



PIONEER
Pioneer Energy Services

**DUAL INDUCTION
LOG**

Company **RICHLAN DRILLING**
Well **HILLERY #1**
Field **WILDCAT**
County **LOGAN** State **KANSAS**

Location: API #: 15-109-21550-00-00
2300' FSL & 2500' FEL
SEC 19 TWP 15S RGE 34W
Permanent Datum **GROUND LEVEL** Elevation **3137'**
Log Measured From **KELLY BUSHING**
Drilling Measured From **KELLY BUSHING**
Other Services
**CNL/CDL
MEL/SON**
Elevation
K.B. 3147'
D.F. N/A
G.L. 3137'

Company **RICHLAN DRILLING**
Well **HILLERY #1**
Field **WILDCAT**
County **LOGAN**
State **KANSAS**

Date	6/15/2018
Run Number	ONE
Depth Driller	4800'
Depth Logger	4796'
Bottom Logged Interval	4795'
Top Log Interval	350'
Casing Driller	8.625" @ 374'
Casing Logger	373'
Bit Size	12.25"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	5500
Density / Viscosity	9.4 57
pH / Fluid Loss	10.0 9.6
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.80 @ 86
Rmf @ Meas. Temp	0.60 @ 86
Rmc @ Meas. Temp	1.08 @ 86
Source of Rmf / Rmc	CHARTS
Rm @ BHT	@
Operating Rig Time	4 HOURS
Max Rec. Temp. F	124
Equipment Number	91
Location	HAYS
Recorded By	IAN MABB
Witnessed By	JIM MUSGROVE

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

PENCE, KS.
3 MILES WEST TO COUNTY LINE
NORTH 6 MILES, WEST INTO

Log Measured From: KELLY BUSHING 10 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

Your Pioneer Energy Services Crew

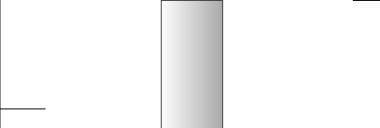
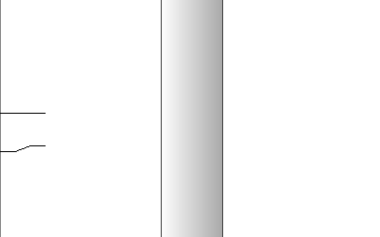
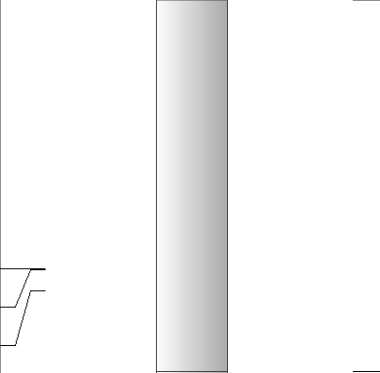
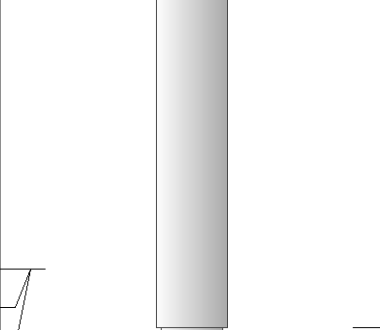
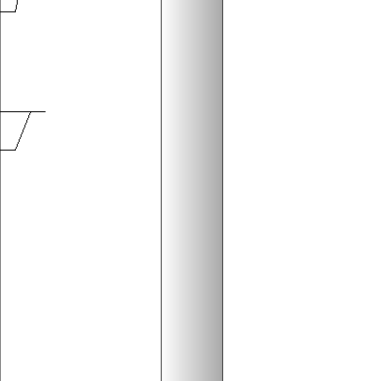
Engineer: IAN MABB
Operator:
Operator:
Operator:

This Log Record Was Witnessed By

Primary Witness: JIM MUSGROVE
Secondary Witness:
Secondary Witness:
Secondary Witness:

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	140	2
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
6	85	0	5.5	0	4796	124	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (207-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (817-947)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSIML (PSI-01) GO Micro log tools converted to Simplec electronics	7.58	4.00	65.00
RLL3F RLL3	15.80 15.80					

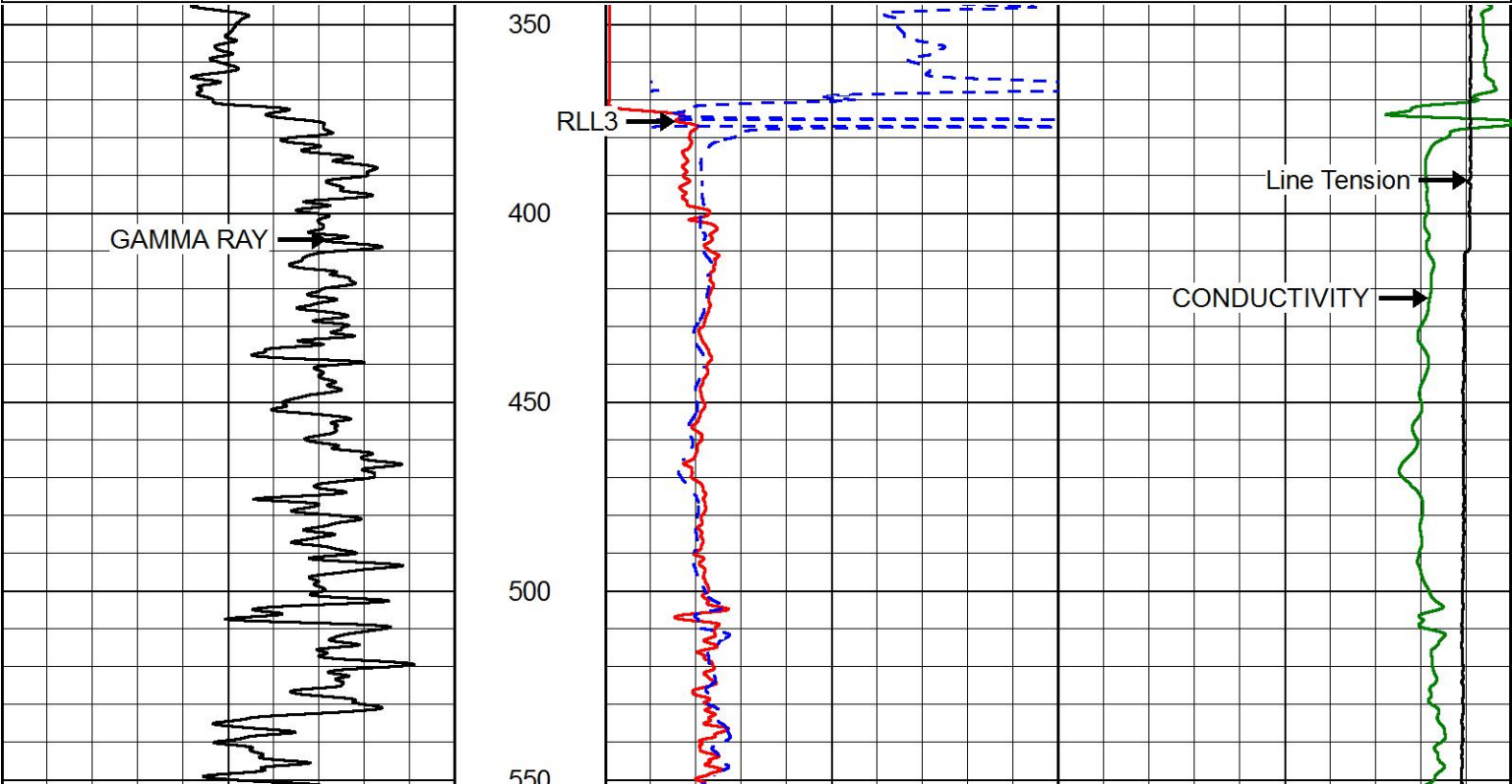
				DIL-PSI HIGH TEMP (PSI 971 HT)	18.50	3.50	220.00
CILD	8.00						
CILM	4.70						
SP	0.20						
Dataset: richlan_hillery_1.db: field/well/stkmel/pass3.1 Total length: 43.08 ft Total weight: 685.00 lb O.D.: 4.00 in							

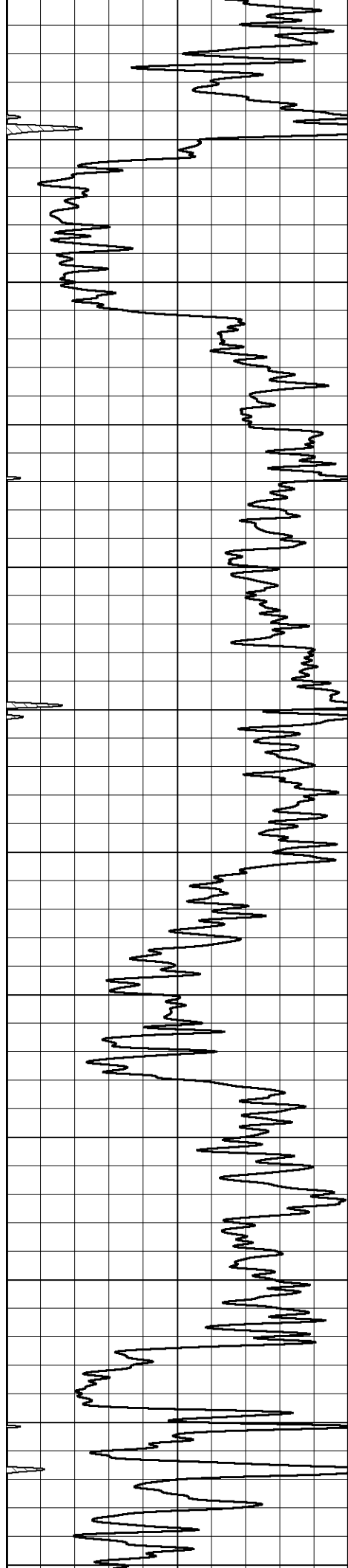


MAIN PASS

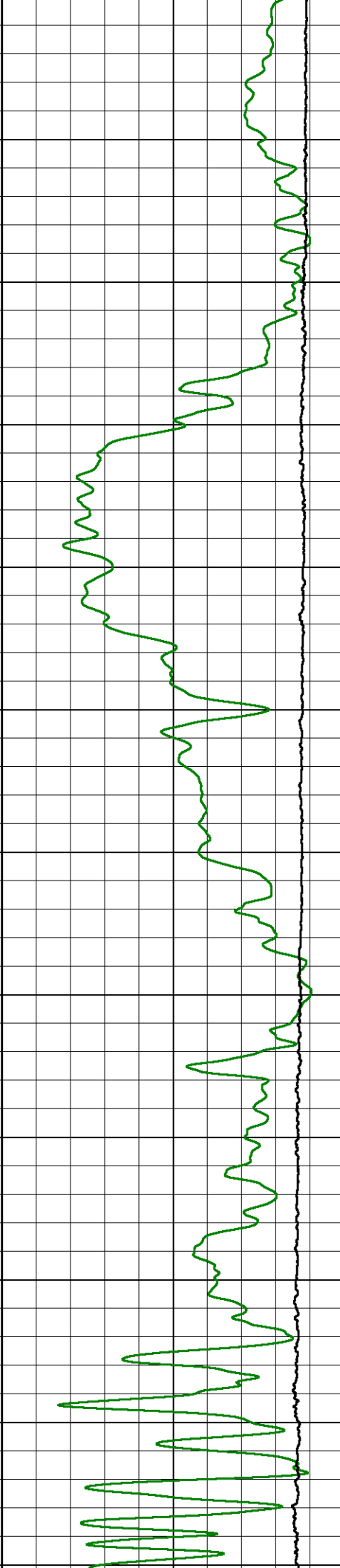
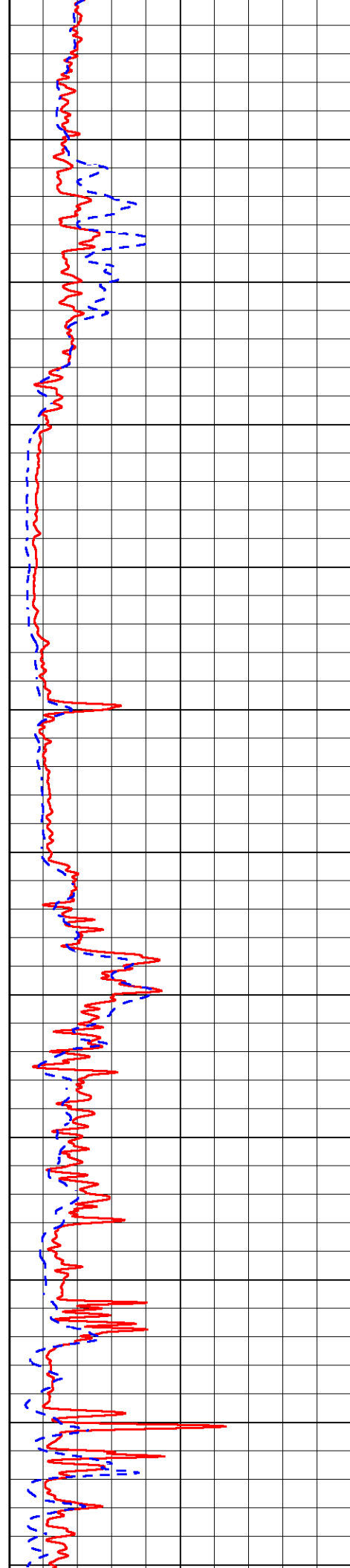
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Dataset Pathname	stkmel/pass3.1
Presentation Format	dil2in
Dataset Creation	Fri Jun 15 14:04:20 2018
Charted by	Depth in Feet scaled 1:600

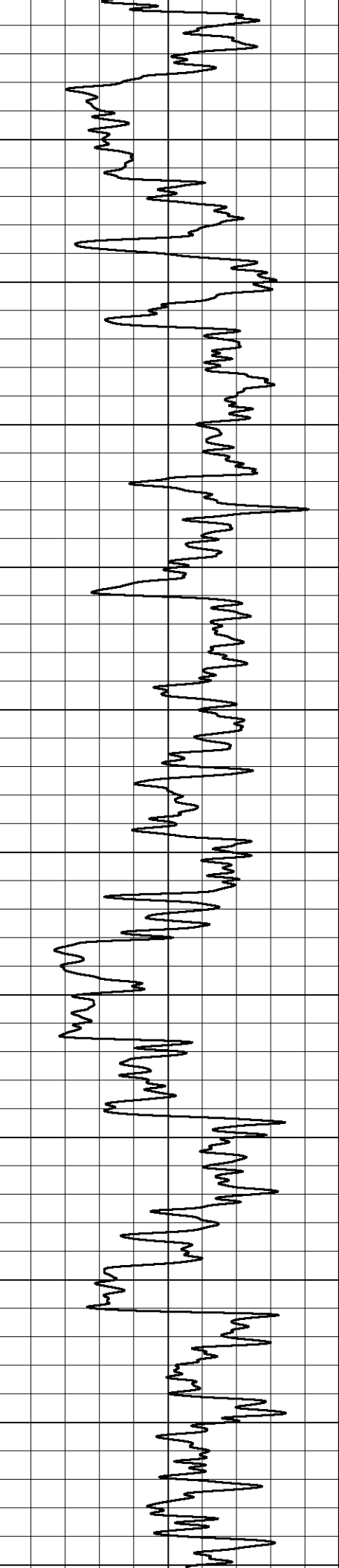
GAMMA RAY 0 (GAPI) 150	1000 CONDUCTIVITY (mmho/m) 0	
	15000 Line Tension (lb) 0	
	0 RLL3 (Ohm-m) 50	
	0 DEEP RESISTIVITY (Ohm-m) 50	
	50 RLL3 (Ohm-m) 500	
	50 Deep Resistivity (Ohm-m) 500	



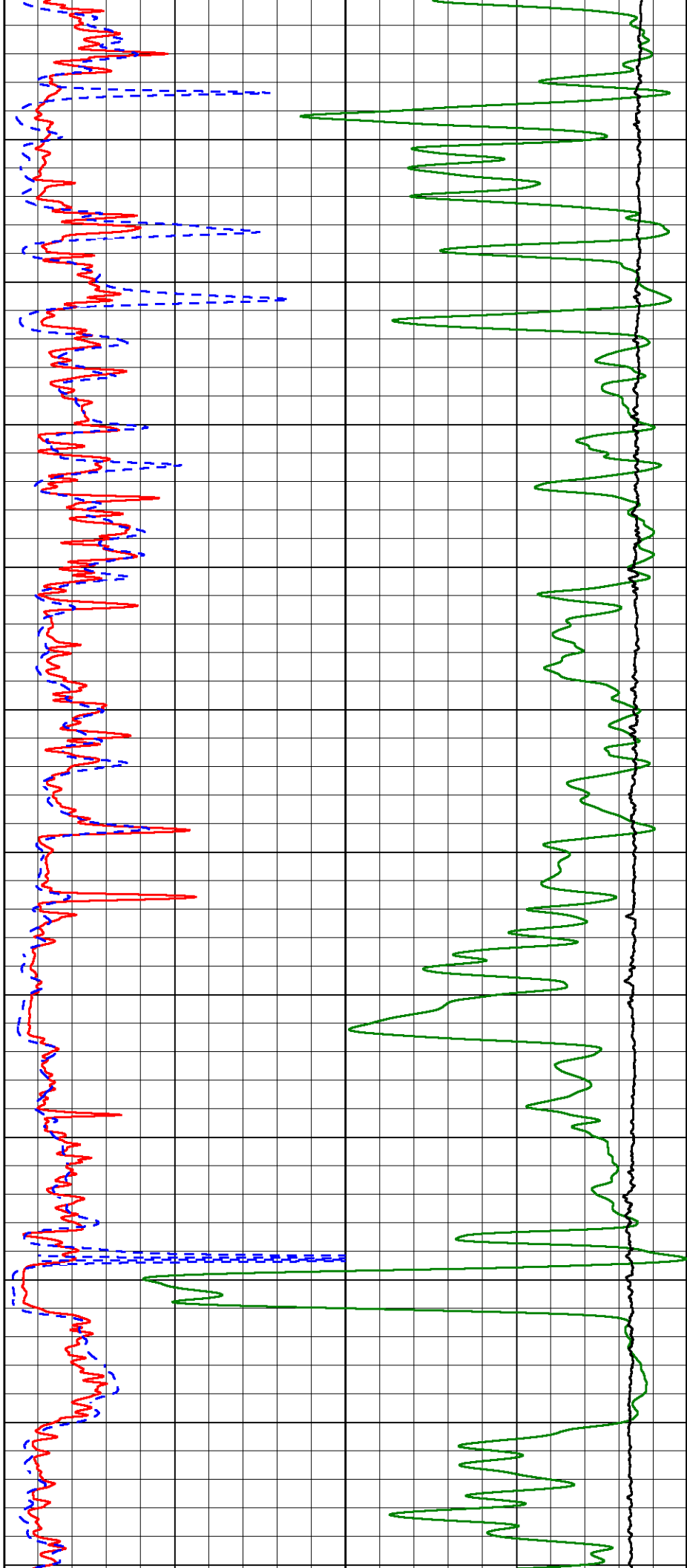


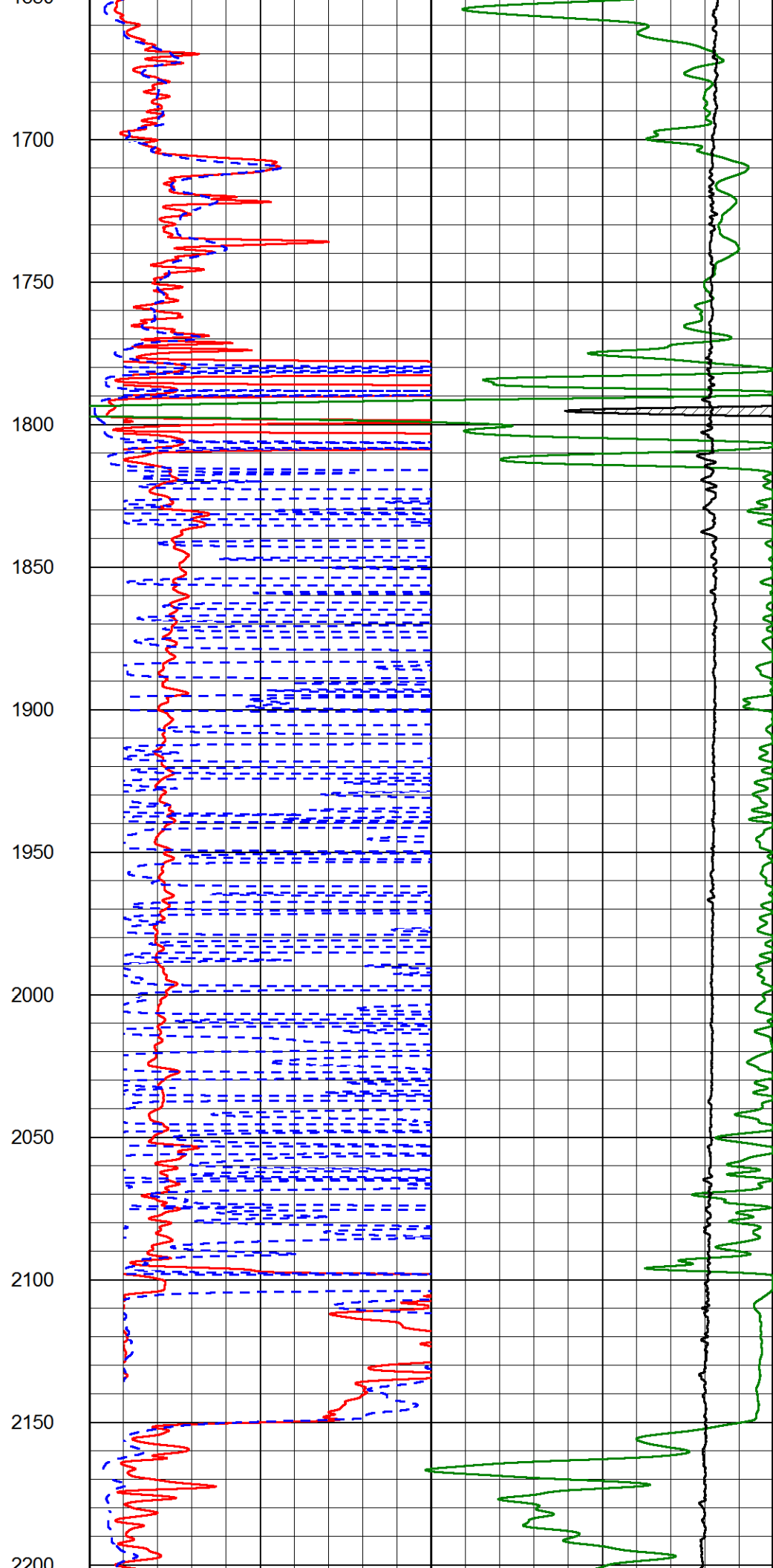
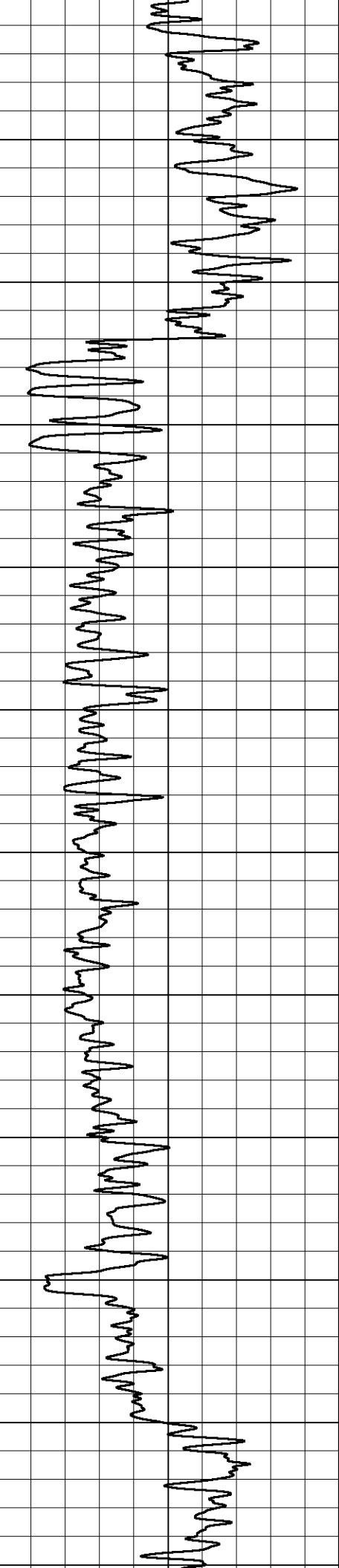
600
650
700
750
800
850
900
950
1000
1050
1100

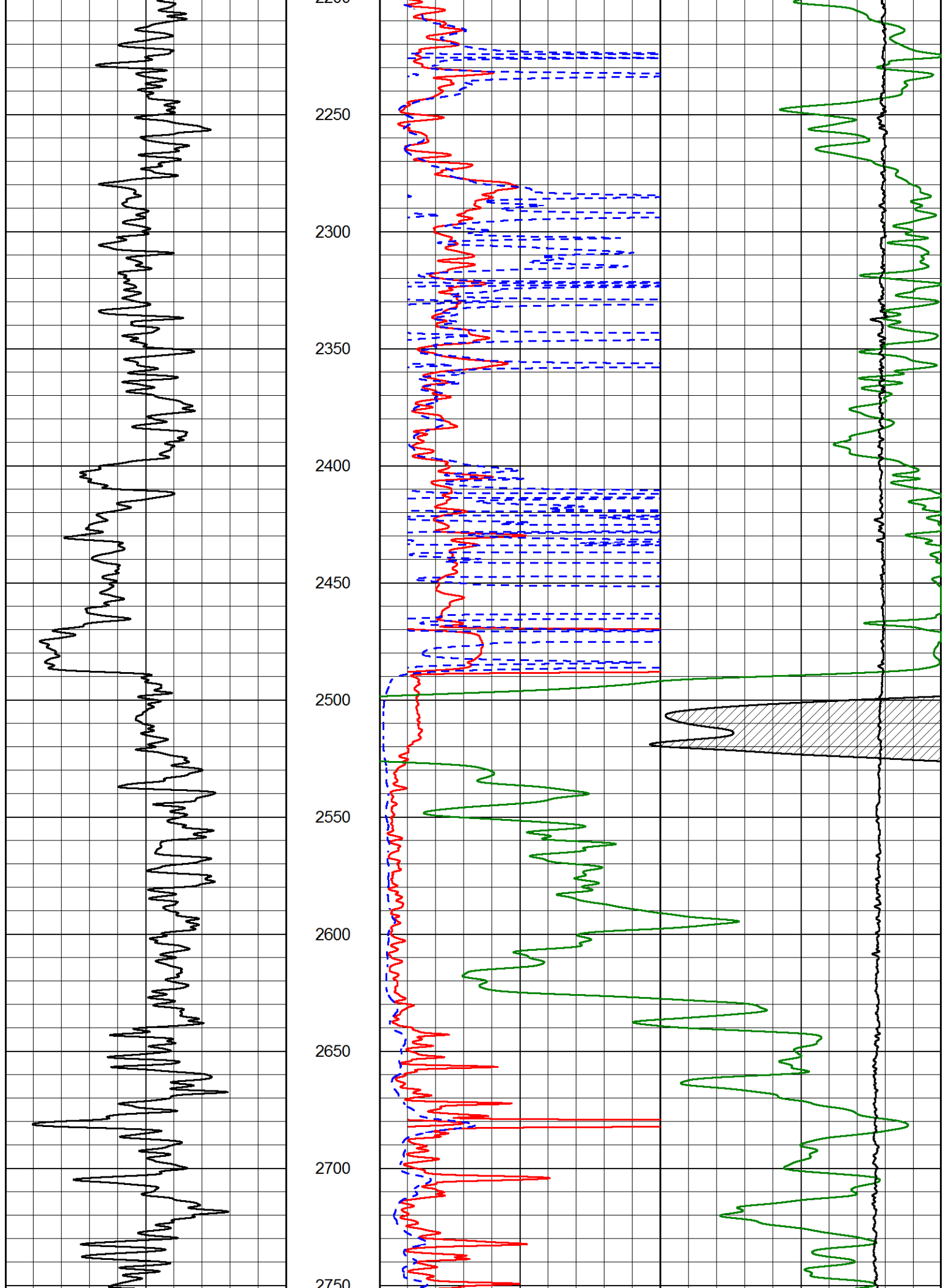


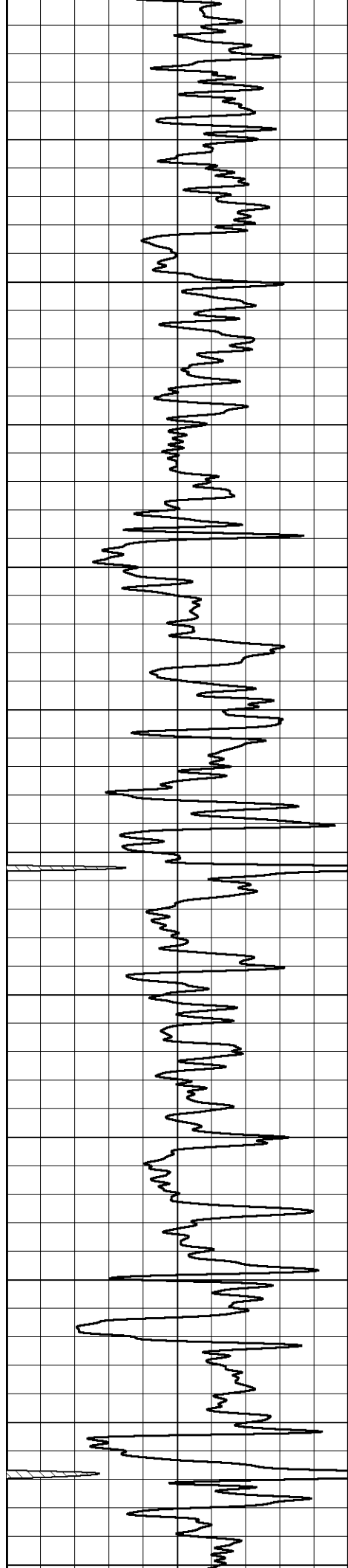


1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650

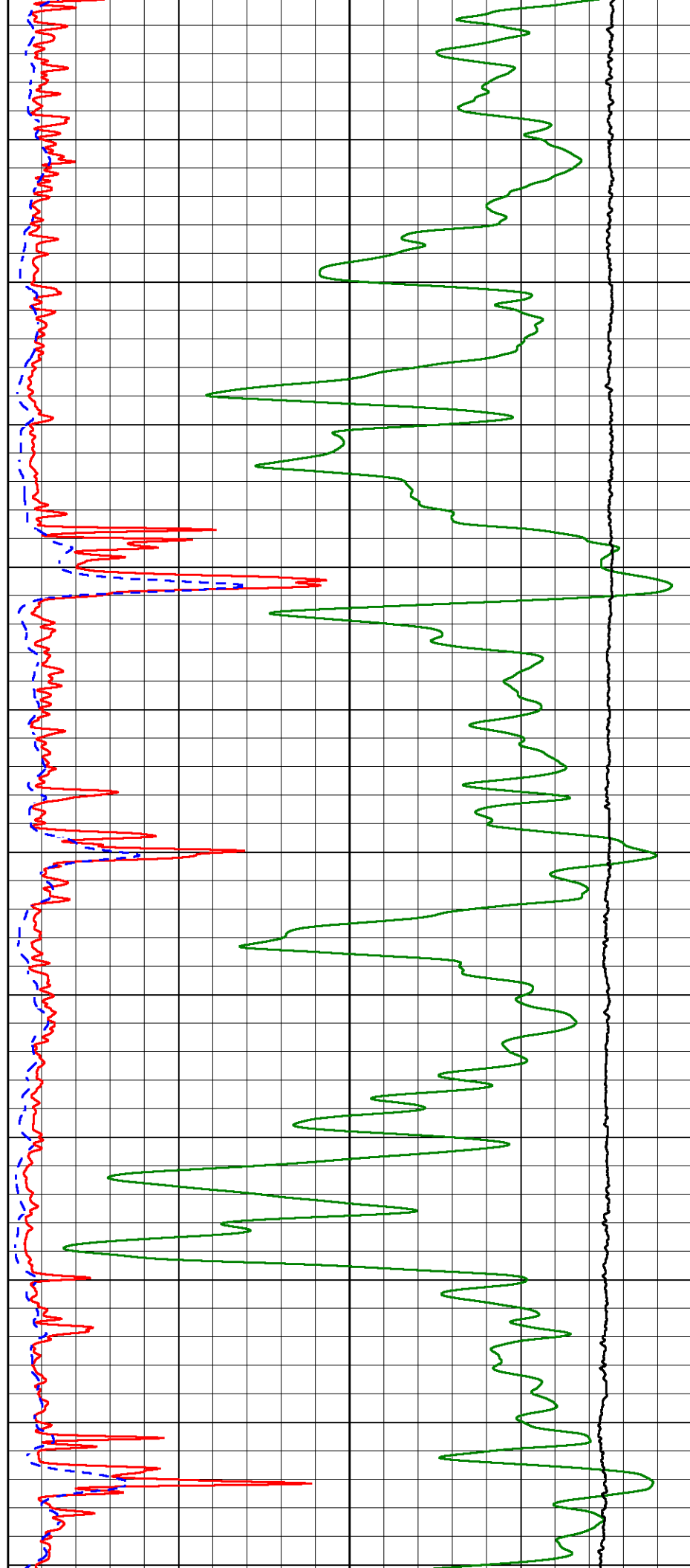


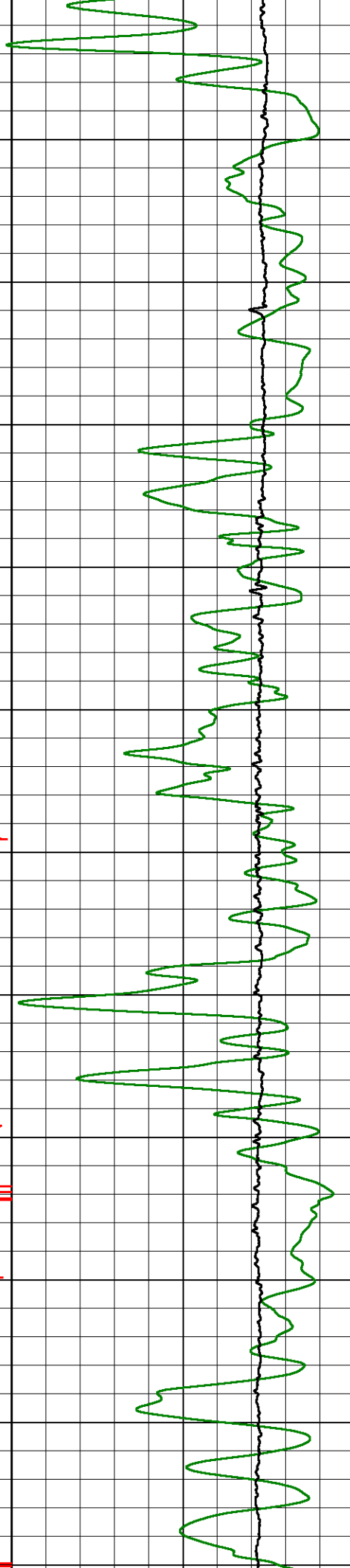
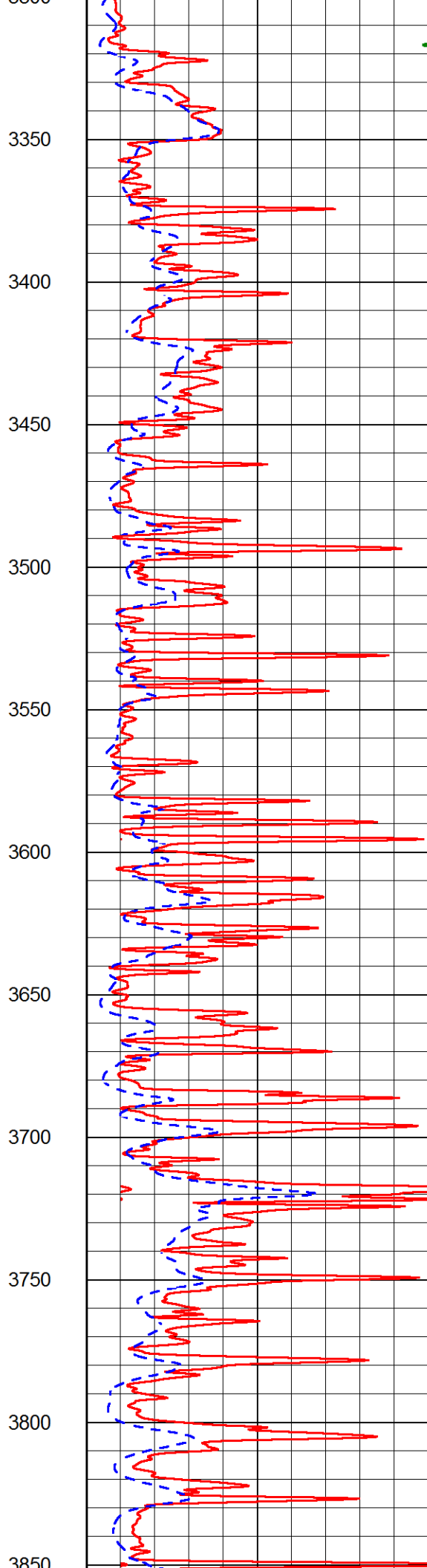
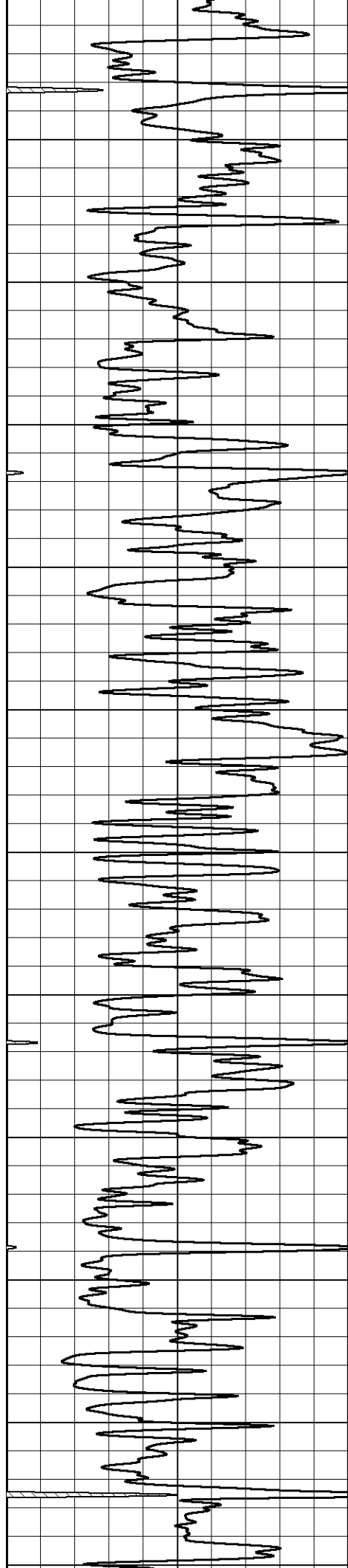


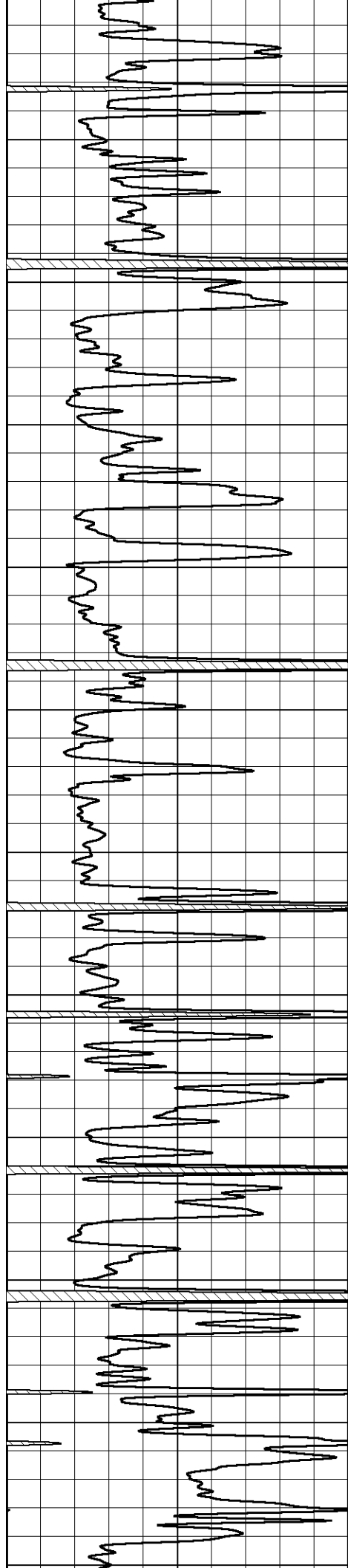




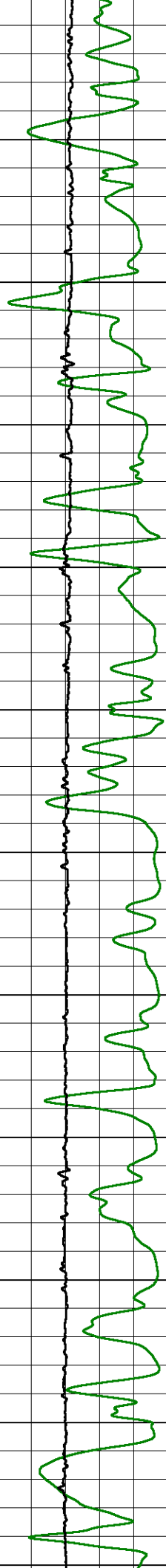
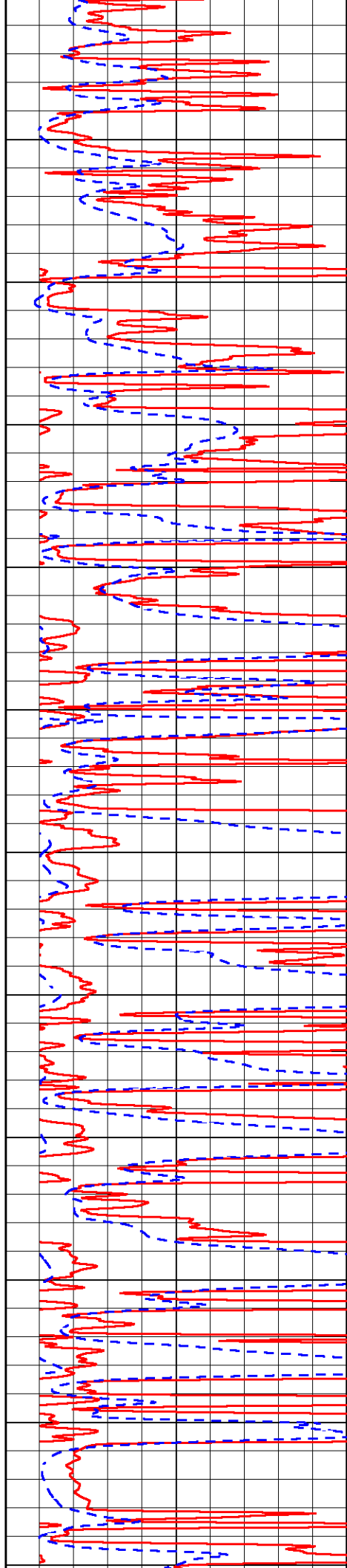
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2800
2850
2900
2950
3000
3050
3100
3150
3200
3250
3300

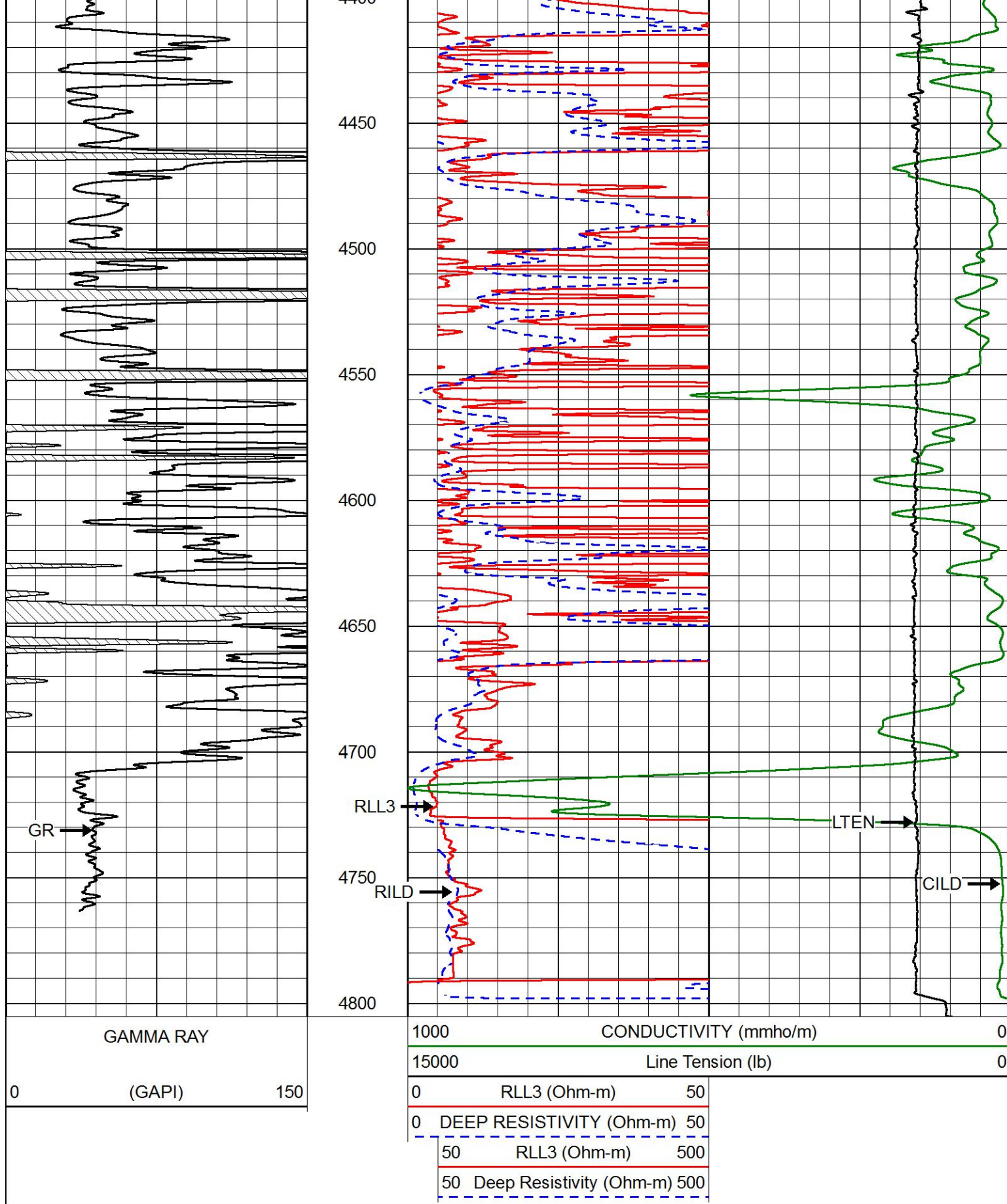






3900
3950
4000
4050
4100
4150
4200
4250
4300
4350
4400

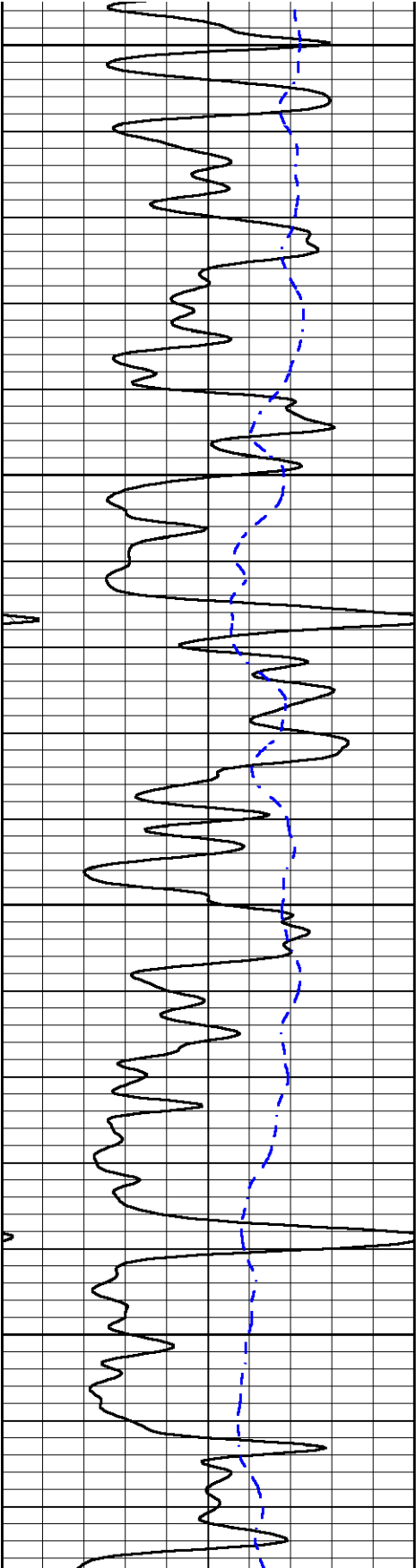




Database File	richlan_hillery_1.db
Dataset Pathname	stkmel/pass3.1
Presentation Format	dil
Dataset Creation	Fri Jun 15 14:04:20 2018
Charted by	Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
-200	SP (mV)	0

0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	LINE TENSION (lb)	0

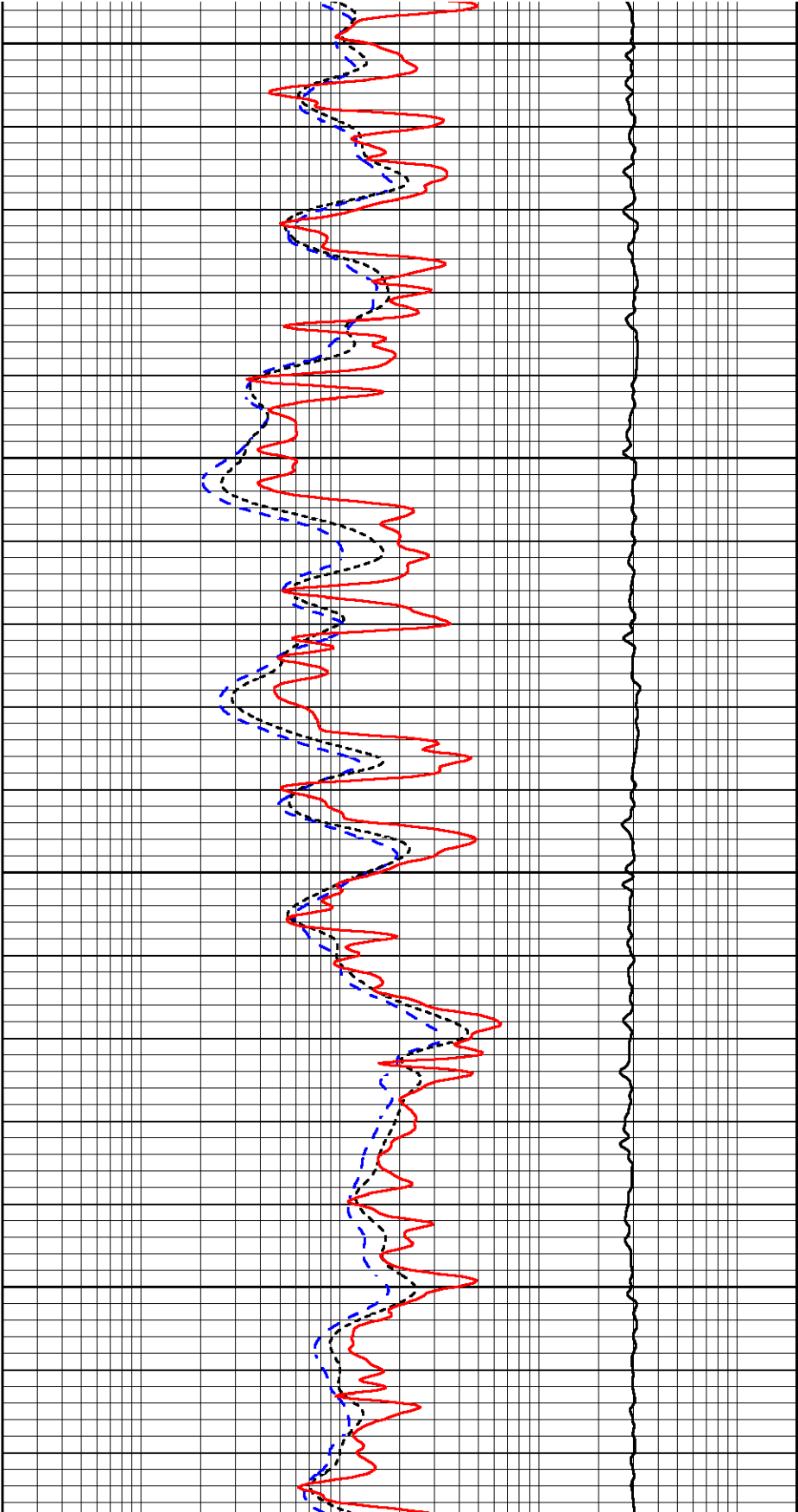


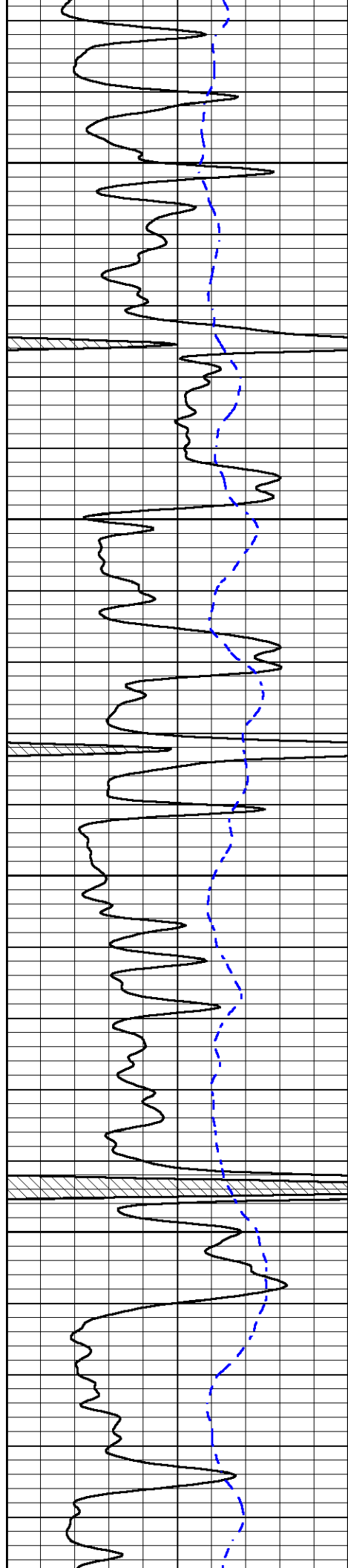
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3650

3700

3750



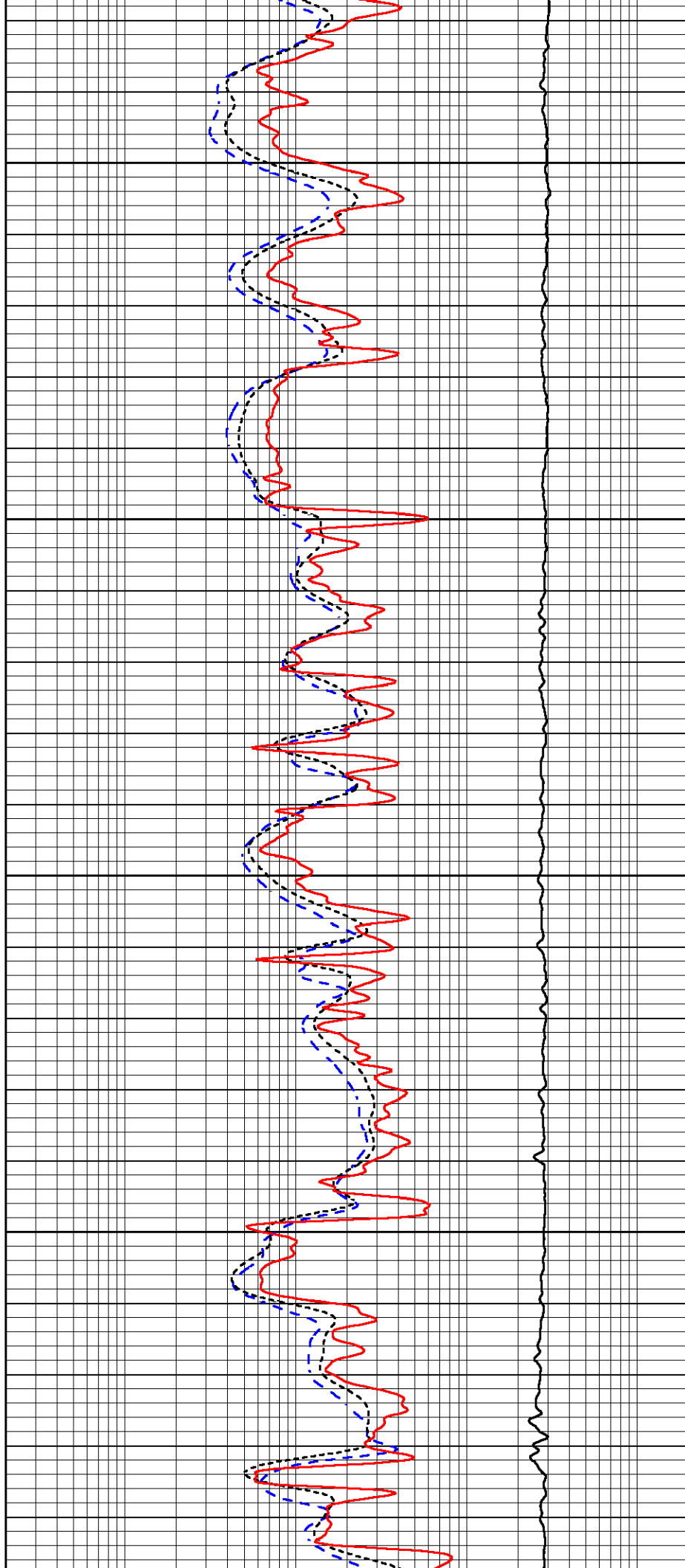


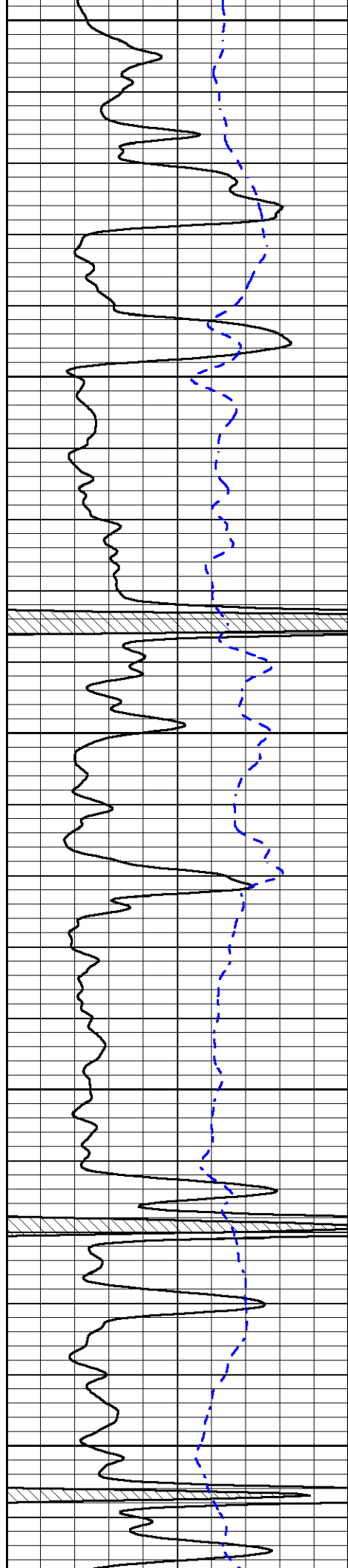
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3850

3900

3950





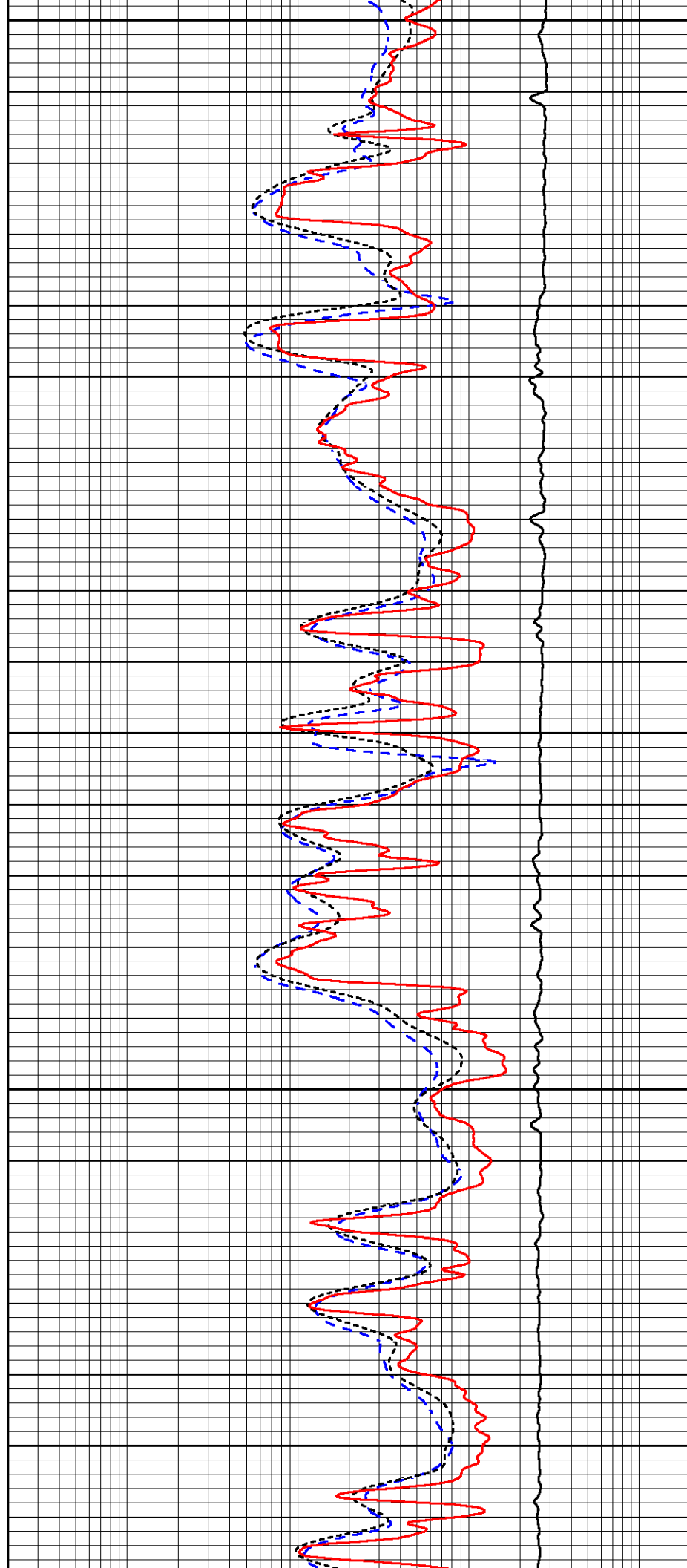
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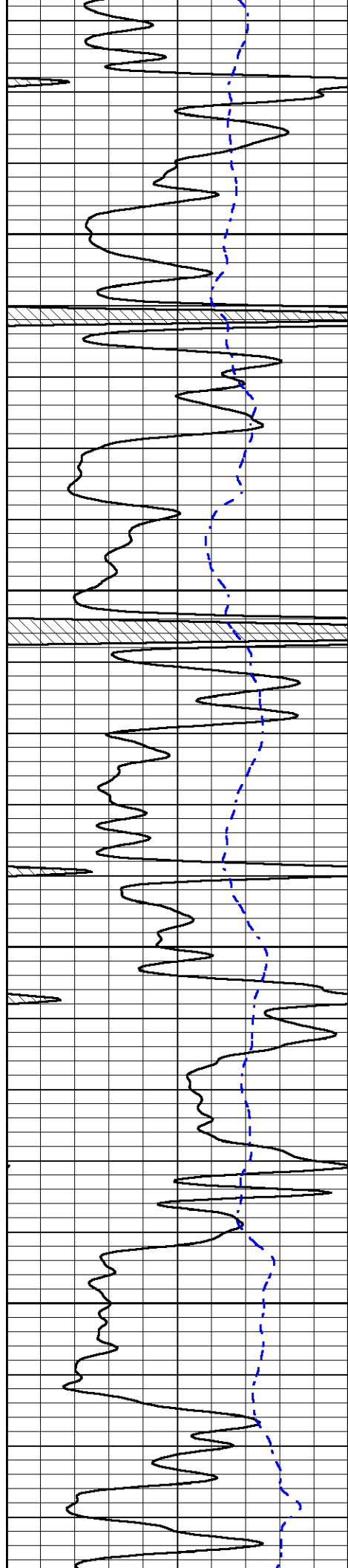
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4100

4150

4200



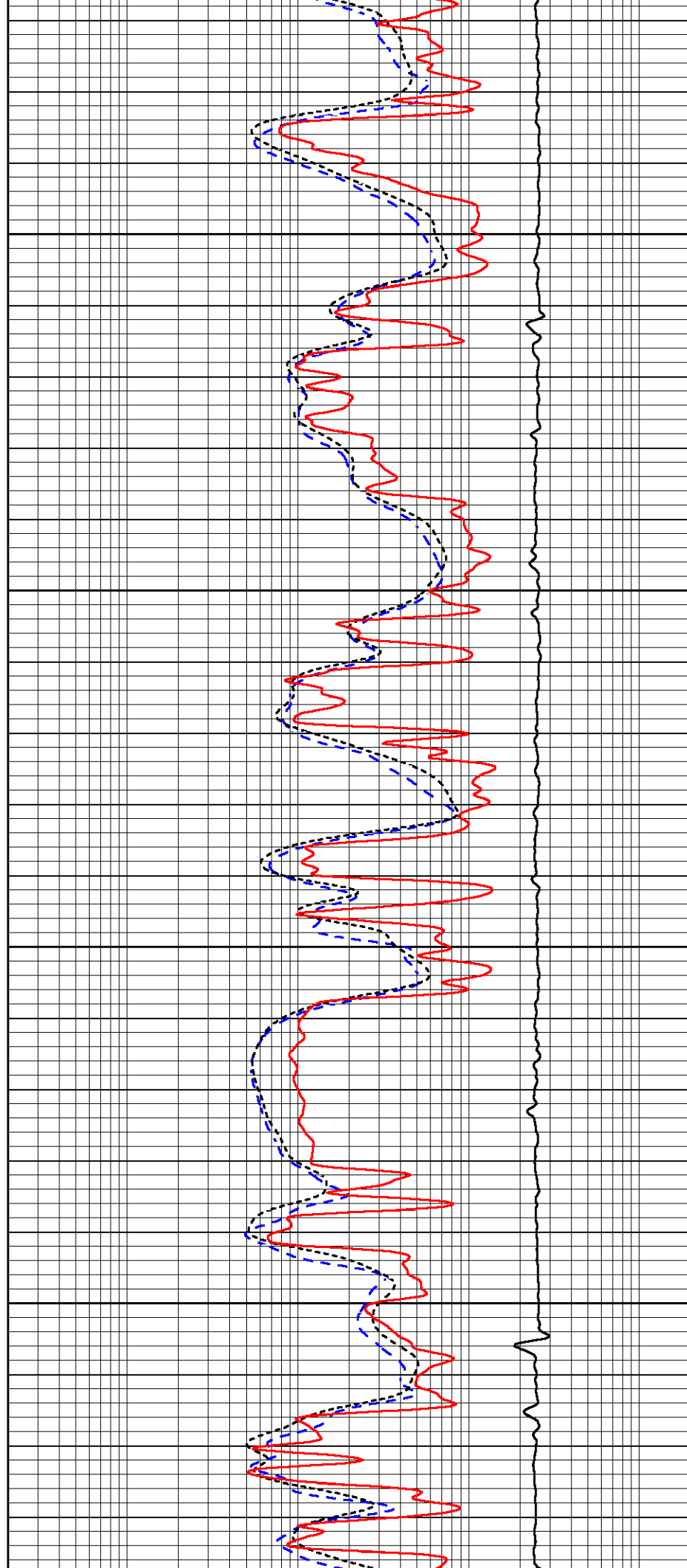


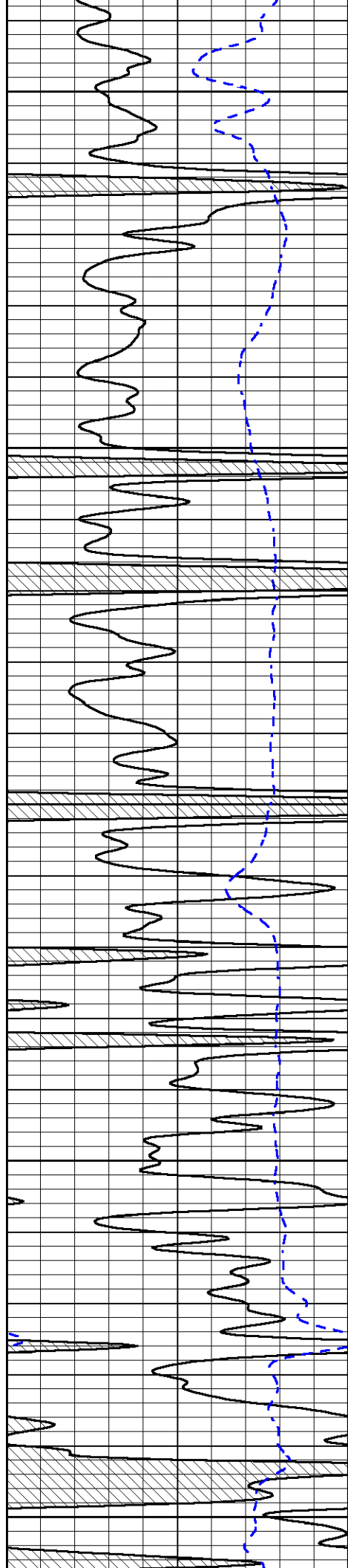
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4400





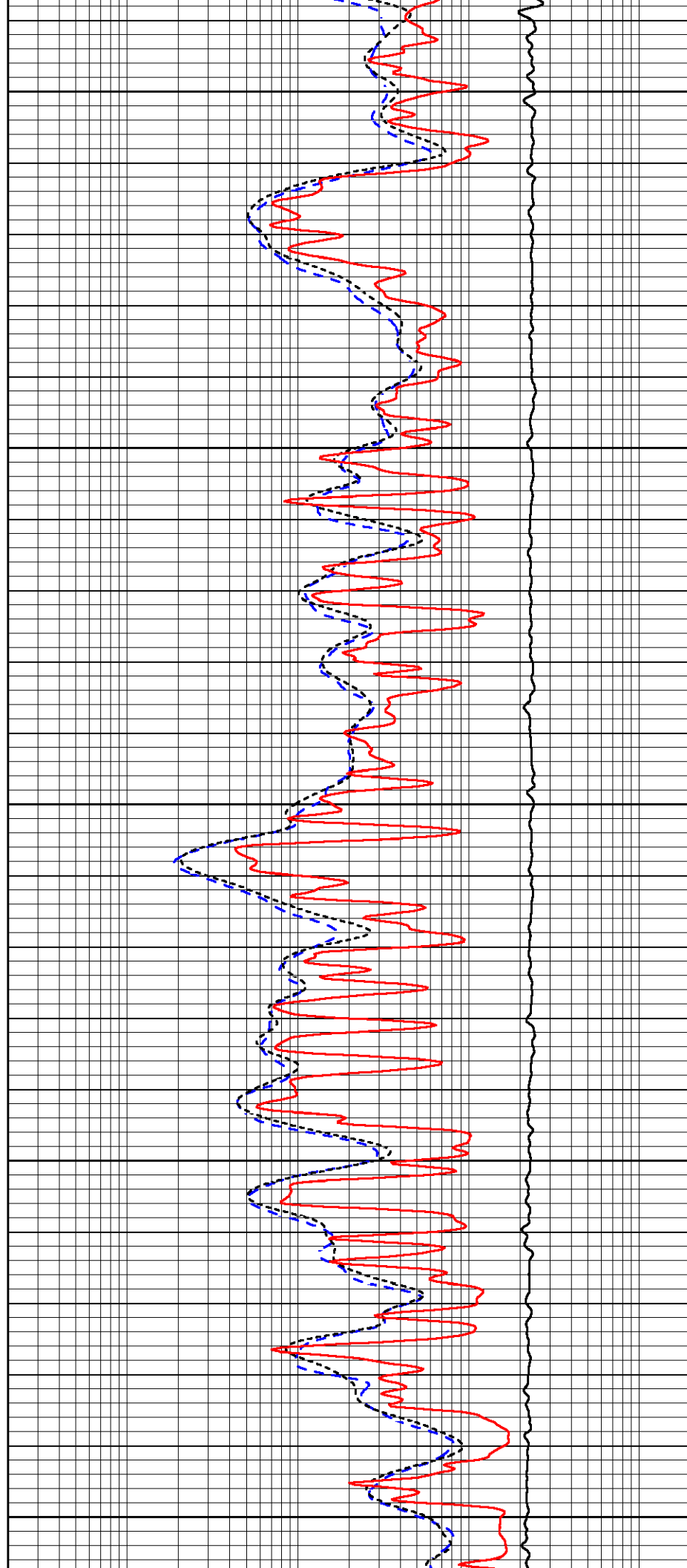
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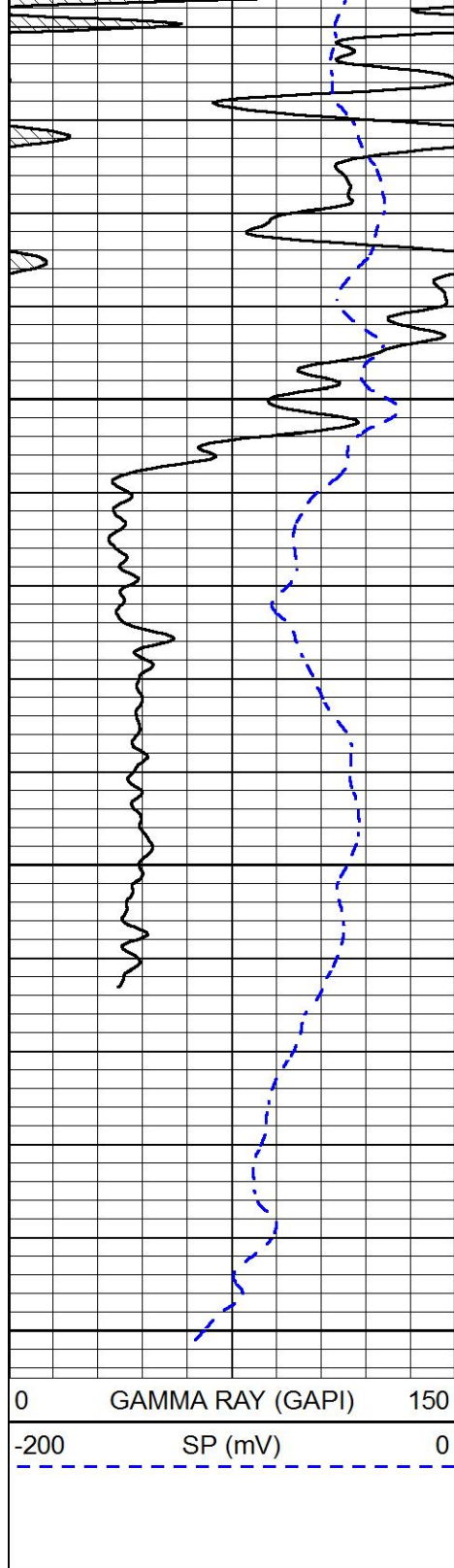
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4550

4600

4650

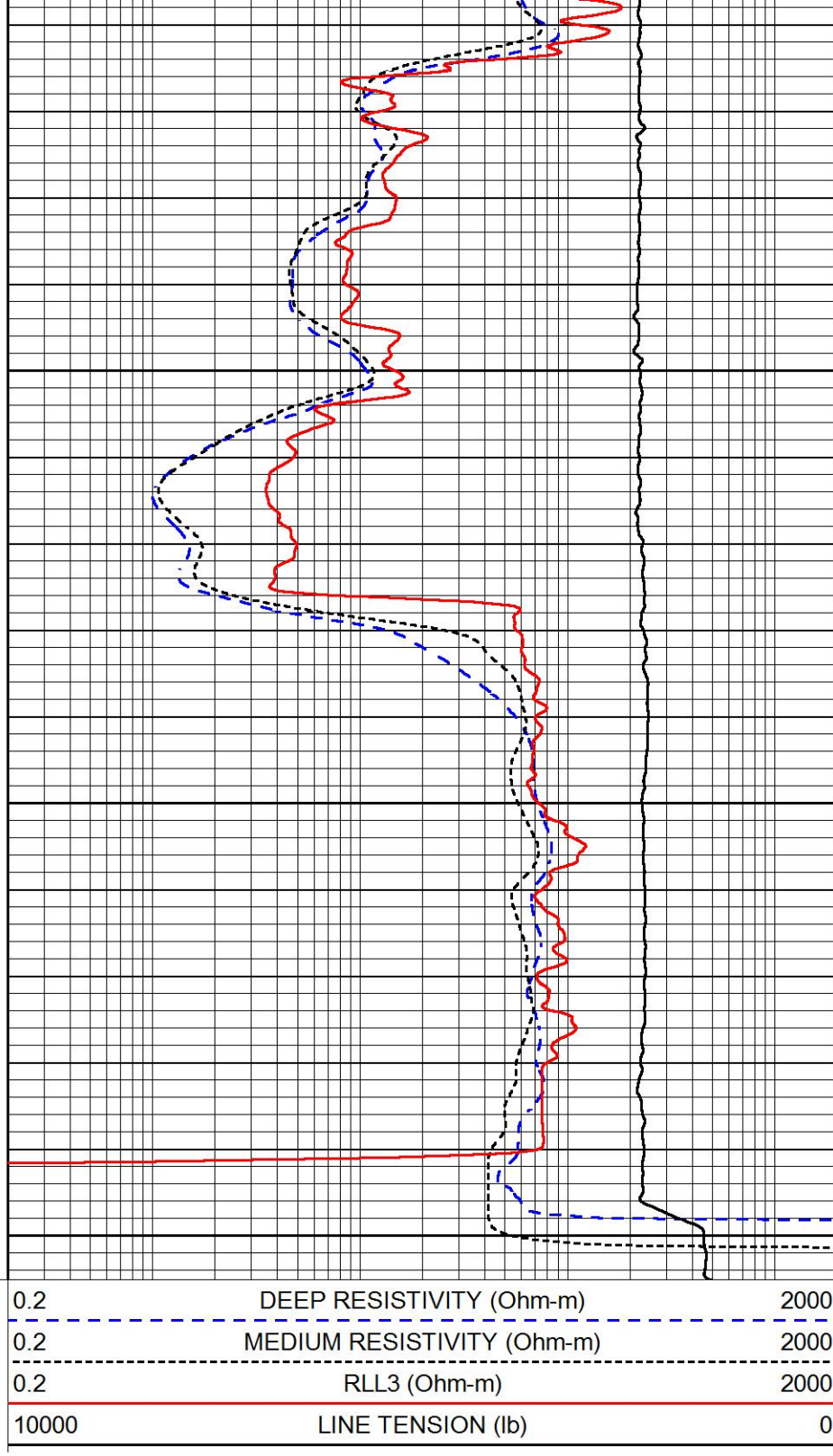




4700

4750

4800



REPEAT SECTION

Database File richlan_hillery_1.db
 Dataset Pathname stkmel/pass2.1
 Presentation Format dil
 Dataset Creation Fri Jun 15 13:05:15 2018
 Charted by Depth in Feet scaled 1:240

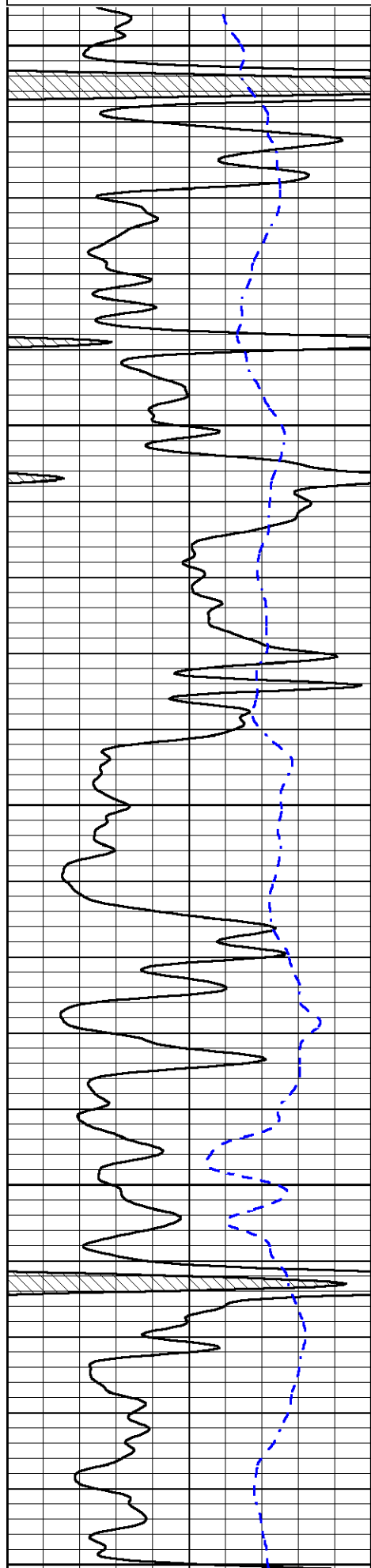


-200 SP (mV) 0

0.2 MEDIUM RESISTIVITY (Ohm-m) 2000

0.2 RLL3 (Ohm-m) 2000

10000 LINE TENSION (lb) 0



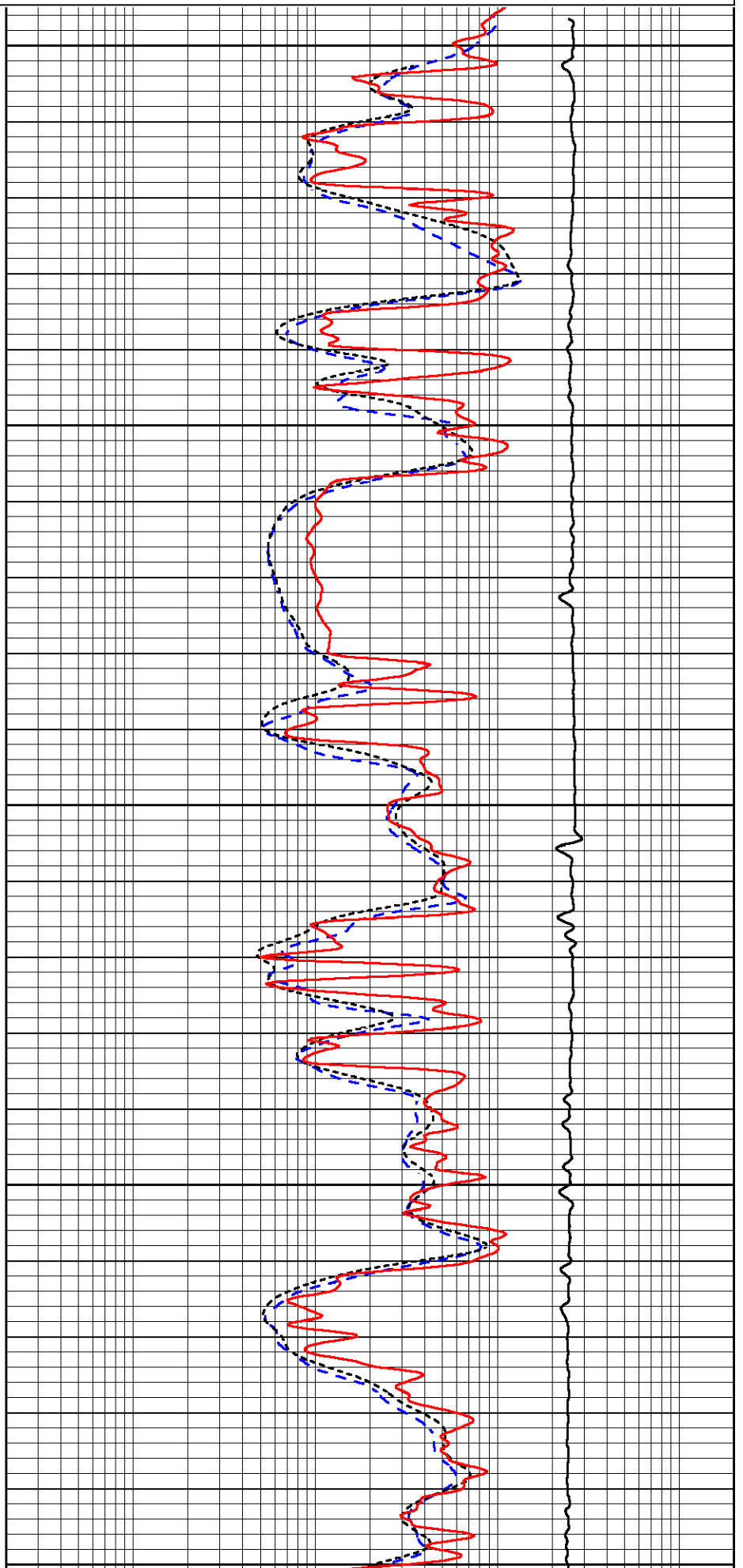
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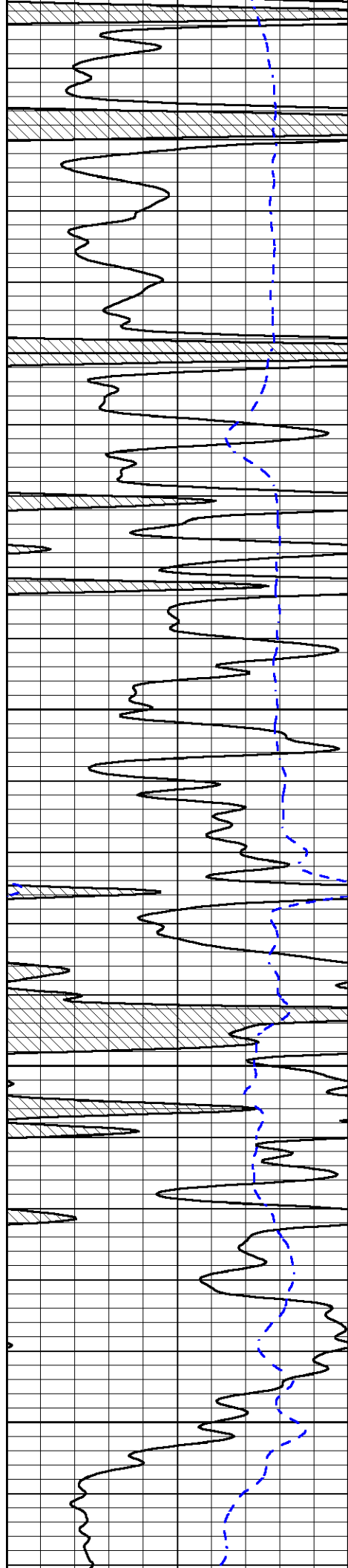
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4500





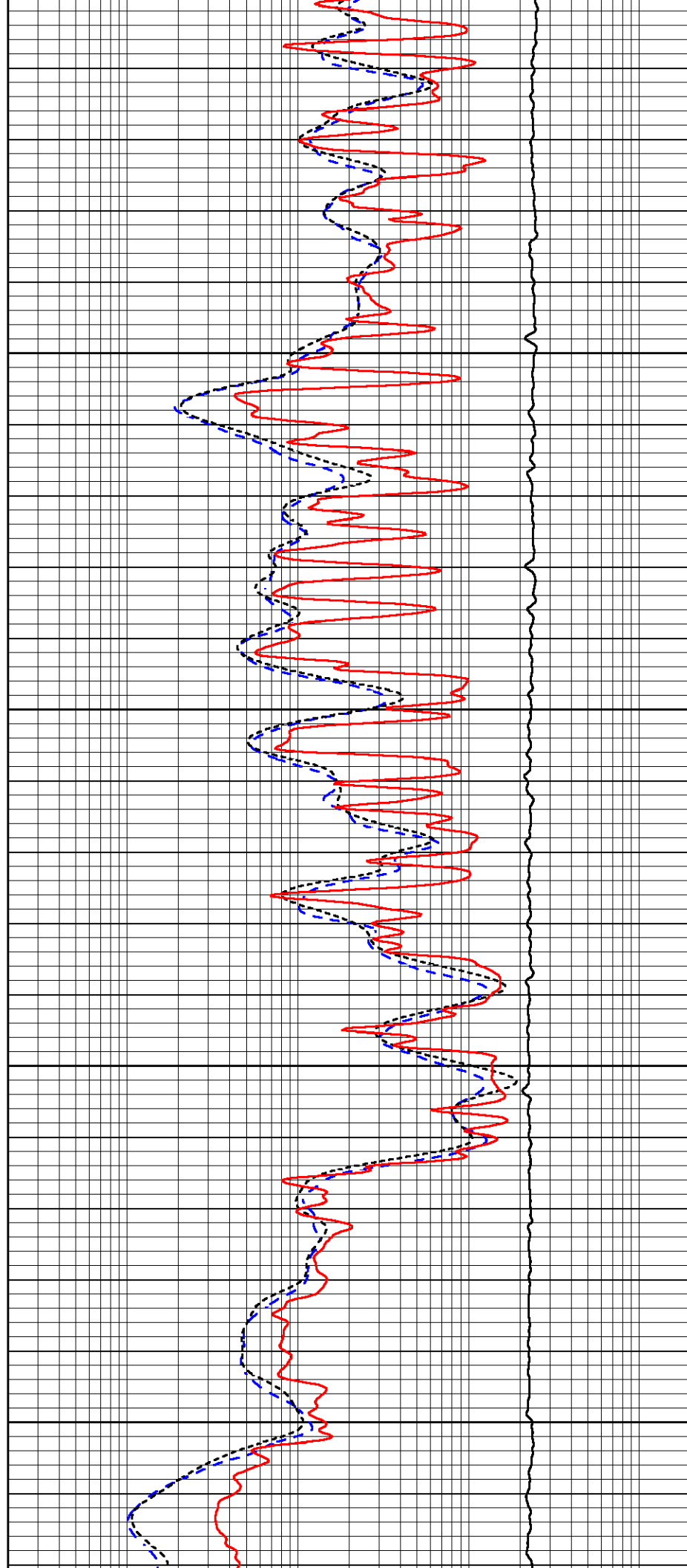
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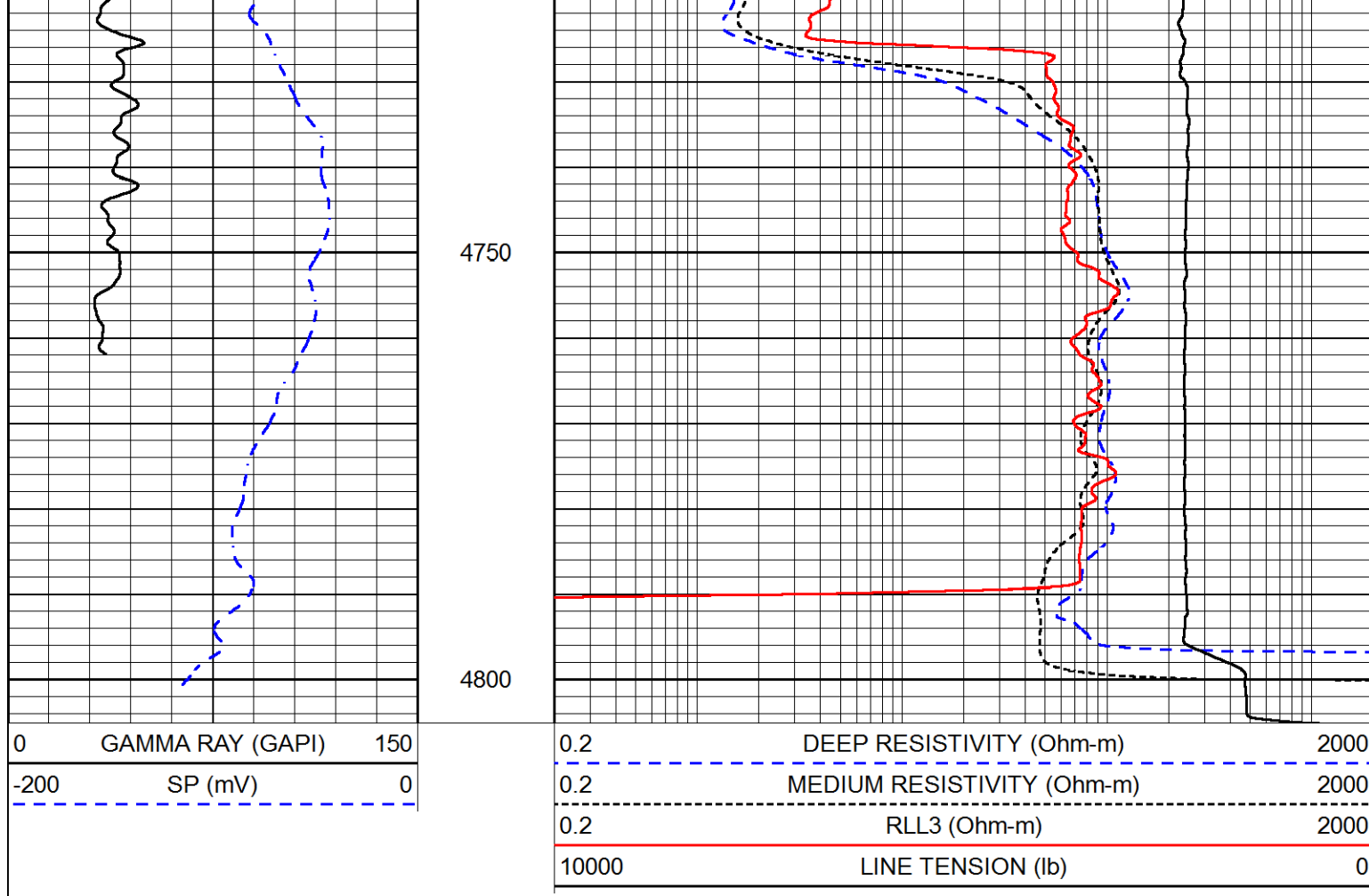
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4600

4650

4700





Calibration Report							
Database File	richlan_hillery_1.db						
Dataset Pathname	stkmel/pass3.1						
Dataset Creation	Fri Jun 15 14:04:20 2018						
Dual Induction Calibration Report							
Serial-Model:				PSI 971 HT-PSI HIGH TEMP			
Calibration Performed:				Sun May 27 00:33:10 2018			
		Readings		References		Results	
Loop:	Air	Loop	Air	Loop		Gain	Offset
Deep	167.000	835.000	0.000	255.800	mmho/m	0.430	-30.000
Medium	0.000	1348.000	142.000	255.800	mmho/m	0.375	-30.000
Microlog Calibration Report							
Serial-Model:				PSI-01-PSIML			
Performed:				Sun May 27 00:33:27 2018			
		Readings		References		Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	39000.0000	-0.8000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	40000.0000	-0.4000
Caliper	1.0001	1.1397	6.5000	18.5000	in	70.0000	-66.7000

Serial-Model:	817-947-M&W
Source / Verifier:	16955B / 2ci
Master Calibration Performed:	Tue May 01 14:00:17 2018

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	6127.15	5922.31	cps
Aluminum	2.650	g/cc	1141.85	3762.09	cps
Spine Angle = 74.89			Density/Spine Ratio = 0.514		
	Size		Reading		
Small Ring	4.50	in	1.02		
Large Ring	15.00	in	1.15		

Compensated Neutron Calibration Report

Serial Number:	207-MW
Tool Model:	M&W
Calibration Performed:	MON APR 16 10:30:30 2018

Detector	Readings		Target		Normalization
Short Space	6240.00	cps	1000.00	cps	1.6025
Long Space	460.00	cps	1000.00	cps	1.9500

Gamma Ray Calibration Report

Serial Number:	89
Tool Model:	M&W
Calibration Performed:	Mon Jan 15 11:20:44 2018
Calibrator Value:	1.0 GAPI
Background Reading:	0.0 cps
Calibrator Reading:	1.0 cps
Sensitivity:	0.6000 GAPI/cps



Company	RICHLAN DRILLING
Well	HILLERY #1
Field	WILDCAT
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