



# DUAL INDUCTION LOG

Company L.D. DRILLING, INC.  
 Well BIGGS #1-36  
 Field WILD CAT  
 County THOMAS  
 State KANSAS

Company L.D. DRILLING, INC.  
 Well BIGGS #1-36  
 Field WILD CAT  
 County THOMAS State KANSAS

Location: 1220' FSL & 1590' FWL  
 API # : 15-193-21005-00-00  
 Other Services CD/LCN/LMEL  
 Permanent Datum GROUND LEVEL Elevation 3334'  
 Log Measured From KELLY BUSHING 5' A.G.L.  
 Drilling Measured From KELLY BUSHING  
 Elevation K.B. 3339'  
 D.F. 3337  
 G.L. 3334

|                              |                 |
|------------------------------|-----------------|
| Date                         | 11/17/17        |
| Run Number                   | ONE             |
| Depth Driller                | 4900            |
| Depth Logger                 | 4900            |
| Bottom Logged Interval       | 4898            |
| Top Log Interval             | 00              |
| Casing Driller               | 8 5/8" @ 332    |
| Casing Logger                | 332             |
| Bit Size                     | 7 7/8"          |
| Type Fluid in Hole           | CHEMICAL MUD    |
| Density / Viscosity          | 9.2/54          |
| pH / Fluid Loss              | 10.5/7.8        |
| Source of Sample             | FLOWLINE        |
| Rm @ Meas. Temp              | 1.0@54          |
| Rmt @ Meas. Temp             | .75@54          |
| Rmc @ Meas. Temp             | 1.2@54          |
| Source of Rmt / Rmc          | MEASURED        |
| Rm @ BHT                     | .43@124         |
| Time Circulation Stopped     | 2 HOURS         |
| Time Logger on Bottom        | ///             |
| Maximum Recorded Temperature | 124F            |
| Equipment Number             | 4010            |
| Location                     | HAYS, KANSAS    |
| Recorded By                  | GUS PFANENSTIEL |
| Witnessed By                 | KIM SHOEMAKER   |

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, 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. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

### Comments

THANK YOU FOR USING ELI WIRELINE, HAYS, KS. (785) 628-6395

DIRECTIONS  
 LEVANT EXIT NORTH 9 MILES TO Z RD.  
 WEST 4 MILES, 1 SOUTH, WEST INTO.



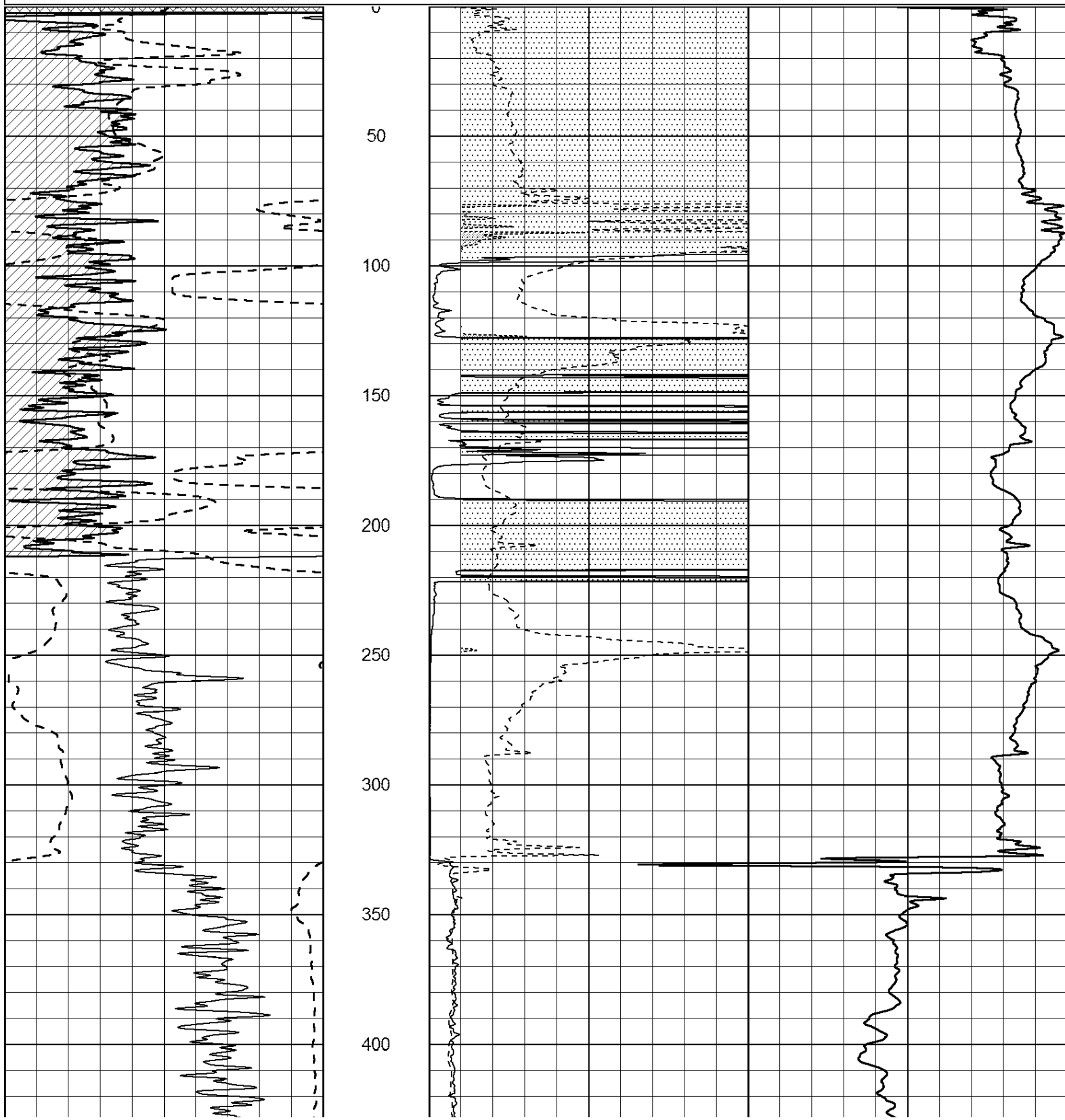
# MAIN PASS

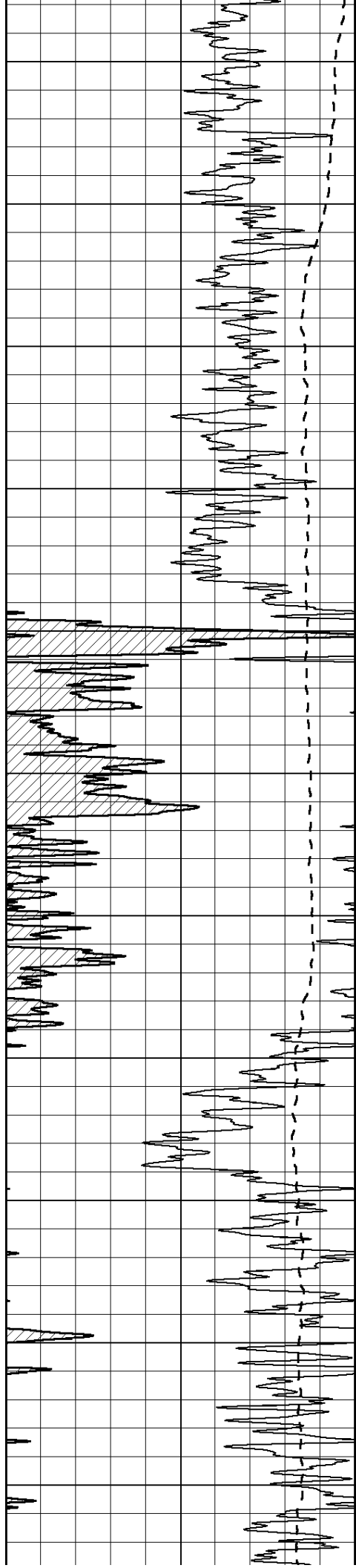
Database File: 2109ddn.db  
 Dataset Pathname: pass3.1  
 Presentation Format: \_dil2  
 Dataset Creation: Fri Nov 17 05:26:11 2017  
 Charted by: Depth in Feet scaled 1:600

0 Gamma Ray (GAPI) 150  
 -100 SP (mV) 100

0 RLL3 (Ohm-m) 50  
 0 RILD (Ohm-m) 50

1000 CILD (mmho/m) 0  
 50 RILD X10 (Ohm-m) 500  
 50 RLL3 X10 (Ohm-m) 500





450

500

550

600

650

700

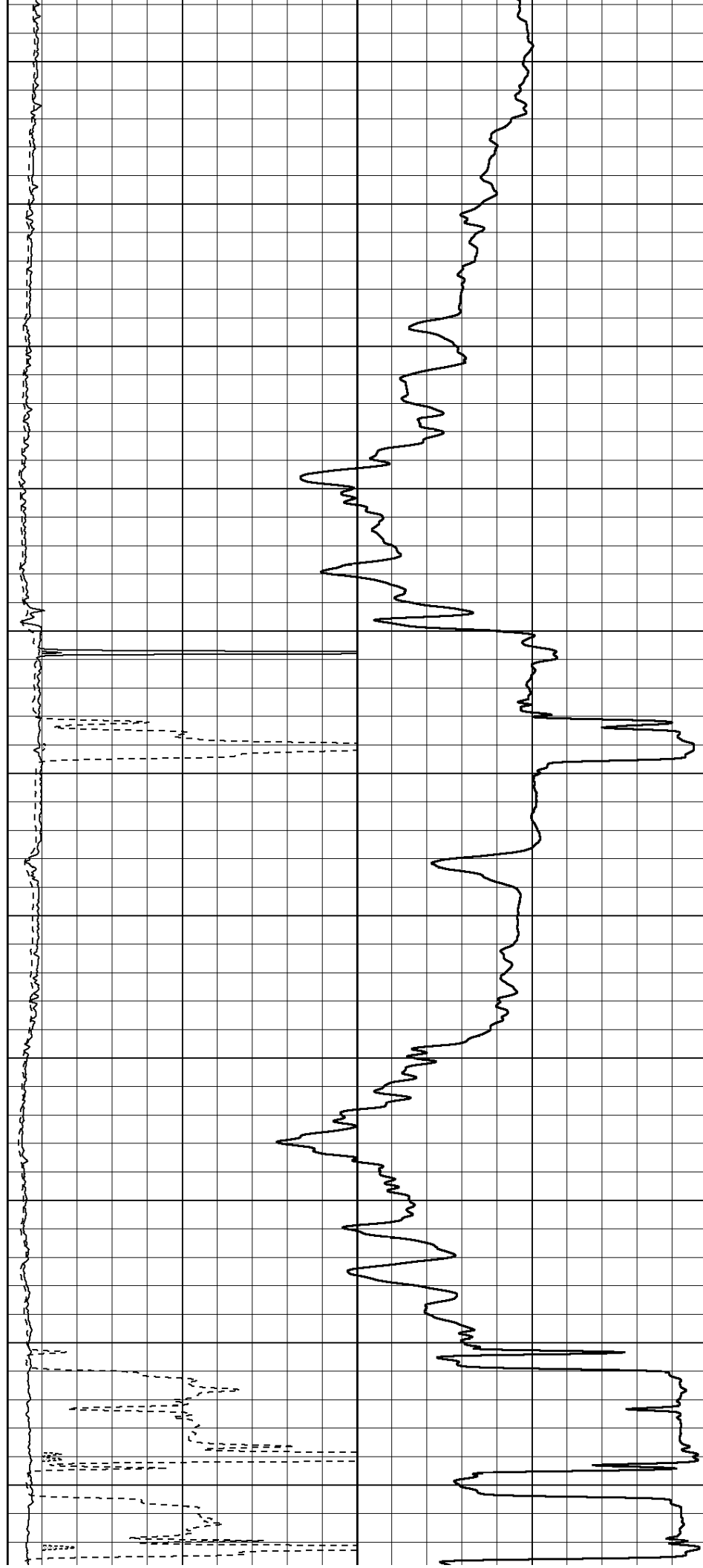
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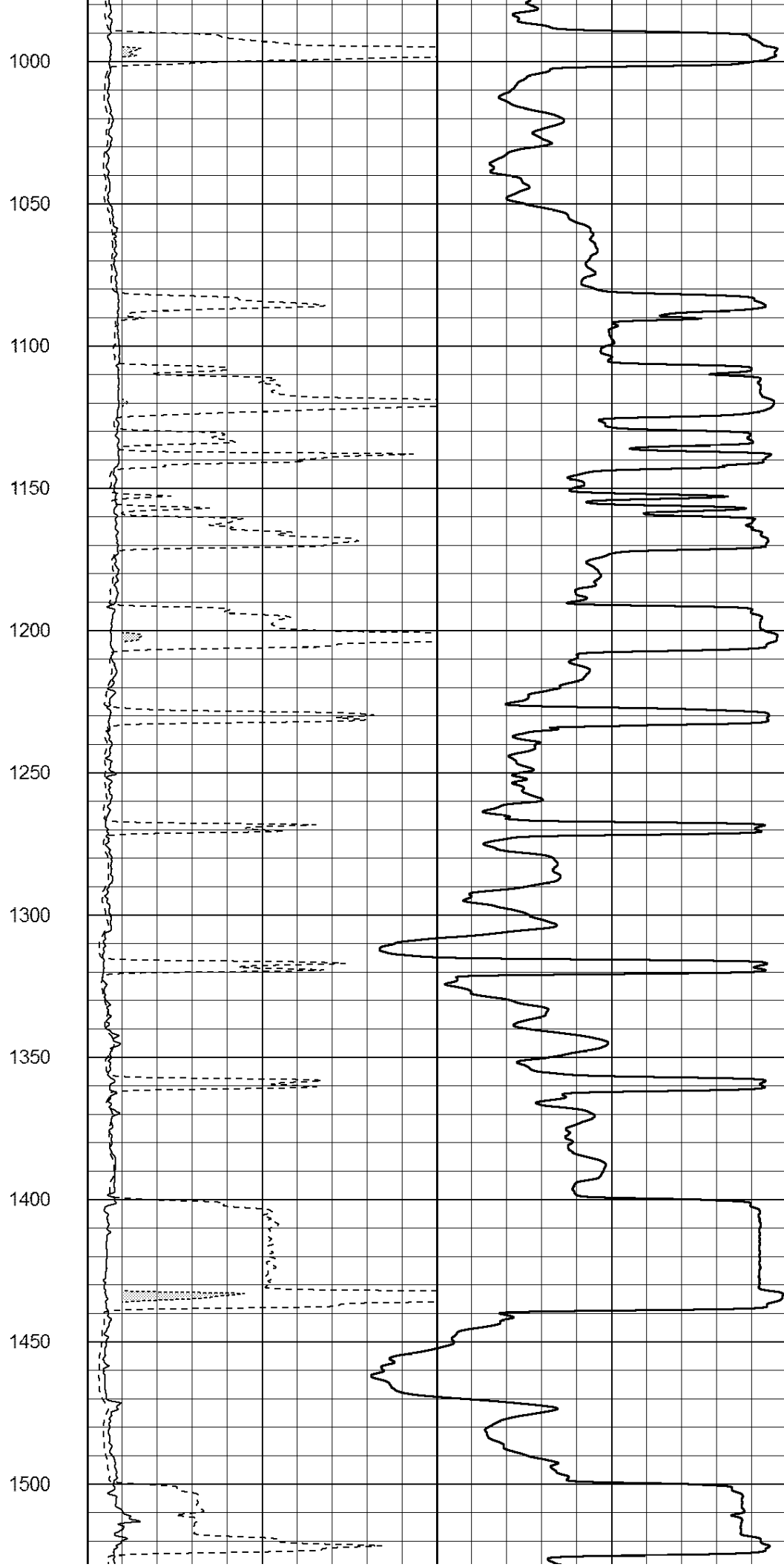
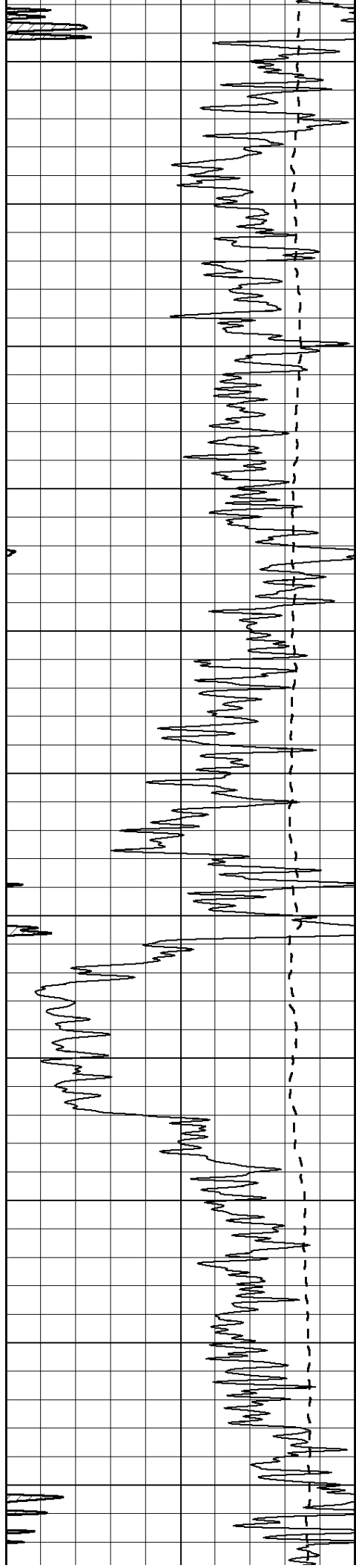
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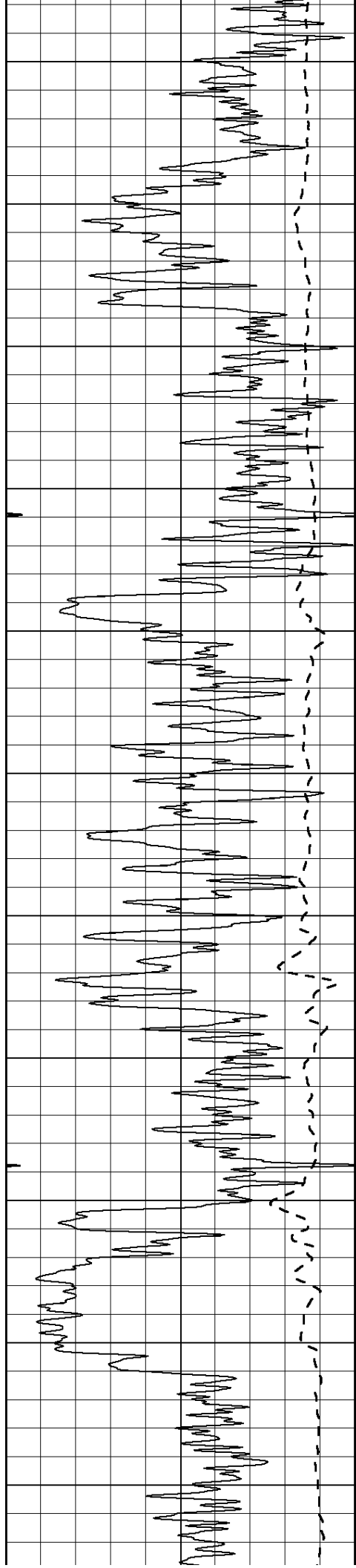
850

900

950







1550

1600

1650

1700

1750

1800

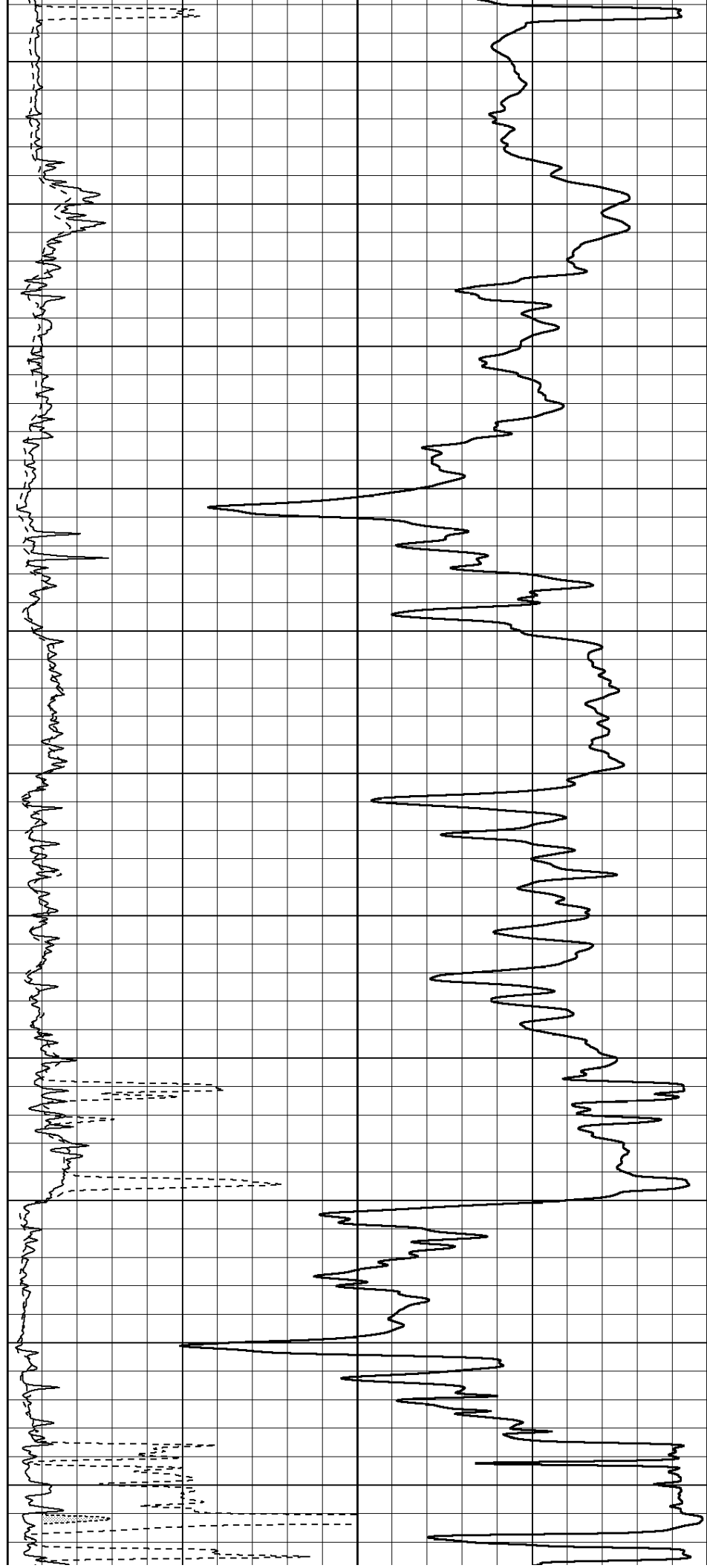
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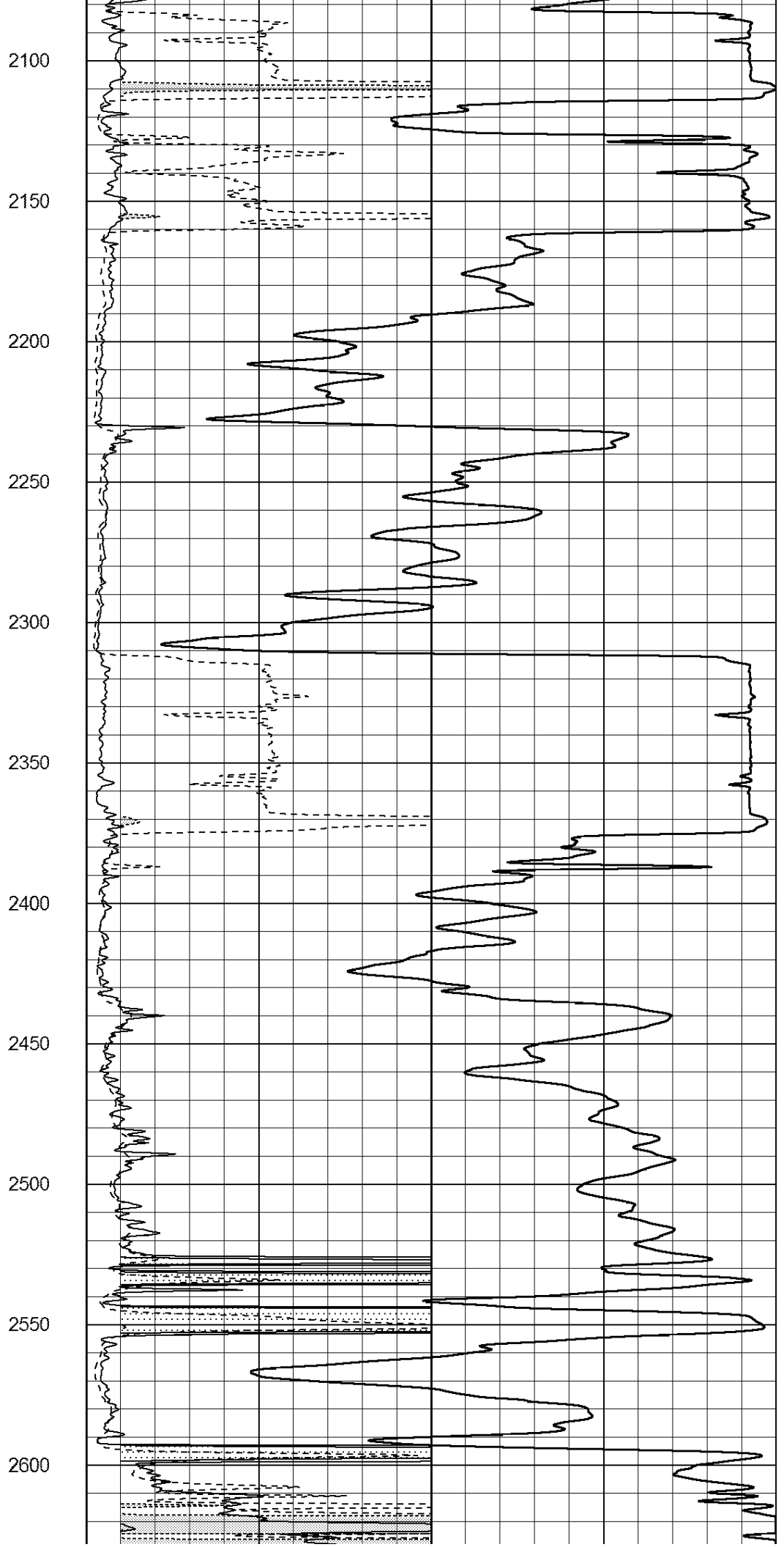
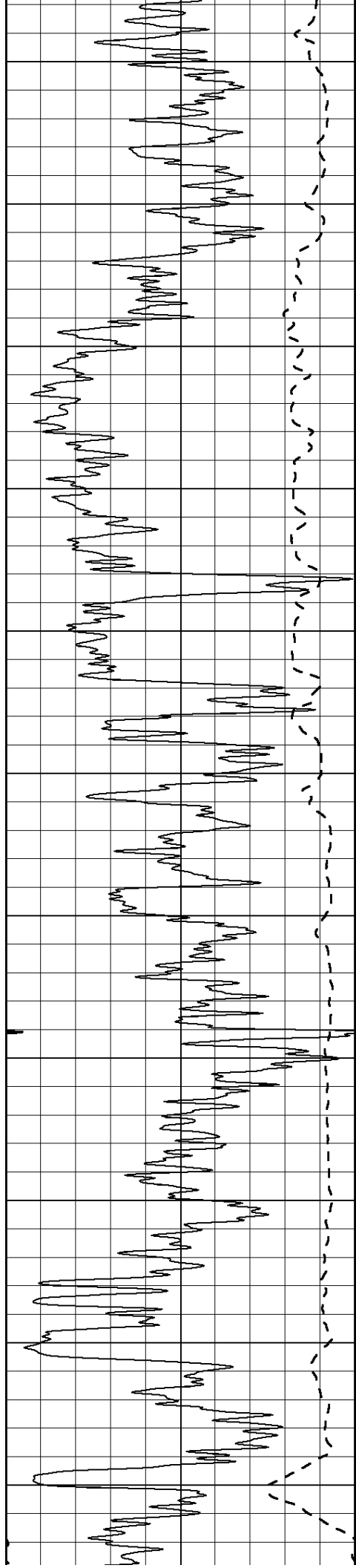
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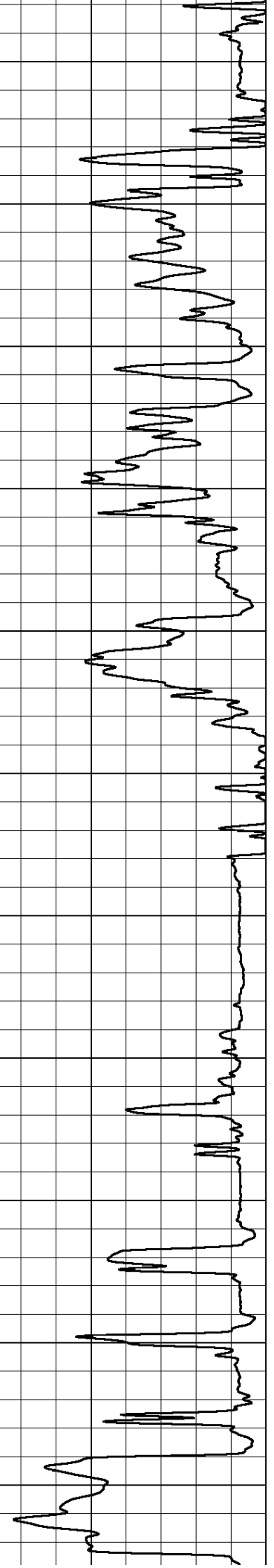
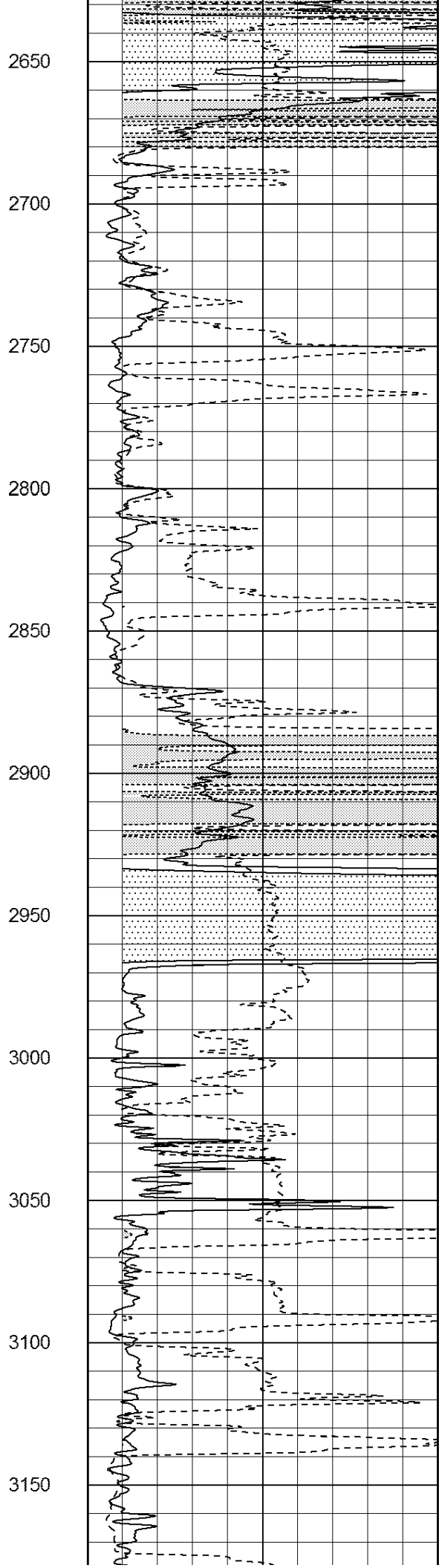
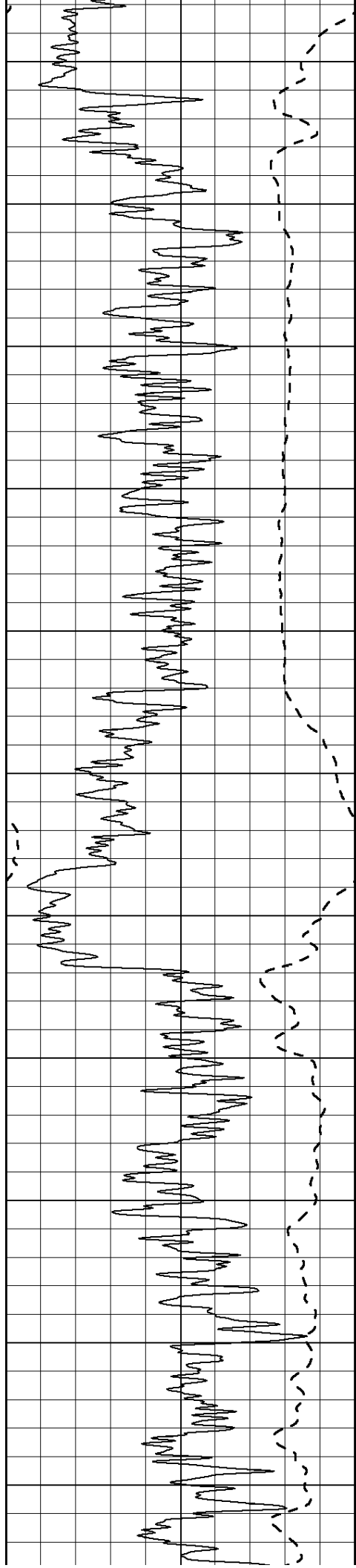
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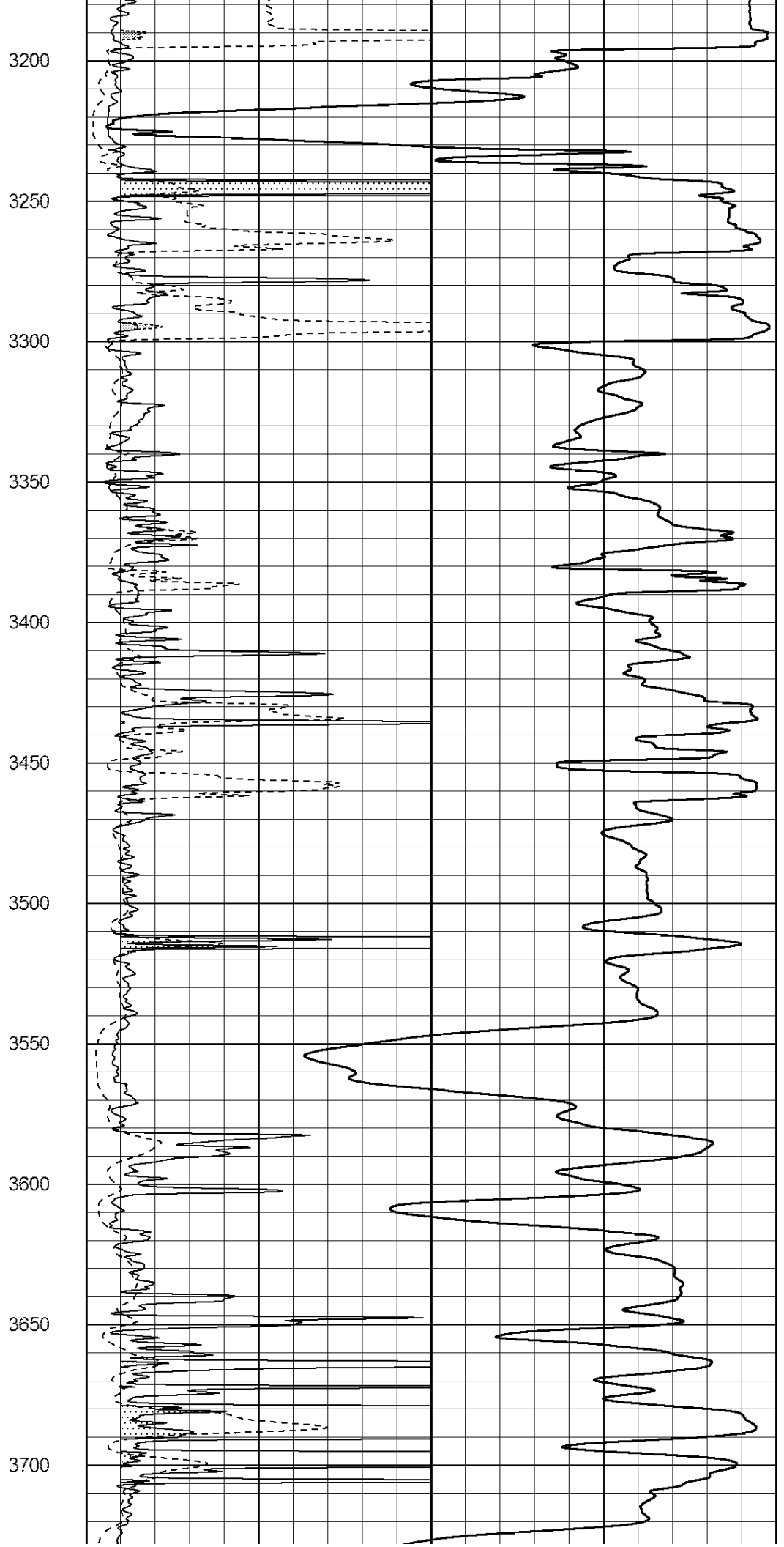
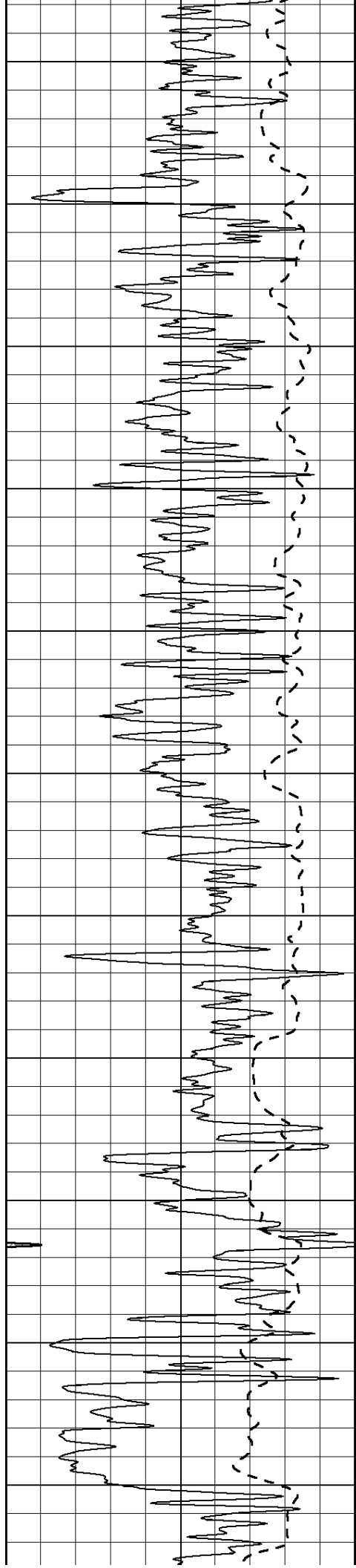
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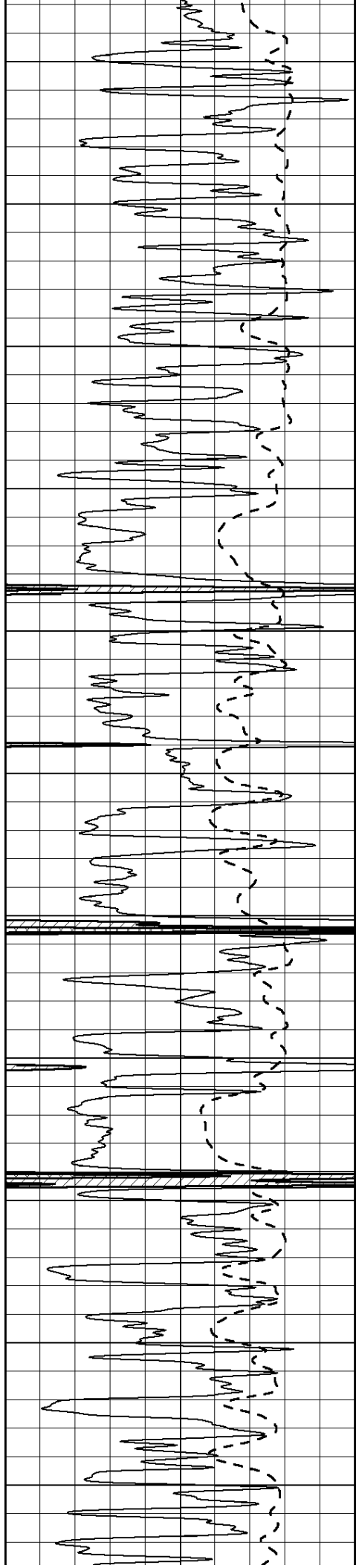
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3750

3800

3850

3900

3950

4000

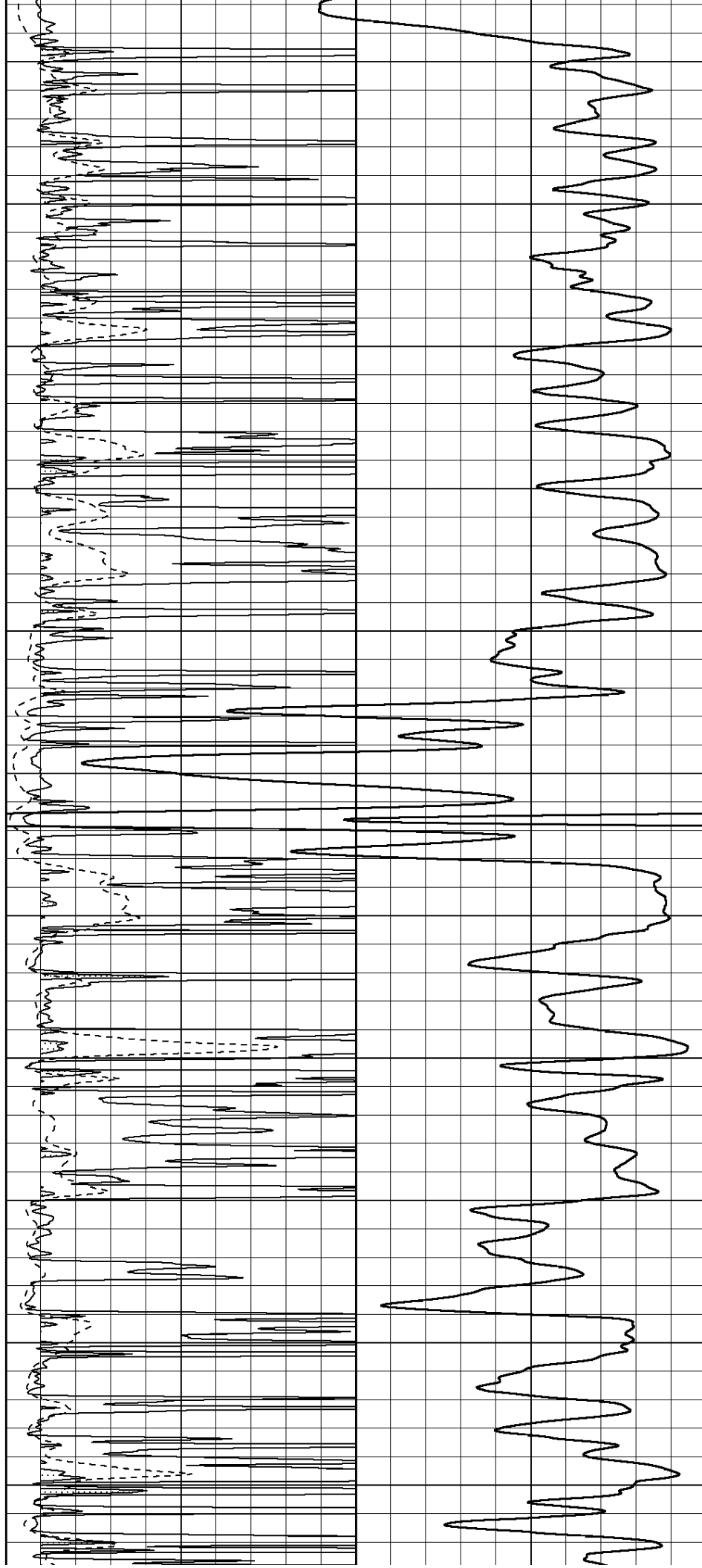
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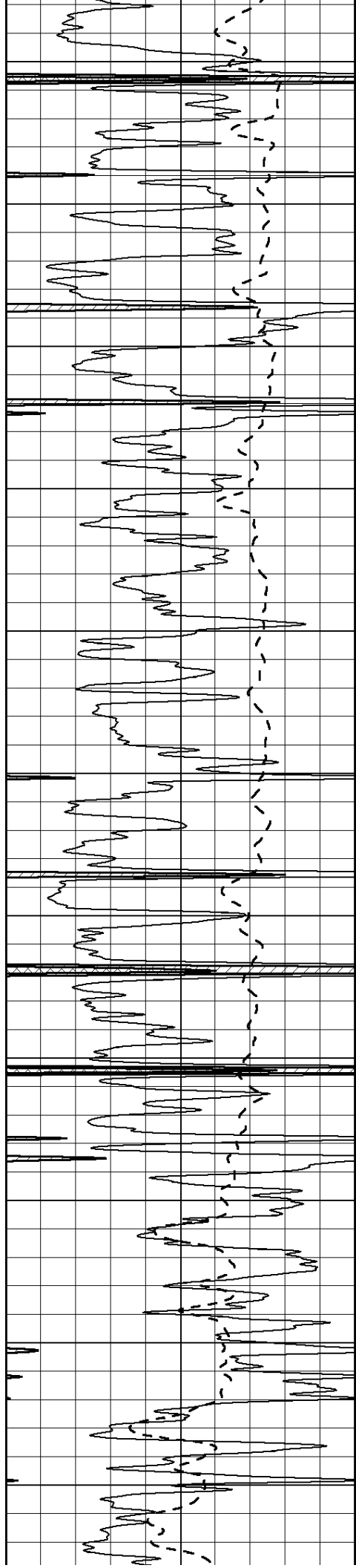
4100

4150

4200

4250





4300

4350

4400

4450

4500

4550

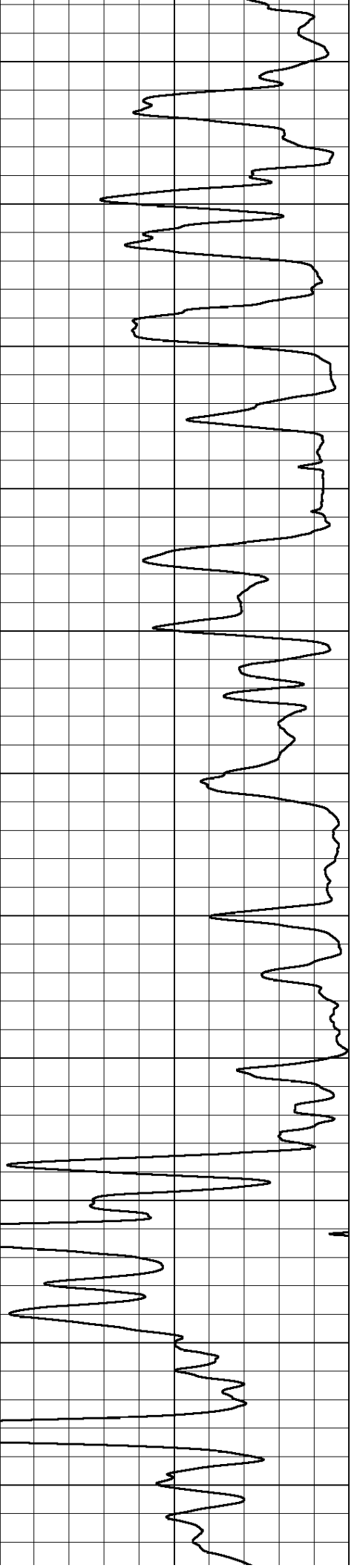
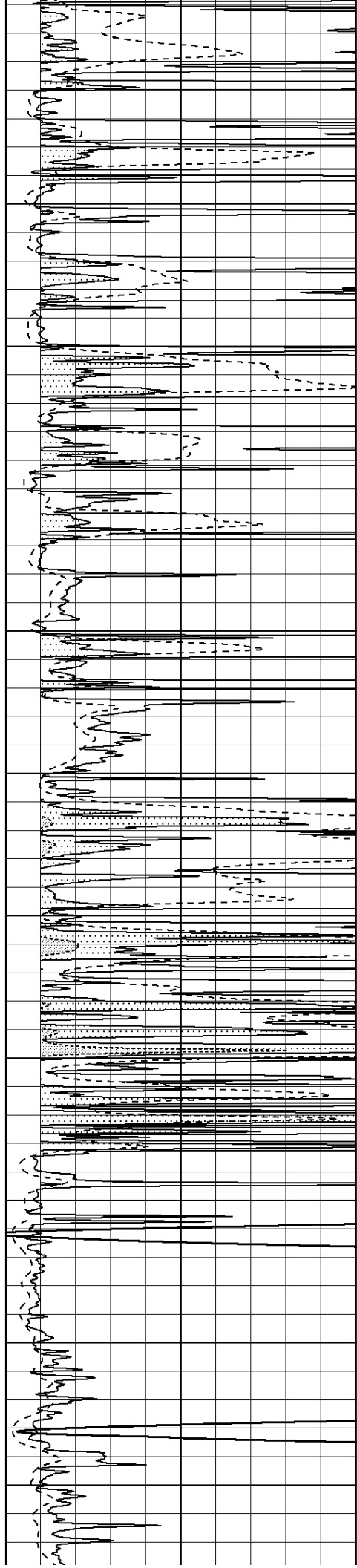
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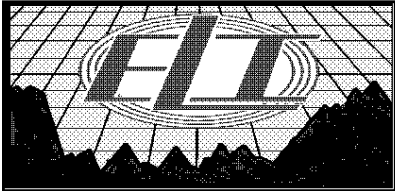
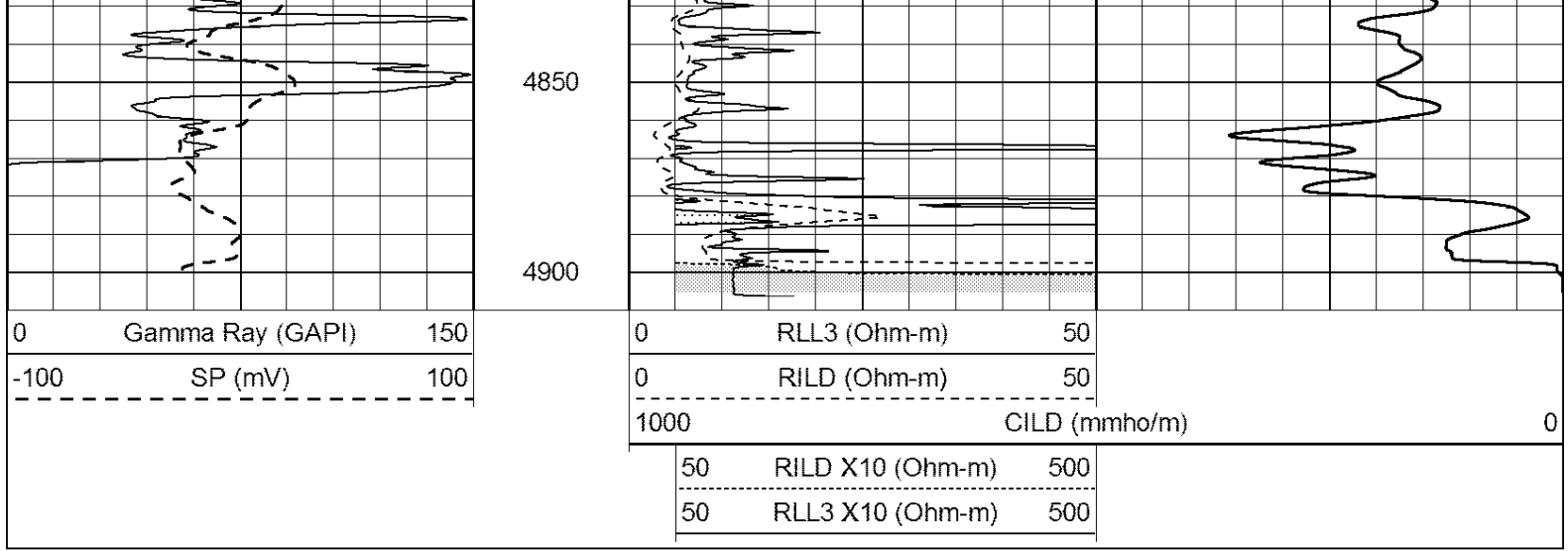
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4700

4750

4800



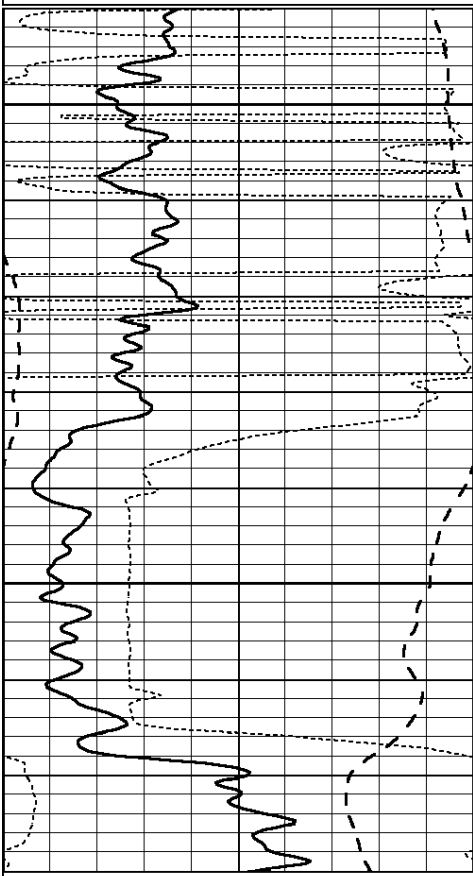


# MAIN PASS

Database File: 2109ddn.db  
 Dataset Pathname: pass3.1  
 Presentation Format: \_dil  
 Dataset Creation: Fri Nov 17 05:26:11 2017  
 Charted by: Depth in Feet scaled 1:240

|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |



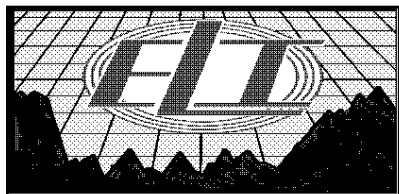
2900

2950



|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |

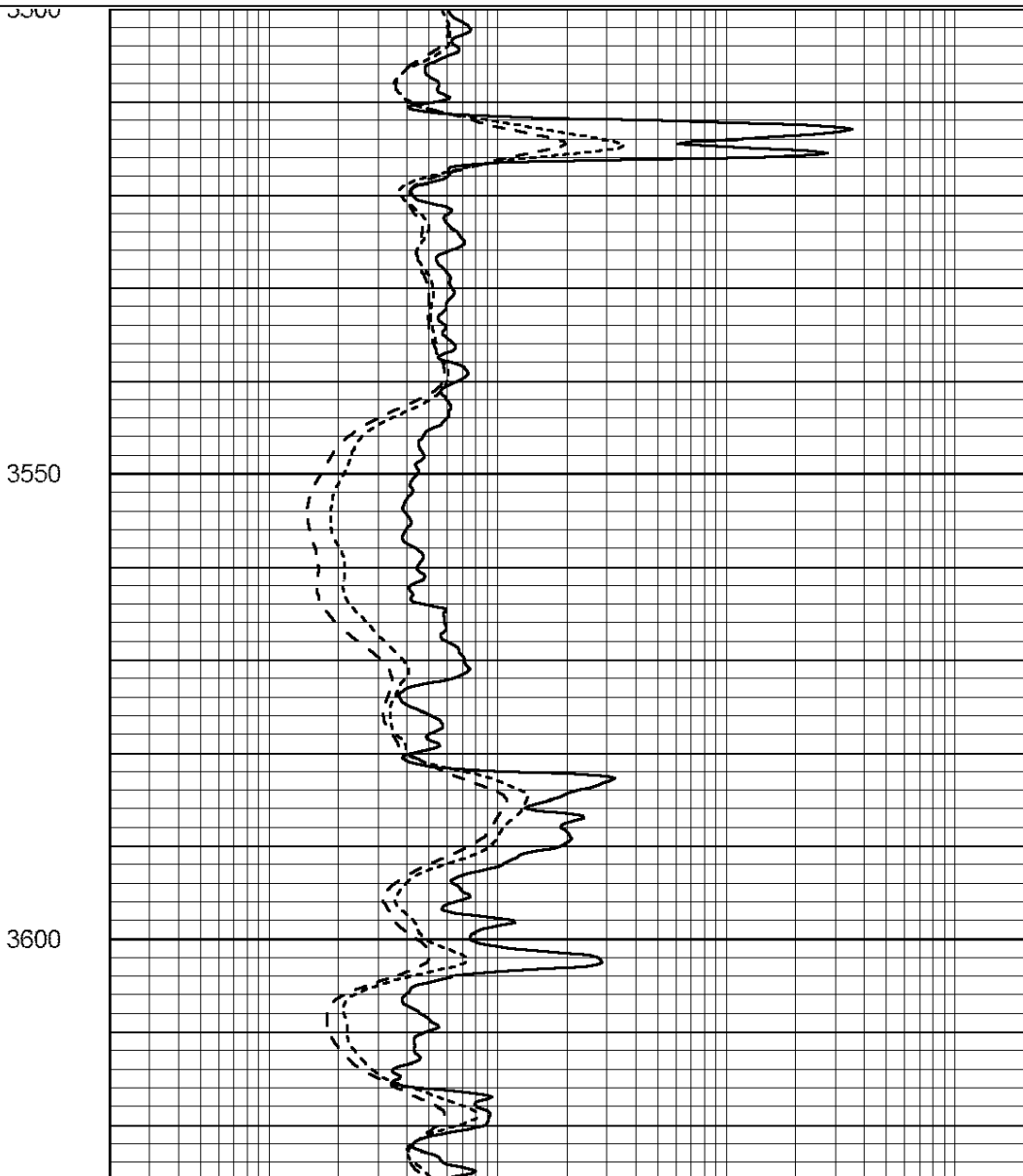
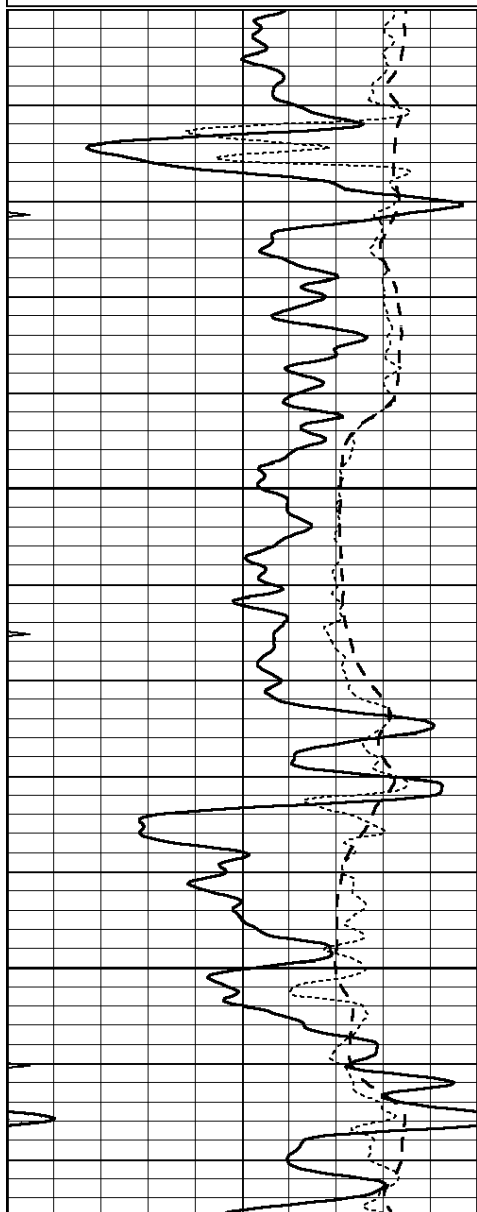


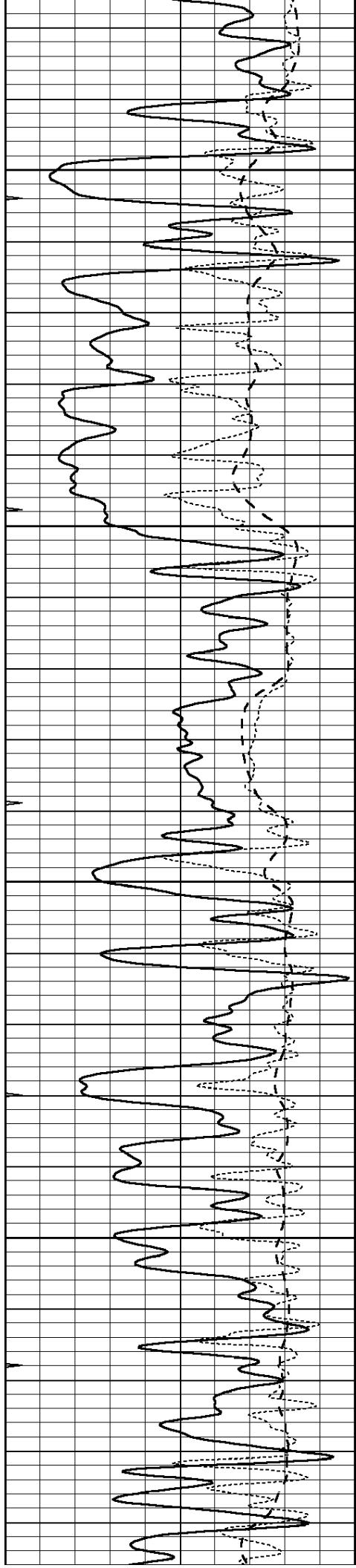
# MAIN PASS

Database File: 2109ddn.db  
 Dataset Pathname: pass3.1  
 Presentation Format: \_dil  
 Dataset Creation: Fri Nov 17 05:26:11 2017  
 Charted by: Depth in Feet scaled 1:240

|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |



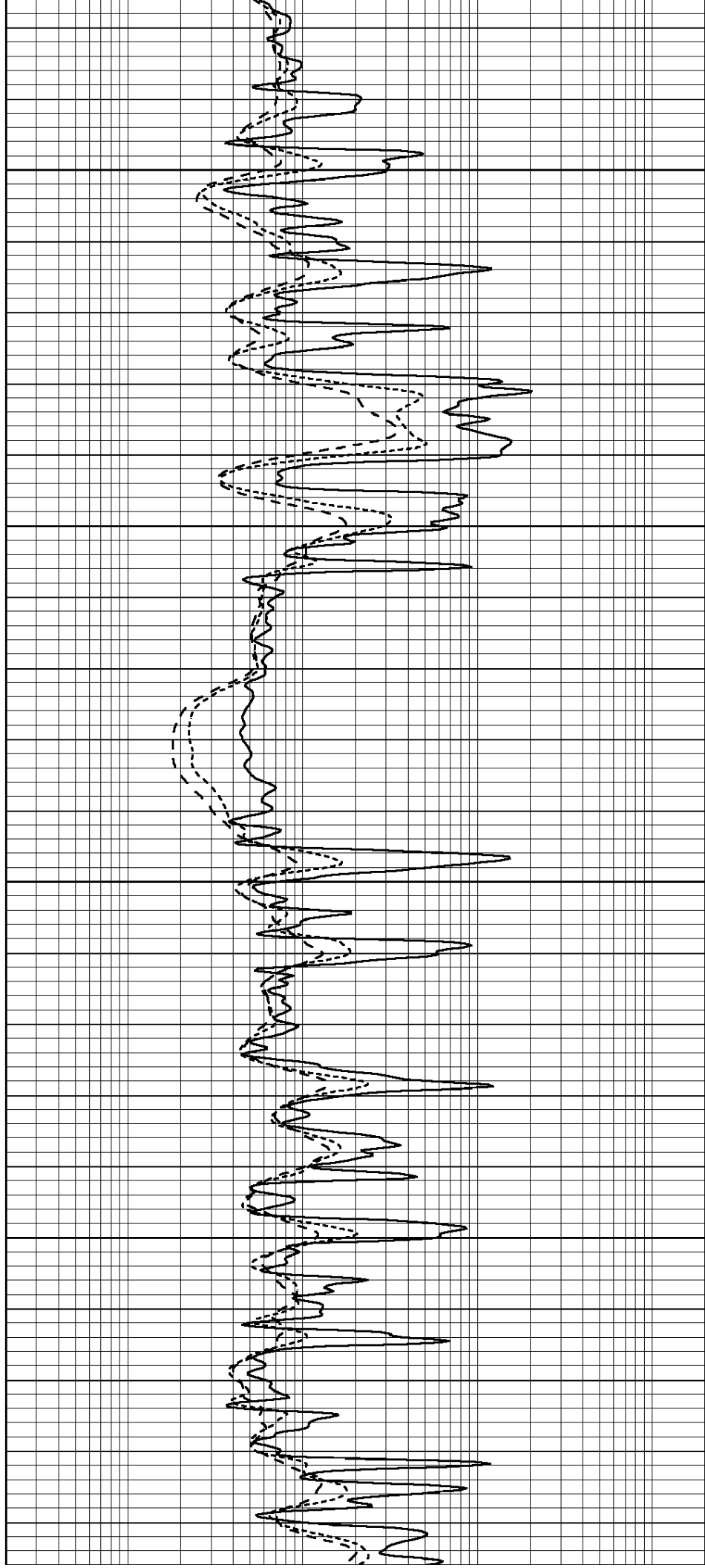


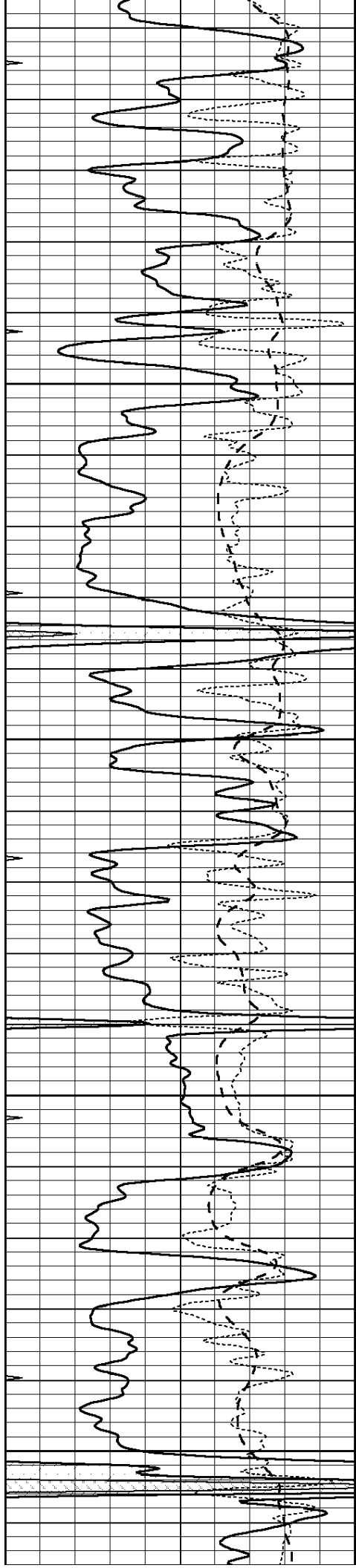
3650

3700

3750

3800





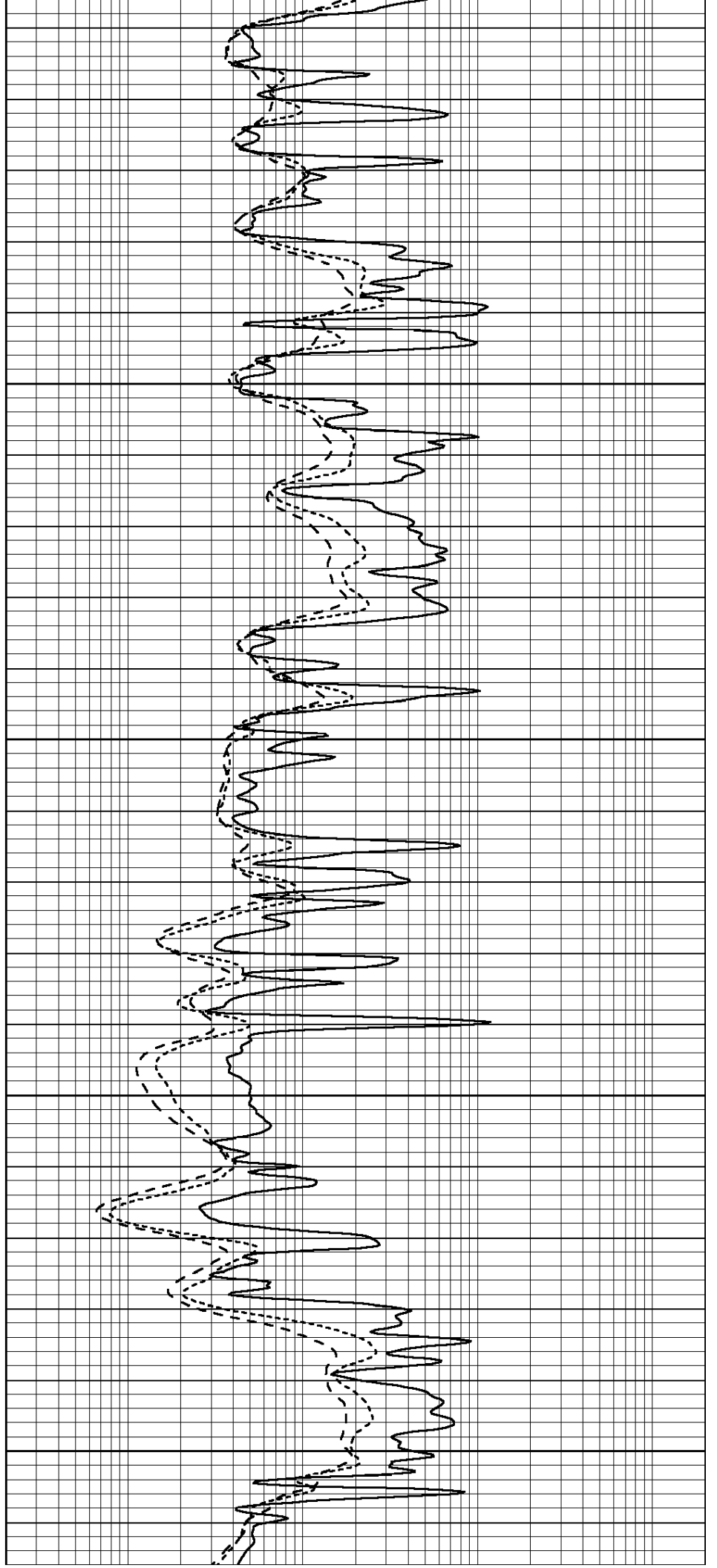
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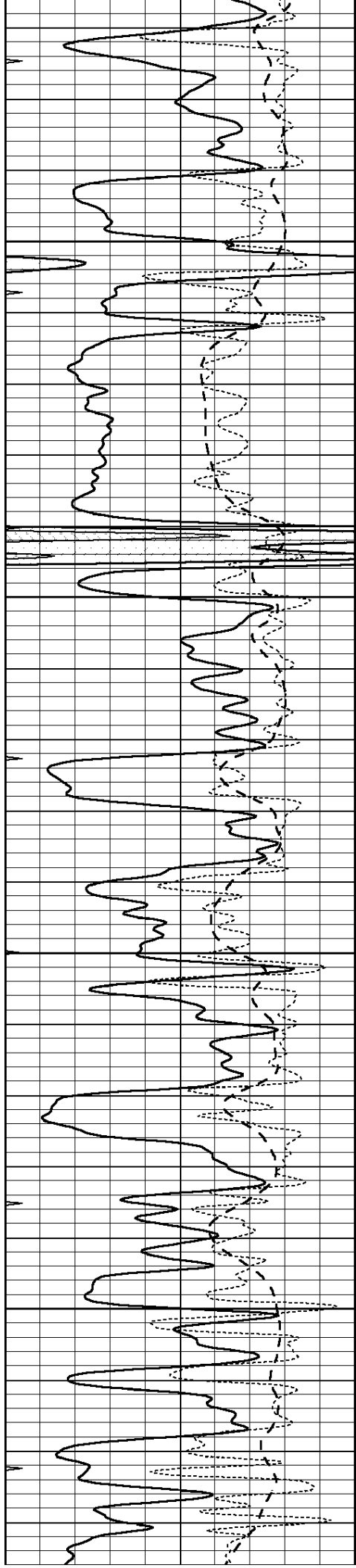
3900

3950

4000

4050



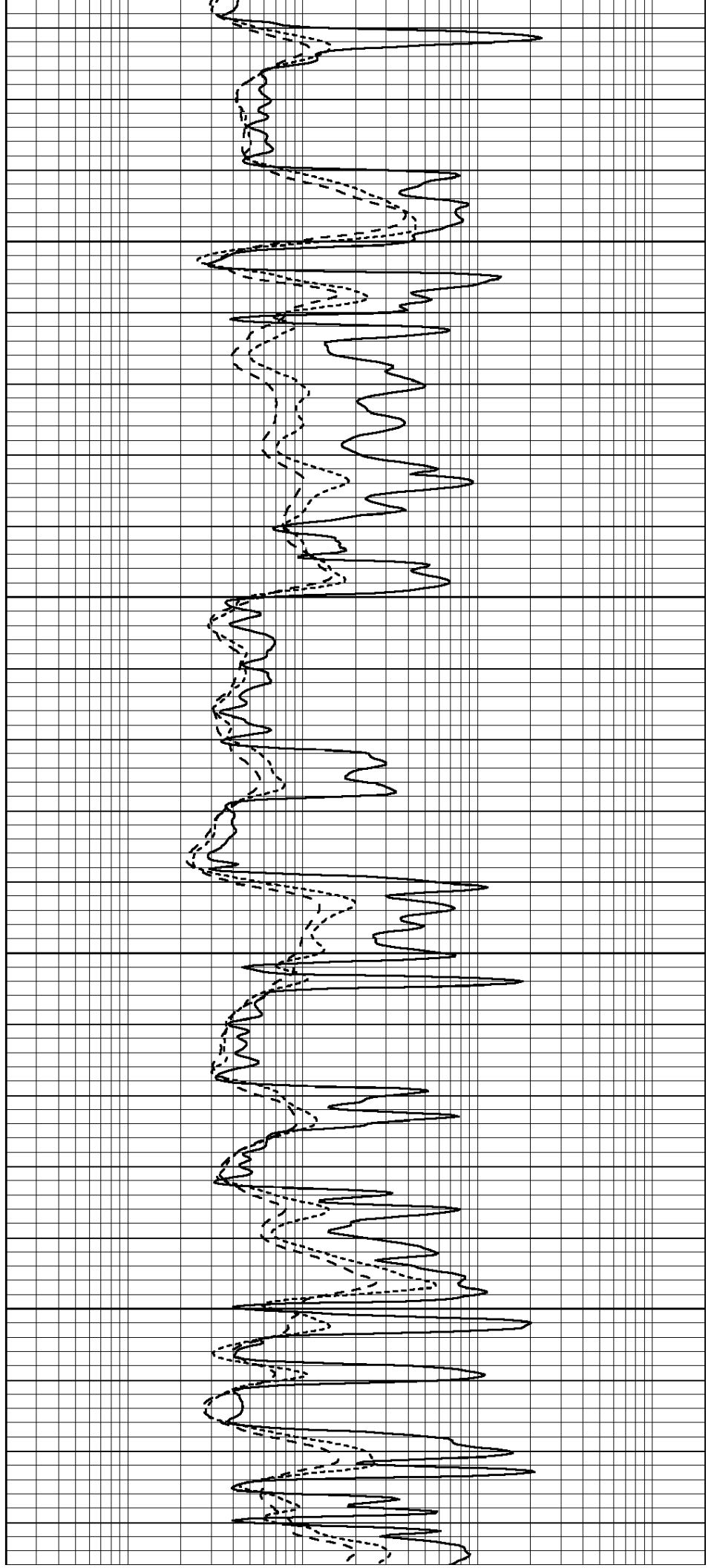


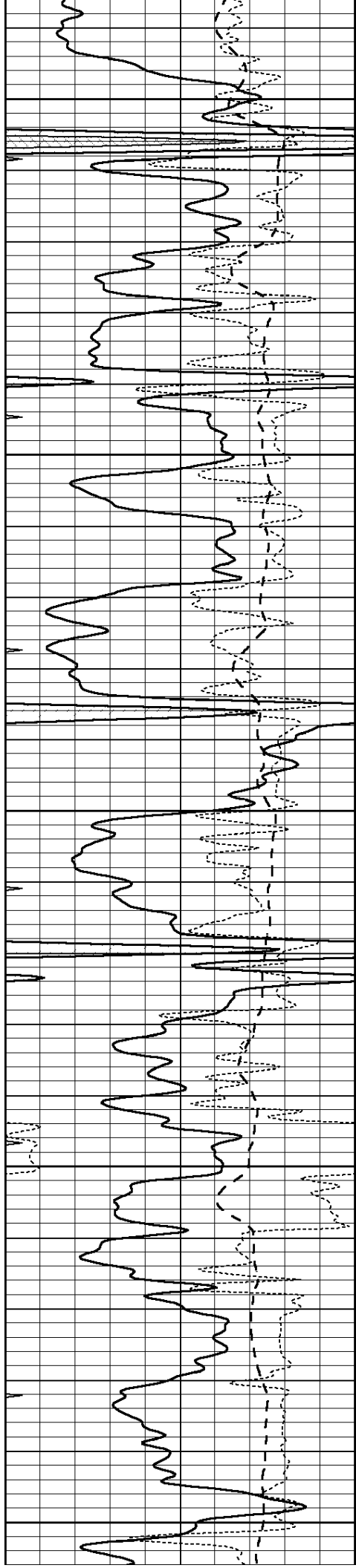
4100

4150

4200

4250





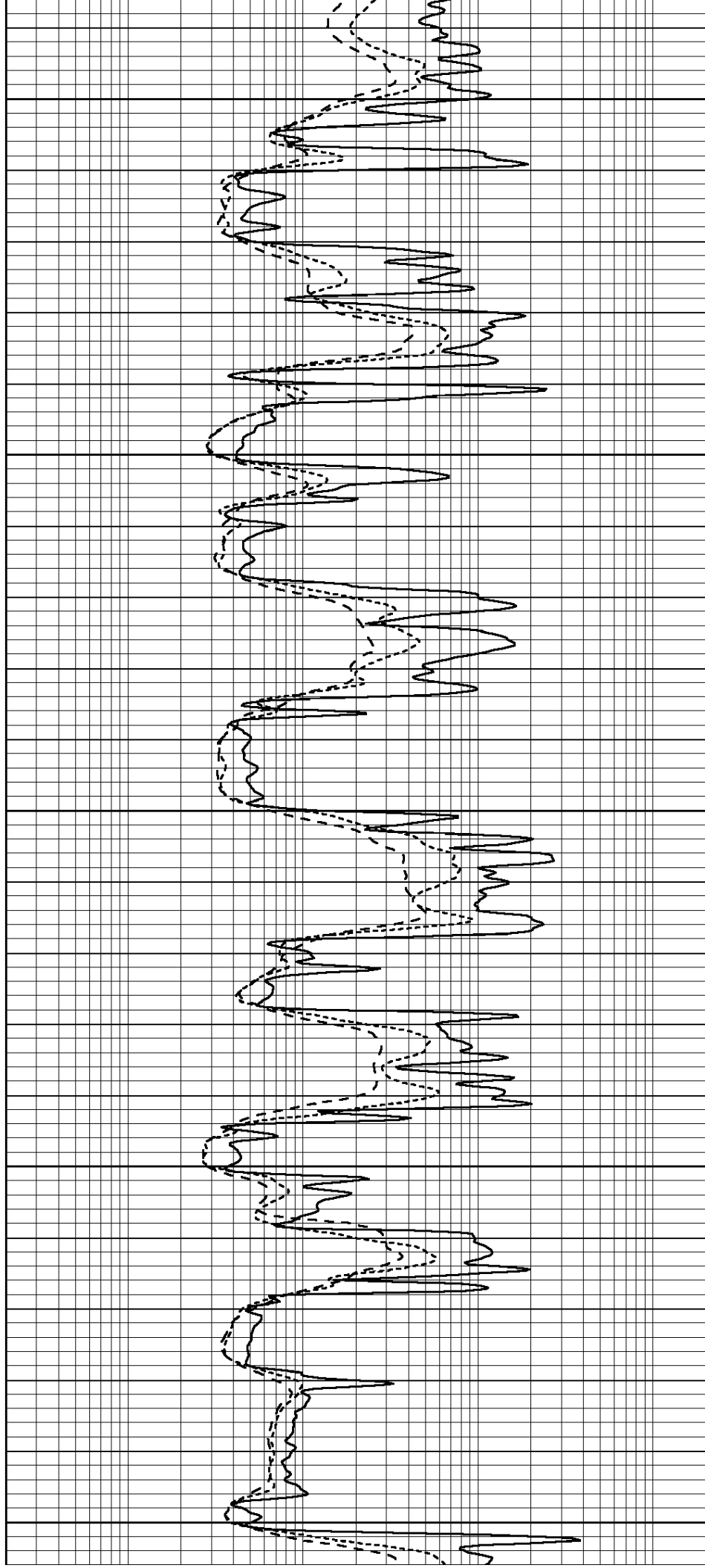
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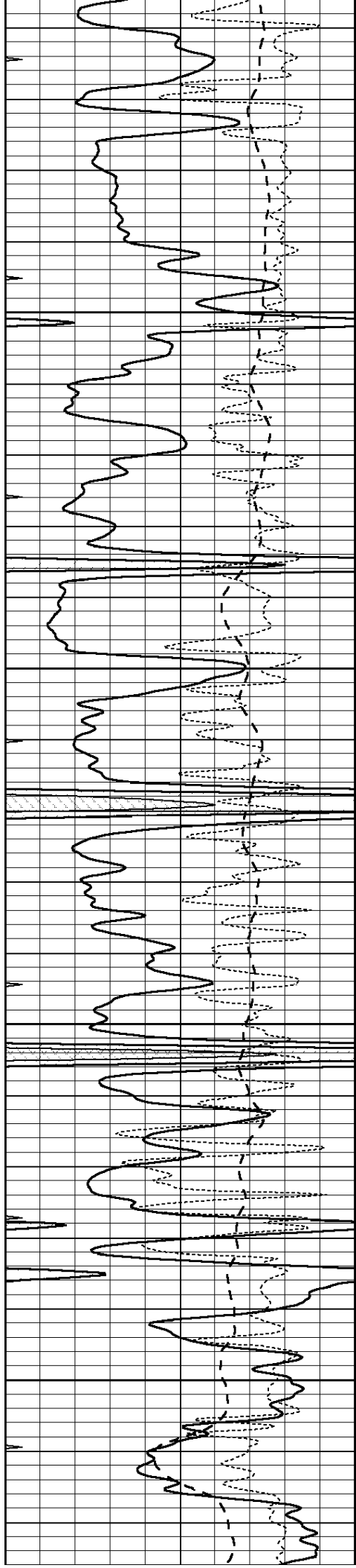
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4400

4450

4500



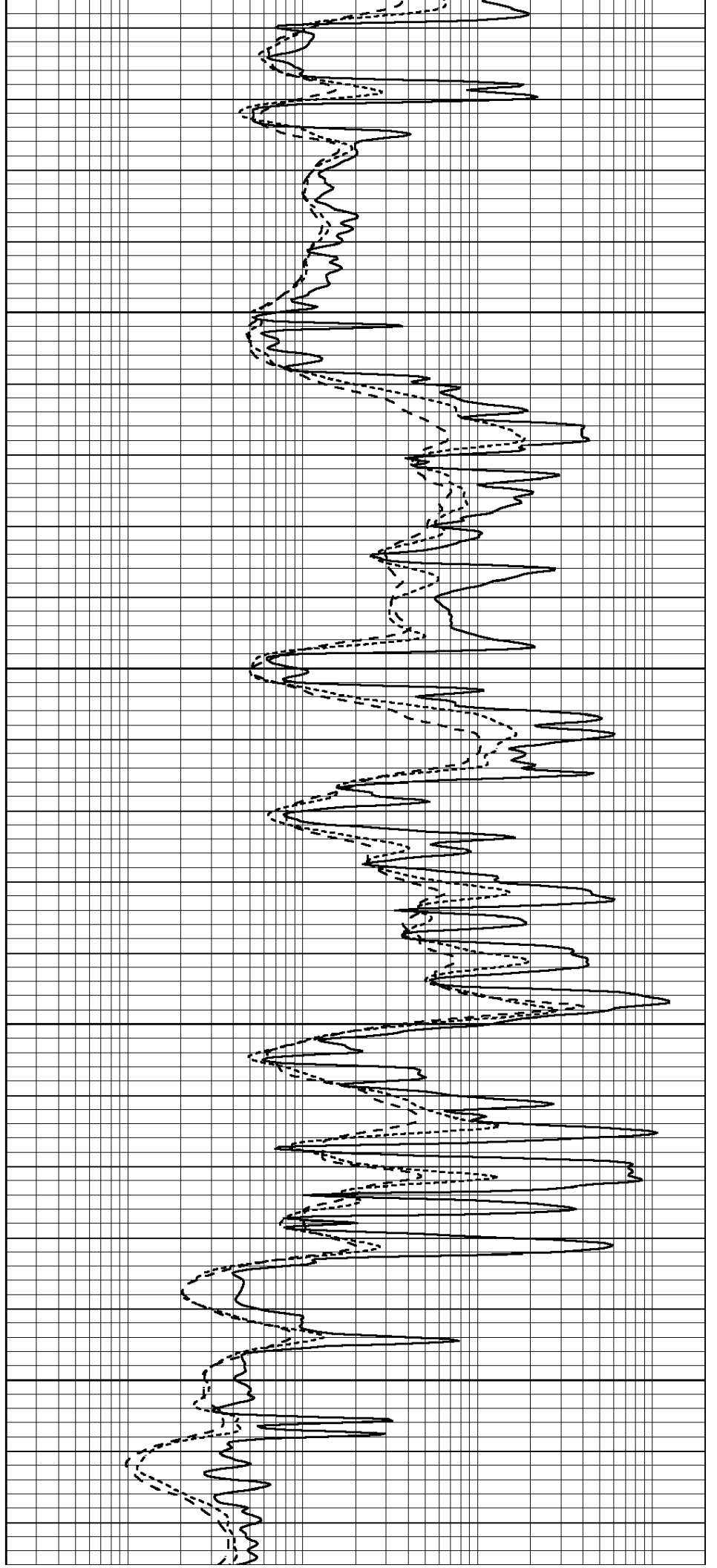


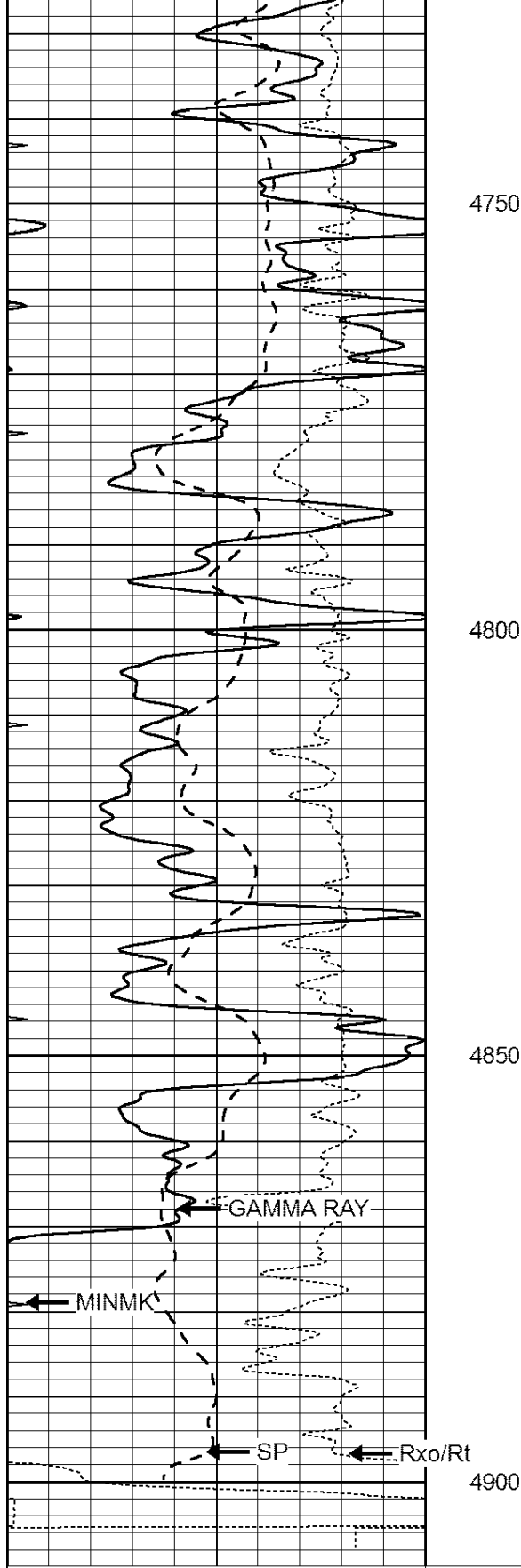
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4600

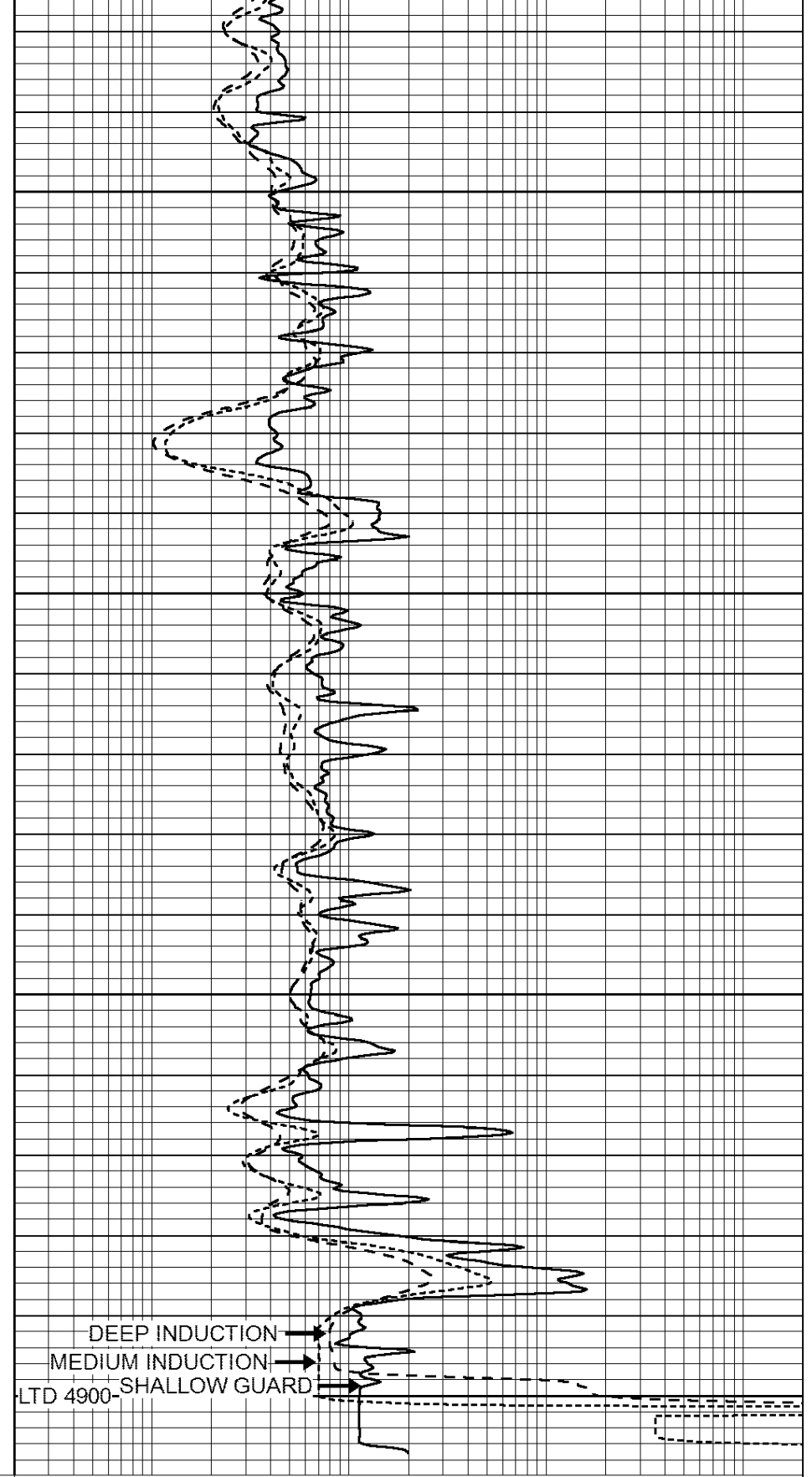
4650

4700





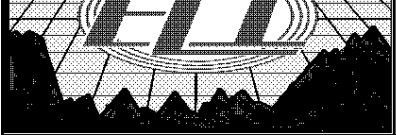
|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |



|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |



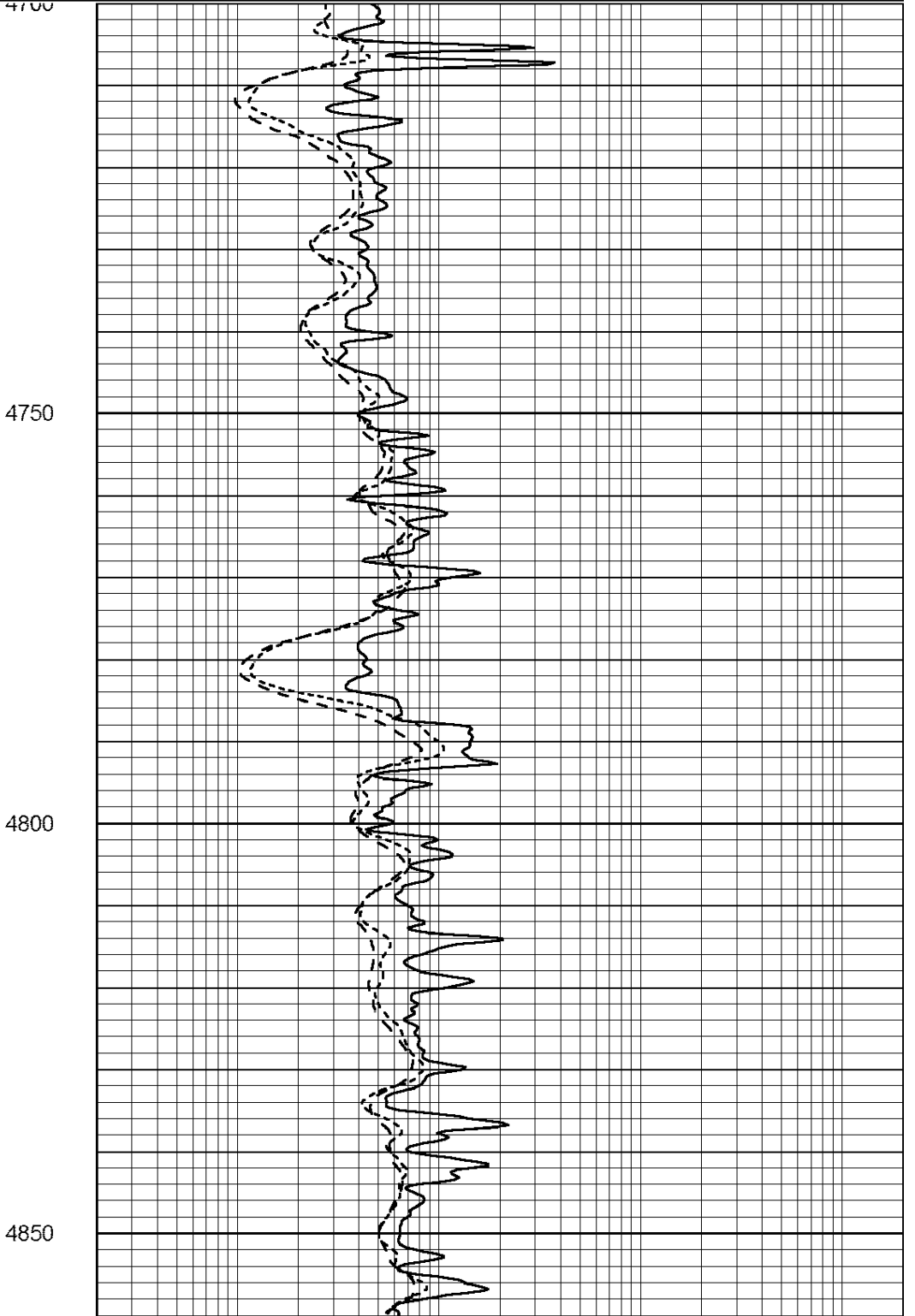
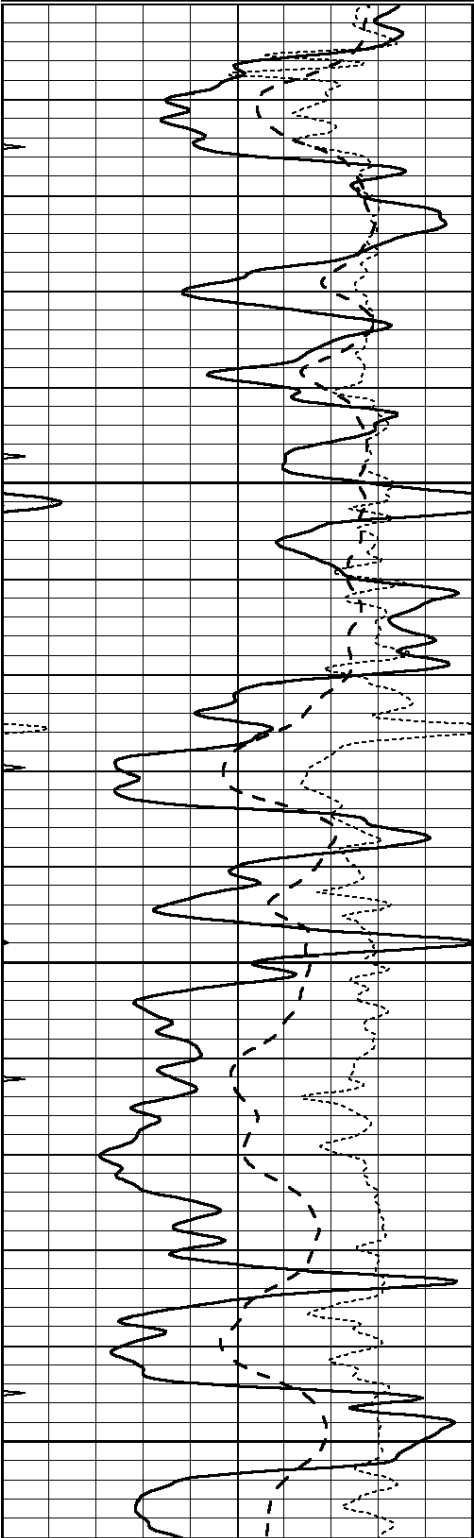
# REPEAT SECTION

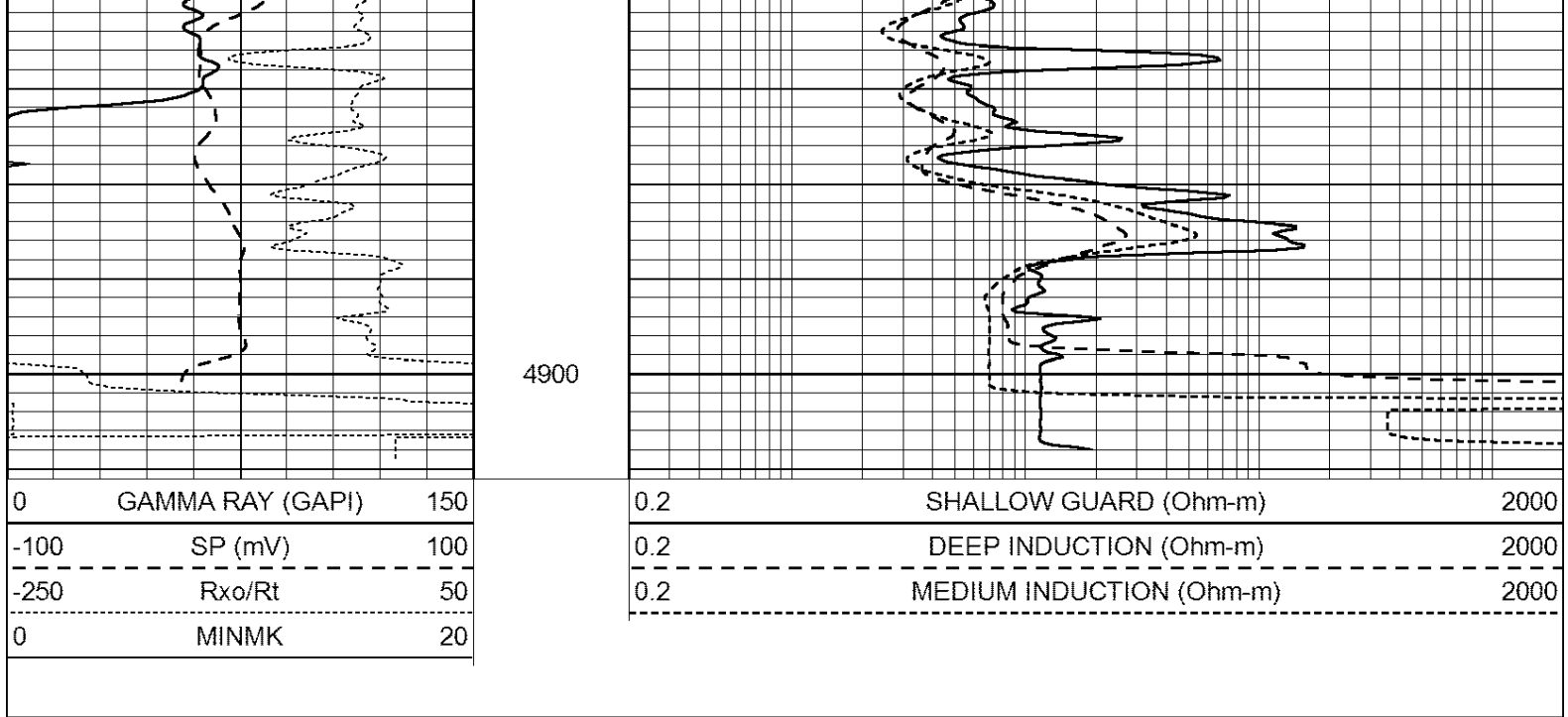


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Dataset Pathname: pass2RP  
Presentation Format: \_dil  
Dataset Creation: Fri Nov 17 05:40:38 2017  
Charted by: Depth in Feet scaled 1:240

|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |





Calibration Report

Database File: pe2.db  
 Dataset Pathname: pass2  
 Dataset Creation: Mon Aug 21 11:58:02 2017 by Log Open-Cased 090629

Dual Induction Calibration Report

Serial-Model: PROBE8-DILG  
 Surface Cal Performed: Mon Aug 21 11:58:18 2017  
 Downhole Cal Performed: Mon Aug 21 11:58:21 2017  
 After Survey Verification Performed: Mon Aug 21 11:58:23 2017

Surface Calibration

| Loop:     | Readings |       |   | References |         |        | Results |         |
|-----------|----------|-------|---|------------|---------|--------|---------|---------|
|           | Air      | Loop  |   | Air        | Loop    |        | m       | b       |
| Deep      | 0.015    | 0.648 | V | 0.000      | 400.000 | mmho/m | 620.000 | 0.000   |
| Medium    | 0.029    | 0.796 | V | 0.000      | 464.000 | mmho/m | 590.000 | -12.000 |
| Internal: | Zero     | Cal   |   | Zero       | Cal     |        | m       | b       |
| Deep      | 0.017    | 0.657 | V | 0.000      | 400.000 | mmho/m | 625.153 | -10.619 |
| Medium    | 0.016    | 0.757 | V | 0.000      | 464.000 | mmho/m | 625.992 | -9.739  |

Downhole Calibration

|        | Readings |        |        | References |          |        | Results |       |
|--------|----------|--------|--------|------------|----------|--------|---------|-------|
|        | Zero     | Cal    |        | Zero       | Cal      |        | m'      | b'    |
| Deep   | 0.000    | 0.000  | mmho/m | 2.011      | 405.777  | mmho/m | 1.000   | 0.000 |
| Medium | 0.000    | 0.000  | mmho/m | 7.590      | 503.393  | mmho/m | 1.000   | 0.000 |
| LL3    |          | 7.500  | V      |            | 1500.000 | Ohm-m  |         |       |
|        |          | 0.000  | V      |            | 20.000   | Ohm-m  |         |       |
|        |          | -7.200 | V      |            | 3800.000 | mmho-m |         |       |

After Survey Verification

|        | Readings |       |        | Targets |       |        | Results |       |
|--------|----------|-------|--------|---------|-------|--------|---------|-------|
|        | Zero     | Cal   |        | Zero    | Cal   |        | m'      | b'    |
| Deep   | 0.000    | 0.000 | mmho/m | 0.000   | 0.000 | mmho/m | 0.000   | 0.000 |
| Medium | 0.000    | 0.000 | mmho/m | 0.000   | 0.000 | mmho/m | 0.000   | 0.000 |
| LL3    |          | 1.000 | Ohm-m  |         | 1.000 | Ohm-m  |         |       |

|       |        |       |        |
|-------|--------|-------|--------|
| 1.000 | Ohm-m  | 1.000 | Ohm-m  |
| 0.000 | Ohm-m  | 0.000 | Ohm-m  |
| 1.000 | mmho-m | 1.000 | mmho-m |

Litho Density Calibration Report  
Serial: 002      Model: PRB

Master Calibration

Performed Mon Aug 21 11:56:41 2017

|             | Background | Magnesium   | Aluminum | Sandstone           |         |
|-------------|------------|-------------|----------|---------------------|---------|
| Window 1    | 833.6      | 7394.2      | 2287.3   | 8111.8              | cps     |
| Window 2    | 768.9      | 6322.3      | 1995.6   | 6800.0              | cps     |
| Window 3    | 621.5      | 3261.9      | 1186.4   | 3380.9              | cps     |
| Window 4    | 184.2      | 185.7       | 184.9    | 184.8               | cps     |
| Long Space  | 0.0        | 5553.4      | 1226.6   | 6031.1              | cps     |
| Short Space | 1.2        | 1307.5      | 903.9    | 1387.7              | cps     |
| Rho         |            | 1.7100      | 2.5900   | 1.3800              | g/cc    |
| Pe          |            | 0.0000      | 2.5700   | 1.5500              |         |
| Rib Angle   | : 46.3     | Rib Slope   | : 1.045  | Density/Spine Ratio | : 0.566 |
| Spine Angle | : 76.3     | Spine Slope | : 4.090  | Spine Intercept     | : -20.7 |

Before Survey Verification

Performed Wed Dec 31 18:00:00 1969

|                     |     |        |        |        |      |
|---------------------|-----|--------|--------|--------|------|
| Window 1            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 2            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 3            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 4            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Long Space          | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Short Space         | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Measured Rho        |     | 0.0000 | 0.0000 | 0.0000 | g/cc |
| Measured Correction |     | 0.0000 | 0.0000 | 0.0000 | g/cc |
| Measured Pe         |     |        | 0.0000 | 0.0000 |      |

After Survey Verification

Performed Wed Dec 31 18:00:00 1969

|                     |     |        |        |        |      |
|---------------------|-----|--------|--------|--------|------|
| Window 1            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 2            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 3            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Window 4            | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Long Space          | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Short Space         | 0.0 | 0.0    | 0.0    | 0.0    | cps  |
| Measured Rho        |     | 0.0000 | 0.0000 | 0.0000 | g/cc |
| Measured Correction |     | 0.0000 | 0.0000 | 0.0000 | g/cc |
| Measured Pe         |     |        | 0.0000 | 0.0000 |      |

Compensated Neutron Calibration Report

Serial Number:      6I  
Tool Model:            G

CALIBRATION

| Detector    | Readings    | Target      | Normalization |
|-------------|-------------|-------------|---------------|
| Short Space | 1.00    cps | 1.00    cps | 1.0000        |
| Long Space  | 1.00    cps | 1.00    cps | 1.0000        |

PRE-SURVEY VERIFICATION

| Detector | Readings | Measured | Target |
|----------|----------|----------|--------|
|----------|----------|----------|--------|

|    |                           |            |    |    |
|----|---------------------------|------------|----|----|
| 1) | Short Space<br>Long Space | cps<br>cps | pu | pu |
| 2) | Short Space<br>Long Space | cps<br>cps | pu |    |
| 3) | Short Space<br>Long Space | cps<br>cps | pu |    |

POST-SURVEY VERIFICATION

|    | Detector                  | Readings   | Measured | Target |
|----|---------------------------|------------|----------|--------|
| 1) | Short Space<br>Long Space | cps<br>cps | pu       | pu     |
| 2) | Short Space<br>Long Space | cps<br>cps | pu       | pu     |
| 3) | Short Space<br>Long Space | cps<br>cps | pu       | pu     |

Gamma Ray Calibration Report

|                     |                          |          |
|---------------------|--------------------------|----------|
| Serial Number:      | GR6                      |          |
| Tool Model:         | OPEN                     |          |
| Performed:          | Mon Aug 21 11:59:01 2017 |          |
| Calibrator Value:   | 150.0                    | GAPI     |
| Background Reading: | 0.0                      | cps      |
| Calibrator Reading: | 276.0                    | cps      |
| Sensitivity:        | 0.5500                   | GAPI/cps |