



LWD MEMORY LOG

Gamma Ray

Company: SRC Energy

Well: Harvesters State 5C-16-M

Field: Weld County

County: Weld Country: United States

State: Colorado

Surface Location: Other Services:

Final Print

API No: 05-123-46371-00

Job ID: 9051279

Permanent Datum (P.D.): Ground Level

Log Measured From: Rig Floor

Elevation: 4802.00 ft

Elev. KB: 4822.00 ft

Elev. DF: 4802.00 ft

Elev. GL: 4802.00 ft

Interval Logged

Magnetic Field Reference

Date From: 2018-05-11

Top: (ft) 1836.00

Date To: 2018-05-14

Bottom: (ft) 15095.00

Spud Date: 2018-03-21

Azi Reference North: True

Total Magnetic Field Strength: (nT) 52471

Mag to Reference North Correction: (deg) 7.55 E

Borehole Record

Casing Record

Hole Size (in) From (ft) To (ft)

Size (in) Weight (lb/ft) From (ft) To (ft)

13.500 20.00 1836.00 9.625 36.00 20.00 1828.00

8.500 1836.00 15108.00

Mud Record

Deviation Record

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

Water Based Mud 20.00 1836.00 13.500 1816.00 0.00 | 127.12 1.81 | 318.66

Diesel-Oil Based Mud 1836.00 15108.00 8.500 13272.00 1.81 | 318.66 0.00 | 97.55

Acquisition System Software Version Other

Baker Hughes Cadence RT4.1

PlotStudio 4.1.7763.3

Rig: Precision Drilling 462

Contractor: Precision Drilling

District: RMD

Unit: D&E

©"4239"Dcmgt"JwiJgu."c"IG"eqorcp{"."NNE"ó"Cnn"tkijvu"tgugtXgF0"Dcmgt"JwiJgu."c"IG"eqorcp{"."NNE"cpf"kvu"chhknkcvgu"\*ôDJIGö+"rtqXkfgu"vjku"kphqtocvkqp"qp"cp"ôcu"kuö"dcuku"hqt"igpgtcn"kphqtocvkqp" purposes and believes it to be accurate as of the date of publication. BHGE does not make any representation as to the accuracy or completeness of the information and makes no warranties of any kind, specific, implied or oral, to the fullest extent permissible by law, including those of merchantability and fitness for a particular purpose or use. BHGE hereby disclaims any and all liability for any direct, indirect, consequential or special damages, claims for lost profits, or third party claims arising from the use of the information, whether a claim is asserted in contract, tort, or otherwise. The BHGE logo is a trademark of Baker Hughes, a GE company, LLC. GE and the GE monogram are trademarks of General Electric Company used under trademark license.

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	1	13.500	PDC	6.00	Steerable	0.00	0.00	20.00	1836.00	2018-03-21 21:51	2018-03-22 05:14	10.46
2	2	8.500	PDC	3.00	AutoTrak Curve	1836.00	2432.00	1836.00	2445.00	2018-05-11 03:11	2018-05-11 06:49	4.14
3	3	8.500	PDC	3.00	AutoTrak Curve	2432.00	15095.00	2445.00	15108.00	2018-05-11 16:35	2018-05-14 00:05	48.20

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
John Moisan	2018-03-21	2018-03-22	John Bryson	2018-05-11	2018-05-14			

### 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+ (%)
2018-03-21 13:17	1	20.00	Water Based Mud	8.4	1	N/A	N/A	0/100	Flow Line	800	0.00
2018-05-11 02:00	2	1836.00	Diesel-Oil Based Mud	8.7	7	N/A	8.8	89/11	Suction	21000	0.00
2018-05-11 15:00	3	2445.00	Diesel-Oil Based Mud	8.6	7	N/A	8.8	89/11	Suction	21000	0.00
2018-05-12 15:00	3	7844.00	Diesel-Oil Based Mud	9.4	16	N/A	12.6	84/16	Suction	39000	0.00
2018-05-13 15:00	3	13300.00	Diesel-Oil Based Mud	9.8	25	N/A	10.2	83/17	Suction	34500	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	Sensor Sub	ZAPS230949	Directional (mag)	12.17	61.94	8.000	3.250
1	Sensor Sub	ZAPS230949	VSS	12.17	61.94	8.000	3.250
1	Sensor Sub	ZAPS230949	Pressure	32.77	82.54	8.000	3.250
2	ATC_SU	11813727	Near Bit Inclination	5.93	6.73	7.000	4.330
2	ATC_SU	11813727	Near Bit VSS	5.93	6.73	7.000	4.330
2	ATC_MWD	14371880	Gamma (single)	2.79	12.90	7.000	3.250
2	ATC_MWD	14371880	Directional (mag)	12.27	22.38	7.000	3.250
3	ATC_SU	13867779	Near Bit VSS	5.93	6.73	7.000	4.330
3	ATC_SU	13867779	Near Bit Inclination	5.93	6.73	7.000	4.330
3	ATC_MWD	12141334	Gamma (single)	2.79	12.93	7.000	3.250
3	ATC_MWD	12141334	Directional (mag)	12.27	22.41	7.000	3.250

### Service and Tool Mnemonics

Mnemonic	Name	Description
GAM	APS	APS EM Module
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 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 Run 1 utilized 8 inch APS EM Services (Directional only) behind a 13 1/2 inch bit and steerable assembly from surface to 1836 feet MD (surface to 1835 feet TVD). No logging data was acquired during this run.
3	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 1836 to 15108 feet MD (1835 to 7251 feet TVD).
4	Gamma Ray Curve (GRAM) is presented 0 to 300 API per customer request.

### Remarks

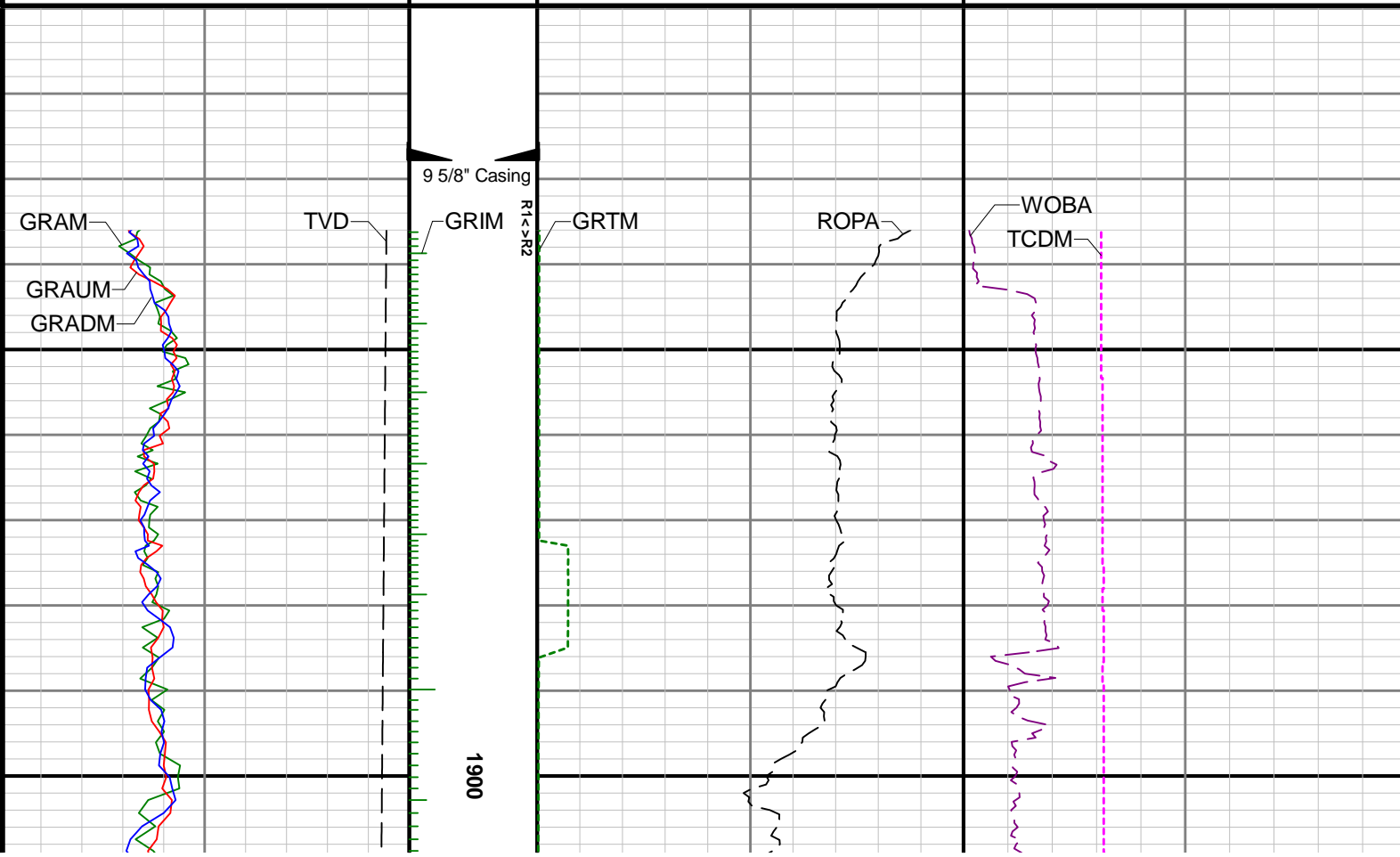
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	2432.00	8.500	3	The interval from 2432 to 2445 feet MD (2429 to 2442 feet TVD) was logged up to 10.5 hours after being drilled due to a trip out of the hole for a tool failure.
2	15095.00	8.500	3	The interval from 15095 to 15108 feet MD (7251 feet TVD) was not logged due to sensor to bit offset at well TD.

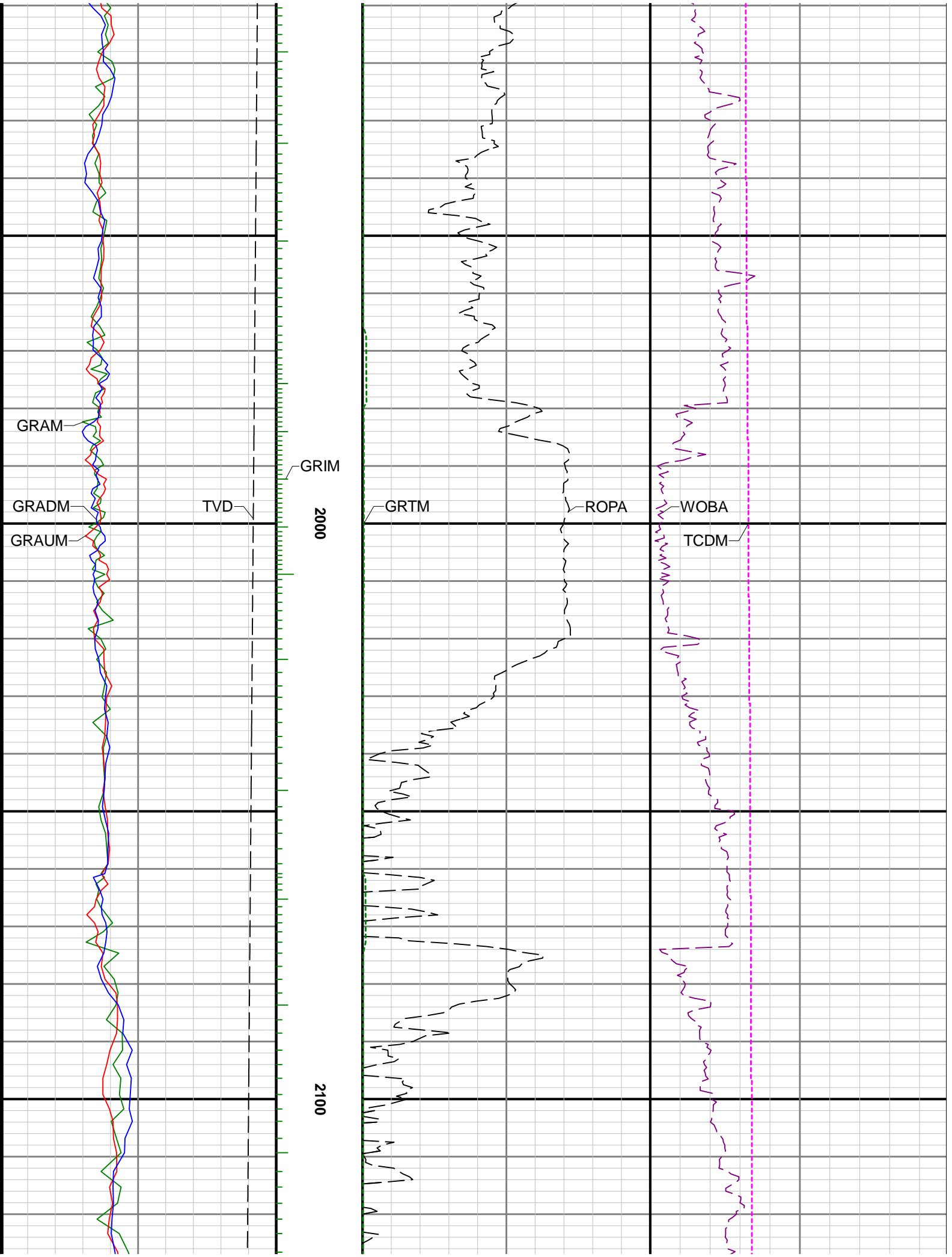
### Curve Mnemonics

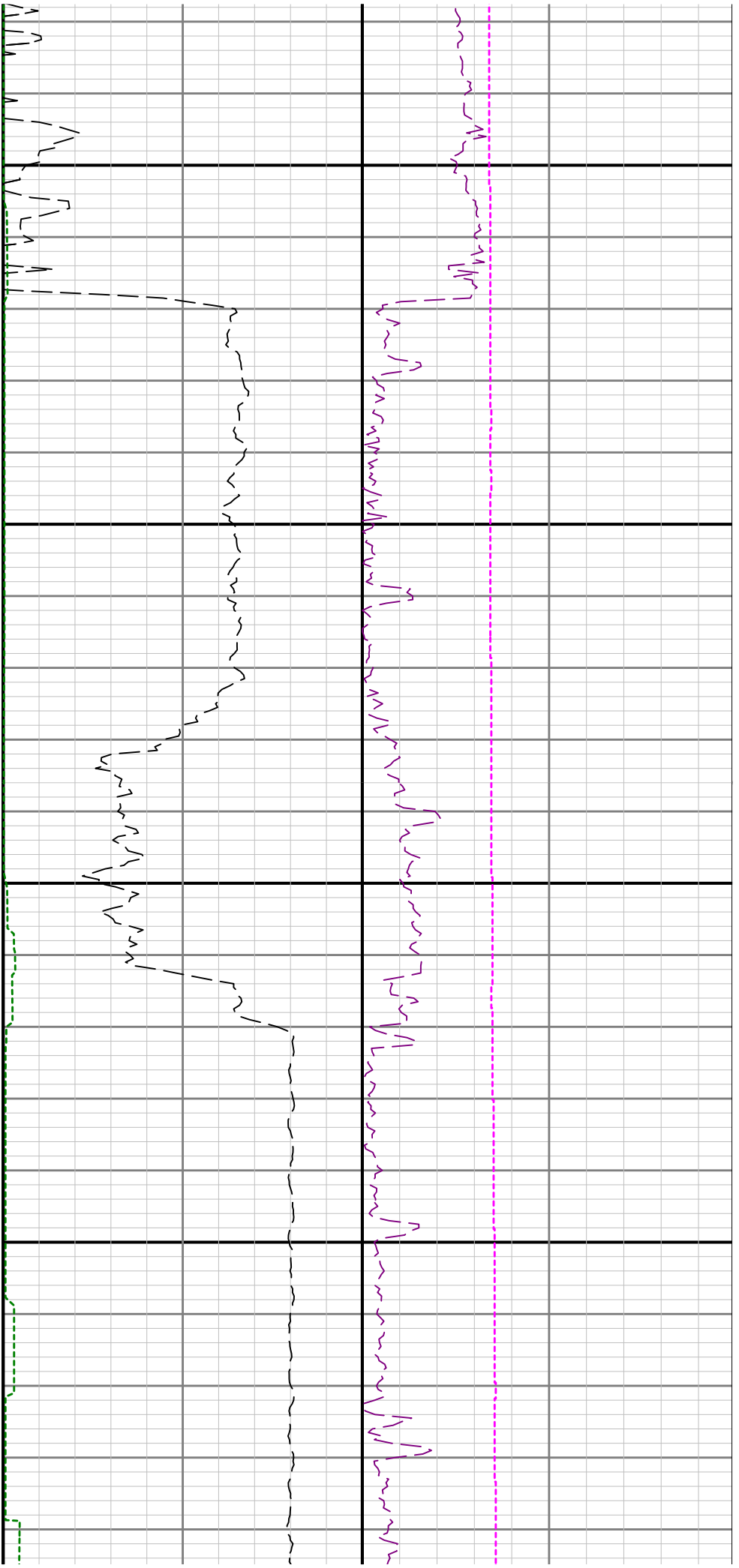
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
GRADM	Gamma Ray - Apparent - Down Quadrant - Memory 0.5 ft Average	API
GRAUM	Gamma Ray - Apparent - Up Quadrant - Memory 0.5 ft Average	API
TCDM	Downhole Temperature	degF

 	<b>Company</b>	SRC Energy			
	<b>Well</b>	Harvesters State 5C-16-M			
	<b>Interval</b>	<b>Date From:</b>	2018-05-11 03:11:03	<b>Top:</b>	1836.00
		<b>Date To:</b>	2018-05-14 00:05:29	<b>Bottom:</b>	15108.00
	<b>Created</b>	2018-05-14 13:17:44			

Gamma Ray - Apparent 0.5 ft Average GRAM 0 300	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA 1000 0	Weight On Bit, Average 1 ft Average WOBA 0 50
API		ft/h	klb
Azimuthal Gamma Ray - Apparent - Up Quadrant 0.5 ft Average GRAUM 0 300		Gamma Time Since Drilled GRTM 0 600	Downhole Temperature TCDM 0 300
API		min	degF
Azimuthal Gamma Ray - Apparent - Down Quadrant 0.5 ft Average GRADM 0 300			
API			
True Vertical Depth TVD 7500 1500			
ft			

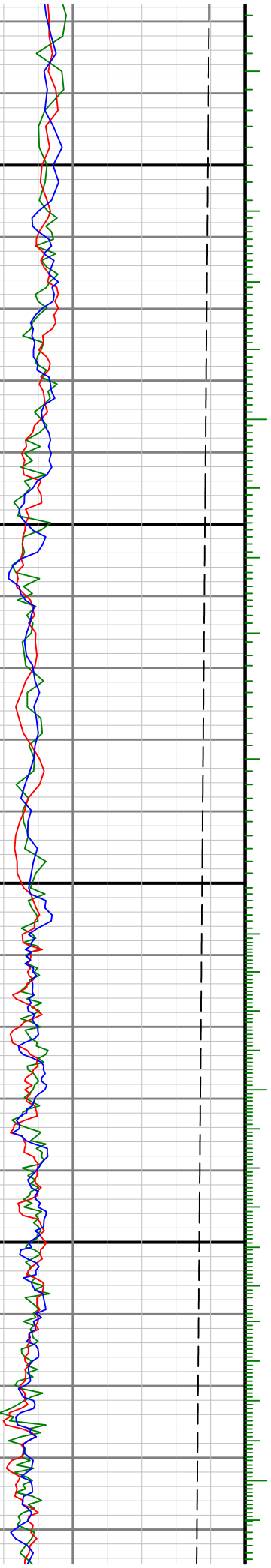


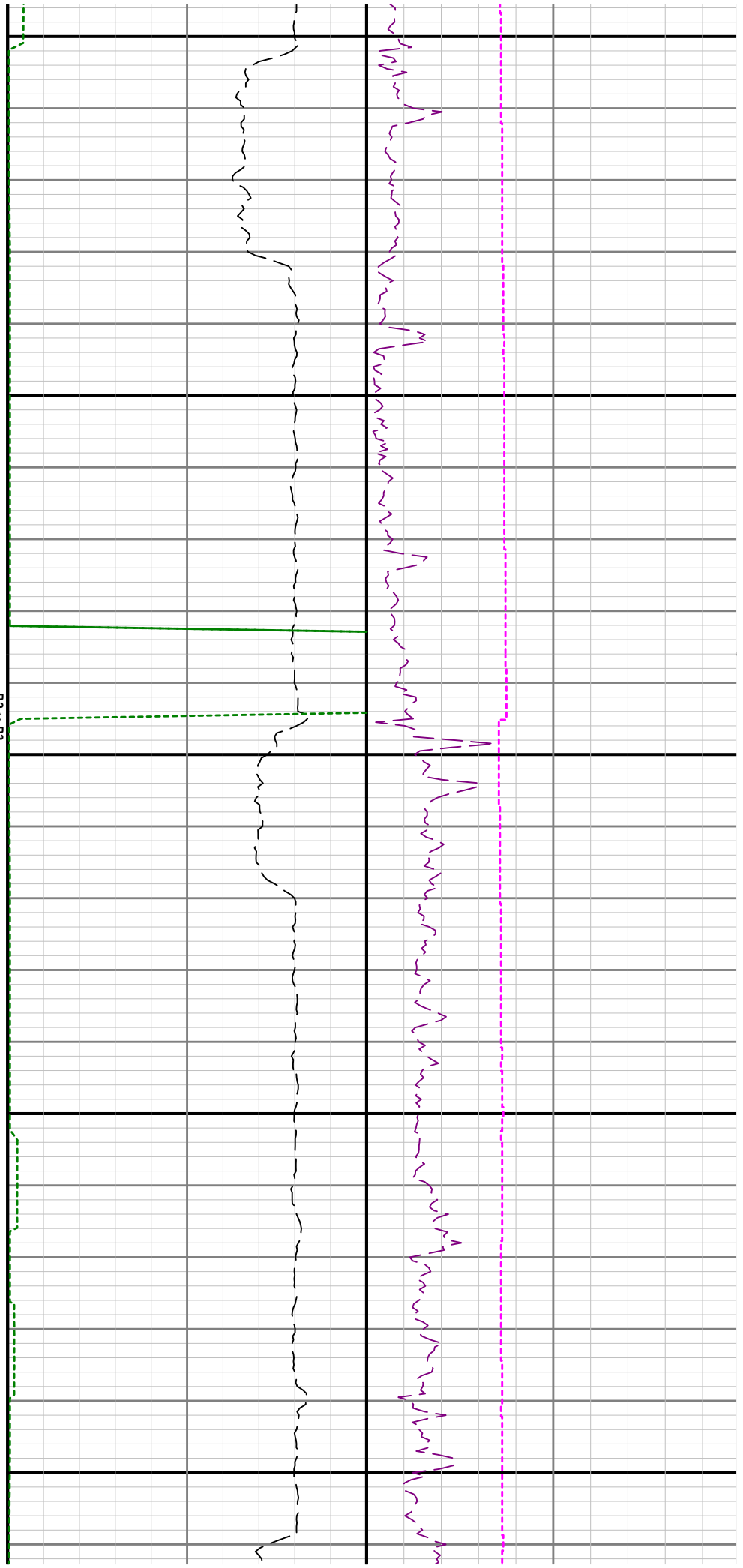




2200

2300

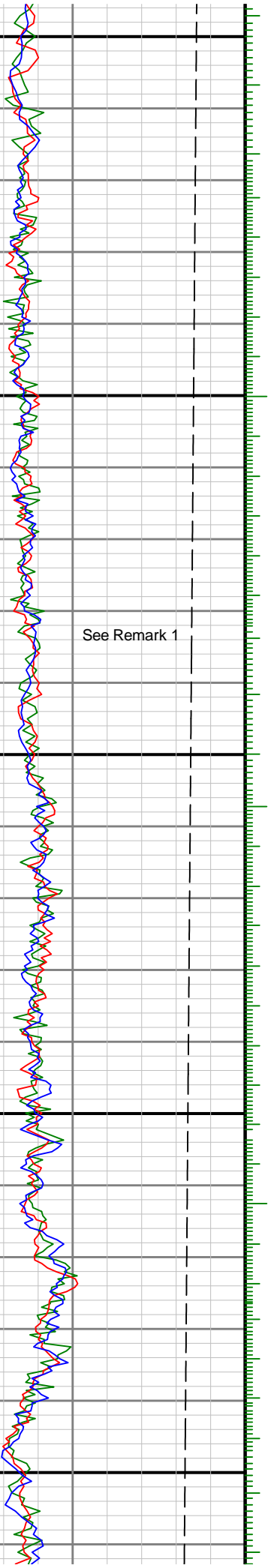


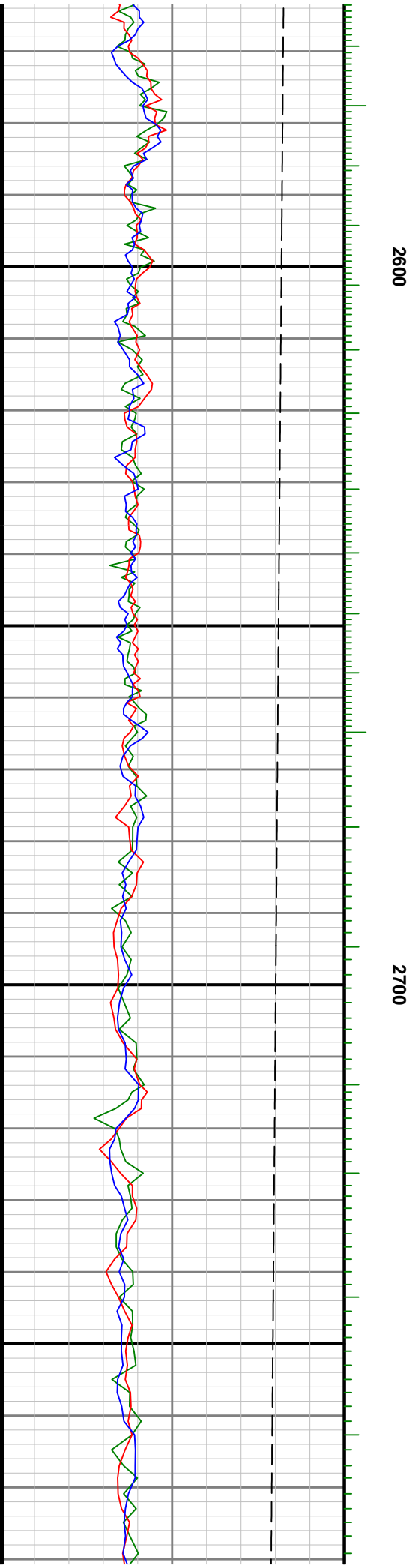
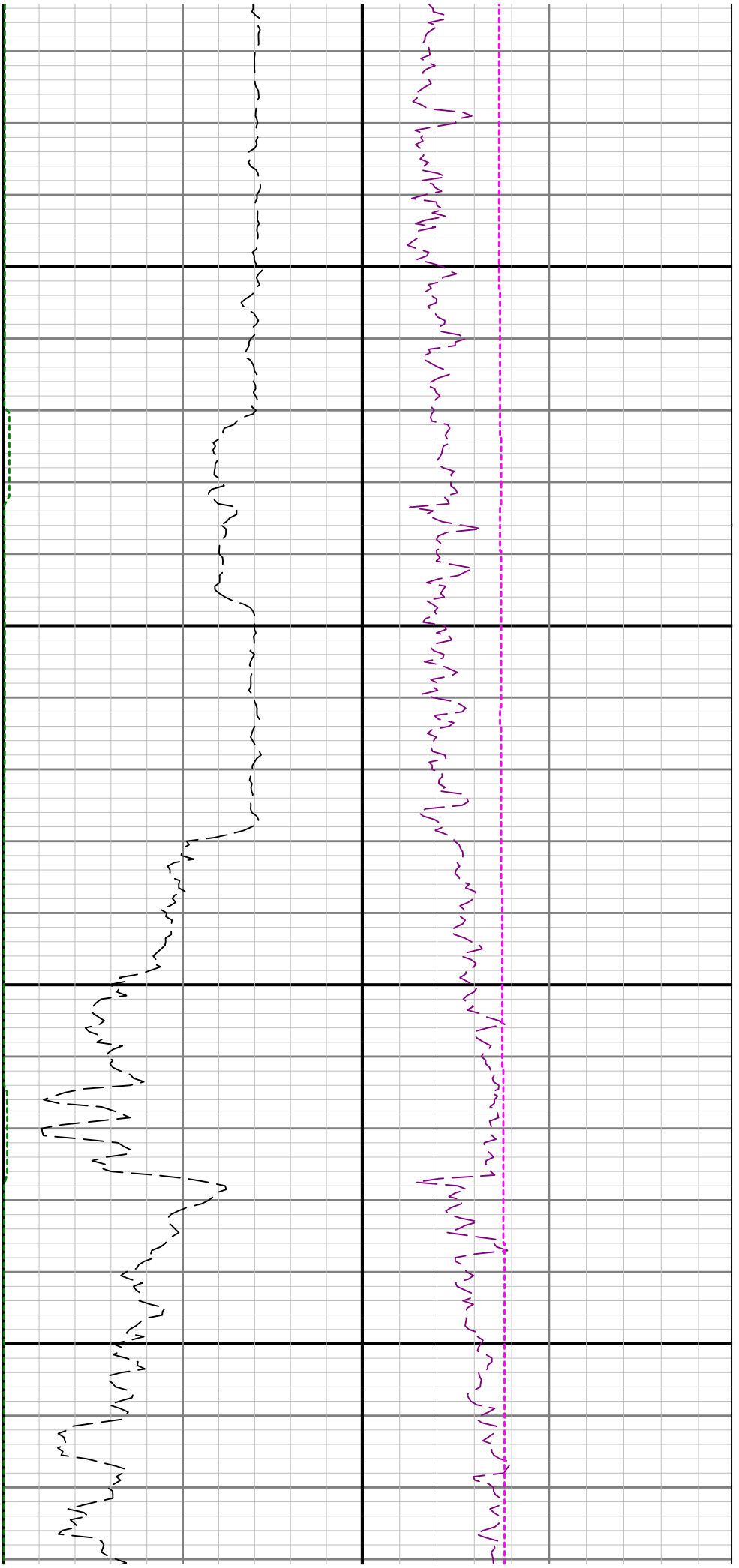


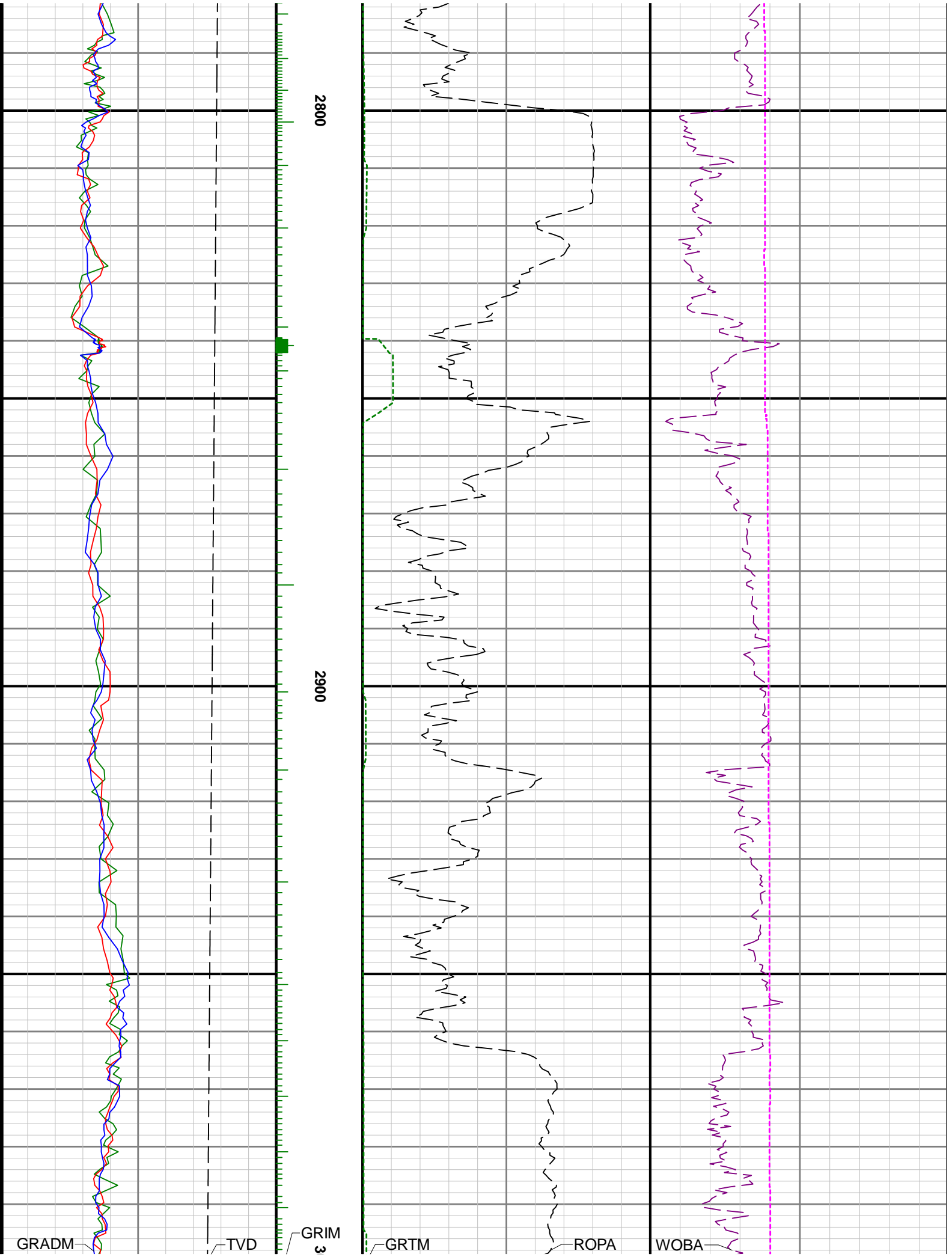
2400

2500

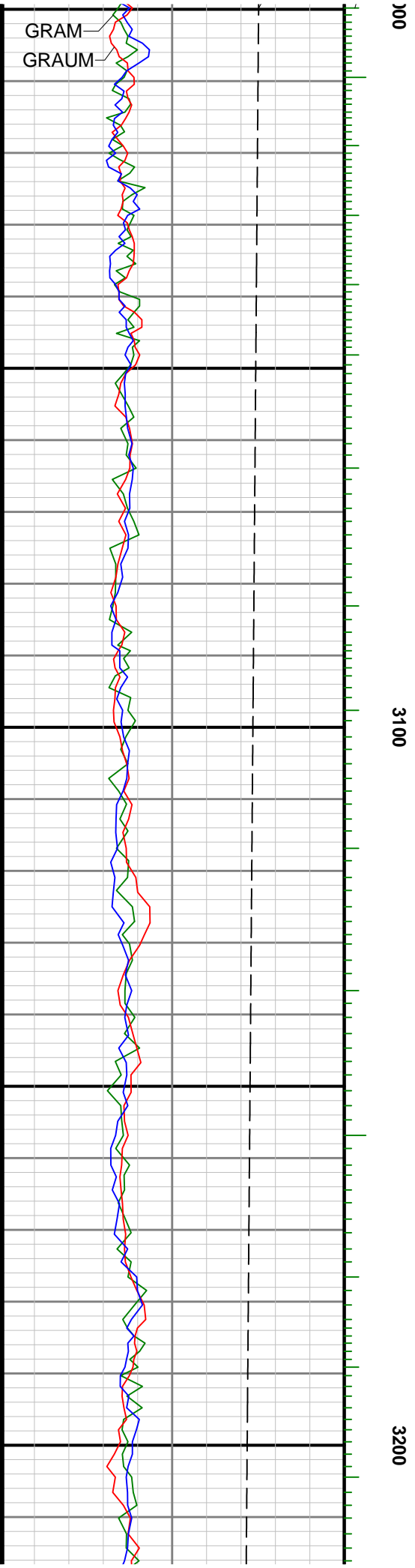
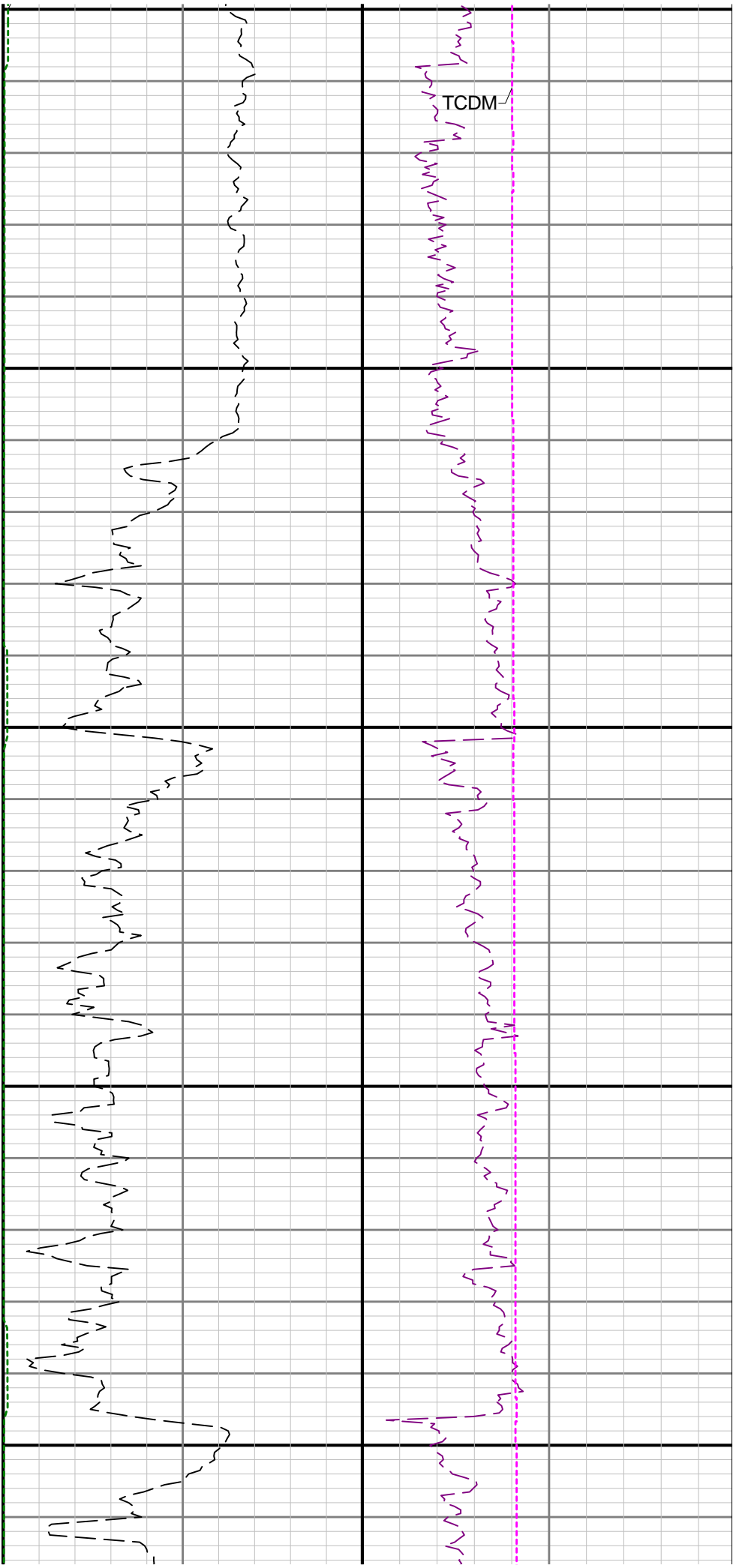
See Remark 1

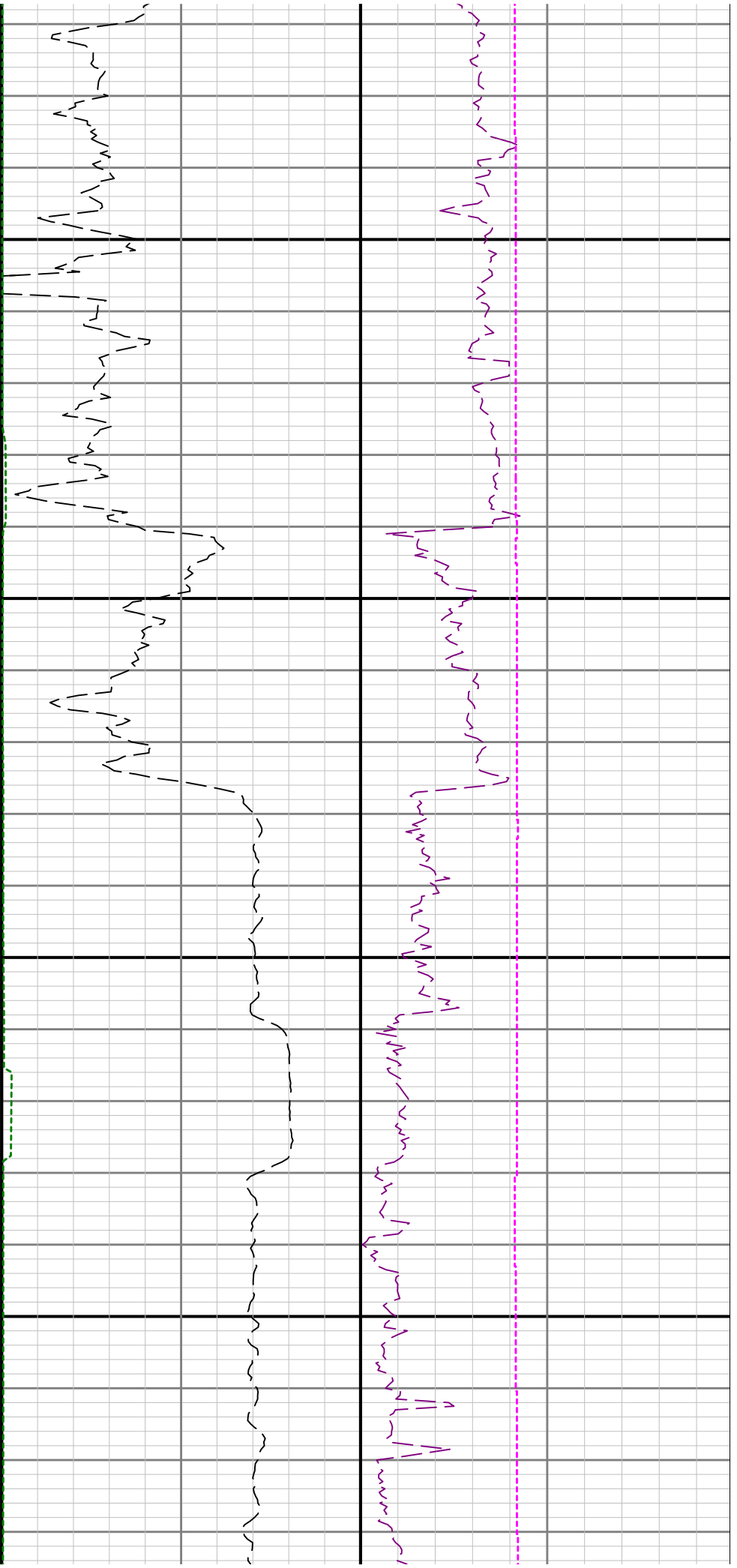






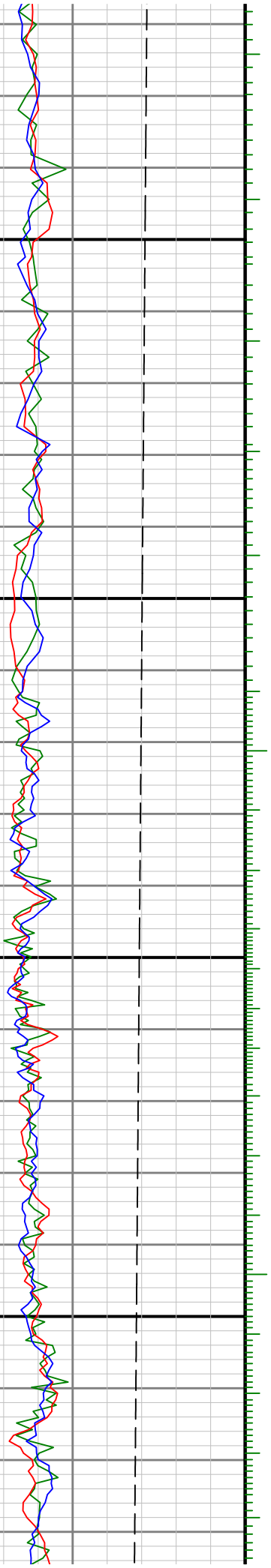


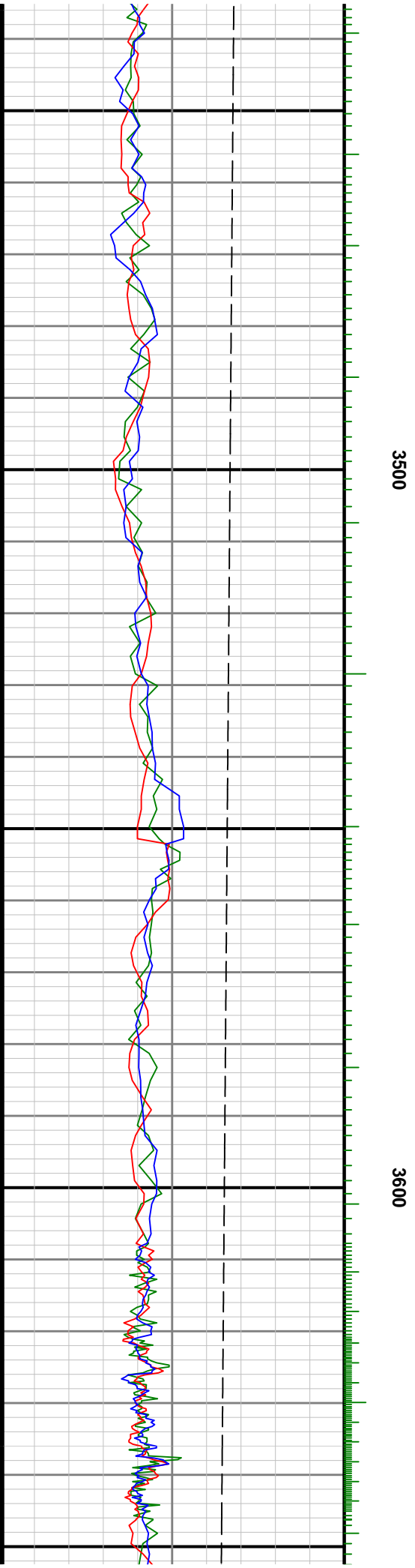
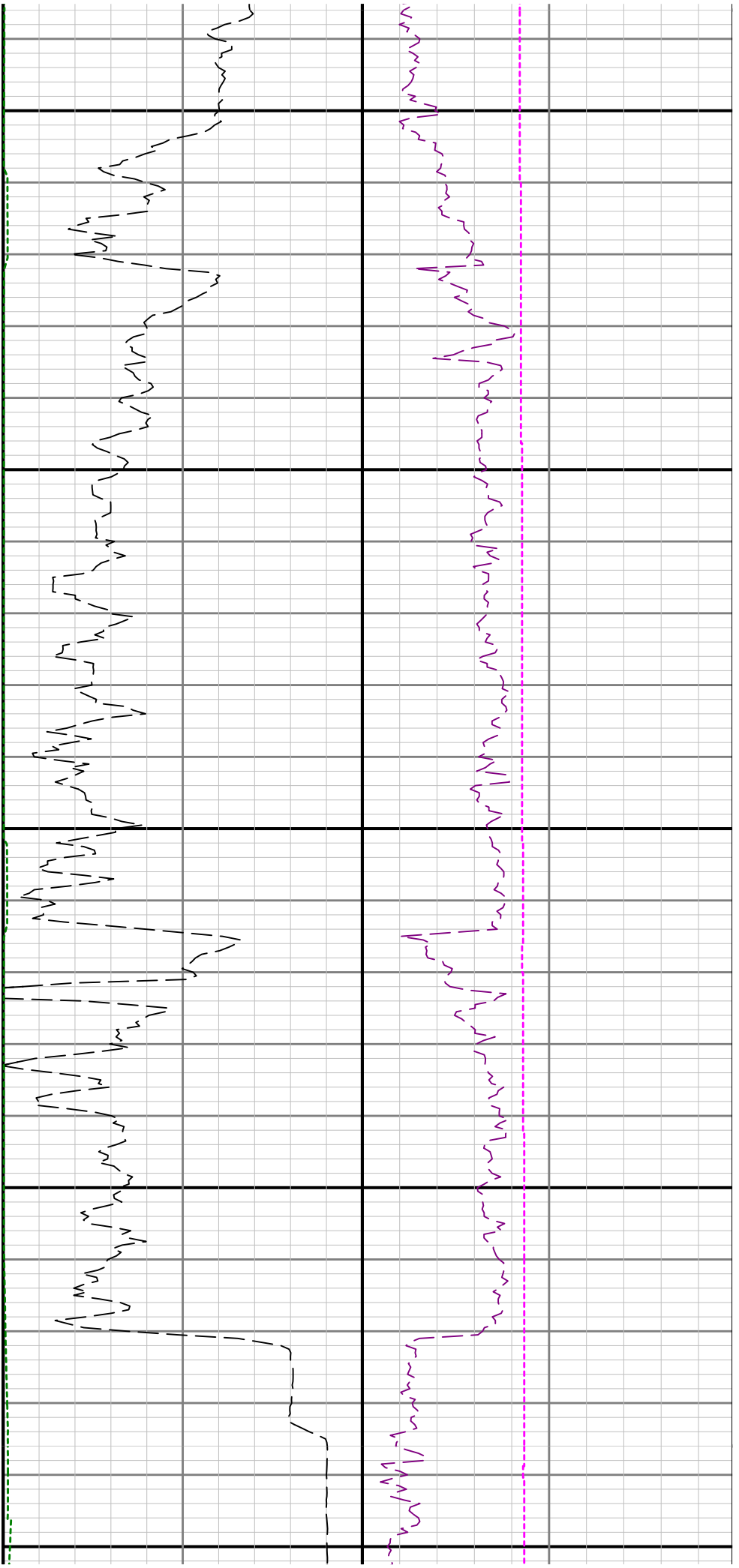


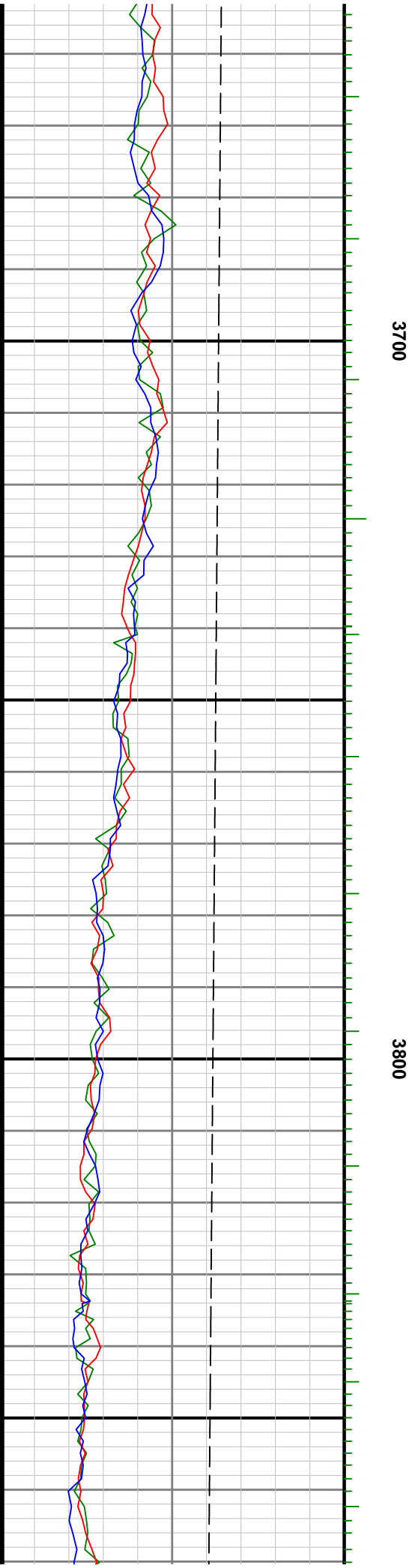
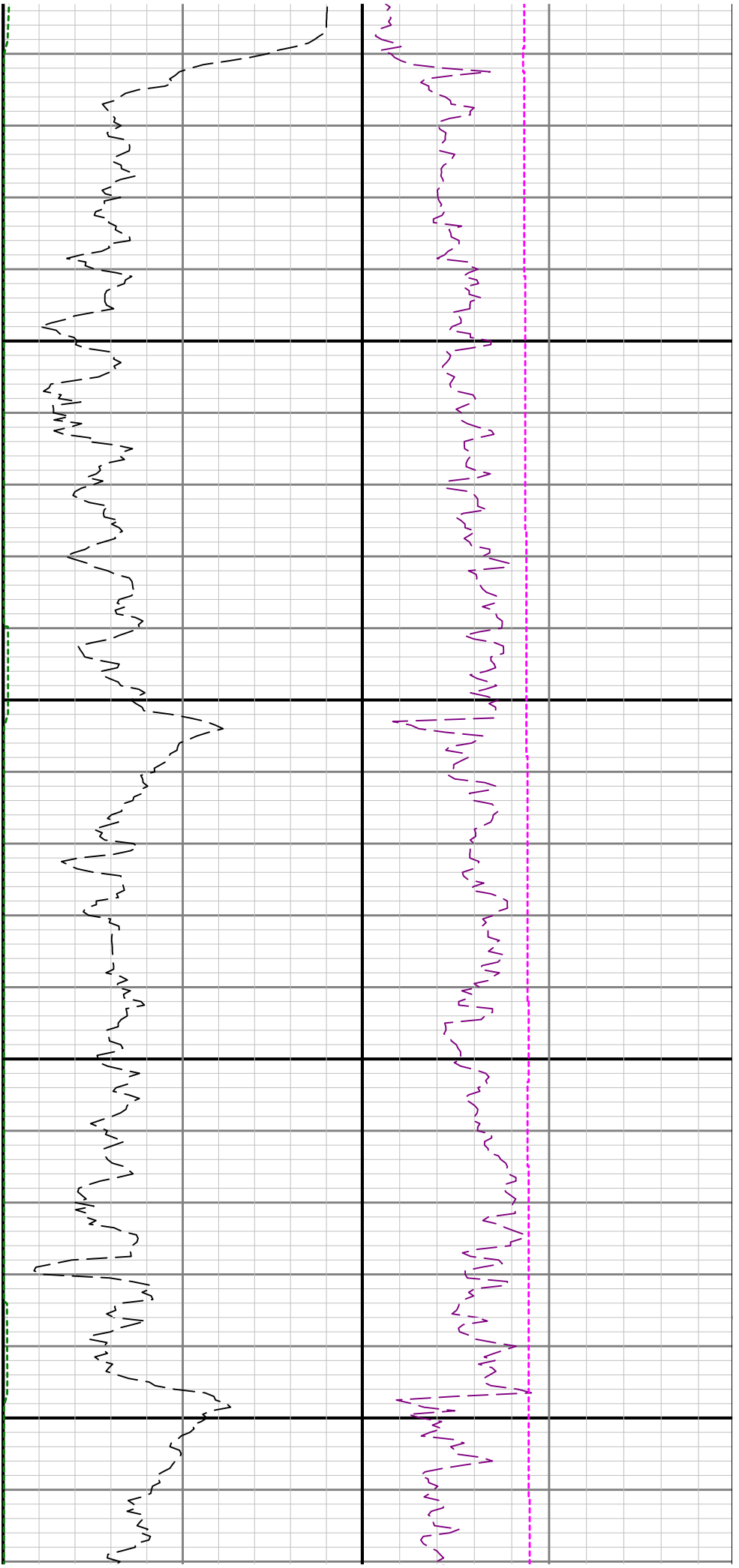


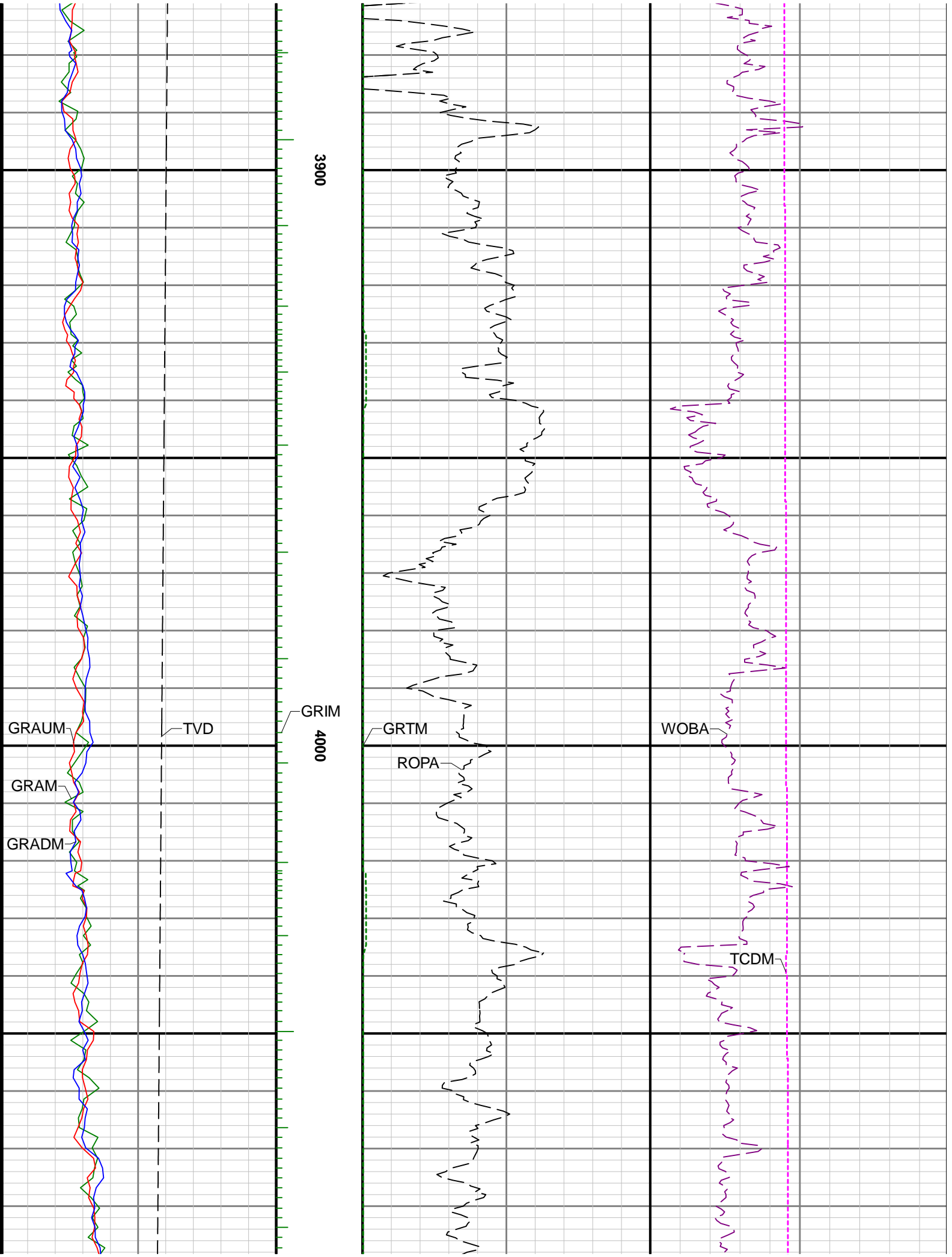
3300

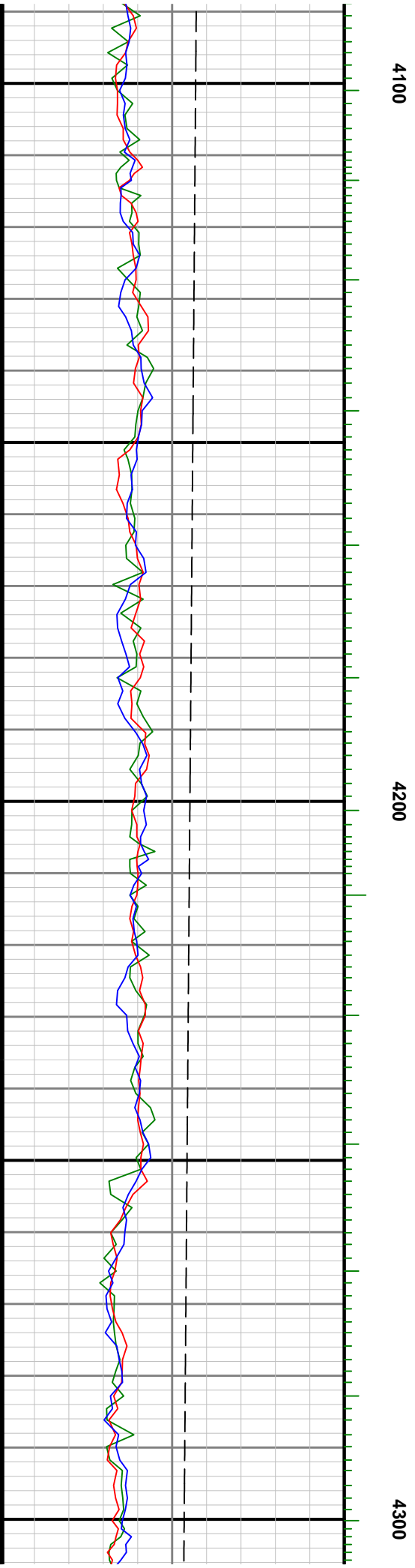
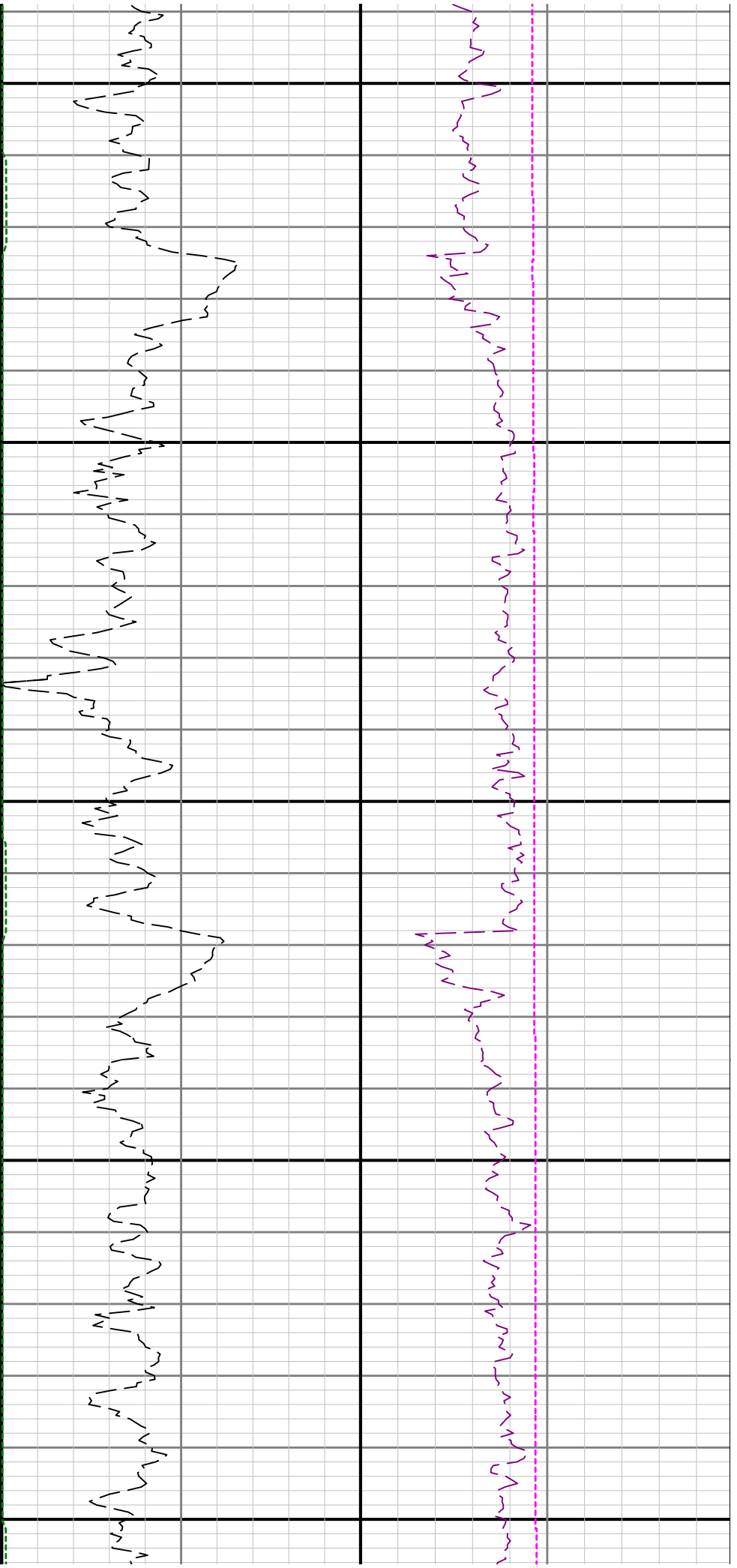
3400

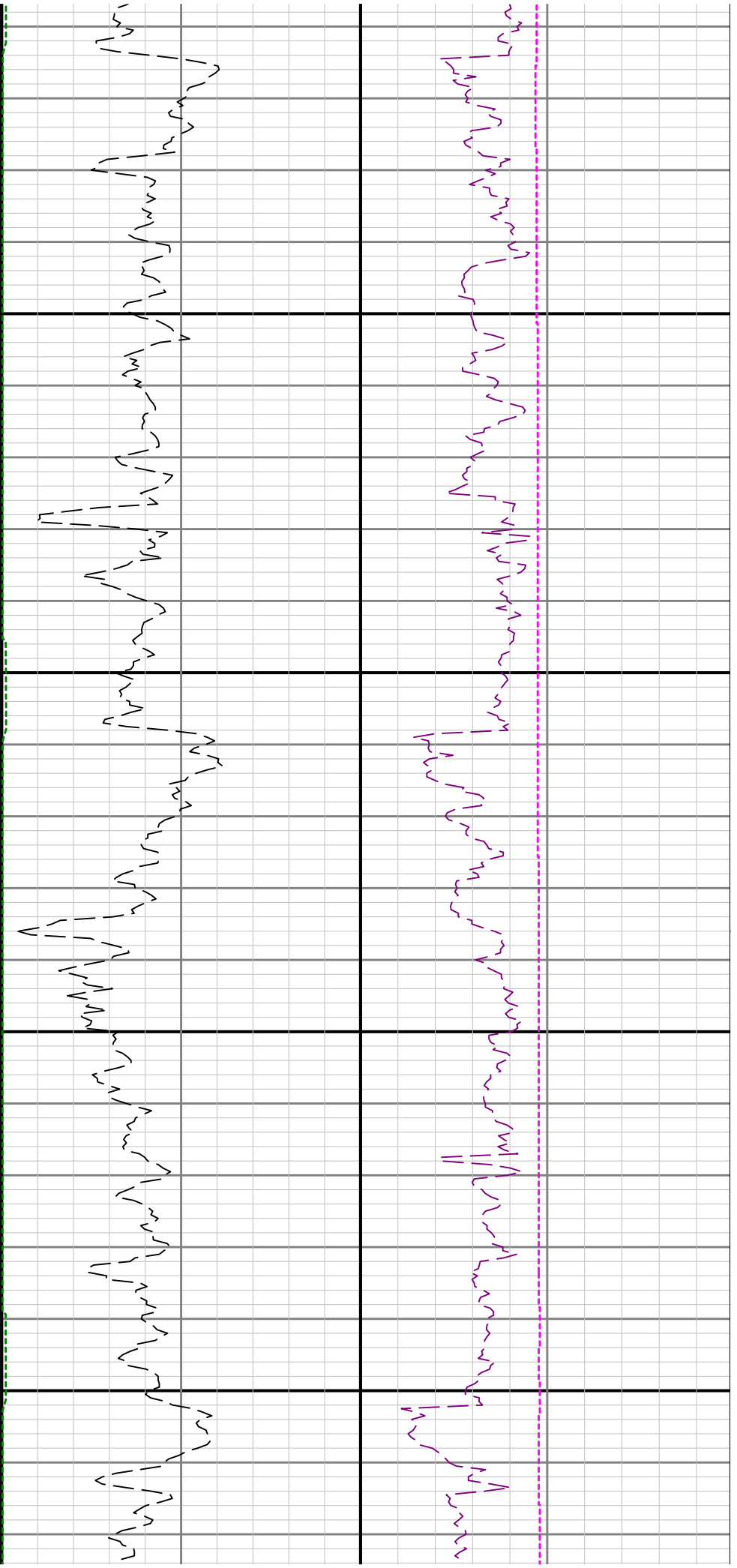






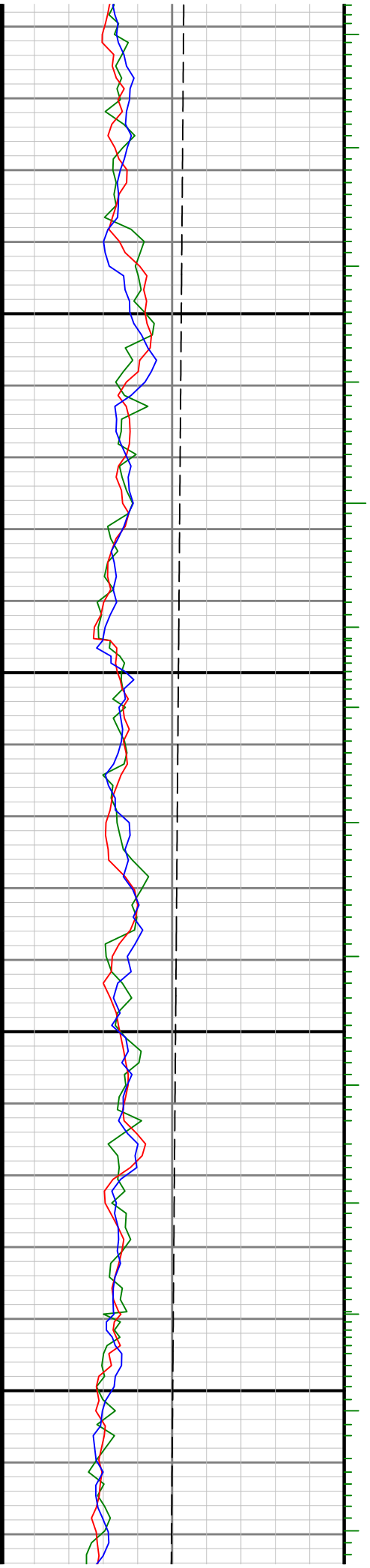


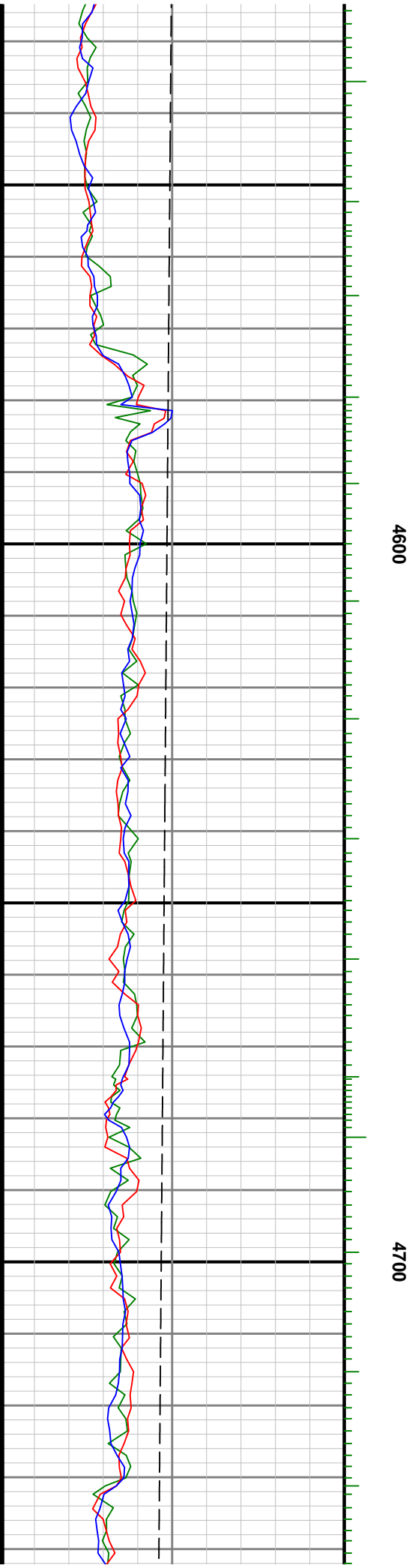
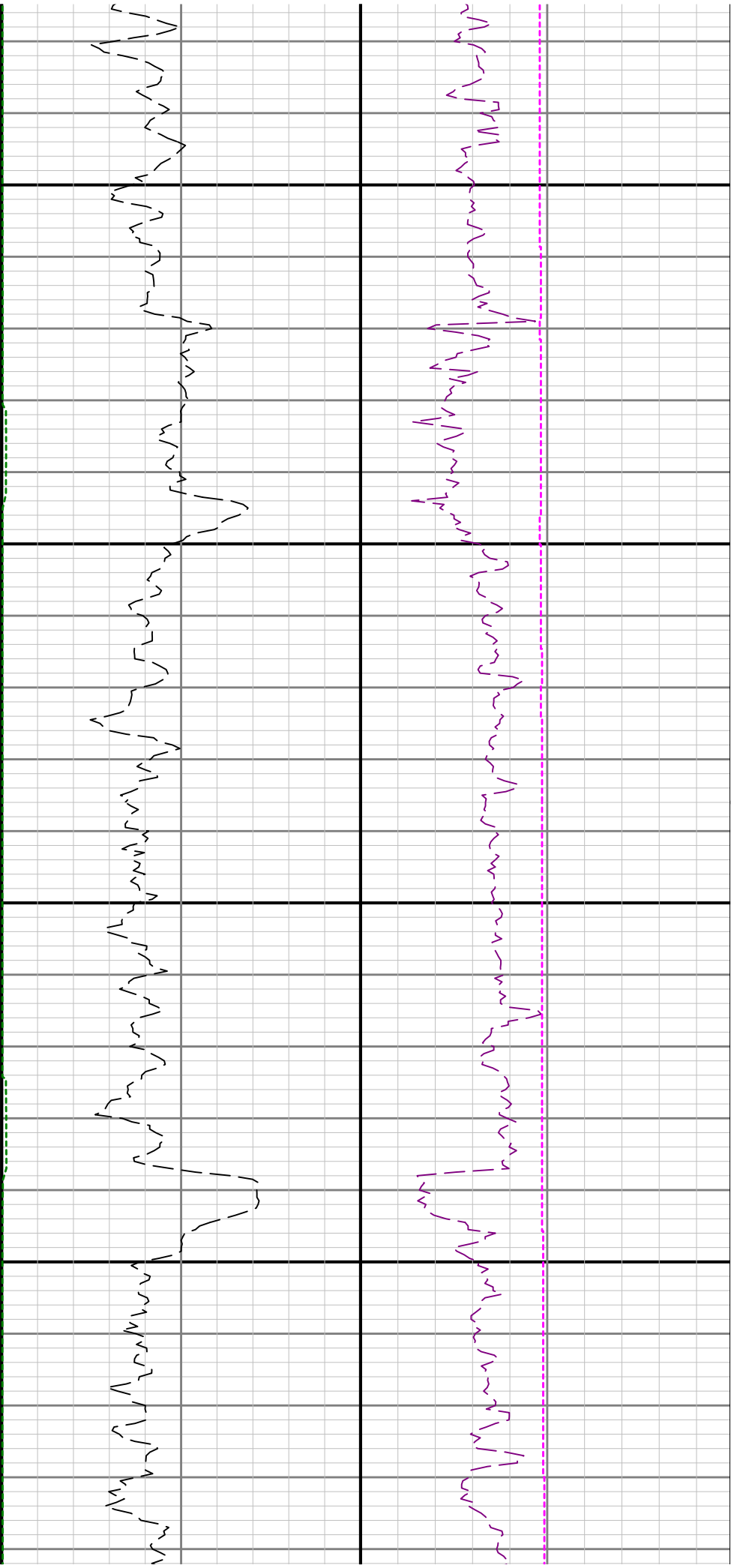




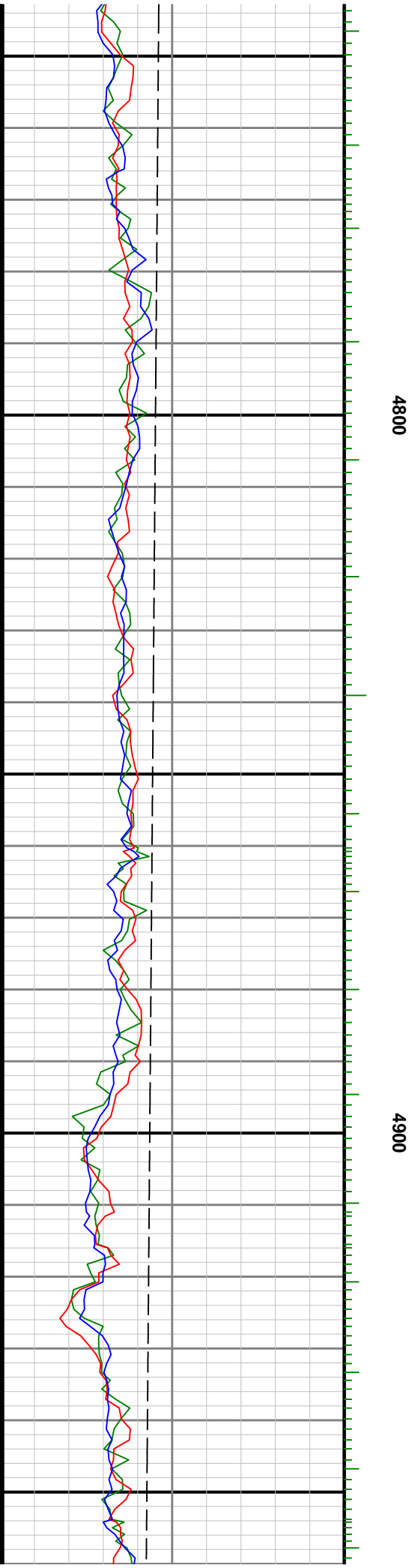
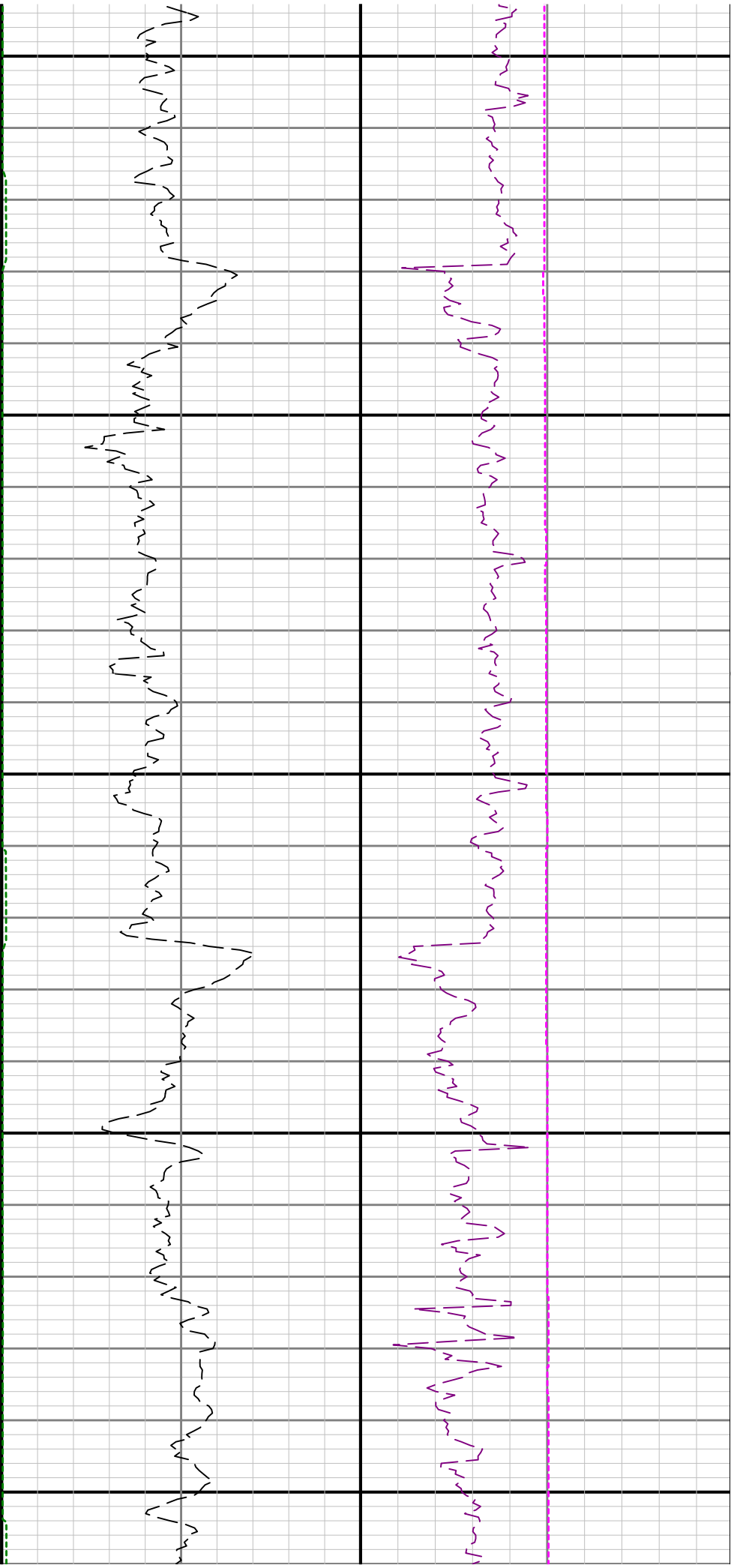
4400

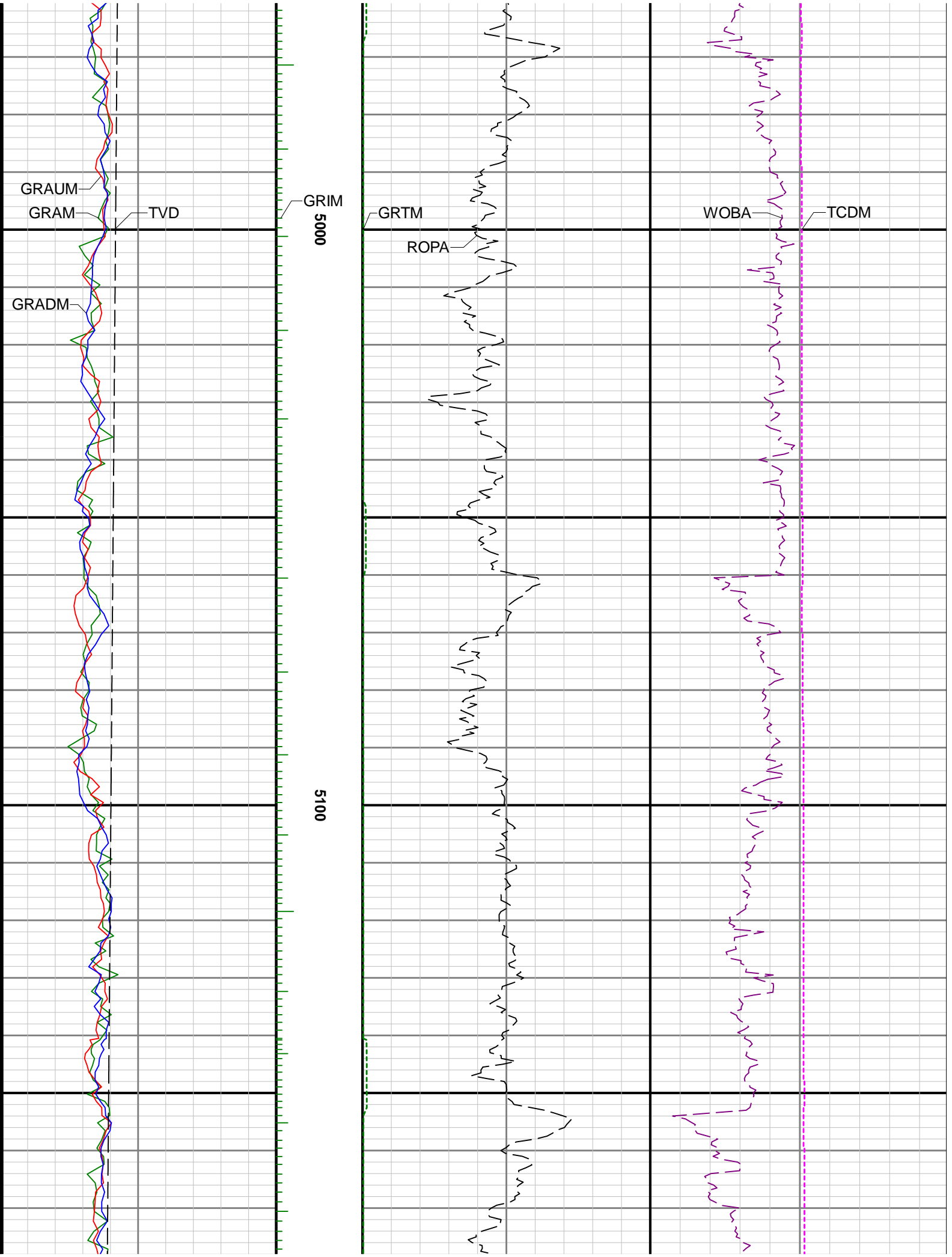
4500



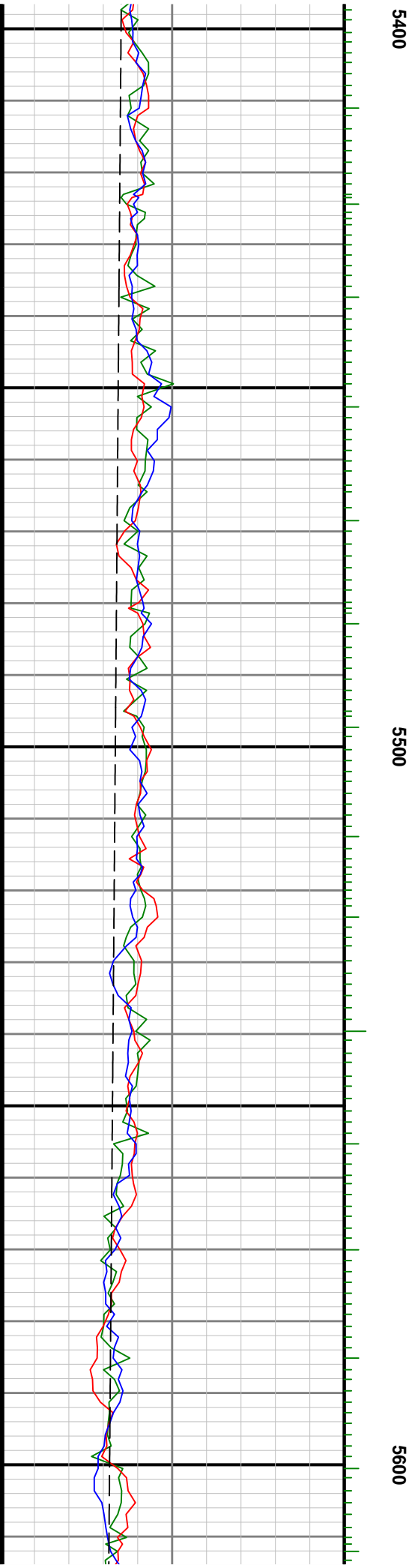
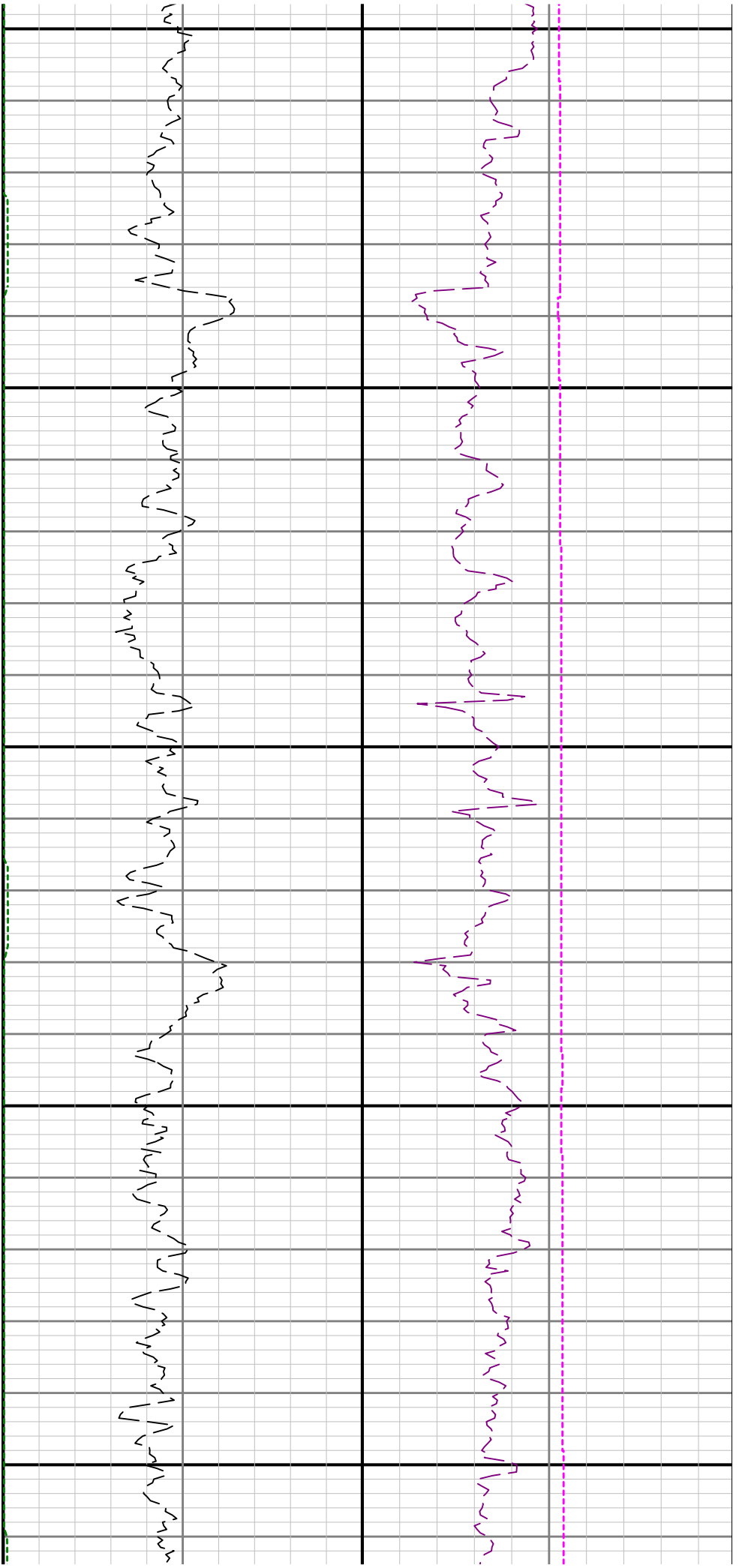


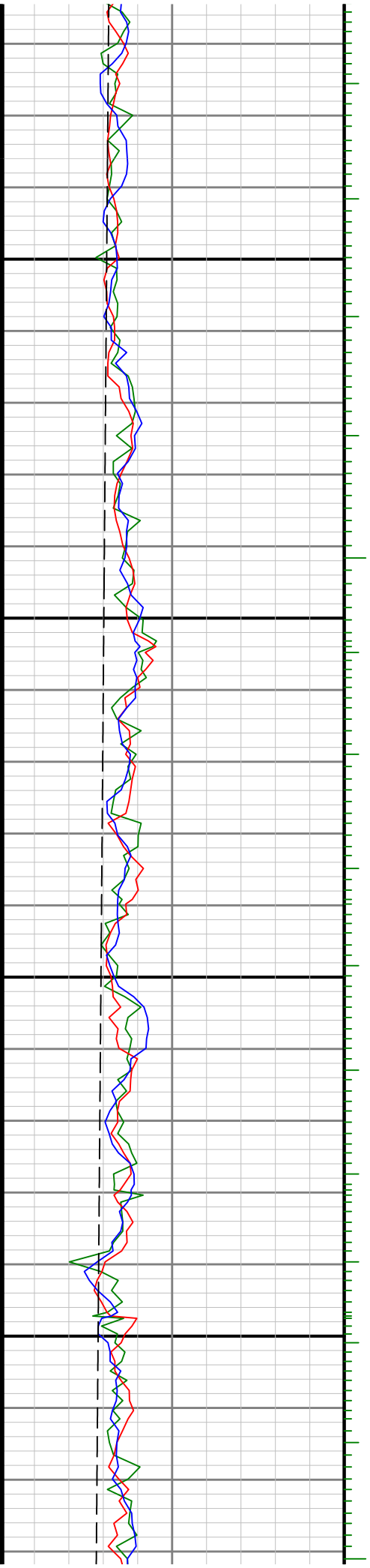
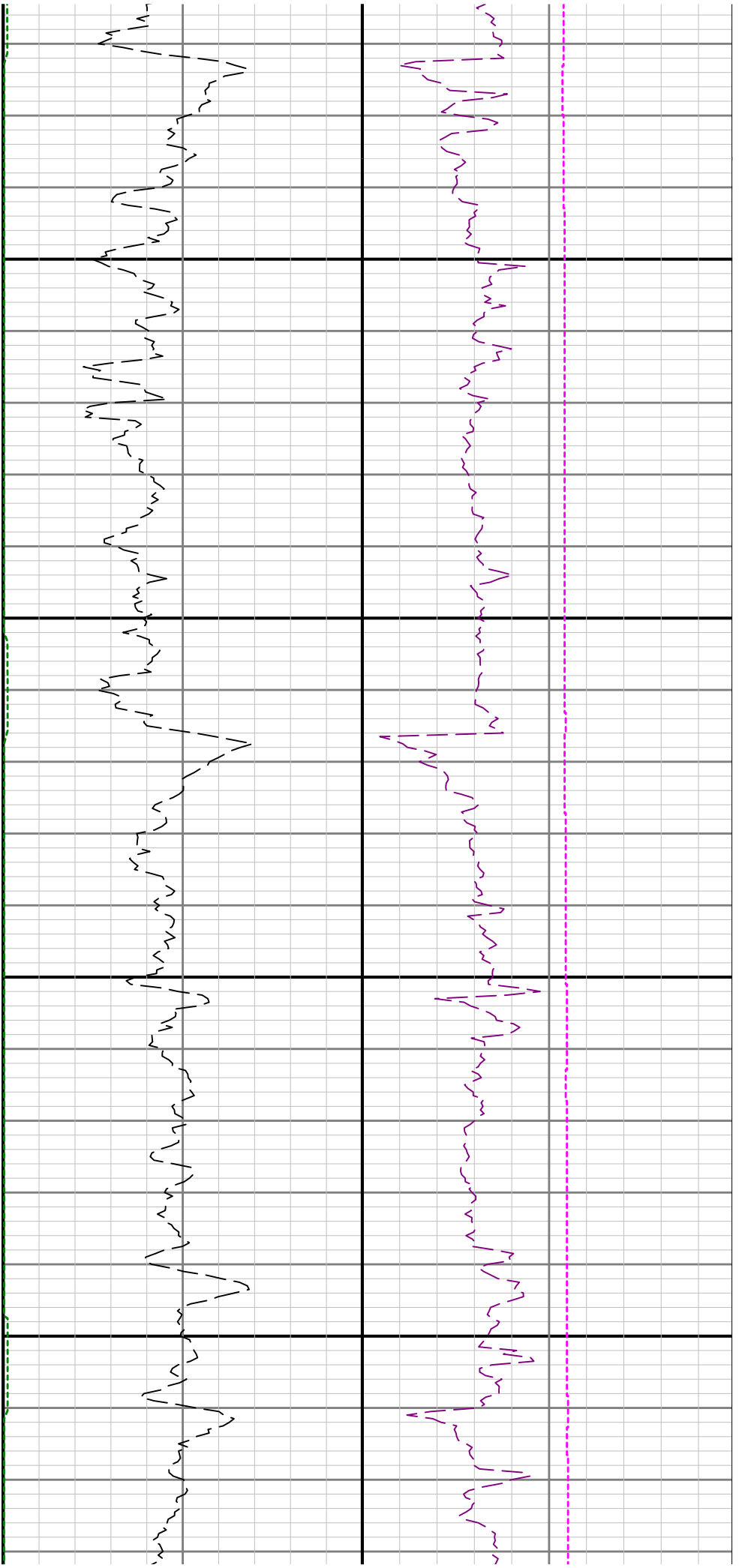


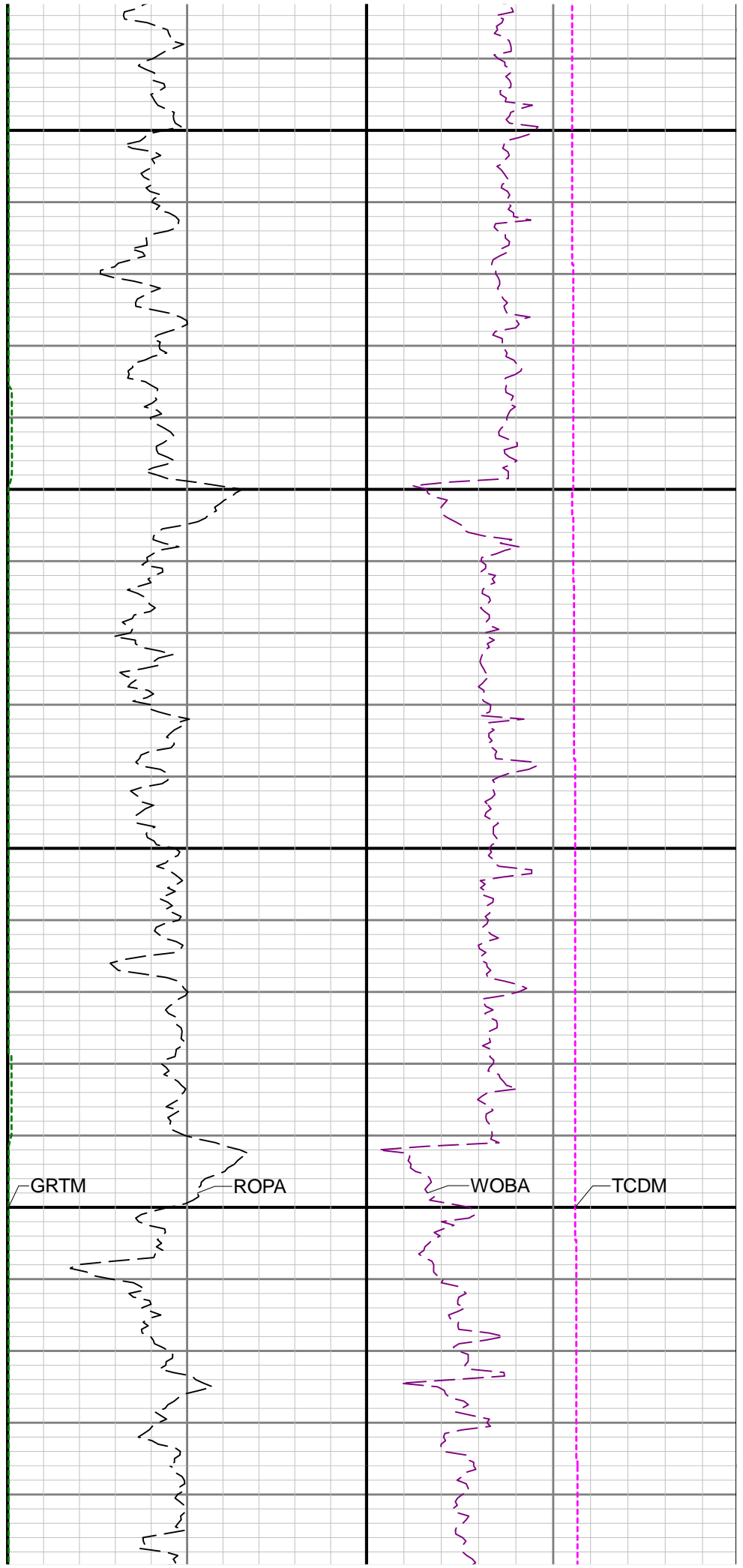
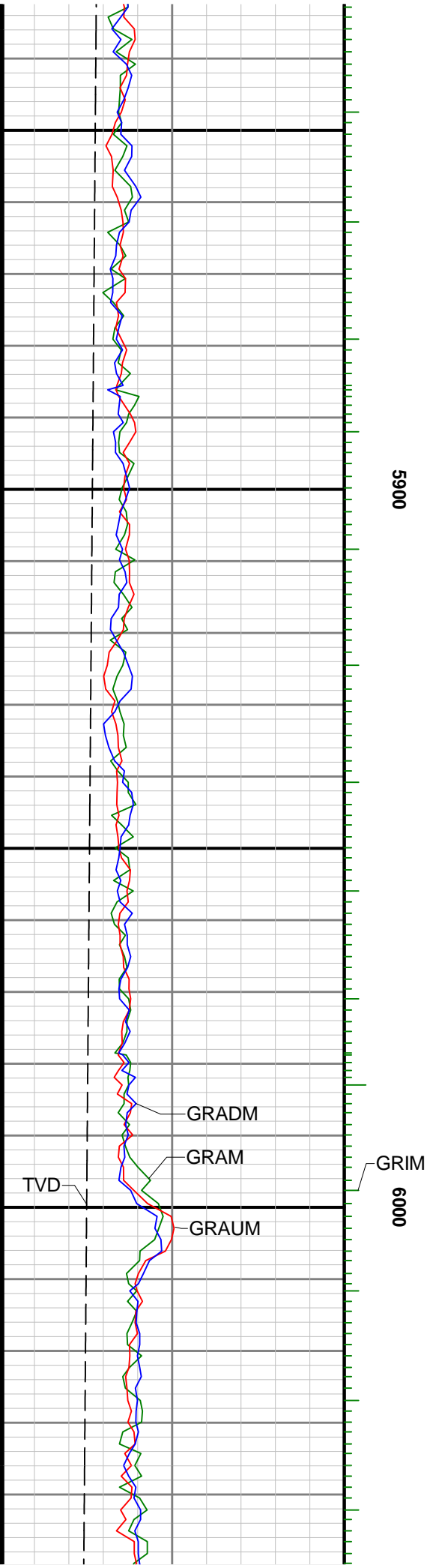


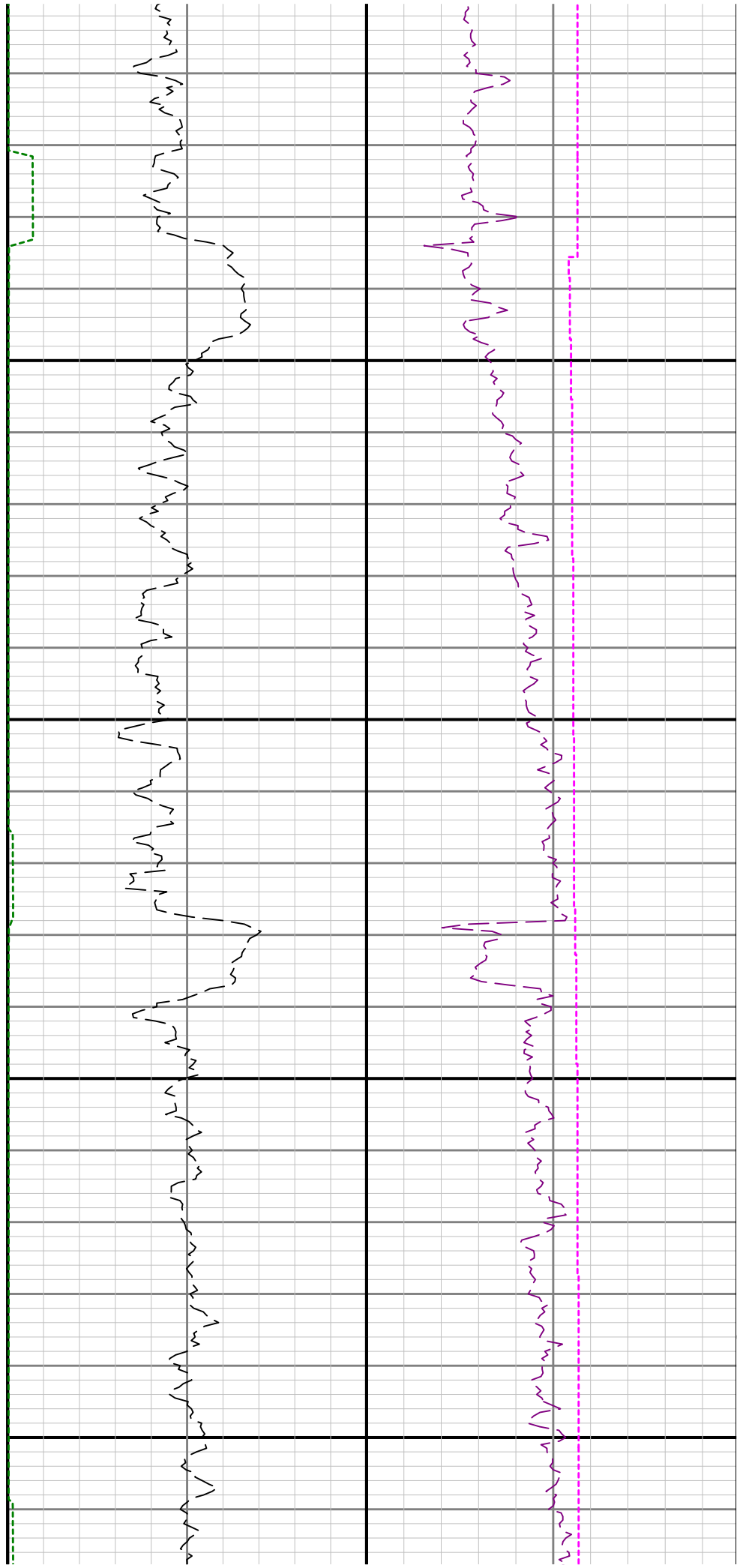






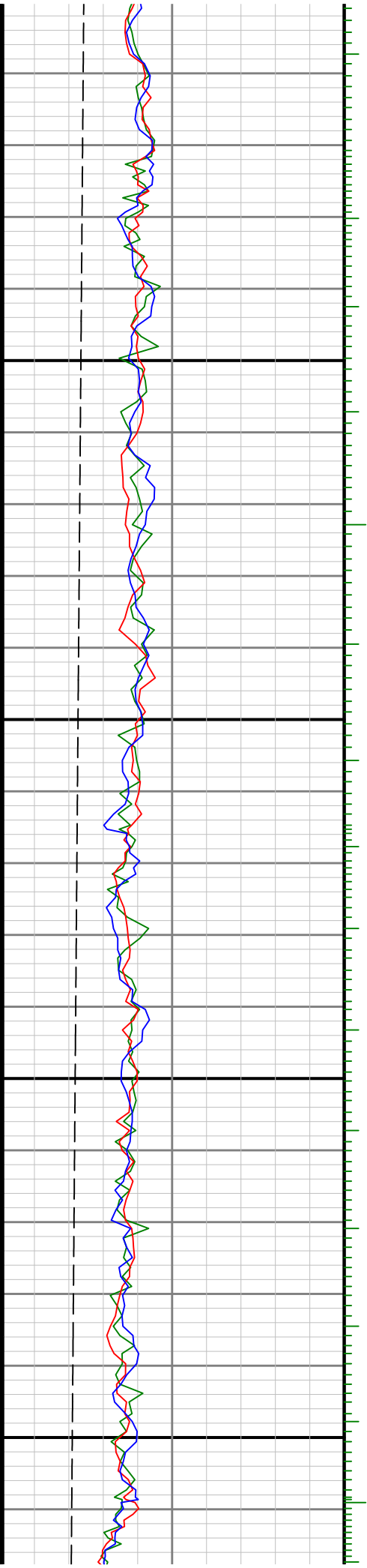


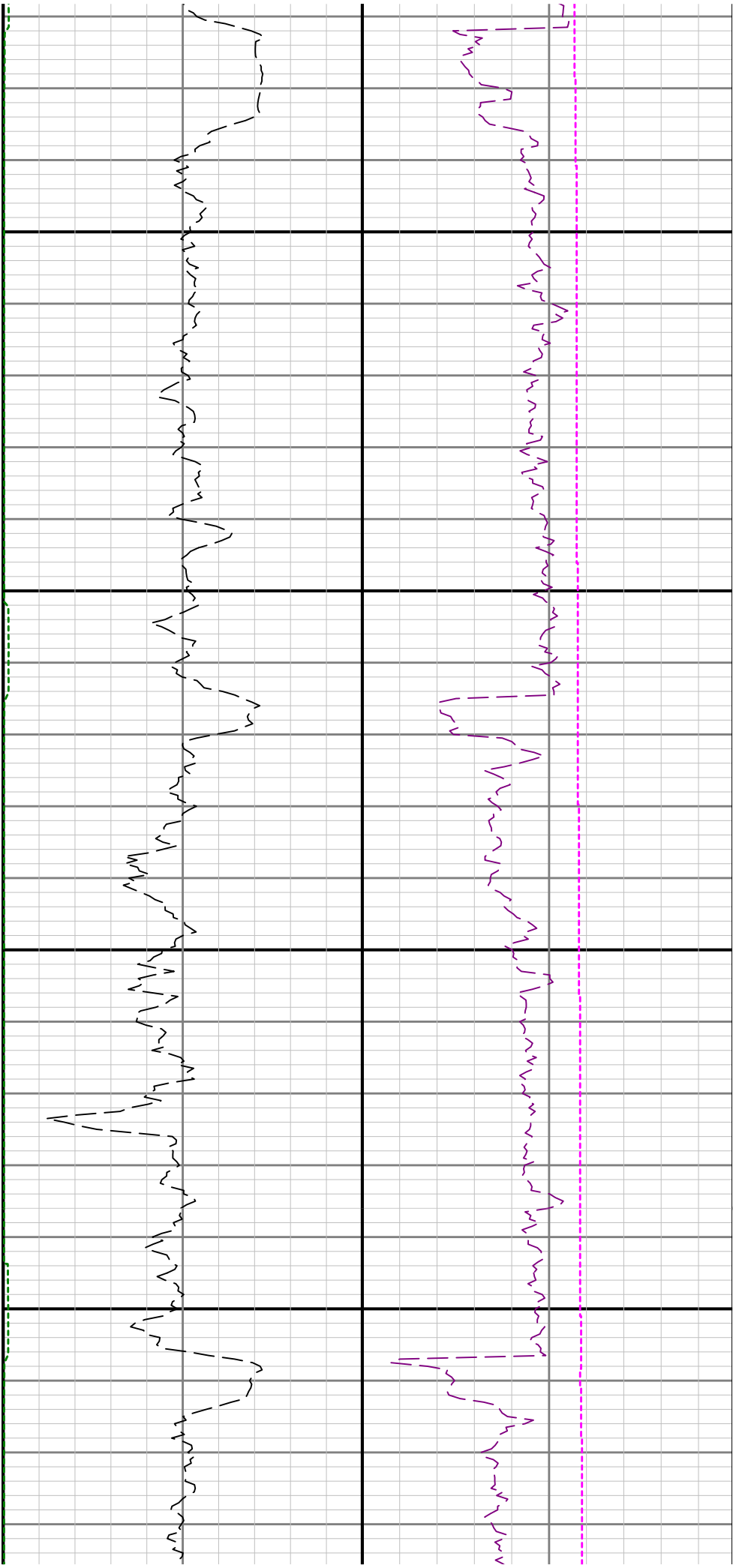




6100

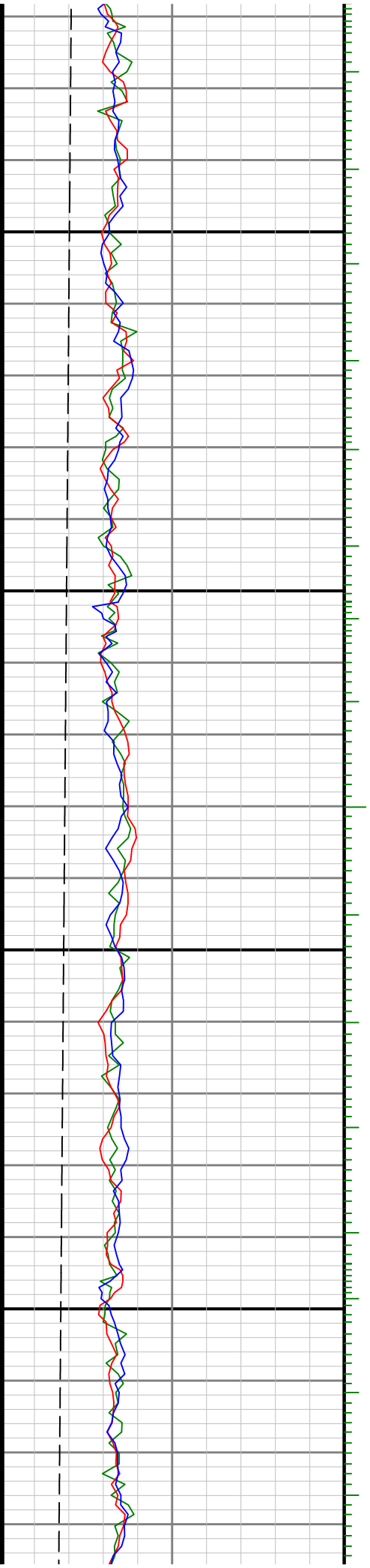
6200



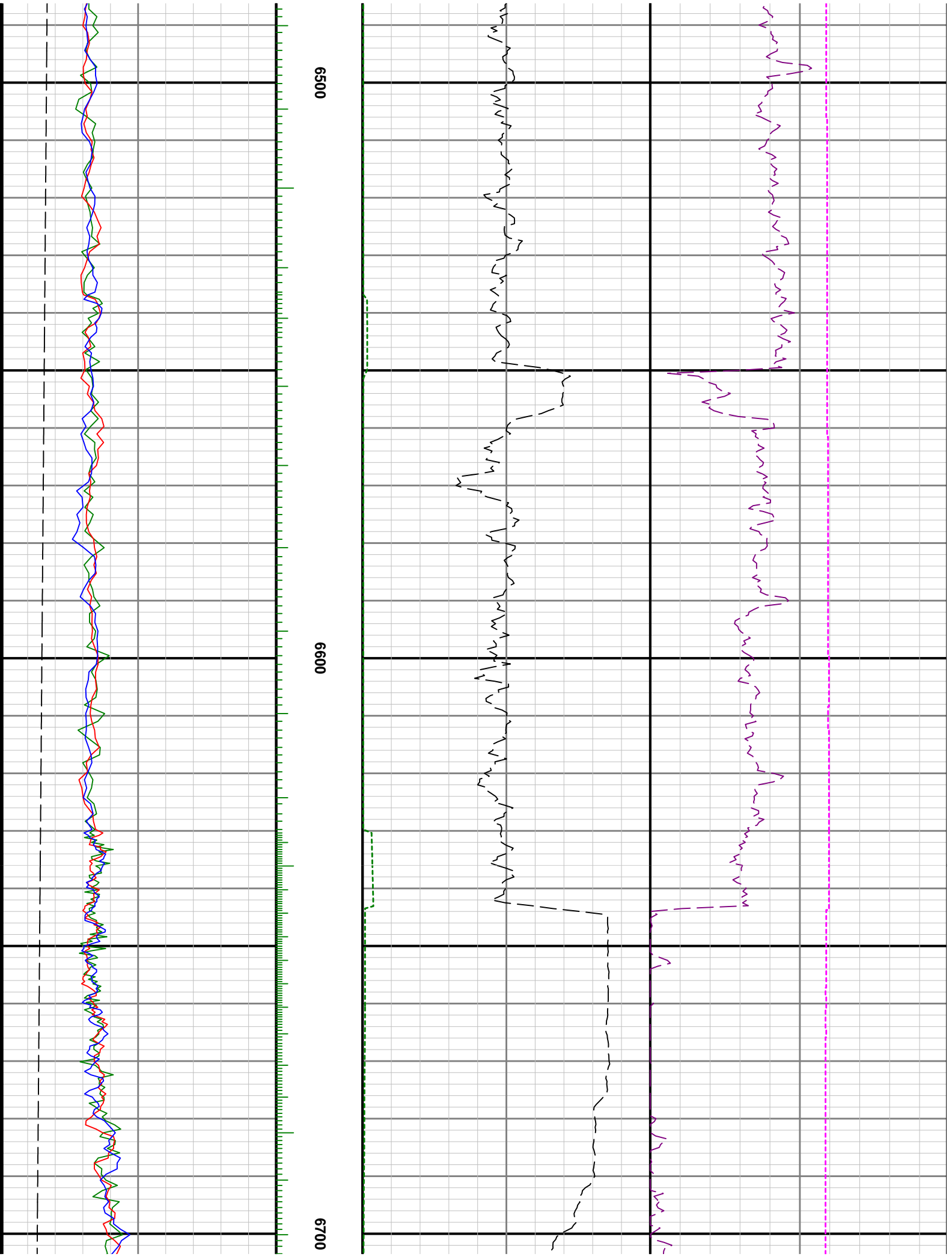


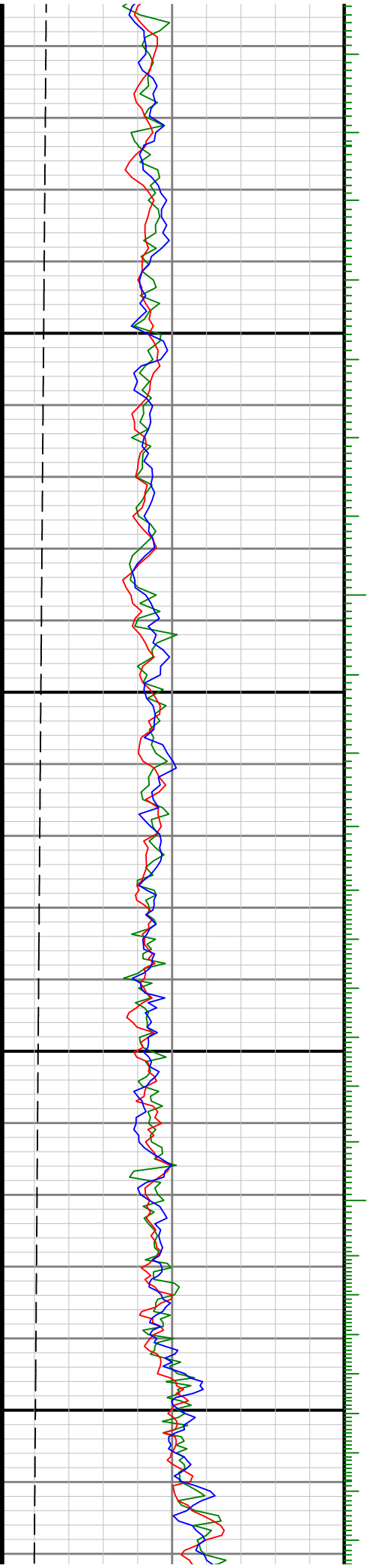
6300

6400



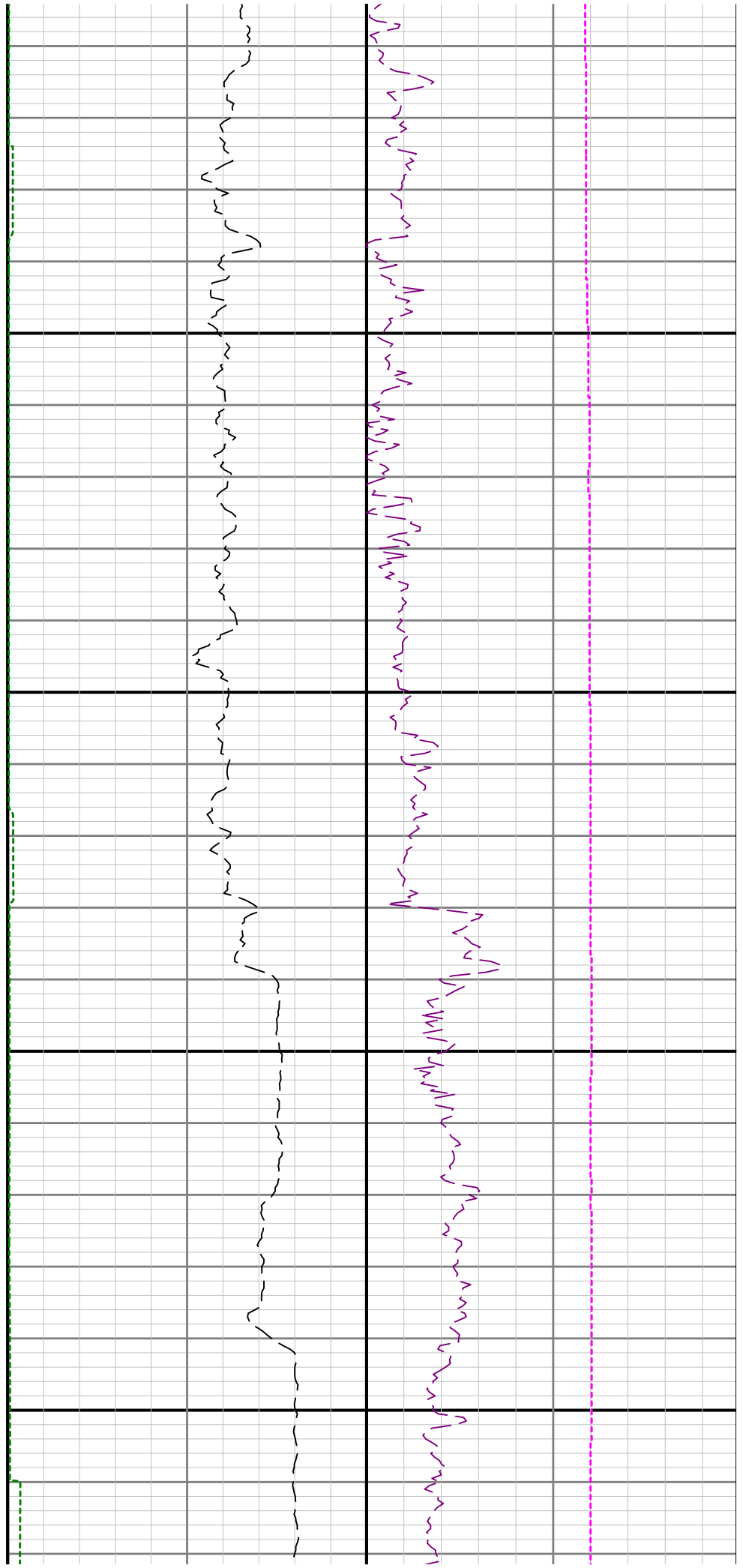


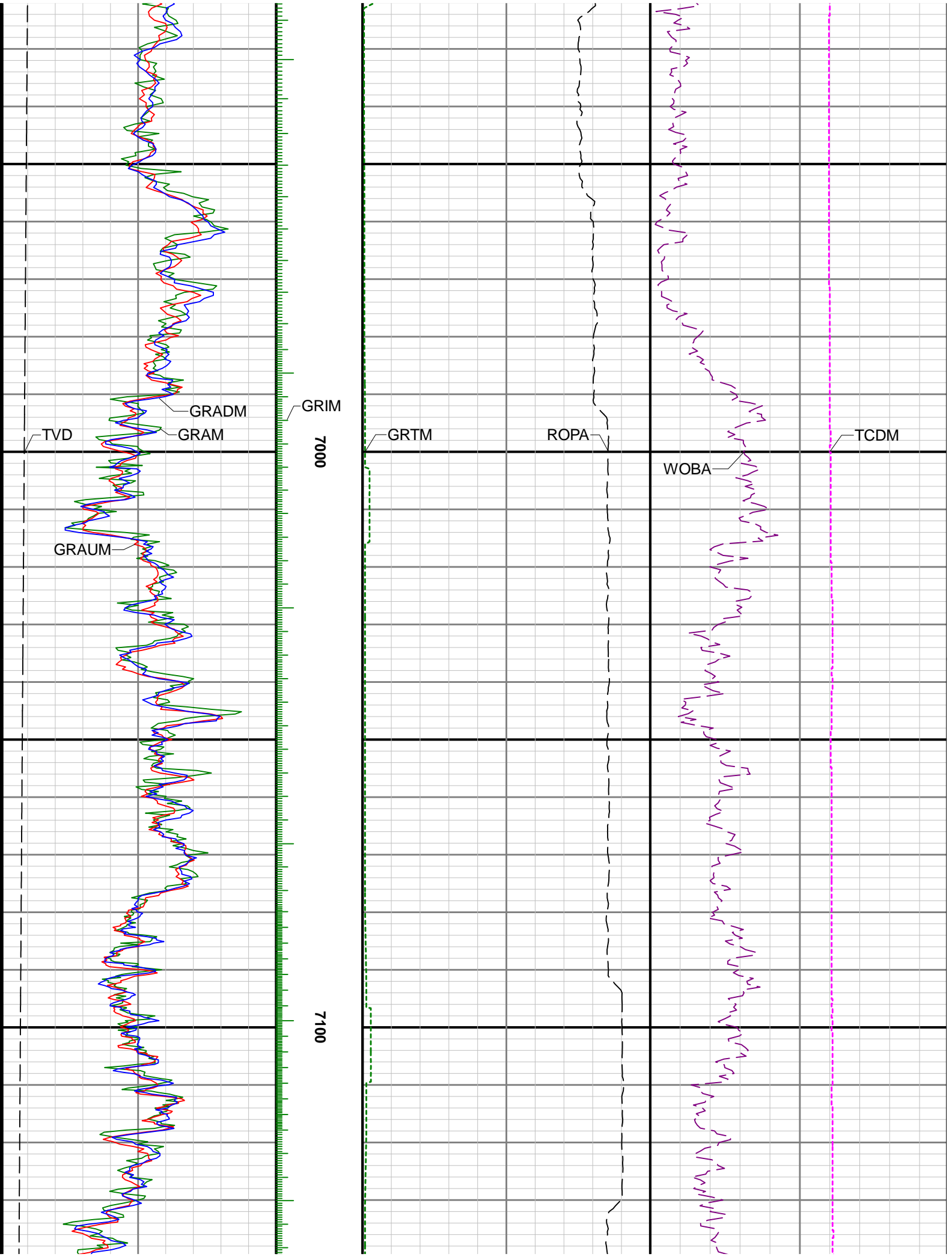


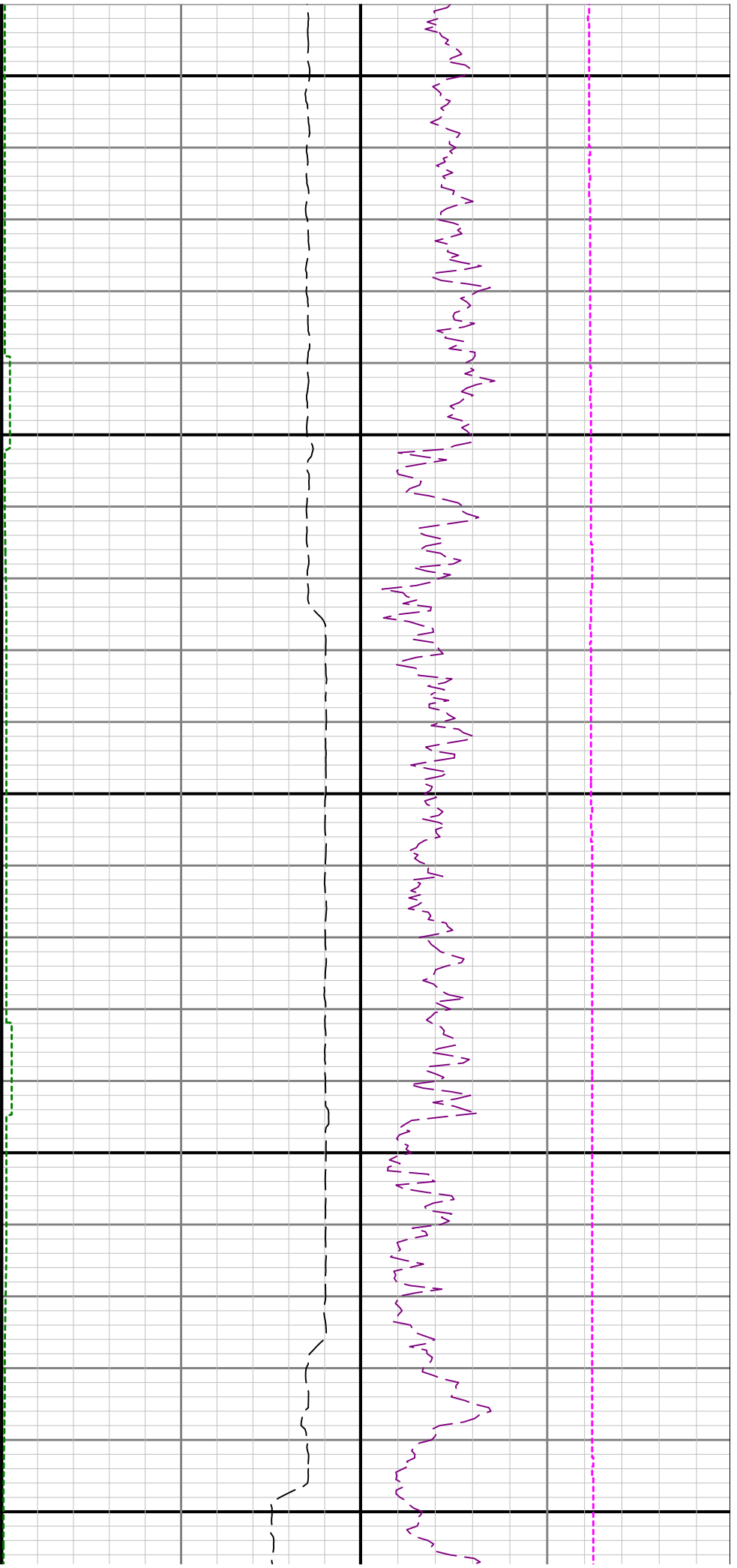


0069

0089

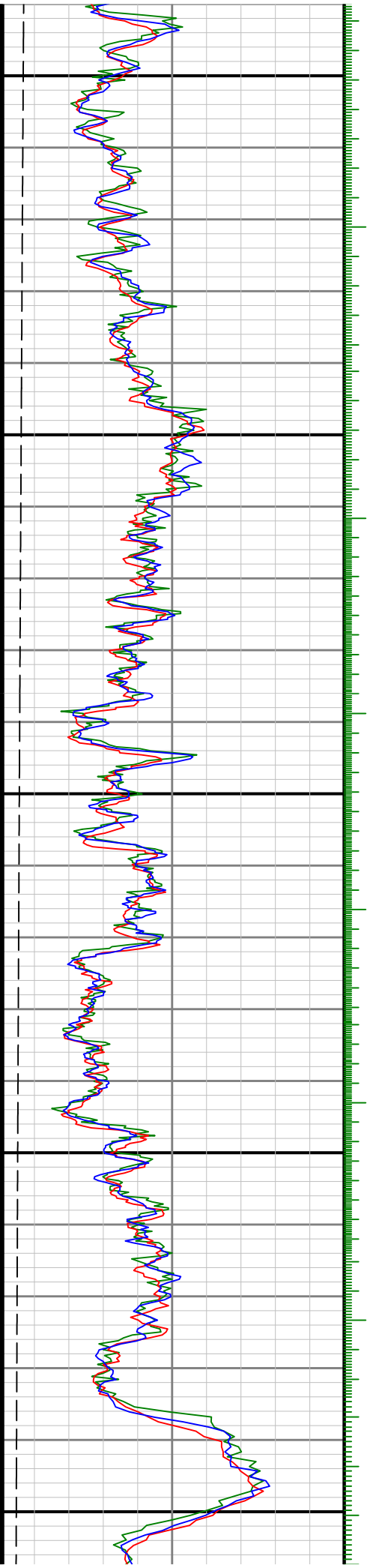


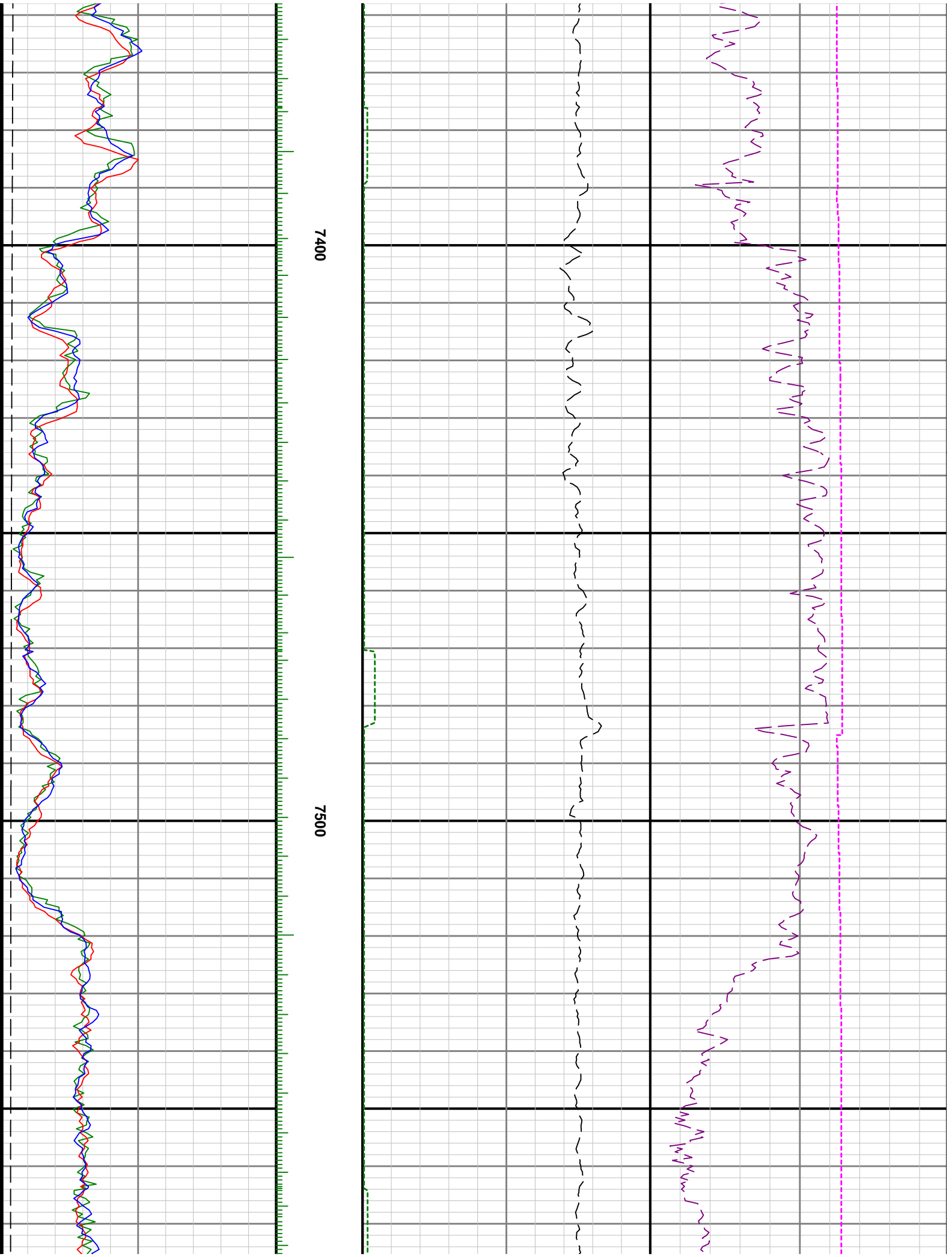


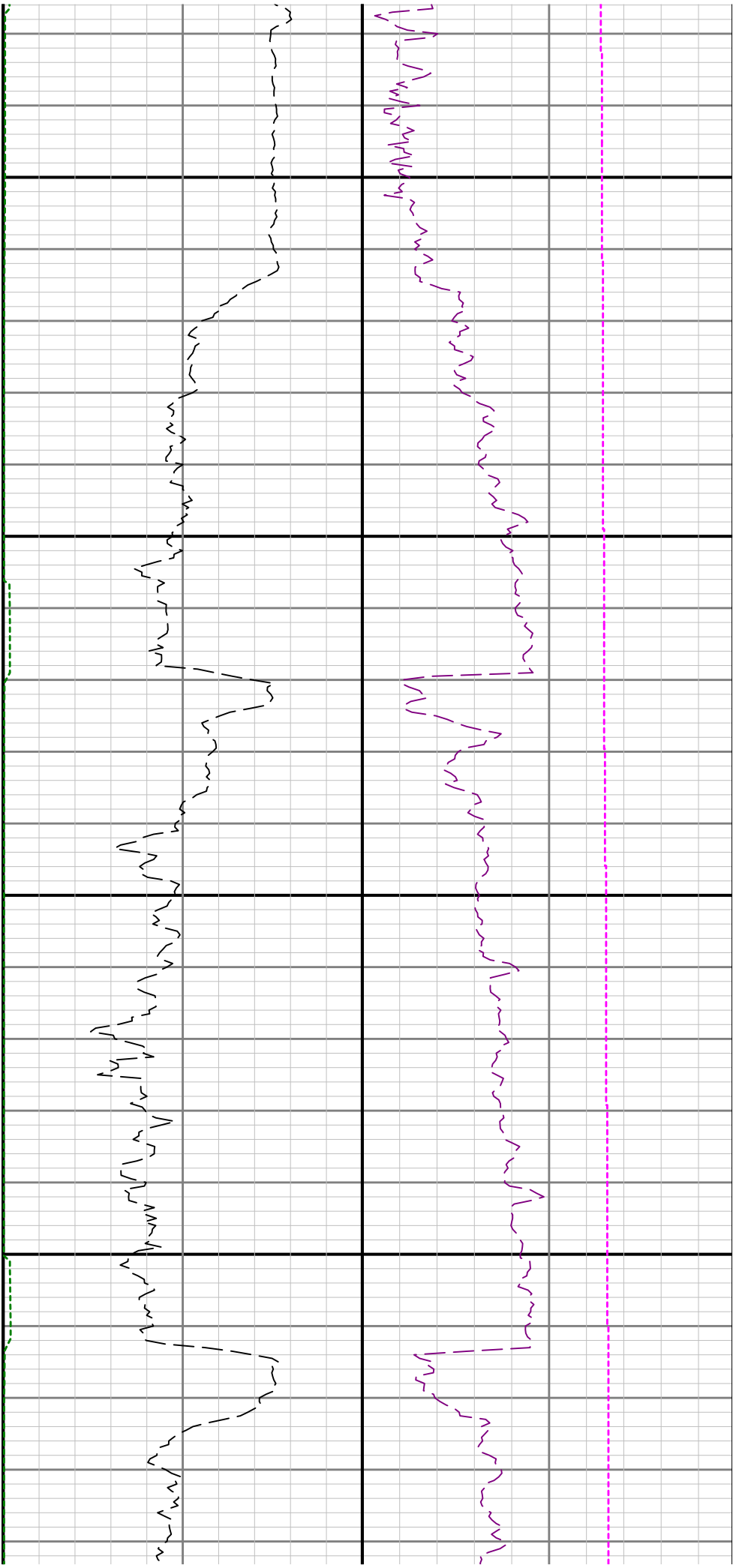


7200

7300

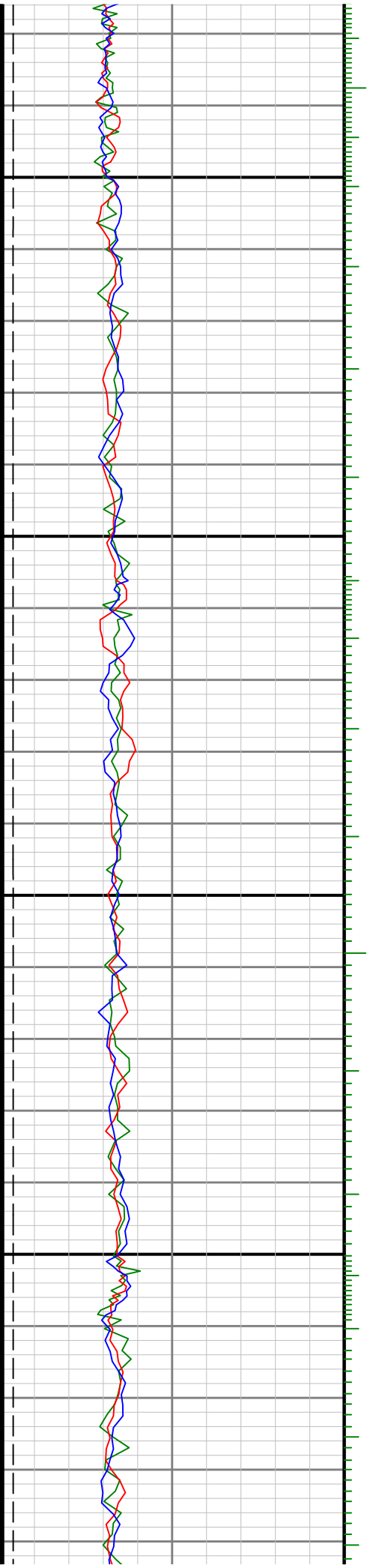


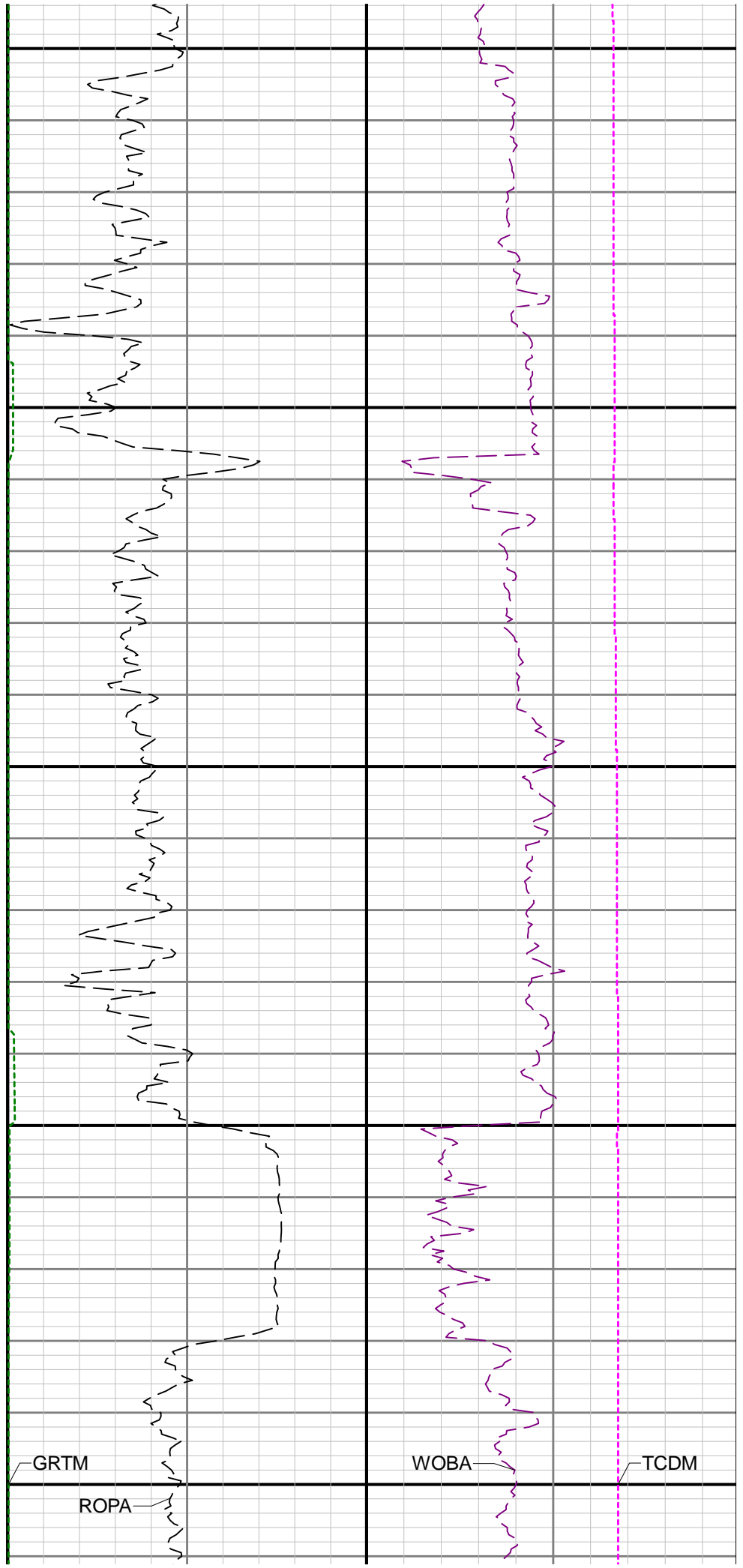
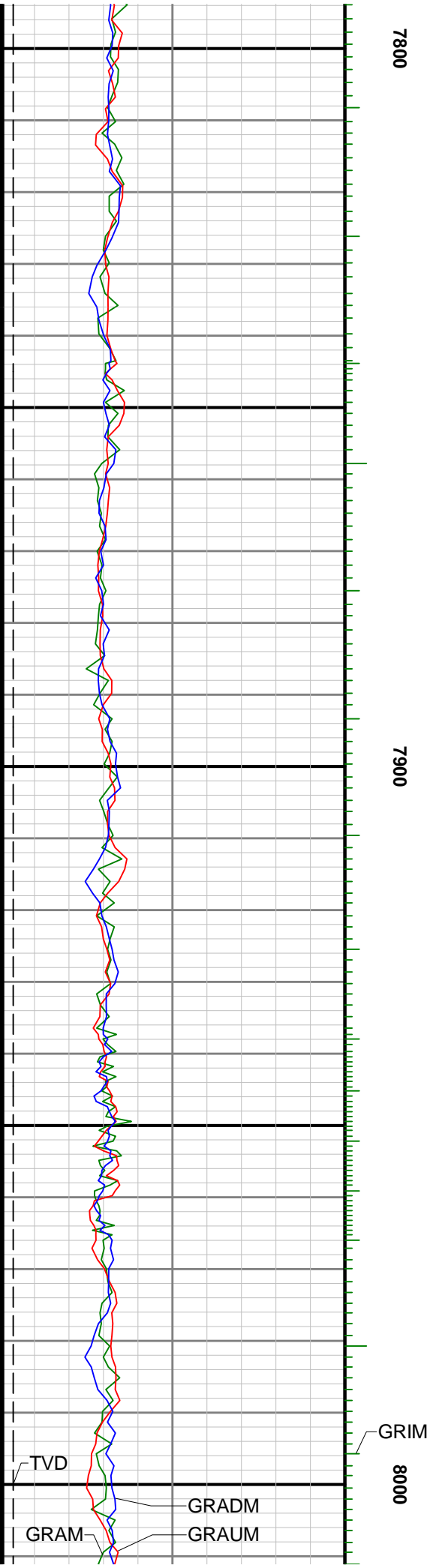


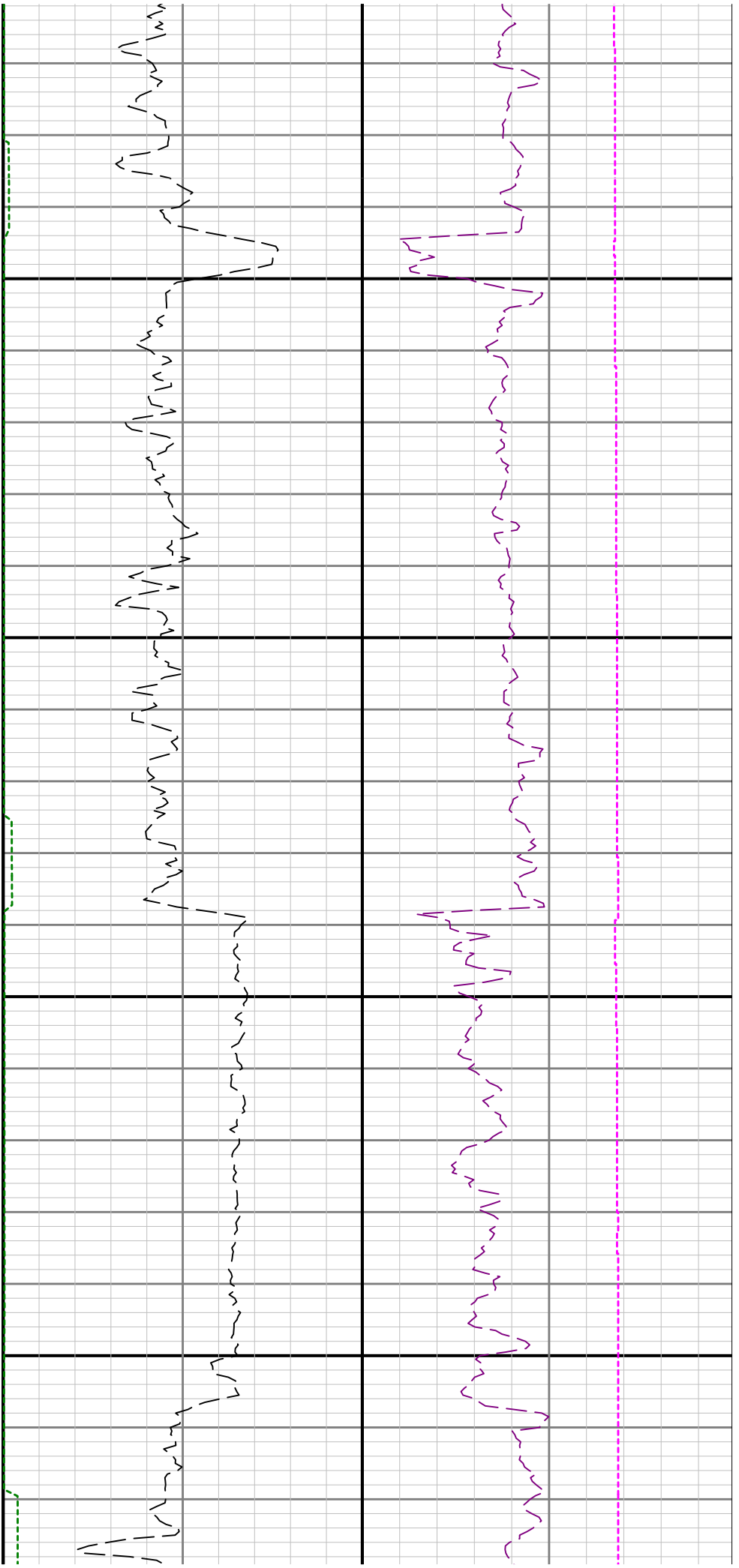


7600

7700

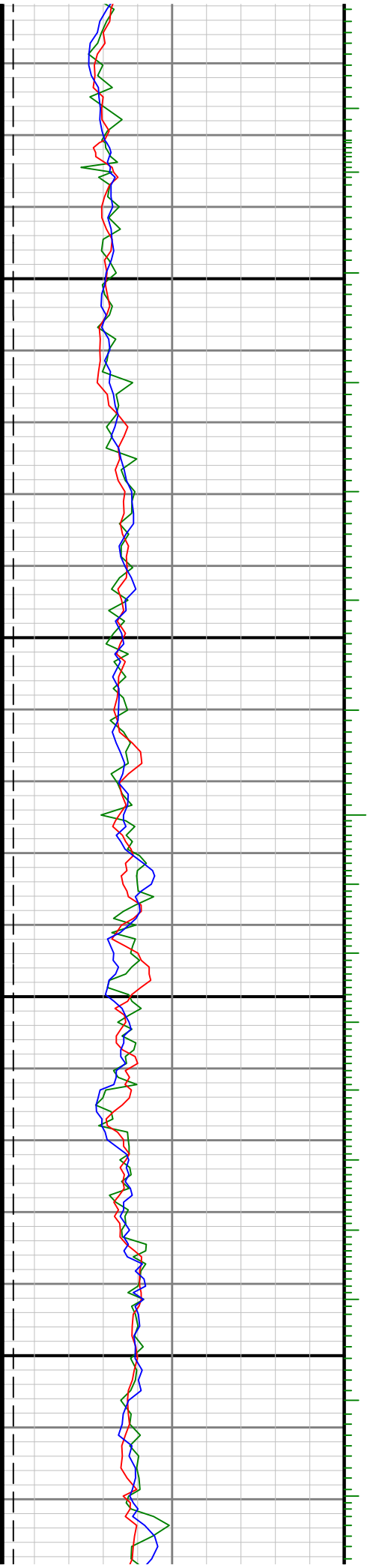




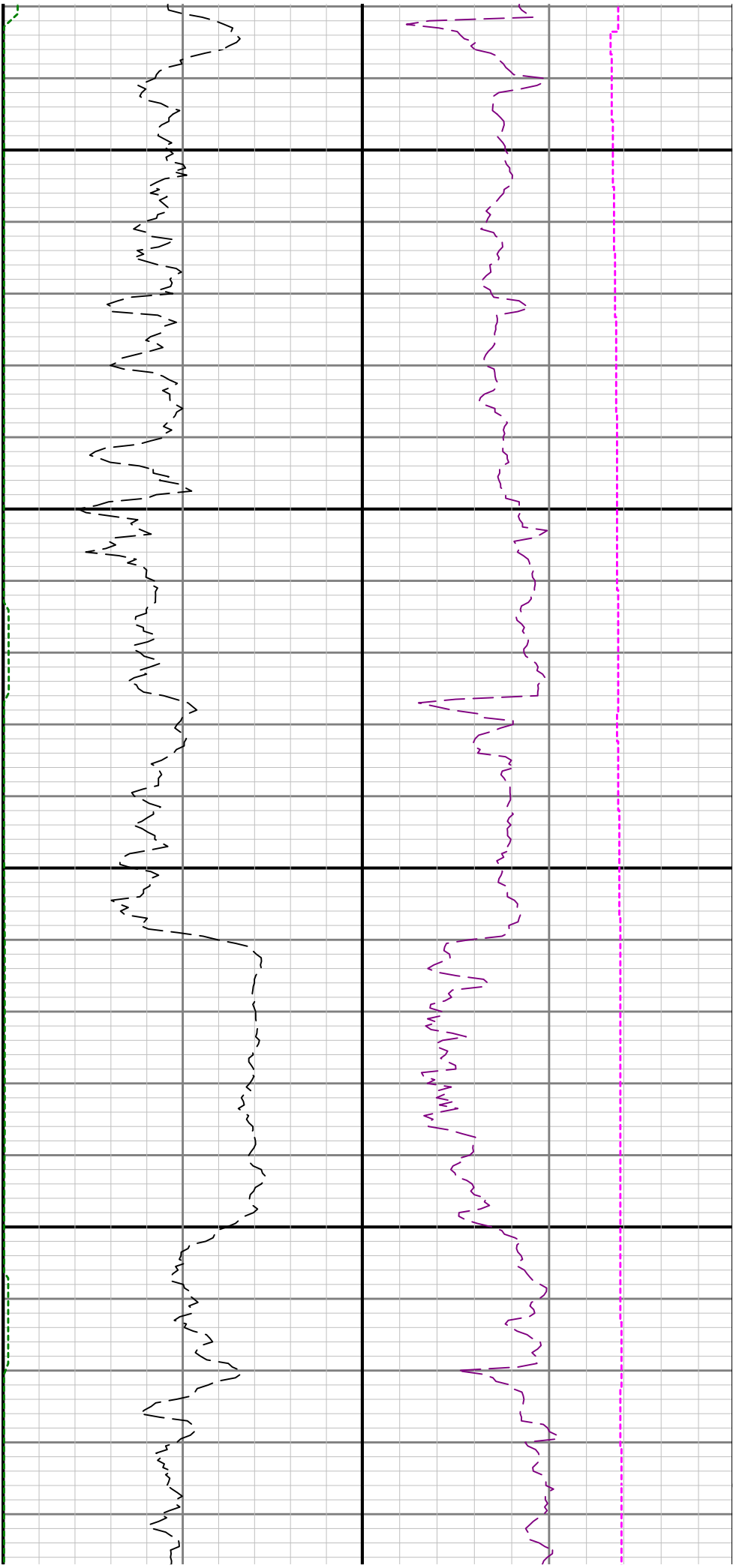


8100

8200

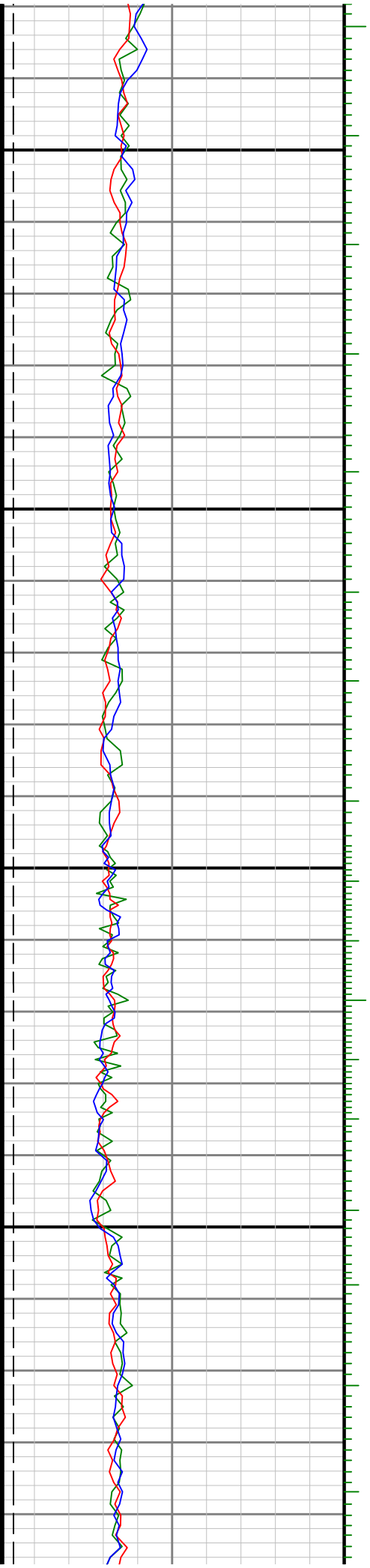


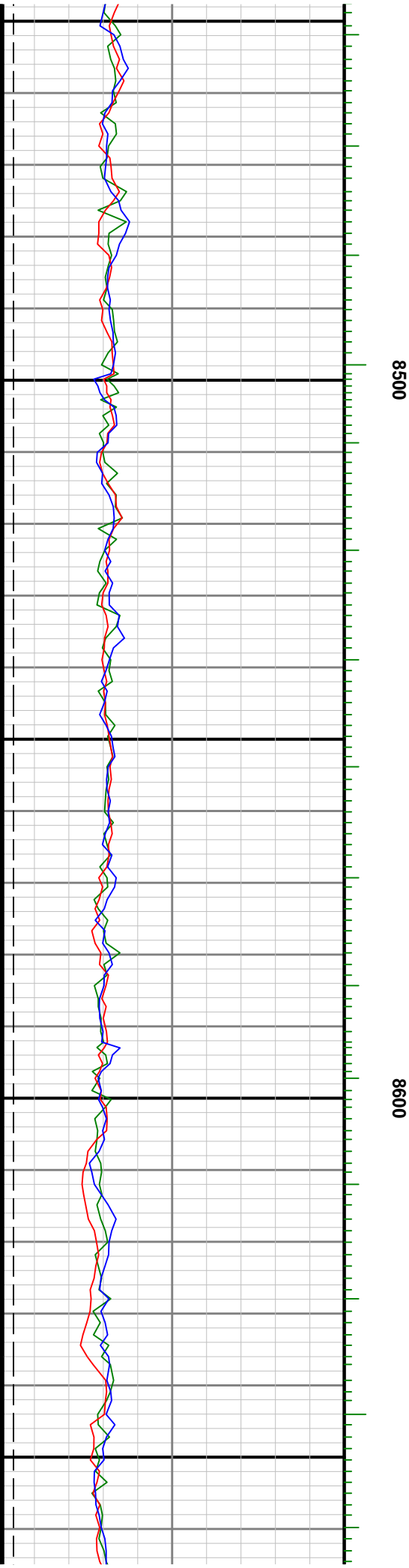
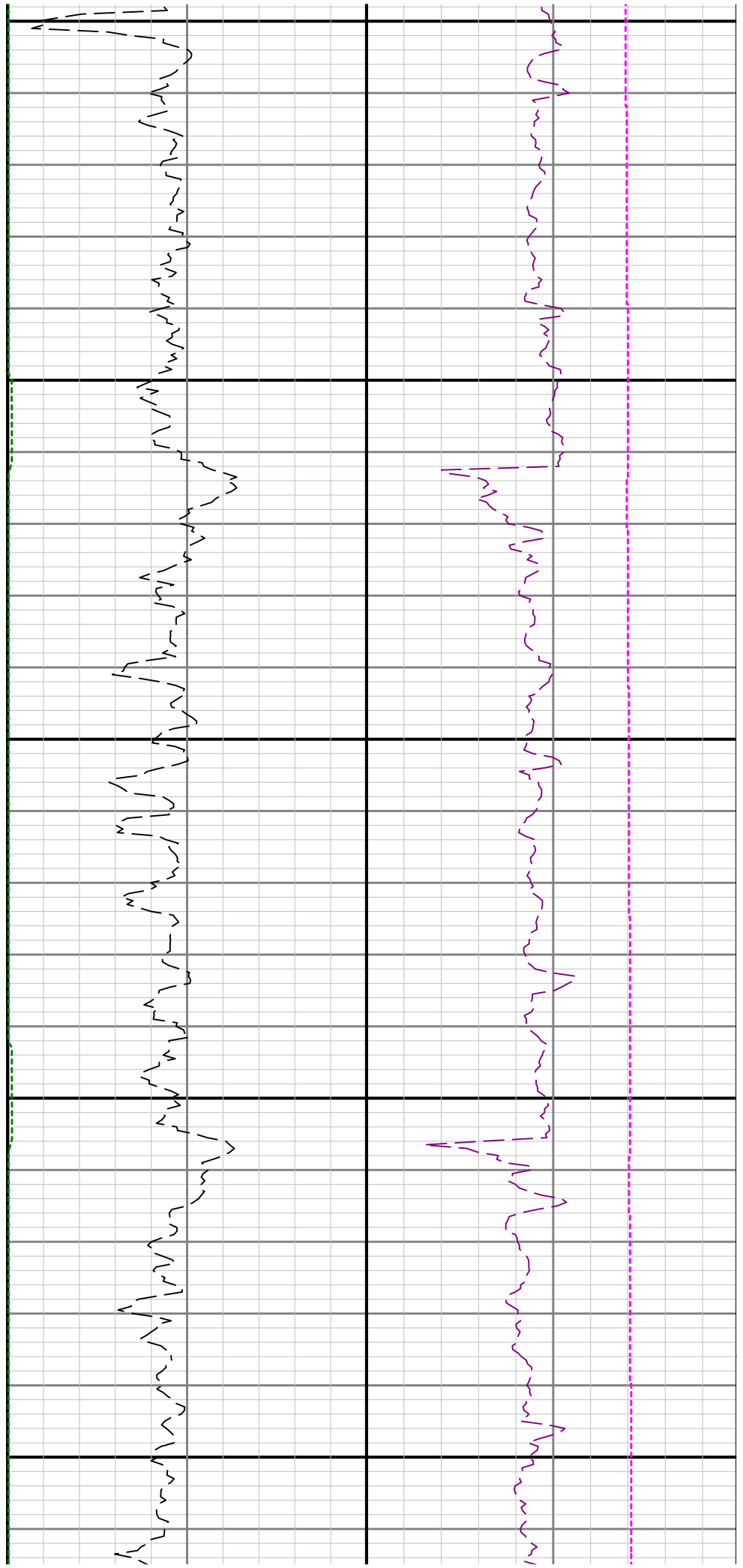


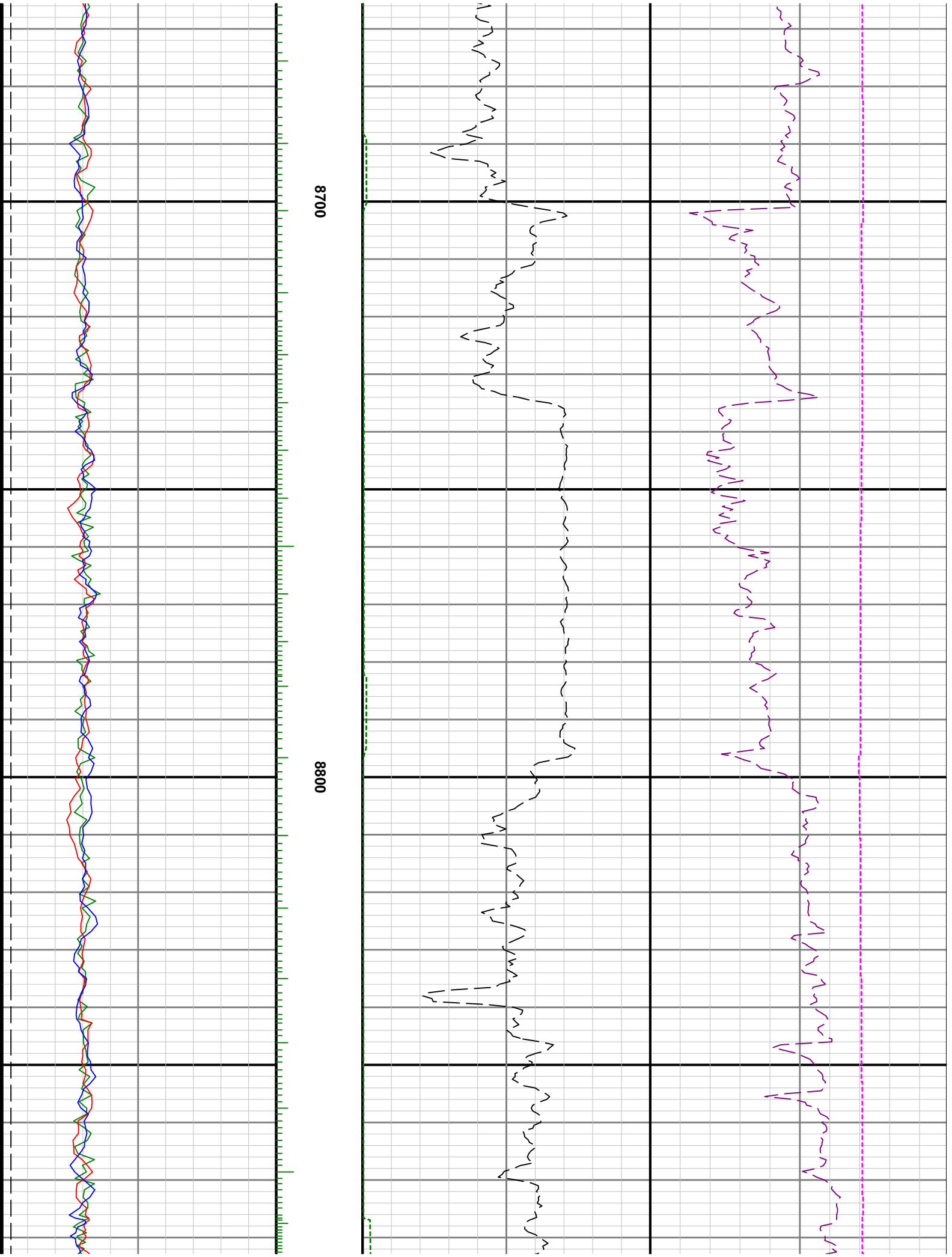


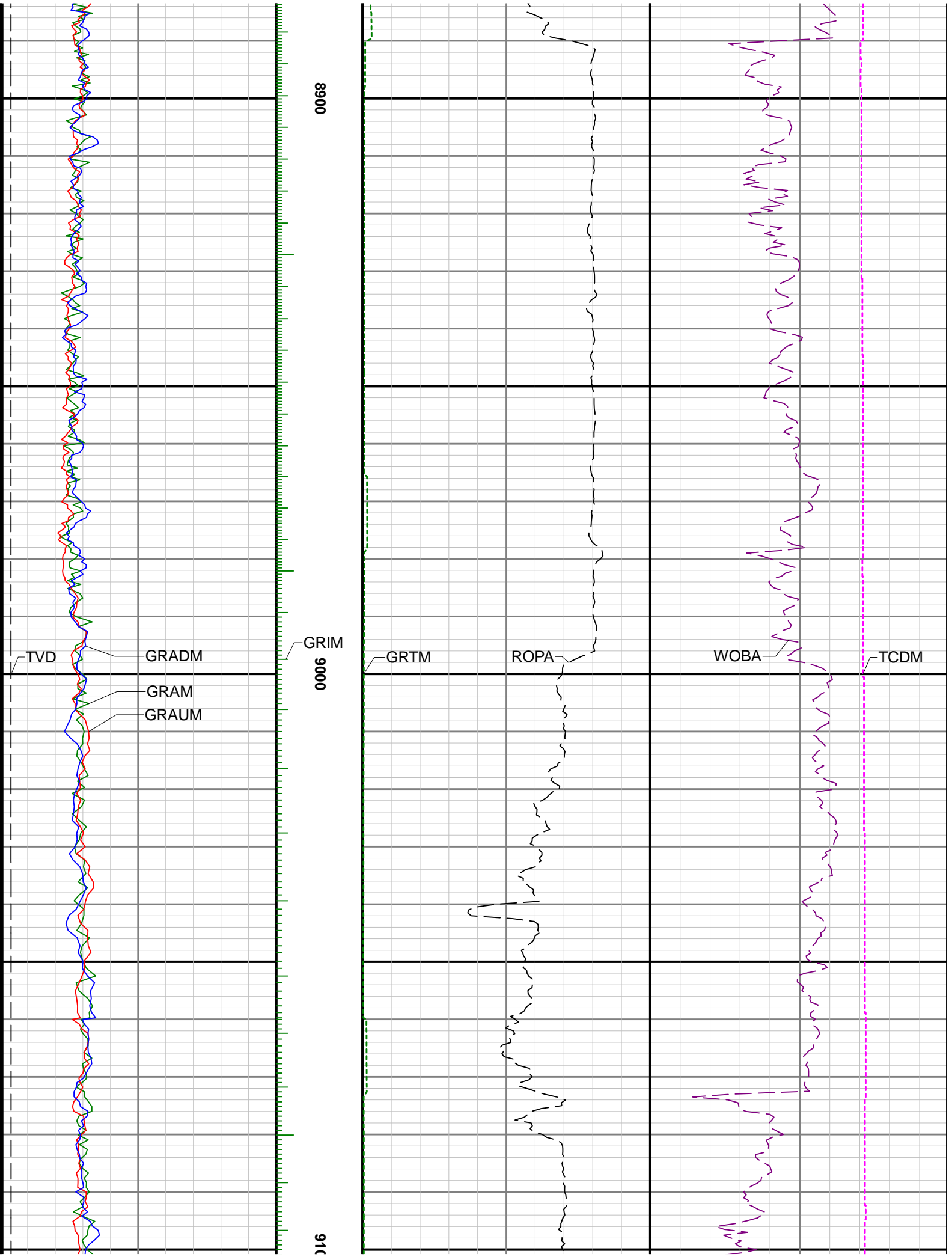
8300

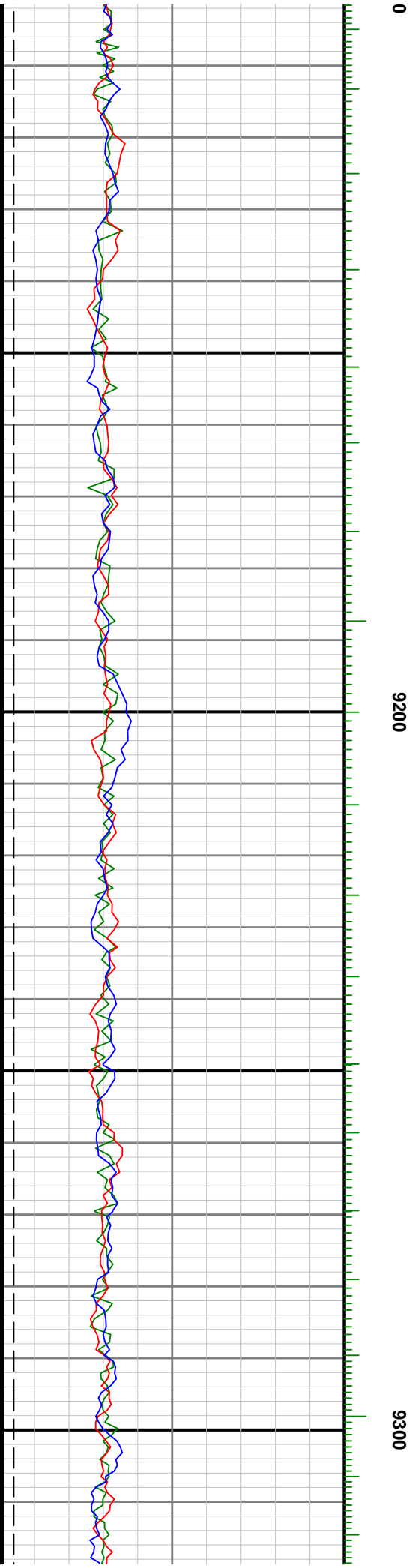
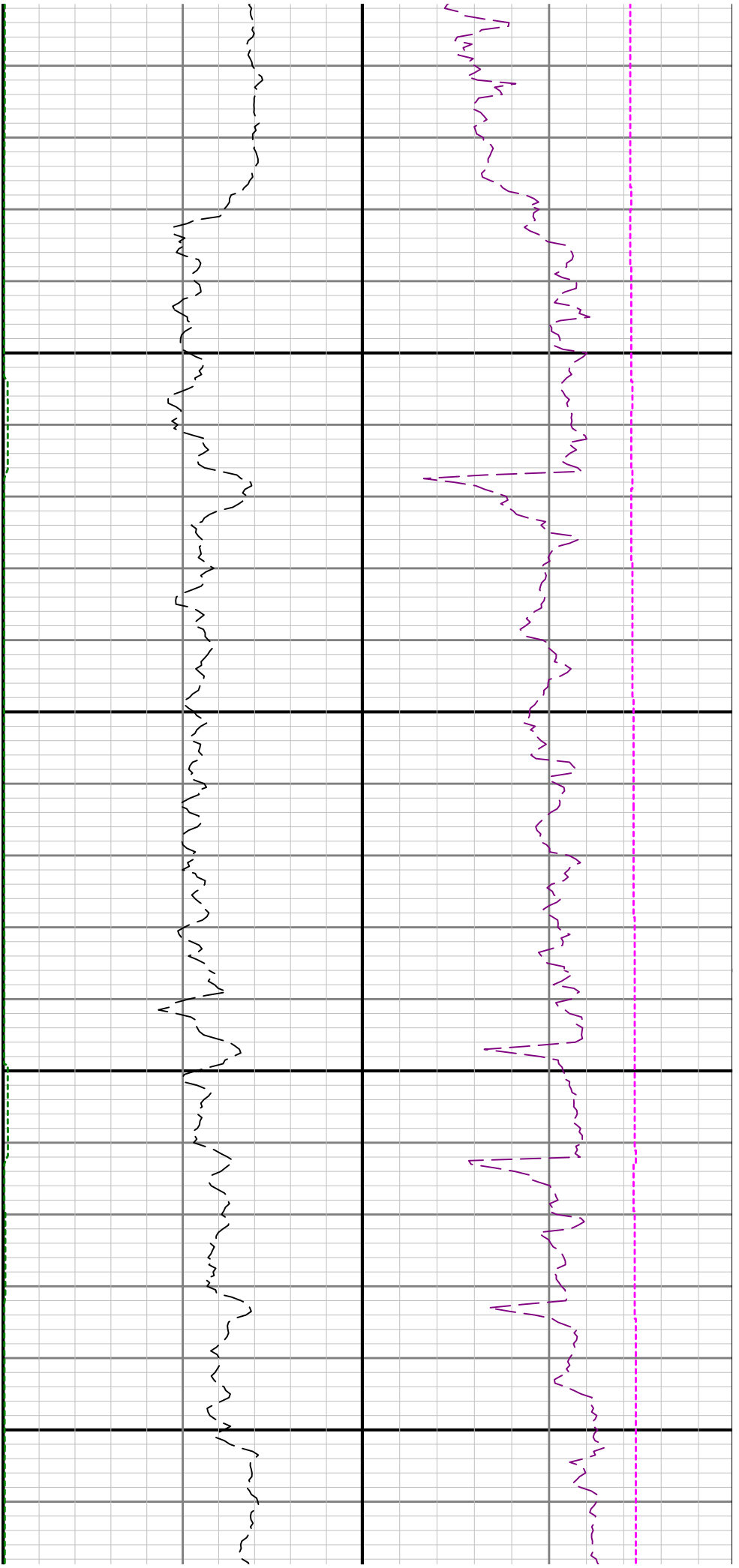
8400

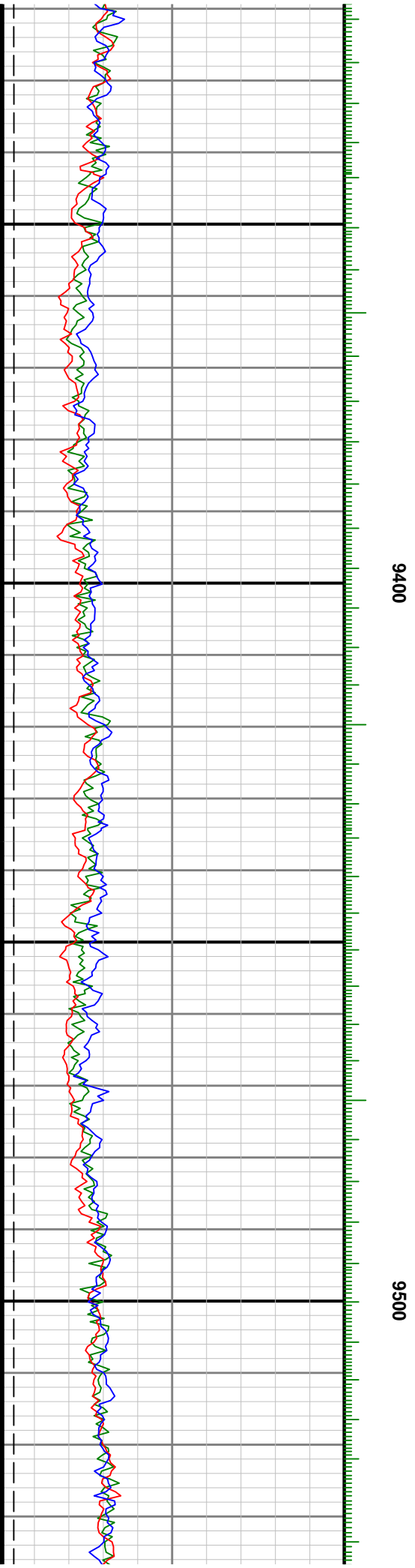
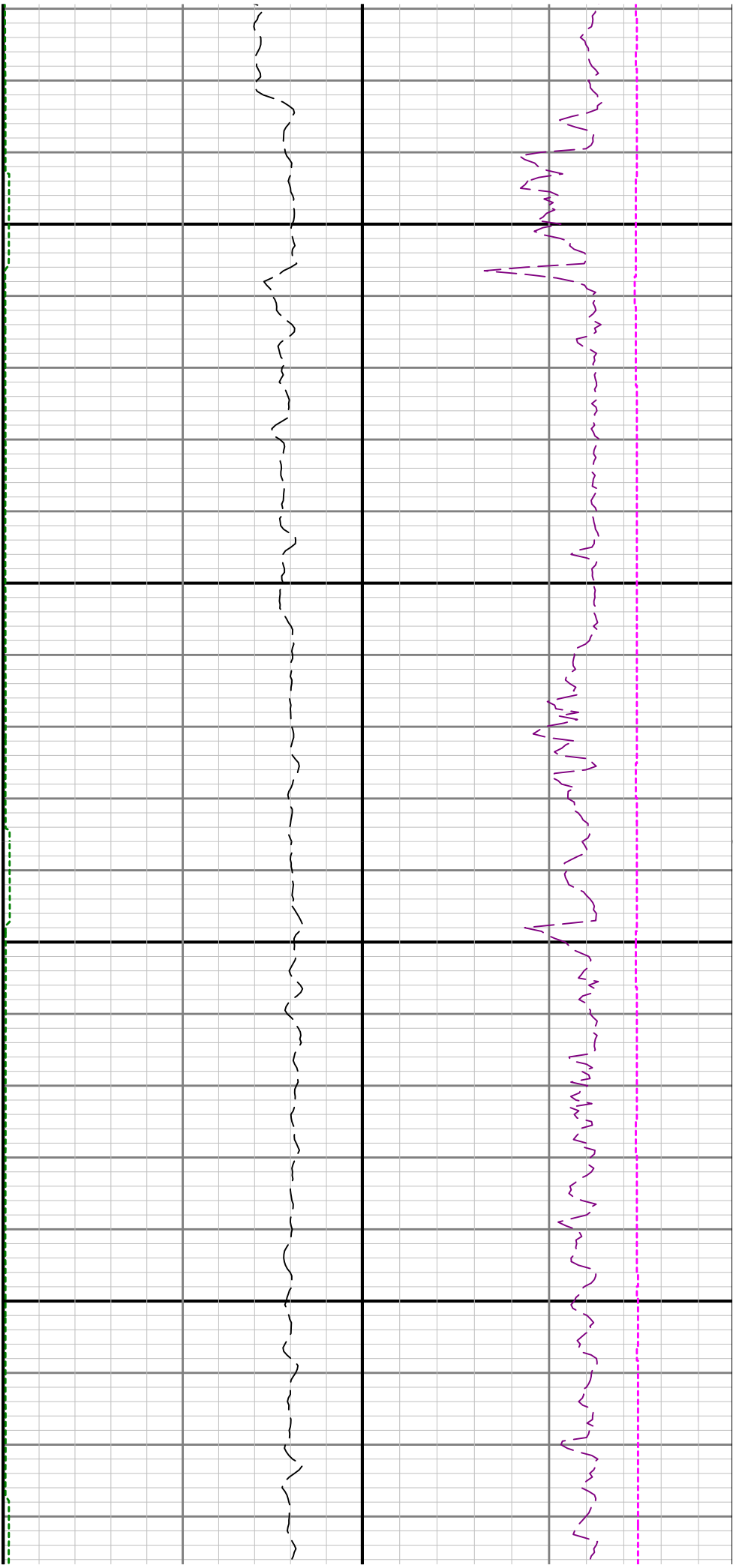


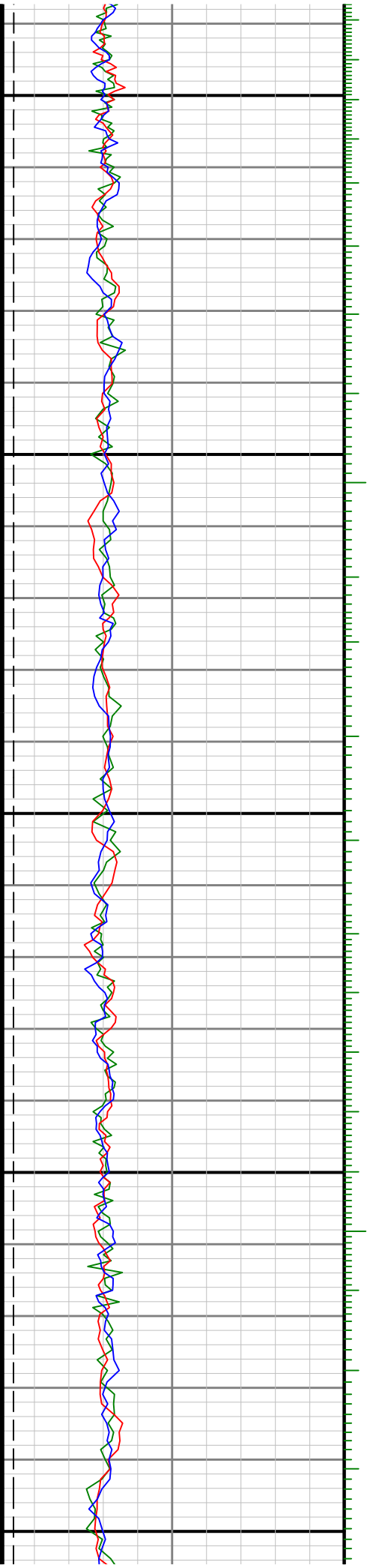






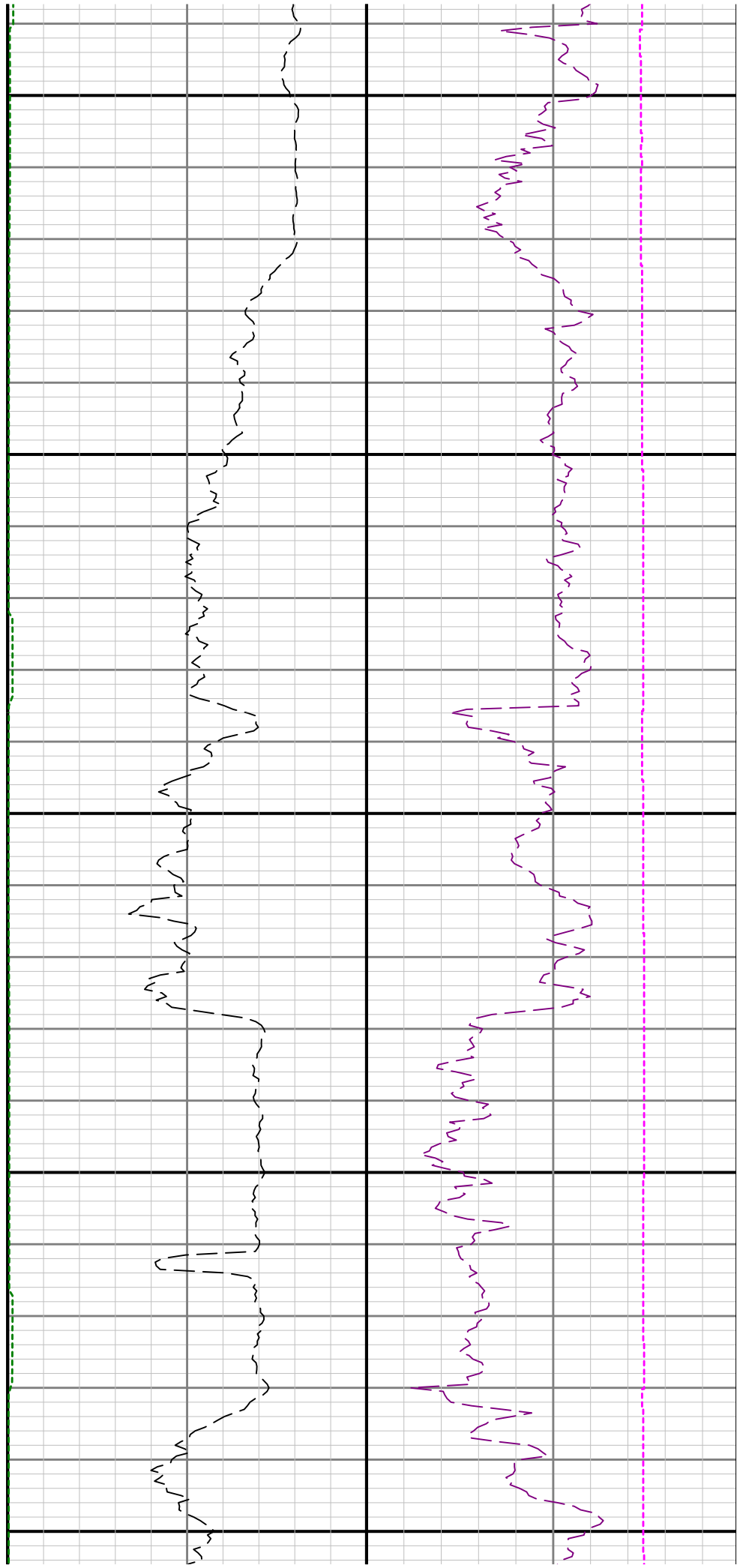


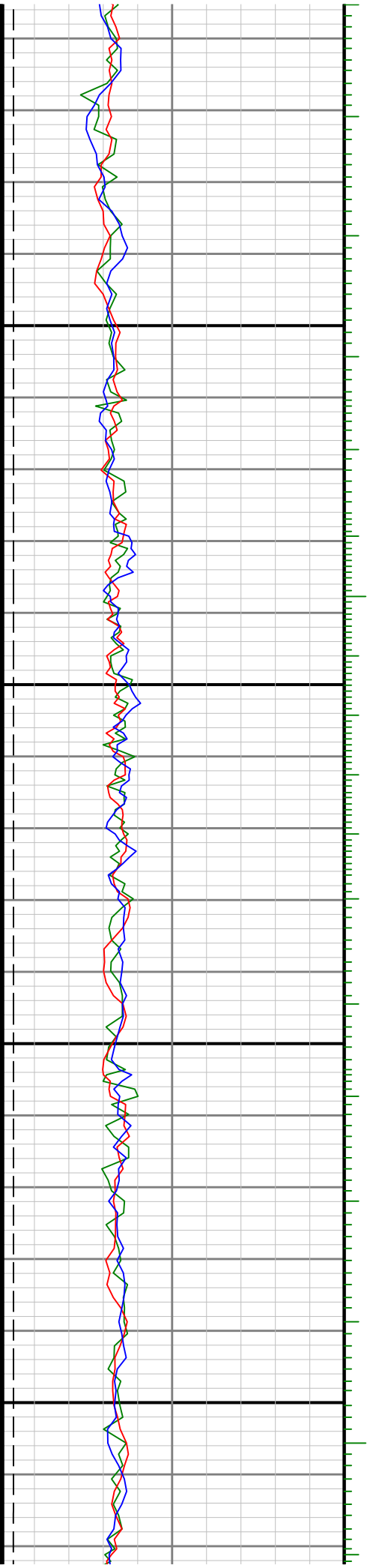




0096

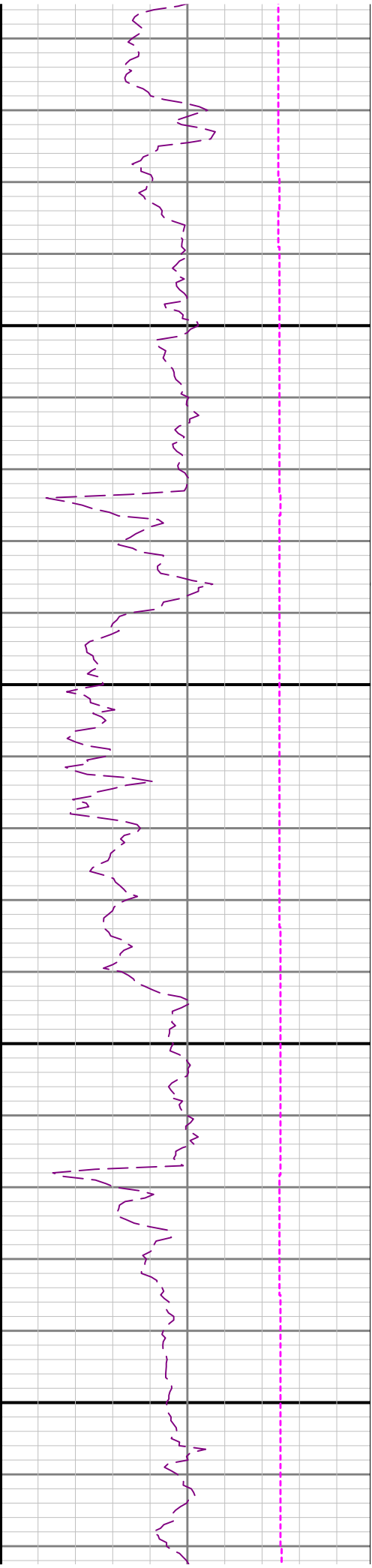
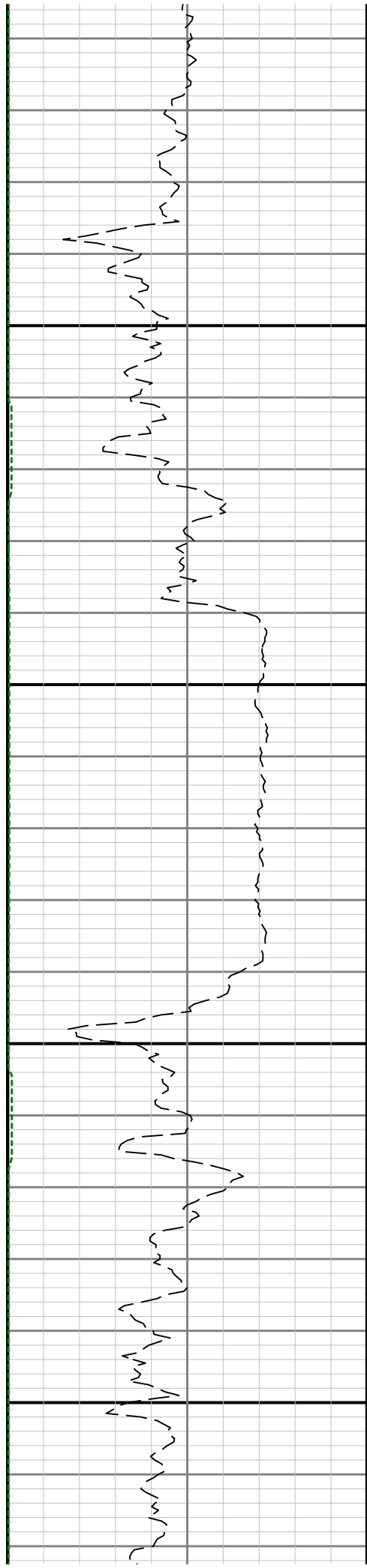
9700



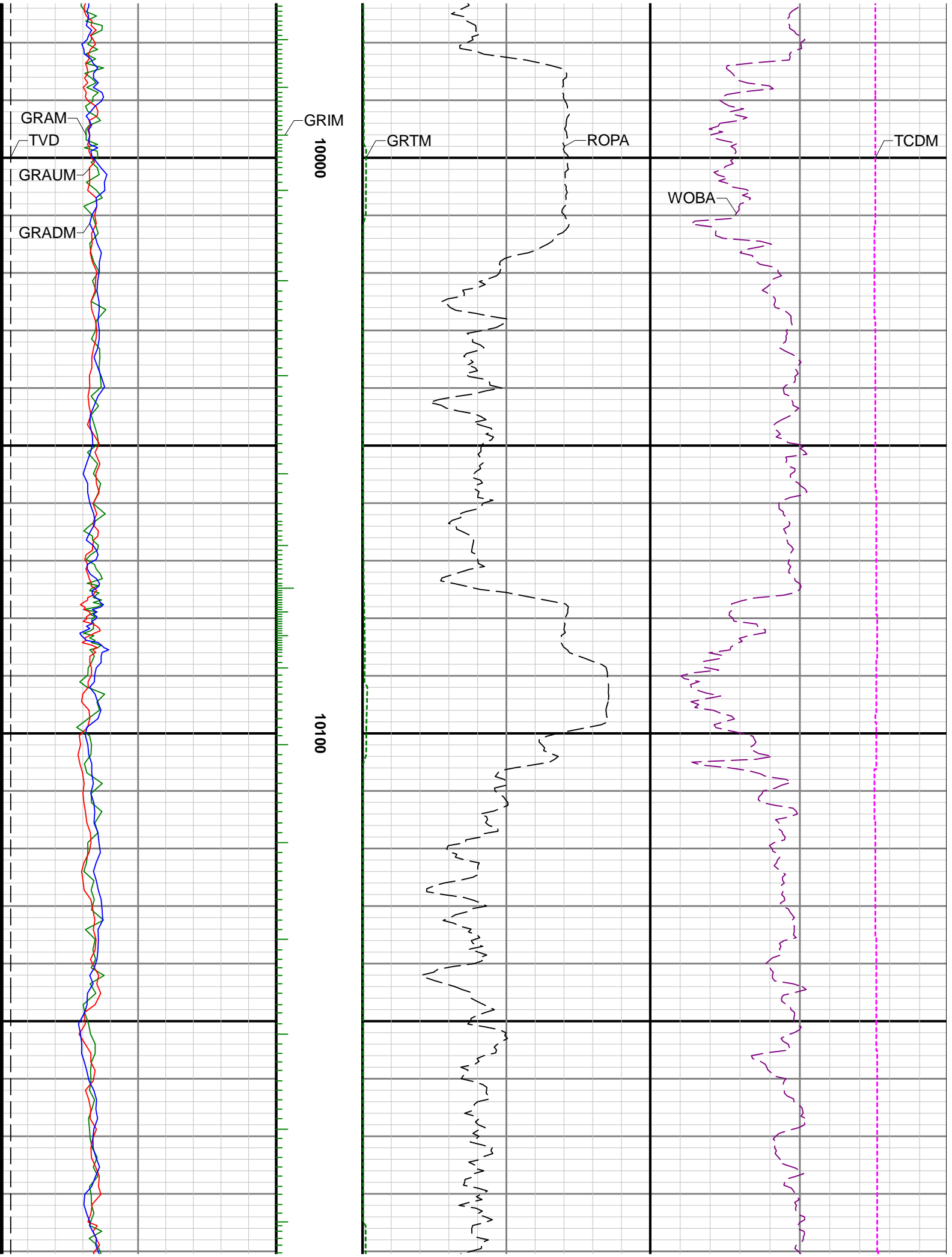


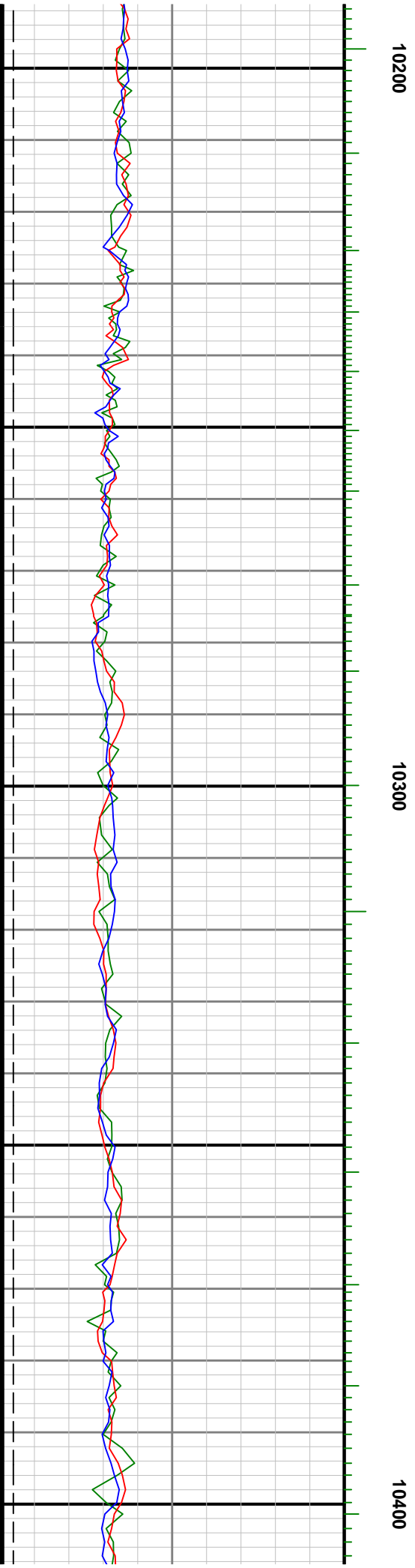
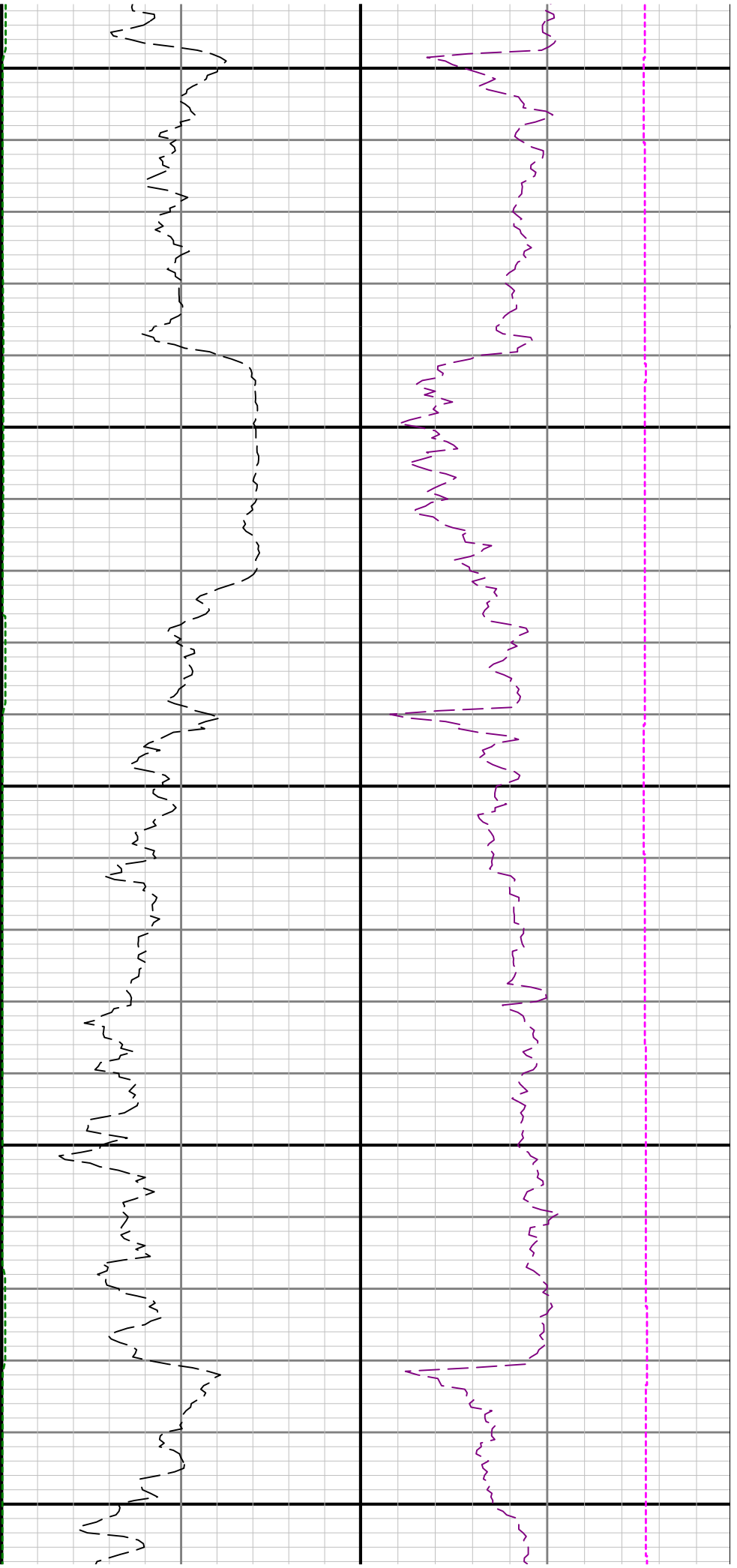
0066

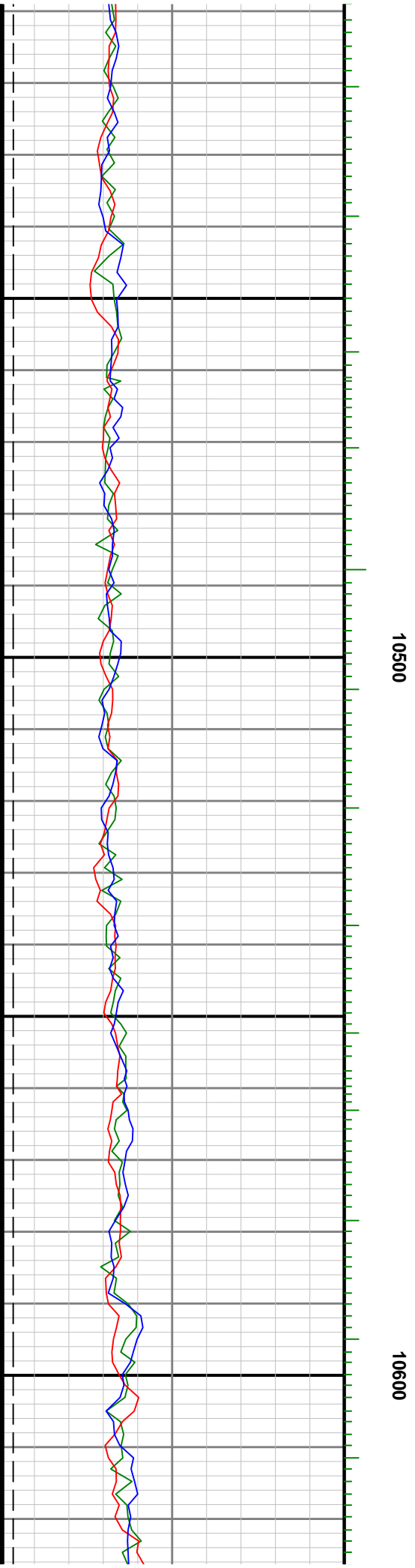
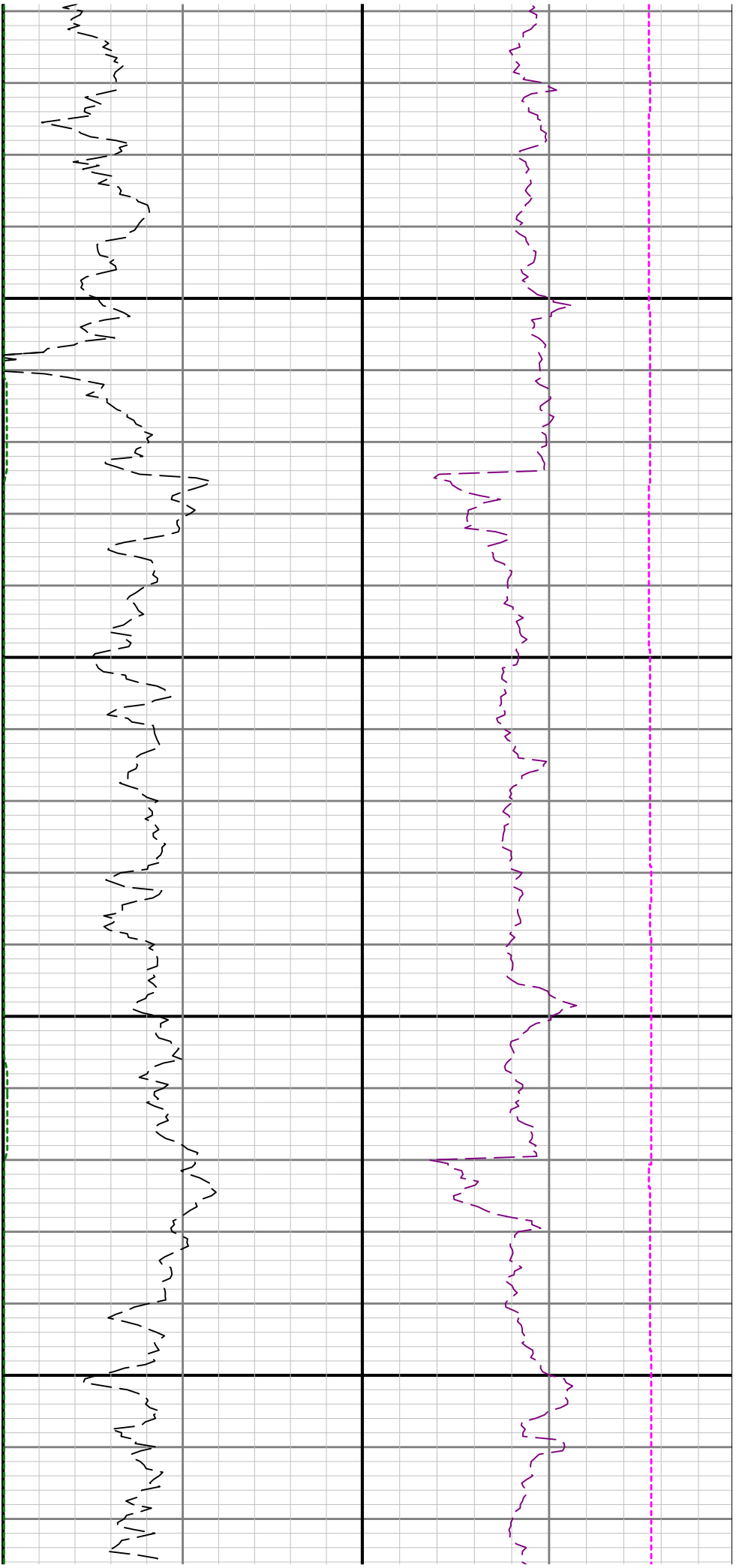
0086

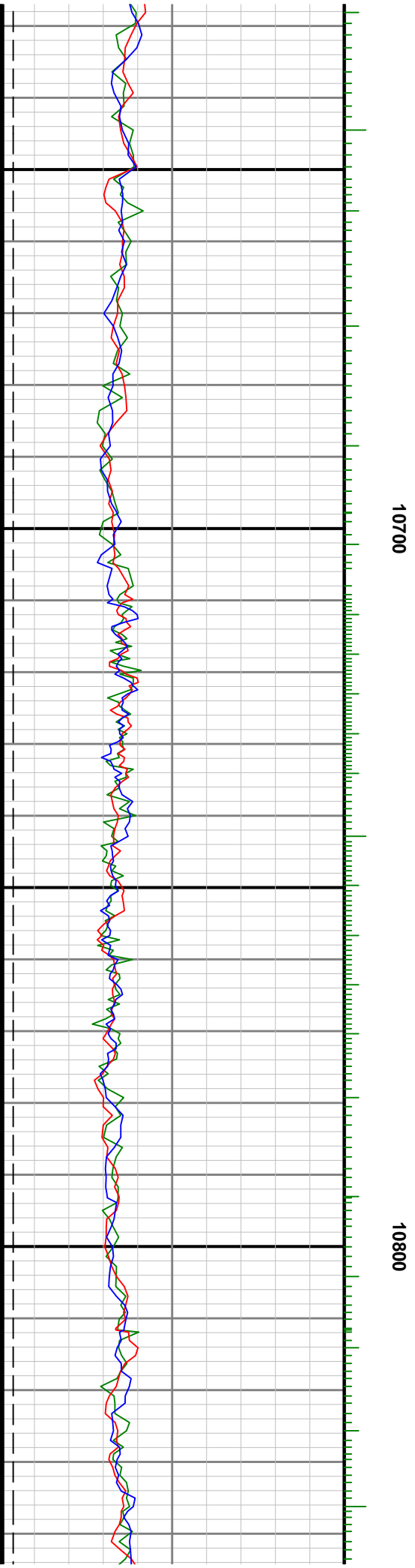
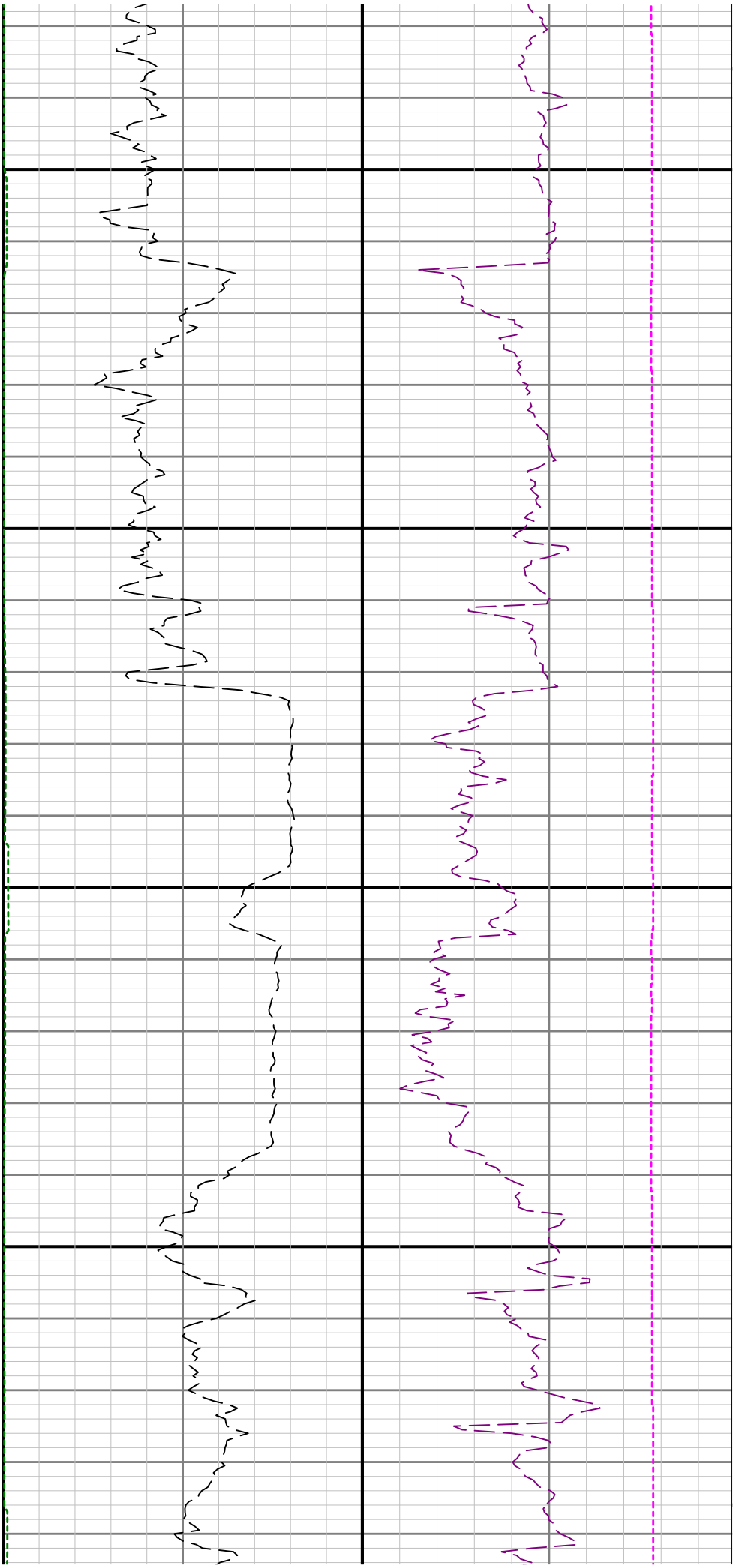


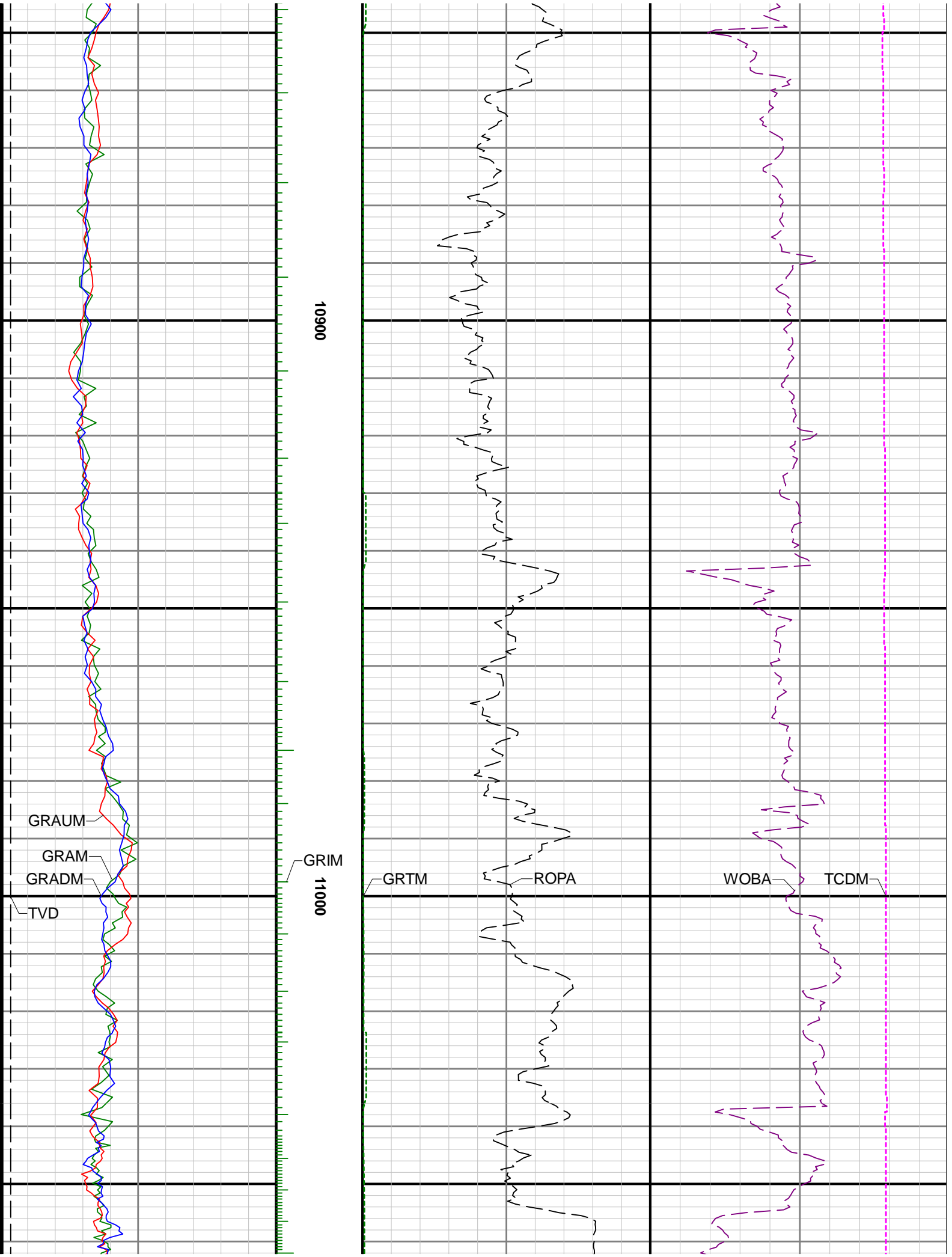


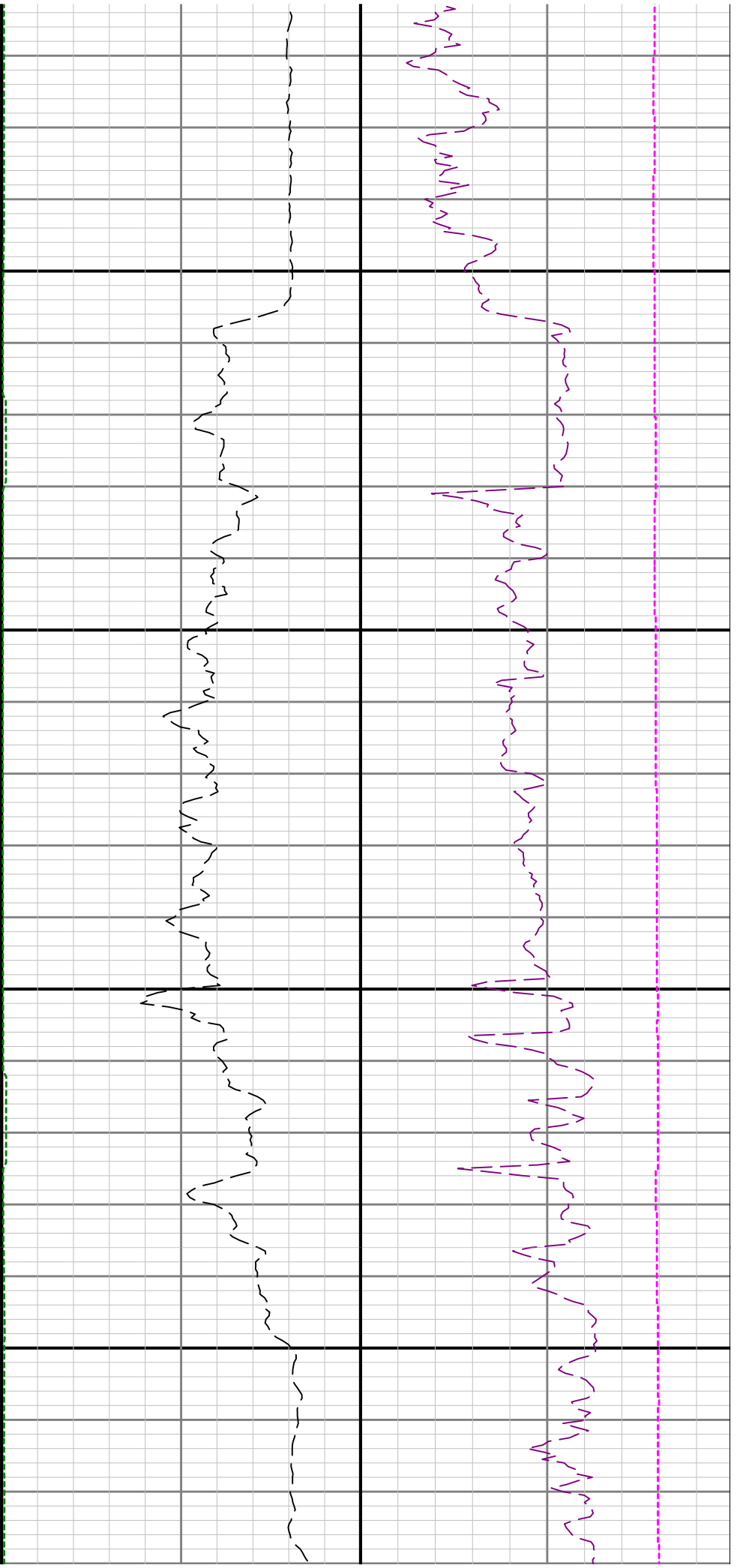






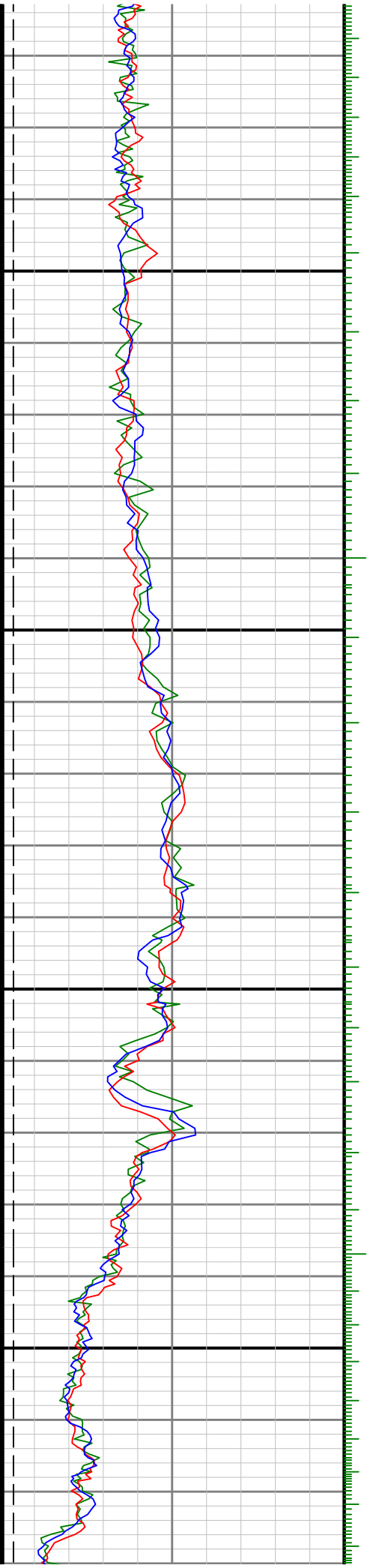


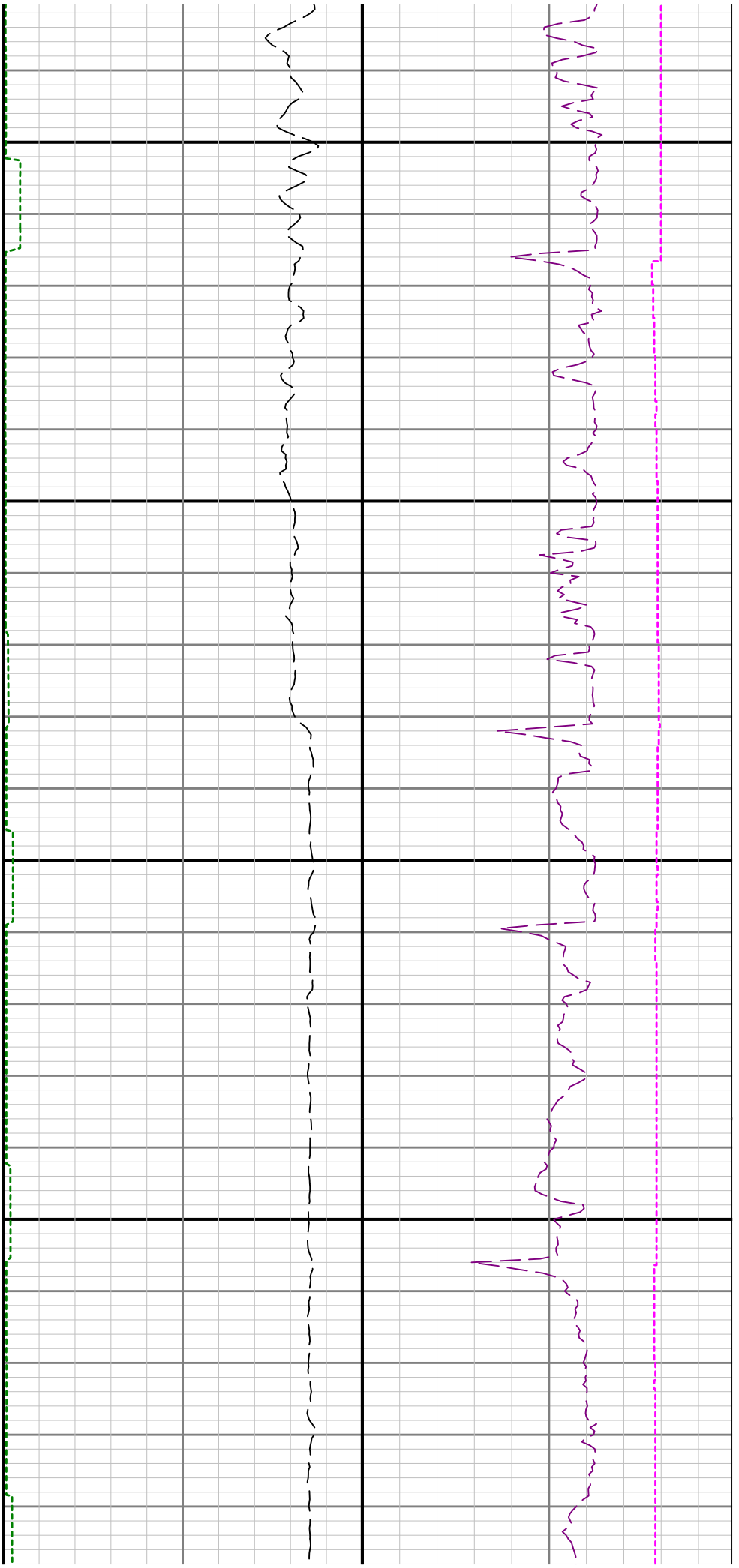




11100

11200

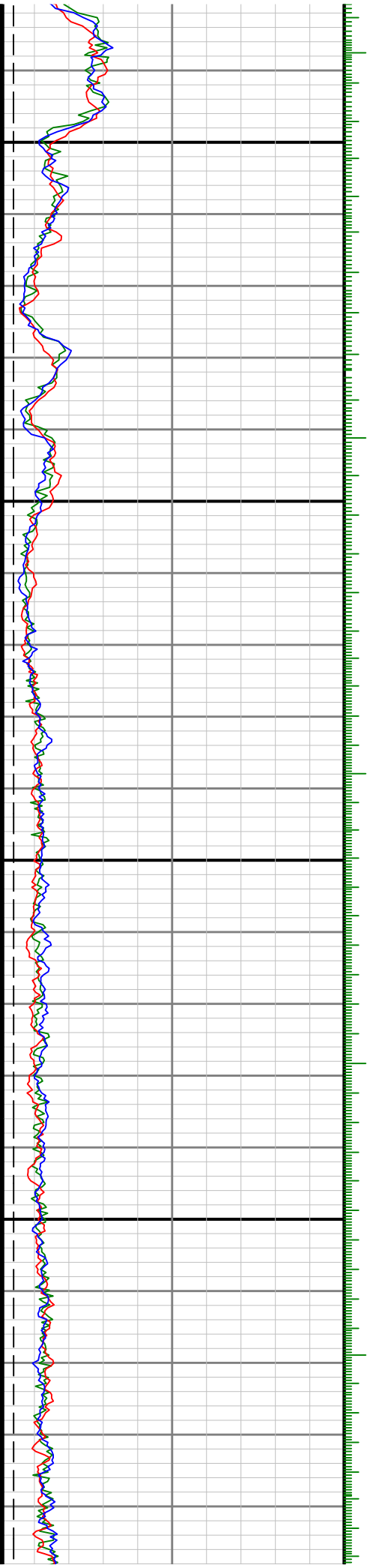


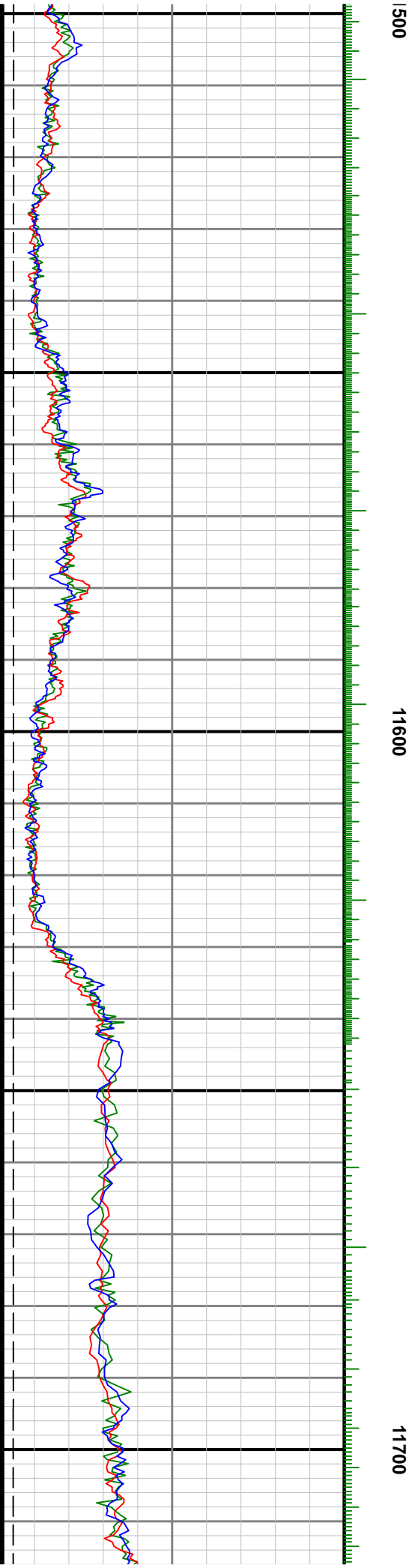
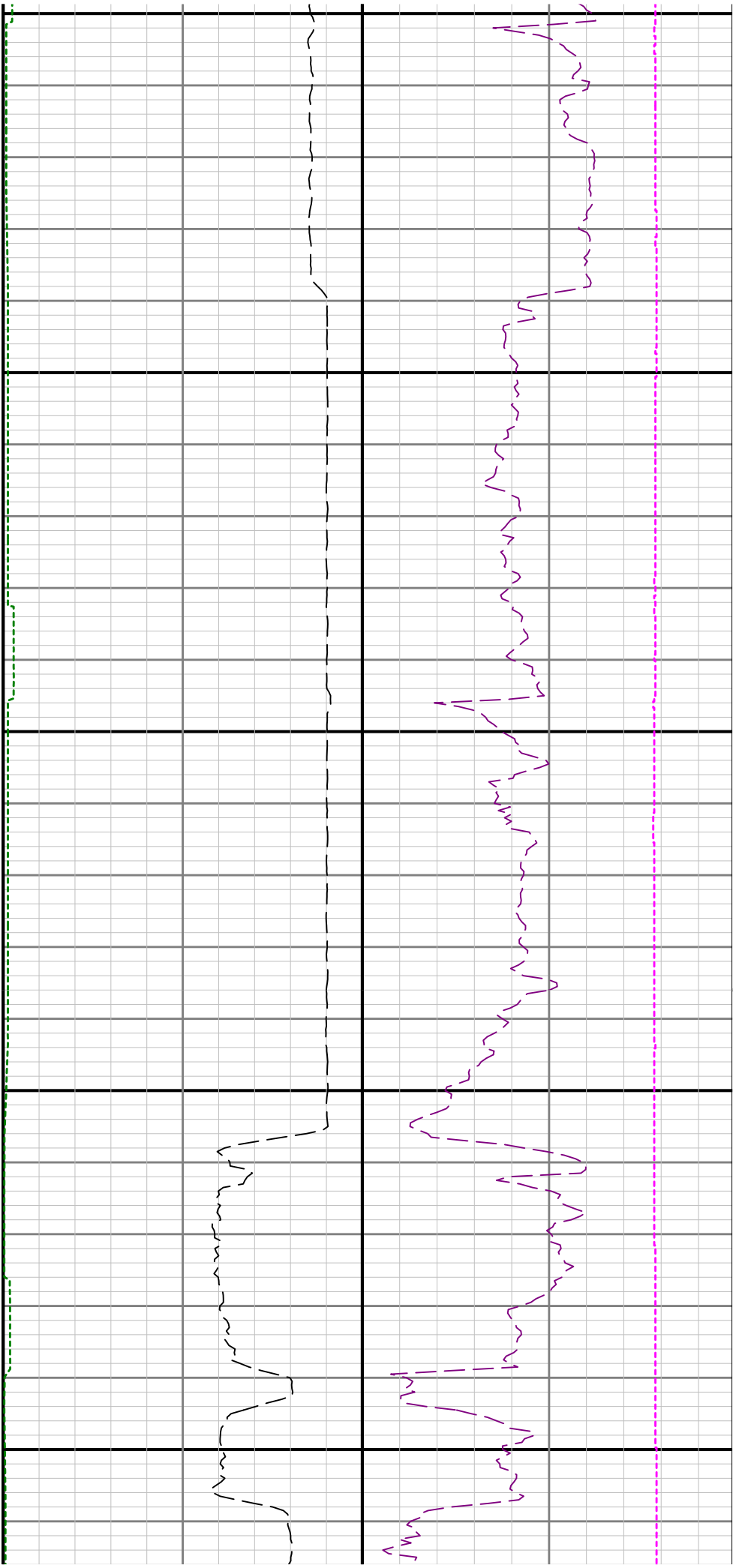


11300

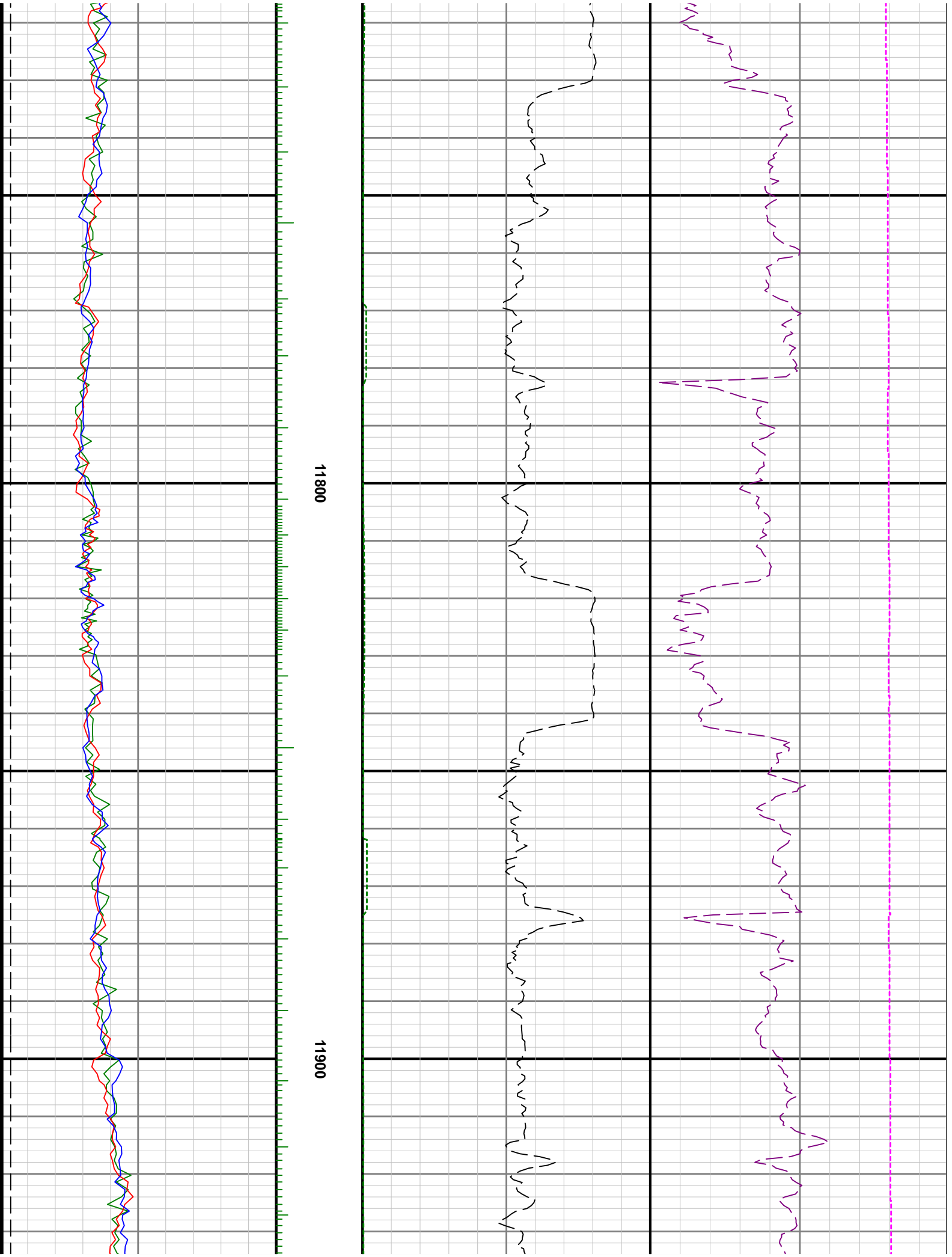
11400

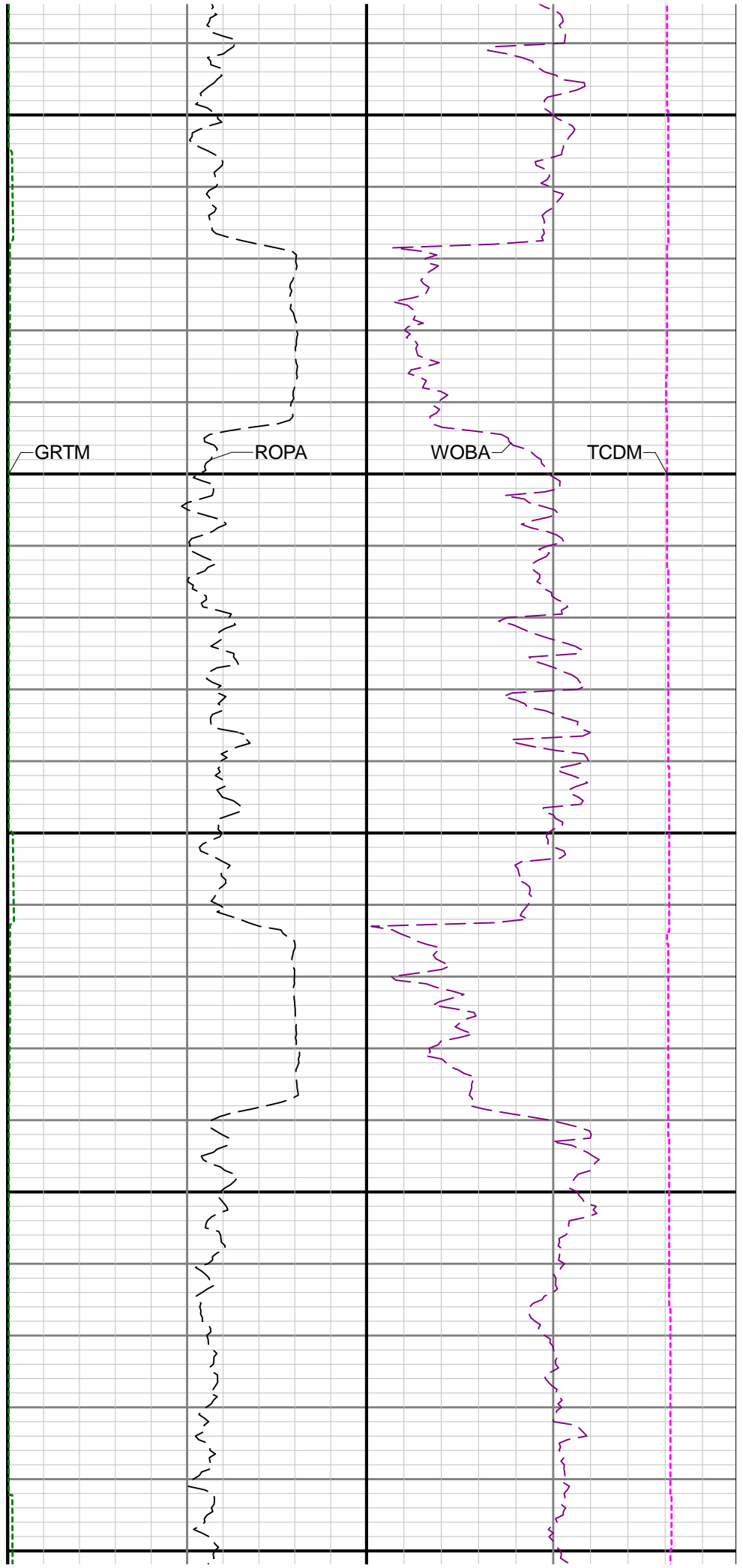
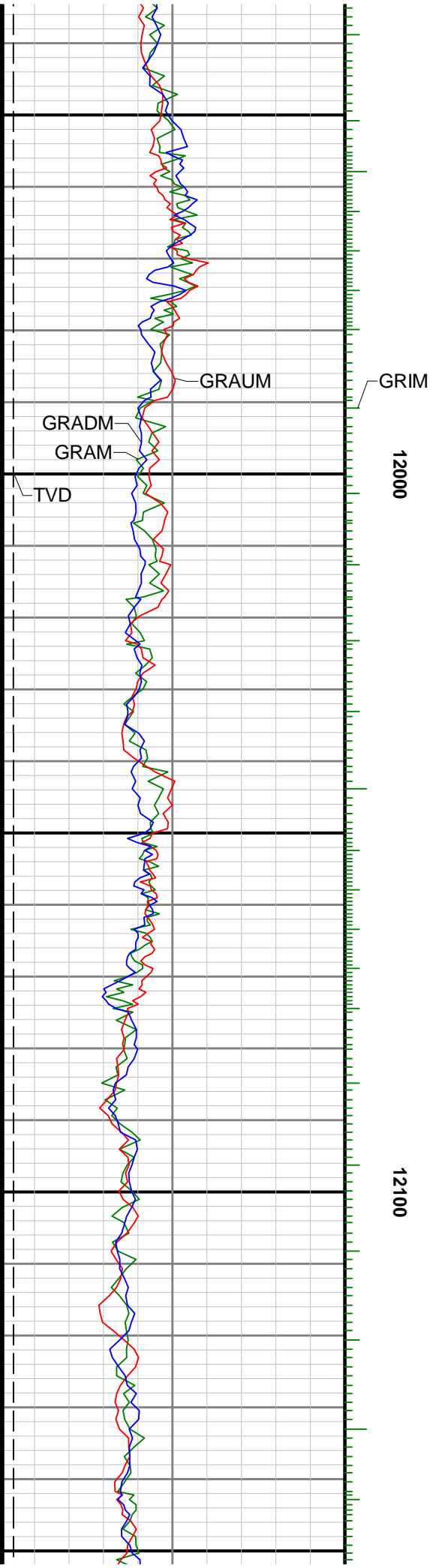
1

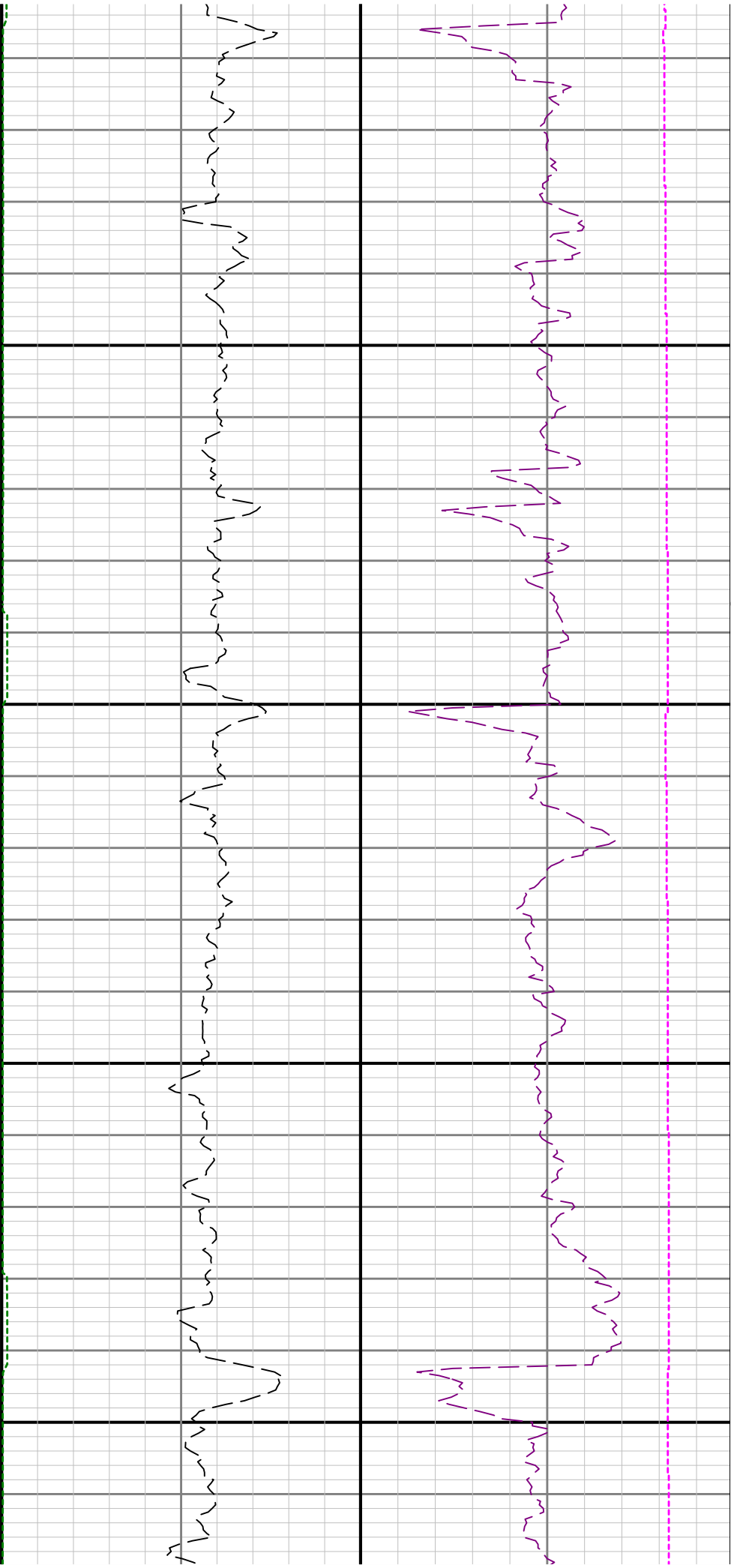






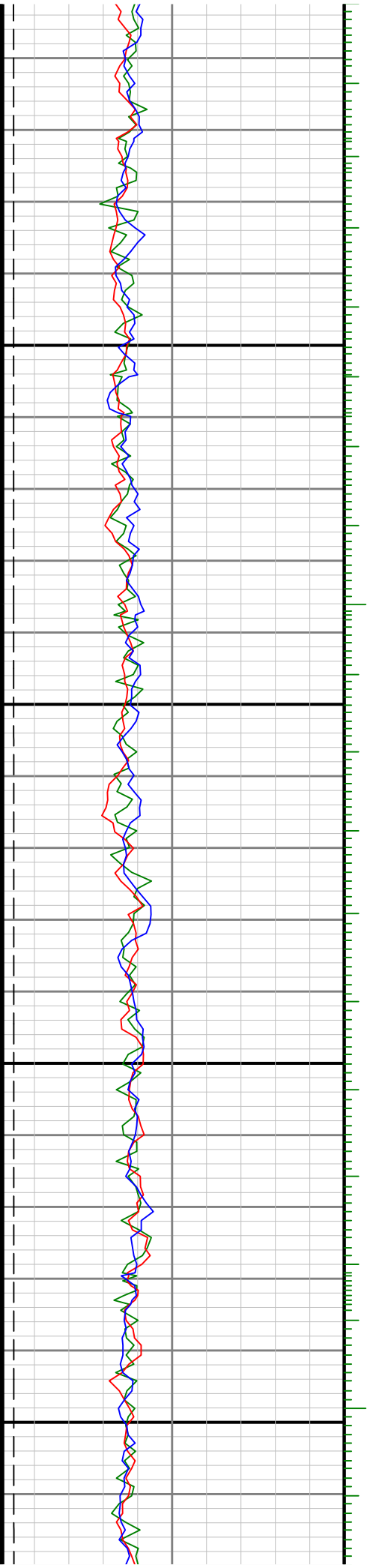


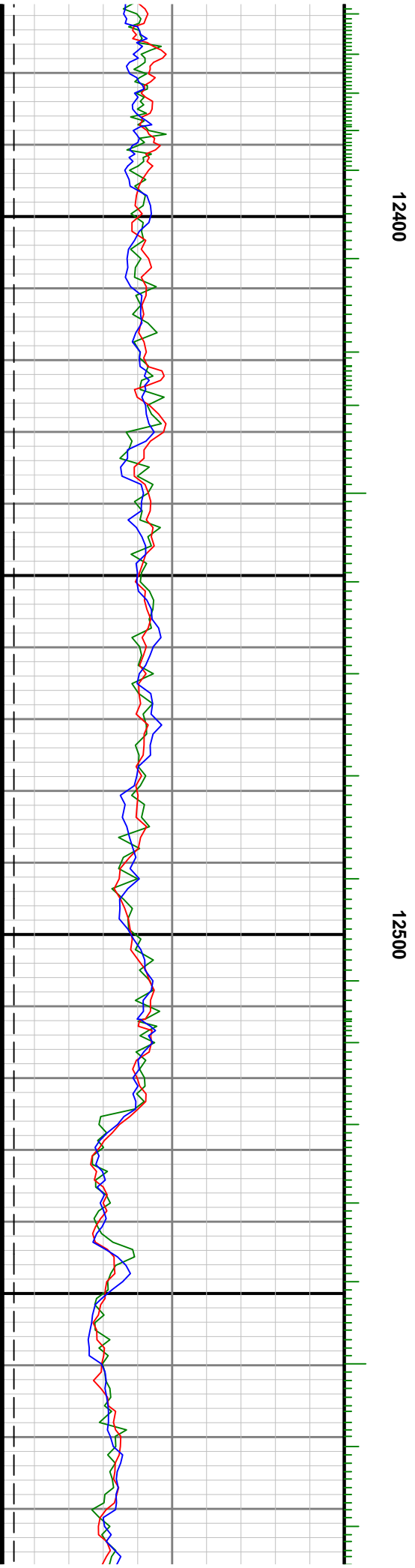
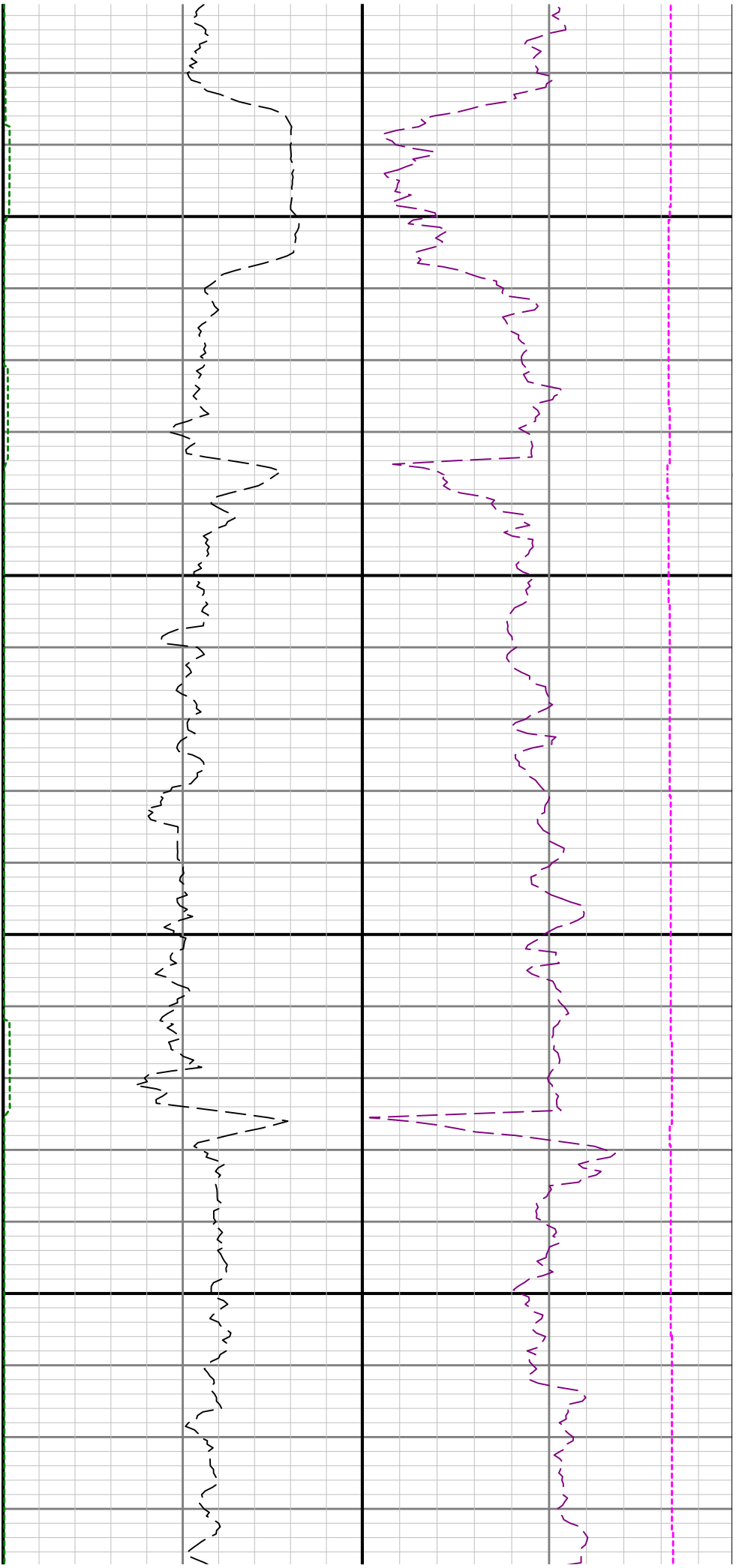


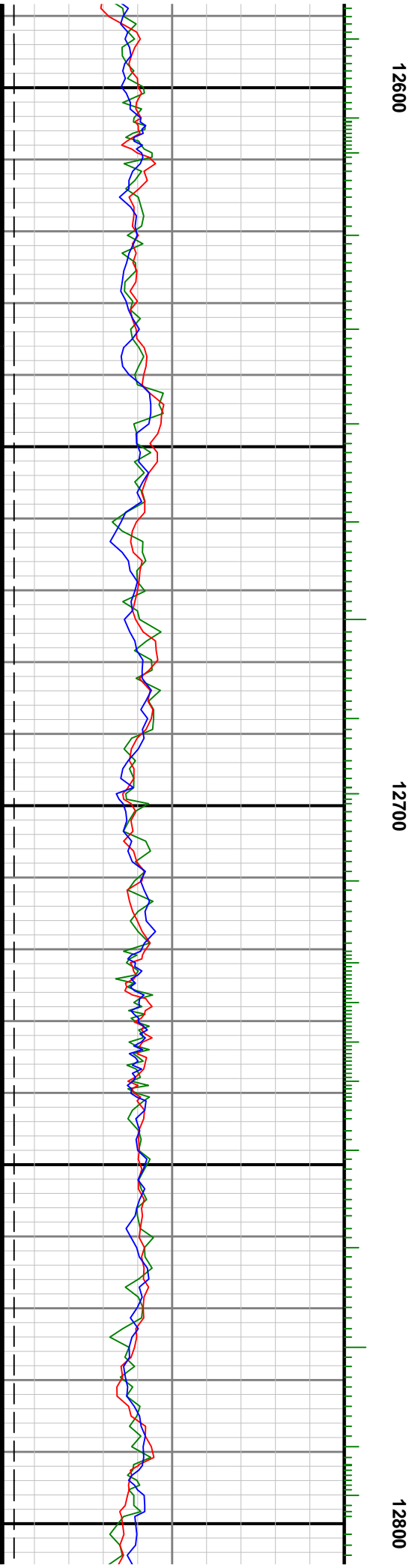
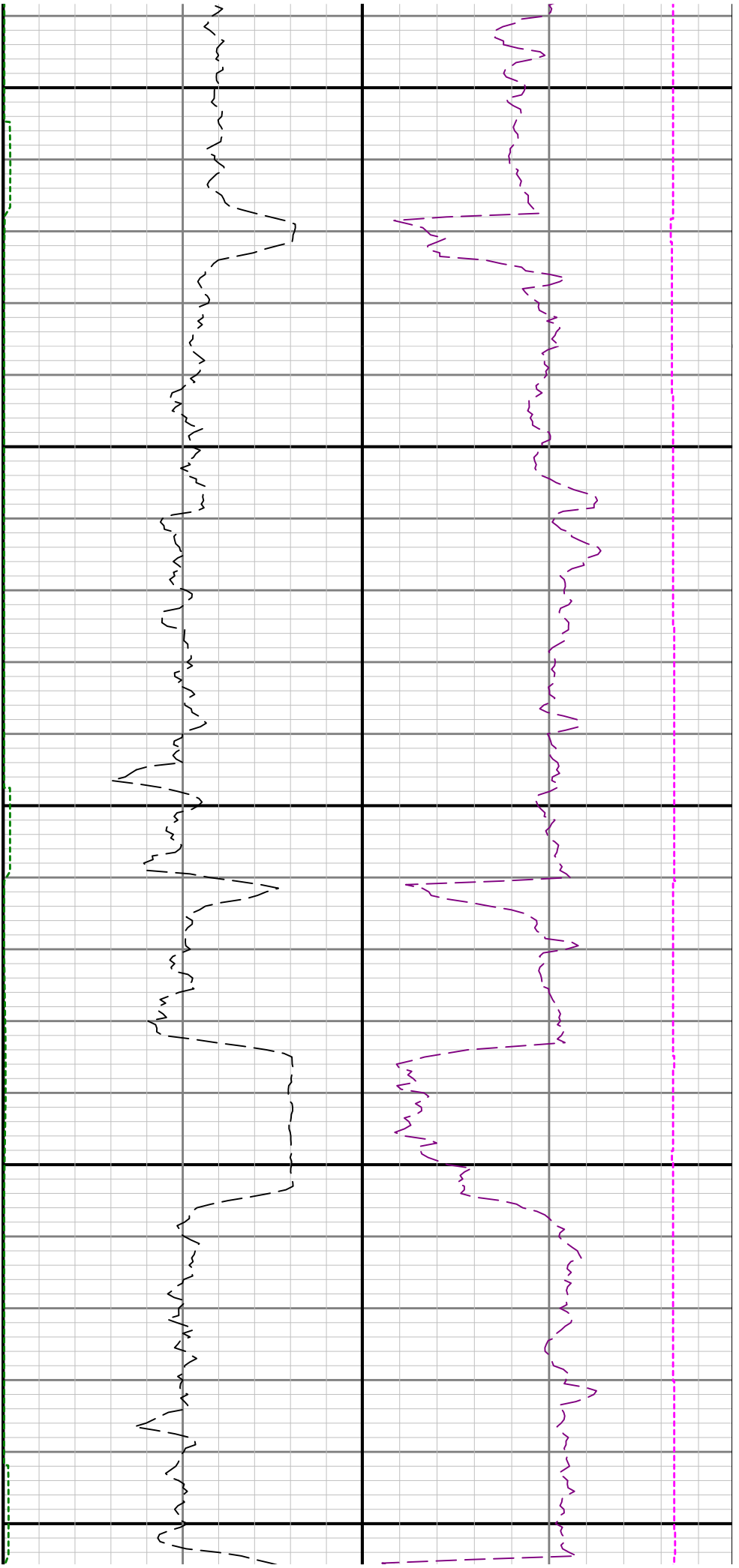


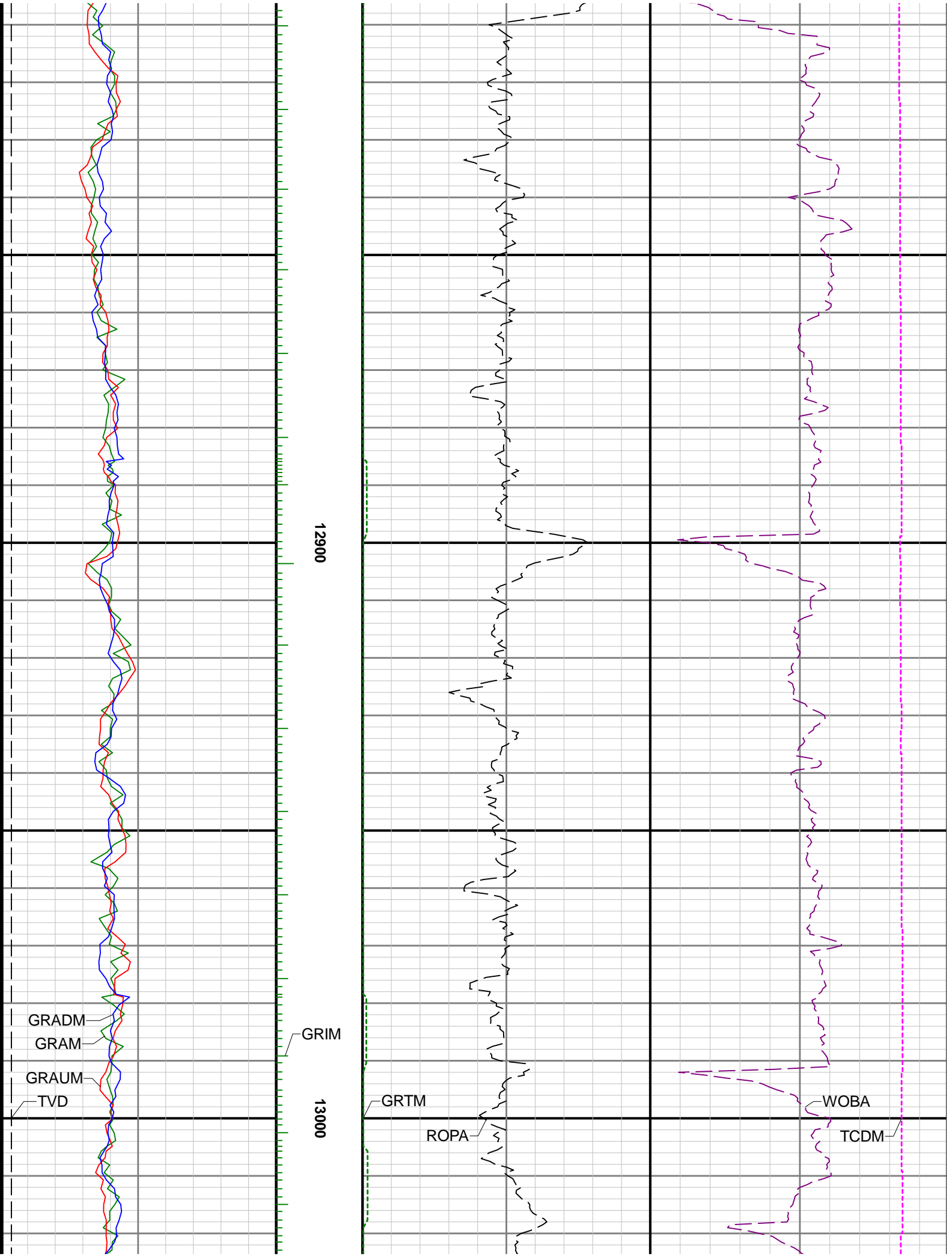
12200

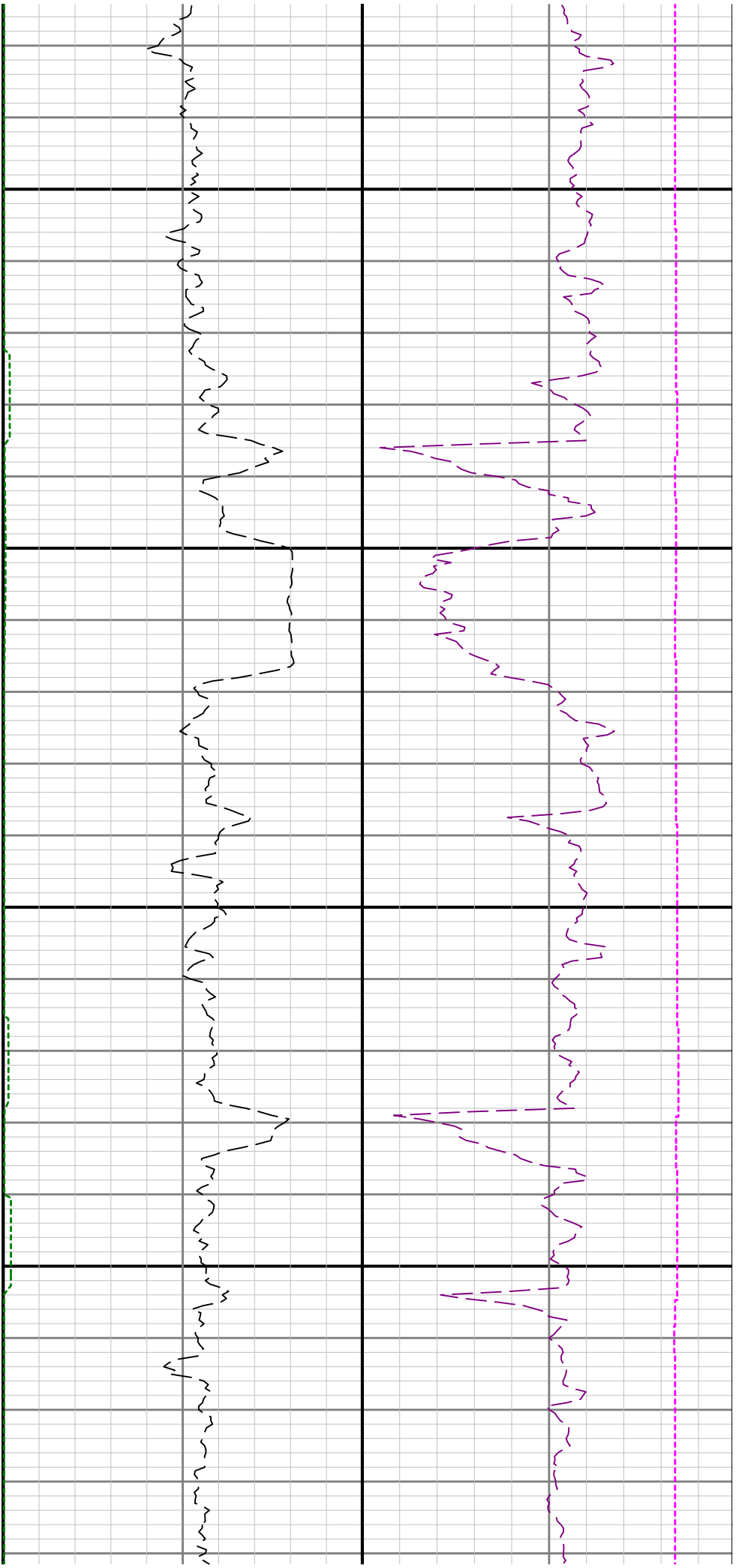
12300











13100

13200

