



Gamma Ray

LWD Memory Logs

Company: Confluence Resources

Well: Willow 22-5-4L

Field: Wattenberg

County: Weld State: Colorado Country: United States

Driller's Depth

Status: Final Print

Surface Location: 40° 01' 48.612" N
Longitude: 104° 39' 19.476" W
Azimuthal Gamma Ray

API No: 05123509420000
Job ID: 110892255
SEC: 22 TWN: 1N RGE: 65W

Permanent Datum (P.D.): Mean Sea Level
Elevation: 0.00 ft
Above P.D.: 5118.00 ft

Log Measured From: Rig Floor
Elev. KB: 5118.00 ft
Elev. DF: 5095.00 ft
Elev. GL:

Interval
Magnetic Field Reference
From: 2021-05-20 Drilled (ft) 105.00 Logged (ft) 105.00 Azi Reference North: True Dip Angle: (deg) 66.28
To: 2021-06-21 Top: 105.00 Total Magnetic Field Strength: (nT) 51760
Spud: 2021-05-20 Bottom: 20206.00 Bottom: 20192.96 Mag to Reference North Correction: (deg) 7.96

Borehole Record
Casing Record
Hole Size (in) From (ft) To (ft) Size (in) Weight (lb/ft) From (ft) To (ft)

26.000	23.00	103.00	16.000	36.00	23.00	103.00
13.500	103.00	1574.00	9.625	36.00	23.00	1564.00

Mud Record
Deviation Record
Type From (ft) To (ft) Hole Size (in) Interval (ft) Inc | Az (Start) Inc | Az (End)

Water Based Mud	103.00	1574.18	13.500	1471.18	0.51	157.56	3.10	211.84
Oil Based Mud	1574.00	20205.00	8.500	18631.00	3.10	211.84	90.74	0.22

Acquisition System Software Version Other
Cadence RT 5.9 Ensign 161
Plot Studio 5.9.9111.3 Contractor: Ensign Drilling Unit: D&E
District: RMA

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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 (h)
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1RR	13.500	PDC	3.00	Steerable	105.00	1574.00	105.00	1574.00	2021-05-20 16:56	2021-05-20 23:38	9.21
2	2	8.500	PDC	3.00	AutoTrak Curve	1562.00	20193.00	1575.00	20206.00	2021-06-16 12:04	2021-06-21 09:25	106.40

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adam Schlenz	2021-05-20	2021-05-21	David Browning	2021-06-16	2021-06-22			

Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2021-05-21 02:00	1	1574.00	Water Based Mud	9.2	N/A	7.5	N/A	99/1	Active Pit	695	0.00
2021-06-16 06:22	2	1564.00	Oil Based Mud	9.8	24	N/A	9.0	68.5/18.5	Active Pit	35000	0.00
2021-06-16 14:00	2	1905.00	Oil Based Mud	9.7	21	N/A	N/A	67/18	Active Pit	33000	0.00
2021-06-17 04:00	2	5929.00	Oil Based Mud	9.7	21	N/A	N/A	65/20	Active Pit	37000	0.00
2021-06-17 15:00	2	7450.00	Oil Based Mud	9.7	25	N/A	N/A	67/18.5	Active Pit	35000	0.00
2021-06-18 02:30	2	8685.00	Oil Based Mud	9.7	23	N/A	N/A	68/17.5	Active Pit	35000	0.00
2021-06-19 02:00	2	13092.00	Oil Based Mud	10.0	22	N/A	N/A	68/15.5	Active Pit	36000	0.00
2021-06-19 14:00	2	14632.00	Oil Based Mud	10.0	23	N/A	N/A	67/16	Active Pit	33000	0.00
2021-06-20 02:30	2	16453.00	Oil Based Mud	10.1	21	N/A	N/A	68/15.5	Active Pit	35000	0.00
2021-06-20 15:00	2	18405.00	Oil Based Mud	10.1	23	N/A	N/A	67/16	Active Pit	34000	0.00

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	DHP 815	VSS	16.12	52.25	8.000	3.125
1	NaviTrak	DHP 815	Directional (mag)	16.12	52.25	8.000	3.125
2	AutoTrak Curve Steering Unit	13867779	Near Bit VSS	5.93	6.90	7.000	4.330
2	AutoTrak Curve Steering Unit	13867779	Near Bit Inclination	5.93	6.90	7.000	4.330
2	AutoTrak Curve MWD	12398256	Gamma (single)	2.75	13.04	7.000	3.250
2	AutoTrak Curve MWD	12398256	Directional (mag)	12.30	22.59	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

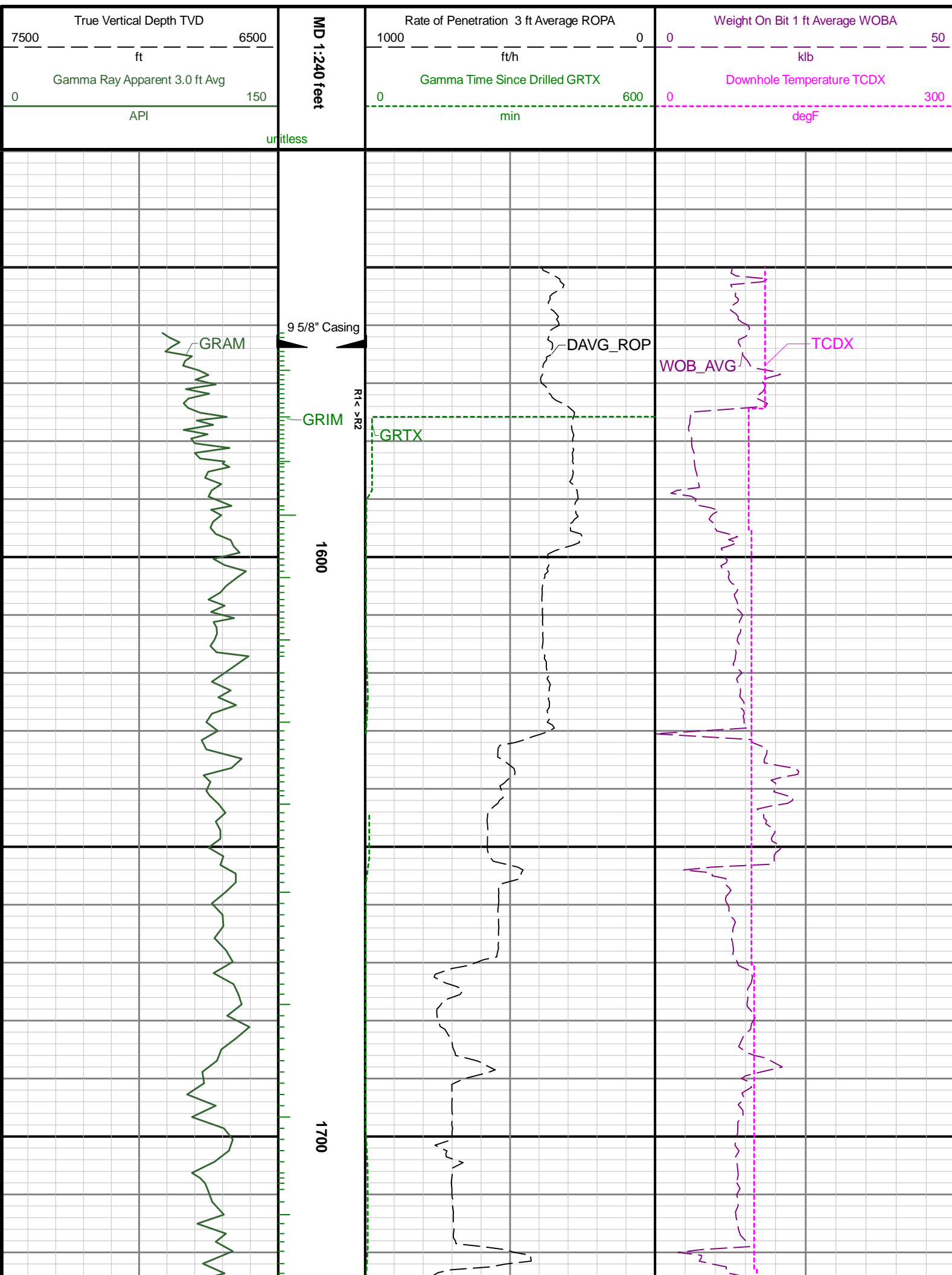
- 1 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes Company. Due to a lack of control by Baker Hughes Company logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes Company are being used to present logging data.
- 2 Baker Hughes Company run 2 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 1/2 inch PDC bit and steerable assembly from 1574 to 20205 feet MD (1571 to 7435 feet TVD).

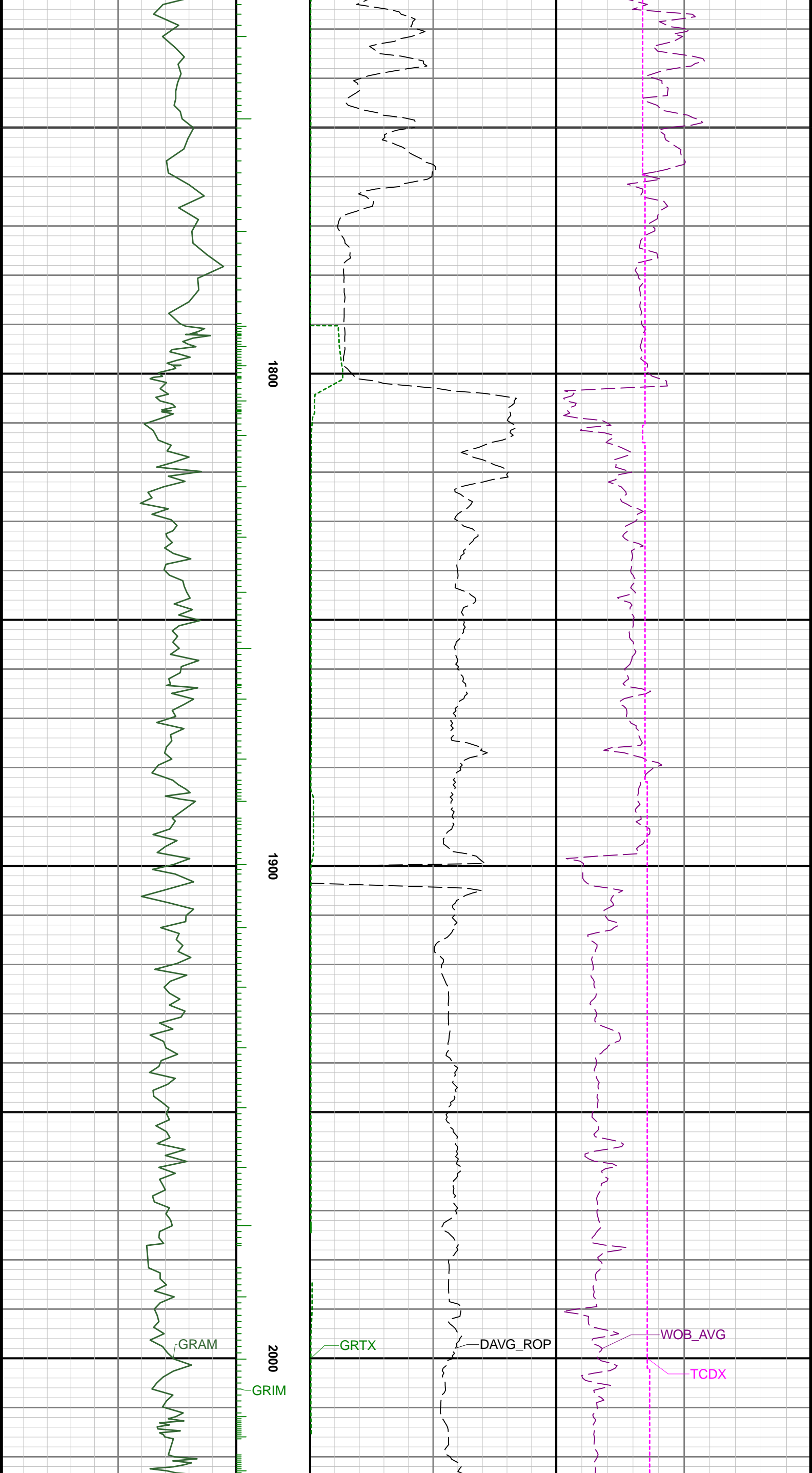
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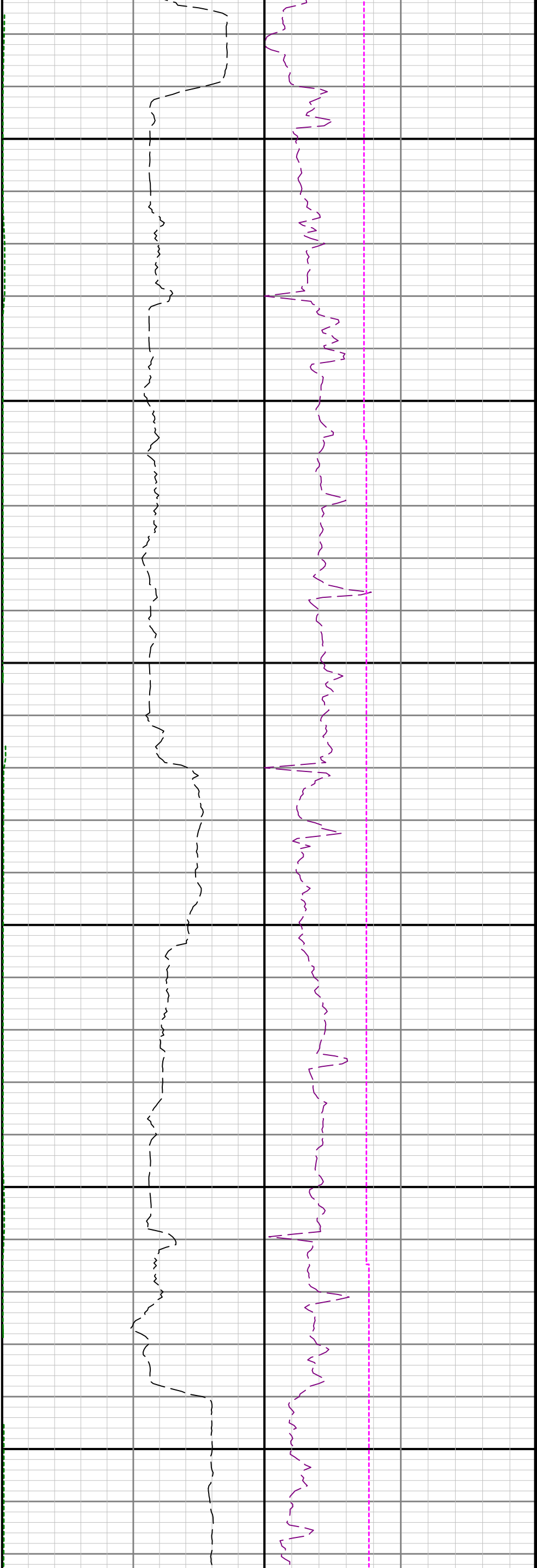
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	5700.00	8.500	2	The gap in gamma ray data from 5690 to 5738 feet MD (5681 to 5729 feet TVD) is due to the AutoTrak Curve tool turning off during a downlink and not turning back on until pumps were recycled at the connection.
2	20205.00	8.500	2	The interval from 20193 to 20205 feet MD (7436 feet TVD) was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

Presented Curves	Description	Units
TCDX	Downhole Temperature	degF
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	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTX	Gamma Ray - Time Since Drilled - Real-Time	min



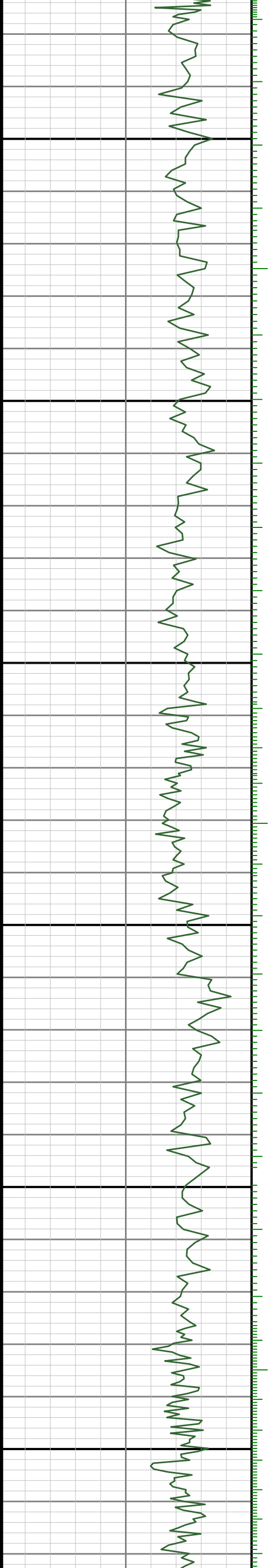


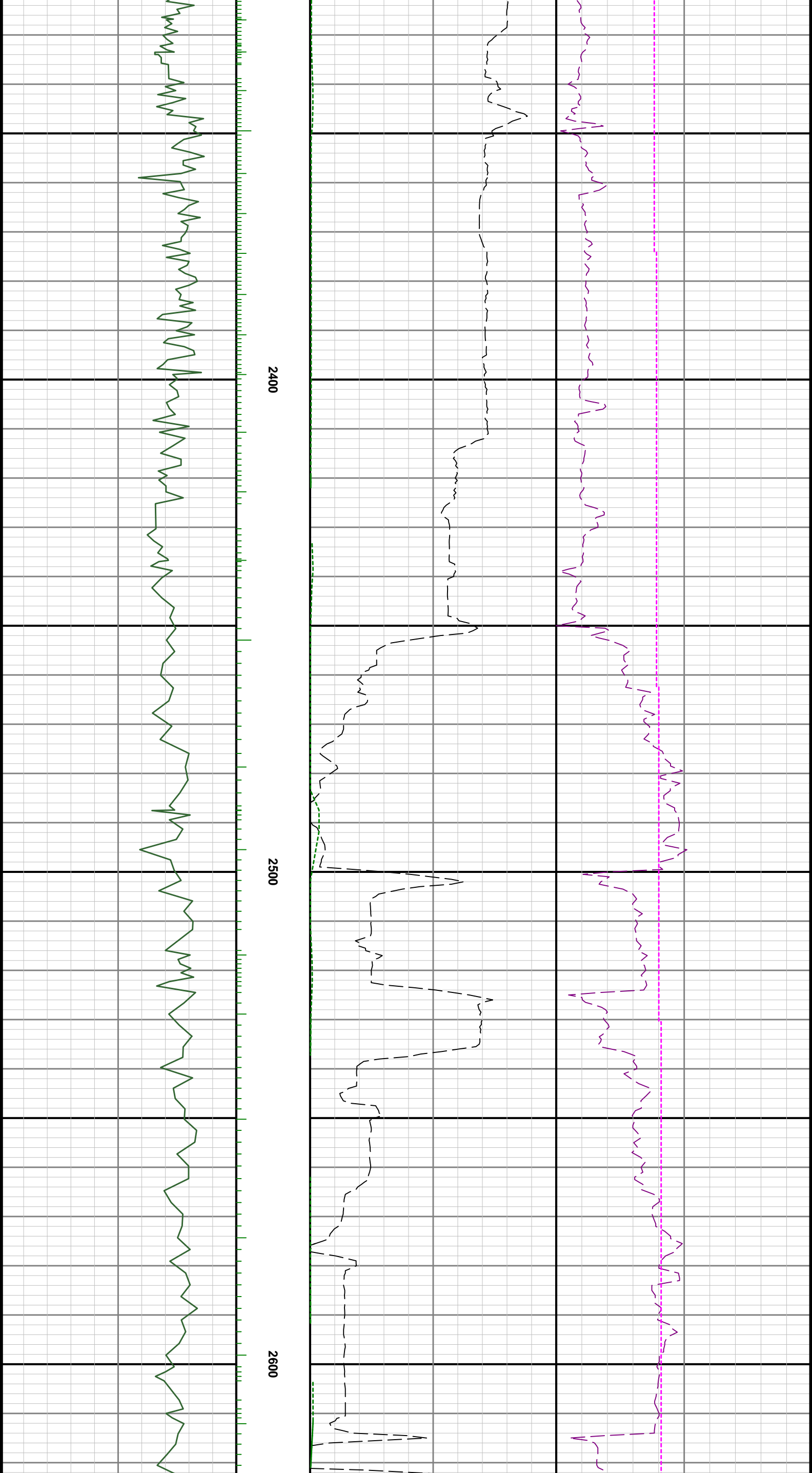


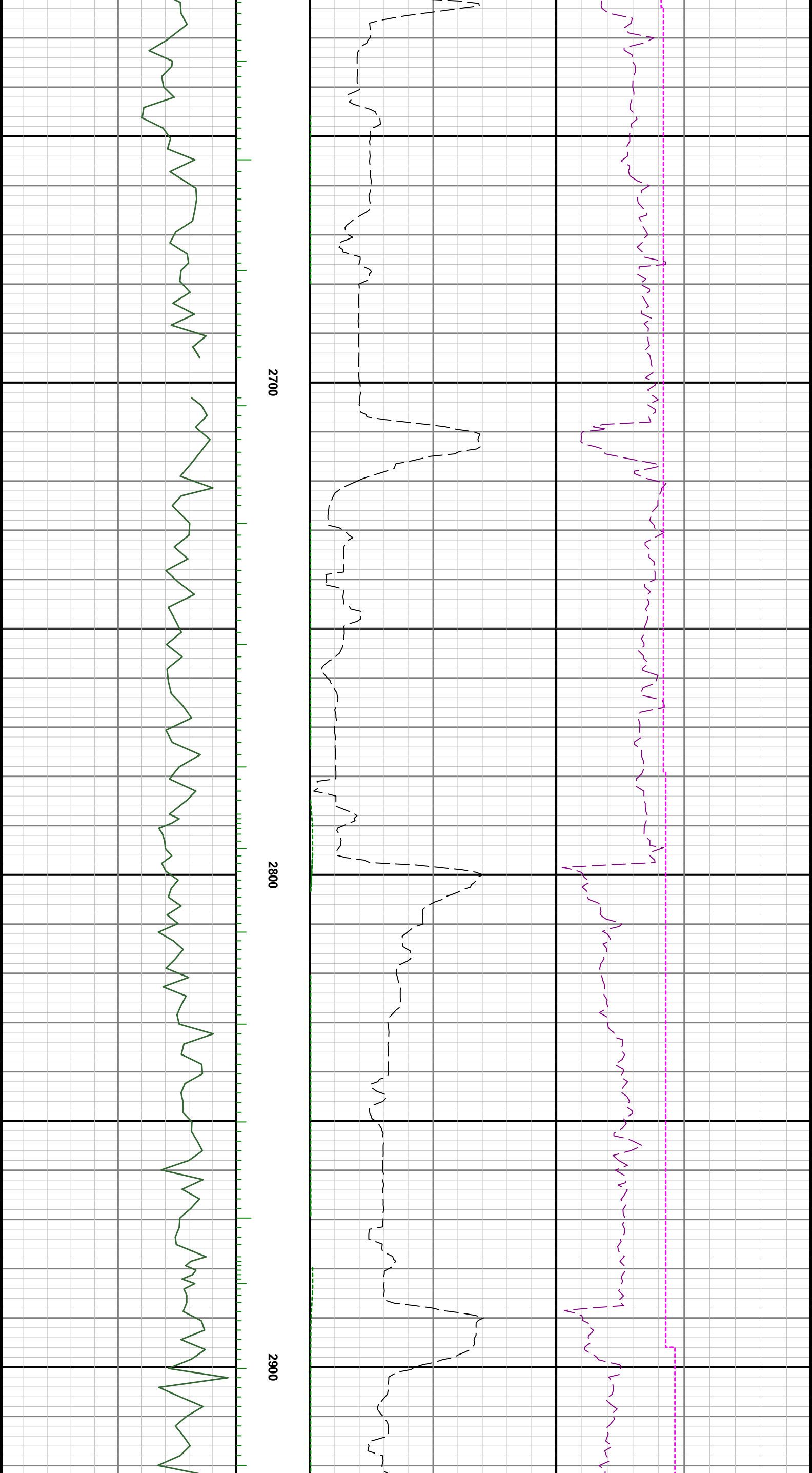
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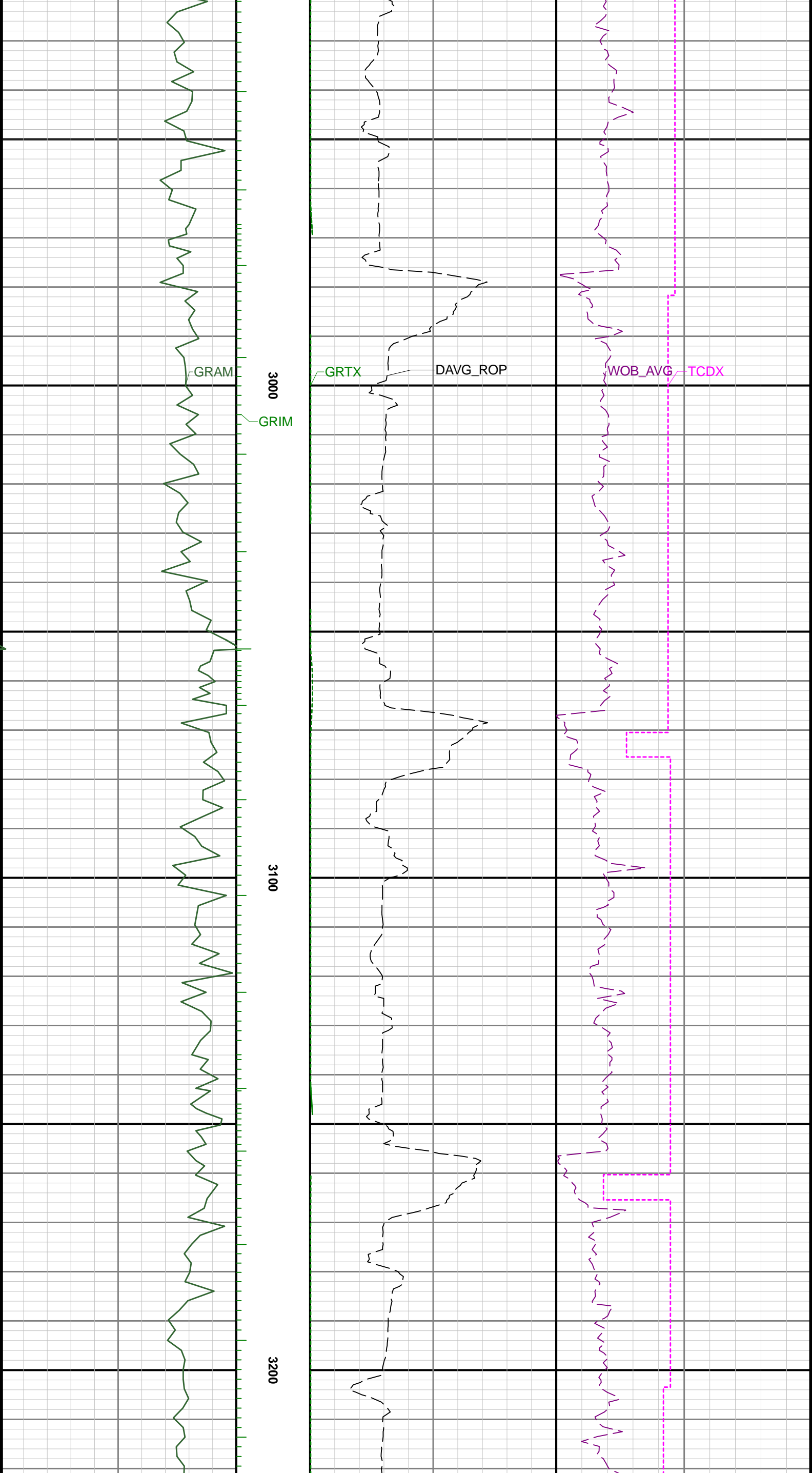
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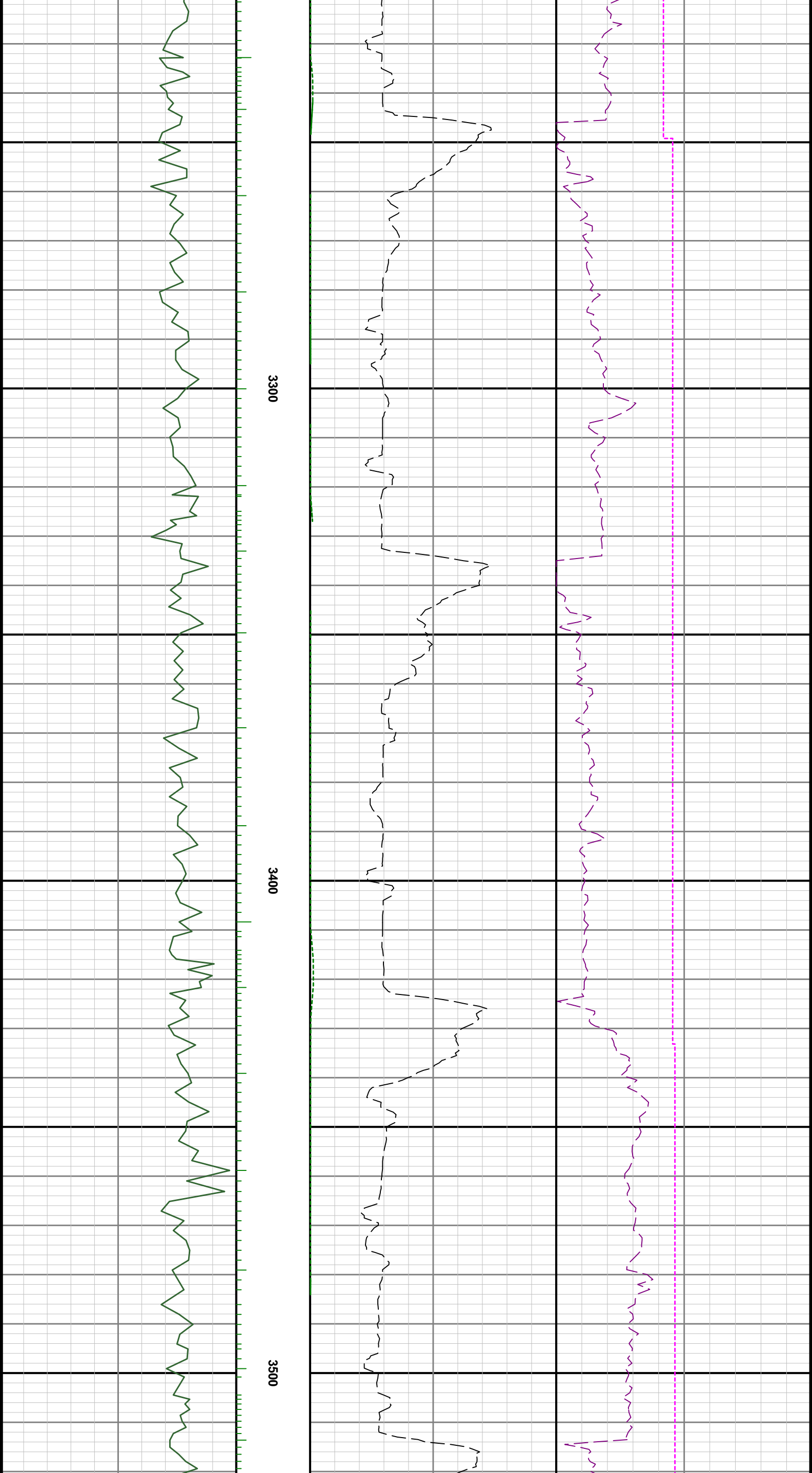
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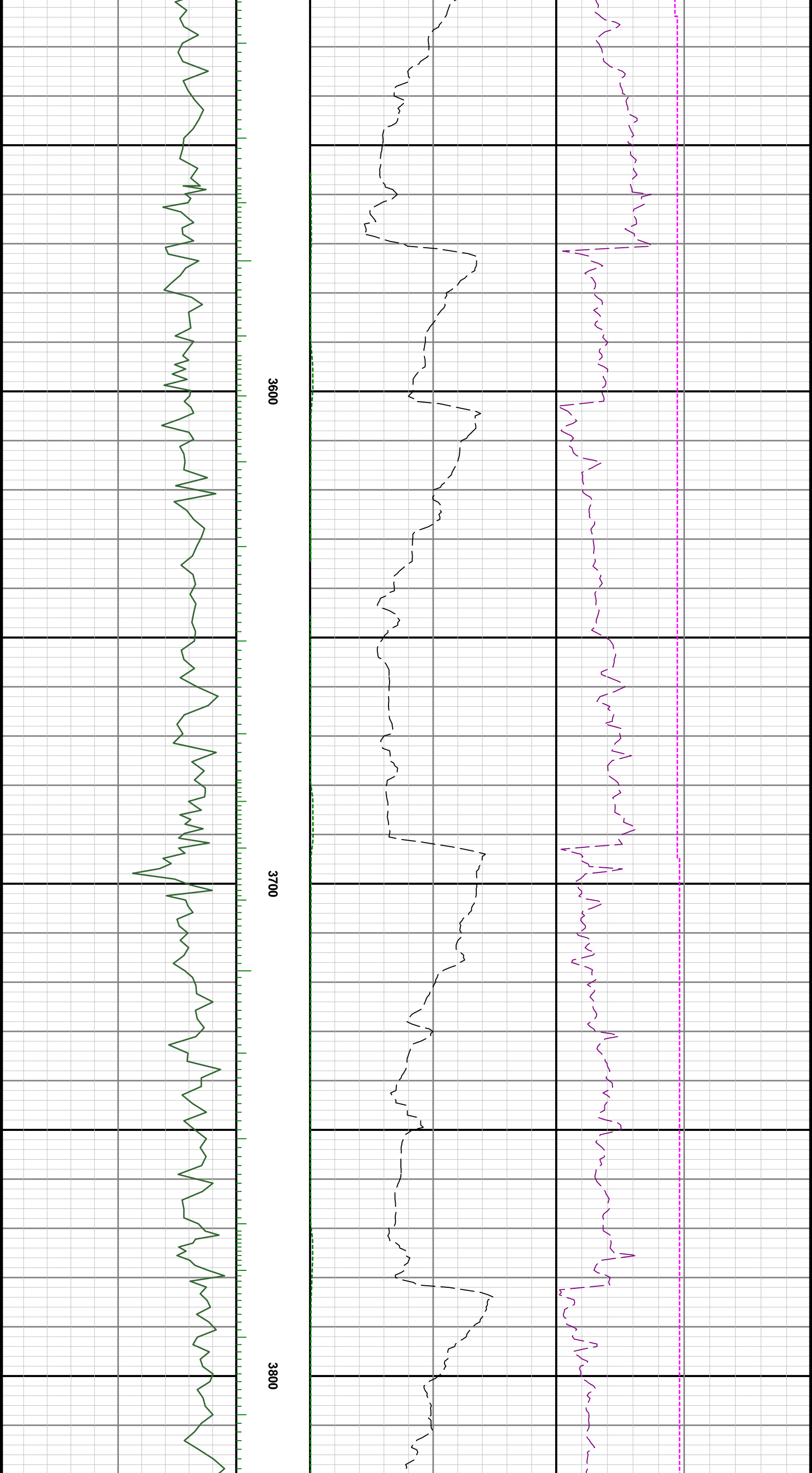


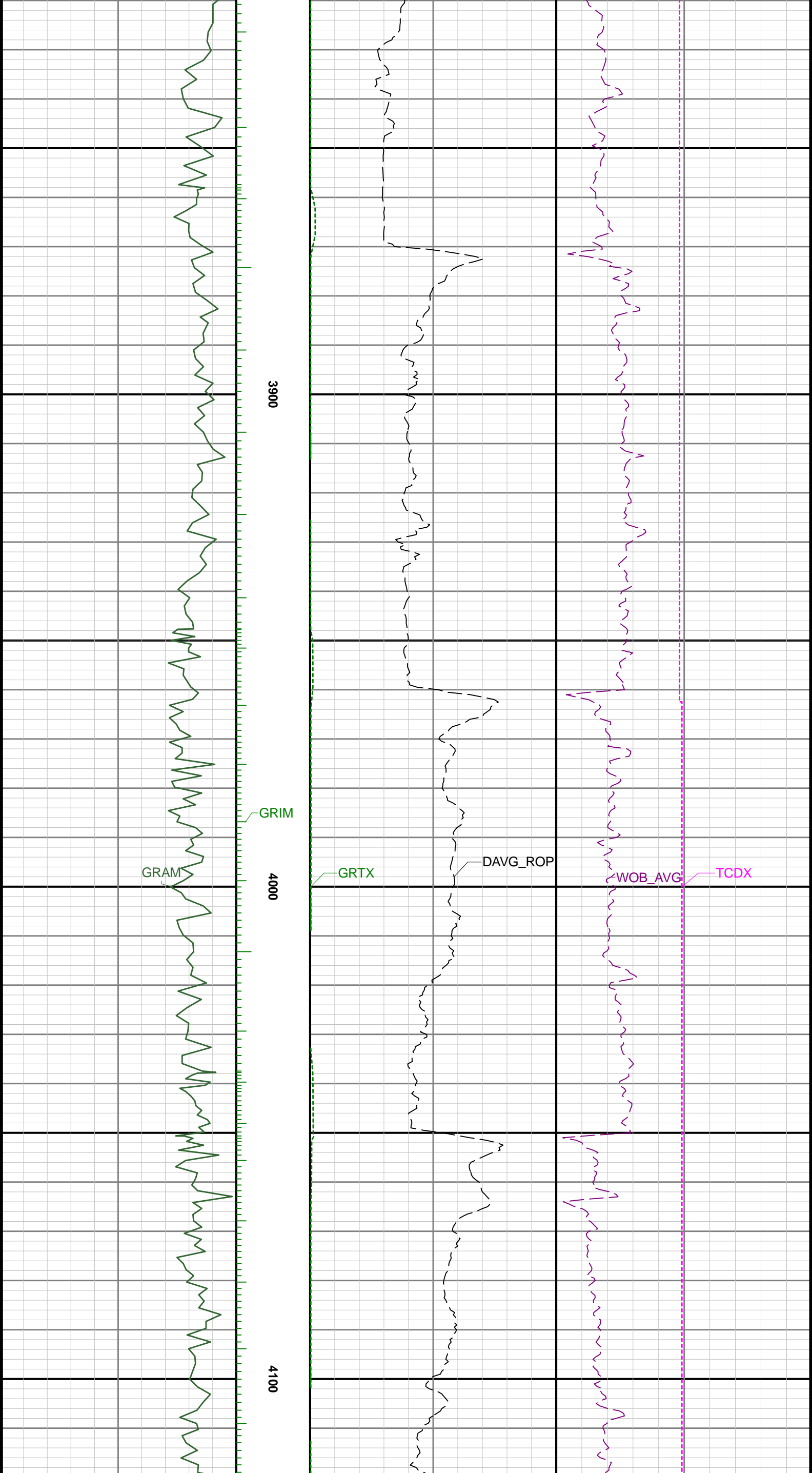


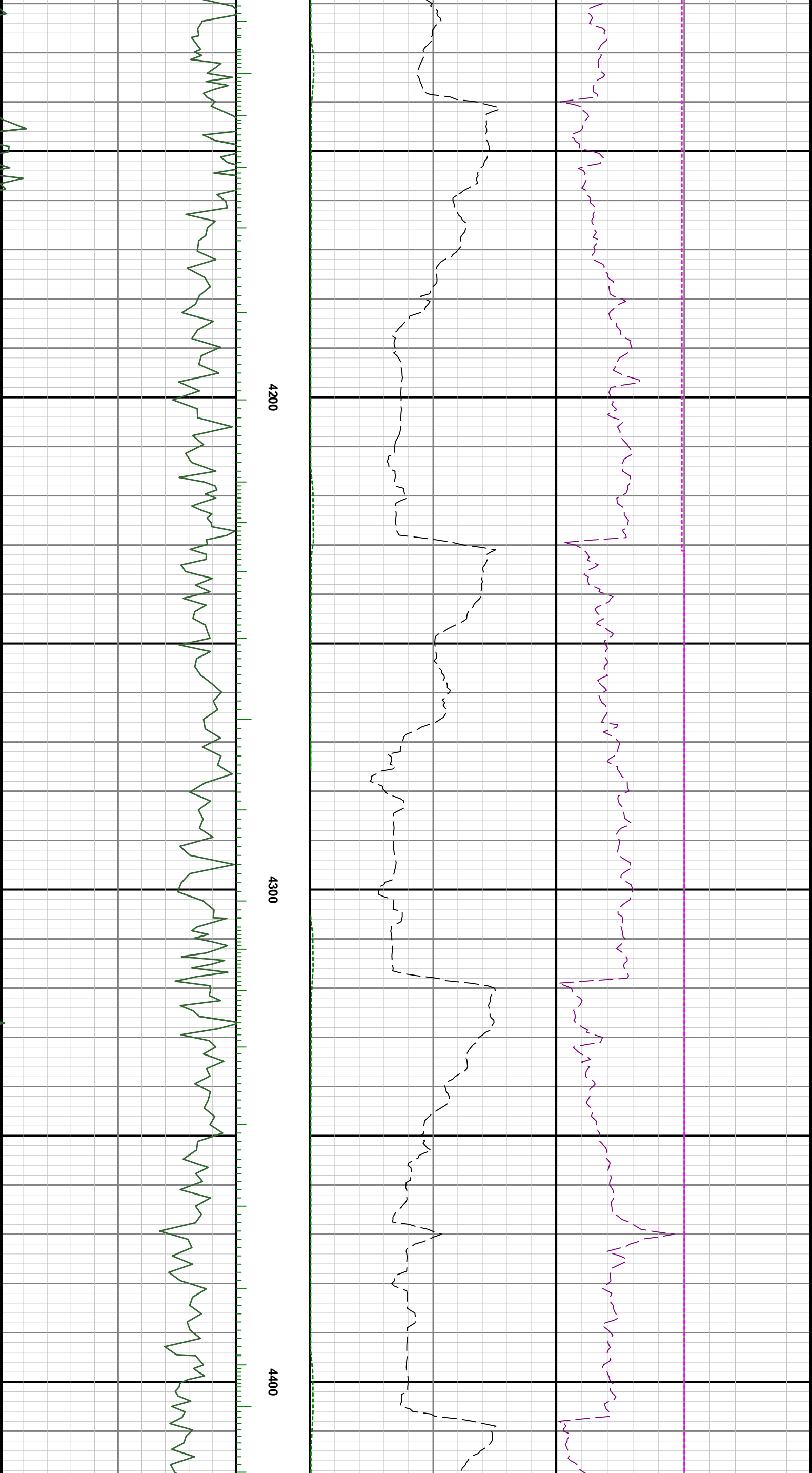


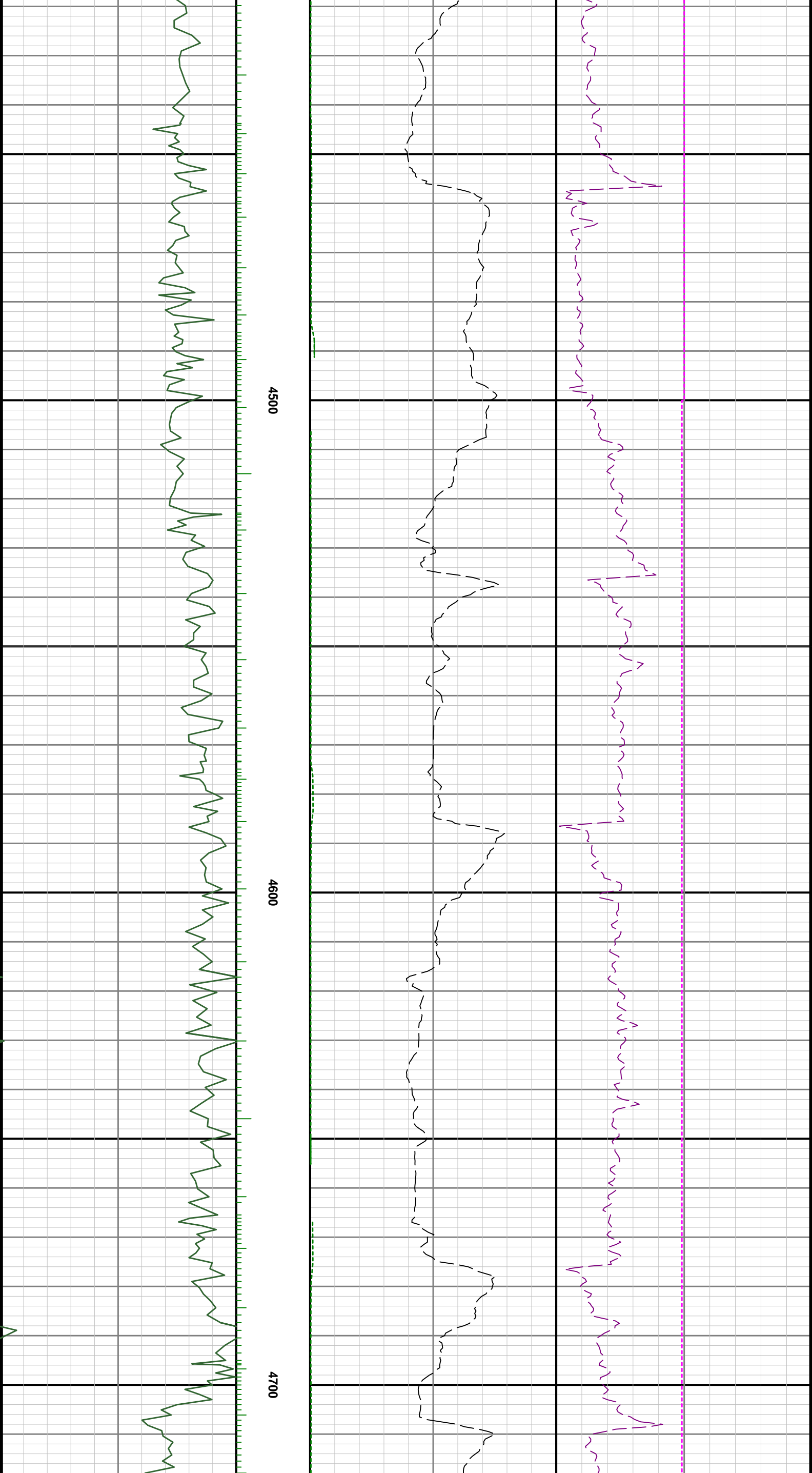


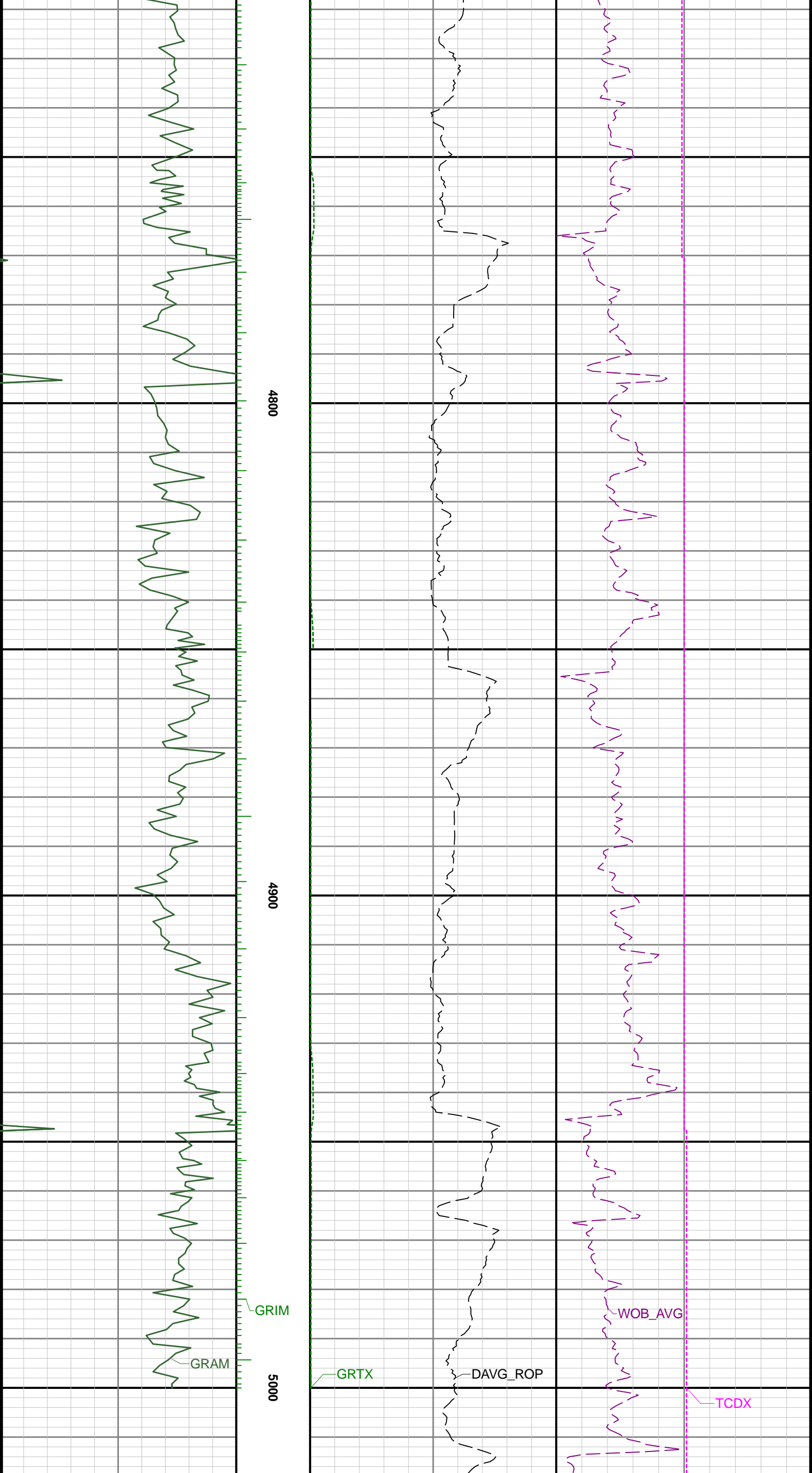


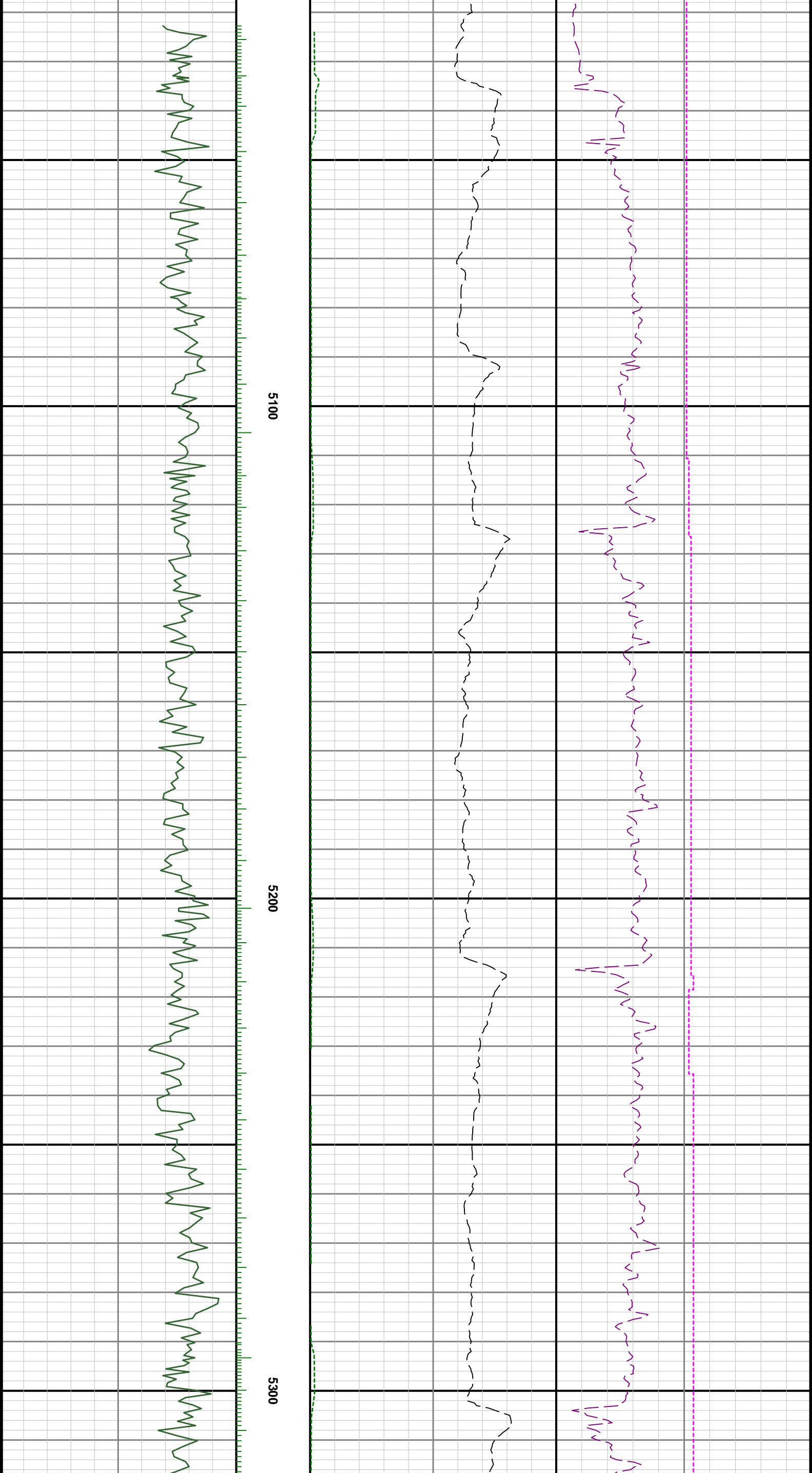


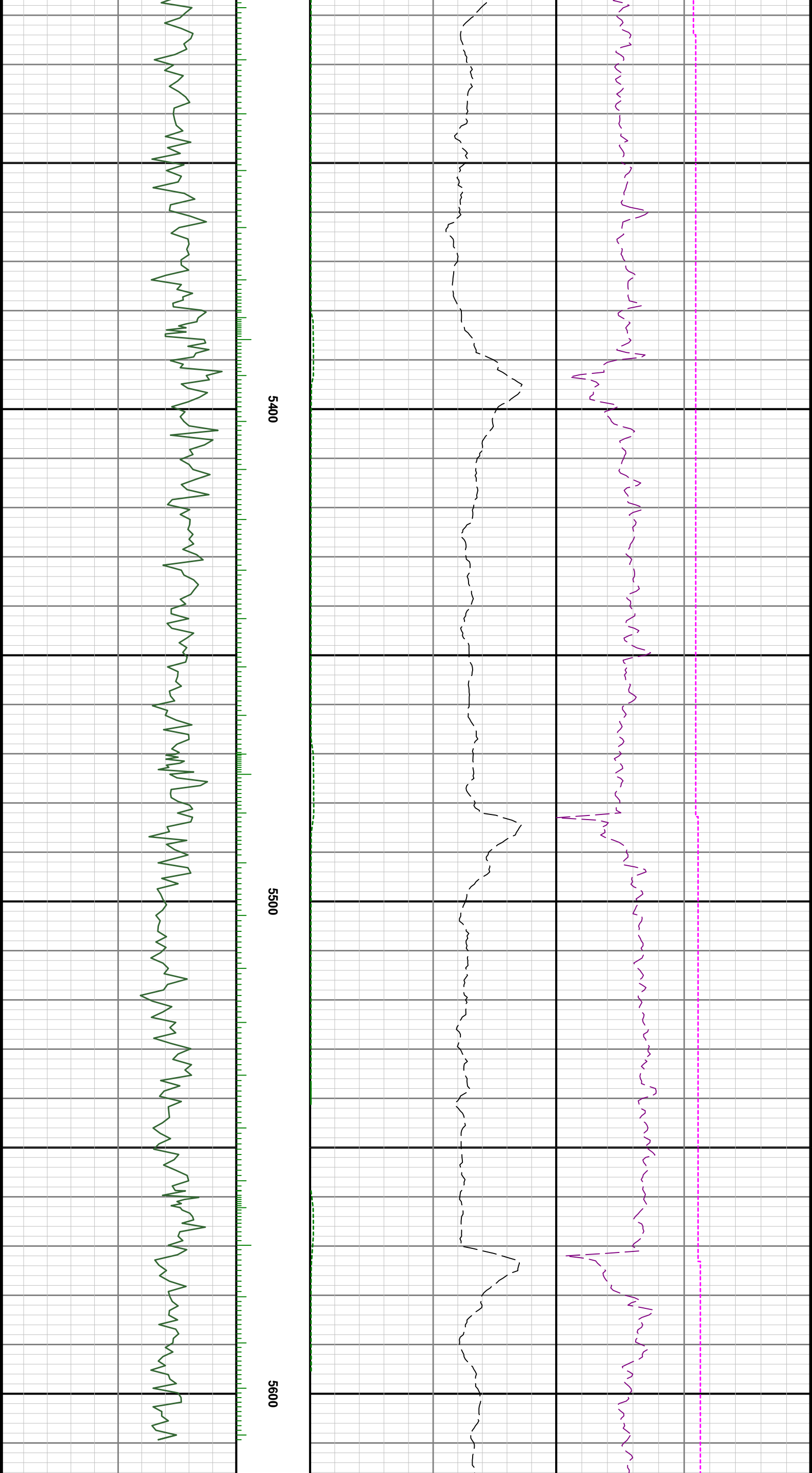


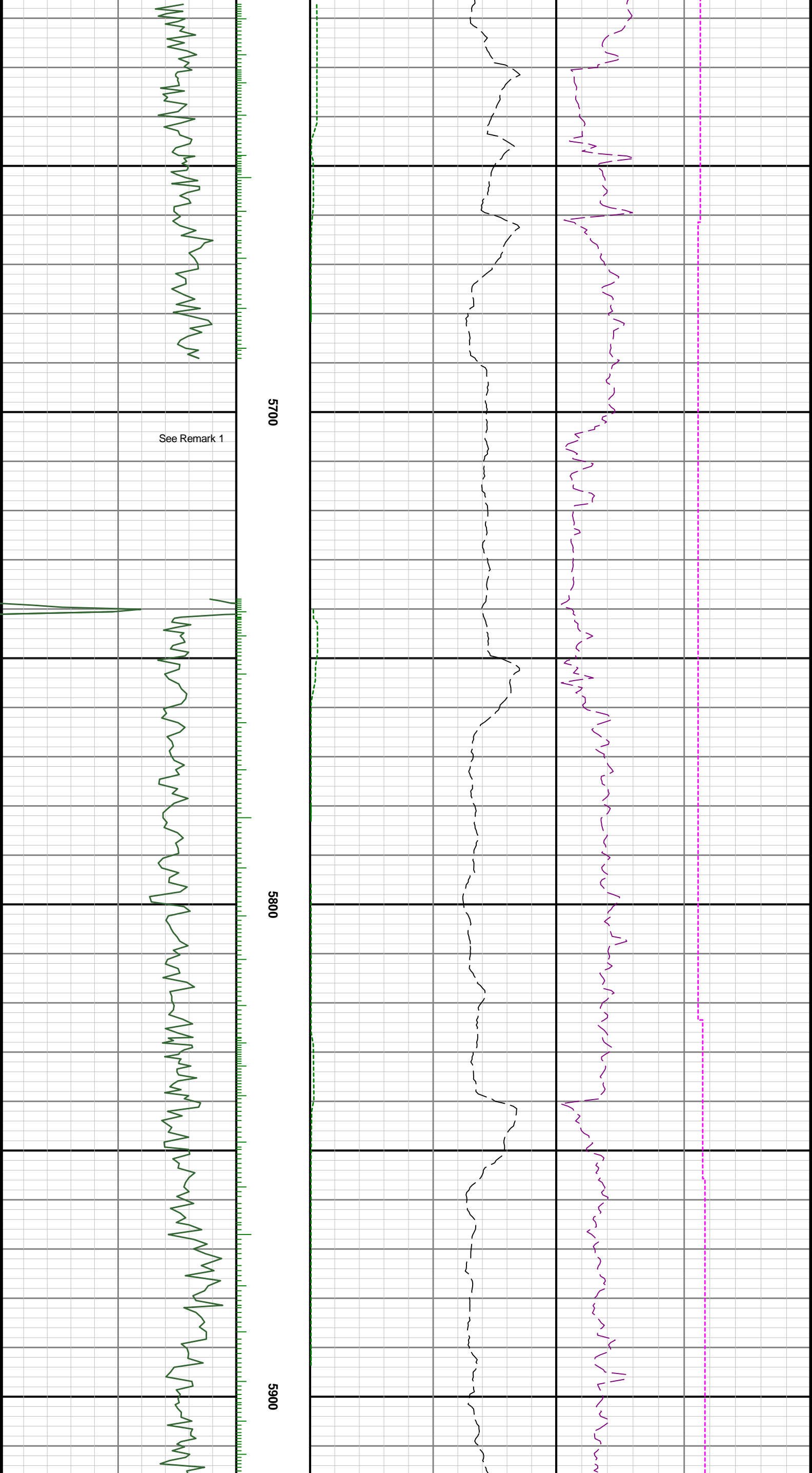










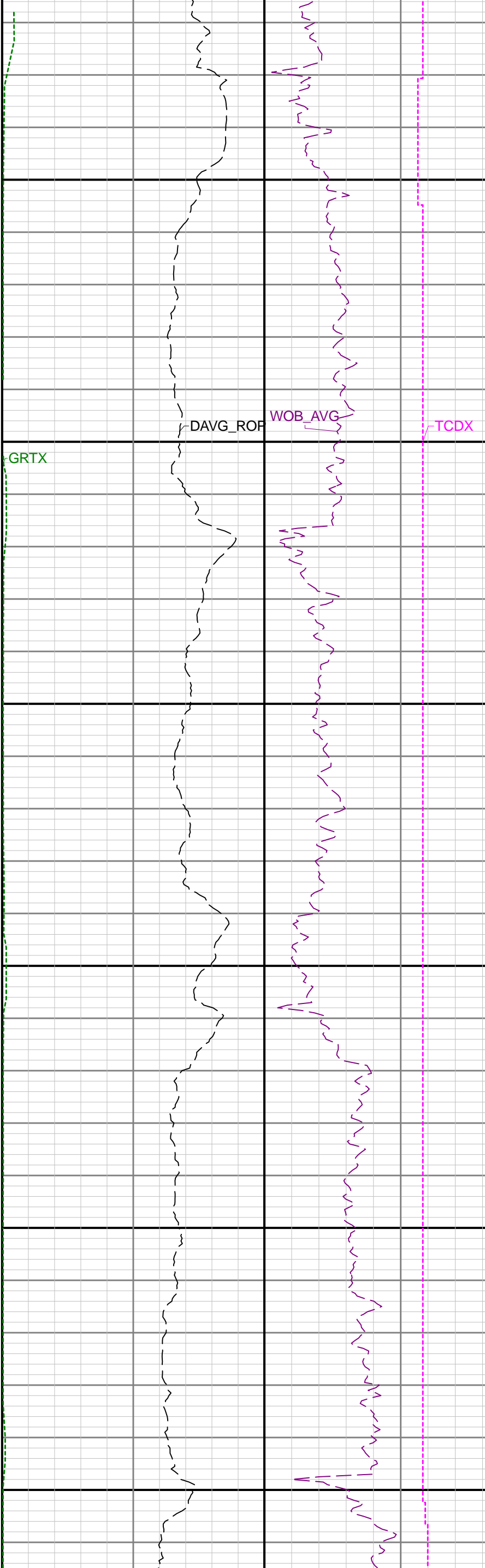
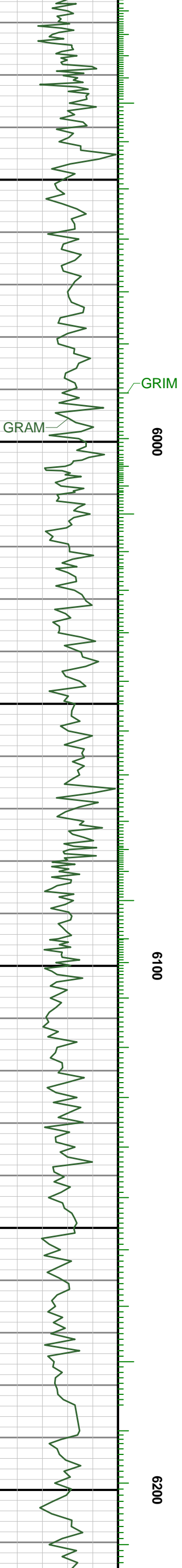


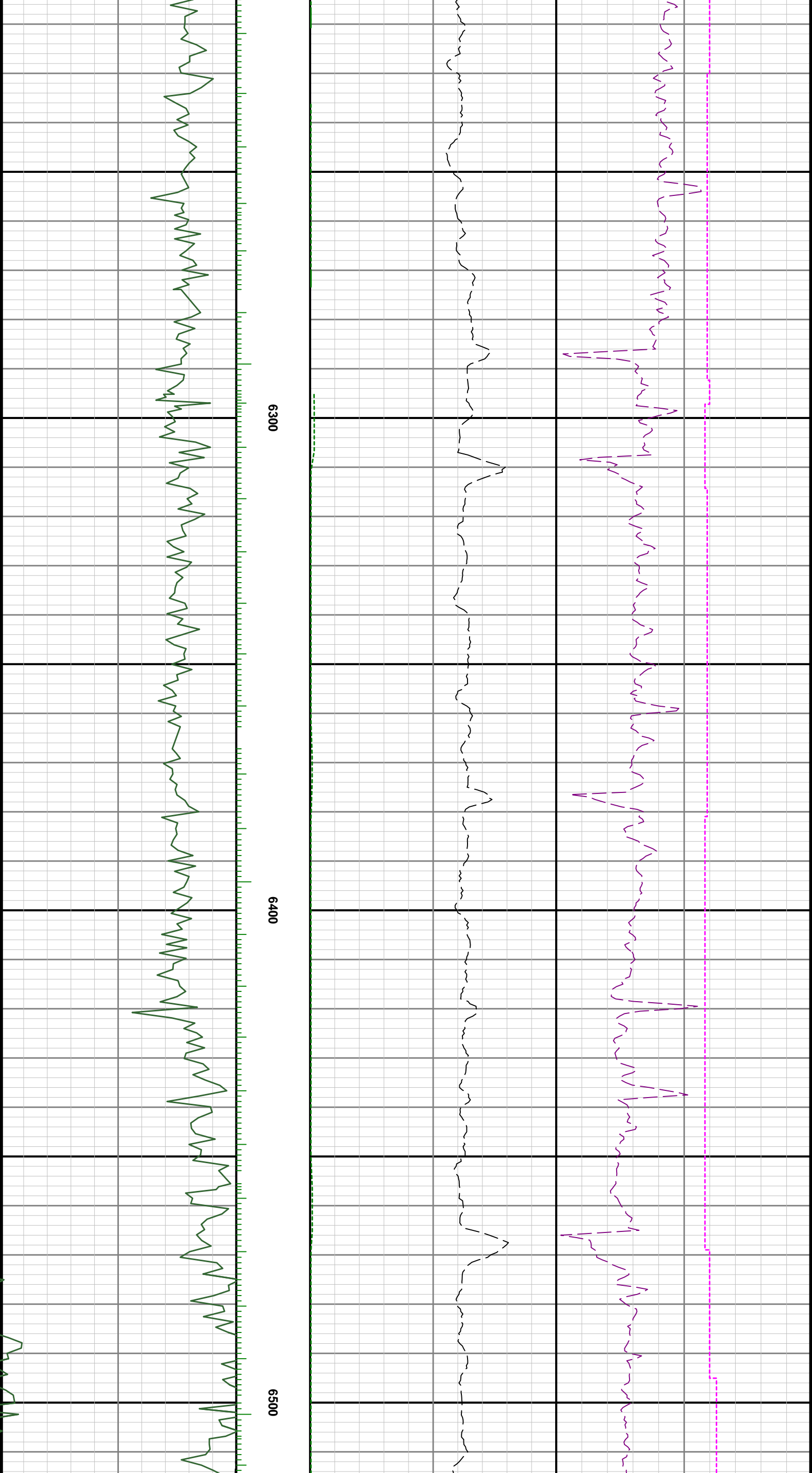
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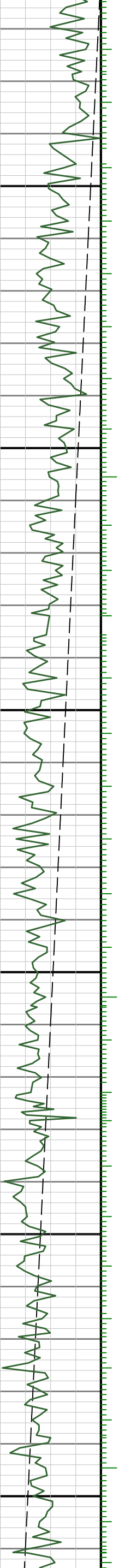
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5900



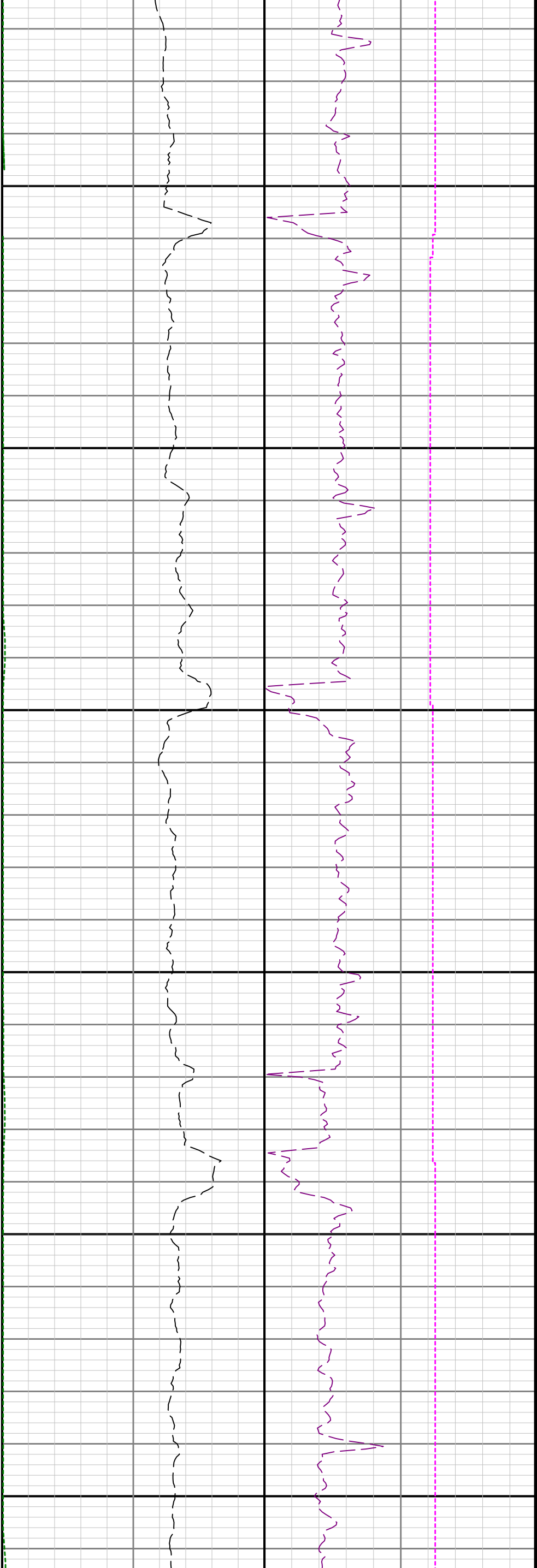


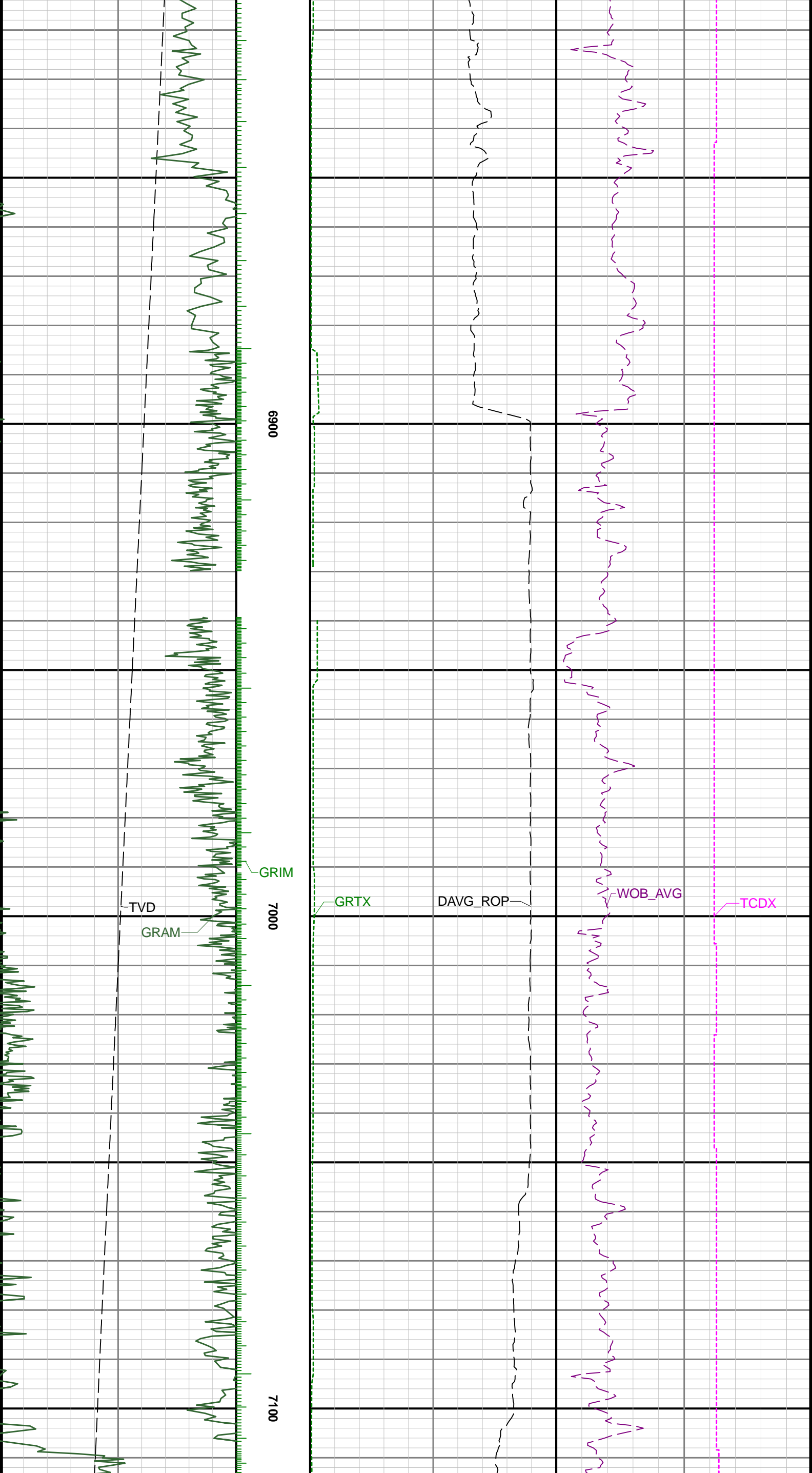


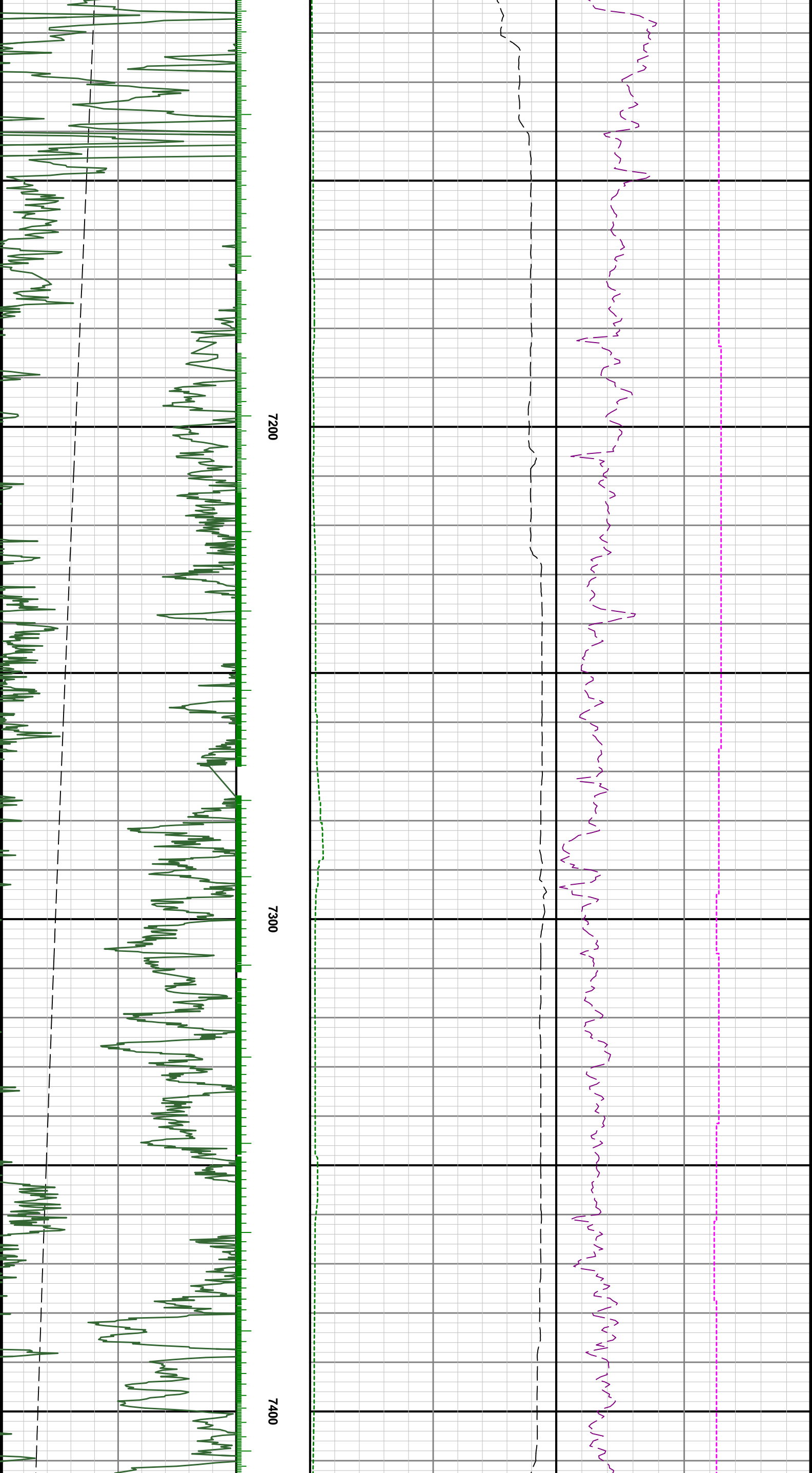
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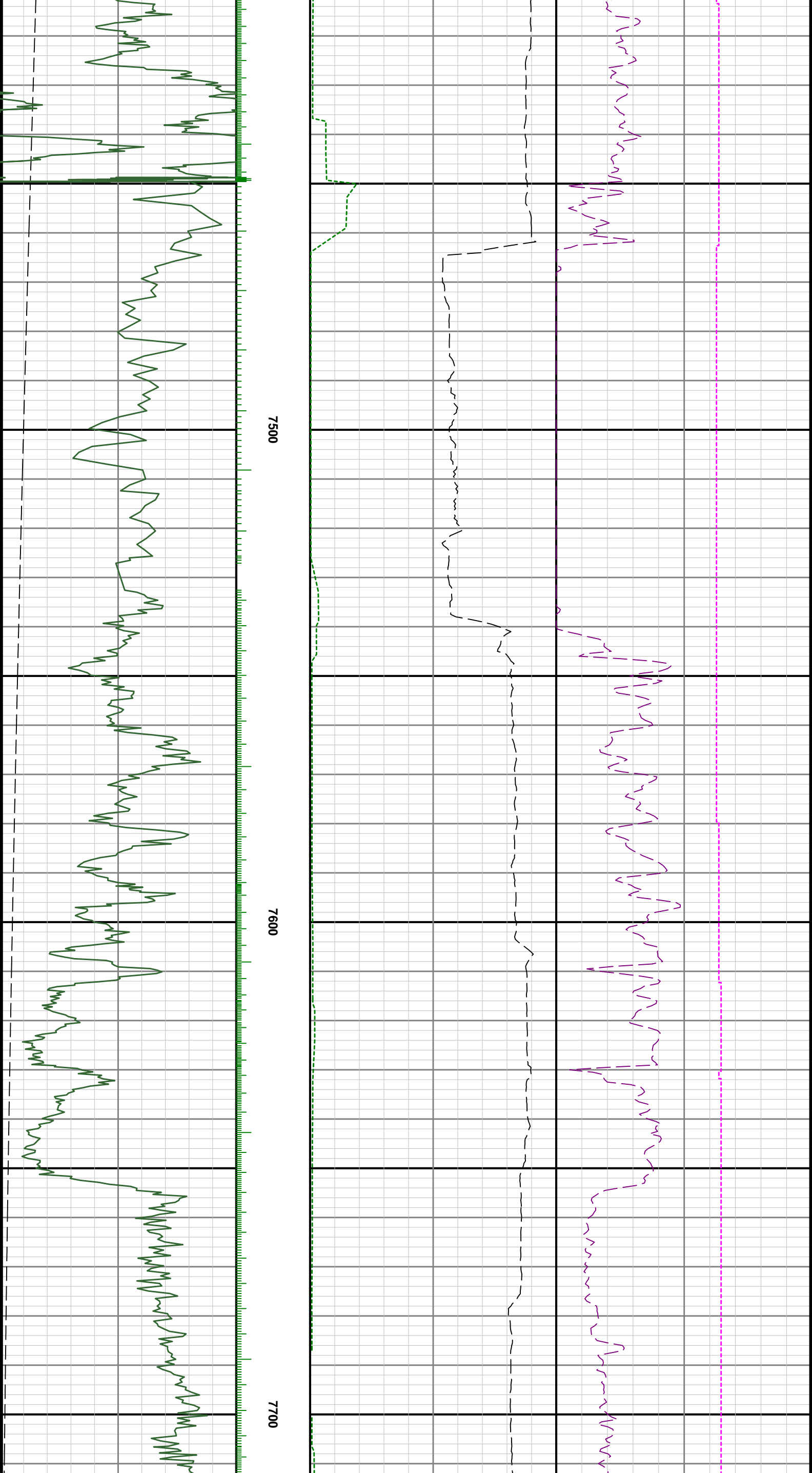
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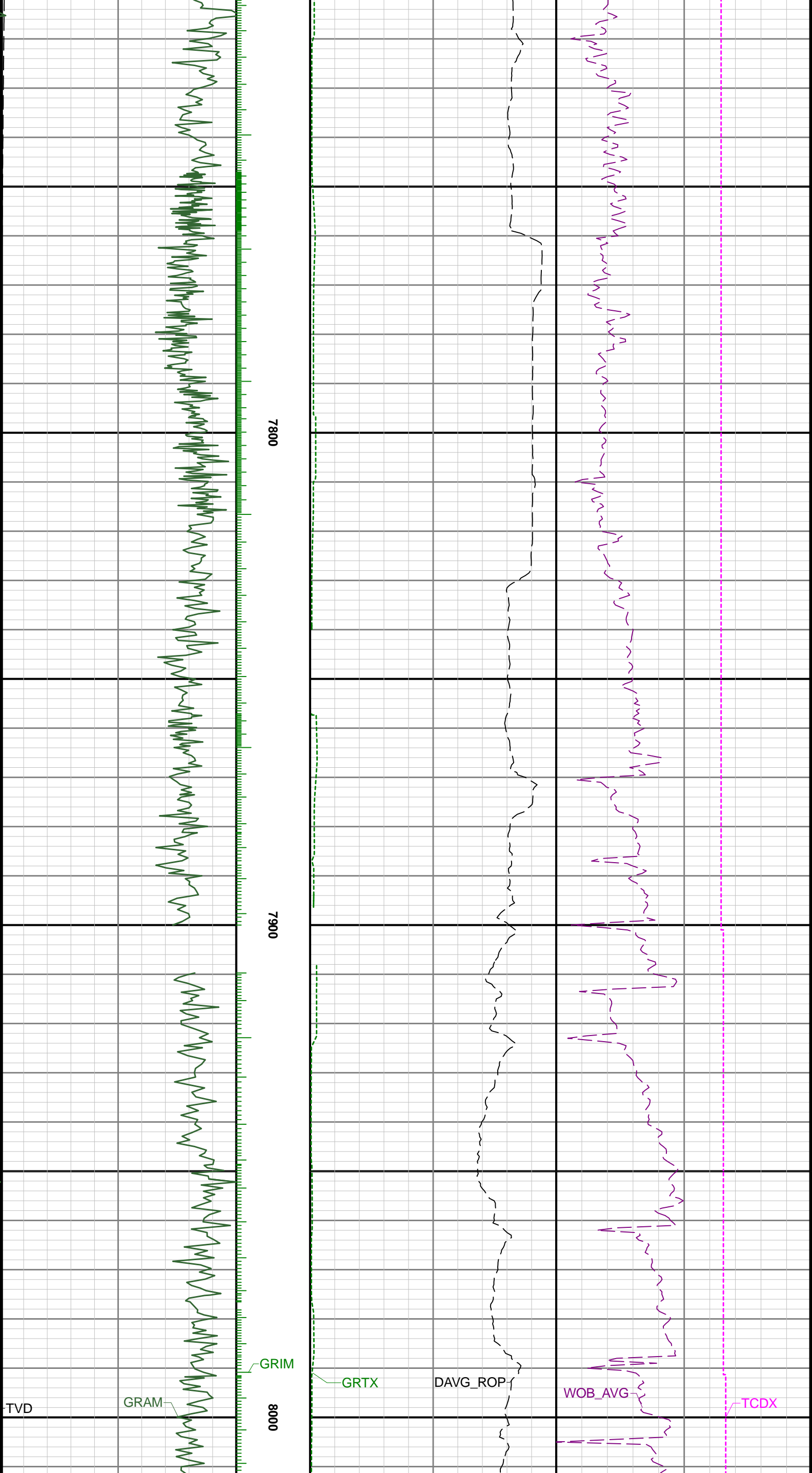
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TVD

GRAM

GRIM

GRTX

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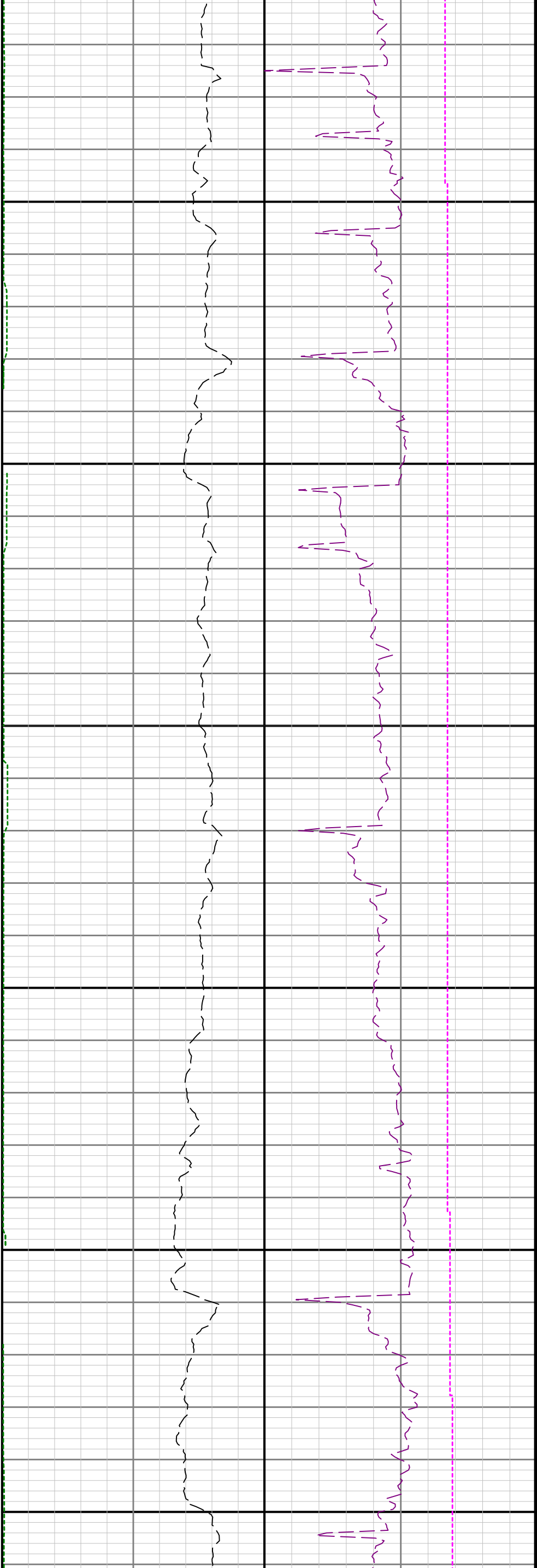
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TCDX

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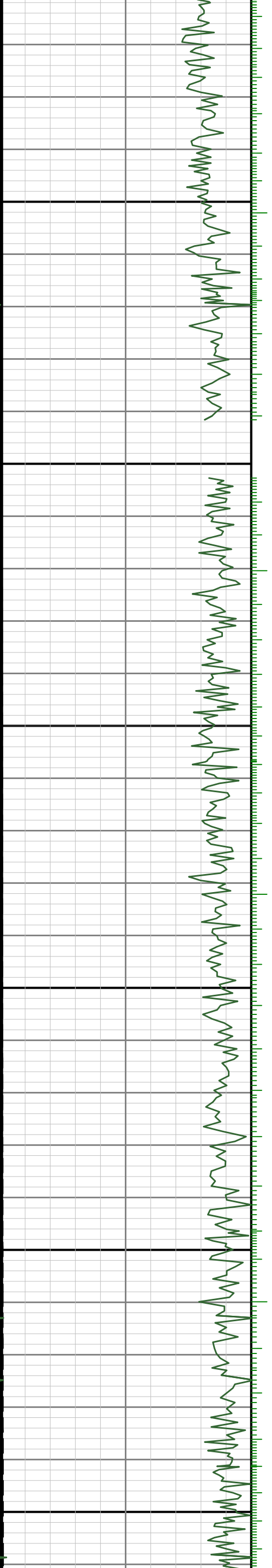
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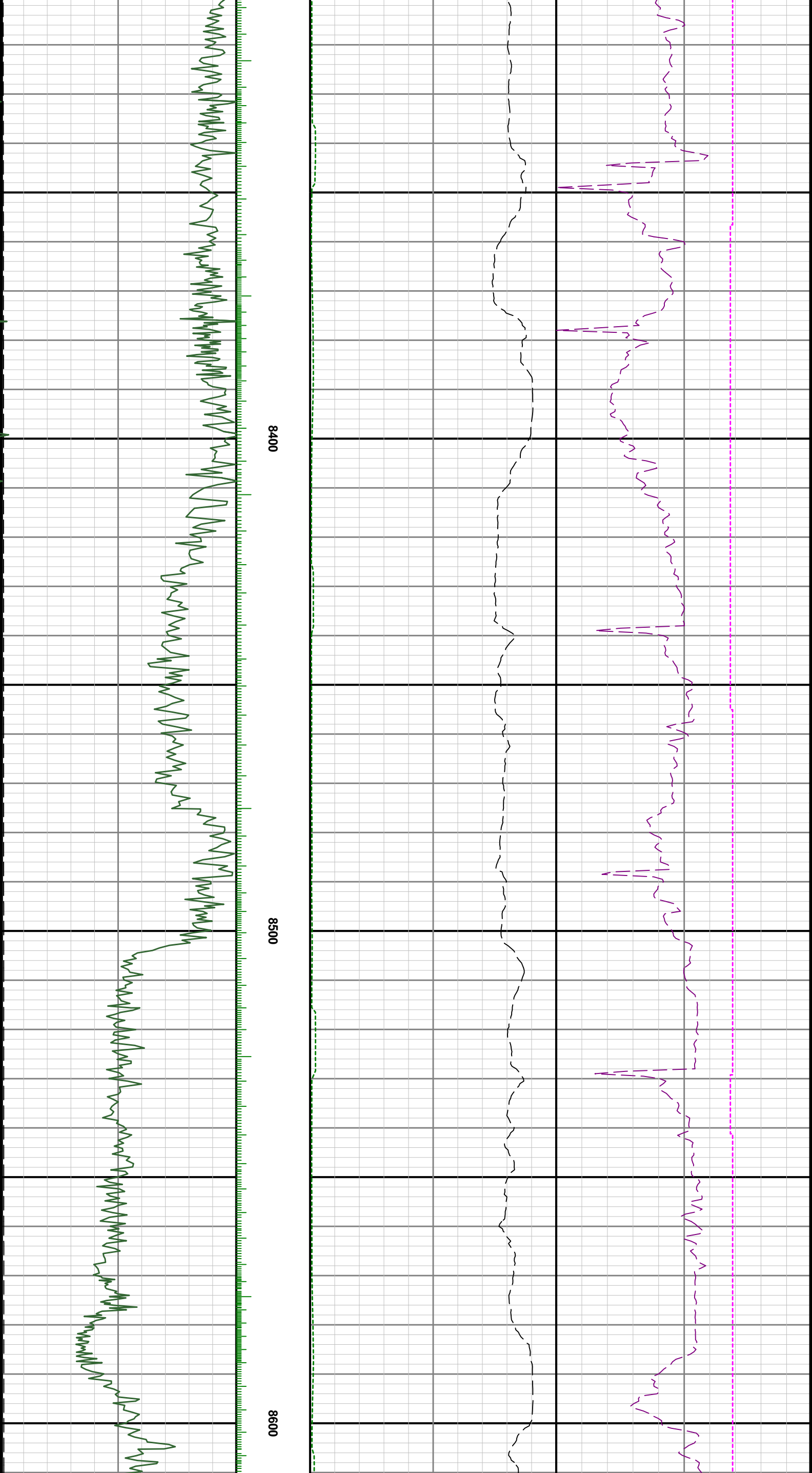


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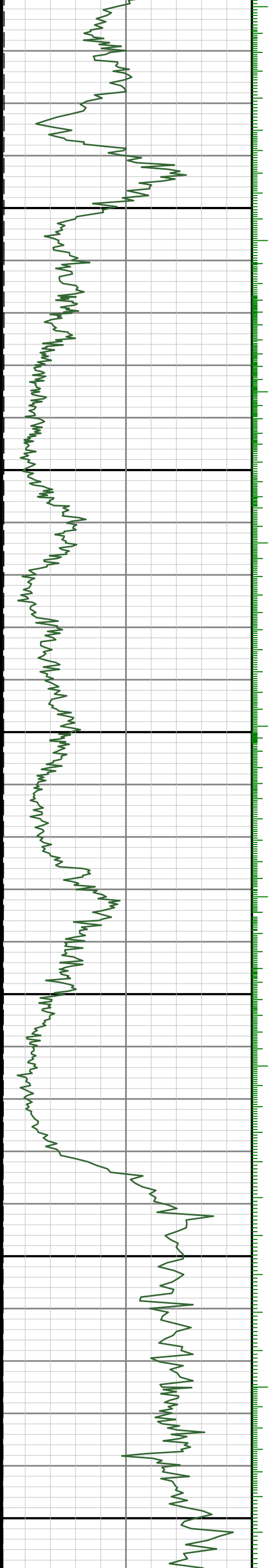




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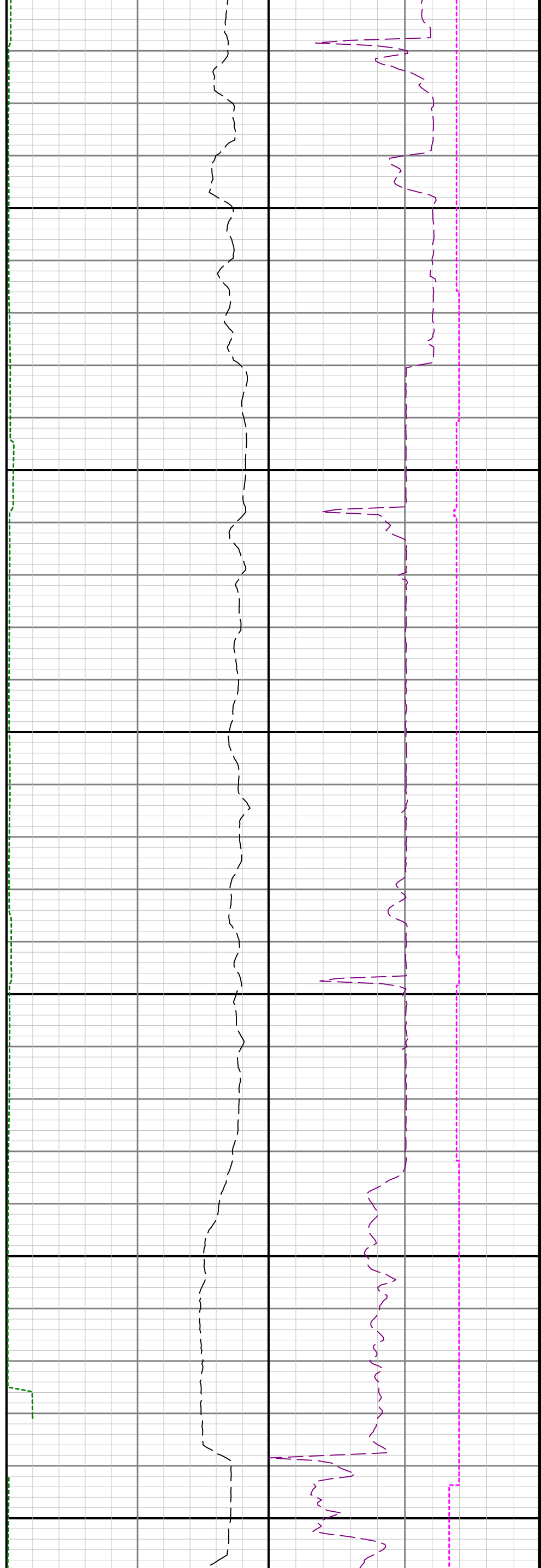
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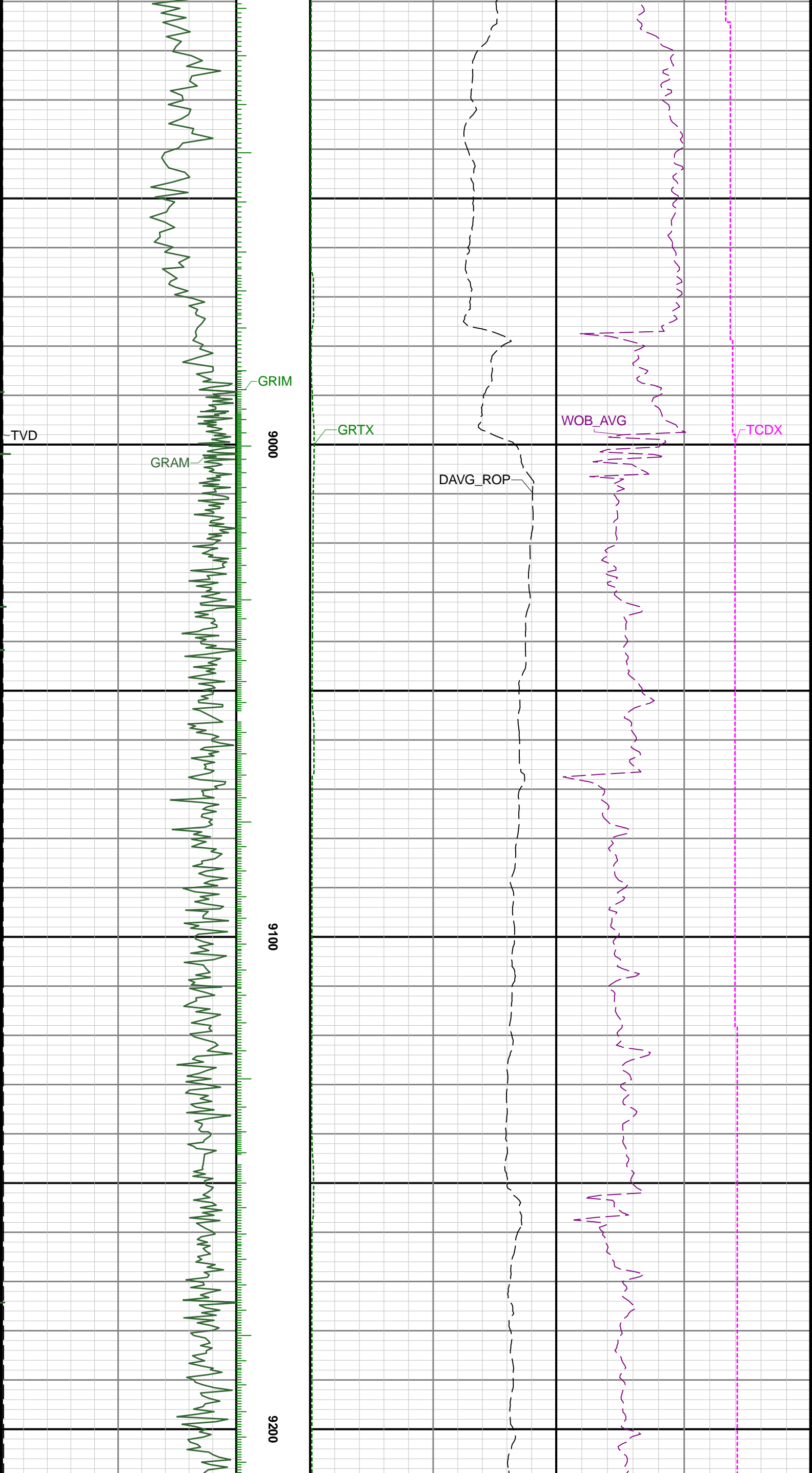


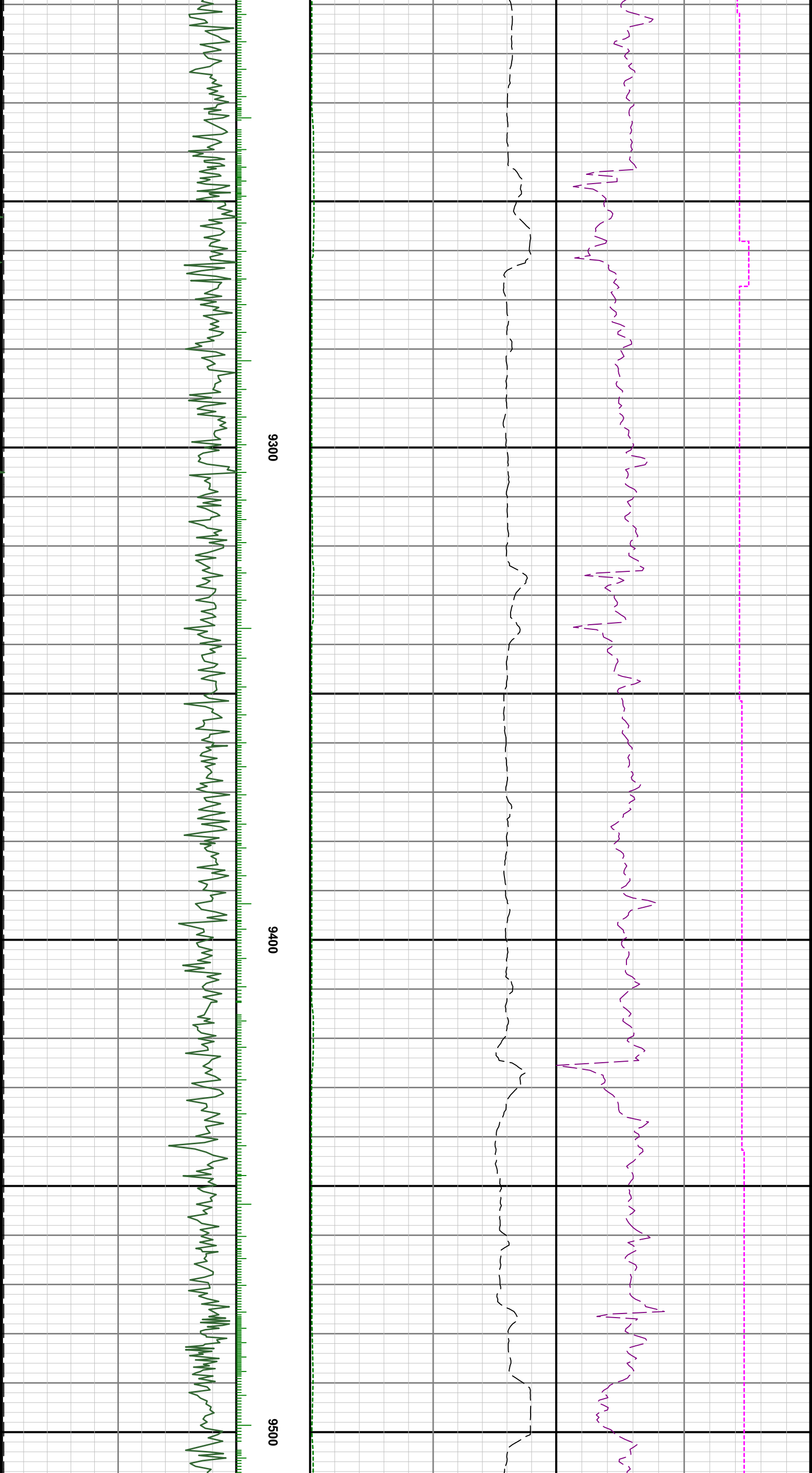
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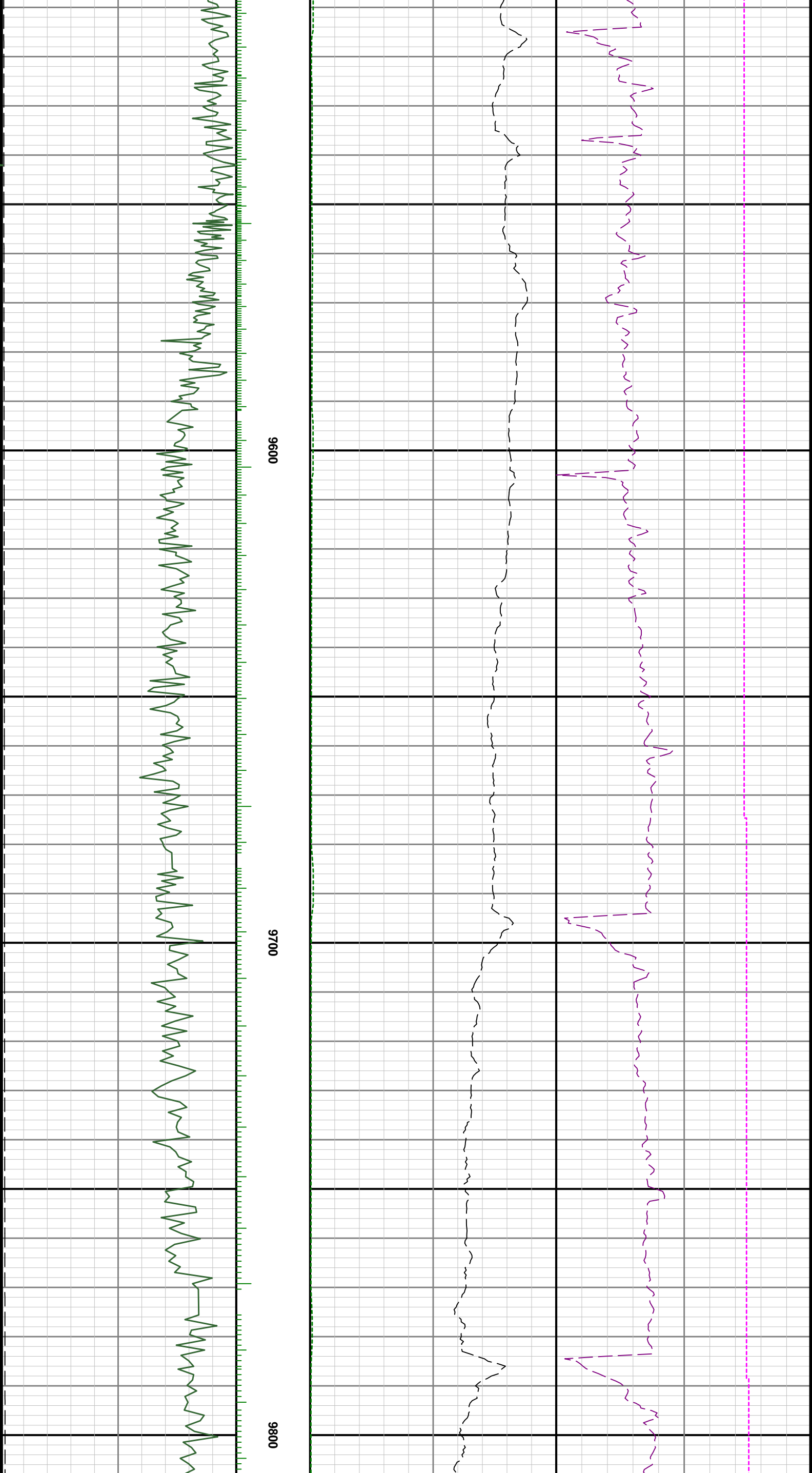
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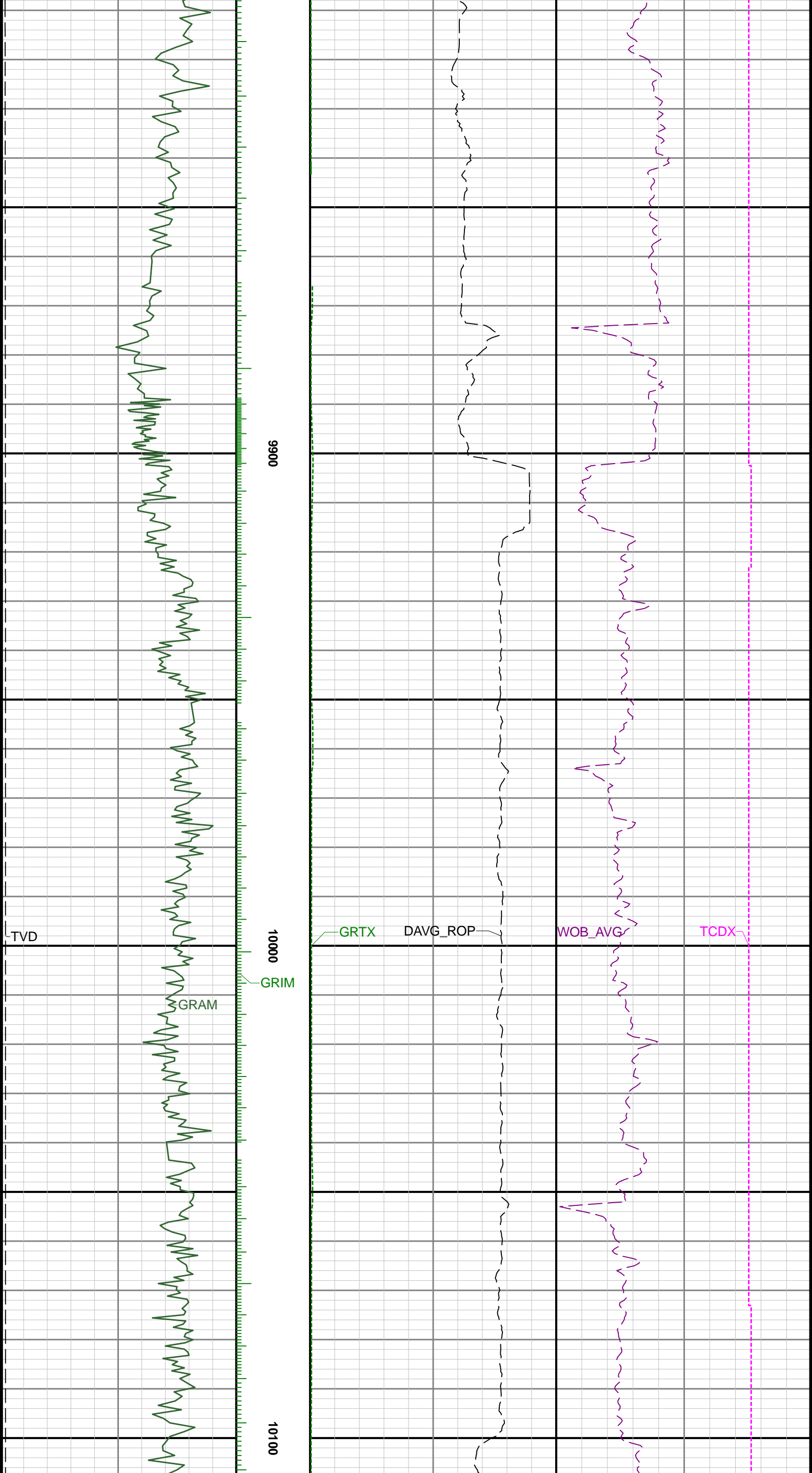
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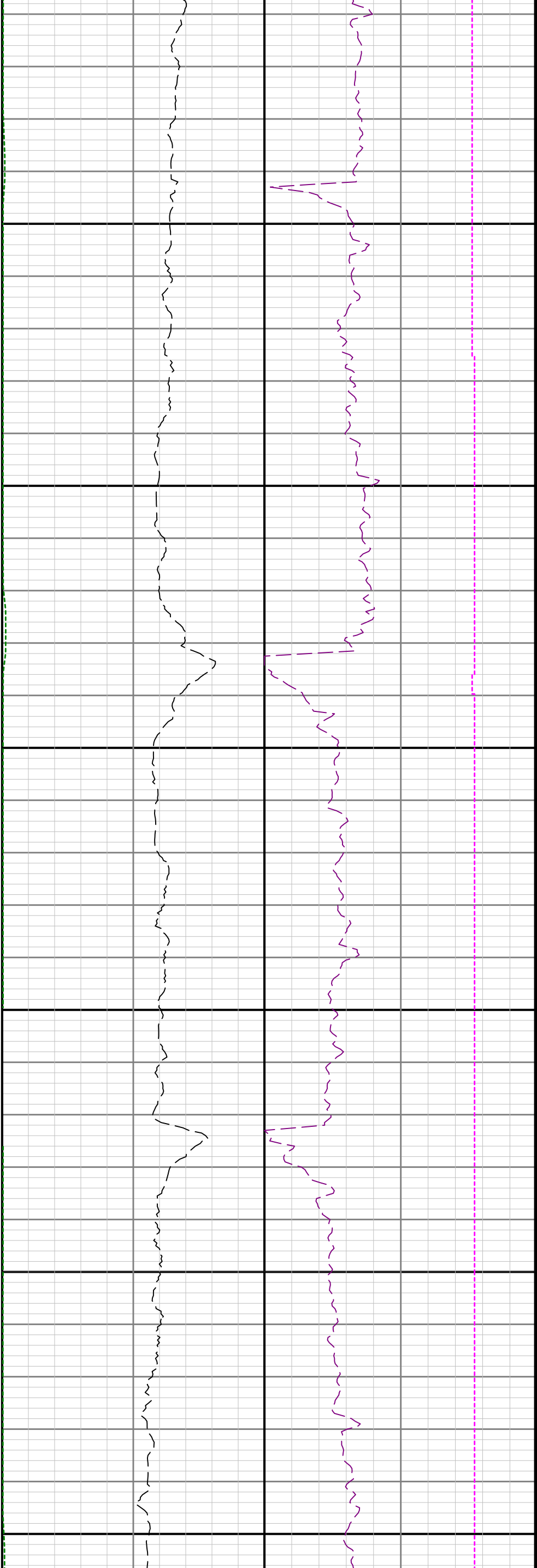








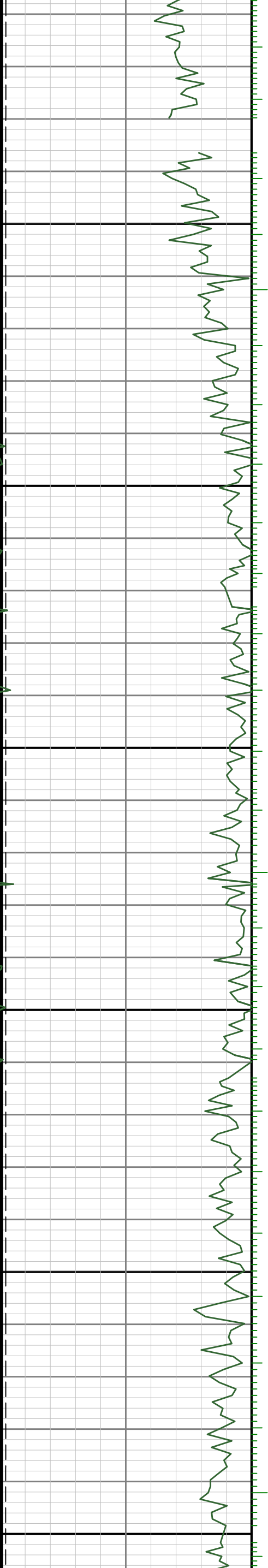


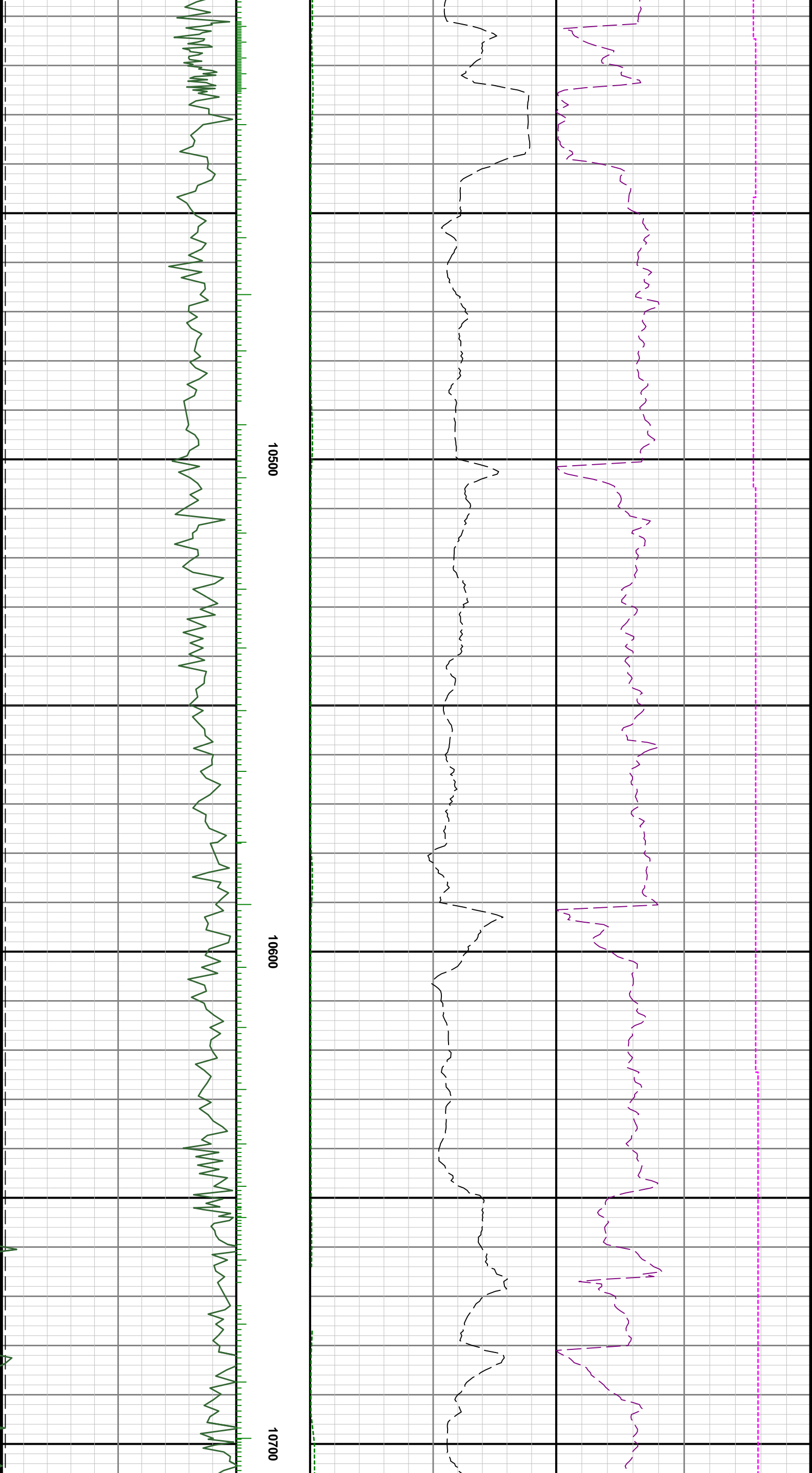


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TVD

GRAM

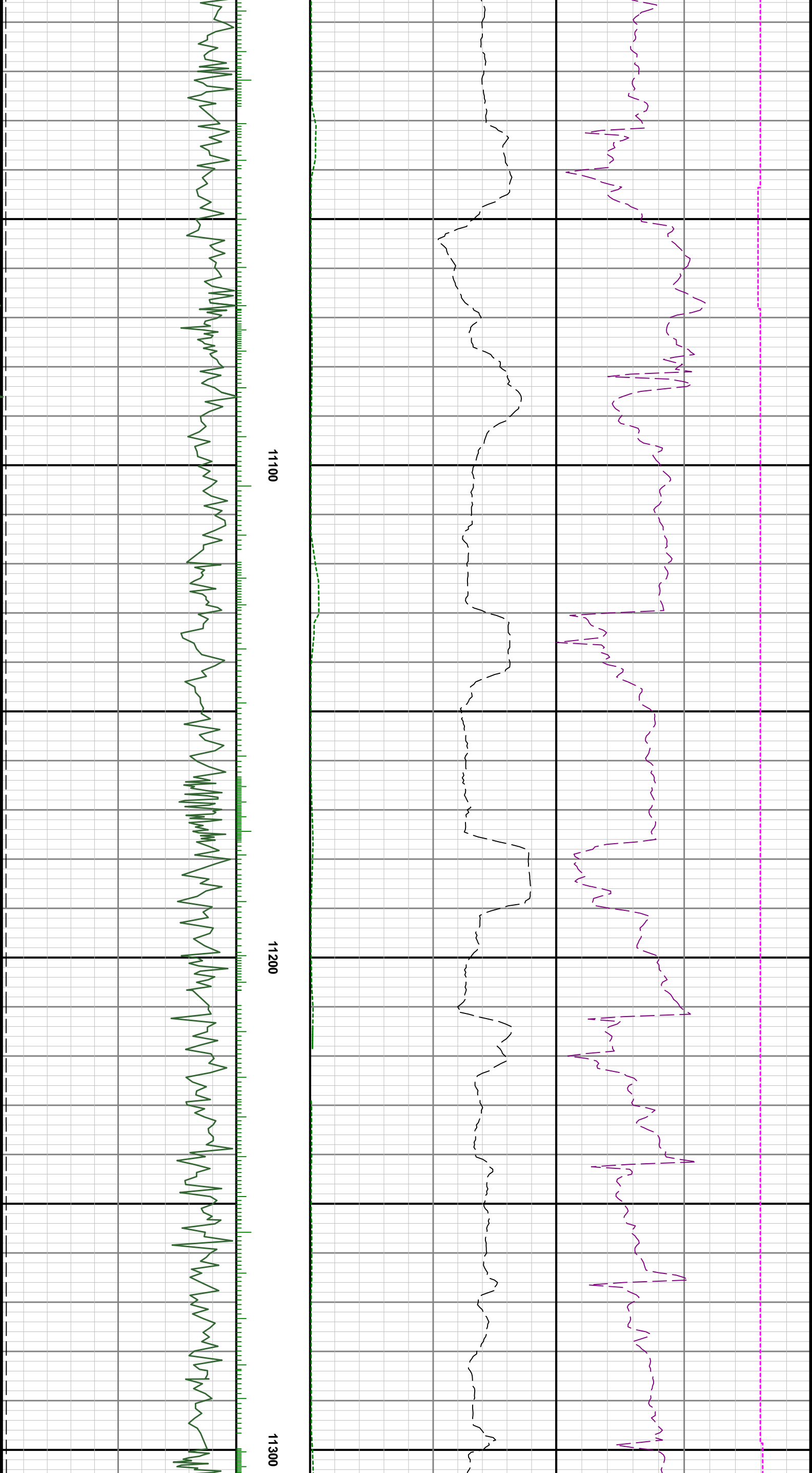
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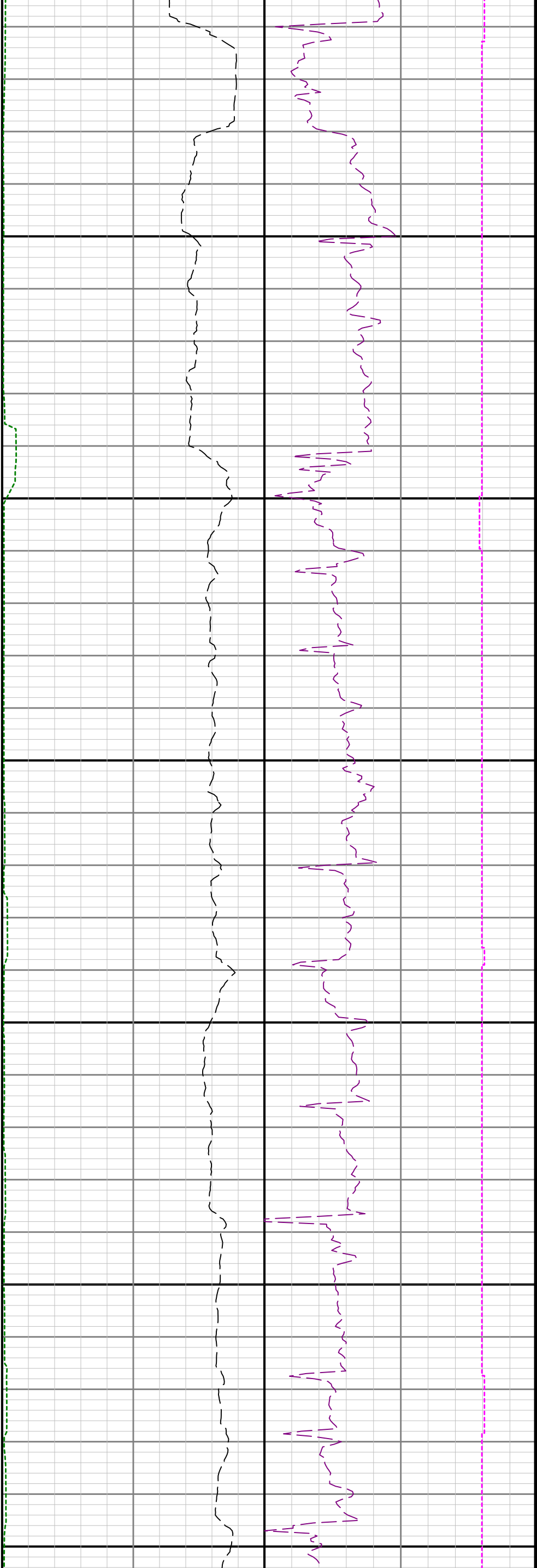
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DAVG_ROP

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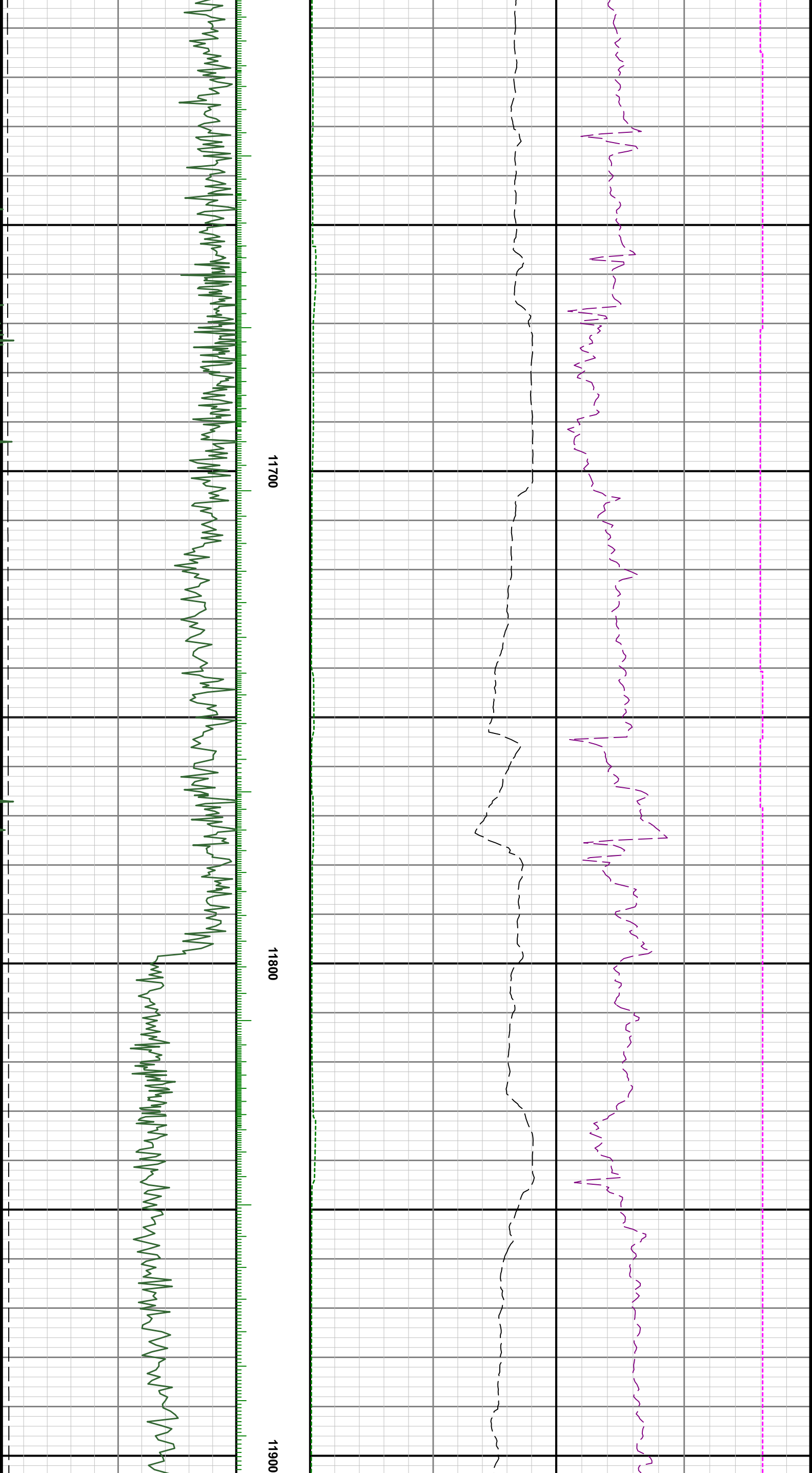


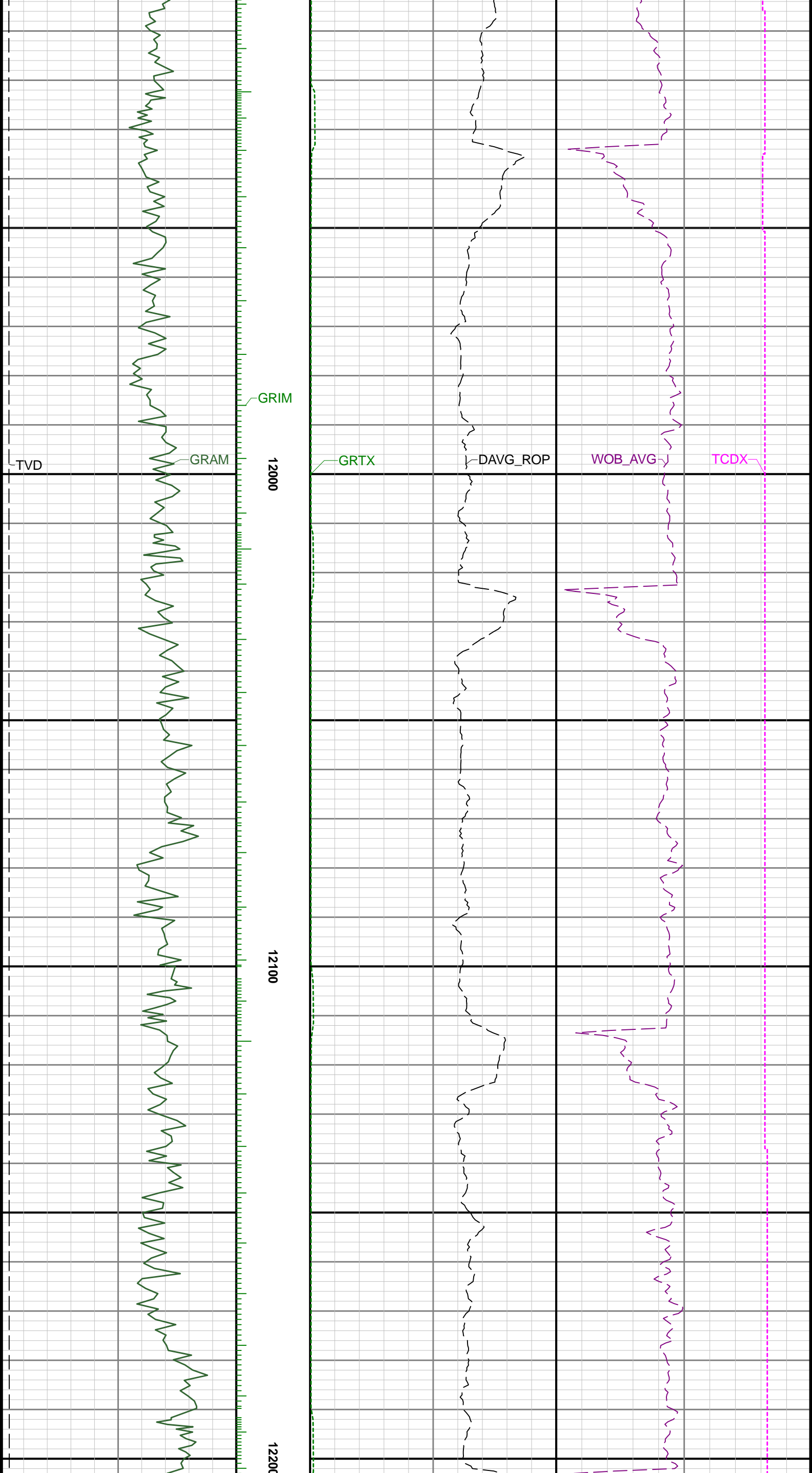
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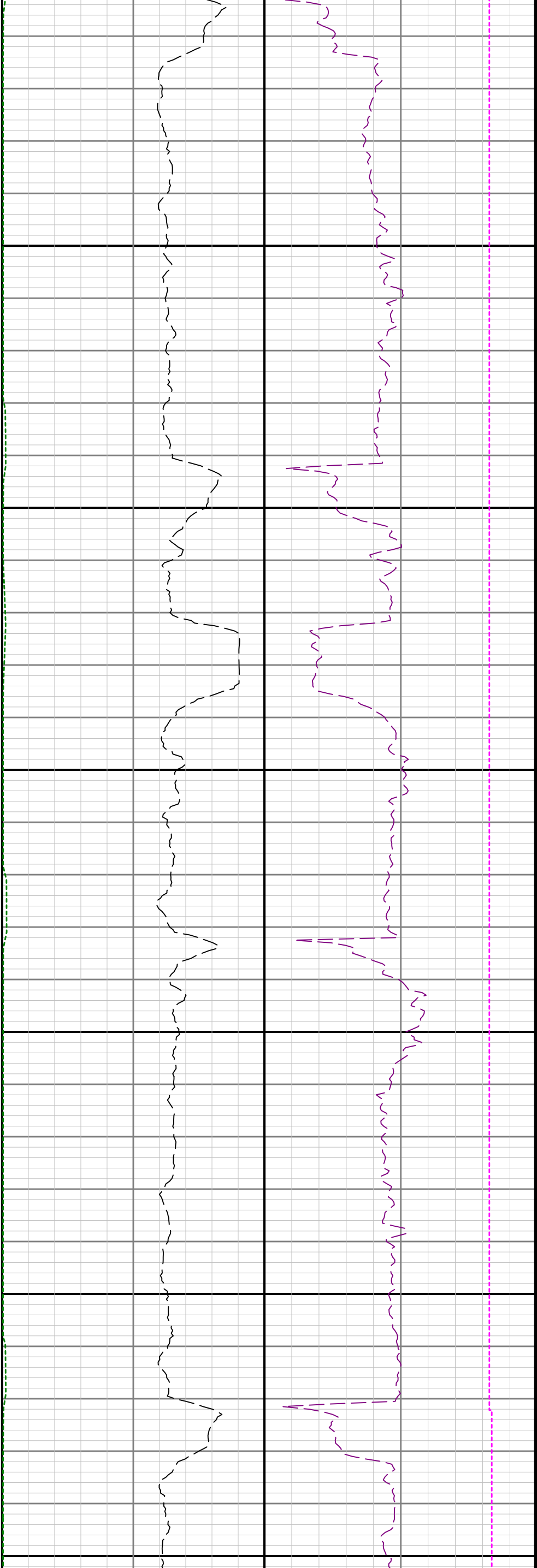
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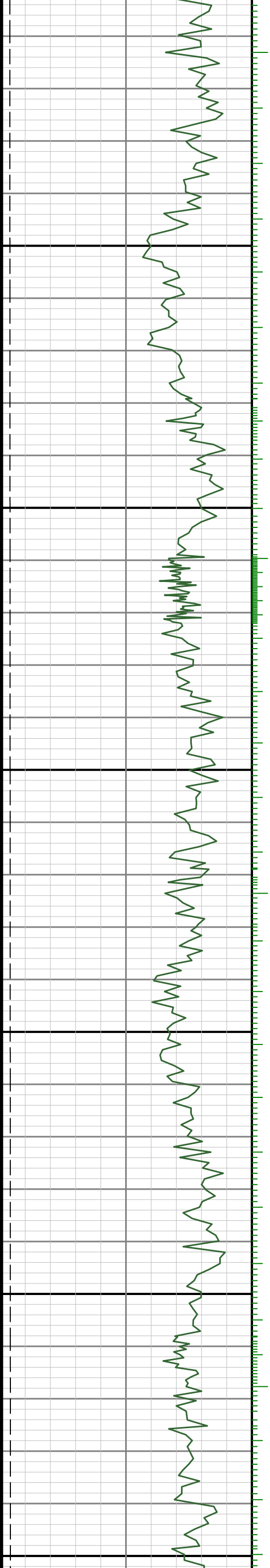


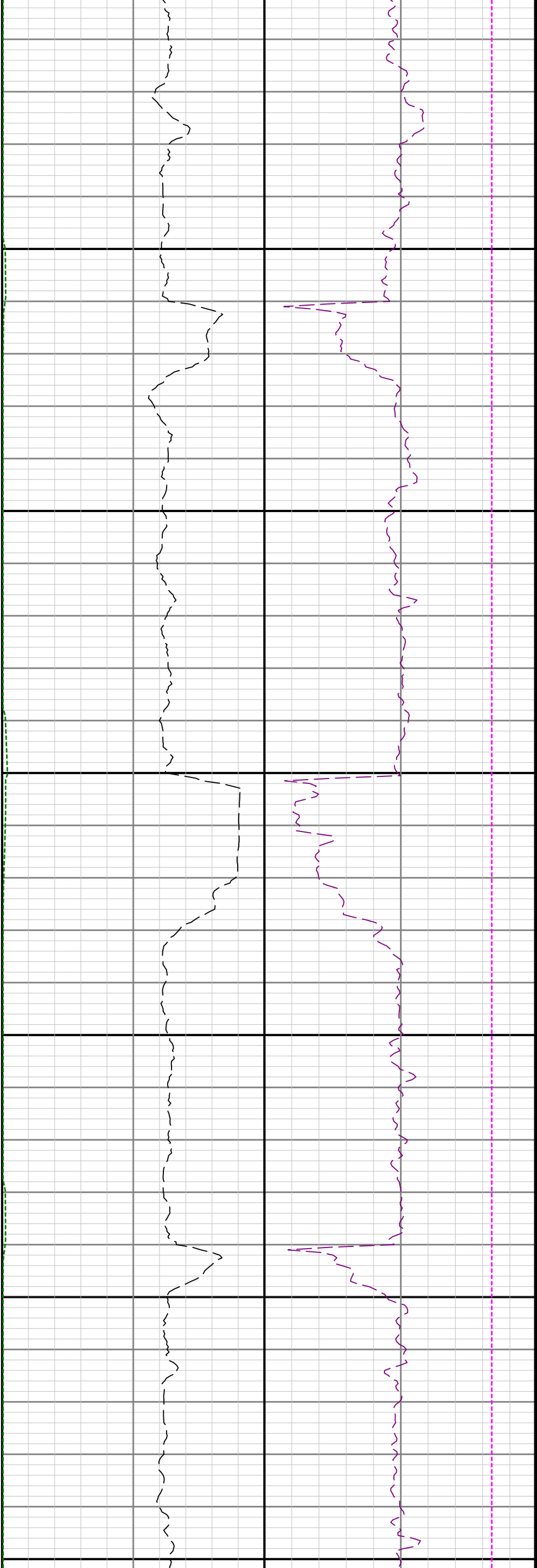


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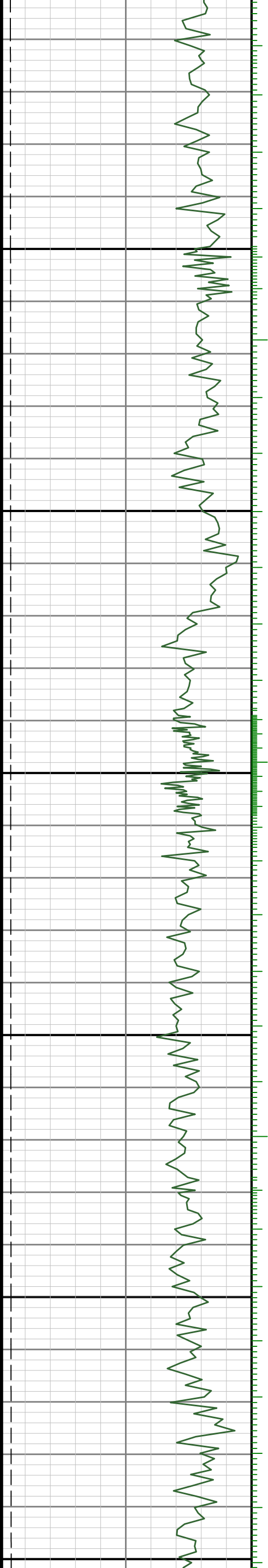
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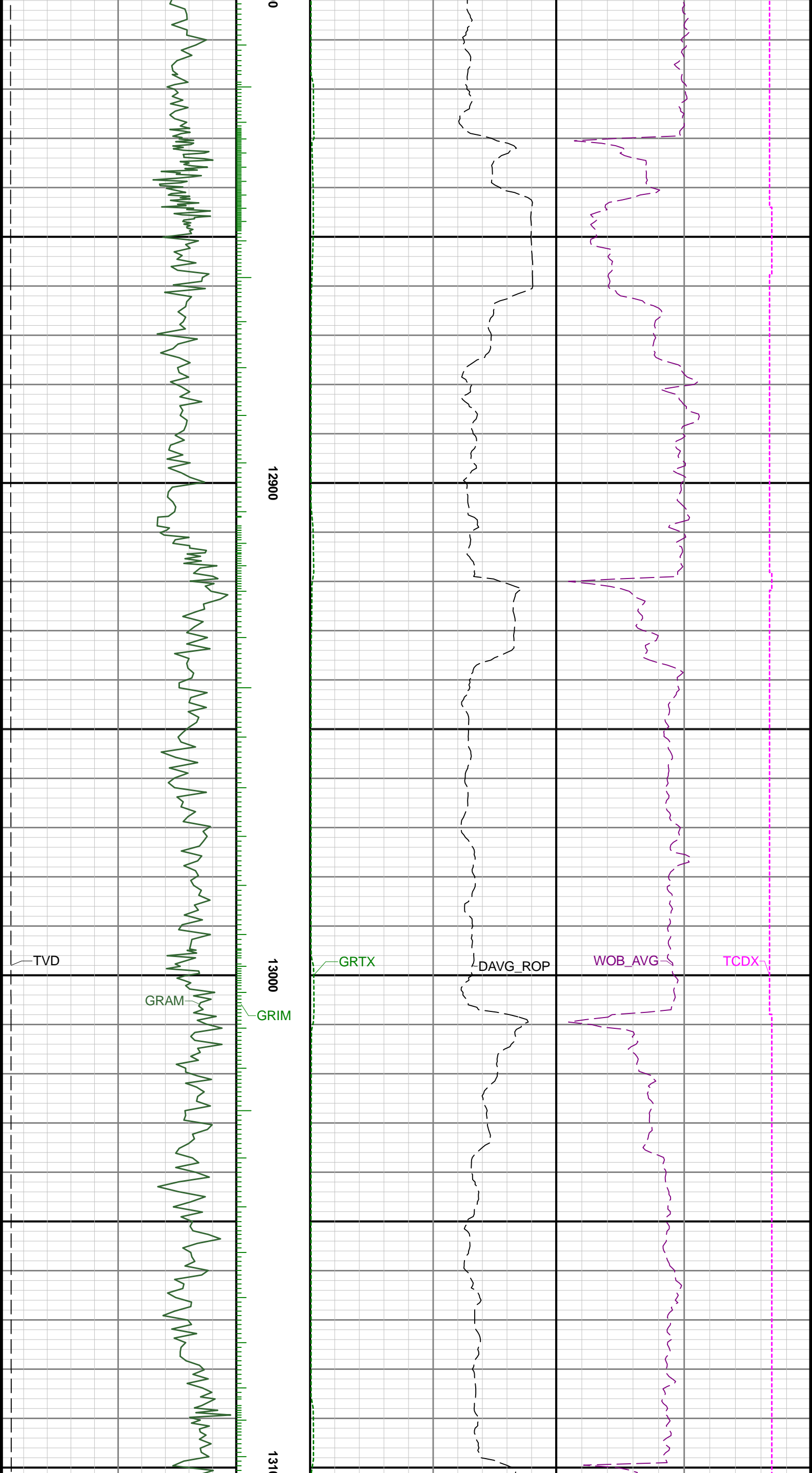
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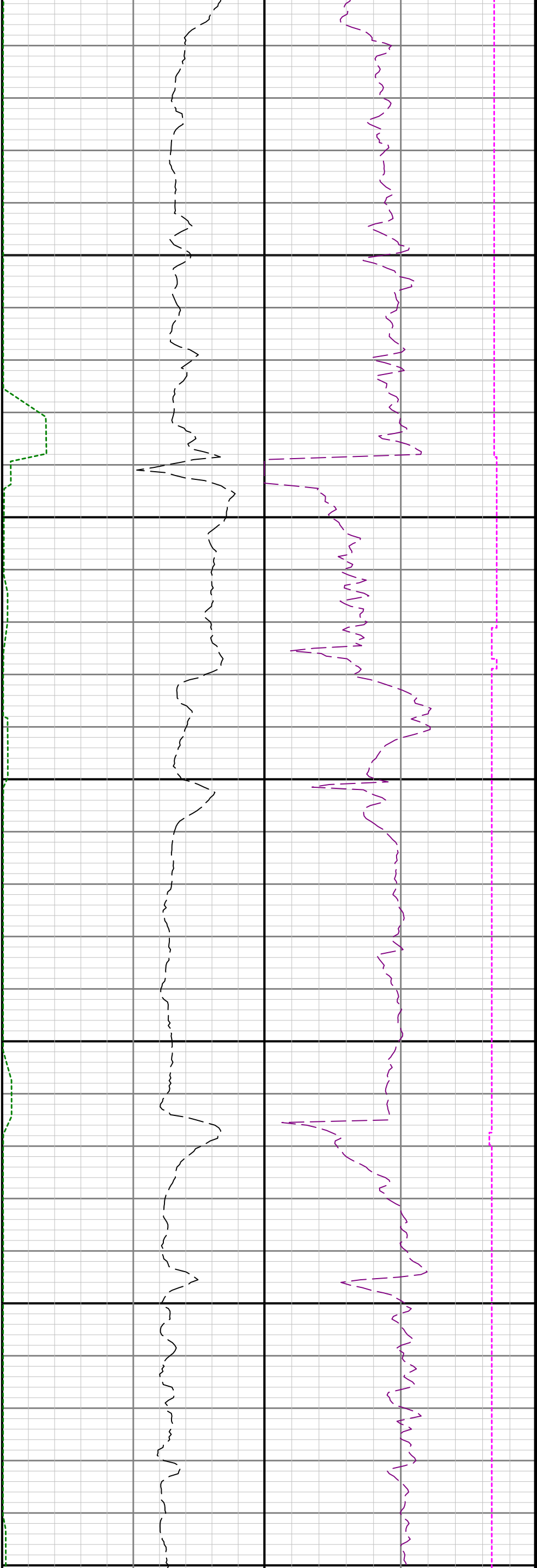




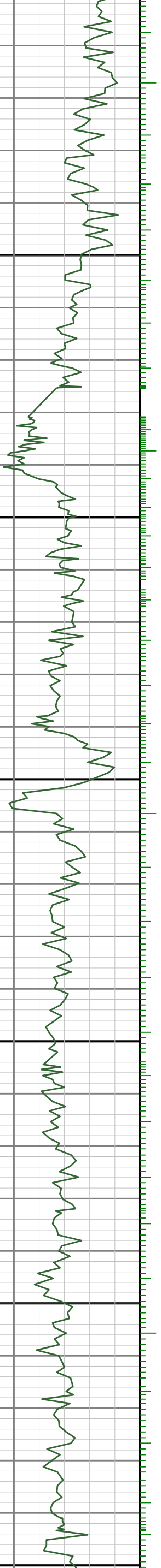
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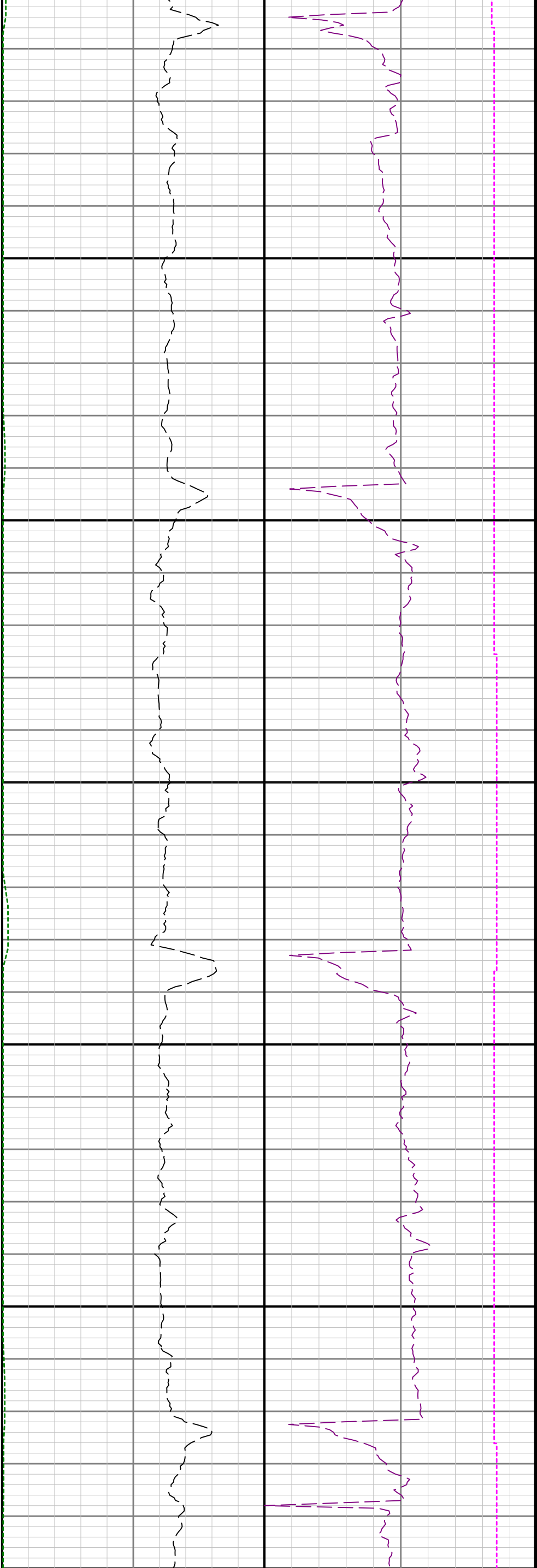




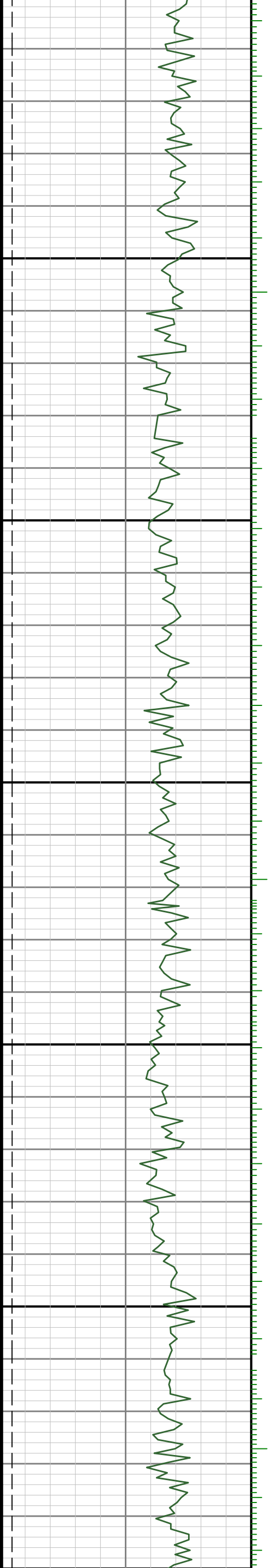


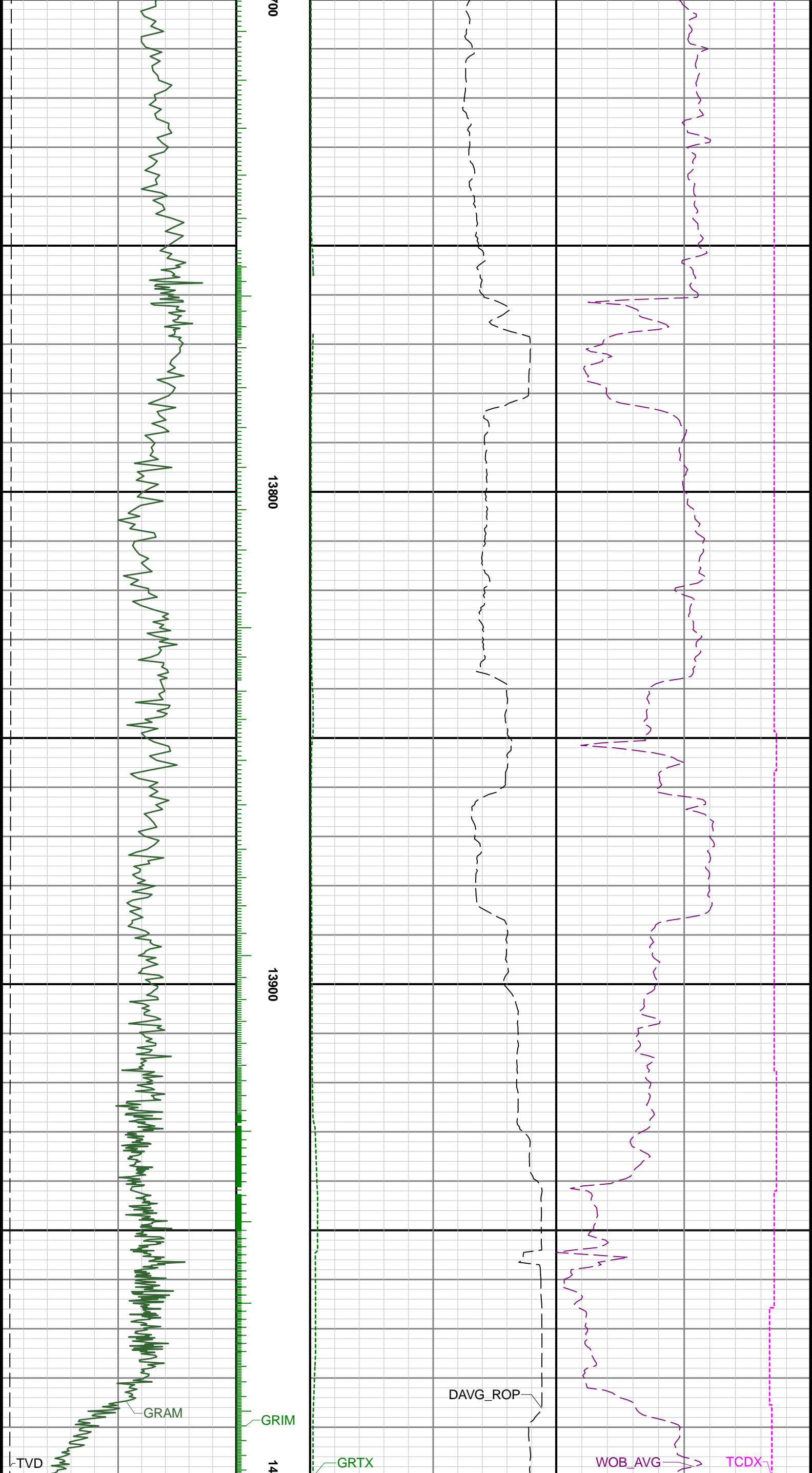
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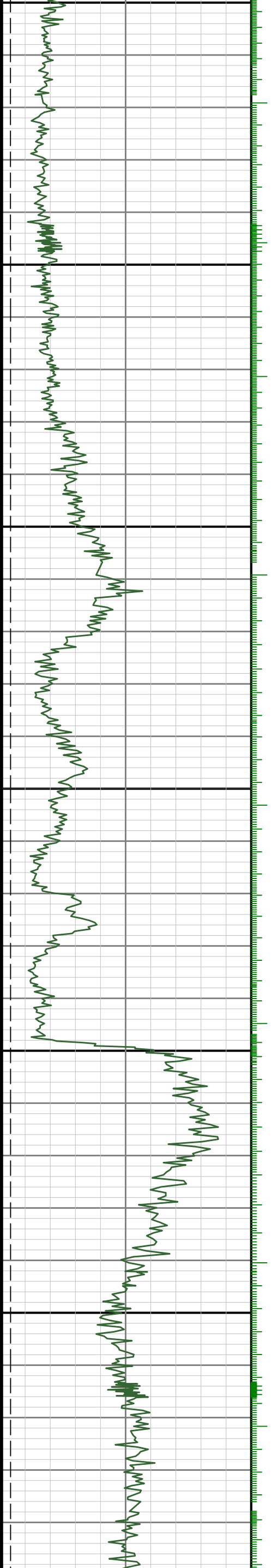


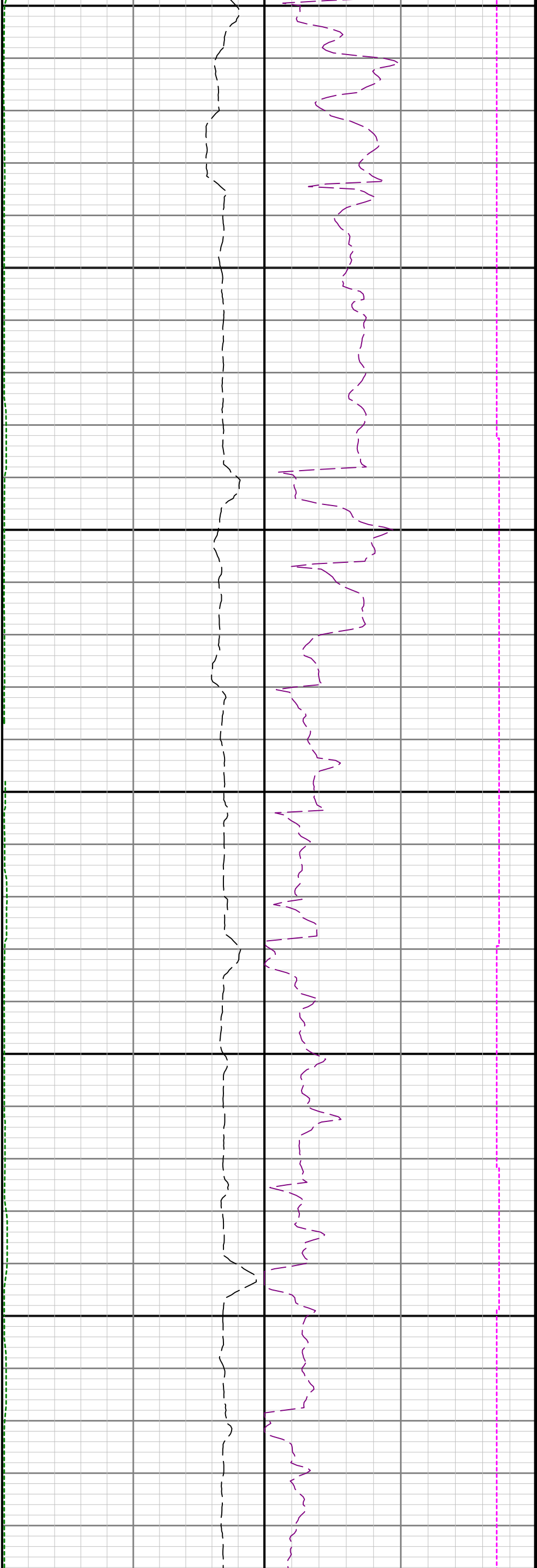
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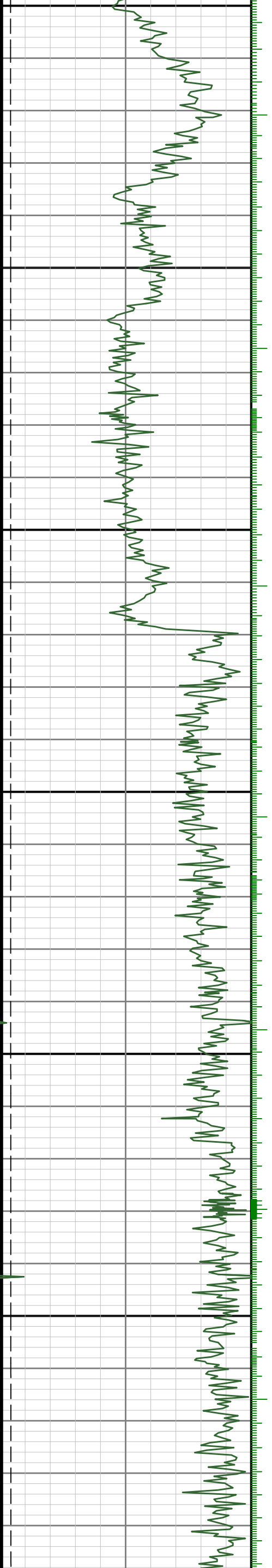


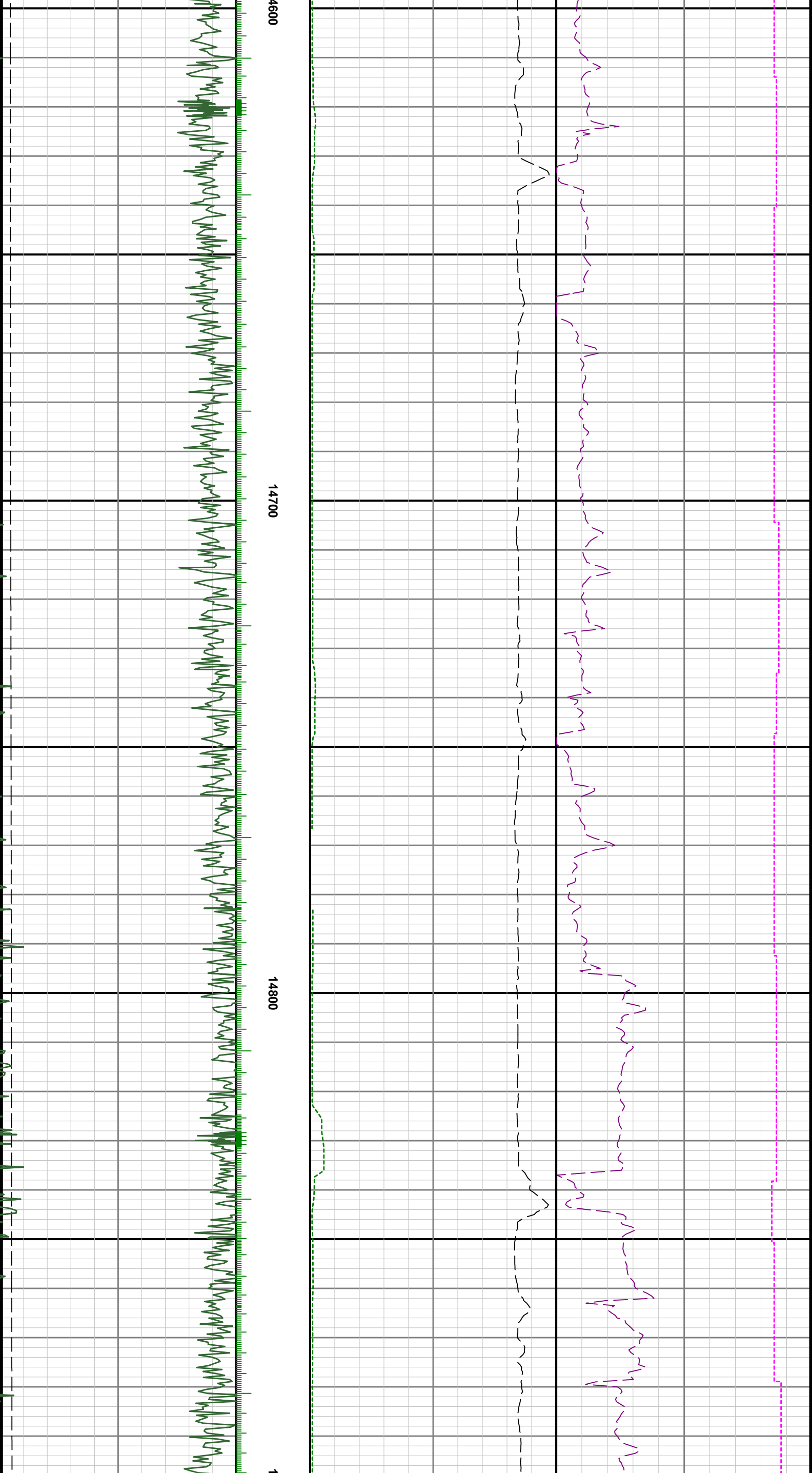
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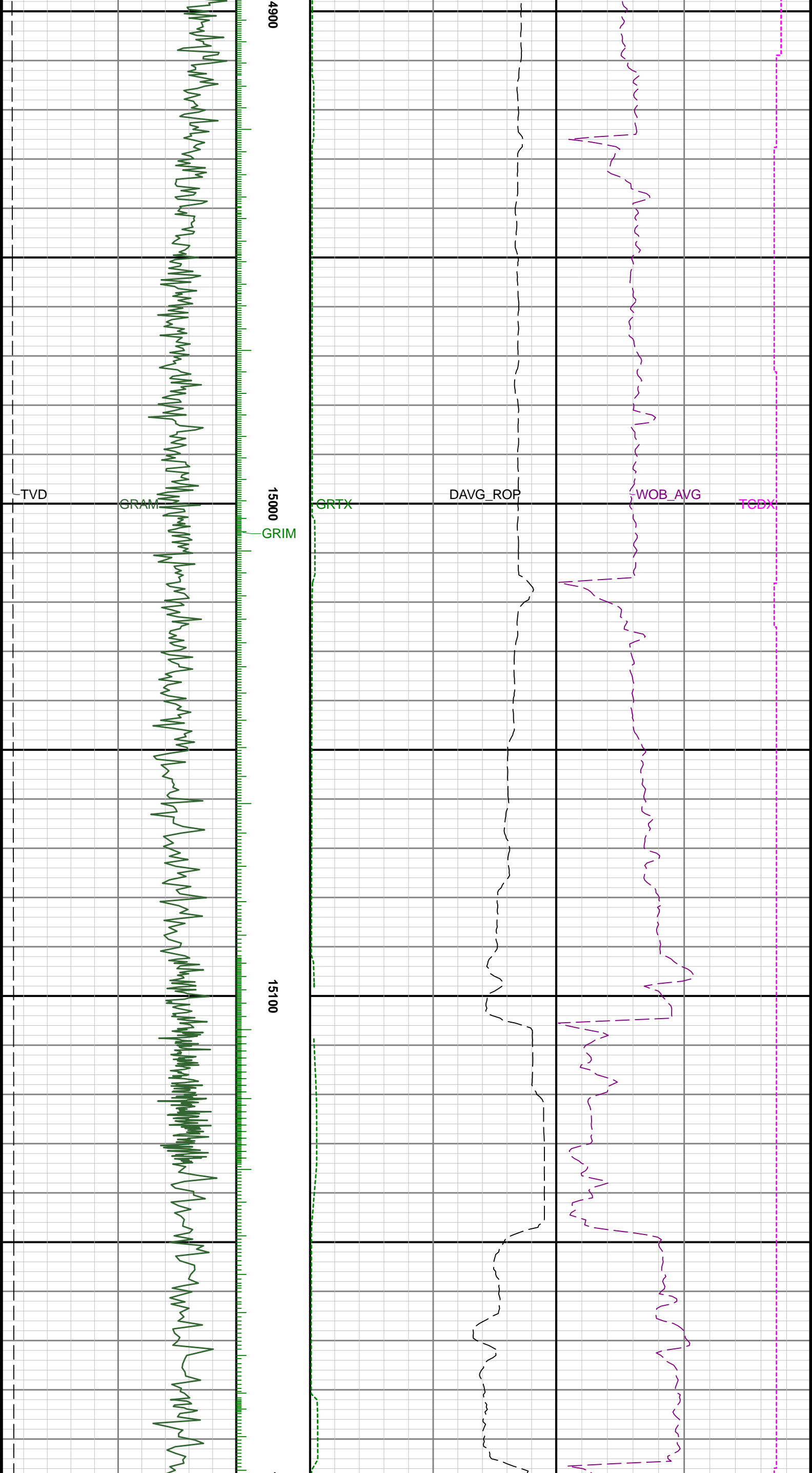
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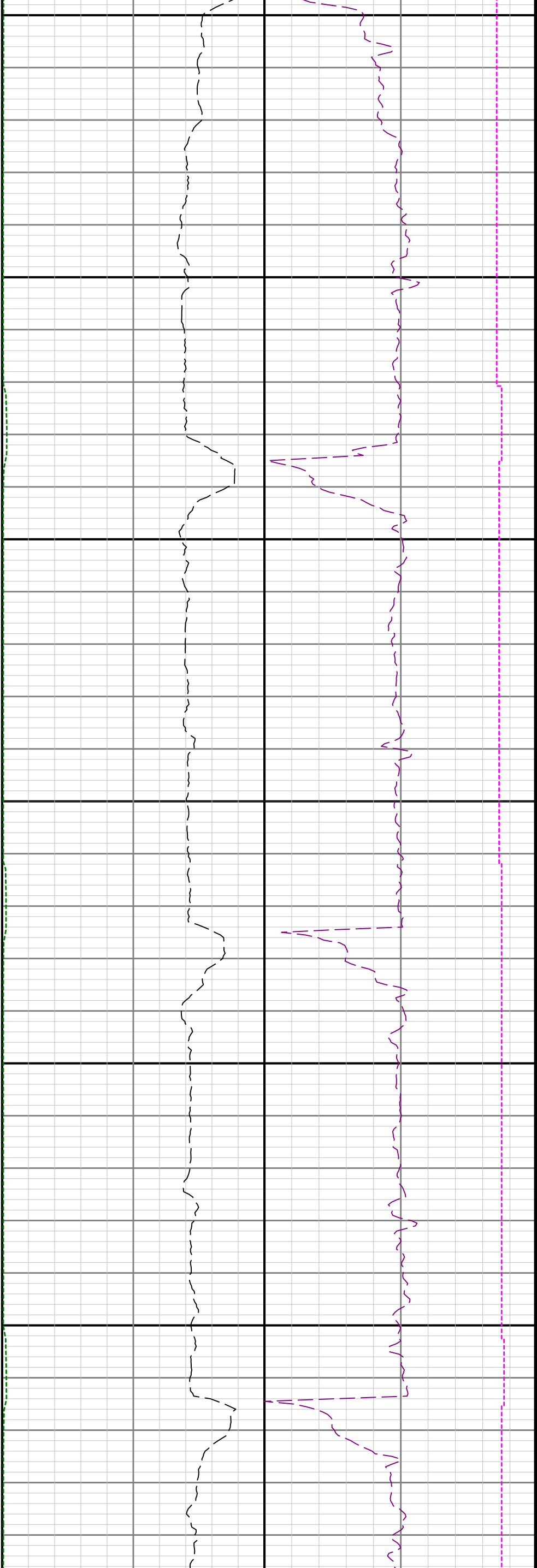
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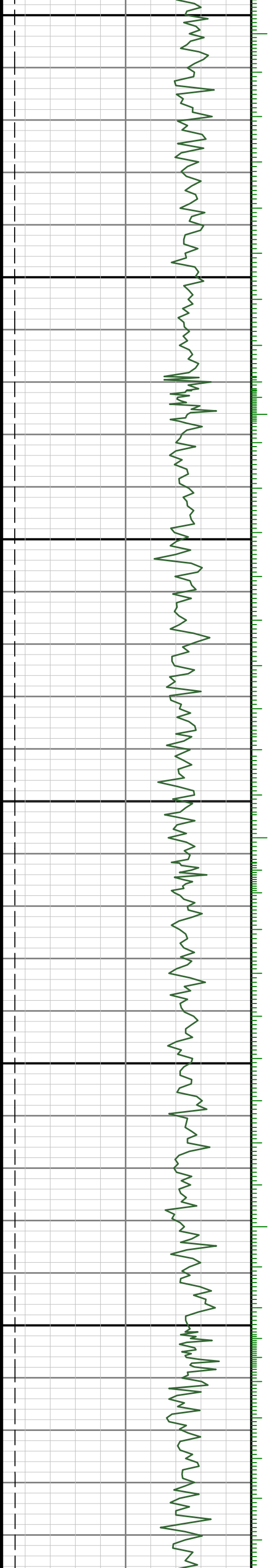


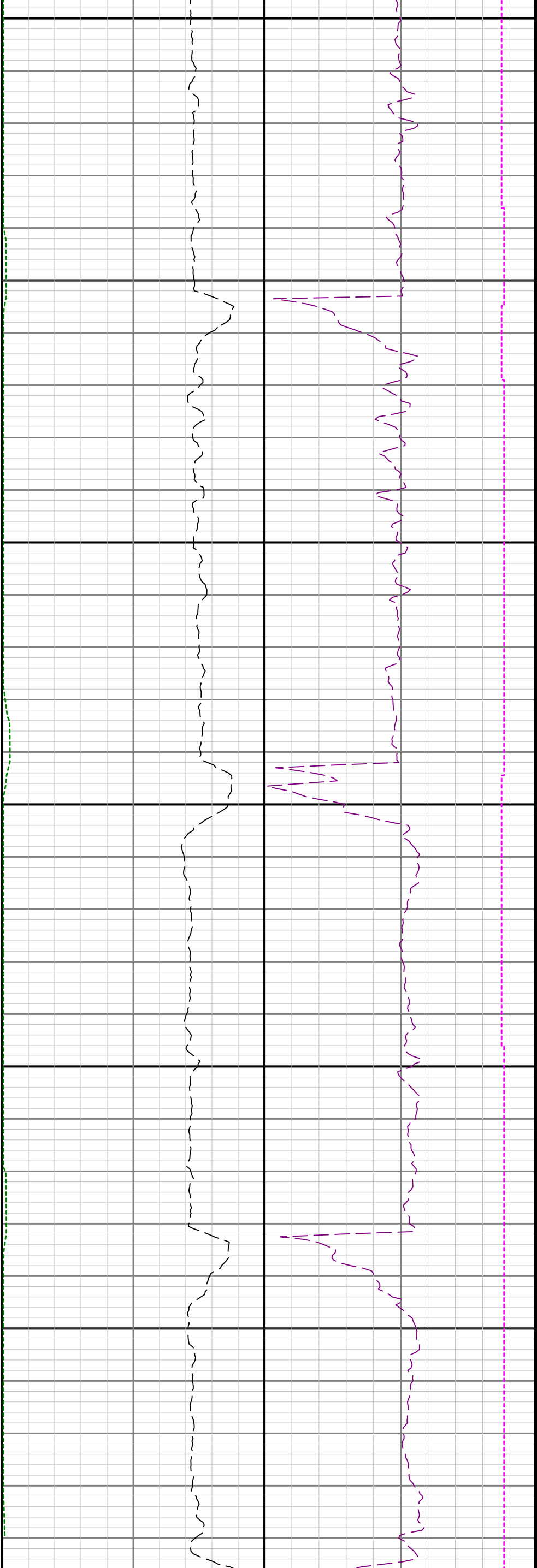


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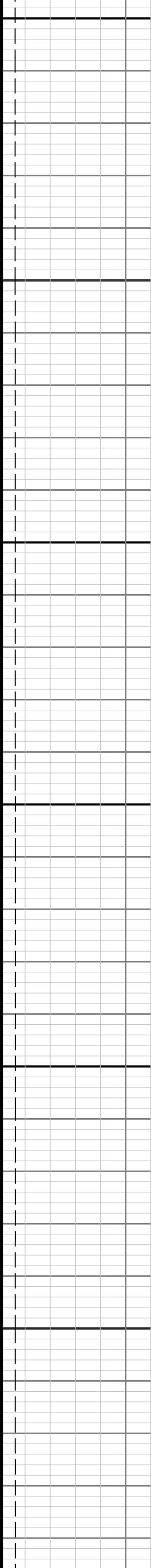


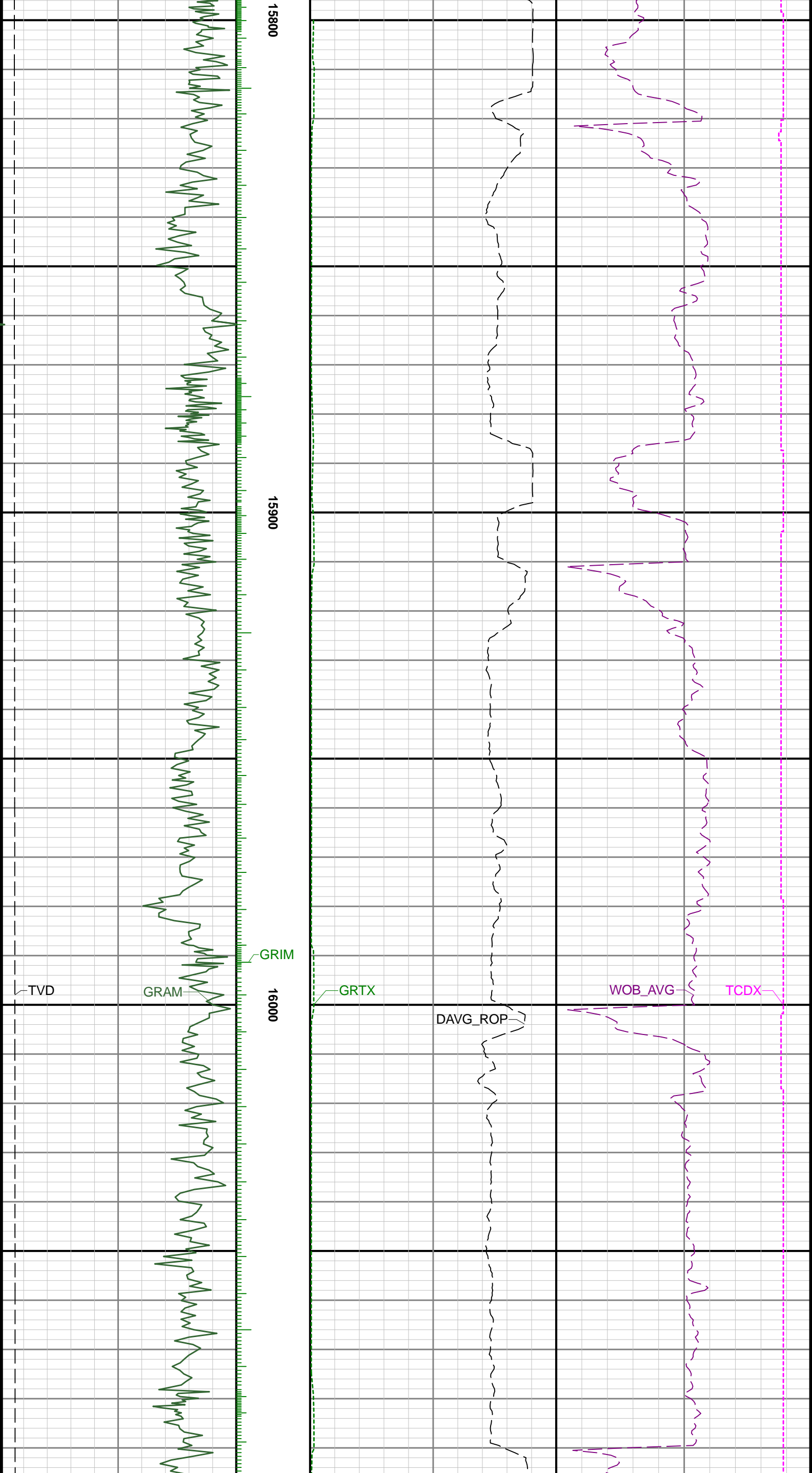


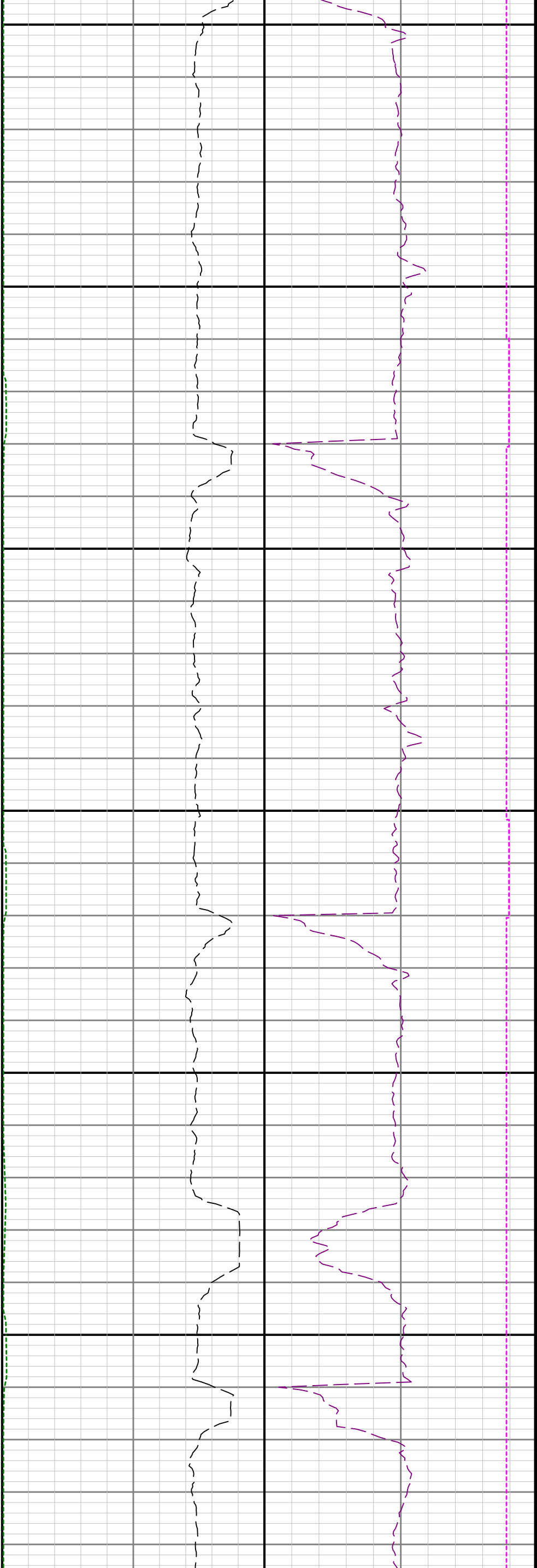
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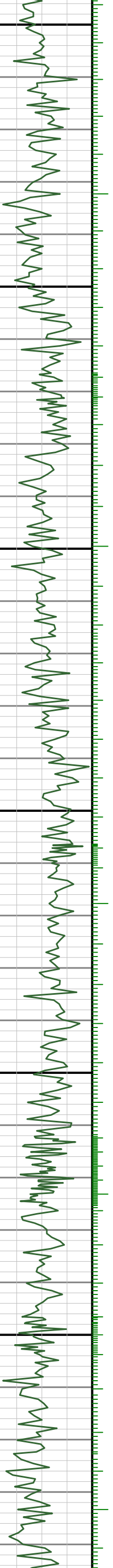


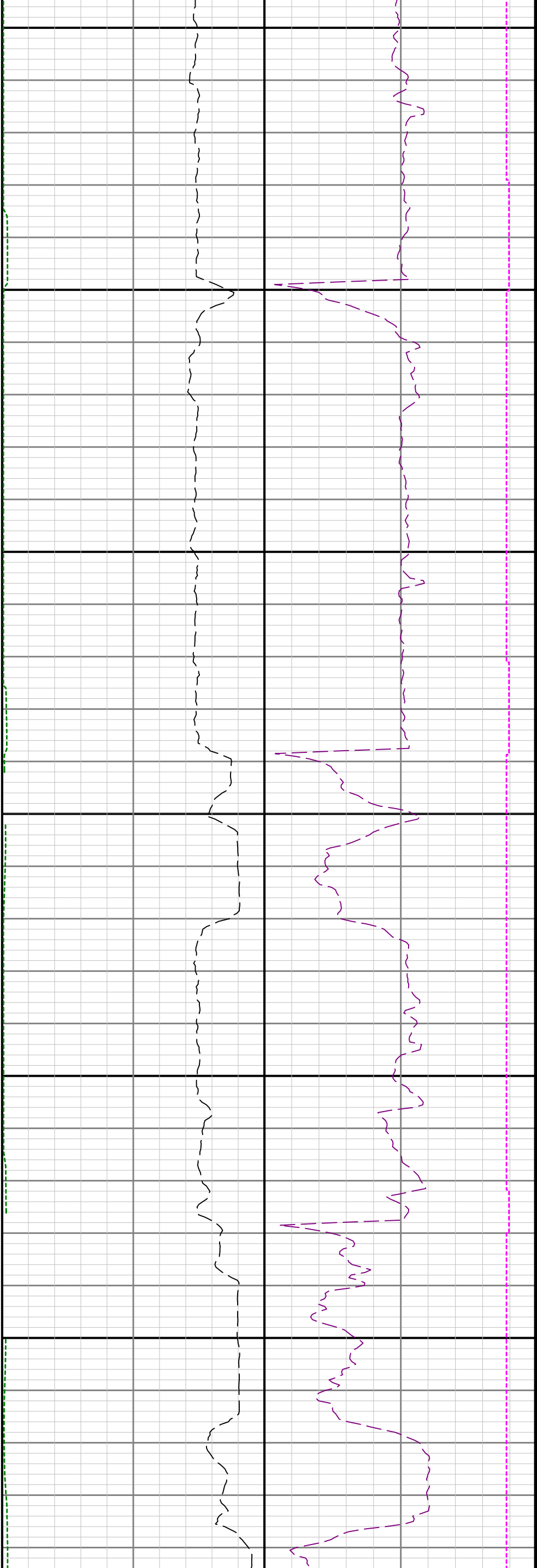


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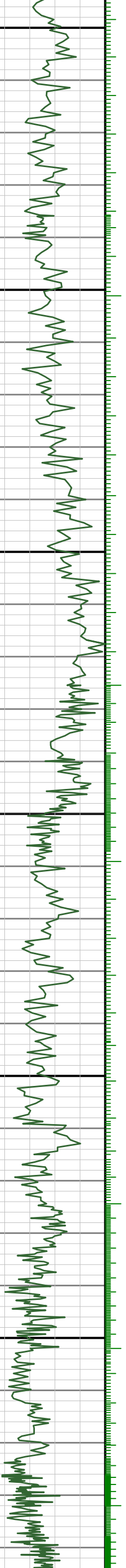


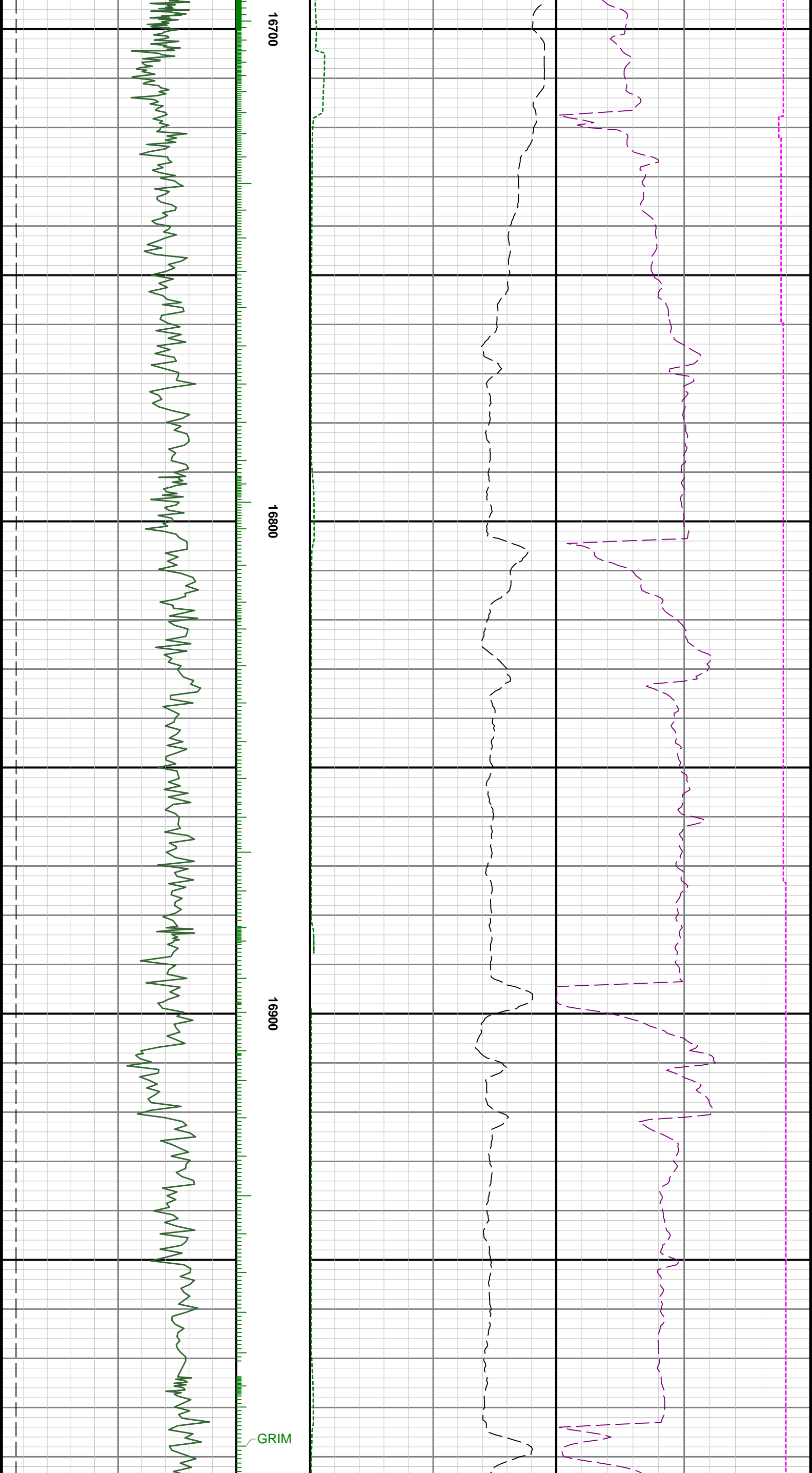


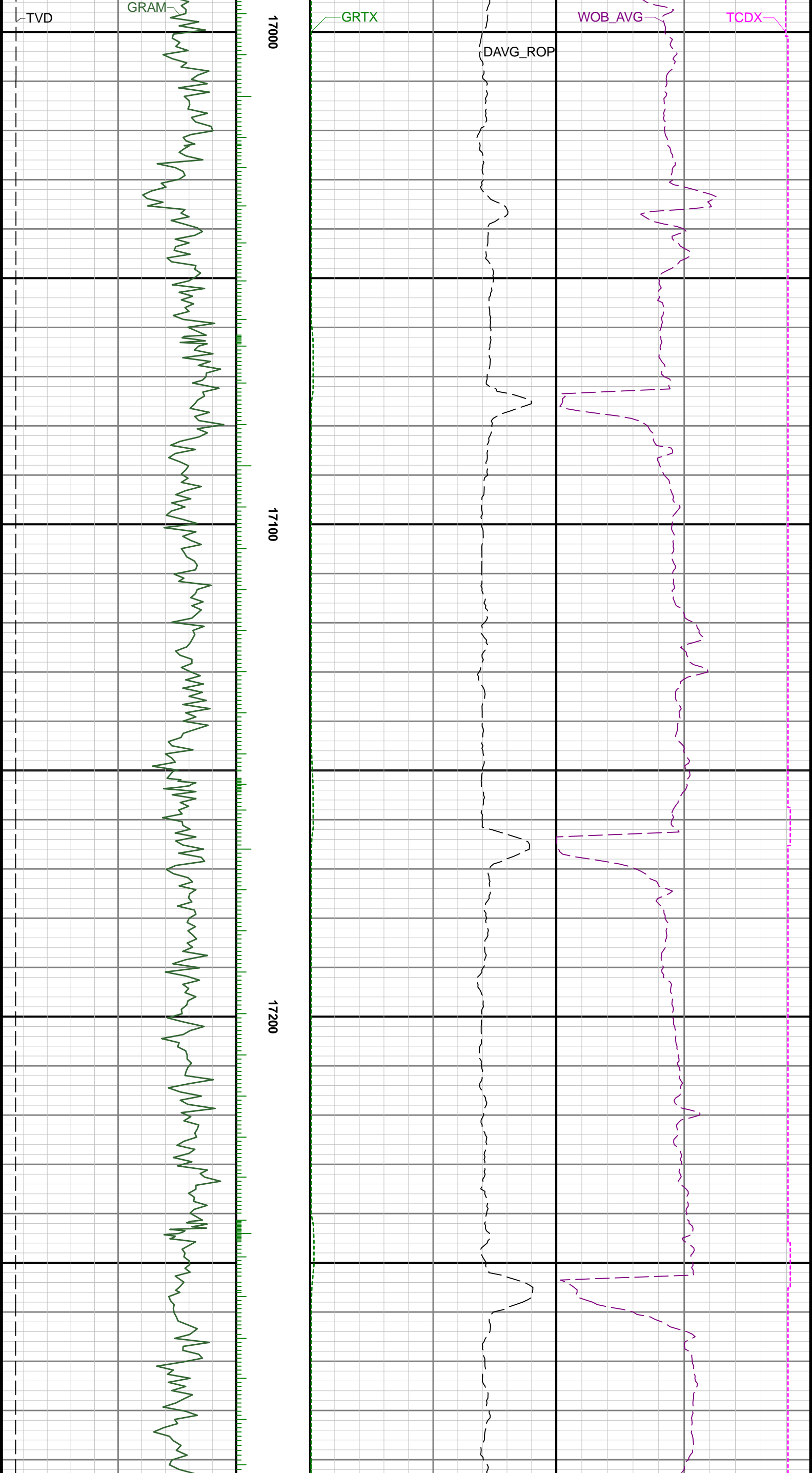
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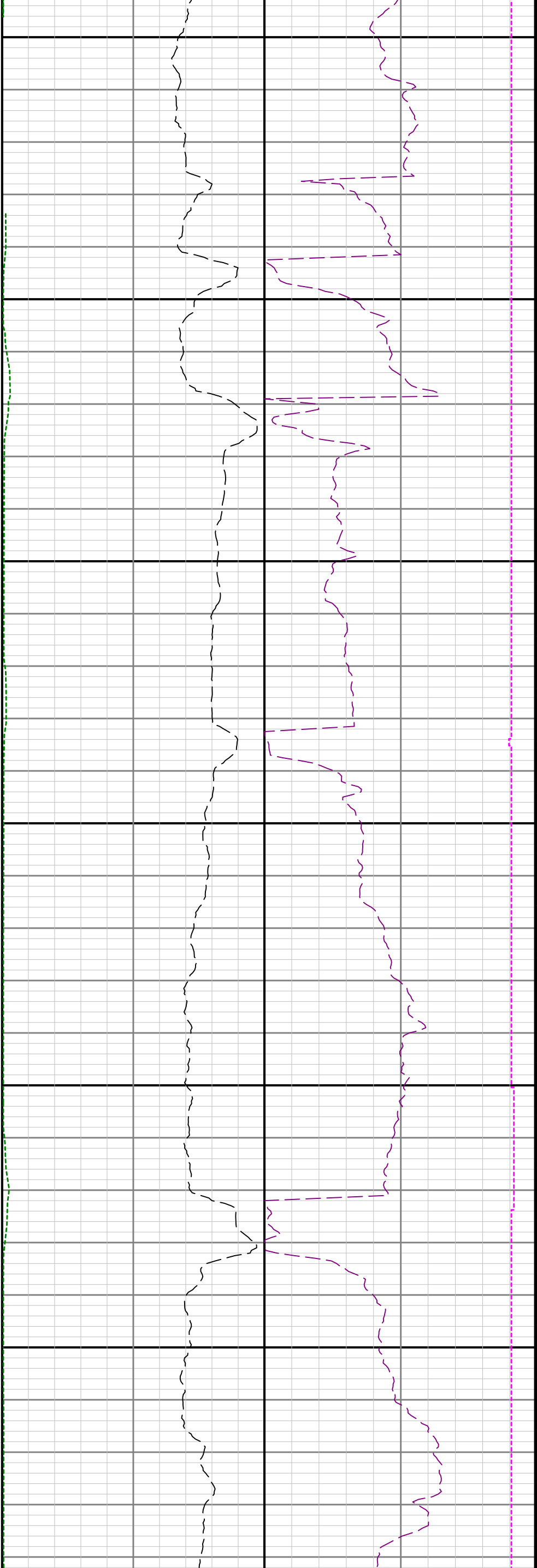
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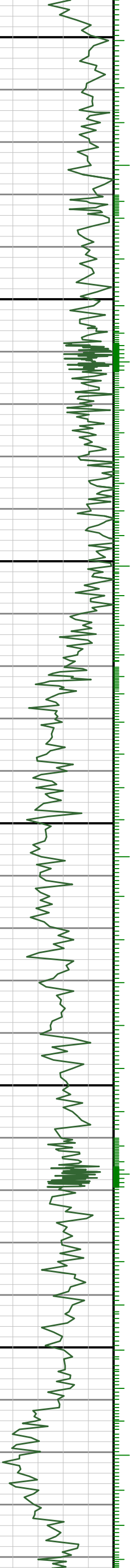


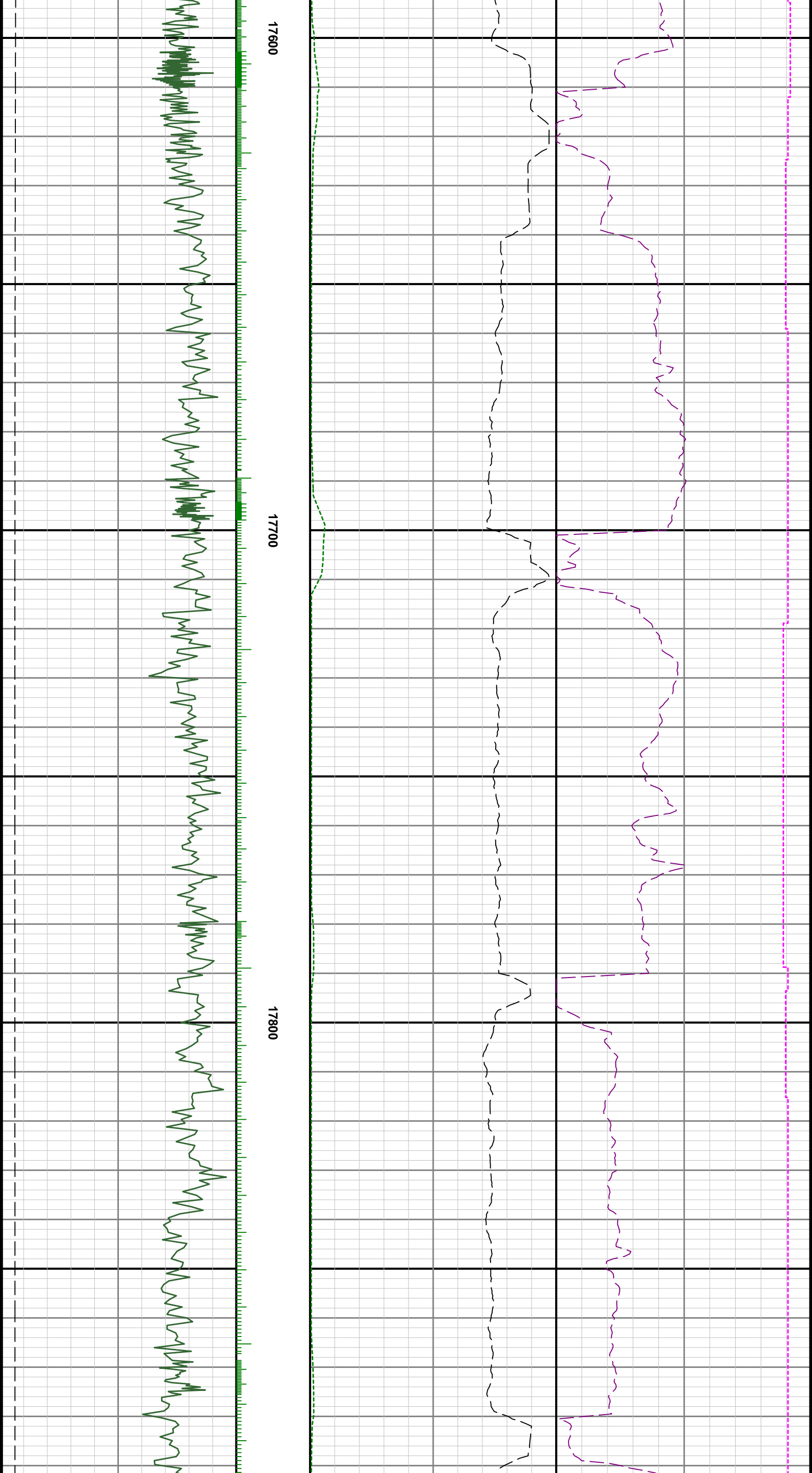


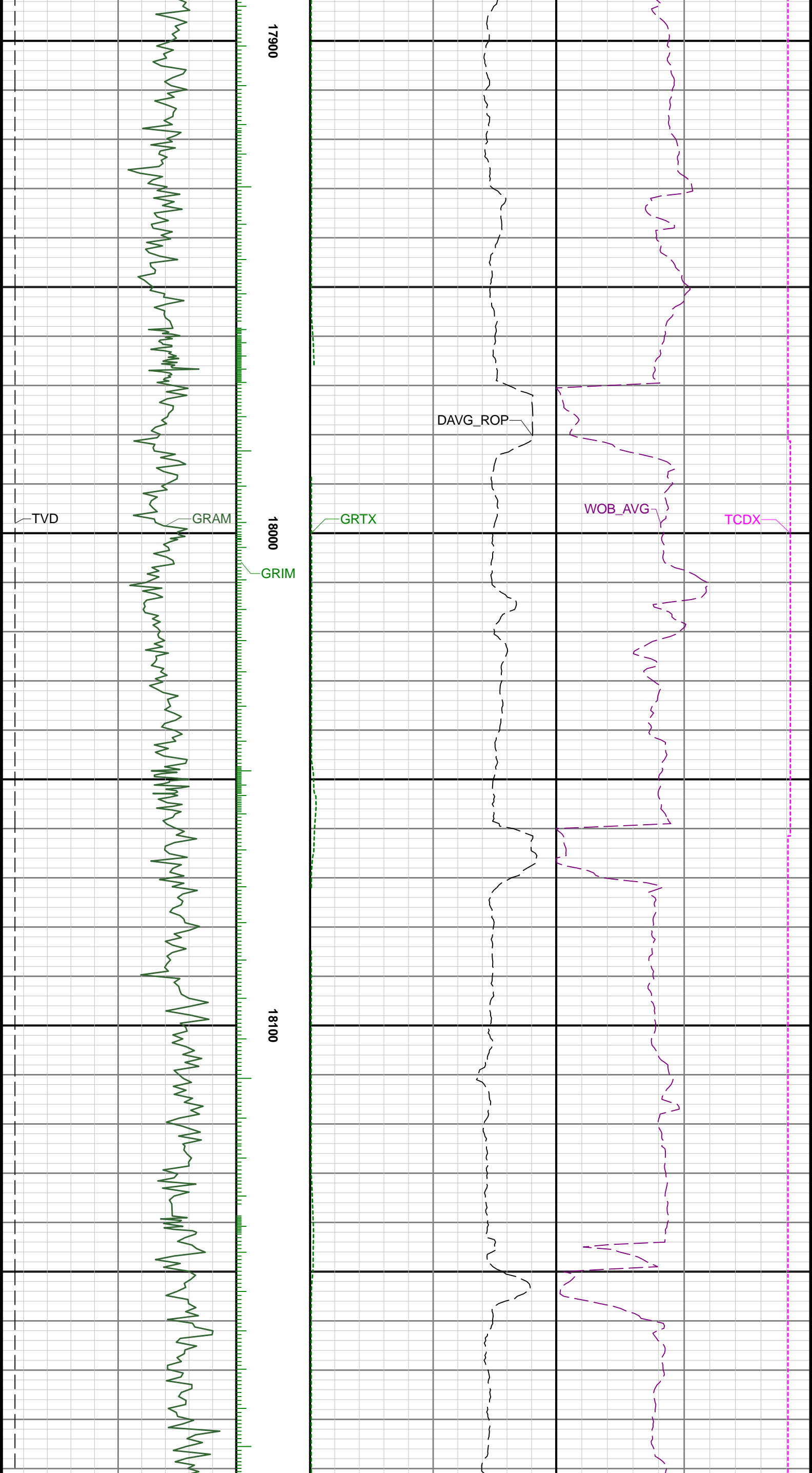
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17400

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17900

18000

18100

DAVG_ROP

WOB_AVG

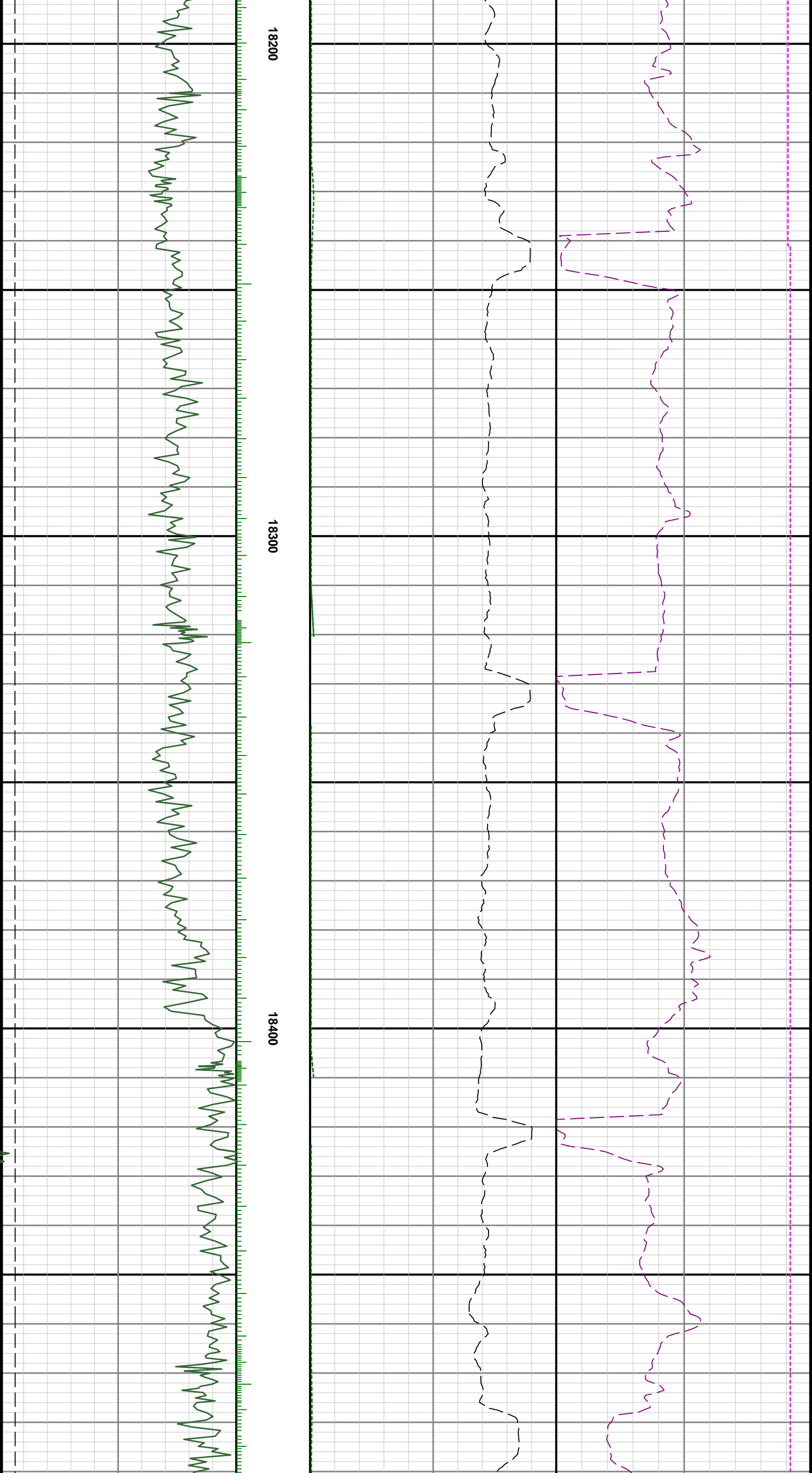
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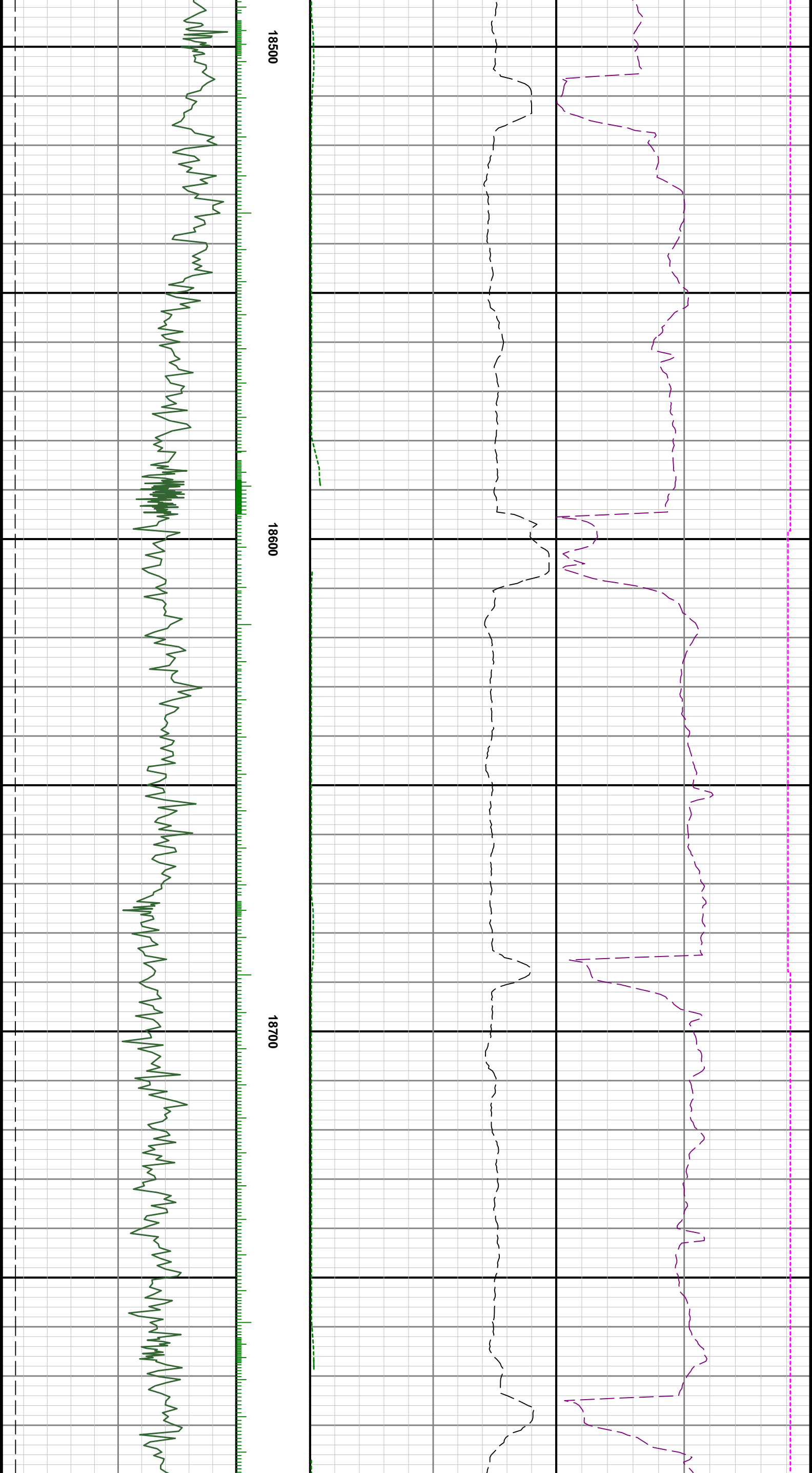
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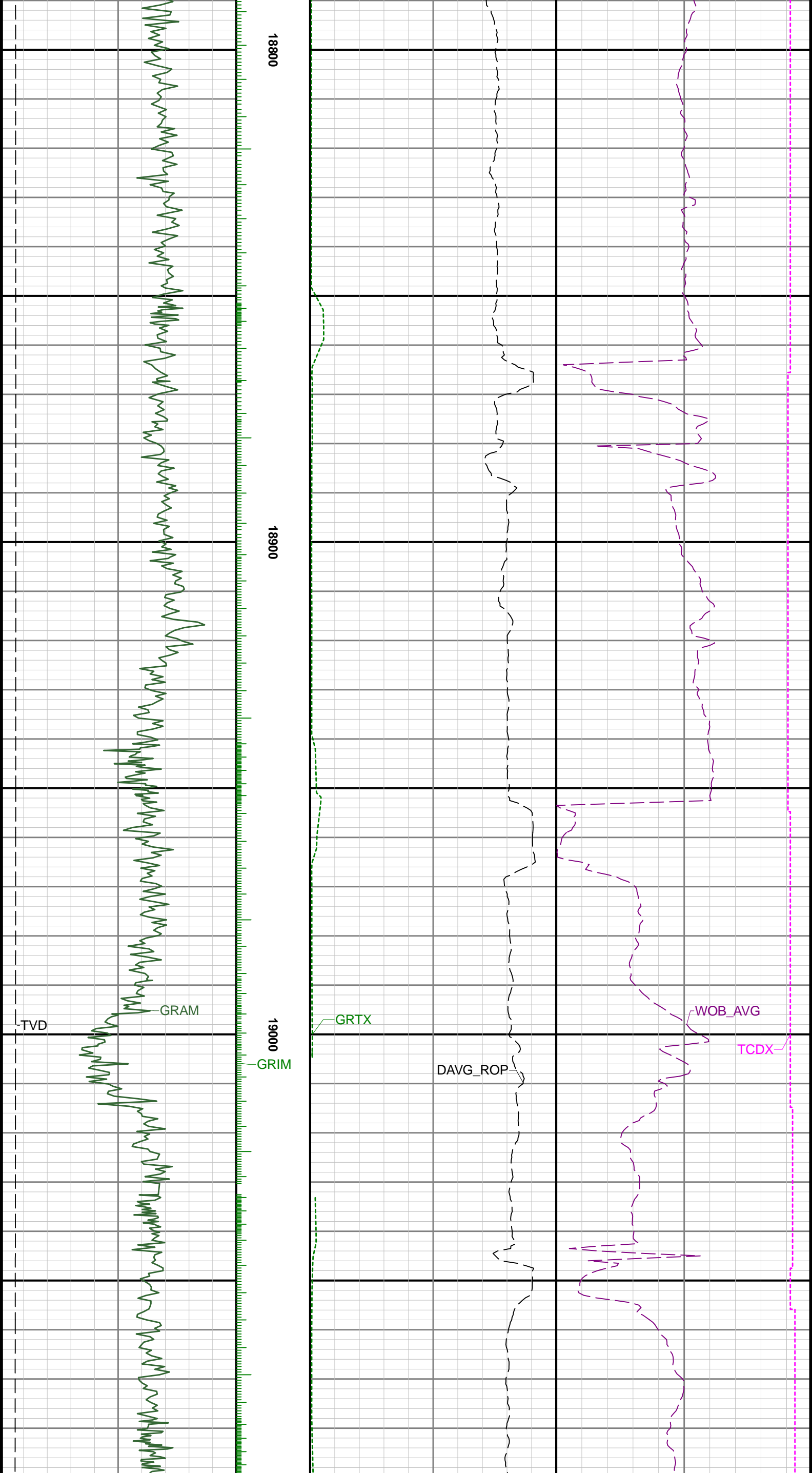
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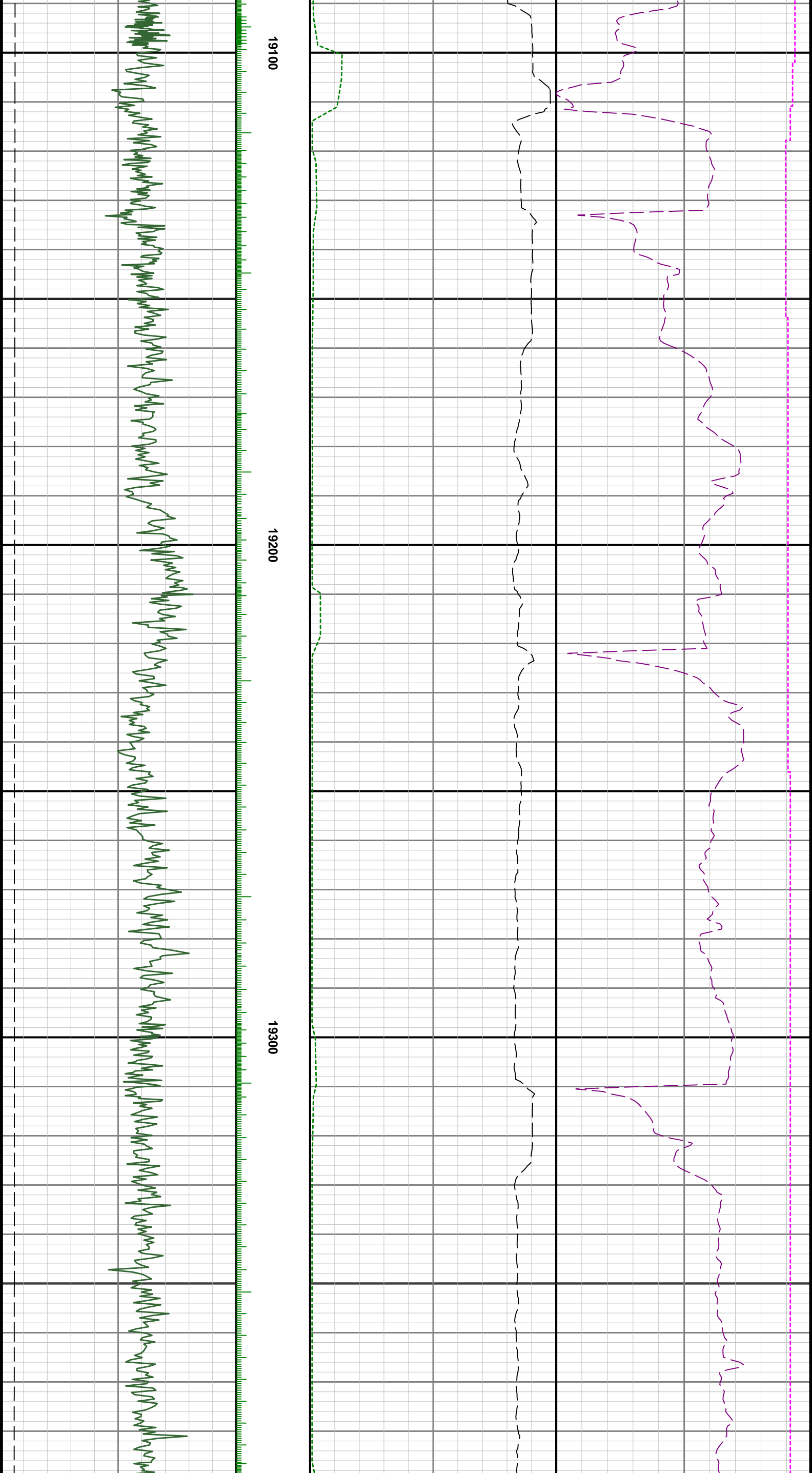
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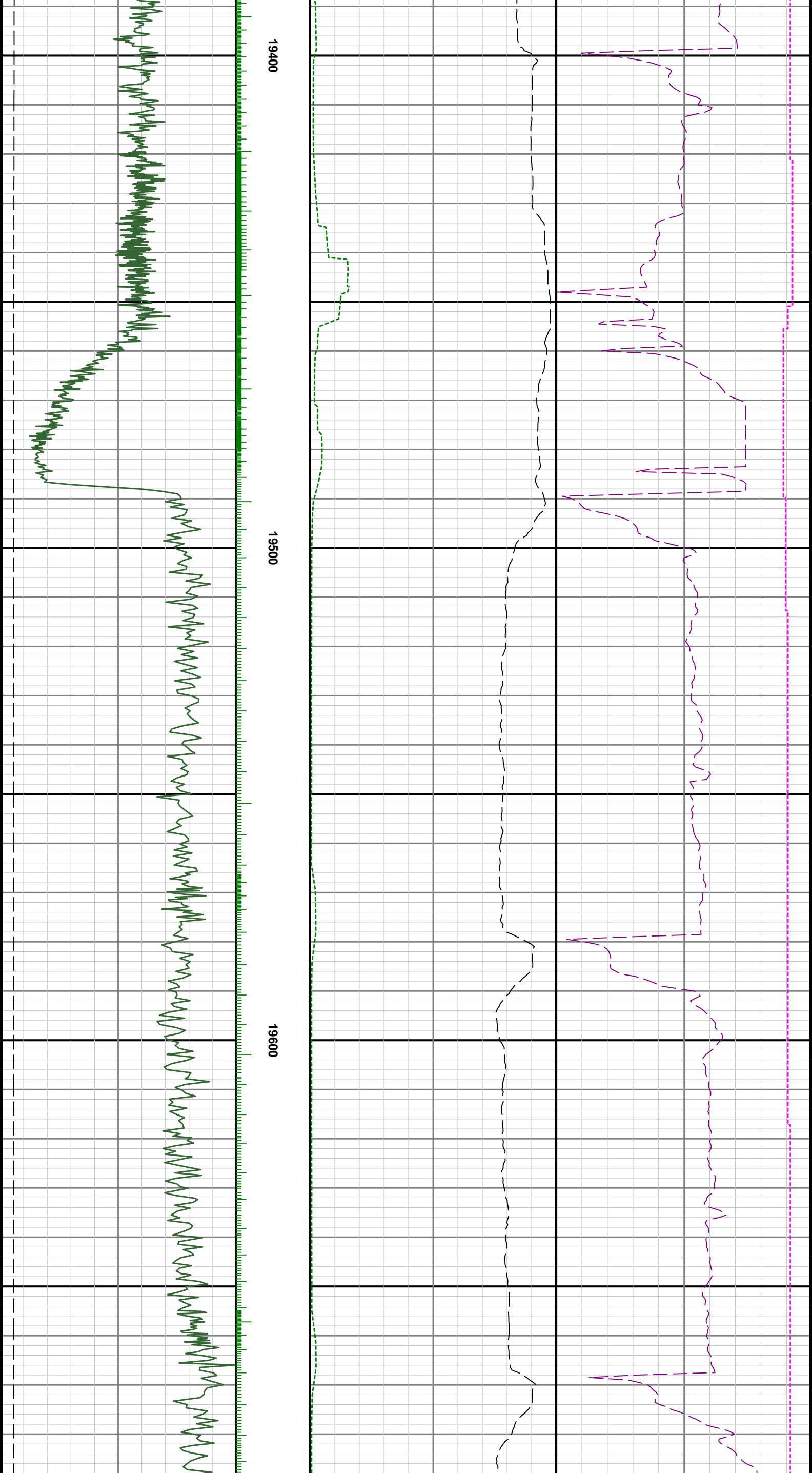
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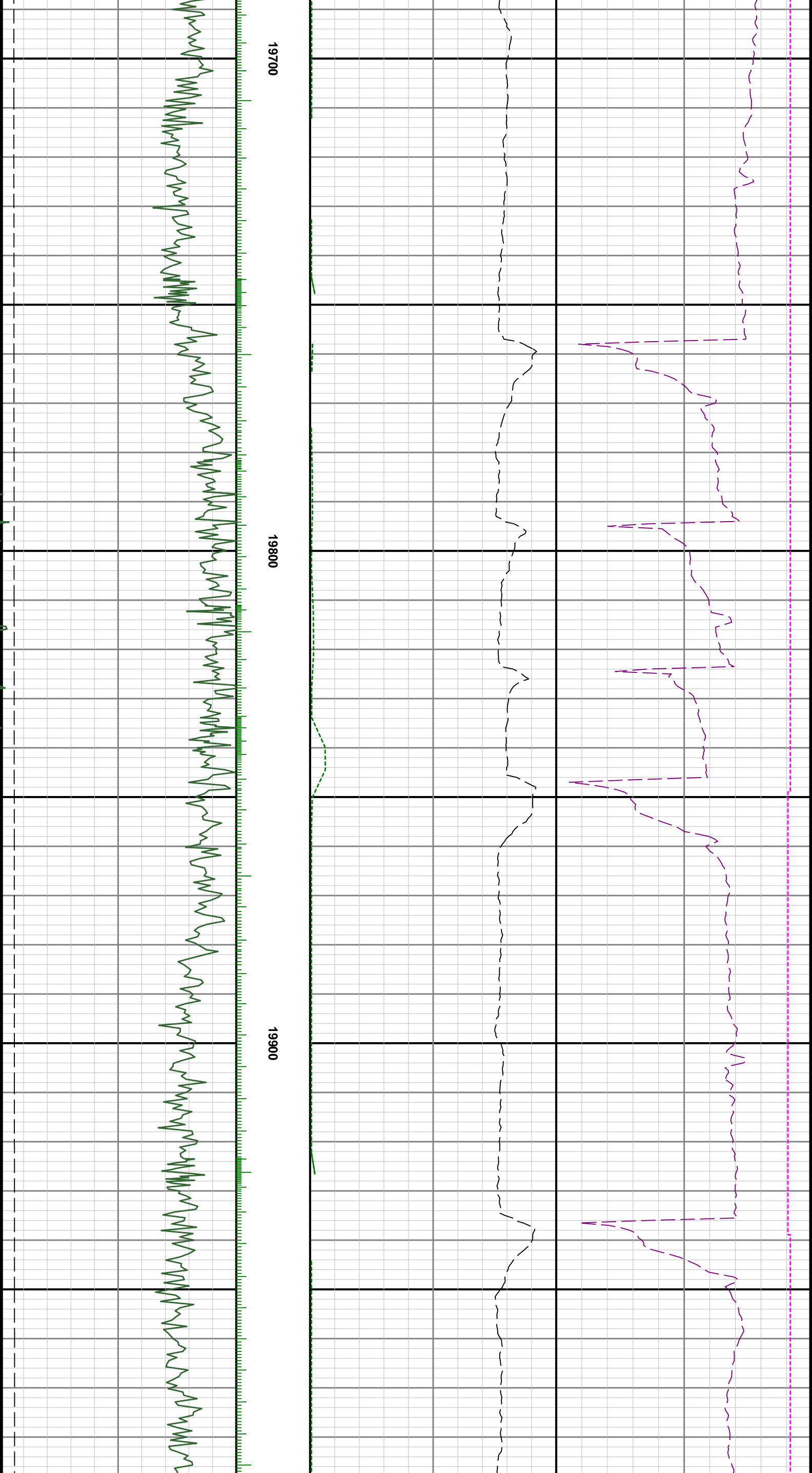


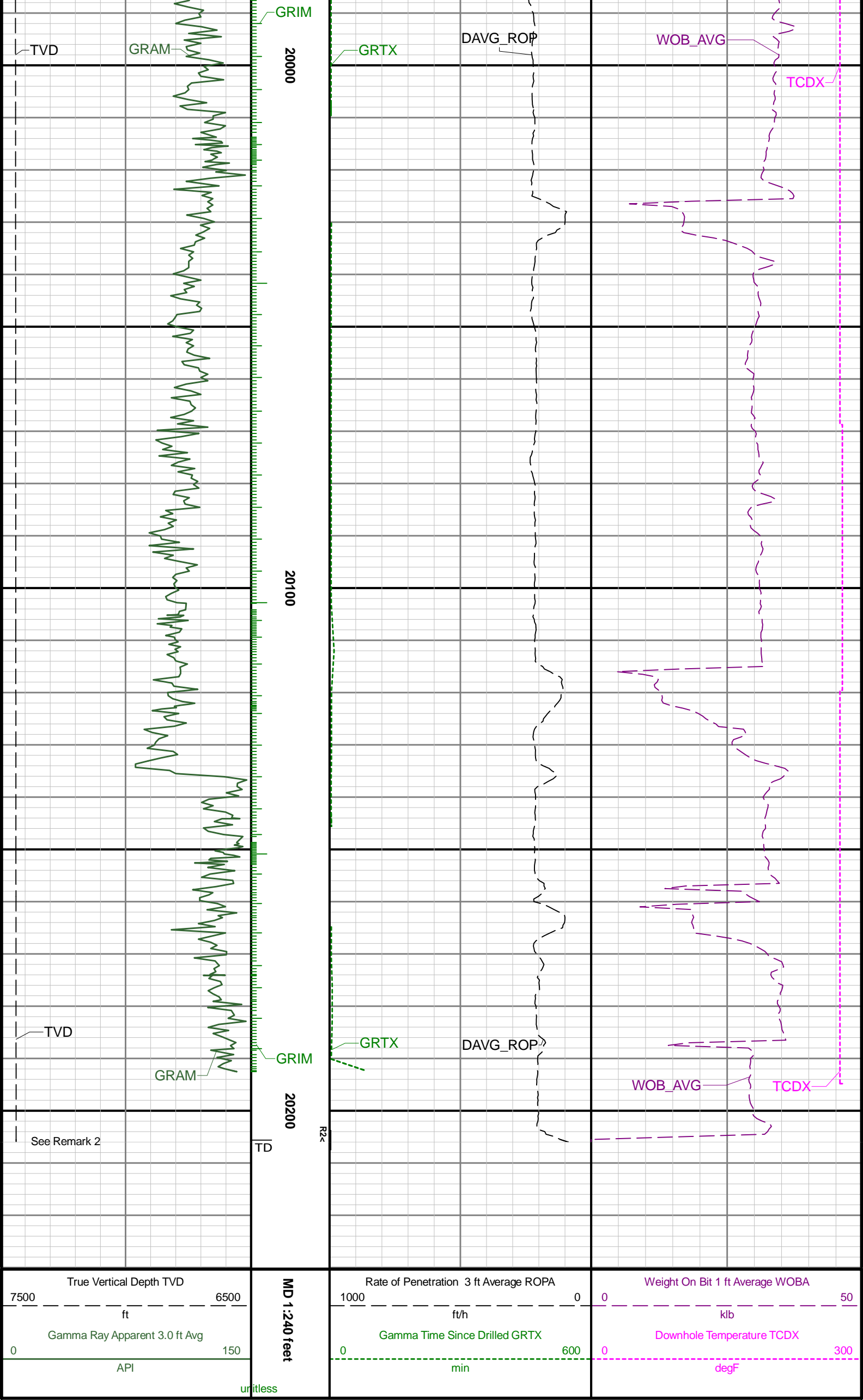












True Vertical Depth TVD	
7500	6500
ft	
Gamma Ray Apparent 3.0 ft Avg	
0	150
API	

MD 1:240 feet
 TD
 R2<

Rate of Penetration 3 ft Average ROPA	
1000	0
ft/h	
Gamma Time Since Drilled GRTX	
0	600
min	

Weight On Bit 1 ft Average WOBA	
0	50
klb	
Downhole Temperature TCDX	
0	300
degF	

unitless