



# NABORS

**COMPLETION  
& PRODUCTION  
SERVICES CO.**

## DUAL INDUCTION LOG

|                              |               |                                                    |  |
|------------------------------|---------------|----------------------------------------------------|--|
| Company                      |               | MULL DRILLING COMPANY, INC.                        |  |
| Well                         |               | #2-31 CURTIS UNIT                                  |  |
| Field                        |               | HORCHEM WEST                                       |  |
| County                       |               | GOVE                                               |  |
| State                        |               | KANSAS                                             |  |
| Company                      |               | MULL DRILLING COMPANY, INC.                        |  |
| Well                         |               | #2-31 CURTIS UNIT                                  |  |
| Field                        |               | HORCHEM WEST                                       |  |
| County                       |               | GOVE                                               |  |
| State                        |               | KANSAS                                             |  |
| Location:                    |               | API # : 15-063-22197-0000<br>1512' FNL & 2582' FEL |  |
| Permanent Datum              |               | GROUND LEVEL                                       |  |
| Log Measured From            |               | KELLY BUSHING 5' A.G.L.                            |  |
| Drilling Measured From       |               | KELLY BUSHING                                      |  |
| SEC 31 TWP 15S RGE 26W       |               | Elevation<br>K.B. 2513<br>D.F. 2511<br>G.L. 2508   |  |
| Date                         | 4/23/14       |                                                    |  |
| Run Number                   | ONE           |                                                    |  |
| Depth Driller                | 4500          |                                                    |  |
| Depth Logger                 | 4502          |                                                    |  |
| Bottom Logged Interval       | 4500          |                                                    |  |
| Top Log Interval             | 00            |                                                    |  |
| Casing Driller               | 8 5/8"@215'   |                                                    |  |
| Casing Logger                | 220           |                                                    |  |
| Bit Size                     | 7 7/8"        |                                                    |  |
| Type Fluid in Hole           | CHEMICAL MUD  | CHLORIDES 3,800 PPM                                |  |
| Density / Viscosity          | 9.4/50        |                                                    |  |
| pH / Fluid Loss              | 10.0/7.2      |                                                    |  |
| Source of Sample             | FLOWLINE      |                                                    |  |
| Rim @ Meas. Temp             | .850@70F      |                                                    |  |
| Rmf @ Meas. Temp             | .638@70F      |                                                    |  |
| Rmc @ Meas. Temp             | 1.02@70F      |                                                    |  |
| Source of Rmf / Rmc          | MEASUREMENT   |                                                    |  |
| Rim @ BHT                    | .492@121F     |                                                    |  |
| Time Circulation Stopped     | 2.5 HOURS     |                                                    |  |
| Time Logger on Bottom        | 6:45 A.M.     |                                                    |  |
| Maximum Recorded Temperature | 121F          |                                                    |  |
| Equipment Number             | 4854          |                                                    |  |
| Location                     | HAYS, KANSAS  |                                                    |  |
| Recorded By                  | JEFF LUEBBERS |                                                    |  |
| Witnessed By                 | KEVIN KESSLER |                                                    |  |

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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 "NABORS" HAYS, KANSAS (785) 628-6395  
DIRECTIONS  
UTICA, KS., W. ON HWY 4 TO "CASTLE ROCK RD.", 5N. TO "RD. A", 1 W. & N. & W. TO FARM, N.  
THROUGH CATTLE PENS, TAKE RIGHT FORK AROUND

Database File:

23816pe.db

Dataset Pathname:

pass3.7

Presentation Format:

dil2

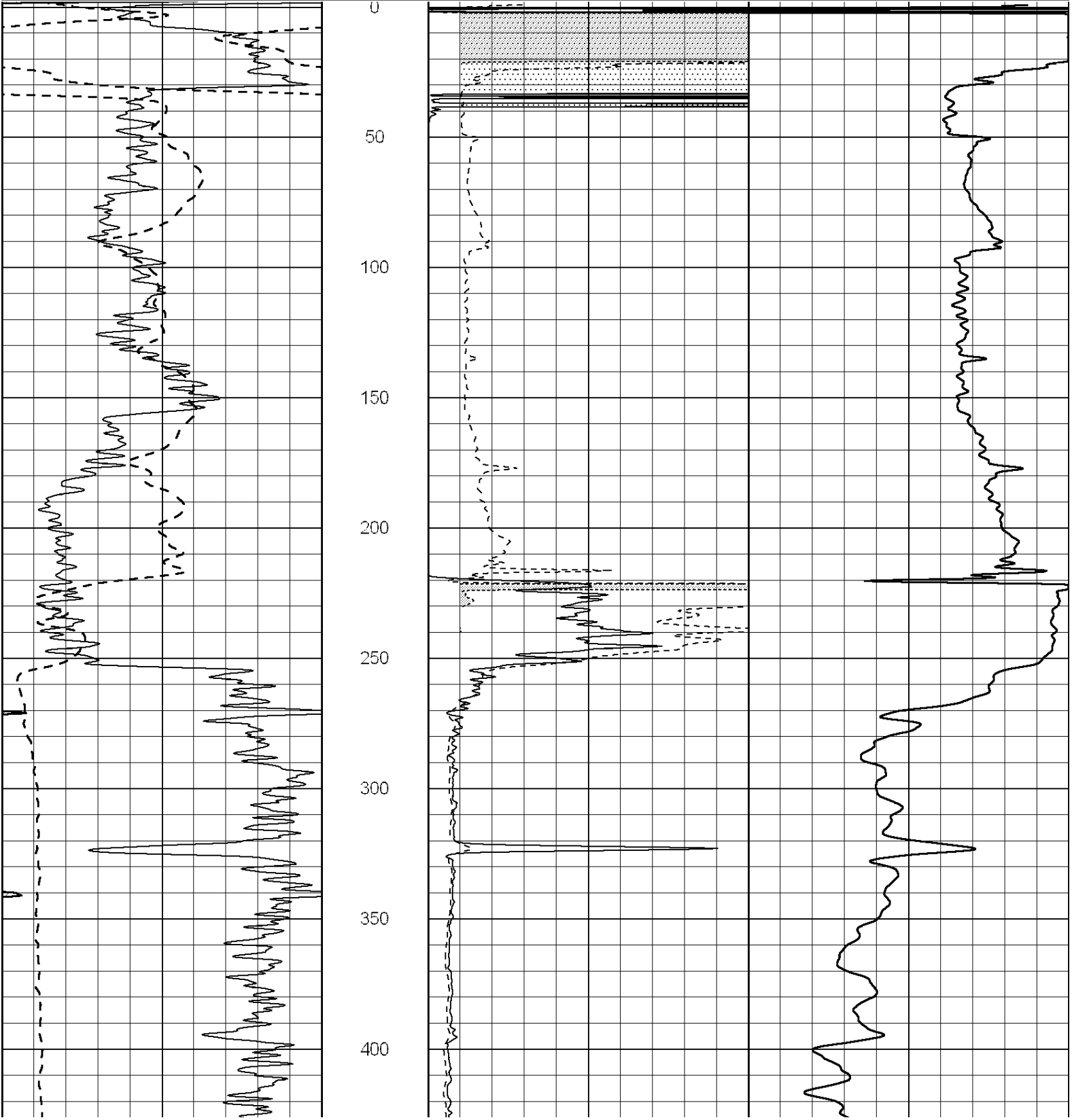
Dataset Creation:

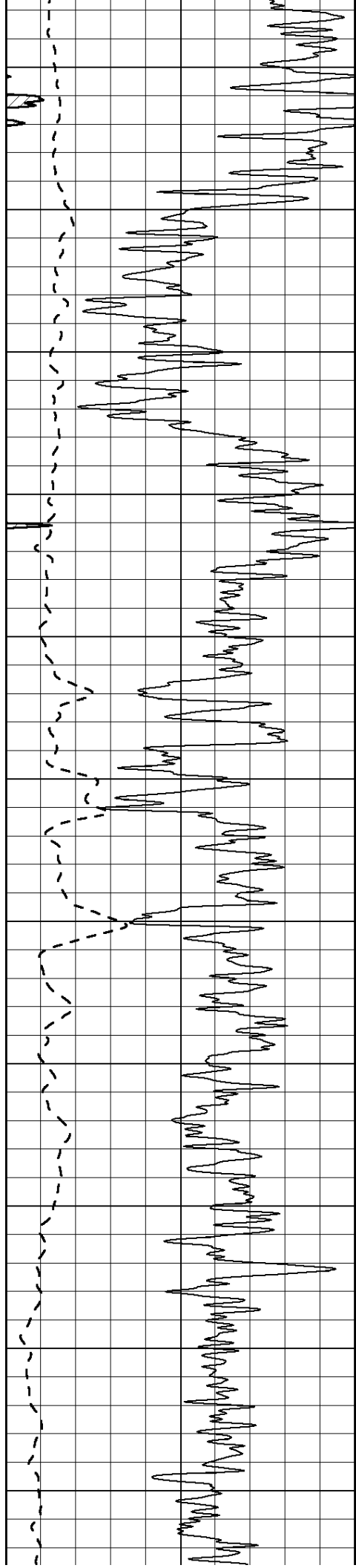
Wed Apr 23 08:28:07 2014 by Calc SOC 120430

Charted by:

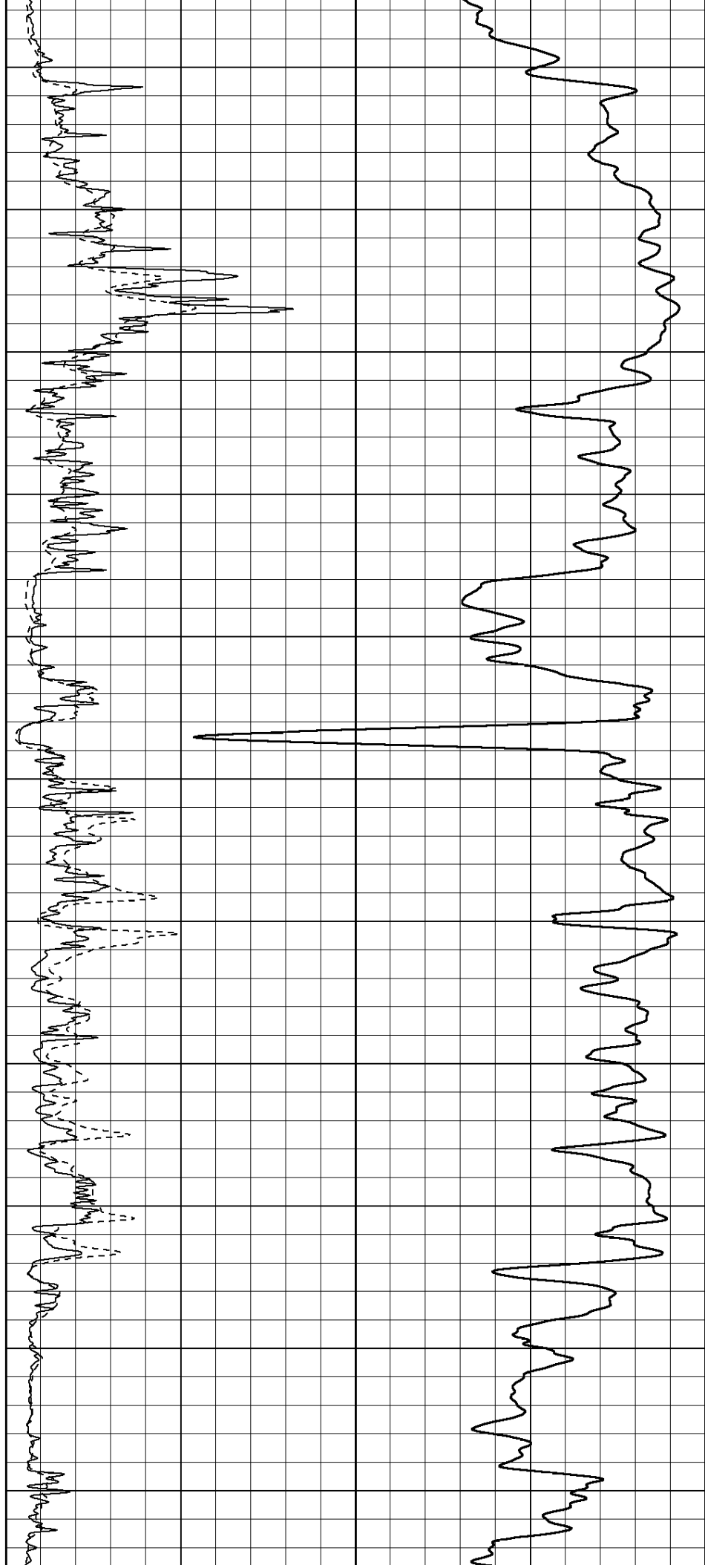
Depth in Feet scaled 1:600

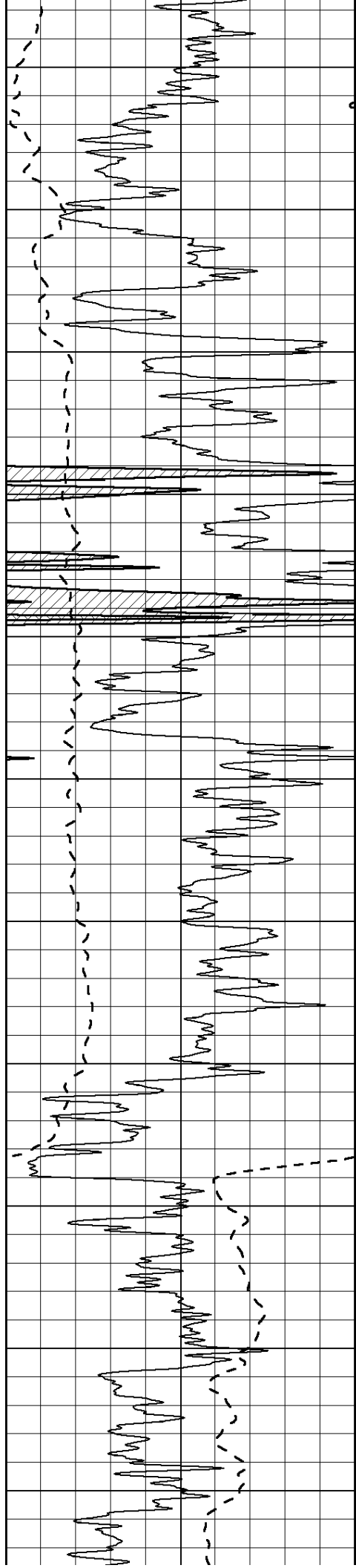
|       |                  |     |       |                  |               |   |
|-------|------------------|-----|-------|------------------|---------------|---|
| 0     | Gamma Ray (GAPI) | 150 | 0     | RLL3 (Ohm-m)     | 50            |   |
| -100  | SP (mV)          | 100 | 0     | RILD (Ohm-m)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



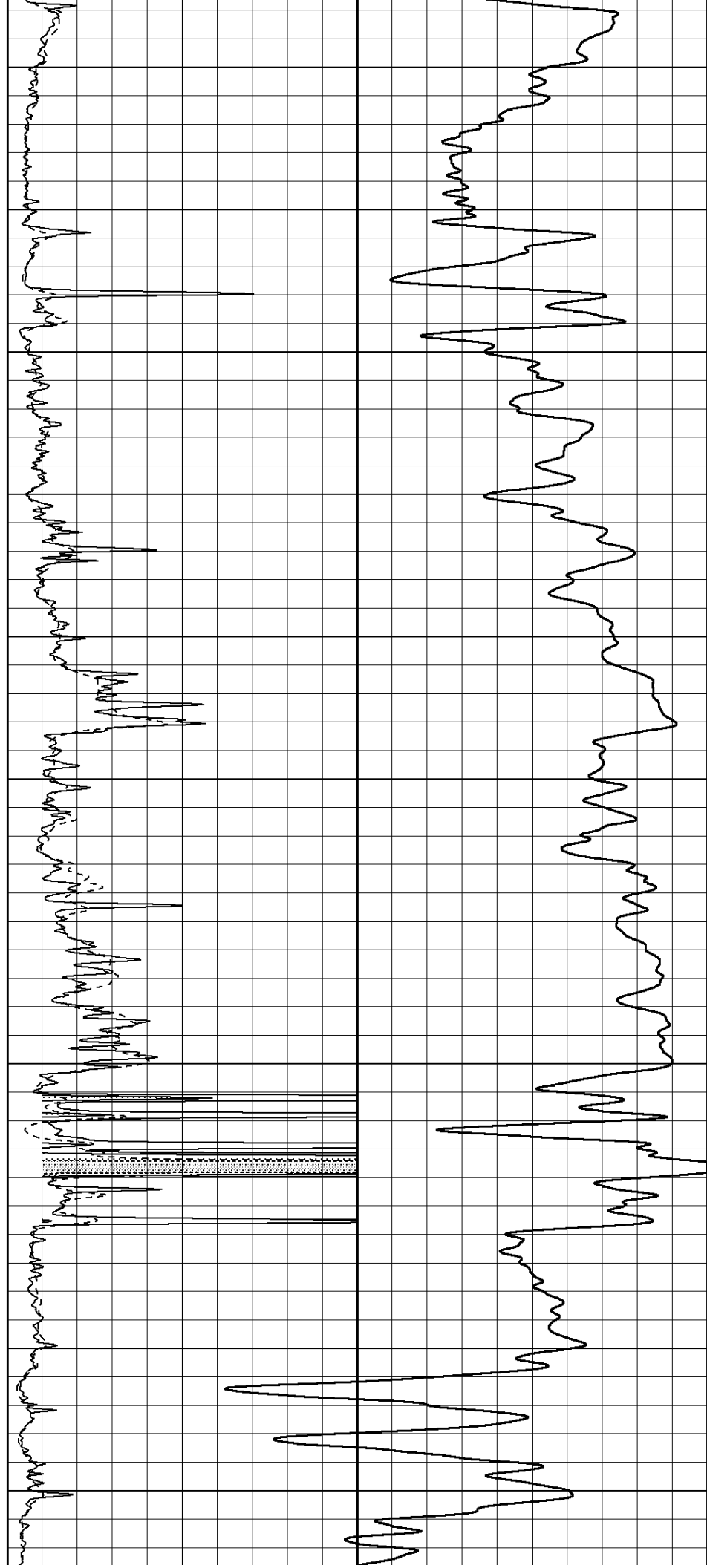


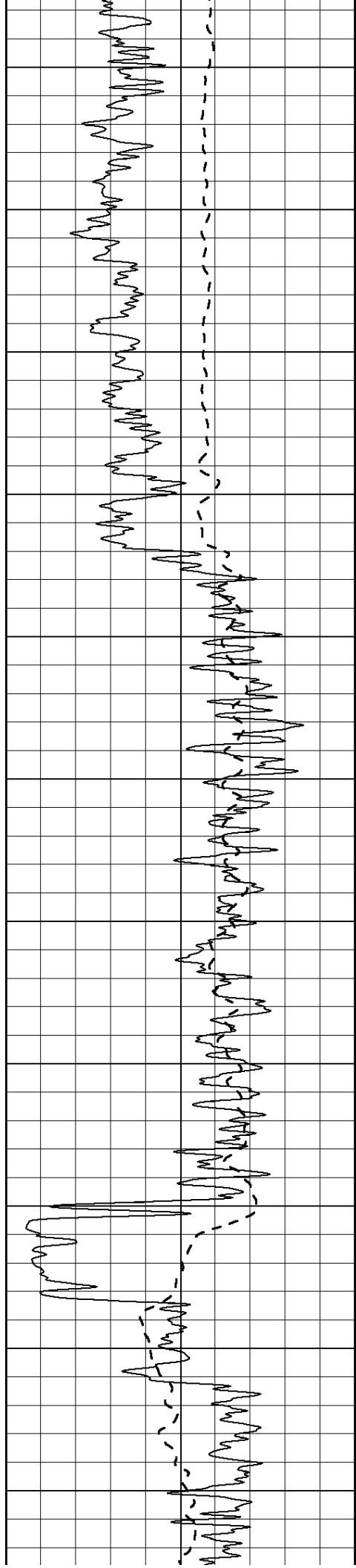
450 500 550 600 650 700 750 800 850 900 950





1000  
1050  
1100  
1150  
1200  
1250  
1300  
1350  
1400  
1450  
1500





1550

1600

1650

1700

1750

1800

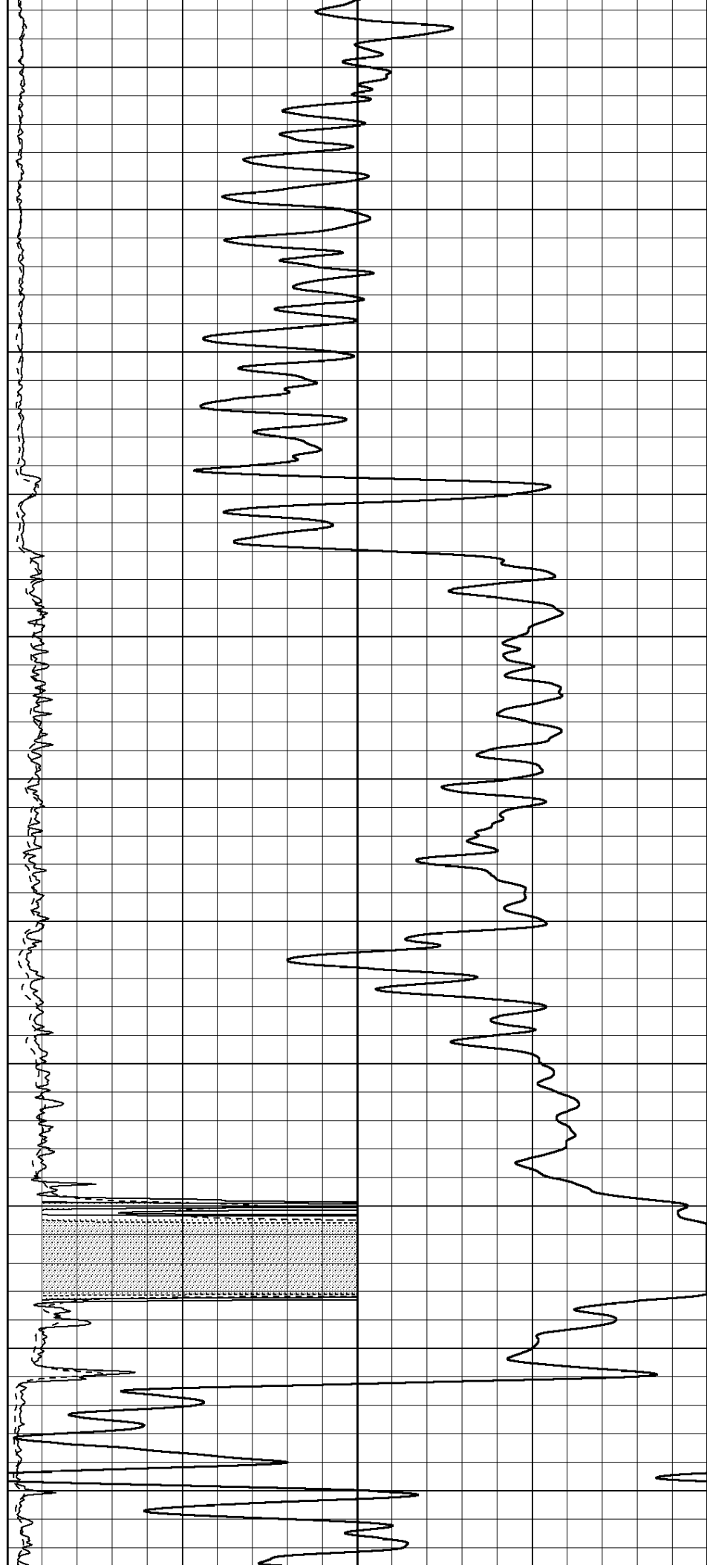
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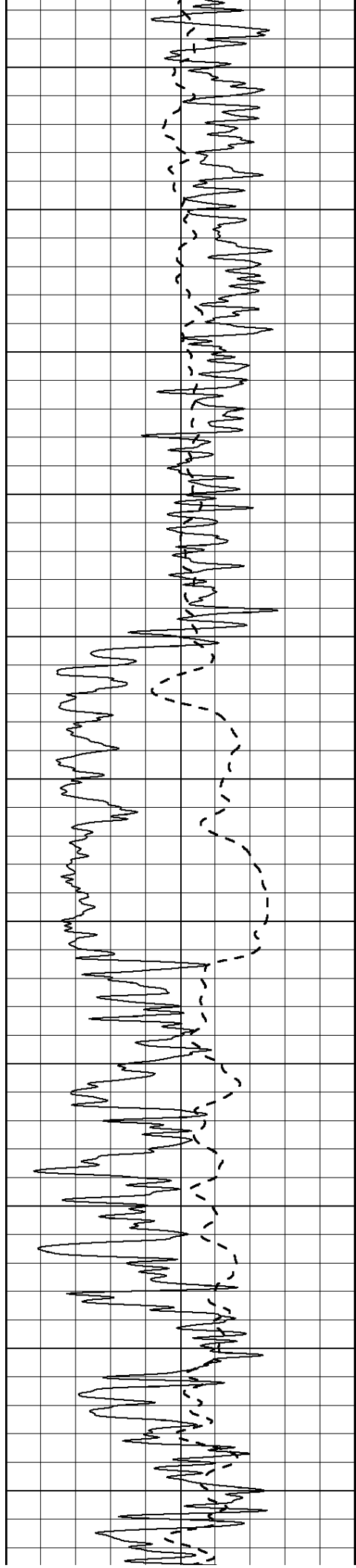
1900

1950

2000

2050





2100

2150

2200

2250

2300

2350

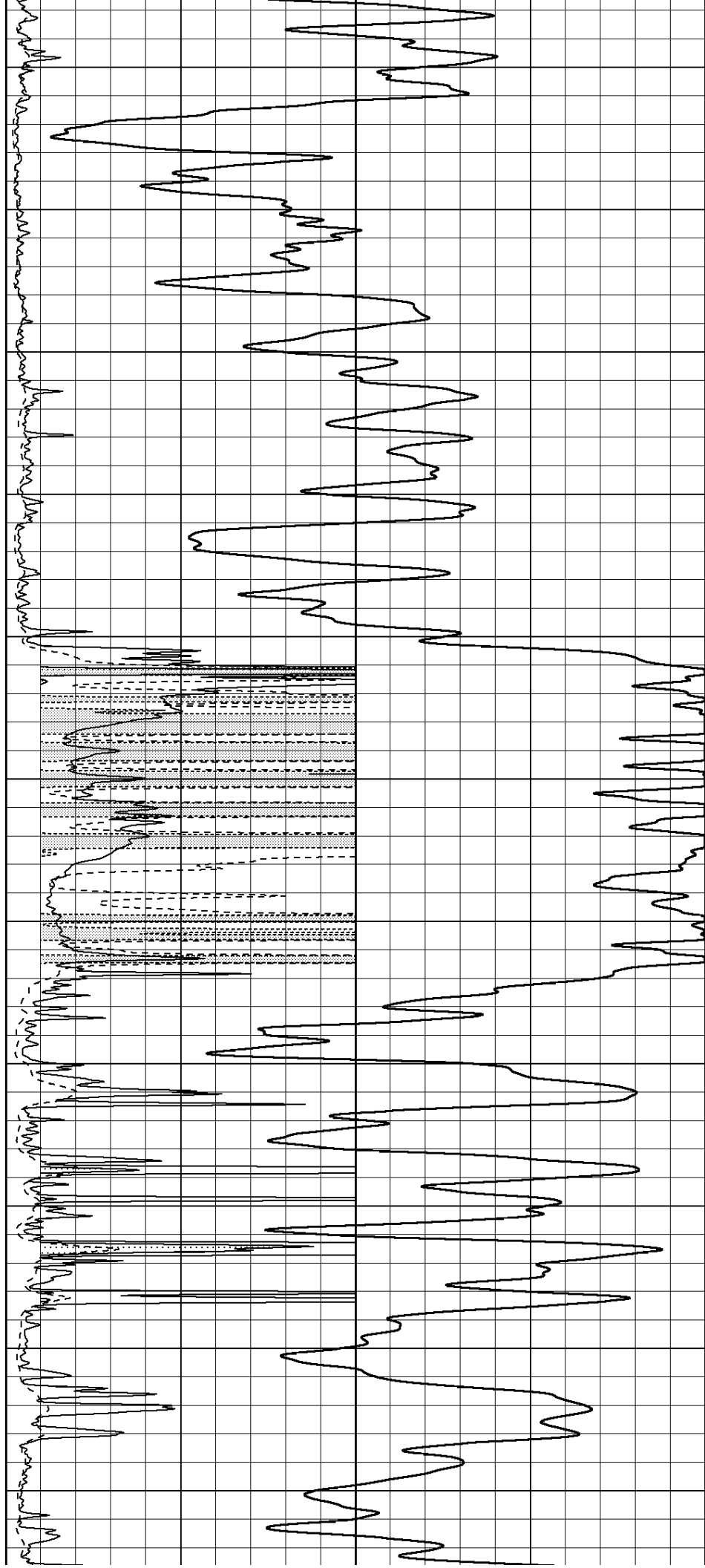
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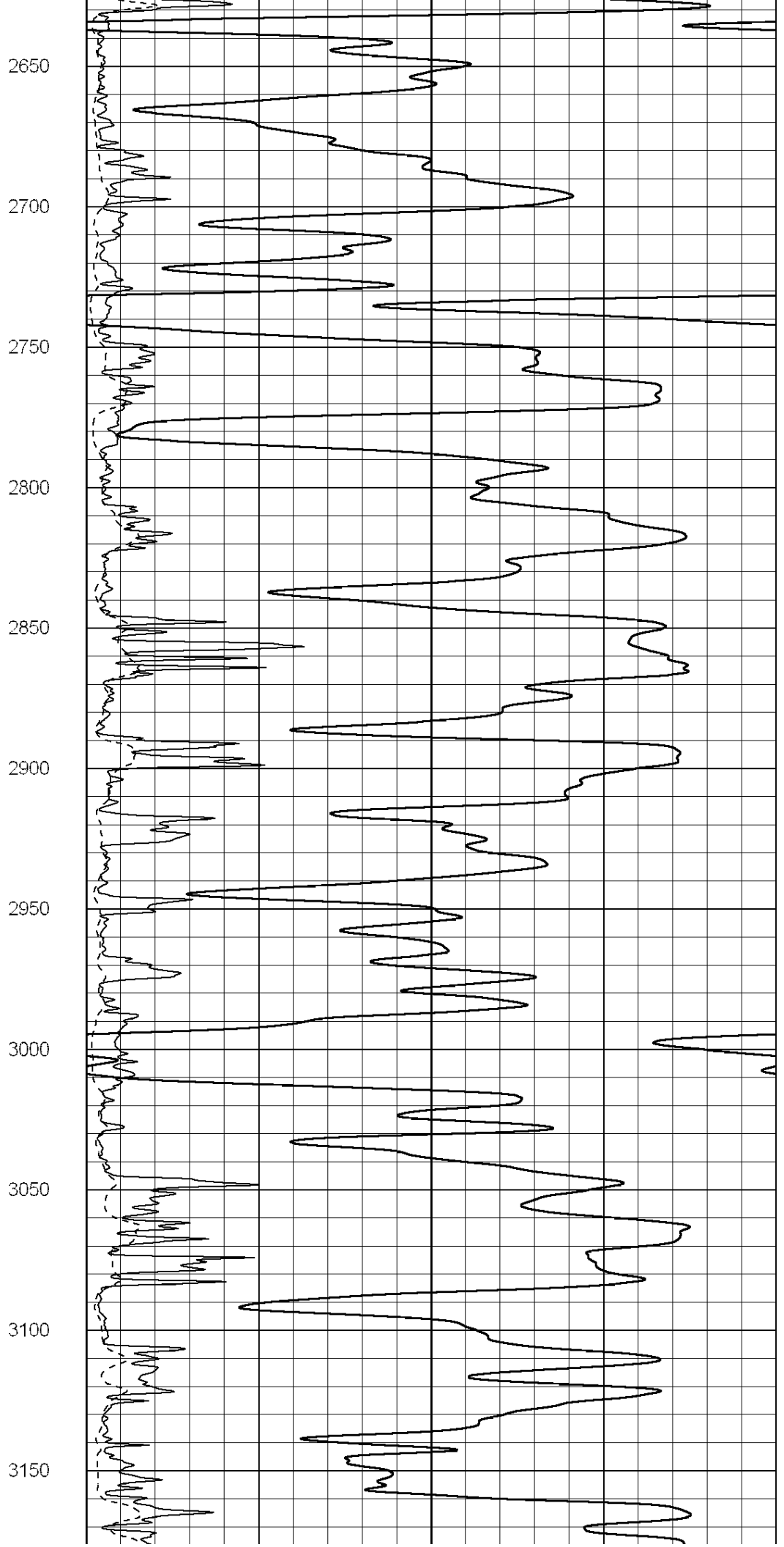
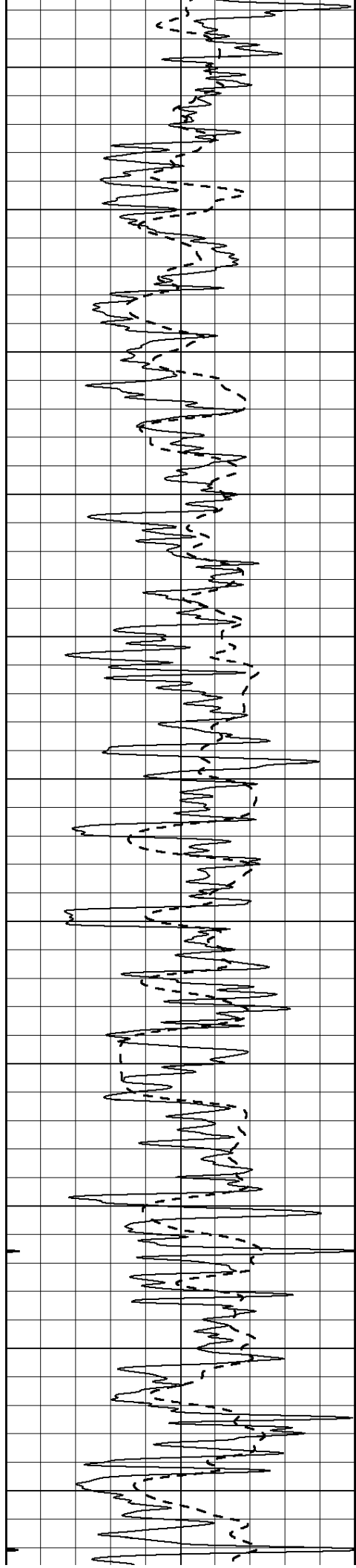
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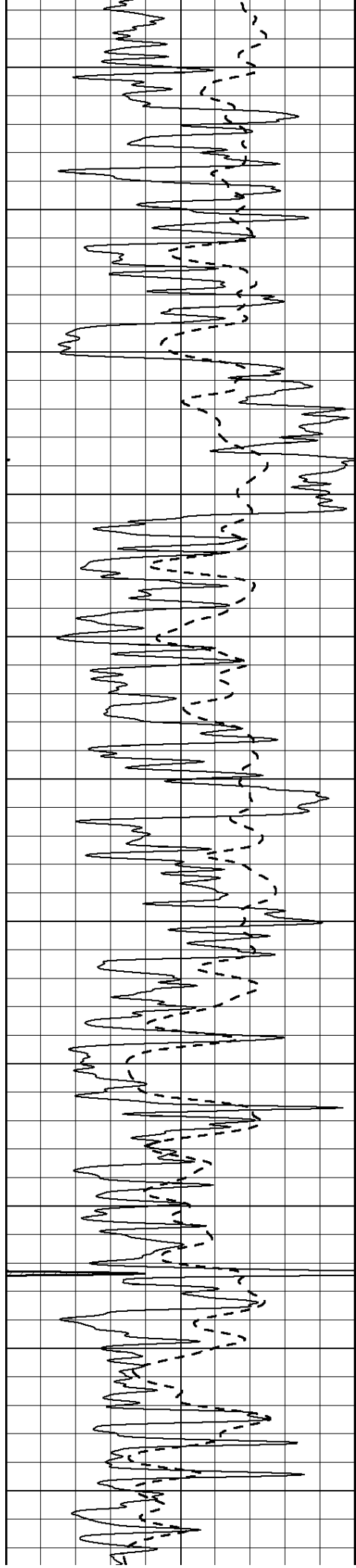
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2550

2600







3200

3250

3300

3350

3400

3450

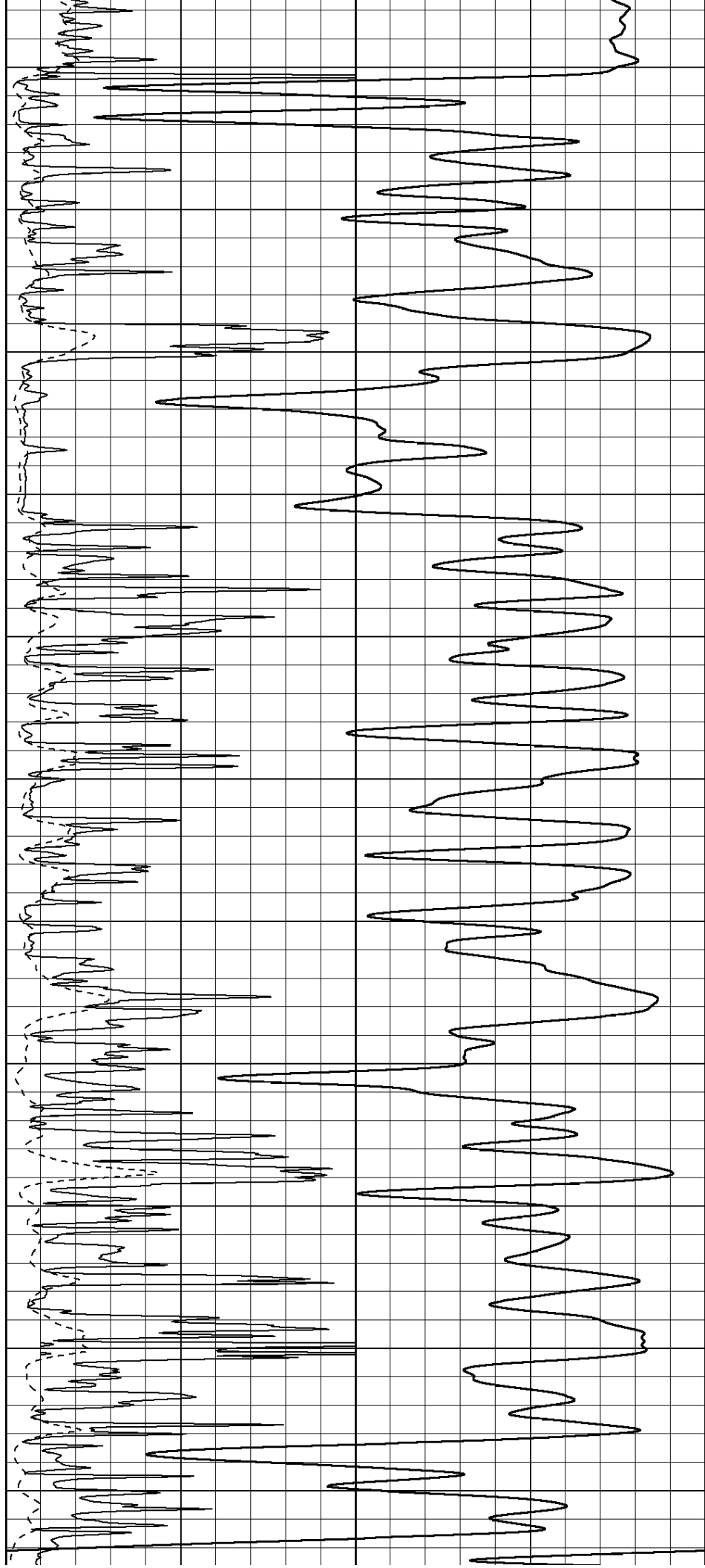
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3550

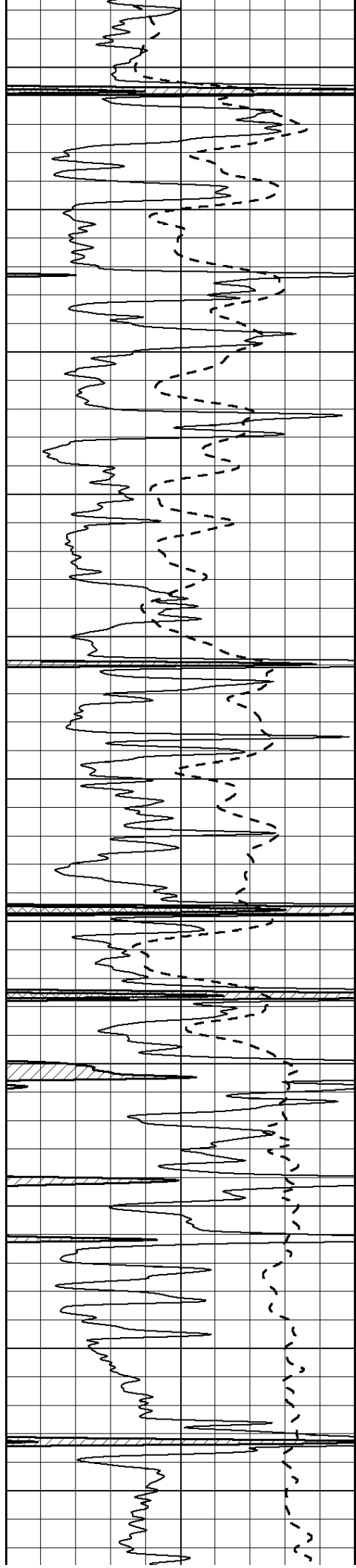
3600

3650

3700







3750

3800

3850

3900

3950

4000

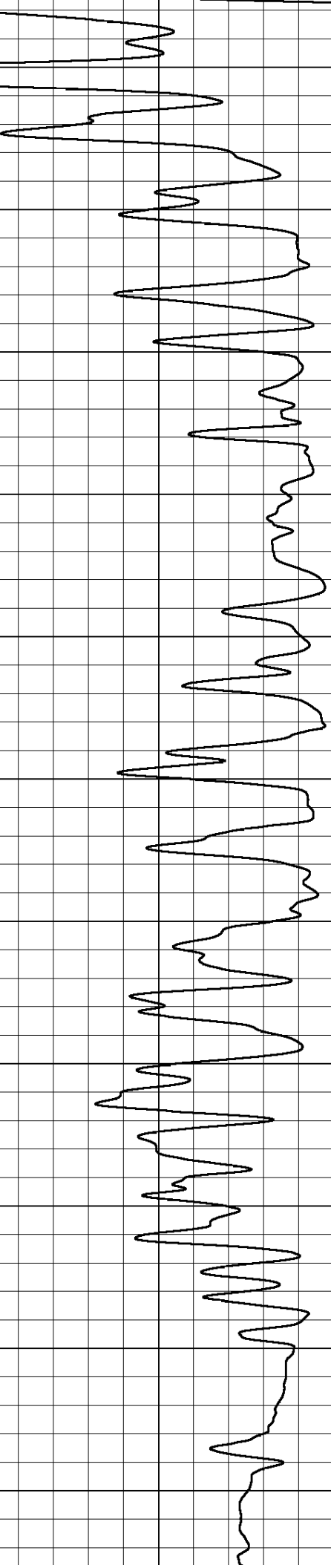
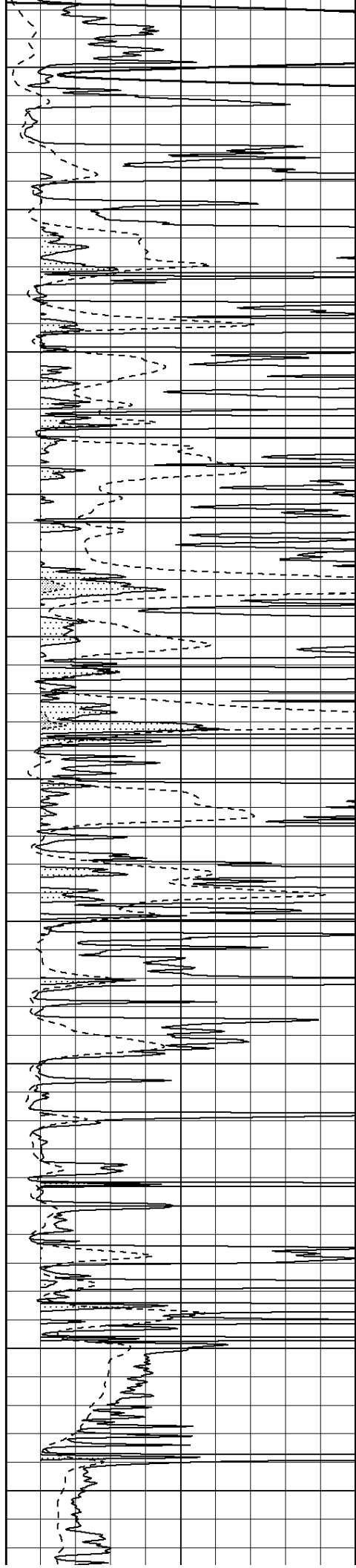
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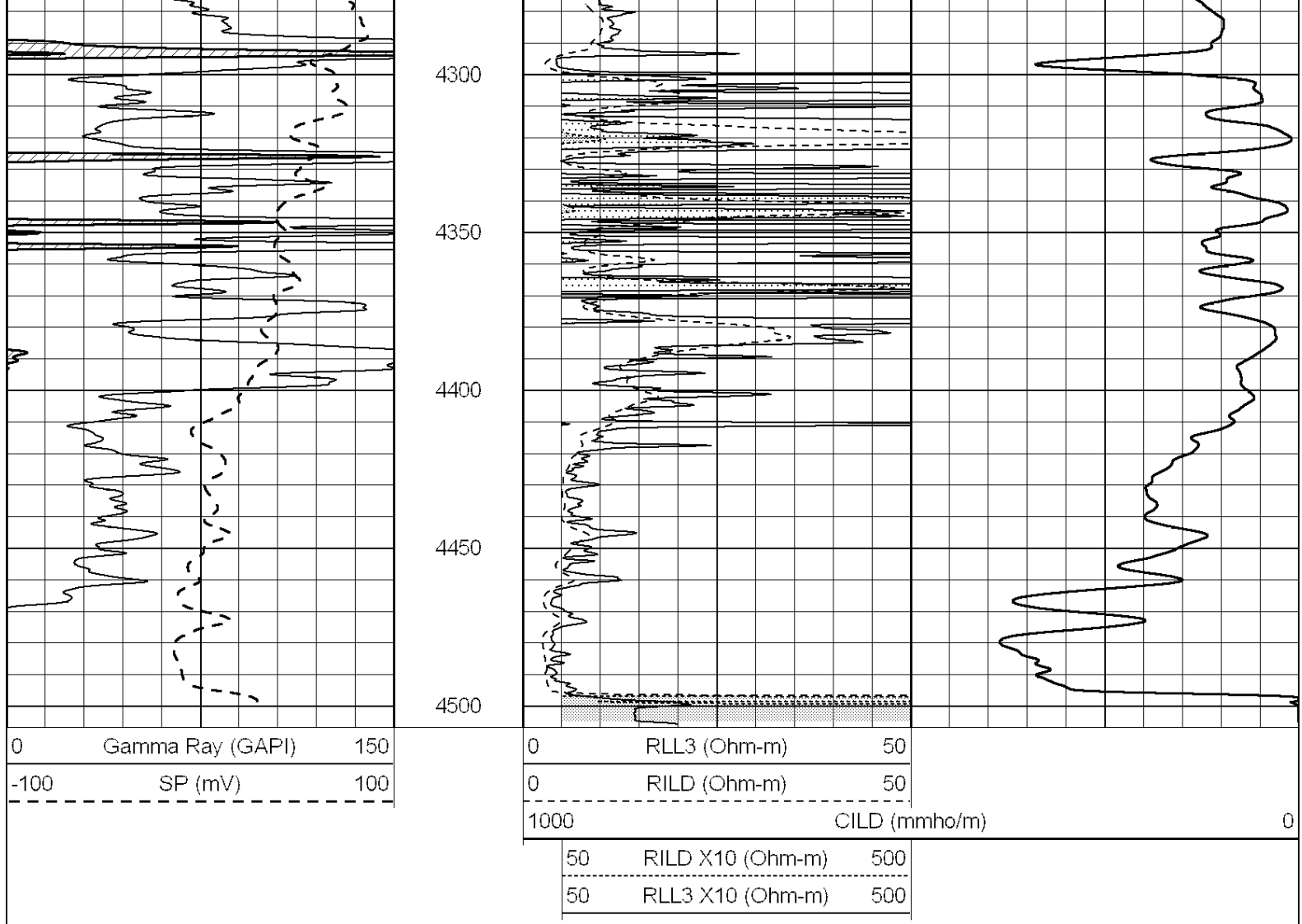
4100

4150

4200

4250





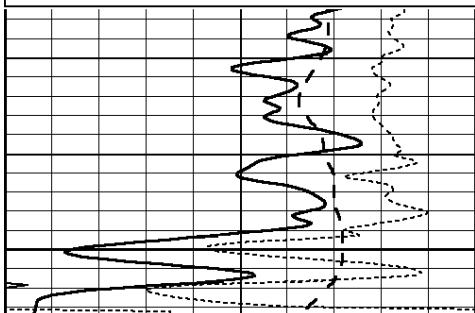
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# ANHYDRITE

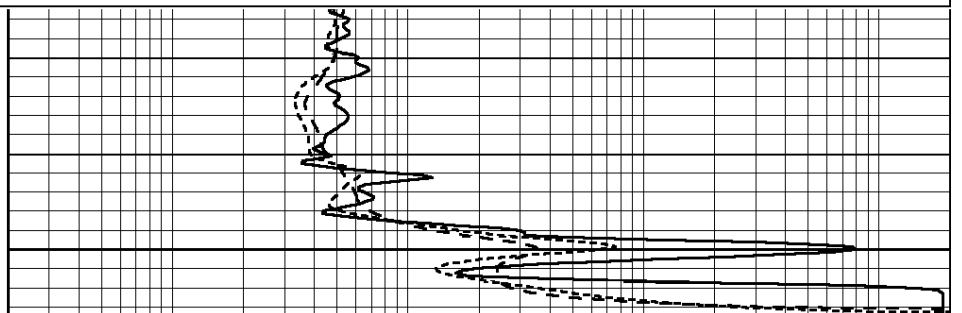
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Dataset Pathname: pass3.8  
Presentation Format: \_dil  
Dataset Creation: Wed Apr 23 08:28:52 2014 by Calc SOC 120430  
Charted by: Depth in Feet scaled 1:240

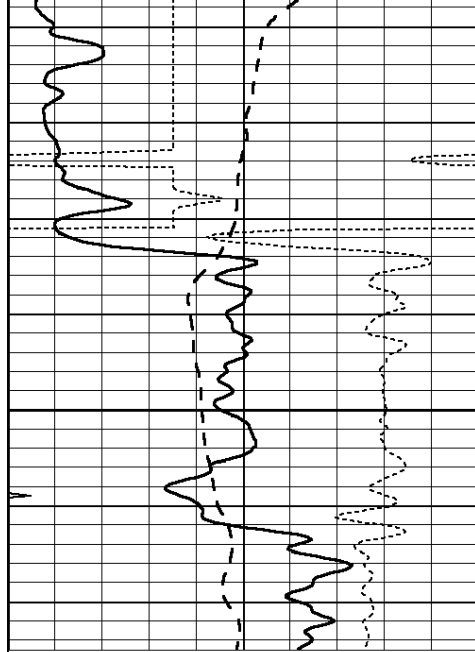
|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

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



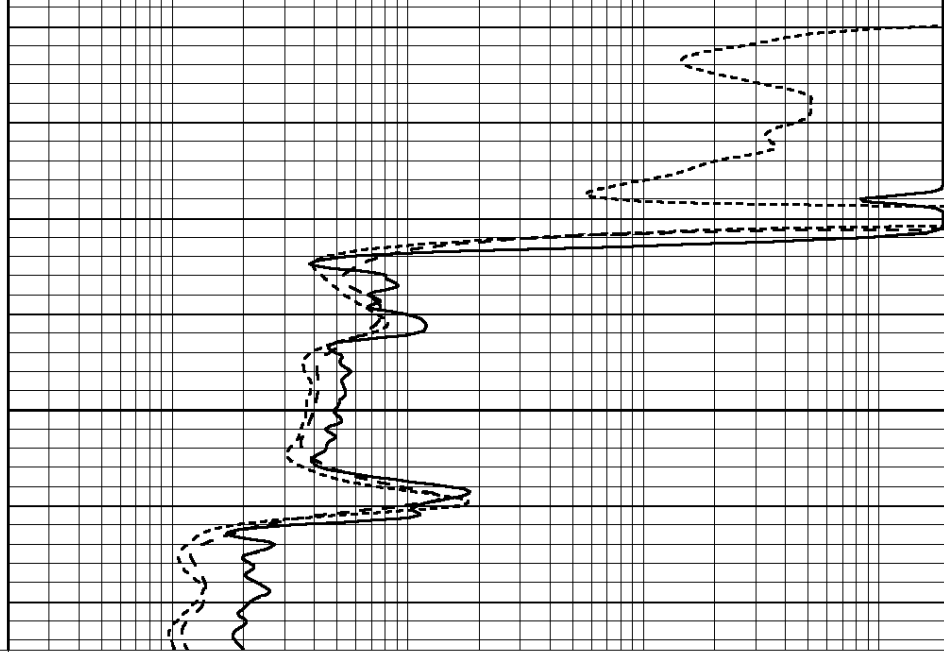
1950





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

2000



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

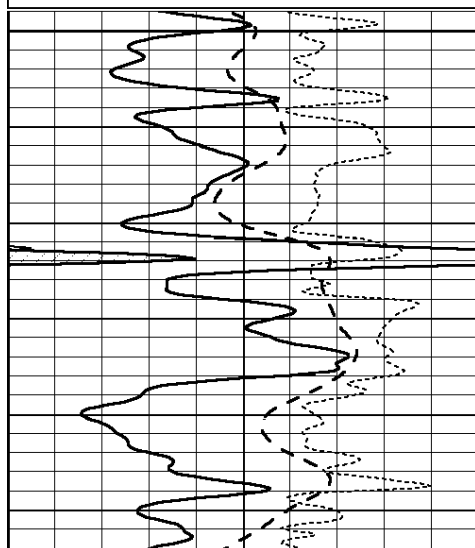


# MAIN SECTION

Database File: 23816pe.db  
 Dataset Pathname: pass3.7  
 Presentation Format: dil  
 Dataset Creation: Wed Apr 23 08:28:07 2014 by Calc SOC 120430  
 Charted by: Depth in Feet scaled 1:240

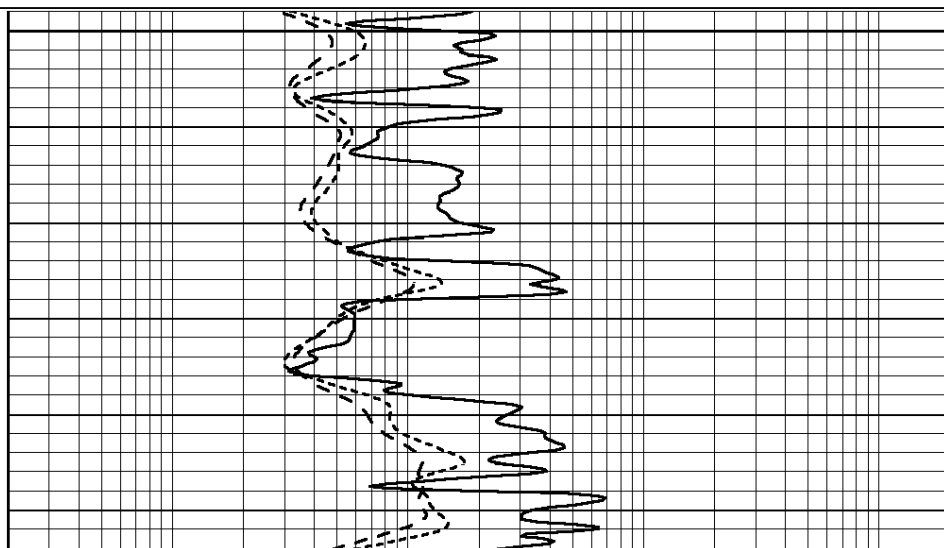
|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

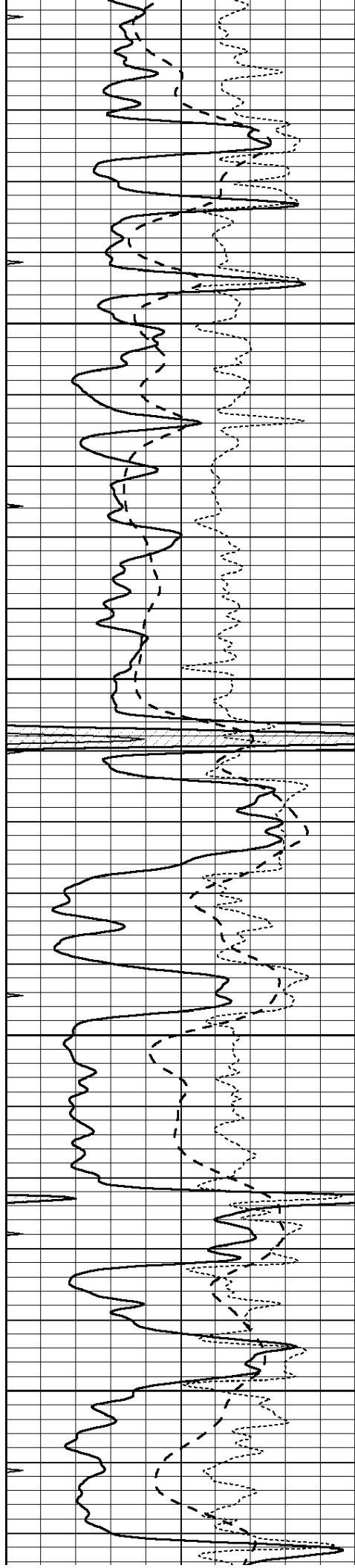
|     |                          |      |
|-----|--------------------------|------|
| 0.2 | SHALLOW GUARD (Ohm-m)    | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m)   | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |



3600

3650



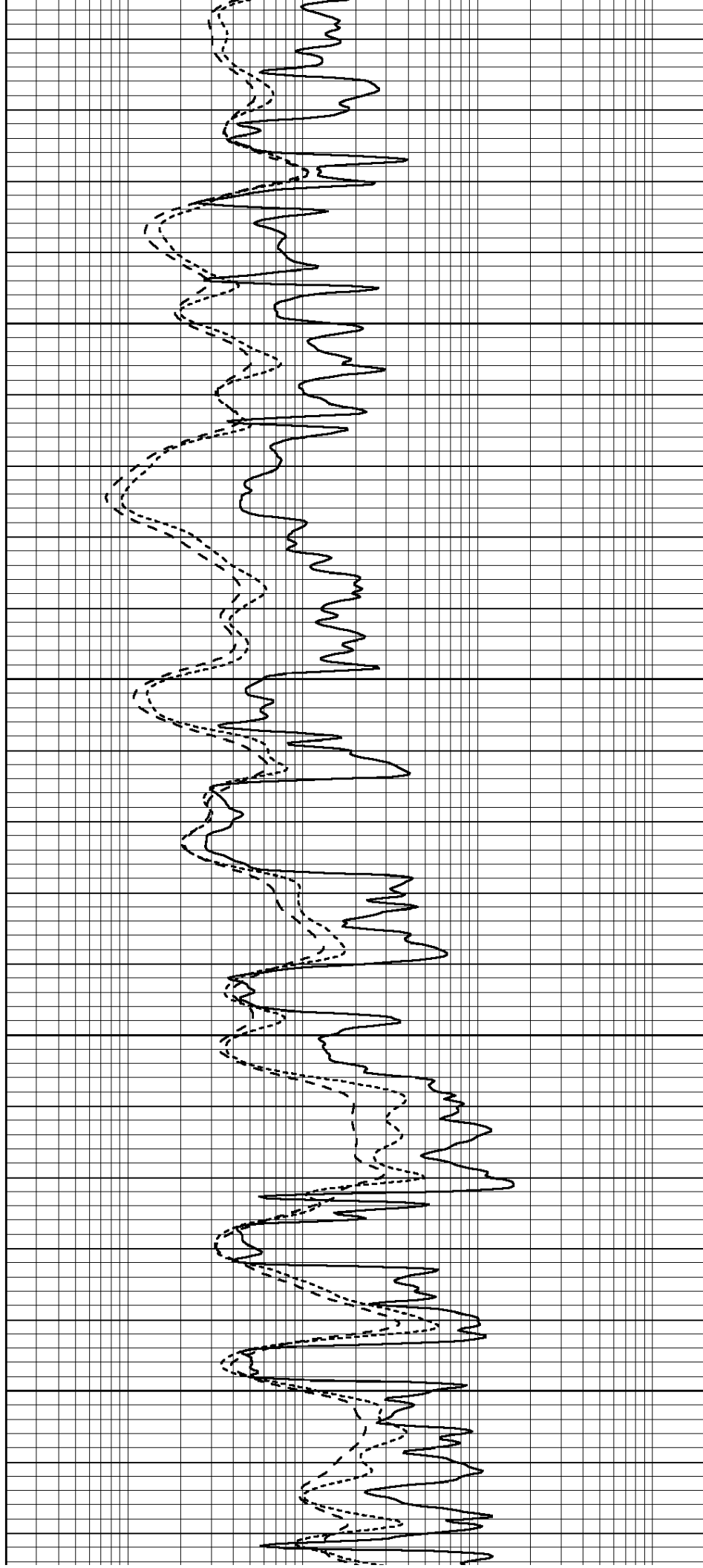


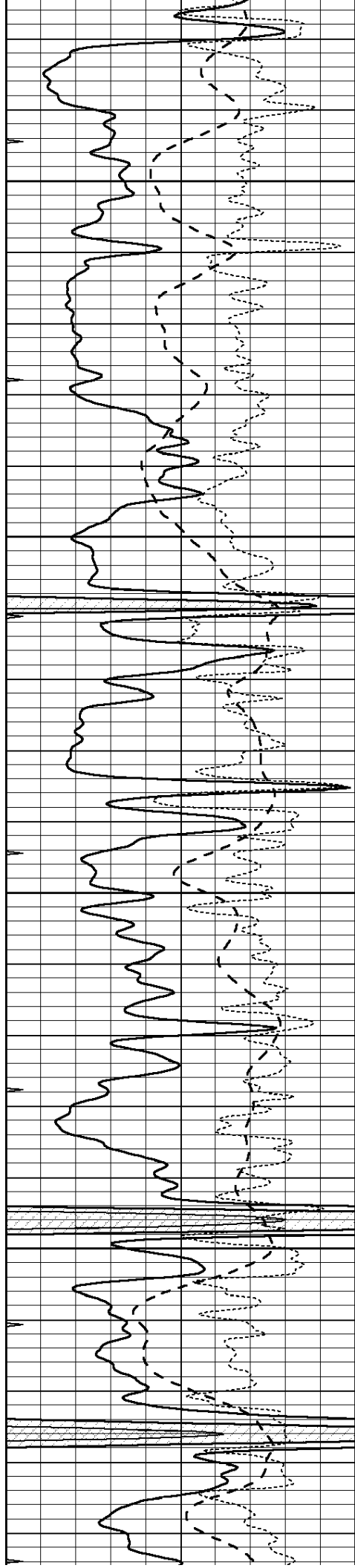
3700

3750

3800

3850



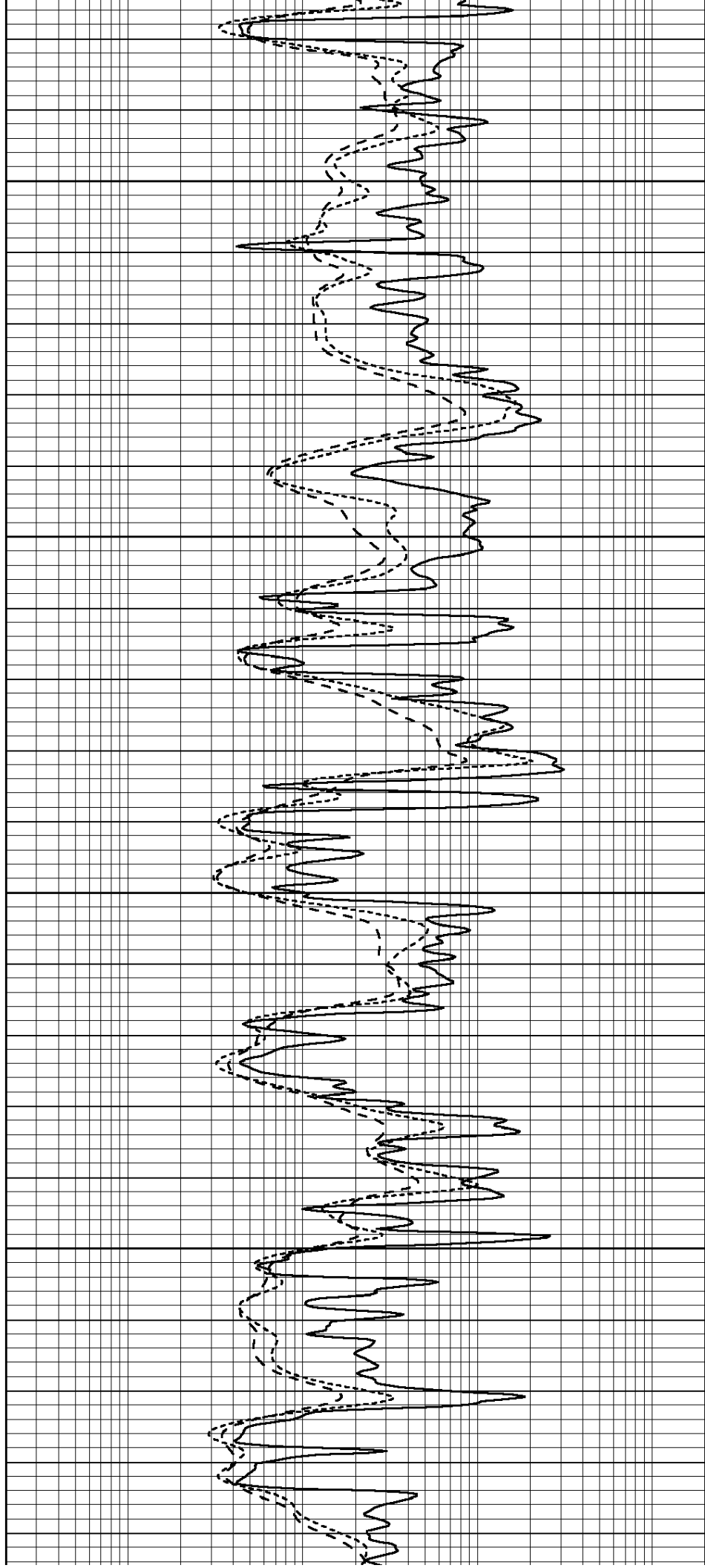


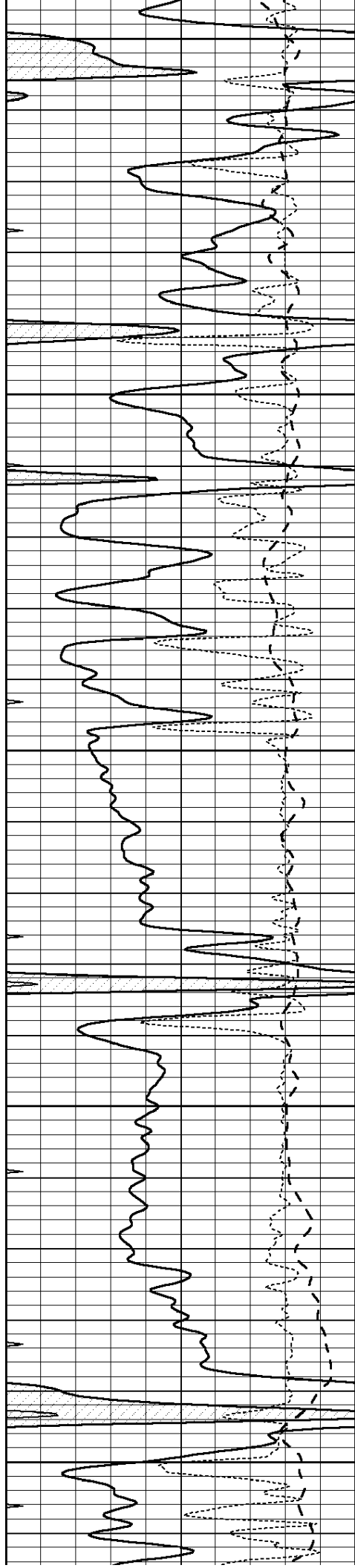
3900

3950

4000

4050





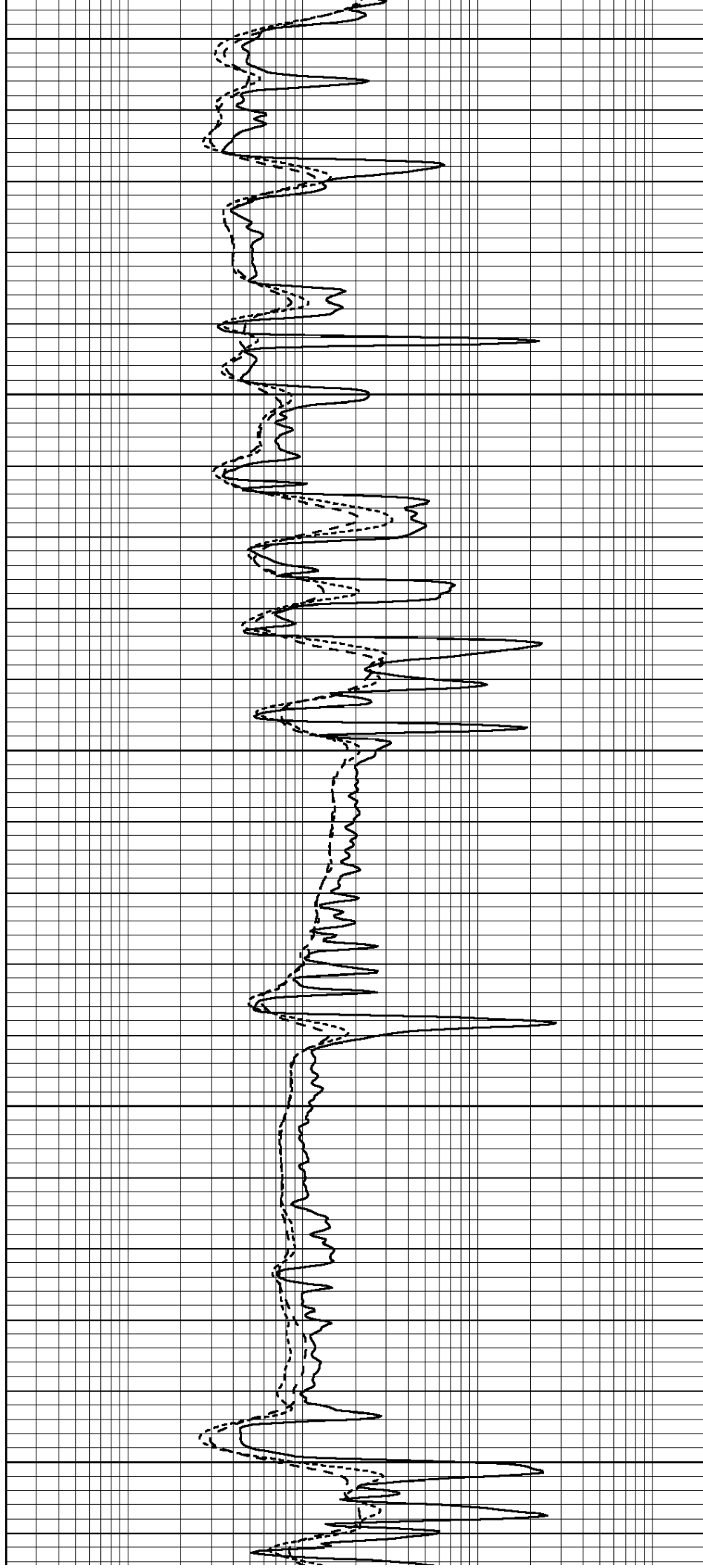
4100

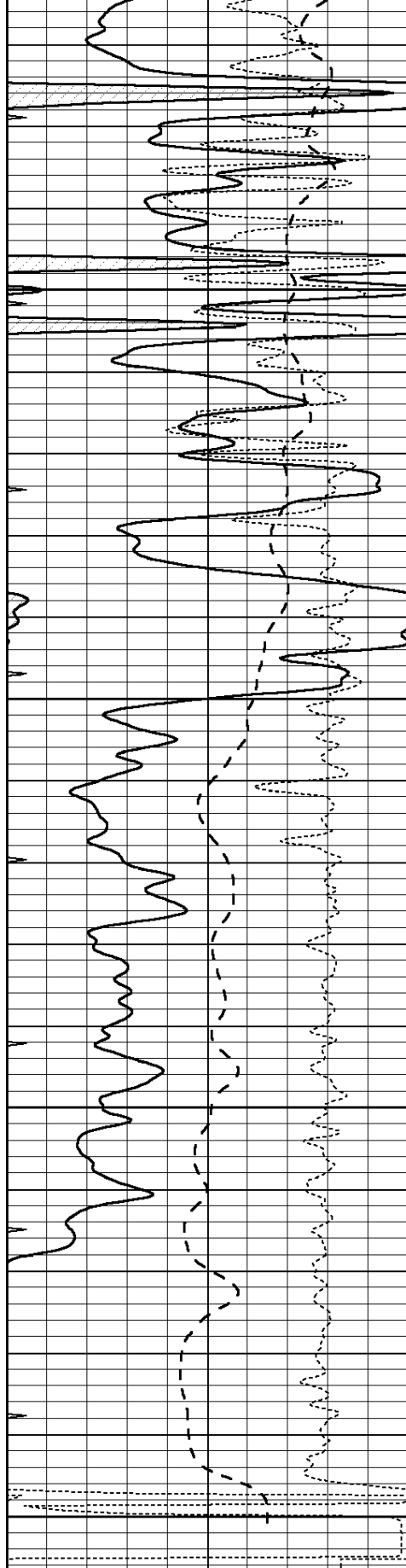
4150

4200

4250

4300





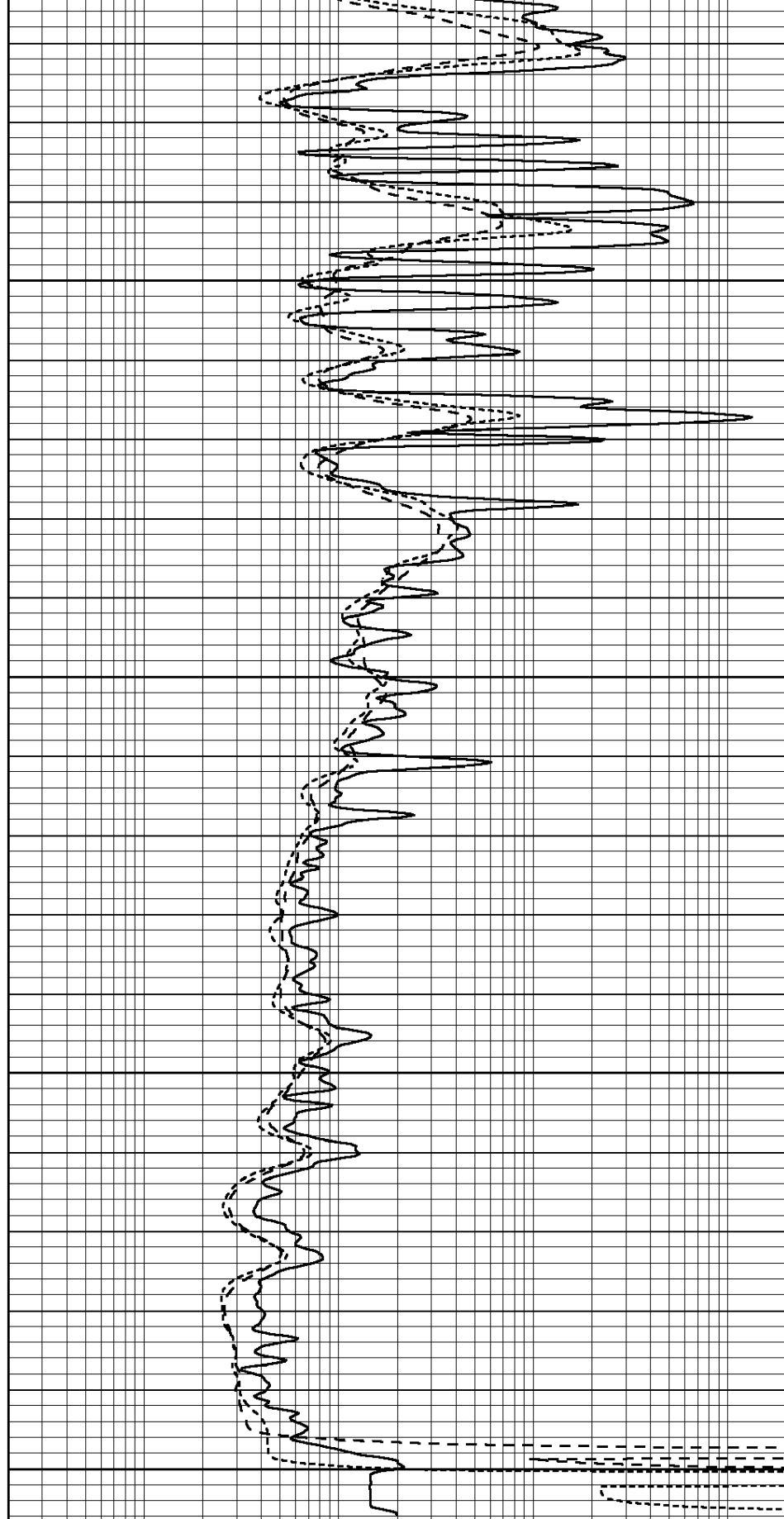
|      |                  |     |
|------|------------------|-----|
| 0    | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV)          | 100 |
| -250 | Rxo/Rt           | 50  |
| 0    | MINMK            | 20  |

4350

4400

4450

4500



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



# NABORS

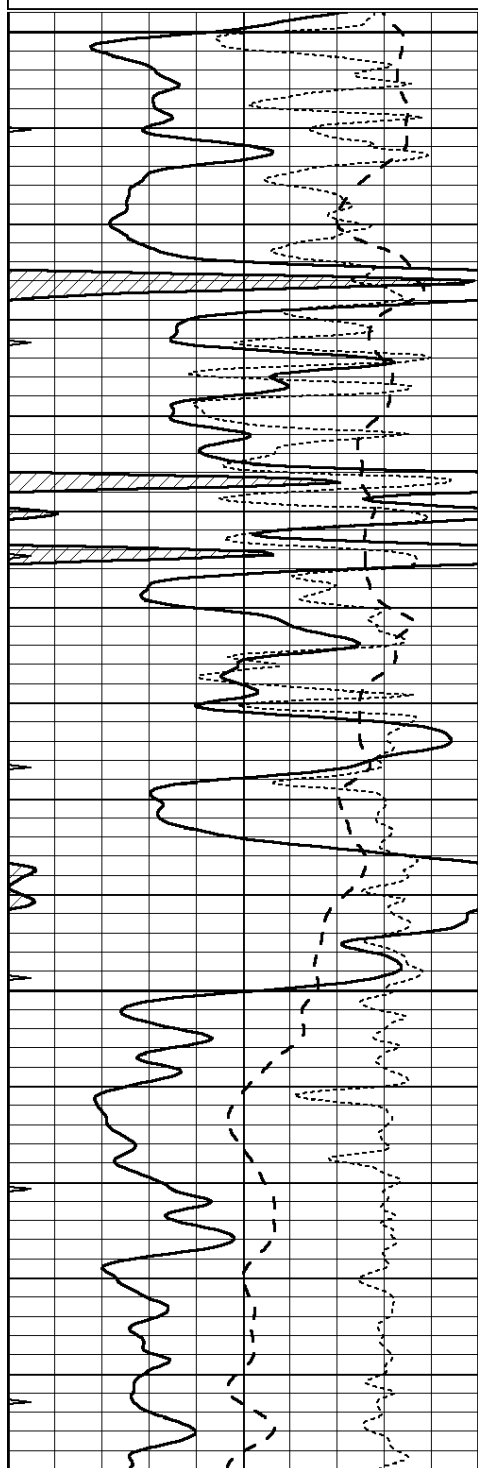
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## REPEAT SECTION

Database File: 23816pe.db  
Dataset Pathname: pass2.2  
Presentation Format: \_dil  
Dataset Creation: Wed Apr 23 08:35:10 2014 by Calc SOC 120430  
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 |

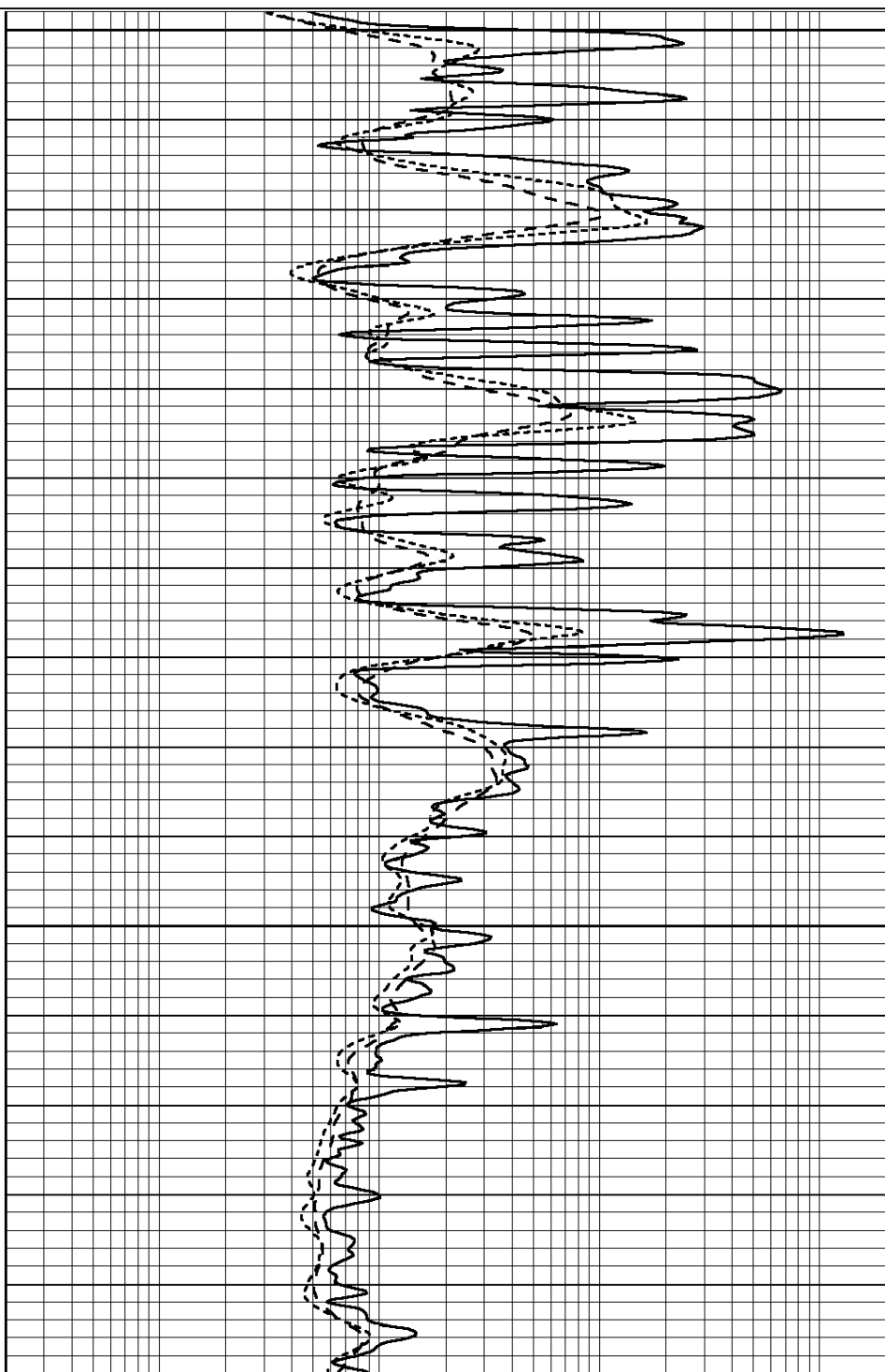


4300

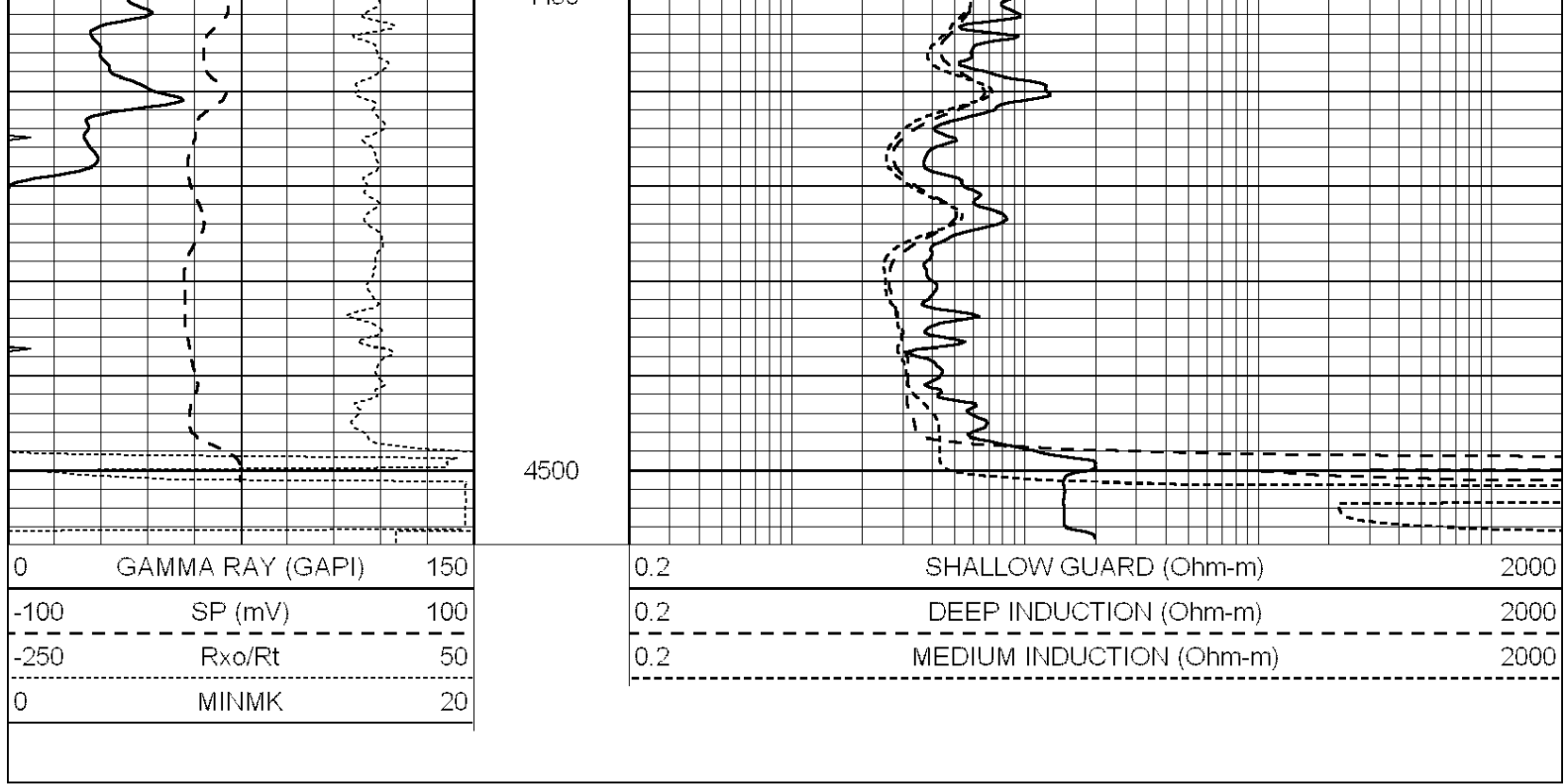
4350

4400

4450







| Calibration Report |                                             |  |
|--------------------|---------------------------------------------|--|
| Database File:     | 23816pe.db                                  |  |
| Dataset Pathname:  | pass3.7                                     |  |
| Dataset Creation:  | Wed Apr 23 08:28:07 2014 by Calc SOC 120430 |  |

| Dual Induction Calibration Report    |                          |  |
|--------------------------------------|--------------------------|--|
| Serial-Model:                        | PROBE9-DILG              |  |
| Surface Cal Performed:               | Wed Apr 23 01:07:33 2014 |  |
| Downhole Cal Performed:              | Mon Jul 28 12:02:56 2008 |  |
| After Survey Verification Performed: | Mon Jul 28 12:02:56 2008 |  |

| Surface Calibration |        |       |            |       |         |         |         |         |
|---------------------|--------|-------|------------|-------|---------|---------|---------|---------|
| Readings            |        |       | References |       |         | Results |         |         |
| Loop:               | Air    | Loop  |            | Air   | Loop    |         | m       | b       |
| Deep                | -0.014 | 0.629 | V          | 0.000 | 400.000 | mmho/m  | 650.000 | -22.000 |
| Medium              | 0.039  | 0.728 | V          | 0.000 | 464.000 | mmho/m  | 660.000 | -26.000 |
| Internal:           | Zero   | Cal   |            | Zero  | Cal     |         | m       | b       |
| Deep                | 0.011  | 0.610 | V          | 0.000 | 400.000 | mmho/m  | 667.135 | -7.256  |
| Medium              | 0.005  | 0.712 | V          | 0.000 | 464.000 | mmho/m  | 655.677 | -3.102  |

| Downhole Calibration |       |        |            |         |          |         |       |       |
|----------------------|-------|--------|------------|---------|----------|---------|-------|-------|
| Readings             |       |        | References |         |          | Results |       |       |
|                      | Zero  | Cal    |            | Zero    | Cal      |         | m'    | b'    |
| Deep                 | 0.000 | 0.000  | mmho/m     | 14.508  | 388.384  | mmho/m  | 1.000 | 0.000 |
| Medium               | 0.000 | 0.000  | mmho/m     | 166.367 | 504.400  | mmho/m  | 1.000 | 0.000 |
| LL3                  |       | 7.500  | V          |         | 1400.000 | Ohm-m   |       |       |
|                      |       | 0.000  | V          |         | 20.000   | Ohm-m   |       |       |
|                      |       | -7.200 | V          |         | 4000.000 | 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                       |       | 7.500  | V       |       | 1400.000 | Ohm-m   |       |       |
|                           |       | 0.000  | V       |       | 20.000   | Ohm-m   |       |       |
|                           |       | -7.200 | V       |       | 4000.000 | mmho-m  |       |       |

|        |       |       |        |       |       |        |       |       |
|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| 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: 003N      Model: PRB

|                    |            |  |                                    |         |                     |  |           |      |
|--------------------|------------|--|------------------------------------|---------|---------------------|--|-----------|------|
| Master Calibration |            |  | Performed Tue Sep 08 14:14:44 2009 |         |                     |  |           |      |
|                    | Background |  | Magnesium                          |         | Aluminum            |  | Sandstone |      |
| Window 1           | 2042.6     |  | 12312.8                            |         | 4225.8              |  | 13758.4   | cps  |
| Window 2           | 1855.8     |  | 10134.7                            |         | 3624.2              |  | 11113.1   | cps  |
| Window 3           | 1639.4     |  | 6760.2                             |         | 2716.3              |  | 7260.3    | cps  |
| Window 4           | 466.4      |  | 469.2                              |         | 466.1               |  | 476.5     | cps  |
| Long Space         | 0.0        |  | 8278.9                             |         | 1768.4              |  | 9257.4    | cps  |
| Short Space        | 2.2        |  | 2377.3                             |         | 1544.1              |  | 2574.2    | cps  |
| Rho                |            |  | 1.7100                             |         | 2.5900              |  | 1.3800    | g/cc |
| Pe                 |            |  | 0.0000                             |         | 2.5700              |  | 1.5500    |      |
| Rib Angle          | : 44.4     |  | Rib Slope                          | : 0.979 | Density/Spine Ratio |  | : 0.549   |      |
| Spine Angle        | : 74.4     |  | Spine Slope                        | : 3.577 | Spine Intercept     |  | : -18.8   |      |

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

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Compensated Neutron Calibration Report

|                |        |
|----------------|--------|
| Serial Number: | 070808 |
| Tool Model:    | Probe  |

|                         |          |          |        |
|-------------------------|----------|----------|--------|
| PRE-SURVEY VERIFICATION |          |          |        |
| Detector                | Readings | Measured | Target |
| Short Space             | cps      |          |        |
| Long Space              | cps      | pu       | pu     |

POST-SURVEY VERIFICATION

| Detector                     | Readings                 | Measured | Target |
|------------------------------|--------------------------|----------|--------|
| Short Space                  | cps                      |          |        |
| Long Space                   | cps                      | pu       | pu     |
| Gamma Ray Calibration Report |                          |          |        |
| Serial Number:               | 070558                   |          |        |
| Tool Model:                  | OPEN_GR                  |          |        |
| Performed:                   | Mon Mar 24 01:53:40 2014 |          |        |
| Calibrator Value:            | 1.0                      | GAPI     |        |
| Background Reading:          | 0.0                      | cps      |        |
| Calibrator Reading:          | 1.0                      | cps      |        |
| Sensitivity:                 | 0.3000                   | GAPI/cps |        |