# CML MESSENGER SHUTTLE
# COMPACT PHOTO DENSITY
# DUAL SPACED NEUTRON LOG

Weatherford®

| | |
|---|---|
| COMPANY | SANDRIDGE ENERGY |
| WELL | RUBY 3119 2-20H |
| FIELD | SASSY |
| PROVINCE/COUNTY | COMANCHE |
| COUNTRY/STATE | USA / KANSAS |
| LOCATION | NW NE NW NE |
| | 200' FNL & 1880' FEL |

| SEC | TWP | RGE | Other Services |
|---|---|---|---|
| 20 | 31S | 19W | MAI/MFE |

API Number 15-033-21661
Permit Number

Permanent Datum GL, Elevation 2166 feet
Log Measured From KB
Drilling Measured From KB

| Elevations: | feet |
|---|---|
| KB | 2186.00 |
| DF | 2186.00 |
| GL | 2166.00 |

| | | | |
|---|---|---|---|
| Date | 02-SEP-2012 | | |
| Run Number | ONE | | |
| Depth Driller | 9600.00 | feet | |
| Depth Logger | 9600.00 | feet | |
| First Reading | 9546.00 | feet | |
| Last Reading | 4900.00 | feet | |
| Casing Driller | 5603.00 | feet | |
| Casing Logger | 5620.00 | feet | |
| Bit Size | 6.125 | inches | |
| Hole Fluid Type | WATER | | |
| Density / Viscosity | 8.40 lb/USg | 26.00 CP | |
| PH / Fluid Loss | 10.00 | 60.00 ml/30Min | |
| Sample Source | FLOWLINE | | |
| Rm @ Measured Temp | 0.50 @ 90.0 | ohm-m | |
| Rmf @ Measured Temp | 0.40 @ 90.0 | ohm-m | |
| Rmc @ Measured Temp | 0.60 @ 90.0 | ohm-m | |
| Source Rmf / Rmc | CALC | CALC | |
| Rm @ BHT | 0.35 @133.0 | ohm-m | |
| Time Since Circulation | 19 HOURS | | |
| Max Recorded Temp | 133.00 | deg F | |
| Equipment Name | COMPACT | | |
| Equipment / Base | 18077 | OKC | |
| Recorded By | GUTHMUELLER | | |
| Witnessed By | J HILEMAN | | K GENTRY |
| AFE# DC12314 | SO# 3536737 | | |

## BOREHOLE RECORD

Last Edited: 02-SEP-2012 17:36

| Bit Size inches | Depth From feet | Depth To feet |
|---|---|---|
| 17.500 | 0.00 | 280.00 |
| 12.250 | 280.00 | 1050.00 |
| 8.750 | 1050.00 | 5603.00 |
| 6.125 | 5603.00 | 9600.00 |

## CASING RECORD

| Type | Size inches | Depth From feet | Shoe Depth feet | Weight pounds/ft |
|---|---|---|---|---|
| SURF | 13.375 | 0.00 | 280.00 | 54.50 |
| INTER | 9.625 | 0.00 | 1050.00 | 36.00 |
| INTER | 7.000 | 0.00 | 5603.00 | 26.00 |

## REMARKS

TOOLS RAN:SRT-069, 400V MBS-159, MCG-476, MMSD159, MDN-391, MPD-394,MFE-363, MAI-427 RAN IN COMBINATION
WELL LOGGED USING MESSENGER METHOD OF DEPLOYMENT, AND MEMORY LOGGING SYSTEM

DEPTHS SET BACK TO PIPE STRAP

HARDWARE: MAI: MIS-B 0.5" STANDOFF USED ABOVE MAI, ISA 0.5" STANDOFF USED BELOW MAI.
MFE: MIS-B 0.5" STANDOFF USED ABOVE MFE,
- MDN: MIS-A DOUBLE BOWSPRING USED ABOVE MDN.
- MPD: 4INCH PROFILE PLATE USED, MIS-A SINGLE BOWSPRING USED BELOW MPD

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

CALIPER FAILED TO OPEN, LOGS CALCULATED BACK TO BIT SIZE

DRILL PIPE DEPTH DURING DEPLOYMENT: 9500
LOGGING TOOL DEPTH AFTER DEPLOYMENT: 9581

SERVICE ORDER # 3536737
RIG: LARIAT 45

OPERATOR(S): G GARCIA, R CASPARIAN

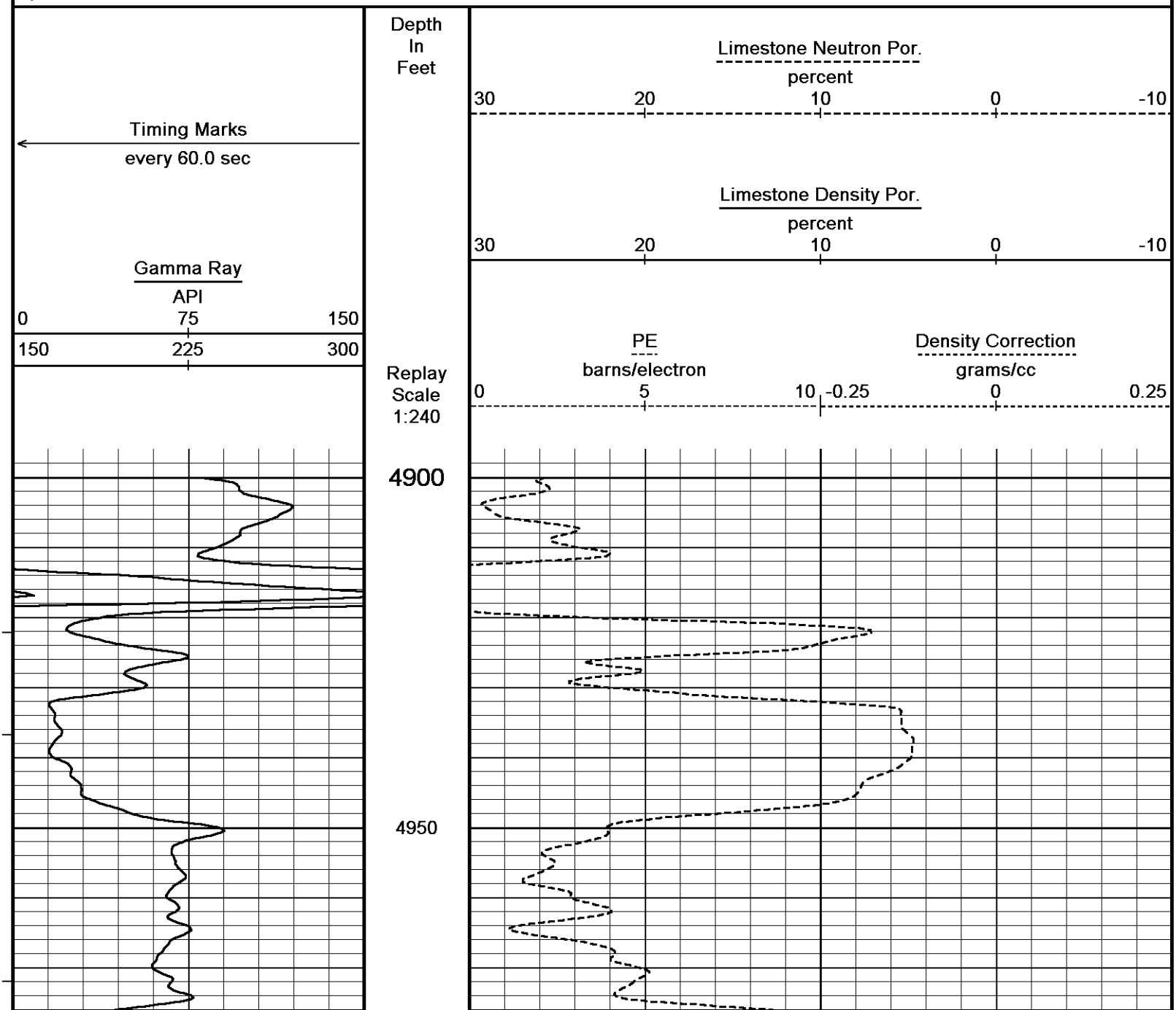
HOLE RUGOSITY MAY AFFECT LOG QUALITY.

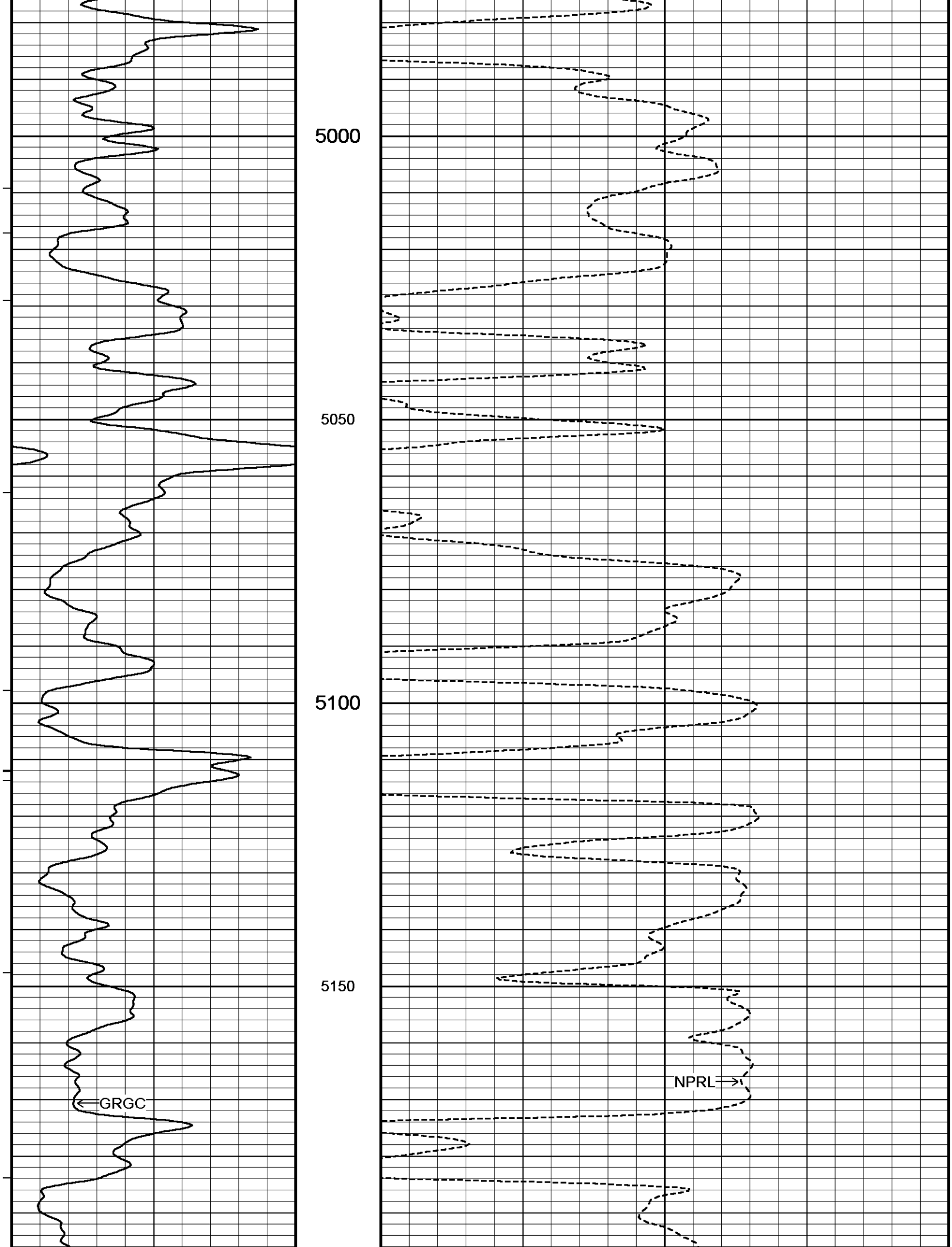


## 5 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

Plotted on 03-SEP-2012 02:26
Recorded on 02-SEP-2012 23:43

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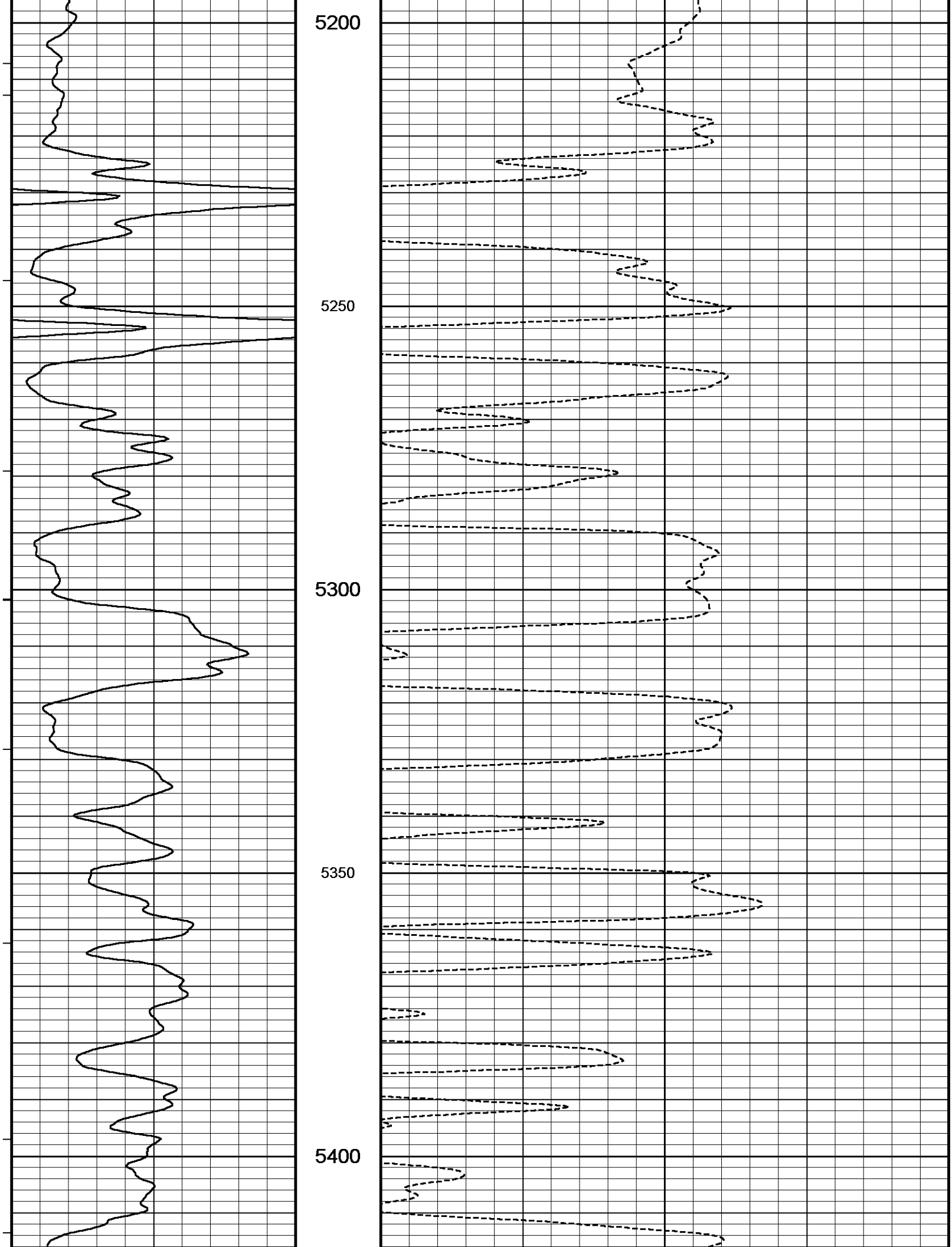
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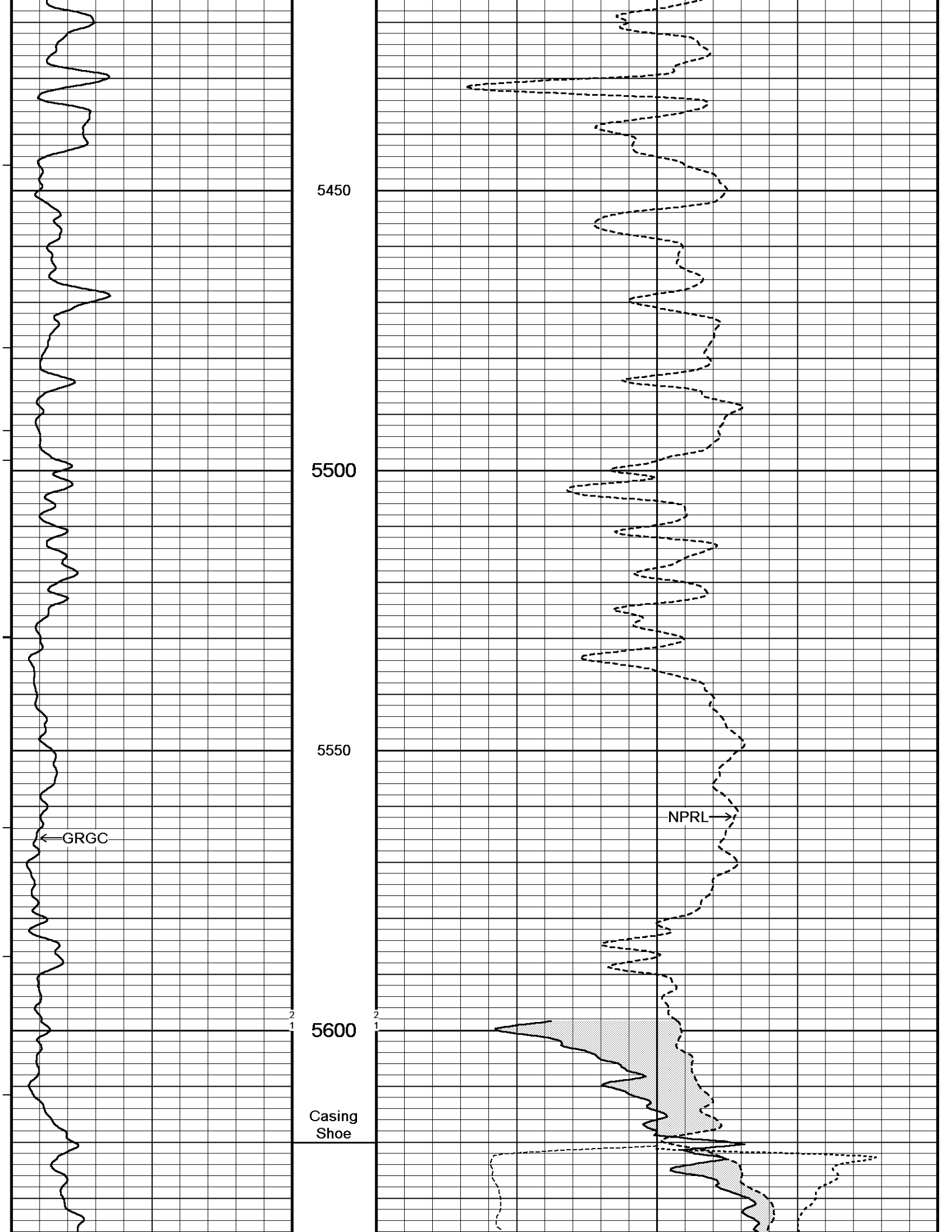
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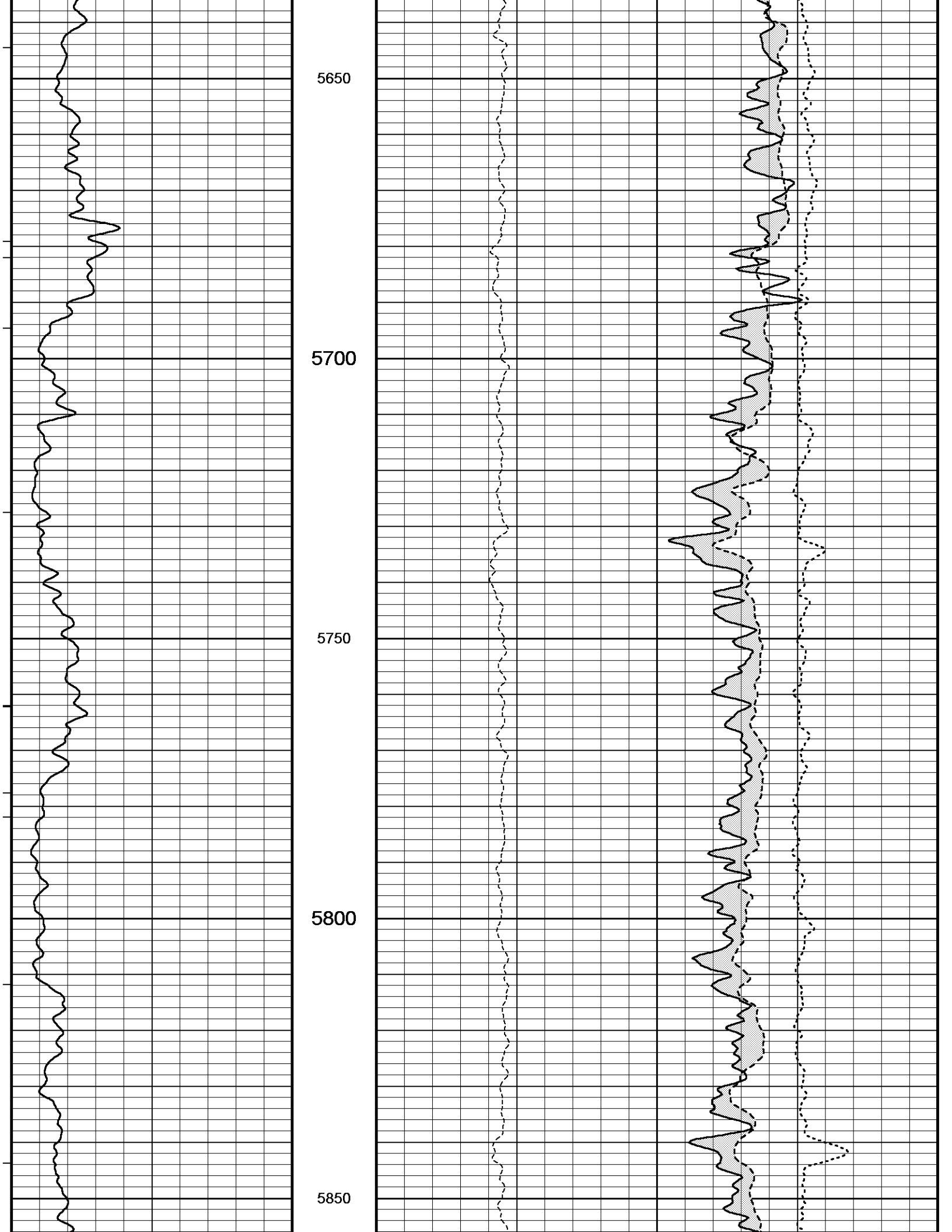
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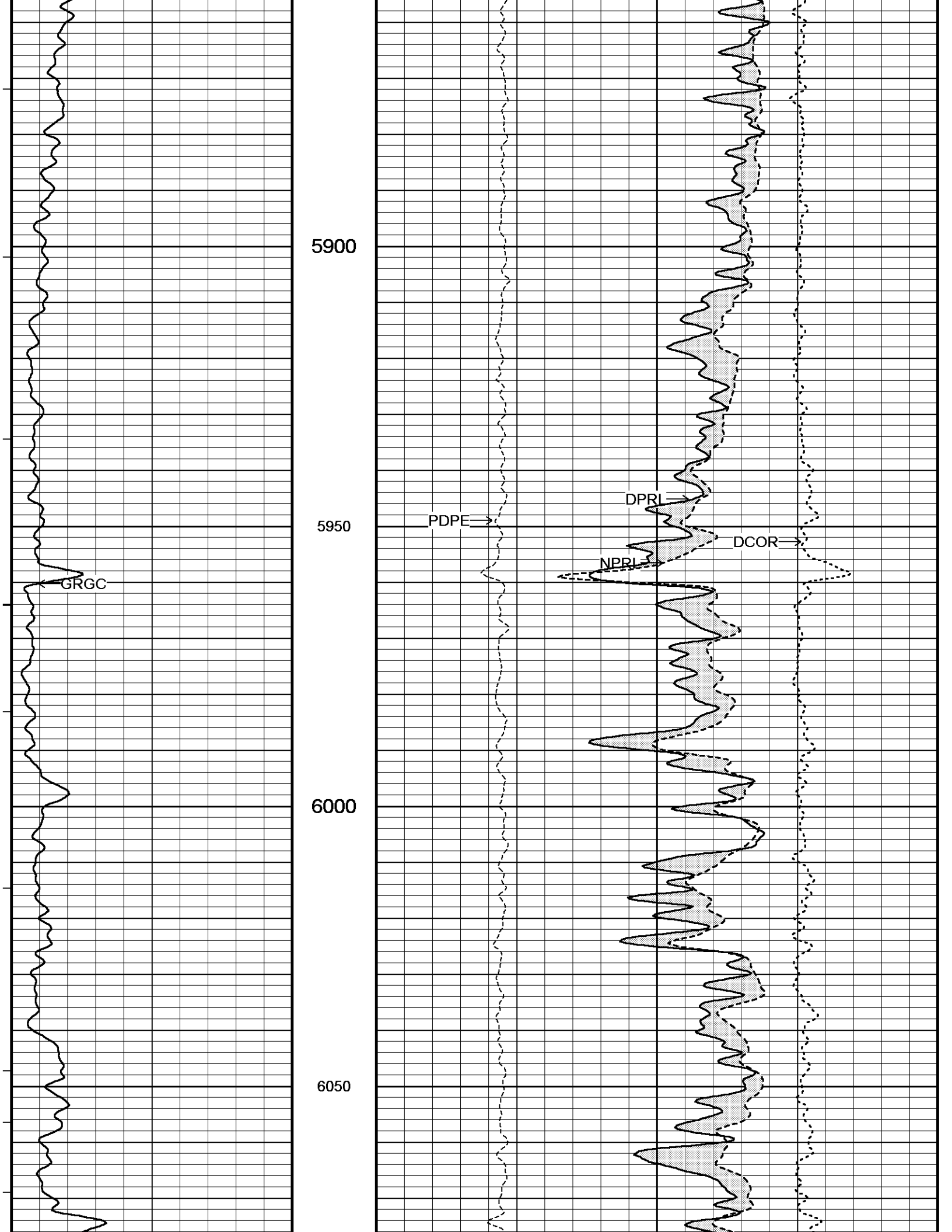
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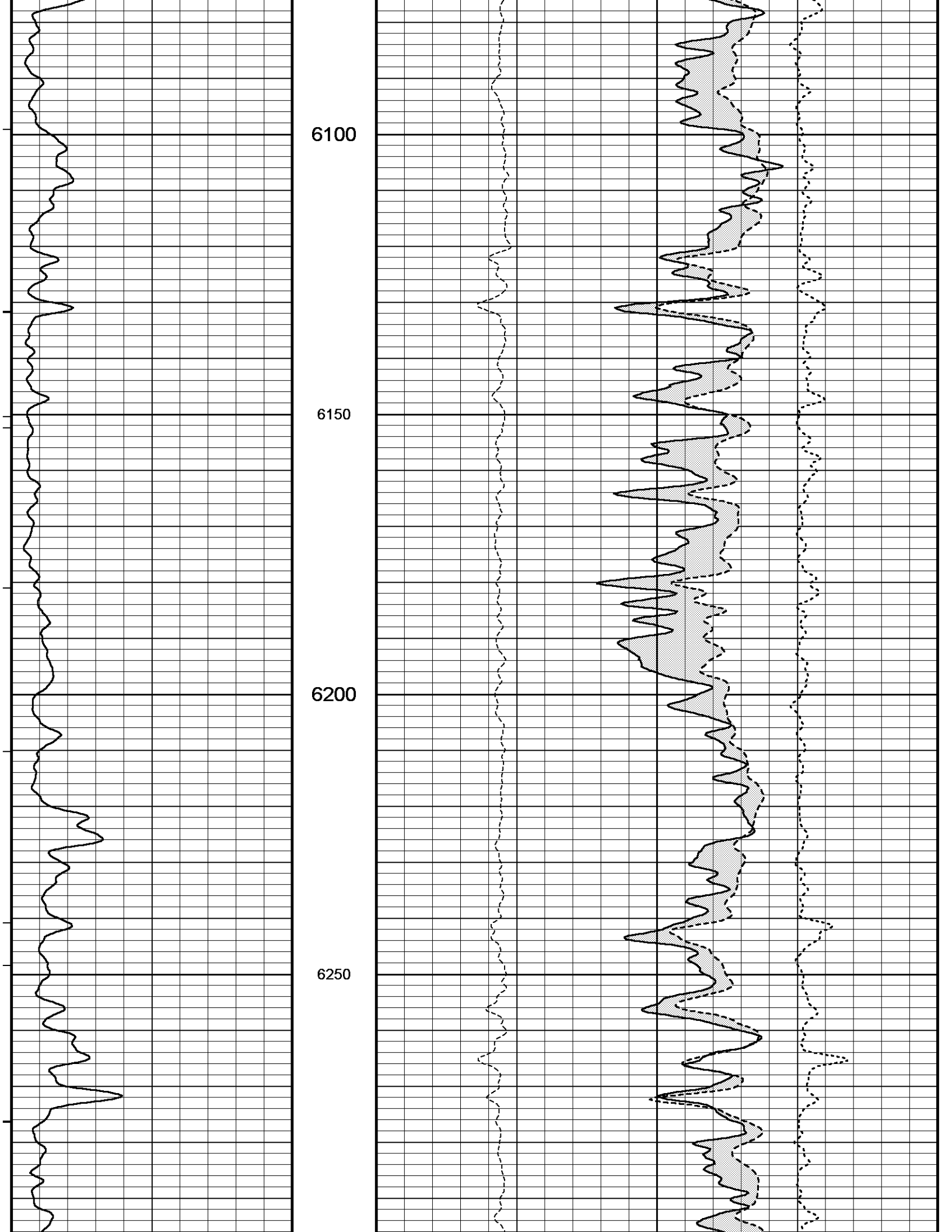
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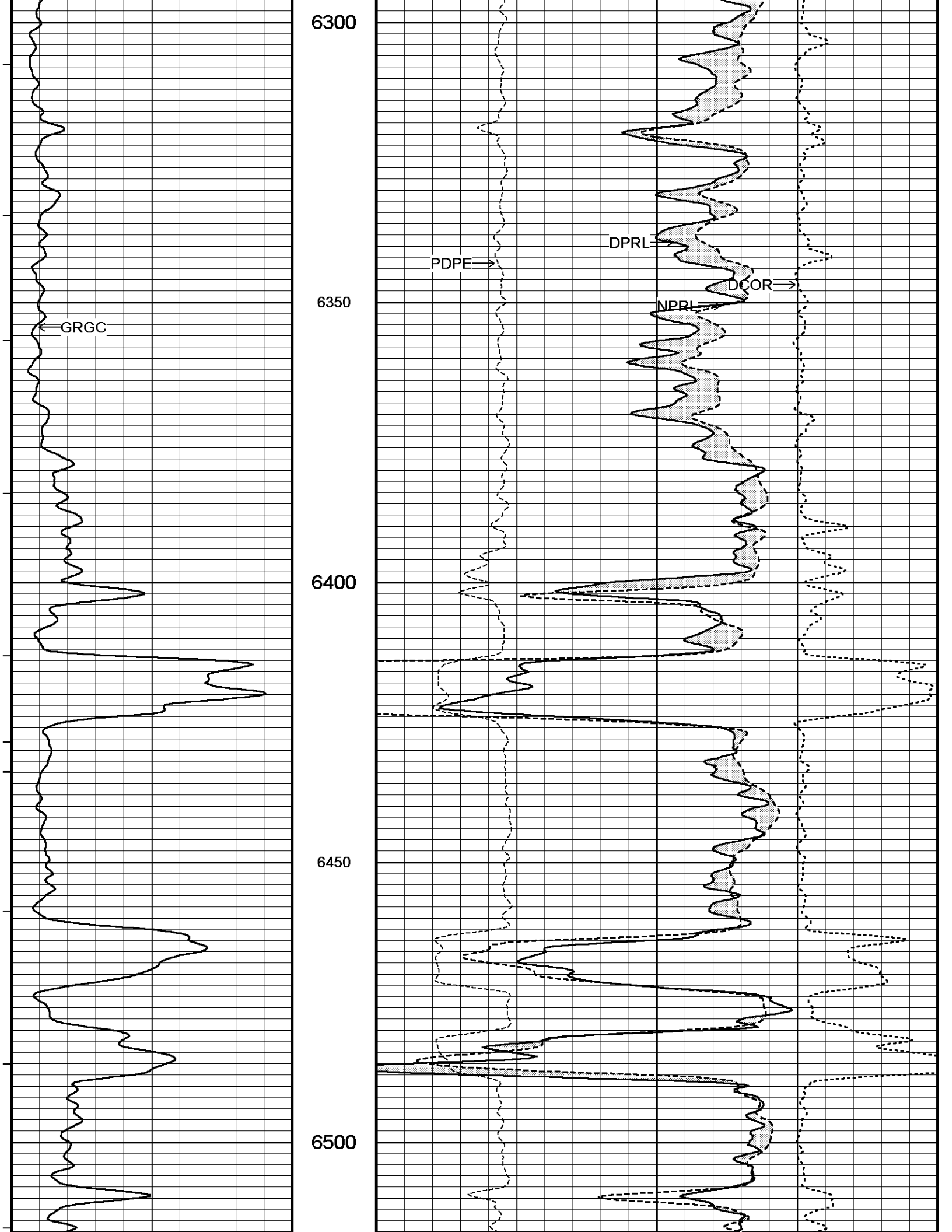
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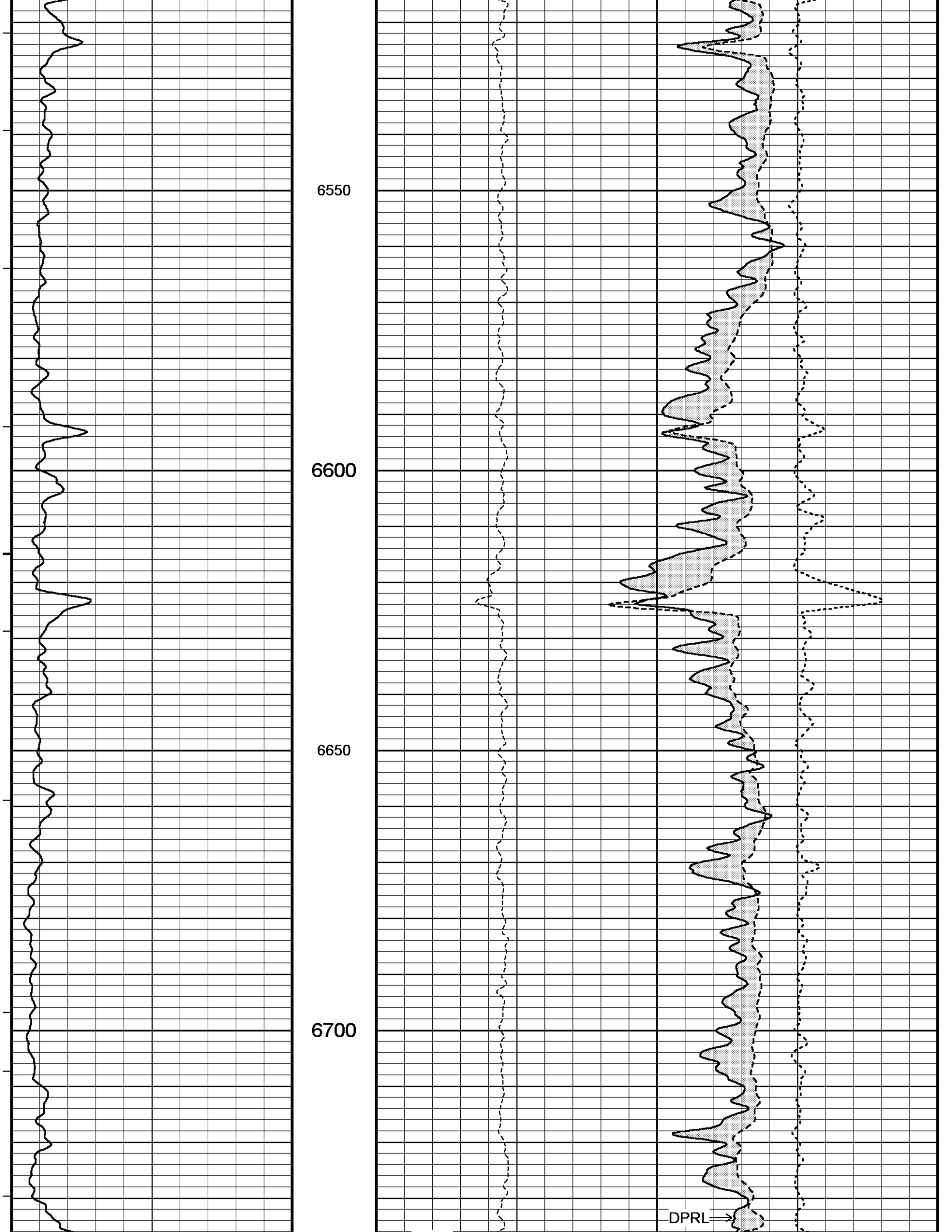
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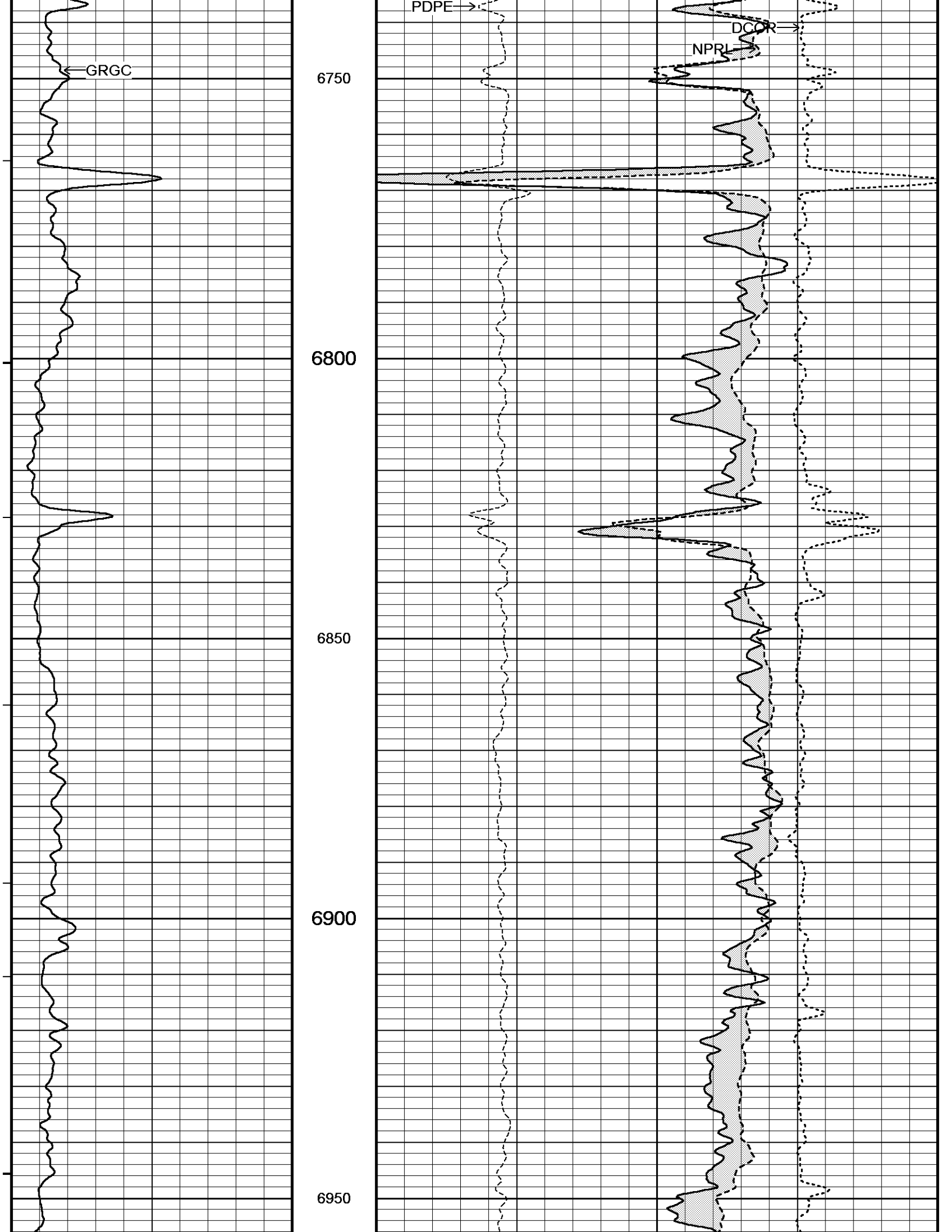
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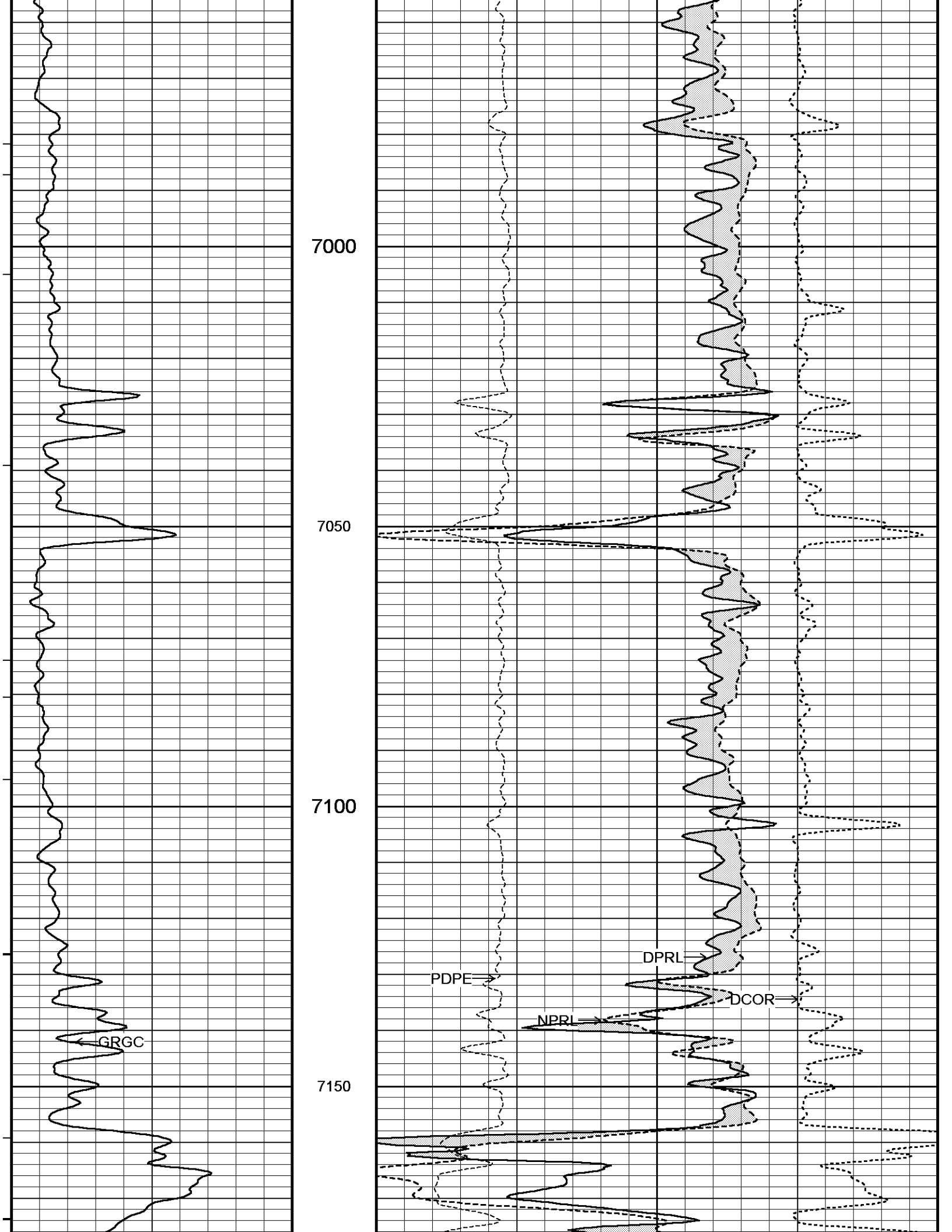
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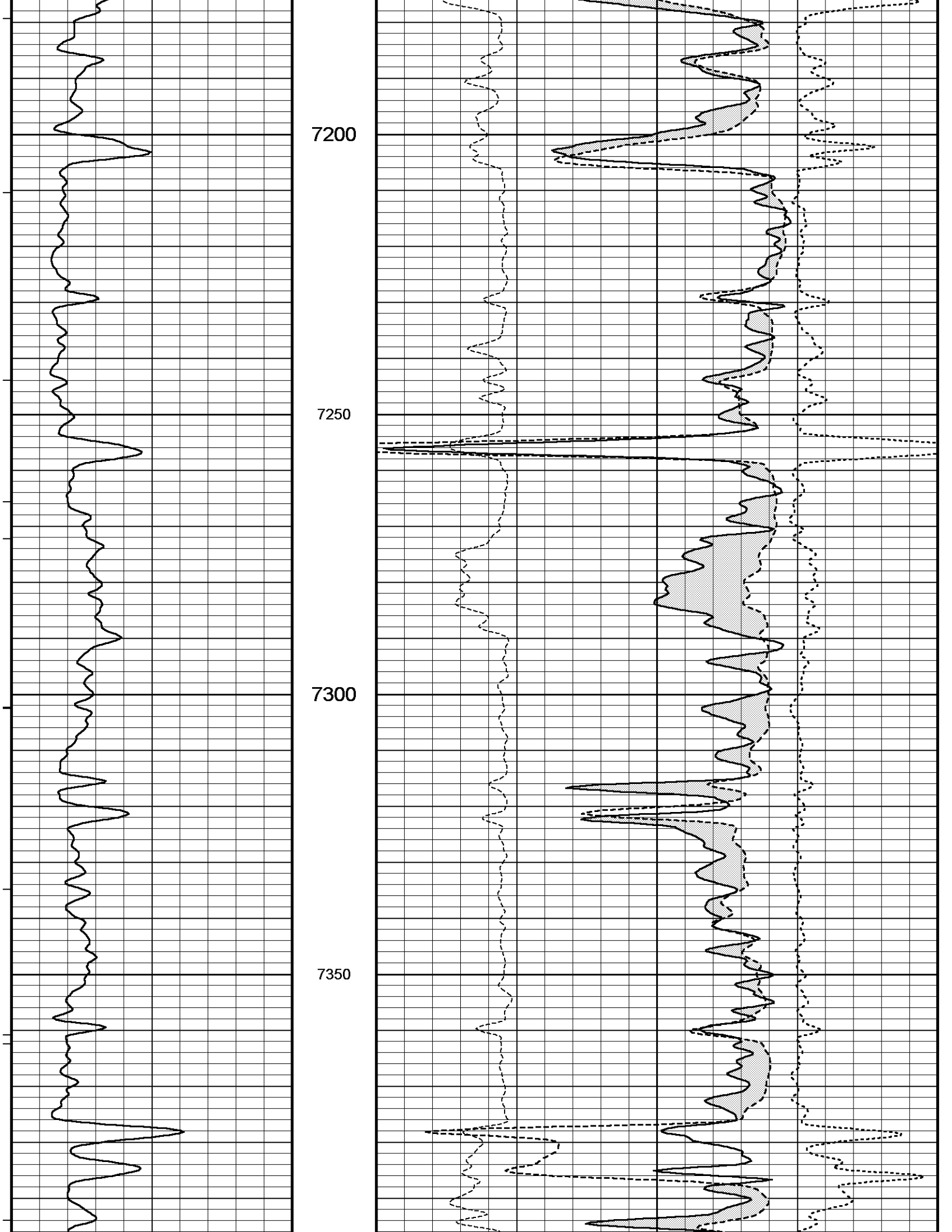
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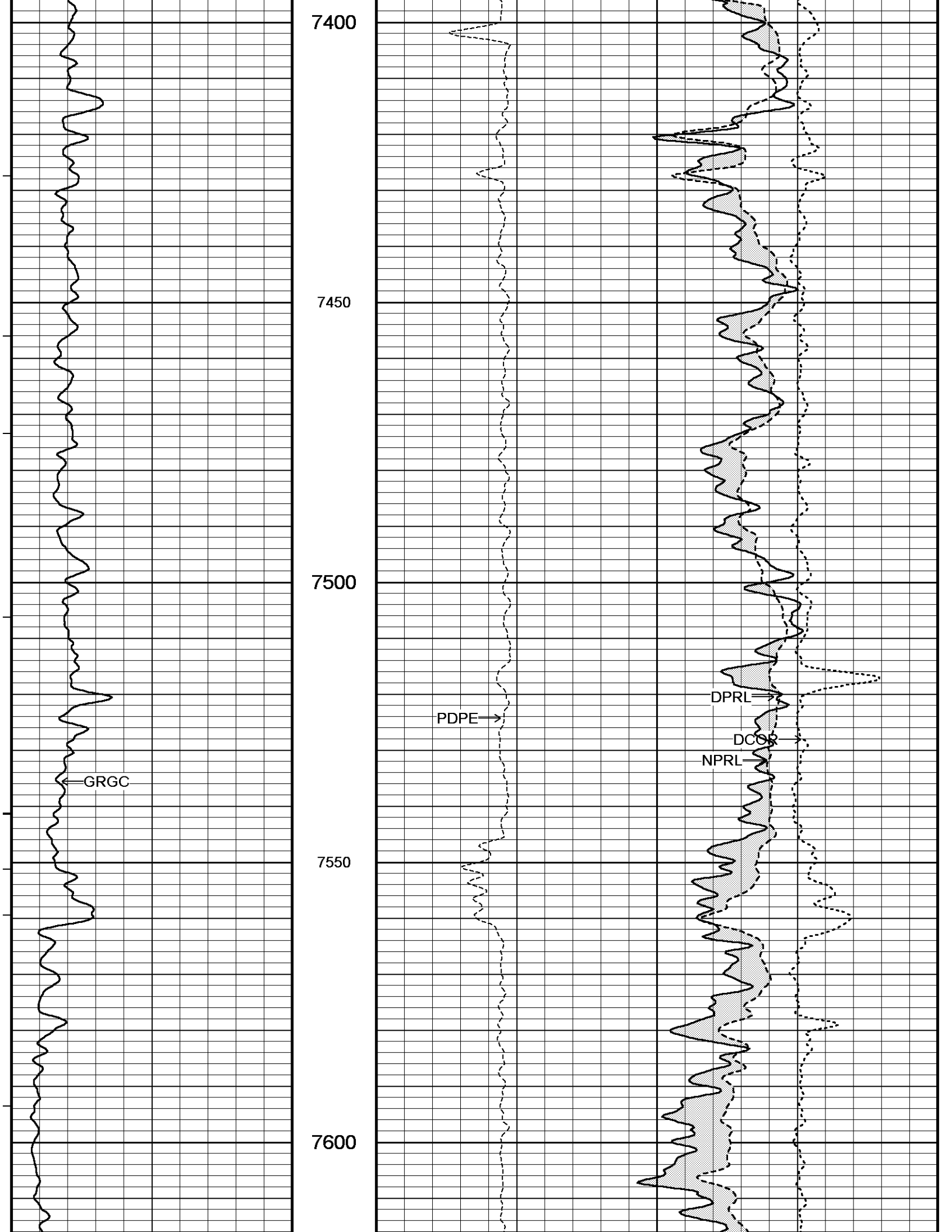
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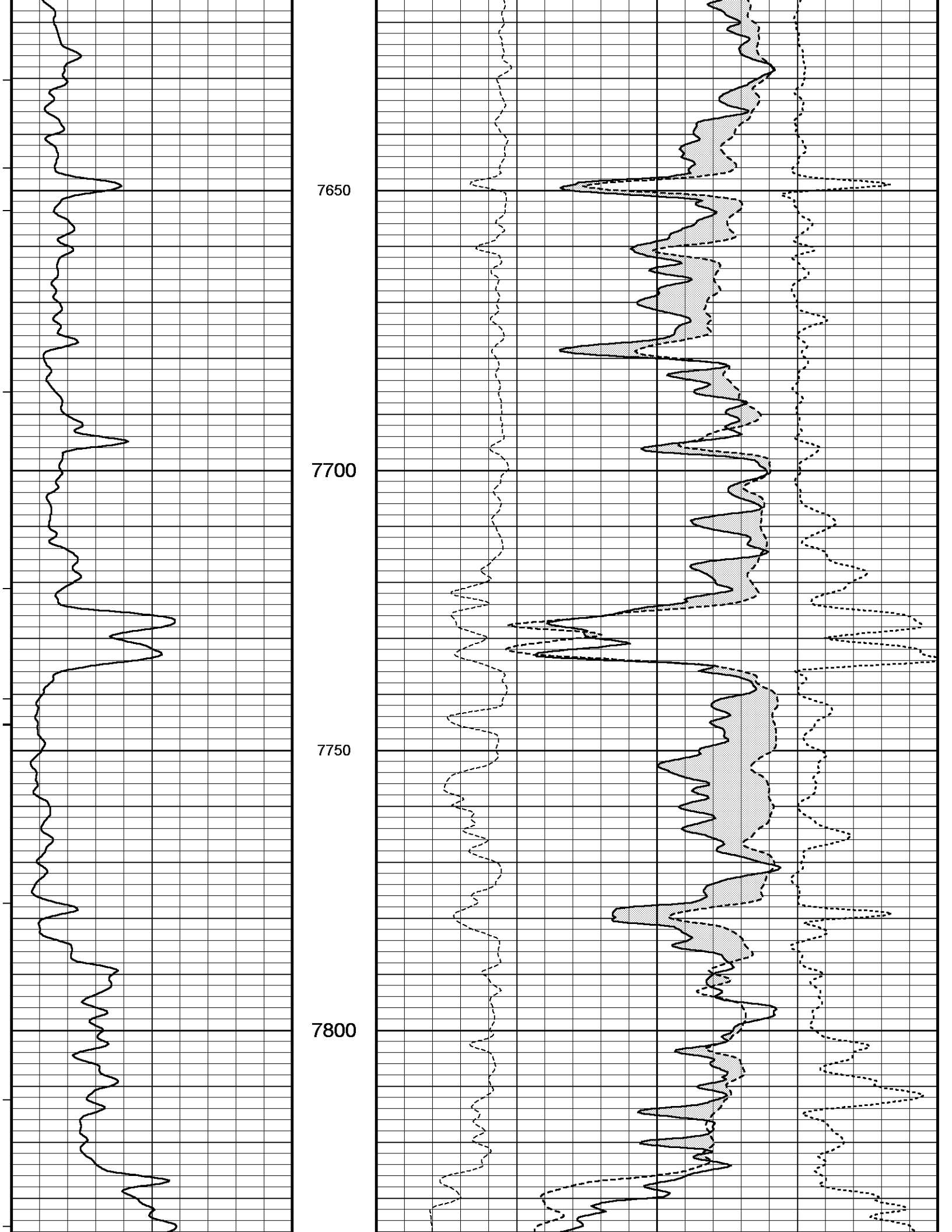
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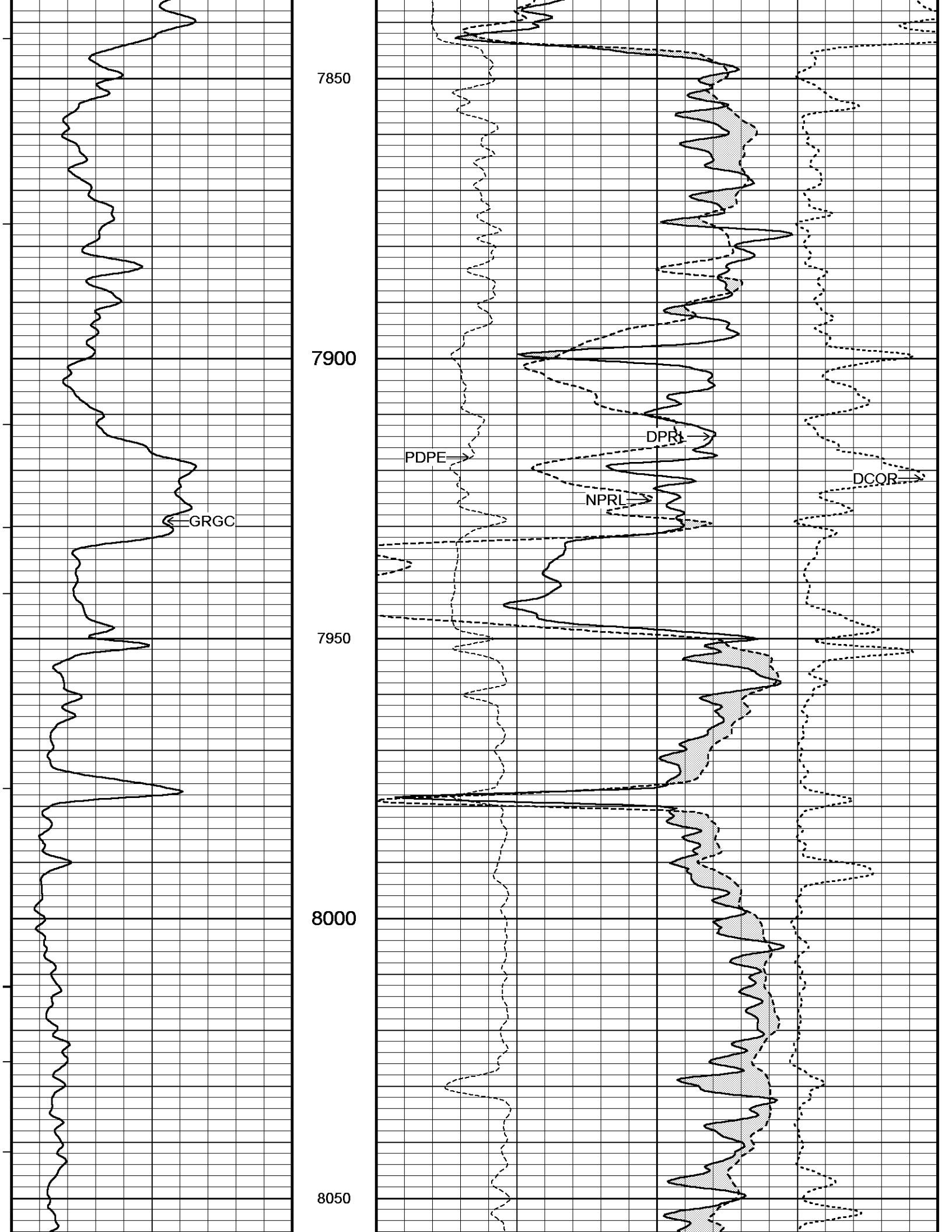
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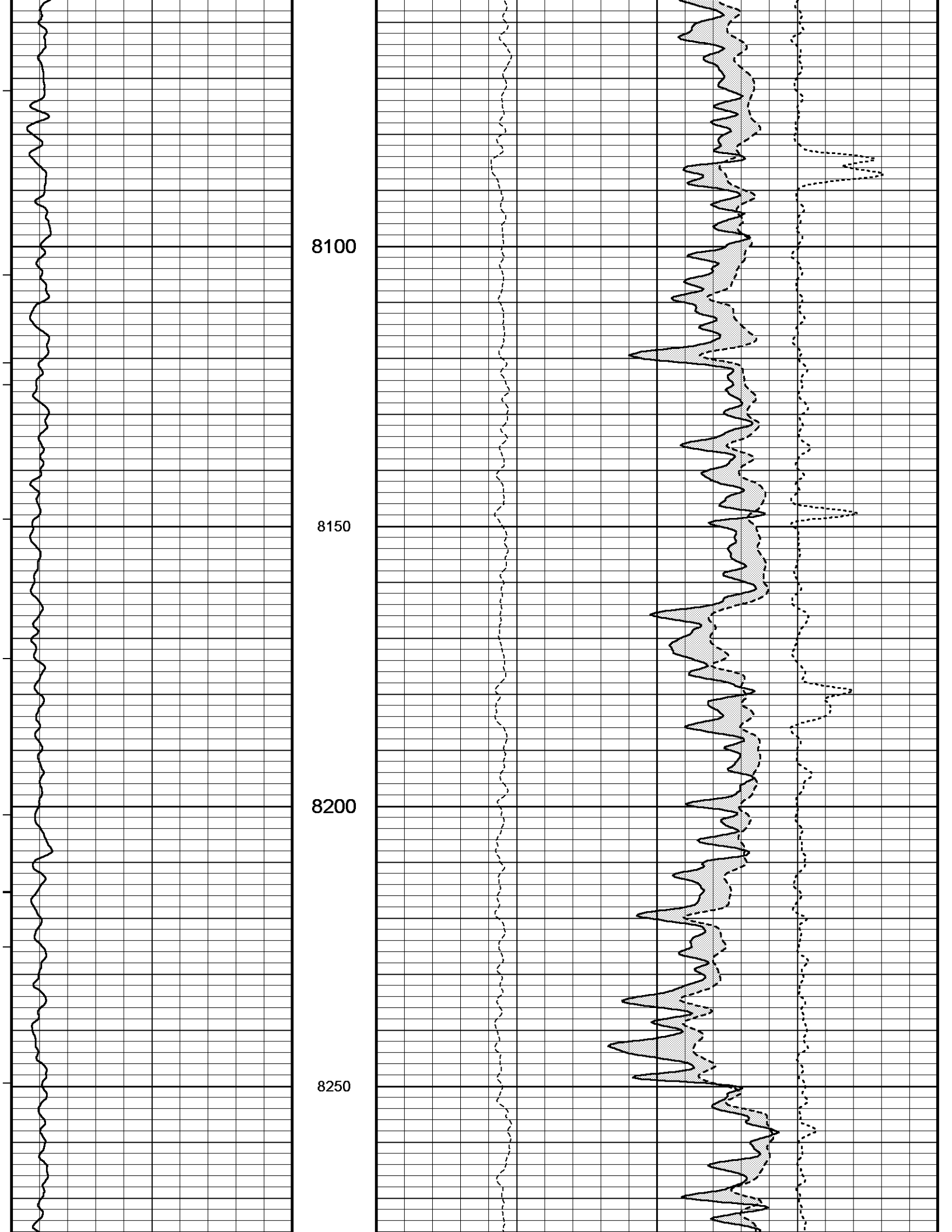
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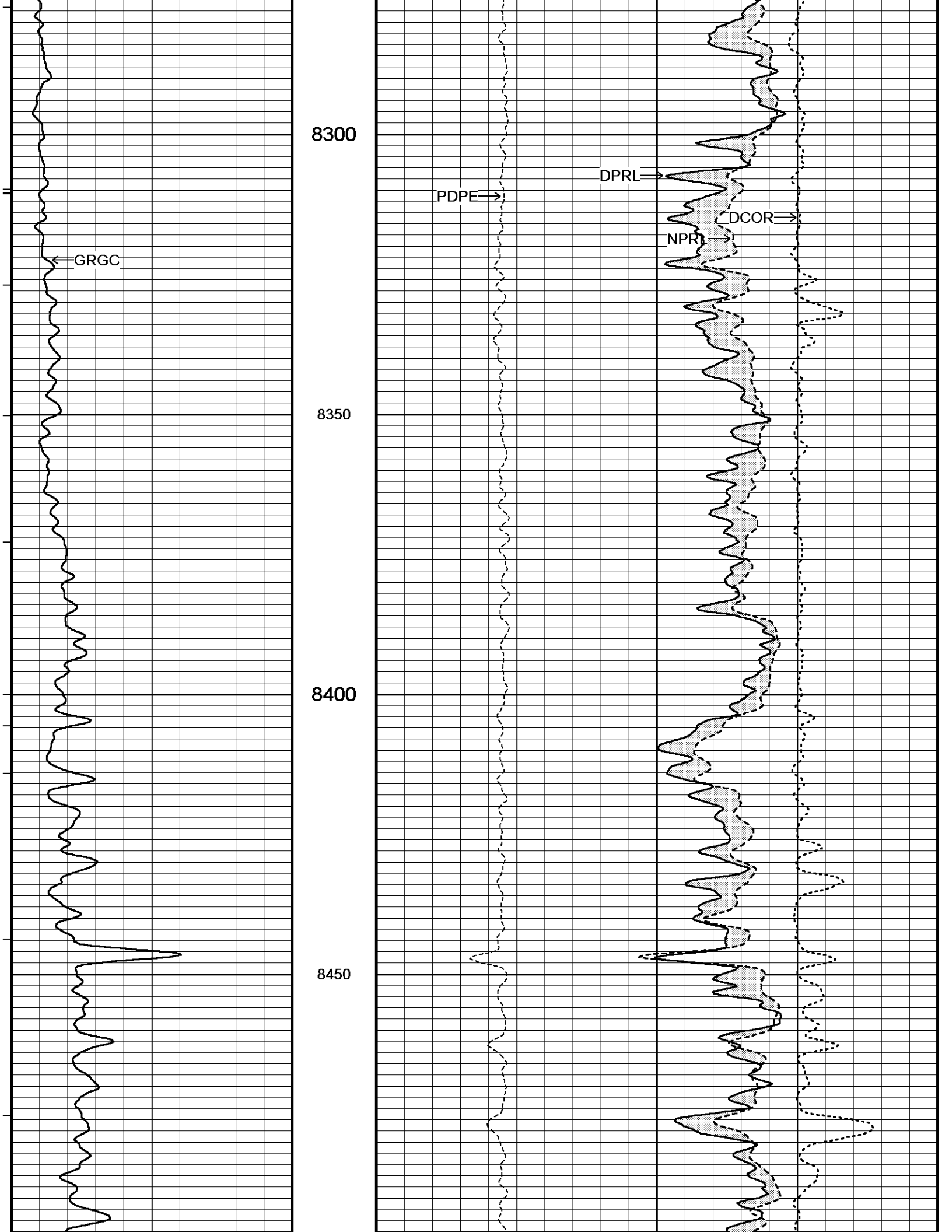
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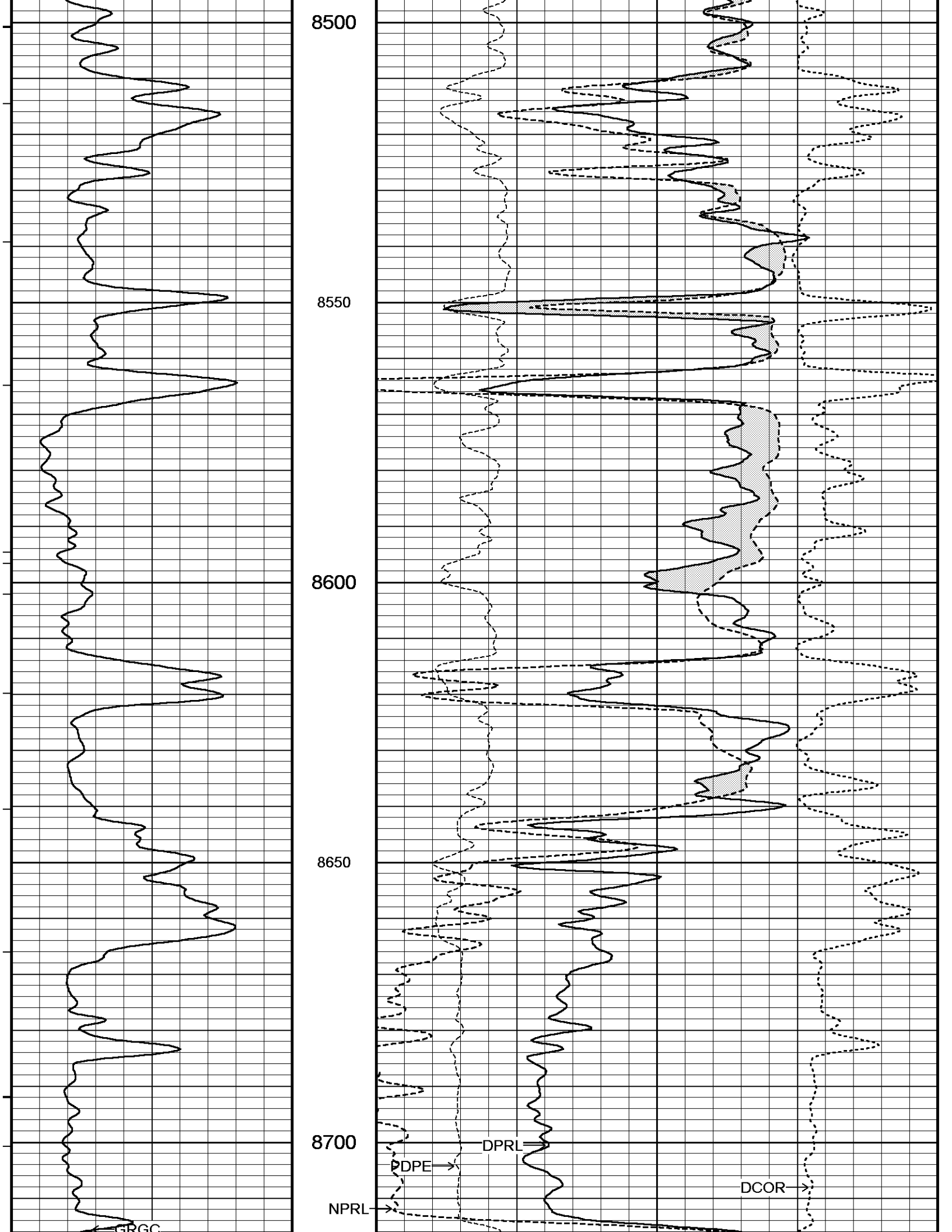
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DPE
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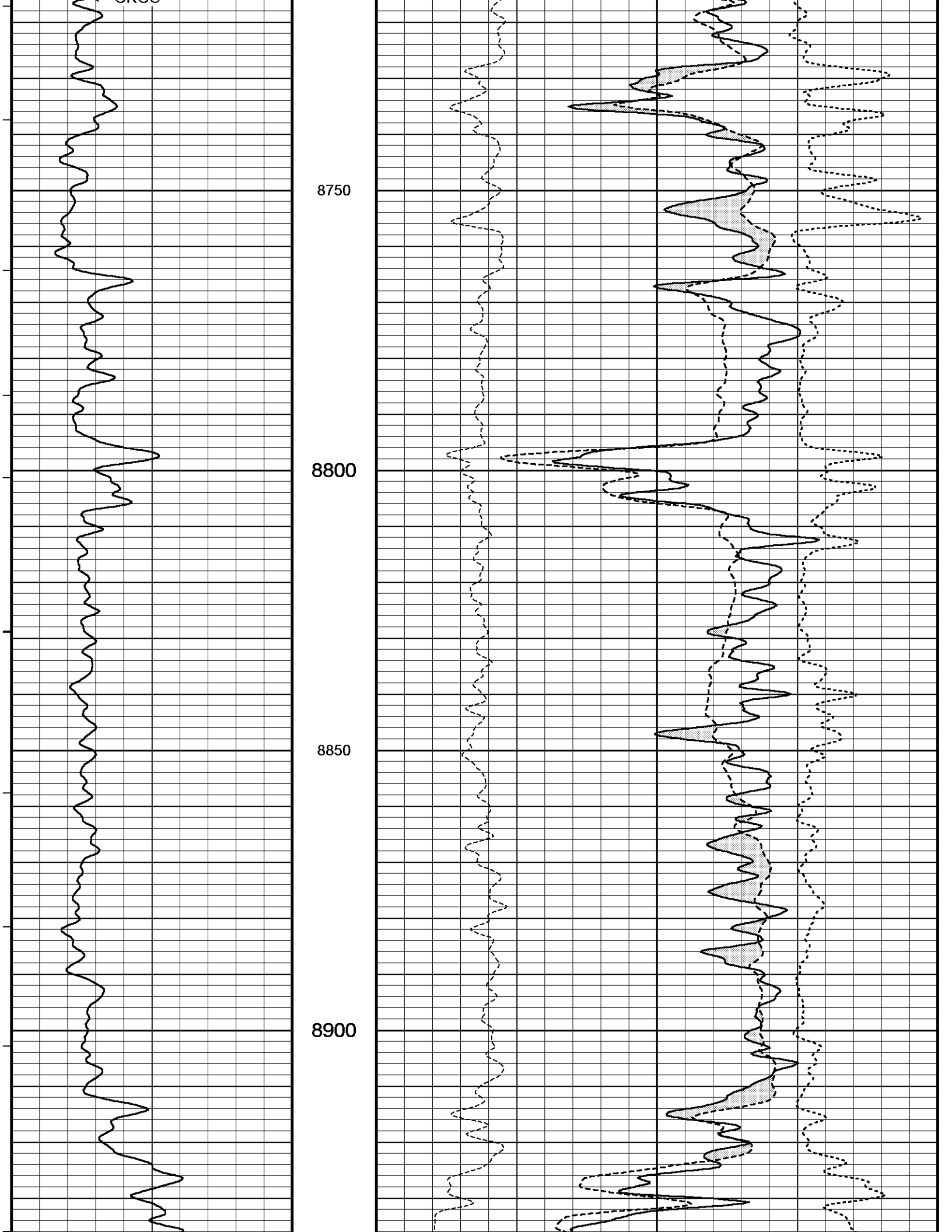
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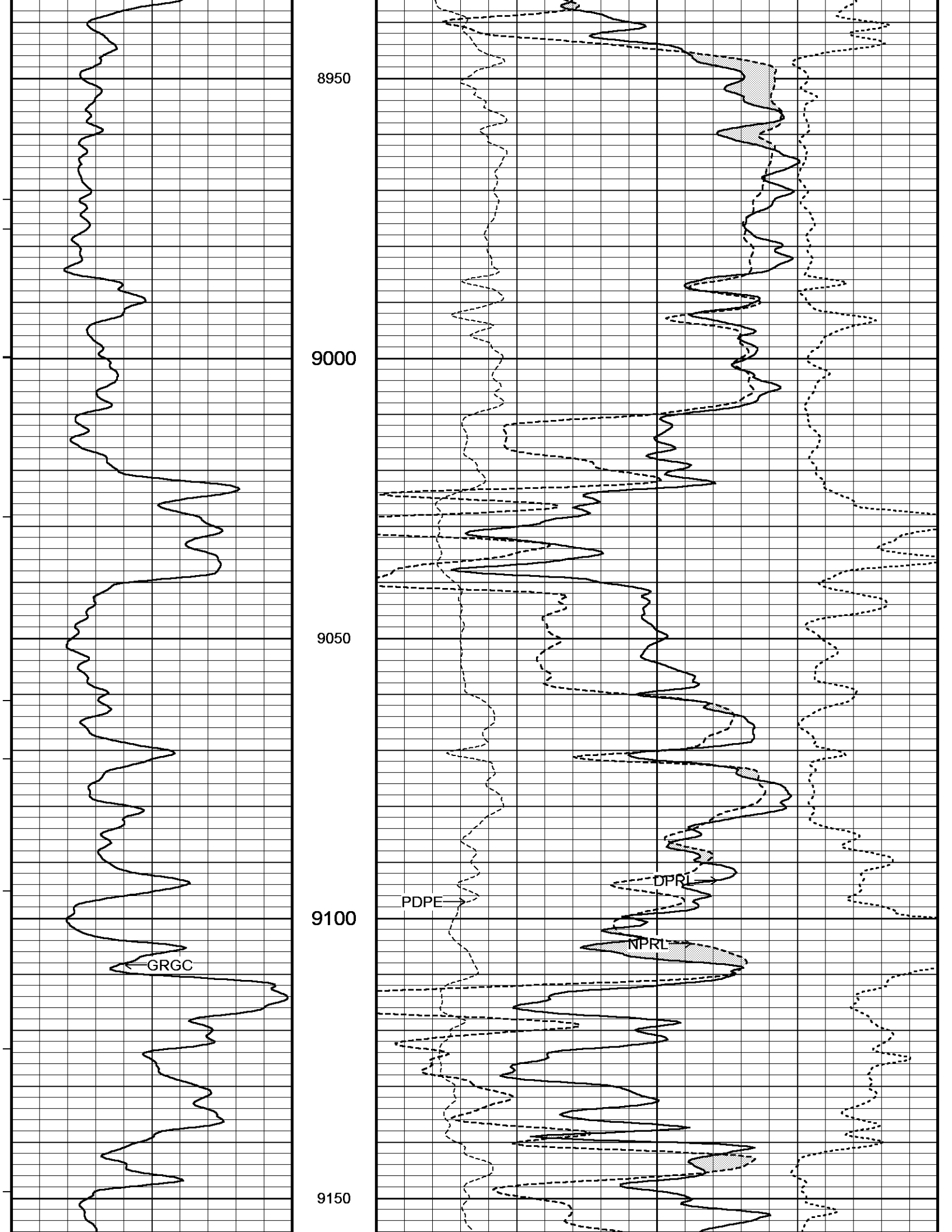
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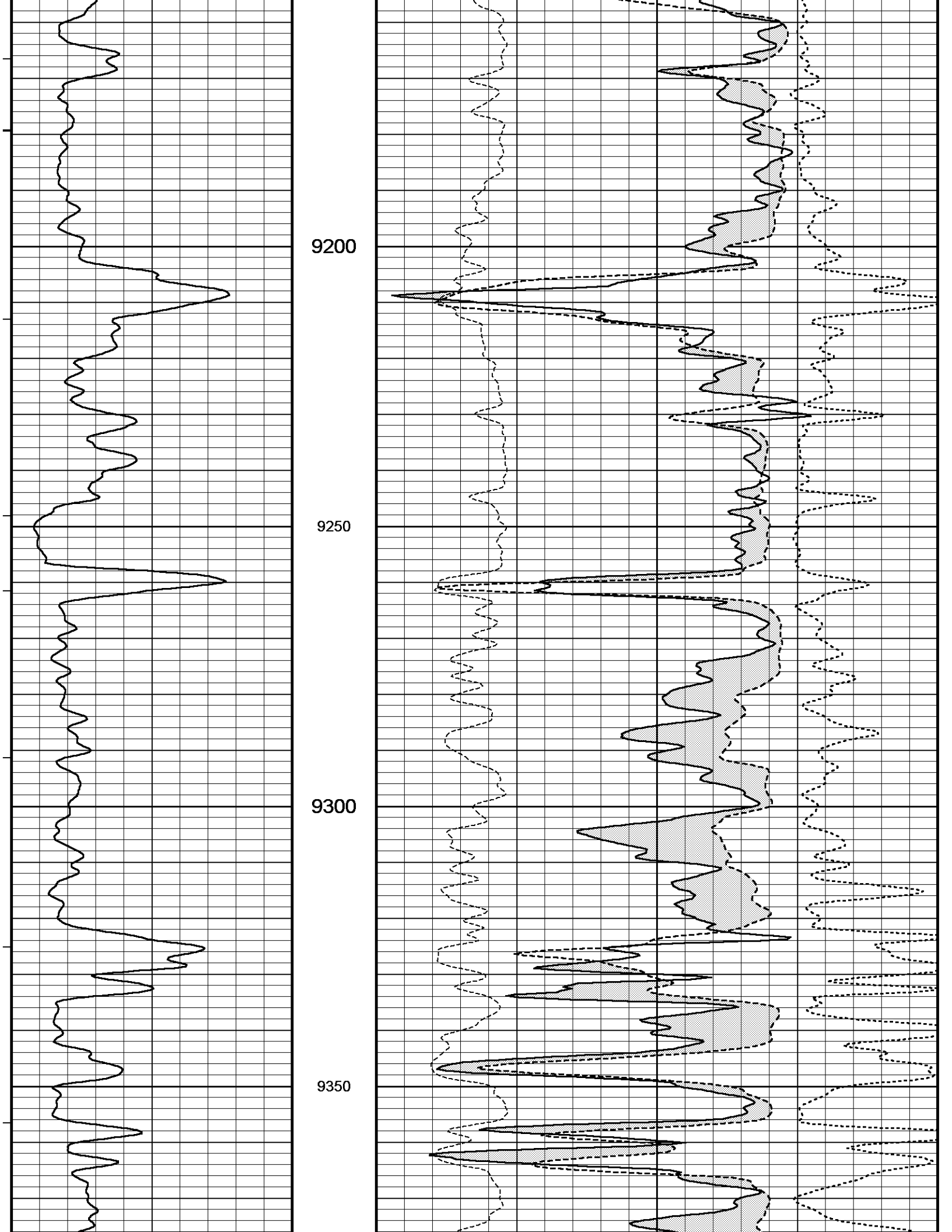
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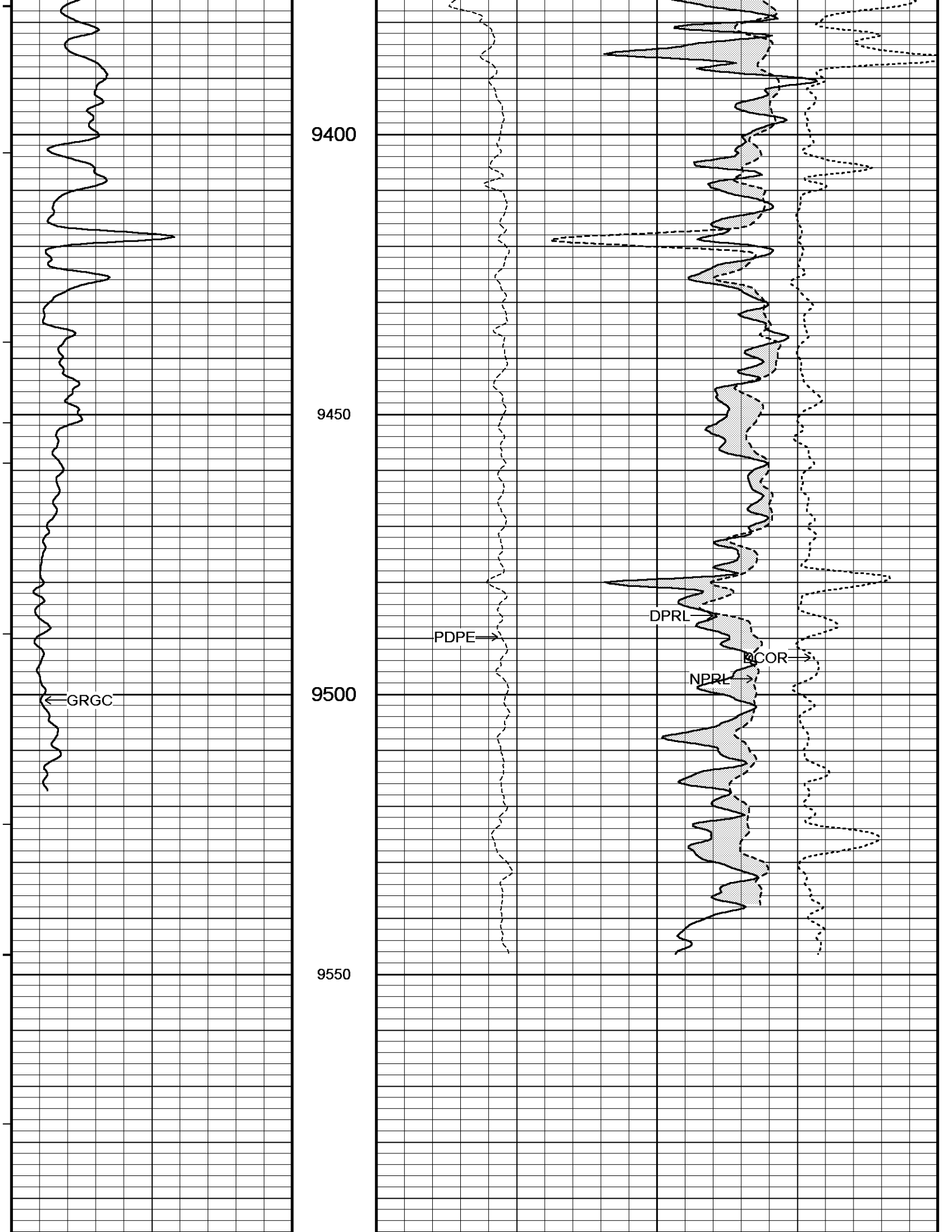
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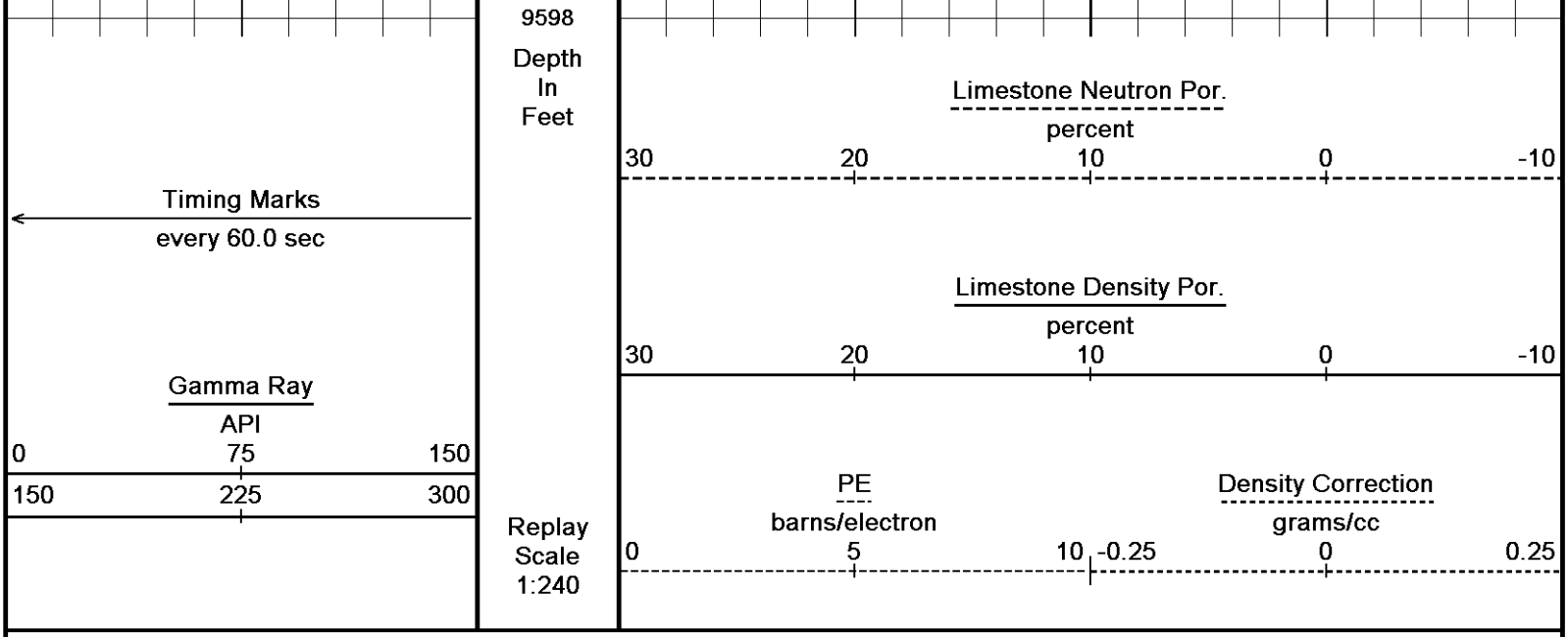
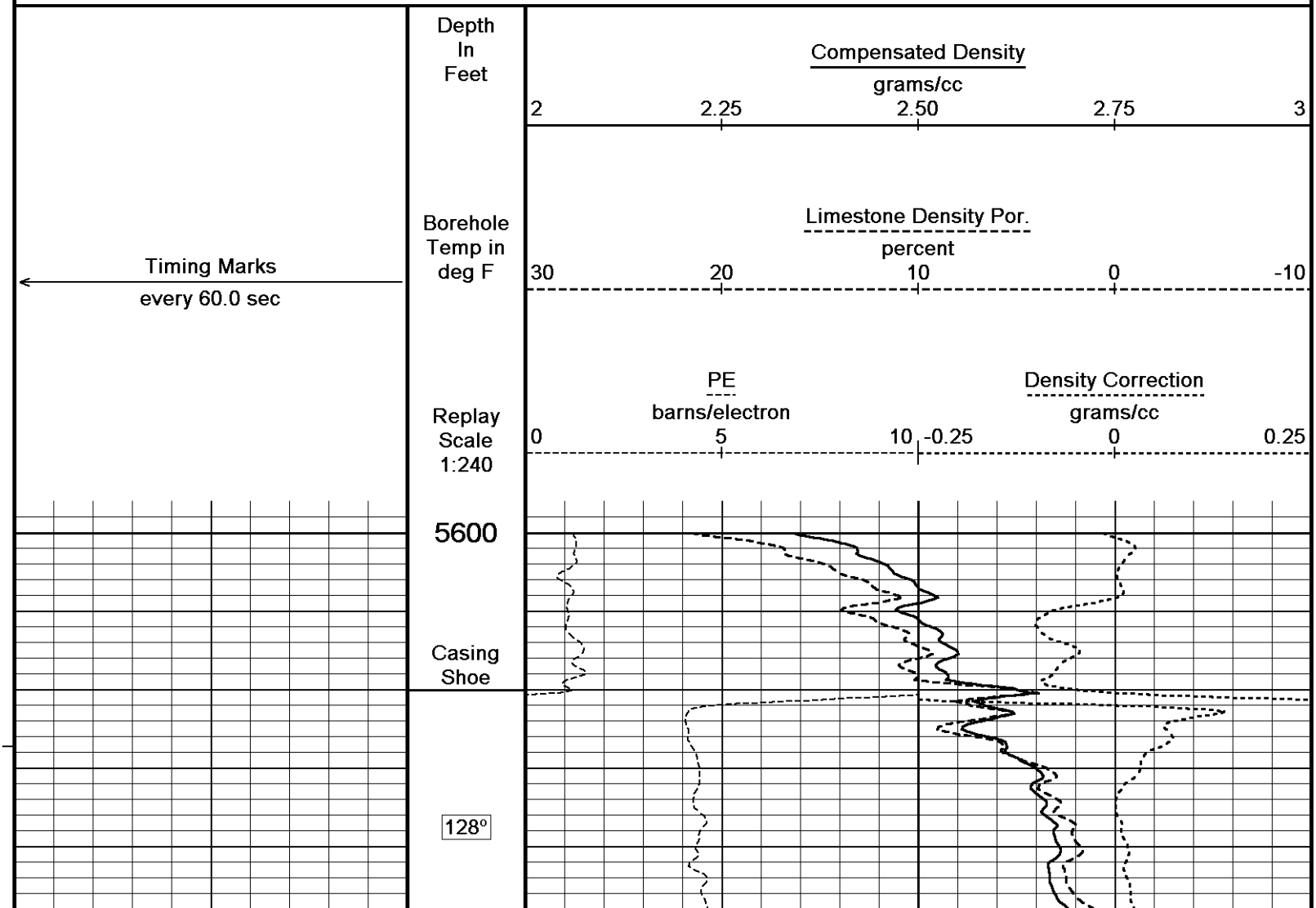


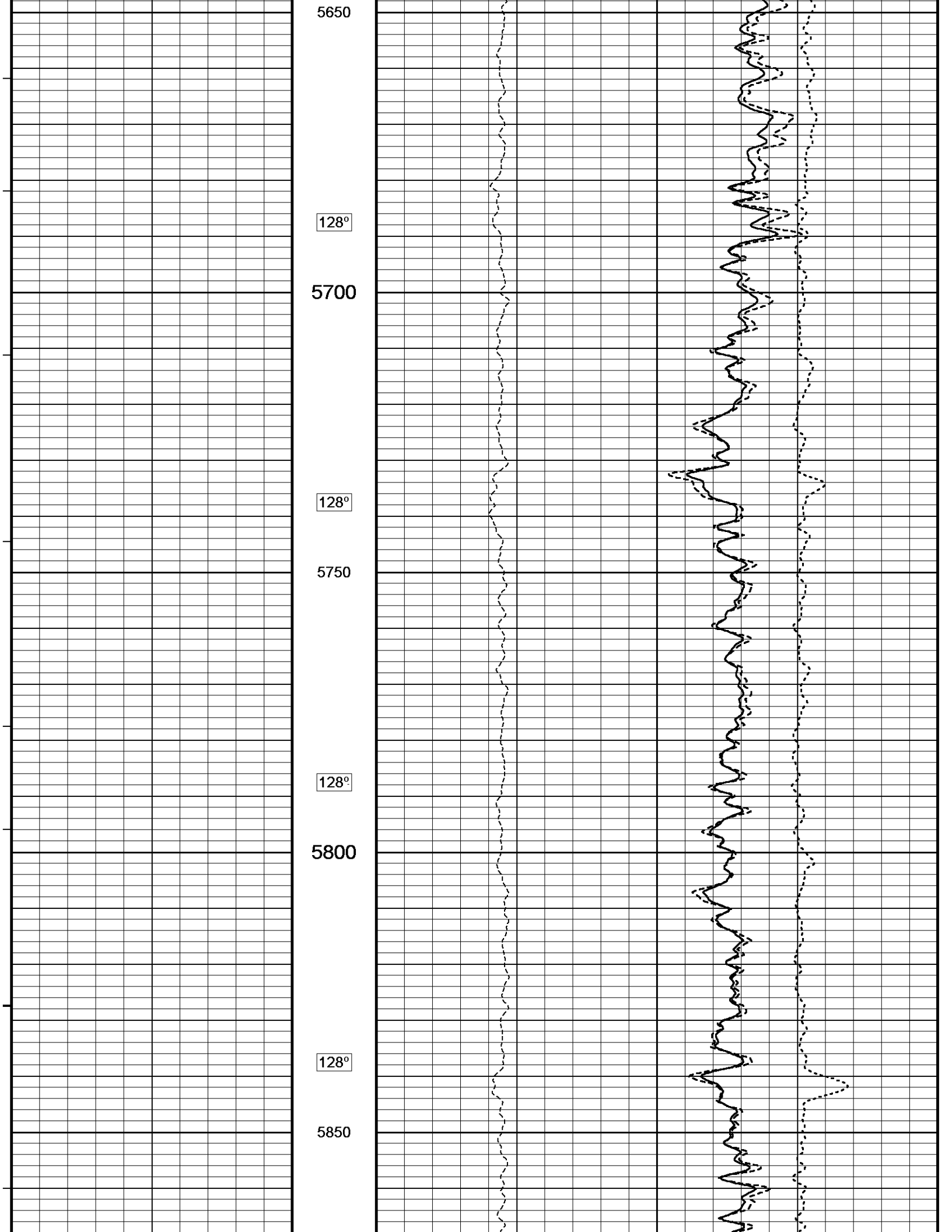

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-SEP-2012 02:26
Filename: C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta
Recorded on 02-SEP-2012 23:43
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

5 INCH MAIN LOG

5 INCH BULK DENSITY

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-SEP-2012 02:26
Filename: C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta
Recorded on 02-SEP-2012 23:43
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

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128°
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128°
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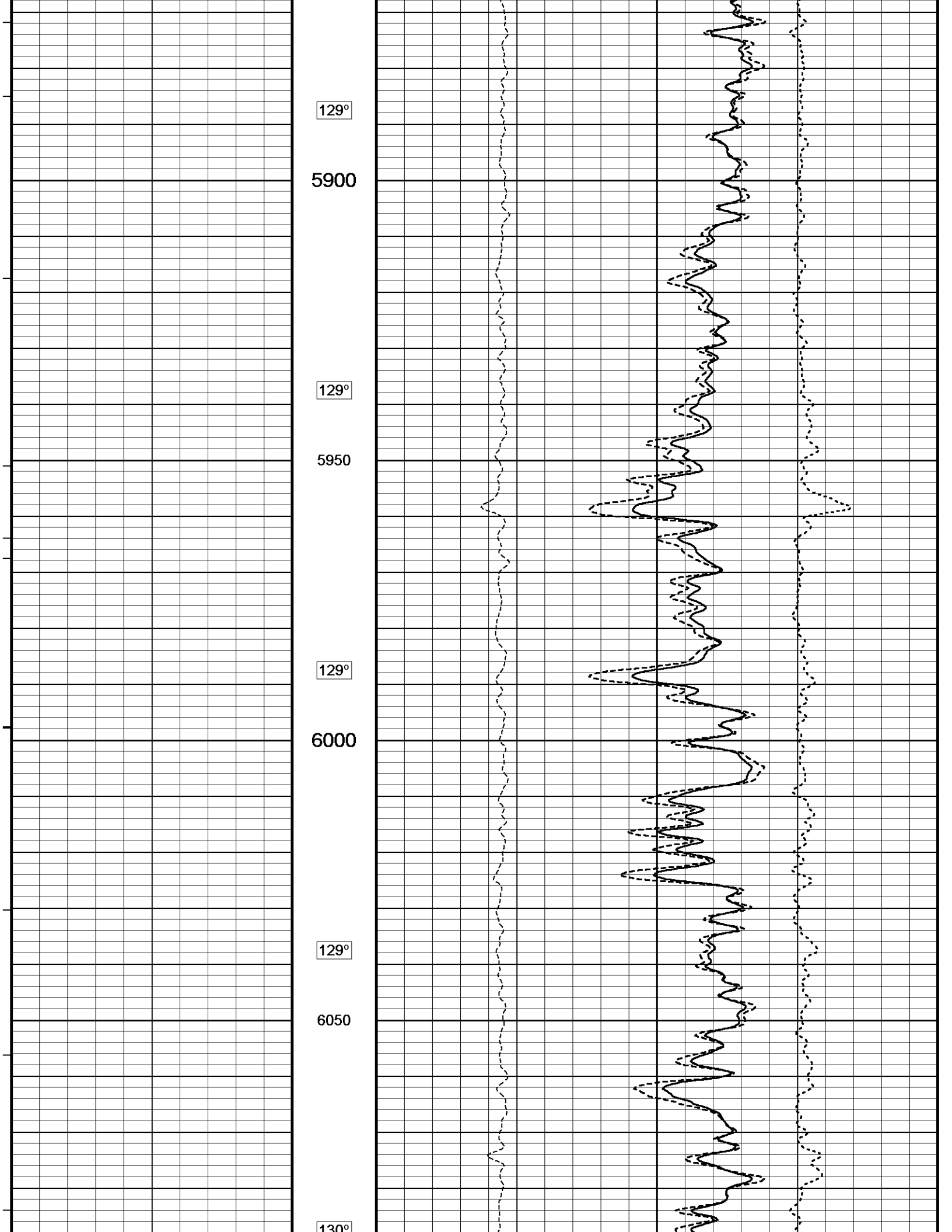
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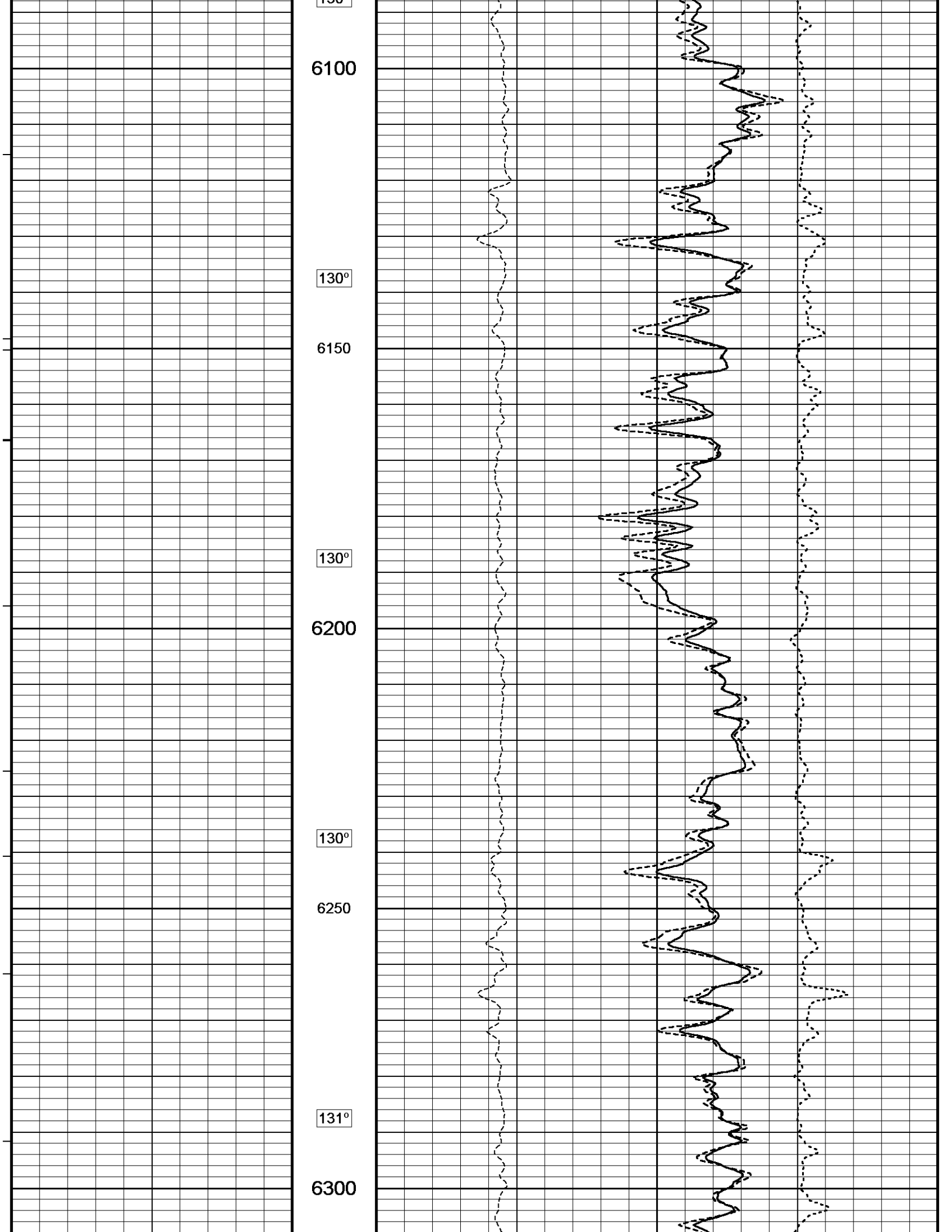
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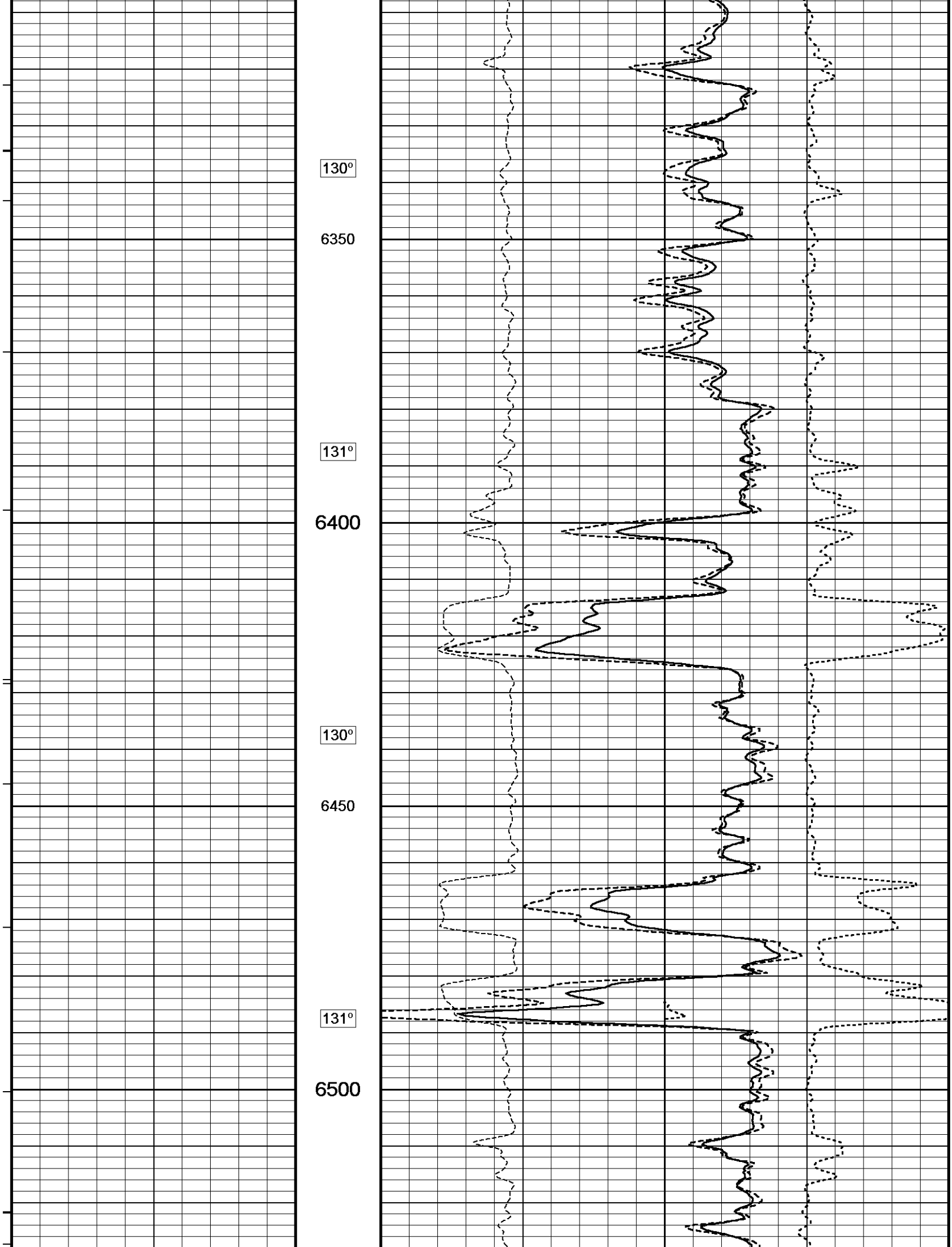
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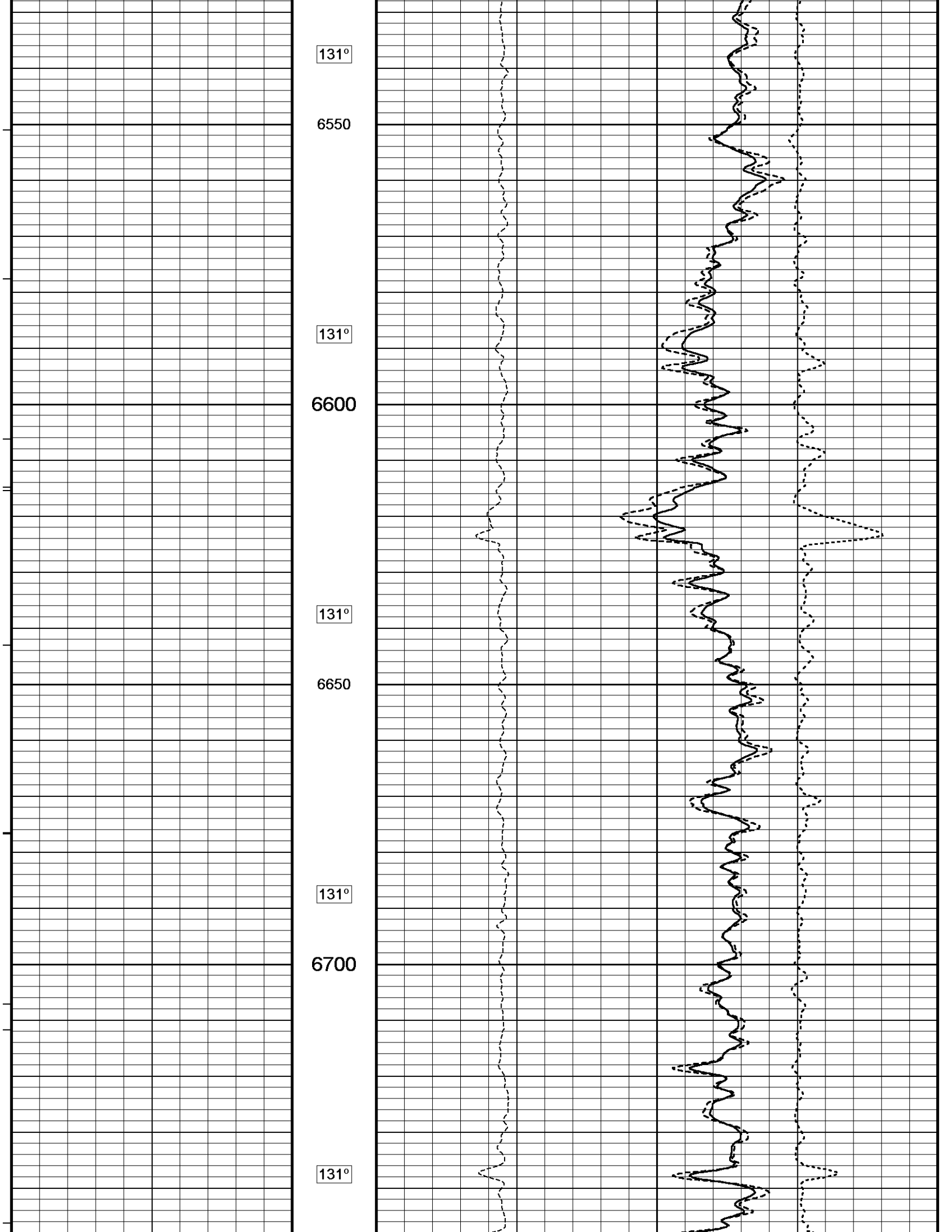
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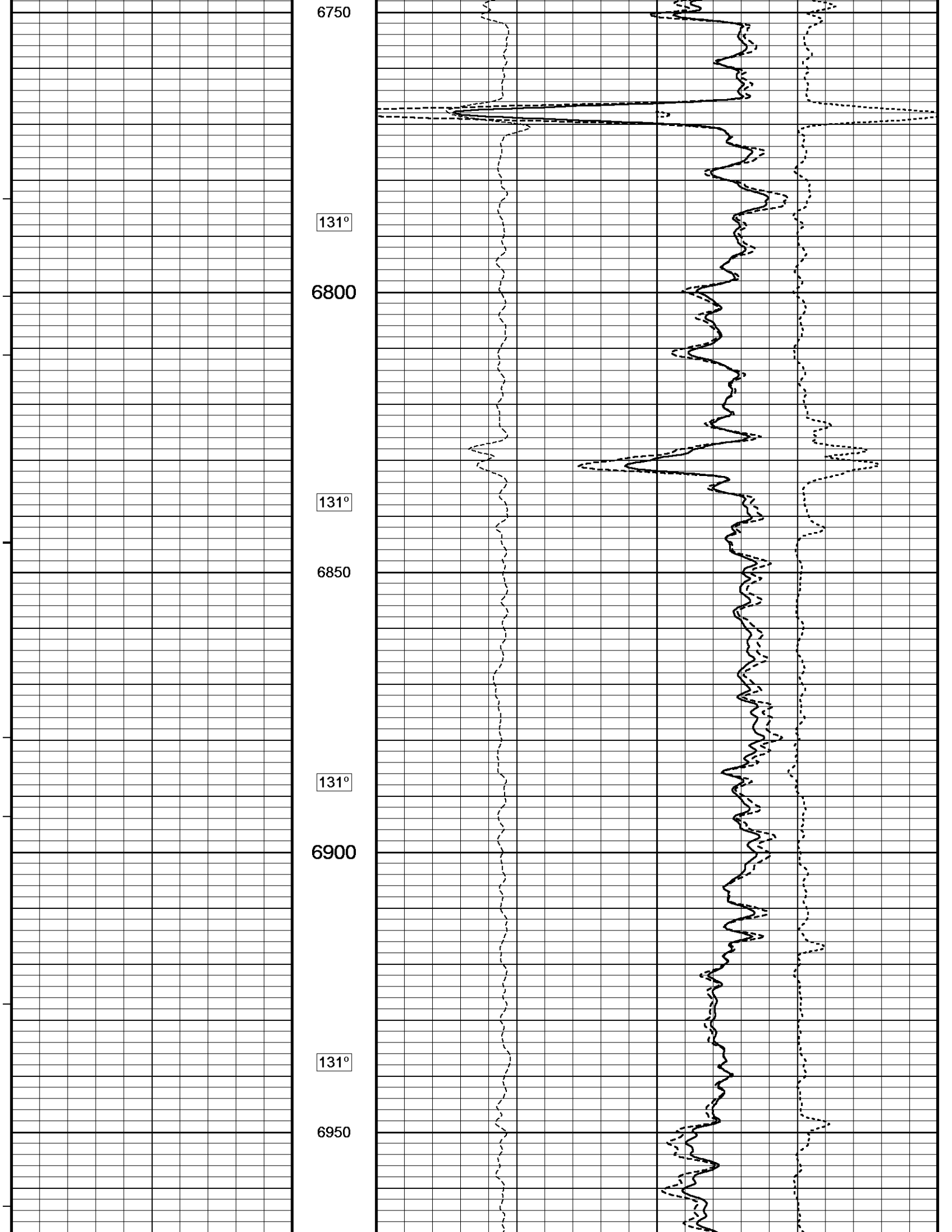
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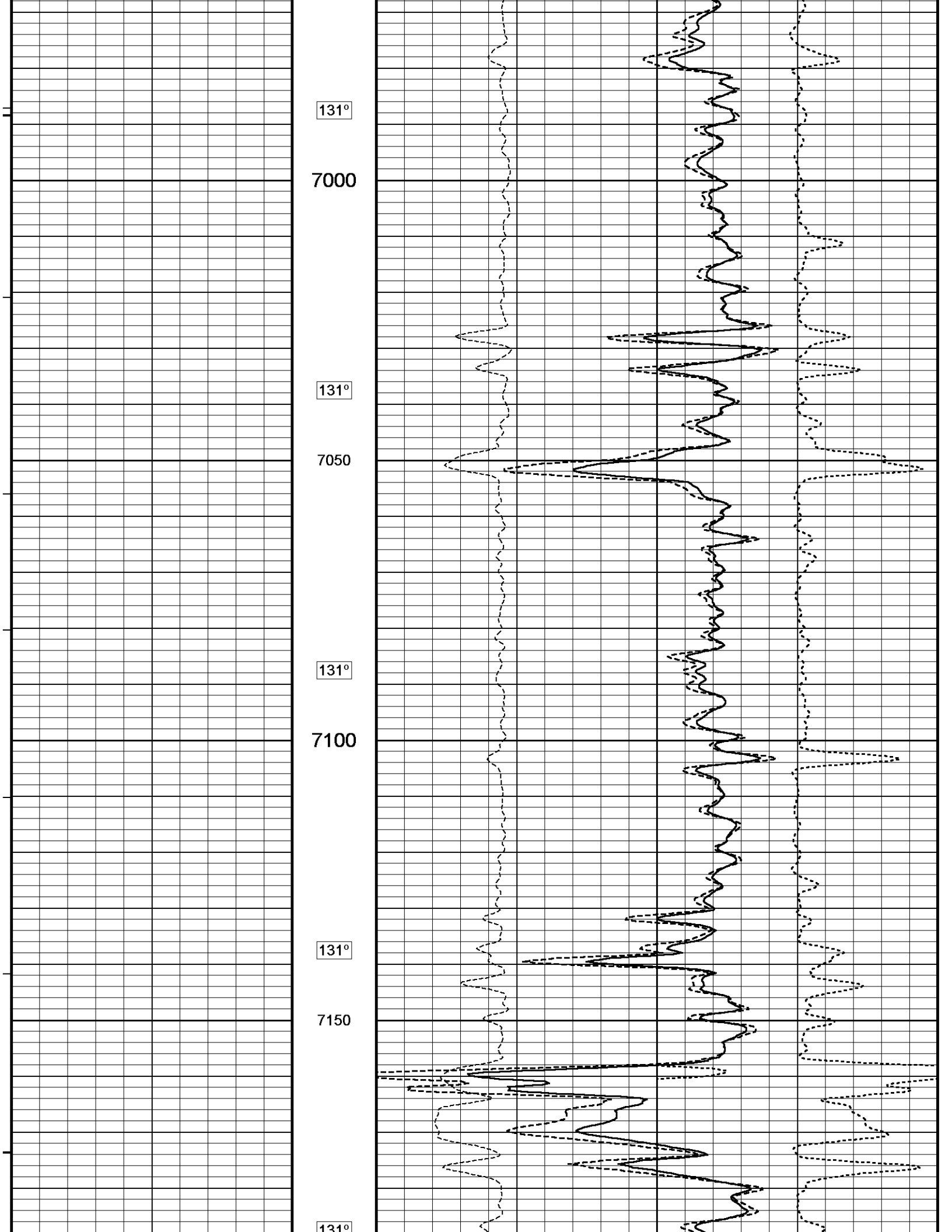
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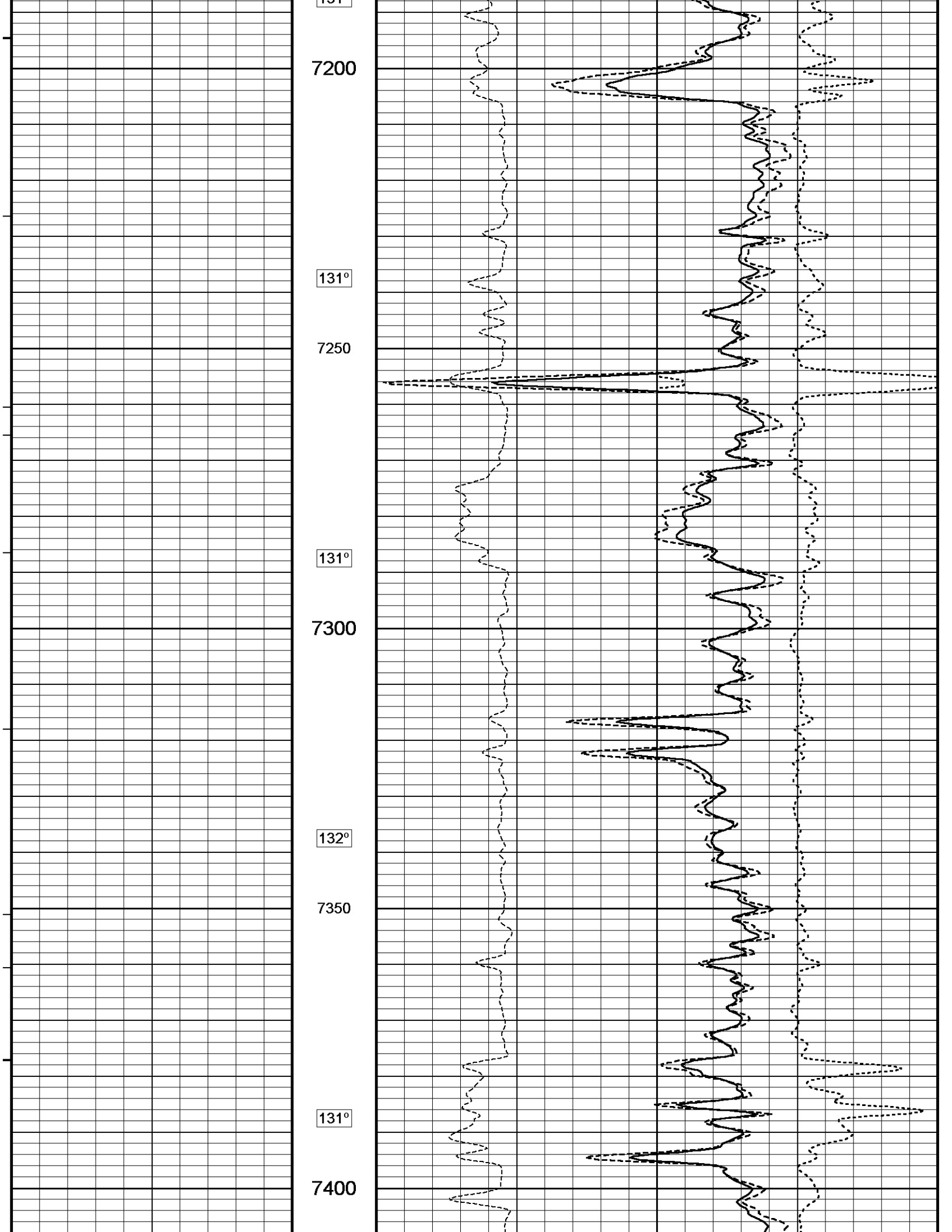
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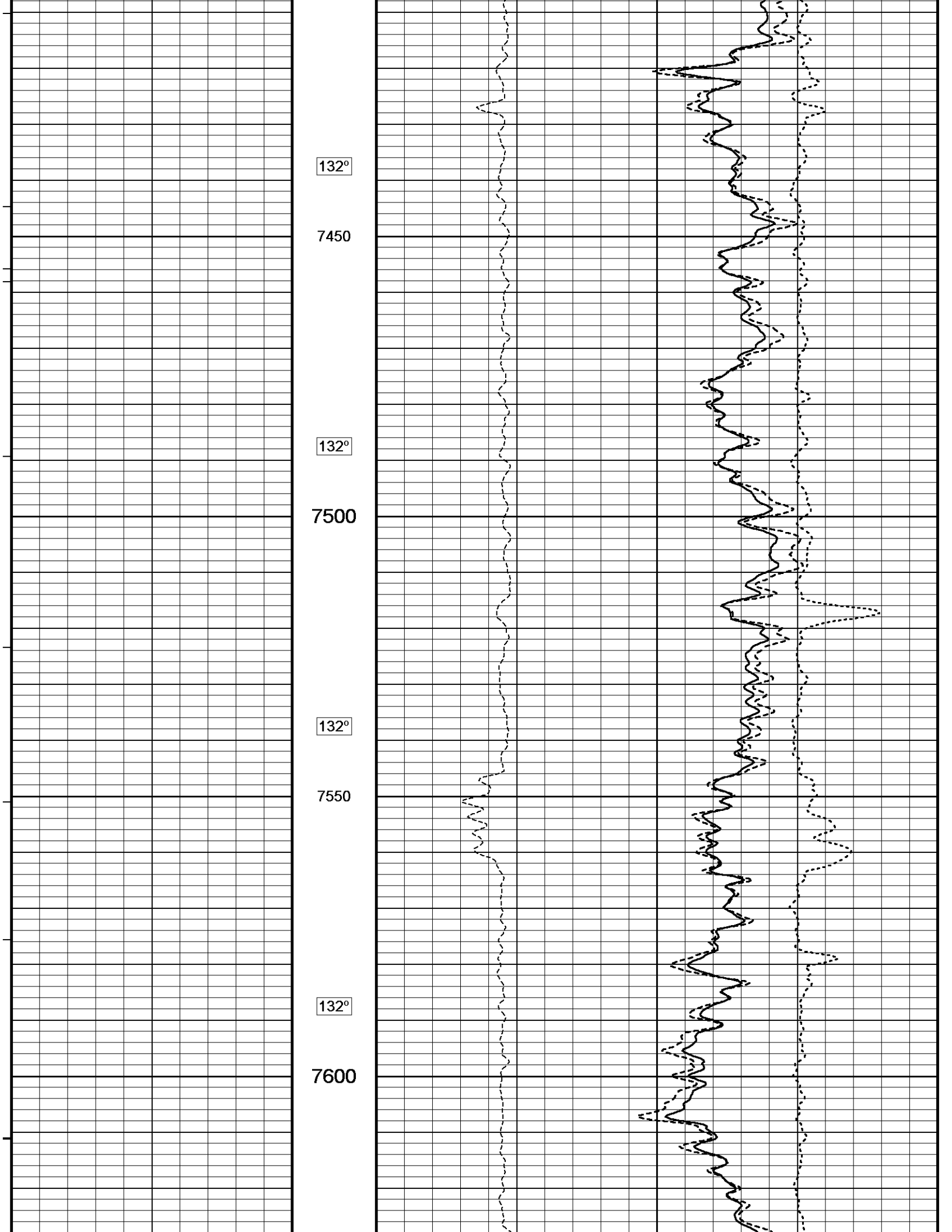
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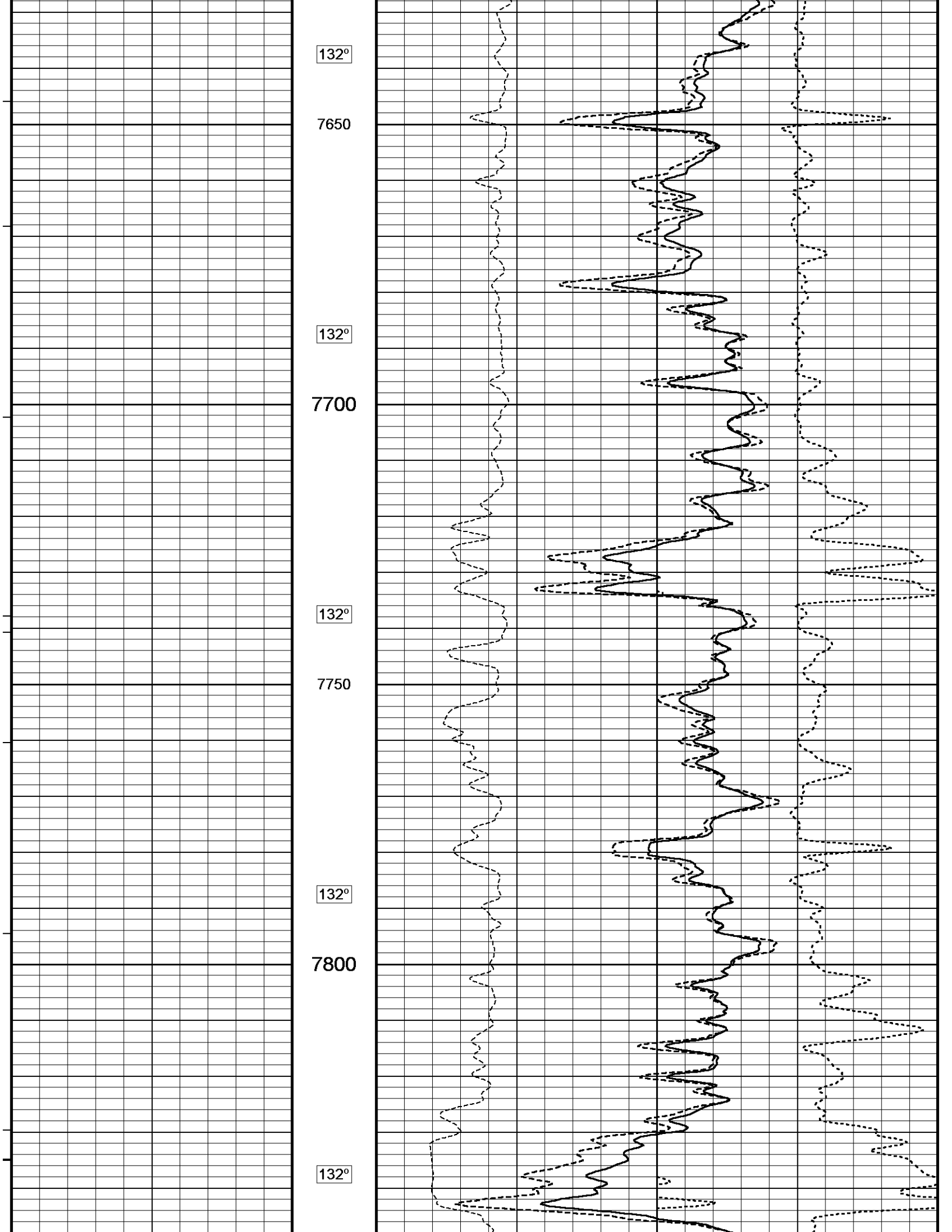
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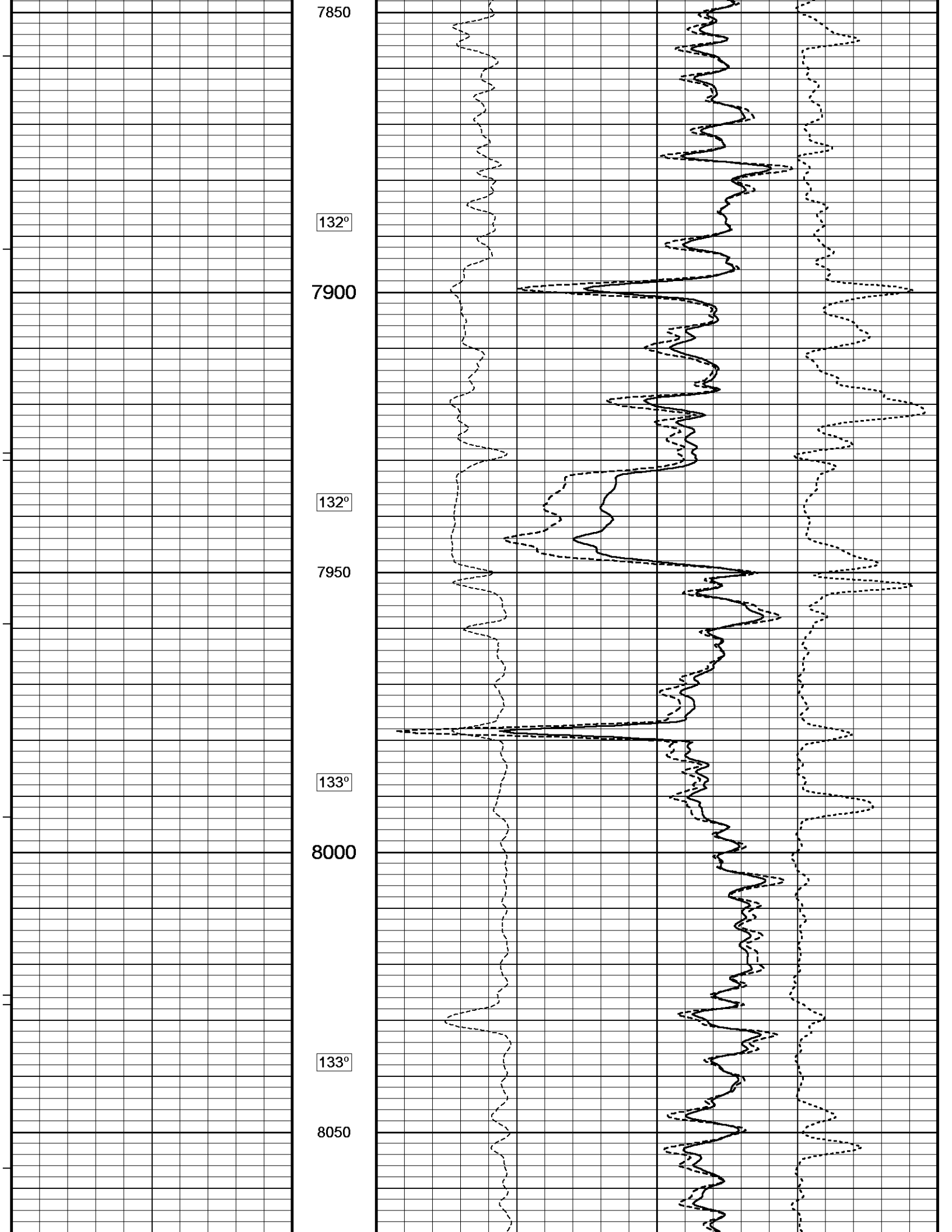
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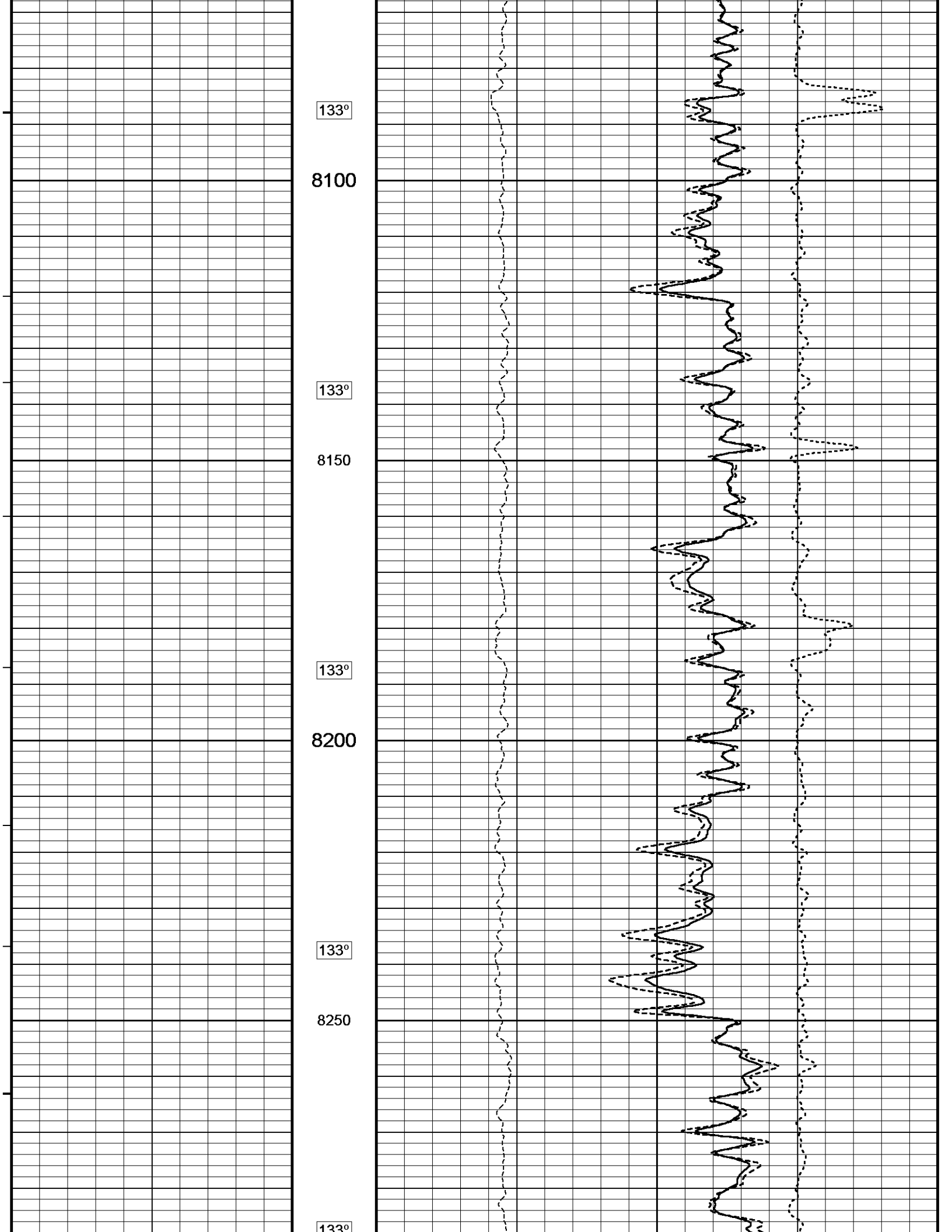
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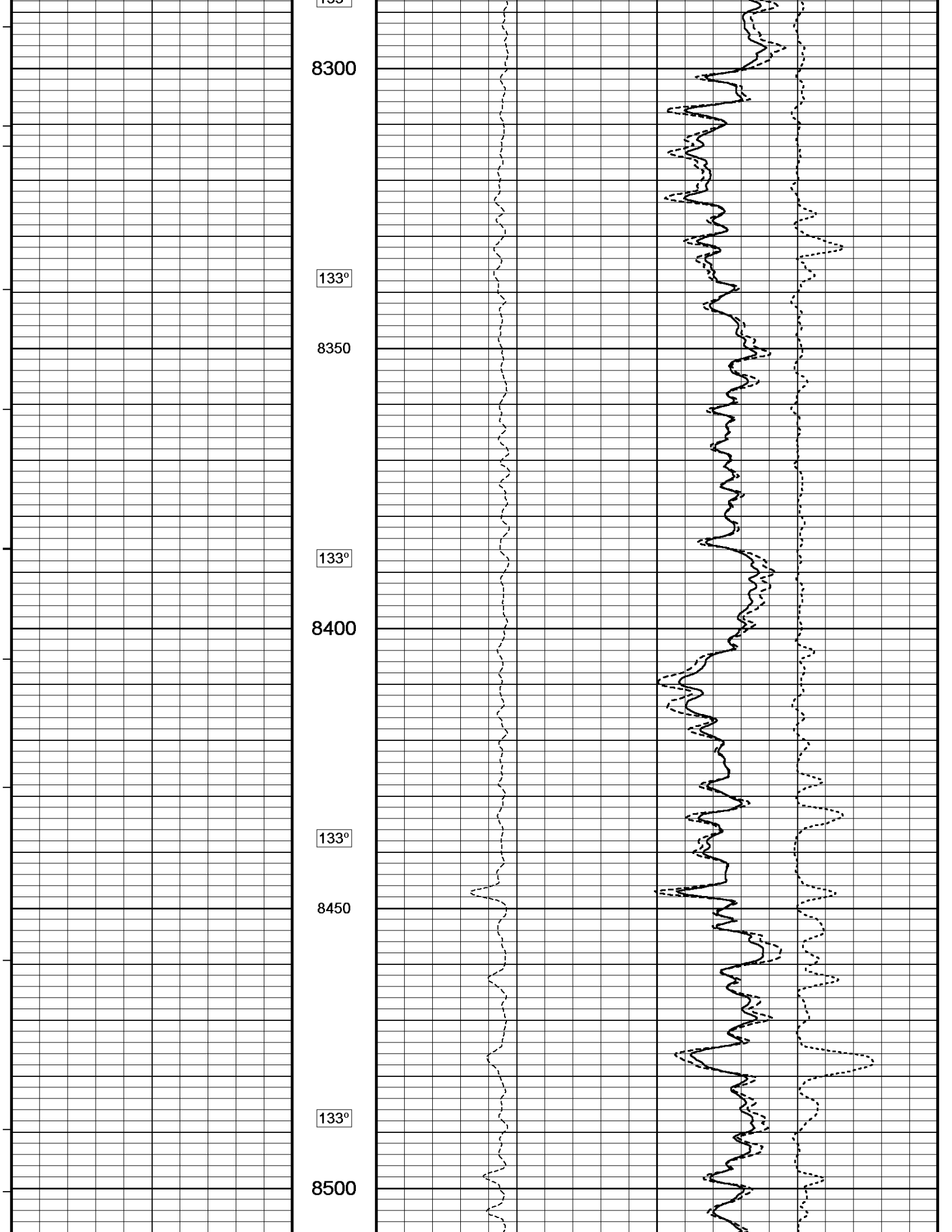
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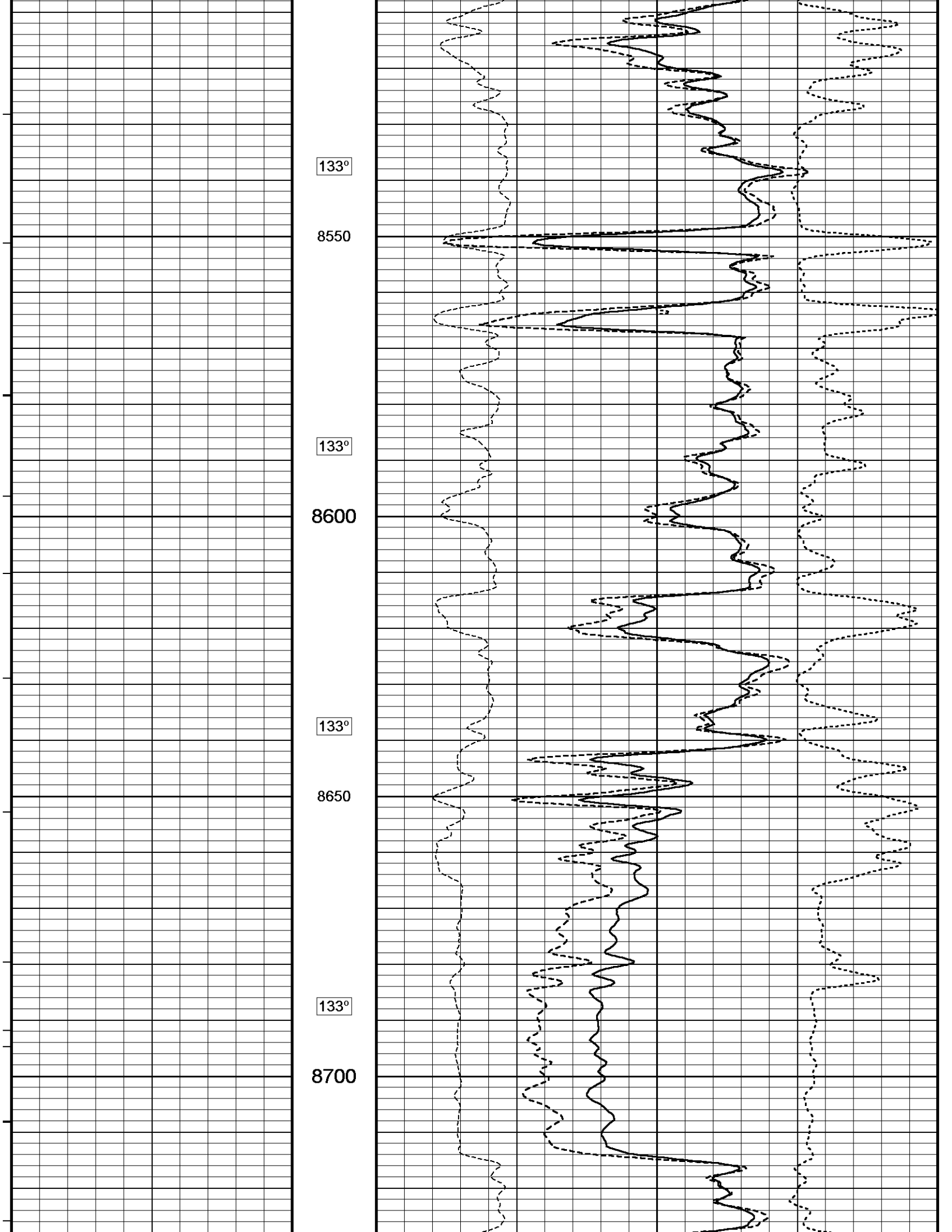
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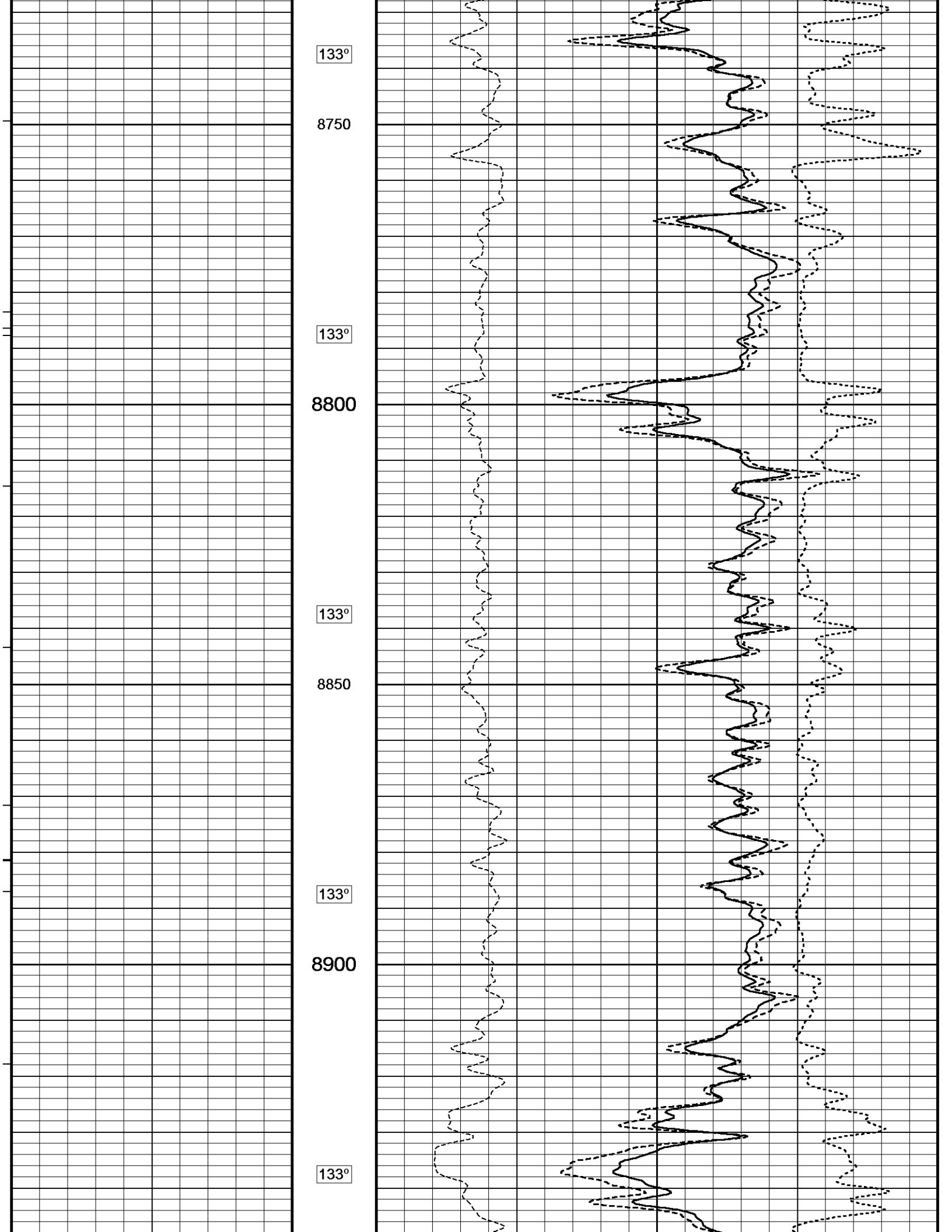
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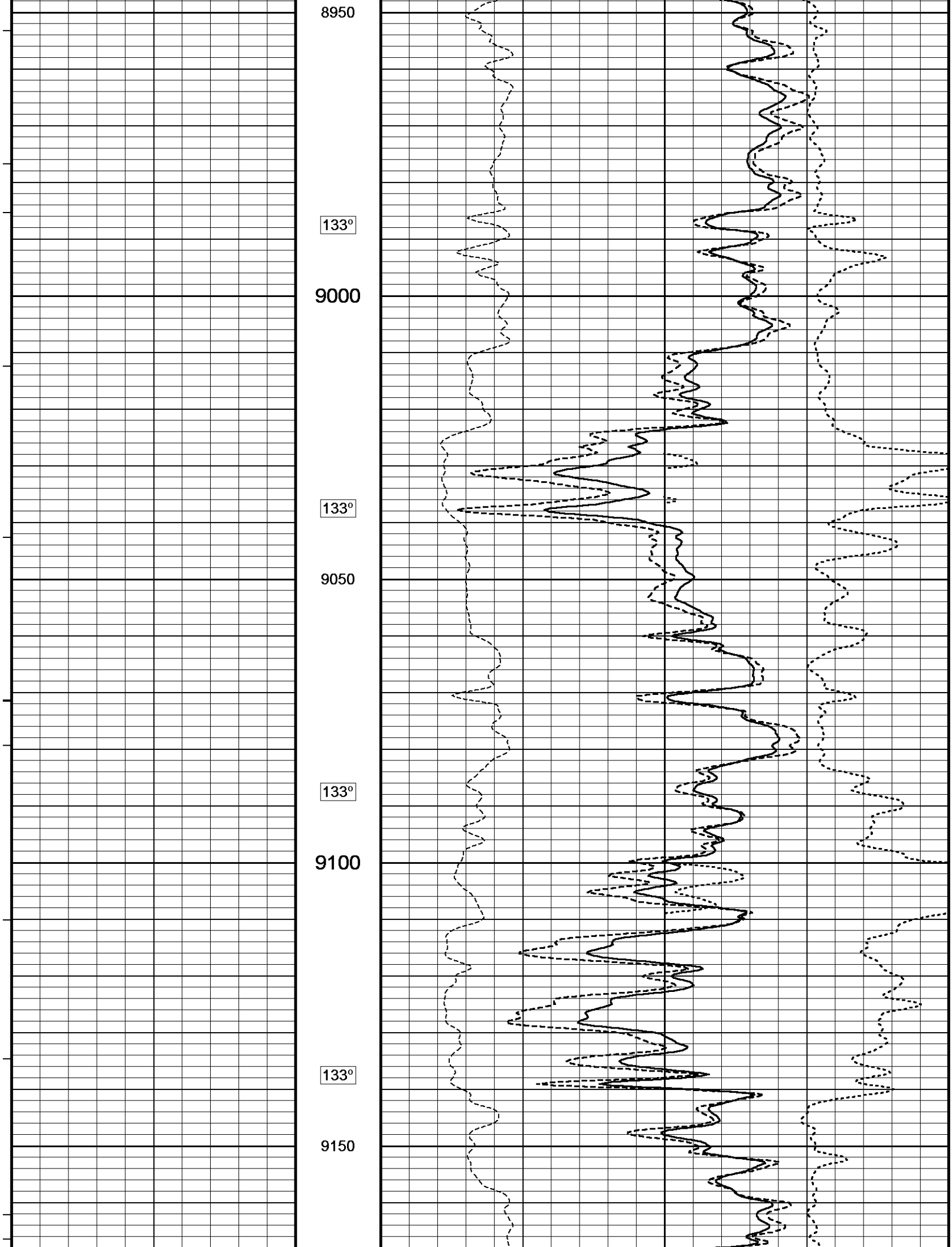
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9000
133°
9050
133°
9100
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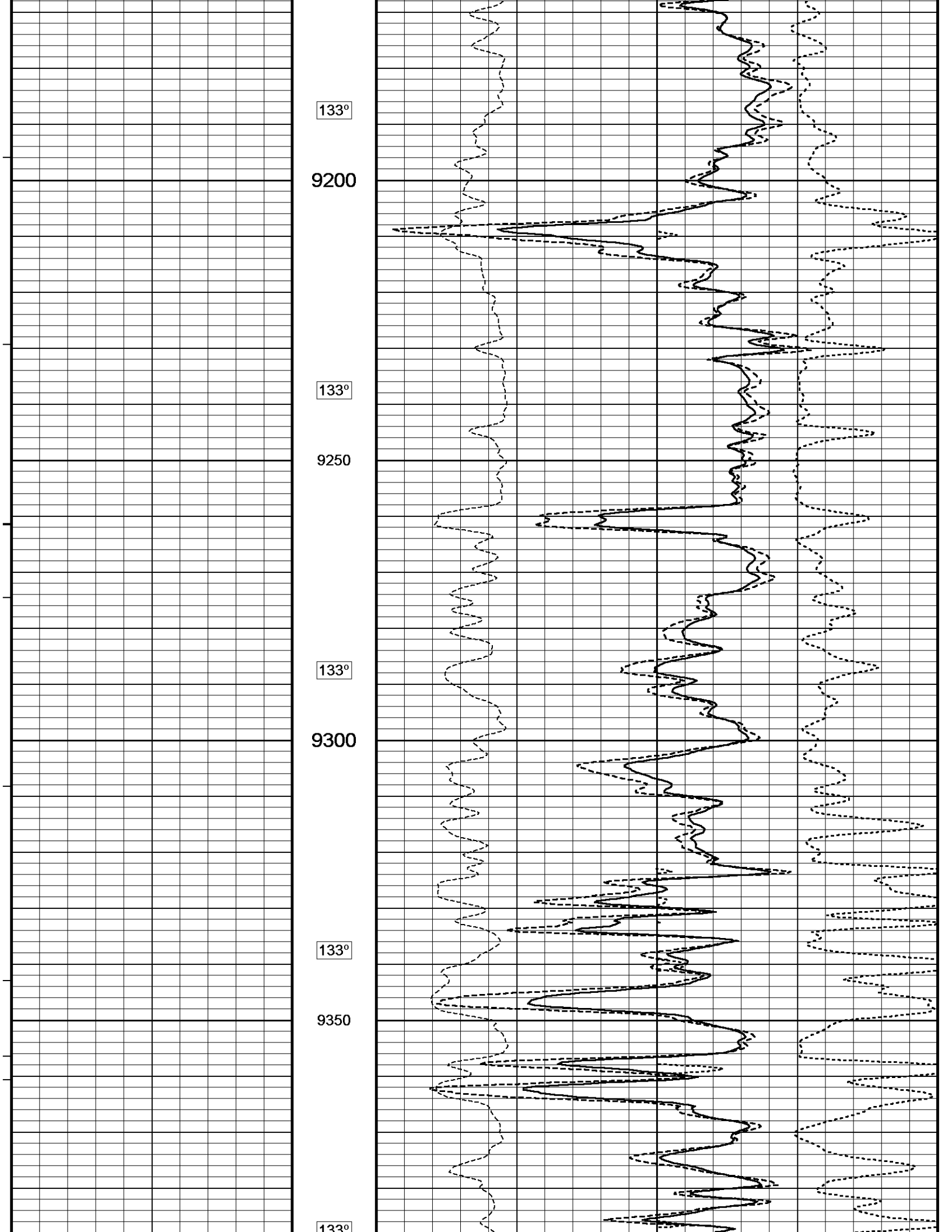
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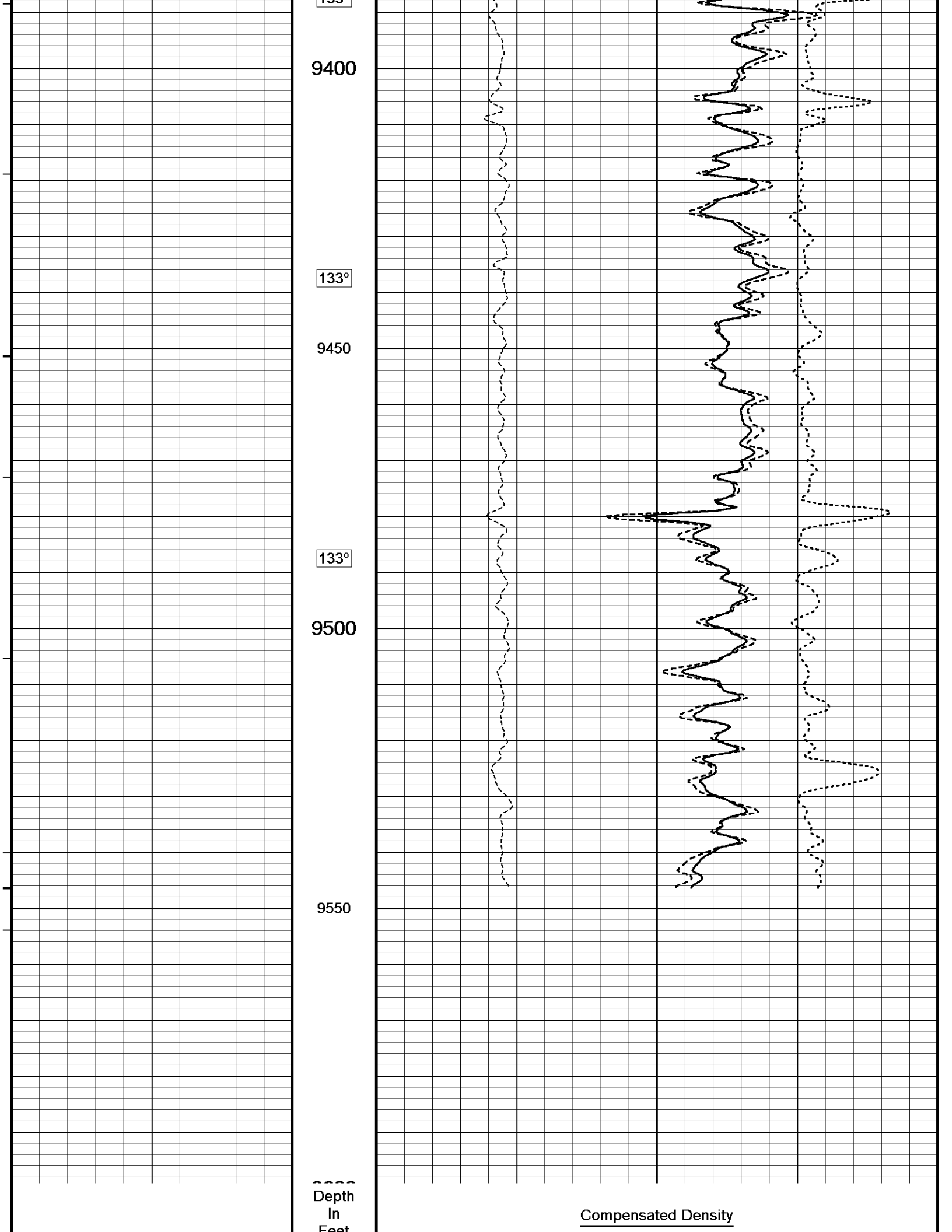
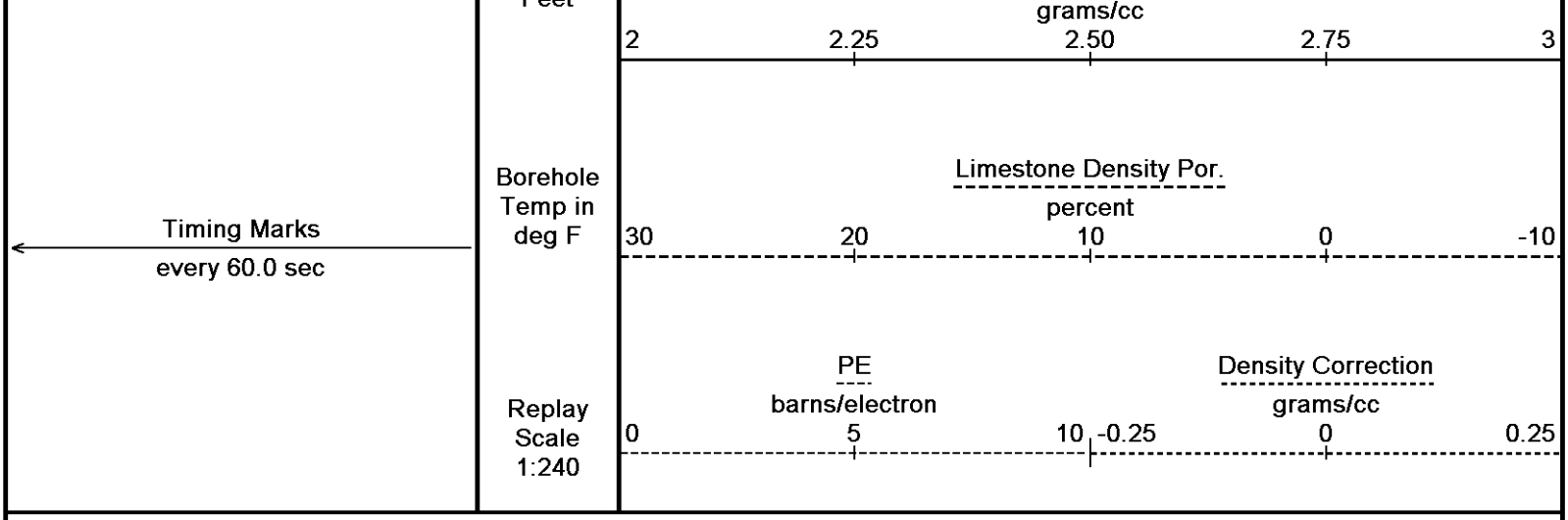
9350
133°


9400
133°
9450
133°
9500
9550
Depth
In
Feet
Compensated Density




Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 03-SEP-2012 02:26
Filename: C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta
Recorded on 02-SEP-2012 23:43
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

5 INCH BULK DENSITY

## BEFORE SURVEY CALIBRATION

C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta

### General Constants All 000

Last Edited on 03-SEP-2012,00:44

| | | |
|---|---|---|
| **General Parameters** | | |
| Mud Resistivity | 0.500 | ohm-metres |
| Mud Resistivity Temperature | 76.000 | degrees F |
| Water Level | 0.000 | feet |
| Density/Neutron Processing | Wet Hole | |
| **Hole/Annular Volume and Differential Caliper Parameters** | | |
| HVOL Method | Single Caliper | |
| HVOL Caliper 1 | Bit Size | |
| HVOL Caliper 2 | N/A | |
| Annular Volume Diameter | 4.500 | inches |
| Caliper for Differential Caliper | Density Caliper | |
| **Rwa Parameters** | | |
| Porosity used | Base Density Porosity | |
| Resistivity used | Array Ind. One Res Rt | |
| RWA Constant A | 0.610 | |
| RWA Constant M | 2.150 | |

### Gamma Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012 23:39

| | Measured | Calibrated (API) |
|---|---|---|
| Background | 40 | 28 |
| Calibrator (Gross) | 1024 | 724 |
| Calibrator (Net) | 984 | 696 |

### Gamma Constants MCG-D.K 476

Last Edited on 03-SEP-2012,00:26

| | | |
|---|---|---|
| Gamma Calibrator Number | 036 | |
| Mud Density | 1.01 | gm/cc |
| Caliper Source for Processing | Bit Size | |
| Tool Position | Eccentred | |
| Concentration of KCl | 0.00 | kppm |

### SP Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012,23:30

| | Measured | Calibrated (mV) |
|---|---|---|
| Reference 1 | 100.0 | 100.0 |
| Reference 2 | -100.0 | -100.0 |

### High Resolution Temperature Calibration MCG-D.K 476

Field Calibration on 01-SEP-2012,23:30

| | Measured | Calibrated(Deg F) |
|---|---|---|
| Lower | 50.00 | 50.00 |
| Upper | 100.00 | 100.00 |

## High Resolution Temperature Constants MCG-D.K 476

Last Edited on 01-SEP-2012,23:30

| | |
|---|---|
| Pre-filter Length | 11 |

## Neutron Calibration MDN-B.J 391

Base Calibration on 02-FEB-2012 17:34
Field Check on 01-SEP-2012 23:45

Base Calibration

| | Measured | | Calibrated (cps) | |
|---|---|---|---|---|
| | Near | Far | Near | Far |
| | 3186 | 96 | 3714 | 110 |
| Ratio | 33.156 | | 33.764 | |

Field Calibrator at Base

| | Calibrated (cps) | |
|---|---|---|
| | 2267 | 3463 |
| Ratio | 0.655 | |

Field Check

| | Calibrated (cps) | |
|---|---|---|
| | 2249 | 3344 |
| Ratio | 0.673 | |

## Neutron Constants MDN-B.J 391

Last Edited on 03-SEP-2012,00:26

| | | |
|---|---|---|
| Neutron Source Id | N1055 | |
| Neutron Jig Number | N639 | |
| Epithermal Neutron | No | |
| Caliper Source for Processing | Bit Size | |
| Stand-off | 0.00 | inches |
| Mud Density | 1.00 | gm/cc |
| Limestone Sigma | 7.10 | cu |
| Sandstone Sigma | 4.26 | cu |
| Dolomite Sigma | 4.70 | cu |
| Formation Pressure Source | Constant Value | |
| Formation Pressure | 1.80 | kpsi |
| Temperature Source | MCG External Temperature | |
| Temperature | N/A | degrees F |
| Mud Salinity | 3.67 | kppm |
| Salinity Correction | Applied | |
| Formation Fluid Salinity Source | None | |
| Formation Fluid Salinity | N/A | kppm |
| Barite Mud Correction | Not Applied | |

## FE Calibration MFE-B.J 363

Base Calibration on 31-AUG-2012 16:00
Field Check on 01-SEP-2012 23:22

Base Calibration

| | Measured | Calibrated (ohm-m) |
|---|---|---|
| Reference 1 | 0.0 | 0.0 |
| Reference 2 | 970.3 | 126.8 |
| Base Check | | 279.6 |
| Field Check | | 279.8 |

## FE Constants MFE-B.J 363

Last Edited on 03-SEP-2012,00:25

| | | |
|---|---|---|
| Running Mode | No Sleeve | |
| MFE K Factor | 0.1268 | |
| Caliper Source for FE correction | Bit Size | |
| Caliper Value for FE correction | N/A | inches |
| Rm Source for FE correction | Temperature Corr | |
| Temp. for Rm Corr. | MCG External Temperature | |
| Stand-off | 0.5 | inches |

## Induction Calibration MAI-B.J 427

Base Calibration on 20-AUG-2012,13:38
Field Check on 01-SEP-2012 23:20

Base Calibration

Test Loop Calibration

| Channel | Measured Low | Measured High | Calibrated (mmho/m) Low | Calibrated (mmho/m) High |
|---|---|---|---|---|
| 1 | 14.4 | 434.9 | 9.3 | 966.2 |
| 2 | 5.8 | 355.4 | 7.6 | 821.4 |

| | | | | |
|---|---|---|---|---|
| 3 | 2.7 | 244.4 | 5.2 | 566.0 |
| 4 | 1.8 | 129.3 | 2.6 | 279.2 |

Array Temperature 75.0 Deg F

| Channel | Base Check (mmho/m) Low | Base Check (mmho/m) High | Field Check (mmho/m) Low | Field Check (mmho/m) High |
|---|---|---|---|---|
| 1 | | | 20.0 | 4139.7 |
| 2 | | | 32.1 | 3767.5 |
| 3 | | | 31.1 | 3207.7 |
| 4 | | | 20.0 | 2121.9 |
| Deep | | | 19.6 | 2018.6 |
| Medium | | | 45.0 | 4286.1 |
| Shallow | | | 47.3 | 5674.6 |

Array Temperature 91.7 Deg F

## Induction Constants MAI-B.J 427

Last Edited on 03-SEP-2012,00:45

| | | |
|---|---|---|
| Induction Model | RtAP-WBM | |
| Caliper for Borehole Corr. | Bit Size | |
| Hole Size for Borehole Correction | N/A | inches |
| Tool Centred | No | |
| Stand-off Type | Fins | |
| Stand-off | 0.00 | inches |
| Number of Fins on Stand-off | 6.0000 | |
| Stand-off Fin Angle | 60.00 | degrees |
| Stand-off Fin Width | 0.5000 | inches |
| Borehole Corr. Rm Source | Temperature Corr | |
| Temp. for Rm Corr. | MCG External Temperature | |
| Squasher Start | 0.0060 | mhos/metre |
| Squasher Offset | N/A | mhos/metre |

Borehole Normalisation

| | | | |
|---|---|---|---|
| DRM1 | 0.0000 | DRC1 | 0.0000 |
| DRM2 | 0.0000 | DRC2 | 0.0000 |
| MRM1 | 0.0000 | MRC1 | 0.0000 |
| MRM2 | 0.0000 | MRC2 | 0.0000 |
| SRM1 | 0.0000 | SRC1 | 0.0000 |
| SRM2 | 0.0000 | SRC2 | 0.0000 |

Calibration Site Corrections

| | | |
|---|---|---|
| Channel 1 | 0.00 | mmhos/metre |
| Channel 2 | 0.00 | mmhos/metre |
| Channel 3 | 0.00 | mmhos/metre |
| Channel 4 | 0.00 | mmhos/metre |

Apparent Porosity and Water Saturation Constants

| | | |
|---|---|---|
| Archie Constant (A) | 1.00 | |
| Cementation Exponent (M) | 2.00 | |
| Saturation Exponent (N) | 2.00 | |
| Saturation of Water for Apor | 100.00 | percent |
| Resistivity of Water for Apor and Sw | 0.05 | ohm-m |
| Resistivity of Mud Filtrate for Sw | 0.00 | ohm-m |
| Source for Rt | 0.00 | |
| Source for Rxo | 0.00 | |

## High Resolution Temperature Calibration MAI-B.J 427

Field Calibration on 20-AUG-2012,14:27

| | Measured | Calibrated(Deg F) |
|---|---|---|
| Lower | 50.00 | 50.00 |
| Upper | 100.00 | 100.00 |

## High Resolution Temperature Constants MAI-B.J 427

Last Edited on 20-AUG-2012,14:27

| | |
|---|---|
| Pre-filter Length | 11 |

## Caliper Calibration MPD-C.J 394

Base Calibration on 31-AUG-2012 14:51
Field Calibration on 01-SEP-2012 23:24

Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|---|---|---|
| 1 | 15552 | 4.02 |

| | | |
|---|---|---|
| 2 | 23792 | 6.00 |
| 3 | 32160 | 8.03 |
| 4 | 40750 | 10.02 |
| 5 | 49488 | 12.01 |
| 6 | N/A | N/A |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|---|---|
| 5.95 | 6.00 |

## Photo Density Calibration MPD-C.J 394

Base Calibration on 31-AUG-2012 15:26
Field Check on 01-SEP-2012 23:30

Density Calibration

| Base Calibration | Measured | | Calibrated (sdu) | |
|---|---|---|---|---|
| | Near | Far | Near | Far |
| Reference 1 | 51997 | 26047 | 59869 | 31110 |
| Reference 2 | 21749 | 2530 | 24557 | 2522 |

Field Check at Base

| | |
|---|---|
| 1066.4 | 1315.9 |

Field Check

| | |
|---|---|
| 1066.2 | 1317.2 |

PE Calibration

| Base Calibration | Measured | | | Calibrated |
|---|---|---|---|---|
| | WS | WH | Ratio | Ratio |
| Background | 191 | 947 | | |
| Reference 1 | 20679 | 51819 | 0.403 | 0.369 |
| Reference 2 | 5938 | 21621 | 0.278 | 0.271 |

Field Check at Base

| | |
|---|---|
| 191.2 | 947.4 |

Field Check

| | |
|---|---|
| 190.0 | 948.4 |

## Density Constants MPD-C.J 394

Last Edited on 03-SEP-2012,00:40

| | | |
|---|---|---|
| Density Source Id | 236 | |
| Nylon Calibrator Number | 633 | |
| Aluminium Calibrator Number | 633 | |
| Density Shoe Profile | 4 inch | |
| Caliper Source for Processing | Bit Size | |
| PE Correction to Density | Not Applied | |
| Mud Density | 1.01 | gm/cc |
| Mud Density Z/A Multiplier | 1.11 | |
| Mud Filtrate Density | 1.00 | gm/cc |
| Dry Hole Mud Filtrate Density | 1.00 | gm/cc |
| DNCT | 0.00 | gm/cc |
| CRCT | 0.03 | gm/cc |
| Density Z/A Correction | Hybrid | |

| Matrix density (gm/cc) | Depth (m) |
|---|---|
| 2.71 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |

## DOWNHOLE EQUIPMENT

C:\Data\15033216610100_Ruby 3119 2-20H\26487RTAP.dta

Shuttle Running Tool 3.5" )
SRT-A A 69 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-D.A 400v Compact Battery Sub
MBS-D.A 147 LG: 7.84 ft WT: 57.3 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 476 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

62.63 ft GRGC - Gamma Ray

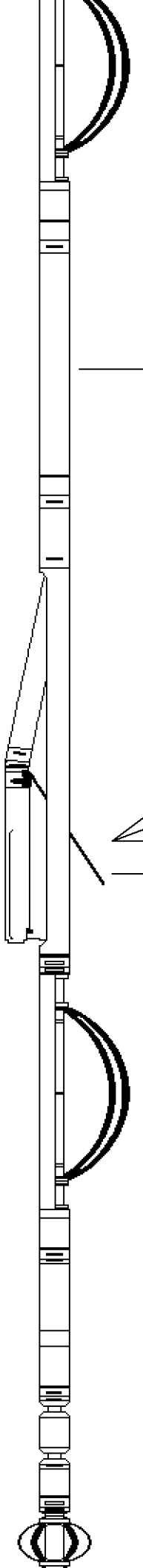
59.72 ft CGXT - MCG External Temperature

Compact Memory Sub D.A
MMS-D.A 159 LG: 3.12 ft WT: 30.9 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 479 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 431 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub



Compact Neutron
MDN-B.J 391 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

42.89 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-C.J 394 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

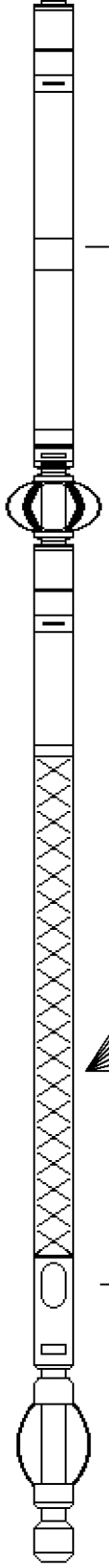
33.72 ft DCOR - Density Correction
33.72 ft DEN - Compensated Density
33.72 ft DPRL - Limestone Density Por.
33.65 ft PDPE - PE

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 275 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 434 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 474 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub



MIS-E.B 337 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
MFE-B.J 363 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

15.86 ft FEFE - Shallow FE

MIS-E.A Compact Inline Standoff sub
MIS-E.A 337 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-B.J 427 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

3.34 ft CTAO - Array Ind. One Cond Ct
3.34 ft R20O - Array Ind. One Res 20
3.34 ft R30O - Array Ind. One Res 30
3.34 ft R40O - Array Ind. One Res 40
3.34 ft R60O - Array Ind. One Res 60
3.34 ft R85O - Array Ind. One Res 85
3.34 ft RTAO - Array Ind. One Res Rt

Tool Zero (1.84ft from bottom)

Total Length: 84.08 ft Weight: 617.3 lb

All measurements relative to tool zero.

| | |
|---|---|
| COMPANY | SANDRIDGE ENERGY |
| WELL | RUBY 3119 2-20H |
| FIELD | SASSY |
| PROVINCE/COUNTY | COMANCHE |
| COUNTRY/STATE | USA / KANSAS |

| | | | | | |
|---|---|---|---|---|---|
| Elevation Kelly Bushing | 2186.00 | feet | First Reading | 9546.00 | feet |
| Elevation Drill Floor | 2186.00 | feet | Depth Driller | 9600.00 | feet |
| Elevation Ground Level | 2166.00 | feet | Depth Logger | 9600.00 | feet |

Weatherford®

CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
DUAL SPACED NEUTRON LOG