



LWD MEMORY LOG

Multiple Propagation Resistivity  
Gamma Ray

Scale:	Company: Bonanza Creek Oil Company
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Well: 1:240	Antelope Federal 44-20-17XRLNC
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Field: Measured Depth	Weld County
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County: Depth Reference:	Weld	Country: United States
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Driller's Depth	State: Colorado
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Status: Final Print	Surface Location: Latitude: 040° 22' 46.945" N Longitude: 104° 20' 47.756" W	Other Services: Directional
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API No: 05-123-49090-00	SEC: 20	TWN: 5N	RGE: 62W
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Job ID: 109775619	Elevation: 0.00 ft	Elev. KB: 4672.00 ft	N/A
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Permanent Datum (P.D.): Mean Sea Level	Above P.D.	Elev. DF: 4672.00 ft	Elev. GL: 4655.00 ft
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Log Measured From: Rig Floor			
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Interval Drilled		Magnetic Field Reference	
Date From: 2019-04-25	Top: (ft) 17.00	Azi Reference North: True	Dip Angle: (deg) 66.83
Date To: 2019-05-05	Bottom: (ft) 17163.00	Total Magnetic Field Strength: (nT) 52273	
Spud Date: 2019-04-25		Mag to Reference North Correction: (deg) 7.96	

Borehole Record				Casing Record			
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)	

13.500	17.00	1637.00	9.625	36.00	17.00	1627.00	
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8.500	1637.00	17163.00					
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Acquisition System		Software Version		Other			
Baker Hughes Cadence	RT 5.0			Rig: Akita 519			
Plot Studio	5.0.8260.3			Contractor: Akita Drilling			
				District: RMA			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	
1	1	13.500	PDC	2.50	Steerable	0.00	0.00	17.00	1637.00	2019-04-25 09:57	2019-04-25 17:38	7.02
2	2	8.500	PDC	3.00	Rotary Steerable	1627.00	6090.00	1637.00	17163.00	2019-05-02 02:05	2019-05-05 00:13	74.35

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Steve Bueghly	2019-04-30	2019-05-05						

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+ (%)
2019-04-25 10:00	1	43.00	Water Based Mud	8.5	2	8.3	N/A	0/99	Active Pit	695	0.00
2019-05-01 18:00	2	2940.00	Diesel-Oil Based Mud	9.0	8	N/A	N/A	78/14	Active Pit	27211	0.00
2019-05-02 18:00	2	7826.00	Diesel-Oil Based Mud	9.0	8	N/A	97.0	78/14	Active Pit	27211	0.00
2019-05-03 06:09	2	11450.00	Diesel-Oil Based Mud	9.6	10	N/A	N/A	77/14	Active Pit	27992	0.00
2019-05-04 17:00	2	15660.00	Diesel-Oil Based Mud	9.6	11	N/A	N/A	78/13	Active Pit	27992	0.00

Mud Resistivity Record

Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Surface			BHCT (degF)	Downhole		
				Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)		Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
2019-05-03 06:00	2	10488.00	127.0	100.000	N/A	N/A	220.0	100.000	N/A	N/A
2019-05-04 04:00	2	13470.00	135.0	100.000	N/A	N/A	244.0	100.000	N/A	N/A
2019-05-05 01:00	2	17163.00	135.0	100.000	N/A	N/A	252.0	100.000	N/A	N/A

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	NaviTrak	11753275	VSS	15.17	50.90	8.000	0.000
1	NaviTrak	11753275	Directional (mag)	15.17	50.90	8.000	0.000
2	AutoTrak Curve Steering Unit	14262247	Near Bit VSS	5.93	6.73	7.000	4.330
2	AutoTrak Curve Steering Unit	14262247	Near Bit Inclination	5.93	6.73	7.000	4.330
2	AutoTrak Curve MWD	14705263	Gamma (single)	2.74	12.90	7.000	3.250
2	AutoTrak Curve MWD	14705263	Directional (mag)	12.27	22.43	7.000	3.250
2	OnTrak	11779203	Pressure	1.17	11047.90	6.750	0.000
2	OnTrak	11779203	Gamma (double)	2.06	11048.79	6.750	0.000
2	OnTrak	11779203	Resistivity (4tx)	6.10	11052.83	6.750	0.000
2	OnTrak	11779203	Directional (mag)	11.89	11058.62	6.750	0.000
2	NaviTrak	11753275	VSS	15.17	11090.82	8.000	0.000
2	NaviTrak	11753275	Directional (mag)	15.17	11090.82	8.000	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit

ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve LCPM	Auto Trak Curve LCPM
OTK	OnTrak	Sensor Sub (Inc, Azi, Temp, Azimuthal GR, Res, AP, VSS), OnTrak Platform
BCPM	BCPM	Bi-Directional Communication and Power Module, OnTrak Platform

Comments

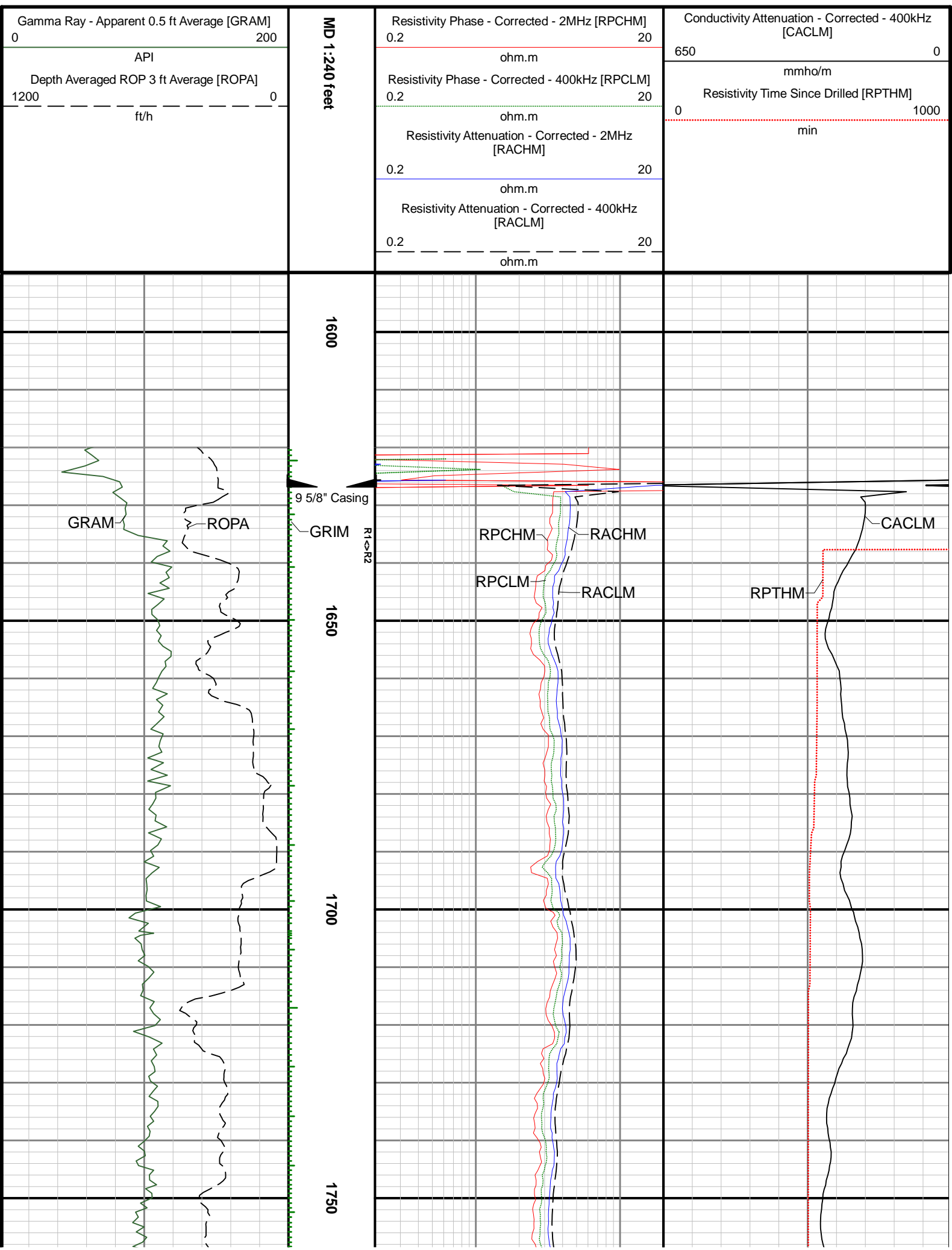
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD Run 1 used the 8 inch NaviTrak service (Directional) behind an 13 1/2 inch bit and steerable assembly to drill from 17 to 1637 feet MD (17 to 1611 feet TVD). No logging data was acquired through out this run.
3	Baker Hughes LWD Run 2 utilized a 6.75 inch OnTrak service (Multiple Propagation Resistivity and Gamma Ray) behind and 8.5 inch bit and rotary steerable assembly to perform a MAD (measurement after drilling) Pass from 1637 to 6090 feet MD (1611 to 5785 feet TVD). The data collected during this run was ream logged more than 10 hours after being drilled and presented independent of the drilled log.
4	The Gamma Ray Apparent (GRAM) data is presented from 0 to 200 API, per customer's request.

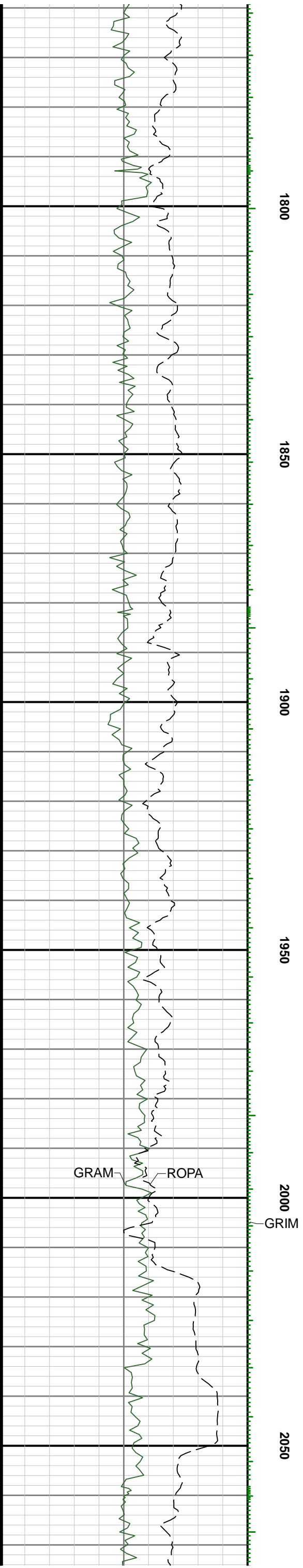
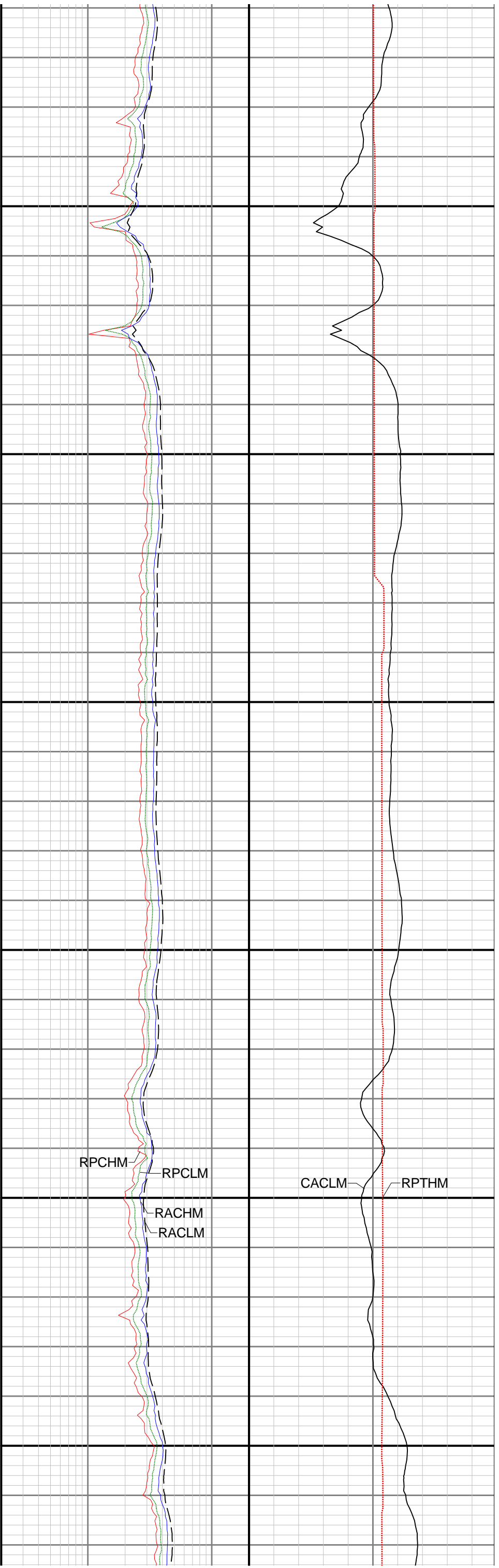
Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	6100.00	8.500	2	The interval from 6090 to 17163 was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

Presented Curves	Description	Units
CACLM	Conductivity Attenuation - Corrected - 400kHz	mmho/m
RACHM	Resistivity Attenuation - Corrected - 2MHz	ohm.m
RACLM	Resistivity Attenuation - Corrected - 400kHz	ohm.m
RPCHM	Resistivity Phase - Corrected - 2MHz	ohm.m
RPCLM	Resistivity Phase - Corrected - 400kHz	ohm.m
RPTHM	Resistivity Time Since Drilled	min
ROPA	Depth Averaged ROP 3 ft Average	ft/h
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless







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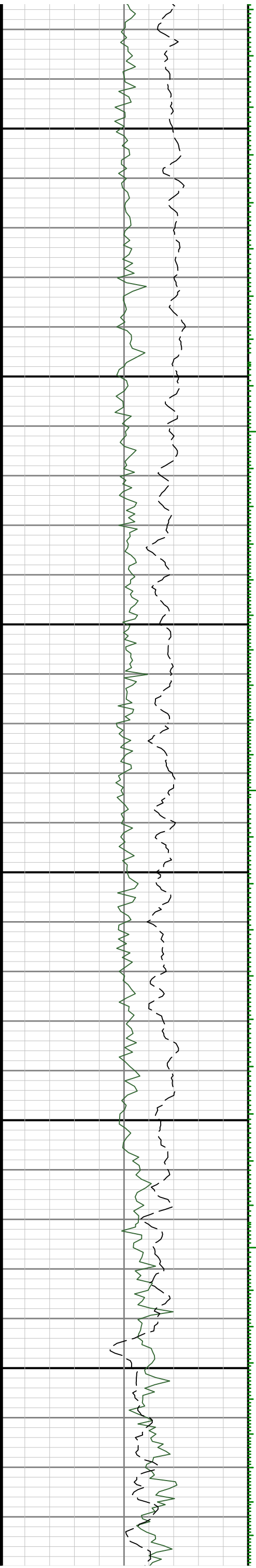
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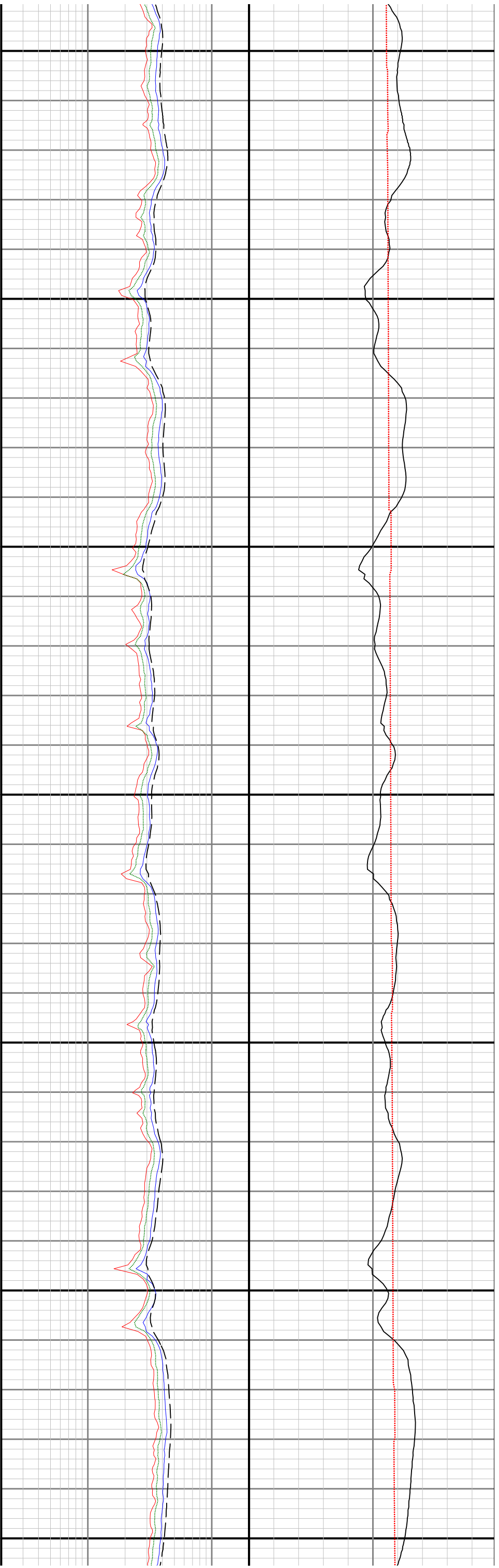
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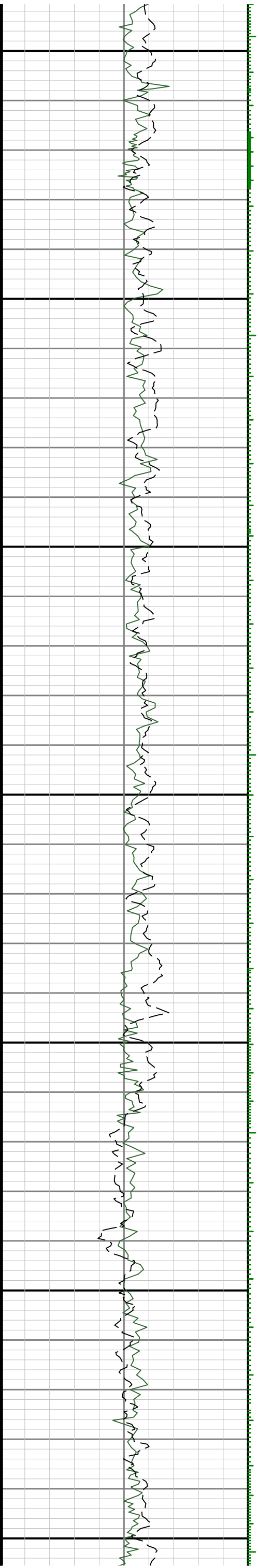
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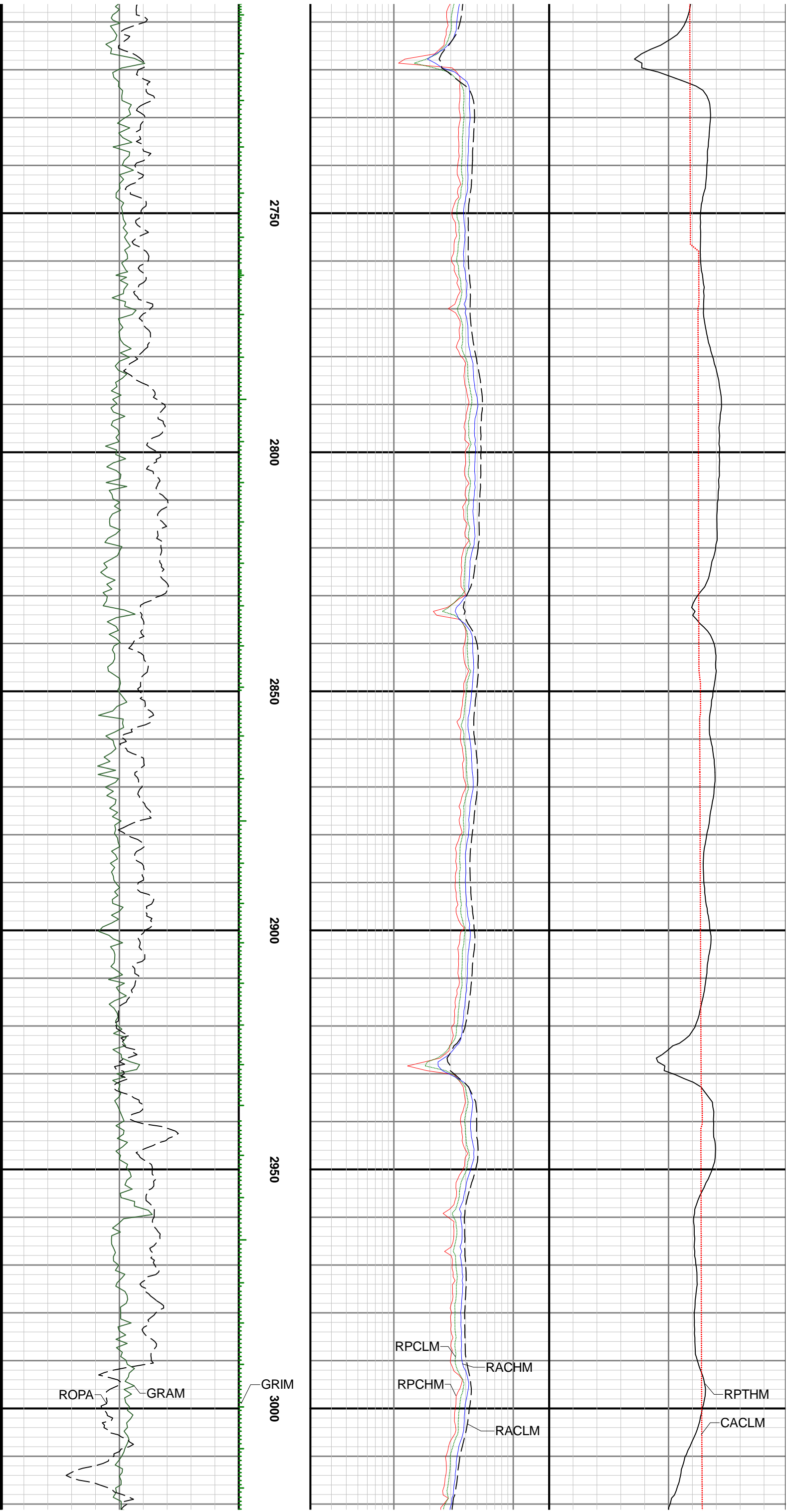
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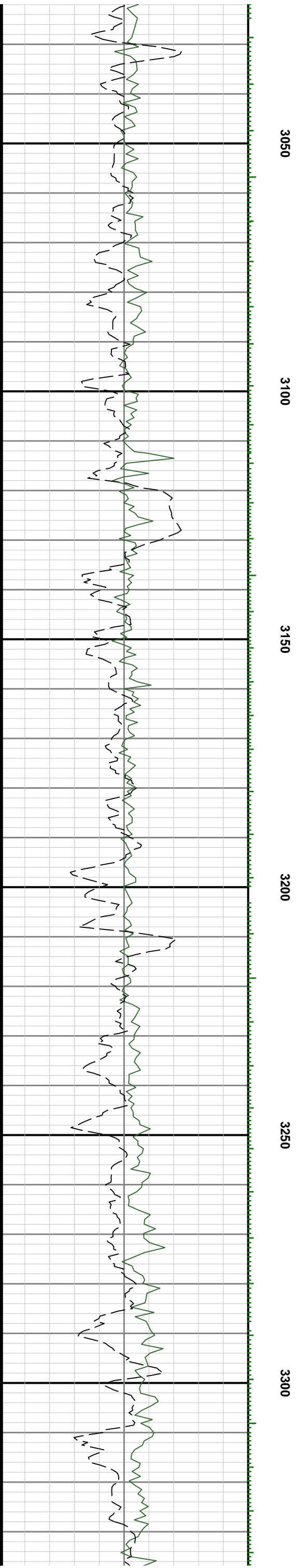
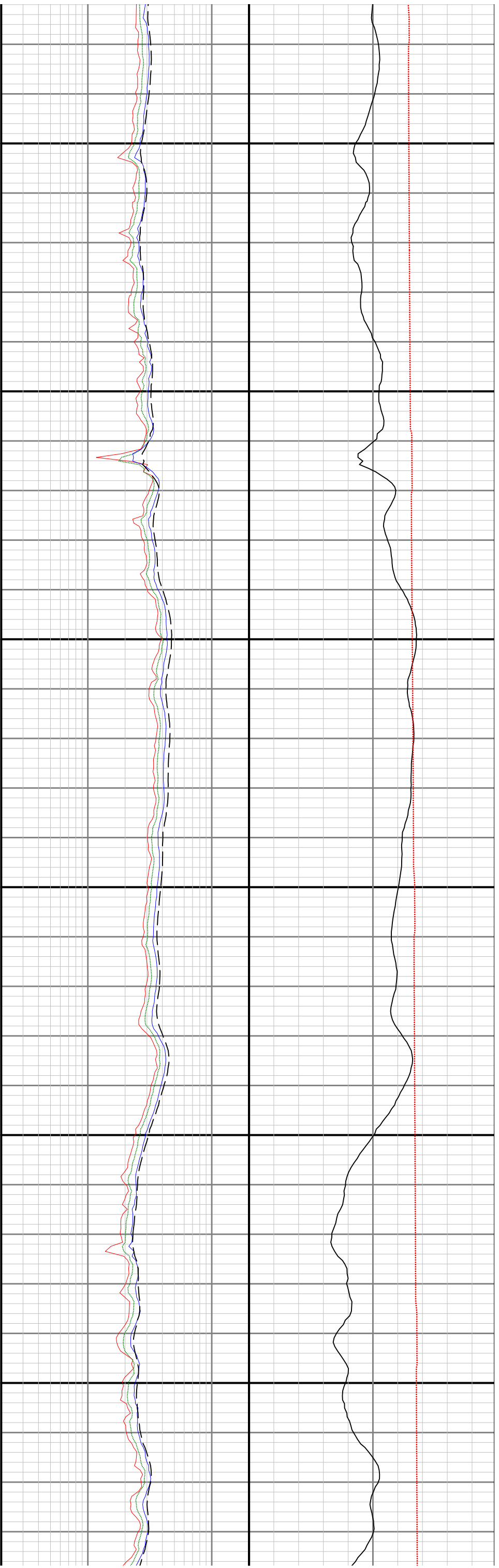
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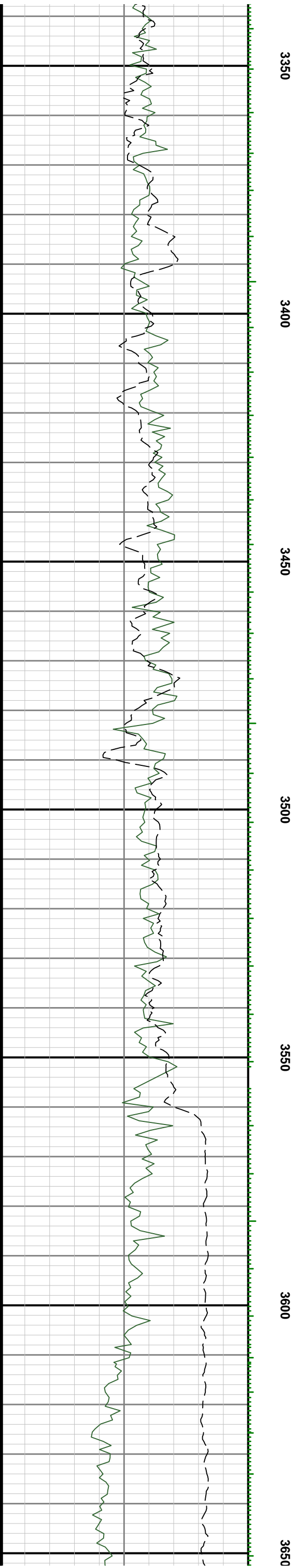
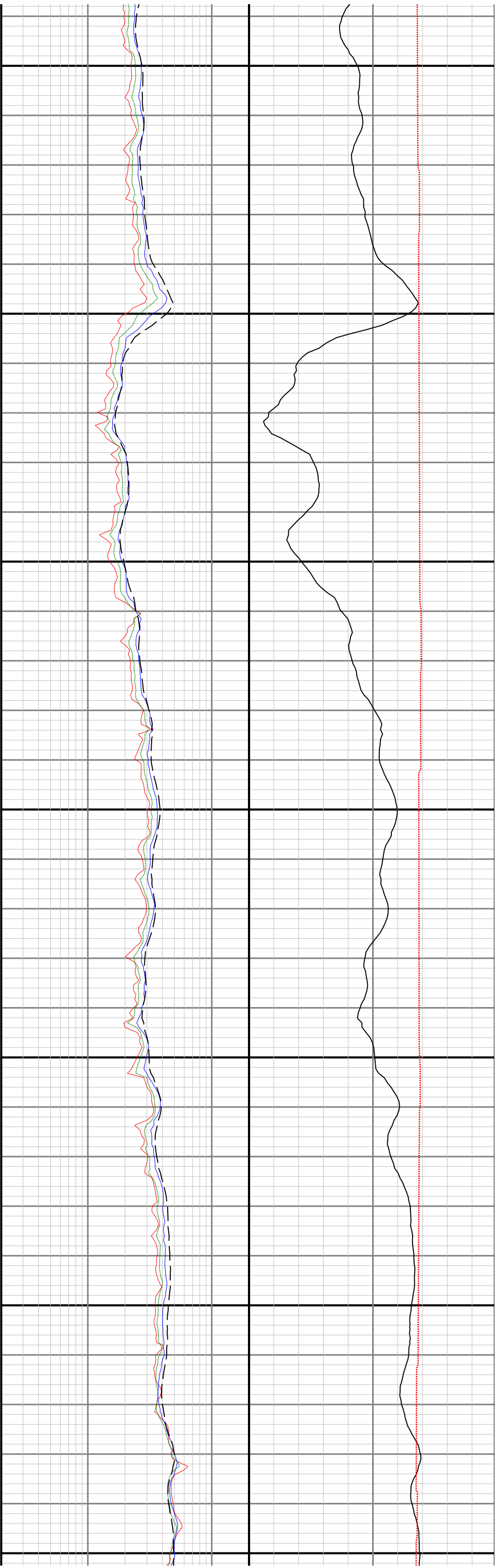
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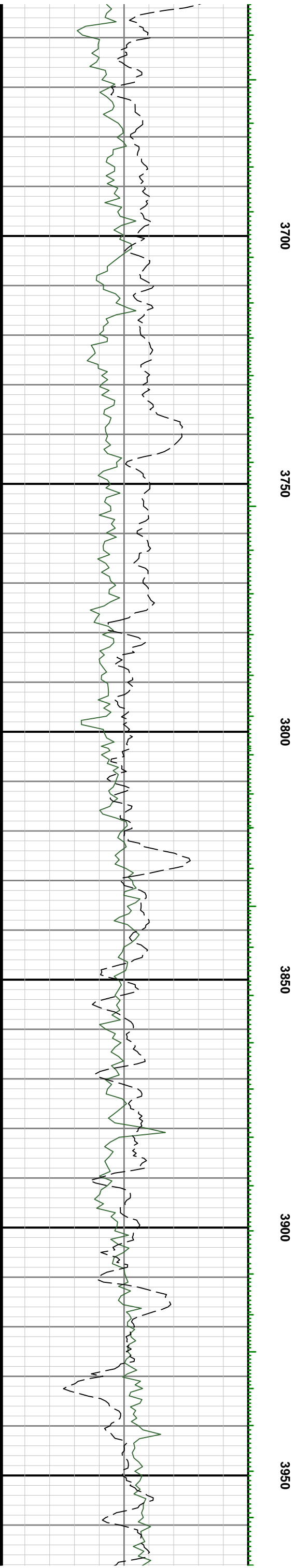
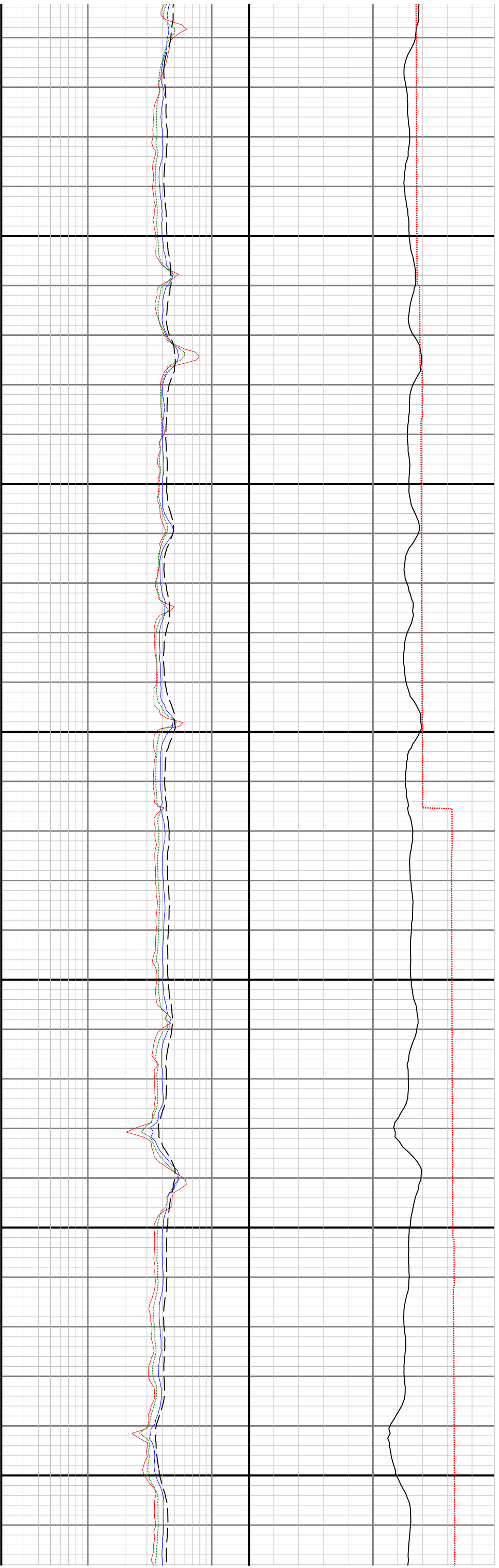


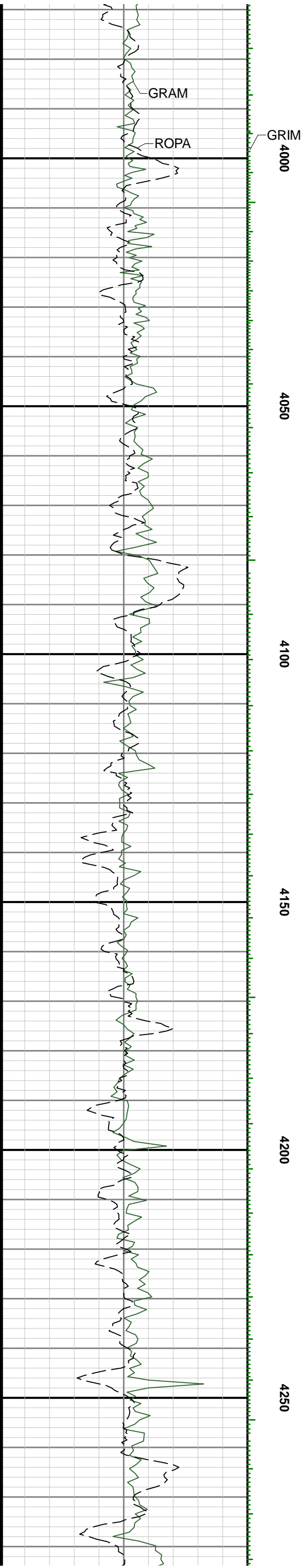
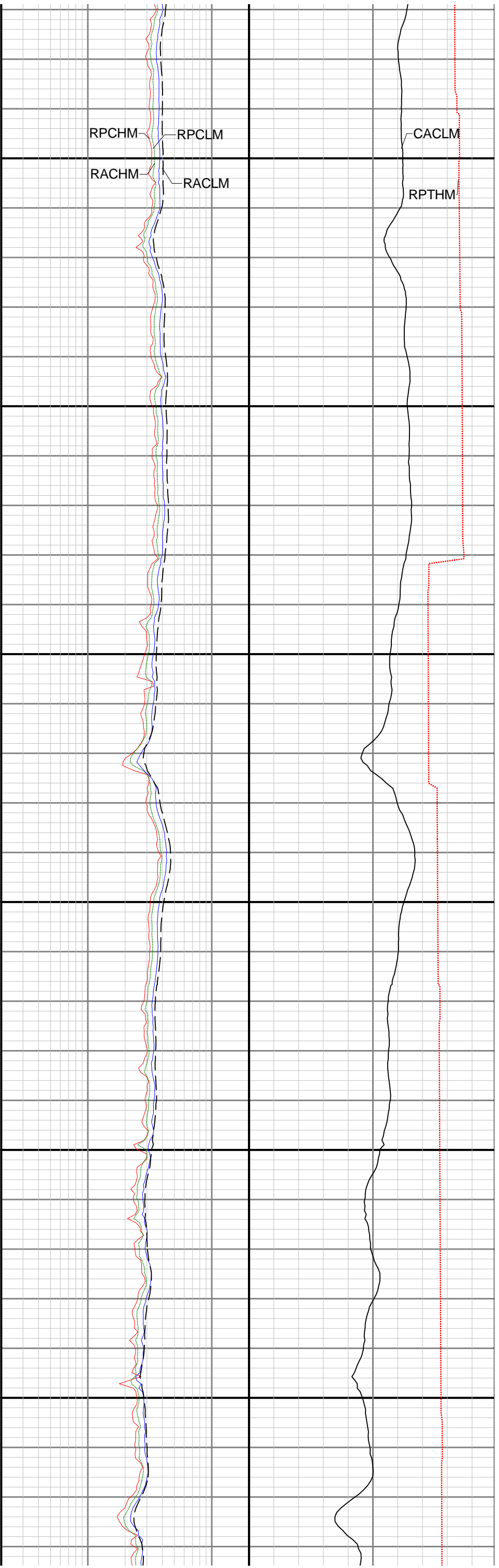


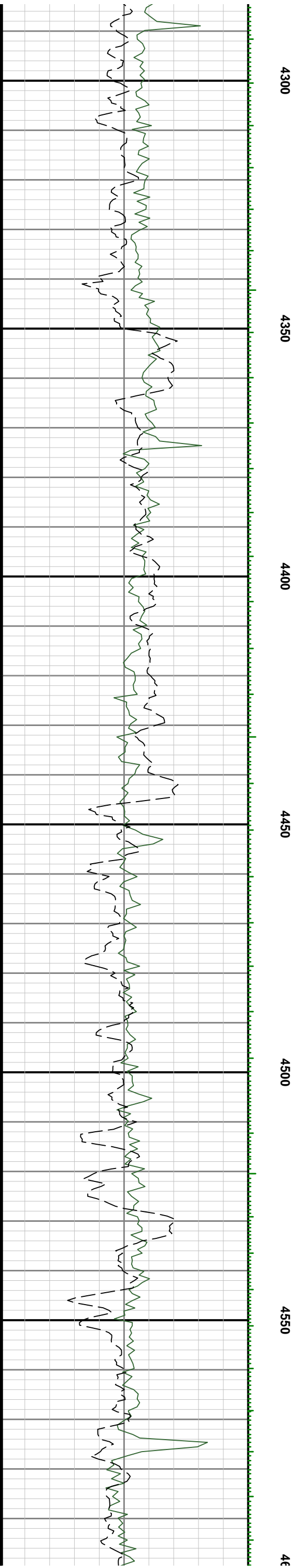
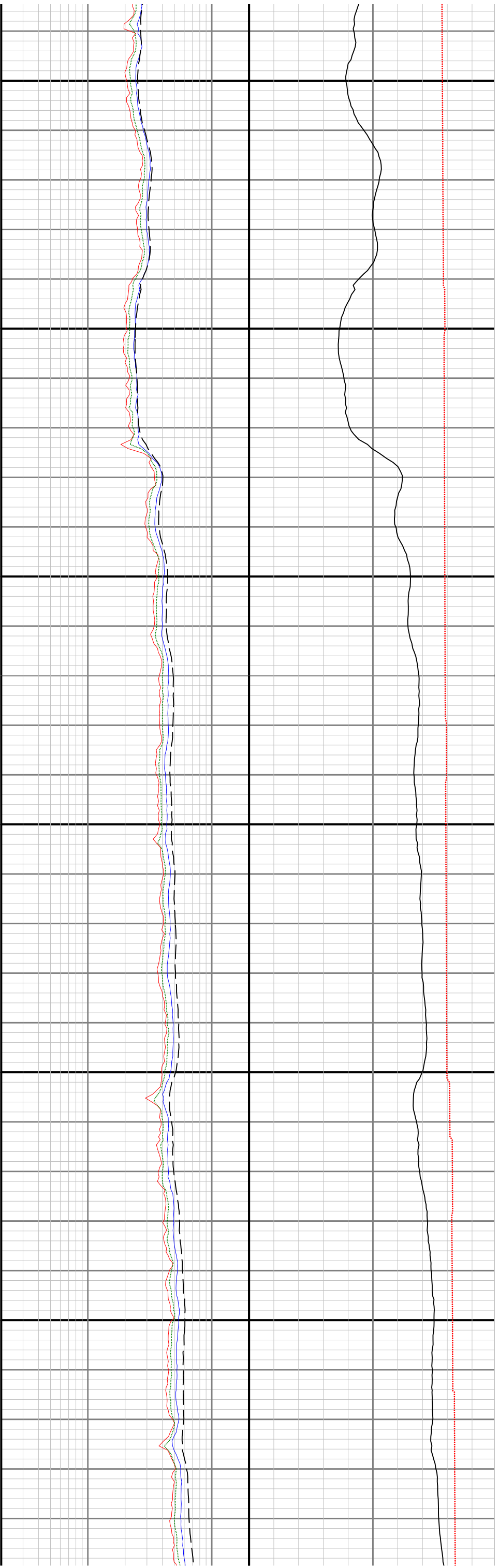


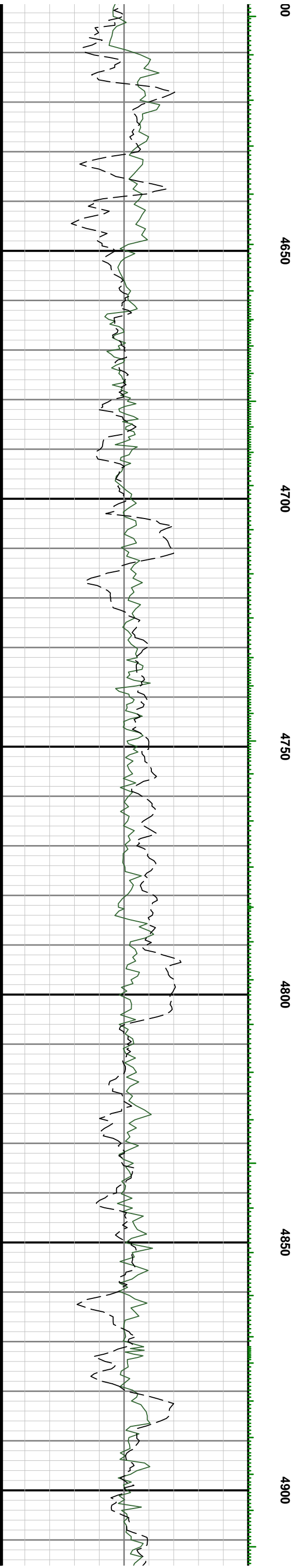
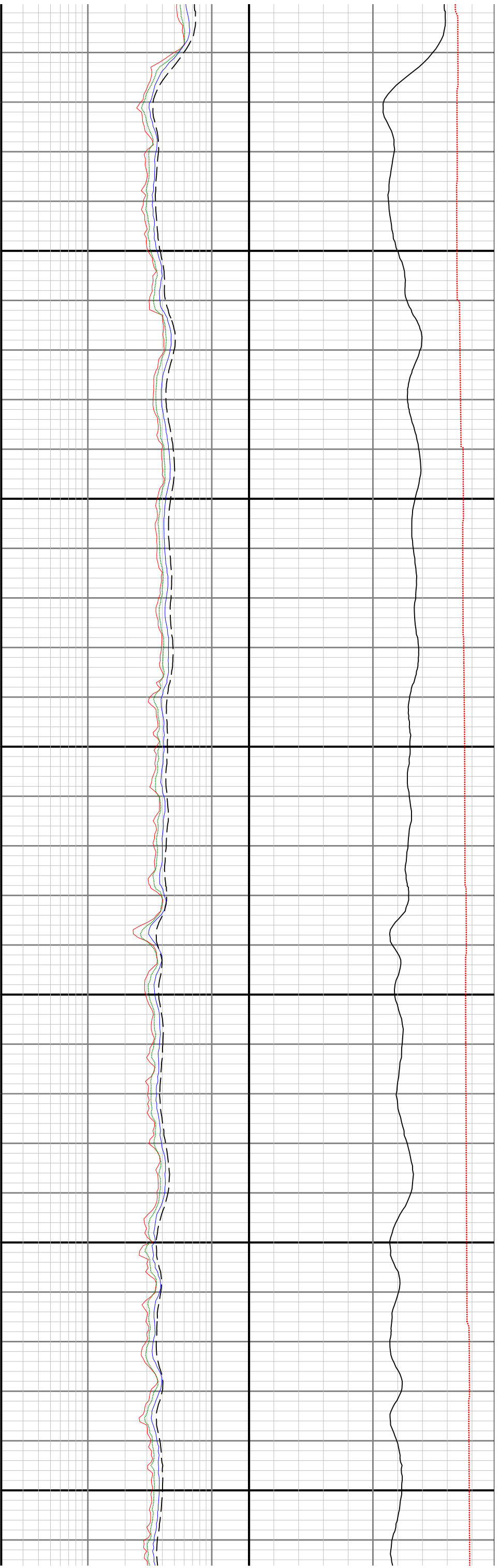


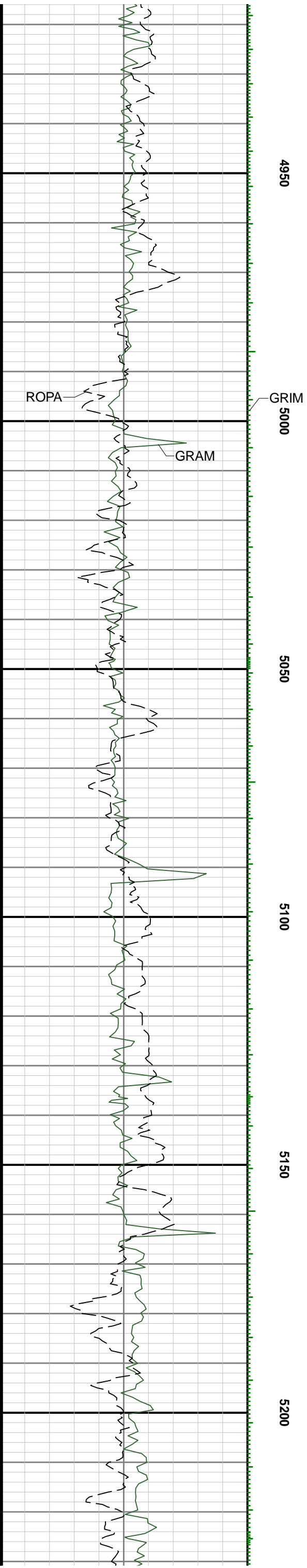
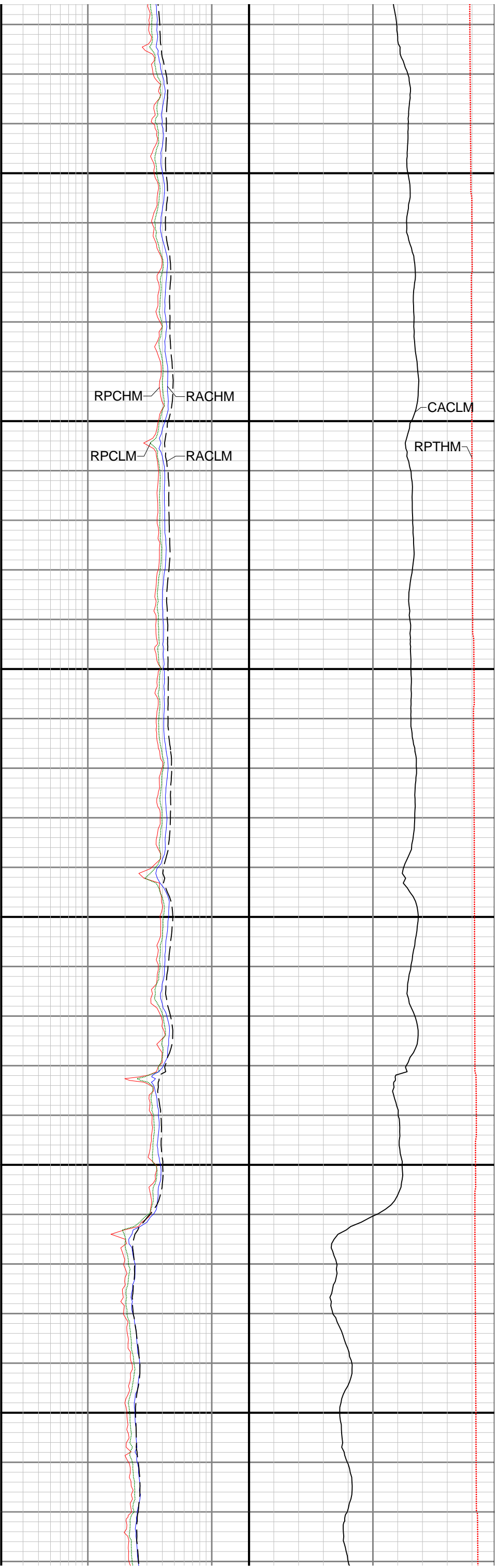


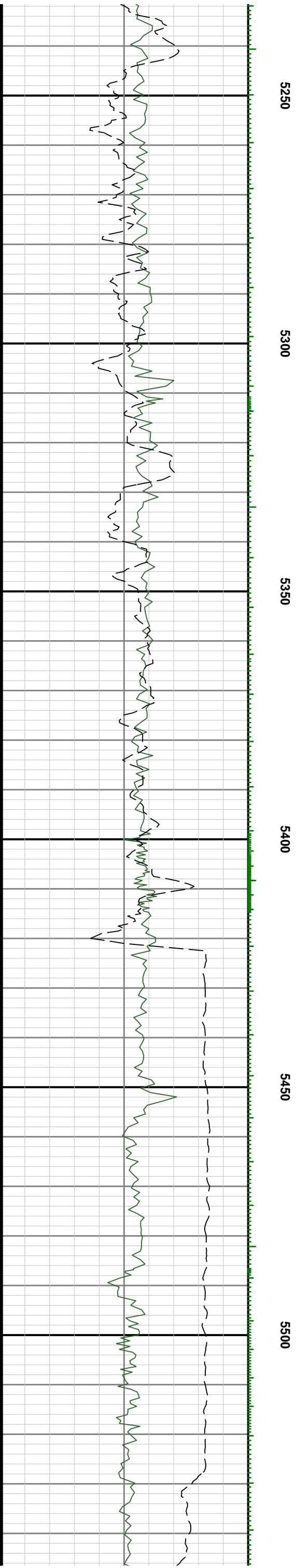
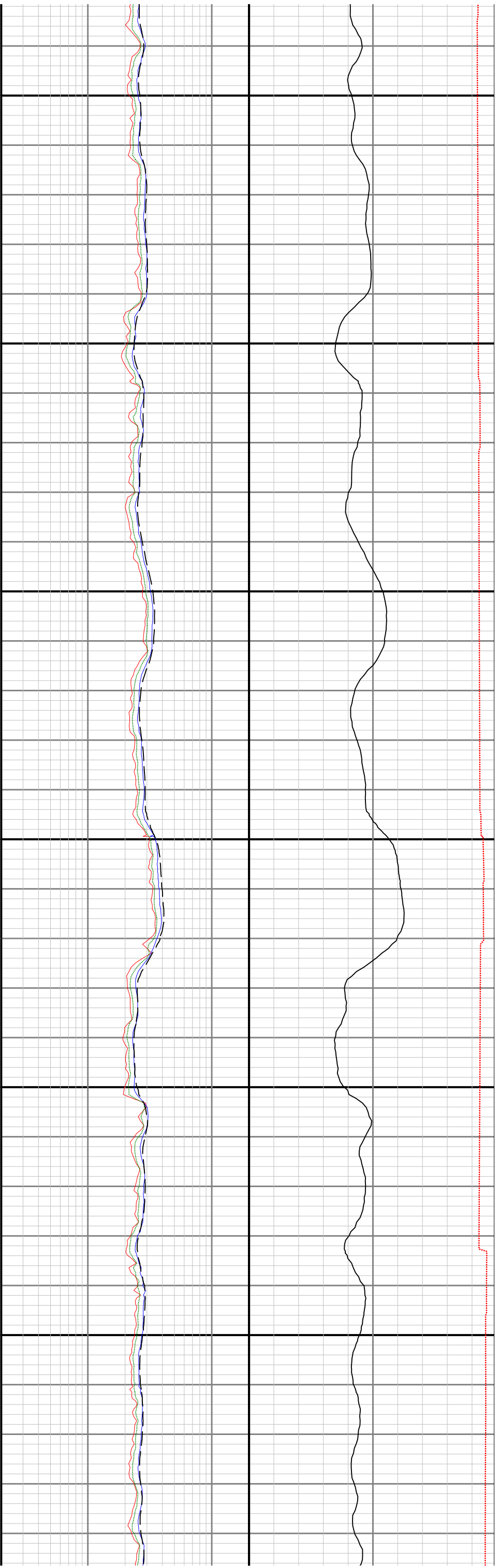




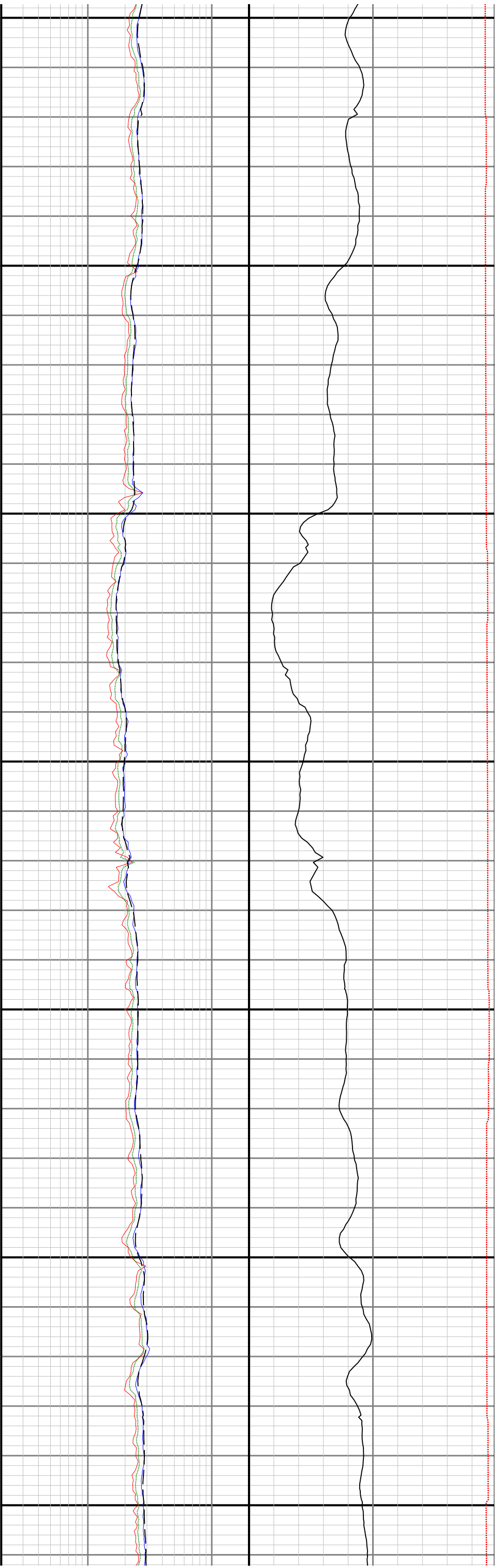












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