



DUAL INDUCTION LOG

Company ELK ENERGY HOLDINGS, LLC.
 Well SHEPHERD #1-14
 Field NOLLETTE SOUTHEAST
 County THOMAS
 State KANSAS

Company ELK ENERGY HOLDINGS, LLC.
 Well SHEPHERD #1-14
 Field NOLLETTE SOUTHEAST
 County THOMAS State KANSAS

Location: API # : 15-193-21010-00-00
 2060' FSL & 650' FEL
 SEC 14 TWP 10S RGE 33W
 Permanent Datum GROUND LEVEL Elevation 3133'
 Log Measured From KELLY BUSHING 5' A.G.L.
 Drilling Measured From KELLY BUSHING
 Other Services CDL/CNL/MEL
 Elevation K.B. 2138
 D.F. 3136
 G.L. 3133

| | |
|------------------------------|-----------------|
| Date | 04/04/18 |
| Run Number | ONE |
| Depth Driller | 4720 |
| Depth Logger | 4723 |
| Bottom Logged Interval | 4721 |
| Top Log Interval | 50 |
| Casing Driller | 8 5/8" @ 344 |
| Casing Logger | 344 |
| Bit Size | 7 7/8" |
| Type Fluid in Hole | CHEMICAL MUD |
| Density / Viscosity | 9.3/55 |
| pH / Fluid Loss | 10.0/8.0 |
| Source of Sample | FLOWLINE |
| Rm @ Meas. Temp | 1.4@40 |
| Rmt @ Meas. Temp | 1.05@40 |
| Rmc @ Meas. Temp | 1.68@40 |
| Source of Rmf / Rmc | MEASURED |
| Rm @ BHT | .46@122 |
| Time Circulation Stopped | 2 HOURS |
| Time Logger on Bottom | /// |
| Maximum Recorded Temperature | 122F |
| Equipment Number | 4010 |
| Location | HAYS, KANSAS |
| Recorded By | GUS PFANENSTIEL |
| Witnessed By | SEAN DEENIHAN |

<<< Fold Here >>>

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

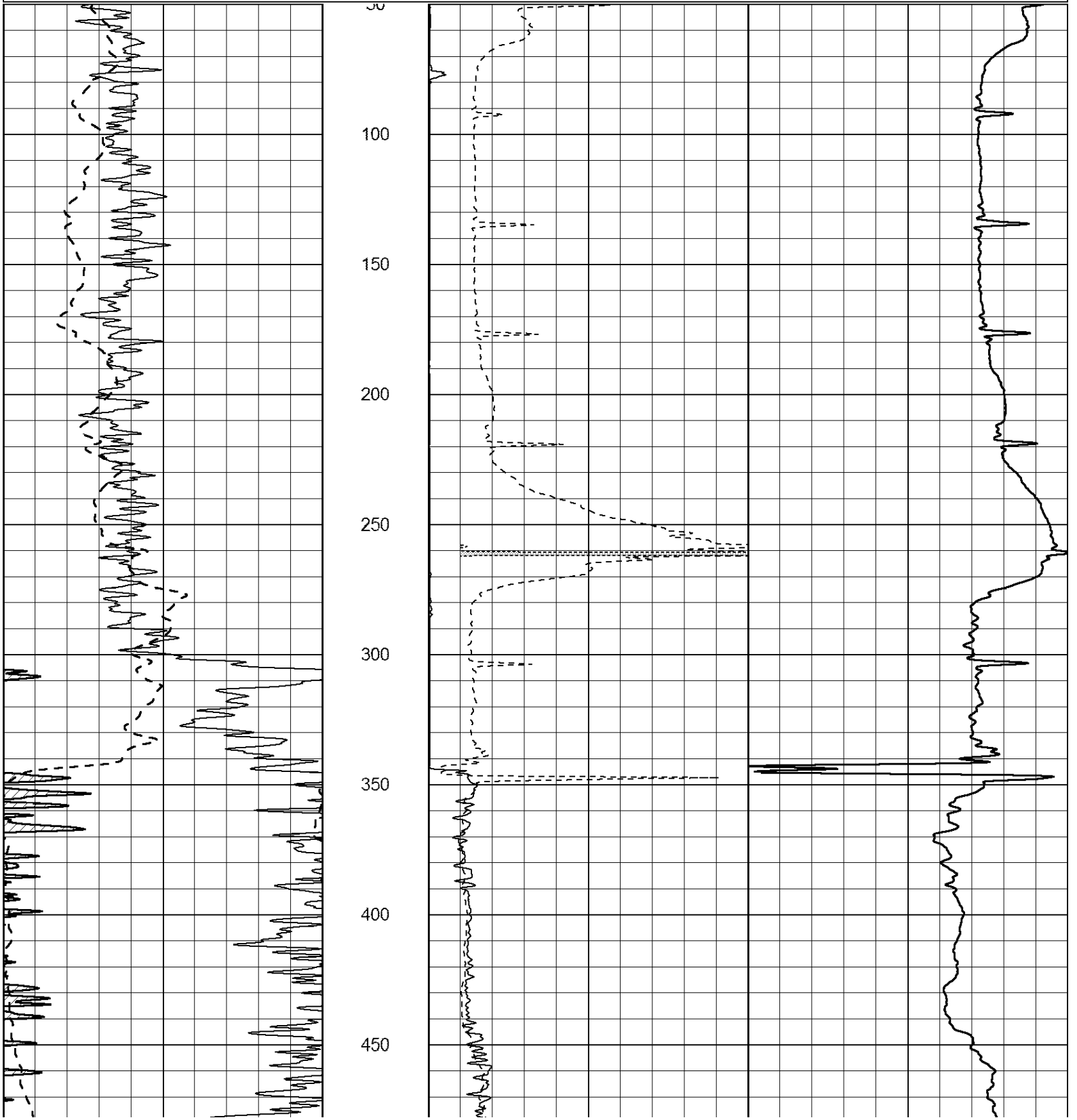
DIRECTIONS
 OAKLEY FARTHEST WEST EXIT SOUTH TO C. RD.
 5 WEST, 2 NORTH, WEST INTO.

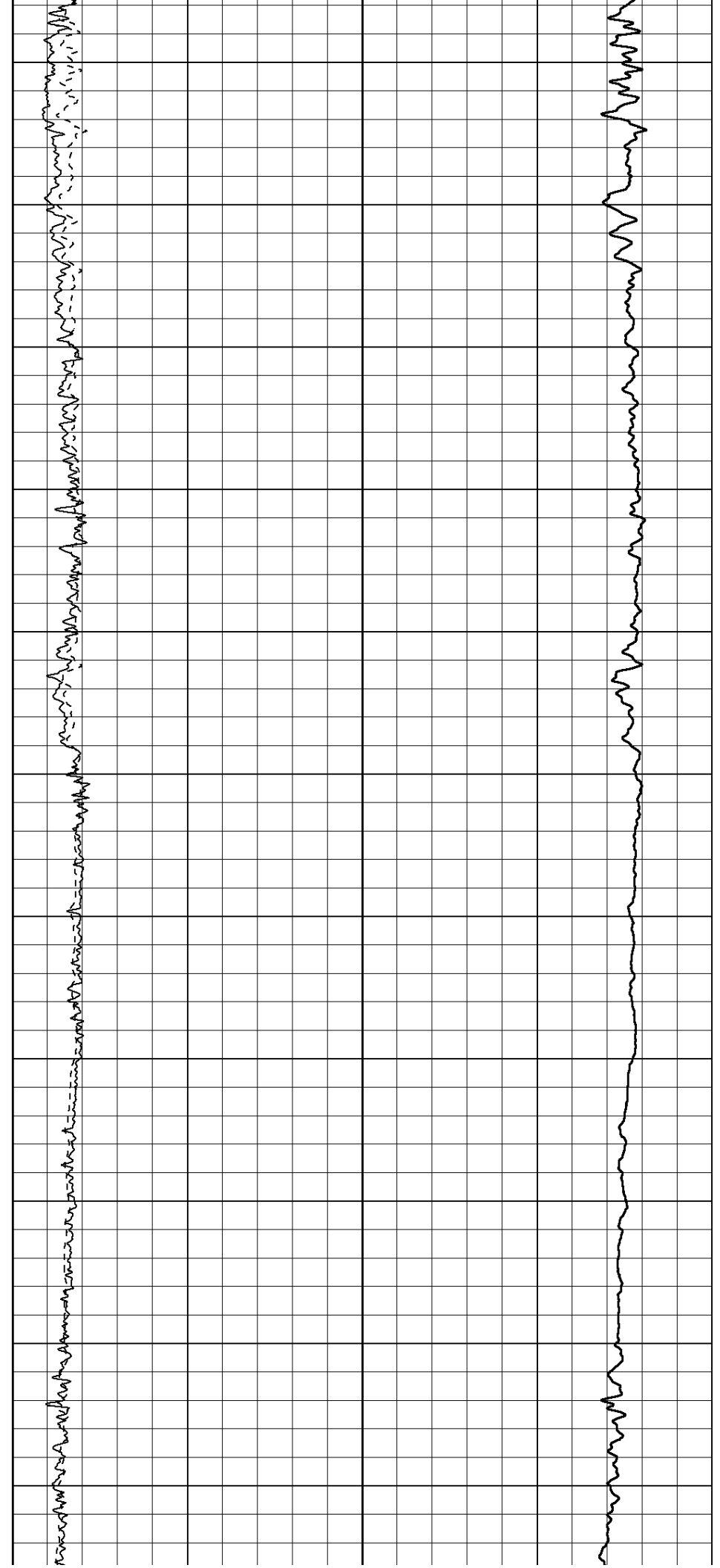
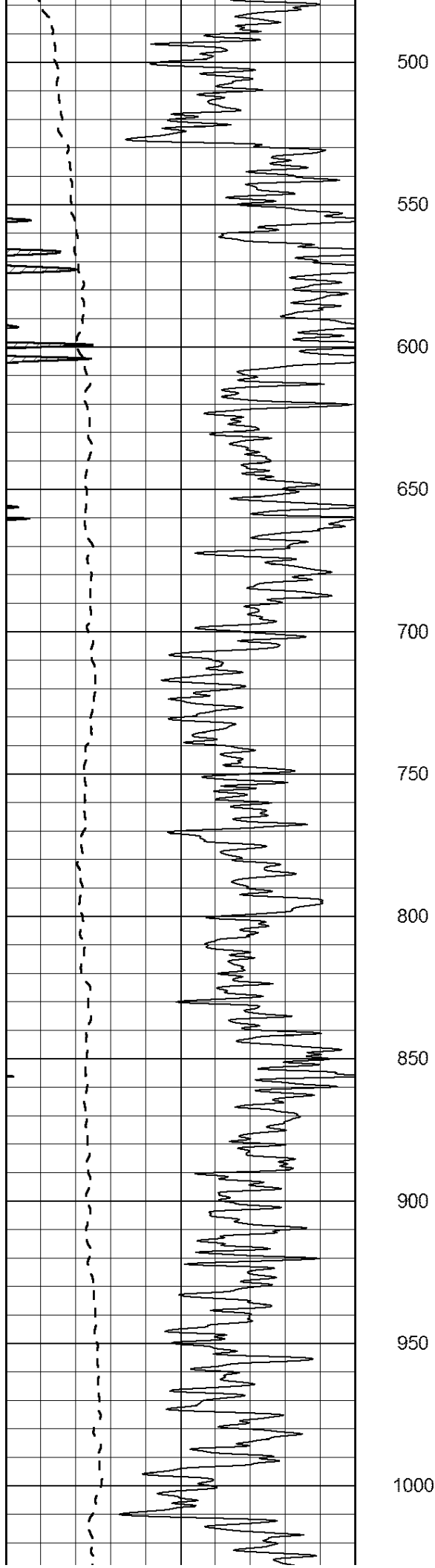


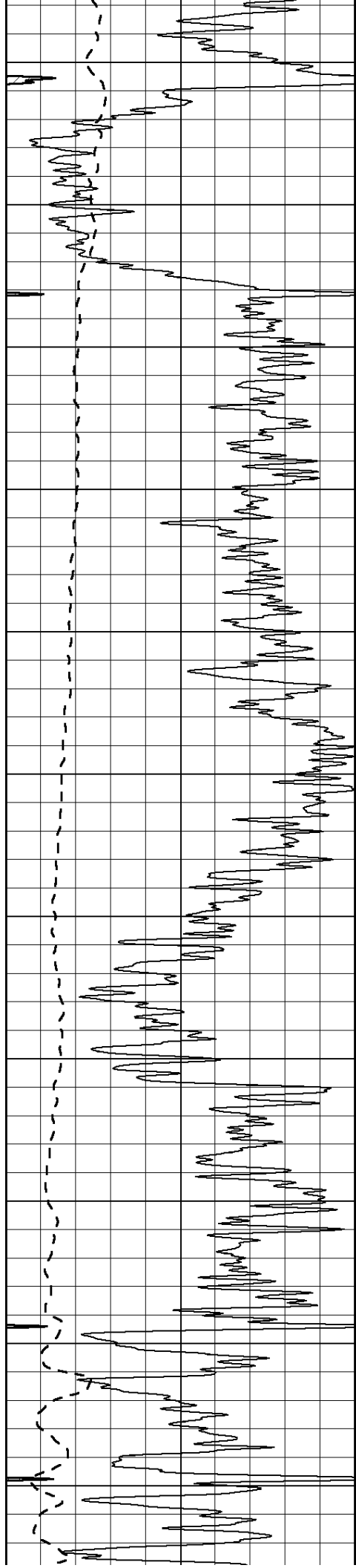
MAIN PASS

Database File: 2417ddn.db
 Dataset Pathname: pass3.1
 Presentation Format: _dil2
 Dataset Creation: Wed Apr 04 10:02:39 2018 by Calc Open-Cased 090629
 Charted by: Depth in Feet scaled 1:600

| | | | | | |
|-------|------------------|-----|-------|------------------|-----|
| 0 | Gamma Ray (GAPI) | 150 | 0 | RLL3 (Ohm-m) | 50 |
| -100 | SP (mV) | 100 | 0 | RILD (Ohm-m) | 50 |
| ----- | | | ----- | | |
| | | | 1000 | CILD (mmho/m) | 0 |
| | | | 50 | RILD X10 (Ohm-m) | 500 |
| | | | 50 | RLL3 X10 (Ohm-m) | 500 |







1050

1100

1150

1200

1250

1300

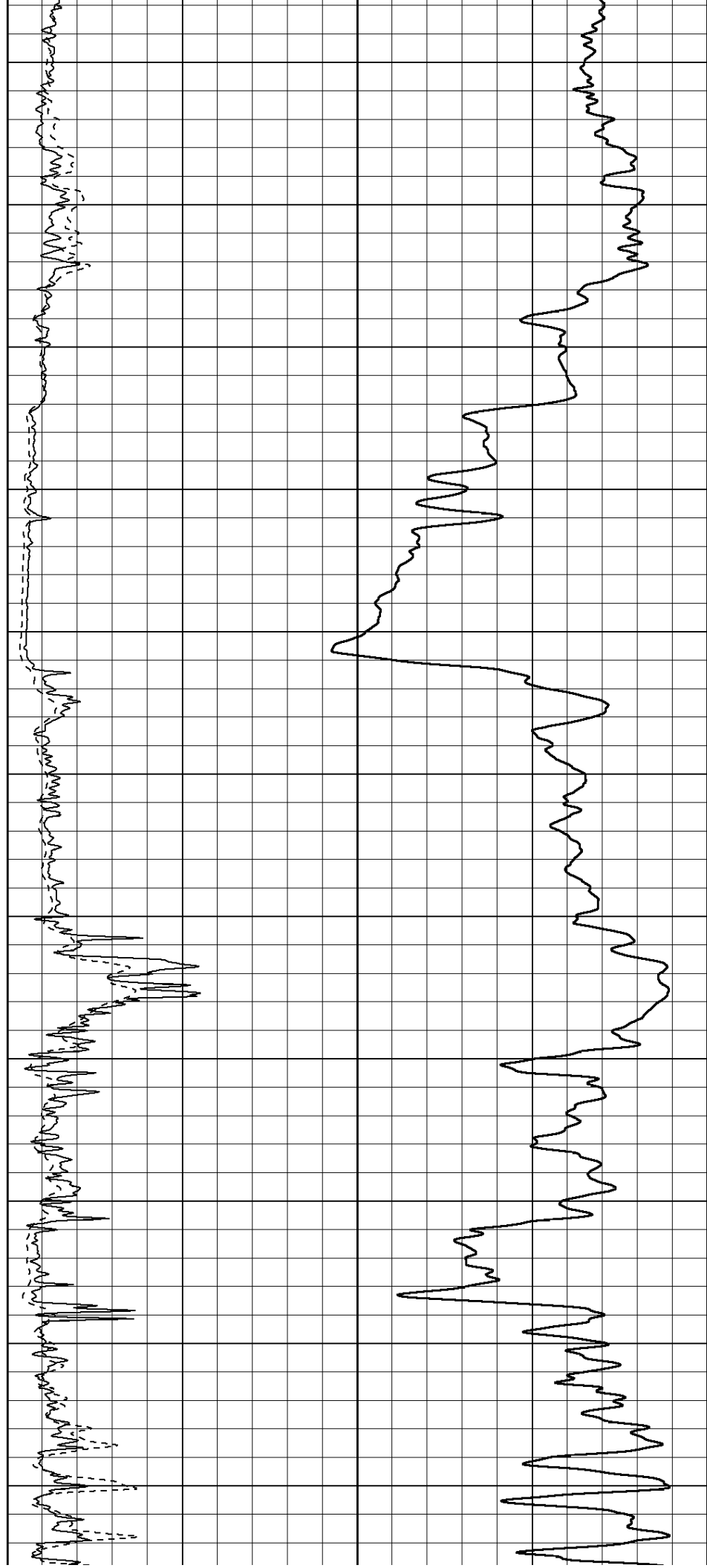
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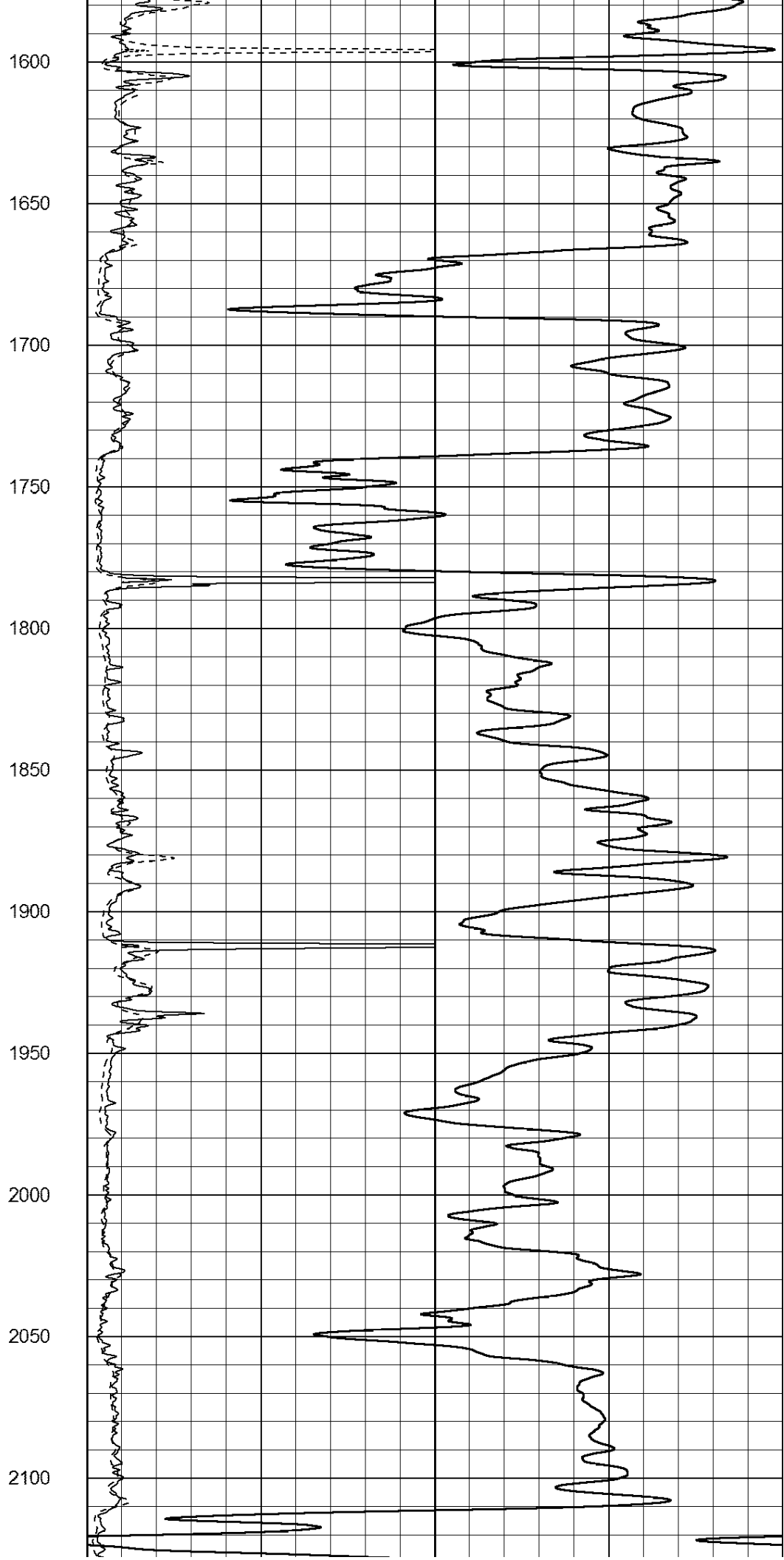
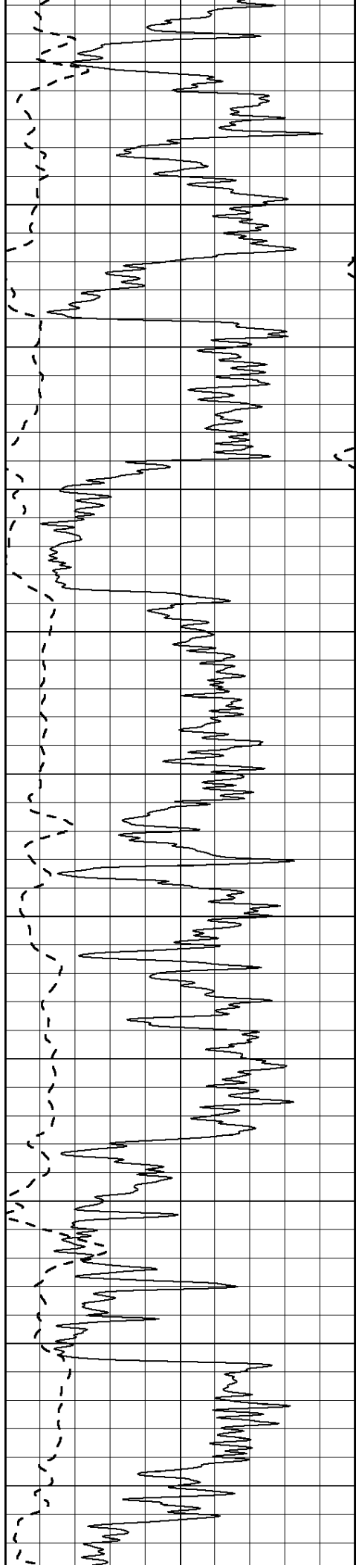
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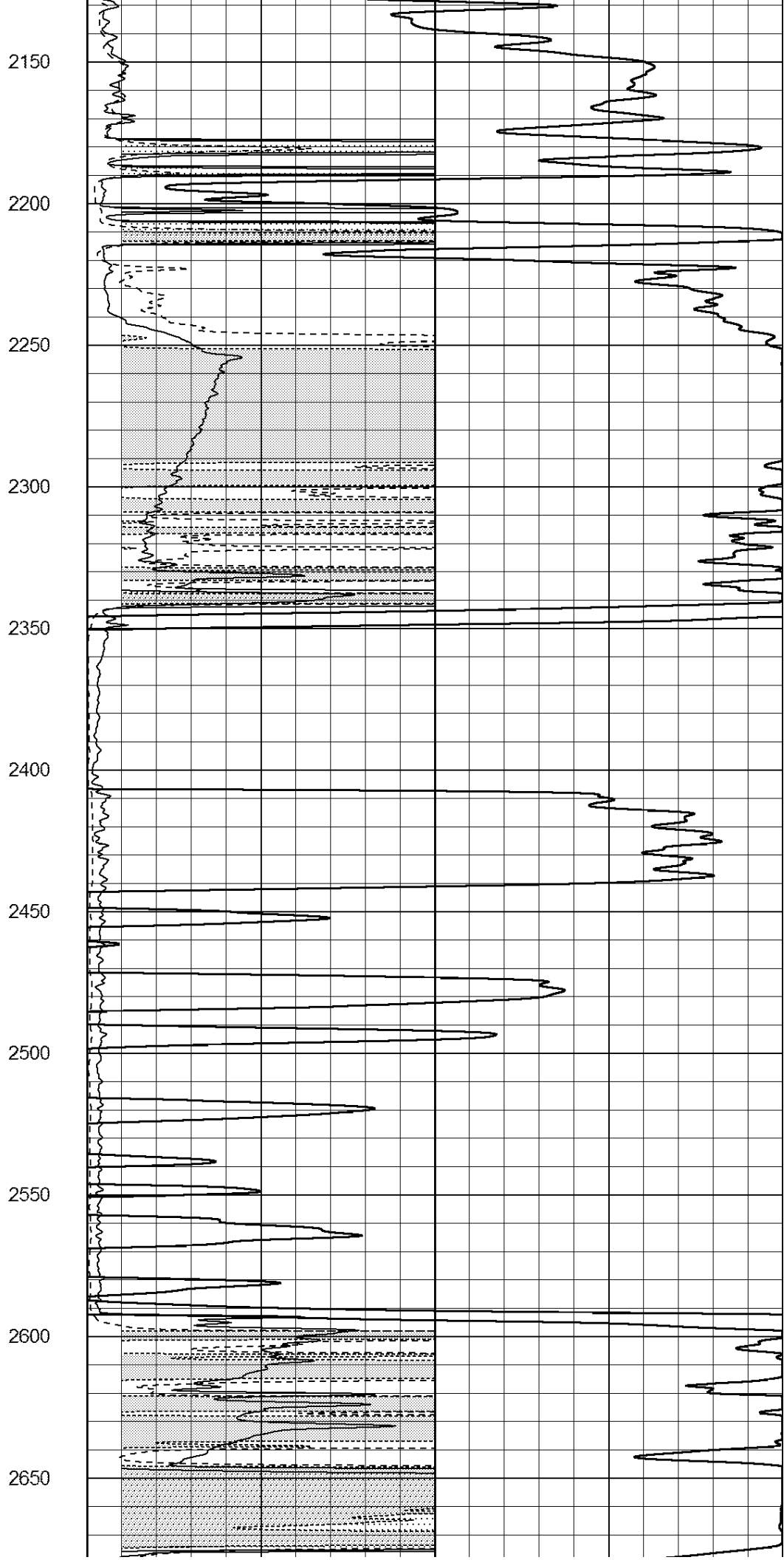
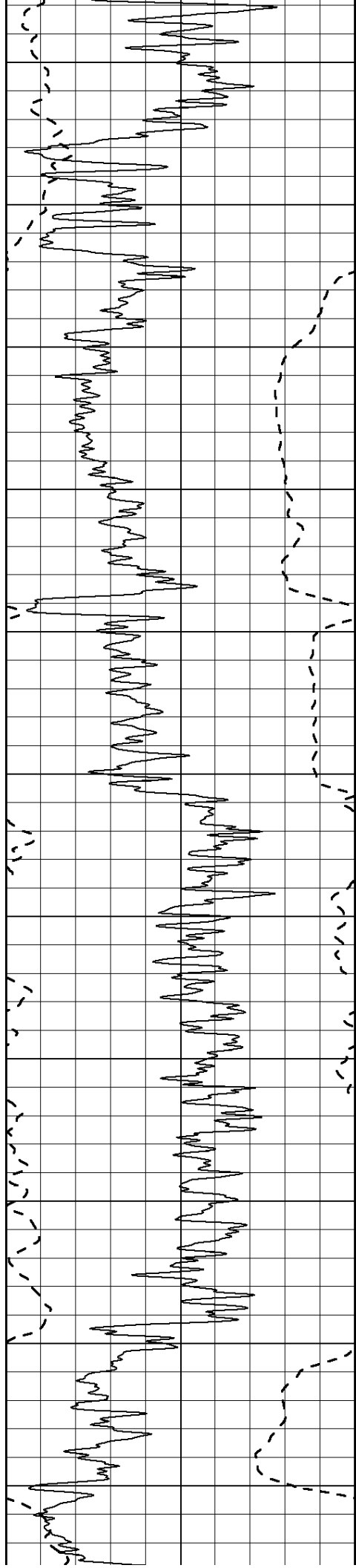
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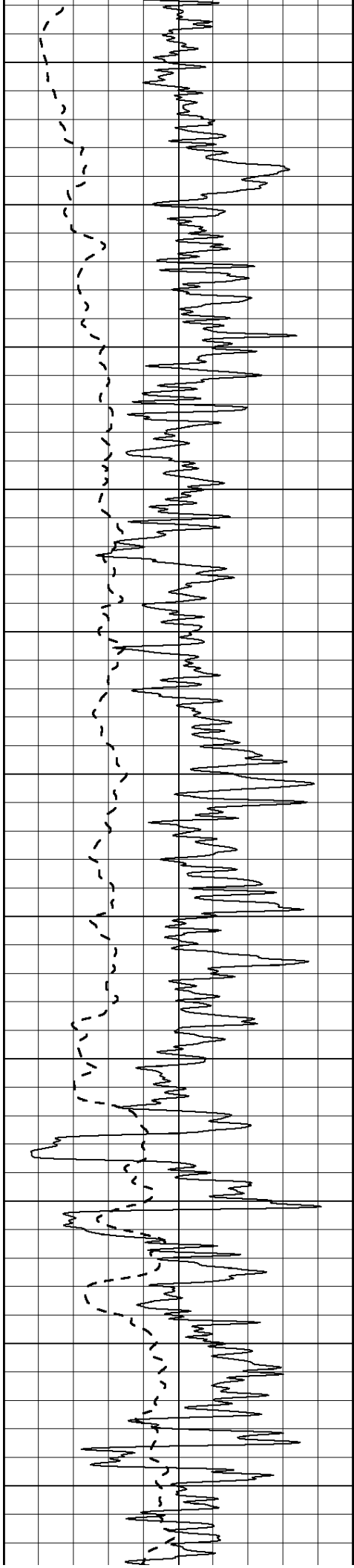
1500

1550









2700

2750

2800

2850

2900

2950

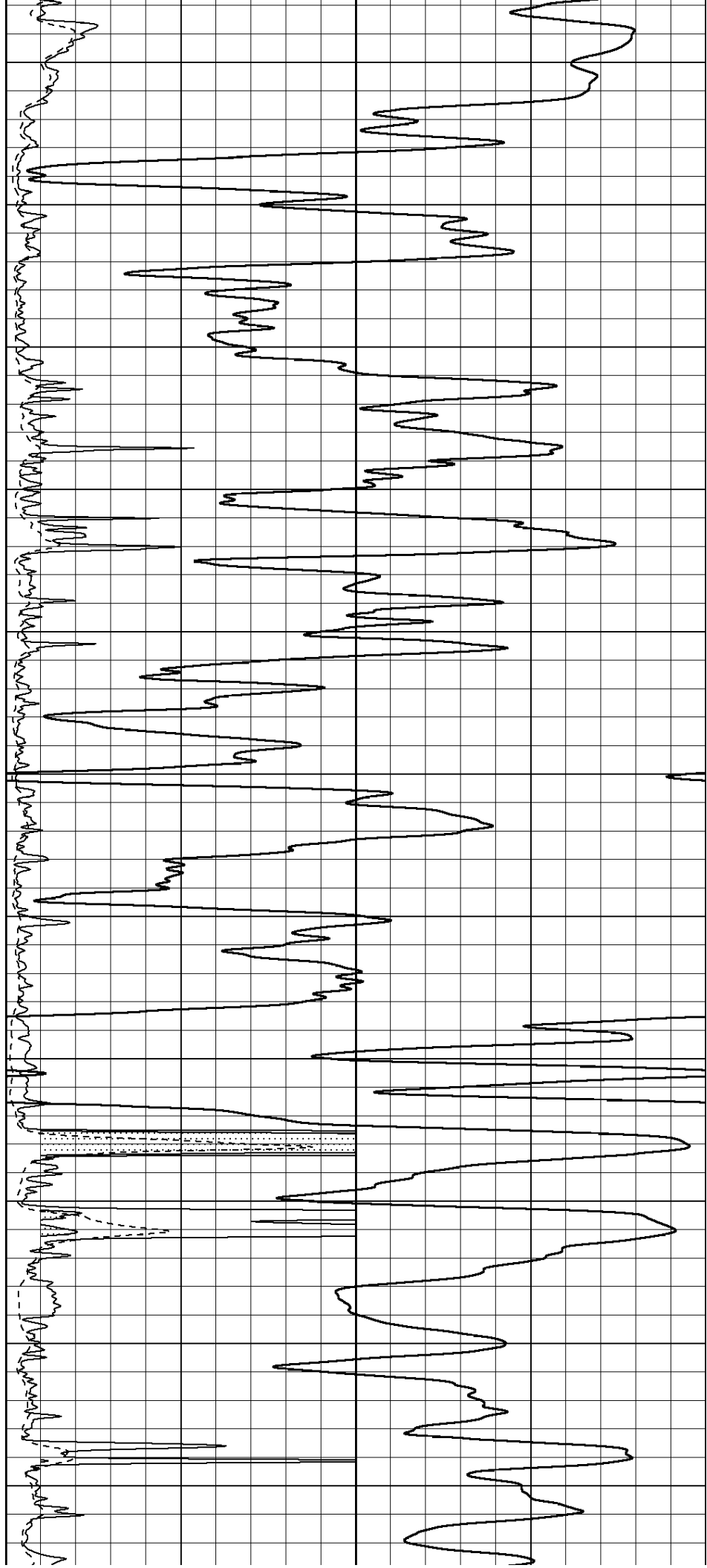
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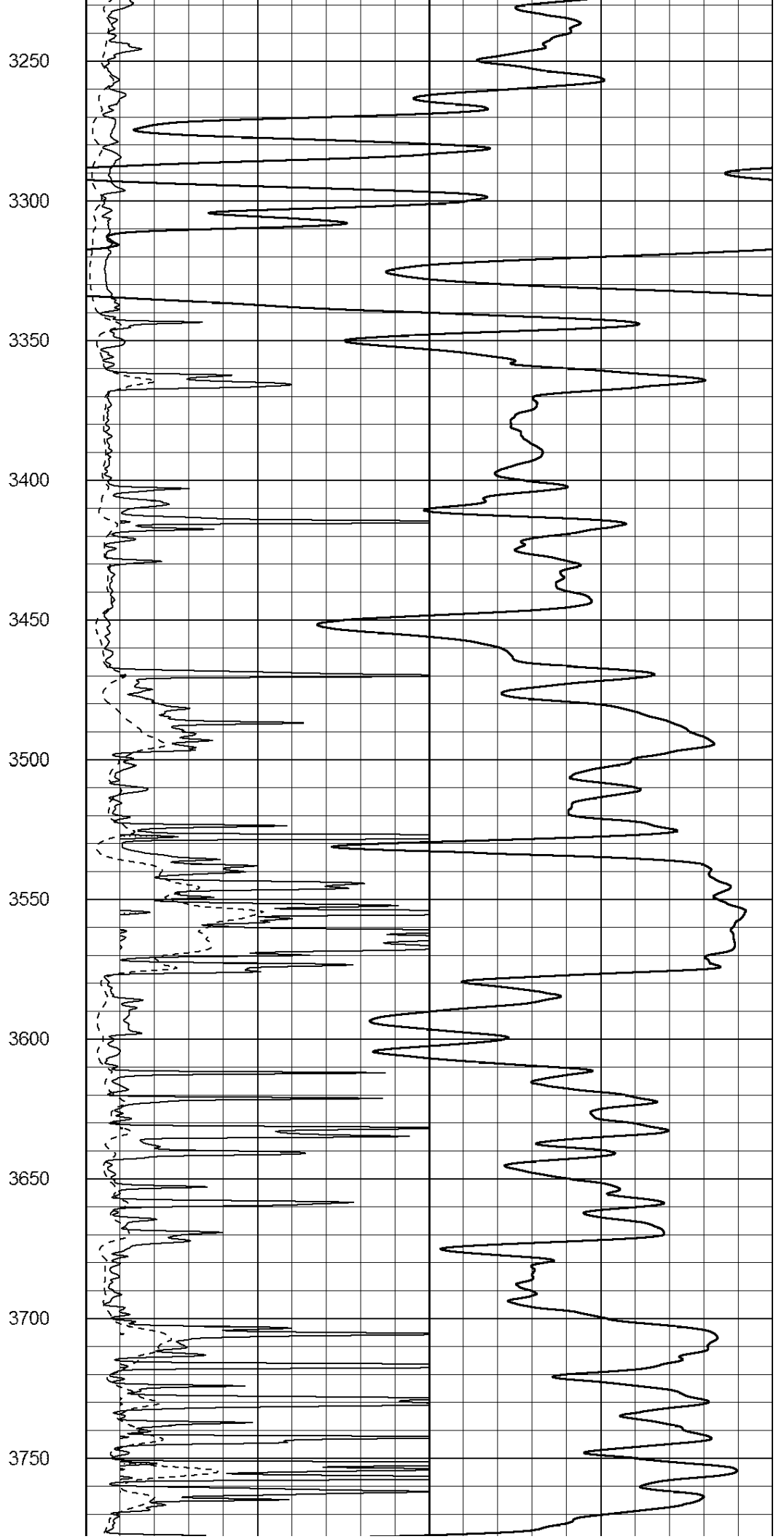
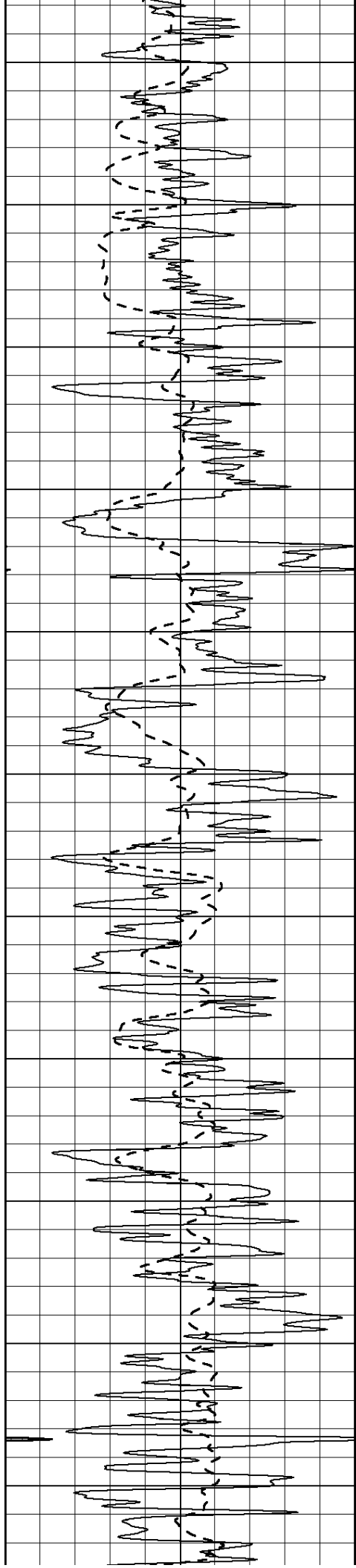
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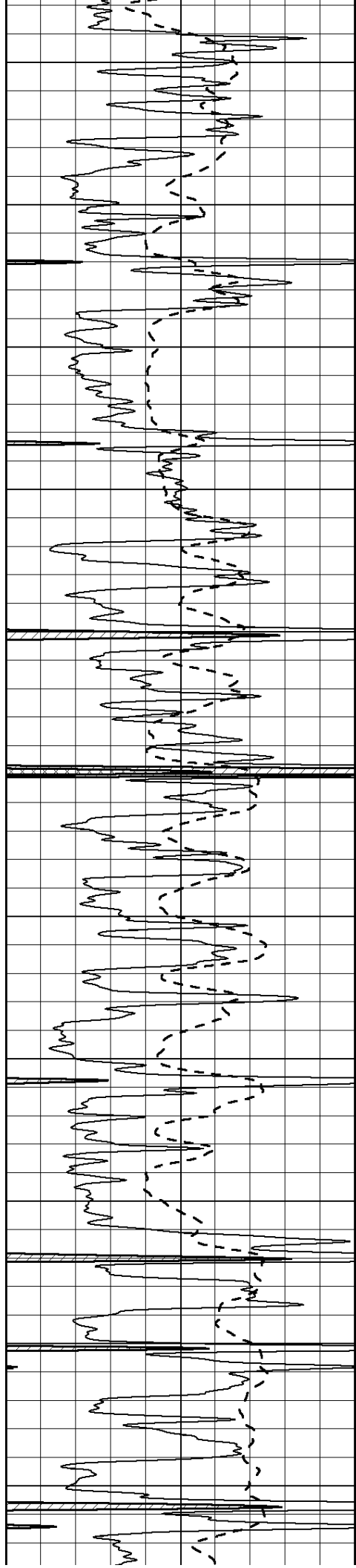
3100

3150

3200







3800

3850

3900

3950

4000

4050

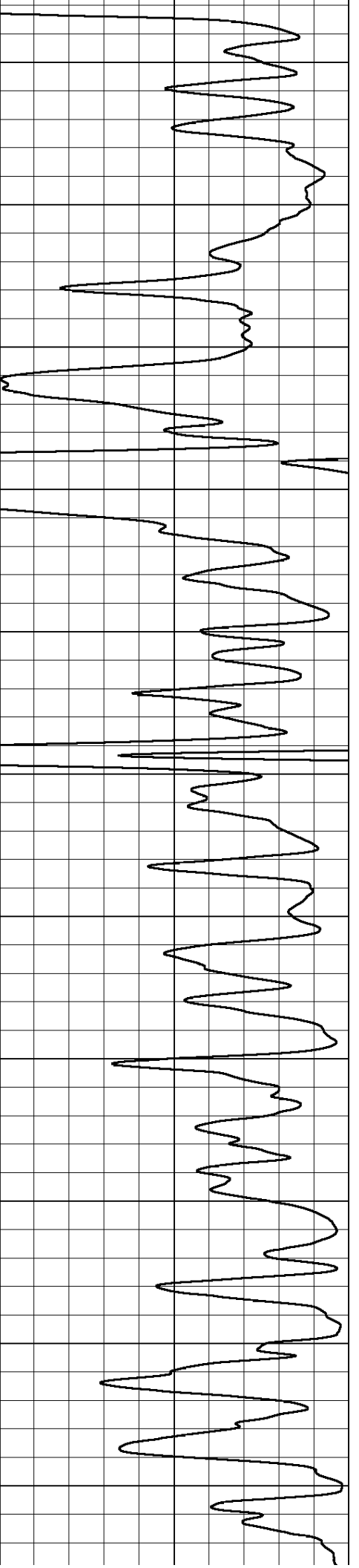
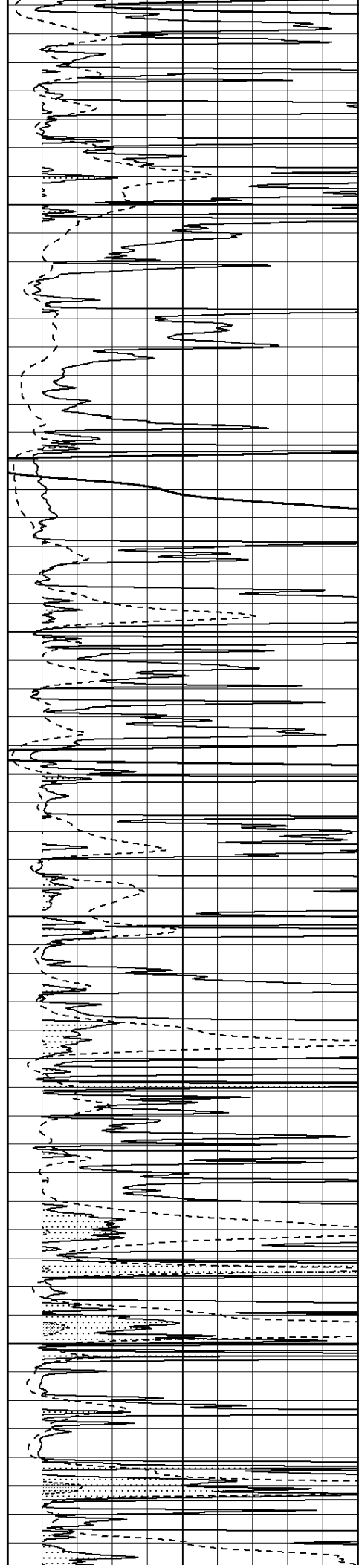
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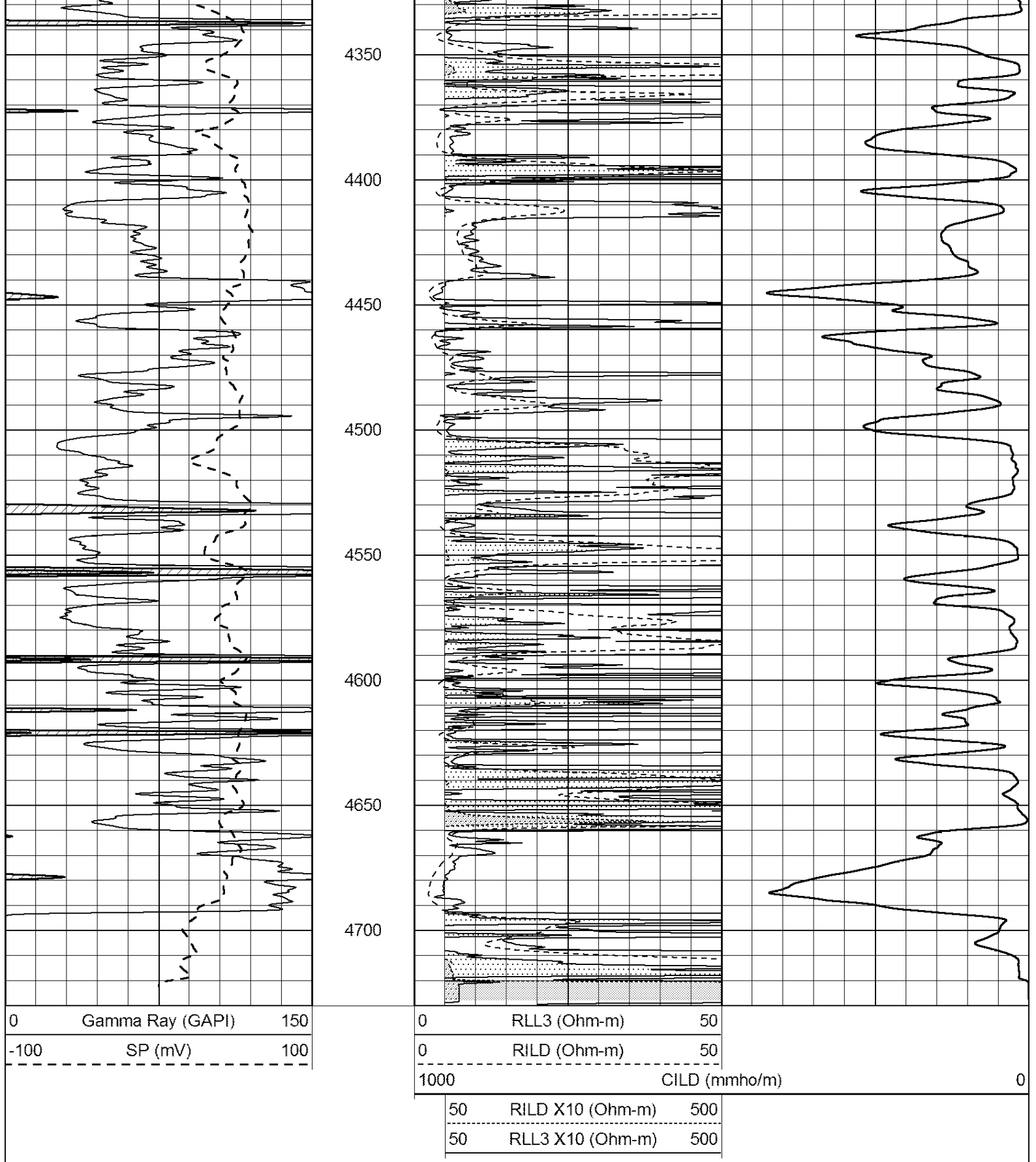
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4200

4250

4300

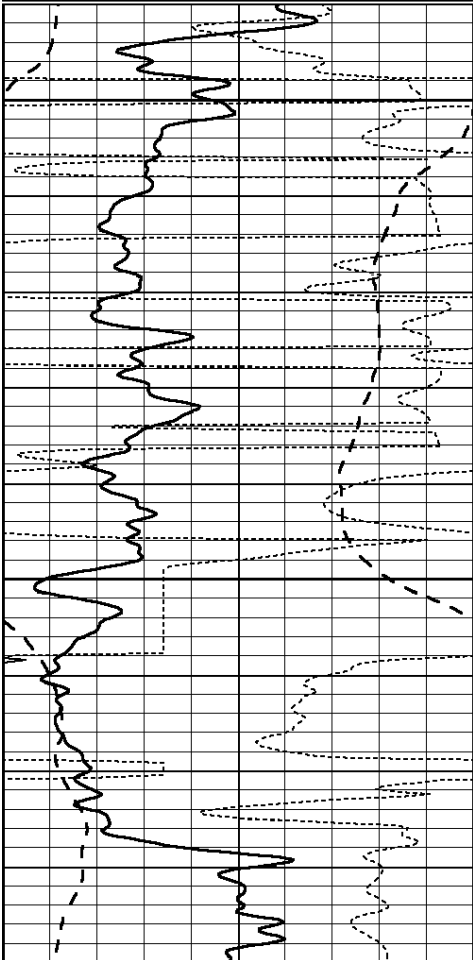




MAIN PASS

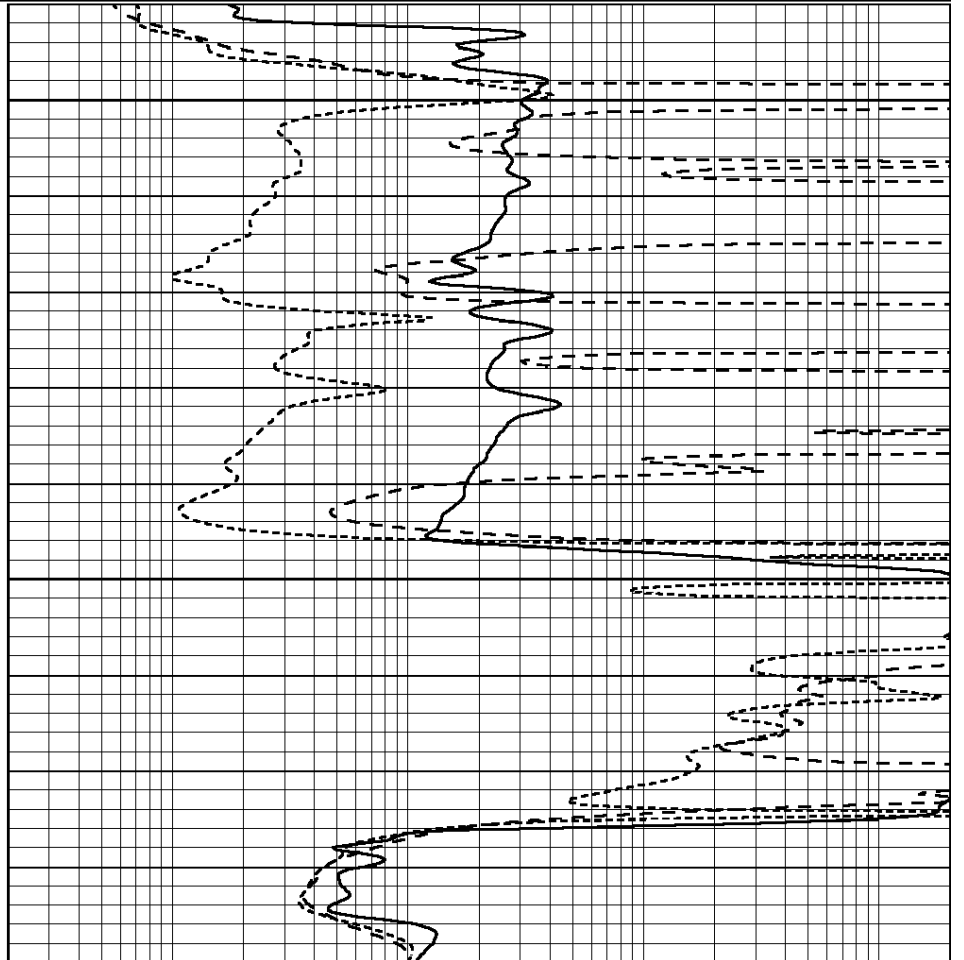
| | | |
|------|------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV) | 100 |
| -250 | Rxo/Rt | 50 |
| 0 | MINMK | 20 |

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



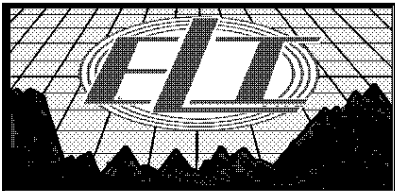
2600

2650



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

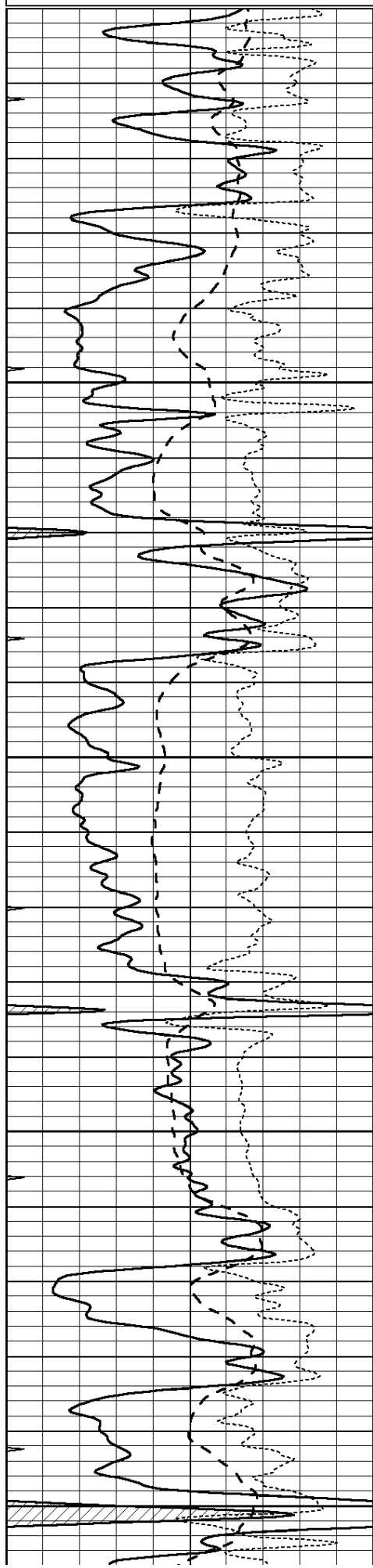
| | | |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m) | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m) | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |



MAIN PASS

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

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



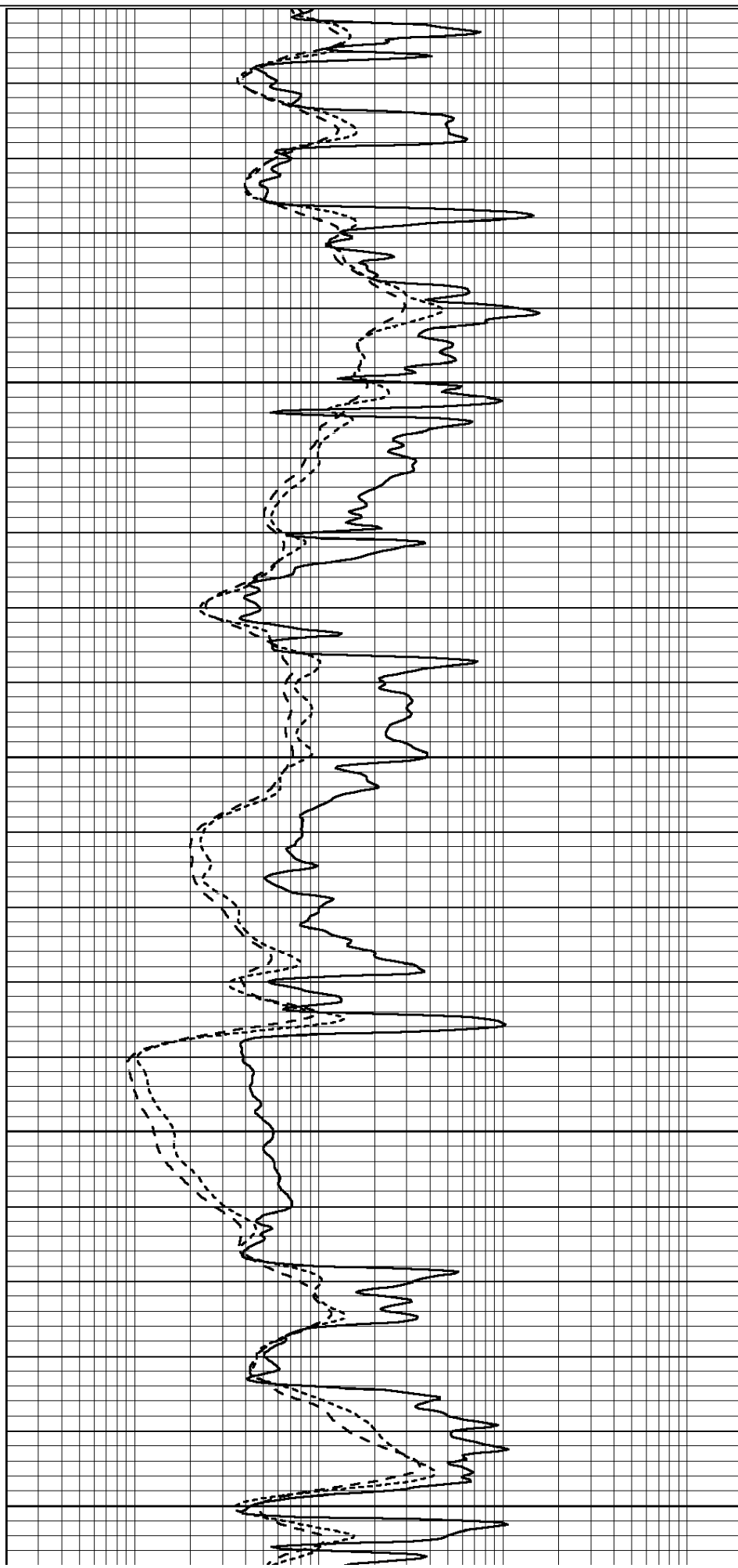
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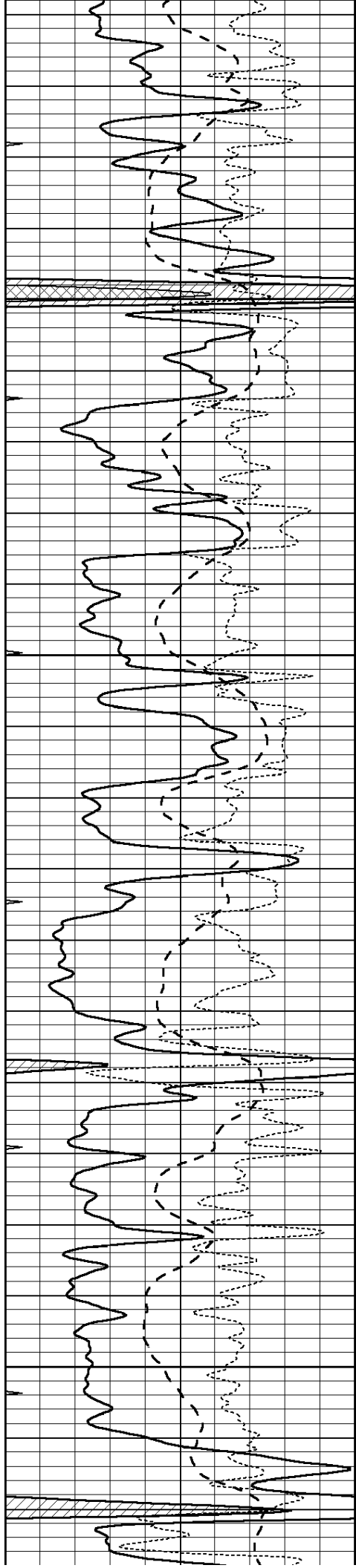
3850

3900

3950

4000



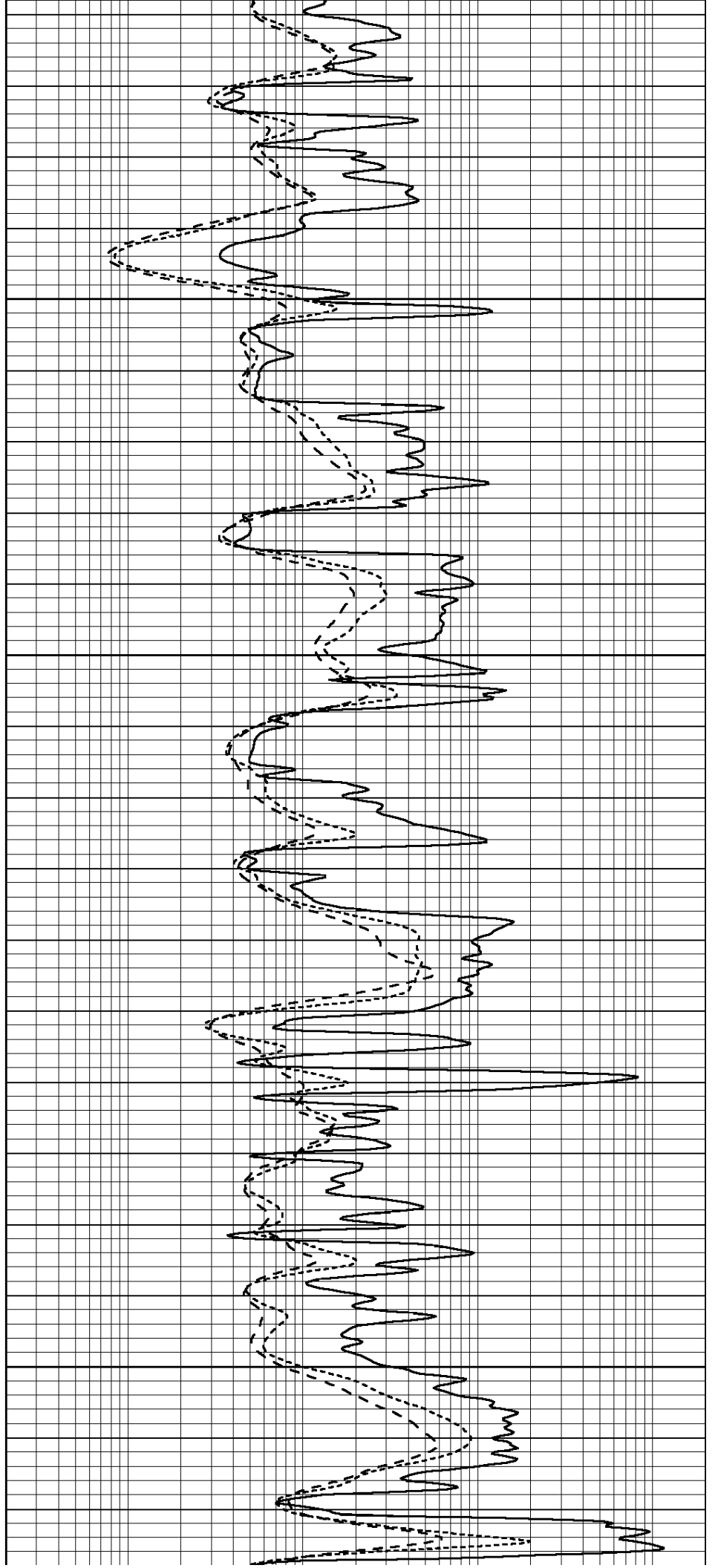


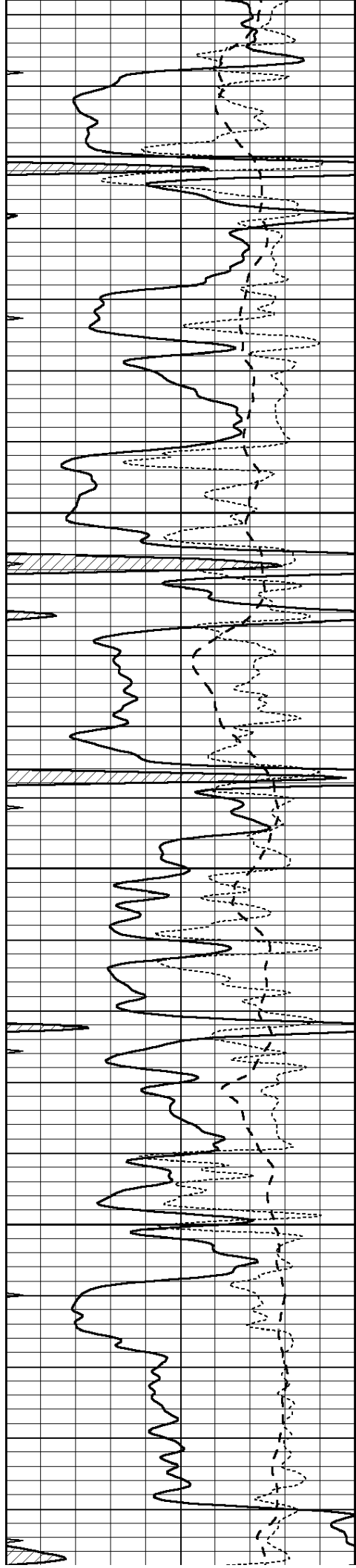
4050

4100

4150

4200



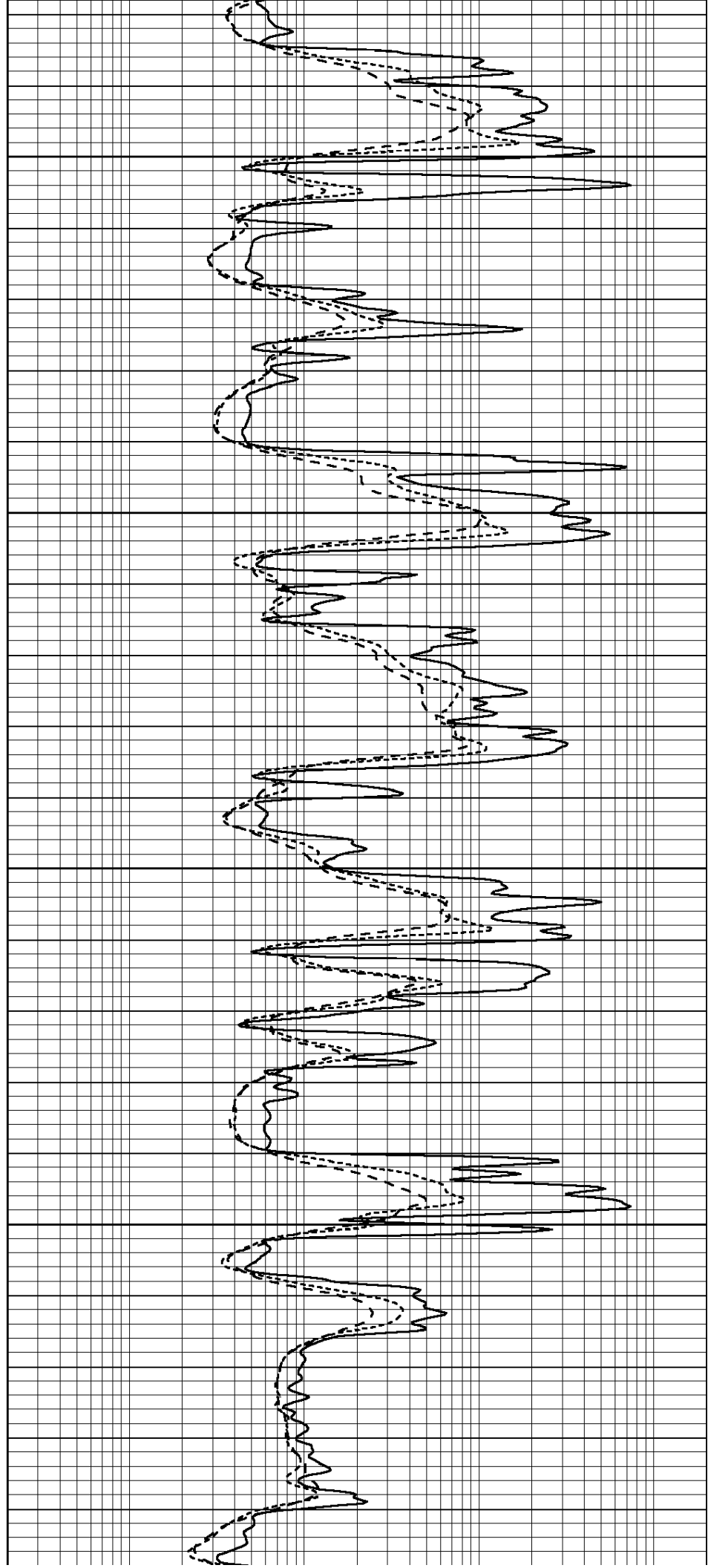


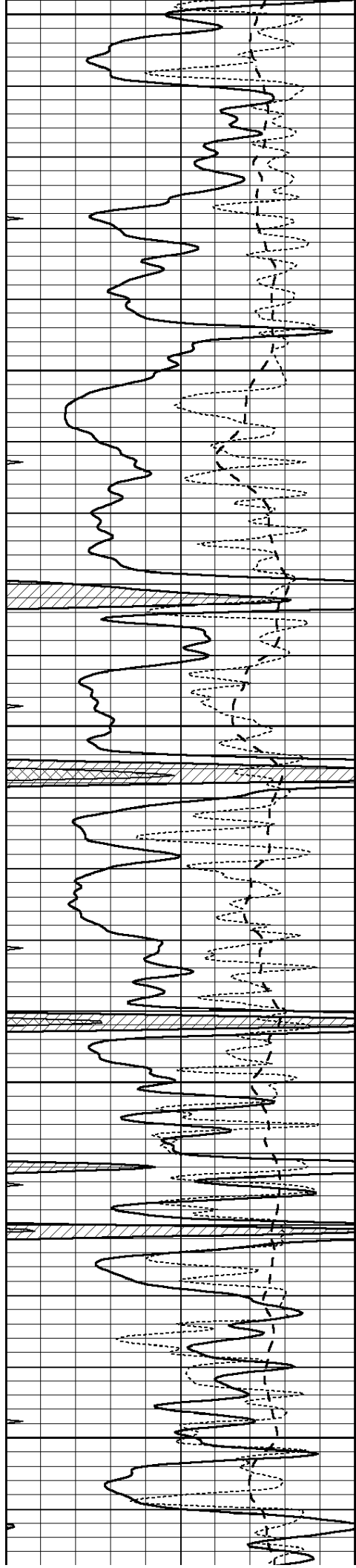
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4300

4350

4400





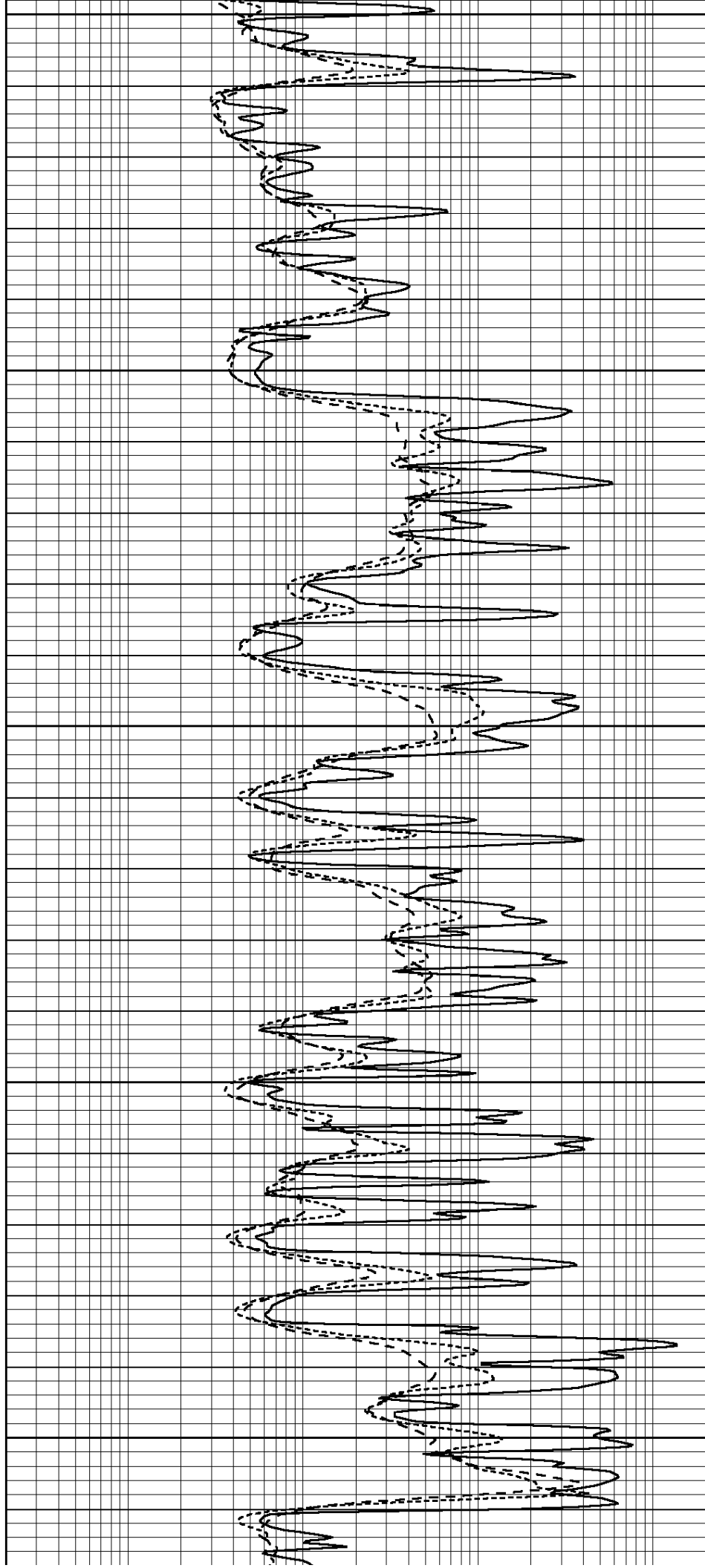
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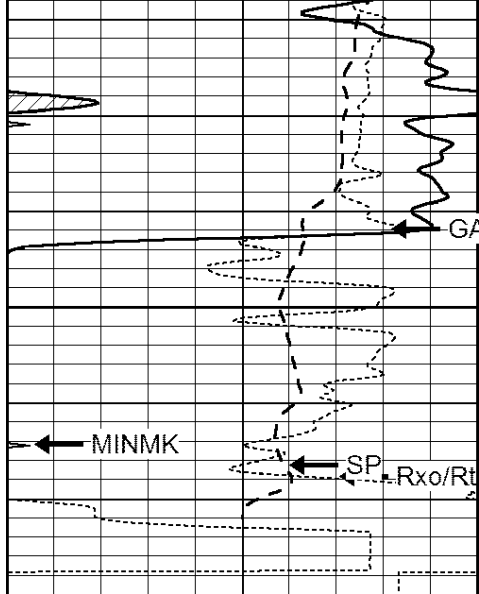
4500

4550

4600

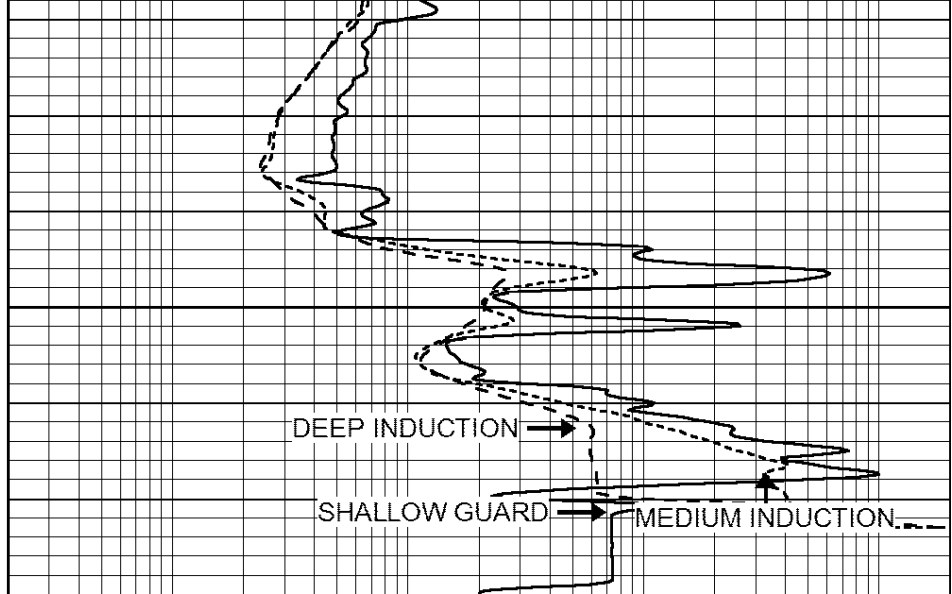
4650





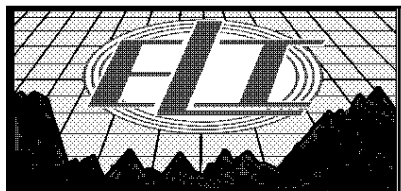
| | | |
|------|------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV) | 100 |
| -250 | Rxo/Rt | 50 |
| 0 | MINMK | 20 |

GAMMA RAY
4700
LTD 4723



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

DEEP INDUCTION
SHALLOW GUARD
MEDIUM INDUCTION

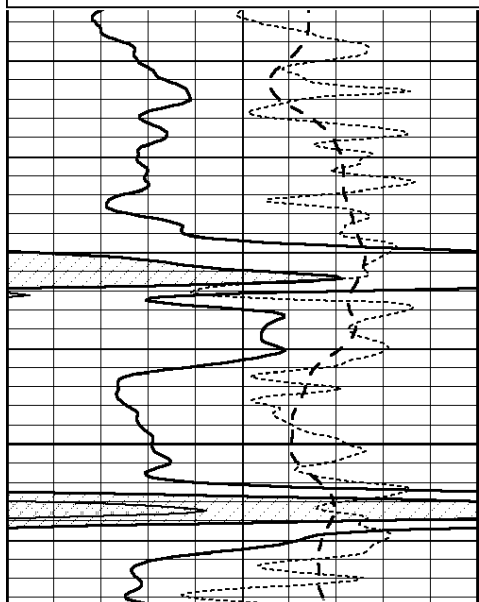


REPEAT SECTION

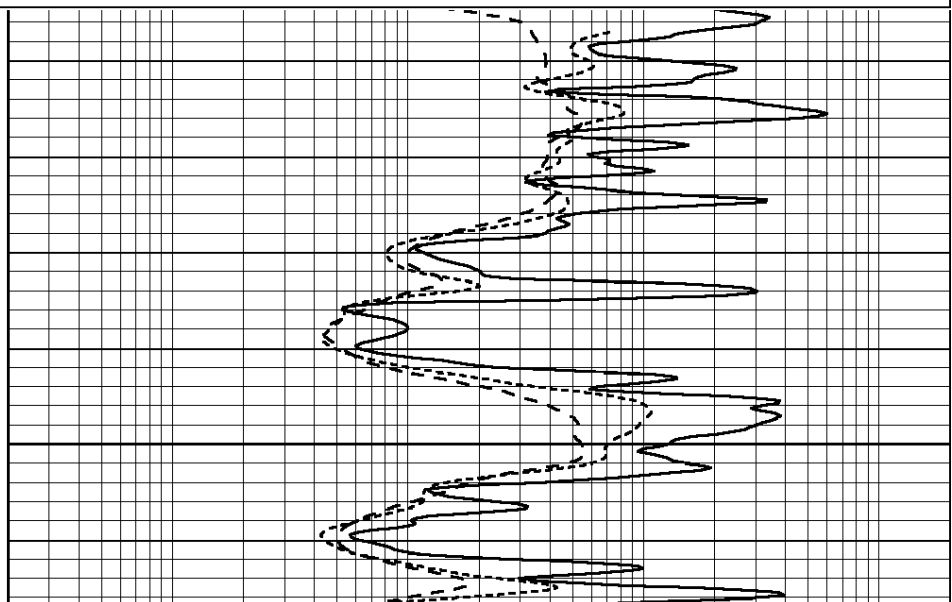
Database File: 2417ddn.db
 Dataset Pathname: pass2.1
 Presentation Format: _dil
 Dataset Creation: Wed Apr 04 09:01:02 2018 by Calc Open-Cased 090629
 Charted by: Depth in Feet scaled 1:240

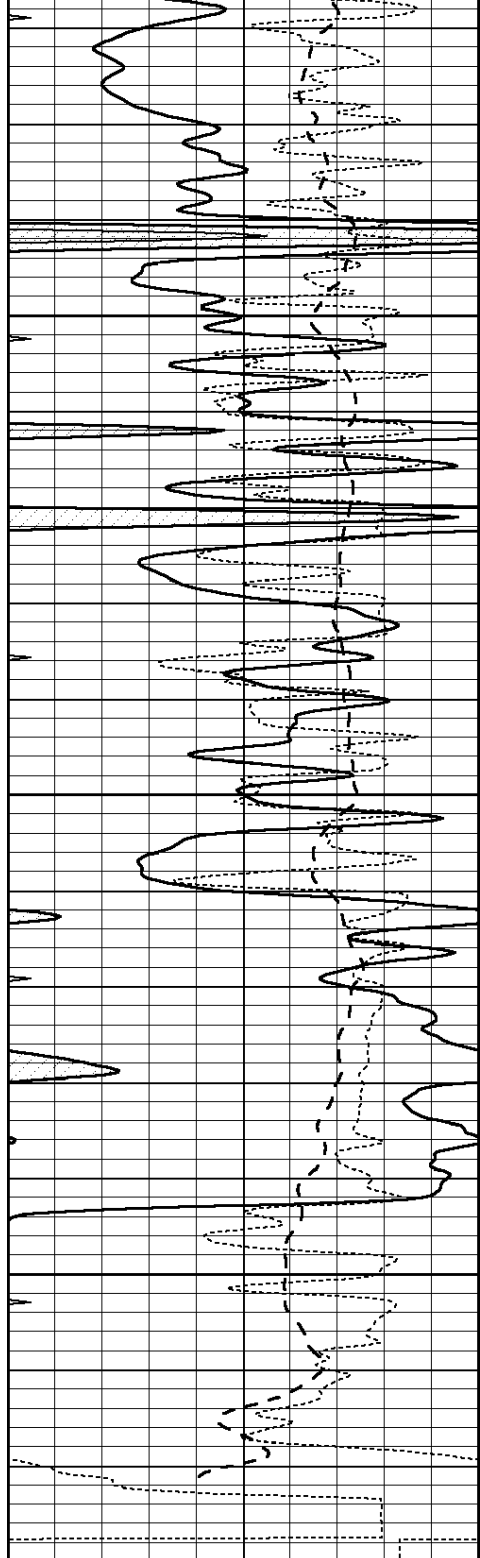
| | | |
|------|------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV) | 100 |
| -250 | Rxo/Rt | 50 |
| 0 | MINMK | 20 |

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



4550



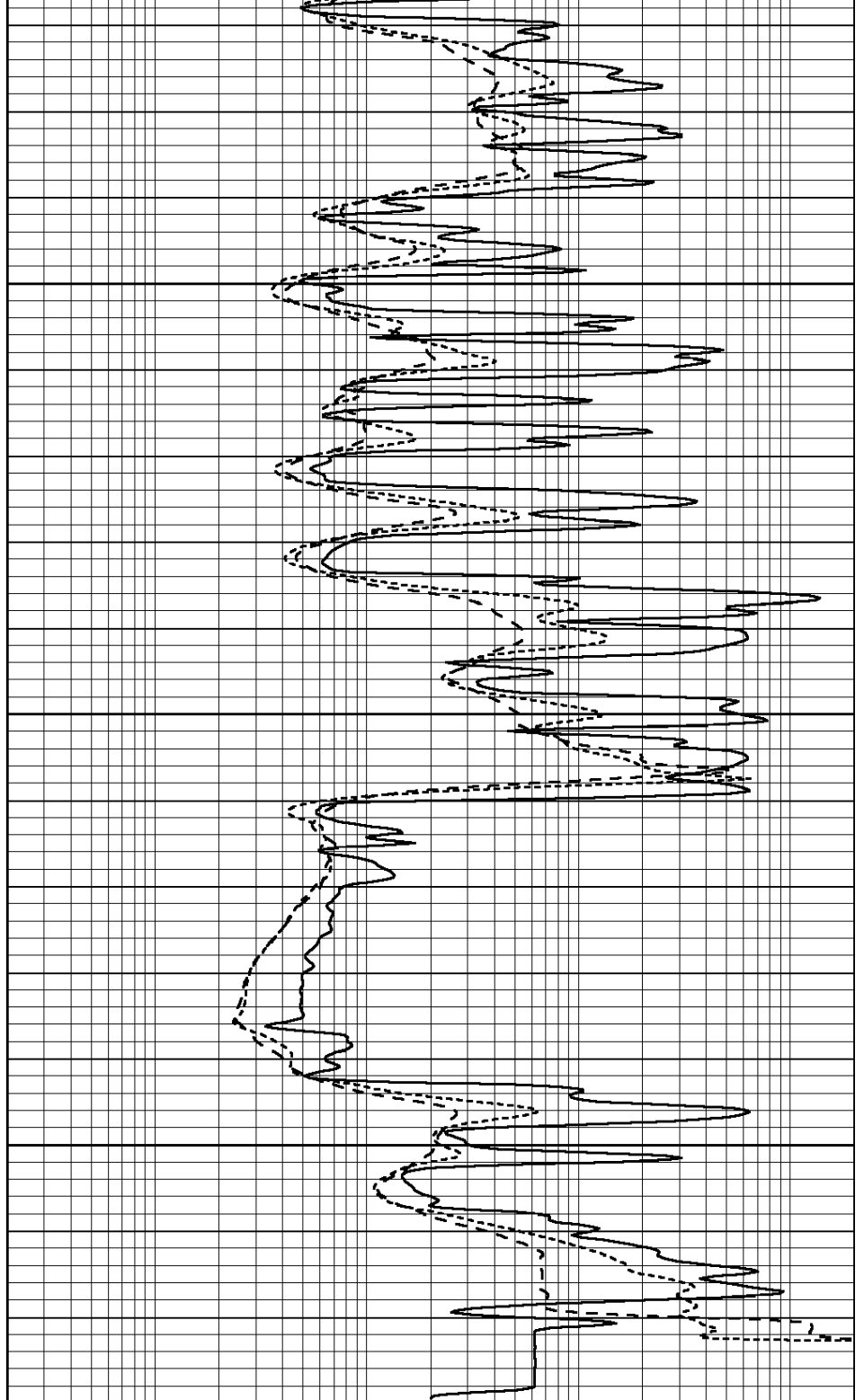


| | | |
|------|------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV) | 100 |
| -250 | Rxo/Rt | 50 |
| 0 | MINMK | 20 |

4600

4650

4700



| | | |
|-----|--------------------------|------|
| 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:
 Downhole Cal Performed:
 After Survey Verification Performed:

Mon Aug 21 11:58:18 2017
 Mon Aug 21 11:58:21 2017
 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 | | |
| | | 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 | | |
|----------------------------|------------|-----------|----------|-----------|--|------------------------------------|--|------|
| | Background | Magnesium | Aluminum | Sandstone | | | | |
| 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 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 | cps | | |
| | Long Space | cps | pu | pu |
| 2) | Short Space | cps | | |
| | Long Space | cps | pu | |
| 3) | Short Space | cps | | |
| | Long Space | cps | pu | |

POST-SURVEY VERIFICATION

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

GAP/cps