



**RADIAL CEMENT BOND LOG
GAMMA RAY / CCL / VDL**

Company ANTERO RESOURCES CORPORATION
Well CALLAHAN UNIT 1H
Field MARCELLUS
County DODDRIDGE
State W.V. Country USA

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Location: AFE#A08794-D API #: 47017068730000 Other Services

SEC TWP RGE Elevation

Permanent Datum GROUND LEVEL Elevation
Log Measured From R.K.B. 25'
Drilling Measured From R.K.B.

Date 10/25/19

Run Number ONE

Depth Driller 17093'

Depth Logger 7590'

Bottom Logged Interval 7590'

Top Log Interval SURFACE

Open Hole Size 8.25

Type Fluid FW

Density / Viscosity 8.6

Max. Recorded Temp. 142 degF

Estimated Cement Top 2930'

Time Well Ready N/A

Time Logger on Bottom N/A

Equipment Number 214181

Location BRIDGEPORT W.V.

Recorded By S.BUTLER

Witnessed By JAYSON LUKES

Run Number	Borehole Record		Tubing Record				
	Bit Size	From	To	Size	Weight	From	To
ONE	24"	SURFACE	105'				
TWO	17.5"	105'	388'				
THREE	12.25"	388'	2585'				
FOUR	8.25"	2585'	17093'				

Casing Record	Surface String	Prot. String	Production String	Liner	Size	Wgt/Ft	Top		Bottom
							Weight	Length	
					5.5	54.5	SURFACE	388'	388'
					5.5	36	SURFACE	2585'	2585'
					5.5	20	SURFACE	17093'	17093'

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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

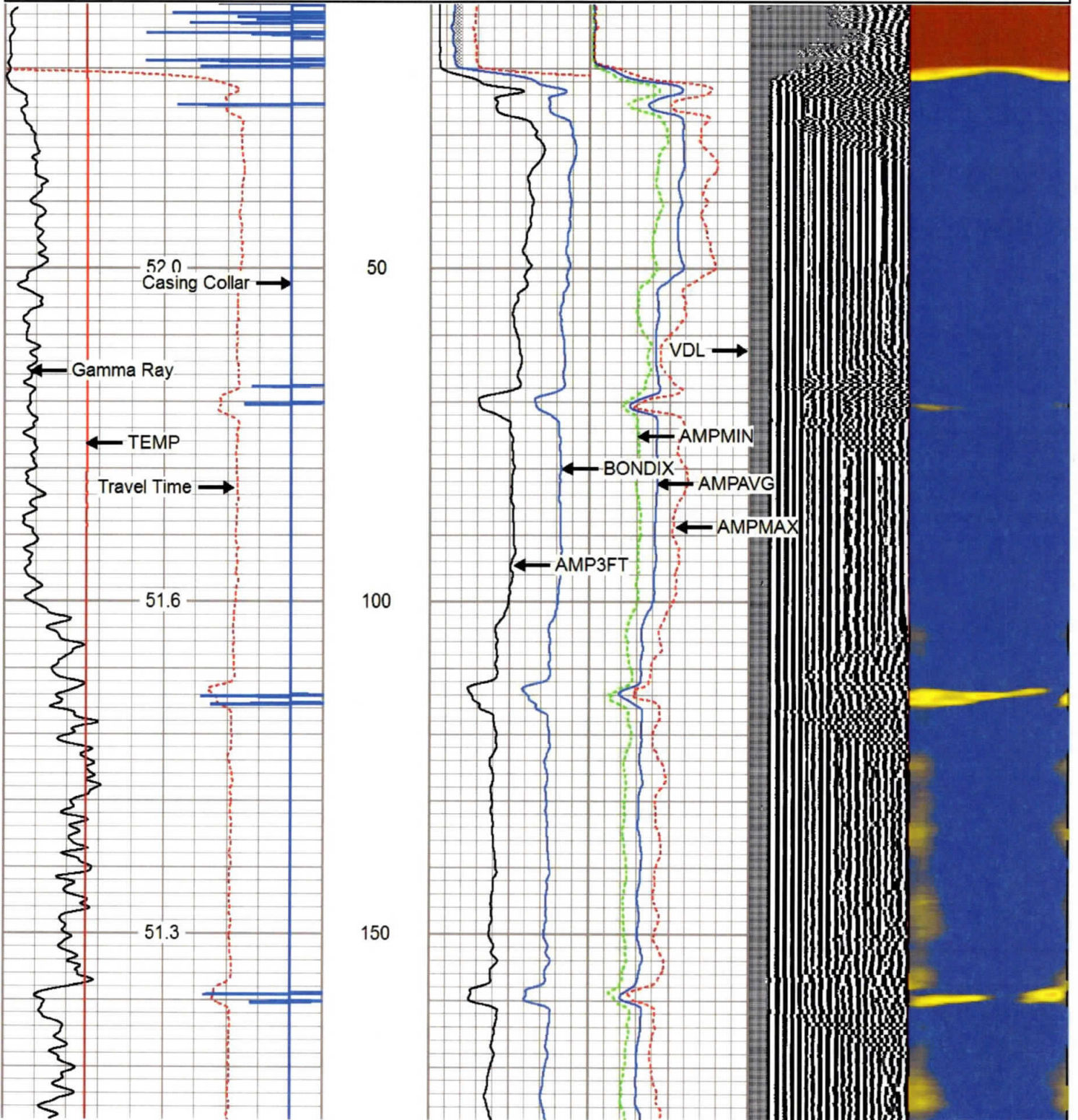
THANK YOU FOR USING KLX ENERGY SERVICES
LOG WAS RAN ON 5.5" CASING
LOG WAS RAN WITH 1500 PSI ON WELL
LOG T.D 7590"
MARKER JOINT @ 6254' TO 6265'

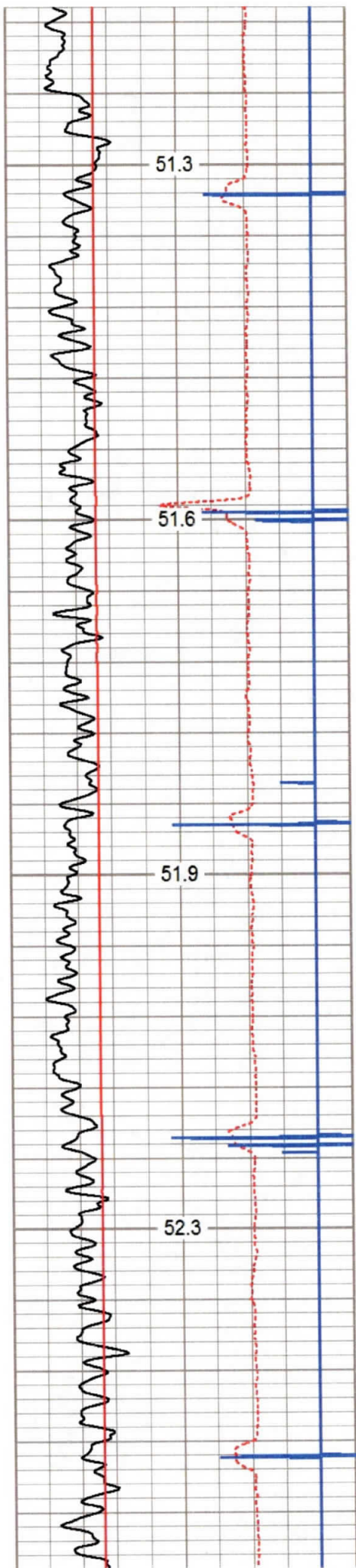


MAIN LOG

Database File e:\antero10-25-19\antero_callahan_unit_1h.db
 Dataset Pathname pass3.1
 Presentation Format antero1
 Dataset Creation Mon Oct 28 15:12:36 2019
 Charted by Depth in Feet scaled 1:240

280	Travel Time (usec)	180	Amplitude	Sector Amp AVG	VDL	1 Sector Map 12
9	Casing Collar	-1	0 (mV) 100	Sector Amp MAX	200 (usec) 1200	
0	Gamma Ray (GAPI)	180	Amp X5	Sector Amp MIN		
0	TEMP (degF)	200	0 (mV) 20			
180	GR (GAPI)	360	1 BONDIX	0		
	TEMP (degF)					



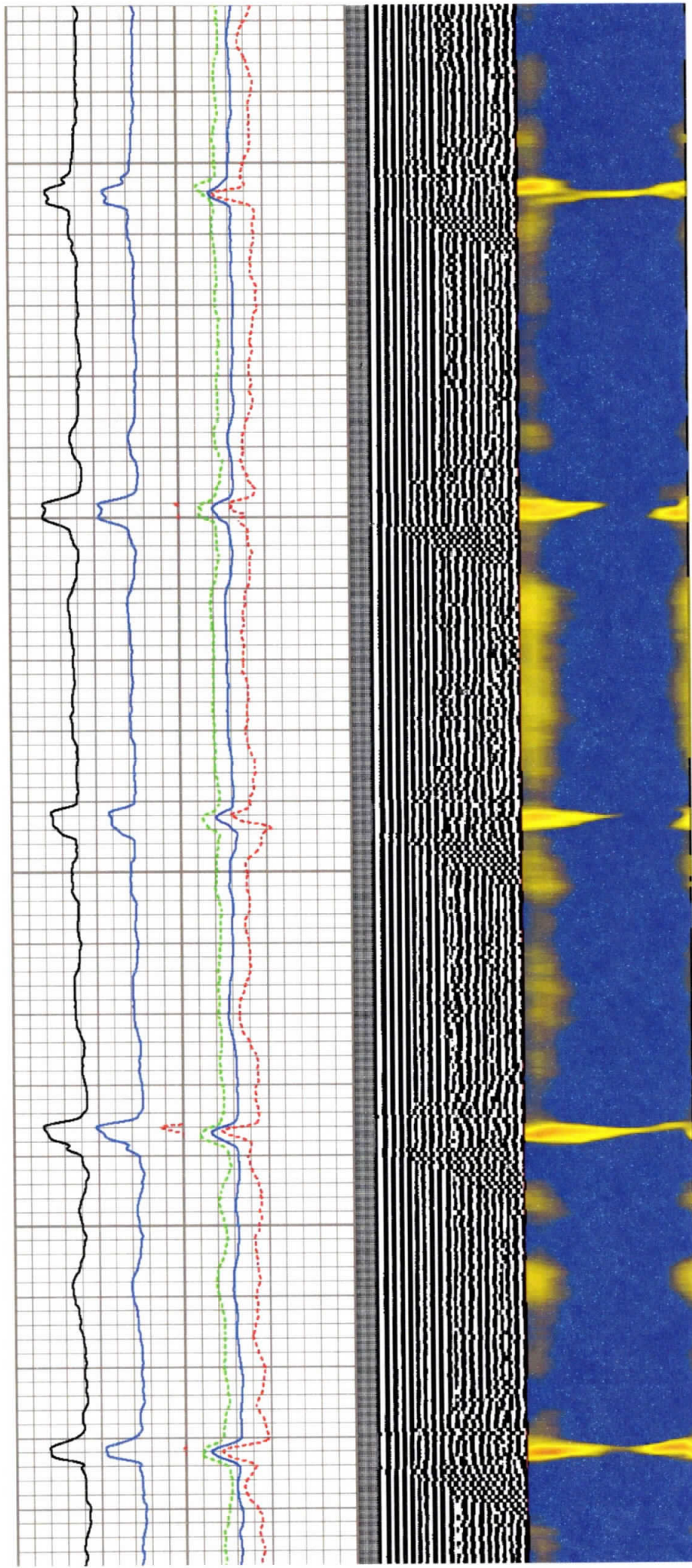


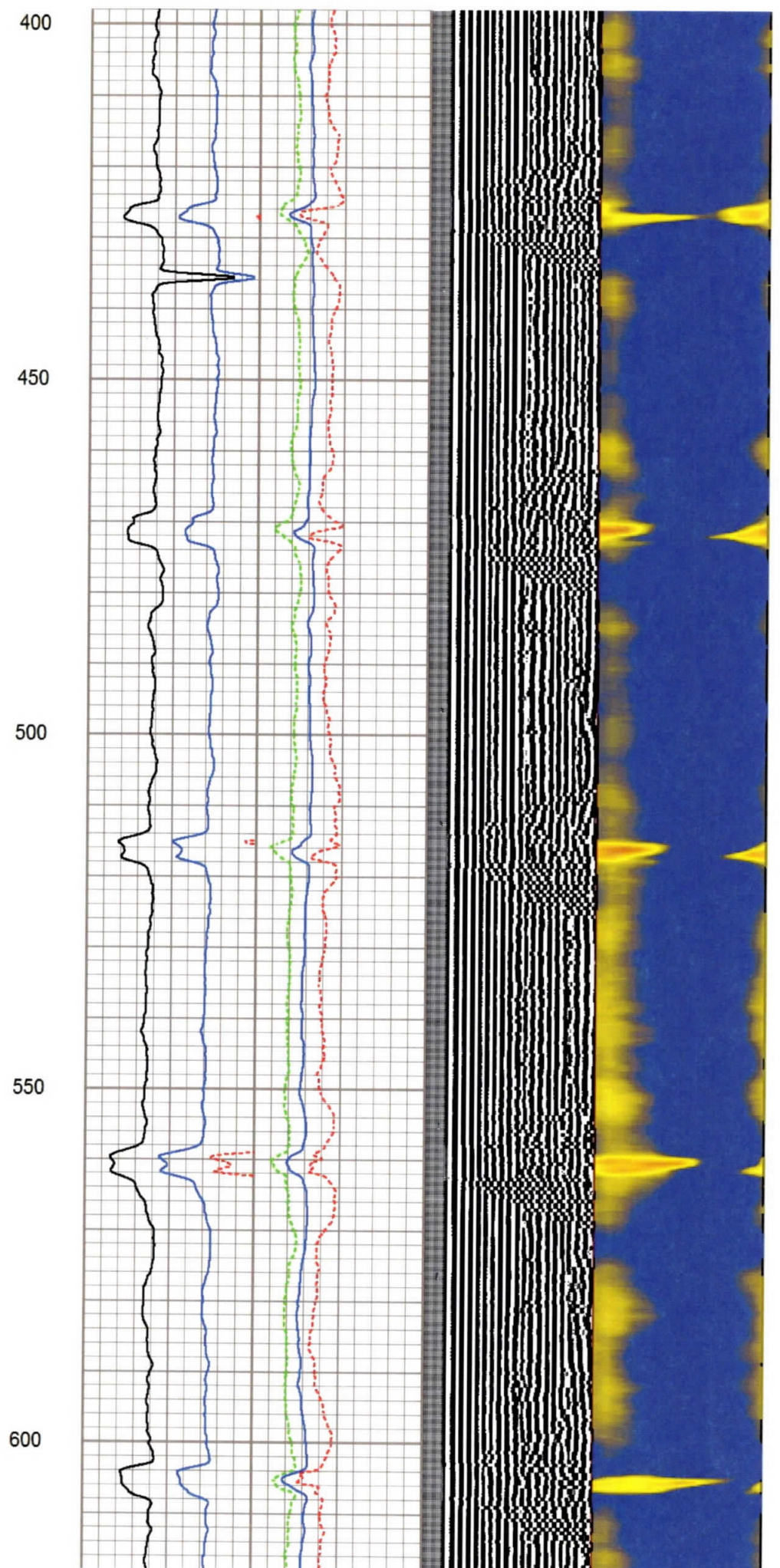
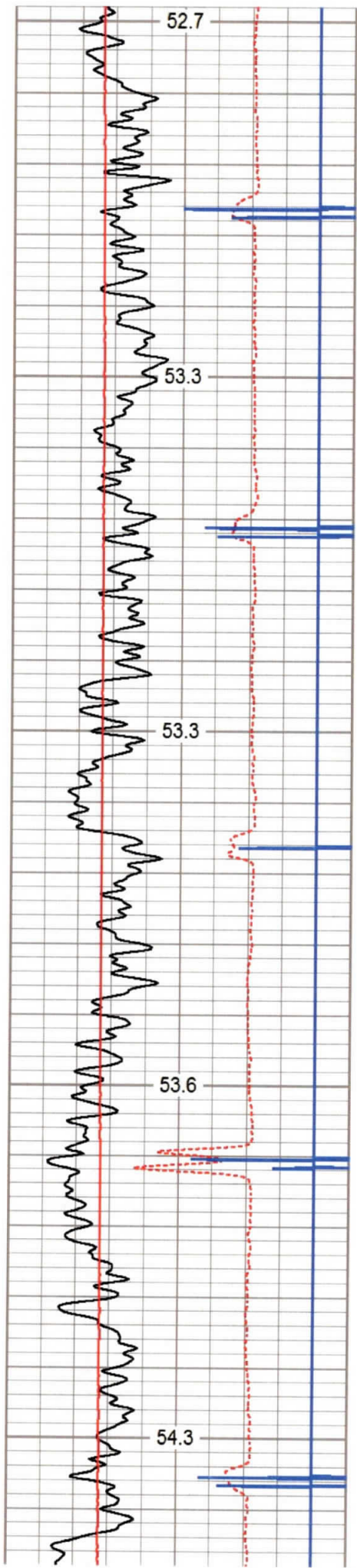
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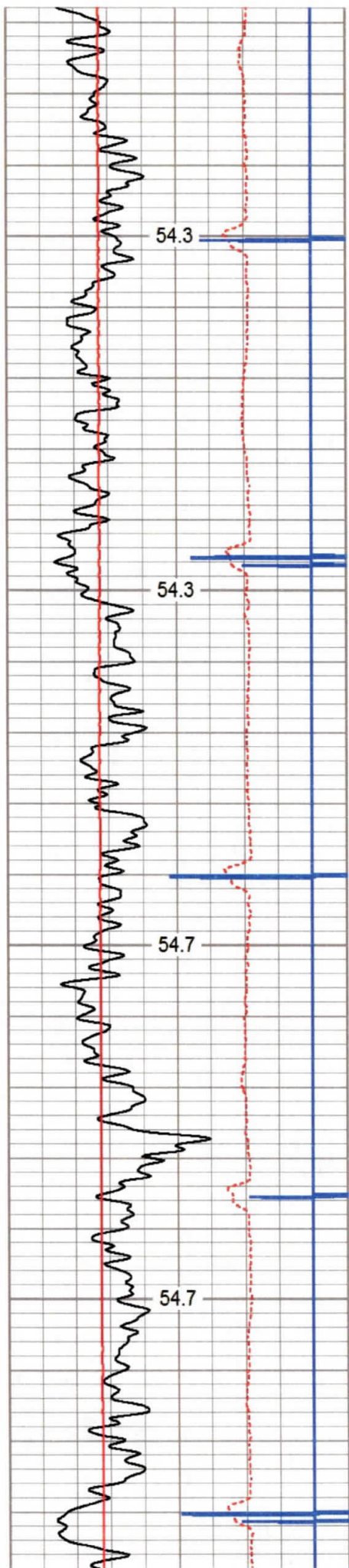
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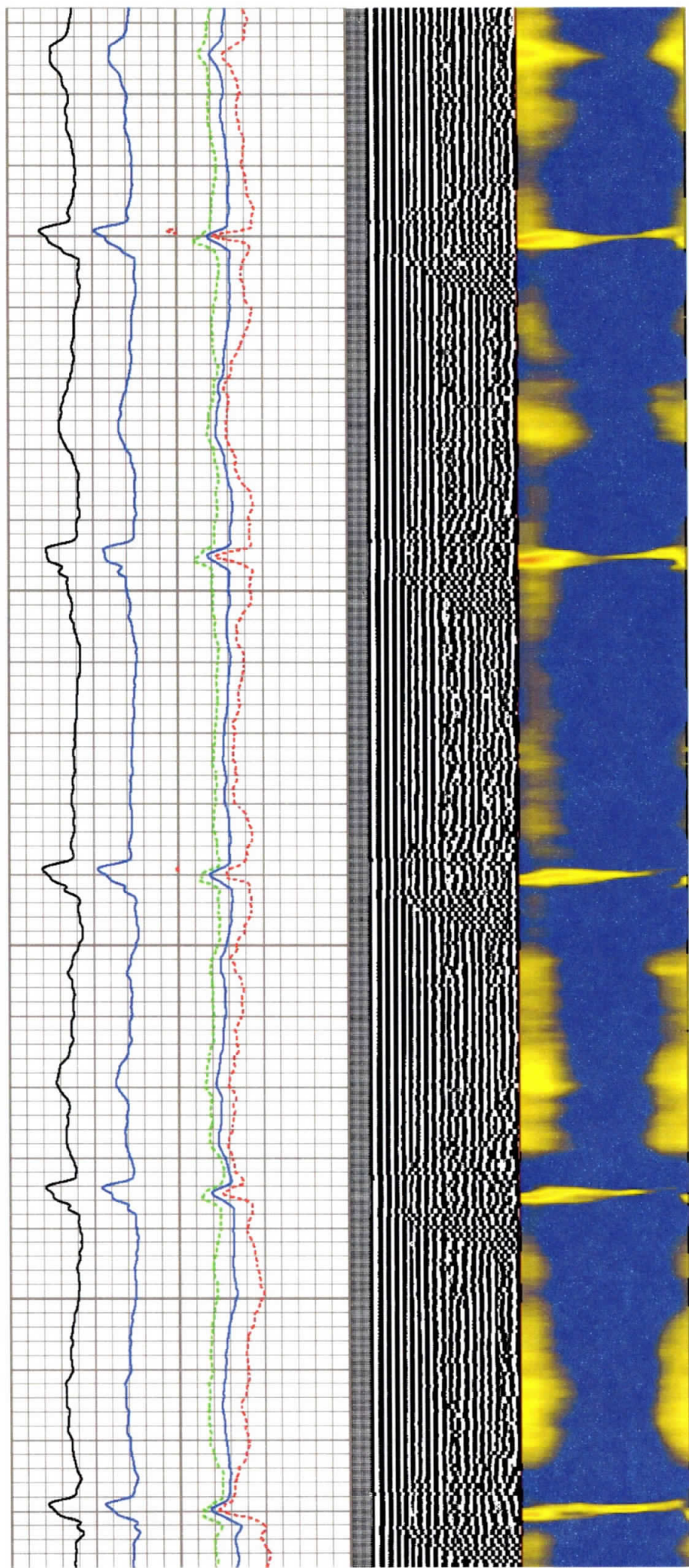


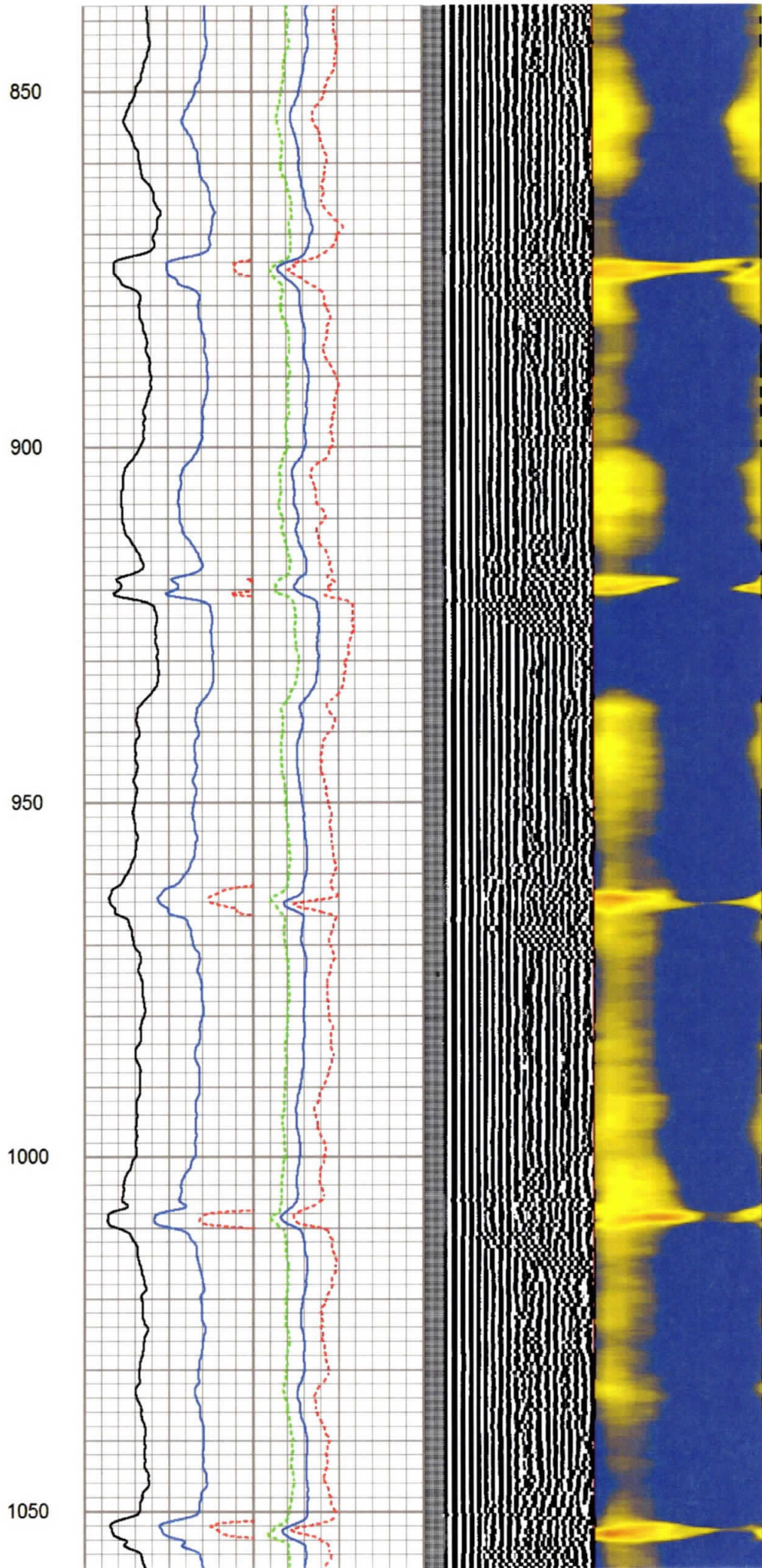
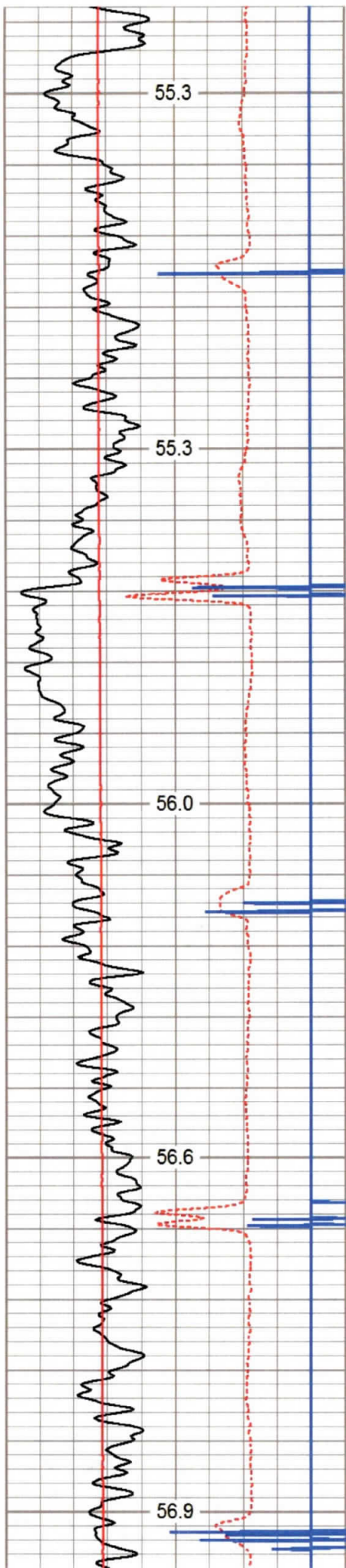
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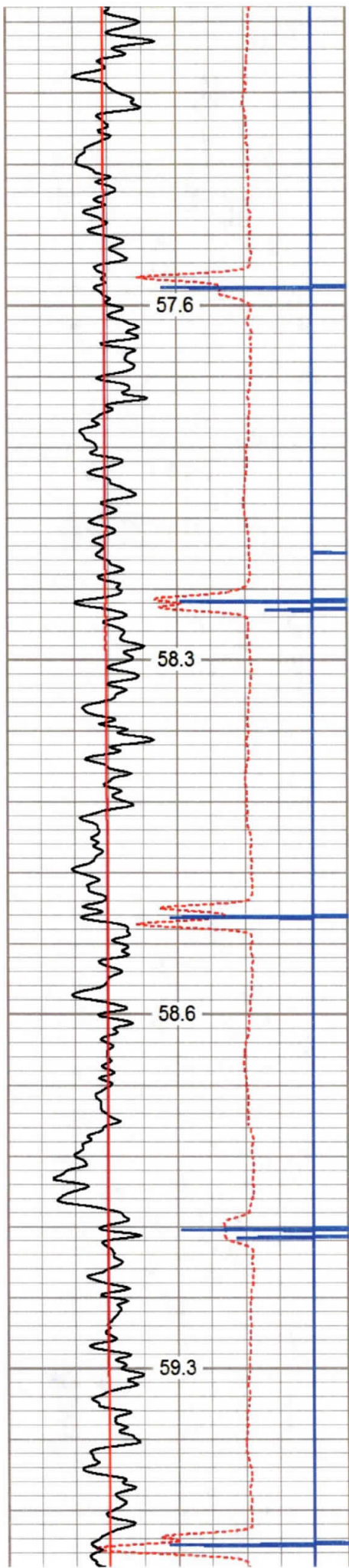
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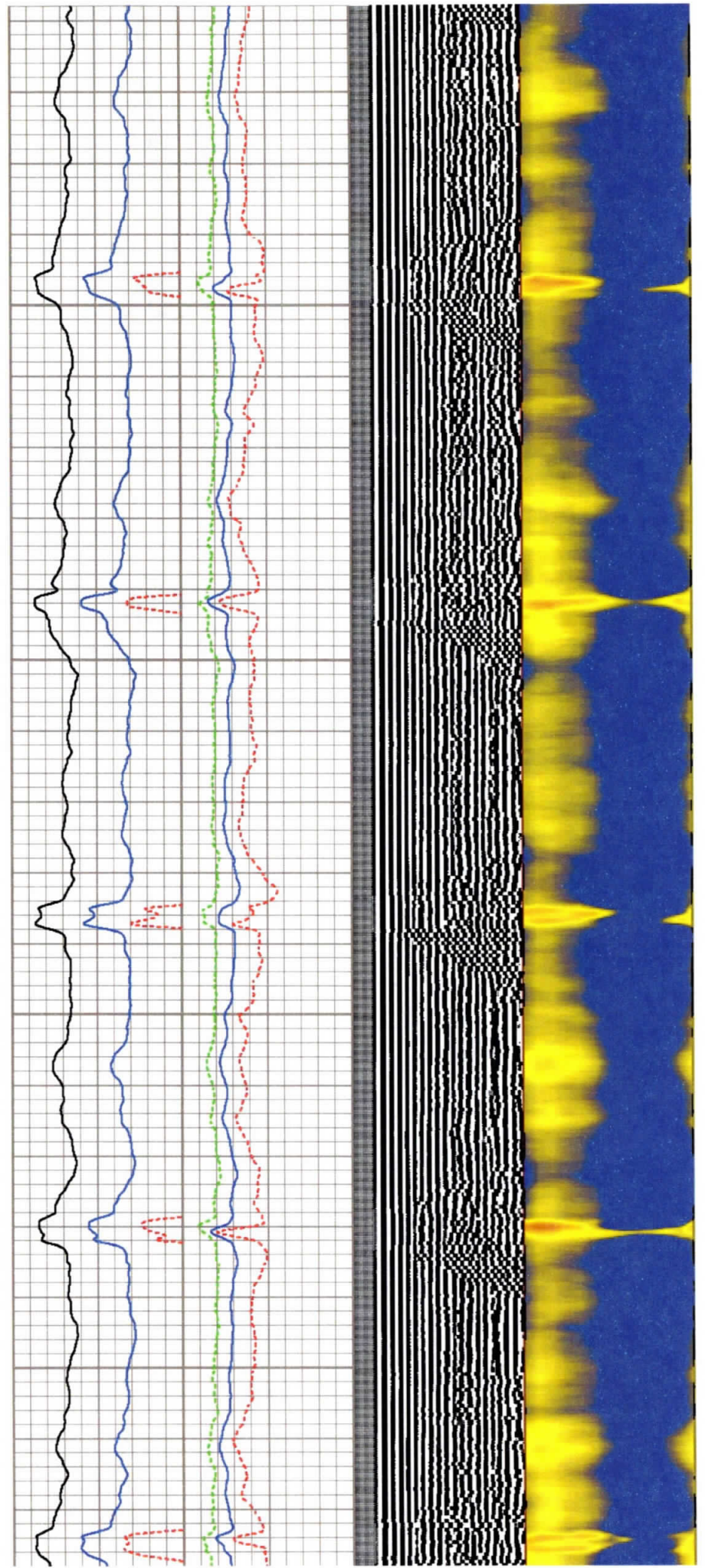


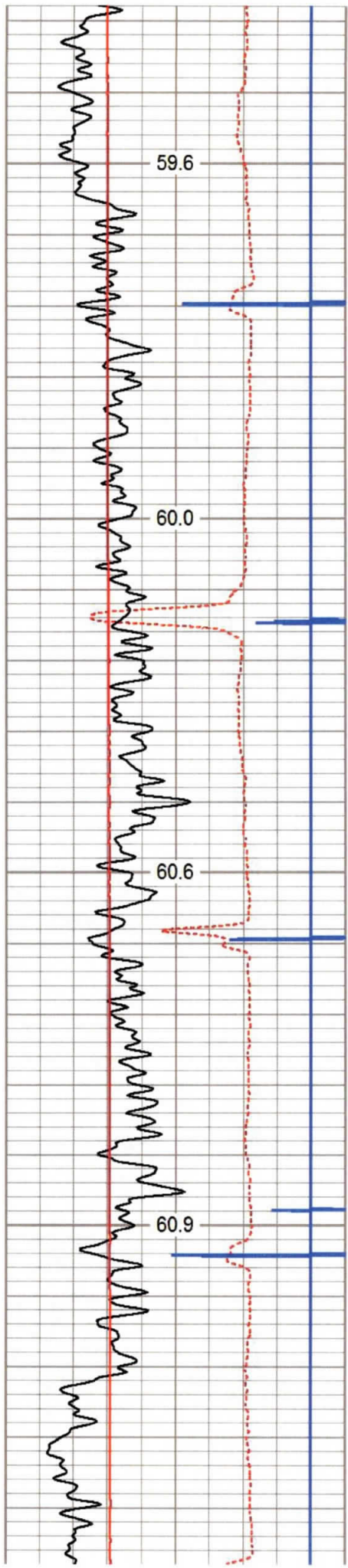
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1150

1200

1250



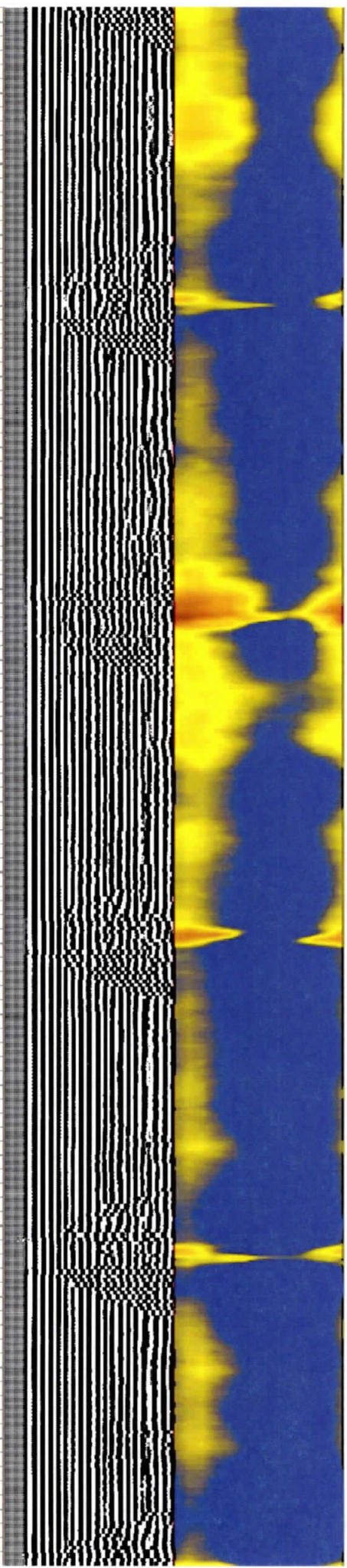


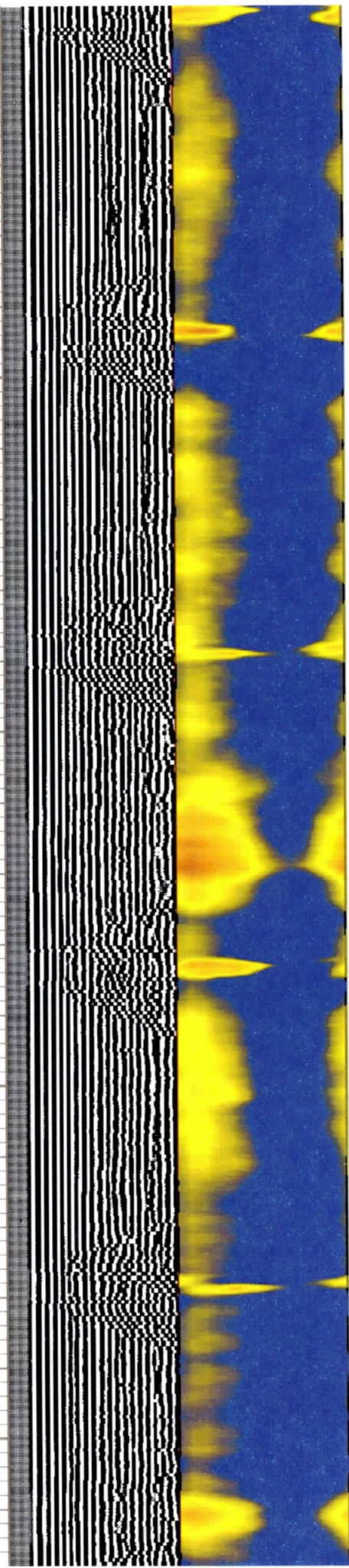
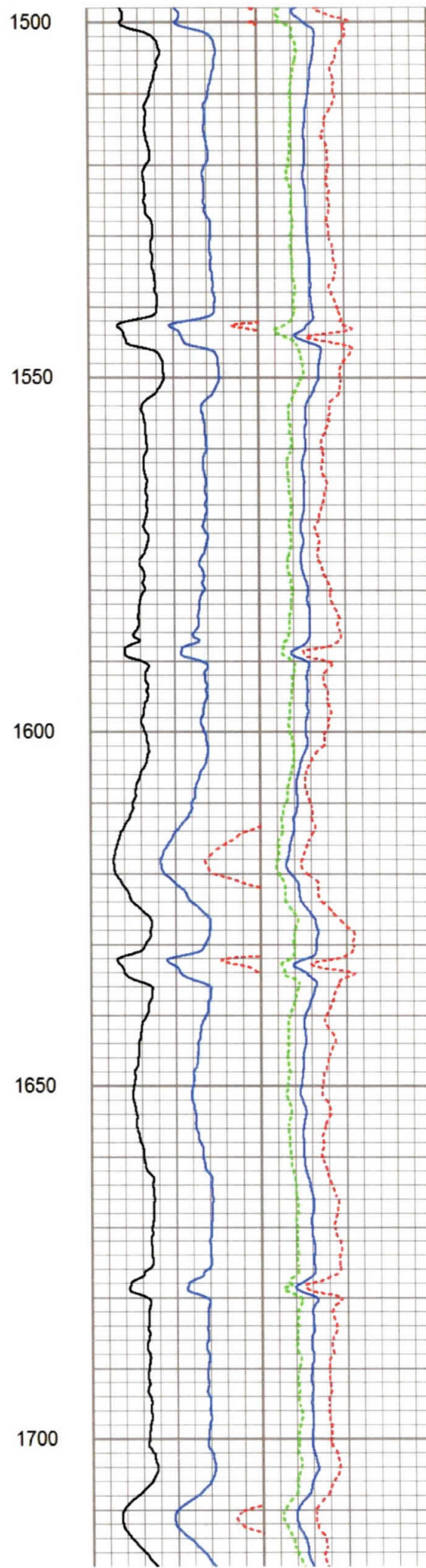
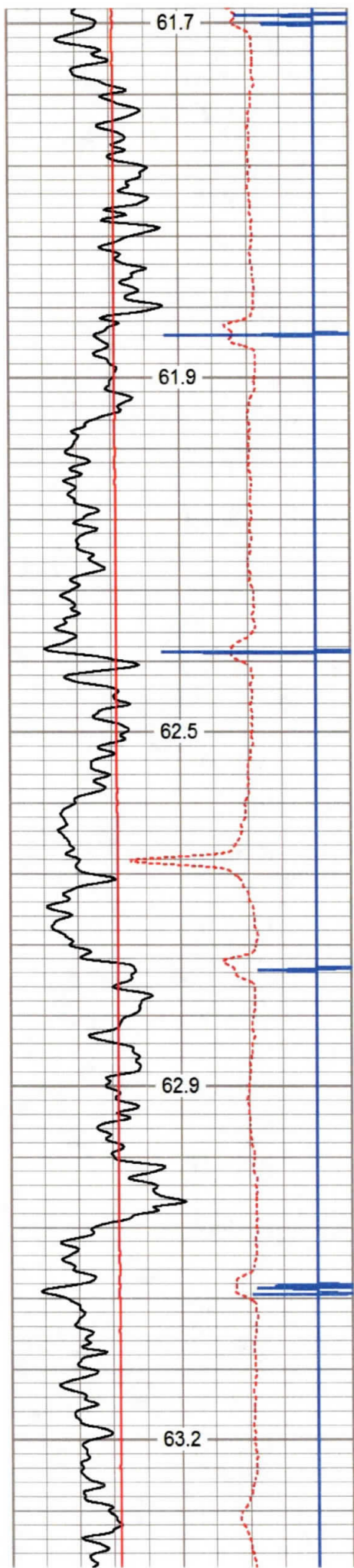
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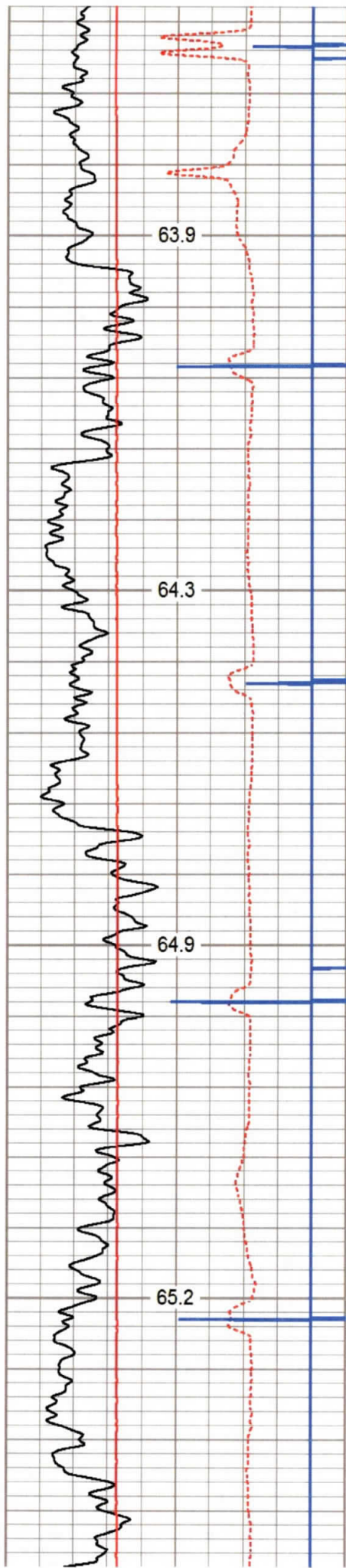
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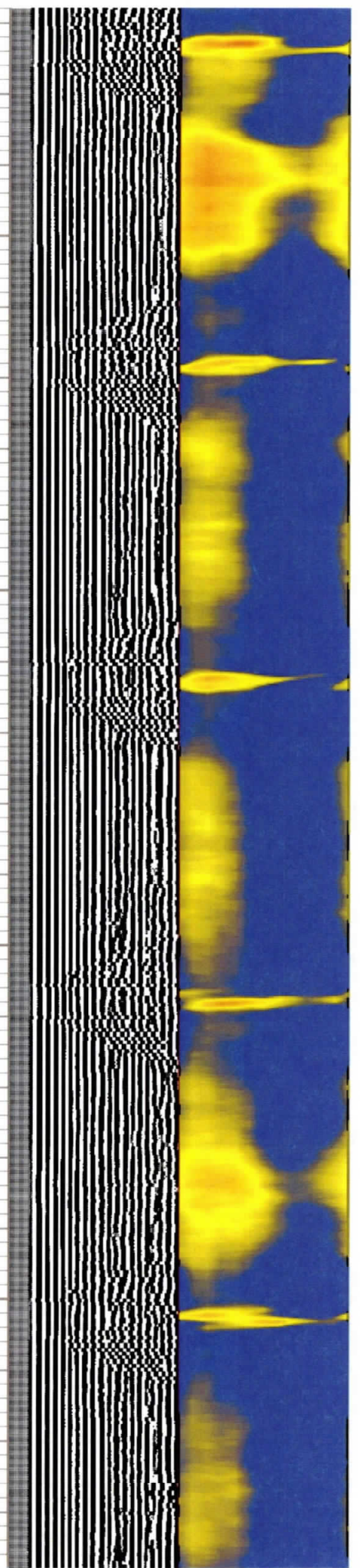
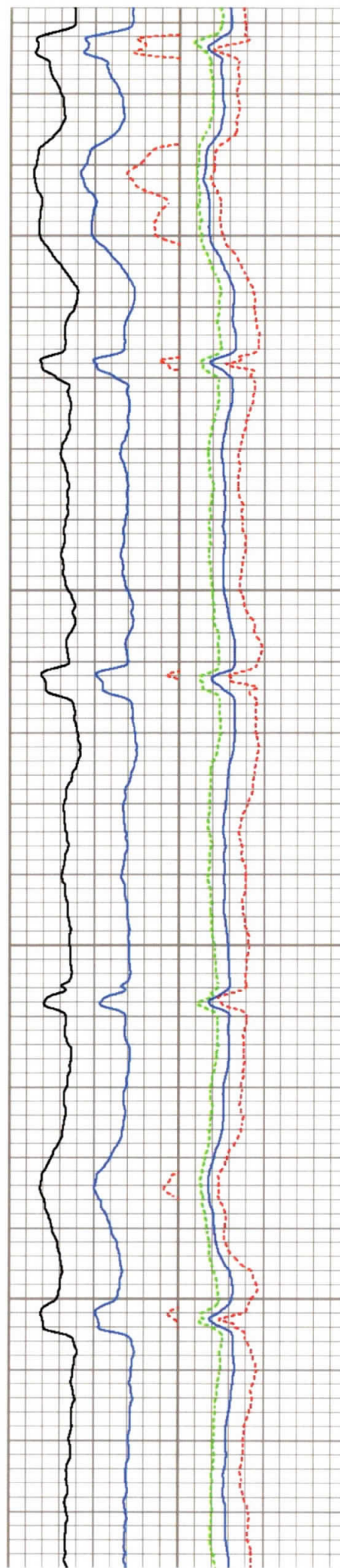


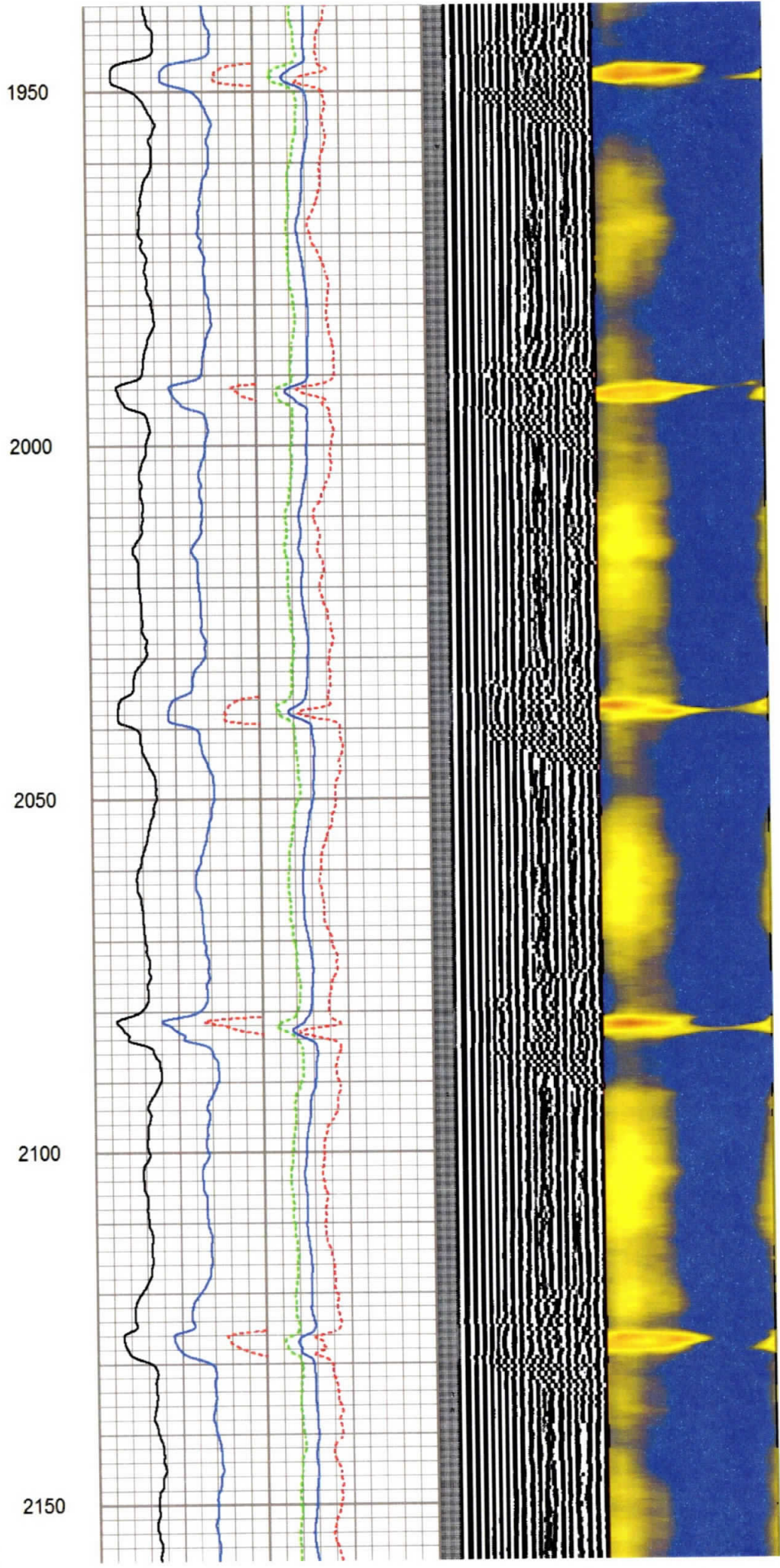
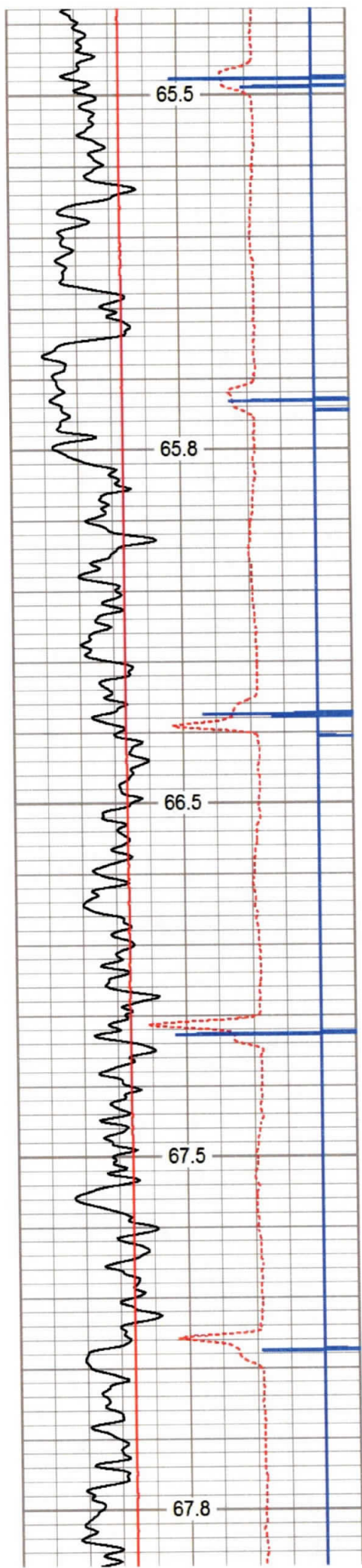
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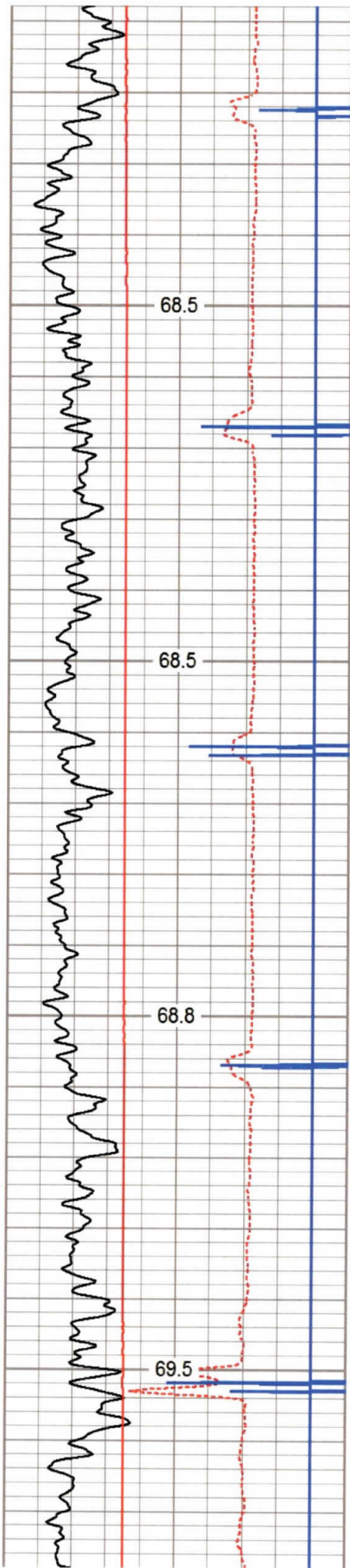
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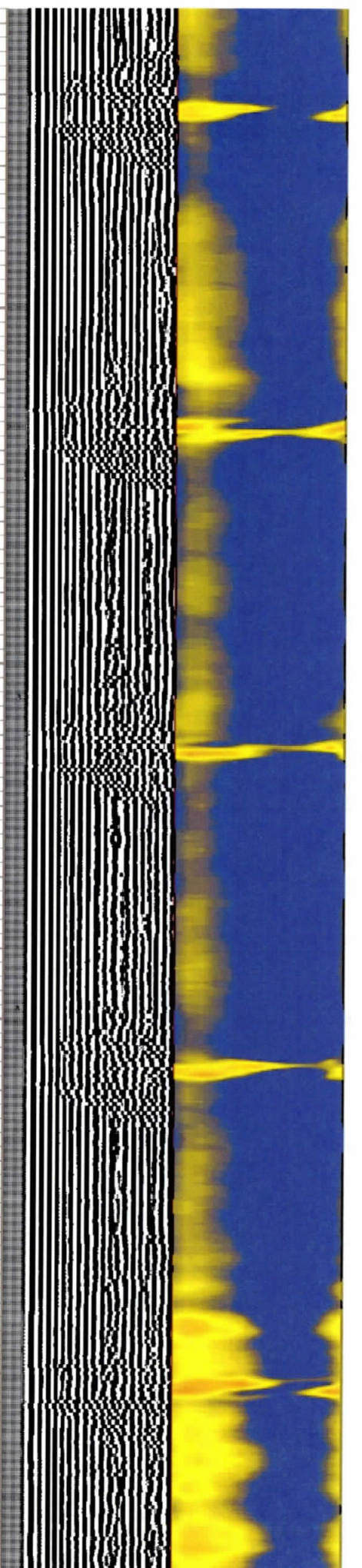
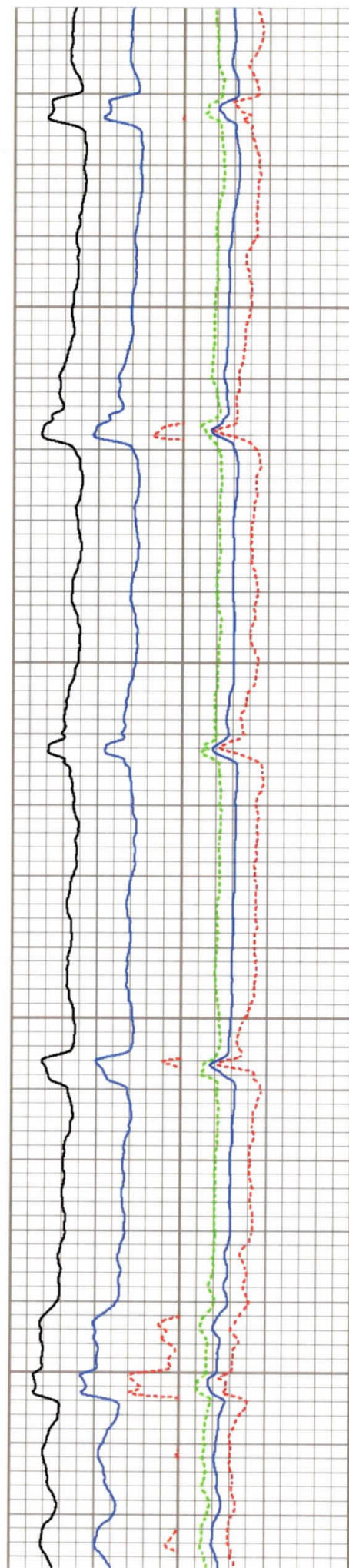


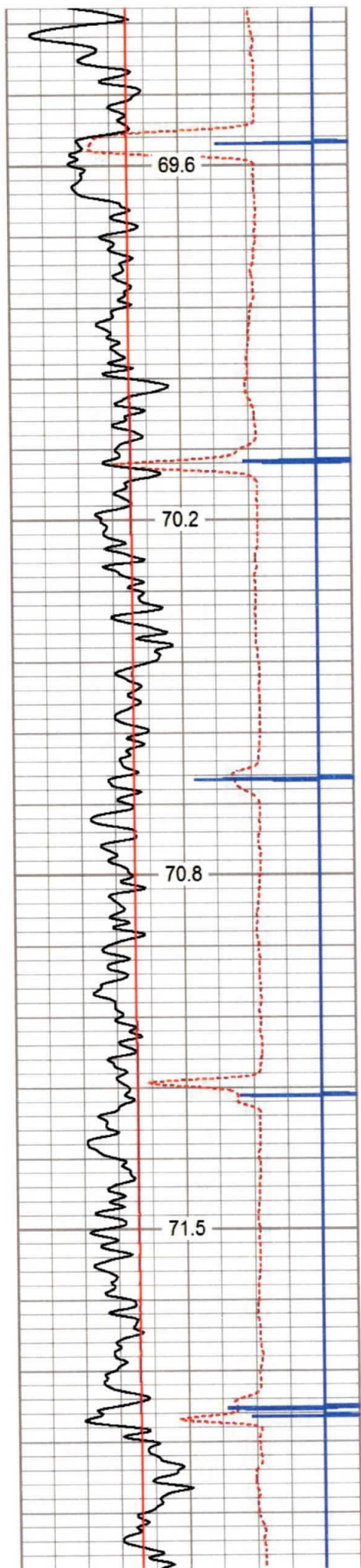
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2350



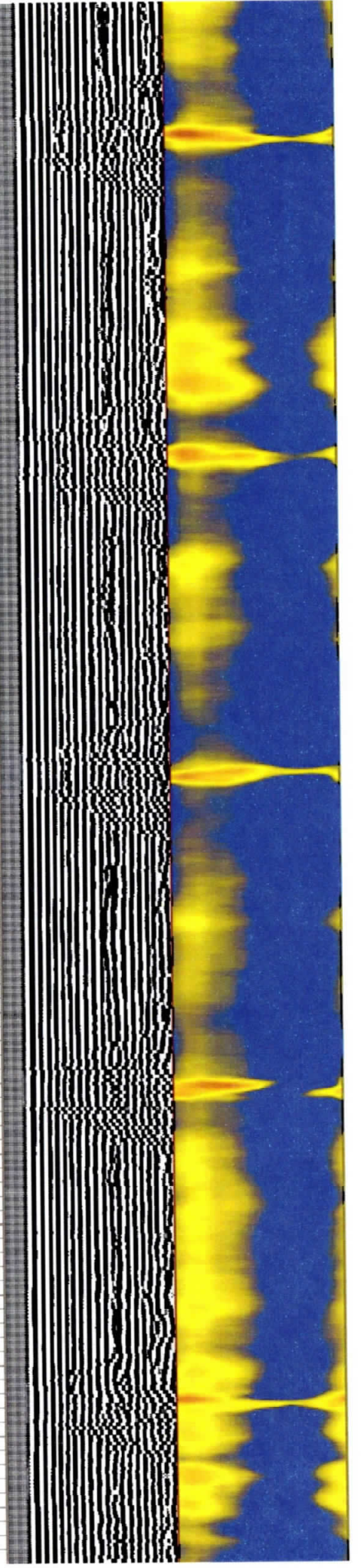
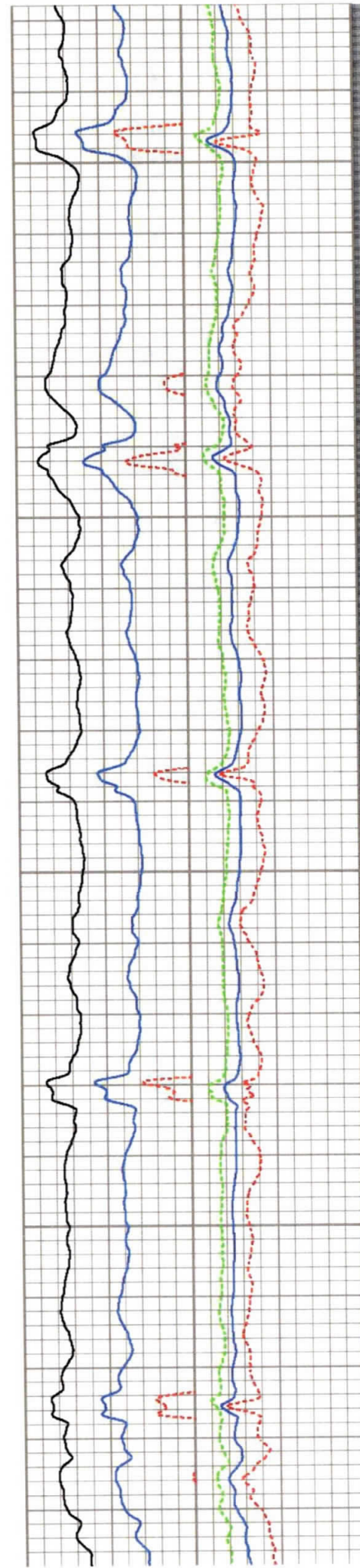


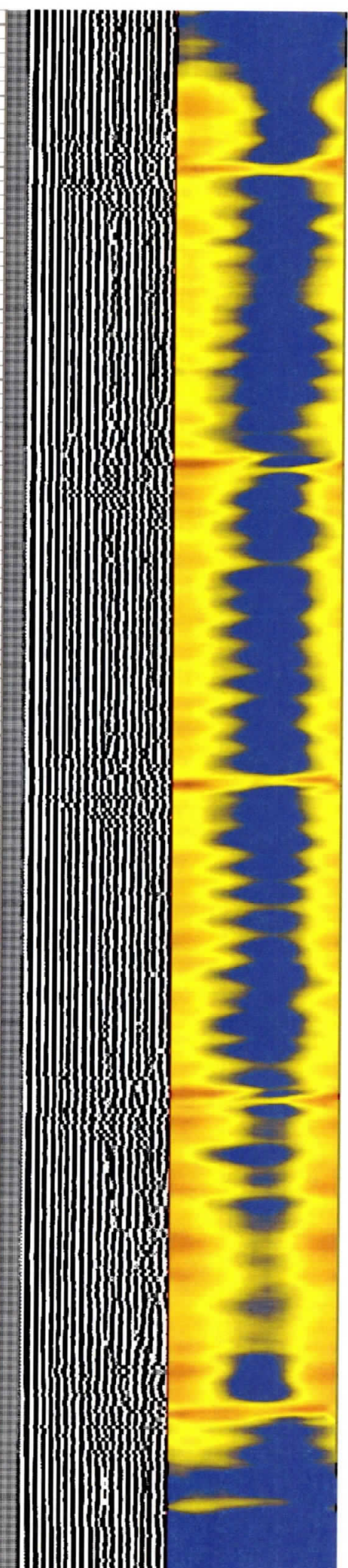
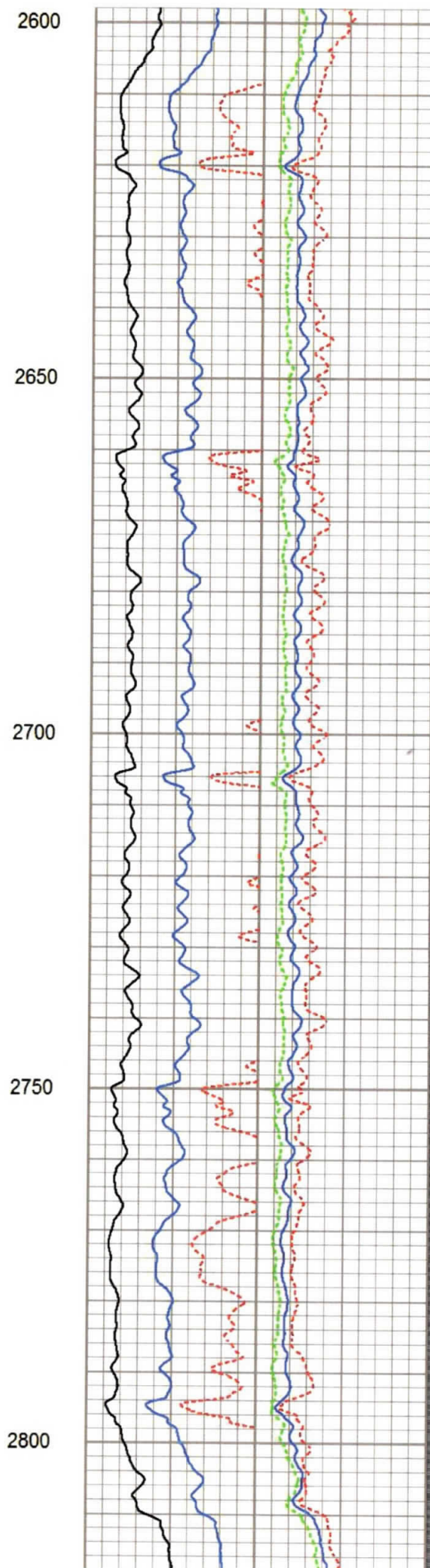
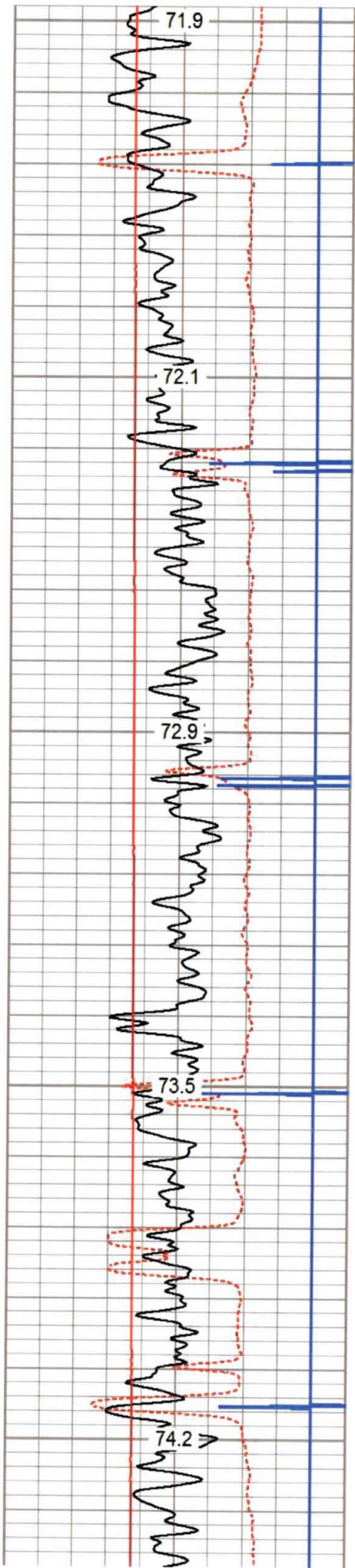
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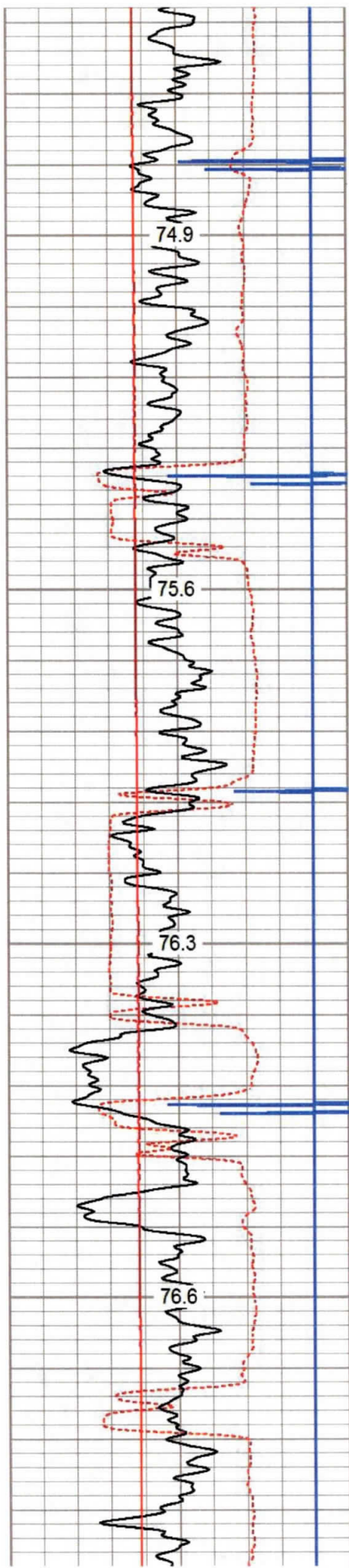
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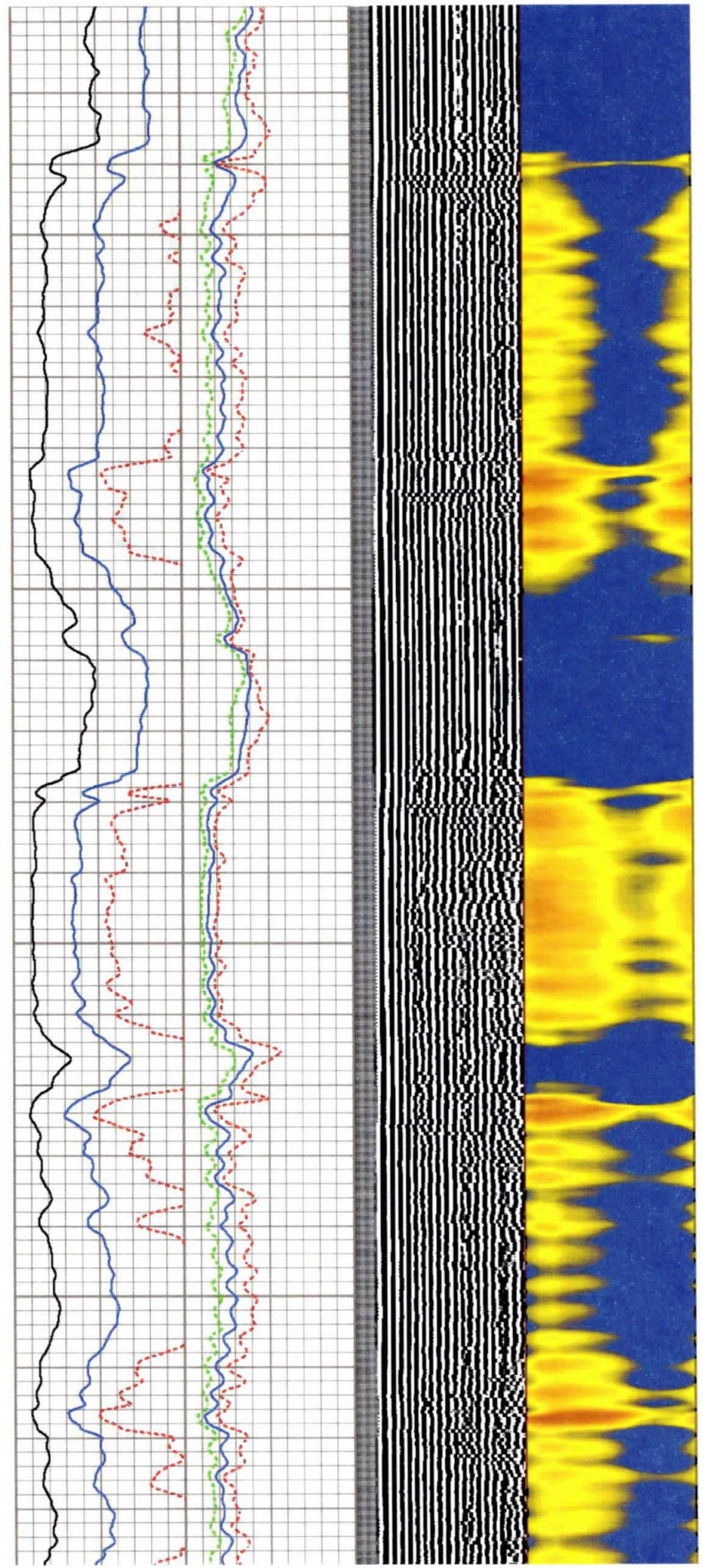


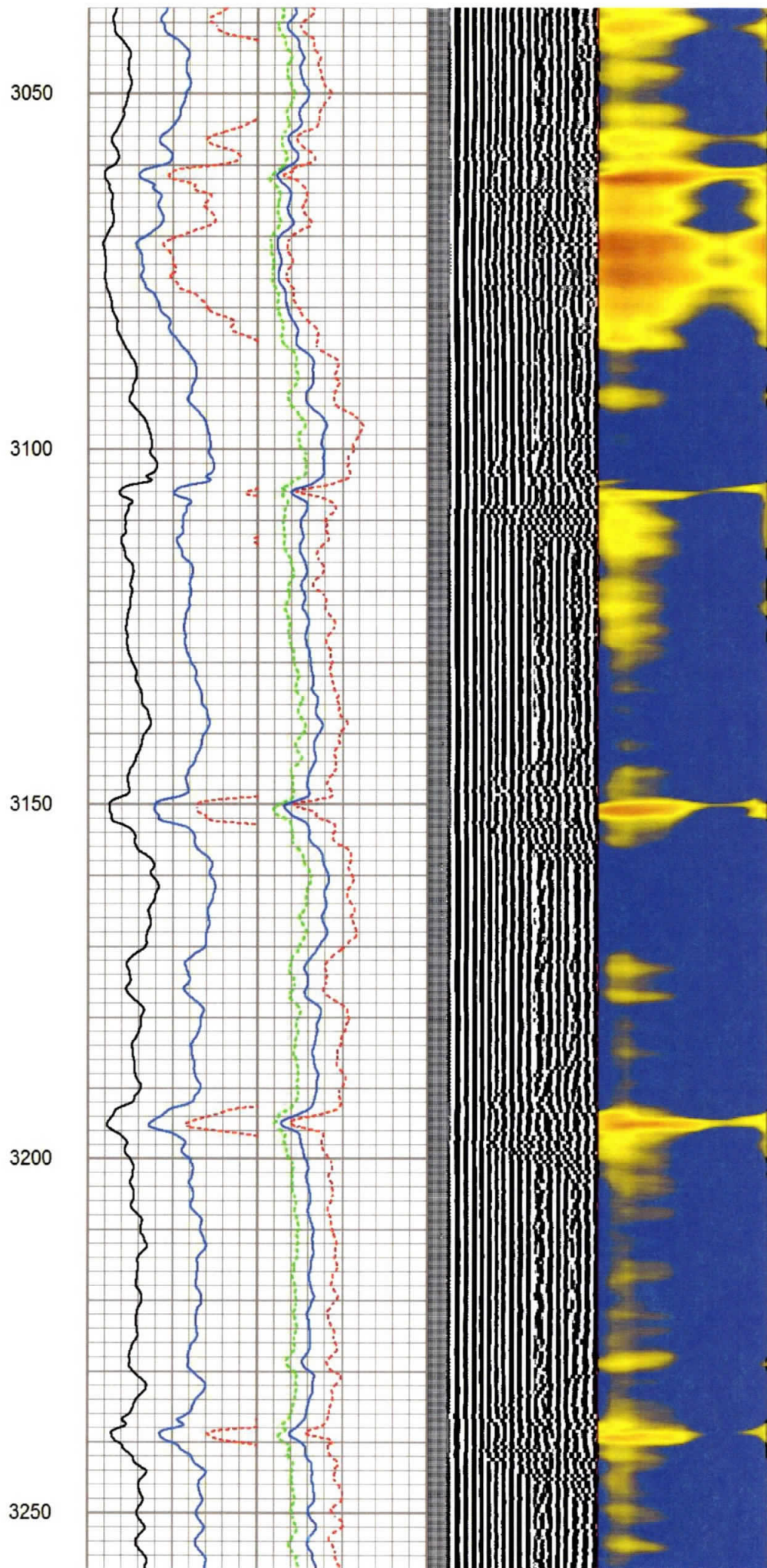
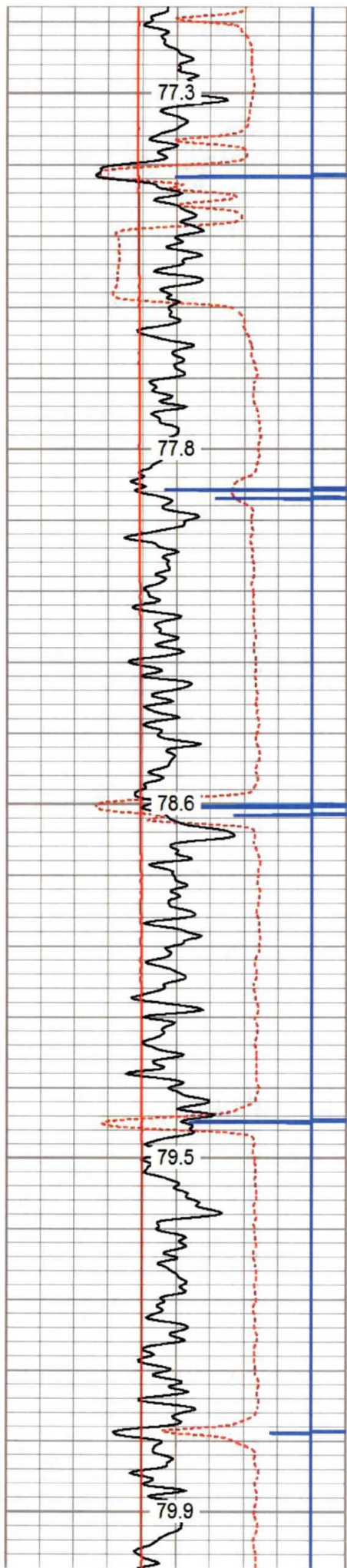
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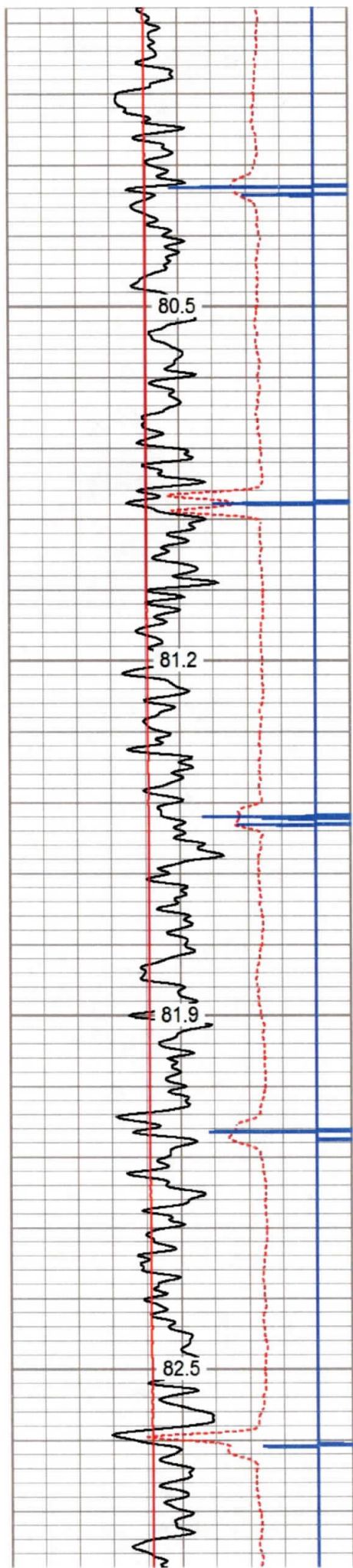
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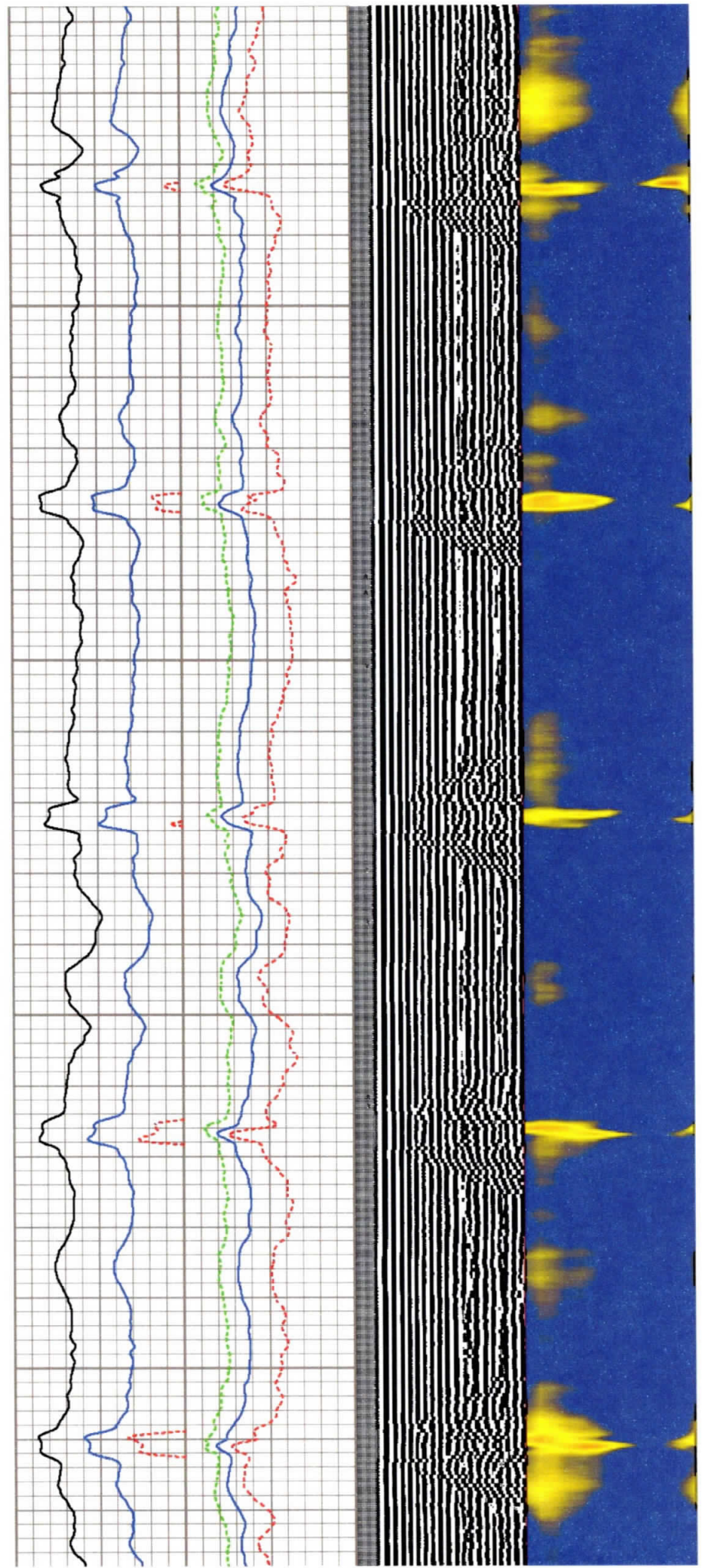


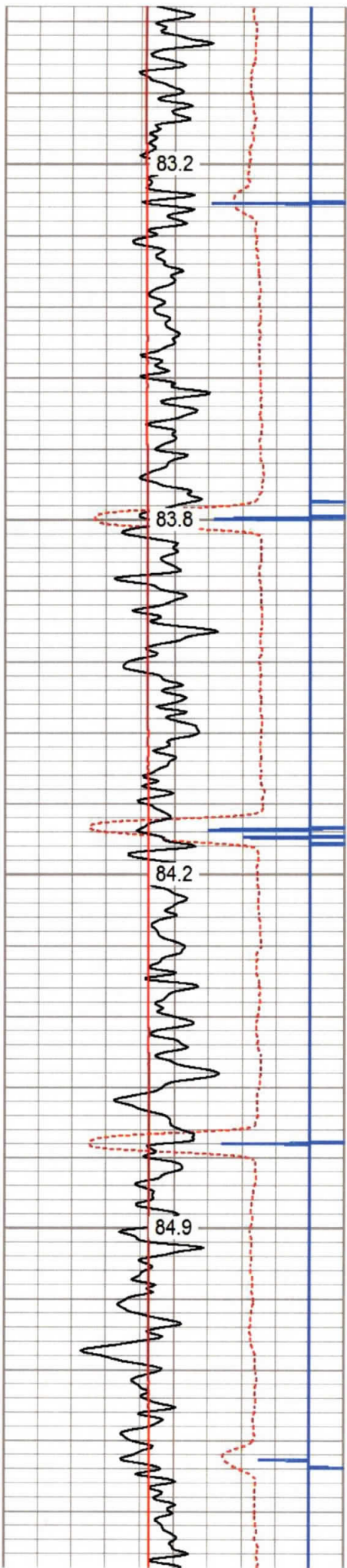
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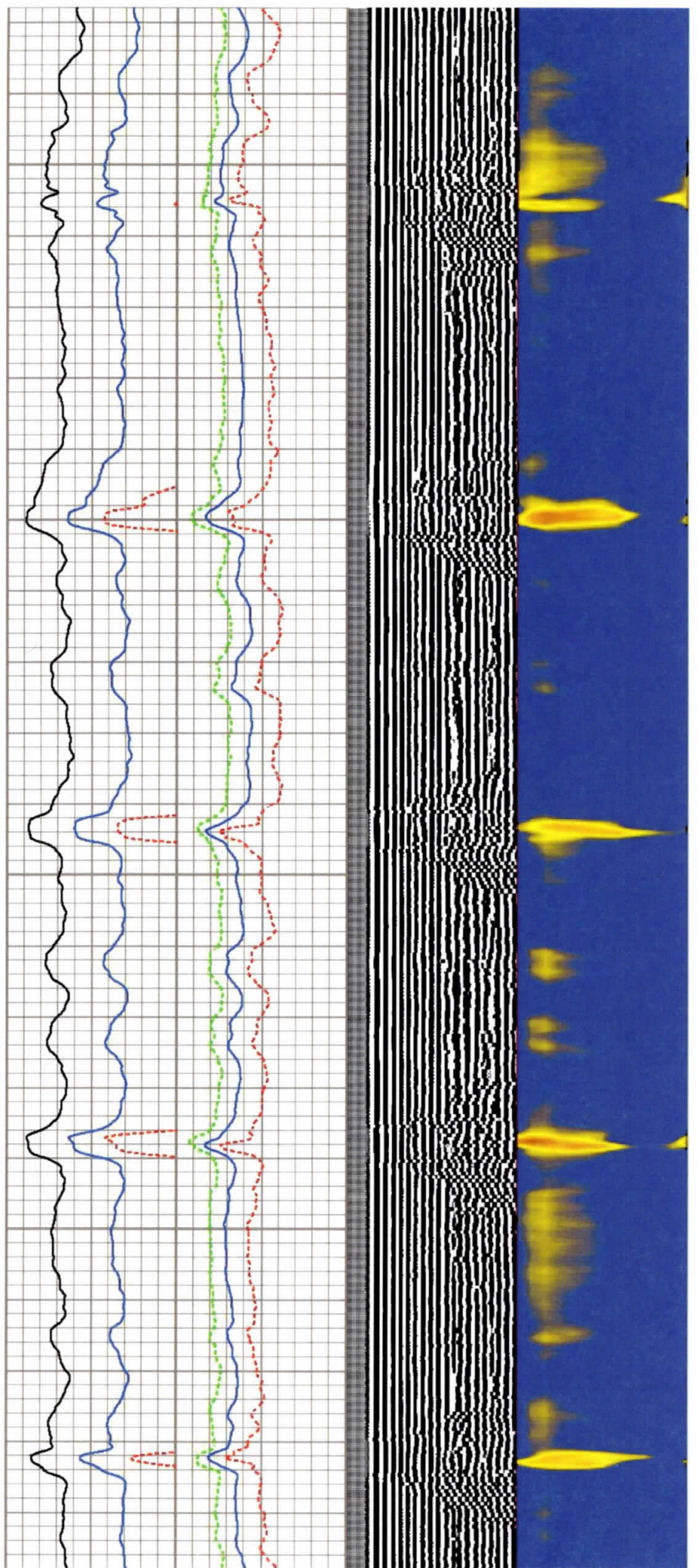


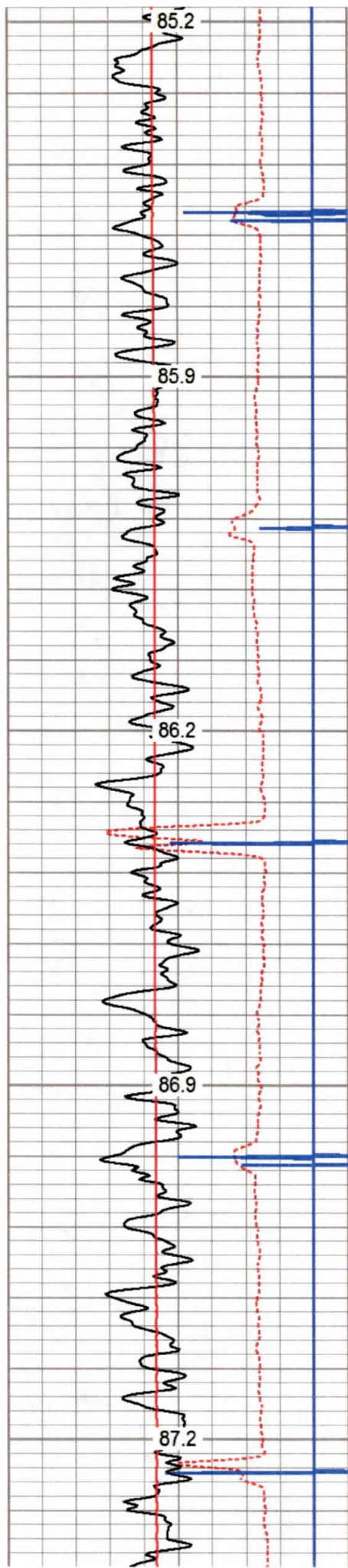
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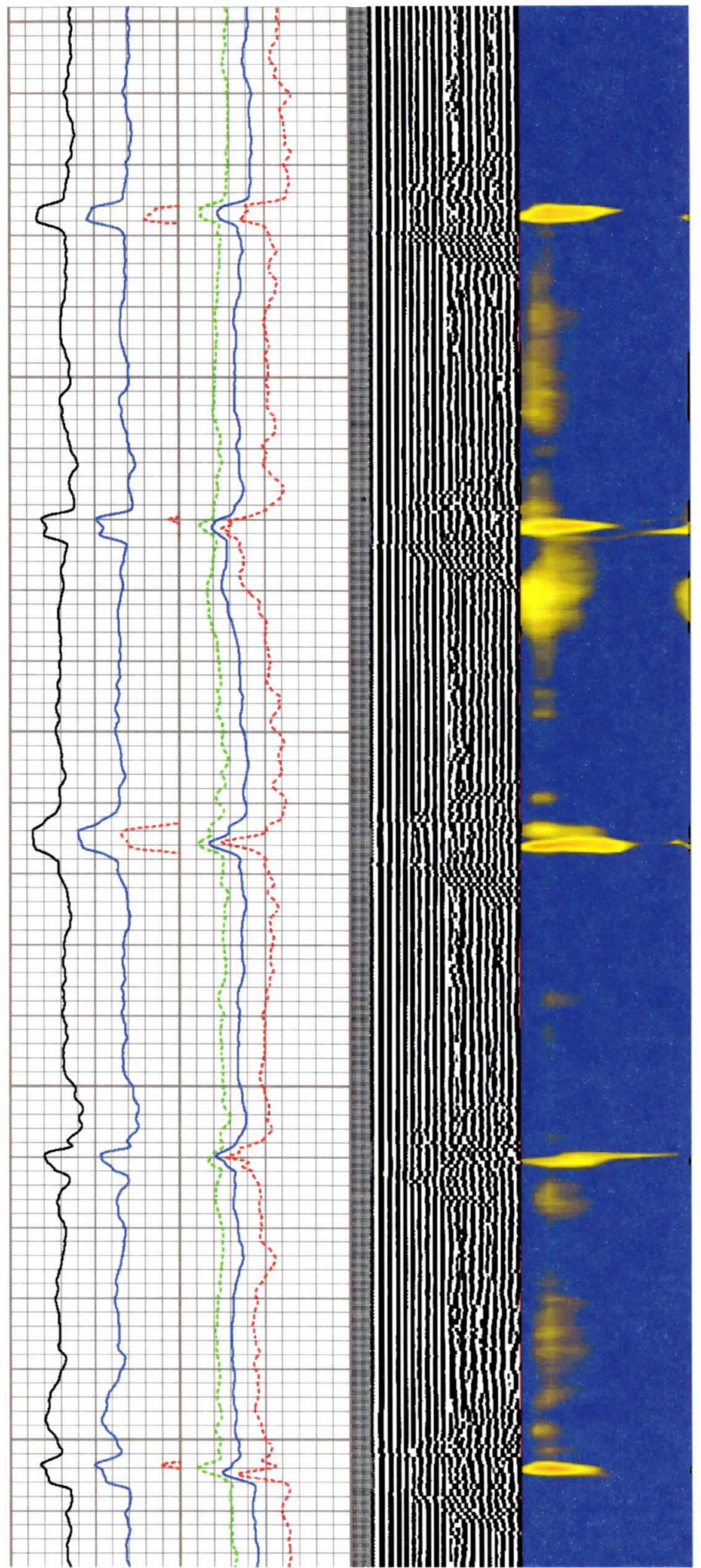
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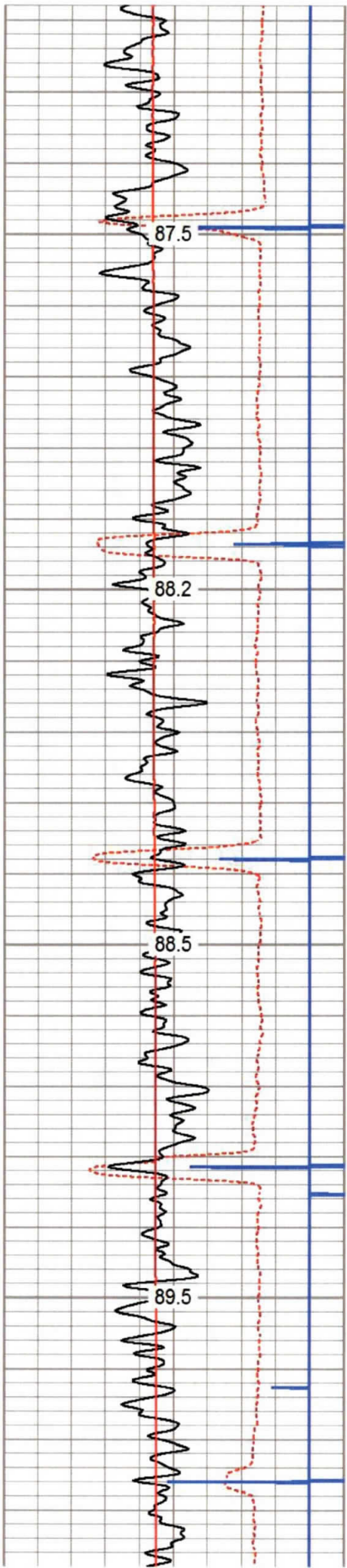
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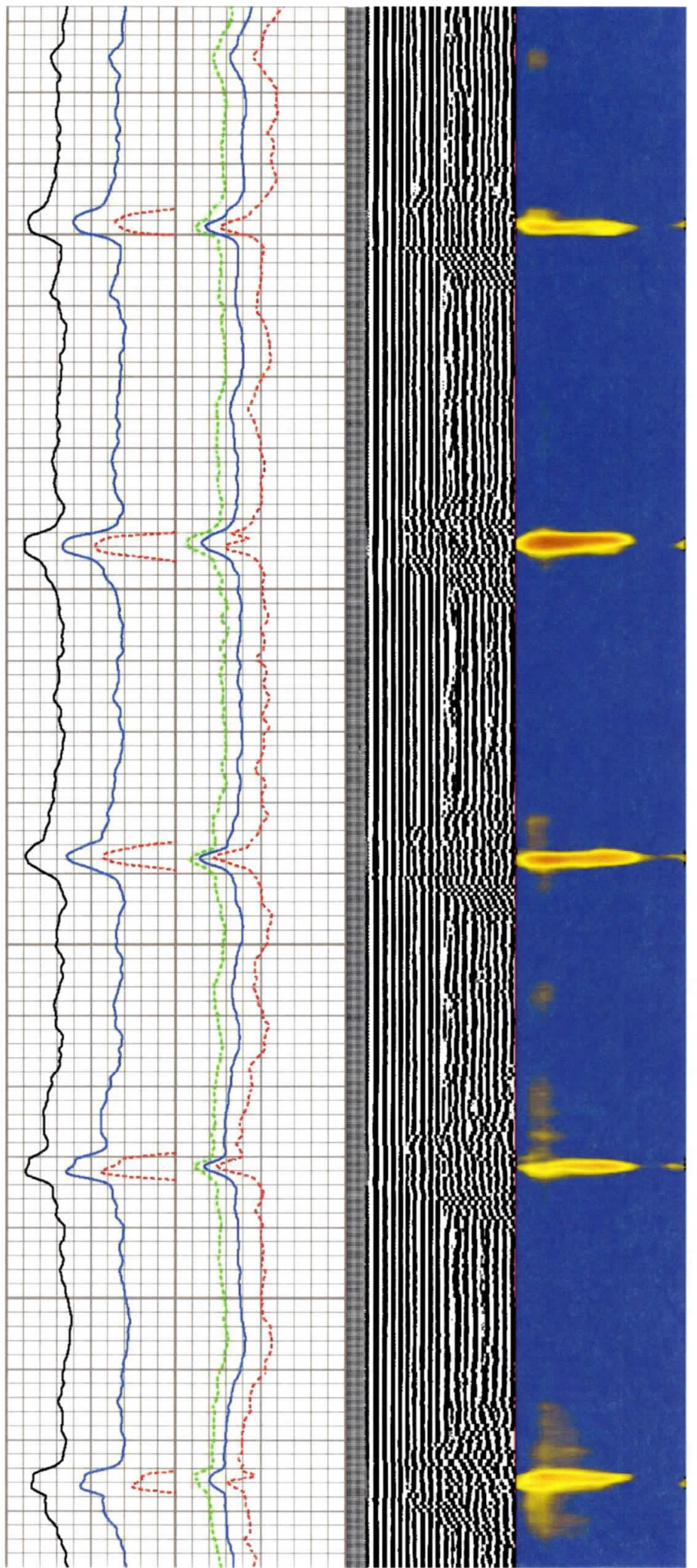


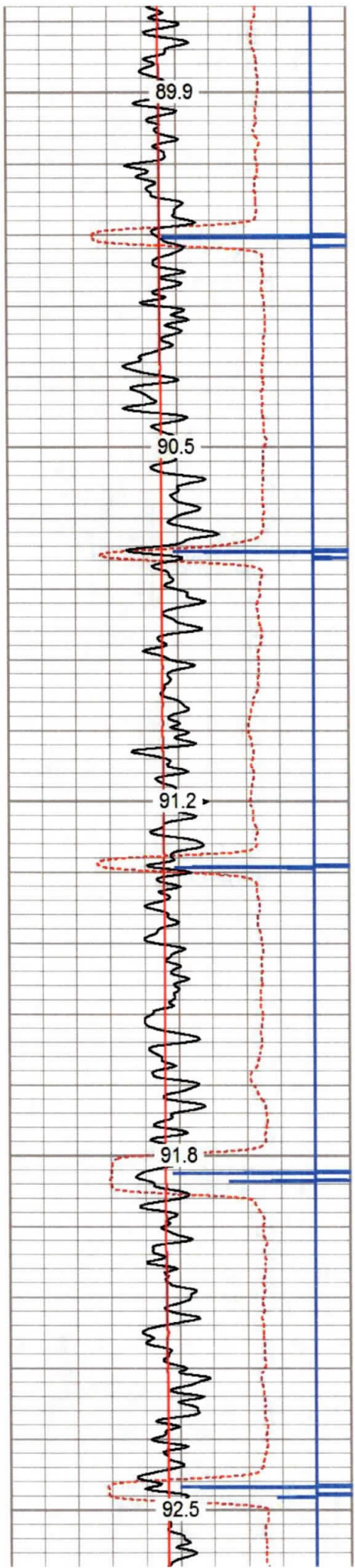
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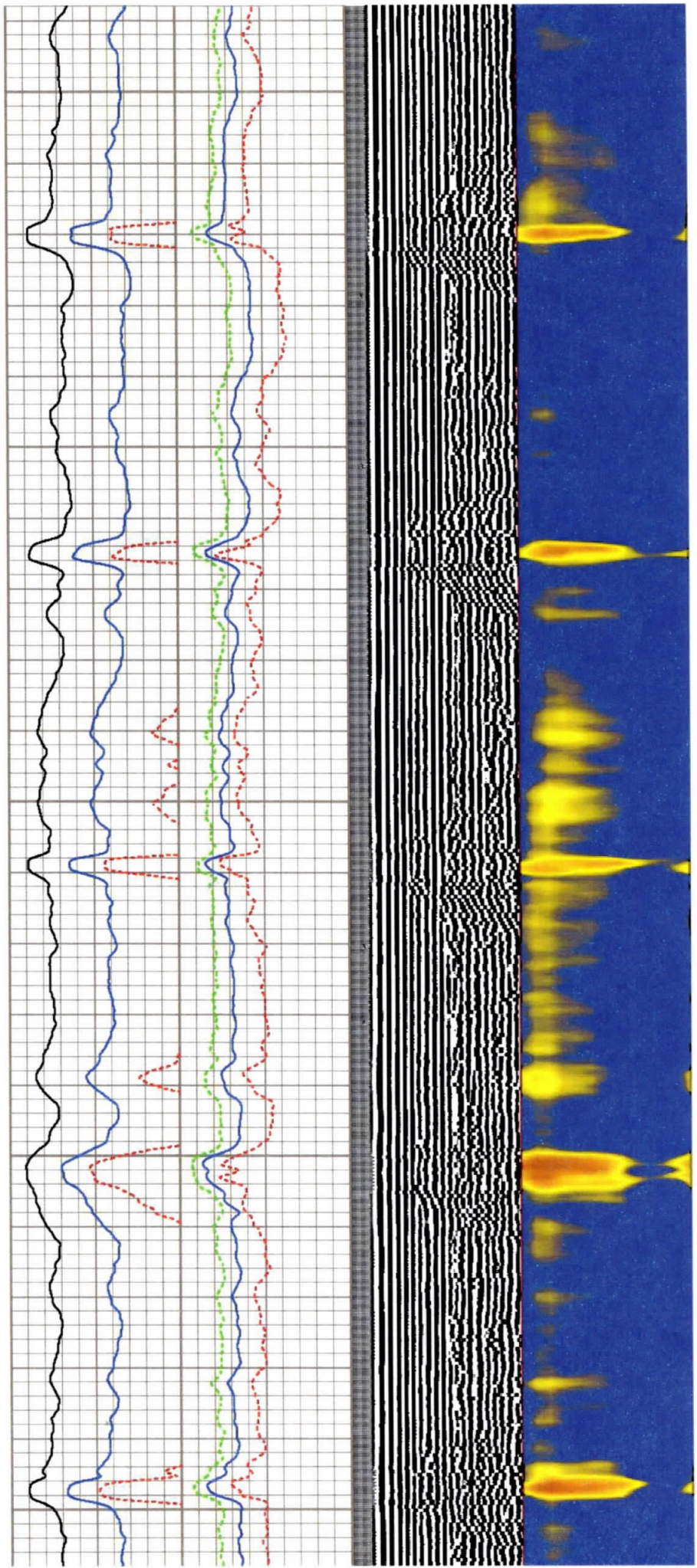
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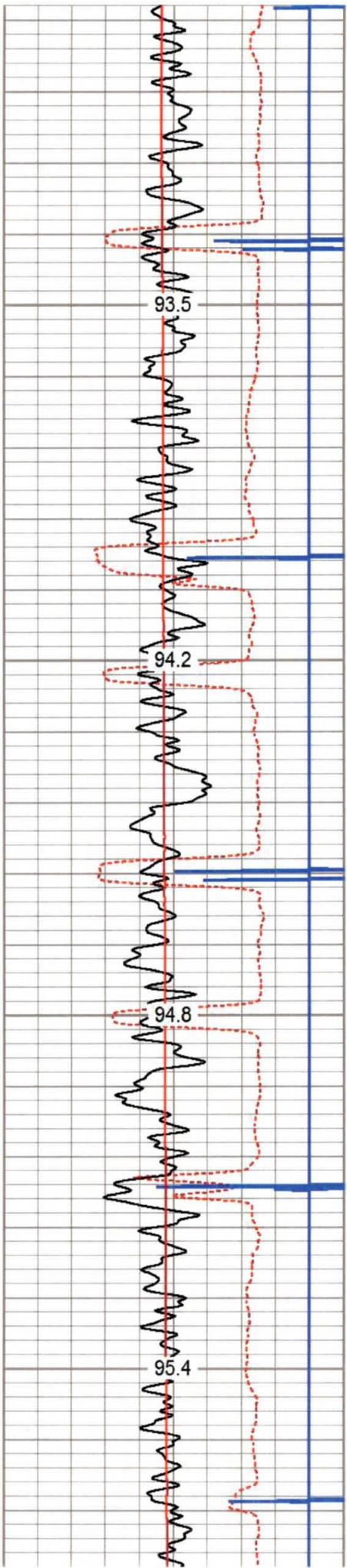
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4200
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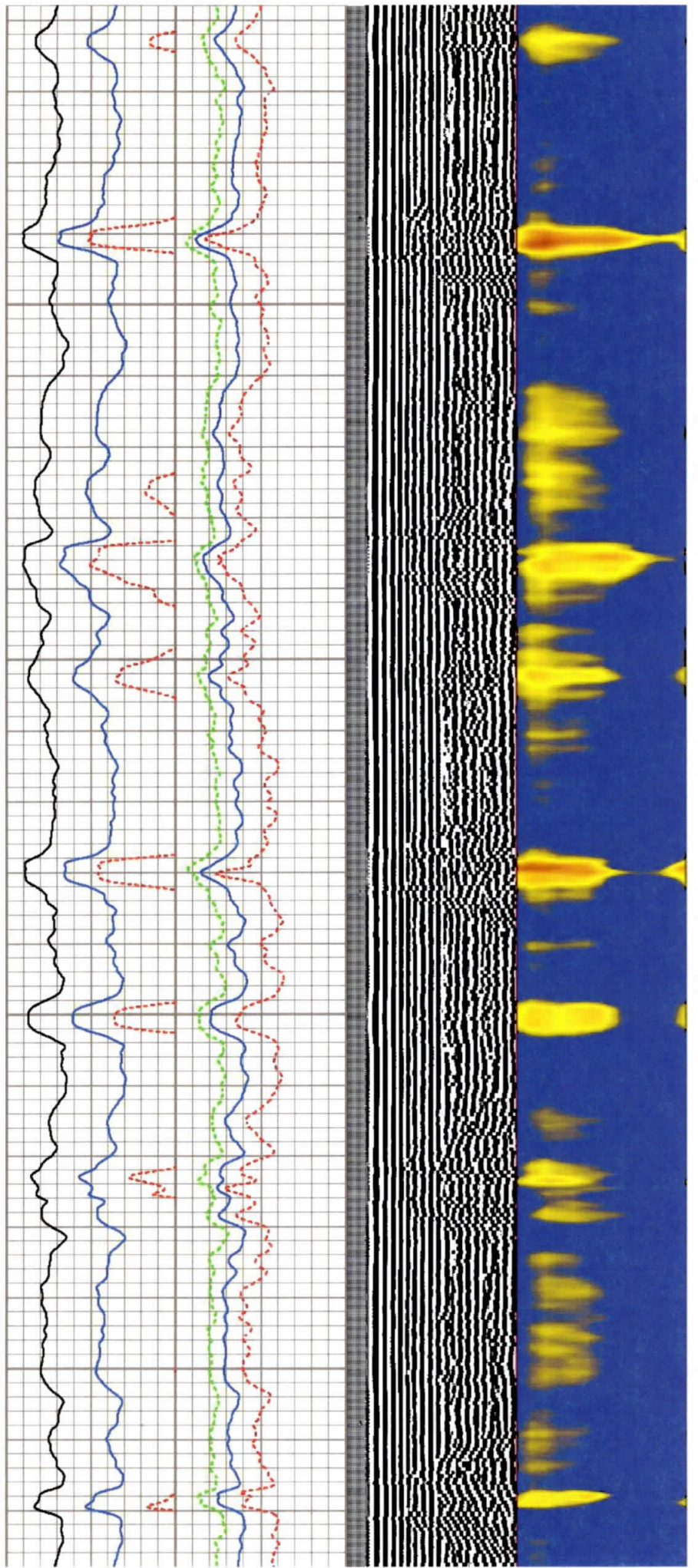


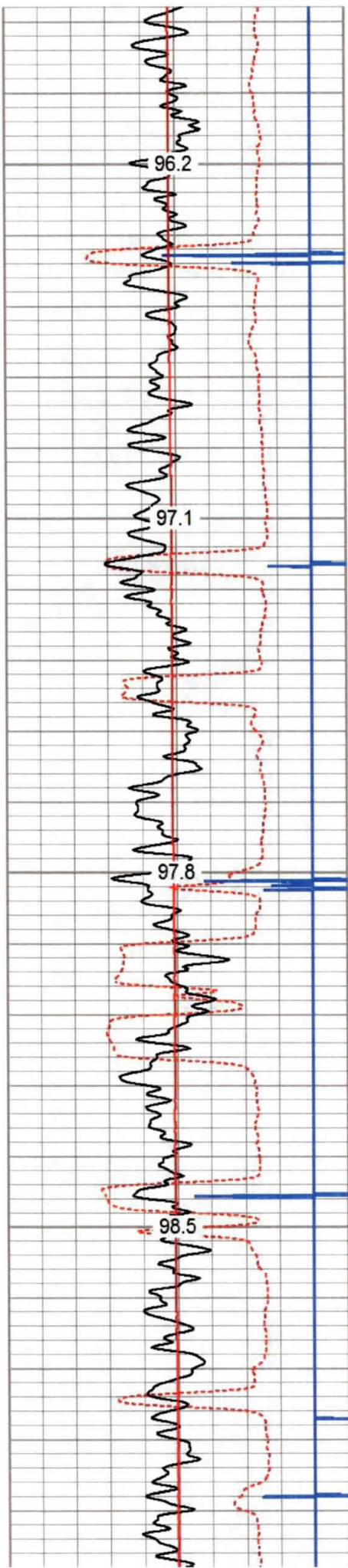
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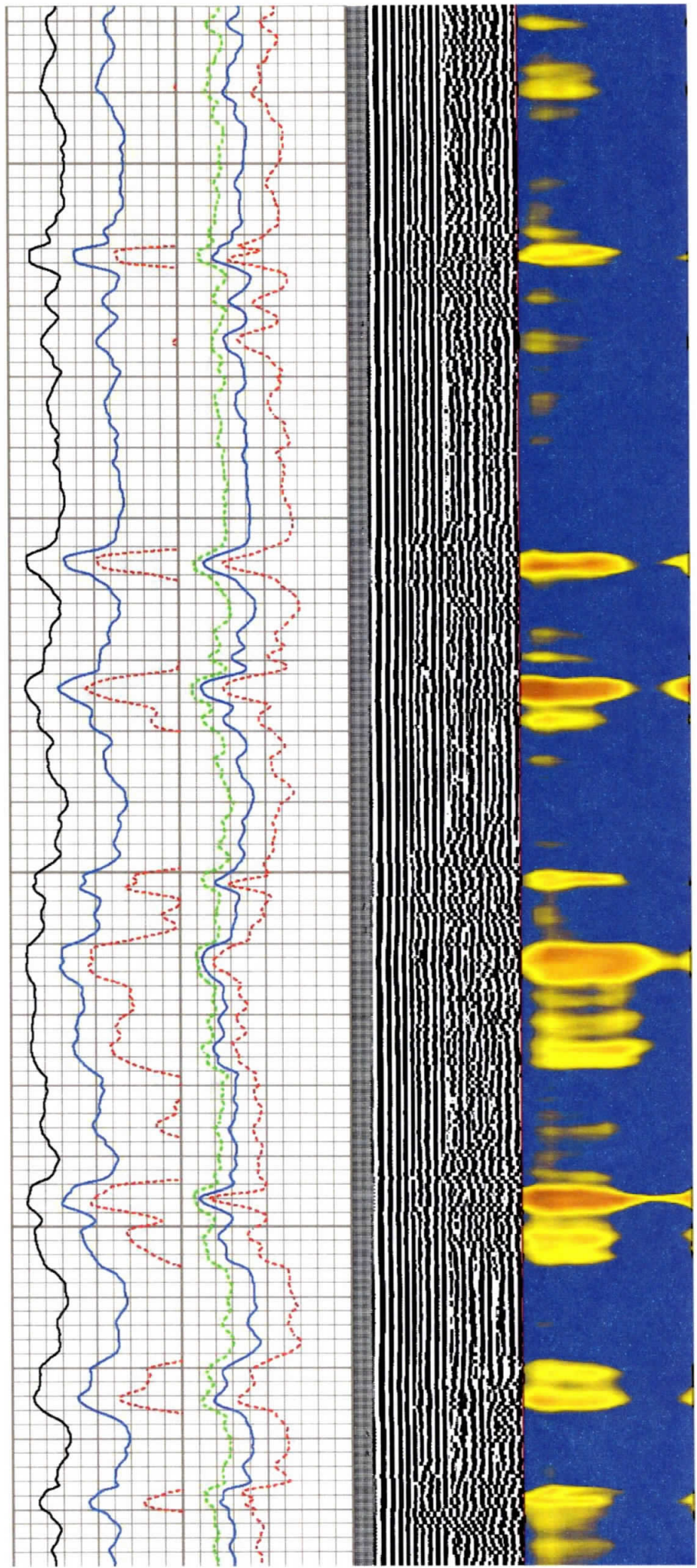


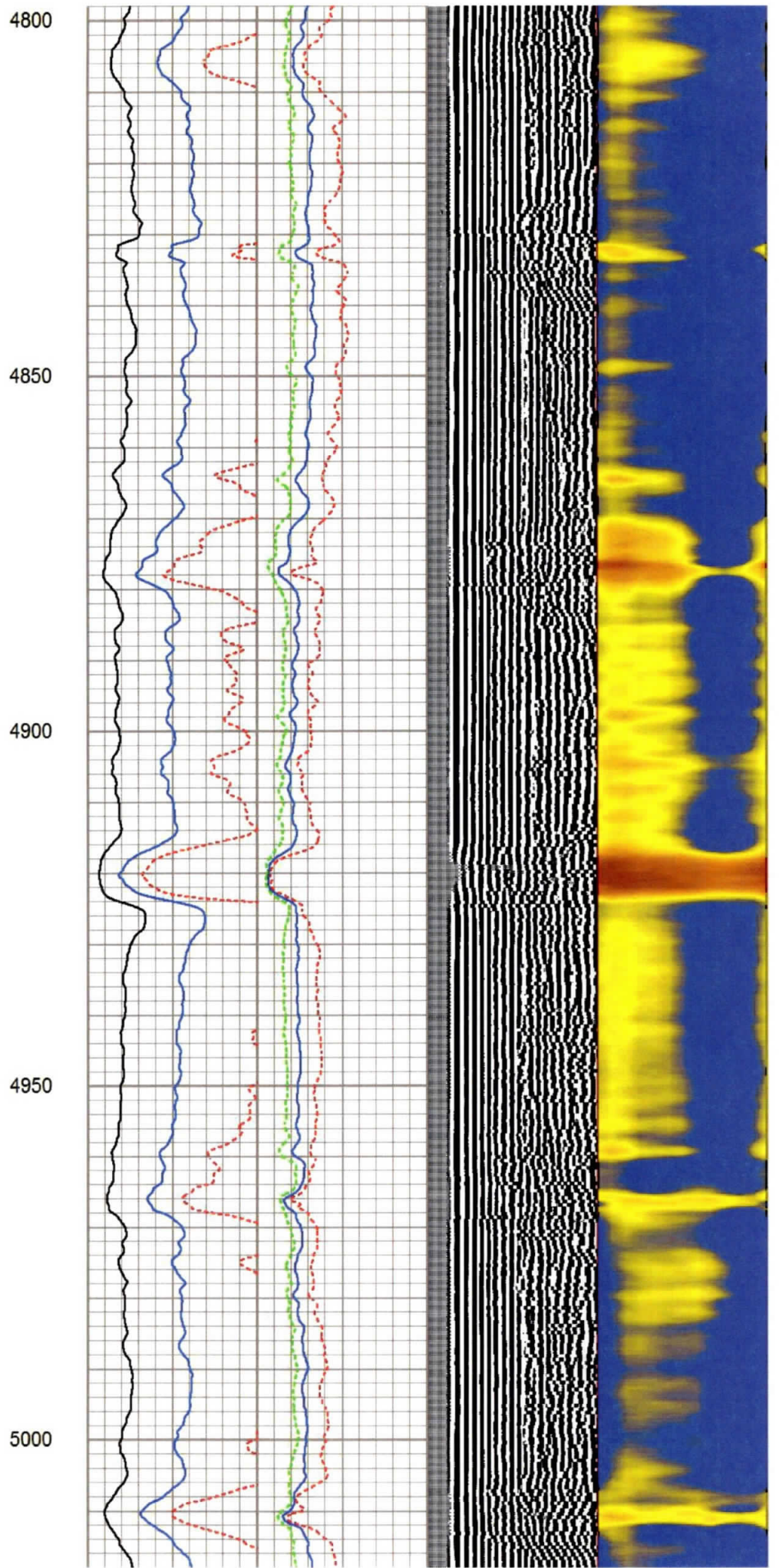
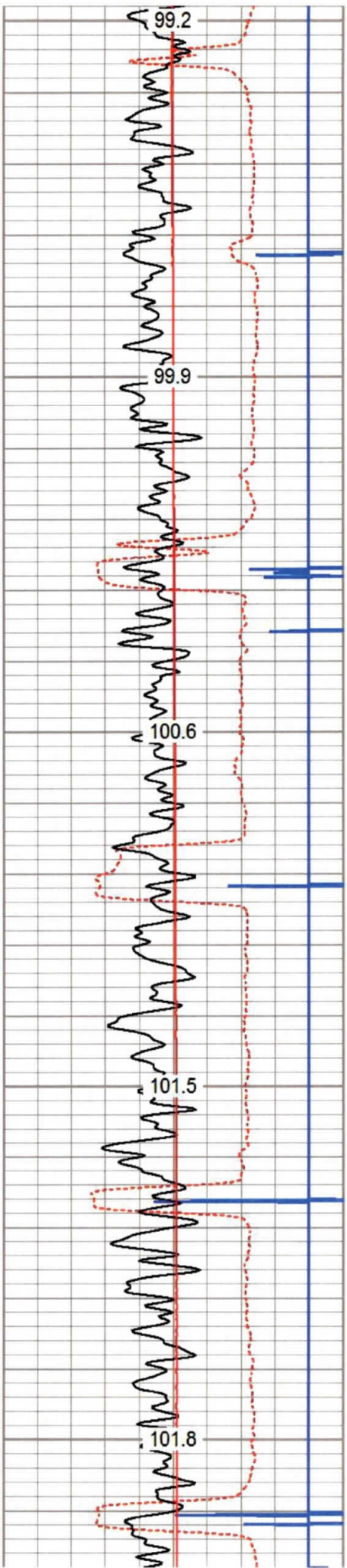
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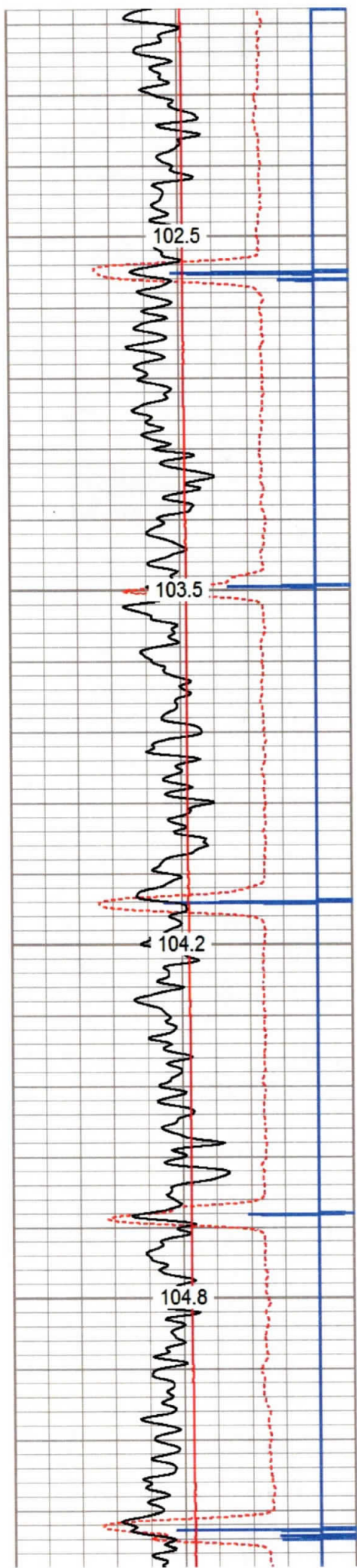
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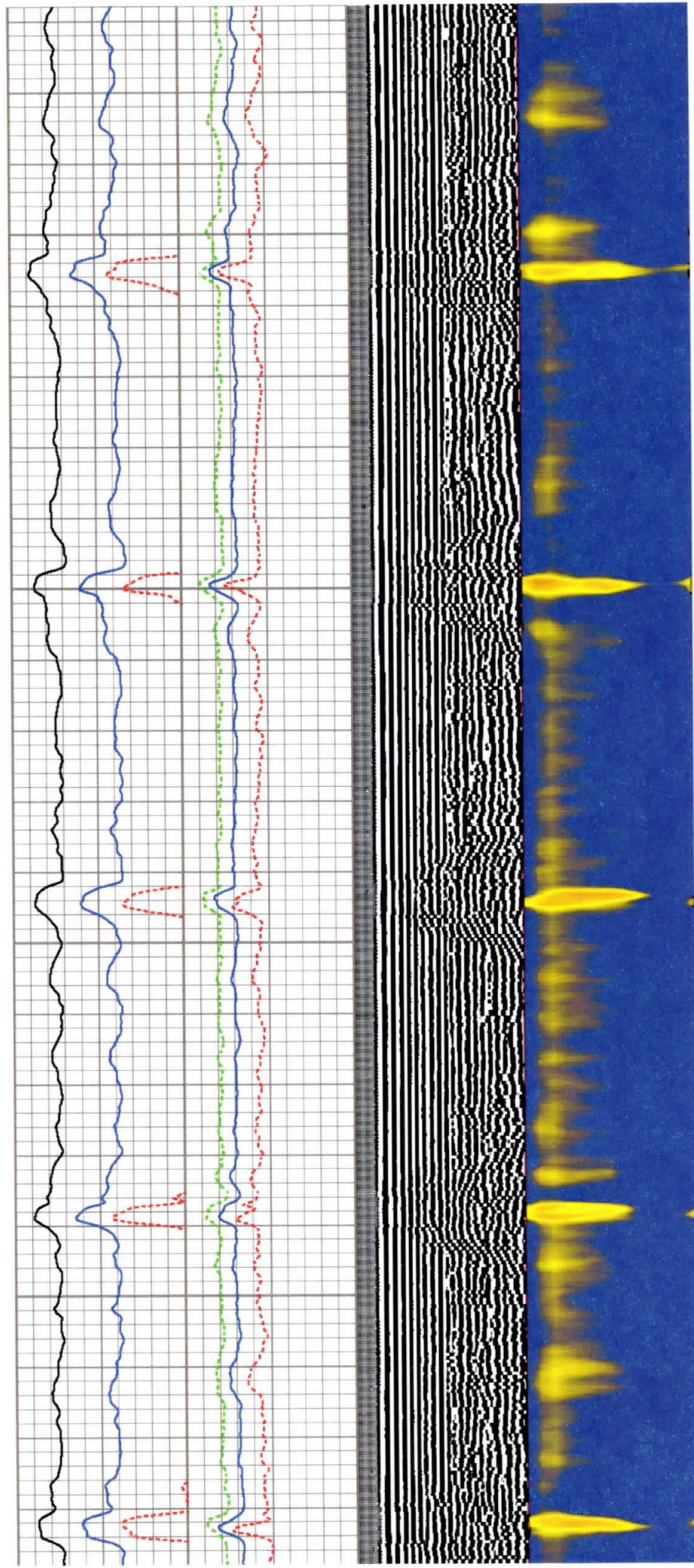
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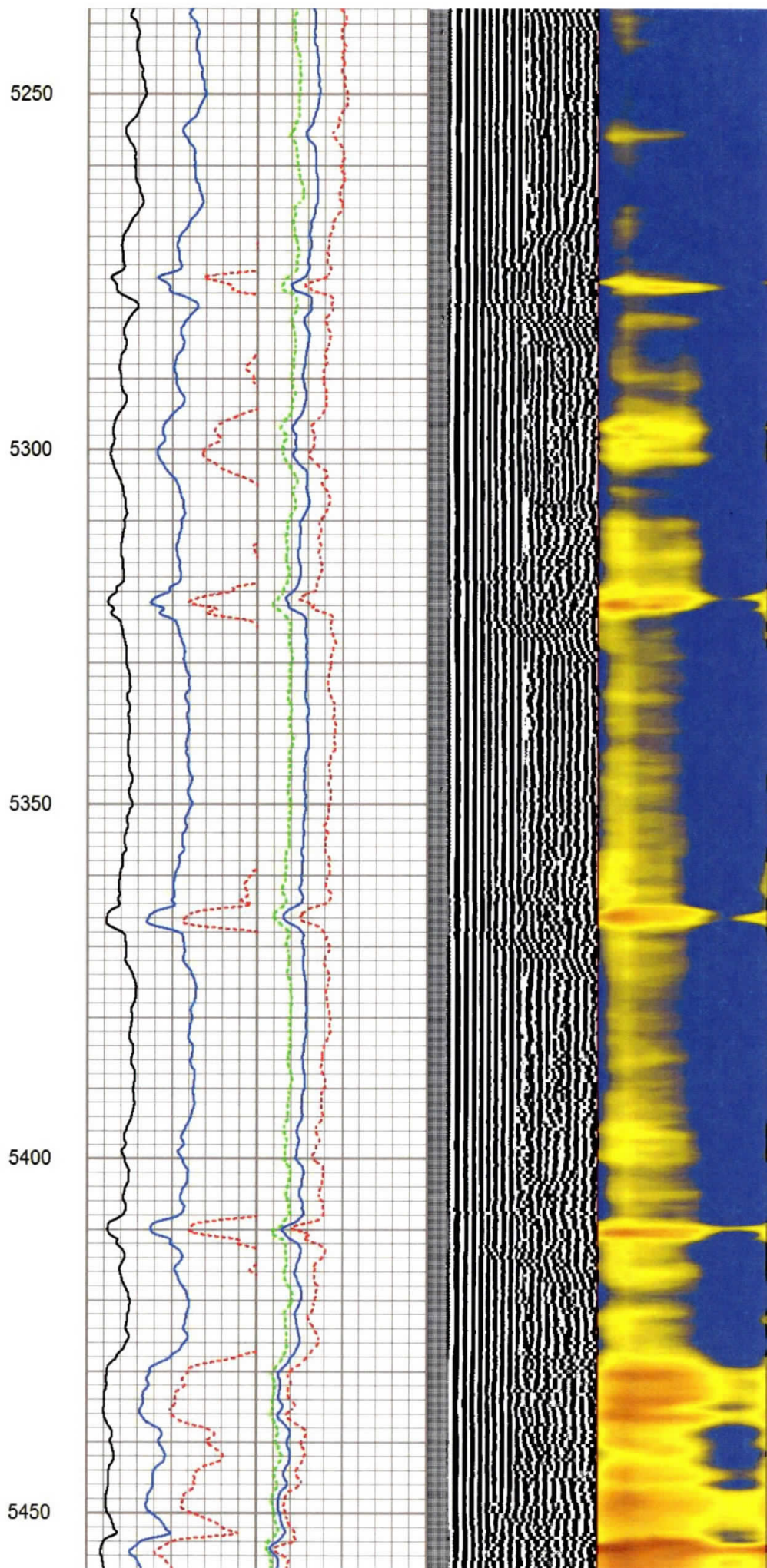
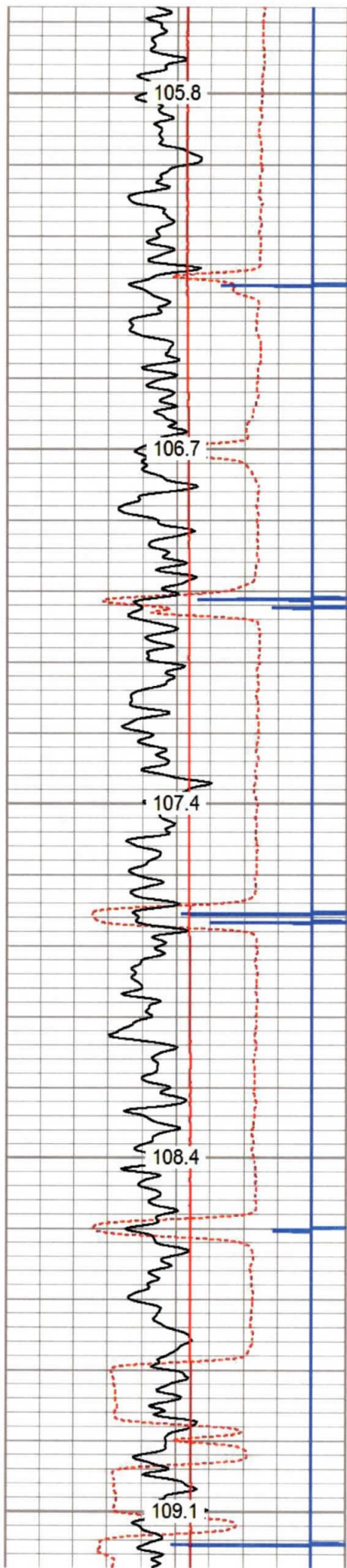


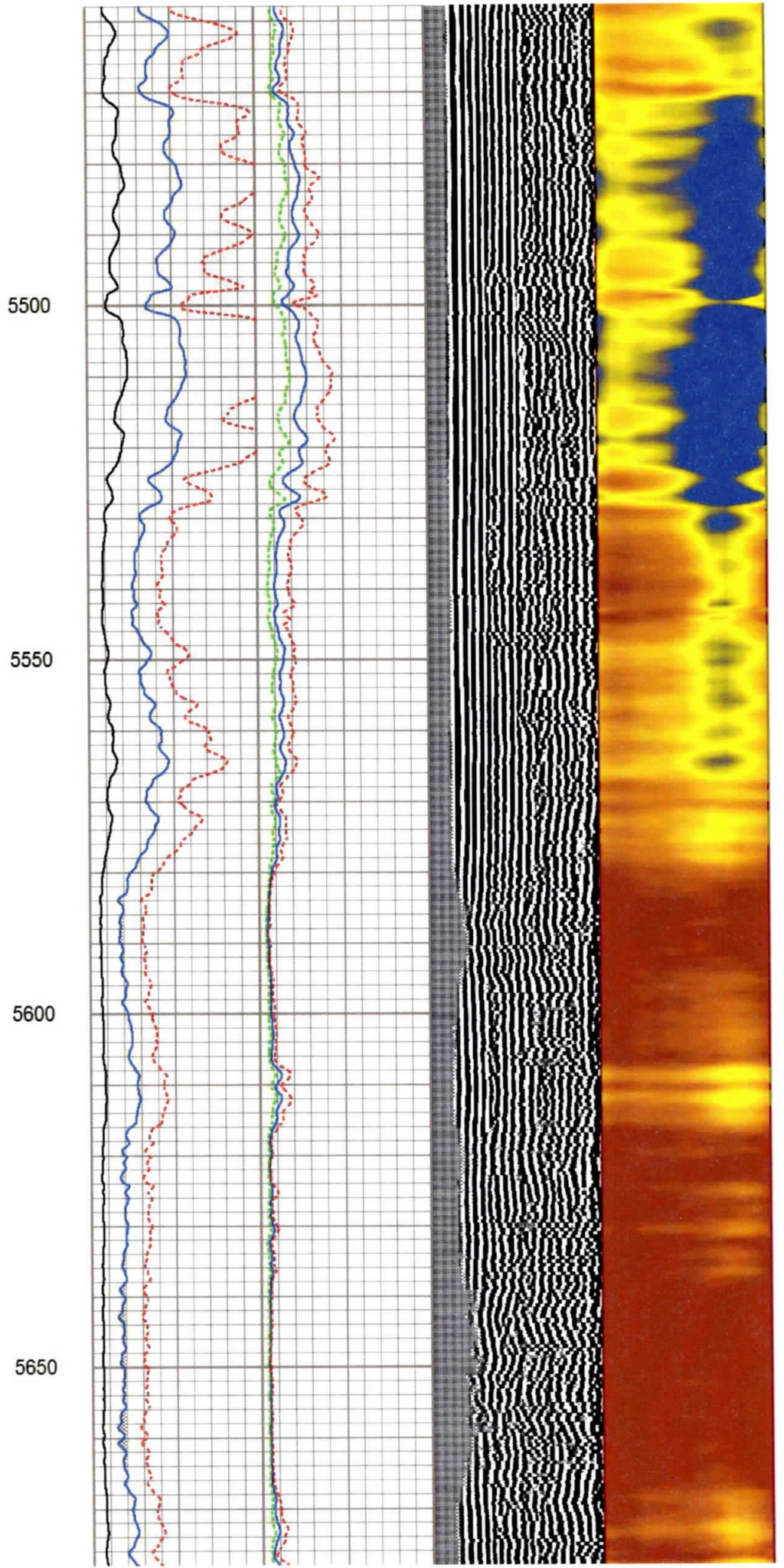
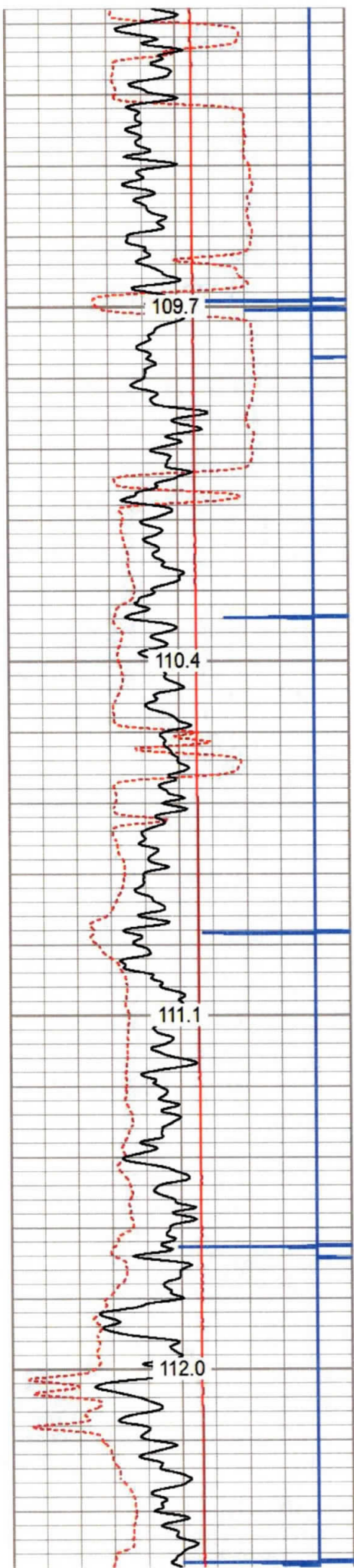


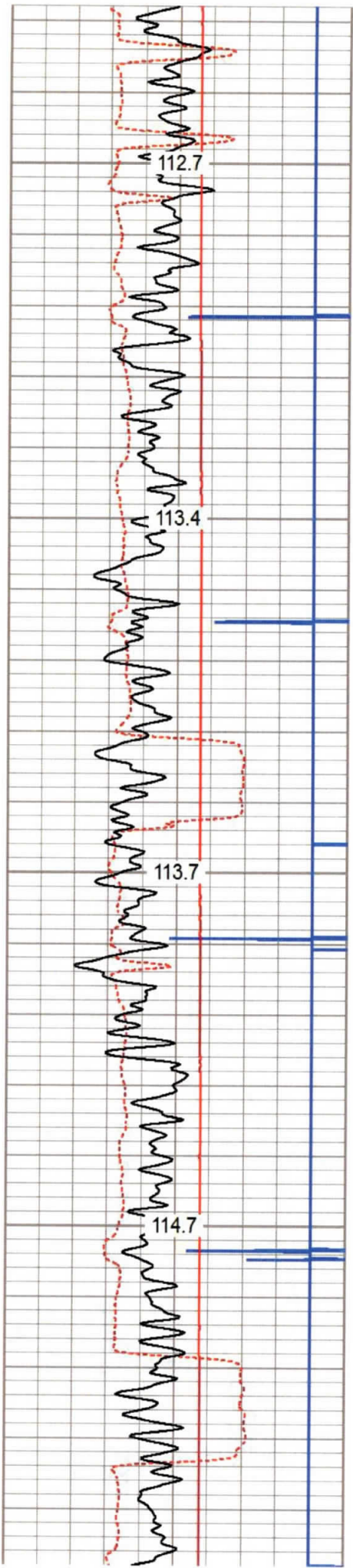


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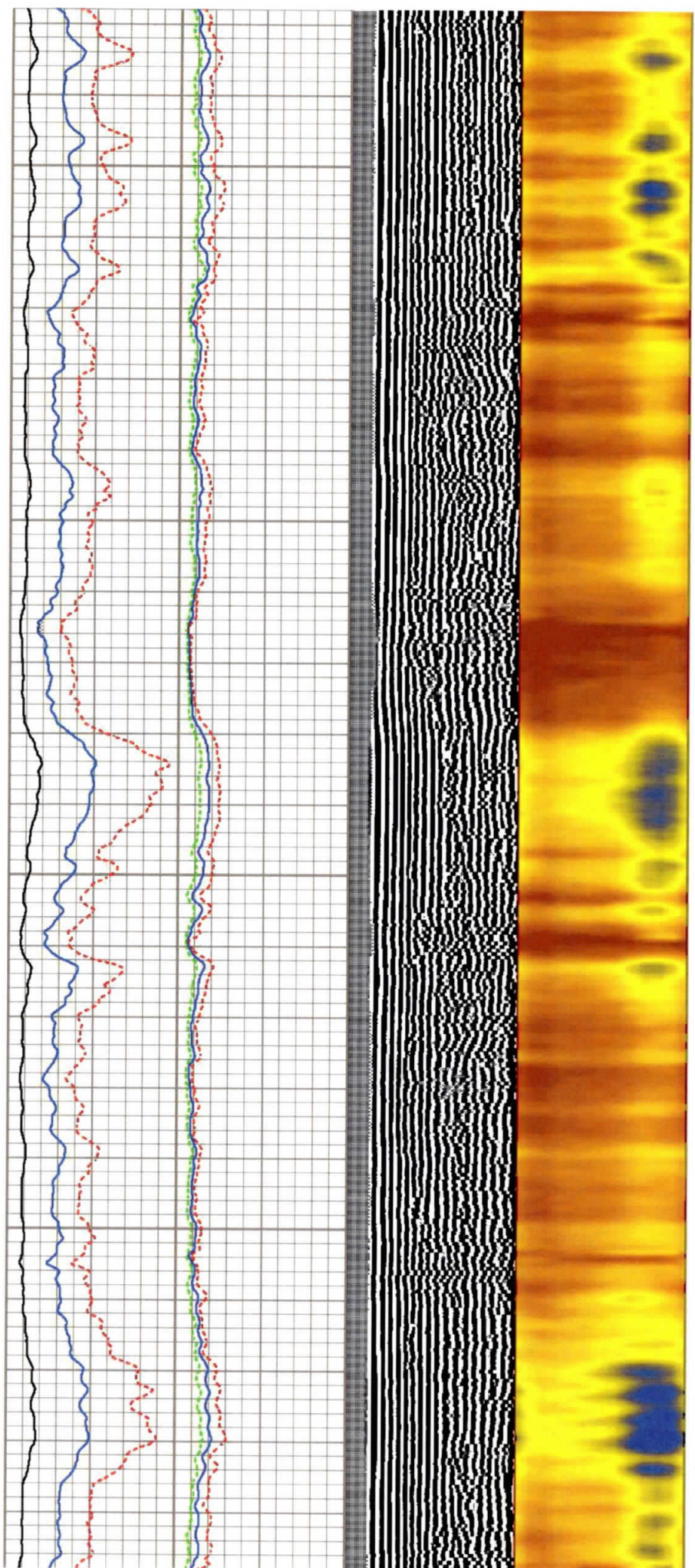


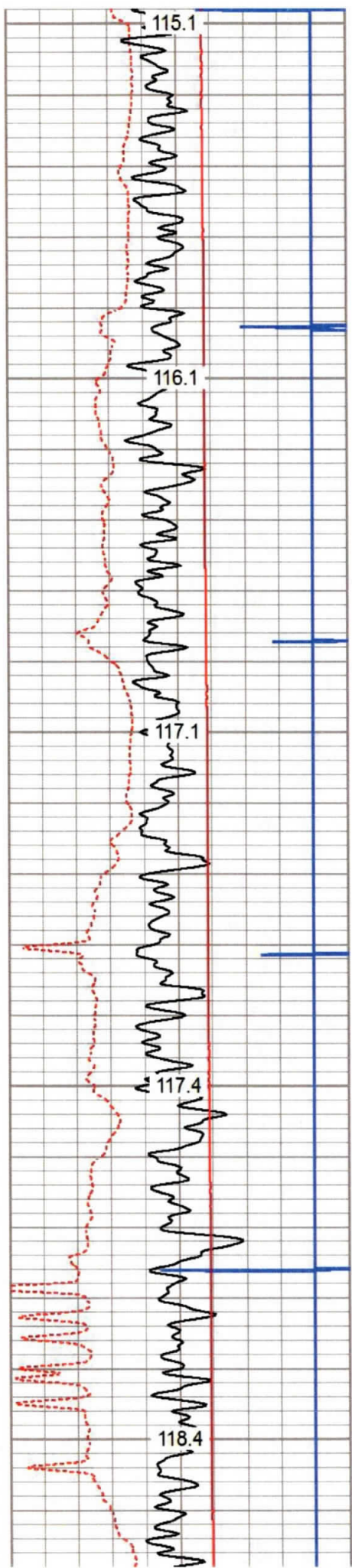
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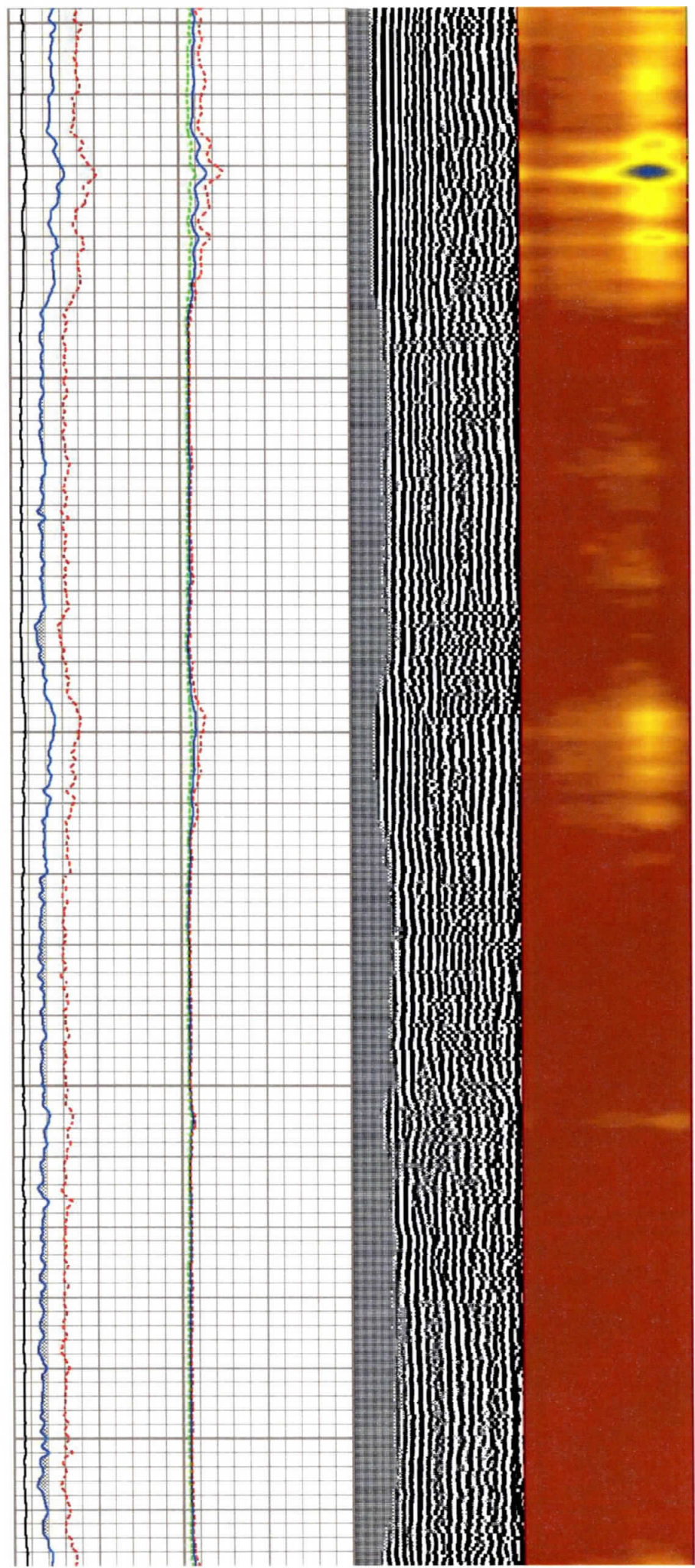
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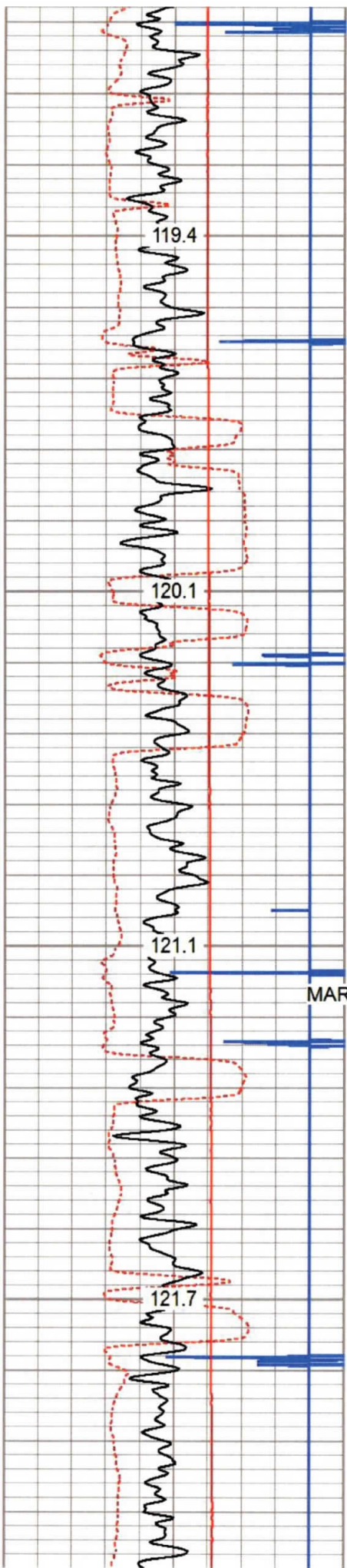
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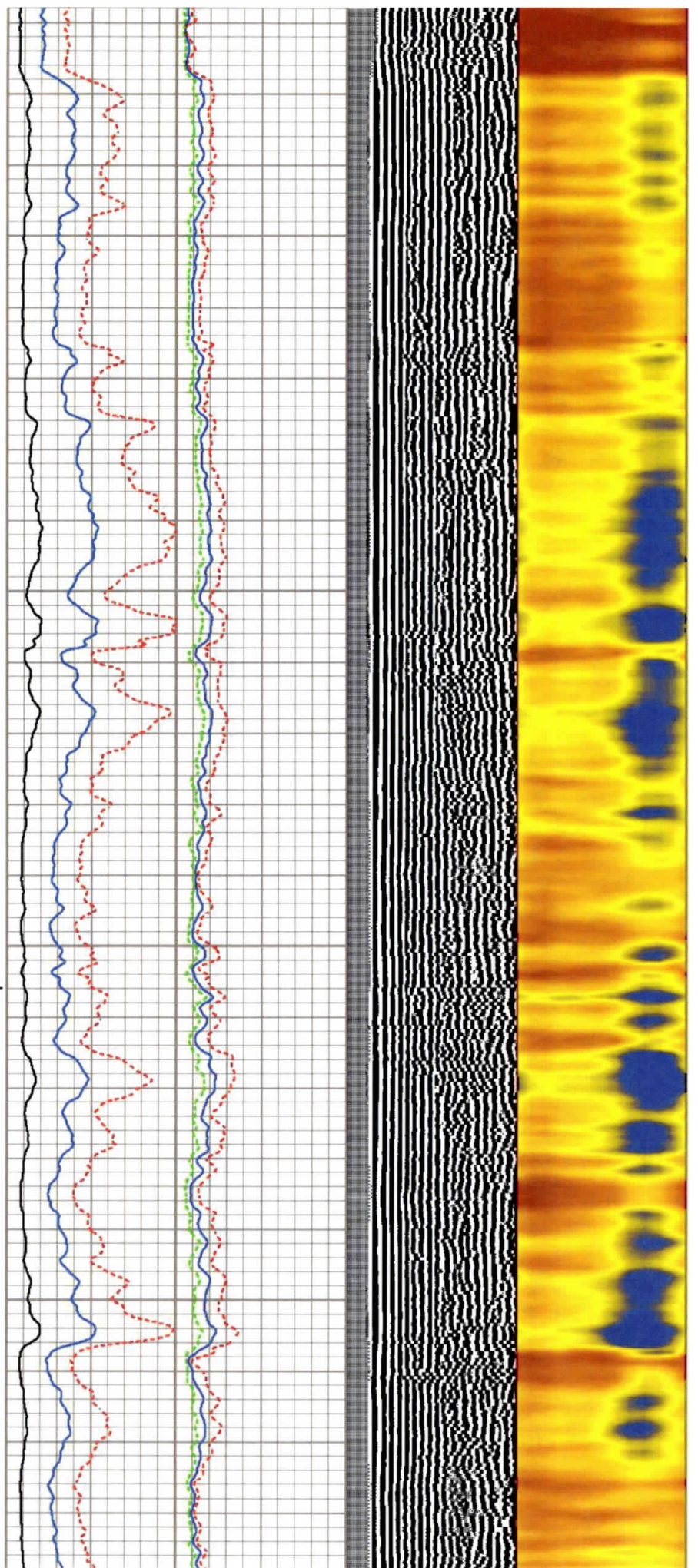
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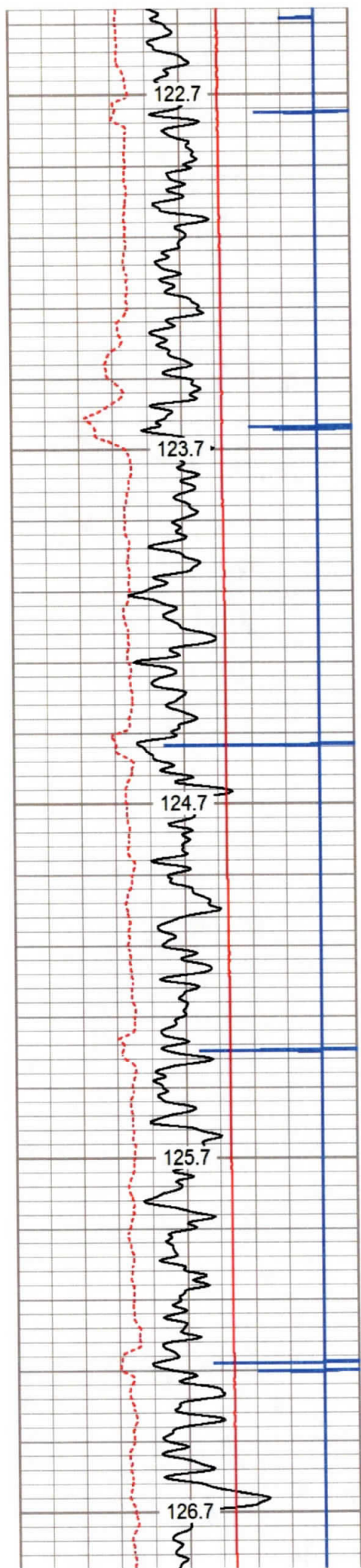
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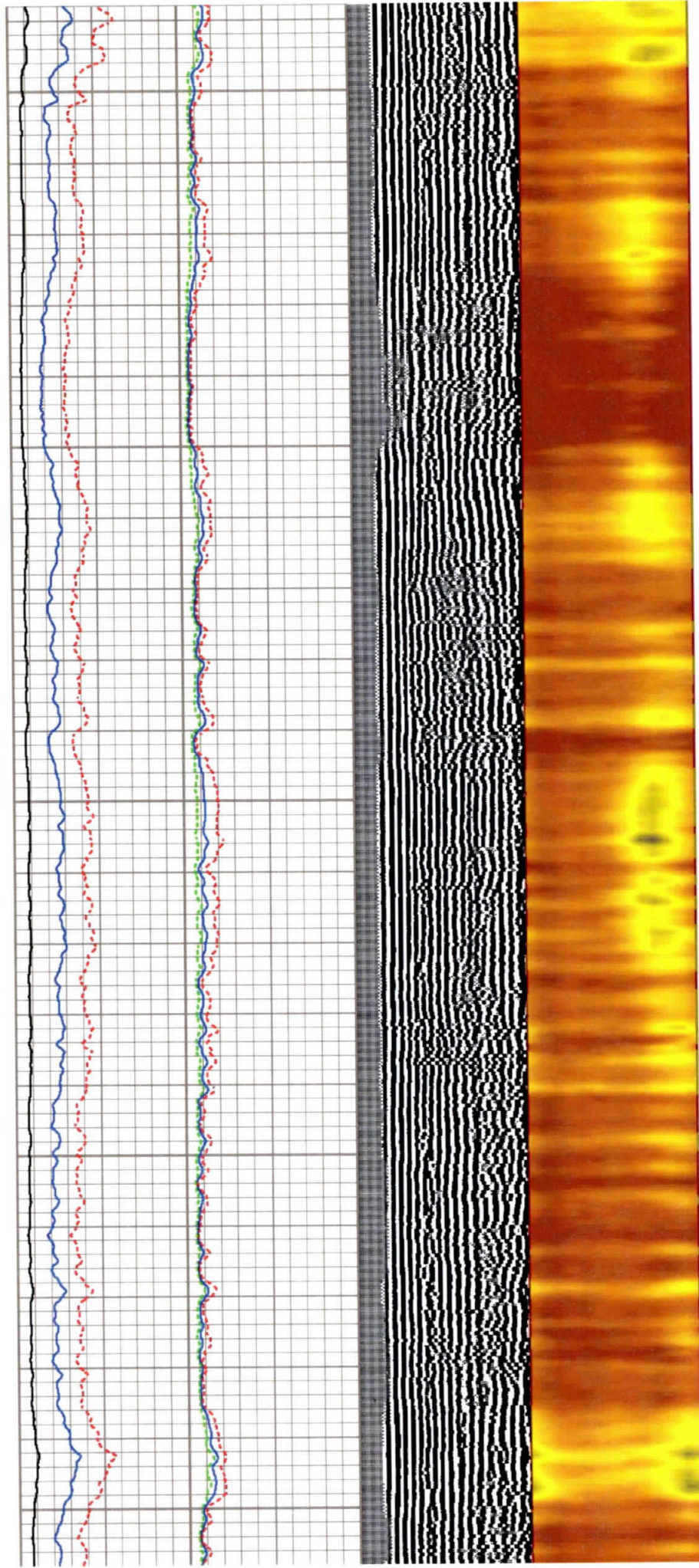
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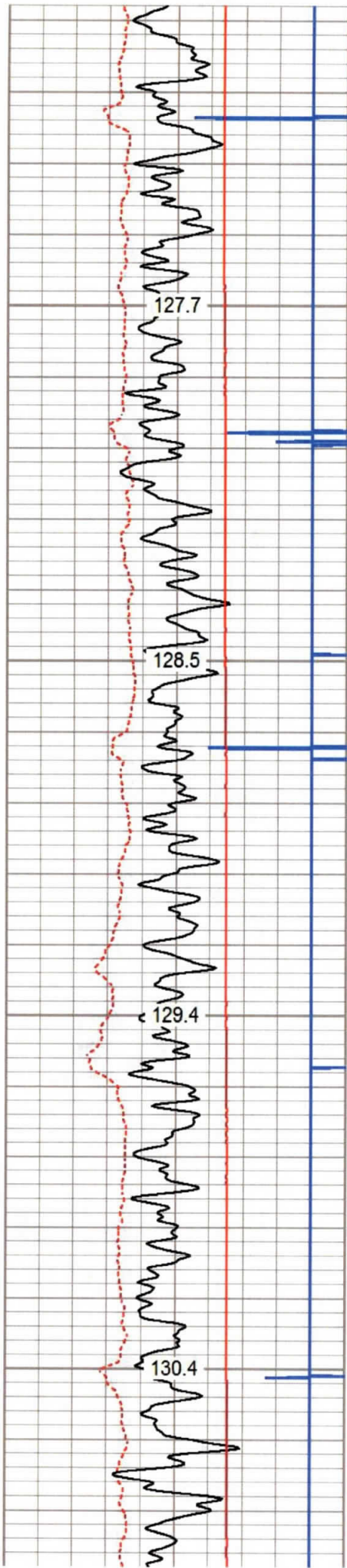
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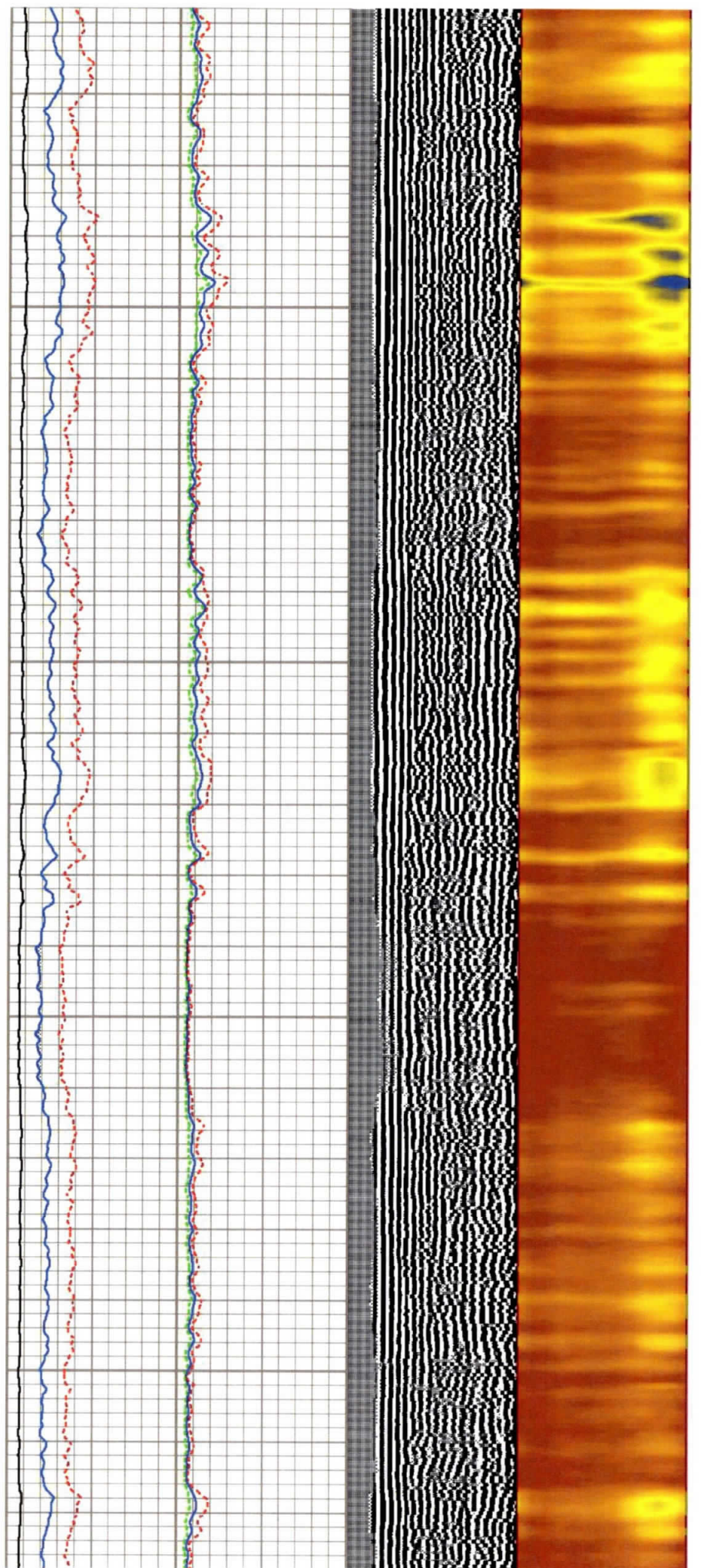


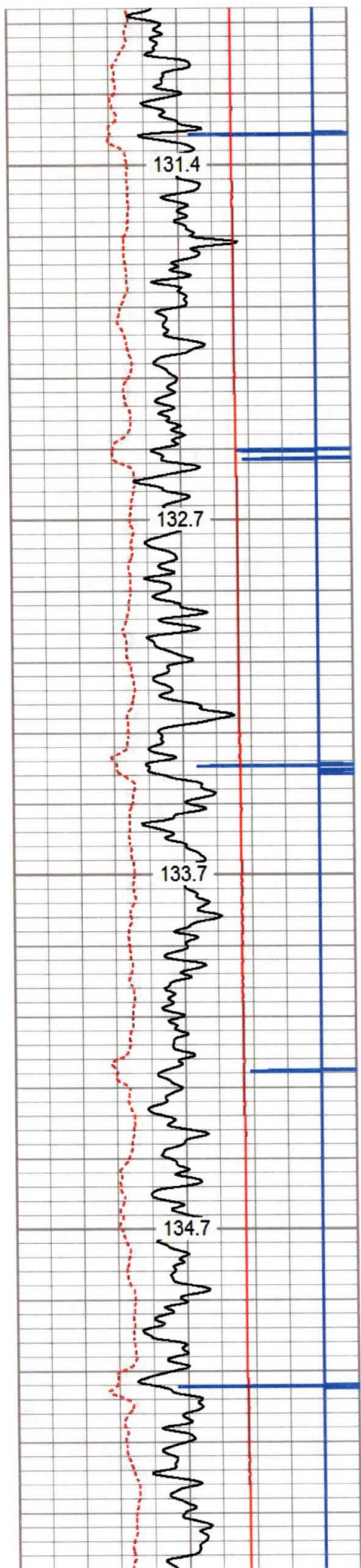
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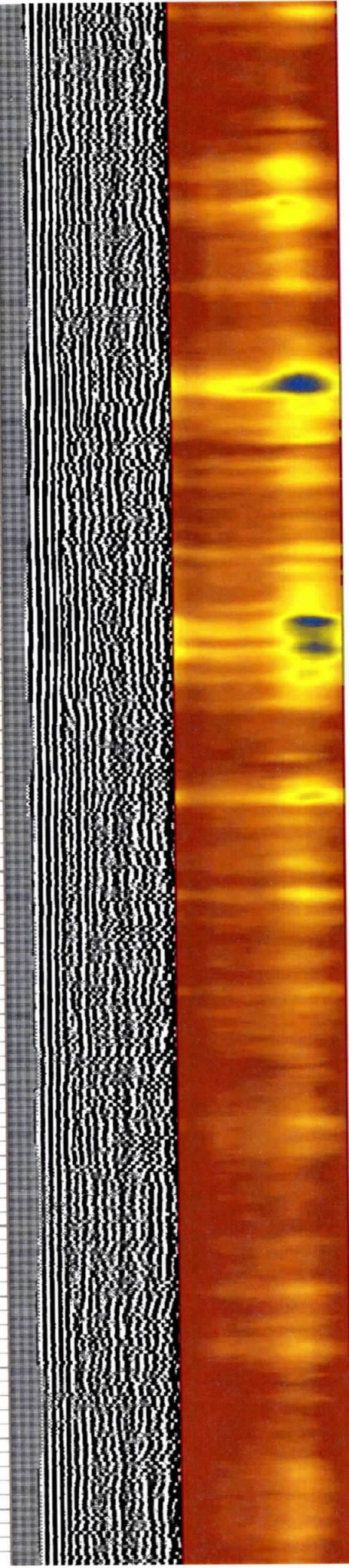
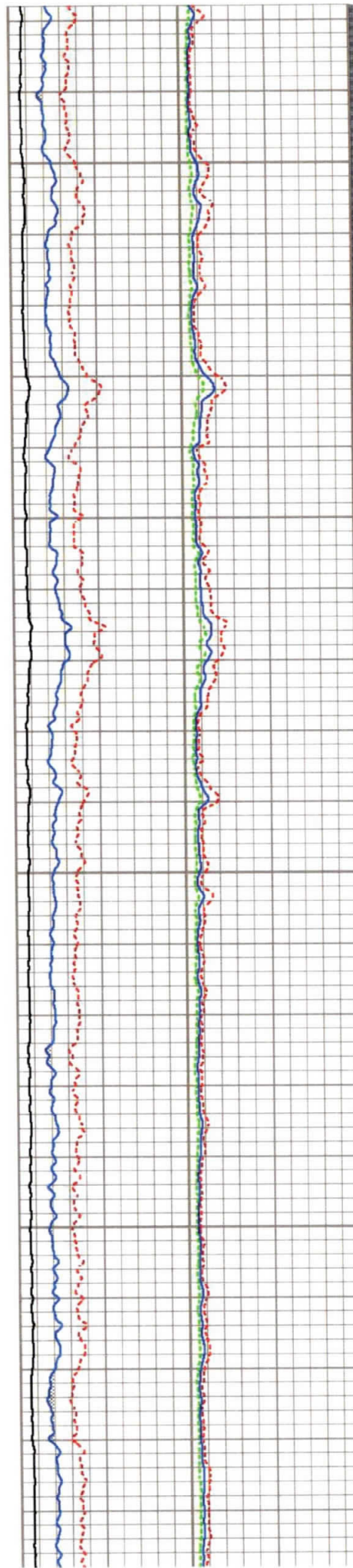


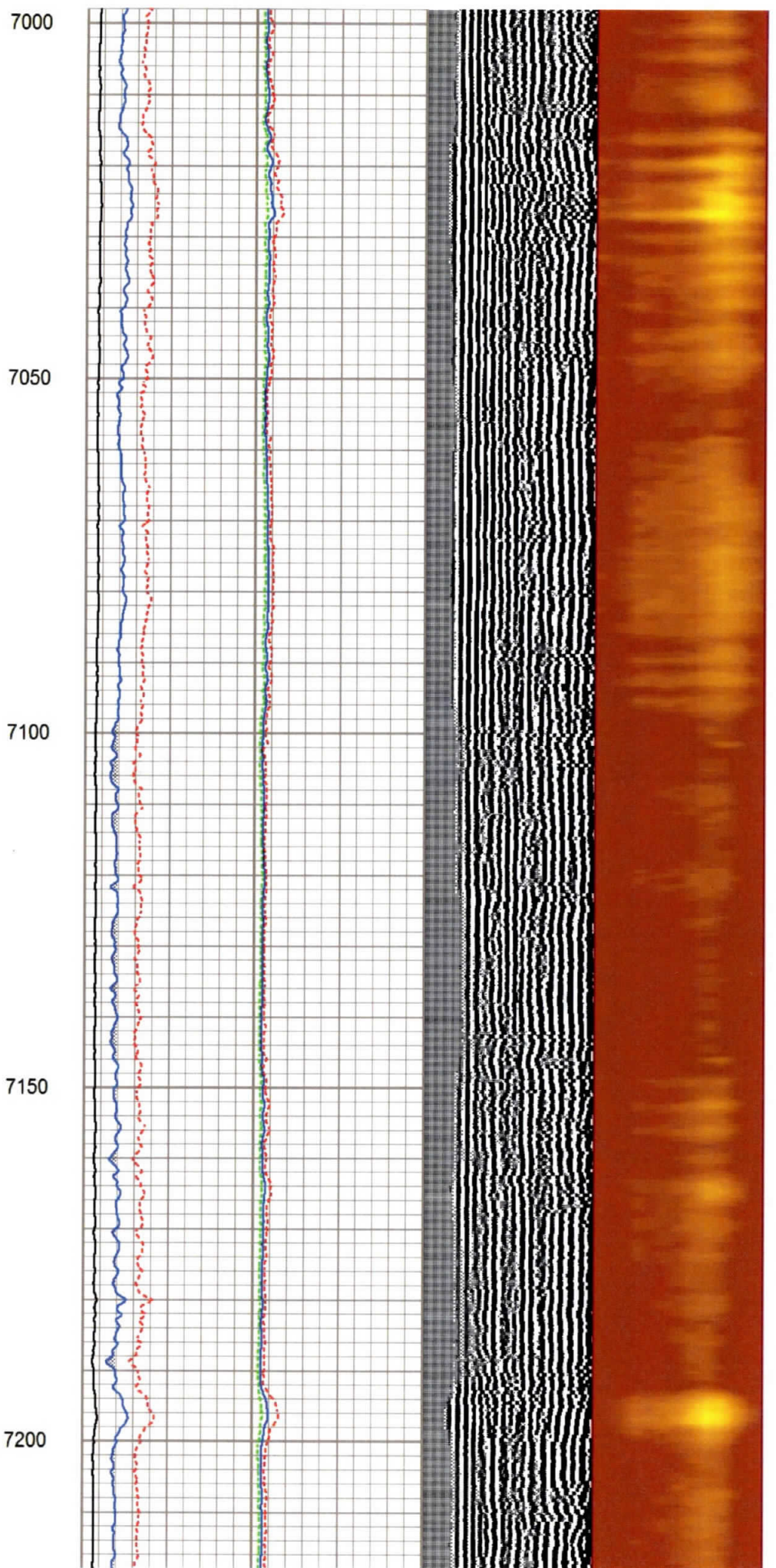
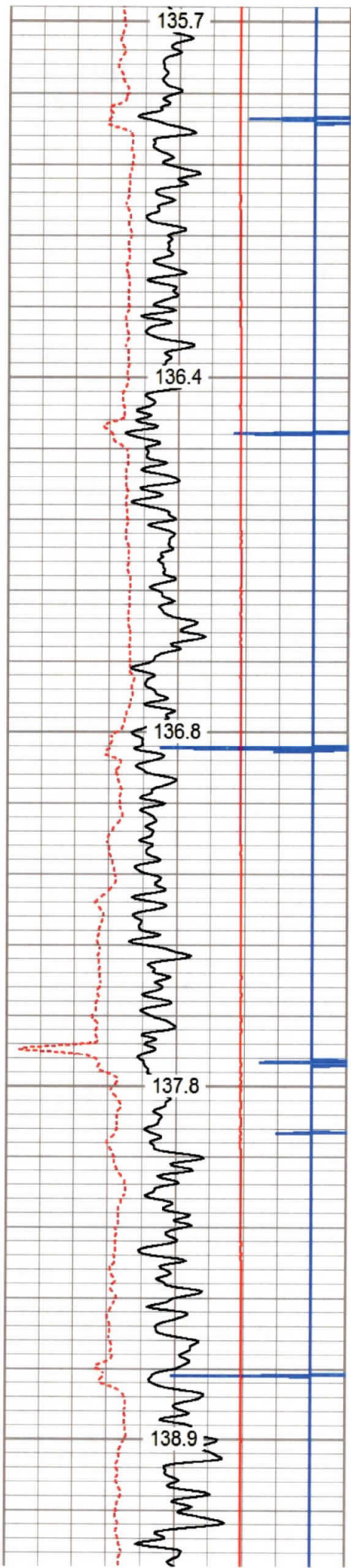
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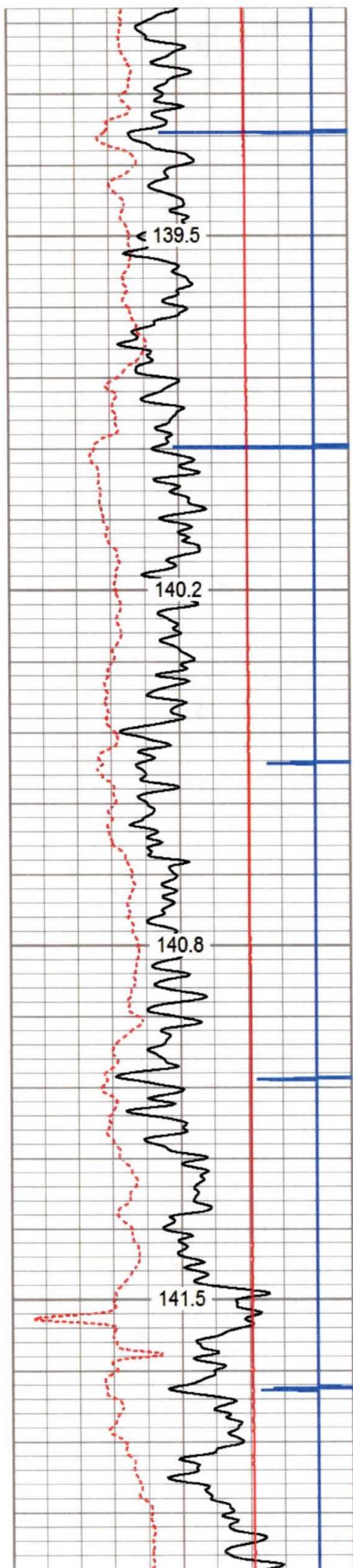
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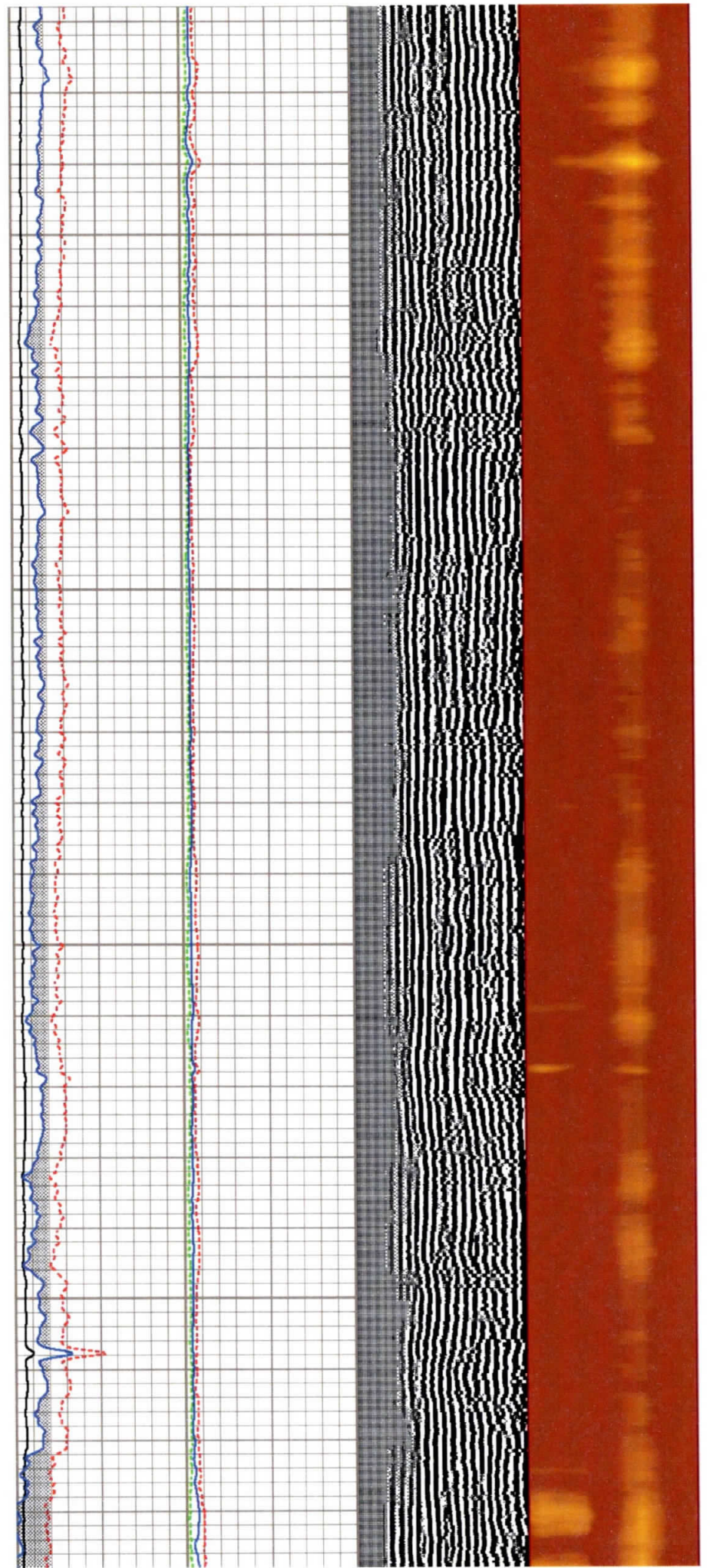


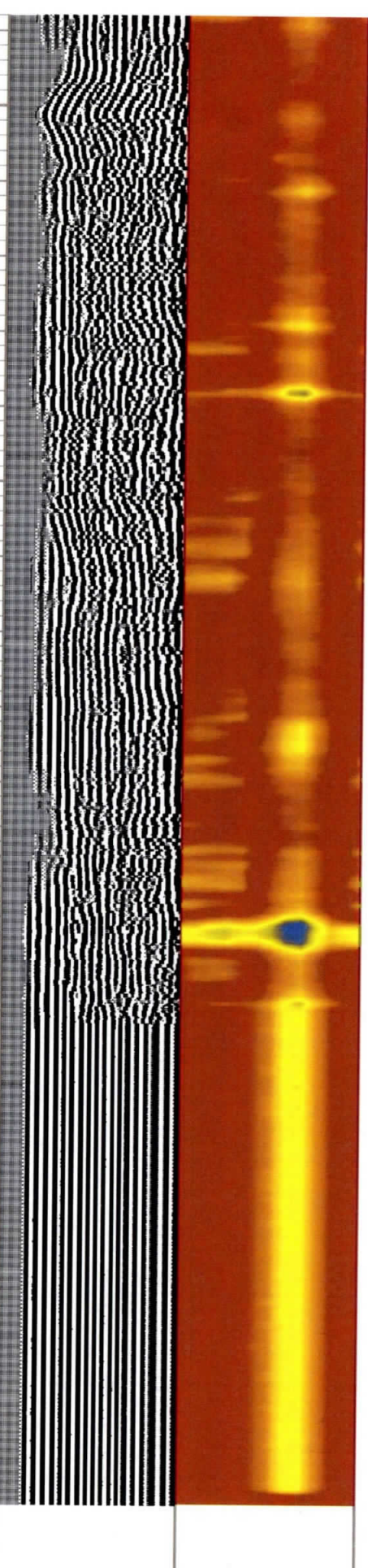
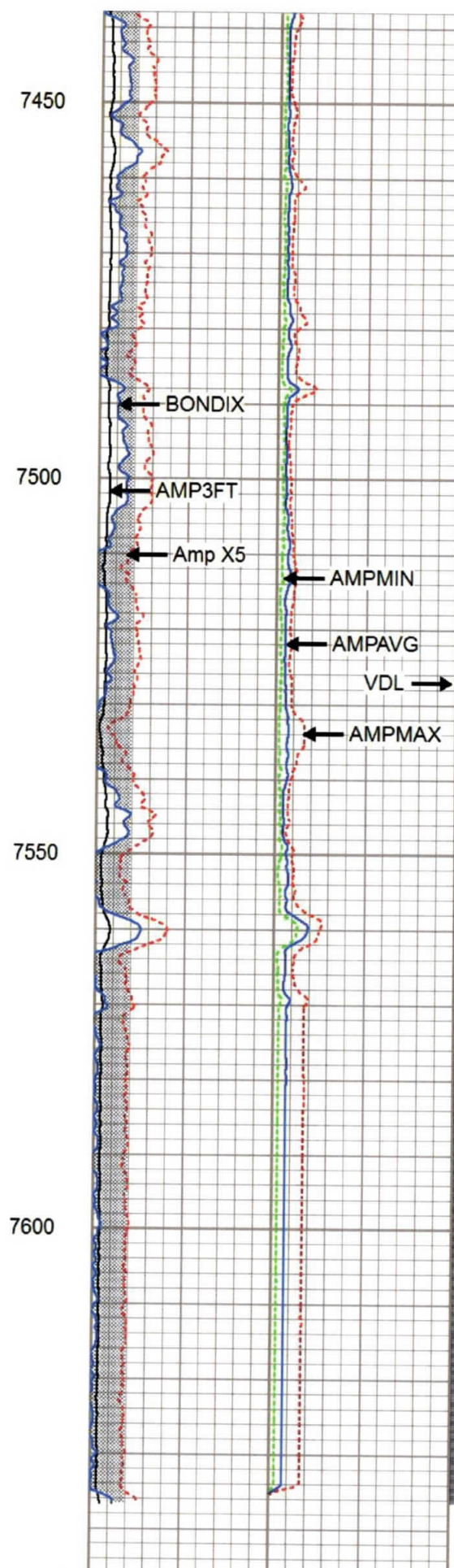
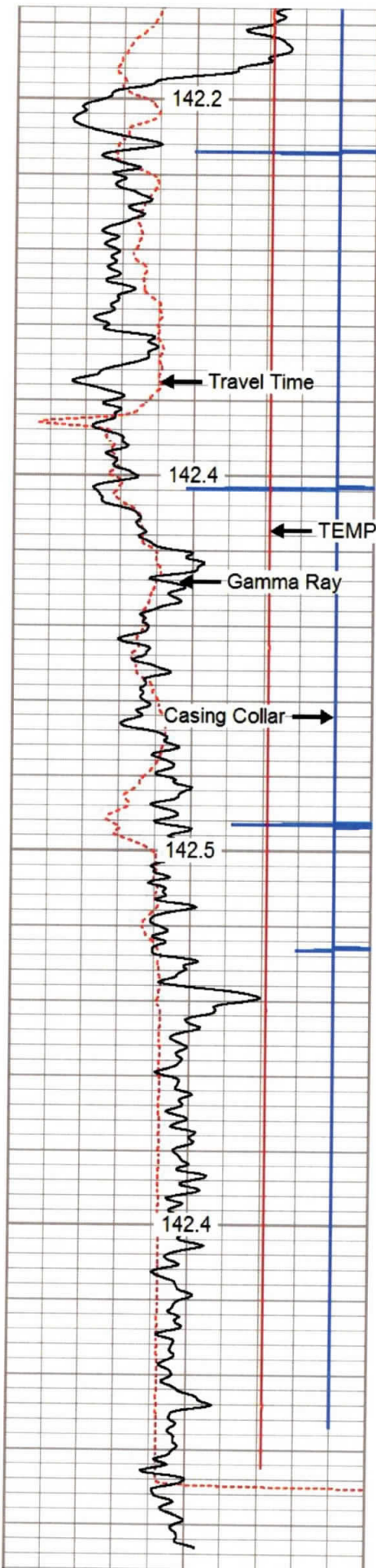
7250

7300

7350

7400





280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray (GAPI)	180

Amplitude	Sector Amp AVG
0 (mV) 100	Sector Amp MAX
Amp X5	Sector Amp MIN

VDL	1 Sector Map 12
200 (usec) 1200	

0	TEMP (degF)	200
180	GR (GAPI)	360
	TEMP (degF)	

0	(mV)	20
1	BONDIX	0

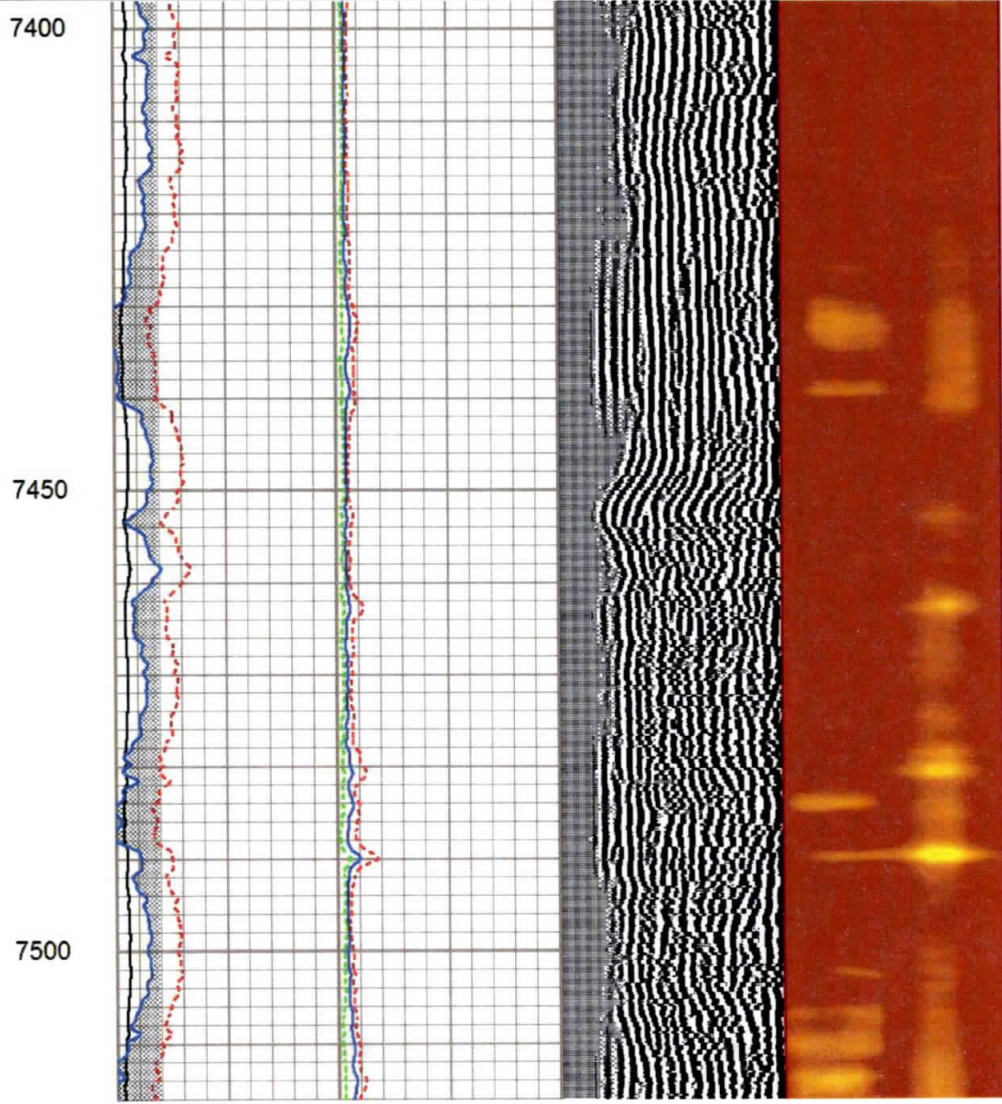
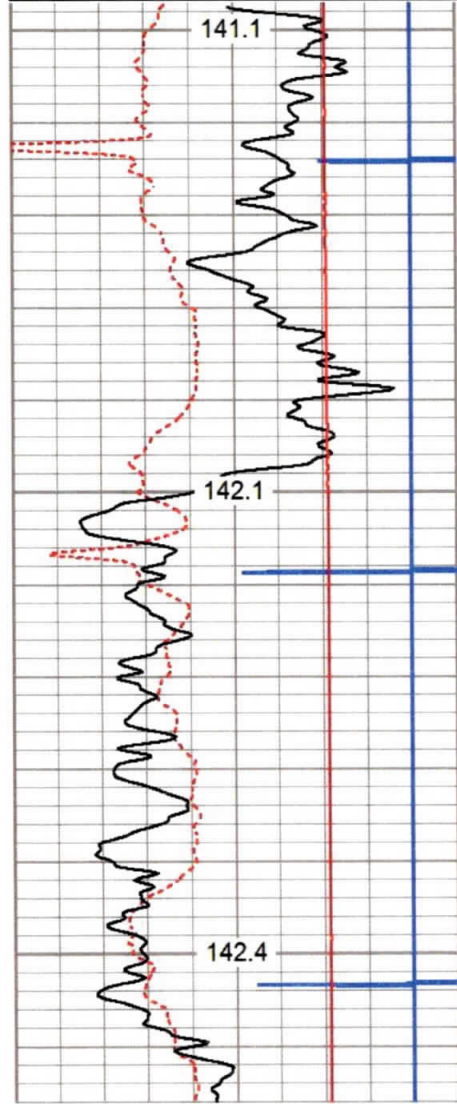


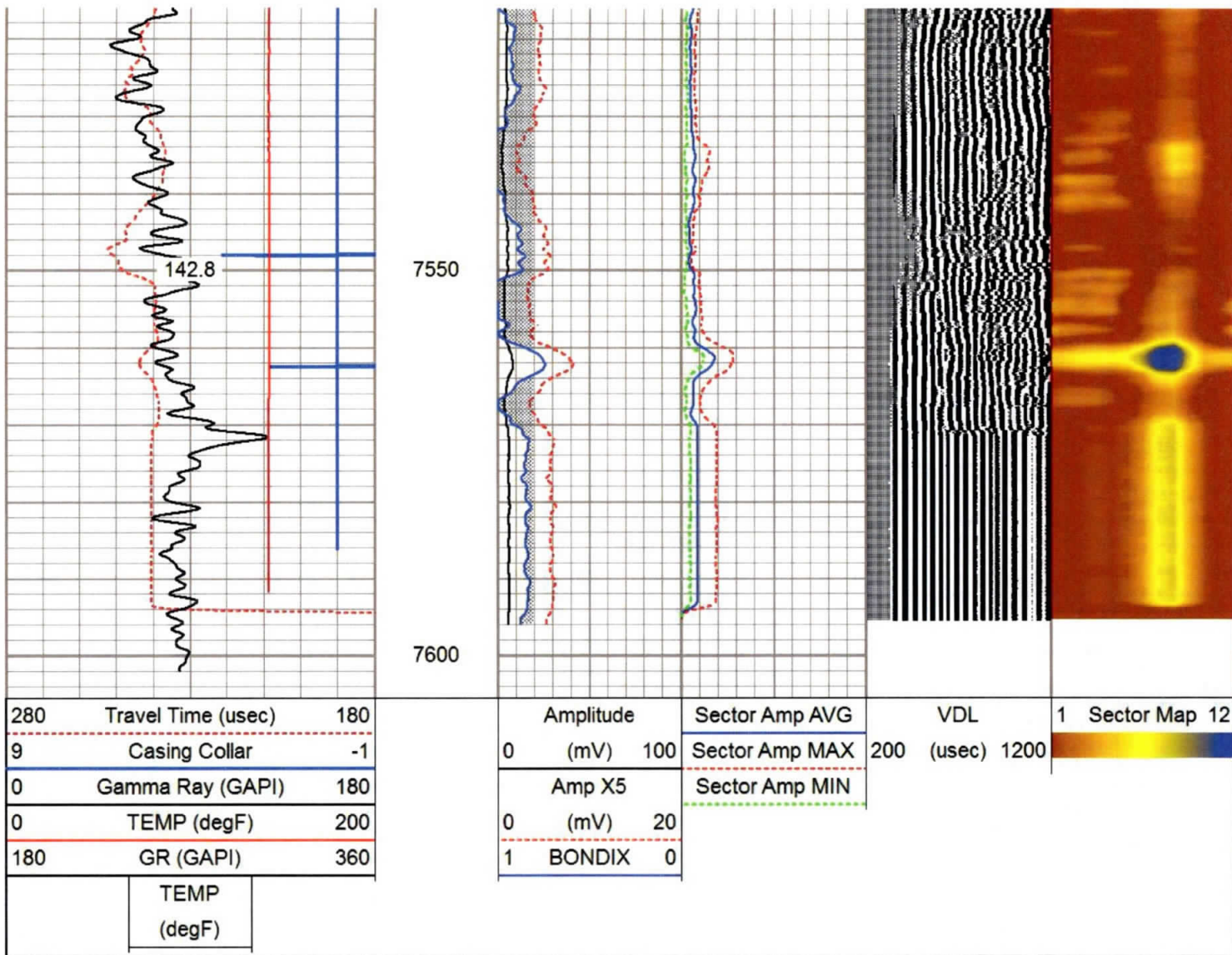
Repeat Pass

Database File e:\antero10-25-19\antero_callahan_unit_1h.db
 Dataset Pathname pass2
 Presentation Format antero1
 Dataset Creation Fri Oct 25 08:53:47 2019
 Charted by Depth in Feet scaled 1:240

280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray (GAPI)	180
0	TEMP (degF)	200
180	GR (GAPI)	360
	TEMP (degF)	

Amplitude	Sector Amp AVG	VDL	1	Sector Map	12
0 (mV) 100	Sector Amp MAX	200 (usec) 1200			
Amp X5	Sector Amp MIN				
0 (mV) 20					
1 BONDIX 0					





Log Variables

DatabaseE:\ANTERO10-25-19\antero_callahan_unit_1h.db
Dataset field/well/run1/pass3/_vars_

Top - Bottom						
BHTEMP_Src	BOREID	BOTTEMP	CASEOD	CASETHCK	CASEWGHT	MAXAMPL
TEMP	in	degF	in	in	lb/ft	mV
TEMP	8.25	100	5.5	0	20	71.9
MINAMPL	MINATTN	PERFS	PPT	SRFTEMP	TDEPTH	
mV	db/ft		uSec	degF	ft	
3.5	0.8	No	219	0	0	

Variable Description

BHTEMP_Src : BHTEMP Input Source Selector BOREID : Borehole I.D. BOTTEMP : Bottom Hole Temperature CASEOD : Casing O.D. CASETHCK : Casing Thickness CASEWGHT : Casing Weight MAXAMPL : Maximum Amplitude	MINAMPL : Minimum Amplitude MINATTN : Minimum Attenuation PERFS : Perforation Flag PPT : Predicted Pipe Time SRFTEMP : Surface Temperature TDEPTH : Total Depth
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Gamma Ray Calibration Report

Serial Number: 0111
 Tool Model: Tek-Co 2 3/4
 Performed: Thu Oct 24 08:41:06 2019

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 0.5000 GAPI/cps

Segmented Cement Bond Log Calibration Report

Serial Number: T12_01
 Tool Model: Tek12

Calibration Casing Diameter: 5.500 in
 Calibration Depth: 57.275 ft

Master Calibration, performed Thu Oct 24 13:31:44 2019:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	-0.006	0.919	3.500	71.921	50.880	5.245
CAL	0.630	0.627				
5'	-0.001	1.035	3.500	71.921	40.761	4.381
SUM						
S1	0.000	1.103	0.000	100.000	56.543	-0.001
S2	0.000	1.088	0.000	100.000	61.007	-0.001
S3	0.000	1.122	0.000	100.000	64.737	-0.001
S4	0.000	1.089	0.000	100.000	72.448	-0.001
S5	0.000	1.045	0.000	100.000	71.838	-0.001
S6	0.000	0.965	0.000	100.000	74.574	-0.001
S7	0.000	0.897	0.000	100.000	76.604	-0.001
S8	0.000	0.821	0.000	100.000	77.230	-0.001
S9	0.000	0.802	0.000	100.000	76.037	-0.001
S10	0.000	0.932	0.000	100.000	63.640	-0.001
S11	0.000	1.003	0.000	100.000	56.910	-0.001
S12	0.000	1.091	0.000	100.000	55.333	-0.001

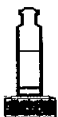
Temperature Calibration Report

Serial Number: T12_01
 Tool Model: Tek12
 Performed: Fri Oct 22 17:21:06 2010

Reference Reading

Low Reference: 0.00 degF 0.00 usec
 High Reference: 1.00 degF 1.00 usec

Gain: 0.33
 Offset: 0.00
 Delta Spacing: 2

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			Titan-1.4375 1 7/16 Titan Type II Cable Head	1.03	1.44	5.00
			CGI 312600 (101)	1.00	2.10	25.00

CCL	19.20		CCL-312600 (101) Tekco 3 1/8" 450 Deg. "F" SmCo Logging CCL	1.02	3.12	23.00	
			Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00	
TEMP	13.04						
WVFSYNC	13.04						
WVFCAL	13.04						
WVFS12	11.75						
WVFS11	11.75						
WVFS10	11.75						
WVFS9	11.75						
WVFS8	11.75						
WVFS7	11.75						
WVFS6	11.75						
WVFS5	11.75						
WVFS4	11.75						
WVFS3	11.75						
WVFS2	11.75						
WVFS1	11.75						
WV3FT	11.00						
WV5FT	10.00						
WVTEMP	6.67						
			SCBL-Tek12 (T12_01) Tekco 400 Deg F 12 Sector RIB with Temp	9.13	3.25	135.00	
			Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00	
			GR-Tek-Co 2 3/4 (0111) Tekco 2 3/4" 400 Deg. F Logging Gamma Ray	3.67	2.75	40.00	
GR	1.31		Titan-1.4375_Cap Titan 1 7/16" Cap	0.27	1.44	1.00	

Dataset: antero_callahan_unit_1h.db: field/well/run1/pass3
 Total length: 21.37 ft
 Total weight: 256.00 lb
 O.D.: 3.25 in



Company ANTERO RESOURCES CORPORATION
 Well CALLAHAN UNIT 1H
 Field MARCELLUS



Energy Services

County

DODDRIDGE

State

W.V.

Country

USA