SUPERIOR WELL SERVICES

SUPERIOR
Hays,
Kansas

# DUAL INDUCTION LOG

| | |
|---|---|
| Company | EDISON OPERATING CO., LLC. |
| Well | STERLING #1-31 |
| Field | HARDTNER |
| County | BARBER |
| State | KANSAS |

Company EDISON OPERATING COMPANY, LLC

Well STERLING #1-31

Field HARDTNER

County BARBER State KANSAS

Location: API # : 15-007-23765-0000

1320' FNL & 330' FWL

SEC 31 TWP 34S RGE 12W

Permanent Datum GROUND LEVEL Elevation 1461

Log Measured From KELLY BUSHING 10' A.G.L.

Drilling Measured From KELLY BUSHING

Other Services: CDL/CNL/PE, MEL/SON

Elevation: K.B. 1471, D.F. 1469, G.L. 1461

| | | | |
|---|---|---|---|
| Date | 9/24/11 | | |
| Run Number | ONE | | |
| Depth Driller | 5476 | | |
| Depth Logger | 5477 | | |
| Bottom Logged Interval | 5475 | | |
| Top Log Interval | 0 | | |
| Casing Driller | 8 5/8"@331' | | |
| Casing Logger | 332' | | |
| Bit Size | 7 7/8" | | |
| Type Fluid in Hole | CHEMICAL MUD | CHLORIDES 4,000 PPM | |
| Density / Viscosity | 9.1/48 | | |
| pH / Fluid Loss | 11.0/8.8 | | |
| Source of Sample | FLOWLINE | | |
| Rm @ Meas. Temp | .85@88F | | |
| Rmf @ Meas. Temp | .64@88F | | |
| Rmc @ Meas. Temp | 1.02@88F | | |
| Source of Rmf / Rmc | MEASUREMENT | | |
| Rm @ BHT | .58@129F | | |
| Time Circulation Stopped | 5 HOURS | | |
| Time Logger on Bottom | | | |
| Maximum Recorded Temperature | 129F | | |
| Equipment Number | 4010 | | |
| Location | HAYS, KANSAS | | |
| Recorded By | JEFF GRONEWEG | | |
| Witnessed By | DEREK PATTERSON | | |

<<< 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

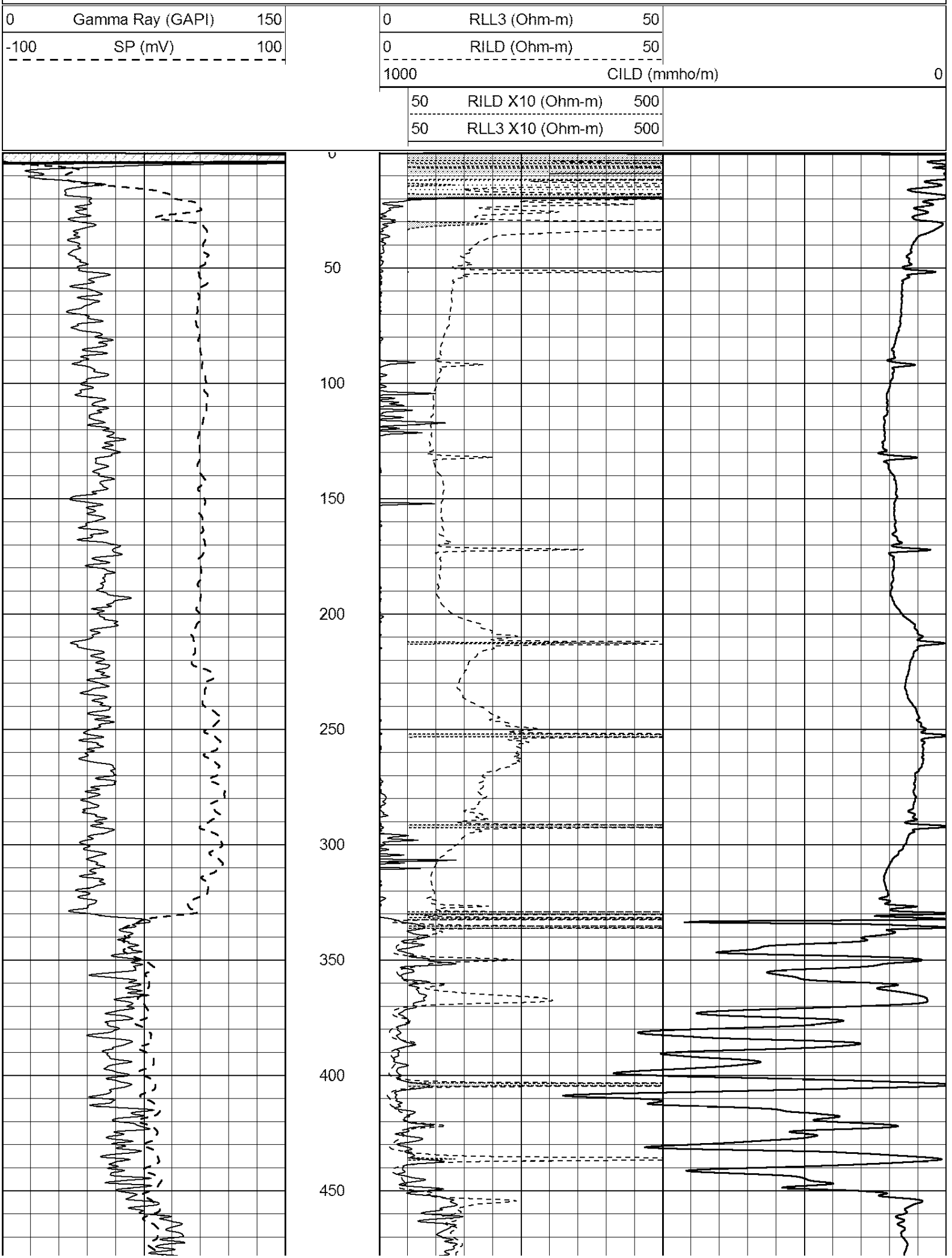
THANK YOU FOR USING SUPERIOR WELL SERVICE HAYS, KANSAS (785) 628-6395

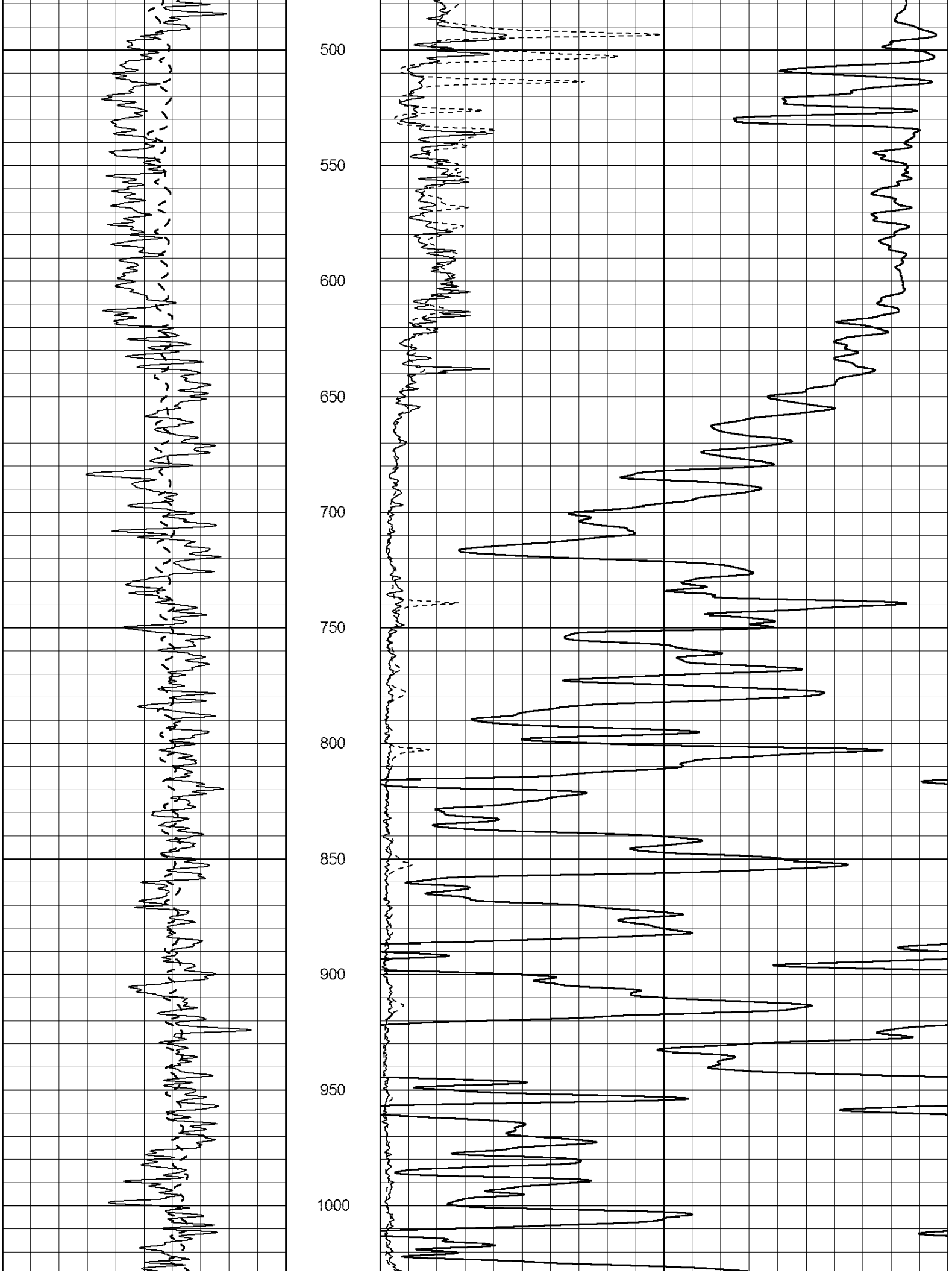
DIRECTIONS

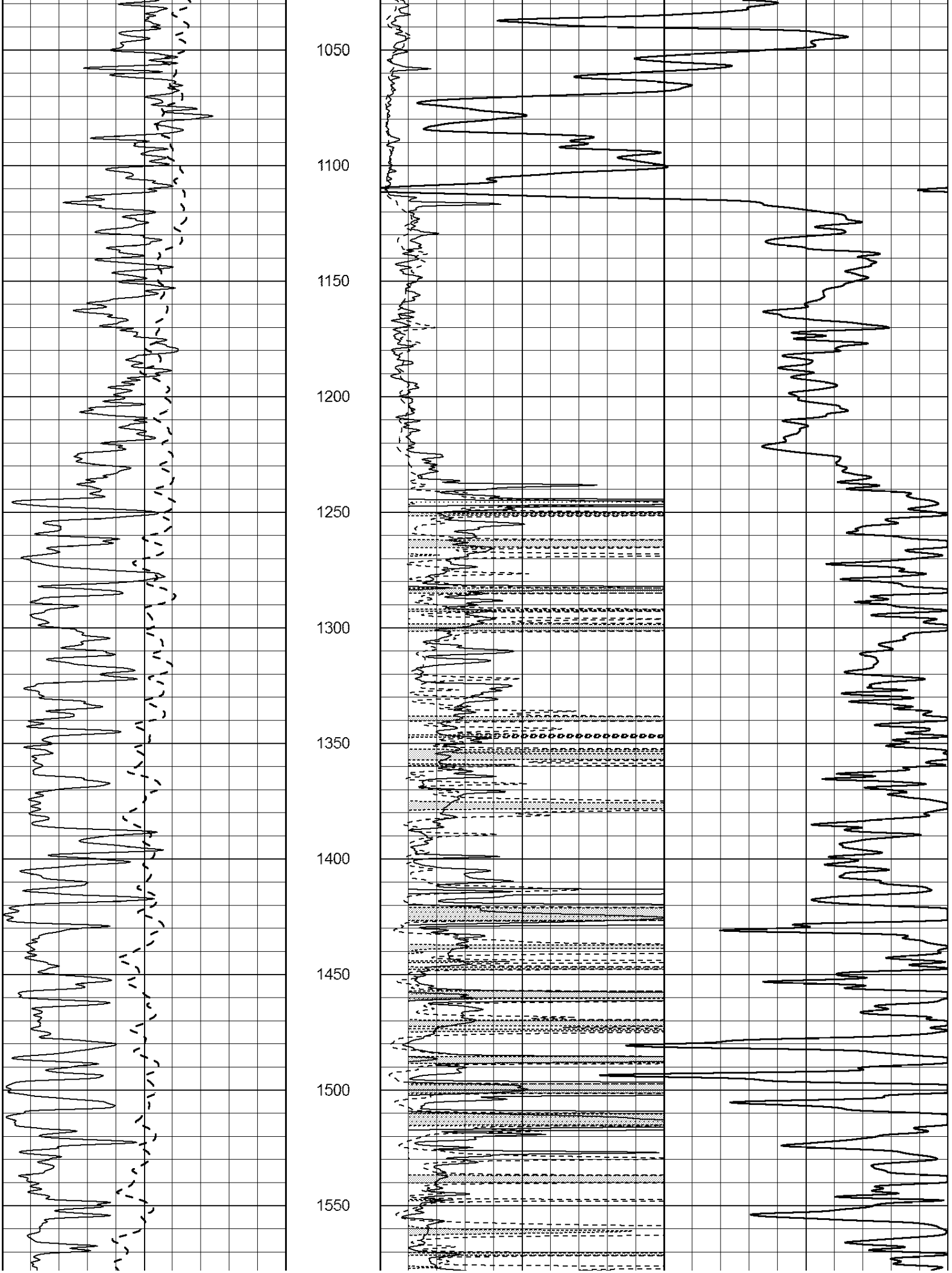
HARDTNER, KS - NORTH ON BLACKTOP 2 1/2 MILES TO RATTLESNAKE TRAIL

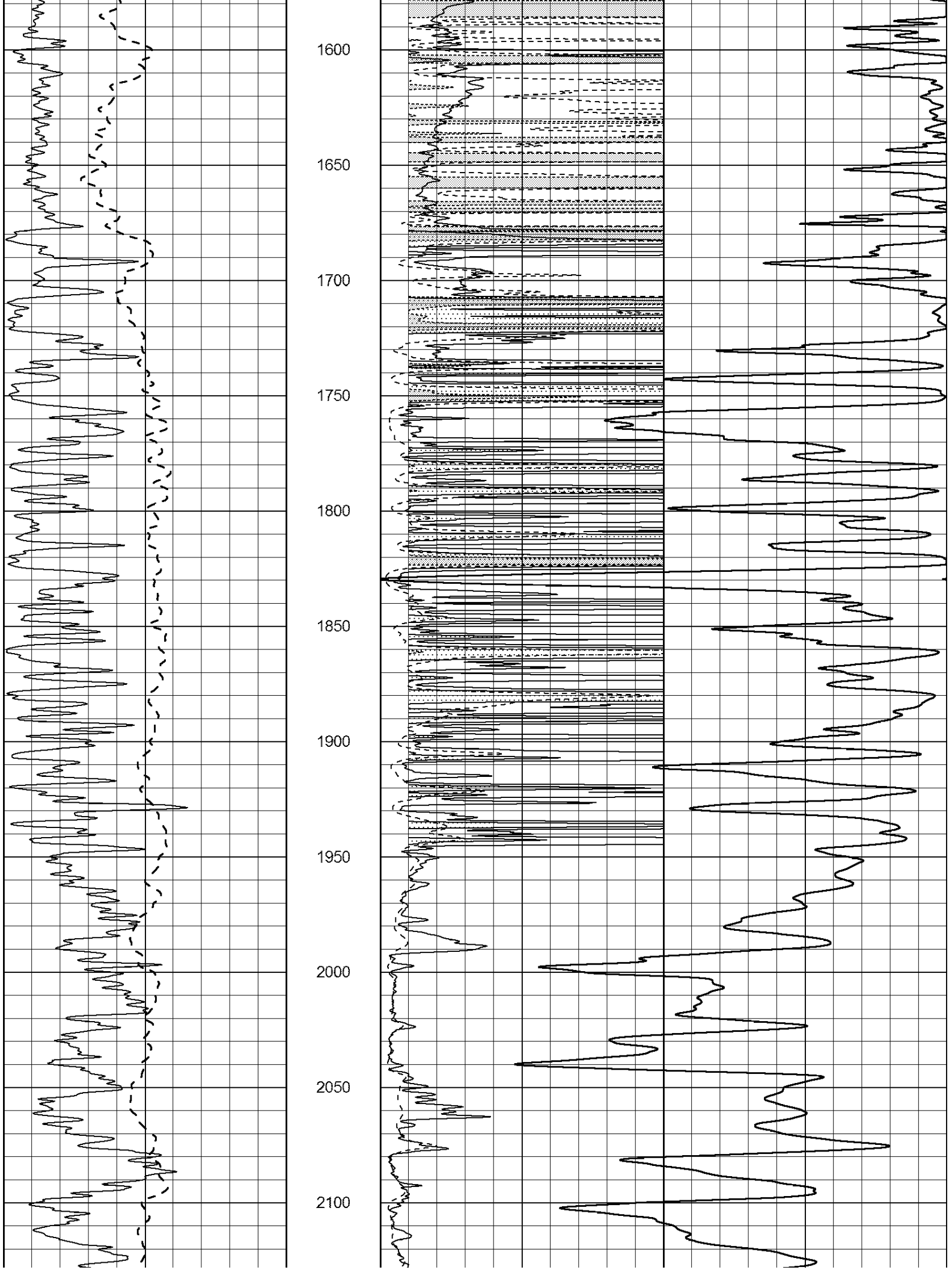
2 1/2 MILES WEST - SOUTH INTO

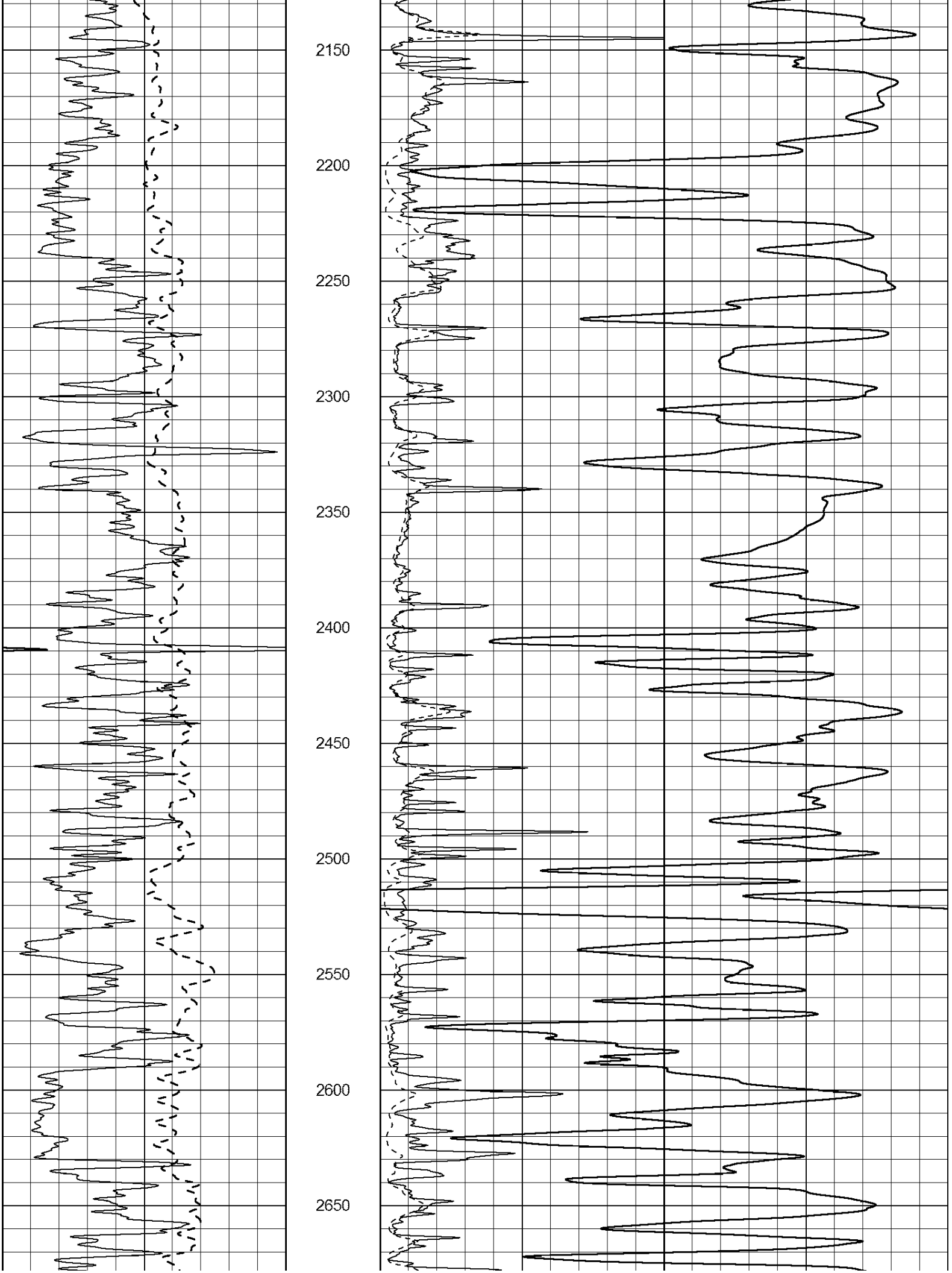
| | |
|---|---|
| Database File: | 007453pe.db |
| Dataset Pathname: | pass3.2 |
| Presentation Format: | dil2 |
| Dataset Creation: | Sat Sep 24 16:47:46 2011 by Calc Open-Cased 110302 |
| Charted by: | Depth in Feet scaled 1:600 |

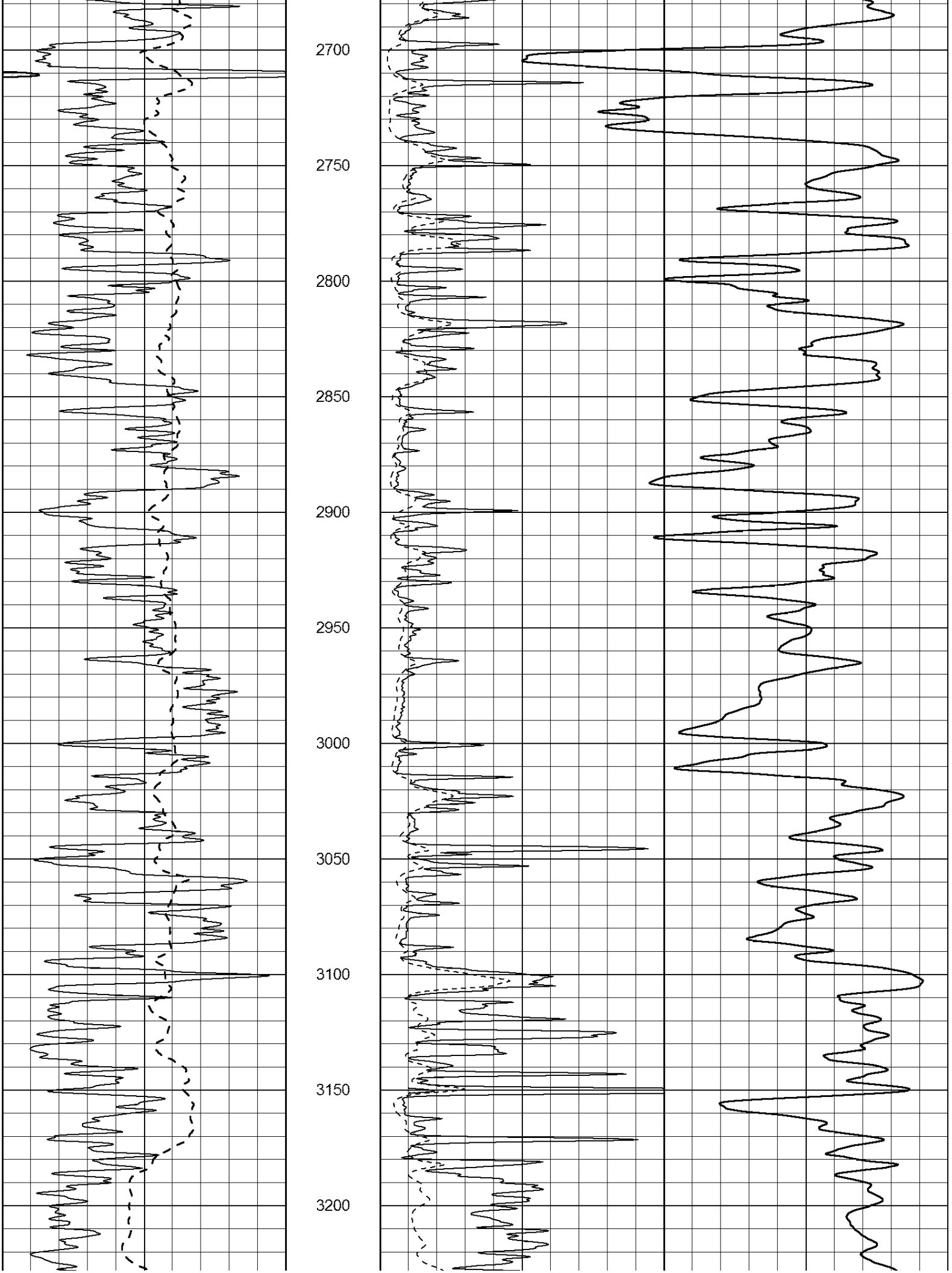

0 Gamma Ray (GAPI) 150
-100 SP (mV) 100
0 RLL3 (Ohm-m) 50
0 RILD (Ohm-m) 50
1000 CILD (mmho/m) 0
50 RILD X10 (Ohm-m) 500
50 RLL3 X10 (Ohm-m) 500
0
50
100
150
200
250
300
350
400
450

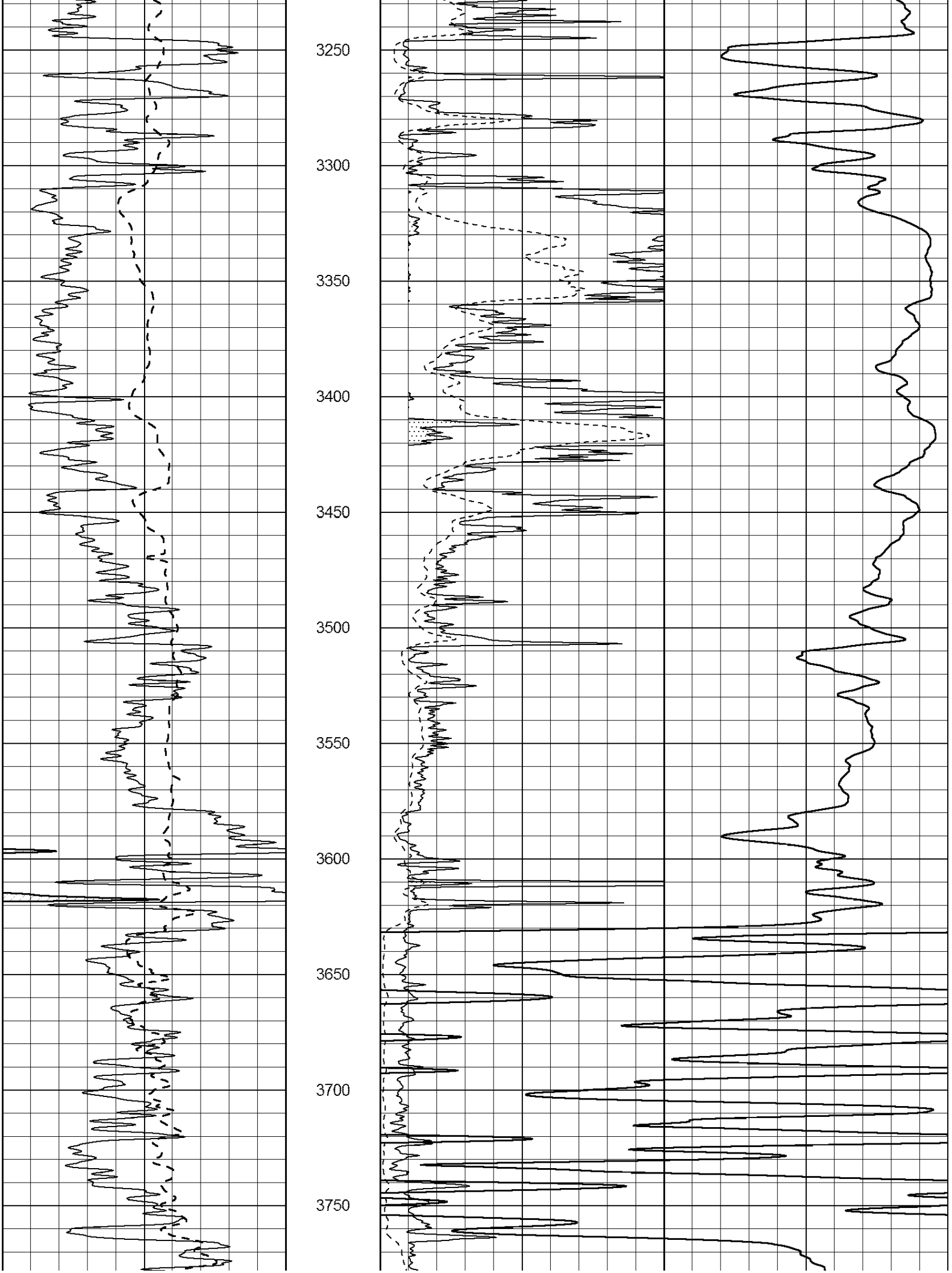

500
550
600
650
700
750
800
850
900
950
1000

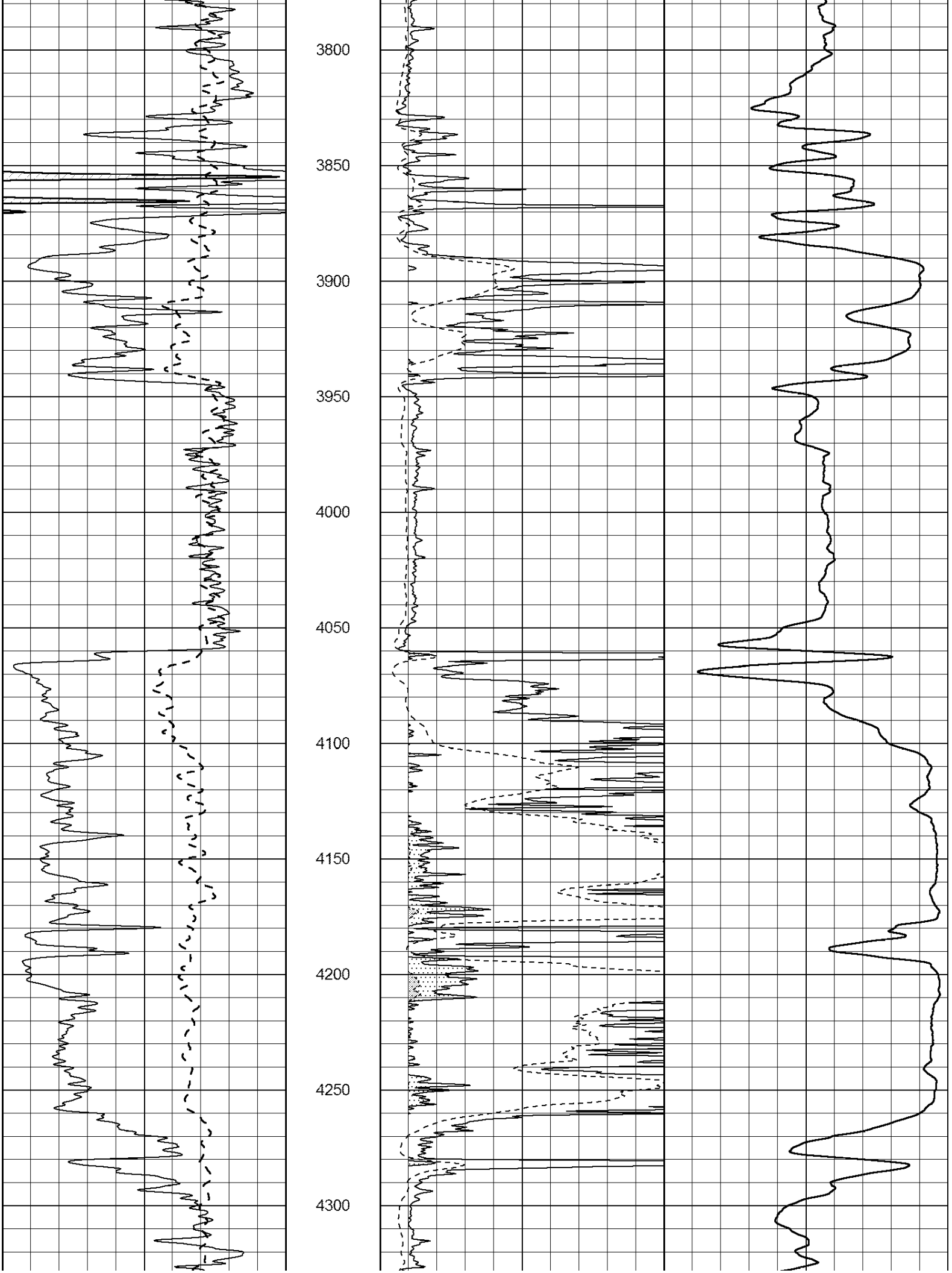

1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550

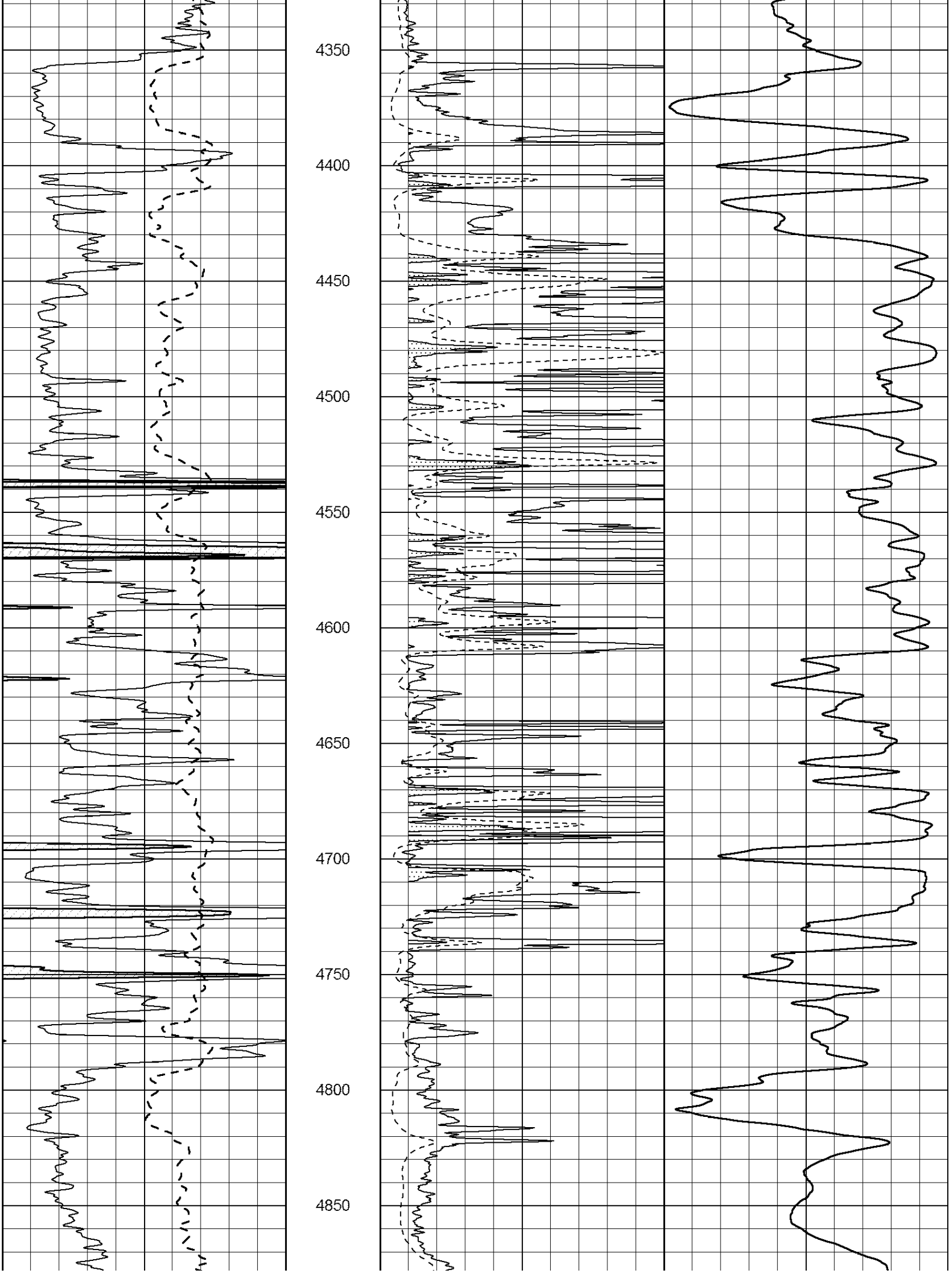

1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100

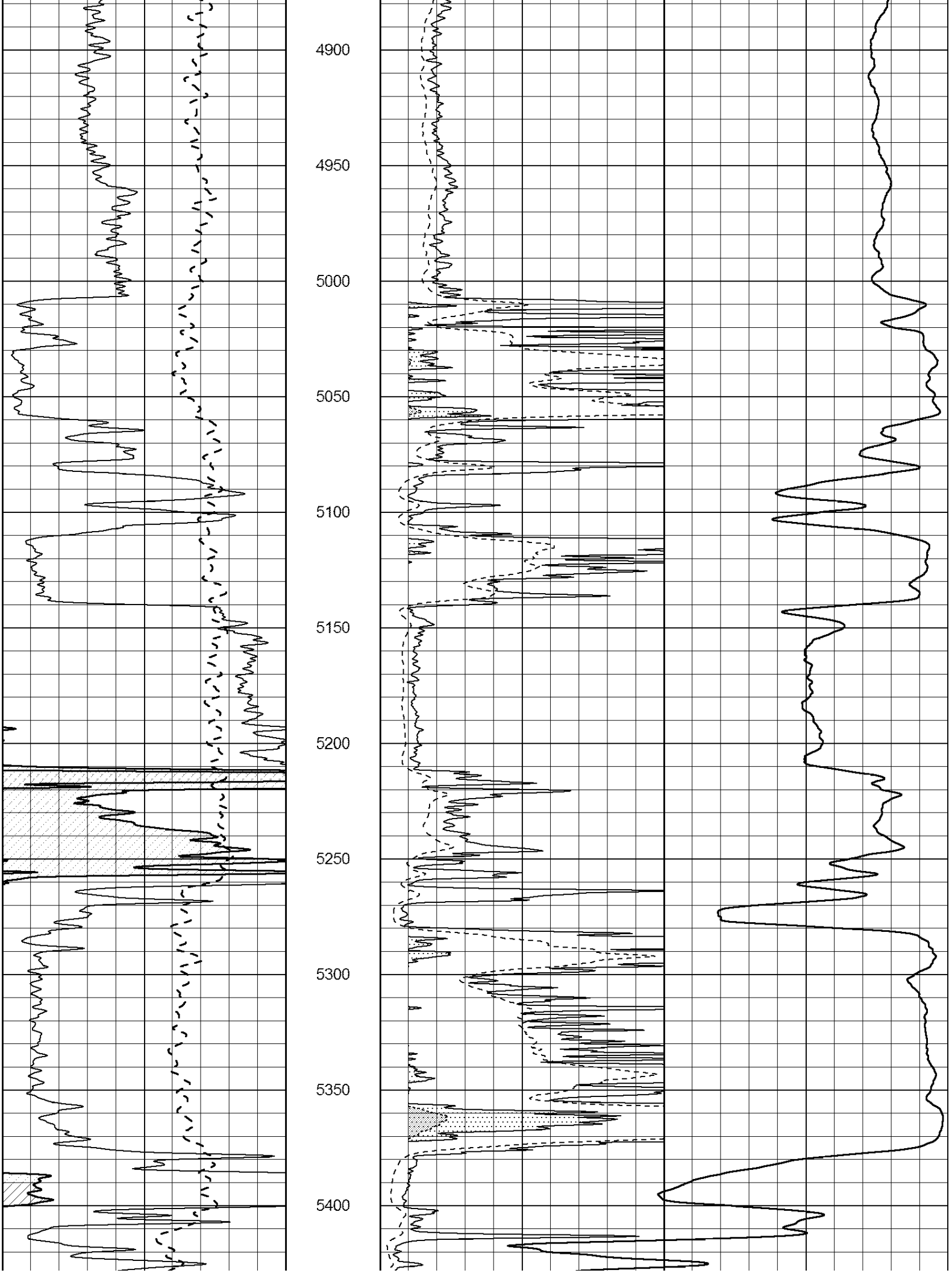

2150
2200
2250
2300
2350
2400
2450
2500
2550
2600
2650

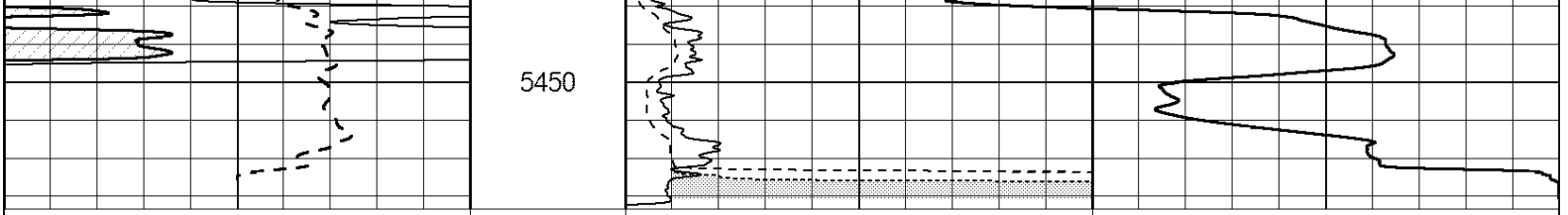

2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3200


3250
3300
3350
3400
3450
3500
3550
3600
3650
3700
3750


3800
3850
3900
3950
4000
4050
4100
4150
4200
4250
4300


4350
4400
4450
4500
4550
4600
4650
4700
4750
4800
4850


4900
4950
5000
5050
5100
5150
5200
5250
5300
5350
5400



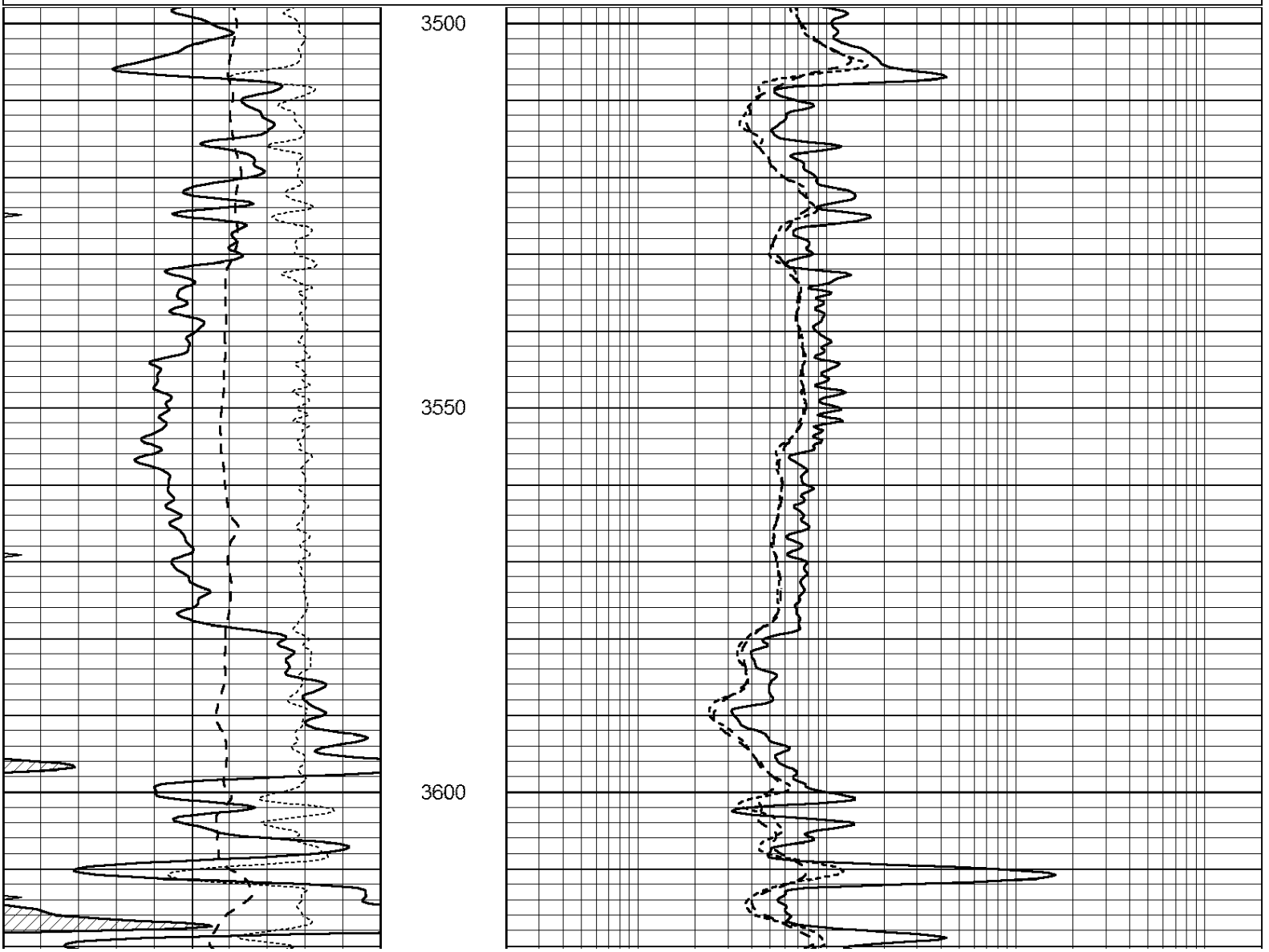

| | | |
|---|---|---|
| 0 | Gamma Ray (GAPI) | 150 |
| -100 | SP (mV) | 100 |

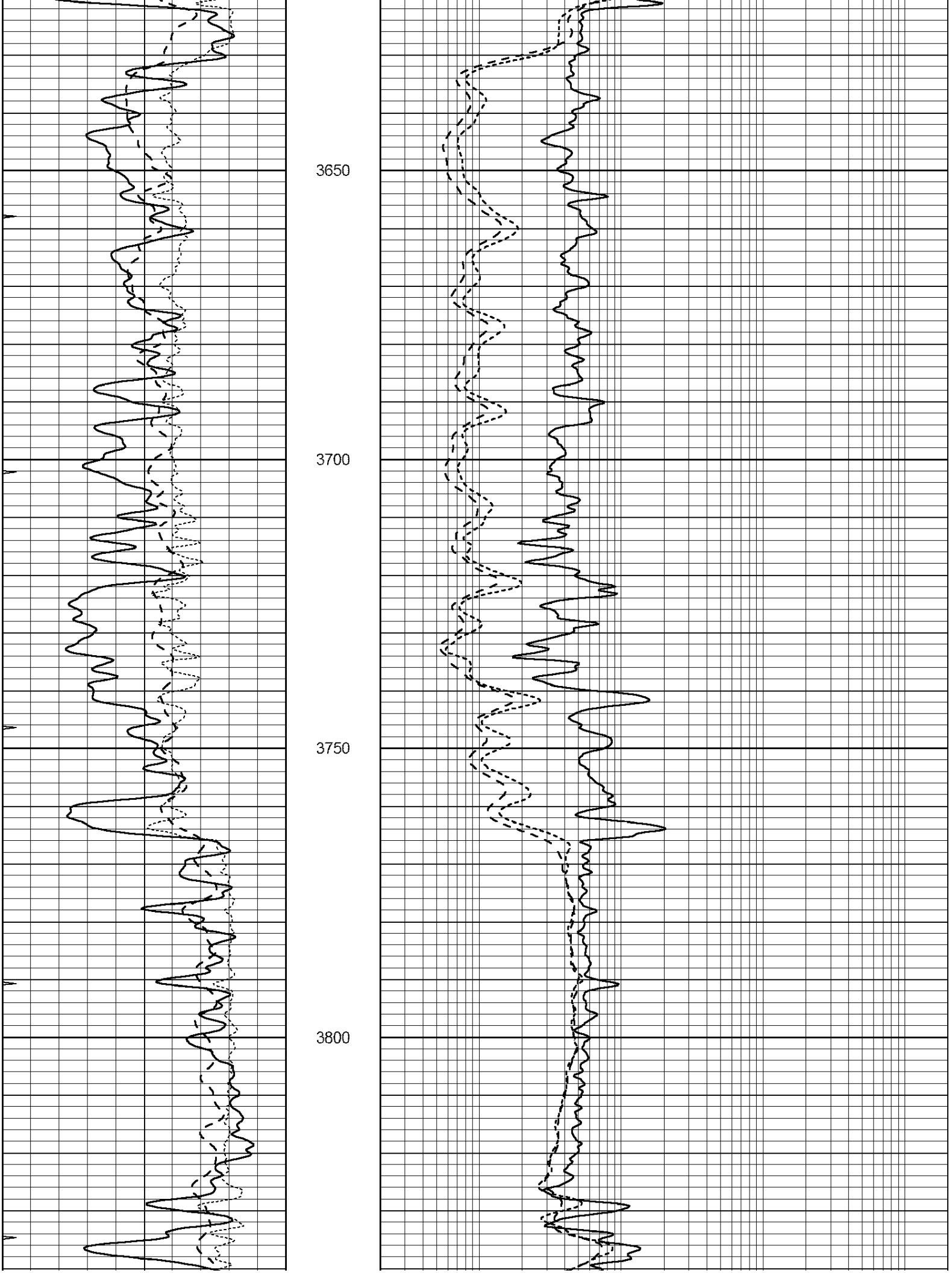
| | | |
|---|---|---|
| 0 | RLL3 (Ohm-m) | 50 |
| 0 | RILD (Ohm-m) | 50 |
| 1000 | CILD (mmho/m) | 0 |
| 50 | RILD X10 (Ohm-m) | 500 |
| 50 | RLL3 X10 (Ohm-m) | 500 |

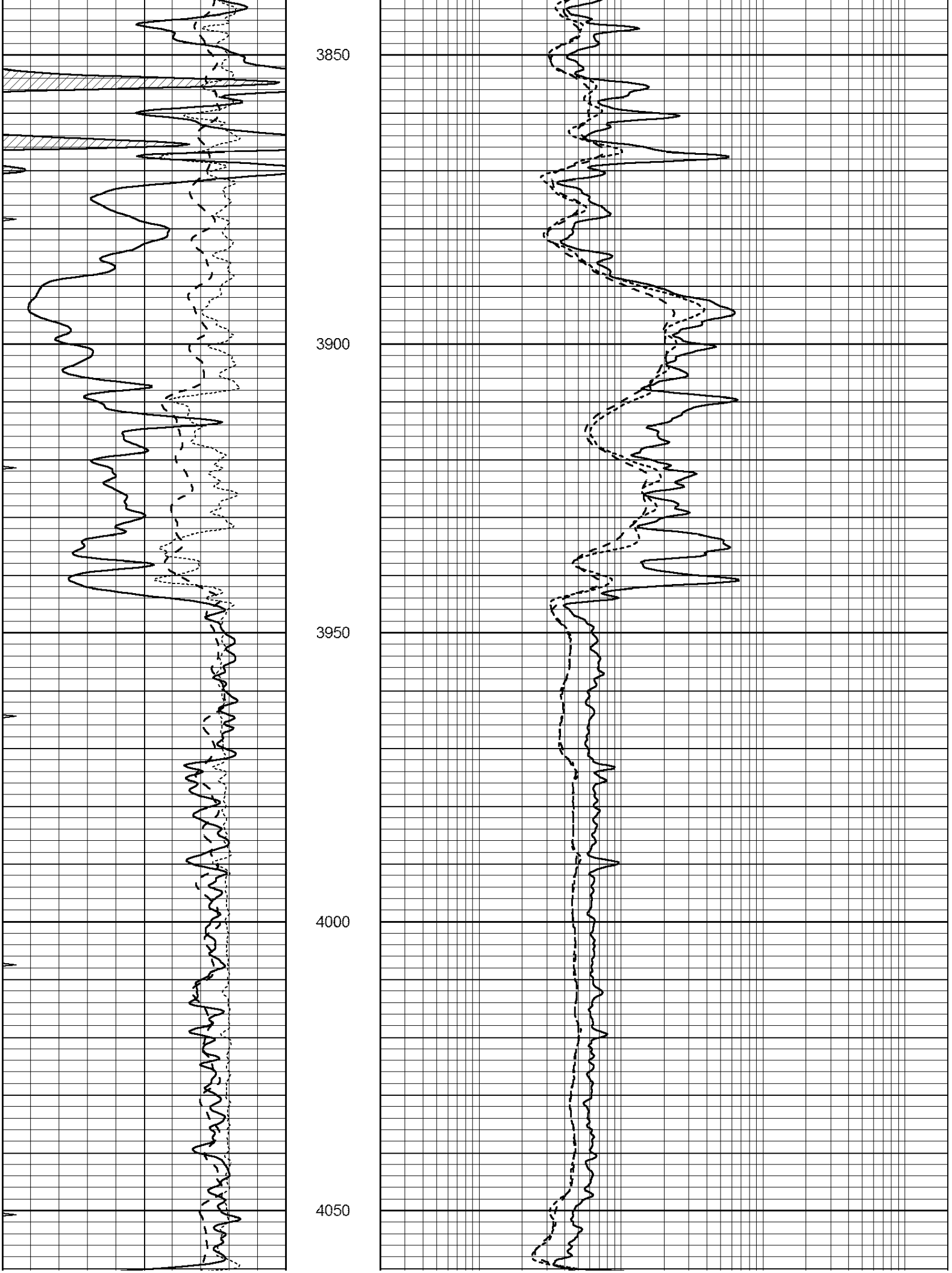
Database File: 007453pe.db
Dataset Pathname: pass3.1
Presentation Format: dil
Dataset Creation: Sat Sep 24 14:53:11 2011 by Calc Open-Cased 110302
Charted by: Depth in Feet scaled 1:240

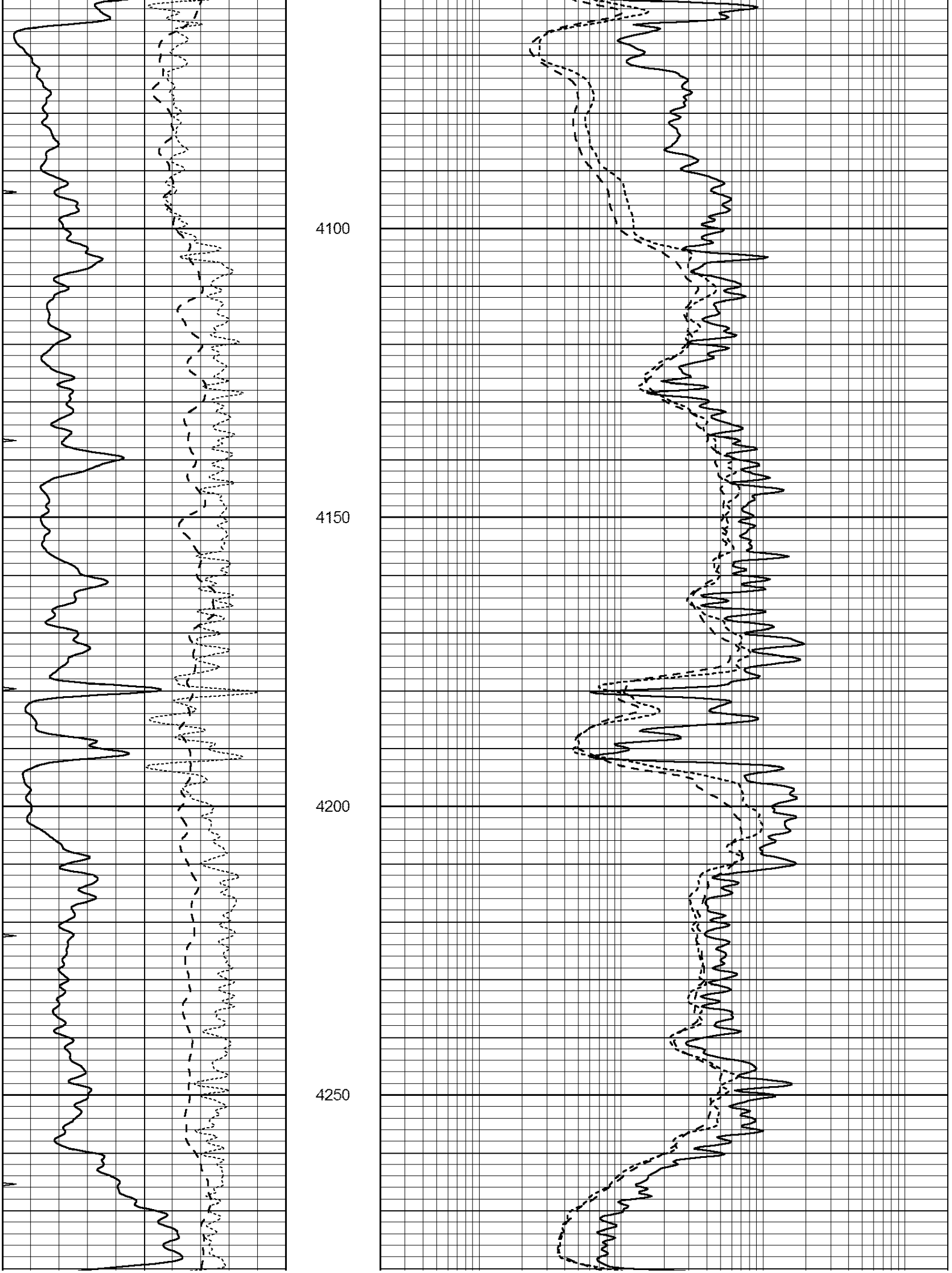
| | | |
|---|---|---|
| 0 | GAMMA RAY (GAPI) | 150 |
| -100 | SP (mV) | 100 |
| -250 | Rxo/Rt | 50 |
| 0 | MINMK | 20 |

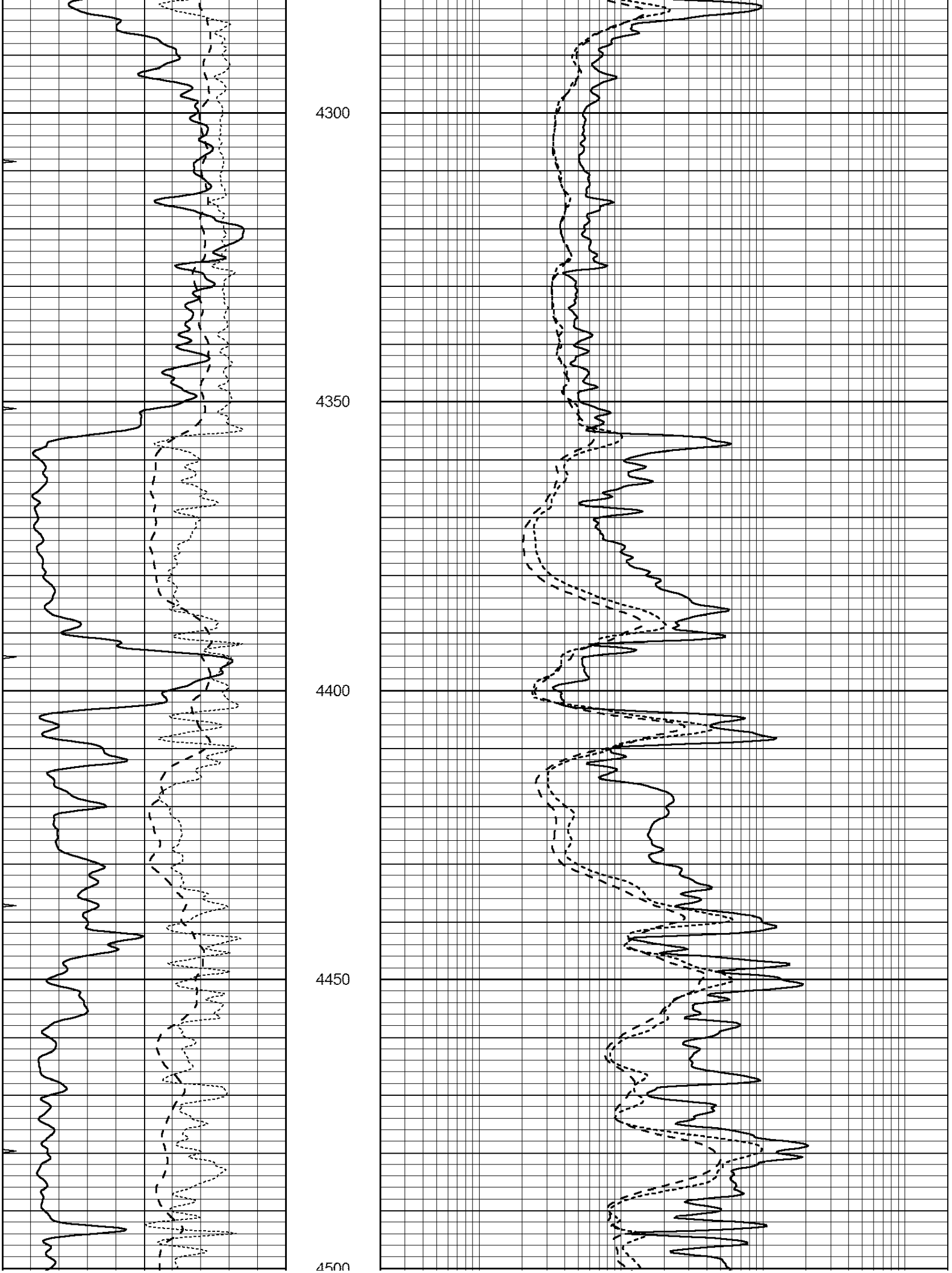
| | | |
|---|---|---|
| 0.2 | SHALLOW GUARD (Ohm-m) | 2000 |
| 0.2 | DEEP INDUCTION (Ohm-m) | 2000 |
| 0.2 | MEDIUM INDUCTION (Ohm-m) | 2000 |

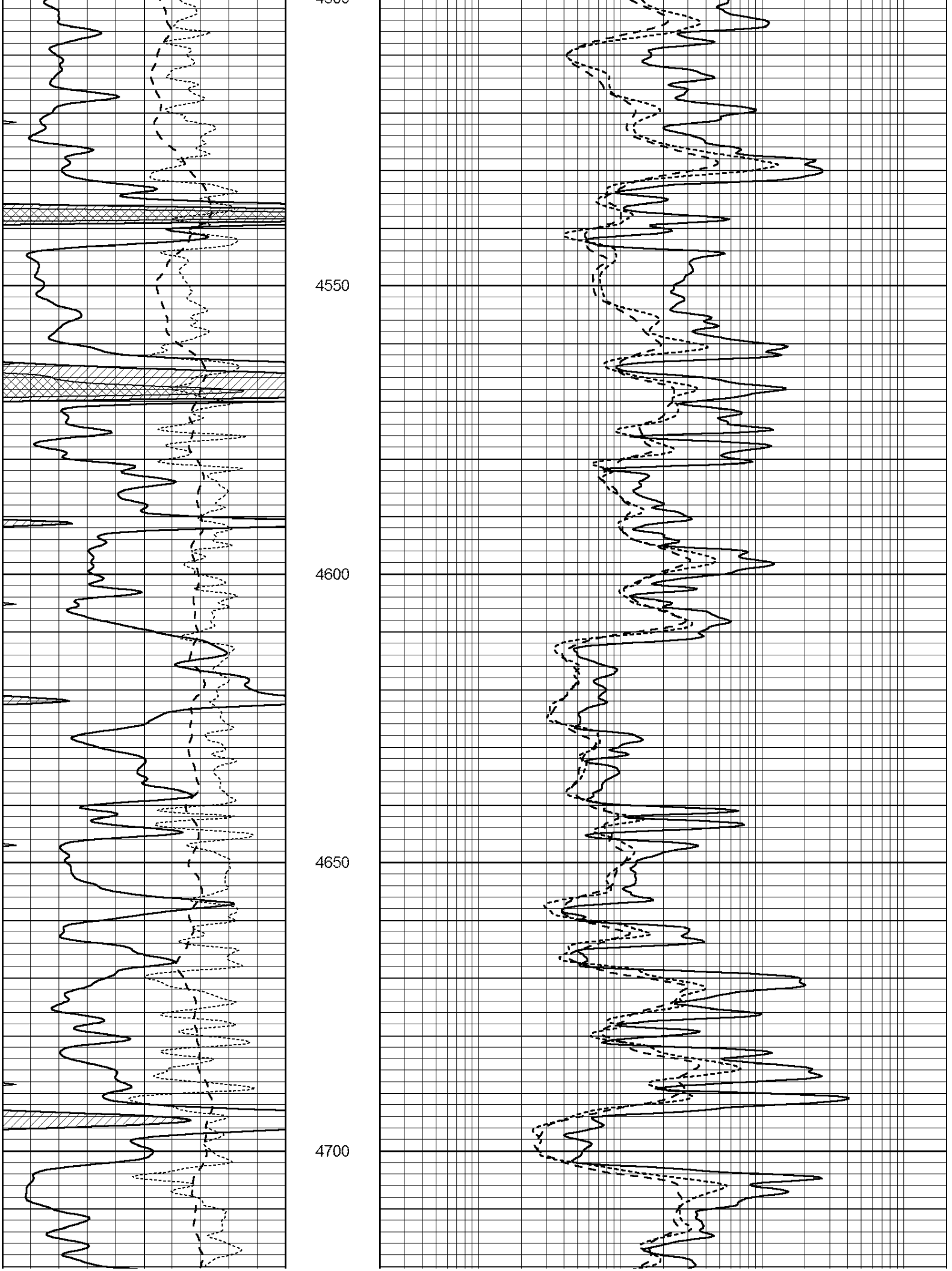


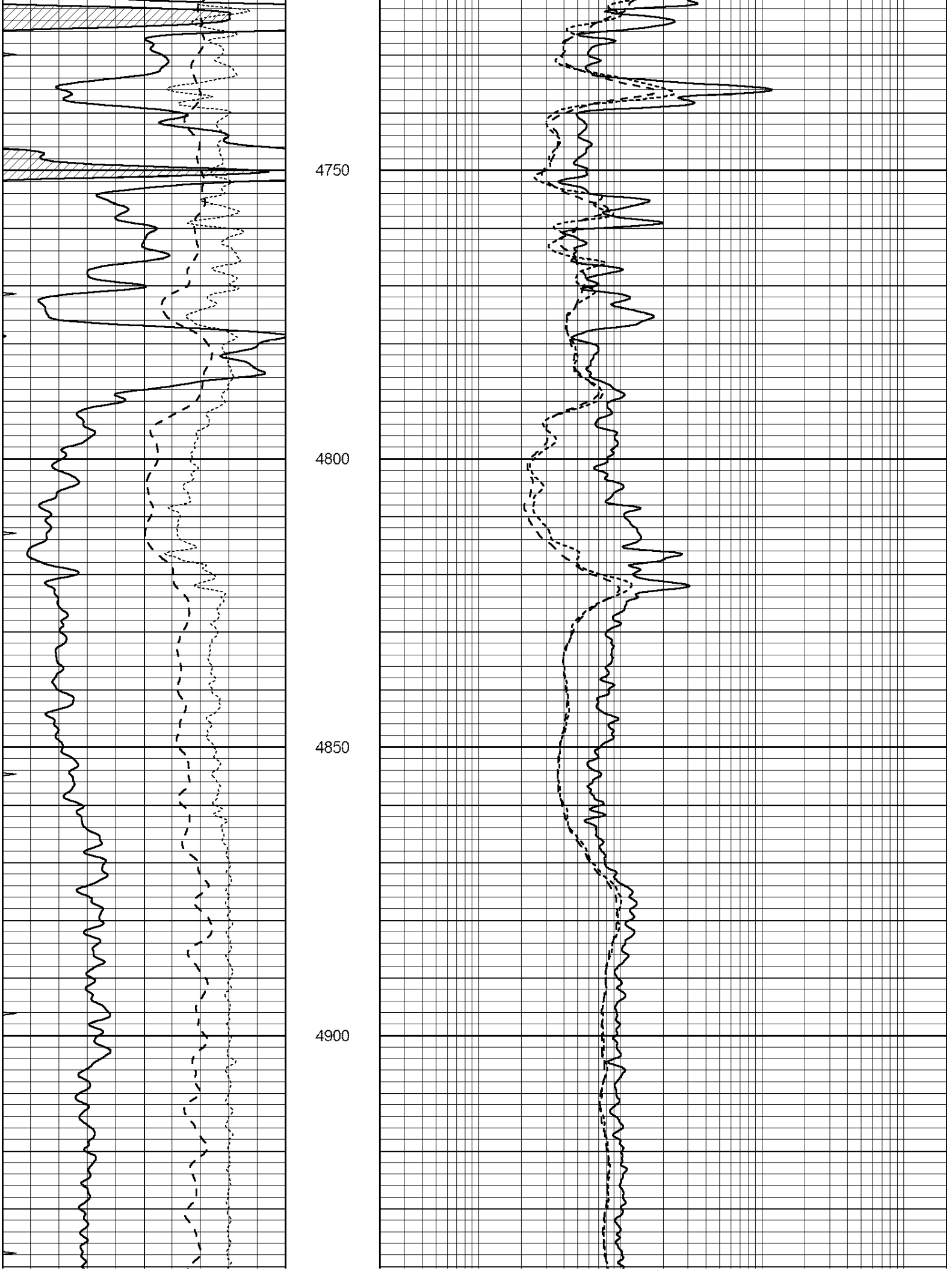

3650
3700
3750
3800

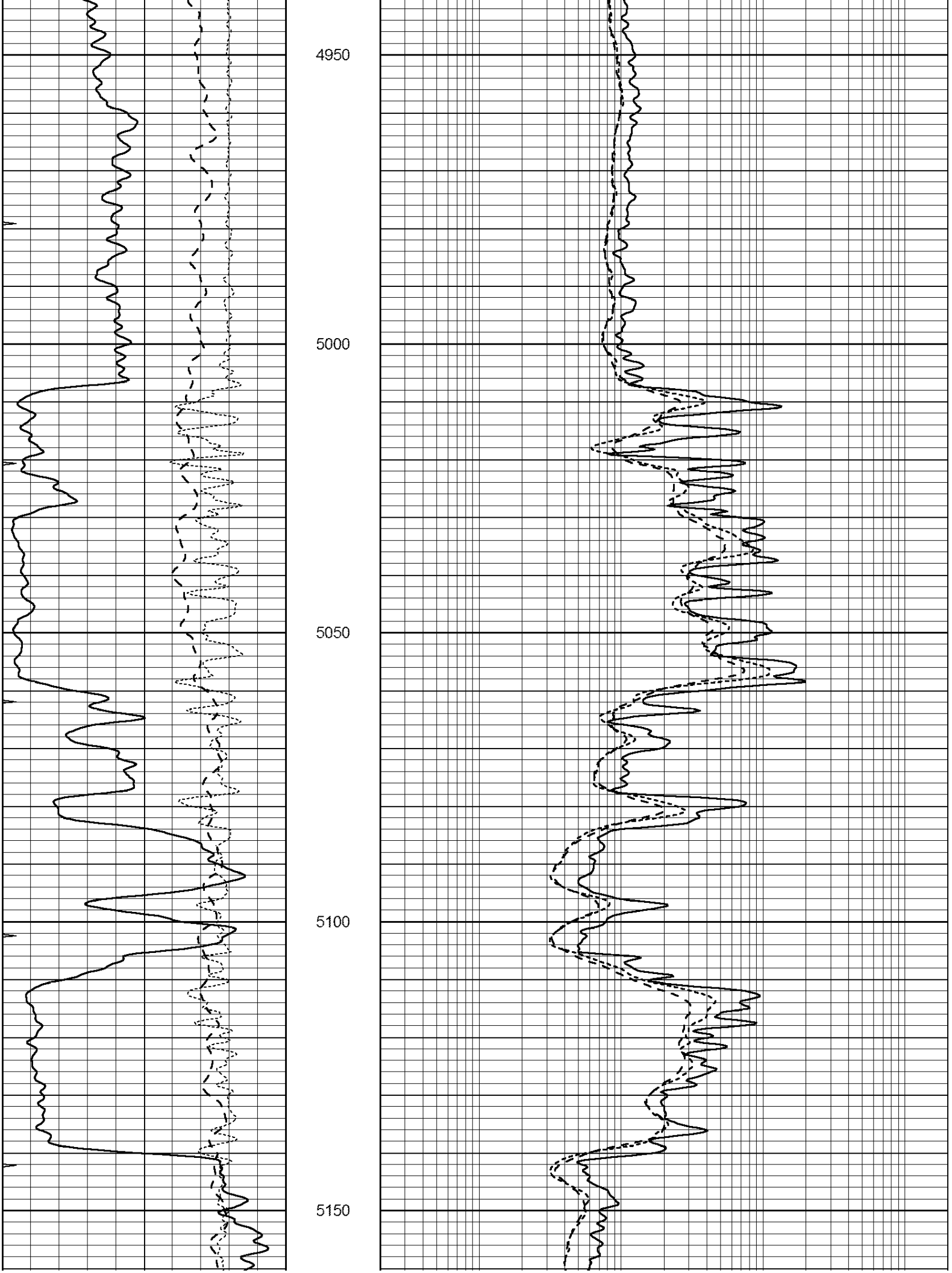

3850
3900
3950
4000
4050

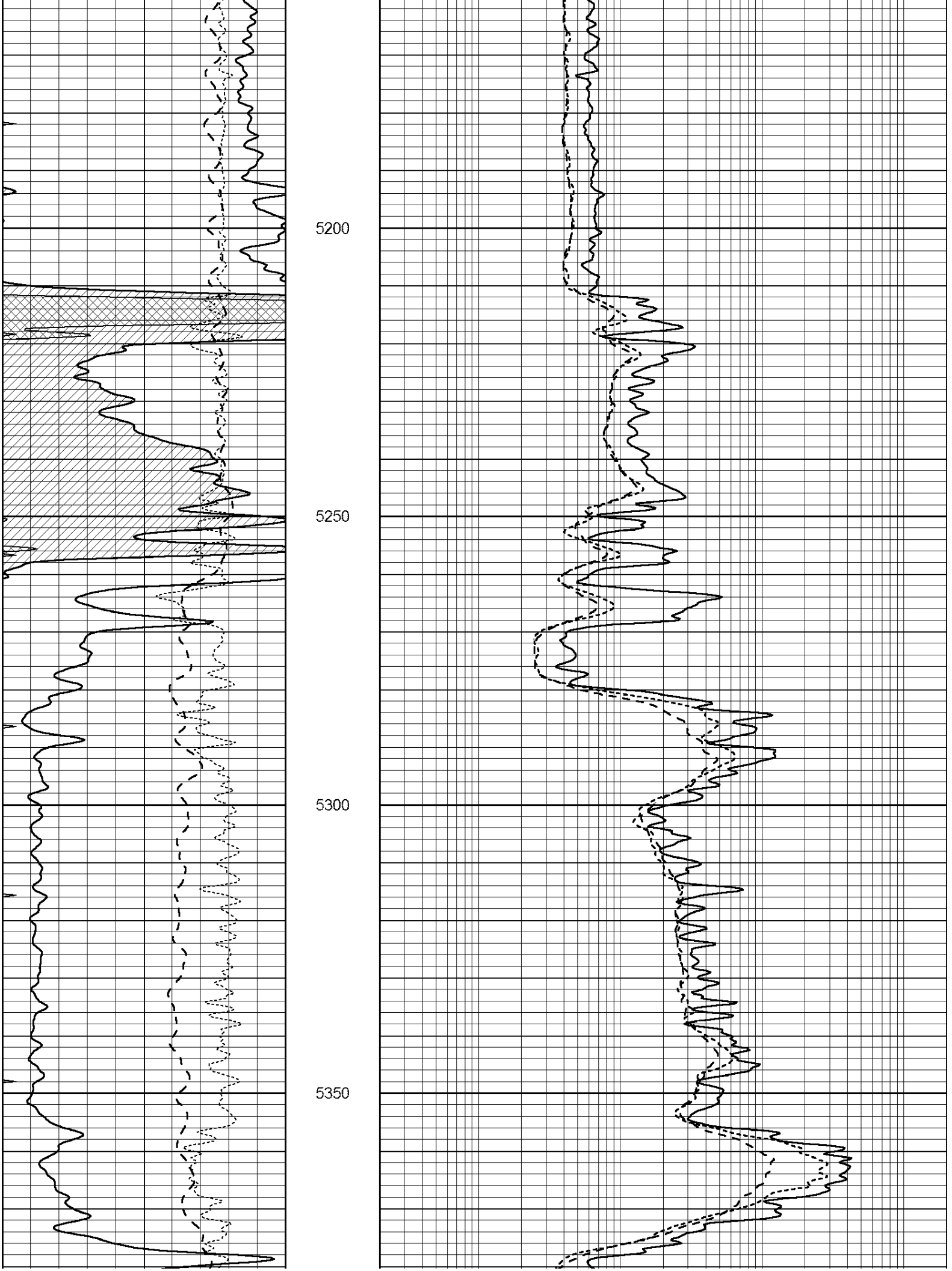

4100
4150
4200
4250

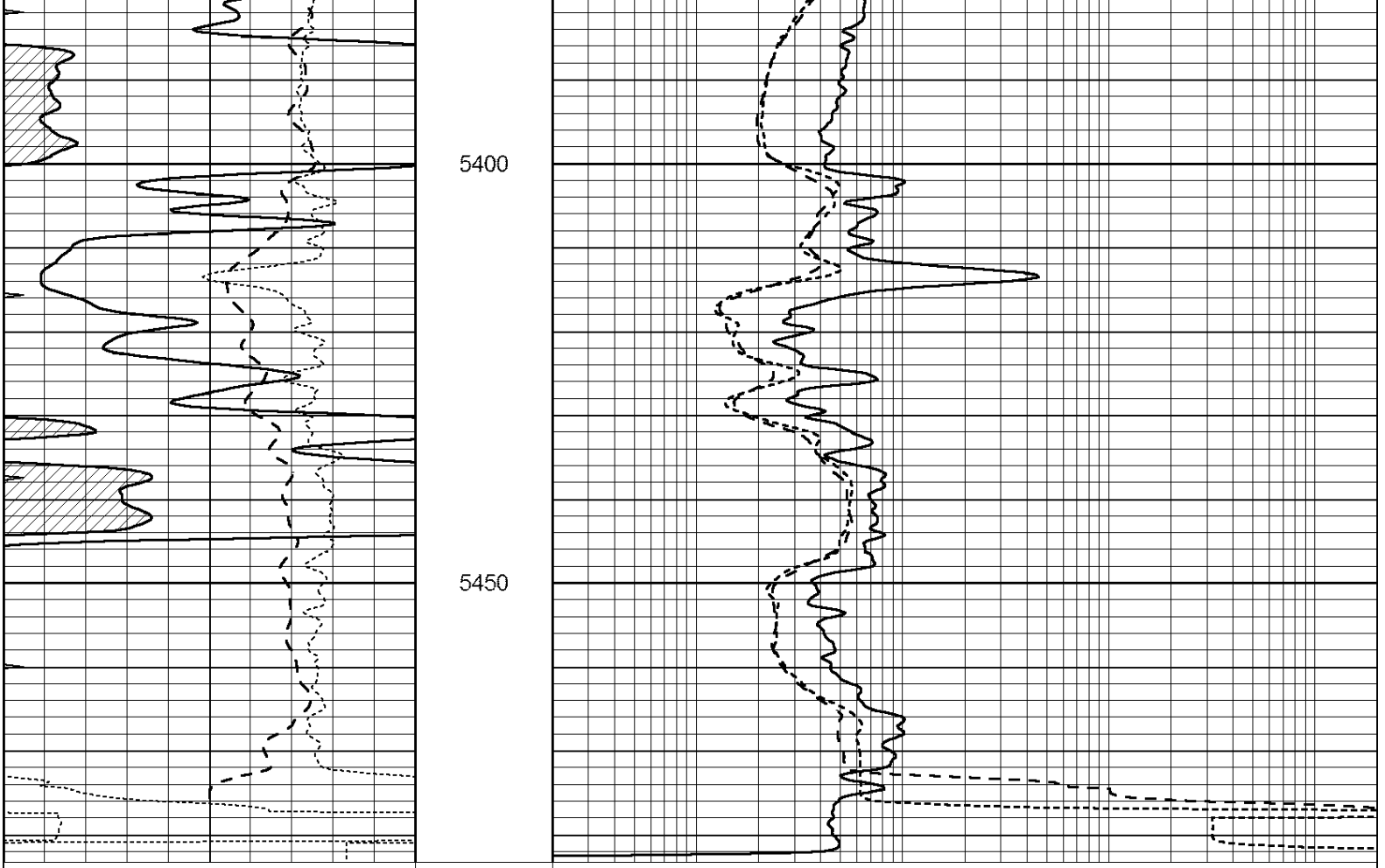

4300
4350
4400
4450
4500


4550
4600
4650
4700


4750
4800
4850
4900


4950
5000
5050
5100
5150


5200
5250
5300
5350




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

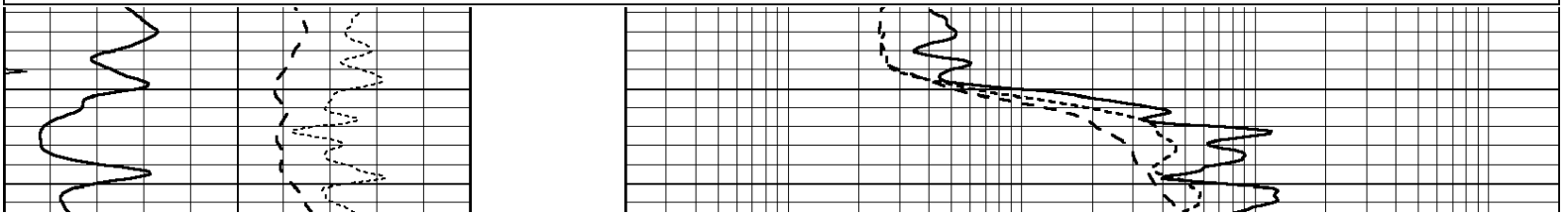
SUPERIOR
Hays,
Kansas

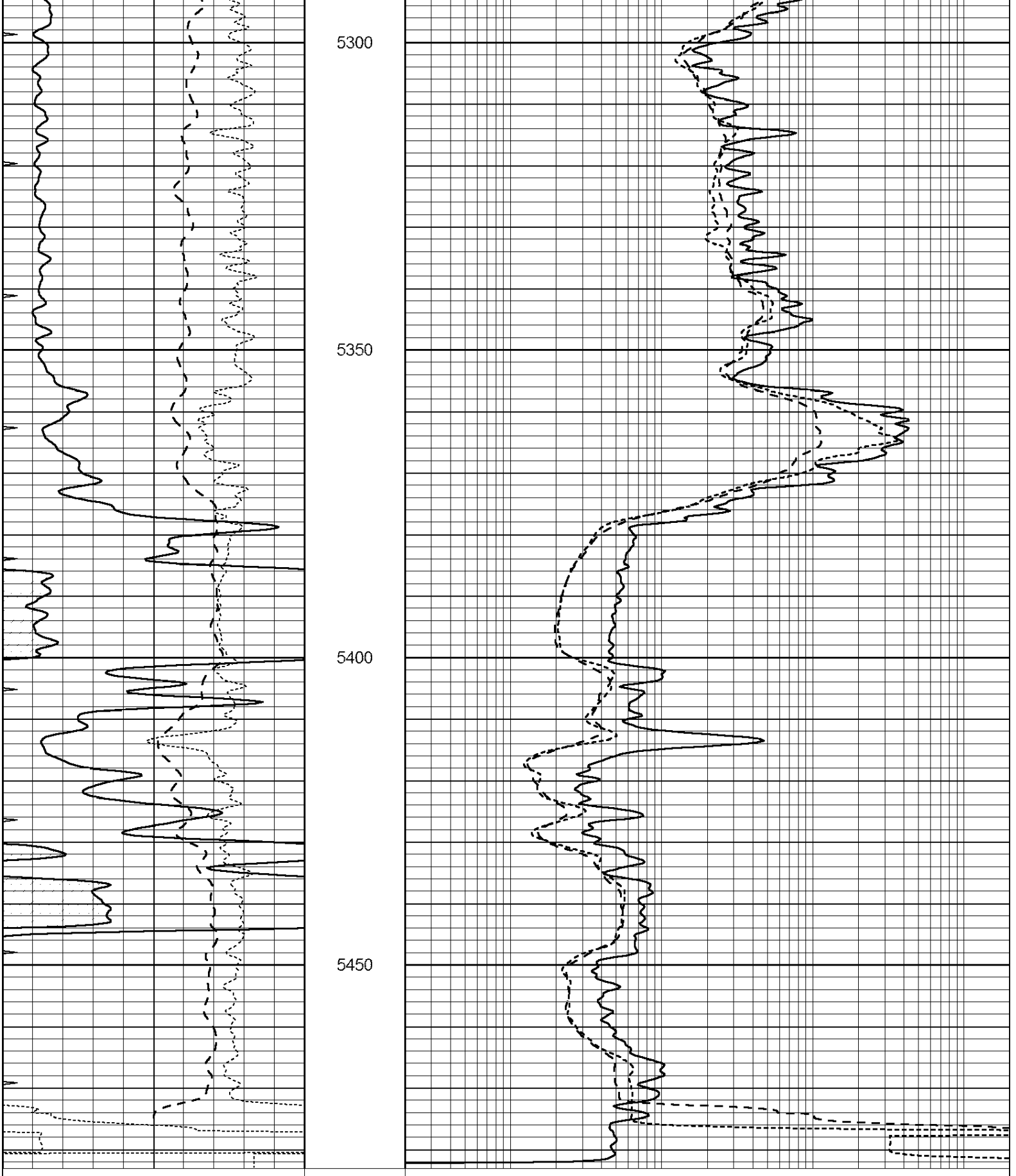
# REPEAT SECTION

Database File: 007453pe.db
Dataset Pathname: pass2.1
Presentation Format: dil
Dataset Creation: Sat Sep 24 14:00:00 2011 by Calc Open-Cased 110302
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 |






| | | |
|---|---|---|
| 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: 007453pe.db
Dataset Pathname: pass3.2
Dataset Creation: Sat Sep 24 16:47:46 2011 by Calc Open-Cased 110302

## Dual Induction Calibration Report

Serial-Model: DIL3-GEAR
Performed: Wed Sep 21 06:07:29 2011

| | Readings | | | References | | | Results | |
|---|---|---|---|---|---|---|---|---|
| Loop: | Air | Loop | | Air | Loop | | m | b |
| Deep | 0.011 | 0.656 | V | 0.000 | 400.000 | mmho/m | 640.000 | 7.000 |
| Medium | 0.013 | 0.740 | V | 0.000 | 462.500 | mmho/m | 700.000 | -8.000 |
| Internal: | Zero | Cal | | Zero | Cal | | m | b |
| Deep | 0.002 | 0.645 | V | 0.000 | 400.000 | mmho/m | 622.059 | -1.071 |
| Medium | 0.007 | 0.740 | V | 0.000 | 462.500 | mmho/m | 631.393 | -4.555 |

## Litho Density Calibration Report

Serial: 004N Model: PRB
Performed Tue Sep 08 13:49:55 2009

### Litho Density Calibration

| | Background | Magnesium | Aluminum | Sandstone | |
|---|---|---|---|---|---|
| Window 1 | 1535.8 | 11161.3 | 3721.6 | 12498.8 | cps |
| Window 2 | 1402.6 | 9435.7 | 3219.7 | 10417.7 | cps |
| Window 3 | 1077.6 | 4422.0 | 1779.2 | 4753.4 | cps |
| Window 4 | 337.3 | 342.8 | 337.4 | 343.7 | cps |
| Long Space | 0.0 | 8033.1 | 1817.0 | 9015.1 | cps |
| Short Space | 1.2 | 1671.8 | 1138.1 | 1813.0 | cps |
| Rho | | 1.7100 | 2.5900 | 1.3800 | g/cc |
| Pe | | | 2.5700 | 1.5500 | |

| | | | | | |
|---|---|---|---|---|---|
| Rib Angle | : 45.5 | Rib Slope | : 1.017 | Density/Spine Ratio | : 0.573 |
| Spine Angle | : 75.5 | Spine Slope | : 3.865 | Spine Intercept | : -19.7 |

### Caliper

| | Readings | Reference |
|---|---|---|
| Low Ref | 2.8 | 7.8 |
| High Ref | 4.6 | 15.0 |
| | Gain: 3.9 | Offset: -2.9 |

## Compensated Neutron Calibration Report

Serial Number: NEU_1I
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 |

## Gamma Ray Calibration Report

Serial Number: GR1
Tool Model: OPEN
Performed: Wed Sep 21 07:17:06 2011

Calibrator Value: 200.0 GAPI

| | | |
|---|---|---|
| Background Reading: | 3.0 | cps |
| Calibrator Reading: | 186.0 | cps |
| Sensitivity: | 0.2500 | GAPI/cps |