



LWD MEMORY LOG

Gamma Ray

Scale: **Company: Noble Energy**

Well: Guttersen CC32-783

| | | |
|----------------|--------|------------|
| Measured Depth | Field: | Wattenberg |
|----------------|--------|------------|

County: Weid County: United states

Driller's Depth

State: Colorado

| | | |
|---------|-------------------|-----------------|
| Status: | Surface Location: | Other Services: |
|---------|-------------------|-----------------|

Final Print

Latitude: 40° 16' 58.584" N
Longitude: 104° 27' 56.988" W

Other Services:

API No: 05-123-49269-00

| | | | | | | | |
|---------|-----------|------|----|------|----|------|-----|
| Job ID: | 111313192 | SEC: | 29 | TWN: | 4N | RGE: | 63W |
|---------|-----------|------|----|------|----|------|-----|

| | | | | | |
|-------------------------|----------------|------------|------------|-----------|------------|
| Permanent Datum (P.D.): | Mean Sea Level | Elevation: | 4761.00 ft | Elev. KB: | 4791.00 ft |
|-------------------------|----------------|------------|------------|-----------|------------|

| | | | | | |
|--------------------|-----------|-------------|------------|-----------|------------|
| Log Measured From: | Rig Floor | Above P.D.: | 4/91.00 ft | Elev. GL: | 4761.00 ft |
|--------------------|-----------|-------------|------------|-----------|------------|

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| | | | | | | |
|------------------|--------------|-------------|----------------------|------|------------------|-------|
| From: 2022-05-16 | Drilled (ft) | Logged (ft) | Azi Reference North: | Grid | Dip Angle: (deg) | 66.63 |
|------------------|--------------|-------------|----------------------|------|------------------|-------|

| | | | | |
|----------------|-------------|--------------|-------------------------------------|-------|
| To: 2022-05-19 | Top: 110.00 | Top: 1963.00 | Total Magnetic Field Strength: (nT) | 51839 |
|----------------|-------------|--------------|-------------------------------------|-------|

| | | | |
|------------------|------------------|------------------|--|
| Spud: 2022-05-16 | Bottom: 14611.00 | Bottom: 14598.00 | Mag to Reference North Correction: (deg) |
|------------------|------------------|------------------|--|

Borehole Record

Casing Record

| Hole Size (in) | From (ft) | To (ft) | Size (in) | Weight (lb/ft) | From (ft) | To (ft) |
|----------------|-----------|---------|-----------|----------------|-----------|---------|
|----------------|-----------|---------|-----------|----------------|-----------|---------|

| | | | | | | |
|--------|-------|---------|-------|-------|-------|---------|
| 13.500 | 30.00 | 1963.00 | 9.625 | 36.00 | 30.00 | 1953.00 |
|--------|-------|---------|-------|-------|-------|---------|

| | | | | | |
|-------|---------|----------|--|--|--|
| 8.500 | 1963.00 | 14611.00 | | | |
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Mud Record

Deviation Record

| Type | From (ft) | To (ft) | Hole Size (in) | Interval (ft) | Inc Az (Start) | Inc Az (End) |
|------|-----------|---------|----------------|---------------|------------------|----------------|
|------|-----------|---------|----------------|---------------|------------------|----------------|

| | | | | | | | | |
|-----------------|--------|---------|-------|----------|------|--------|-------|--------|
| Water Based Mud | 110.00 | 1963.98 | 8.500 | 12648.00 | 1.18 | 223.01 | 90.55 | 176.19 |
|-----------------|--------|---------|-------|----------|------|--------|-------|--------|

| | | | | | |
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| | | | | | |
| | | | | | |

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| Acquisition System | Software Version | Other |
|--------------------|------------------|-------|
| ... | ... | ... |

| | | | |
|---------|-------|------|---------|
| Cadence | R10.4 | Rig: | H&P 517 |
|---------|-------|------|---------|

District: BMA City: D&E

| | | | |
|-----------|-----|-------|-----|
| District: | RMA | Unit: | D&E |
|-----------|-----|-------|-----|

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Log Run Summary

| Run No | Bit Run No. | Bit Size (in) | Bit Type | Bit Gauge Length (in) | Assembly Type | Logged Interval | | Bit Depth Interval | | Date / Time | | Circ. Hours |
|--------|-------------|------------------|----------|--------------------------|----------------|-----------------|----------|--------------------|----------|------------------|------------------|-------------|
| | | | | | | Top | Bottom | From | To | Start Logging | End Logging | |
| | | | | | | (ft) | (ft) | (ft) | (ft) | | | |
| 1 | 1RR | 13.500 | PDC | 4.00 | Motor | 110.00 | 1963.00 | 110.00 | 1963.00 | 2022-05-16 15:17 | 2022-05-16 22:32 | 6.80 |
| 2 | 1 | 8.250 | PDC | 3.00 | AutoTrak Curve | 1963.00 | 14598.00 | 1963.00 | 14611.00 | 2022-05-17 21:46 | 2022-05-19 20:42 | 43.04 |

Crew

| Name | Arrive Wellsite | Depart Wellsite | Name | Arrive Wellsite | Depart Wellsite | Name | Arrive Wellsite | Depart Wellsite |
|----------|--------------------|--------------------|------|--------------------|--------------------|------|--------------------|--------------------|
| Tien Bui | 2022-05-16 | 2022-05-20 | | | | | | |

Mud Properties Record

| Date / Time | Run No. | Depth (ft) | Mud Type | Density (g/cc) | Viscosity (cP) | pH | Fluid Loss (cc) | Oil / Water | Source | Total Chlorides (ppm) | K+ (ppm) |
|-------------|---------|------------|----------|----------------|----------------|----|-----------------|-------------|--------|-----------------------|----------|
|-------------|---------|------------|----------|----------------|----------------|----|-----------------|-------------|--------|-----------------------|----------|

| | | | | | | | | | | | |
|------------------|---|---------|-----------------|-------|------|-----|-------|-----------|------------|-------|-----|
| | | (in) | | (ppg) | (cP) | | (cm3) | | | (ppm) | (%) |
| 2022-05-16 10:38 | 1 | 110.00 | Water Based Mud | 9.0 | 2 | 8 | N/A | 0/100 | Active Pit | 500 | N/A |
| 2022-05-17 05:08 | 2 | 1963.00 | Oil Based Mud | 9.3 | 10 | N/A | 18.0 | 79.5/20.5 | Active Pit | 25000 | N/A |

Equipment and Service Data

| Run No. | Tool | Serial Number | Measurement | Sensor Offset (ft) | Bit Offset (ft) | Max O.D. (in) | Min I.D. (in) |
|---------|------------------------------|---------------|----------------------|--------------------|-----------------|---------------|---------------|
| 1 | NaviTrak | ZDHP899 | Directional (mag) | 14.64 | 50.82 | 8.062 | 3.250 |
| 1 | NaviTrak | ZDHP899 | VSS | 14.64 | 50.82 | 8.062 | 3.250 |
| 2 | AutoTrak Curve Steering Unit | 14502006 | Near Bit Inclination | 5.93 | 6.78 | 7.000 | 4.330 |
| 2 | AutoTrak Curve Steering Unit | 14502006 | Near Bit VSS | 5.93 | 6.78 | 7.000 | 4.330 |
| 2 | AutoTrak Curve MWD | 14275758 | Gamma (single) | 2.12 | 12.95 | 7.000 | 3.250 |
| 2 | AutoTrak Curve MWD | 14275758 | Directional (mag) | 12.27 | 23.10 | 7.000 | 3.250 |

Service and Tool Mnemonics

| Mnemonic | Name | Description |
|----------|---------------------|---|
| NTK | NaviTrak | Probe Based Directional Module, NaviTrak Platform |
| ATC SU | AutoTrak Curve SU | Auto Trak Curve Steering Unit |
| ATC MWD | AutoTrak Curve MWD | Auto Trak Curve MWD |
| ATC LCPM | AutoTrak Curve LCPM | Auto Trak Curve LCPM |

Comments

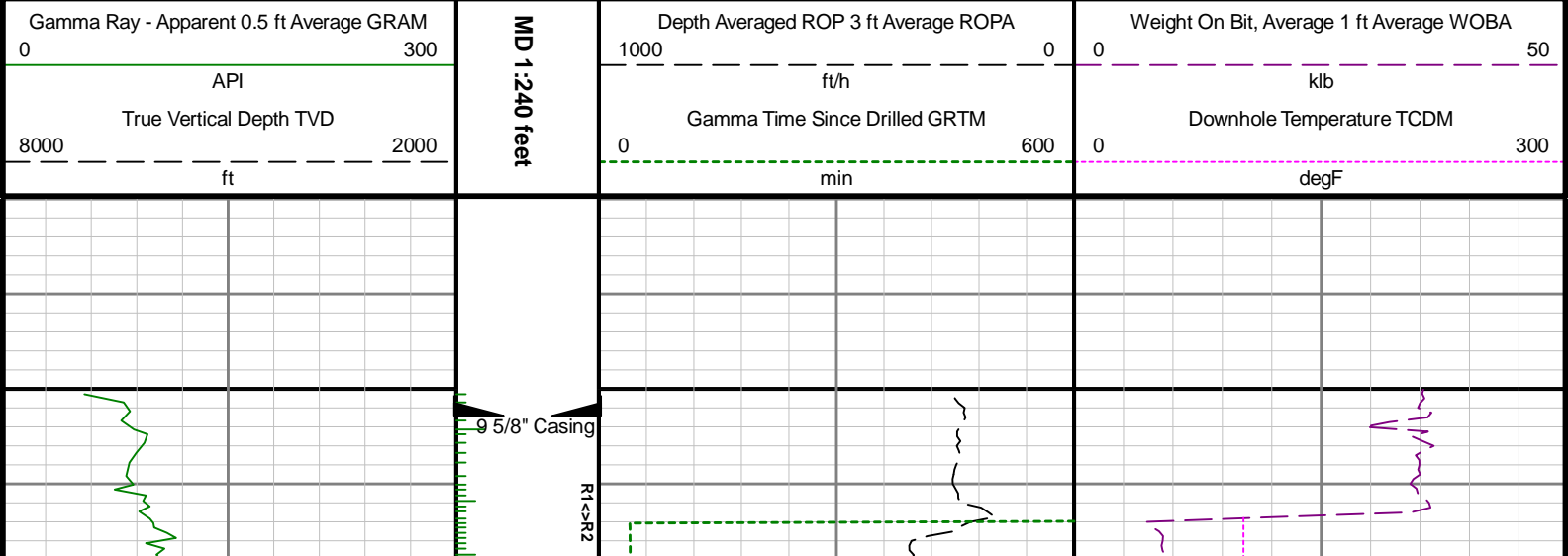
| | |
|---|--|
| 1 | Baker Hughes Company run 1 utilized 8 inch NaviGamma services (Gamma Ray and Directional) behind an 13 ½ inch PDC bit and steerable assembly from 110 to 1963 feet MD (110 to 1693 feet TVD). |
| 2 | Baker Hughes Company run 2 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind an 8 ½ inch PDC bit and rotary steerable assembly from 1693 to 14611 feet MD (1693 to 6667 feet TVD). |
| 3 | Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to a lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to present logging data. |
| 4 | The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request. |

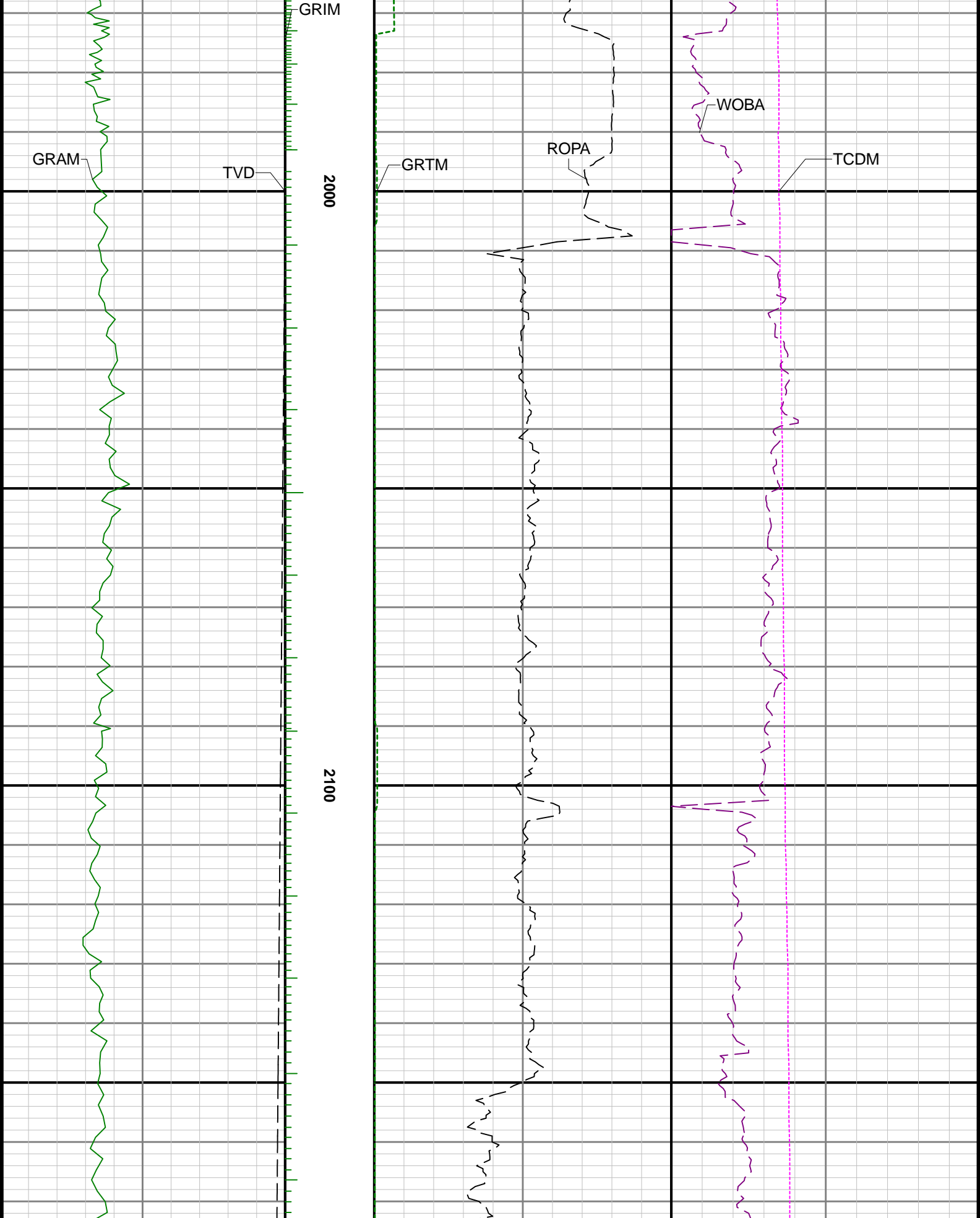
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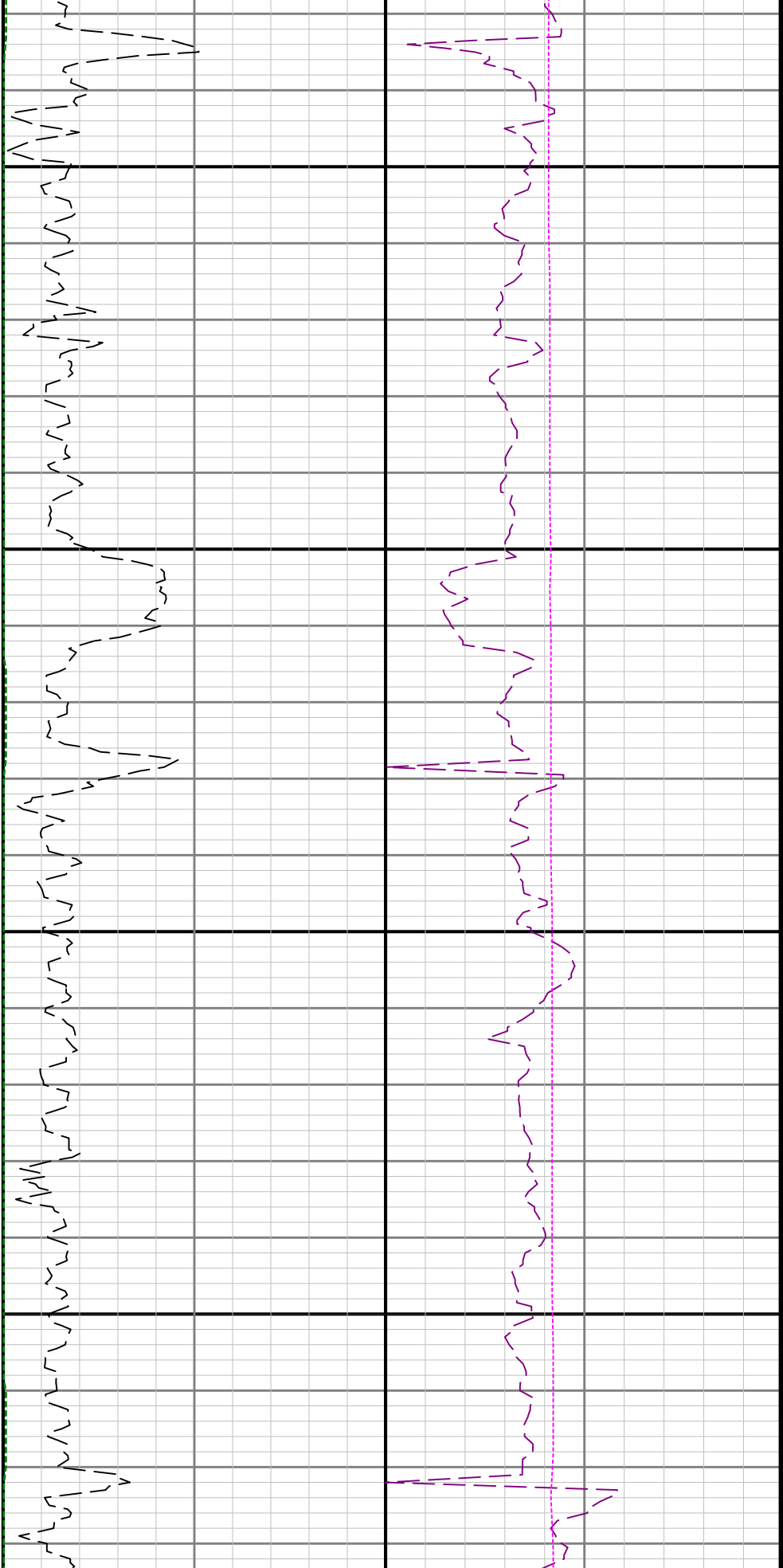
| Number | Depth (ft) | Hole Section (in) | Run No. | Remark |
|--------|------------|-------------------|---------|---|
| 1 | 14598.00 | 8.500 | 2 | The interval from 14598 to 14611 feet MD (6667 to 6667 feet TVD) was not logged due to sensor to bit offset at well TD. |

Curve Mnemonics

| Presented Curves | Description | Units |
|------------------|--|----------|
| ROPA | Depth Averaged ROP 3 ft Average | ft/h |
| TVD | True Vertical Depth | ft |
| WOBA | Weight On Bit, Average 1 ft Average | klb |
| GRAM | Gamma Ray - Apparent - Memory 0.5 ft Average | API |
| GRIM | Gamma Ray - Data Point Indicator - Memory | unitless |
| GRTM | Gamma Ray - Time Since Drilled - Memory | min |
| TCDM | Directional Real-Time Survey Temperature | degF |

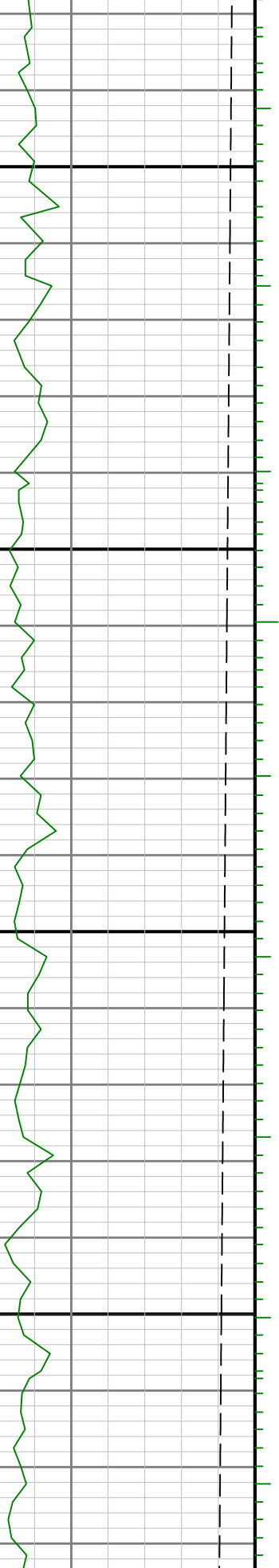


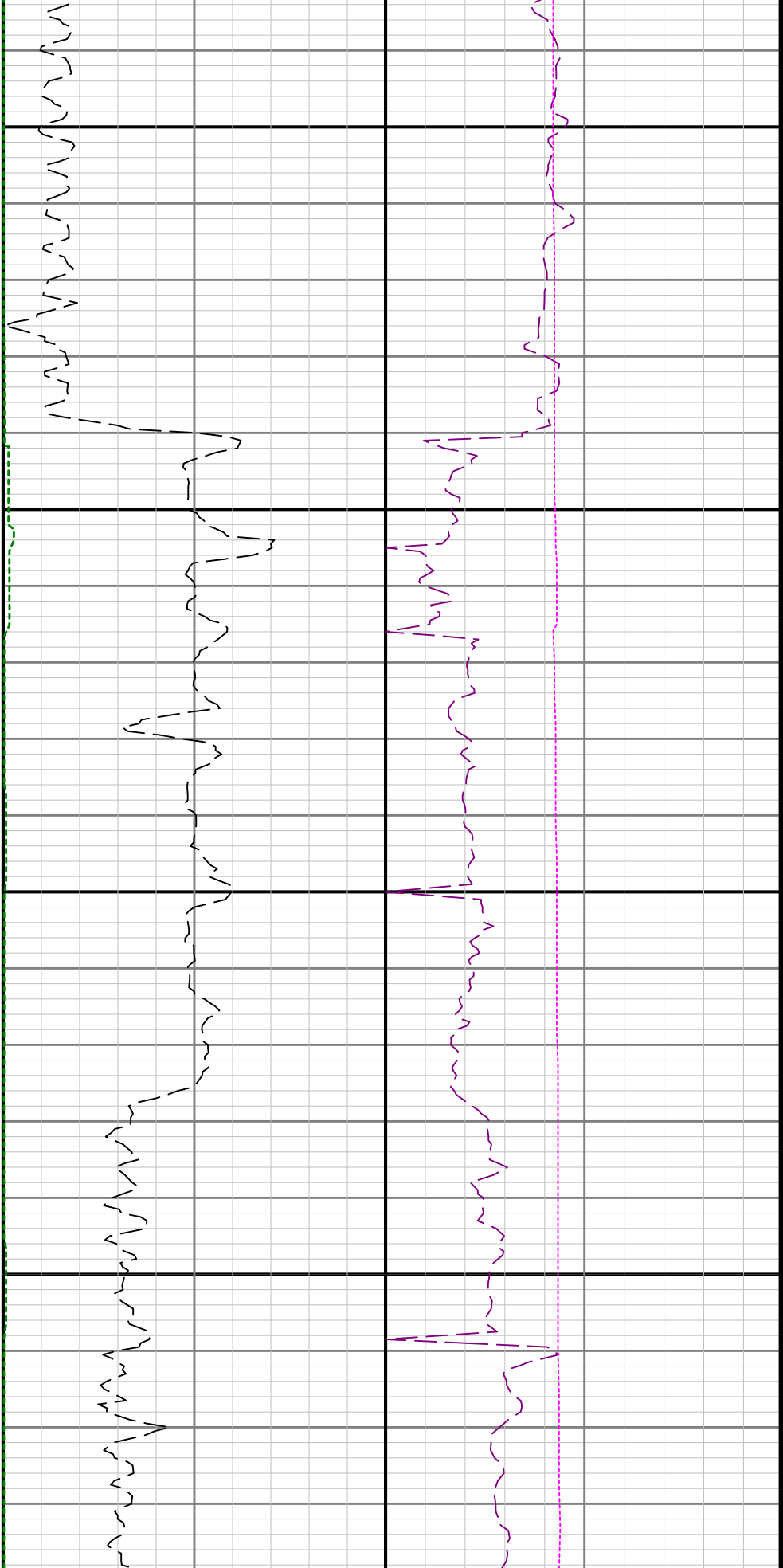




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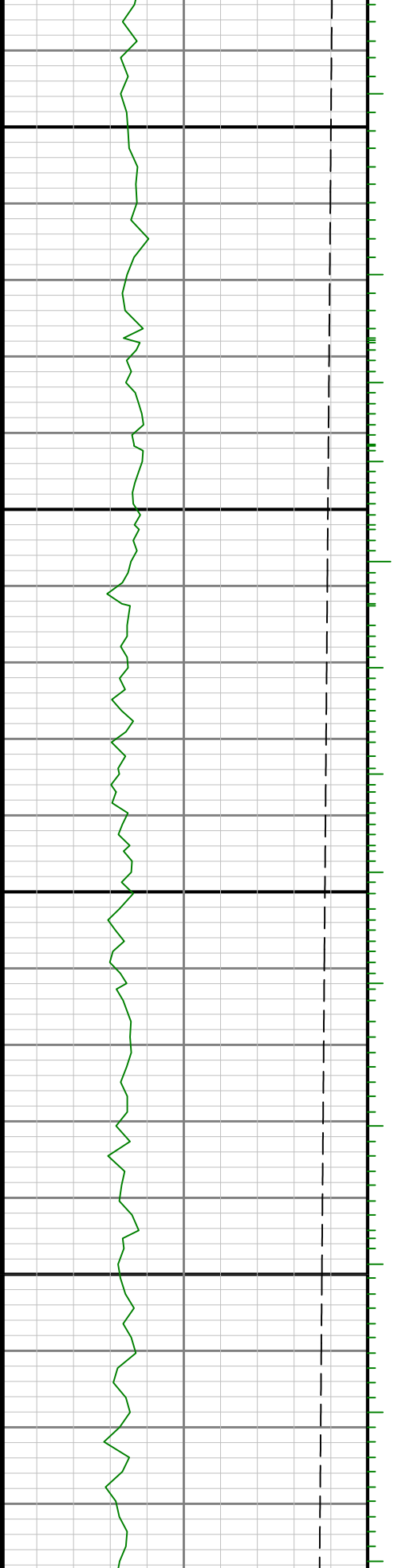
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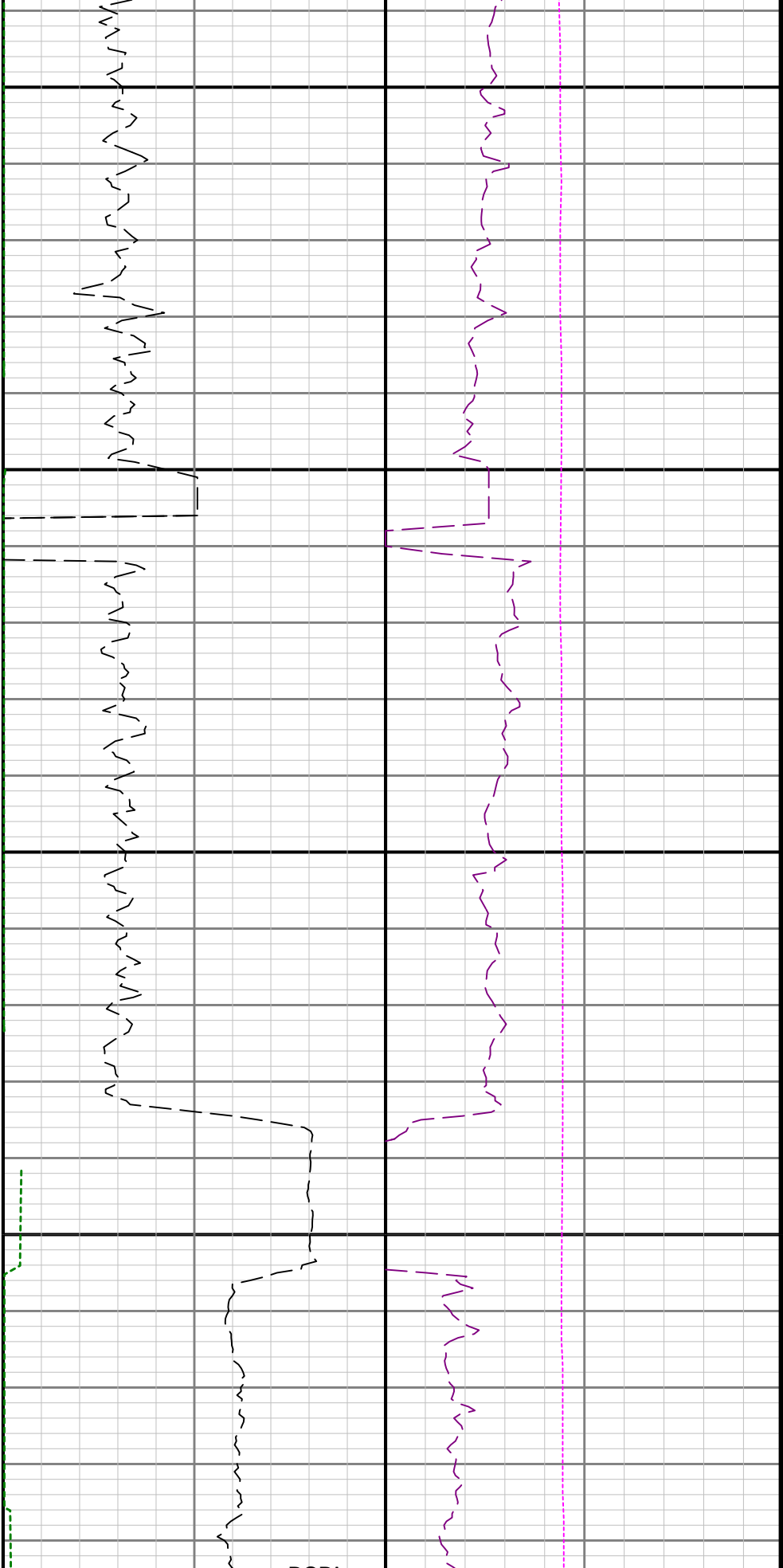




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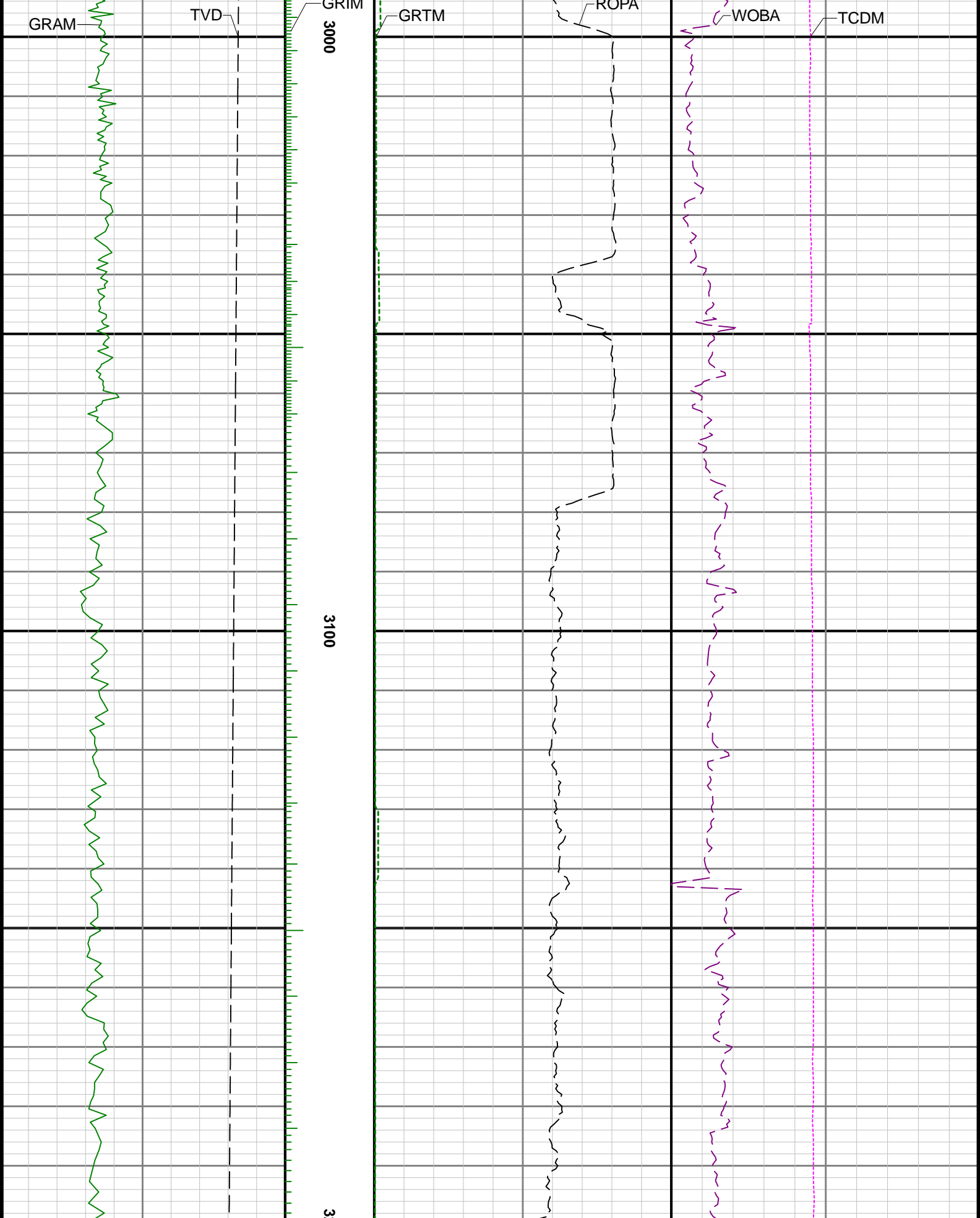
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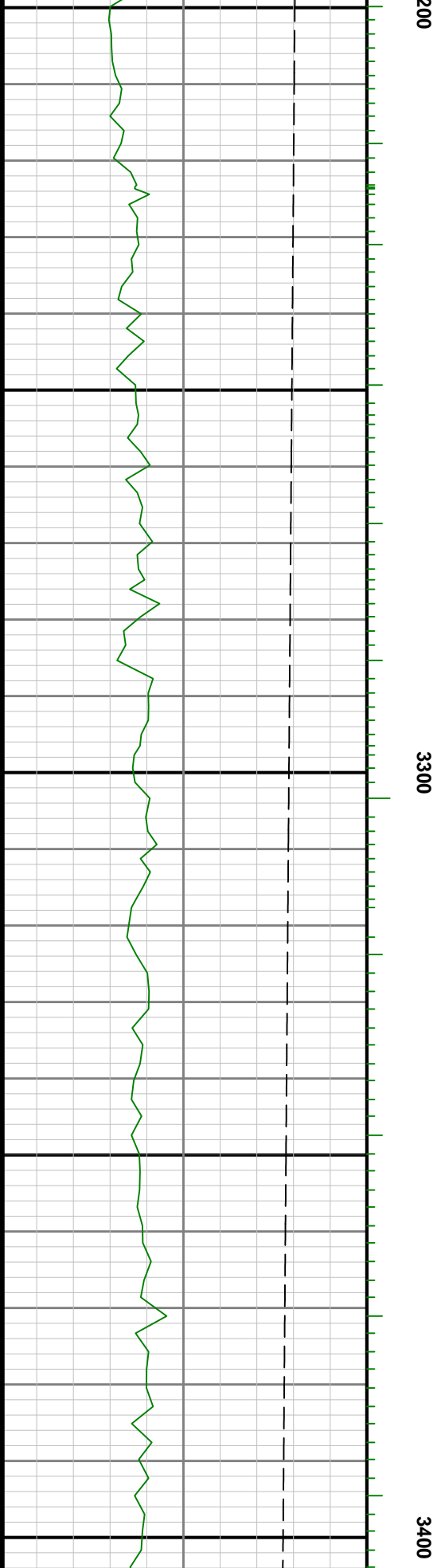
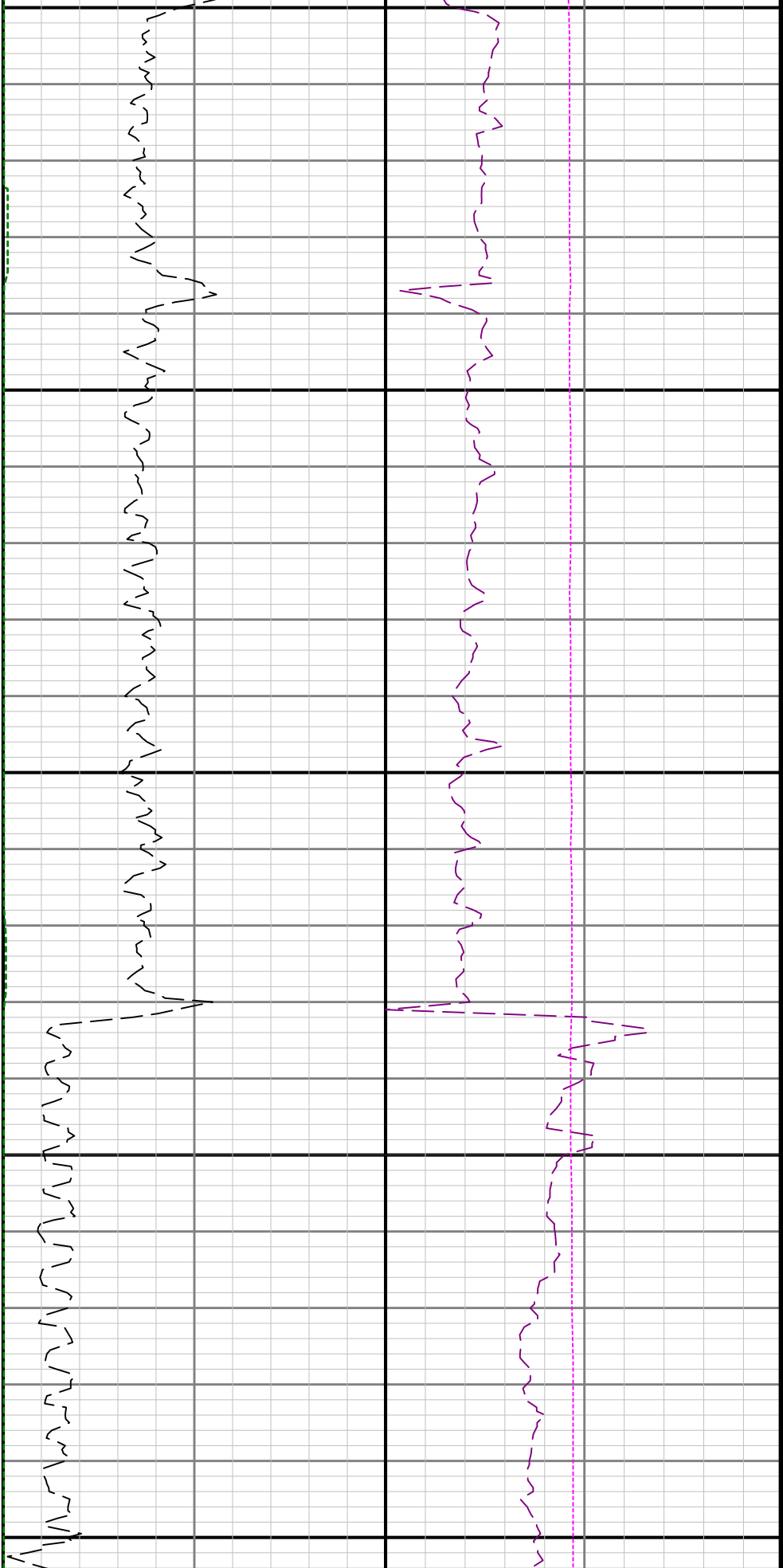


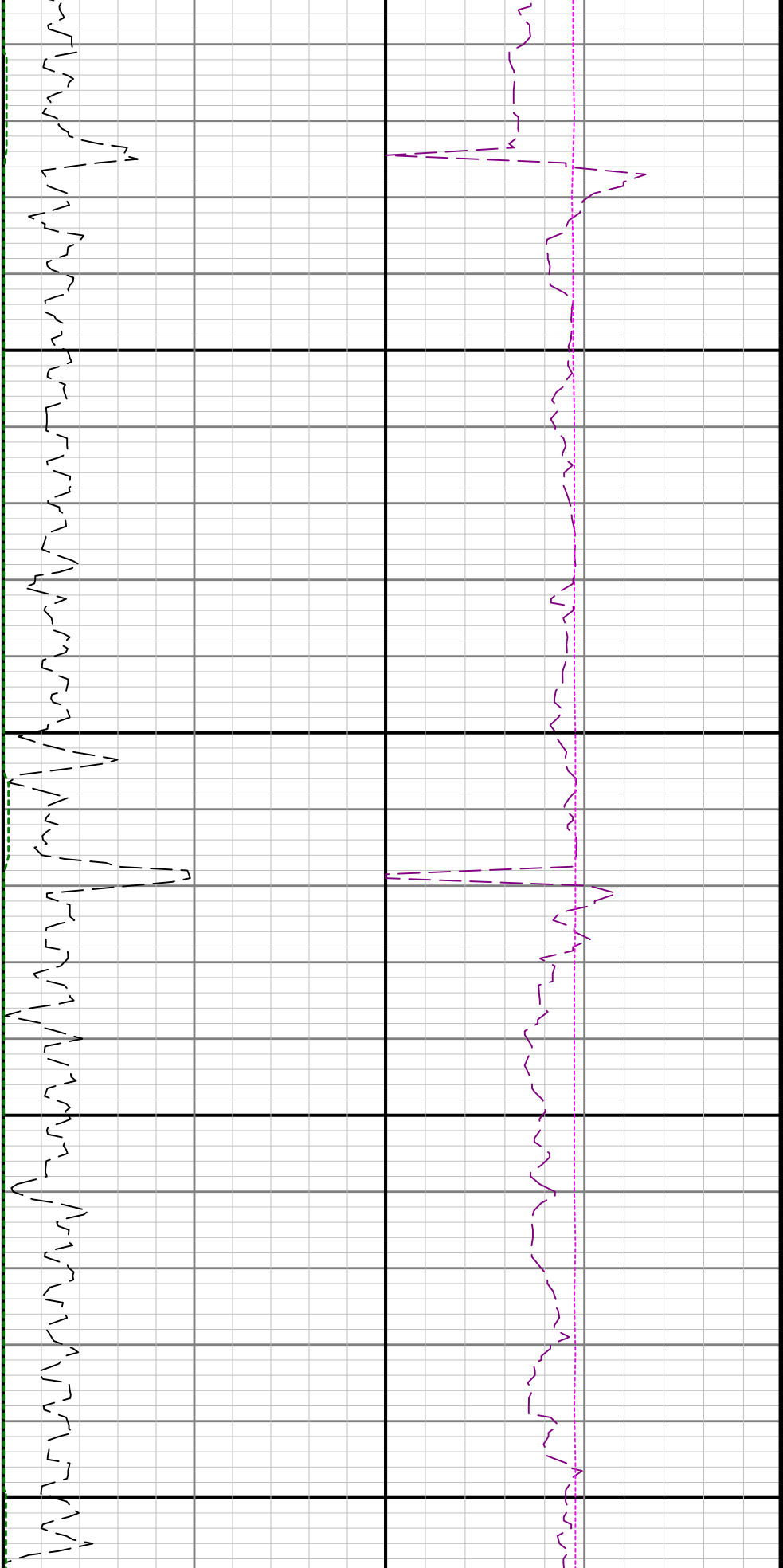


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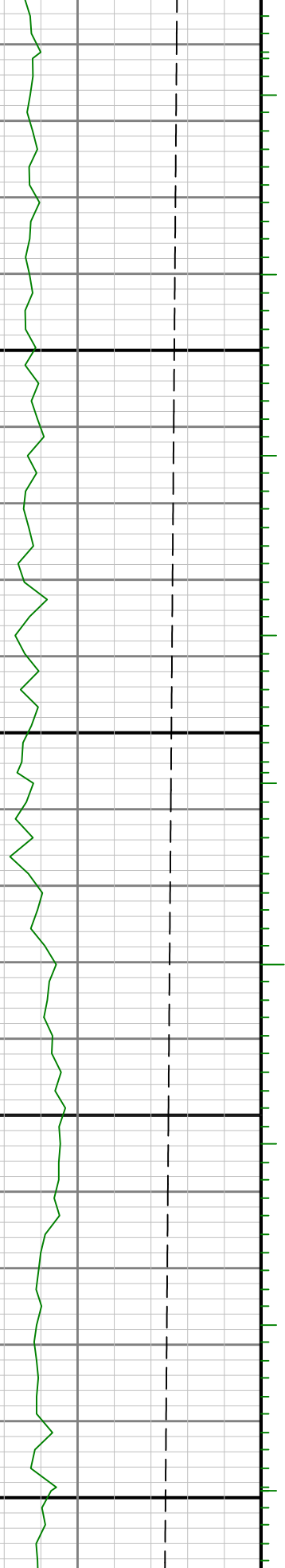
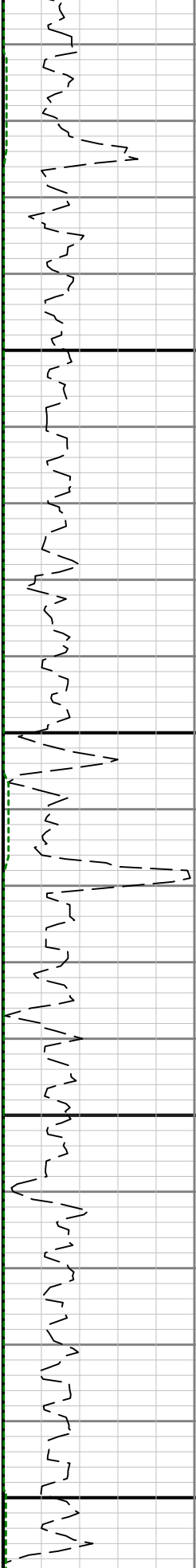


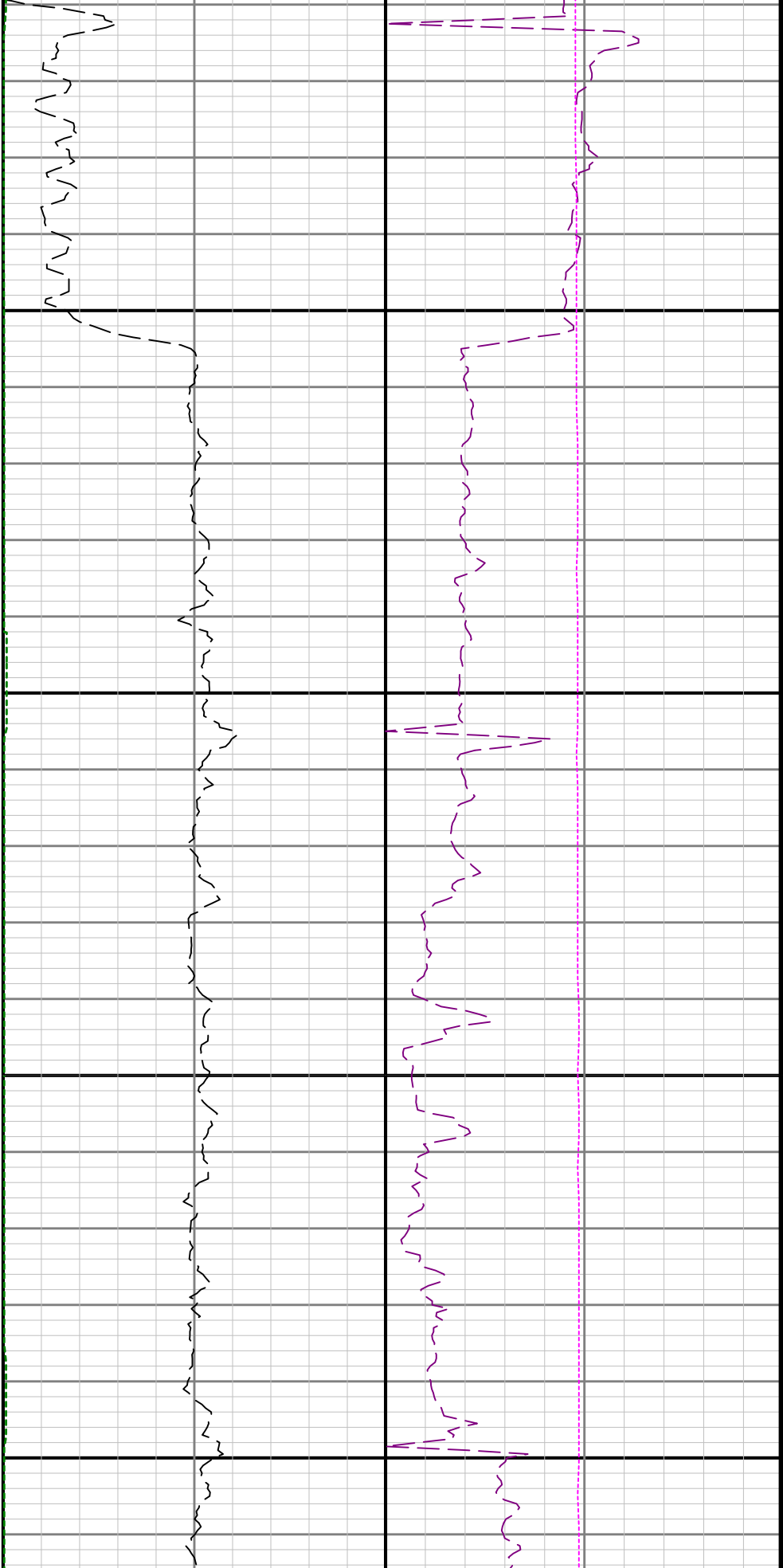




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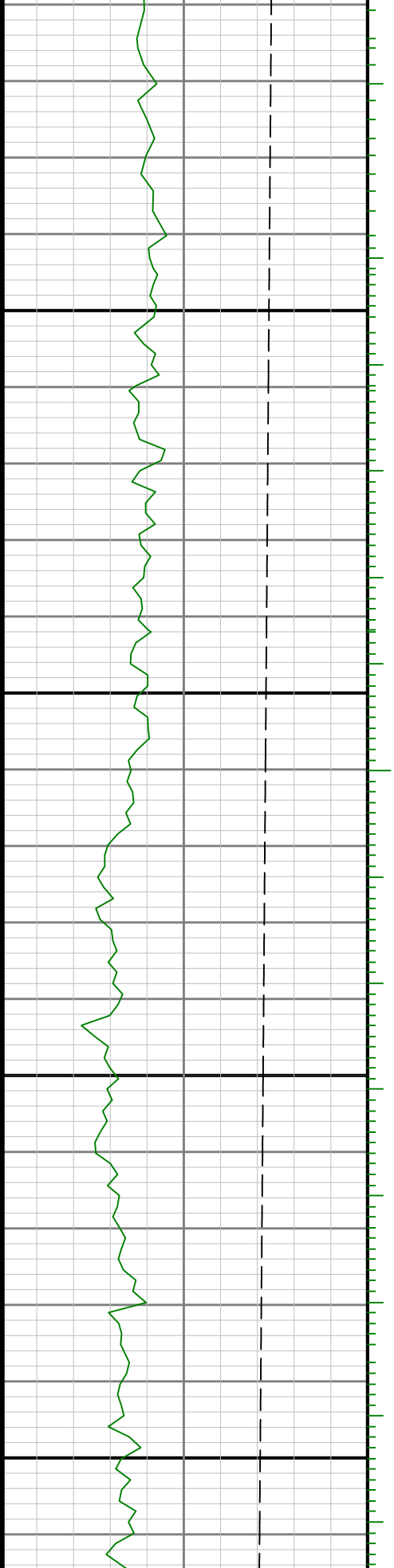
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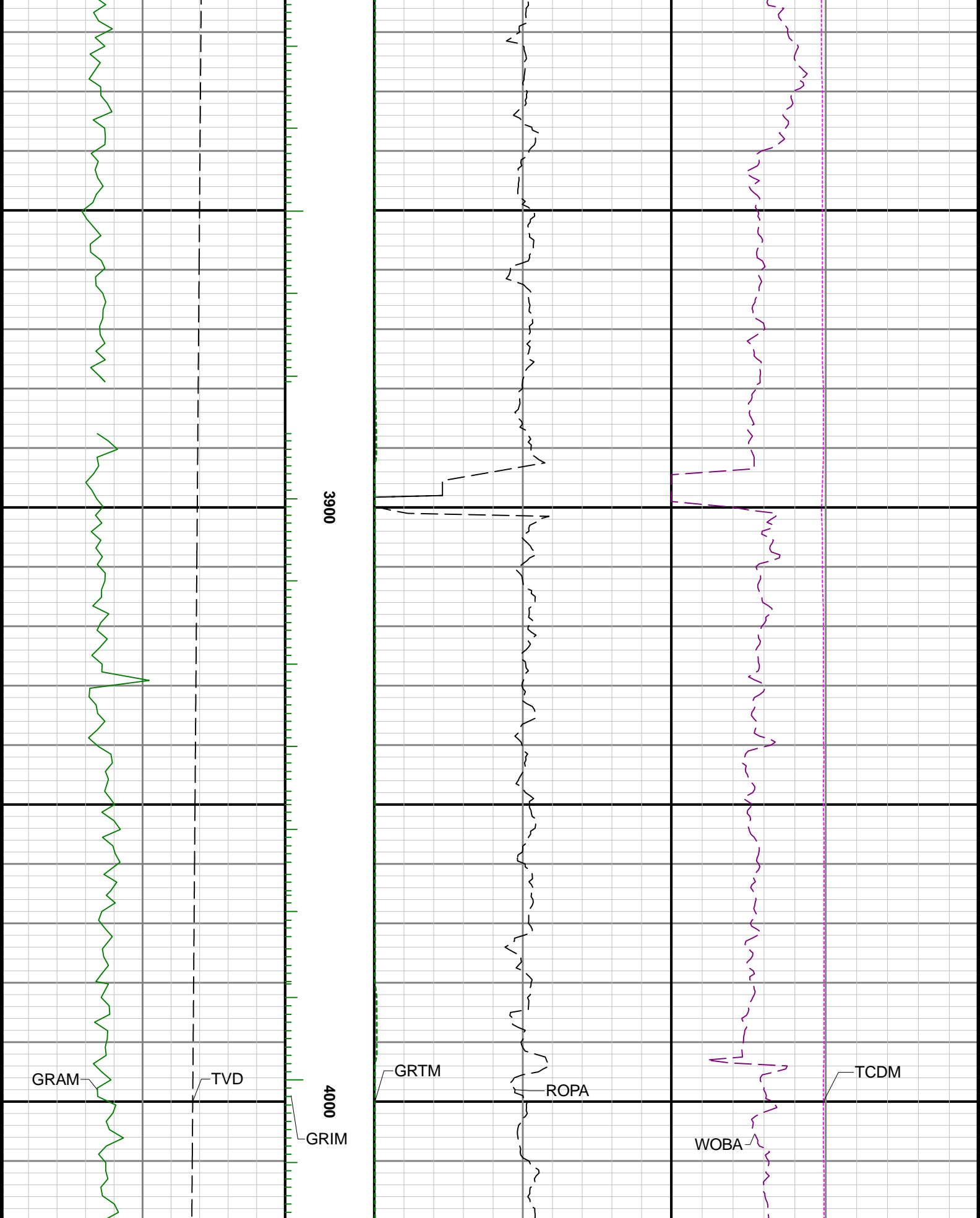


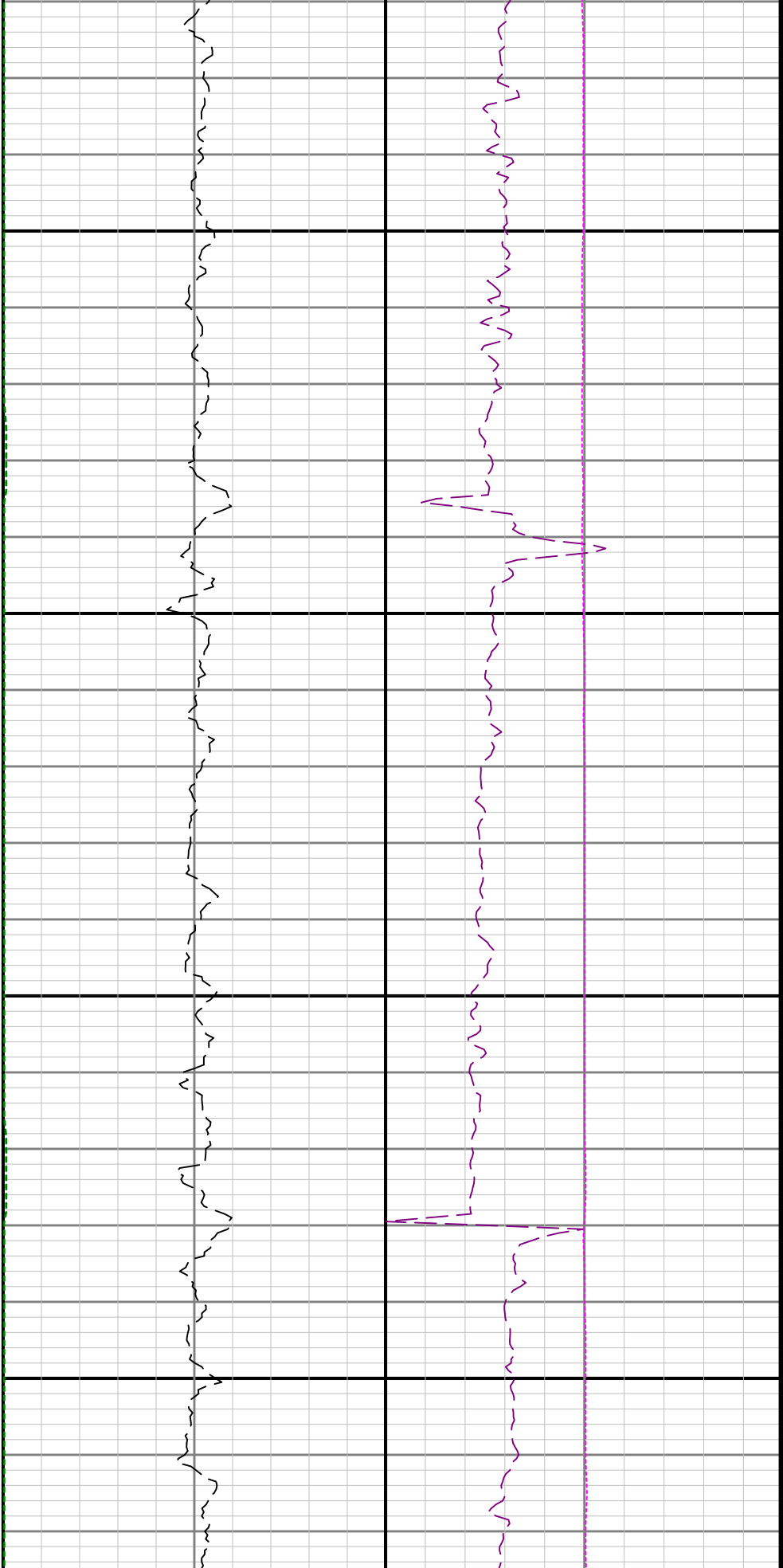


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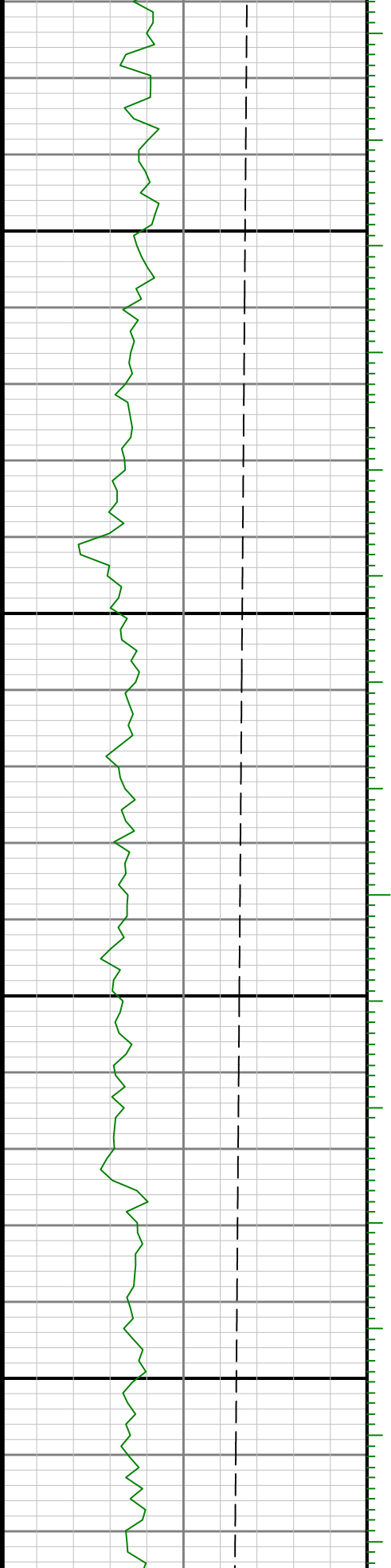


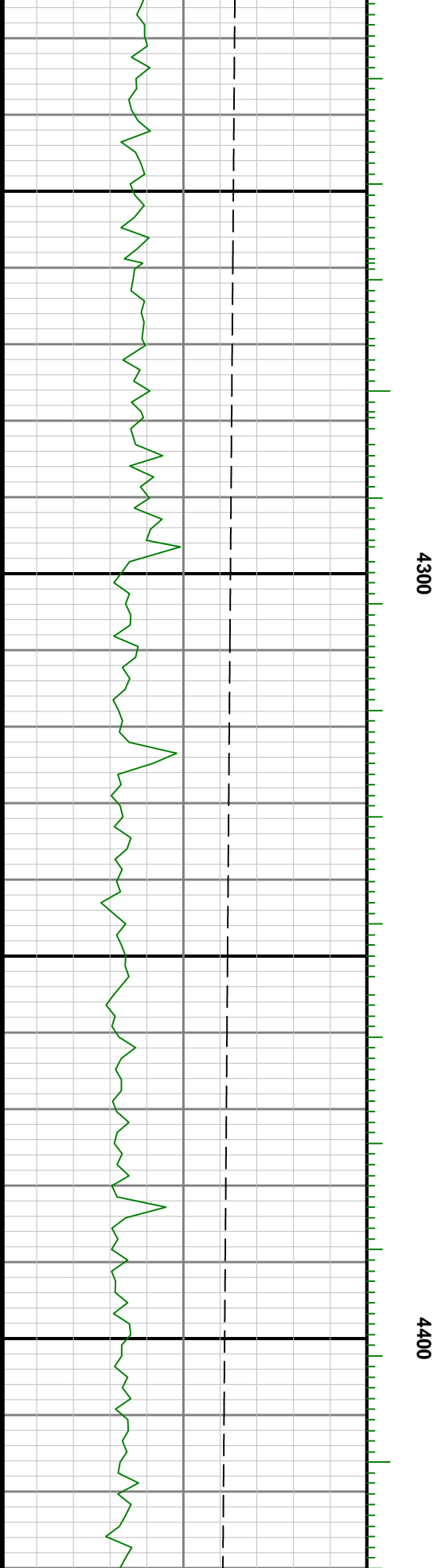
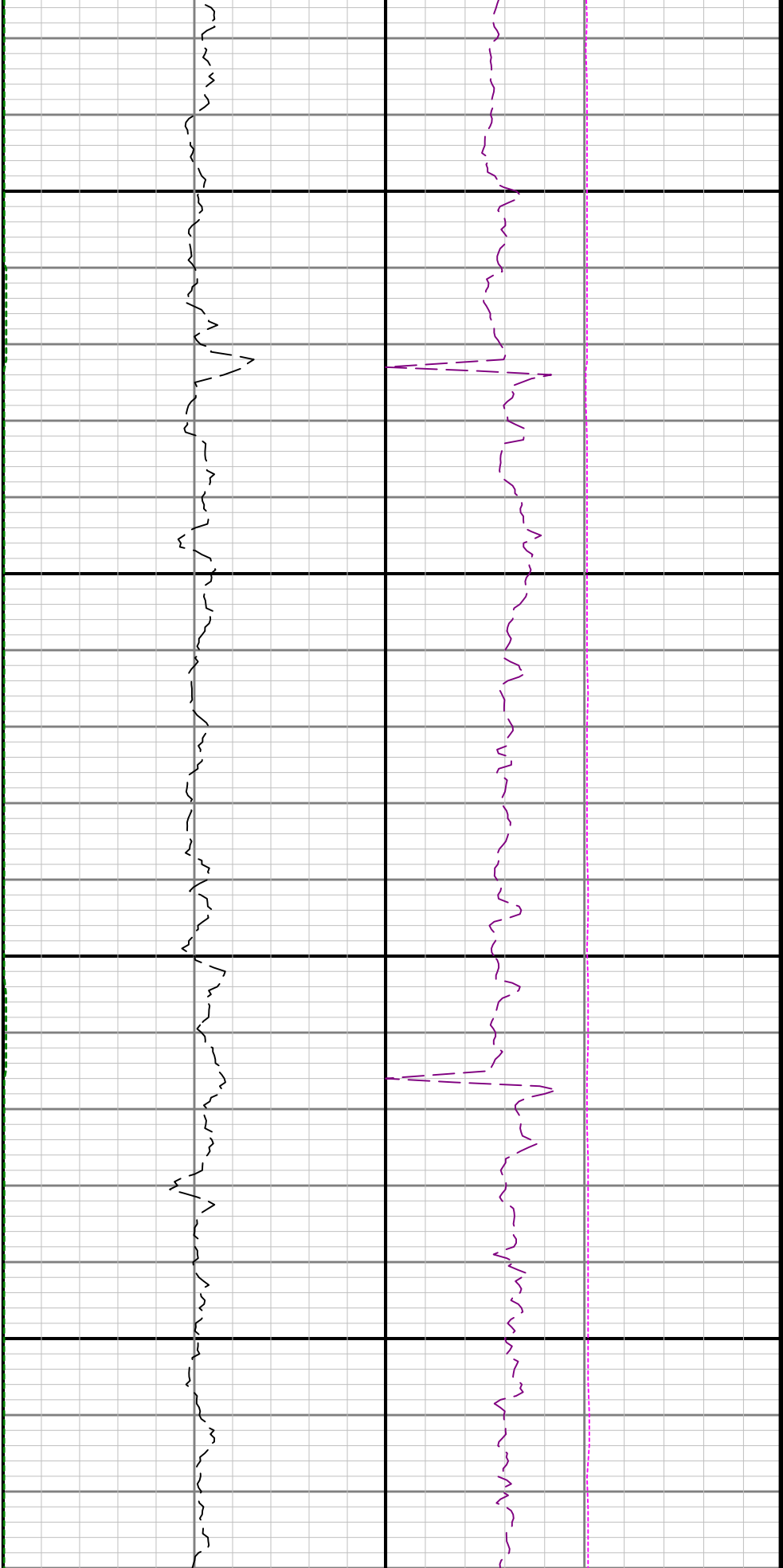


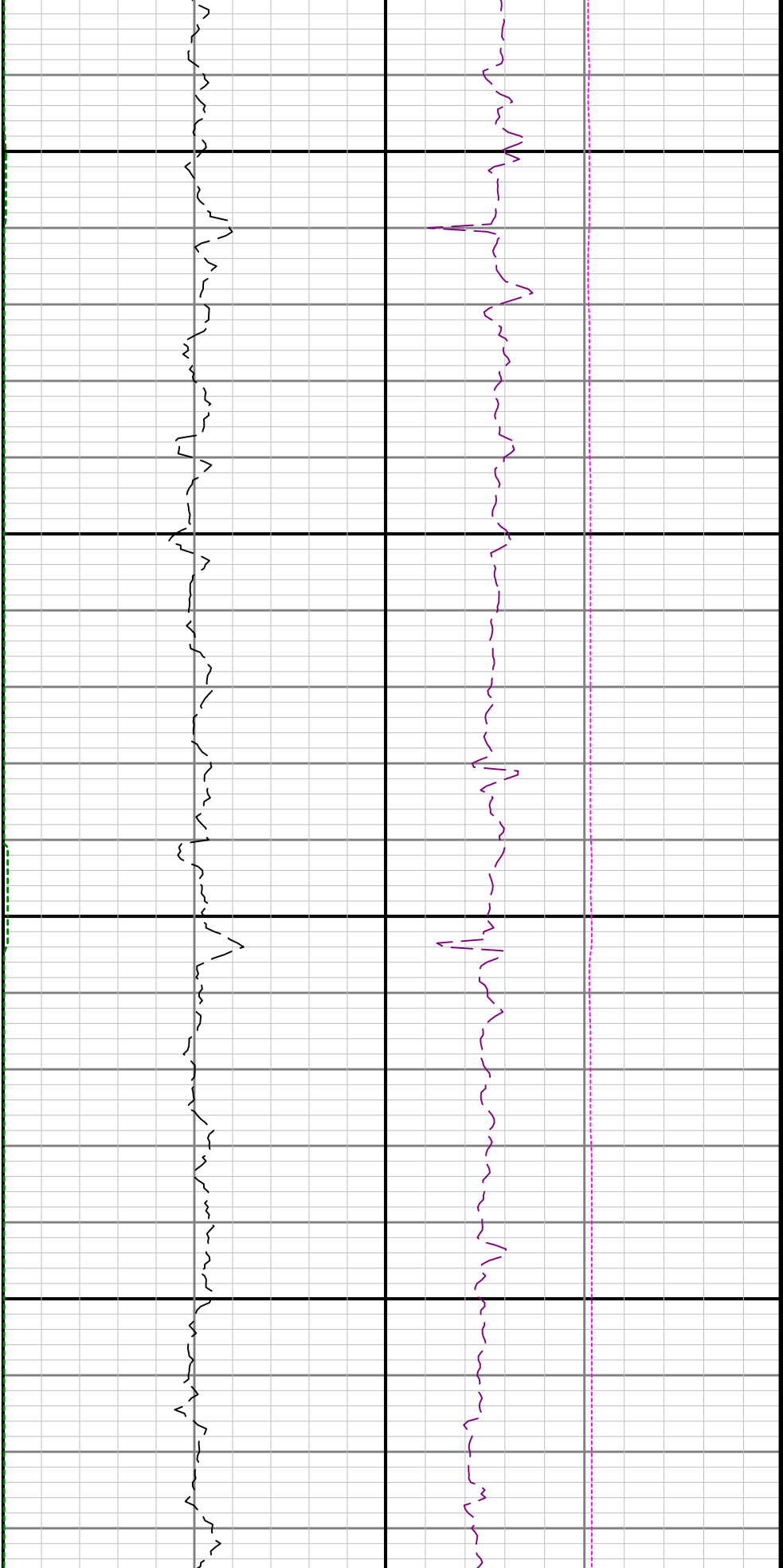


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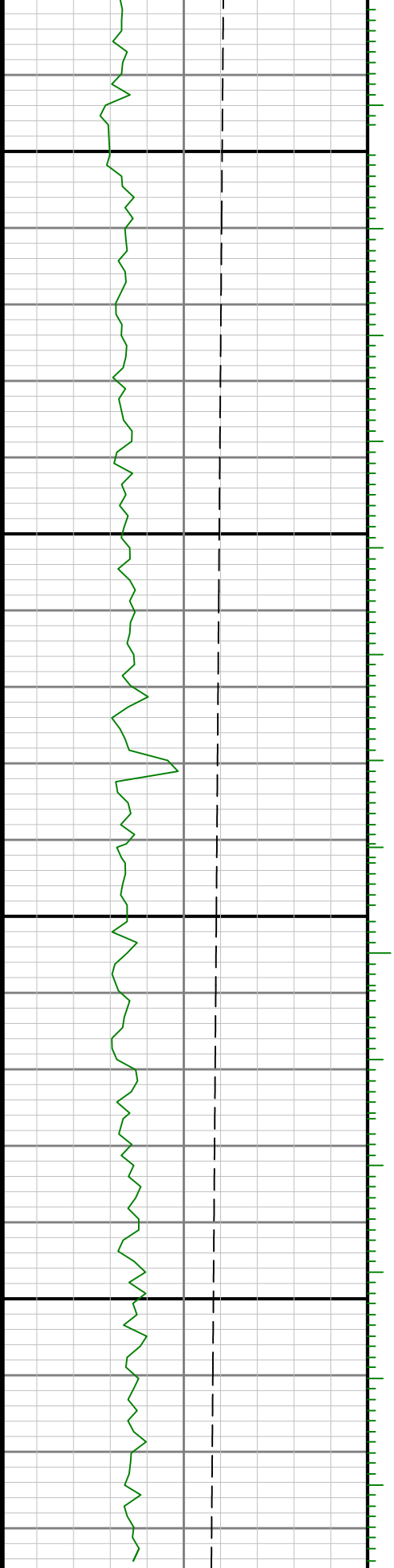


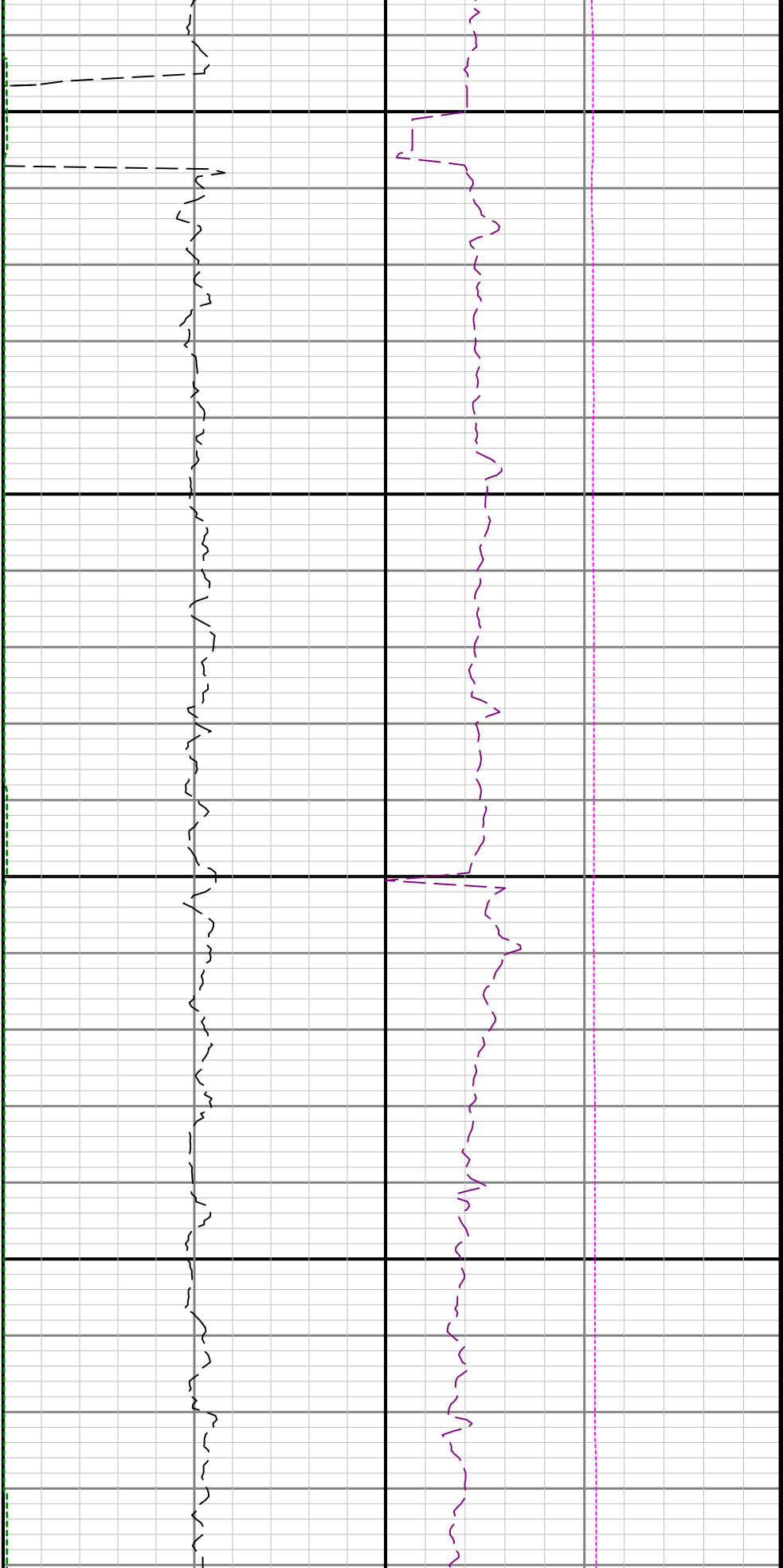




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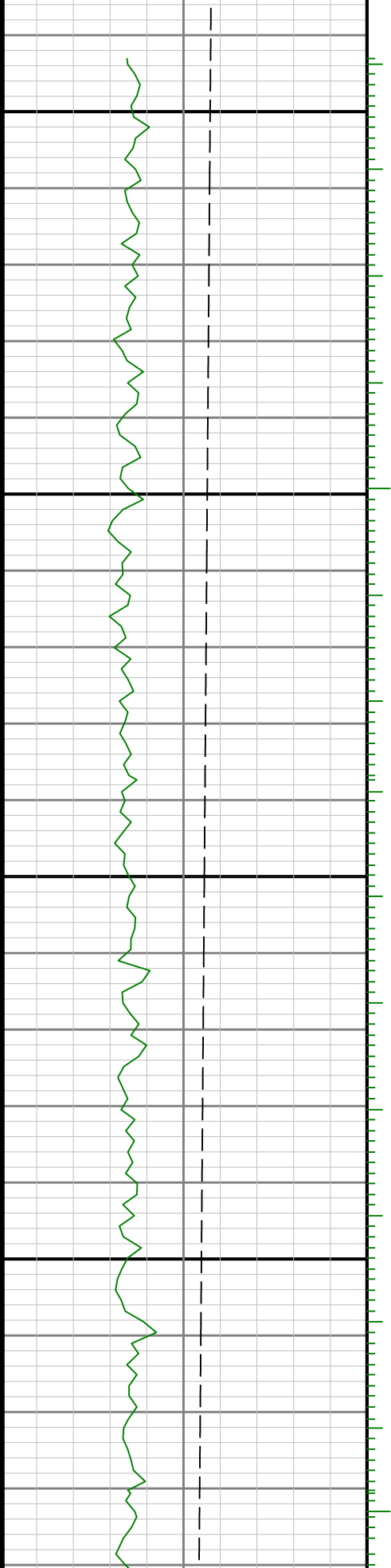
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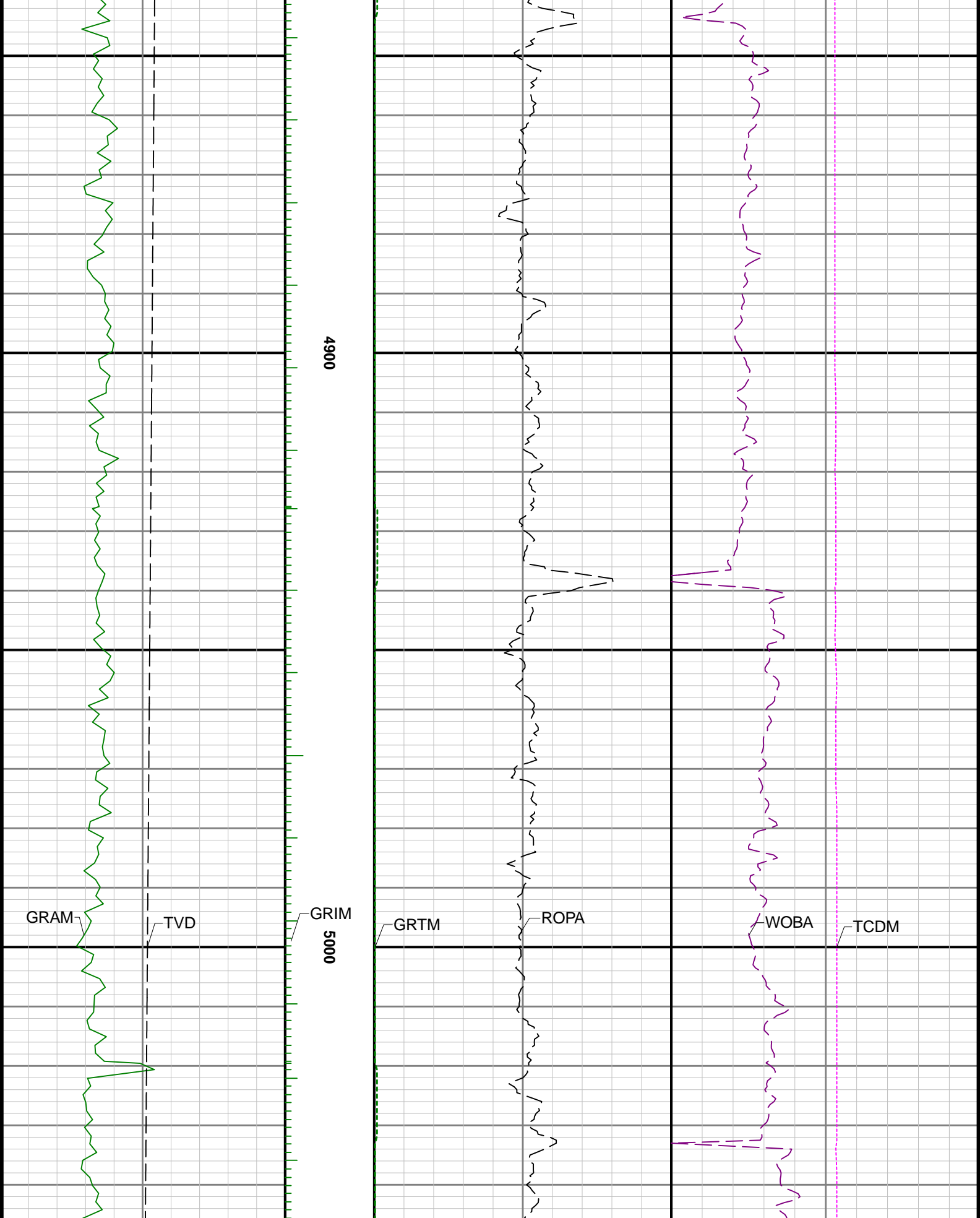


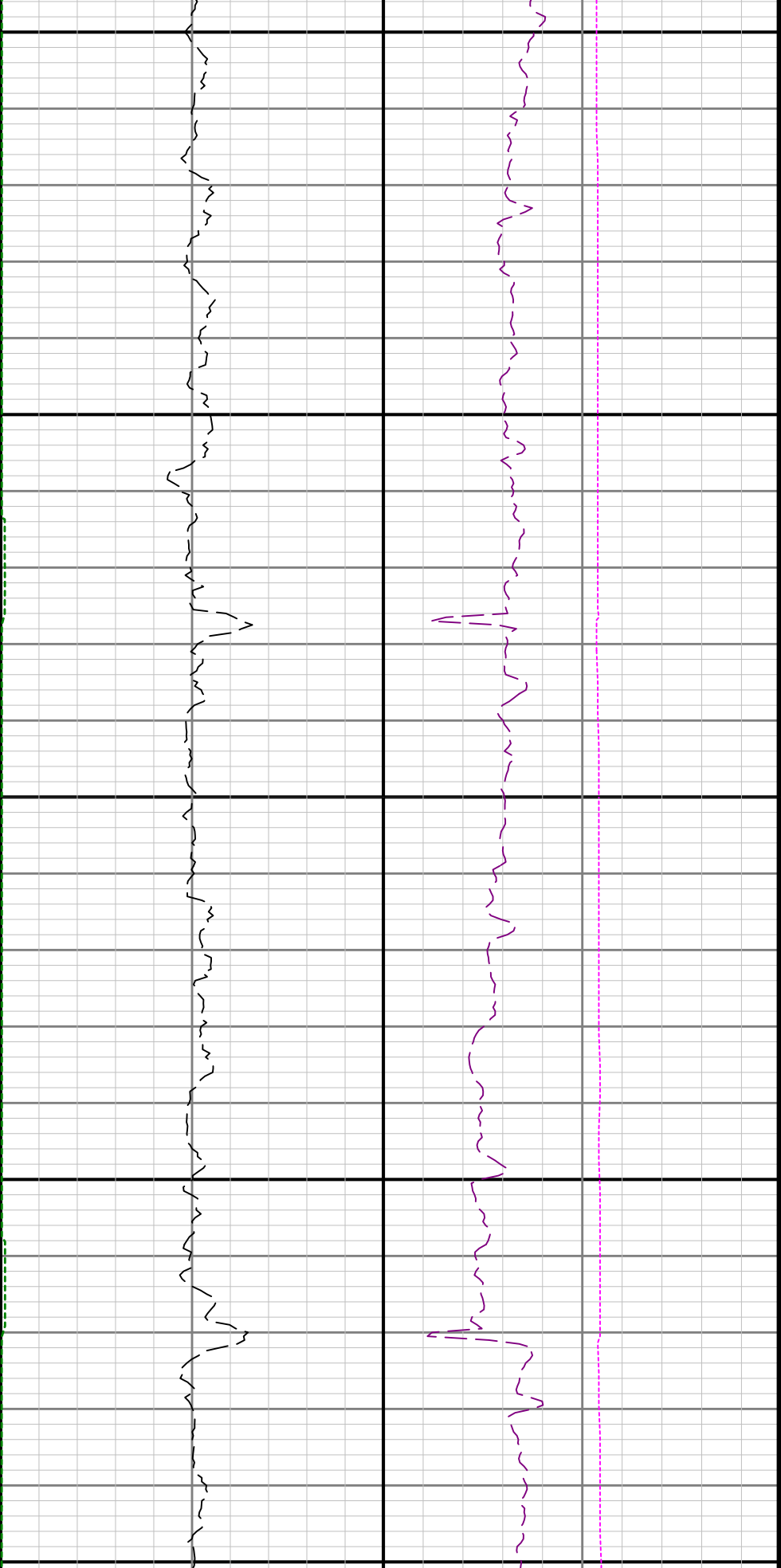


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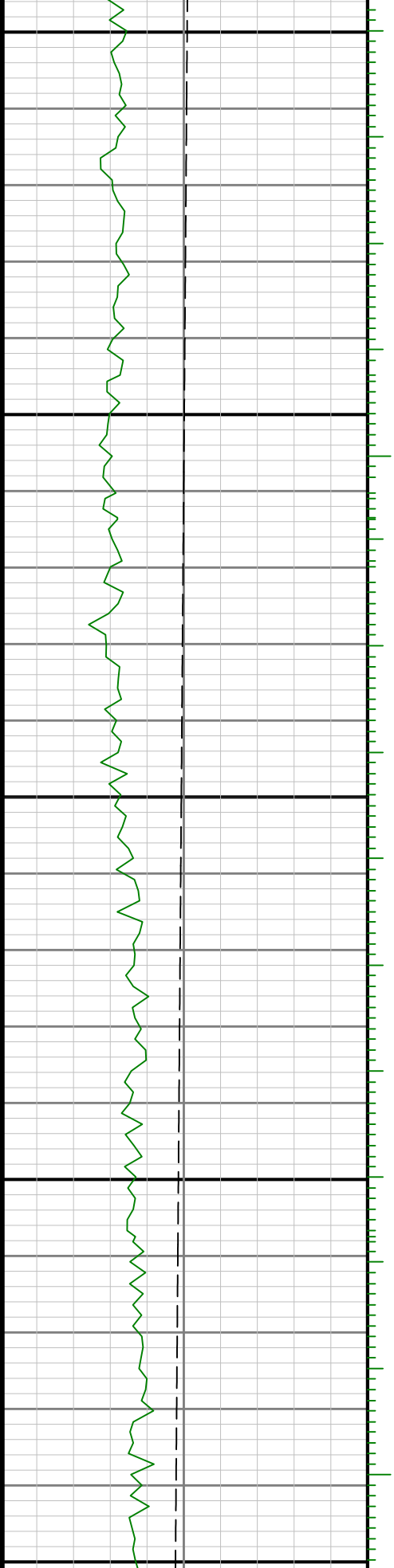


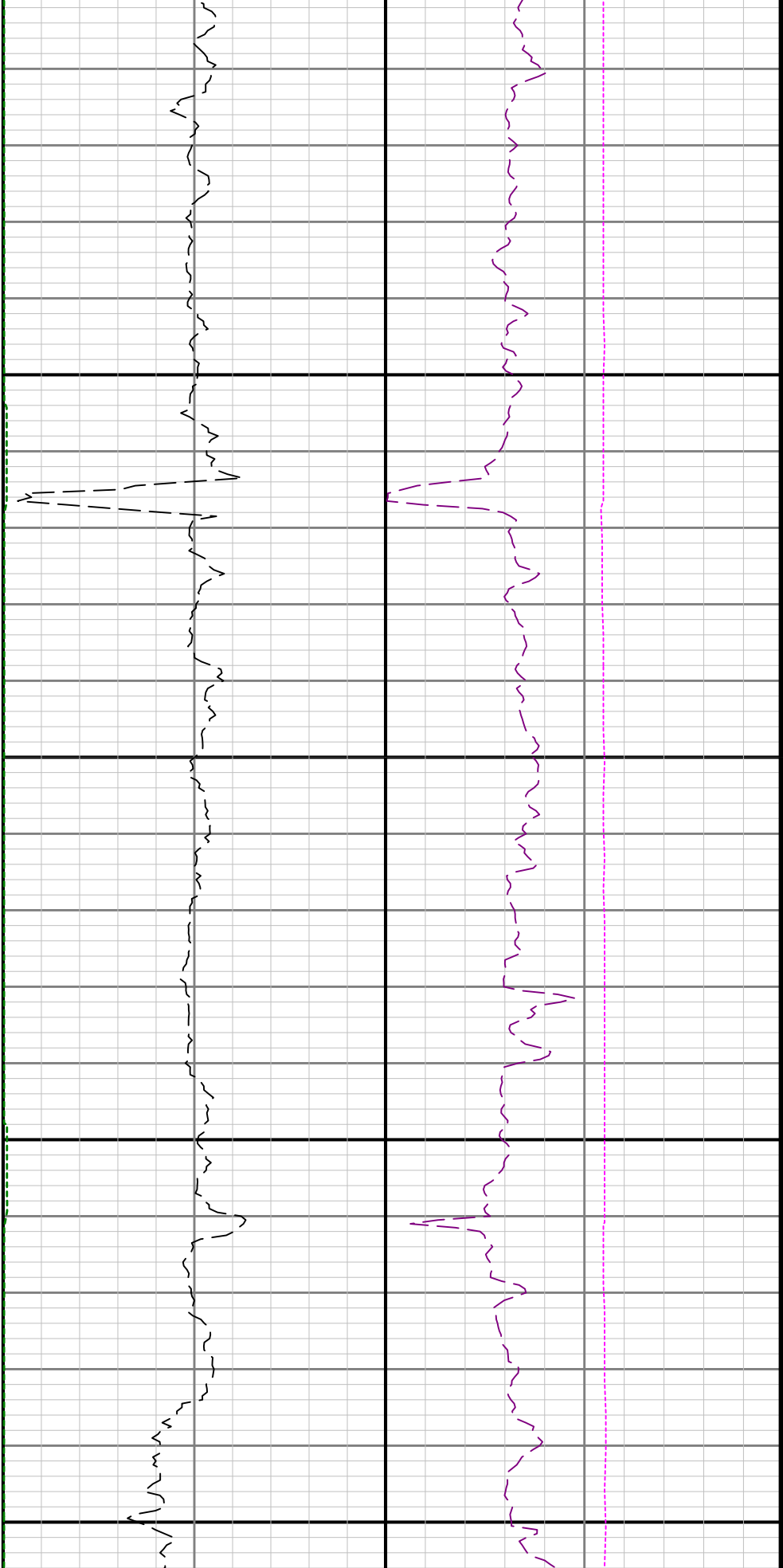




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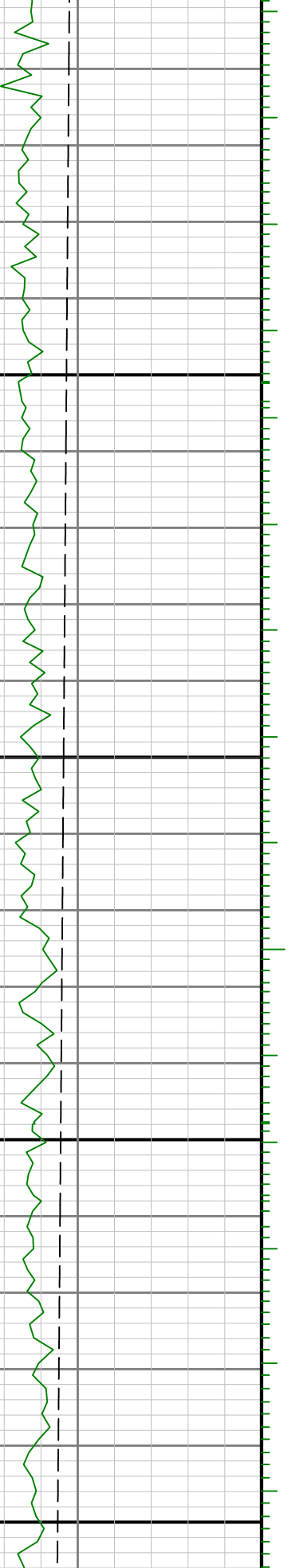
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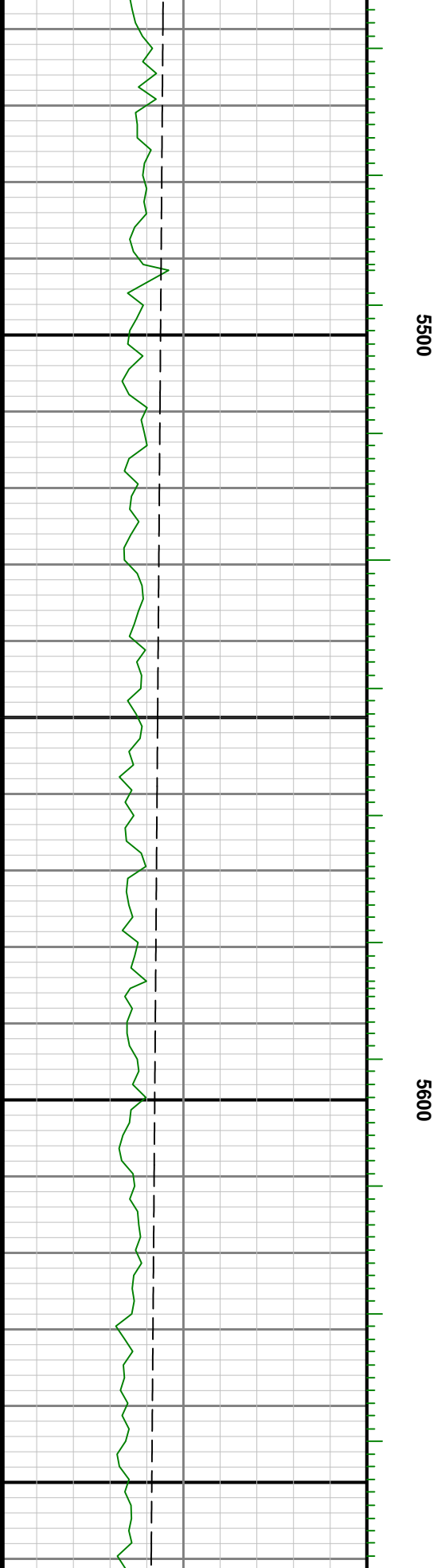
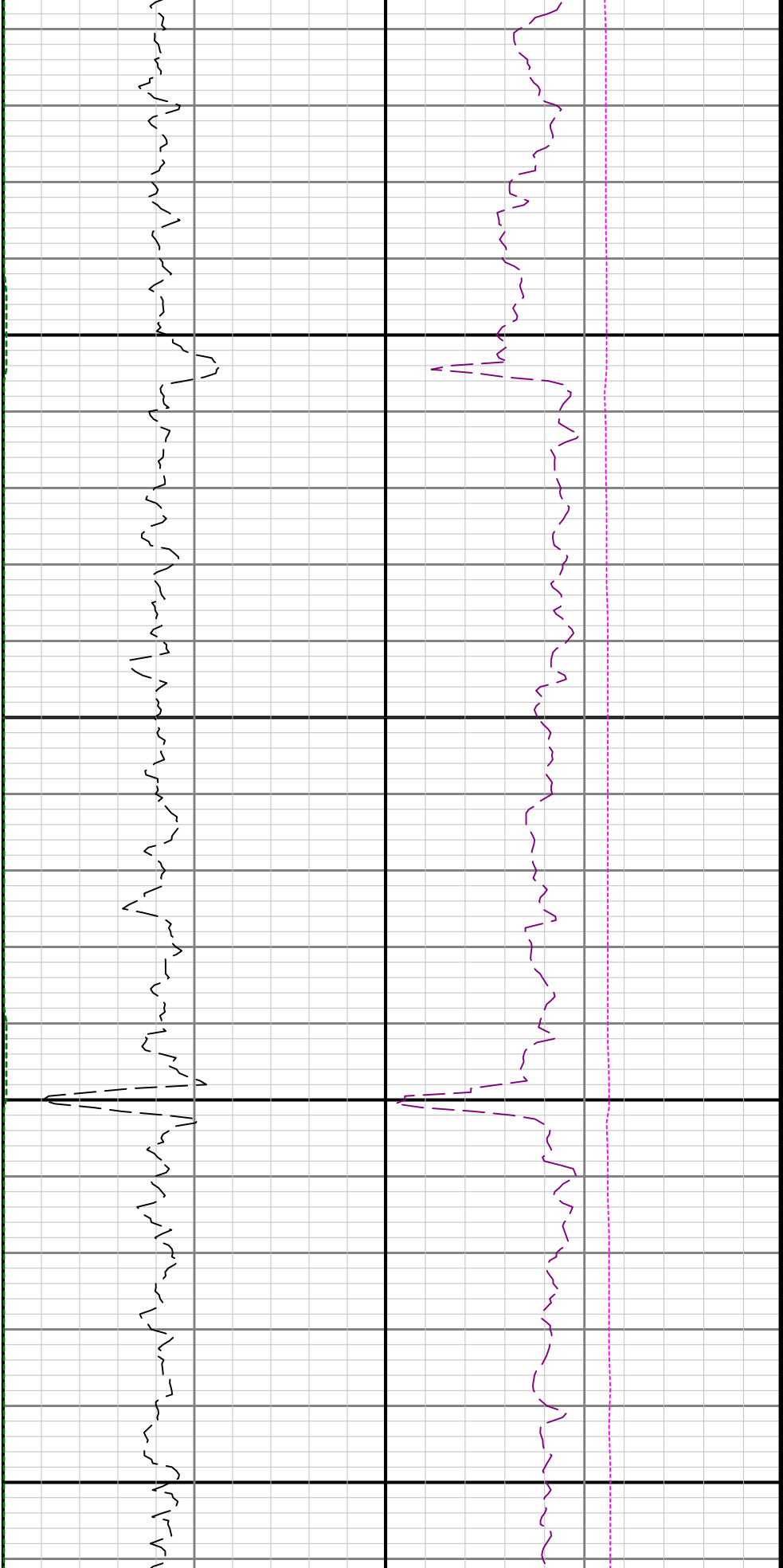


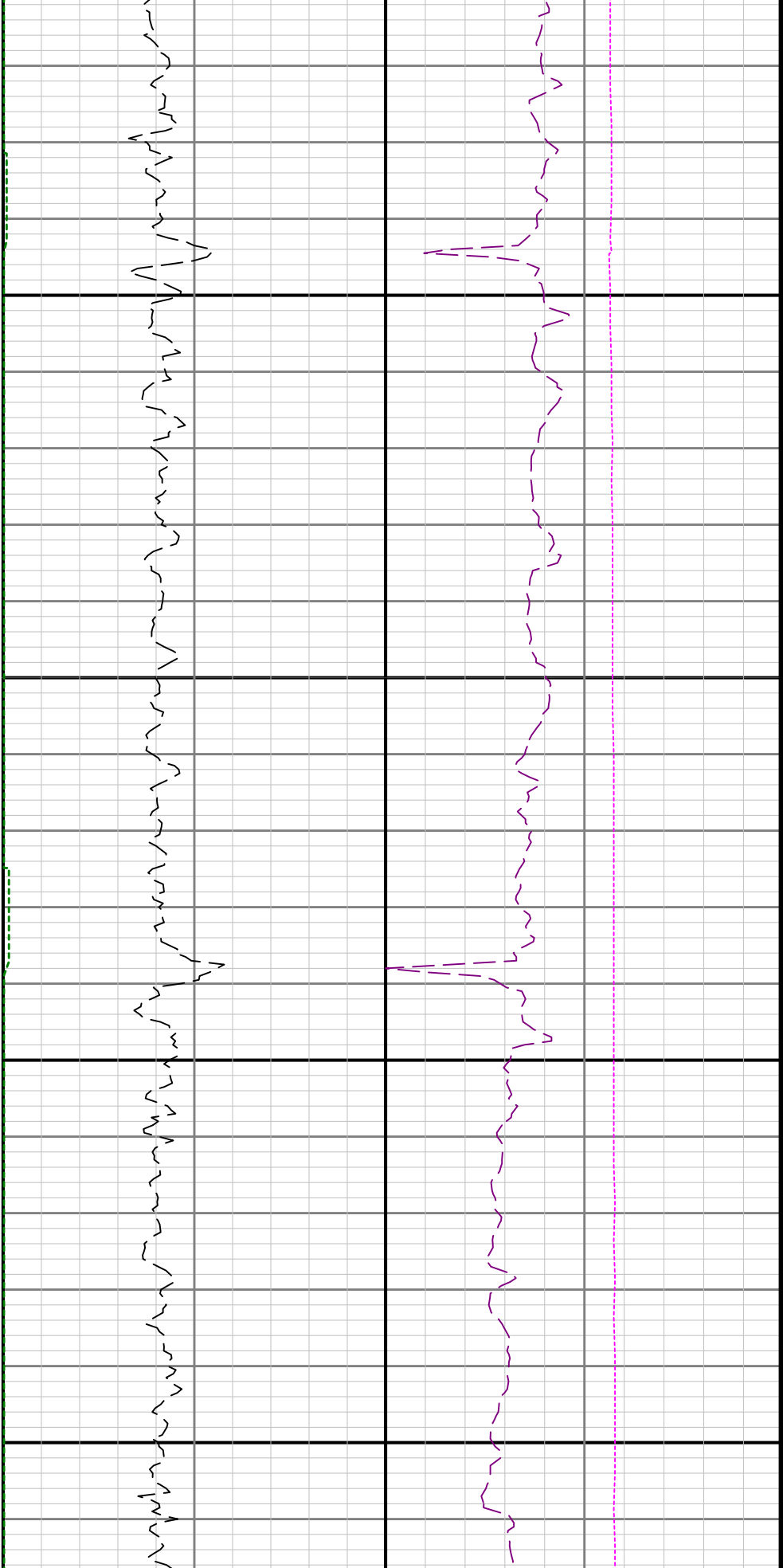


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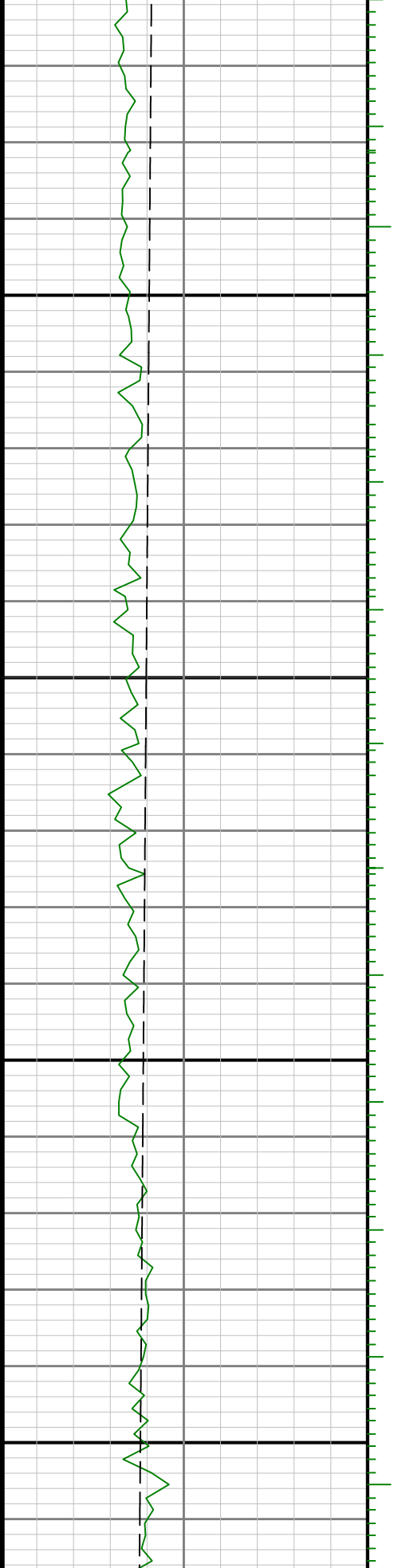


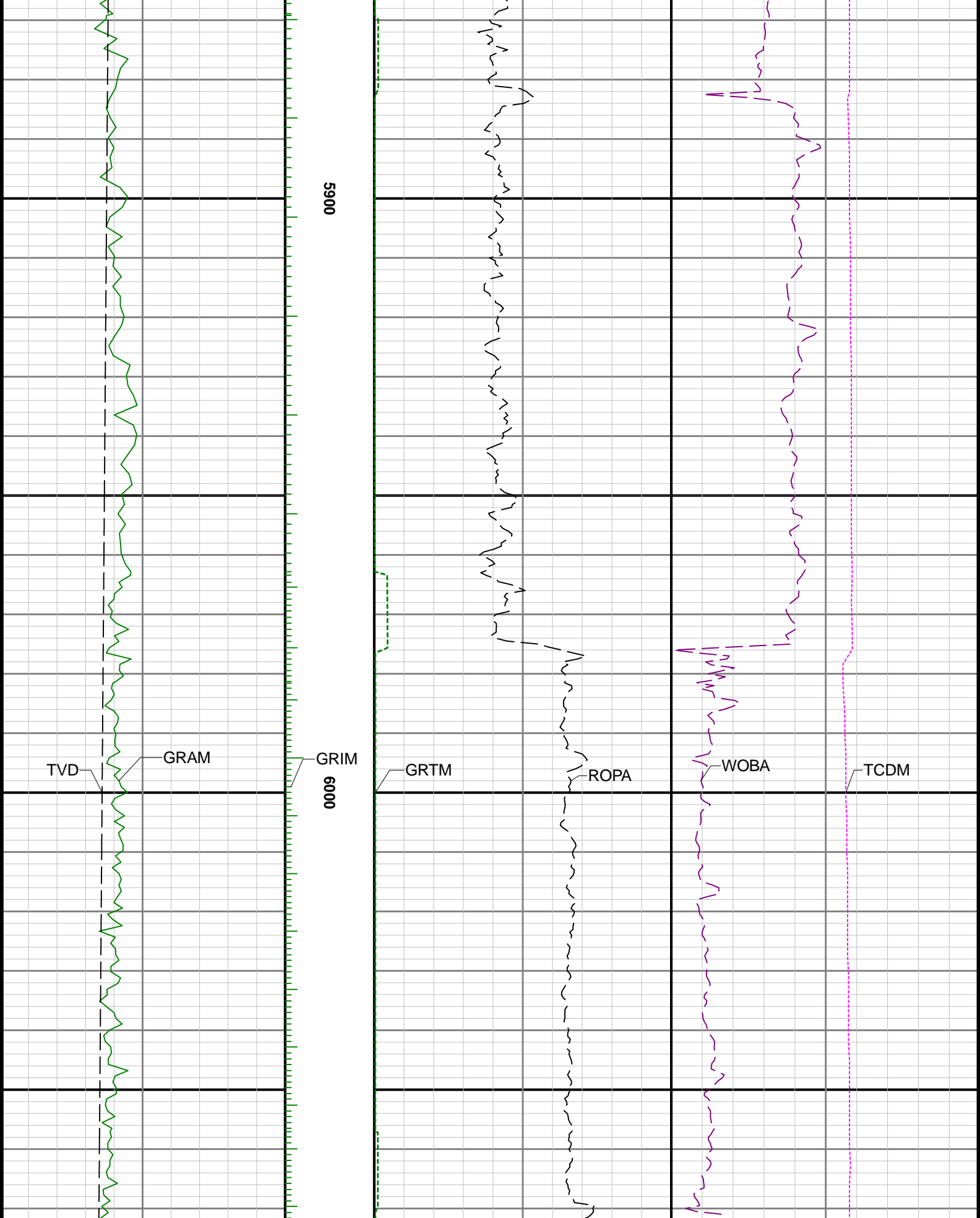


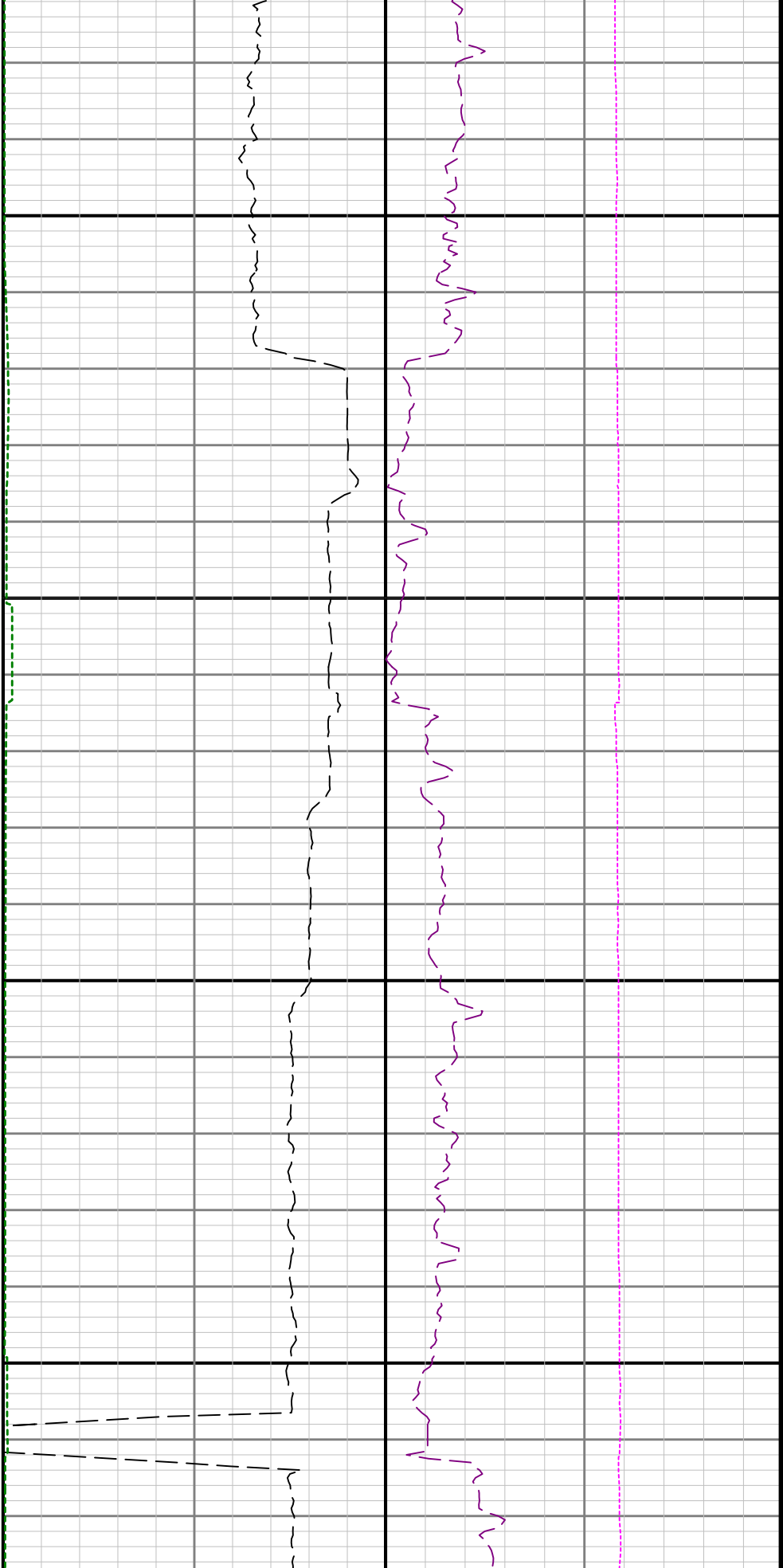


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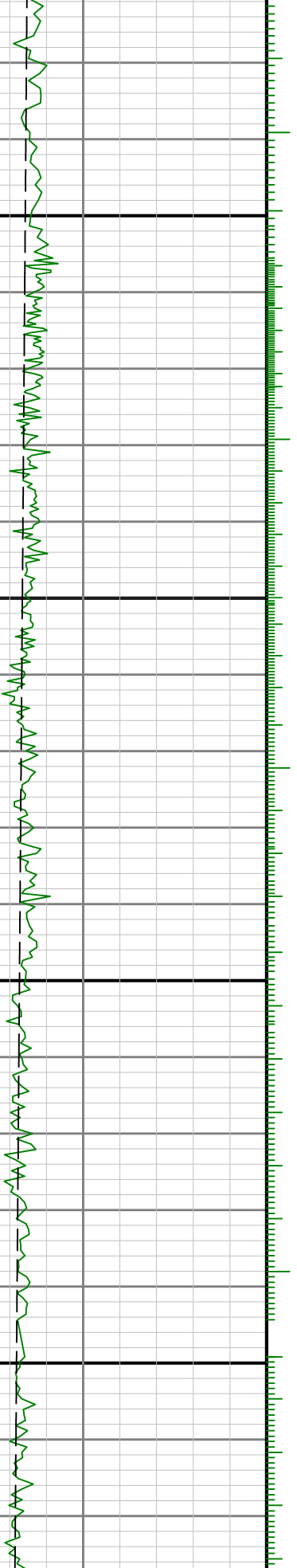


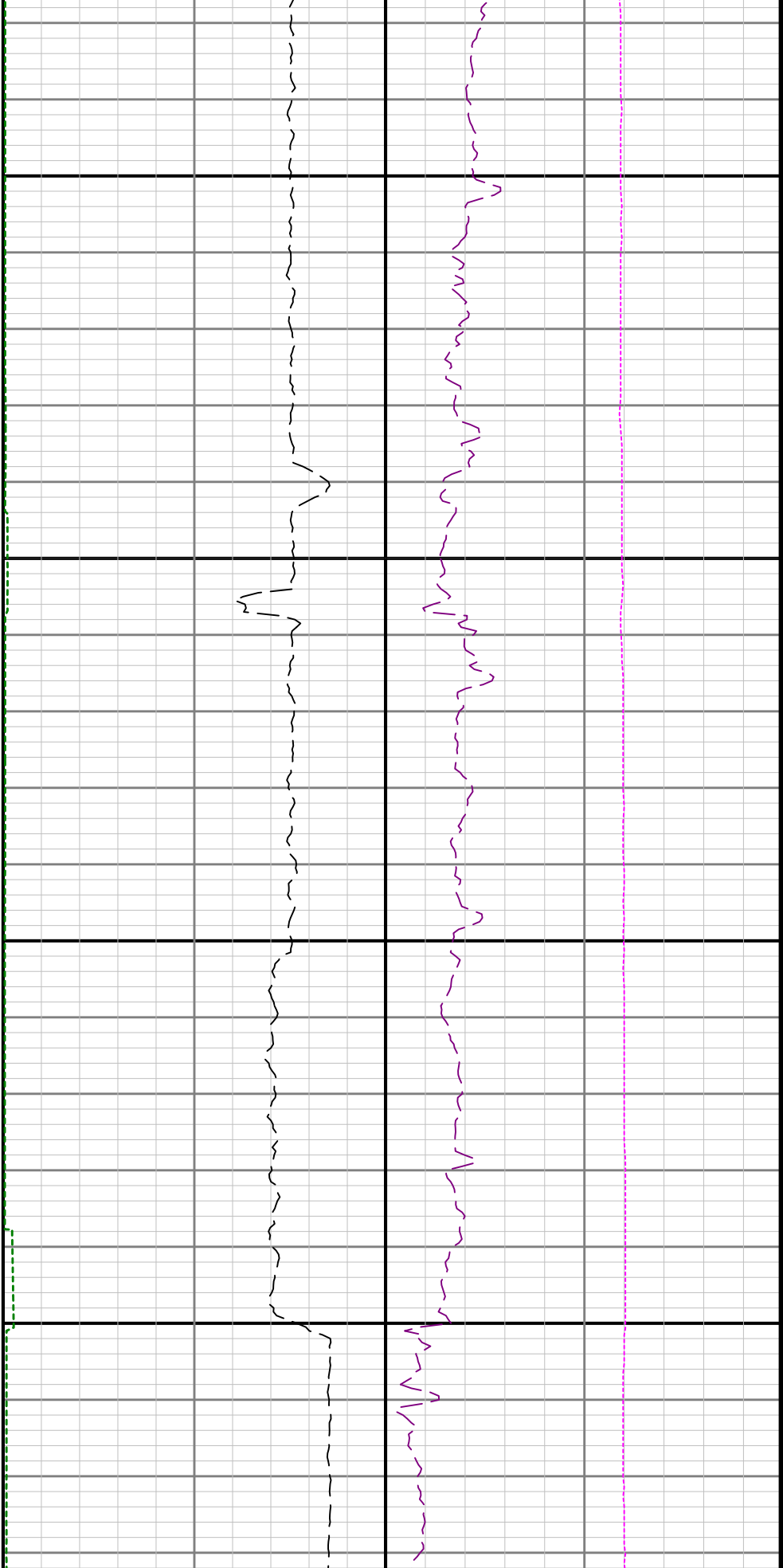




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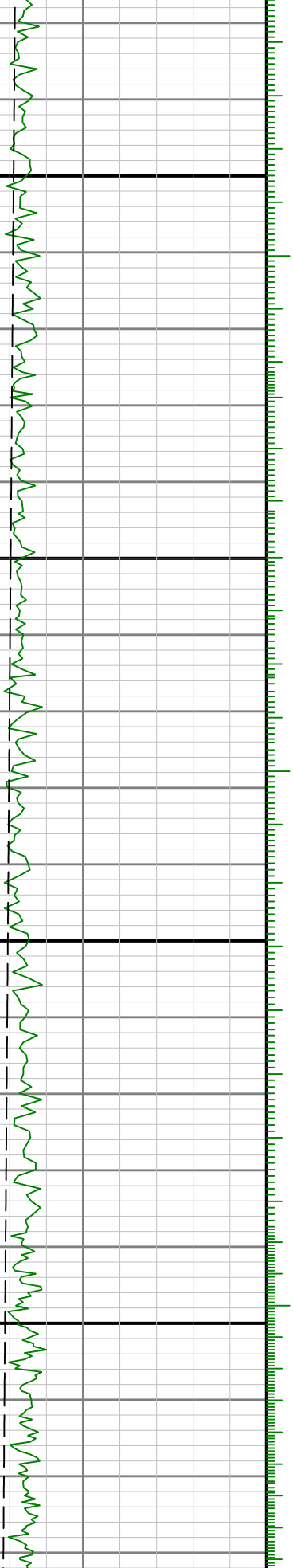
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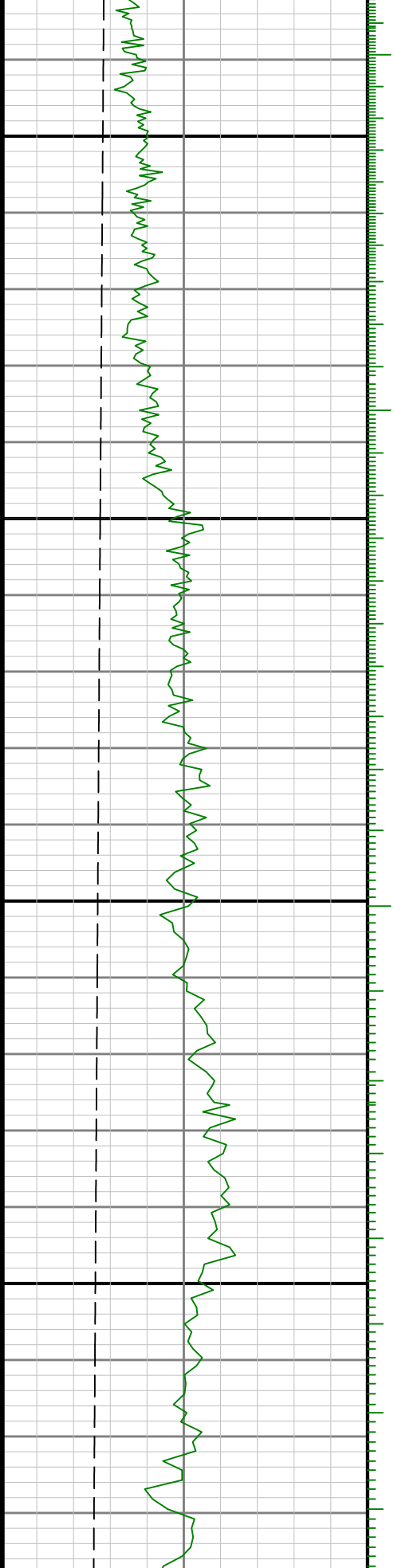




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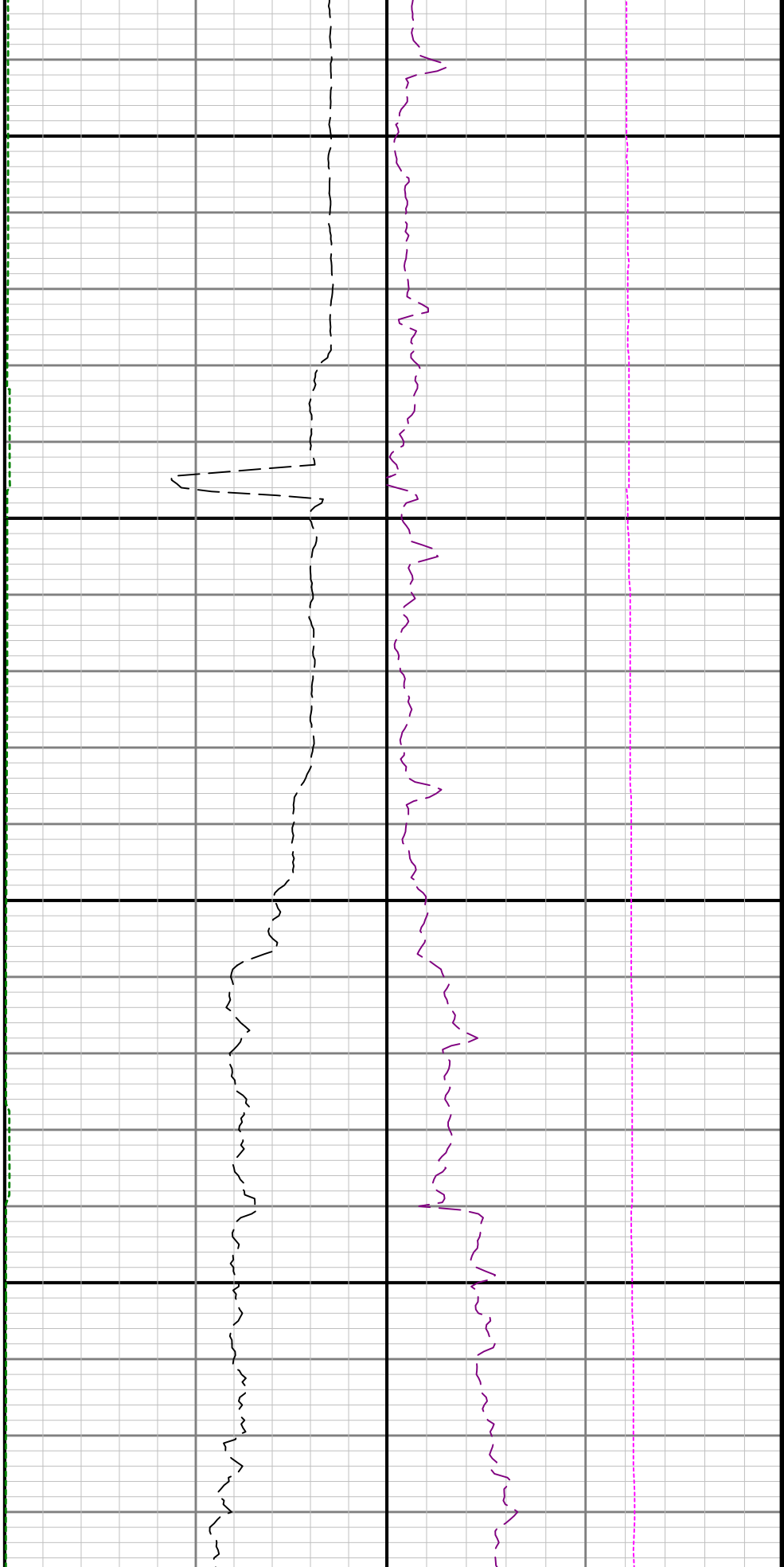
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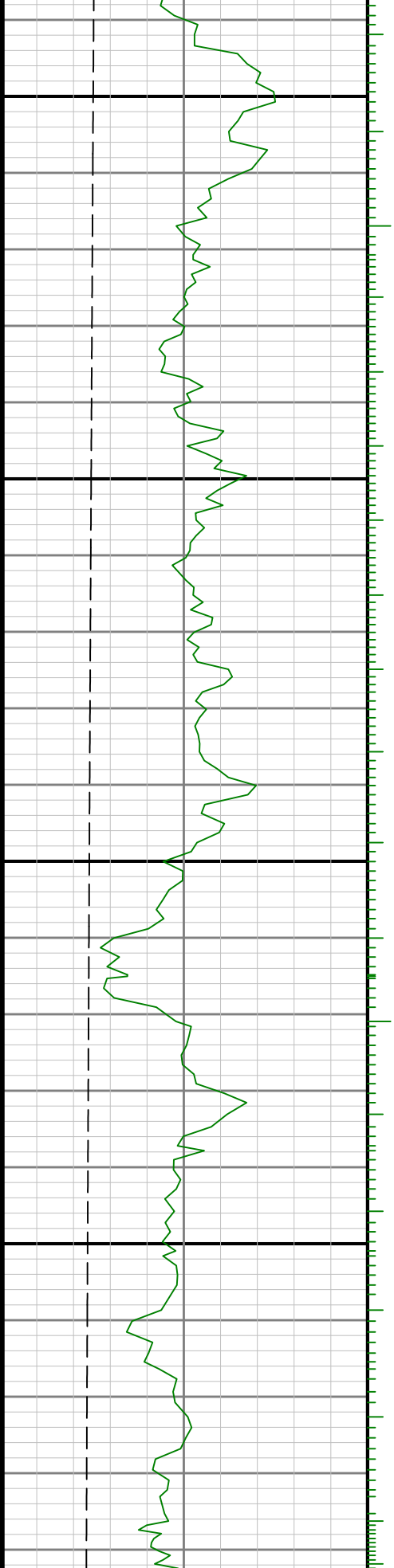




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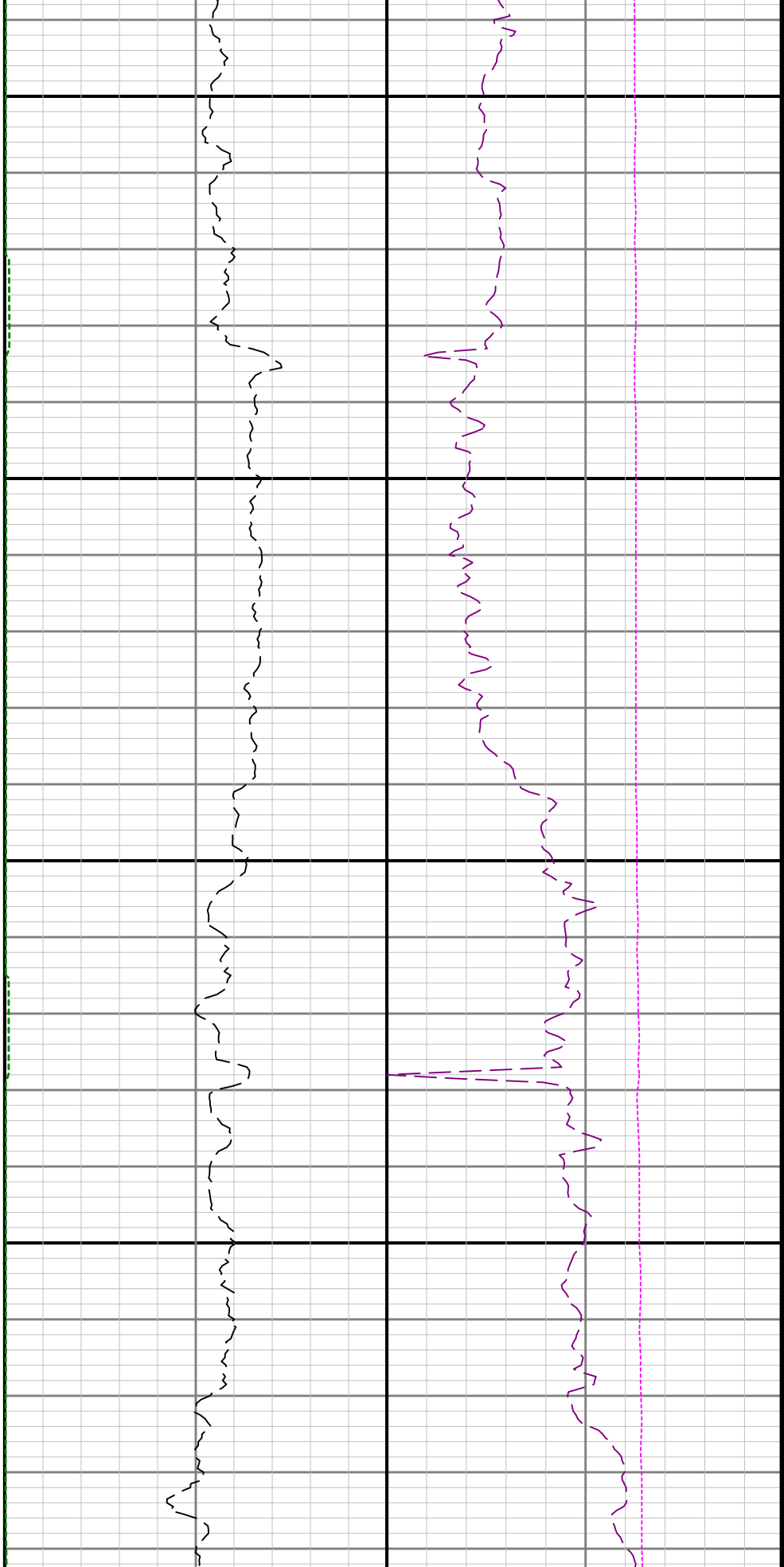
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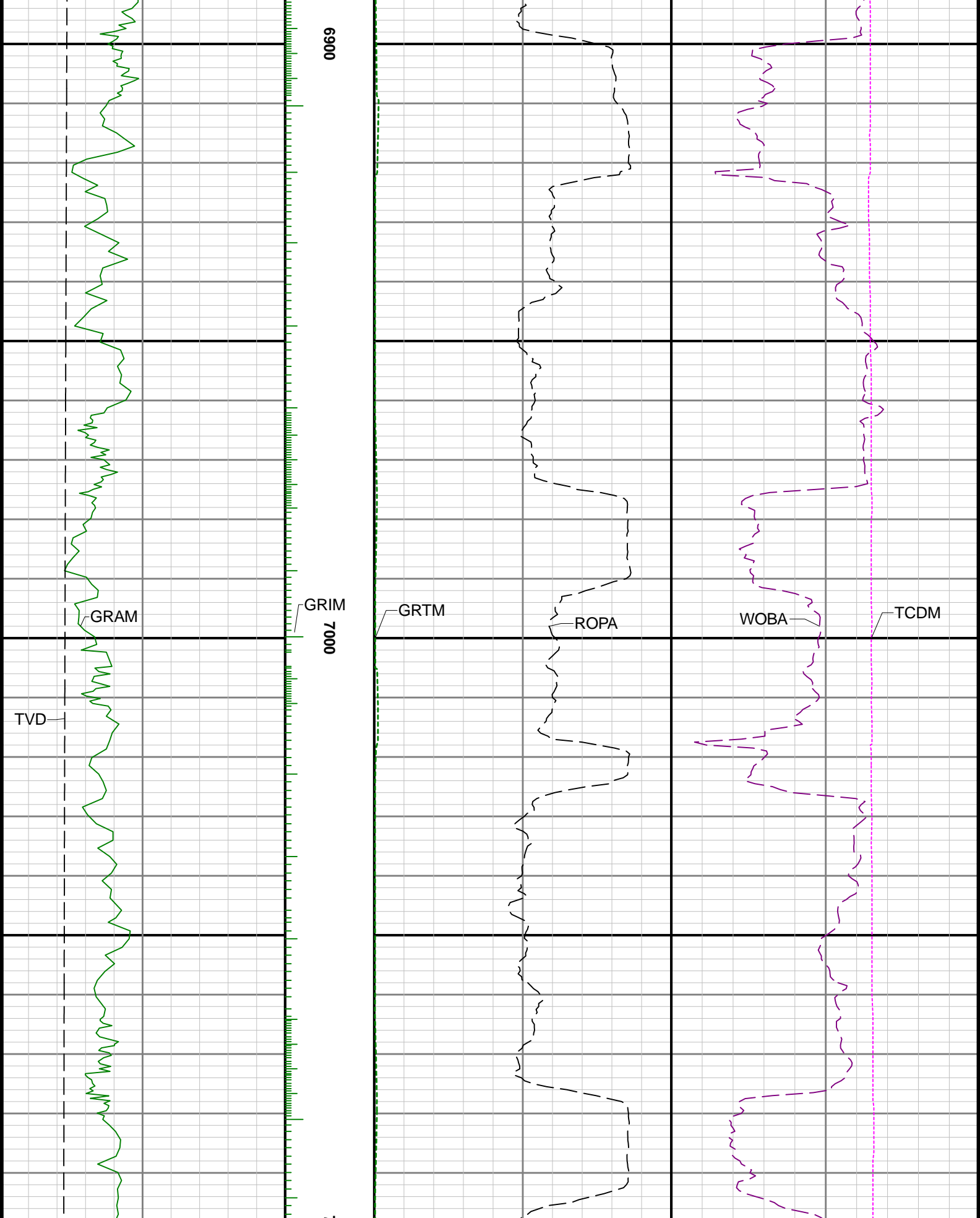


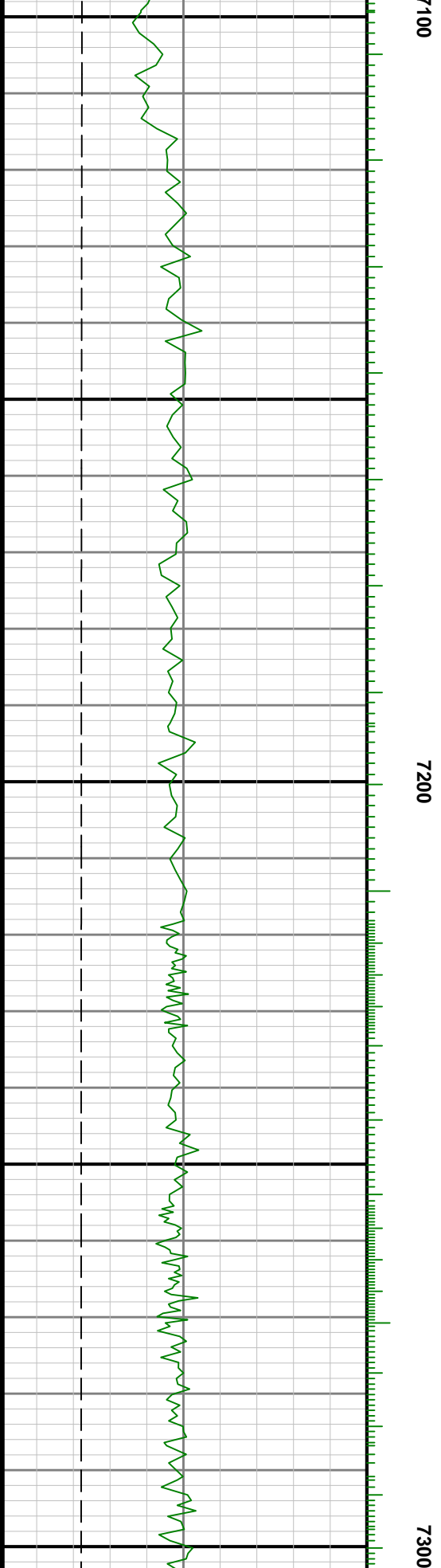
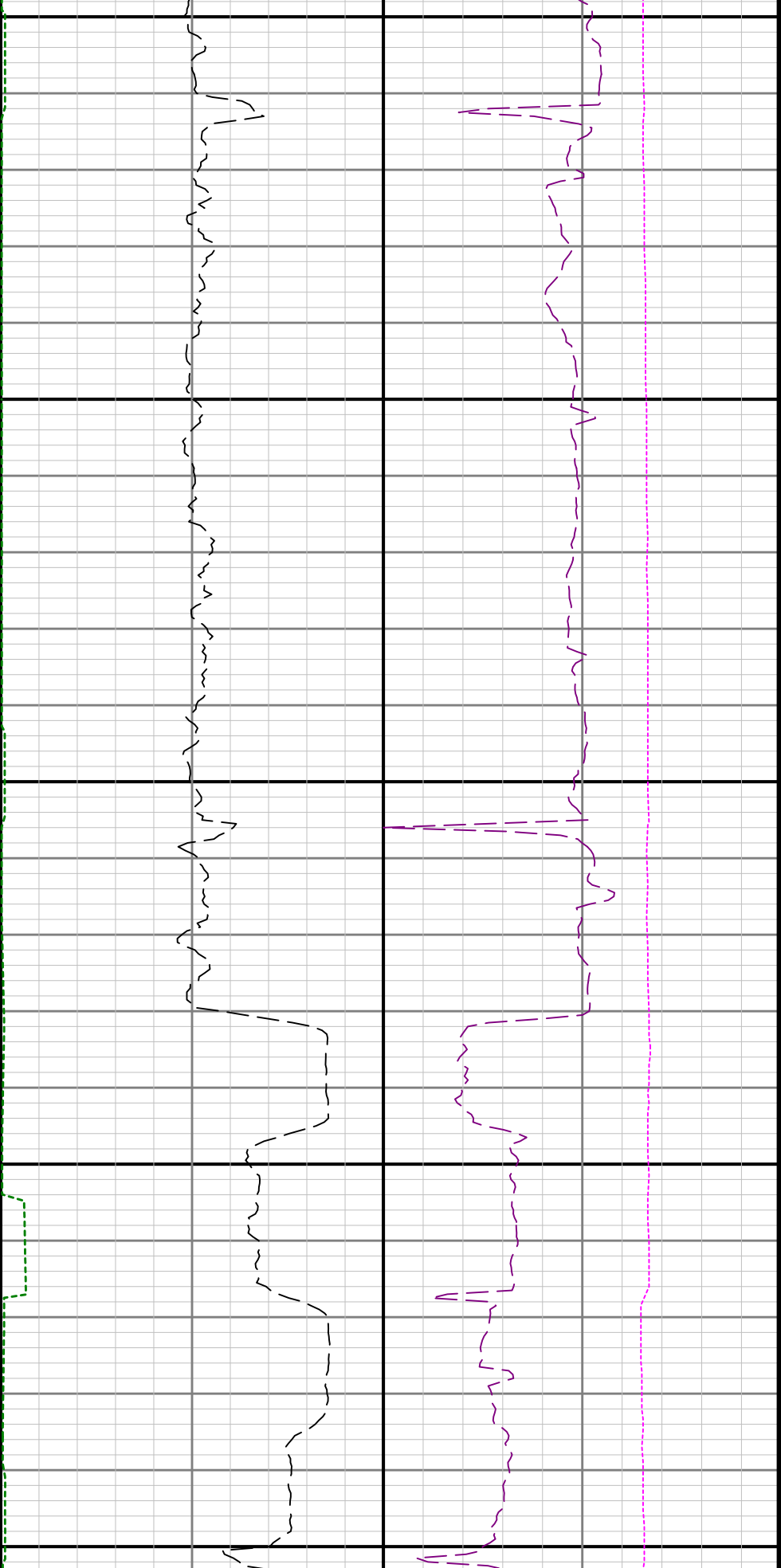


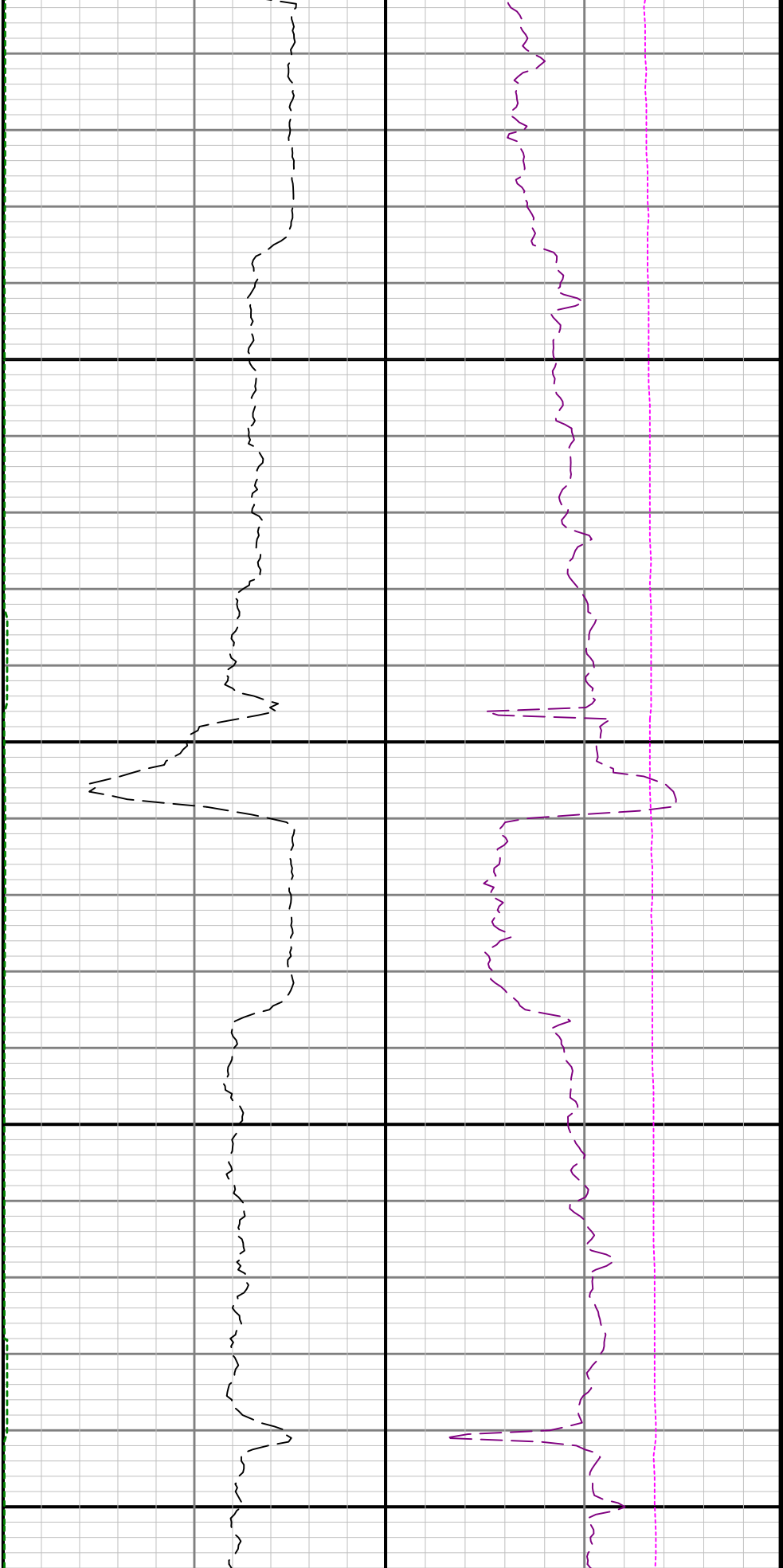
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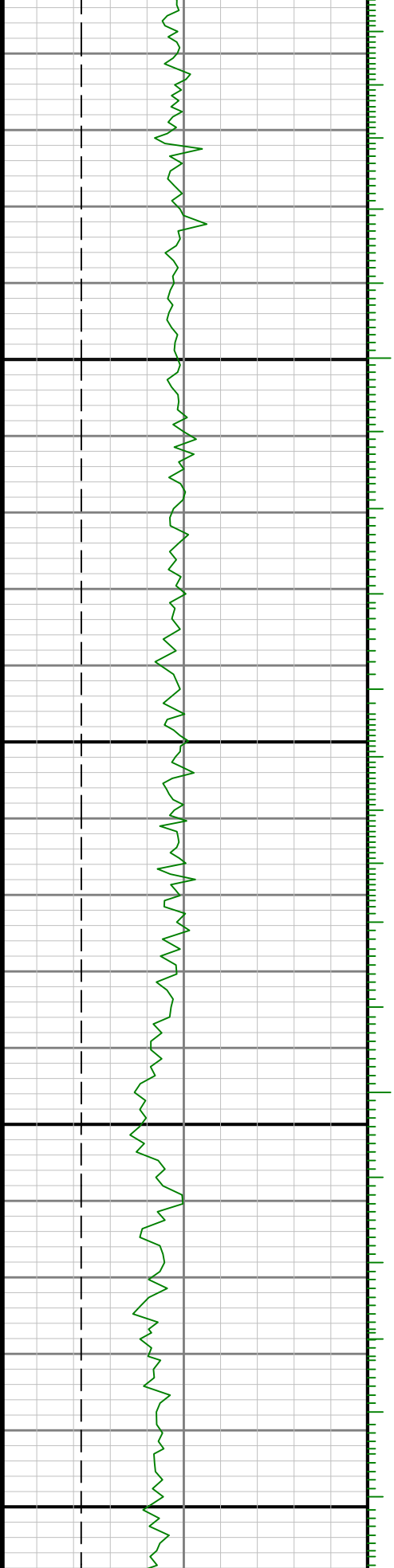


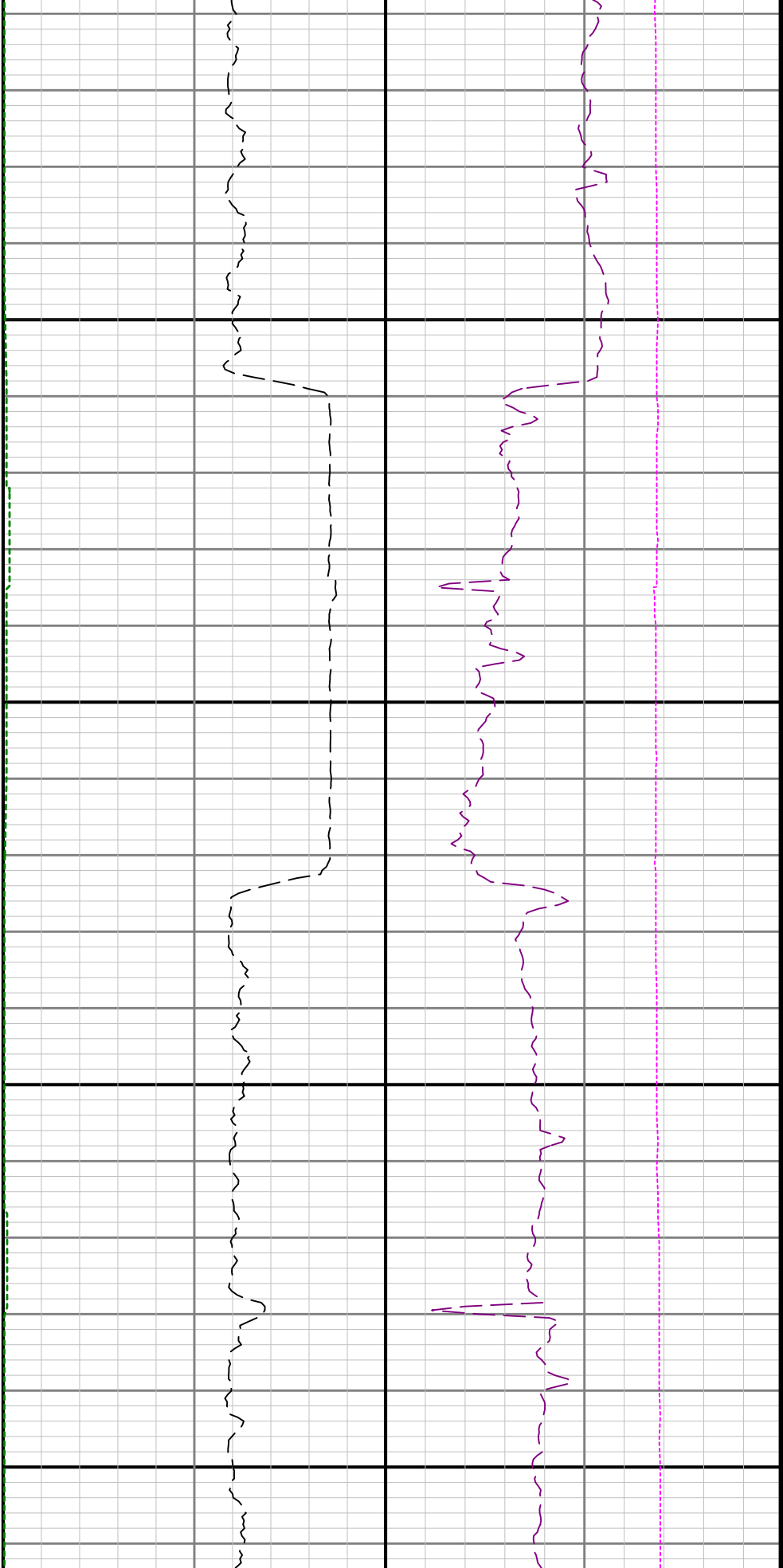




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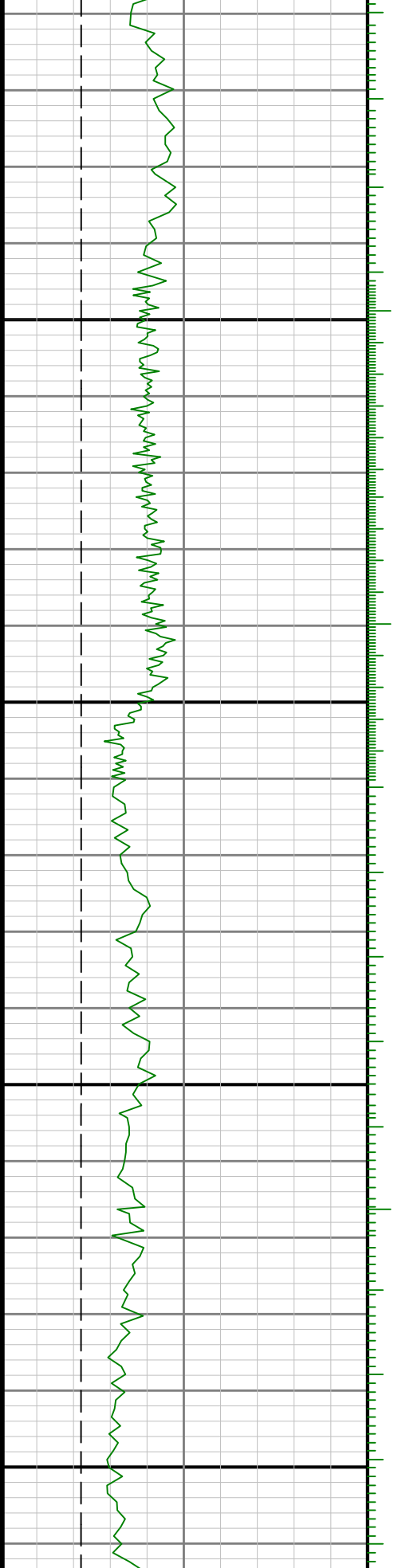
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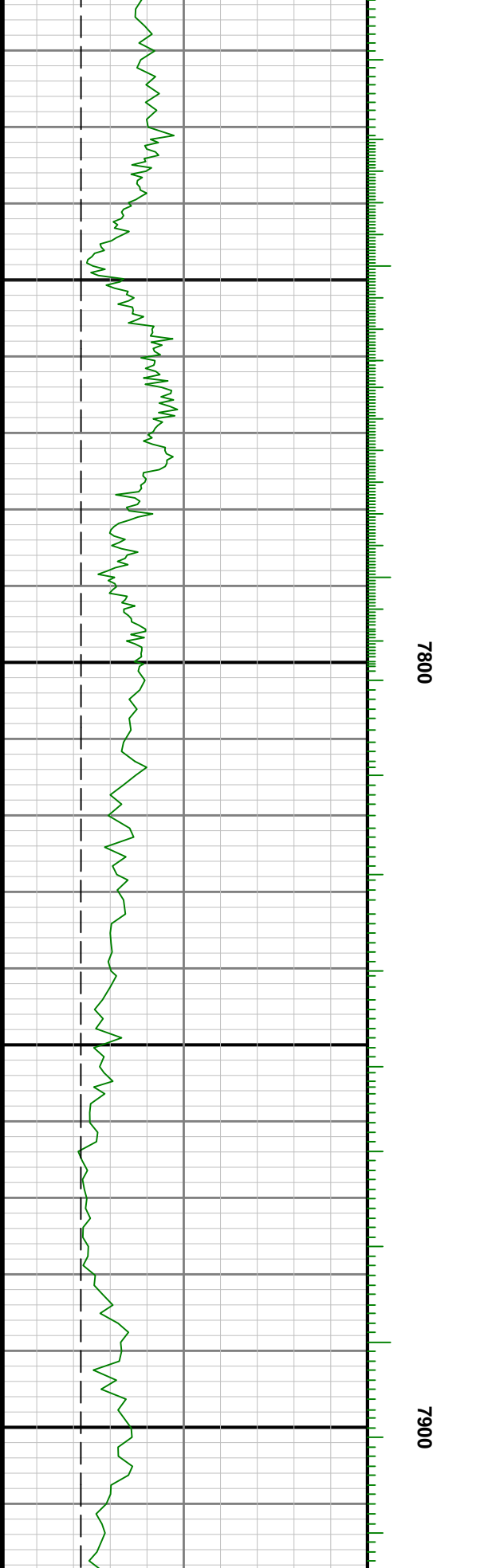
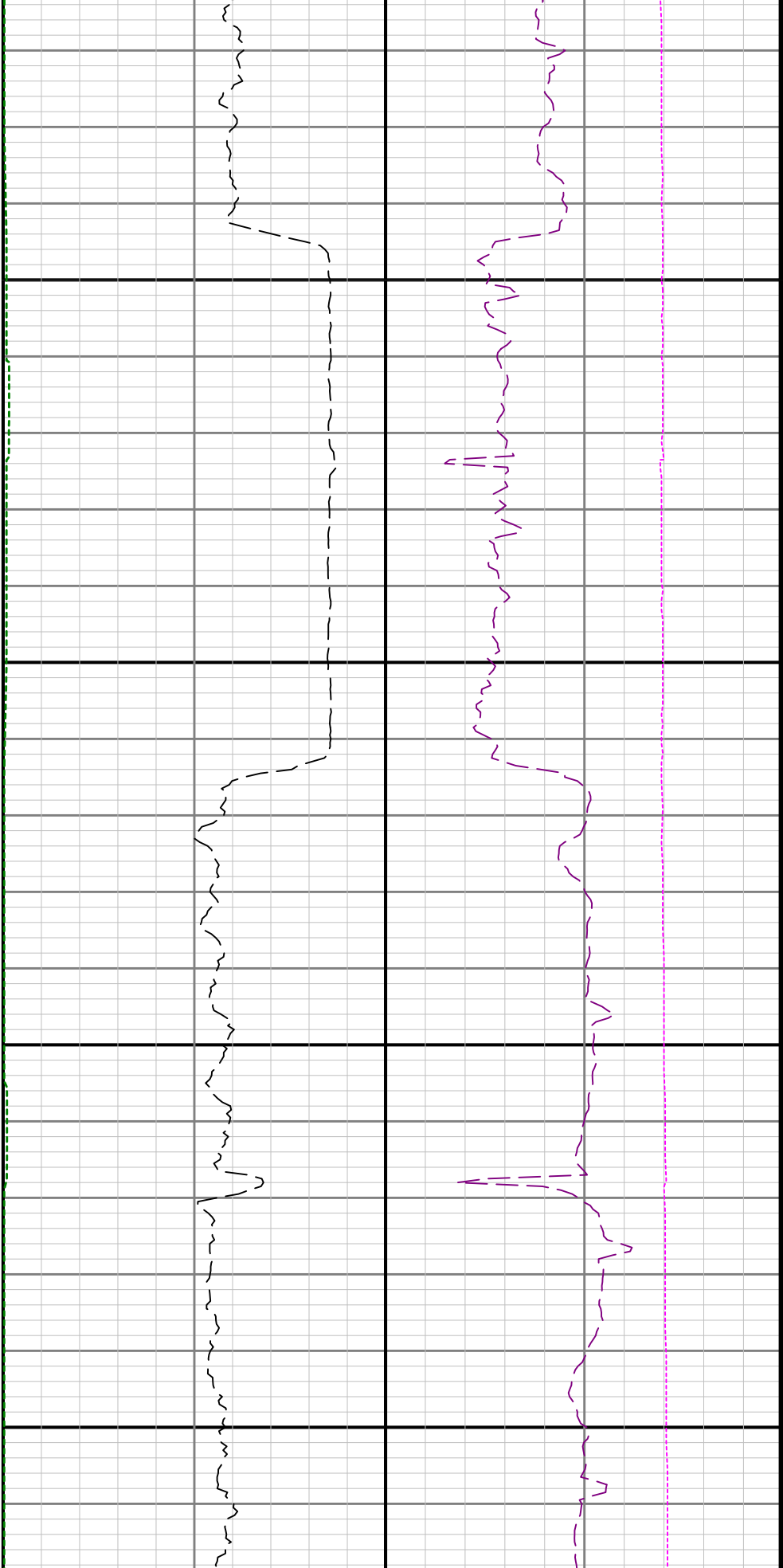


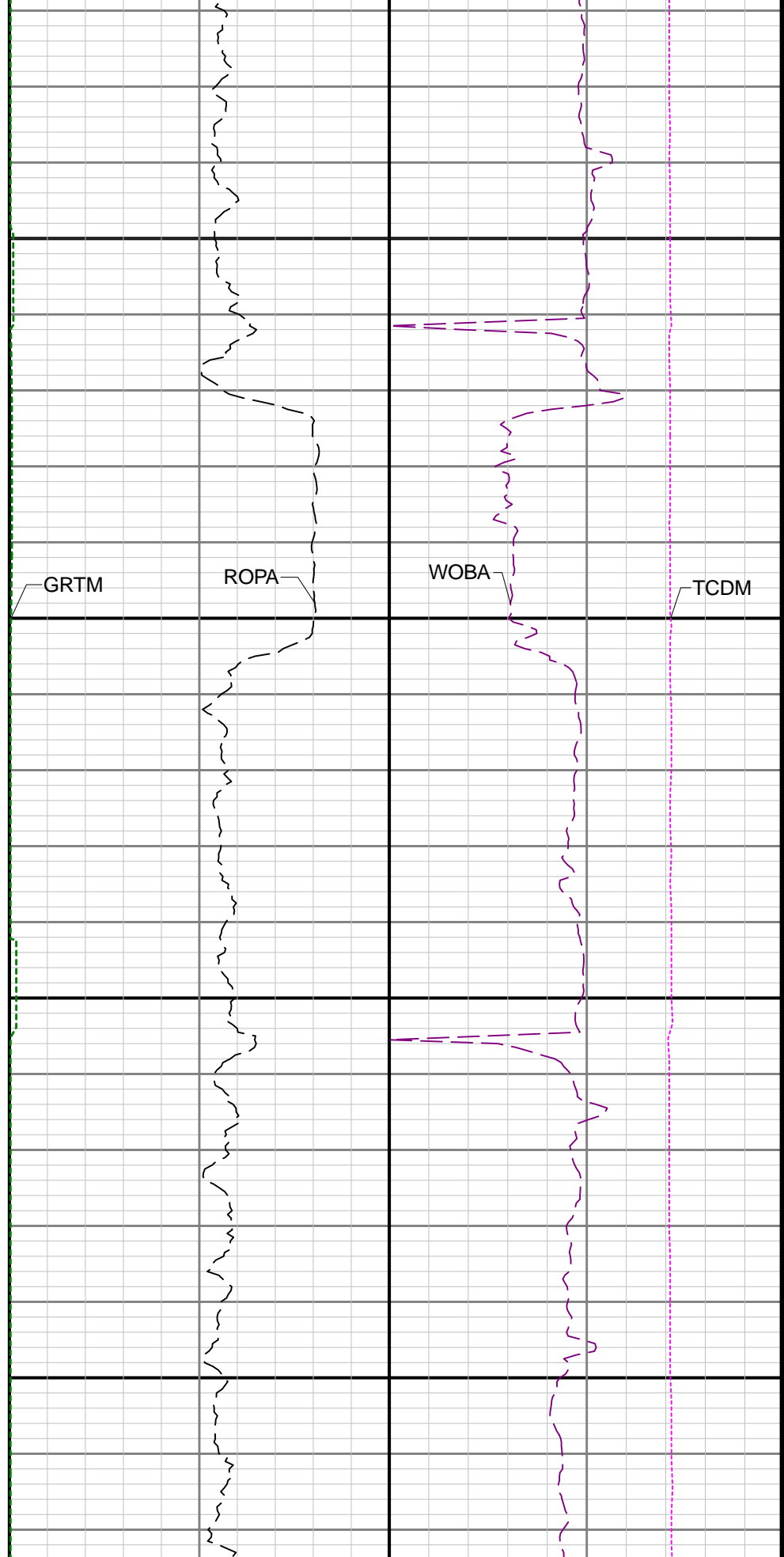
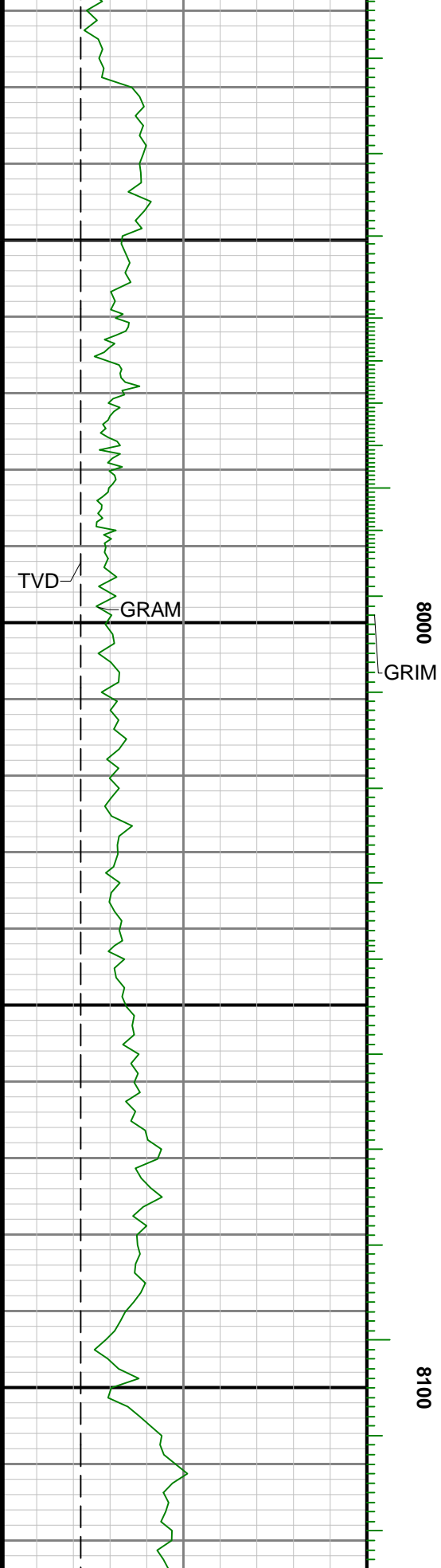


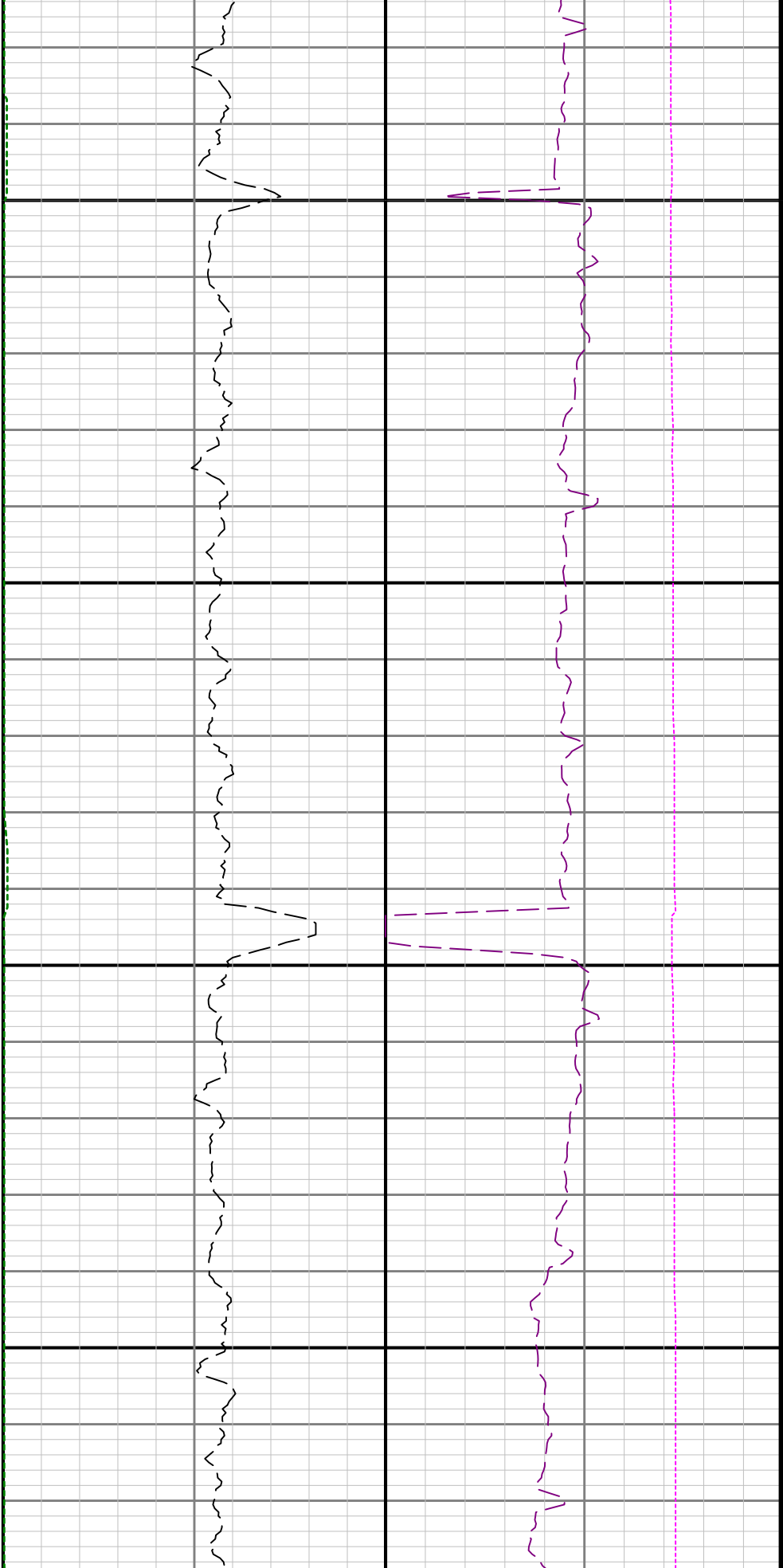
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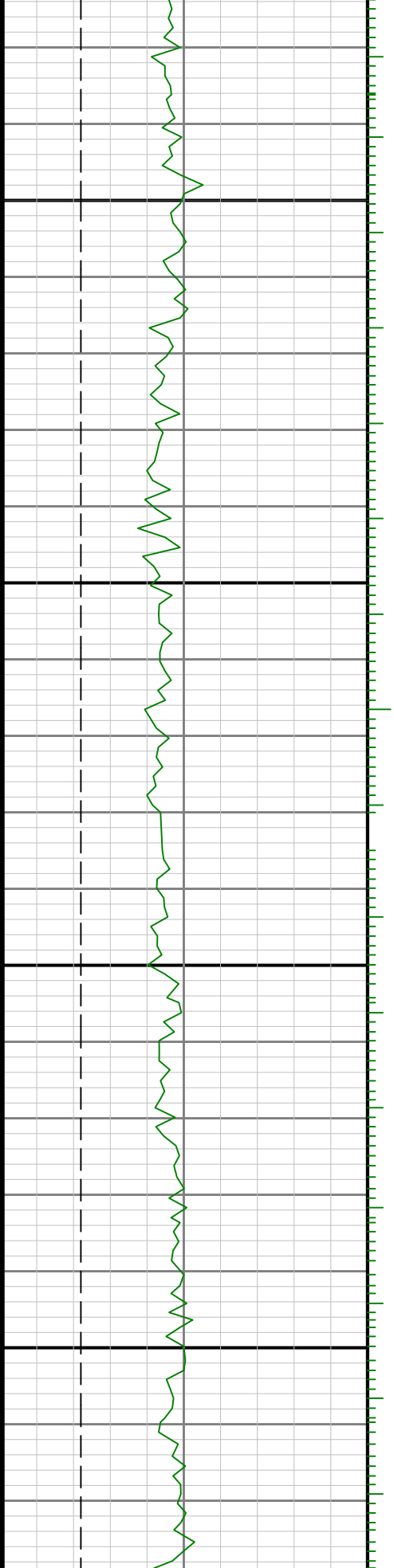


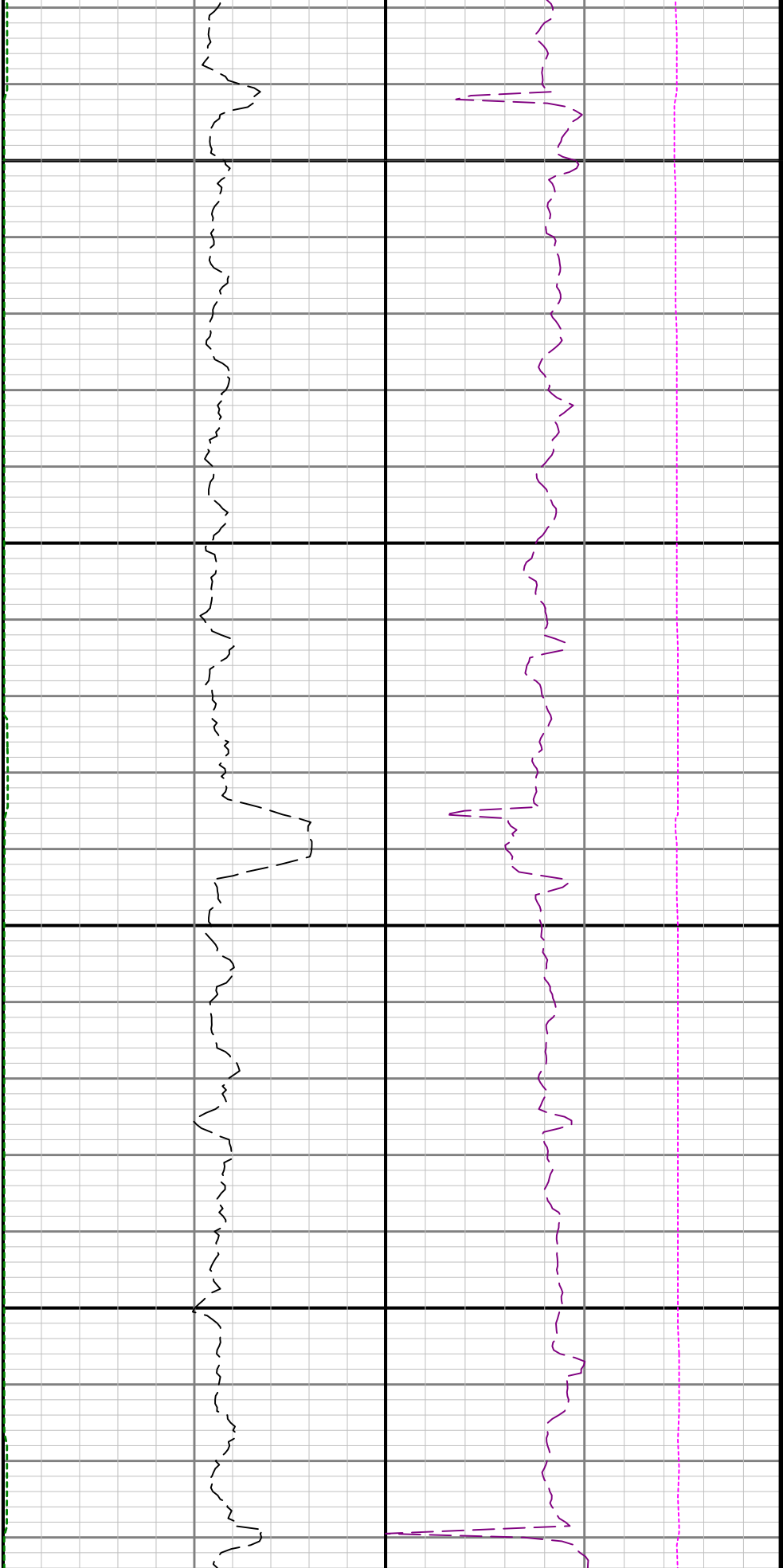




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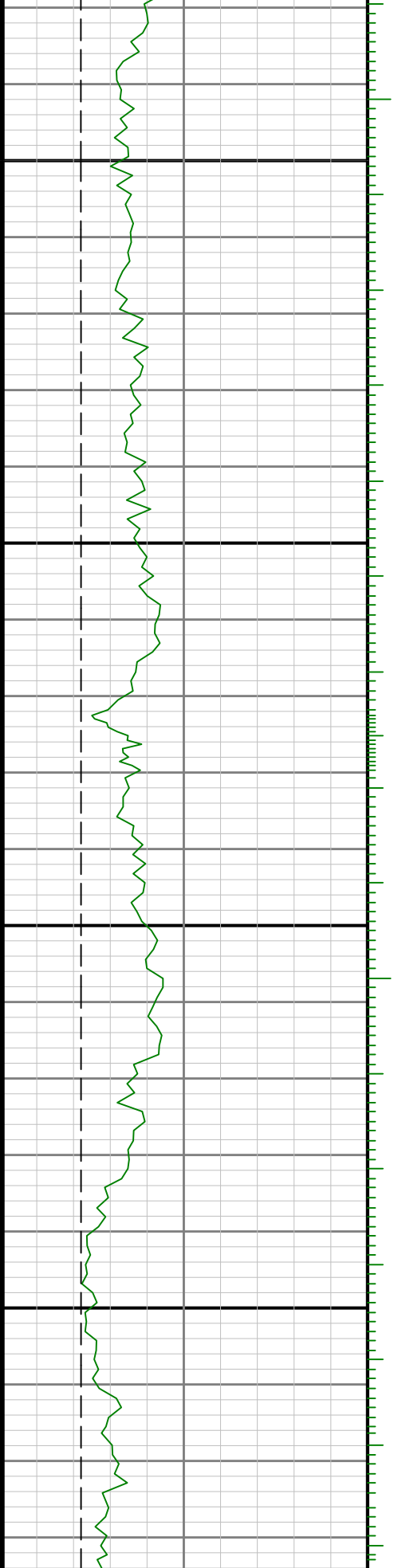
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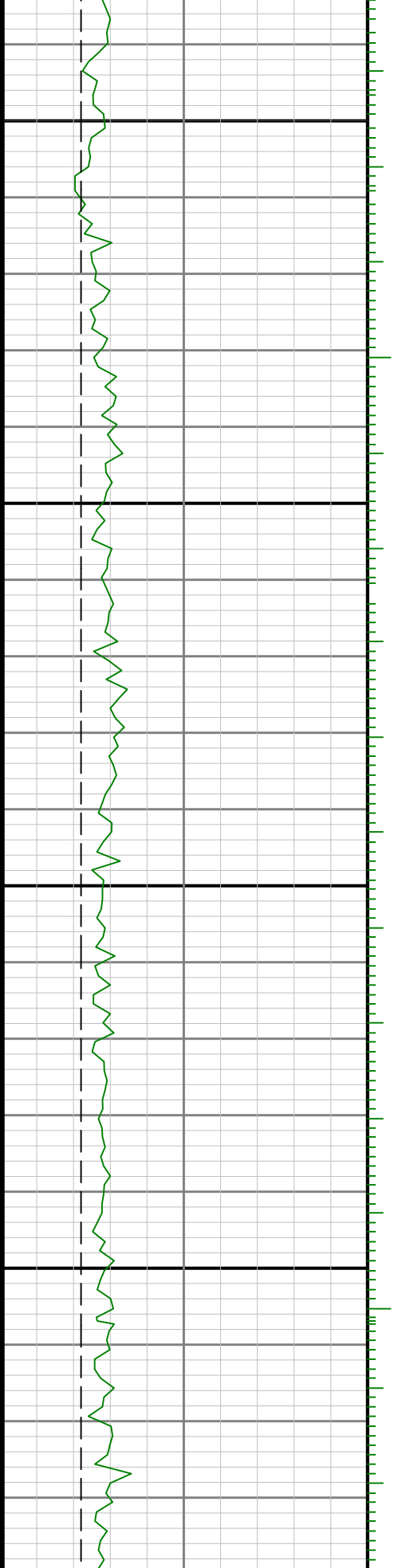




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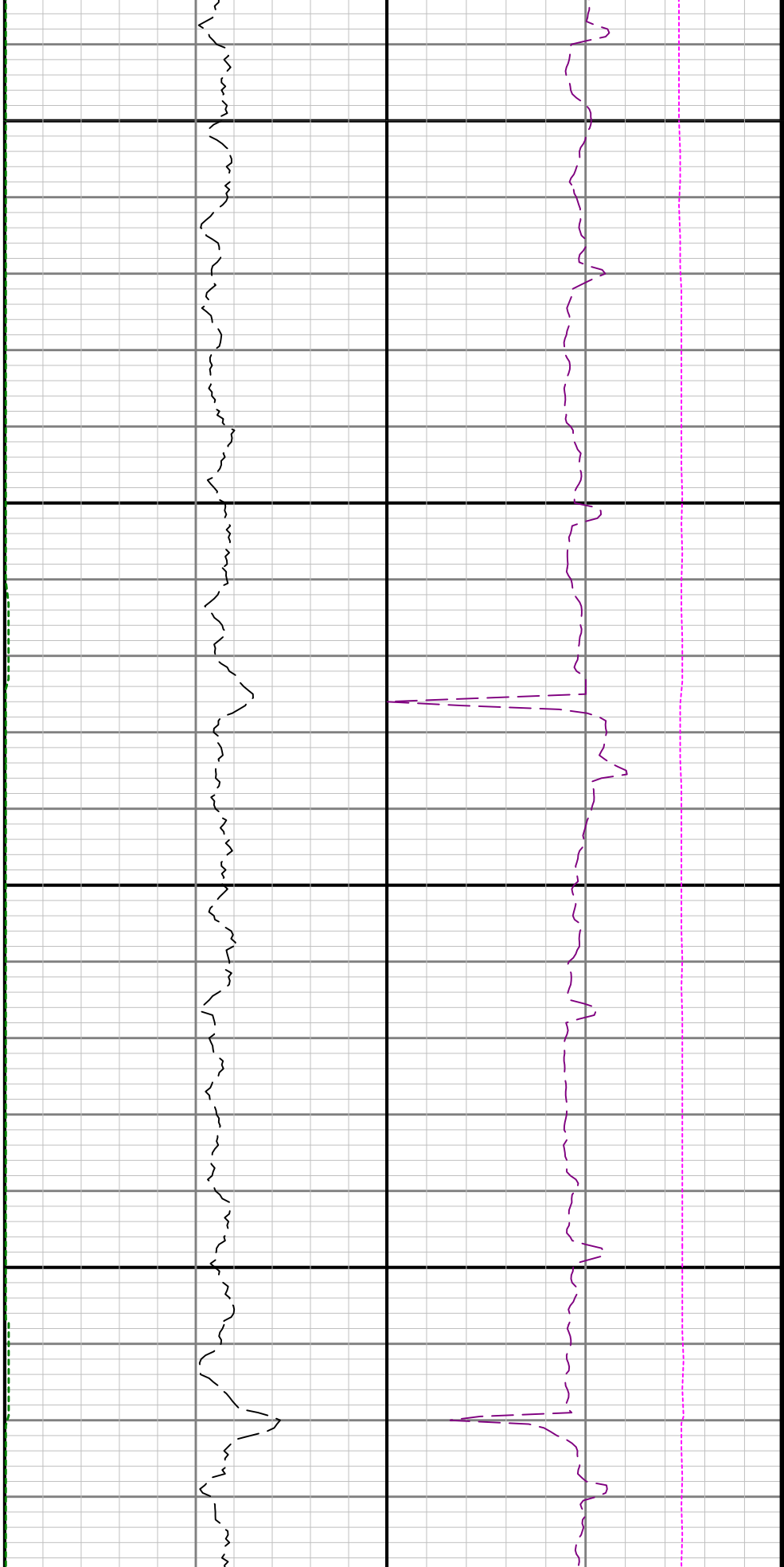
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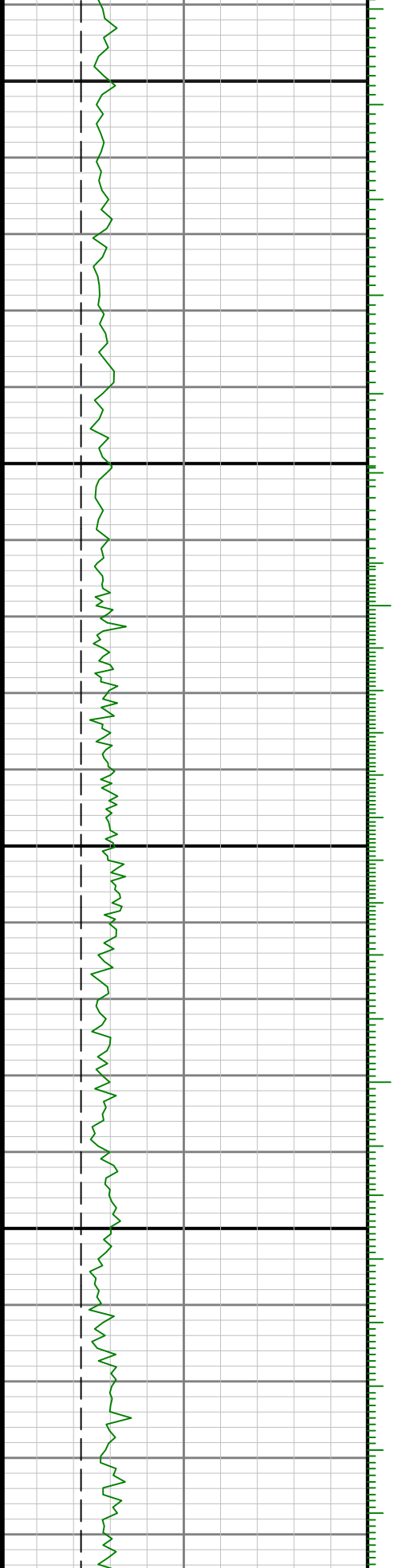




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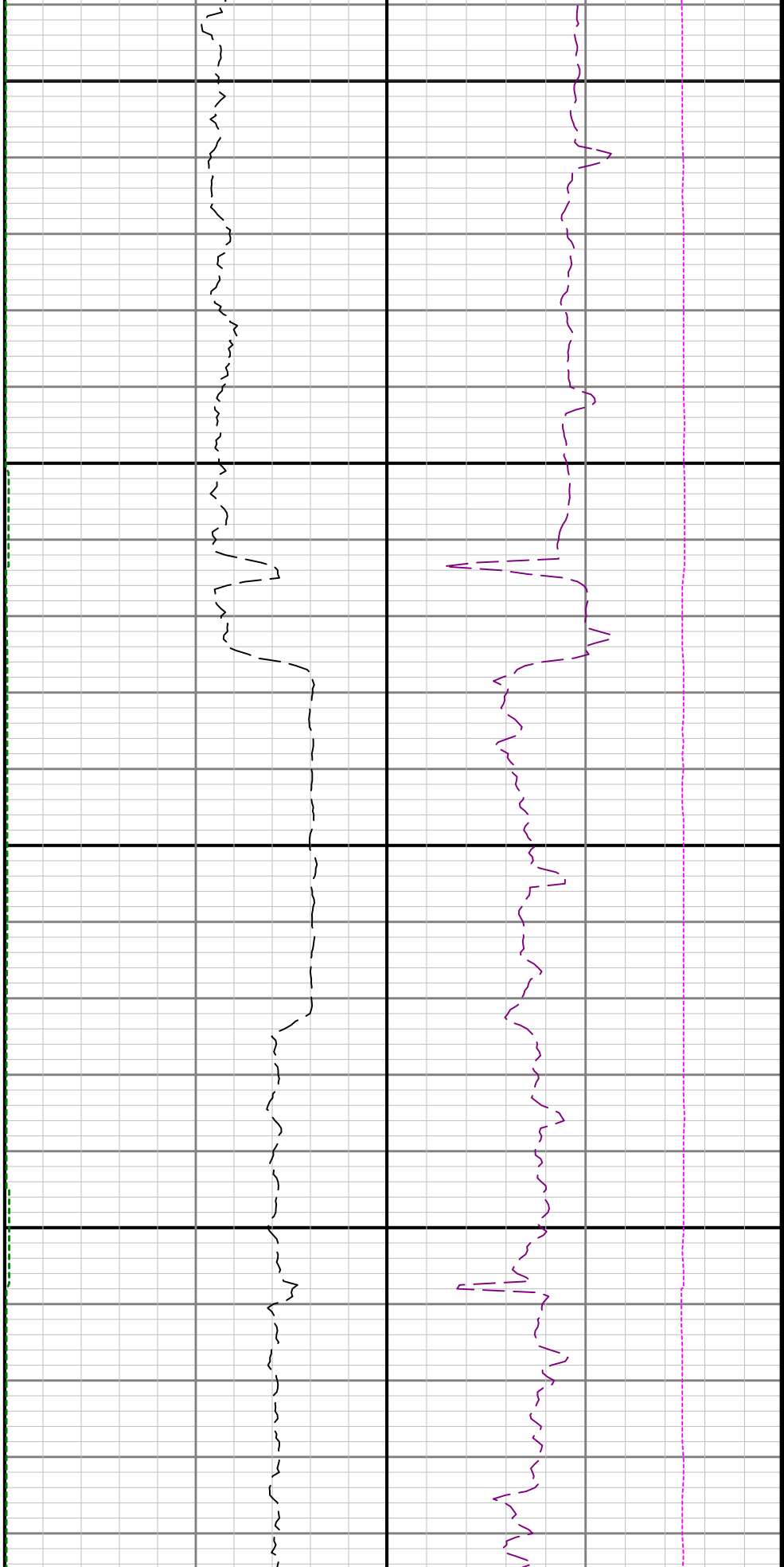
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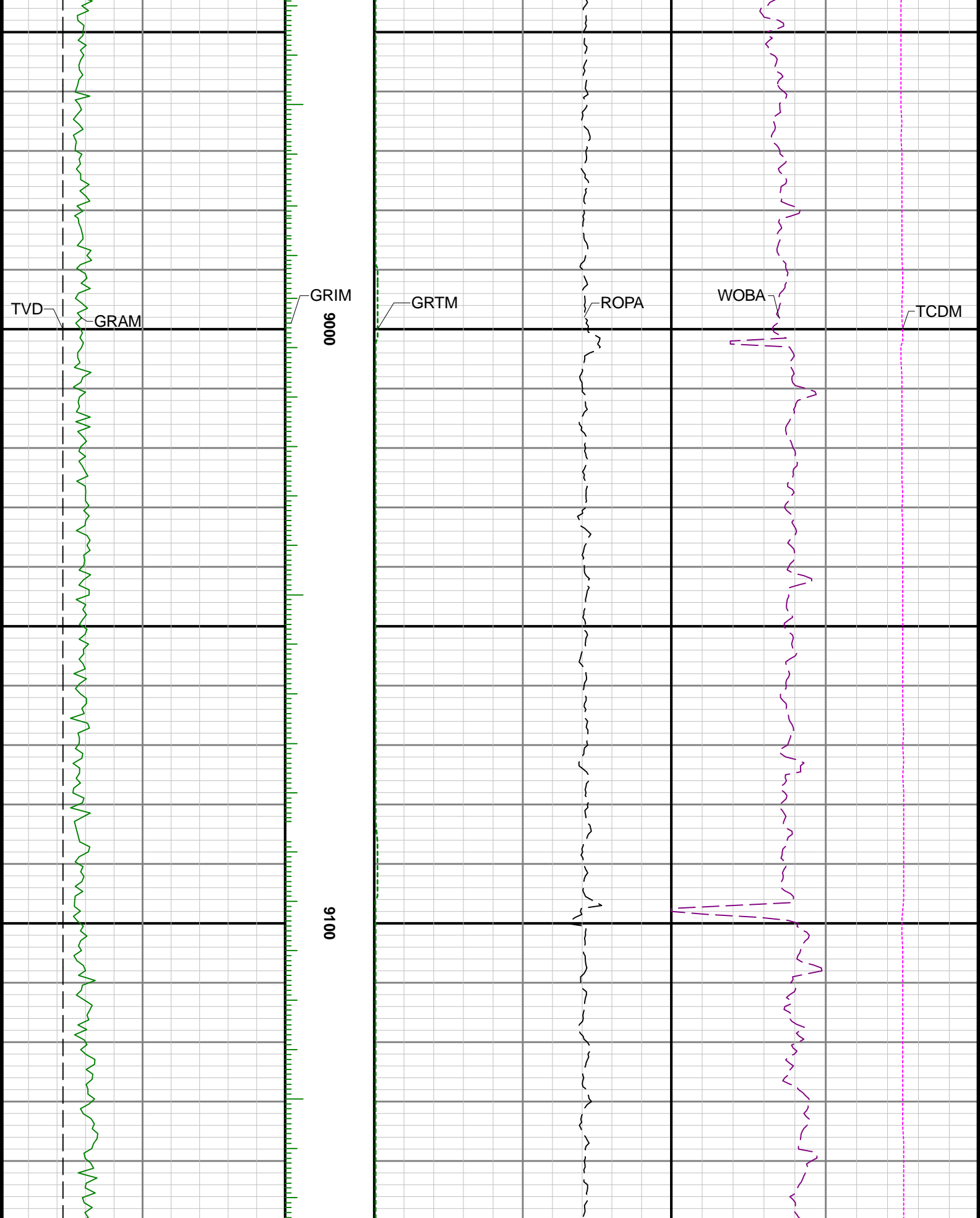


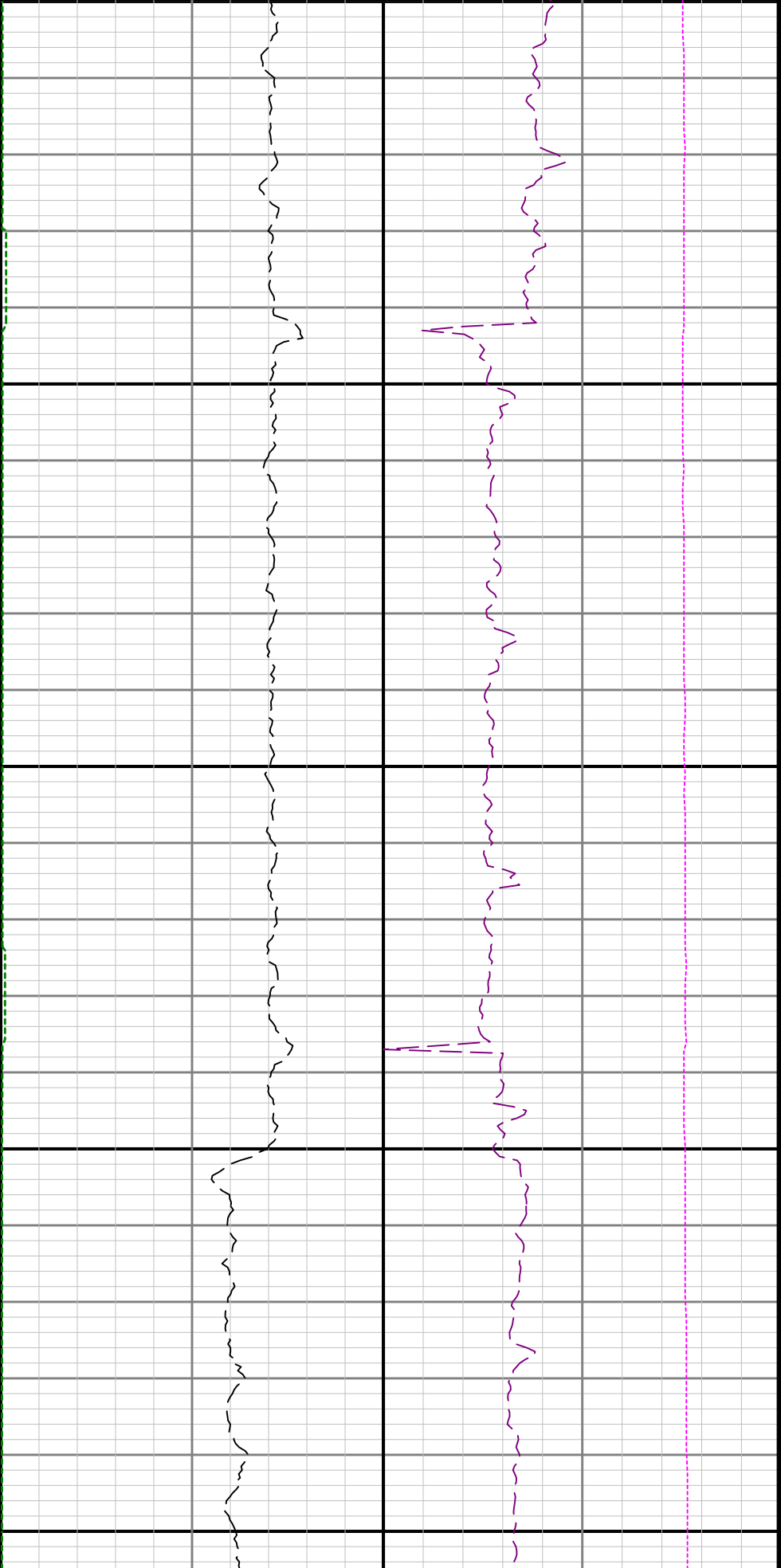


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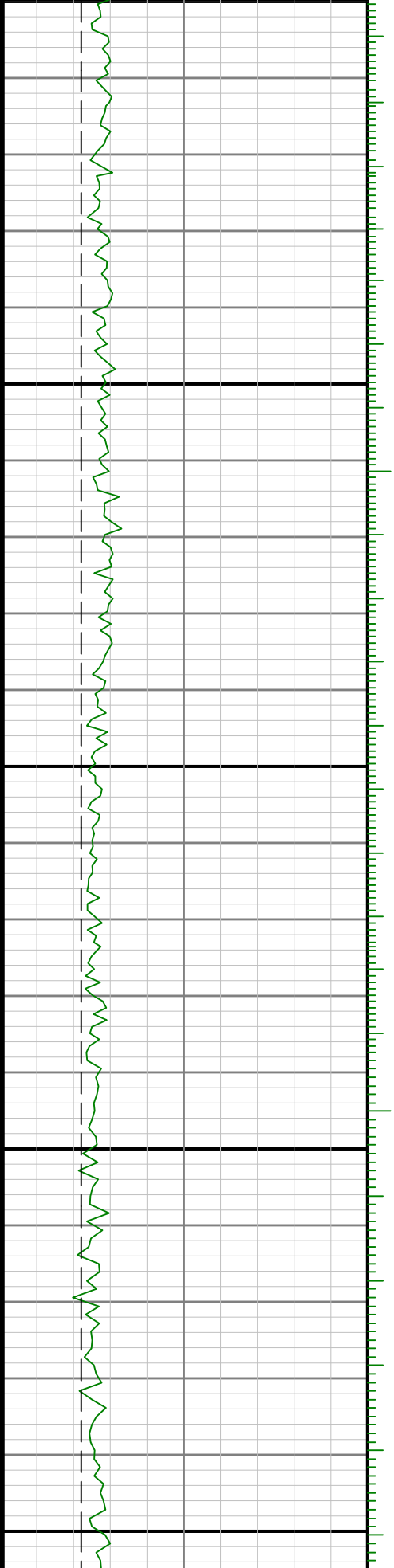


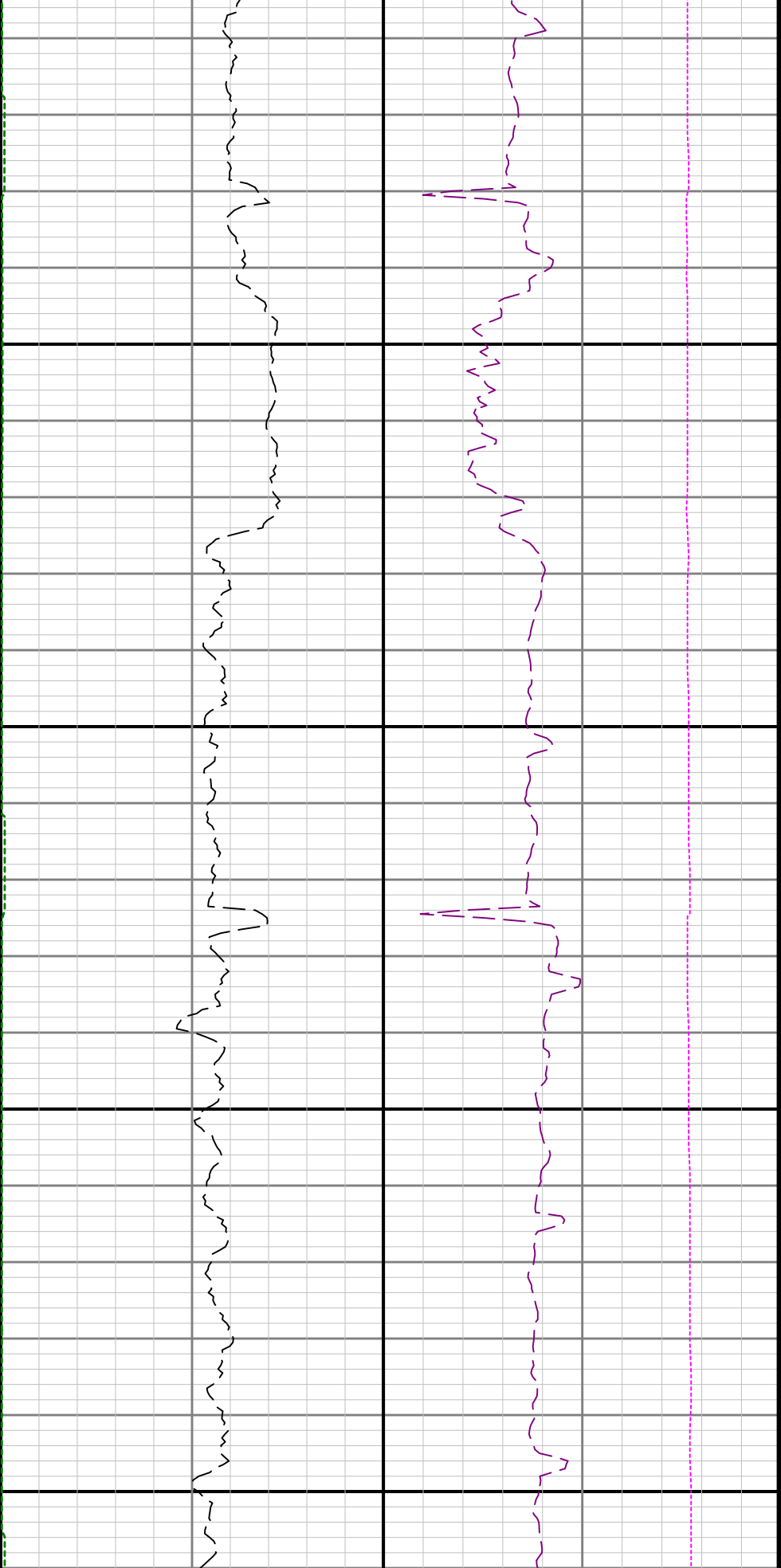




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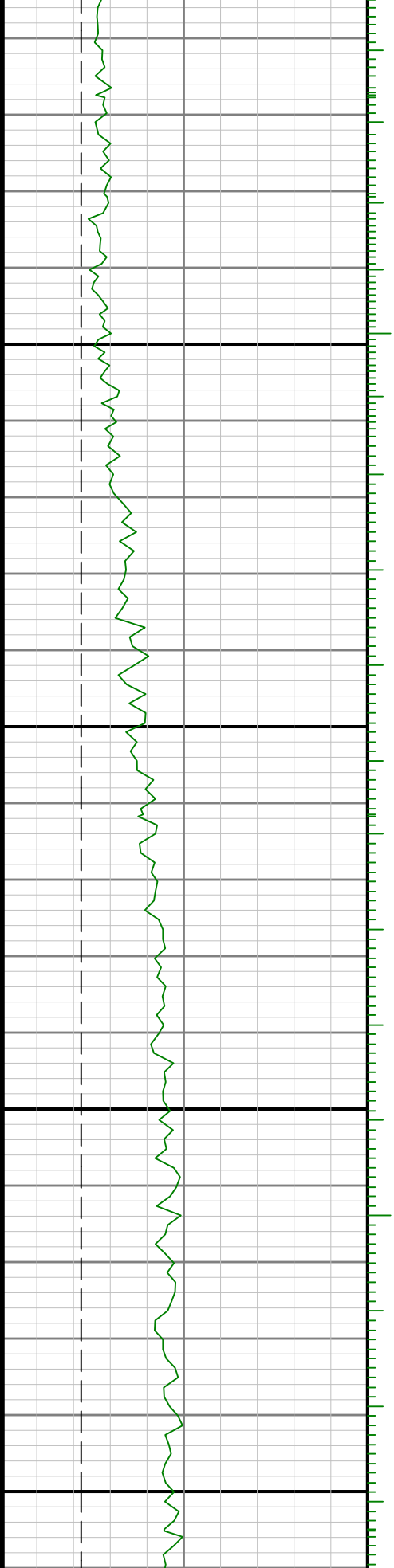
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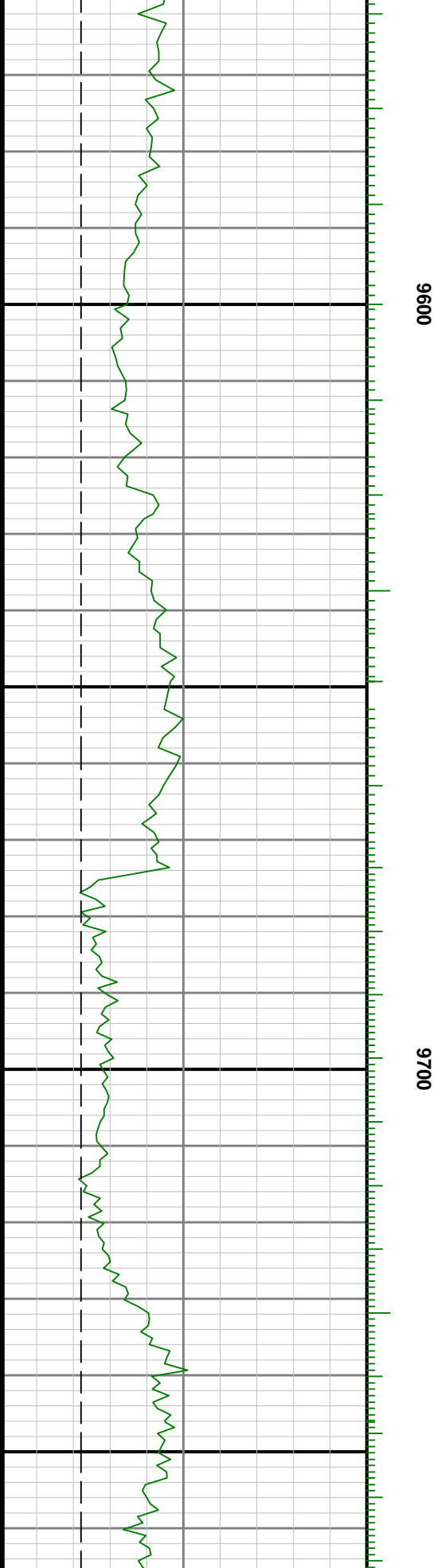
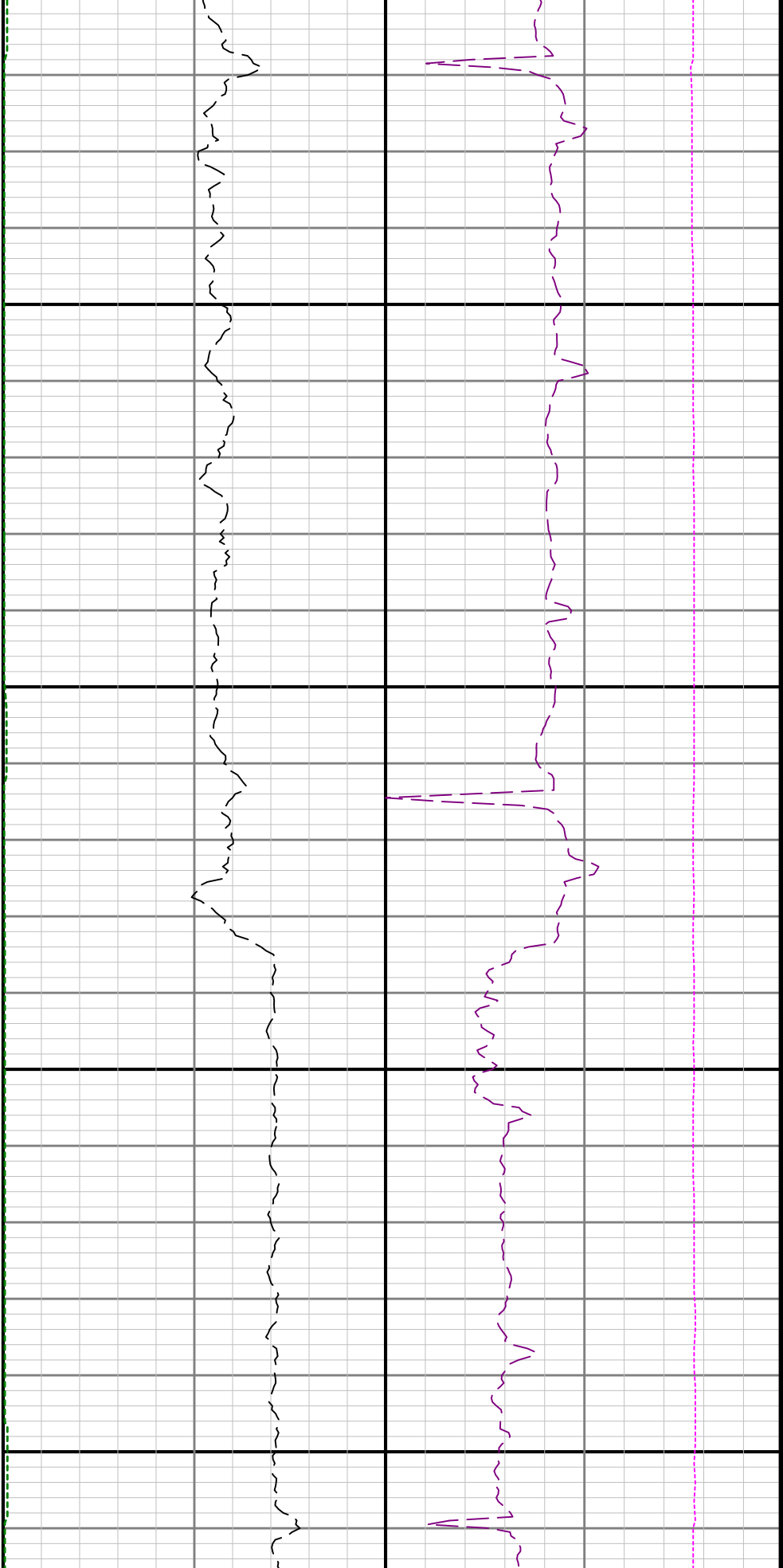


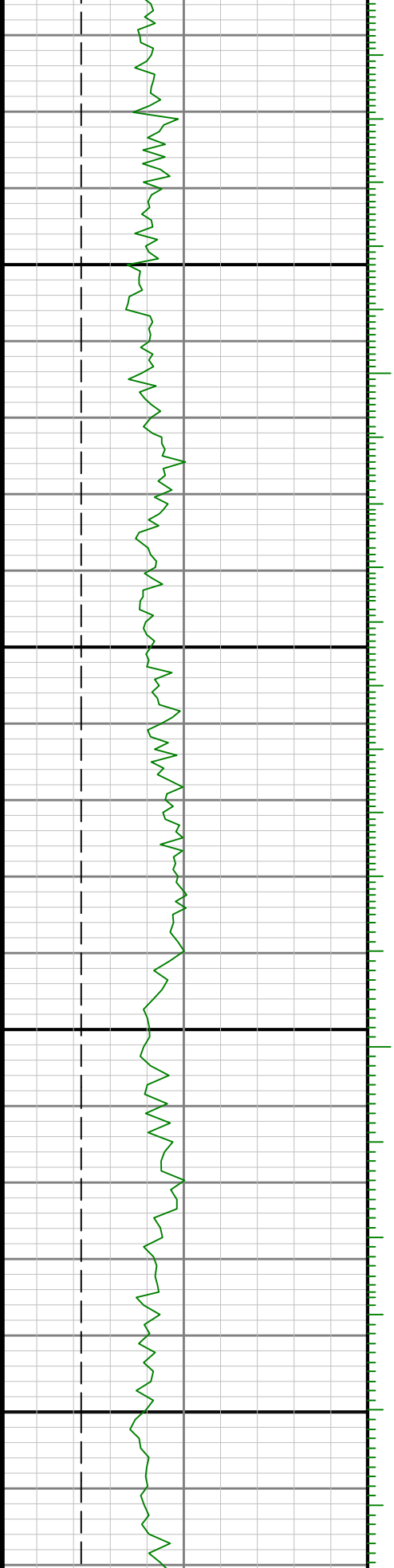


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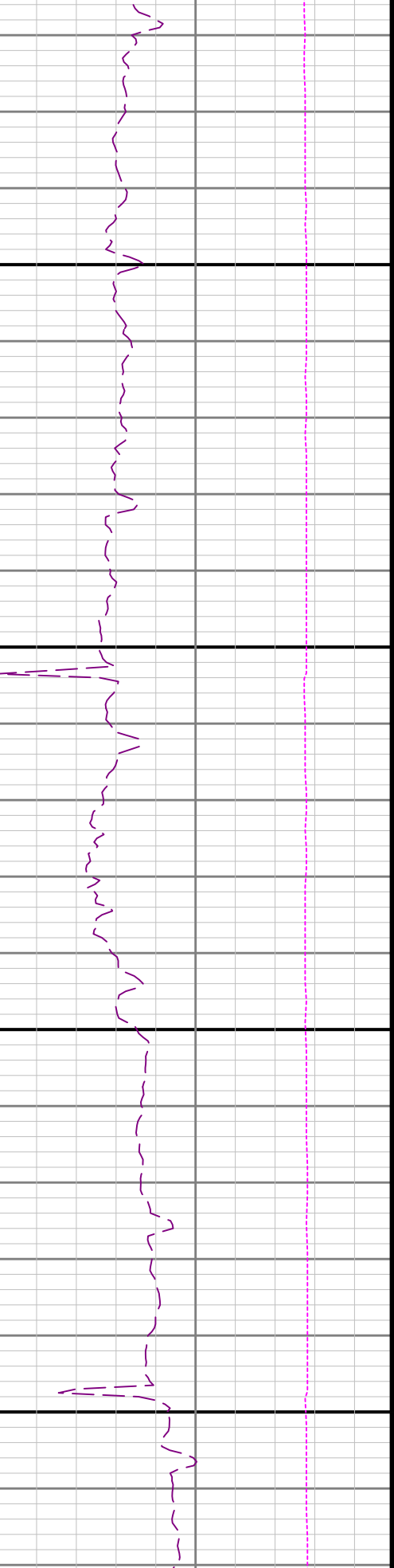
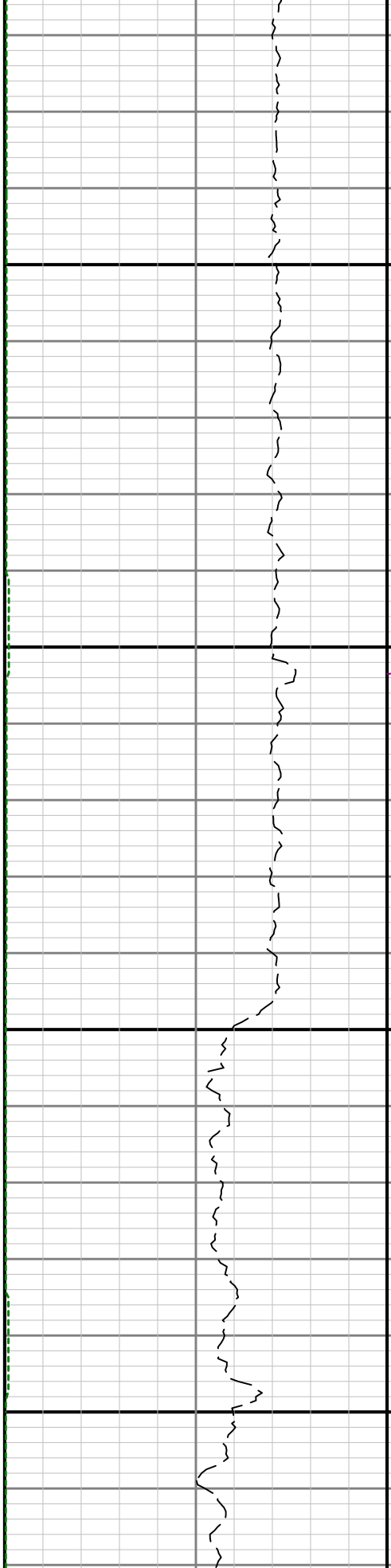


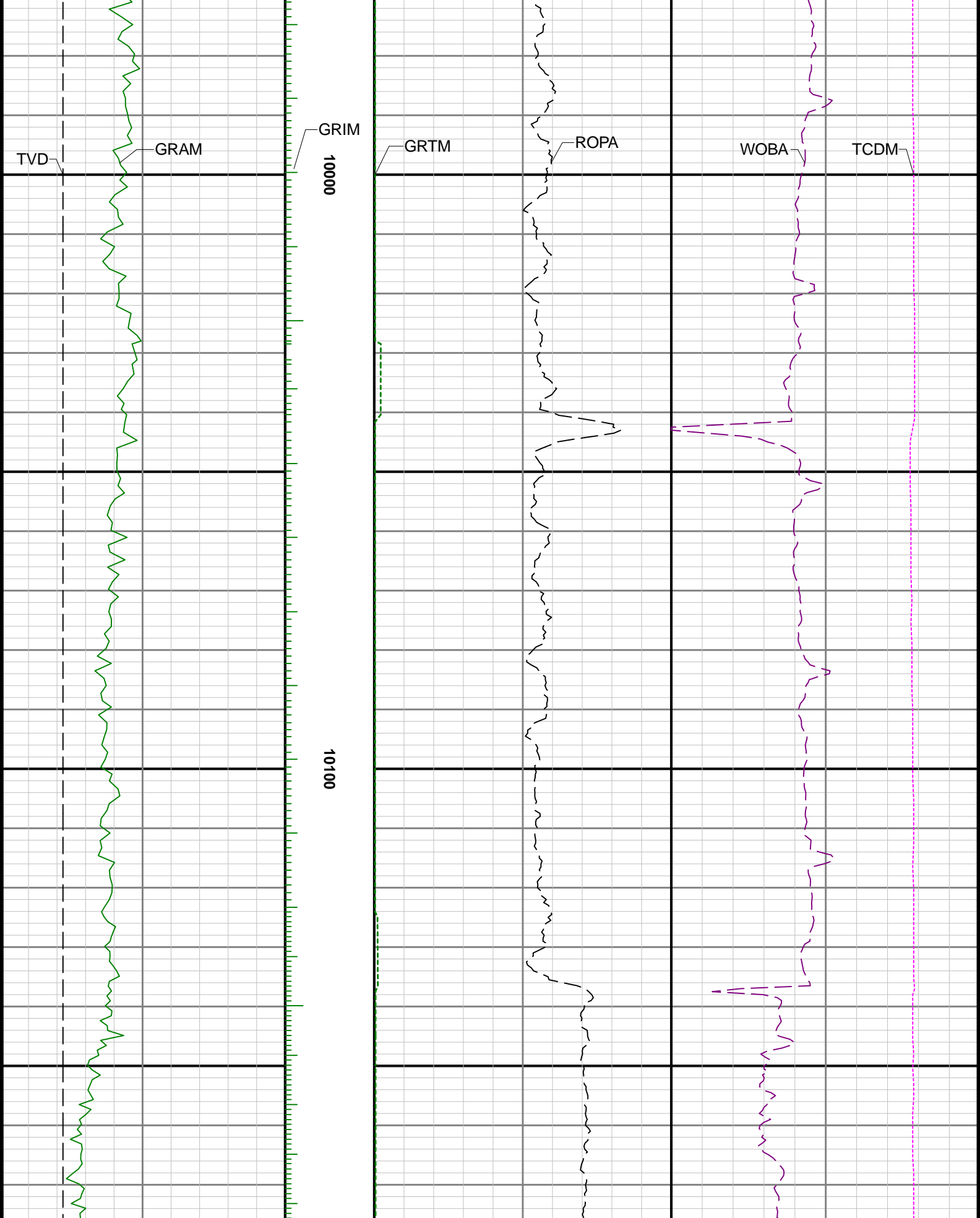


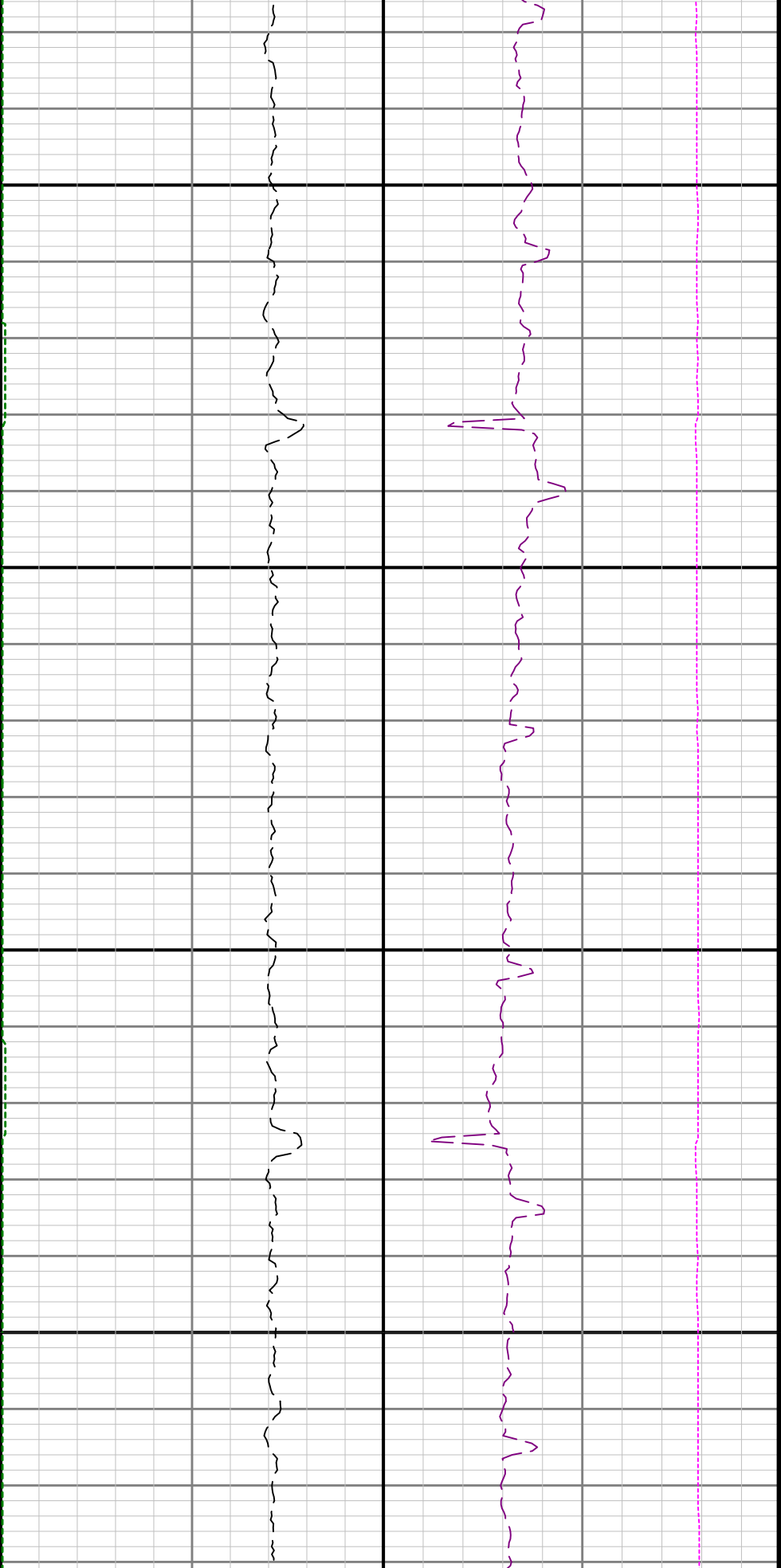


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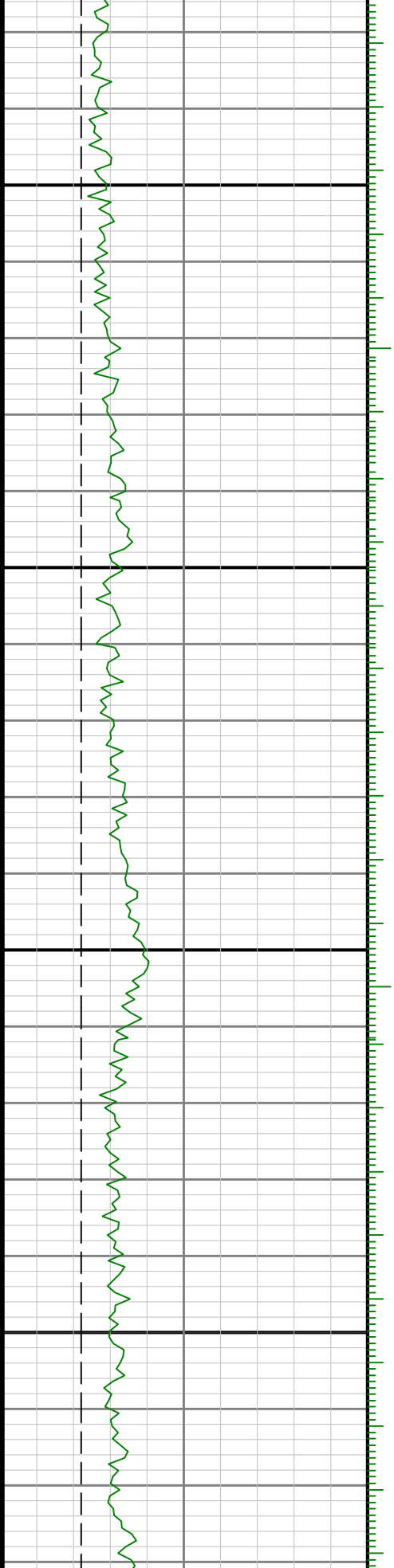


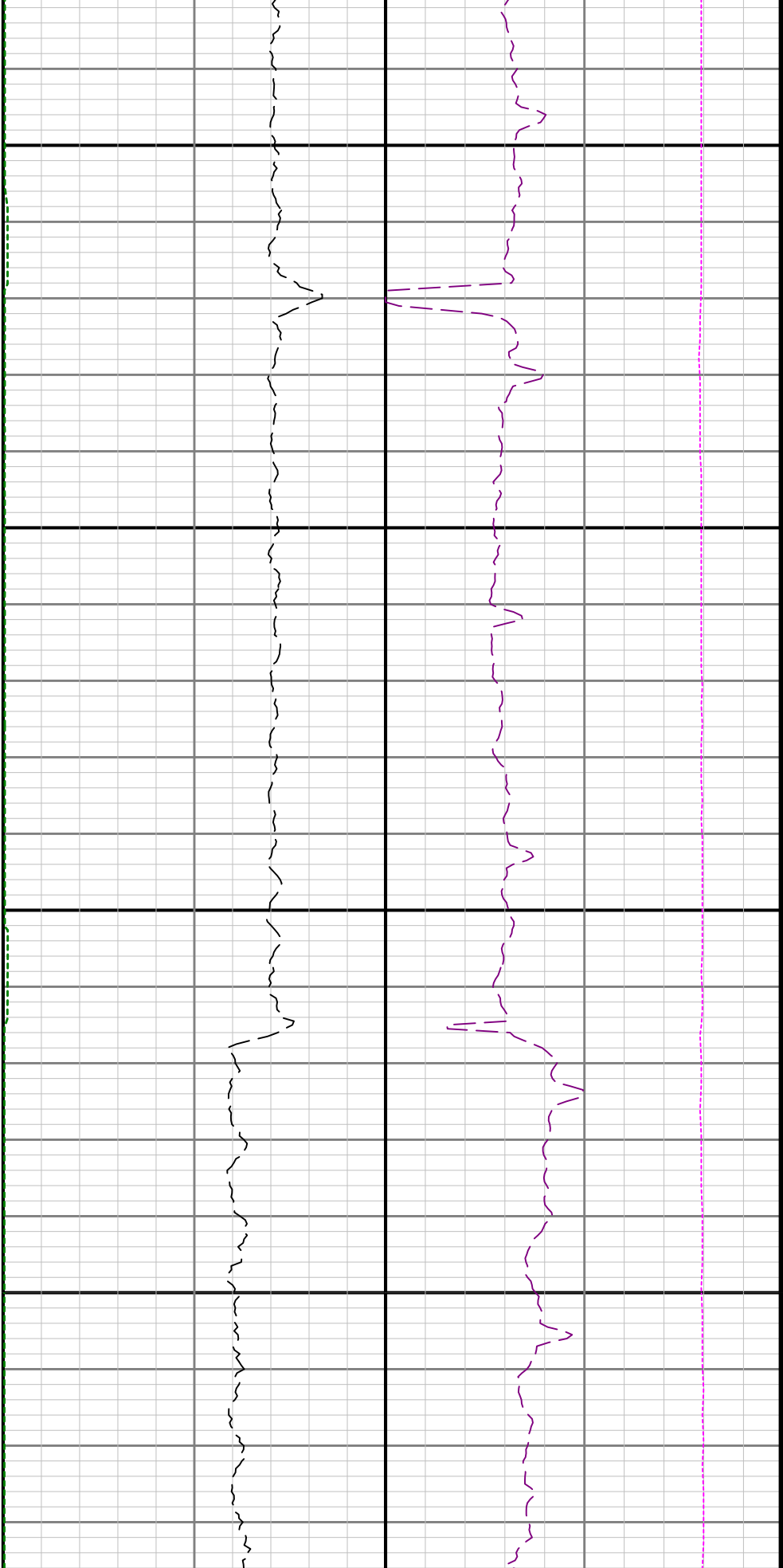




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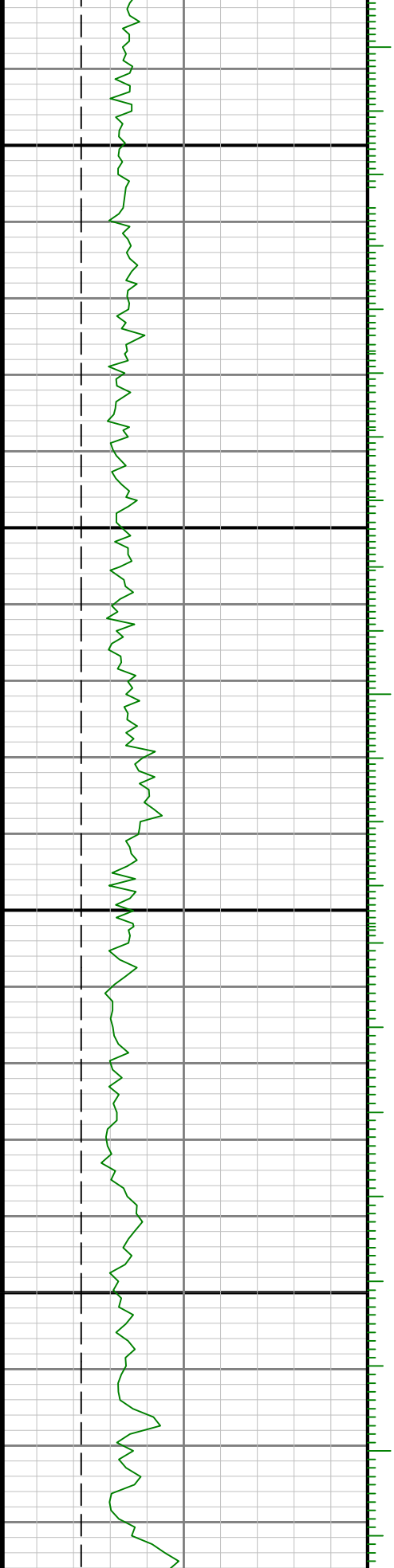
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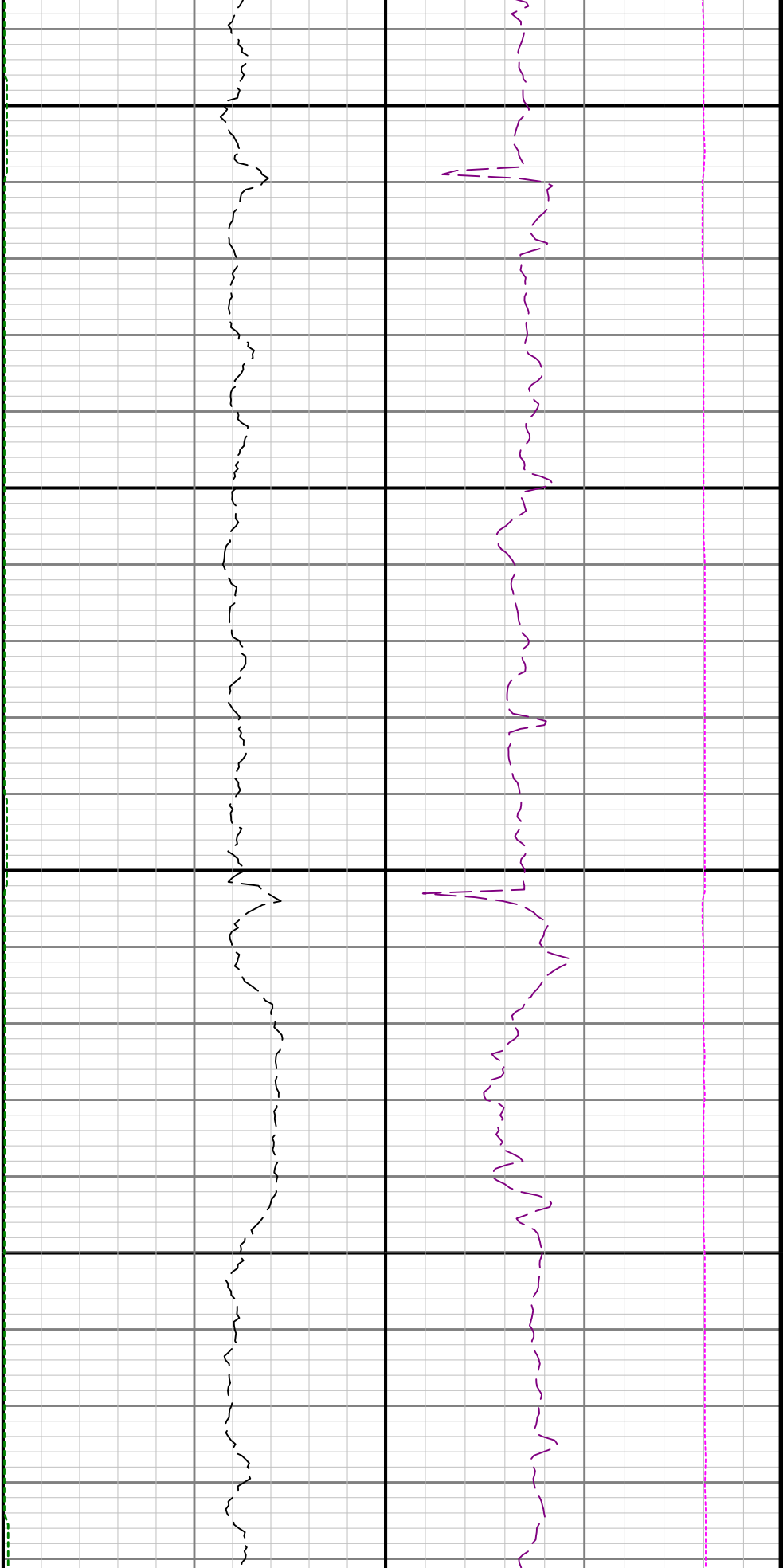




10400

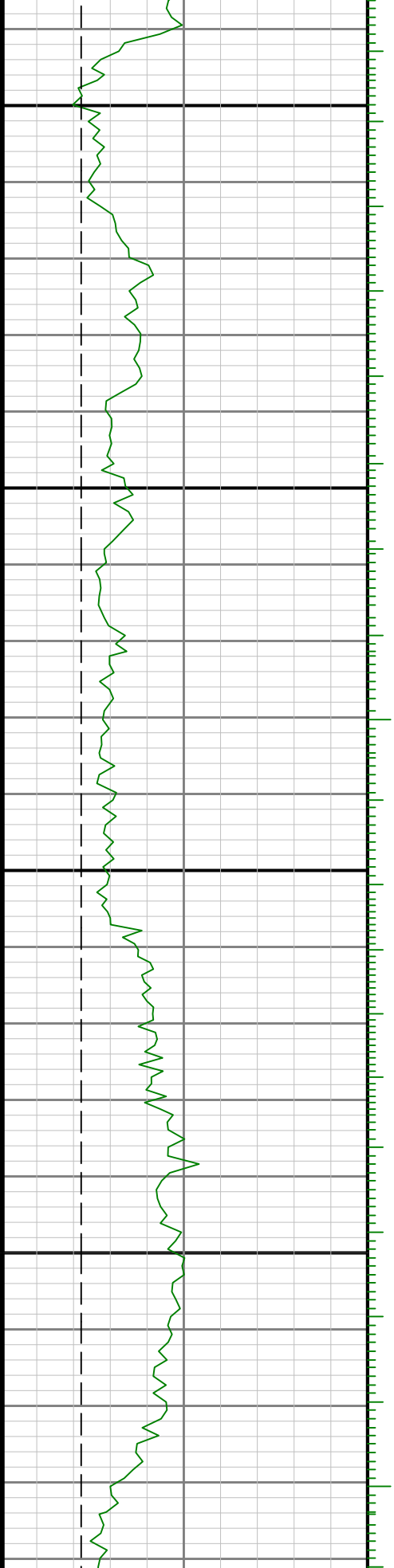
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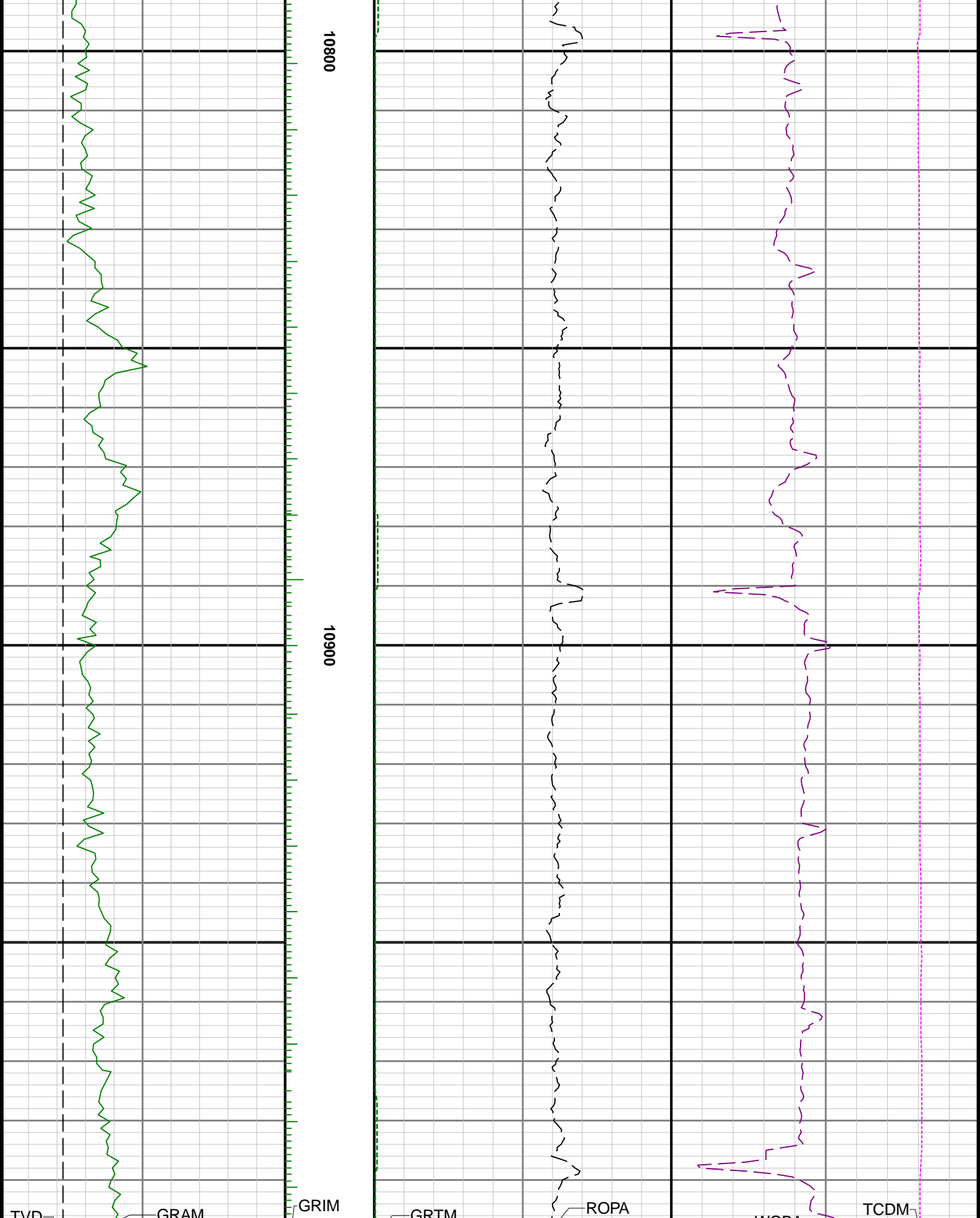


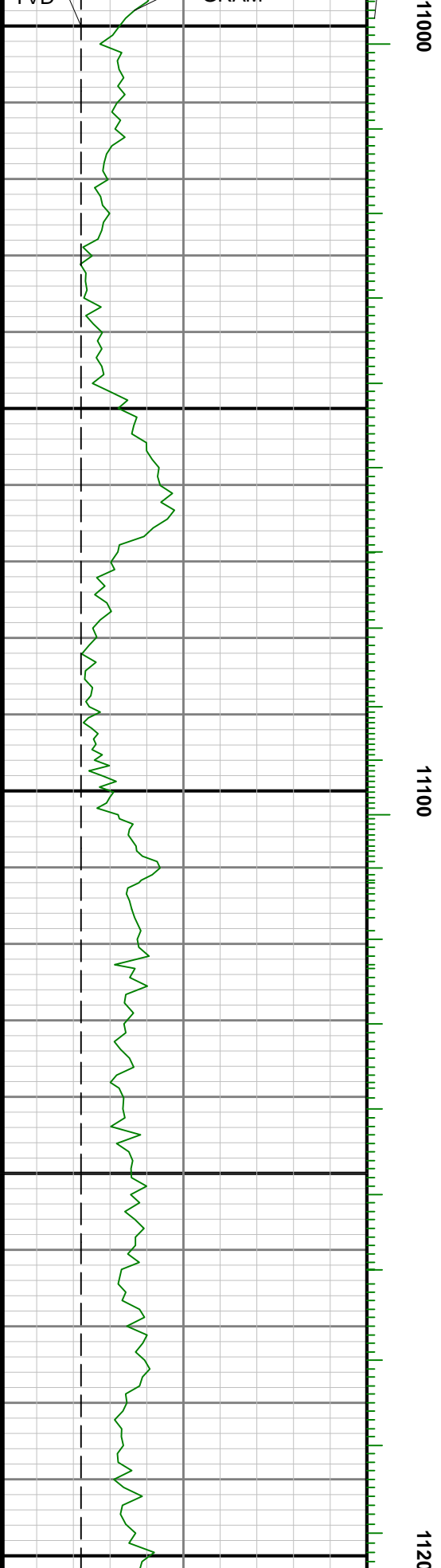
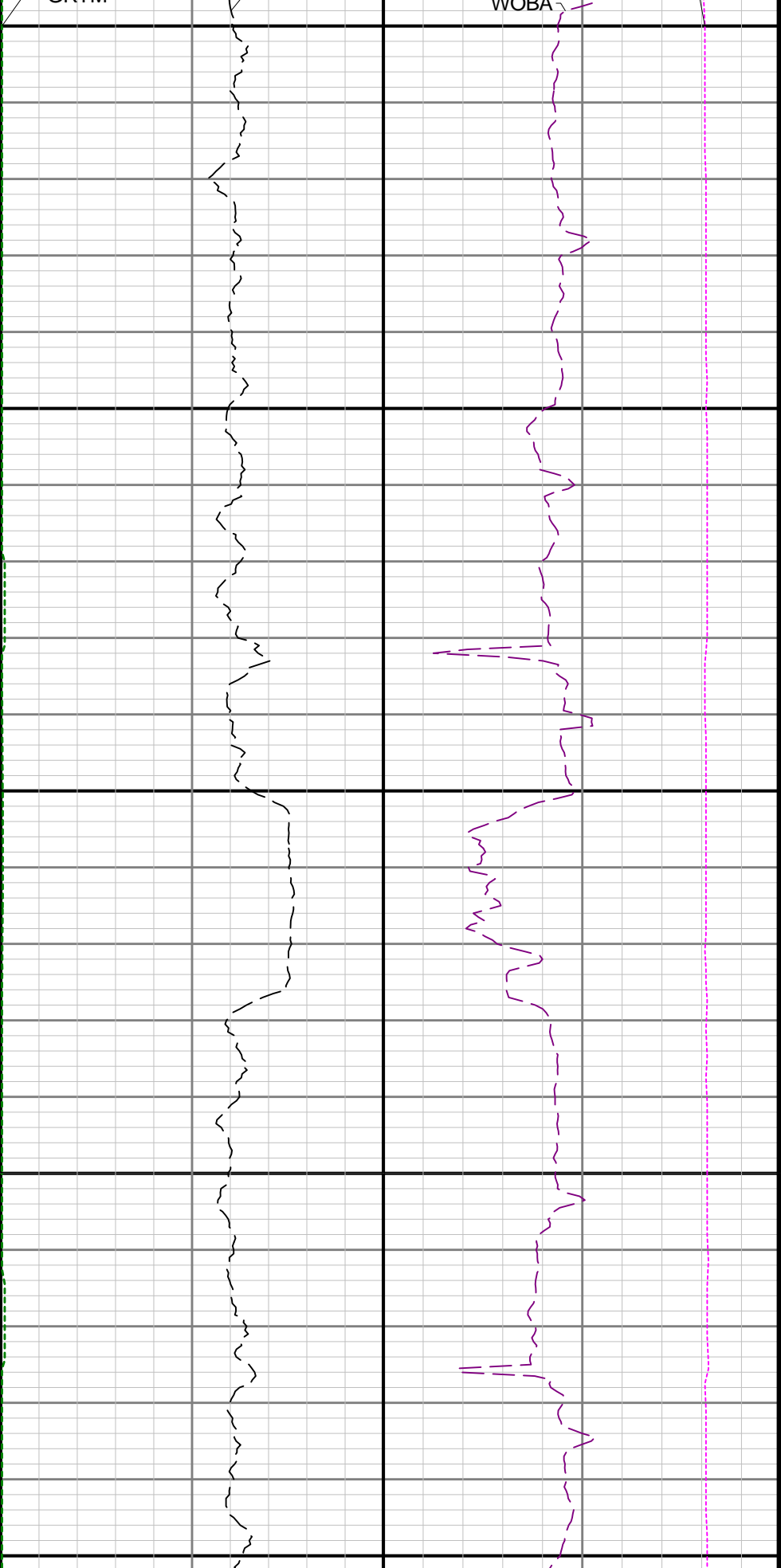


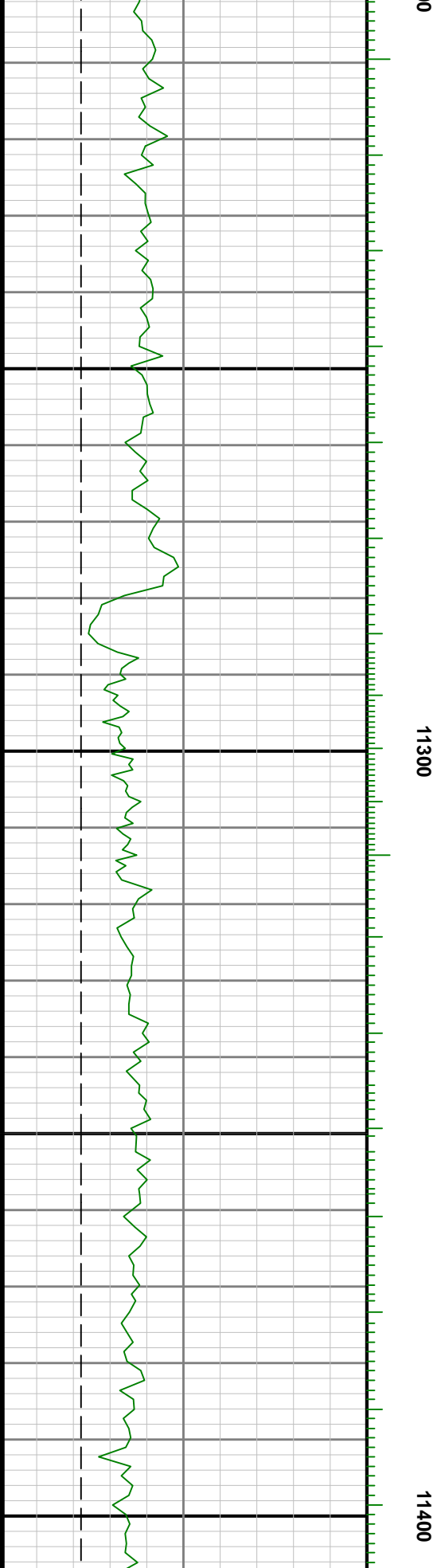
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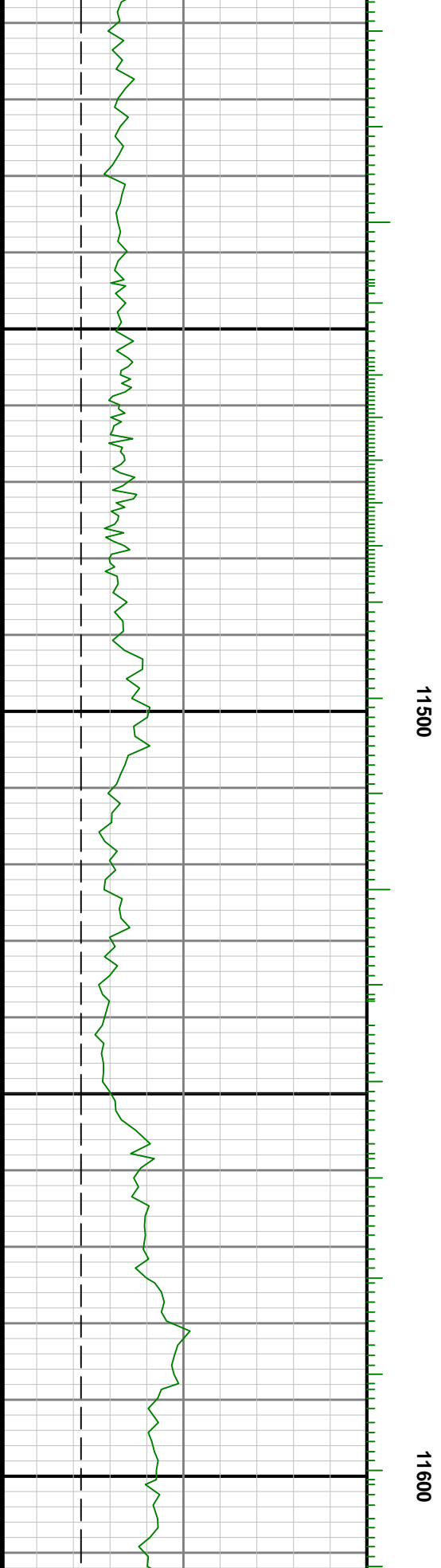
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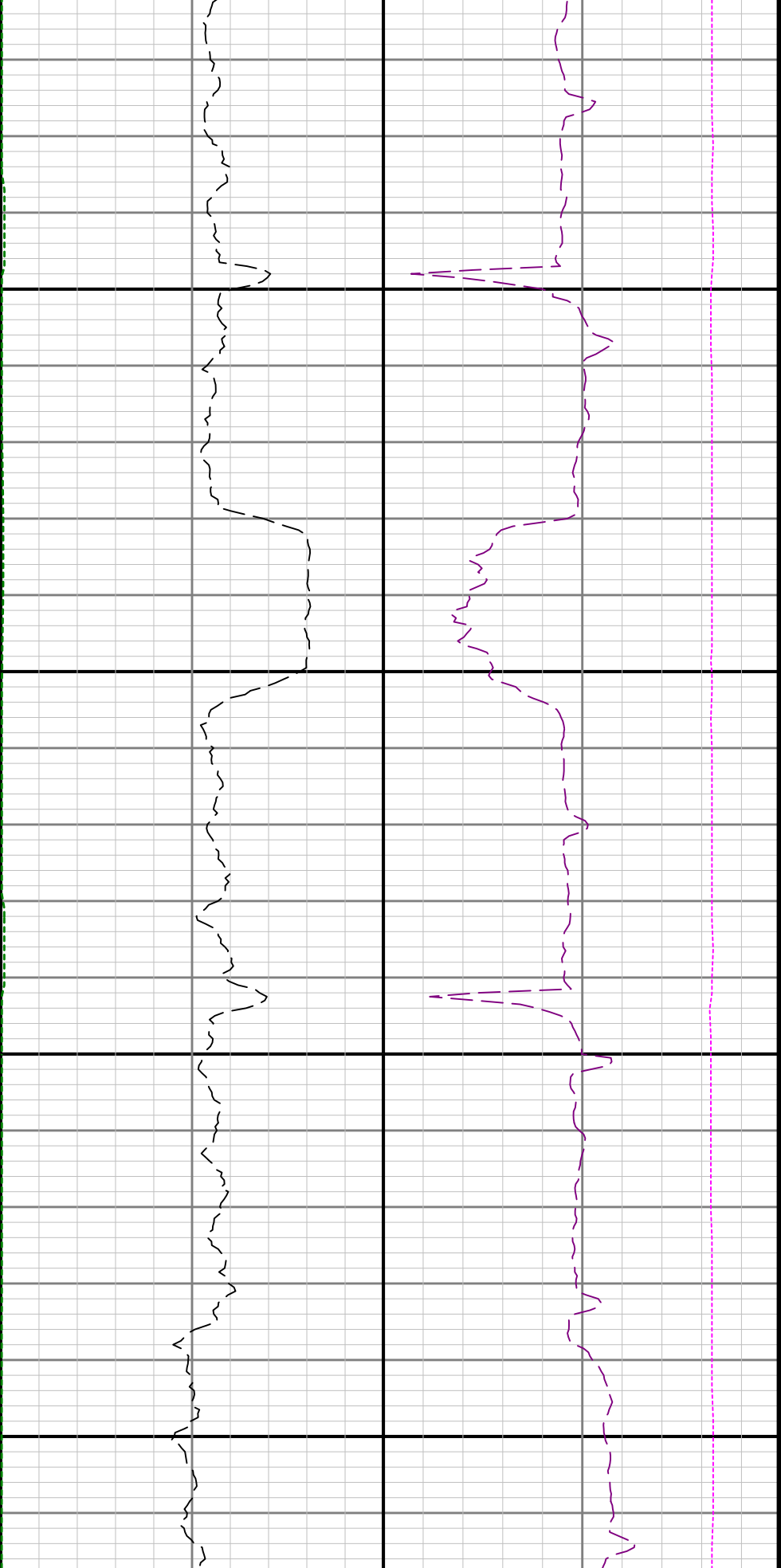






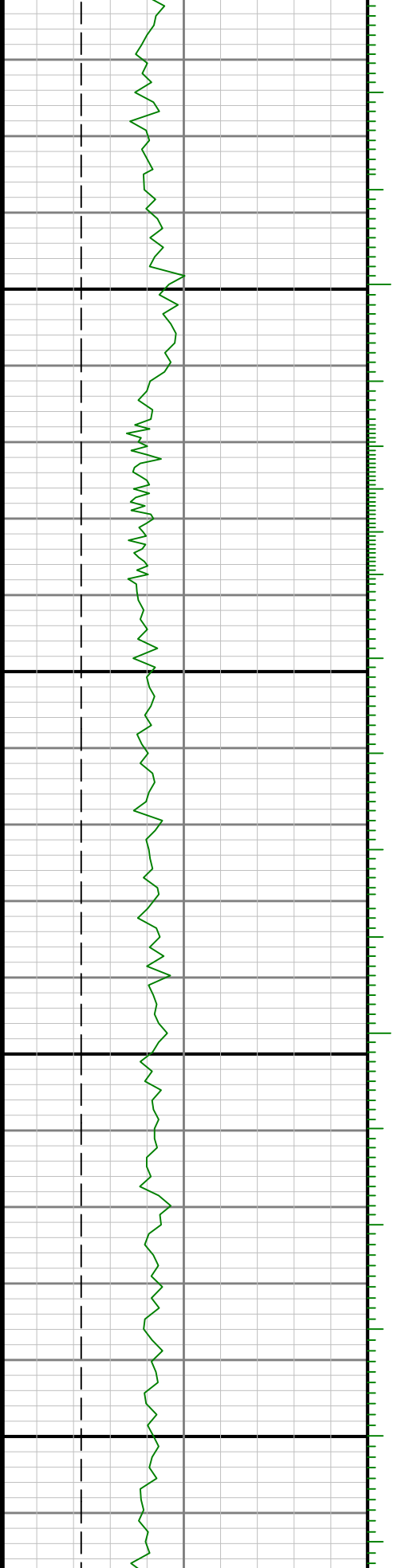


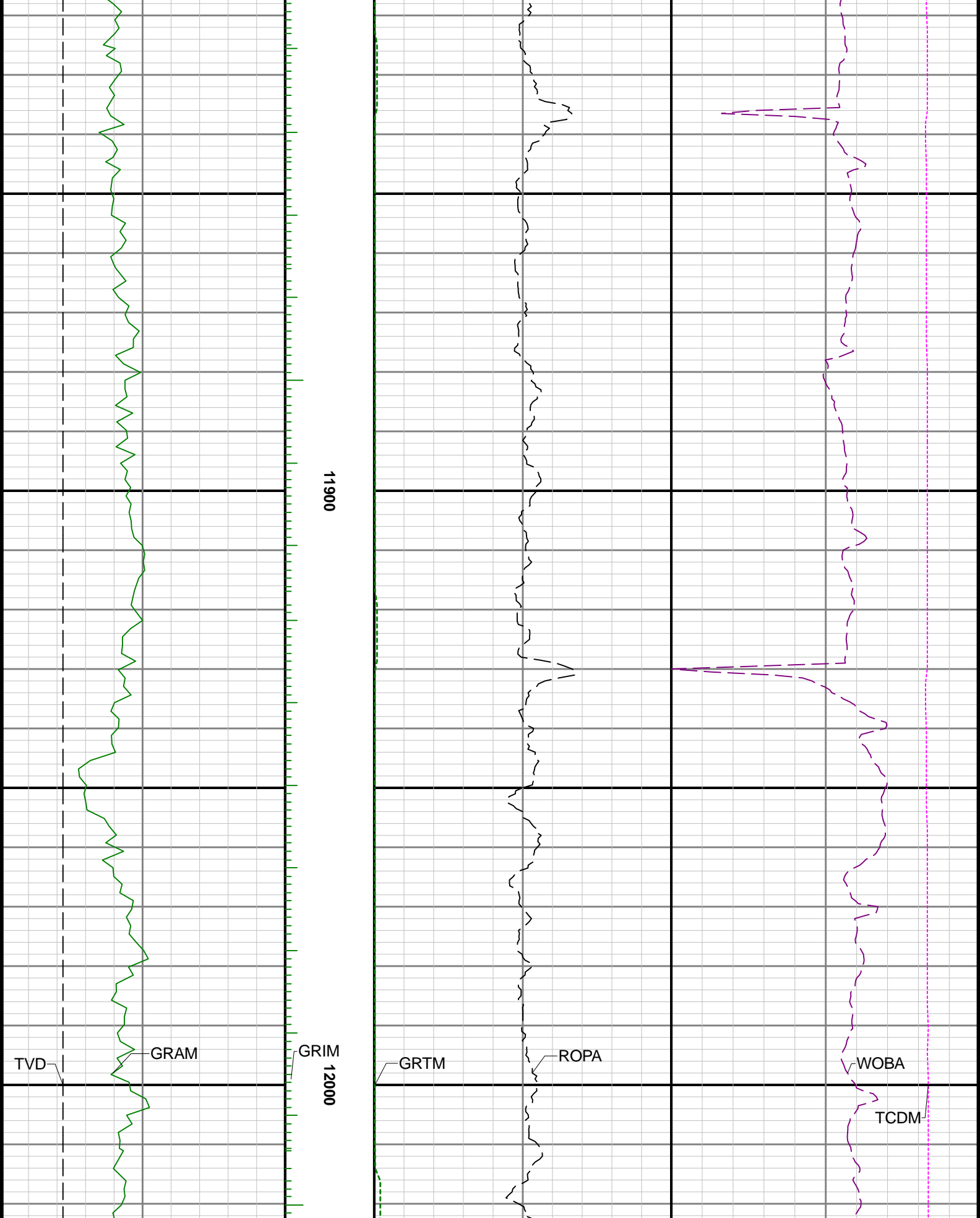


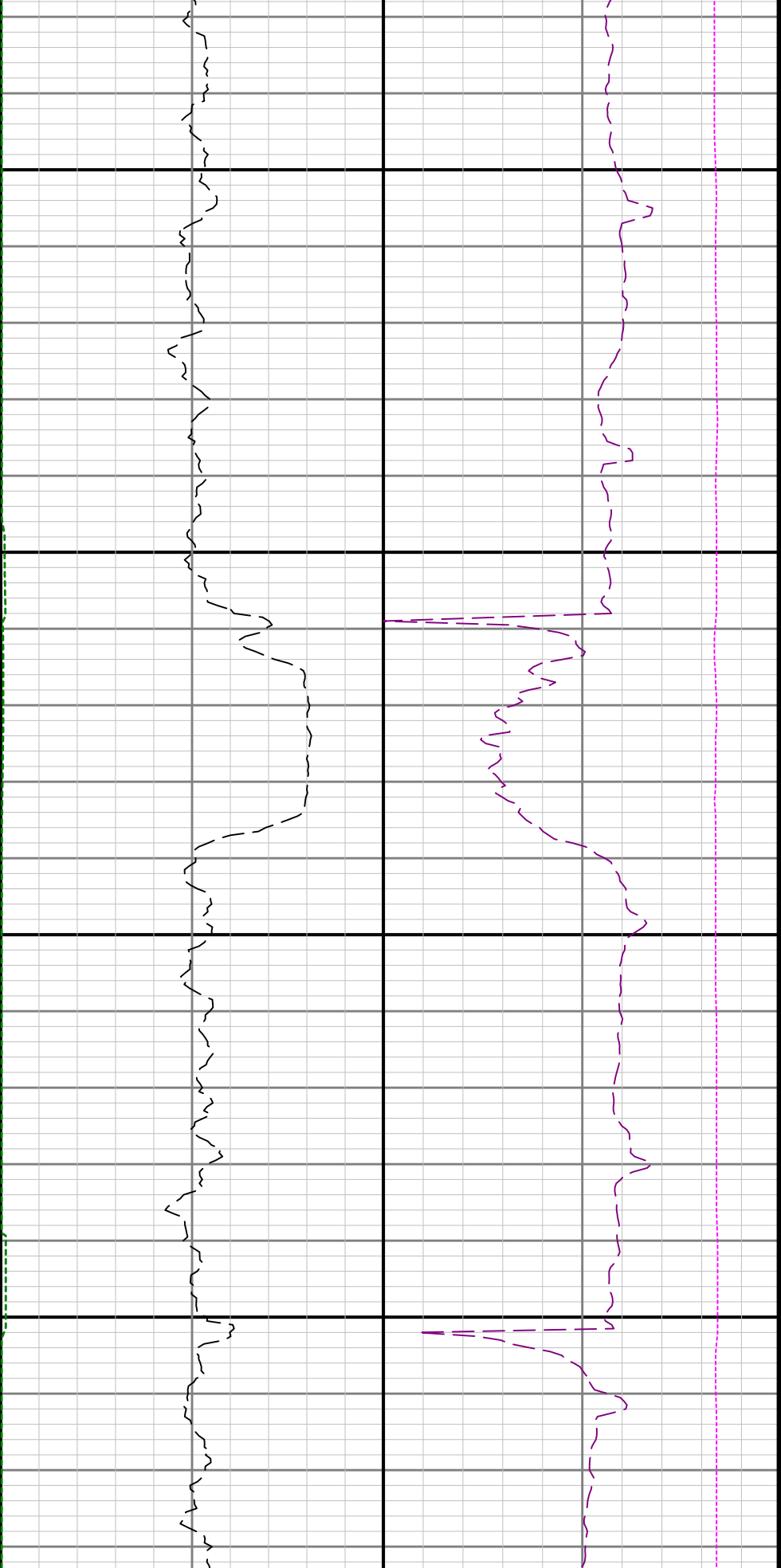


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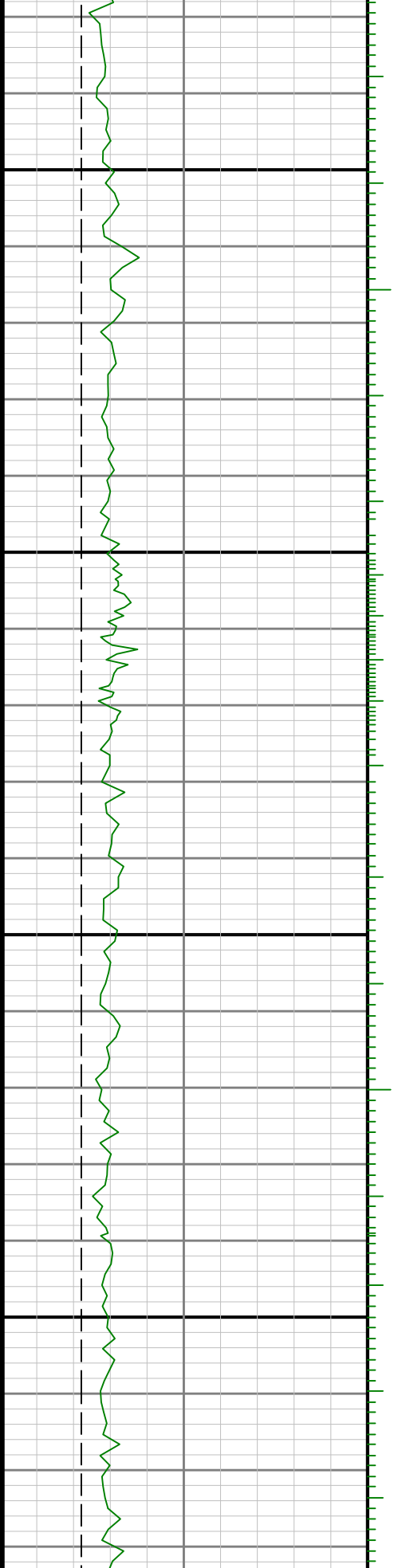


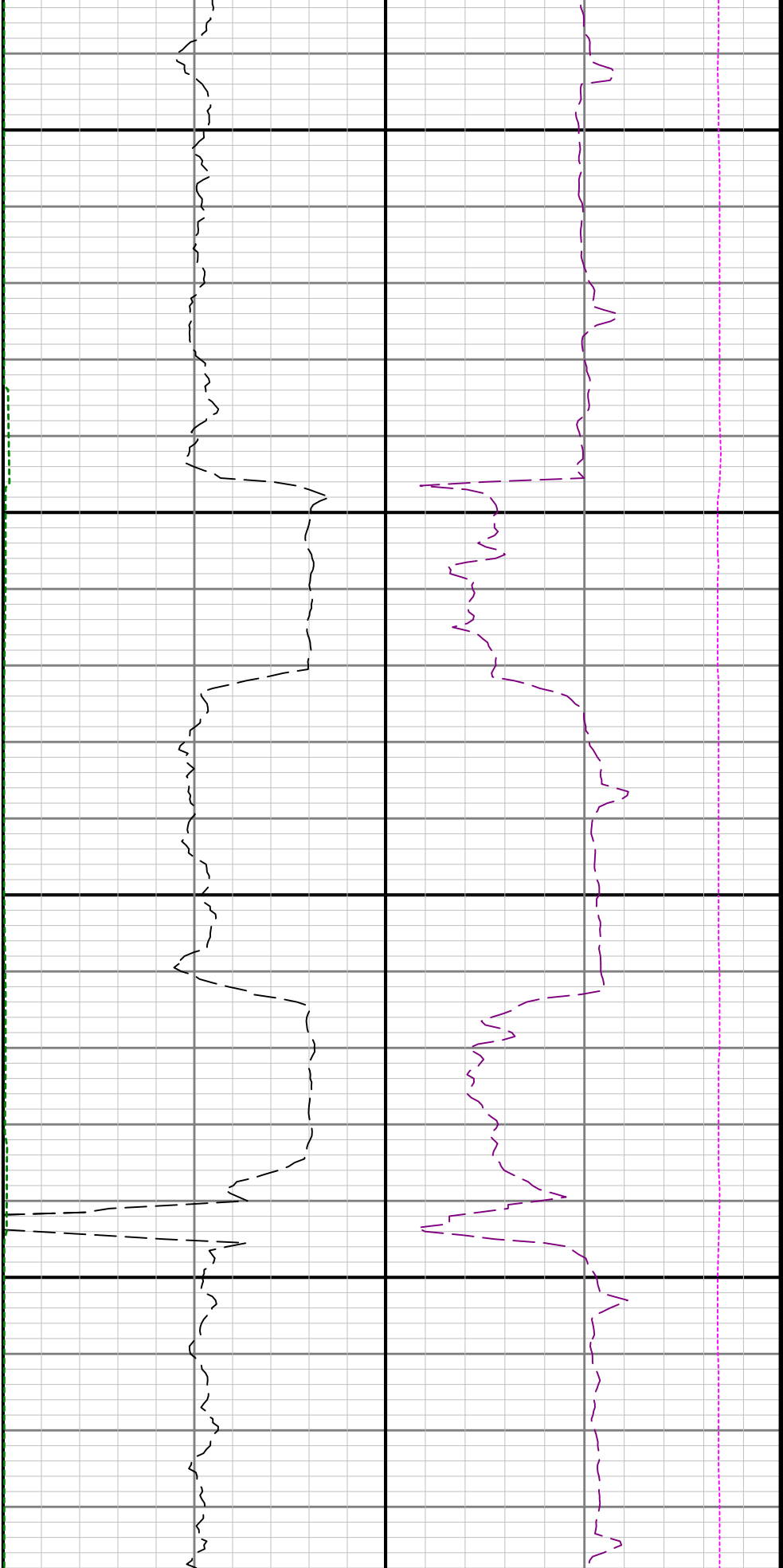




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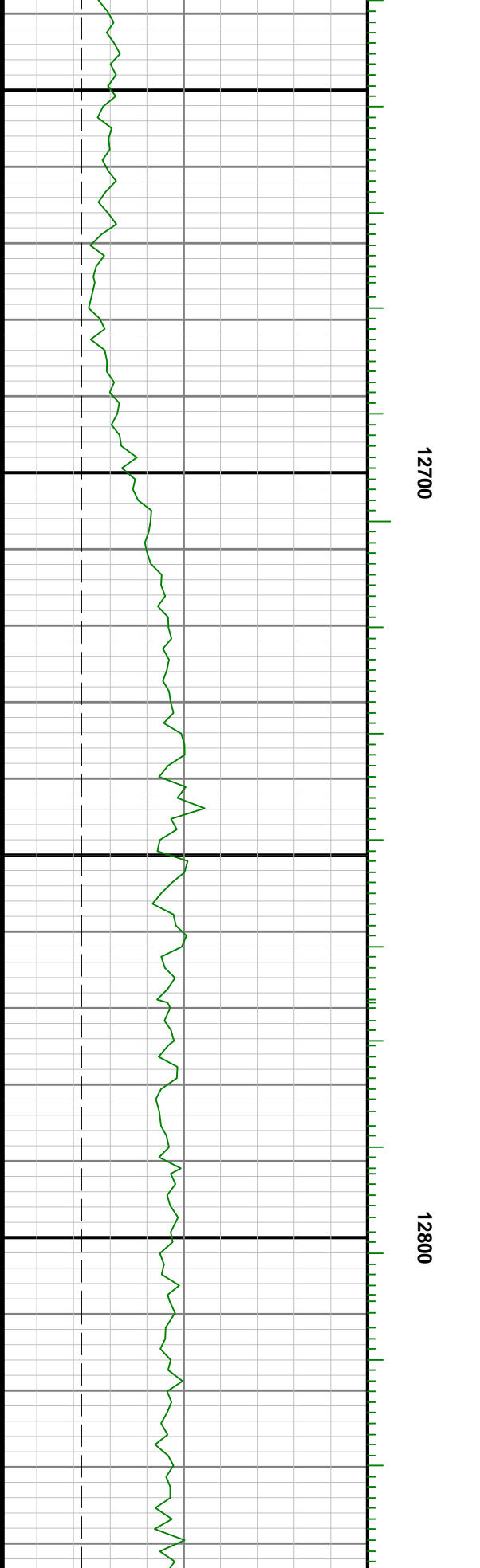
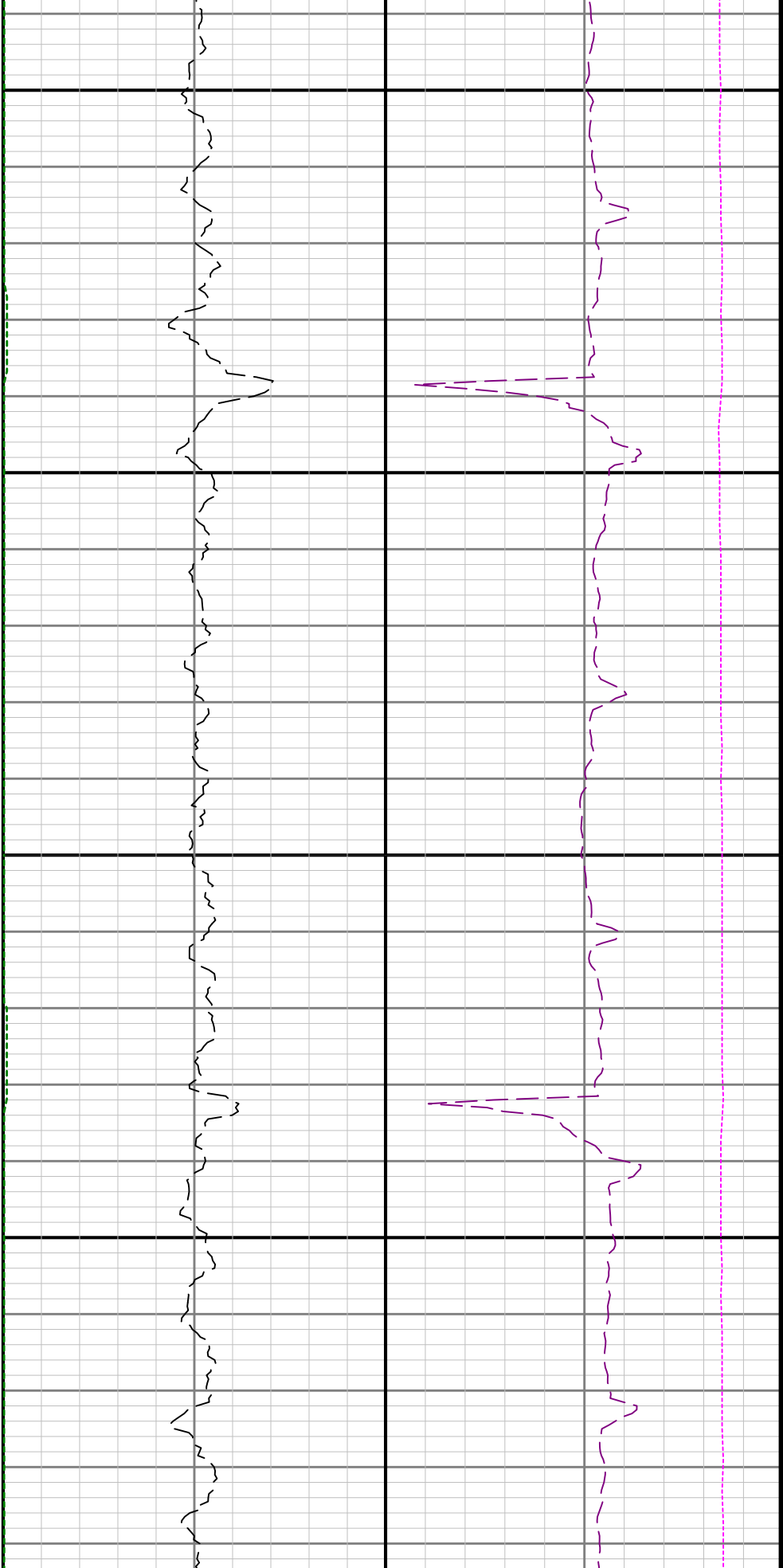
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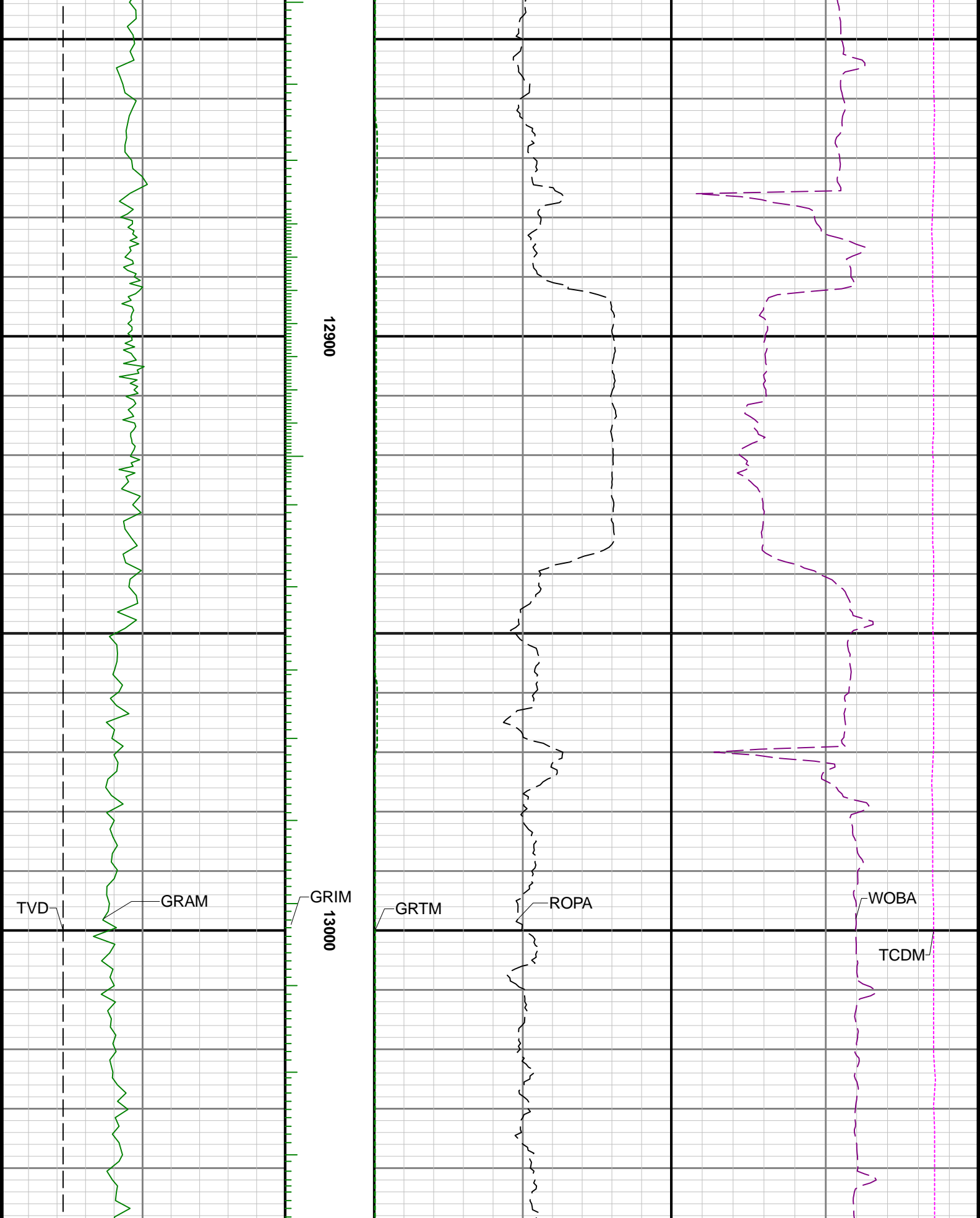


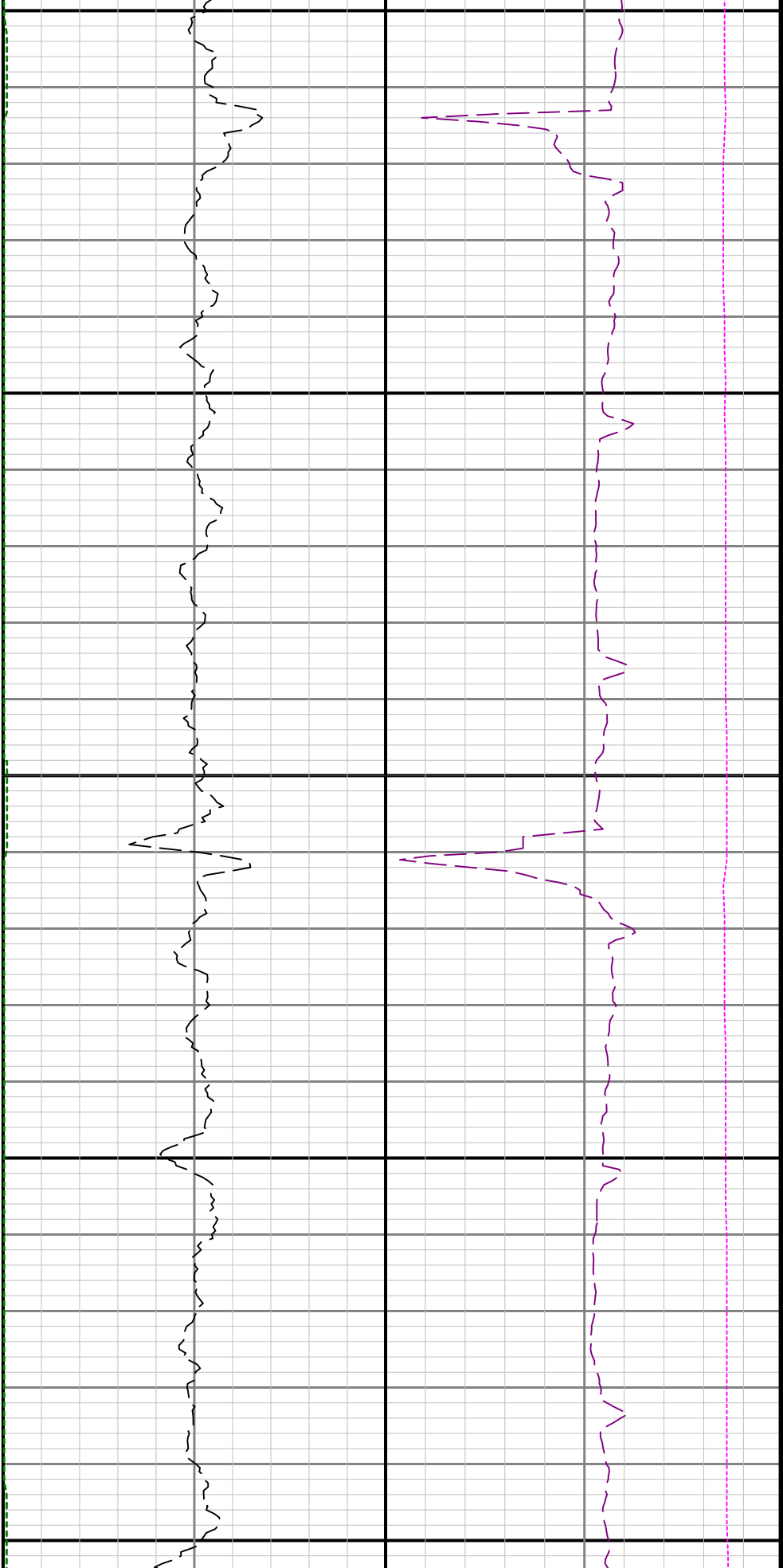


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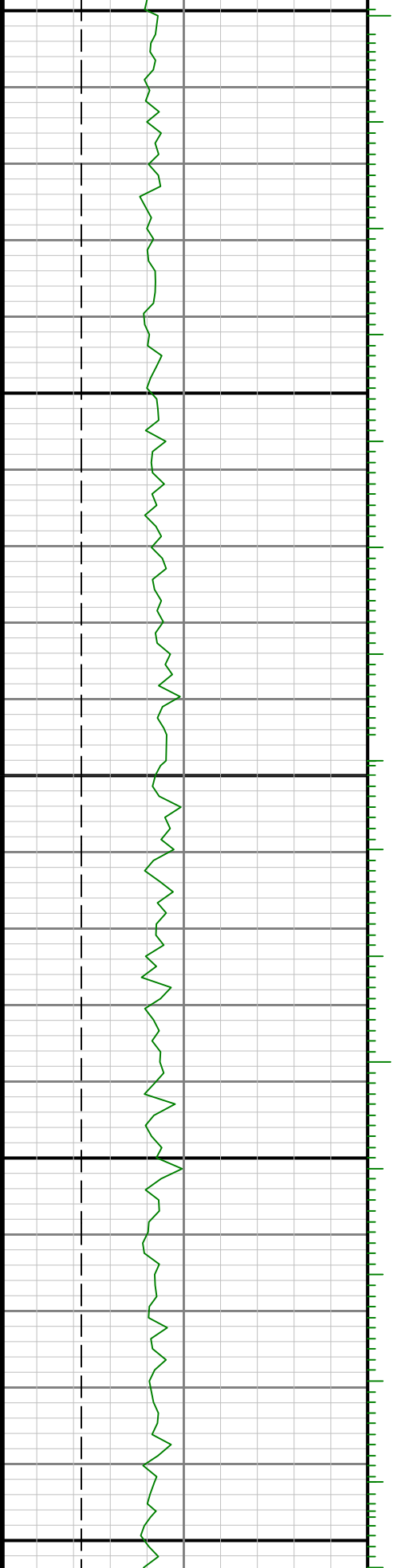


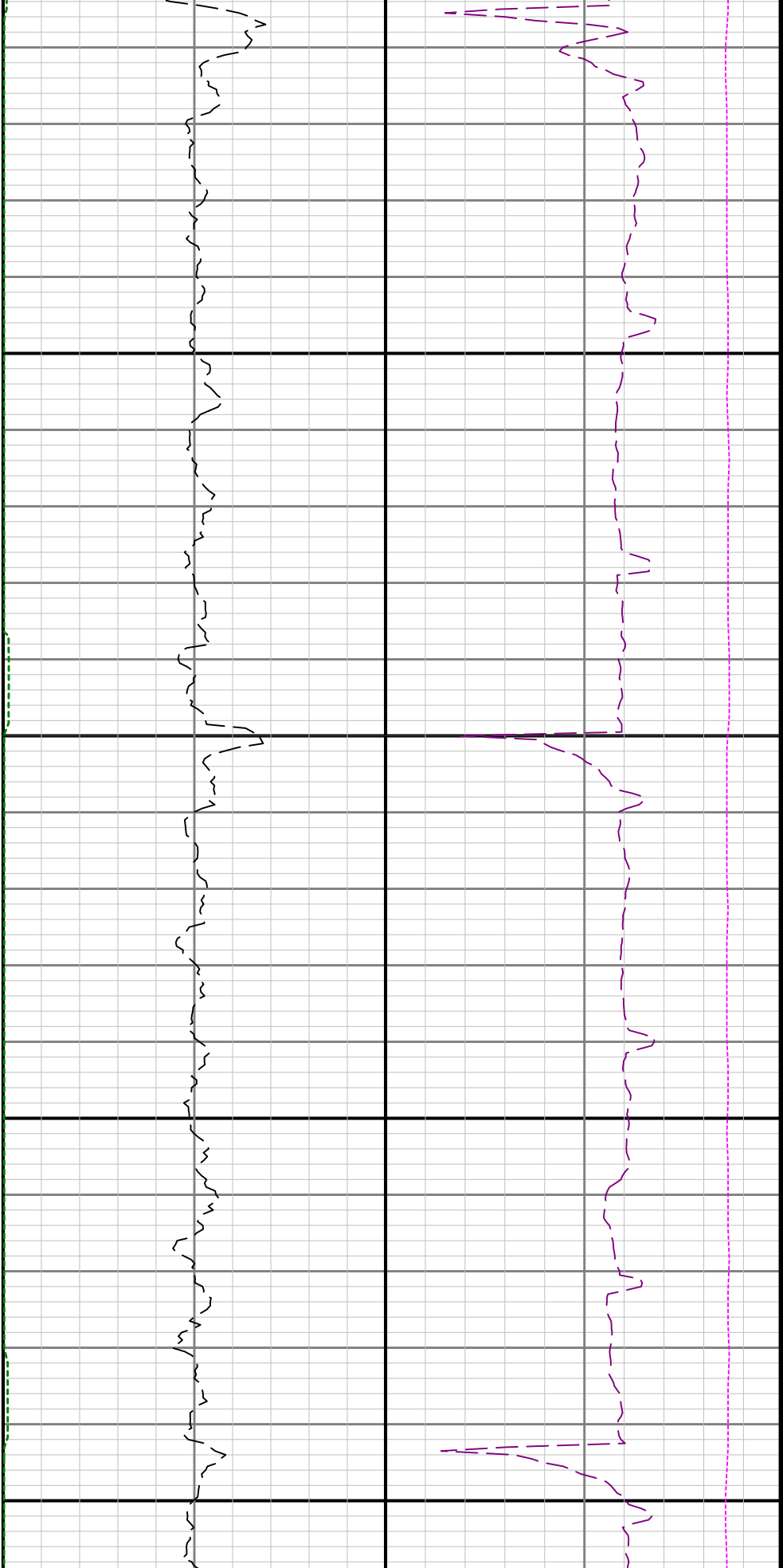




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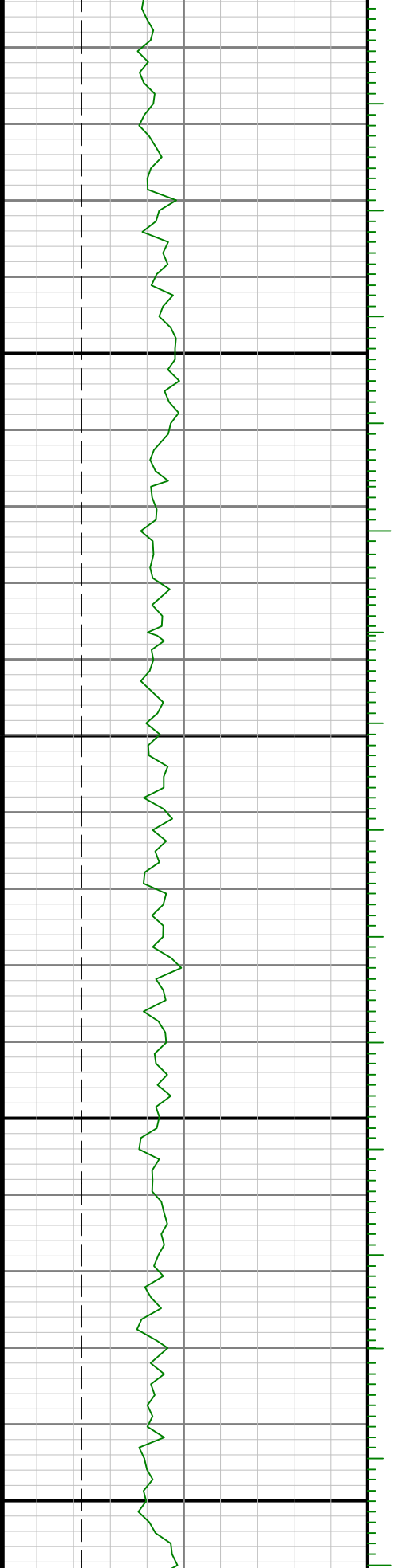
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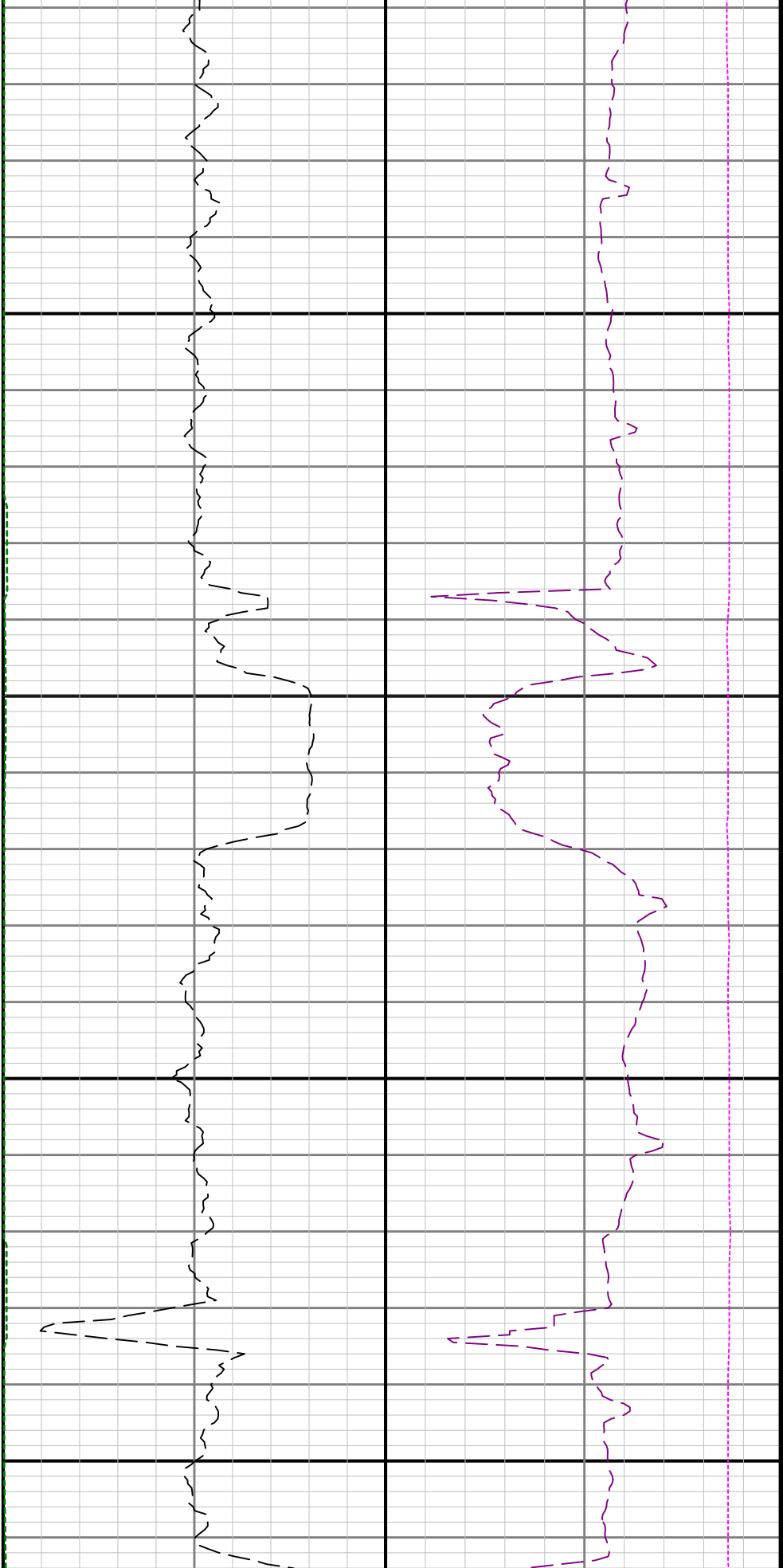




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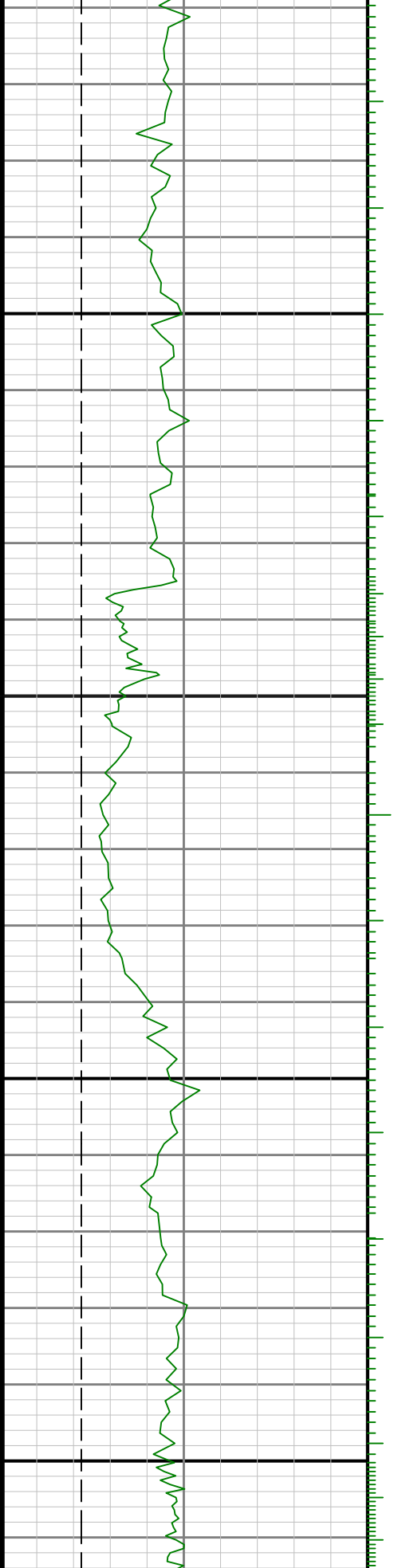
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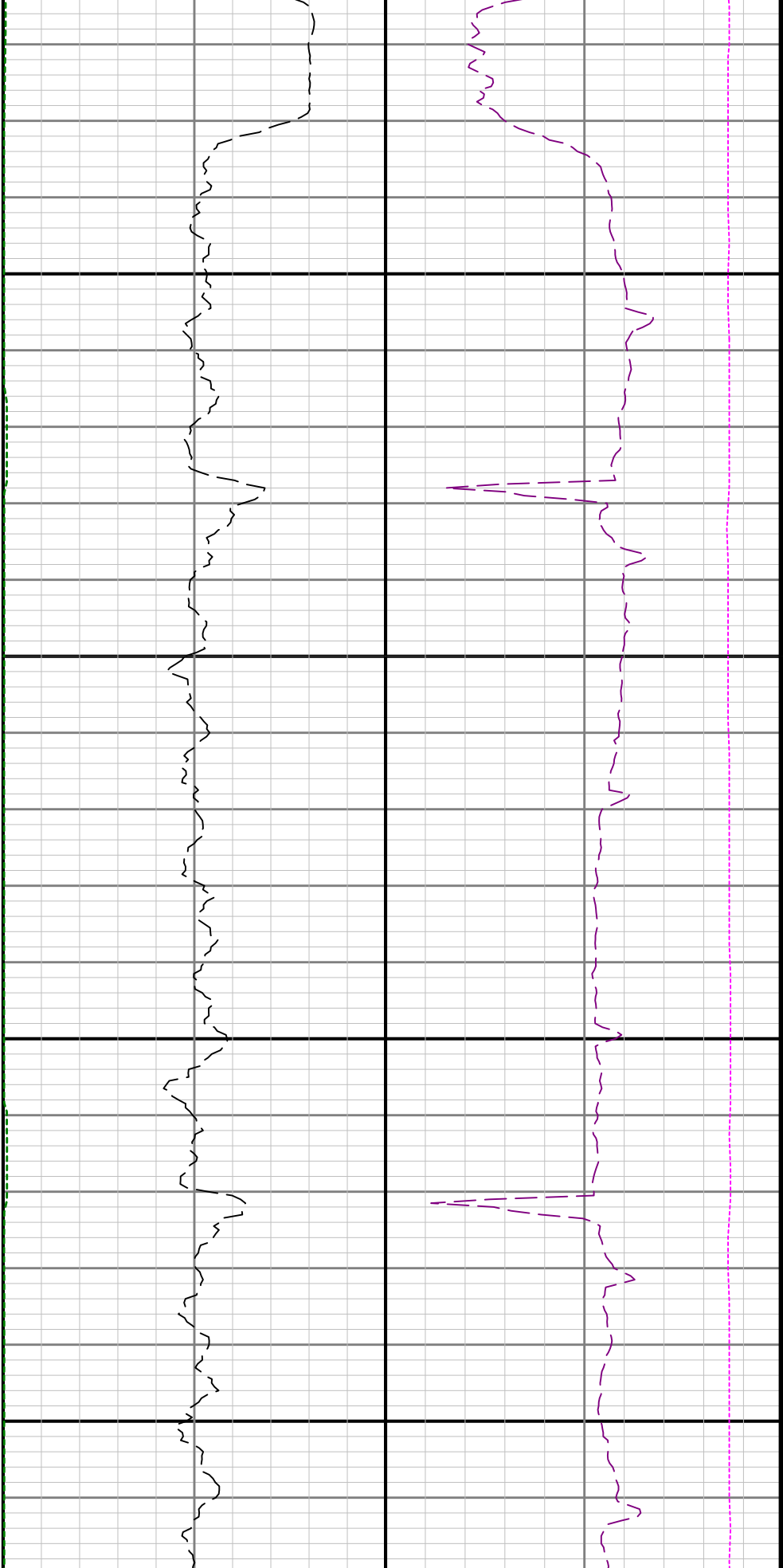




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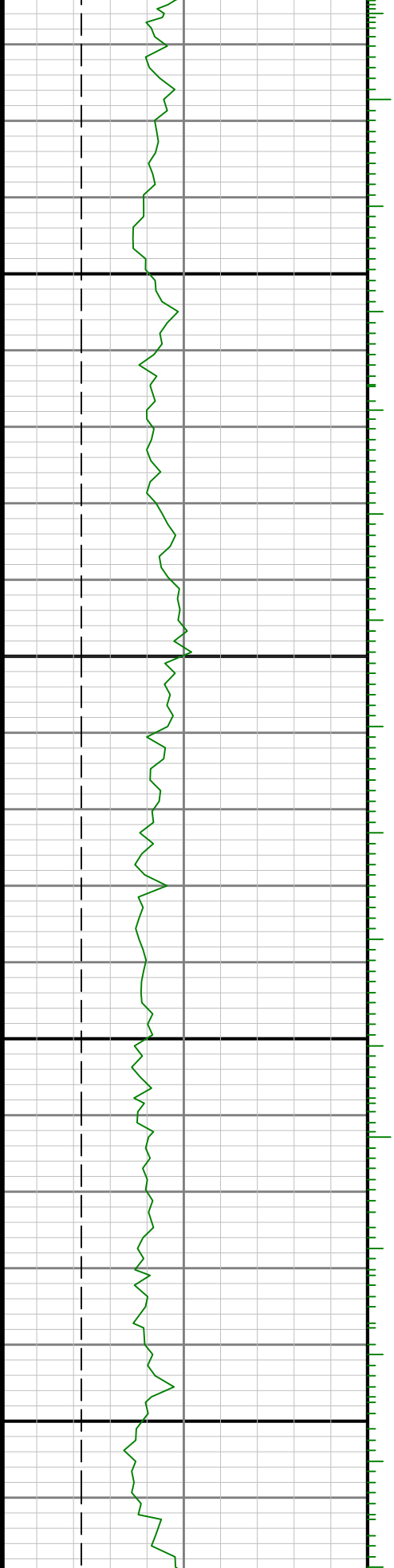
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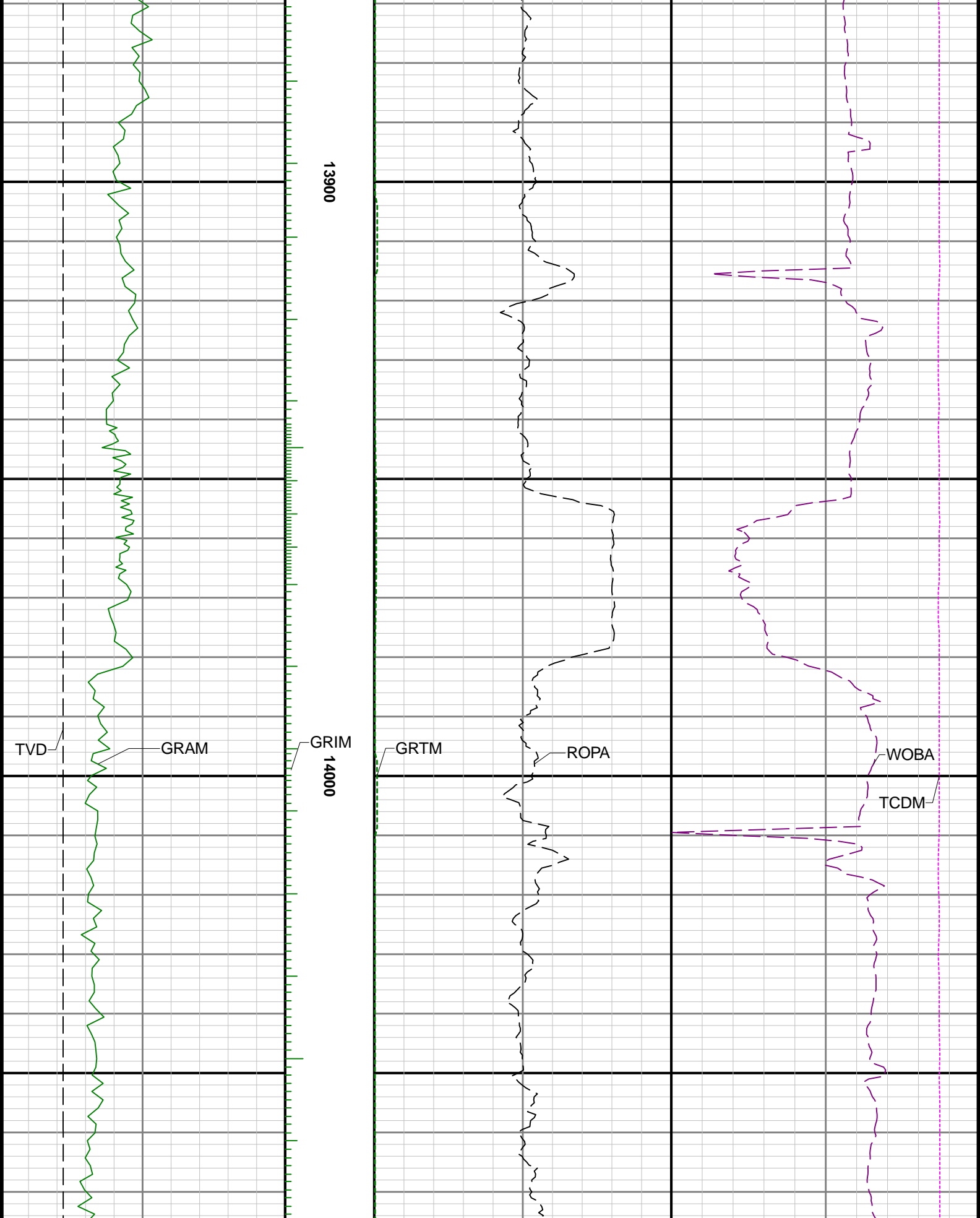


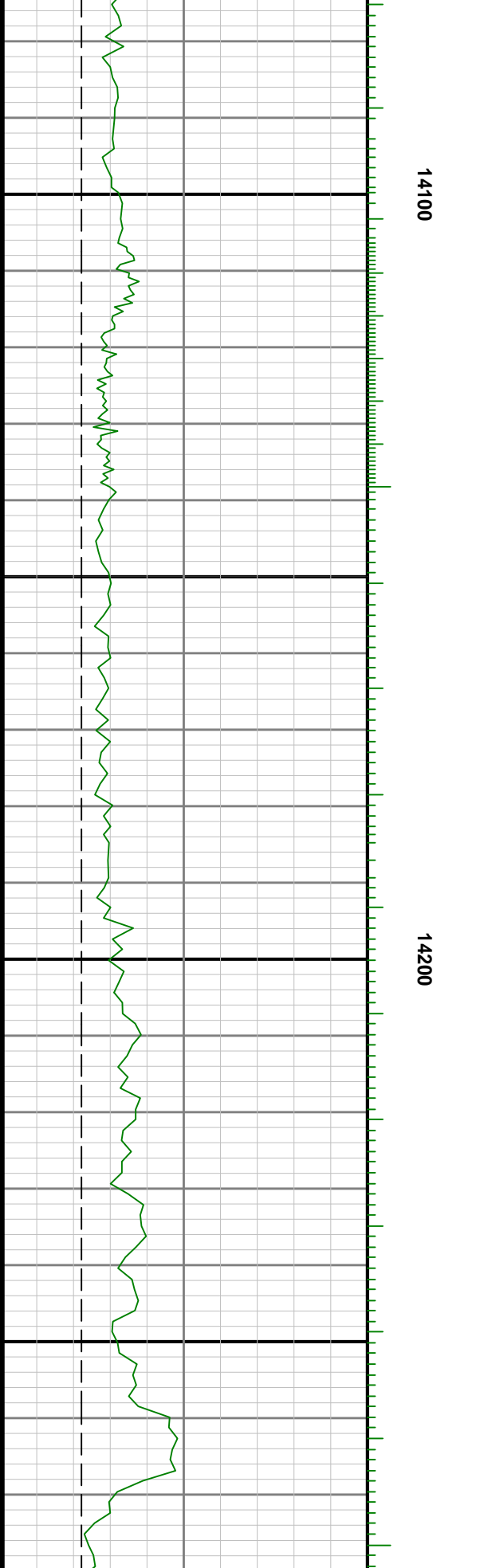
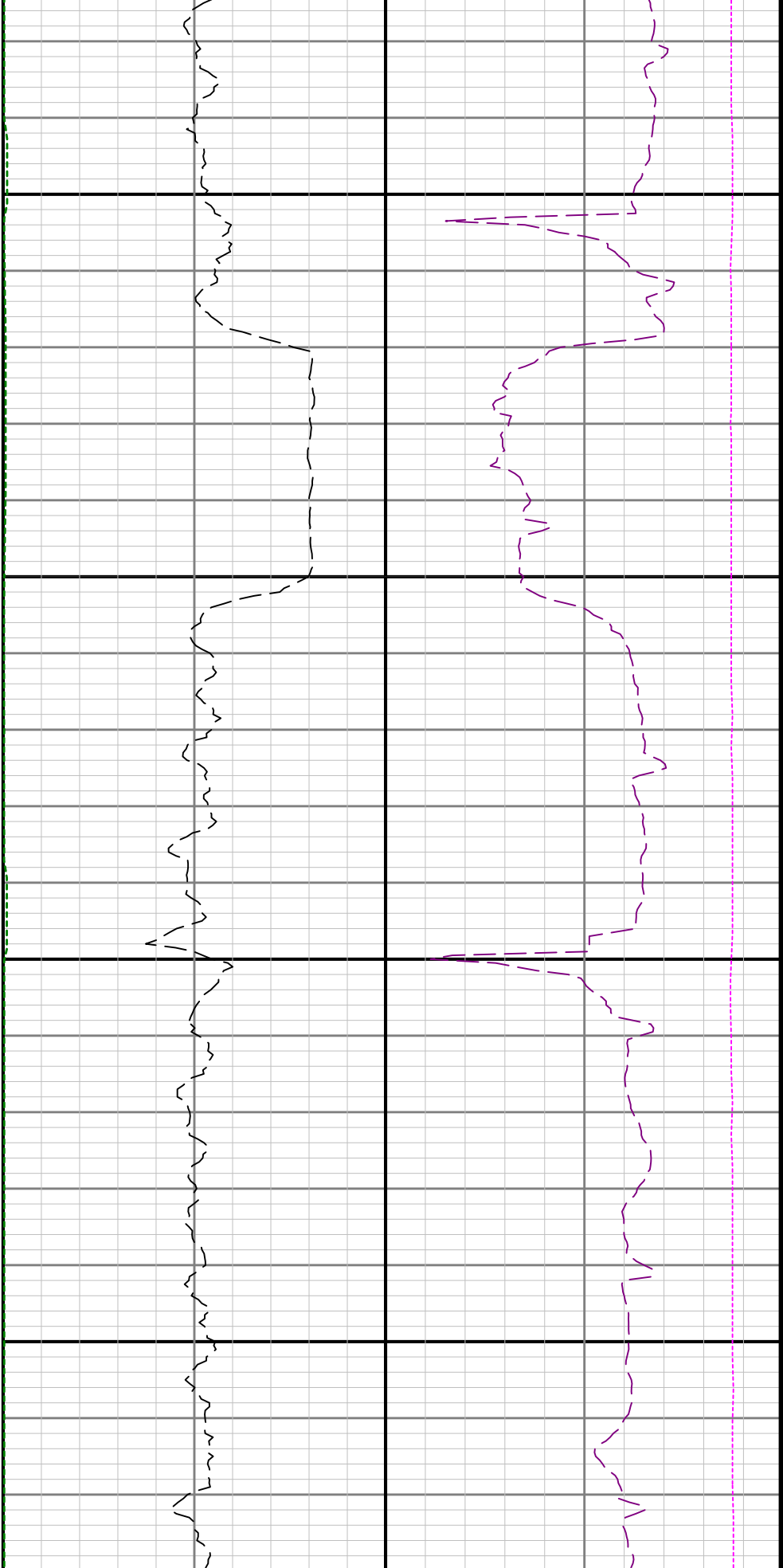


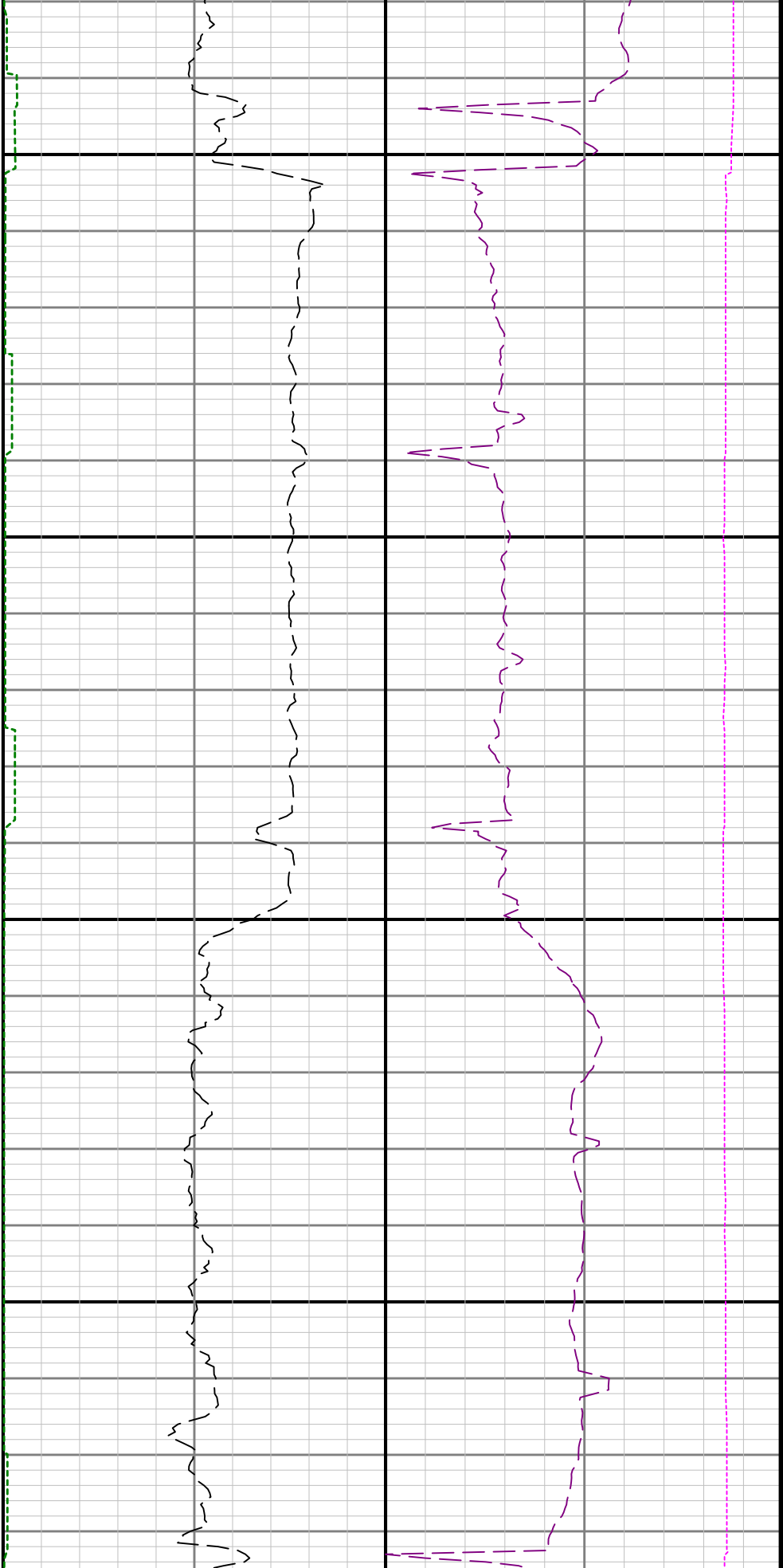
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13800









14300

14400

