



## LWD MEMORY LOG COMPOSITE

## Gamma Ray

Scale:		Company: VERDAD OIL & GAS				
1:1200 MD		Well: BRNAK 01N-64W-10-1H				
Depth Reference:		Field: Weld County		Country: United States		
Driller's Depth		County: State:		Weld Colorado Block: BRNAK 01N-64W-10-1H		
Status:	Final Print		Surface Location:		Other Services:	
API No: 05-123-45000		Latitude: Longitude:		040° 04' 21.166" N 104° 32' 30.725" W		
Job ID: 8704484				Directional		
Permanent Datum (P.D.): Ground Level		Elevation: 5104.00 ft		Elev. KB: N/A		
Log Measured From: Rig Floor		Above P.D. 16.00 ft		Elev. DF: 5120.00 ft Elev. GL: 5104.00 ft		
Dates		Interval Logged		Magnetic Field Reference		
Date From: 2017-08-14		Top: (ft) 16.00		Azi Reference North: True Dip Angle: (deg) 66.66		
Date To: 2017-08-20		Bottom: (ft) 17283.00		Total Magnetic Field Strength: (nT) 52294		
Spud Date: 2017-08-14				Mag to Reference North Correction: (deg) 8.22 E		
Borehole Record				Casing Record		
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	16.00	1770.00	9.625	36.00		1758.00
8.500	1770.00	17283.00				
Mud Record				Deviation Record		
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc   Az (Start)	Inc   Az (End)
Oil Based Mud	1770.00	17283.00	13.500	1769.42	0.90   262.45	8.75   310.73
			8.500	15513.16	8.75   310.73	89.91   176.42
Acquisition System				Software Version		Other
Baker Hughes Cadence		RT4.1		Rig: Xtreme 20		
PlotStudio		4.1.7763.3		Contractor: Xtreme 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	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	13.500	PDC	8.00	Steerable	100.00	1769.42	100.00	1769.42	2017-08-14 11:19	2017-08-14 22:05	11.25
2	2	8.500	PDC	3.00	AutoTrak Curve	1770.00	13736.00	1770.00	13749.00	2017-08-16 08:52	2017-08-18 19:23	54.45
3	2	8.500	PDC	3.00	AutoTrak Curve	13736.00	17270.00	13749.00	17283.00	2017-08-19 16:29	2017-08-20 23:41	37.19

## Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Eugene Igwe	2017-08-16	2017-08-21	Garrett Gerdson	2017-08-16	2017-08-21			

Mud Properties Record

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2017-08-16 17:30	2	3696.00	Oil Based Mud	9.5	68	N/A	10.0	67/33	Active Pit	42500	0.00
2017-08-17 05:00	2	6894.00	Oil Based Mud	9.6	65	N/A	10.0	67/33	Active Pit	41000	0.00
2017-08-17 17:30	2	8994.00	Oil Based Mud	9.8	58	N/A	9.0	67/33	Active Pit	42000	0.00
2017-08-18 05:00	2	11419.00	Oil Based Mud	9.8	58	N/A	9.0	67/33	Active Pit	41500	0.00
2017-08-19 17:30	3	13821.00	Oil Based Mud	9.8	58	N/A	9.0	67/33	Active Pit	41000	0.00
2017-08-20 05:00	3	14974.00	Oil Based Mud	9.8	58	N/A	9.0	67/33	Active Pit	41500	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	13225696	Directional (mag)	15.02	58.40	8.000	0.000
1	NaviTrak	13225696	VSS	15.02	58.40	8.000	0.000
2	ATC_SU	14262244	Near Bit VSS	5.93	6.71	6.750	4.330
2	ATC_SU	14262244	Near Bit Inclination	5.93	6.71	6.750	4.330
2	ATC_MWD	12603327	Gamma (single)	2.73	12.88	6.750	3.250
2	ATC_MWD	12603327	Directional (mag)	12.26	22.41	6.750	3.250
3	ATC_SU	14262244	Near Bit VSS	5.93	6.71	6.750	4.330
3	ATC_SU	14262244	Near Bit Inclination	5.93	6.71	6.750	4.330
3	ATC_MWD	12603327	Gamma (single)	2.73	12.88	6.750	3.250
3	ATC_MWD	12603327	Directional (mag)	12.26	22.41	6.750	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments

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.
2	Baker Hughes LWD Runs 2 and 3 utilized 6 3/4 inch Navigamma services (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1770 to 17283 feet MD (1761 to 7120 feet TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1770.00	8.500	2	Baker Hughes LWD began logging services at 1729 feet MD (1724 feet TVD) per client request.
2	13725.00	8.500	3	The interval from 13724 to 13736 feet MD (7148 feet TVD) was drilled while troubleshooting AutoTrak Curve tool failure in Run 2.
3	13740.00	8.500	3	The interval from 13736 to 13749 feet MD (7148 feet TVD) was logged up to 21 hours after drilling due to tripping for a new AutoTrak Curve tool failure.
4	17257.00	8.500	3	The interval from 17270 to 17283 feet MD (7120 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	OnTrak - Gamma Ray - Apparent - Memory 3 ft Average	API
TCDM	Downhole Temperature	degF

**Company**

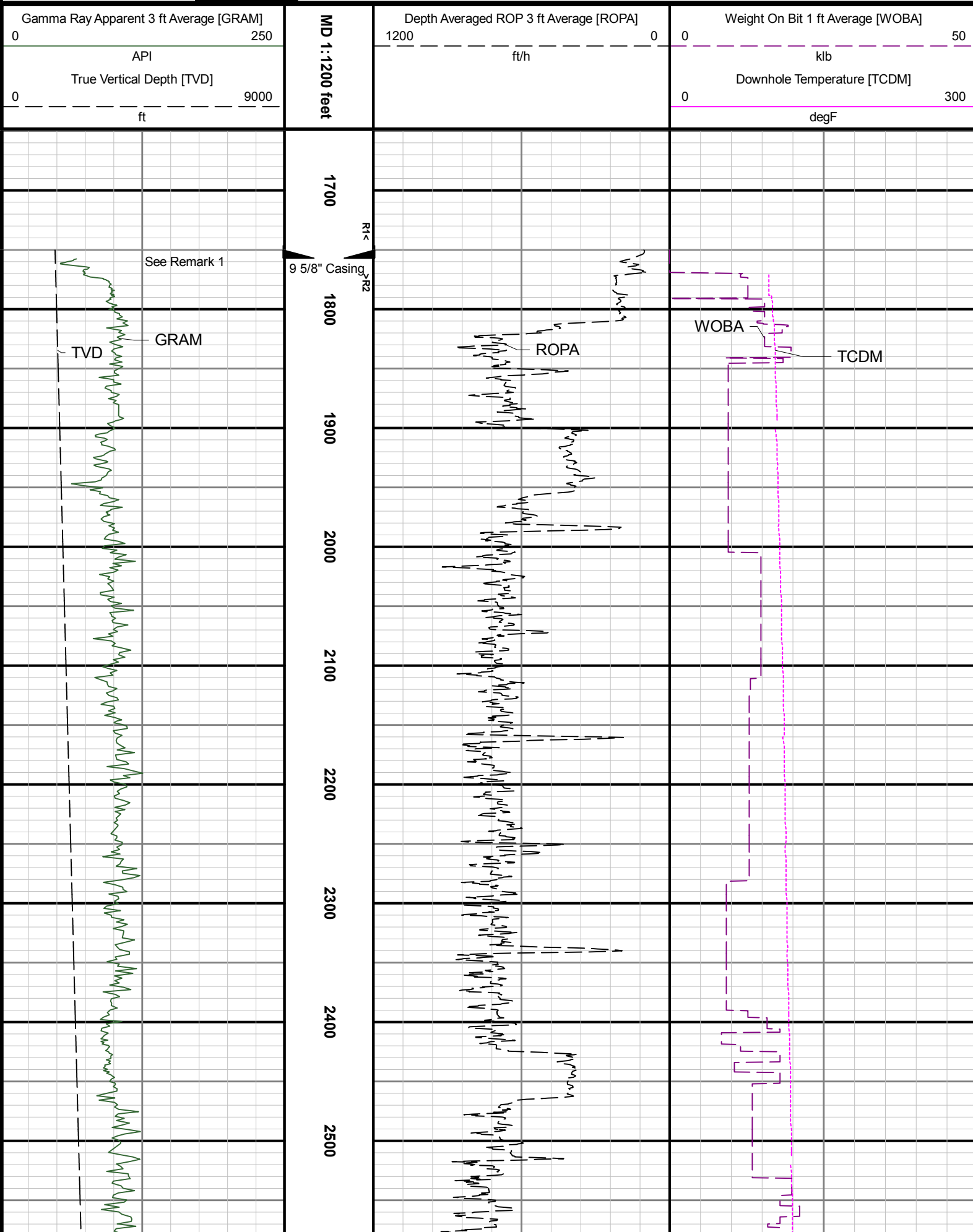
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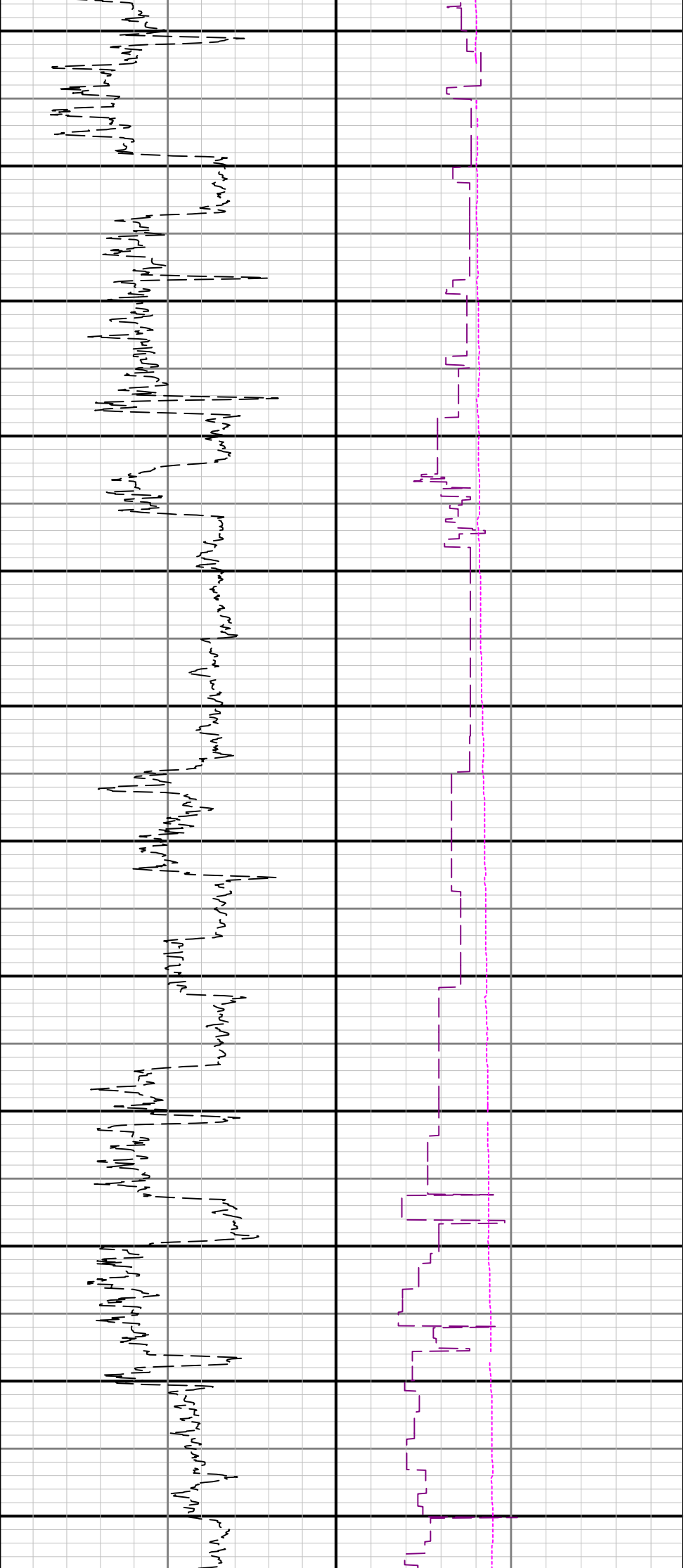
**Well**

BRNAK 01N-64W-10-1H

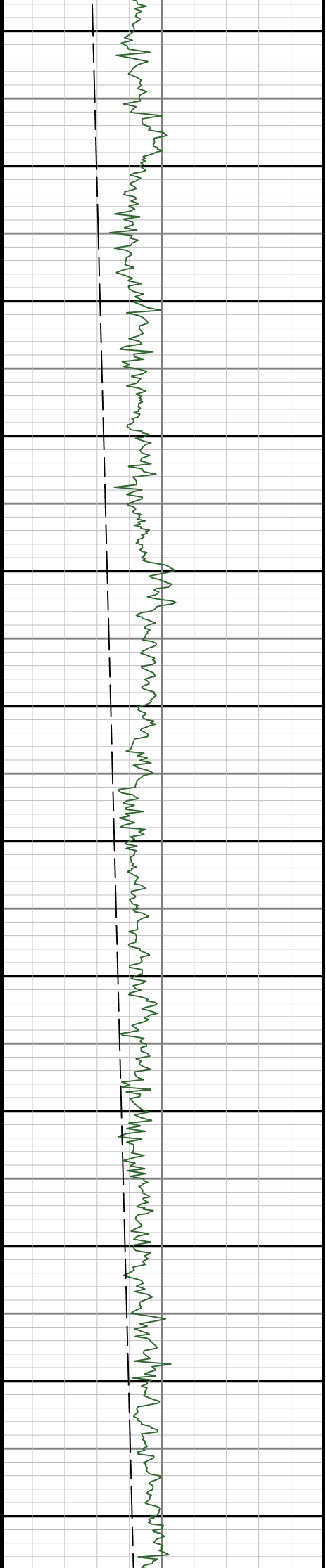
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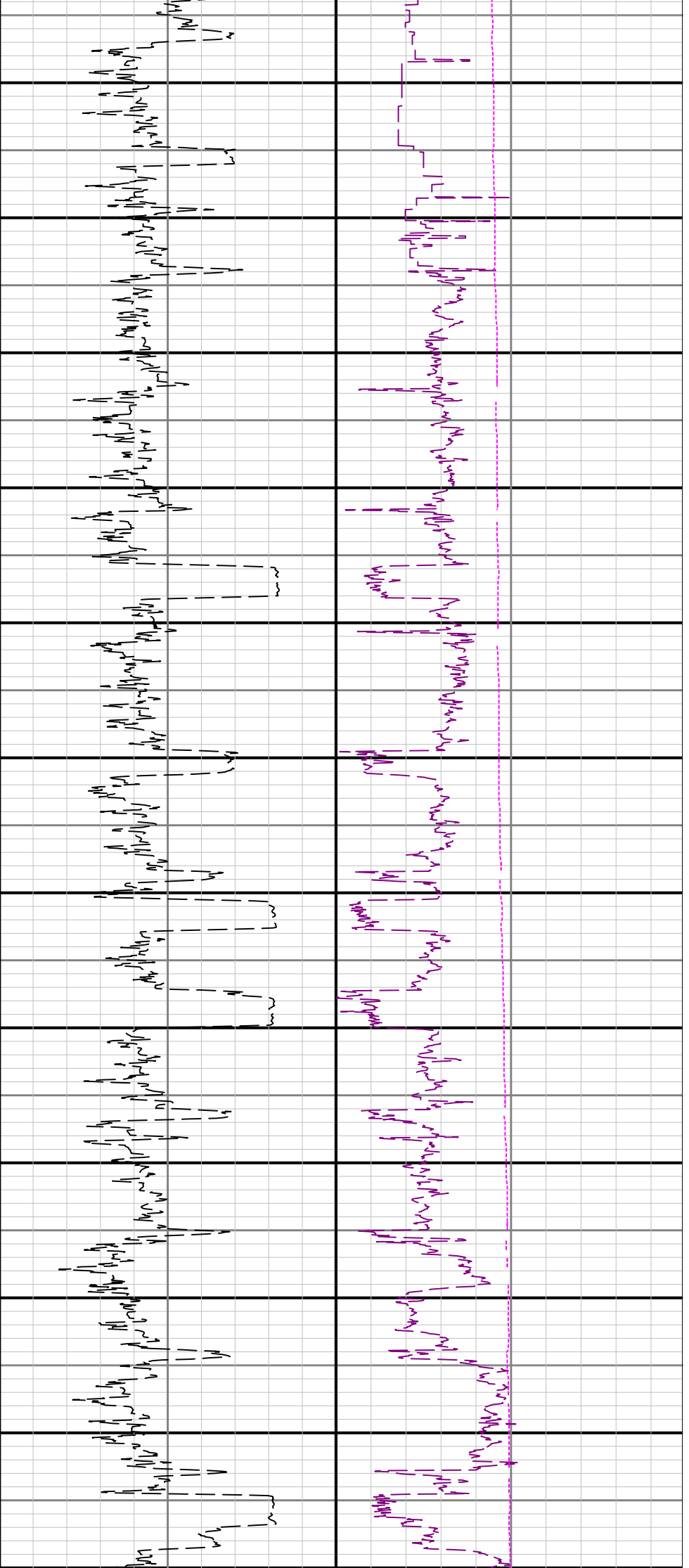
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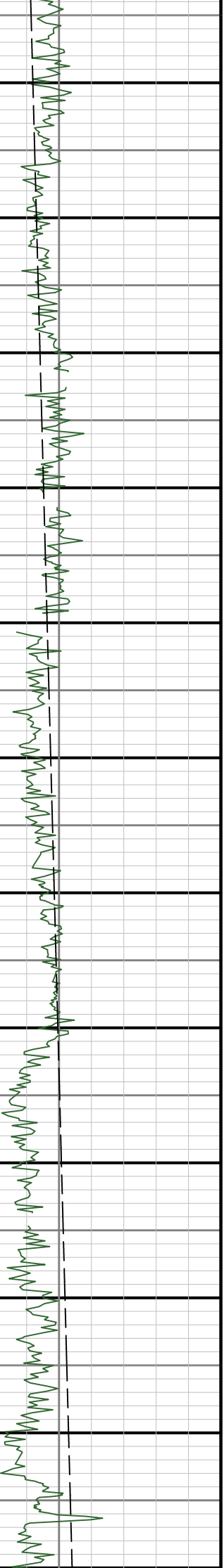


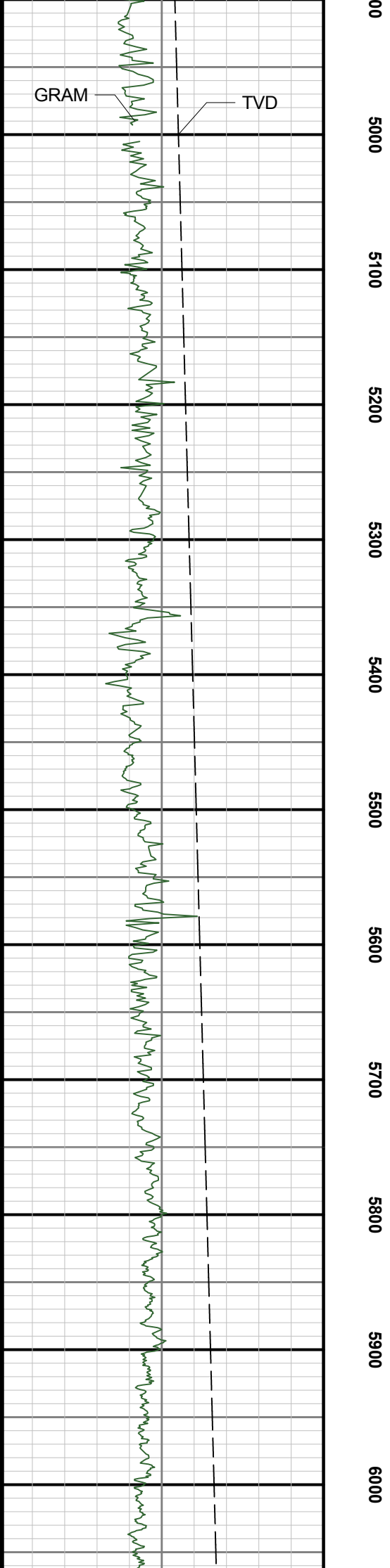
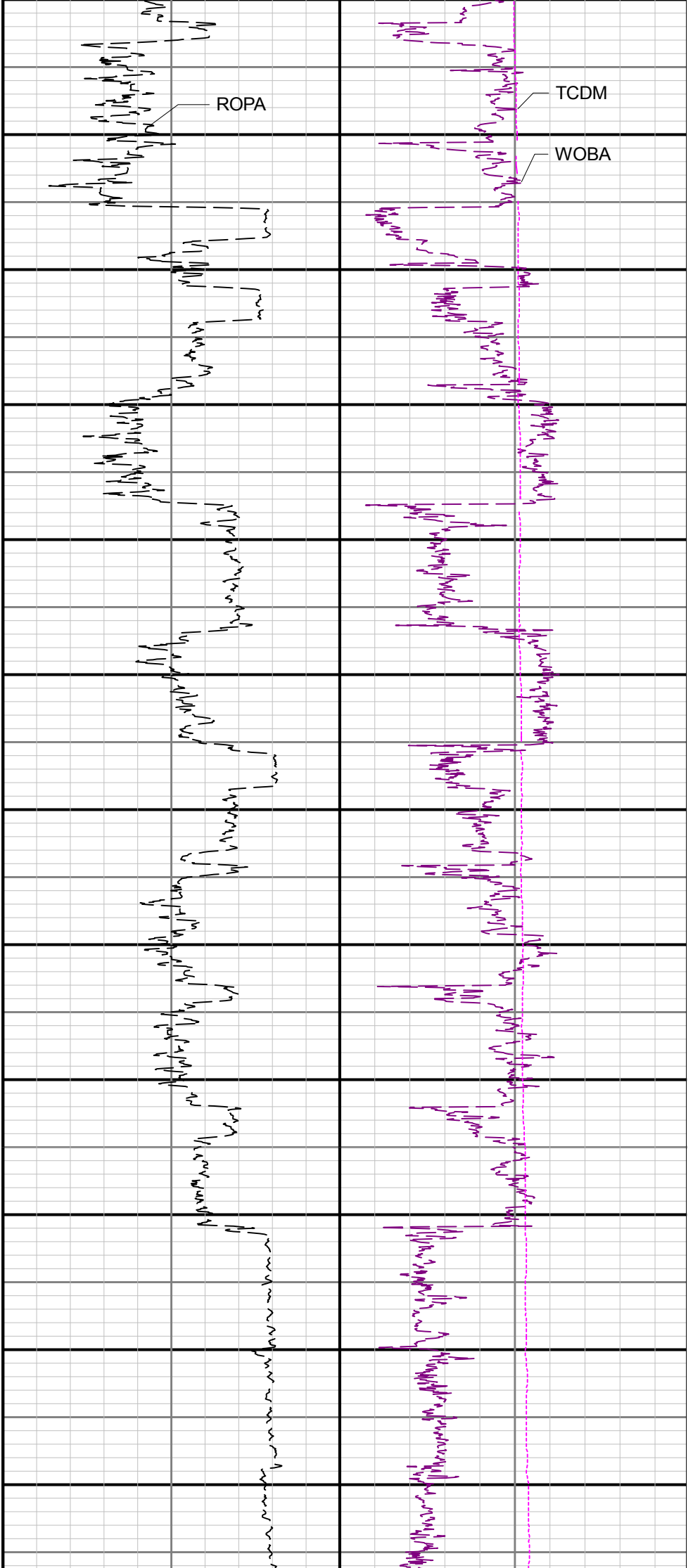
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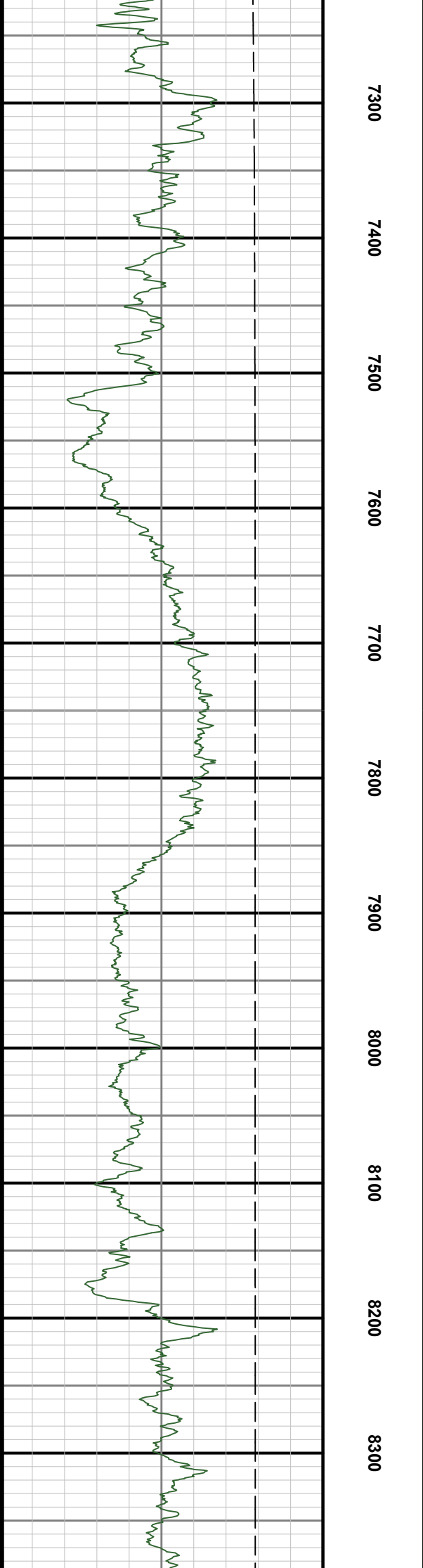
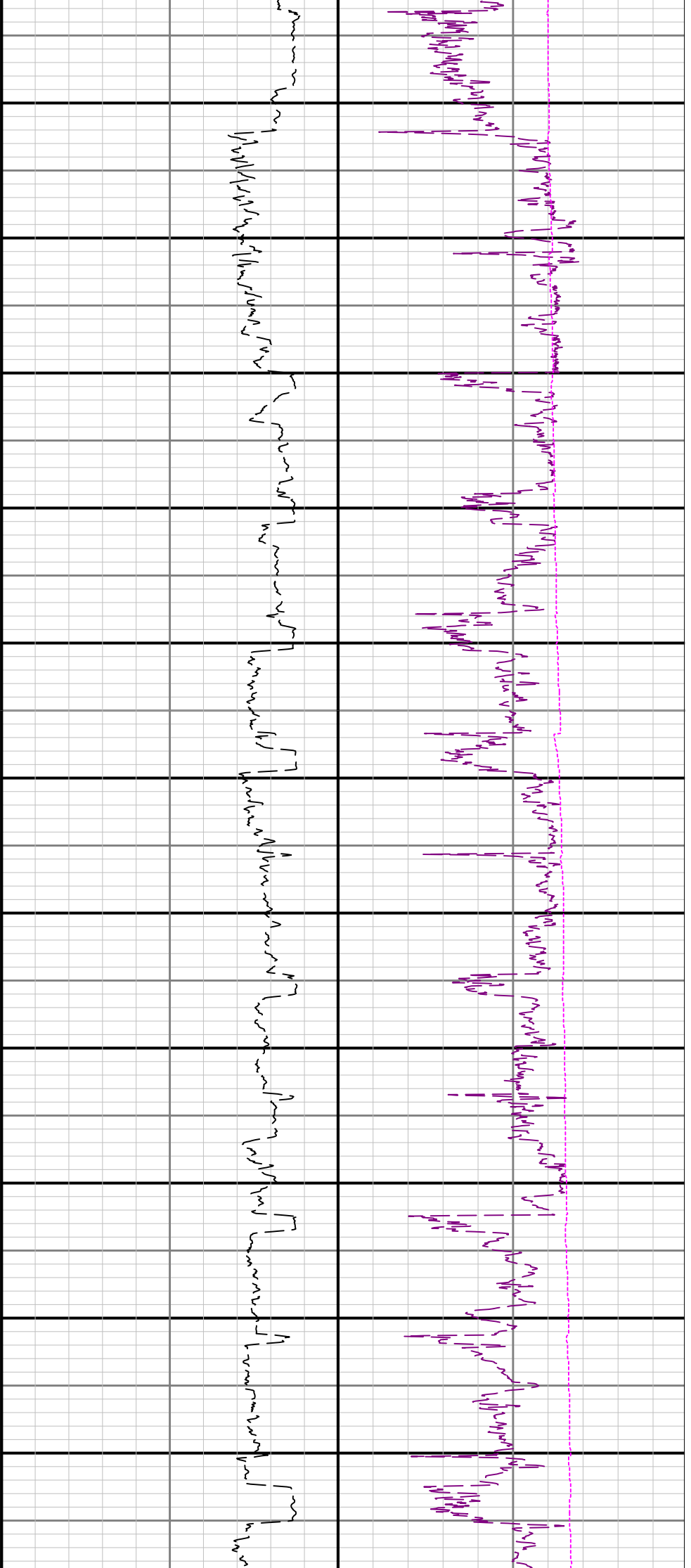


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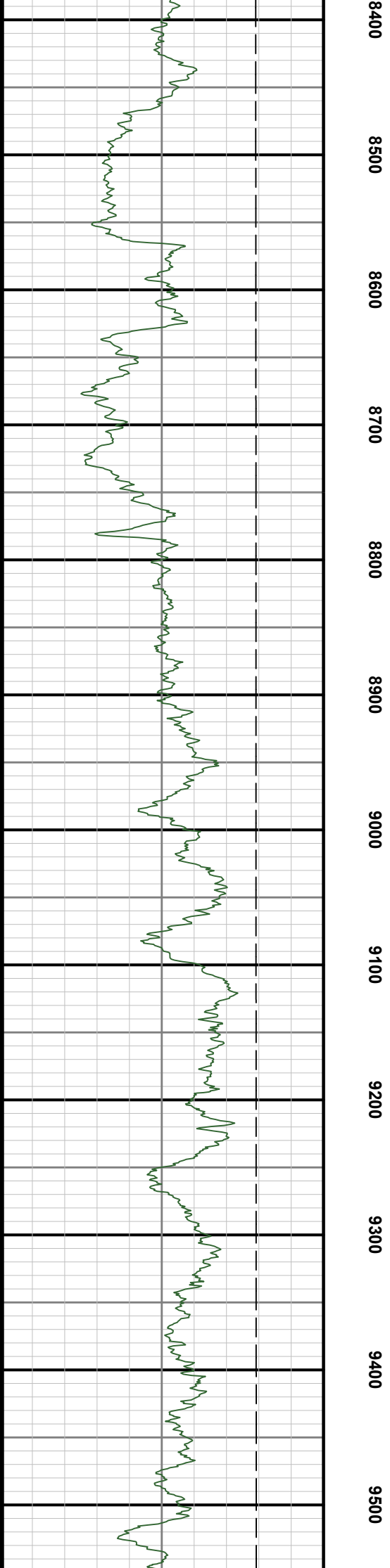
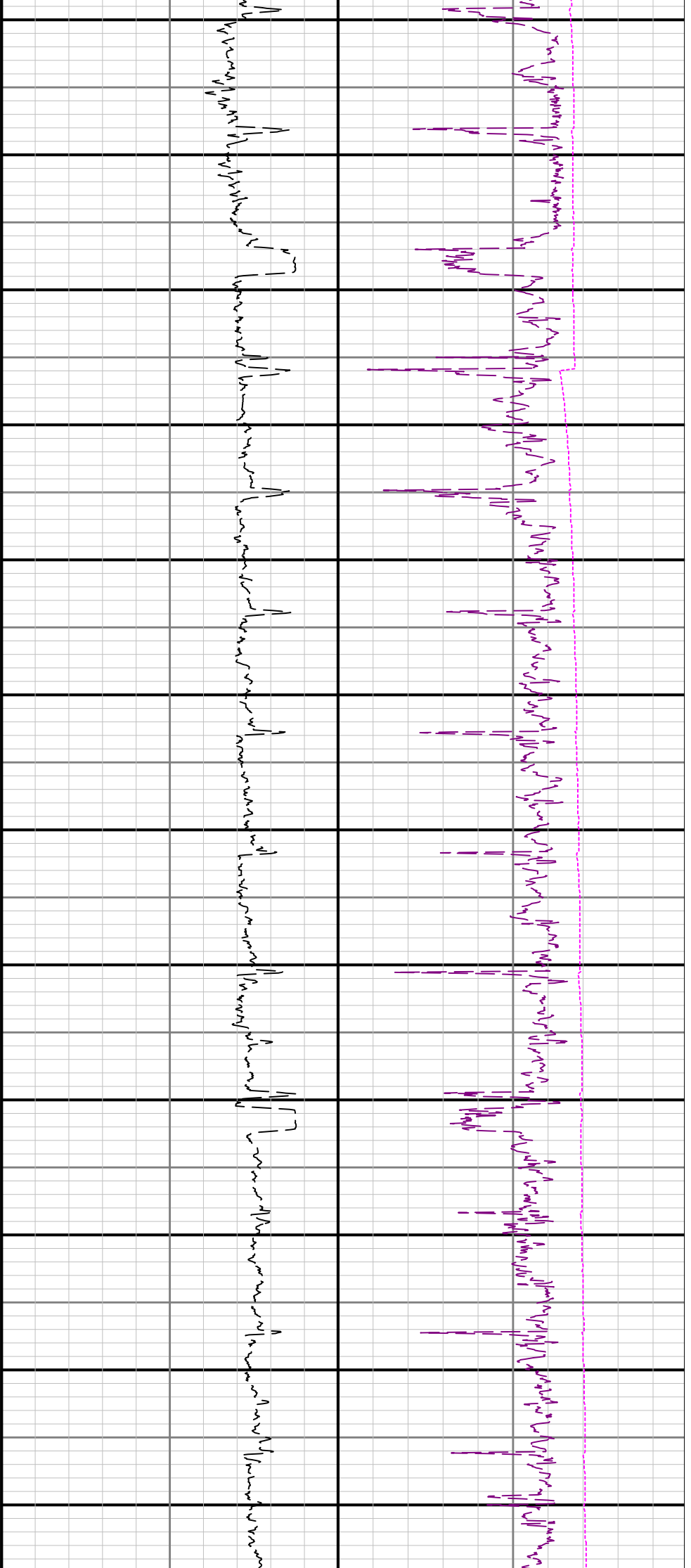


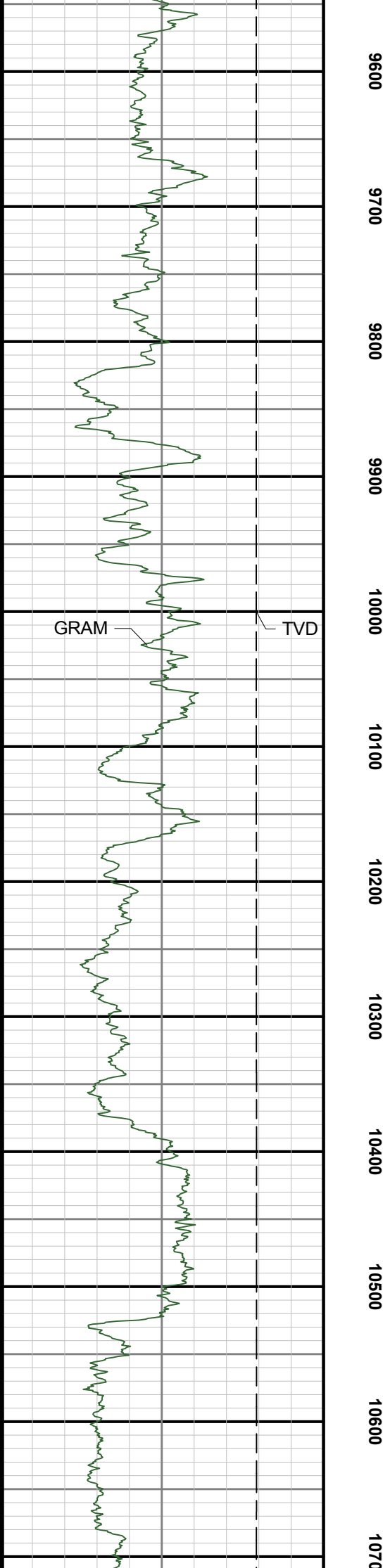
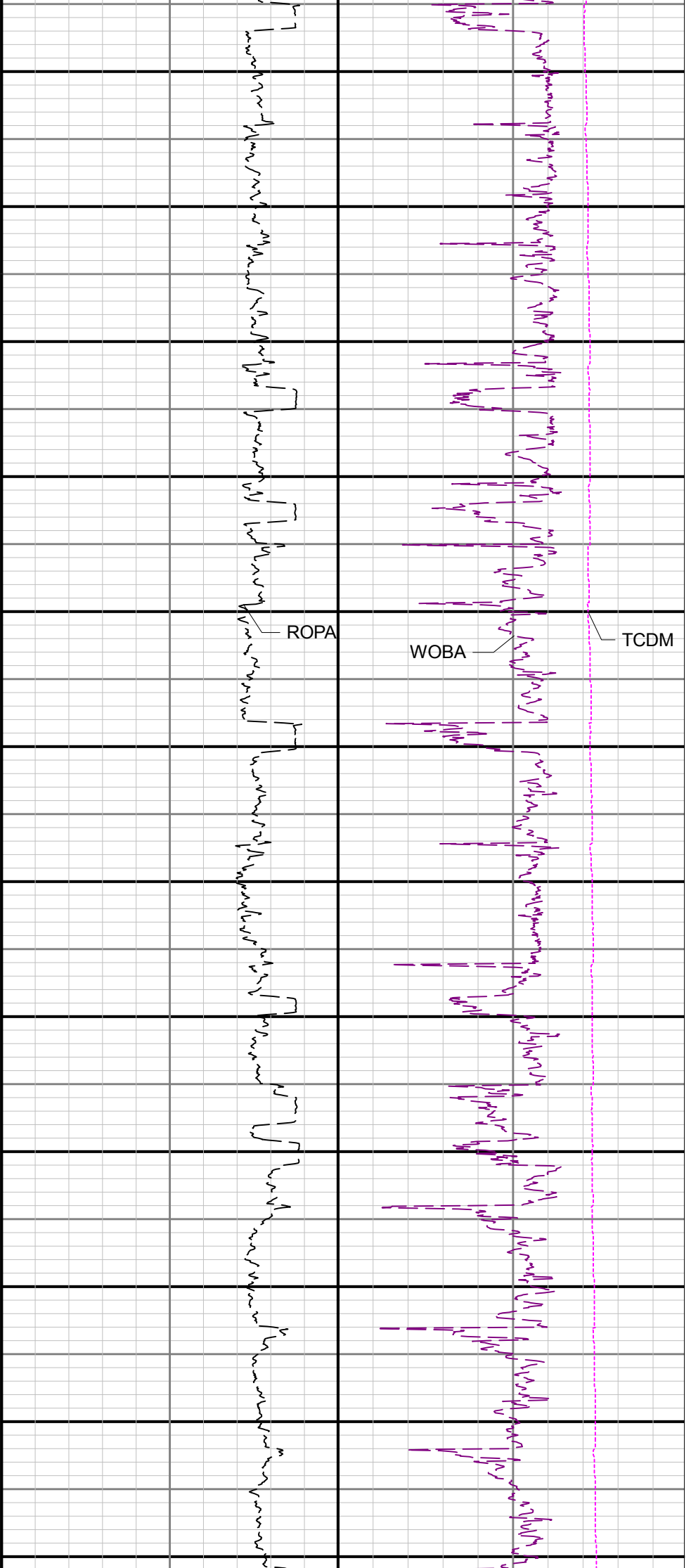


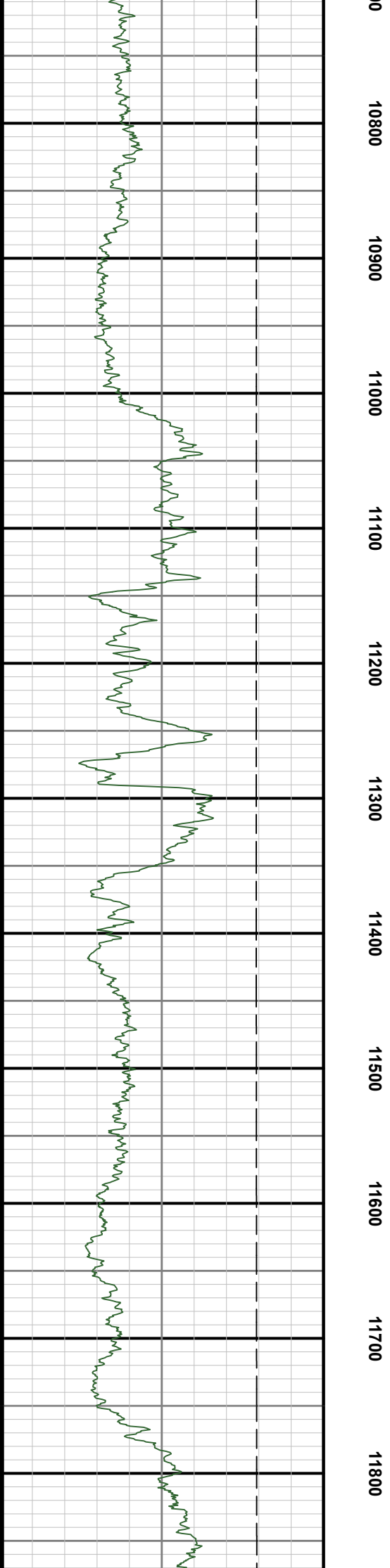
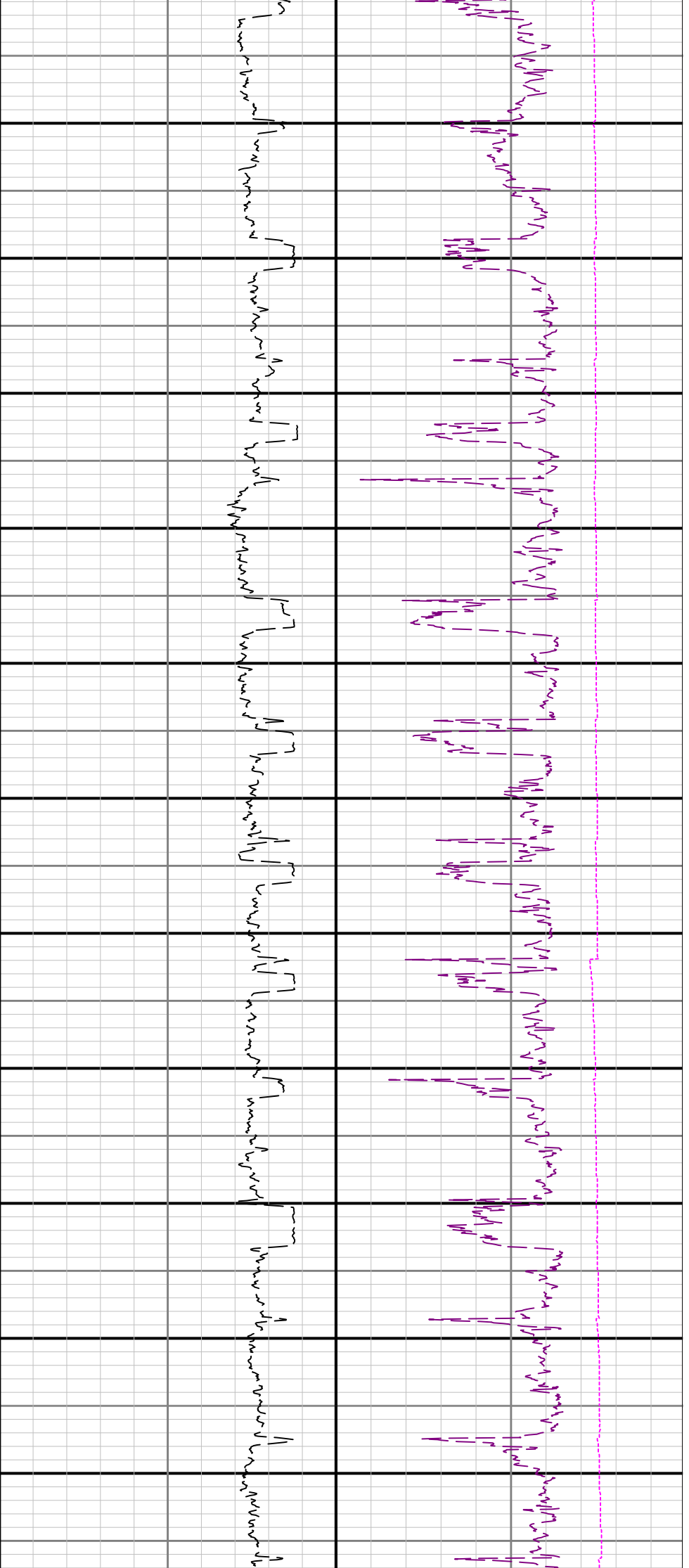




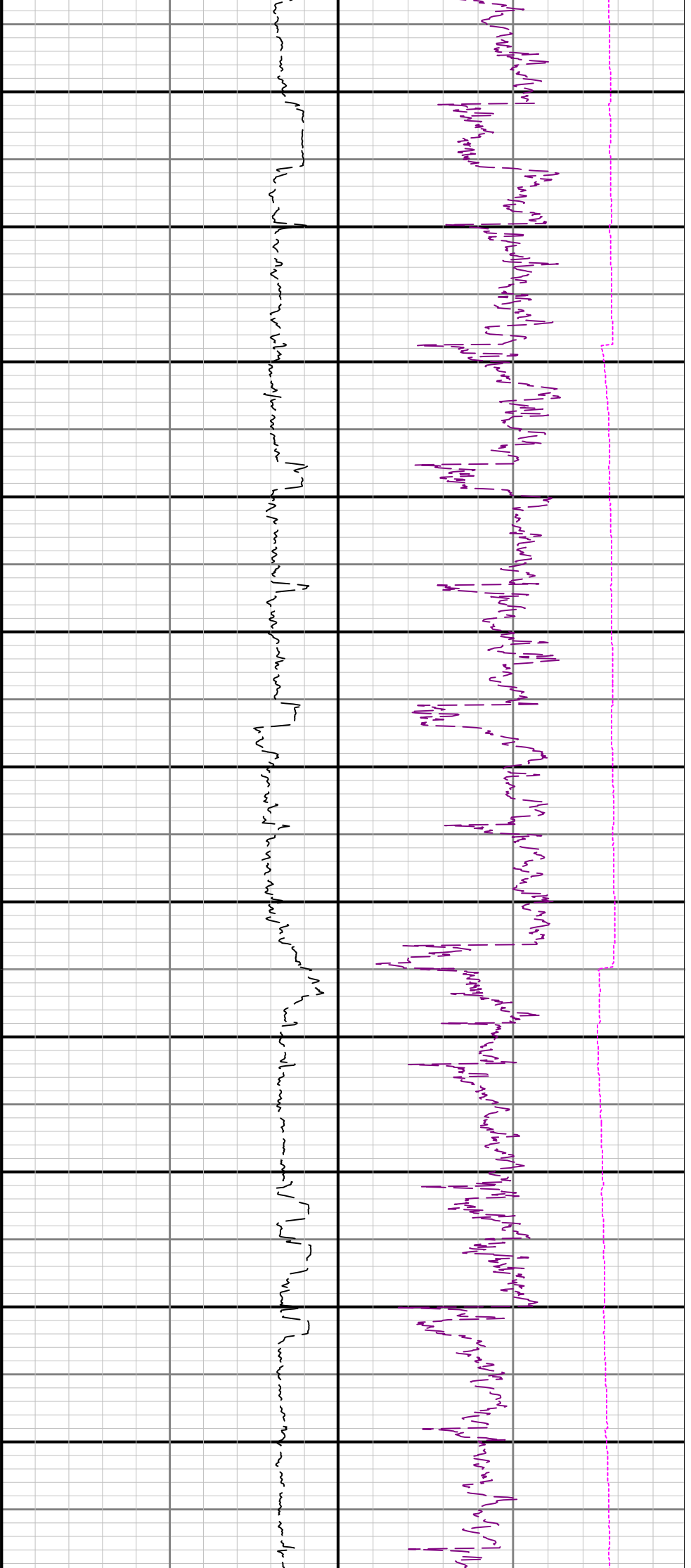












13100 13200 13300 13400 13500 13600 13700 13800 13900 14000 14100 14200

R2 > R3

See Remark 3

See Remark 2

