



**Segmented Radial Cement Bond
W/Gamma Ray, CCL
Log**

Company ANTERO RESOURCES CORPORATION
Well RIGGS UNIT 1H
Field MARCELLUS
County RITCHIE
State W.V. Country US

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Location: API #: AFE# A05635
SEC TWP RGE
Permanent Datum GROUND LEVEL Elevation 1149'
Log Measured From K.B. OF 25'
Drilling Measured From K.B. G.L. 1149'

Other Services
Elevation
K.B. 1174'
D.F. 1174'
G.L. 1149'

Date 11/15/19
Run Number ONE
Depth Driller 21648'
Depth Logger 6571'
Bottom Logged Interval 6571'
Top Log Interval SURFACE
Open Hole Size 8.25"
Type Fluid WATER
Density / Viscosity N/A
Max. Recorded Temp. 138 DEG
Estimated Cement Top 2500'
Time Well Ready N/A
Time Logger on Bottom N/A
Equipment Number 214182
Location BRIDGEPORT W.V.
Recorded By S. MAXWELL
Witnessed By JERRAKO EVANS

Run Number	Borehole Record		Tubing Record	
	Bit	From	To	Size
ONE	24"	Surface	95'	
TWO	17.5"	96'	578'	
THREE	12.25"	578'	2569'	
FOUR	8.25"	2569'	21648'	

Casing Record	Surface String	Prot. String	Production String	Liner	Size	Wgt/Ft	Top		Bottom	
							Surface	Surface	Surface	Surface
					13.375"	64.5	Surface	Surface	578'	Bottom
					9.625"	36	Surface	Surface	2569'	Bottom
					5.5"	23	Surface	Surface	21648'	Bottom

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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 WITH 1500 PSI
T.V.D. 6571'
MARKER JOINT @ 5548'-5558'
CEMENT TOP @ 2500'**

RECEIVED
Office of Oil and Gas
AUG 31 2020
WV Department of
Environmental Protection



MAIN PASS

Database File antero_riggs unit 1h .db
 Dataset Pathname pass4.1
 Presentation Format antero
 Dataset Creation Fri Nov 15 17:57:28 2019
 Charted by Depth in Feet scaled 1:240

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

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

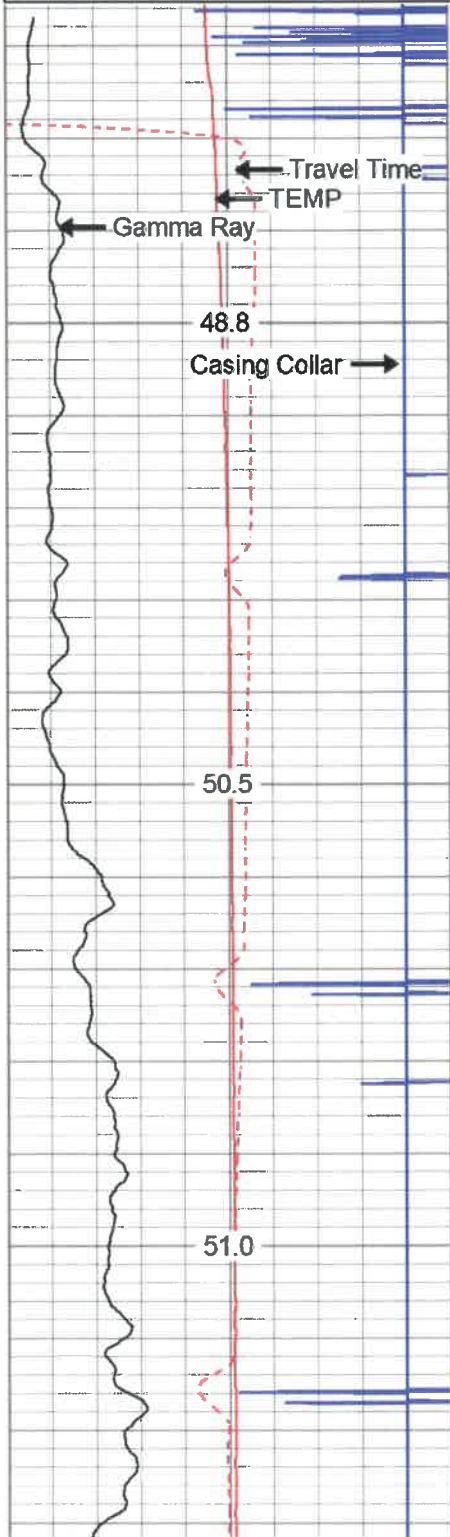
Sector Amp AVG
Sector Amp MAX
Sector Amp MIN

VDL 200 (usec) 1200

1 Sector Map 12



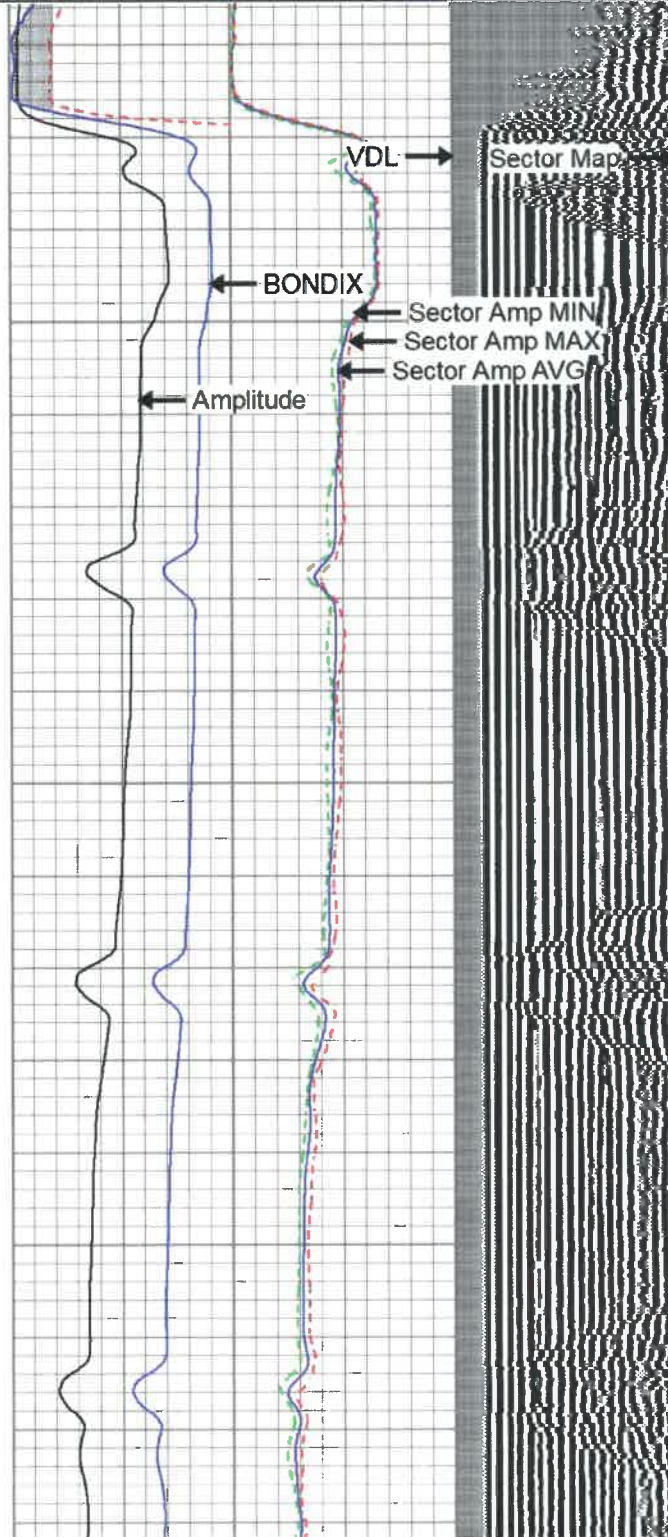
TEMP (degF)



50

100

150



VDL

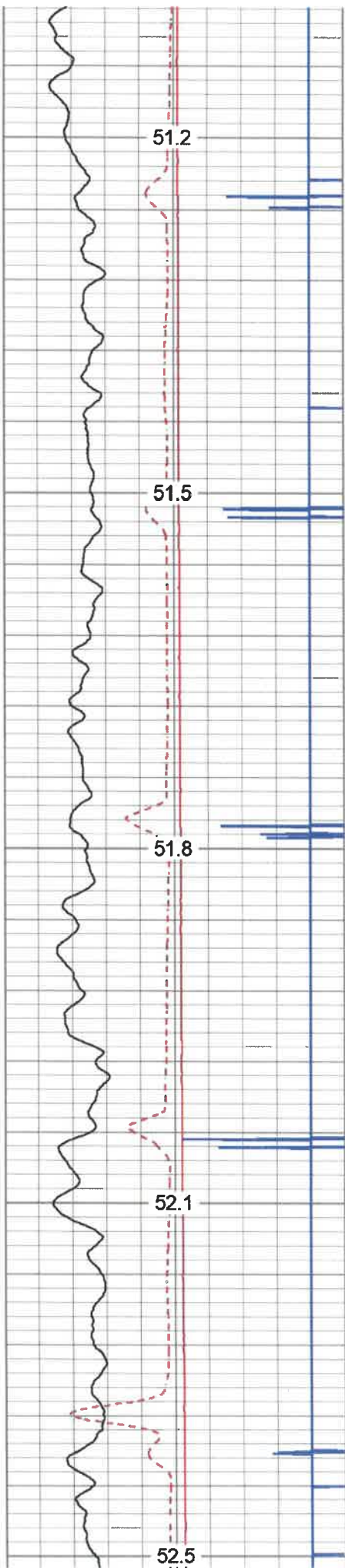
BONDIX

Sector Amp MIN
Sector Amp MAX
Sector Amp AVG

Amplitude

Sector Map





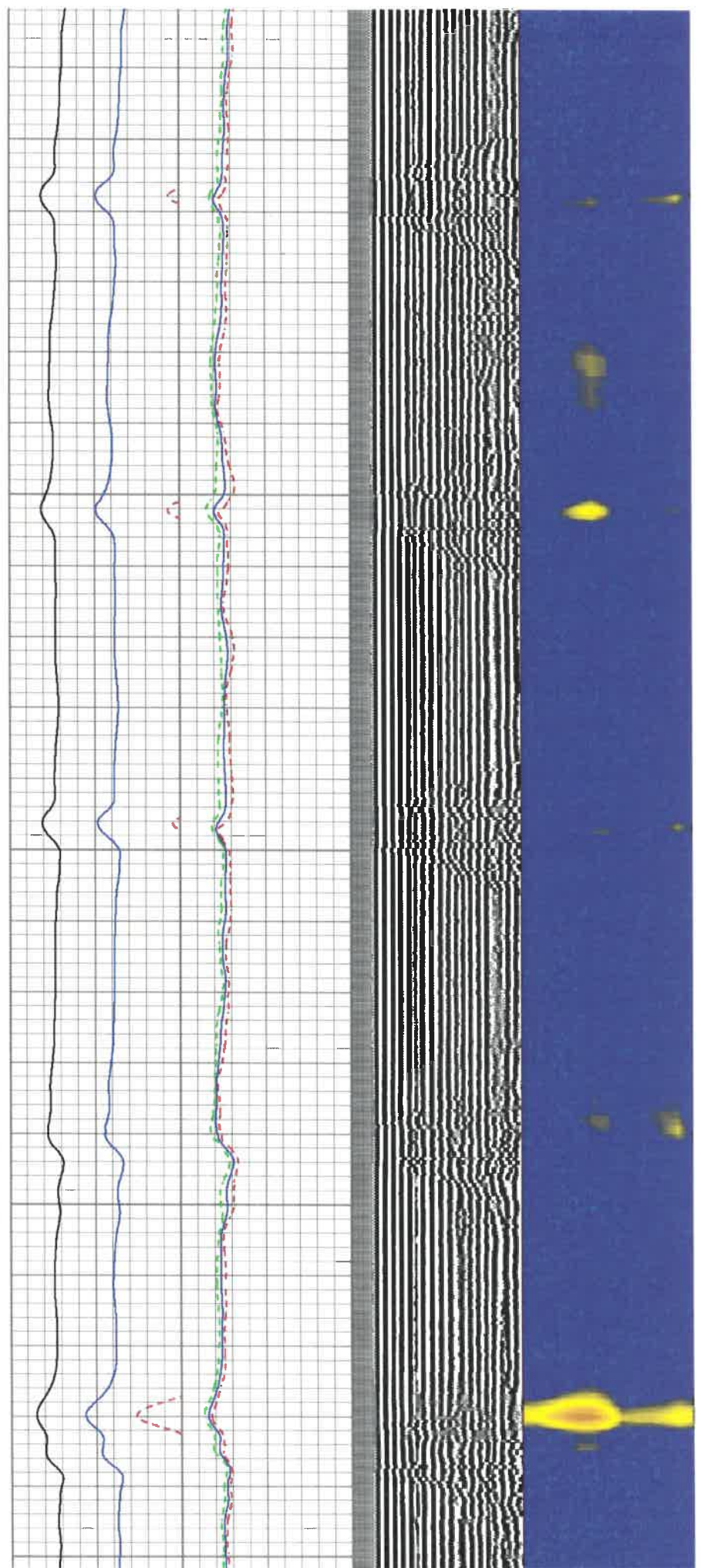
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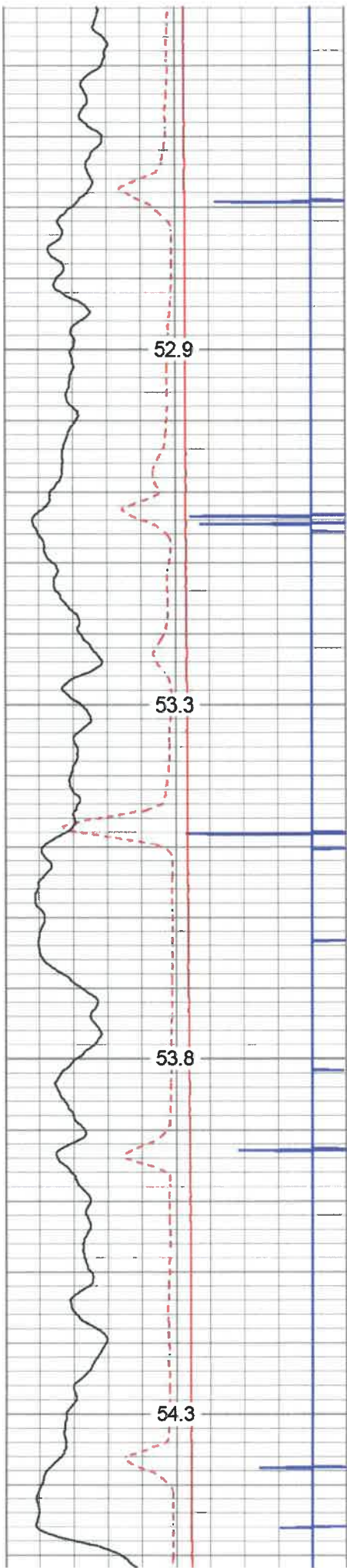
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300

350

400



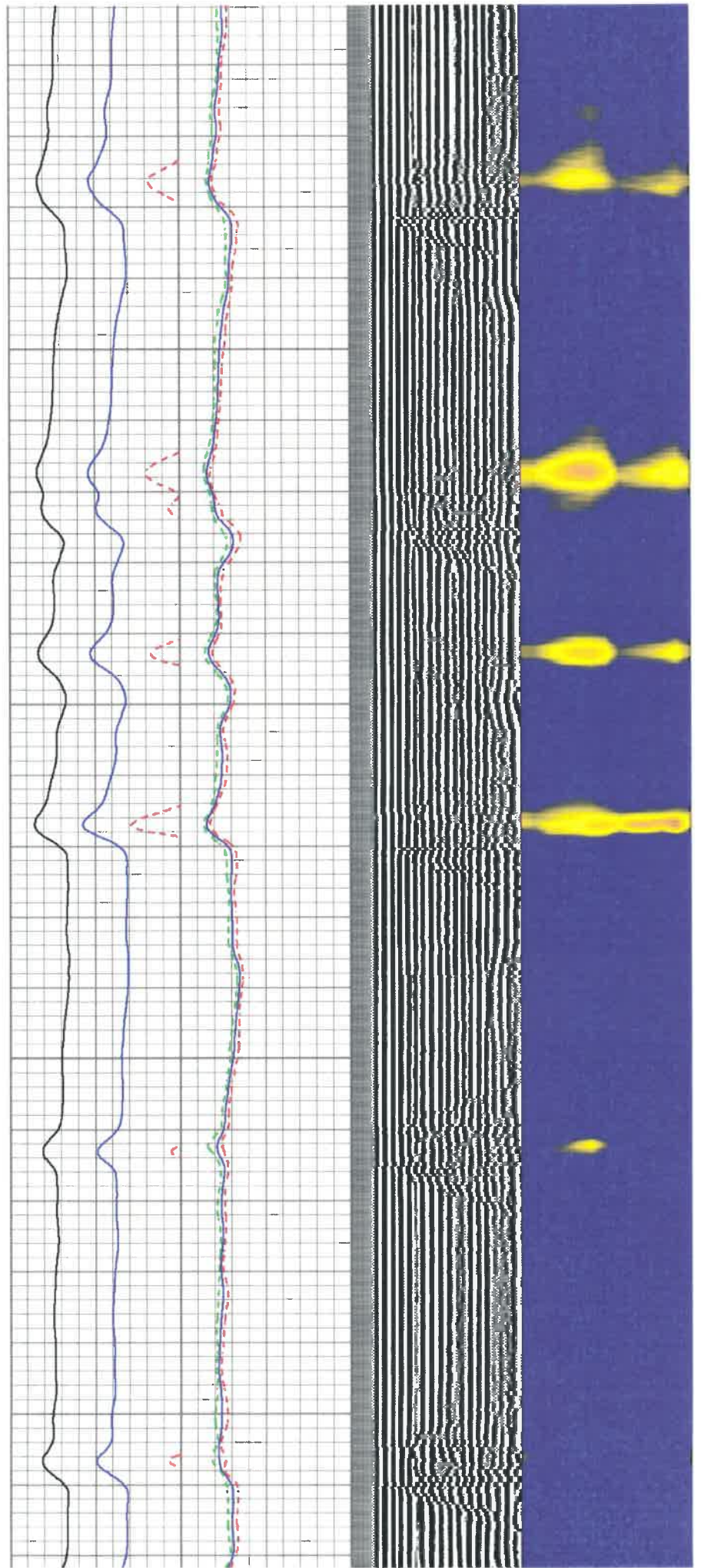


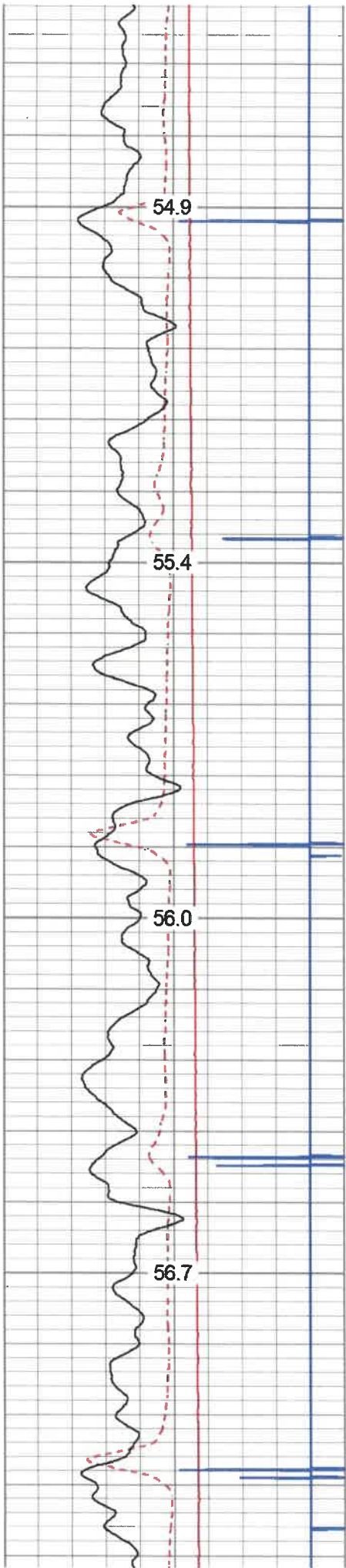
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500

550

600



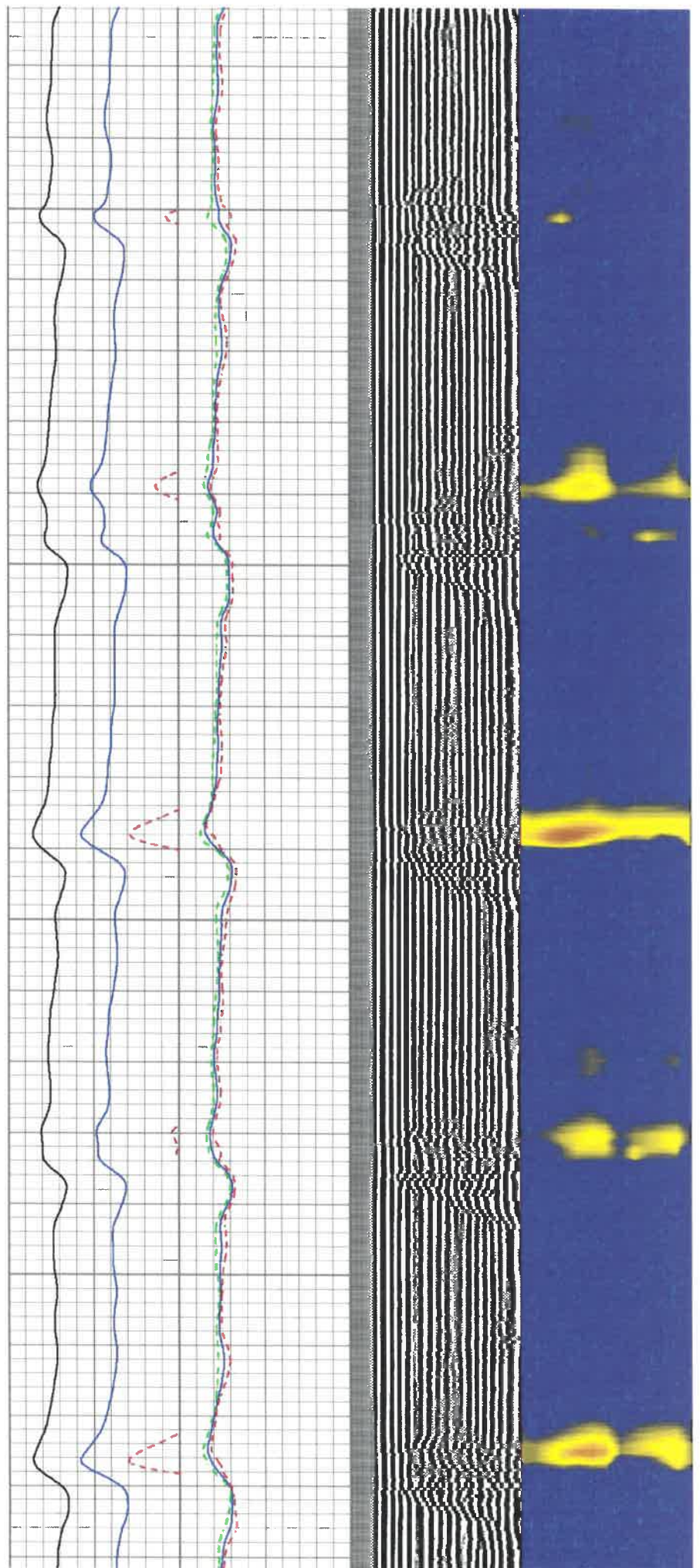


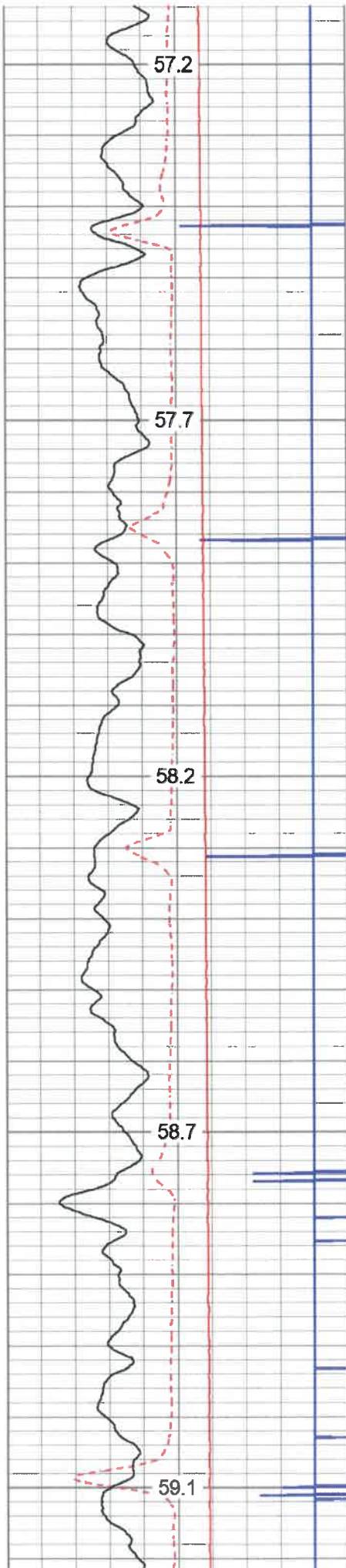
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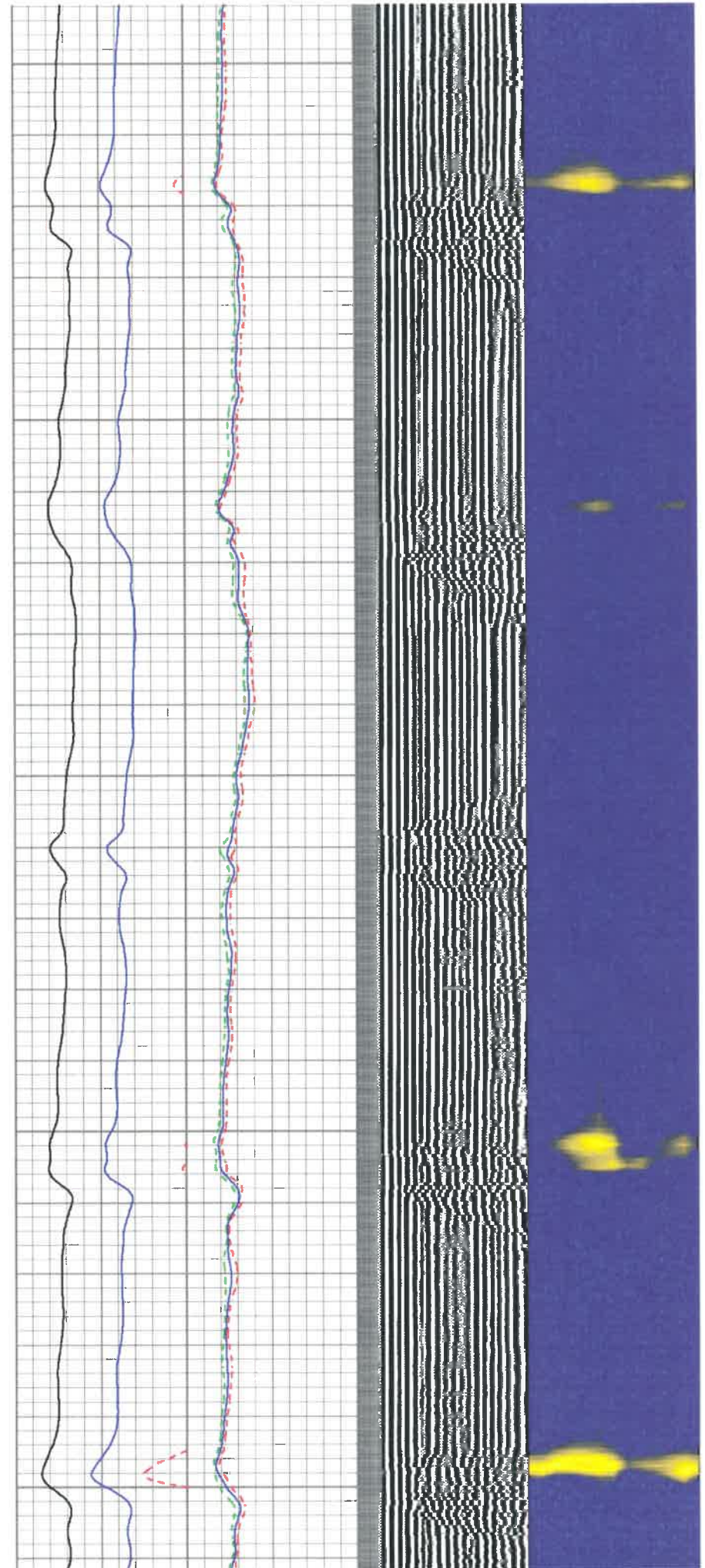
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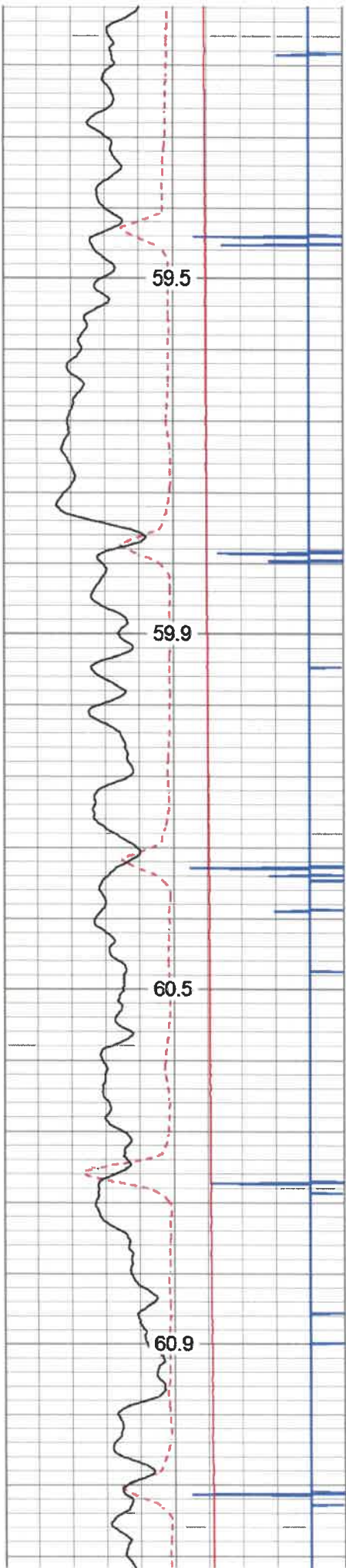
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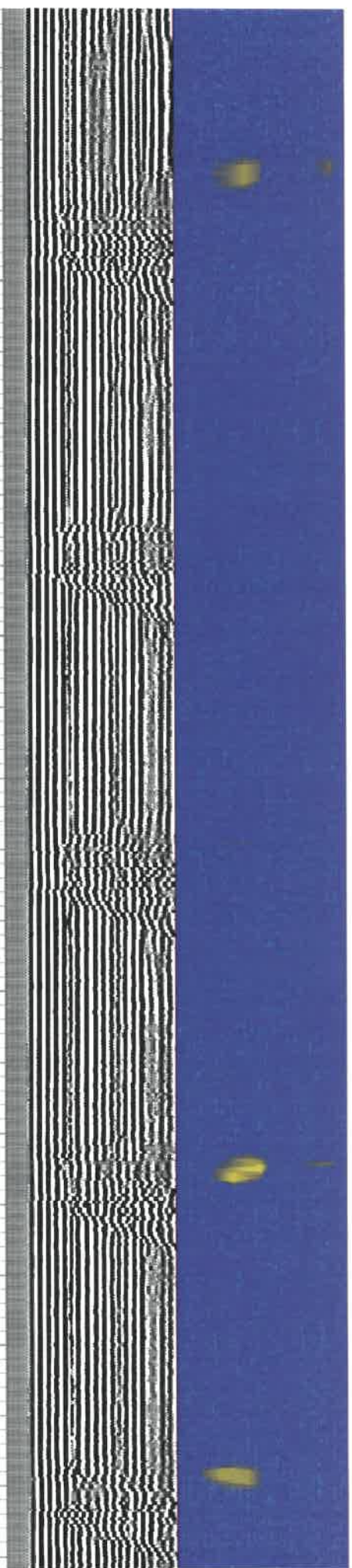


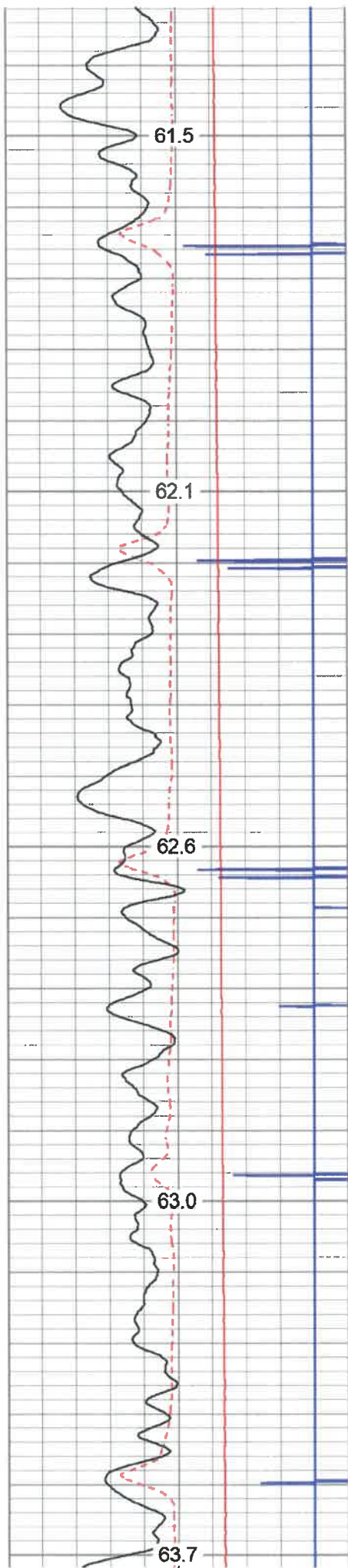
850
900
950
1000
1050





1100
1150
1200
1250





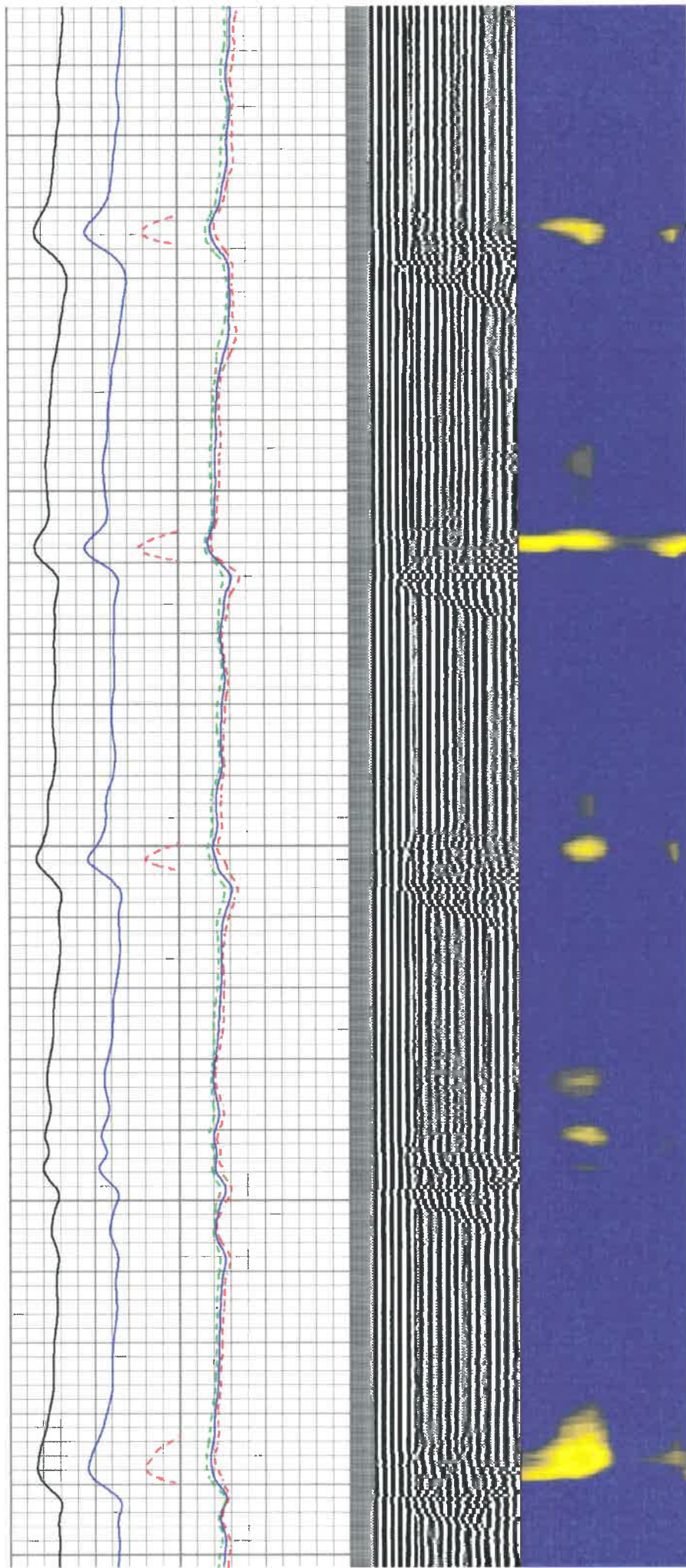
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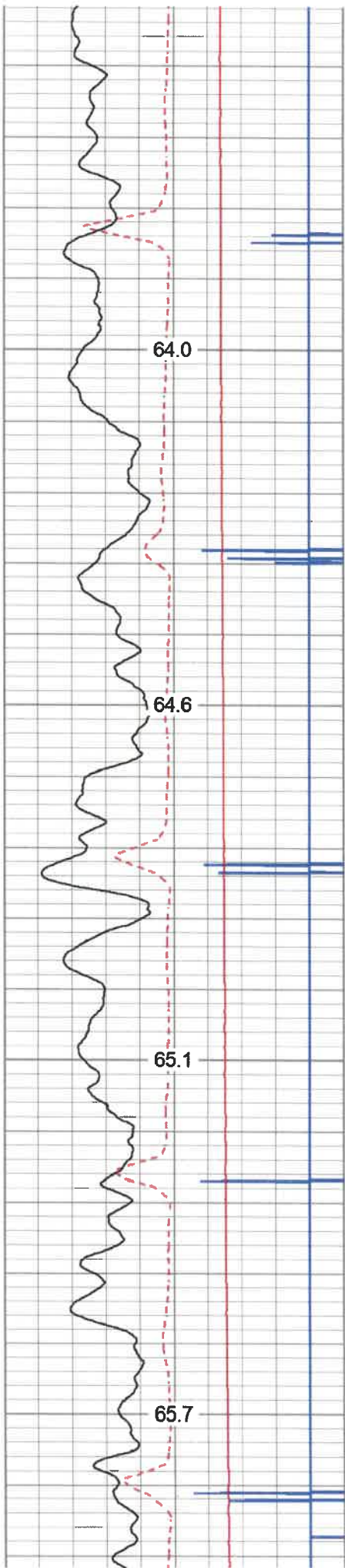
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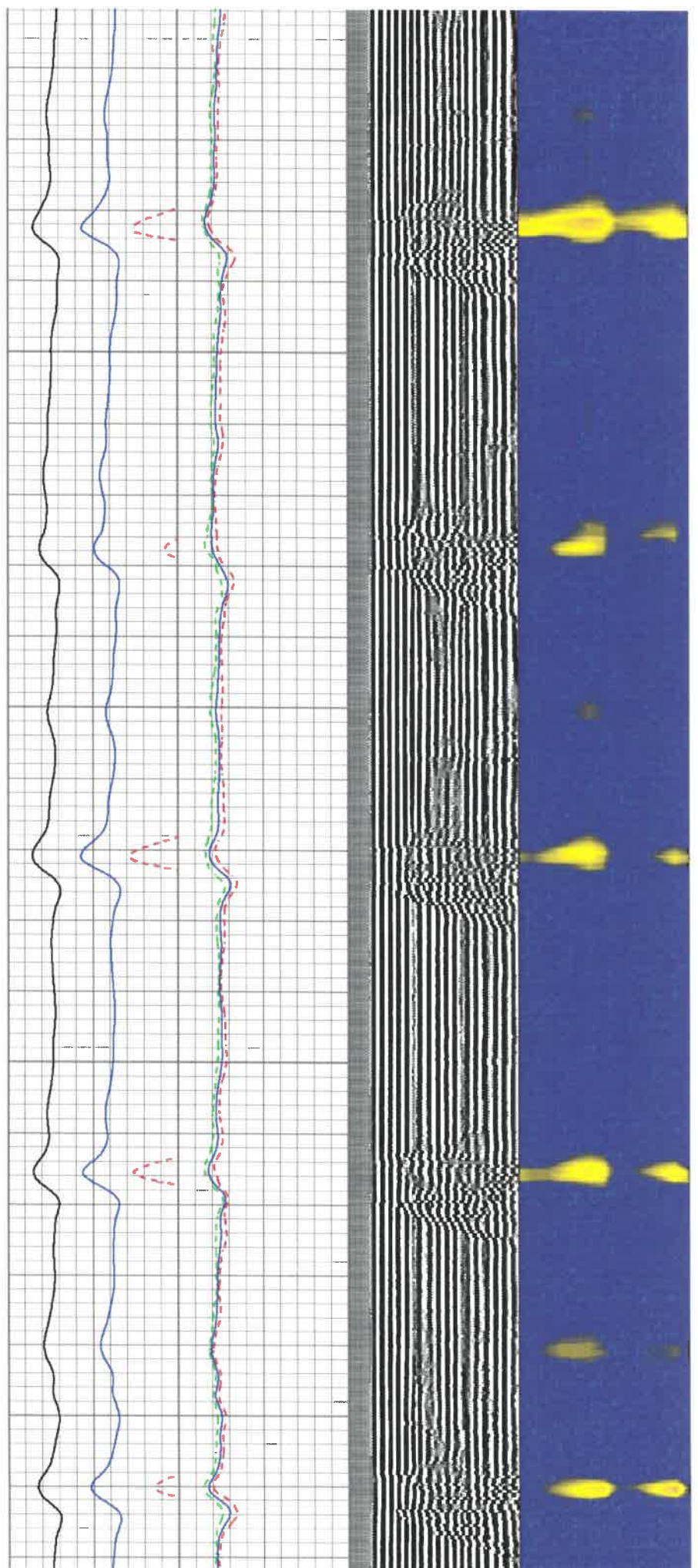


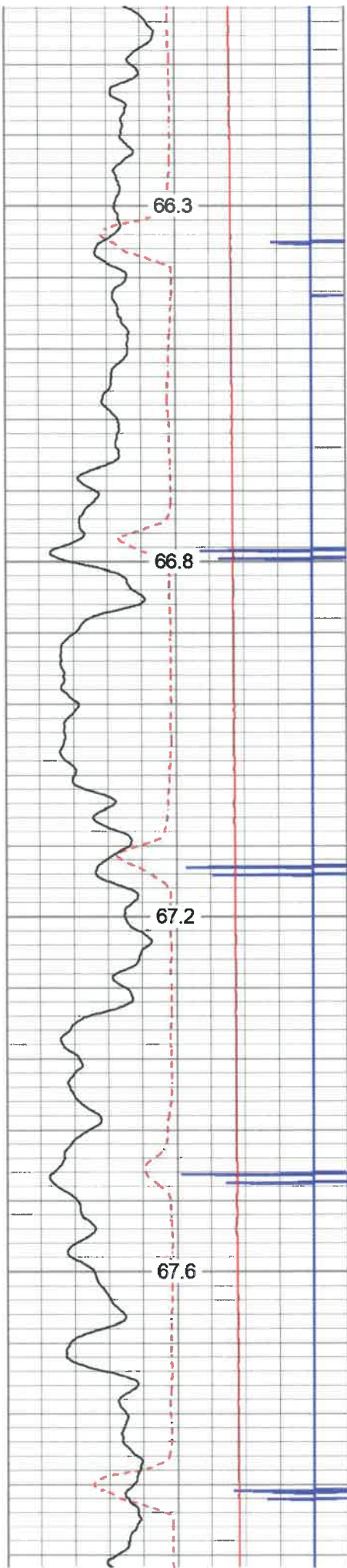
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1600

1650

1700



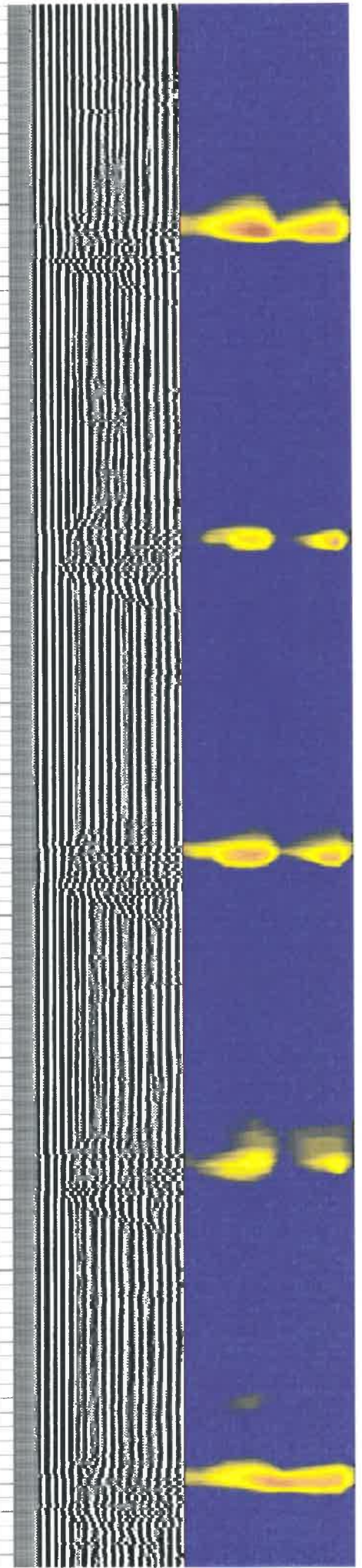
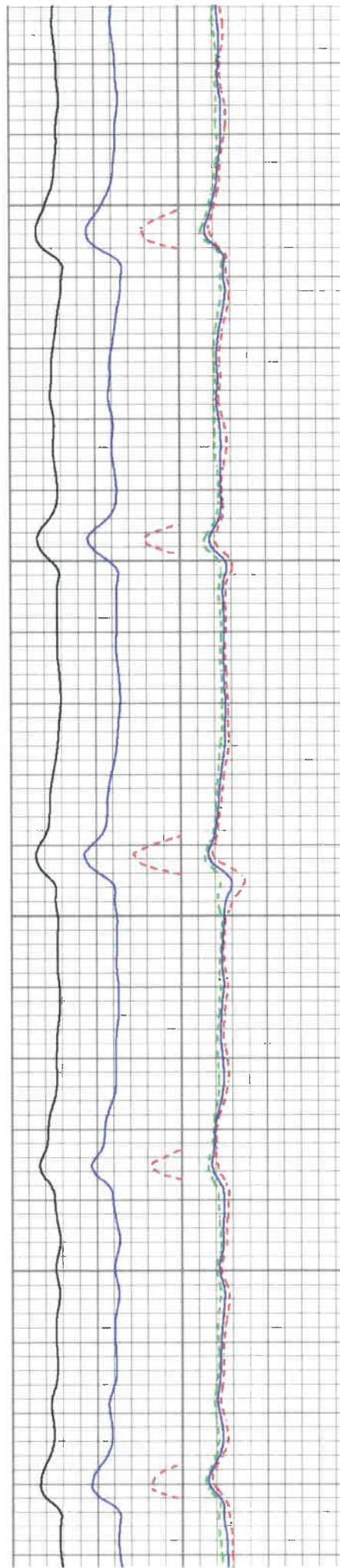


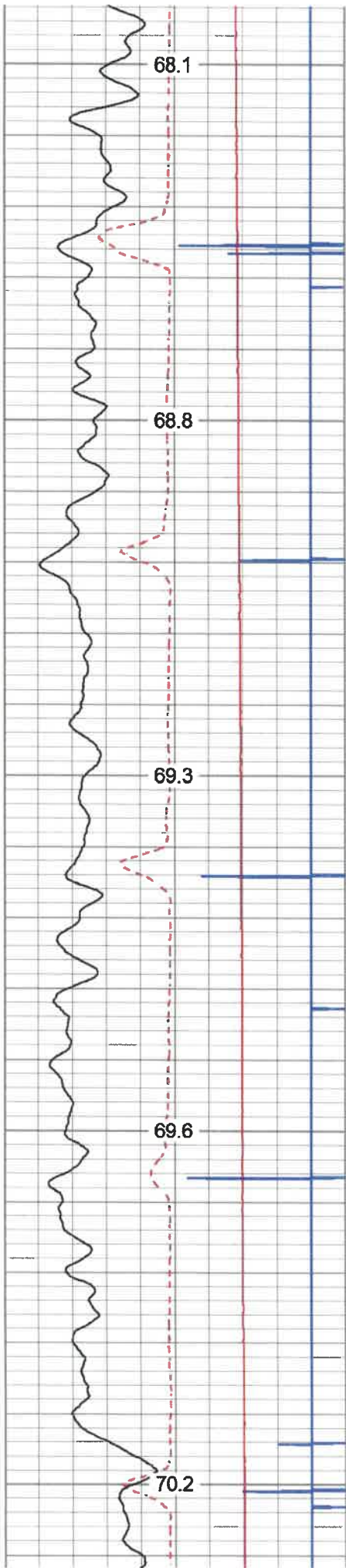
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1850

1900





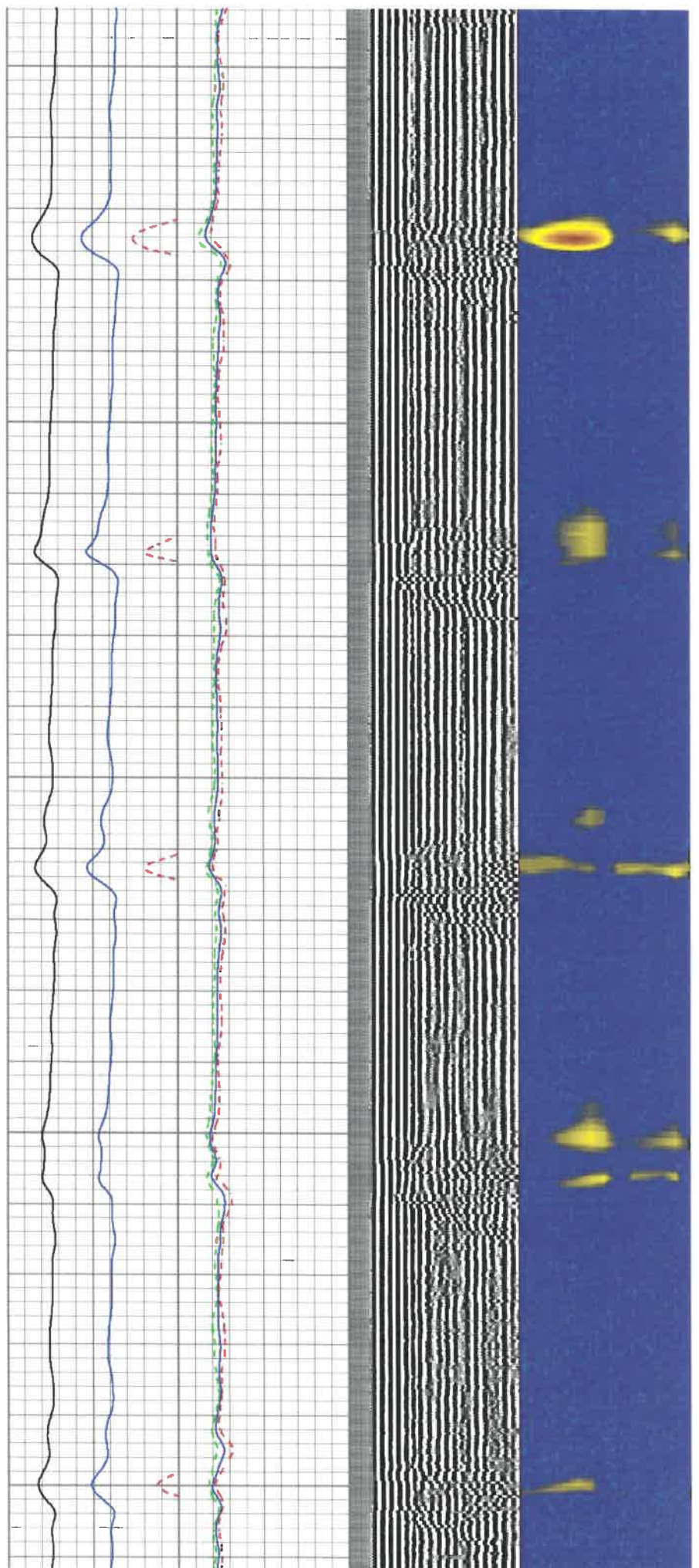
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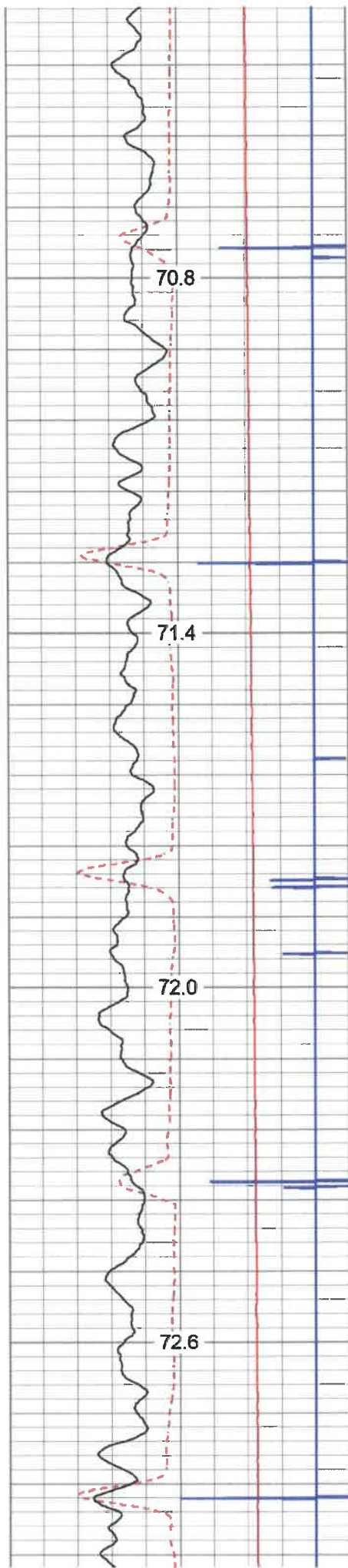
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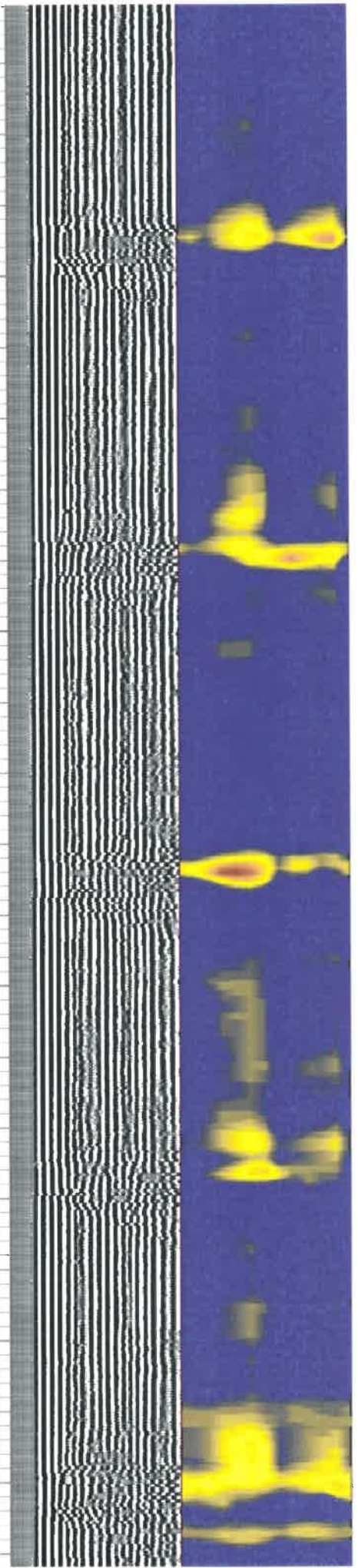
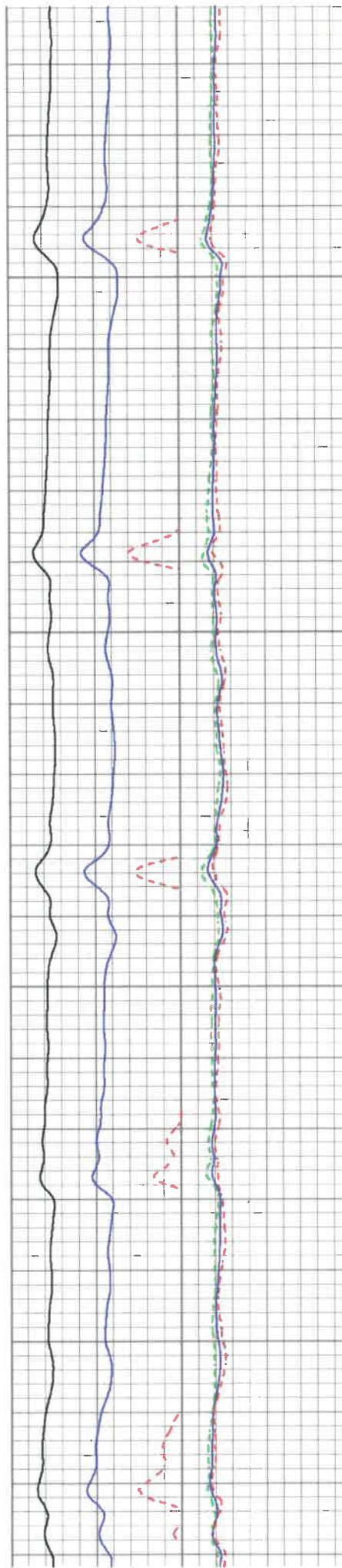


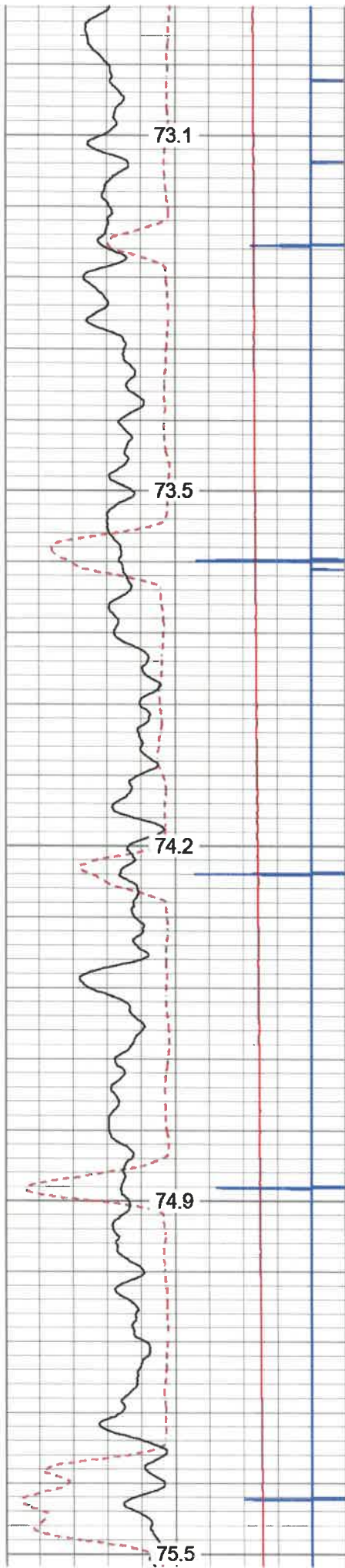
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2300

2350





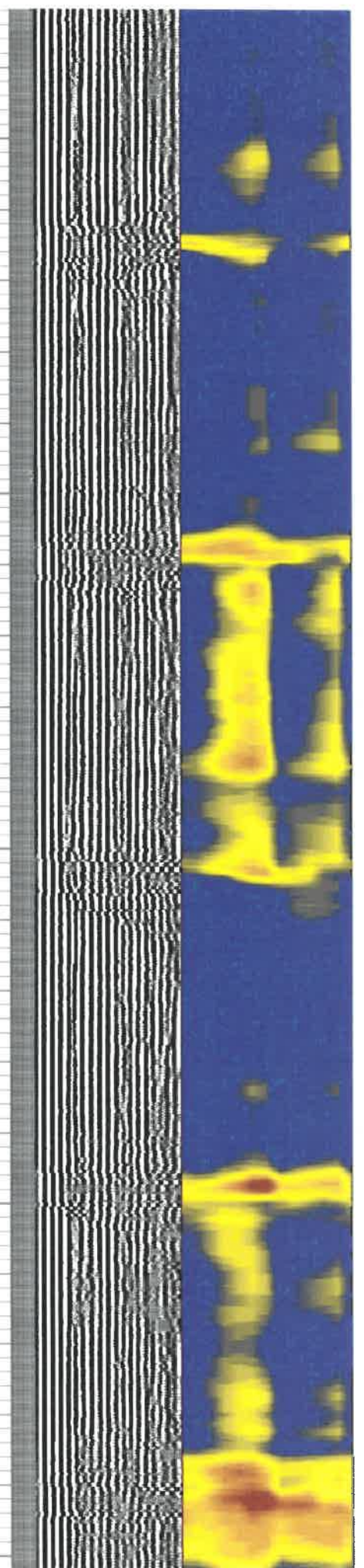
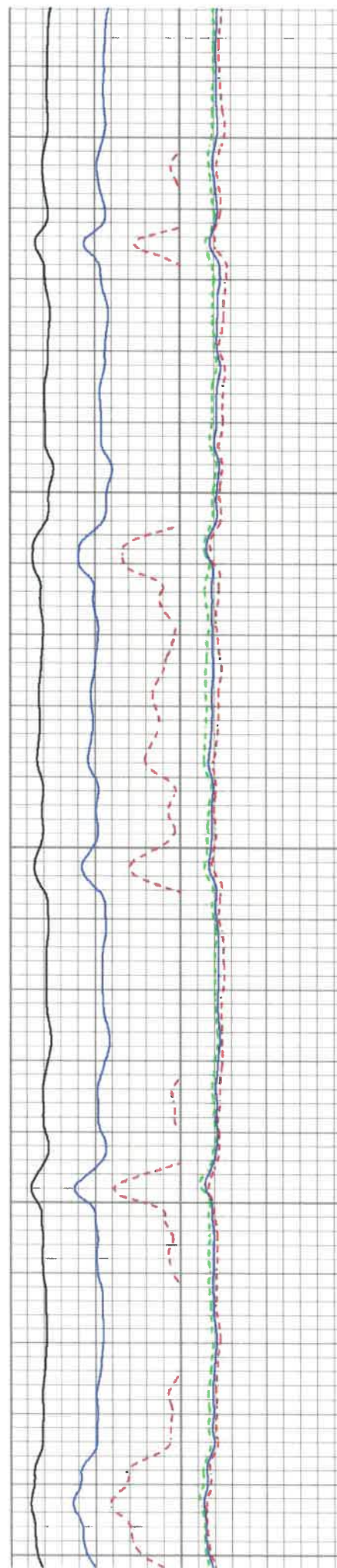
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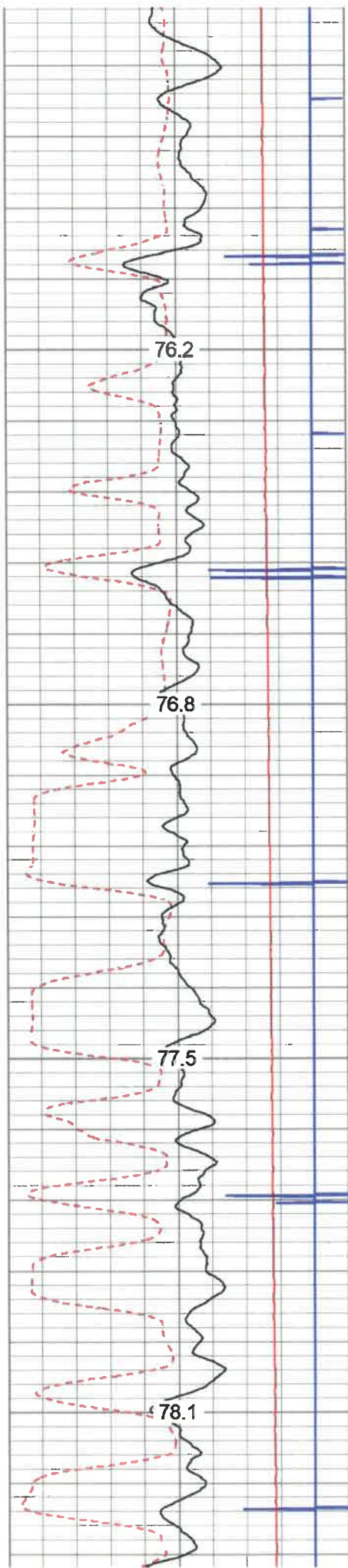
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2600



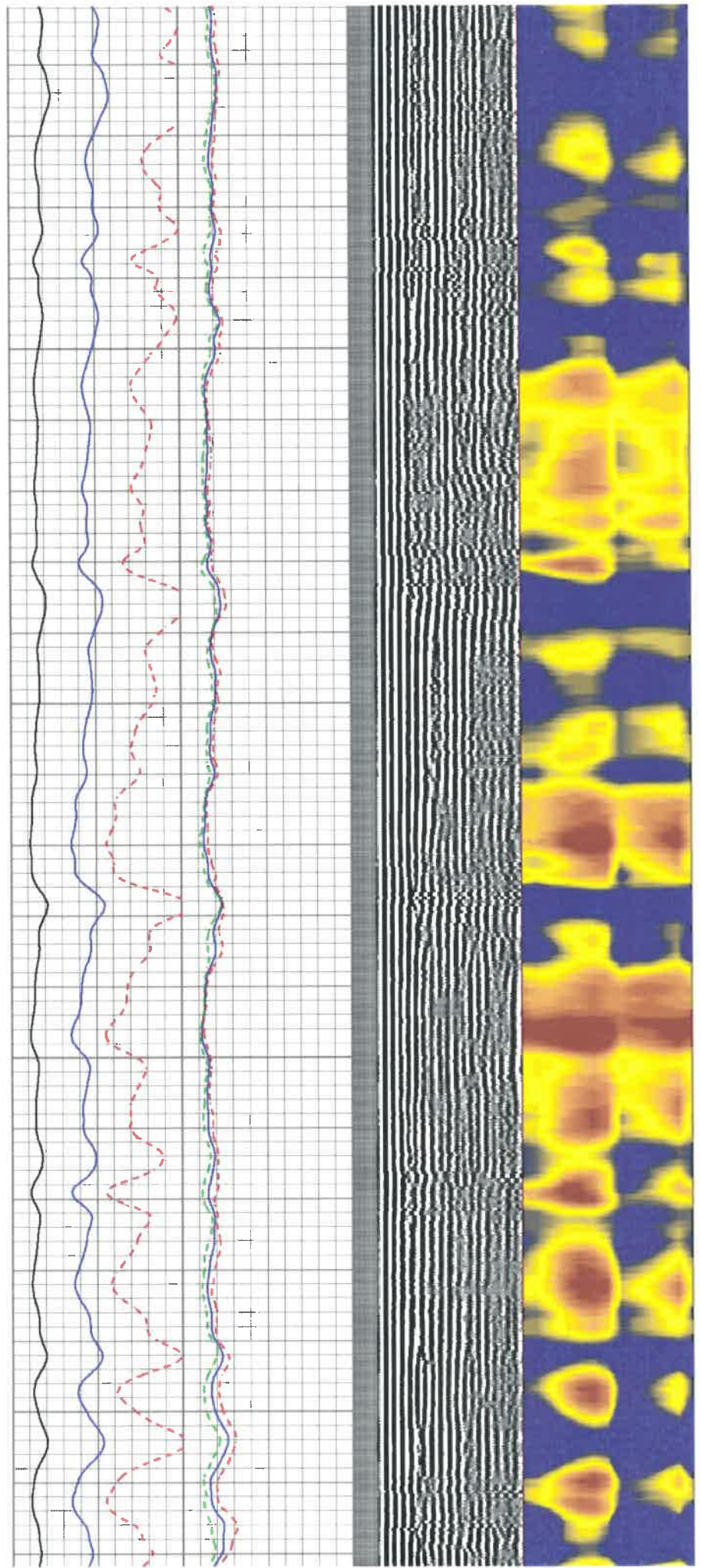


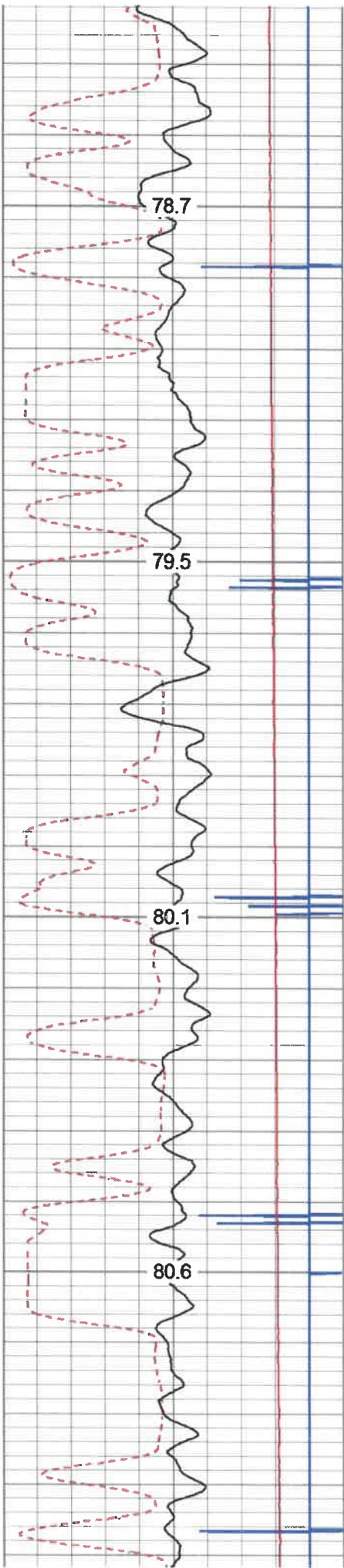
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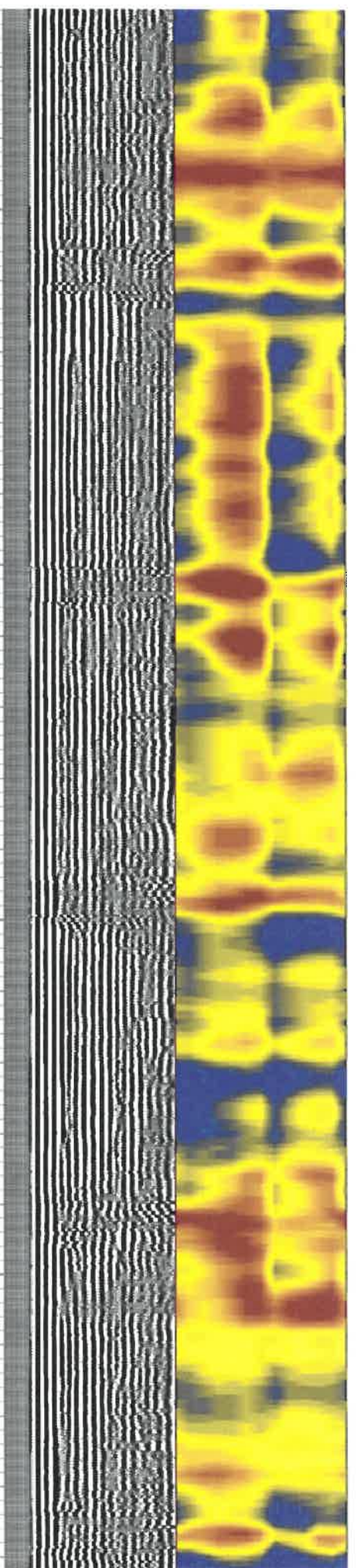
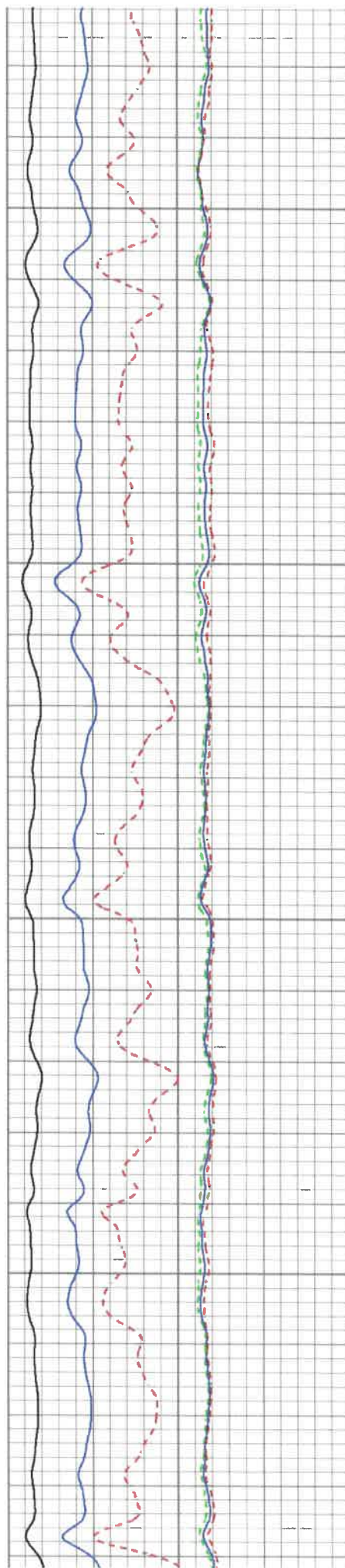


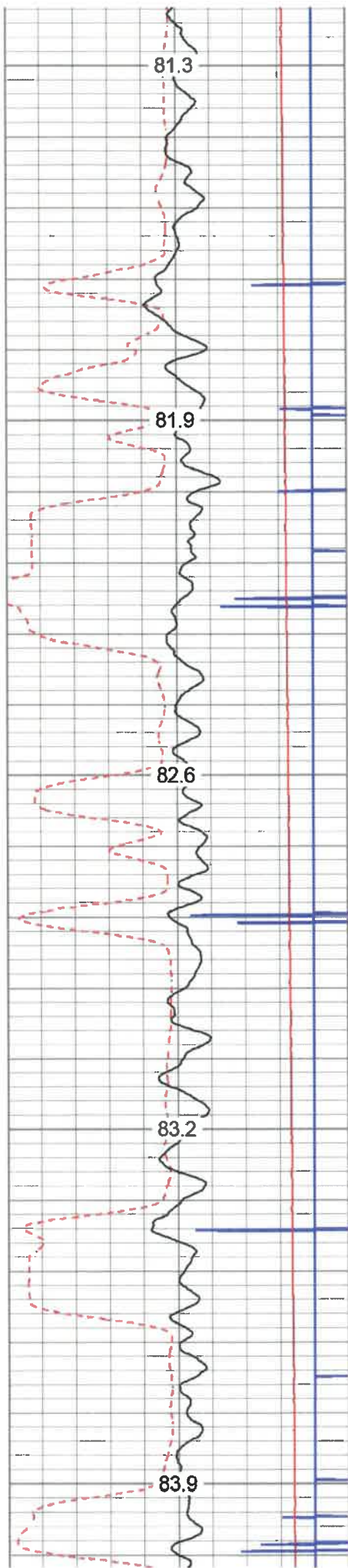
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2900

2950

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3050

3100

3150

3200

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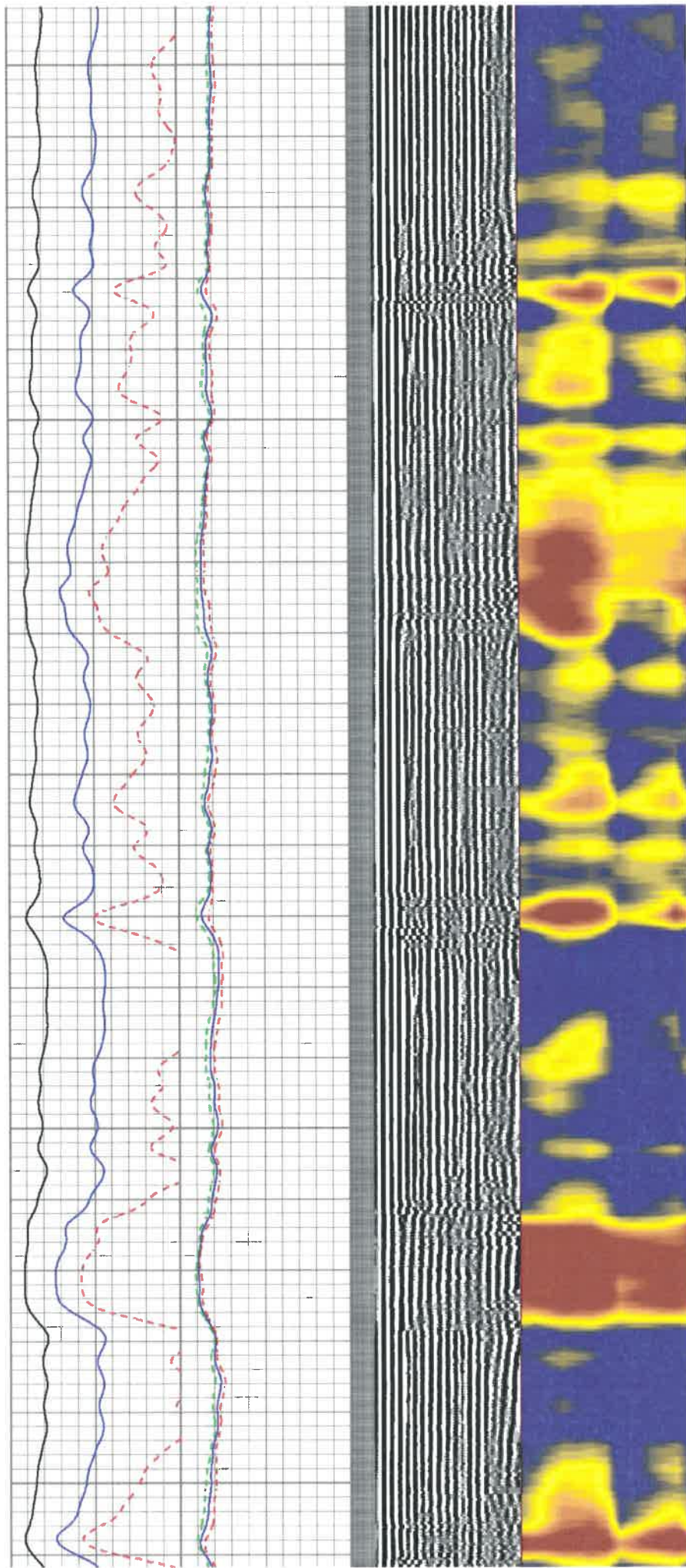
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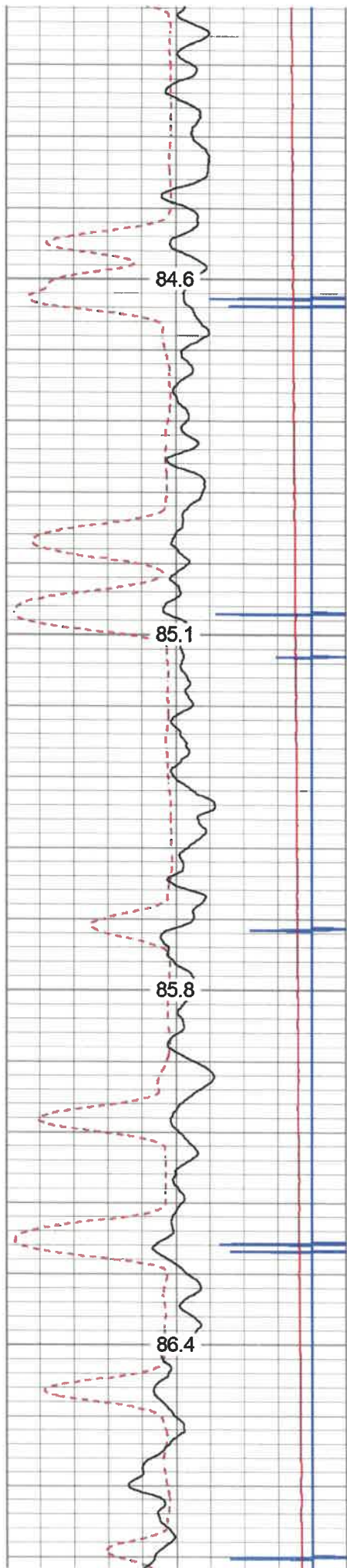
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82.6

83.2

83.9



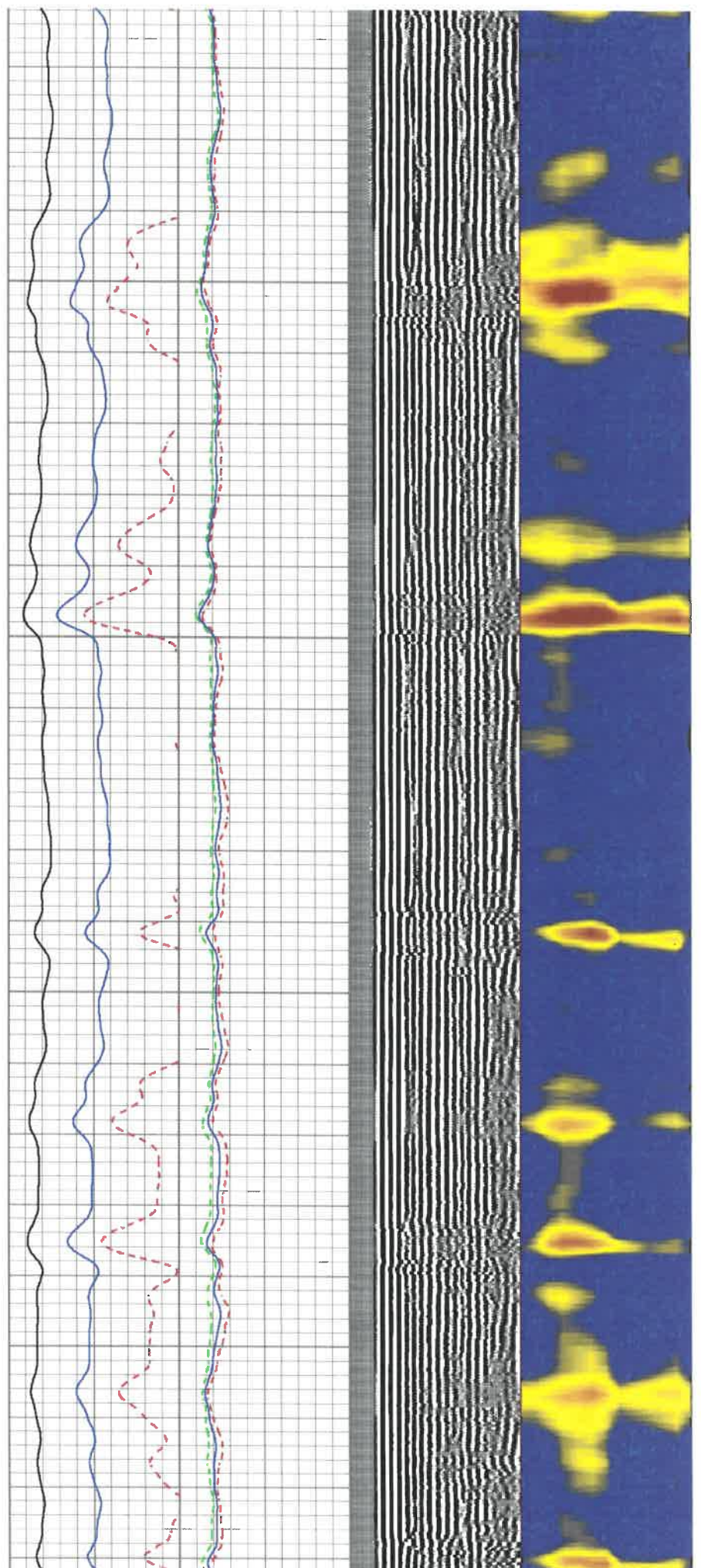


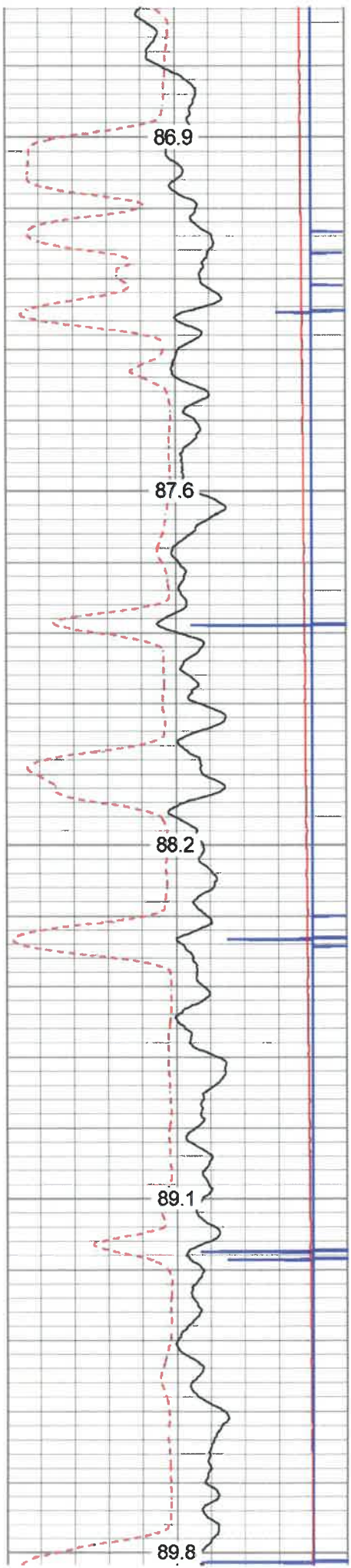
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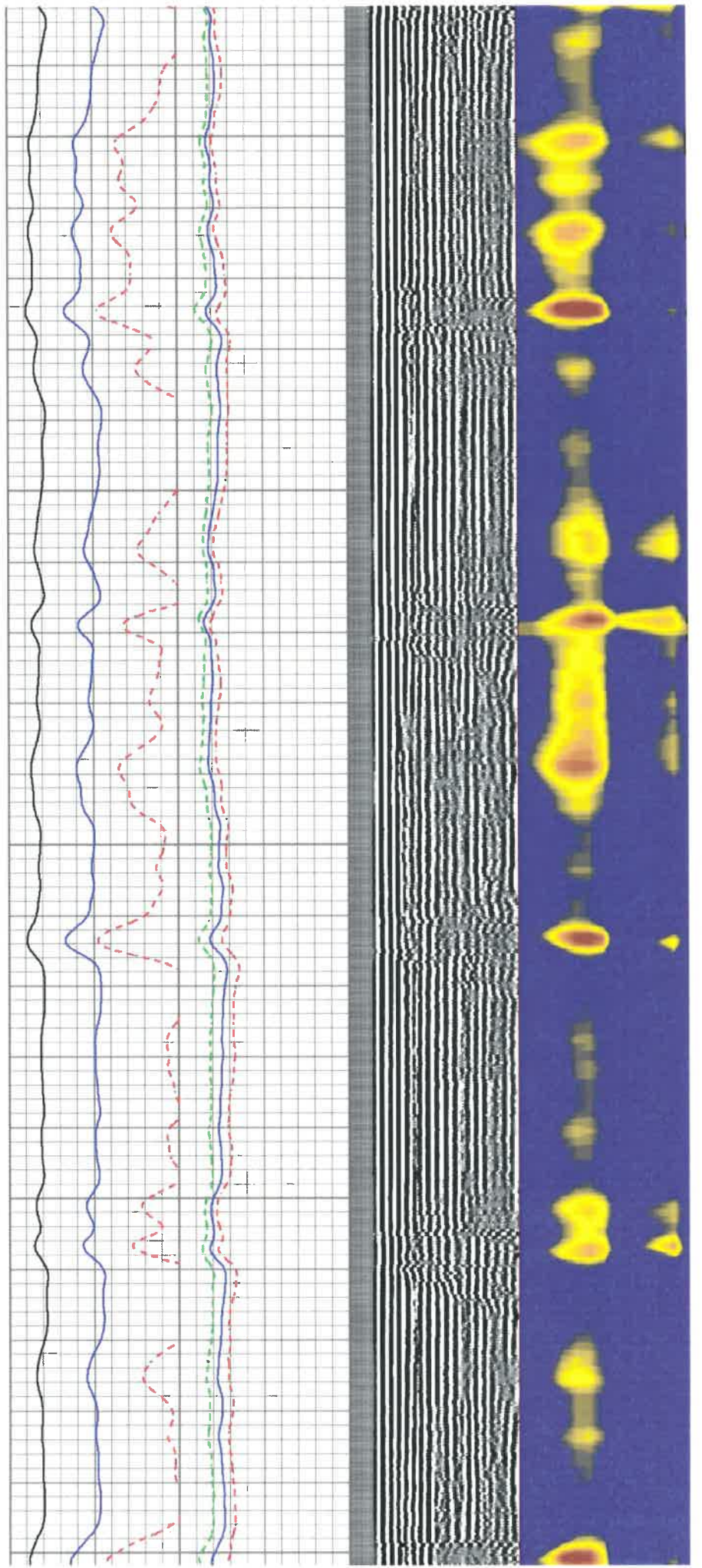
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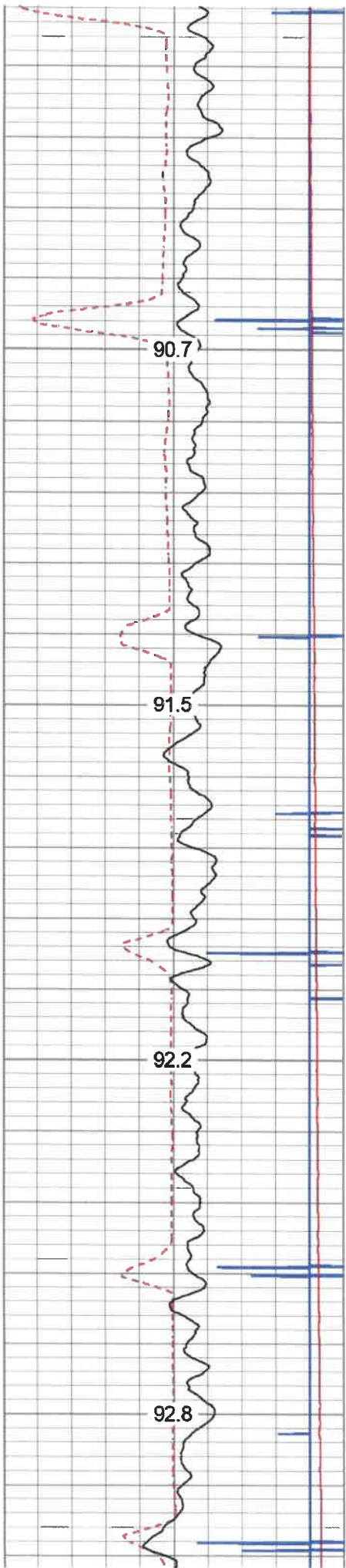
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3500
3550
3600
3650
3700



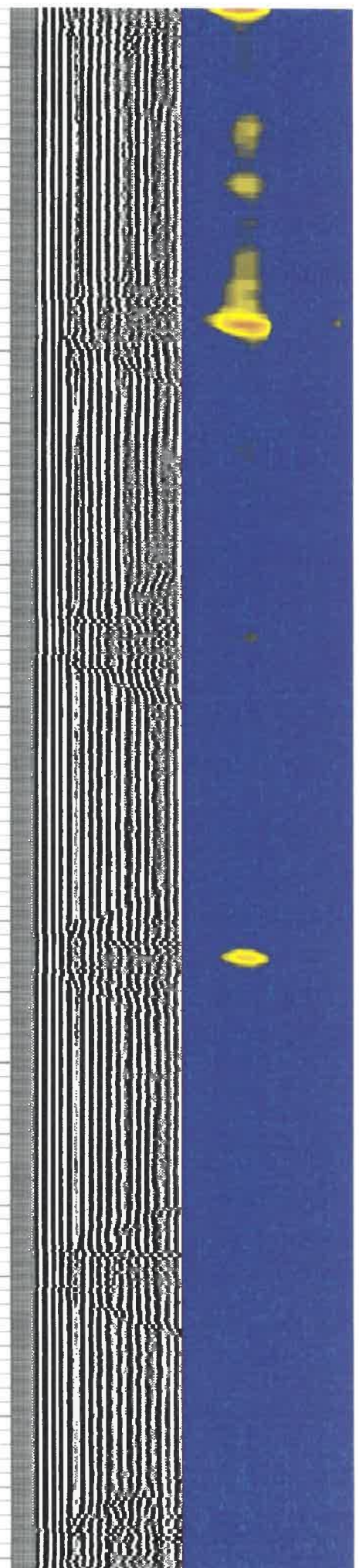
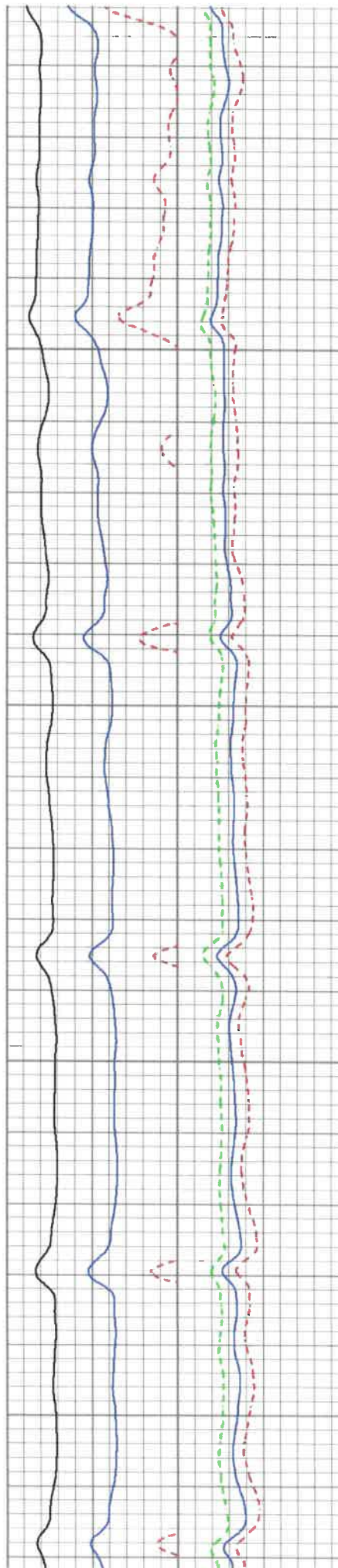


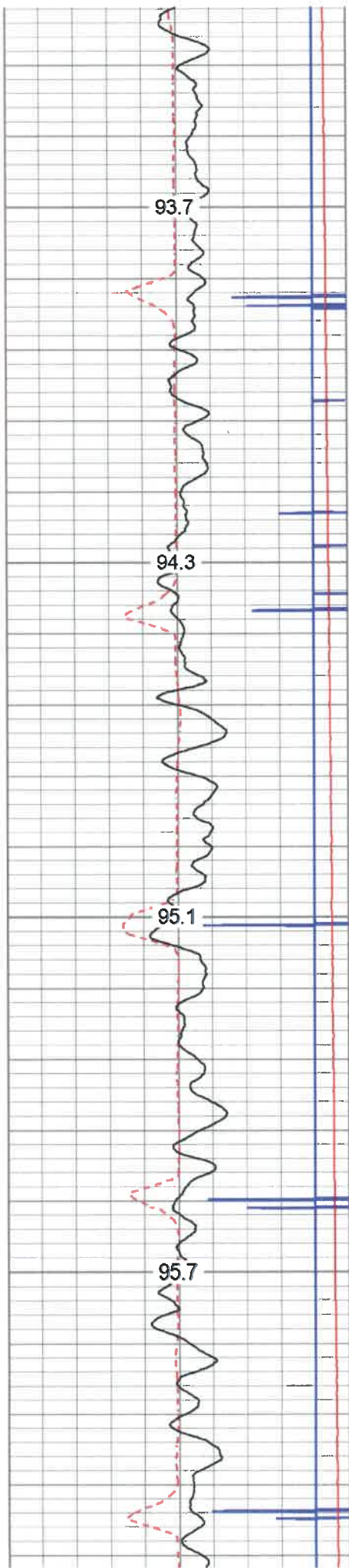
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3850

3900



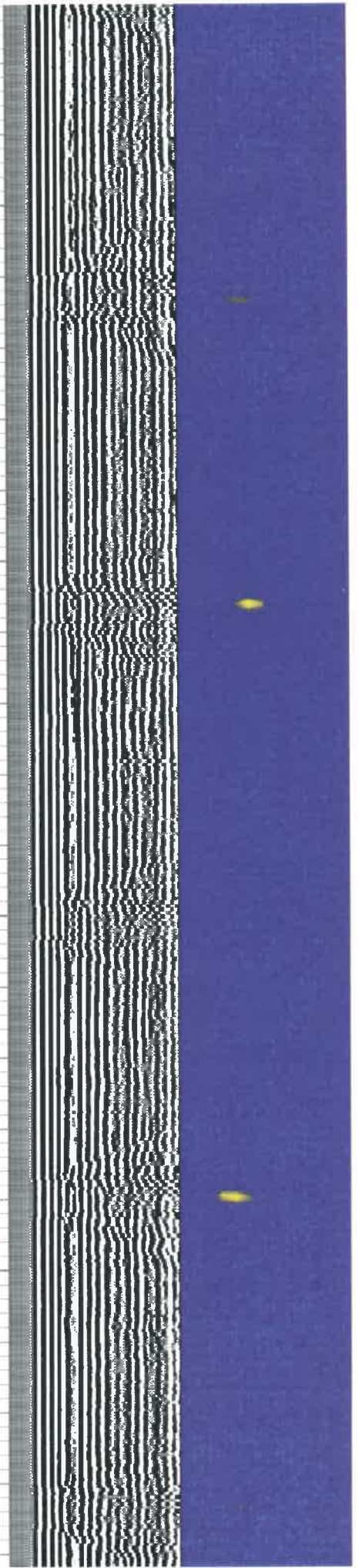
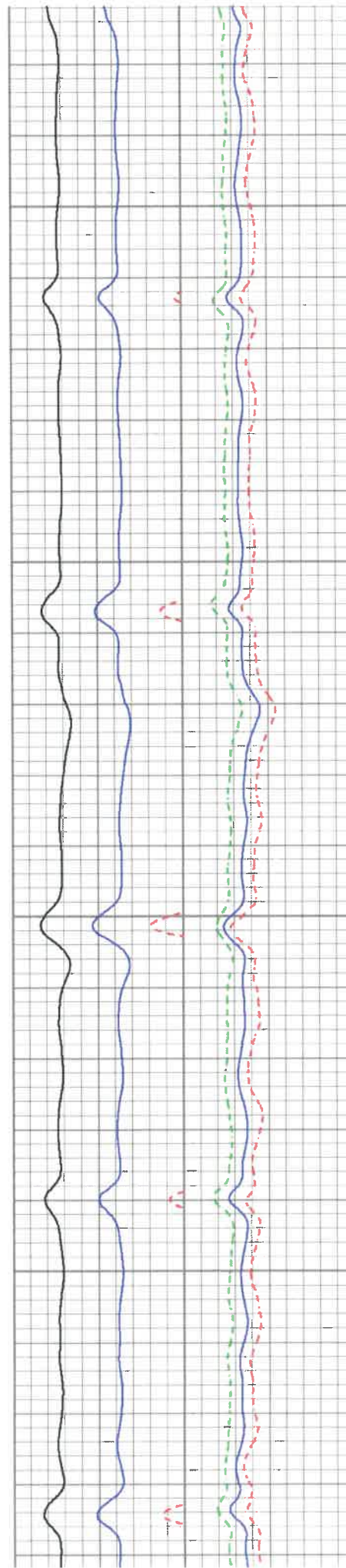


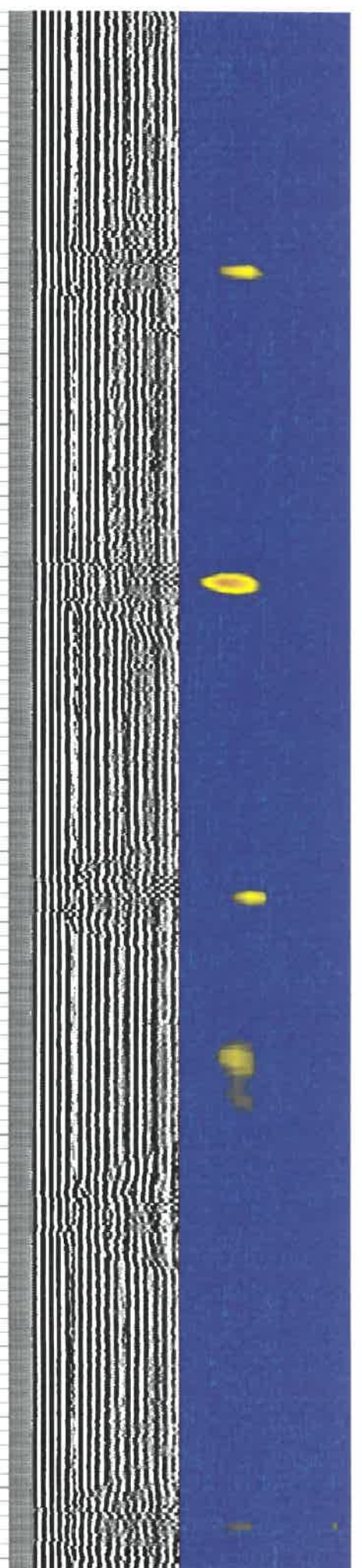
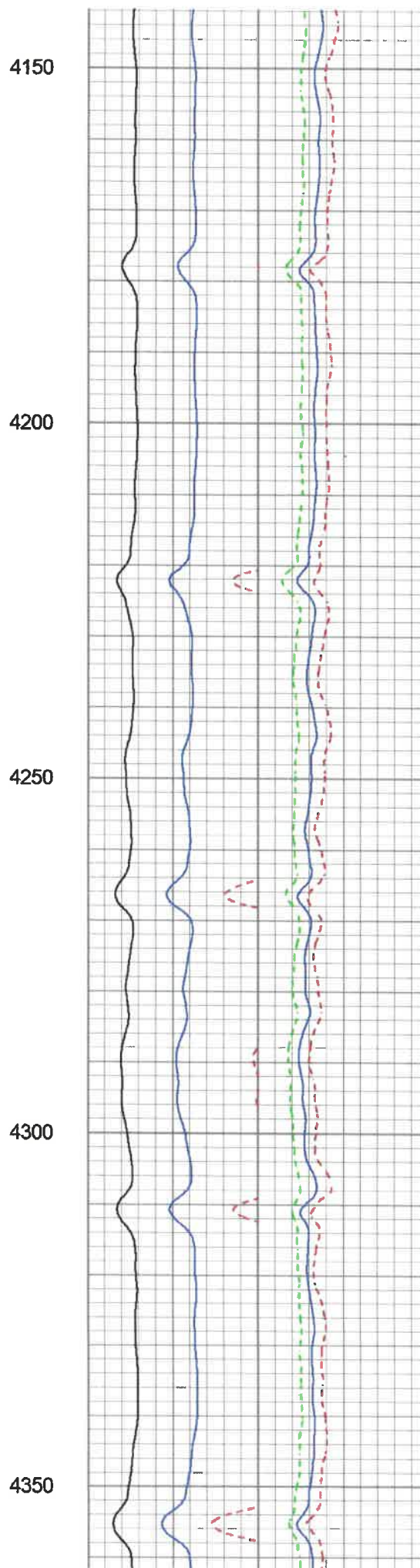
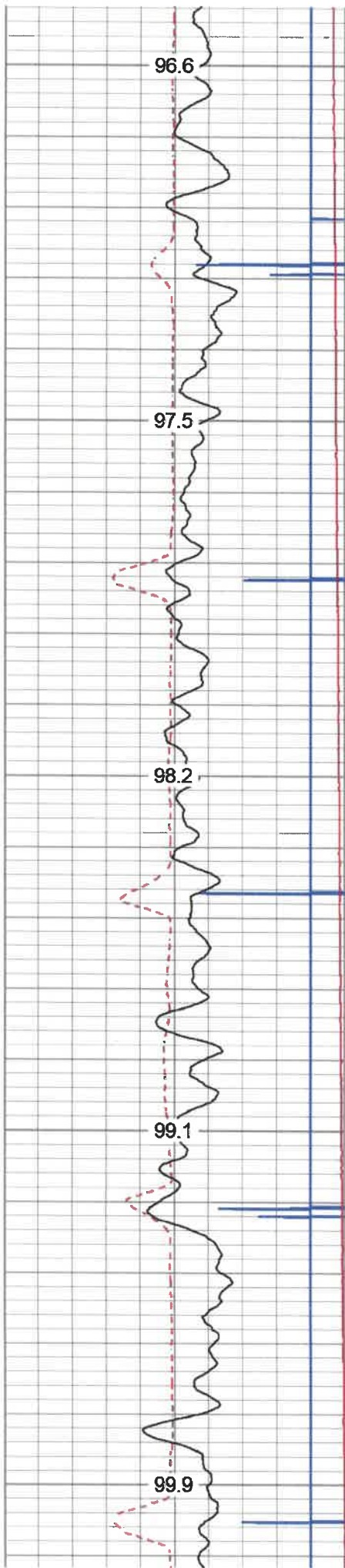
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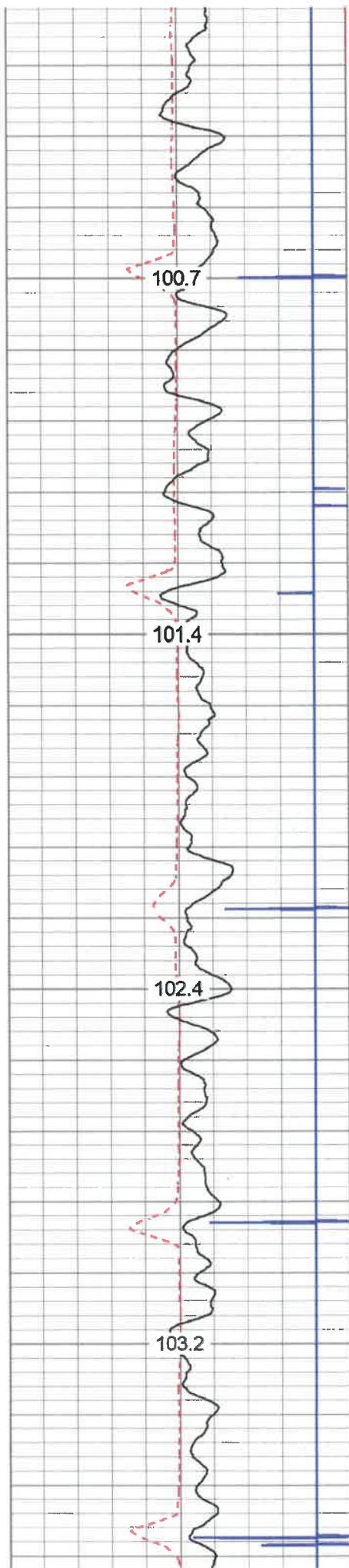
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4100





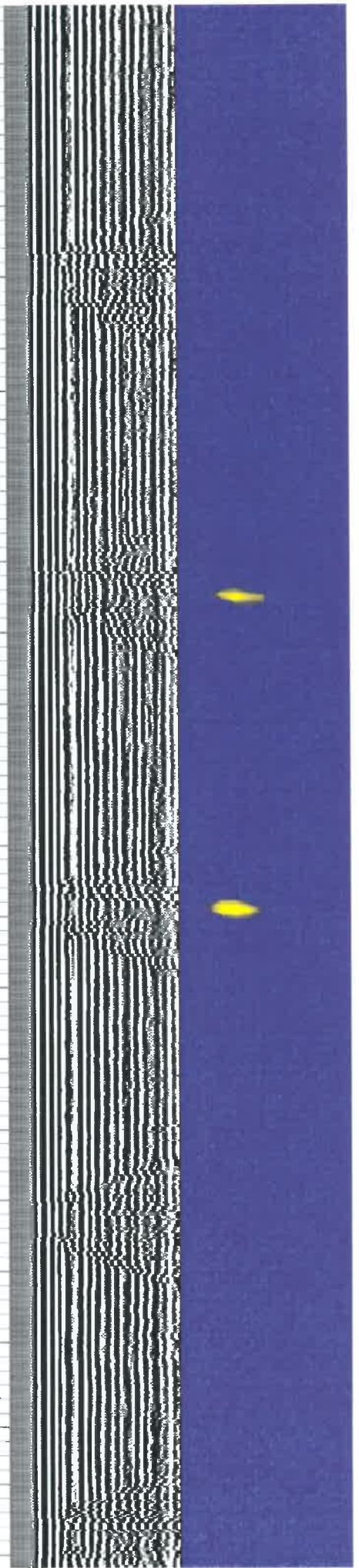
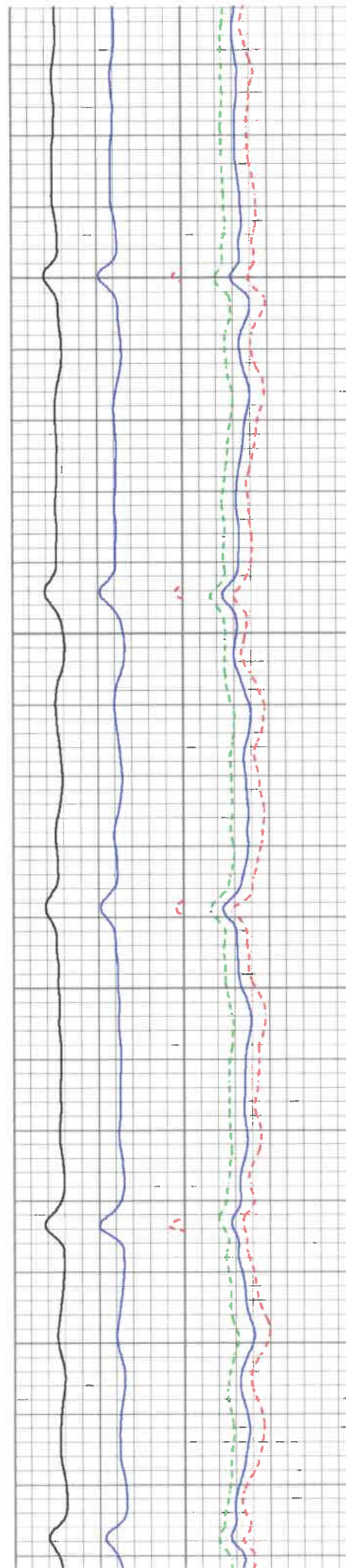


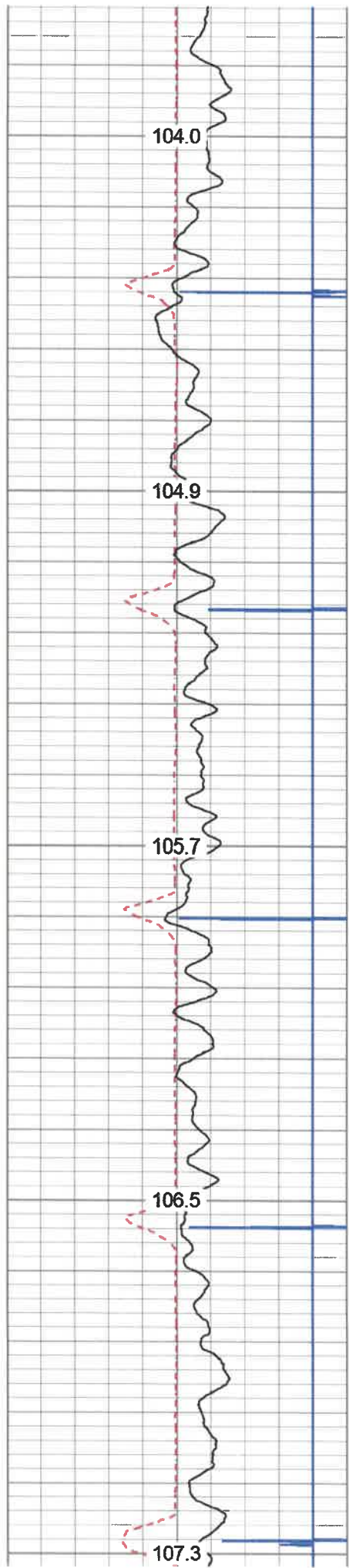
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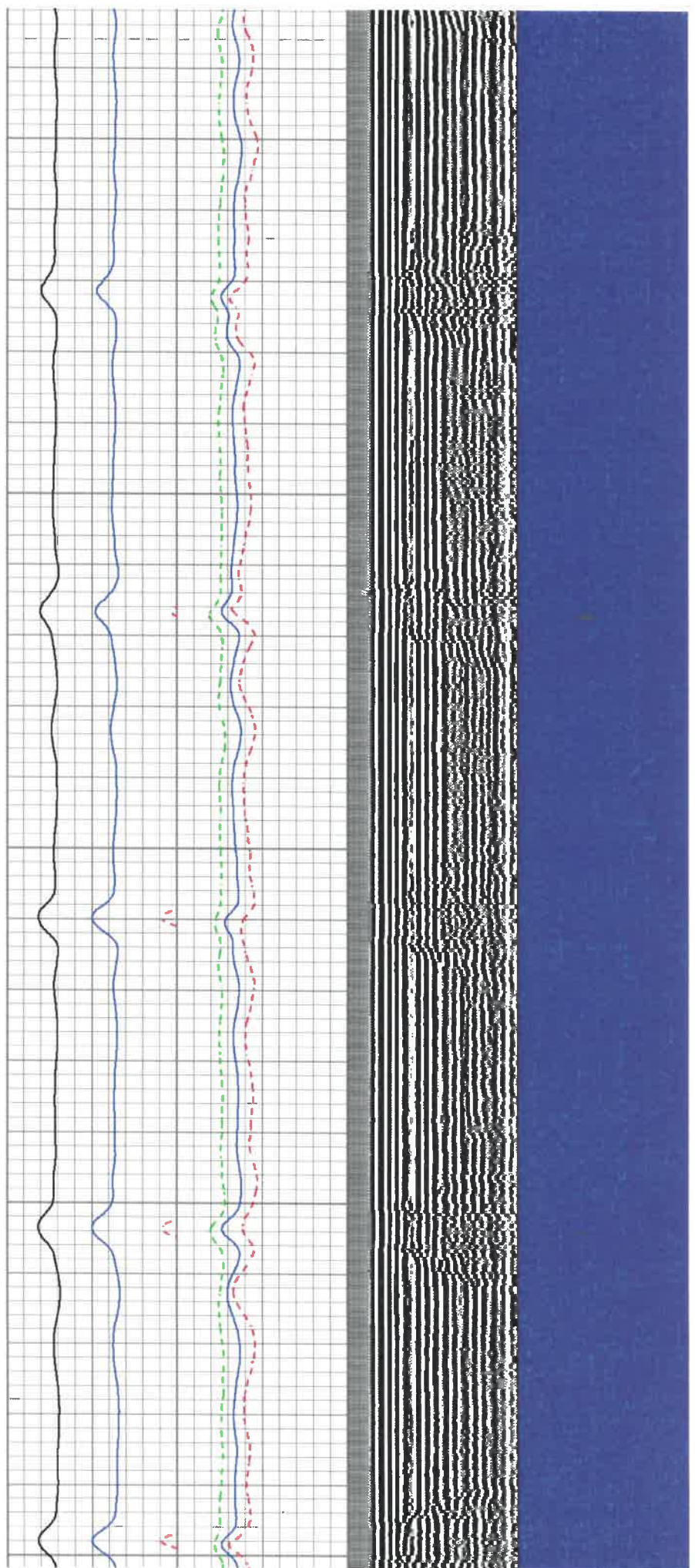
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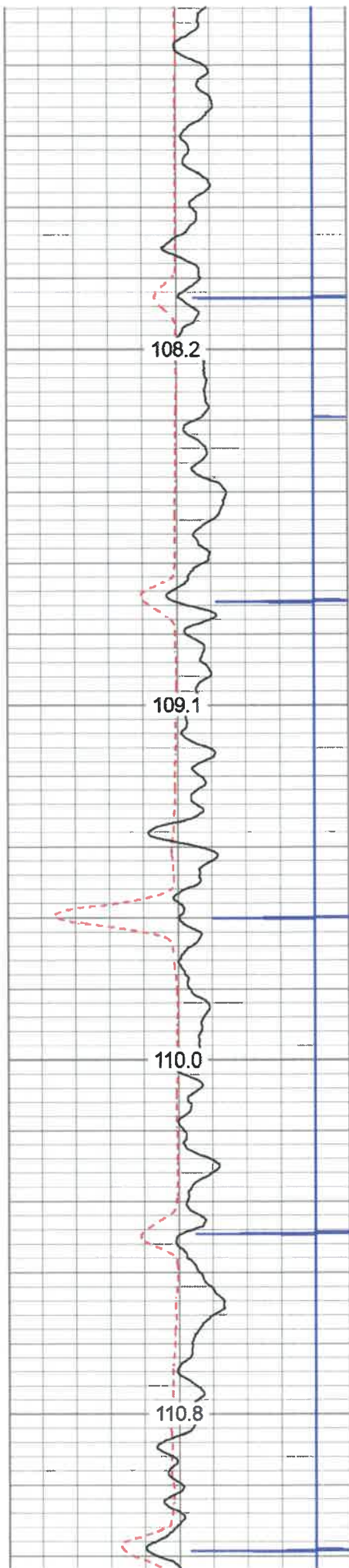
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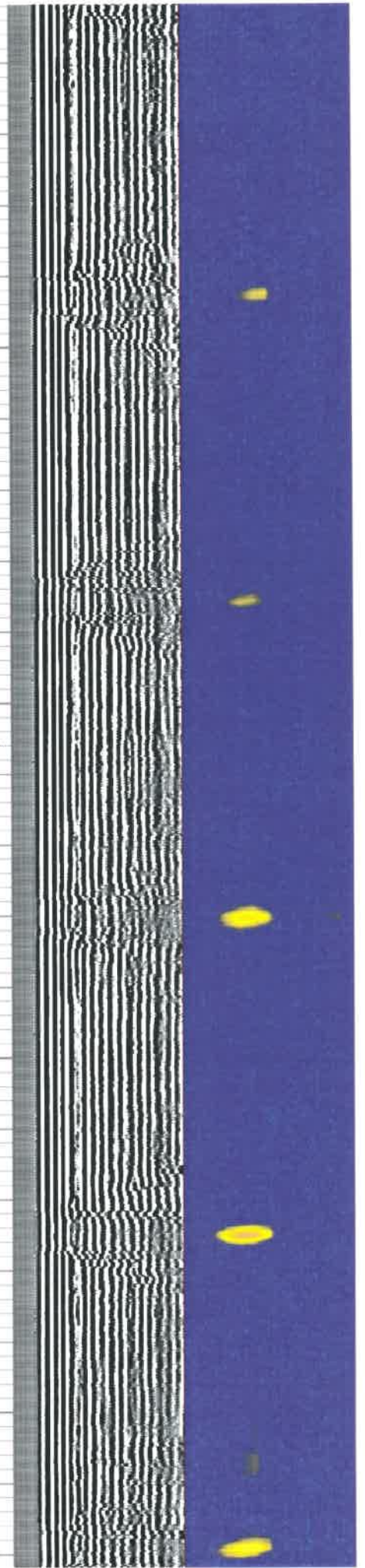
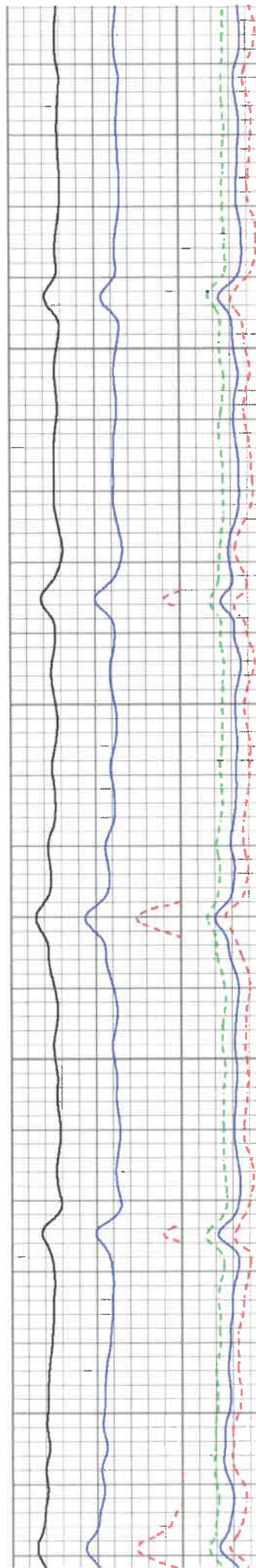


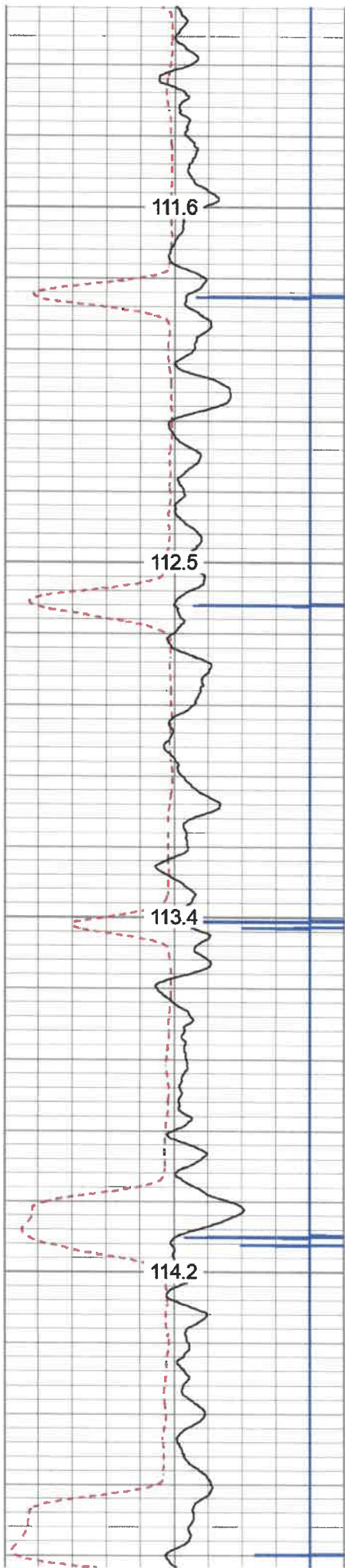
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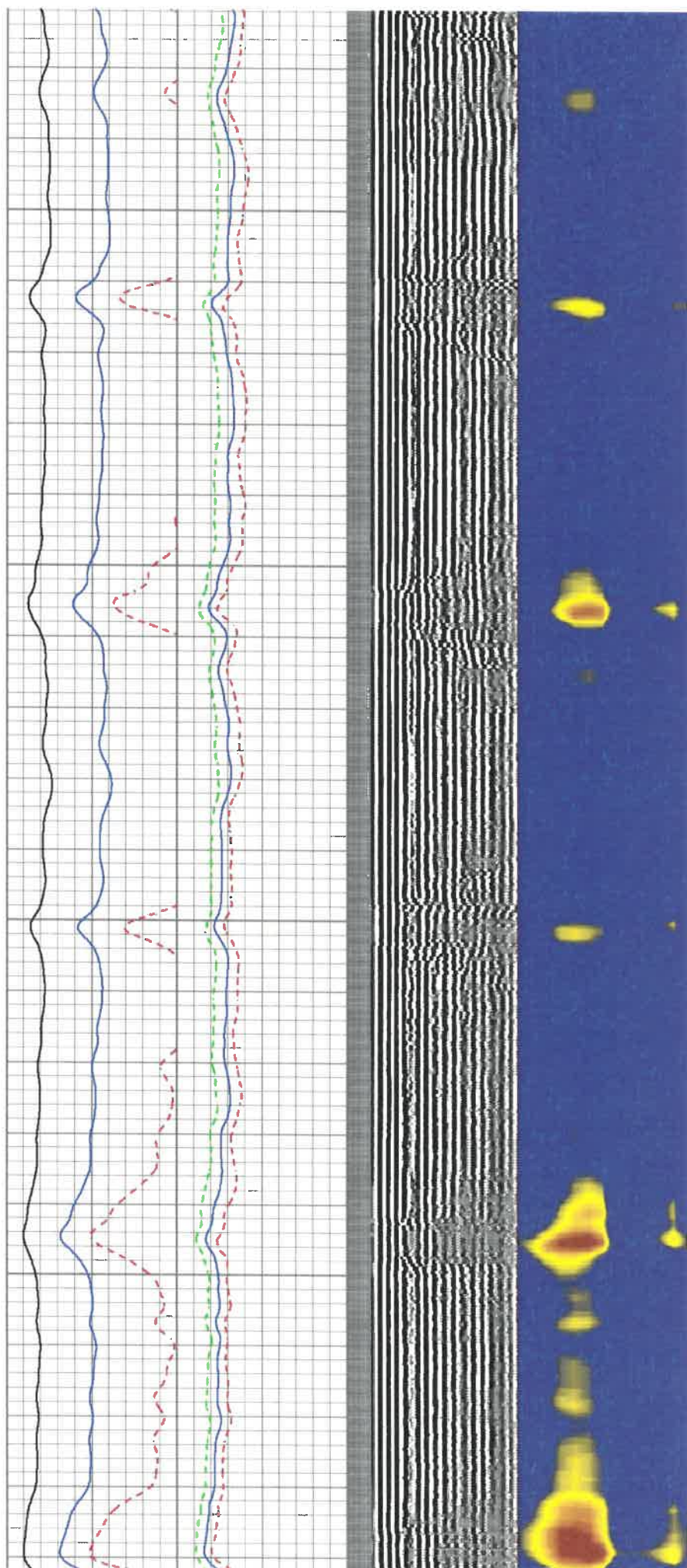


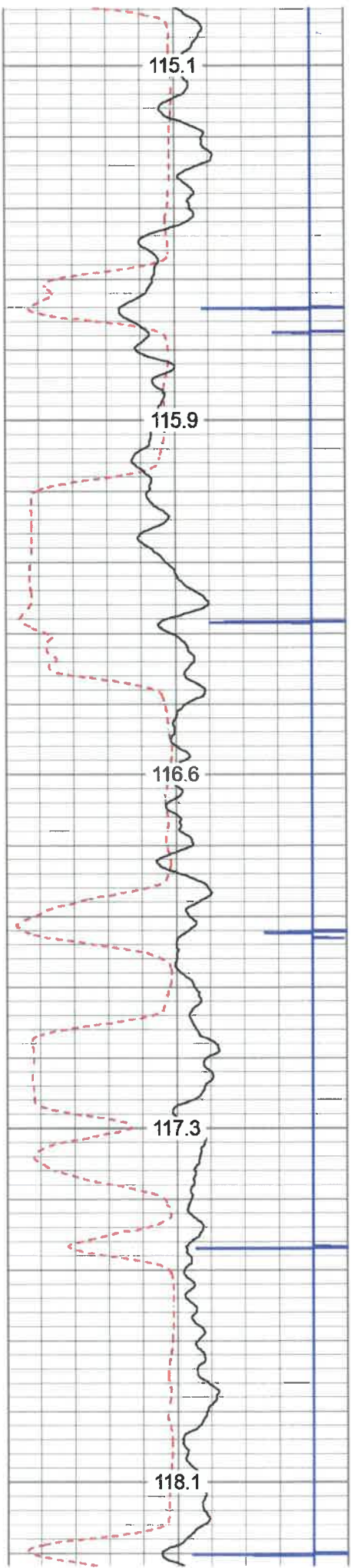
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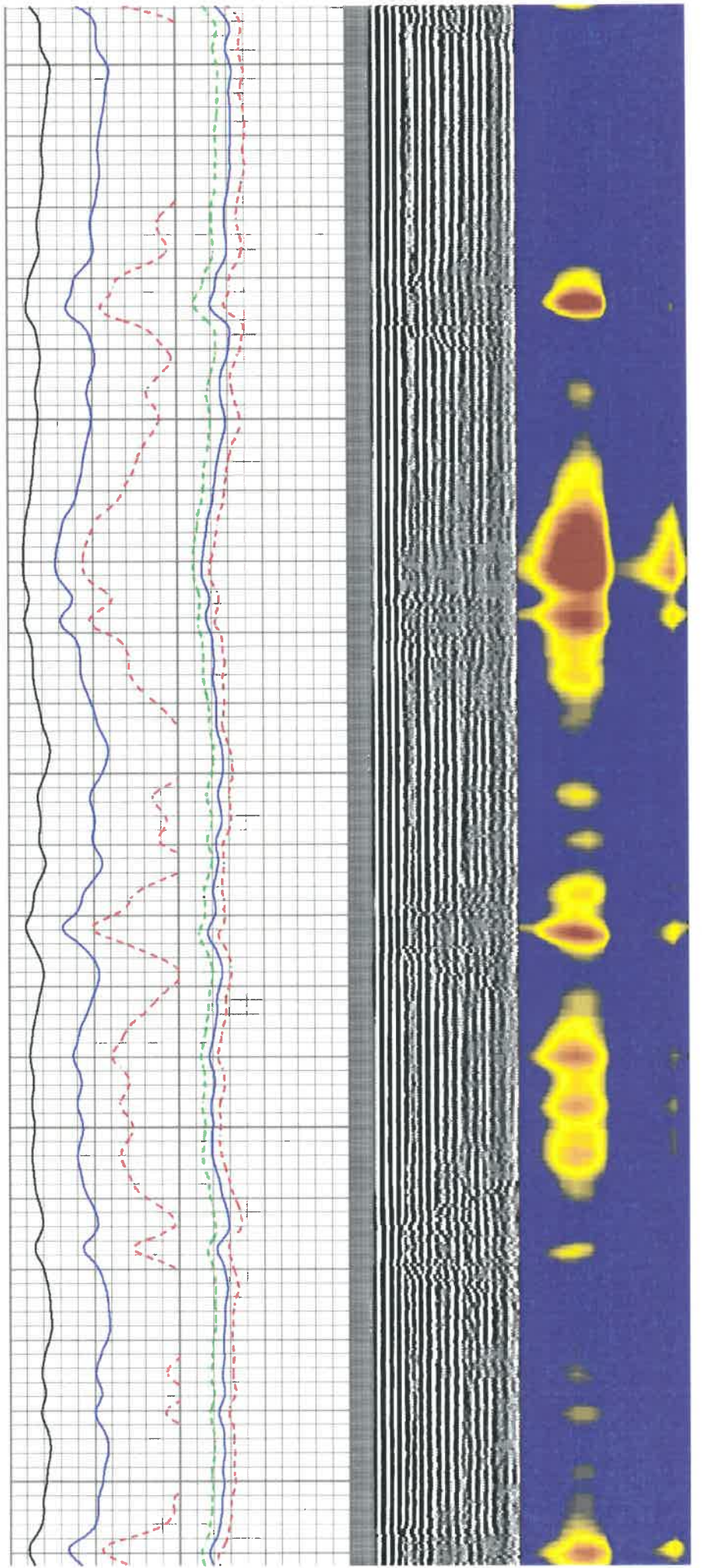
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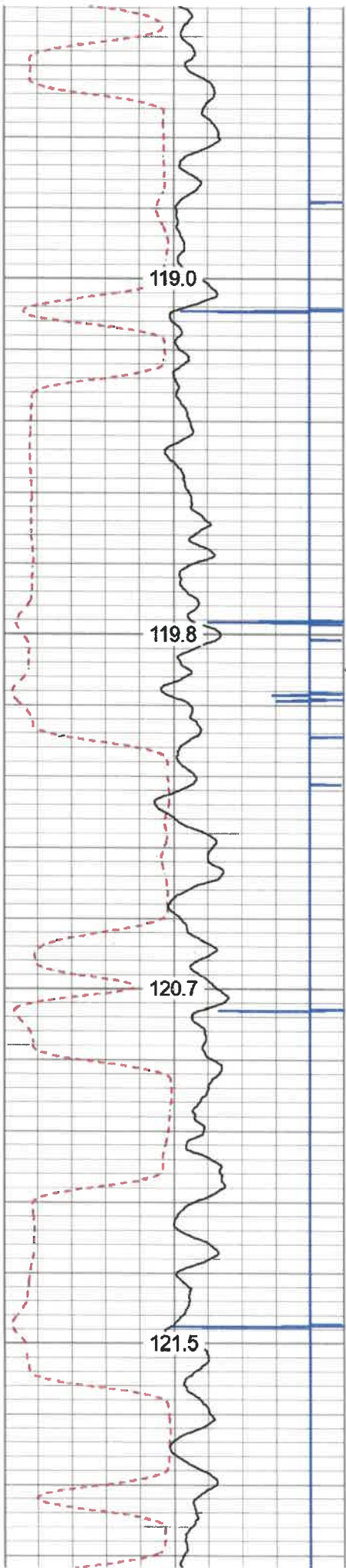
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5250
5300
5350
5400
5450





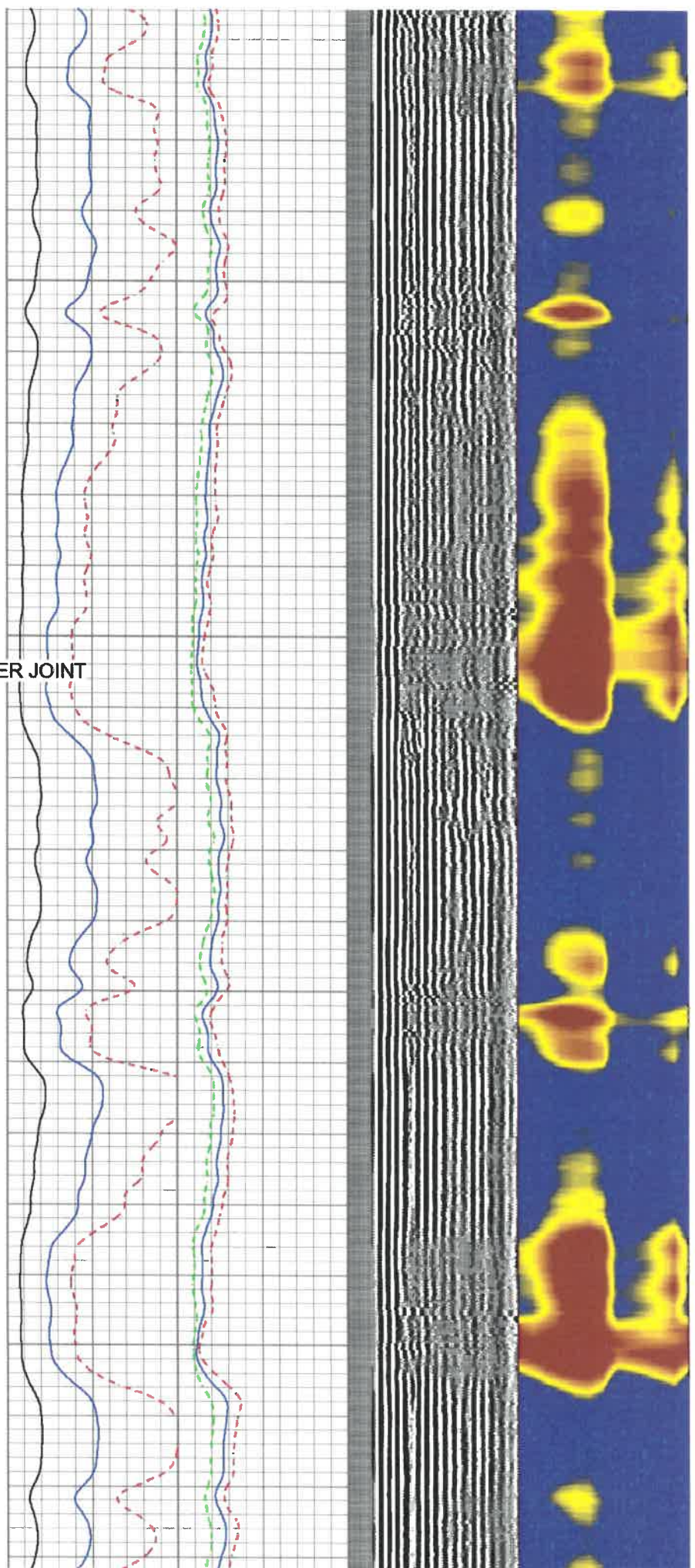
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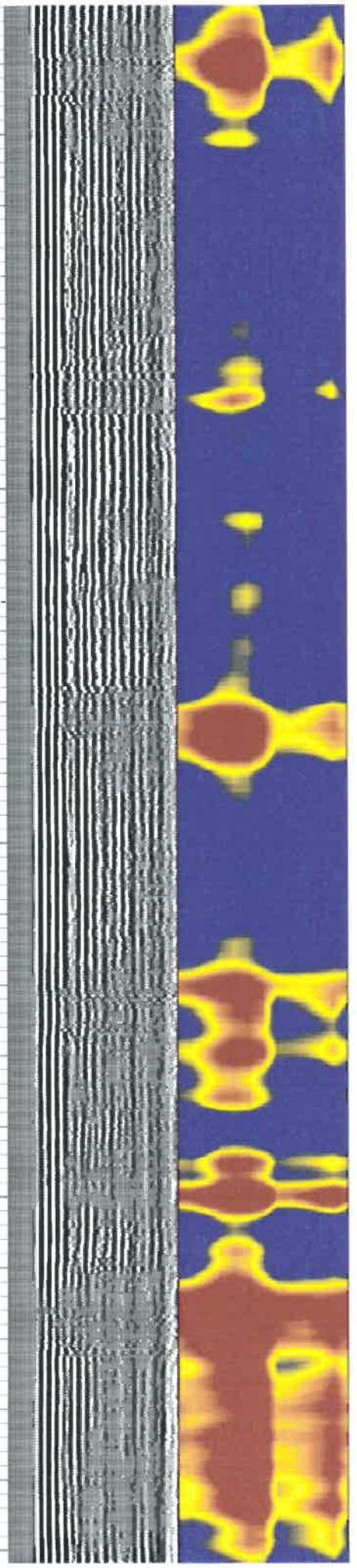
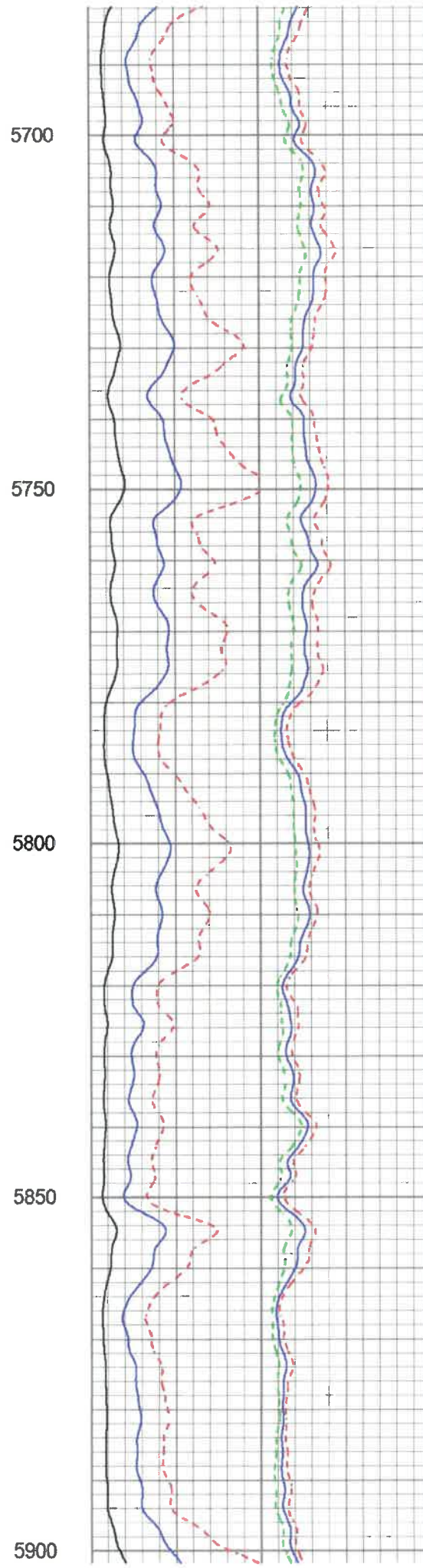
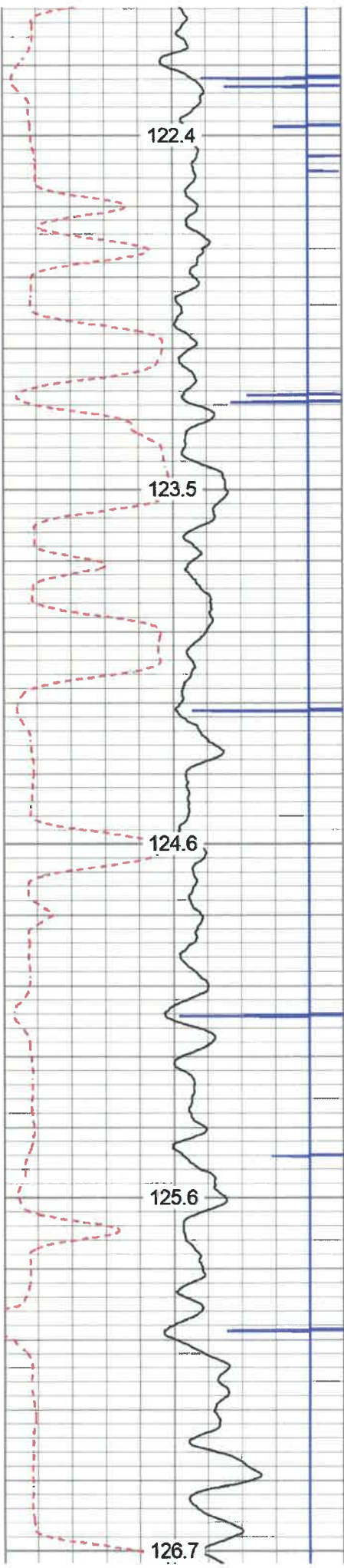
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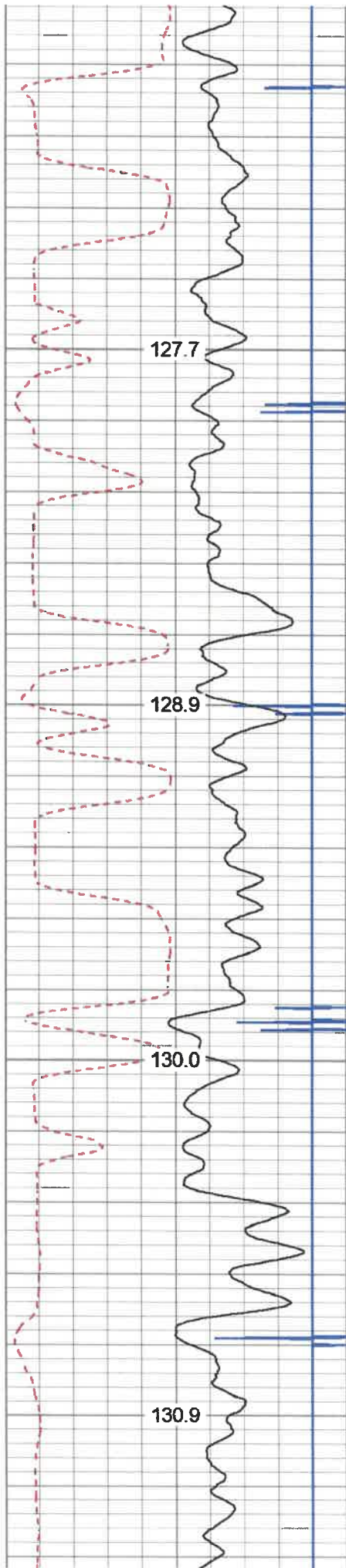
← MARKER JOINT

5600

5650





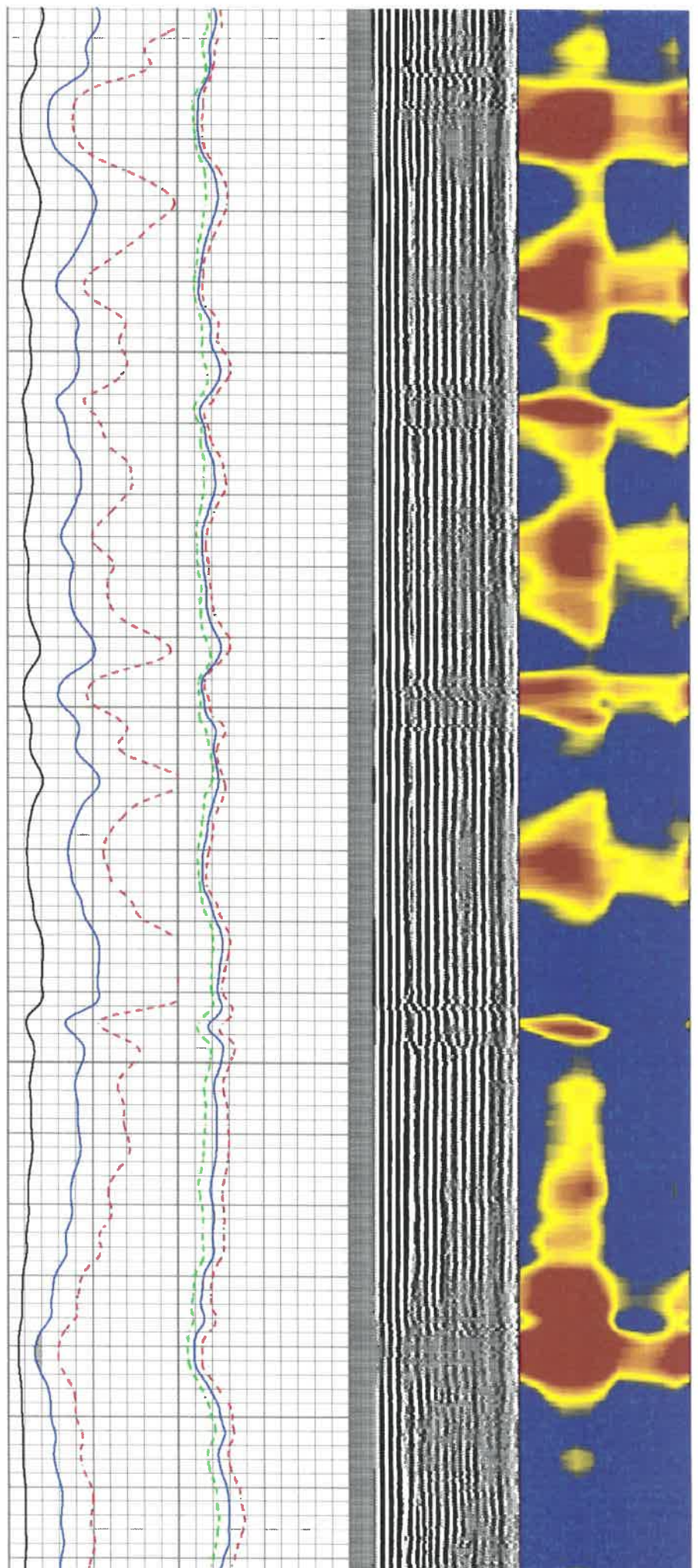


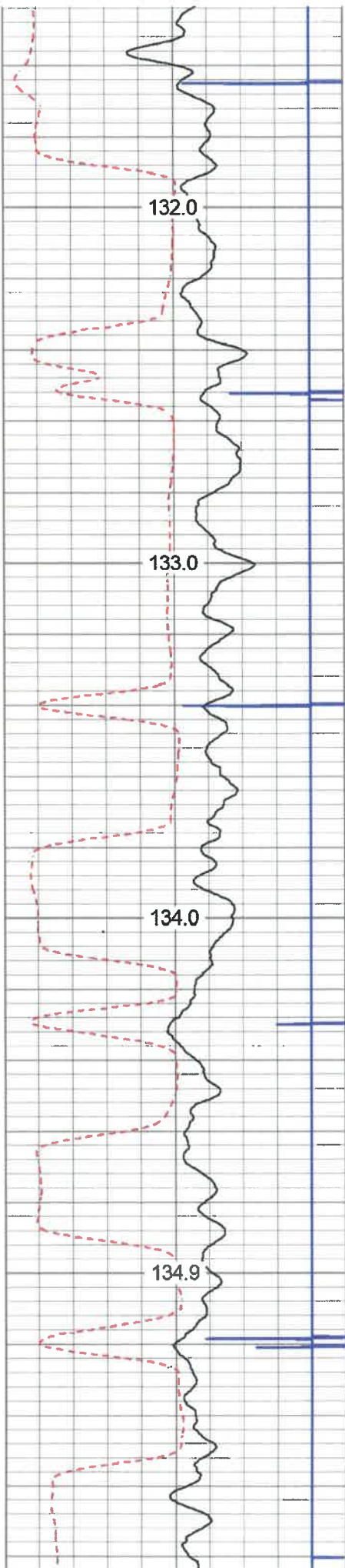
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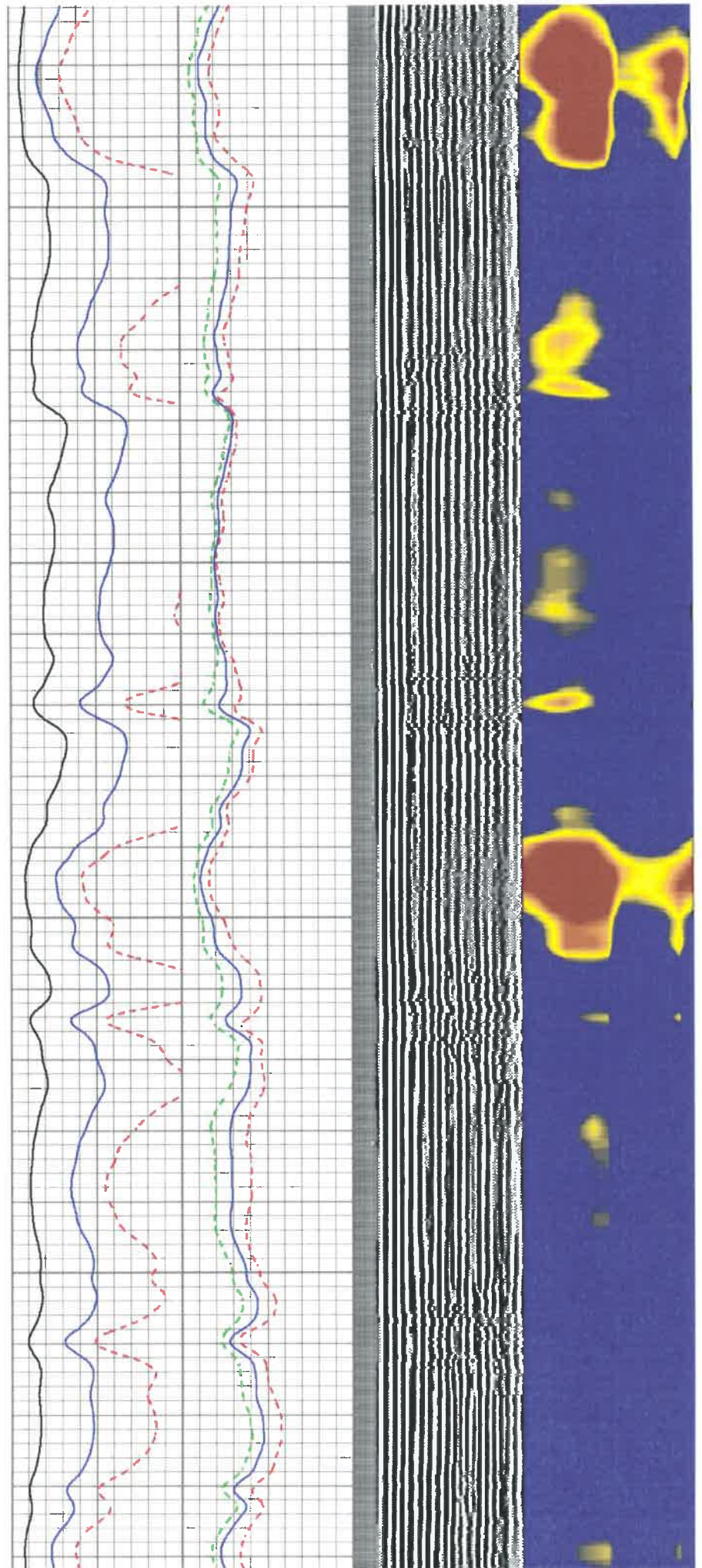


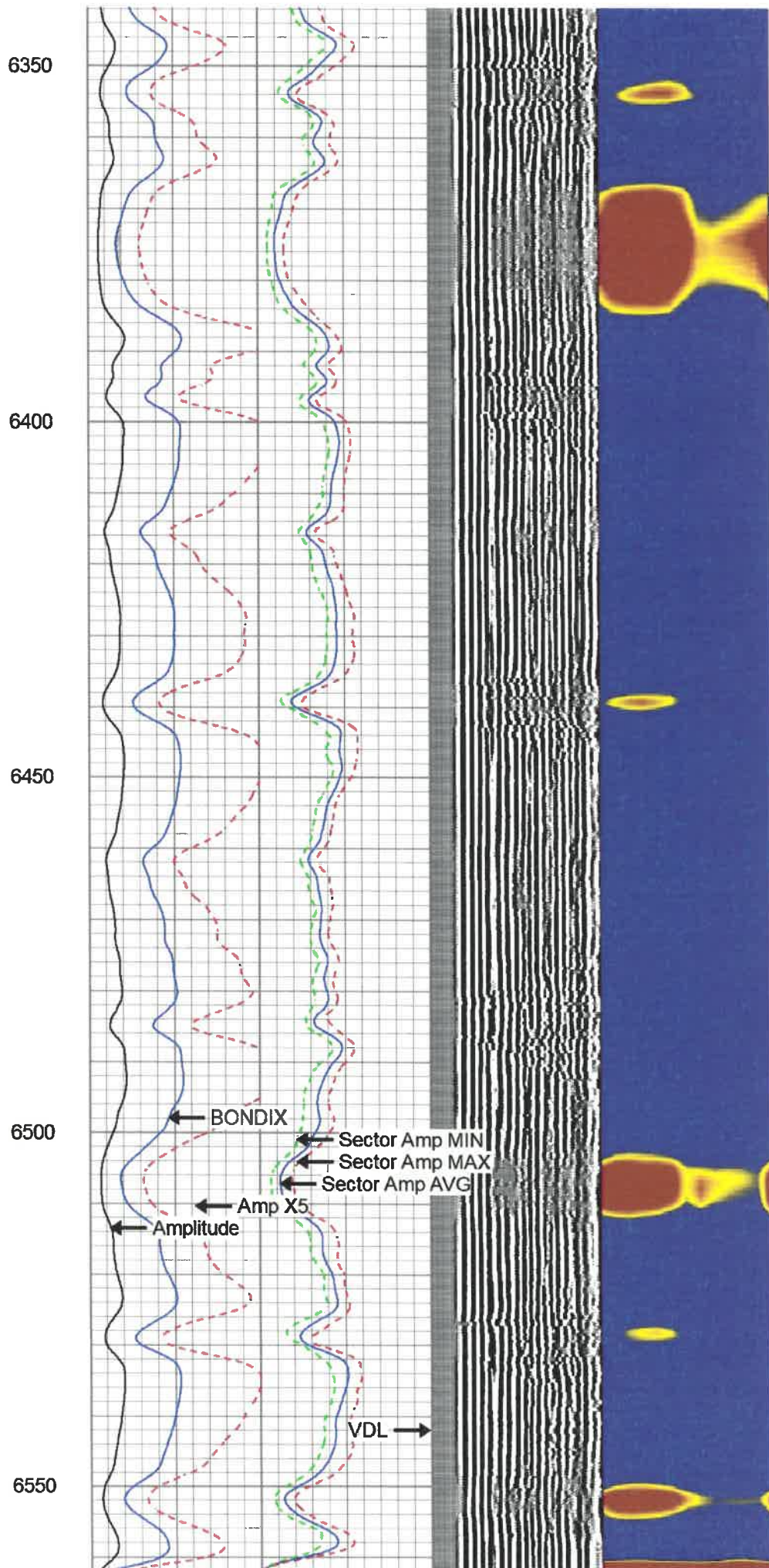
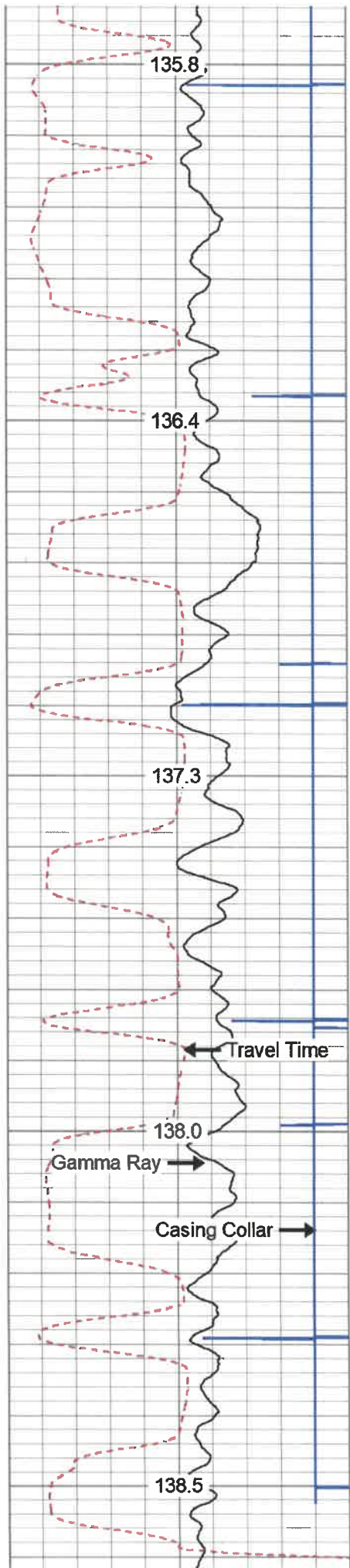
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6200

6250

6300





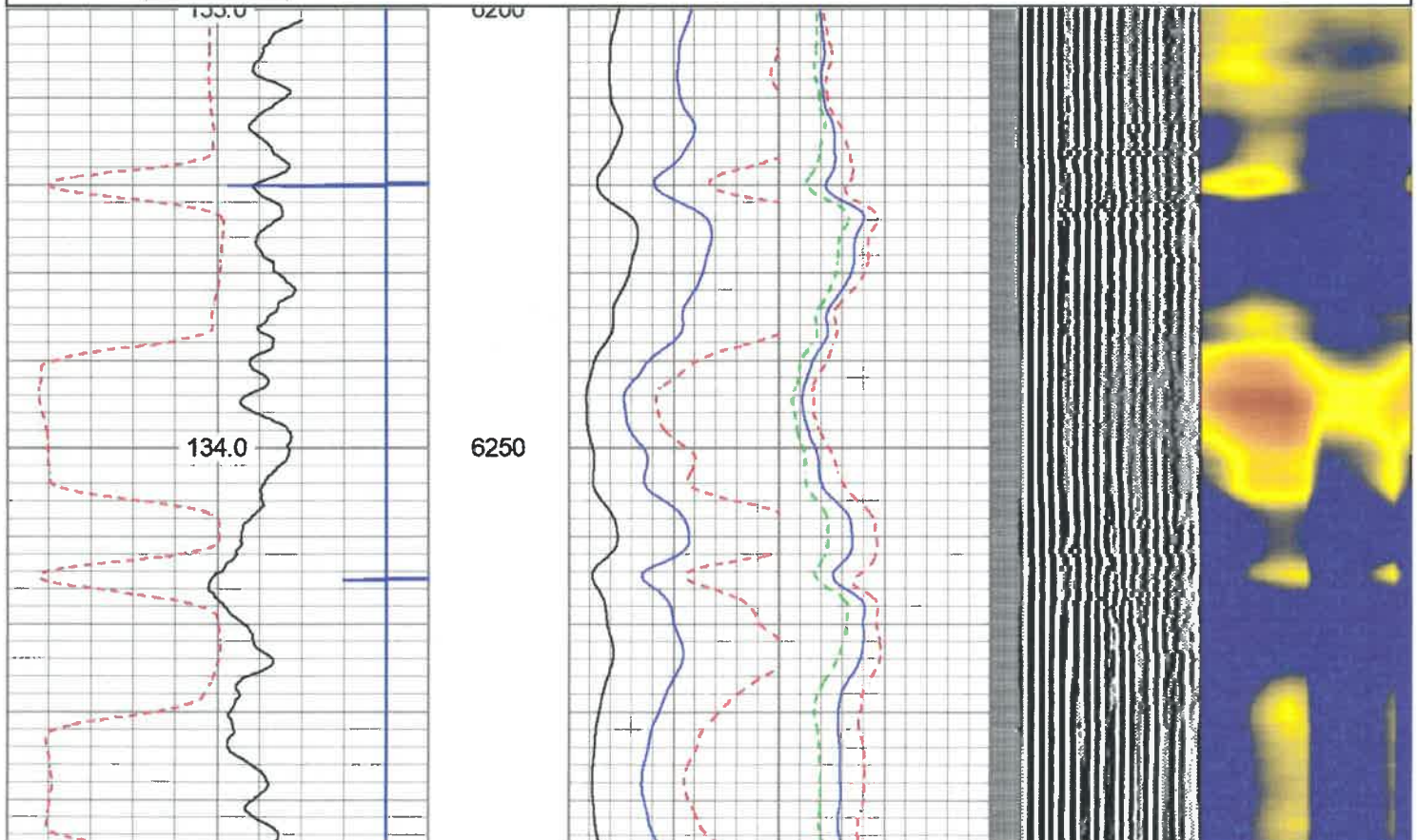
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280	Travel Time (usec)	180	Amplitude		Sector Amp AVG	VDL		1 Sector Map 12	
9	Casing Collar	-1	0	(mV) 100	Sector Amp MAX	200	(usec) 1200		
0	Gamma Ray	180	Amp X5		Sector Amp MIN				
0	TEMP (degF)	100	0	(mV) 20					
180	GR	360	1	BONDIX 0					
TEMP (degF)									

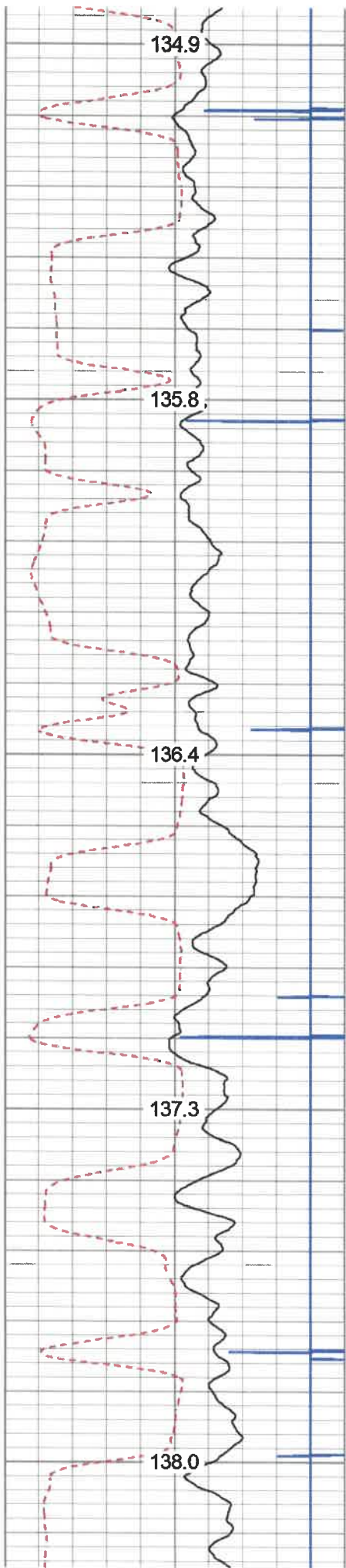


REPEAT PASS

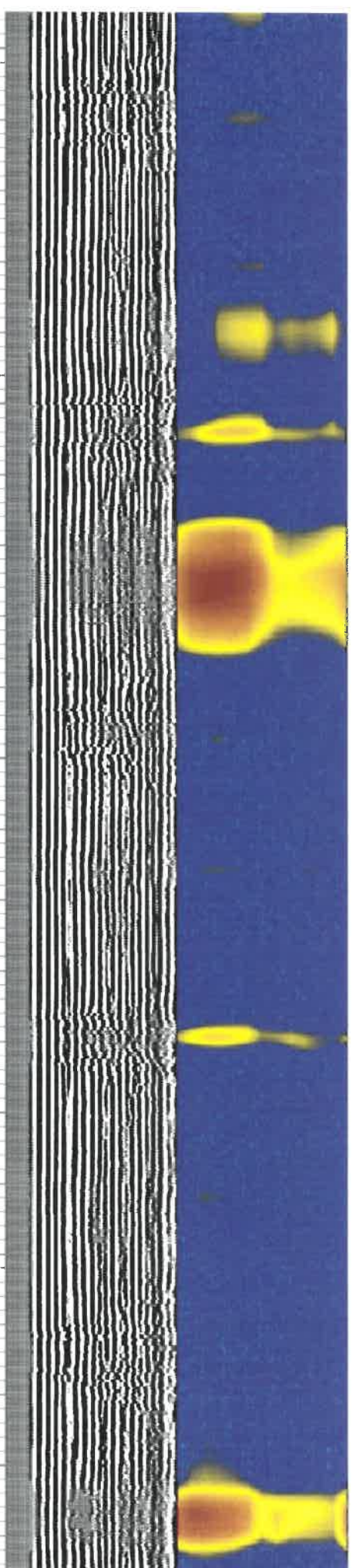
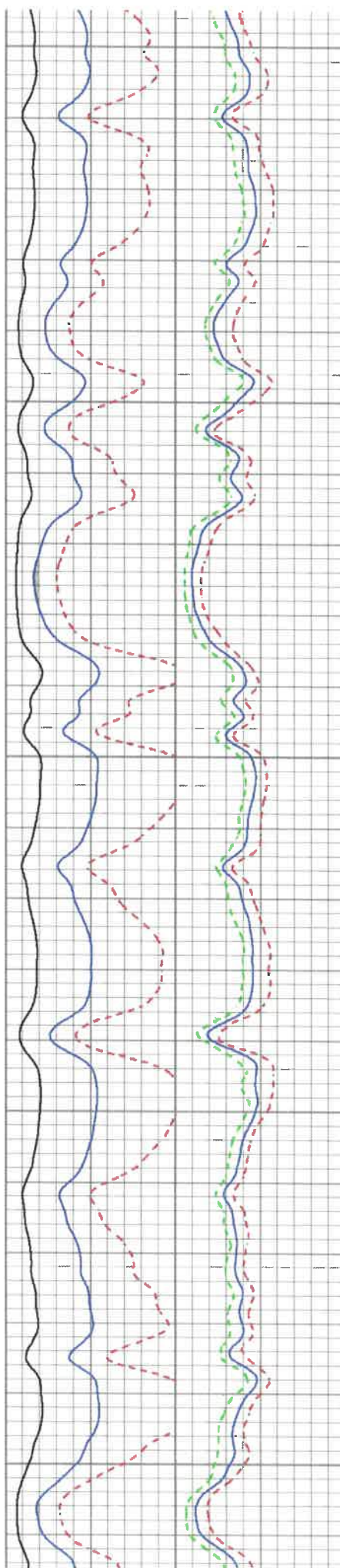
Database File antero_riggs unit 1h .db
 Dataset Pathname passREP
 Presentation Format antero
 Dataset Creation Fri Nov 15 18:05:59 2019
 Charted by Depth in Feet scaled 1:240

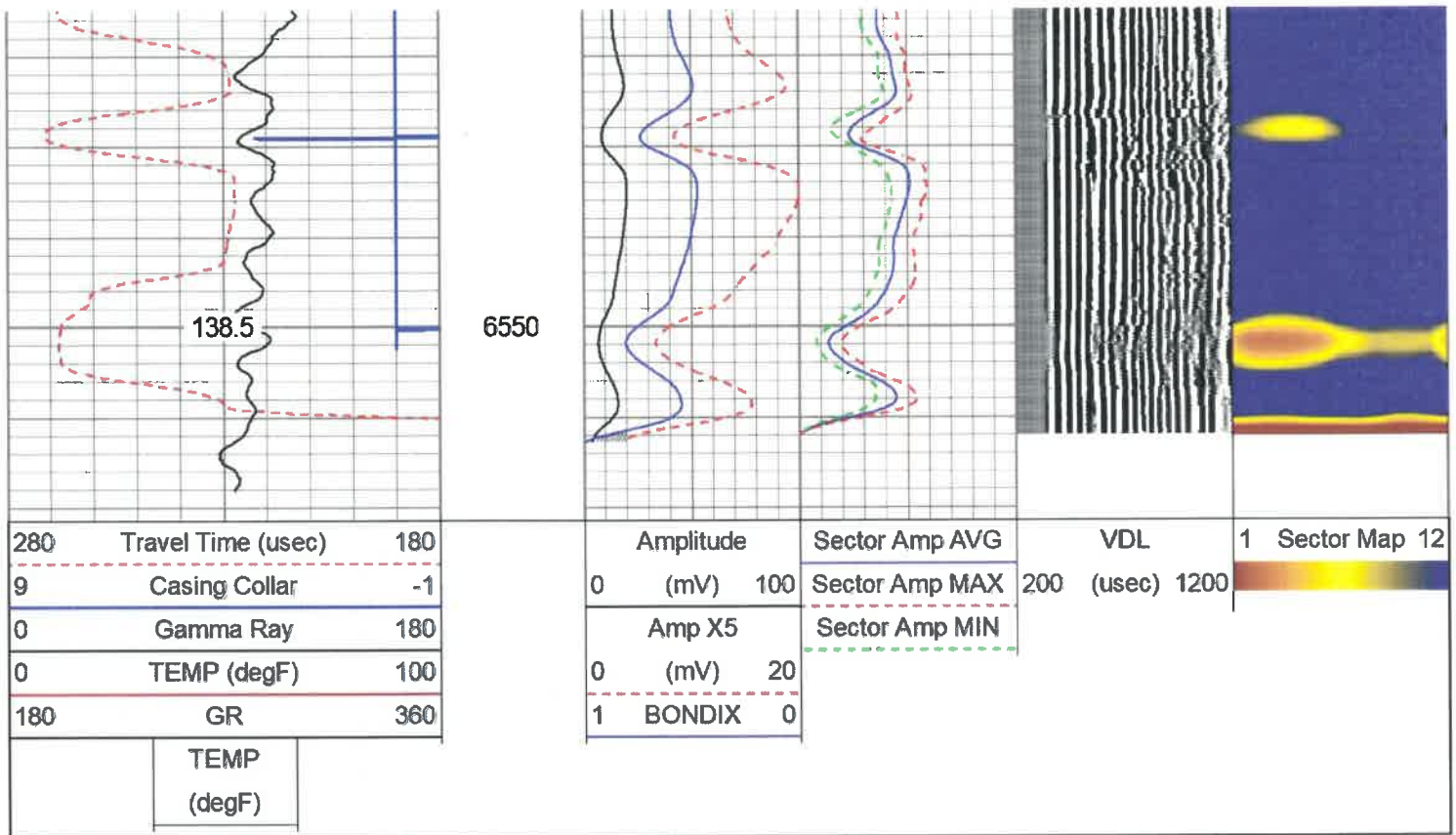
280	Travel Time (usec)	180	Amplitude		Sector Amp AVG	VDL		1 Sector Map 12	
9	Casing Collar	-1	0	(mV) 100	Sector Amp MAX	200	(usec) 1200		
0	Gamma Ray	180	Amp X5		Sector Amp MIN				
0	TEMP (degF)	100	0	(mV) 20					
180	GR	360	1	BONDIX 0					
TEMP (degF)									





6300
6350
6400
6450
6500





Log Variables

DatabaseC:\ProgramData\Warrior\Data\antero_riggs unit 1h .db
 Dataset field/well/run1/pass4.1/_vars_

Top - Bottom

BHTEMP_Src	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	CASEWGHT lb/ft	MAXAMPL mV	MINAMPL mV
TEMP	8.25	100	5.5	0	23	71.9	3.5
MINATTN db/ft	PERFS	PPT usec	SRFTEMP degF	TDEPTH ft			
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

Calibration Report

Database File antero_riggs unit 1h .db
 Dataset Pathname pass4.1
 Dataset Creation Fri Nov 15 17:57:28 2019

Gamma Ray Calibration Report

Serial Number: IPSNO-03
 Tool Model: Tek-Co 2 3/4
 Performed: Tue Nov 12 16:11:18 2019
 Calibrator Value: 1.0

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps
 Sensitivity: 0.5000 /cps

Segmented Cement Bond Log Calibration Report

Serial Number: IOL40-05
 Tool Model: Tek12
 Calibration Casing Diameter: 5.500 in
 Calibration Depth: 66.642 ft

Master Calibration, performed (Derived):

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.004	1.940	3.500	71.921	35.347	3.354
CAL	0.012	0.556				
5'	0.000	1.996	3.500	71.921	34.285	3.499
SUM						
S1	0.020	2.217	0.000	100.000	45.526	-0.918
S2	0.018	2.243	0.000	100.000	44.952	-0.818
S3	0.017	2.161	0.000	100.000	46.641	-0.774
S4	0.016	2.114	0.000	100.000	47.682	-0.780
S5	0.018	2.060	0.000	100.000	48.967	-0.858
S6	0.019	2.010	0.000	100.000	50.225	-0.939
S7	0.020	2.105	0.000	100.000	47.955	-0.952
S8	0.023	2.301	0.000	100.000	43.891	-1.005
S9	0.020	2.264	0.000	100.000	44.565	-0.886
S10	0.015	2.221	0.000	100.000	45.322	-0.678
S11	0.014	2.142	0.000	100.000	46.984	-0.656
S12	0.016	2.067	0.000	100.000	48.748	-0.781

Temperature Calibration Report


Serial Number: IOL40-05
 Tool Model: Tek12
 Performed: Wed Jul 31 10:53:14 2013

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 Environmental Protection

	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	18.93		CCL-312tekco (I08X3-01) Tekco 3 1/8" 450 Deg. "F" SmCo Logging CCL	1.82	3.12	25.00
			Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00

TEMP	12.77				
WVFS12	11.48				
WVFS11	11.48				
WVFS10	11.48		SCBL-Tek12 (IOL40-05) Tekco 400 Deg F 12 Sector RIB with Temp	9.13	3.25
WVFS9	11.48				
WVFS8	11.48				
WVFS7	11.48				
WVFS6	11.48				
WVFS5	11.48				
WVFS4	11.48				
WVFS3	11.48				
WVFS2	11.48				
WVFS1	11.48				
WVFCAL	10.73				
WVF3FT	10.73				
WVF5FT	9.73				
WVFSYNC	6.40		Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75
WVFTEMP	6.40				
			GR-Tek-Co 2 3/4 (IPSNO-03) Tekco 2 3/4" 400 Deg. F Logging Gamma Ray	3.67	2.75
GR	1.04				40.00
Dataset: antero_riggs unit 1h .db: field/well/run1/pass4.1 Total length: 20.07 ft Total weight: 250.00 lb O.D.: 3.25 in					

	Company	ANTERO RESOURCES	
	Well	RIGGS UNIT 1H	
	Field	MARCELLUS	
	County	RITCHIE	
	State	W.V.	Country