

LWD COMPOSITE LOG



Natural Formation Evaluation
Gamma Ray

Scale:

1:1200 MD

Company: Noble Energy

Well: Wells Ranch BB01-649

Depth Reference:

Field:

Weld County

Driller's Depth

County:

Weld County

State:

Colorado

Status:

Final Print

Surface Location:

Latitude:

Longitude:

Directional
Rotary Steerable
VSS

Other Services:

API No: 05-123-41972-00

Job ID: 7707611

SEC: 5

TWN: 15N

RGE: 62W

Permanent Datum (P.D.): Ground Level

Elevation:

4676.00 ft

KB:

N/A

Log Measured From: Rig Floor

Above P.D.

30.00 ft

DF:

4706.00 ft

GL: 4676.00 ft

Dates

Interval Logged

Magnetic Field Reference

Date From: 2015-12-30

Top: (ft)

1852.00

Azi Reference North:

Grid

Dip Angle: (deg)

67.23

Date To: 2016-01-04

Bottom: (ft)

16403.00

Total Magnetic Field Strength: (nT)

52500

Spud Date: 2015-12-29

Mag to Reference North Correction: (deg)

7.32 E

Borehole Record

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

8.500

1861.00

16403.00

9.625

36.00

30.00

1851.00

Mud Record

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Oil Based Mud

1861.00

16403.00

8.500

14542.00

0.31 | 177.91

89.92 | 272.66

Acquisition System

Software Version

Other

Baker Hughes Cadence

G3.2

Rig:

H&P 321

Prior Studio

3.2.7268.7

Contractor:

Helmerich & Payne Drilling Co

District:

RMD

Unit:

D&E

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part of Baker Hughes. Unless other contract terms have been agreed to by the parties, each party's liabilities and

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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.
						Top	Bottom	From	To	Start Logging	End Logging	Hours
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	2.00	AutoTrak Curve	1852.00	16403.00	1861.00	16403.00	2015-12-31 02:45	2016-01-03 23:56	85.67

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adam Schlenz	2015-12-29	2015-12-31	David Browning	2015-12-29	2016-01-03	Dusty Zink	2015-12-29	2016-01-04
Mike Gurnsey	2015-12-29	2016-01-04	Nick Williams	2015-12-31	2016-01-04			

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+ (%)
2015-12-31 01:30	1	1861.00	Oil Based Mud	9.5	12	N/A	16.0	68.0/20.0	Active Pit	31000	0.00
2015-12-31 13:30	1	4722.62	Oil Based Mud	9.6	16	N/A	14.6	63.0/24.0	Active Pit	30000	0.00
2016-01-01 02:00	1	6292.00	Oil Based Mud	9.6	16	N/A	11.6	62.5/24.5	Active Pit	35000	0.00
2016-01-01 13:30	1	8038.00	Oil Based Mud	9.8	17	N/A	10.8	62.0/23.5	Active Pit	37000	0.00
2016-01-02 02:15	1	10214.00	Oil Based Mud	10.1	24	N/A	10.1	59.0/24.5	Active Pit	42000	0.00
2016-01-02 13:45	1	11346.00	Oil Based Mud	10.0	24	N/A	10.0	59.0/25.4	Active Pit	42000	0.00
2016-01-03 02:00	1	13209.00	Oil Based Mud	10.1	32	N/A	10.1	59.0/24.5	Active Pit	44000	0.00
2016-01-03 13:45	1	15082.00	Oil Based Mud	10.4	34	N/A	10.4	58.0/24.5	Active Pit	45000	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	ATC_SU	12653420	Near Bit Inclination	5.93	6.55	7.000	4.330
1	ATC_SU	12653420	Near Bit VSS	5.93	6.55	7.000	4.330
1	ATC_MWD	12694907	Gamma (single)	2.77	12.72	7.000	3.250
1	ATC_MWD	12694907	Directional (mag)	12.29	22.24	7.000	3.250

Comments

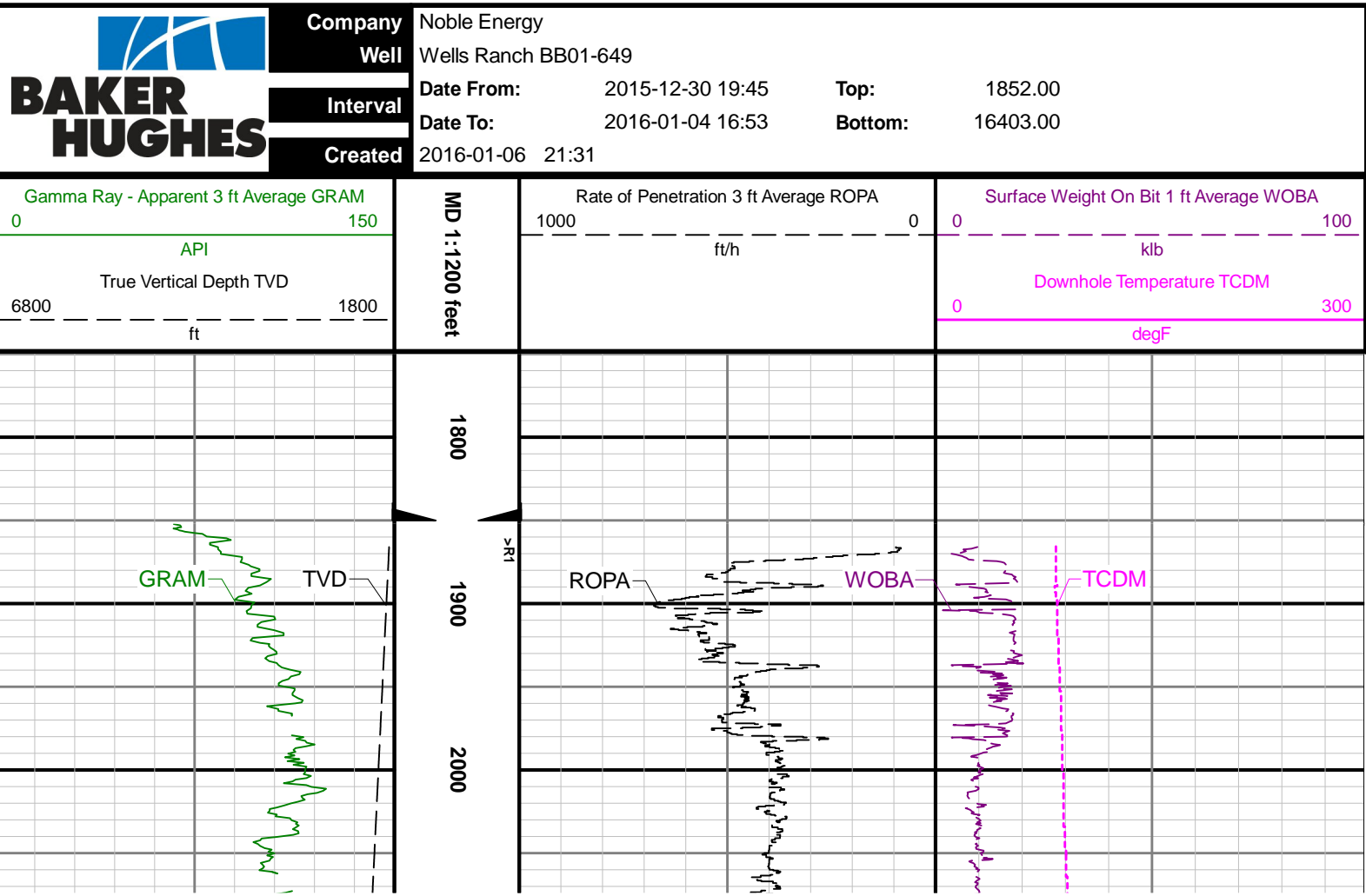
1 Baker Hughes Runs 1 utilized a 6 3/4 inch AutoTrak Curve (Directional and Gamma Ray) tool behind an 8 1/2 inch bit and rotary steerable assembly from 1864 feet MD (1860.95 feet TVD) to 16403 feet MD (6463.01 feet TVD).

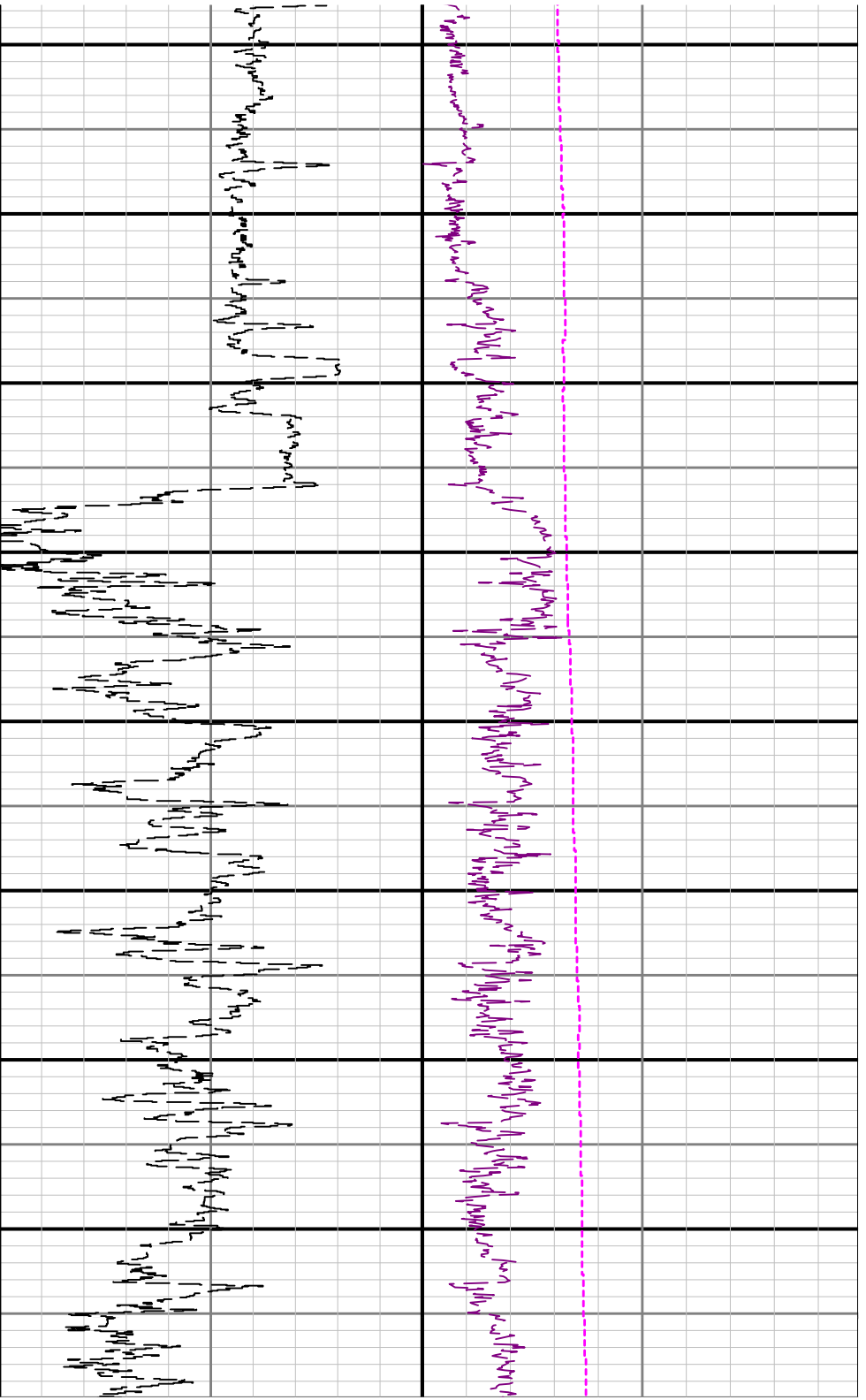
1861 feet MD (1860.95 feet TVD) to 16403 feet MD (6463.01 feet TVD).

2 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the 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.

Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
GRAM	Gamma Ray - Apparent 3 ft Average	API
TCDM	Downhole Temperature	degF
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb





2100

2200

2300

2400

2500

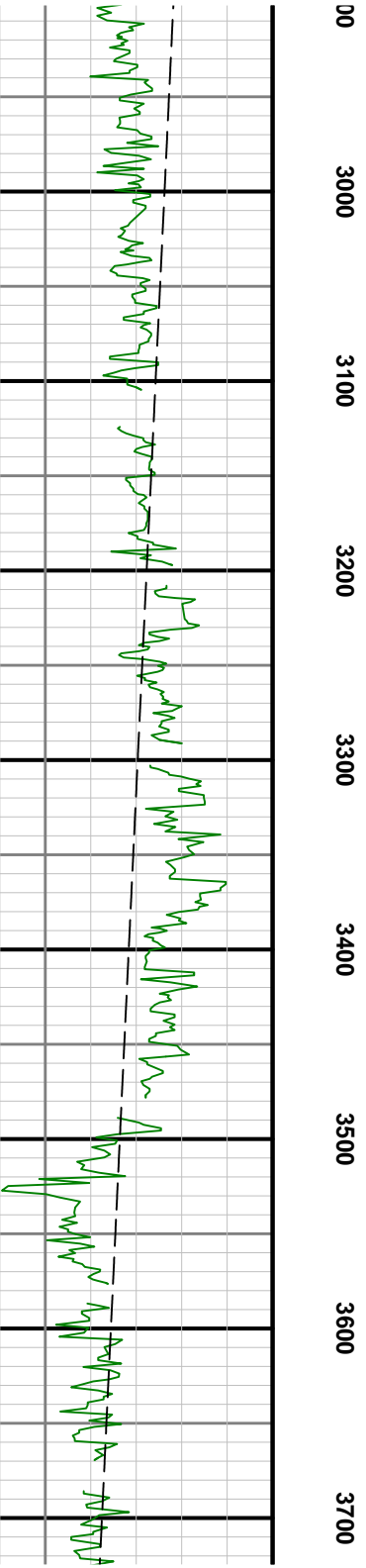
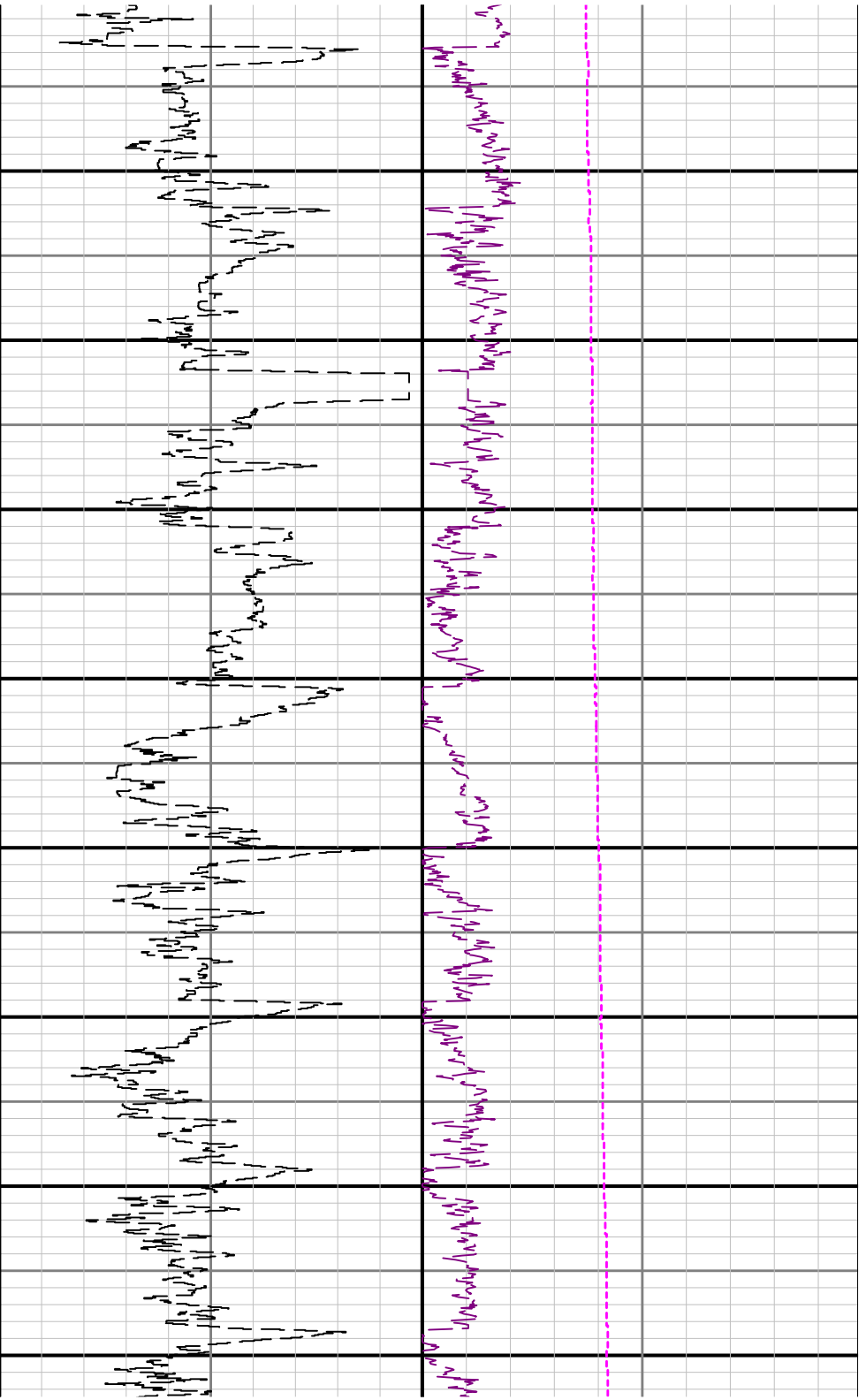
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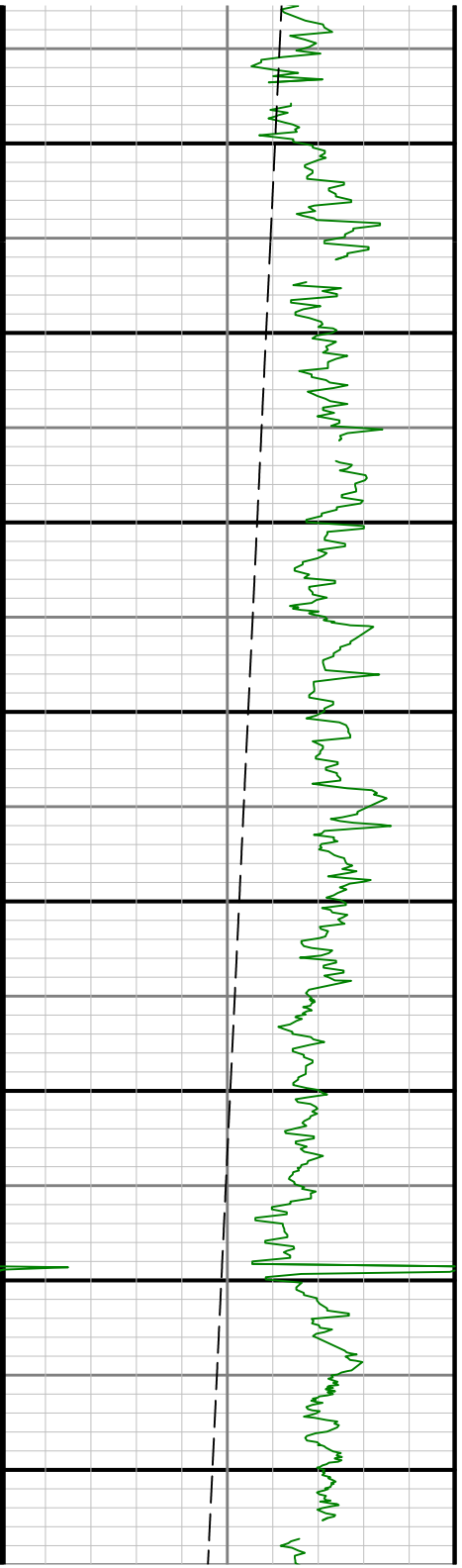
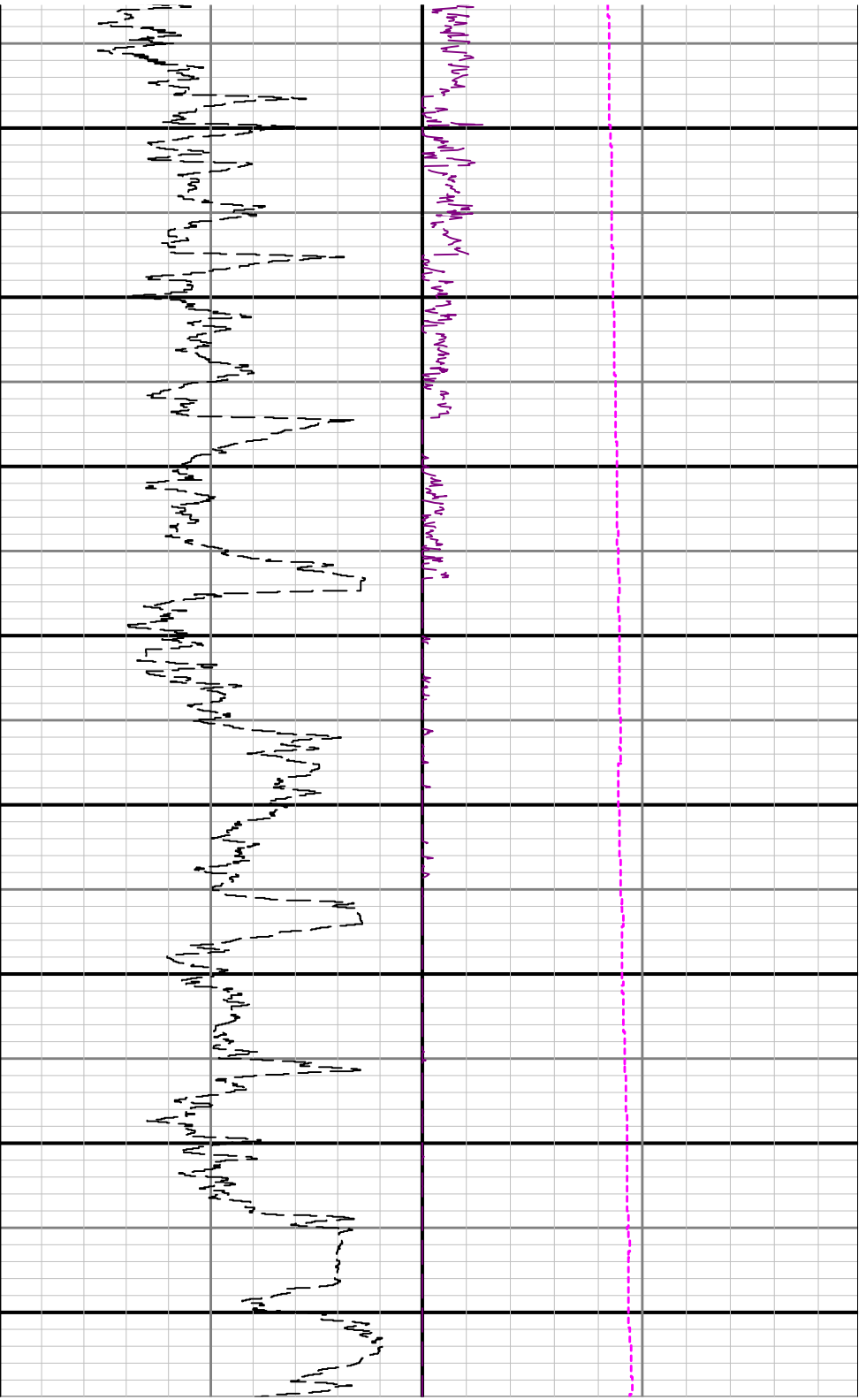
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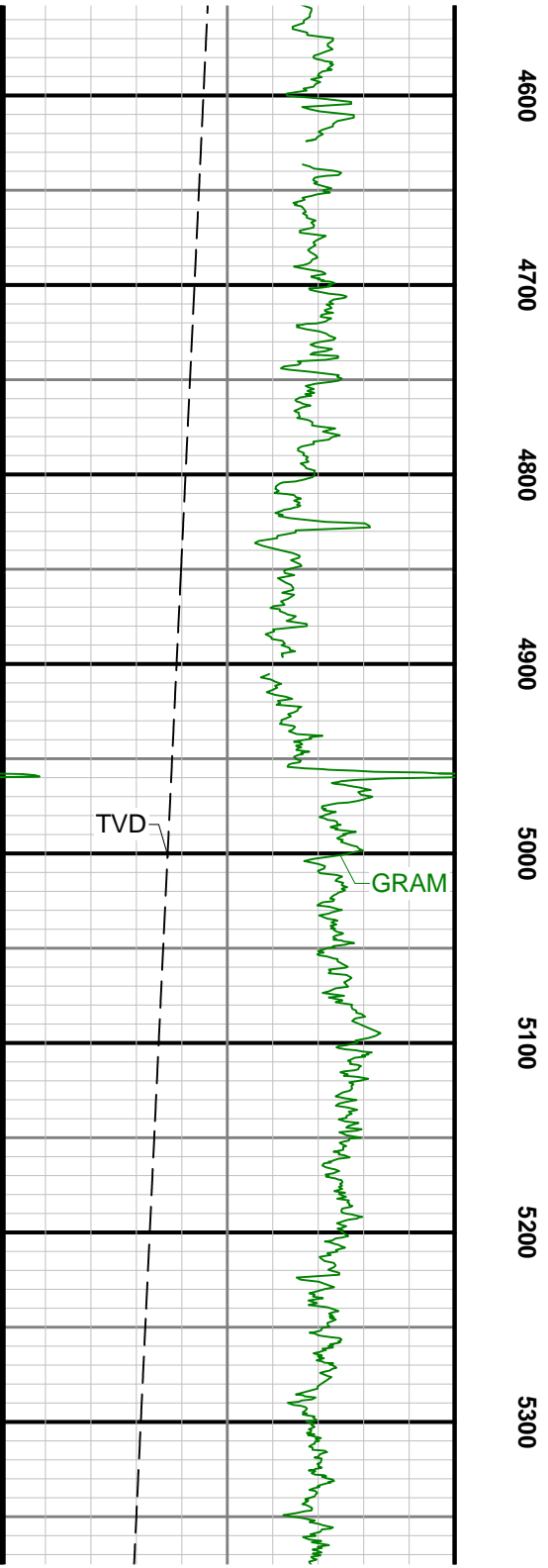
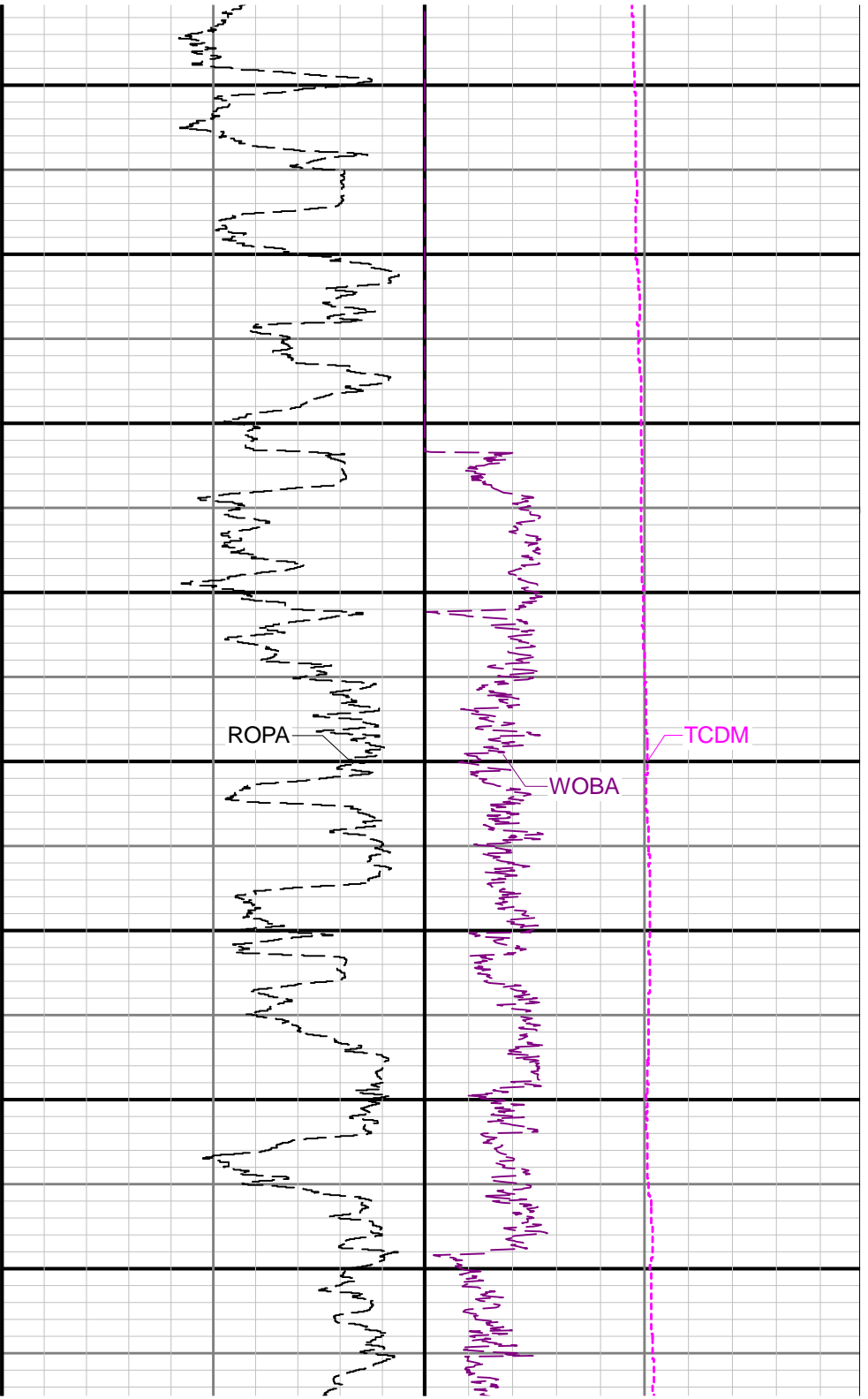
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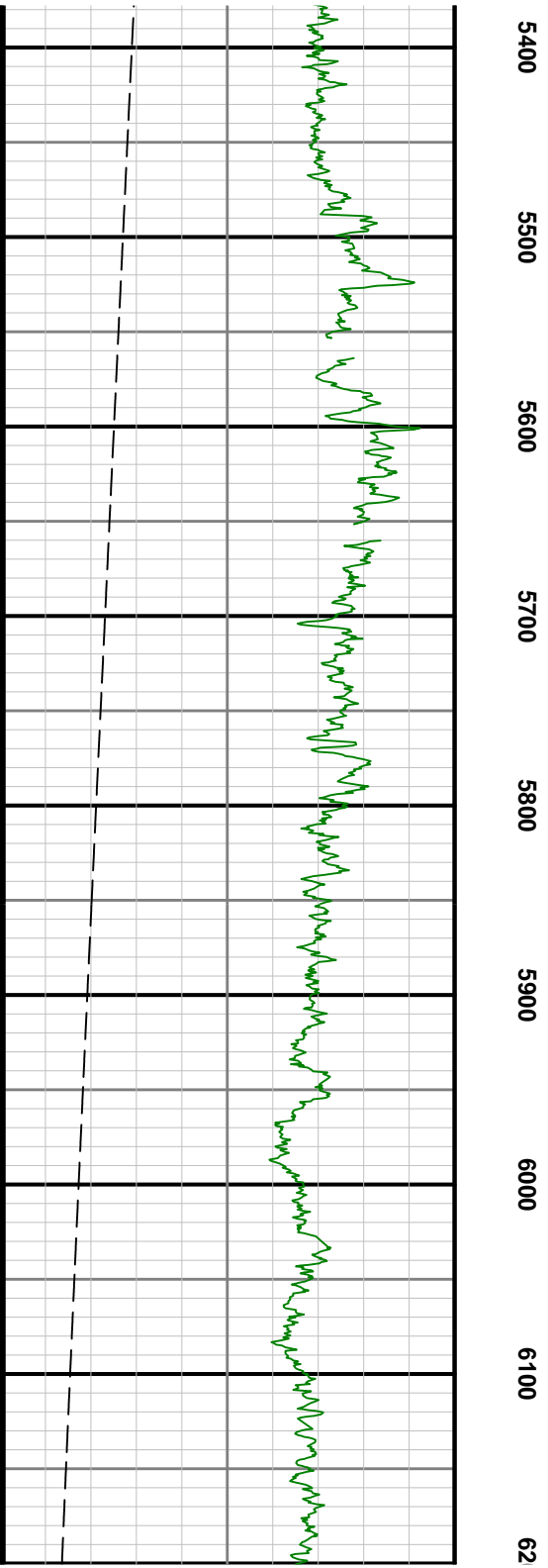
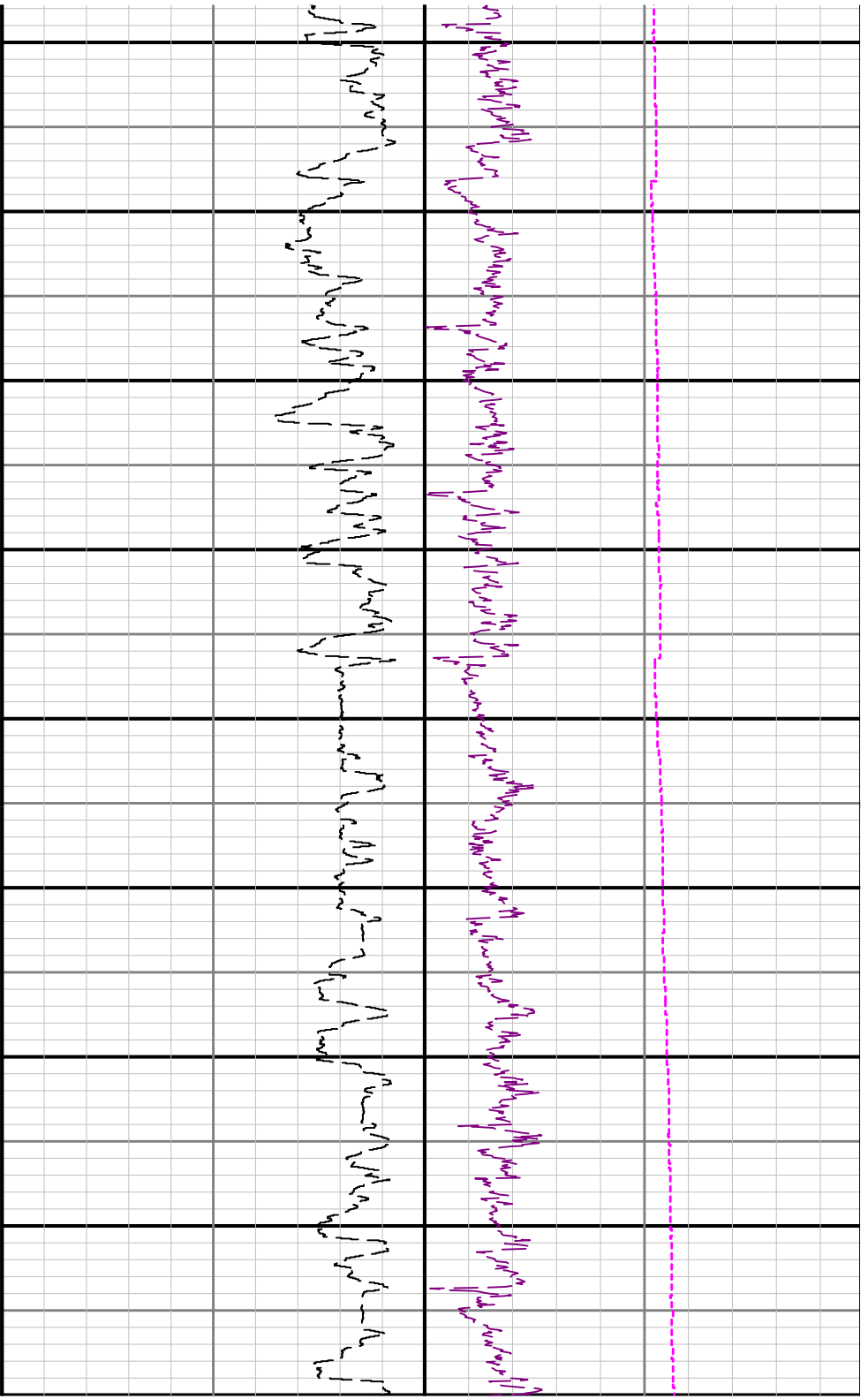
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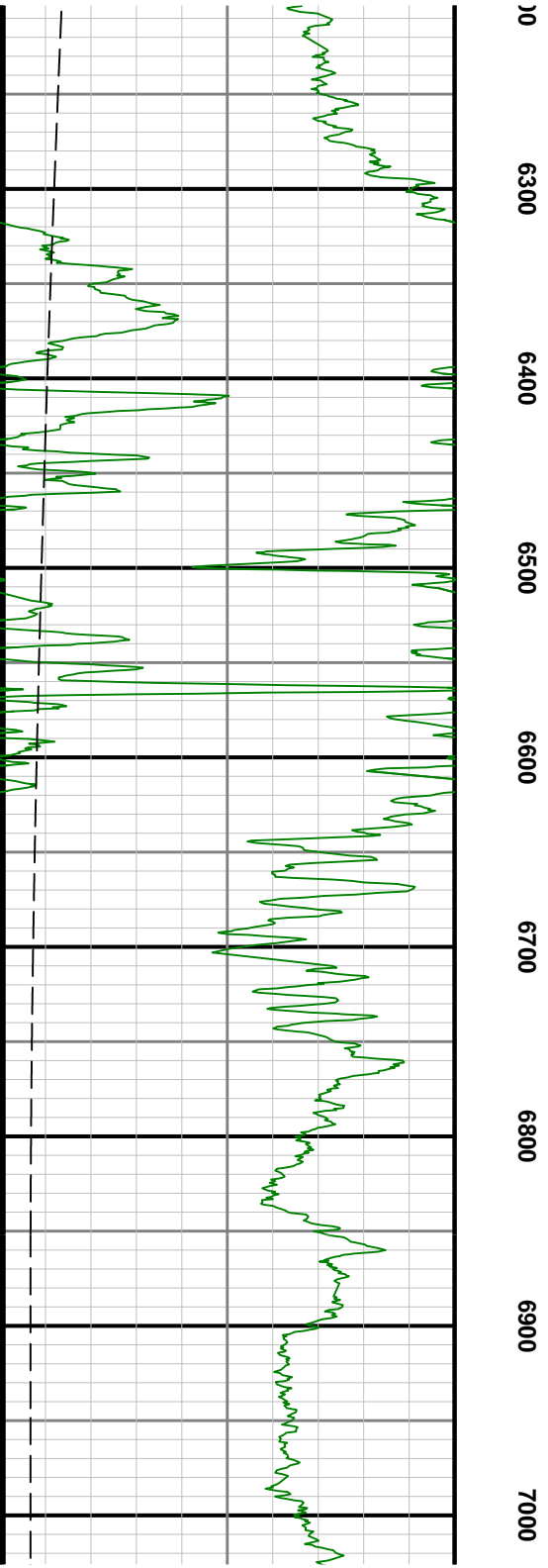
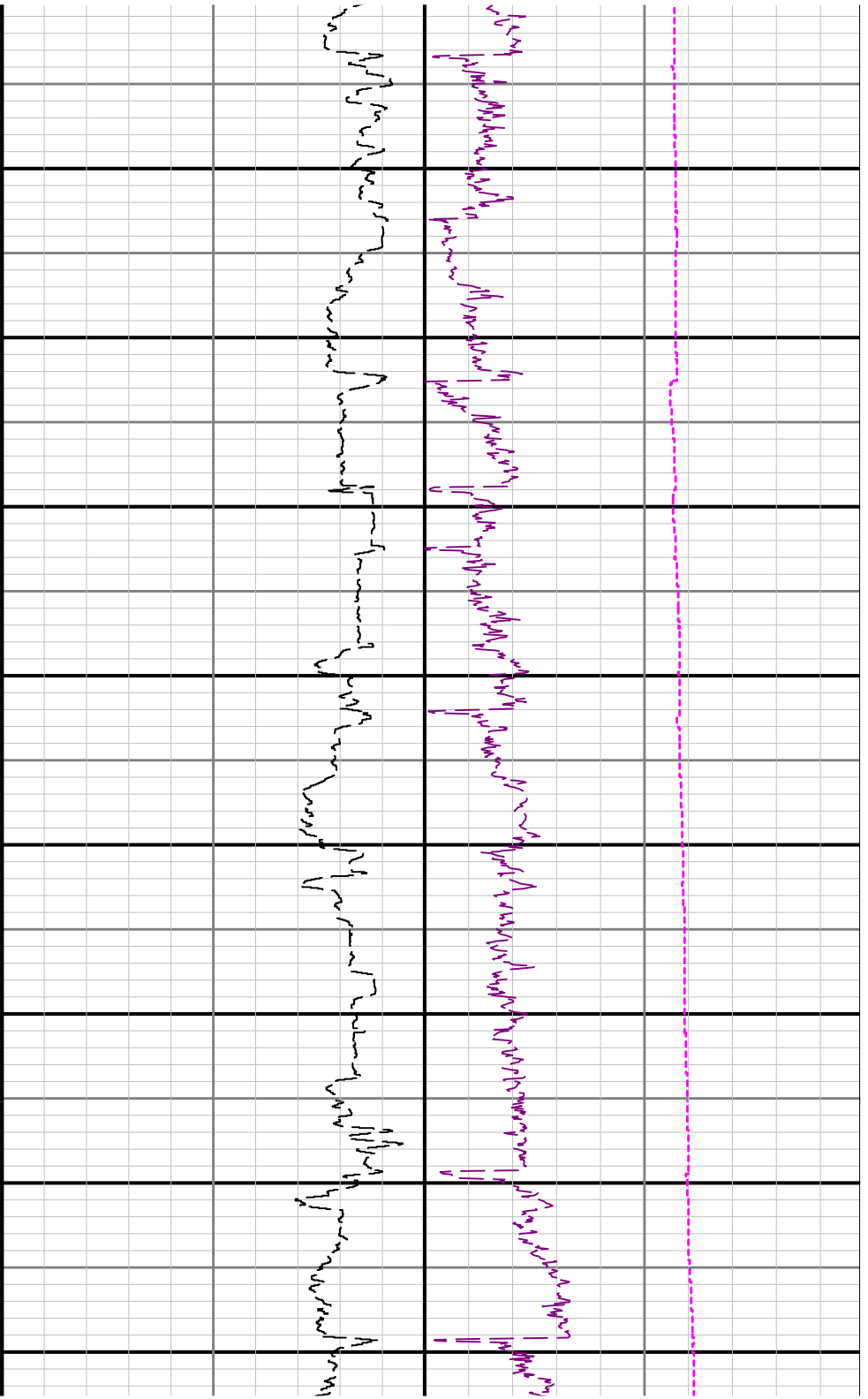
Hand-drawn geological cross-section on a grid. A dashed pink line runs vertically through the center. The left side shows a series of peaks and valleys, with labels '2100', '2200', '2300', '2400', '2500', '2600', '2700', '2800', and '29' along the bottom. The right side shows a series of peaks and valleys, with labels '2100', '2200', '2300', '2400', '2500', '2600', '2700', '2800', and '29' along the bottom. The drawing is done in black ink on a grid background.

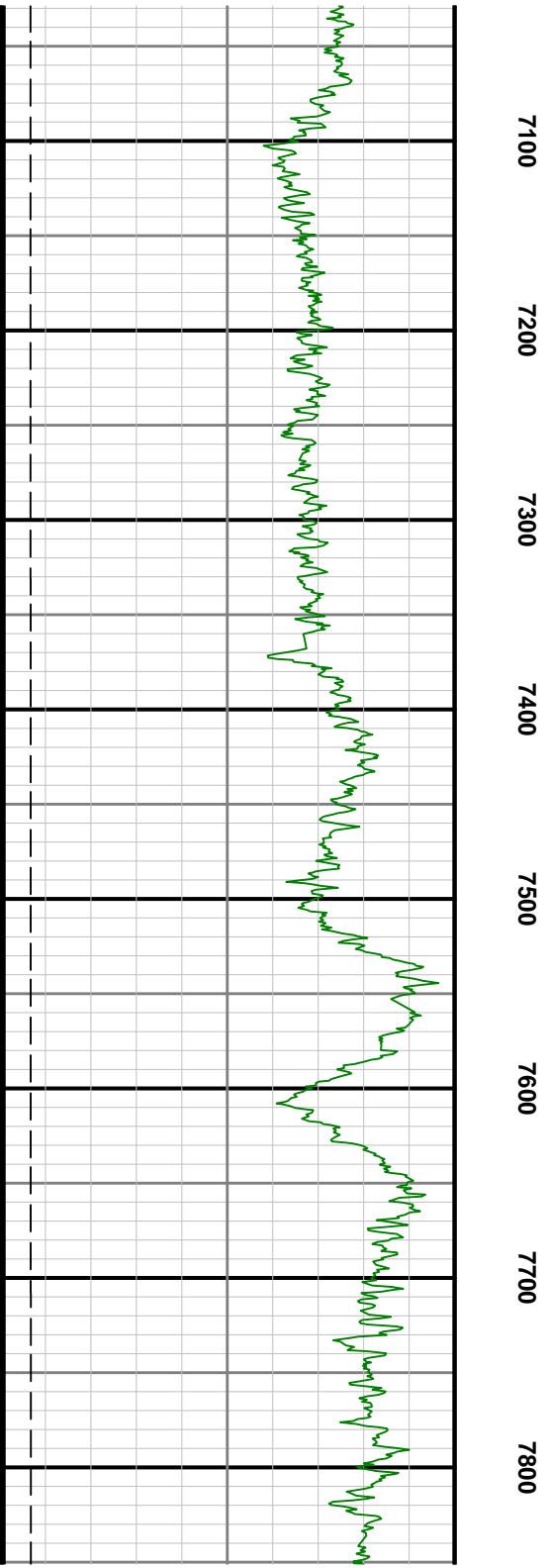
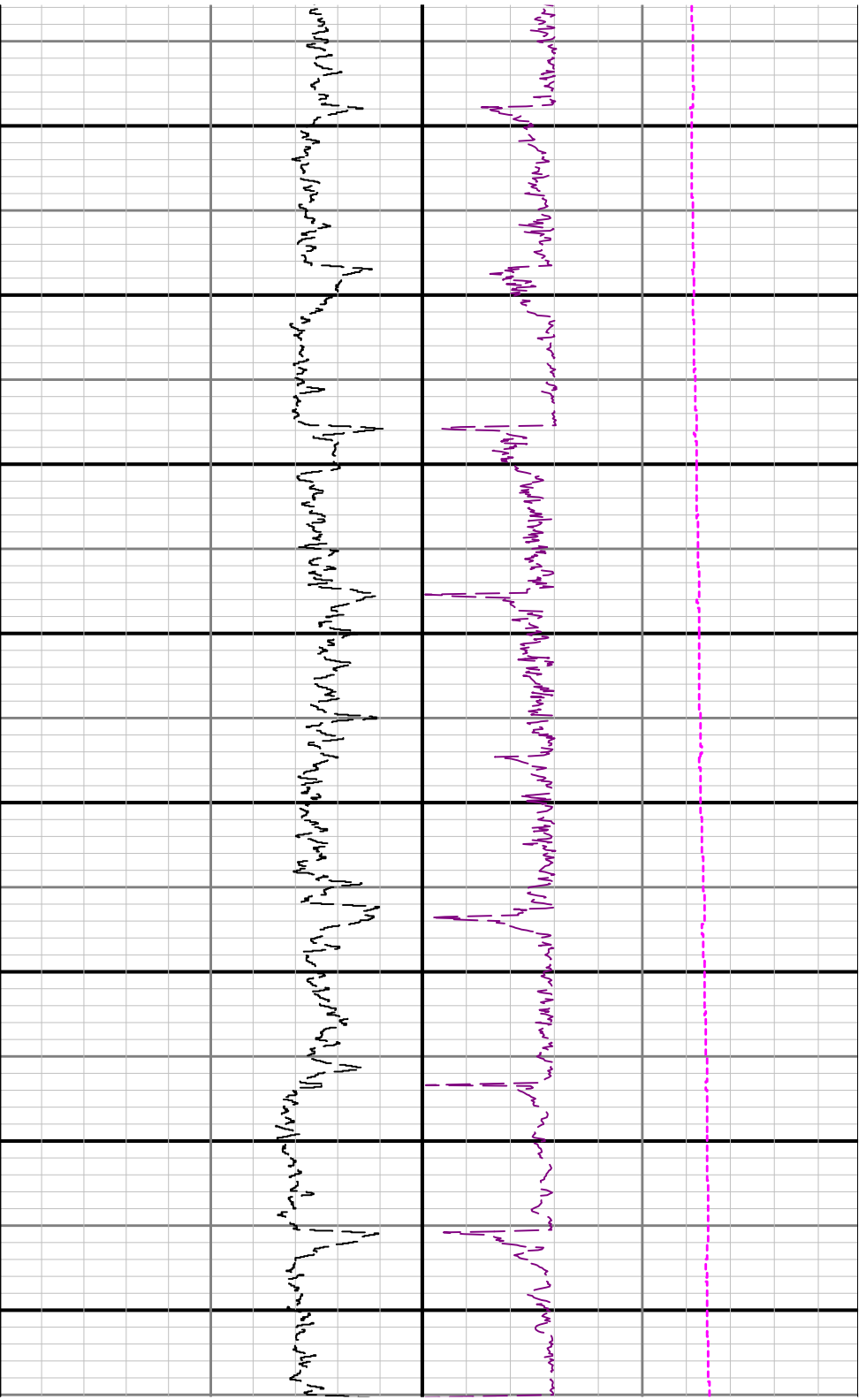


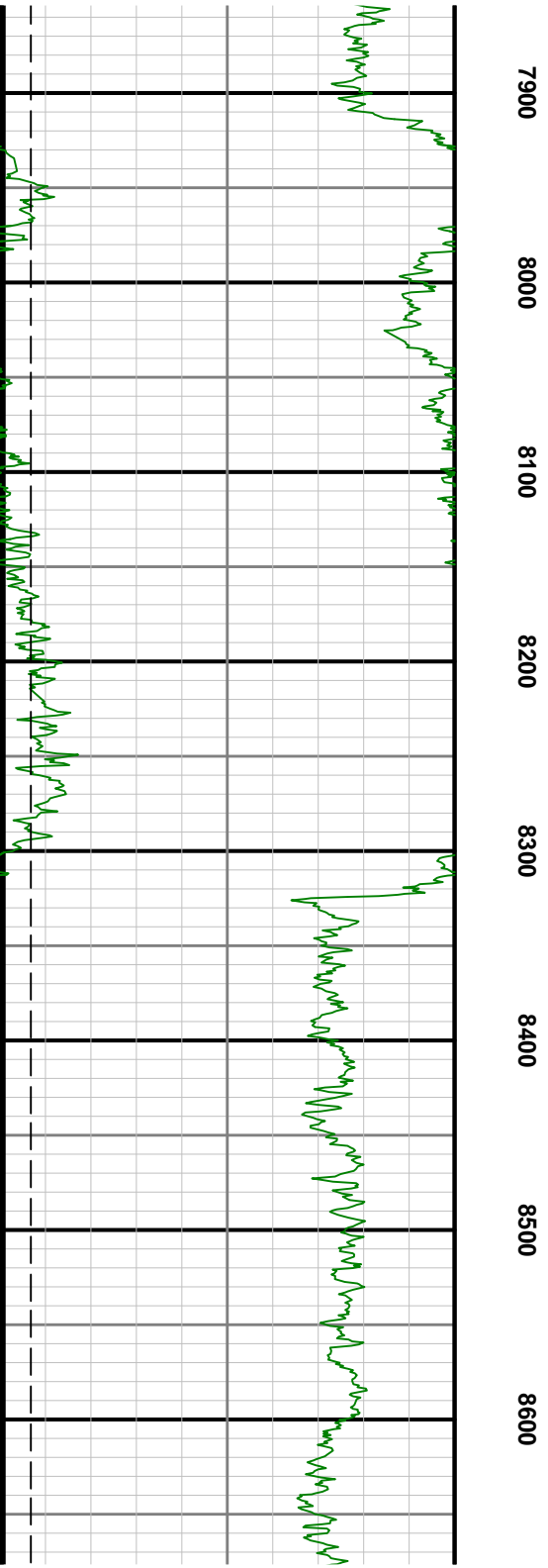
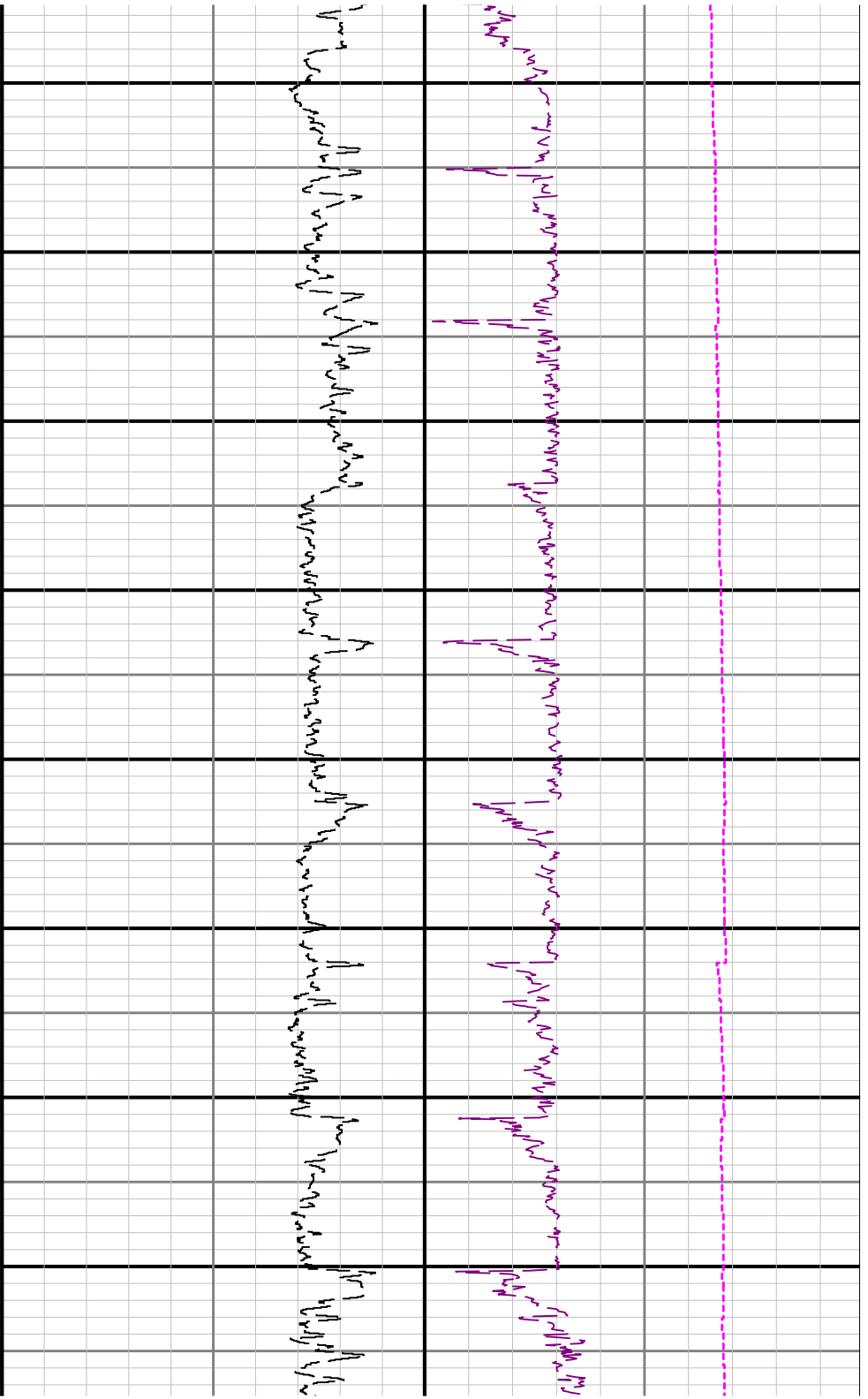


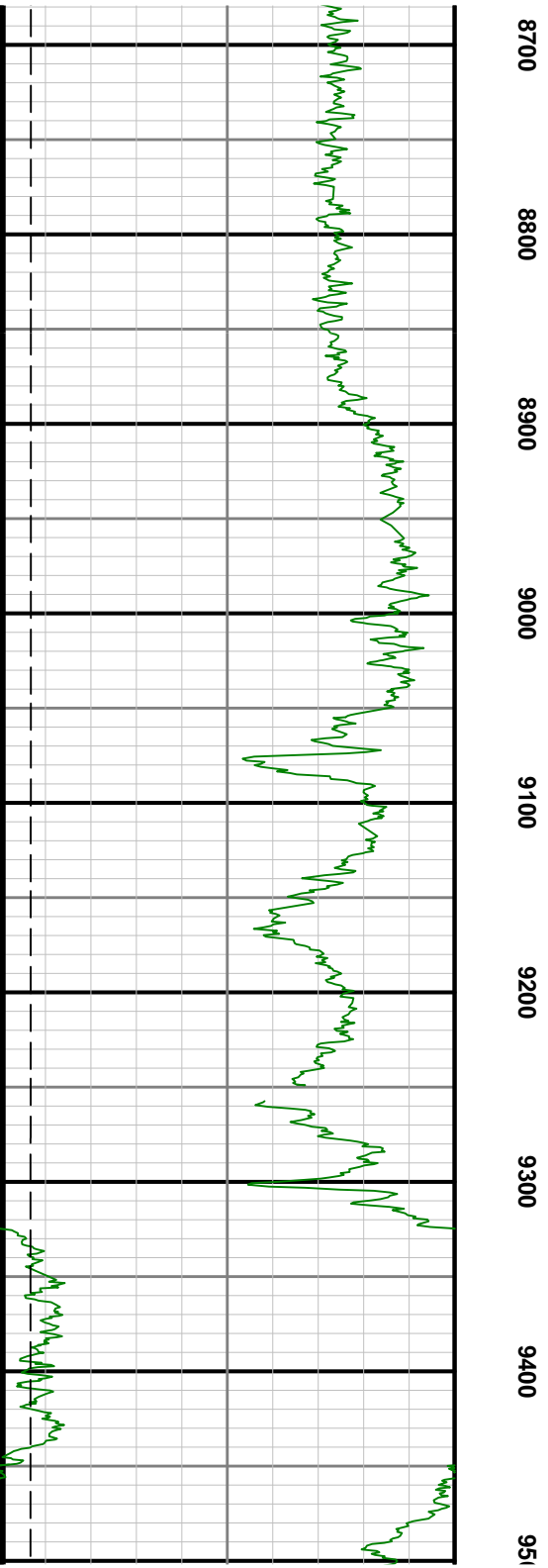
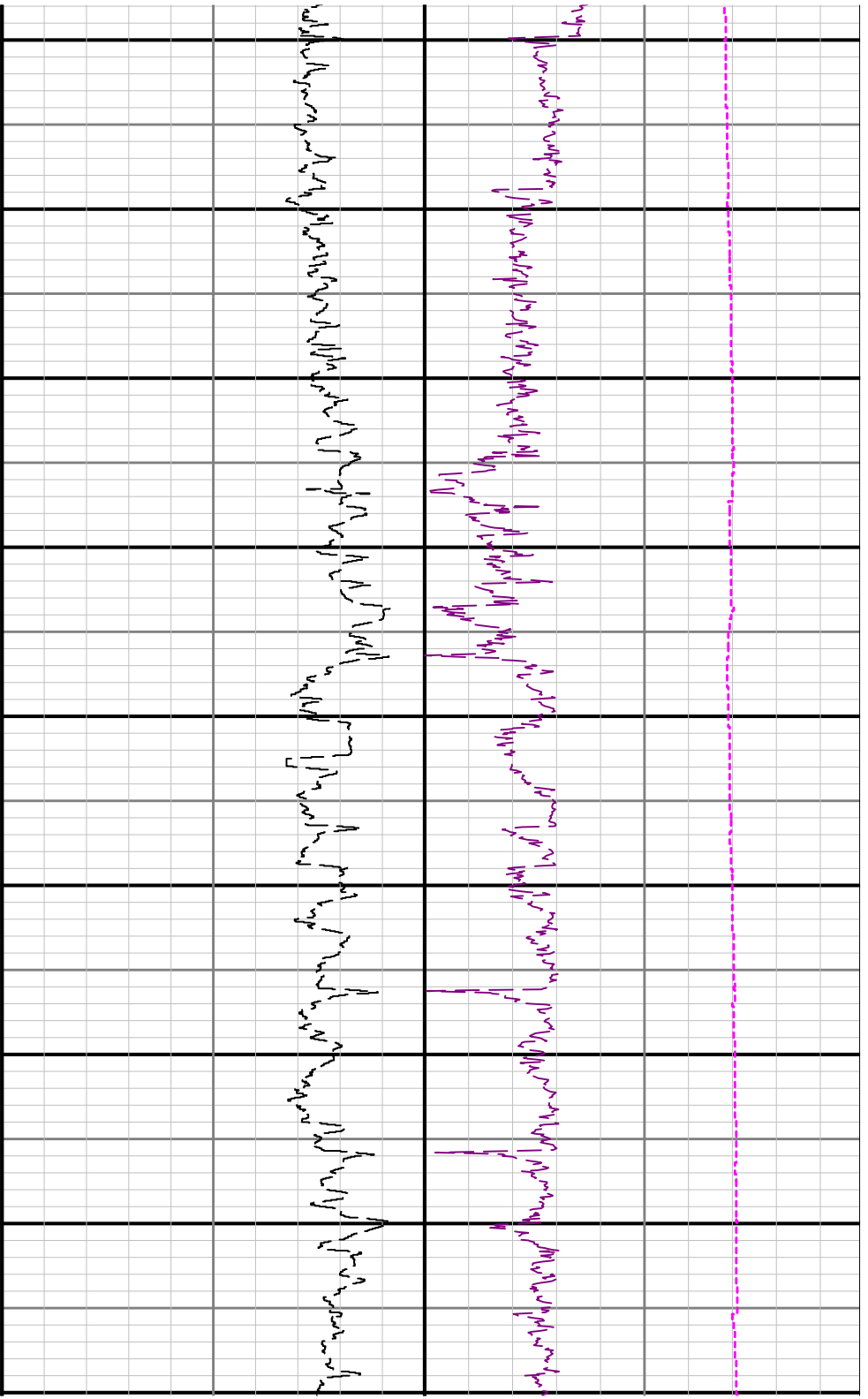


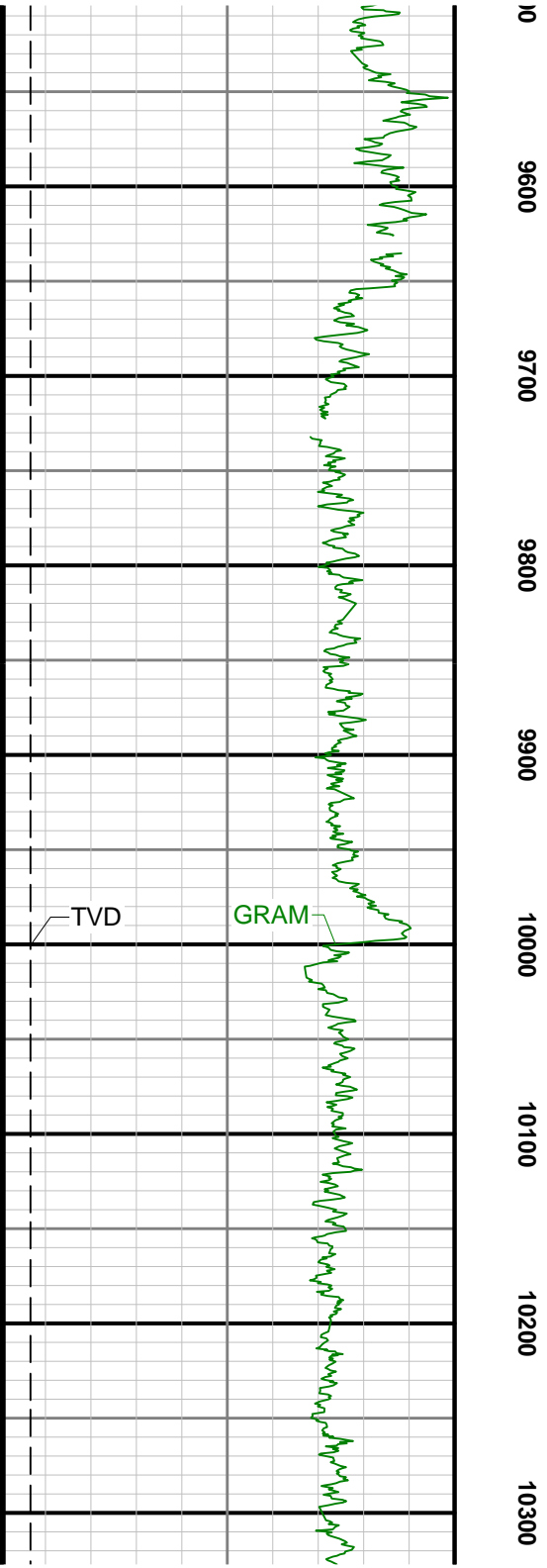
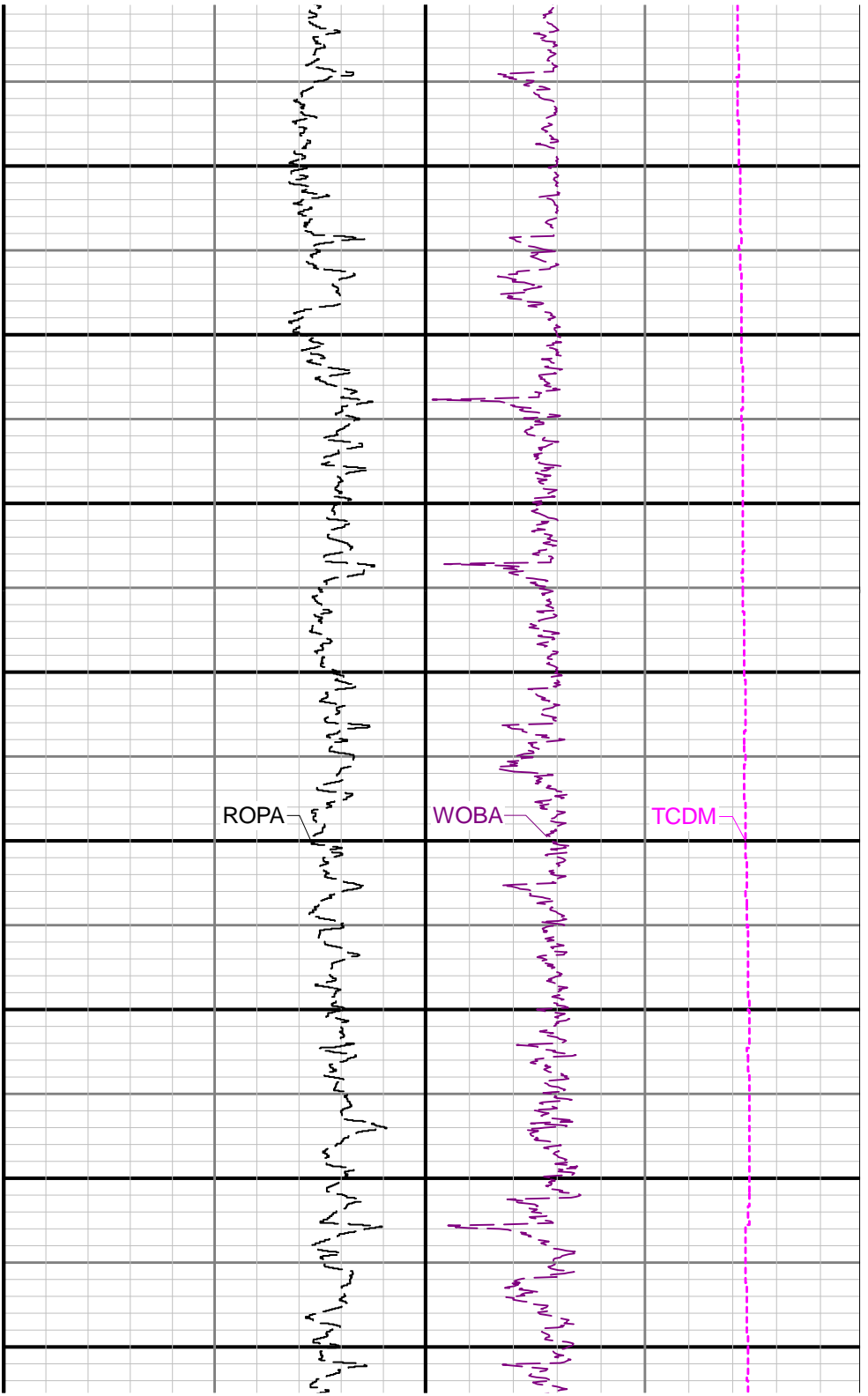


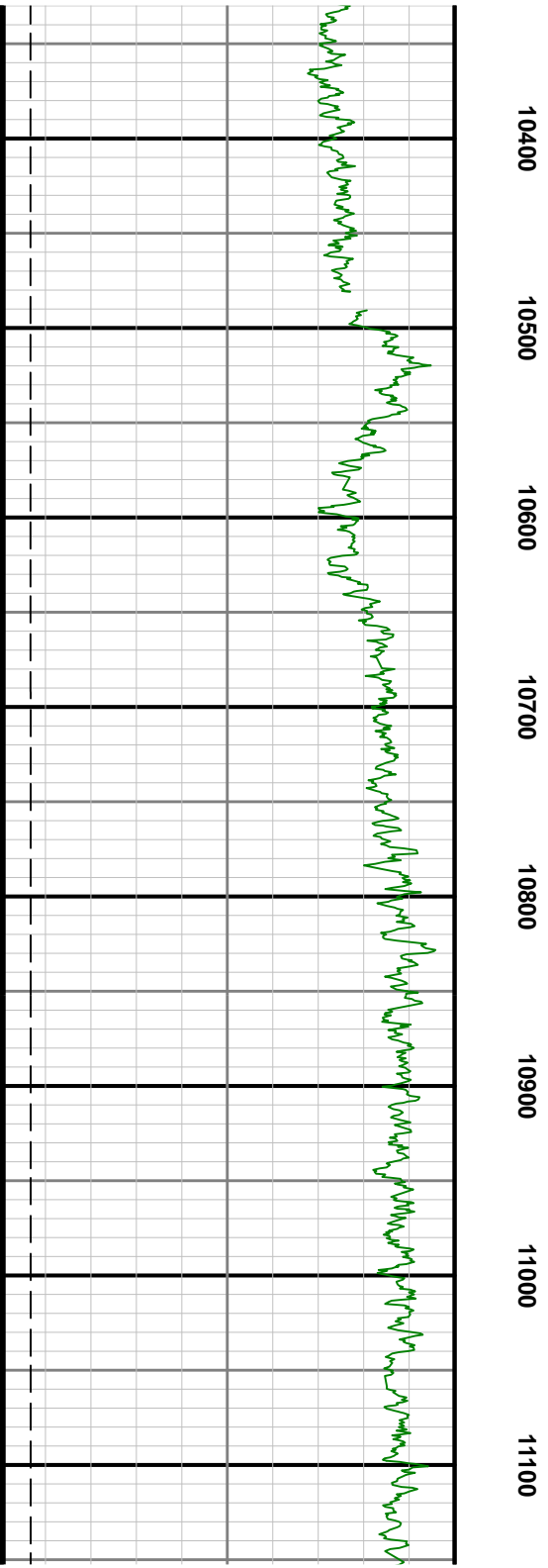
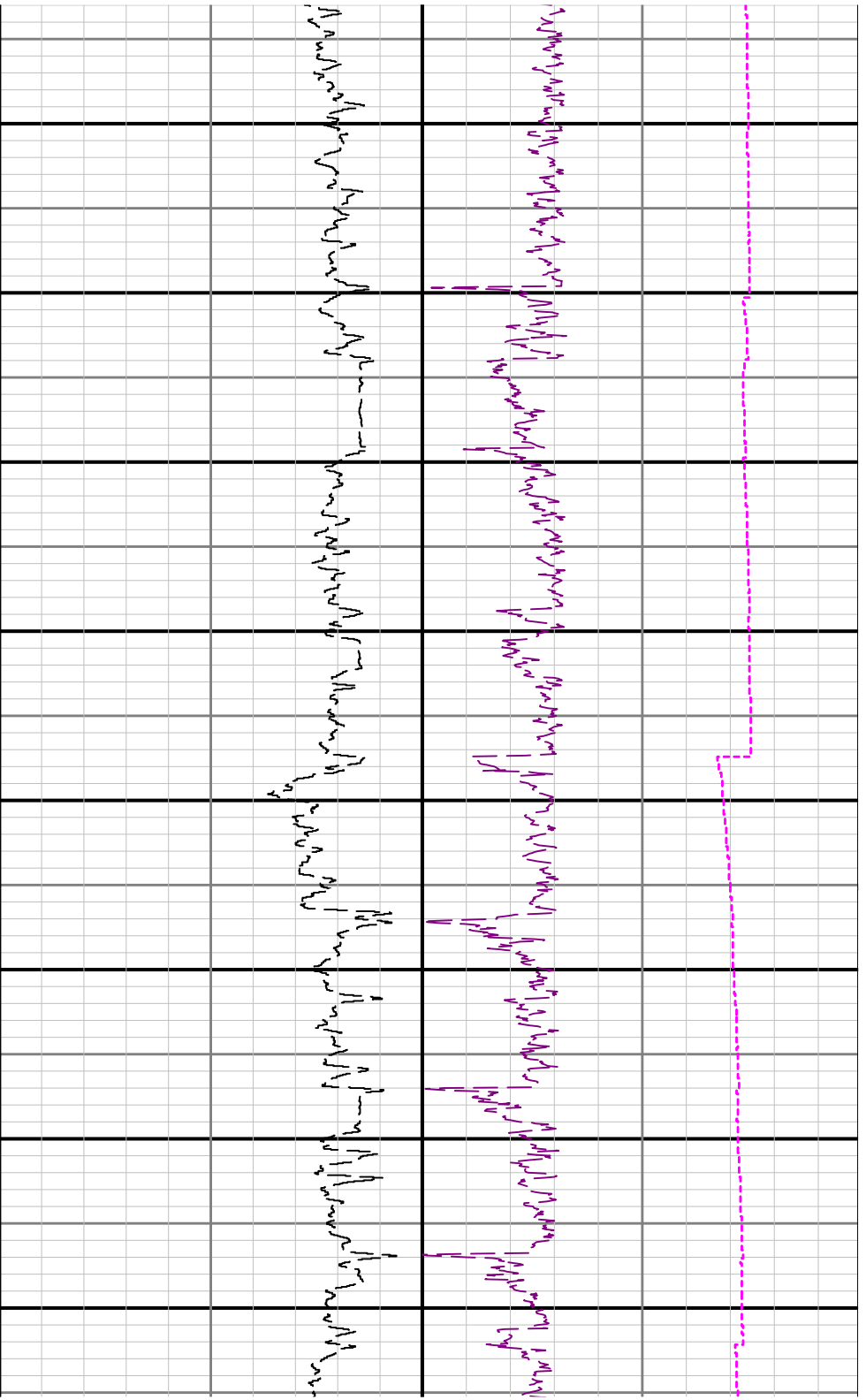


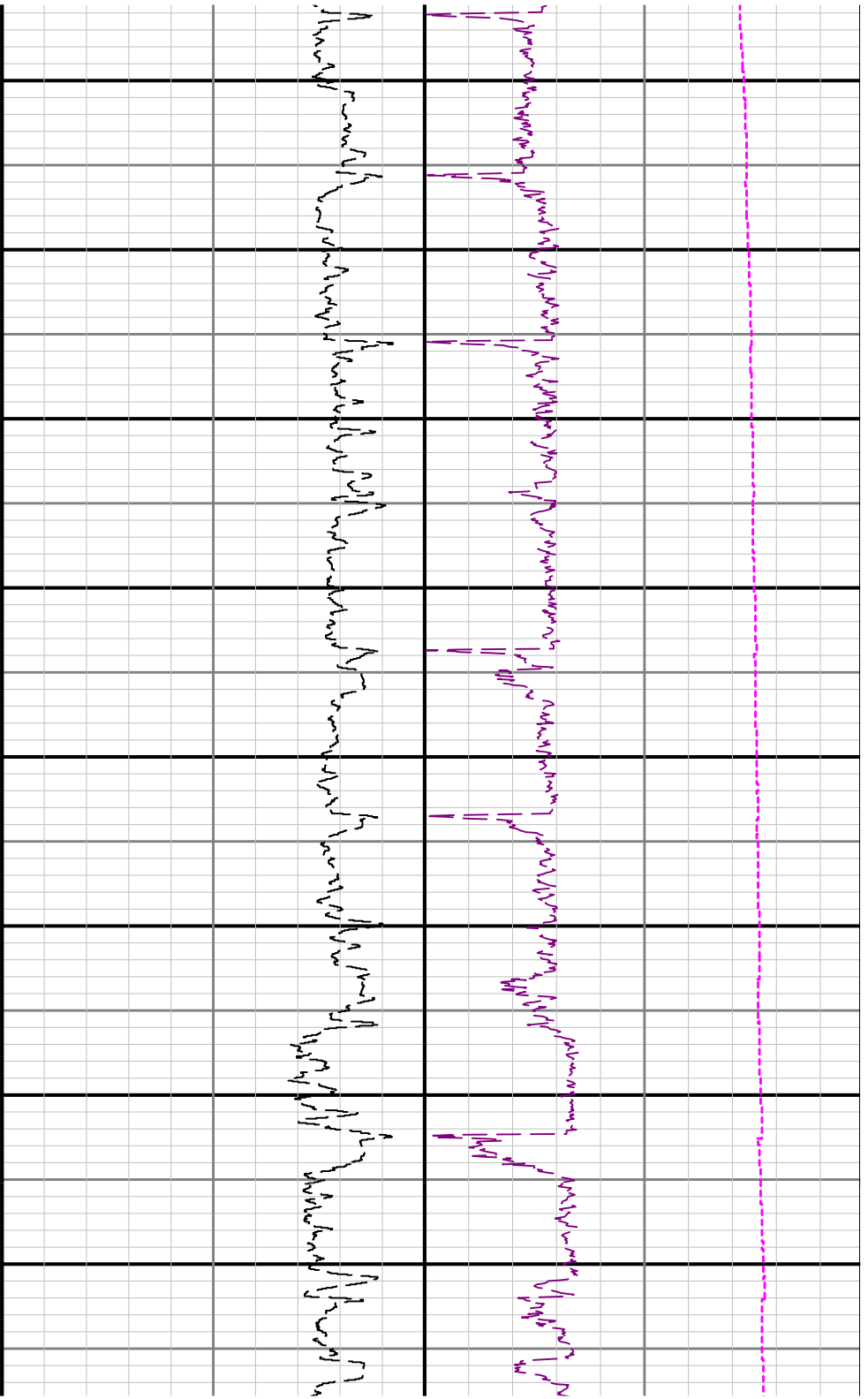












11200 11300 11400 11500 11600 11700 11800 11900

