



# DUAL INDUCTION LOG

Company PATTERSON ENERGY  
 Well MUCHMORE-THORNBURG #1  
 Field CHAPMAN  
 County GOVE  
 State KANSAS

Company PATTERSON ENERGY  
 Well MUCHMORE-THORNBURG #1  
 Field CHAPMAN  
 County GOVE State KANSAS

Location: 2310' FNL & 1650' FEL  
 API #: 15 063 22430  
 SEC 34 TWP 15S RGE 19W  
 Ground Level Elevation 2591  
 Log Measured From KB 8' AGL  
 Drilling Measured From KB  
 Other Services  
 ML  
 DIL  
 Elevation  
 K.B. 2599  
 D.F. 2597  
 G.L. 2591

Date	6/17/23
Run Number	One
Depth Driller	4590
Depth Logger	4594
Bottom Logged Interval	4592
Top Log Interval	00
Casing Driller	8 5/8"@223'
Casing Logger	223'
Bit Size	7 7/8"
Type Fluid in Hole	Chemical
Density / Viscosity	9.3/51
pH / Fluid Loss	9.5/8.0
Source of Sample	Pit
Rm @ Meas. Temp	1.7@70degf
Rmf @ Meas. Temp	1.3@70degf
Rmc @ Meas. Temp	2.0@70degf
Source of Rmf / Rmc	Calculated
Rm @ BHT	1.0@115degf
Time Circulation Stopped	2:00 AM
Time Logger on Bottom	6:30 AM
Maximum Recorded Temperature	115degf
Equipment Number	T-605
Location	Hays, KS.
Recorded By	COLBY DREILING
Witnessed By	JASON T. ALM

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

### Comments

1/2 EAST OF UTICA, 4 NORTH, 2 WEST,  
 7/8 MILE NORTH, WEST INTO.

Thanks for using Gemini Wireline LLC  
 785-625-1182



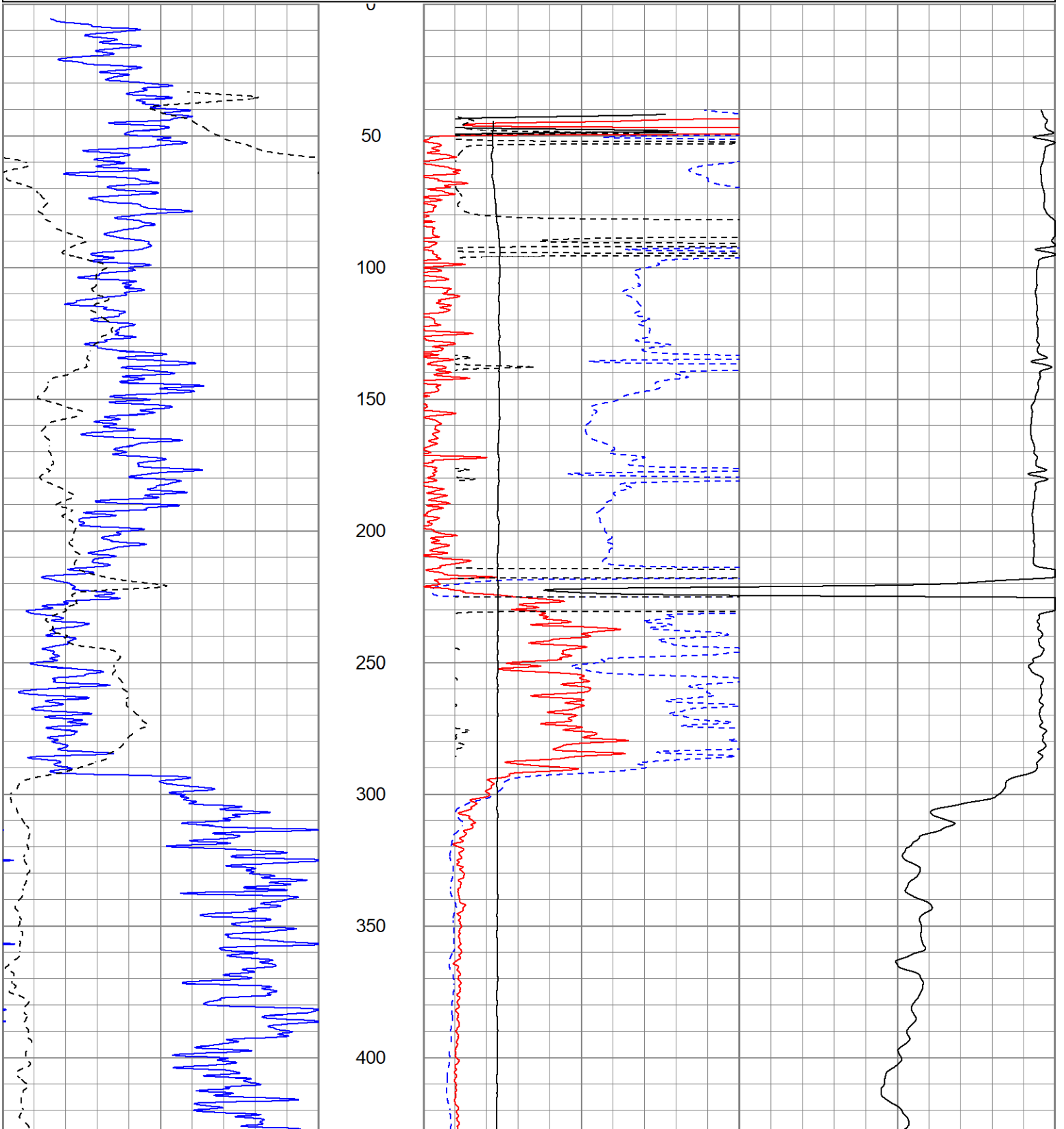
# MAIN PASS

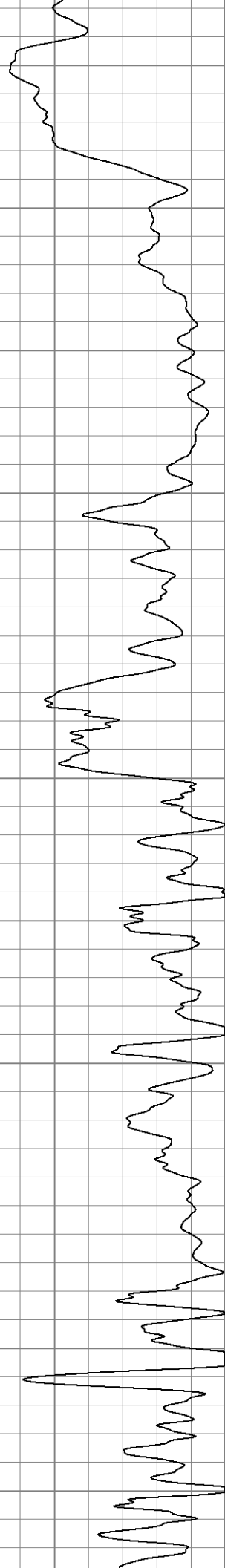
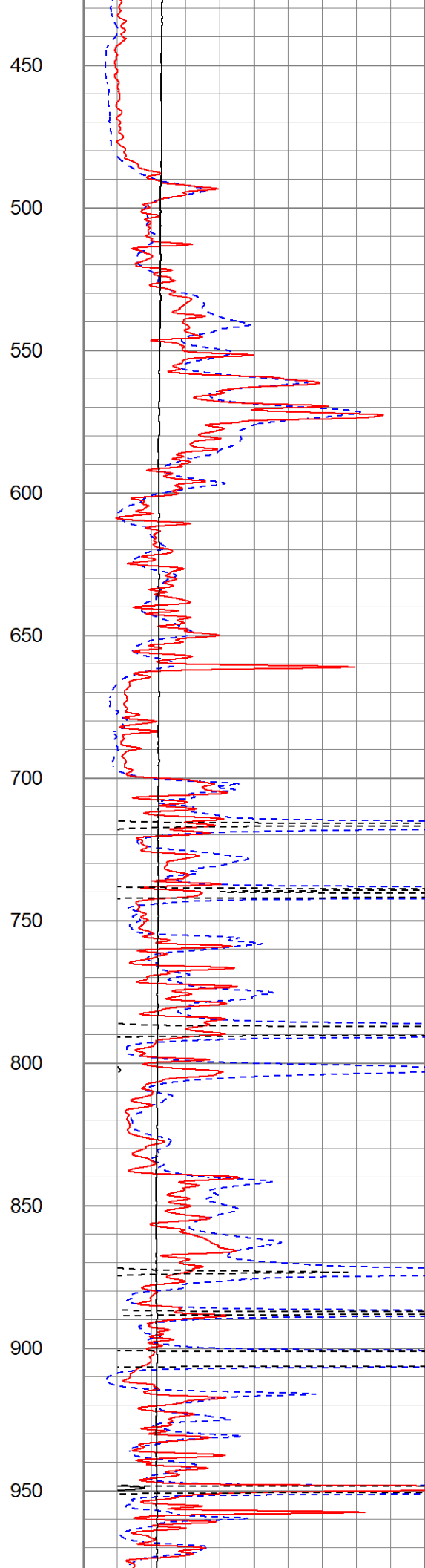
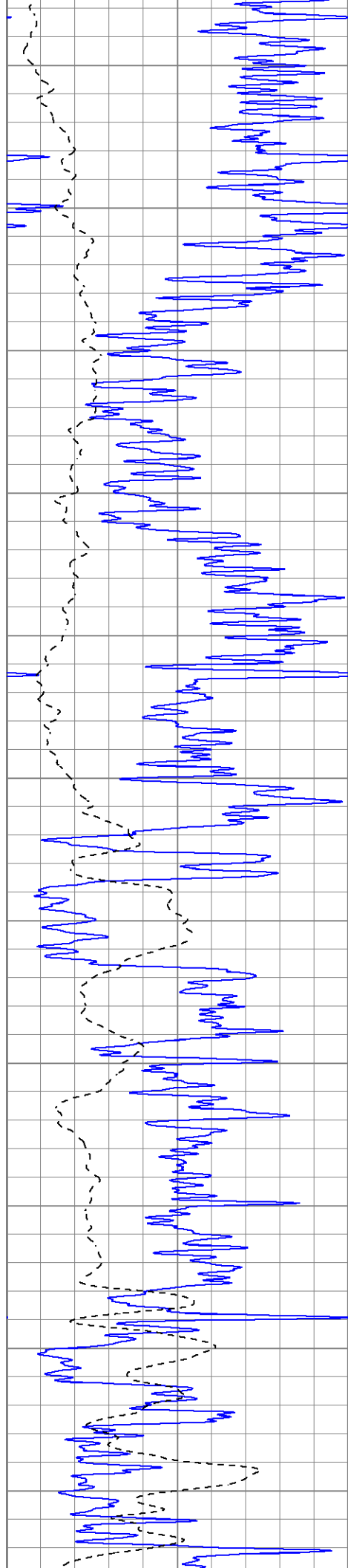
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 Dataset Pathname pass4DILLIN  
 Presentation Format kdillinn  
 Dataset Creation Sat Jun 17 08:18:02 2023  
 Charted by Depth in Feet scaled 1:600

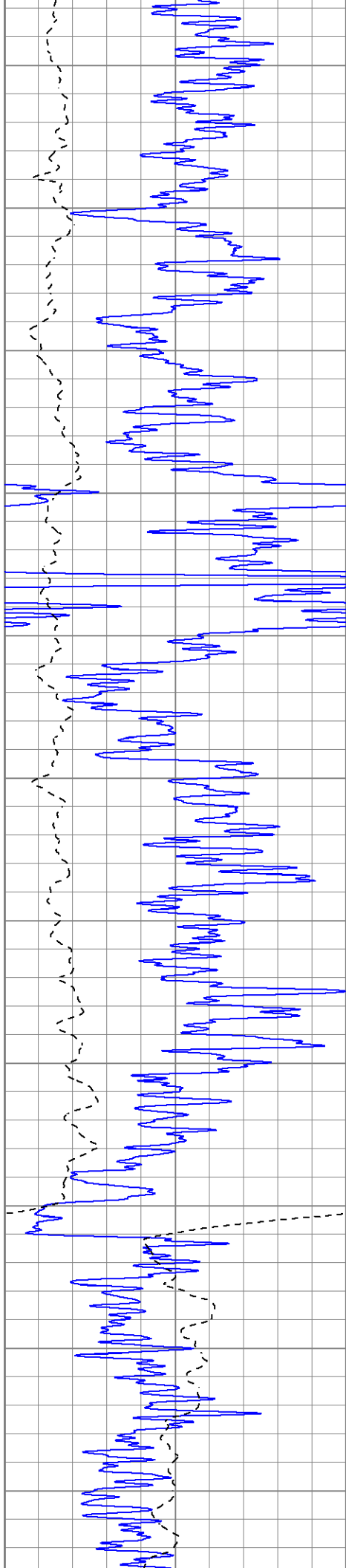
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-100	SP (mV)	100

1000	CILD (mmho/m)	0
10000	LTEN (lb)	0

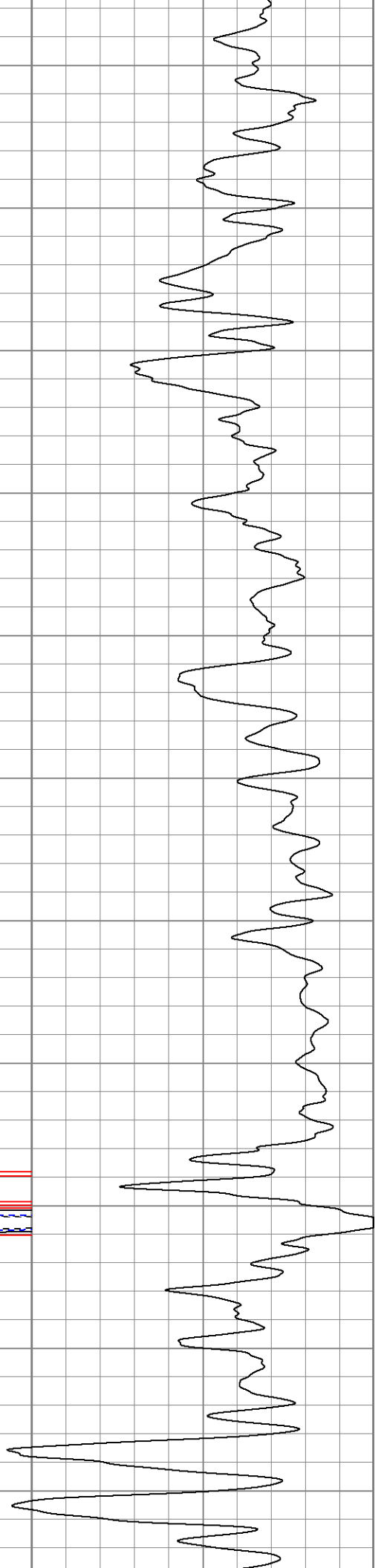
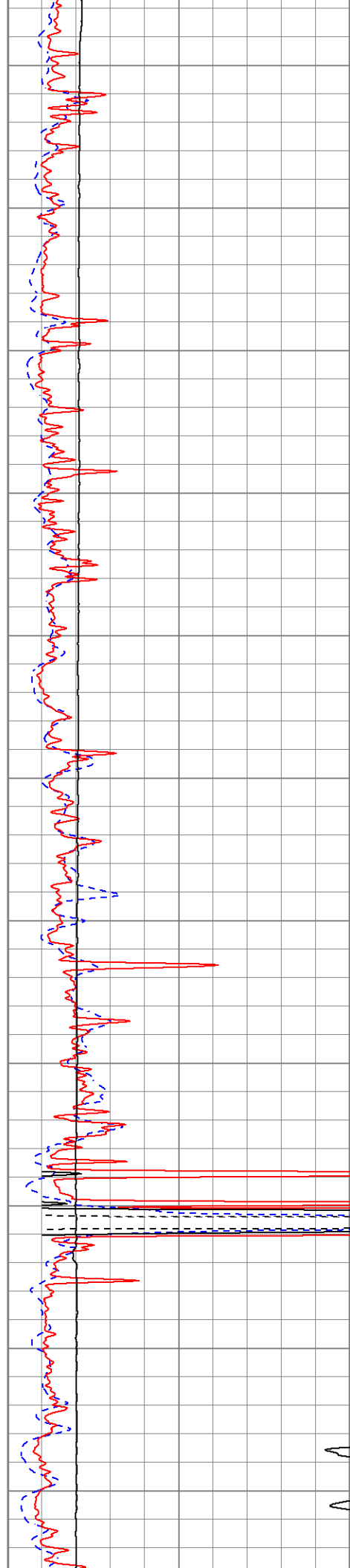
0	RILD (Ohm-m)	50
0	RLL3 (Ohm-m)	50
50	RILD x 10 (Ohm-m)	500
50	RLL3 x 10 (Ohm-m)	500

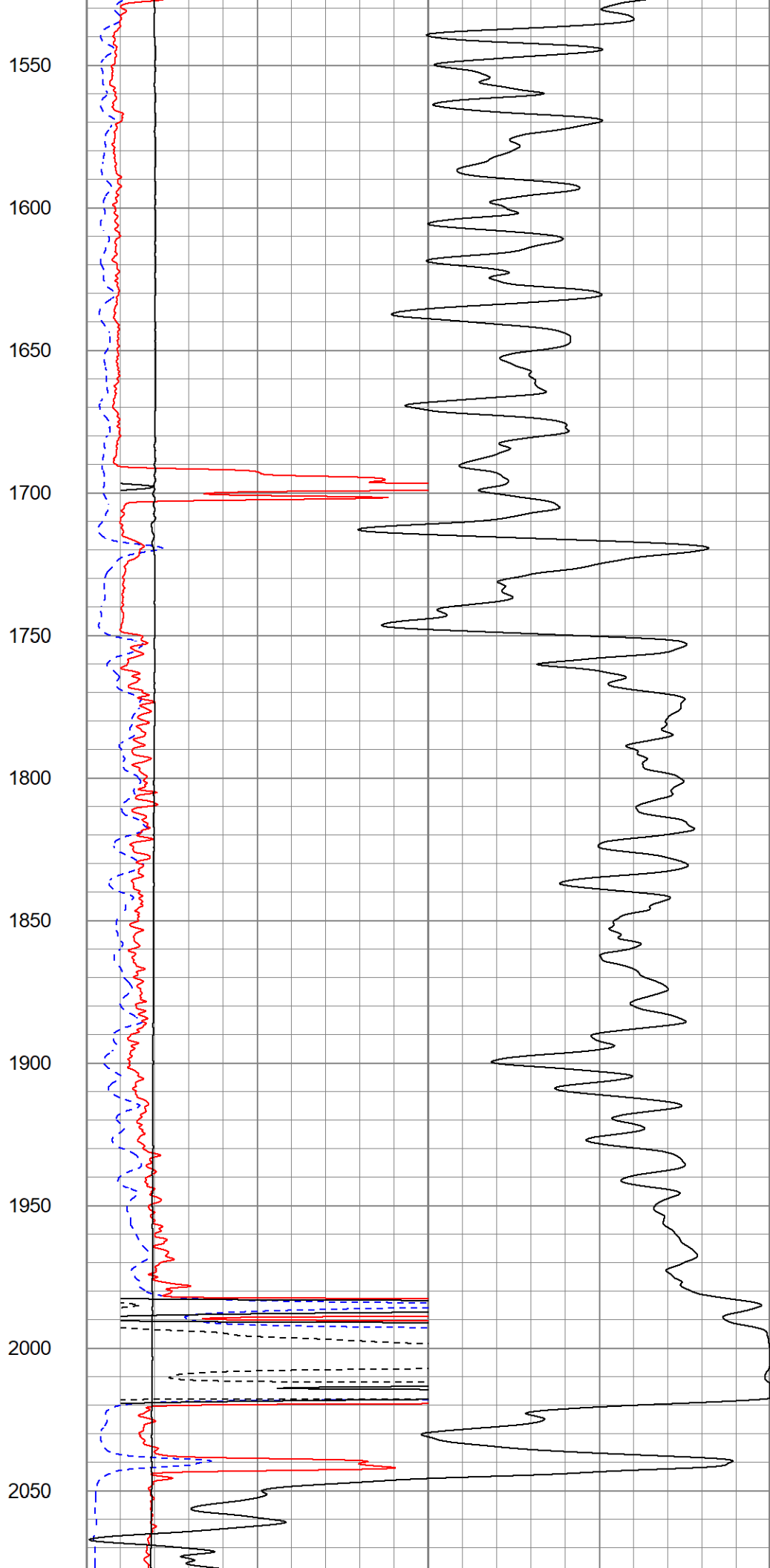
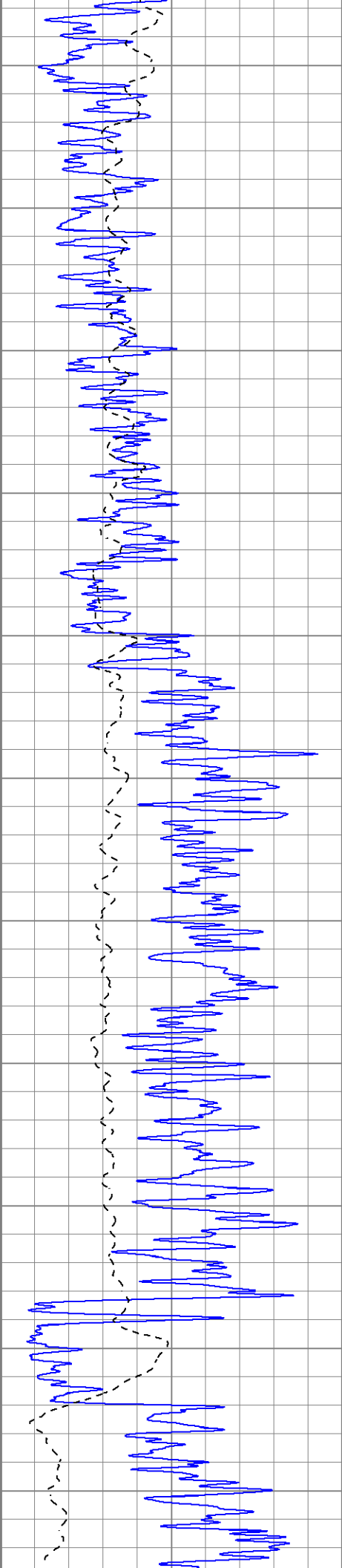


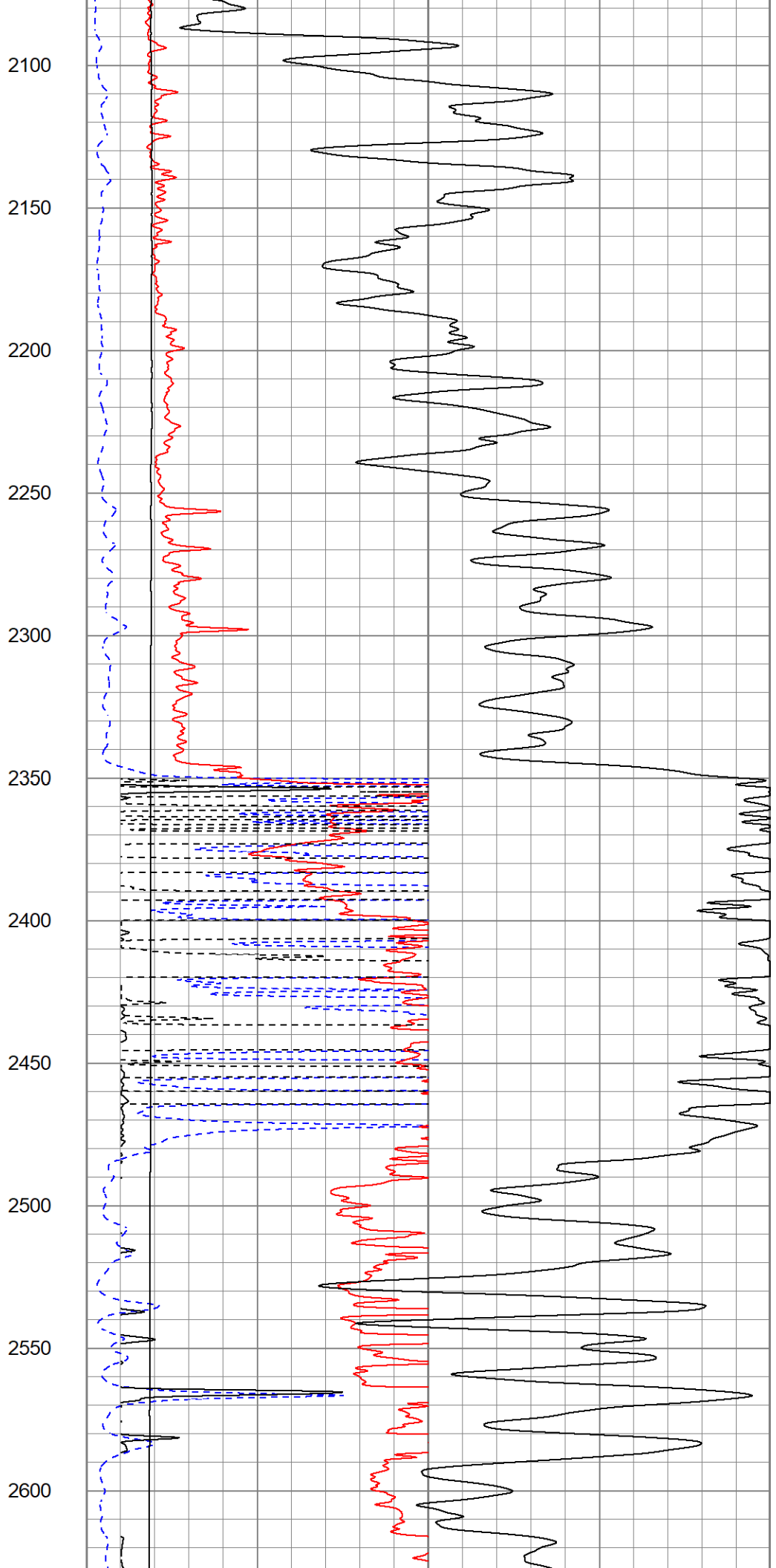
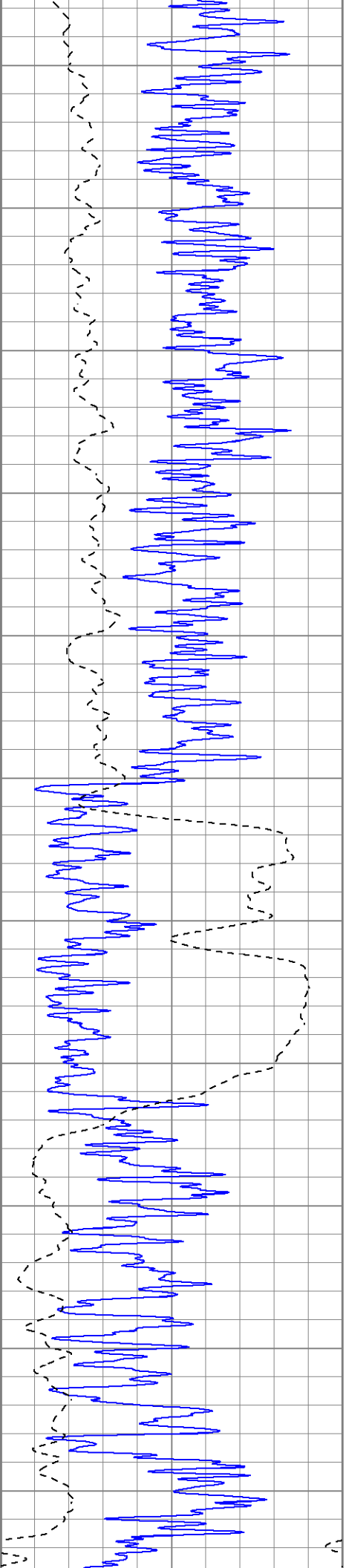


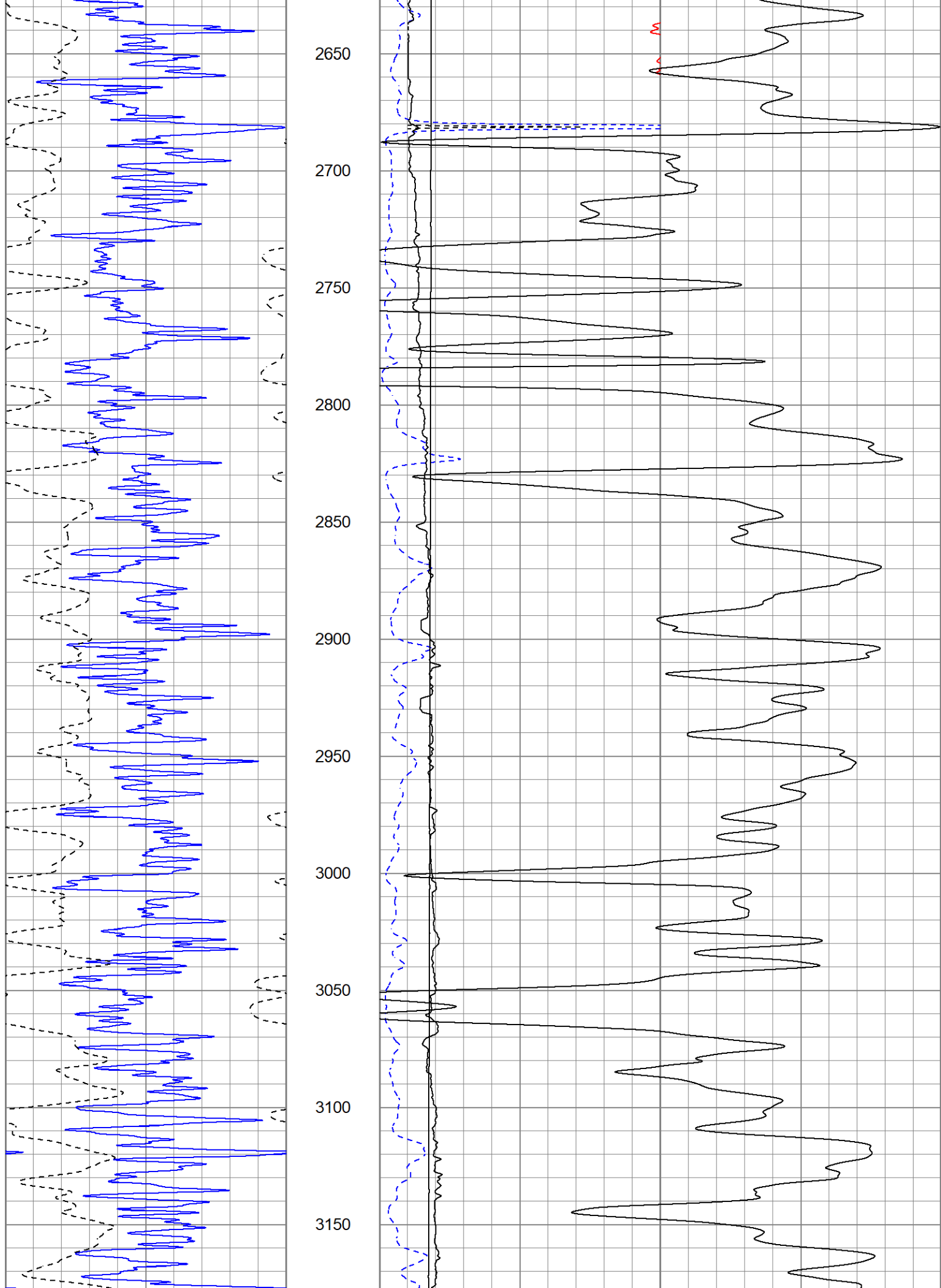


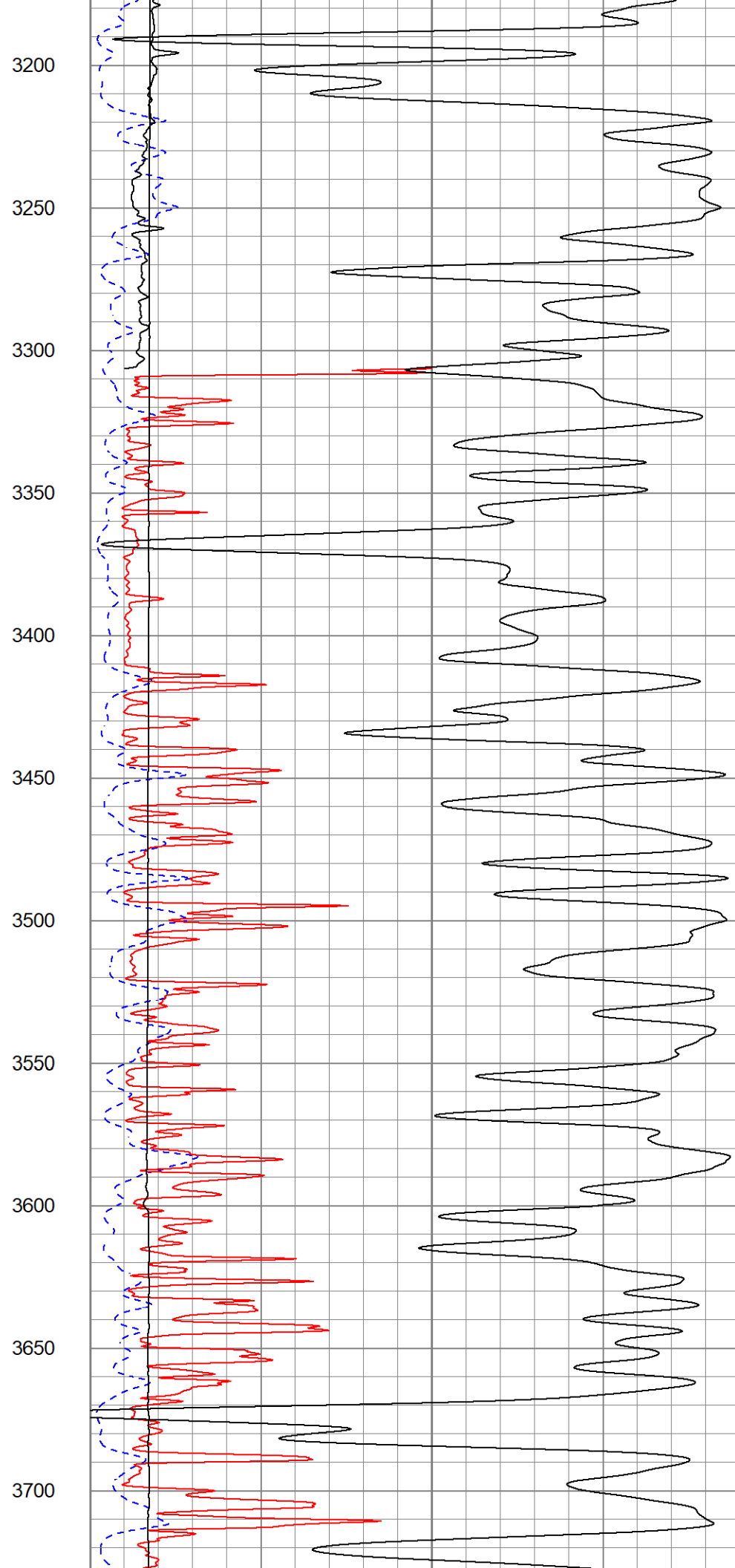
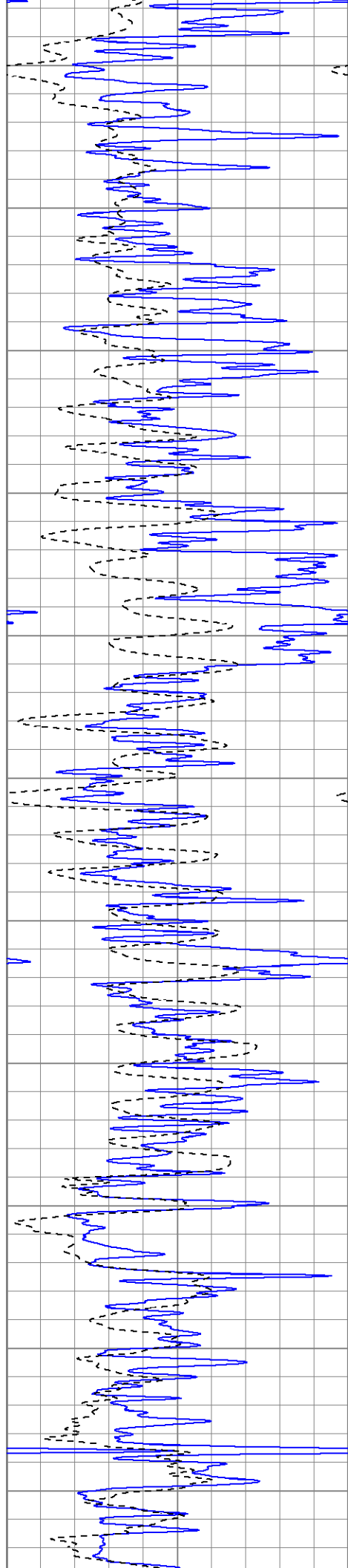
1000  
1050  
1100  
1150  
1200  
1250  
1300  
1350  
1400  
1450  
1500

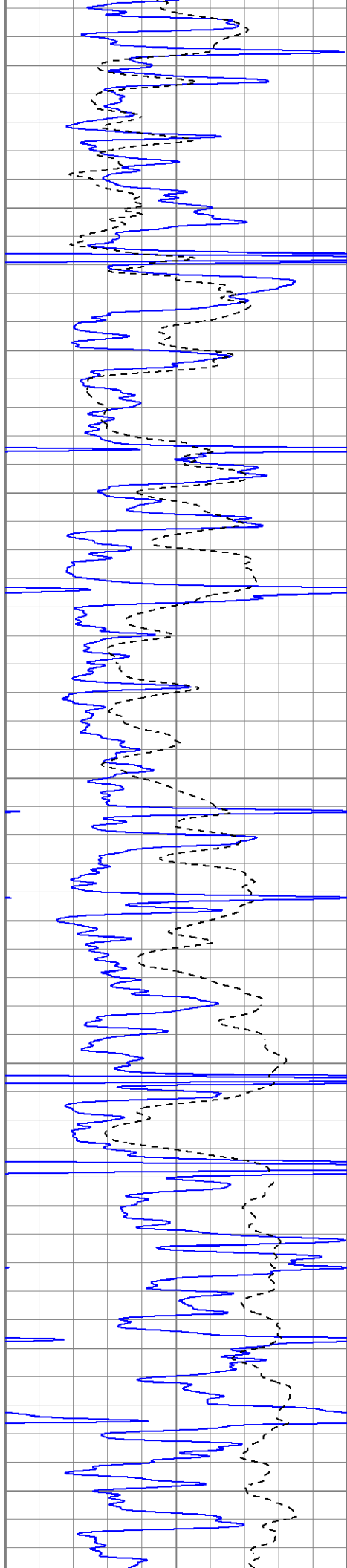












3750

3800

3850

3900

3950

4000

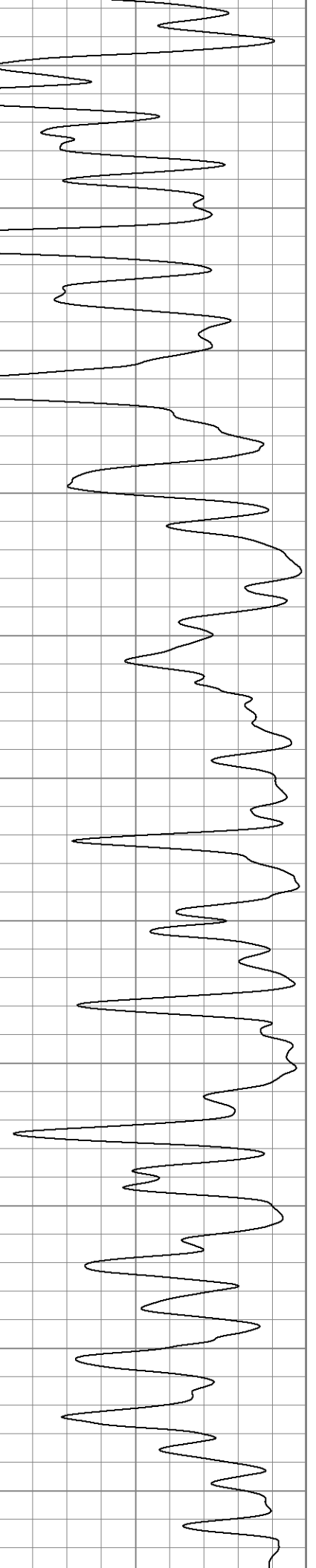
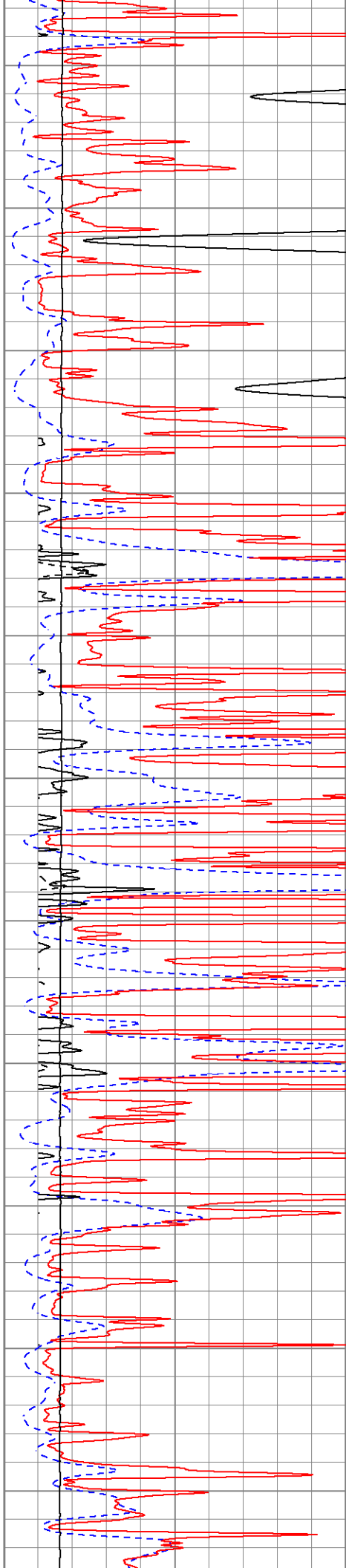
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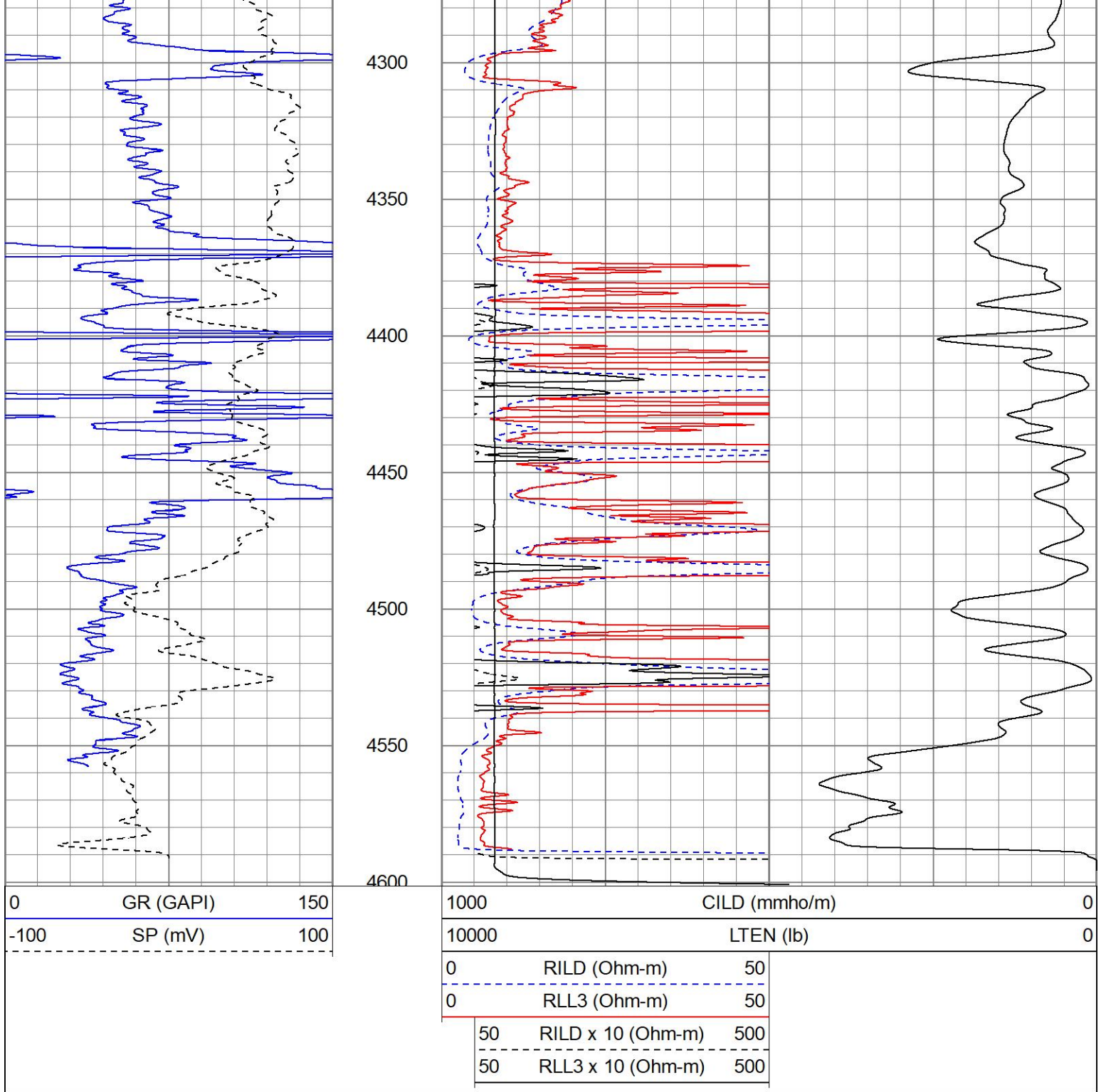
4100

4150

4200

4250

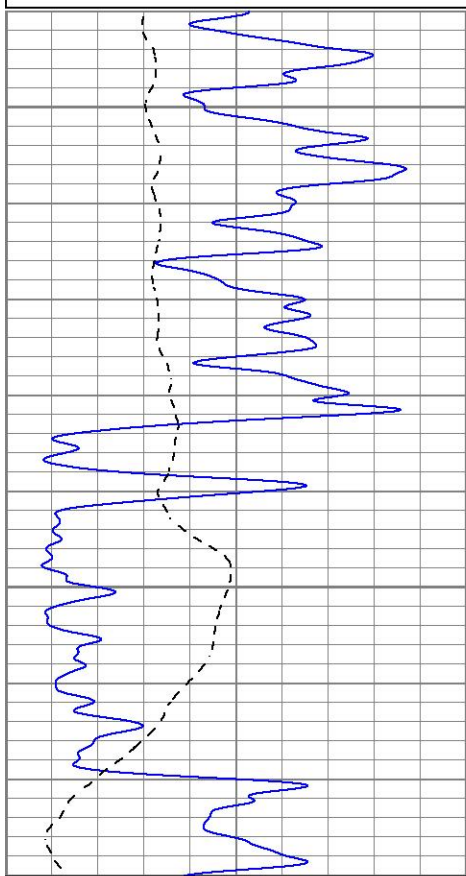




# MAIN PASS

Database File      pemuchmorethornburg#1oh.db  
 Dataset Pathname    pass4DILLIN  
 Presentation Format    kdil  
 Dataset Creation      Sat Jun 17 08:18:02 2023  
 Charted by            Depth in Feet scaled 1:240

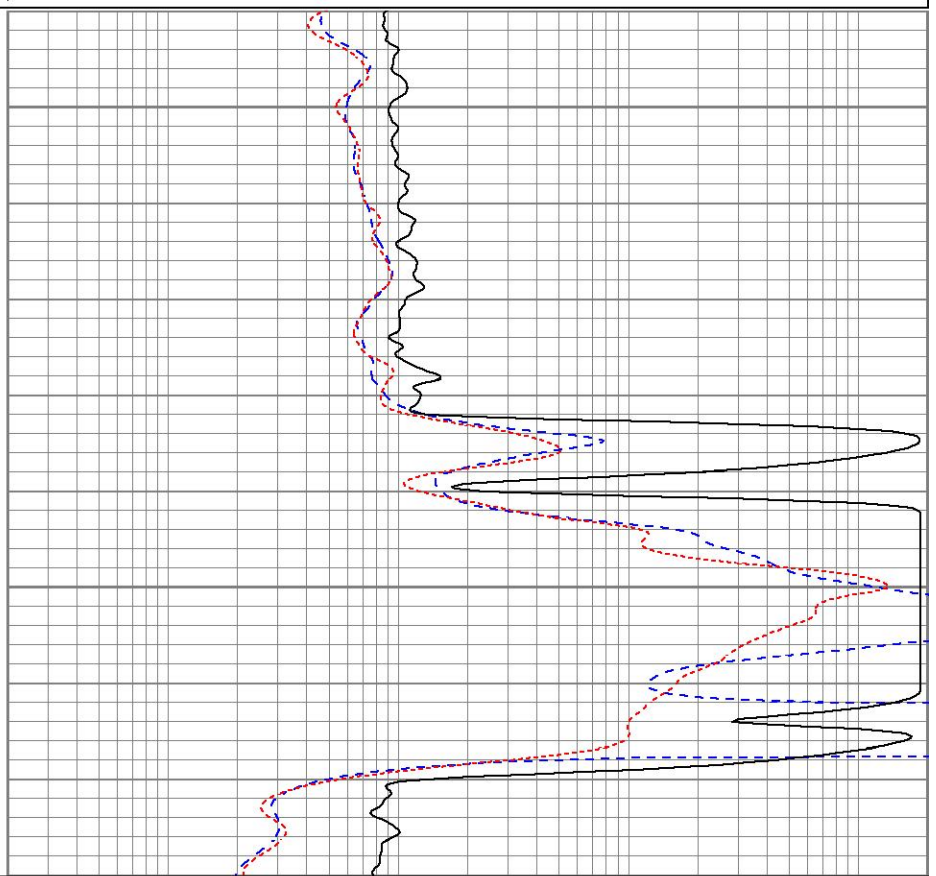
0	GR (GAPI)	150
-100	SP (mV)	100
0.2	RILD (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
0.2	RILM (Ohm-m)	2000



1950

2000

0	GR (GAPI)	150
-100	SP (mV)	100



0.2	RILD (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
0.2	RILM (Ohm-m)	2000

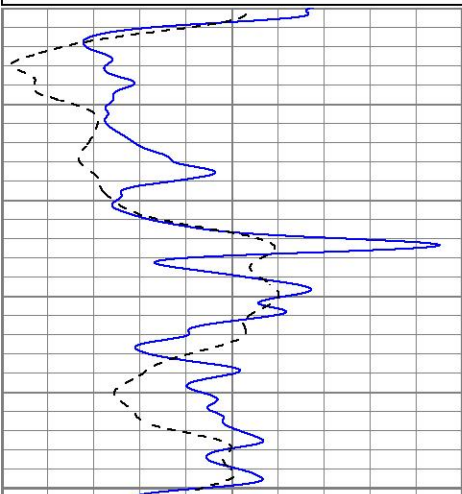


# MAIN PASS

Database File pemuchmorethornburg#1oh.db  
 Dataset Pathname pass4DT  
 Presentation Format kdil  
 Dataset Creation Sat Jun 17 07:29:10 2023  
 Charted by Depth in Feet scaled 1:240

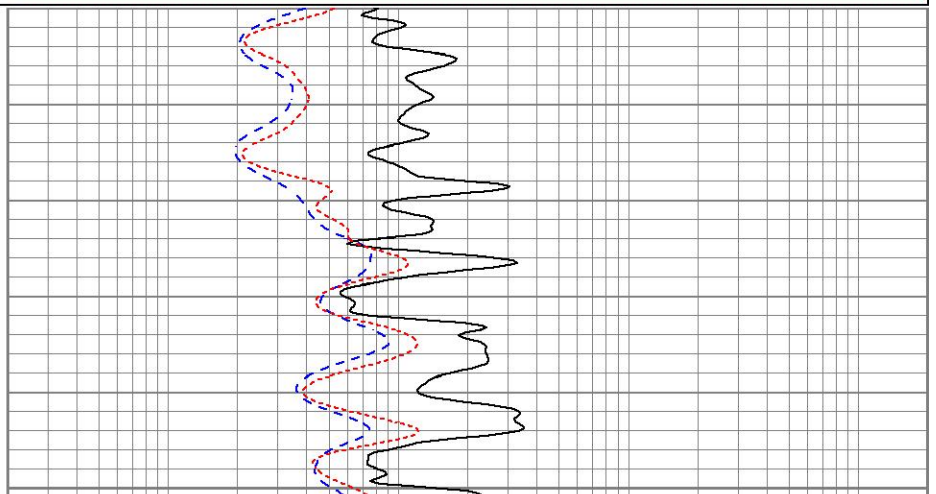
0	GR (GAPI)	150
-100	SP (mV)	100

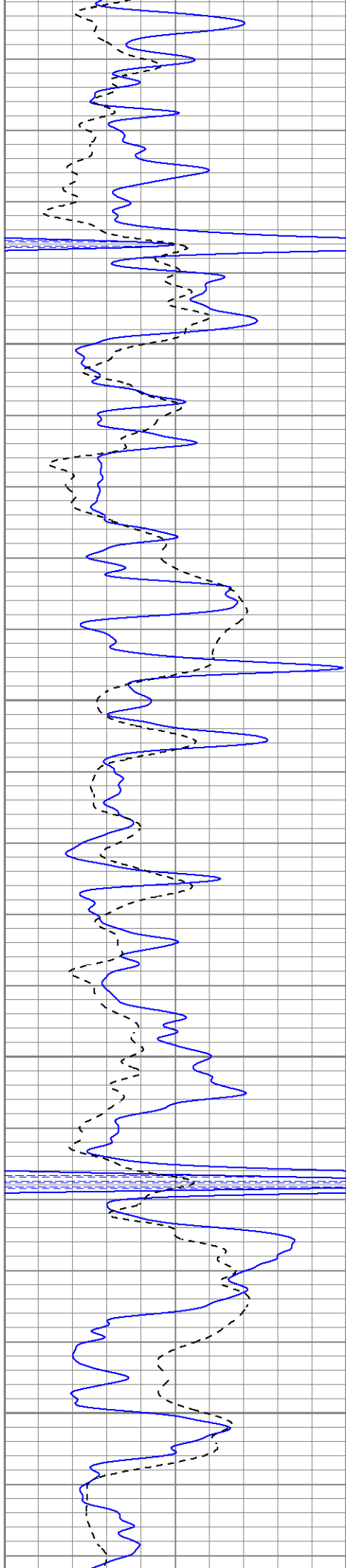
0.2	RILD (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
0.2	RILM (Ohm-m)	2000



3000

3650



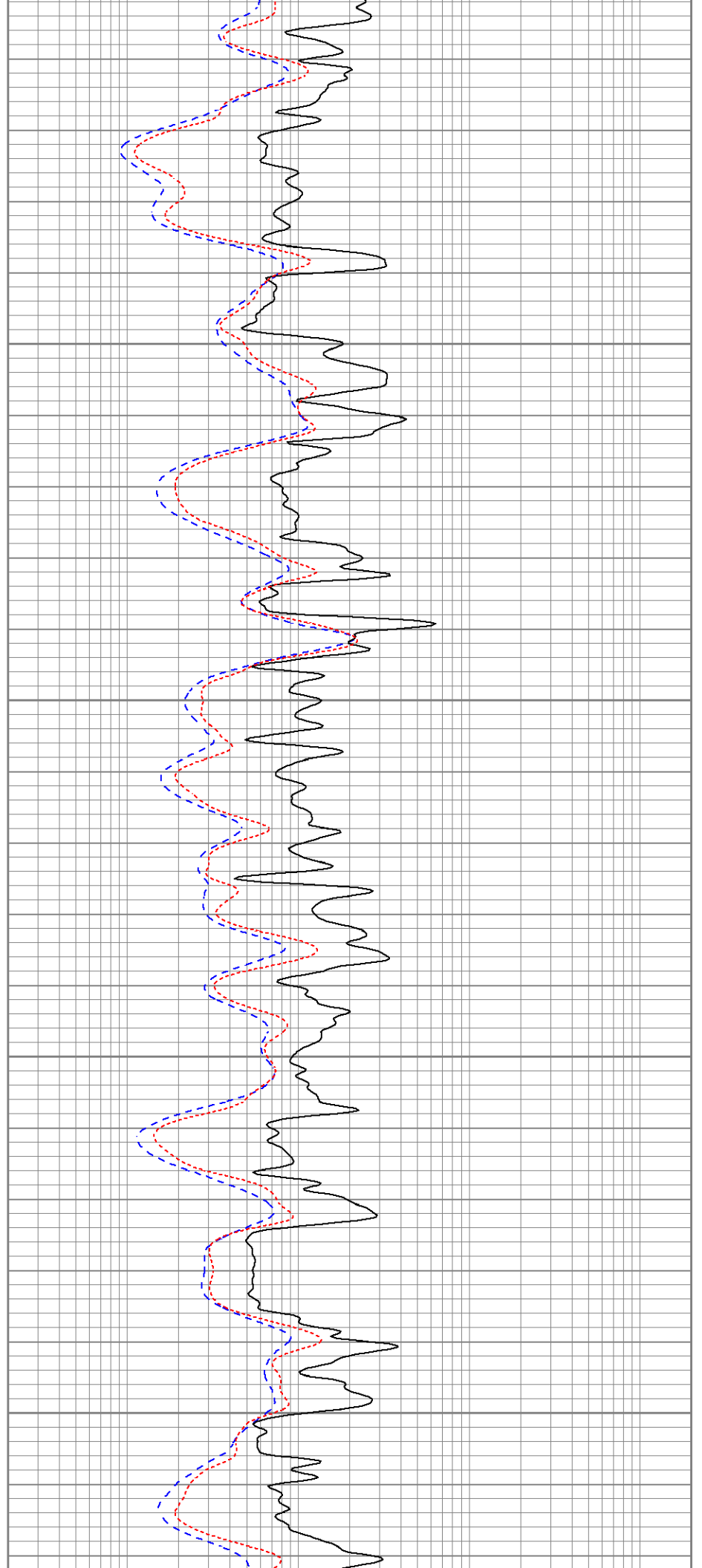


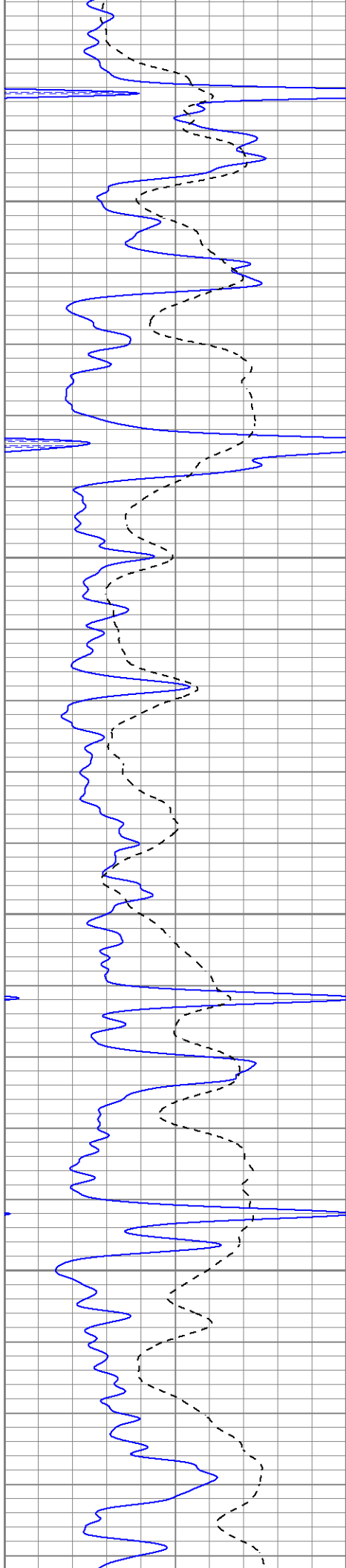
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3750

3800

3850



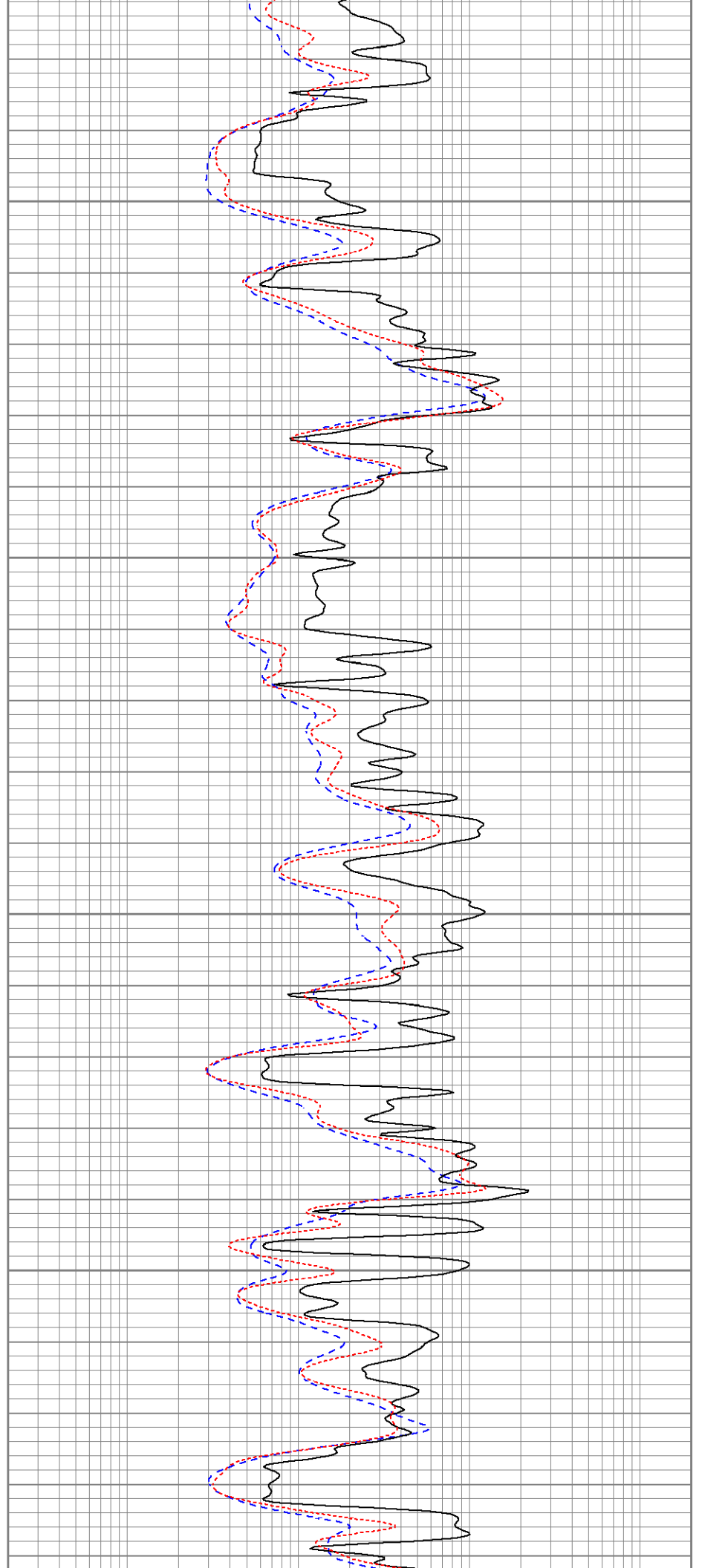


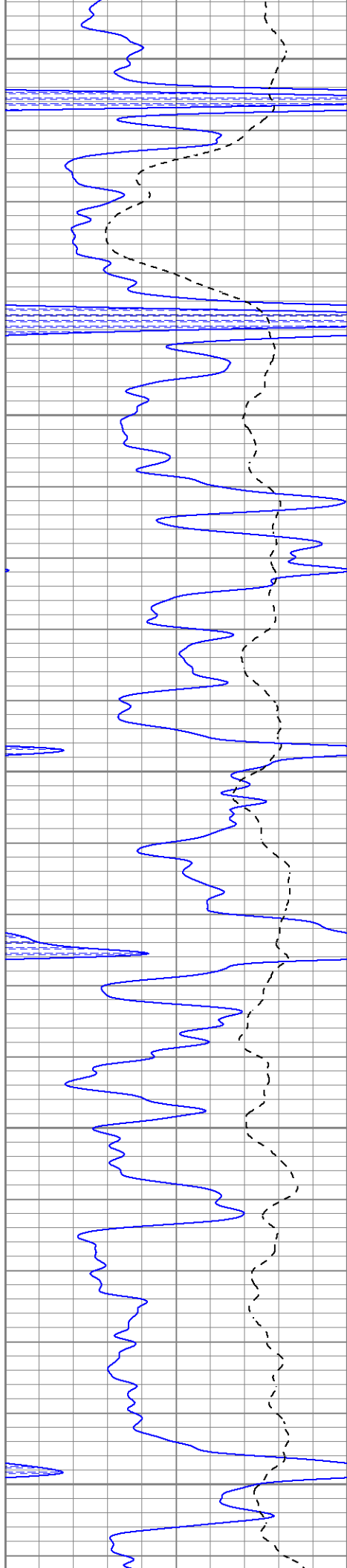
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3950

4000

4050





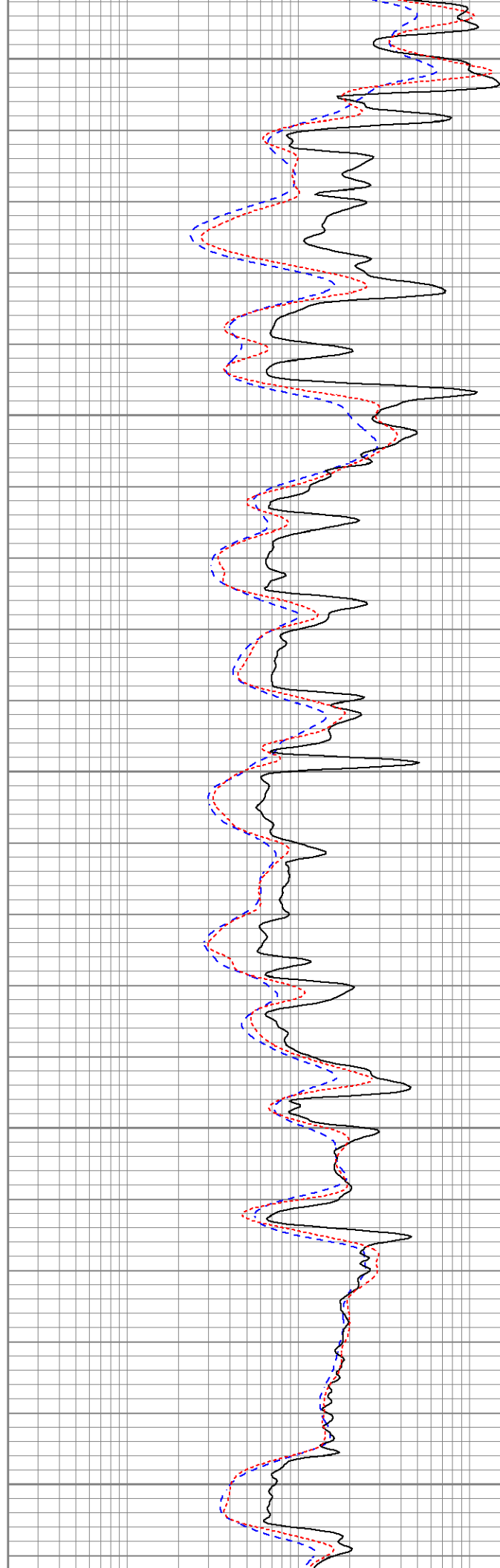
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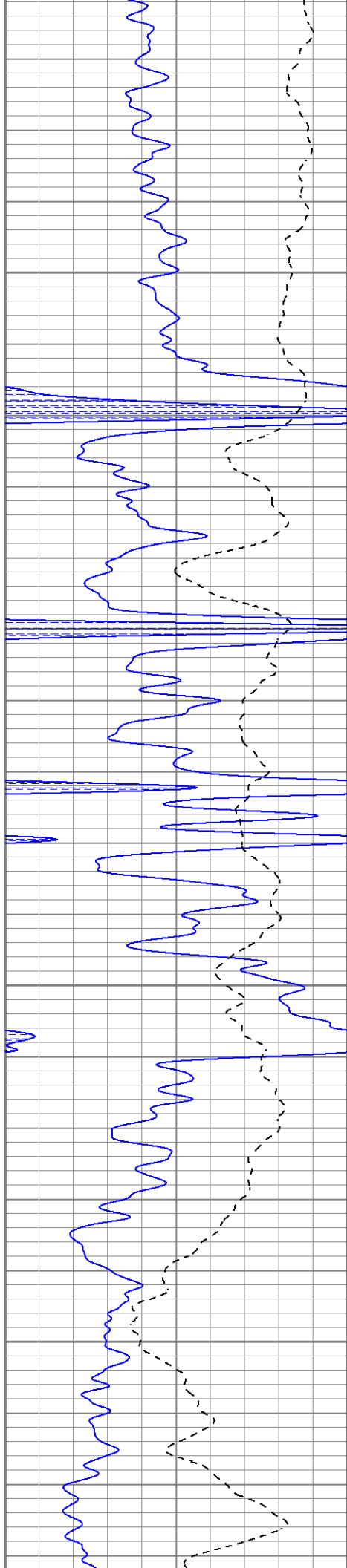
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4200

4250

4300



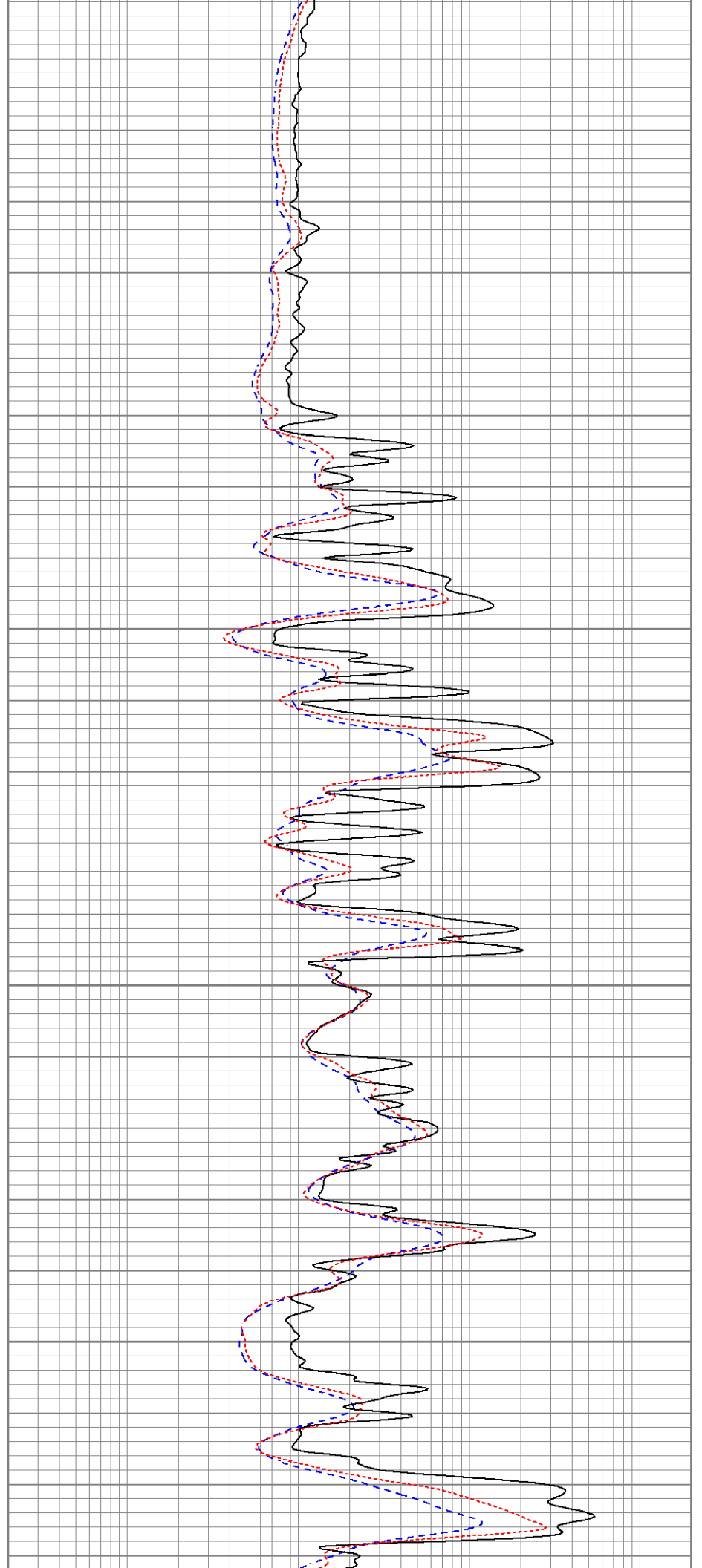


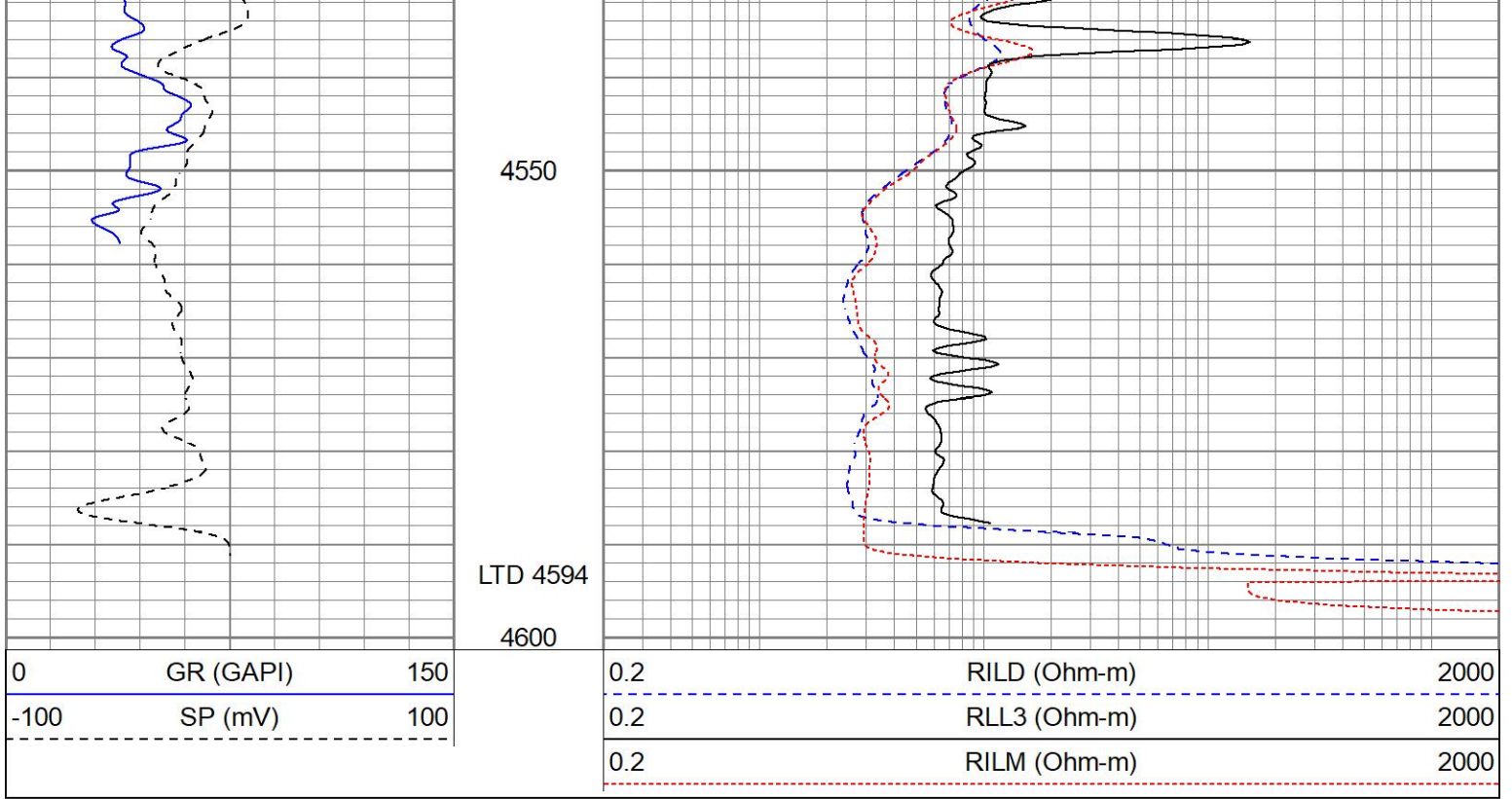
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4400

4450

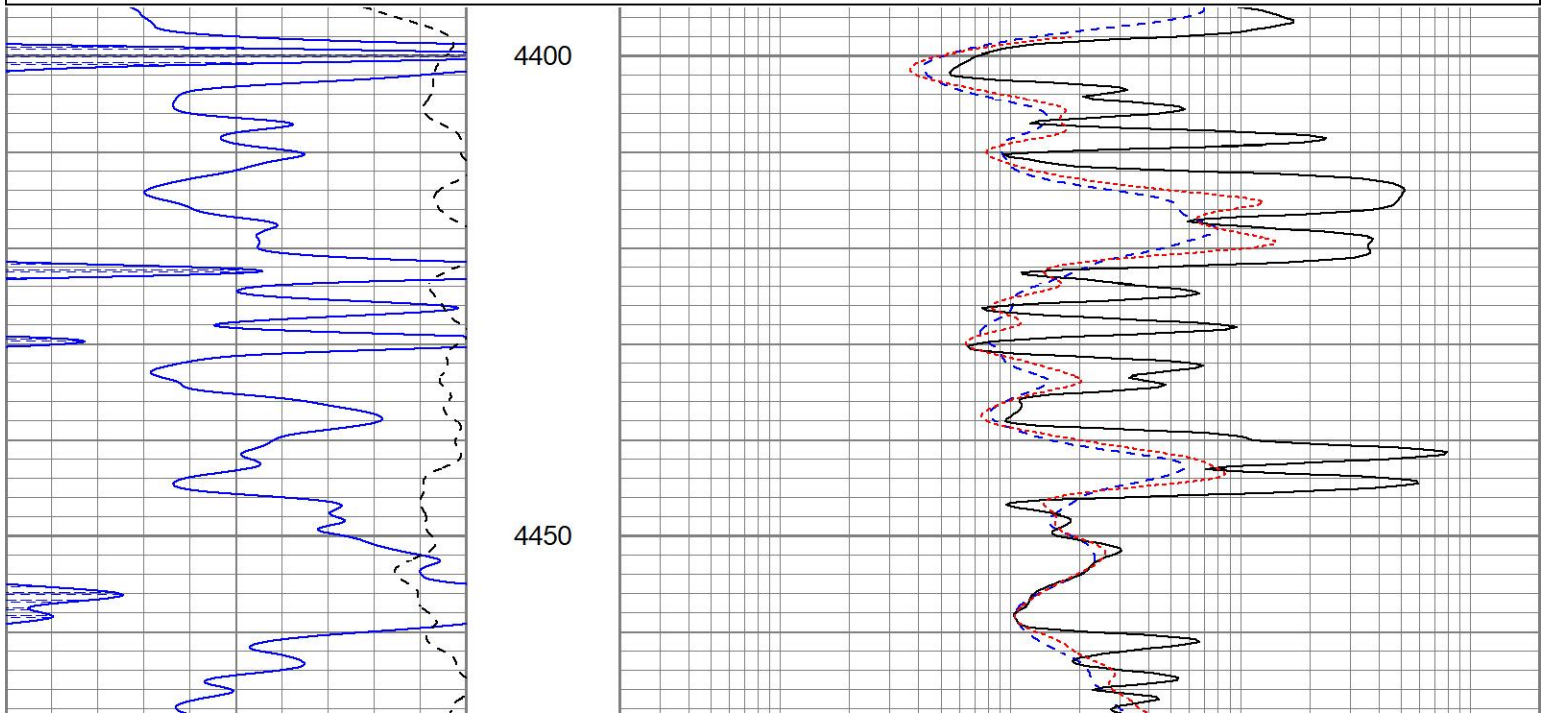
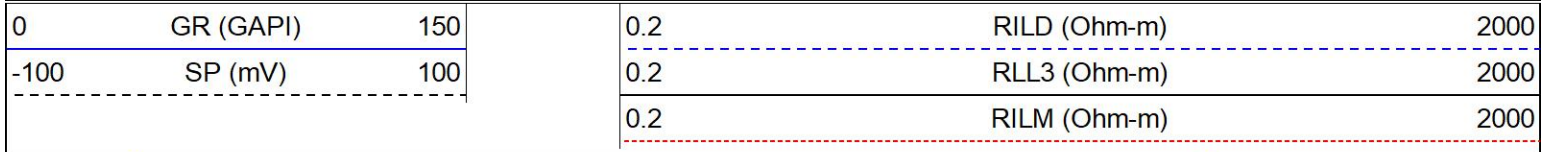
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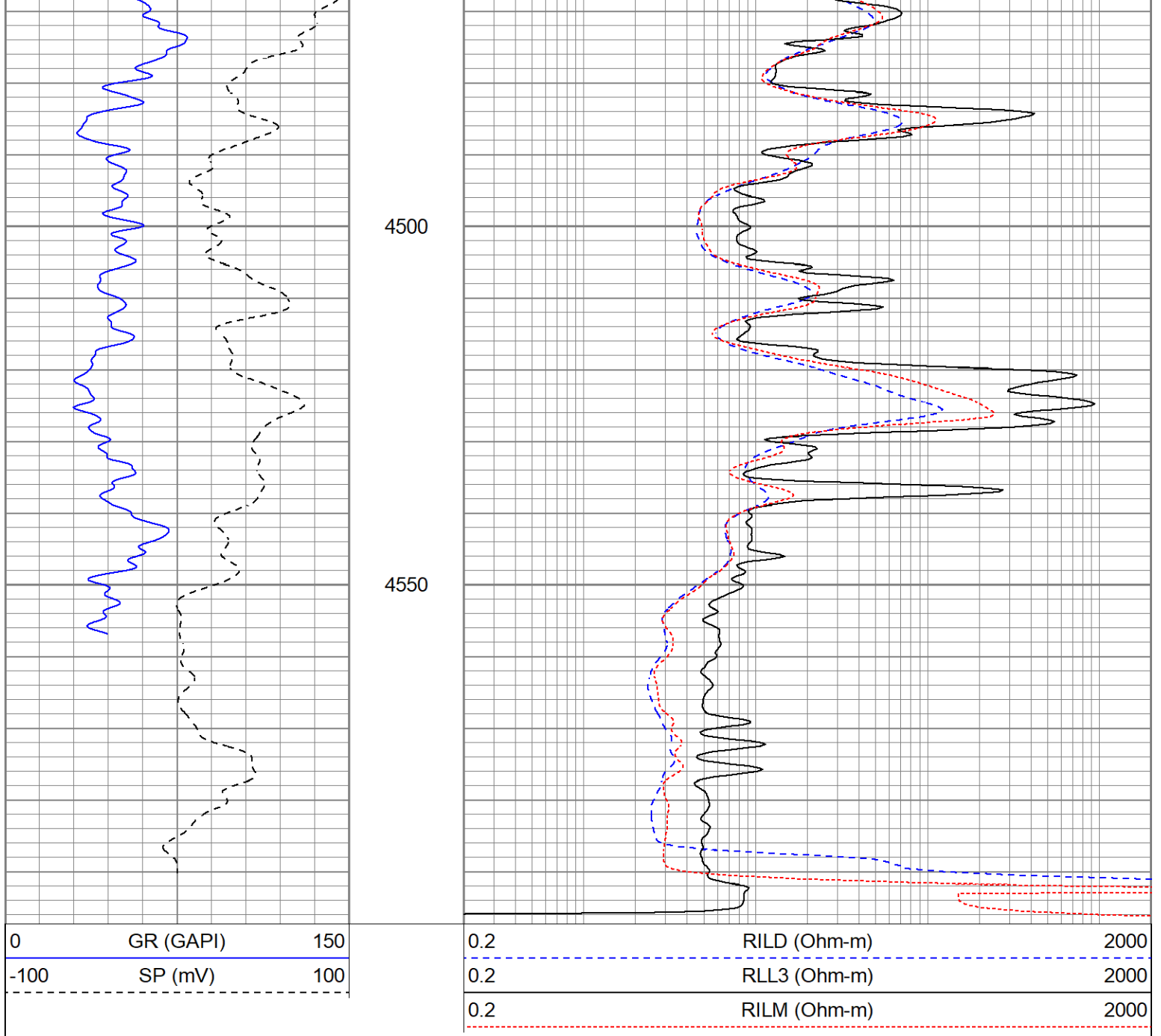




# REPEAT SECTION

Database File pemuchmorethornburg#1oh.db  
 Dataset Pathname pass2.1  
 Presentation Format kdil  
 Dataset Creation Sat Jun 17 08:16:11 2023  
 Charted by Depth in Feet scaled 1:240





### Calibration Report

Database File pemuchmorethornburg#1oh.db  
 Dataset Pathname pass2.1  
 Dataset Creation Sat Jun 17 08:16:11 2023

### Dual Induction Calibration Report

Serial-Model: 1842-ADM  
 Surface Cal Performed: Mon Sep 20 22:00:42 2021  
 Downhole Cal Performed: Mon Sep 20 22:00:24 2021  
 After Survey Verification Performed: Mon Sep 20 22:05:52 2021

#### Surface Calibration

Loop:	Readings			V	References		Results	
	Air	Loop			Air	Loop	m	b
Deep	0.018	0.672		0.000	350.000	mmho/m	535.475	-9.896
Medium	0.003	0.769		0.000	400.000	mmho/m	522.607	-1.745

Internal:	Zero	Cal		Zero	Cal		m	b
Deep	0.018	0.672	V	0.000	350.000	mmho/m	535.240	-9.549
Medium	0.003	0.768	V	0.000	550.000	mmho/m	718.637	-2.088

Downhole Calibration

Readings			References			Results		
Internal:	Zero	Cal		Zero	Cal	m	b	
Deep	-0.219	349.905	mmho/m	-0.343	349.810	mmho/m	1.000	-3.124
Medium	-0.118	399.722	mmho/m	-0.226	399.745	mmho/m	1.000	-3.108
Shallow	2.536	0.025	V	500.000	2.000	Ohm-m	180.330	-1.504

After Survey Verification

Readings			Targets			Results		
Internal:	Zero	Cal		Zero	Cal	m'	b'	
Deep	0.000	0.000	mmho/m	-0.219	349.905	mmho/m	1.000	-3.124
Medium	0.000	0.000	mmho/m	-0.118	399.722	mmho/m	1.000	-3.108
Shallow	0.000	0.000	Ohm-m	500.000	2.000	Ohm-m	1.000	0.000

Admyr Lithodensity Calibration Report

Serial-Model: 1C-C  
Source: Blue2  
Master Calibration Performed: Tue Aug 30 10:20:37 2022

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.670	g/cc	6362.49	3546.71	cps
Aluminium	2.640	g/cc	1733.54	2362.69	cps
Aluminium+Sleeve	2.617	g/cc	1657.01	2197.69	cps
Spine Angle = 72.65			Density/Spine Ratio = 0.712		
	PE		NLITH	NHARD	
Magnesium	2.000	barn	2520.00	1620.00	cps
Aluminium	3.000	barn	1926.00	1699.00	cps
Aluminium+Sleeve	5.000	barn	915.00	1230.00	cps
M = 0.370			B = -0.079	R = 0.999	
	Size		Reading		
Small Ring	8.00	in	8.61	V	
Large Ring	14.30	in	12.40	V	

Neutron Calibration Report

Serial Number: AD5139  
Tool Model: ADMY5139  
Performed: (Not Performed)

Calibrator Value: 1 NAPI

Calibrator Reading: 1 cps

Sensitivity: 1 NAPI/cps

Temperature Calibration Report

Serial Number: WithMC  
Tool Model: WMC  
Performed: Fri Apr 19 12:15:04 2019

	Reference	Reading
Low Reference:	0.00 degF	0.00 degF
High Reference:	1.00 degF	1.00 degF
Gain:	1.00	
Offset:	0.00	
Delta Spacing	1	

#### Inclinometer Calibration Report

Performed:	Wed May 5 19:20:48 2021				
	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	205.00	1843.00	-1.00	1.00	gee
Y Accelerometer	205.00	1843.00	-1.00	1.00	gee
Z Accelerometer					gee

#### Gamma Ray Calibration Report

Serial Number:	WithMC	
Tool Model:	WMC	
Performed:	(Not Performed)	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	1.0000	GAPI/cps