



Gamma Ray

LWD REALTIME/MEMORY LOG - RUN 1

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<div>BAKER HUGHES</div>			Gamma Ray		
Scale:	Company: Noble Energy				
1:1200 MD	Well: Wells Ranch BB11-658				
Depth Reference:	Field: Weld County/(Noble NAD 83 Grid)				
Driller's Depth	Country: Weld Country:(United States) State: Colorado				
Status:	Final Print		Surface Location: Latitude: Longitude:		Other Services:
API No:	N/A			040° 24' 46.008" N 104° 24' 45.468" W	Drilling Dynamics Wellbore Survey
Job ID:	8645741			Elevation: Above P.D.	Elev. KB: Elev. DF: Elev. GL:
Permanent Datum (P.D.): Log Measured From:	Mean Sea Level Rig Floor			0.00 ft 4698.00 ft	N/A 4698.00 ft 4668.00 ft
Dates	Interval Logged		Magnetic Field Reference		
Date From:	2017-08-28	Top: (ft) Bottom: (ft)	Azi Reference North: Total Magnetic Field Strength: (nT)	Grid (deg)	Dip Angle: (deg)
Date To:	2017-08-30				
Spud Date:	2017-08-27		Mag to Reference North Correction: (deg)		
Borehole Record			Casing Record		
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)
8.500	0.00	16573.00	9.625	36.00	0.00
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Incl Azi (Start)
Oil Based Mud	1932.00	16573.00	6.750	14642.00	0.47 62.15
Acquisition System			Software Version		
Baker Hughes Cadence Plot Studio	Rt4.1 4.1.7763.3	Rig: Contractor:		H&P 517 Helmerich & Payne Drilling Co	
			District:	RMA	Unit: N/A

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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	8.500	PDC	2.00	AutoTrak Curve	1908.00	16561.00	1932.00	16573.00	2017-08-28 09:53	2017-08-30 17:39	49.48

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
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	Wellsite	Wellsite	Wellsite	Wellsite	Wellsite			
Mark Herpin	2017-08-27	2017-08-31	Ty Jackson	2017-08-27	2017-08-31			

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+ (%)
2017-08-28 09:01	1	0.00	Oil Based Mud	9.1	42	N/A	N/A	85.6/14.4	Active Pit	22500	0.00
2017-08-29 05:03	1	7717.41	Oil Based Mud	8.9	43	N/A	N/A	80.4/19.6	Active Pit	25000	0.00
2017-08-30 05:55	1	14222.41	Oil Based Mud	9.2	42	N/A	N/A	84.4/15.6	Active Pit	21500	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	12194650	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_SU	12194650	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_MWD	12284825	Gamma (single)	2.75	12.90	7.000	3.250
1	ATC_MWD	12284825	Directional (mag)	12.27	22.42	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	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, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD Run 1 utilized a 6.75 inch NaviGamma services (Gamma Ray and Directional) services behind a 8.5 inch bit and rotary steerable assembly from 1932 to 16573 feet MD (1932 to 6448 feet TVD).

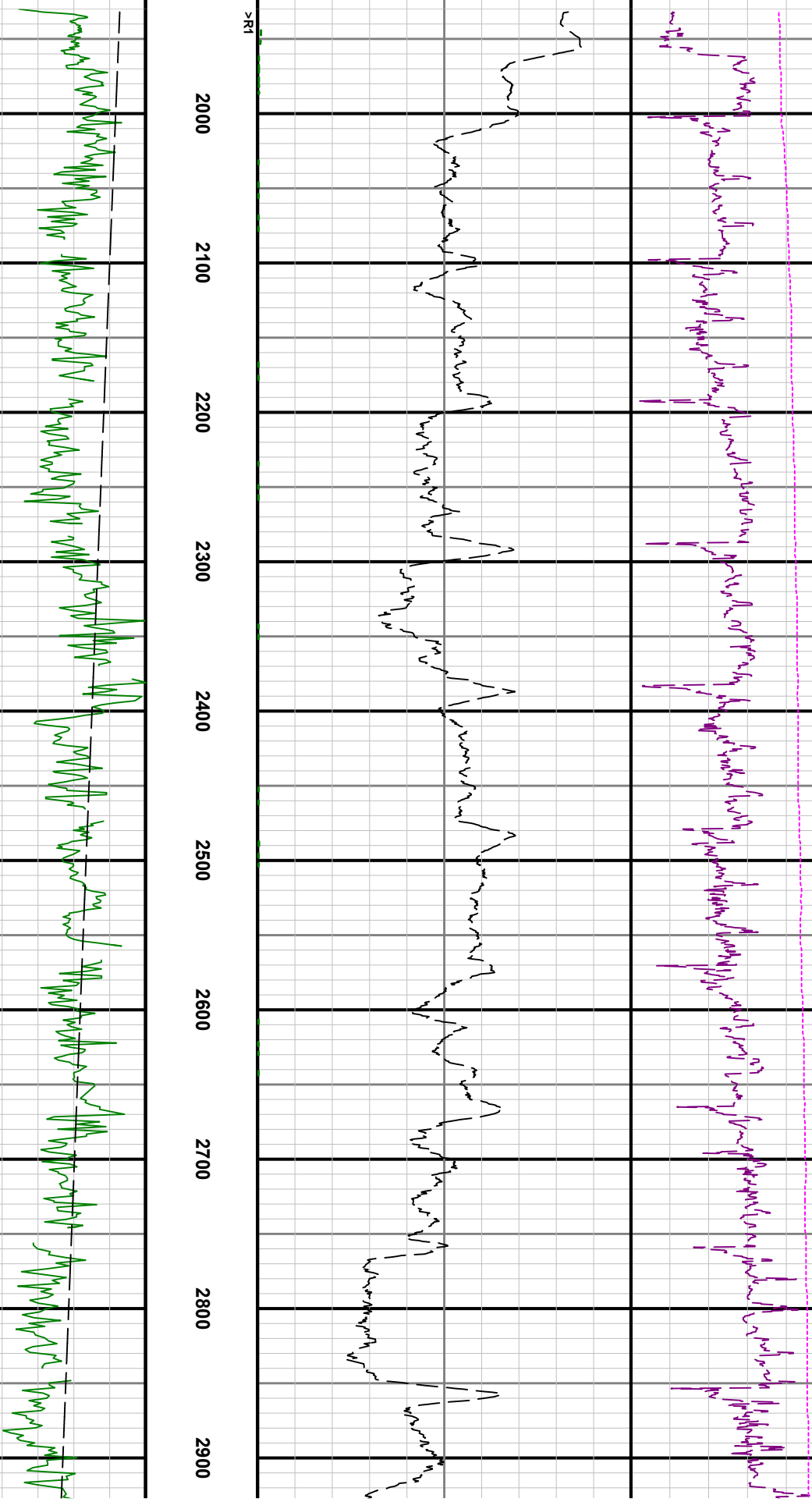
Remarks

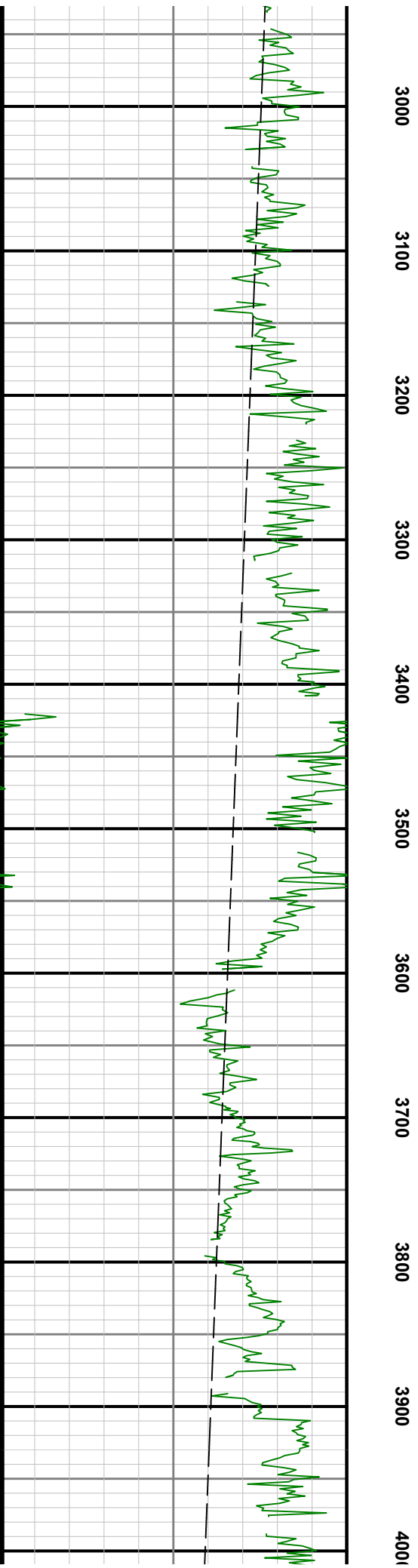
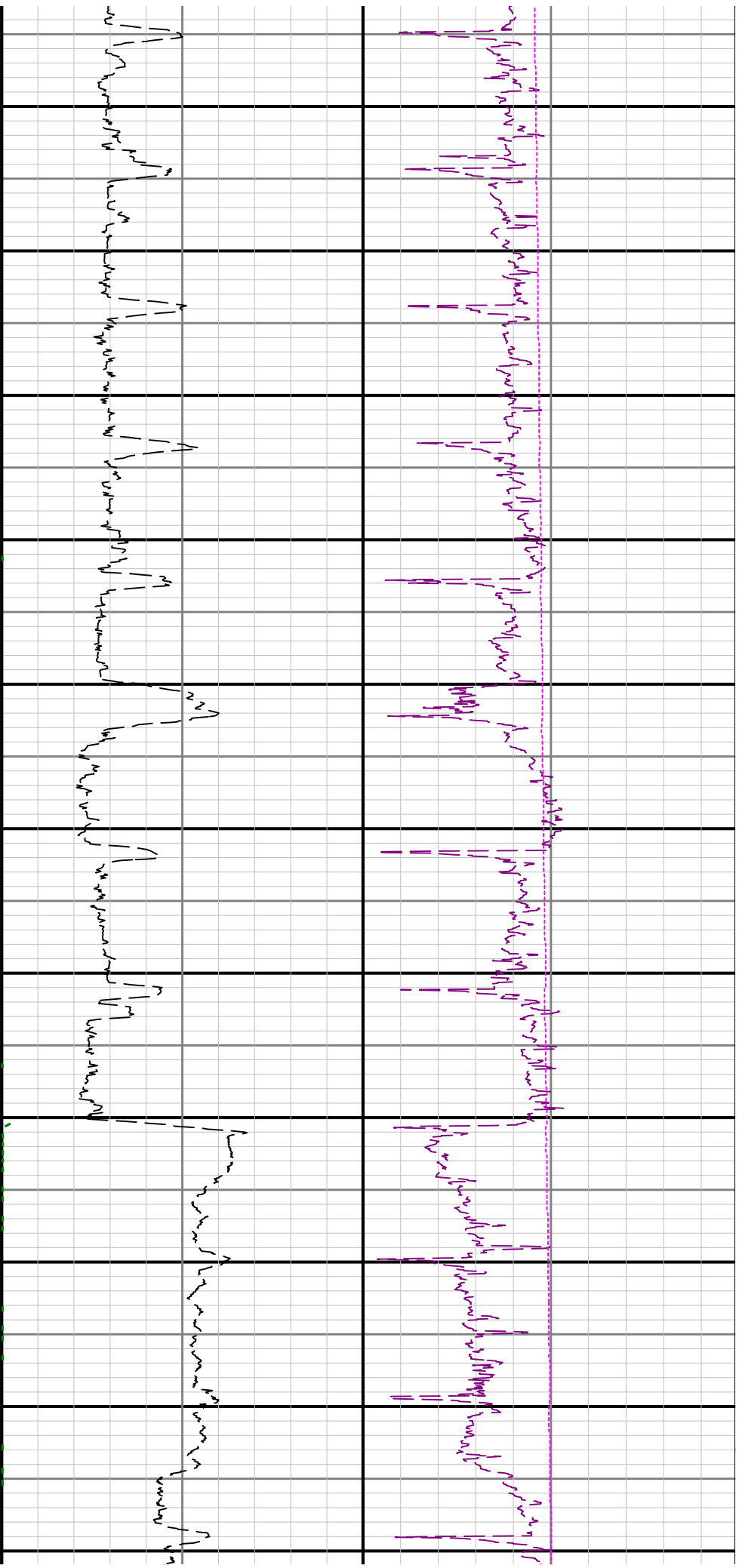
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1932.00	6.750	1	Gamma Ray logging operations began at 1932 feet MD (1932 feet TVD) per customer request.
2	16573.00	6.750	1	The interval from 16561 to 16573 feet MD (6448 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

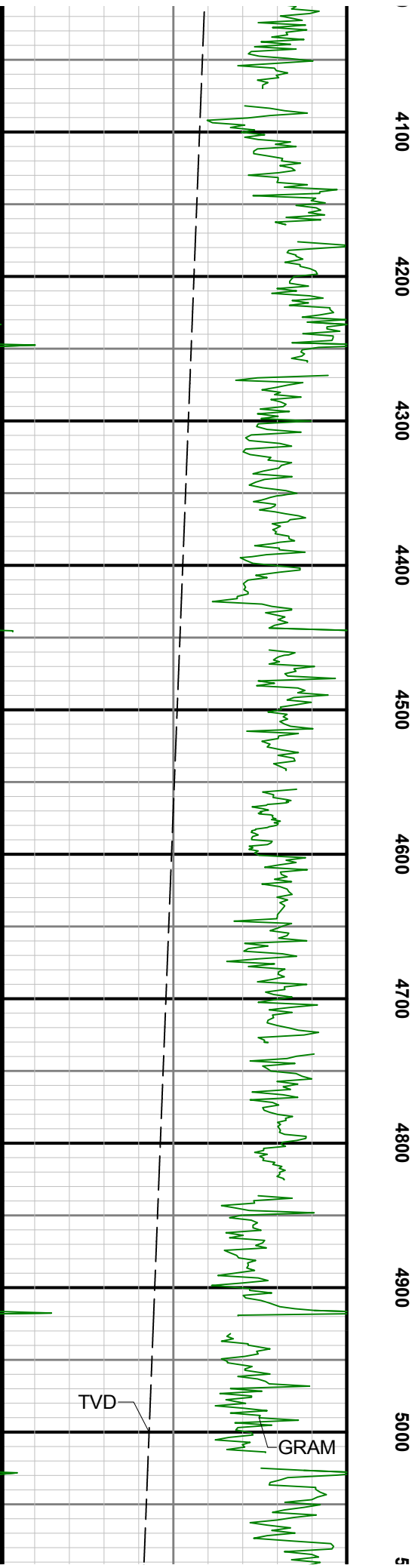
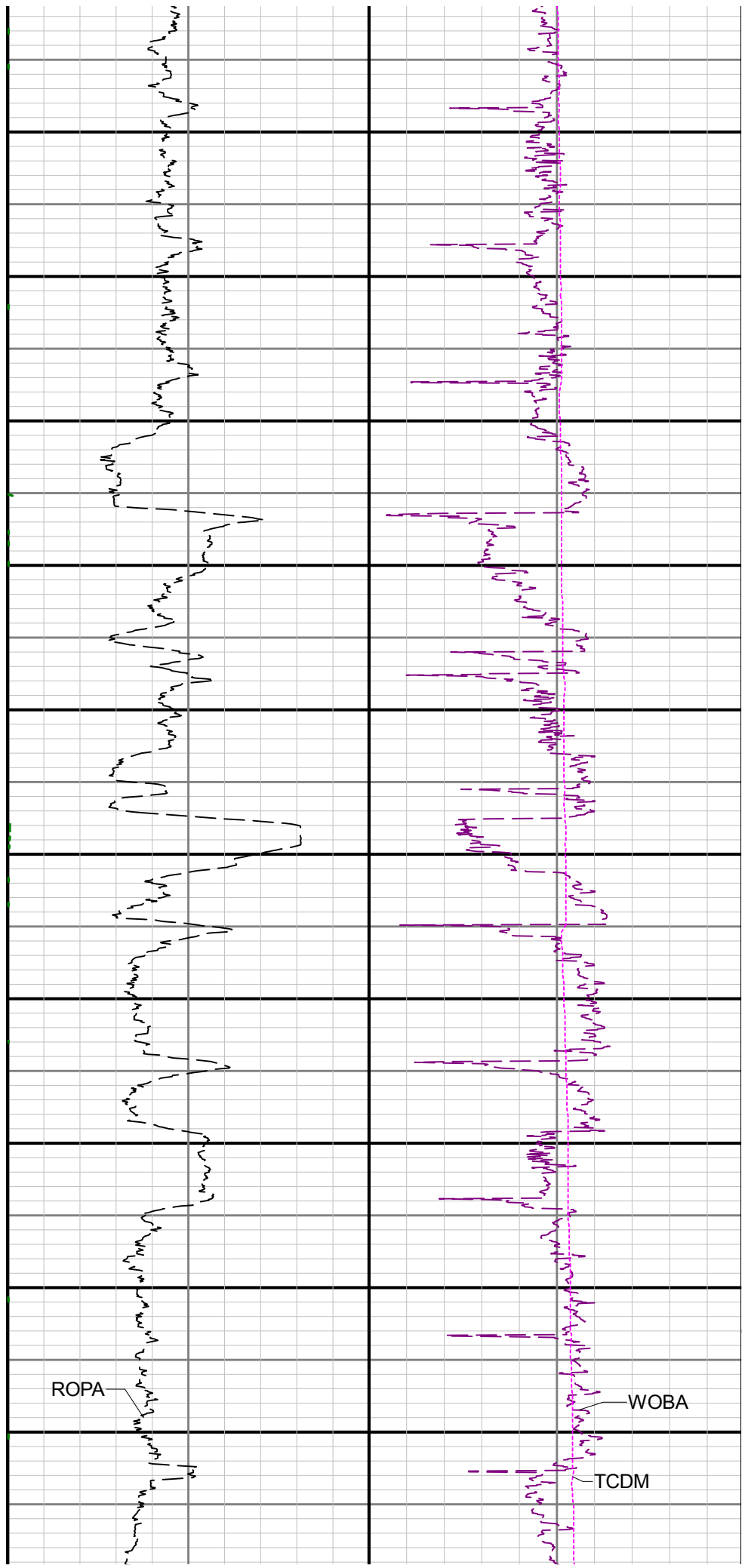
<div></div>		Company	Noble Energy			
		Well	Wells Ranch BB11-658			
		Interval	Date From:	2017-08-28 03:53:12	Top:	0.00
		Created	Date To:	2017-08-30 09:59:06	Bottom:	16574.00
			2017-08-31 09:23:25			
Gamma Ray - Apparent 3 ft Average GRAM		MD 1:1200 feet	Depth Averaged ROP 10 ft Average ROPA		Weight On Bit, Average 1 ft Average WOBA	
0150			10000		050	
API			ft/h		klb	
True Vertical Depth TVD			Gamma Time Since Drilled GRTX		Downhole Temperature TCDM	
75001500			0600		0300	
ft			min		degF	
		1800				

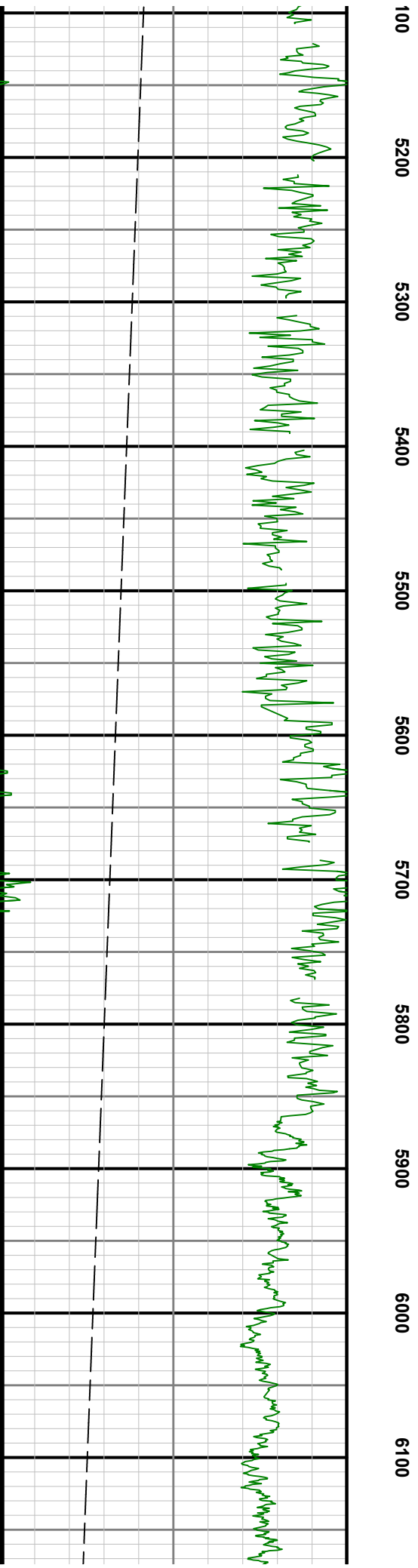
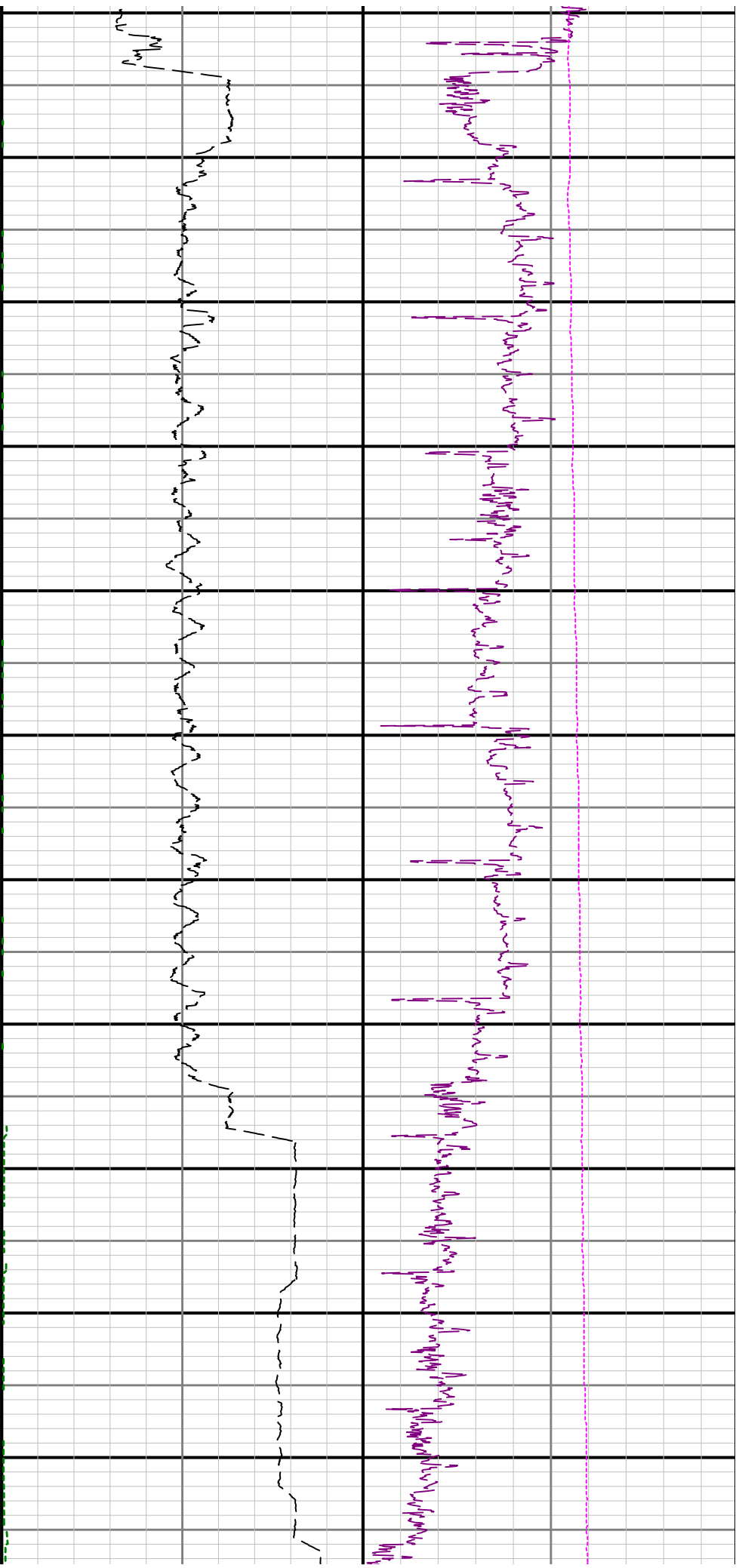
See Remark 1

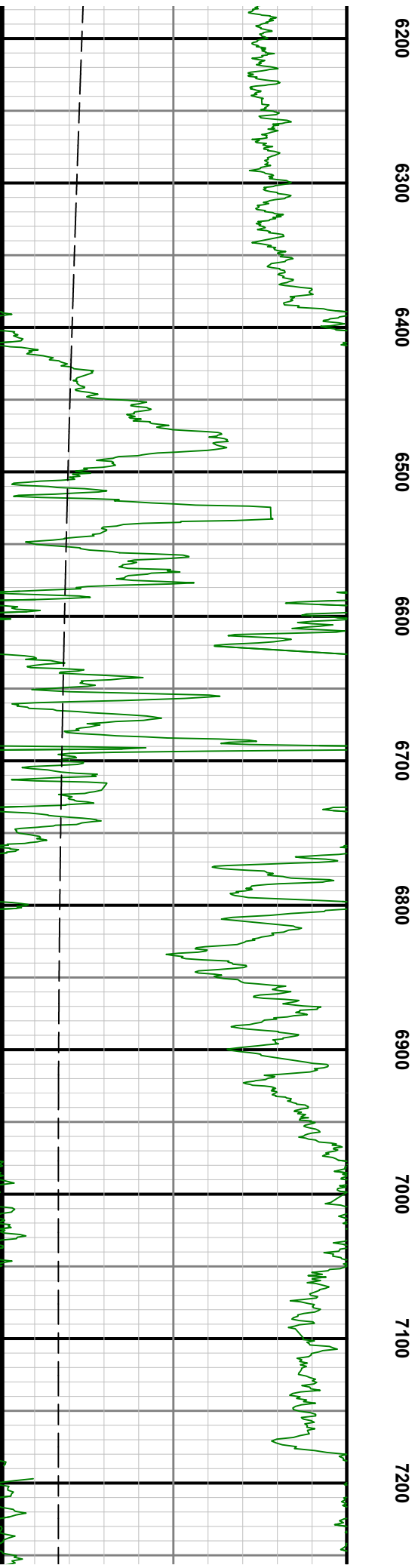
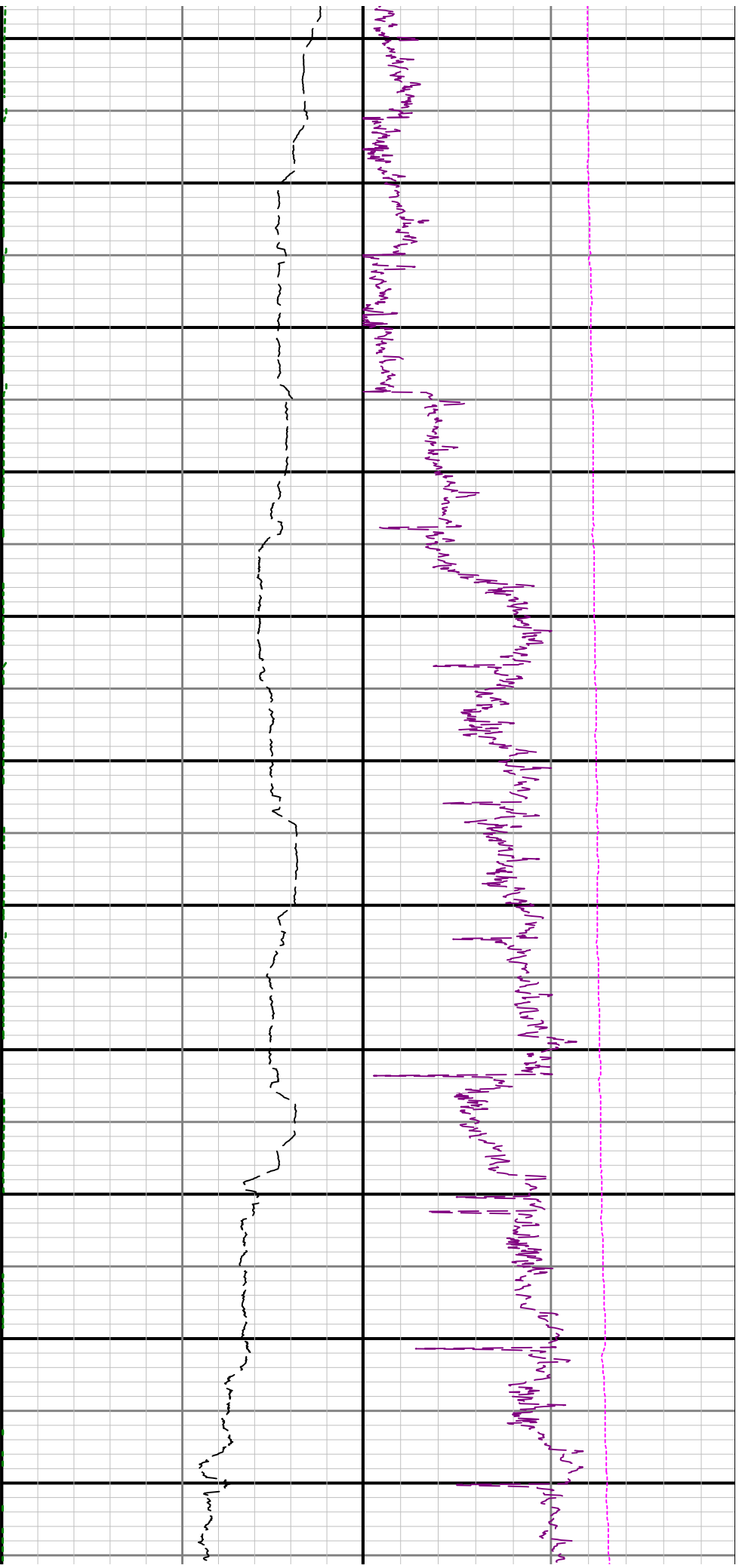
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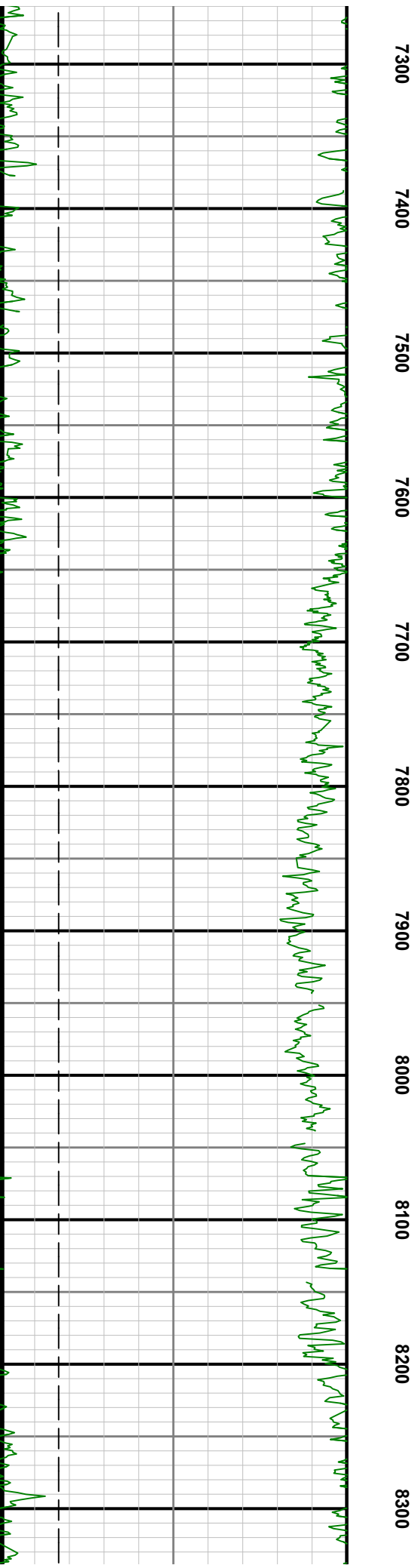
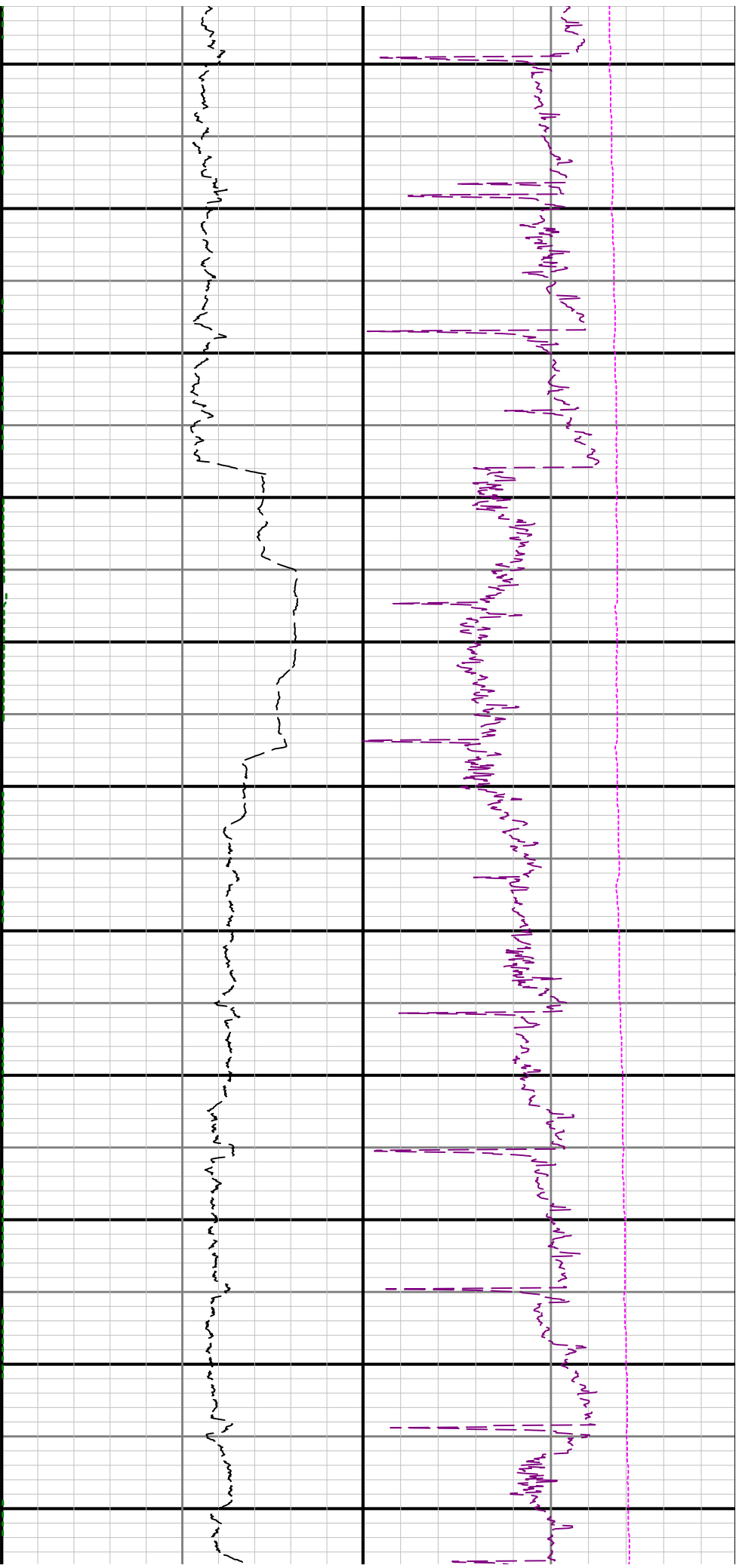


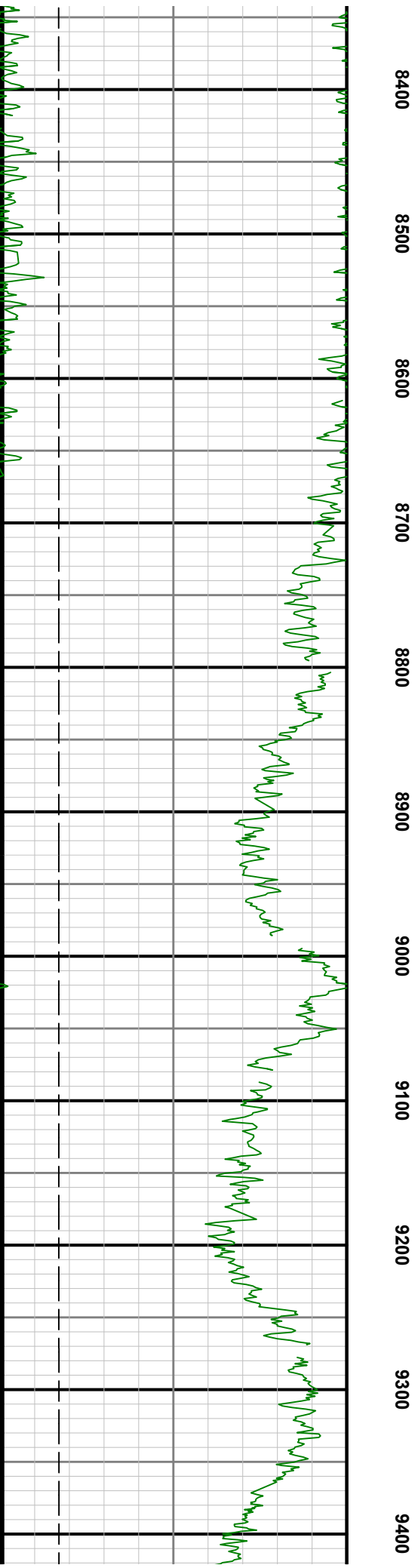
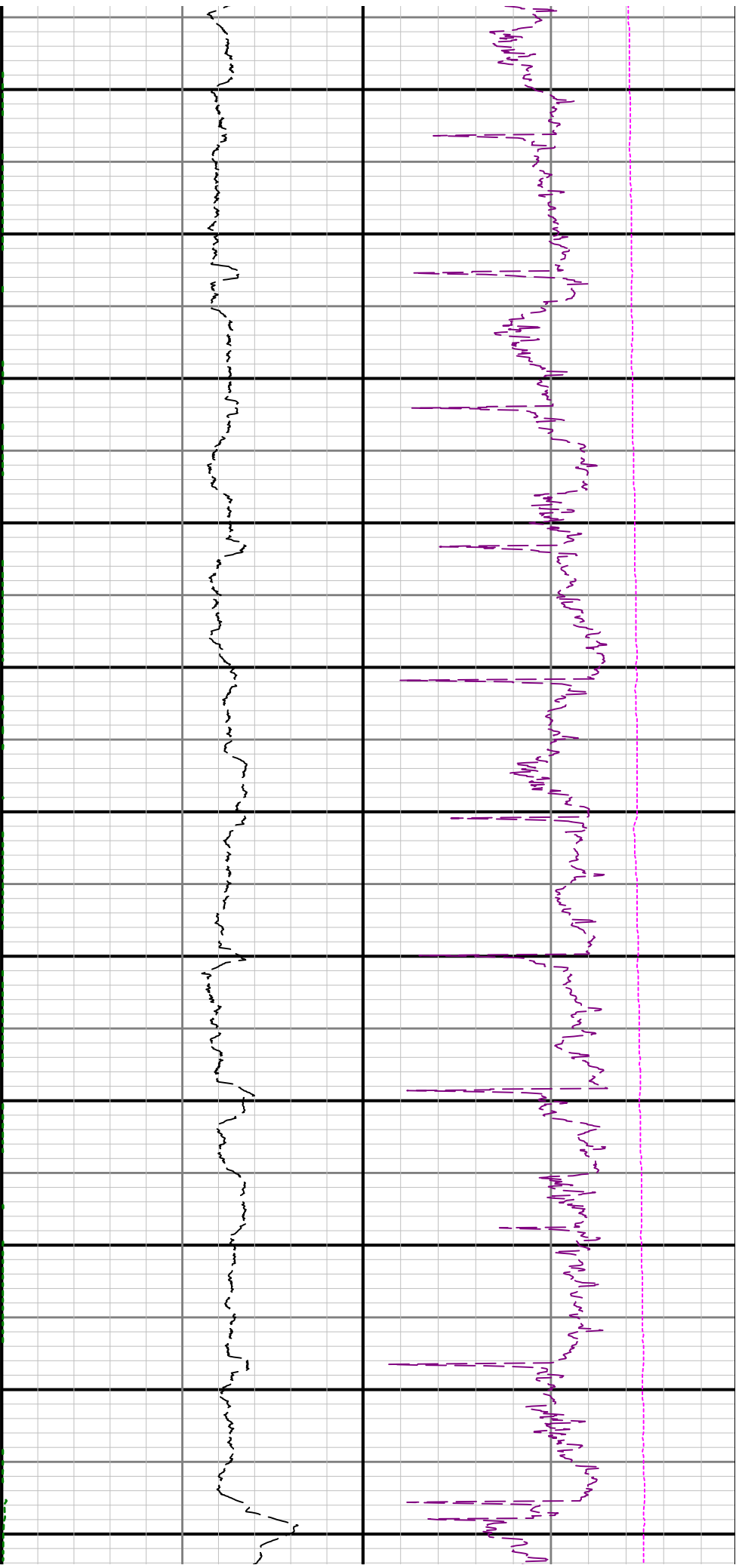


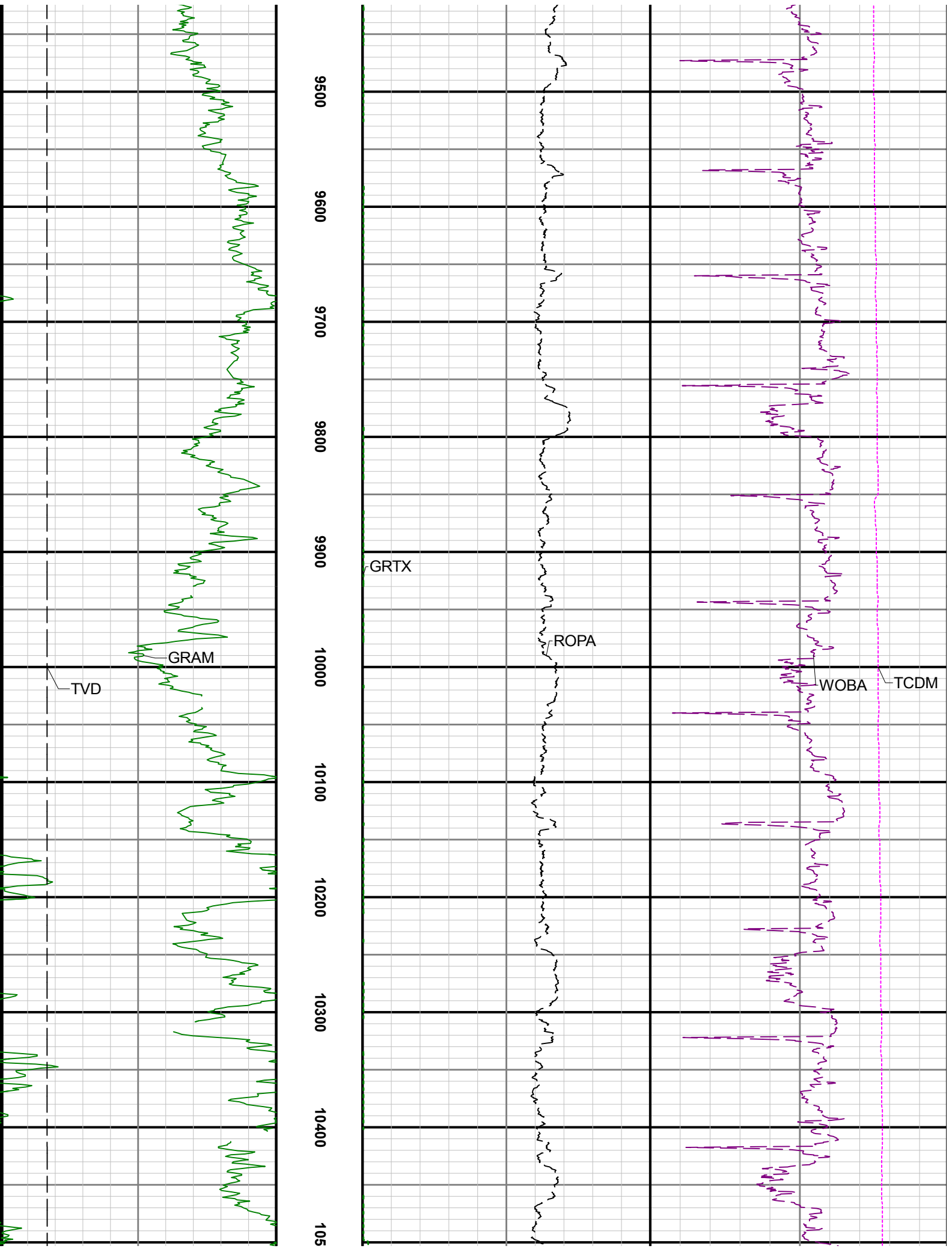


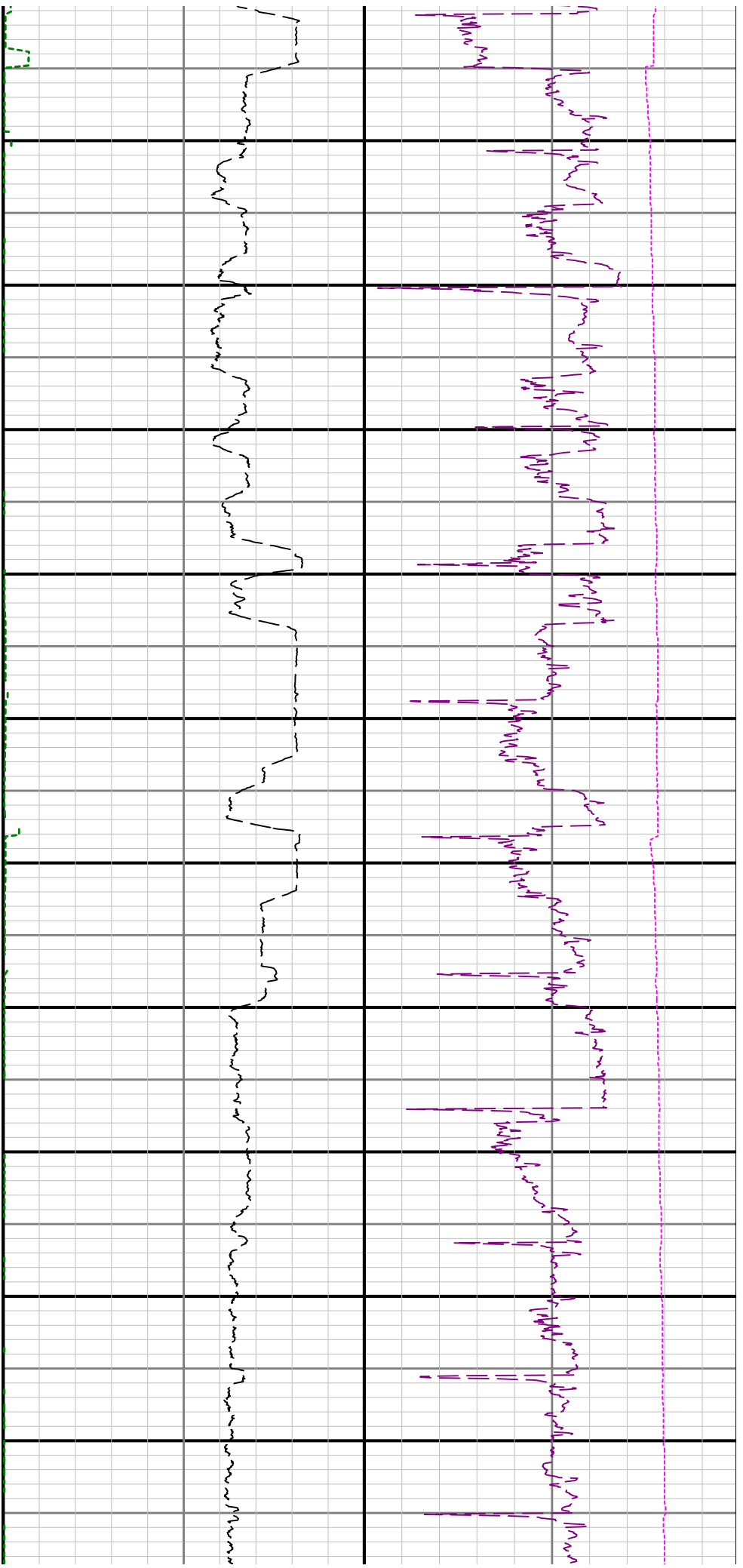












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