



LWD Composite Log

Natural Formation Evaluation  
Azimuthal Gamma Ray  
Drilling Dynamics  
Gamma Ray  
Wellbore Survey  
Rotary Steerable

Scale:

1:1200 MD

Company: Cub Creek Energy

Well: Markham 11

Field: Weld County (NAD83, True North)

County: Weld County State: Colorado

Status:

Final Print

Surface Location:

Latitude: 040° 16' 8.616" N

Longitude: 105° 01' 23.268" W

Other Services:

API No: 05-123-43275-00

Job ID: 8071412

SEC: 32

TWN: 4N

RGE: 68W

Permanent Datum (P.D.): Ground Level

Elevation: 5039.00 ft

KB:

N/A

Log Measured From: Rig Floor

Above P.D.

DF:

5056.00 ft

GL:

5039.00 ft

Dates

Interval Logged

Magnetic Field Reference

Date From: 2016-08-05

Top: (ft) 1524.00

Azi Reference North:

True

Dip Angle: (deg)

66.75

Date To: 2016-08-11

Bottom: (ft) 12157.00

Total Magnetic Field Strength: (nT)

52437

Spud Date: 2016-08-04

Mag to Reference North Correction: (deg)

8.59 E

Borehole Record

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.500

97.00

1538.00

9.625

36.00

17.00

1527.00

8.750

1538.00

12158.00

Mud Record

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Water Based Mud

1538.06

12158.00

13.500

1441.00

0.73 | 4.81

1.14 | 353.03

8.750

10620.00

1.14 | 353.03

90.95 | 268.68

Acquisition System

Software Version

Other

Baker Hughes Cadence

G3.3

PlotStudio

3.3.7410.1

Rig:

Xtreme 18

Contractor:

Xtreme Coil Drilling Corp

District:

RMD

Unit:

D&E

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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 (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
2	2	8.750	PDC	3.00	AutoTrak Curve	1525.81	1732.19	1538.06	1738.82	2016-08-05 23:08	2016-08-06 00:41	3.06
3	3	13.500	PDC	2.00	AutoTrak Curve	1726.10	7936.33	1738.82	7942.88	2016-08-06 06:13	2016-08-08 00:20	39.60
4	4	8.750	PDC	3.00	AutoTrak Curve	7929.87	12150.23	7942.88	12157.07	2016-08-09 20:48	2016-08-11 03:45	36.78
Crew												
Name			Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Adam Harris			2016-08-04	2016-08-12	Austin Small		2016-08-04	2016-08-12	Matthew Delmore		2016-08-04	2016-08-12
Ryan Kielian			2016-08-04	2016-08-12	Barry Combs		2016-08-05	2016-08-08	Scott Sims		2016-08-11	2016-08-12
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+ (%)
2016-08-05 03:30		2	1538.00	Water Based Mud	8.5	1	9.5	24.0	0.0/98.7	Active Pit	200	0.00
2016-08-05 15:30		2	1538.06	Water Based Mud	8.5	1	9	23.0	0.0/98.7	Active Pit	200	0.00
2016-08-06 03:30		2	1739.00	Water Based Mud	8.4	1	9.5	24.0	0.0/99.3	Active Pit	200	0.00
2016-08-08 15:30		3	7943.00	Water Based Mud	10.0	16	9	5.5	0.0/91.7	Active Pit	300	0.00
2016-08-06 15:30		3	3278.00	Water Based Mud	8.5	1	9	24.0	0.0/98.8	Active Pit	240	0.00
2016-08-07 03:30		3	5785.00	Water Based Mud	9.6	10	9	7.0	0.0/93.7	Active Pit	300	0.00
2016-08-07 15:30		3	7151.00	Water Based Mud	9.9	14	9	5.4	0.0/92.2	Active Pit	300	0.00
2016-08-08 03:30		3	7943.00	Water Based Mud	10.0	19	9	5.4	0.0/91.8	Active Pit	300	0.00
2016-08-09 15:30		4	7943.00	Water Based Mud	10.1	18	9	5.8	0.0/91.2	Active Pit	300	0.00
2016-08-10 03:30		4	8928.00	Water Based Mud	10.1	14	9.4	5.4	0.7/90.5	Active Pit	300	0.00
2016-08-10 15:30		4	10501.00	Water Based Mud	10.1	18	10	5.0	1.7/89.4	Active Pit	300	0.00
2016-08-11 03:30		4	12118.22	Water Based Mud	10.1	15	9.4	5.2	1.9/89.4	Active Pit	400	0.00
2016-08-11 15:30		4	12158.00	Water Based Mud	10.2	18	8.8	5.8	1.8/88.7	Active Pit	400	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)	
2	ATC_SU		12123498		Near Bit VSS		5.93		6.63	7.000	4.330	
2	ATC_SU		12123498		Near Bit Inclination		5.93		6.63	7.000	4.330	
2	ATC_MWD		12656414		Gamma (single)		2.20		12.25	7.000	3.250	
2	ATC_MWD		12656414		Directional (mag)		12.27		22.32	7.000	3.250	
3	ATC_SU		12273683		Near Bit VSS		5.93		6.55	7.000	4.330	

3	ATC_SU	12273683	Near Bit Inclination	5.93	6.55	7.000	4.330
3	ATC_MWD	12271999	Gamma (single)	2.76	12.72	7.000	3.250
3	ATC_MWD	12271999	Directional (mag)	12.28	22.24	7.000	3.250
4	ATC_SU	12273683	Near Bit VSS	5.93	6.84	7.000	4.330
4	ATC_SU	12273683	Near Bit Inclination	5.93	6.84	7.000	4.330
4	ATC_MWD	12271999	Gamma (single)	2.76	13.01	7.000	3.250
4	ATC_MWD	12271999	Directional (mag)	12.28	22.53	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
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

Baker Hughes LWD Run 1 utilized a 8 inch NaviTrak (Directional,VSS) assembly behind a 13.5 inch bit from 97 ft MD to 1538 ft MD (97 ft TVD to 1536.95 ft TVD). No logging services were provided for Run 1.
- 2

Baker Hughes LWD Run 2, 3, and 4 utilized a 6.75 inch AutoTrak Curve Rotary Steerable assembly behind a 8.75 inch bit from 1538 ft MD to 12158 MD (1536.95 ft TVD to 7286.33 ft TVD).
- 3

Depth Measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to a lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1532.00	8.750	2	The interval from 1526 ft MD to 1538 ft MD (1524.95 ft TVD to 1536.95 ft TVD) has no surface data due to the Gamma Ray sensor to bit offset
2	12152.00	8.750	4	The interval from 12146 ft MD to 12158 ft MD (7286.53 ft TVD to 7286.33 ft TVD) has no Gamma data due to sensor to bit offset

<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div>BAKER</div><div>HUGHES</div></div></div>		<div><div>Company</div><div>Well</div><div>Interval</div><div>Created</div></div>	<div>Cub Creek Energy</div> <div>Markham 11</div> <div><div><div>Date From:</div><div>2016-08-05 17:08:42</div></div><div><div>Date To:</div><div>2016-08-11 03:43:00</div></div></div> <div><div><div>Top:</div><div>1524.00</div></div><div><div>Bottom:</div><div>12157.00</div></div></div> <div>2016-08-12 13:32</div>
<div><div>Gamma Ray - Apparent 3 ft Average GRAM</div><div>0200</div></div> <div><div>API</div><div>Azimuthal Gamma Ray - Apparent - Up Quadrant 3 ft Average GRAUM</div><div>0200</div></div> <div><div>API</div><div>Azimuthal Gamma Ray - Apparent - Down Quadrant 3 ft Average GRADM</div><div>0200</div></div> <div><div>API</div><div>True Vertical Depth TVD</div><div>75001500</div></div>	<div>MD 1:1200 feet</div>	<div><div>Rate of Penetration 3 ft Average ROPA</div><div>10000</div><div>ft/h</div></div>	<div><div>Surface Weight On Bit 1 ft Average WOBA</div><div>050</div><div>klb</div></div> <div><div>Downhole Temperature TCDM</div><div>0250</div><div>degF</div></div>

1400	1500	1600	1700	1800	1900	2000	2100	2200
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See Remark 1

**>R2**

R2&lt;&gt;R3

-ROPA

—WOB

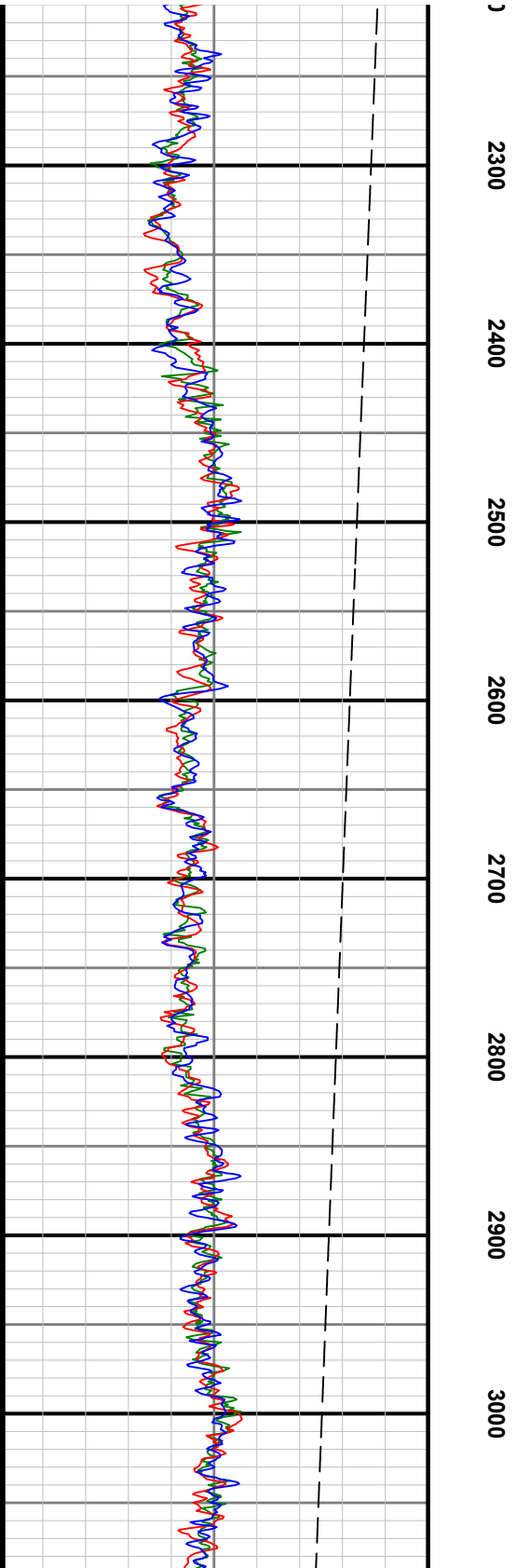
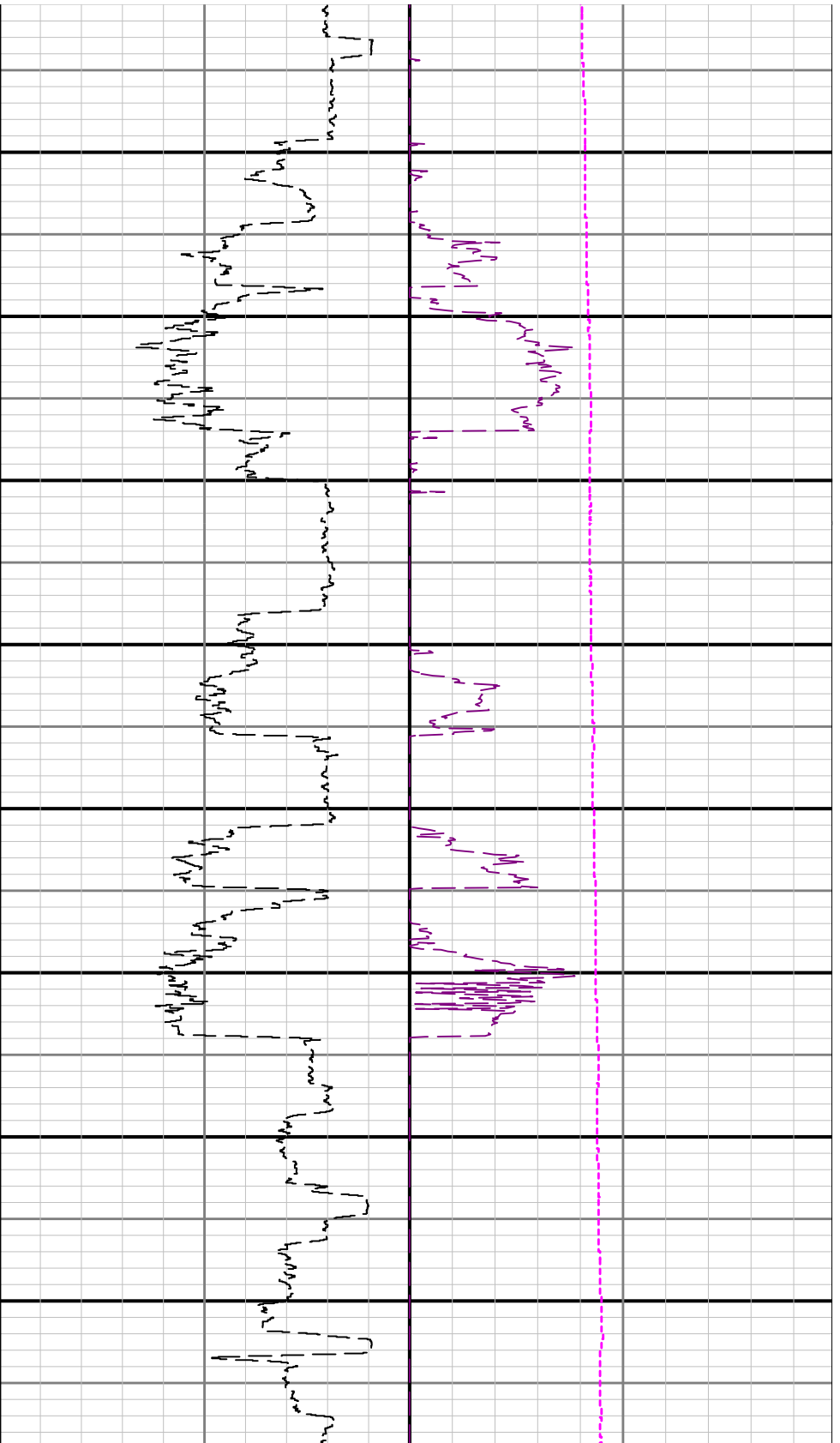
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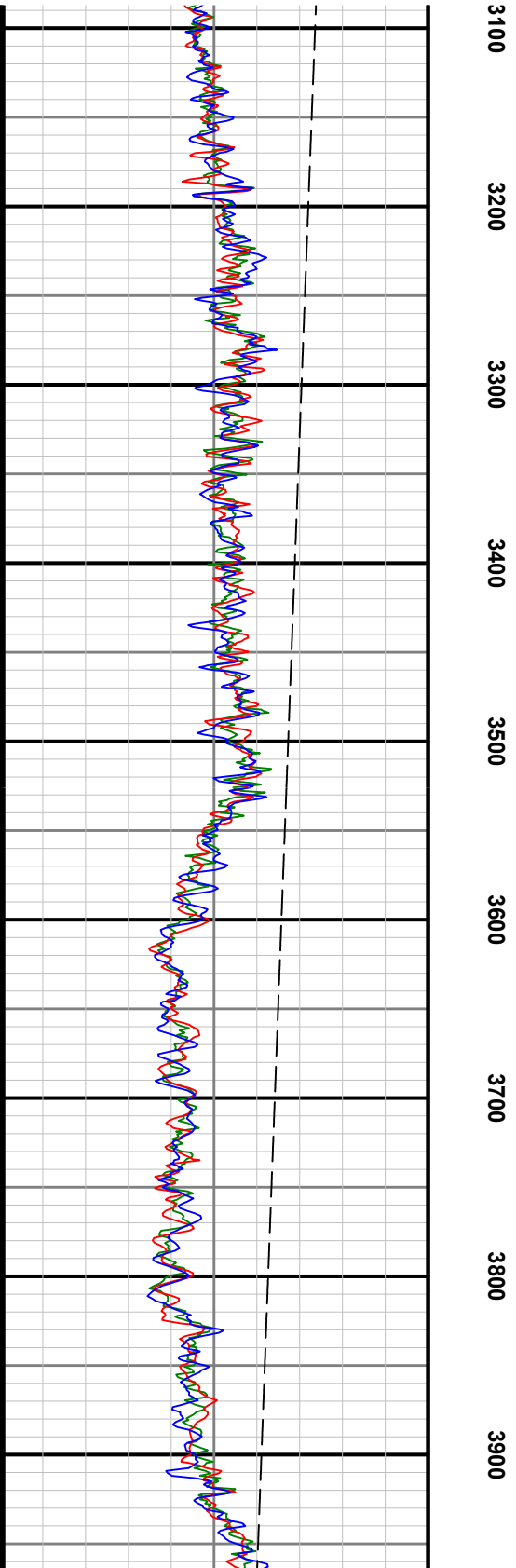
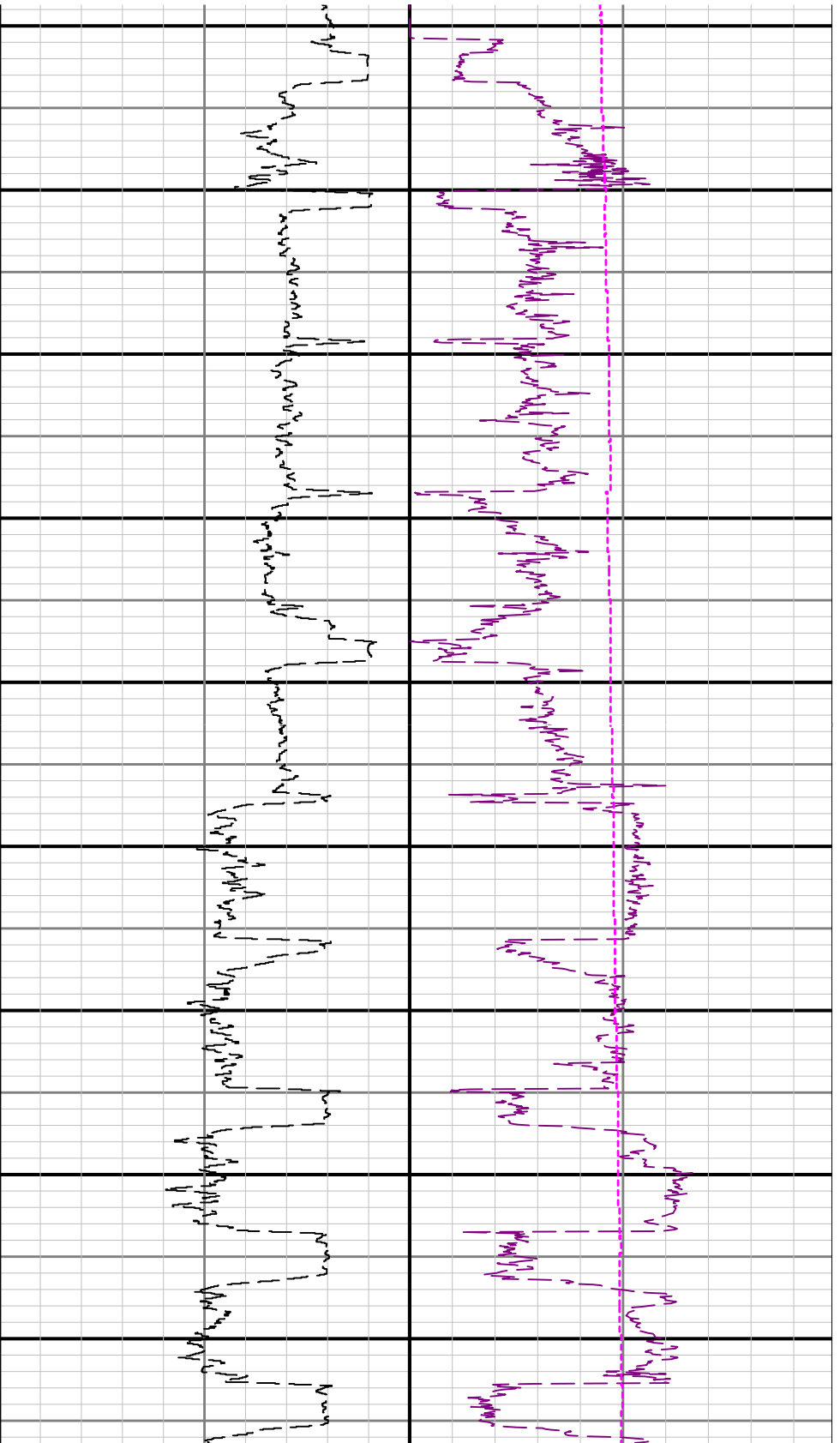
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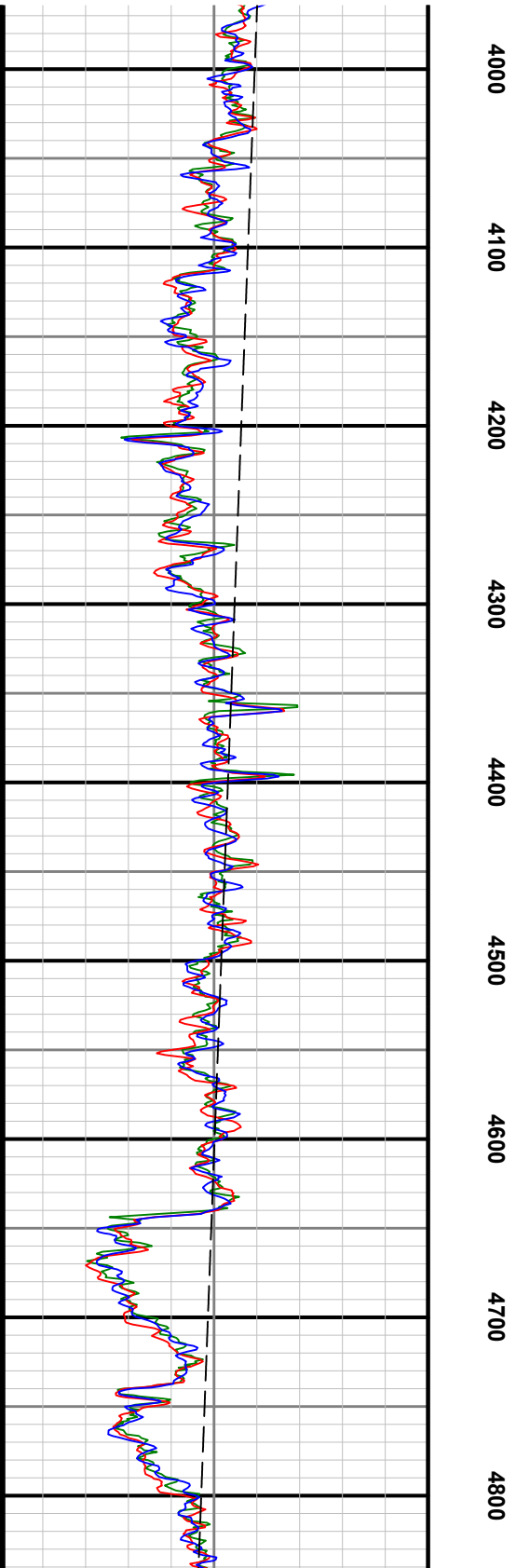
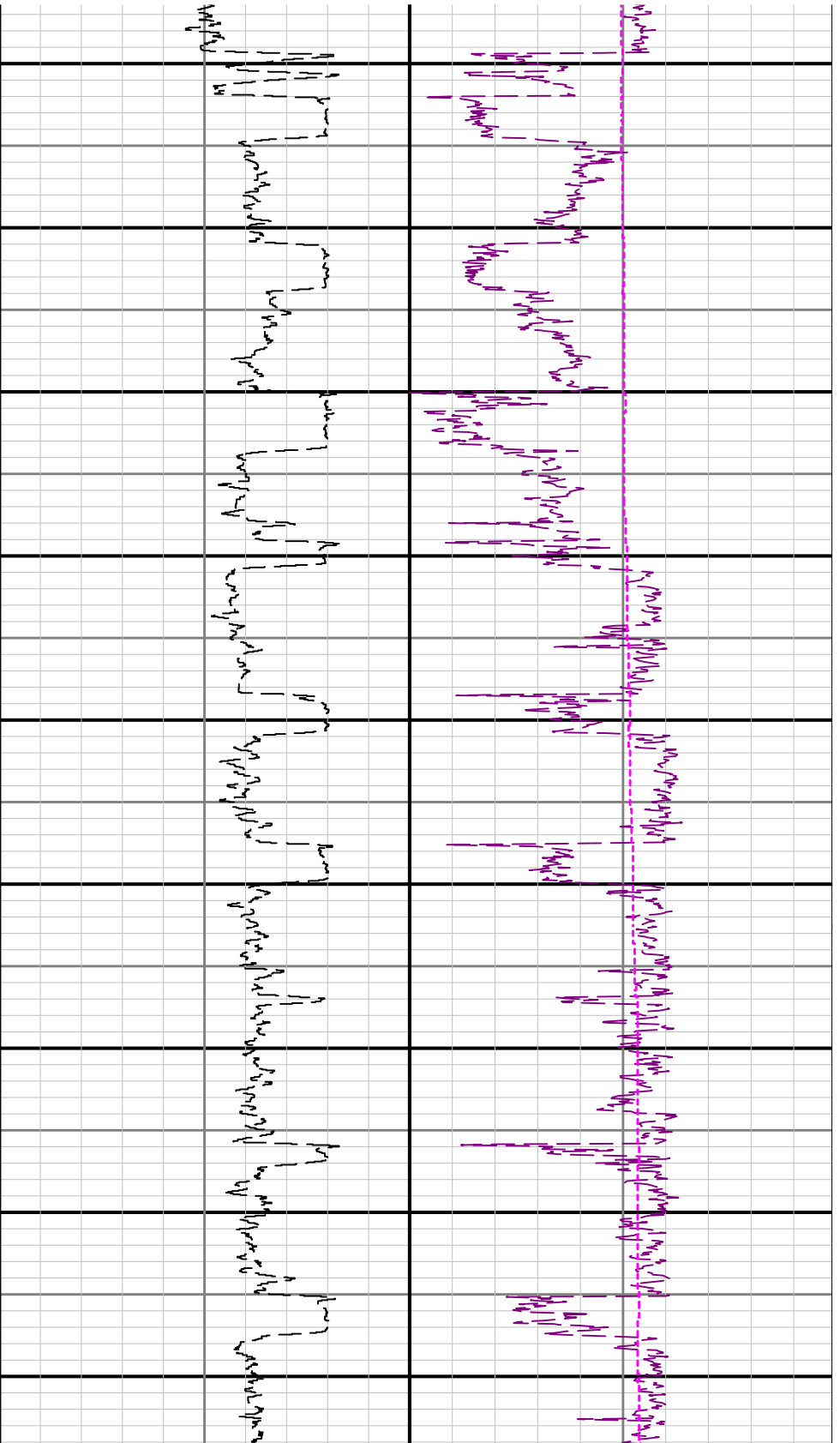
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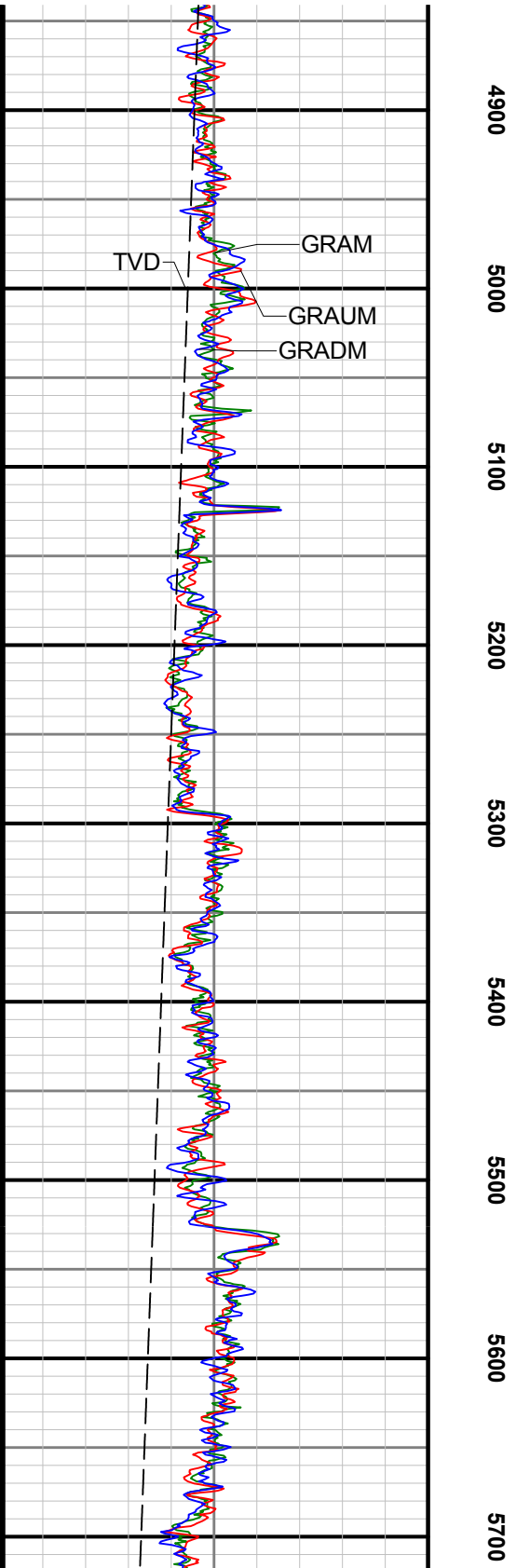
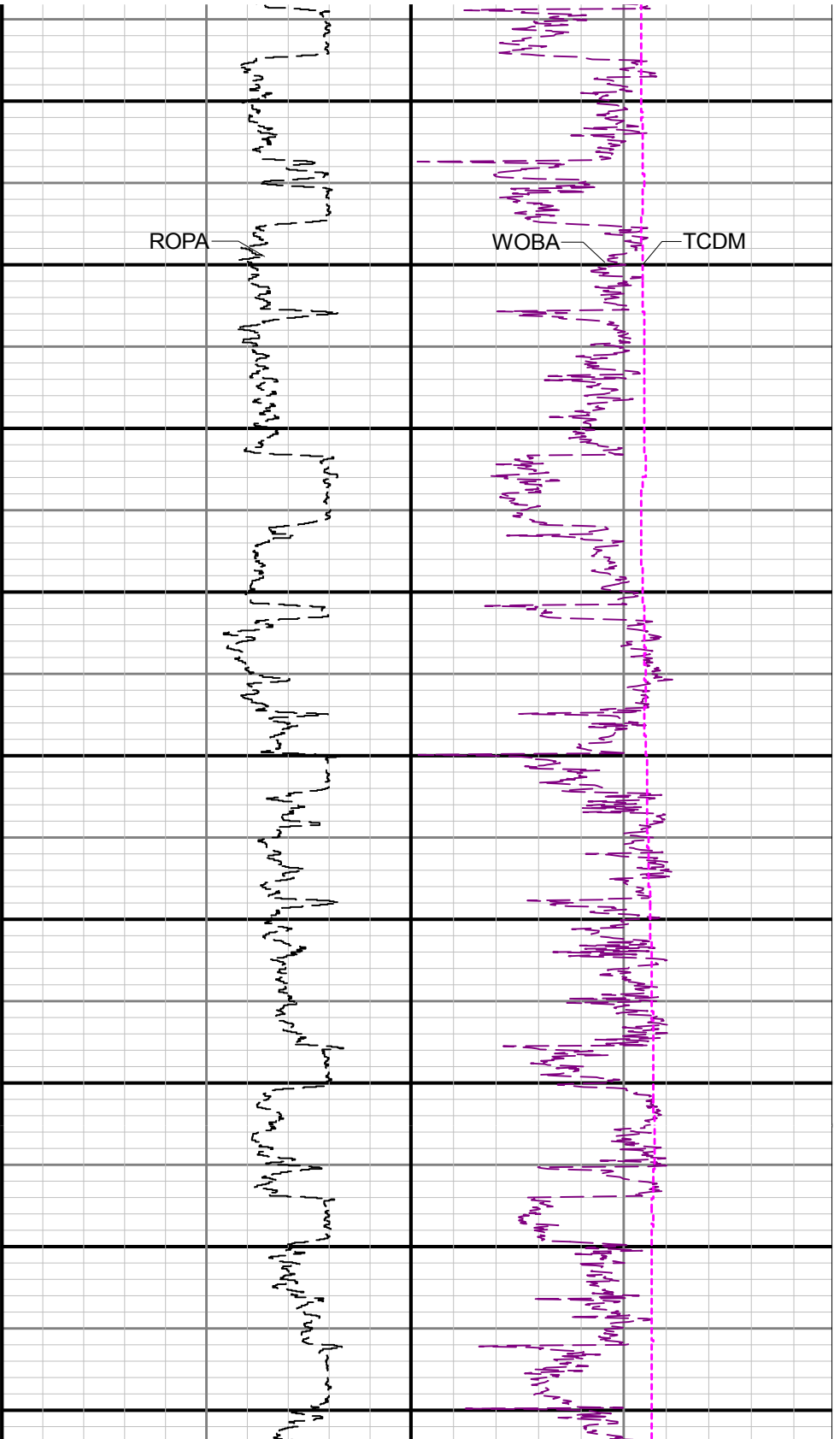
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GRAUM-

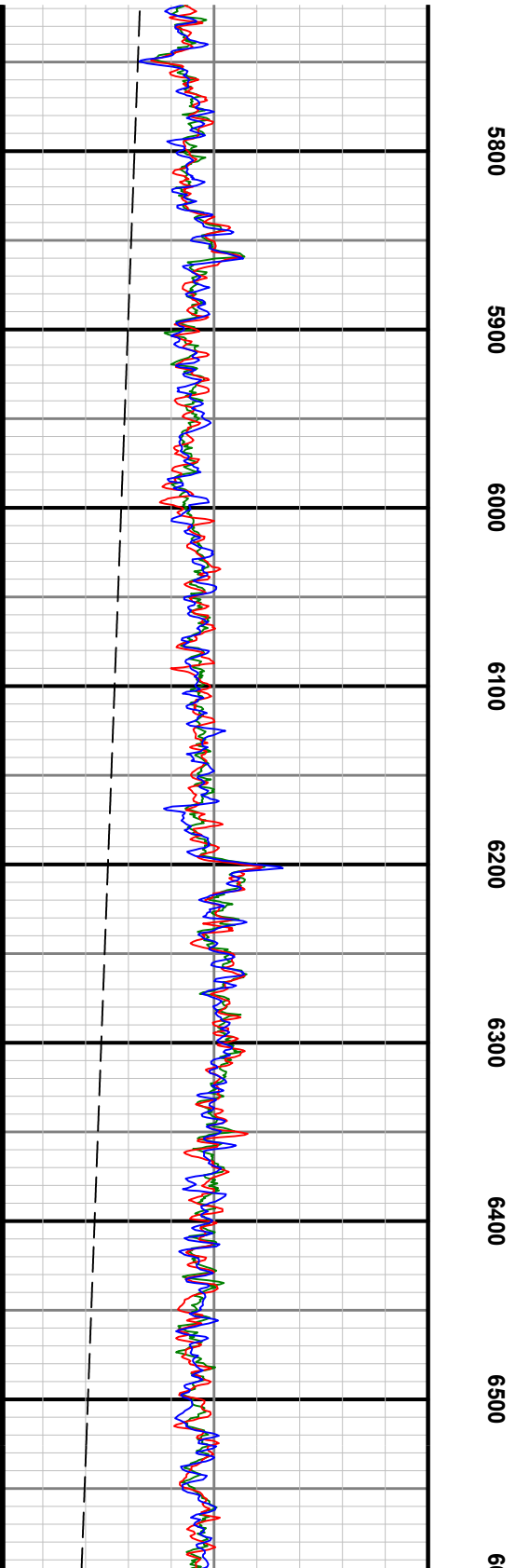
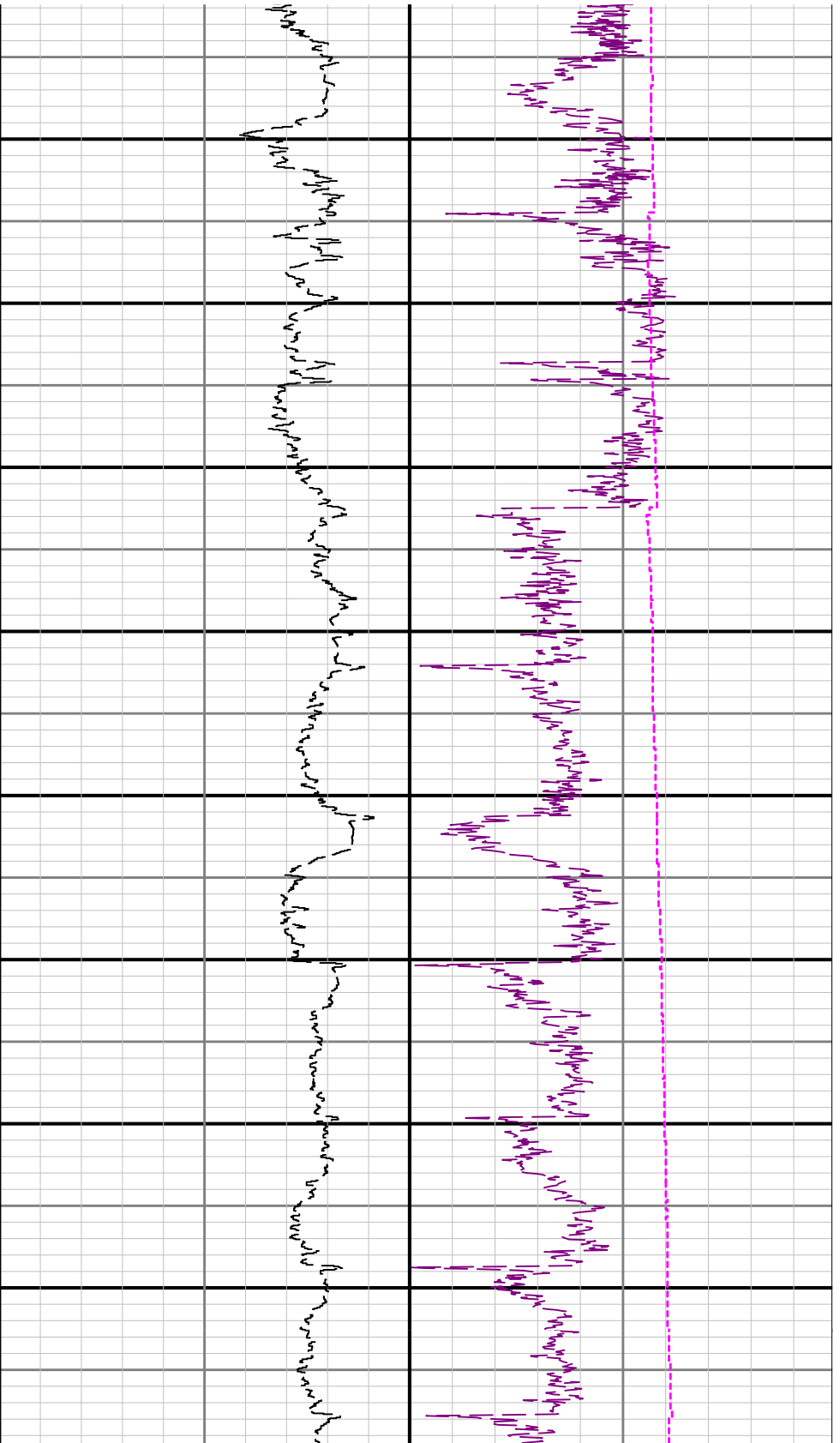


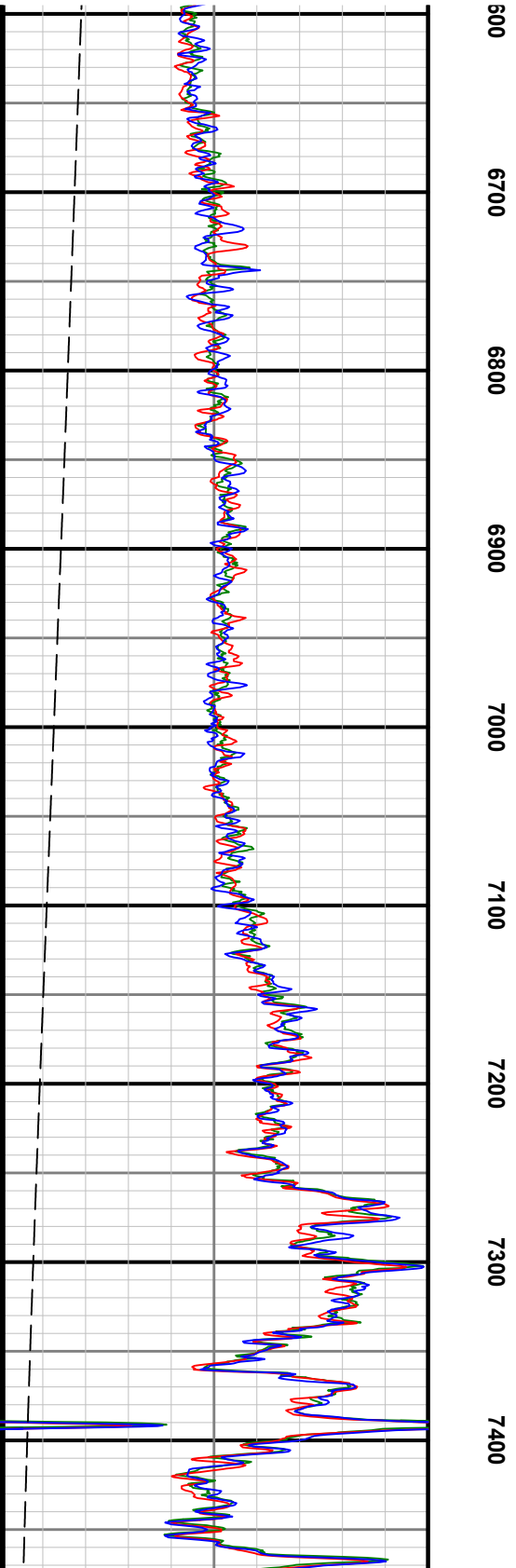
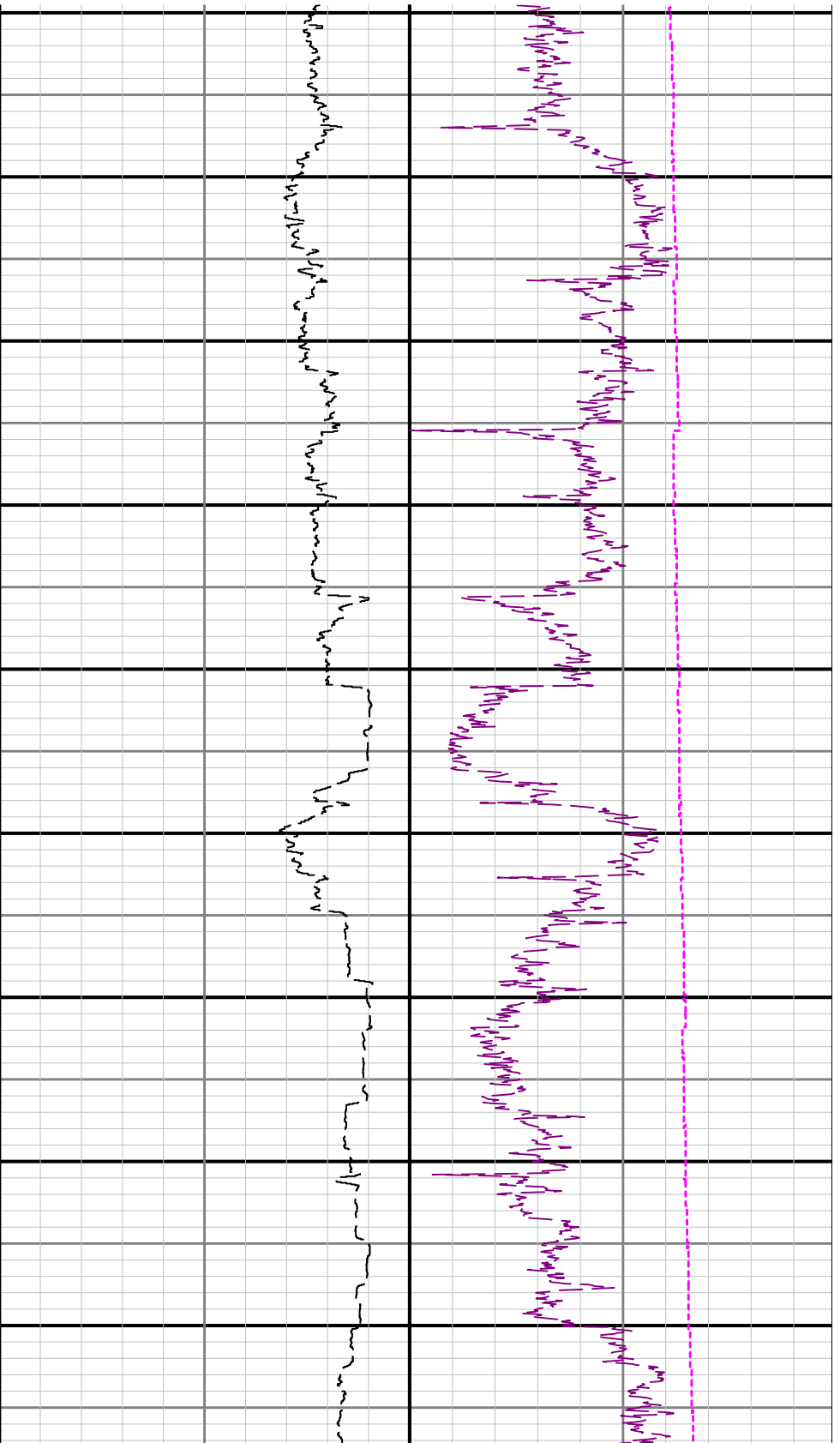


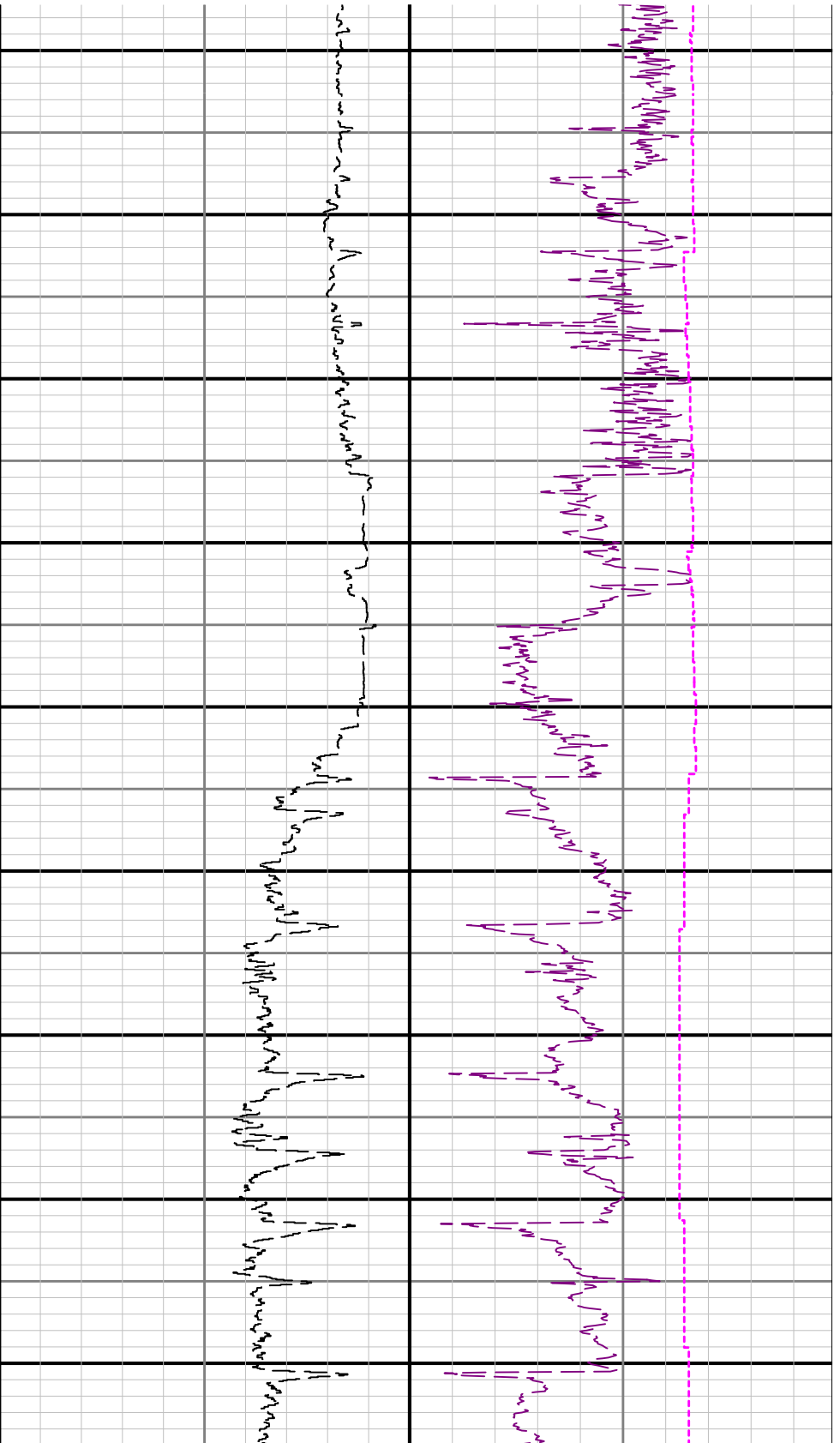












R3>R4

