



**BOREHOLE COMPENSATED
SONIC LOG**

Pioneer Energy Services

Company MURFIN DRILLING COMPANY, INC.
Well CULWELL 'G' #1-20
Field WILDCAT
County CHEYENNE
State KANSAS

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County CHEYENNE State KANSAS

Location: API #: 15-023-21472-00-00
1320' FNL & 1980' FWL
SEC 20 TWP 2S RGE 37W
Permanent Datum GROUND LEVEL Elevation 3413'
Log Measured From KELLY BUSHING
Drilling Measured From KELLY BUSHING
Other Services
CNL/CDL
DIL/MEL
Elevation
K.B. 3418'
D.F. N/A
G.L. 3413'

Date	11/17/2017						
Run Number	TWO						
Type Log	BHGS						
Depth Driller	5100'						
Depth Logger	5100'						
Bottom Logged Interval	5088'						
Top Logged Interval	300'						
Type Fluid In Hole	CHEMICAL						
Salinity, PPM CL	1000						
Density	9.2						
Level	FULL						
Max. Rec. Temp. F	127						
Operating Rig Time	5 HOURS						
Equipment -- Location	91 HAYS						
Recorded By	D. SCHMIDT						
Witnessed By	ROCKY MILFORD						
Borehole Record							
Run No.	Bit	From	To	Size	Wgt.	From	To
ONE	12.25"	0'	348'	8.625"	23#	0'	348'
TWO	7.875"	348'	TD				
Casing Record							

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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.

BIRD CITY,
7 NORTH TO U RD, 2 EAST TO 30 RD, 1 NORTH,
EAST AND SOUTH TO LOCATION

Log Measured From: KELLY BUSHING 5 Ft. Above Permanent Datum

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

Your Pioneer Energy Services Crew		This Log Record Was Witnessed By	
Engineer: D. SCHMIDT	Operator:	Primary Witness: ROCKY MILFORD	Secondary Witness:
Operator:	Operator:	Secondary Witness:	Secondary Witness:
Operator:		Secondary Witness:	

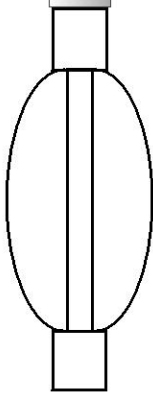
Log Variables

Database C:\ProgramData\Warrior\Data\murfin_culwell g 1-20.db
 Dataset field/well/STKML/pass4.1/_vars_

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	475	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	50	0	5.5	0	5100	127	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			CENT-PENGO (3-PENGO)	5.50	3.00	70.00
WVF4 WVF1	13.50 13.50		SLT-PENGO (0001)	16.00	3.50	300.00
WVF3 WVF2	11.50 11.50					



CENT-PENGO (4-PENGO)

5.50

3.00

70.00

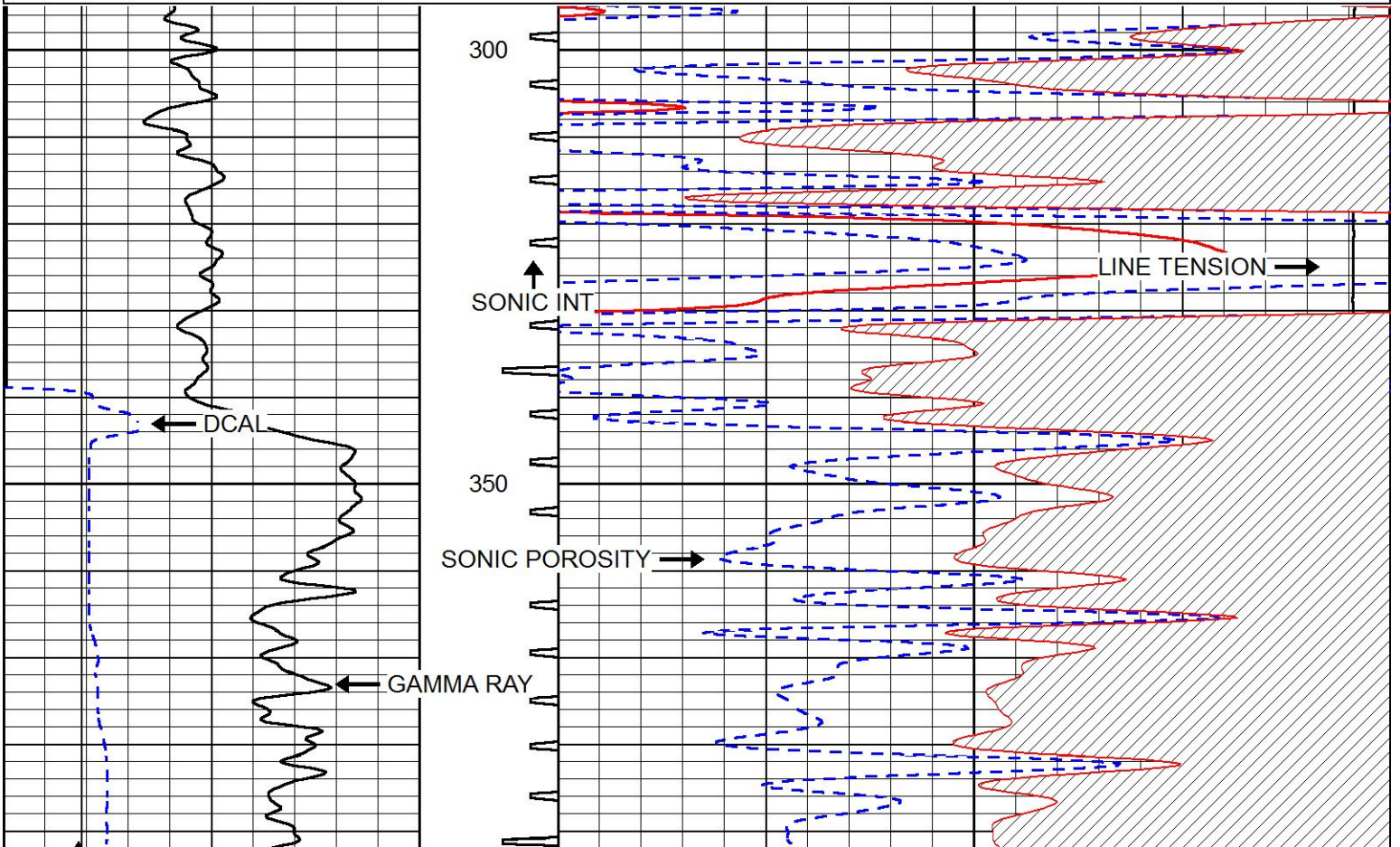
Dataset: murfin_culwell g 1-20.db: field/well/SON/pass2
 Total length: 27.00 ft
 Total weight: 440.00 lb
 O.D.: 3.50 in



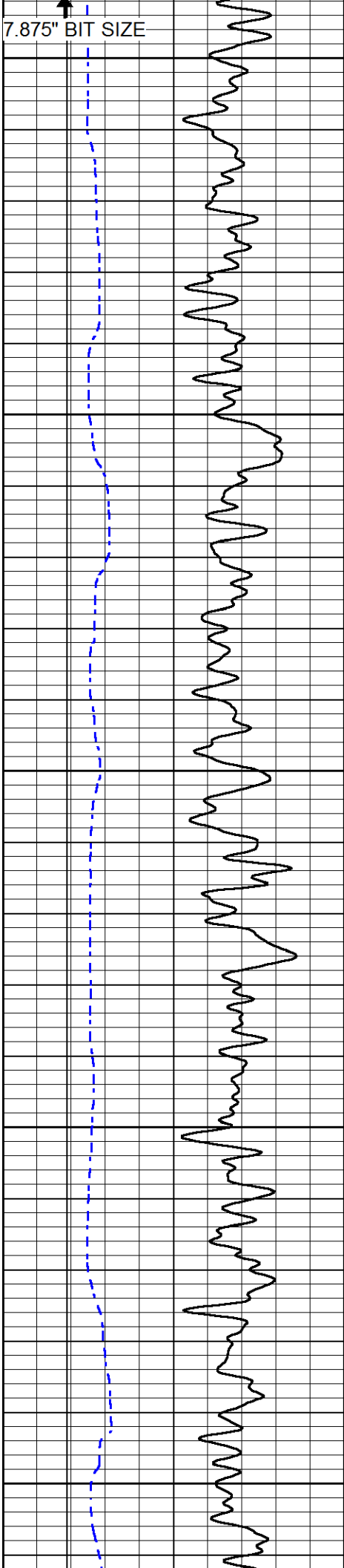
MAIN PASS

Database File: murfin_culwell g 1-20.db
 Dataset Pathname: STKML/pass4.1
 Presentation Format: sonic
 Dataset Creation: Fri Nov 17 03:30:59 2017
 Charted by: Depth in Feet scaled 1:240

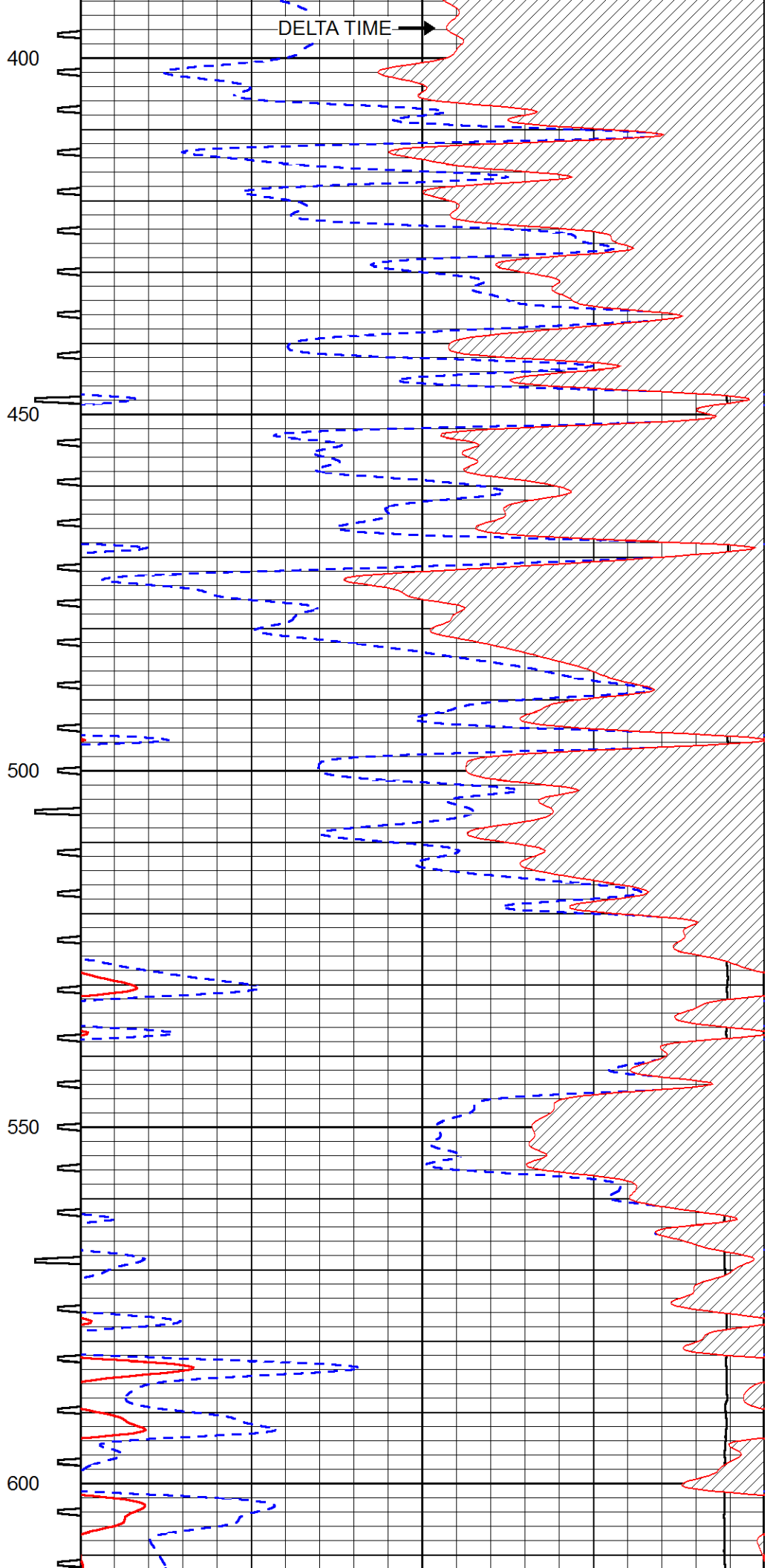
0	Gamma Ray (GAPI)	150	Sonic Int	140	Delta Time (usec/ft) (usec/ft)	40
150	GR (GAPI)	300	5 (msec) 0	30	Sonic Porosity (pu)	-10
6	DCAL (in)	16		15000	LTEN (lb) (lb)	0

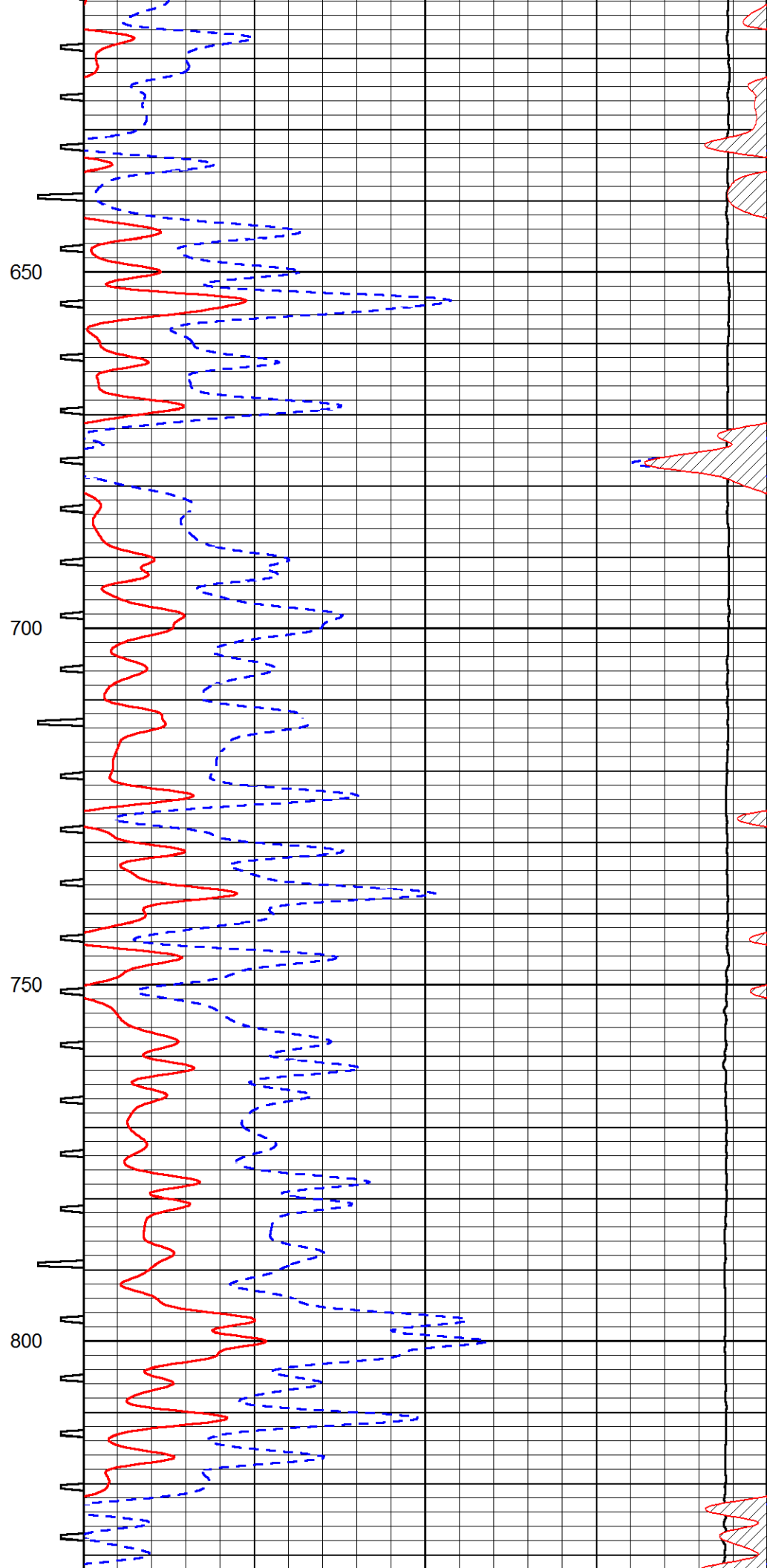
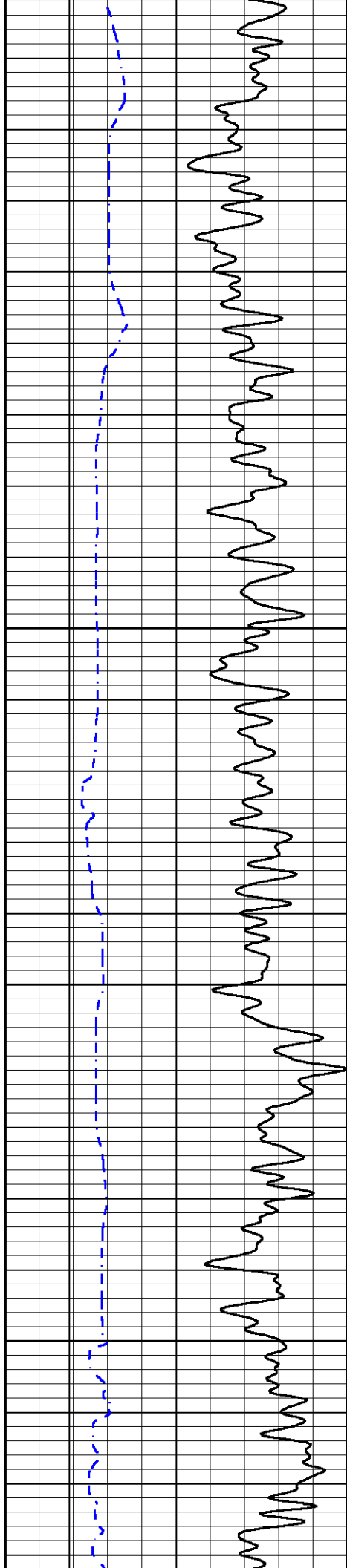


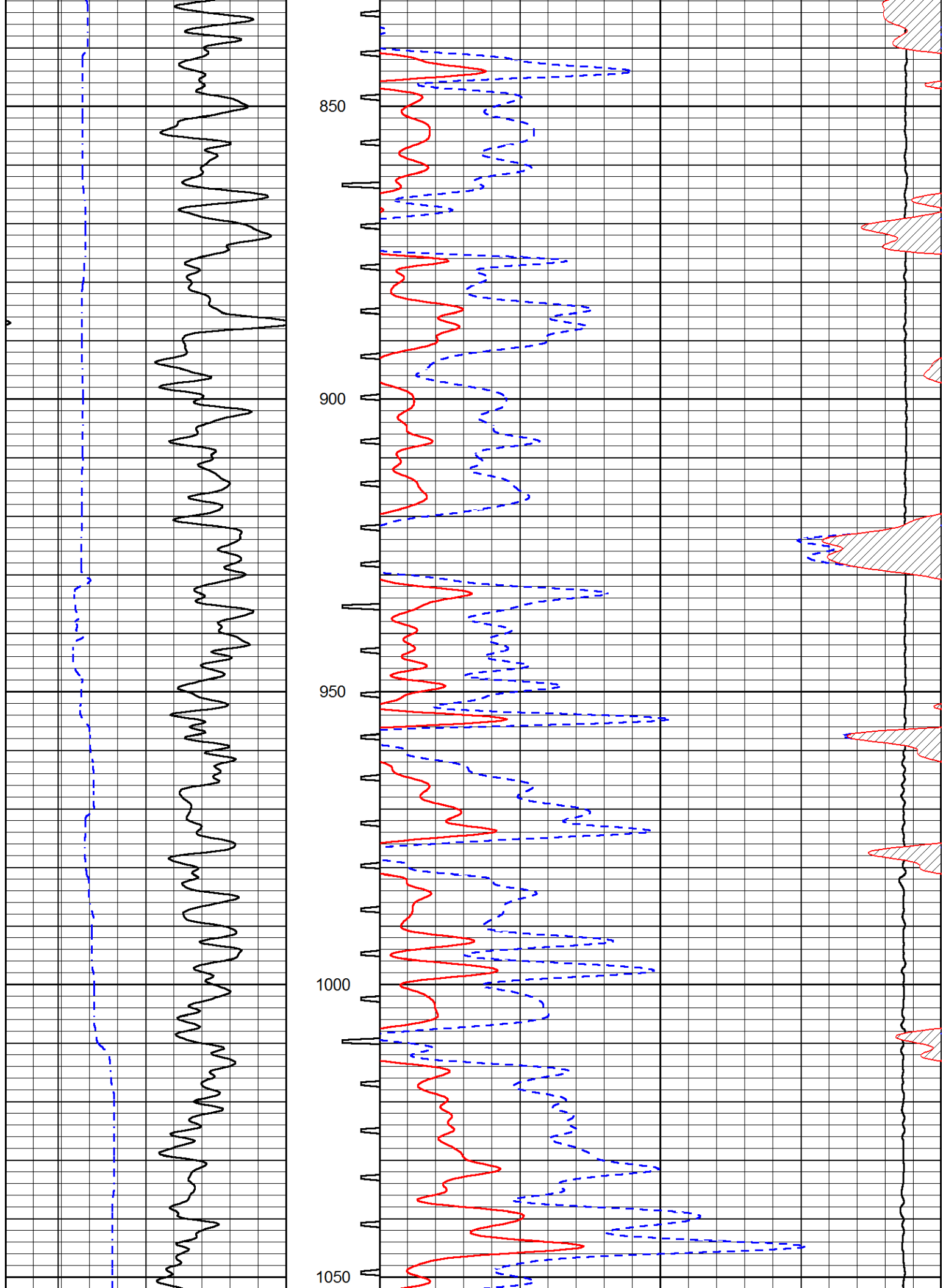
7.875" BIT SIZE

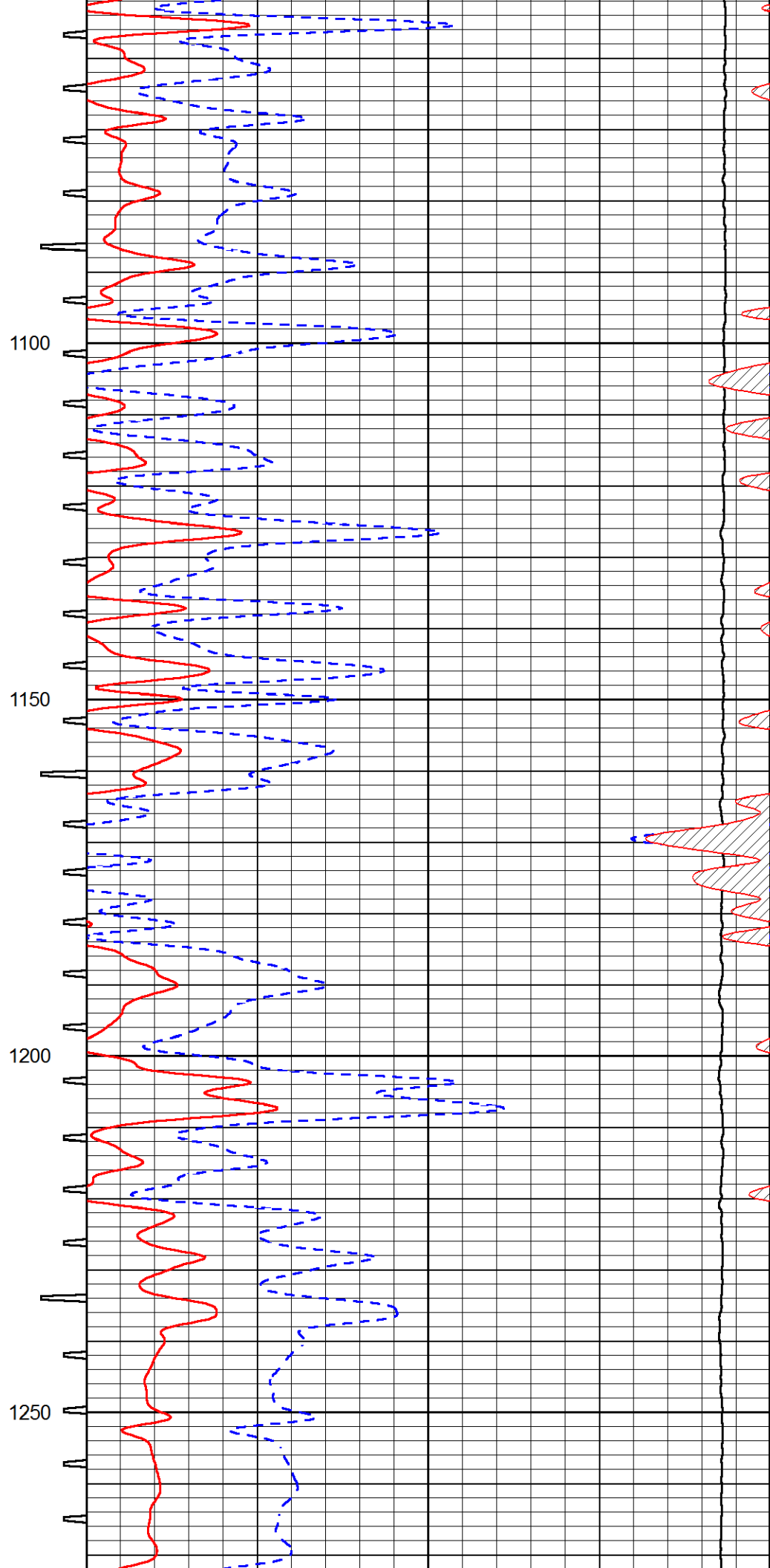
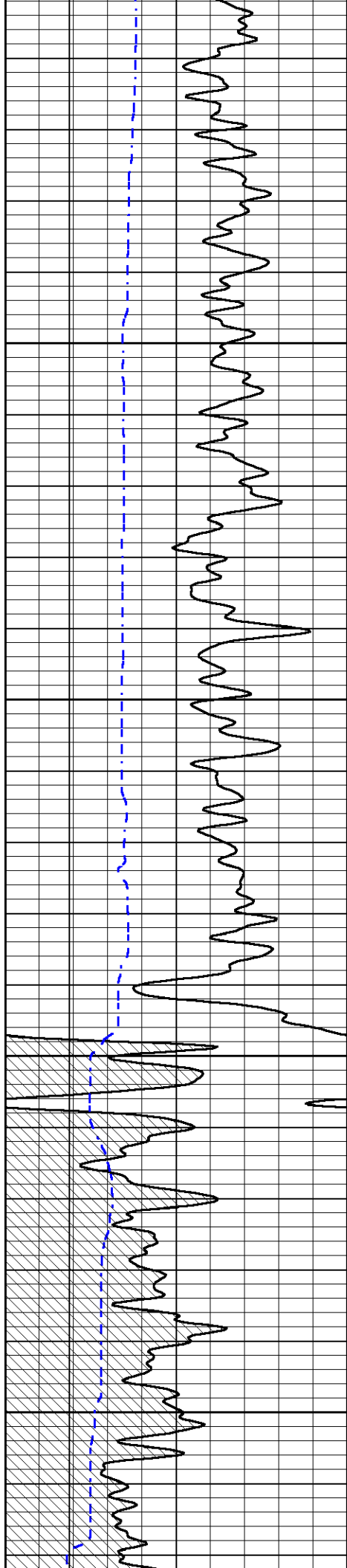


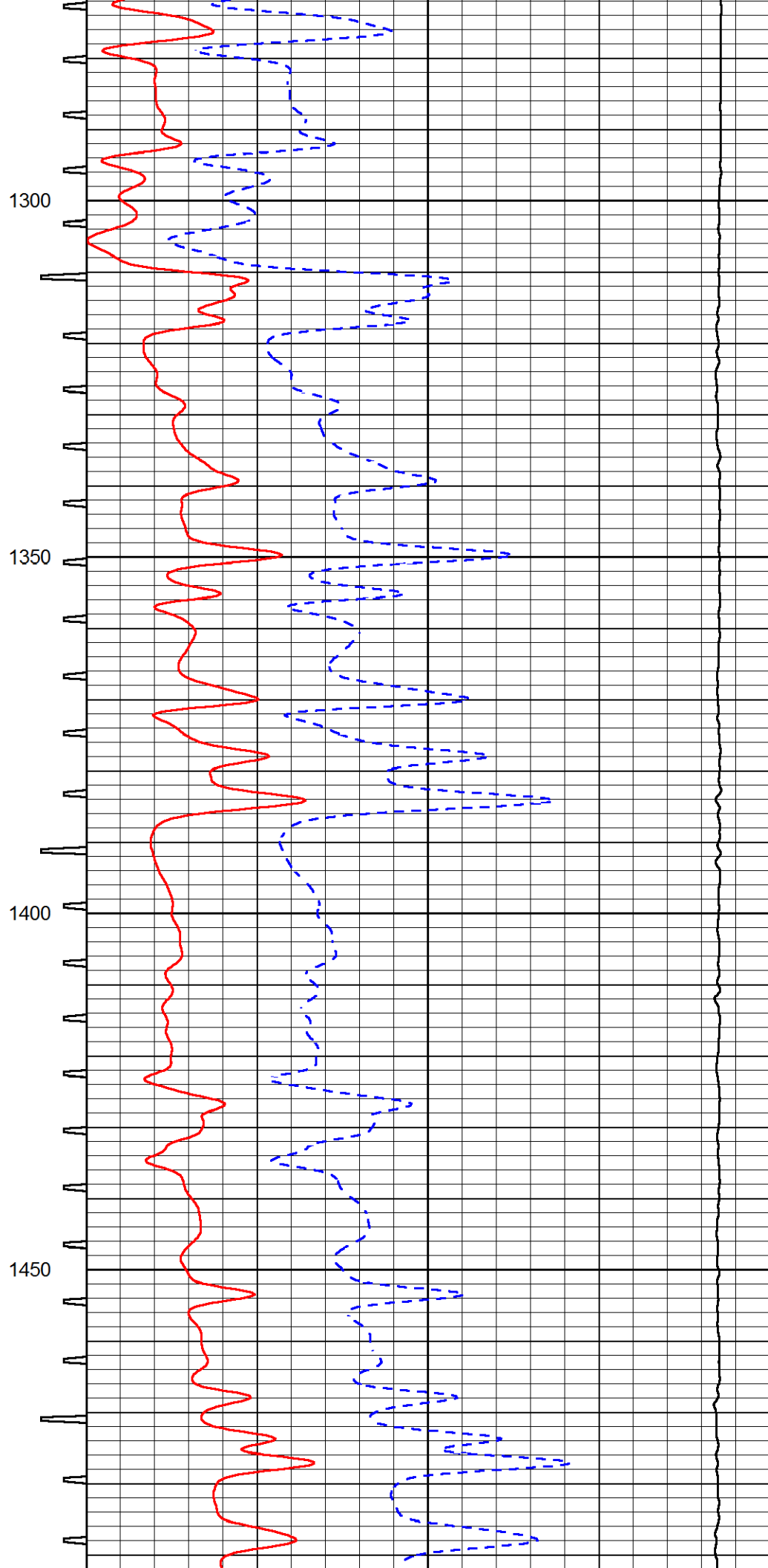
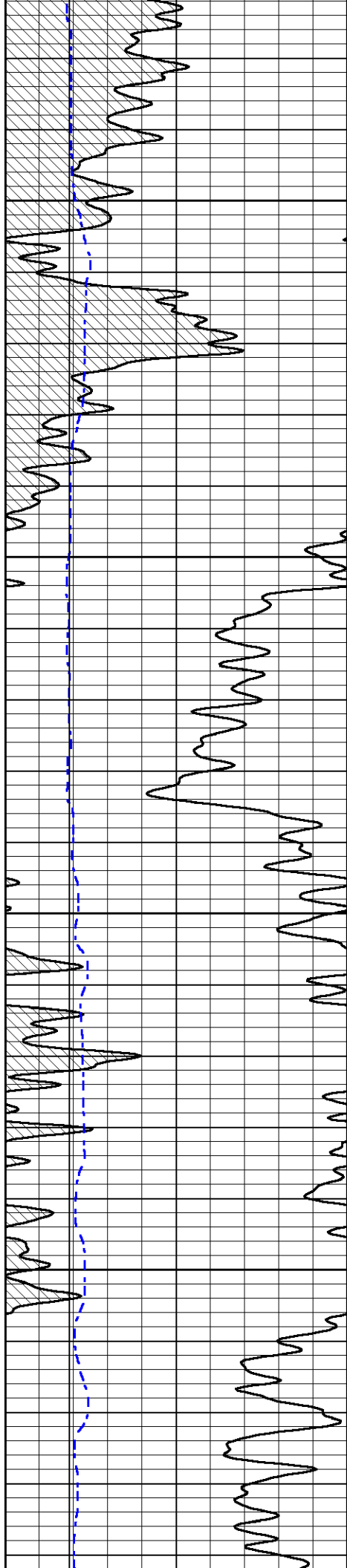
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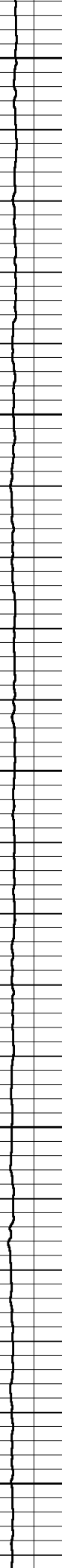
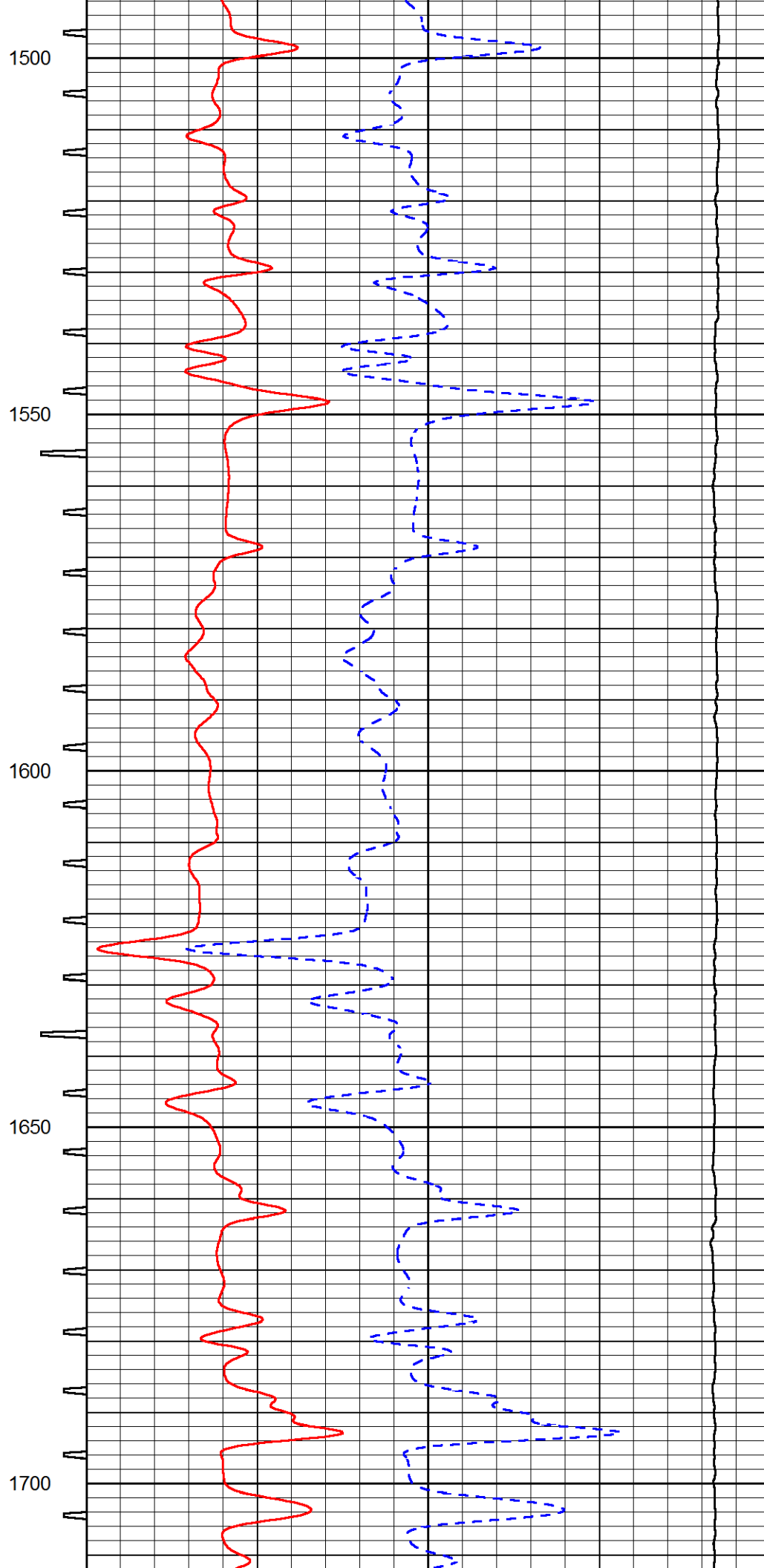
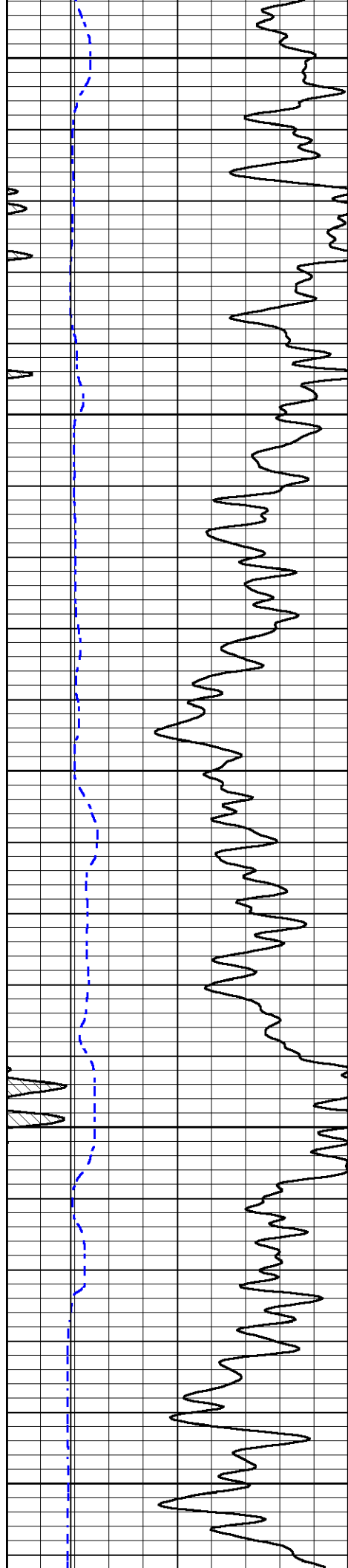


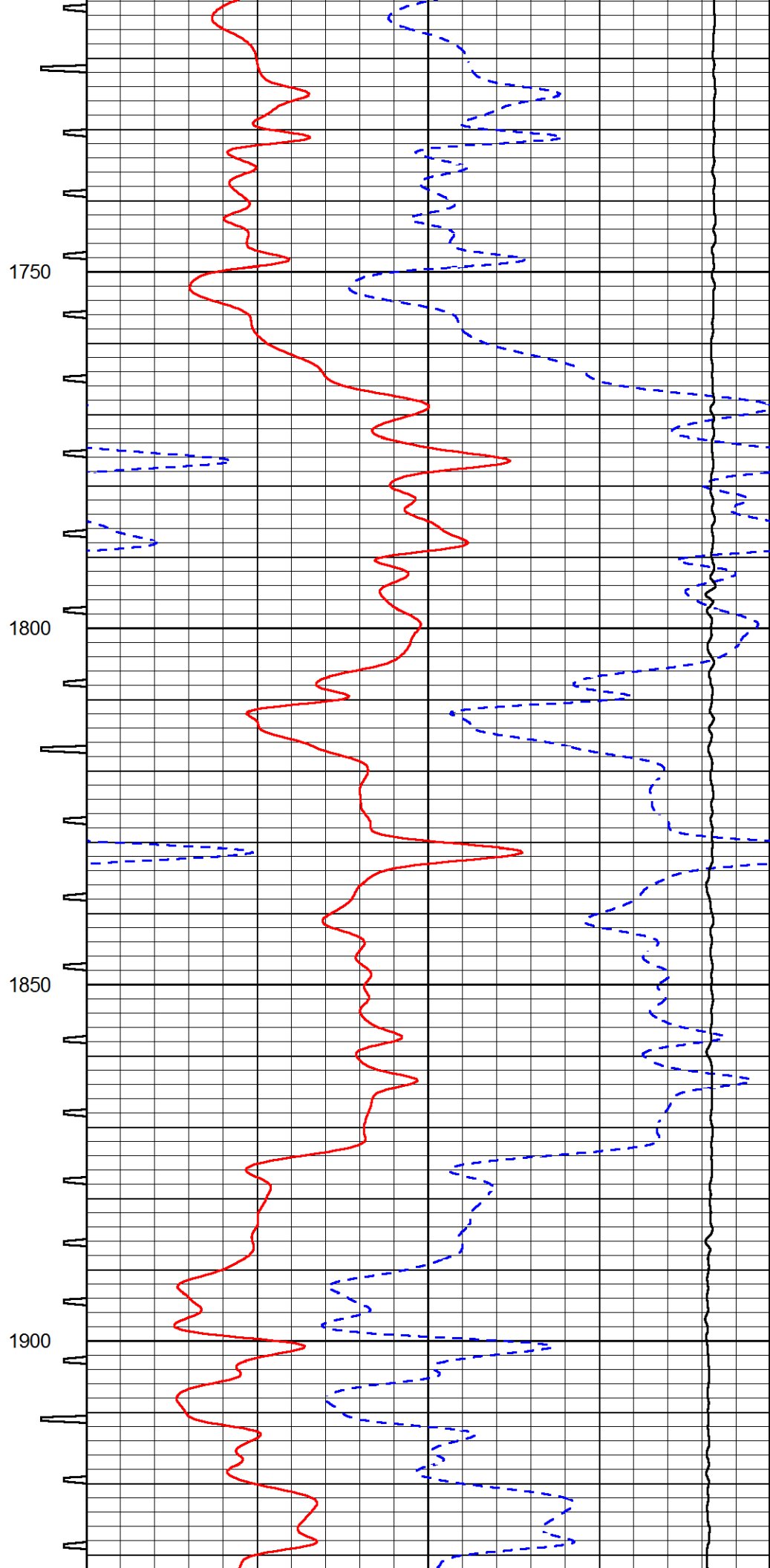
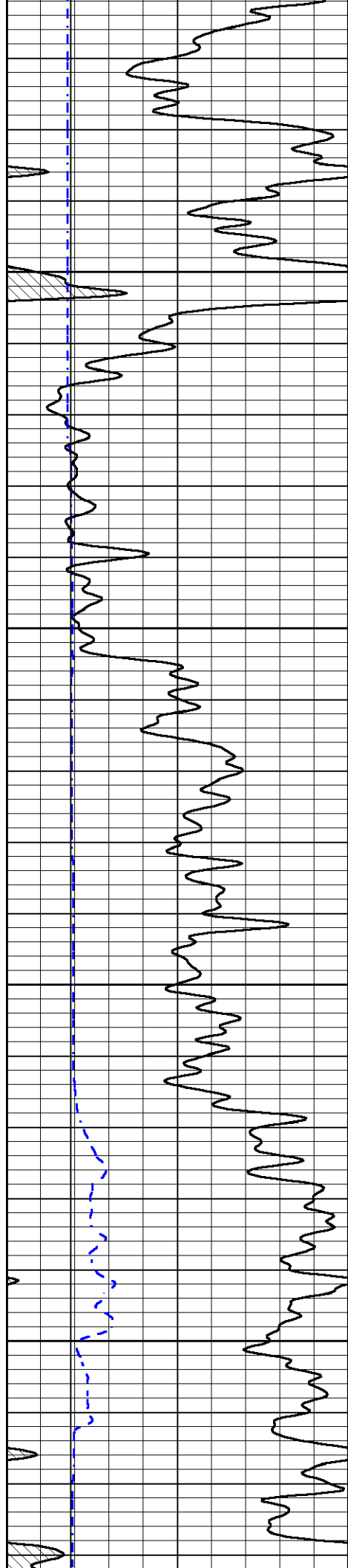


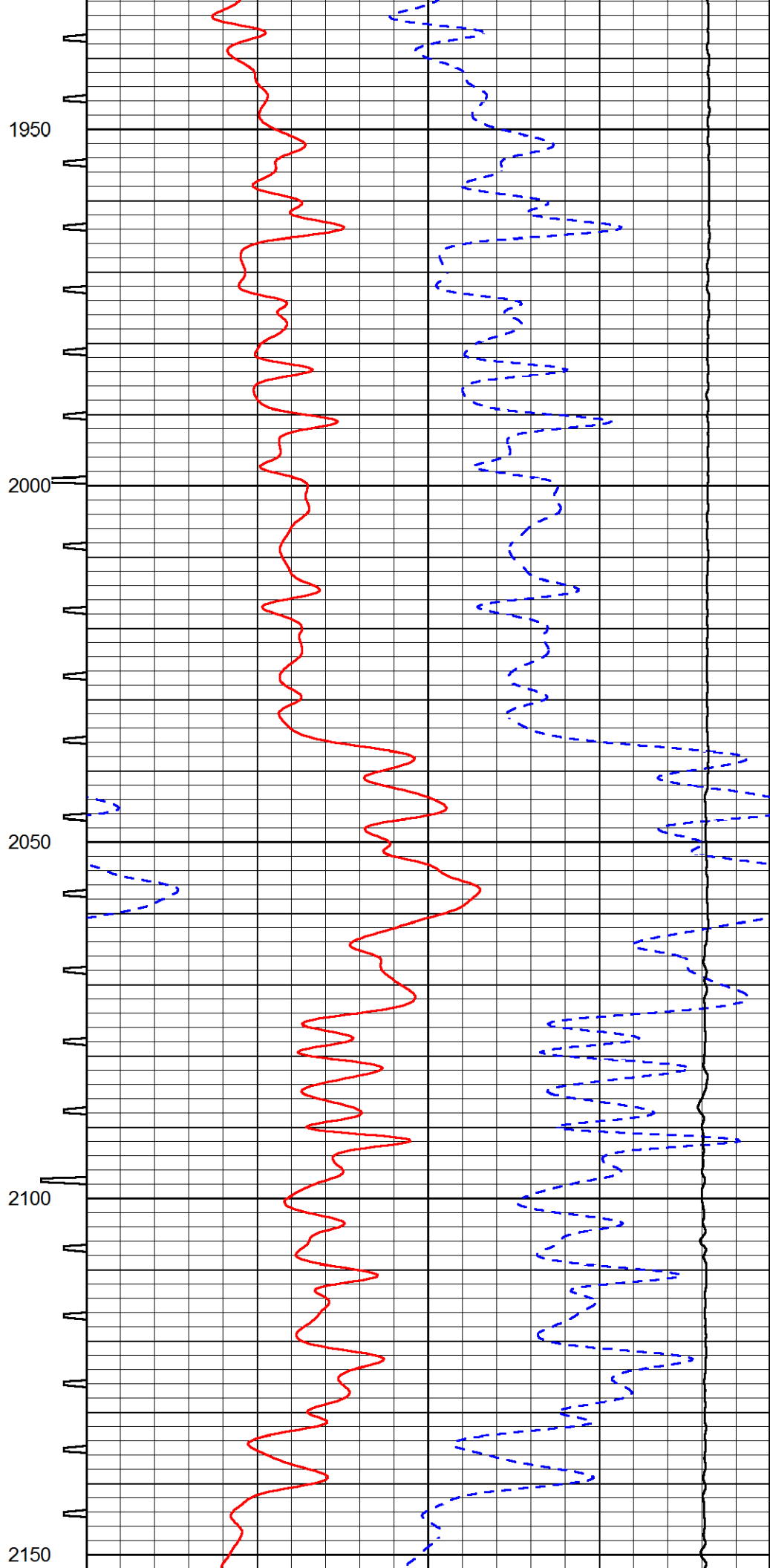
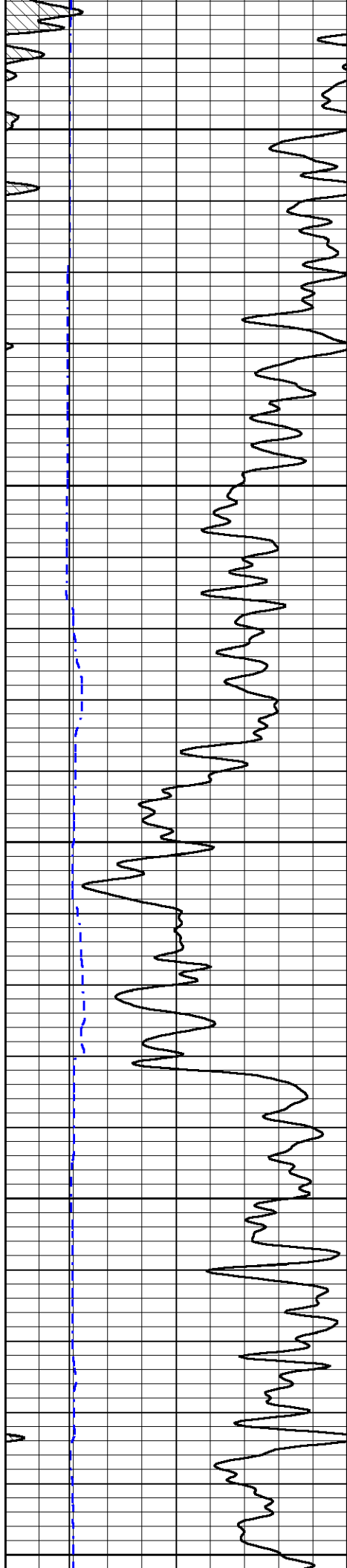












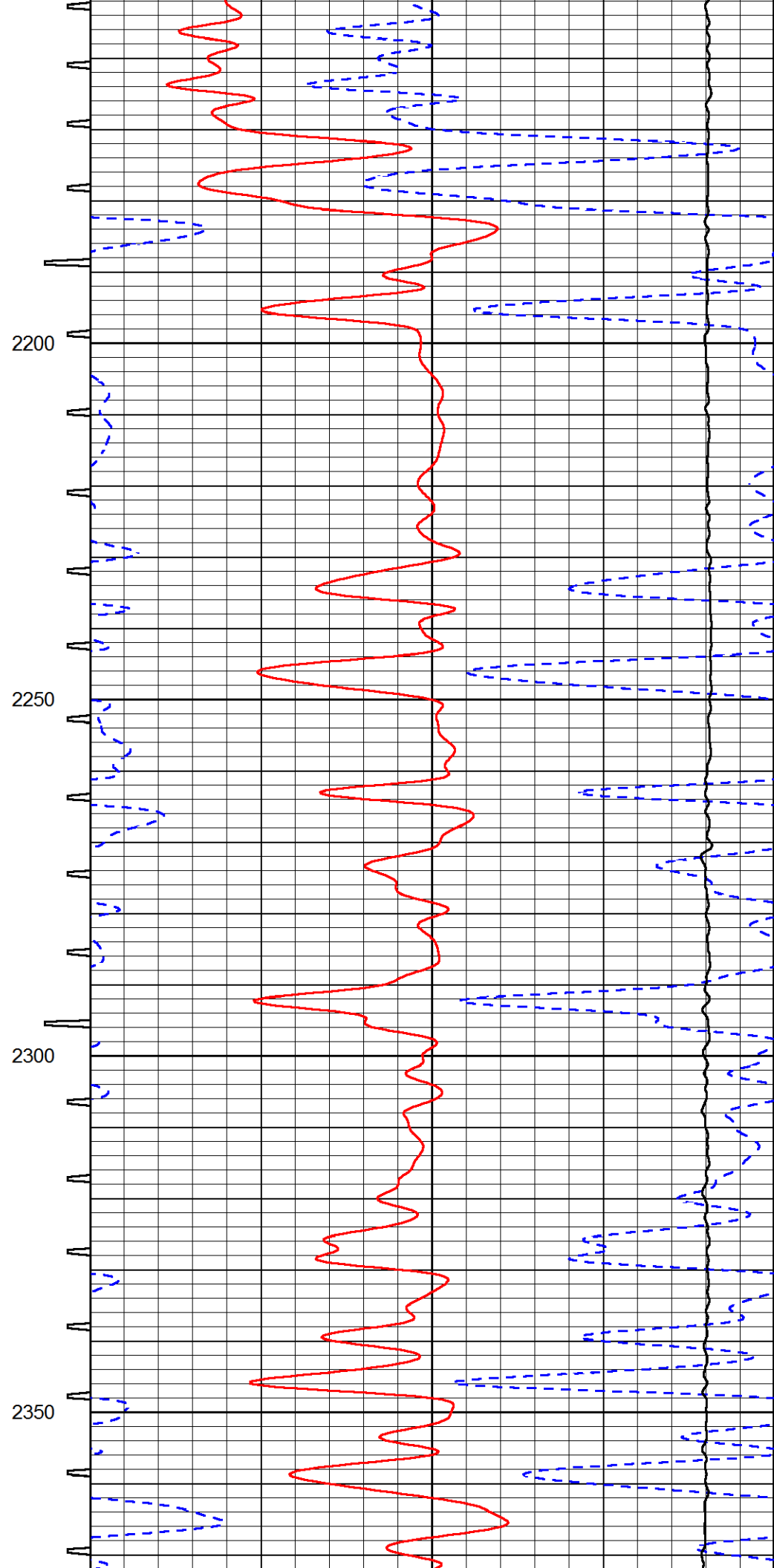
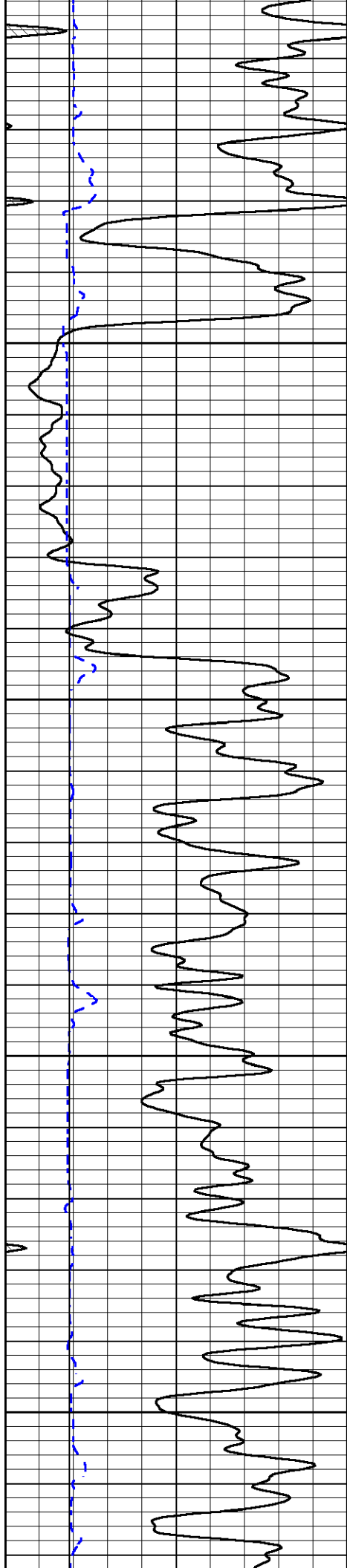
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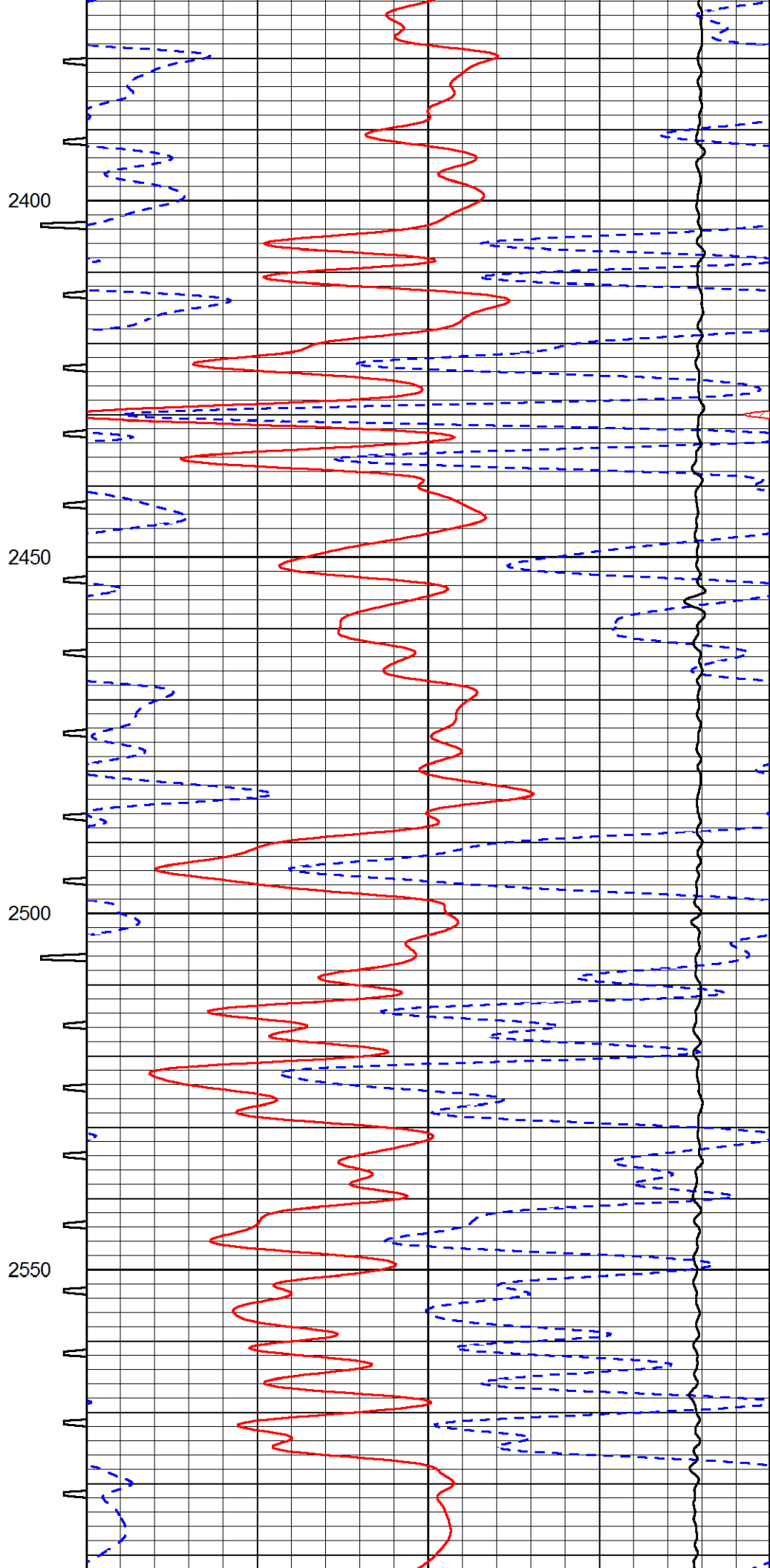
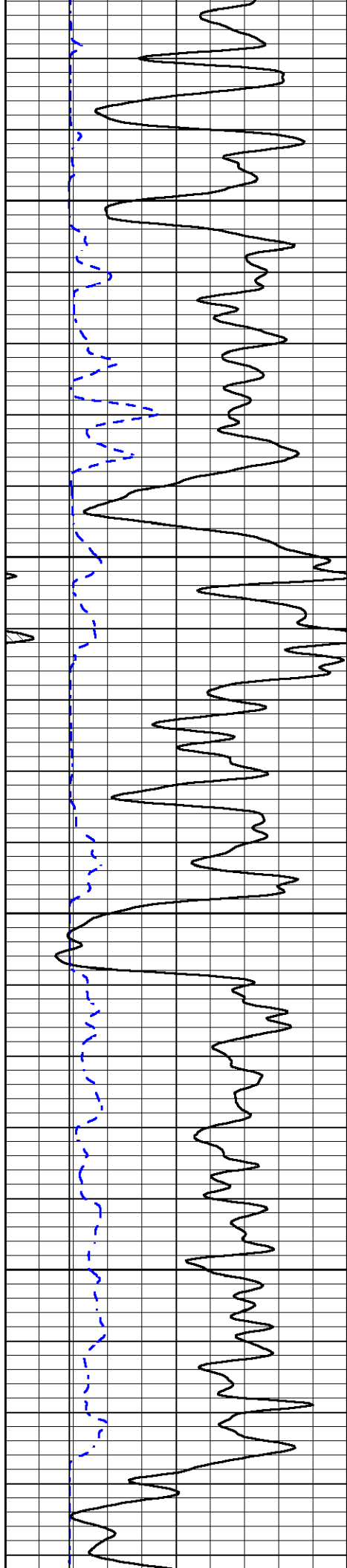
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2050

2100

2150



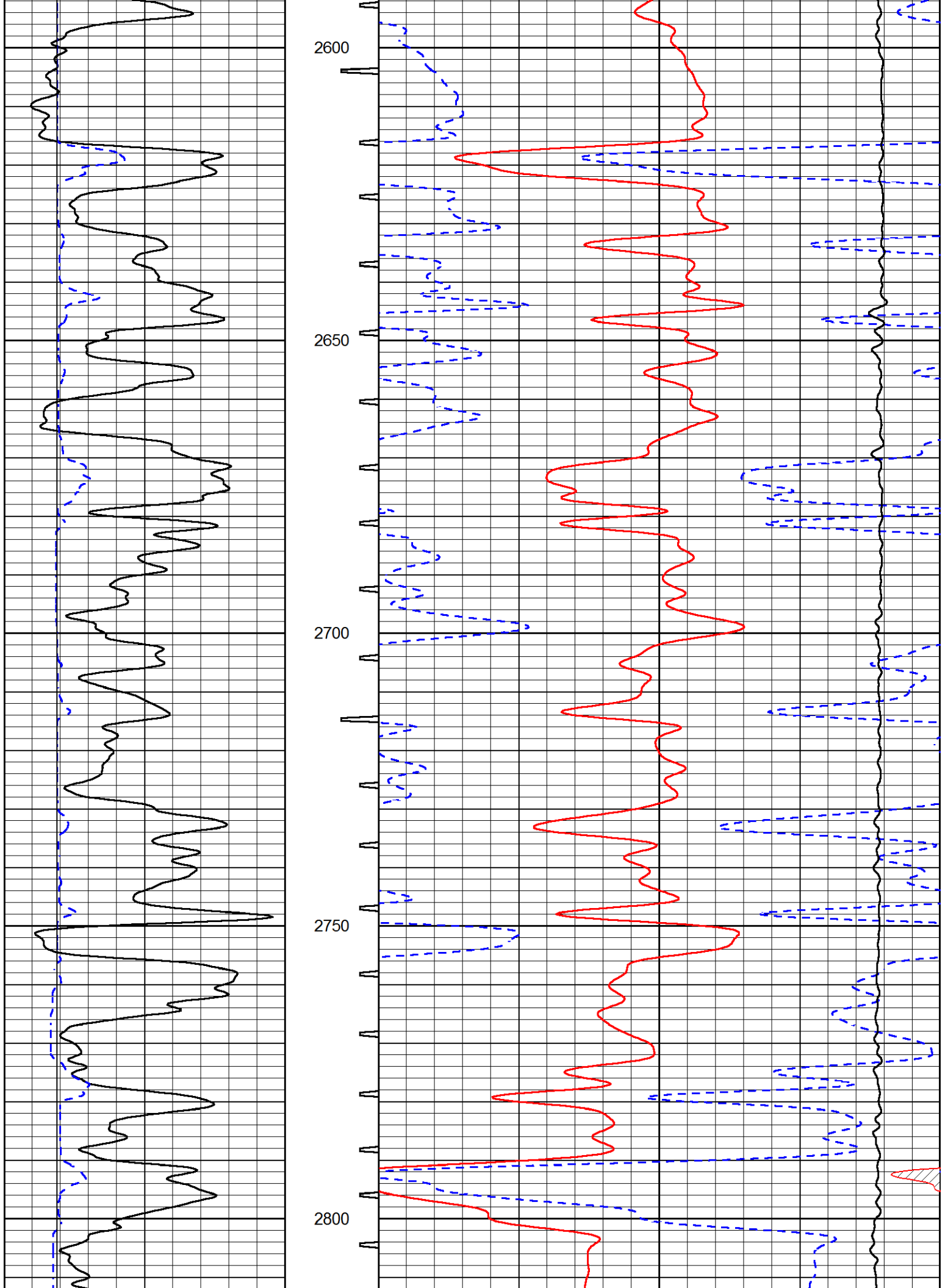


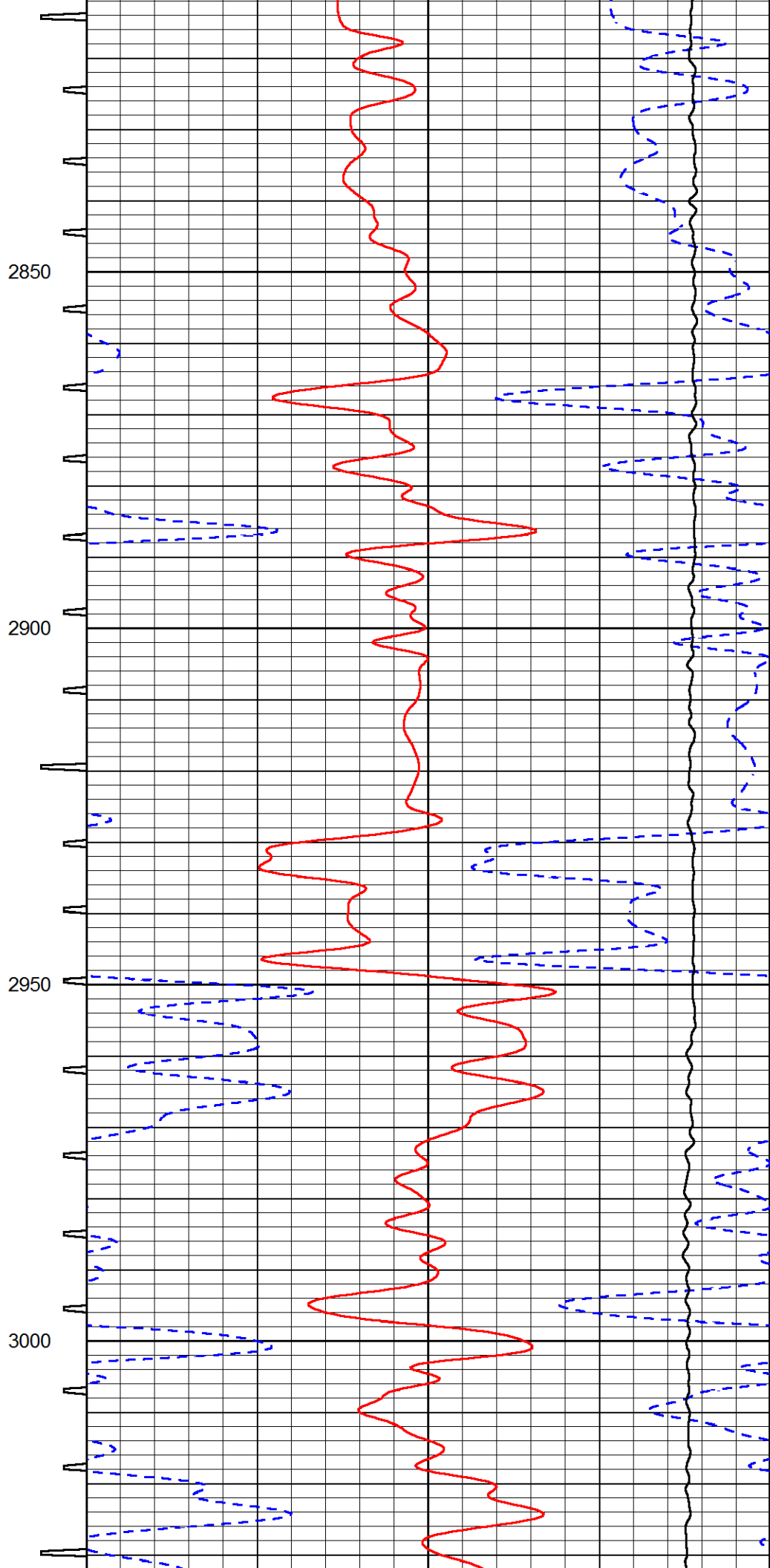
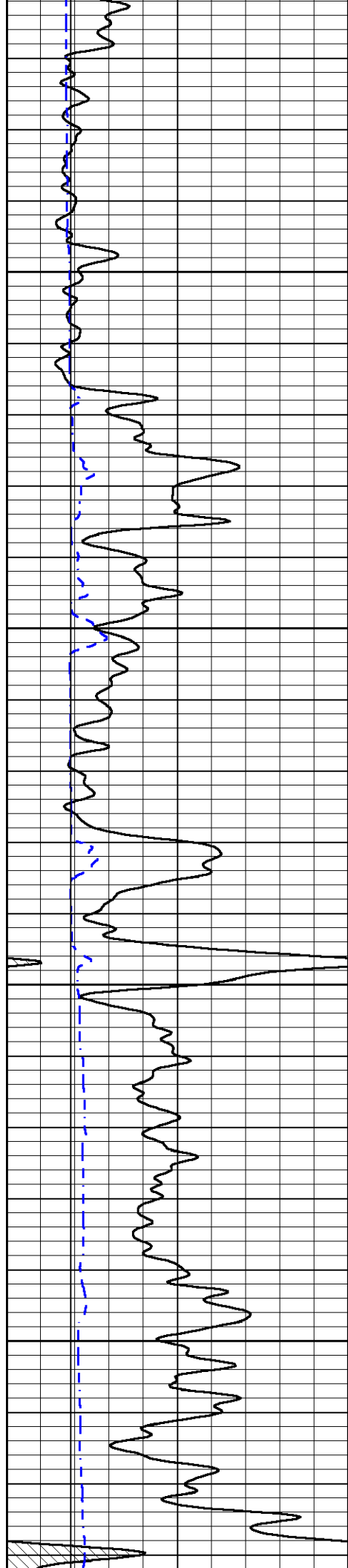
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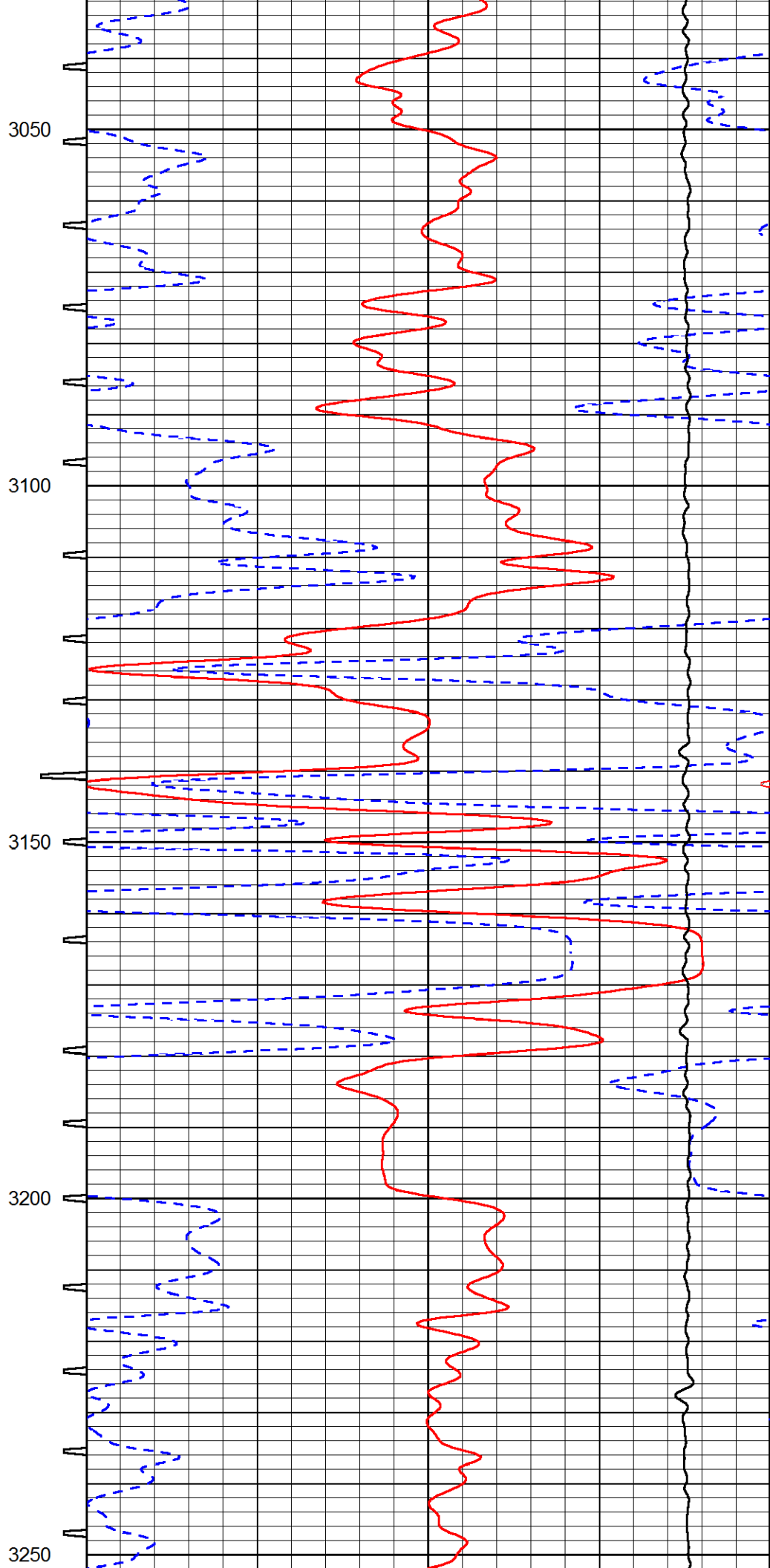
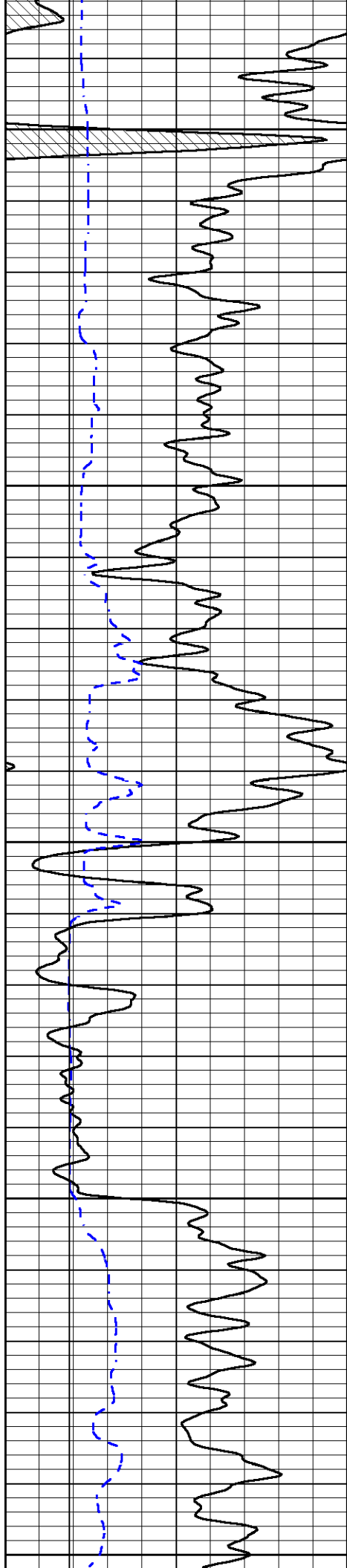
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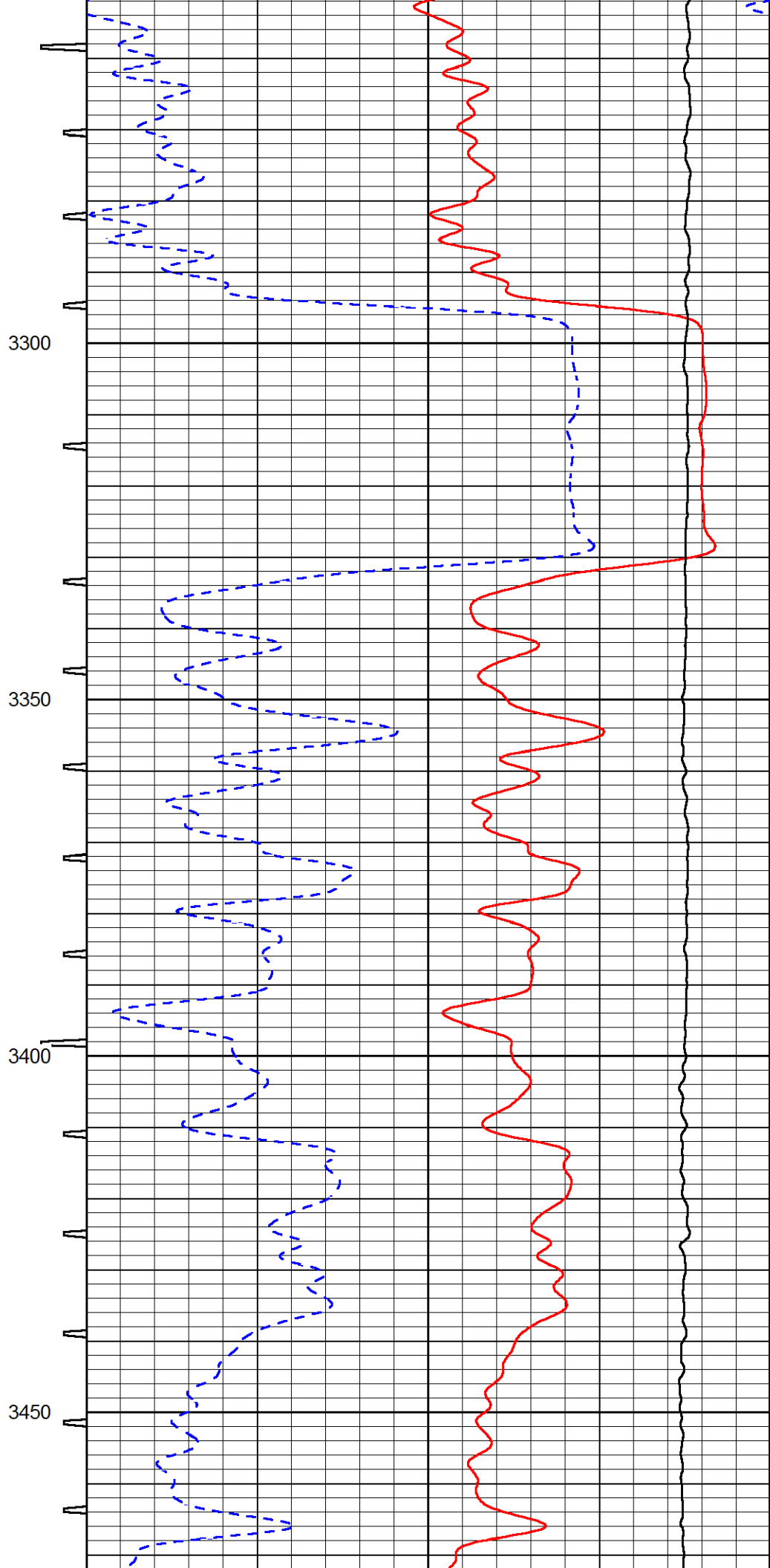
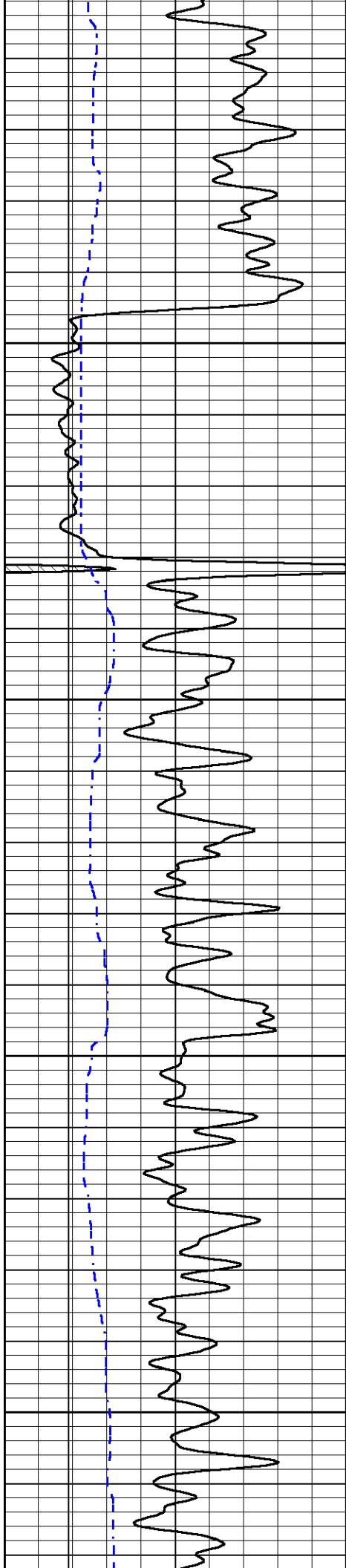
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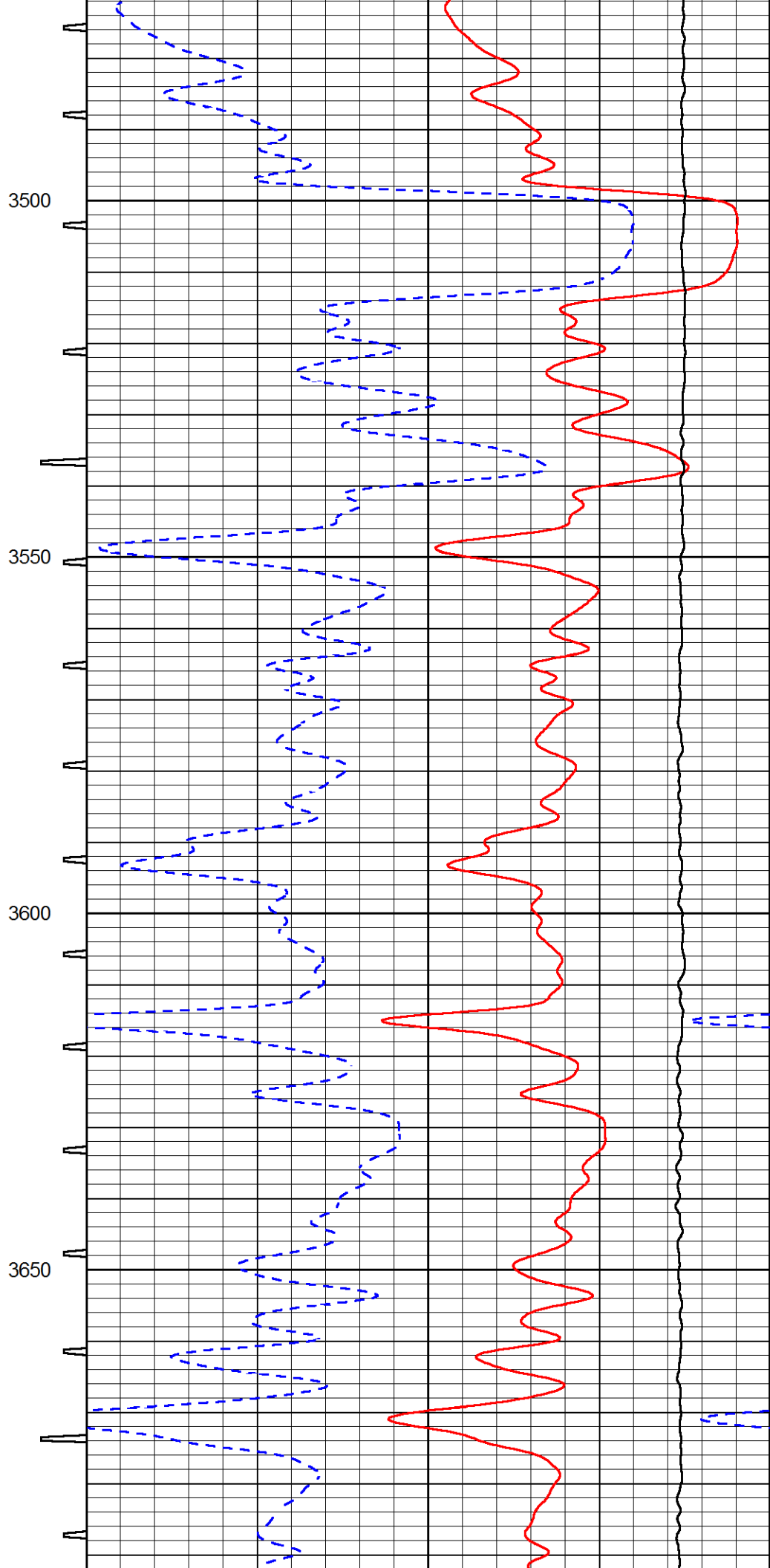
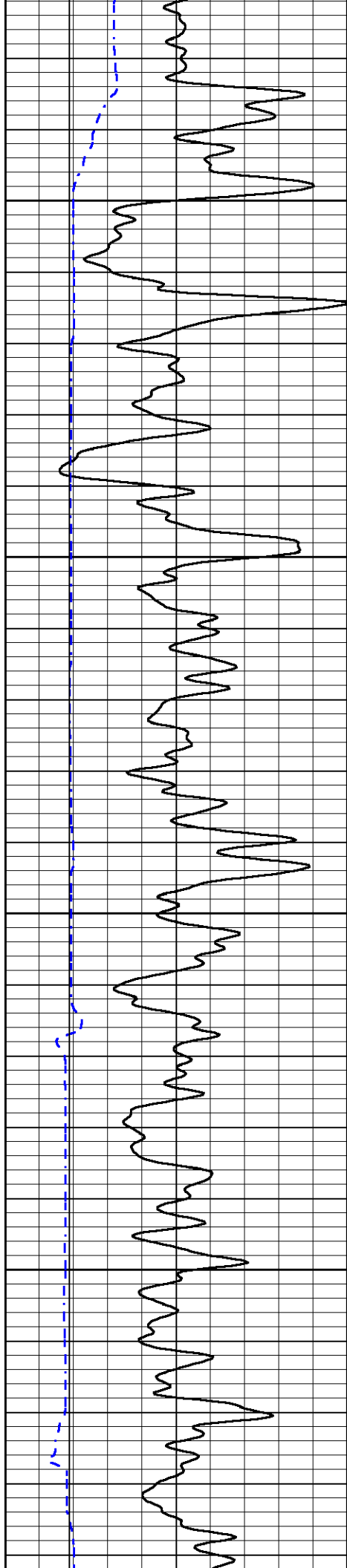
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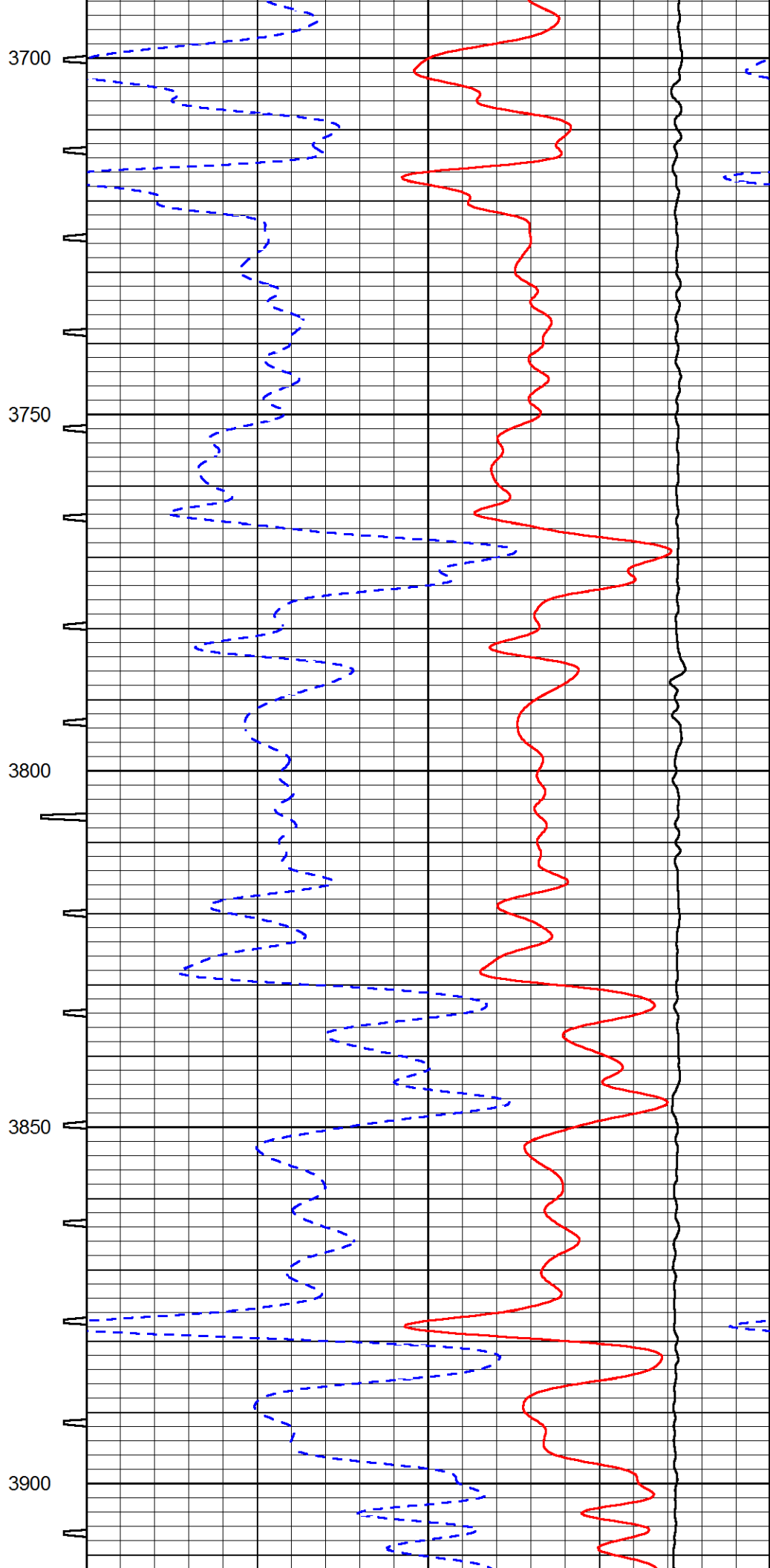
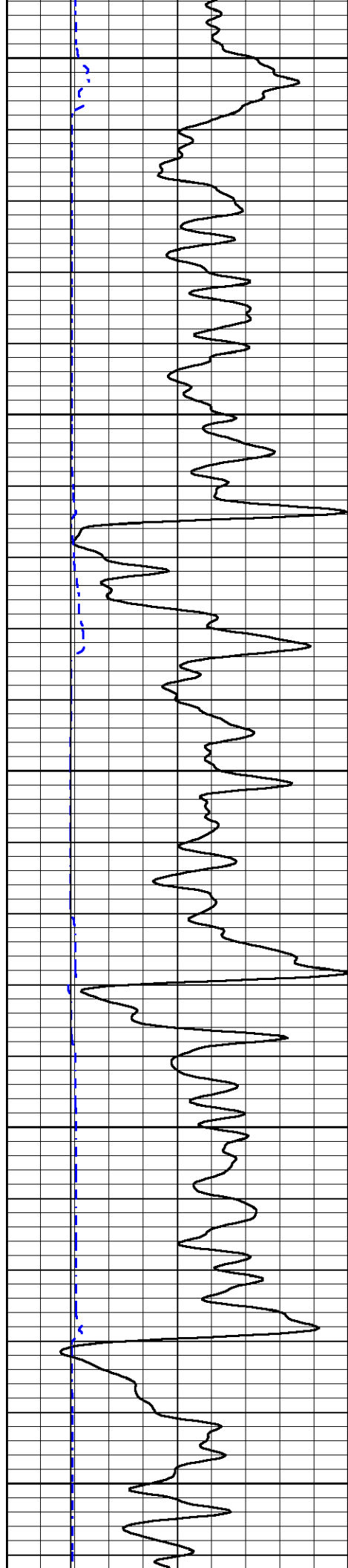


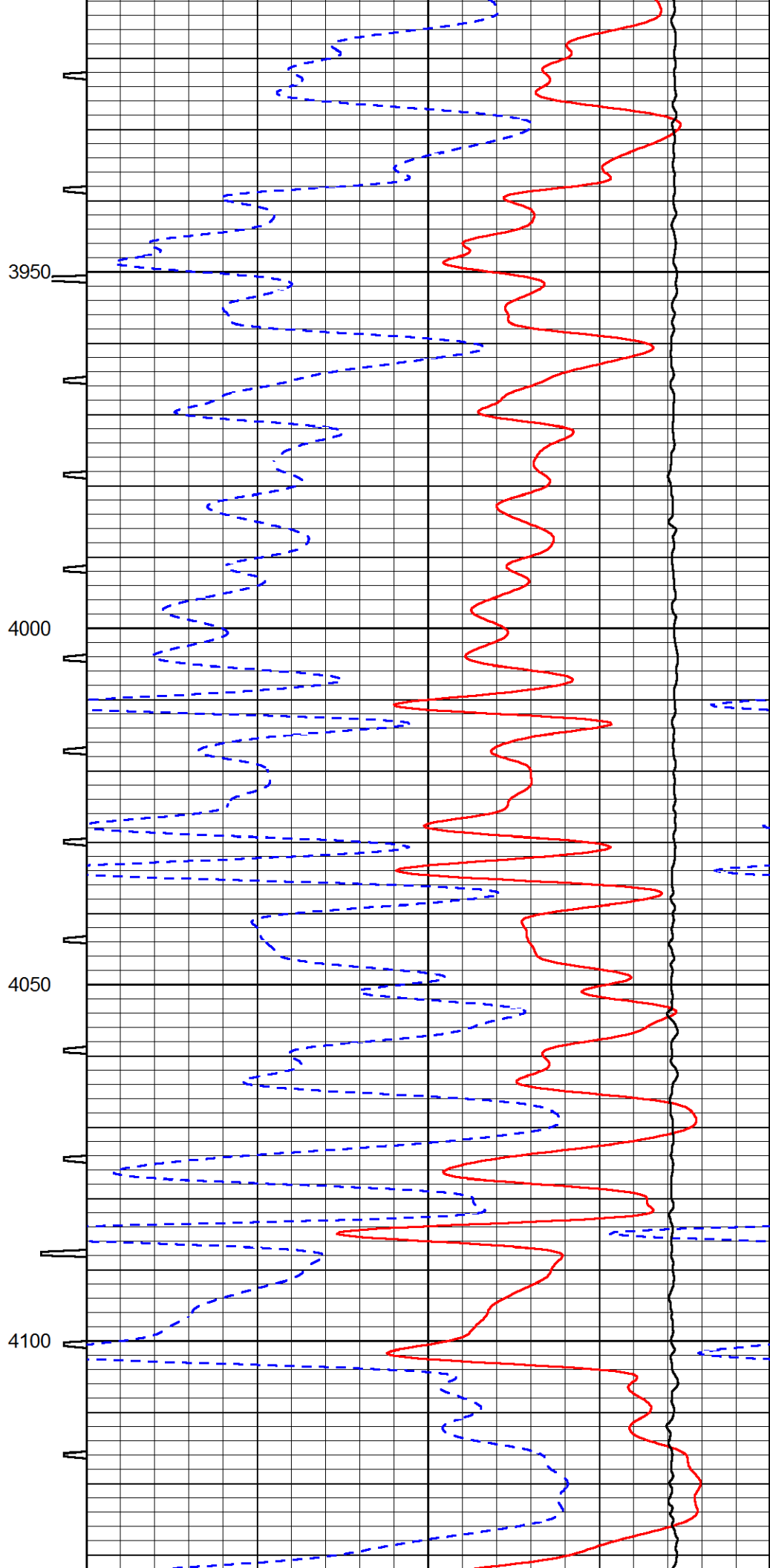
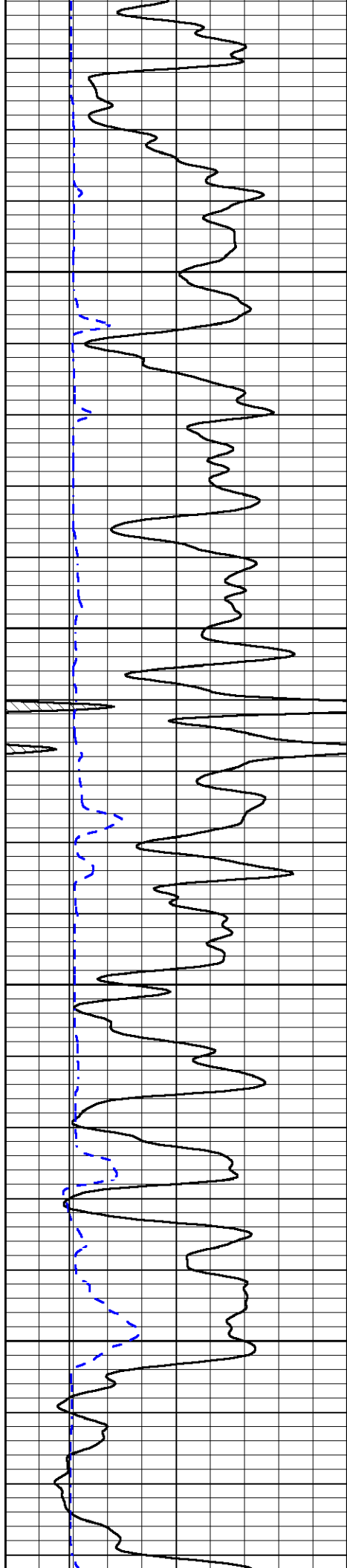


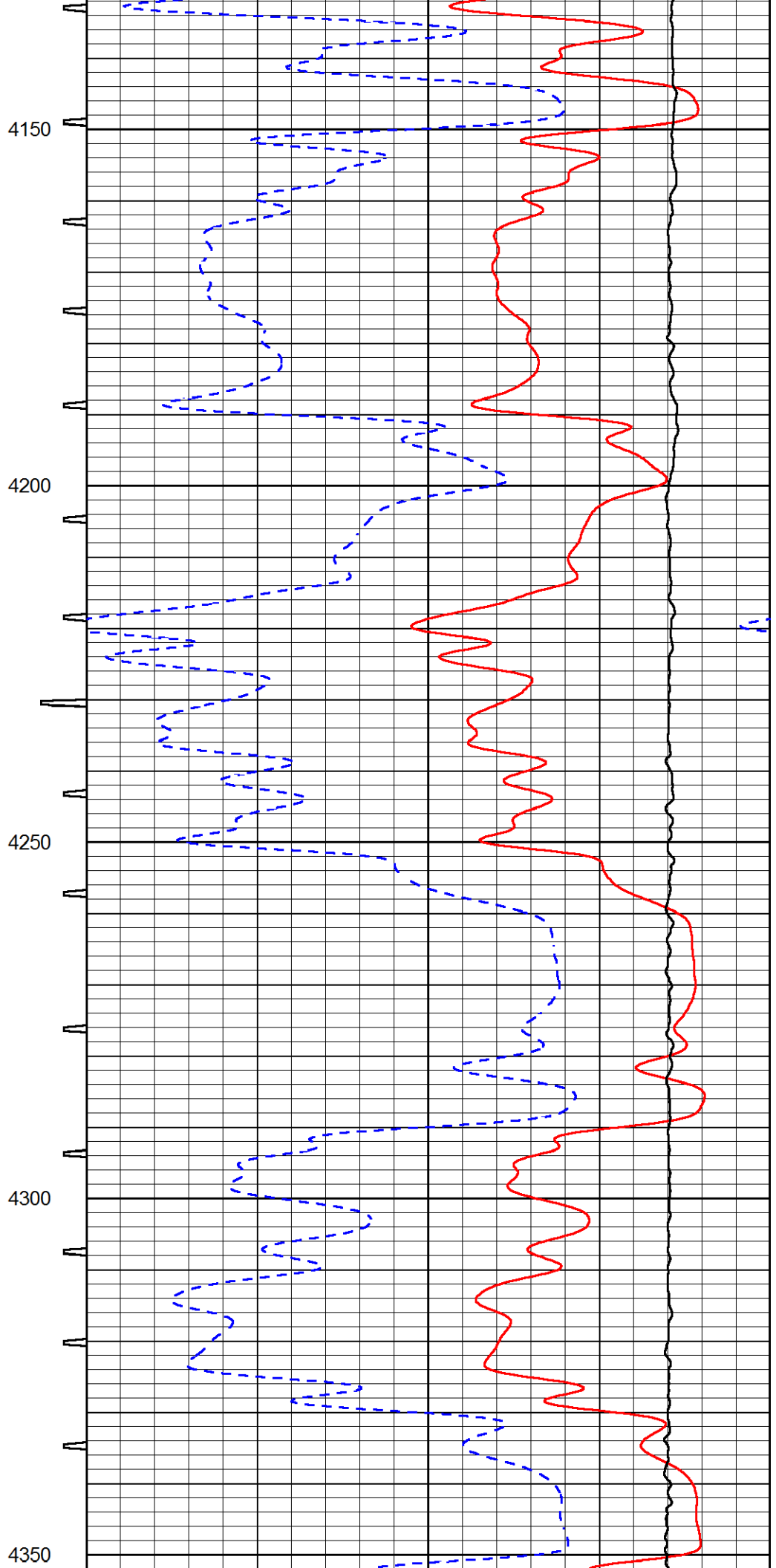
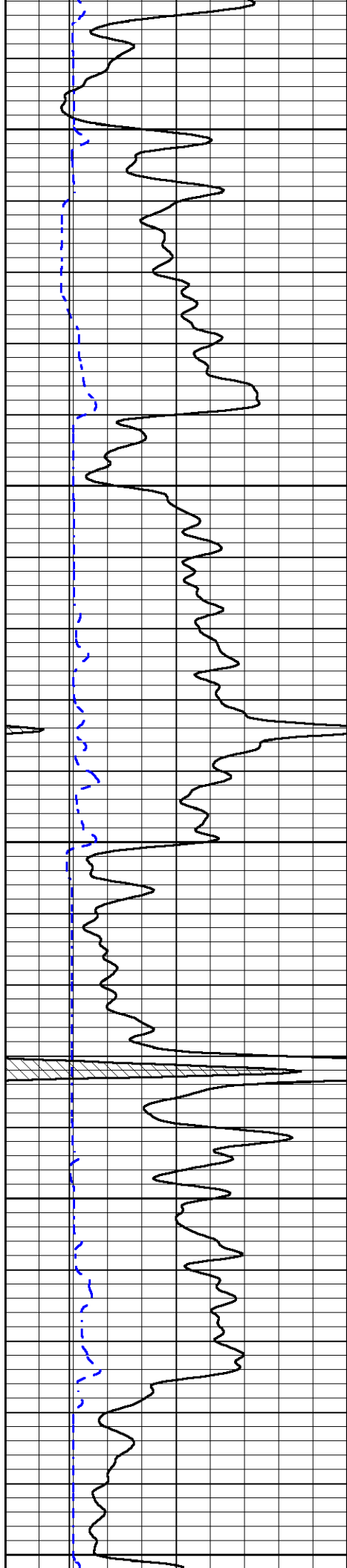


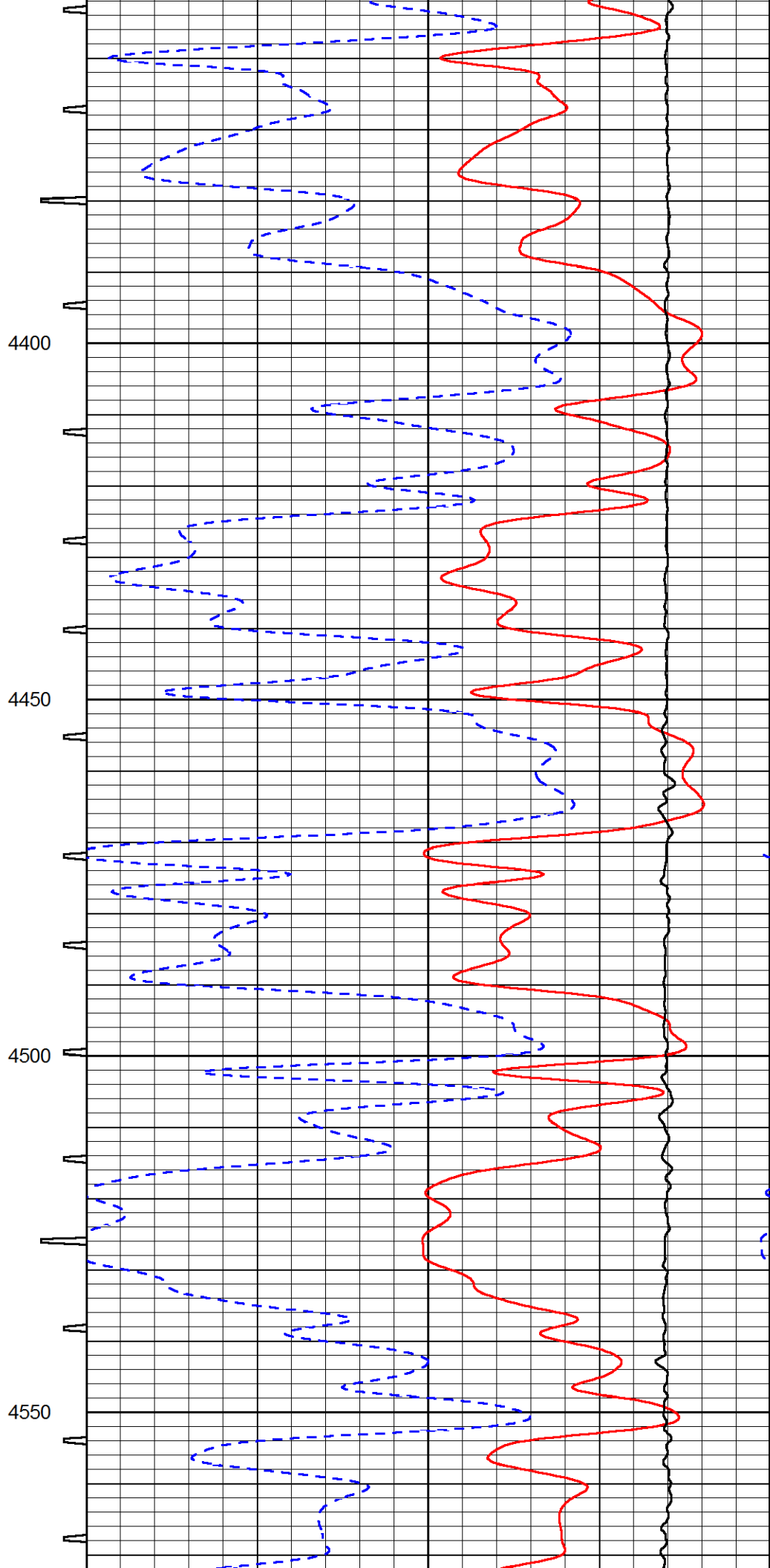
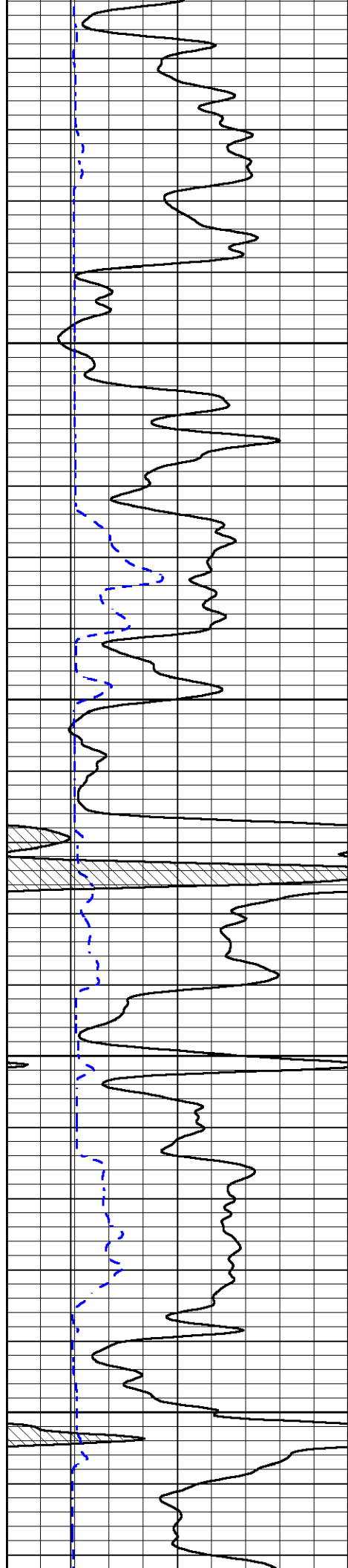


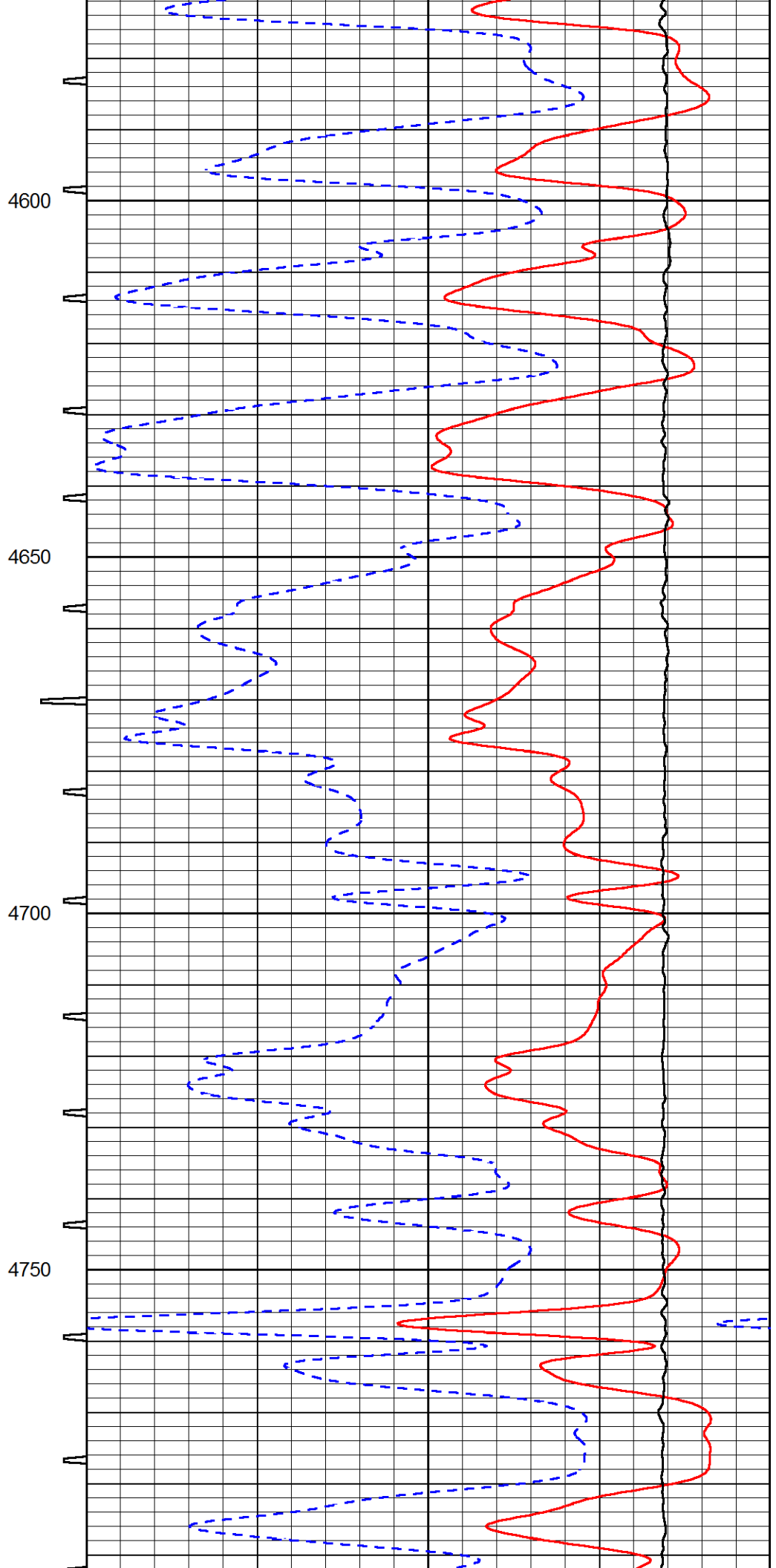
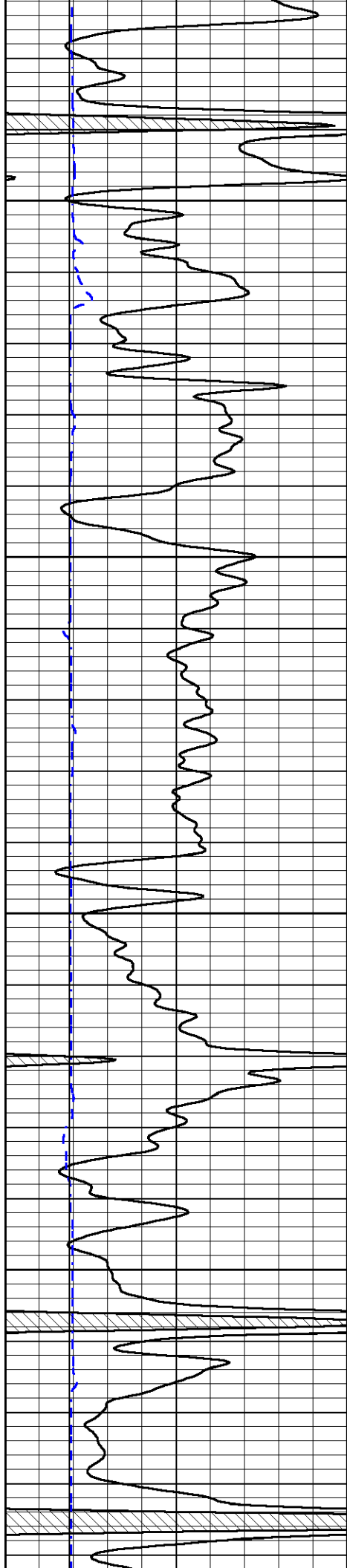


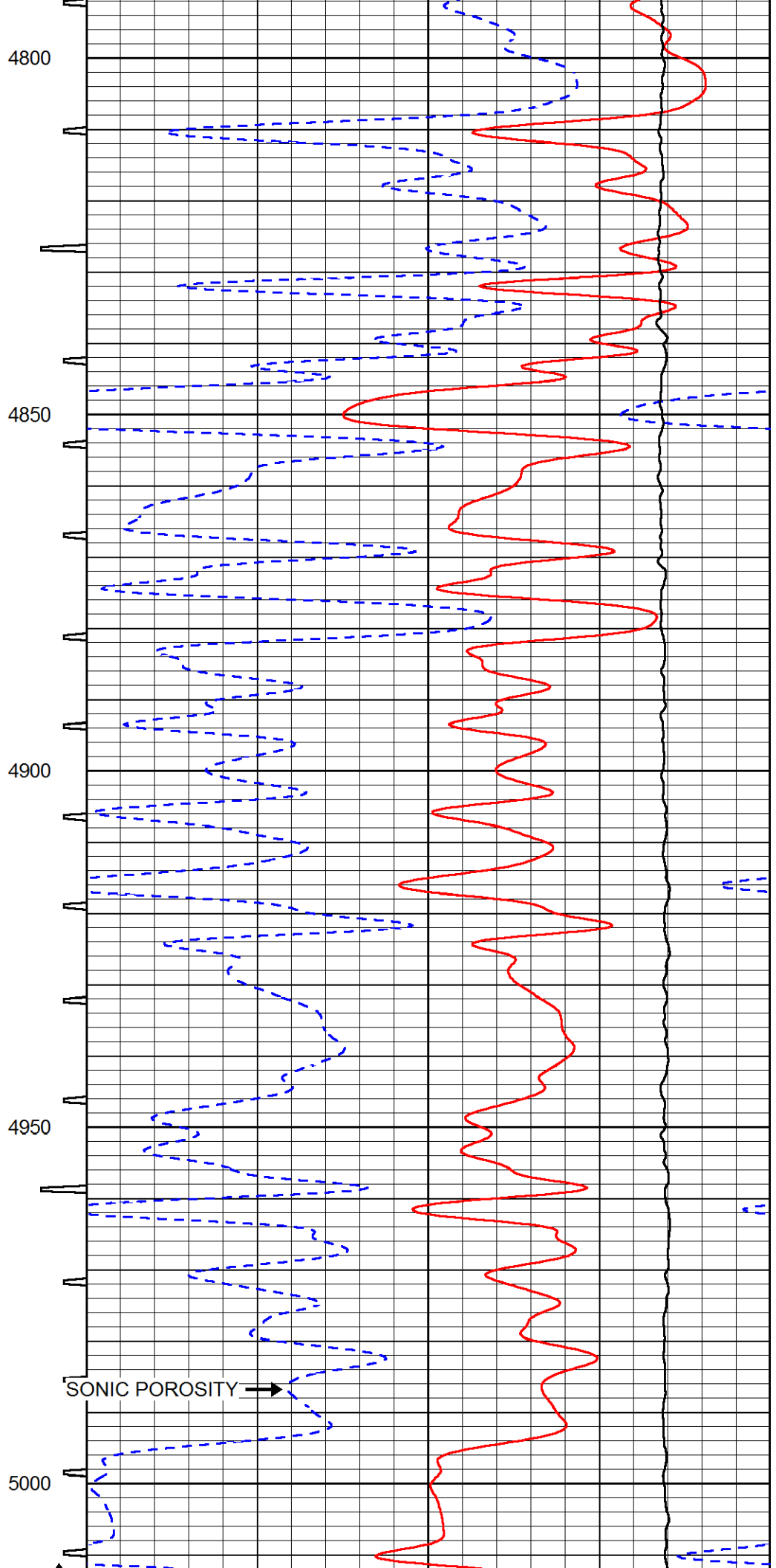
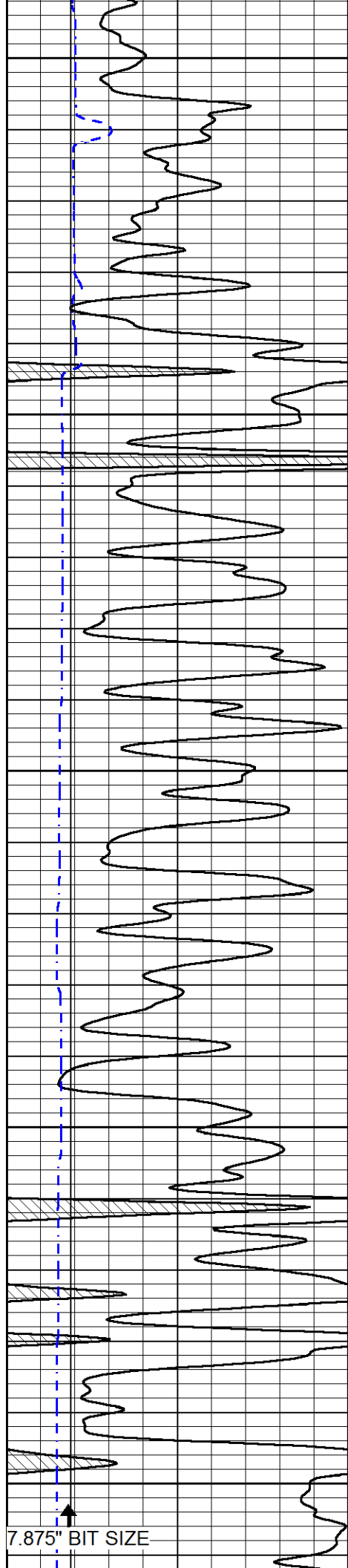


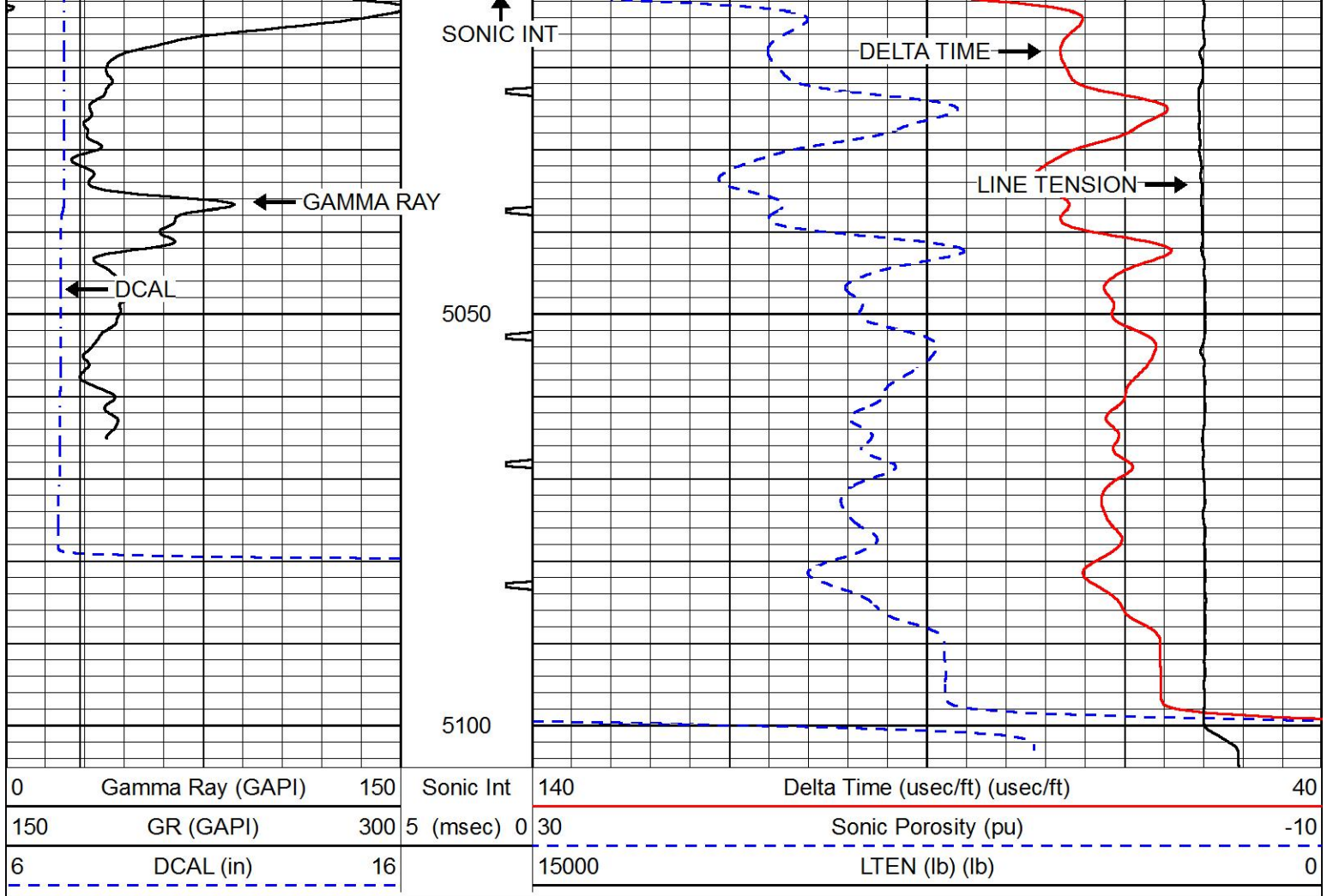








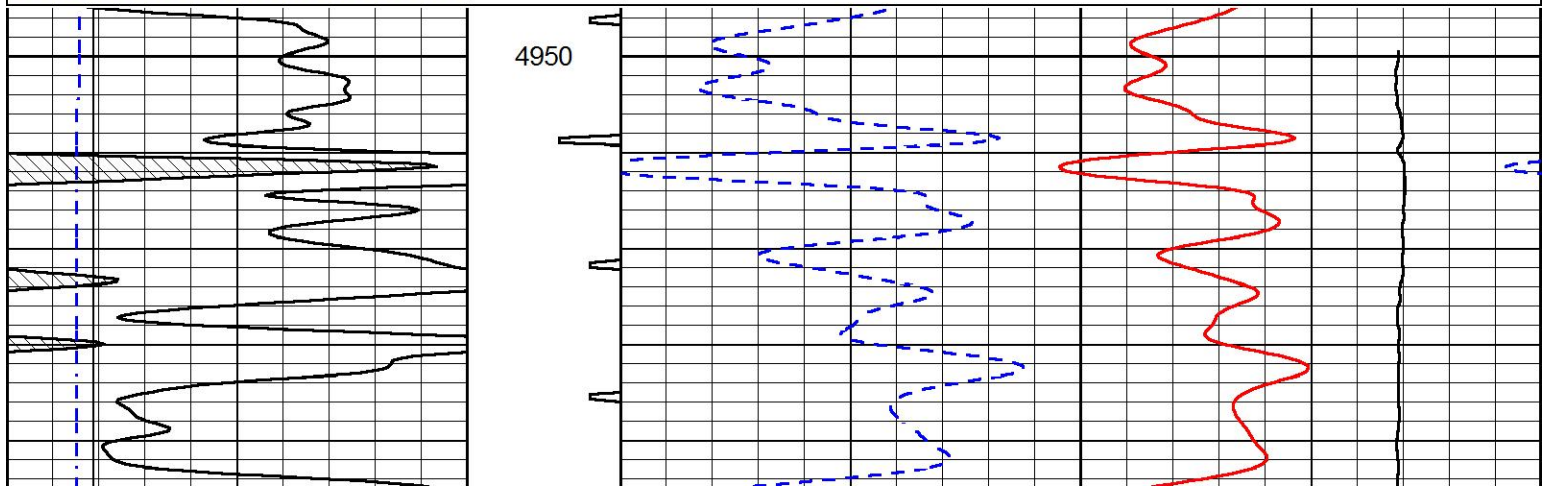


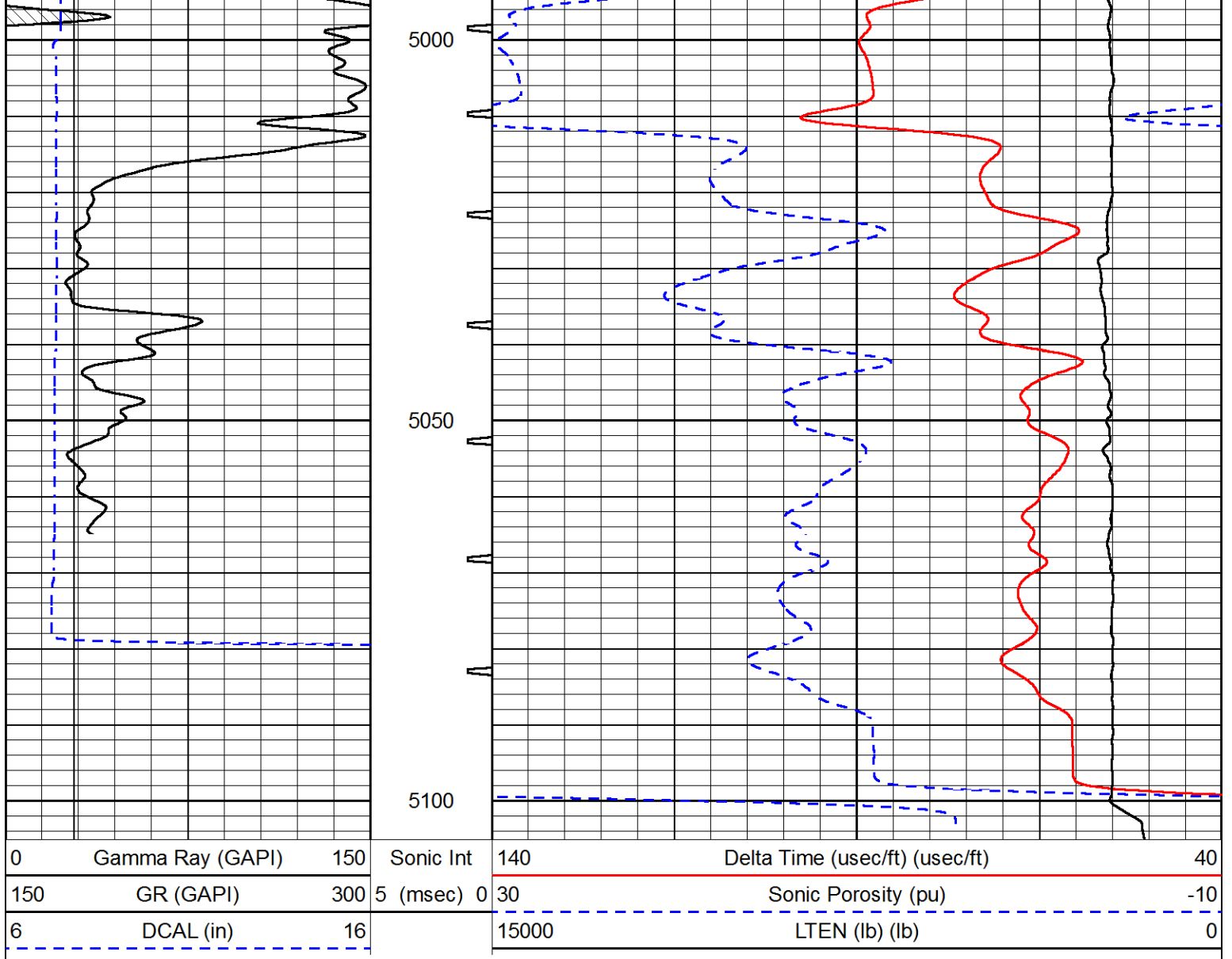


REPEAT SECTION

Database File murfin_culwell g 1-20.db
 Dataset Pathname STKML/pass2.1
 Presentation Format sonic
 Dataset Creation Fri Nov 17 02:44:19 2017
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150	Sonic Int	140	Delta Time (usec/ft) (usec/ft)	40
150	GR (GAPI)	300	5 (msec) 0	30	Sonic Porosity (pu)	-10
6	DCAL (in)	16		15000	LTEN (lb) (lb)	0





Calibration Report

Database File murfin_culwell g 1-20.db
 Dataset Pathname STKML/pass4.1
 Dataset Creation Fri Nov 17 03:30:59 2017

Dual Induction Calibration Report

Serial-Model: PSI 91-M&W
 Calibration Performed: Thu Nov 09 00:57:24 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	166.796	835.089	0.000	255.800	mmho/m	0.520	-14.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.360	-35.650

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Wed Nov 08 02:36:52 2017

Readings		References		Results	
Zero	Cal	Zero	Cal	m	b

Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	34000.0000	-1.6000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	39000.0000	-1.0000
Caliper	1.0001	1.1397	6.5000	18.5000	in	100.0000	-97.3000

Compensated Density Calibration Report

Serial-Model: 90-1031-M&W
Source / Verifier: 16955B / 2ci
Master Calibration Performed: Wed Nov 08 23:24:34 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	4903.44	6153.79	cps
Aluminum	2.640	g/cc	934.50	4021.31	cps
Spine Angle = 75.61			Density/Spine Ratio = 0.517		
	Size		Reading		
Small Ring	8.00	in	1.84		
Large Ring	22.00	in	1.46		

Compensated Neutron Calibration Report

Serial Number: 207-MW
Tool Model: M&W
Calibration Performed: WED SEP 6 10:30:30 2017

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: Wed Sep 06 19:51:14 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



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