



Real Time Log

Natural Formation Evaluation  
Gamma Ray

Scale:

Company: Anadarko

1:240

Well: Howard 9C-22HZ

Measured Depth

Field: Weld County(Kerr McGee)

County: Weld County State: Colorado

Status:

Final Print

Surface Location:

Latitude: 40° 1' 1.693" N

Longitude: 104° 52' 13.667" W

Other Services:

Directional

API Number:  
051233823400

SEC: 27 TWP: 1N RNG: 67W

Permanent Datum (P.D.): Ground Level Elevation: 5068.00 ft.

Elevations:

Log Measured From: Rig Floor 16.00 ft. Above P.D.

N/A

Depth Reference: Driller's Depth

KB: 5084.00 ft.  
DF: 5068.00 ft.  
GL:

Interval Logged

Dates

Magnetic Field Reference

Top: 7190.0 ft. Date From: 02 Nov 2013 Dip Angle: 66.34° Azi Reference North: True

Bottom: 14838.0 ft. Date To: 07 Nov 2013 Total Mag to Reference

Spud Date: 01 Nov 2013 Field Strength: 52742.0 nT North Correction: 8.47°

Borehole Record

Casing Record

| Hole Size | From       | To          | Size      | Weight      | From    | To         |
|-----------|------------|-------------|-----------|-------------|---------|------------|
| 8.750 in. | 1246.0 ft. | 8282.0 ft.  | 9.265 in. | 36.00 lb/ft | Surface | 1246.0 ft. |
| 6.125 in. | 8282.0 ft. | 14838.0 ft. | 7.000 in. | 26.00 lb/ft | Surface | 8272.0 ft. |
|           |            |             |           |             |         |            |
|           |            |             |           |             |         |            |
|           |            |             |           |             |         |            |
|           |            |             |           |             |         |            |
|           |            |             |           |             |         |            |

Mud Record

Deviation Record

| Type | From    | To          | Hole Size | Interval | Inc / Az (Start) | Inc / Az (End) |
|------|---------|-------------|-----------|----------|------------------|----------------|
| LSND | Surface | 14889.0 ft. | 8.750 in. | 85.0 ft. | 0.1° / 239.9°    | 8.1° / 4.7°    |
|      |         |             | 8.750 in. | 42.0 ft. | 8.1° / 4.7°      | 85.8° / 358.2° |
|      |         |             | 6.125 in. | 85.0 ft. | 85.8° / 358.2°   | 92.4° / 3.4°   |
|      |         |             |           |          | /                | /              |
|      |         |             |           |          | /                | /              |
|      |         |             |           |          | /                | /              |
|      |         |             |           |          | /                | /              |

Acquisition System Software Version

Other

|           |          |                  |           |                    |
|-----------|----------|------------------|-----------|--------------------|
| Advantage | 2.20U4   | Rig:             | Xtreme 24 | / Advance Drilling |
| PATS      | 6.4.1.34 | Job No:          | 5868951   | / D & E            |
|           |          | District / Unit: | RMD       |                    |

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Log Run Summary

| LWD<br>Run<br>No. | BHA<br>Run<br>No. | Bit<br>Run<br>No. | Bit<br>Size<br><br>(in.) | Bit<br>Type | Bit<br>Gauge<br>Length<br><br>(in.) | Assembly<br><br>Type | Logged Interval |         | Bit Depth Interval |         | Date / Time       |                   |     |      | Circ.<br><br>Time<br><br>(hrs.) |
|-------------------|-------------------|-------------------|--------------------------|-------------|-------------------------------------|----------------------|-----------------|---------|--------------------|---------|-------------------|-------------------|-----|------|---------------------------------|
|                   |                   |                   |                          |             |                                     |                      | Top             | Bottom  | From               | To      | Start             |                   | End |      |                                 |
|                   |                   |                   |                          |             |                                     |                      | (ft.)           | (ft.)   | (ft.)              | (ft.)   |                   |                   |     |      |                                 |
| 1                 | 1                 | 1                 | 8.750                    | PDC         | 2.000                               | Steerable            | 7190.0          | 8228.0  | 7243.0             | 8282.0  | 02 Nov 2013 09:14 | 04 Nov 2013 06:43 |     | 38.9 |                                 |
| 2                 | 2                 | 2                 | 6.125                    | PDC         | 6.000                               | Steerable            | 8228.0          | 14838.0 | 8282.0             | 14899.0 | 05 Nov 2013 15:26 | 07 Nov 2013 16:25 |     | 45.2 |                                 |

Crew

| Name           | Arrive      | Depart      | Name         | Arrive      | Depart      | Name | Arrive   | Depart   |
|----------------|-------------|-------------|--------------|-------------|-------------|------|----------|----------|
|                | Wellsite    | Wellsite    |              | Wellsite    | Wellsite    |      | Wellsite | Wellsite |
| Jason Williams | 02 Nov 2013 | 08 Nov 2013 | Austin Small | 02 Nov 2013 | 08 Nov 2013 |      |          |          |

| Date / Time      | LWD<br>Run No. | Measured<br>Depth<br>(ft.) | Mud<br>Type | Density<br>(ppg) | Viscosity<br>(cp) | pH  | Fluid<br>Loss<br>(cc) | Oil /<br>Water | Source      | Total<br>Chlorides<br>(ppm) | K+<br>(%) |
|------------------|----------------|----------------------------|-------------|------------------|-------------------|-----|-----------------------|----------------|-------------|-----------------------------|-----------|
| 2 Nov 2013 06:00 | 1              | 7569.0                     | LSND        | 9.8              | 9                 | 8.6 | NA                    | 0/92.3         | Active Pits | 1,000                       | NA        |
| 5 Nov 2013 18:00 | 2              | 8651.0                     | LSND        | 9.1              | 9                 | 9.5 | NA                    | 0/95           | Avtive Pits | 1,100                       | NA        |

Mnemonics

| Curve | Description                         | Units    |
|-------|-------------------------------------|----------|
| GRAX  | Gamma Ray Apparent, 0.5 ft. Avg     | API      |
| GRIX  | Gamma Ray Data Density              | points   |
| GRSI  | Gamma Ray Sliding Indicator         | unitless |
| GRTX  | Gamma Ray Time Since Drilled        | min      |
| ROPA  | Rate of Penetration, 3.0 ft. Avg    | ft/hr    |
| TCDX  | Downhole Temperature                | degF     |
| TVD   | True Vertical Depth                 | ft.      |
| WOBA  | Surface Weight on Bit, 1.0 ft. Avg. | klbs     |

Equipment and Service Data

| LWD<br>Run<br>No. | Tool | Serial<br>Number | Measurement | Bit<br>Offset<br>(ft) | Max<br>O.D.<br>(in.) | Min<br>I.D.<br>(in.) |
|-------------------|------|------------------|-------------|-----------------------|----------------------|----------------------|
| 1                 | DIR  | 12373462         | Directional | 55.77                 | 6.750                | 2.813                |
| 1                 | SRIG | 10595775         | Gamma       | 52.39                 | 6.750                | 2.813                |
| 2                 | DIR  | 12566686         | Directional | 54.97                 | 4.750                | 2.500                |
| 2                 | SRIG | 11801241         | Gamma       | 51.59                 | 4.750                | 2.500                |

Service and Tool Mnemonics

| Mnemonic | Name                  | Description                                  |
|----------|-----------------------|--|
| DIR      | Directional           | Wellbore directional survey                  |
| SRIG     | Inclination and Gamma | Probe based gamma ray and inclination module |

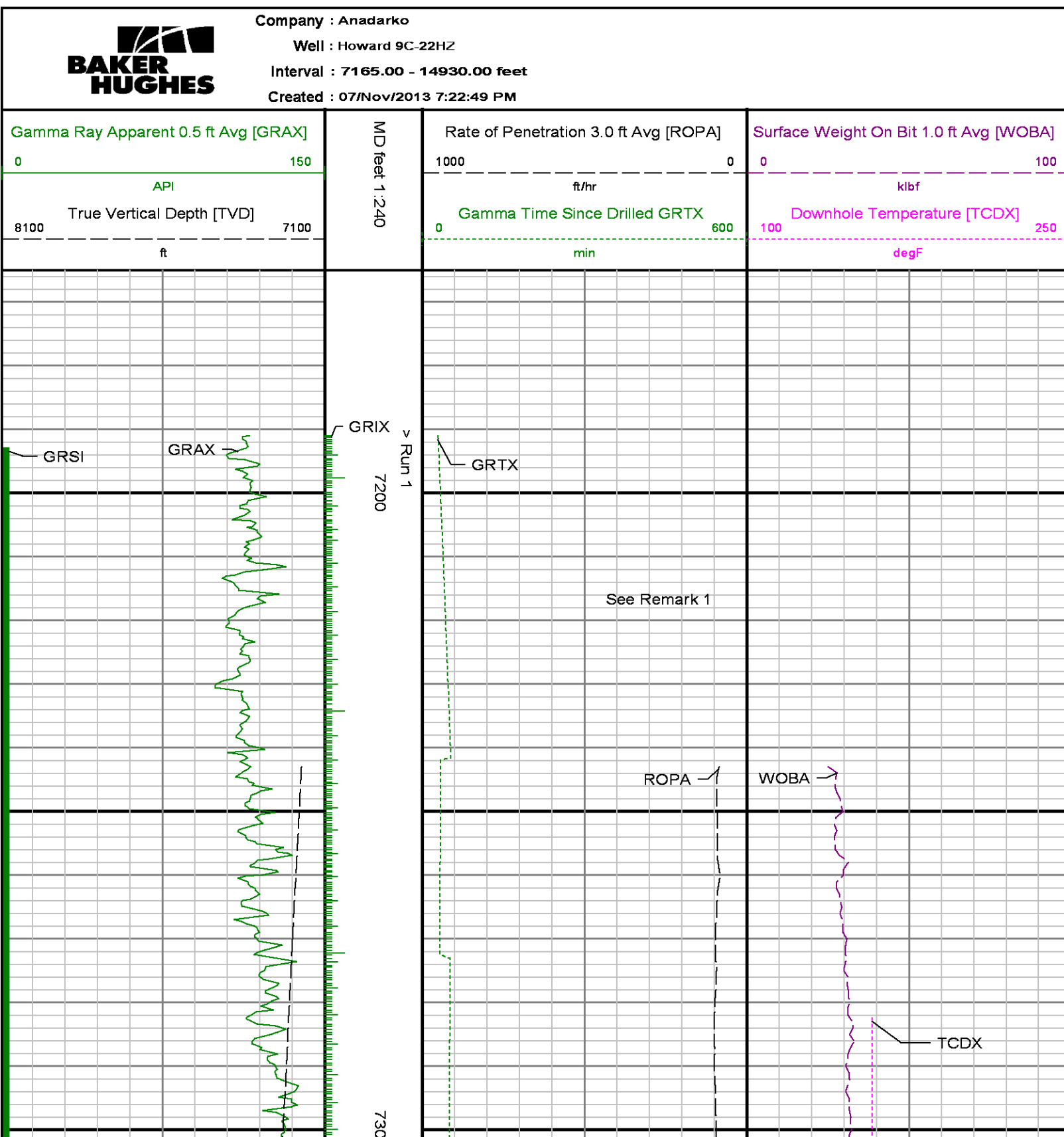
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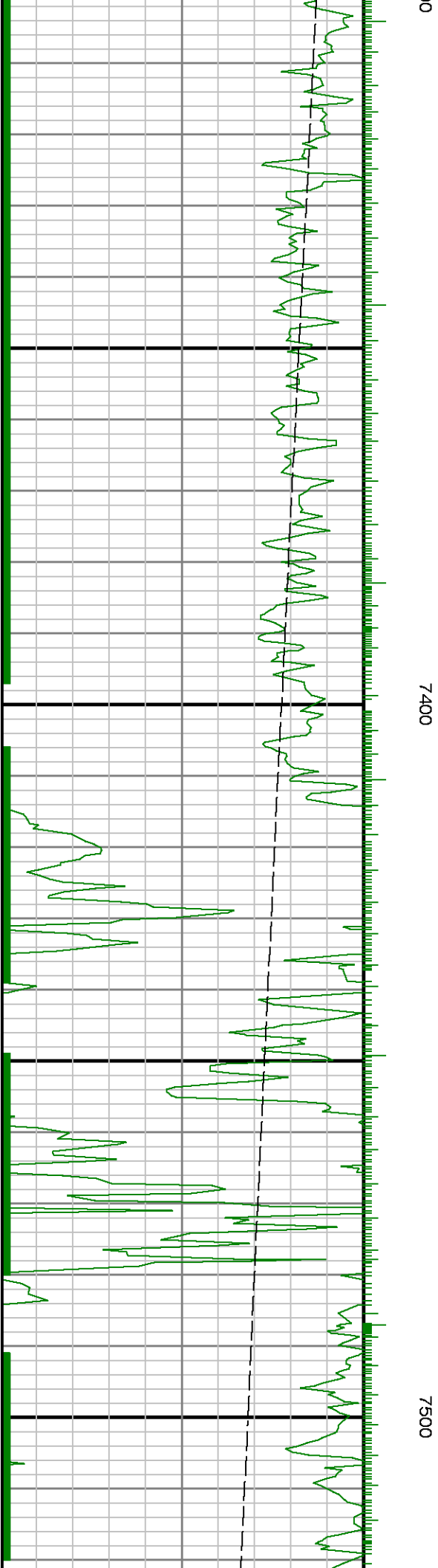
|   |
|---|
| <p>1.) Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to represent logging data.</p> <p>2.) Baker Hughes Run 1 utilized a 6 1/2 inch NaviGamma (Directional and Gamma Ray) tool behind an 8 3/4 inch bit and steerable assembly from 7243 feet to 8282 feet MD (7171 feet to 7797 feet TVD).</p> <p>3.) Baker Hughes Run 2 utilized a 4 3/4 inch NaviGamma (Directional and Gamma Ray) tool behind a 6 1/8 inch bit and steerable assembly from 8282 feet to 14838 feet MD (7797 feet to 7720 feet TVD).</p> <p>4.) A sliding indicator is shown on the left side of track 1 as a heavy line. This indicator has been depth-shifted to the Gamma Ray sensor offset to correspond with Gamma Ray data acquired while sliding.</p> |
|---|

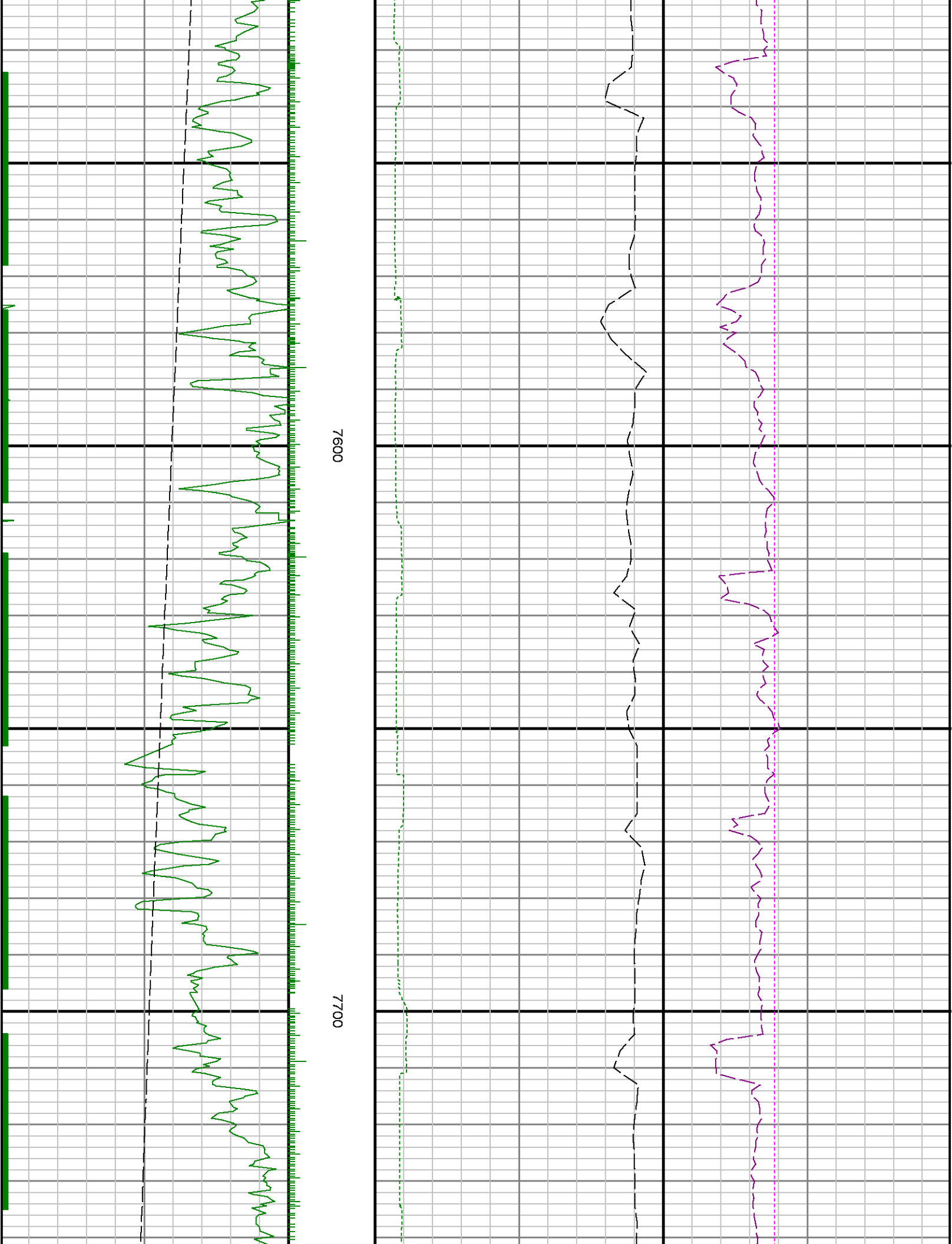
Remarks

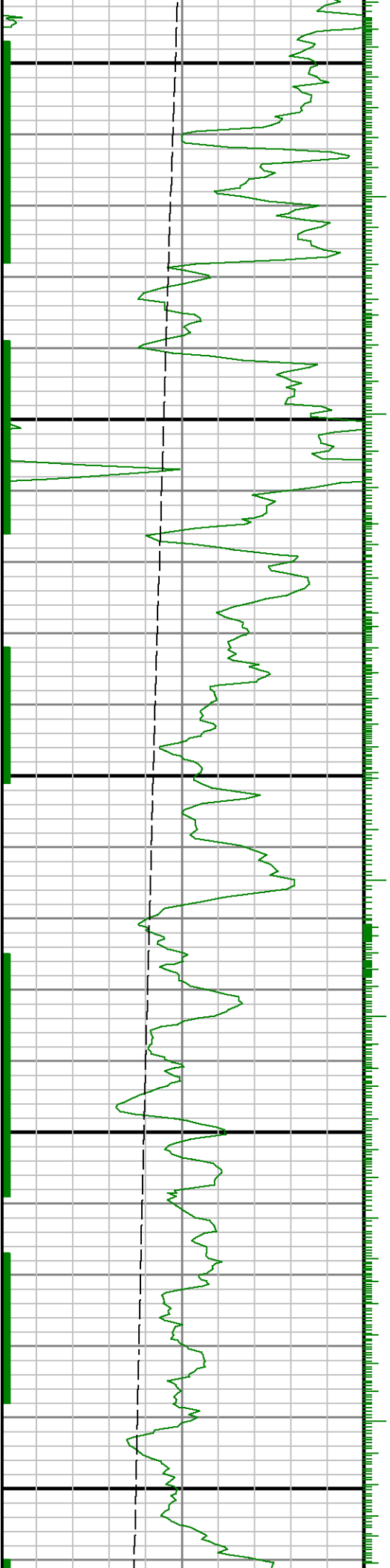
| Number | Measured<br>Depth<br>(ft) | Hole<br>Section<br>(in.) | LWD<br>Run No. | Remark |
|--------|---------------------------|--------------------------|----------------|--------|
|--------|---------------------------|--------------------------|----------------|--------|

|   |       |       |   |   |
|---|-------|-------|---|---|
| 1 | 7190  | 8.750 | 1 | The interval from surface to 7190 feet MD (7118 feet TVD) was not logged since logging services began at kick off point.  |
| 2 | 8282  | 8.750 | 1 | The Interval from 8228 feet to 8282 feet MD (7795 feet to 7797 feet TVD) was logged more than 33 hours after drilling due to tripping for casing and a new BHA. |
| 3 | 14838 | 6.125 | 2 | The interval from 14838 feet to 14889 feet MD (7720 feet to 7718 feet TVD) was not logged due to bit sensor offset at TD.                                       |



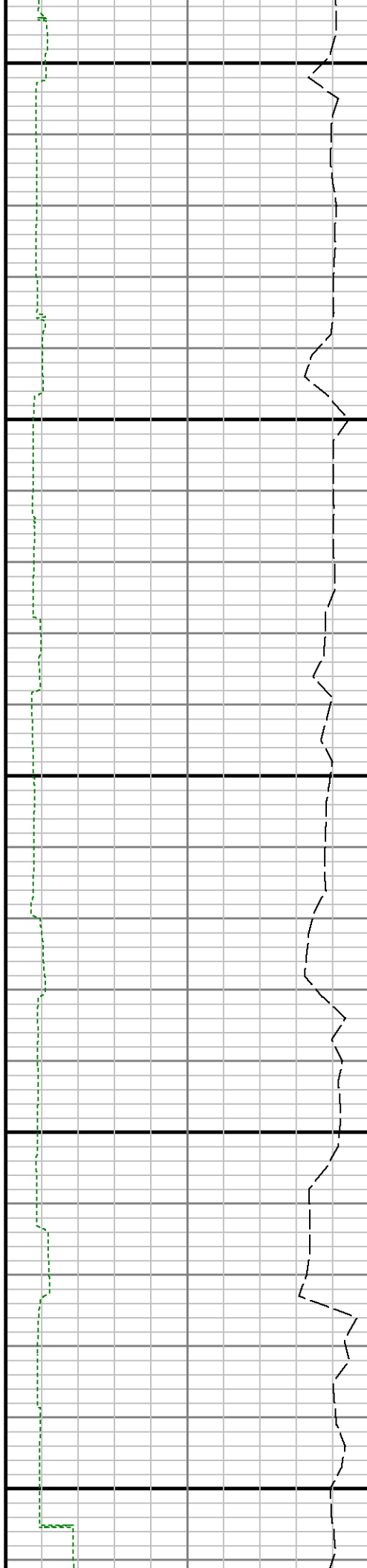


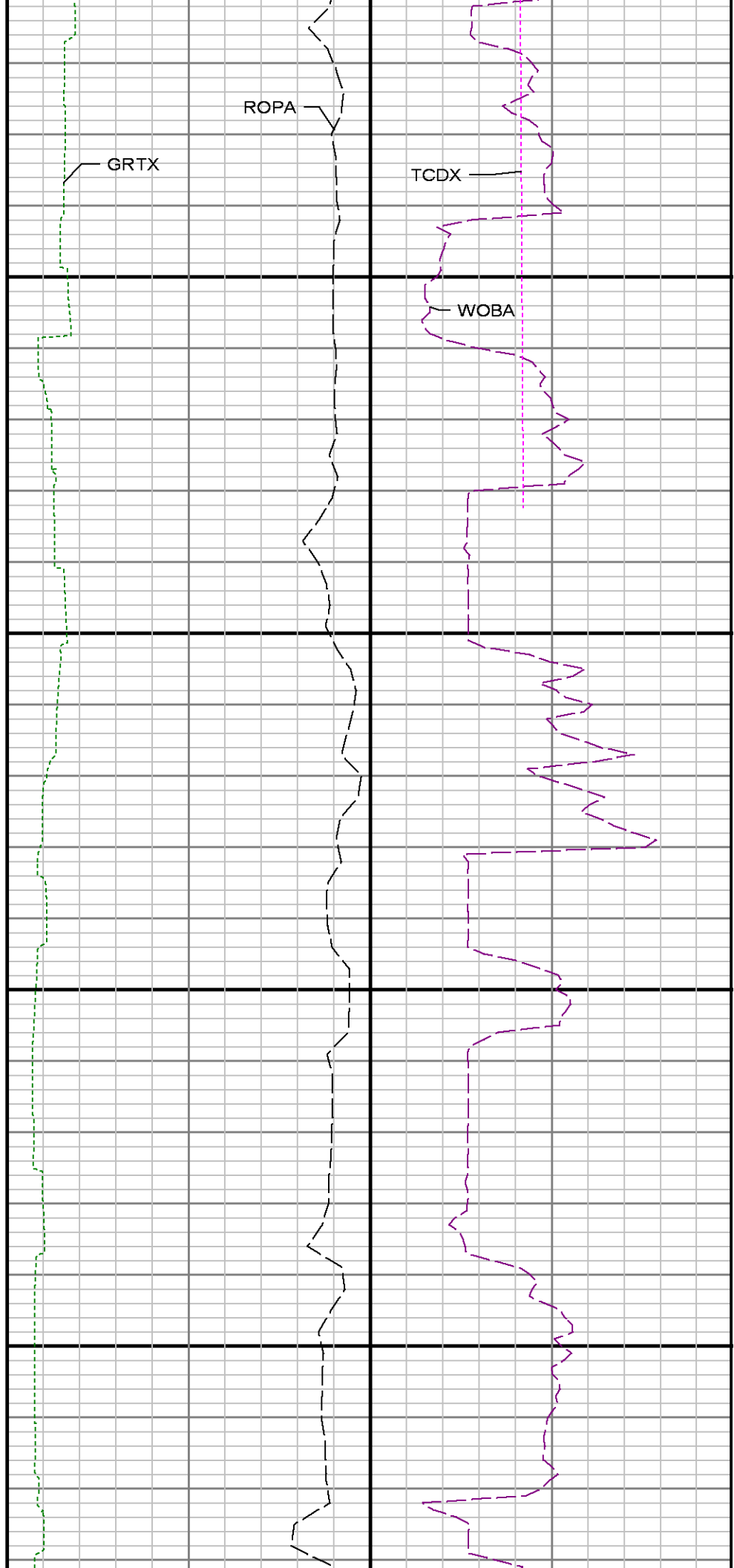
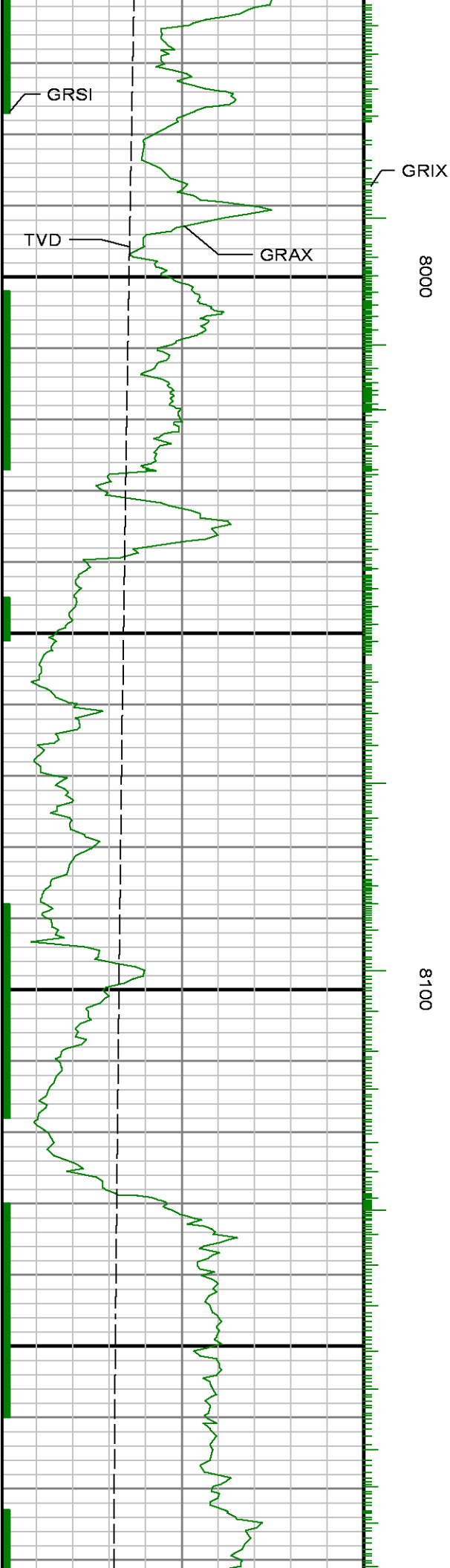


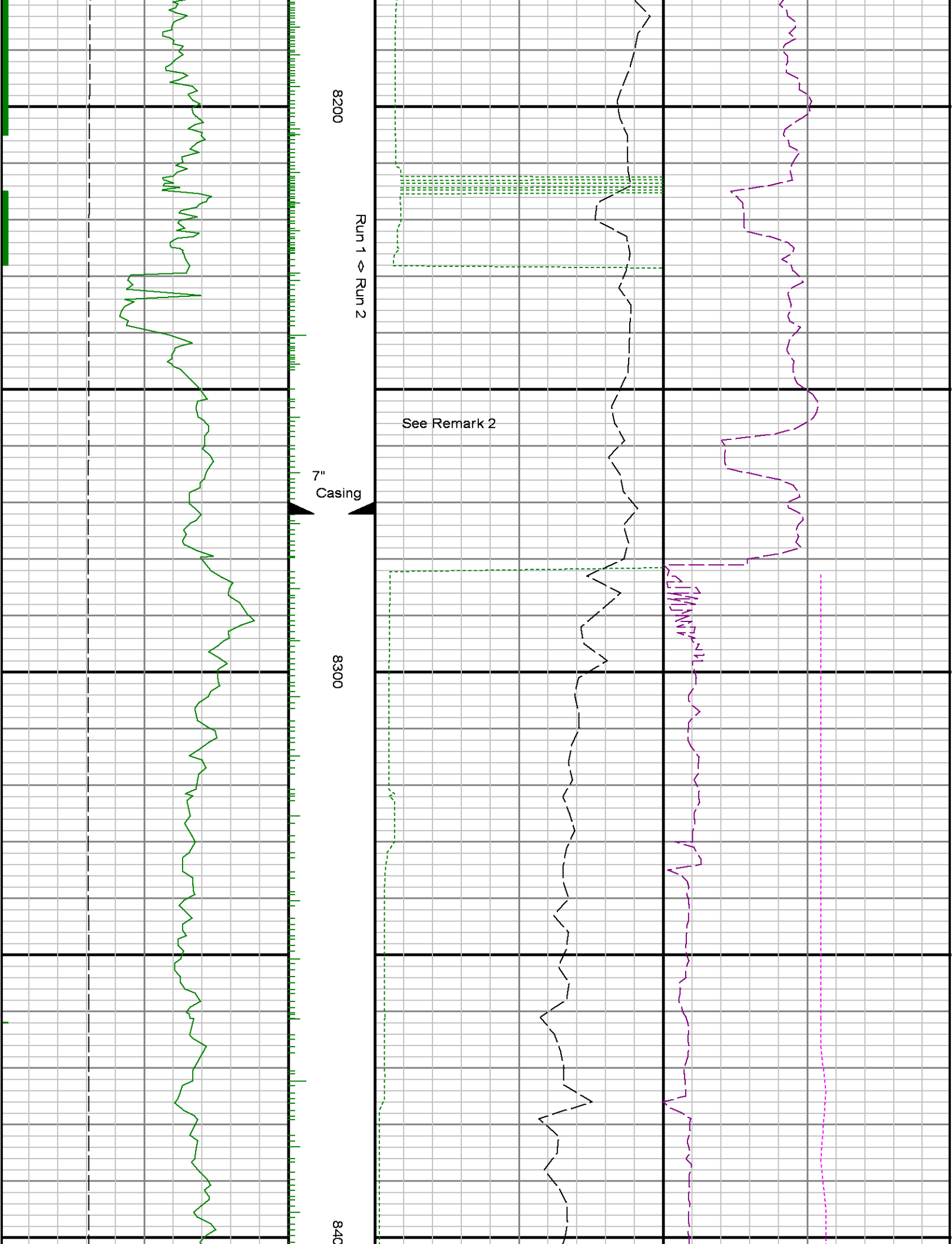


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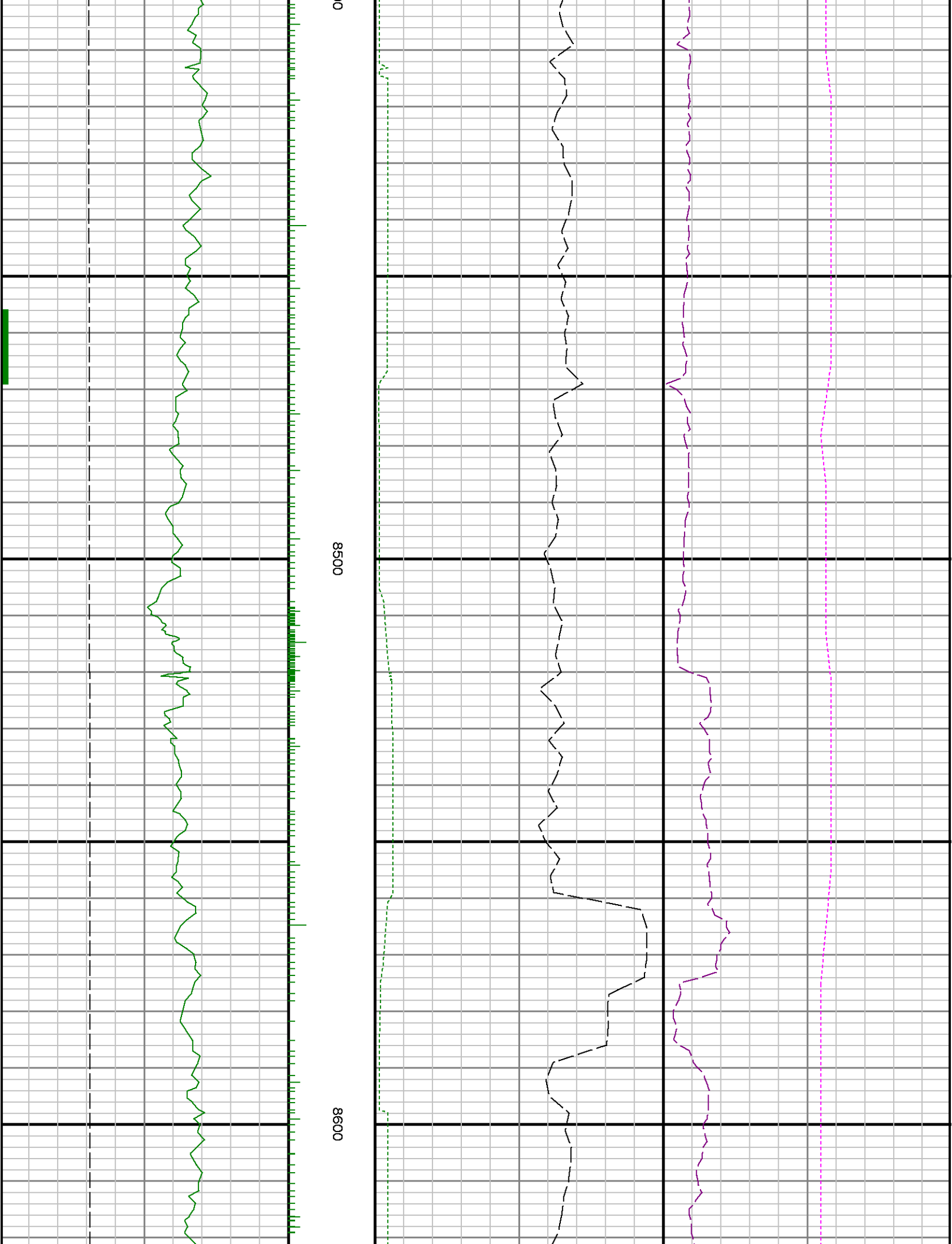
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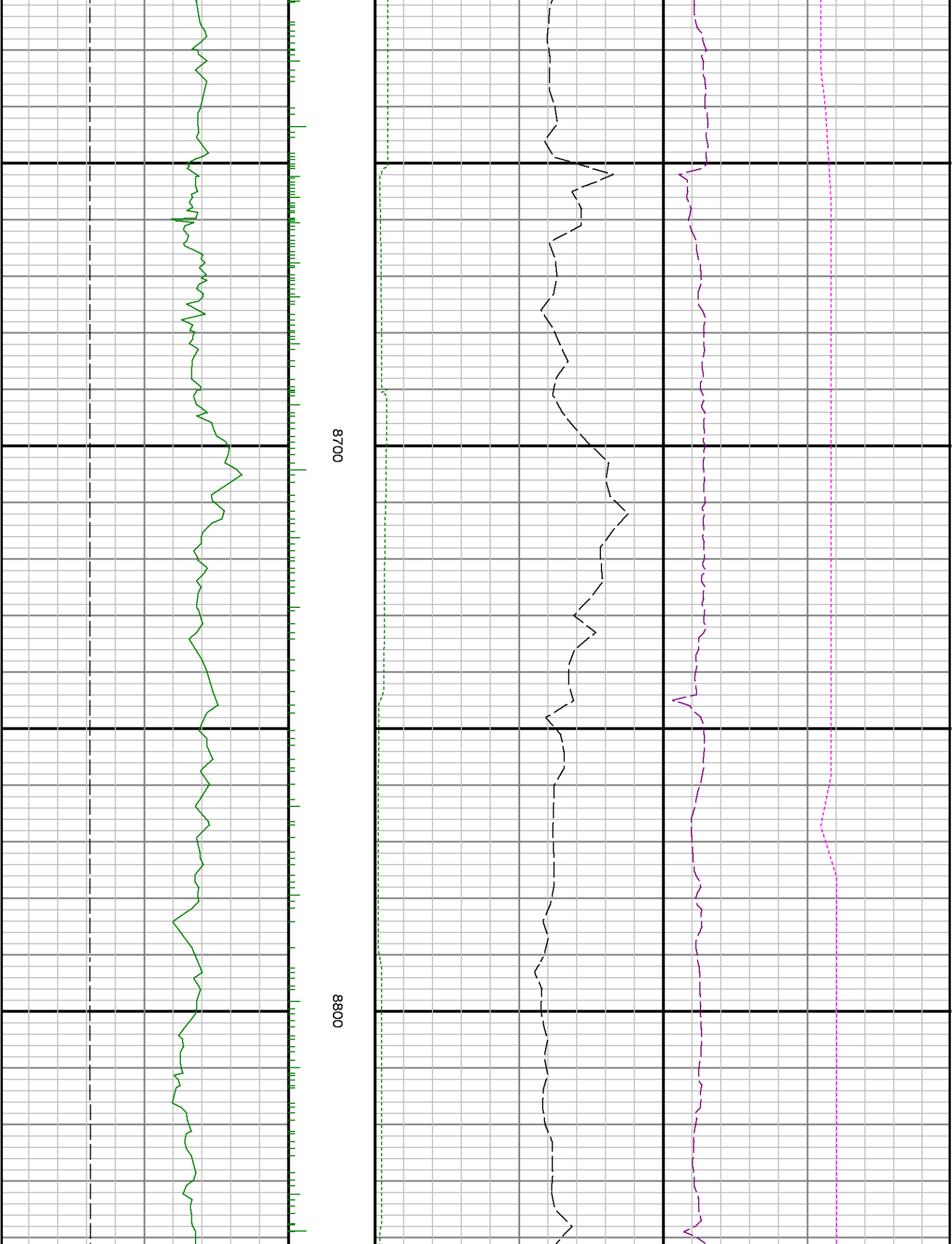


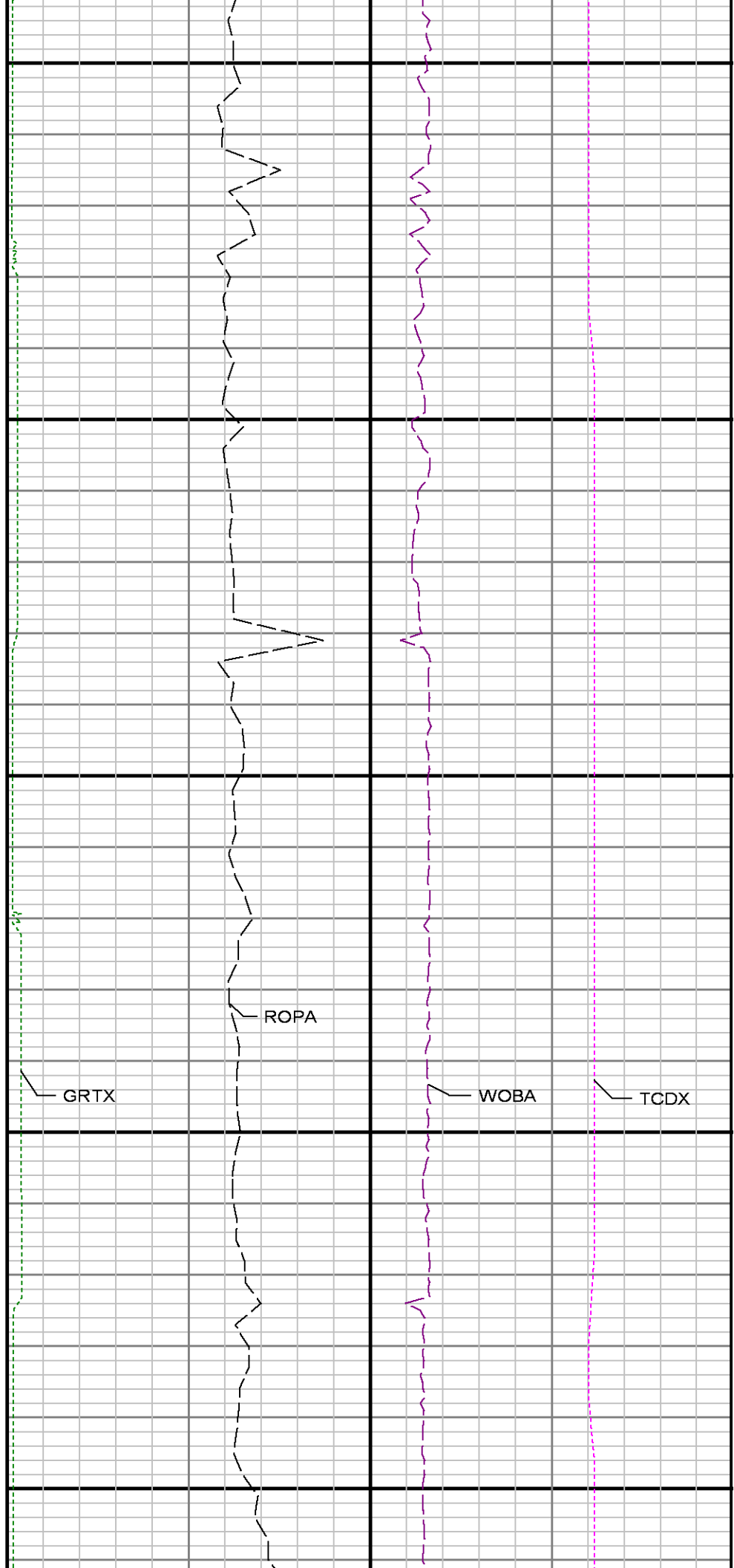
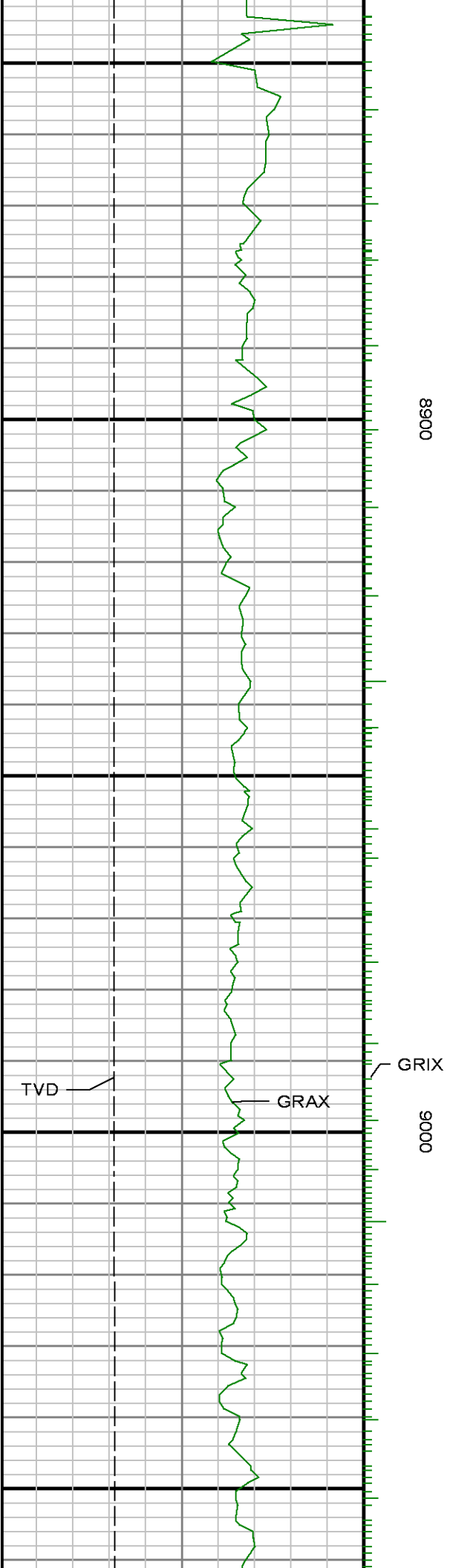


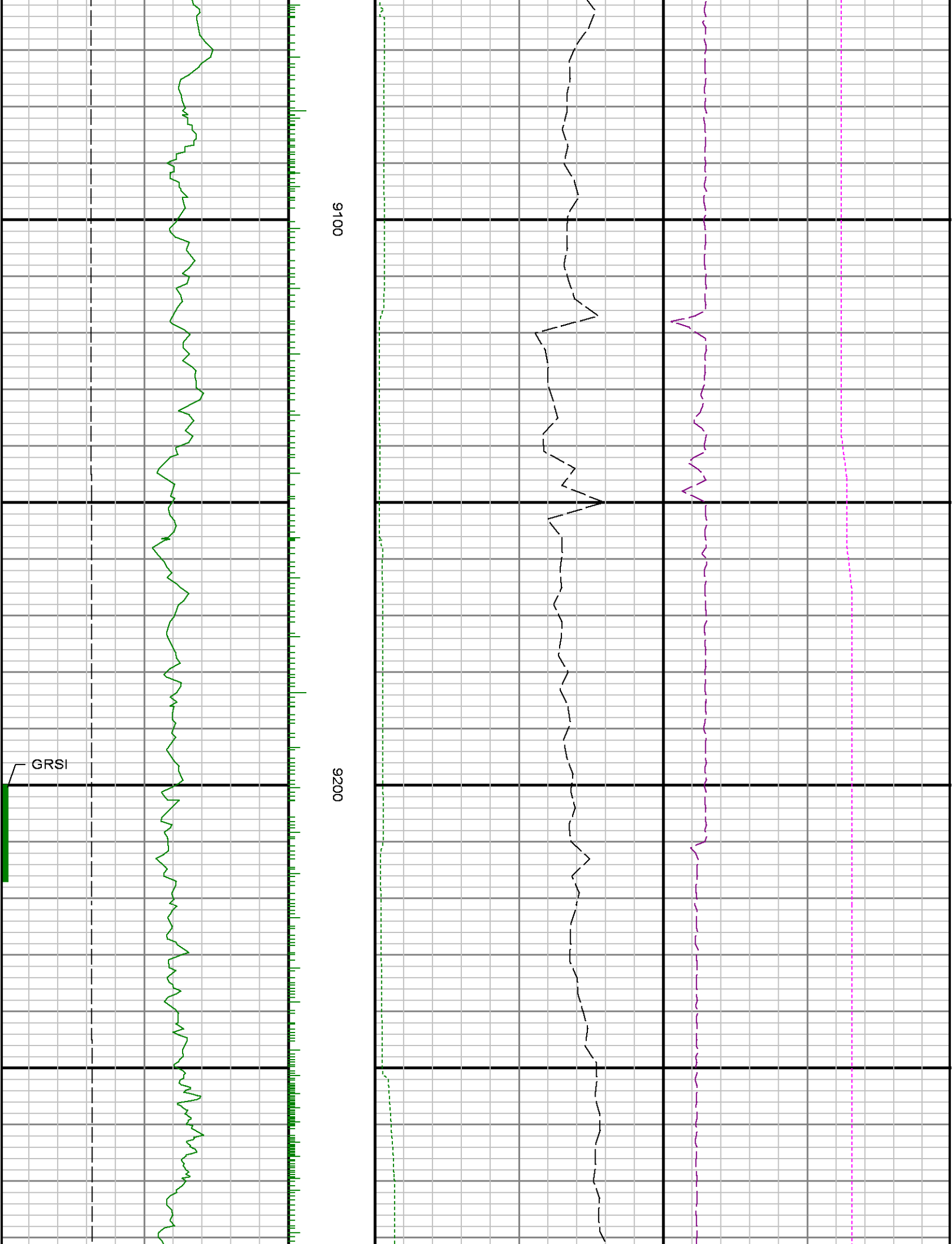


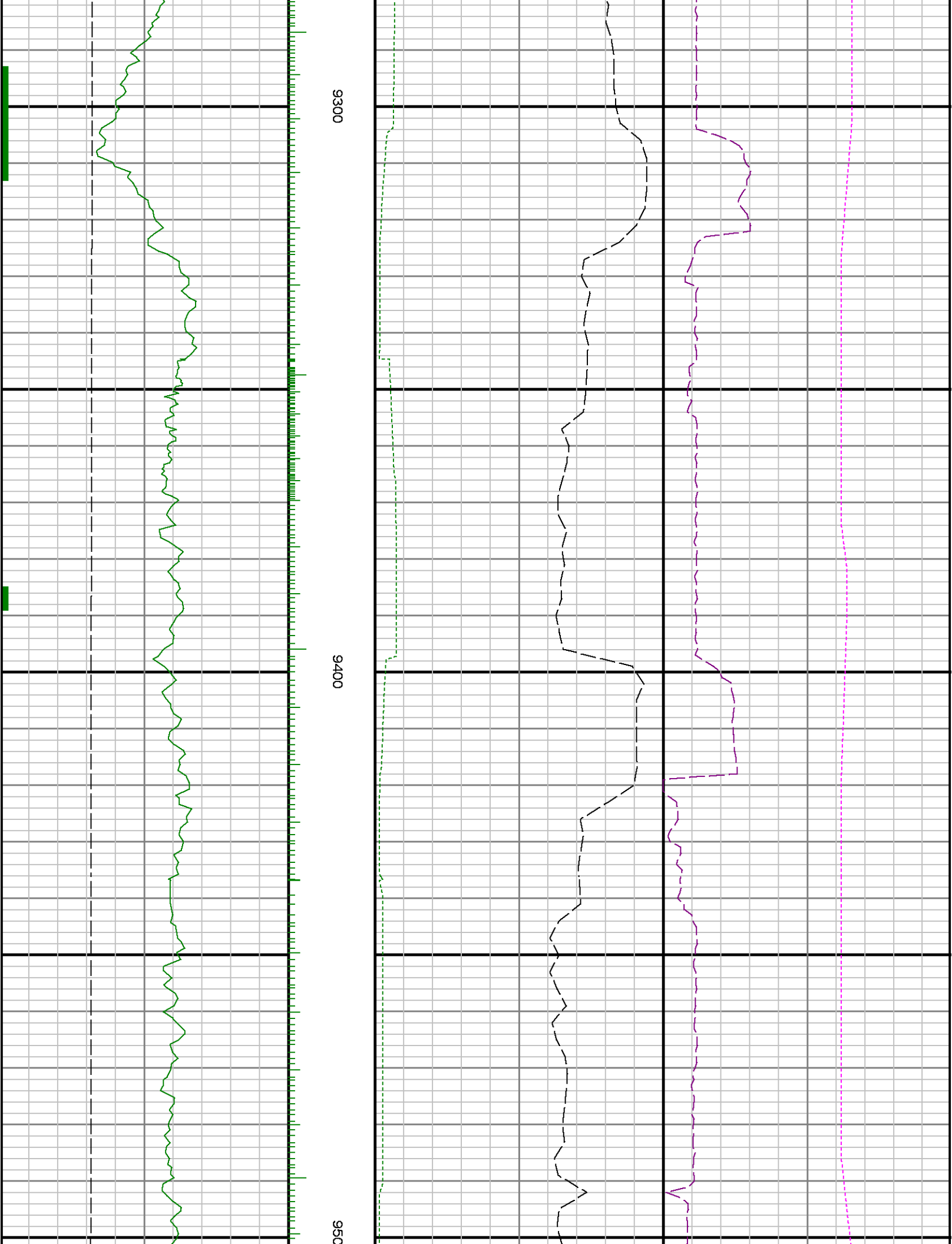




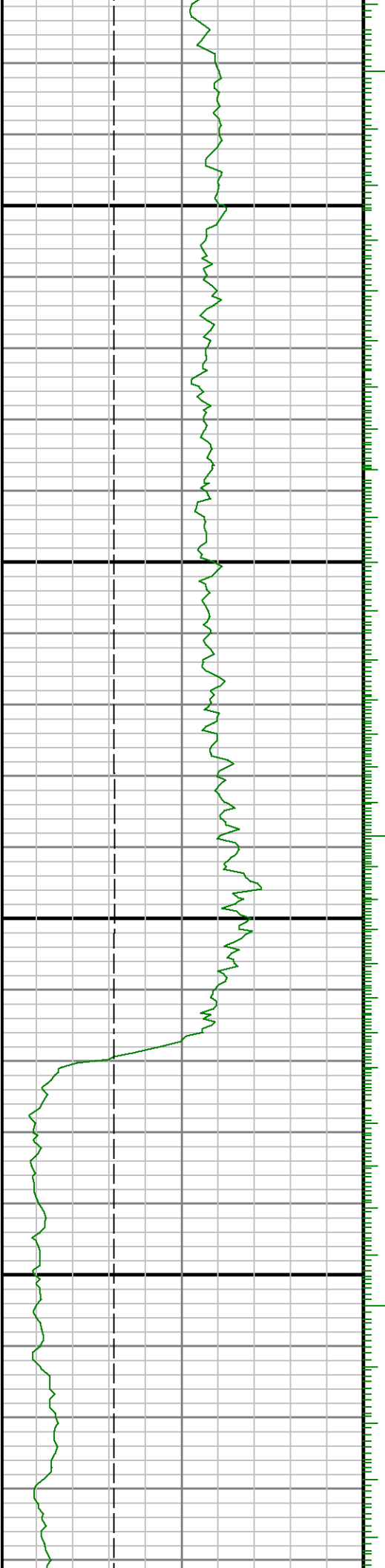








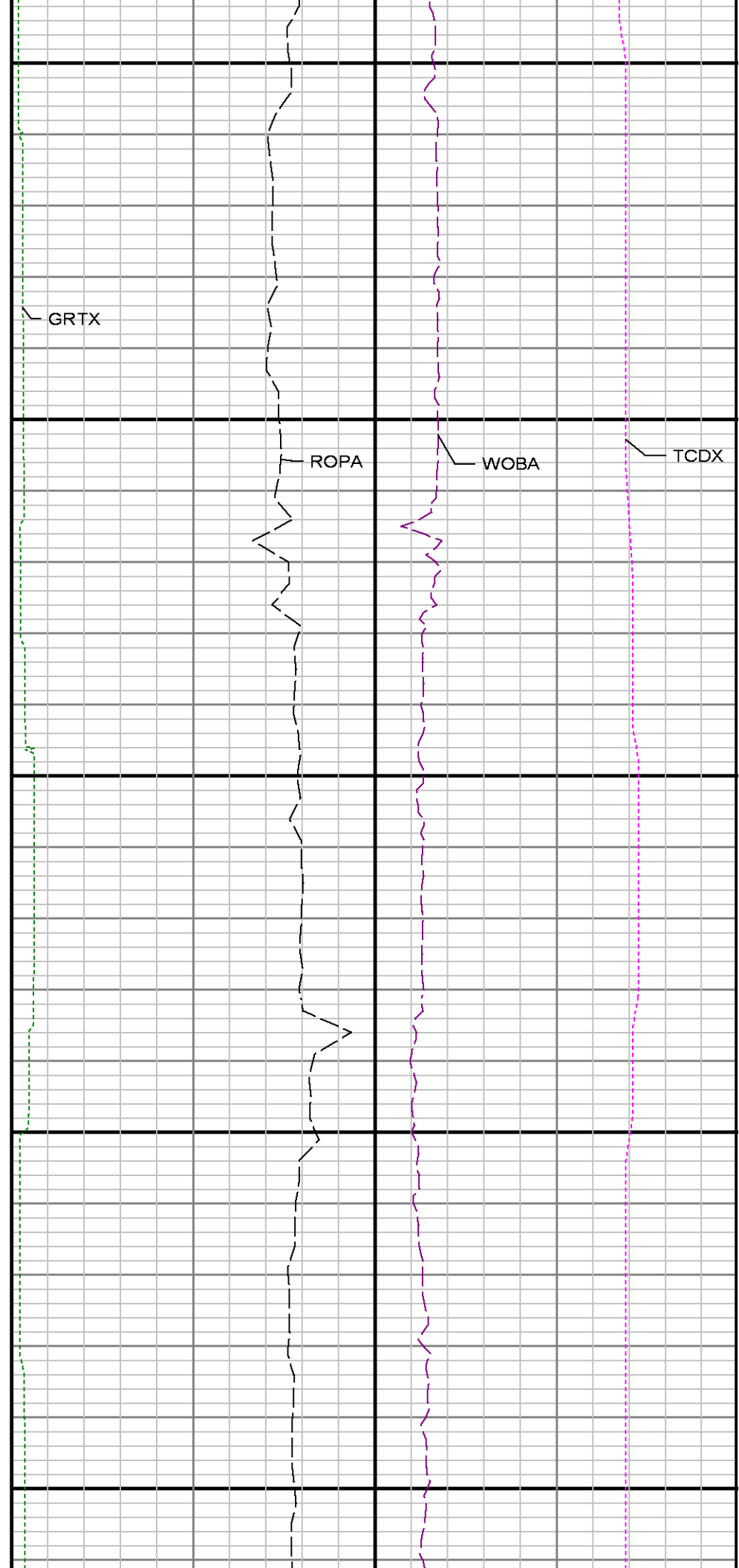
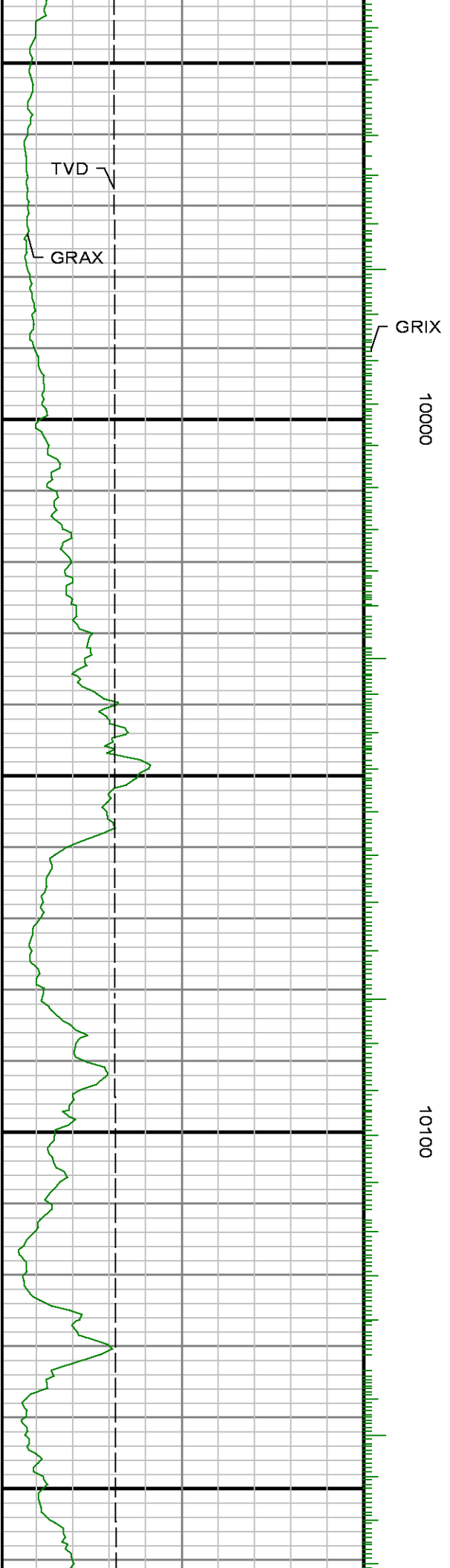




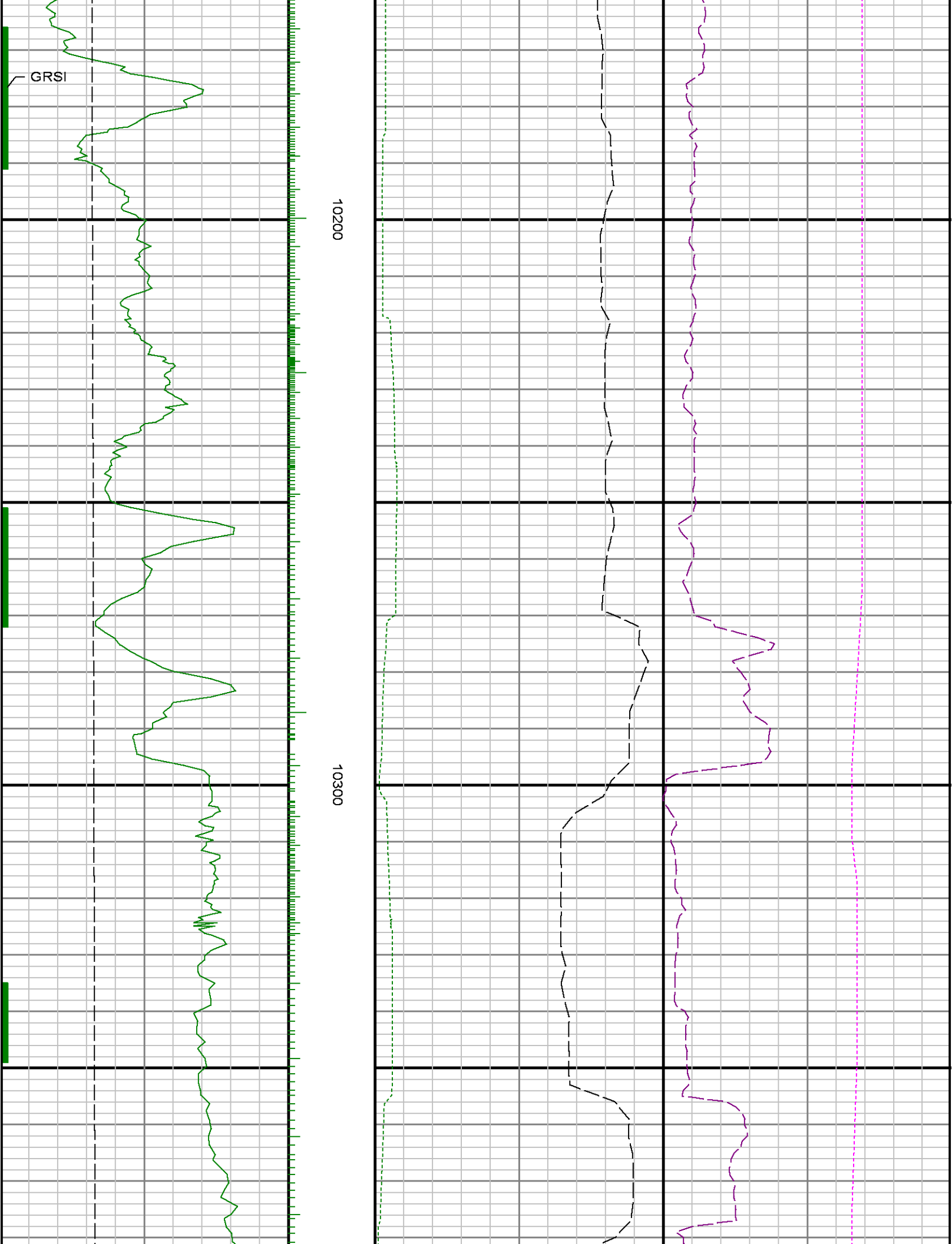
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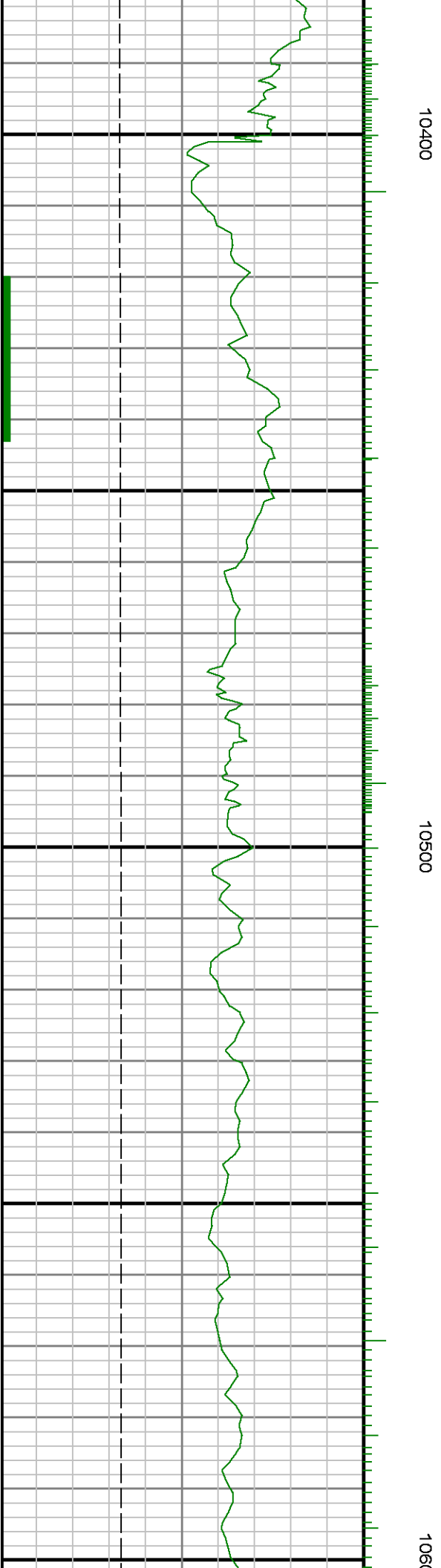
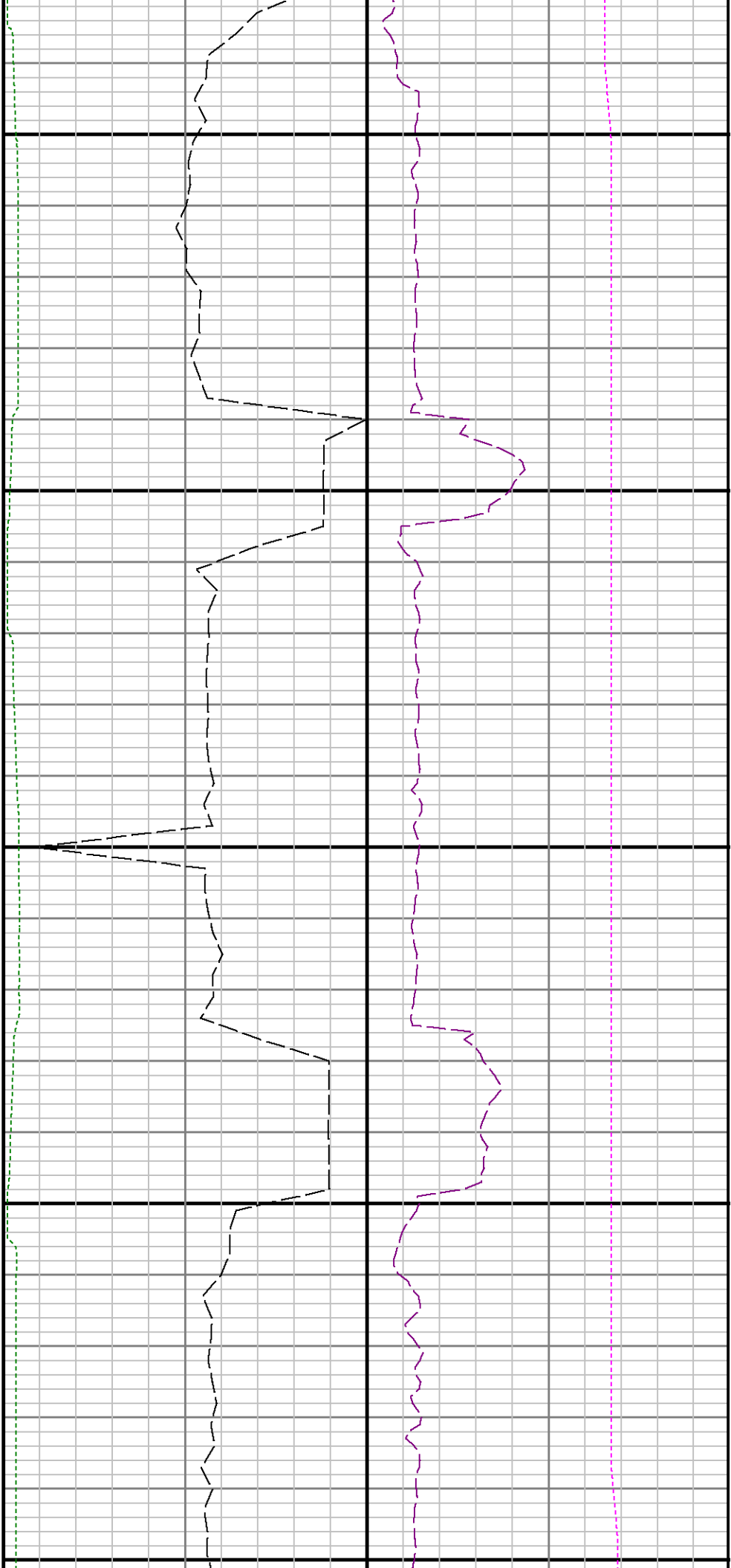
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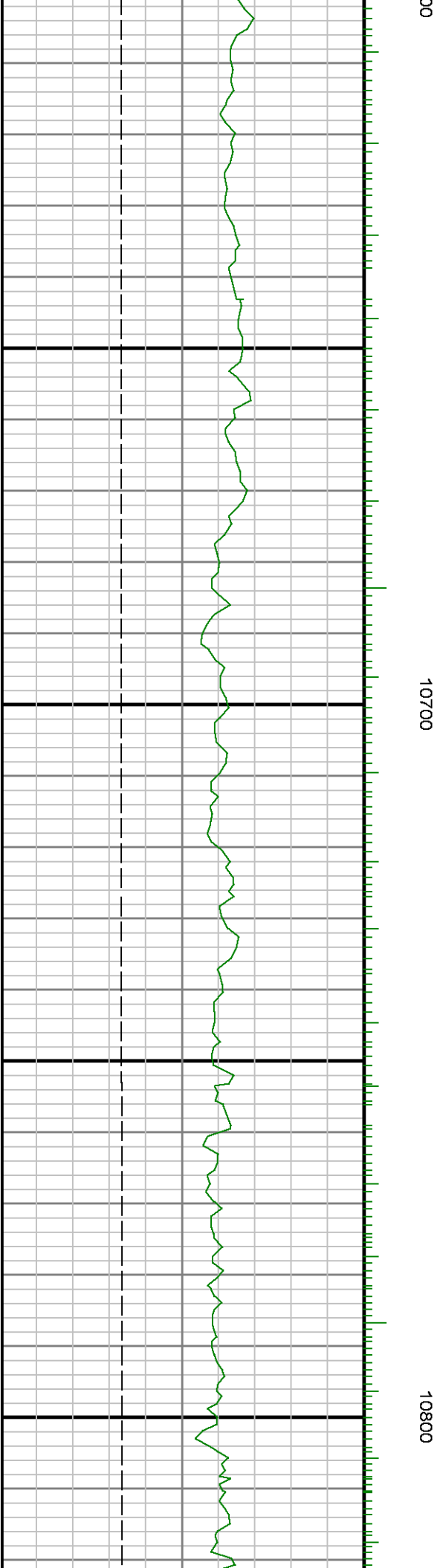


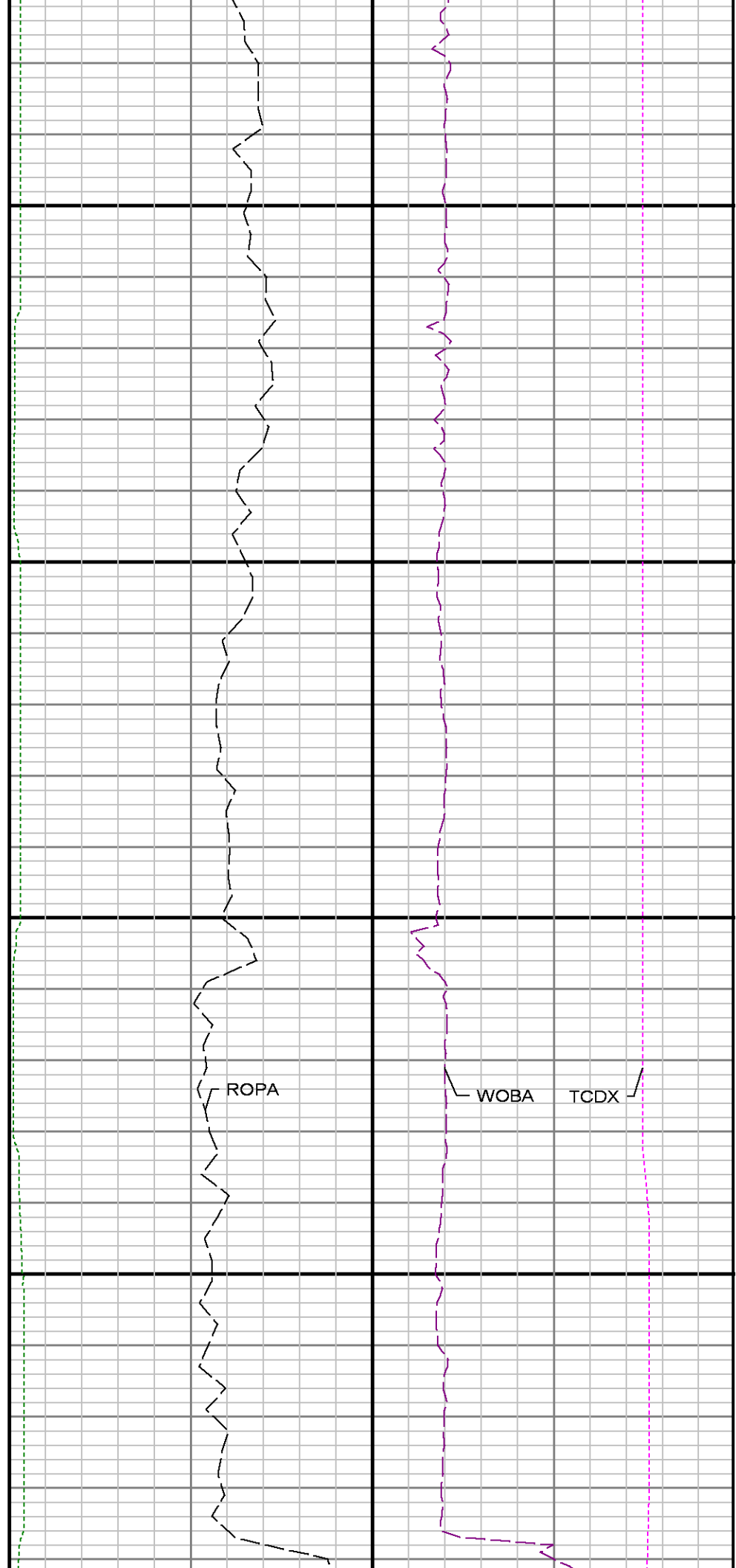
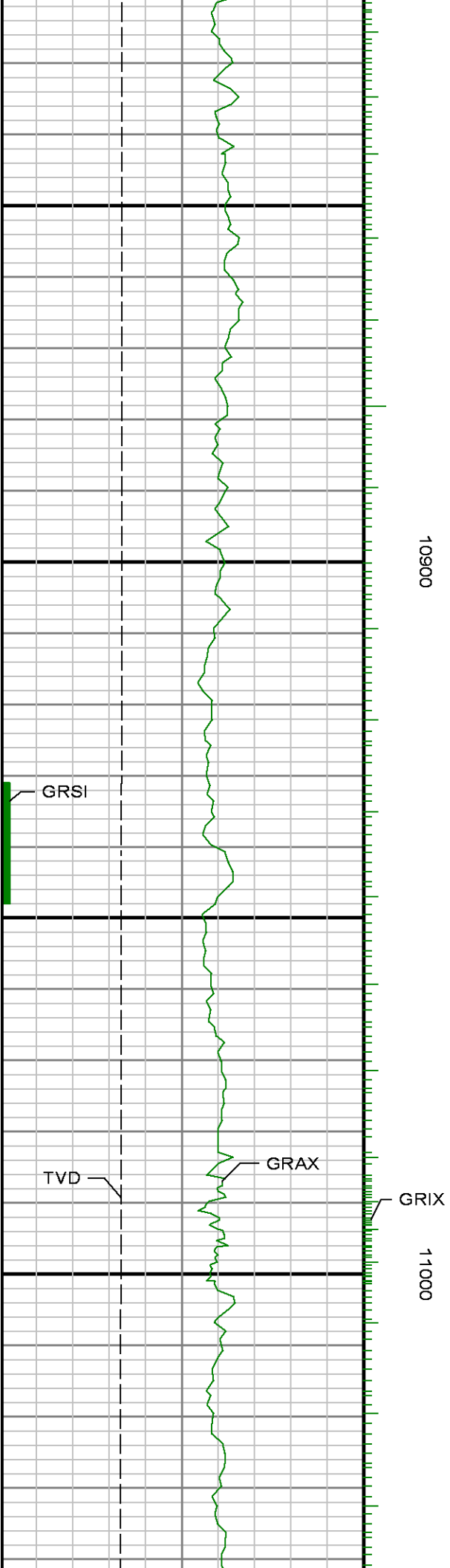


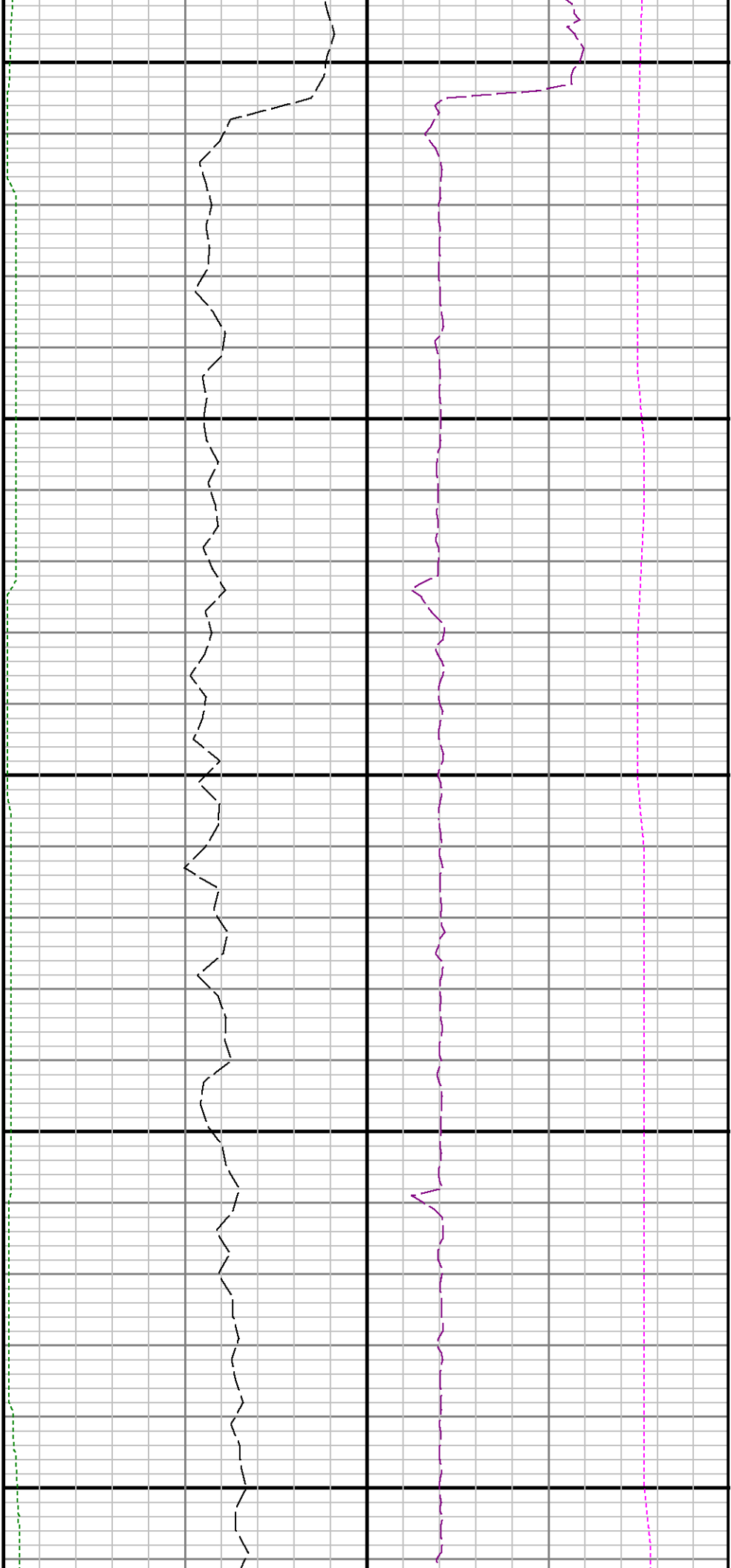






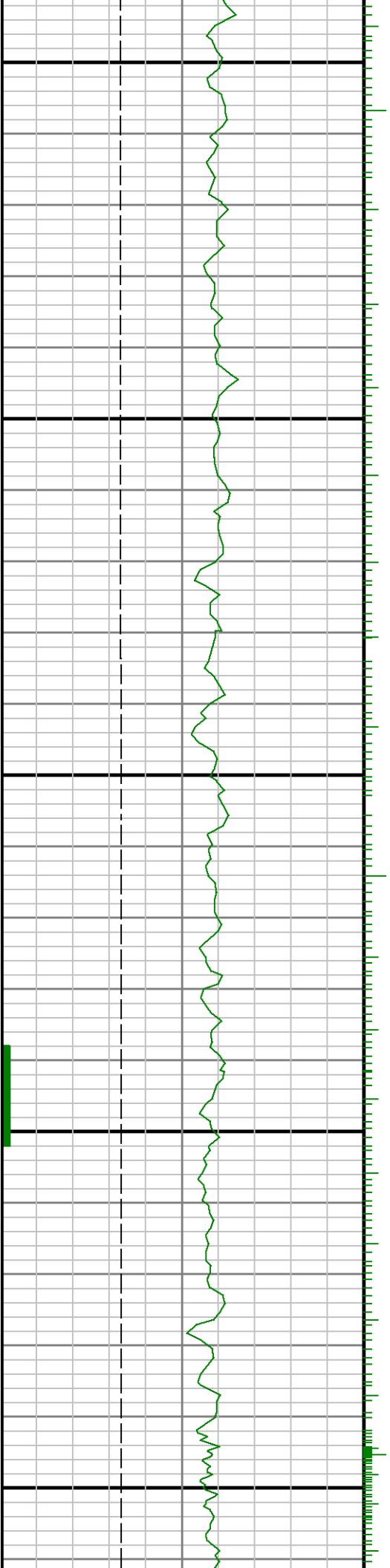


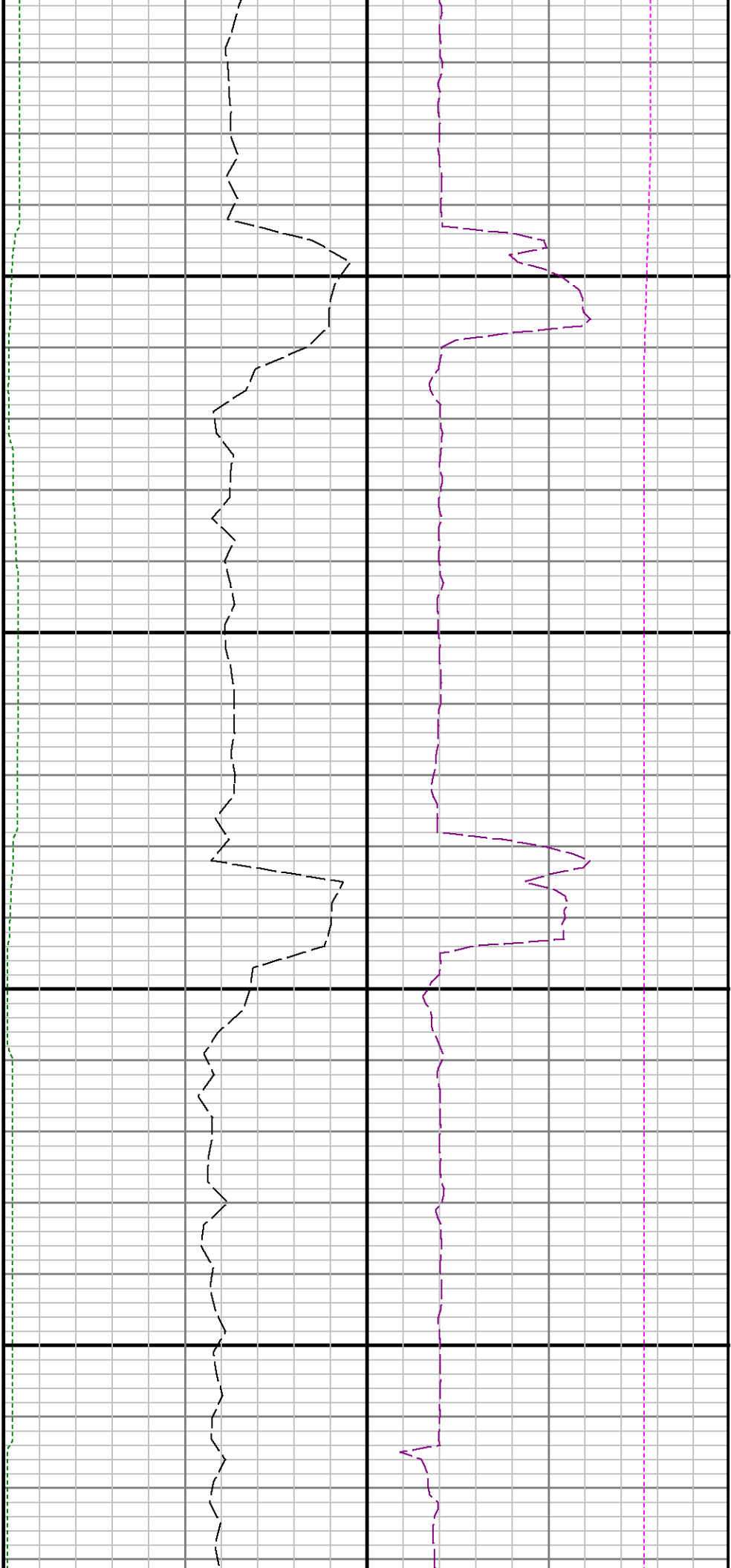




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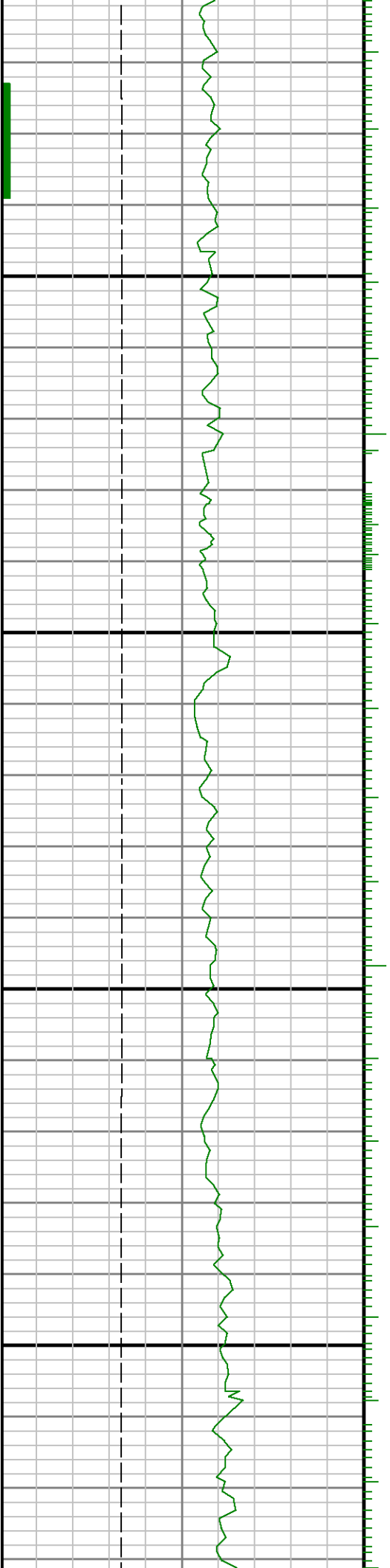
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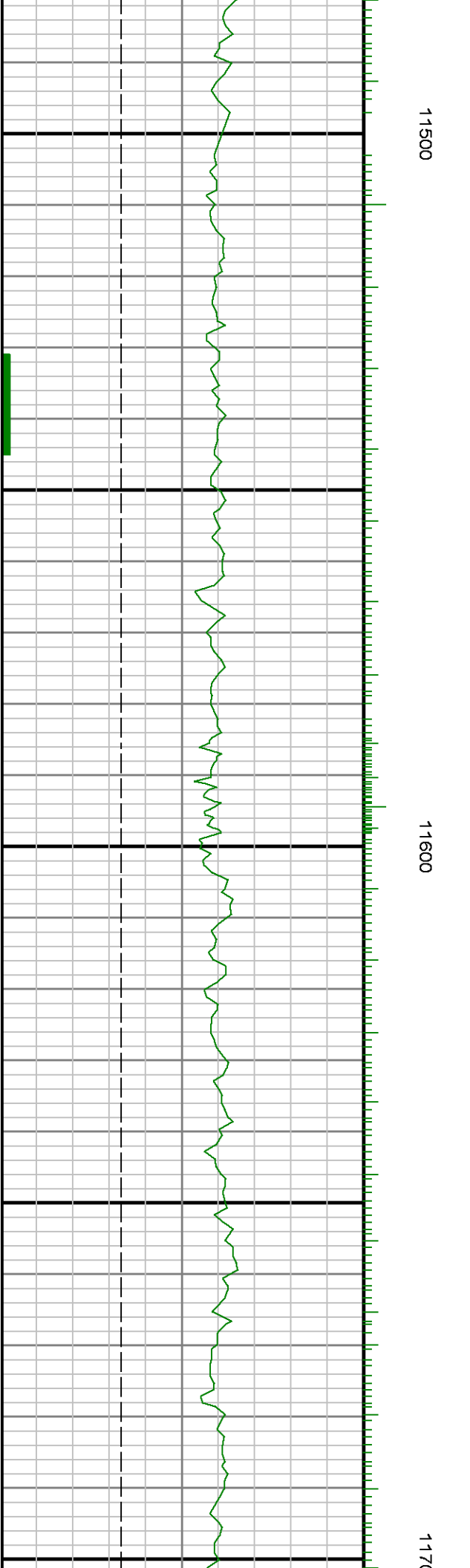


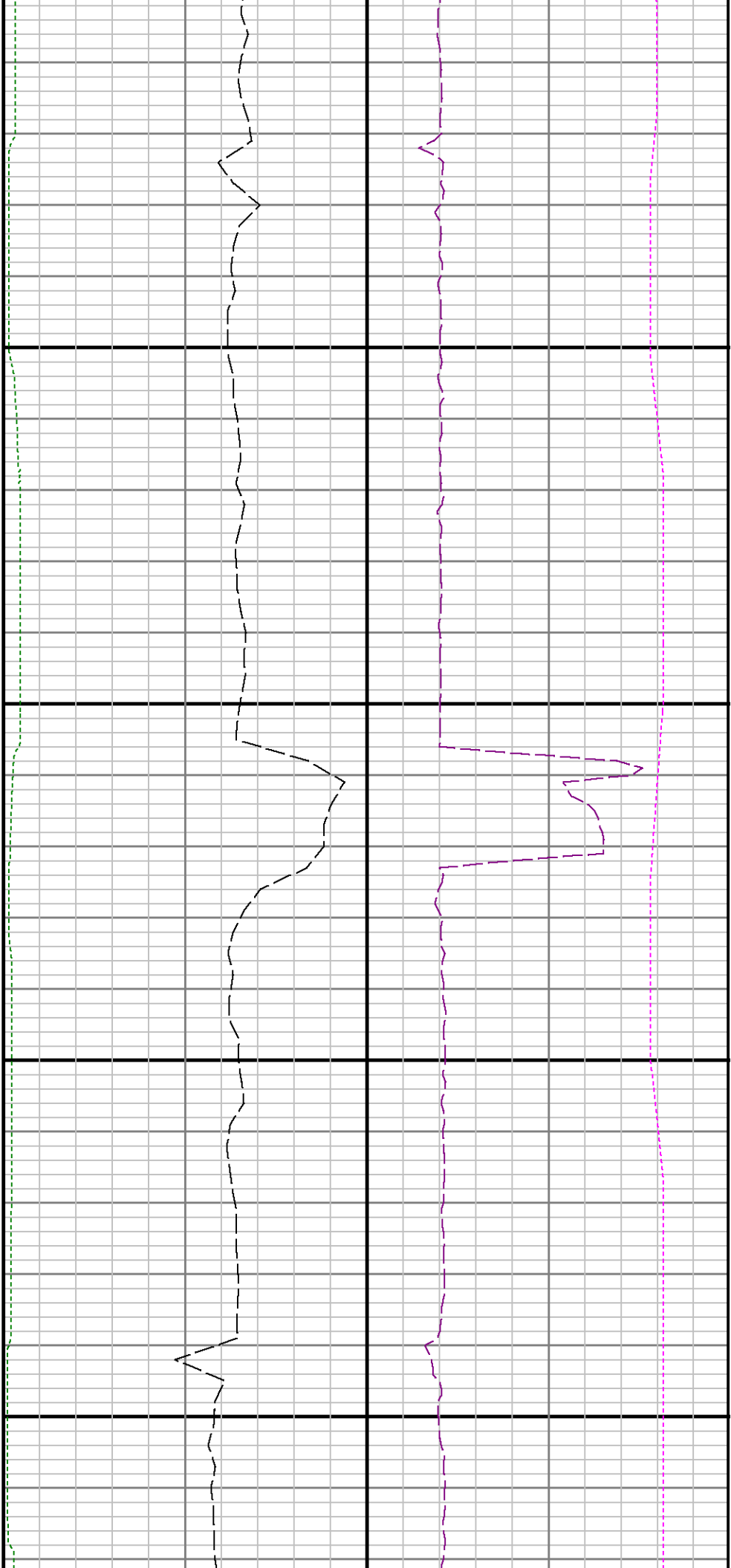


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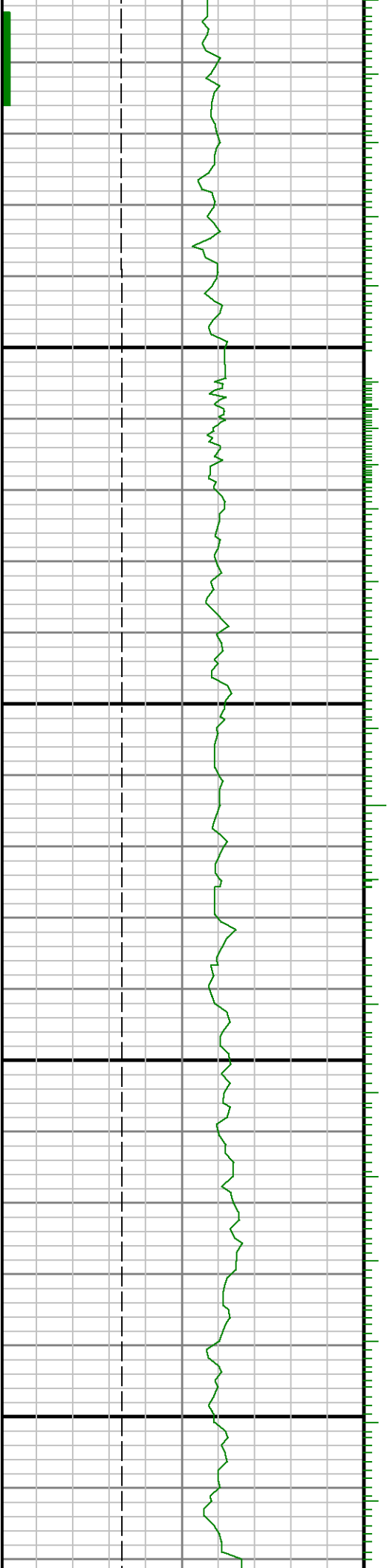




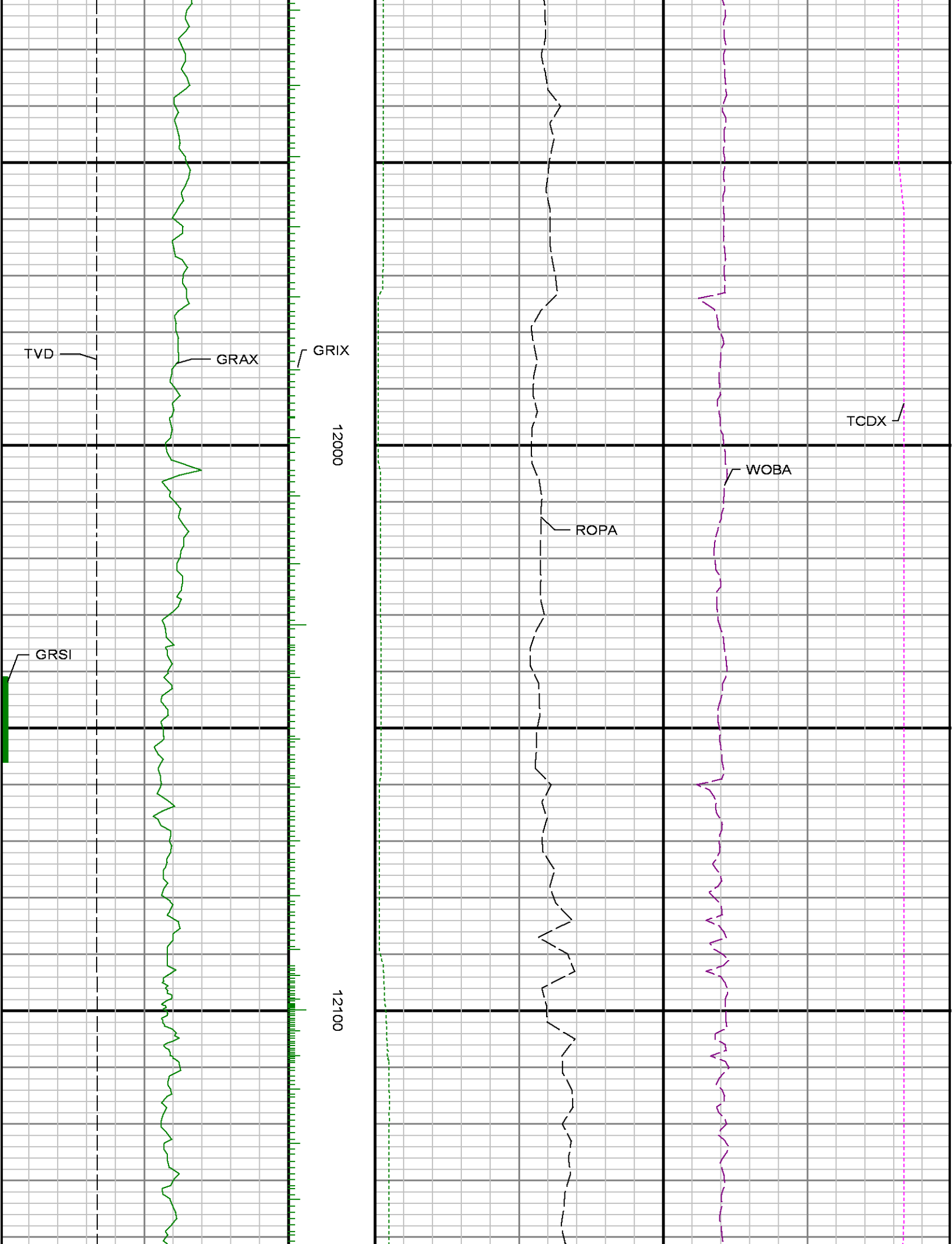
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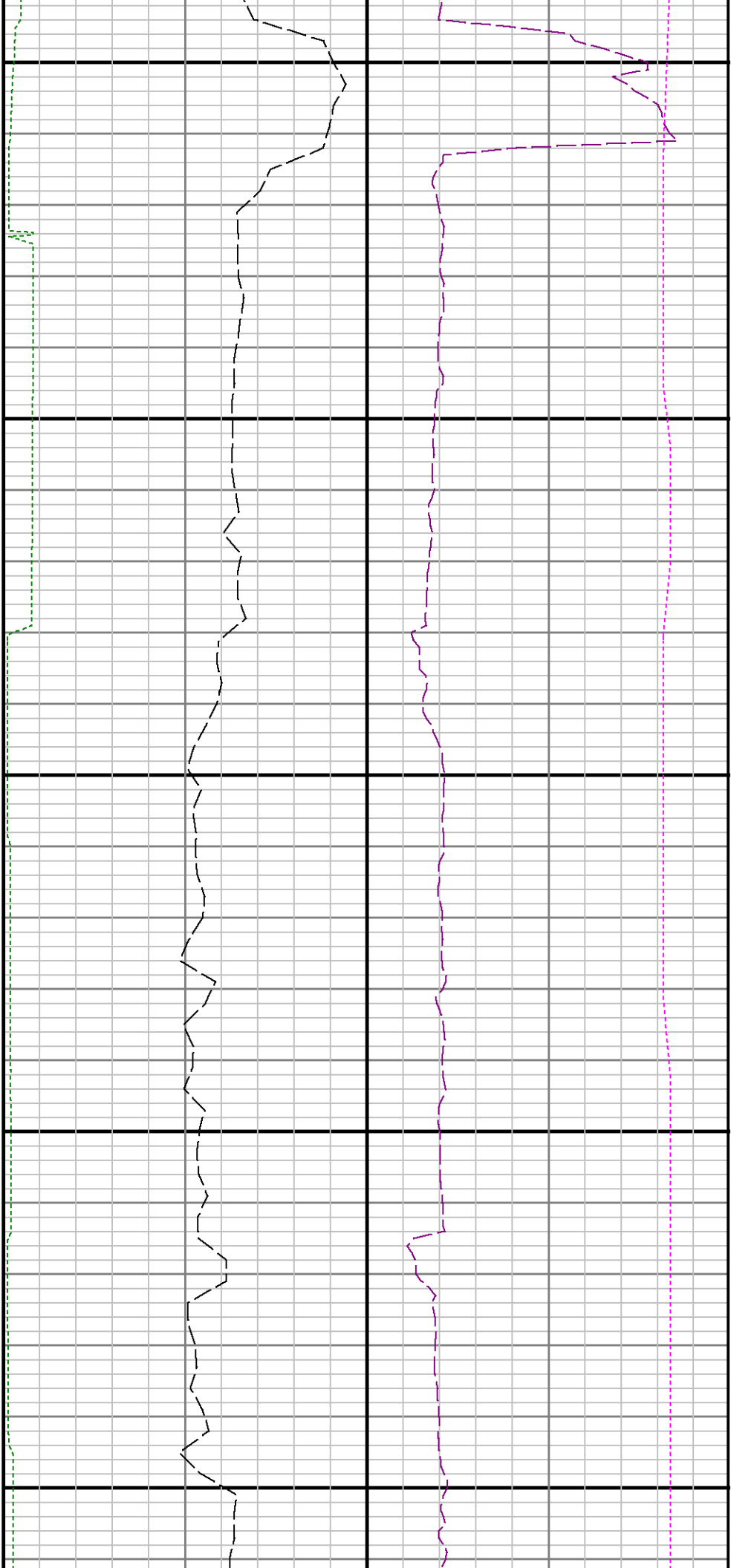
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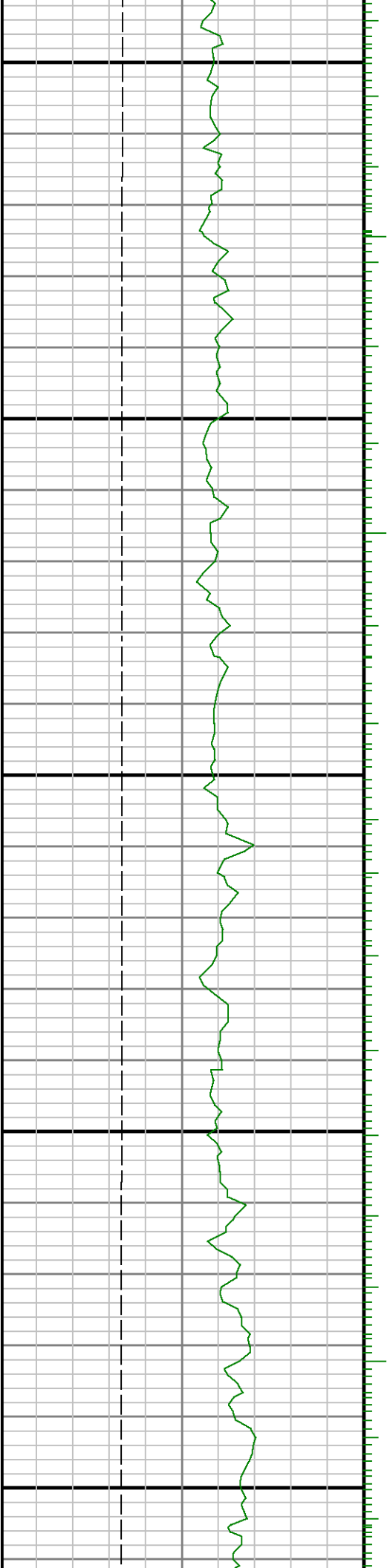


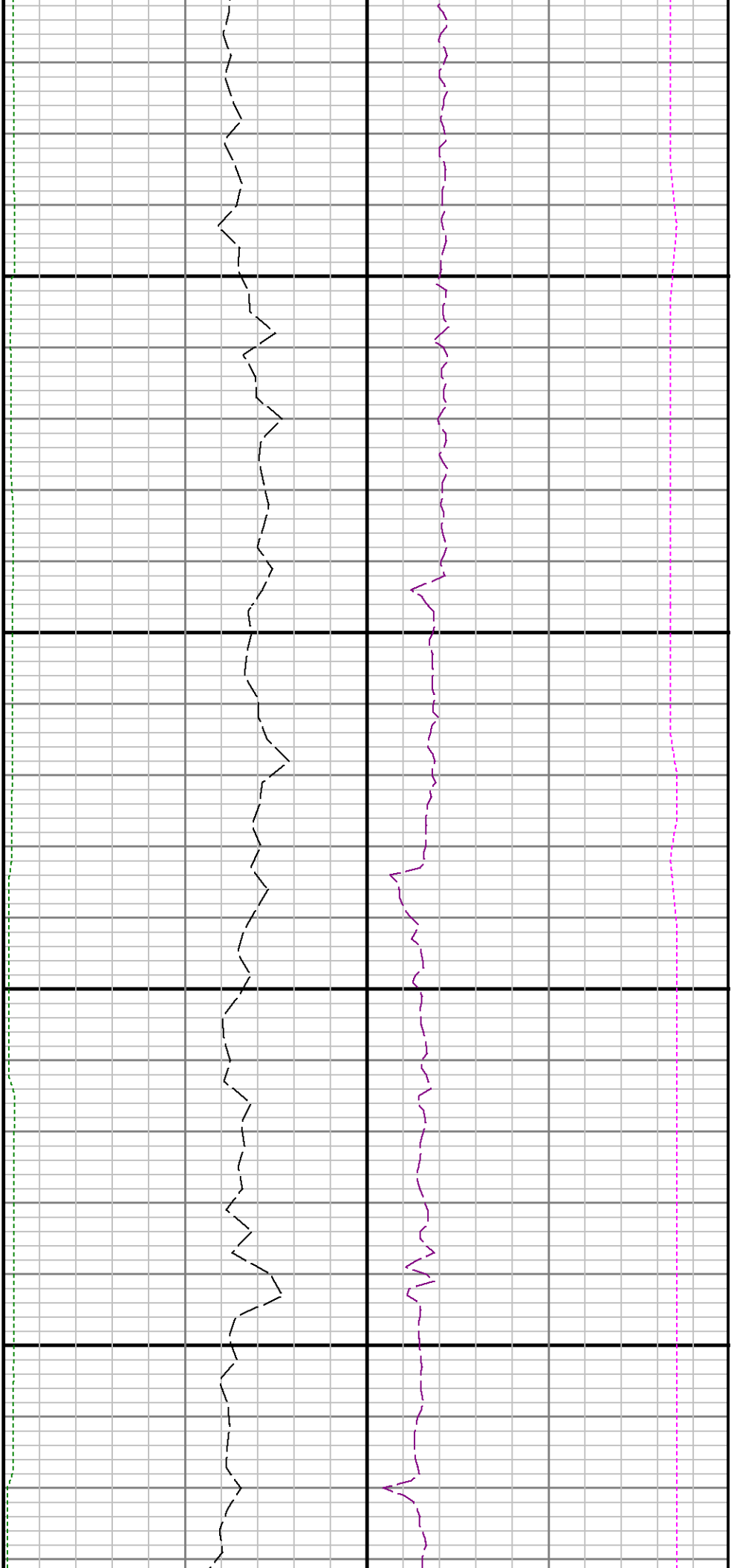




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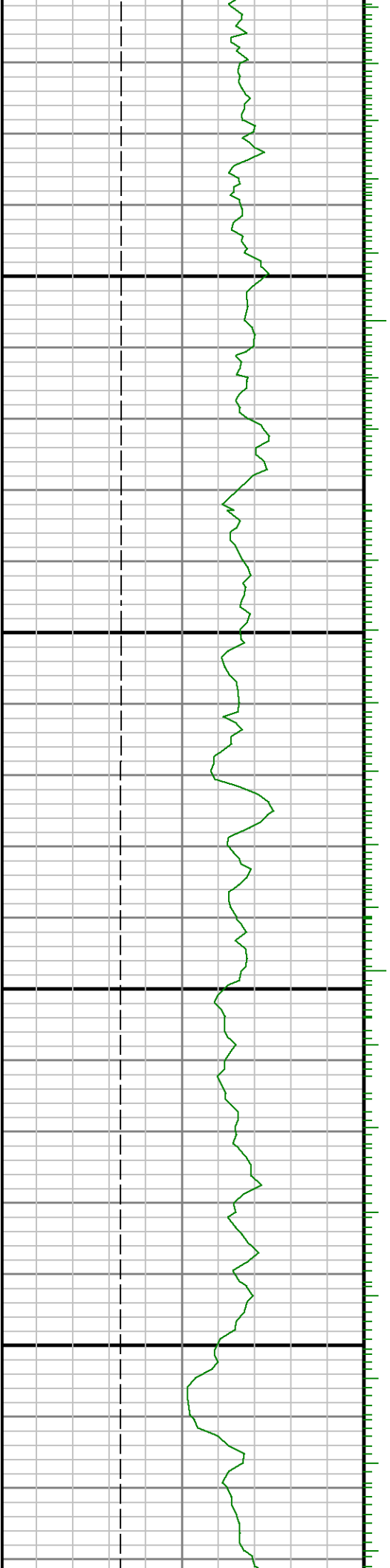
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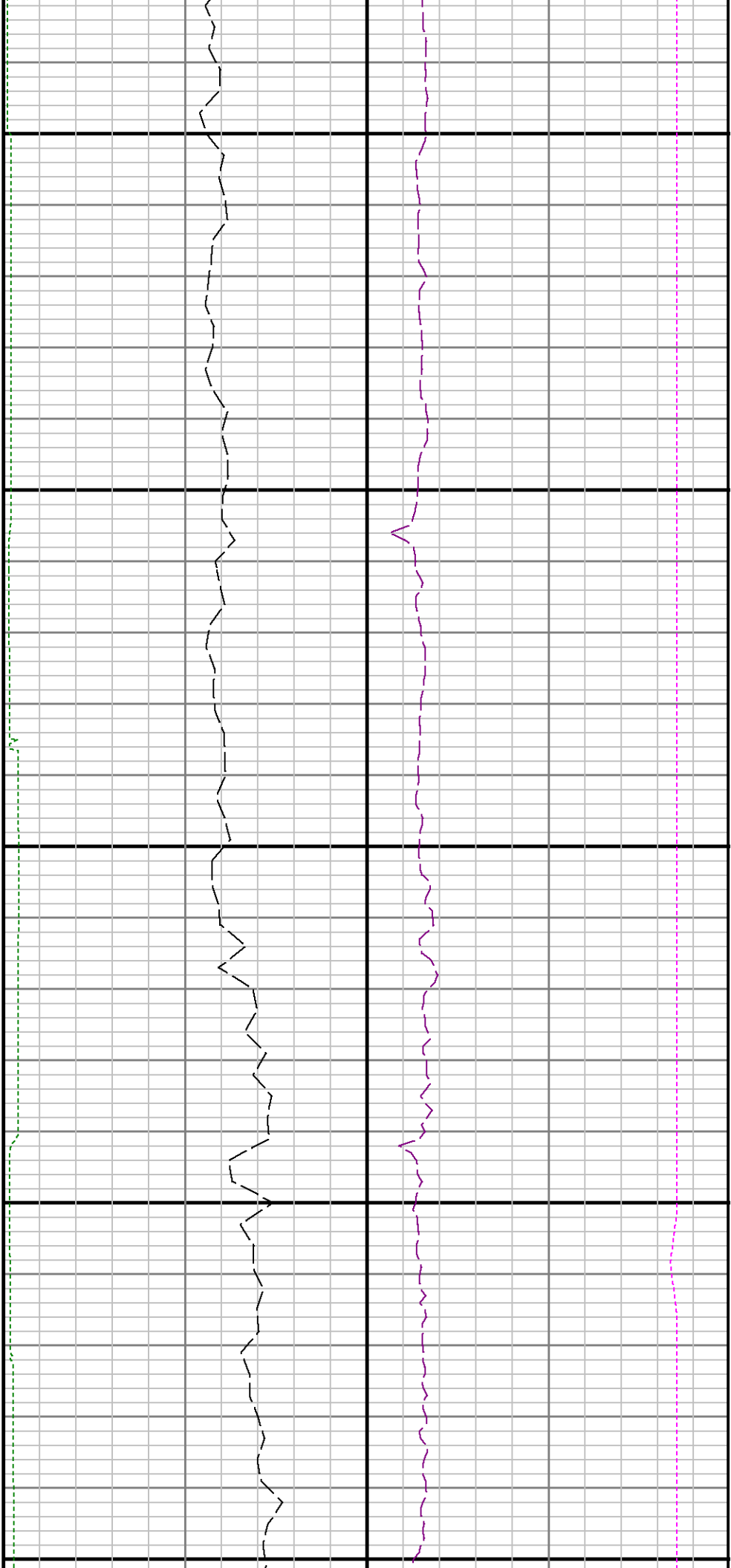




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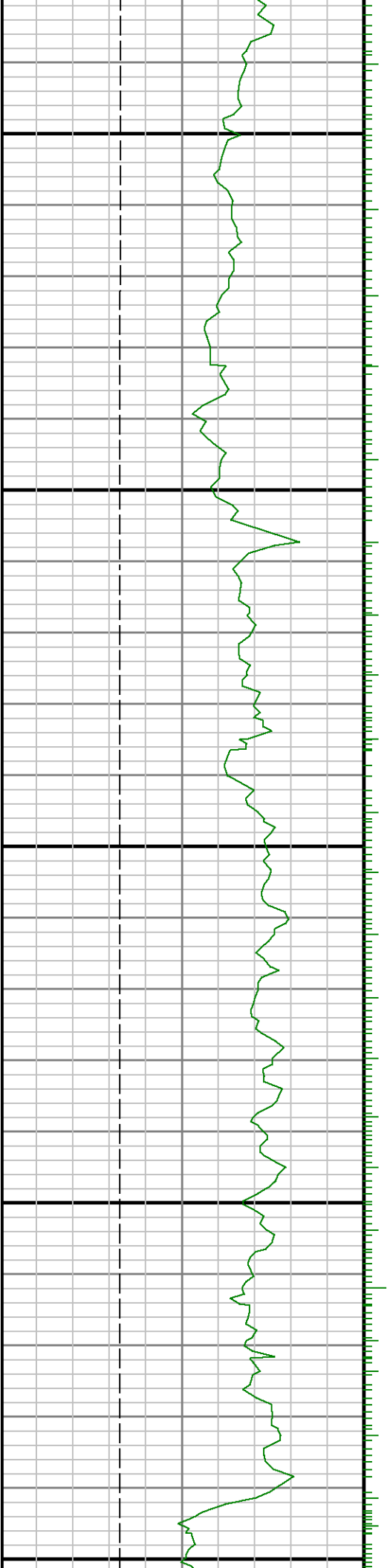


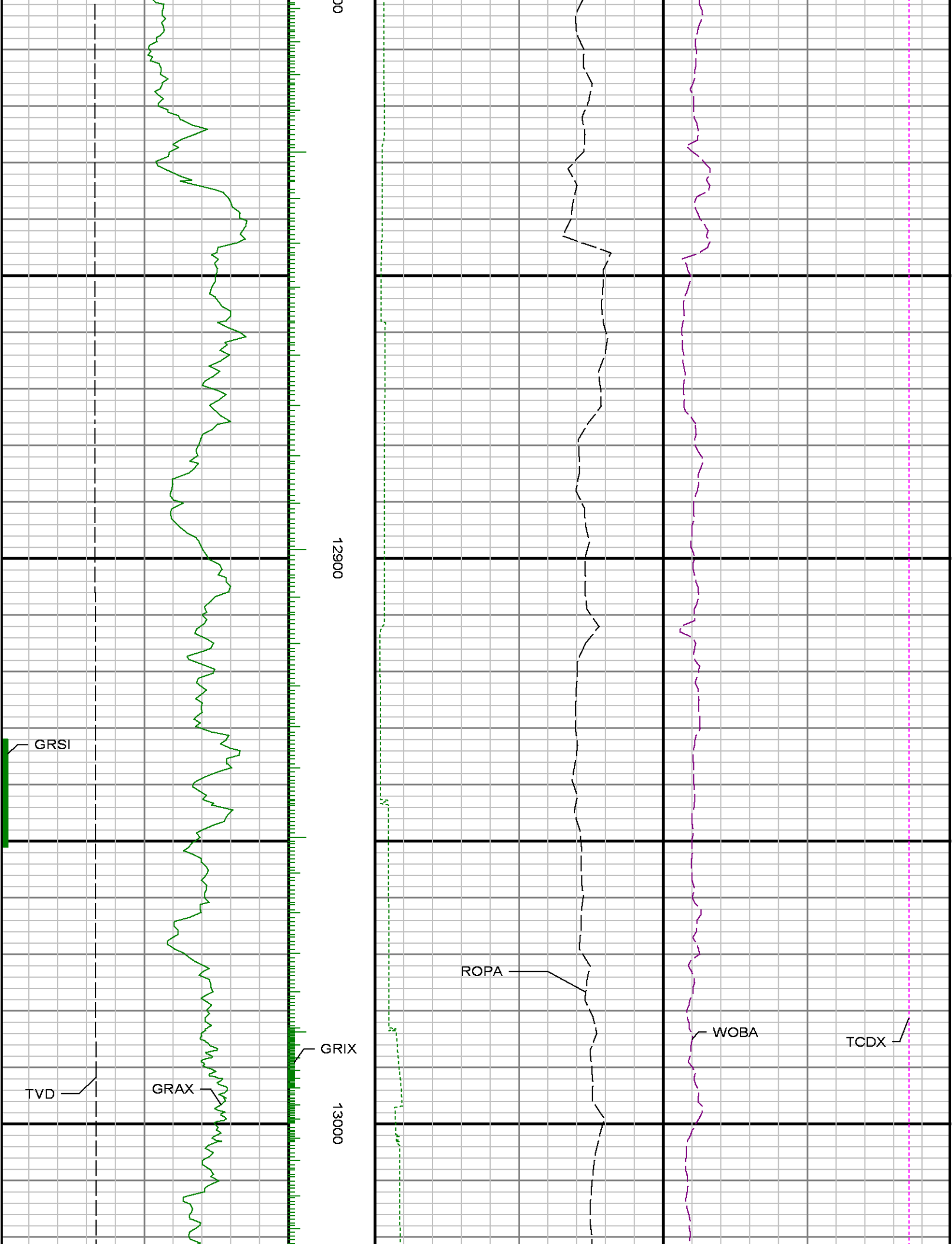


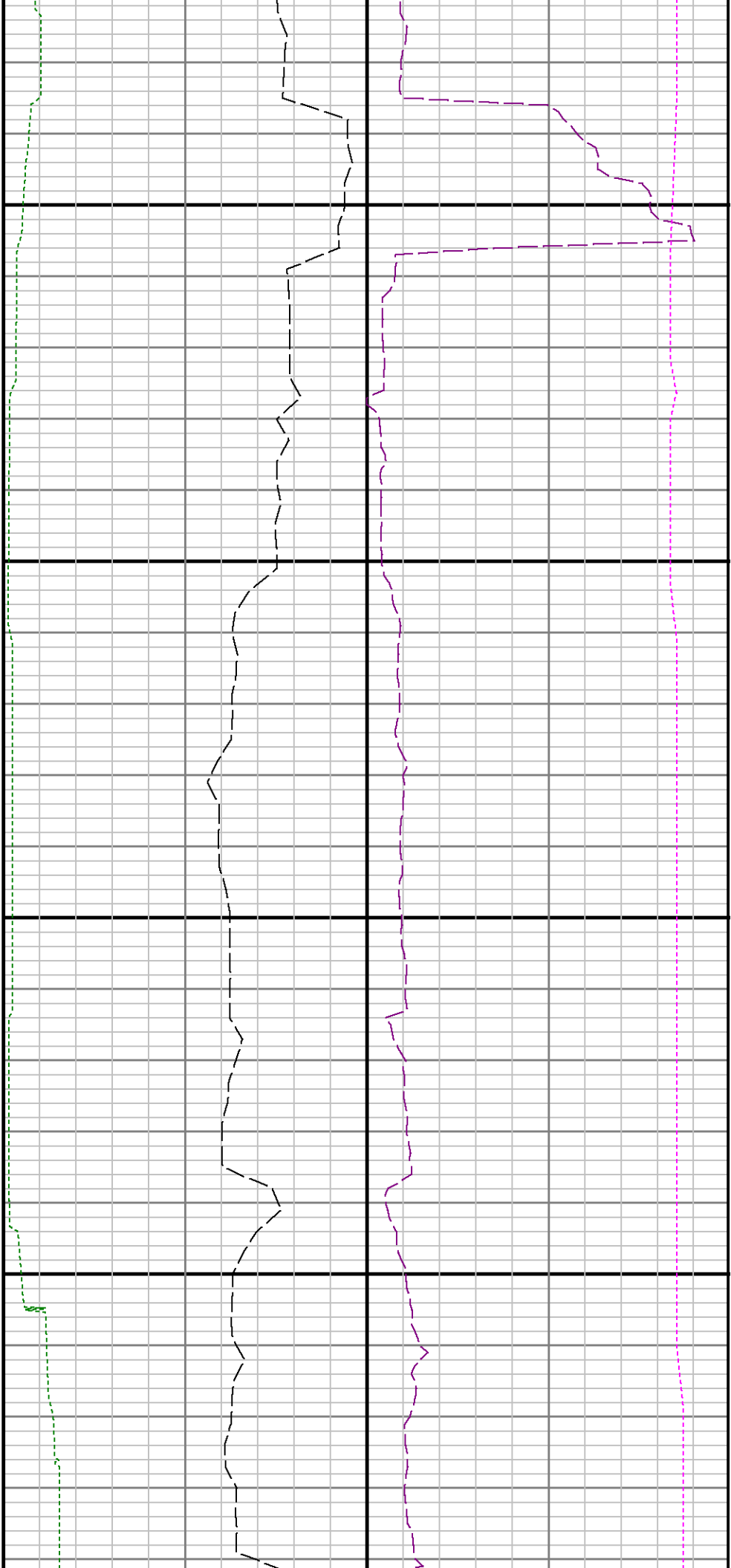
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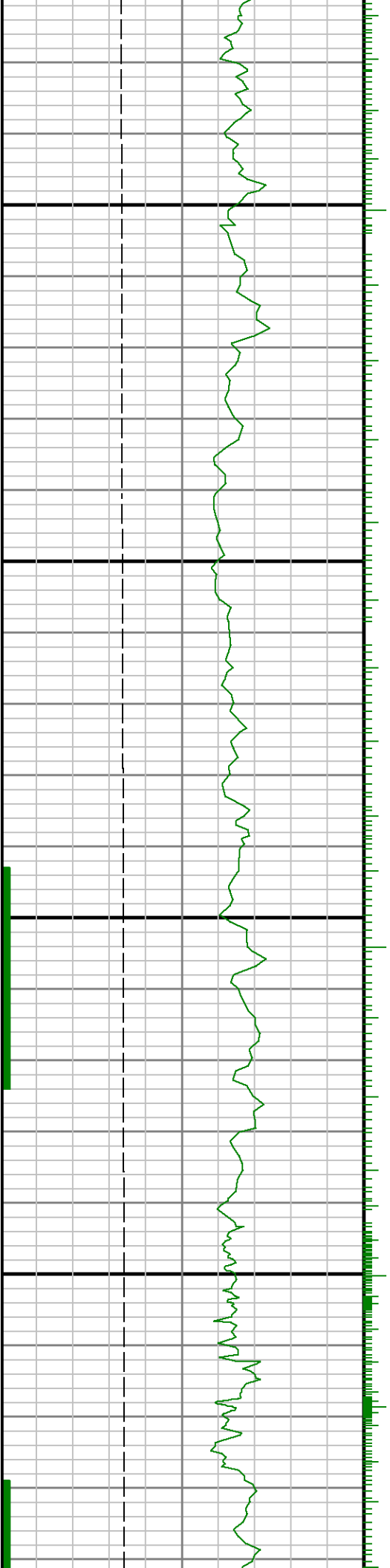


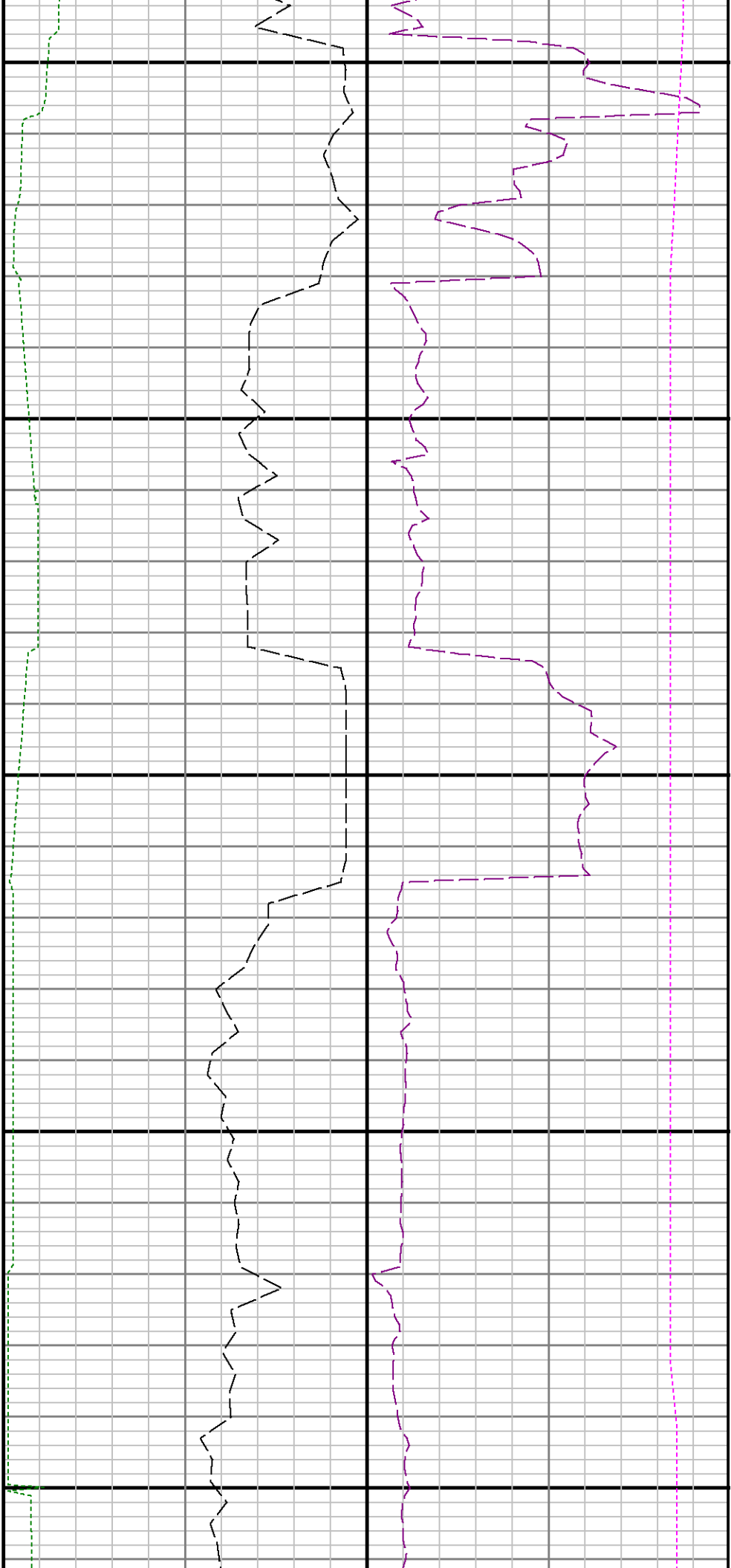




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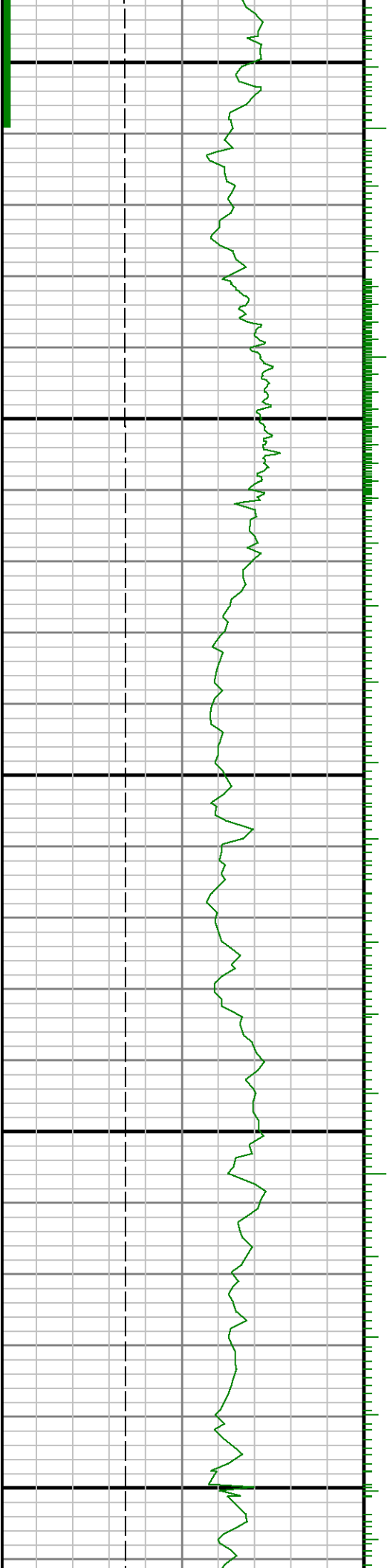
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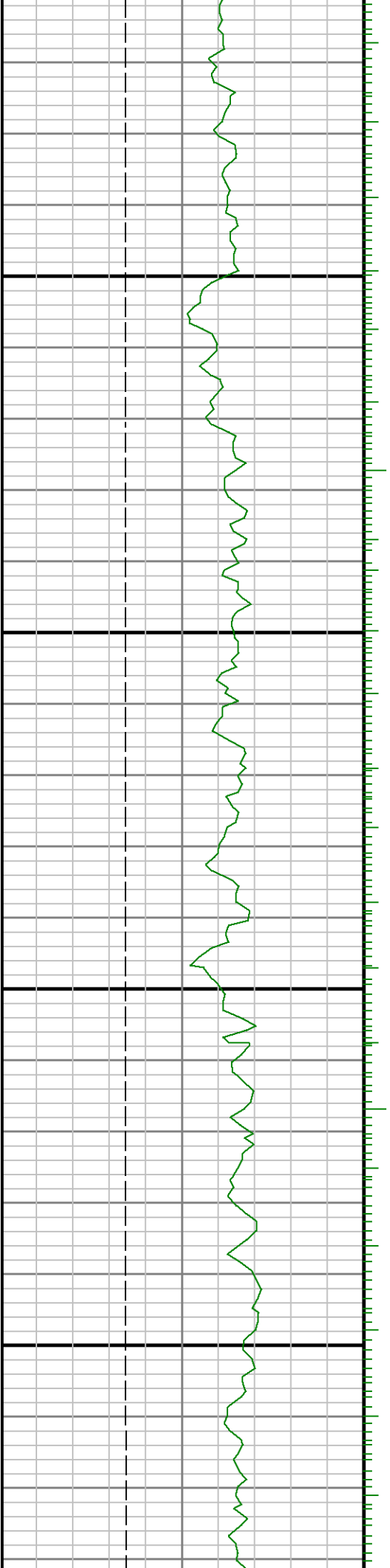
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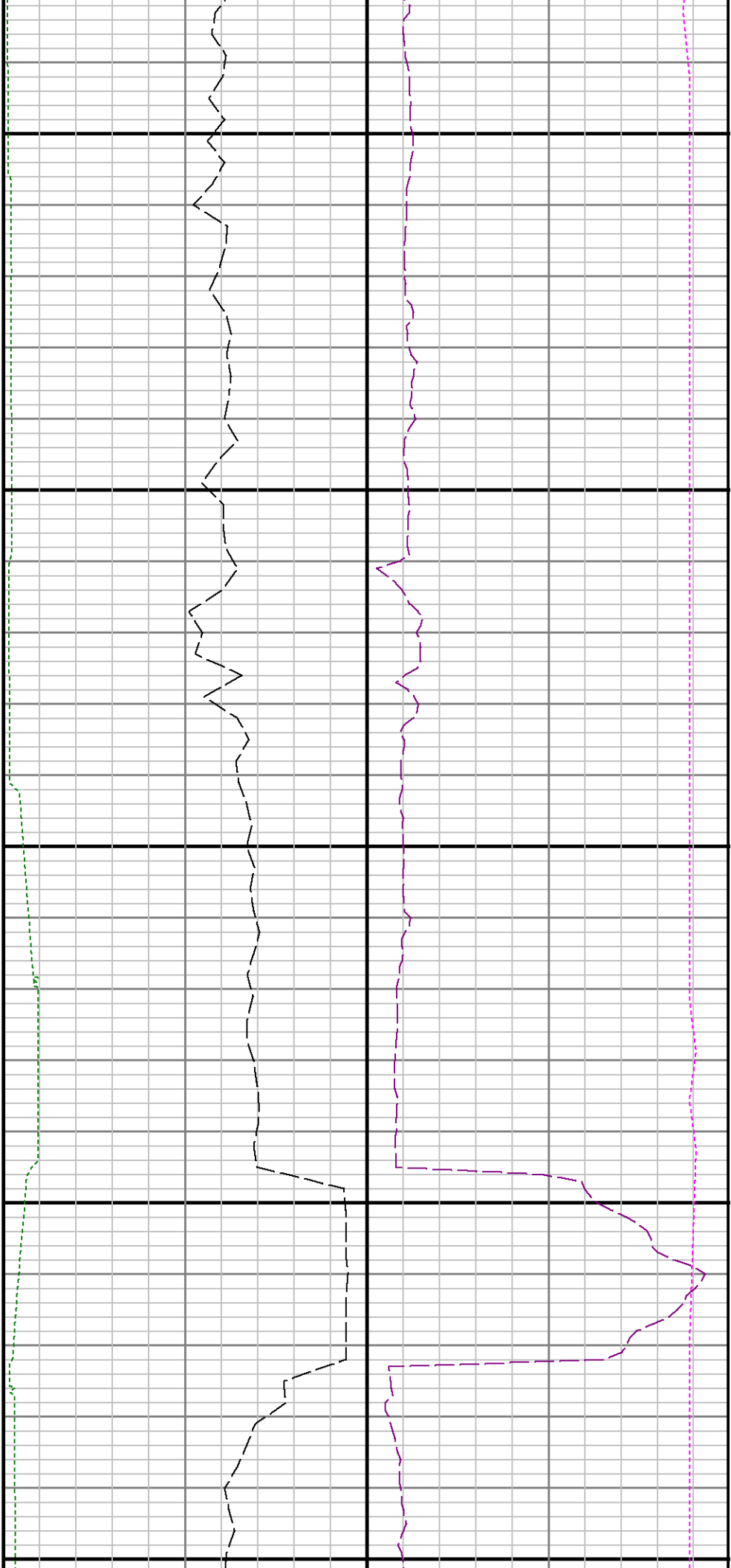


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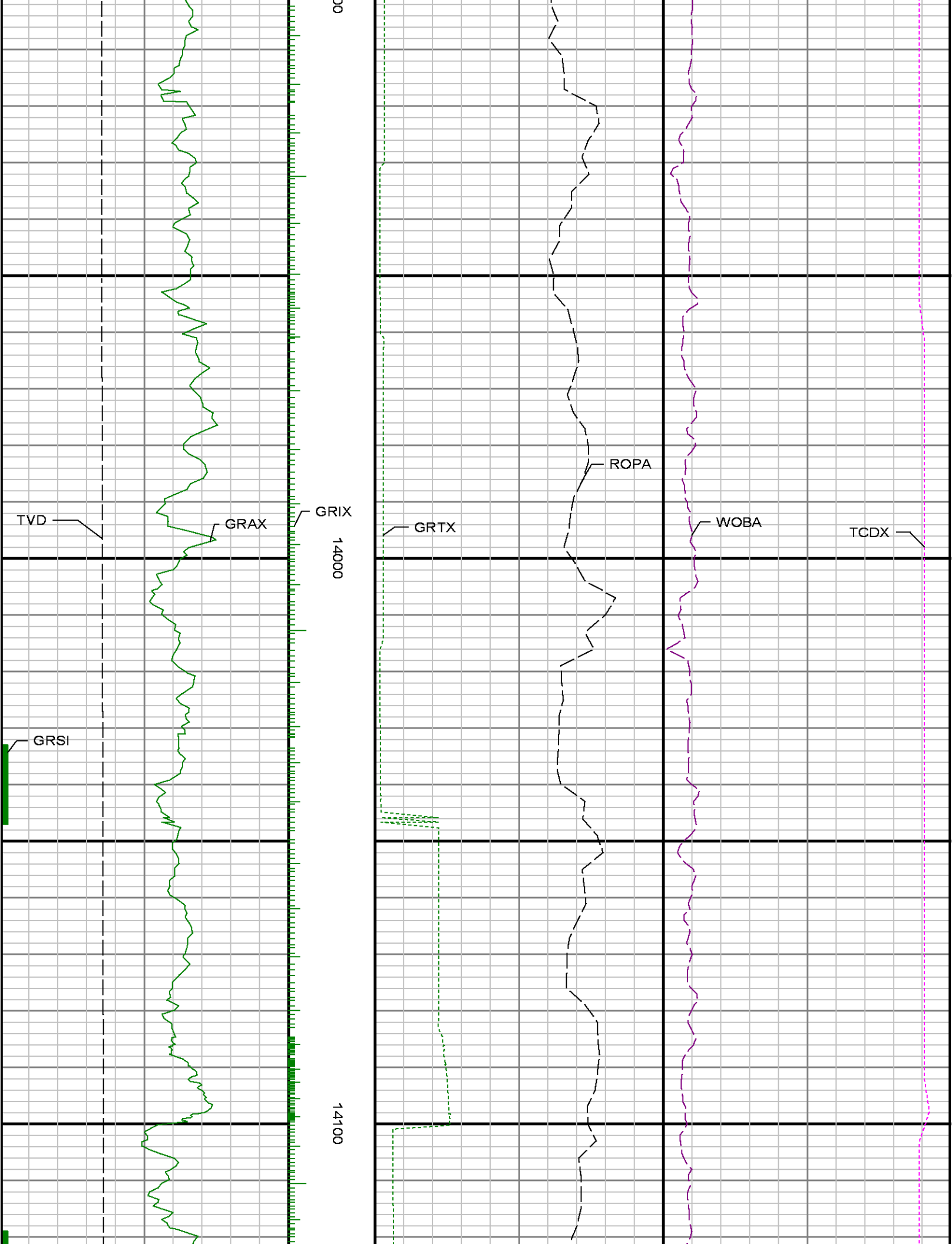


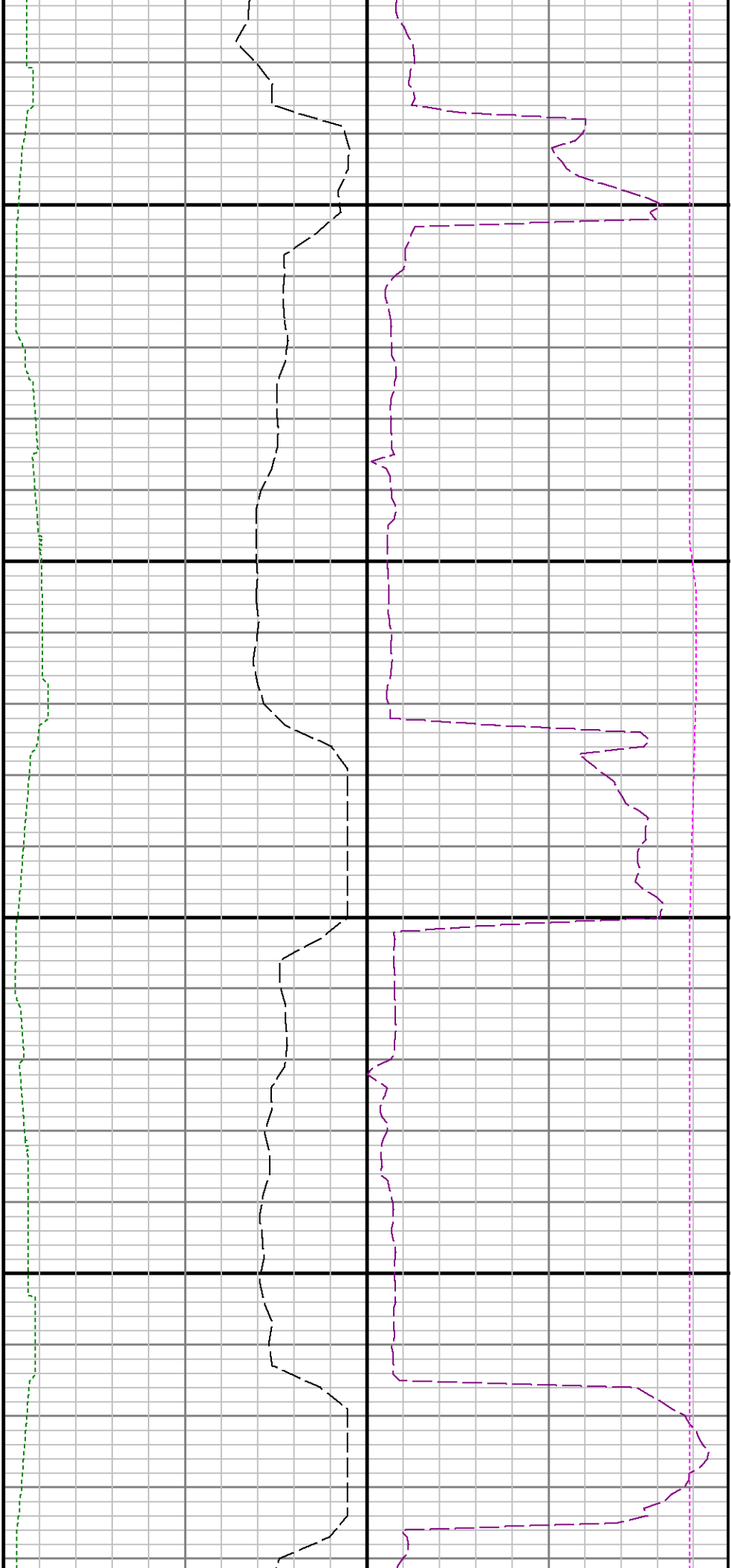


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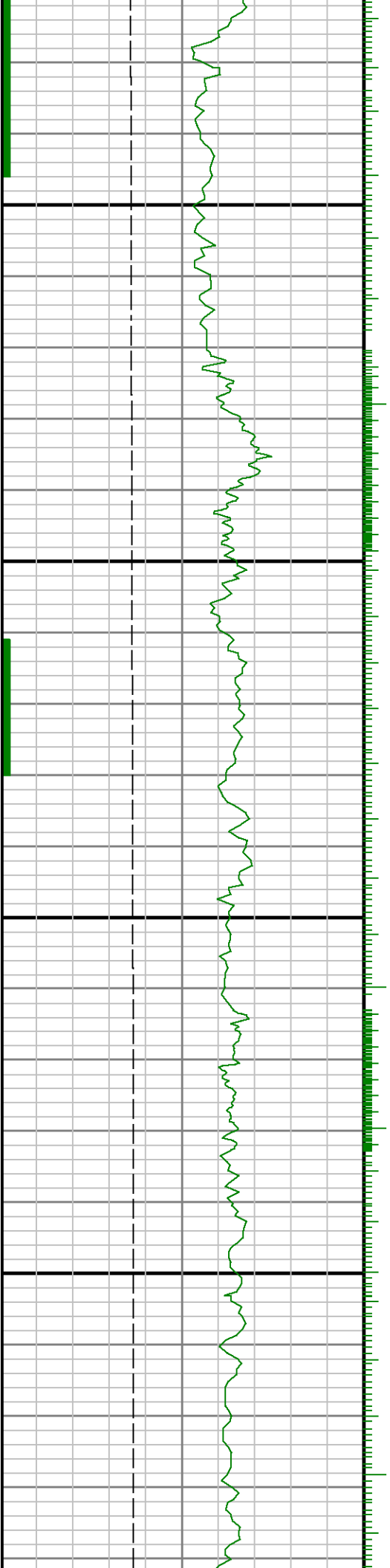
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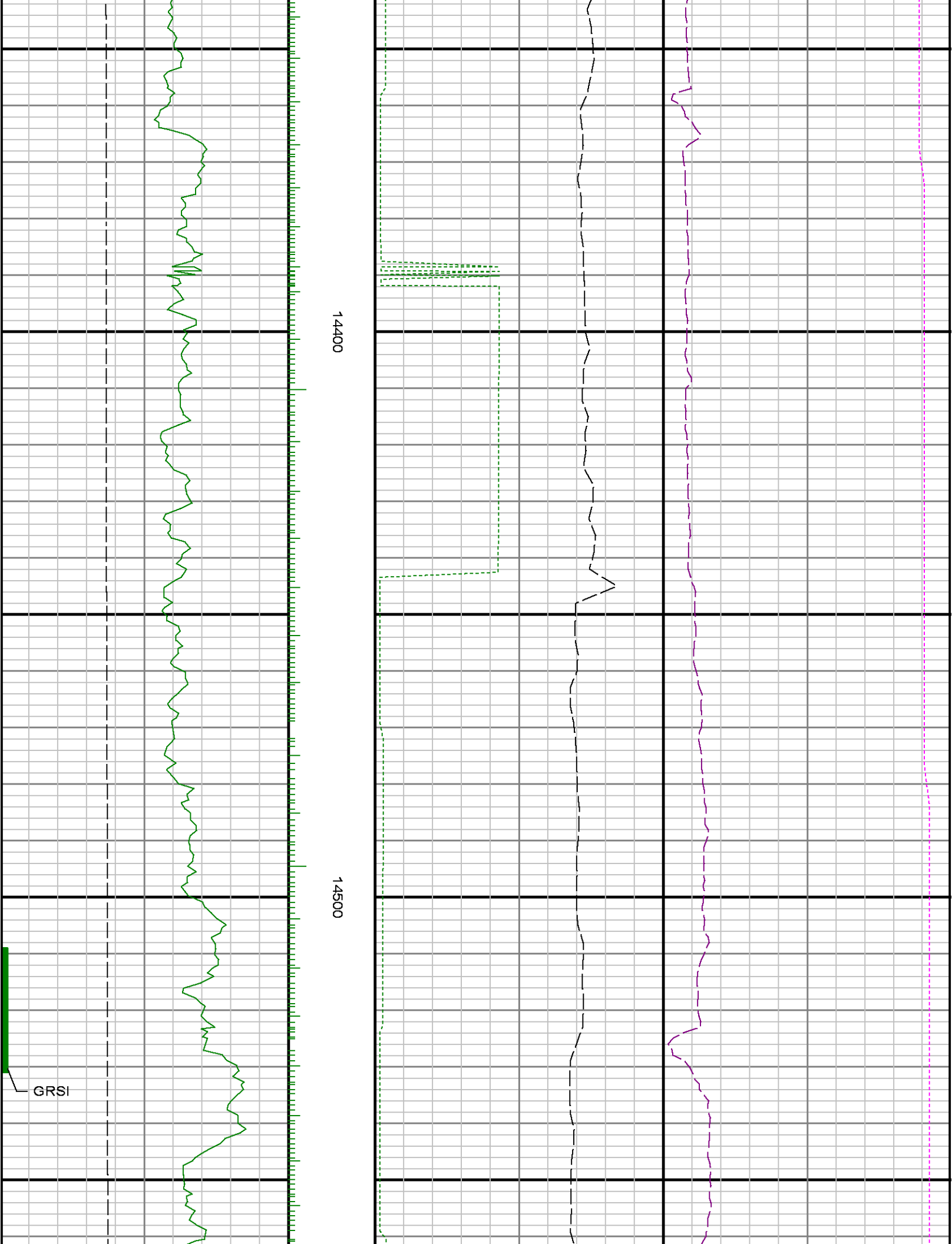


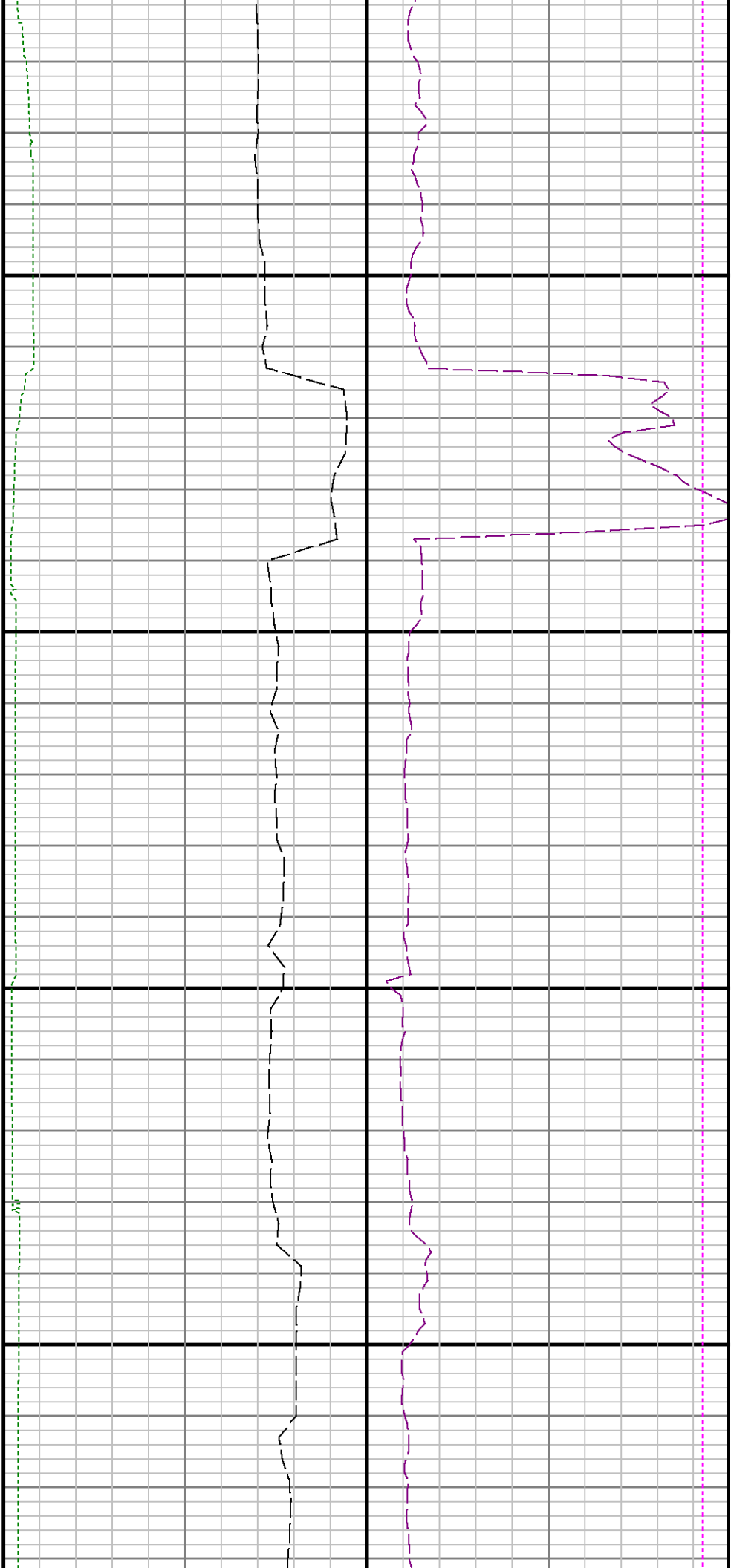


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