



## DUAL INDUCTION LOG

**PIONEER**  
Pioneer Energy Services

Company MURFIN DRILLING COMPANY, INC.  
Well HENDERSON G #7  
Field BEMIS SHUTTS  
County ELLIS  
State KANSAS

Company MURFIN DRILLING COMPANY, INC.  
Well HENDERSON G #7  
Field BEMIS SHUTTS  
County ELLIS State KANSAS

Location: API #: 15-051-26971-00-00

Other Services

SEC 27 TWP 11S RGE 18W  
S2 NE SW NW  
1905' FNL & 990' FWL

CNL/CDL  
MEL/BHCS

Permanent Datum GROUND LEVEL Elevation 2087'  
Log Measured From KELLY BUSHING  
Drilling Measured From KELLY BUSHING

Elevation  
K.B. 2092'  
D.F. N/A  
G.L. 2087'

Date 9/25/2019

Run Number ONE

Depth Driller 3711'

Depth Logger 3710'

Bottom Logged Interval 3709'

Top Log Interval 300'

Casing Driller 8.625" @ 302'

Casing Logger 300'

Bit Size 7.875"

Type Fluid in Hole CHEMICAL

Salinity, ppm CL 3200

Density / Viscosity 9.2 60

pH / Fluid Loss 10.5 7.2

Source of Sample FLOWLINE

Rm @ Meas. Temp 0.75 @ 74

Rmf @ Meas. Temp 0.56 @ 74

Rmc @ Meas. Temp 1.01 @ 74

Source of Rmf / Rmc CHARTS

Rm @ BHT 0.49 @ 113

Operating Rig Time 4 HOURS

Max Rec. Temp. F 113 DEG F

Equipment Number P-108

Location HAYS

Recorded By J. HENRICKSON

Witnessed By ROBERT HENDRIX

<<< 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.

HAYS, N TO HOMESTEAD RD, 1.5 N, E INTO, S & E UP HILL 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

Engineer: J. HENRICKSON  
Operator:  
Operator:  
Operator:

### This Log Record Was Witnessed By

Primary Witness: ROBERT HENDRIX  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

| Sensor                                                      | Offset (ft) | Schematic                                                                         |  | Description       | Length (ft) | O.D. (in) | Weight (lb) |
|-------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|--|-------------------|-------------|-----------|-------------|
| GR                                                          | 33.00       |  |  | GR-M&W (89-M&W)   | 3.00        | 3.50      | 50.00       |
| CNLSC                                                       | 29.90       |                                                                                   |  | CNT-M&W (tk10-MW) | 5.50        | 3.50      | 100.00      |
| CNSSC                                                       | 29.15       |                                                                                   |  |                   |             |           |             |
| LSD<br>DCAL<br>SSD                                          | 20.85       |                                                                                   |  | CDL-M&W (979-229) | 8.50        | 4.00      | 250.00      |
|                                                             | 20.83       |                                                                                   |  |                   |             |           |             |
|                                                             | 20.35       |                                                                                   |  |                   |             |           |             |
|                                                             |             |                                                                                   |  |                   |             |           |             |
| RLL3                                                        | 15.80       |  |  | DIL-M&W (PSI 988) | 18.50       | 3.50      | 220.00      |
| RLL3F                                                       | 15.79       |                                                                                   |  |                   |             |           |             |
| CILD                                                        | 8.00        |                                                                                   |  |                   |             |           |             |
|                                                             |             |                                                                                   |  |                   |             |           |             |
|                                                             |             |                                                                                   |  |                   |             |           |             |
| CILM                                                        | 4.70        |                                                                                   |  |                   |             |           |             |
| SP                                                          | 0.20        |                                                                                   |  |                   |             |           |             |
| Dataset: murfin_henderson g #7.db: field/well/stack/pass3.1 |             |                                                                                   |  |                   |             |           |             |
| Total length: 35.50 ft                                      |             |                                                                                   |  |                   |             |           |             |
| Total weight: 620.00 lb                                     |             |                                                                                   |  |                   |             |           |             |
| O.D.: 4.00 in                                               |             |                                                                                   |  |                   |             |           |             |

# Log Variables

DatabaseC:\ProgramData\Warrior\Data\murfin\_henderson g #7.db  
Dataset field/well/stack/pass3.1/\_vars\_

## Top - Bottom

|           |        |         |         |          |          |       |          |
|-----------|--------|---------|---------|----------|----------|-------|----------|
| A         | BOREID | BOTTEMP | CASEOD  | CASETHCK | FLUIDDEN | M     | MATRXDEN |
| 1         | in     | degF    | in      | in       | g/cc     | 2     | g/cc     |
|           | 7.875  | 113     | 5.5     | 0        | 1        |       | 2.71     |
| NPORSEL   | PERFS  | SNDERR  | SNDERRM | SPSHIFT  | SRFTEMP  | SZCOR | TDEPTH   |
| Limestone | 0      | mmho/m  | mmho/m  | mV       | degF     | Off   | ft       |
|           |        | 0       | 0       | 70       | 70       |       | 3710     |



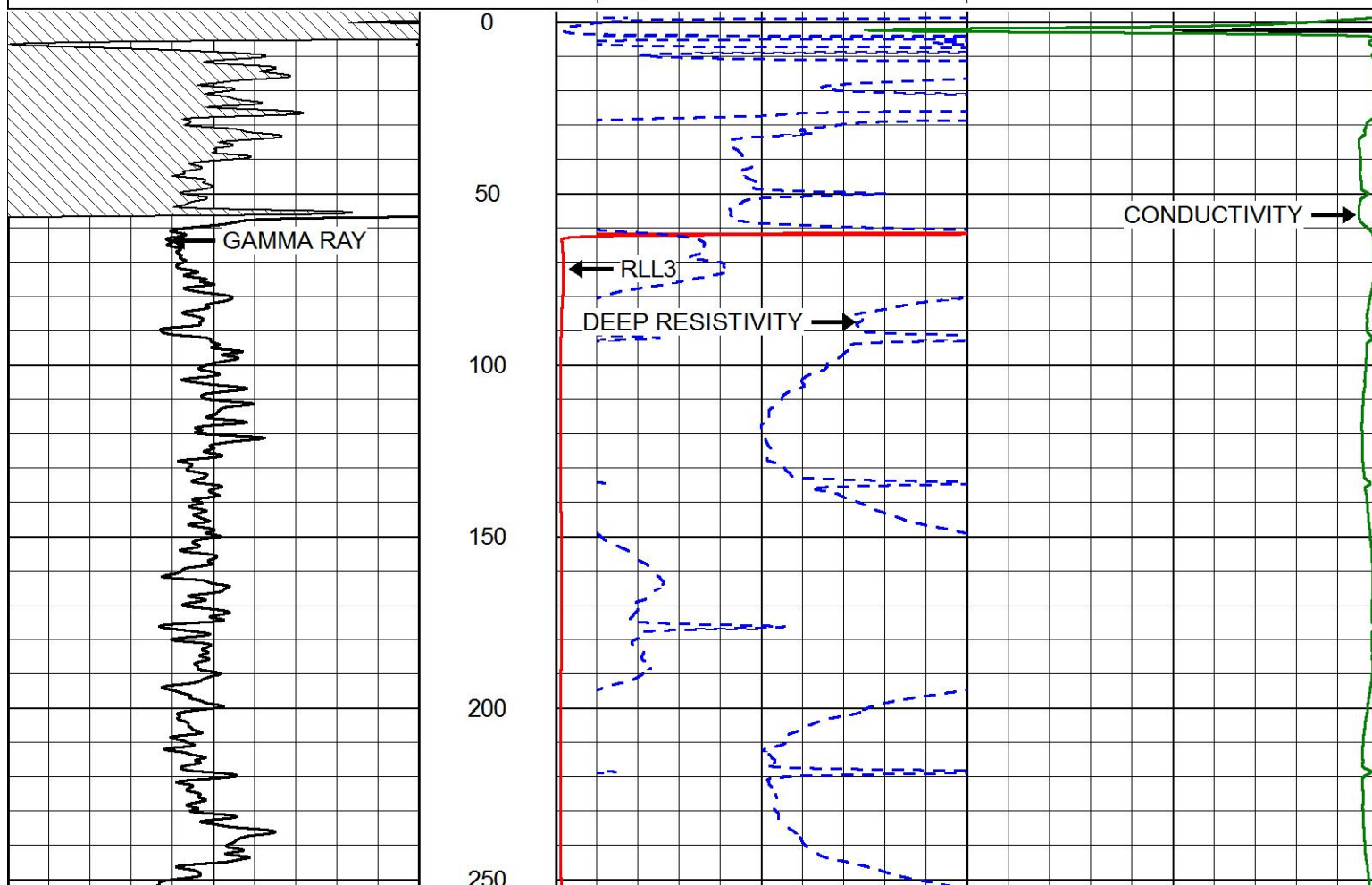
**PIONEER**  
Pioneer Energy Services

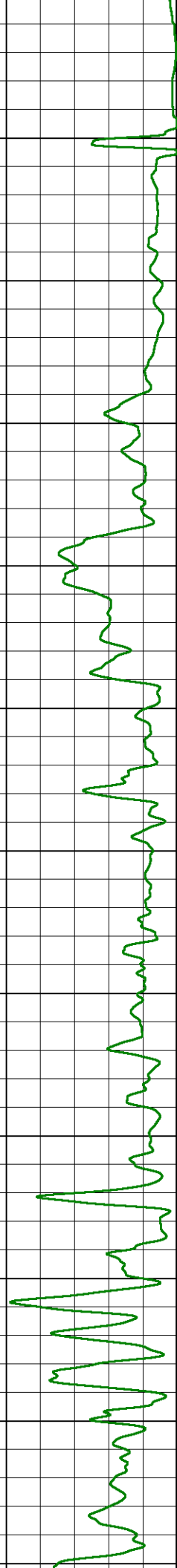
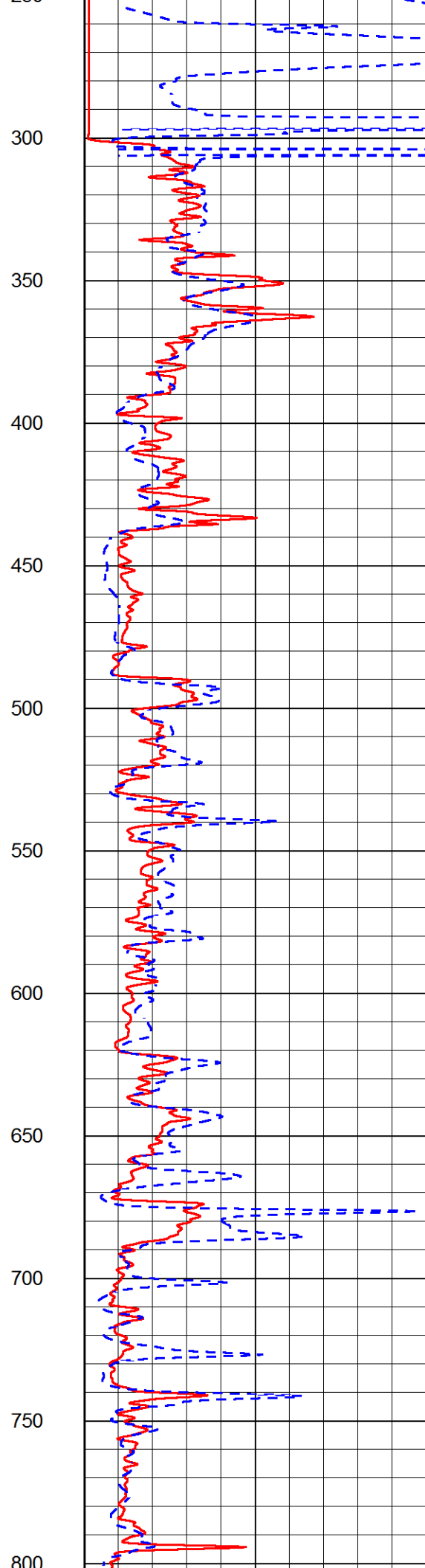
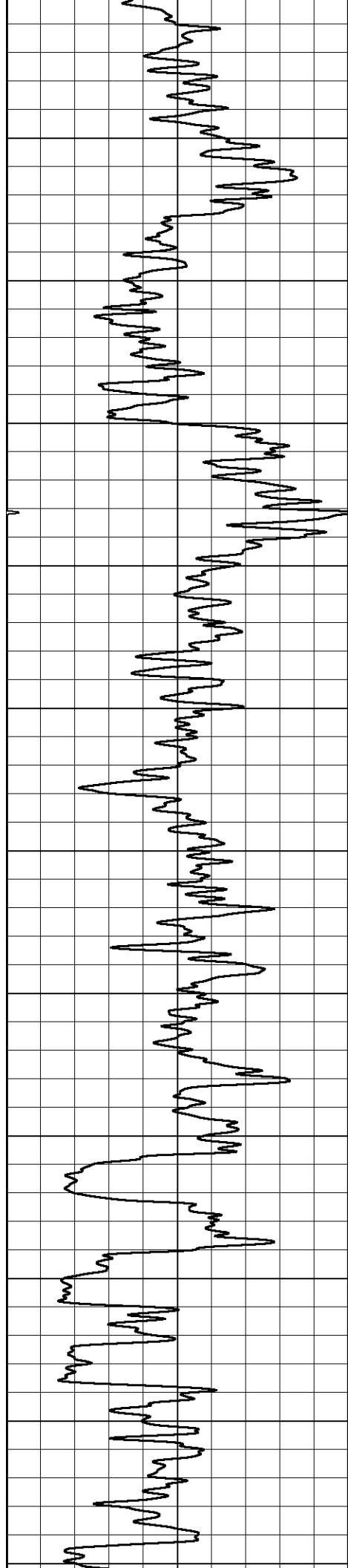
## 2" SCALE RESISTIVITY

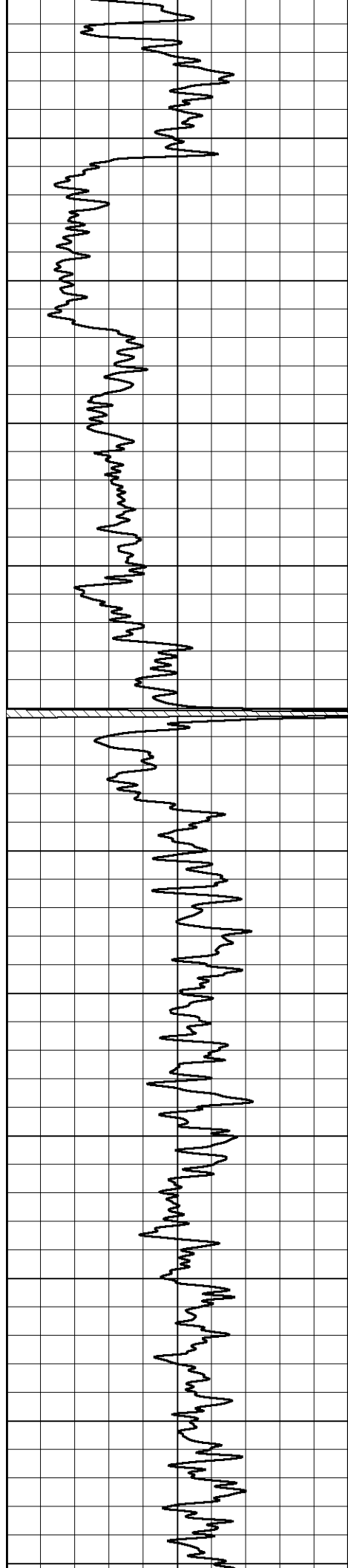
### MAIN PASS

Database File murfin\_henderson g #7.db  
Dataset Pathname stack/pass3.2  
Presentation Format dil2in  
Dataset Creation Wed Sep 25 06:29:31 2019  
Charted by Depth in Feet scaled 1:600

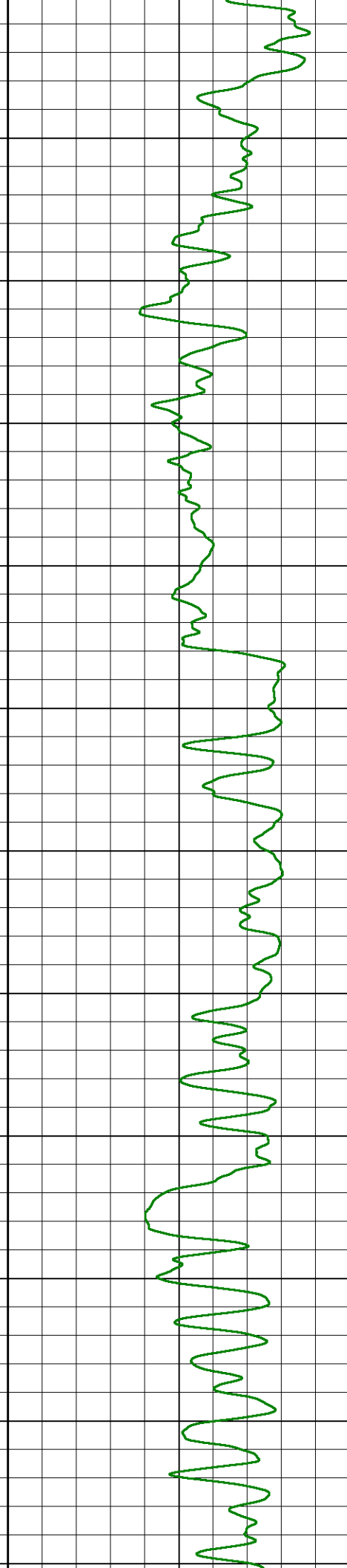
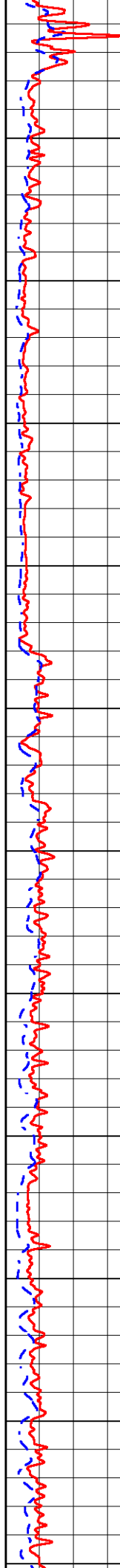
|   |                  |     |      |                          |     |
|---|------------------|-----|------|--------------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 | 2000 | CILD (mmho/m)            | 0   |
|   |                  |     | 0    | RLL3 (Ohm-m)             | 50  |
|   |                  |     | 0    | DEEP RESISTIVITY (Ohm-m) | 50  |
|   |                  |     | 50   | RLL3 (Ohm-m)             | 200 |
|   |                  |     | 50   | RILD (Ohm-m)             | 200 |

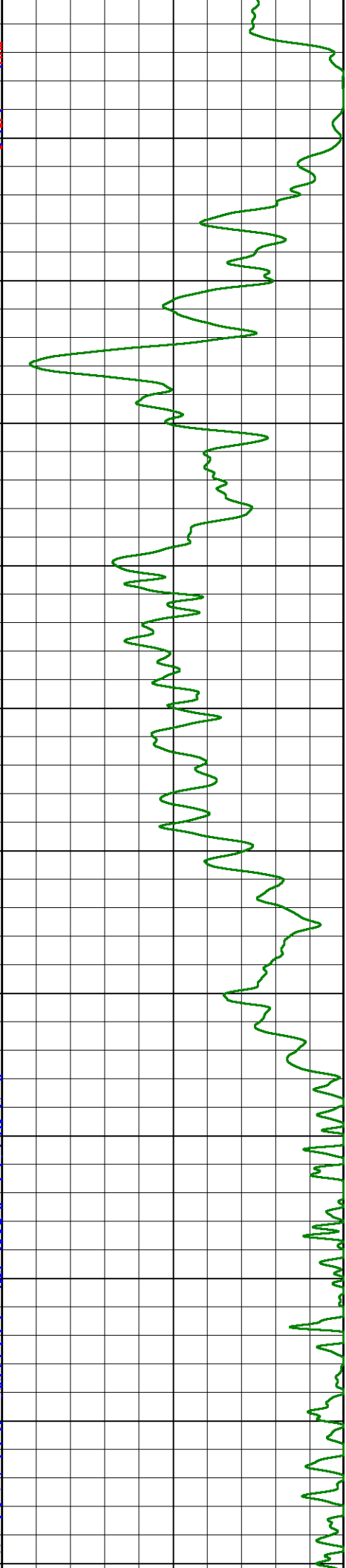
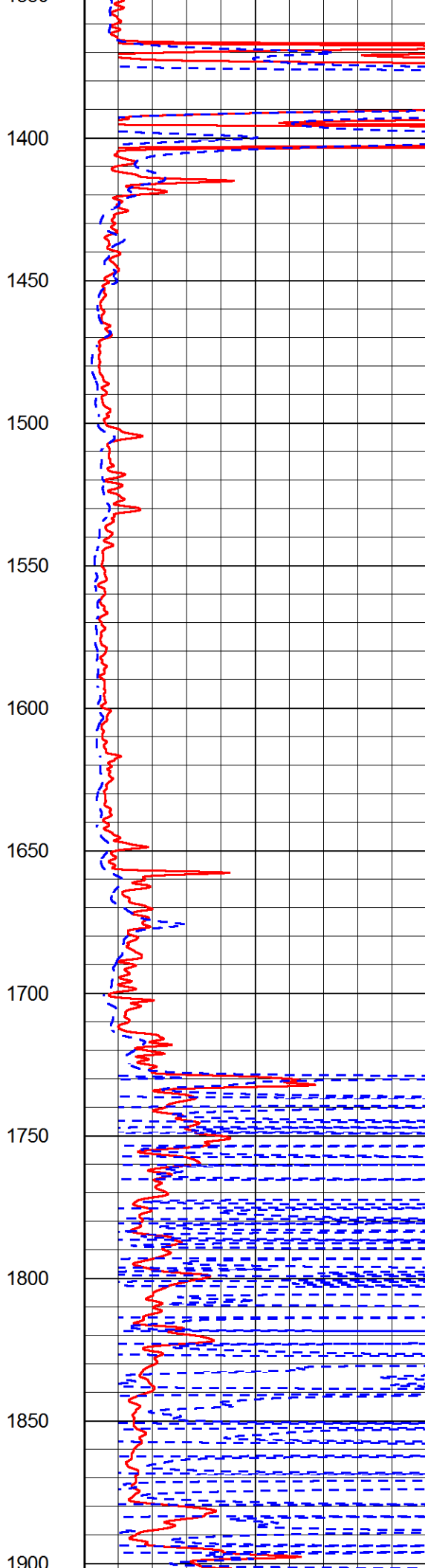
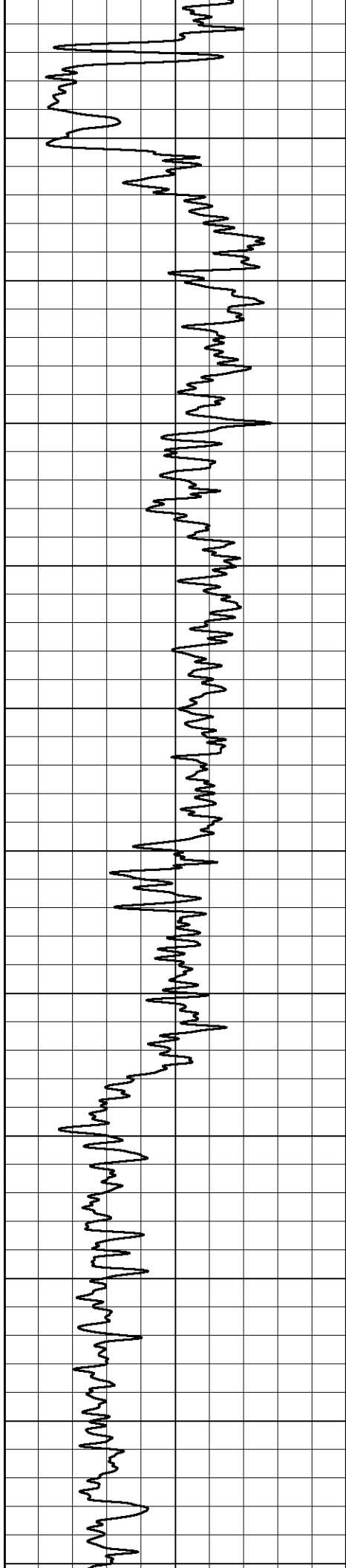


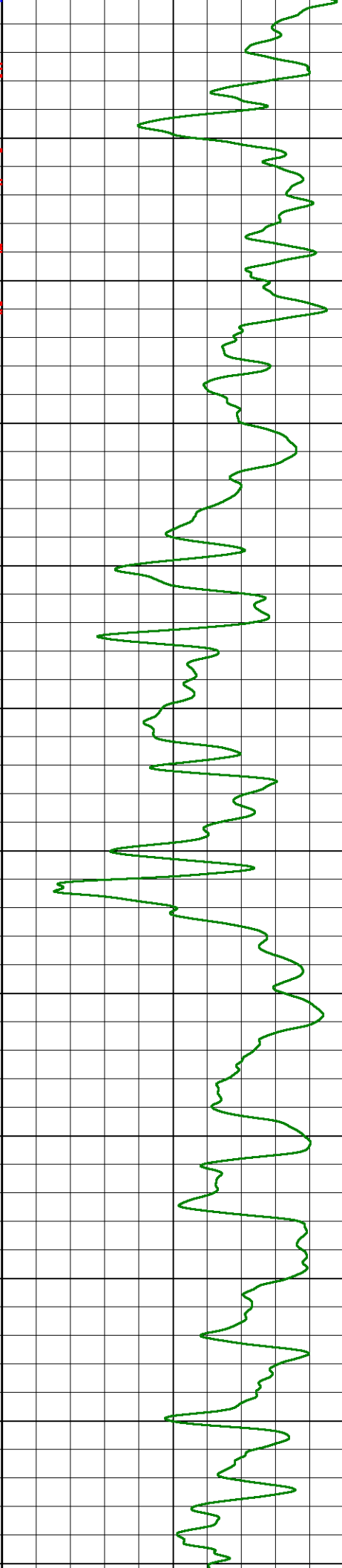
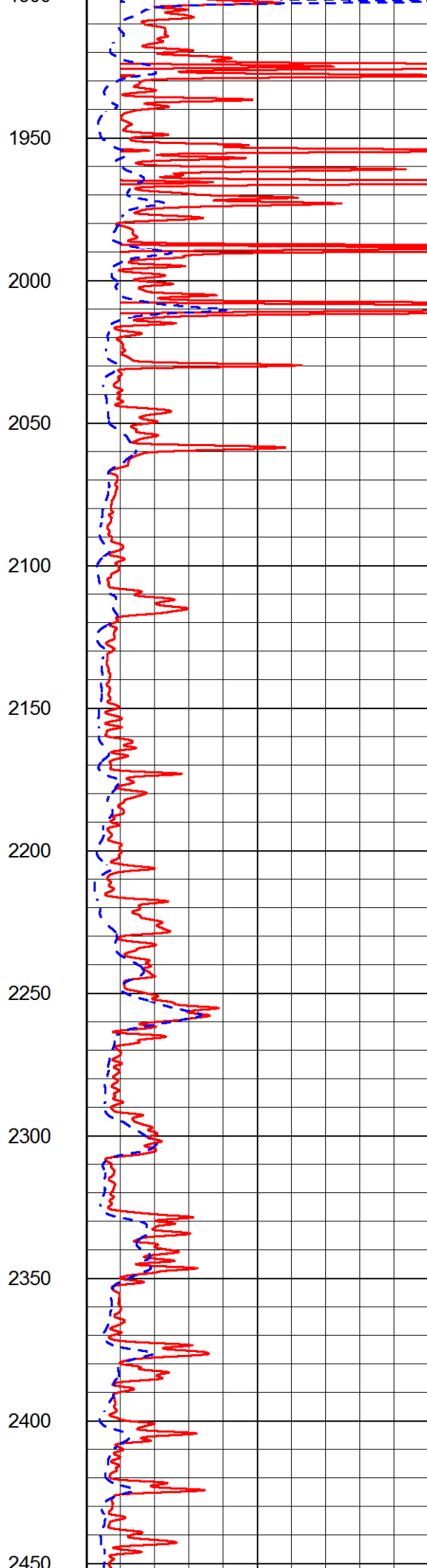
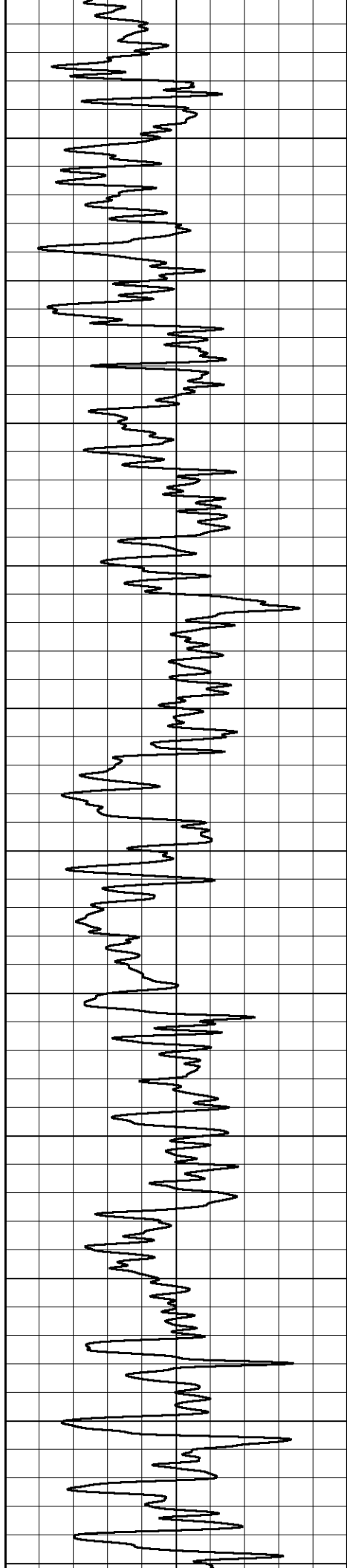


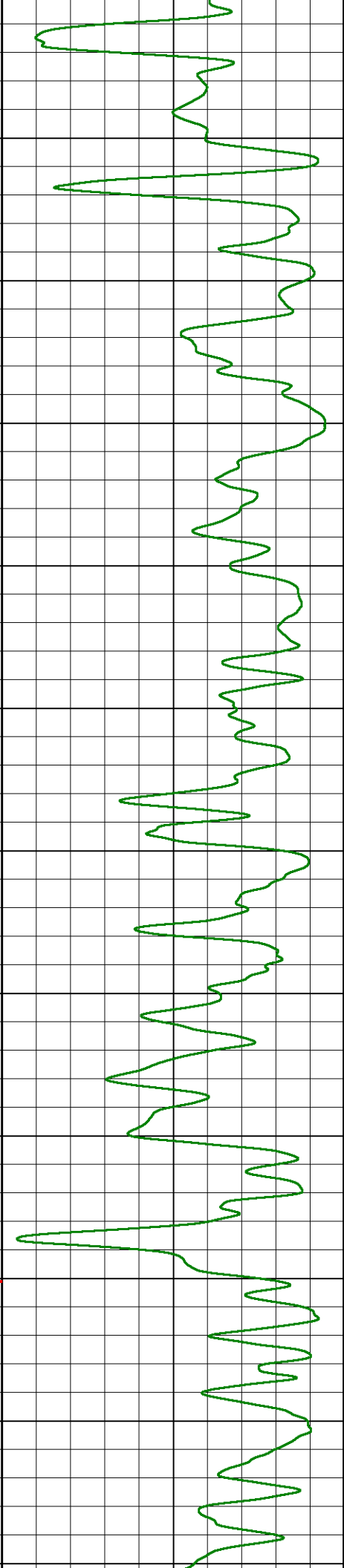
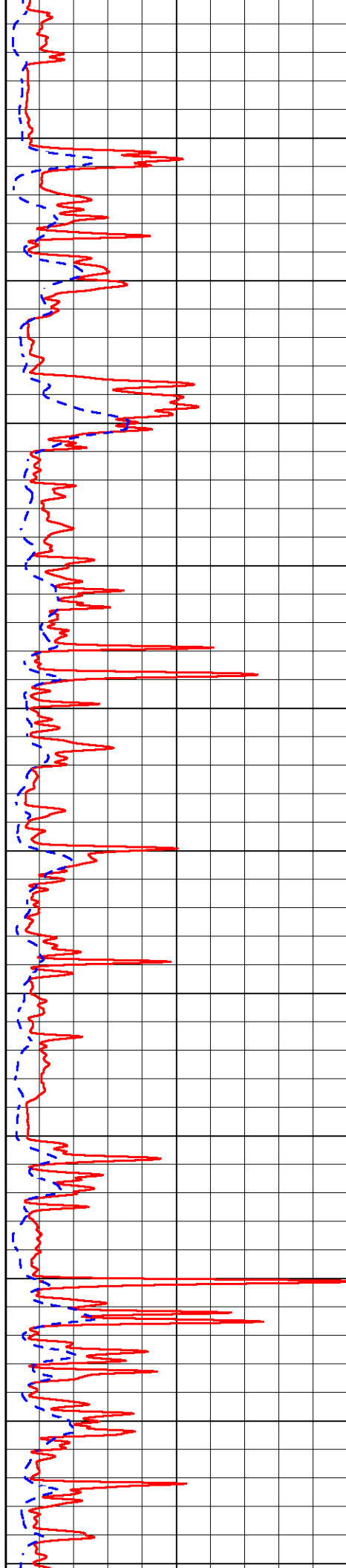
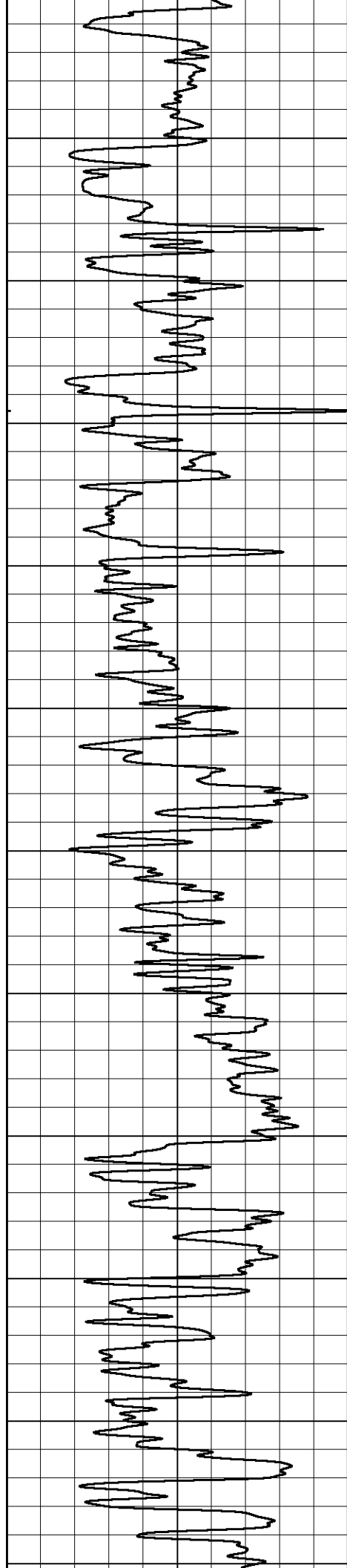


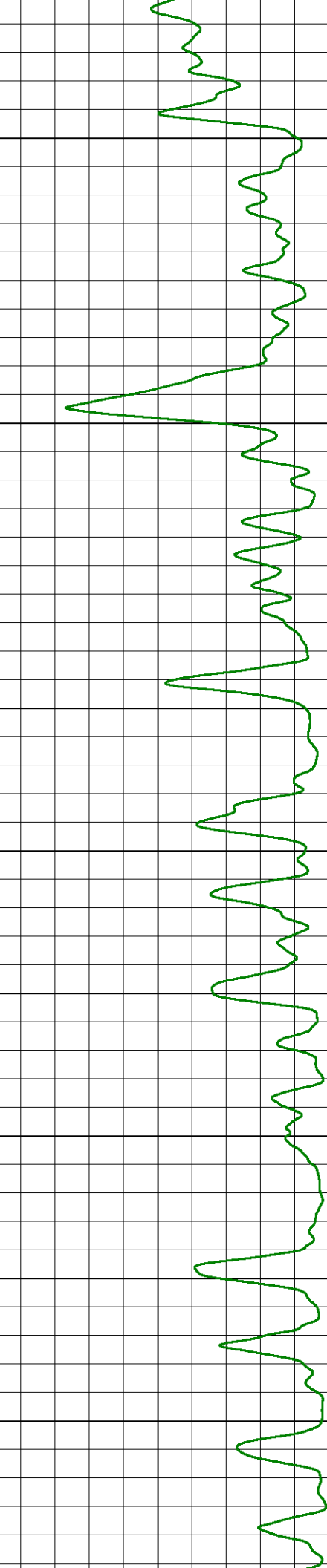
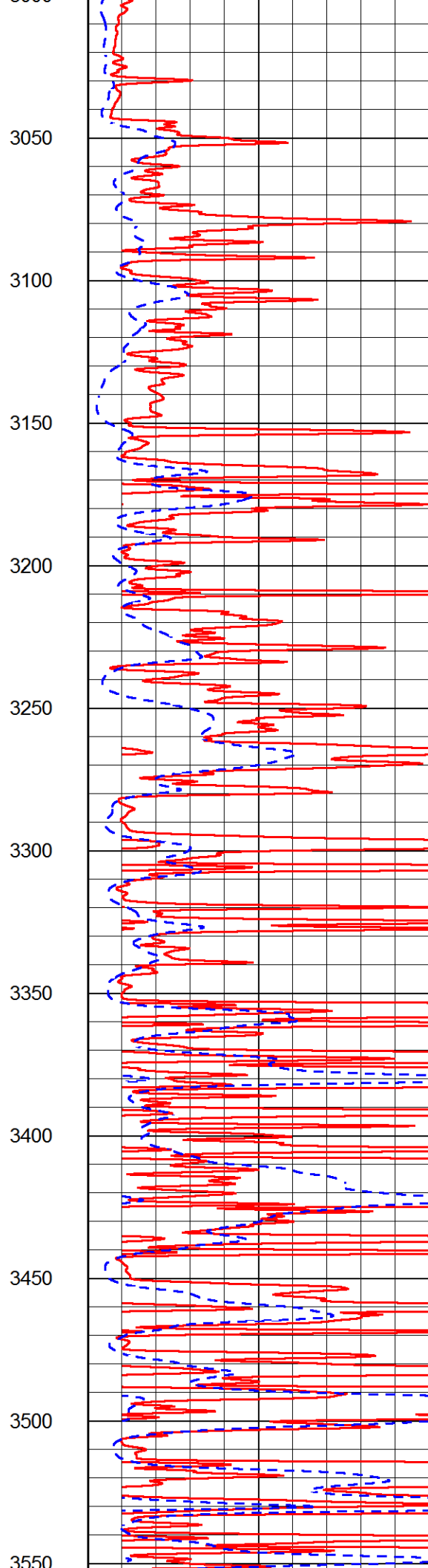
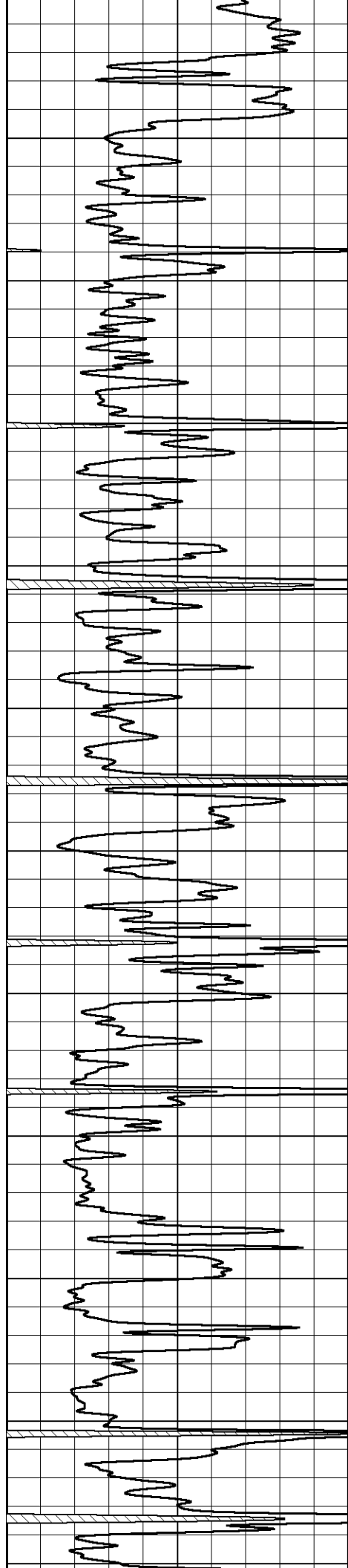
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850  
900  
950  
1000  
1050  
1100  
1150  
1200  
1250  
1300  
1350

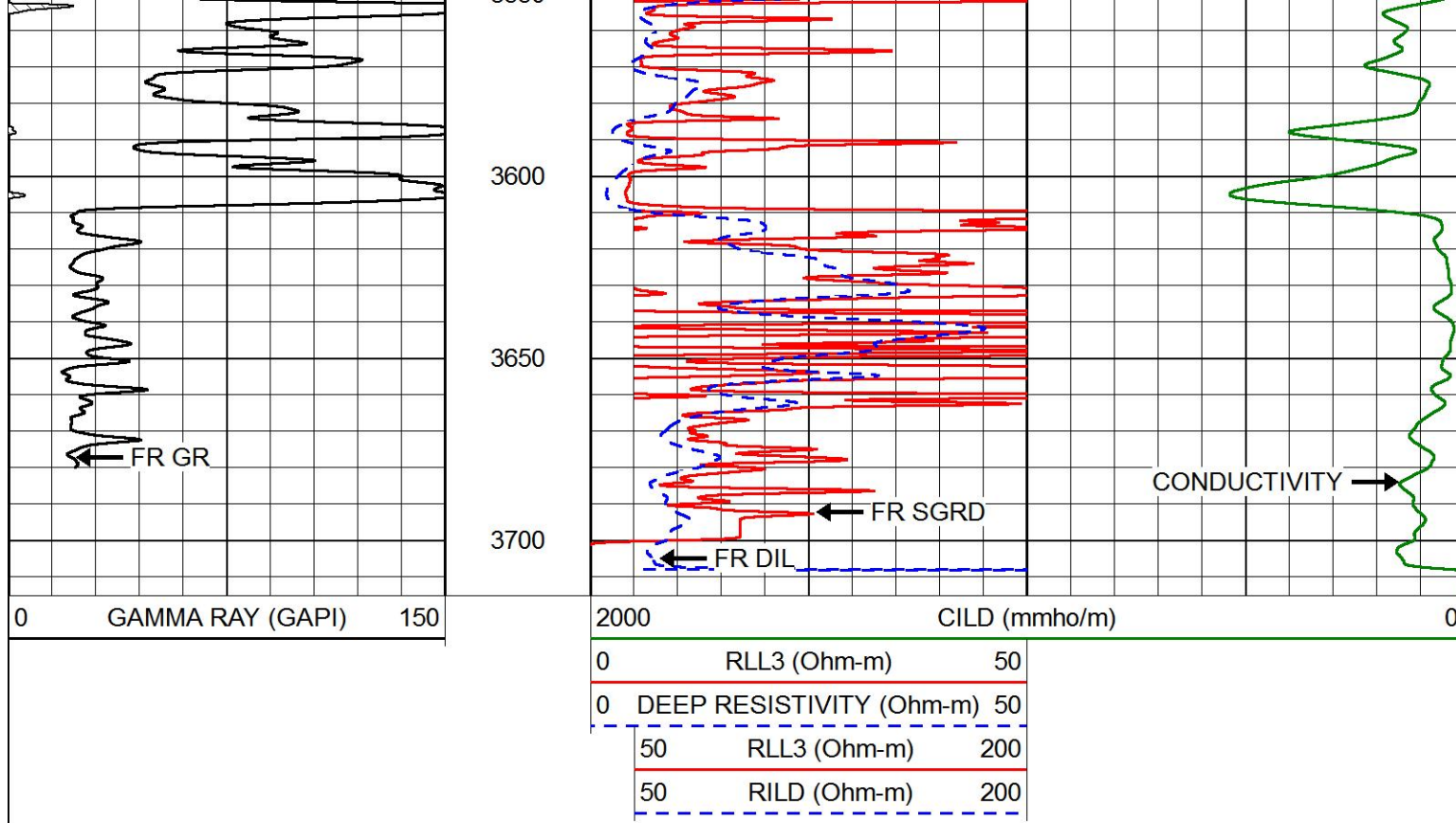










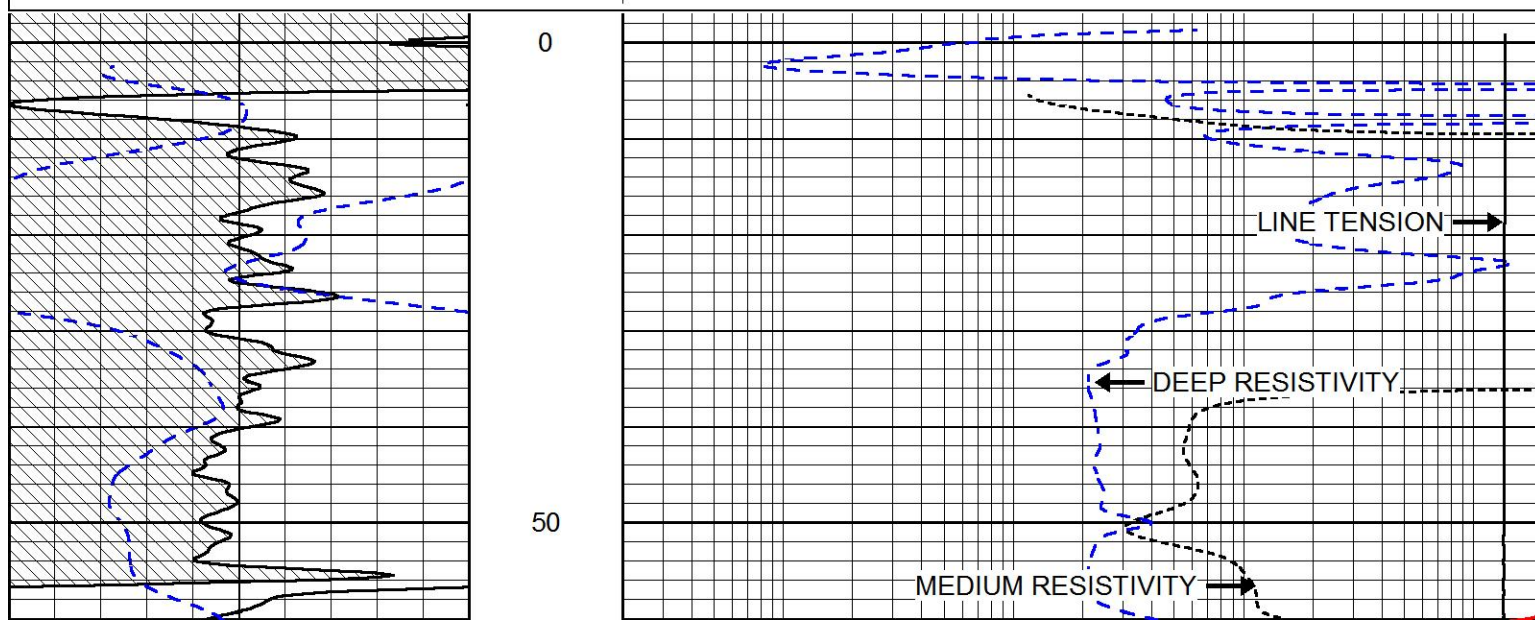


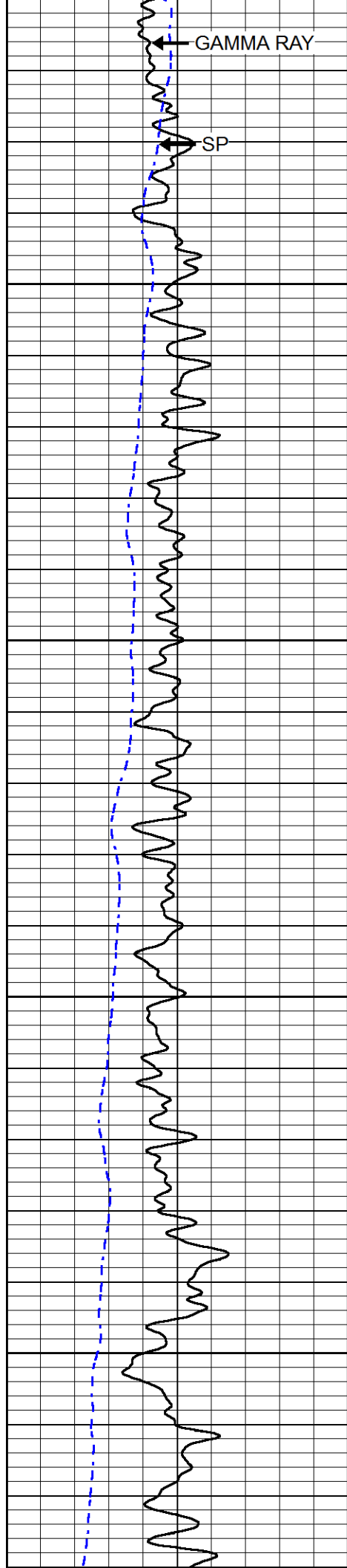


# MAIN PASS

|                     |                            |
|---------------------|----------------------------|
| Database File       | murfin_henderson g #7.db   |
| Dataset Pathname    | stack/pass3.1              |
| Presentation Format | dil                        |
| Dataset Creation    | Wed Sep 25 06:29:42 2019   |
| Charted by          | Depth in Feet scaled 1:240 |

|                        |                                   |                                     |
|------------------------|-----------------------------------|-------------------------------------|
| 0 GAMMA RAY (GAPI) 150 | 0.2 DEEP RESISTIVITY (Ohm-m) 2000 | 0.2 MEDIUM RESISTIVITY (Ohm-m) 2000 |
| -200 SP (mV) 0         | 0.2 RLL3 (Ohm-m) 2000             | 15000 LINE TENSION (lb) 0           |



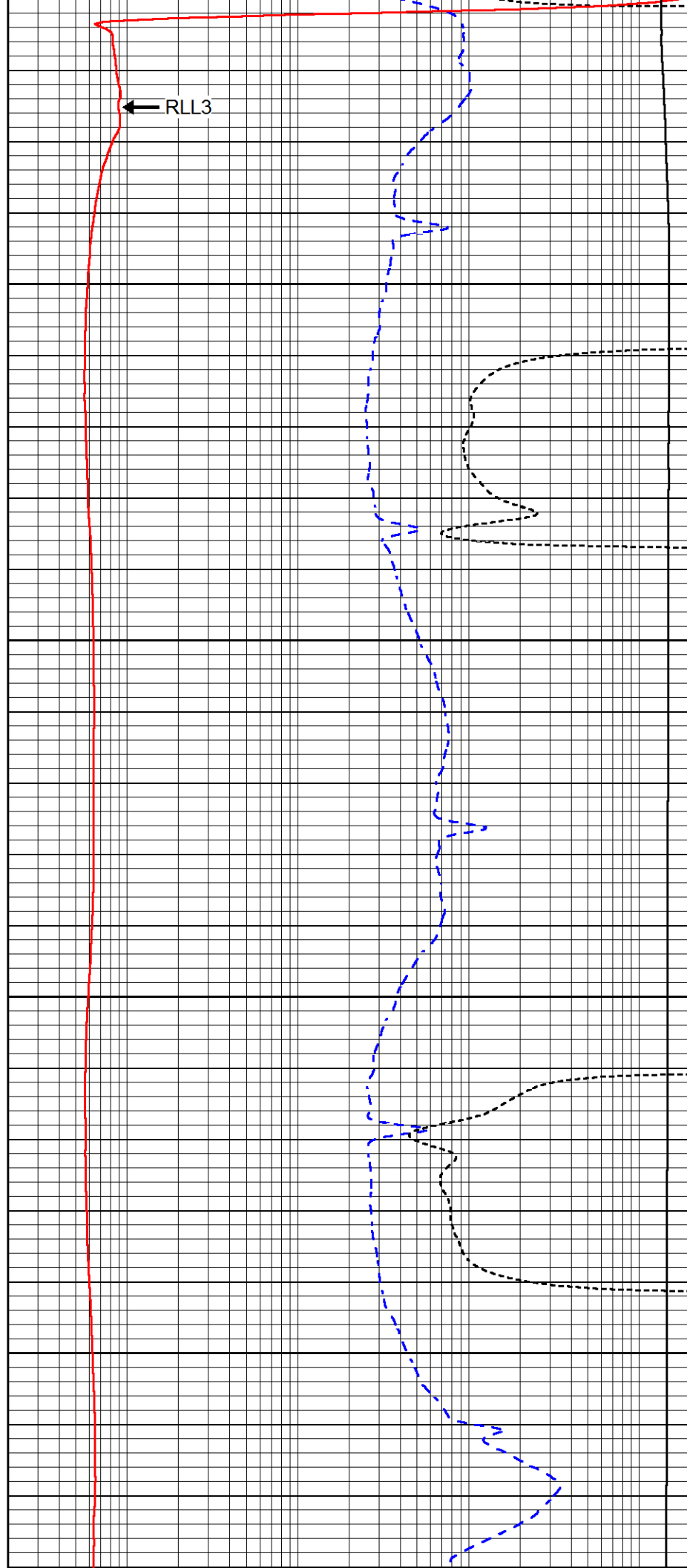


100

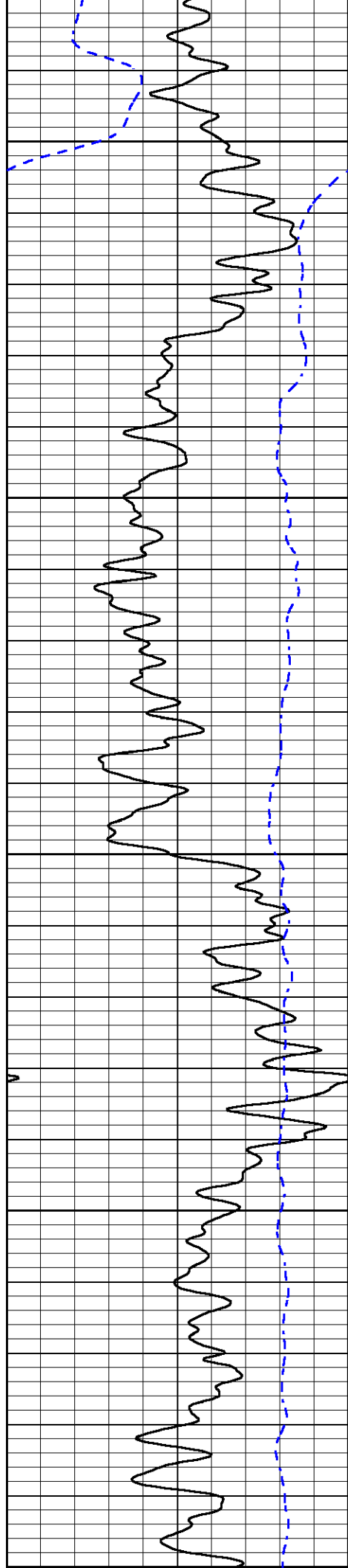
150

200

250



RLL3



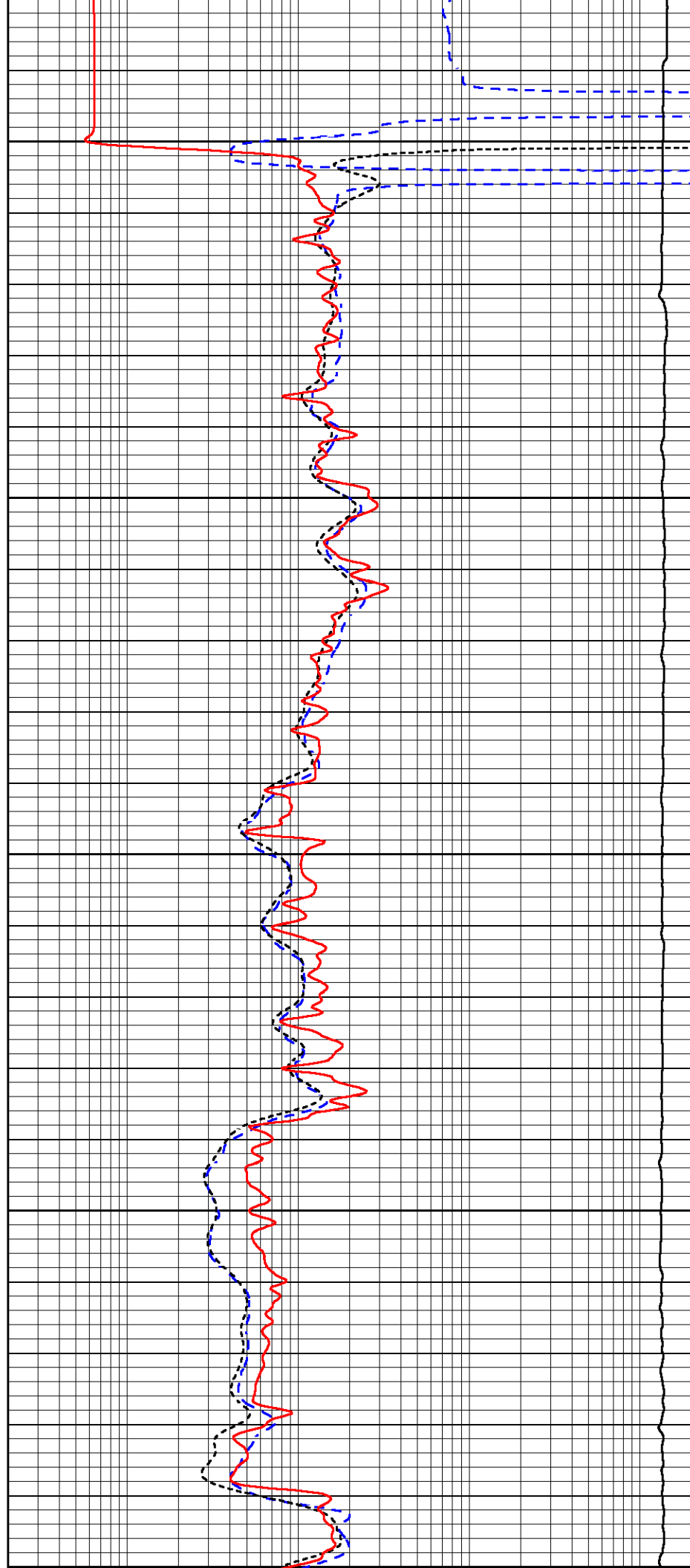
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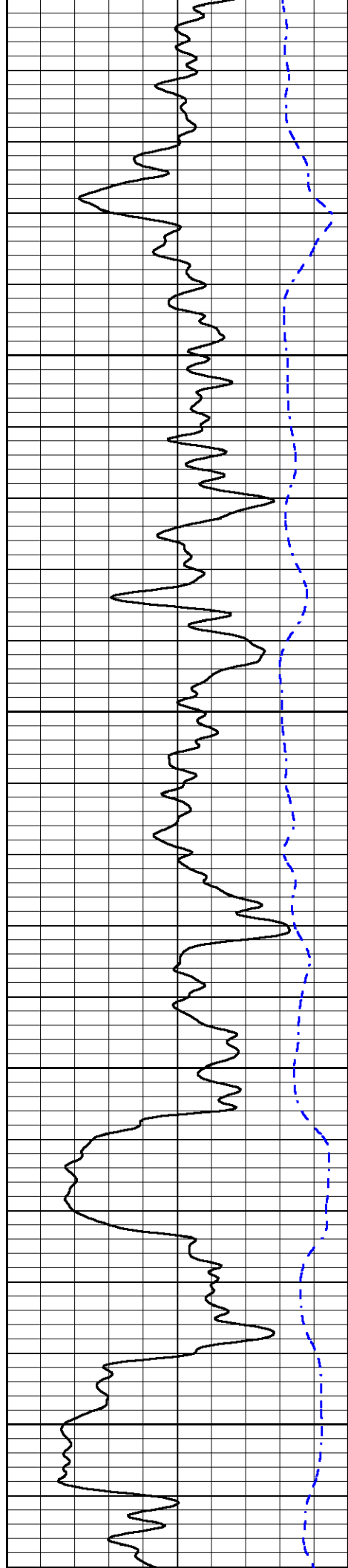
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400

450

500





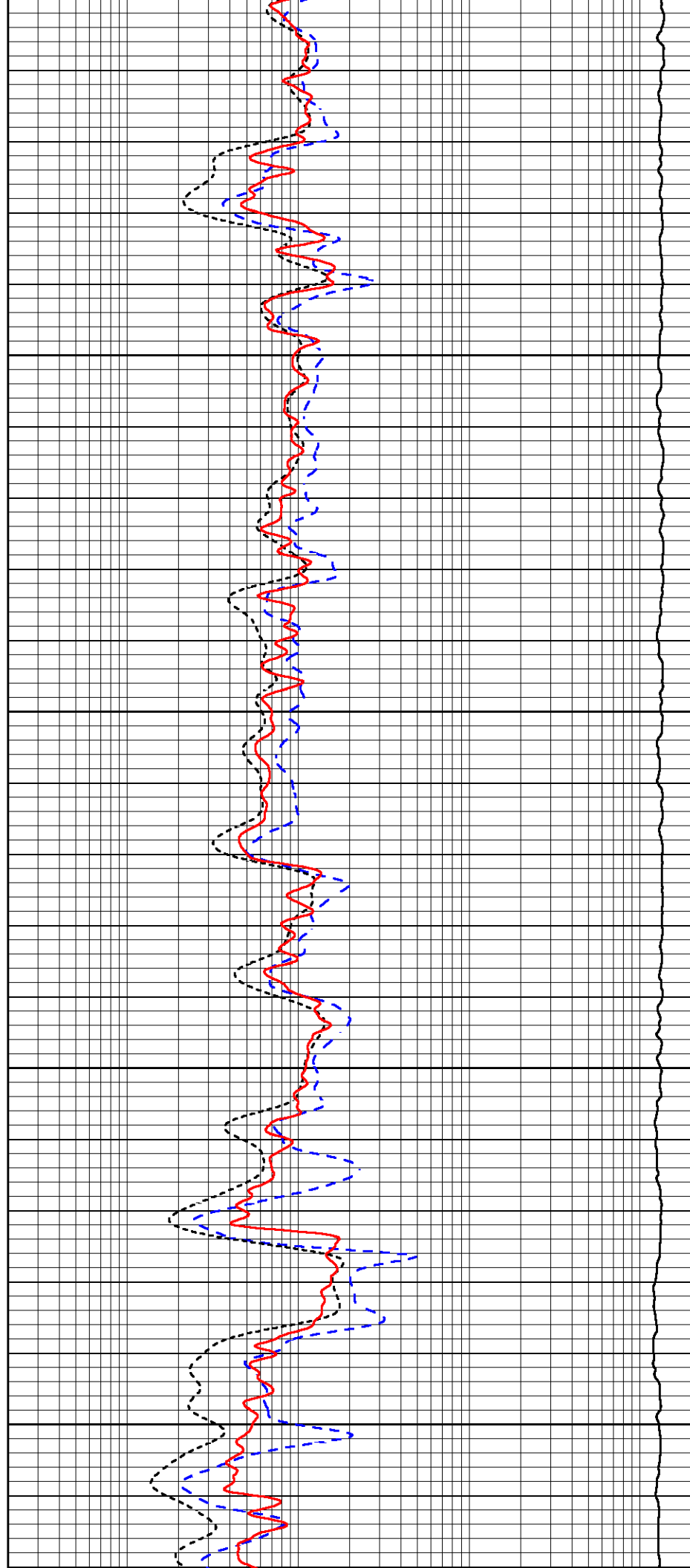
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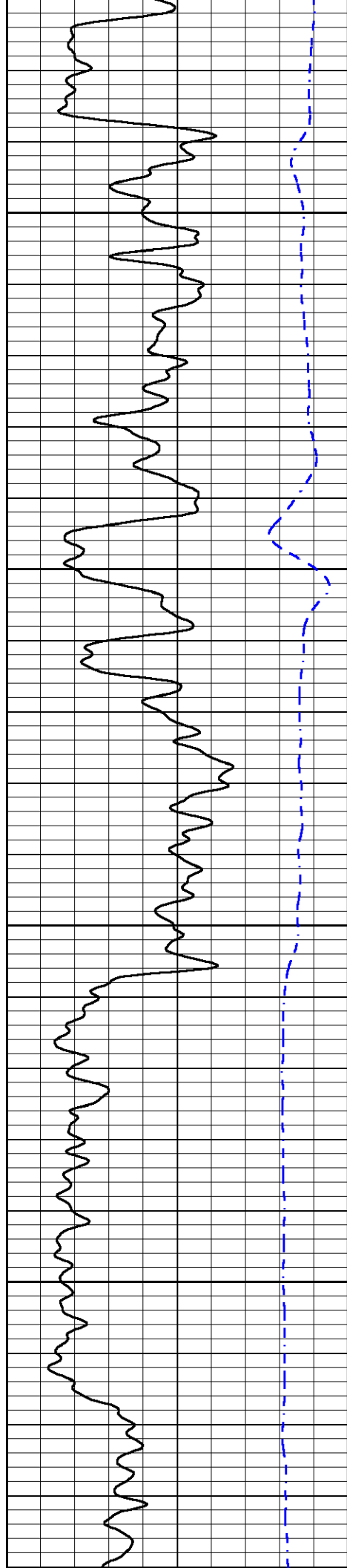
550

600

650

700



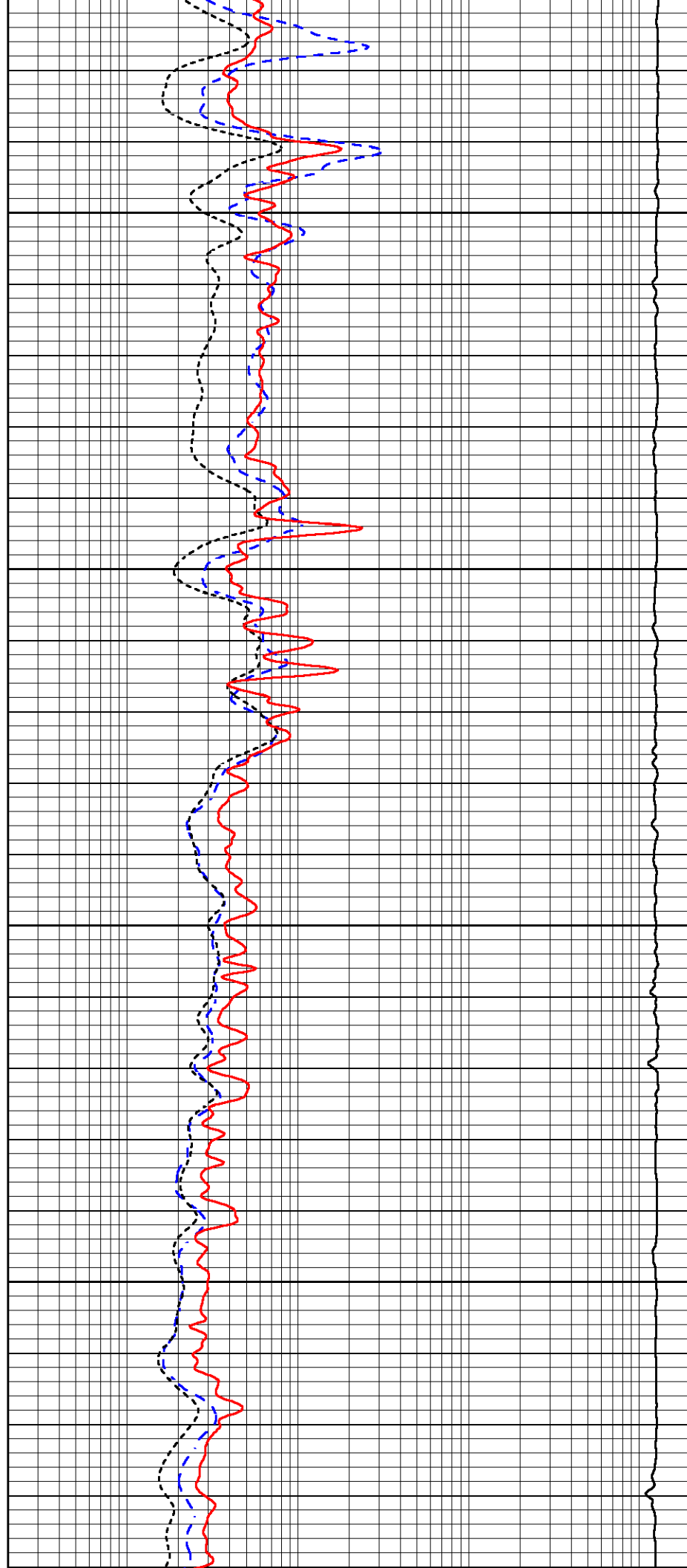


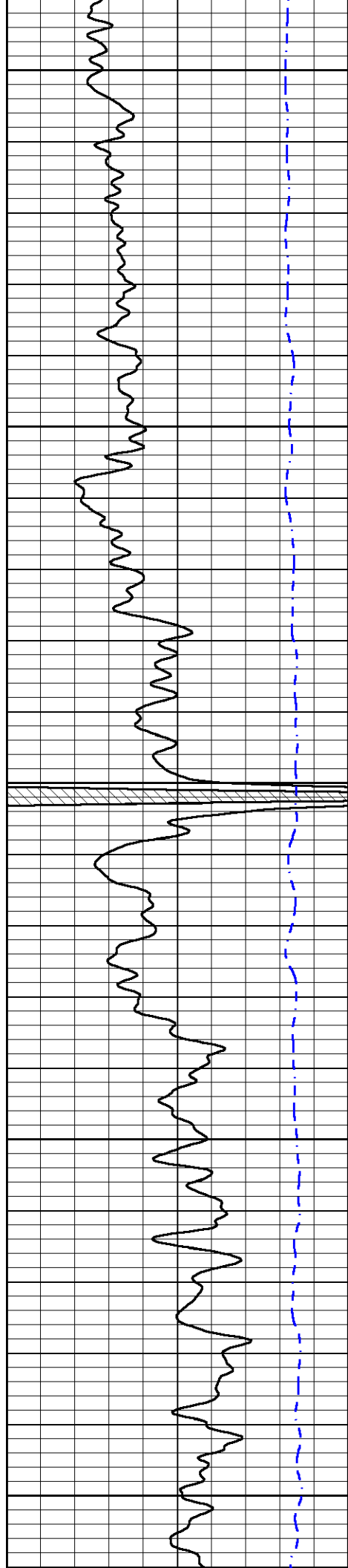
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800

850

900





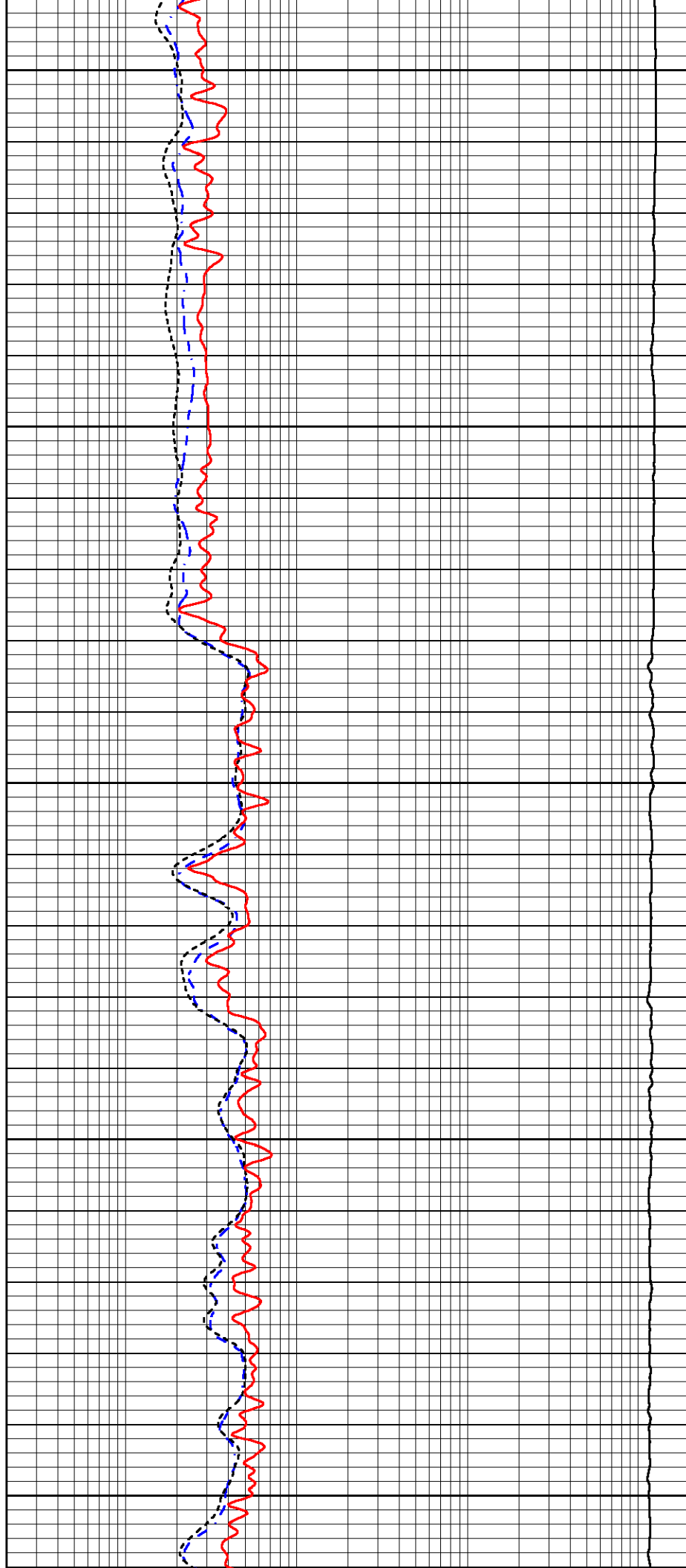
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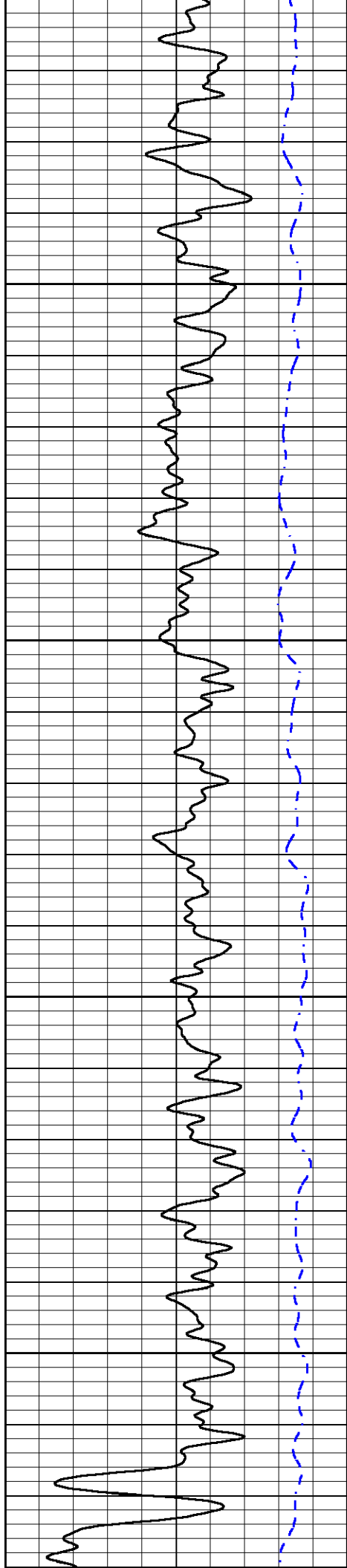
1000

1050

1100

1150



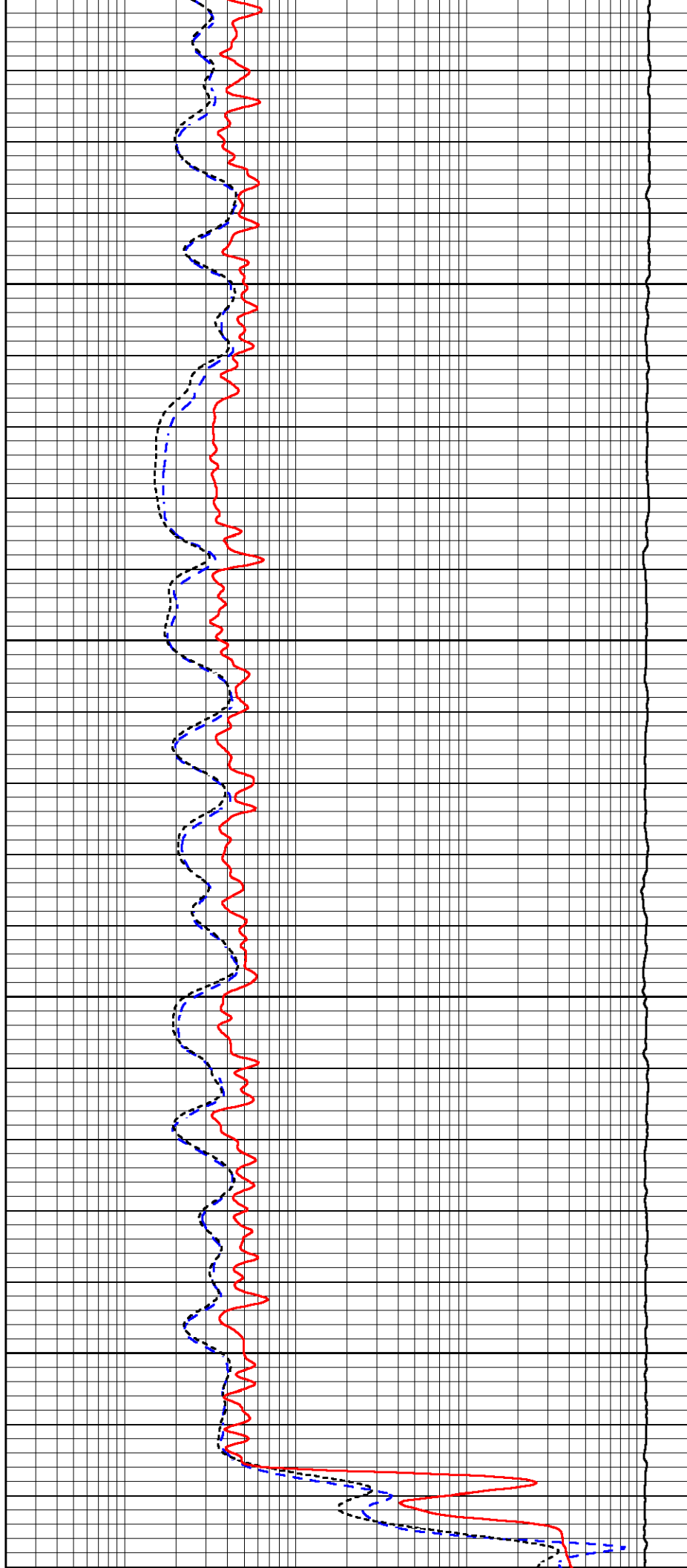


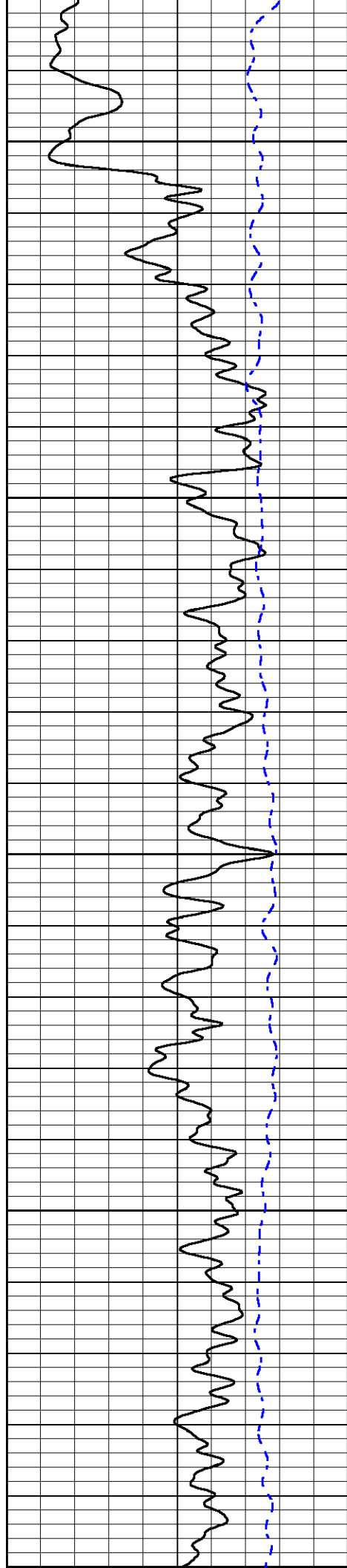
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1250

1300

1350





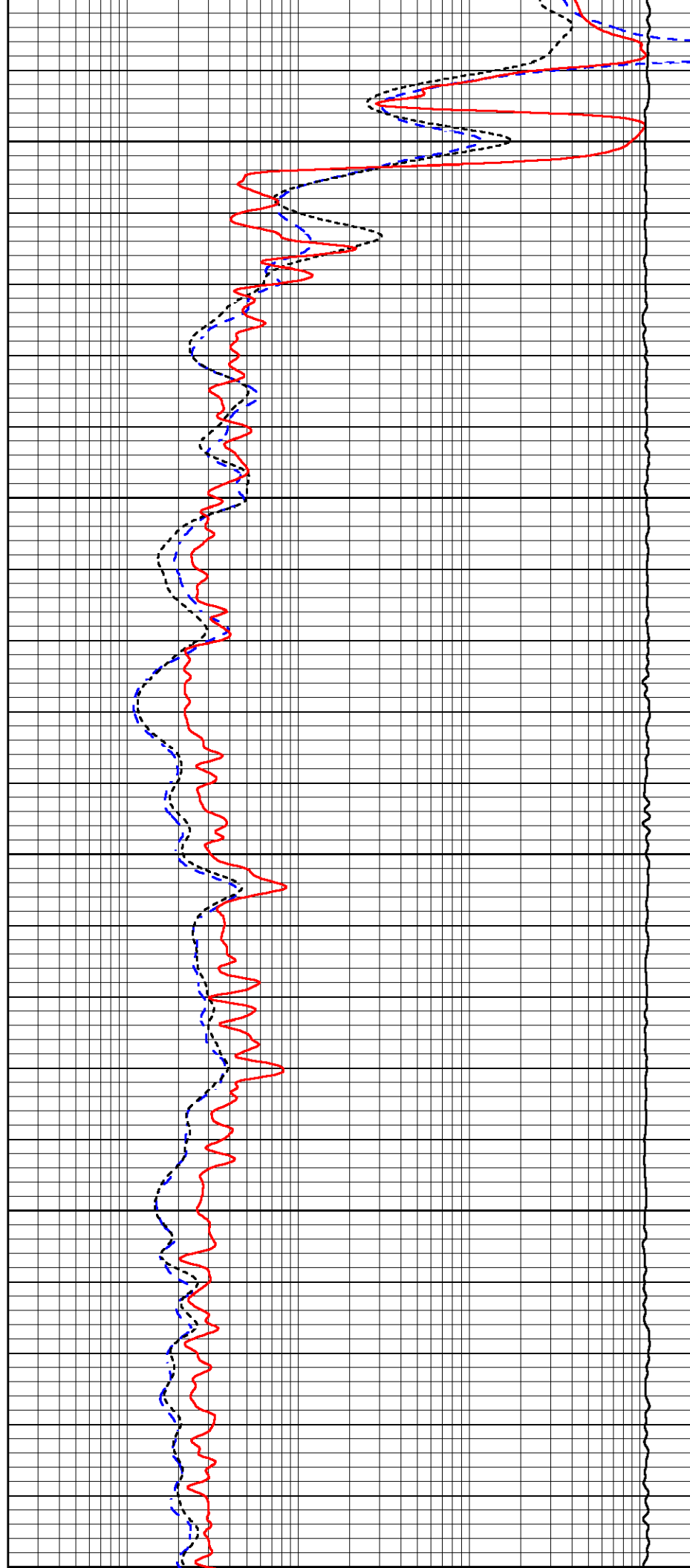
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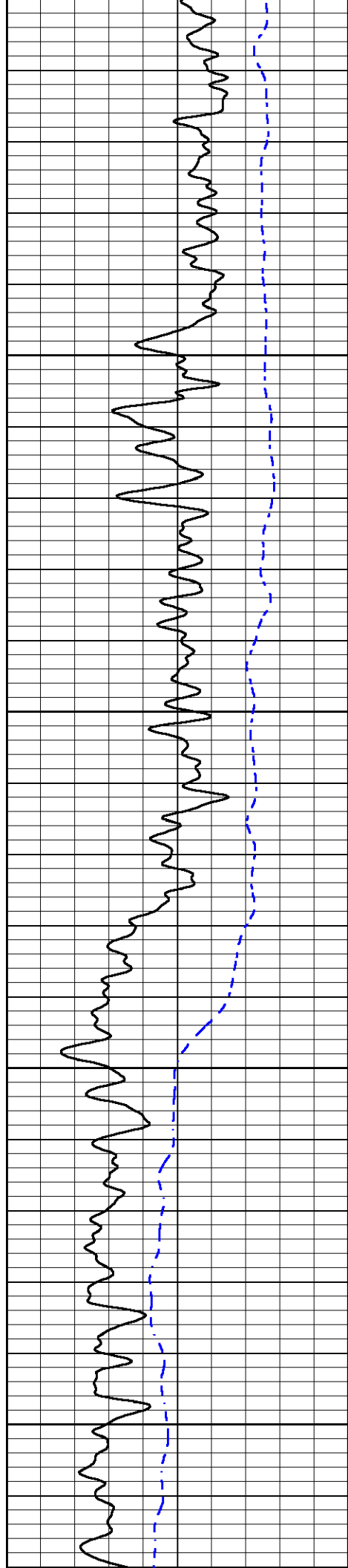
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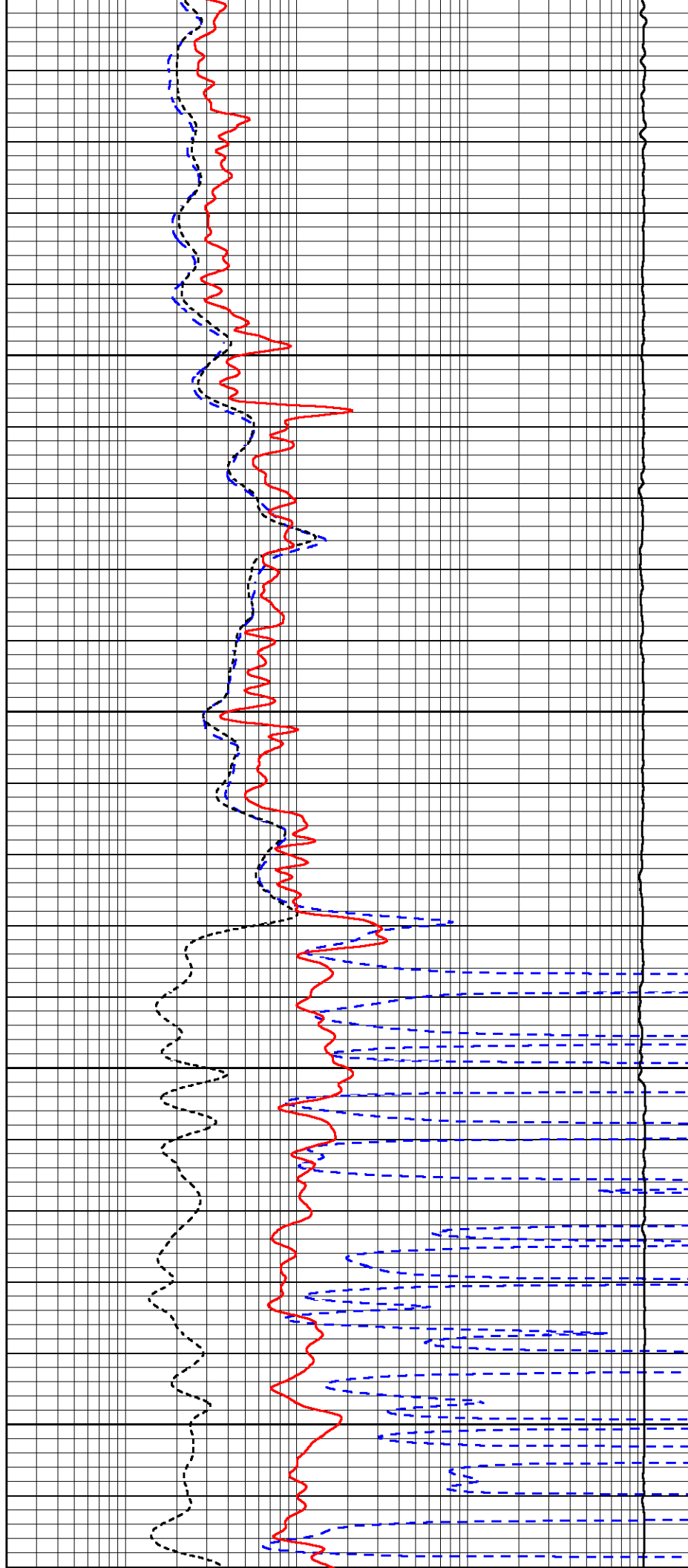
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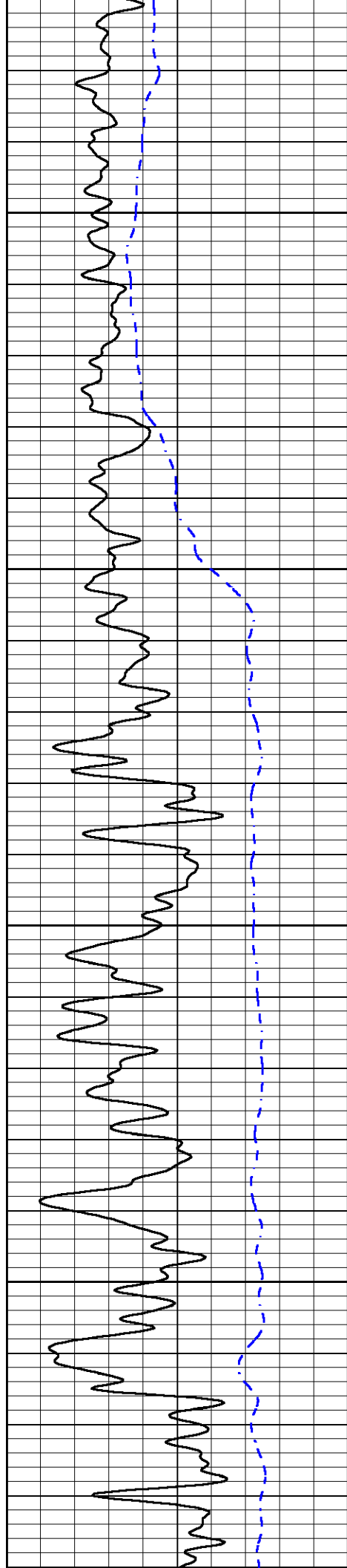
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1650  
1700  
1750  
1800



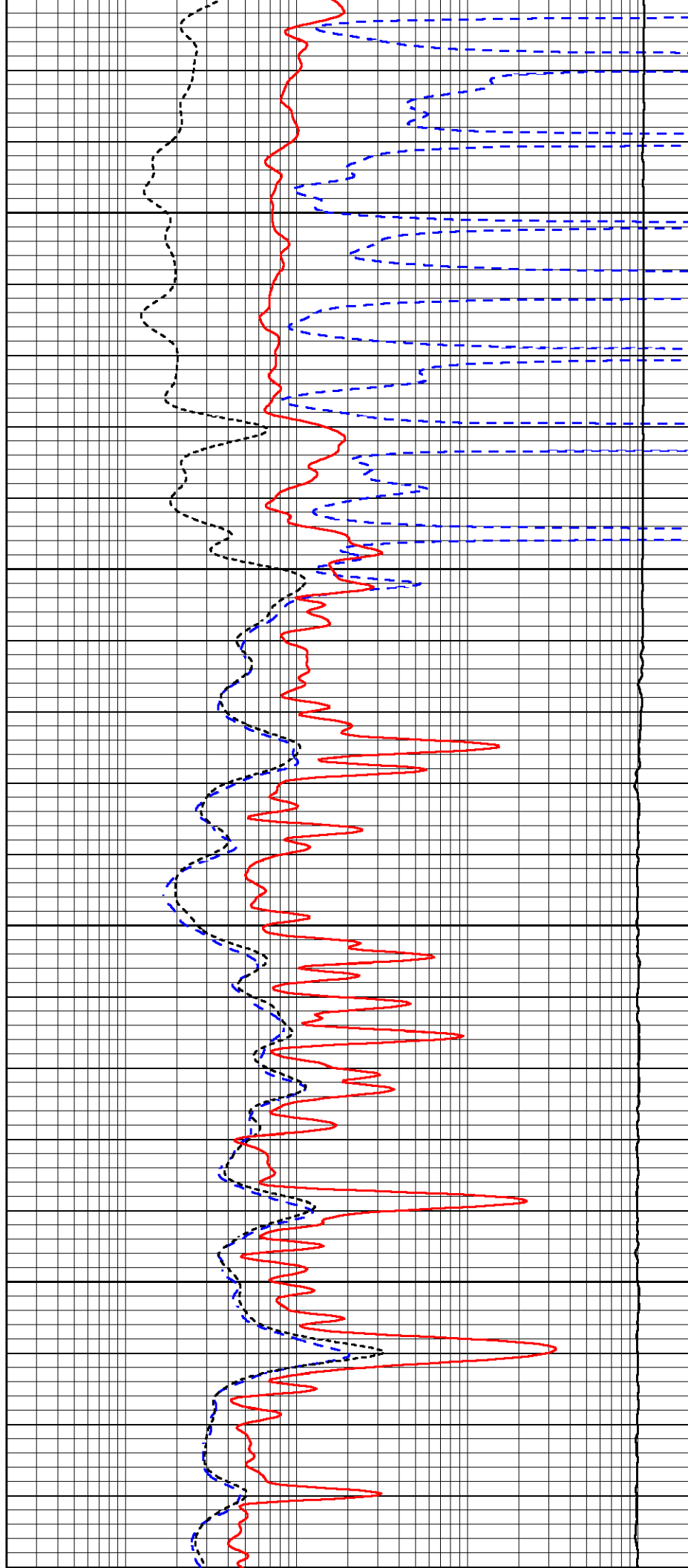


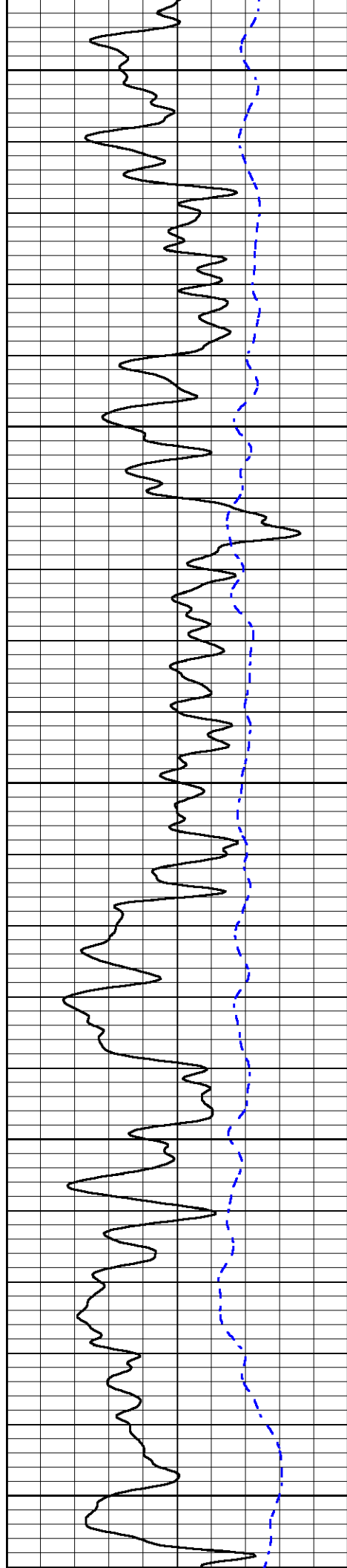
1850

1900

1950

2000





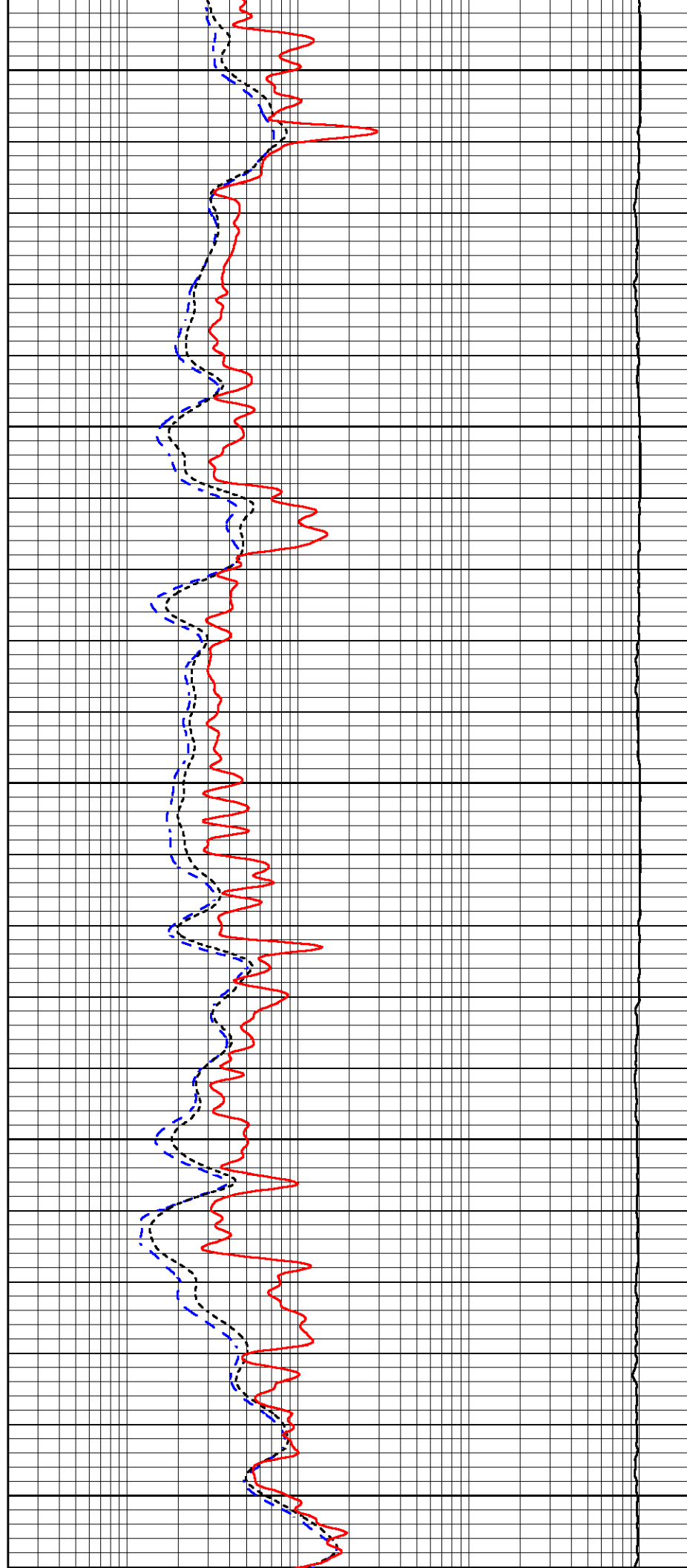
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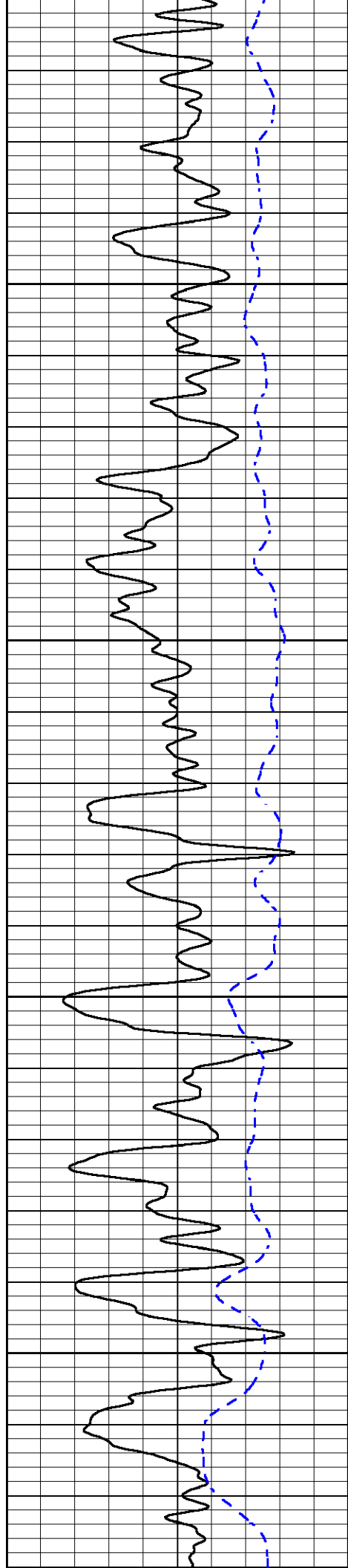
2100

2150

2200

2250



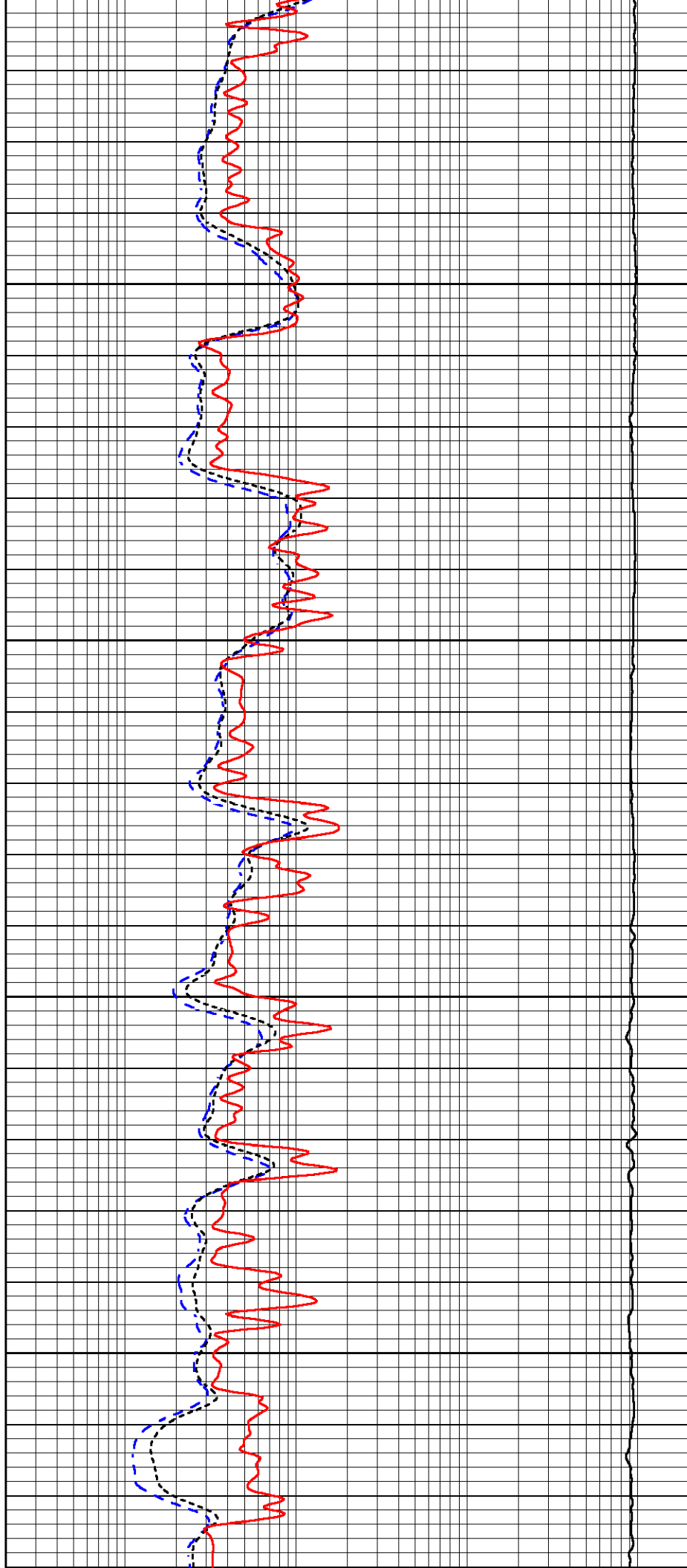


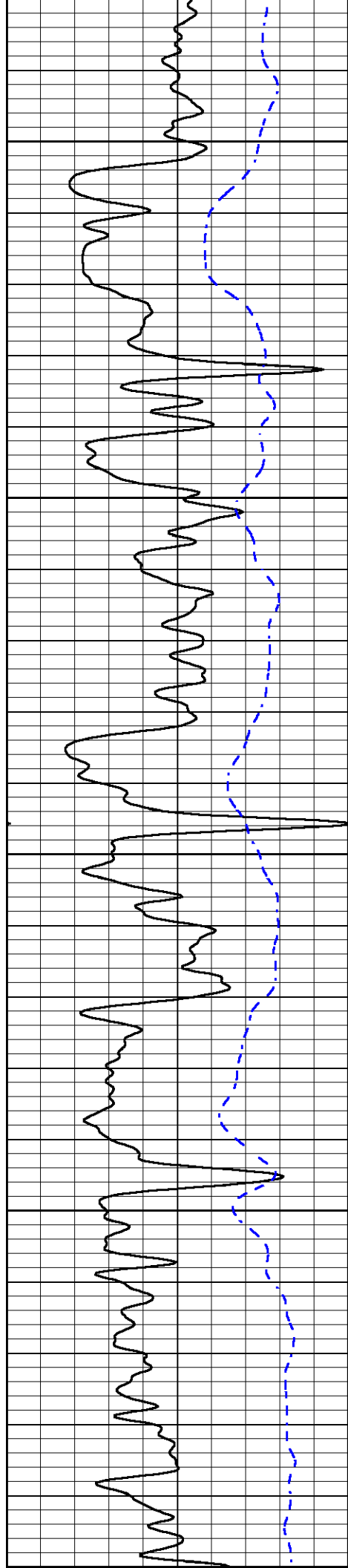
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2350

2400

2450





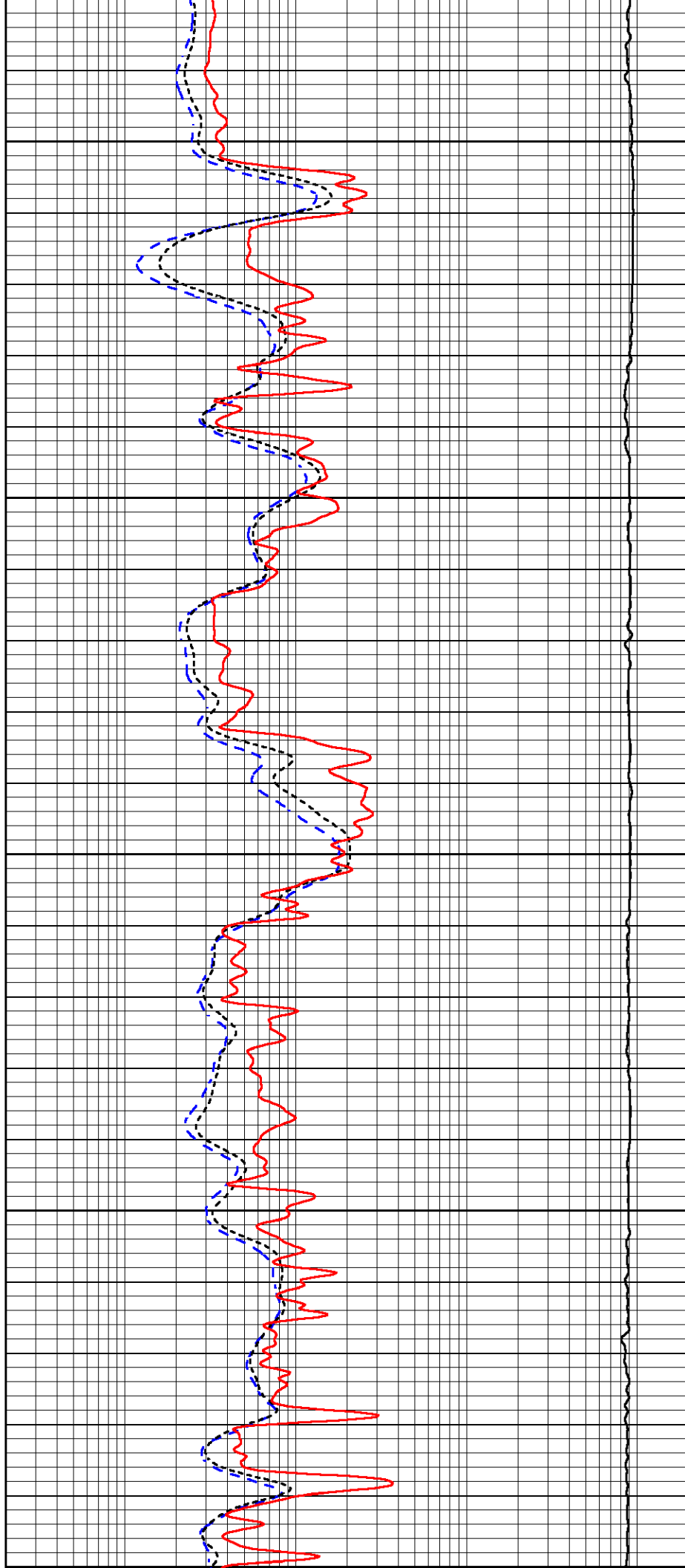
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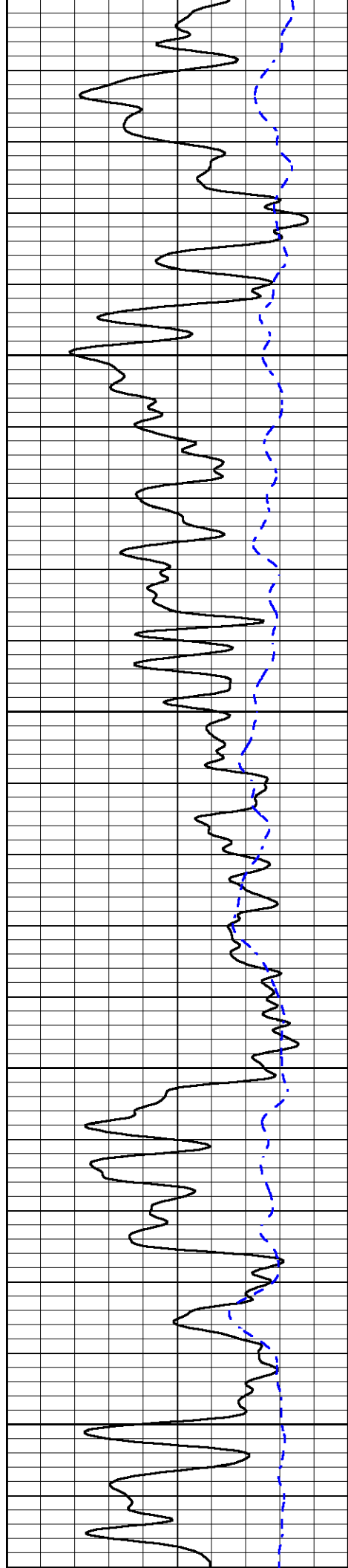
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2600

2650

2700





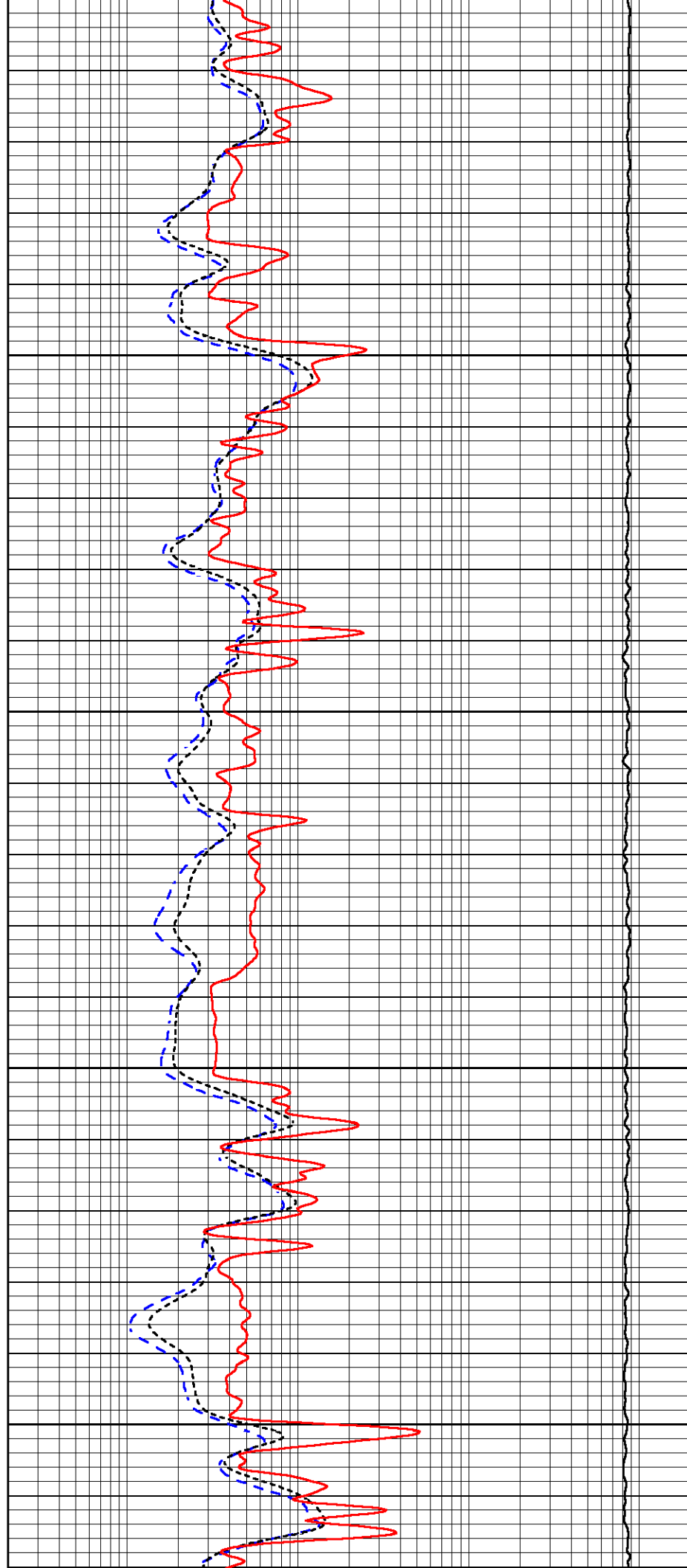
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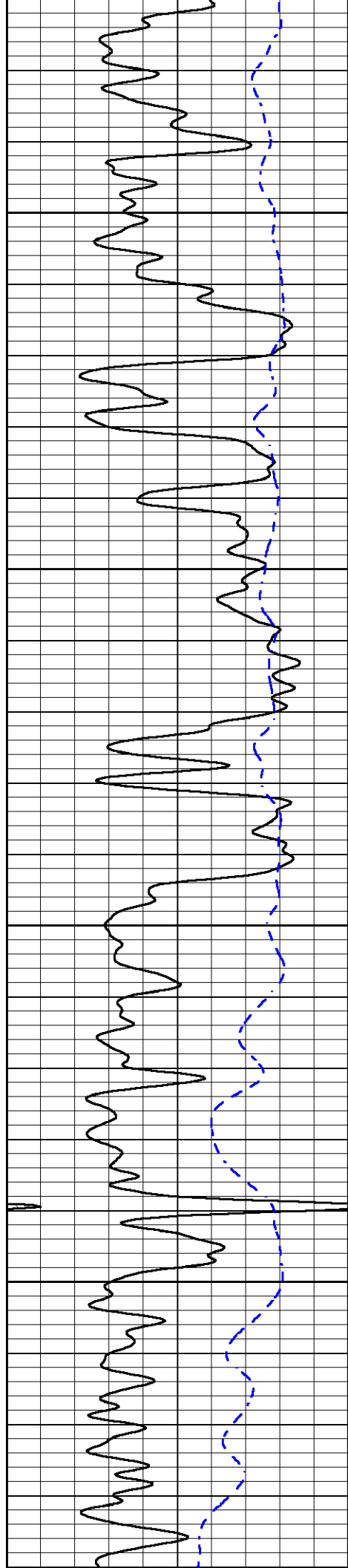
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2800

2850

2900



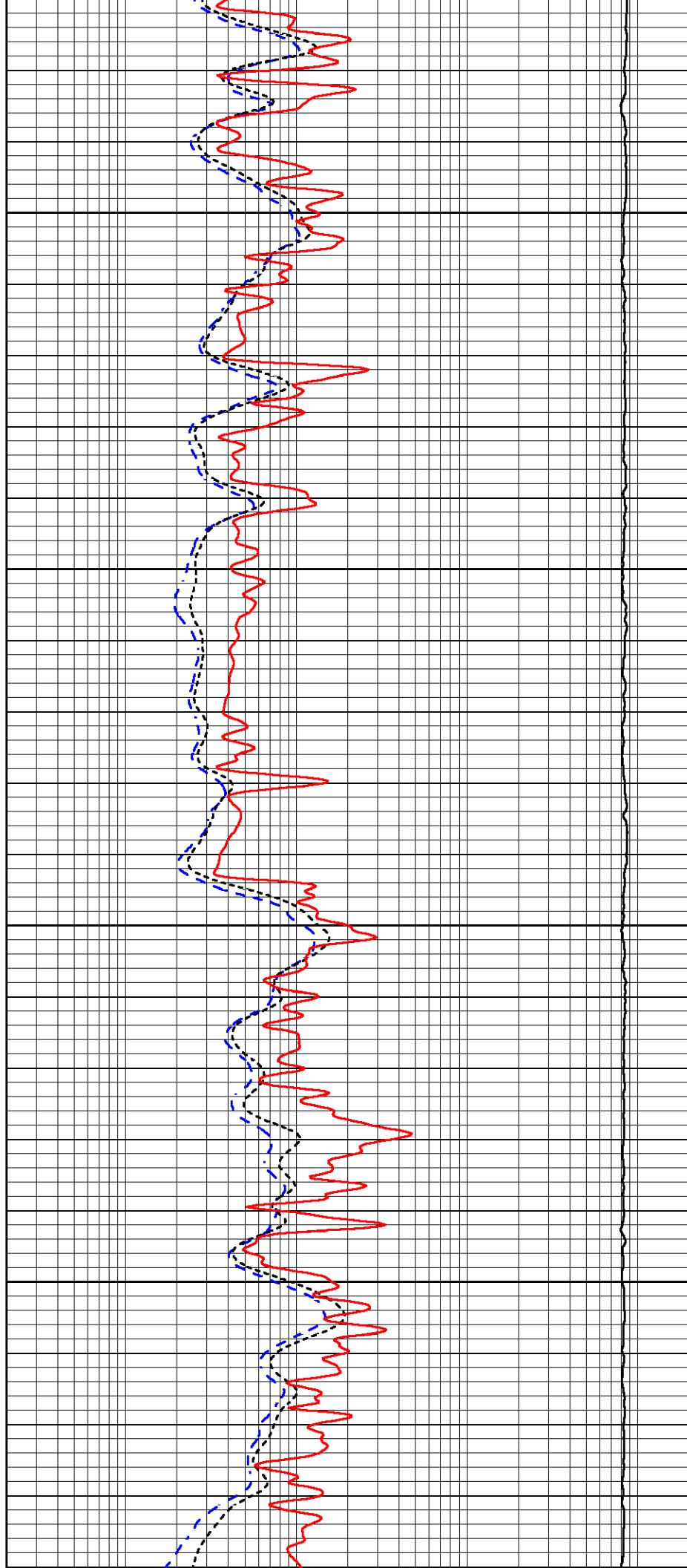


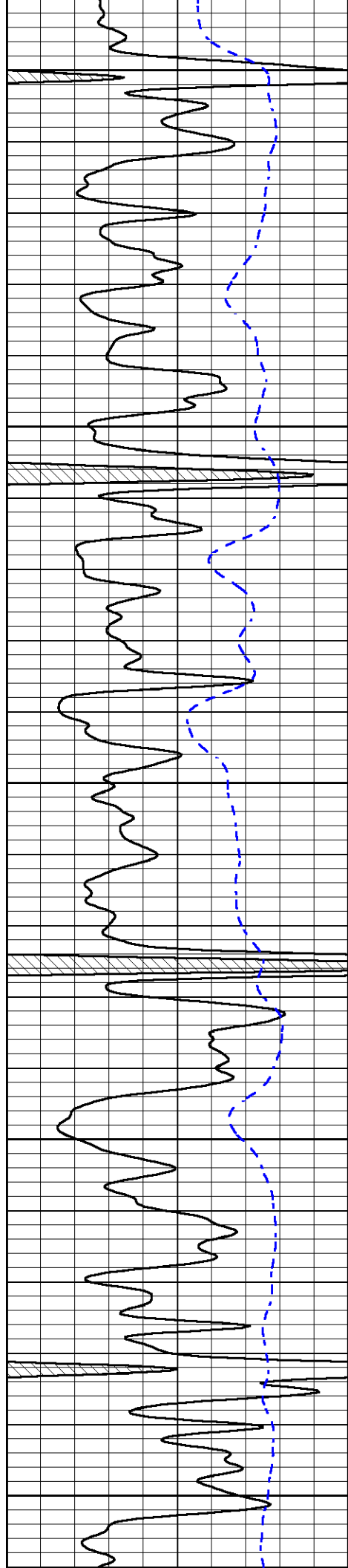
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3050

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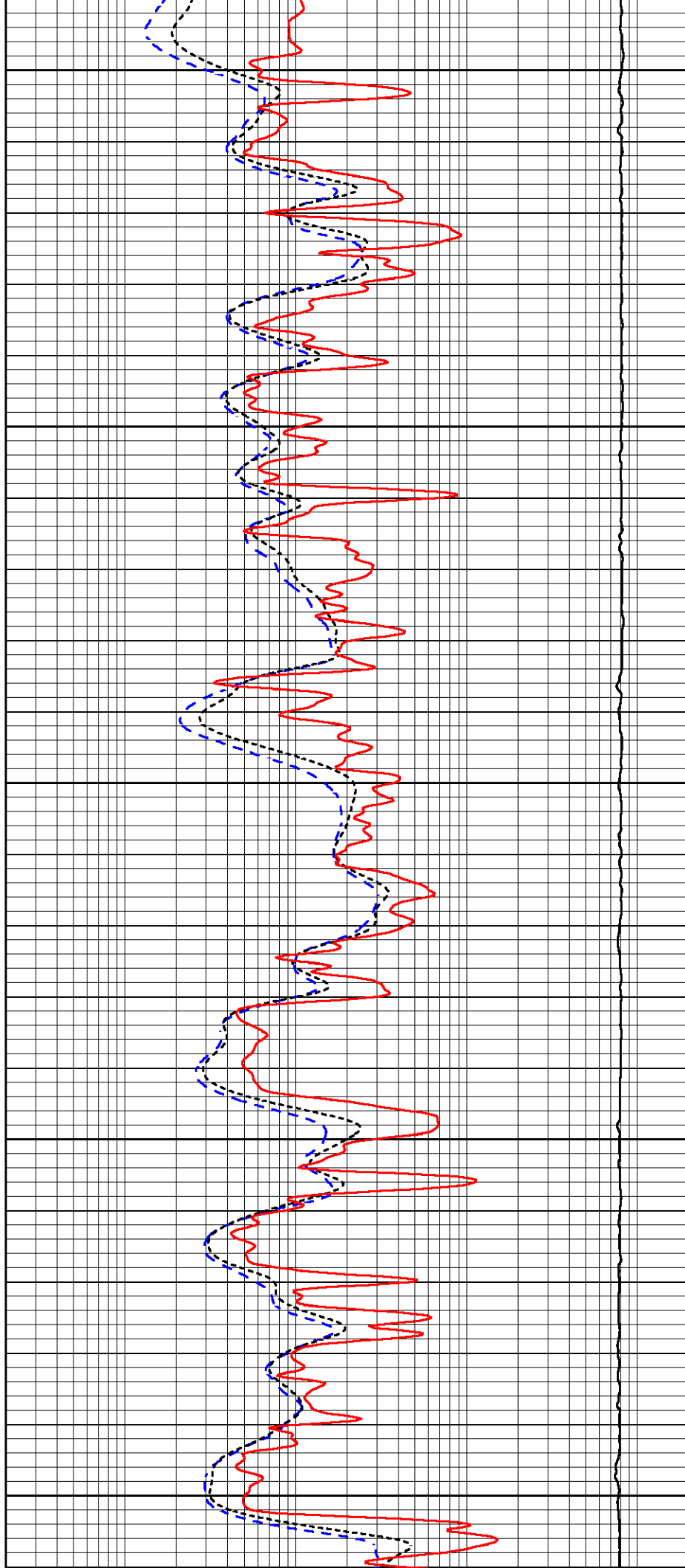
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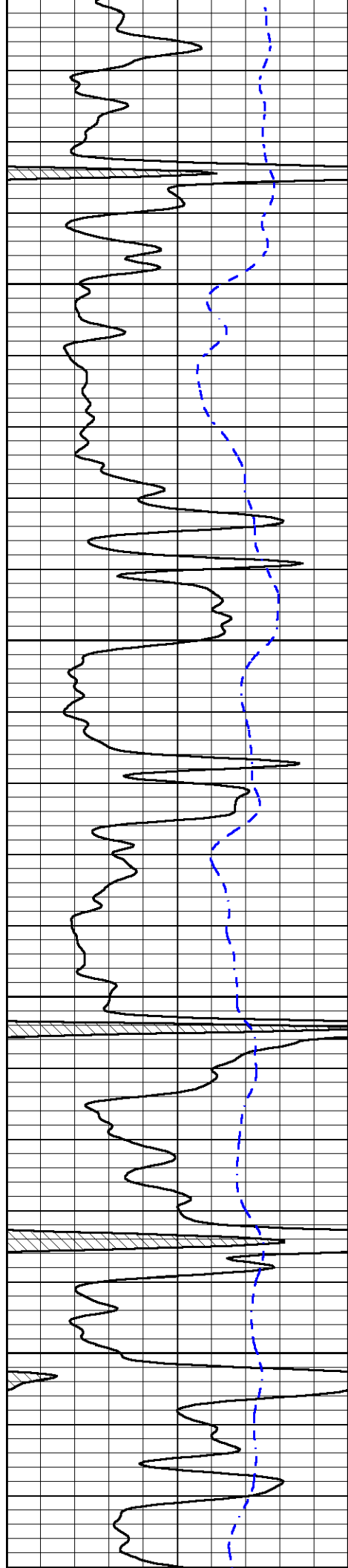
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3250

3300

3350



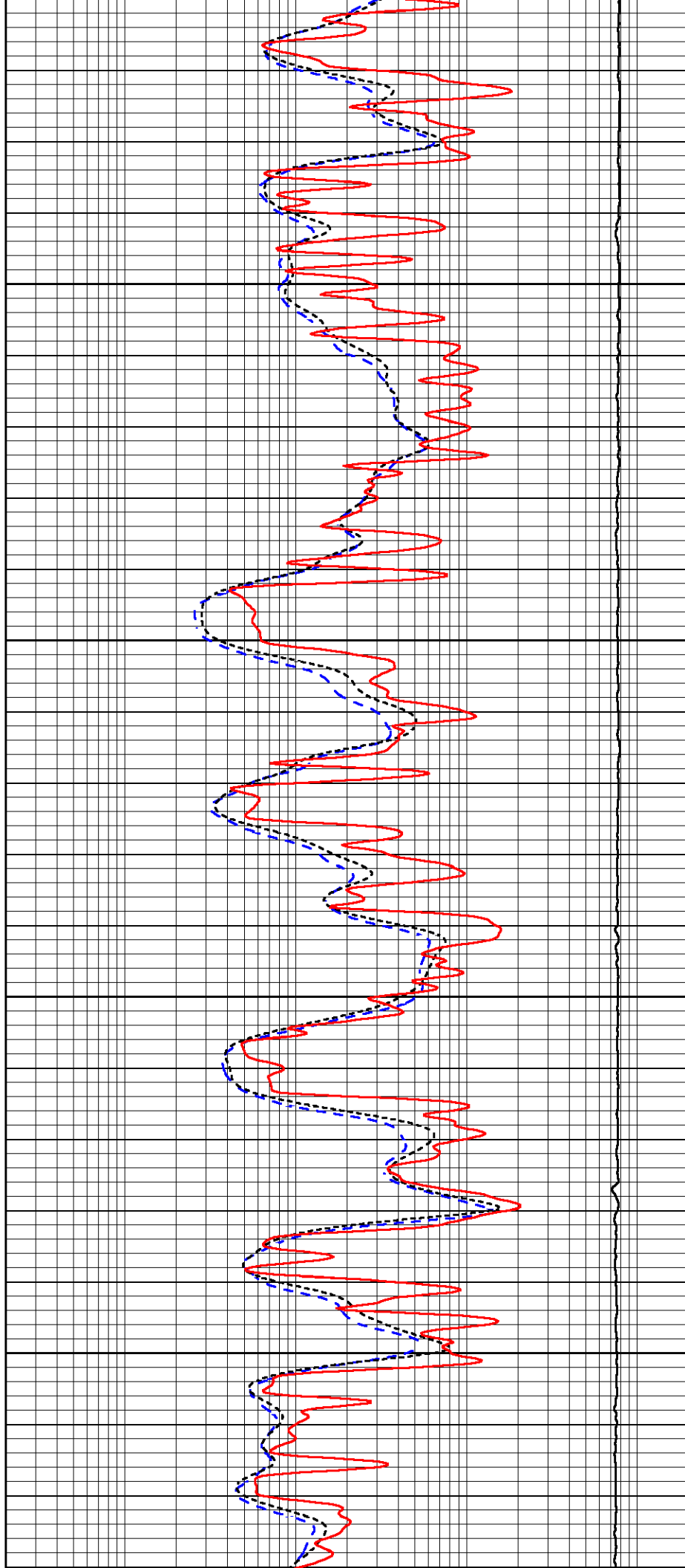


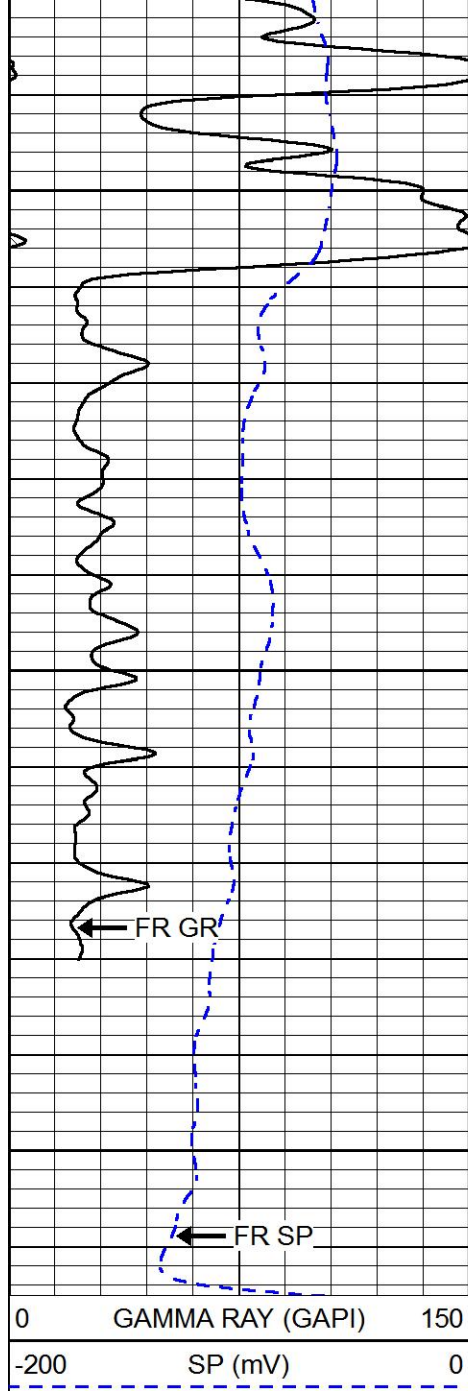
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3450

3500

3550

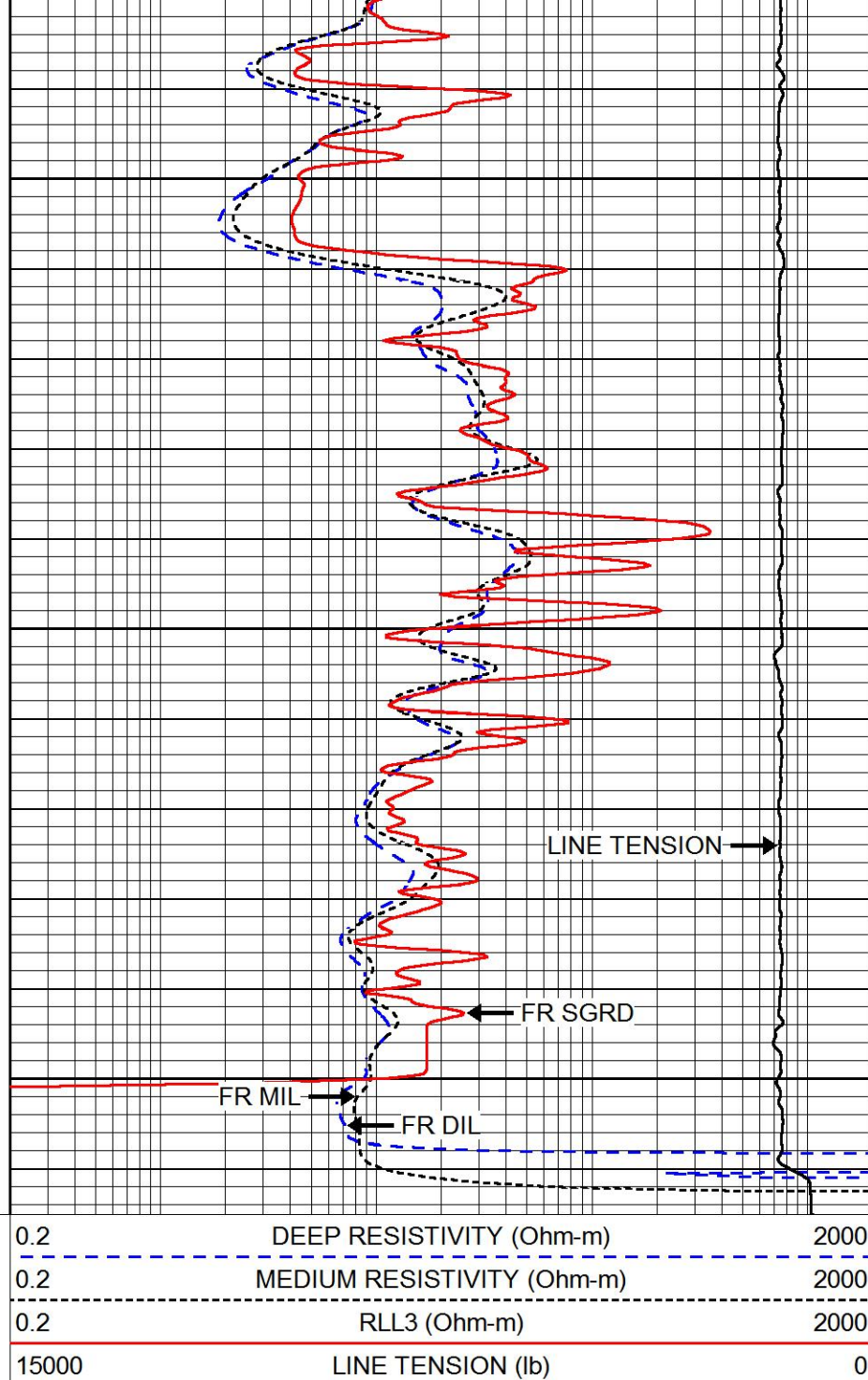




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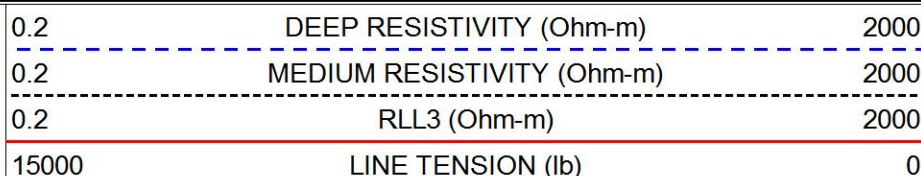
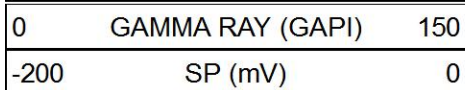
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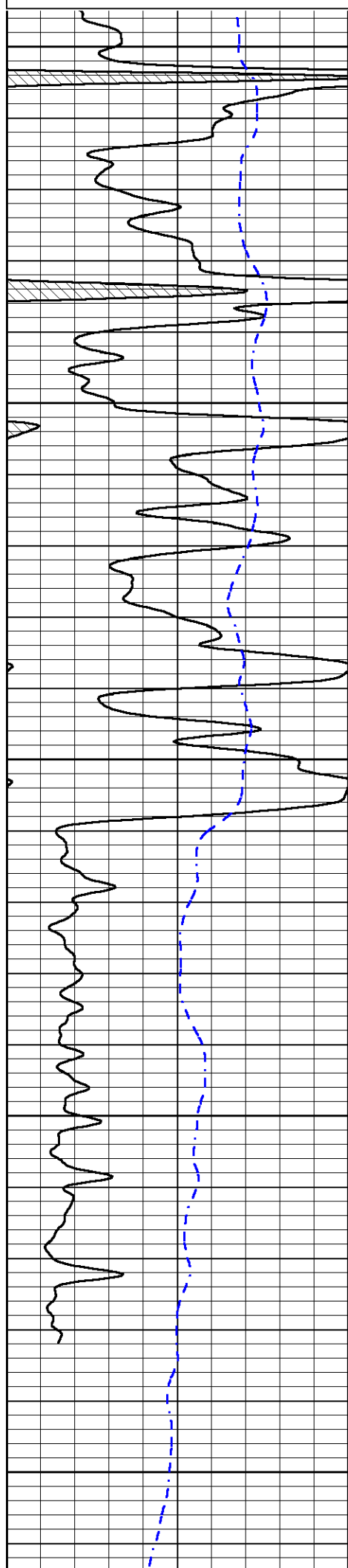
3700



# REPEAT SECTION

Database File murfin\_henderson g #7.db  
Dataset Pathname stack/pass2.1  
Presentation Format dil  
Dataset Creation Wed Sep 25 05:58:24 2019  
Charted by Depth in Feet scaled 1:240





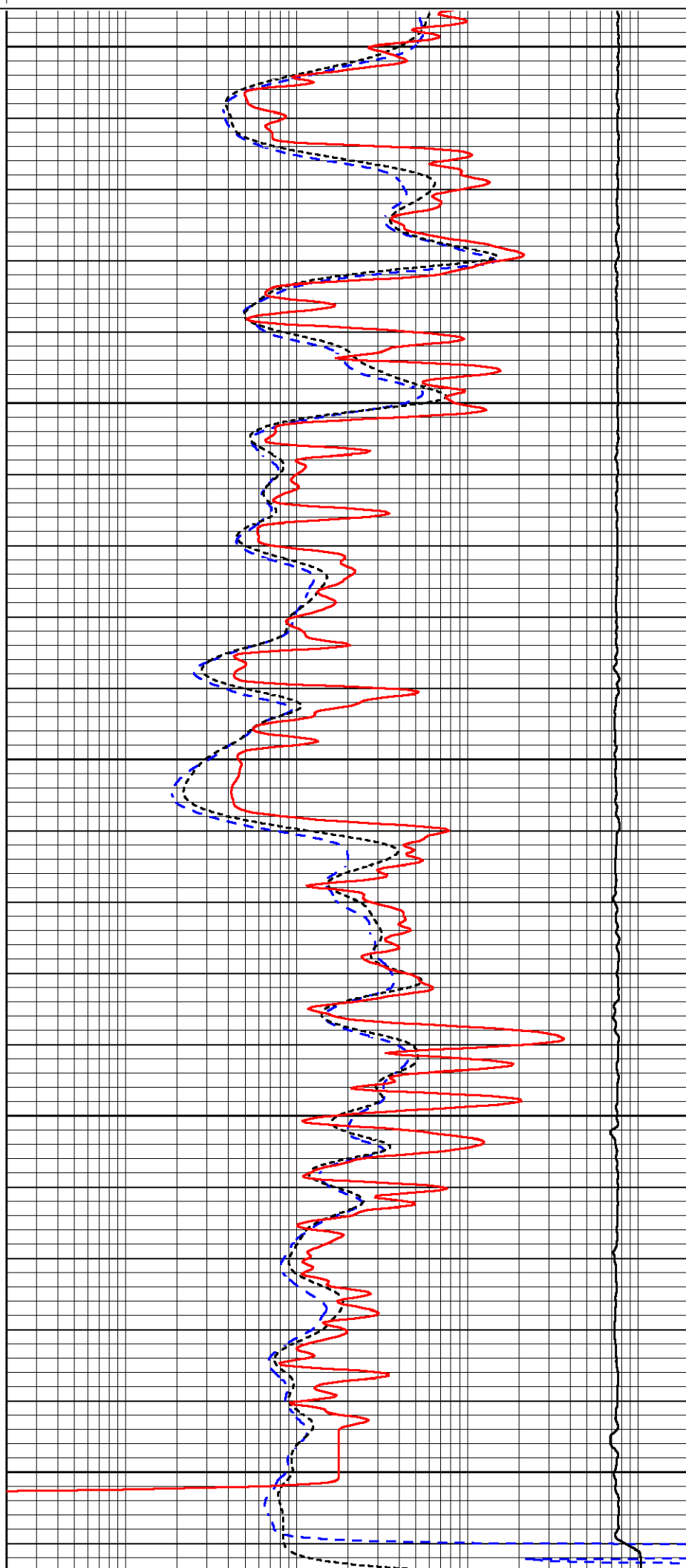
3500

3550

3600

3650

3700



|      |                  |     |
|------|------------------|-----|
| 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    |

### Calibration Report

Database File murfin\_henderson g #7.db  
Dataset Pathname stack/pass3.1  
Dataset Creation Wed Sep 25 06:29:42 2019

### Dual Induction Calibration Report

Serial-Model: PSI 988-M&W  
Calibration Performed: Tue Nov 20 10:50:19 2018

| Loop:  | Readings |          | References |         |        | Results |         |
|--------|----------|----------|------------|---------|--------|---------|---------|
|        | Air      | Loop     | Air        | Loop    |        | Gain    | Offset  |
| Deep   | 178.615  | 710.235  | 0.000      | 255.800 | mmho/m | 0.525   | -45.000 |
| Medium | 161.982  | 1441.110 | 0.000      | 255.800 | mmho/m | 0.380   | -18.500 |

### Compensated Density Calibration Report

Serial-Model: 979-229-M&W  
Source / Verifier: 21170B /  
Master Calibration Performed: Tue Jul 23 10:17:03 2019

### Master Calibration

|                     | Density |      | Far Detector                | Near Detector |     |
|---------------------|---------|------|-----------------------------|---------------|-----|
| Magnesium           | 1.755   | g/cc | 7680.82                     | 9959.08       | cps |
| Aluminum            | 2.690   | g/cc | 1424.07                     | 6427.19       | cps |
| Spine Angle = 75.43 |         |      | Density/Spine Ratio = 0.537 |               |     |
|                     | Size    |      | Reading                     |               |     |
| Small Ring          | 4.00    | in   | 1.15                        |               |     |
| Large Ring          | 14.00   | in   | 1.02                        |               |     |

### Compensated Neutron Calibration Report

Serial Number: tk10-MW  
Tool Model: M&W  
Calibration Performed: 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: 89-M&W  
Tool Model: M&W  
Calibration Performed: Tue Apr 11 17:08:01 2017

|                     |        |          |
|---------------------|--------|----------|
| 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    | HENDERSON G #7                |
| Field   | BEMIS SHUTTS                  |
| County  | ELLIS                         |
| State   | KANSAS                        |