



Natural Formation Evaluation
Gamma Ray

Scale: **1:240MD**

Company: **Bonanza Creek**
Well: **Pronghorn 11-41-28HNB**
Field: **Weld County**

County: **Continental US** State: **United States**

Status: **Final Print**

API Number: **05-123-38633**

SEC: 28 TWP: 5N RNG: 61W

Other Services:

Surface Location:
Latitude: 40° 22' 31.008" N
Longitude: 104° 13' 20.244" W

Elevations:
4616.00 ft.

VSS
Directional

Permanent Datum (P.D.): **Mean Sea Level**

Elevation: **4616.00 ft.**

Elevations:
4633.00 ft.
N/A

Log Measured From: **Kelly Bushing**

4633.00 ft. Above P.D.

KB: 4633.00 ft.
DF: N/A
GL: 4616.00 ft.

Depth Reference: **Drillers Depth**

Drillers Depth

GL: 4616.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 5626.0 ft.	Date From: 14/Jan/14	Dip Angle: 67.02 °	Azi Reference North: True
Bottom: 10742.0 ft.	Date To: 21/Jan/14	Total	Mag to Reference
	Spud Date: 14/Jan/14	Field Strength: 52830.6 nT	North Correction: 8.26 °

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13.500 in.	0.0 ft.	775.0 ft.	9.625 in.	36.00 lb/ft	0.0 ft.	759.0 ft.
8.750 in.	775.0 ft.	6460.0 ft.	7.000 in.	29.00 lb/ft	0.0 ft.	6439.0 ft.
6.125 in.	6460.0 ft.		4.500 in.	11.60 lb/ft	0.0 ft.	

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based Mud	5626.0 ft.	6460.0 ft.	8.750 in.	834.0 ft.	1.7 ° / 84.0 °	82.7 ° / 88.4 °
Water Based Mud	6460.0 ft.		6.125 in.		82.7 ° / 88.4 °	

Acquisition System

Software Version

Other

Advantage	2.20U4	Rig: Cade 22	/ Bonanza Creek Oil Company
PATS	6.4.1.34	Job No.: 6062222	/ D&E

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Log Run Summary

LWD Run No.	BHA Run No.	Bit Run No.	Bit Size (in.)	Bit Type	Bit Gauge Length (in.)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Time (hrs.)
							Top (ft.)	Bottom (ft.)	From (ft.)	To (ft.)	Start	End	
3	3	3	8.750	Roller Cone	4.800	Rotary Steerable	5626.0	6401.5	5626.0	6460.0	17/Jan/2014 09:45	18/Jan/2014 10:00	12.1
4	4	4	6.125	PDC	6.000	Rotary Steerable	6401.5	10669.0	6460.0	10742.0	19/Jan/2014 05:00	21/Jan/2014 05:34	39.1

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Brent Cass	14 Jan 14	21 Jan 14	Eric Smith	14 Jan 14	21Jan 14	Brandon Dexter	14 Jan 14	21Jan 14

Mud Properties Record

Date / Time	LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
18 Jan 2014 12:00	3	6460.0	Water Based Mud	9.2	13	8.3	6.4	0.0 / 95	Active Pits	300	N/A
20 Jan 2014 11:30	4	9640.0	Water Based Mud	9.2	10	10.0	16.8	0.0 / 94	Active Pits	300	N/A

Mnemonics

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

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft)	Max O.D. (in.)	Min I.D. (in.)
3	DIR	12546339	Directional	48.02	6.750	3.250
3	SRIG	11602059	Gamma	44.65	6.750	3.250
4	DIR	12818554	Directional	71.84	4.750	2.250
4	SRIG	12521741	Gamma	68.45	4.750	2.250

Service and Tool Mnemonics

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

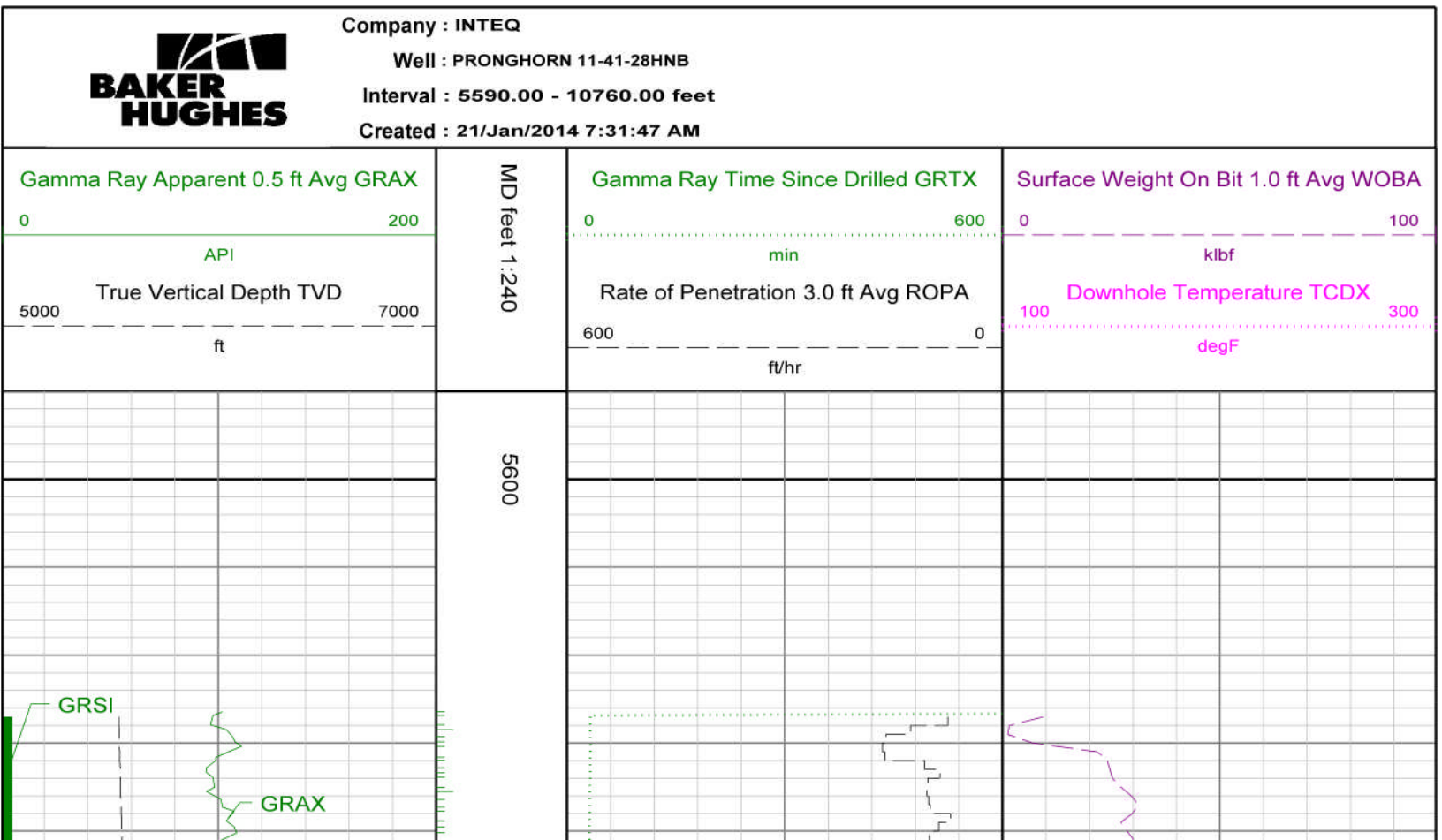
Comments

- 1) Baker Hughes INTEQ Run 3 utilized a 6 3/4 inch NaviGamma (Directional and Gamma Ray) tool ran behind an 8 3/4 inch bith with a steerable assembly from 5626 to 6460 feet MD (5536.43 to 6079.51 feet TVD).
- 2) Baker Hughes INTEQ Run 4 utilized a 4 3/4 inch NaviGamma (Directional and Gamma Ray) tool ran behind a 6 1/8 inch bith with a steerable assembly from 6460 to 10742 feet MD (6079.51 to 6062.12 feet TVD).
- 3) A sliding indicator is shown on the left side of track 1 as a heavy line. The indicator has been shifted to the Gamma Ray sensor offset to correspond with Gamma Ray data acquired while sliding.
- 4) Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes INTEQ. Due to the lack of control by Baker Hughes INTEQ logging engineers, depth calibration and measurements could not be independently verified.

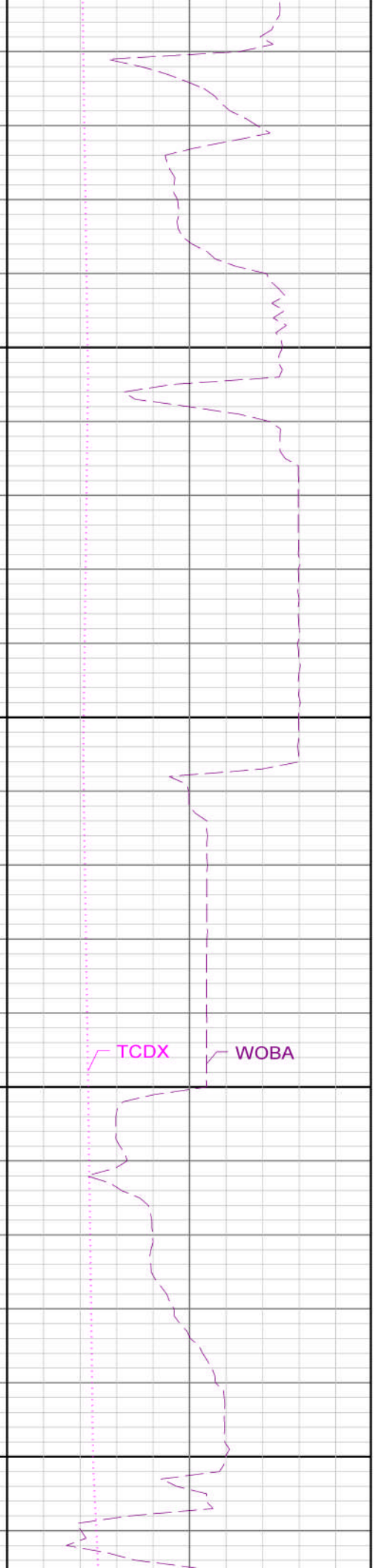
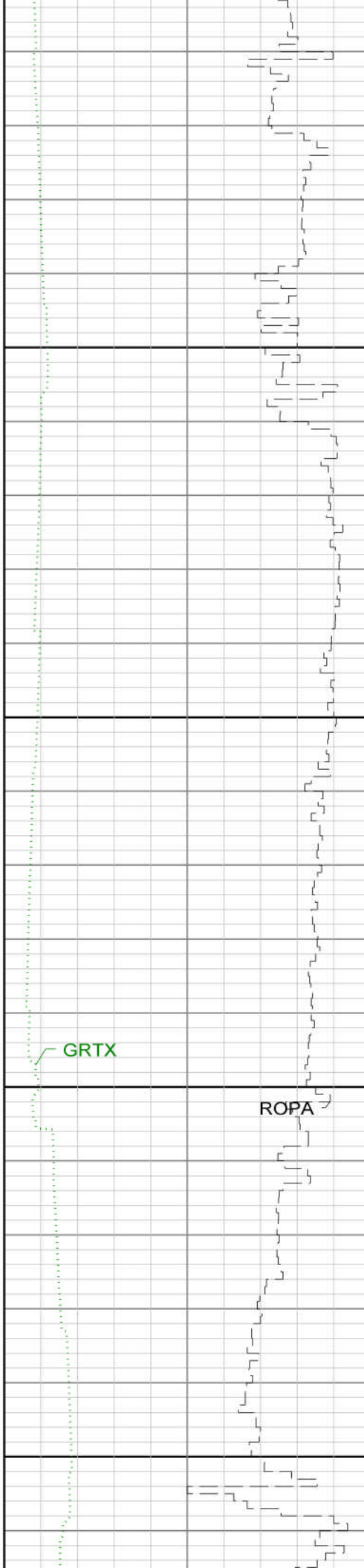
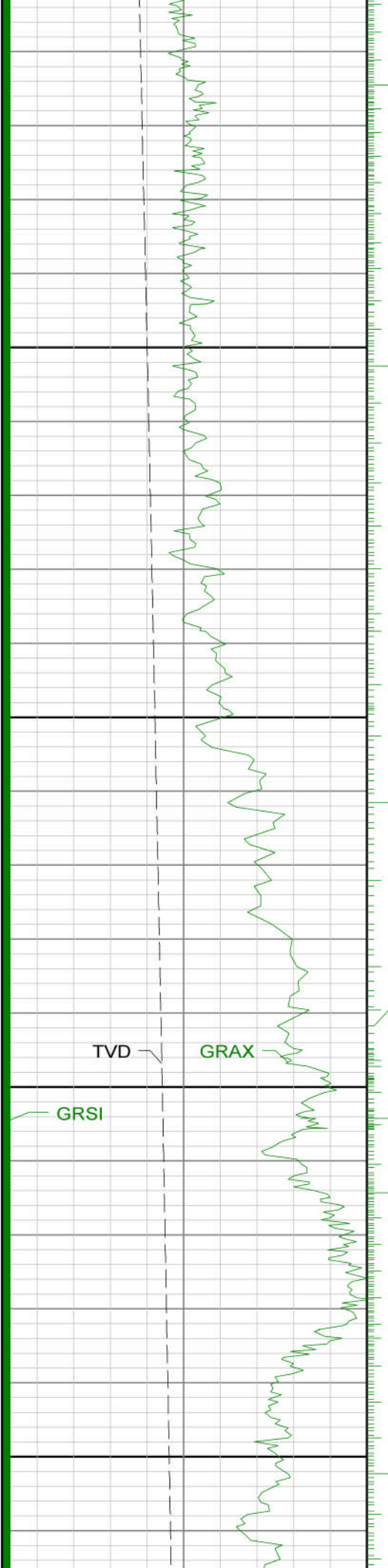
Remarks				
Number	Measured Depth (ft)	Hole Section (in.)	LWD Run No.	Remark
1	6400	8.750	3	The interval from 6400 to 6531 feet MD (6073.43 to 6083.51 feet TVD) has no GRTX due to the Gamma Ray Sensor offset at the end of run 3.
2	10742	6.125	4	The interval from 10667 to 10742 feet MD (6064.43 to 6062.12 feet TVD) has no GRAX, GRIX, or CRTX due to the Gamma Ray sensor offset at the end of run 4.

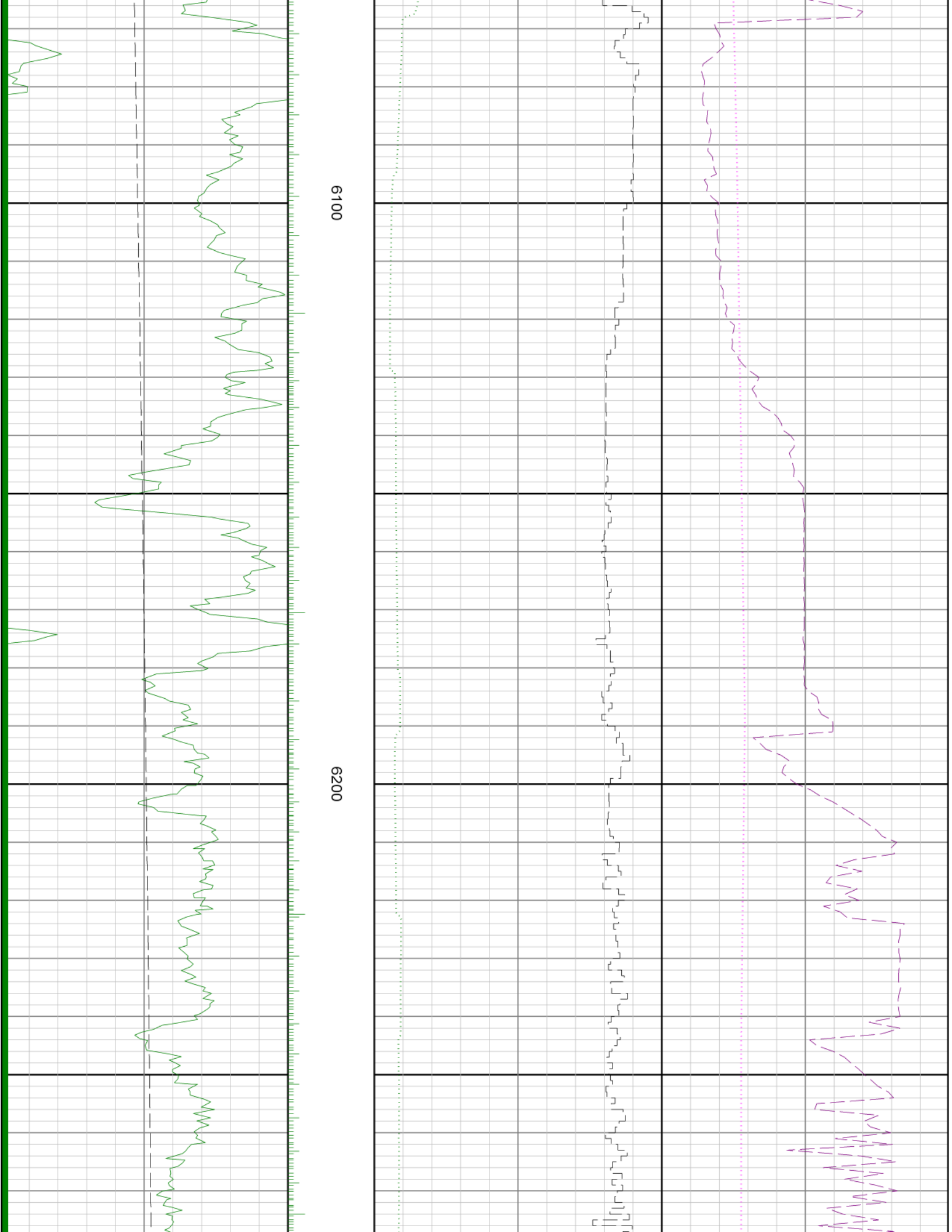
Curve Mnemonics

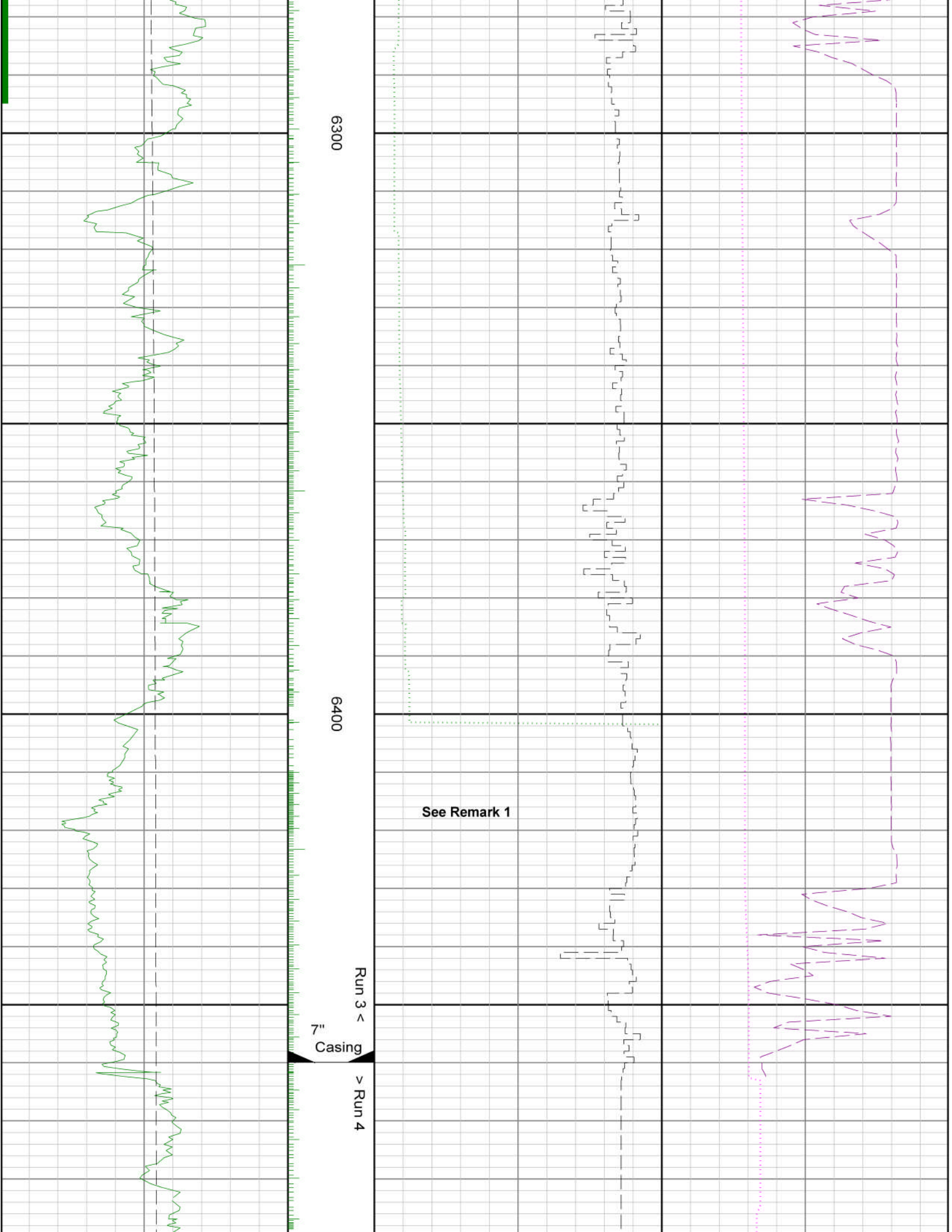
Curve	Description	Units
GRAX	Gamma Ray - Apparent	API
GRIX	Gamma Ray - Data Point Indicator	unitless
GRSI	Gamma Slide Ind.	unitless
GRTX	Gamma Ray Time Since Drilled GRTX	min
ROP_AVG	Depth Averaged ROP	ft/hr
TCDX	Downhole Temperature	degF
TVD	True Vertical Depth TVD	ft
WOB_AVG	AVERAGE Weight On Bit	klbf

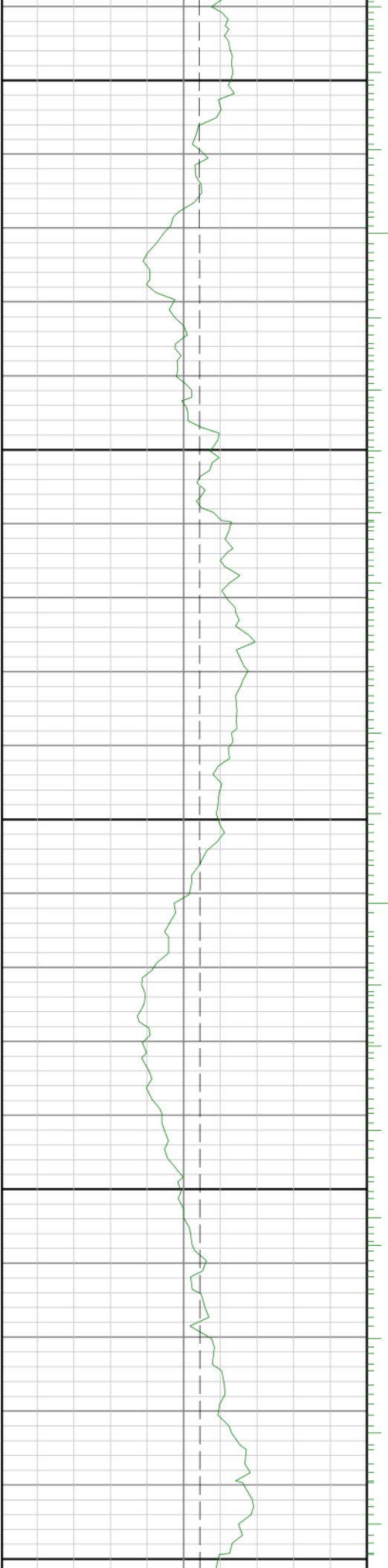








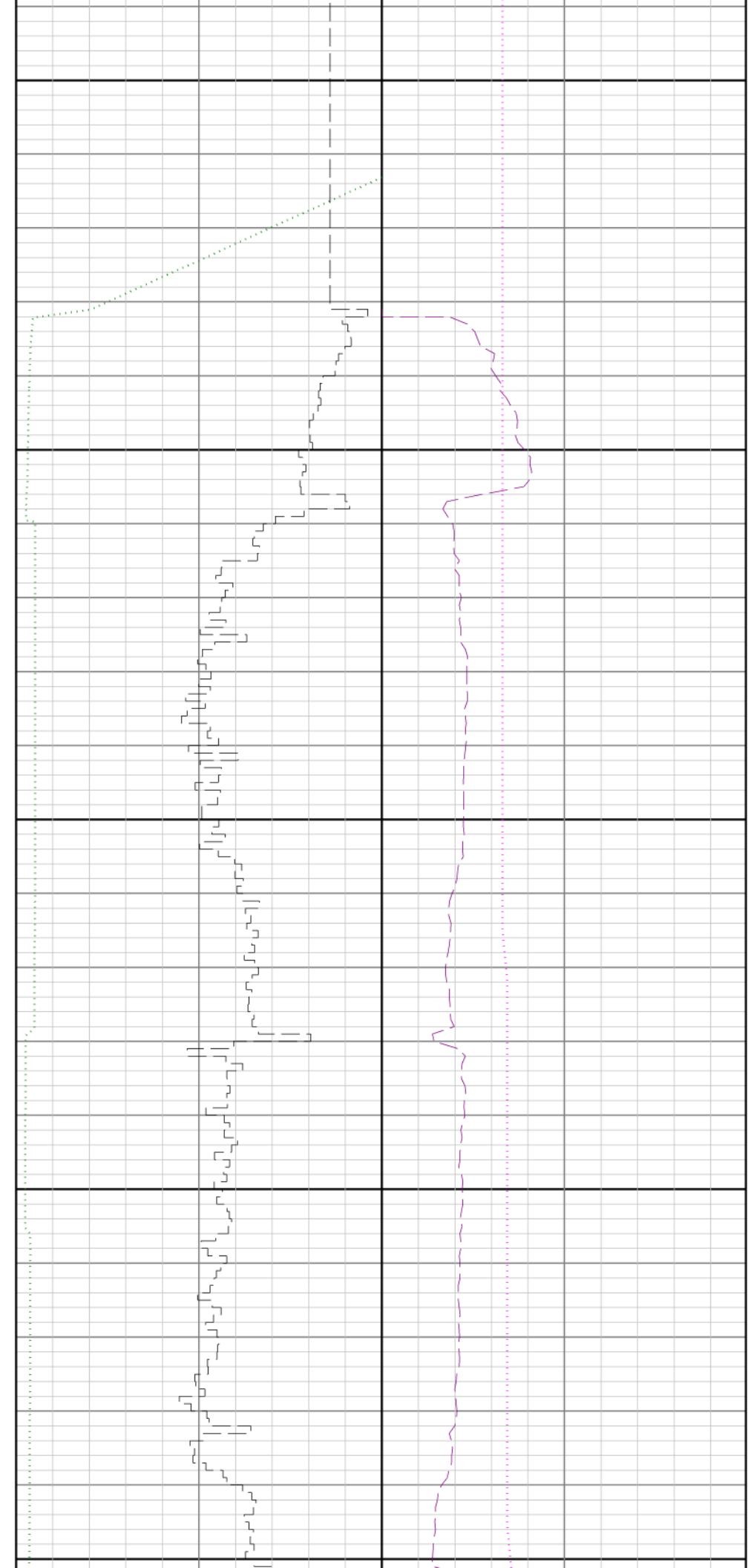


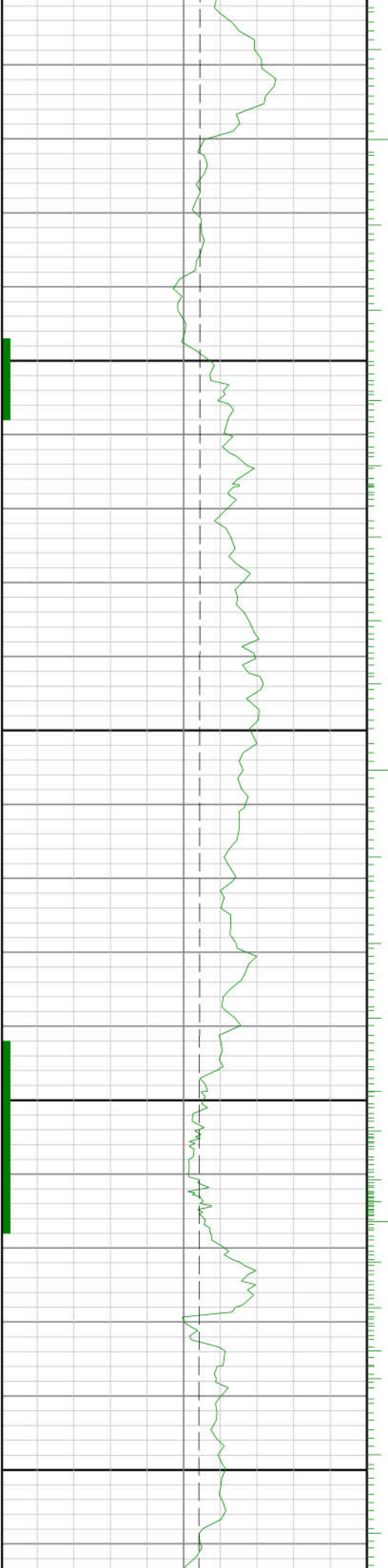


6500

6600

6700

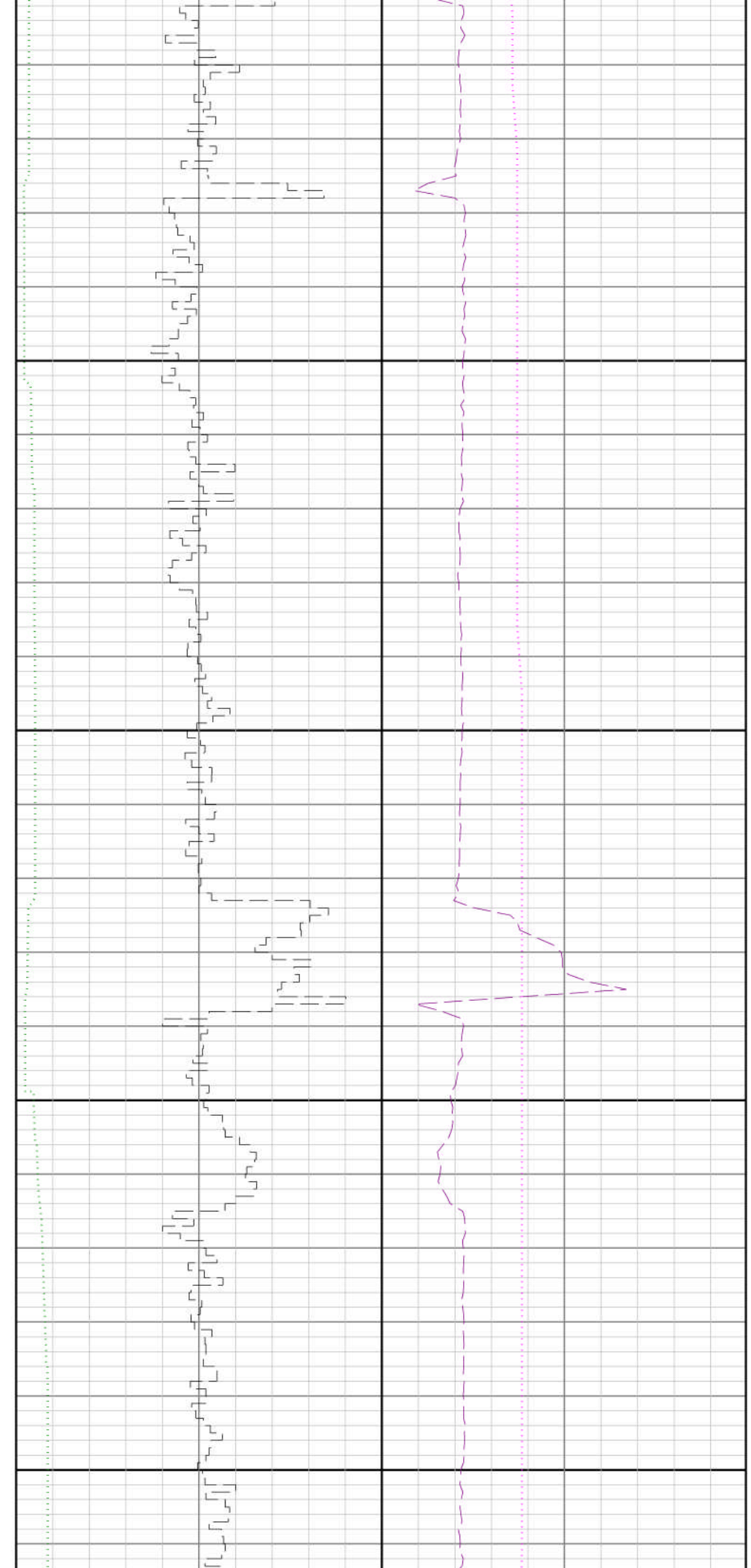


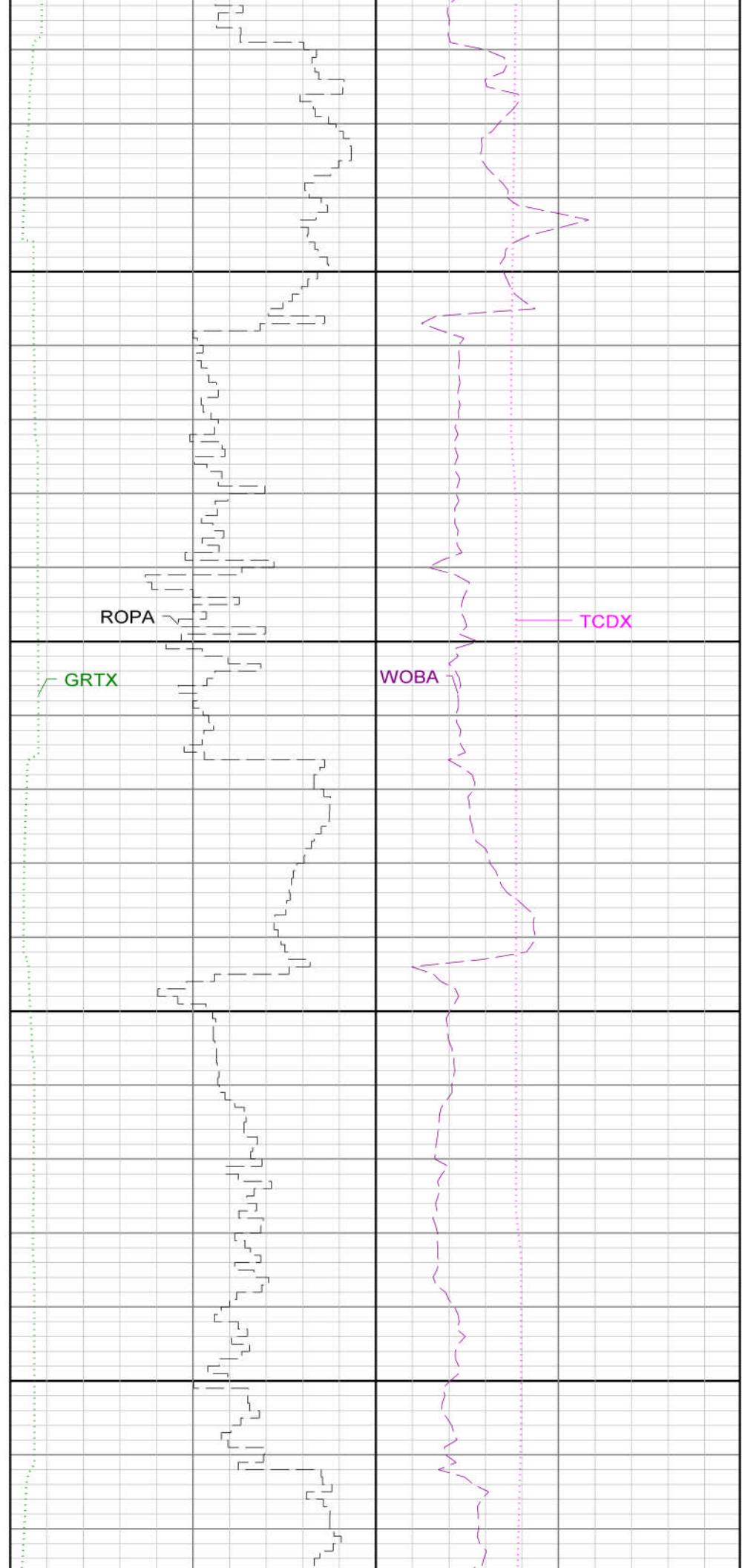
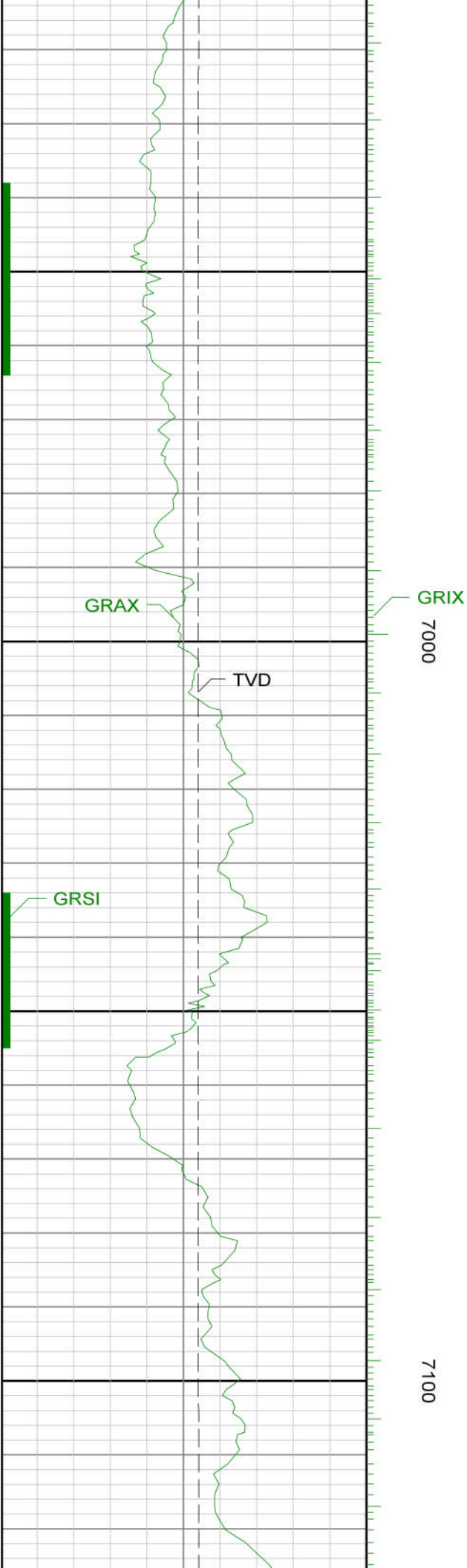


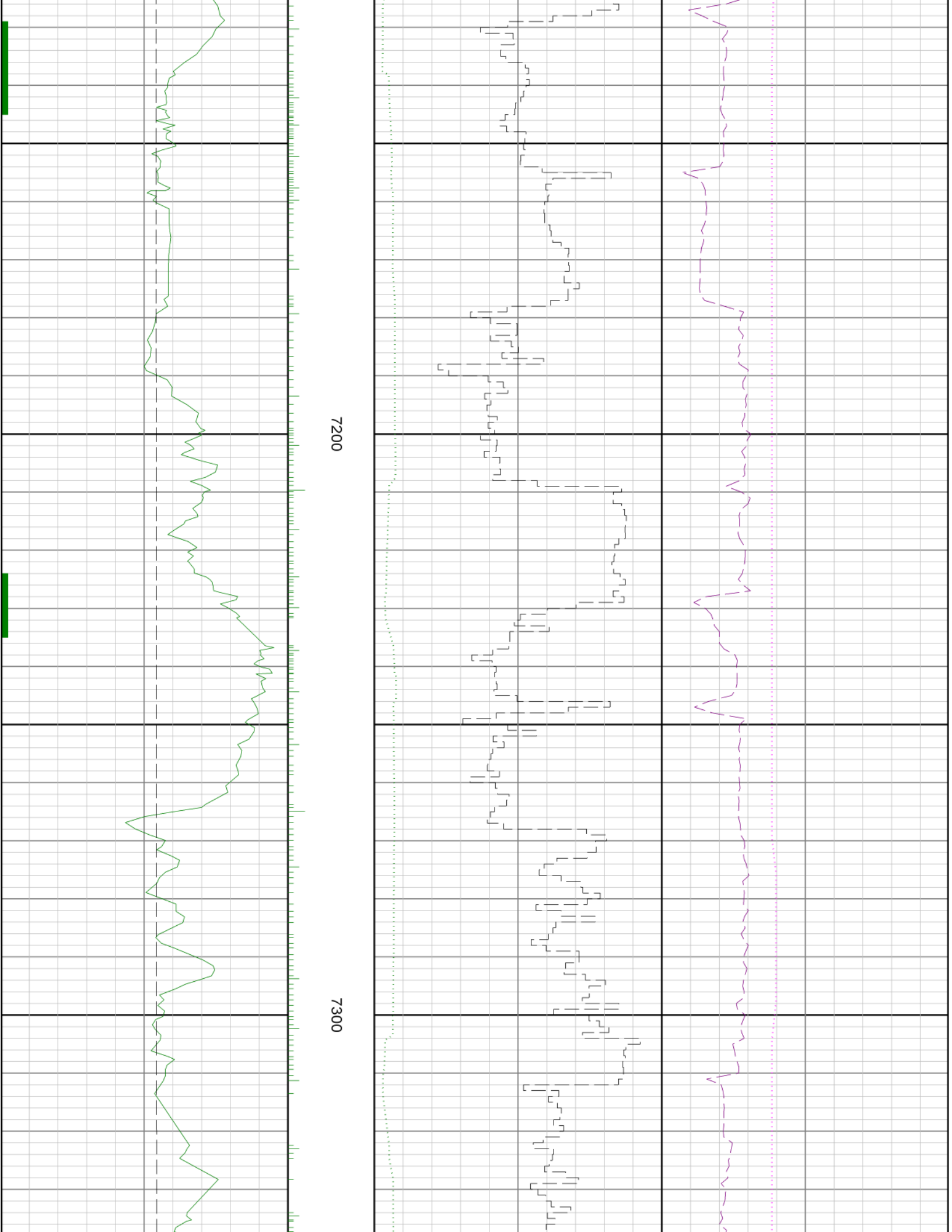
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0089

0

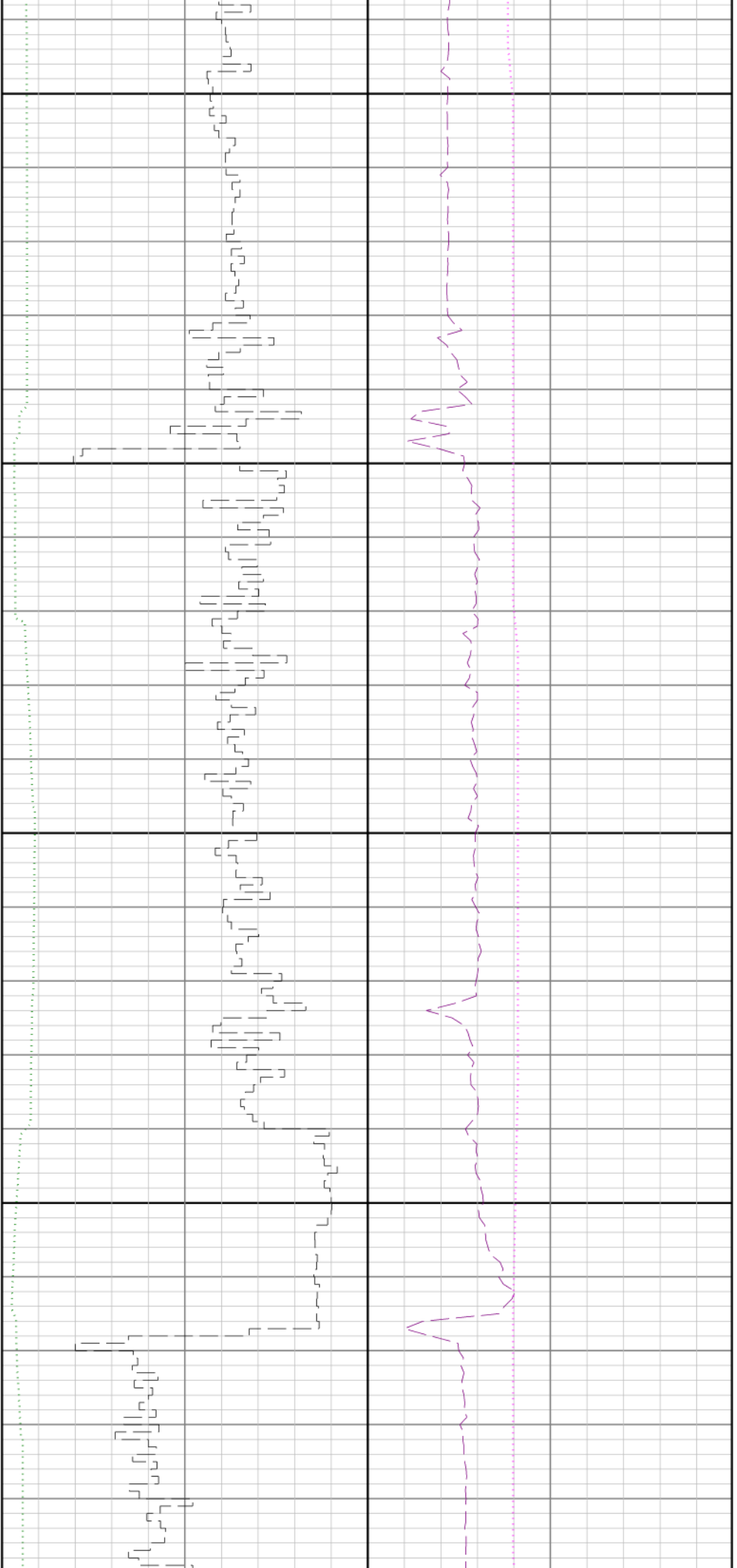






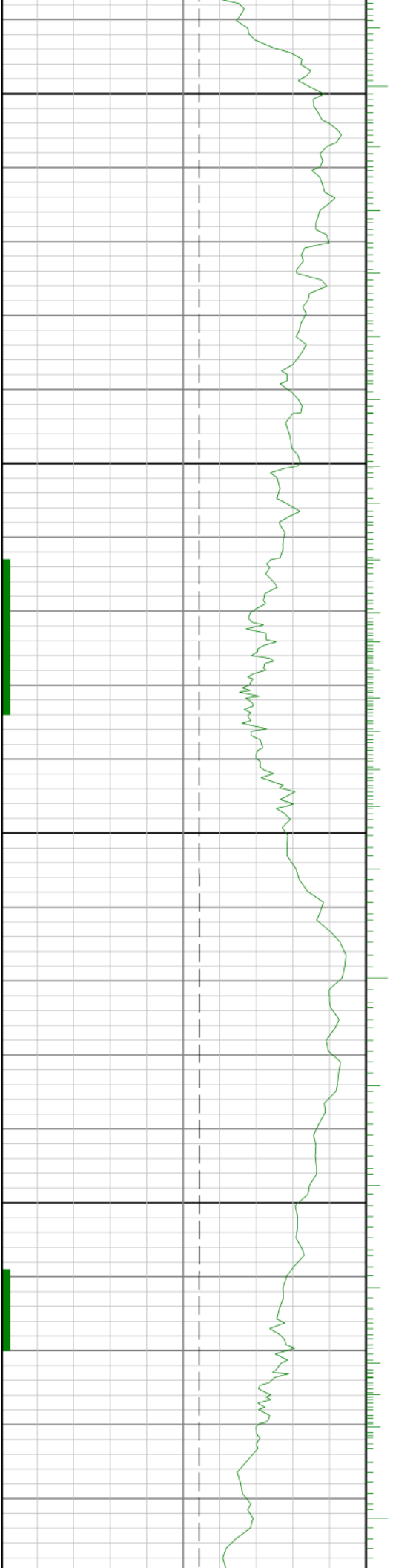
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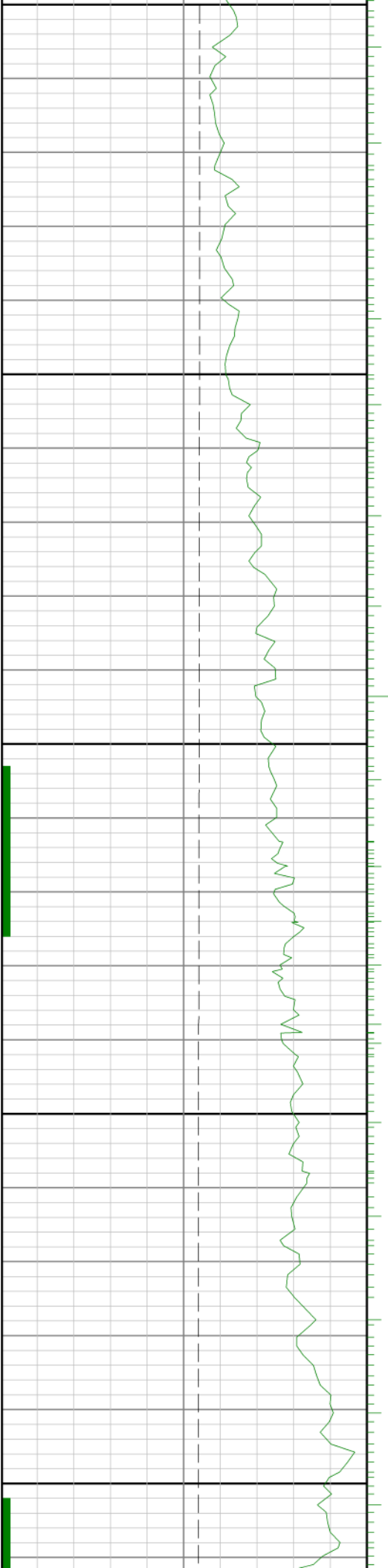
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7400

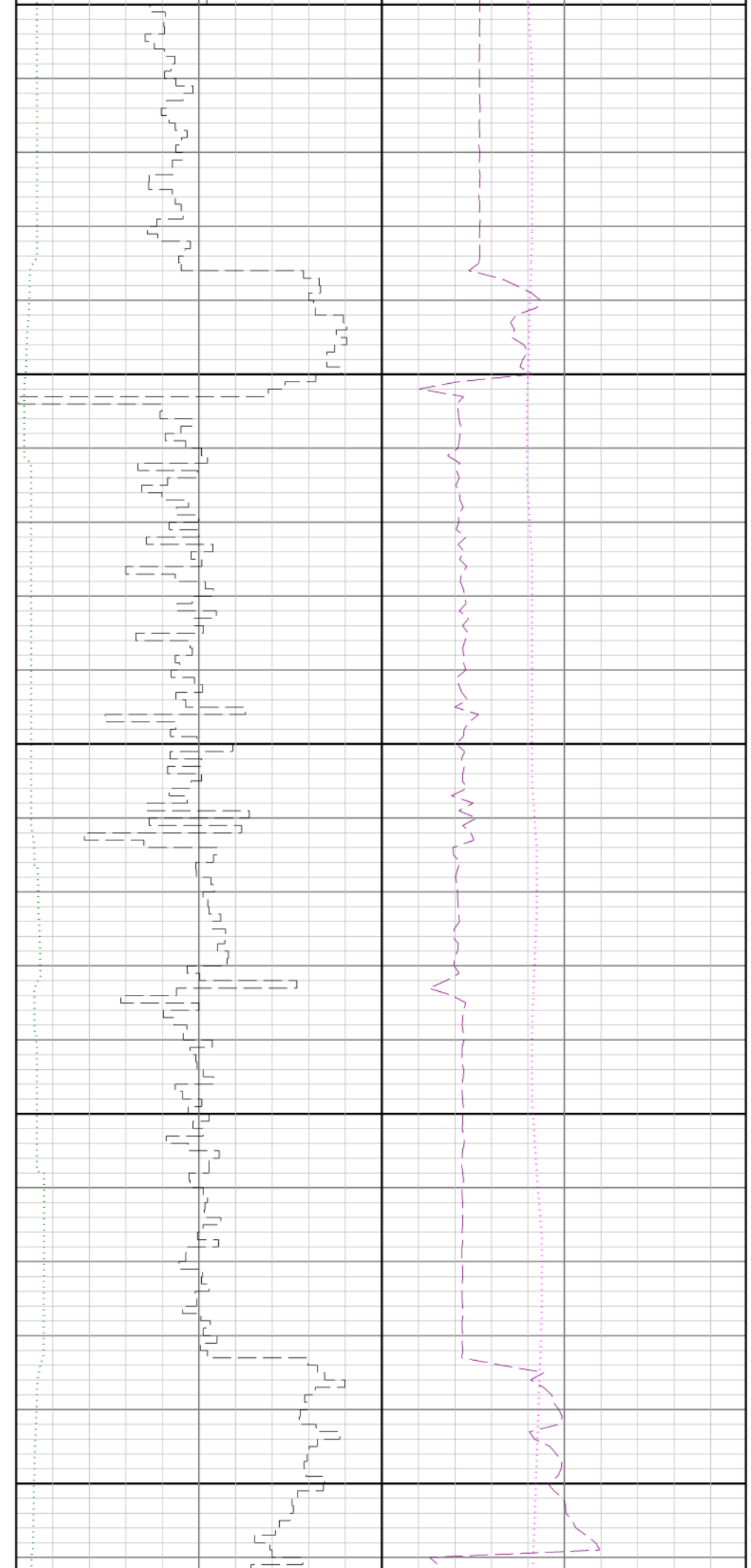
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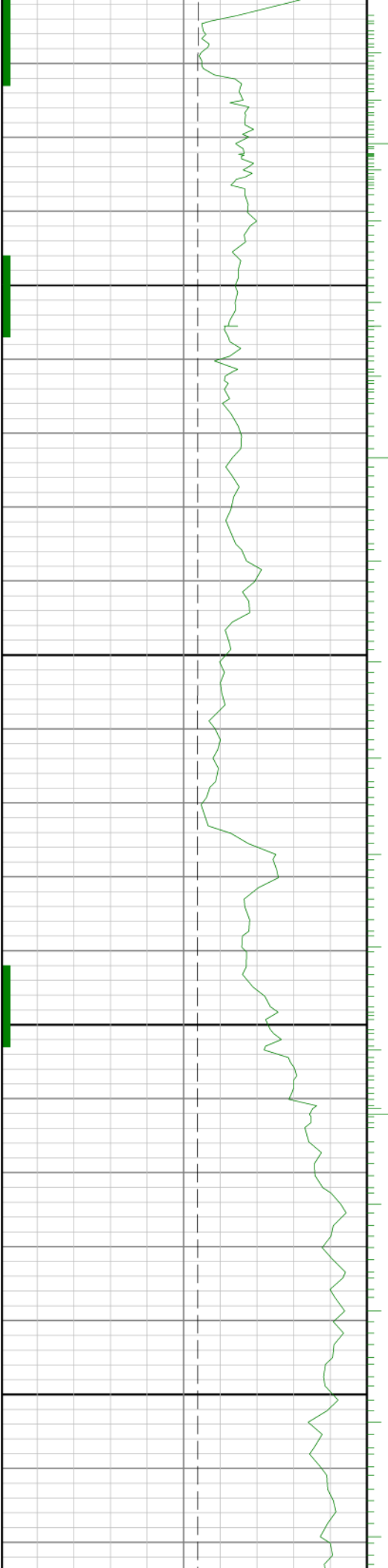




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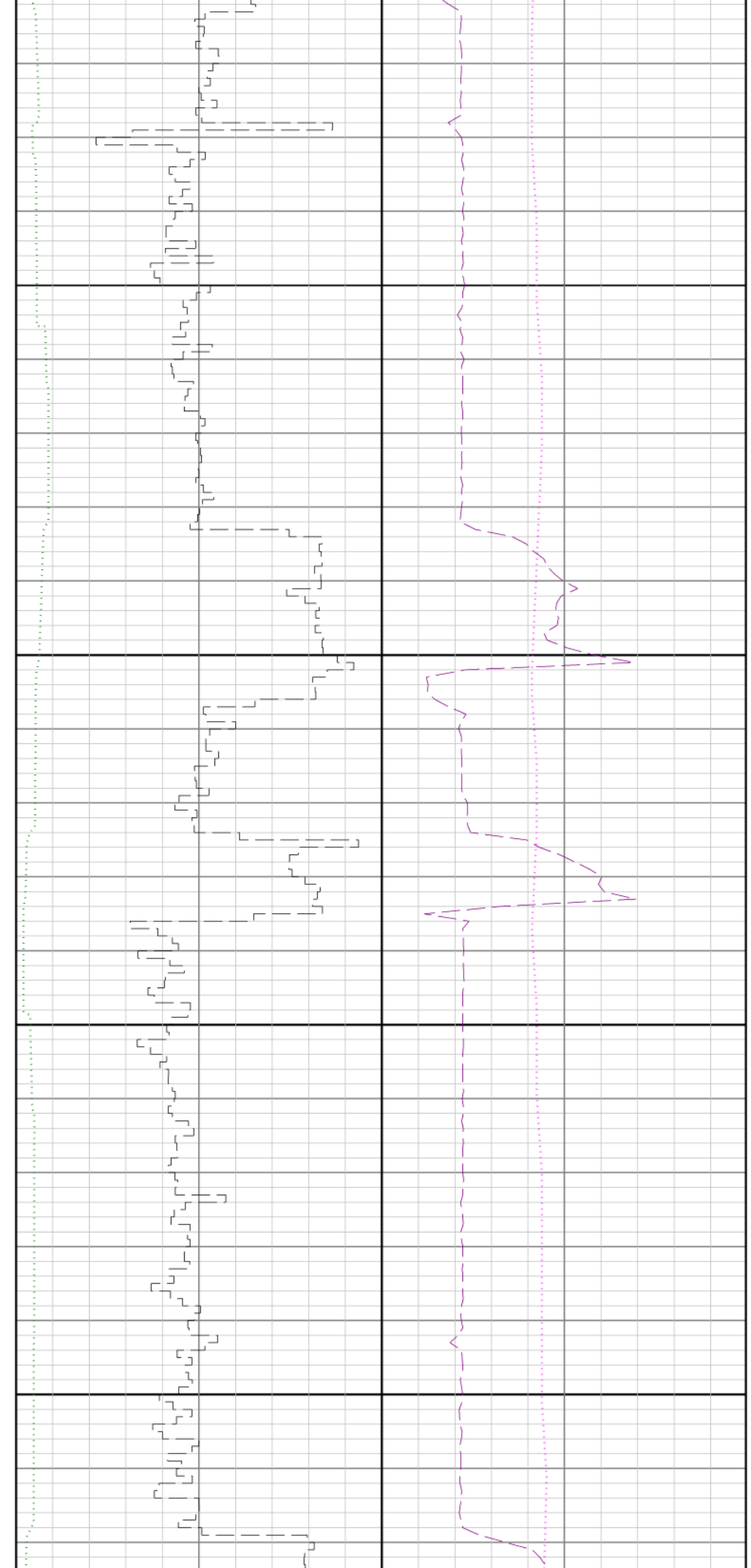
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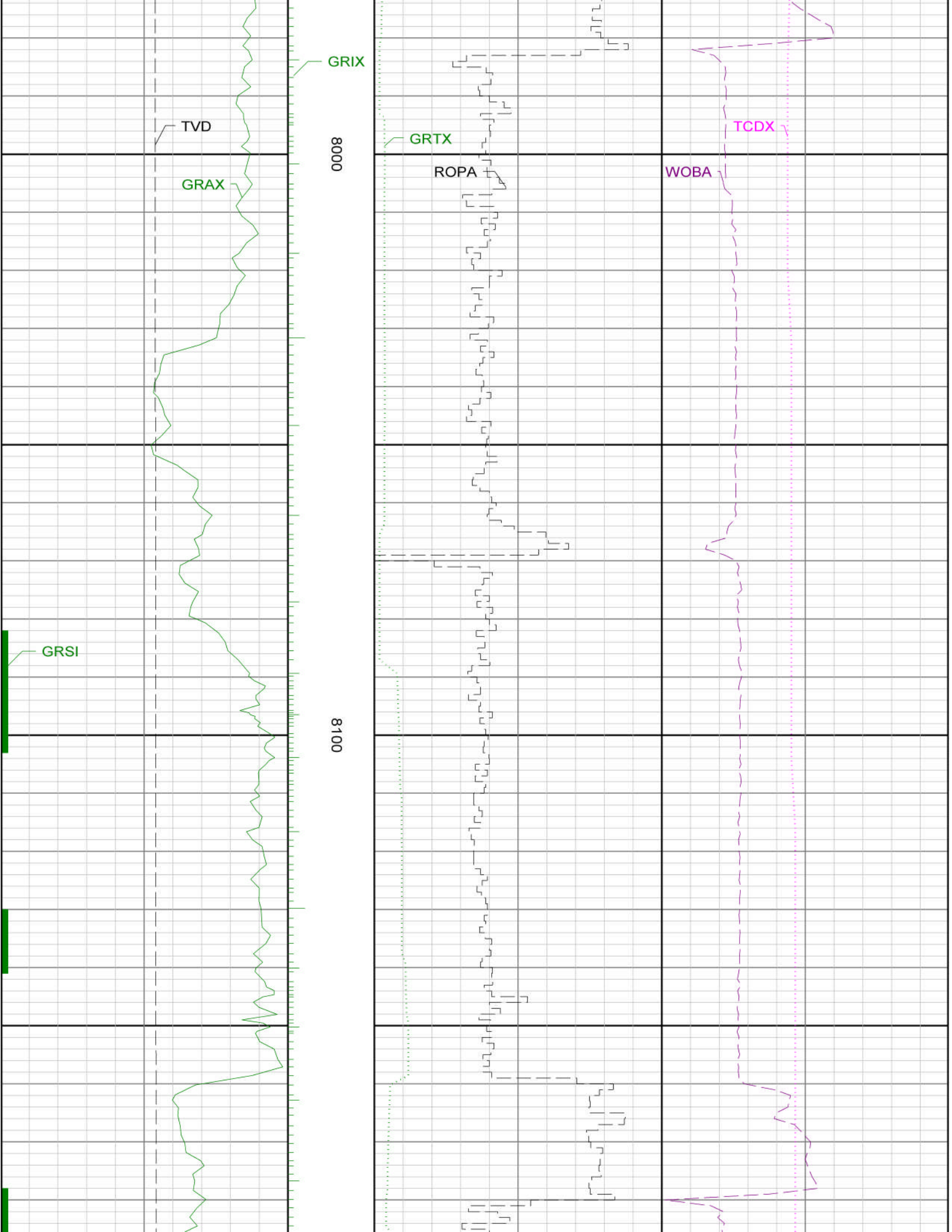


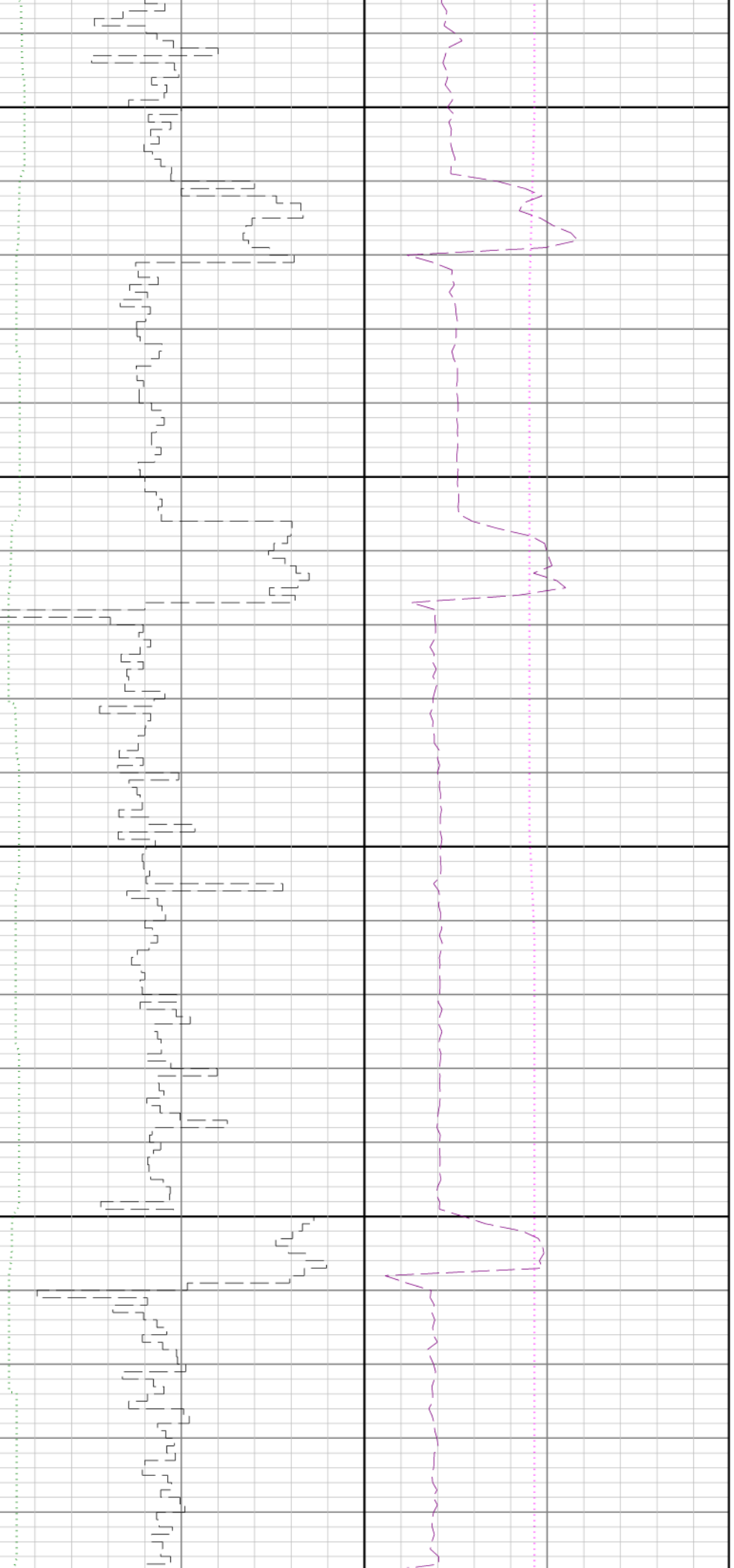


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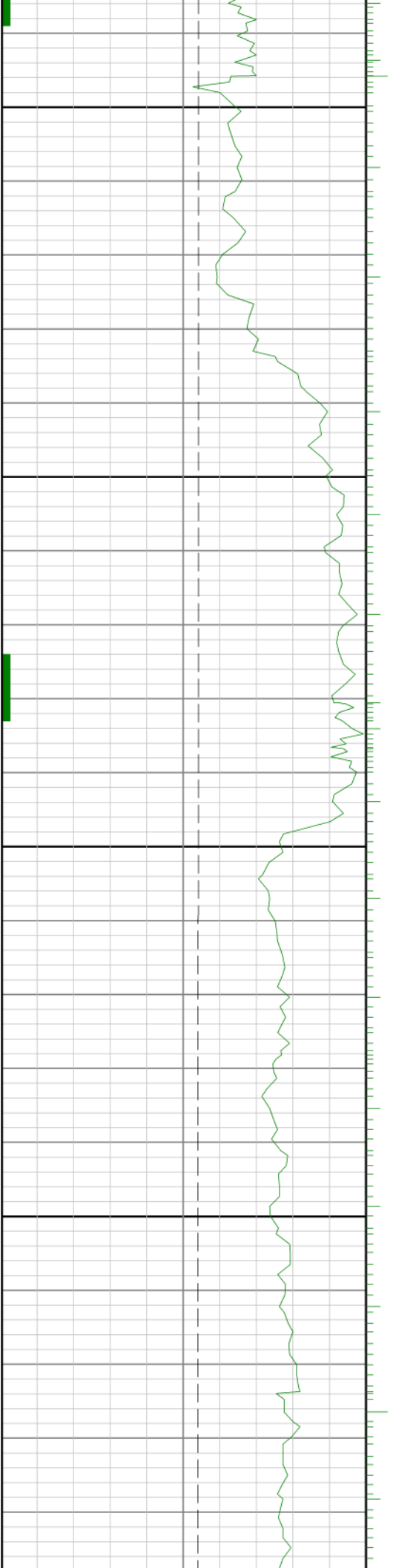


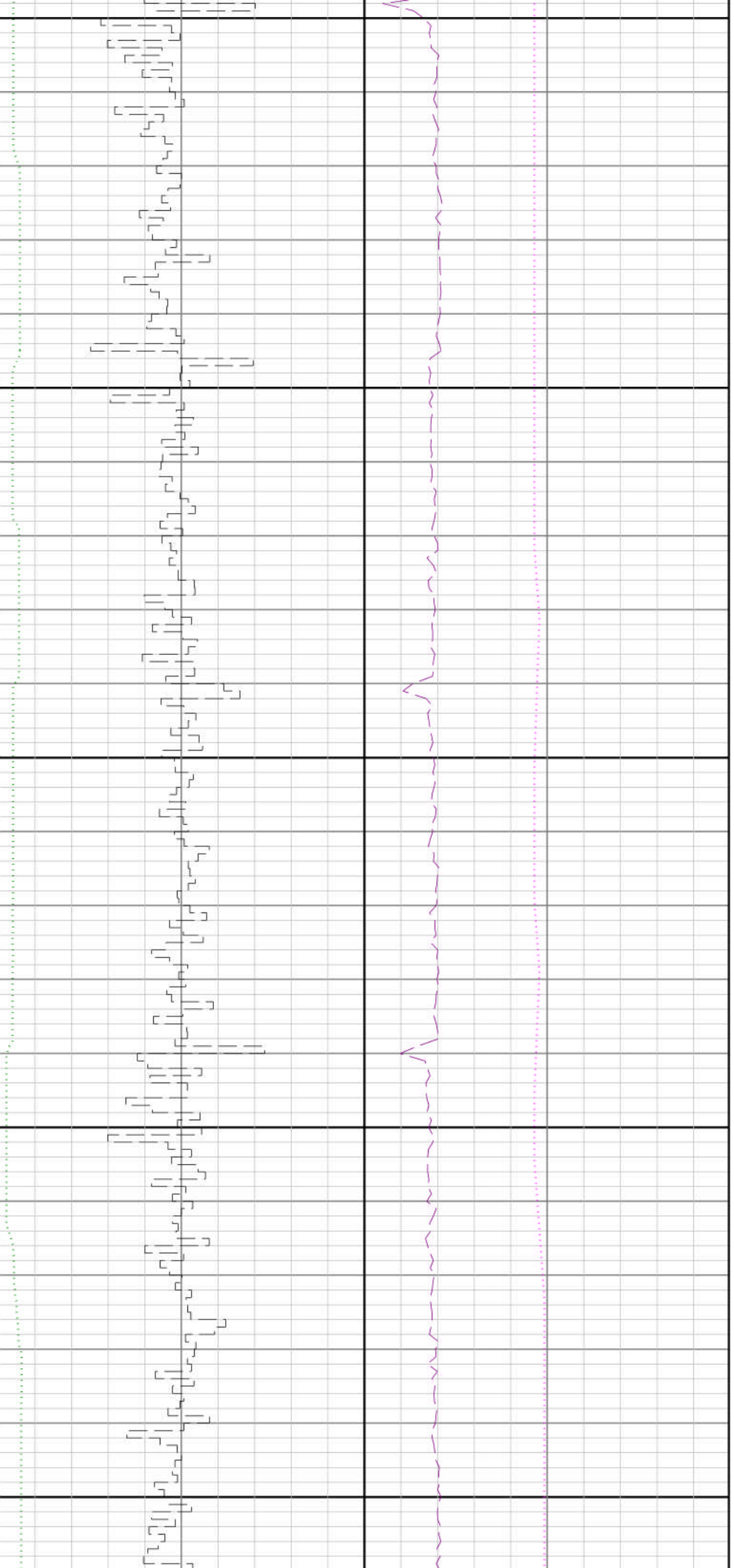




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8300

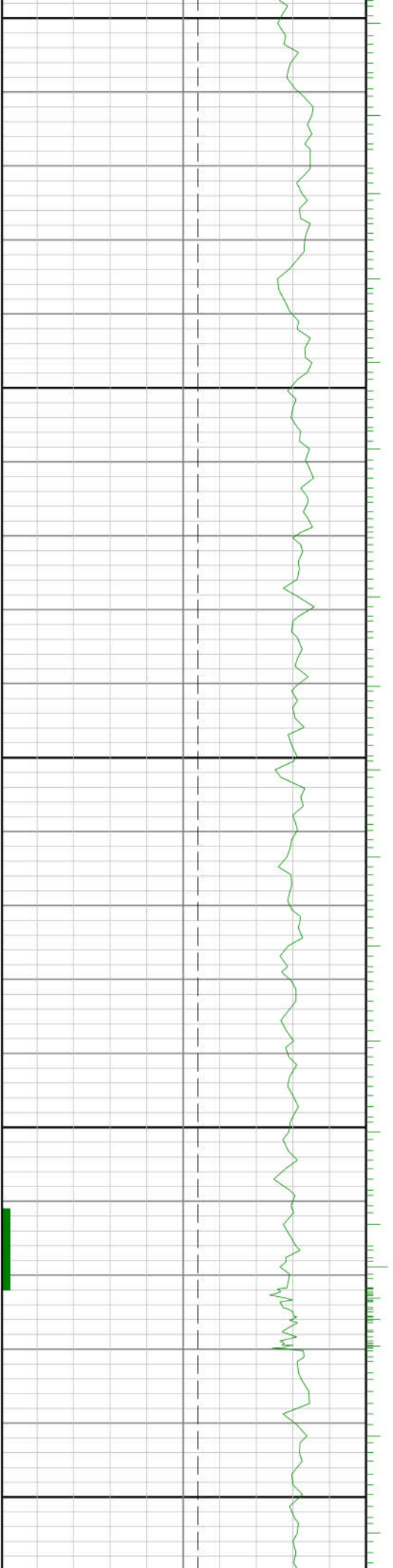


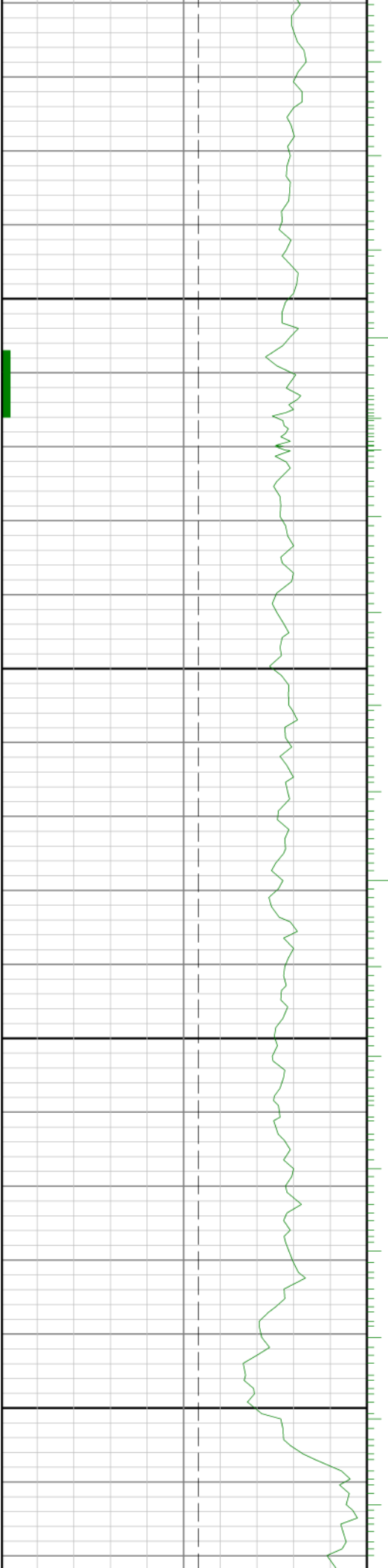


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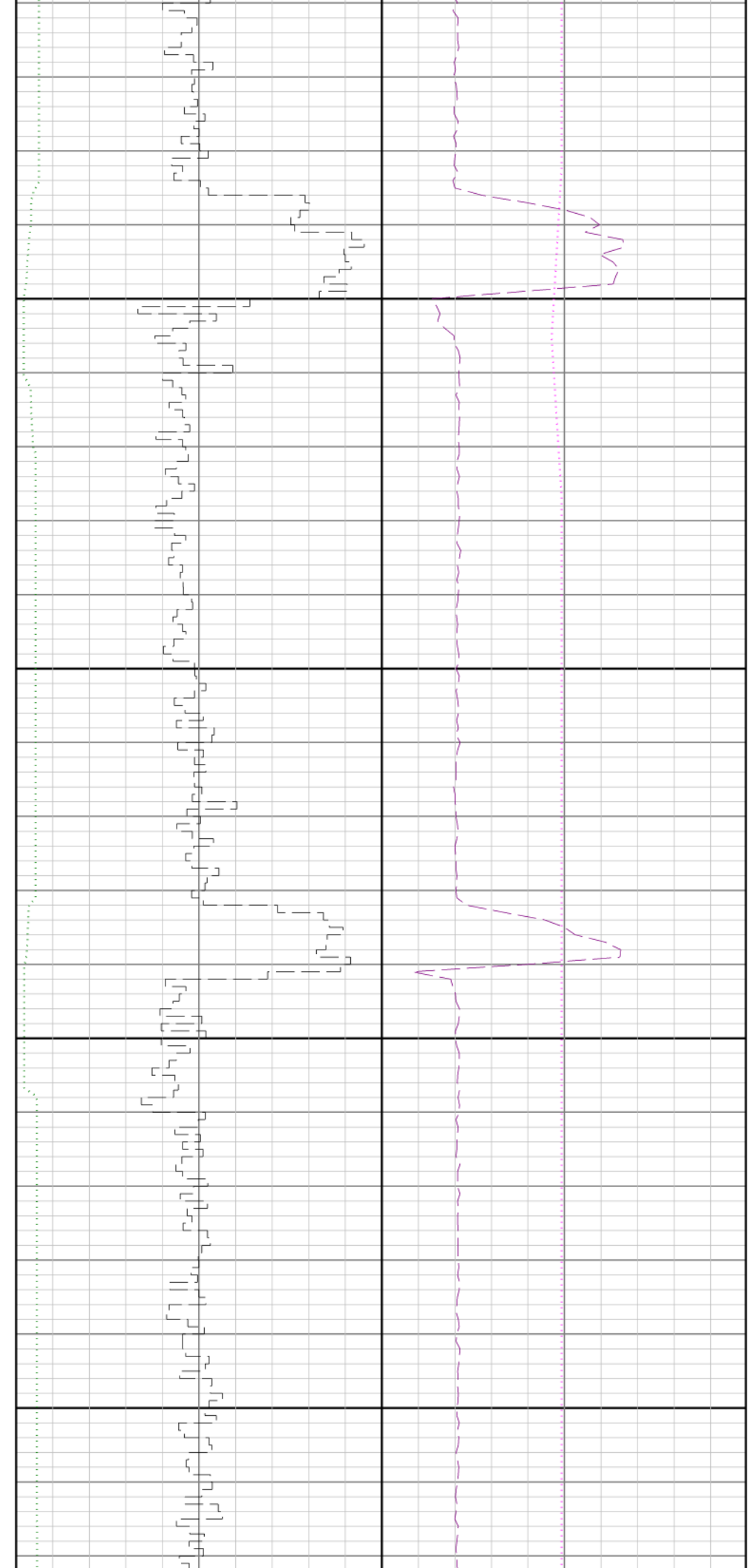
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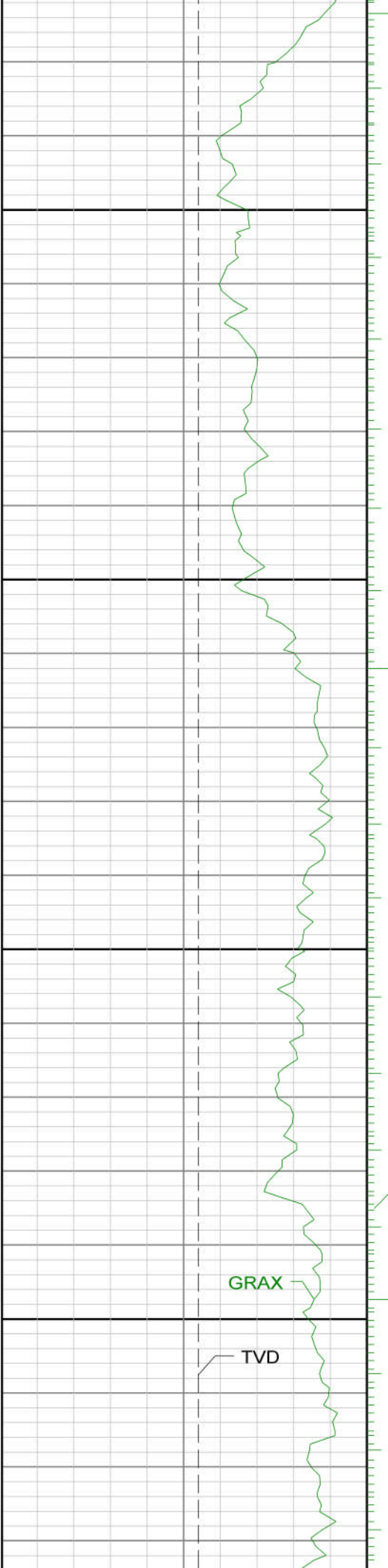




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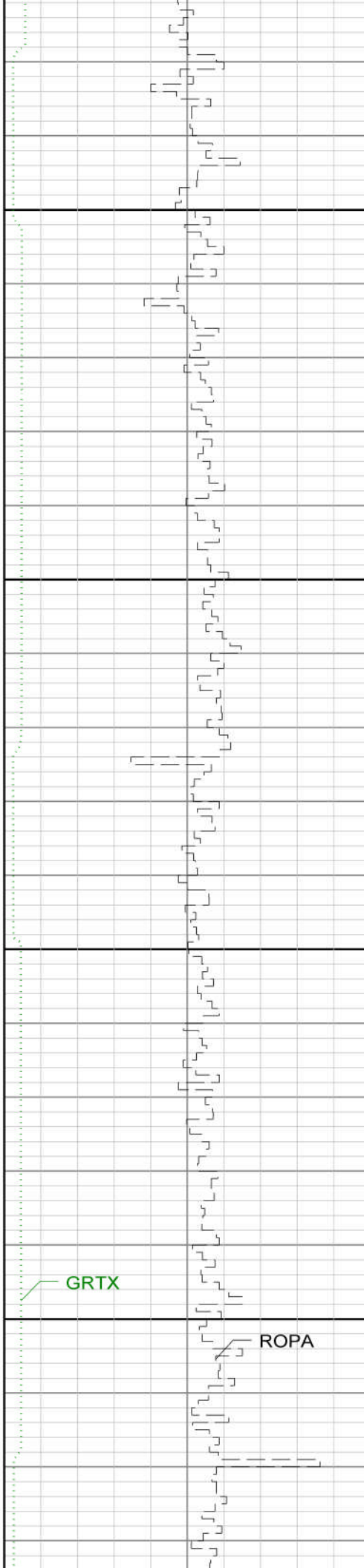
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GRAX

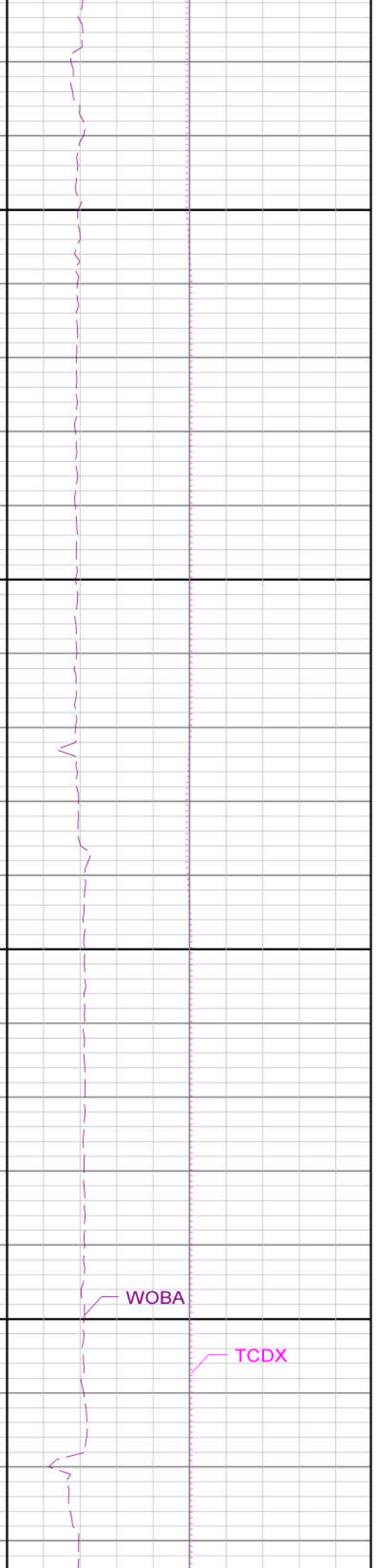
GRIX

TVD



GRTX

ROPA



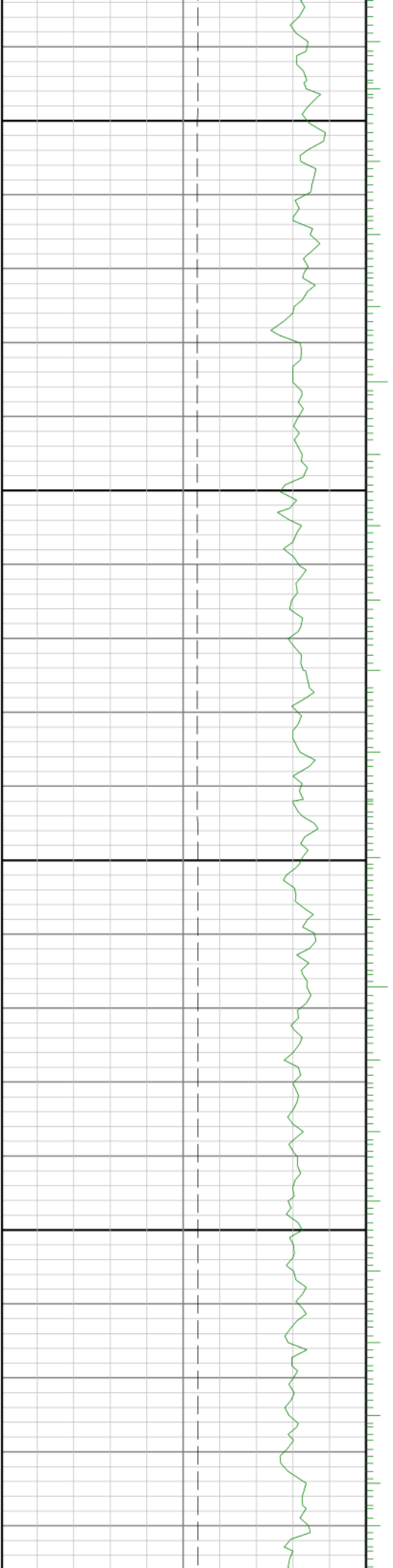
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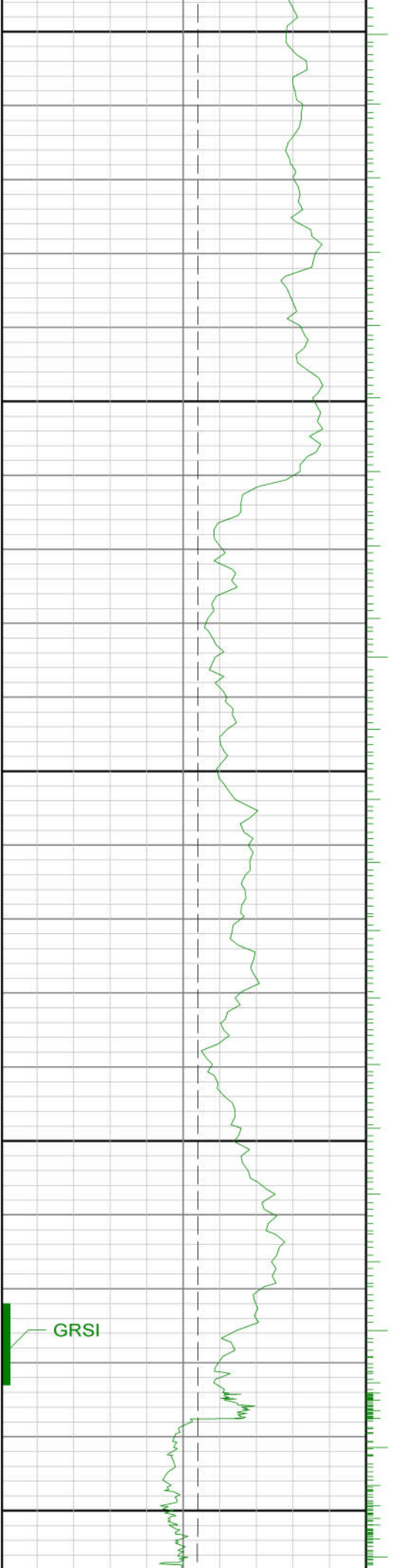
TCDX



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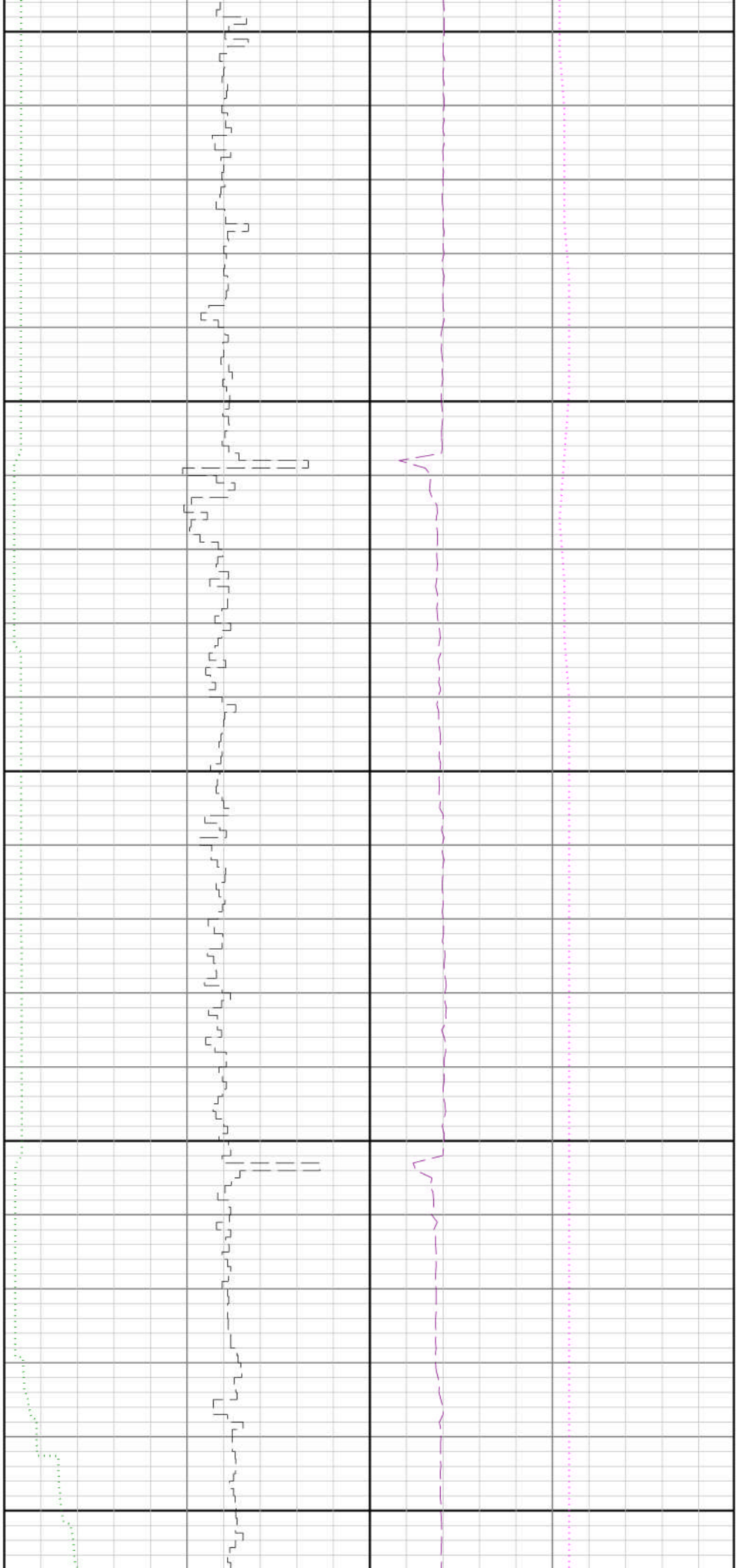
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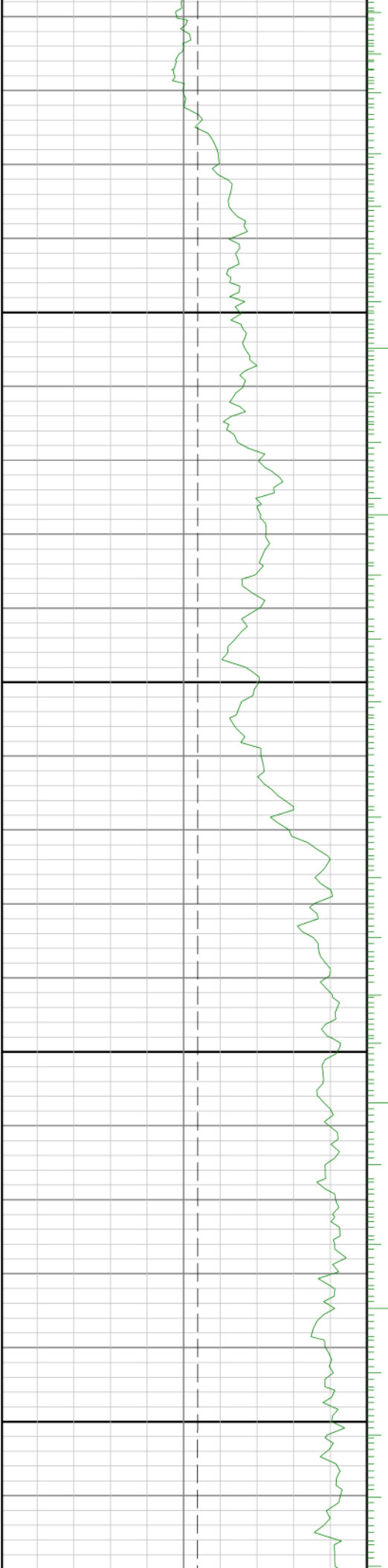




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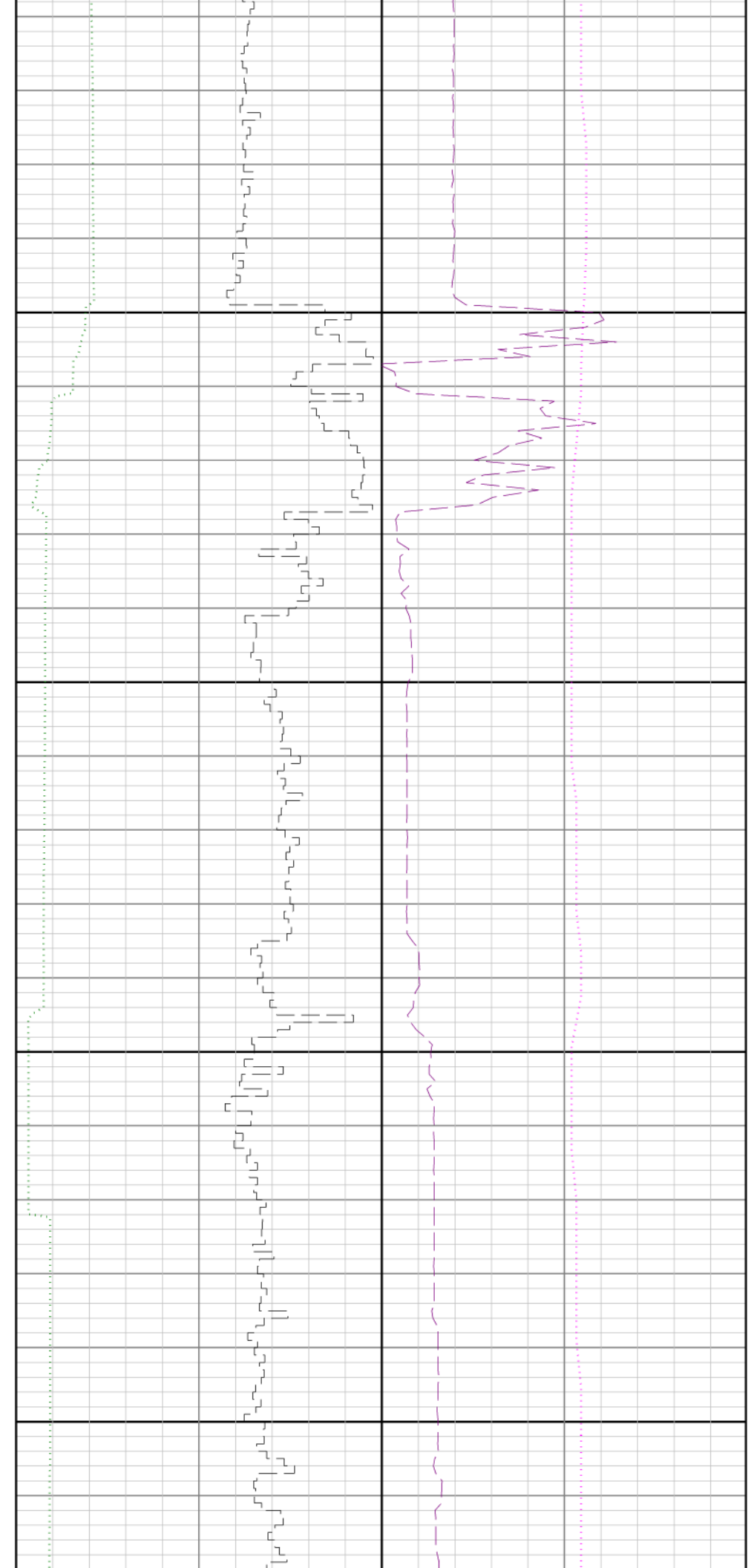
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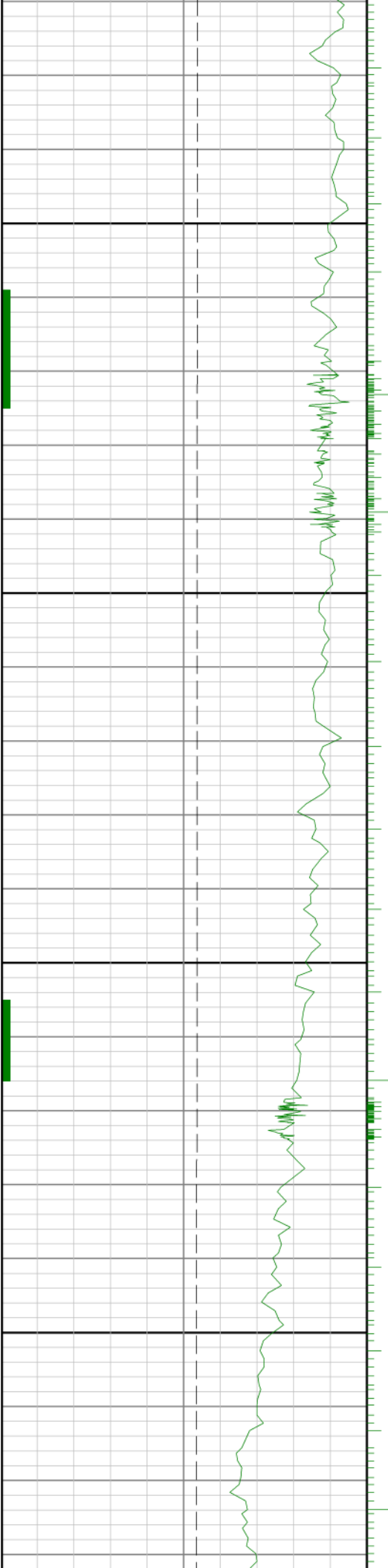




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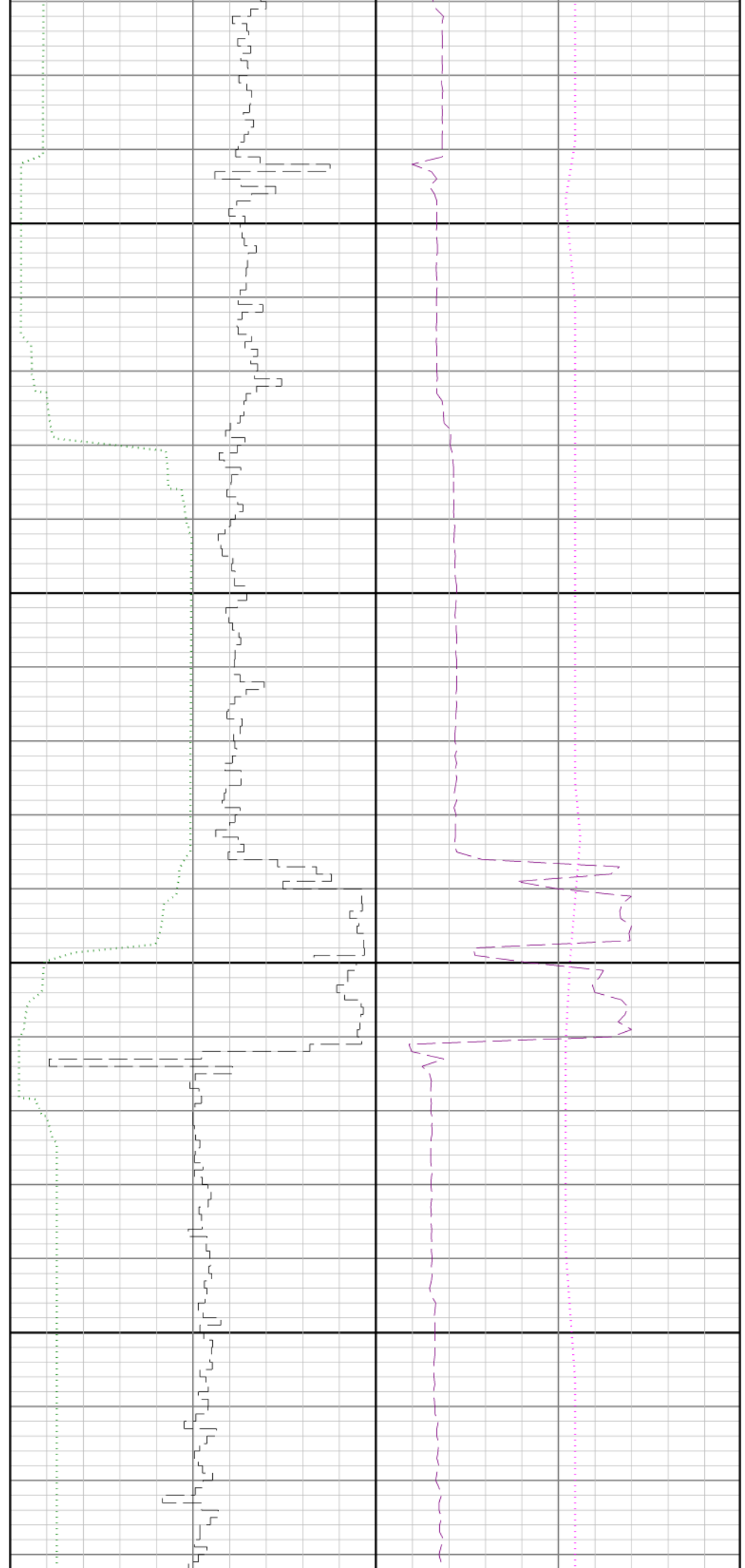
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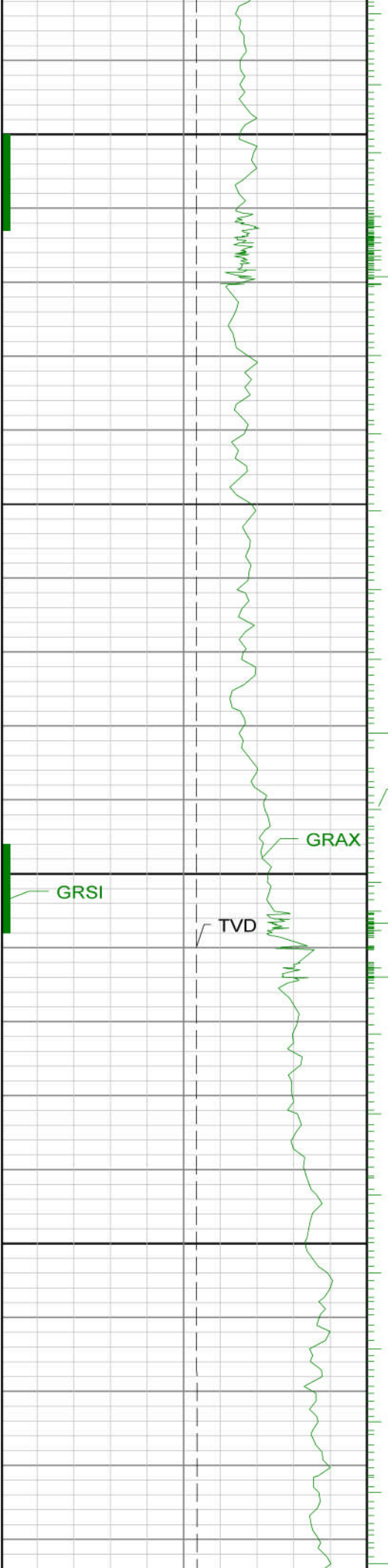




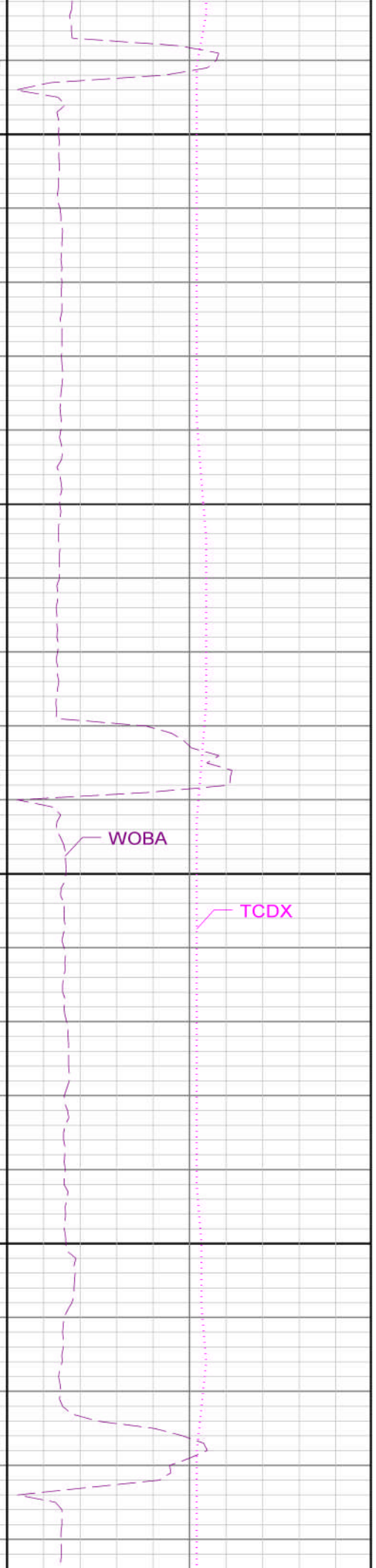
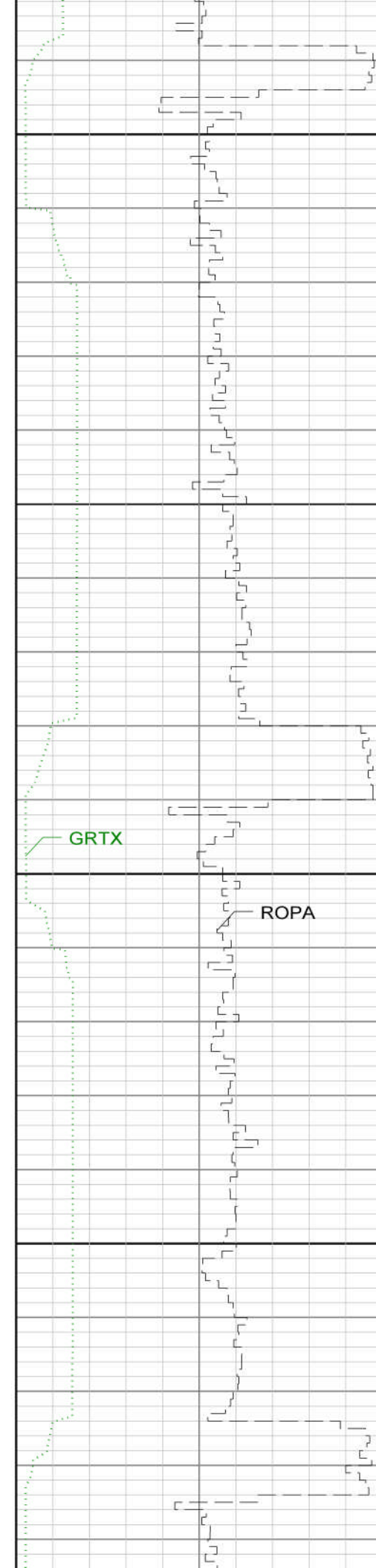
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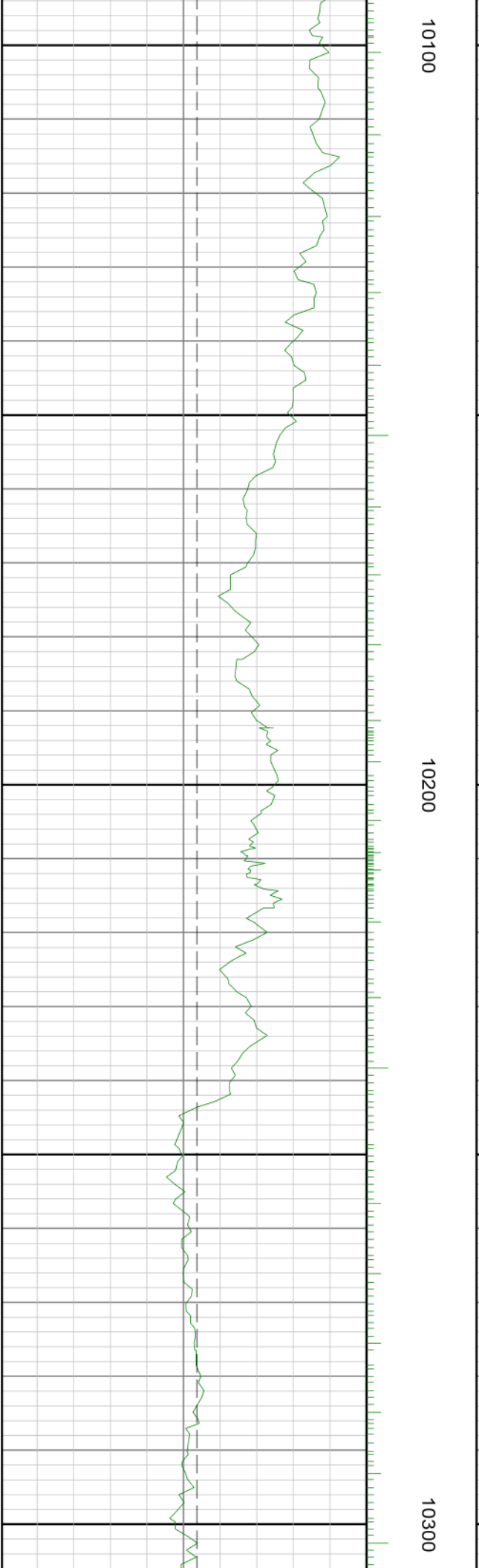
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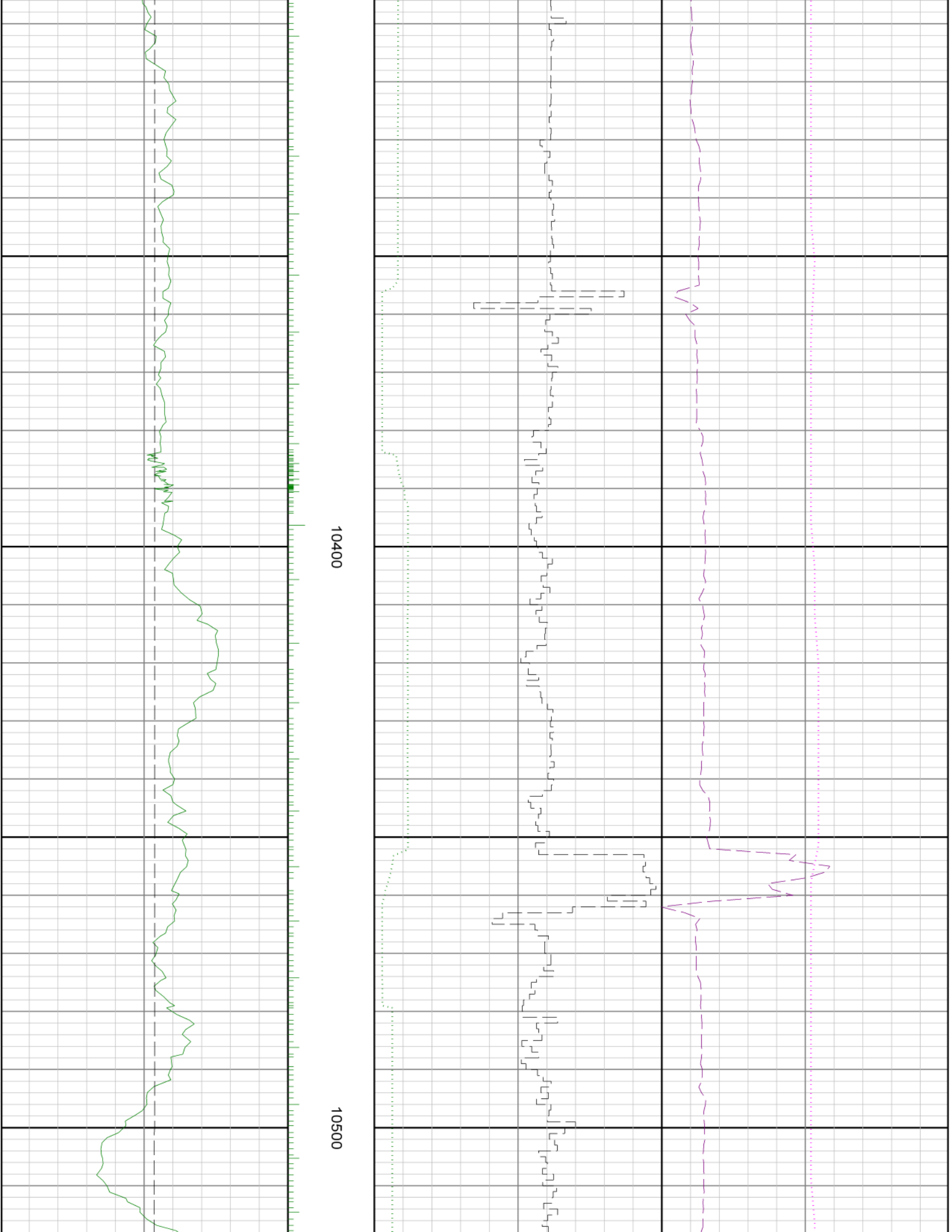


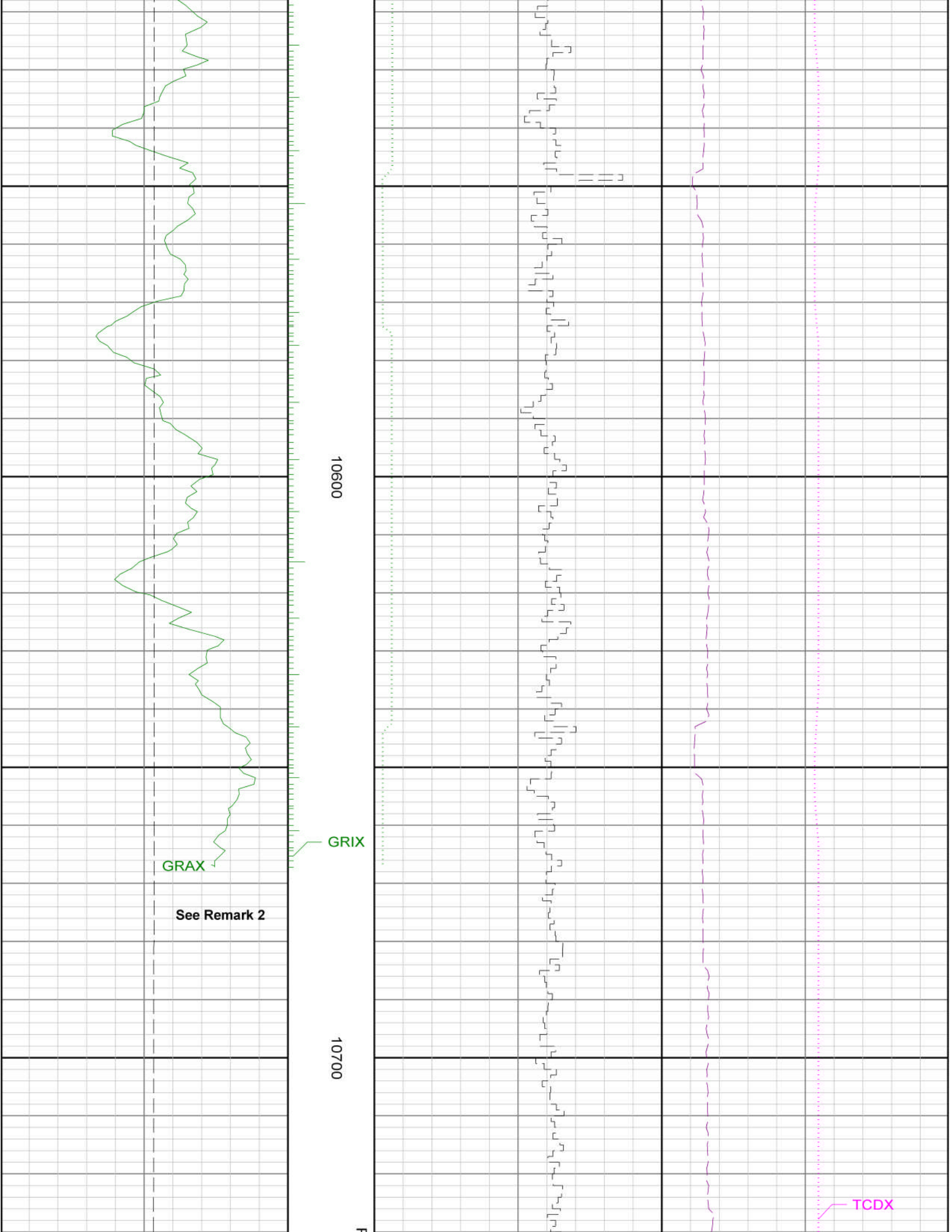


0066
10000
GRIX









10600

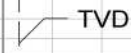
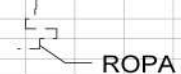

10700

GRAX

GRIX

See Remark 2

TCDX

	Run 4 <		
<p>Gamma Ray Apparent 0.5 ft Avg GRAX</p> <p>0 200</p> <p>API</p> <p>True Vertical Depth TVD</p> <p>5000 7000</p> <p>ft</p>	MD feet 1:240	<p>Gamma Ray Time Since Drilled GRTX</p> <p>0 600</p> <p>min</p> <p>Rate of Penetration 3.0 ft Avg ROPA</p> <p>600 0</p> <p>ft/hr</p>	<p>Surface Weight On Bit 1.0 ft Avg WOBA</p> <p>0 100</p> <p>klbf</p> <p>Downhole Temperature TCDX</p> <p>100 300</p> <p>degF</p>