



**PIONEER**

Pioneer Energy Services

## DUAL INDUCTION LOG

Company MURFIN DRILLING COMPANY, INC.  
Well DORSCH #1-24  
Field WILDCAT  
County CHEYENNE  
State KANSAS

Company MURFIN DRILLING COMPANY, INC.  
Well DORSCH #1-24  
Field WILDCAT  
County CHEYENNE State KANSAS

Location: API #: 15-023-21533-00-00

2310' FSL & 1980' FEL

SEC 24 TWP 2S RGE 38W

Permanent Datum GROUND LEVEL Elevation 3373'  
Log Measured From KELLY BUSHING  
Drilling Measured From KELLY BUSHING

Other Services  
CNL/CDL  
MEL/BHCS  
Elevation  
K.B. 3378'  
D.F. N/A  
G.L. 3373'

Date 2/25/2020

|                        |               |  |  |
|------------------------|---------------|--|--|
| Run Number             | ONE           |  |  |
| Depth Driller          | 5100'         |  |  |
| Depth Logger           | 5103'         |  |  |
| Bottom Logged Interval | 5102'         |  |  |
| Top Log Interval       | 00            |  |  |
| Casing Driller         | 8.625" @ 306' |  |  |
| Casing Logger          | 304'          |  |  |
| Bit Size               | 7.875"        |  |  |
| Type Fluid in Hole     | CHEMICAL      |  |  |
| Salinity, ppm CL       | 600           |  |  |
| Density / Viscosity    | 9.2 62        |  |  |
| pH / Fluid Loss        | 10.5 6.4      |  |  |
| Source of Sample       | FLOWLINE      |  |  |
| Rm @ Meas. Temp        | 1.10 @ 57     |  |  |
| Rmt @ Meas. Temp       | .83 @ 57      |  |  |
| Rmc @ Meas. Temp       | 1.49 @ 57     |  |  |
| Source of Rmt / Rmc    | CHARTS        |  |  |
| Rm @ BHT               | .49 @ 127     |  |  |
| Operating Rig Time     | 4 HOURS       |  |  |
| Max Rec. Temp. F       | 127 DEGF      |  |  |
| Equipment Number       | P-108         |  |  |
| Location               | HAYS          |  |  |
| Recorded By            | J. HENRICKSON |  |  |
| Witnessed By           | BRAD RINE     |  |  |

<<< Fold Here >>>

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 KANSAS  
NORTH TO U ROAD, 1/2 EAST, NORTH 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

Engineer: J. HENRICKSON  
Operator:  
Operator:  
Operator:

### This Log Record Was Witnessed By

Primary Witness: BRAD RINE  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

Top - Bottom

|           |             |             |             |           |            |       |              |
|-----------|-------------|-------------|-------------|-----------|------------|-------|--------------|
| A         | BOREID      | BOTTEMP     | CASEOD      | CASETHCK  | FLUIDDEN   | M     | MATRXDEN     |
| 1         | in<br>7.875 | degF<br>127 | in<br>5.5   | in<br>0   | g/cc<br>1  | 2     | g/cc<br>2.71 |
| NPORSEL   | PERFS       | SNDERR      | SNDERRM     | SPSHIFT   | SRFTEMP    | SZCOR | TDEPTH       |
| Limestone | 0           | mmho/m<br>0 | mmho/m<br>0 | mV<br>400 | degF<br>50 | Off   | ft<br>5103   |

| Sensor                                             | Offset (ft)             | Schematic                                                                           |                                                                                     | Description       | Length (ft) | O.D. (in) | Weight (lb) |
|----------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|-------------|-----------|-------------|
| GR                                                 | 44.50                   |    |    | GR-M&W (89-M&W)   | 3.00        | 3.50      | 50.00       |
| CNLSC<br>CNSSC                                     | 41.40<br>40.65          |                                                                                     |                                                                                     | CNT-M&W (tk10-MW) | 5.50        | 3.50      | 100.00      |
| LSD<br>DCAL<br>SSD                                 | 32.35<br>32.33<br>31.85 |   |   | CDL-M&W (934-229) | 8.50        | 4.00      | 250.00      |
| ML-PSI UDM ML (UDM-01)<br>Stackable Microlog Tools |                         |                                                                                     |                                                                                     |                   | 11.50       | 4.00      | 215.00      |
| MCAL<br>MI<br>MN                                   | 20.87<br>20.87<br>20.87 |  |  |                   |             |           |             |
| RLL3<br>RLL3F                                      | 15.80<br>15.79          |                                                                                     |                                                                                     |                   |             |           |             |
| CILD                                               | 8.00                    |  |  | DIL-M&W (55-222)  | 18.50       | 3.50      | 220.00      |
|                                                    |                         |                                                                                     |                                                                                     |                   |             |           |             |

CILM

4.70

SP

0.20

Dataset: murfin\_dorsch\_1\_24.db: field/well/stackml/pass3.1  
Total length: 47.00 ft  
Total weight: 835.00 lb  
O.D.: 4.00 in



# MAIN PASS

Database File murfin\_dorsch\_1\_24.db  
Dataset Pathname stackml/pass3.1  
Presentation Format dil2in  
Dataset Creation Wed Feb 26 06:17:31 2020  
Charted by Depth in Feet scaled 1:600

0 GAMMA RAY (GAPI) 150

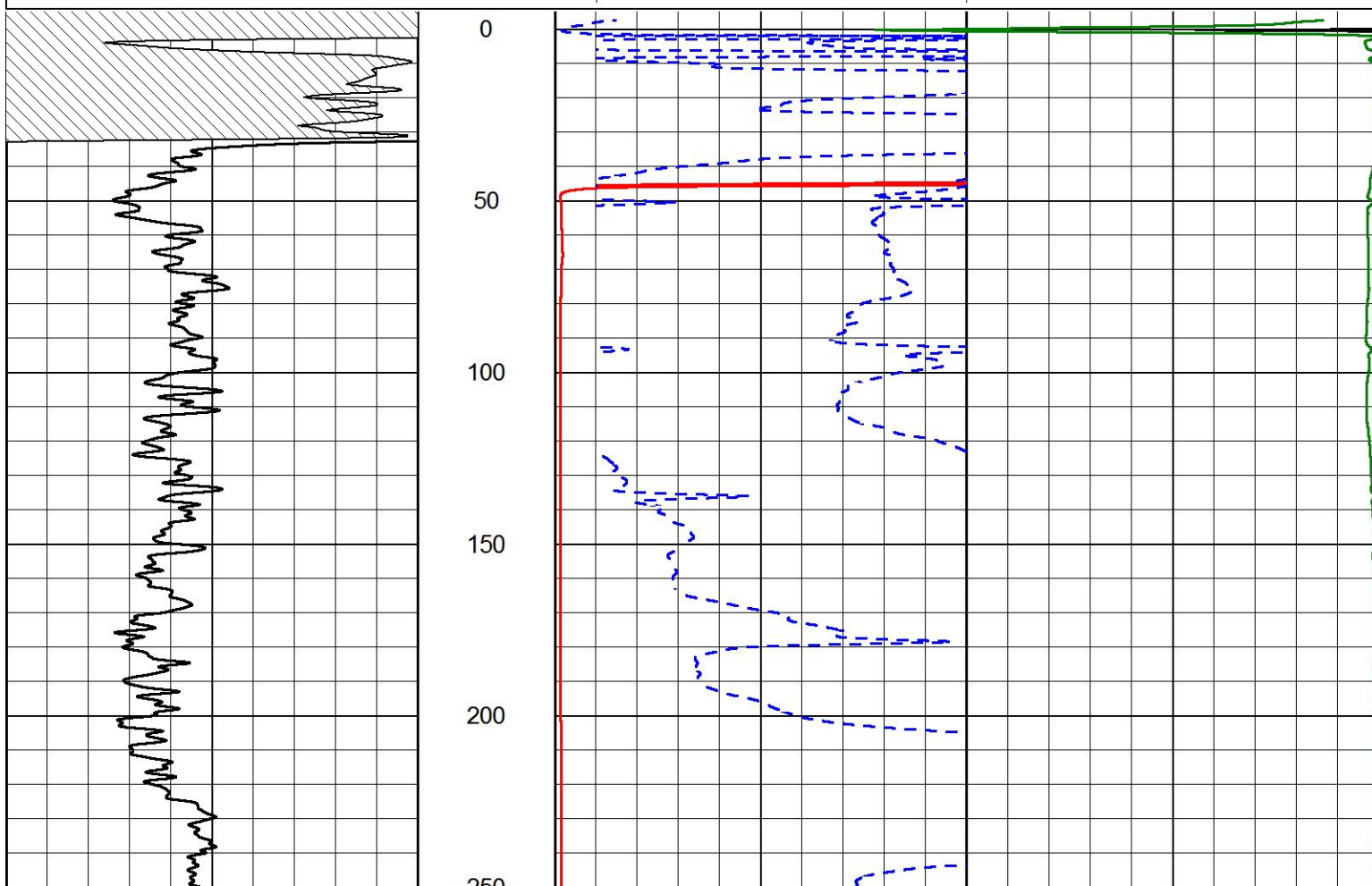
2000 CILD (mmho/m) 0

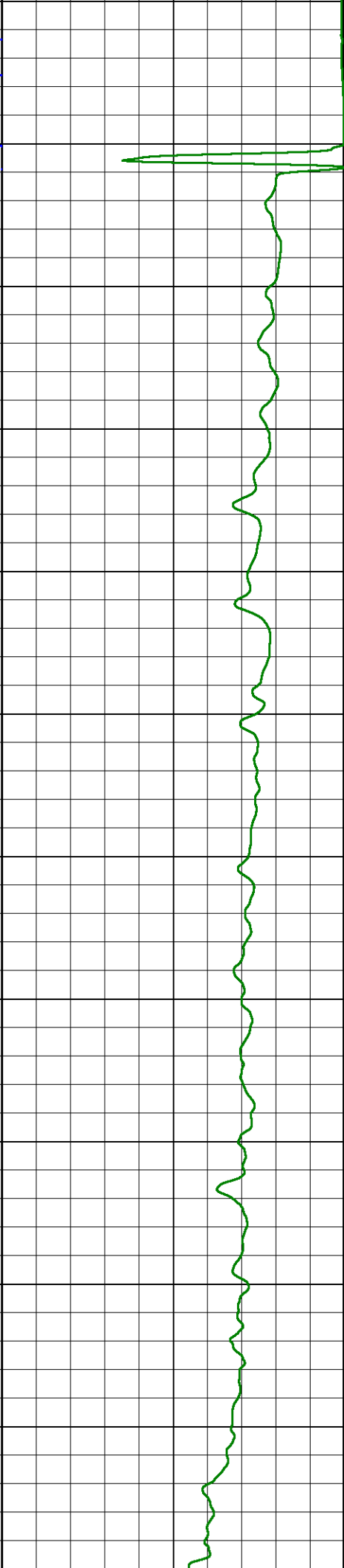
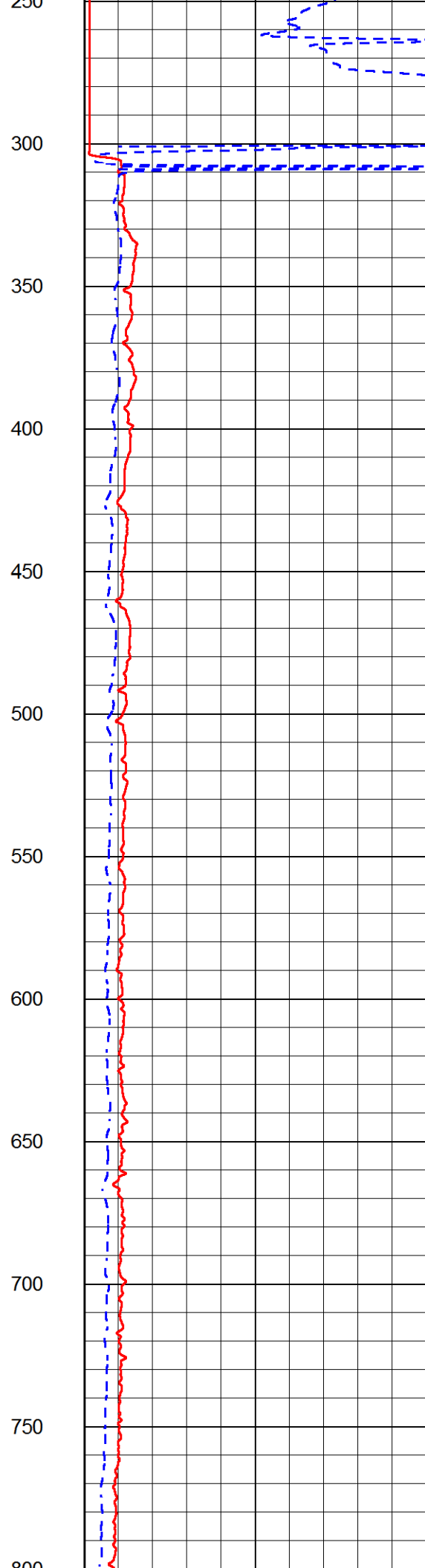
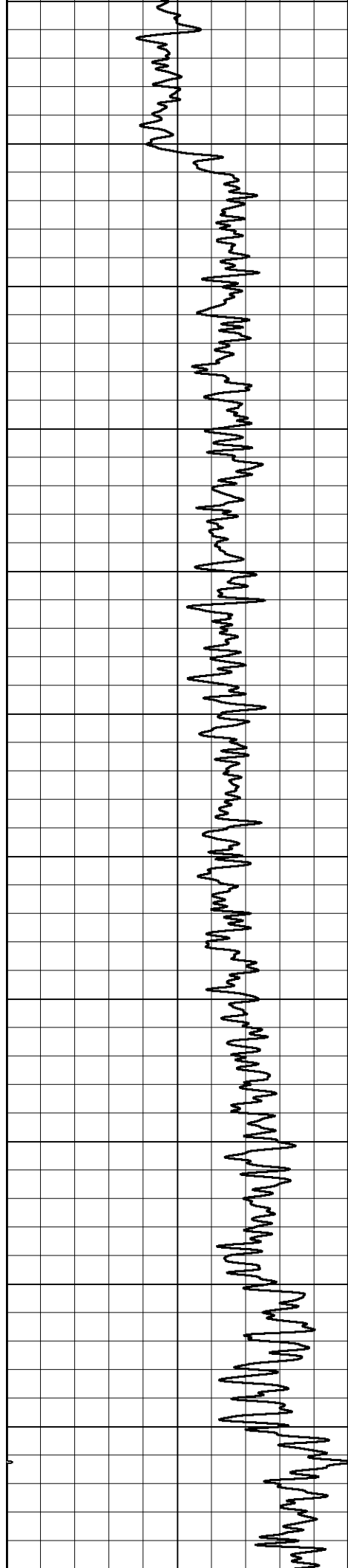
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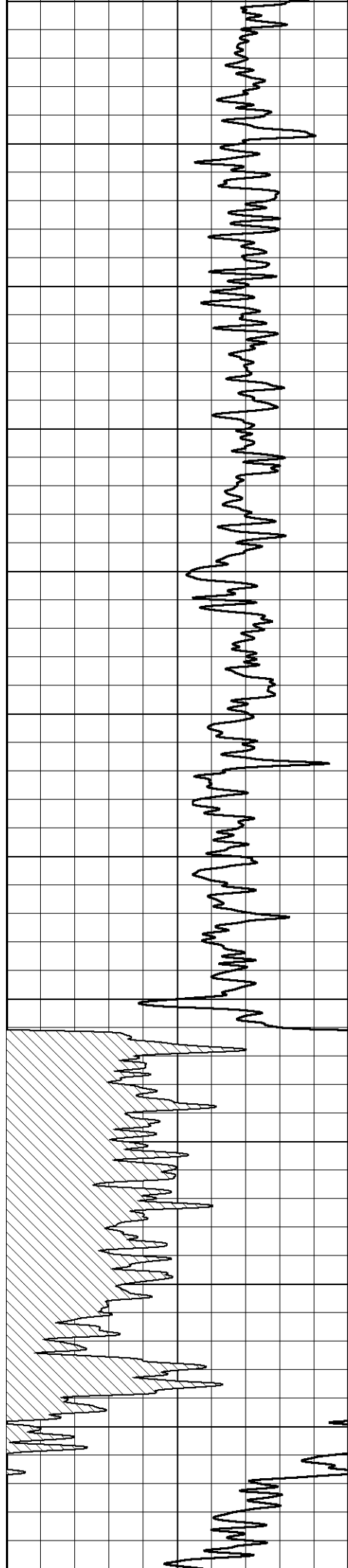
0 DEEP RESISTIVITY (Ohm-m) 50

50 RLL3 (Ohm-m) 200

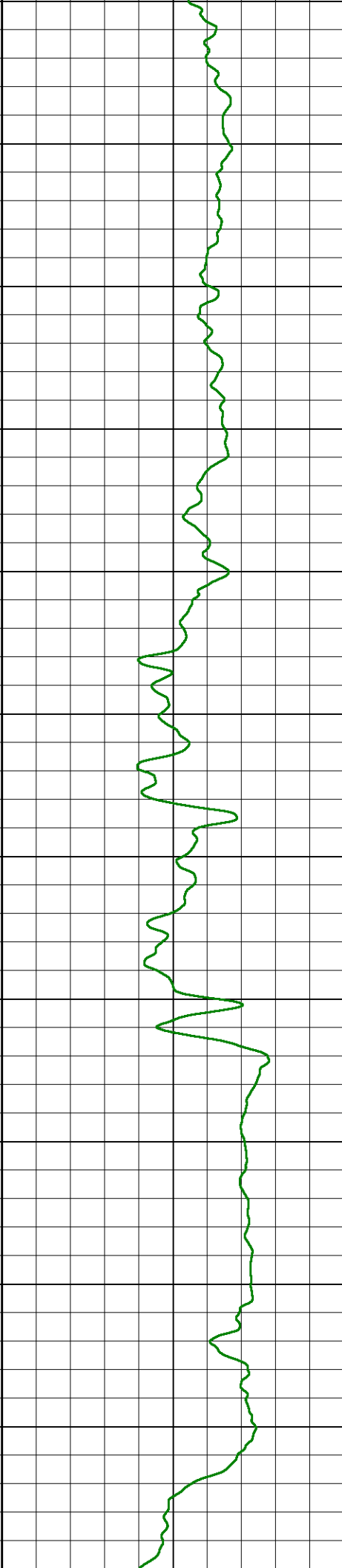
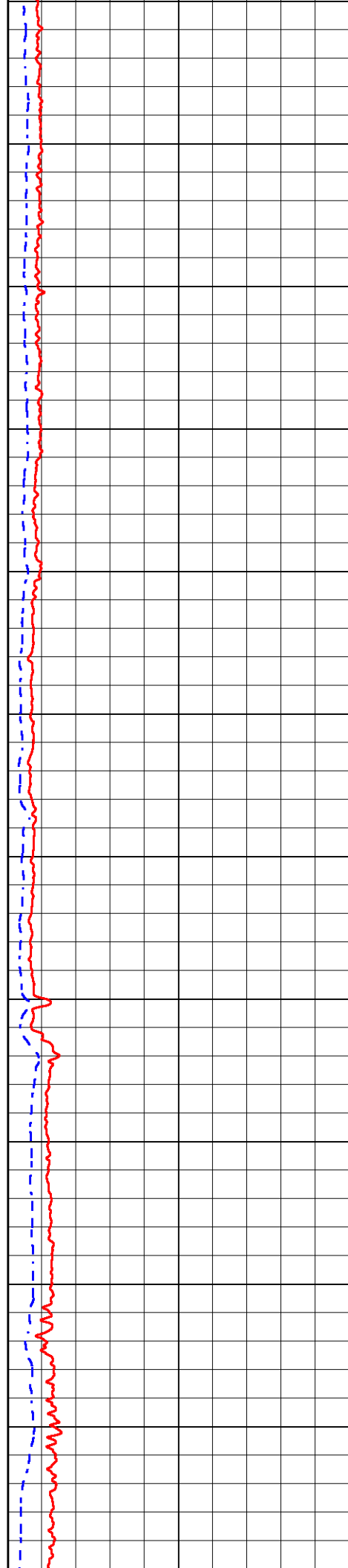
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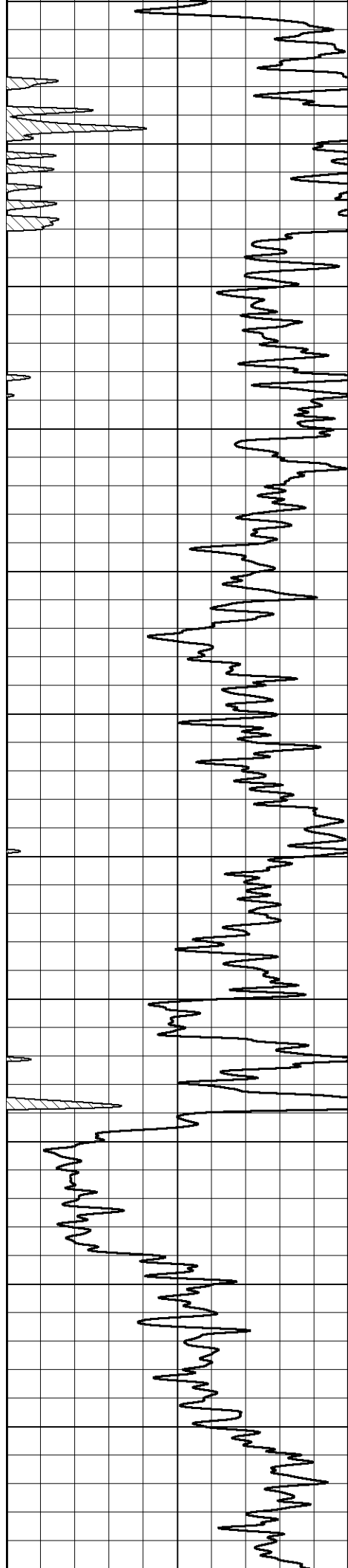




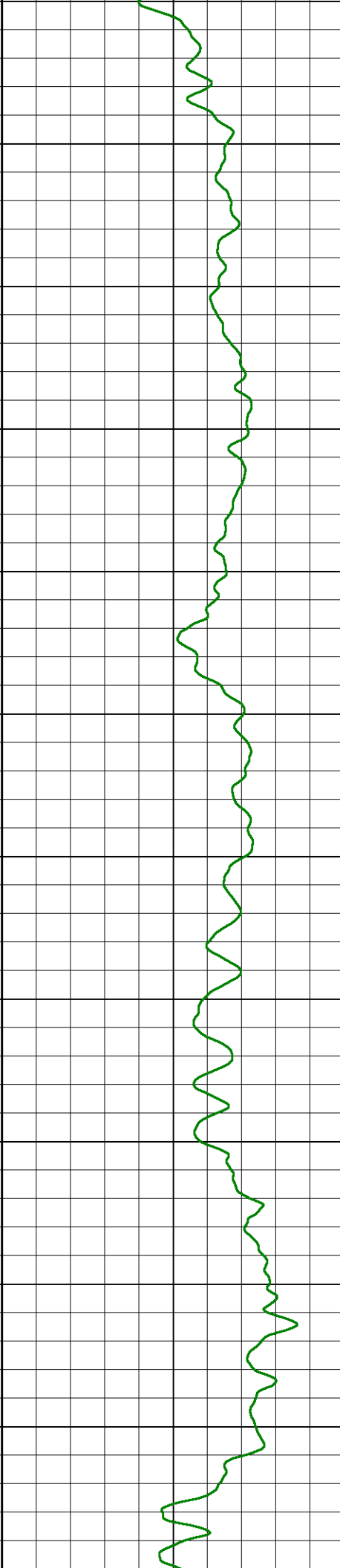
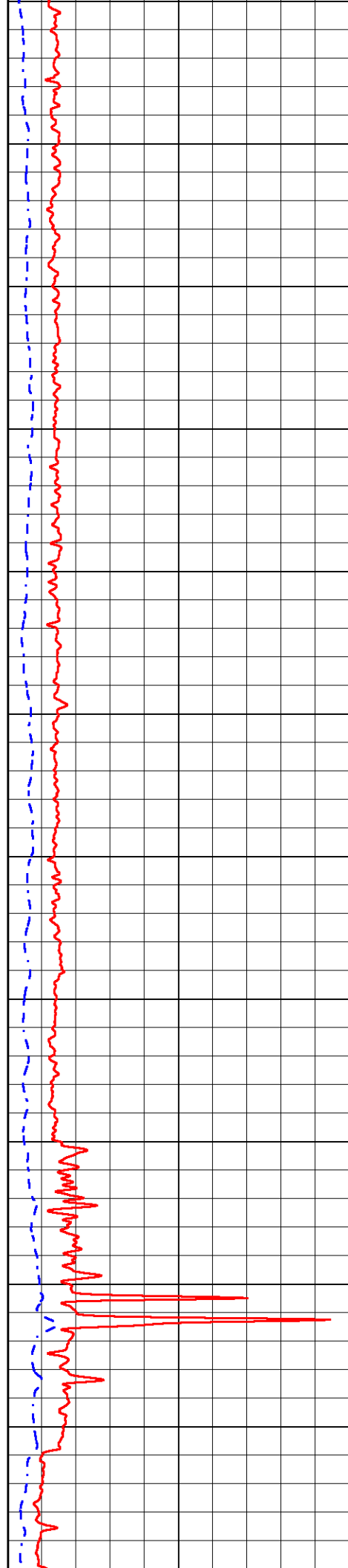


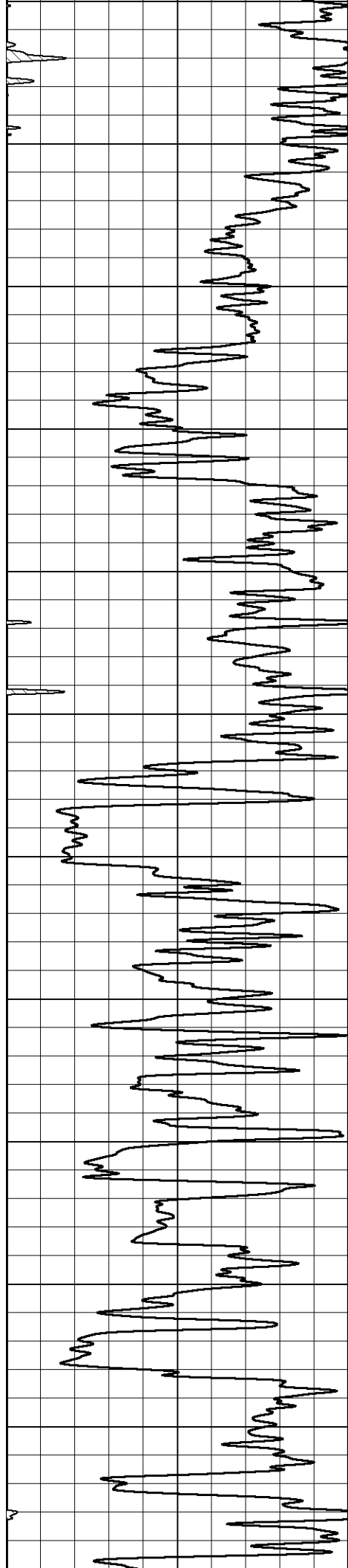
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1350



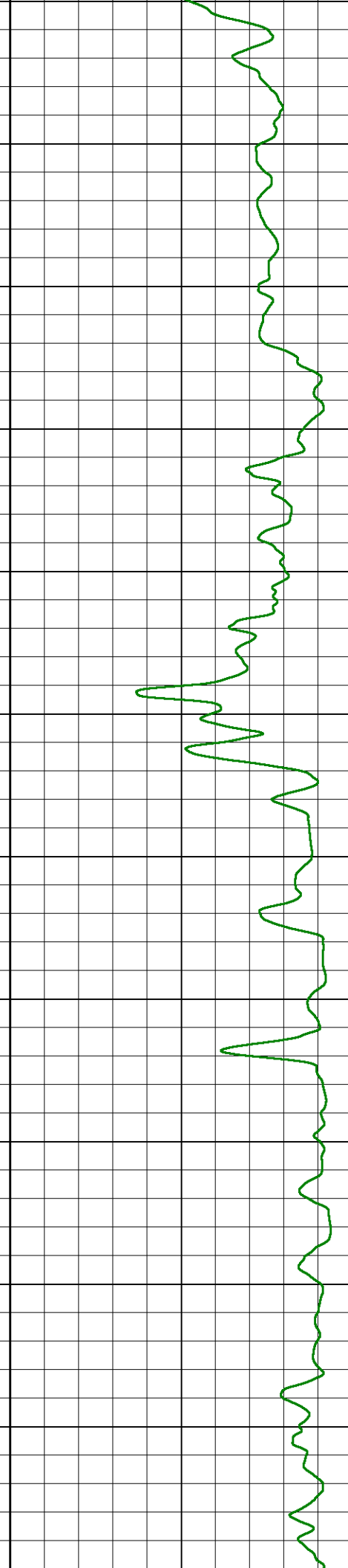
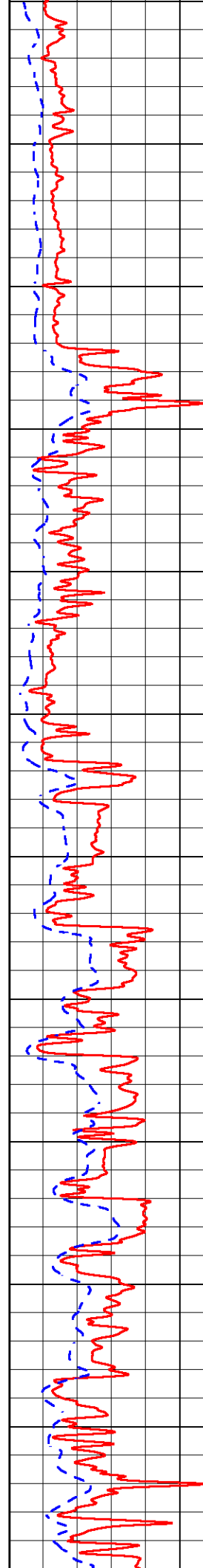


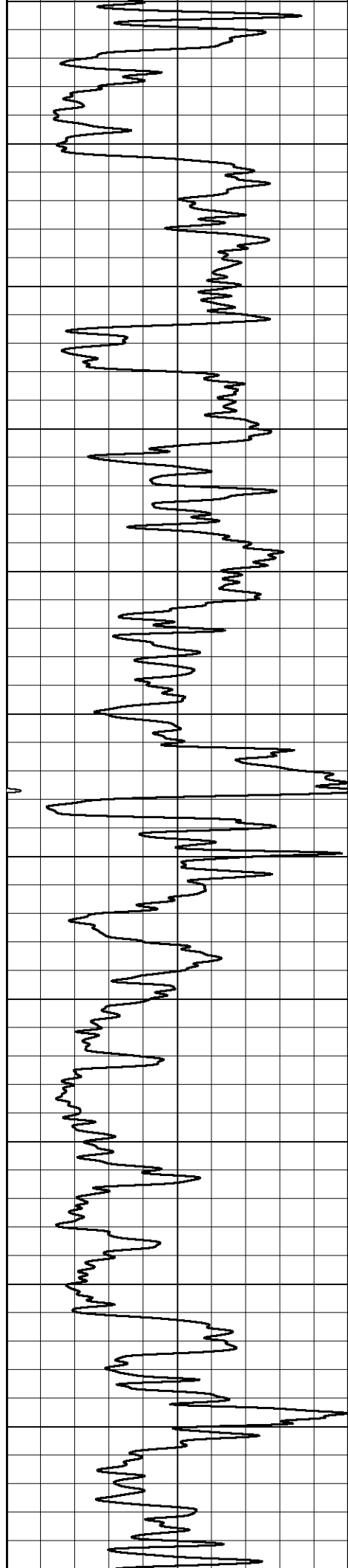
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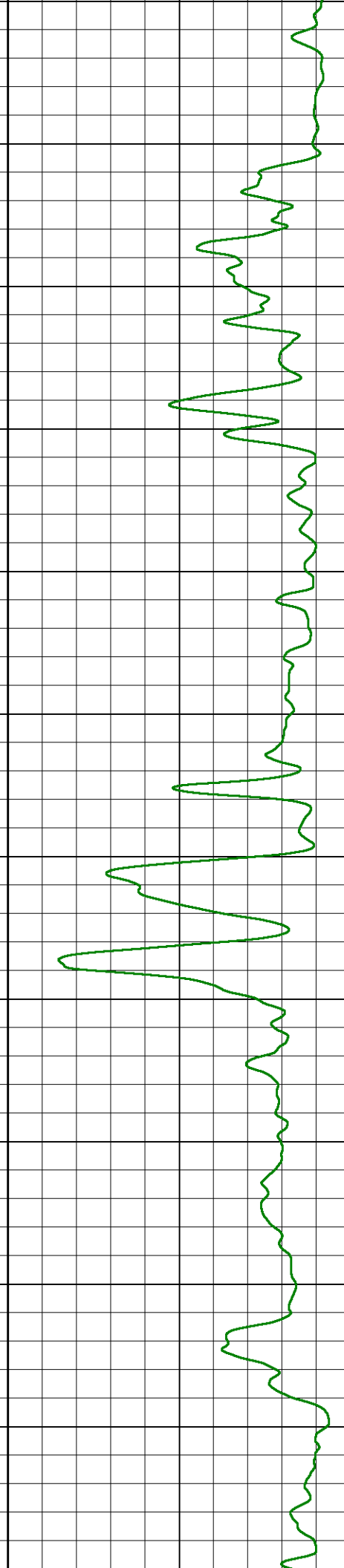
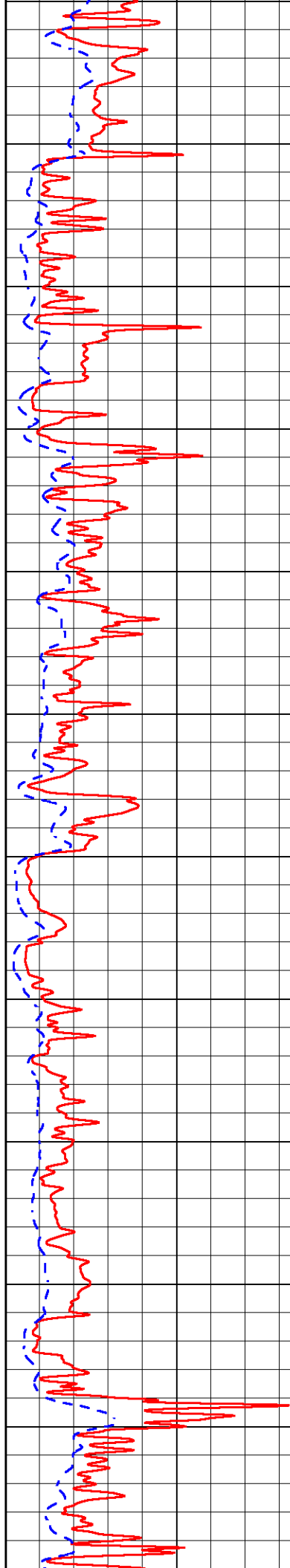


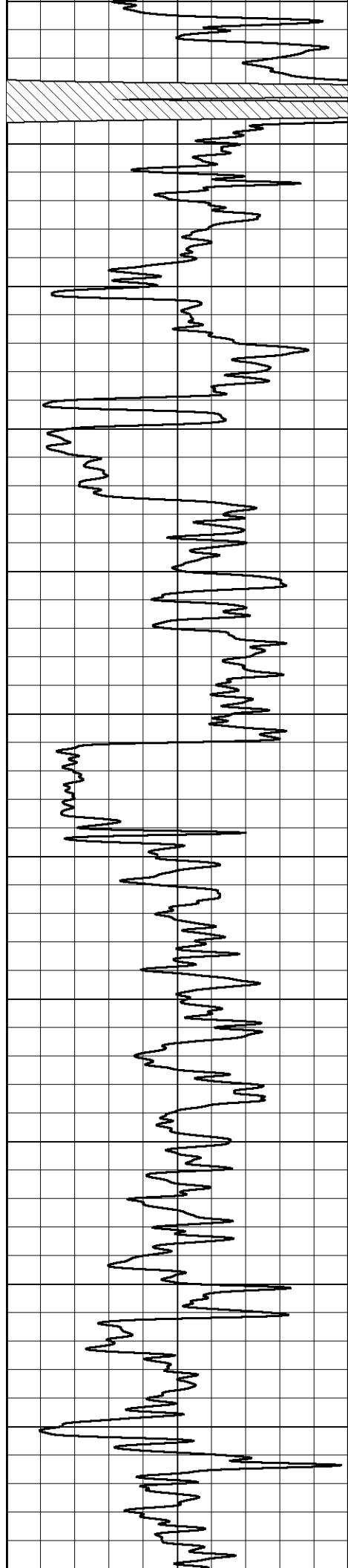
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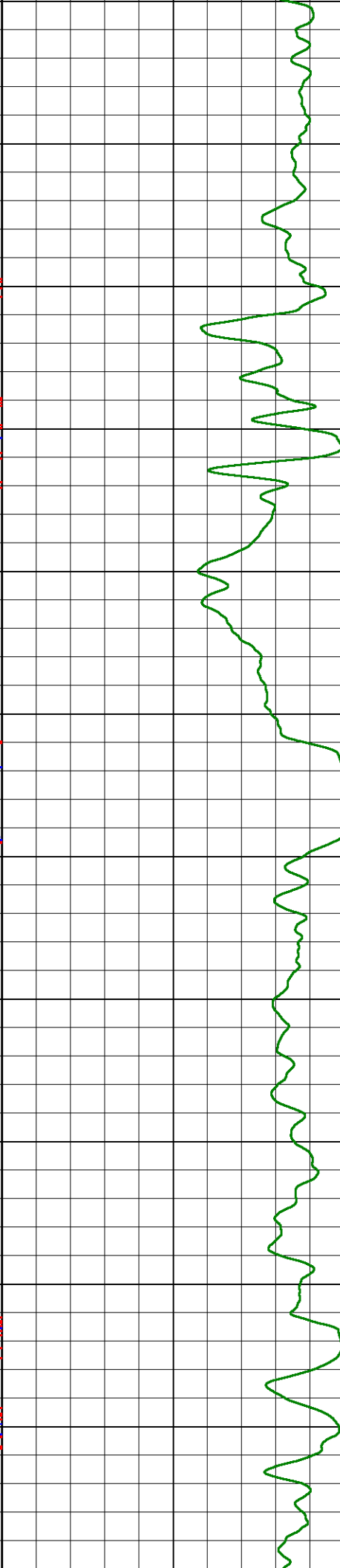
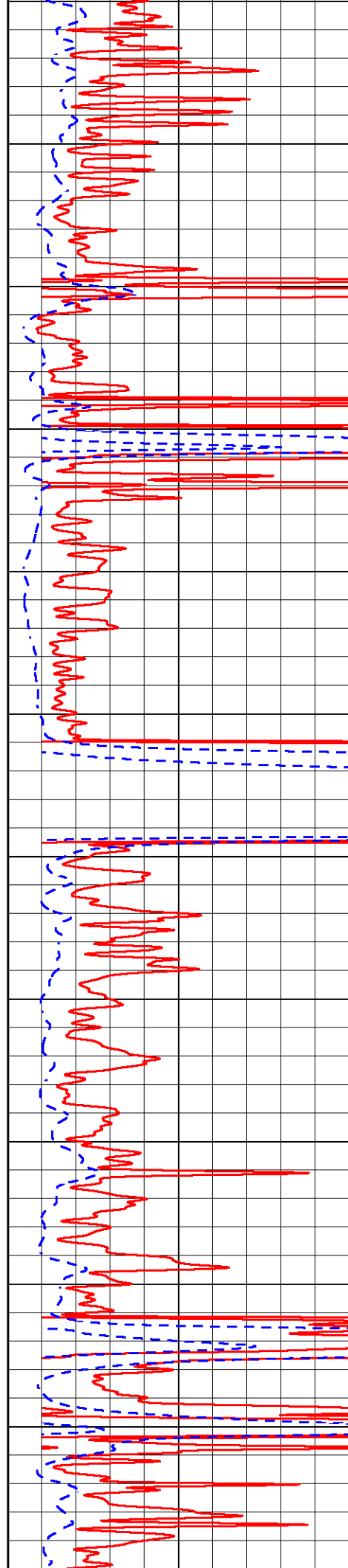


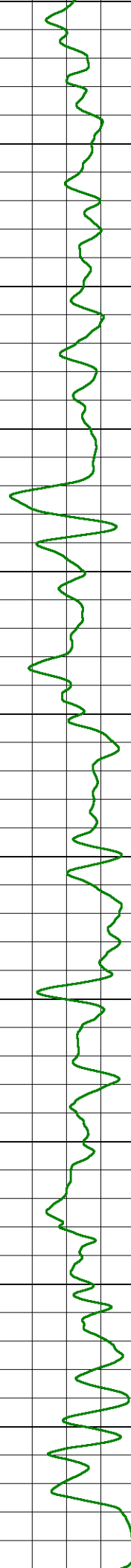
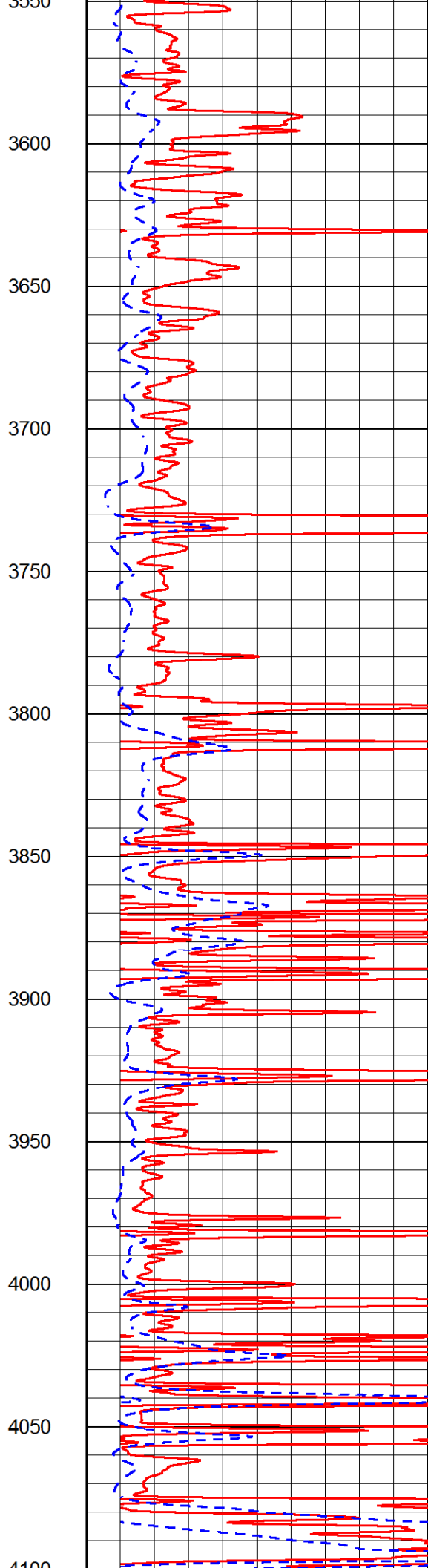
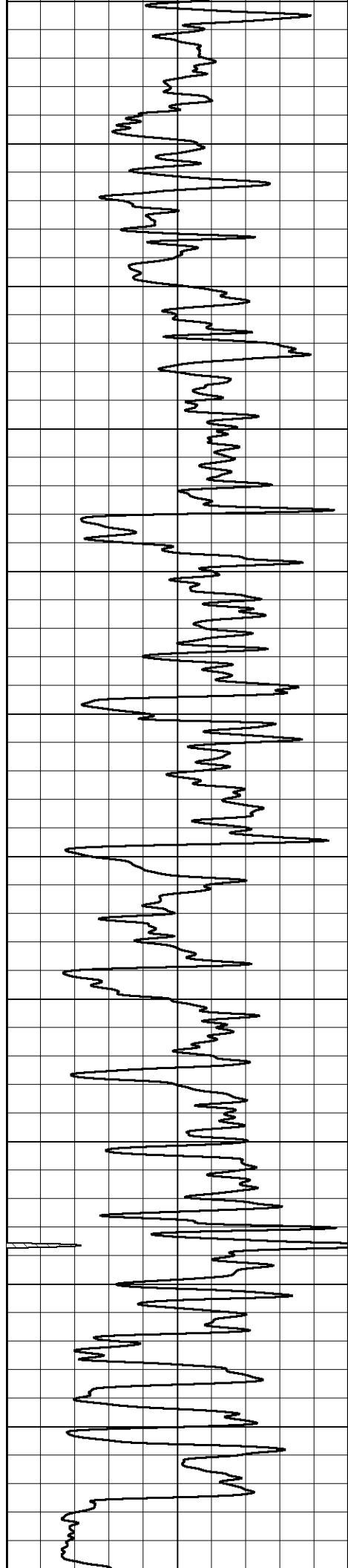
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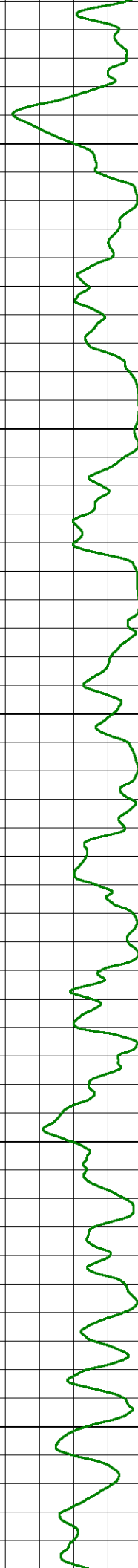
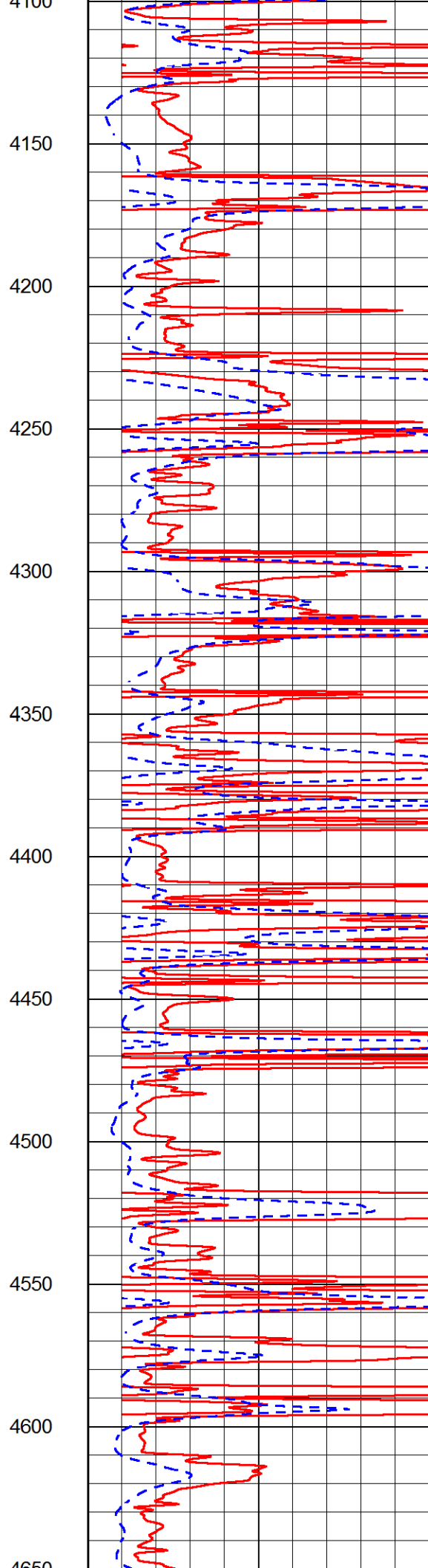
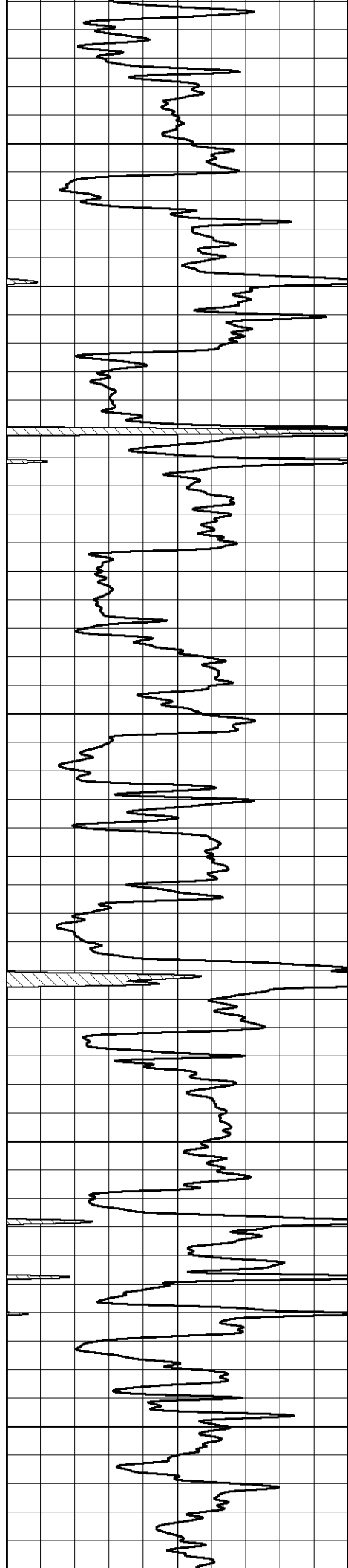


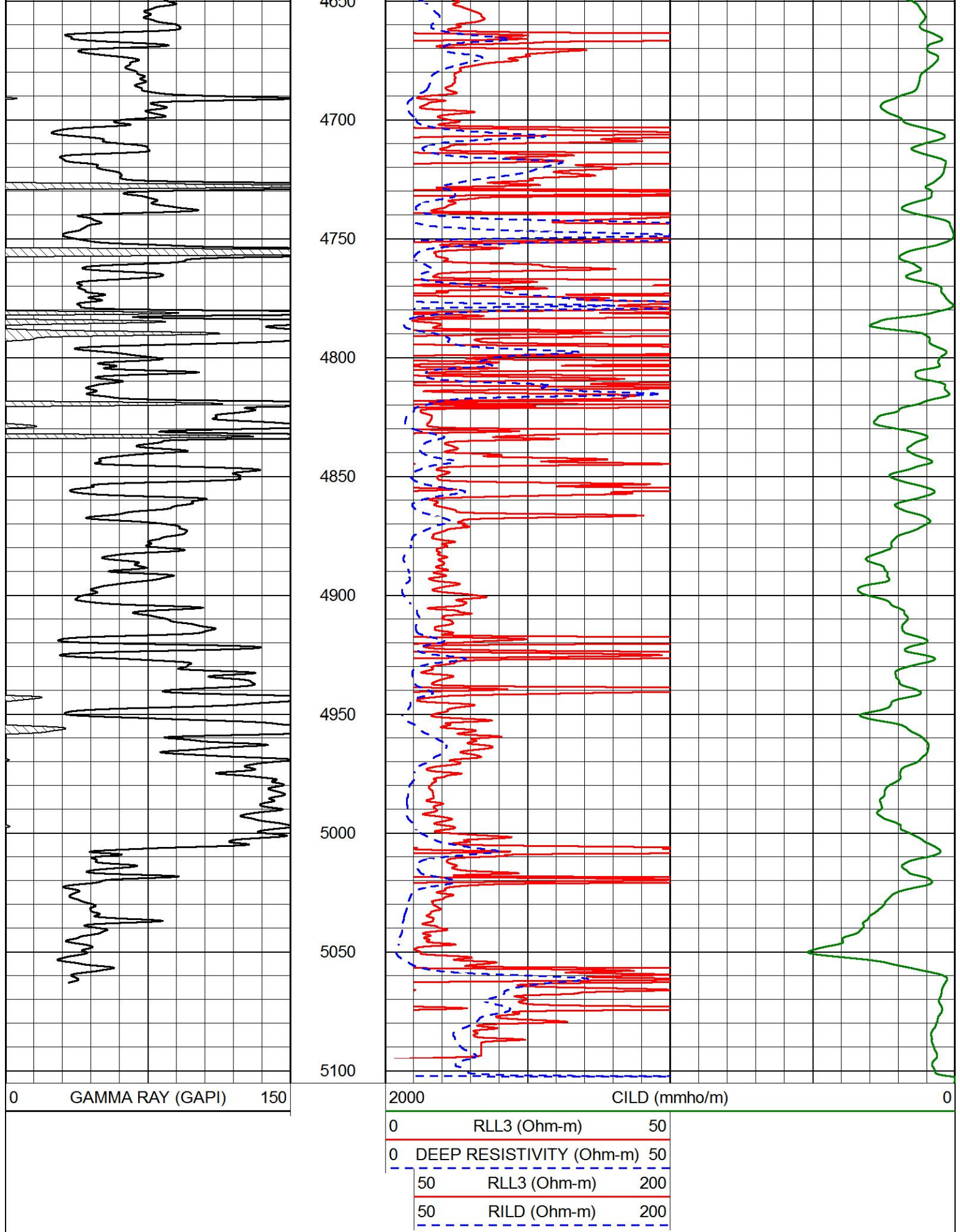


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3500  
3550





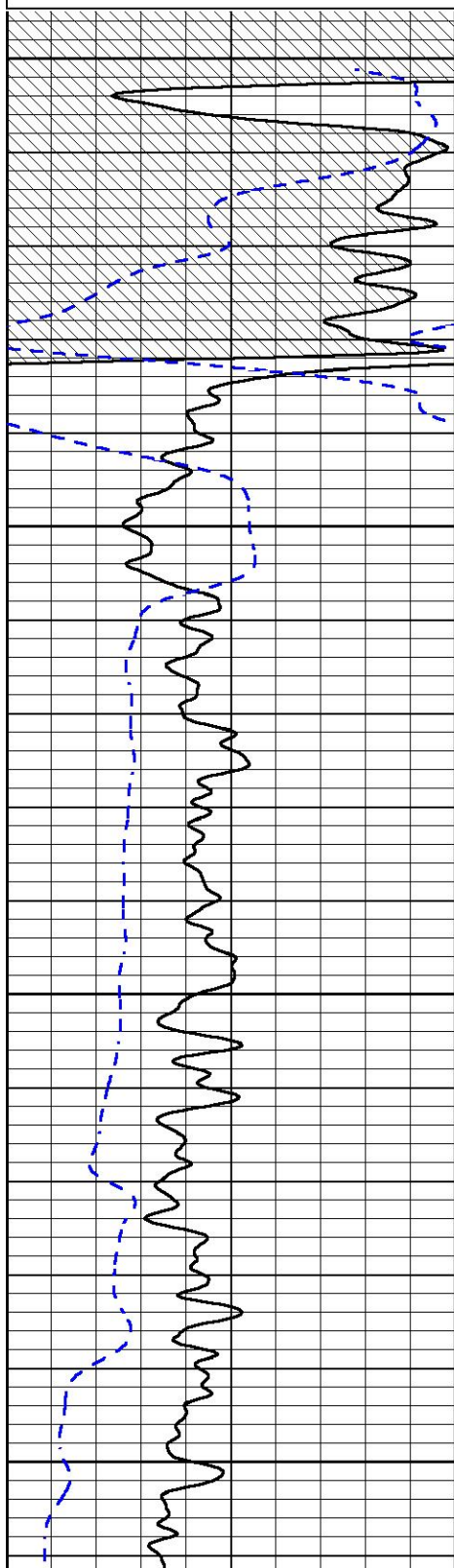




Database File murfin\_dorsch\_1\_24.db  
 Dataset Pathname stackml/pass3.1  
 Presentation Format dil  
 Dataset Creation Wed Feb 26 06:17:31 2020  
 Charted by Depth in Feet scaled 1:240

|      |                  |     |
|------|------------------|-----|
| 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 |
| 15000 | LINE TENSION (lb)          | 0    |

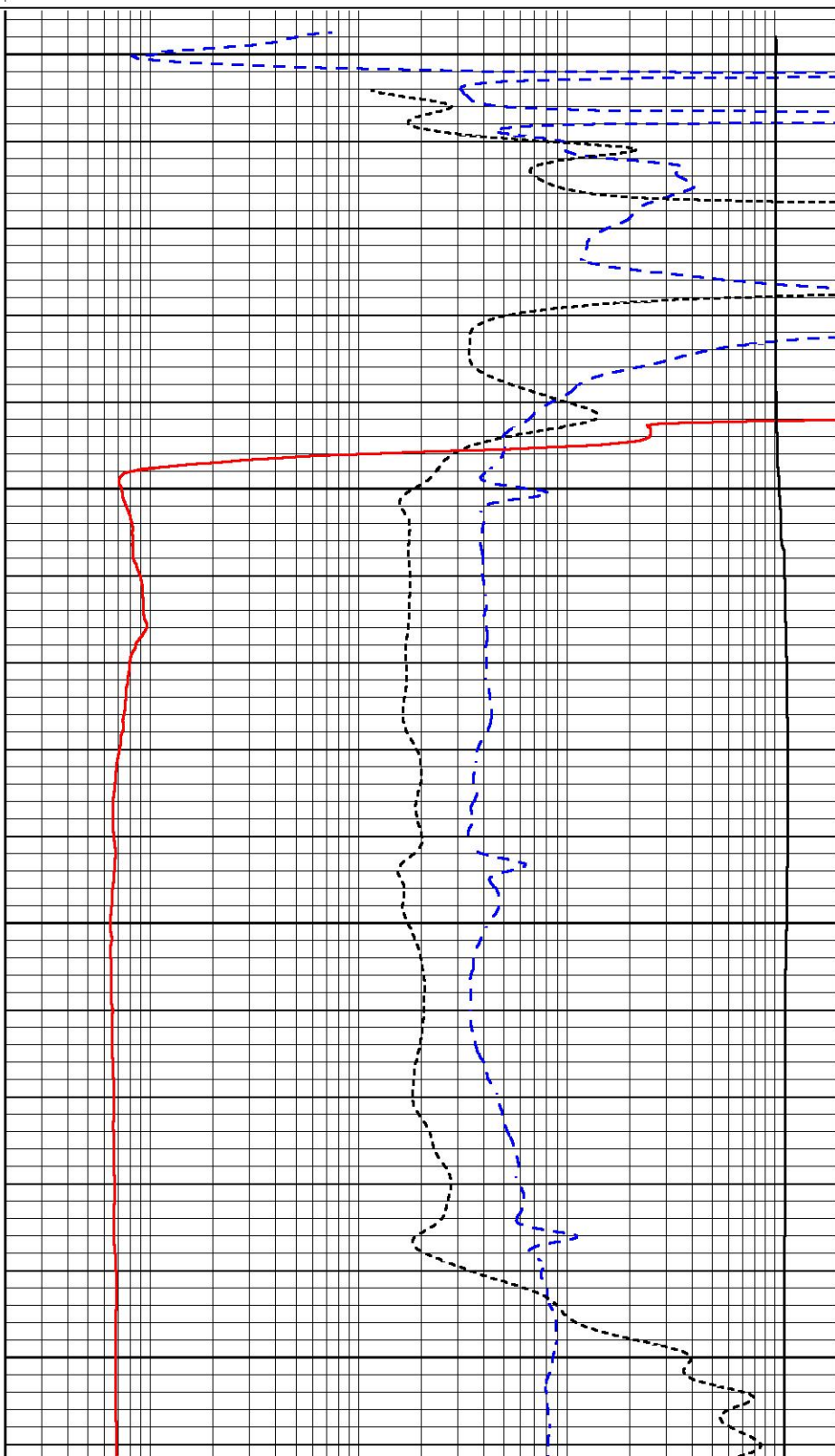


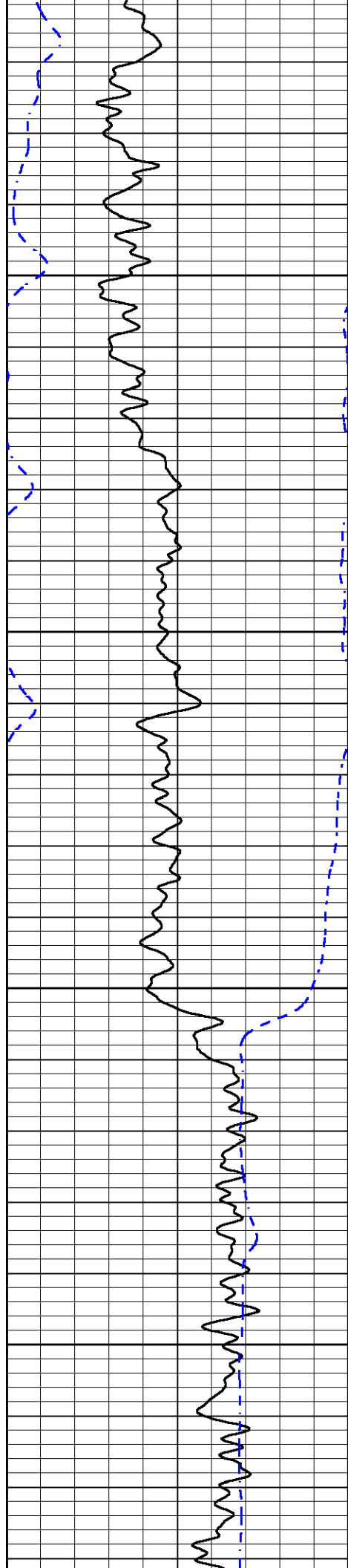
0

50

100

150



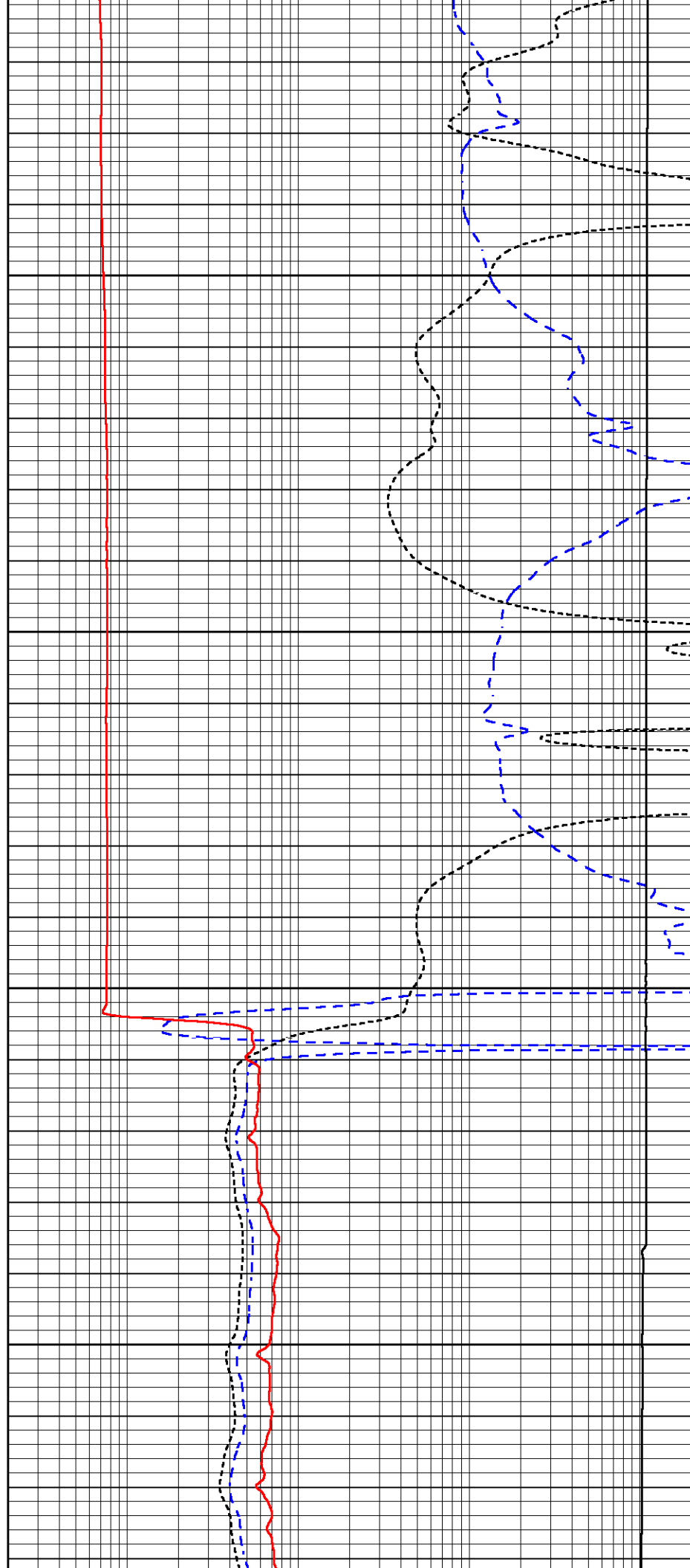


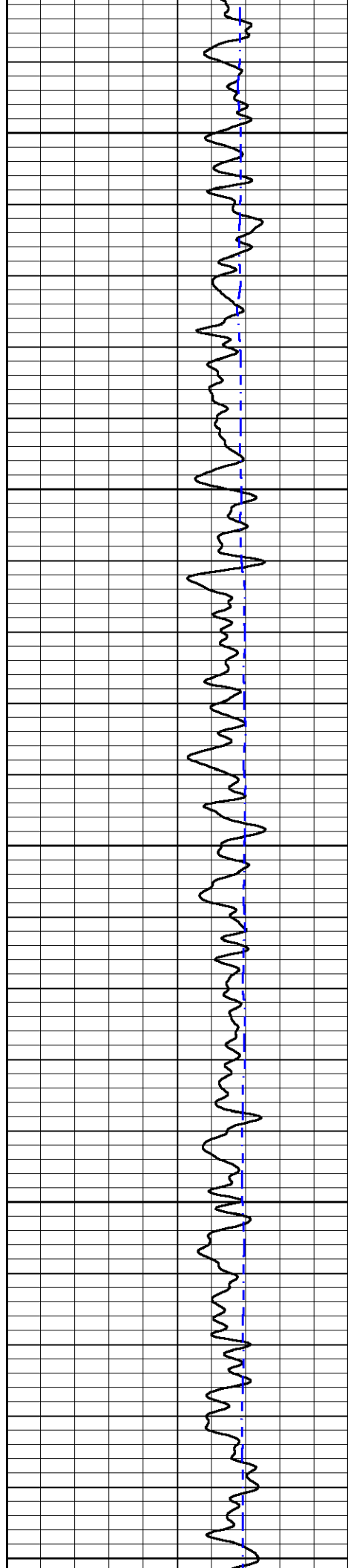
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250

300

350





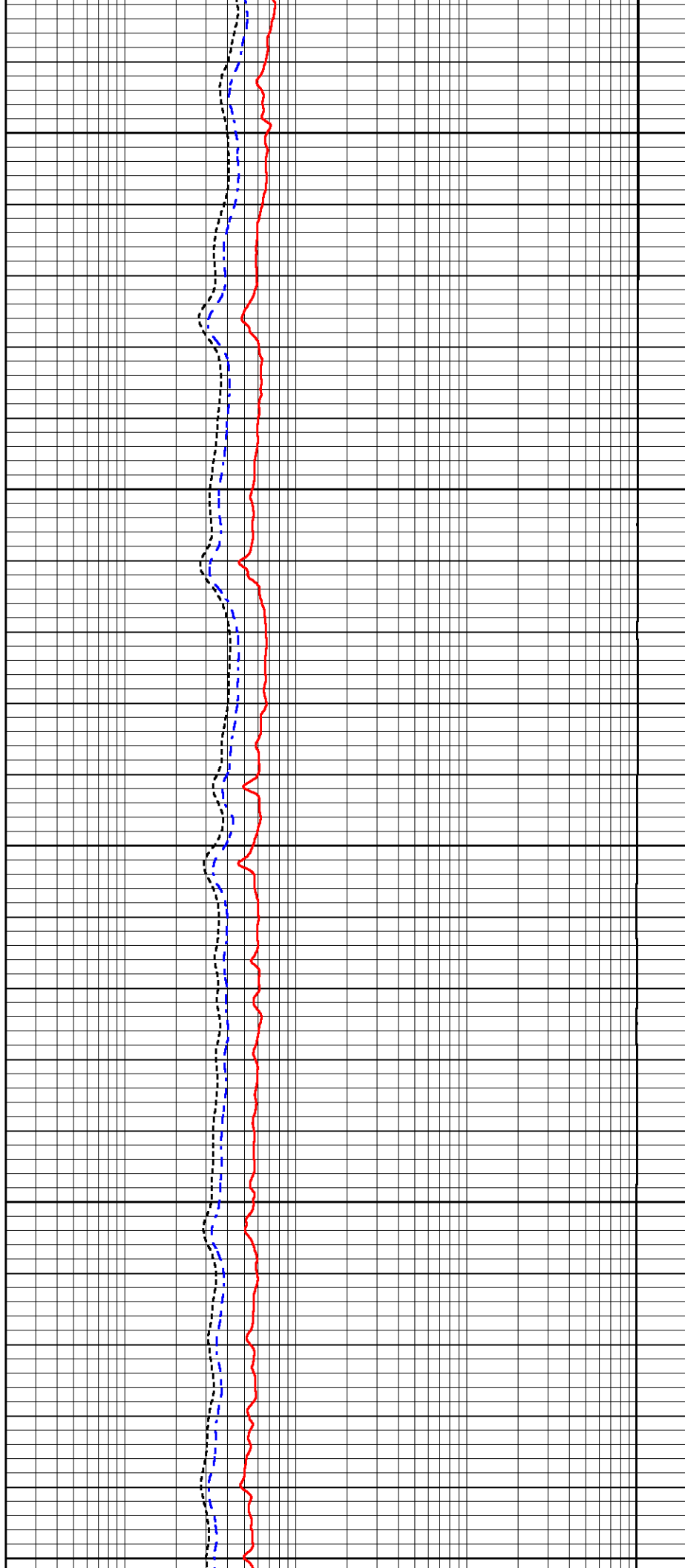
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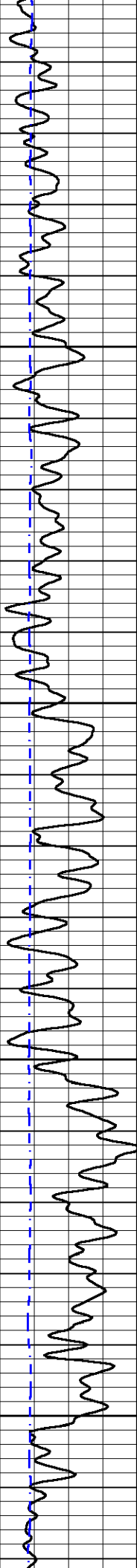
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500

550

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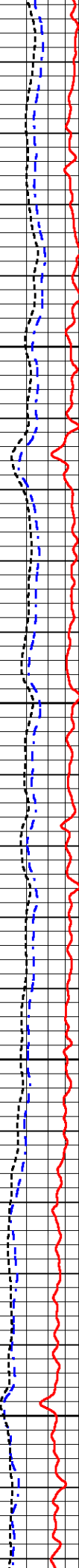


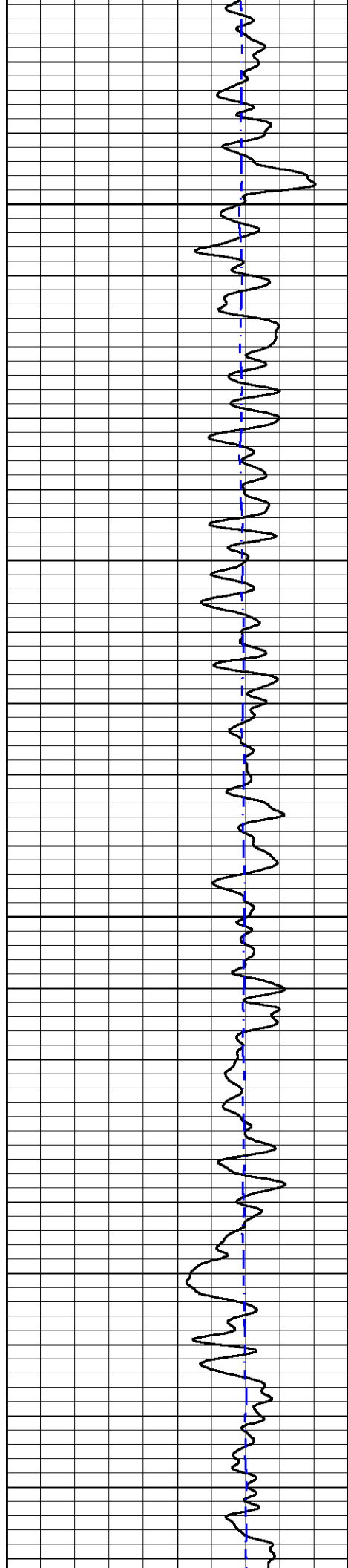
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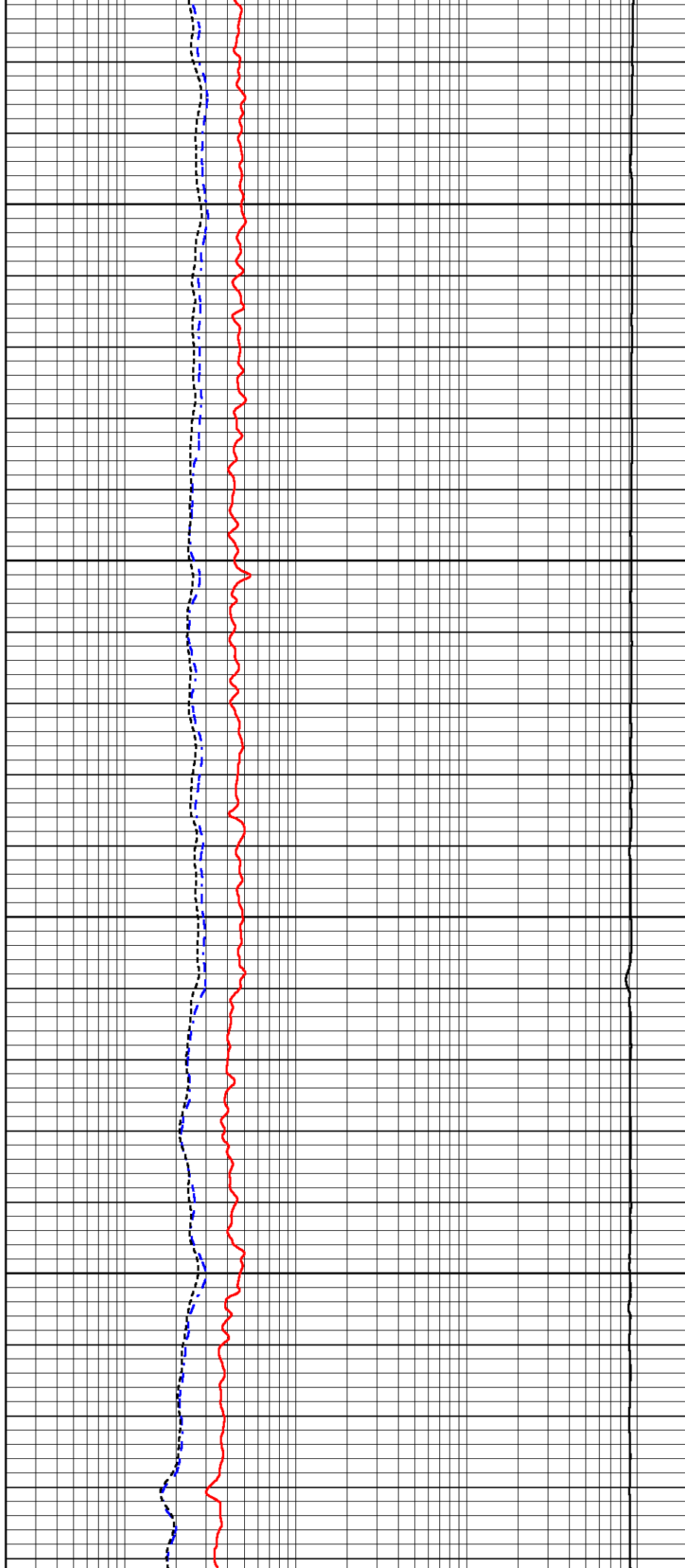


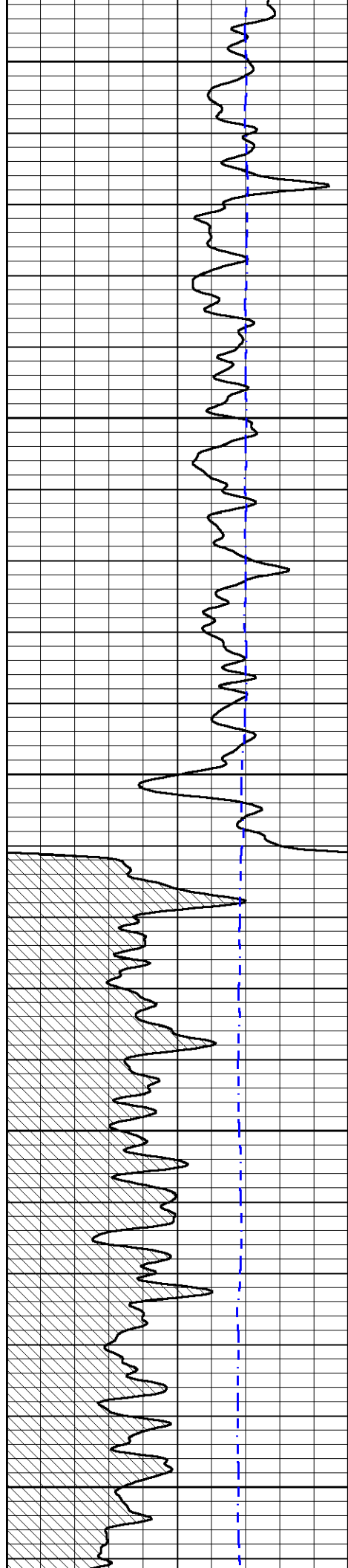
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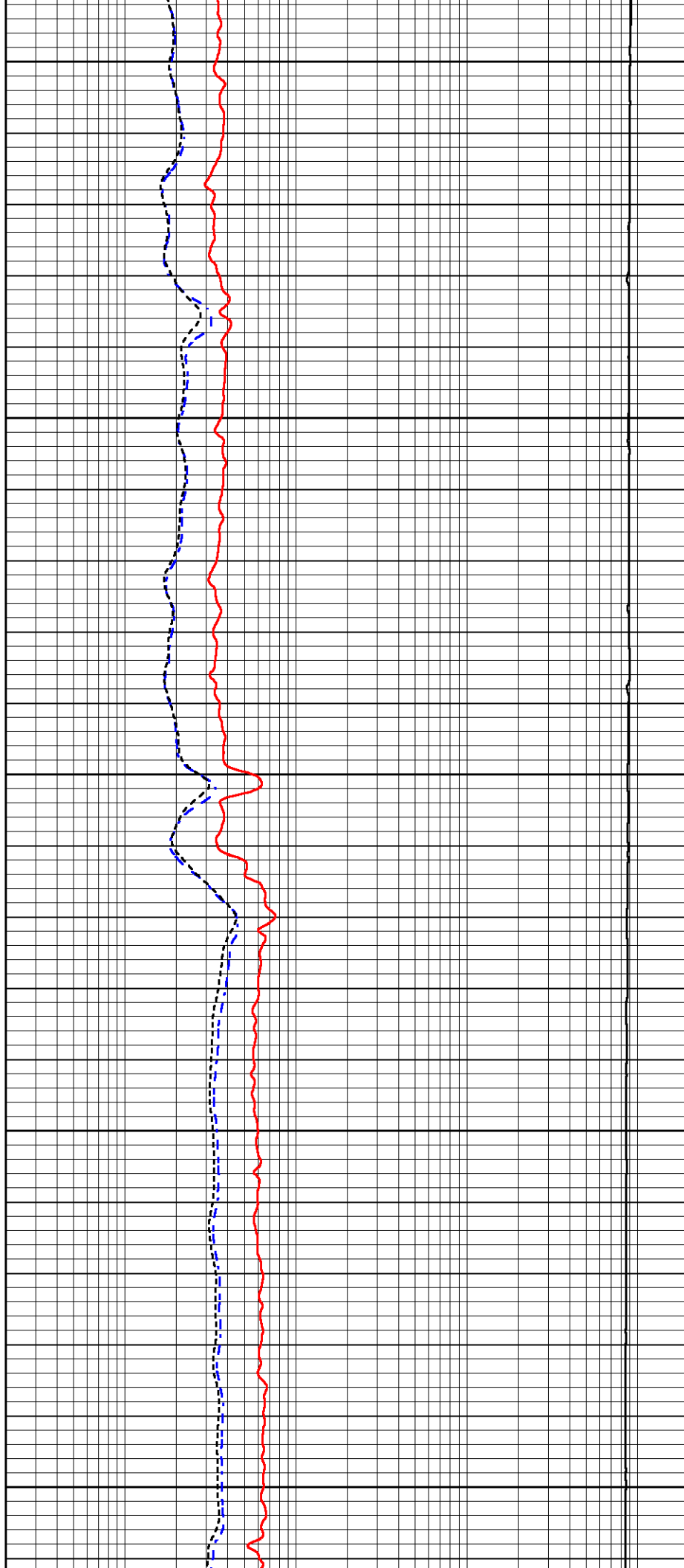
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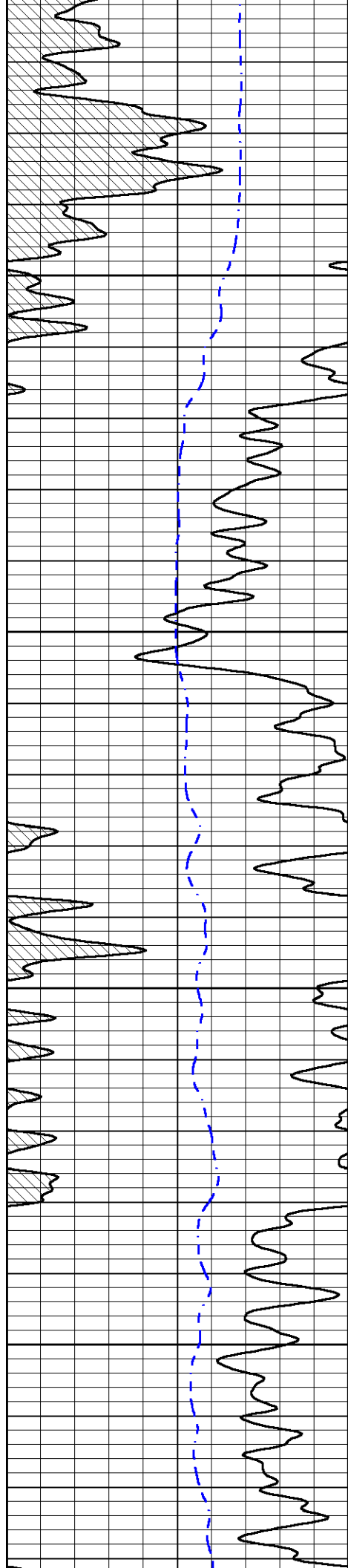
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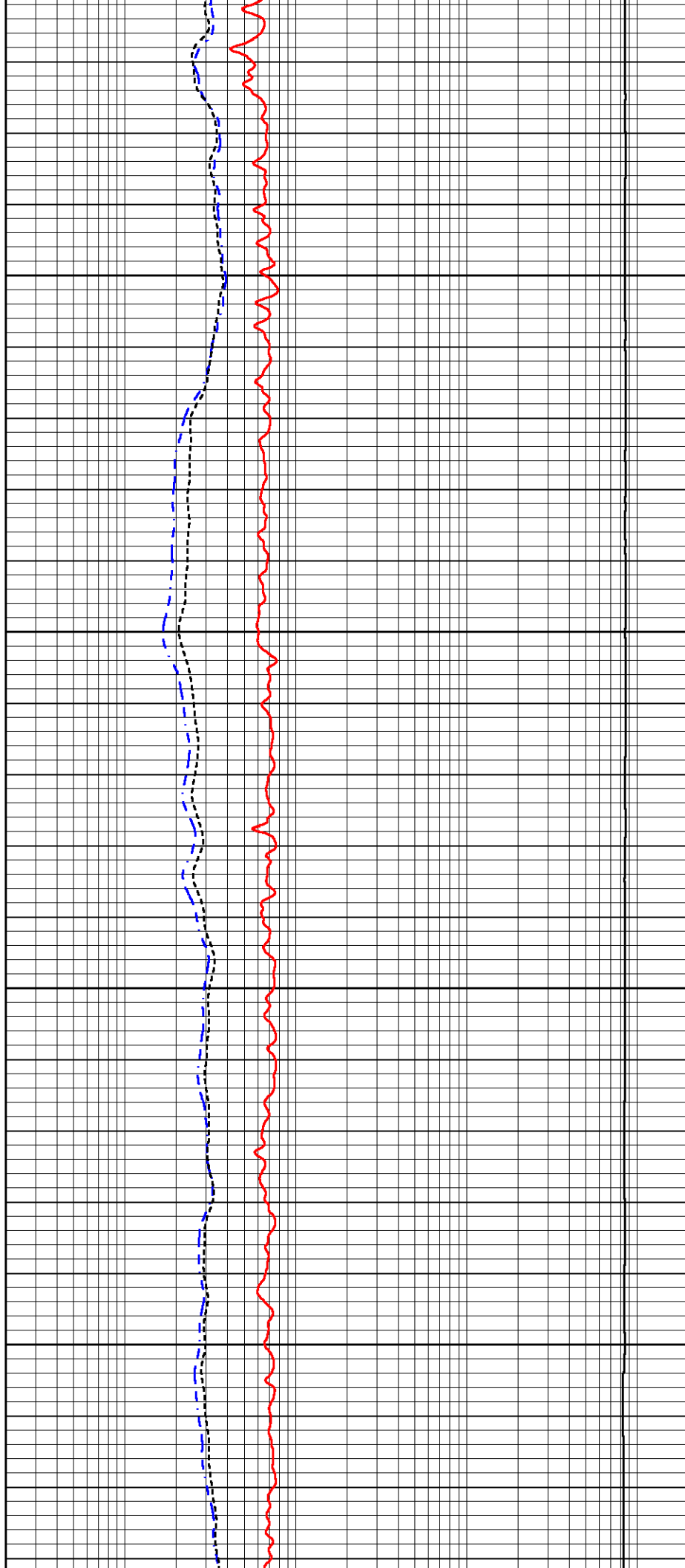


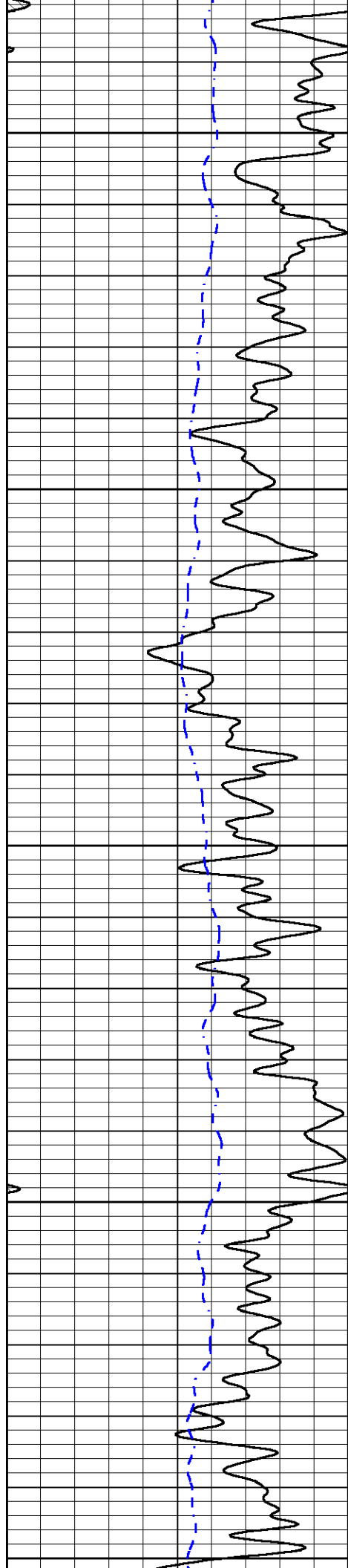
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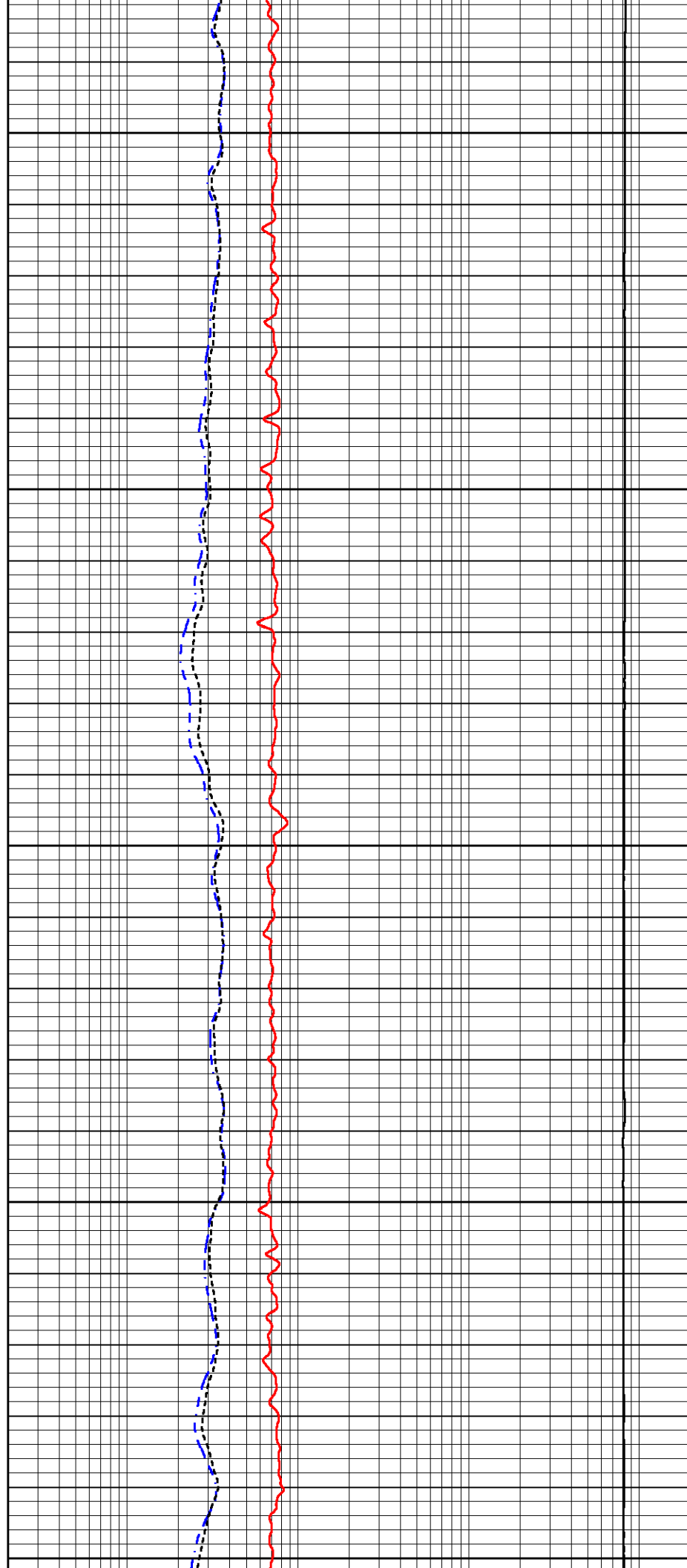
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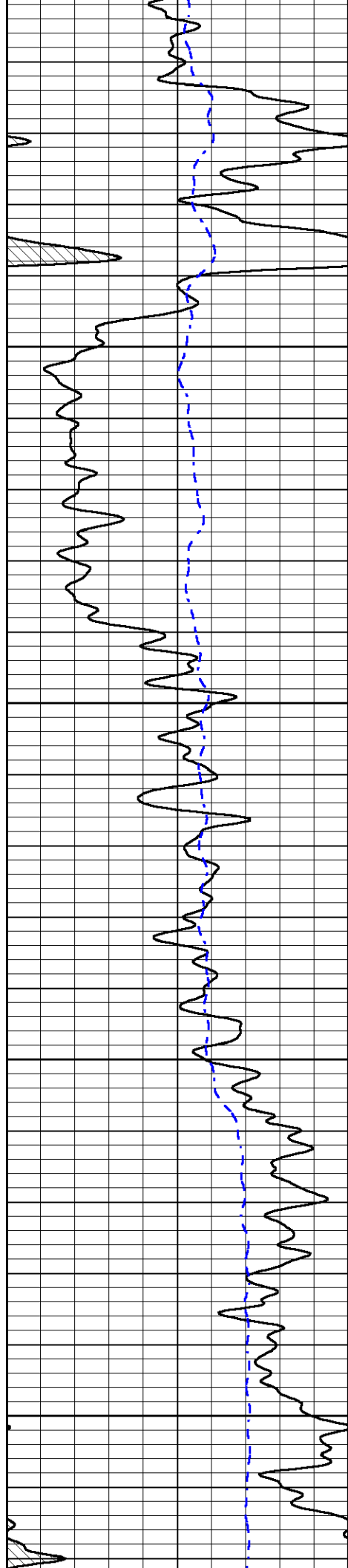
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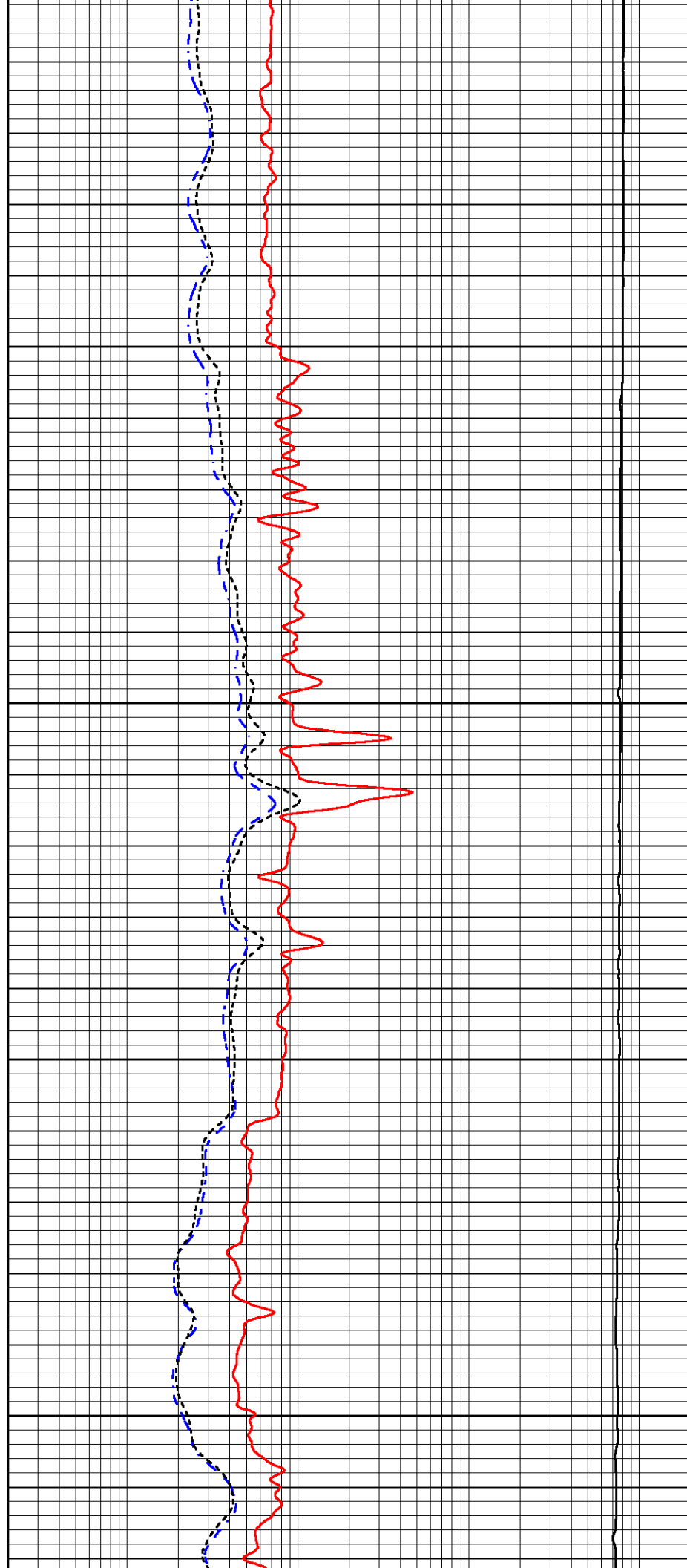


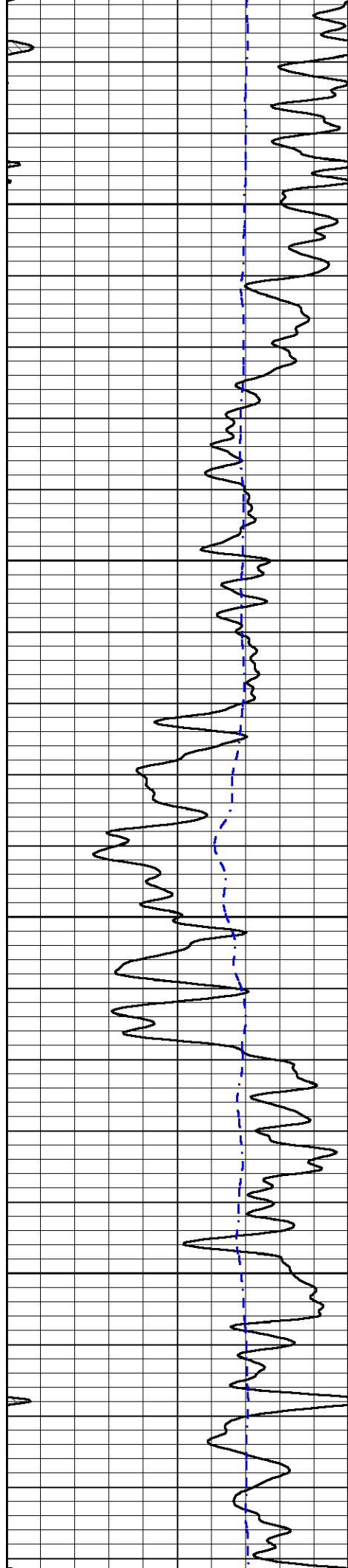
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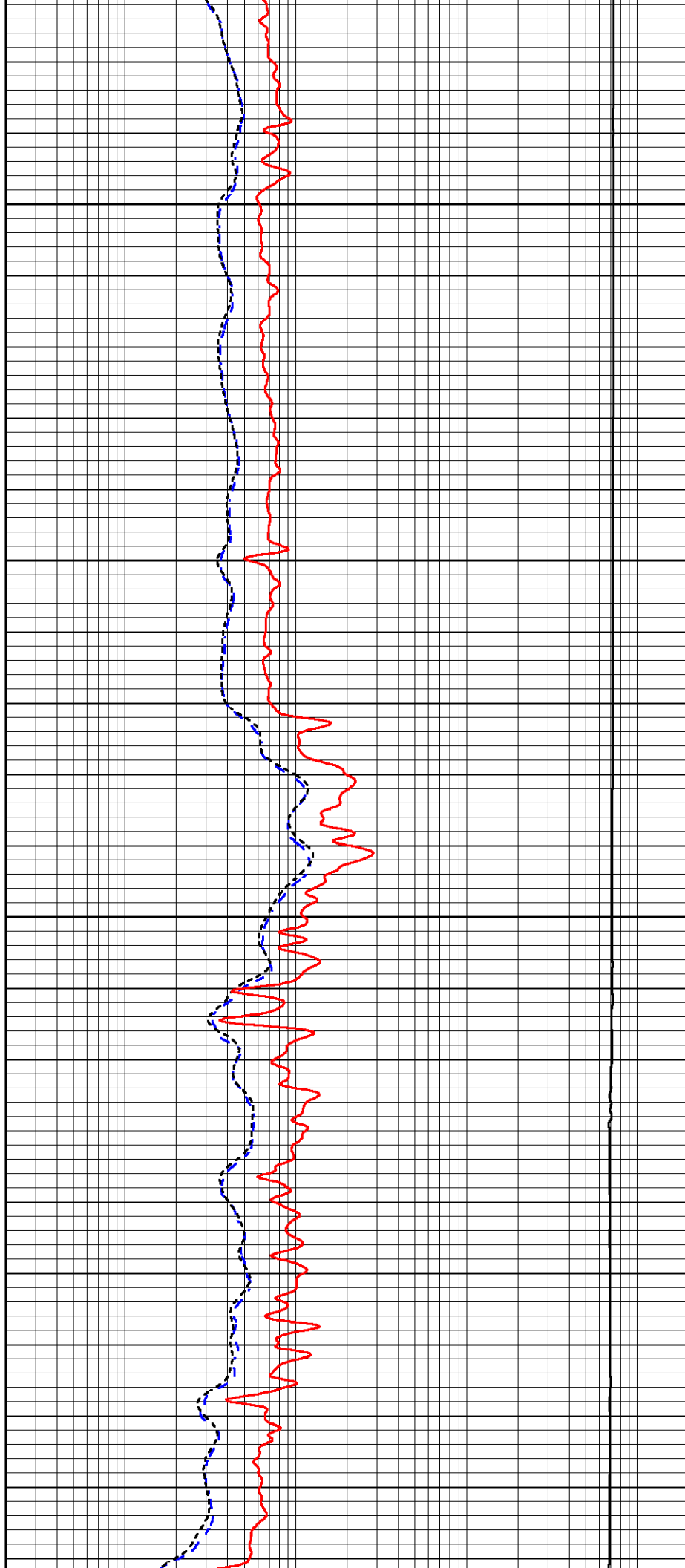


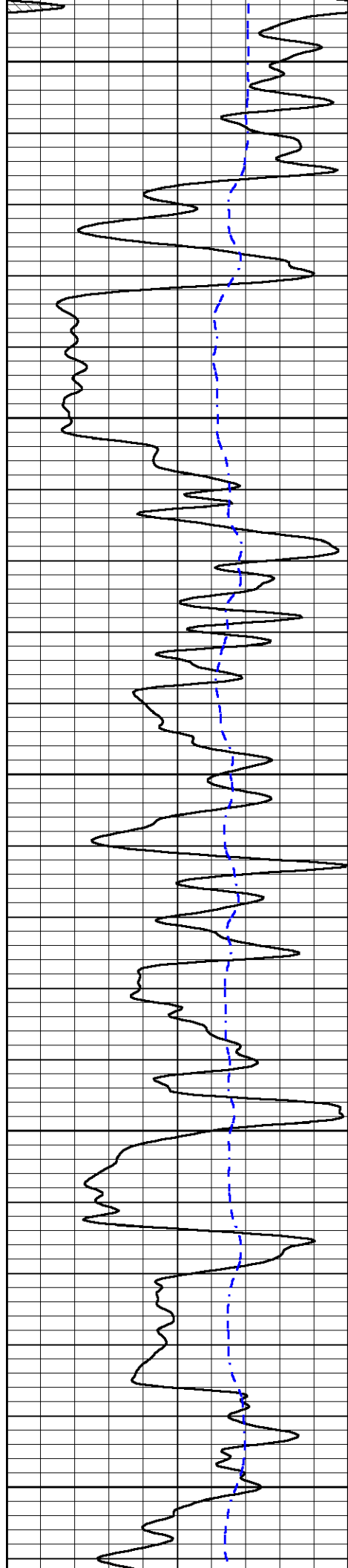
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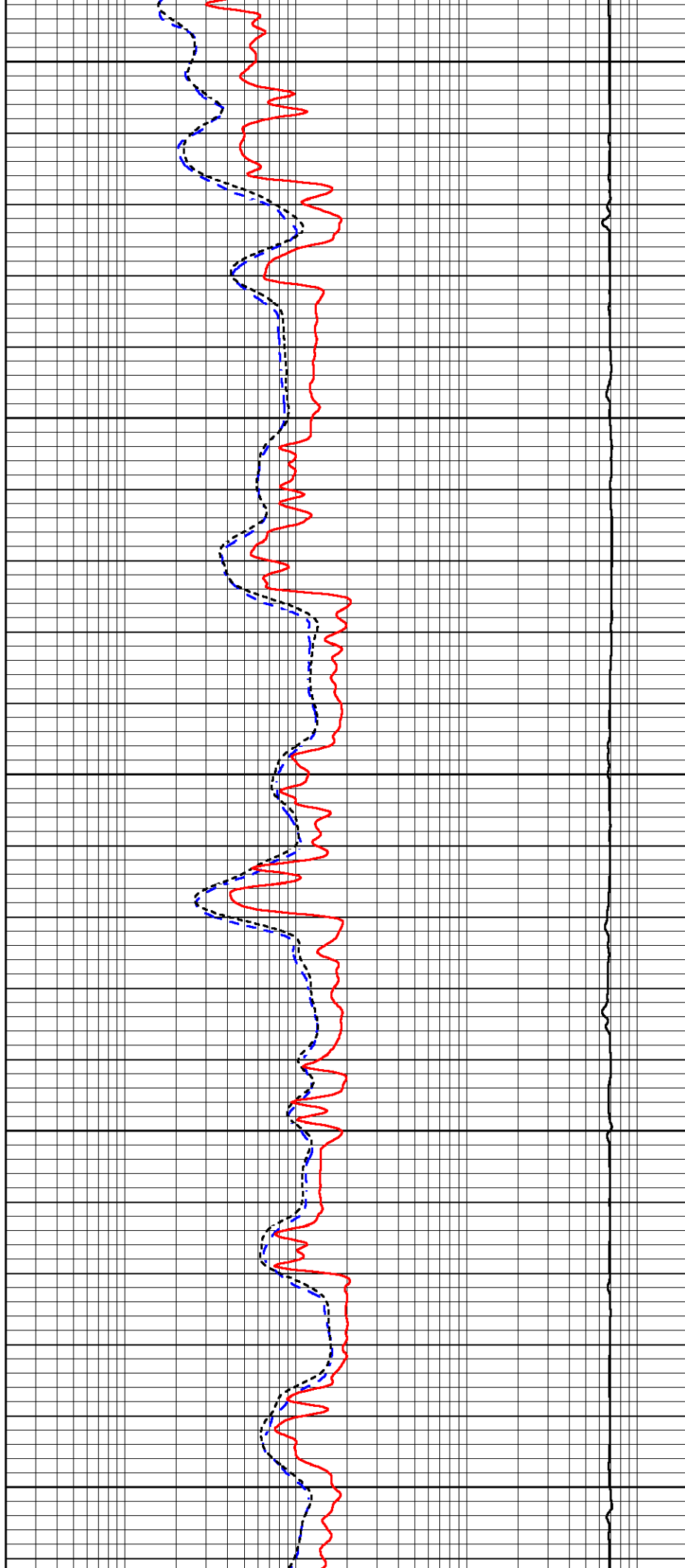
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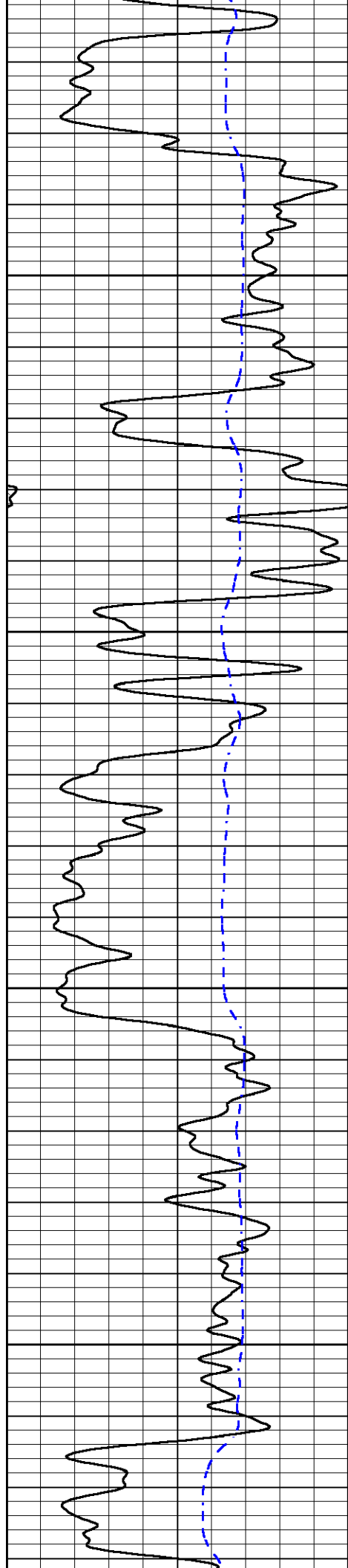
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2300

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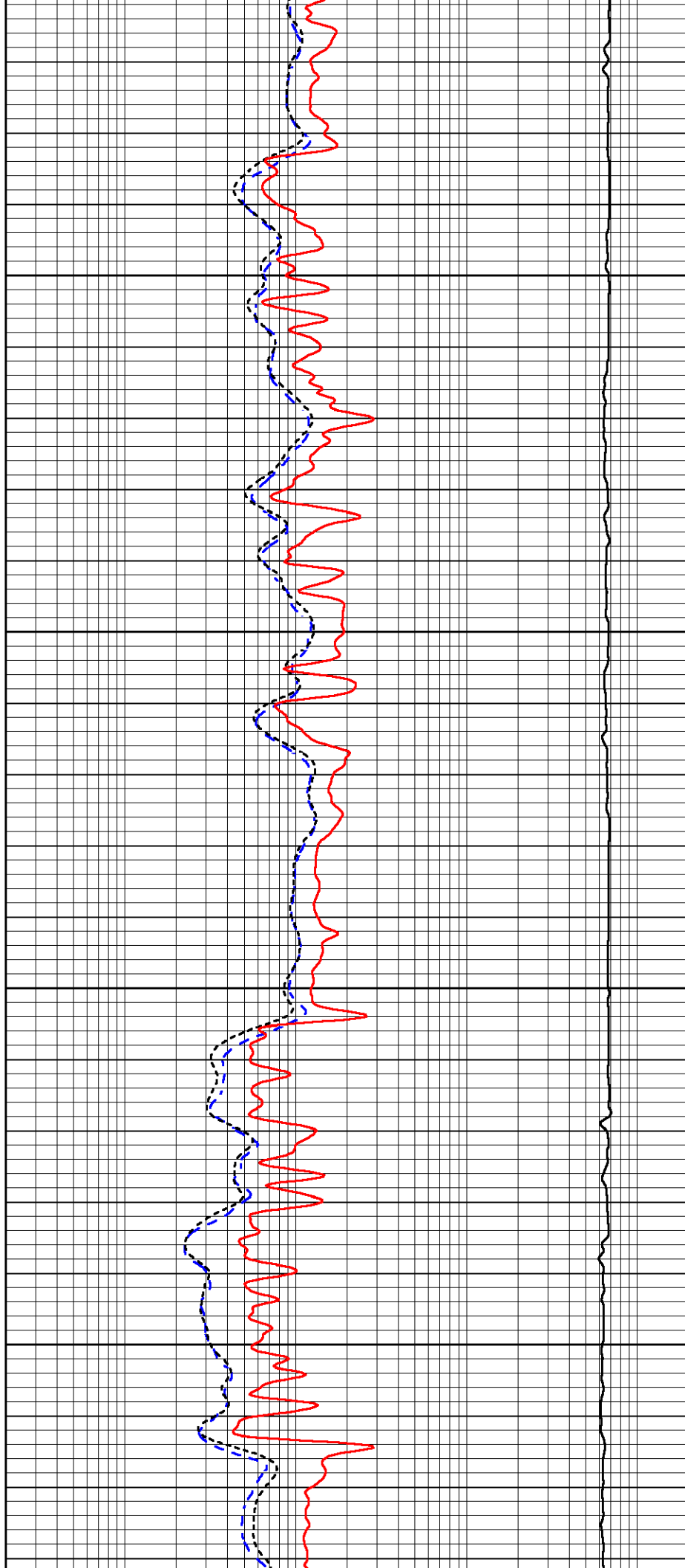


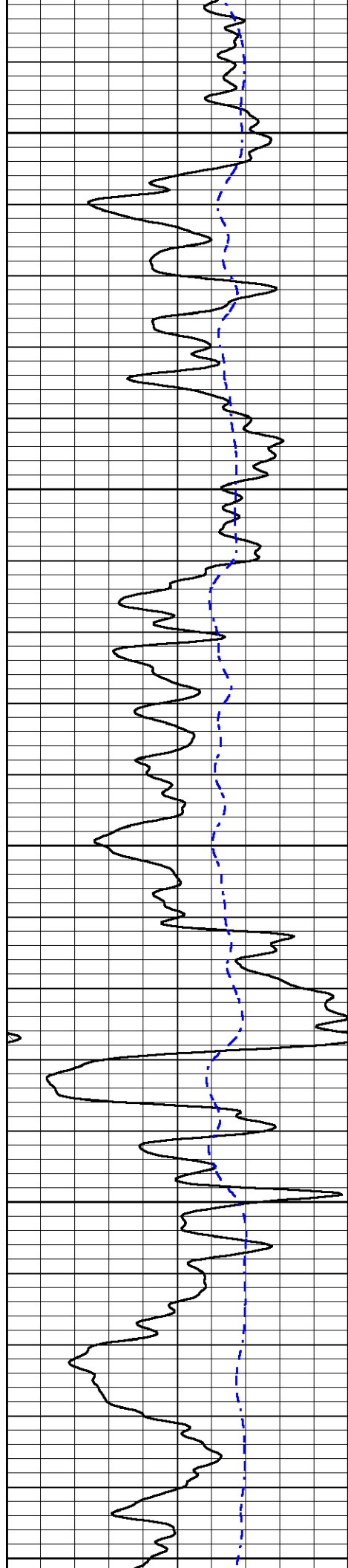
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2550





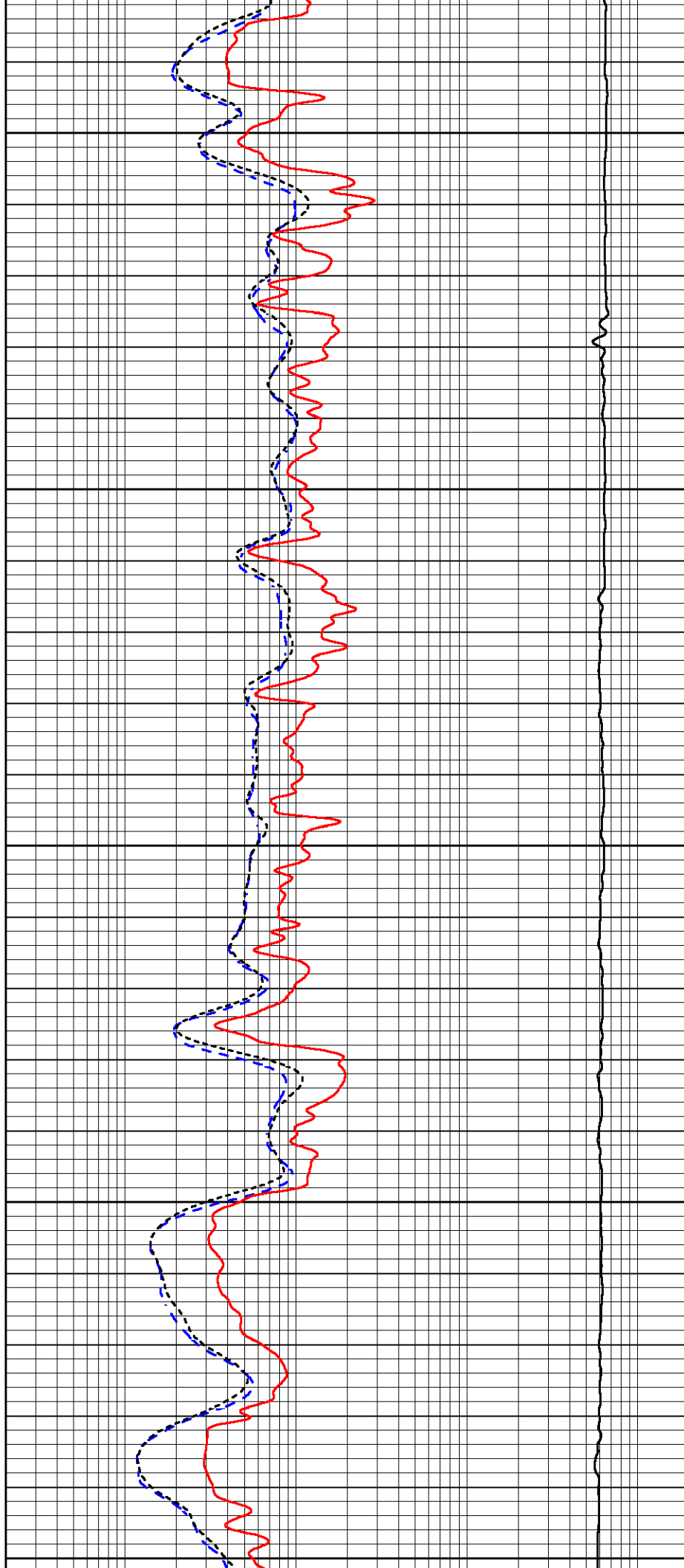
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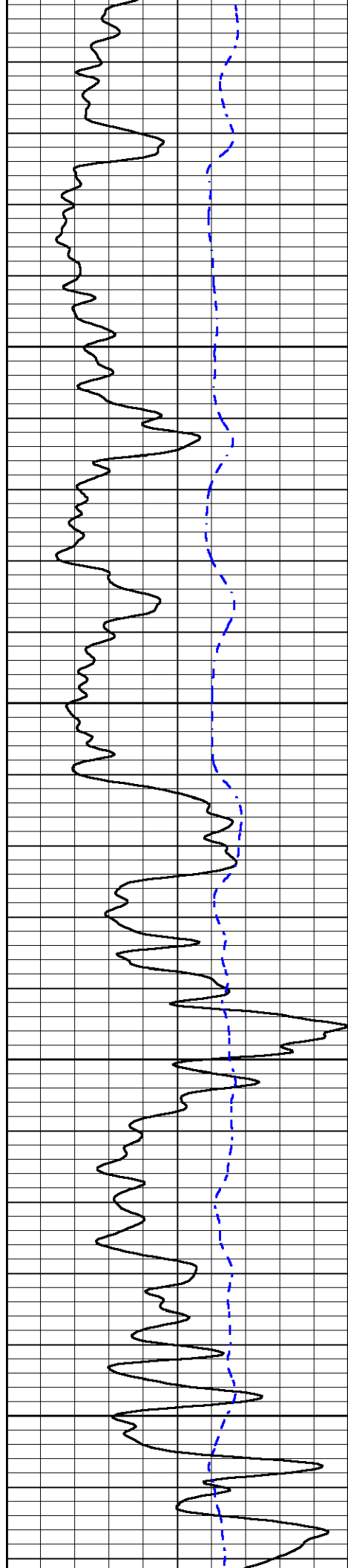
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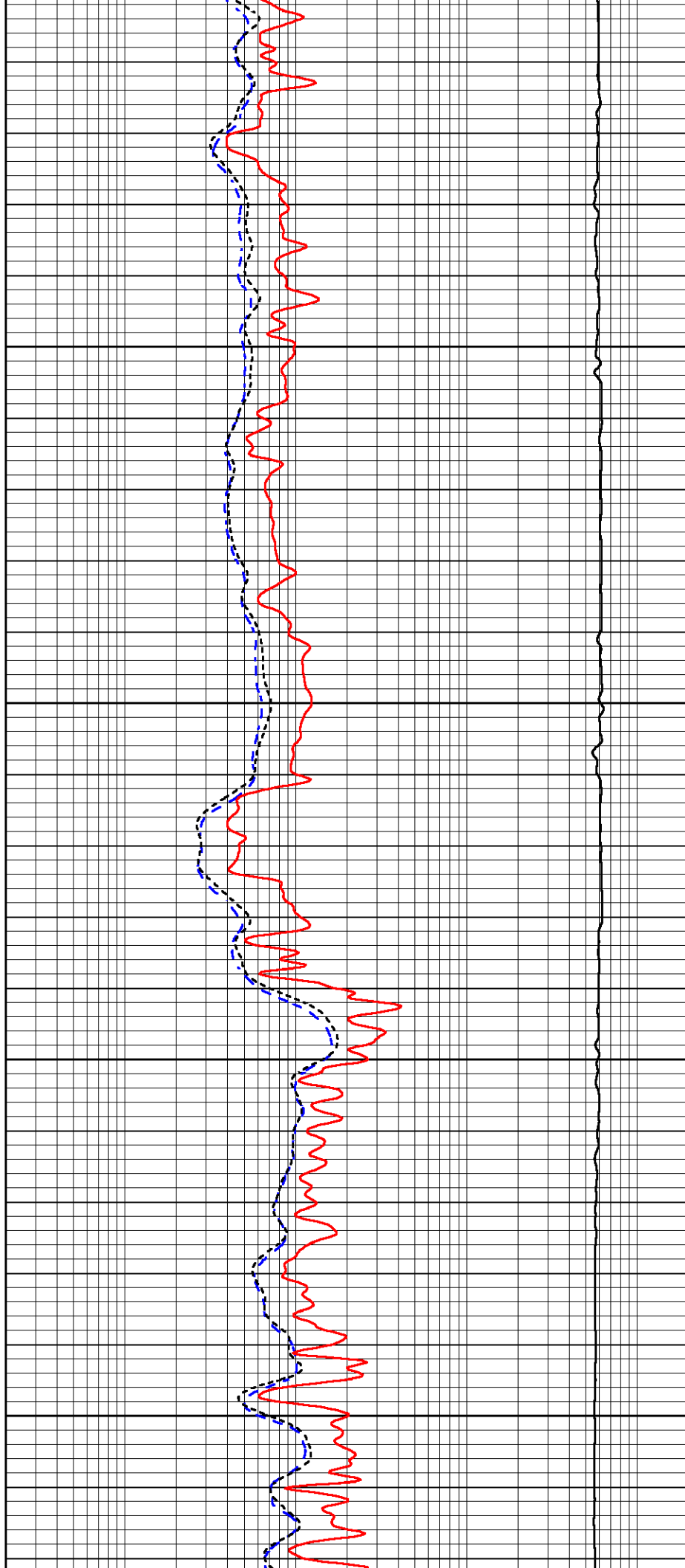


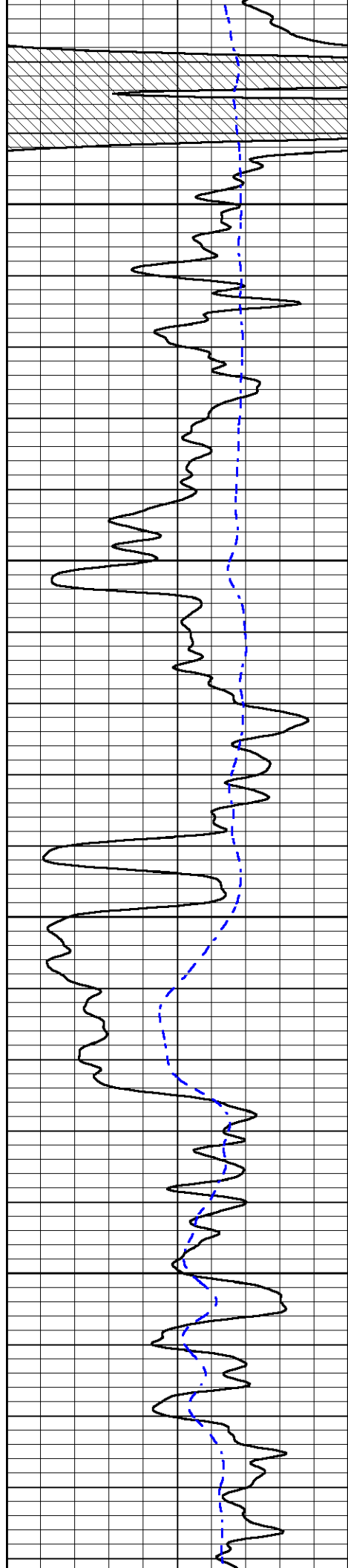
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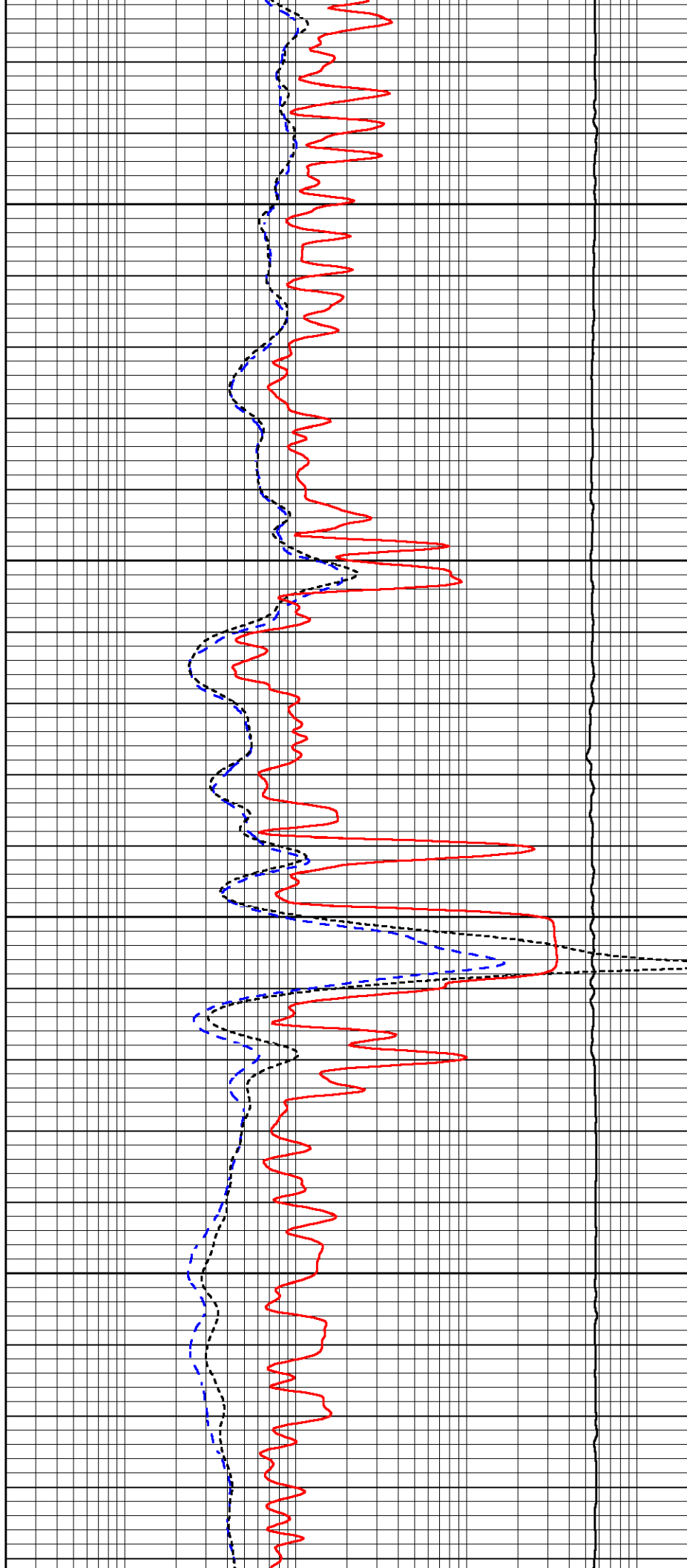


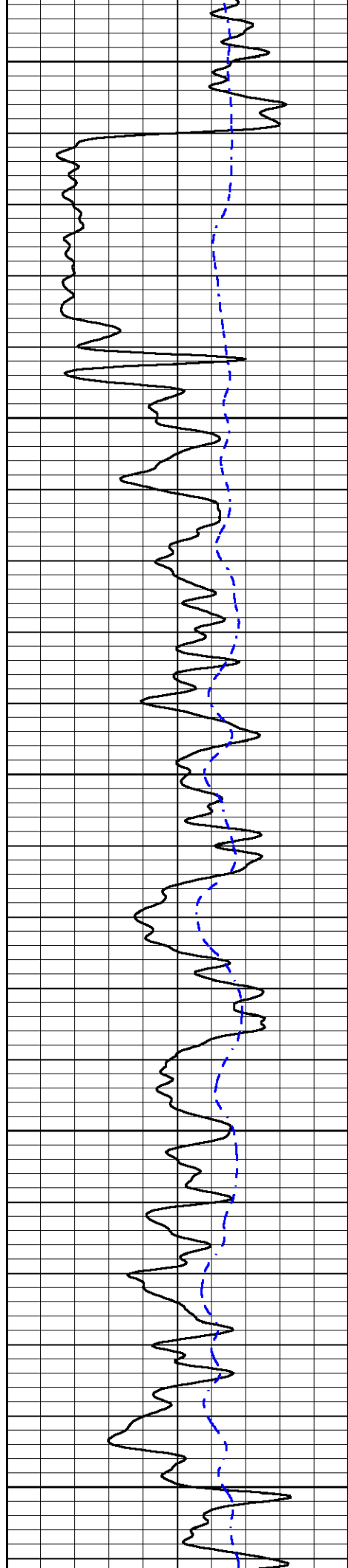
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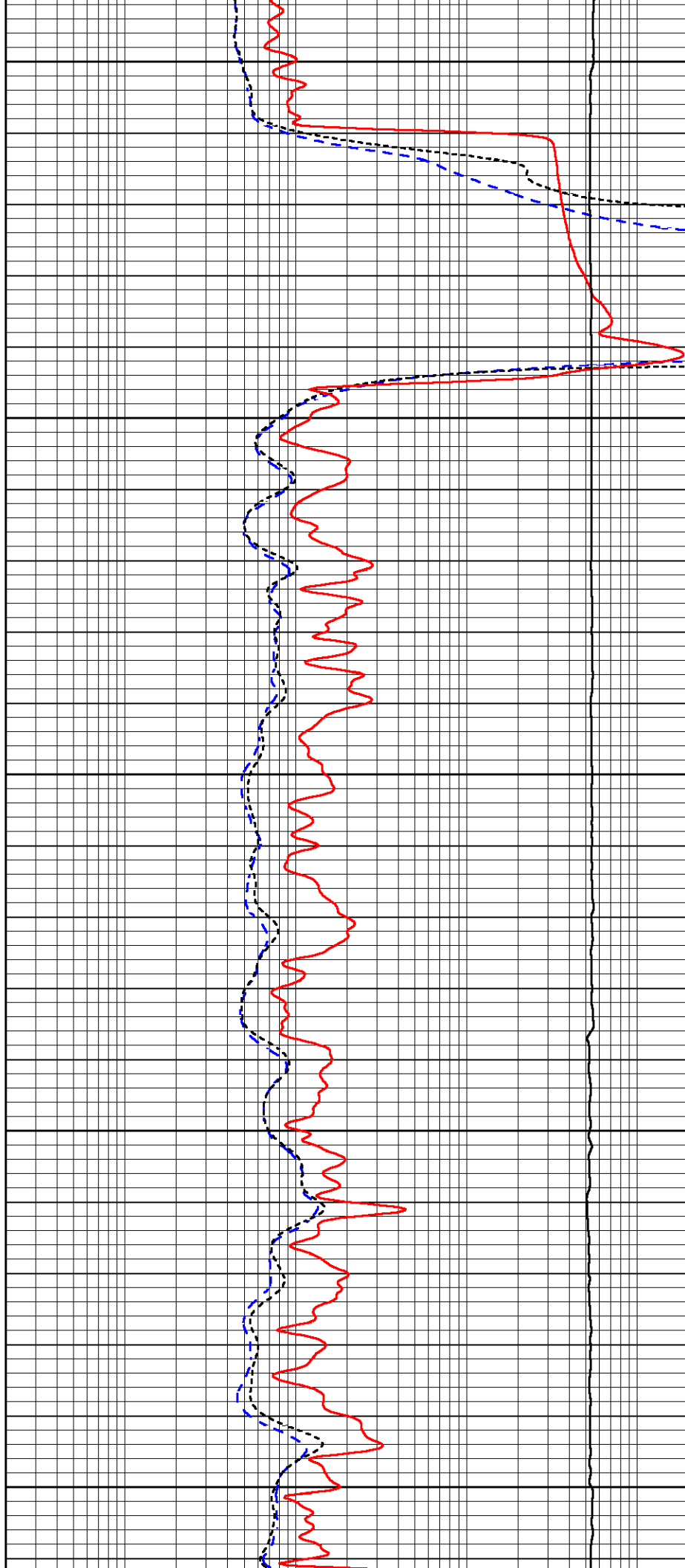
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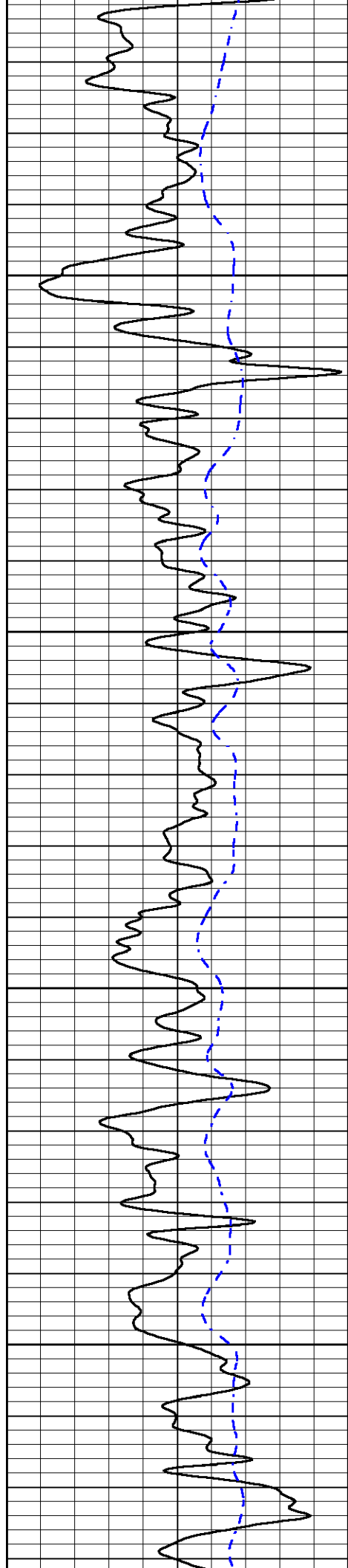
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3400

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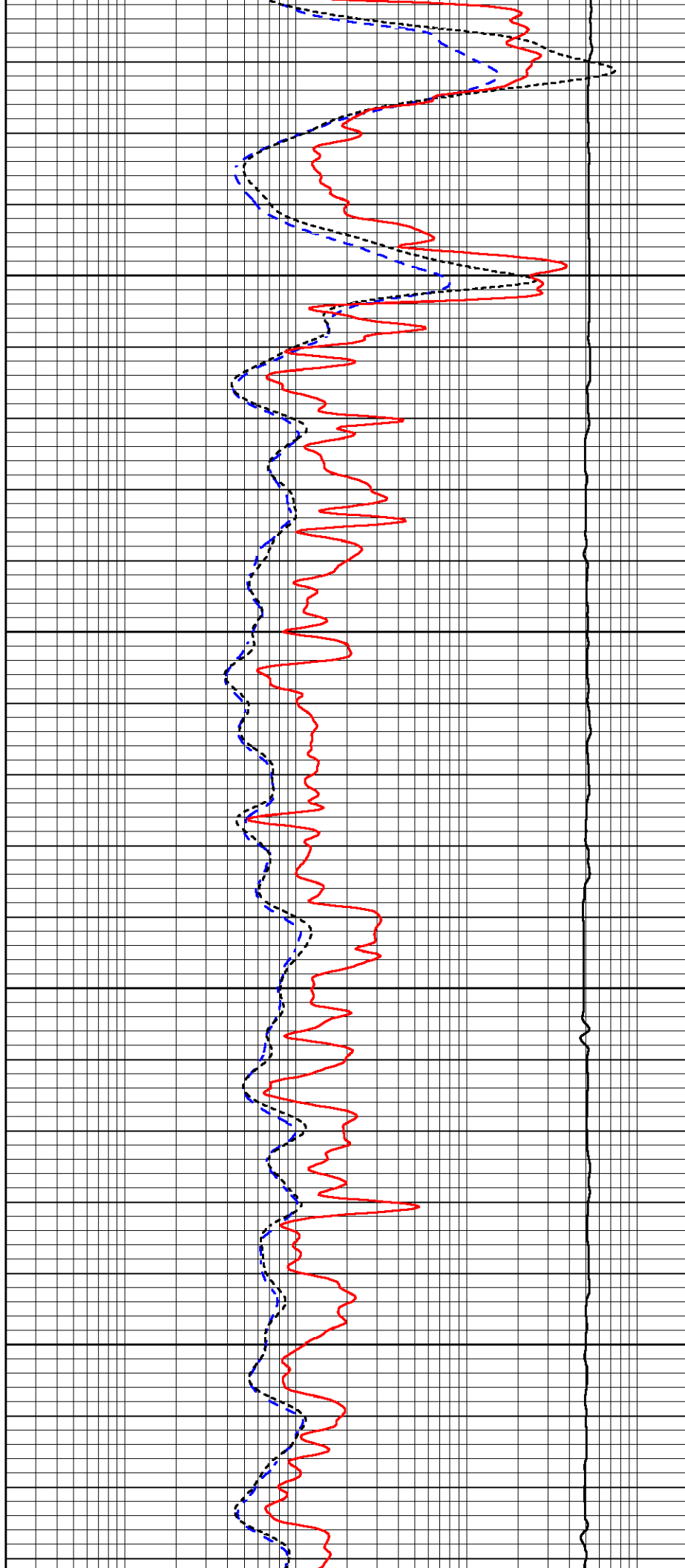


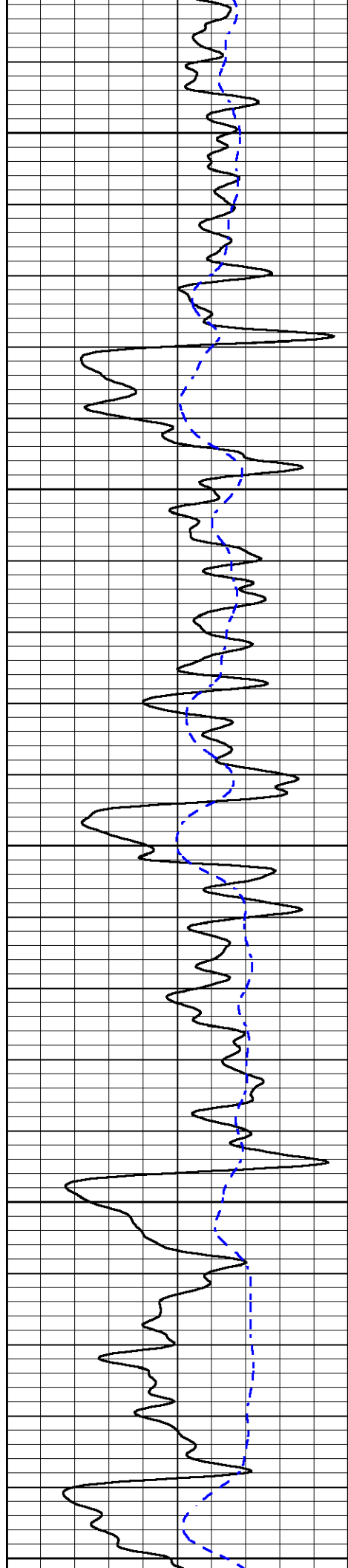
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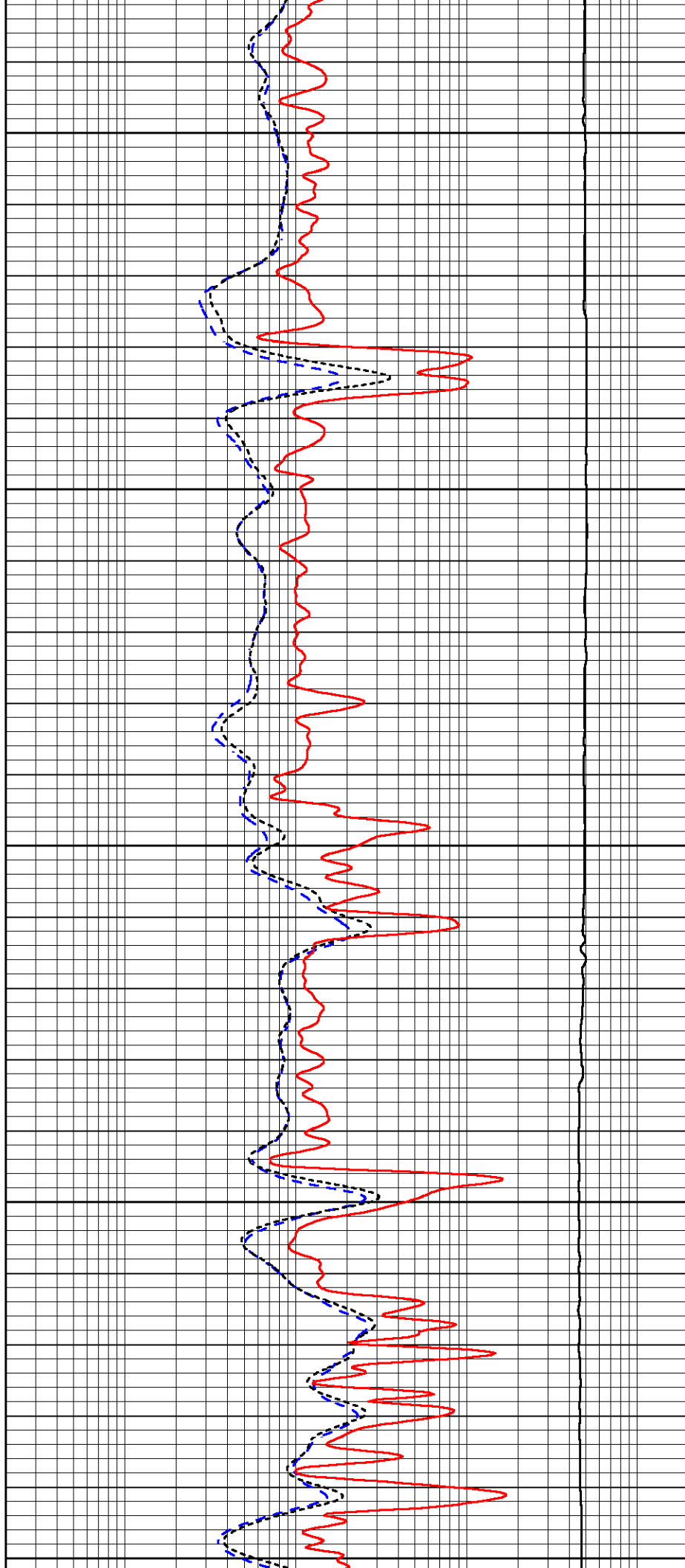
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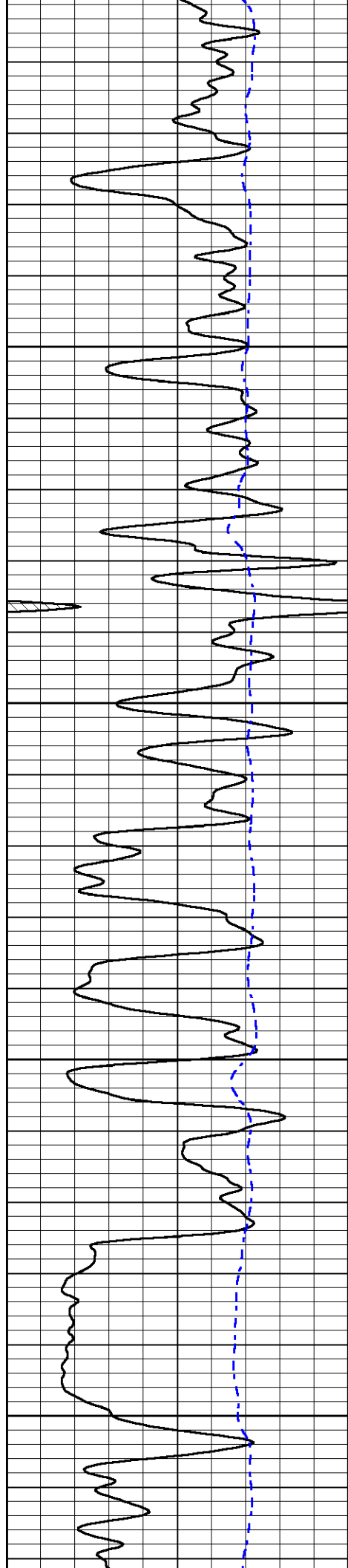
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3800

3850

3900



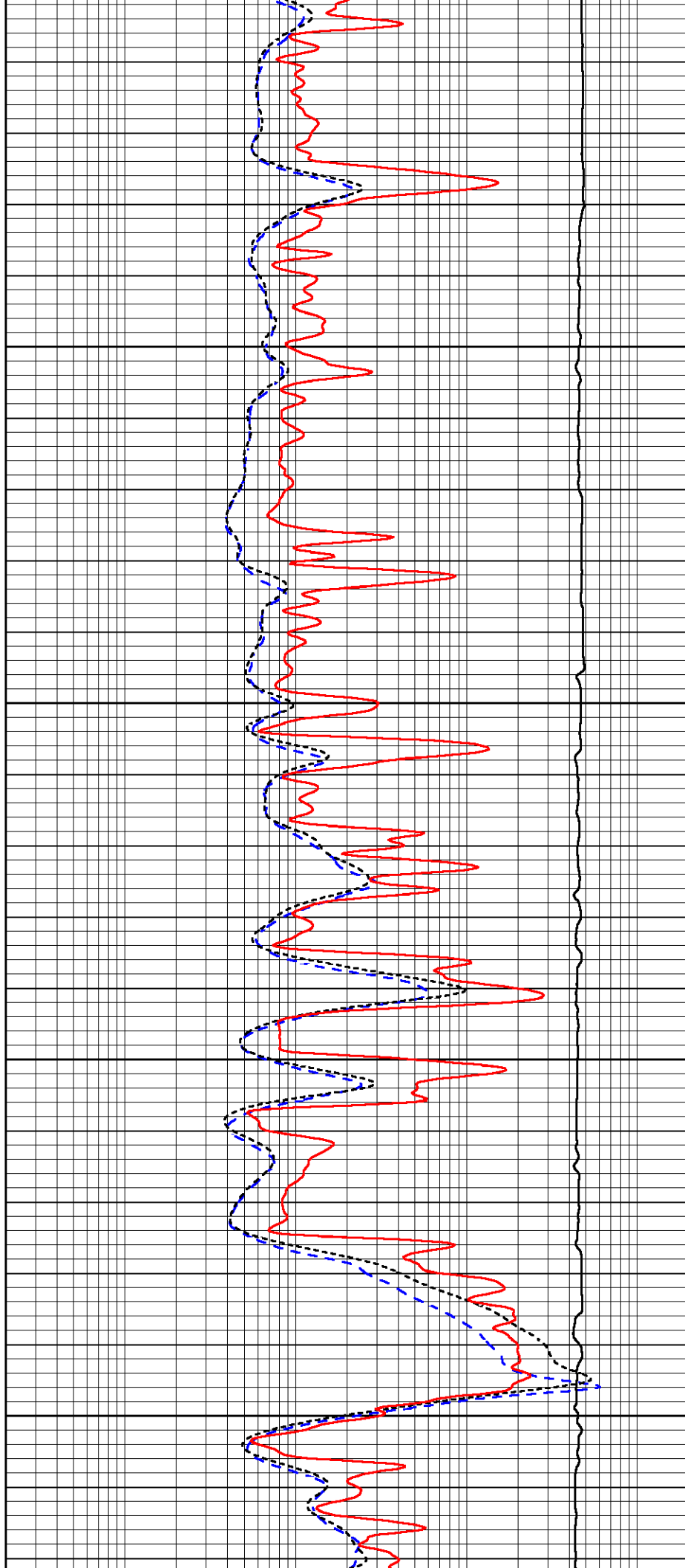


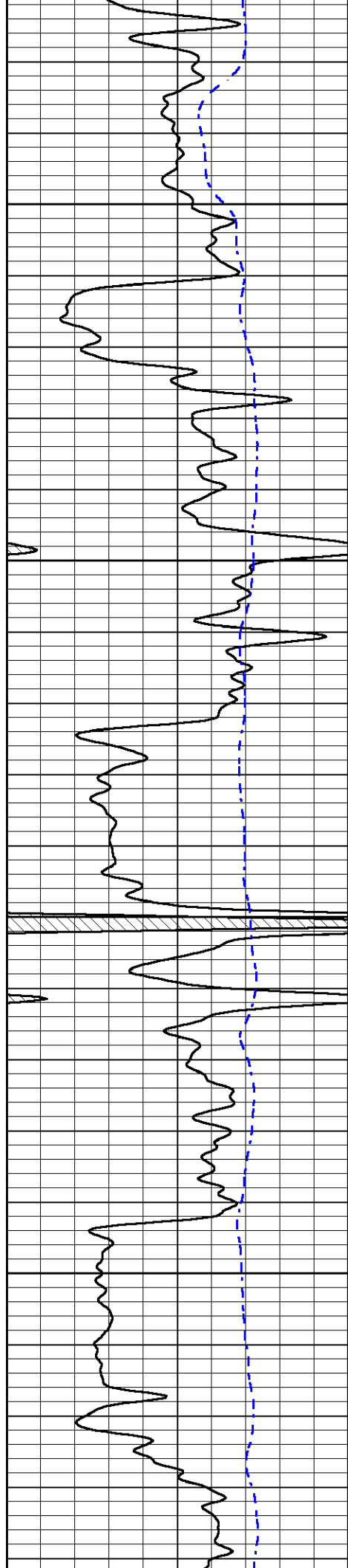
3950

4000

4050

4100



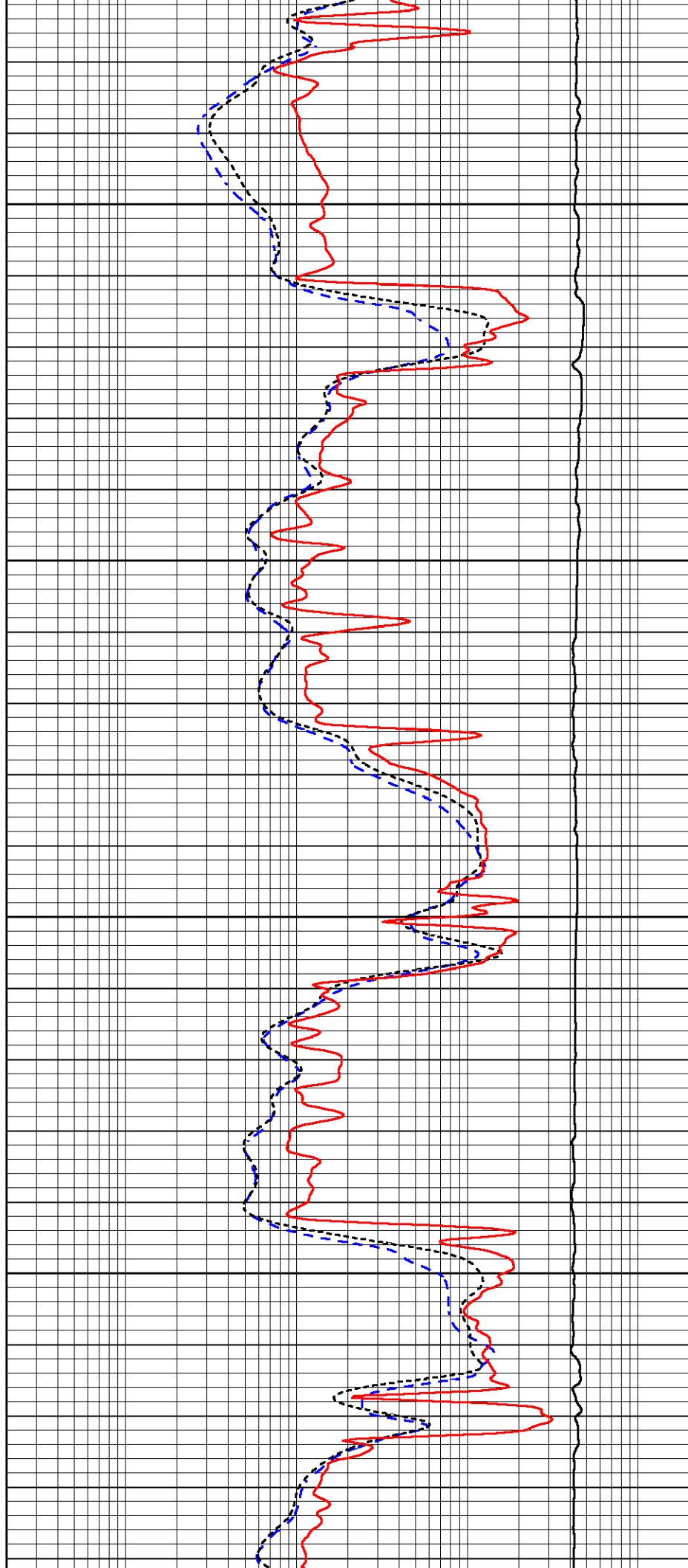


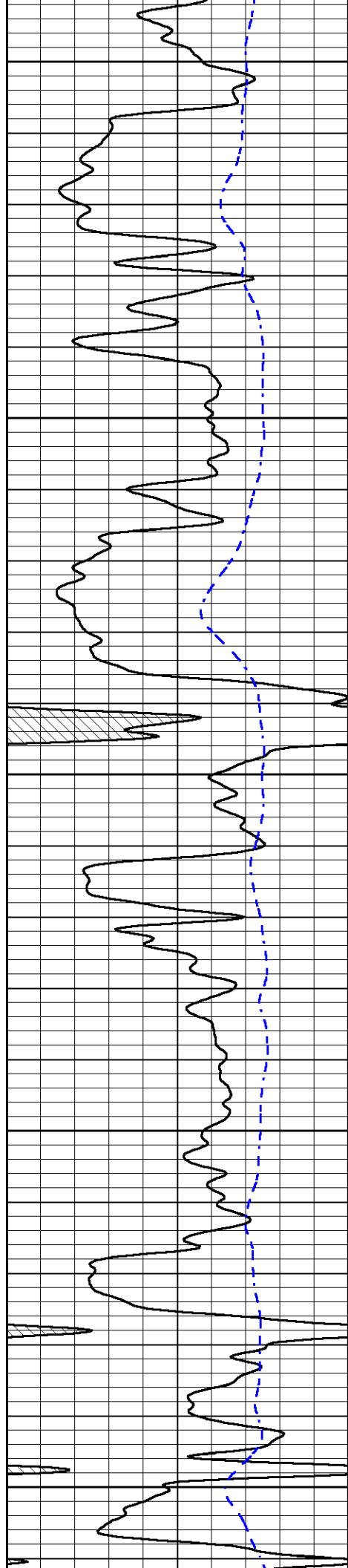
4150

4200

4250

4300





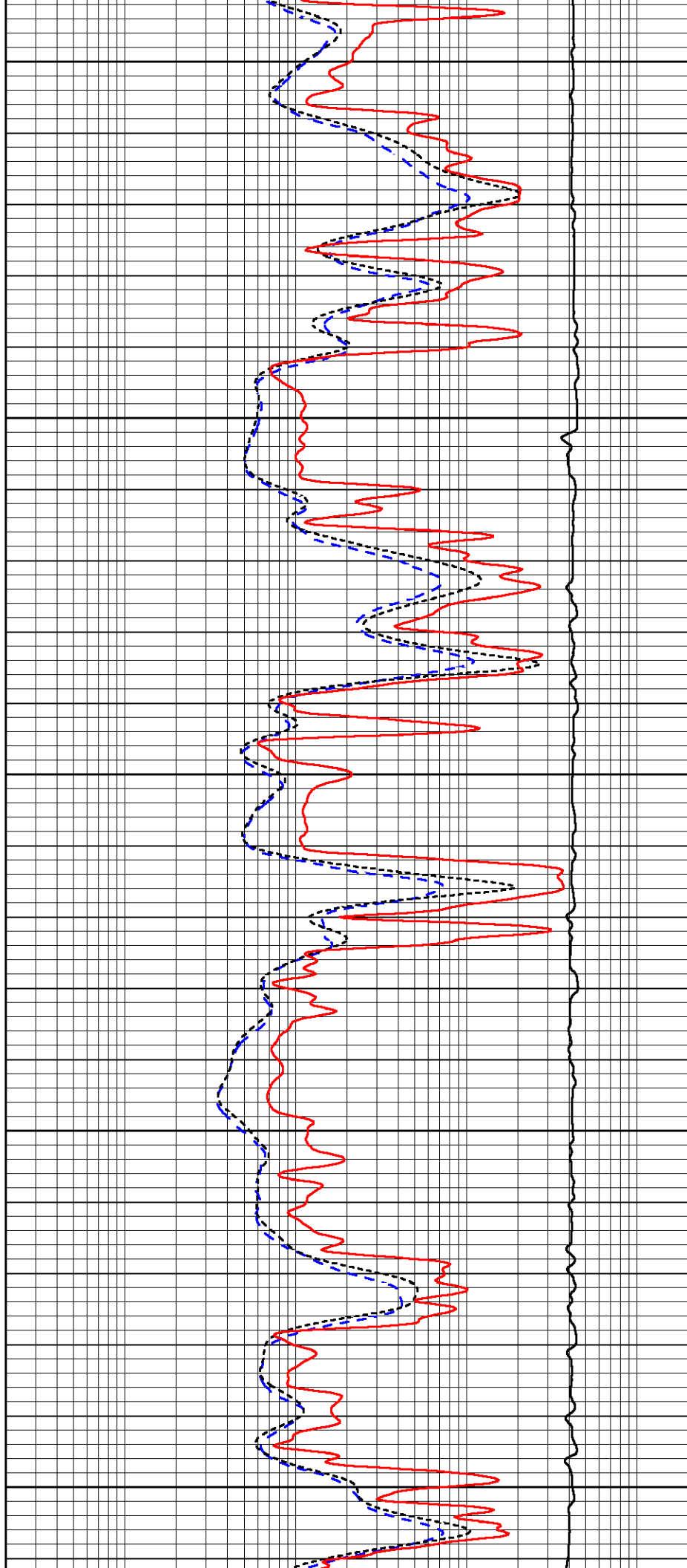
4350

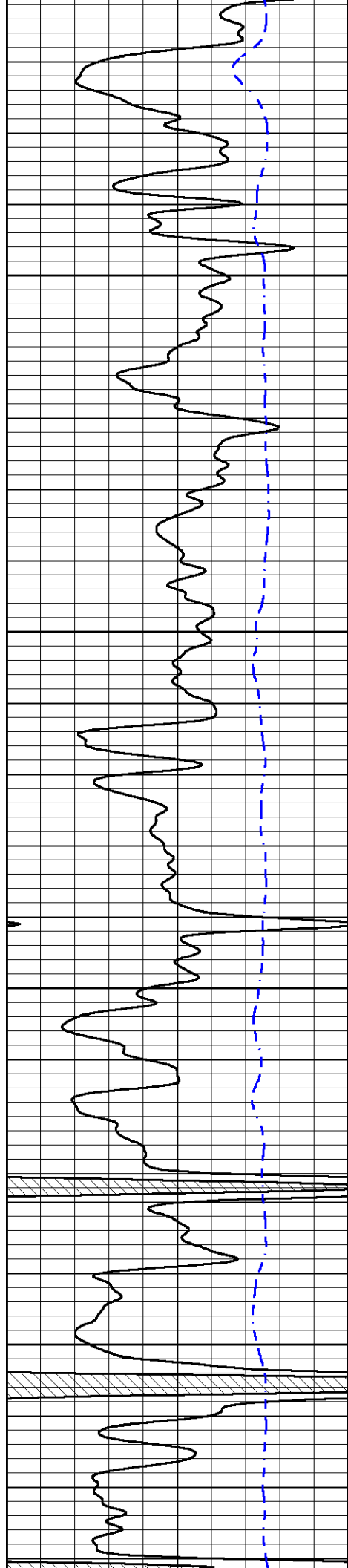
4400

4450

4500

4550



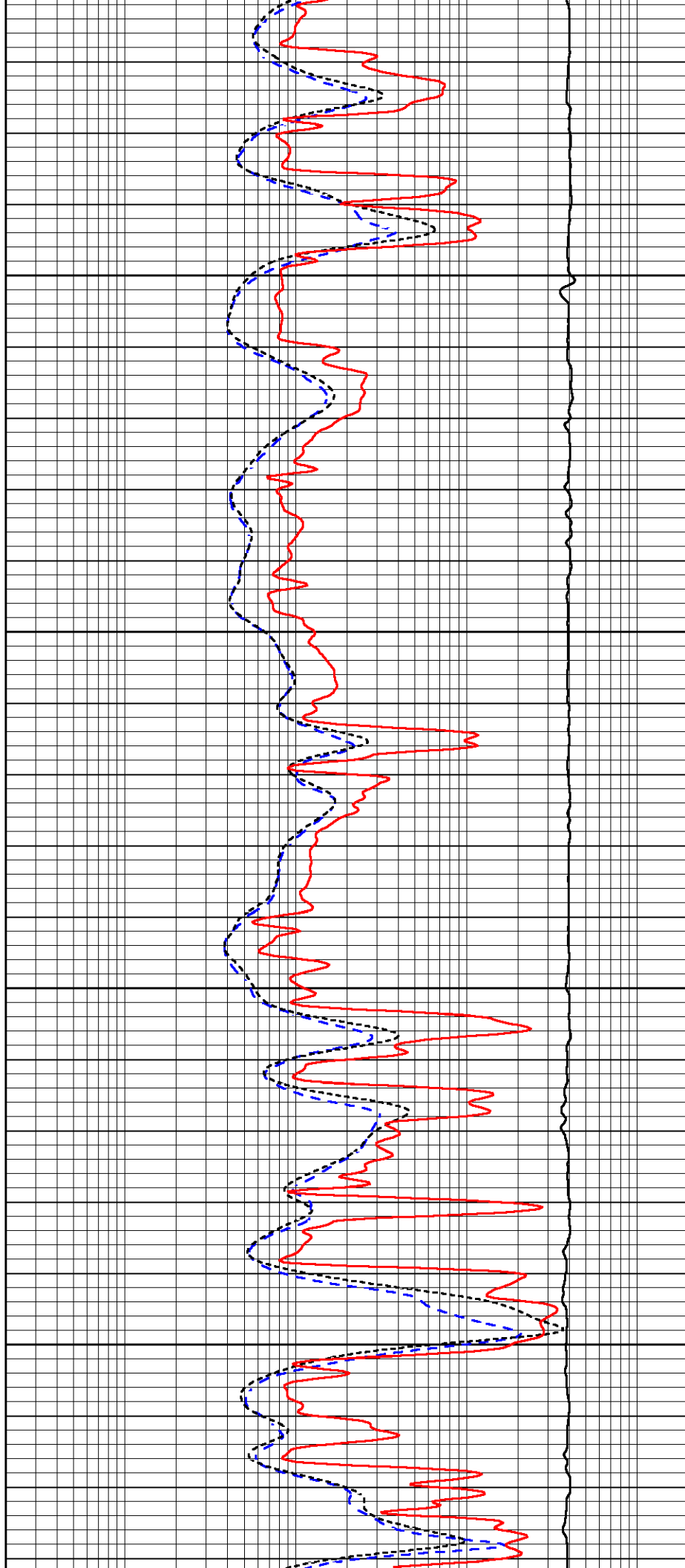


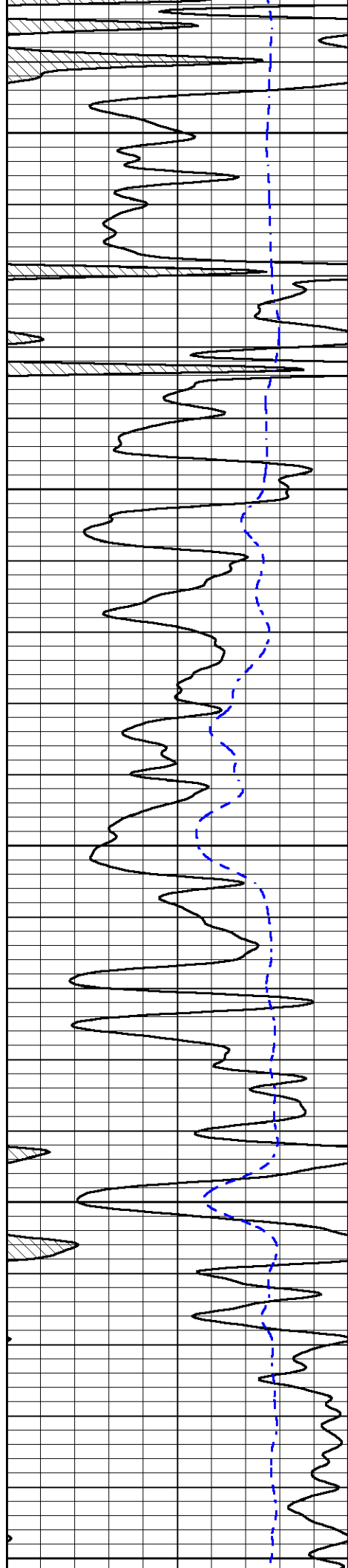
4600

4650

4700

4750





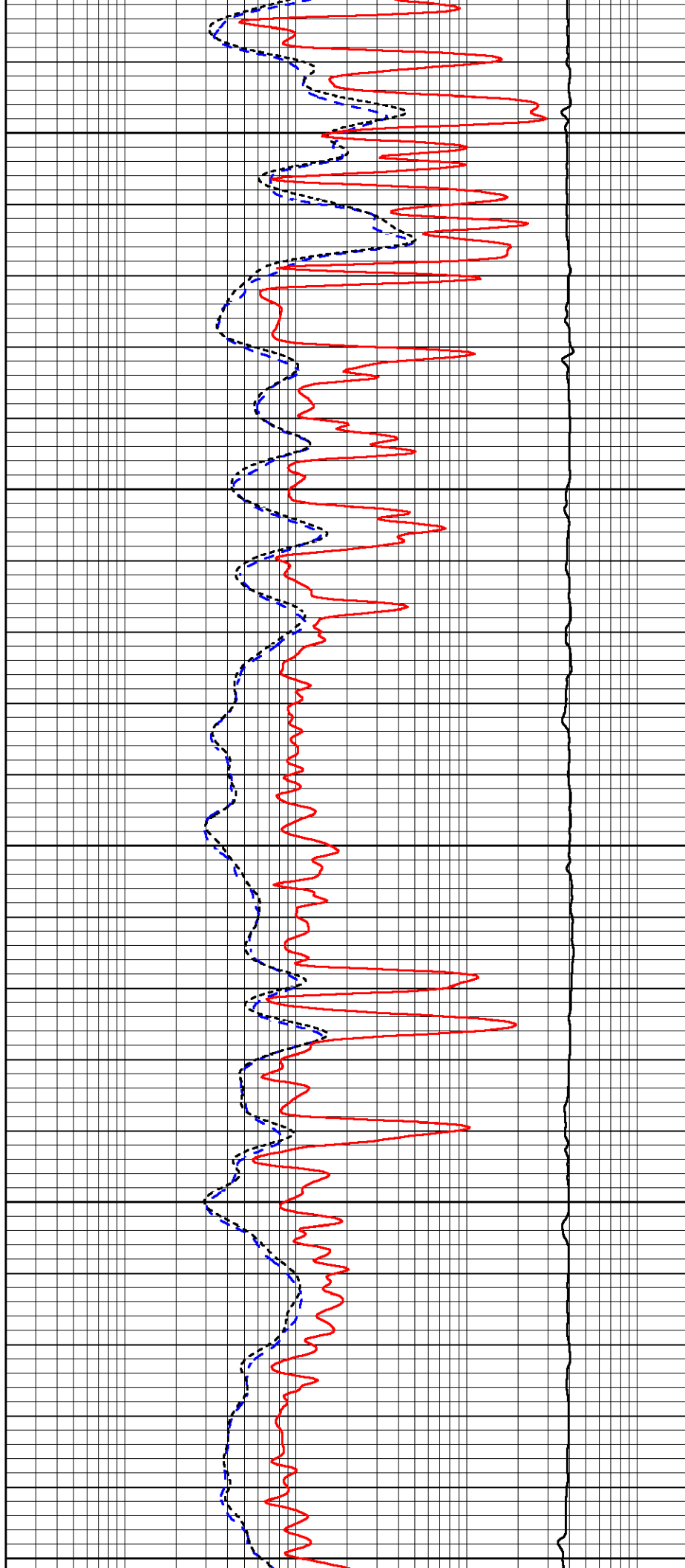
4800

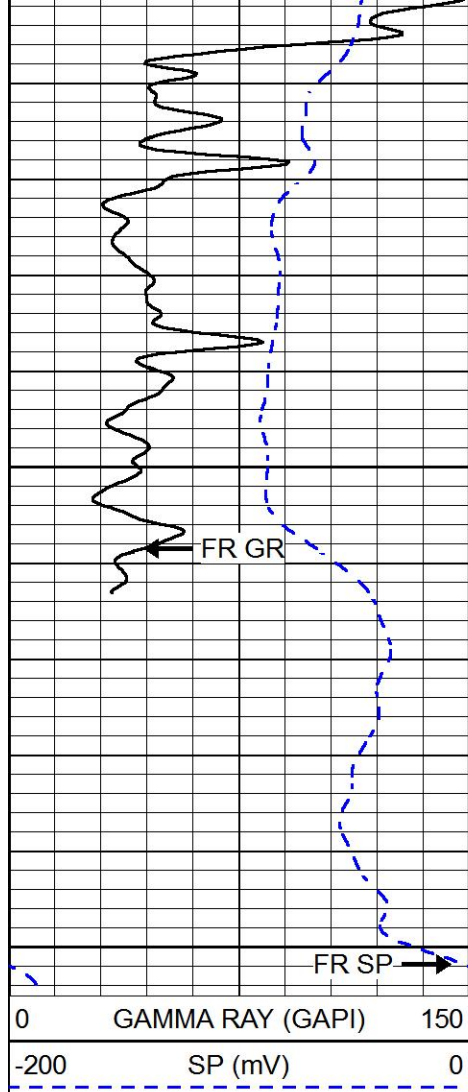
4850

4900

4950

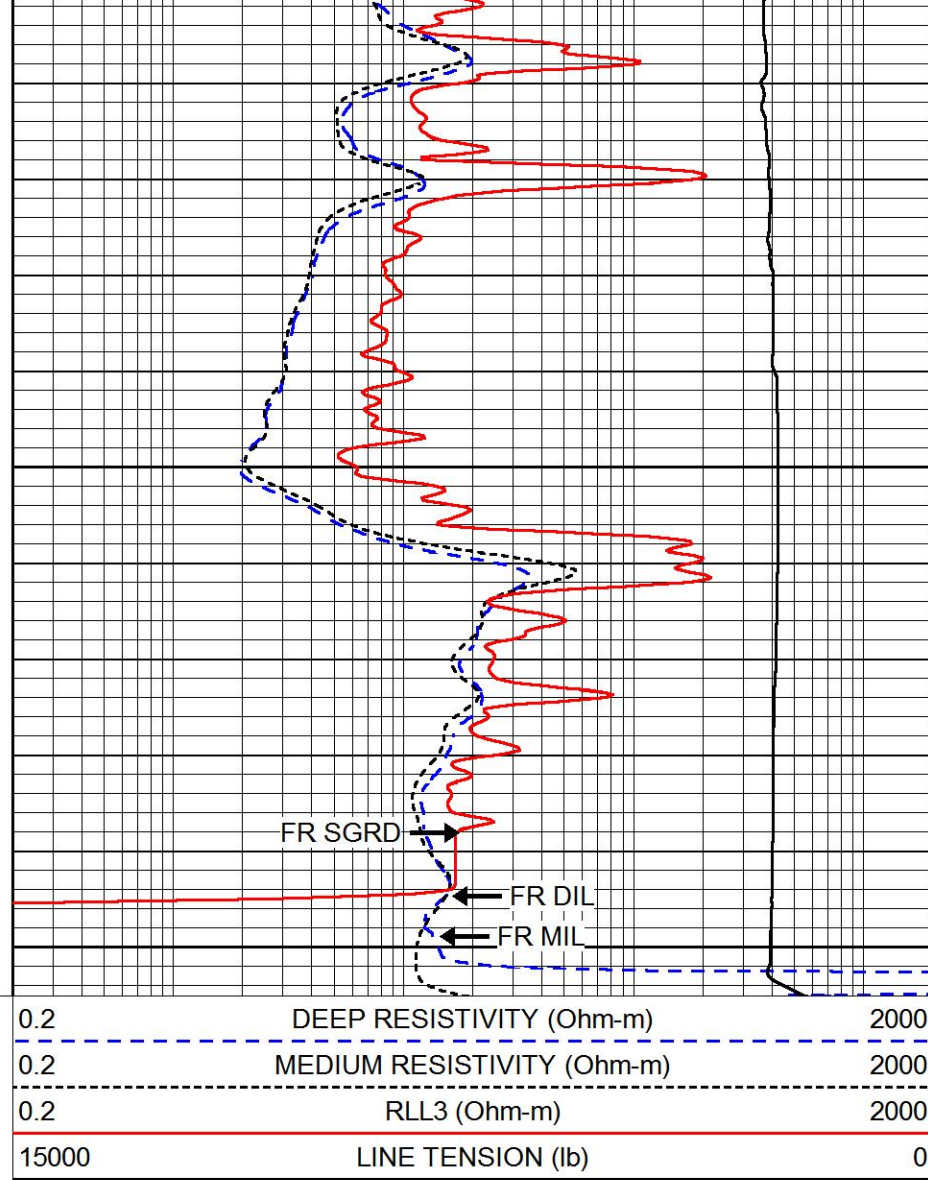
5000





5050

5100



FR SGRD

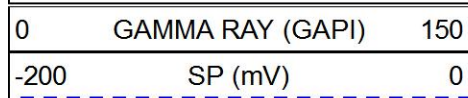
FR DIL

FR MIL

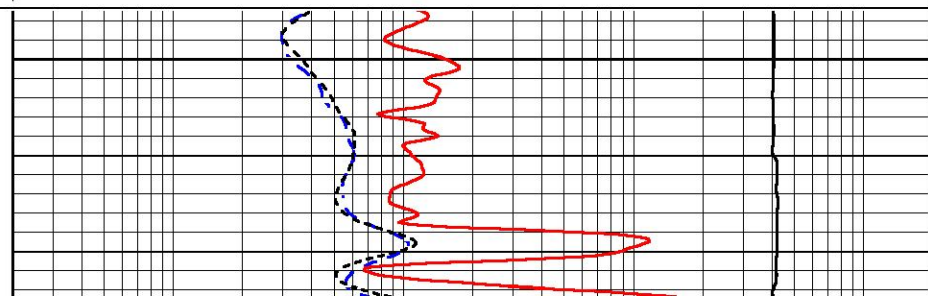
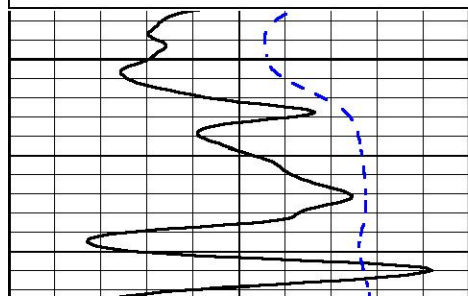
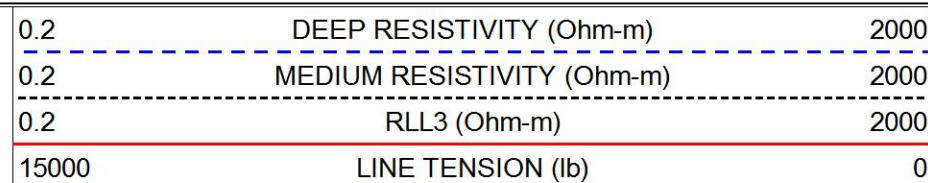


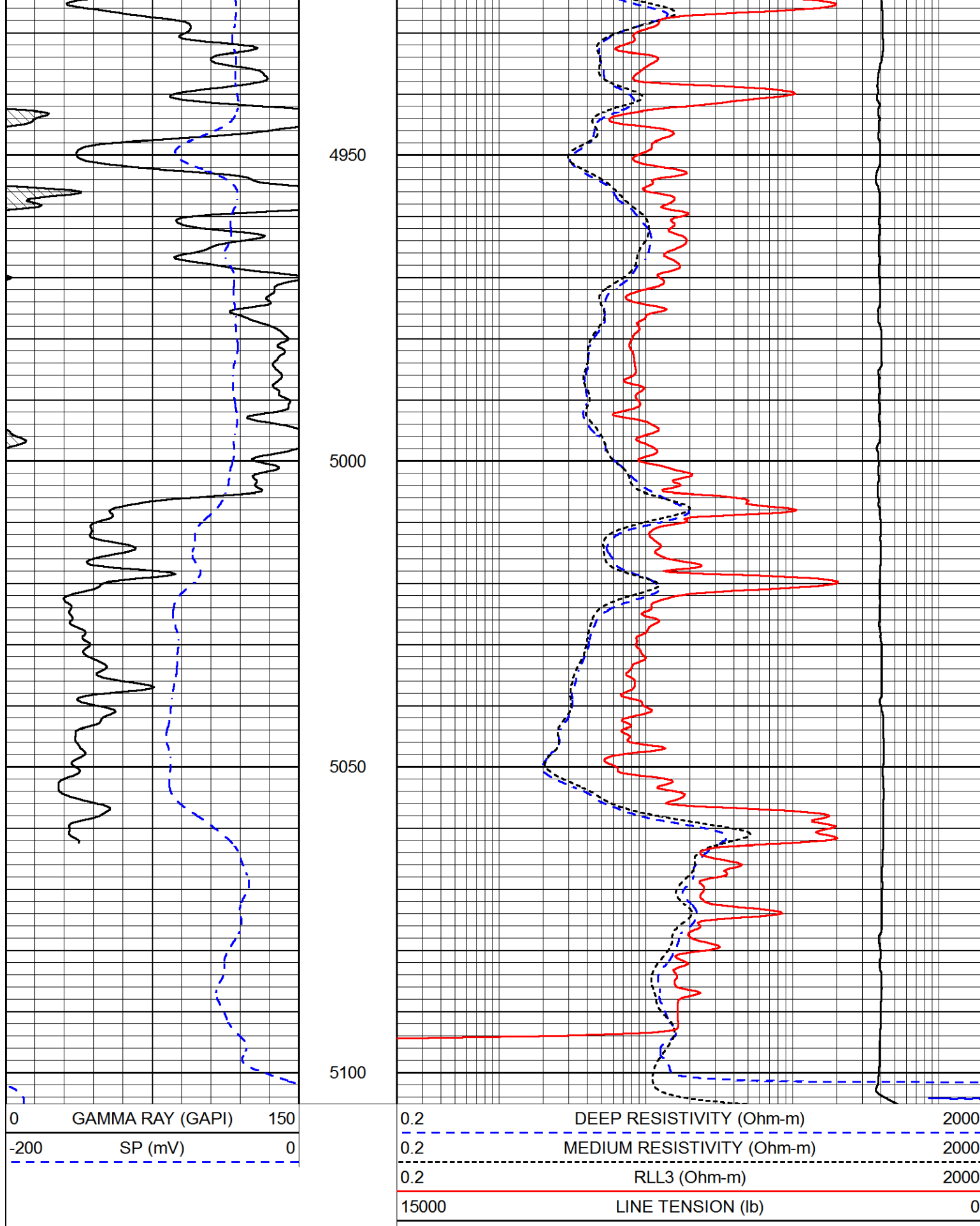
# REPEAT SECTION

Database File murfin\_dorsch\_1\_24.db  
 Dataset Pathname stackml/pass2.1  
 Presentation Format dil  
 Dataset Creation Wed Feb 26 05:36:38 2020  
 Charted by Depth in Feet scaled 1:240



4900





### Calibration Report

Database File      murfin\_dorsch\_1\_24.db  
Dataset Pathname    stackml/pass3.1  
Dataset Creation    Wed Feb 26 06:17:31 2020

Dataset Creation: Wed 11 05 29 00:17:01 2020

|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
|----------------------------------------------------------------------|---------|---------------|---------------------|--------------|-----------------------------------------------------|---------------|------------|----------|--|
| Dual Induction Calibration Report                                    |         |               |                     |              |                                                     |               |            |          |  |
| Serial-Model:<br>Calibration Performed:                              |         |               |                     |              | 55-222-M&W<br>Tue Dec 10 05:11:10 2019              |               |            |          |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
|                                                                      |         | Readings      |                     | References   |                                                     |               | Results    |          |  |
| Loop:                                                                | Air     | Loop          |                     | Air          | Loop                                                |               | Gain       | Offset   |  |
| Deep                                                                 | 167.000 | 835.000       |                     | 0.000        | 255.800                                             | mmho/m        | 0.490      | -41.000  |  |
| Medium                                                               | 0.000   | 1348.000      |                     | 142.000      | 255.800                                             | mmho/m        | 0.390      | -15.000  |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
| Microlog Calibration Report                                          |         |               |                     |              |                                                     |               |            |          |  |
| Serial-Model:<br>Performed:                                          |         |               |                     |              | UDM-01-PSI UDM ML<br>Fri May 31 06:10:42 2019       |               |            |          |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
|                                                                      |         | Readings      |                     | References   |                                                     |               | Results    |          |  |
|                                                                      | Zero    | Cal           |                     | Zero         | Cal                                                 |               | m          | b        |  |
| Normal                                                               | 0.0000  | 1.0000        |                     | 0.0000       | 1.0000                                              | Ohm-m         | 25000.0000 | -1.7000  |  |
| Inverse                                                              | 0.0000  | 1.0000        |                     | 0.0000       | 1.0000                                              | Ohm-m         | 25000.0000 | -1.5000  |  |
| Caliper                                                              | 1.0019  | 1.2642        |                     | 8.0000       | 22.0000                                             | in            | 53.3774    | -47.4000 |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
| Compensated Density Calibration Report                               |         |               |                     |              |                                                     |               |            |          |  |
| Serial-Model:<br>Source / Verifier:<br>Master Calibration Performed: |         |               |                     |              | 934-229-M&W<br>21170B /<br>Thu Dec 19 15:46:53 2019 |               |            |          |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
| Master Calibration                                                   |         |               |                     |              |                                                     |               |            |          |  |
|                                                                      |         | Density       |                     | Far Detector |                                                     | Near Detector |            |          |  |
| Magnesium                                                            |         | 1.755         | g/cc                | 3391.68      |                                                     | 2392.26       |            | cps      |  |
| Aluminum                                                             |         | 2.670         | g/cc                | 645.86       |                                                     | 1568.99       |            | cps      |  |
|                                                                      |         |               | Spine Angle = 75.73 |              | Density/Spine Ratio = 0.535                         |               |            |          |  |
|                                                                      |         | Size          |                     | Reading      |                                                     |               |            |          |  |
| Small Ring                                                           |         | 4.00          | in                  | 1.39         |                                                     |               |            |          |  |
| Large Ring                                                           |         | 14.00         | in                  | 1.04         |                                                     |               |            |          |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
| Compensated Neutron Calibration Report                               |         |               |                     |              |                                                     |               |            |          |  |
| Serial Number:<br>Tool Model:<br>Calibration Performed:              |         |               |                     |              | tk10-MW<br>M&W<br>Wed Nov 16 11:21:36 2016          |               |            |          |  |
|                                                                      |         |               |                     |              |                                                     |               |            |          |  |
| 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:<br>Tool Model:                                        |         | 89-M&W<br>M&W |                     |              |                                                     |               |            |          |  |

|                        |                          |          |
|------------------------|--------------------------|----------|
| Calibration Performed: | Tue Dec 10 05:11:34 2019 |          |
| Calibrator Value:      | 1000.0                   | GAPI     |
| Background Reading:    | 0.0                      | cps      |
| Calibrator Reading:    | 6.2                      | cps      |
| Sensitivity:           | 0.5200                   | GAPI/cps |



|         |                               |
|---------|-------------------------------|
| Company | MURFIN DRILLING COMPANY, INC. |
| Well    | DORSCH #1-24                  |
| Field   | WILDCAT                       |
| County  | CHEYENNE                      |
| State   | KANSAS                        |