



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

Company ANTERO RESOURCES CORPORATION
 Well CALLAHAN UNIT 2H
 Field MARCELLUS
 County DODDRIDGE
 State W.V. Country USA

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Location: API #: 47017068740000 Other Services

AFEX# A08795-D

SEC TWP RGE Elevation

Permanent Datum
 Log Measured From
 Drilling Measured From

Elevation
 K.B.
 D.F.
 G.L.

Date 10/24/19

Run Number ONE

Depth Driller 17389'

Depth Logger 7965'

Bottom Logged Interval 7965'

Top Log Interval SURFACE

Open Hole Size N/A

Type Fluid WATER

Density / Viscosity N/A

Max. Recorded Temp. 143

Estimated Cement Top 2380

Time Well Ready N/A

Time Logger on Bottom N/A

Equipment Number 214181

Location BRIDGEPORT W.V.

Recorded By T.MILLER

Witnessed By JAYSON LUKES

S.MAXWELL

Borehole Record		Tubing Record					
Run Number	Bit	From	To	Size	Weight	From	To

	Size	Wgt/Ft	Top	Bottom
Casing Record				
Surface String	13.375	54.5	SURFACE	390'
Prot. String	9.625	36	SURFACE	2771'
Production String	5.5	20	SURFACE	17389'
Liner				

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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.@7965'
 MARKER JOINT @ 6454-6464



MAIN LOG

Database File e:\antero 10-23-19\callahan2h.db
 Dataset Pathname pass10.2
 Presentation Format antero1
 Dataset Creation Fri Oct 25 18:04:03 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)	100
180	GR (GAPI)	360

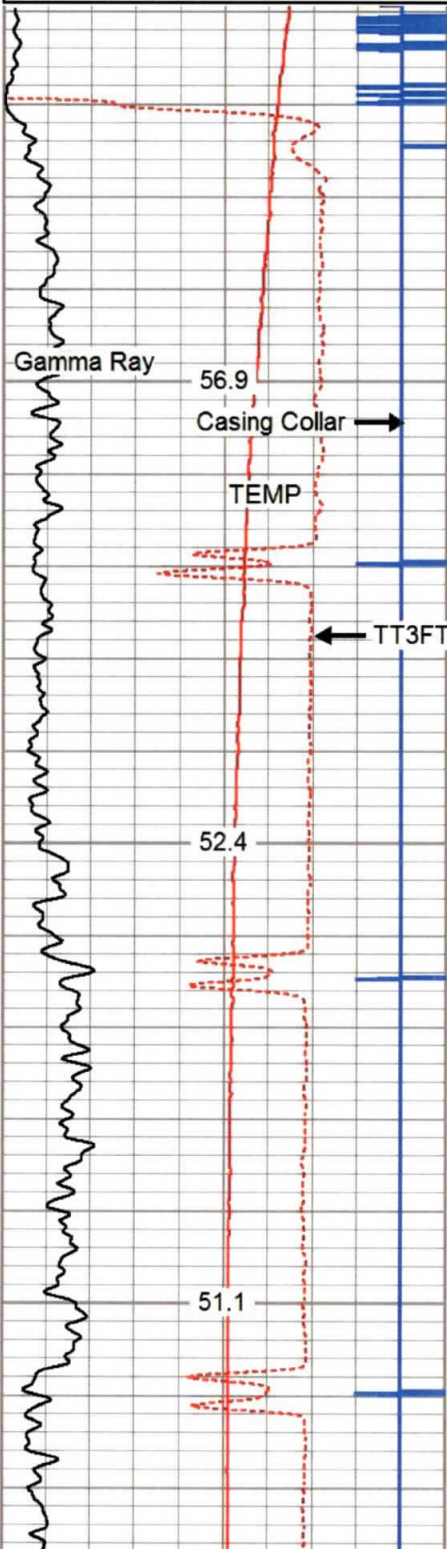
TEMP
(degF)

0	Amplitude (mV)	100
0	Amp X5 (mV)	20
1	BONDIX	0

Sector Amp AVG
Sector Amp MAX
Sector Amp MIN

VDL 200 (usec) 1200

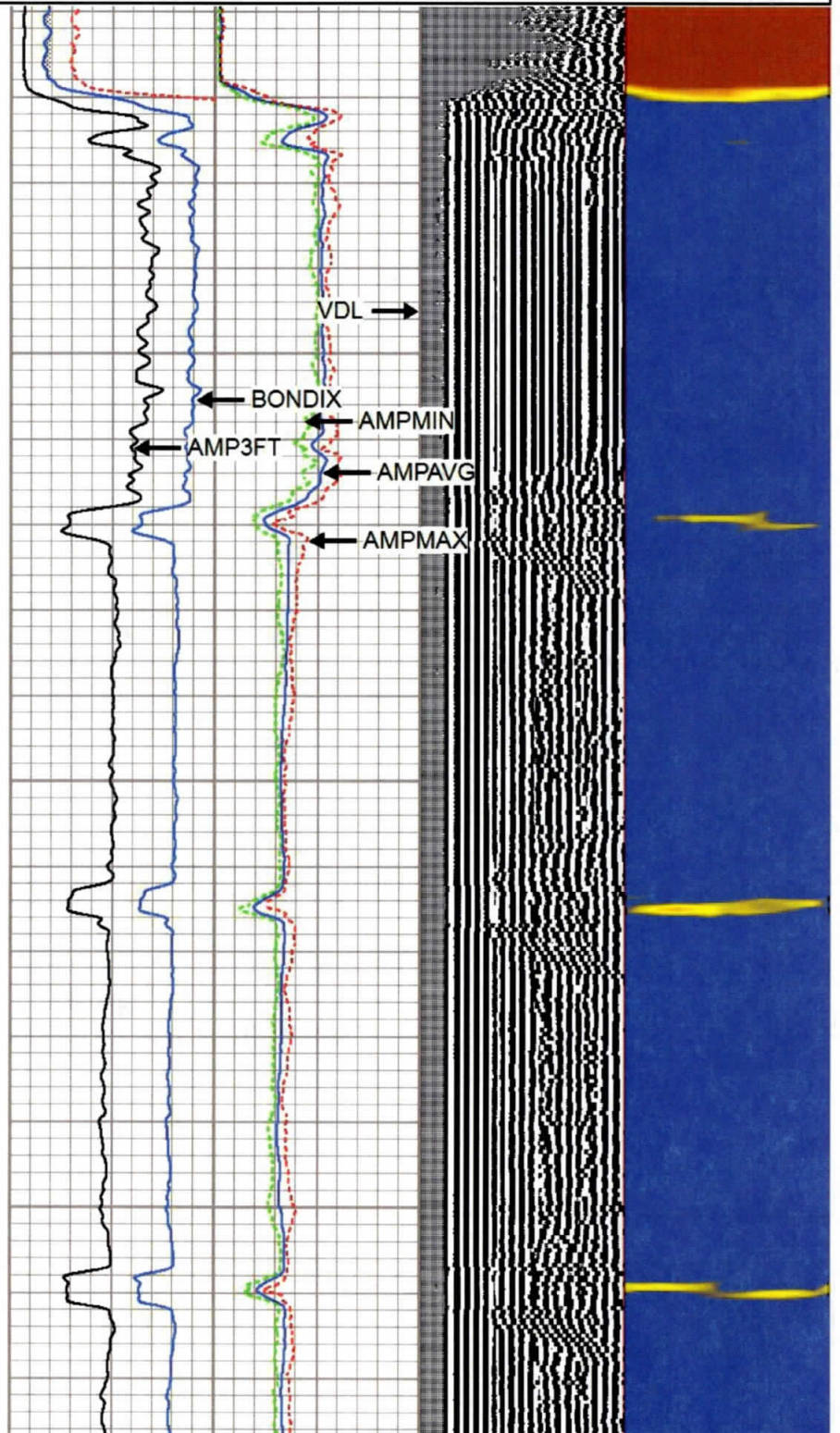
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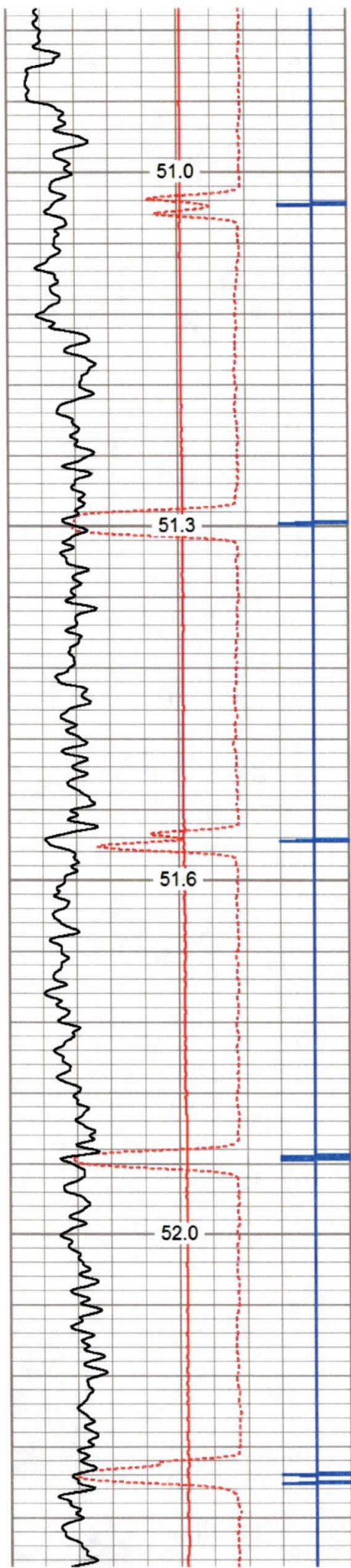


50

100

150



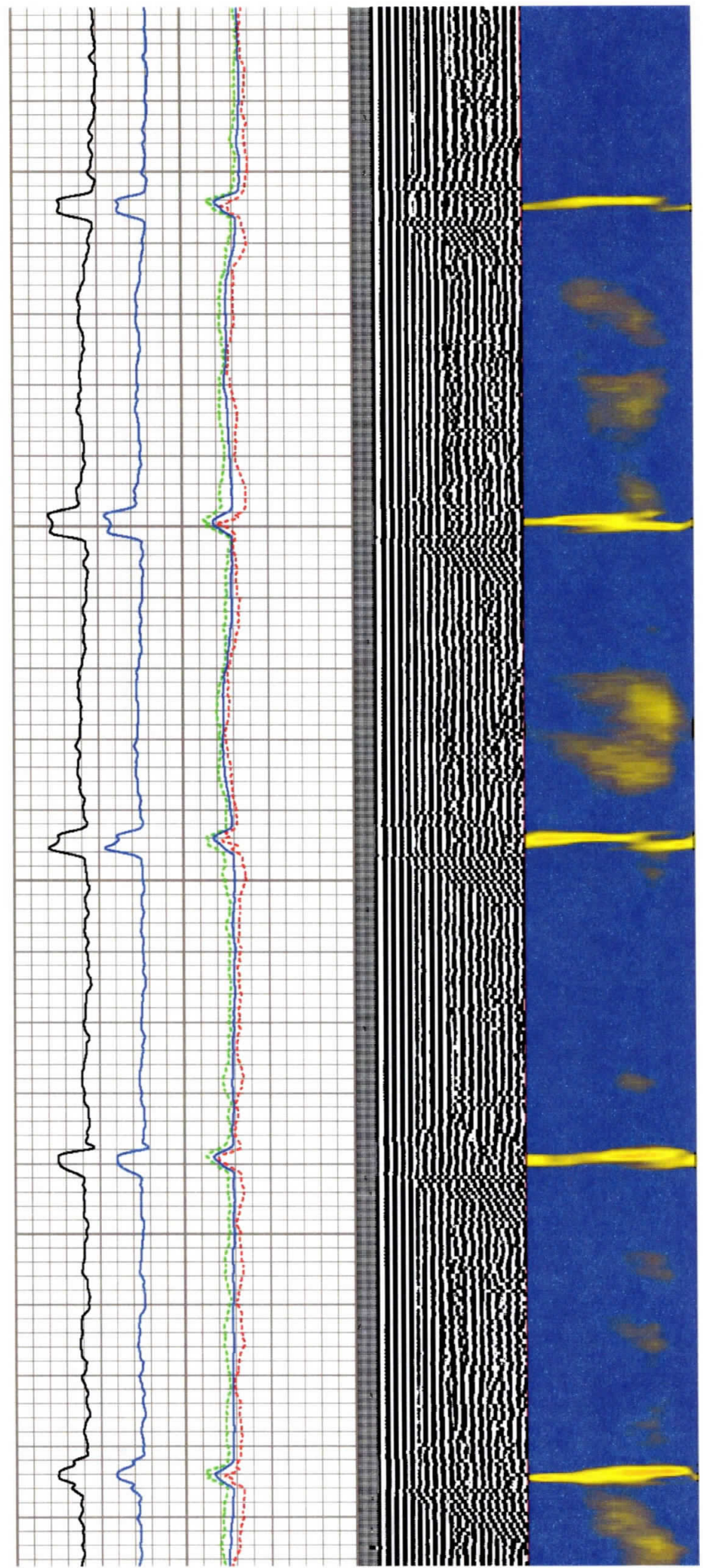


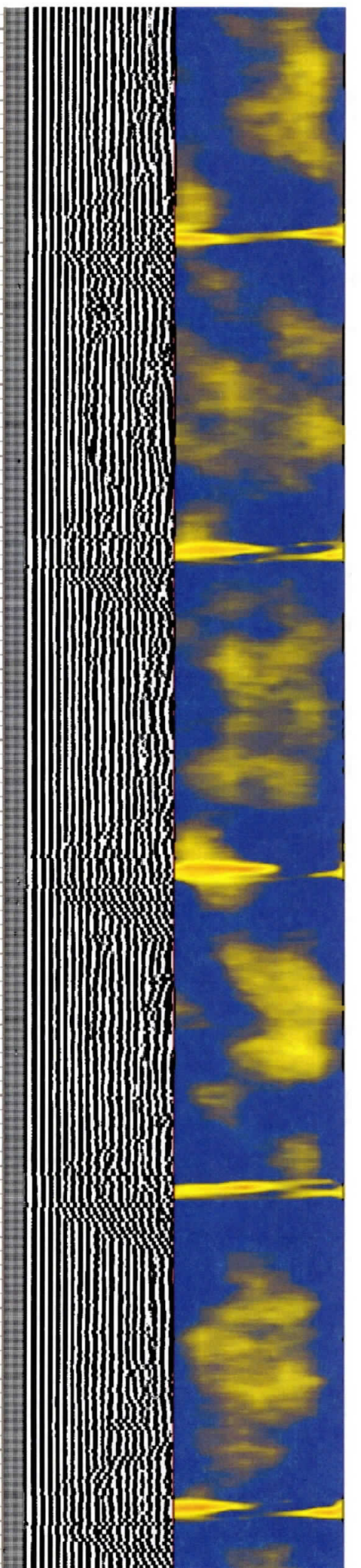
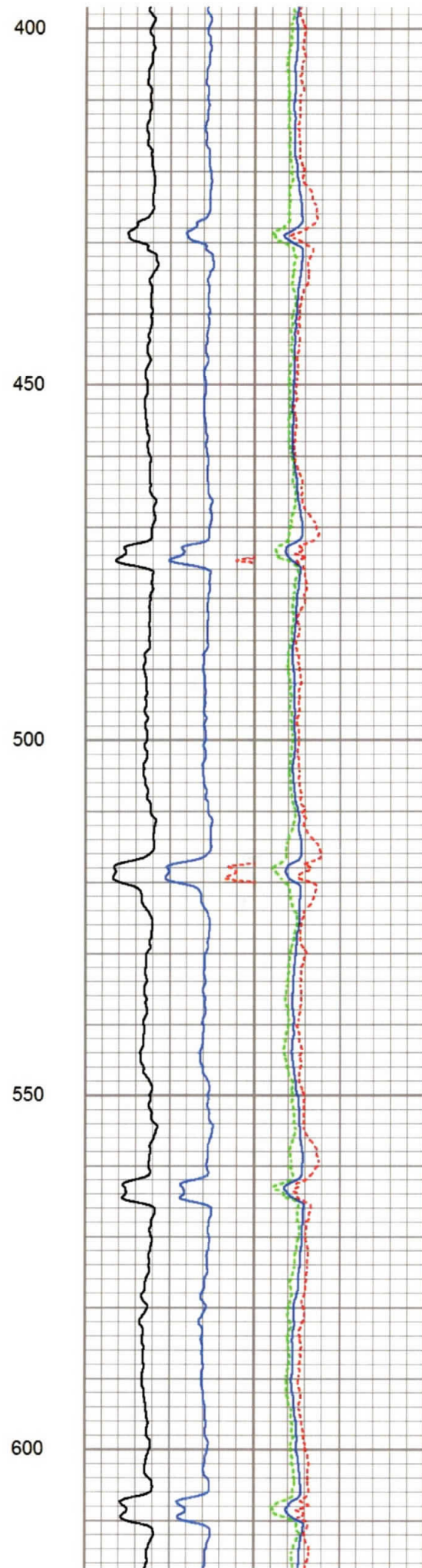
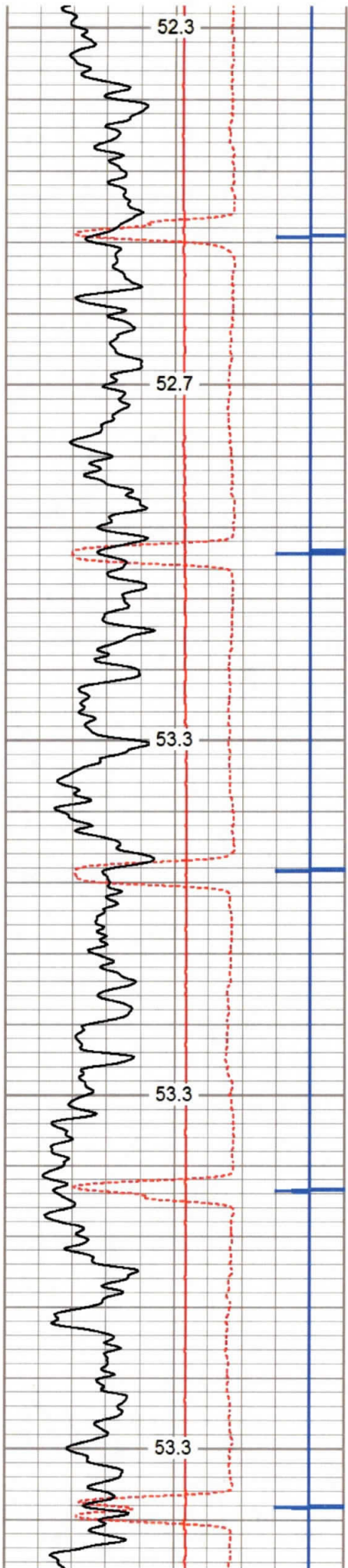
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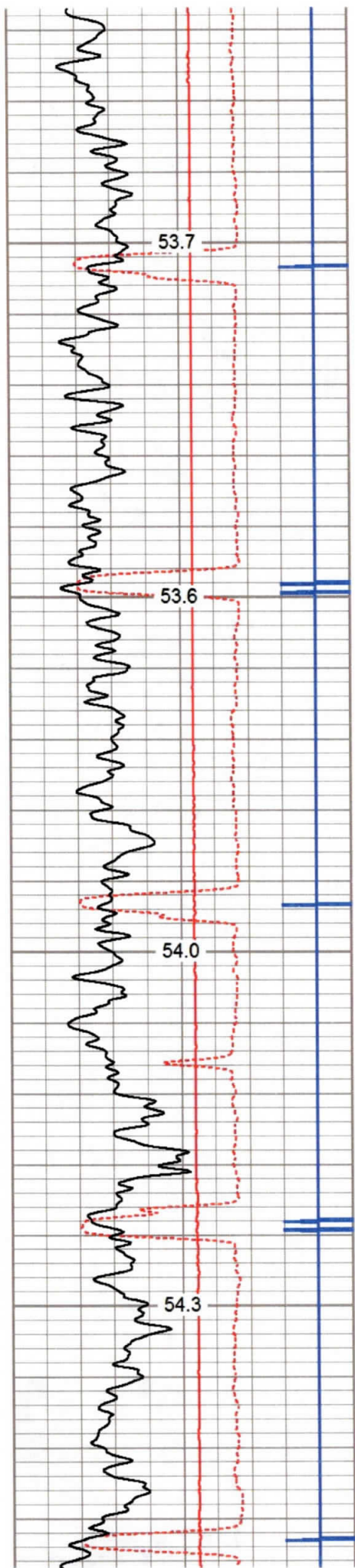
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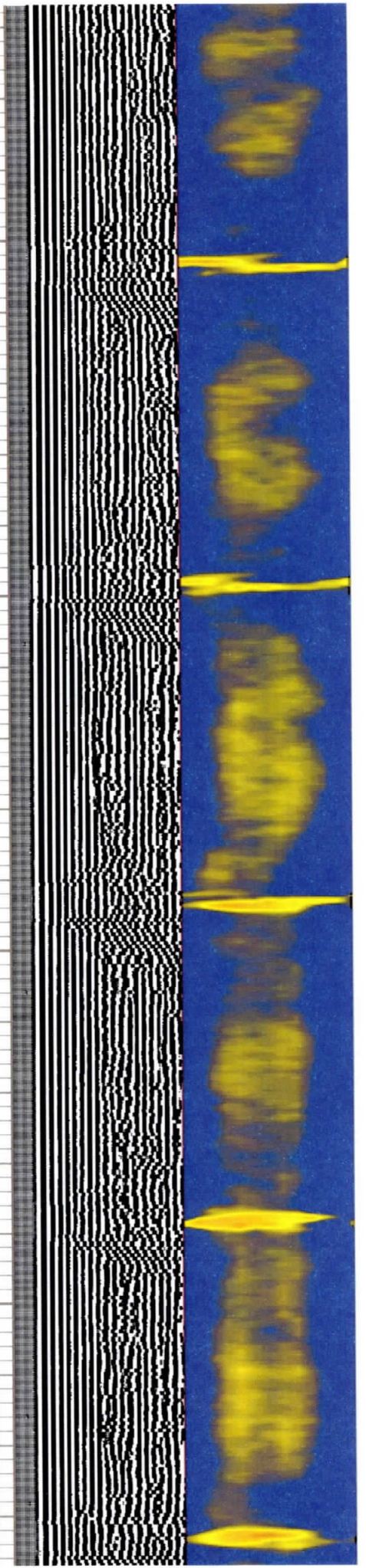
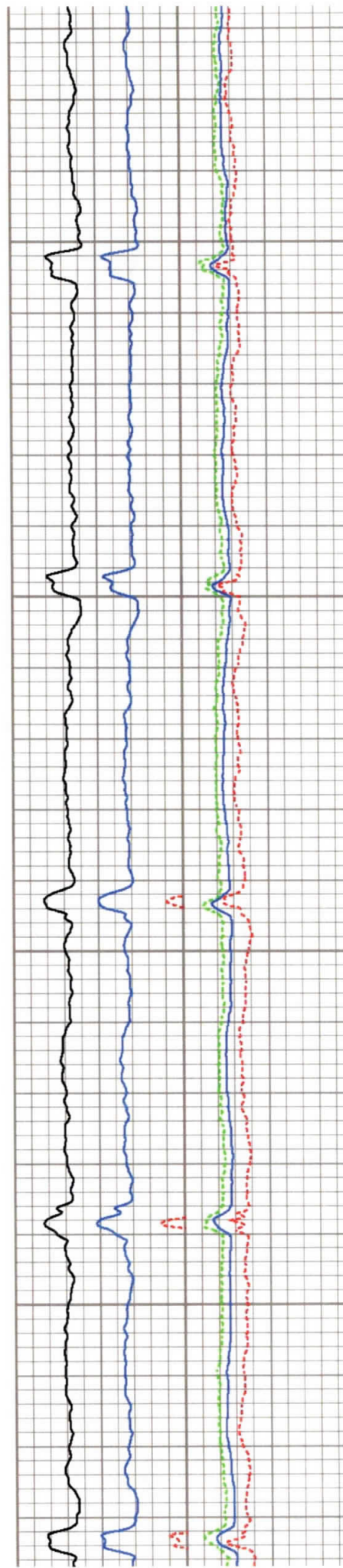


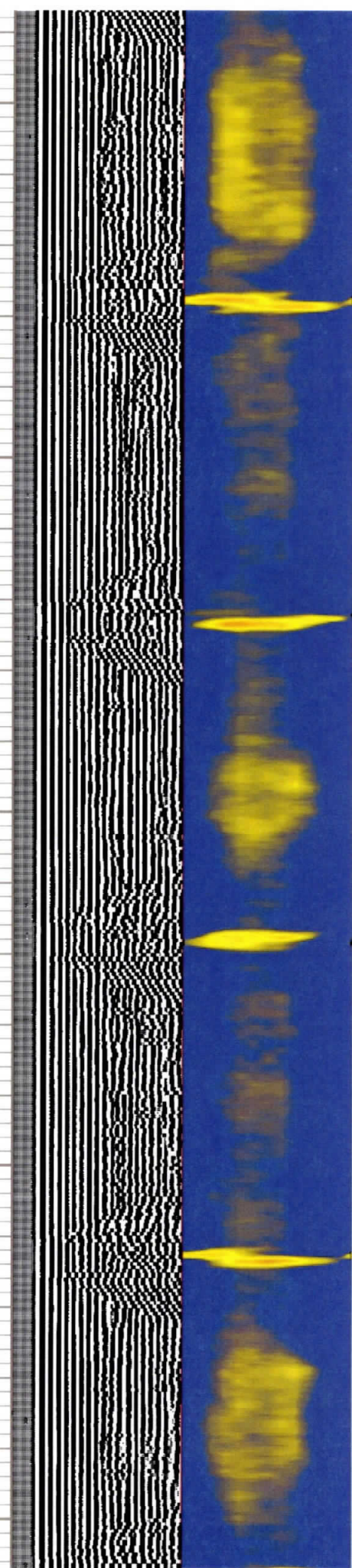
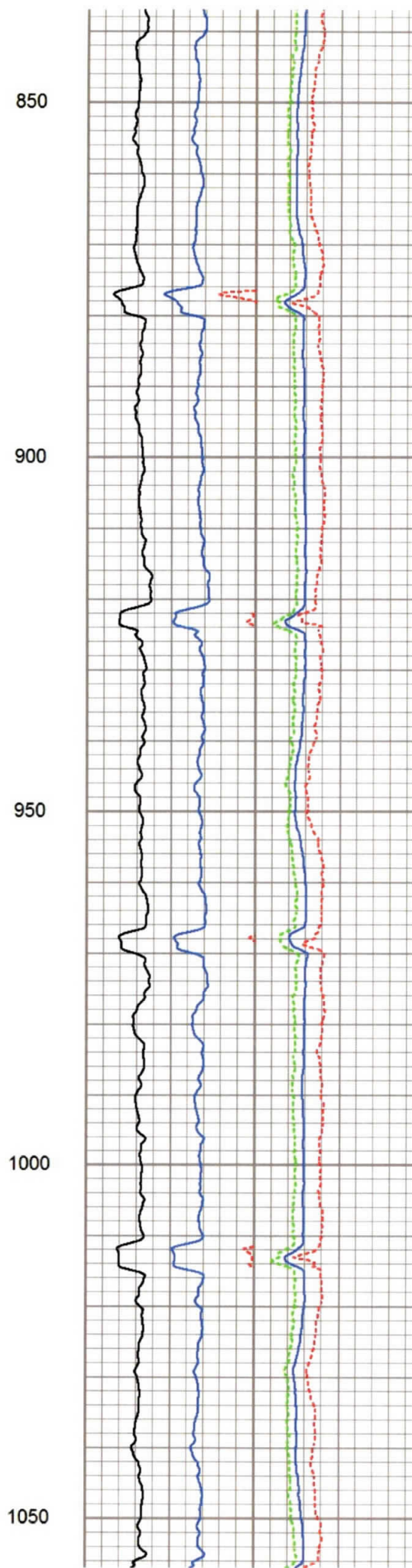
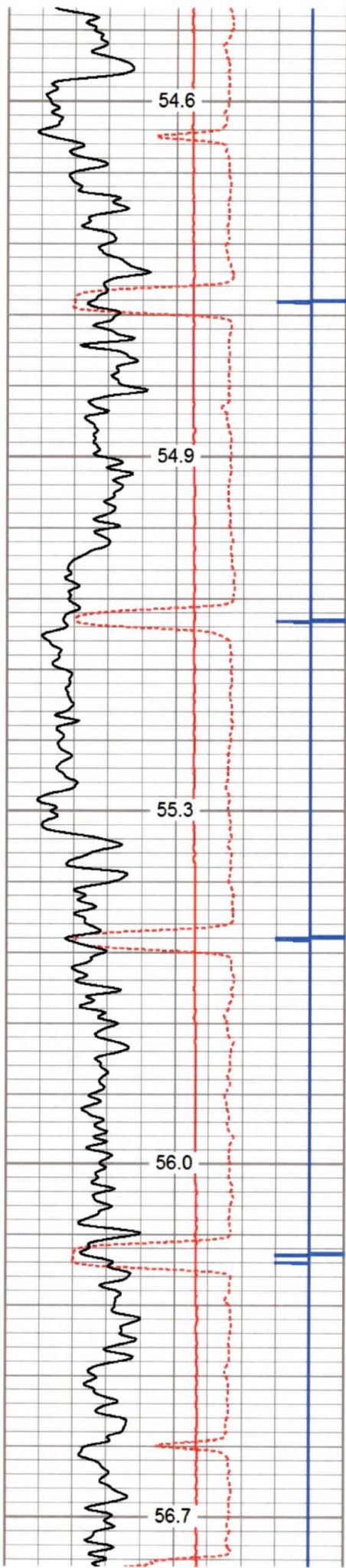
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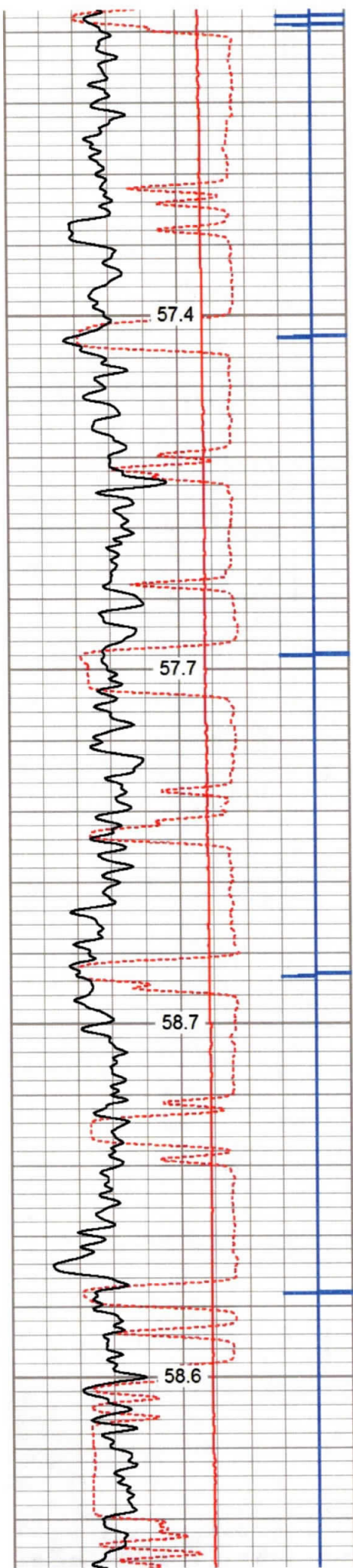
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800





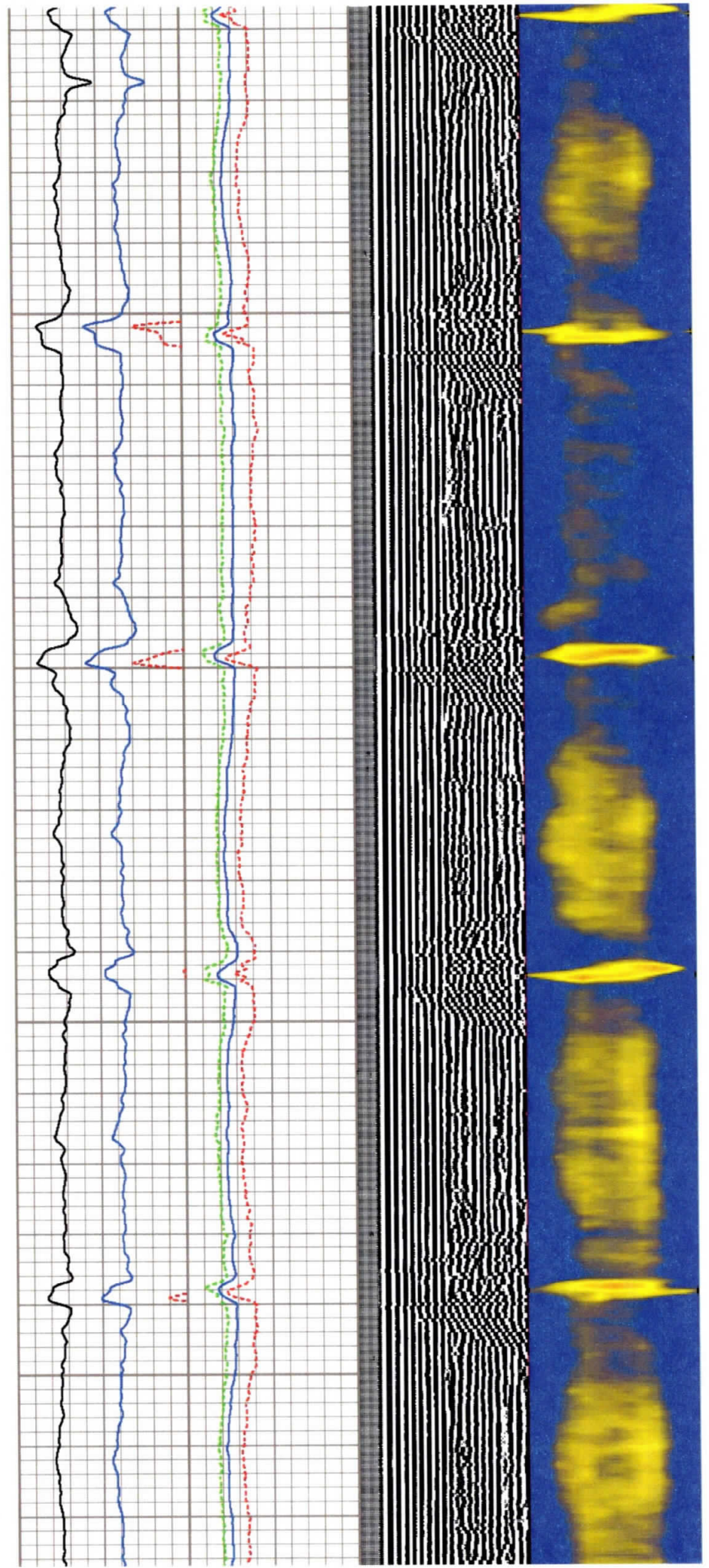


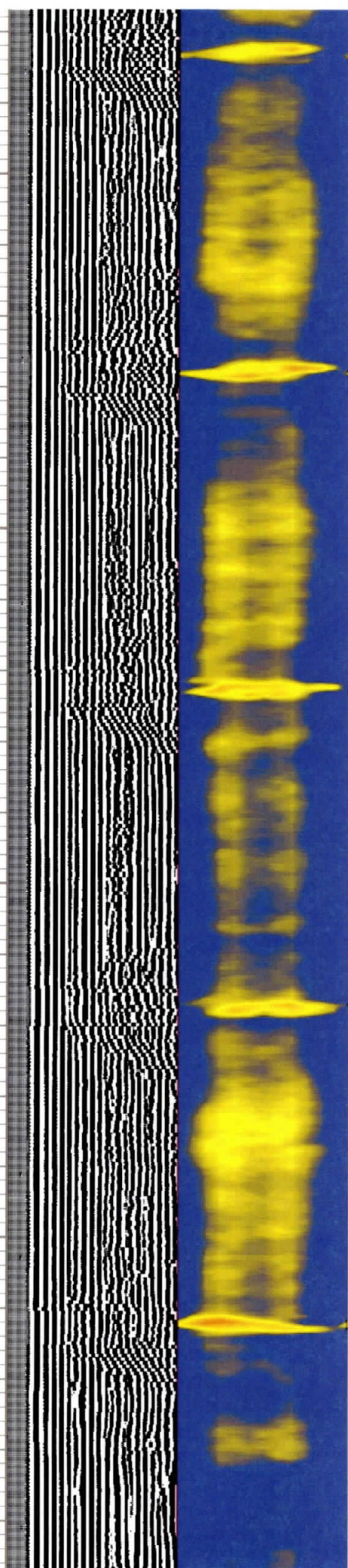
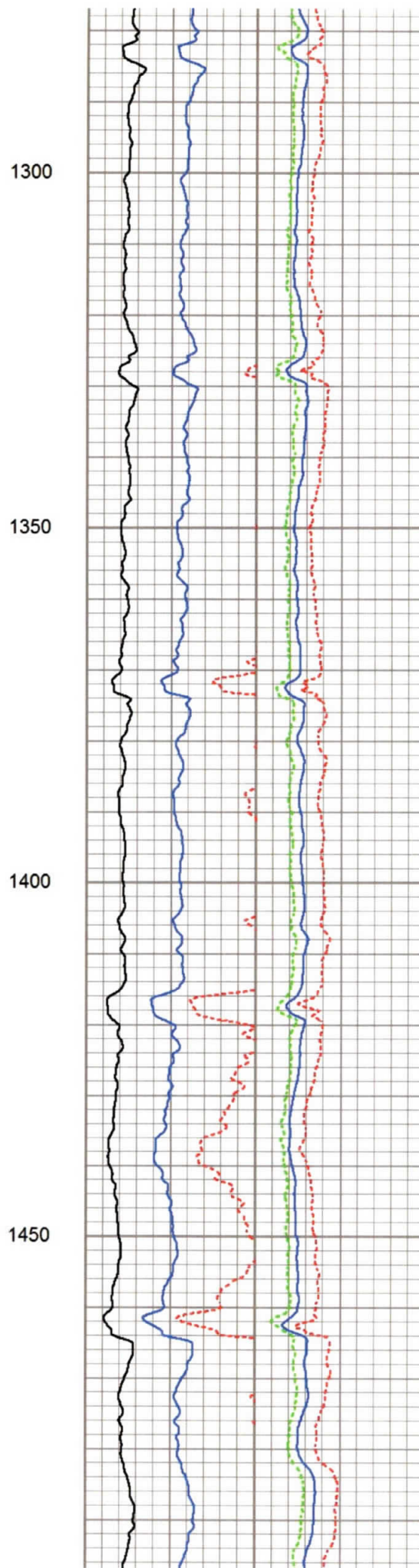
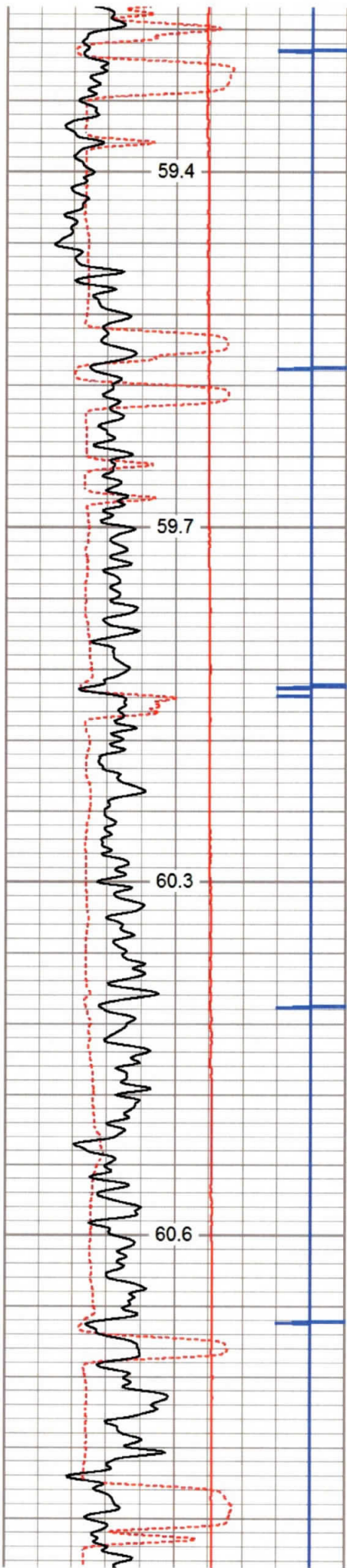
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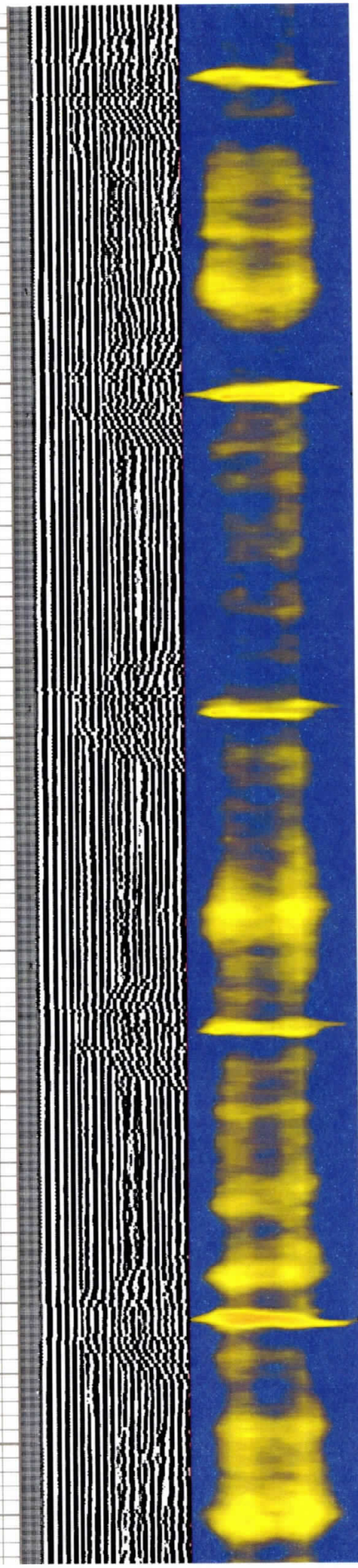
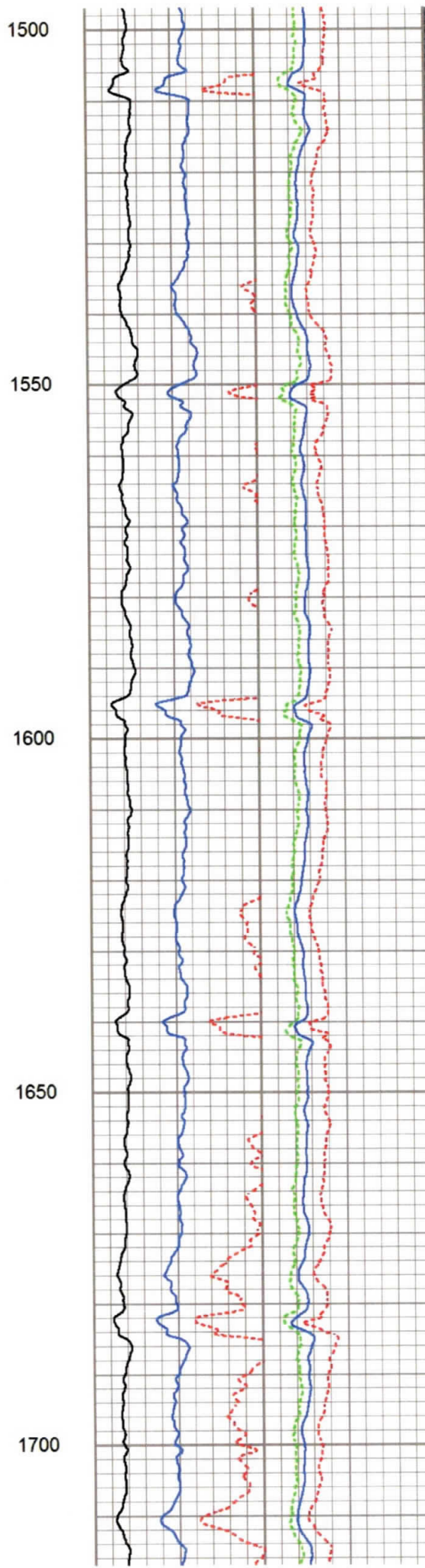
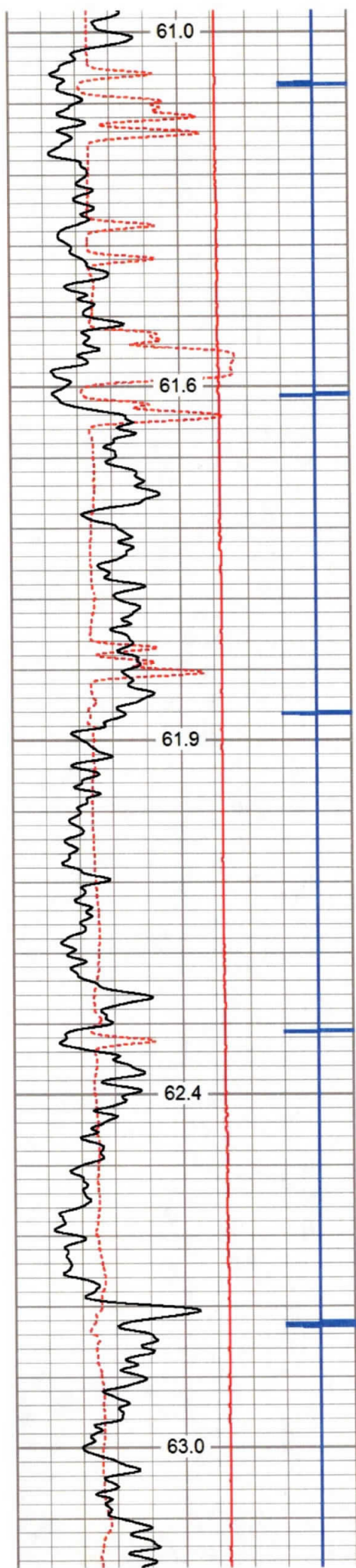
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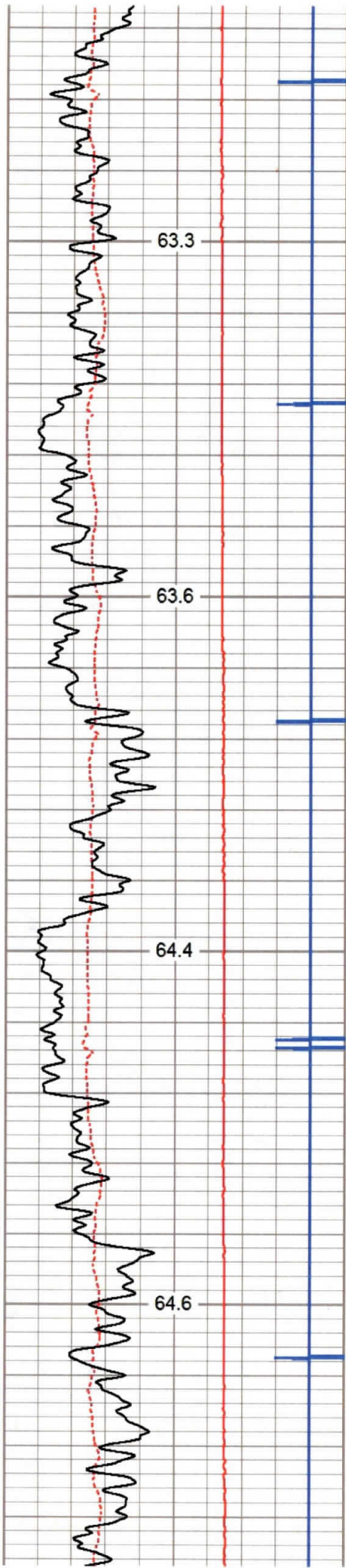
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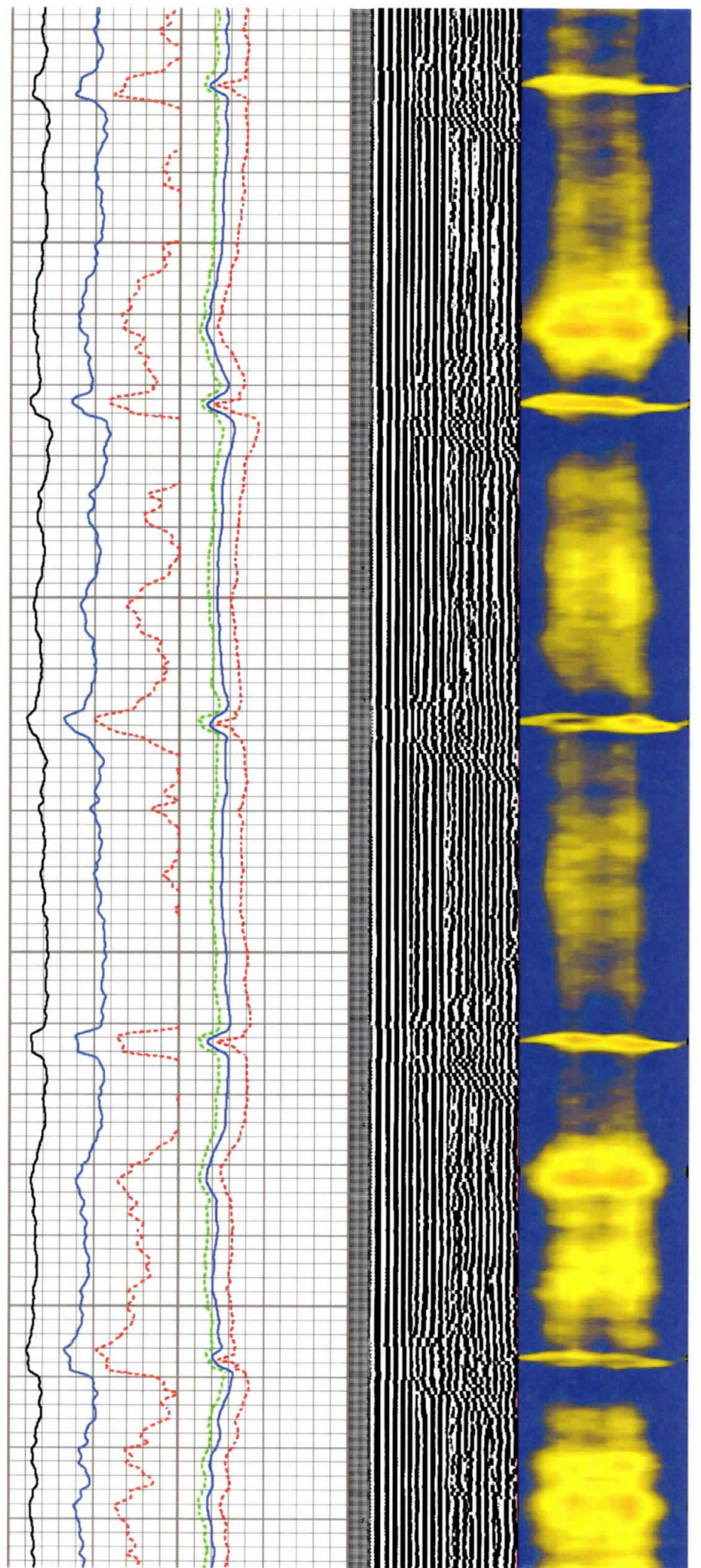


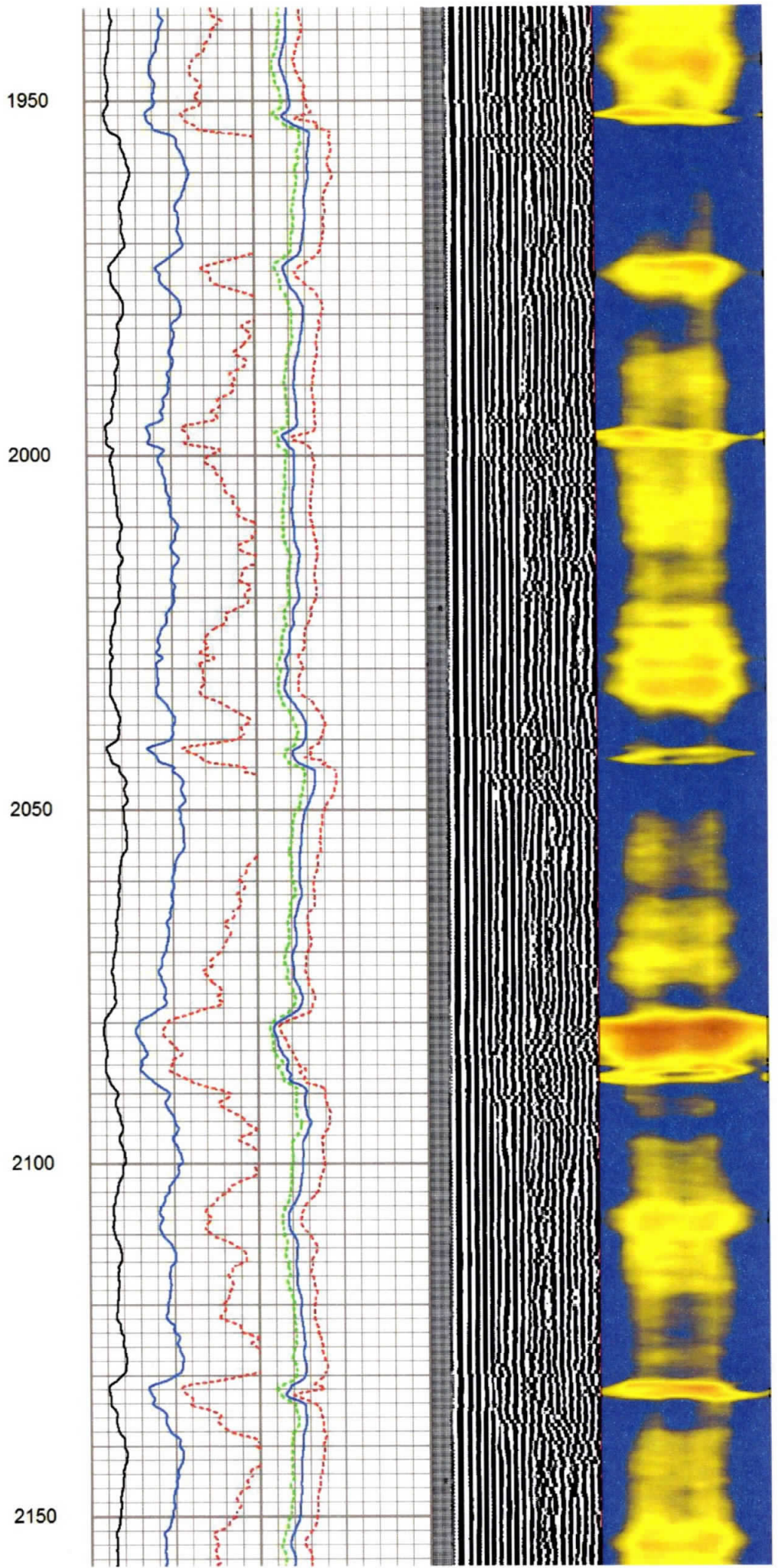
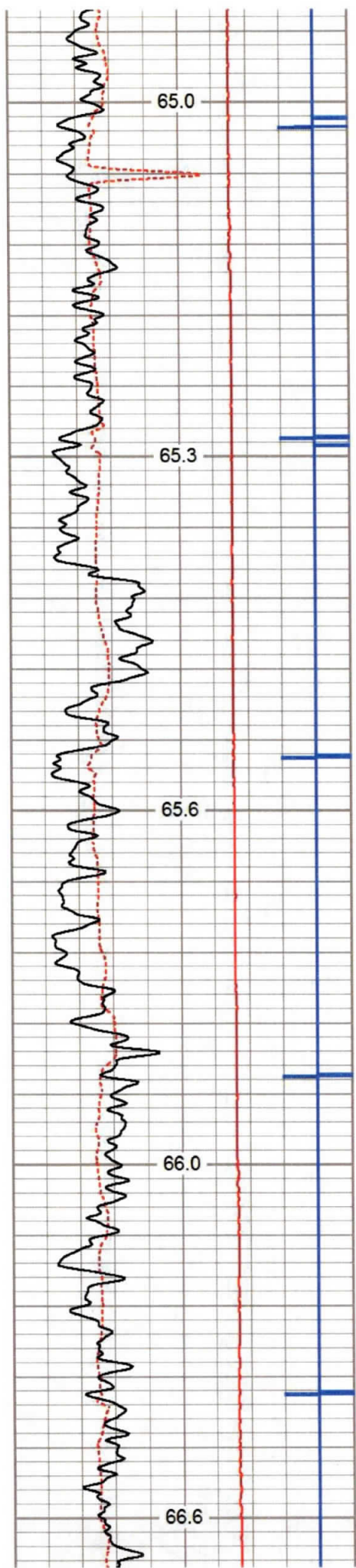
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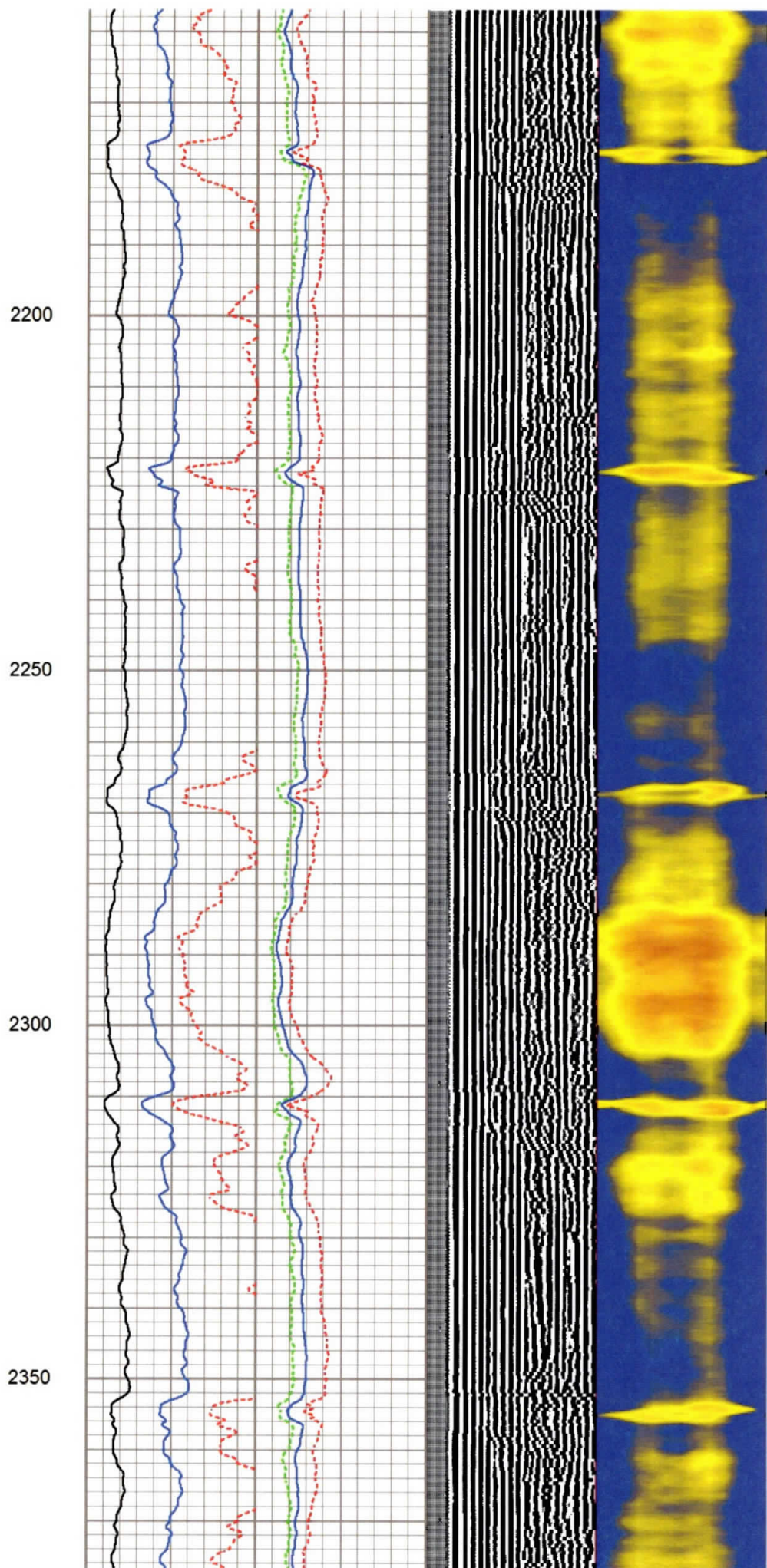
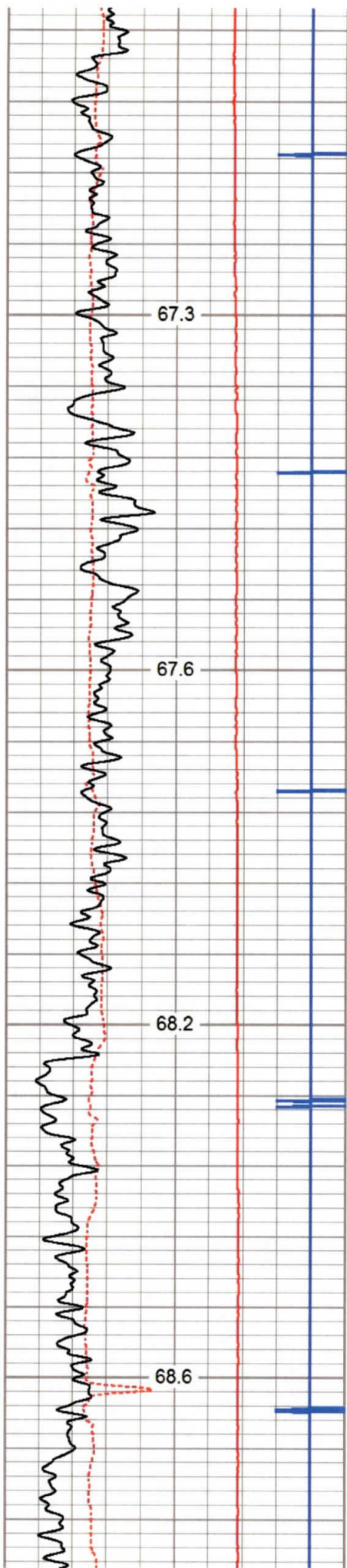
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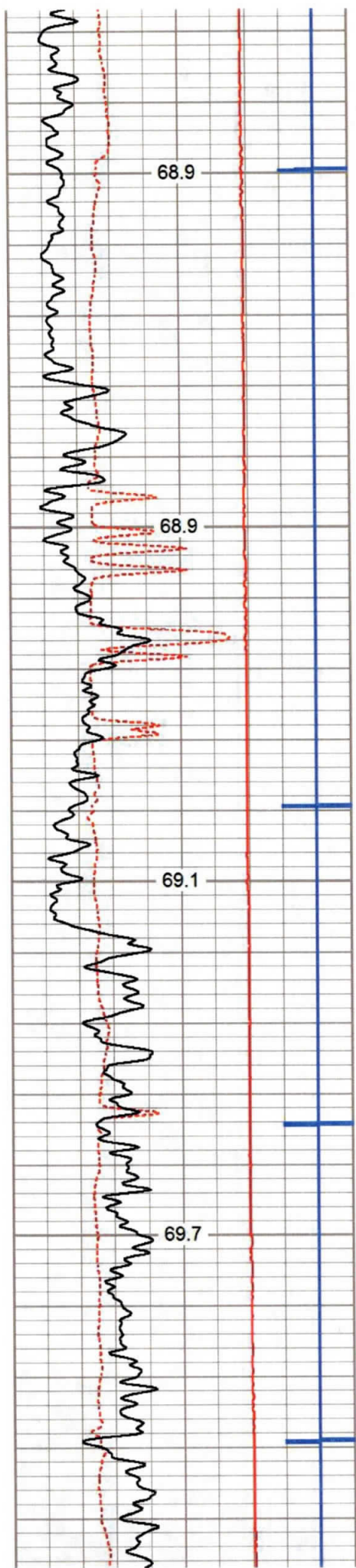
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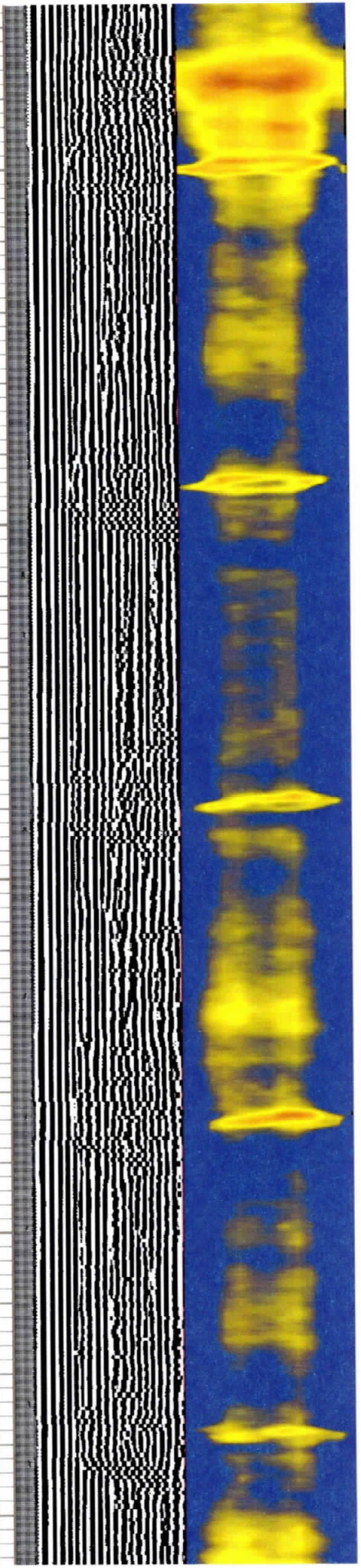
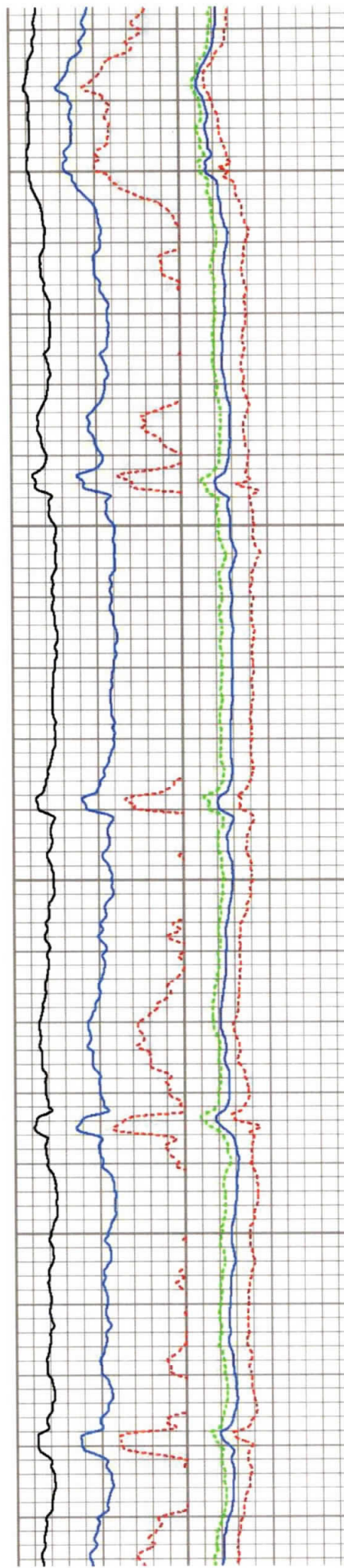


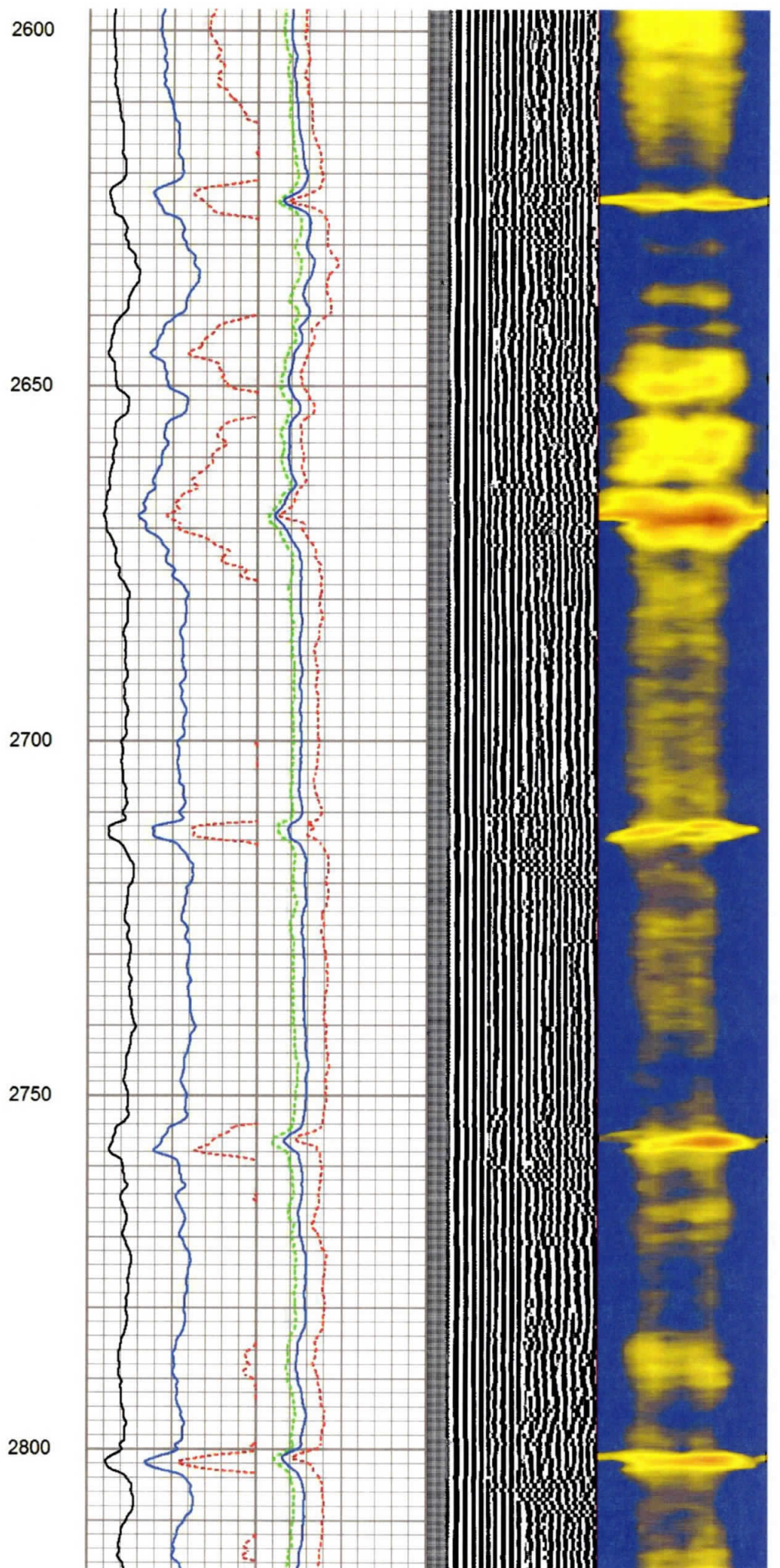
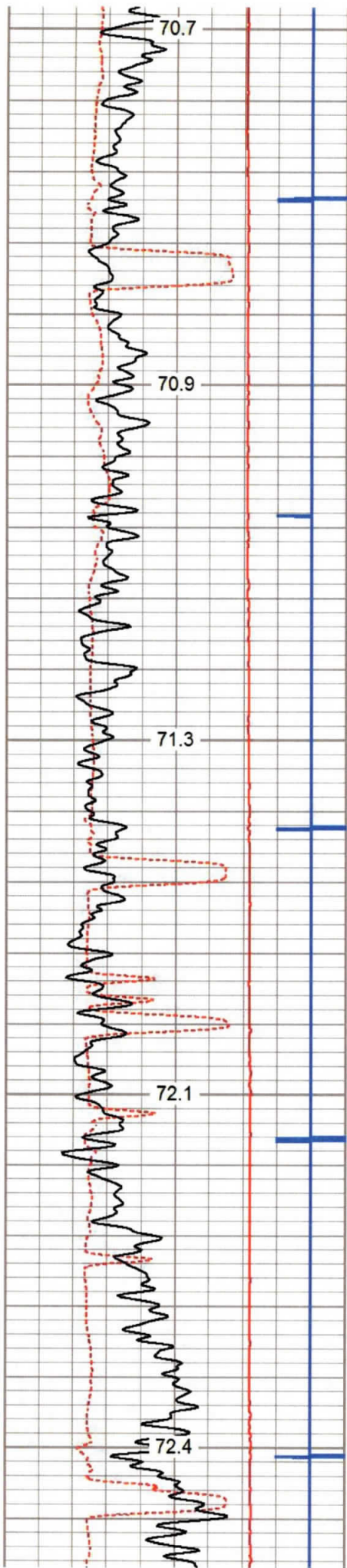
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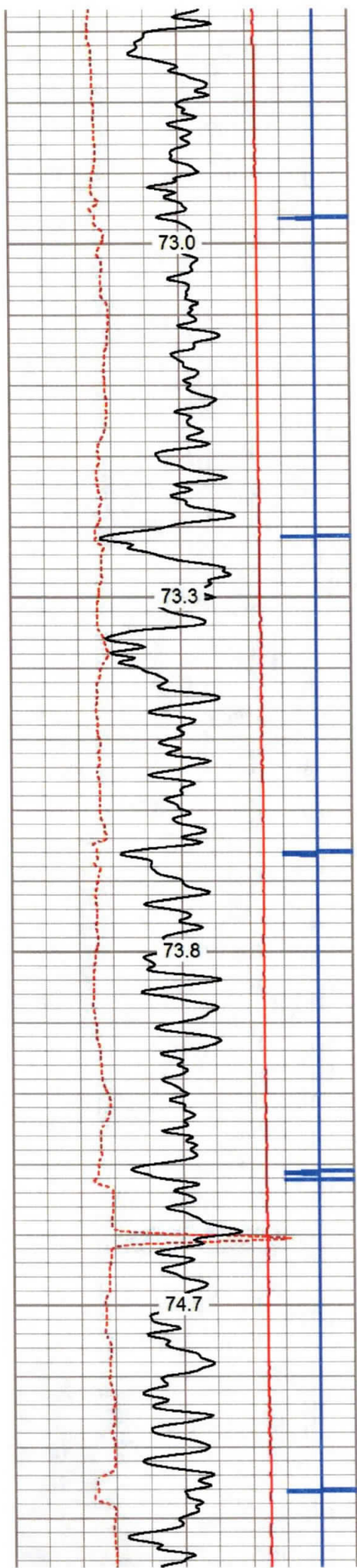
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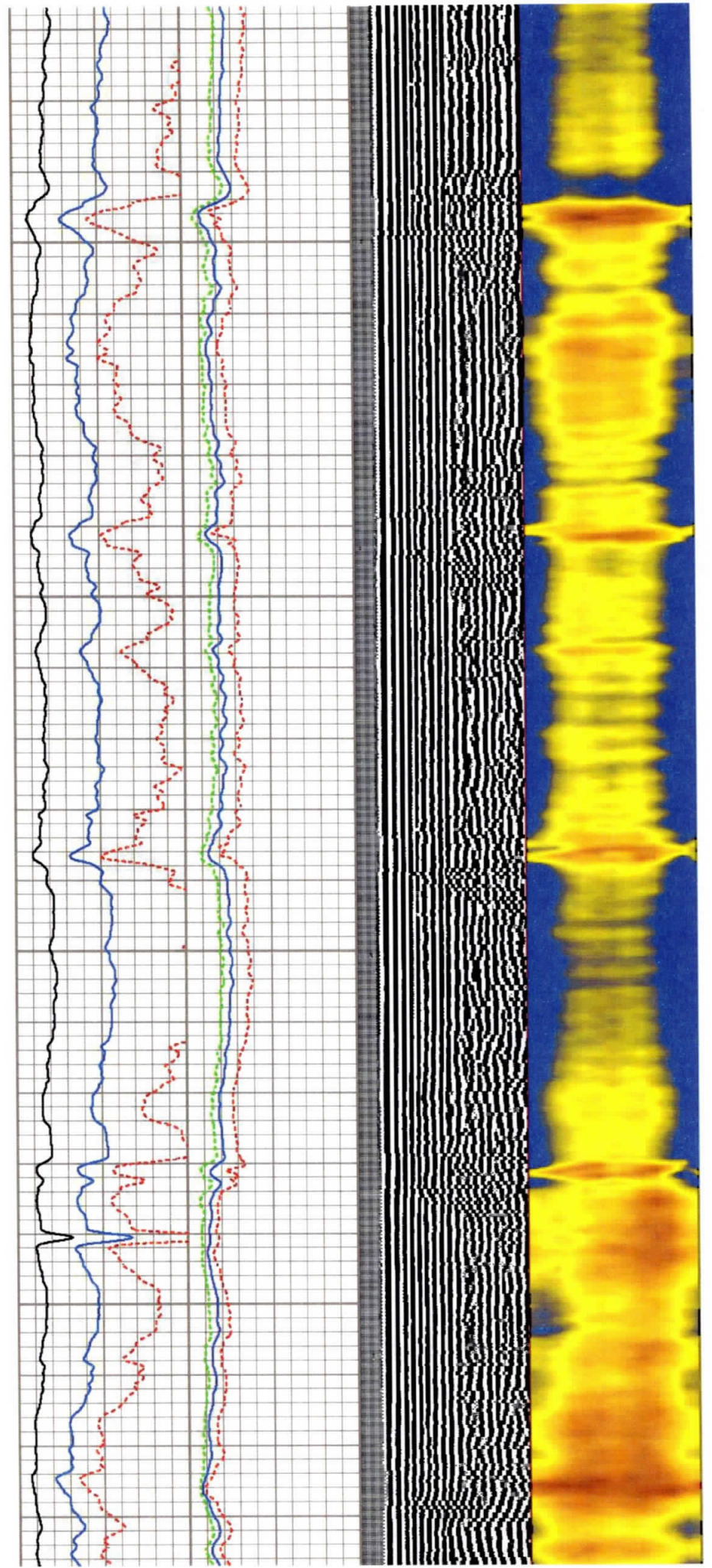


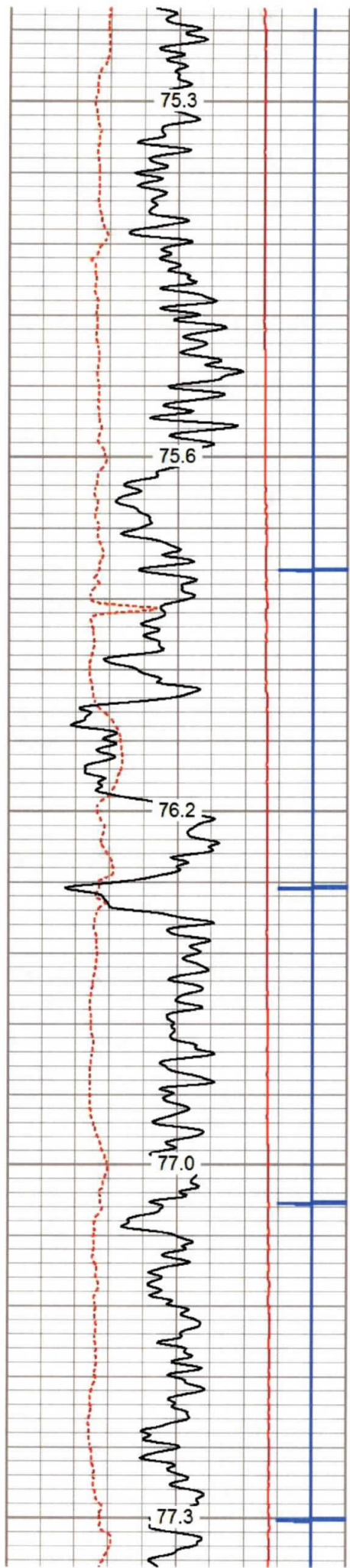
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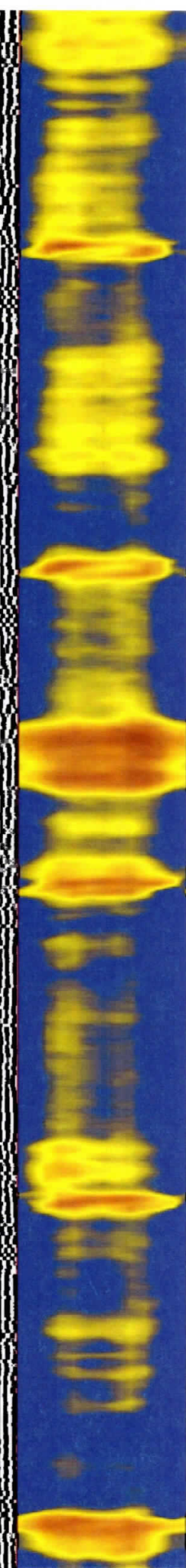
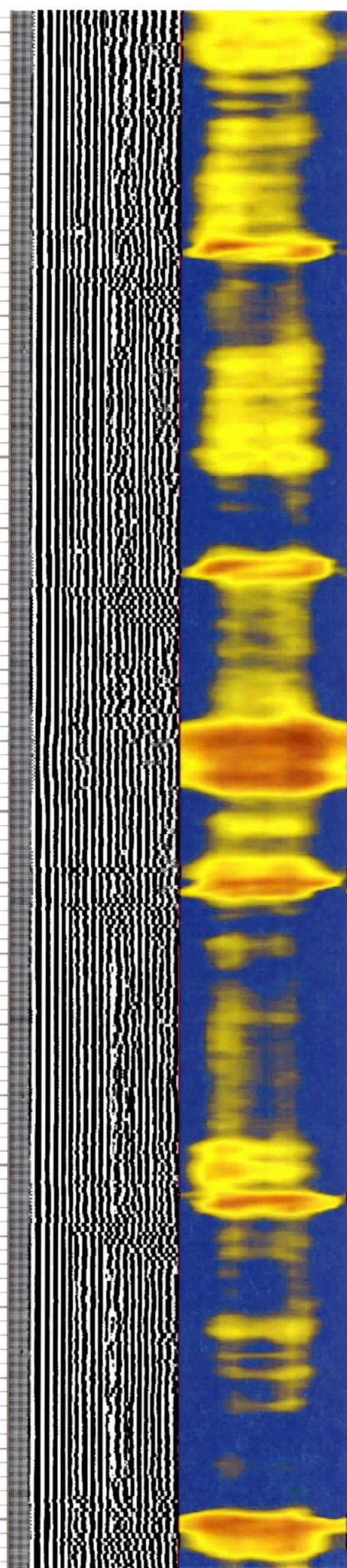
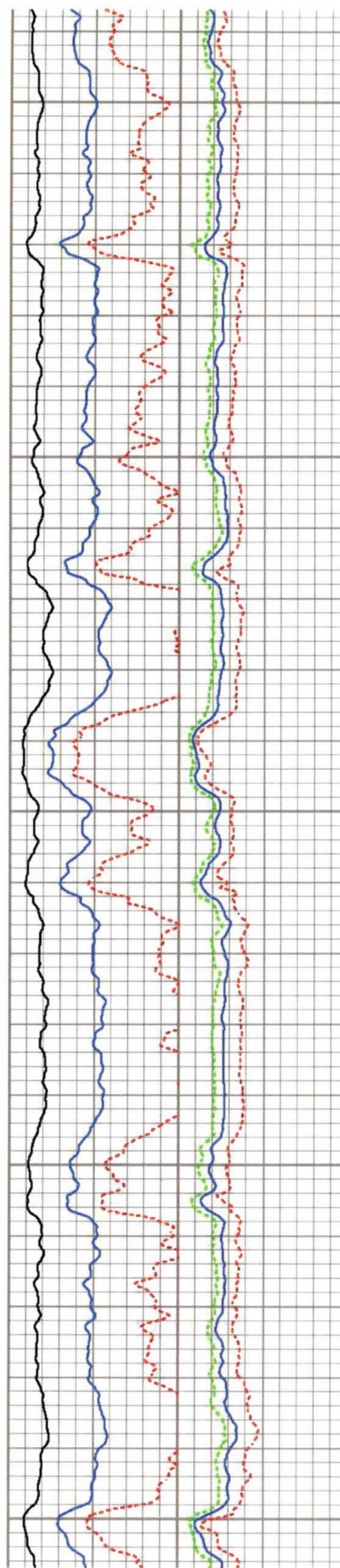
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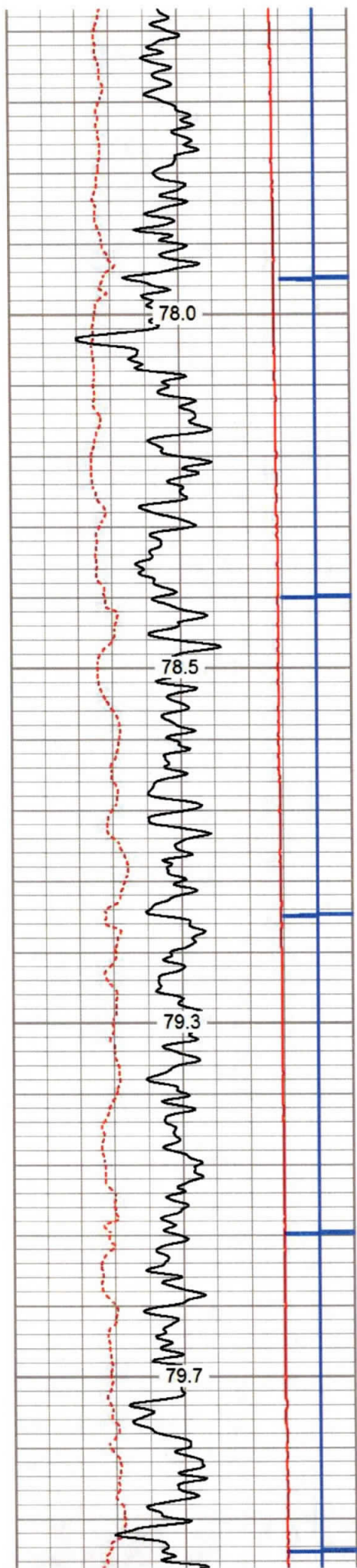
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3100
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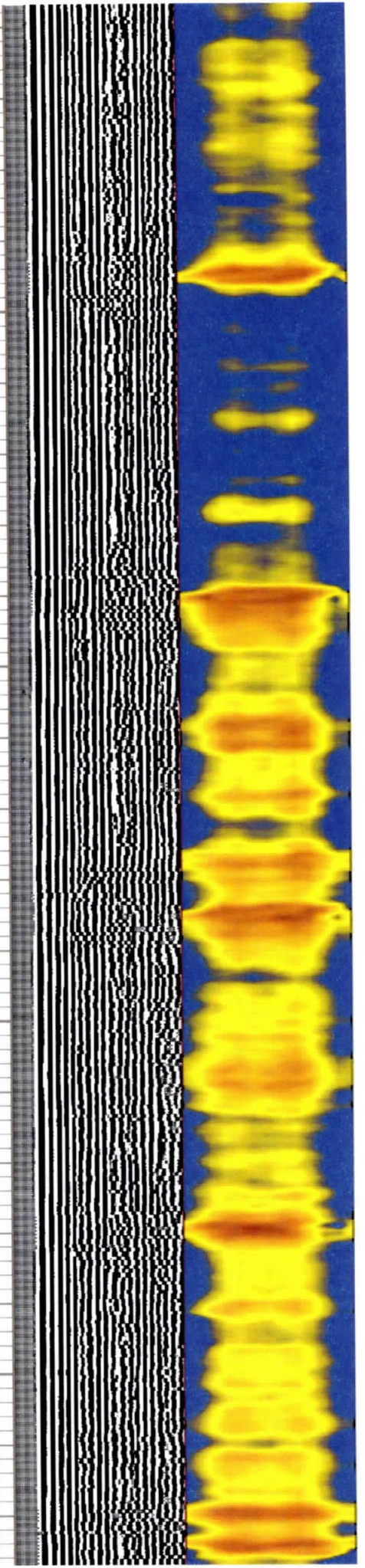
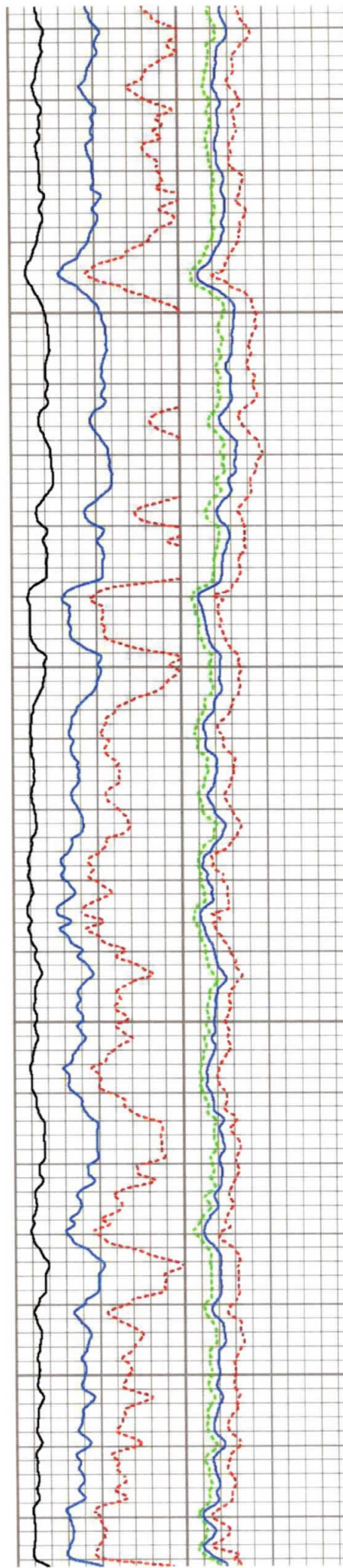


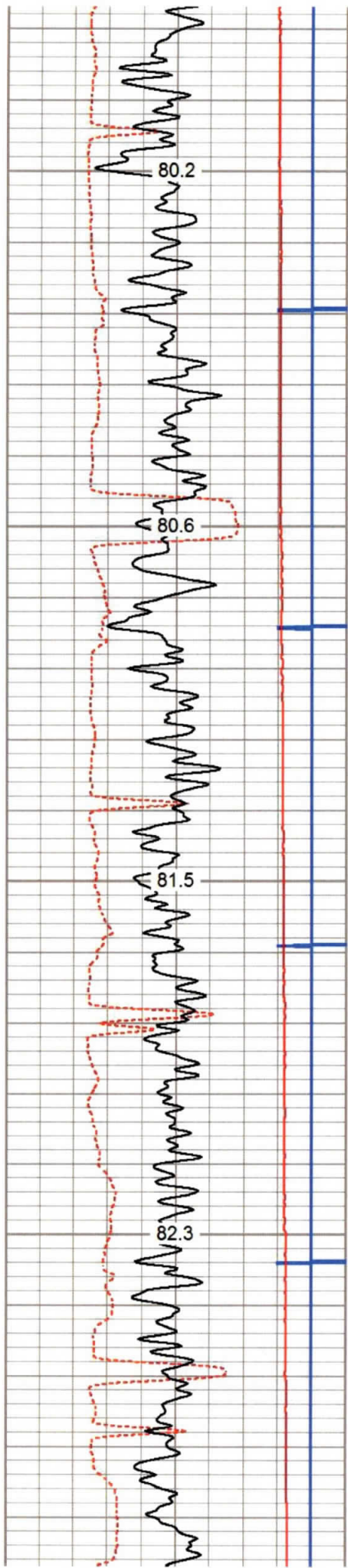
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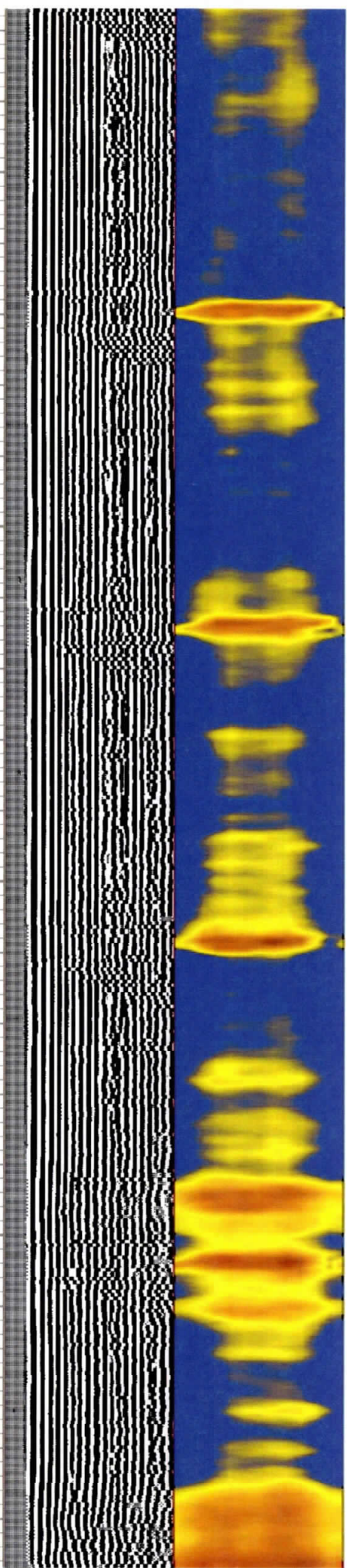
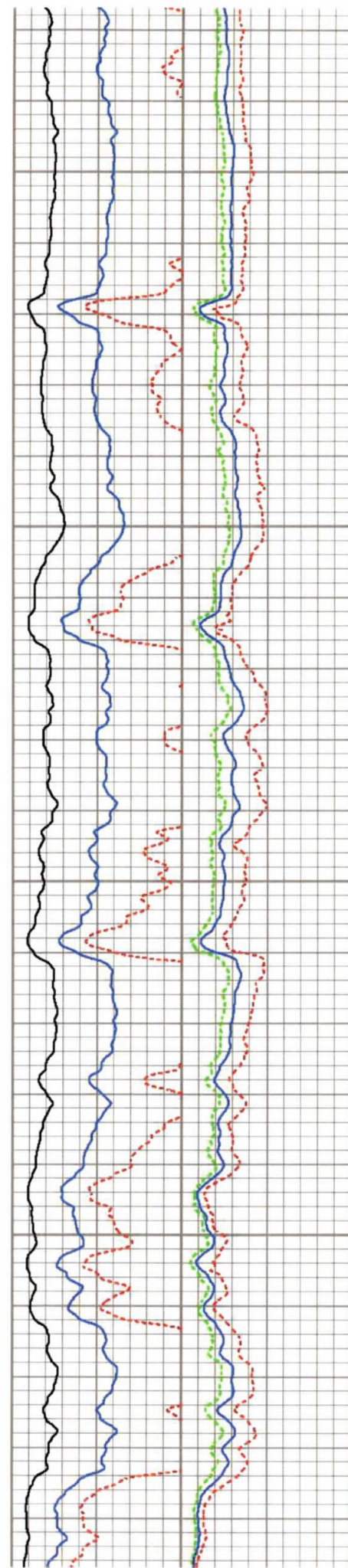
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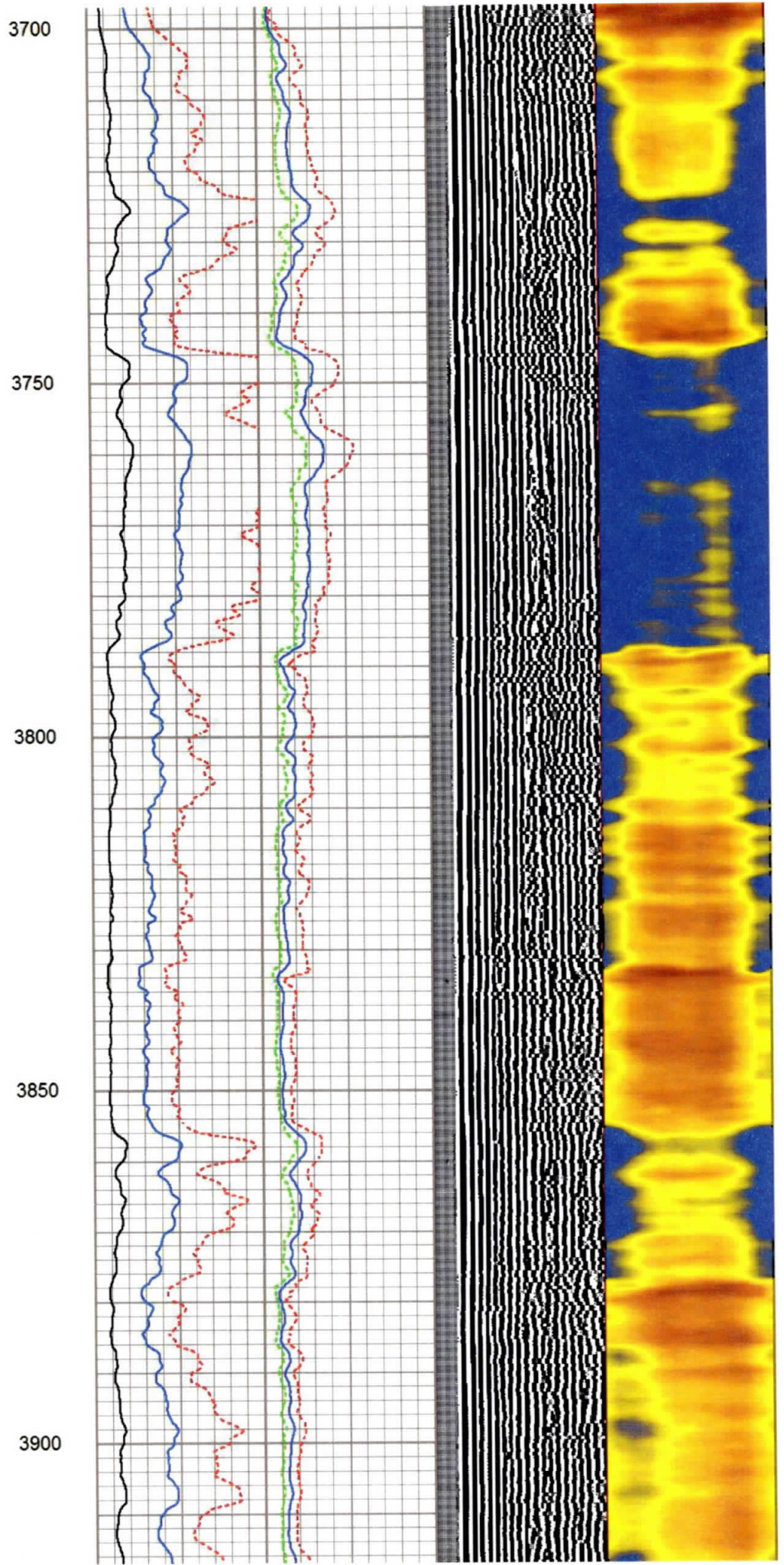
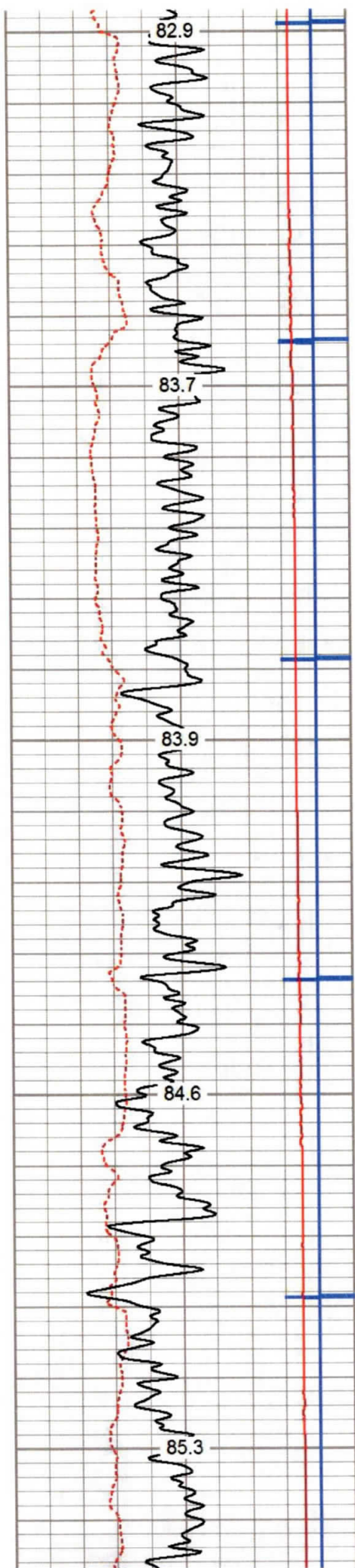
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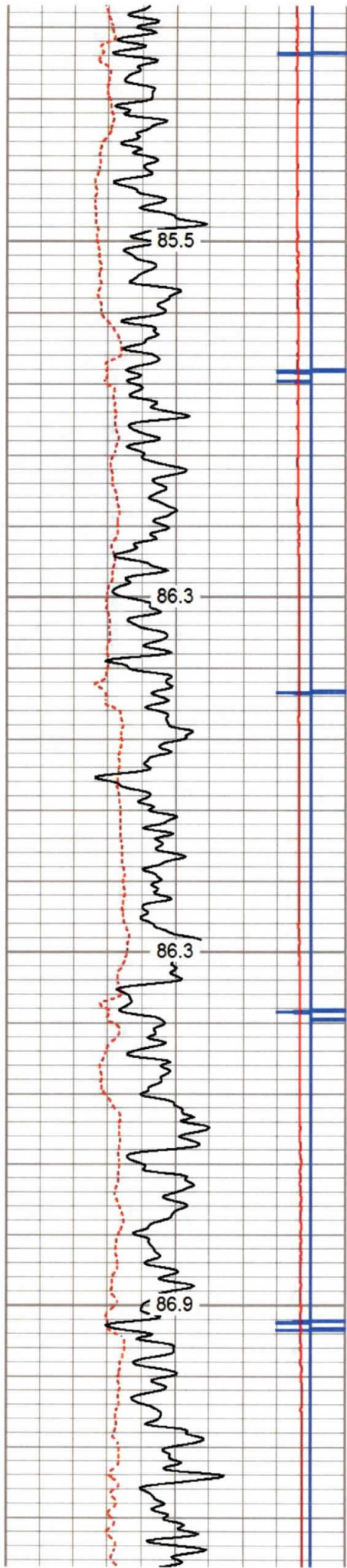




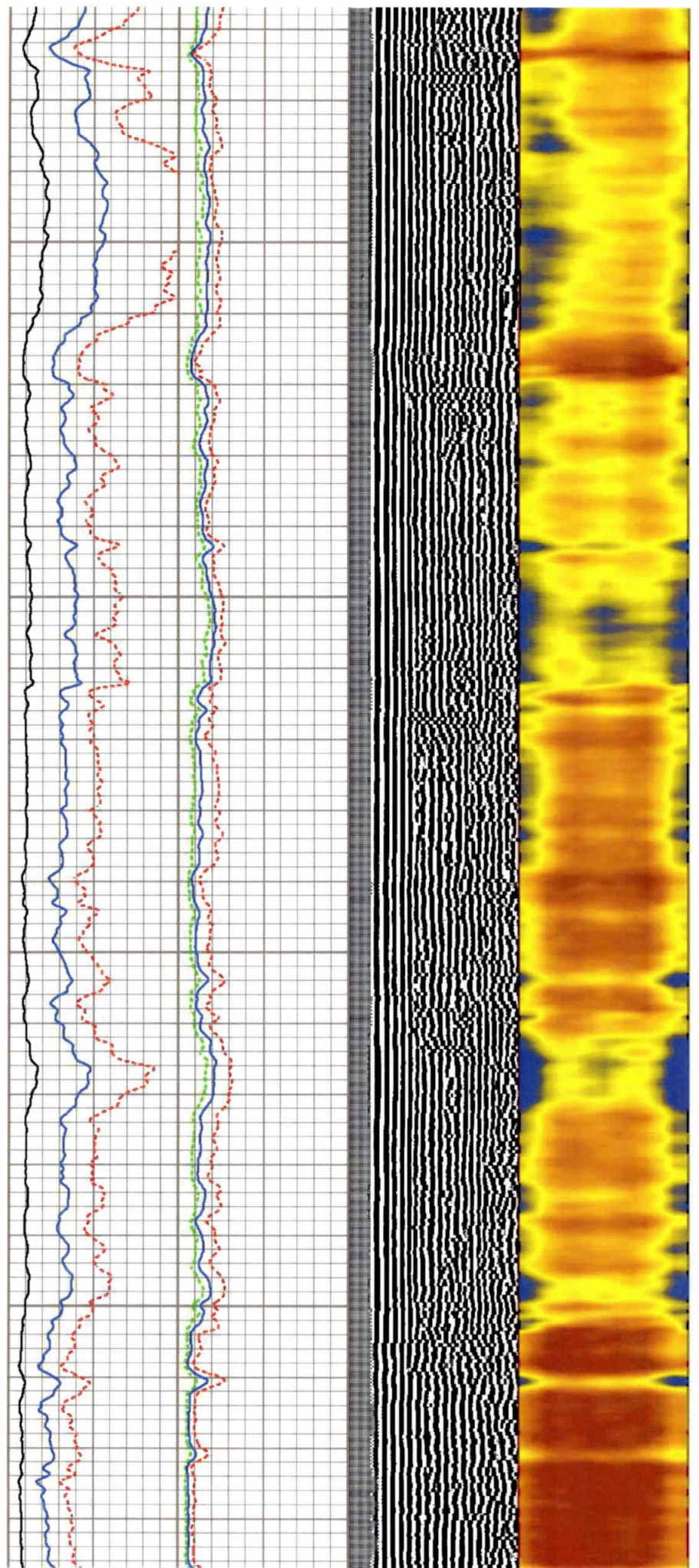
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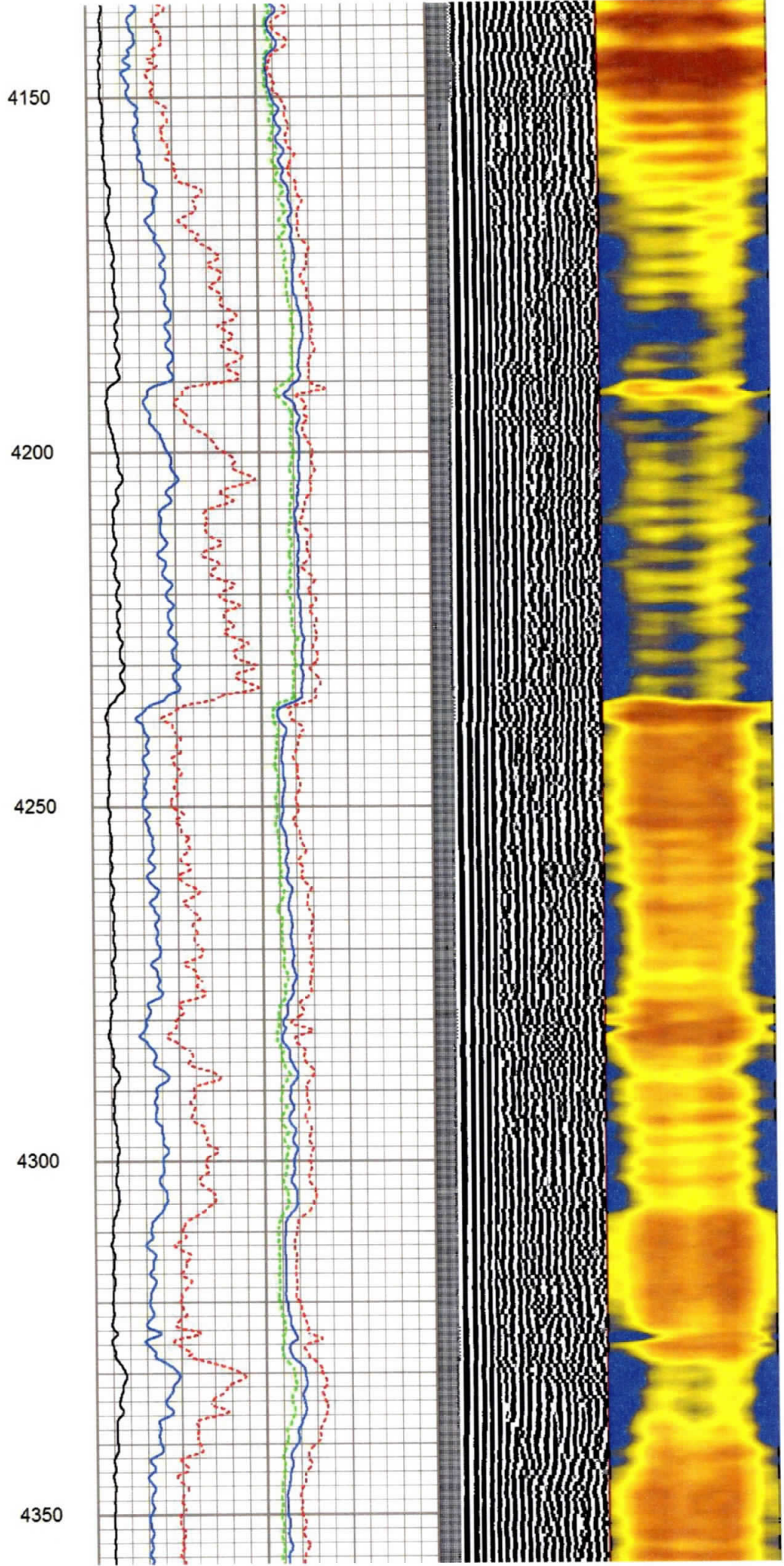
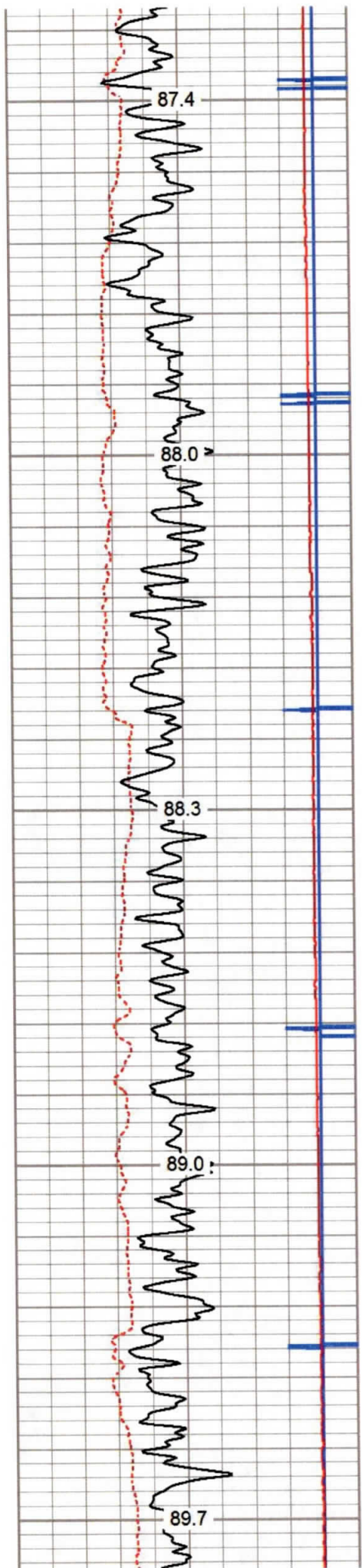


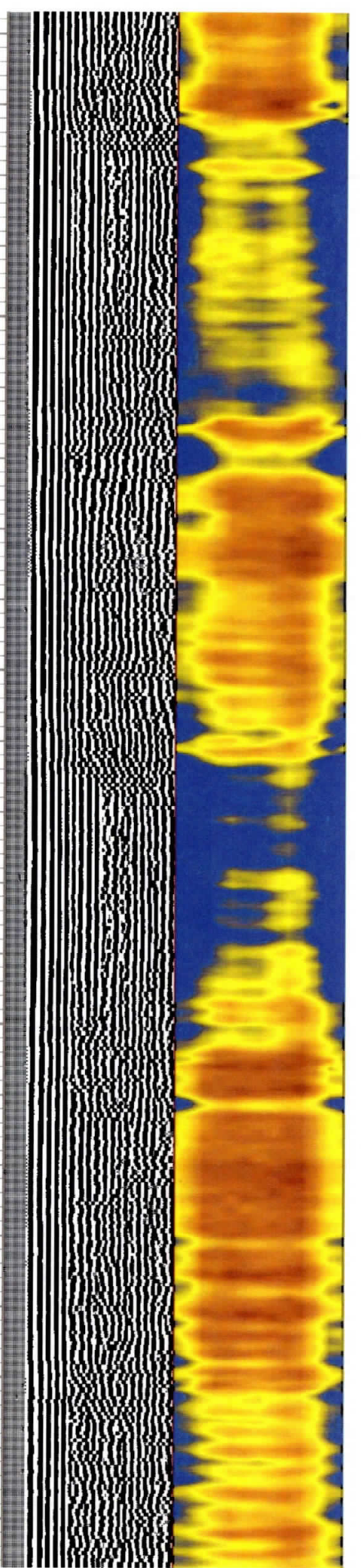
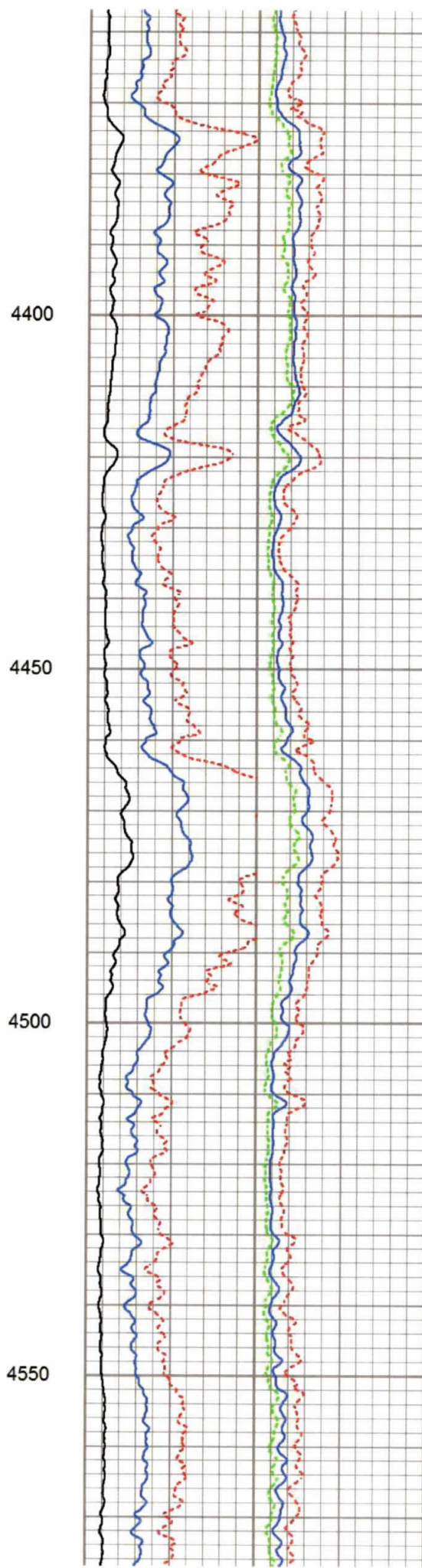
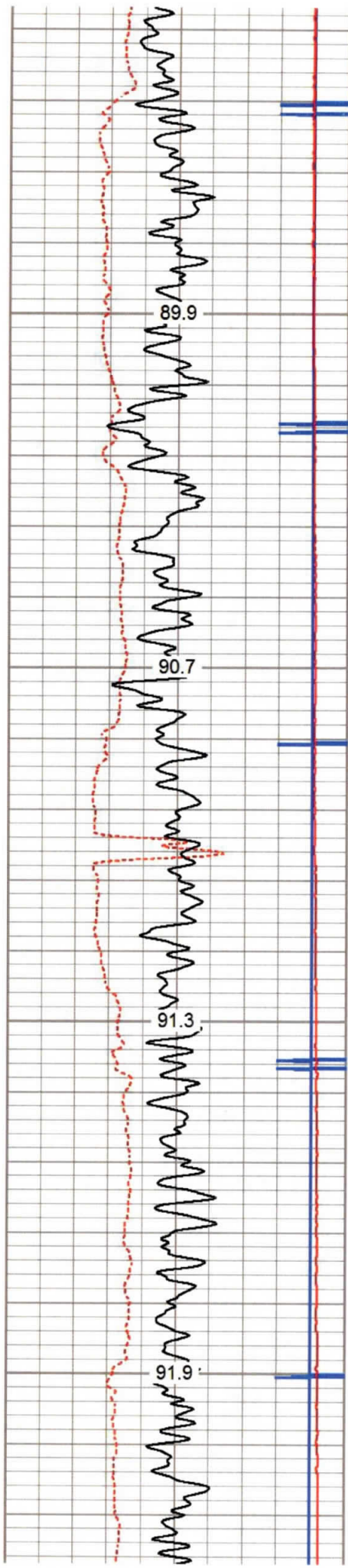


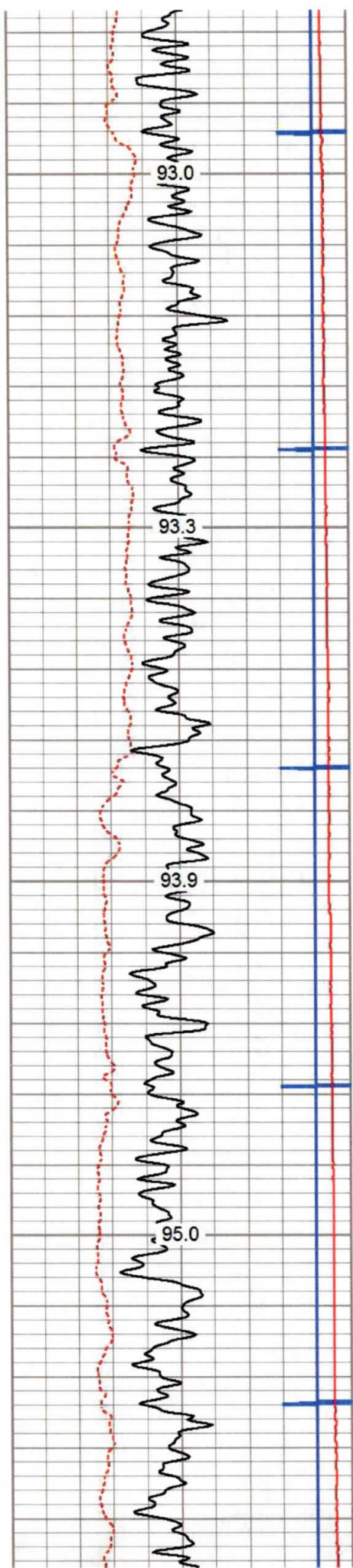


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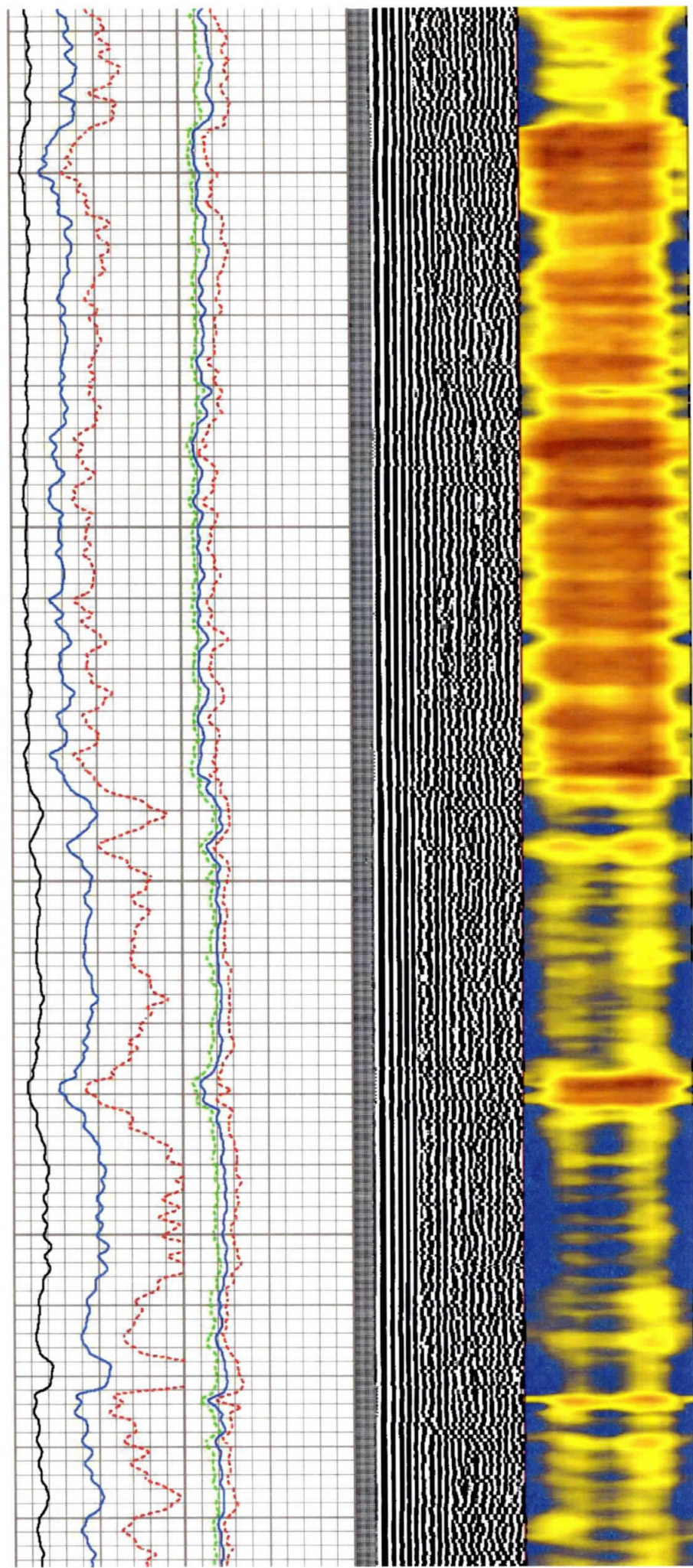


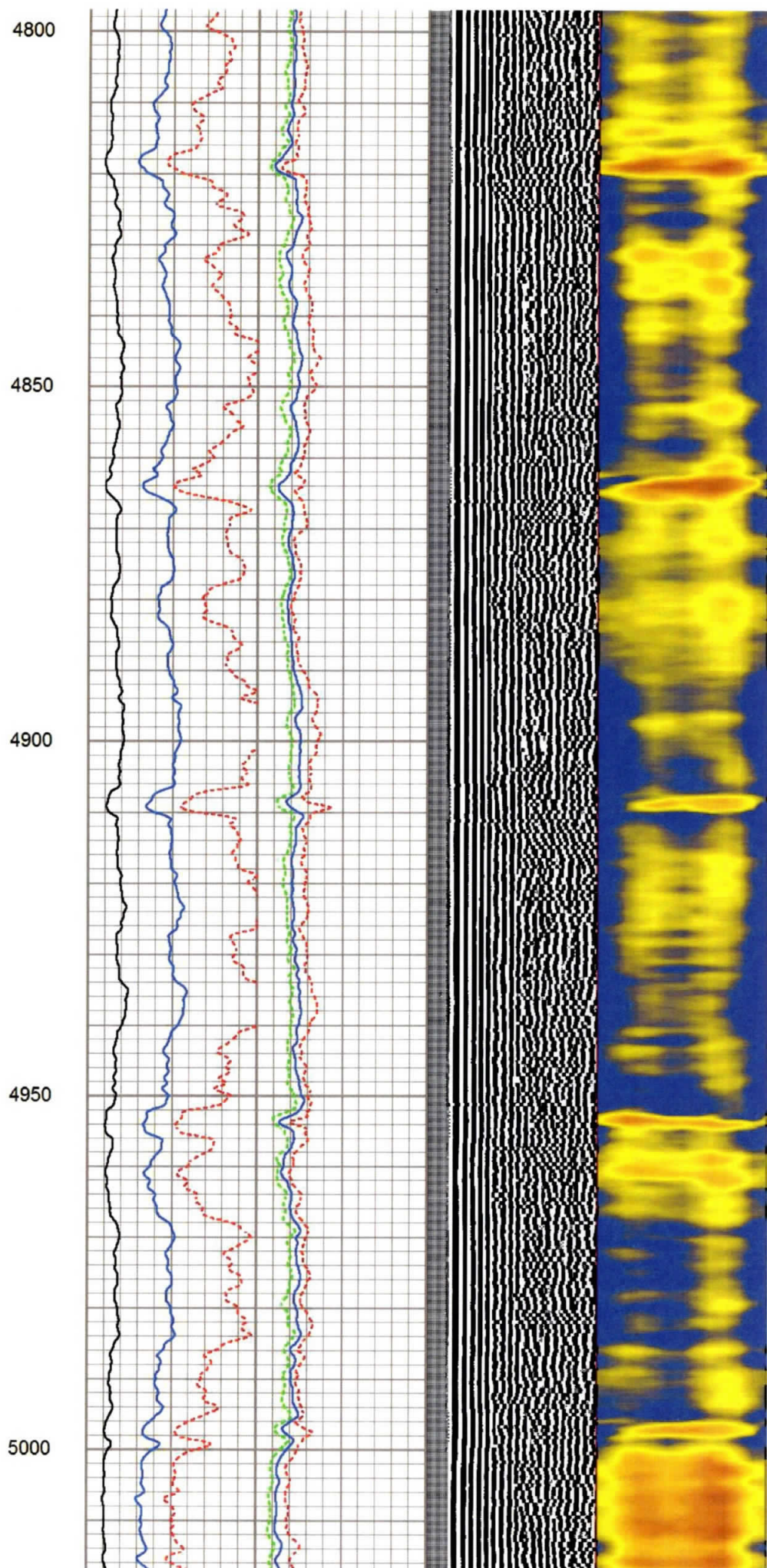
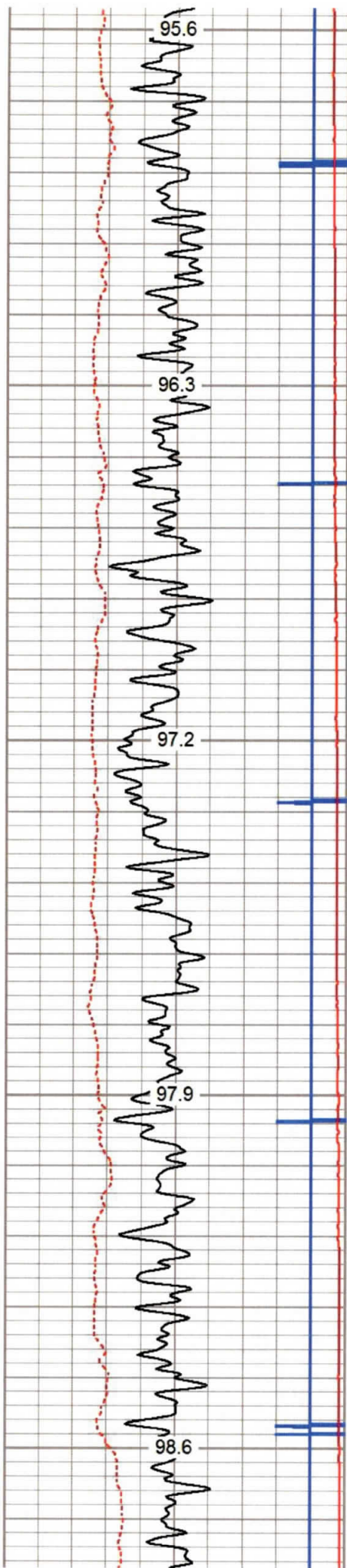
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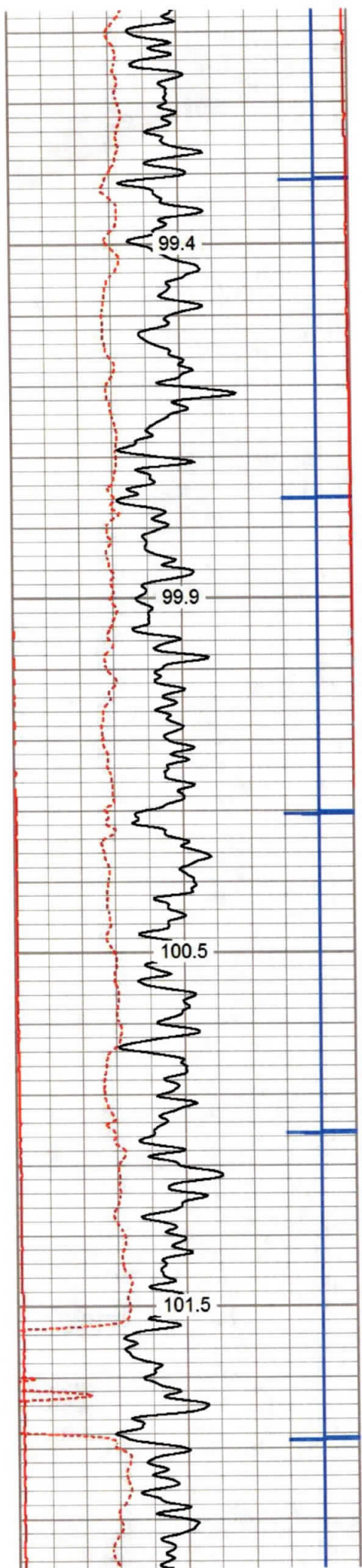
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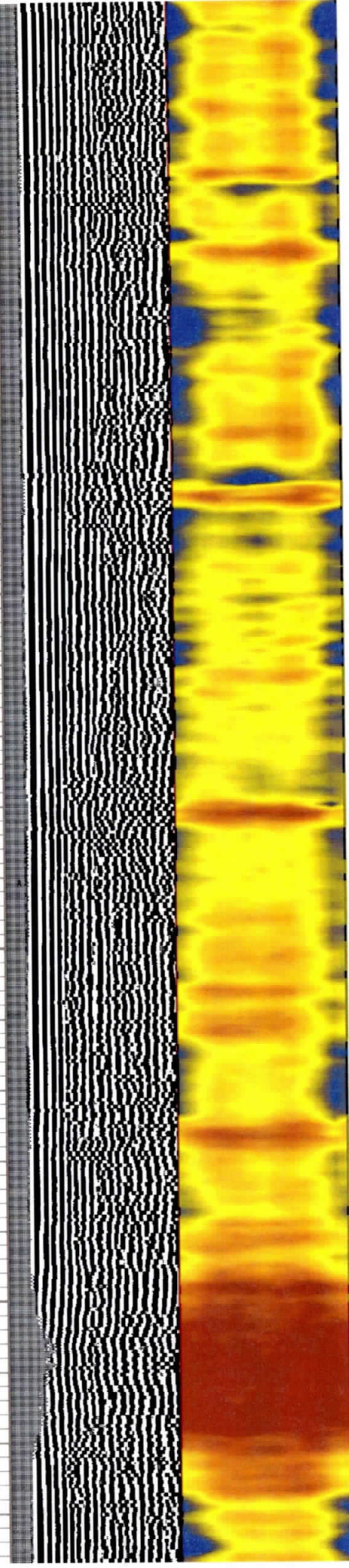
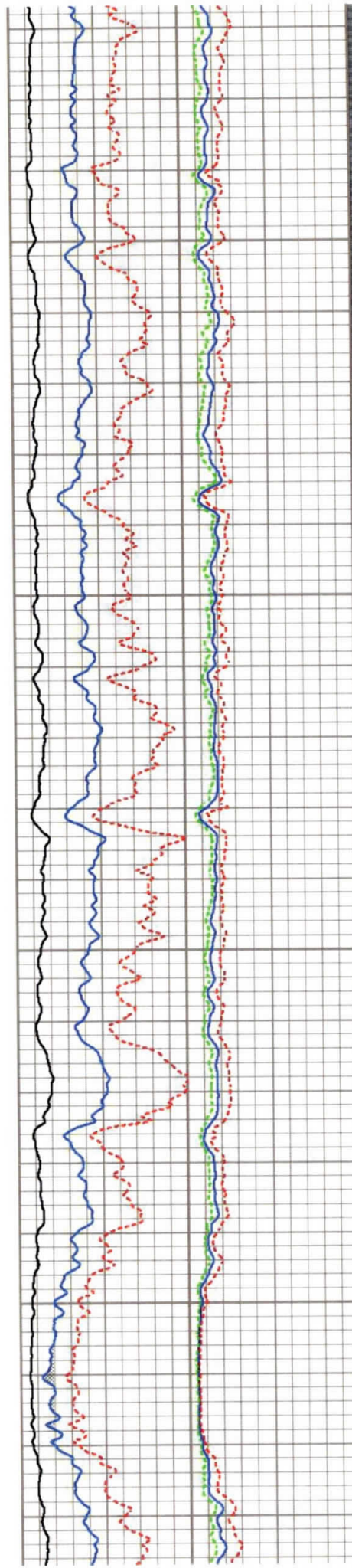


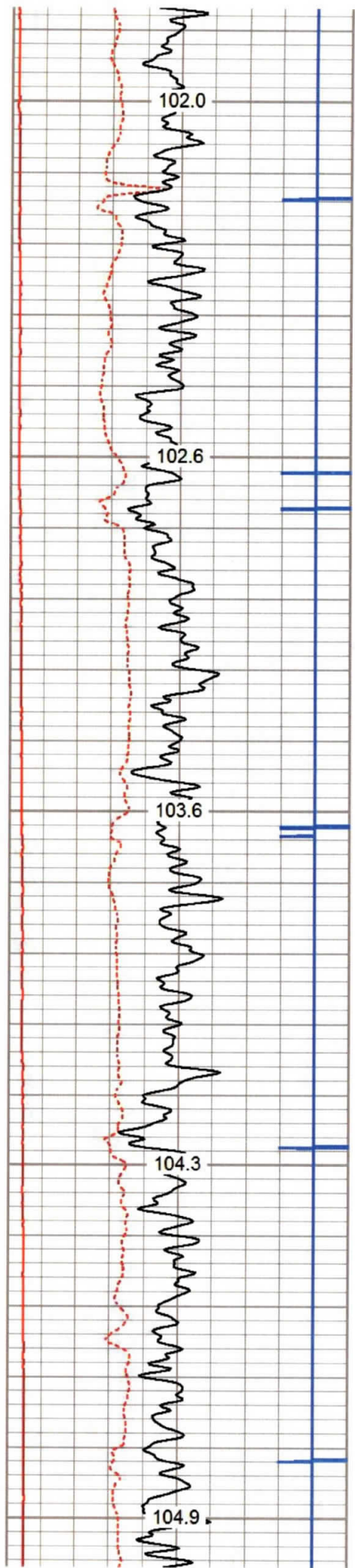
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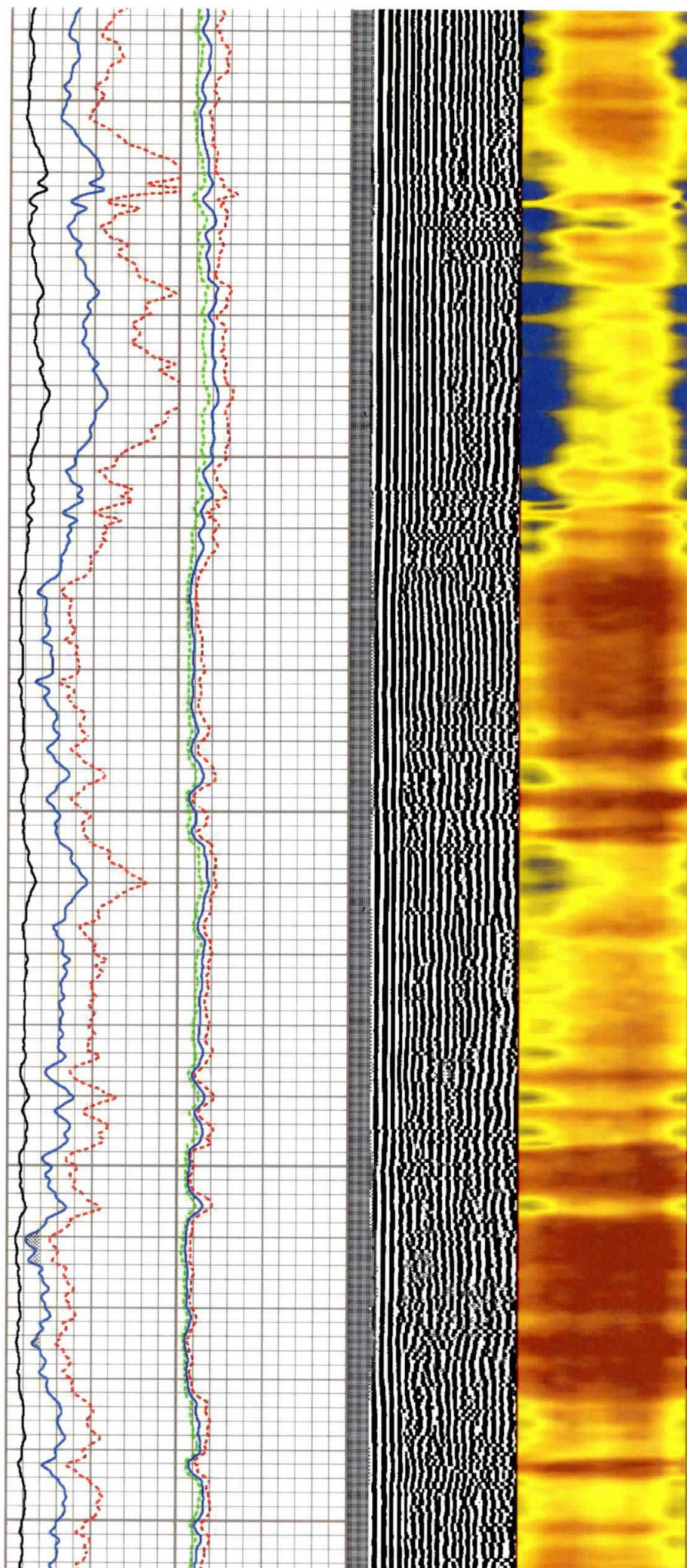
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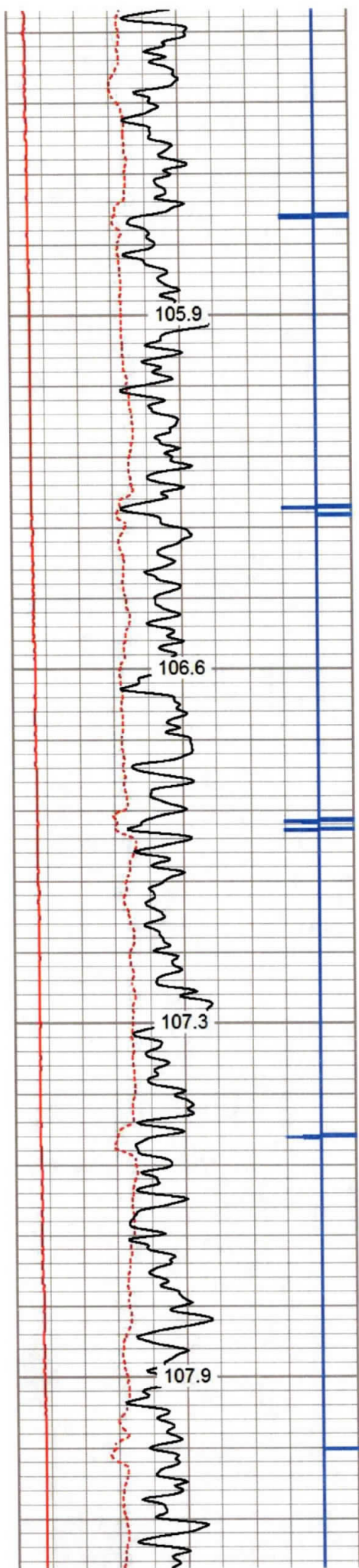
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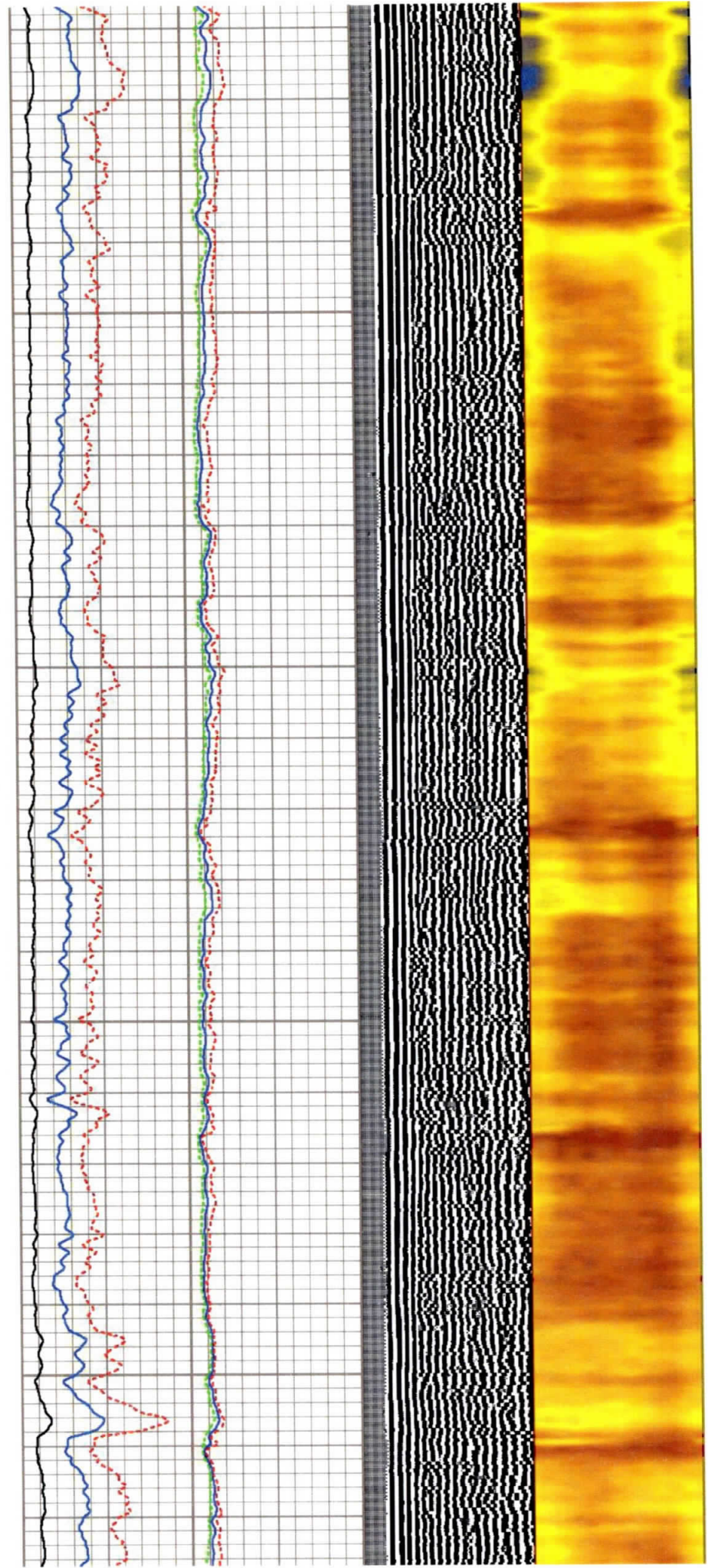


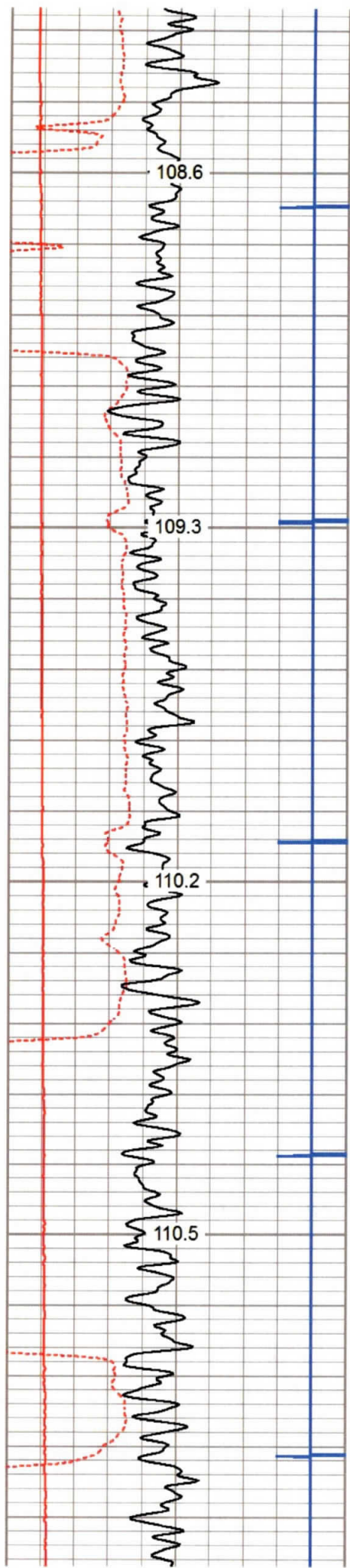
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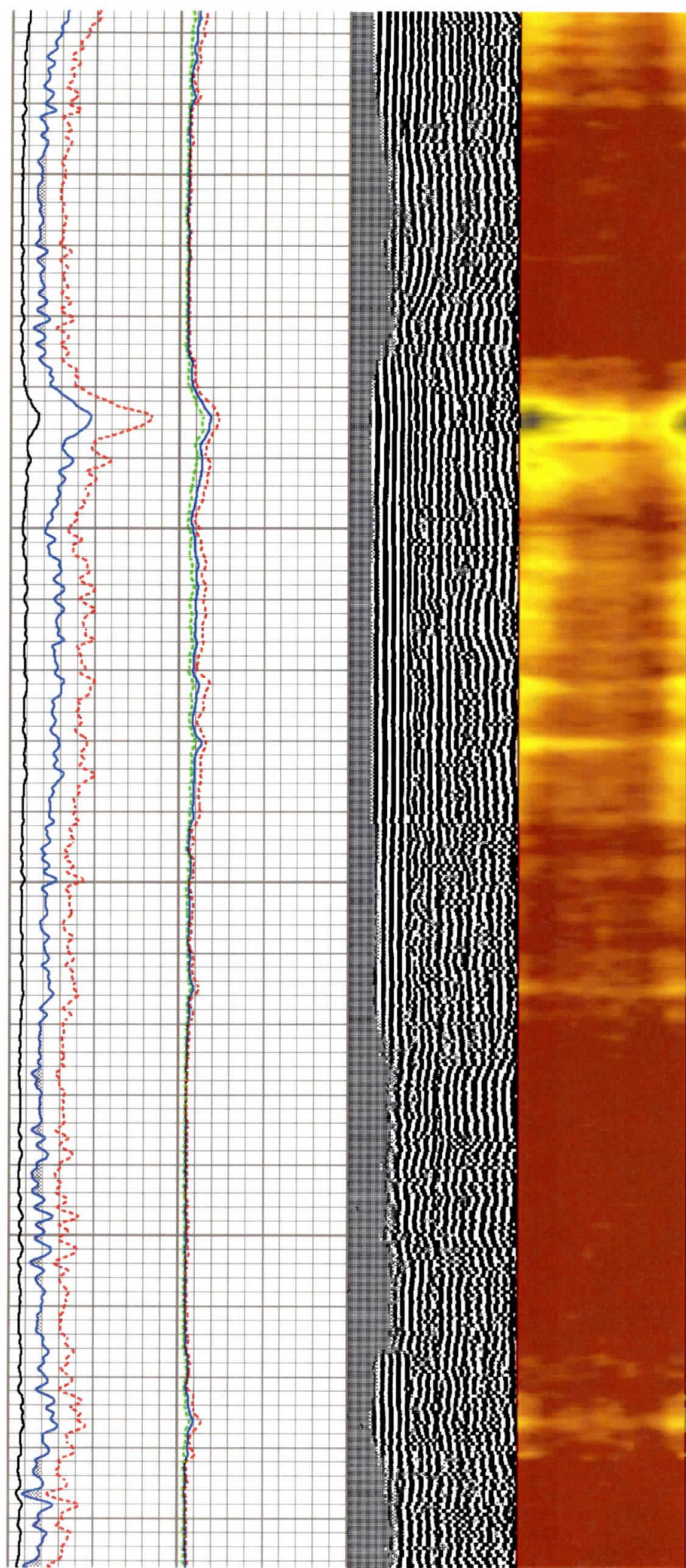


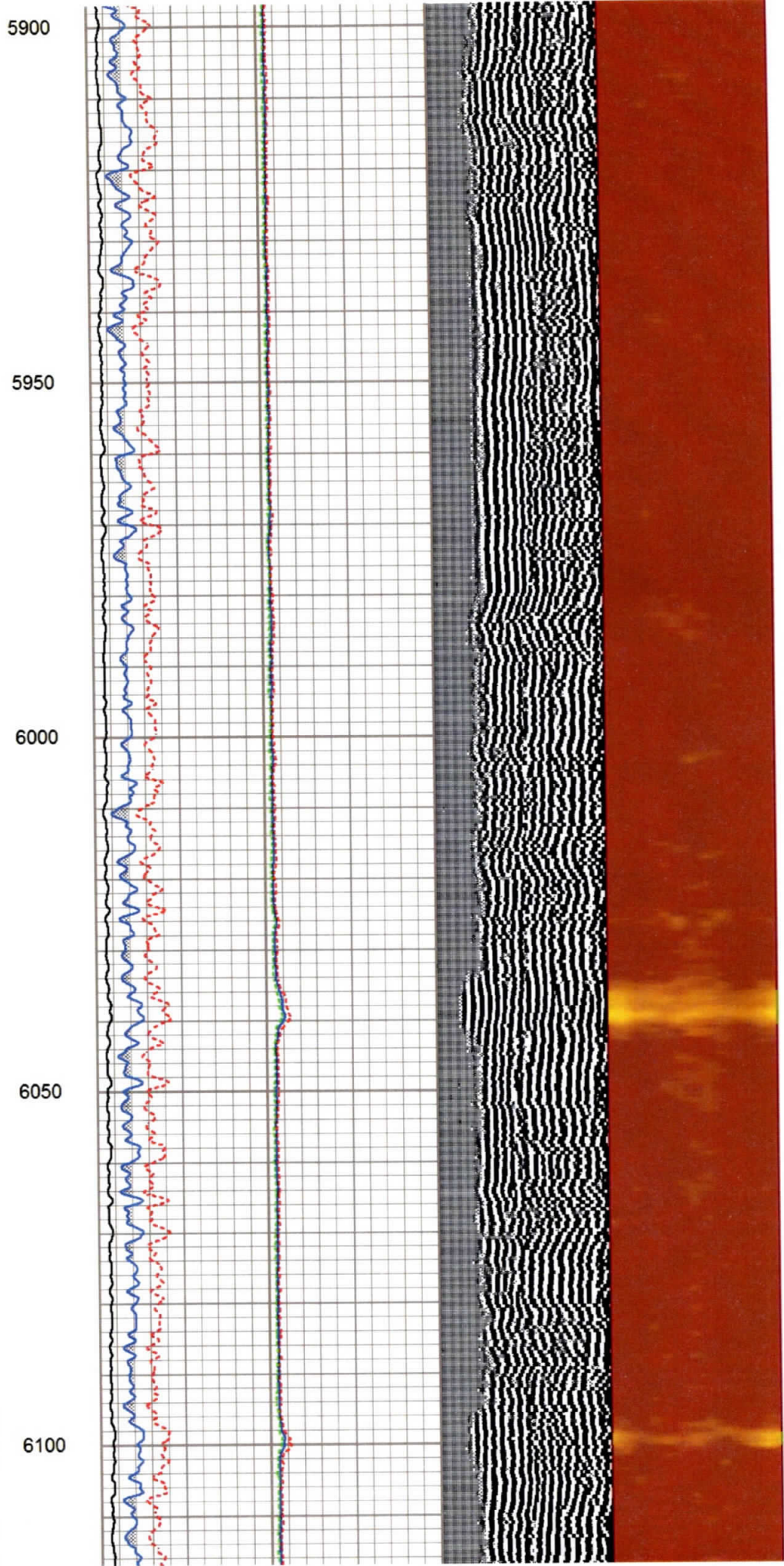
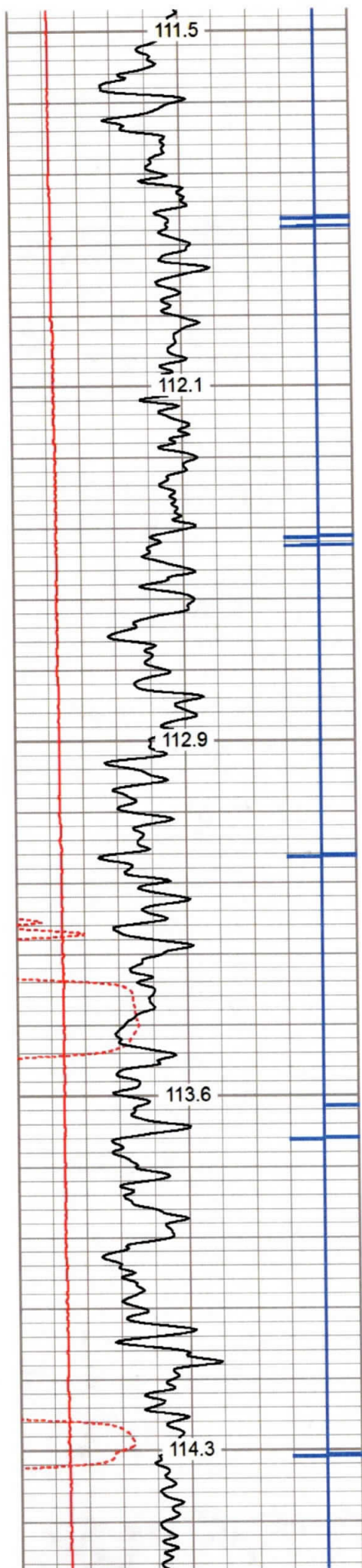
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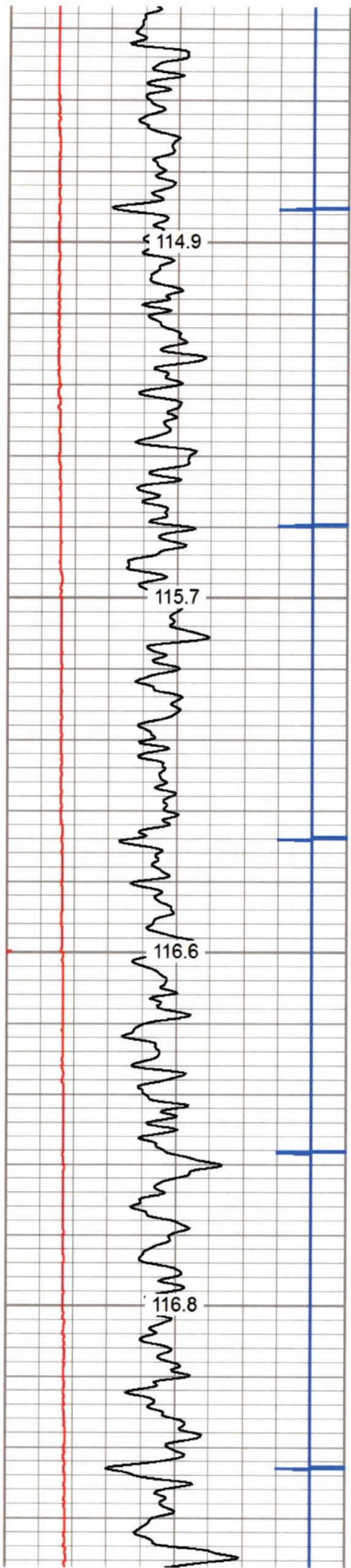
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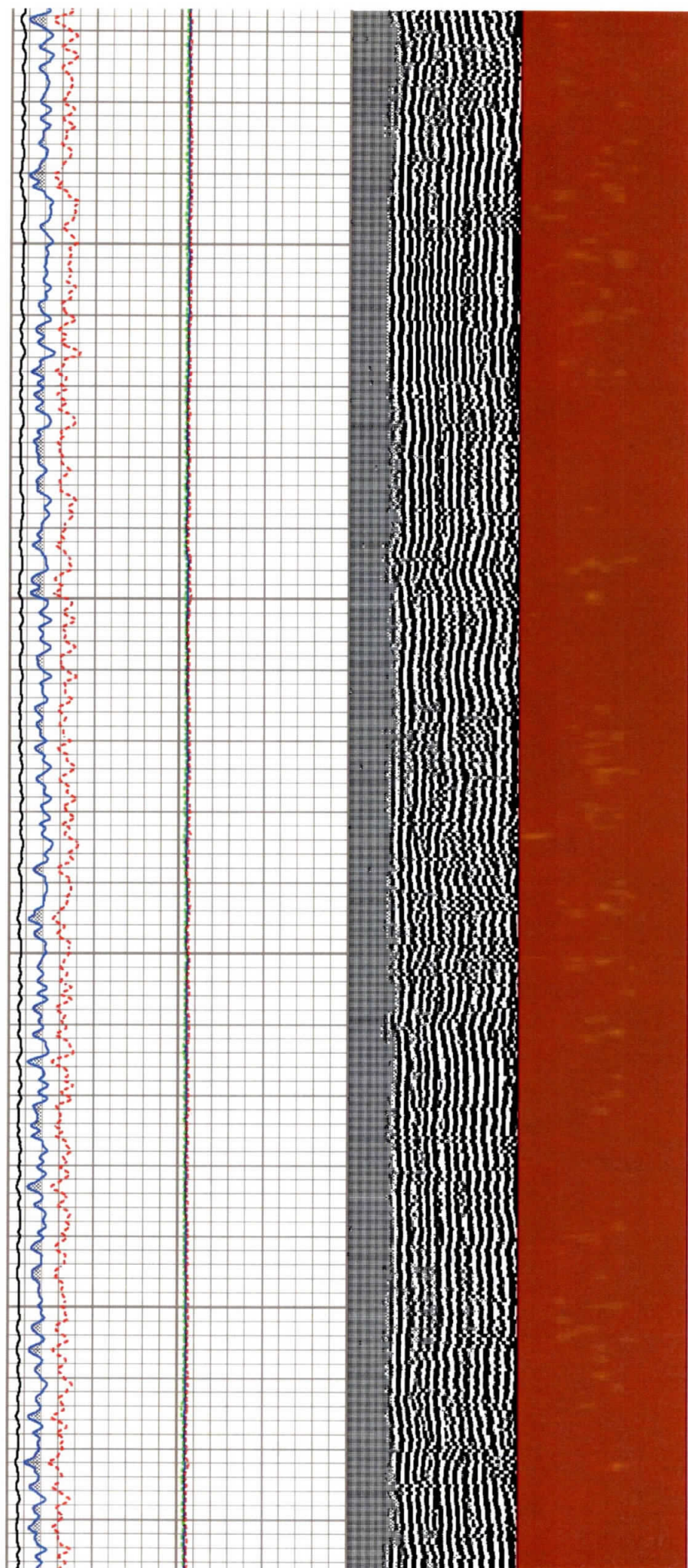


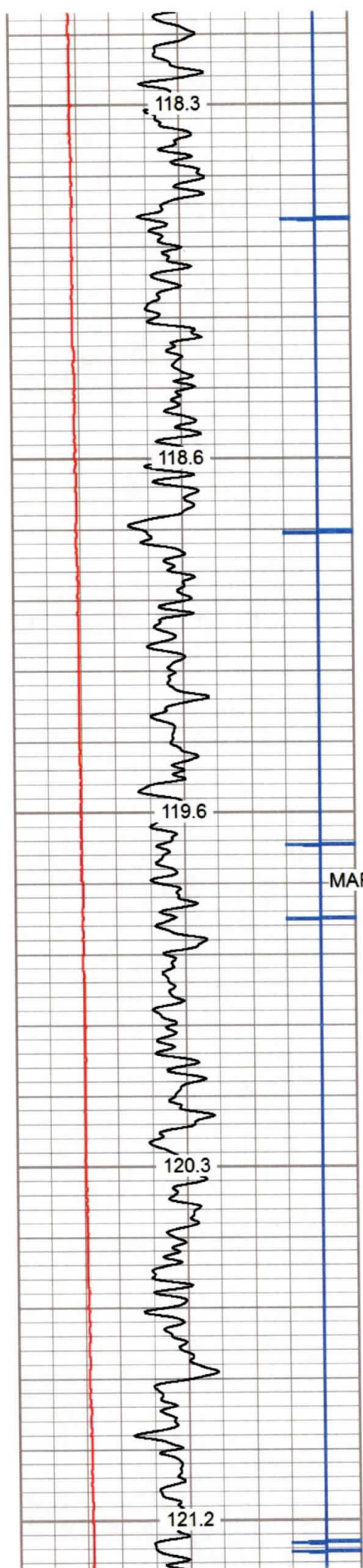
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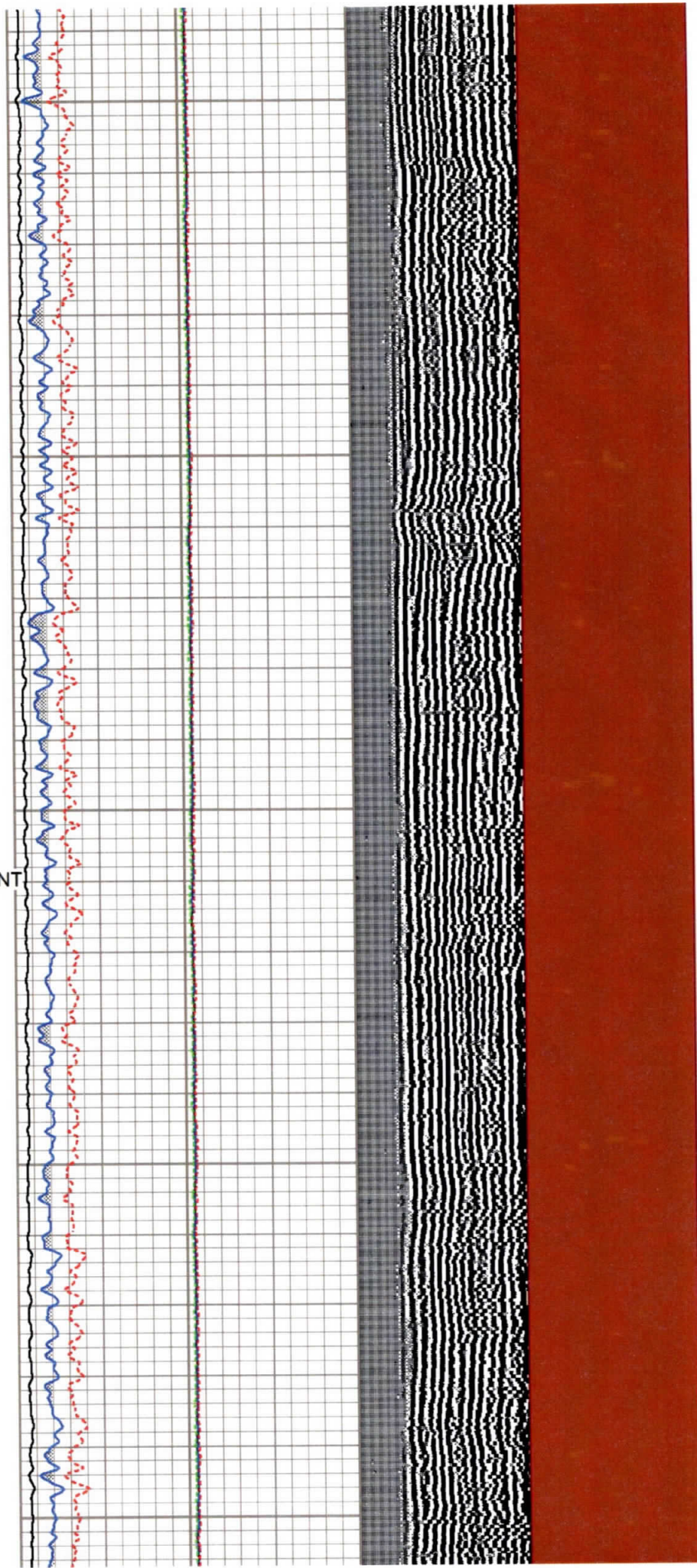
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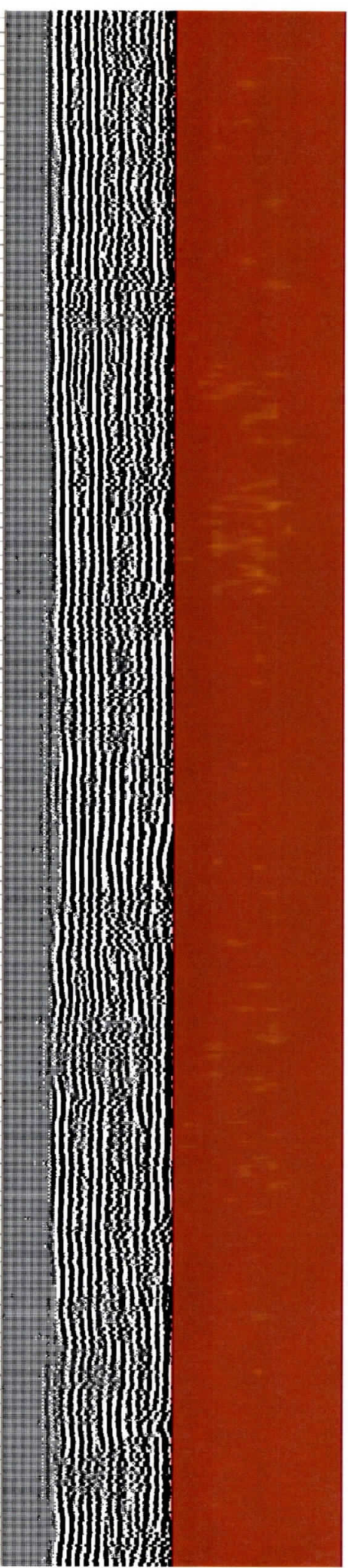
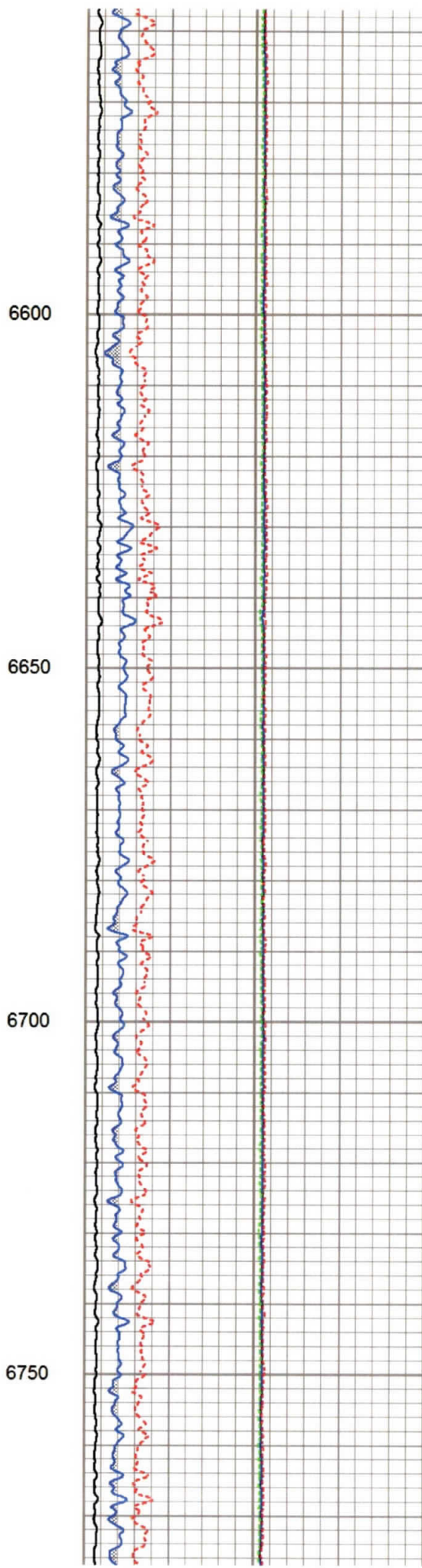
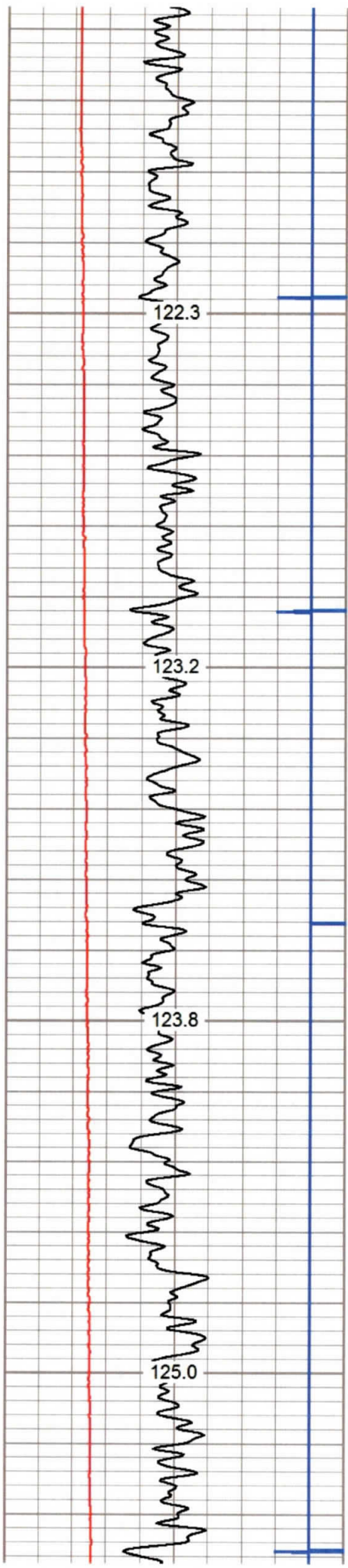


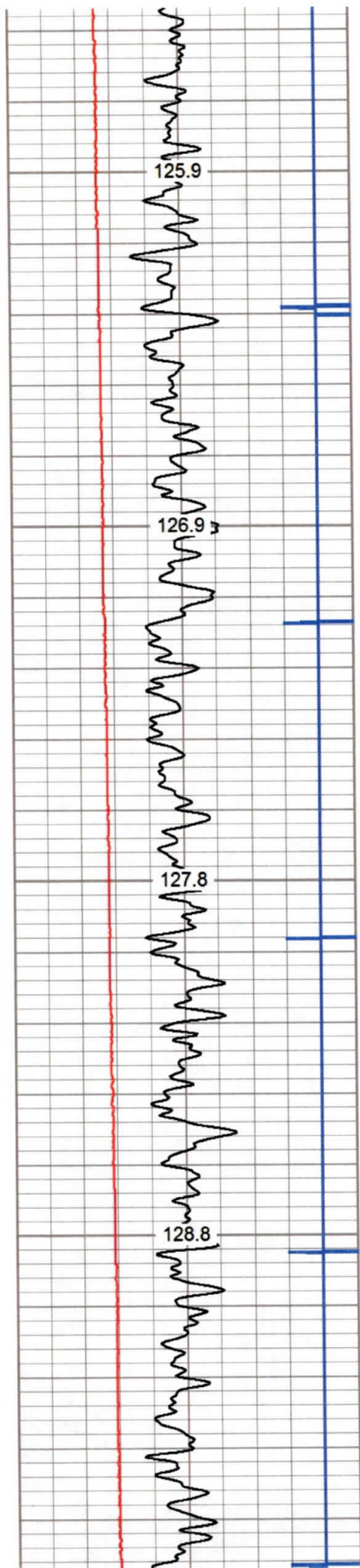


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6400
6450
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6550

MARKER JOINT





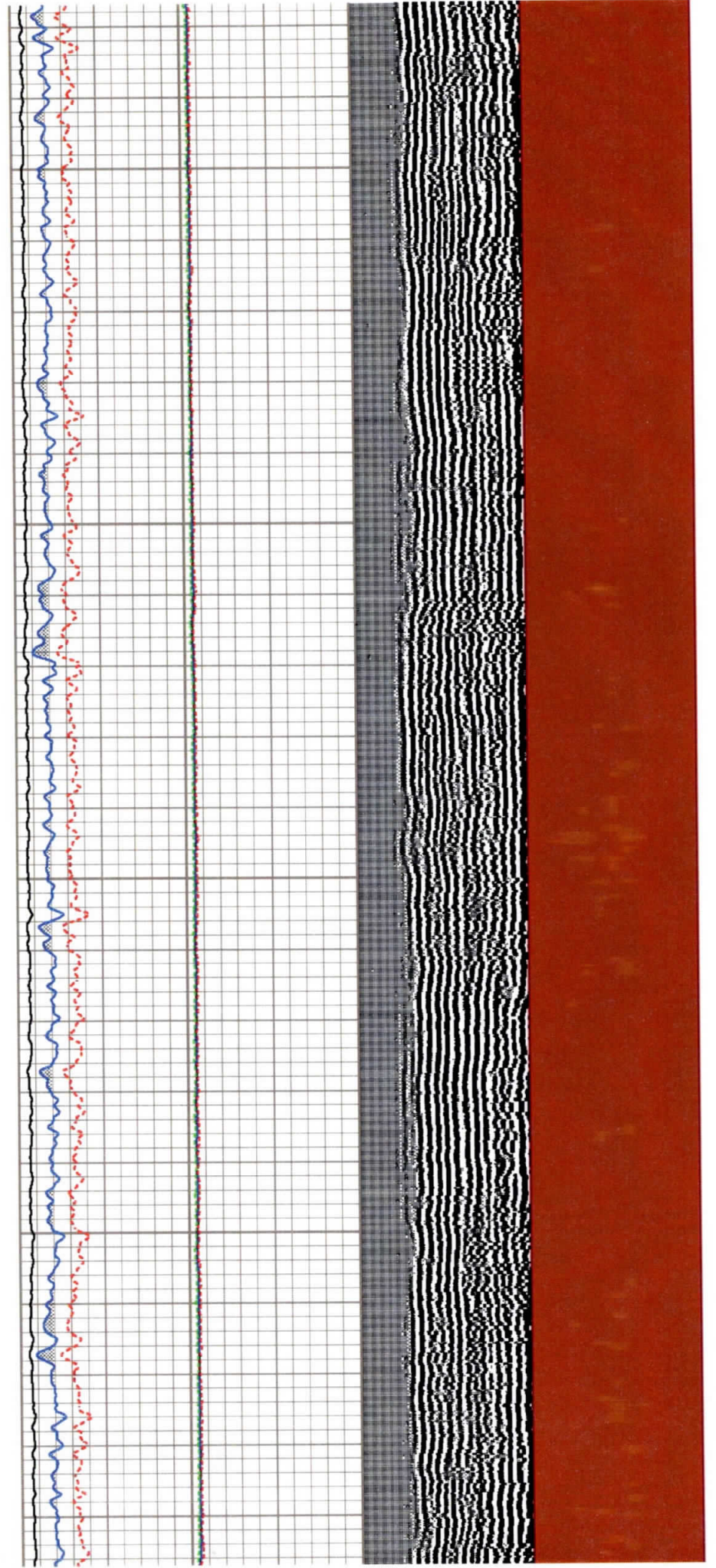


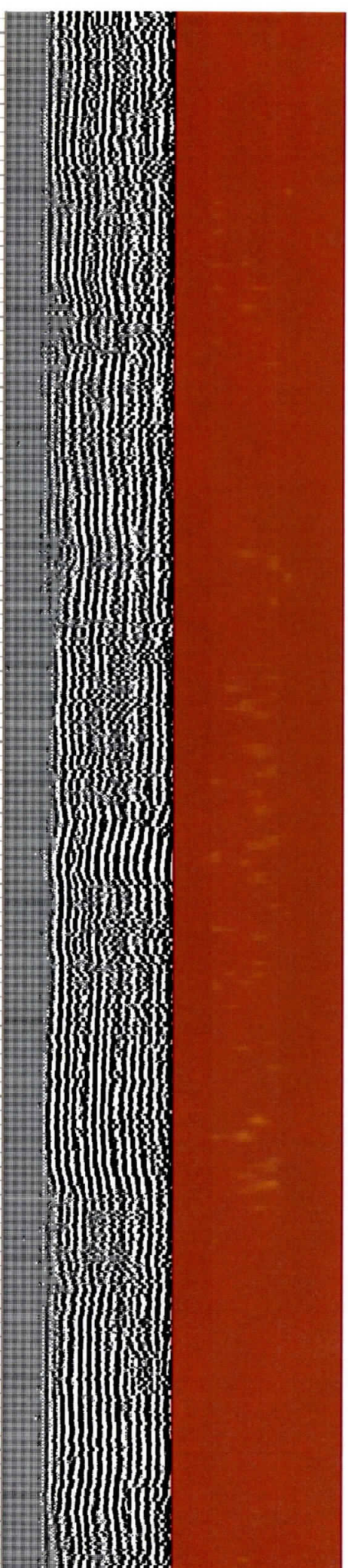
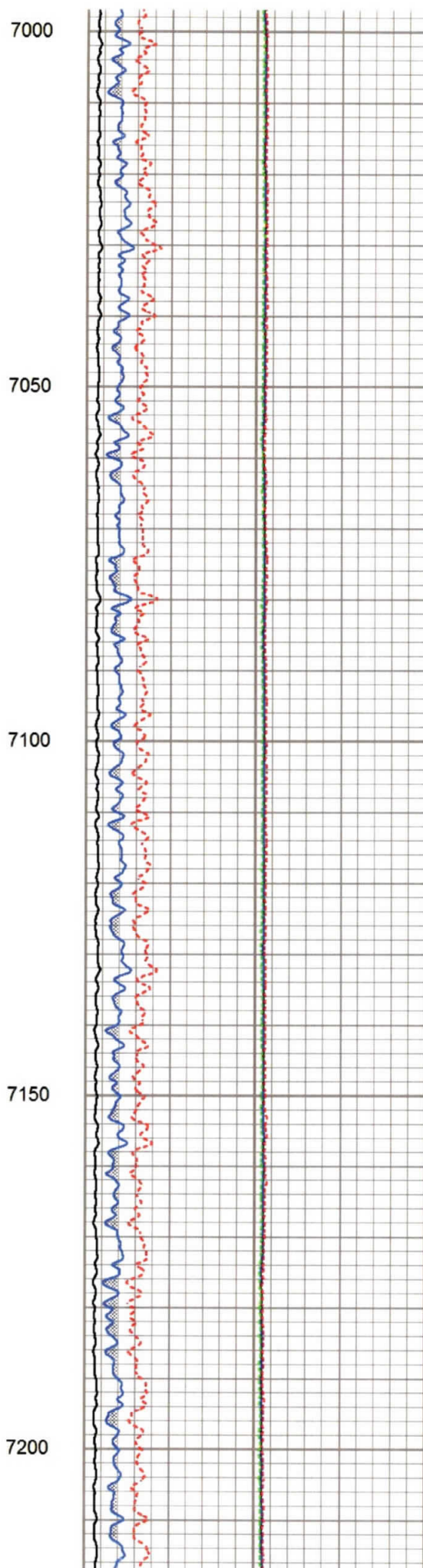
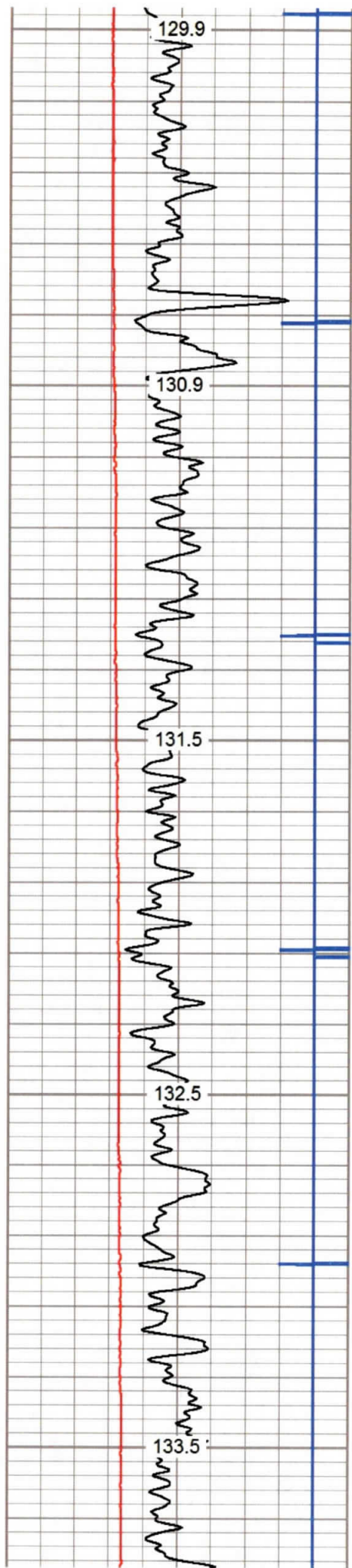
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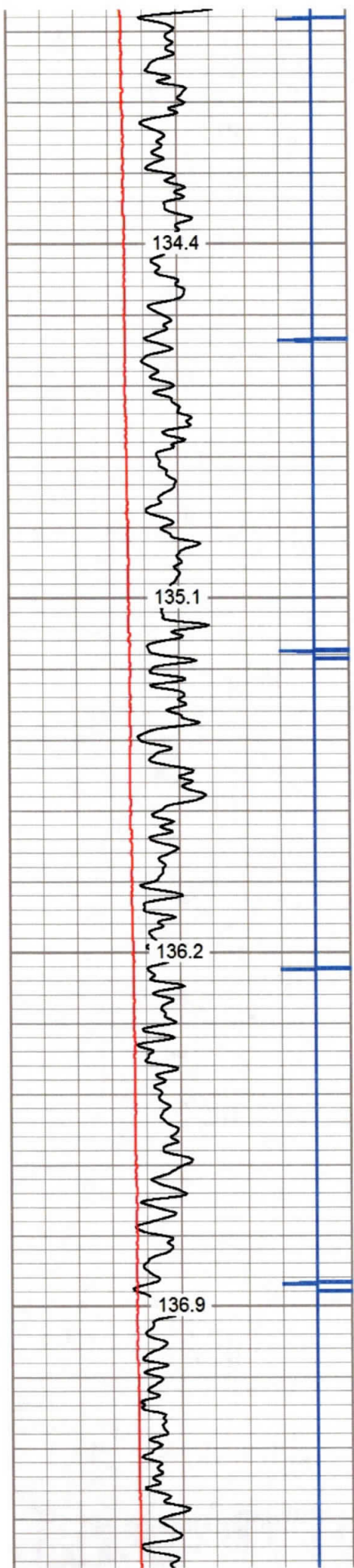
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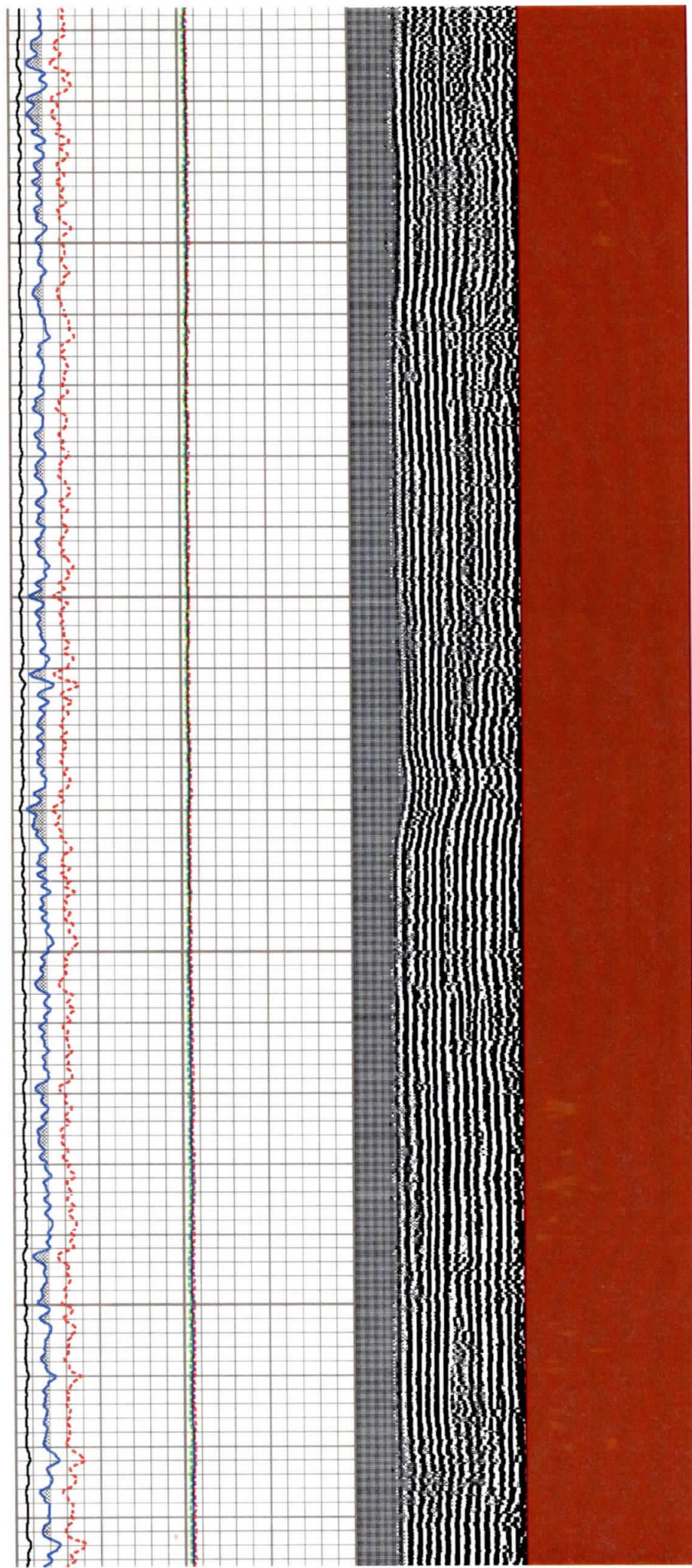


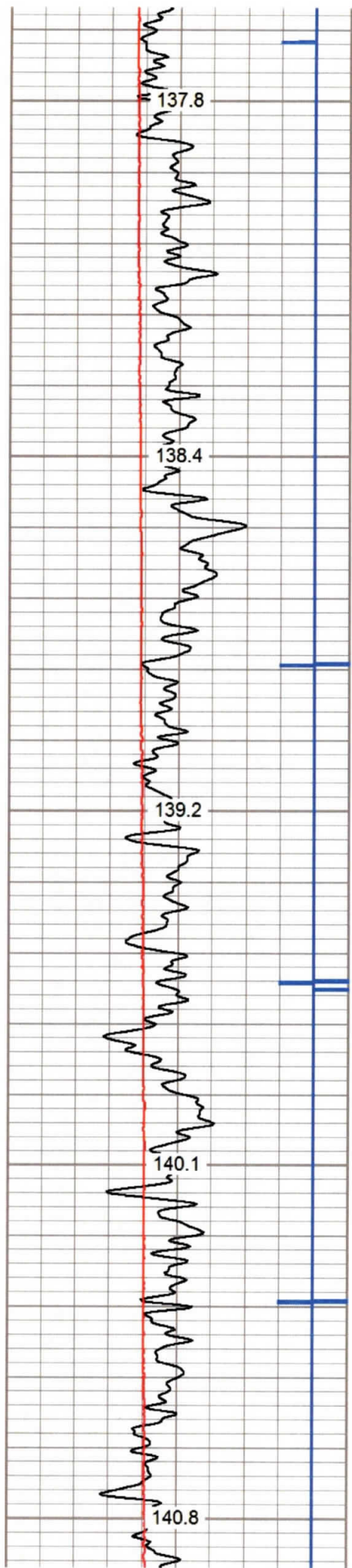
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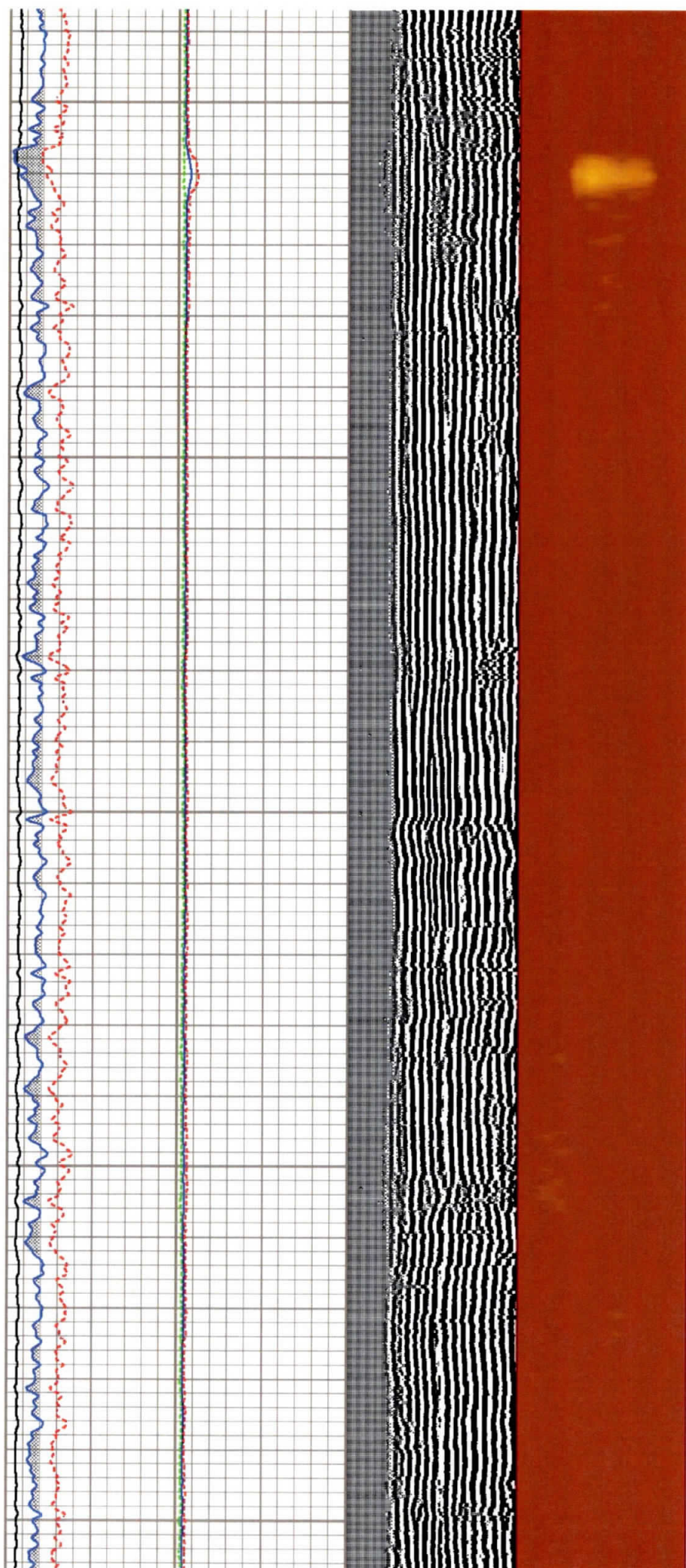
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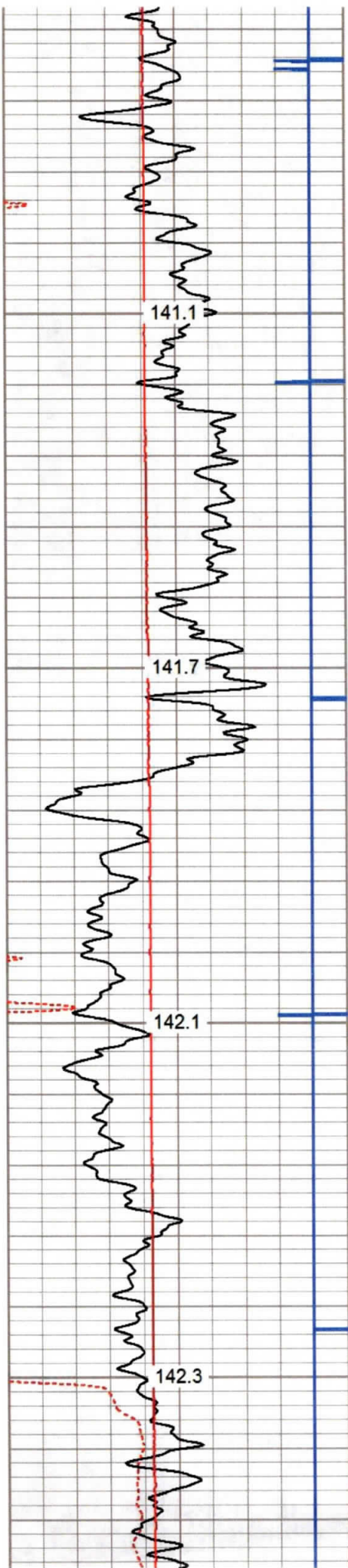
7400





7450
7500
7550
7600
7650



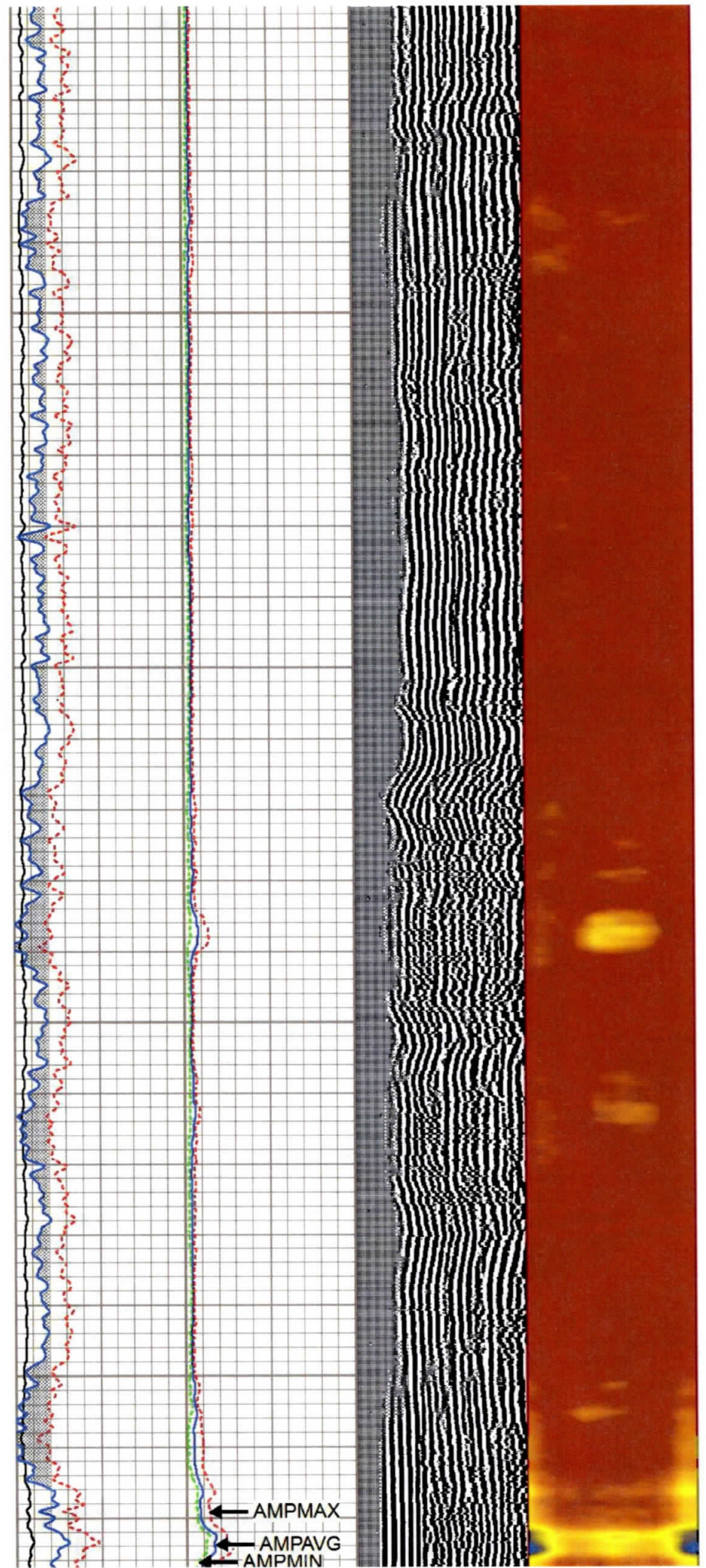


7700

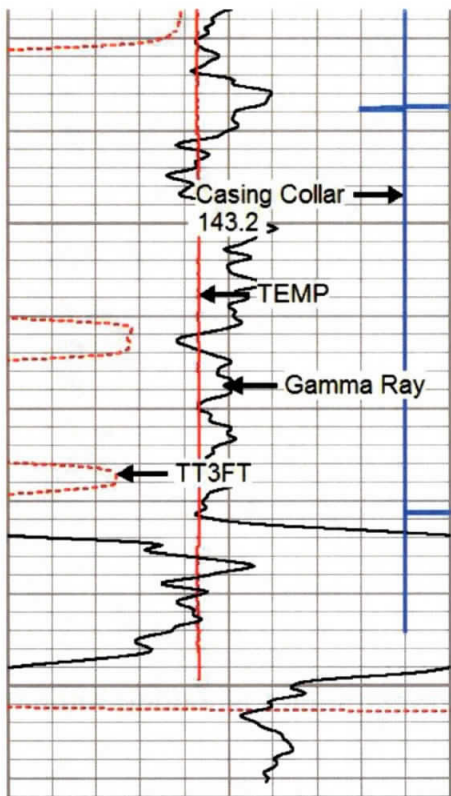
7750

7800

7850

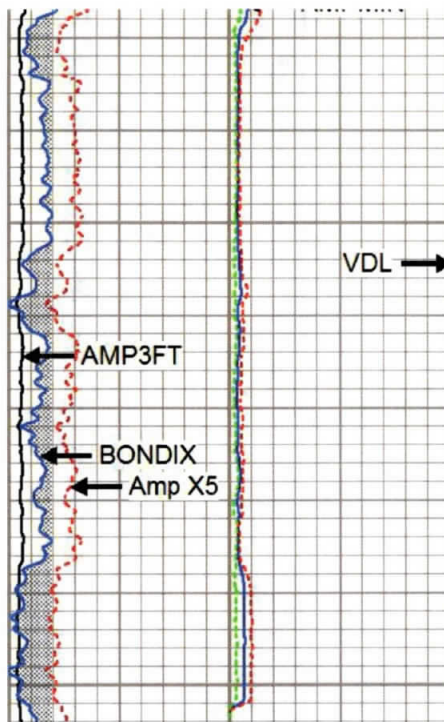


AMPMAX
AMPAVG
AMPMIN

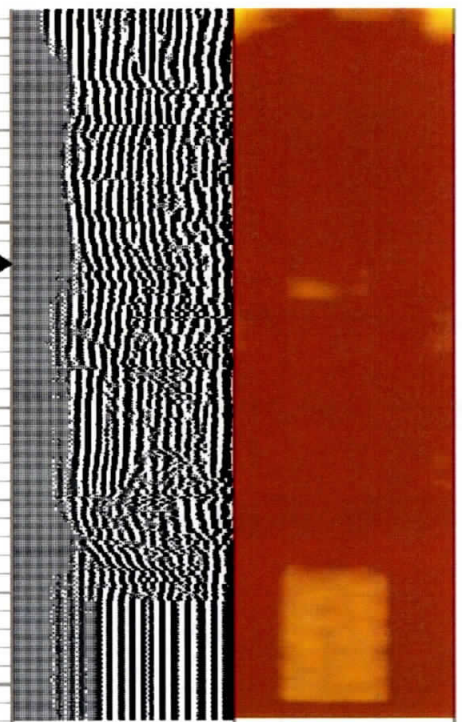


7900

7950



VDL



280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray (GAPI)	180
0	TEMP (degF)	100
180	GR (GAPI)	360

TEMP
(degF)

Amplitude	Sector Amp AVG
0 (mV) 100	Sector Amp MAX
Amp X5	Sector Amp MIN
0 (mV) 20	
1 BONDIX 0	

VDL	1	Sector Map 12
200 (usec) 1200		



REPEAT PASS

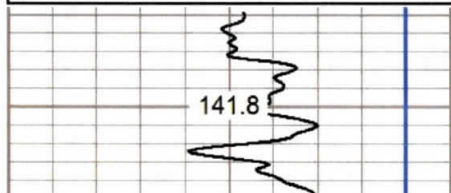
Database File e:\antero 10-23-19\callahan2h.db
 Dataset Pathname pass9
 Presentation Format antero1
 Dataset Creation Thu Oct 24 16:34:31 2019
 Charted by Depth in Feet scaled 1:240

280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray (GAPI)	180
0	TEMP (degF)	100
180	GR (GAPI)	360

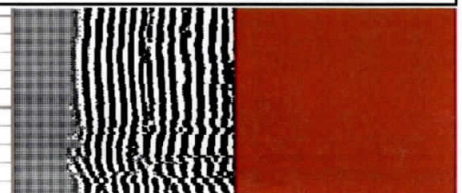
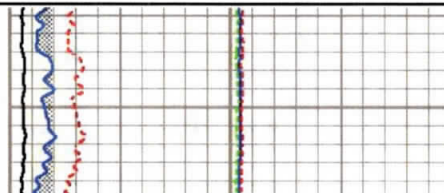
TEMP
(degF)

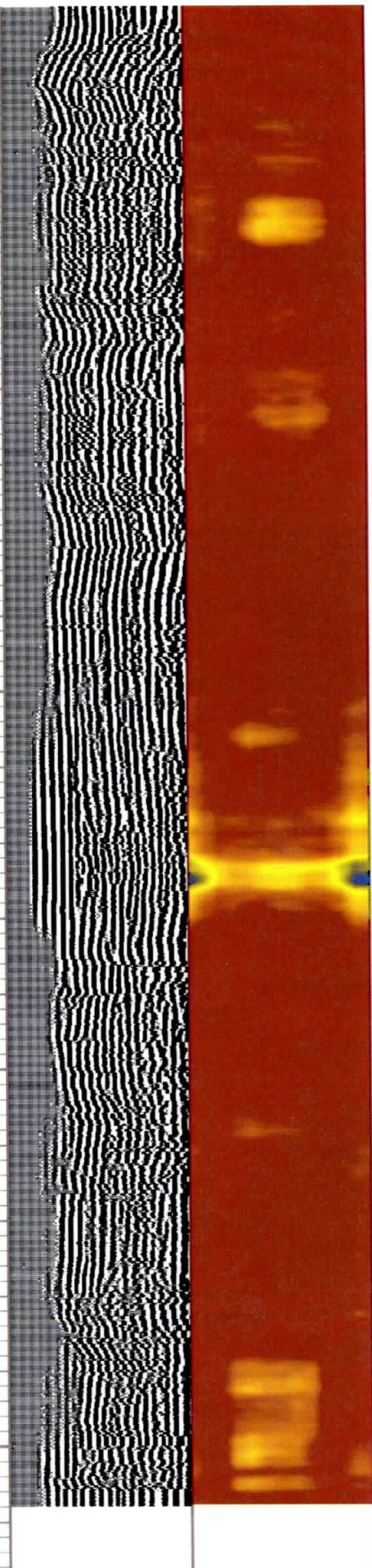
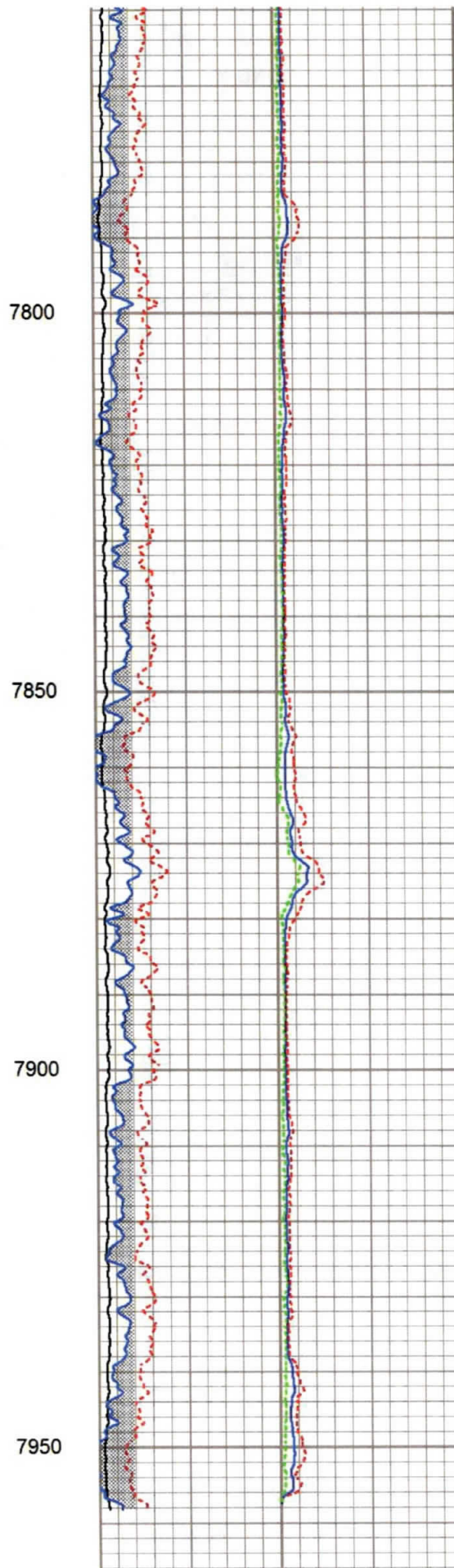
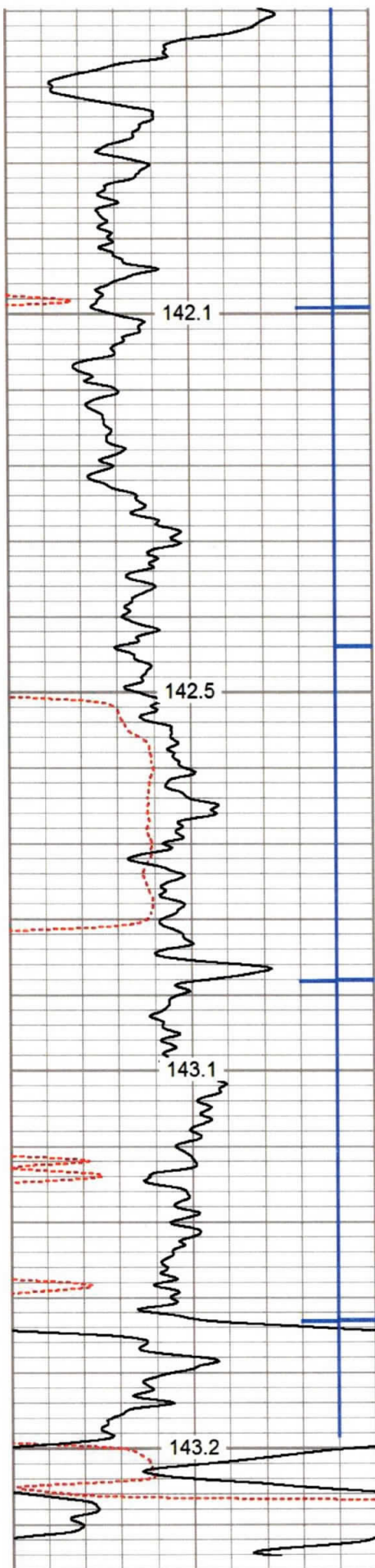
Amplitude	Sector Amp AVG
0 (mV) 100	Sector Amp MAX
Amp X5	Sector Amp MIN
0 (mV) 20	
1 BONDIX 0	

VDL	1	Sector Map 12
200 (usec) 1200		



7750





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

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

VDL
200 (usec) 1200

1	Sector Map	12
---	------------	----

0	TEMP (degF)	100
180	GR (GAPI)	360
	TEMP (degF)	

0	(mV)	20
1	BONDIX	0

Log Variables

Database: E:\ANTERO 10-23-19\callahan2h.db
 Dataset: field/well/run1/pass10/_vars_

Top - Bottom

BHTEMP_Src	BOREID	BOTTEMP	CASEOD	CASETHCK	CASEWGHT	MAXAMPL
TEMP	in 7.875	degF 100	in 5.5	in 0	lb/ft 20	mV 71.9
MINAMPL	MINATTN	PERFS	PPT	SRFTEMP	TDEPTH	
mV 3.5	db/ft 0.8	No	usec 219	degF 0	ft 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

Calibration Report

Database File: E:\ANTERO 10-23-19\callahan2h.db
 Dataset Pathname: pass10
 Dataset Creation: Thu Oct 24 16:49:13 2019

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:

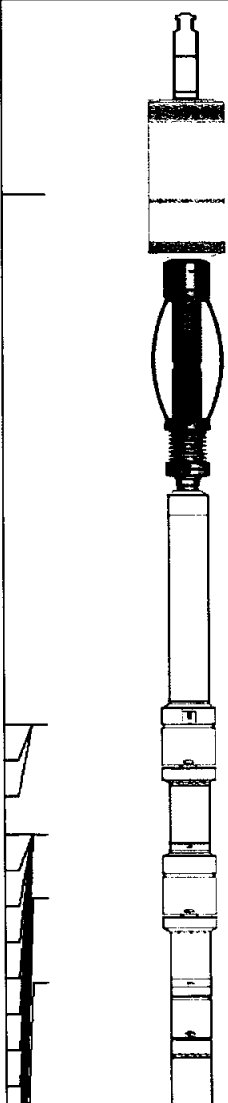
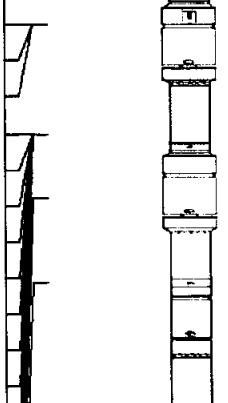
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	-0.006	0.919	3.500	71.921	50.880	5.245
CAL	0.630	0.627				
5'	0.004	1.025	3.500	71.921	40.761	4.284

SUM	-0.001	1.033	3.300	11.921	40.761	4.361
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)
CCL	19.28		Titan-1.4375 1 7/16 Titan Type II Cable Head	1.03	1.44	5.00
			CCL-450tekco (450) Tekco 4 1/2" 450 Deg. "F" SmCo Logging CCL	1.87	4.50	80.00
			Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00
TEMP	13.04		SCBL-Tek12 (T12_01) Tekco 400 Deg F 12 Sector RIB with Temp	9.13	3.25	135.00
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					
WVF3FT	11.00					
WVF5FT	10.00					
WVFTEMP	6.67					
			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: callahan2h.db: field/well/run1/pass10
 Total length: 21.42 ft
 Total weight: 311.00 lb
 O.D.: 4.50 in



Company	ANTERO RESOURCES CORPORATION	
Well	CALLAHAN UNIT 2H	
Field	MARCELLUS	
County	DODDRIDGE	
State	W.V.	Country USA