

LWD REALTIME LOG



Natural Formation Evaluation  
Gamma Ray

Scale:

1:240 MD

Company: Whiting Oil & Gas Corporation

Well: Horsetail #07H-0615

Depth Reference:

Field: Weld County

Driller's Depth

County: Weld

State: Colorado

Status:

Final Print

Surface Location:

Latitude:

Longitude:

Directional  
VSS

Other Services:

API No: 05-123-430430000

Job ID: 7943052

SEC: 7

TWN: 10N

RGE: 57W

Permanent Datum (P.D.): Ground Level

Elevation:

4912.00 ft

KB:

0.00 ft

Log Measured From: Rig Floor

Above P.D.

21.00 ft

DF:

4933.00 ft

GL: 4912.00 ft

Dates

Interval Logged

Magnetic Field Reference

Date From: 2016-06-01 Top: (ft) 5000.00

Azi Reference North: True Dip Angle: (deg) 67.14

Date To: 2016-06-03 Bottom: (ft) 13510.00

Total Magnetic Field Strength: (nT) 52888

Spud Date: 2016-05-31

Mag to Reference North Correction: (deg) 7.34 E

Borehole Record

Casing Record

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

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.500 102.00 2083.00

9.625

36.00

21.00

2073.00

8.500 2083.00 13510.00

Mud Record

Deviation Record

Type From (ft) To (ft)

Hole Size (in)

Interval (ft)

Inc | Azi (Start)

Inc | Azi (End)

Water Based Mud 101.00 13518.15

13.500

1982.00

2.81 | 354.56

6.01 | 173.57

8.500

11435.15

6.01 | 173.57

91.71 | 357.24

Acquisition System

Software Version

Other

Baker Hughes Cadence

G3.2

Rig: Unit 406

Prior Studio

3.2.7268.7

Contractor: Unit Drilling

District: Rocky Mountain

Unit: D & E

"These interpretations and analyses ("Interpretations") are opinions provided by Baker Hughes Oilfield Operations, Inc ("Baker Hughes"), based upon industry practice, empirical relationships, assumptions and measurements, (many of which may be provided by the customer). The Interpretations are not infallible and may be subject to different opinions. Vjwu. "Dcmgt"JwiJgu"fqgu"pqv"ycttcpv"vjgkt"ceewtce{. "eqttgevpguu. "qt"eqorngvgpguu. "qt"vjcv"vjg"ewuvqogtøu"cpflqt"cp{ "vjktf"rctv{øu"tgnkcpeg"qp"uwej"Kpvgtrtgvcvkqpu"yknn"ceeqrnkuj"cp{ "rctvkewnct"tguwnvu0"Vjg"ewuvqogt"cuuwogu"hwnn" responsibility for the use of the Interpretations and for decisions based thereon and the customer agrees to release, defend and indemnify Baker Hughes, its parent, subsidiaries and affiliated or related entities, and subcontractors, together with its and their officers, directors, employees, agents and invitees against, any and all claims, losses, damages, or expenses sustained by the customer or any third party arising out of reliance upon or use of the Interpretations, without regard to the cause(s) thereof, including without limitation any form of negligence on the

part of Baker Hughes. Unless other contract terms have been agreed to by the parties, each party's liabilities and qdnkicvkqpu"ujcnn"dg"iqxgtpgf"d{"Dcmgt"JwiJgu"Kpeqtrqtcvgføu"Yqtnfykfg"Vgtou"cpf"Egpfkvkqpu0\$""

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	4.00	Motor	0.00	0.00	102.00	2083.00	2016-05-31 11:20	2016-05-31 16:03	4.10
2	2	8.500	PDC	2.50	Motor	5000.00	13468.00	2083.00	13510.00	2016-06-01 07:21	2016-06-03 07:40	41.68

Crew

Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Coke Elms		2016-05-30	2016-06-04	Robert Dix		2016-05-30	2016-06-04	Terry Marshall		2016-05-30	2016-06-04
Tyler Wall		2016-05-30	2016-06-04								

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+ (%)
2016-05-30 19:10		1	102.00	Water Based Mud	10.4	12	9	6.0	2 / 86.6	Active Pit	1900	0.00
2016-06-02 09:11		2	5803.00	Water Based Mud	10.4	12	9	6.0	2 / 86.6	Active Pit	1900	0.00
2016-06-03 09:06		2	13518.15	Water Based Mud	10.4	13	9.2	6.0	3 / 85.3	Active Pit	1900	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	NaviGamma	13022836	Gamma (single)	12.50	48.57	5.250	3.250
1	NaviGamma	13022836	VSS	15.87	51.94	5.250	3.250
1	NaviGamma	13022836	Directional (mag)	15.87	51.94	5.250	3.250
2	NaviGamma	694	Gamma (single)	10.95	41.68	6.500	3.250
2	NaviGamma	694	Directional (mag)	14.36	45.09	6.500	3.250
2	NaviGamma	694	VSS	14.36	45.09	6.500	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
GAM	NaviGamma	Probe Based Gamma Module, NaviTrak Platform

Comments


- 1 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.
- 2 A sliding indicator is shown to the left edge of track 1 as a heavy line. The indicator has been depth-shifted to the Gamma Ray sensor offset to correspond with Gamma Ray data acquired while sliding.
- 3 Baker Hughes run 1 utilized an 8.250 inch NaviGamma (Directional and Gamma Ray) tool behind a 13.500 inch bit and steerable assembly from 102.00 to 2083.00 feet MD (102.00 to 2071.71 feet TVD).
- 4 Baker Hughes run 2 utilized a 6.500 inch NaviGamma (Directional and Gamma Ray) tool behind an 8.500 inch bit and steerable assembly from 2083.00 to 13510.00 feet MD (2071.71 to 5820.55 feet TVD).

## Remarks

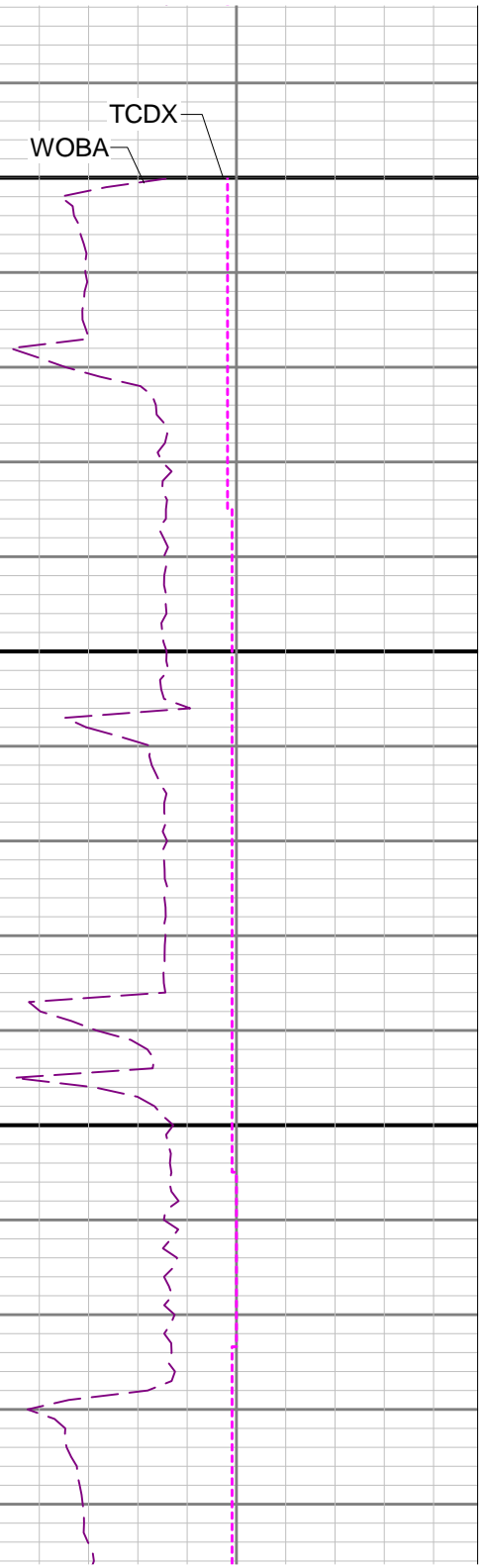
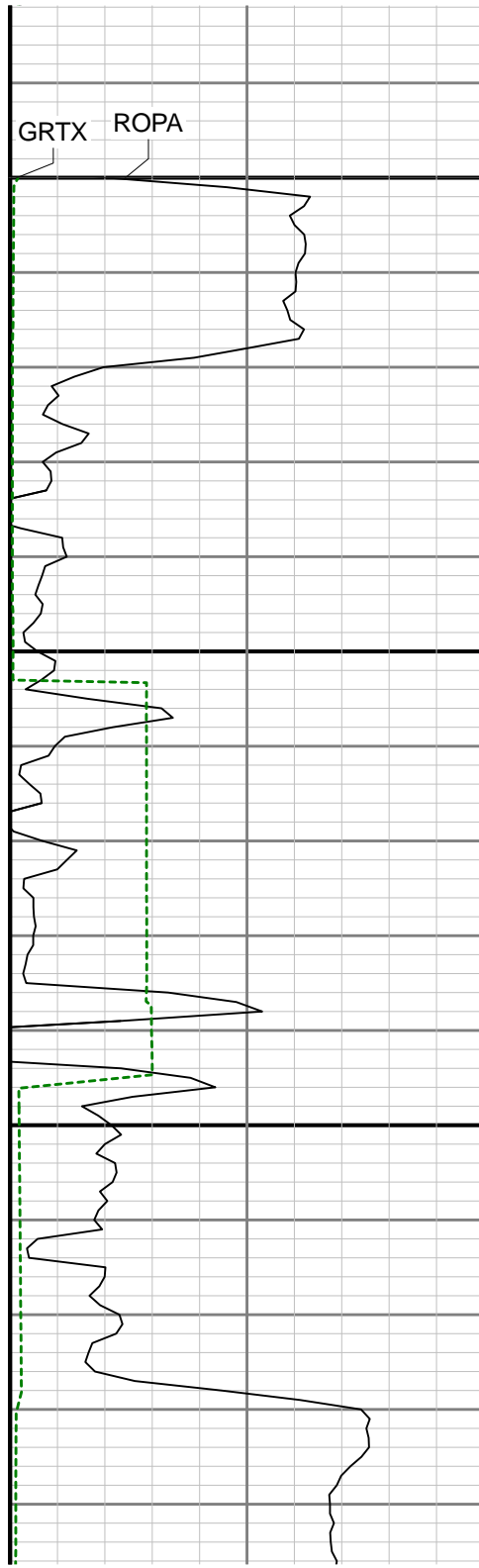
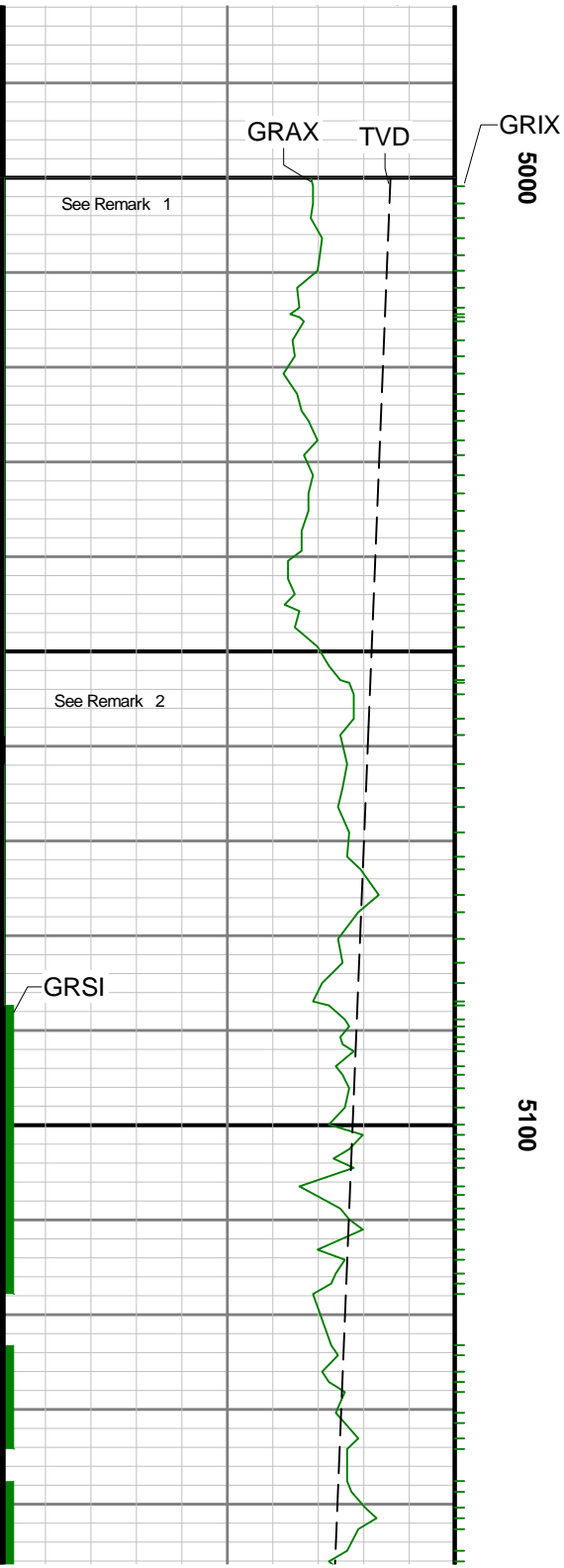
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5000.00	8.500	2	Baker Hughes logging services began at 5000.00 feet MD (4969.37 feet TVD).
2	5052.00	8.500	2	The interval from 5052.00 to 5094.00 feet MD (5021.36 to 5063.36 feet TVD) was logged 3 hours after being drilled due to sensor to bit offset and a scheduled short trip out to pick up additional drilling tools.
3	13468.00	8.500	2	The interval from 13468.00 to 13510.00 feet MD (5821.68 to 5820.55 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

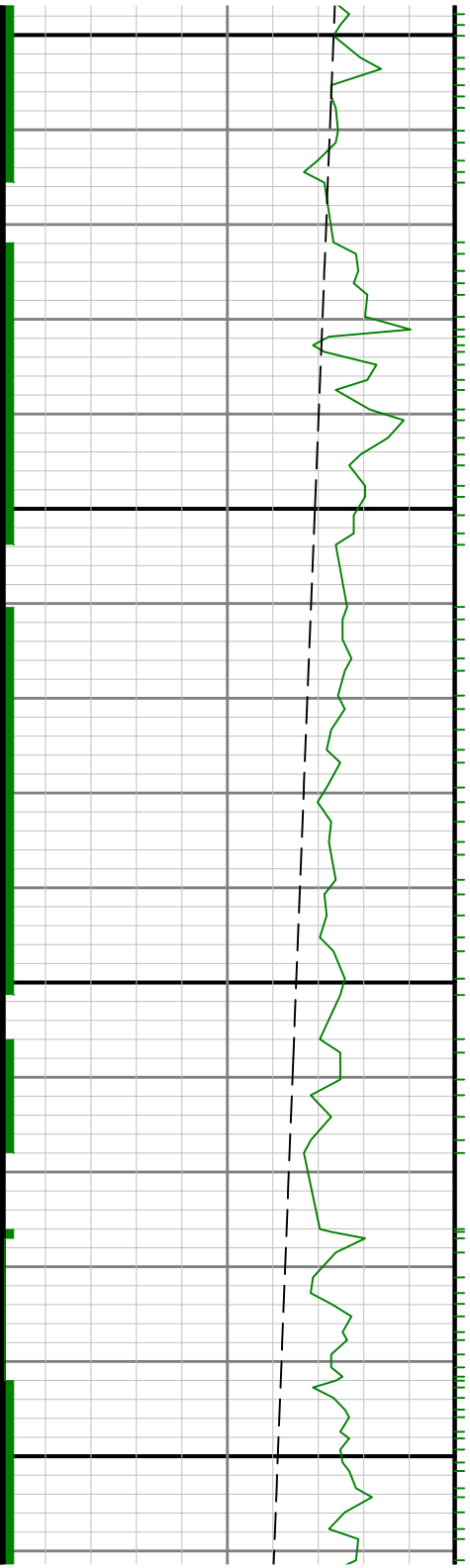
## Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
GRAX	Gamma Ray - Apparent 0.5 ft Average	API
GRIX	Gamma Ray - Data Point Indicator	unitless
GRTX	Gamma Time Since Drilled	min
GRSI	Sliding Indicator Flag	unitless
TCDX	Downhole Temperature	degF
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb

	Company	Whiting Oil & Gas Corporation			
	Well	Horsetail #07H-0615			
	Interval	Date From:	2016-06-01 13:28	Top:	5000.00
		Date To:	2016-06-03 06:49	Bottom:	13510.00
	Created	2016-06-05 08:20			

Gamma Ray Apparent 0.5 ft Average GRAX	MD 1240 feet	Rate of Penetration 3 ft Average ROPA	Surface Weight On Bit 1 ft Average WOBA
0 150		1000 0	0 100
API		ft/h	klb
True Vertical Depth TVD		Gamma Ray Time Since Drilled GRTX	Downhole Temperature TCDX
6000 4800		0 600	0 300
ft		min	degF

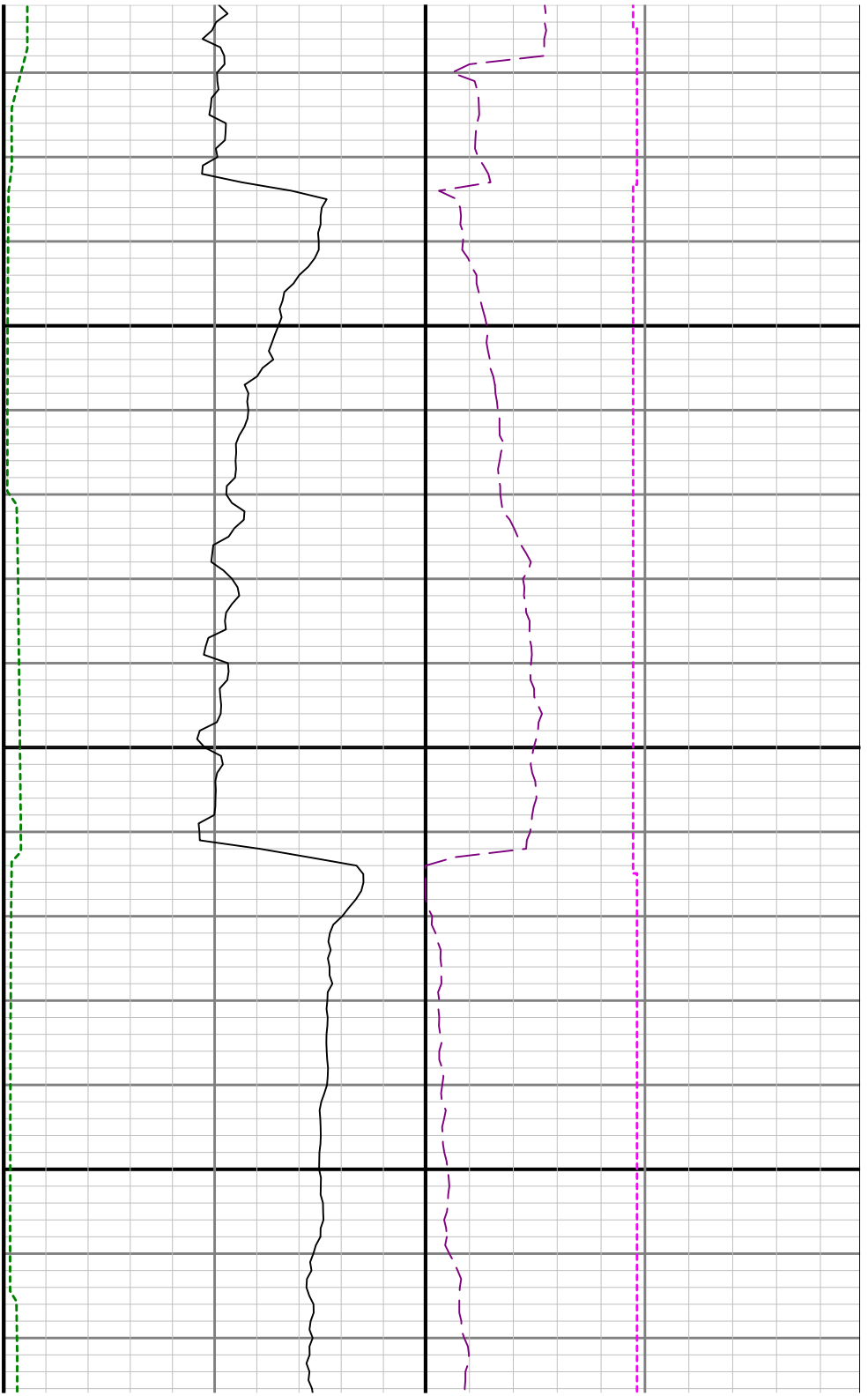




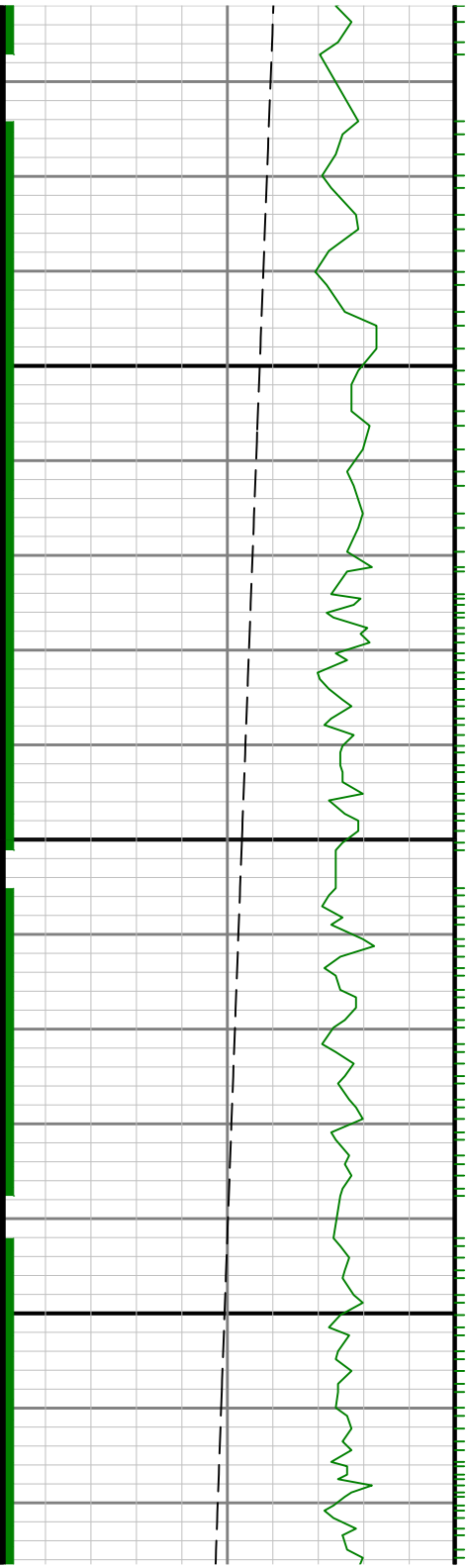
5200

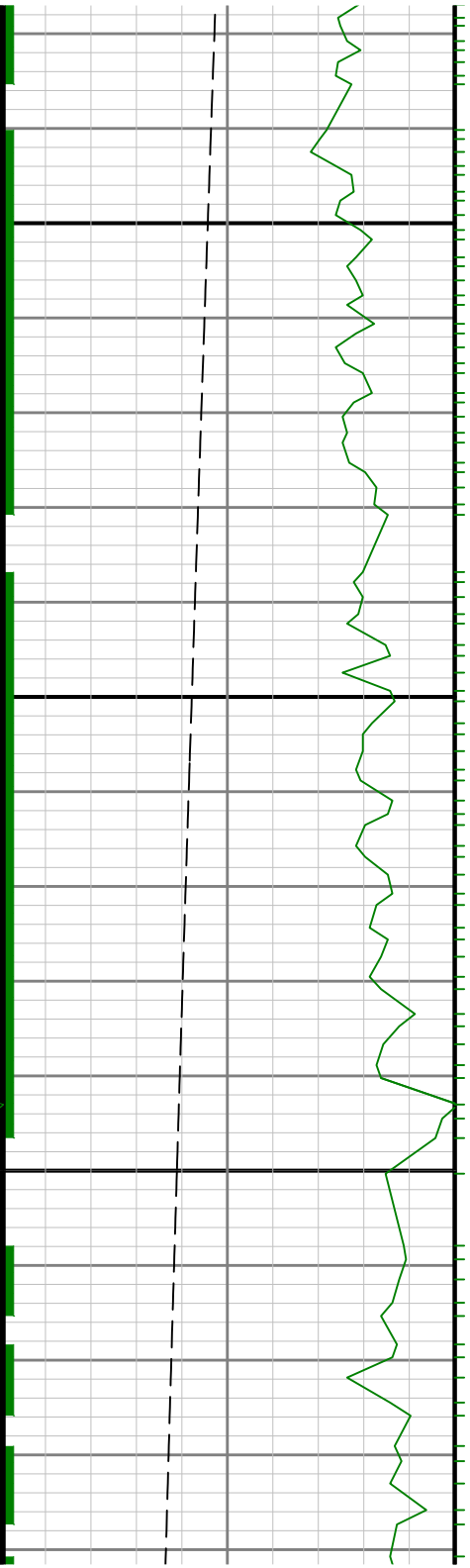
5300





5400

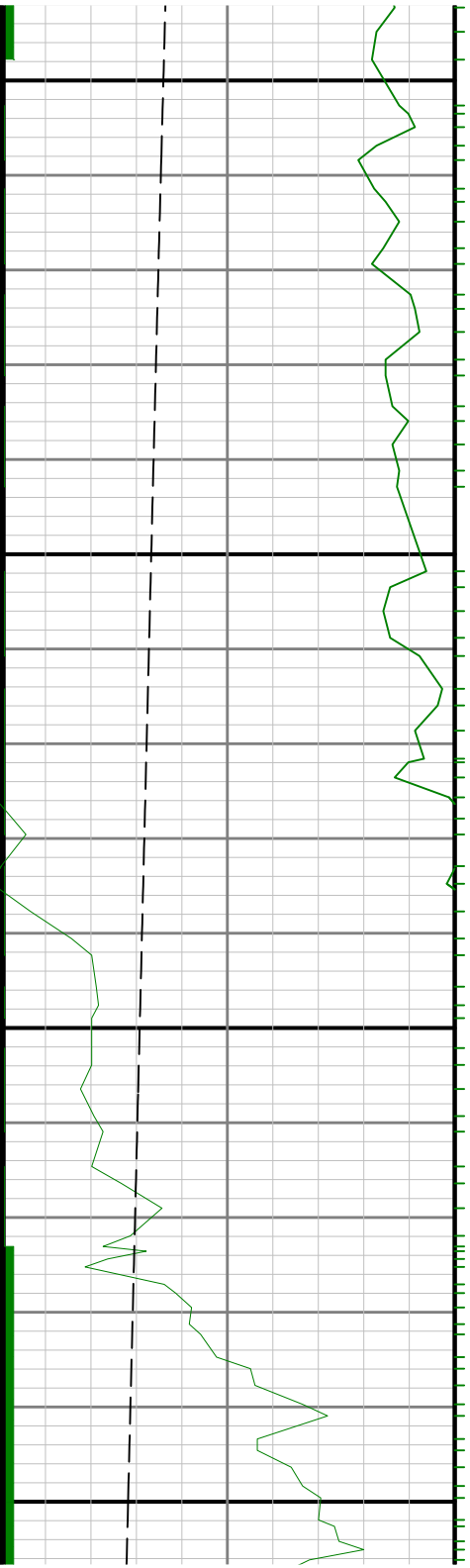




5500

5600



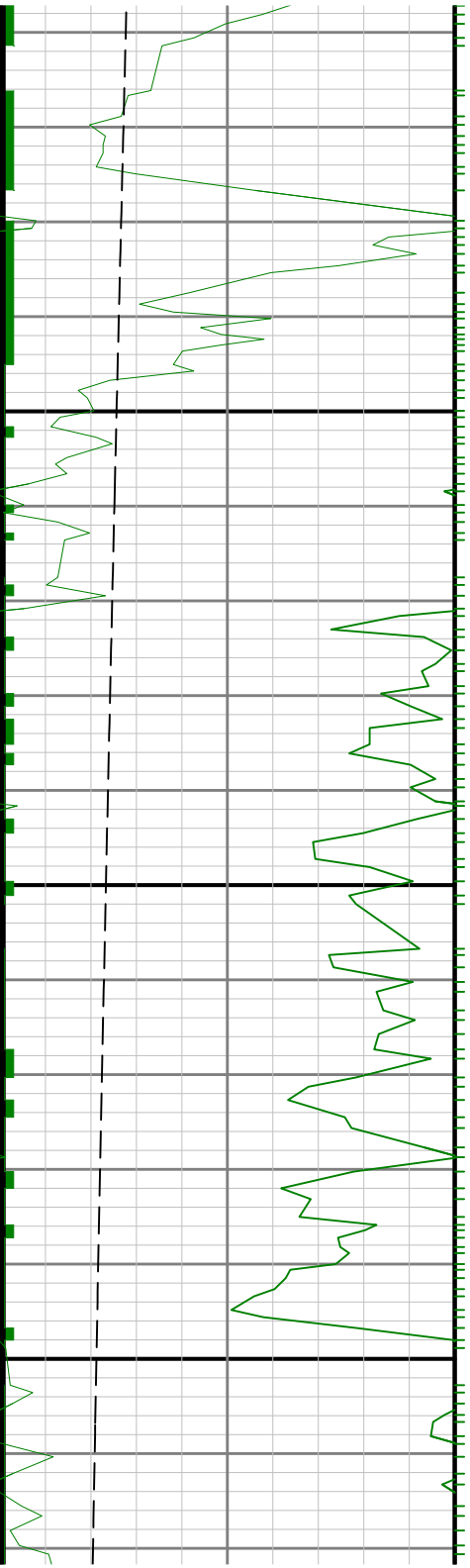


5700

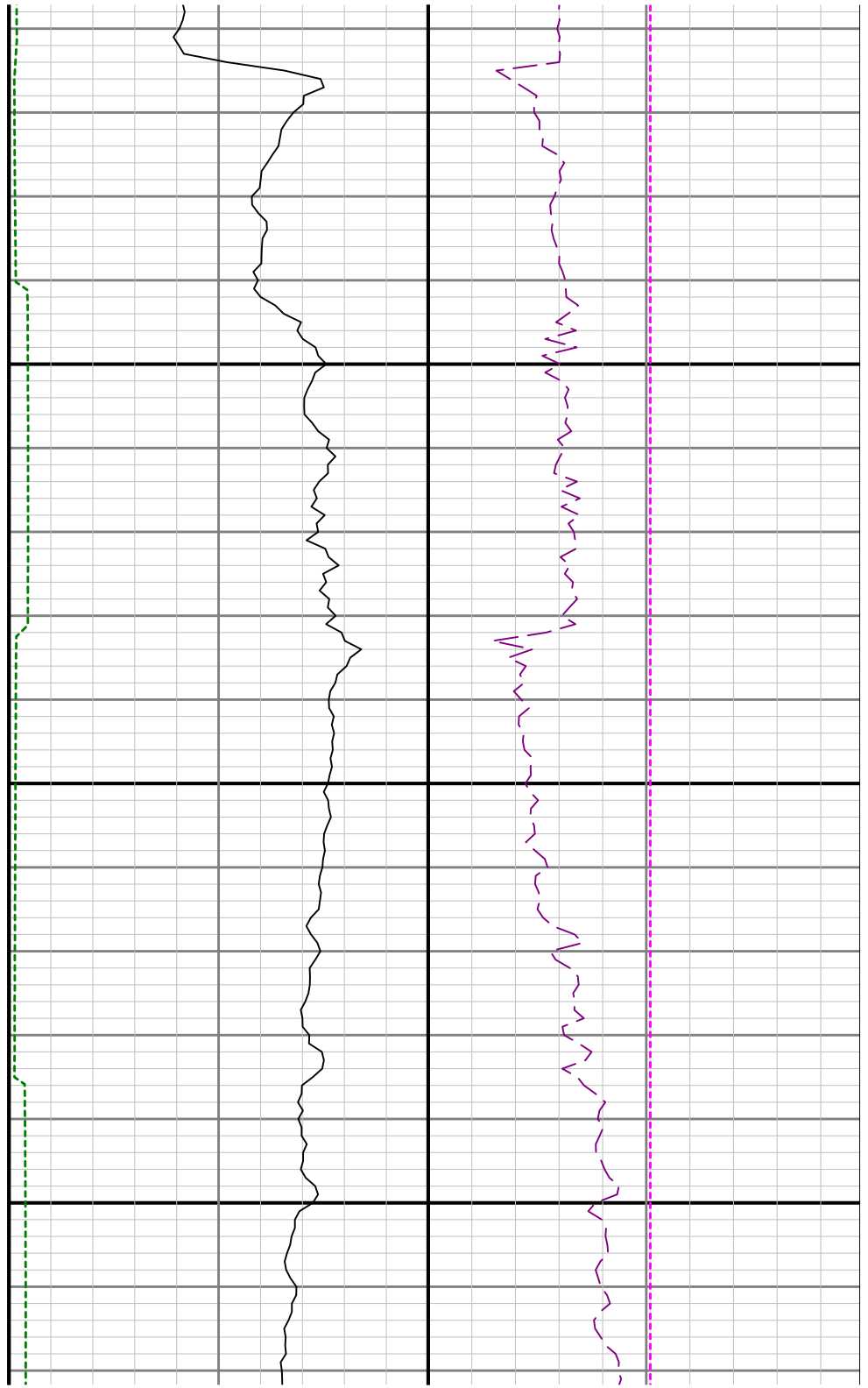
5800

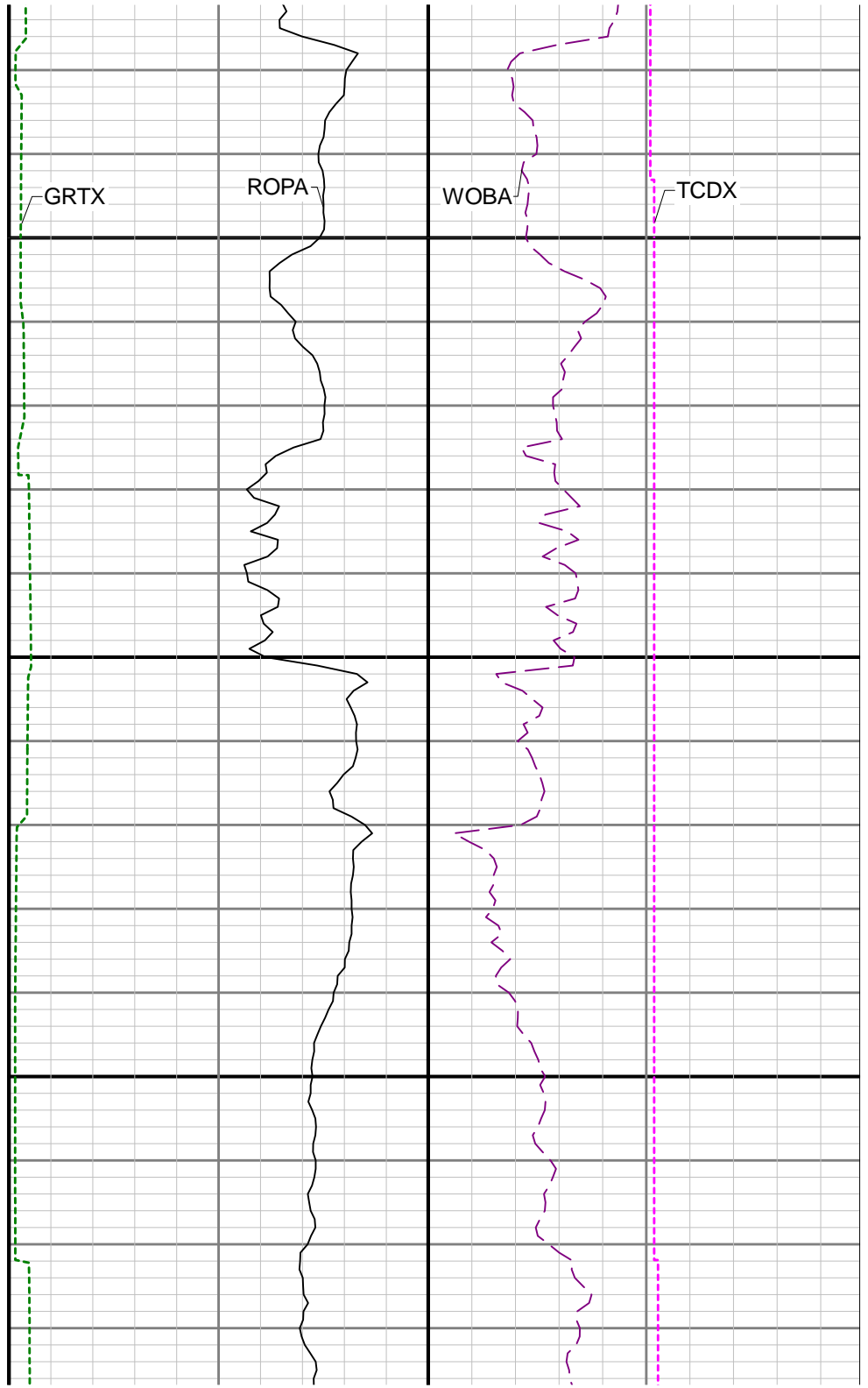
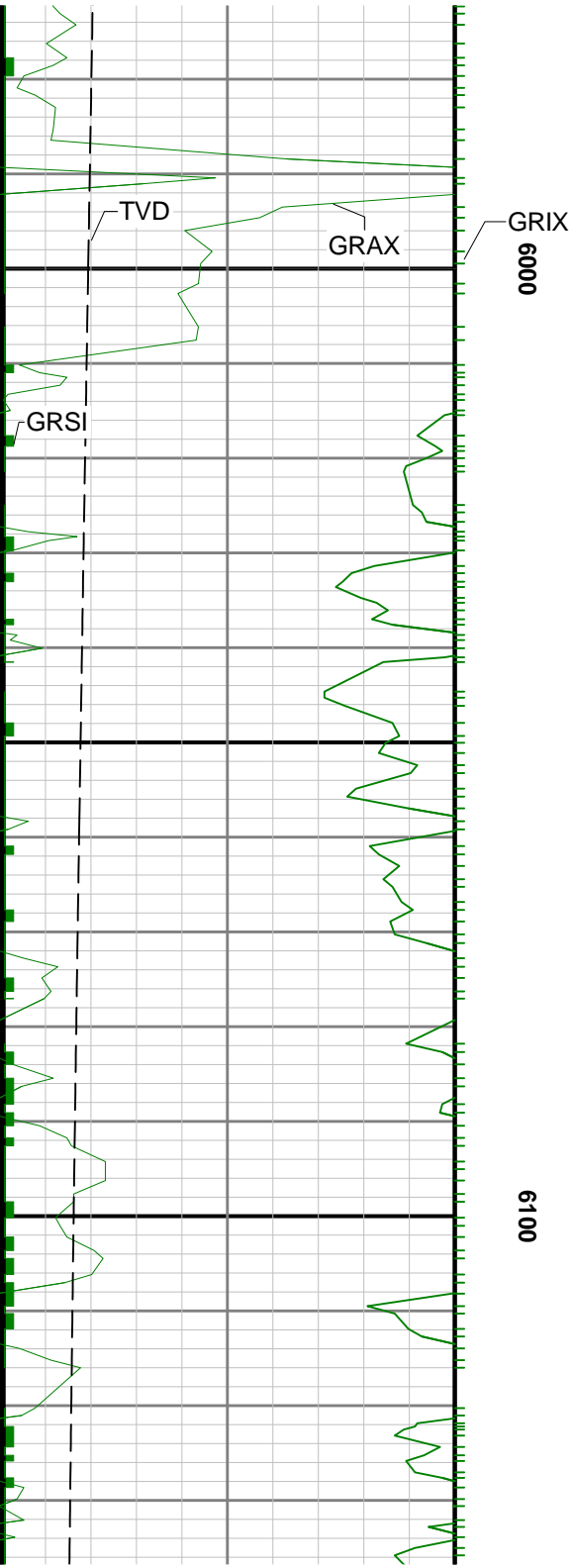


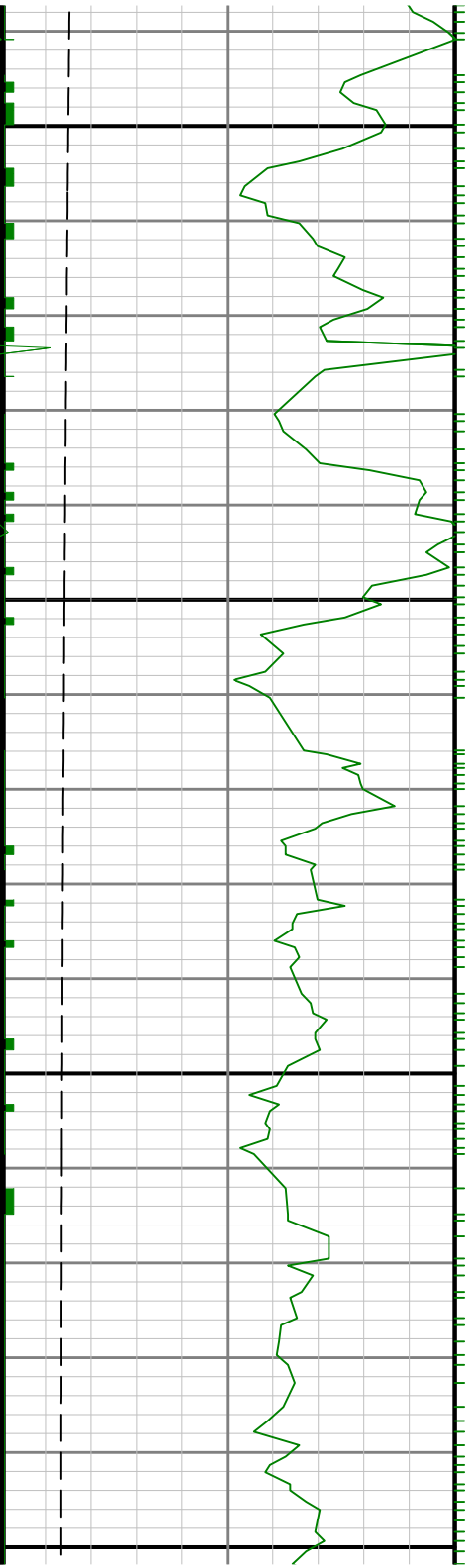




5900

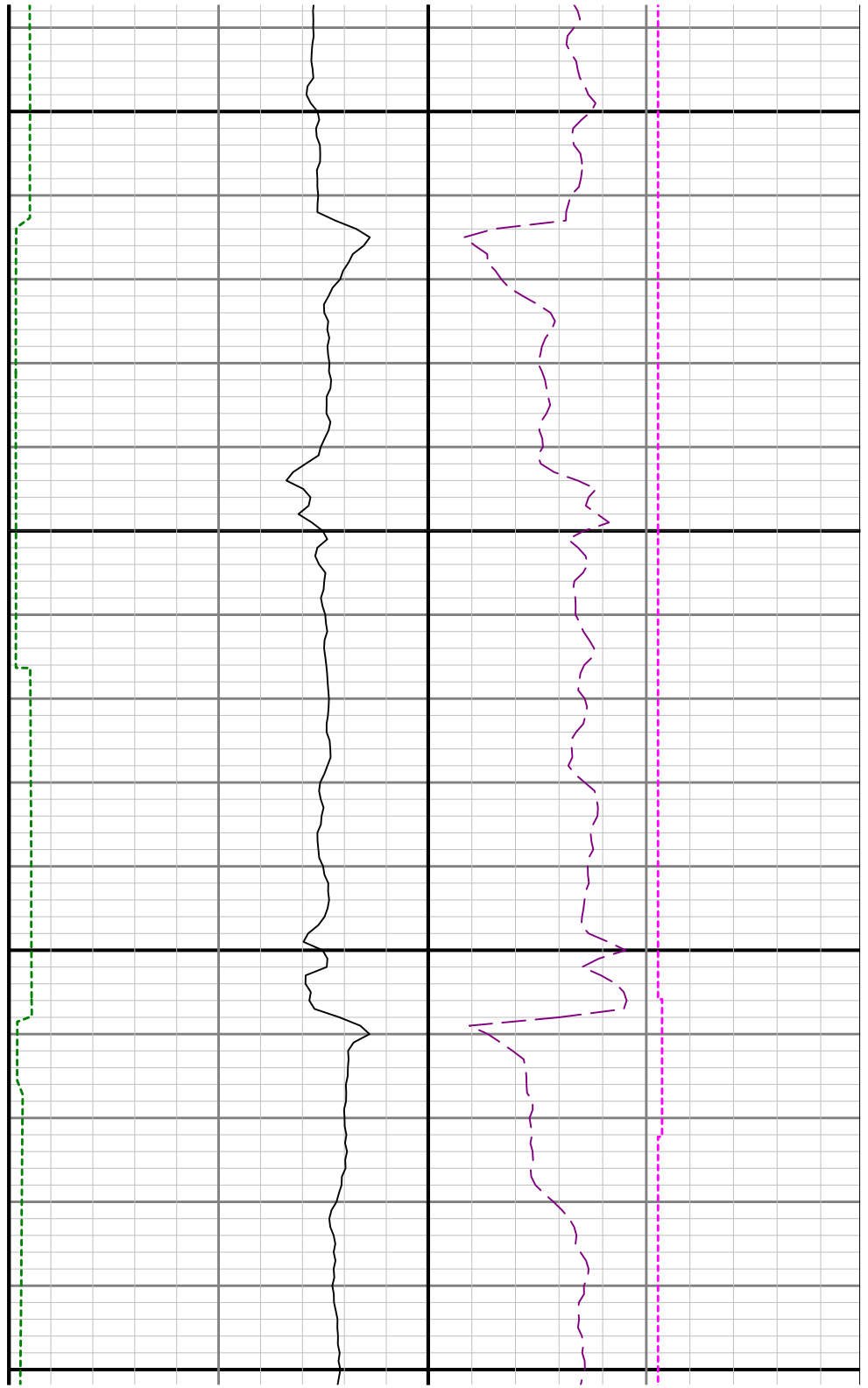






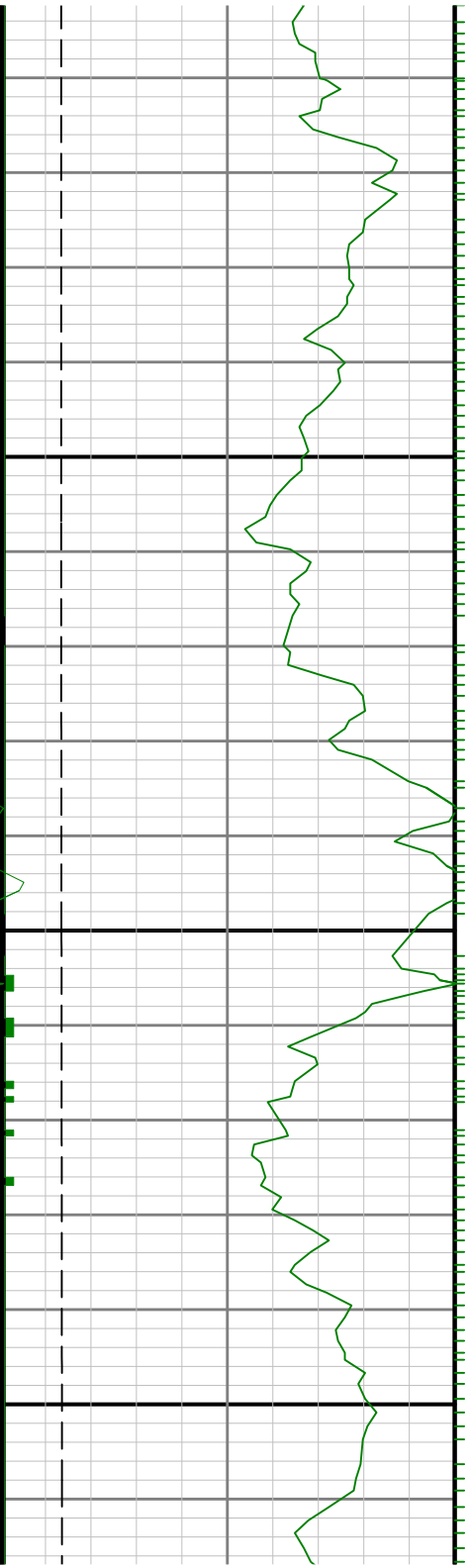
6200

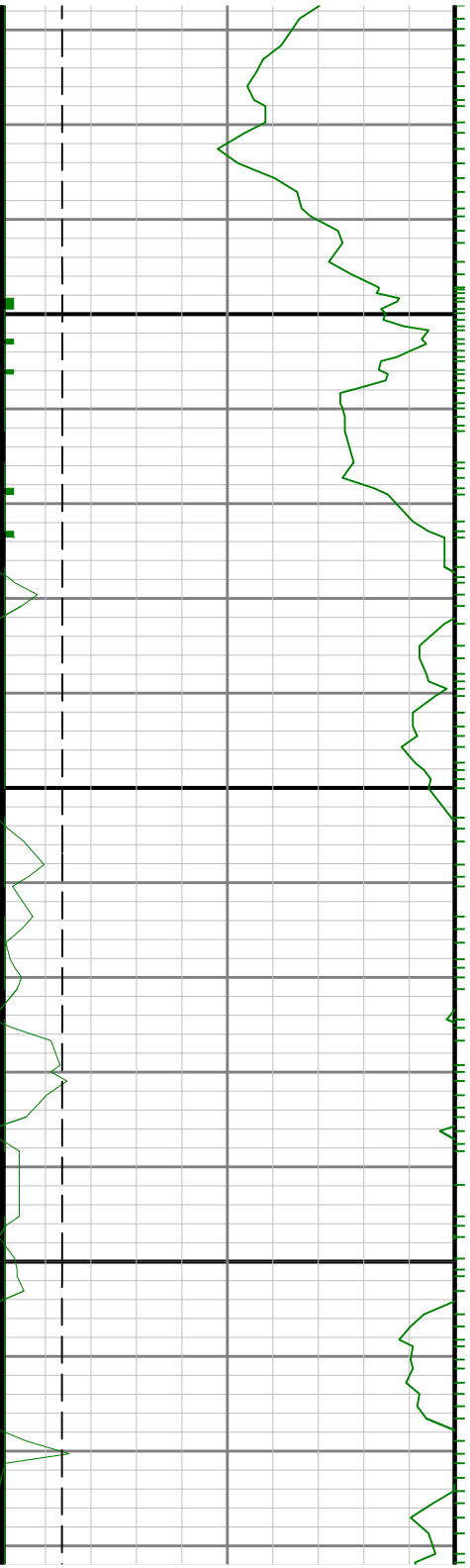
6300





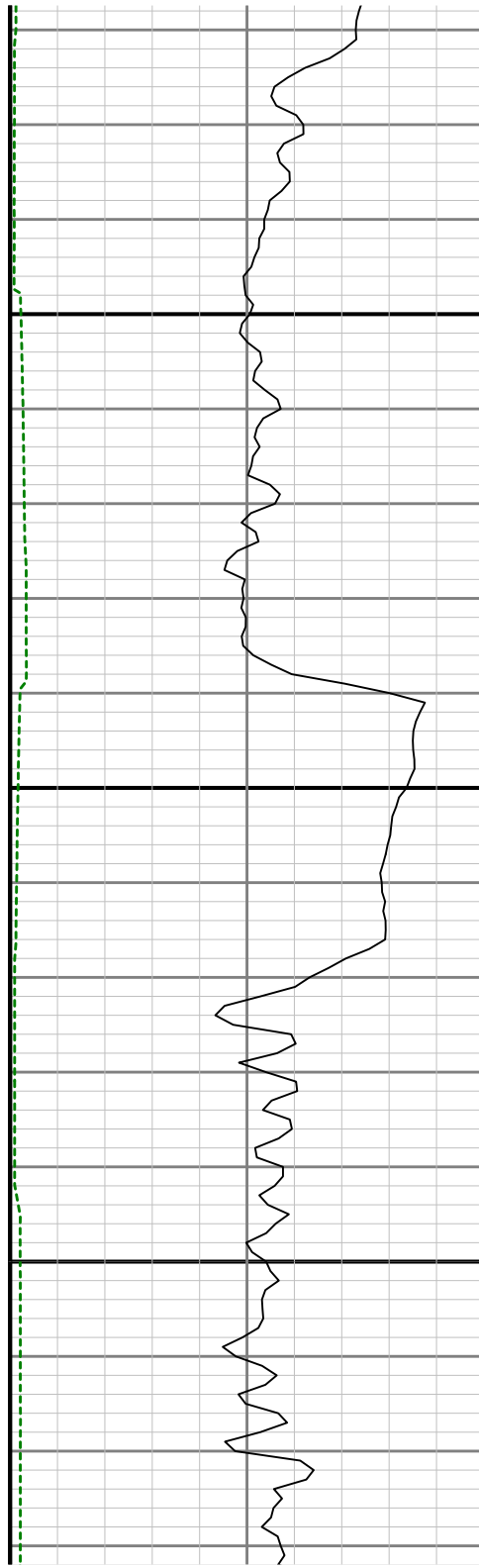
6400

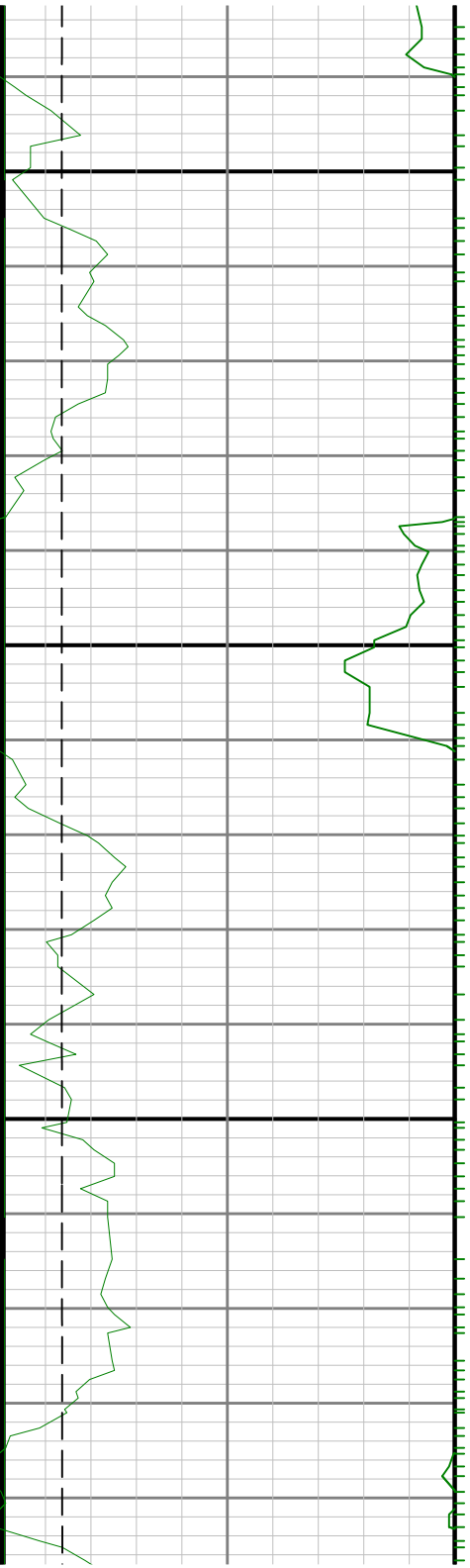




6500

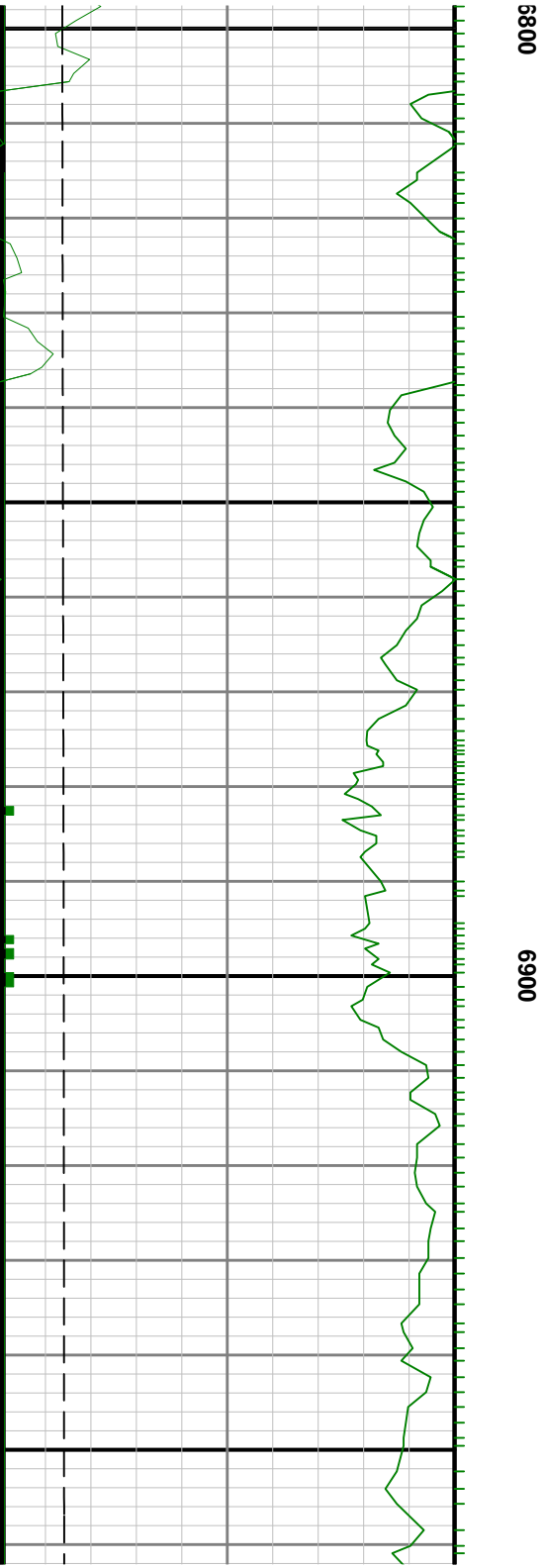
6600

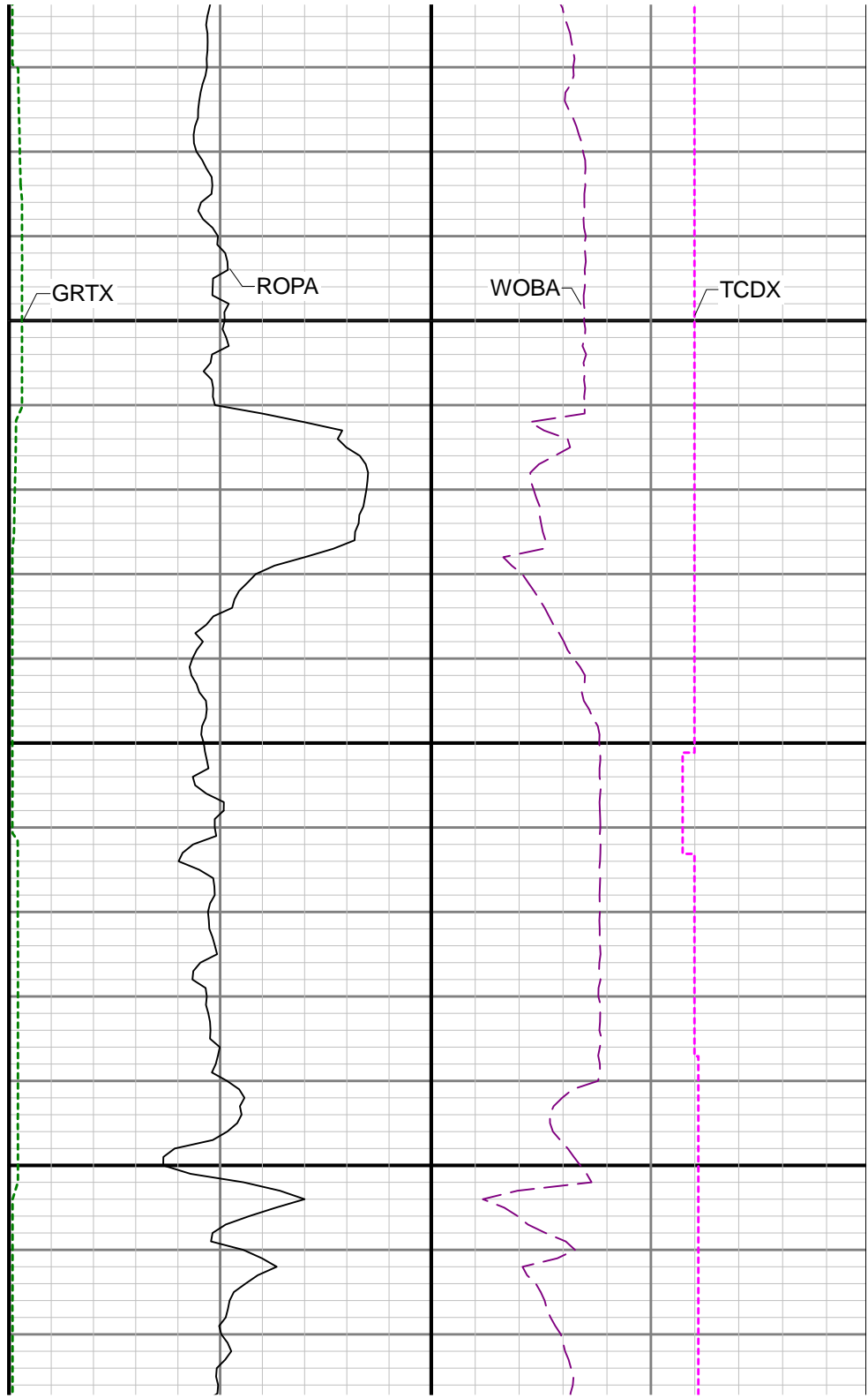
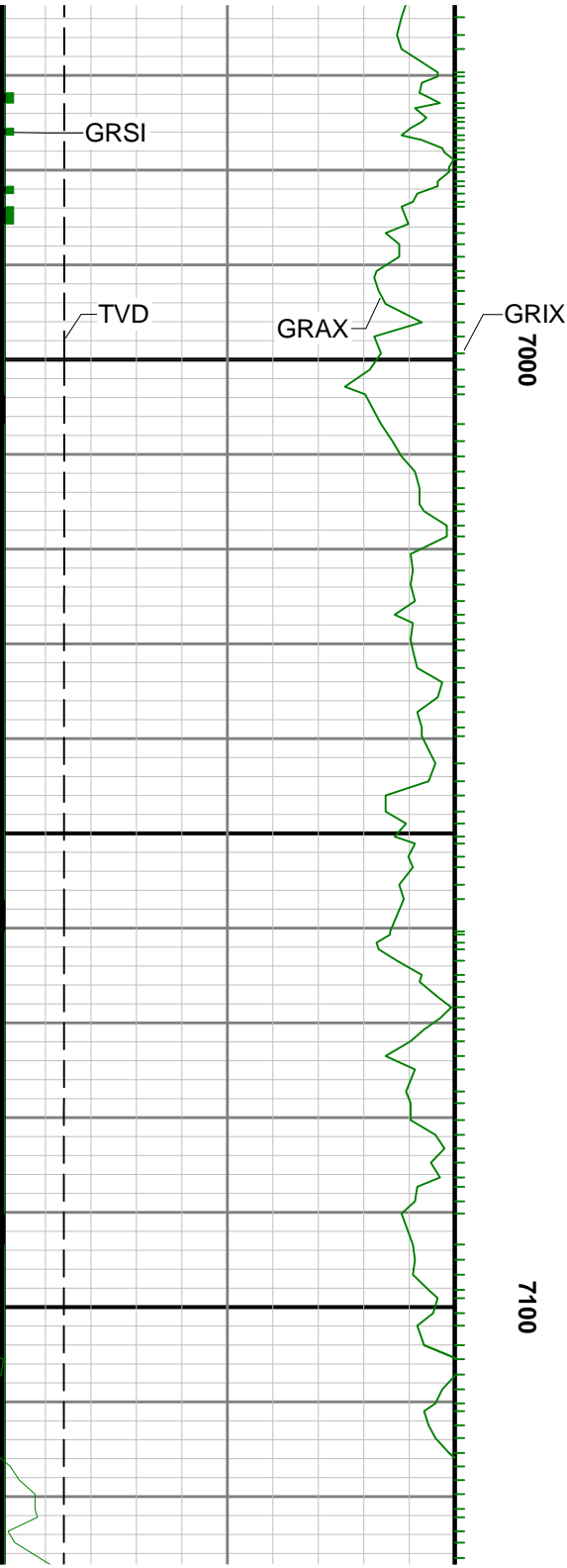




6700



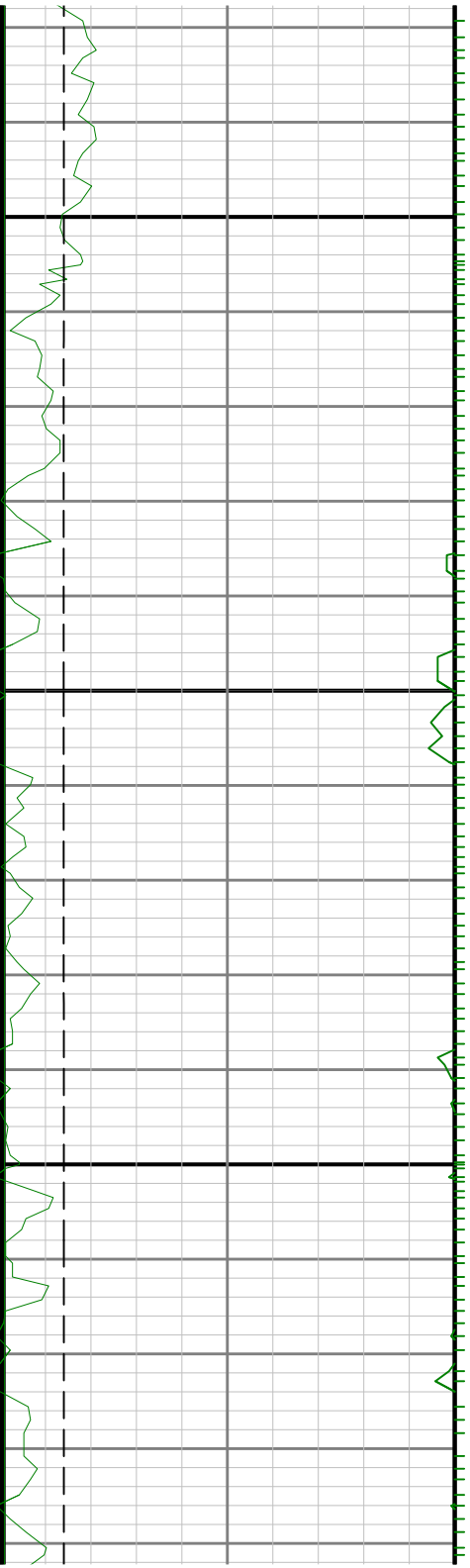


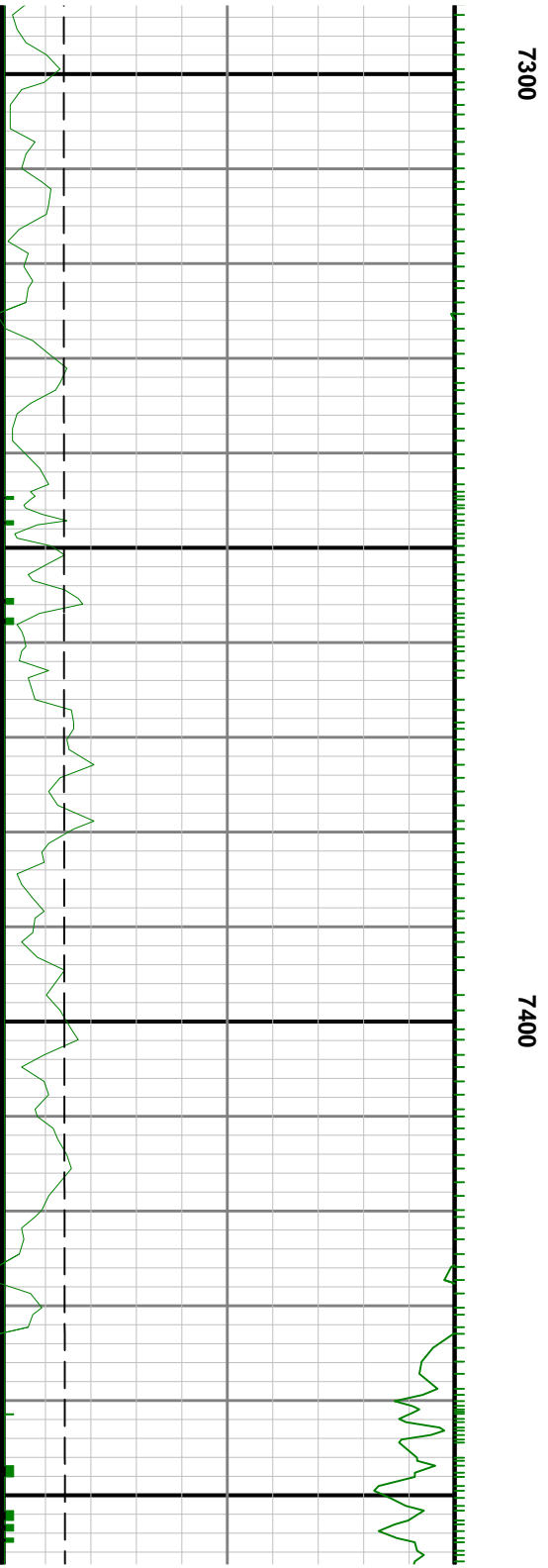


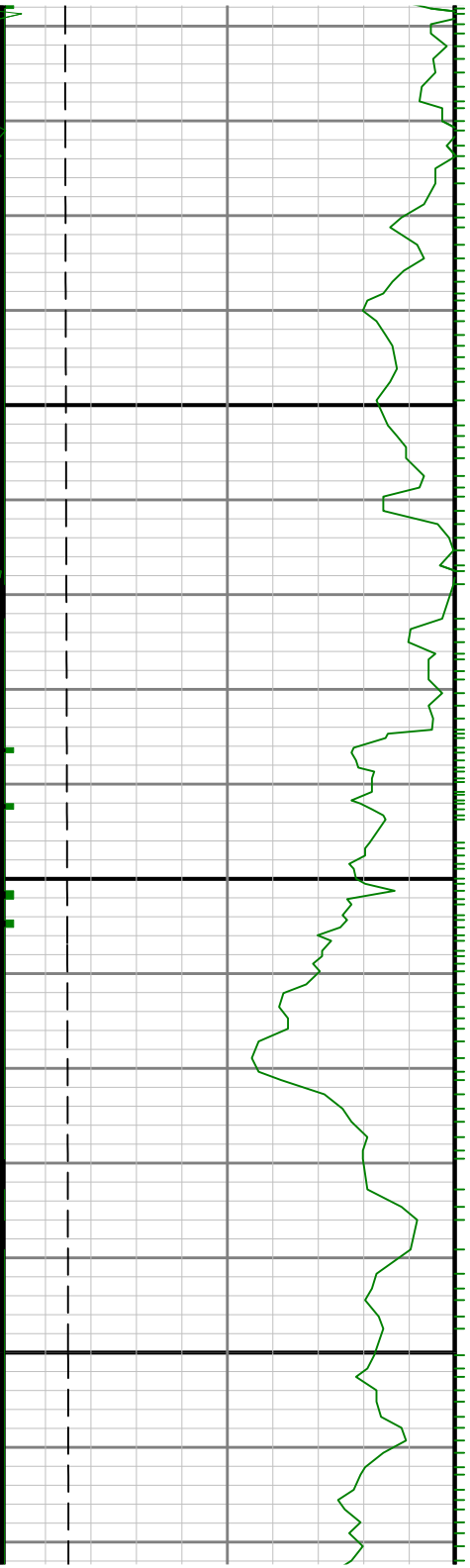




7200

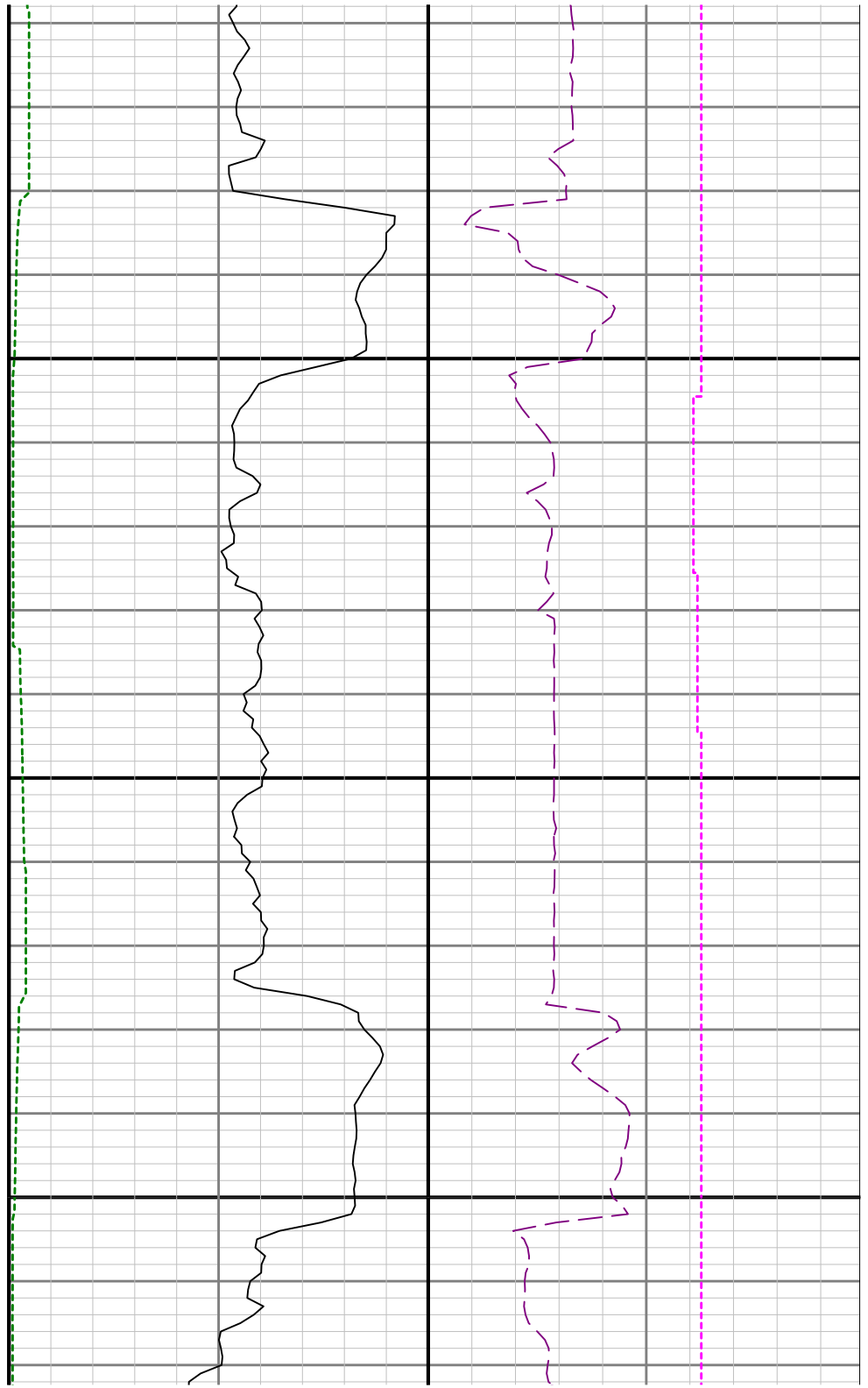


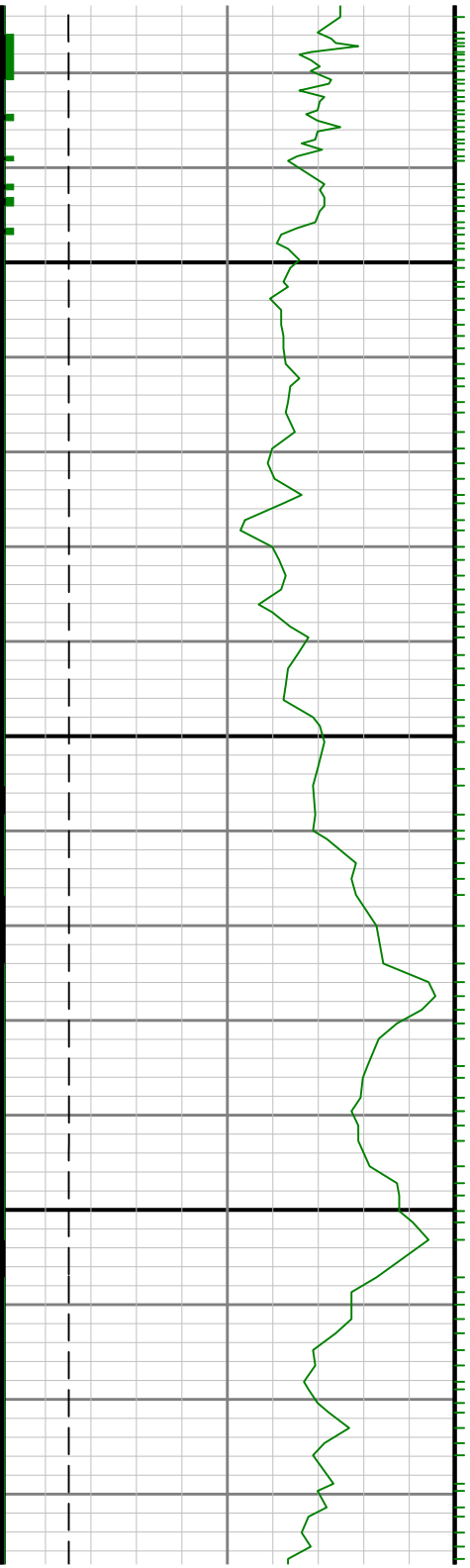




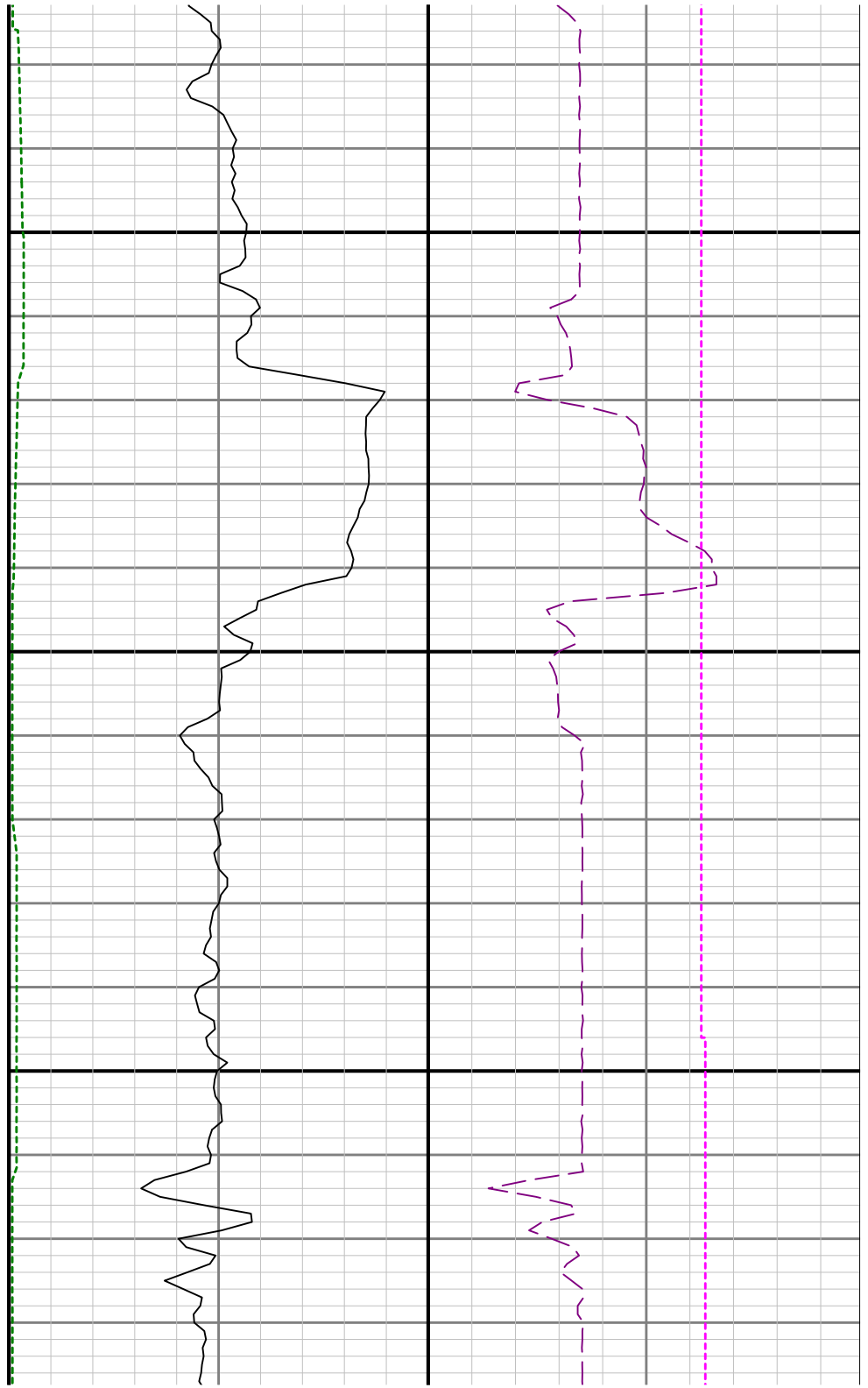
7500

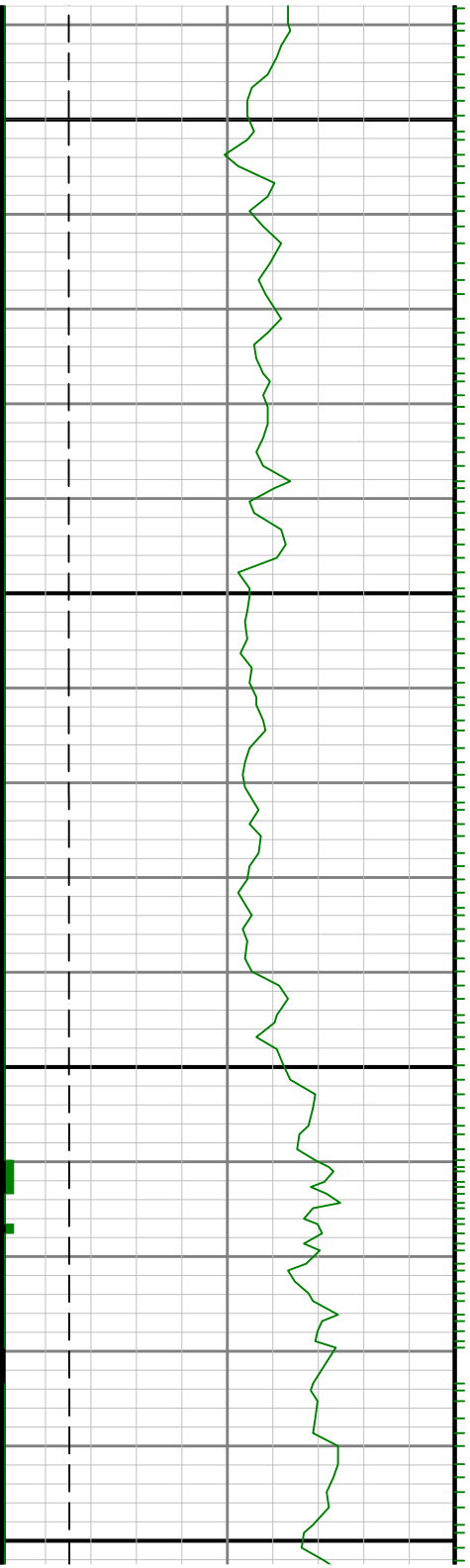
7600





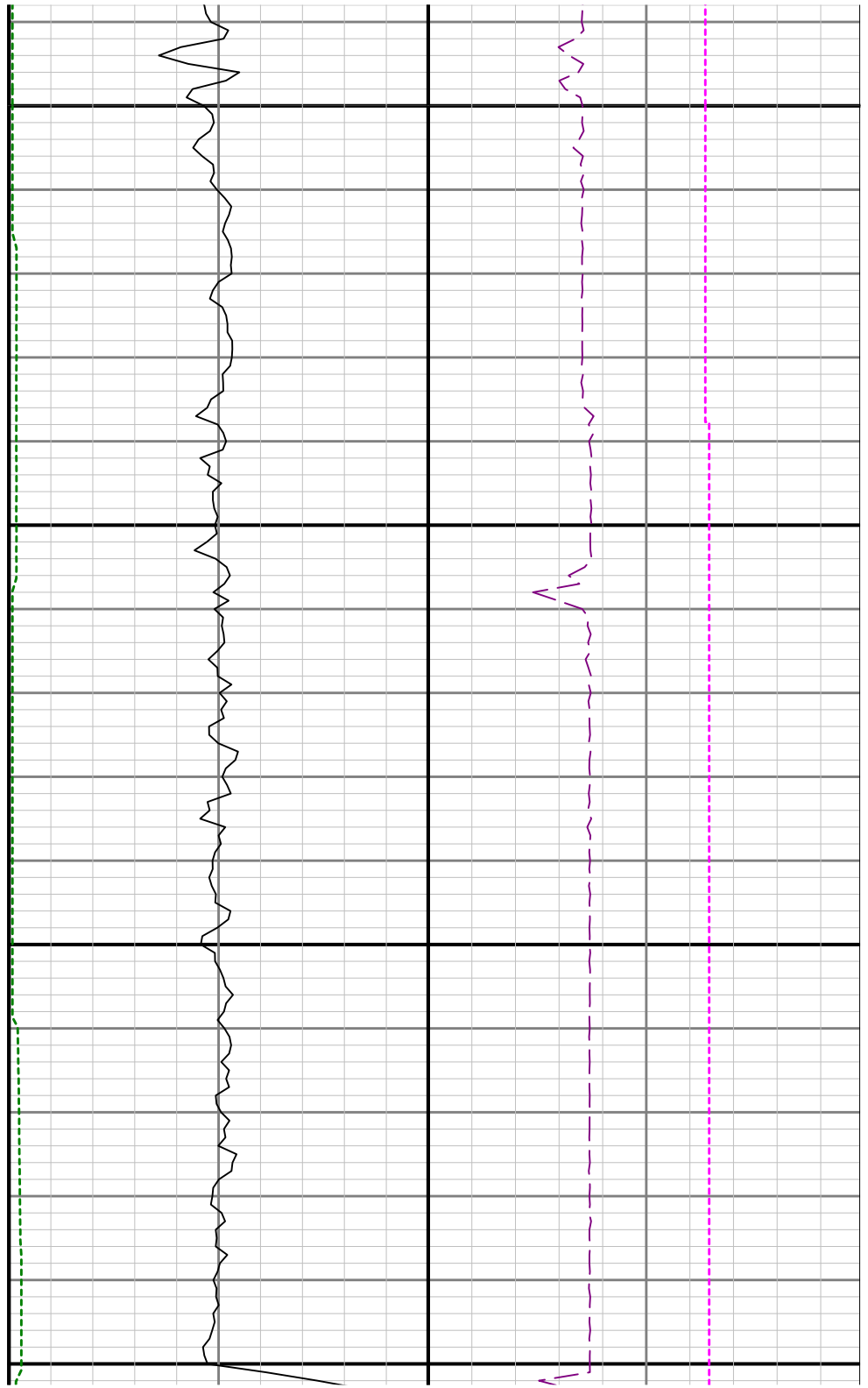
7700

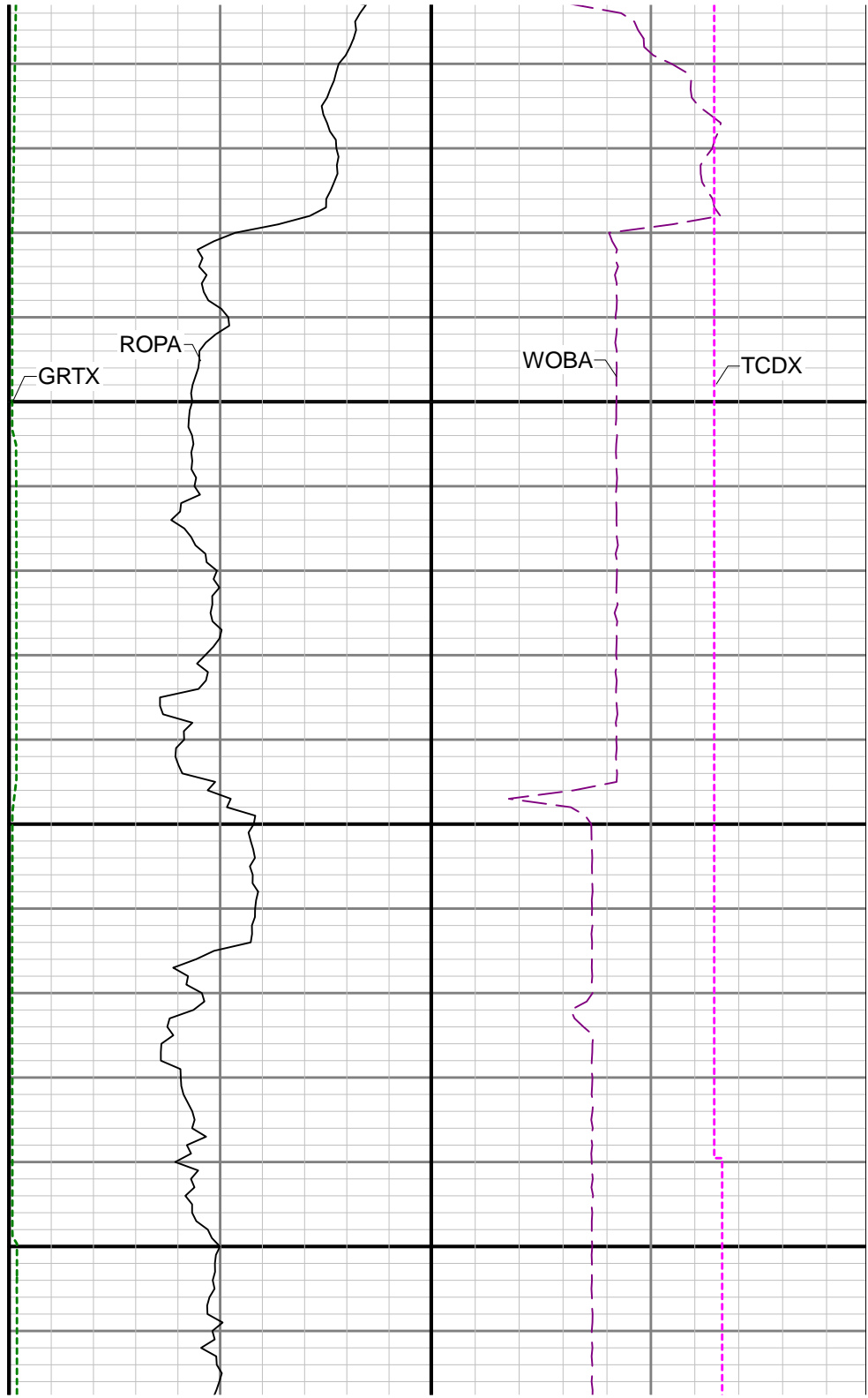
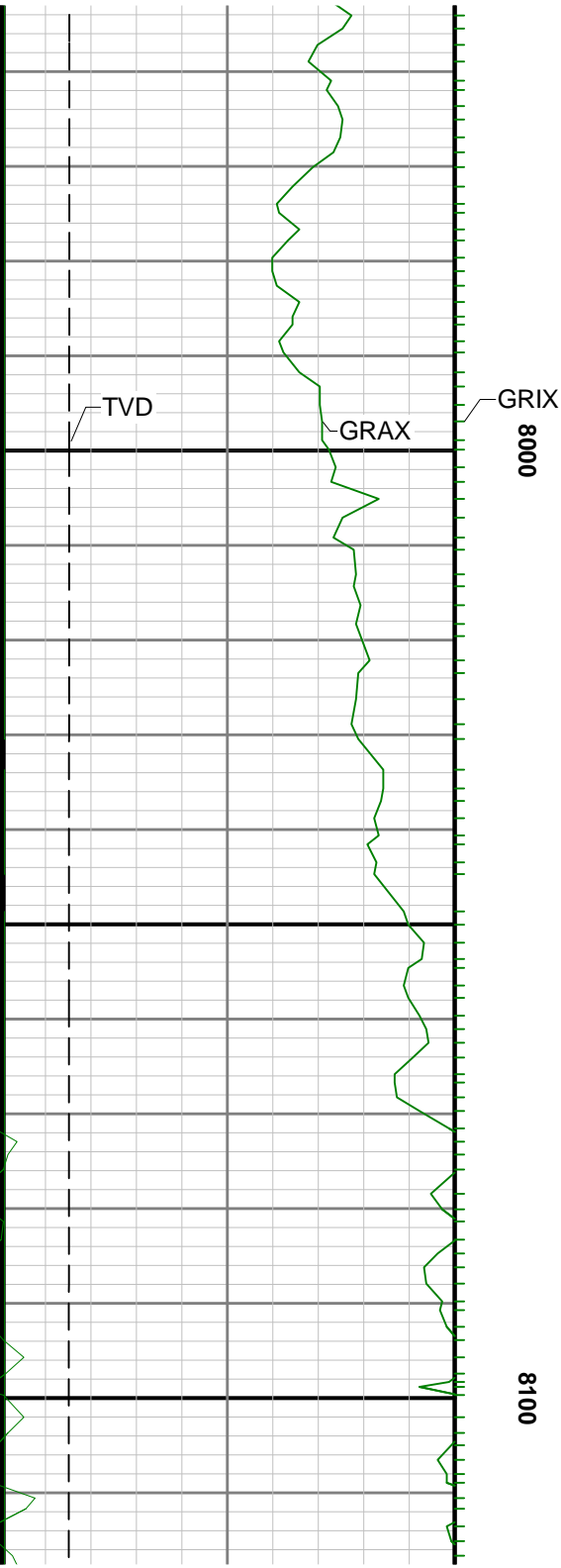


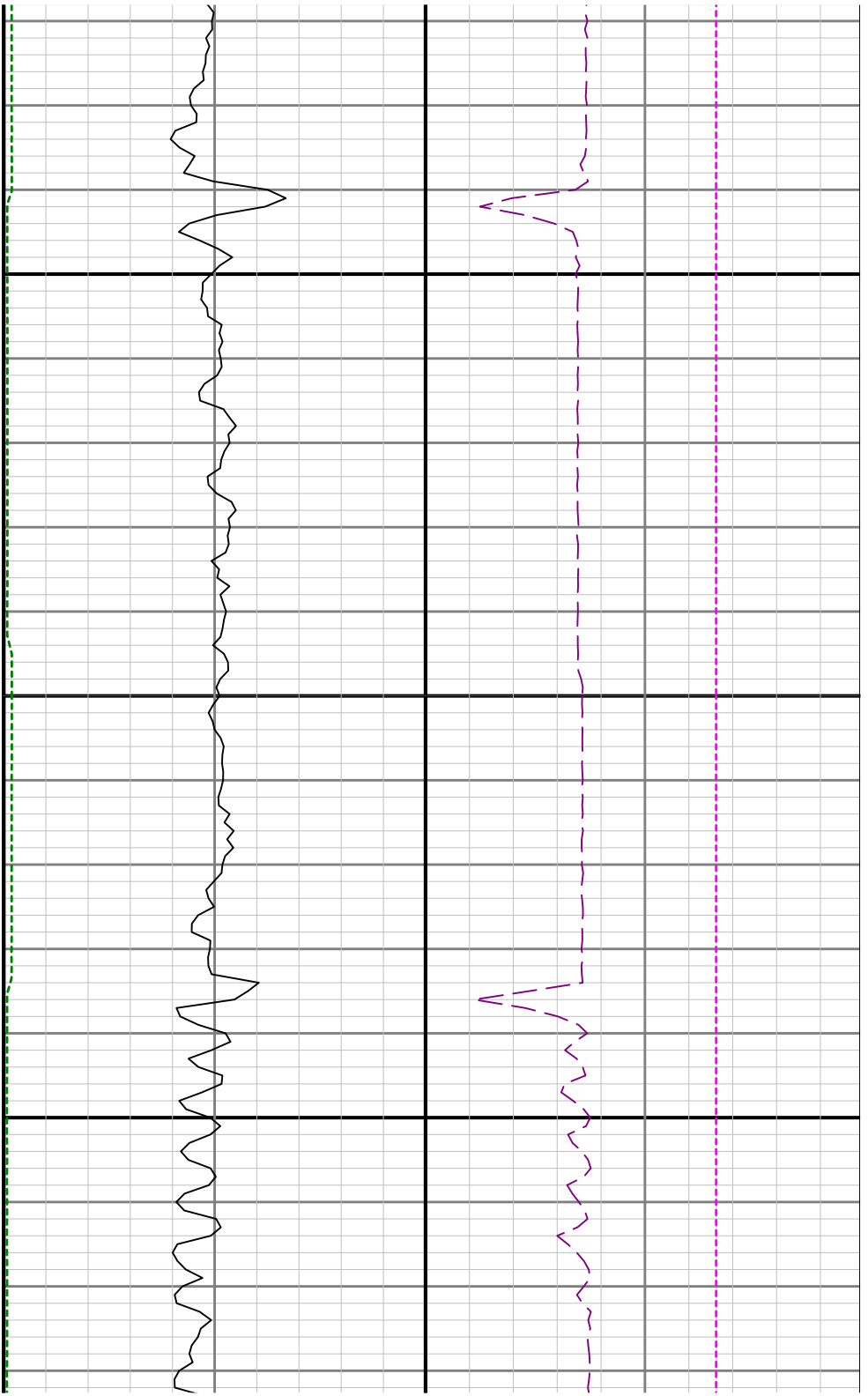


7800

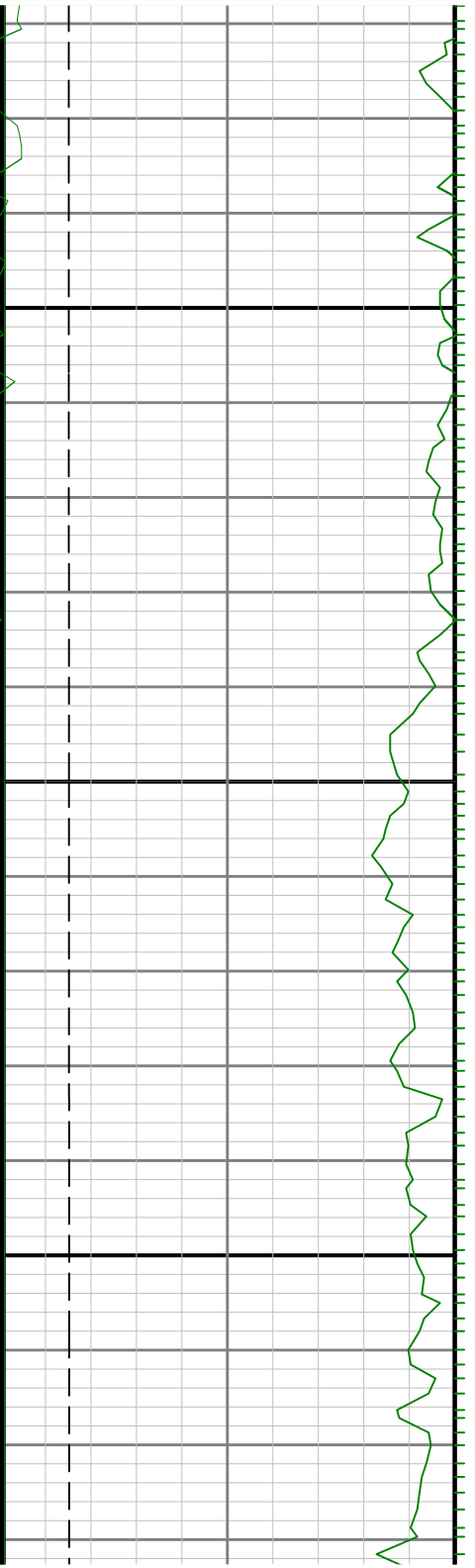
7900

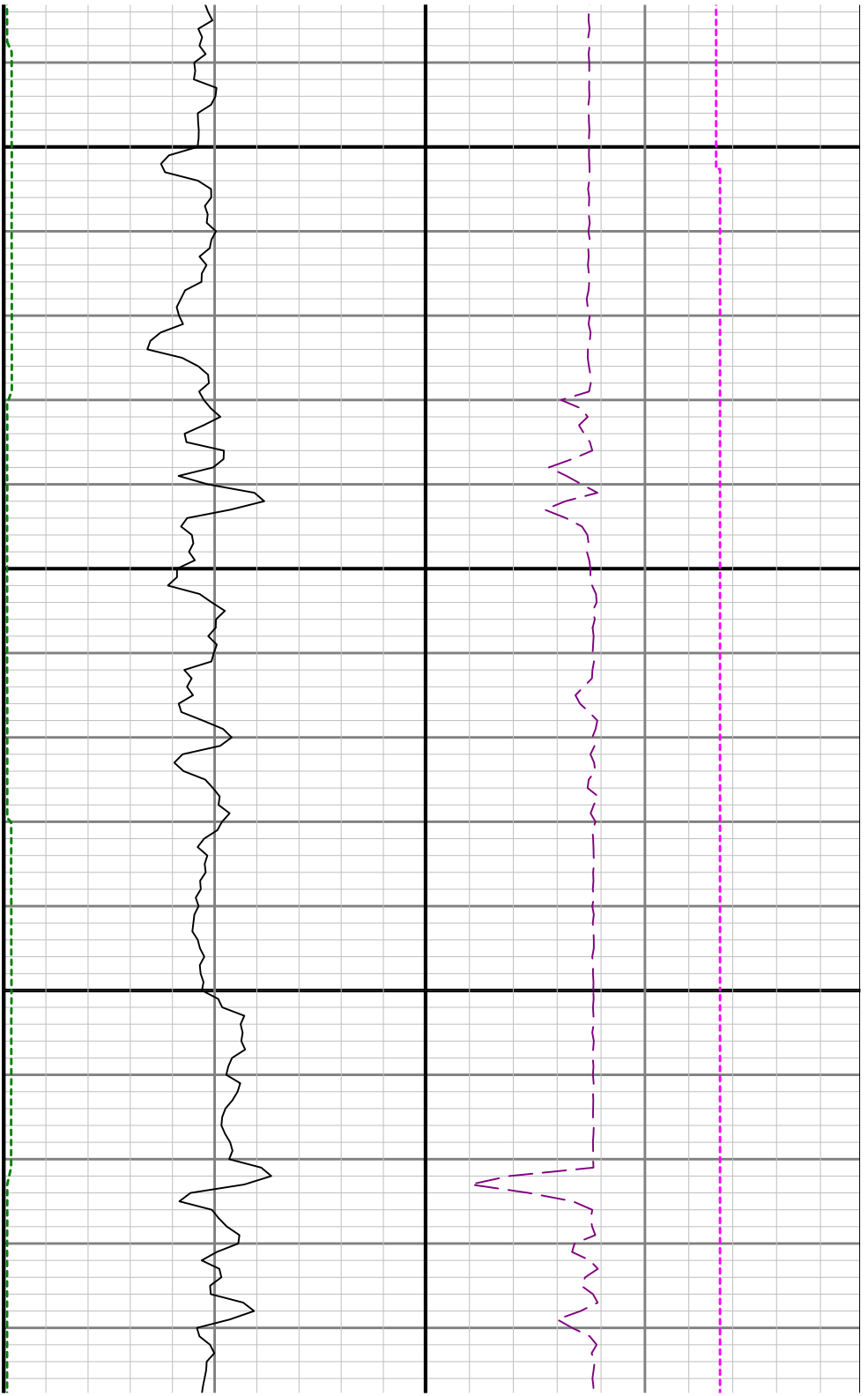






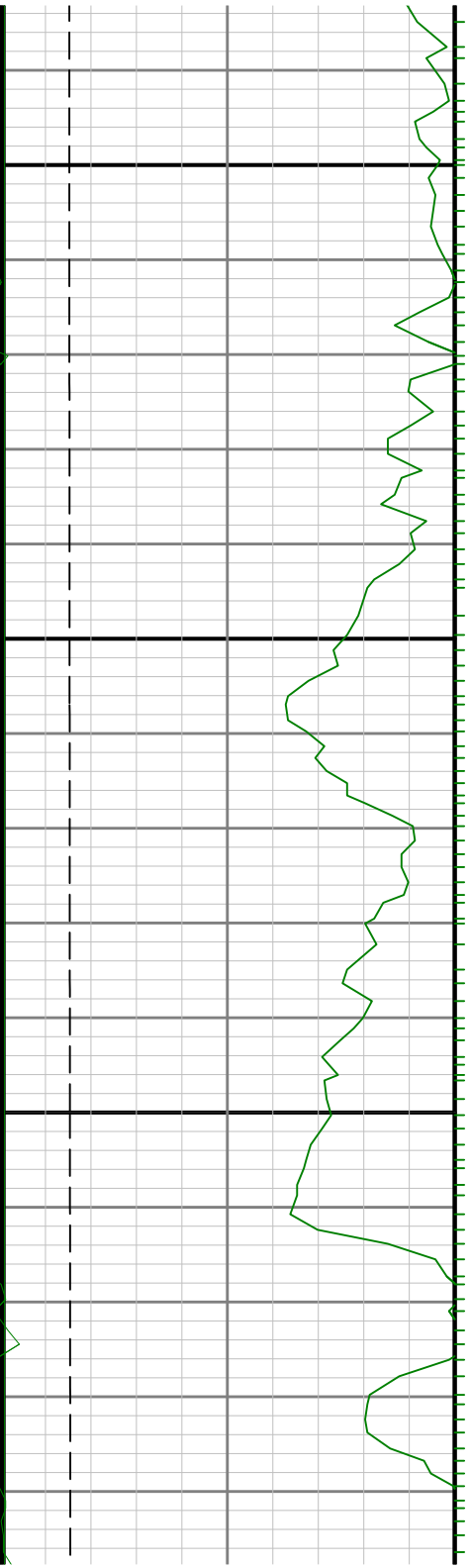
8200



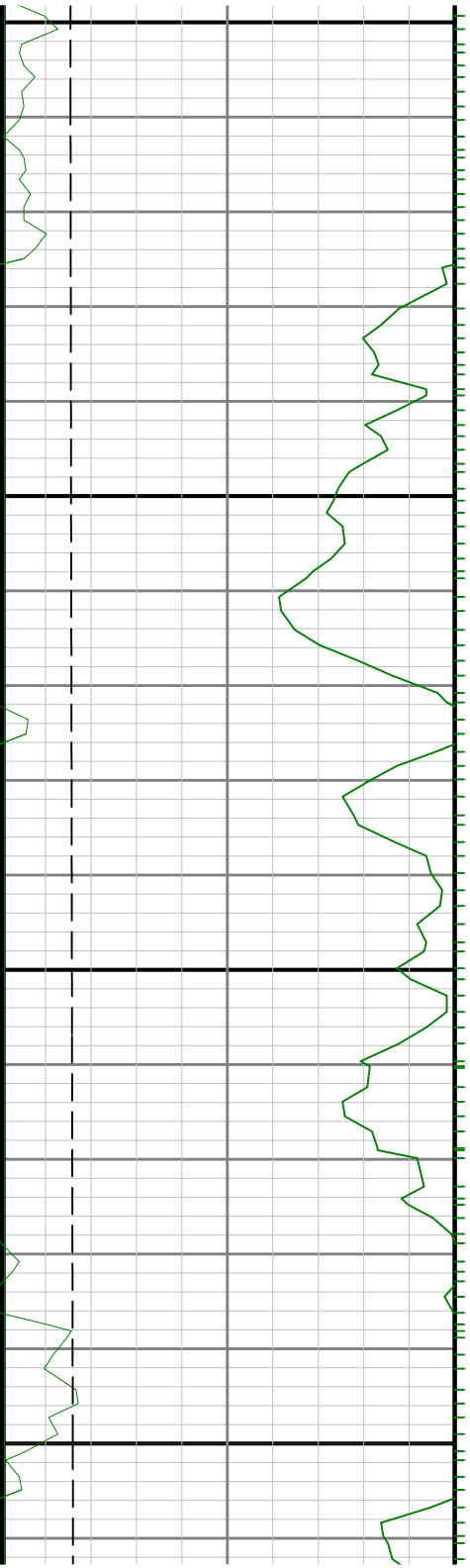


8300

8400



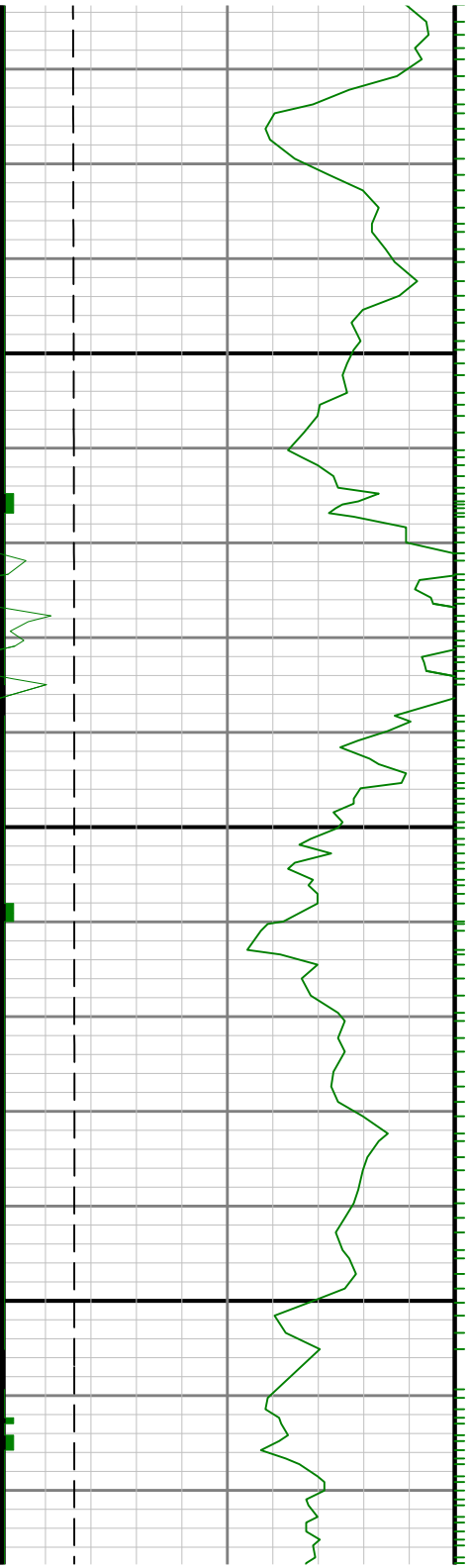




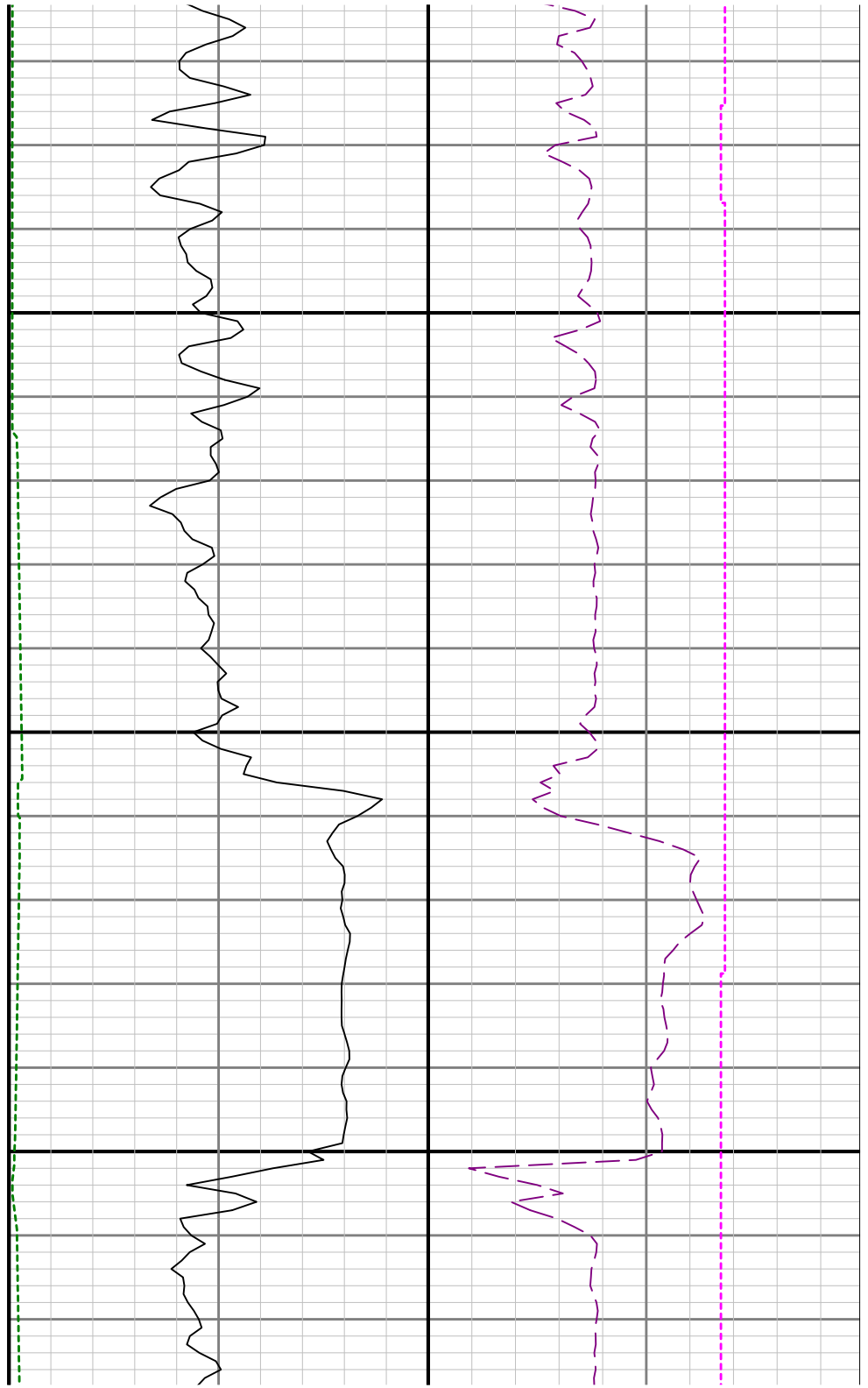
8500

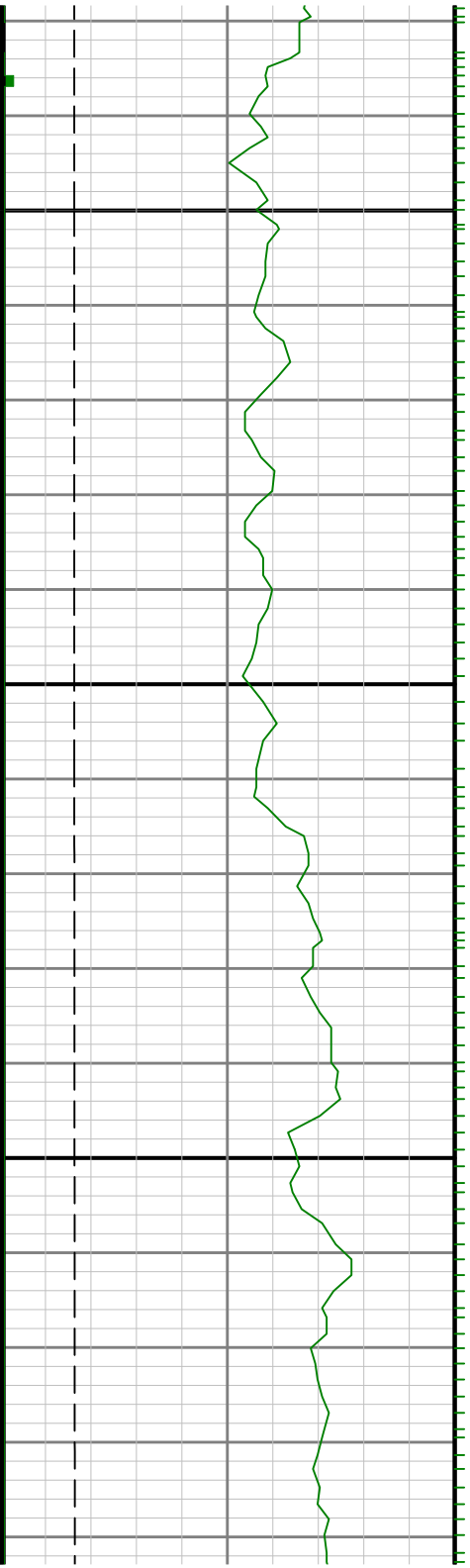
8000





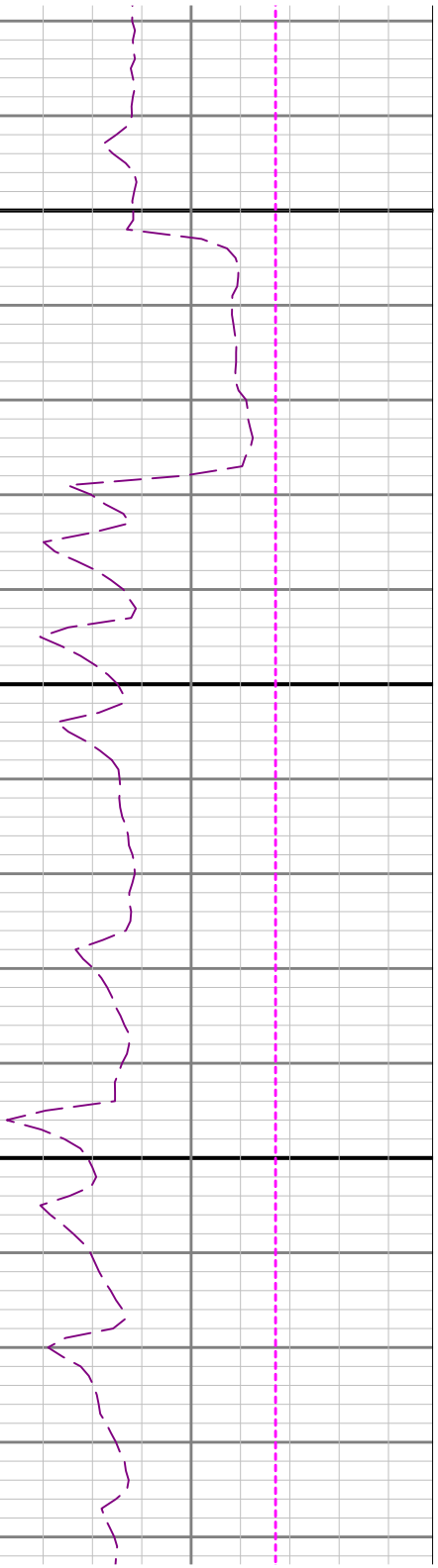
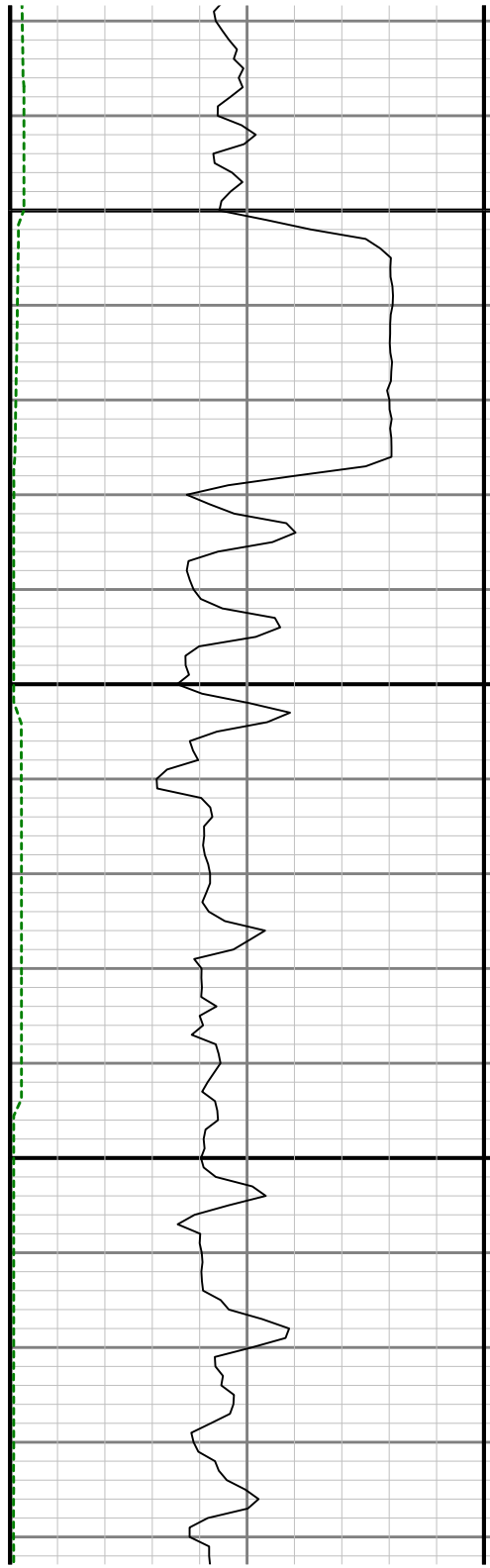
8700

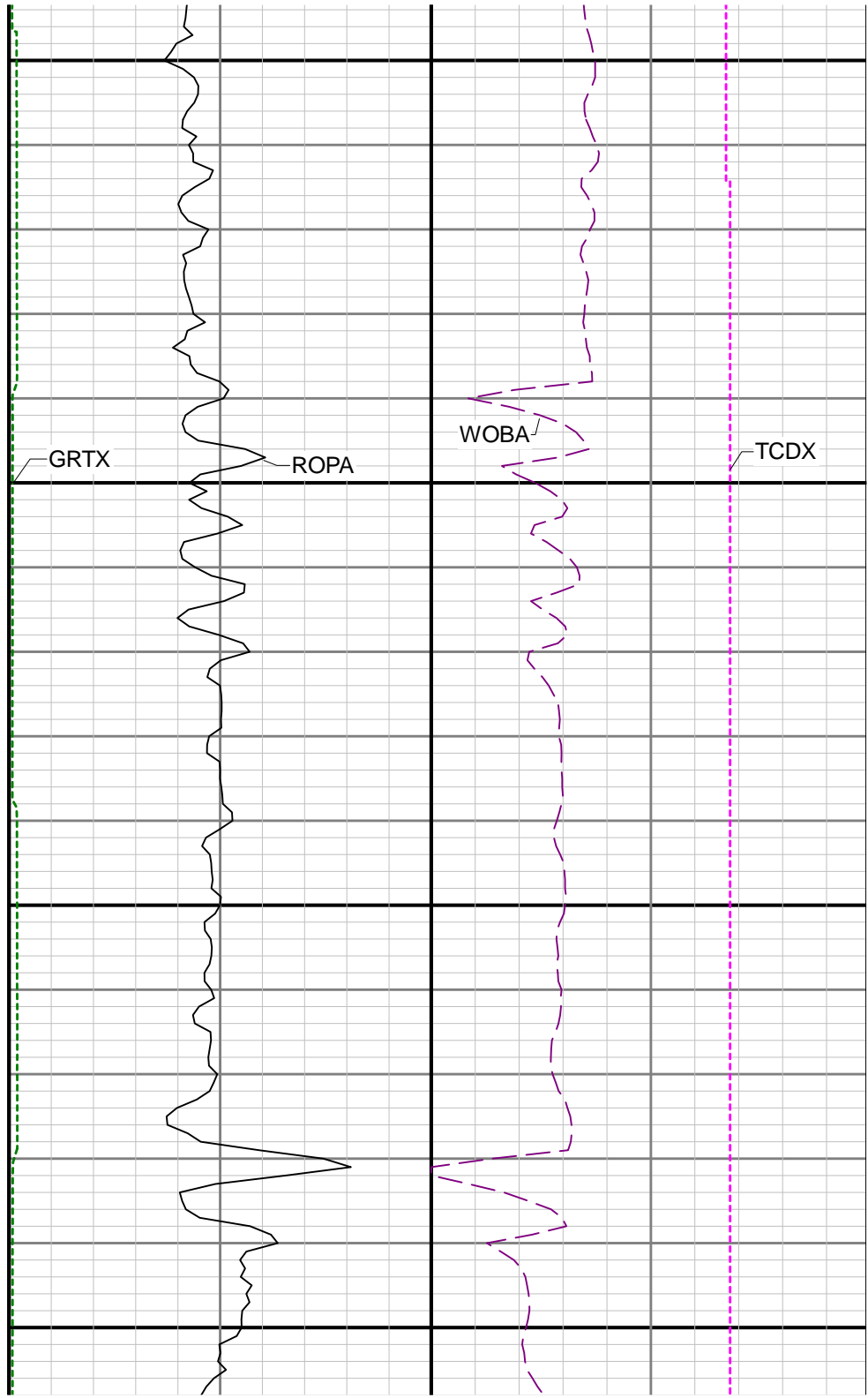
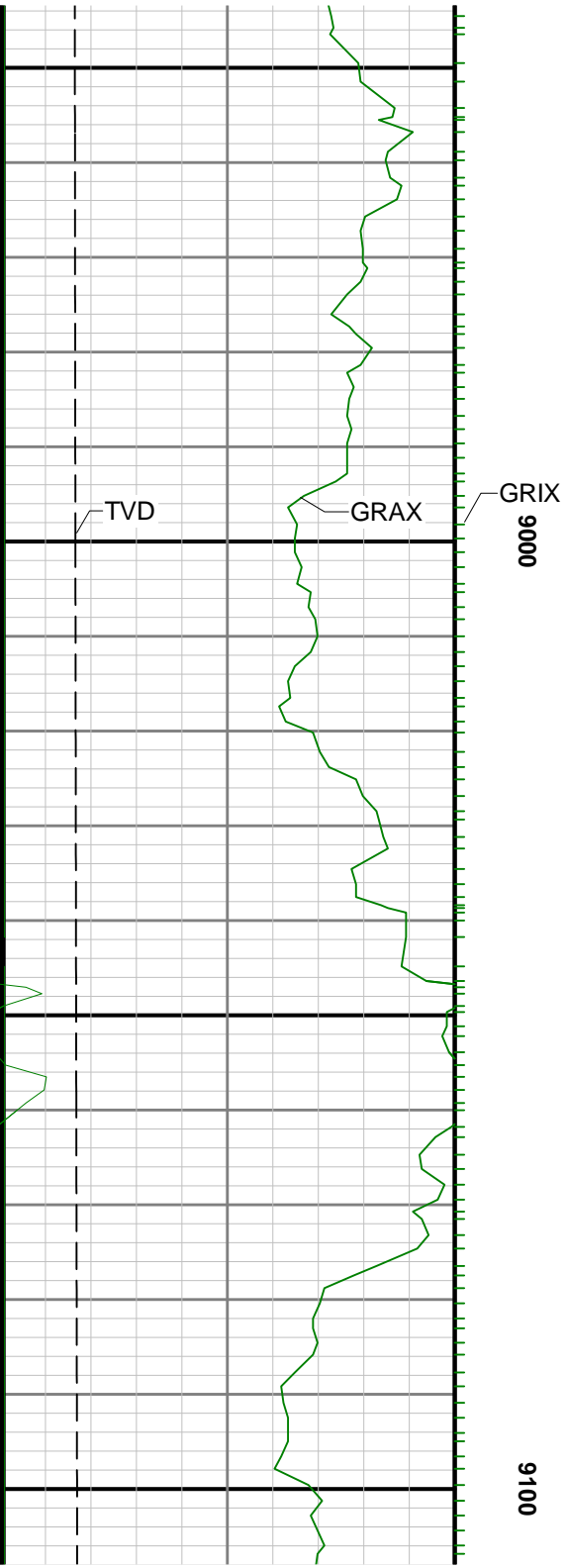


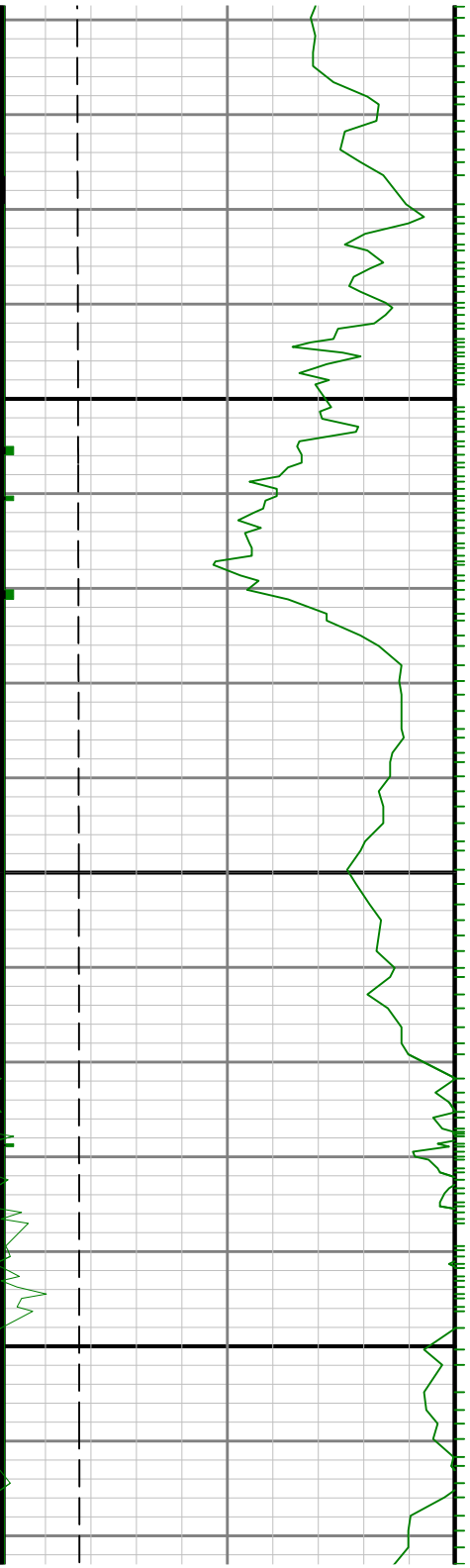


0068

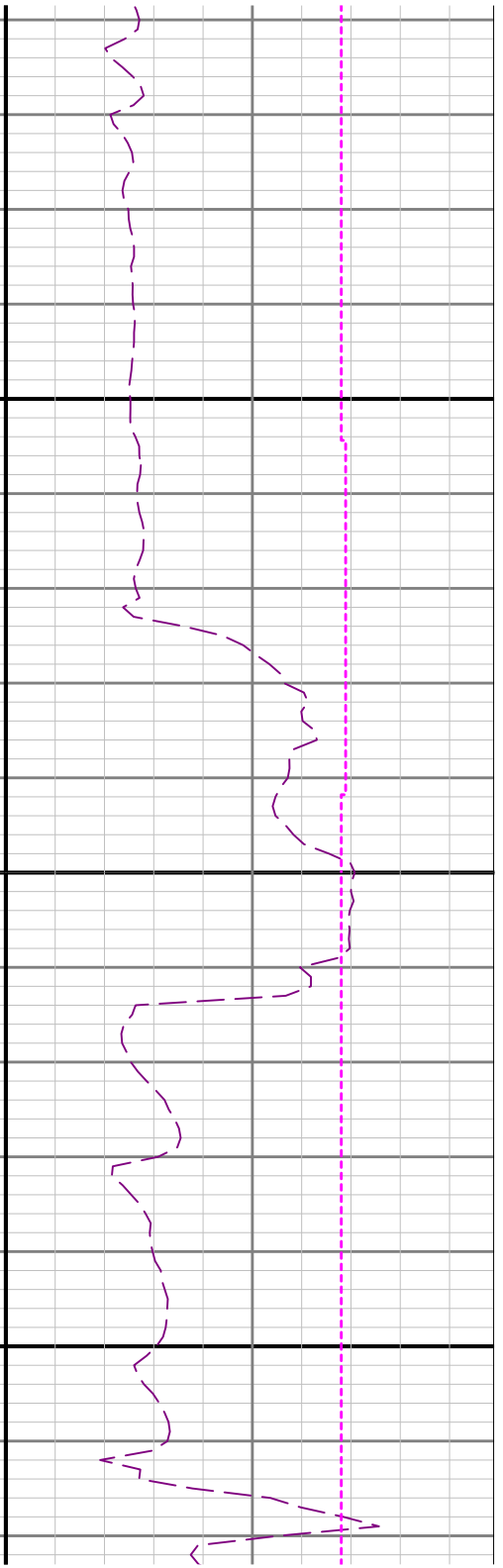
0088







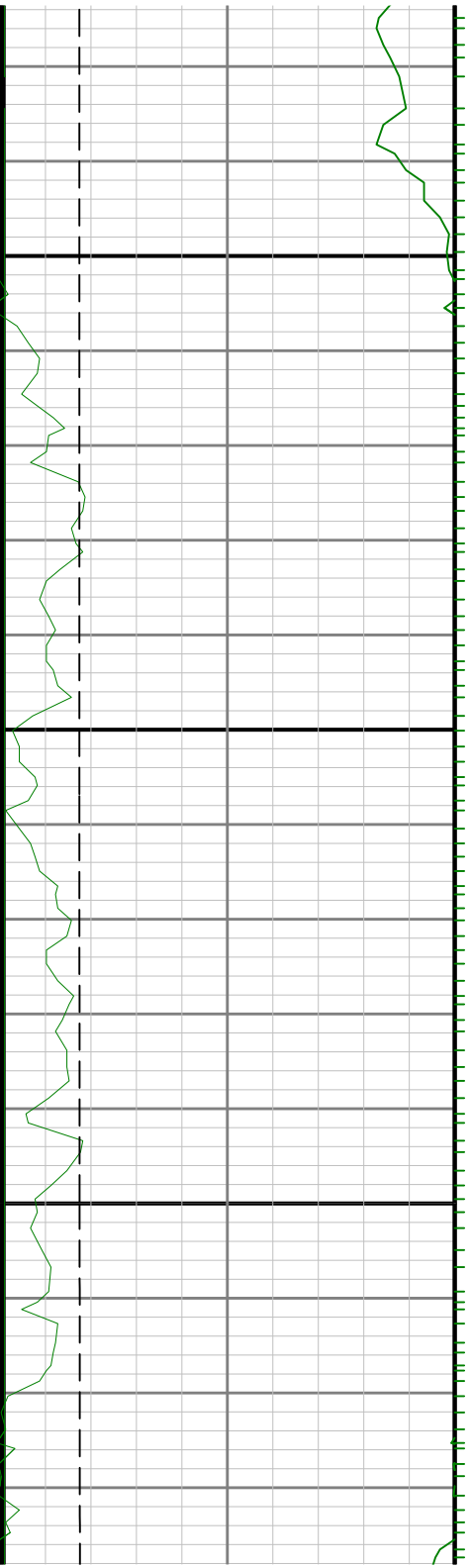
9200

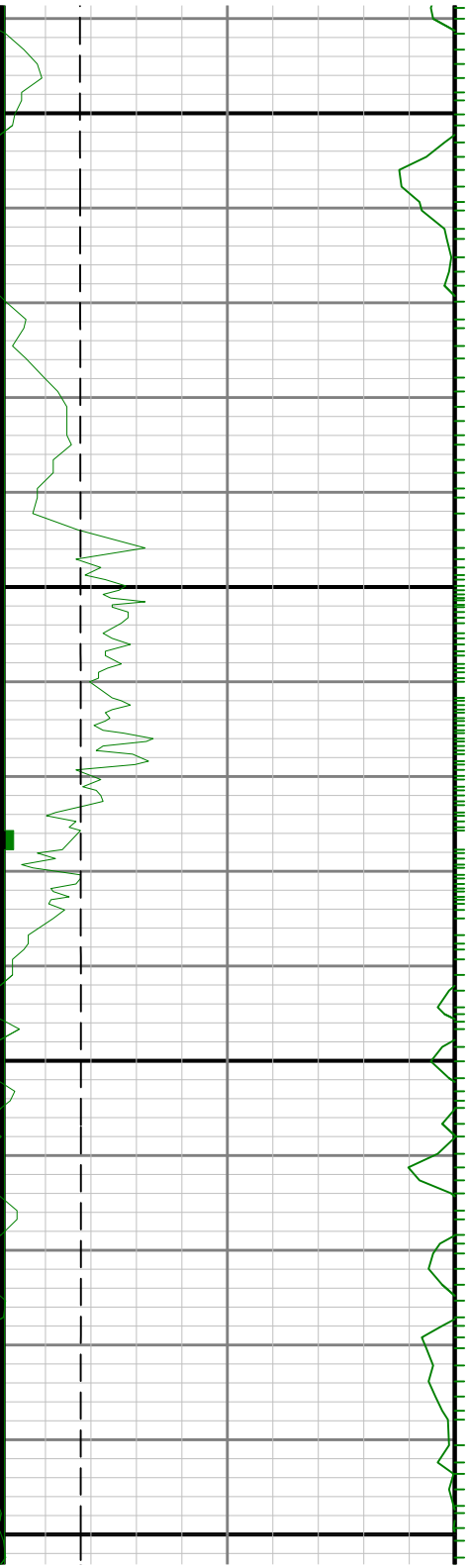




9300

9400

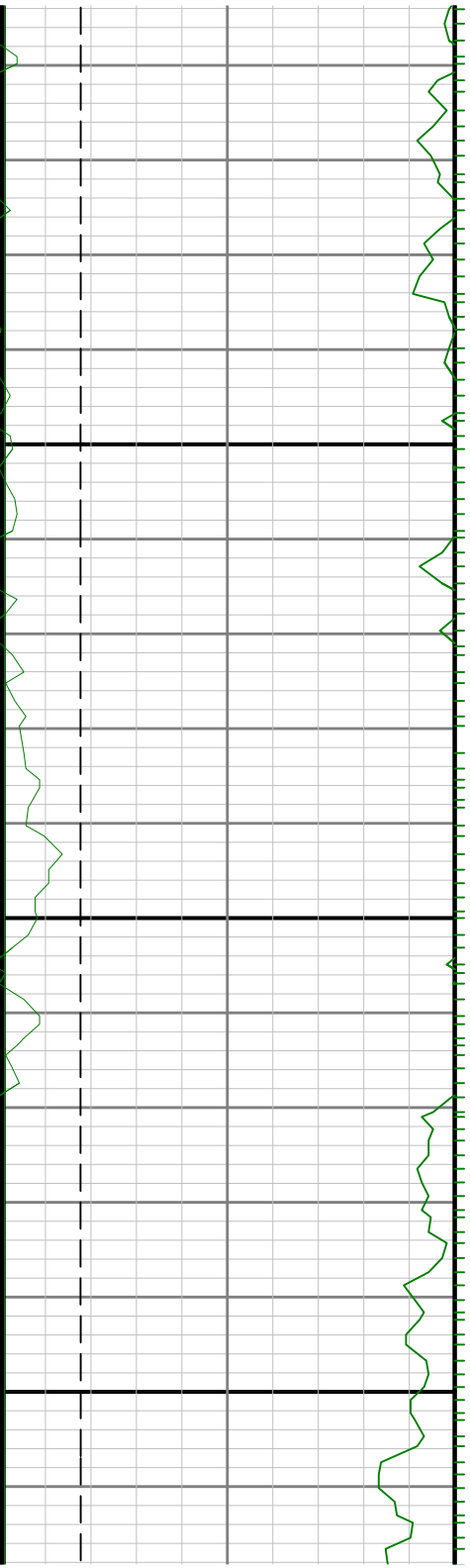




9500

9600

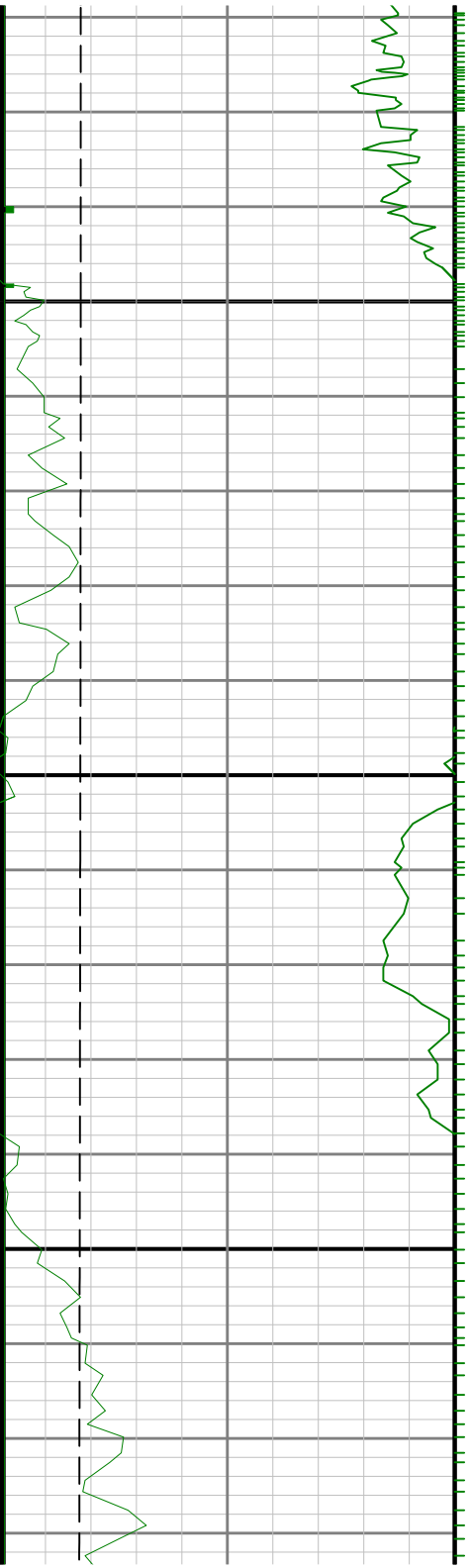




9700

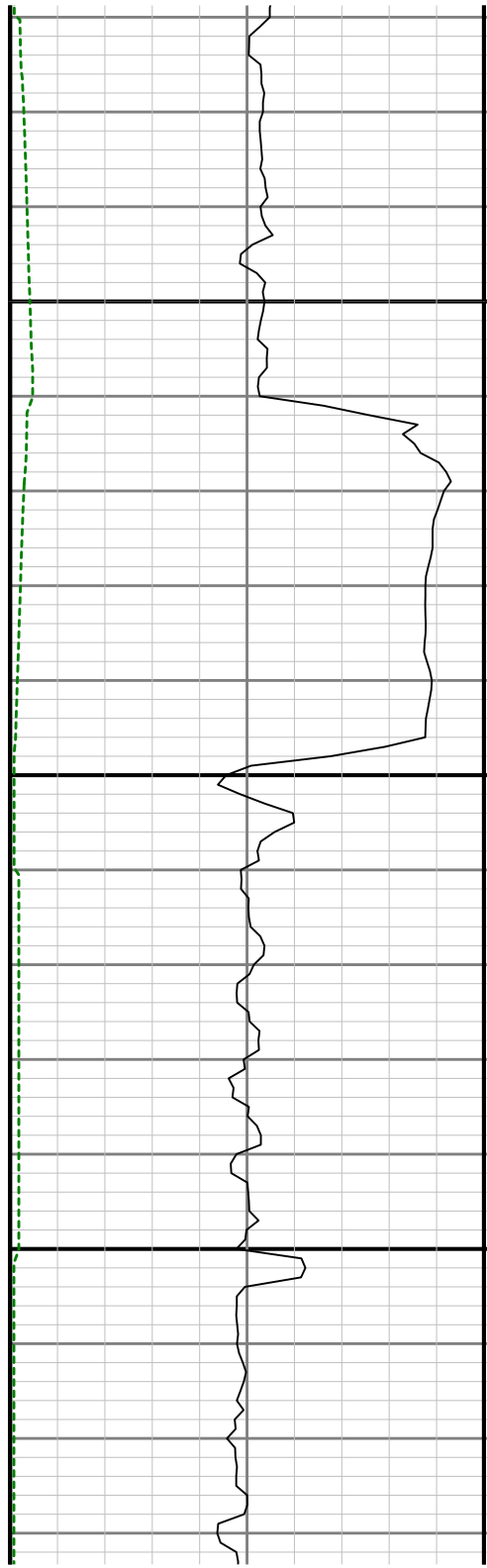


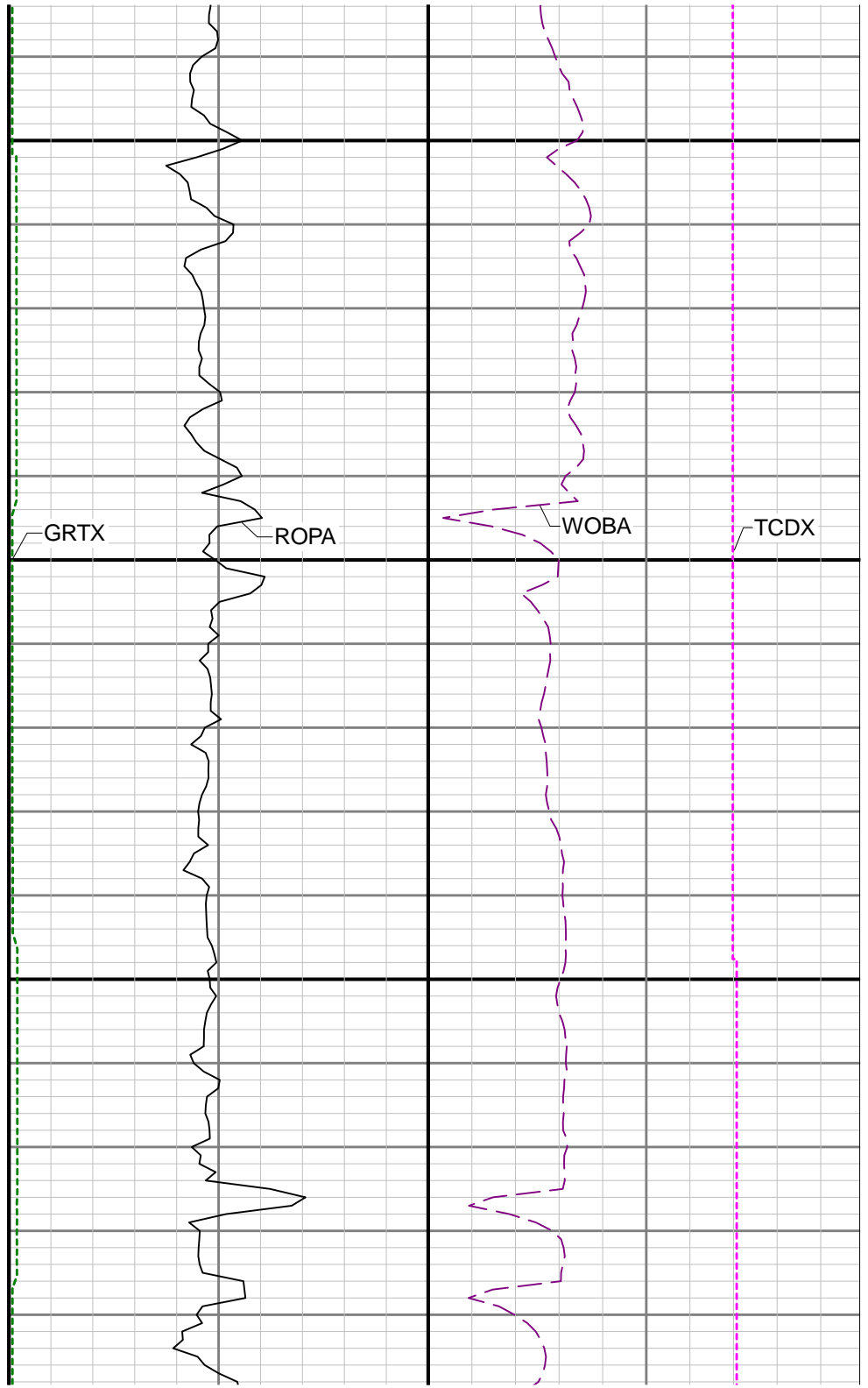
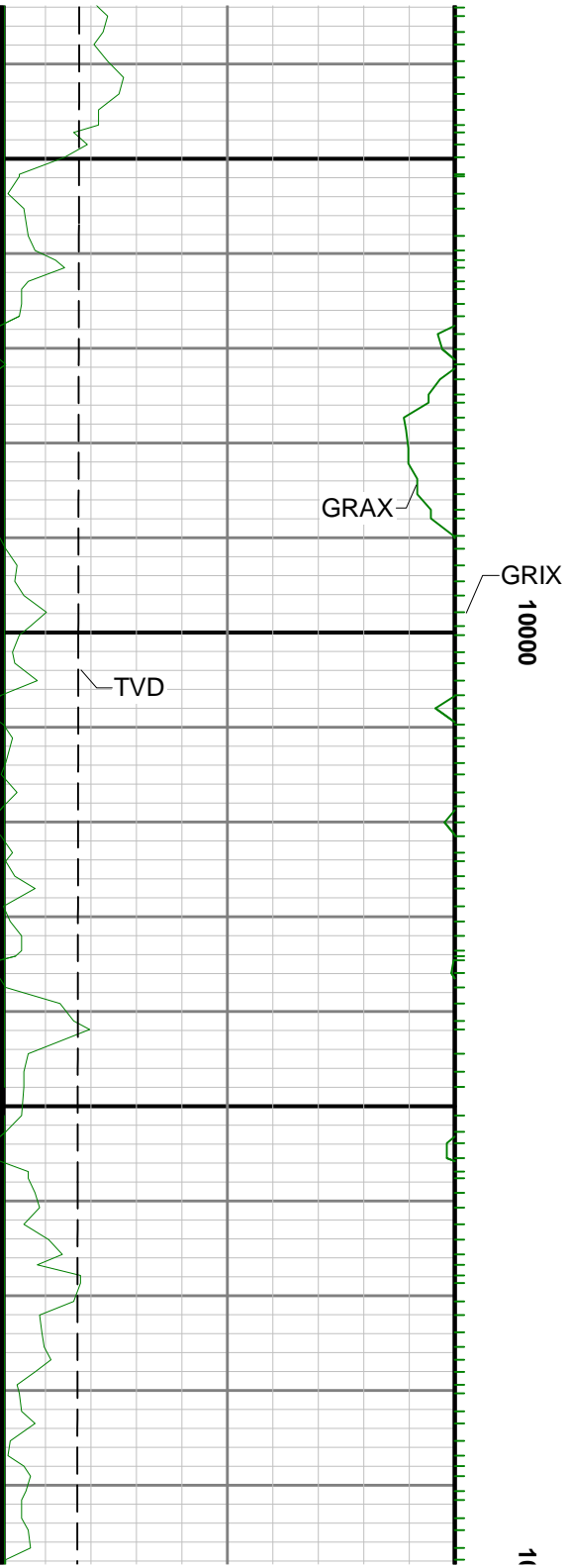


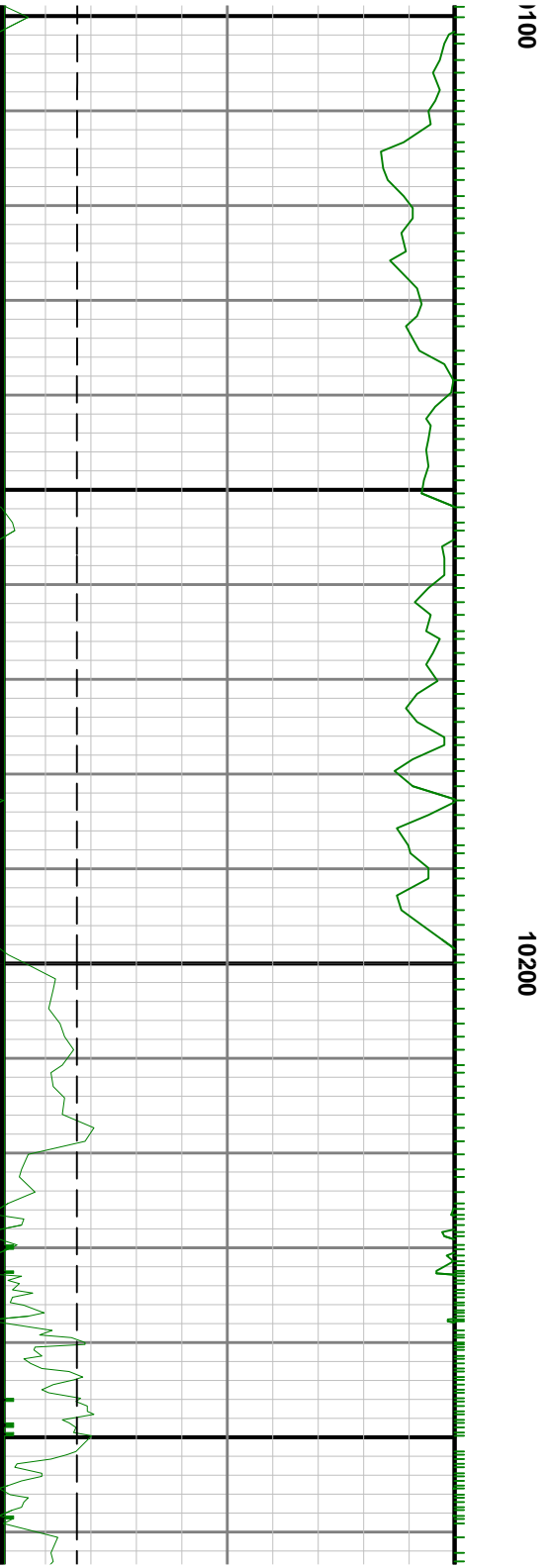


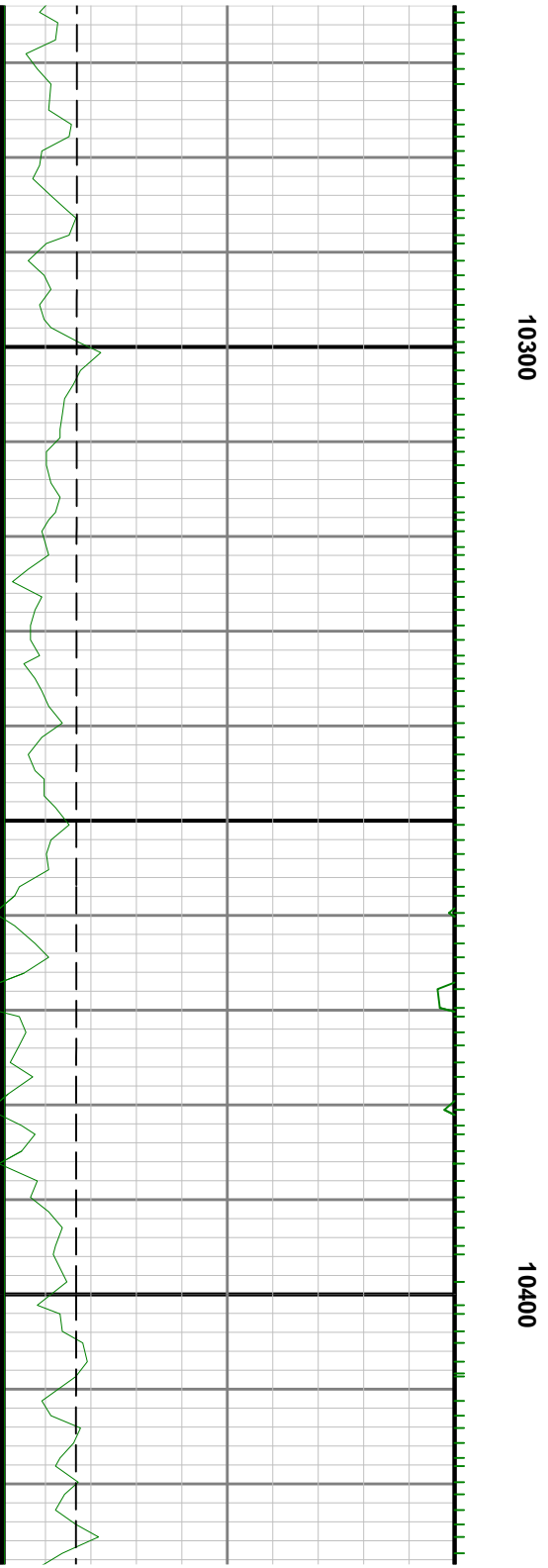
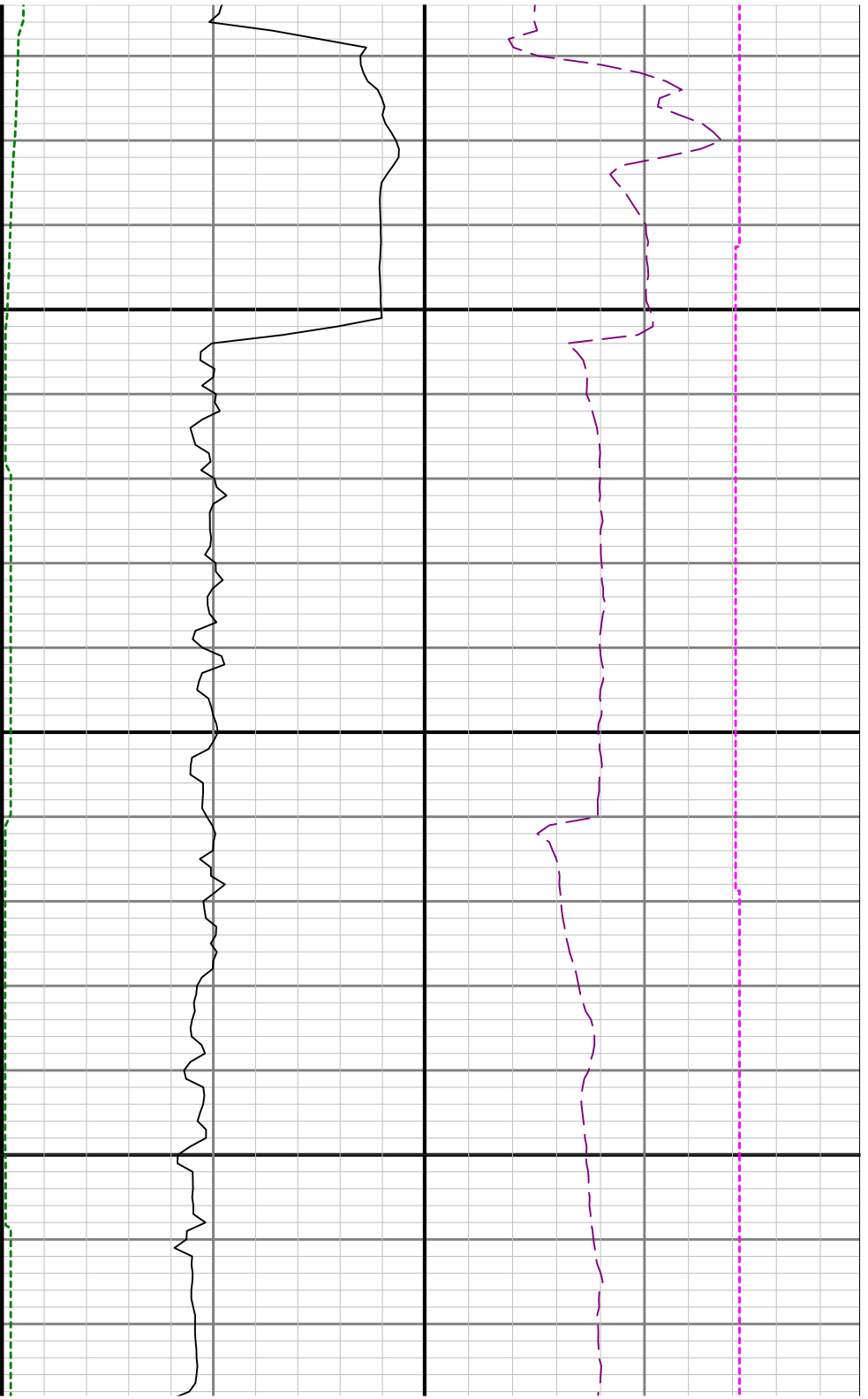
0066

0086



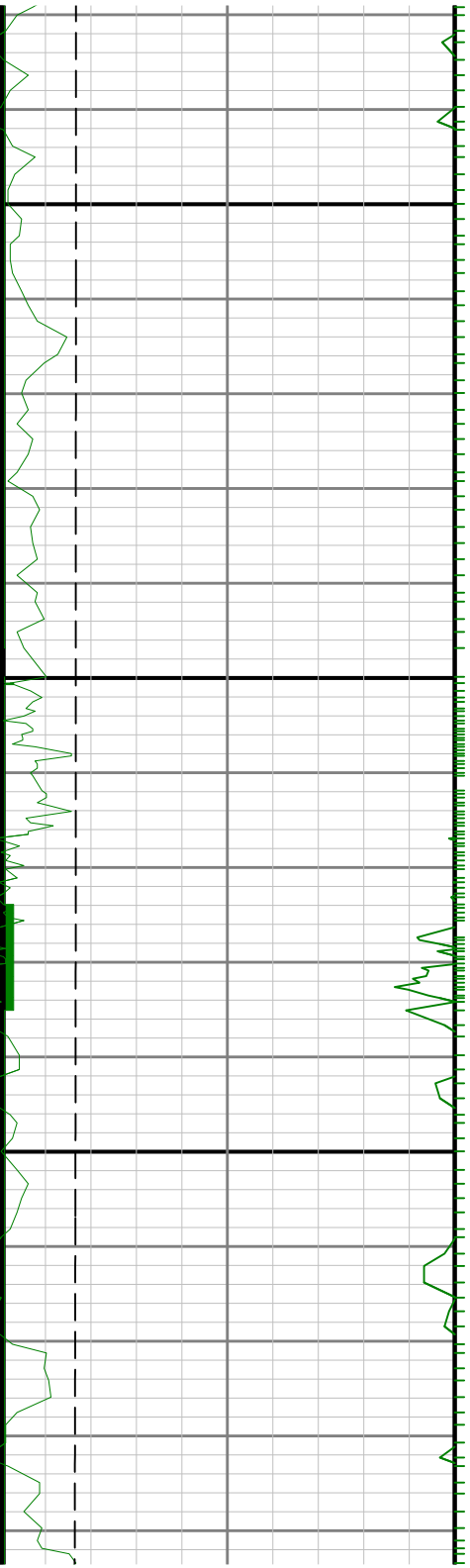


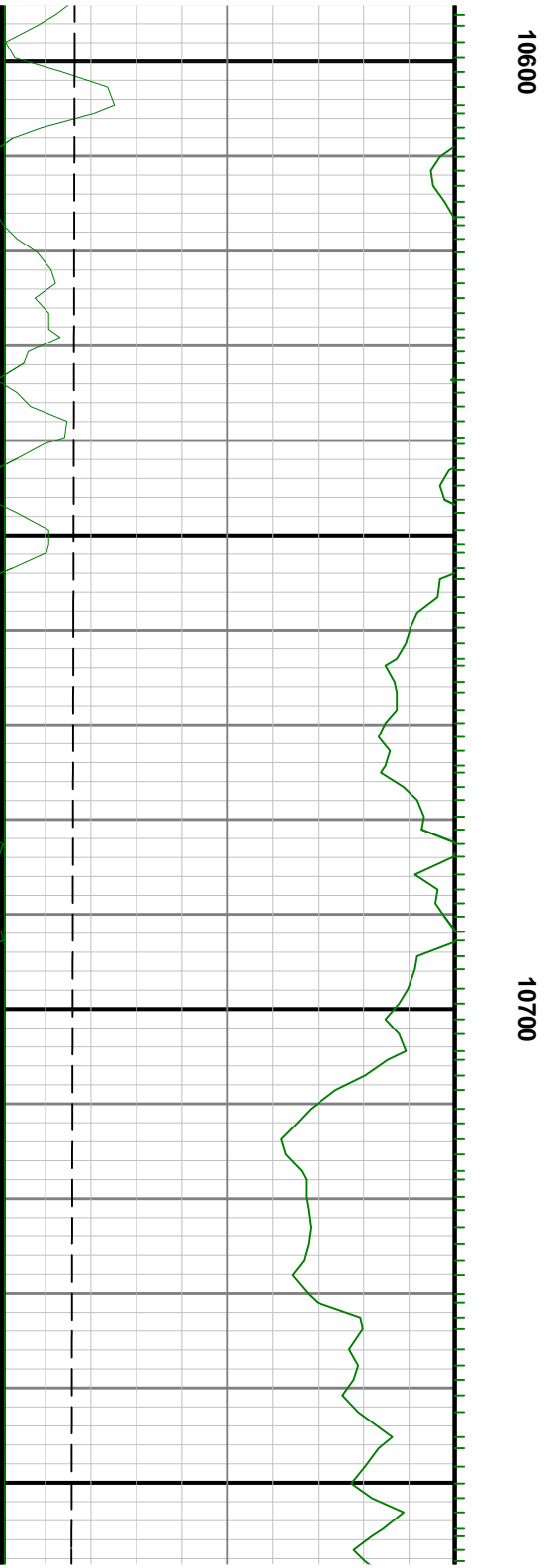
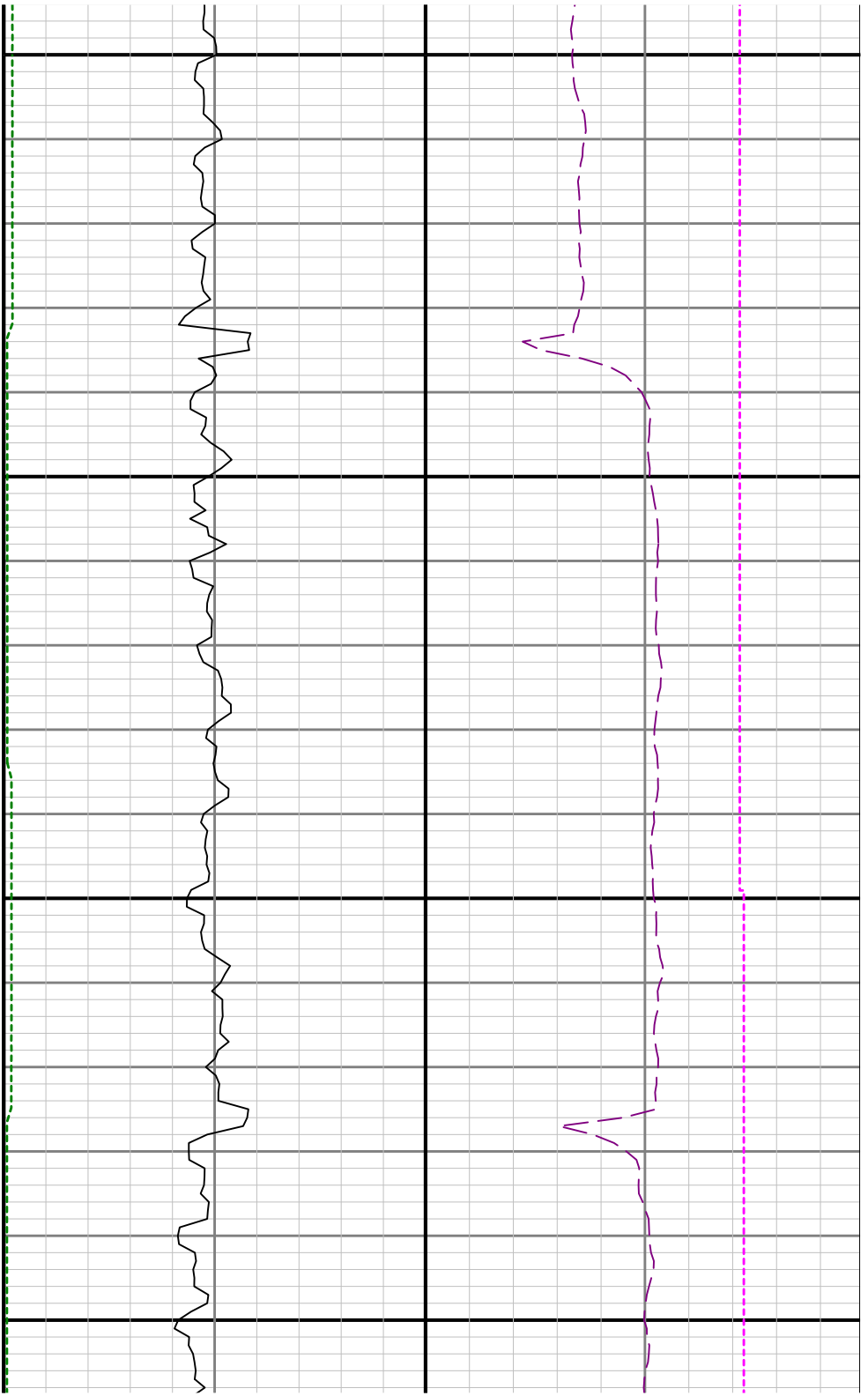


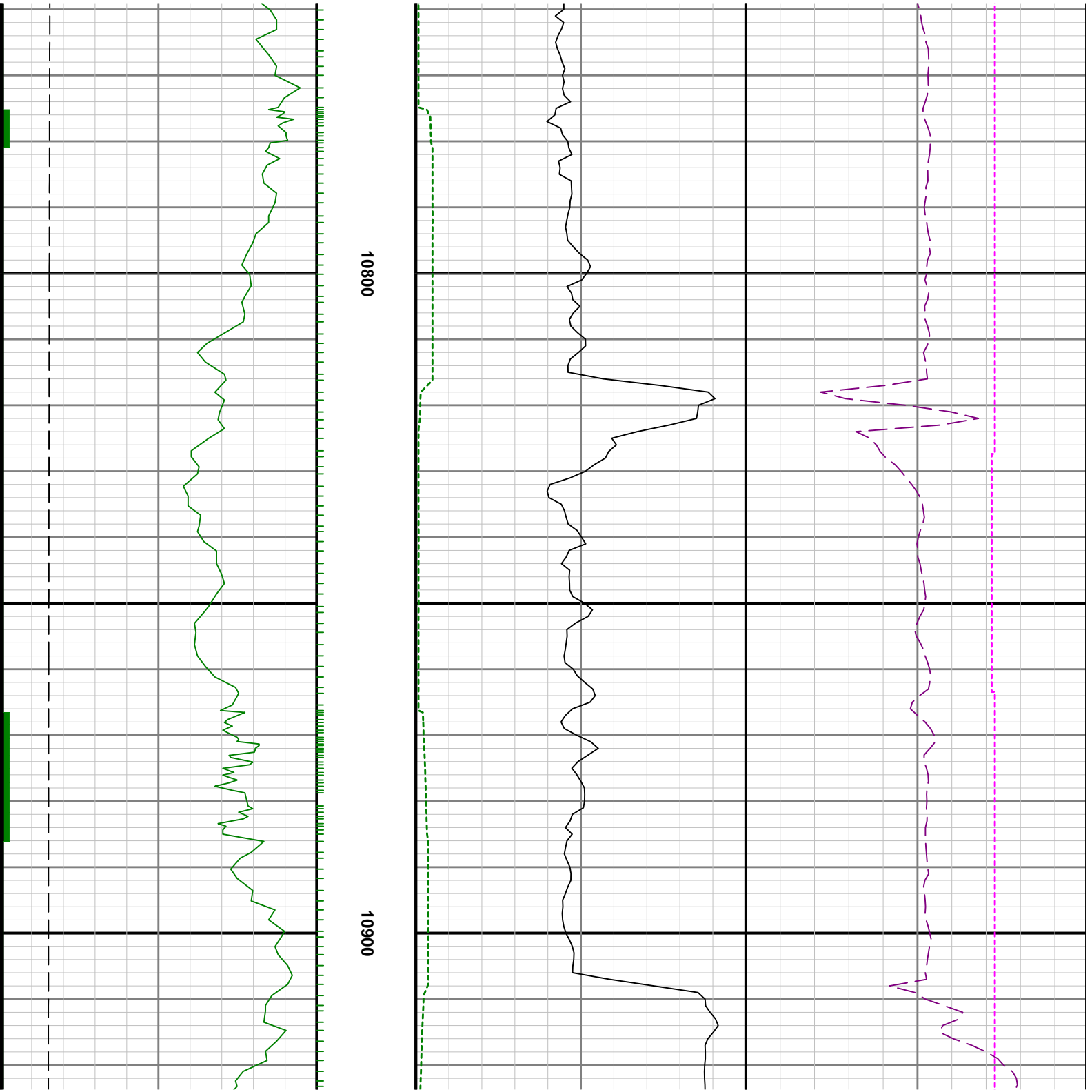


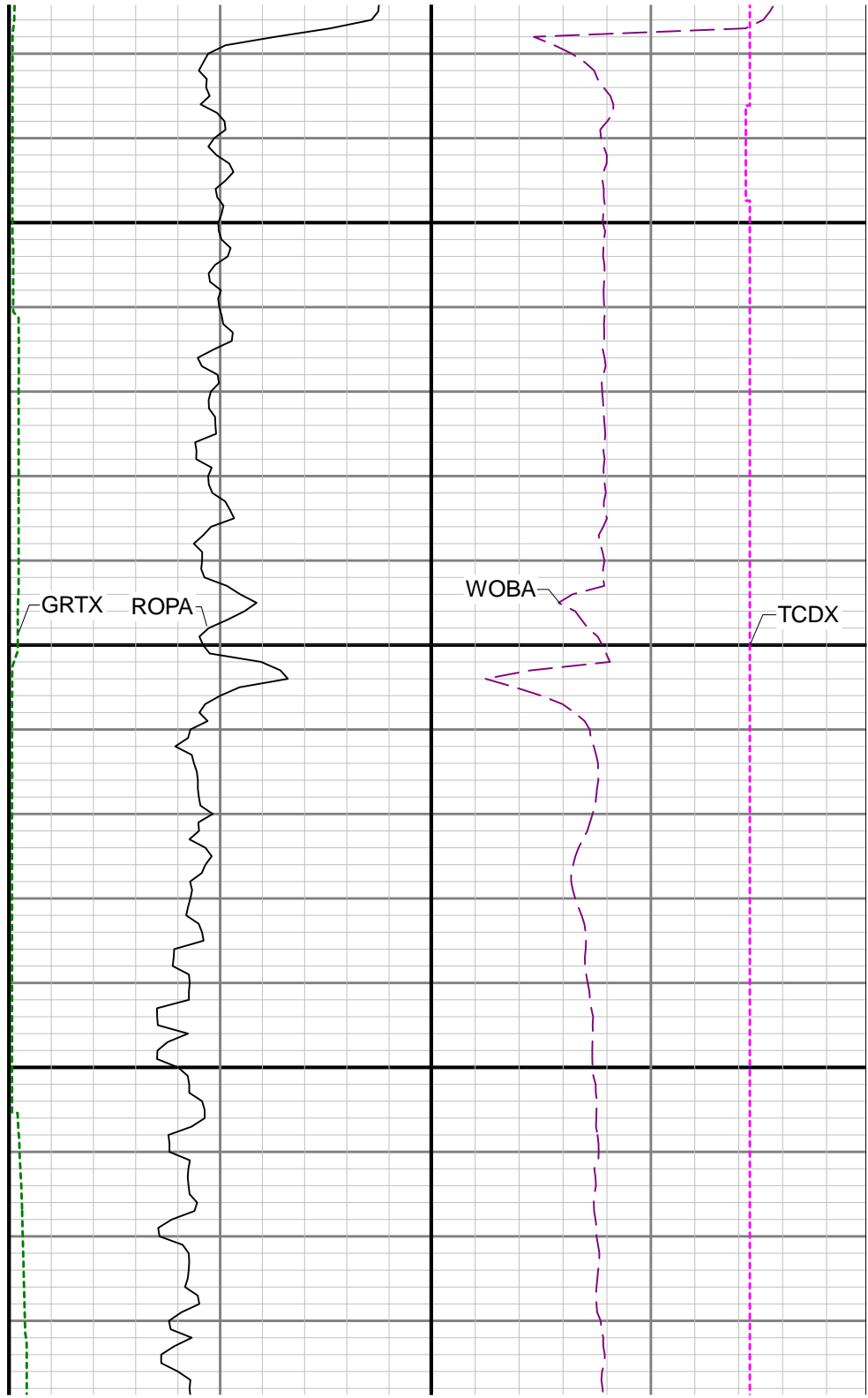
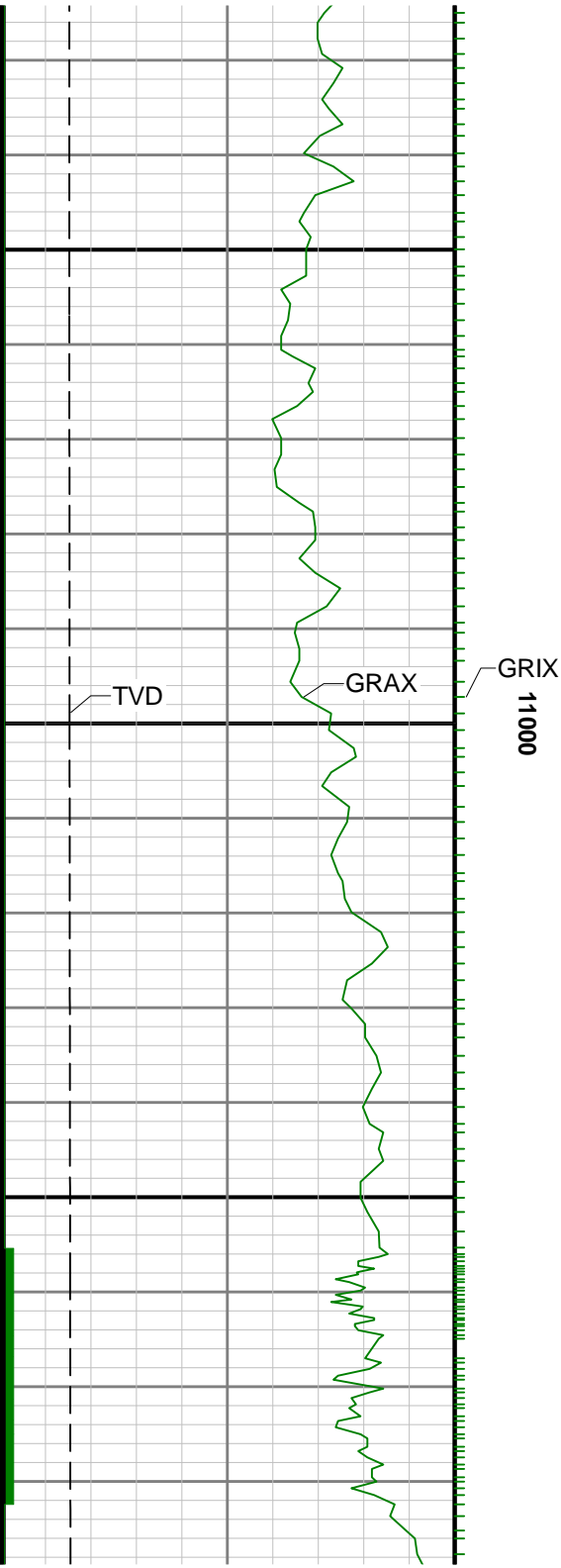


10500

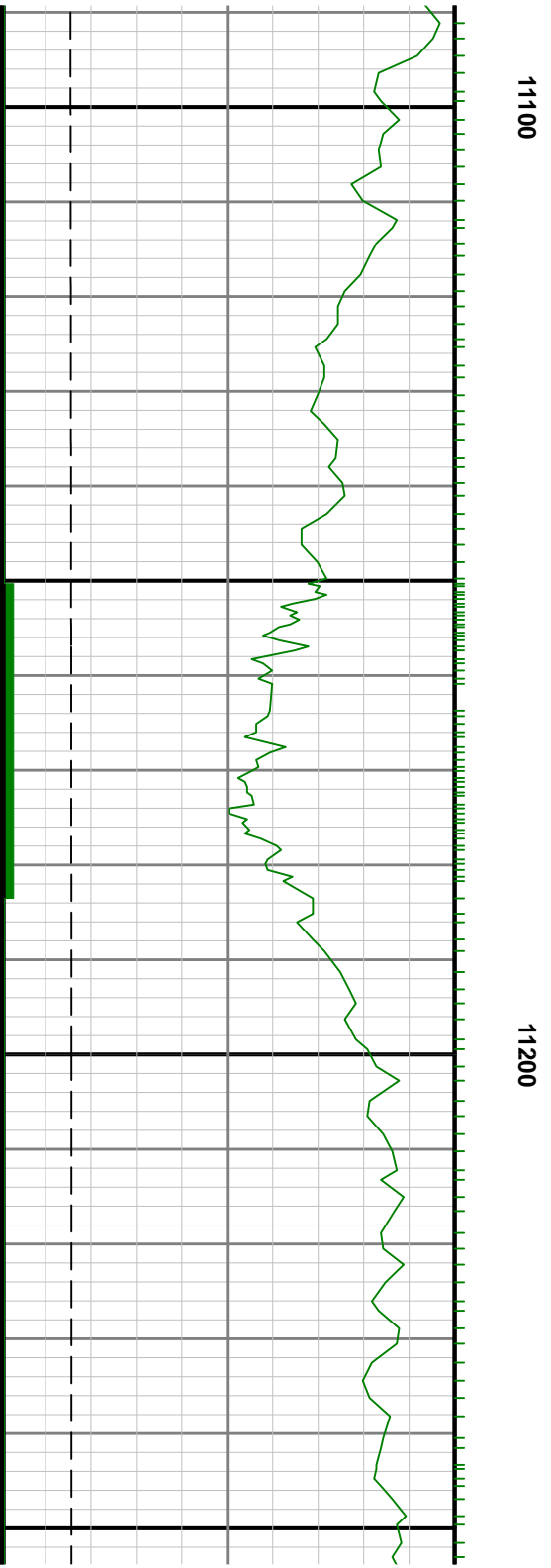
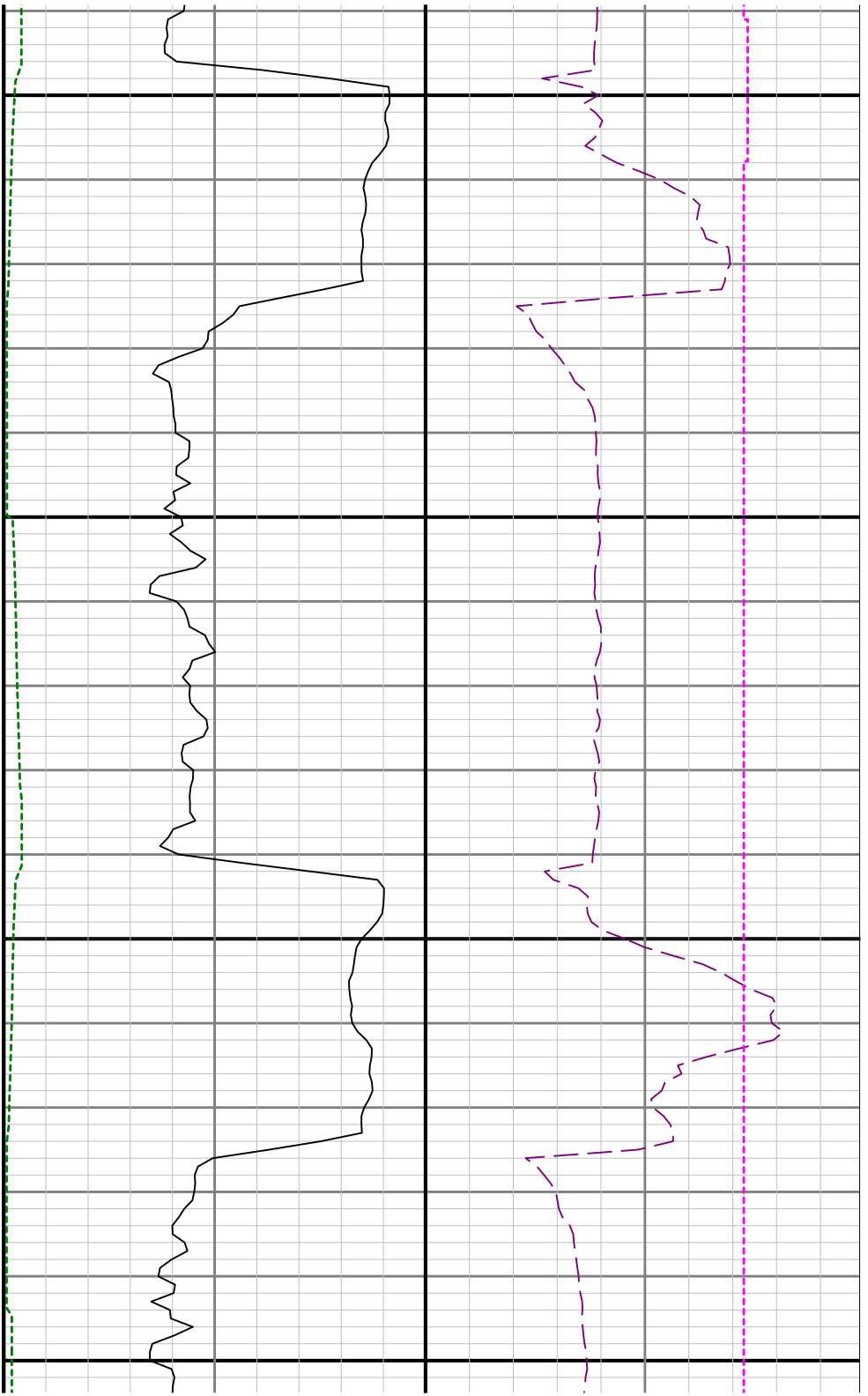


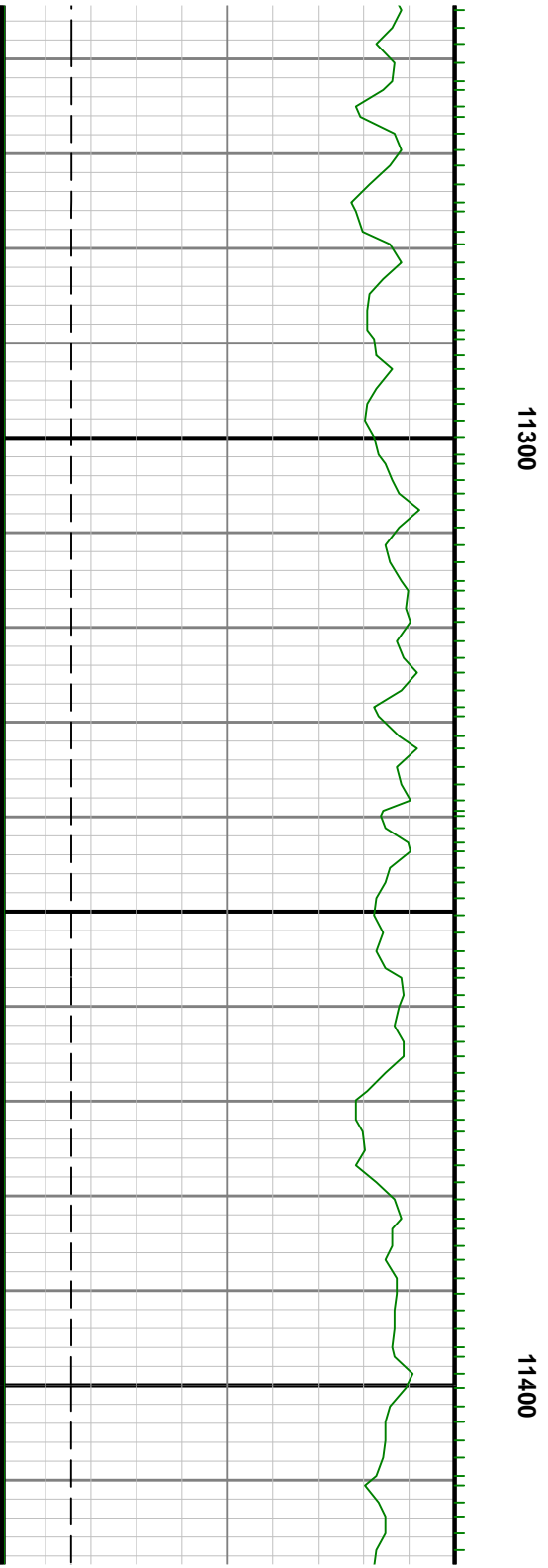
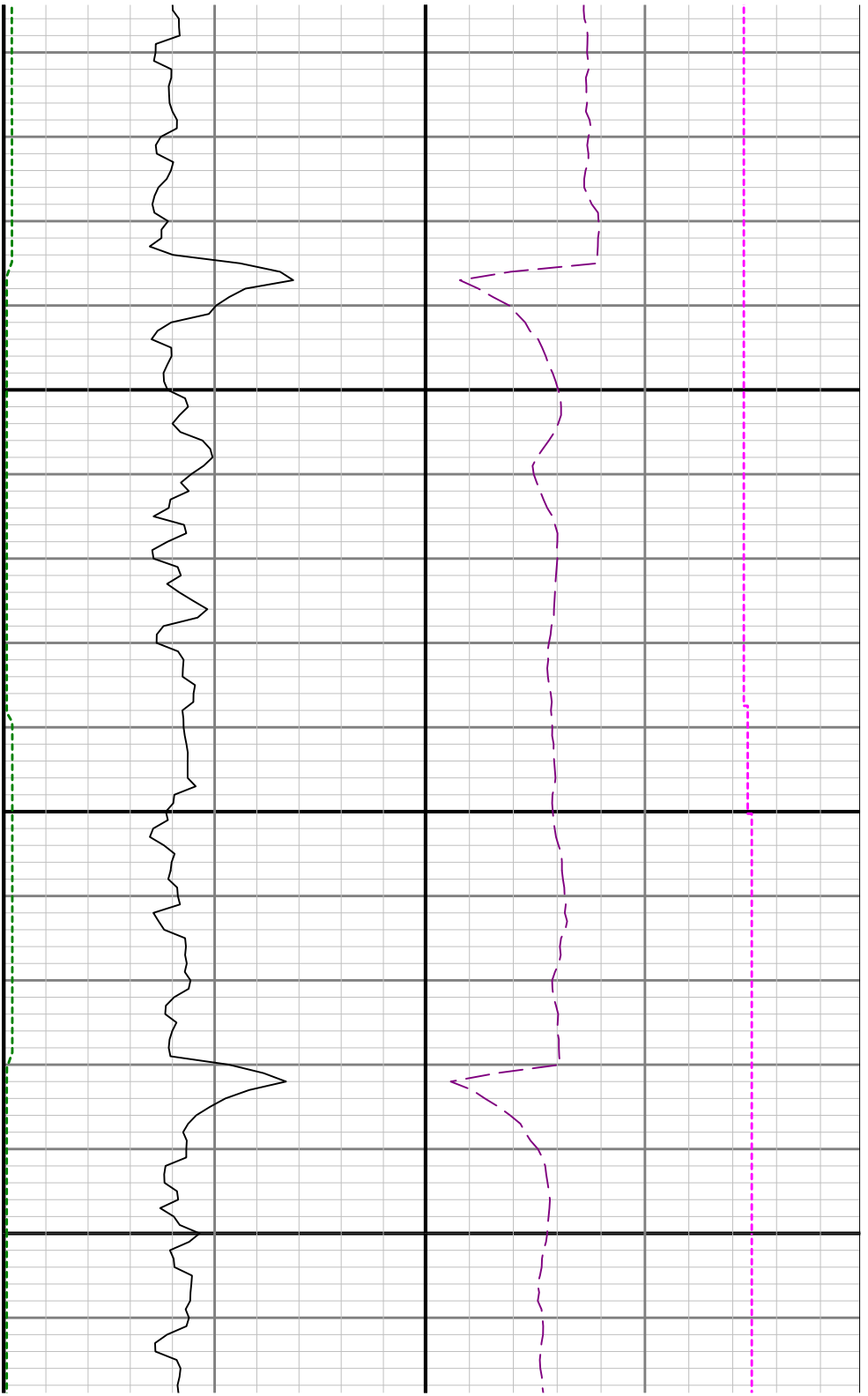


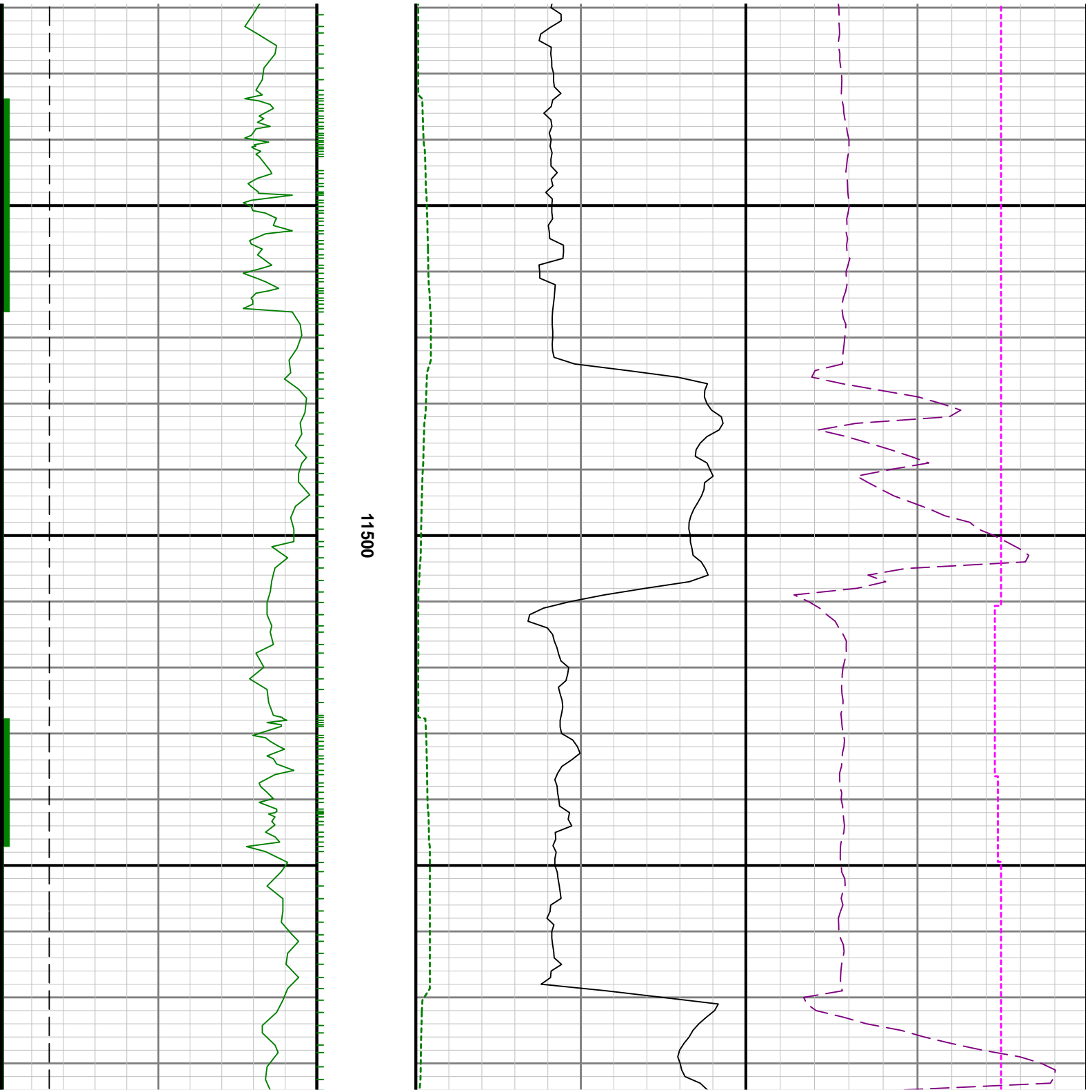


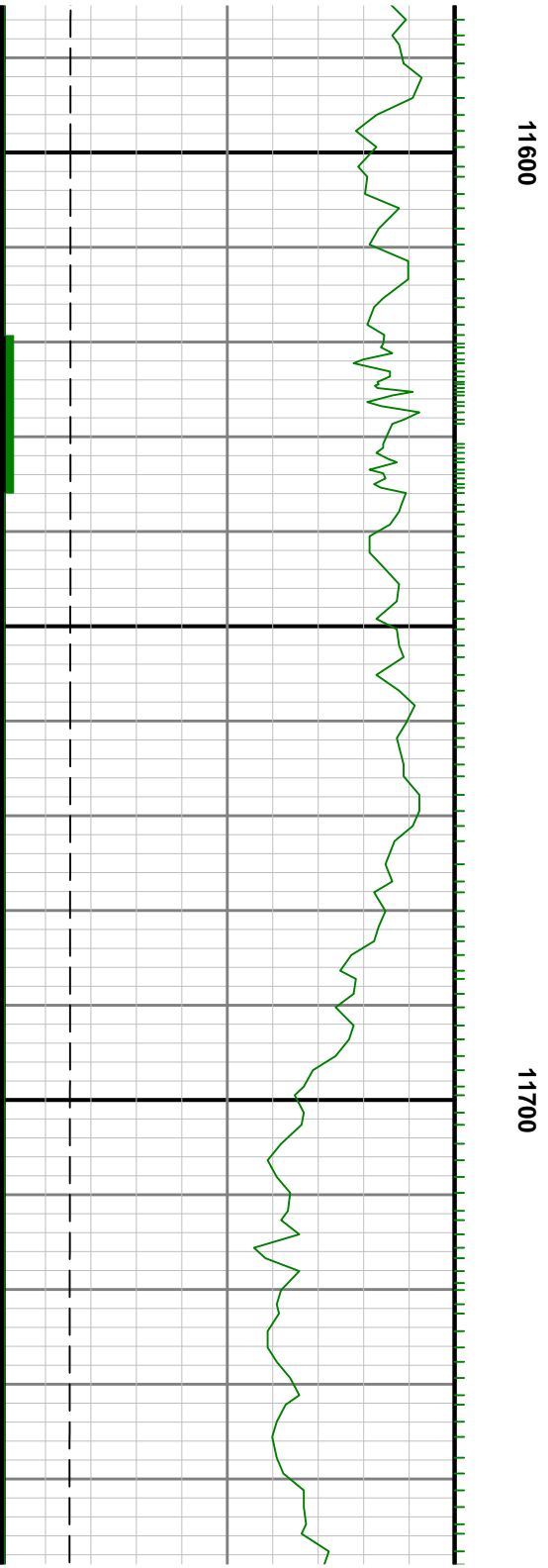
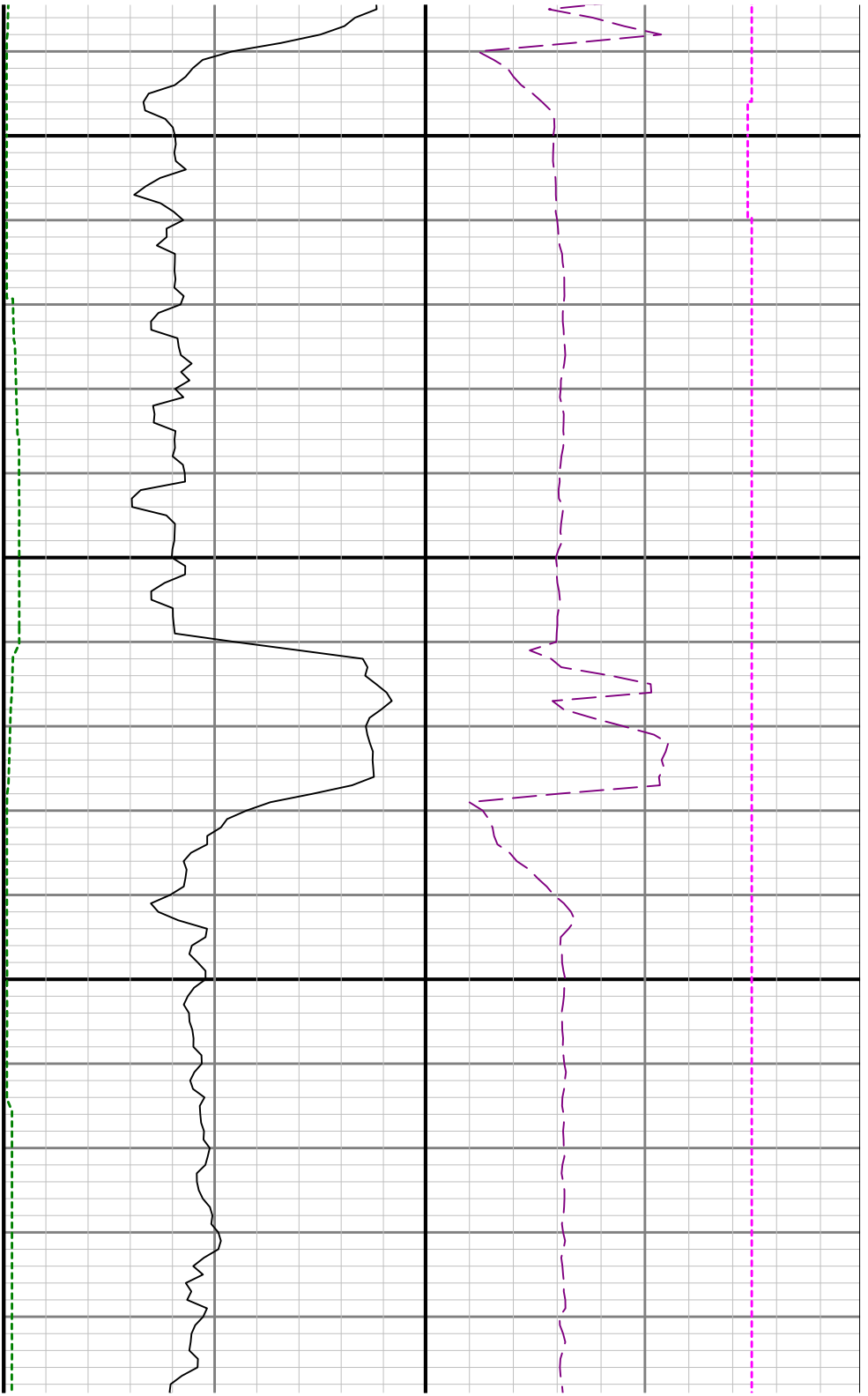


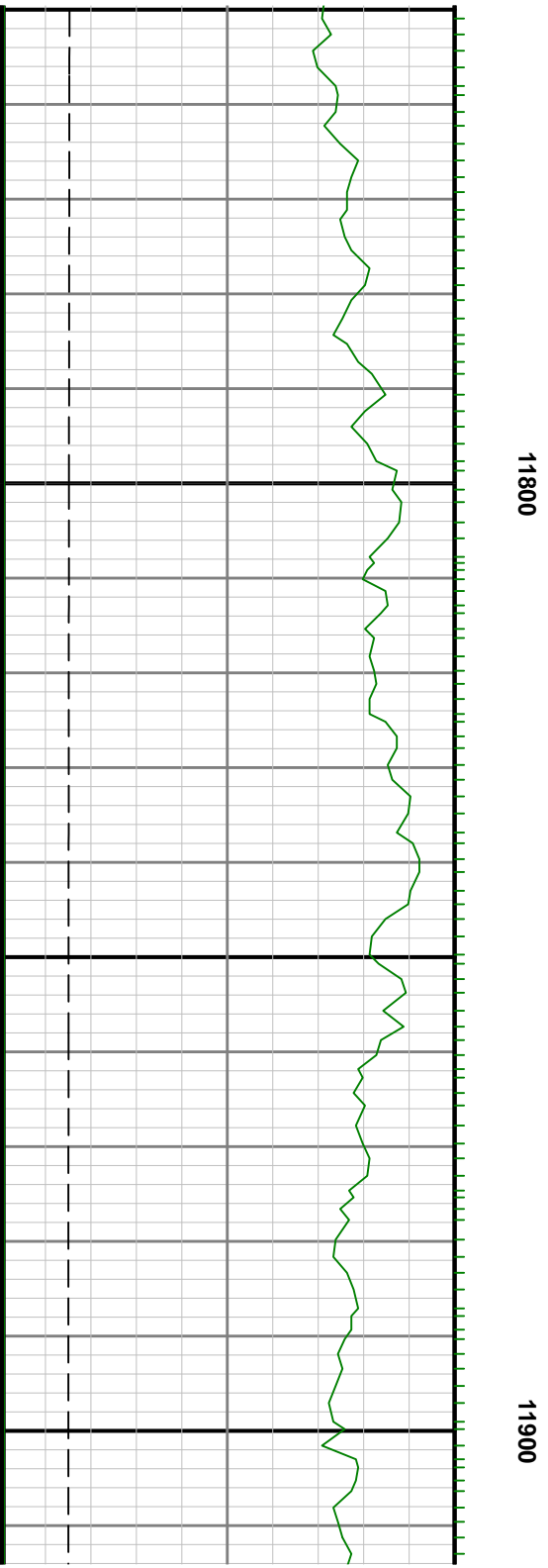
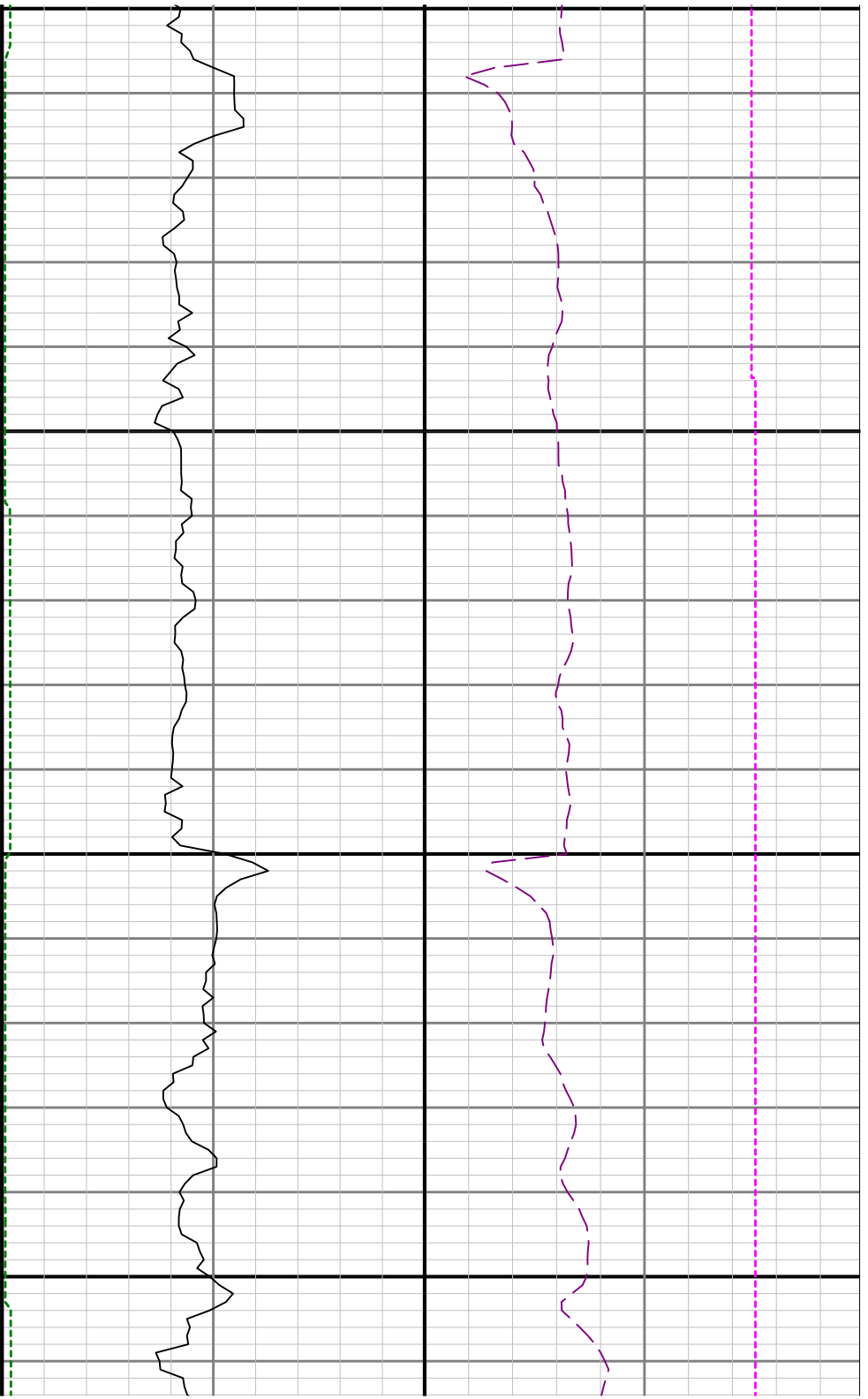


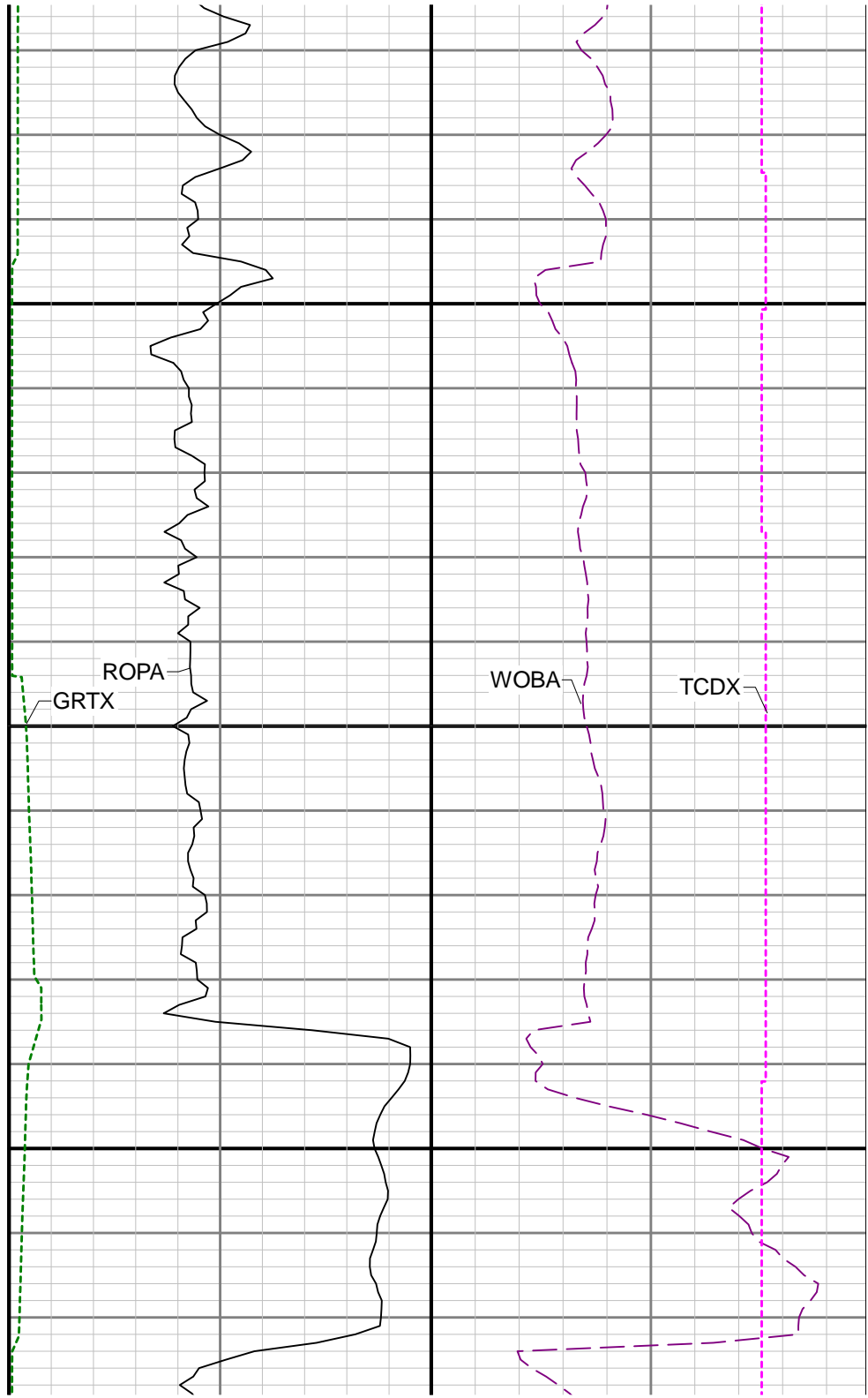
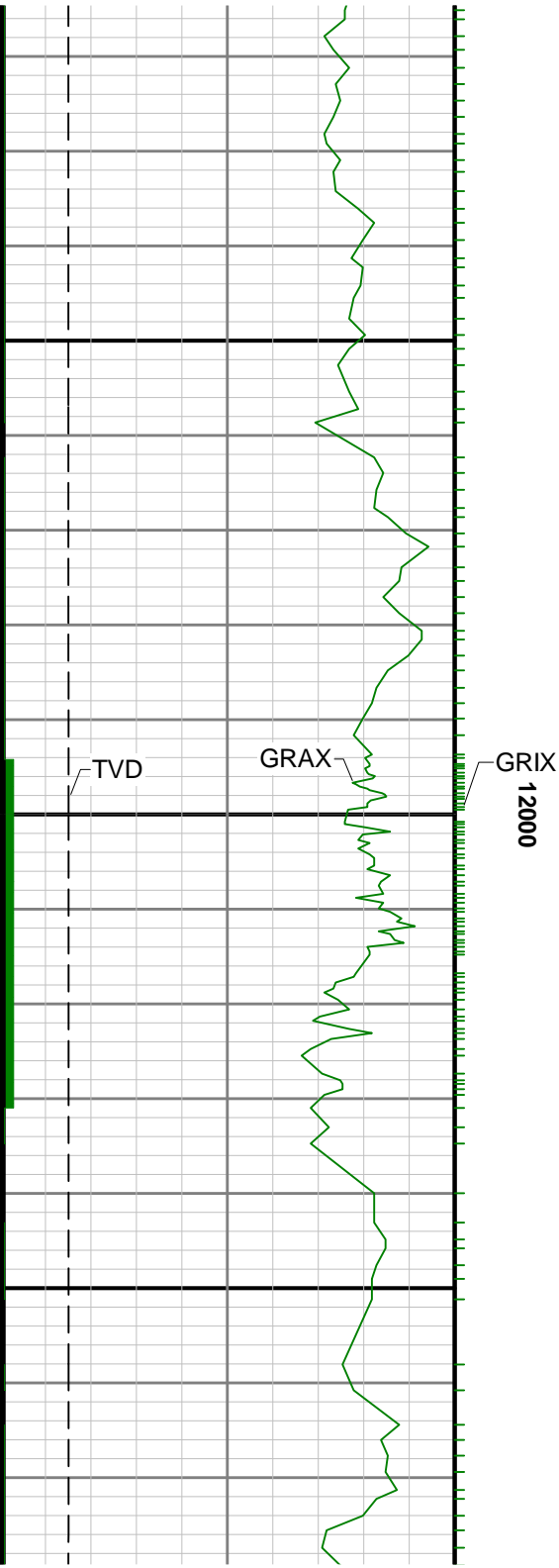


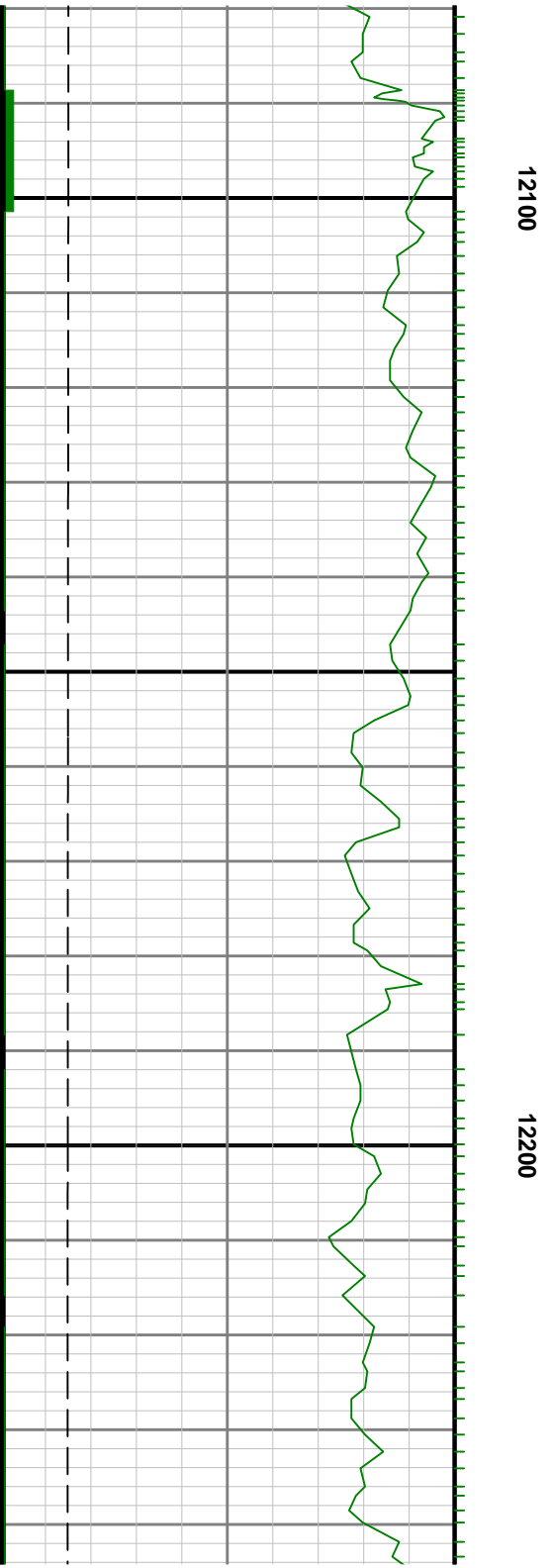
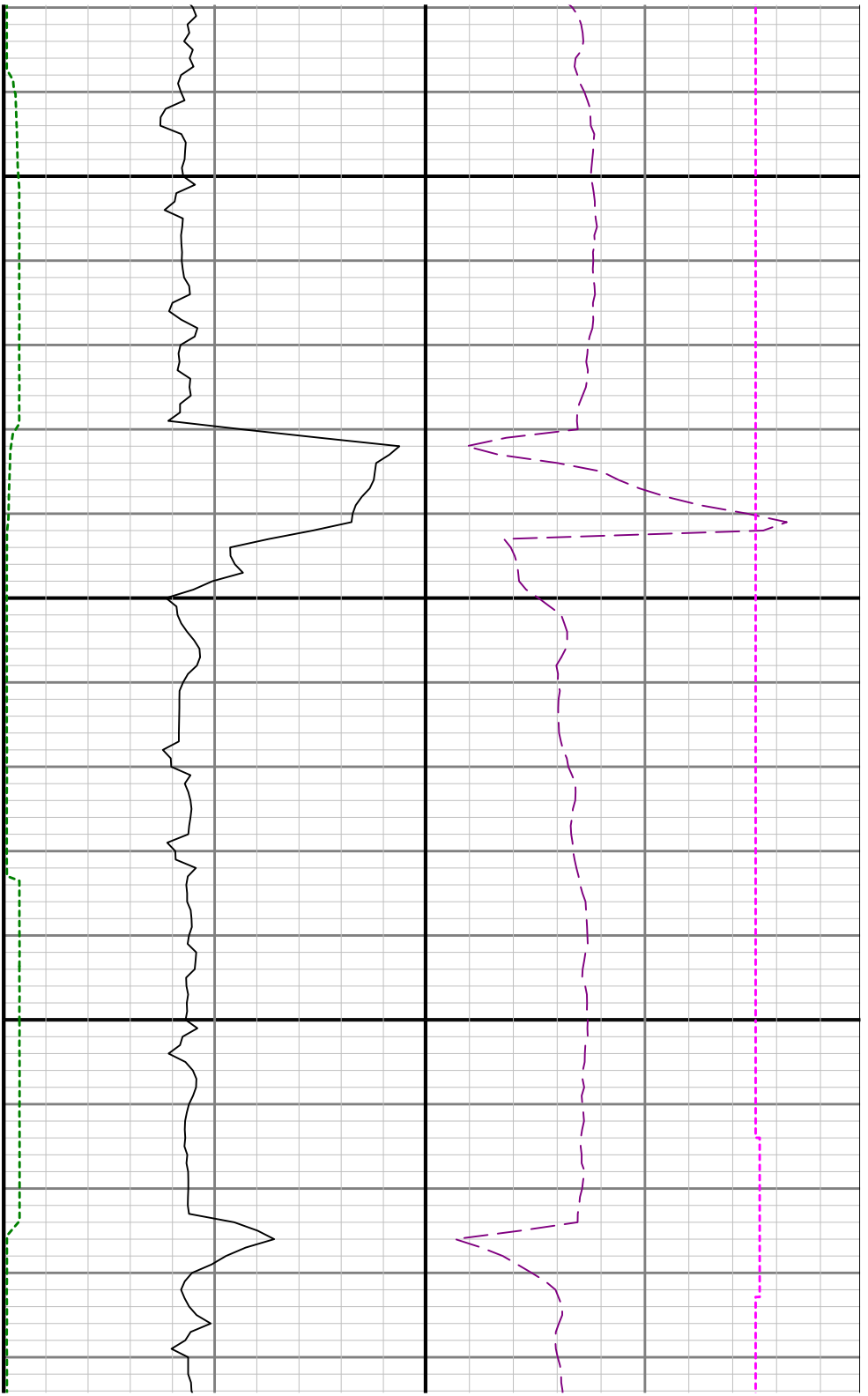


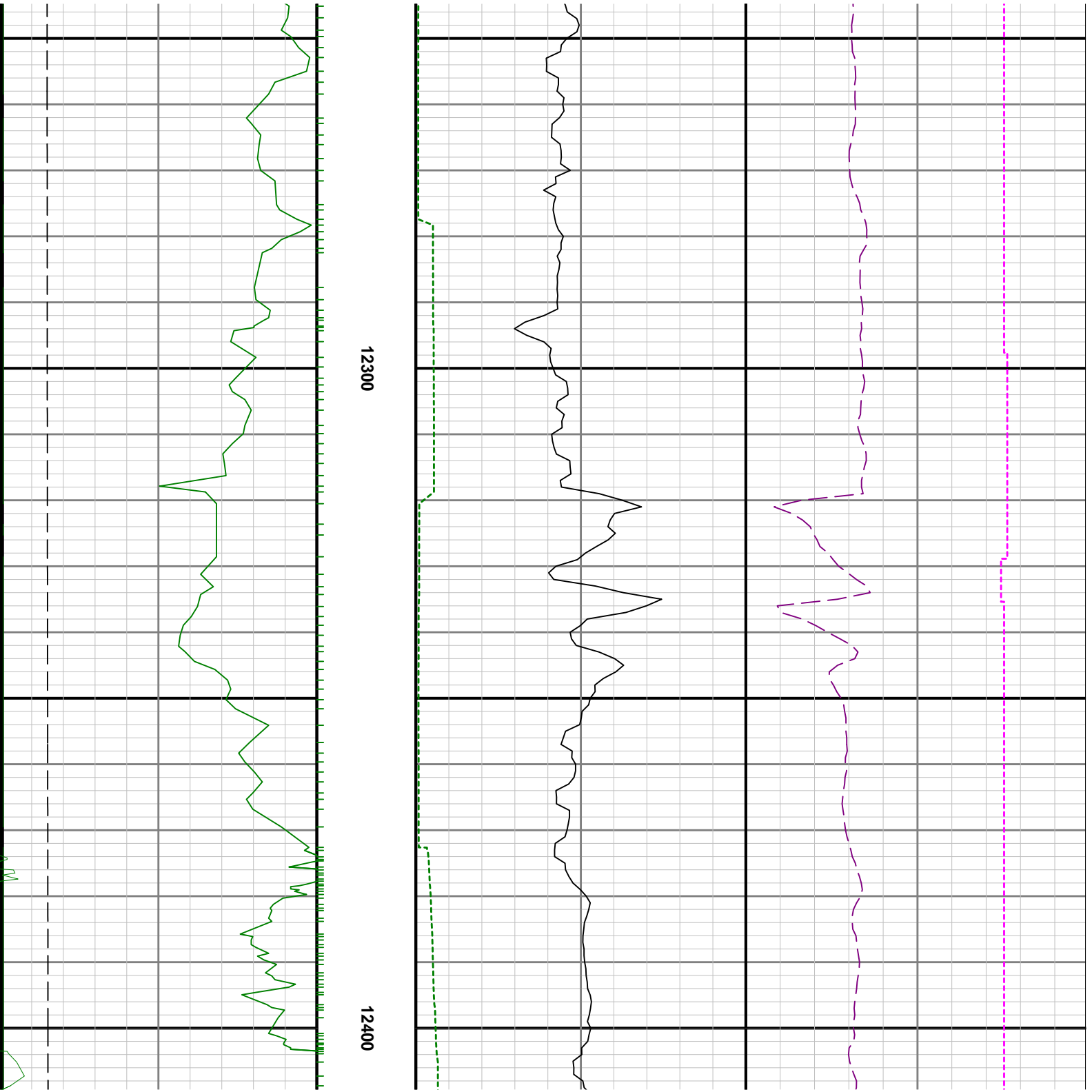




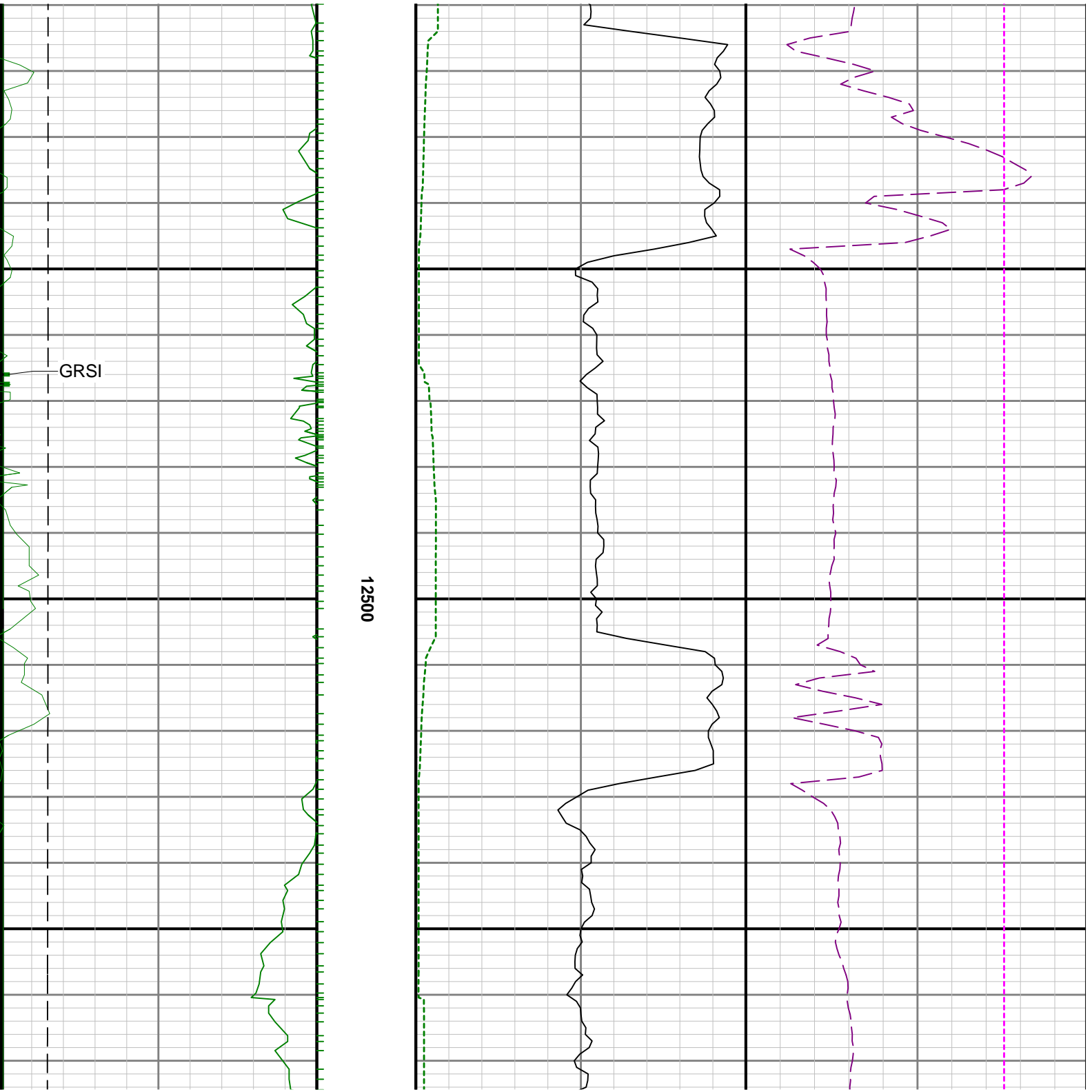


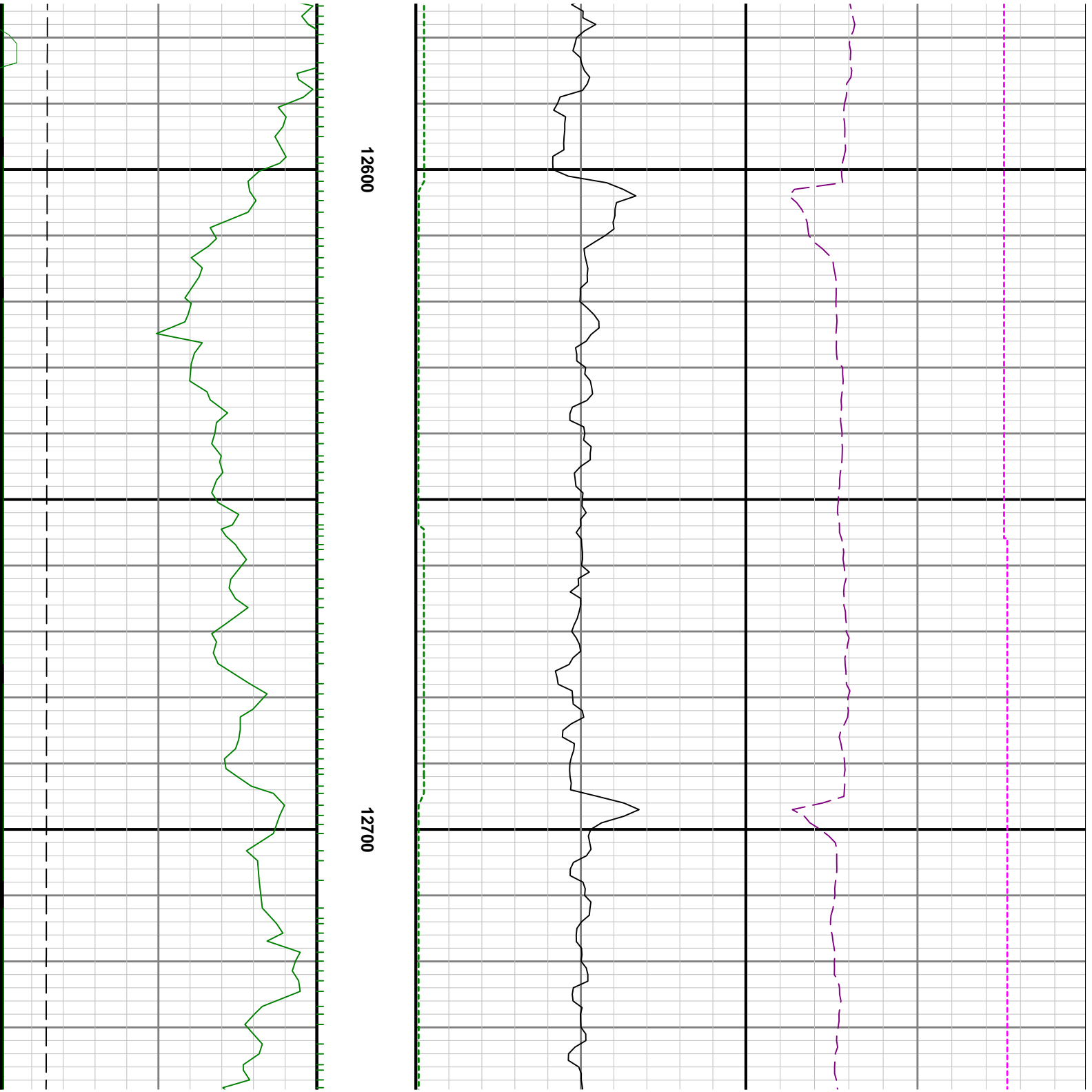


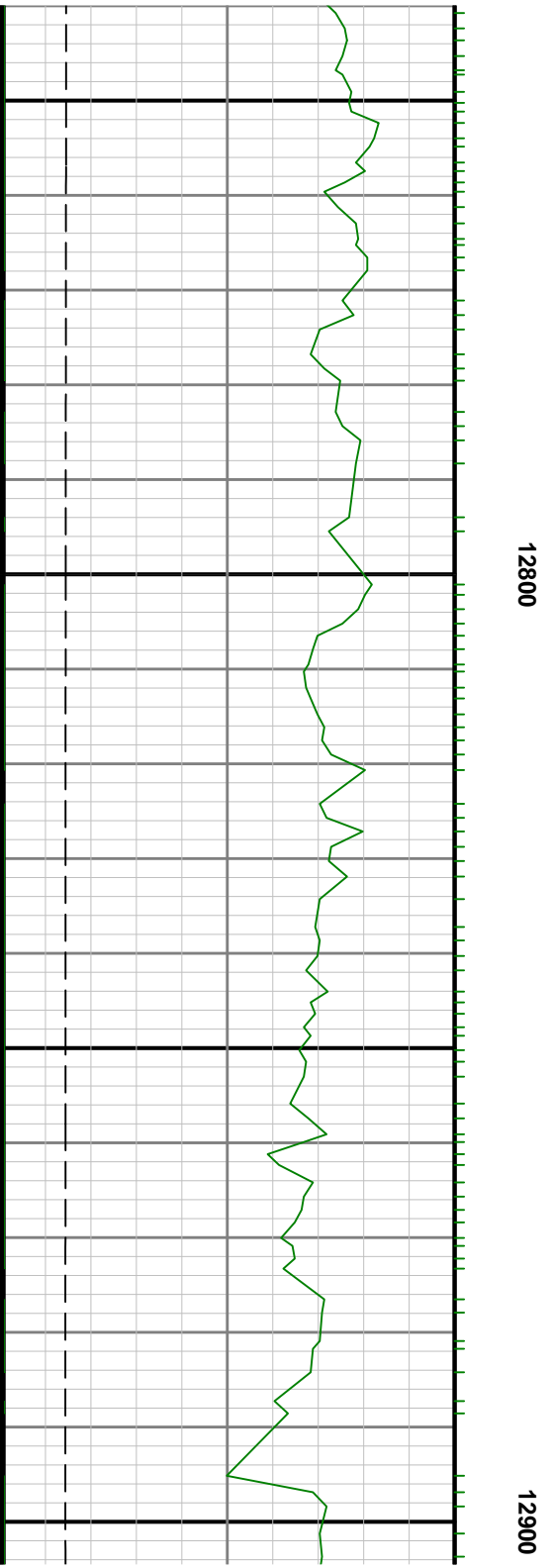


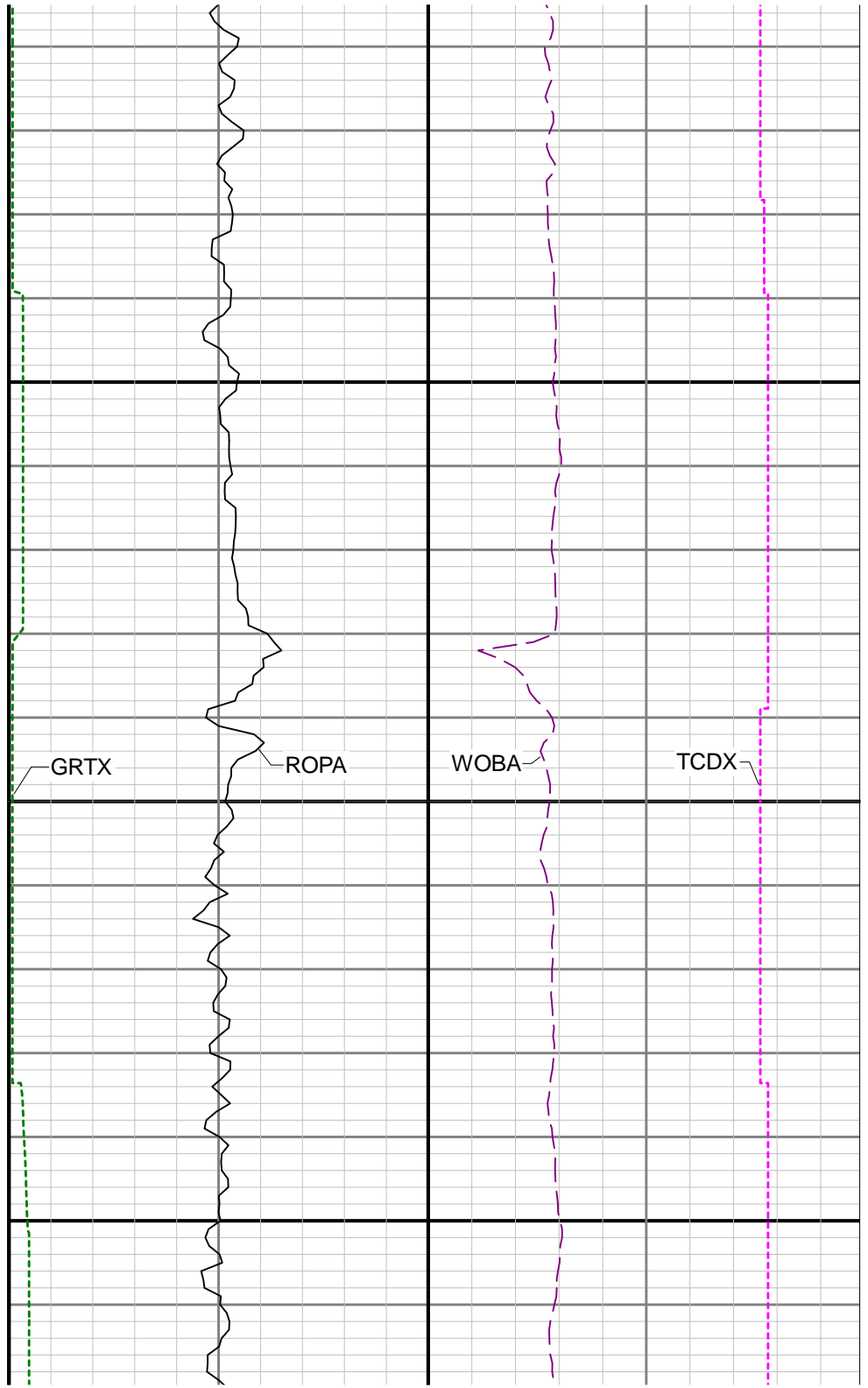
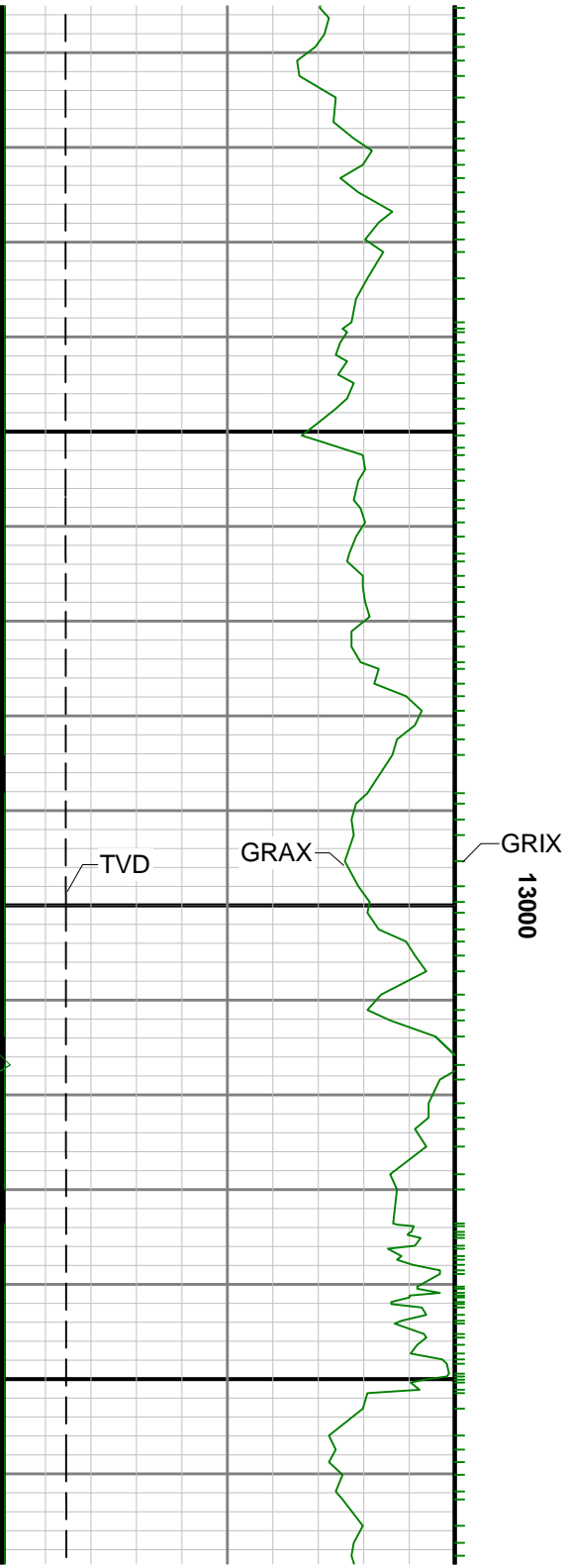


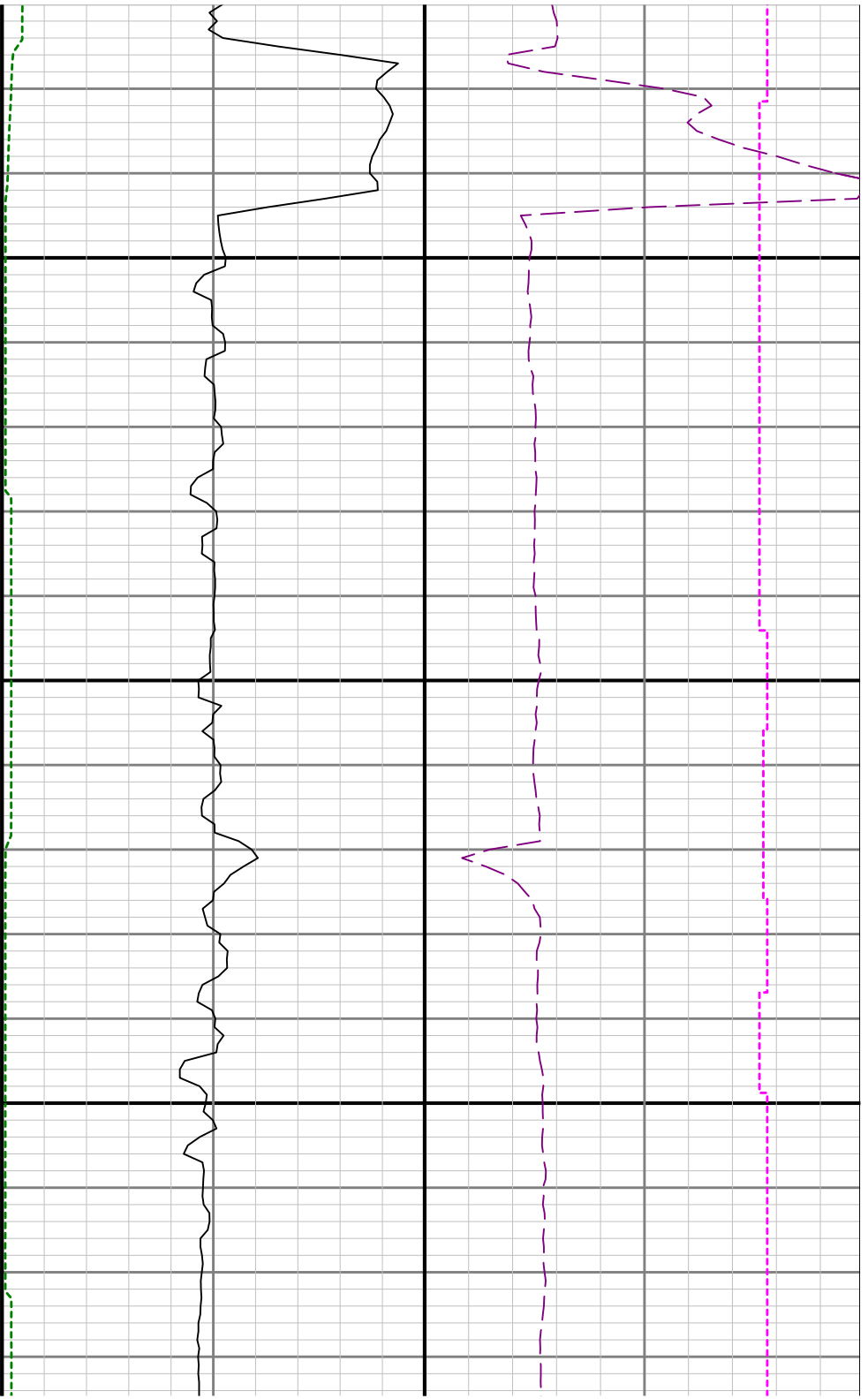












13100

13200

