140	0	0	Off	Limestone	1
MATRXDEN g/cc	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
2.71	80	0	5.5	0	4902	125	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

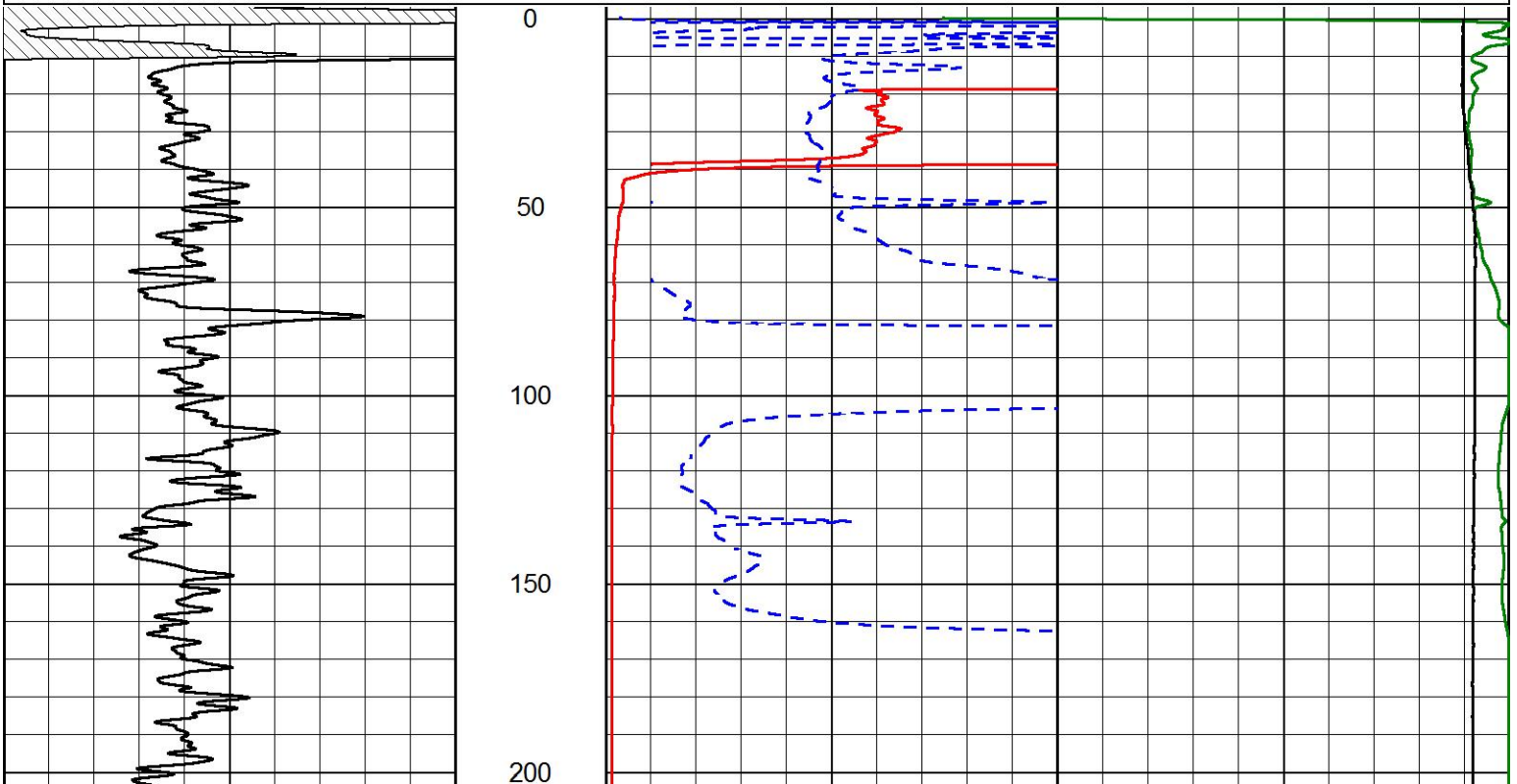
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 Total weight: 685.00 lb
 O.D.: 4.00 in

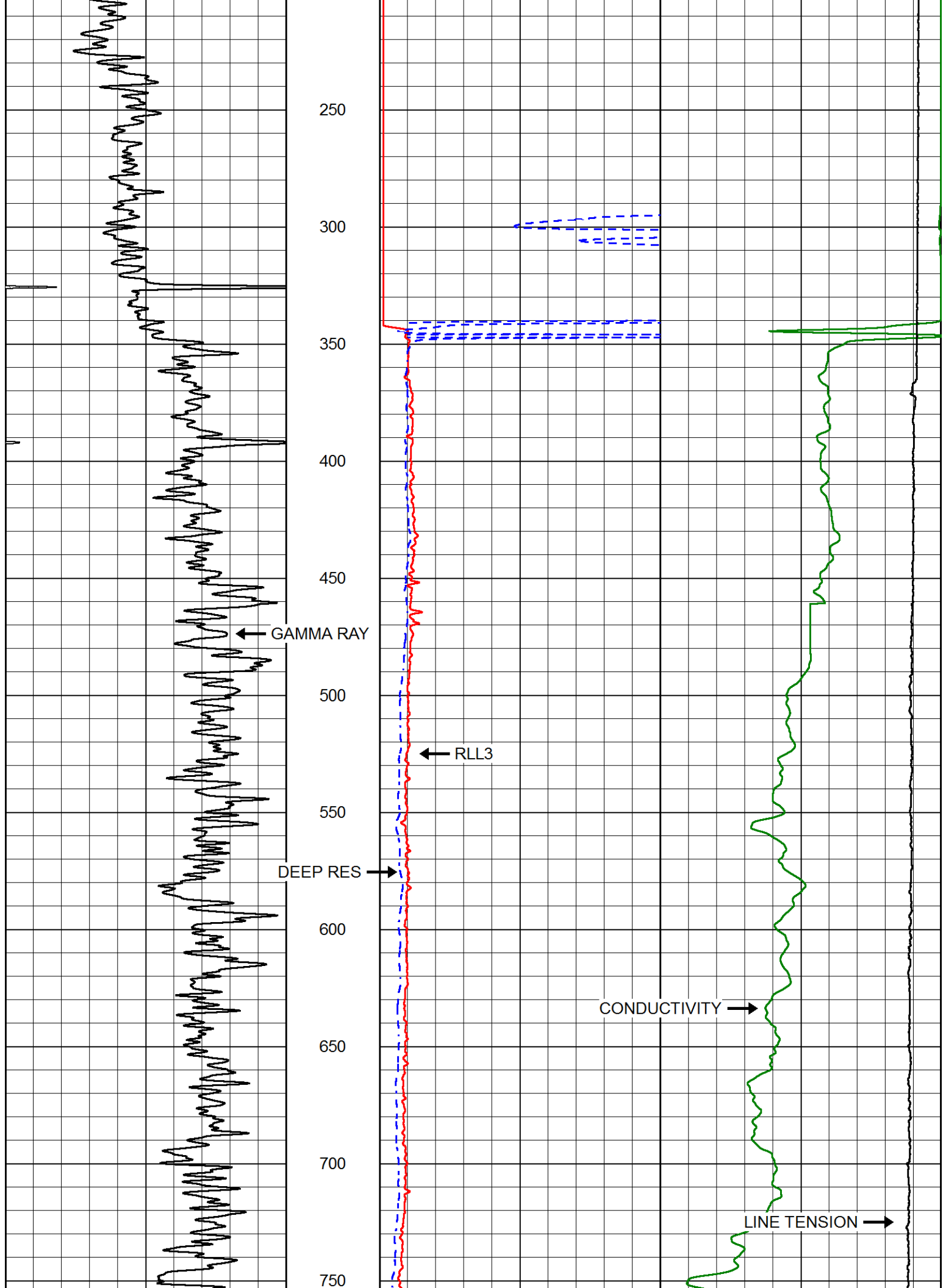


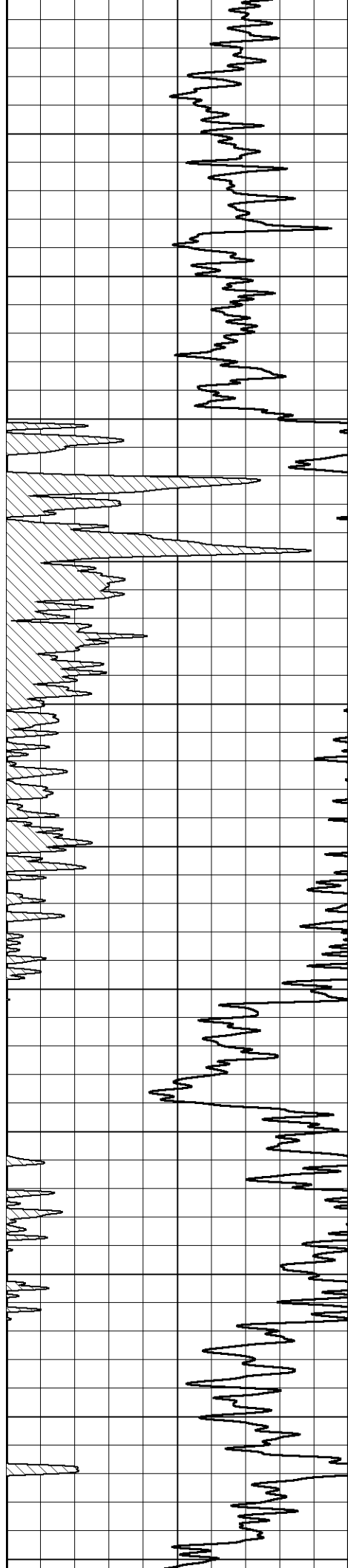
MAIN PASS

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 Dataset Creation Wed Sep 20 19:06:53 2017
 Charted by Depth in Feet scaled 1:600

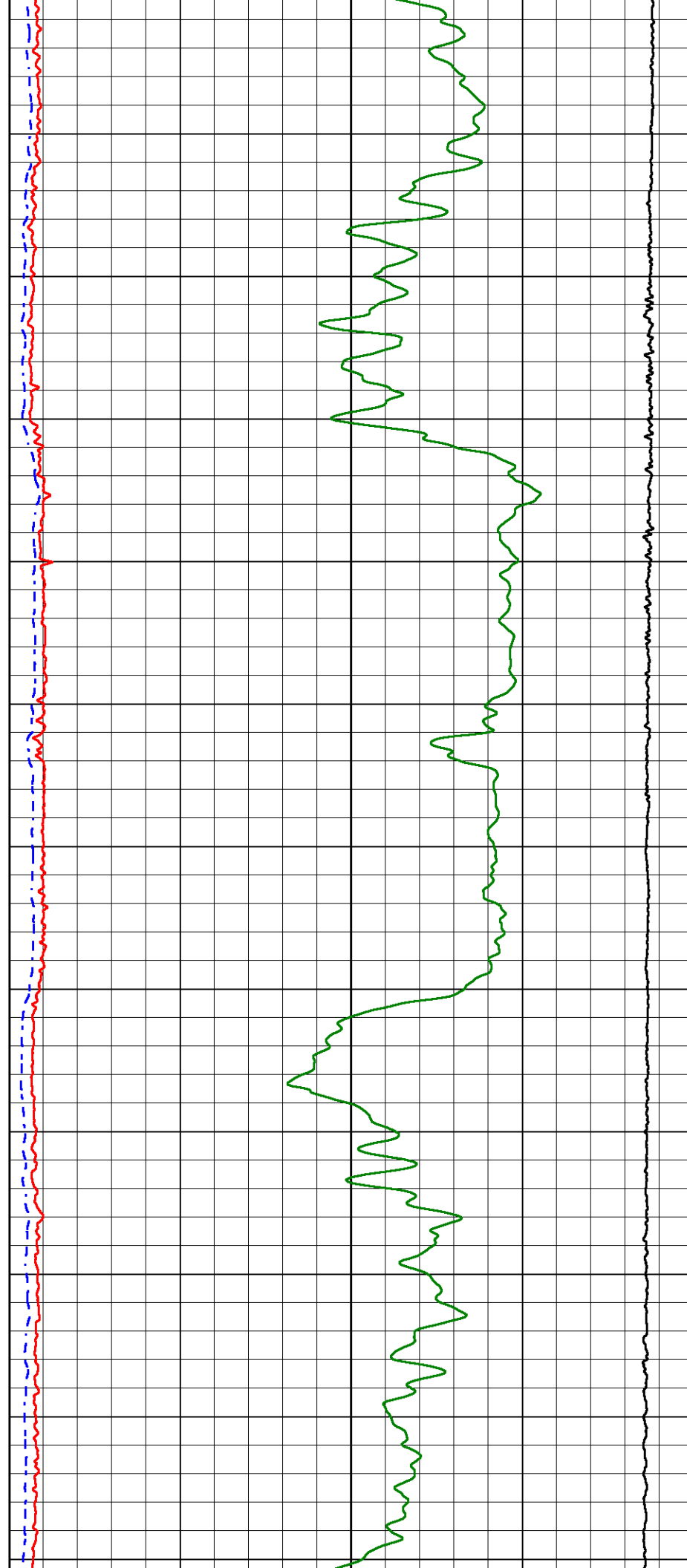
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			50	Deep Resistivity (Ohm-m)	500

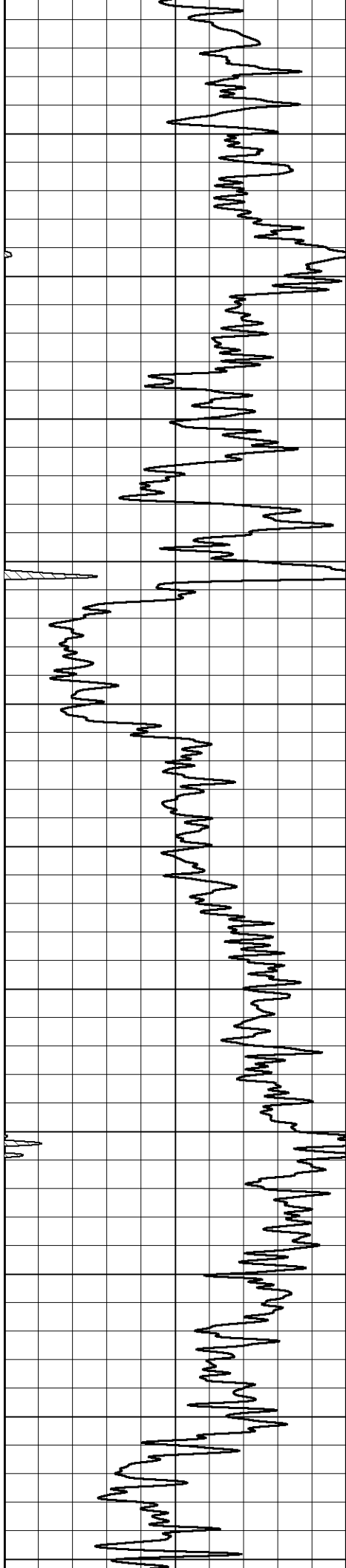




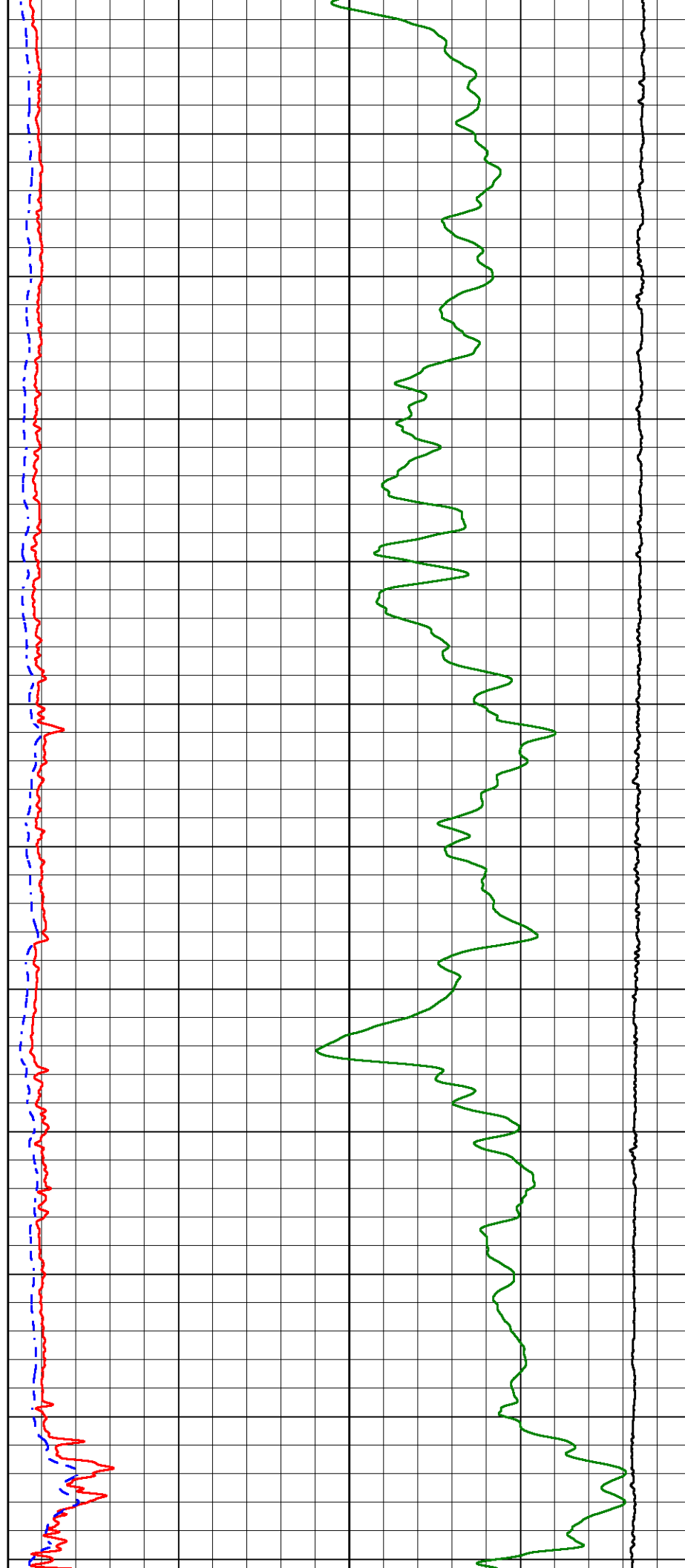


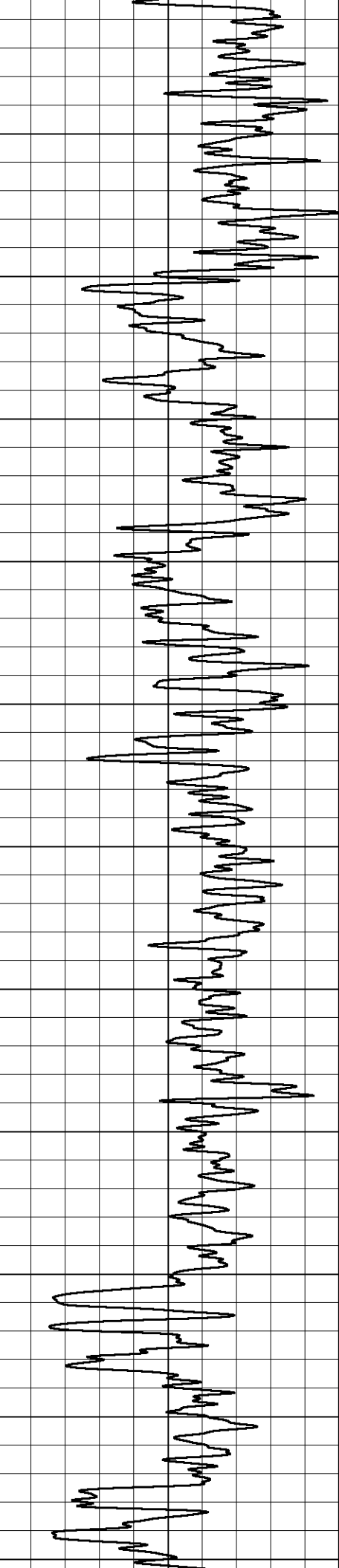
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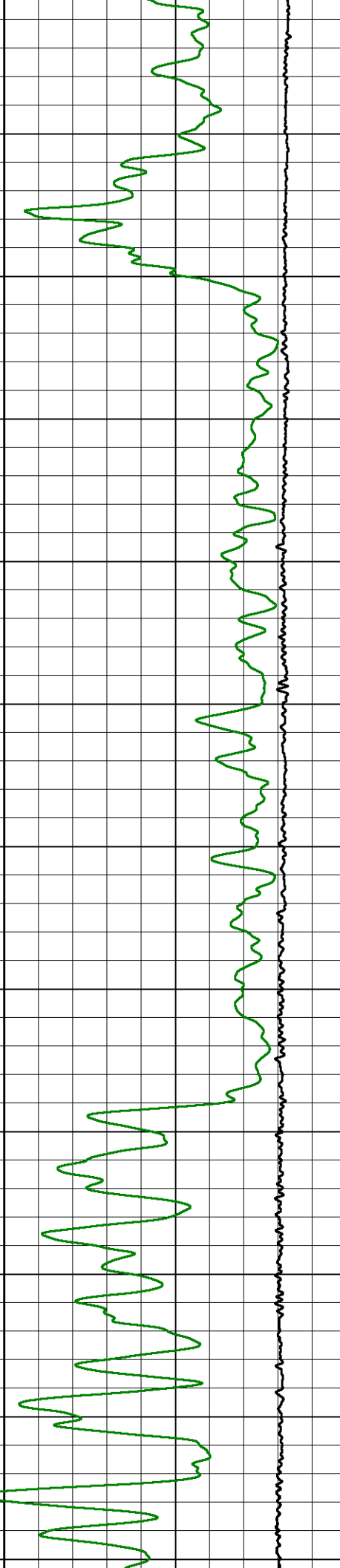
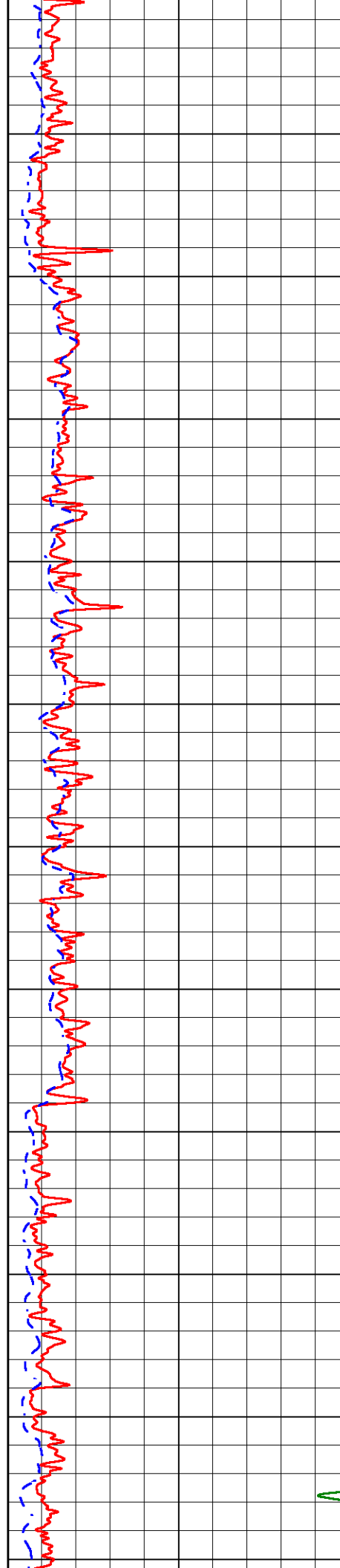


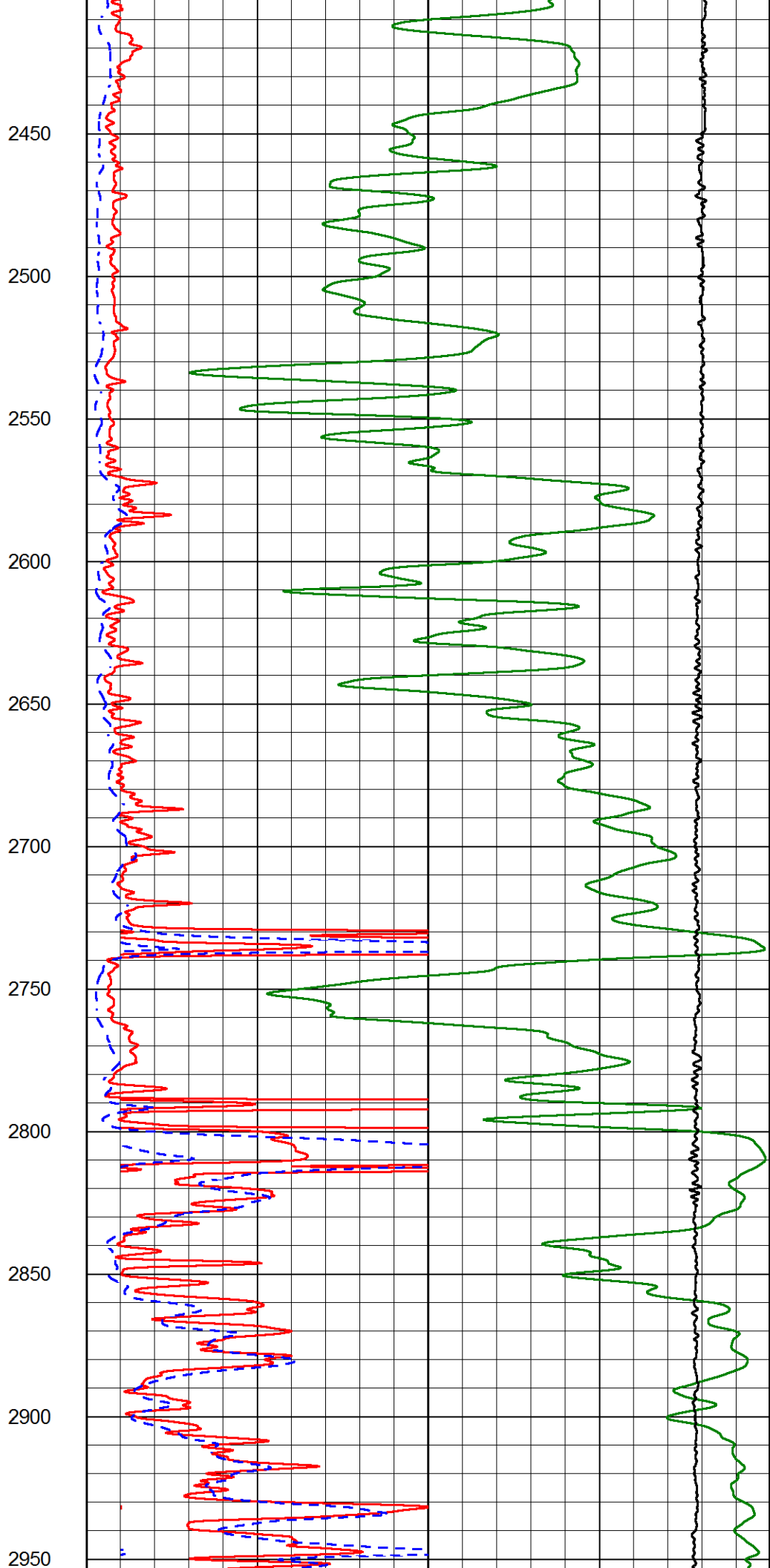
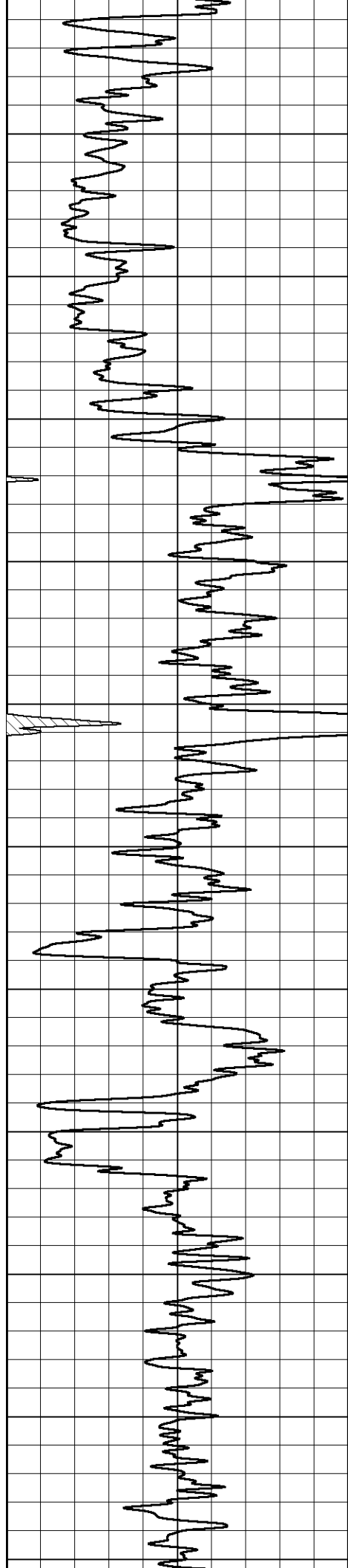
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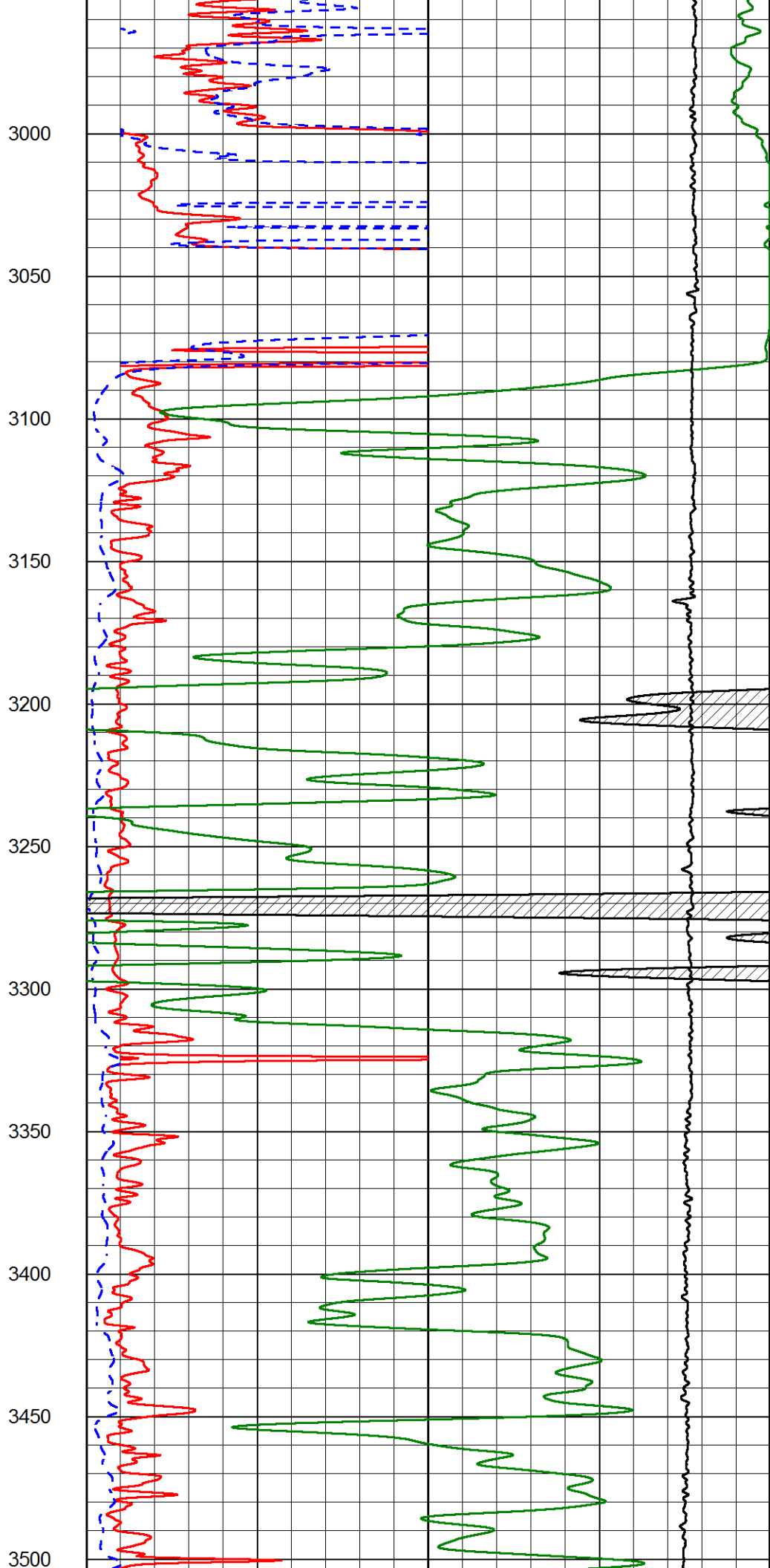
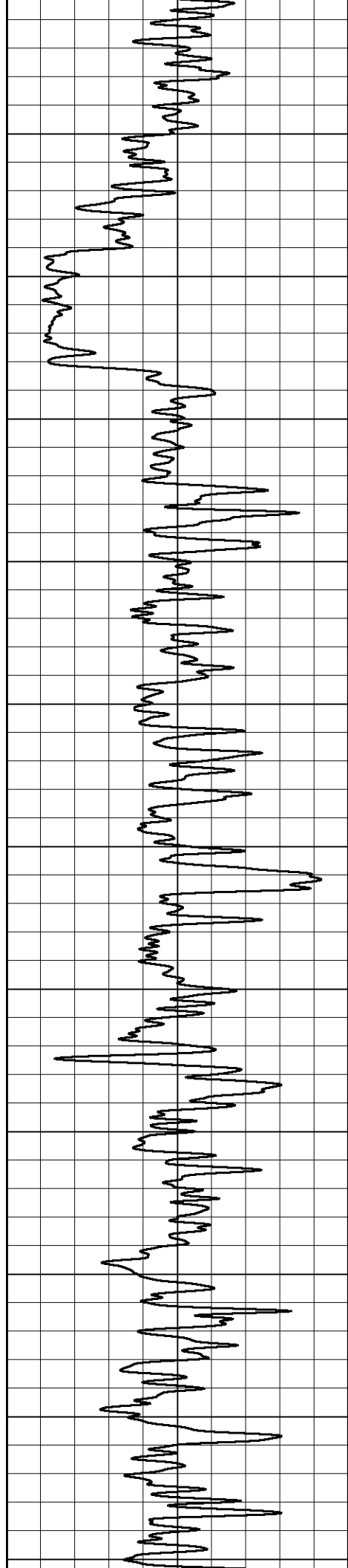


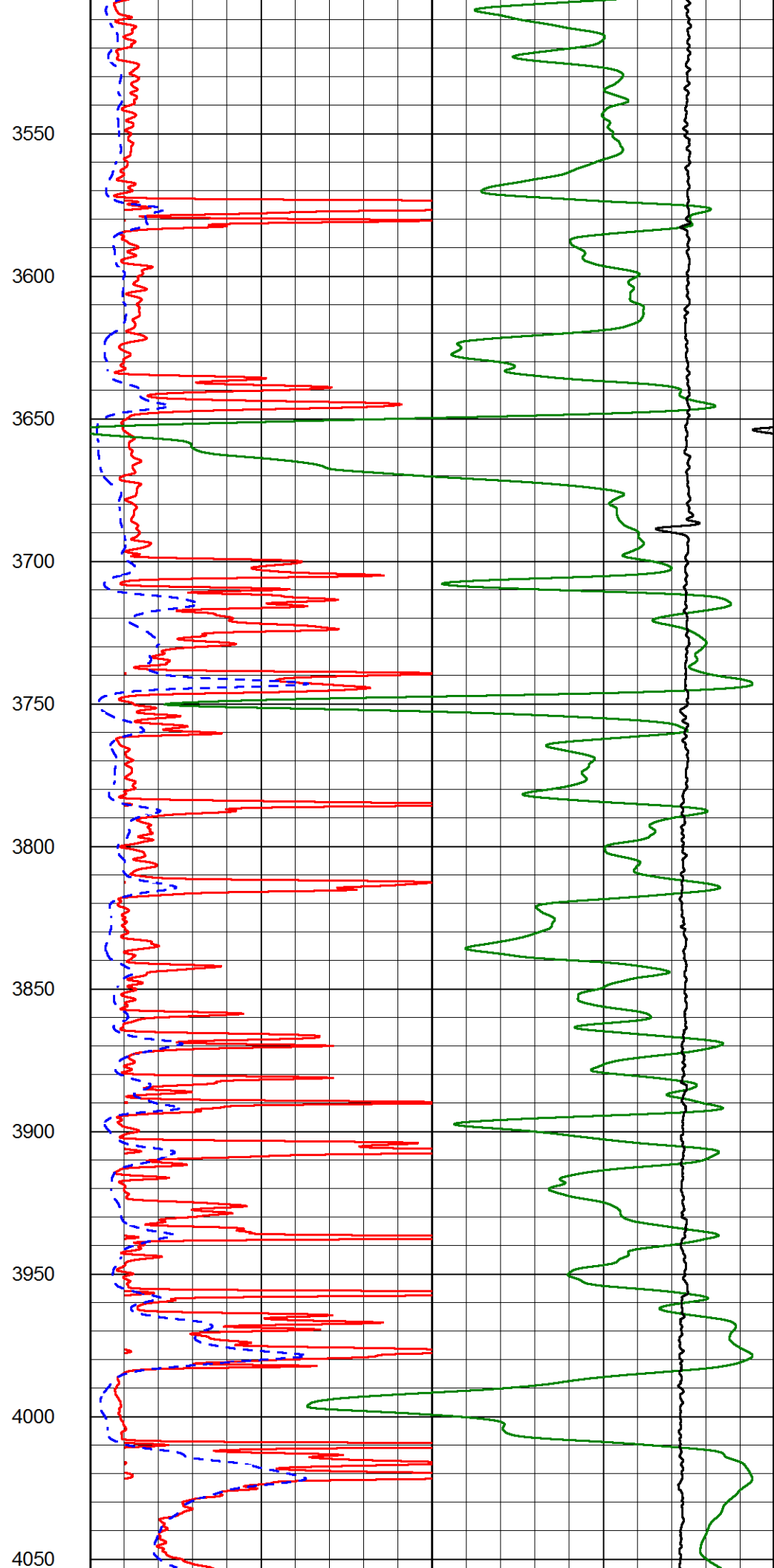
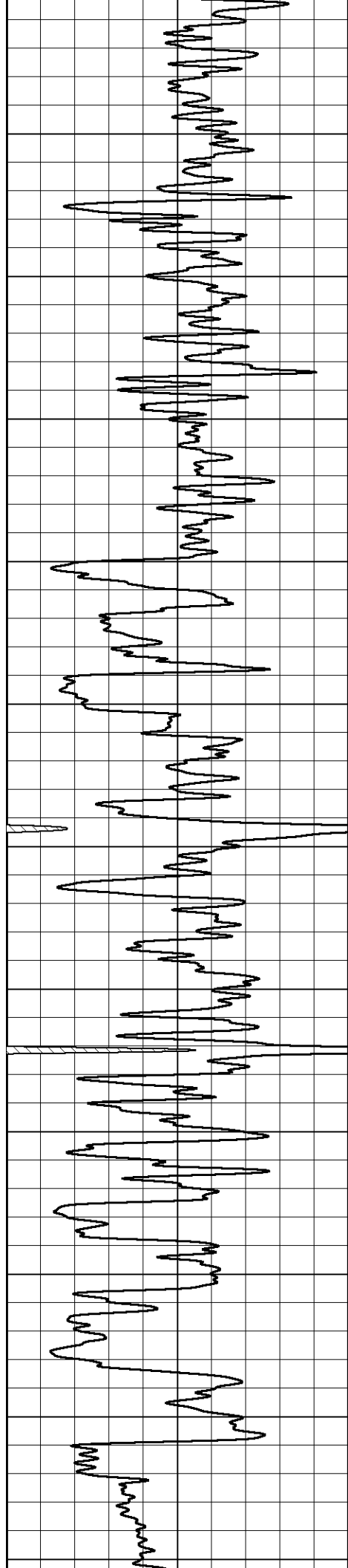


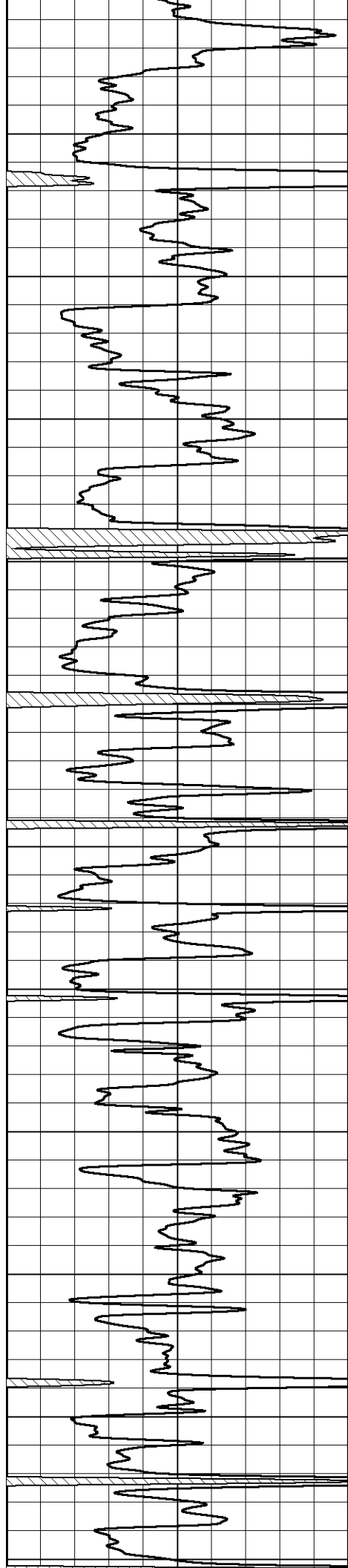
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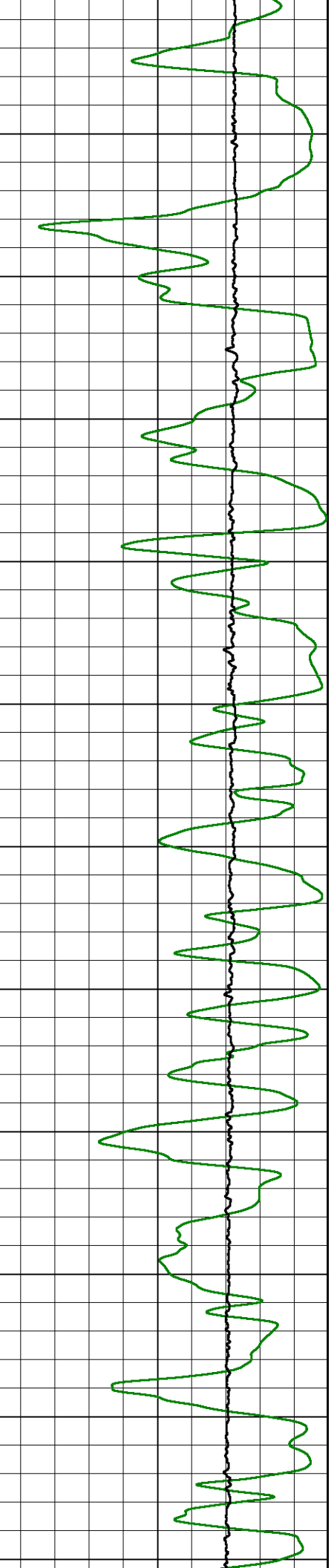
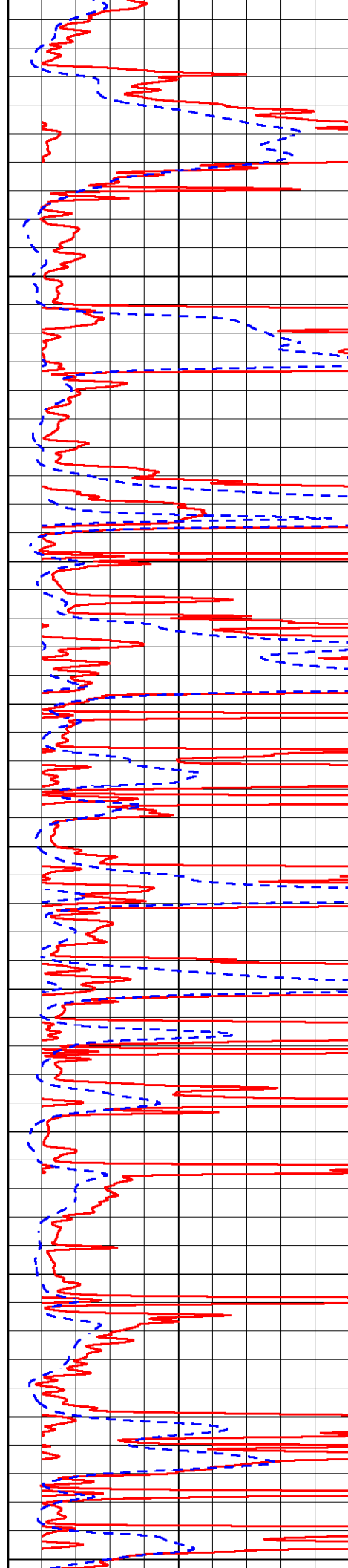
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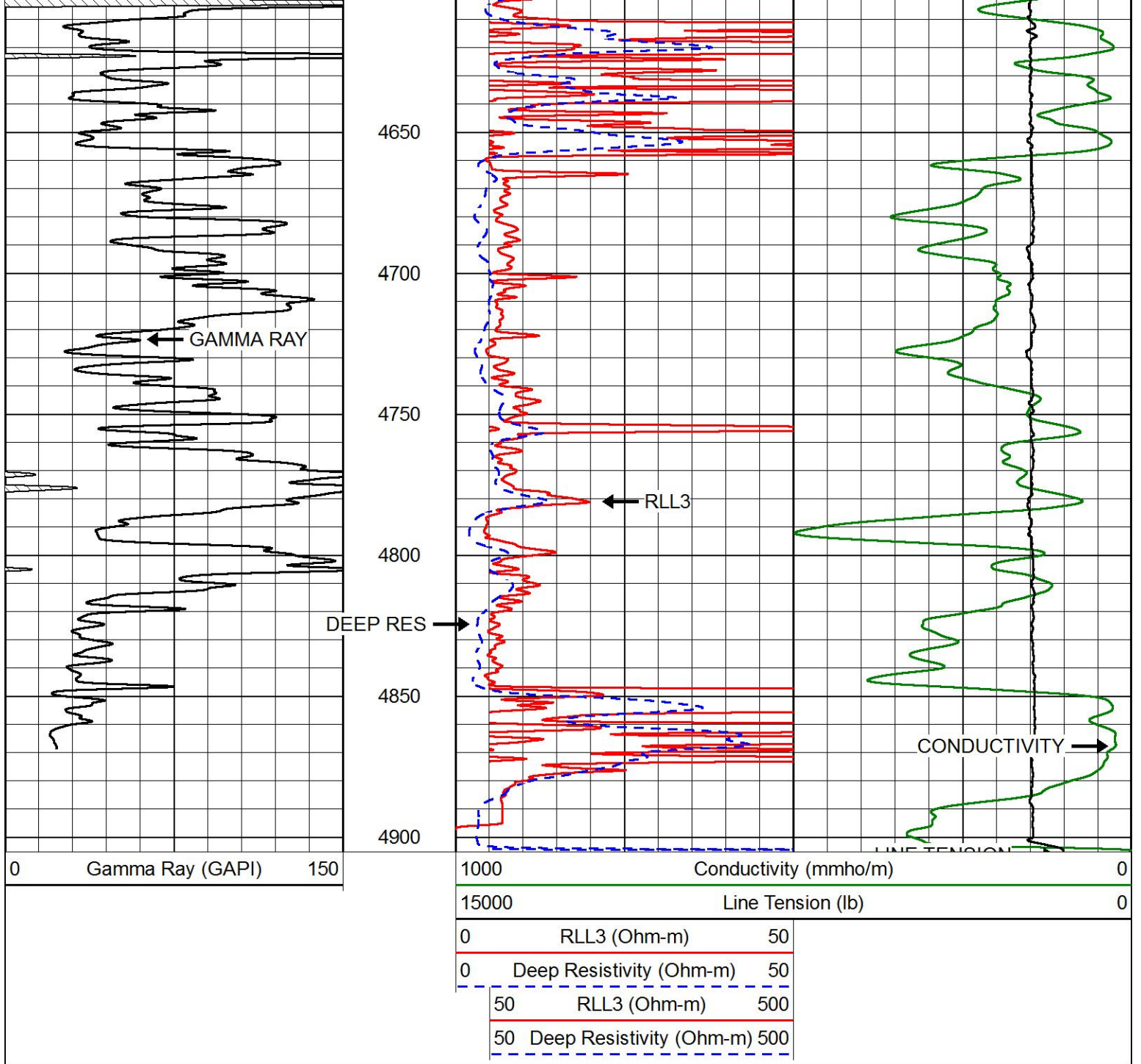
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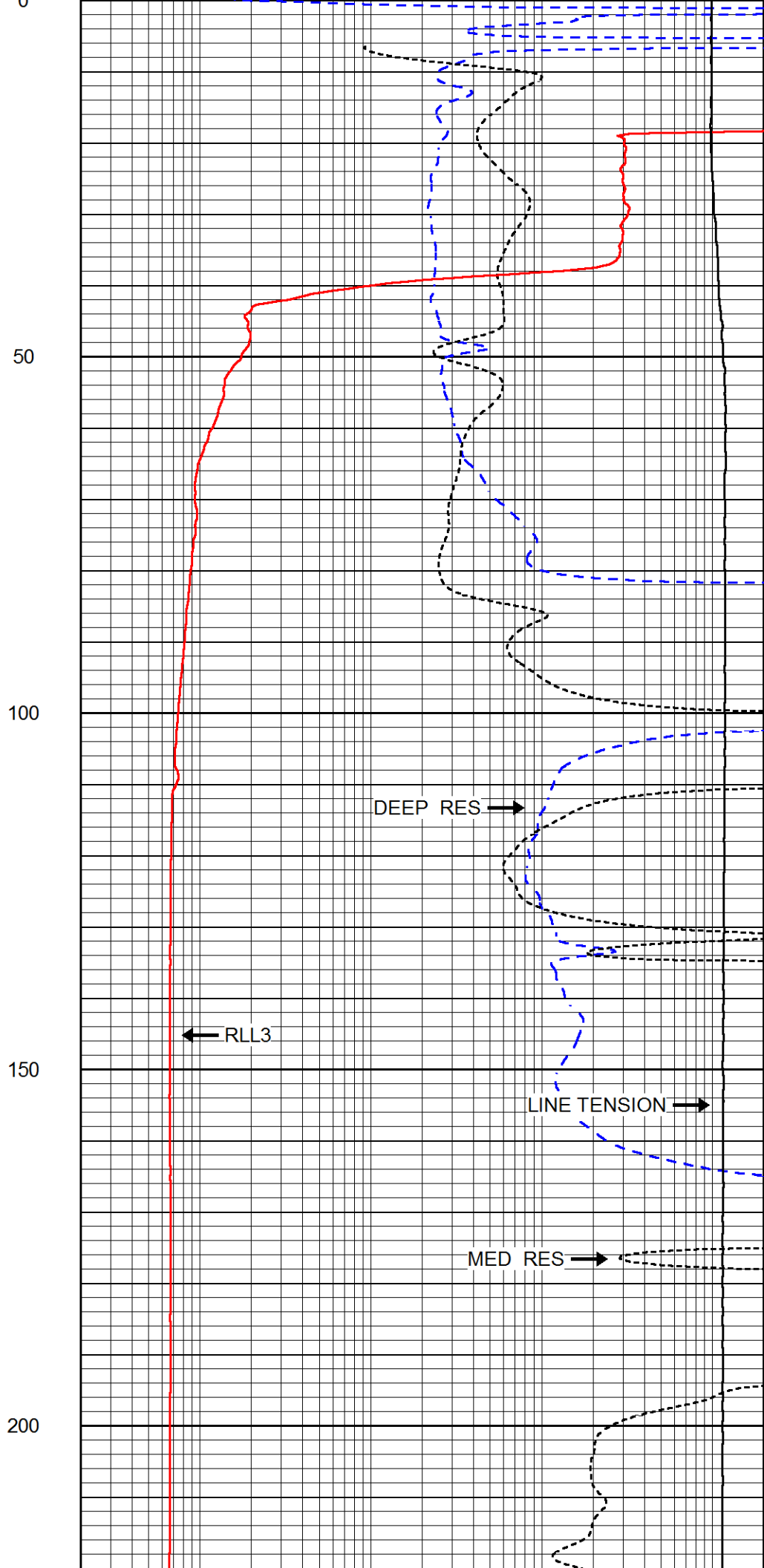
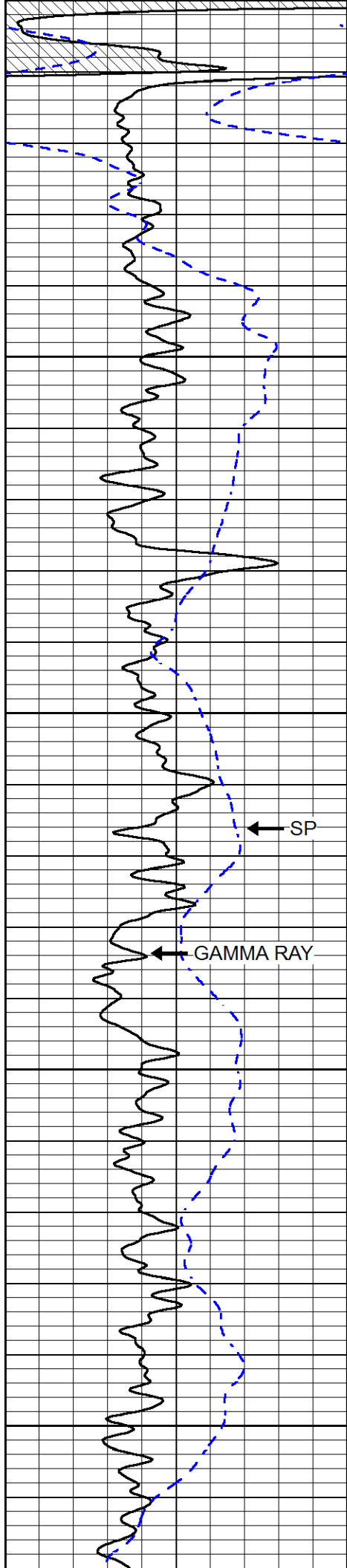


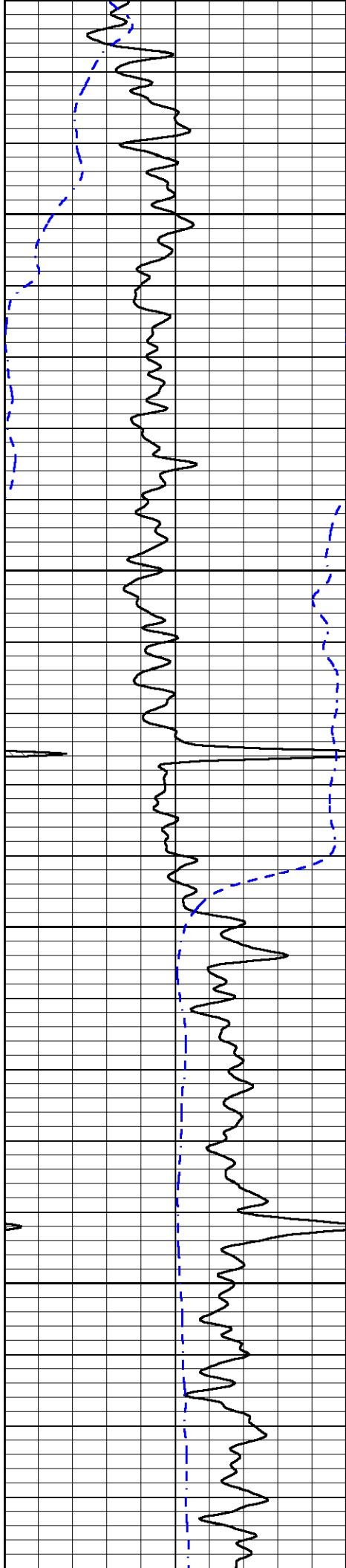


MAIN PASS

Database File murfin_cwa_e 1-17.db
 Dataset Pathname stkml/pass6.1
 Presentation Format dil
 Dataset Creation Wed Sep 20 19:06:53 2017
 Charted by Depth in Feet scaled 1:240

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-200	SP (mV)	0	0.2	Medium Resistivity (Ohm-m)	2000
			0.2	RLL3 (Ohm-m)	2000
			10000	Line Tension (lb)	0



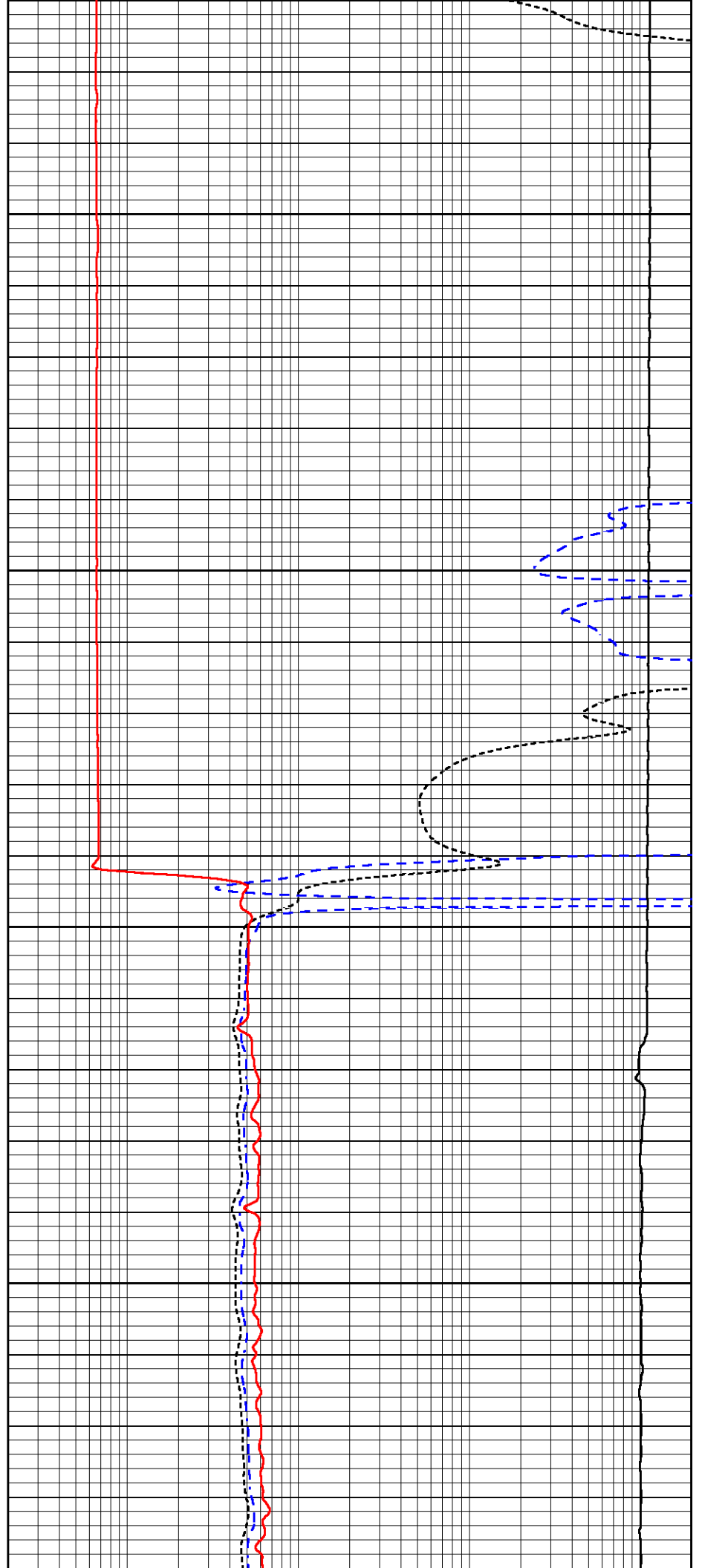


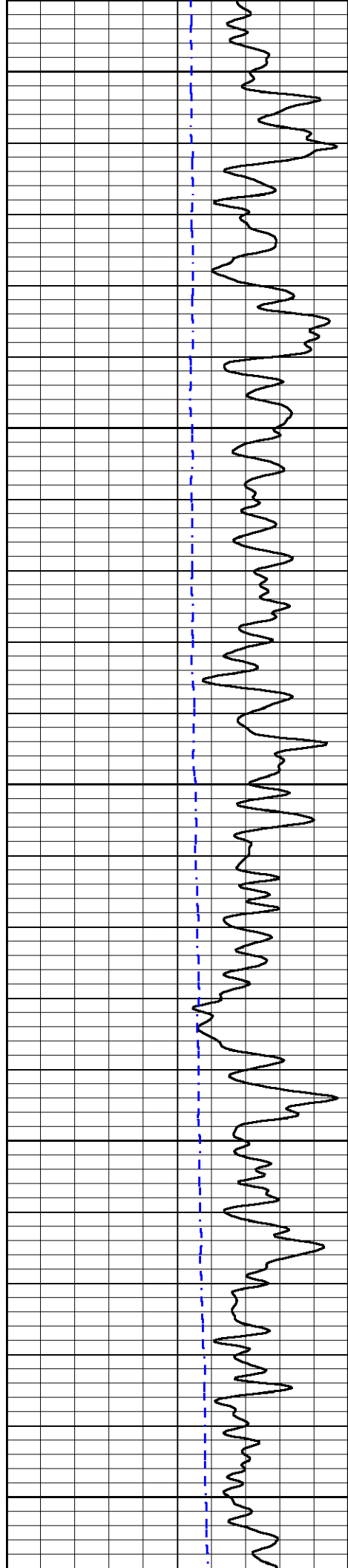
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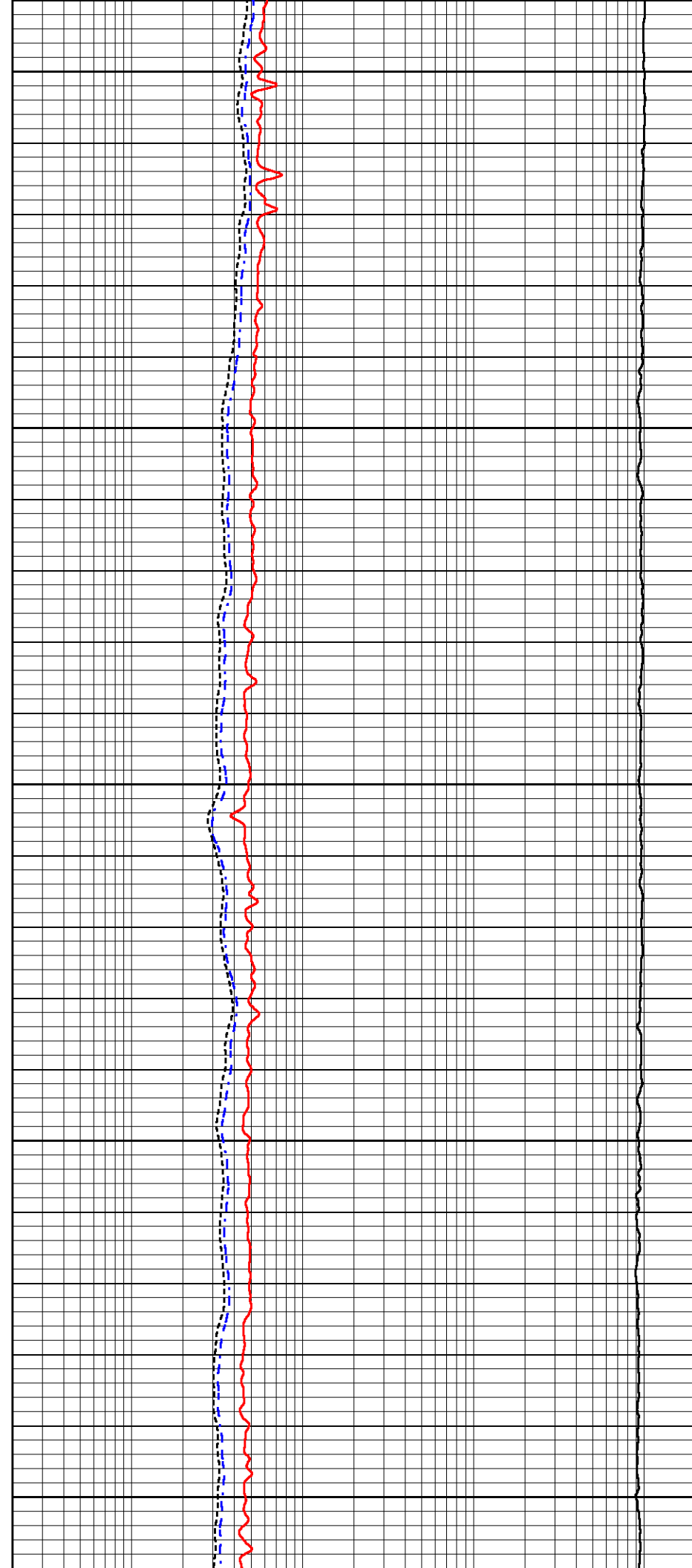
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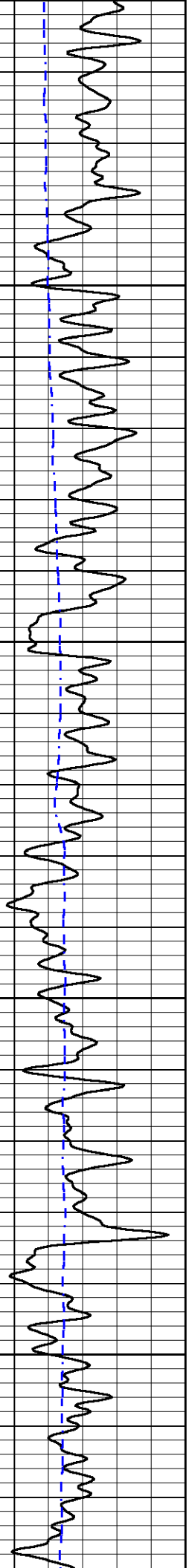
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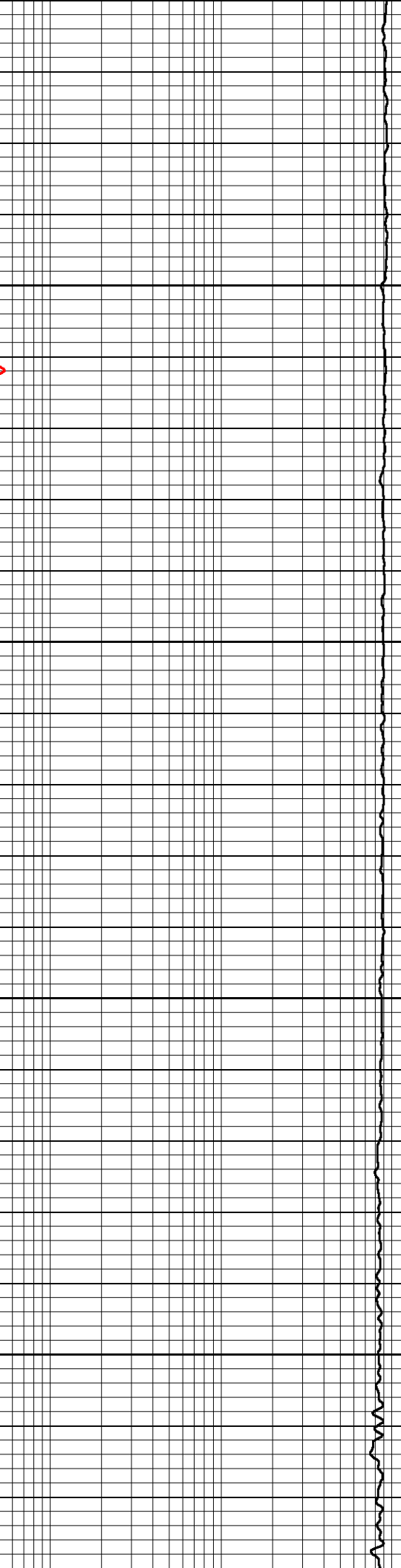
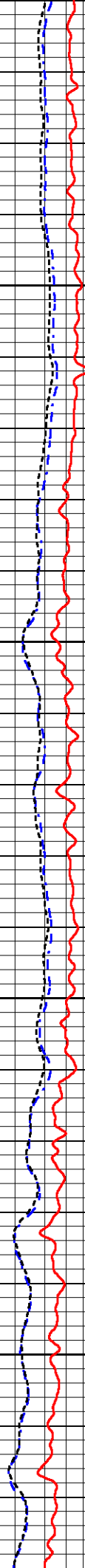


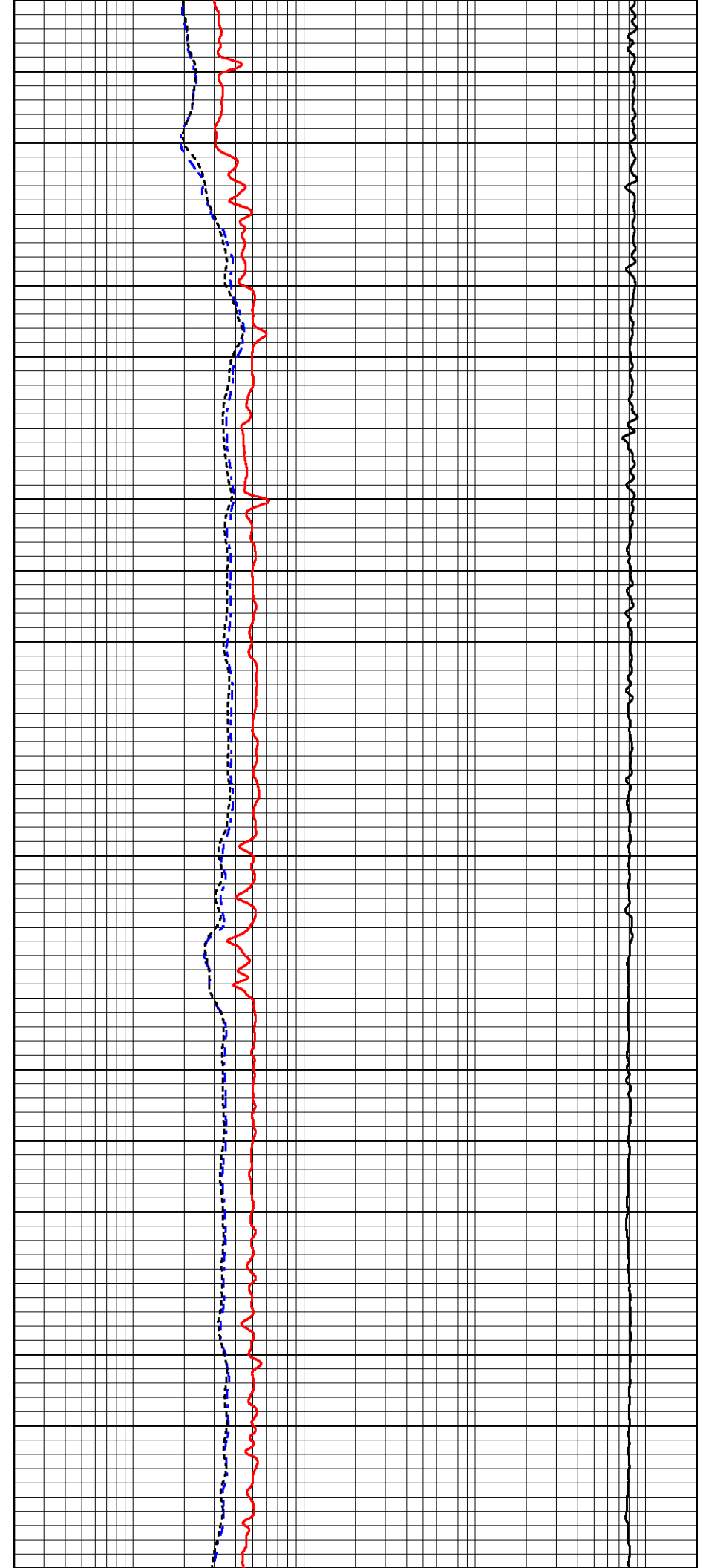
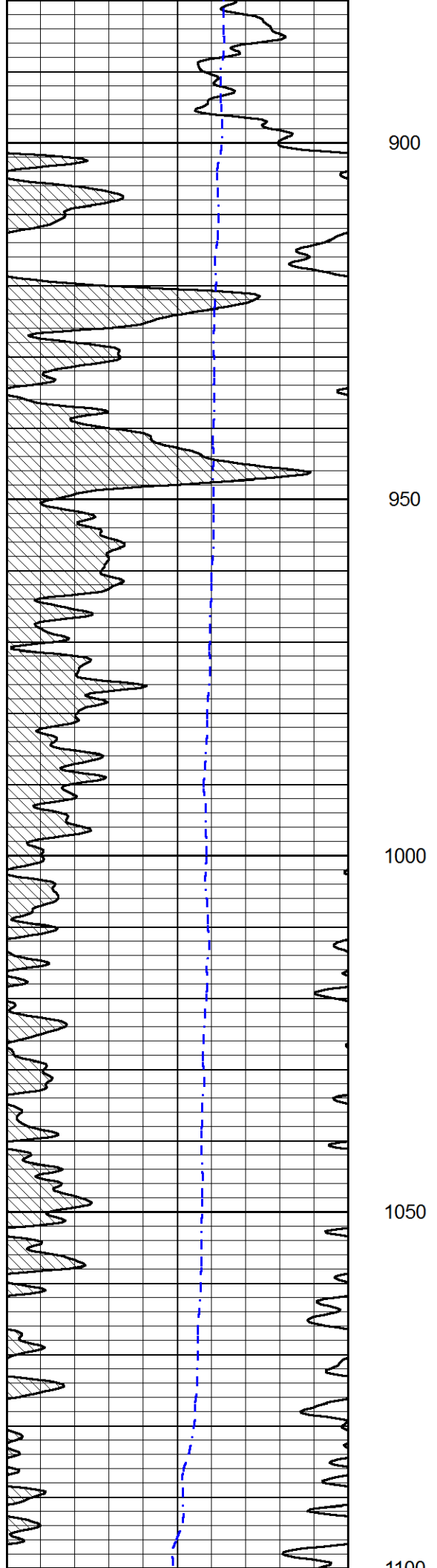
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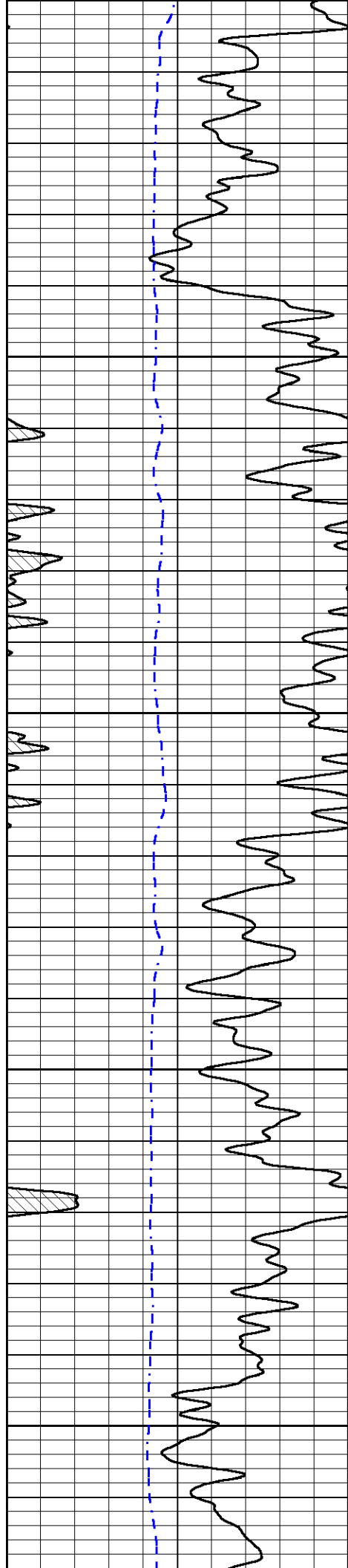
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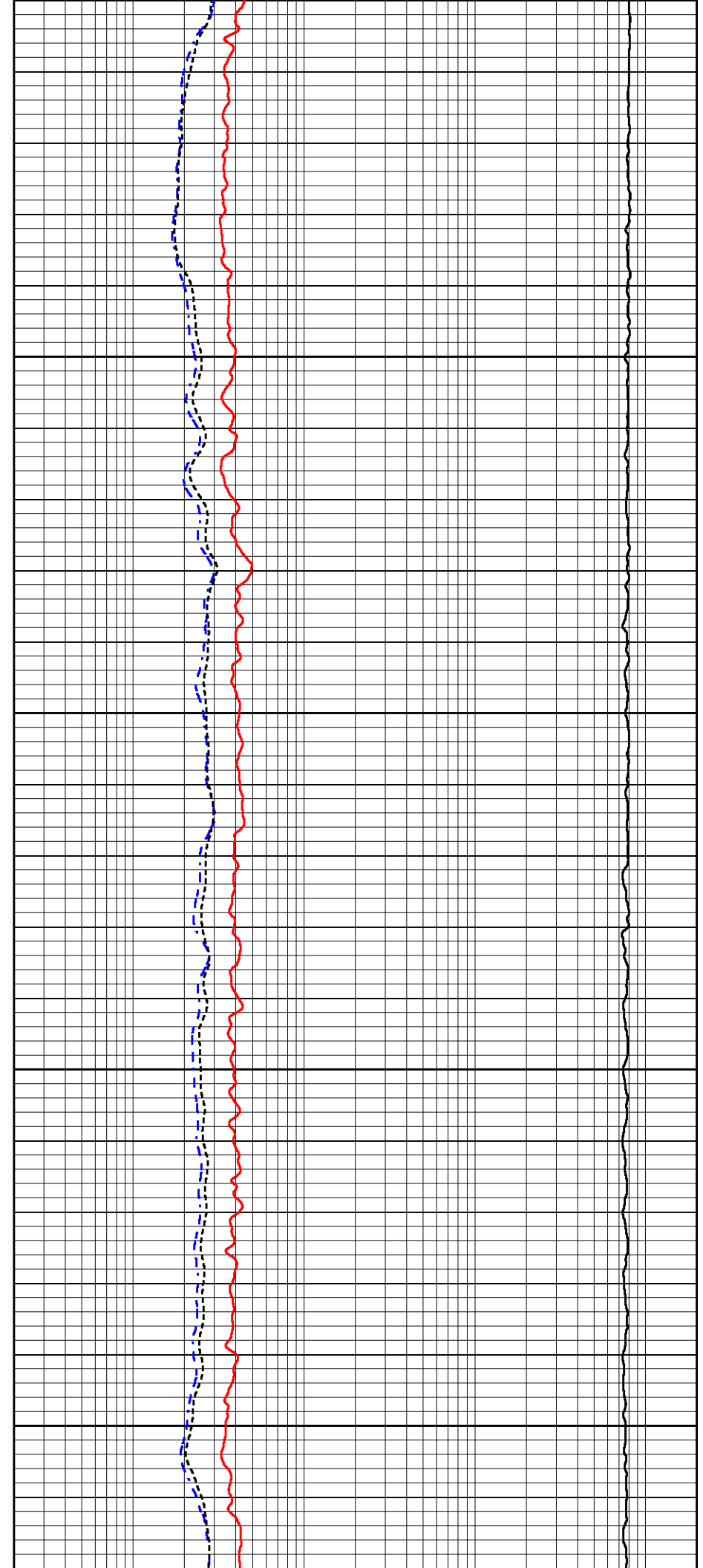
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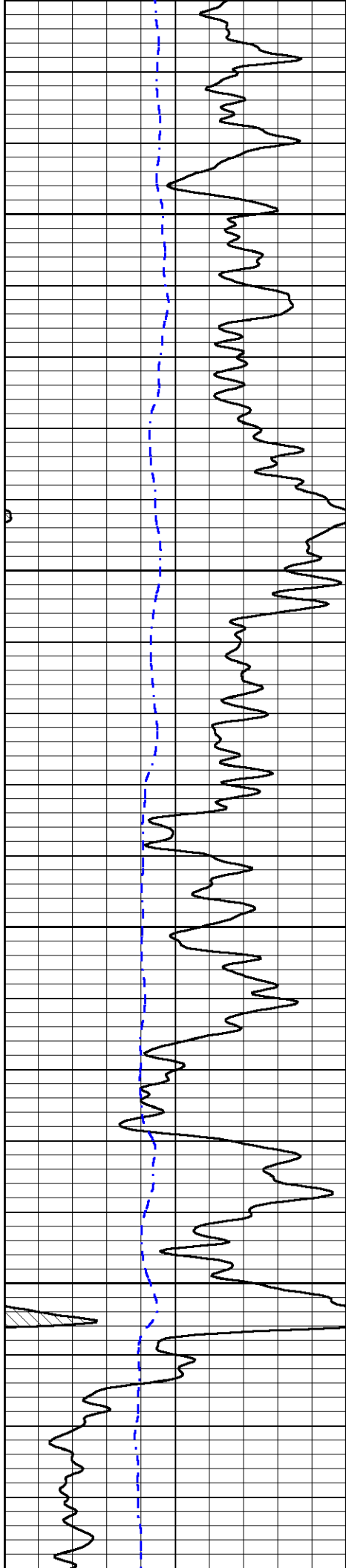
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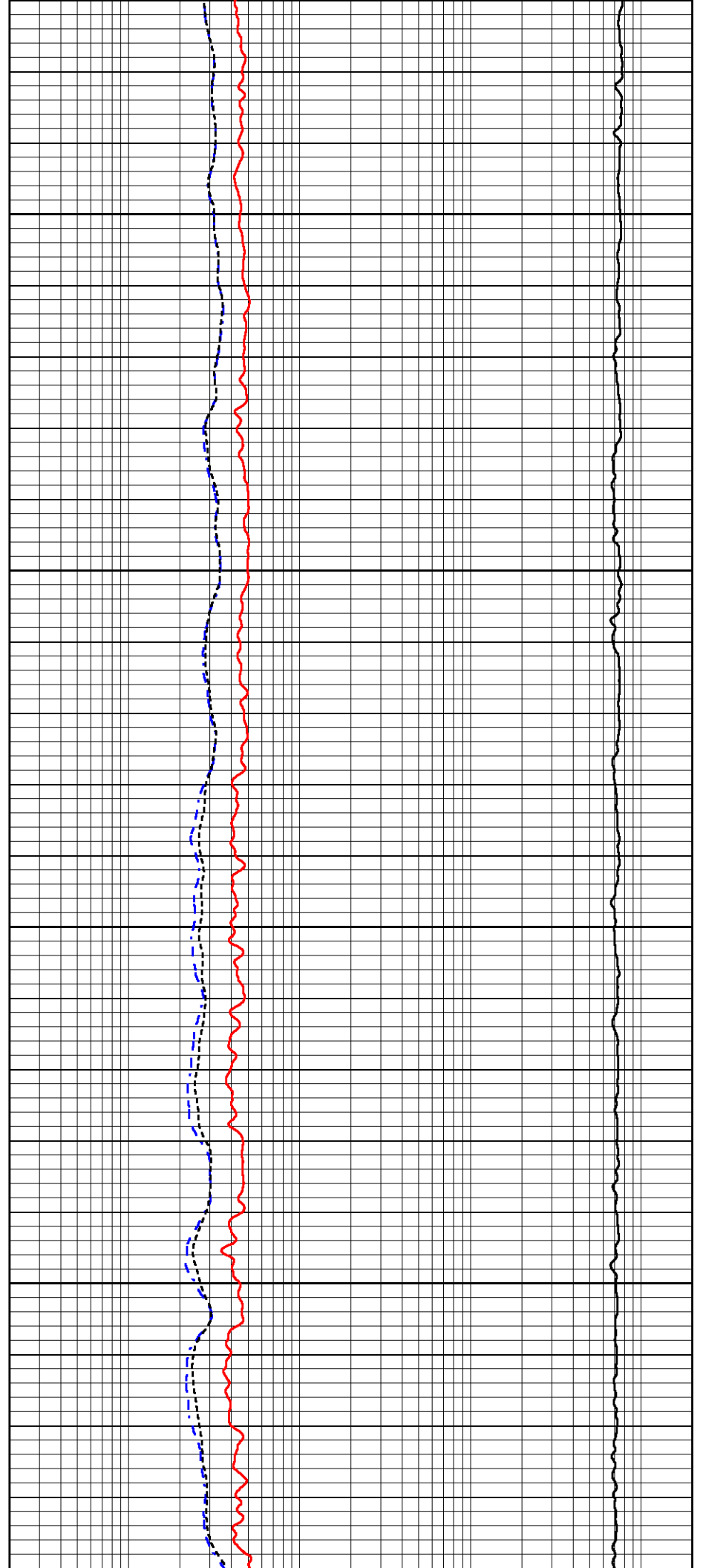


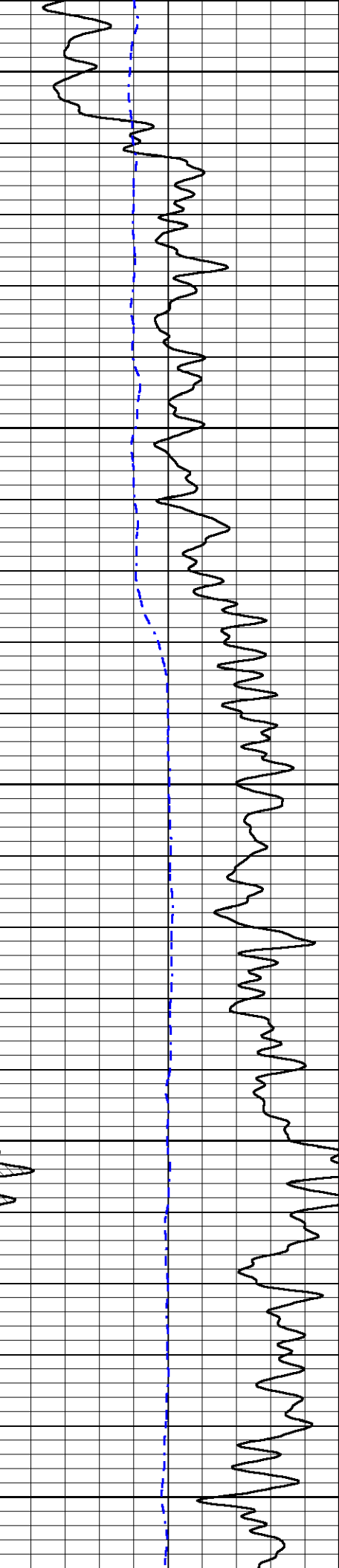
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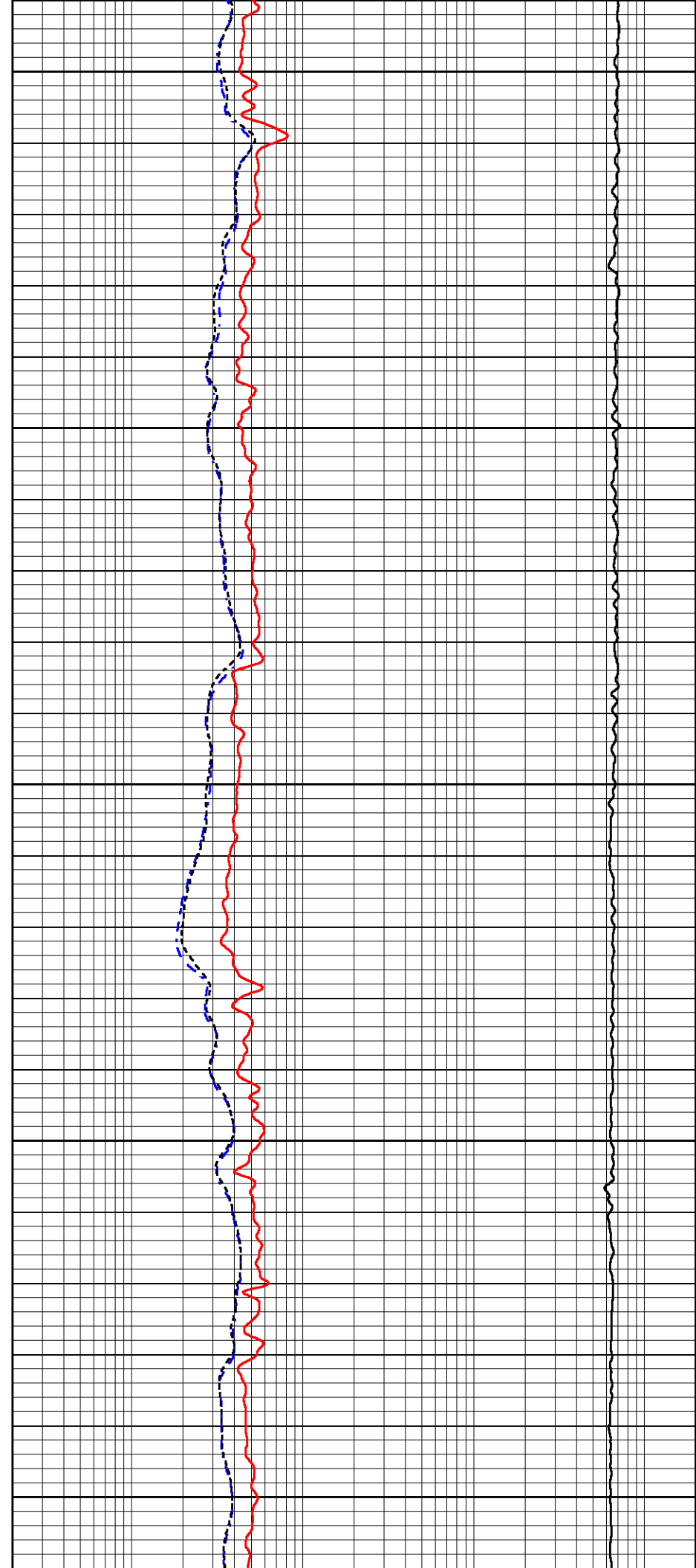
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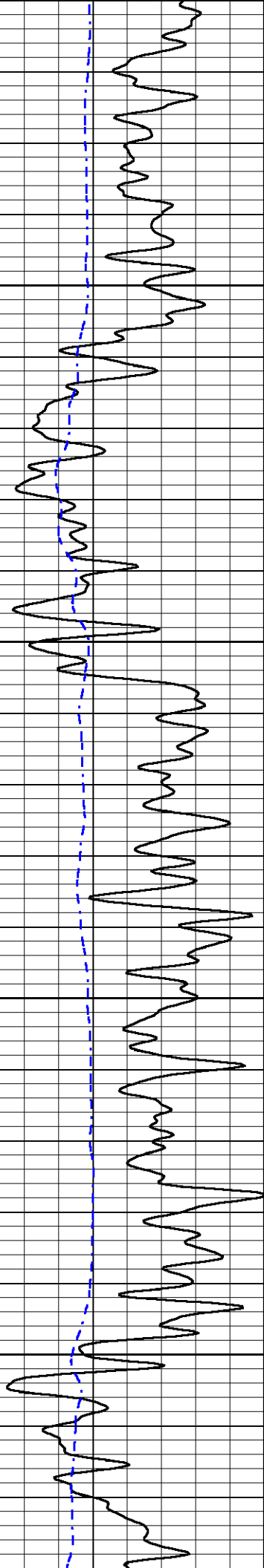
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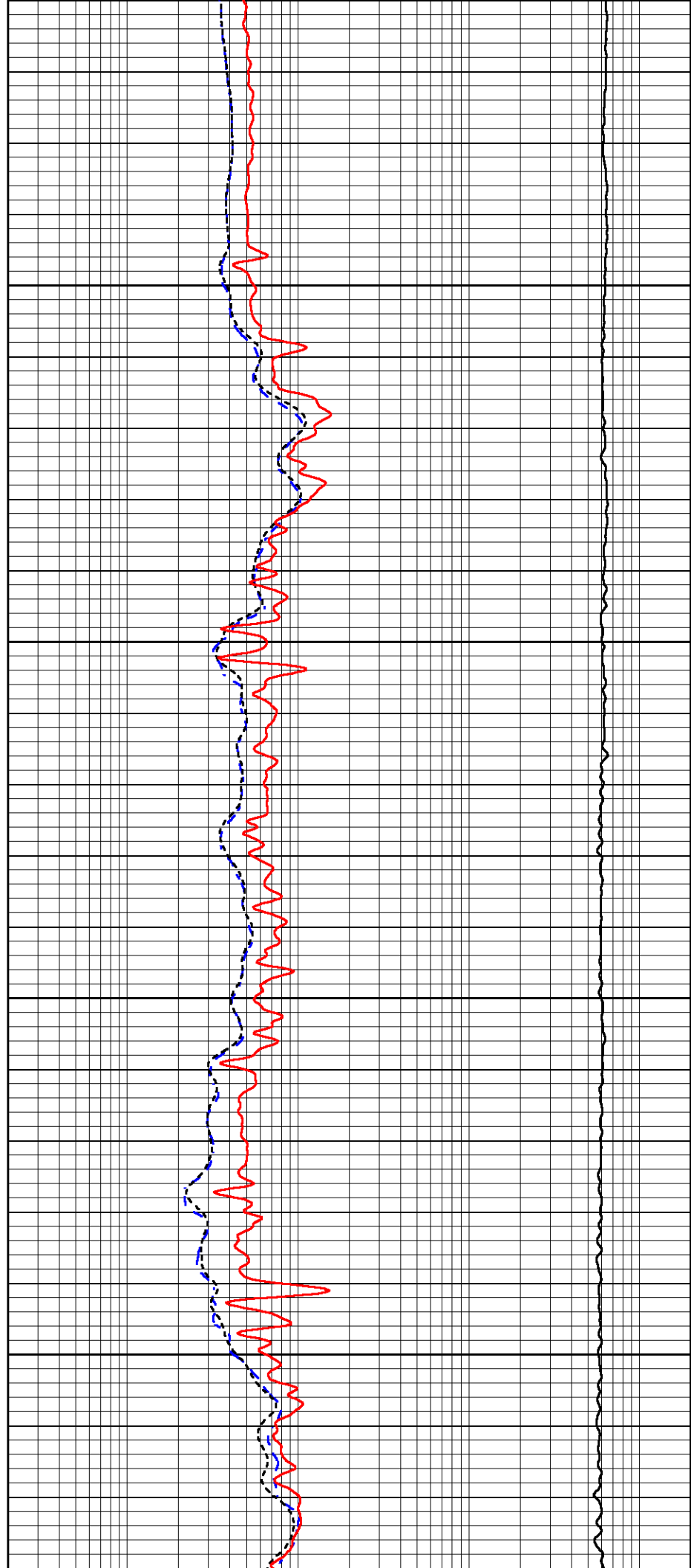


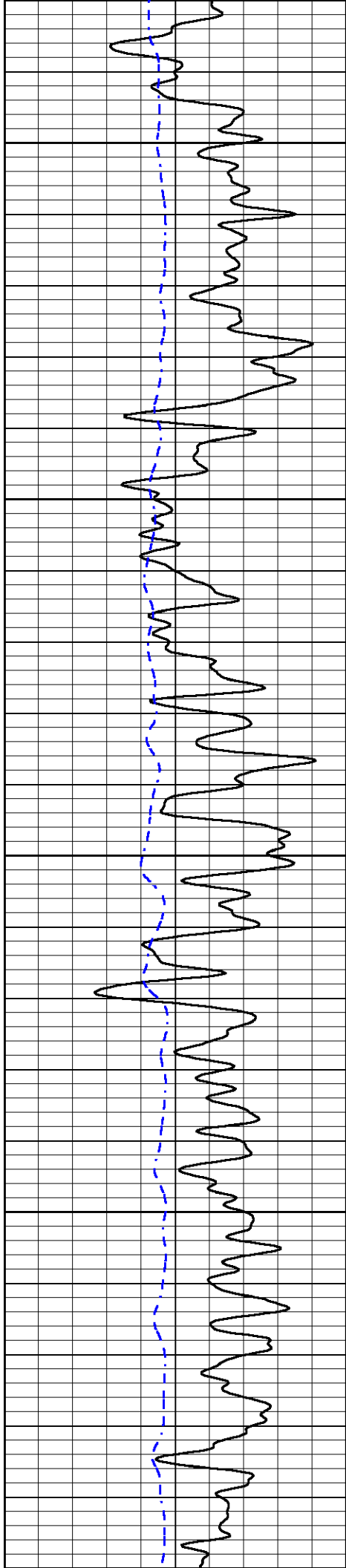
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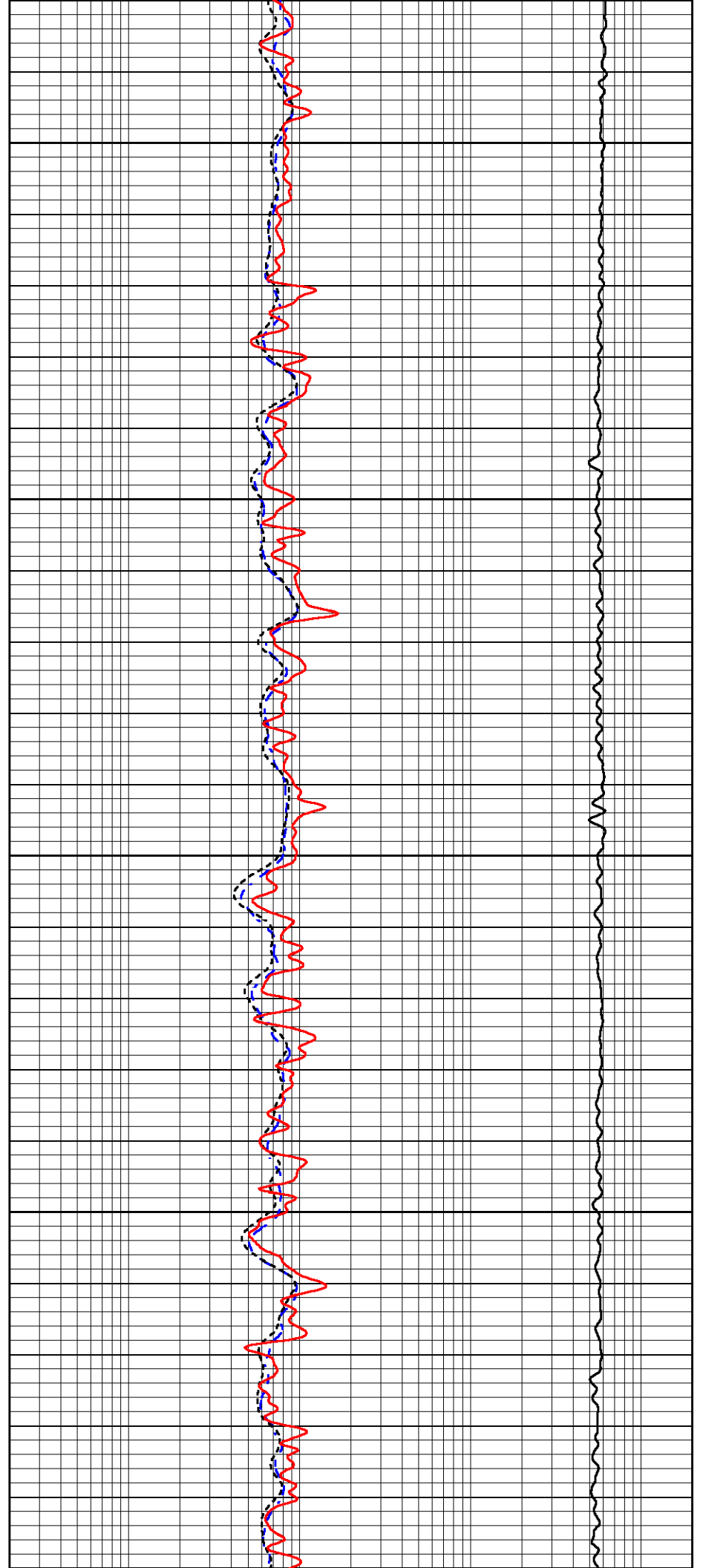
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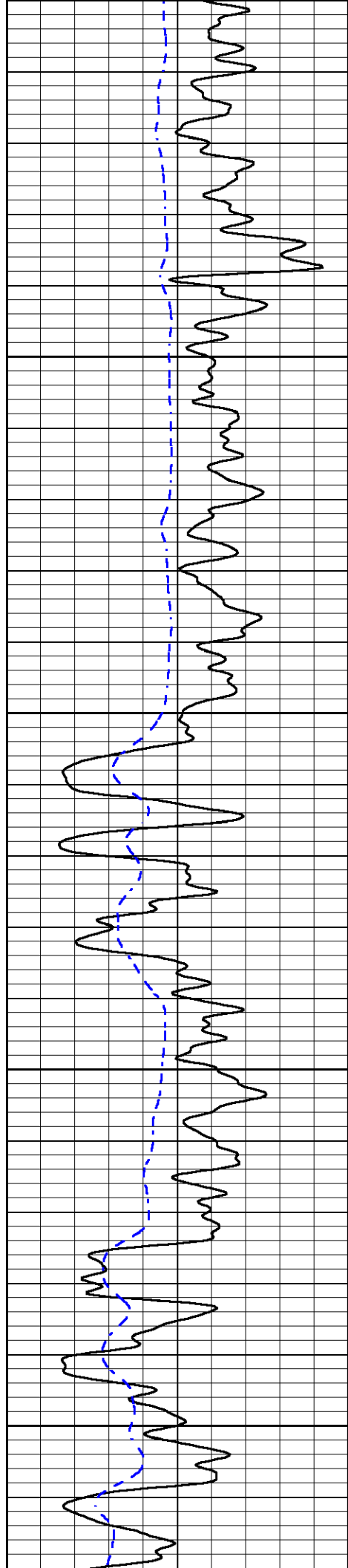
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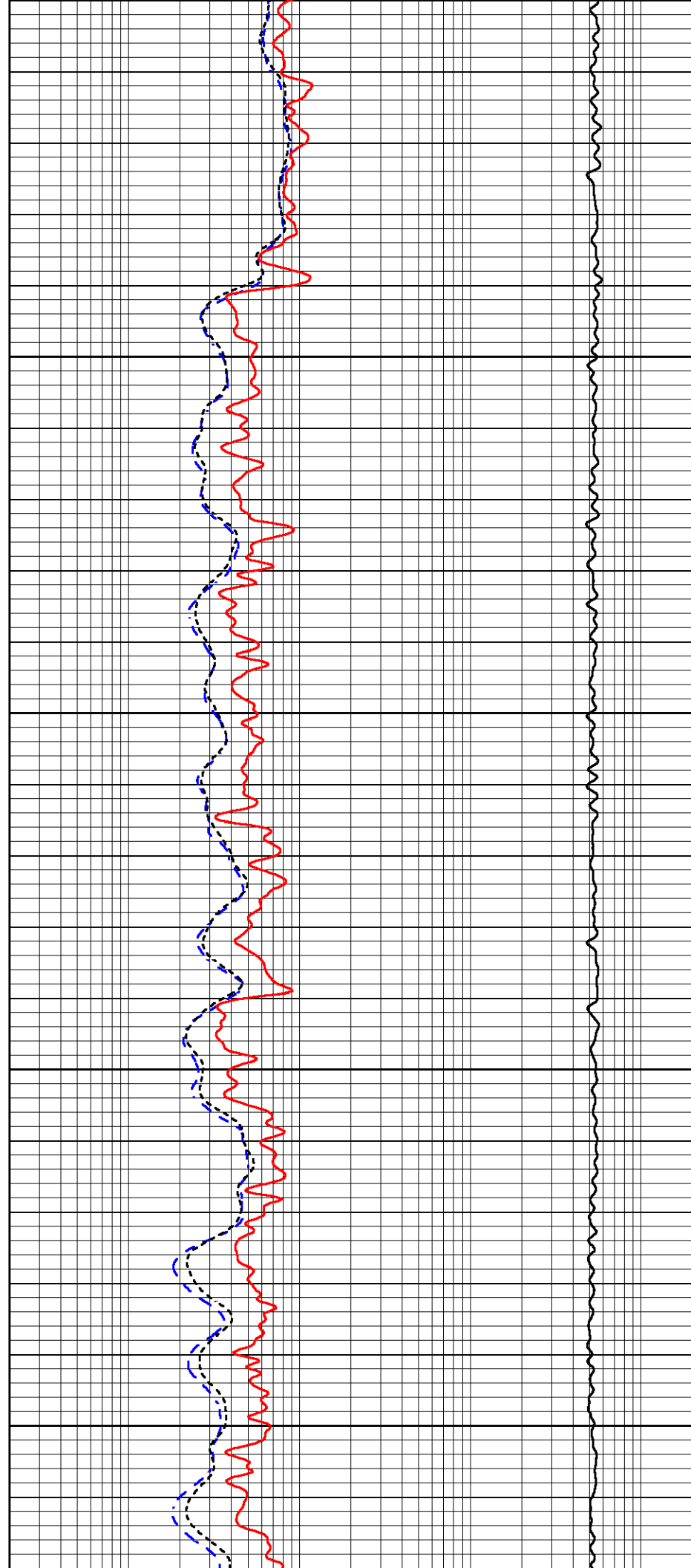
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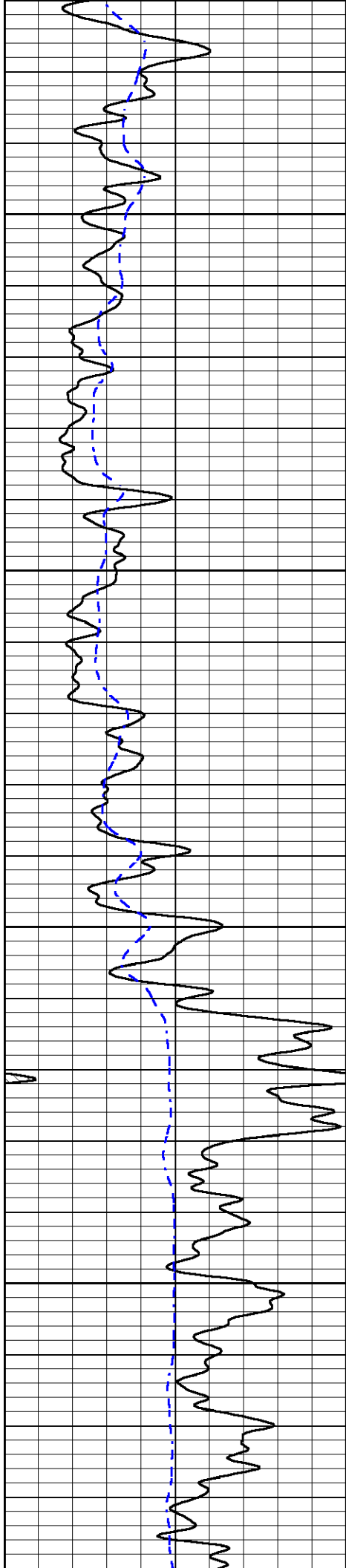
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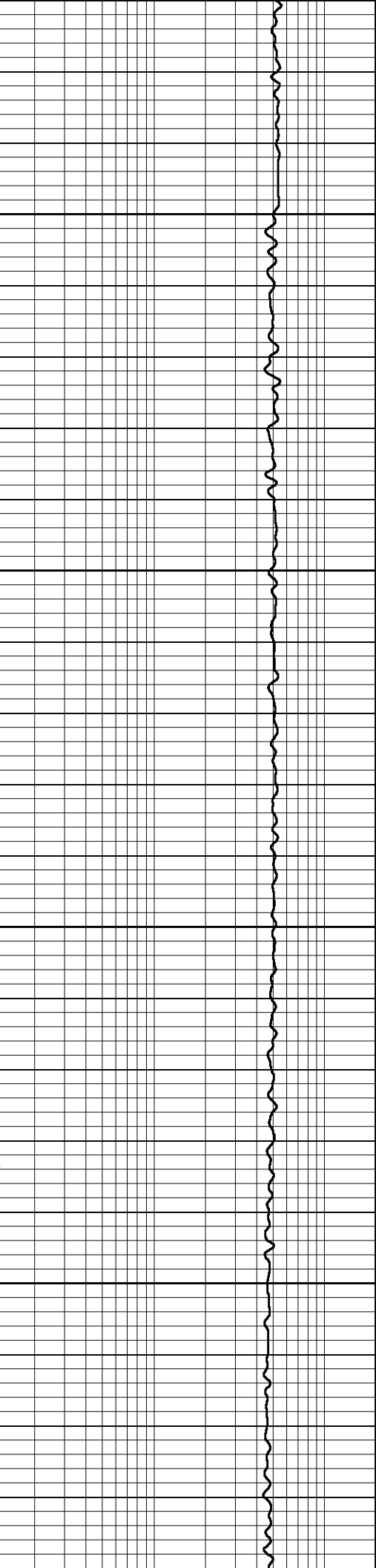
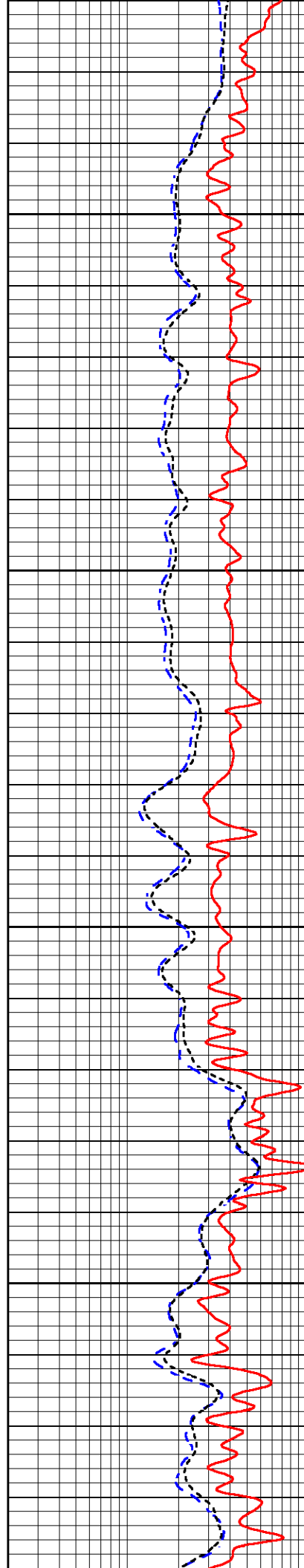


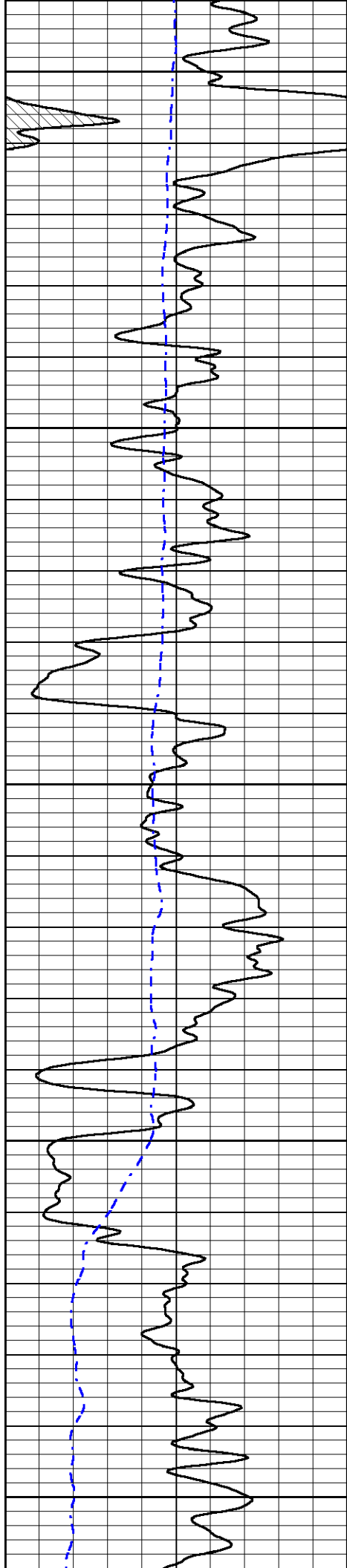
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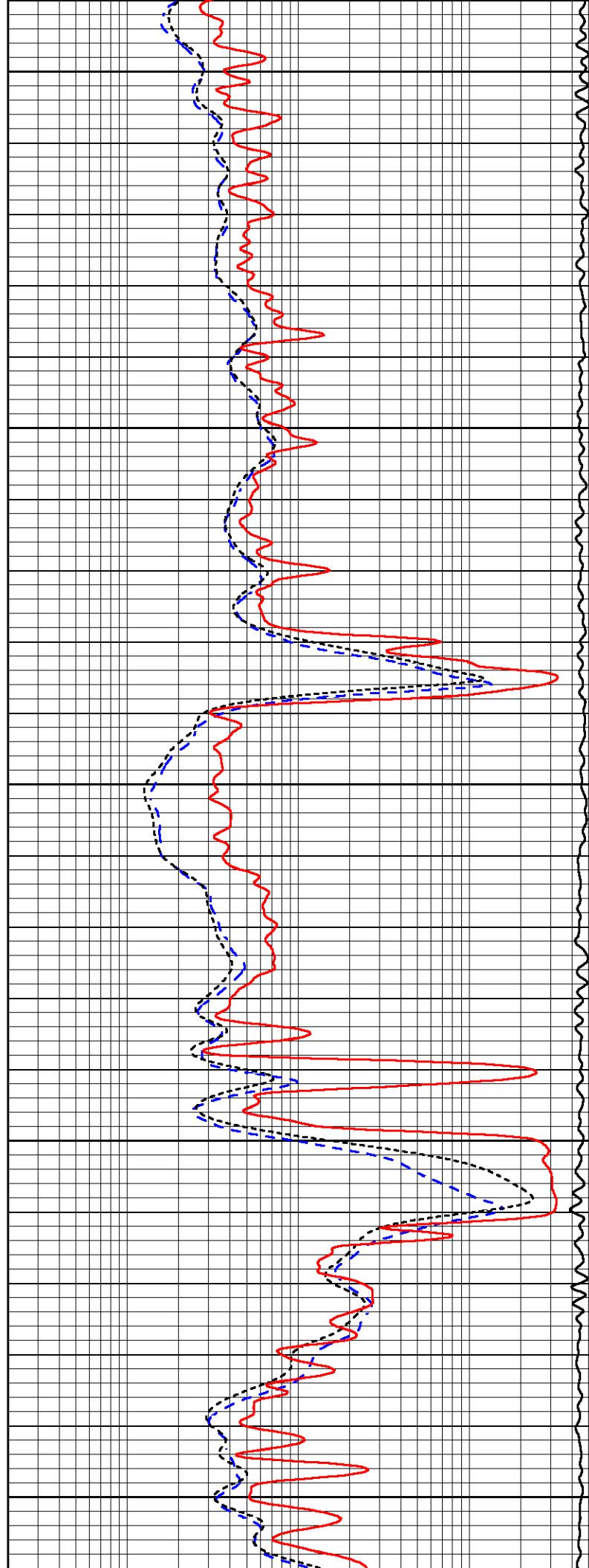
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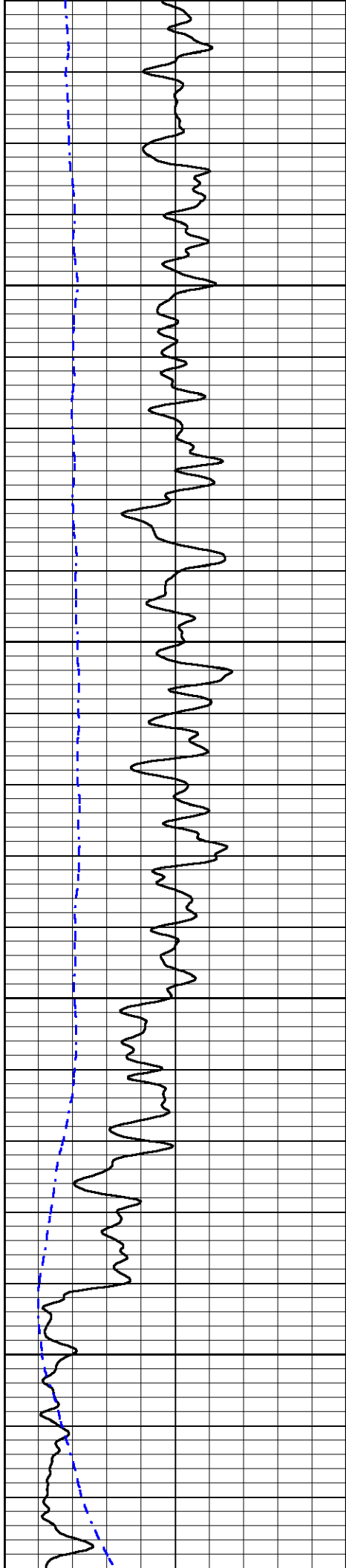
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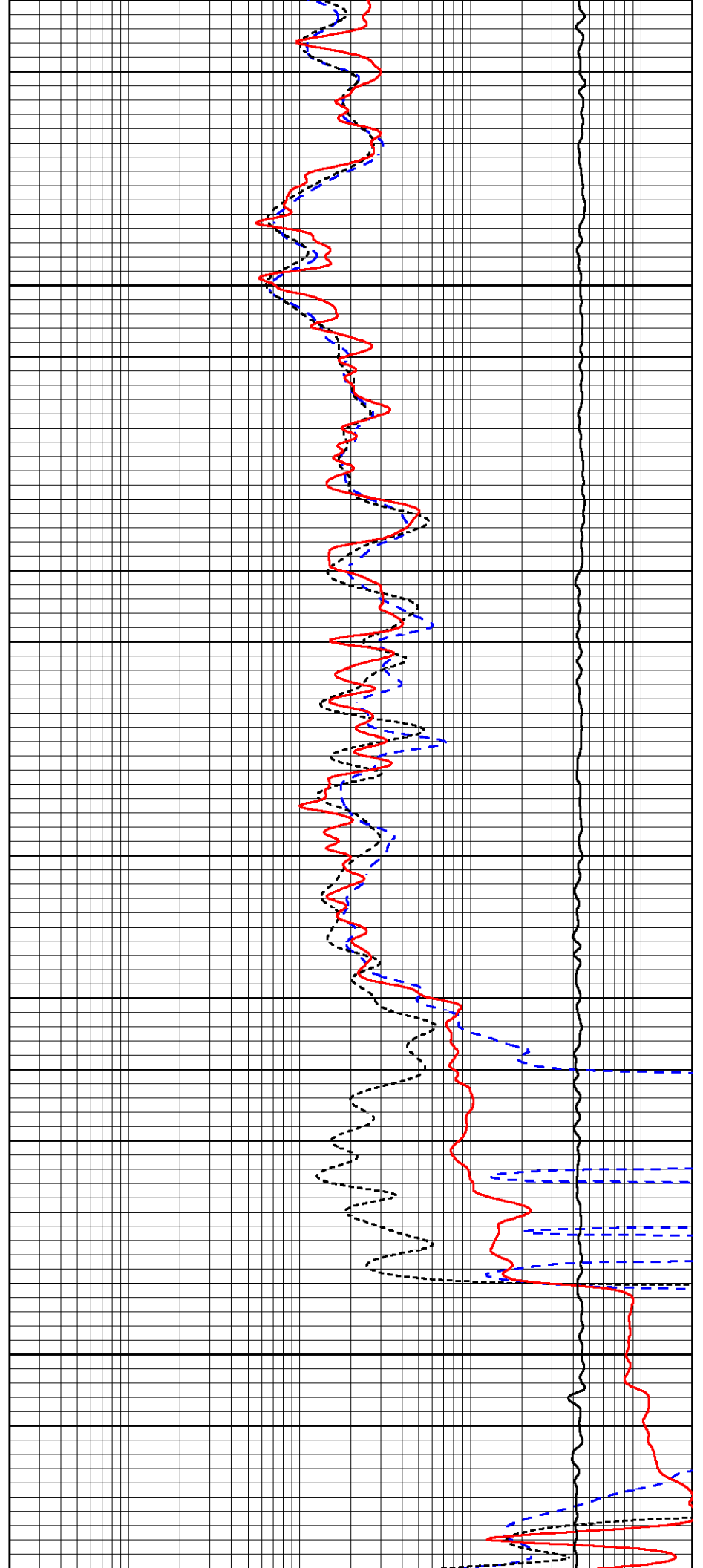


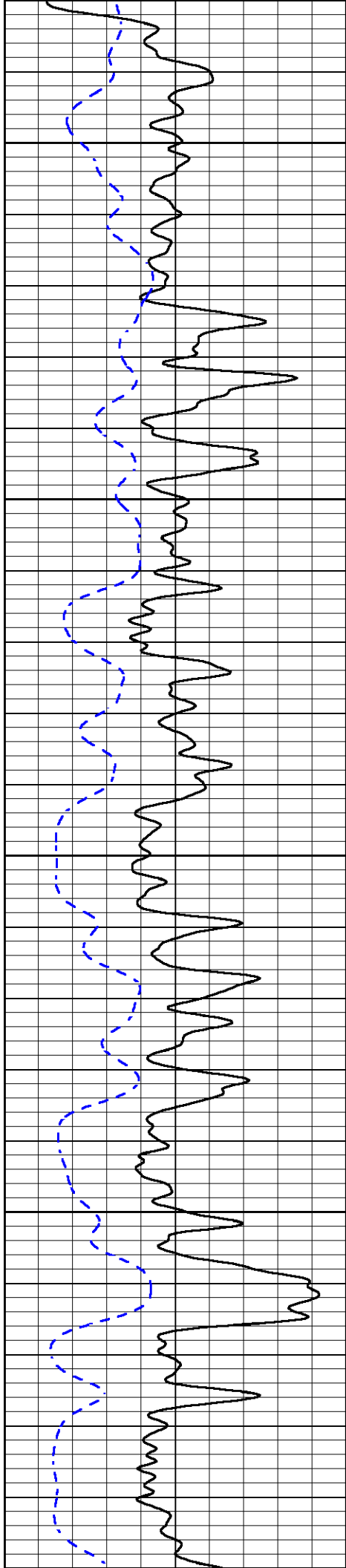
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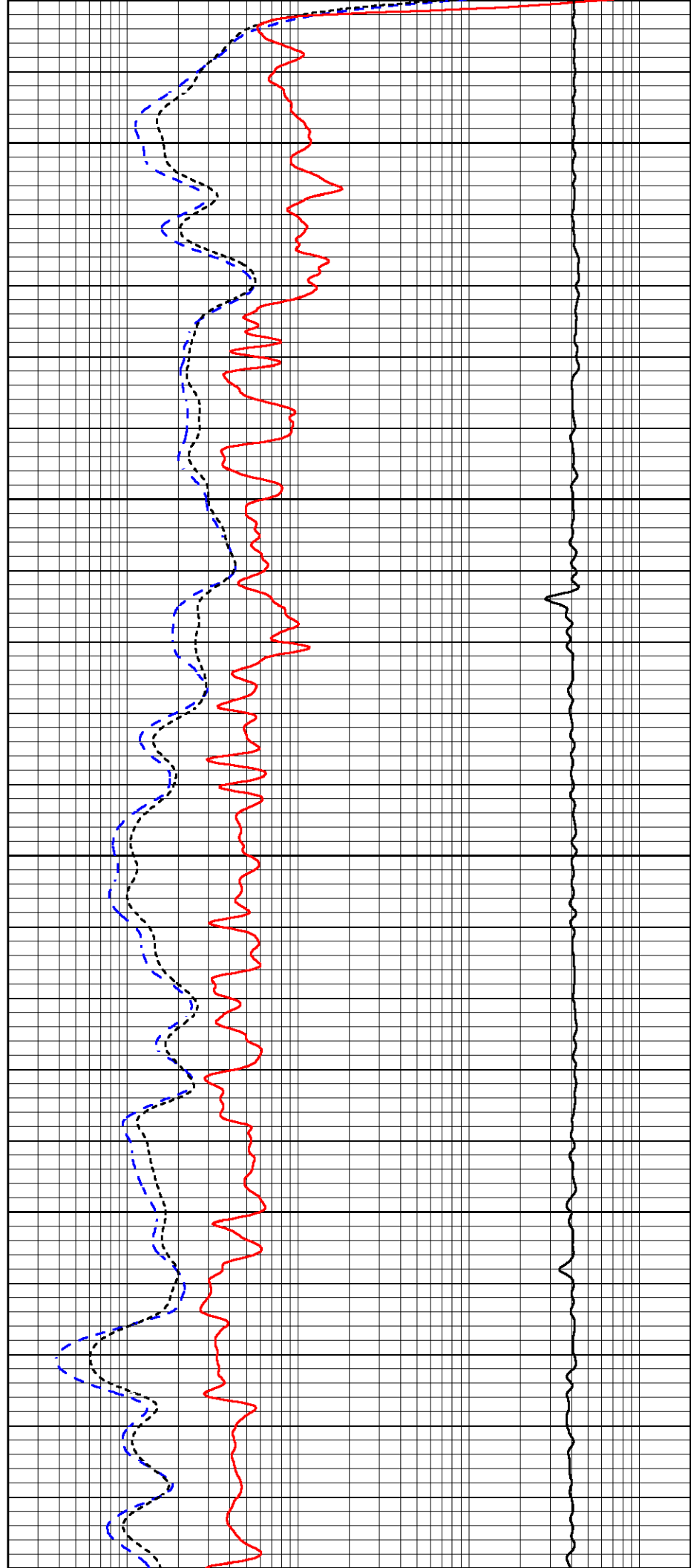
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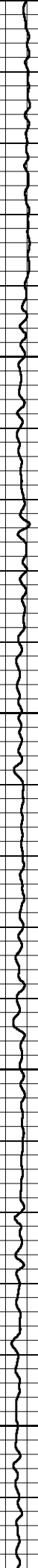
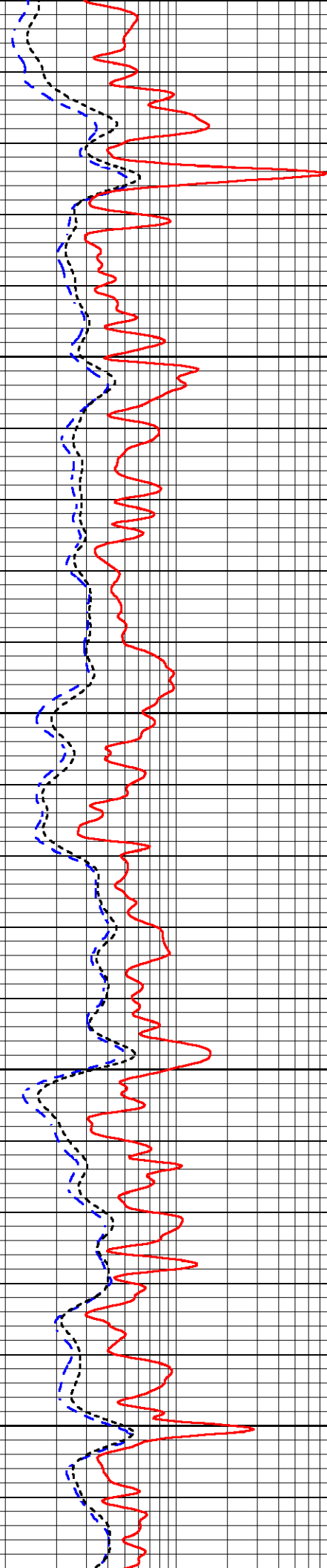
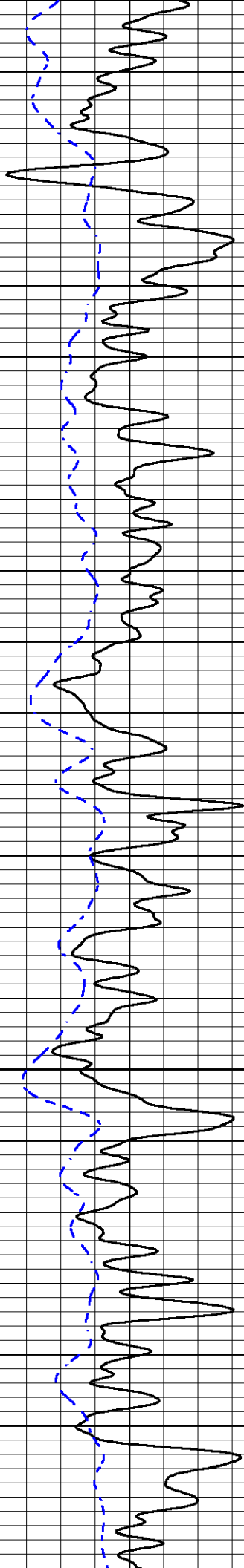
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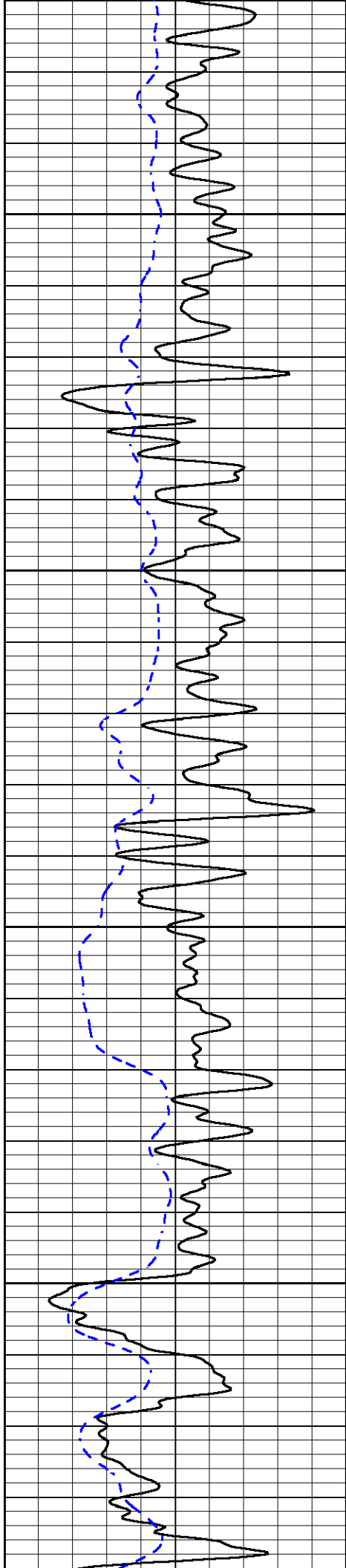
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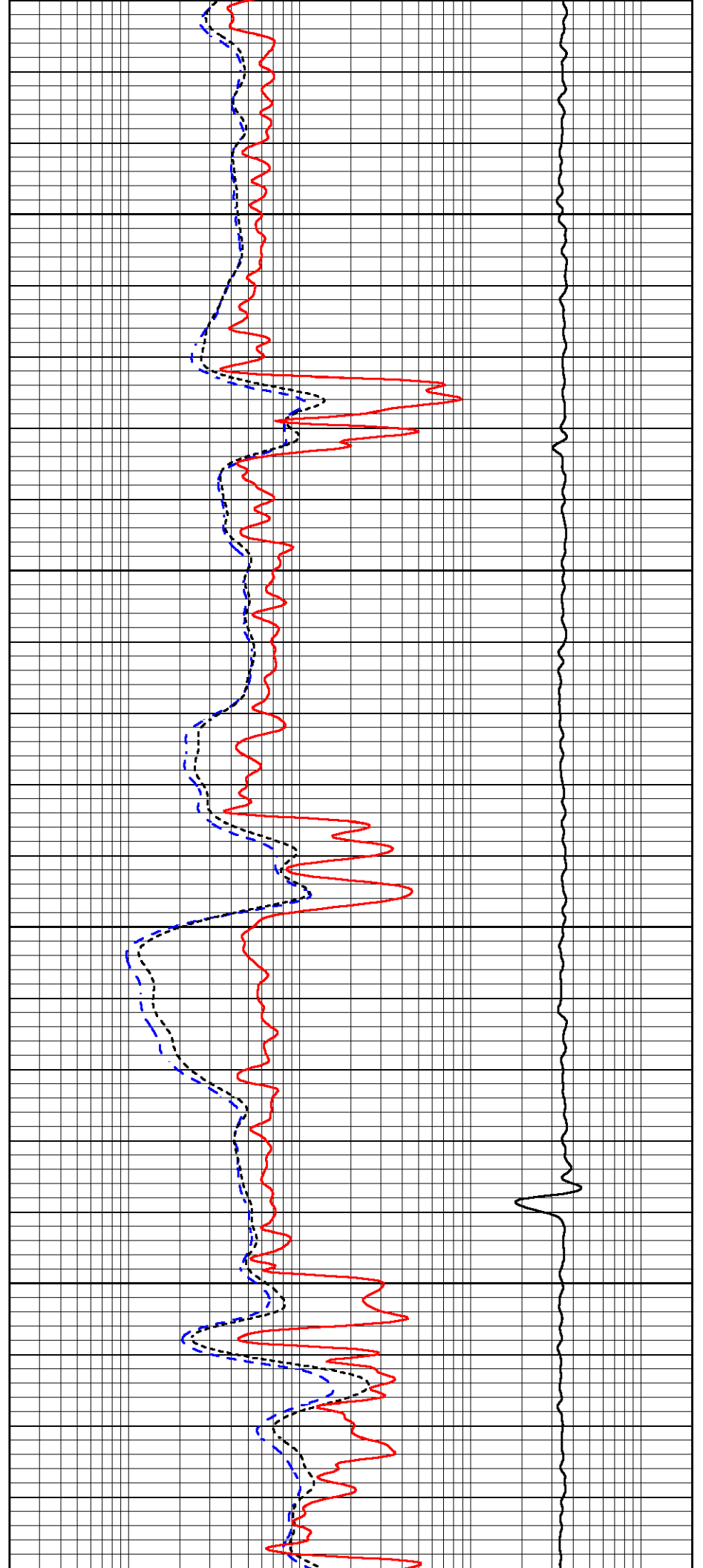


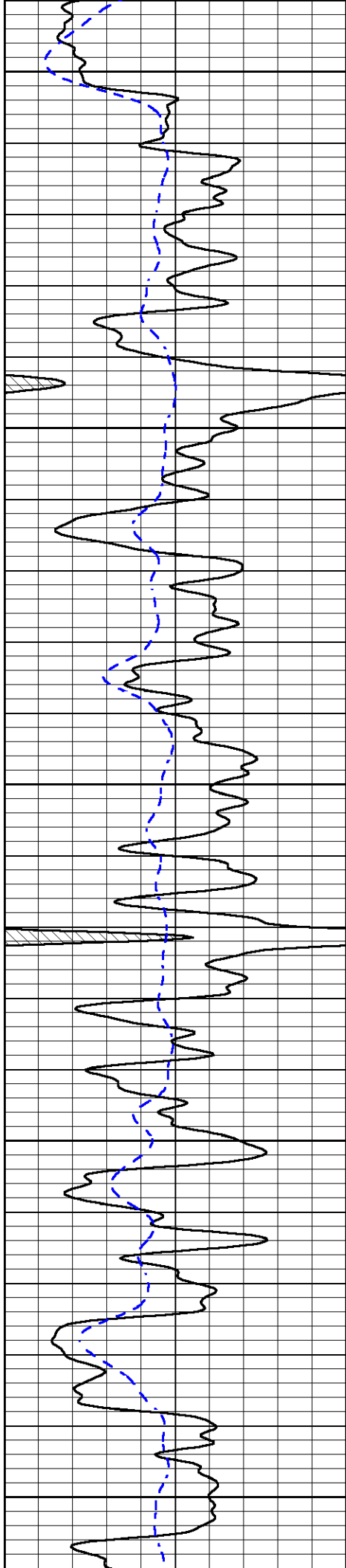
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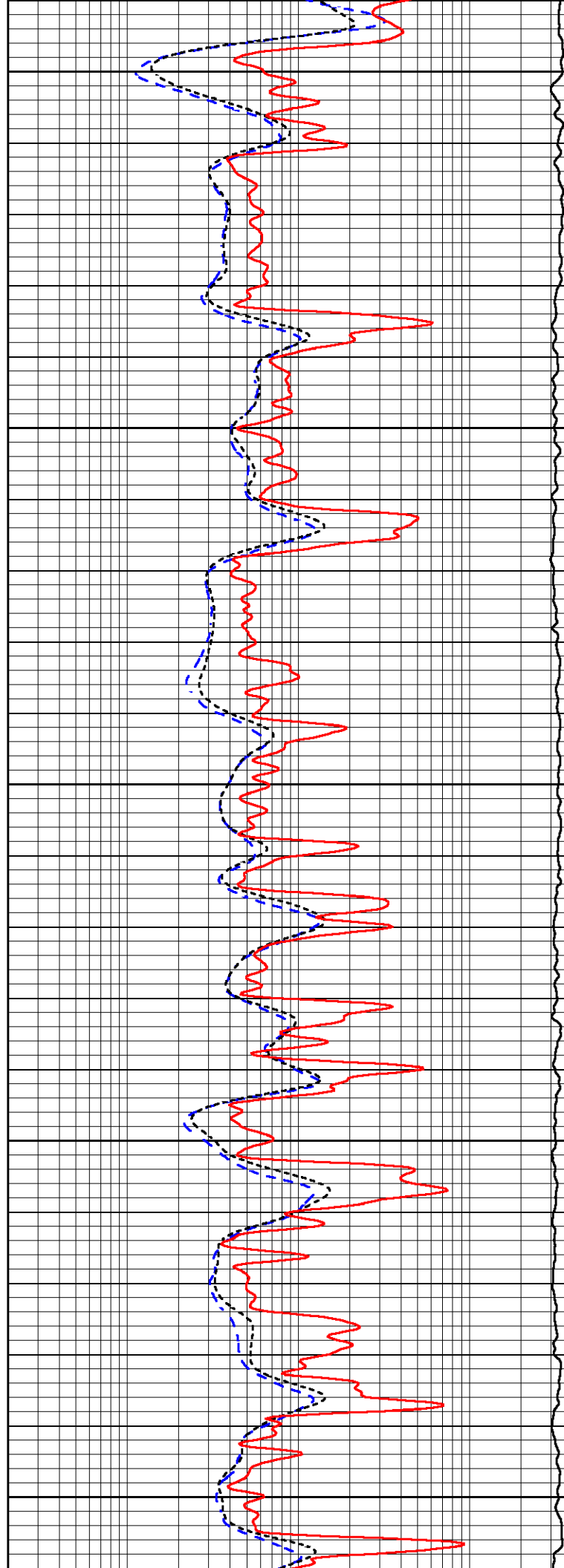
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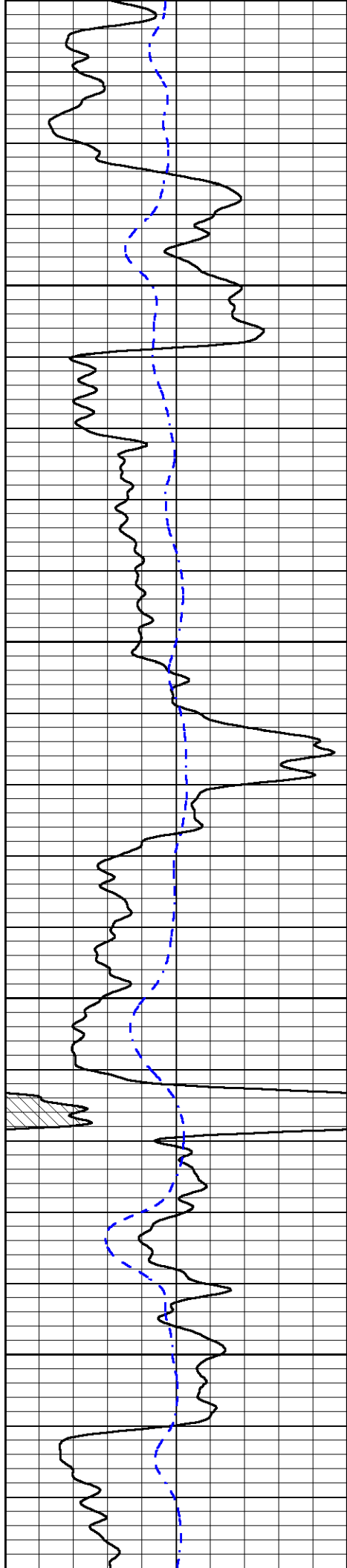
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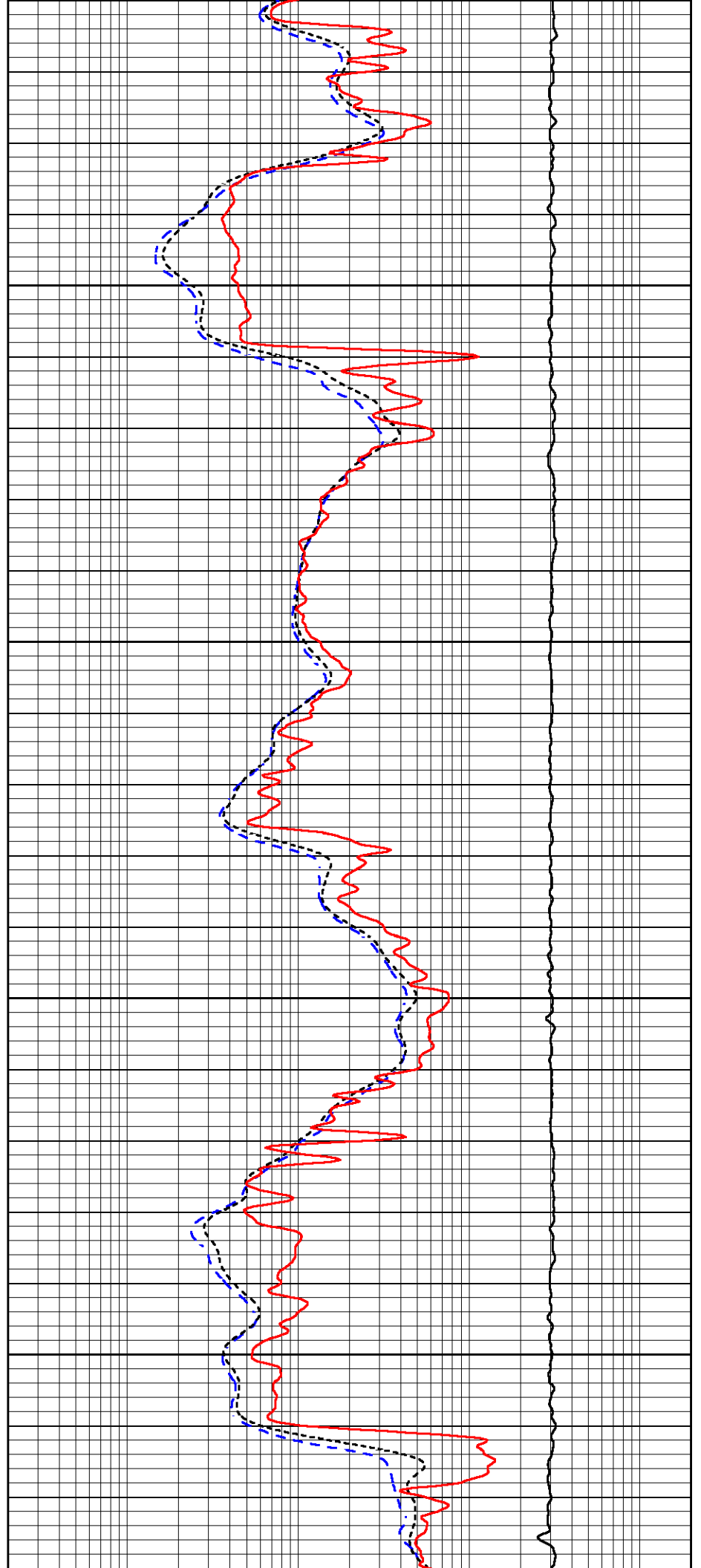


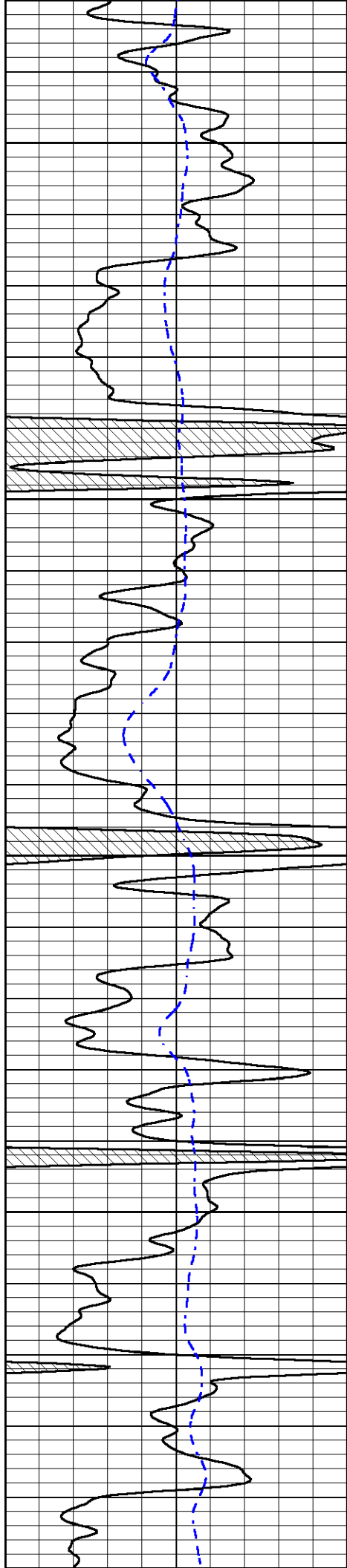
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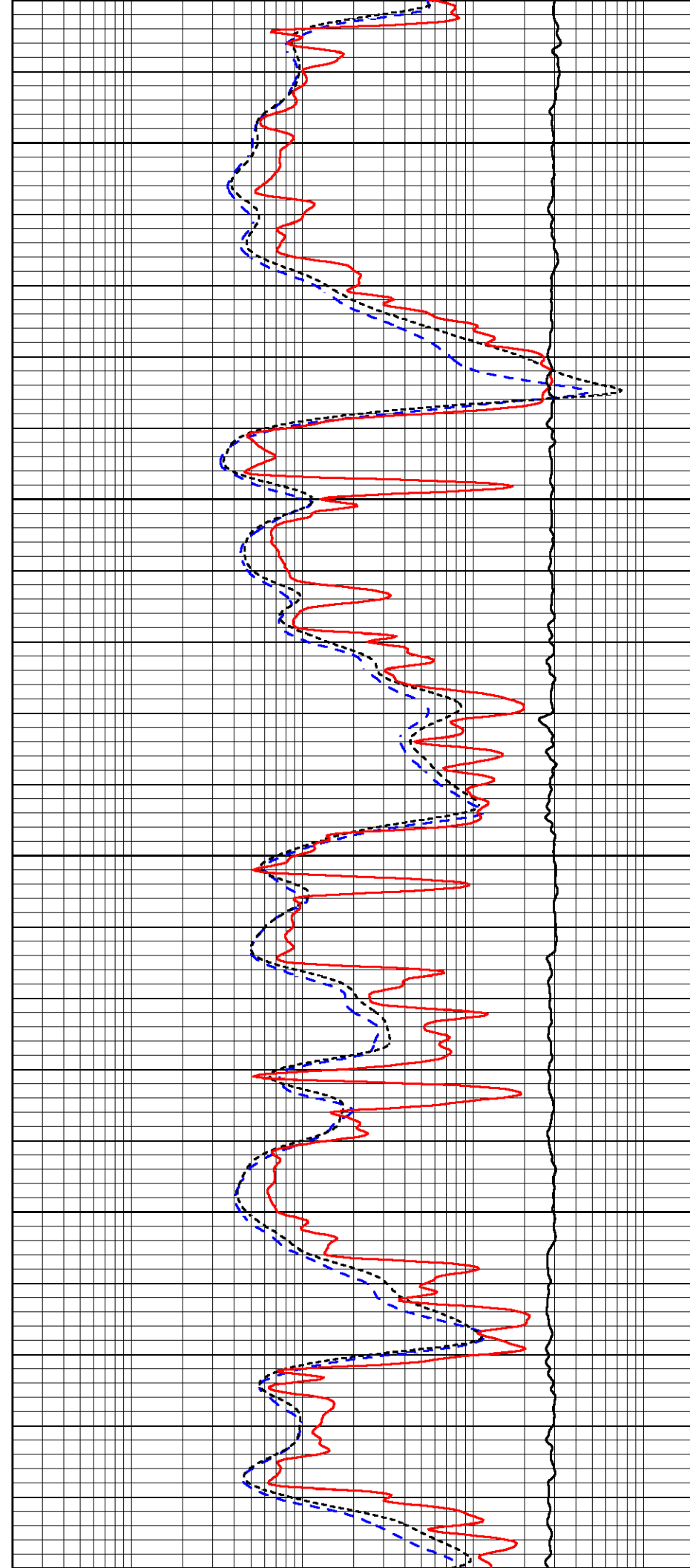
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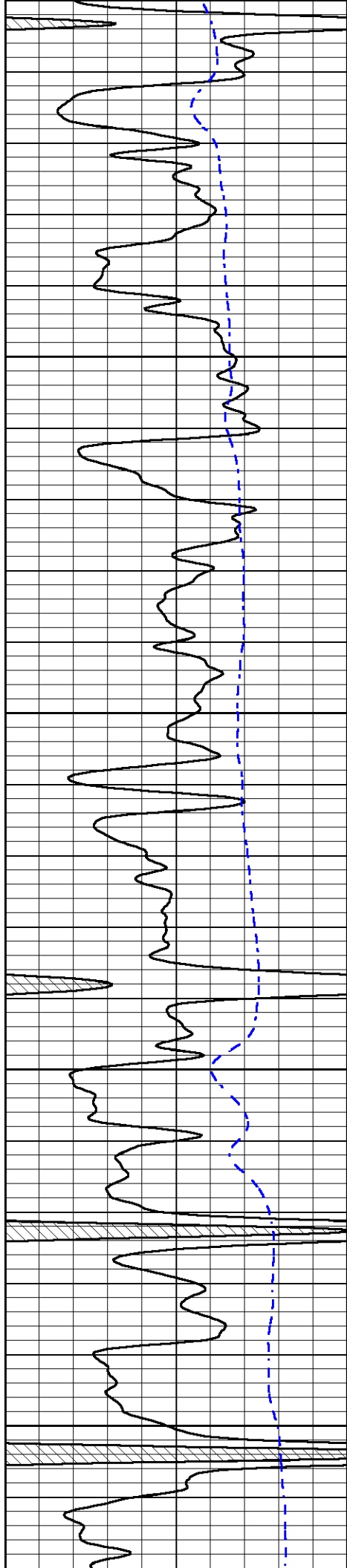
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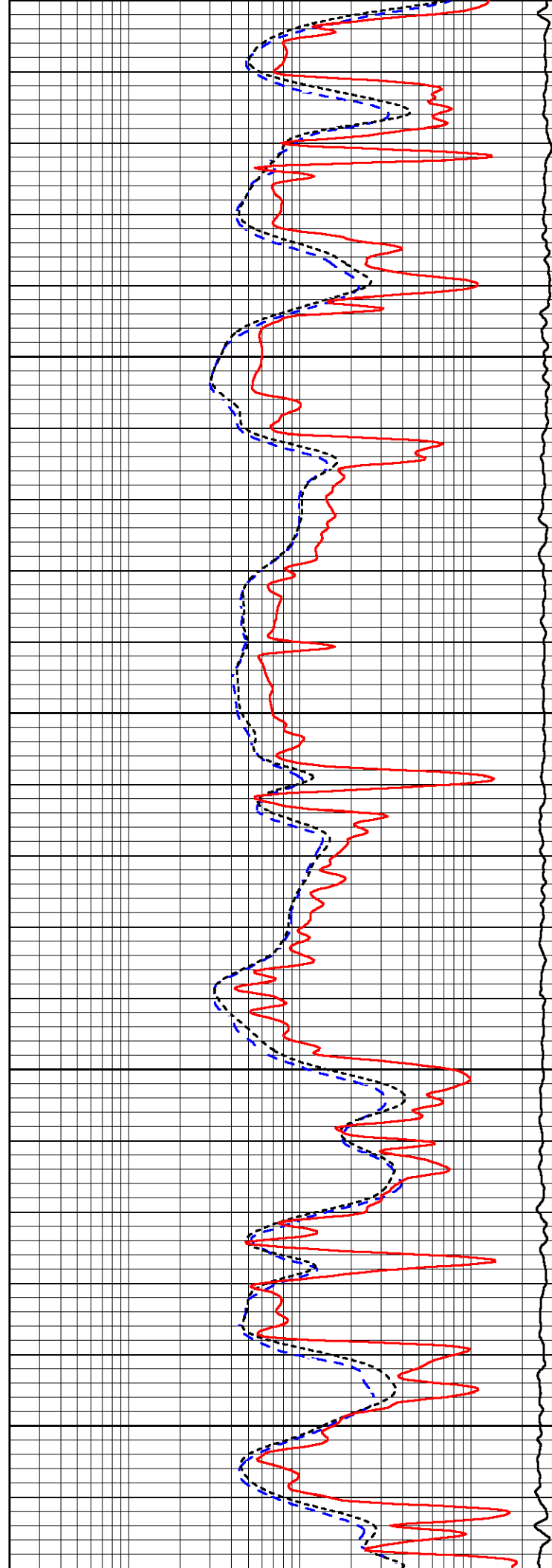
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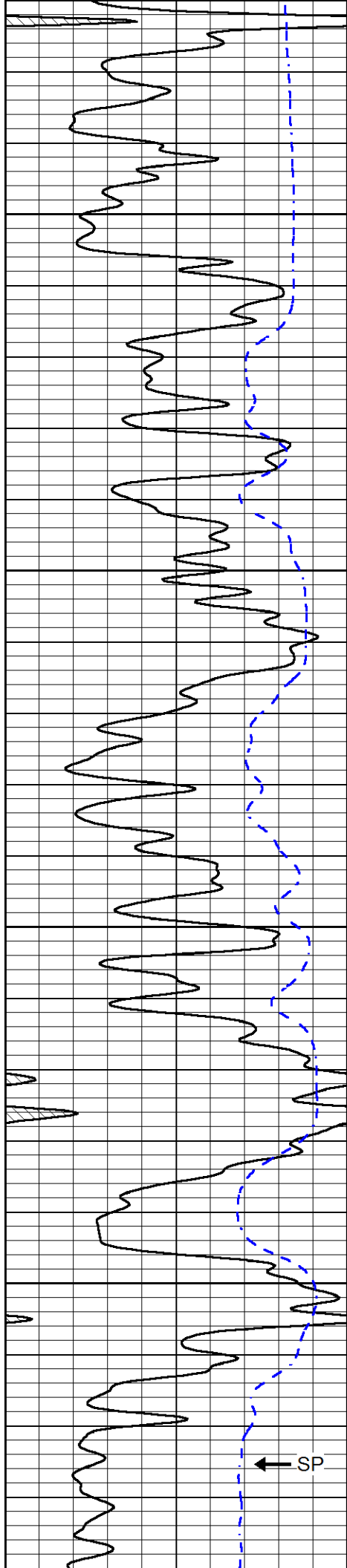
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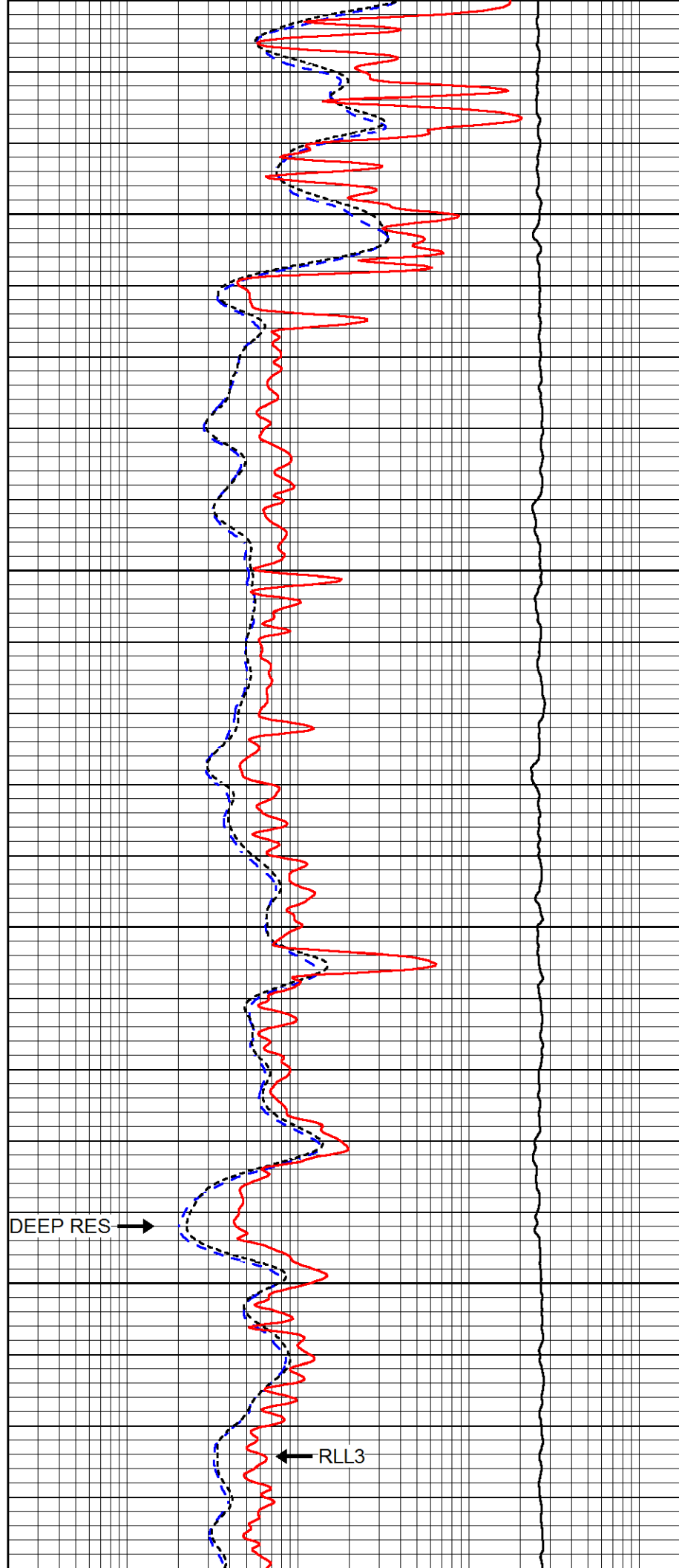


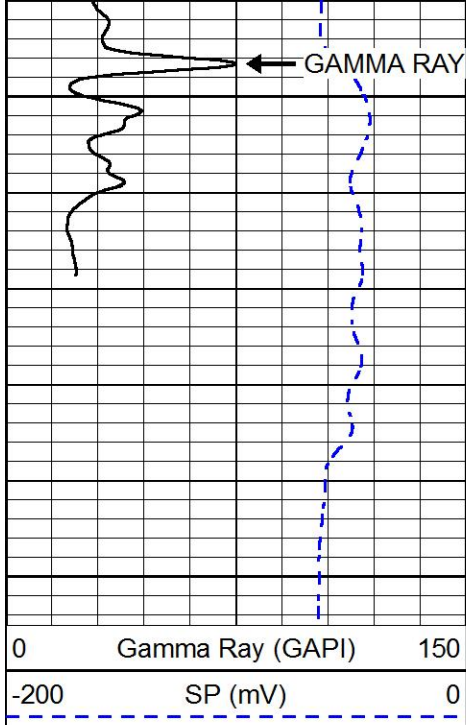
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4750

4800

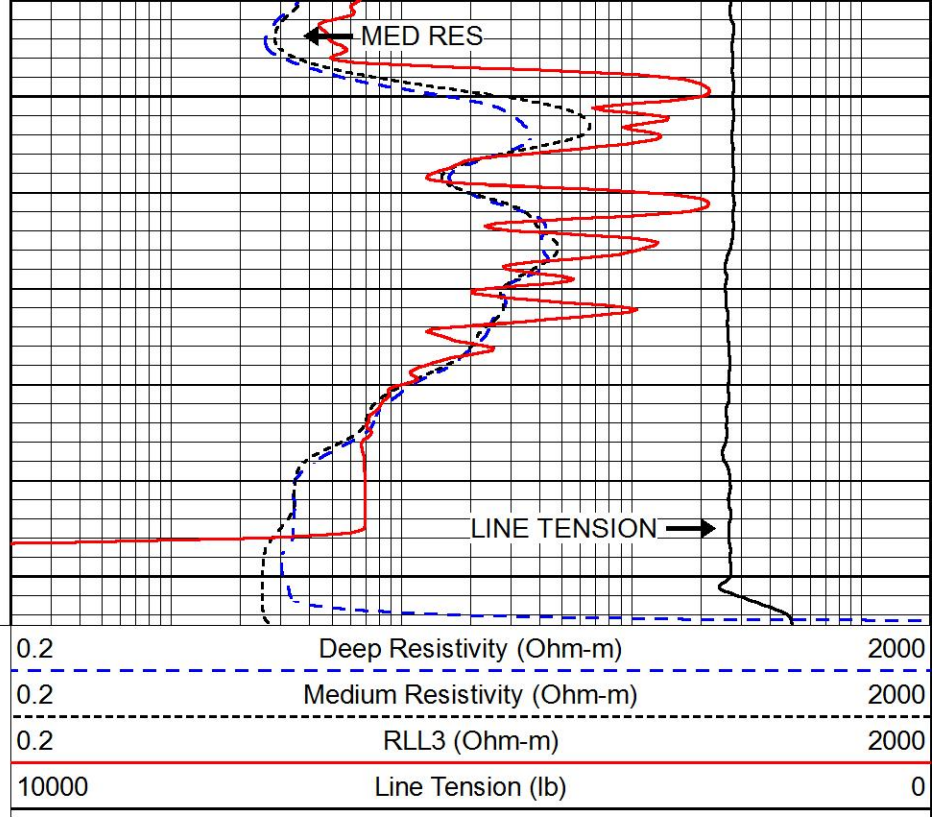




4850

4900

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

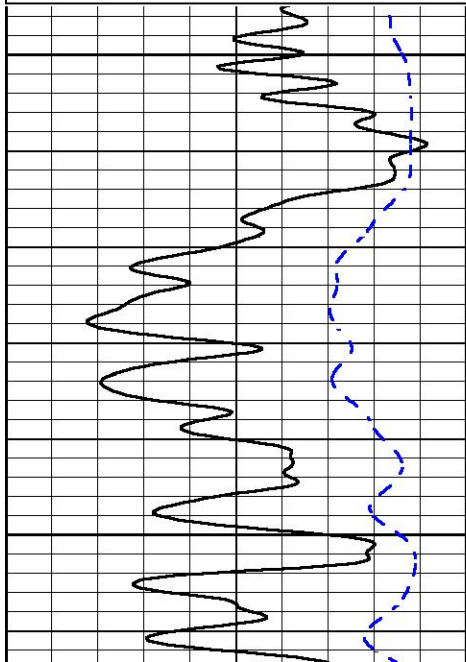


REPEAT SECTION

Database File: murfin_cwa_e 1-17.db
 Dataset Pathname: stkml/pass2.1
 Presentation Format: dil
 Dataset Creation: Wed Sep 20 18:14:44 2017
 Charted by: Depth in Feet scaled 1:240

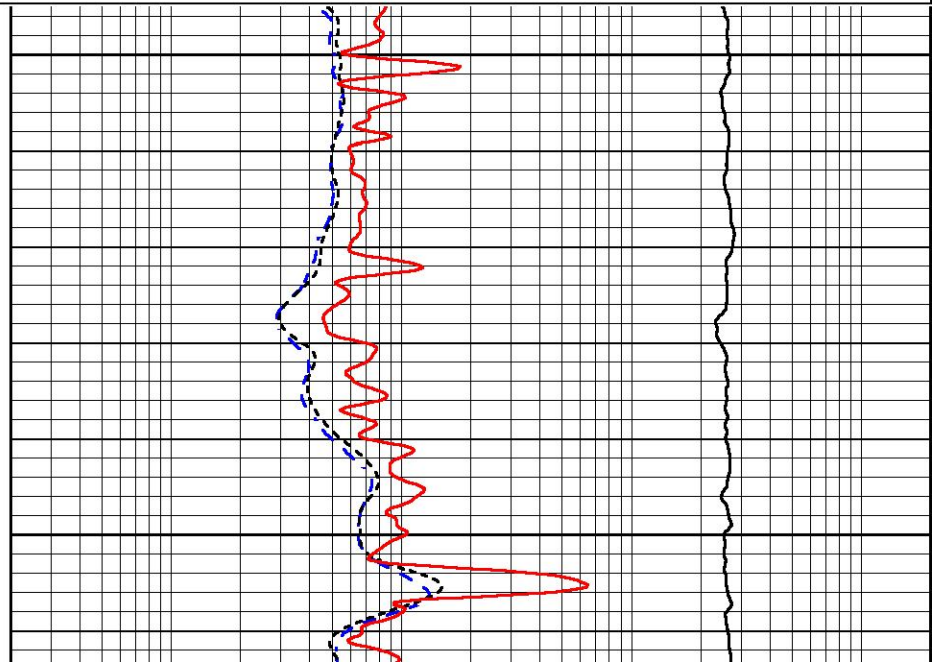
0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

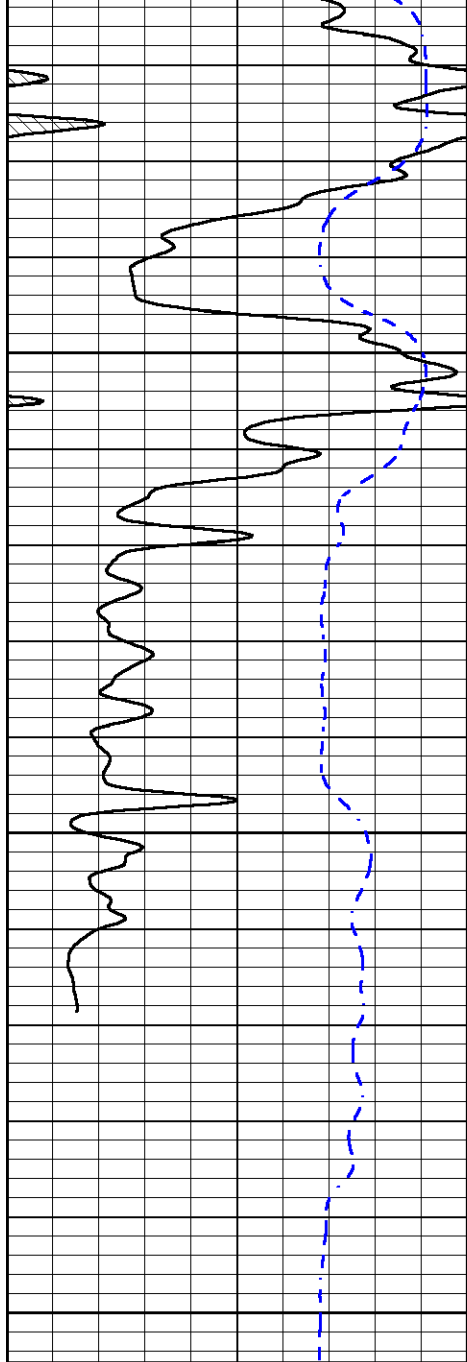
0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0



4700

4750





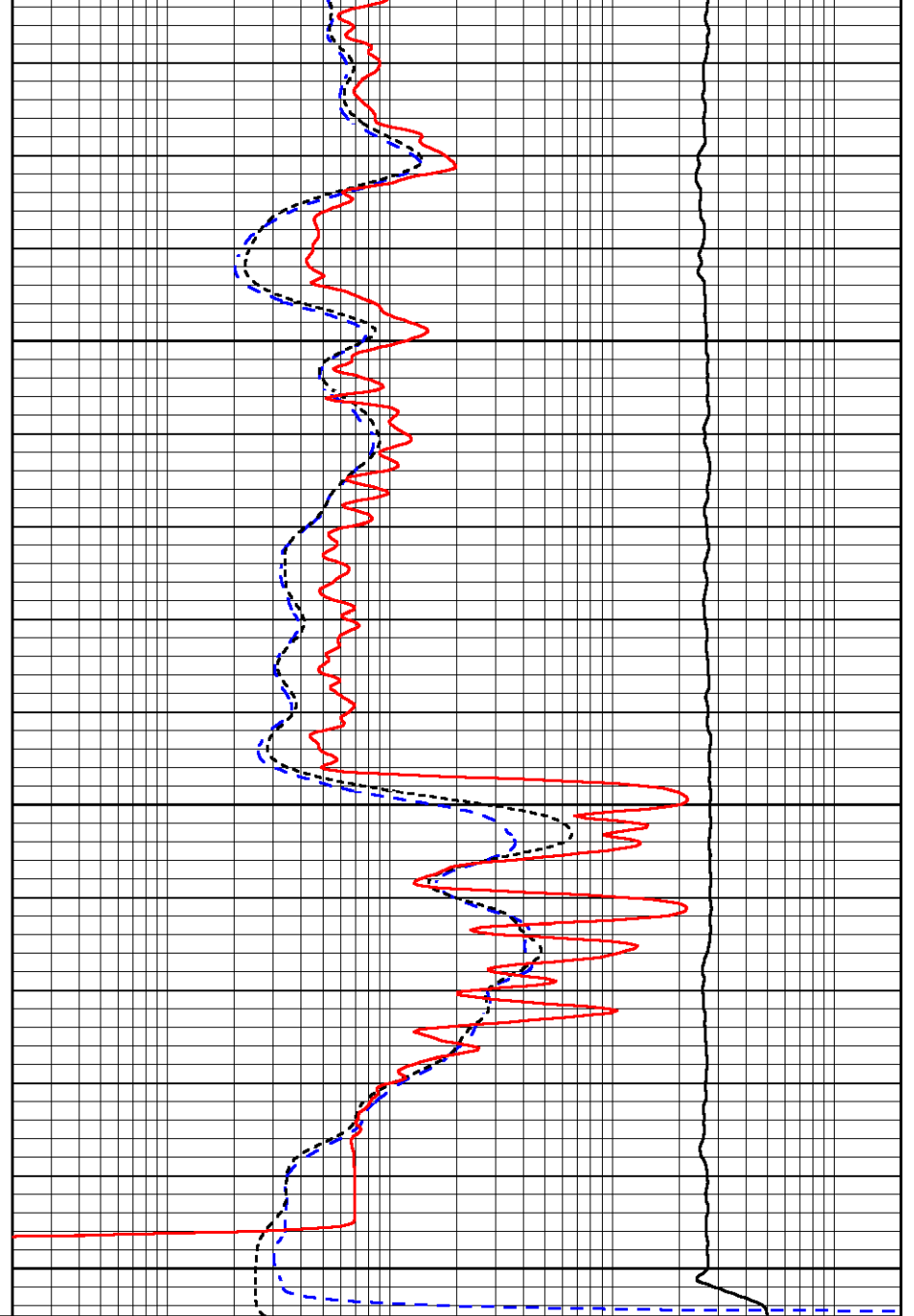
4800

4850

4900

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

Calibration Report

Database File murfin_cwa_e 1-17.db
 Dataset Pathname stkml/pass3.1
 Dataset Creation Wed Sep 20 17:59:02 2017

Dual Induction Calibration Report

Serial-Model: PSI 91-M&W
 Calibration Performed: Wed Sep 13 22:23:16 2017

Loop:	Readings		References		Results	
	Air	Loop	Air	Loop	Gain	Offset
Deep	166.796	835.089	0.000	255.800 mmho/m	0.430	-33.000

Depth 100.000 100.000 100.000 0.000 255.800 mmho/m 0.360 -29.500
 Medium 142.009 1348.560

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Wed Sep 06 19:50:56 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	38000.0000	-1.2000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	41000.0000	-0.3000
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 Sep 06 19:51:03 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

Well	CWA 'E' #1-17
Field	WILDCAT
County	RAWLINS
State	KANSAS