



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

Company: Antero Resources Corporation	Country: US
Well: Buzzard Unit 1H	Company: Antero Resources Corporation
Field: Marcellus	Well: Buzzard Unit 1H
County: Ritchie	Field: Marcellus
State: WV	County: Ritchie
	State: WV
	Country: US
Location: _____	API #: 47085103790000
Other Services: _____	
SEC: _____	TWP: _____
RGE: _____	Elevation: _____
Permanent Datum: _____	Ground Level: _____
Log Measured From: _____	R.K.B. 25'
Drilling Measured From: _____	R.K.B.
	D.F.
	G.L.

Date	16-NOV-2019						
Run Number	ONE						
Depth Driller	18005'						
Depth Logger	6680'						
Bottom Logged Interval	6680'						
Top Log Interval	Surface						
Open Hole Size	8.25"						
Type Fluid	FMW						
Density / Viscosity	8.6						
Max. Recorded Temp.	137 degF						
Estimated Cement Top	4650'						
Time Well Ready	N/A						
Time Logger on Bottom	N/A						
Equipment Number	214182						
Location	Bridgeport, WV						
Recorded By	S. Butler						
Witnessed By	Jerrako Evans						
Borehole Record							
Run Number	Bit	From	To	Size	Weight	From	To
ONE	2 1/2"	Surface	80'				
TWO	17.5"	80'	581'				
THREE	12.25"	581'	2660'				
FOUR	8.25"	2660'	18144'				
Casing Record							
Surface String	Size	Wgt/Ft	Top	Bottom			
Prot. String	13.375"	54.5	Surface	581'			
Production String	9.625"	40	Surface	2660'			
Liner	5.5"	20	Surface	18144'			

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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

Zero @ R.K.B. 25'  
Marker Joint 6040' - 6054'  
Log TD 6680'  
Cement Top @ 4650'  
Log Ran Under 1500 PSI

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



Main Pass

Database File antero\_buzzard\_1h.db  
 Dataset Pathname pass2.1  
 Presentation Format antero  
 Dataset Creation Sun Nov 17 10:08:48 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)	200
180	GR	360

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

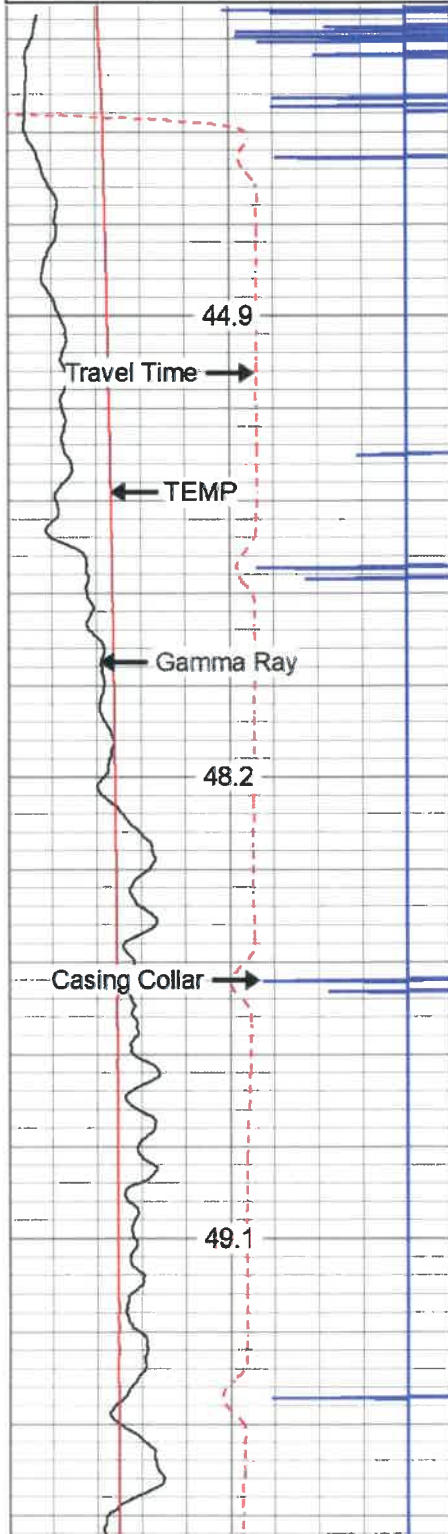
Sector Amp AVG
Sector Amp MAX
Sector Amp MIN

VDL (usec) 200 1200

1 Sector Map 12



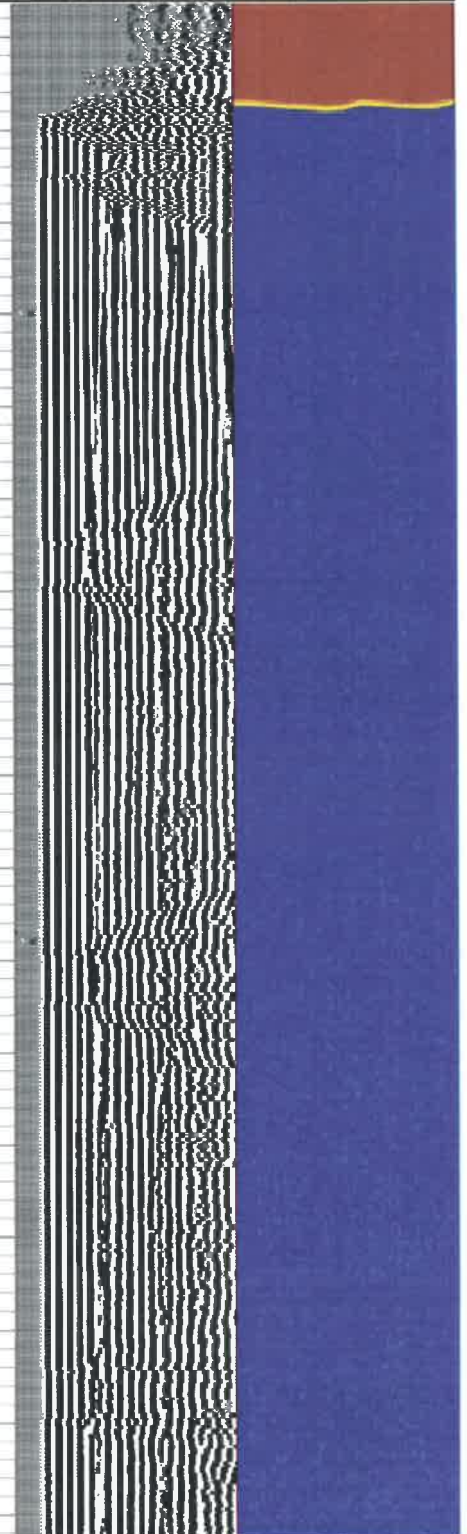
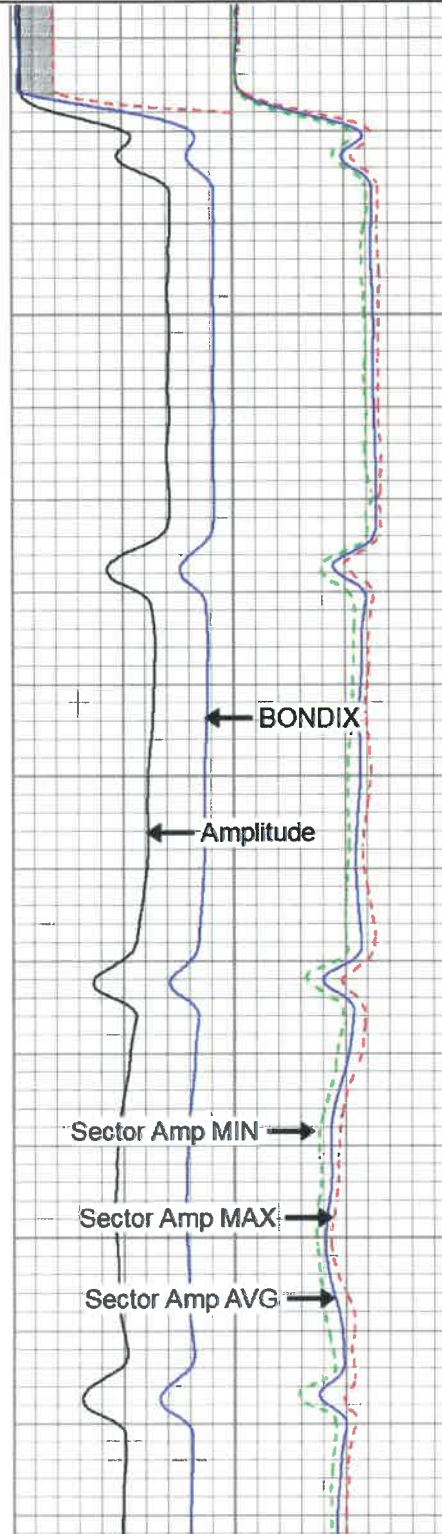
TEMP (degF)



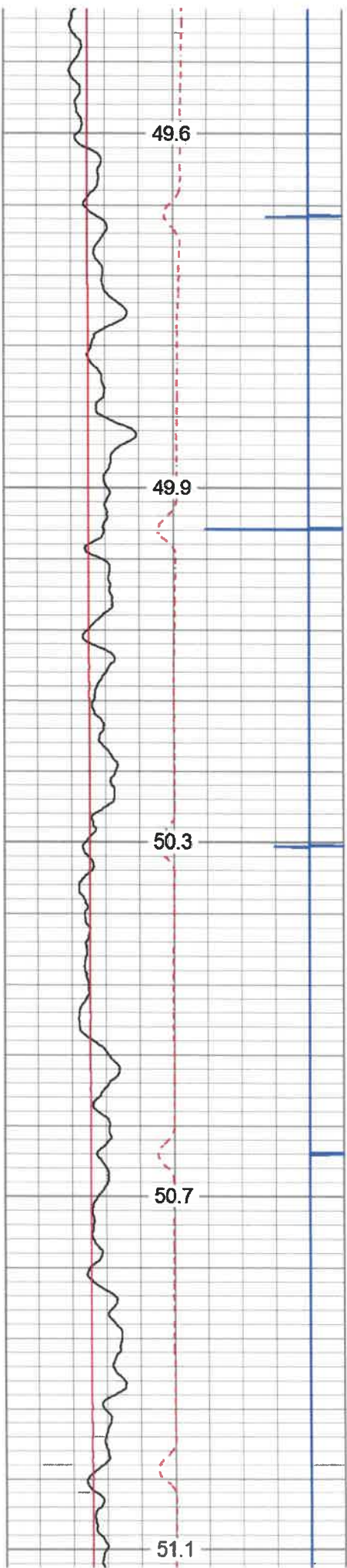
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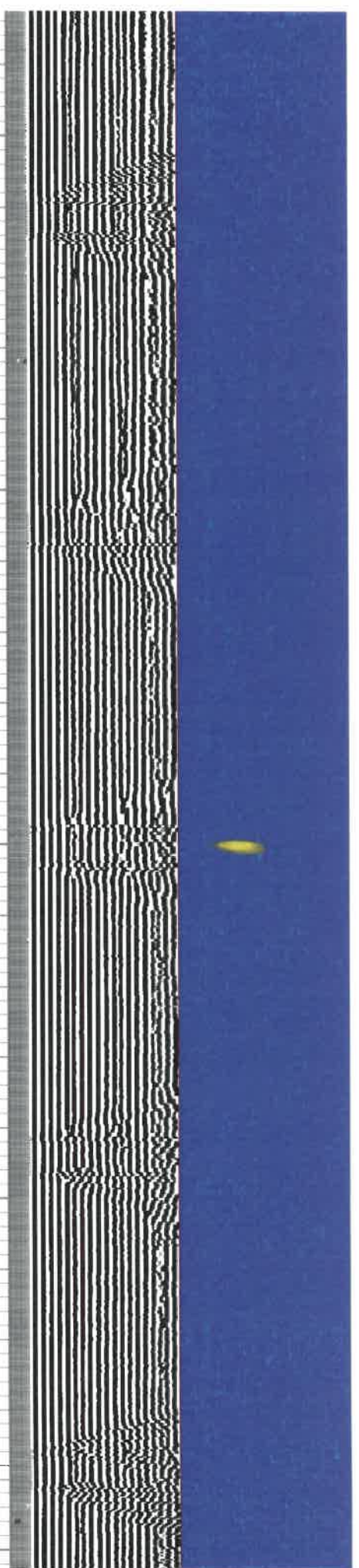
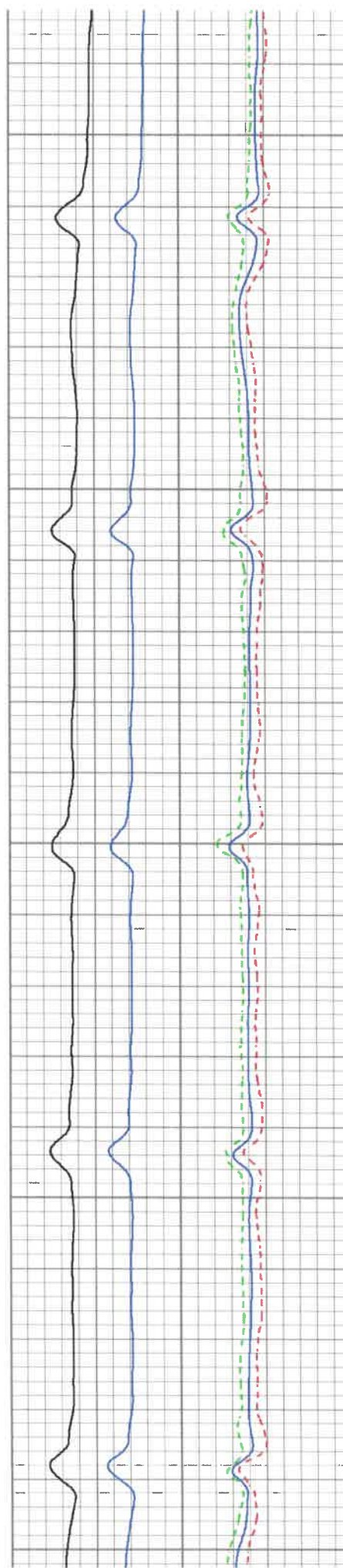
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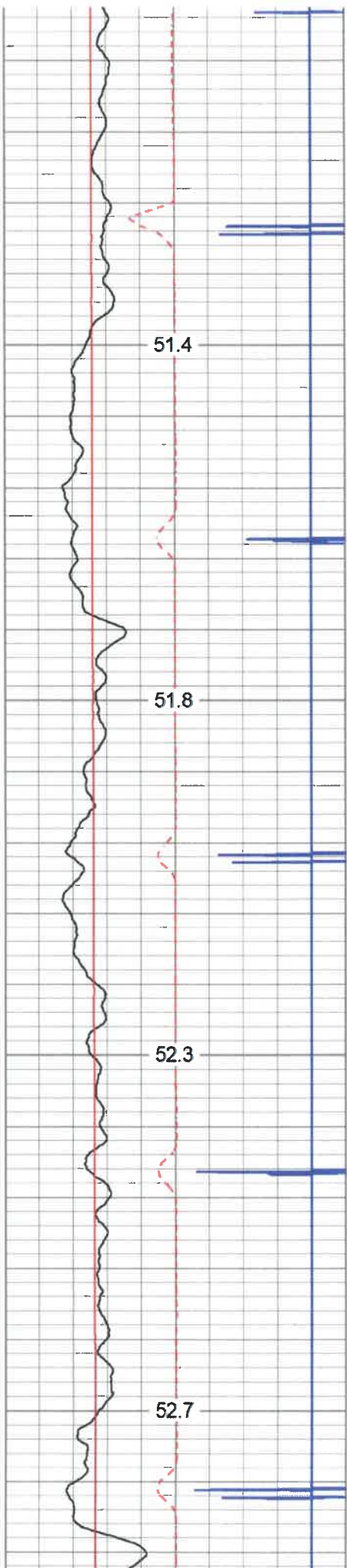
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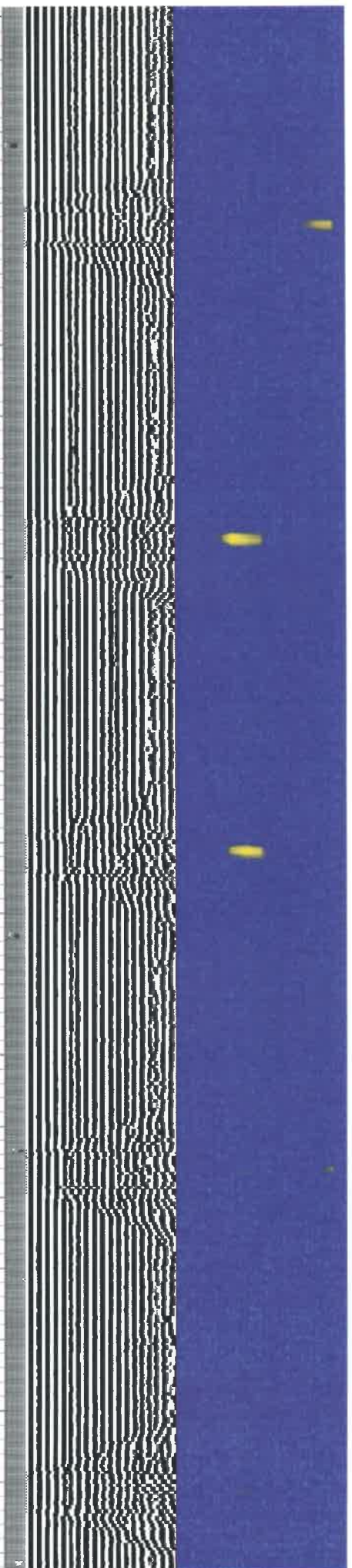
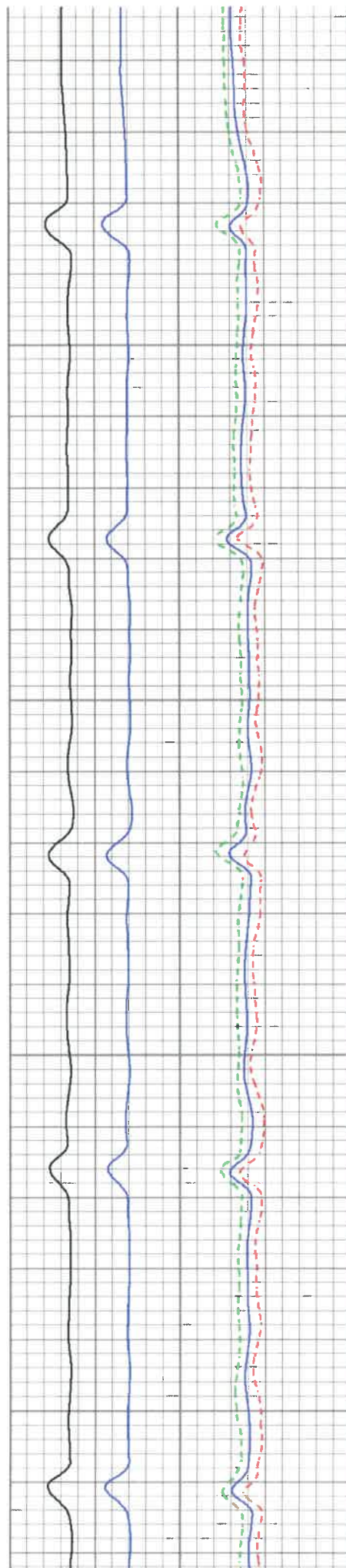


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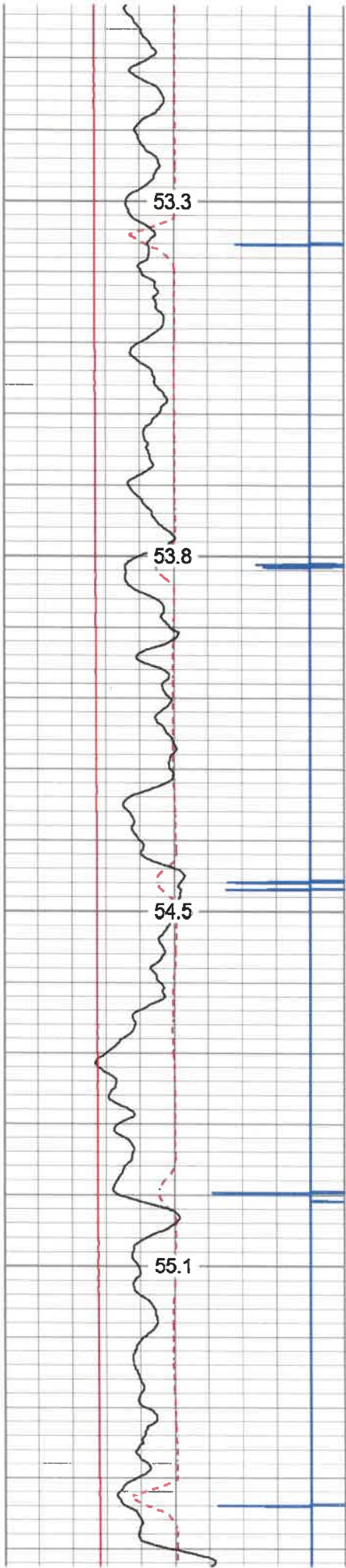
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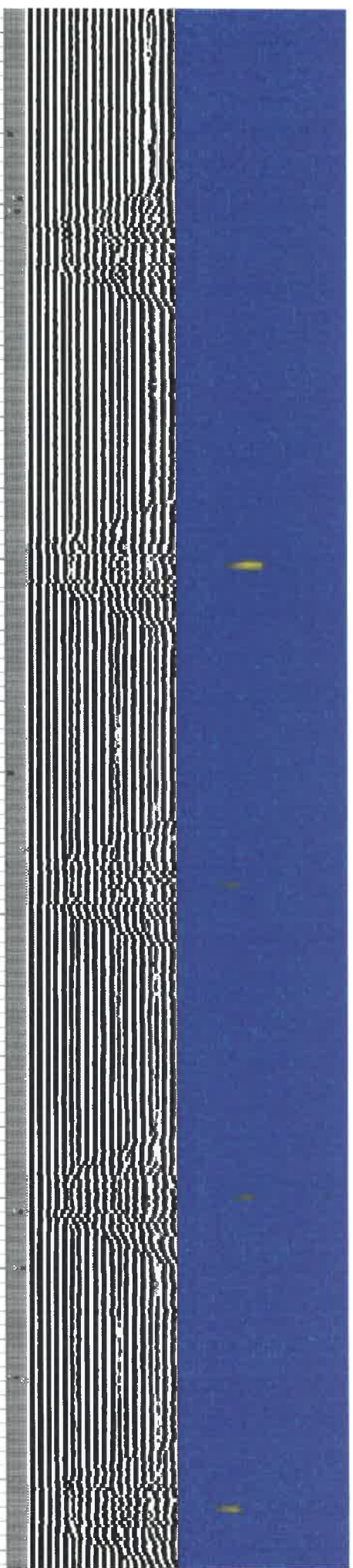
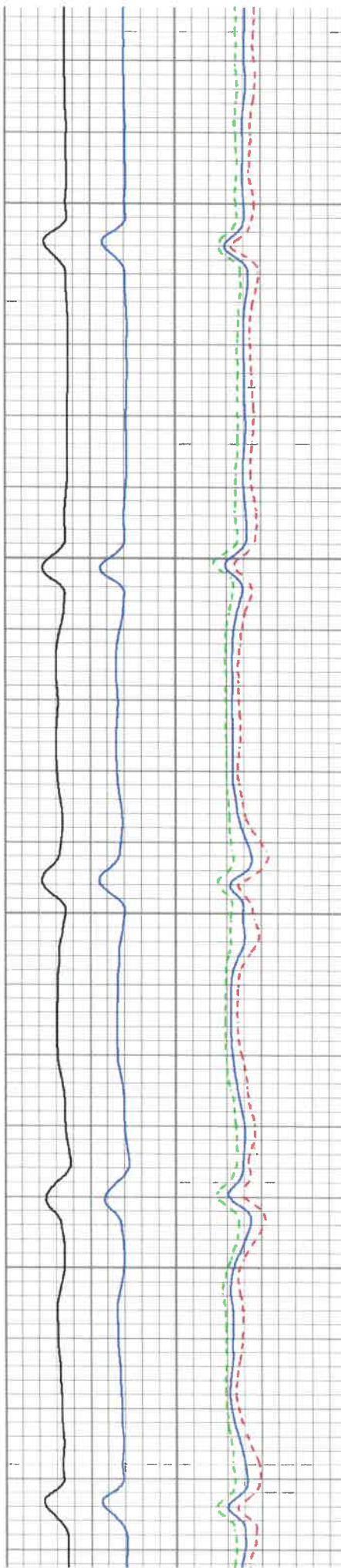
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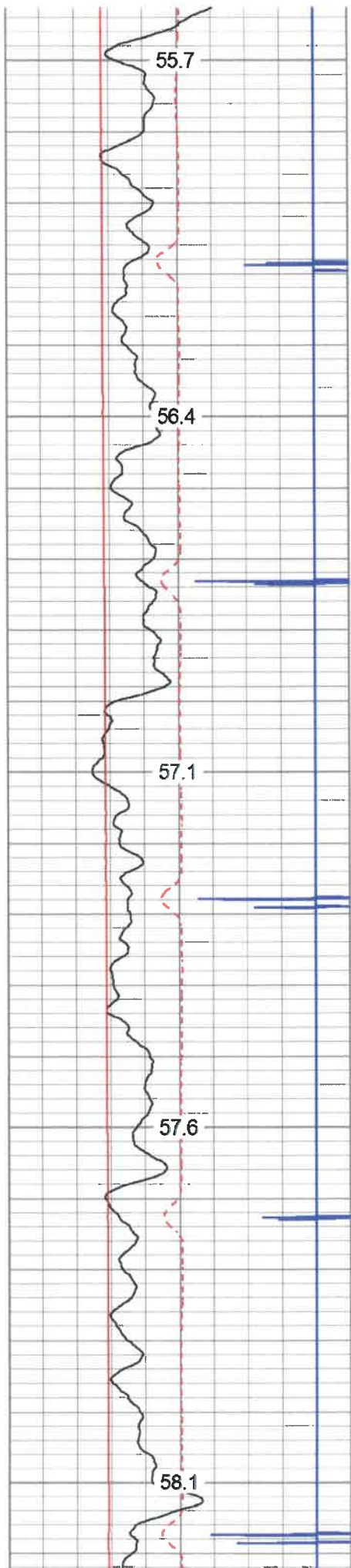






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700  
750  
800





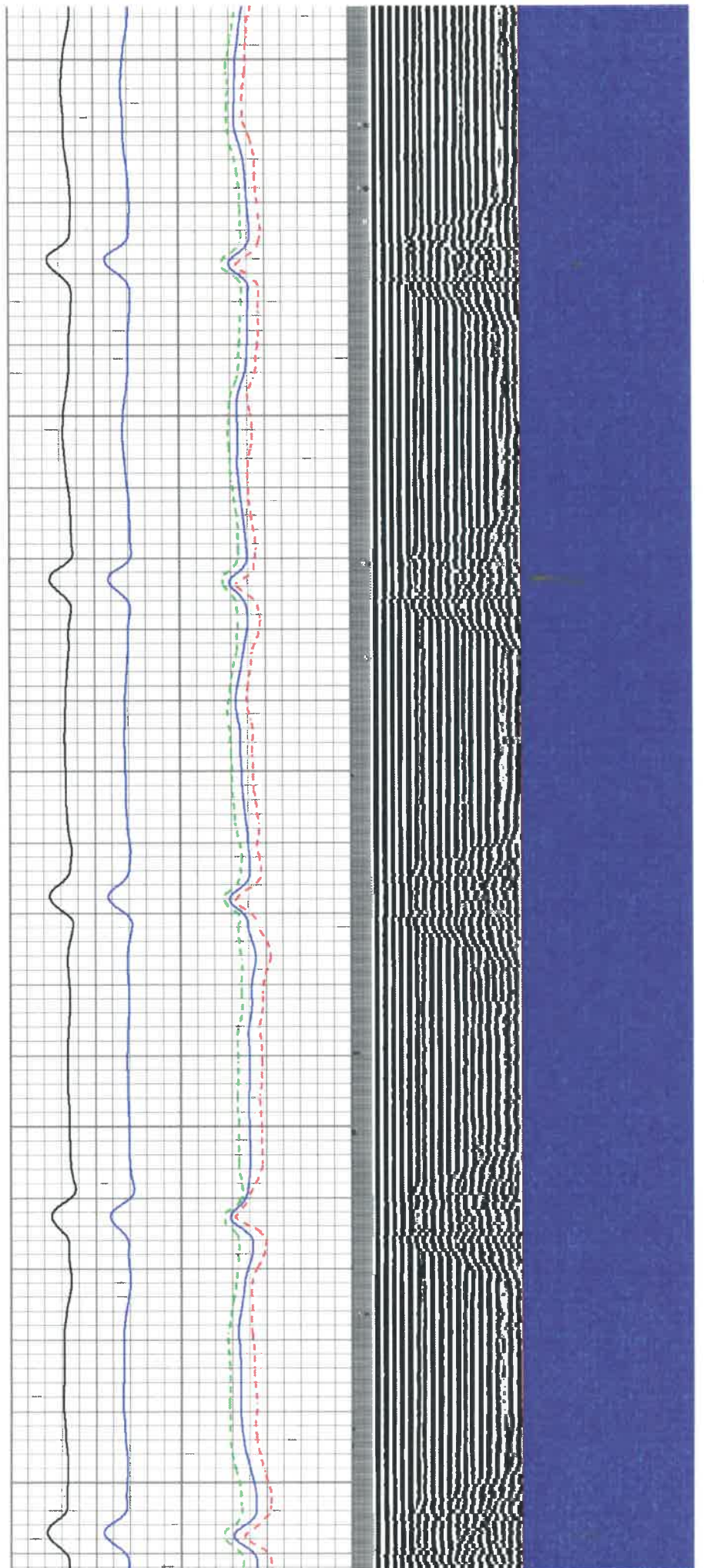
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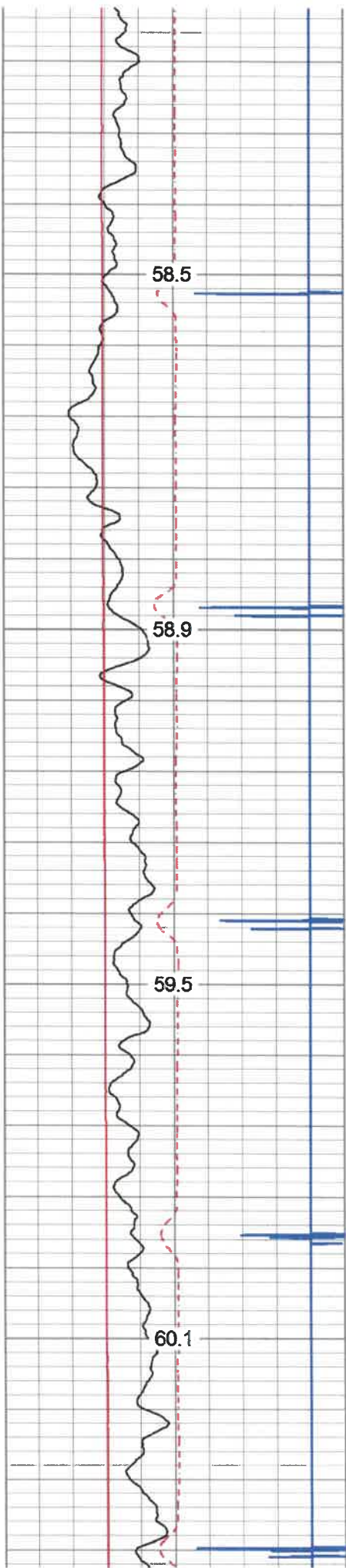
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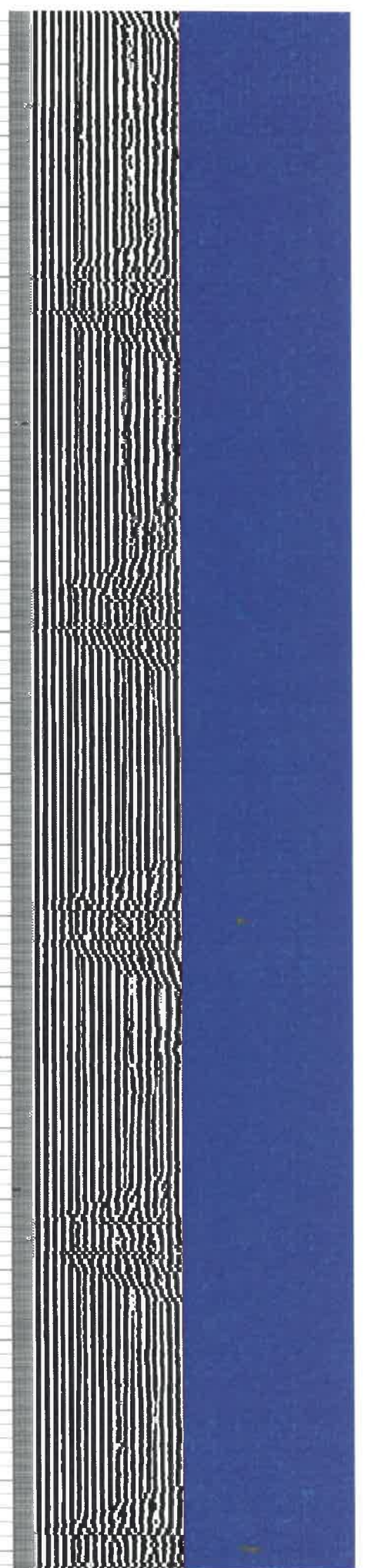
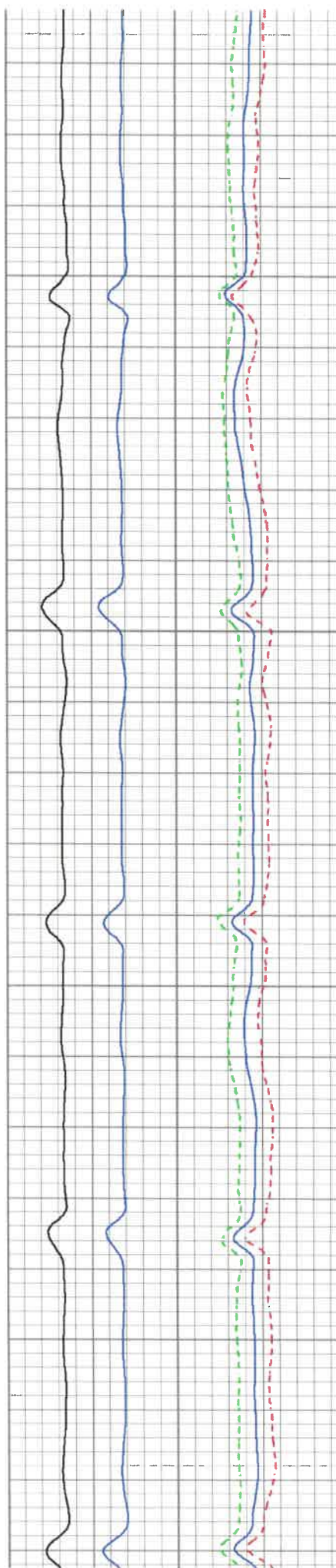


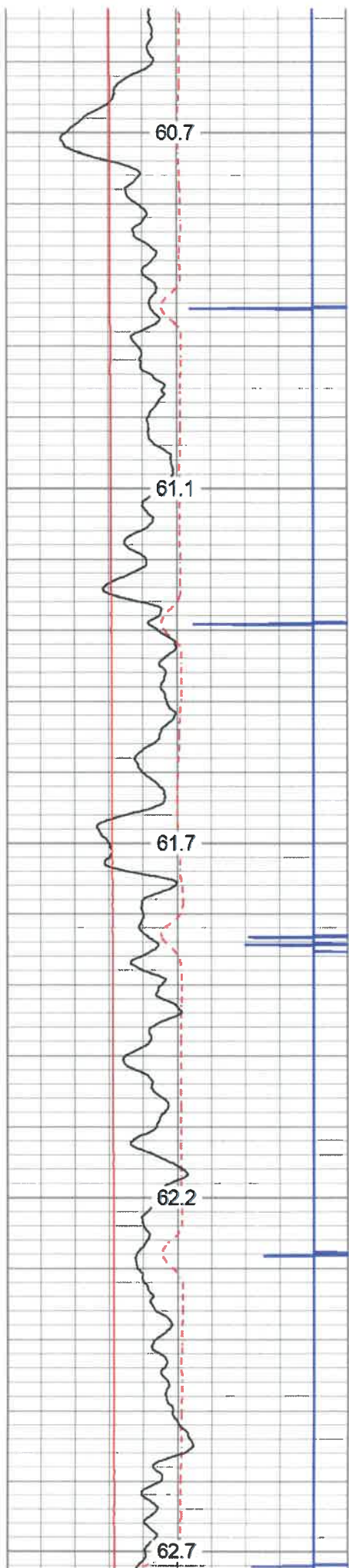
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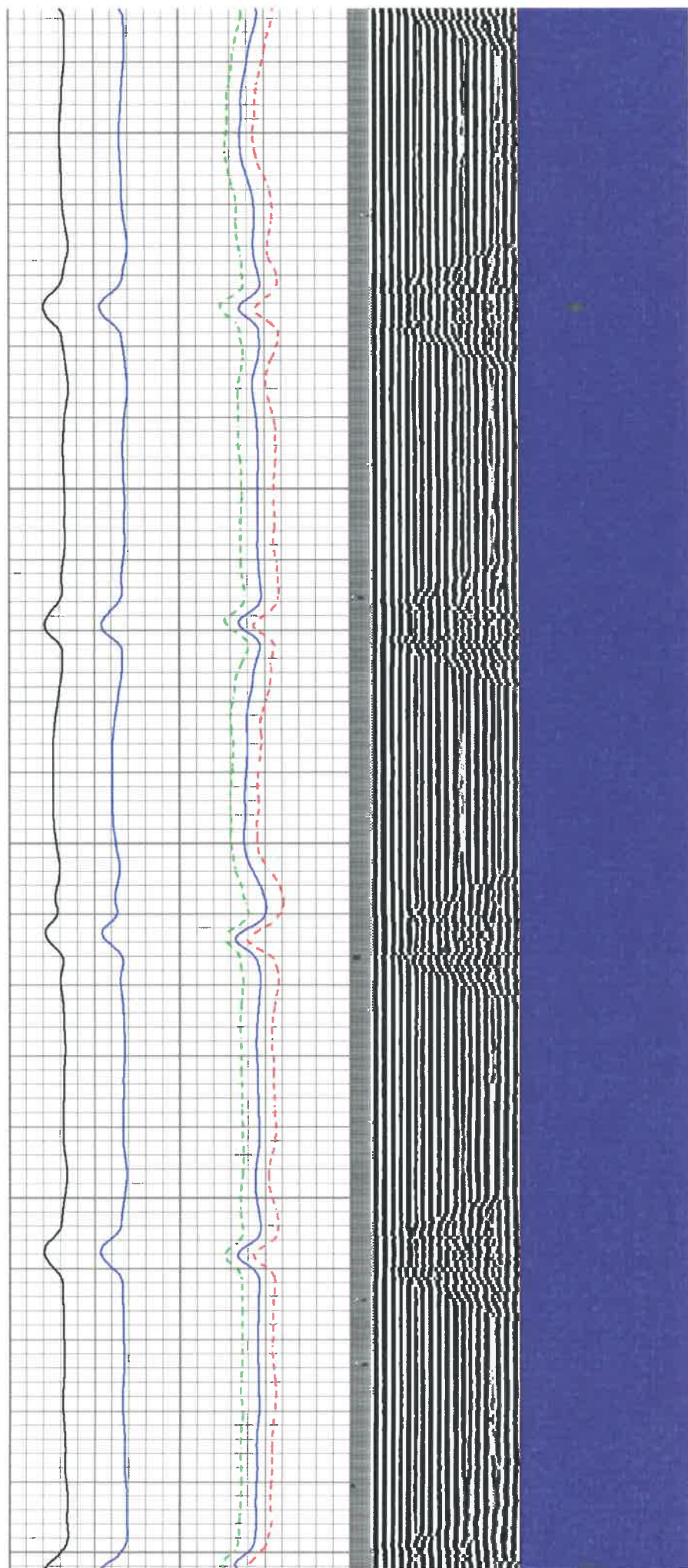
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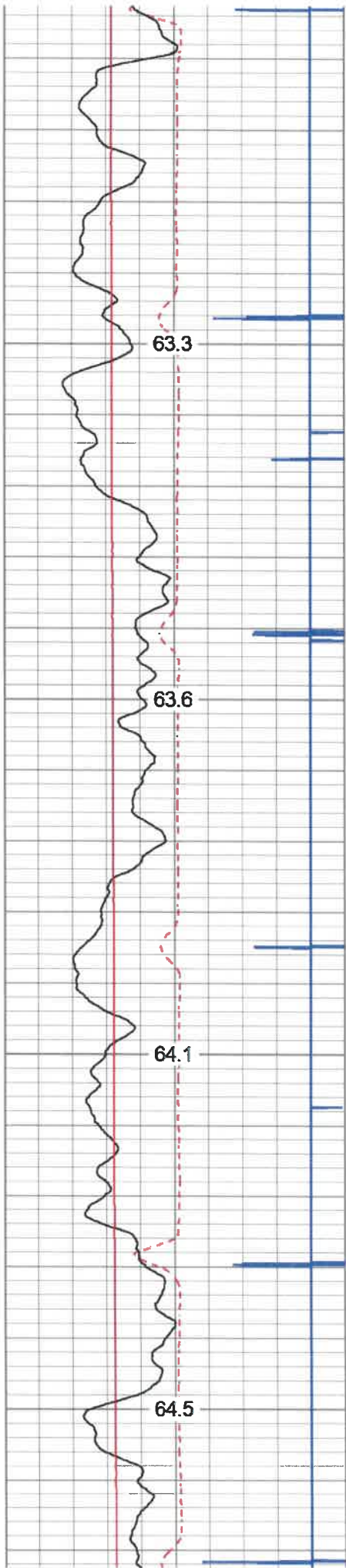
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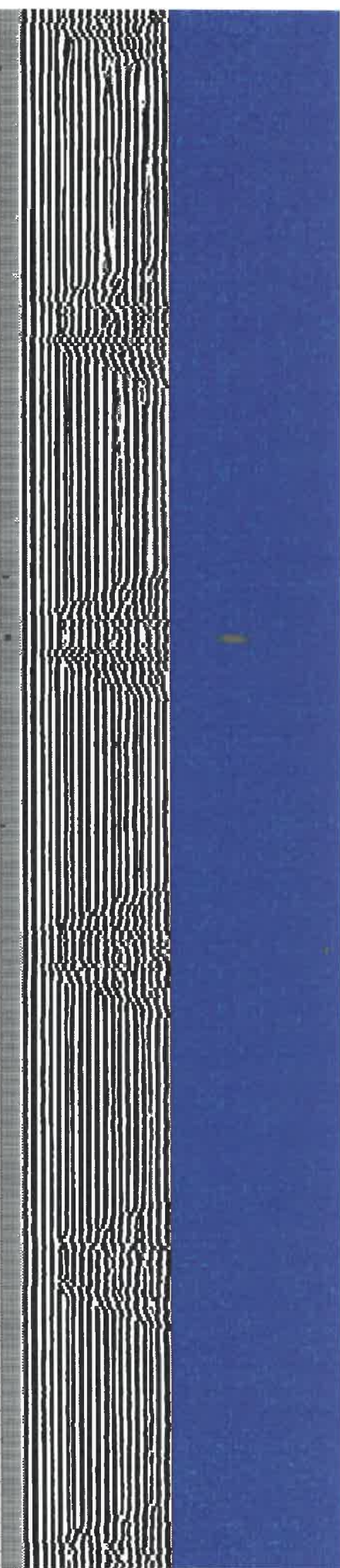
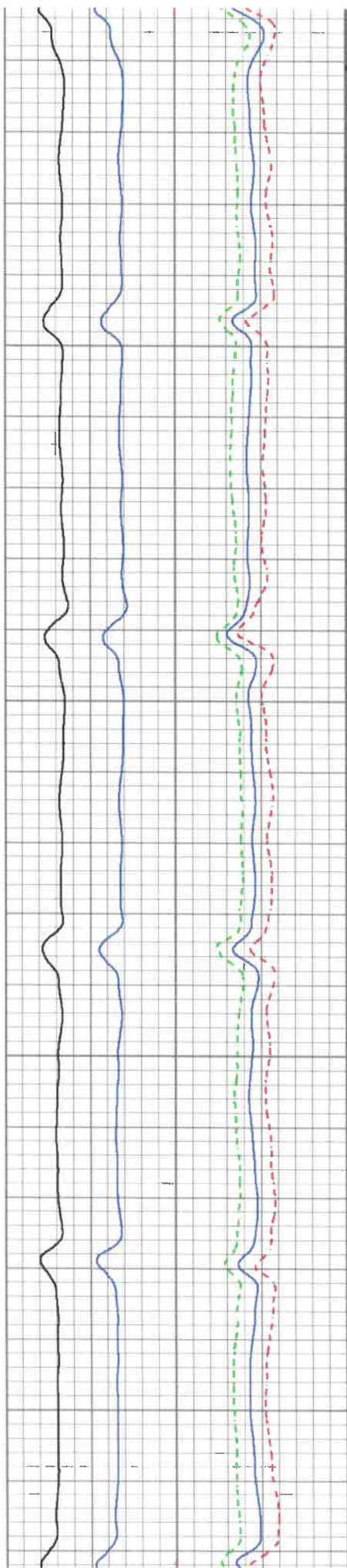


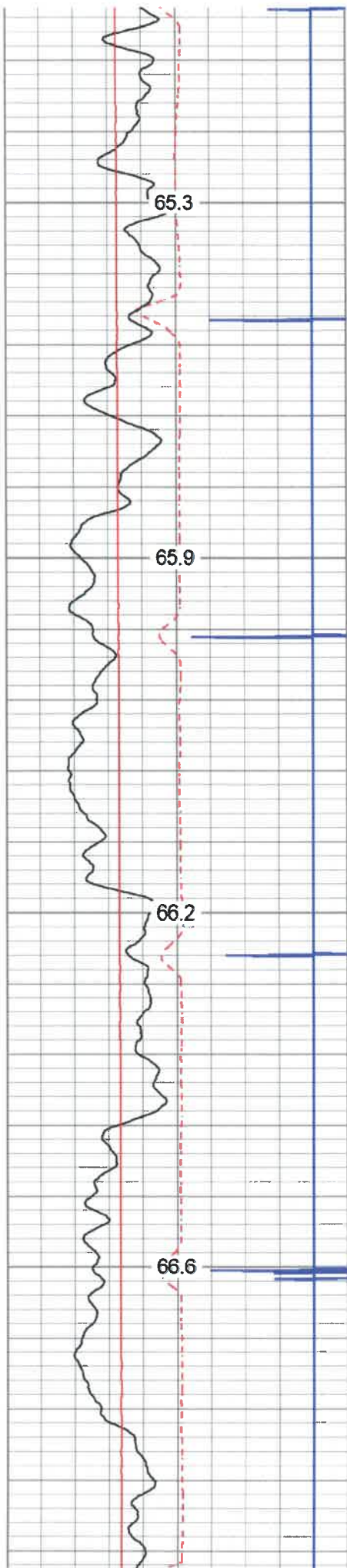
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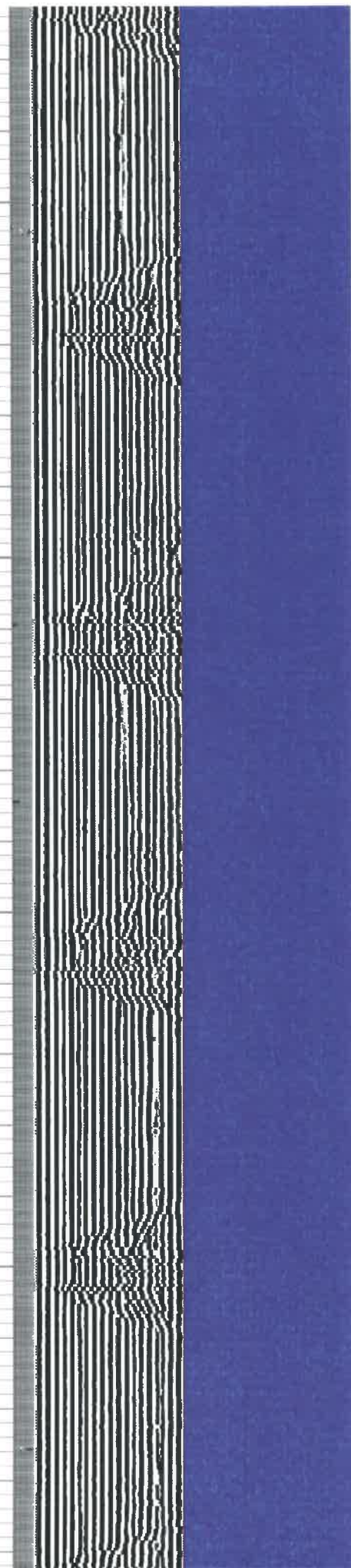
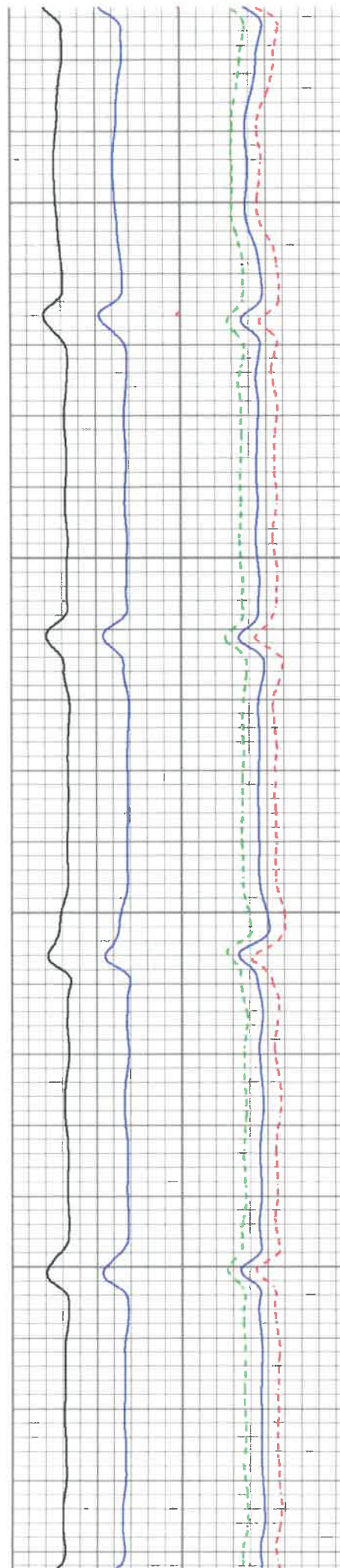


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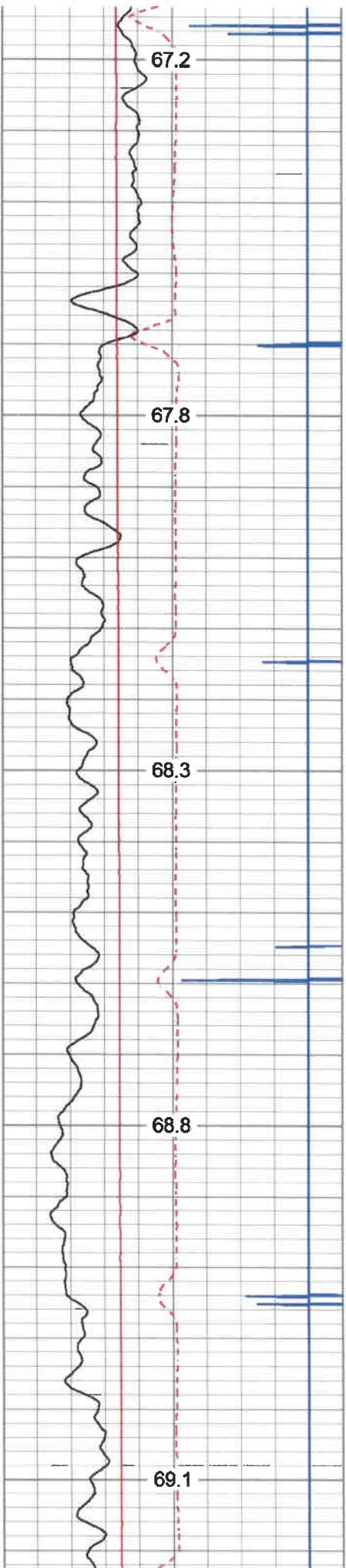
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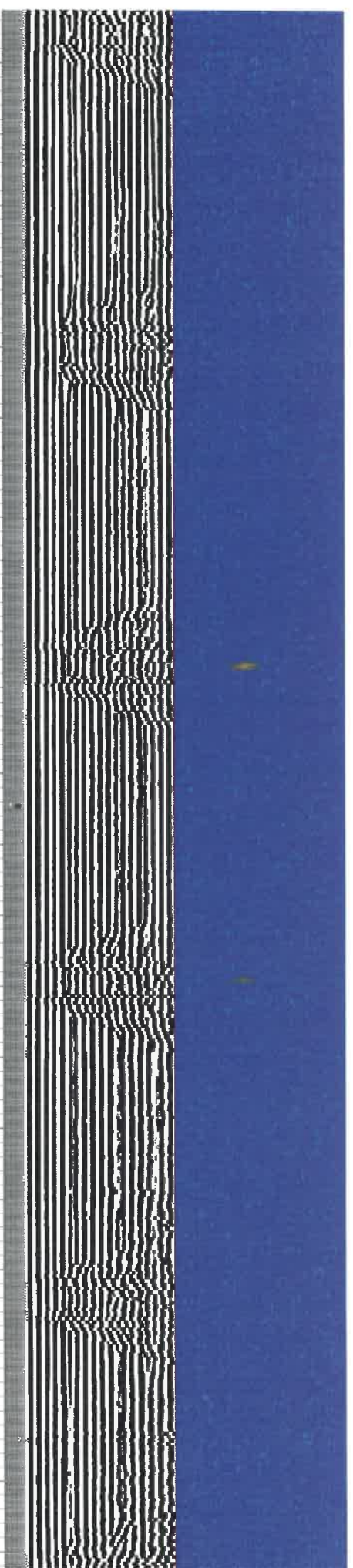
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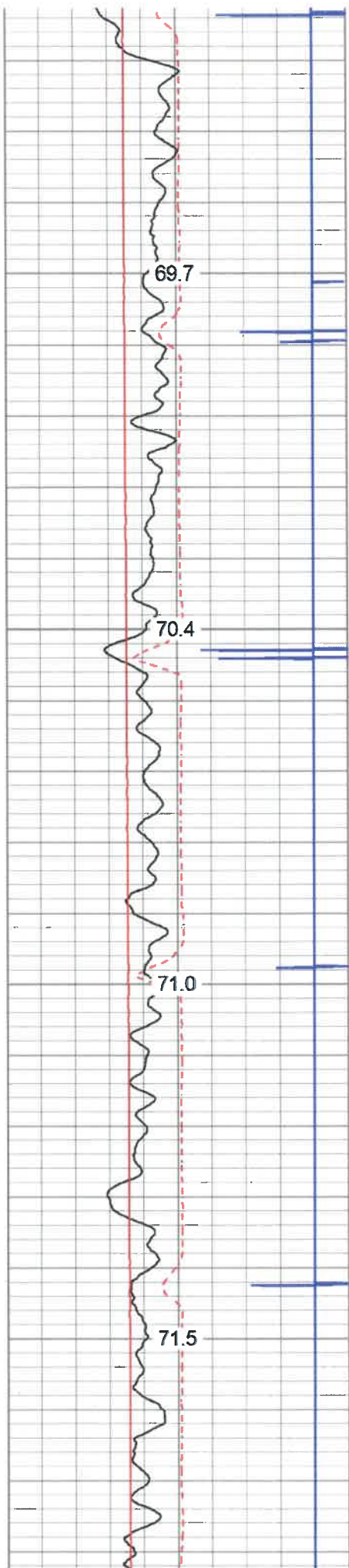






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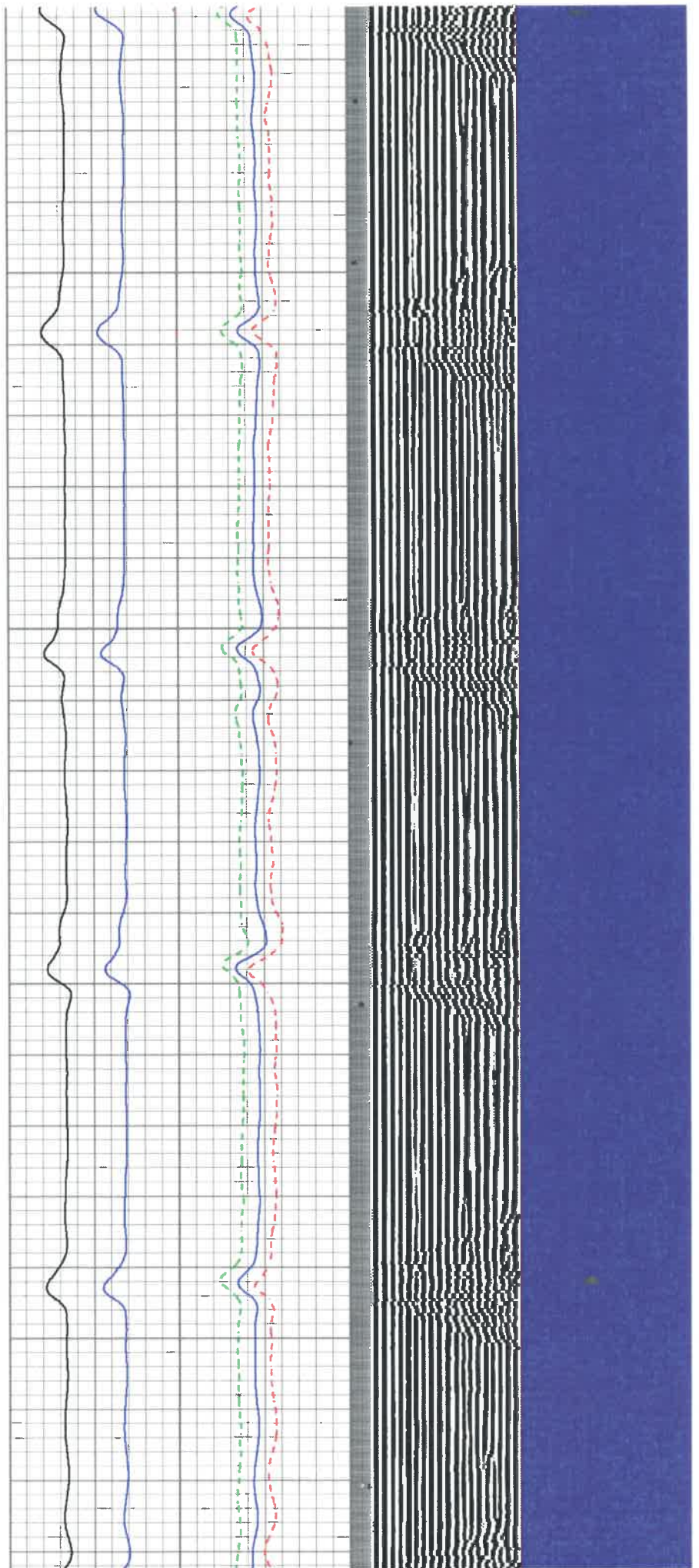


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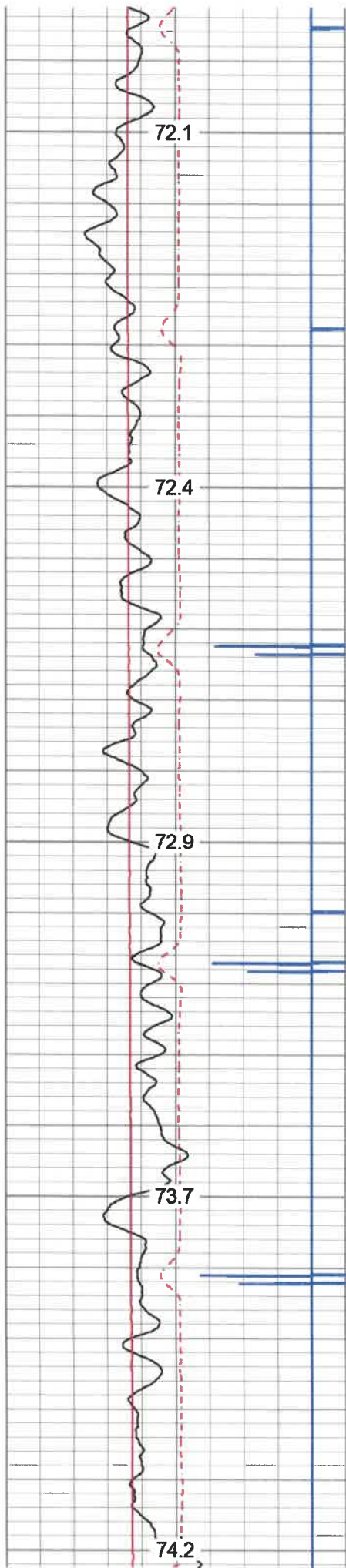
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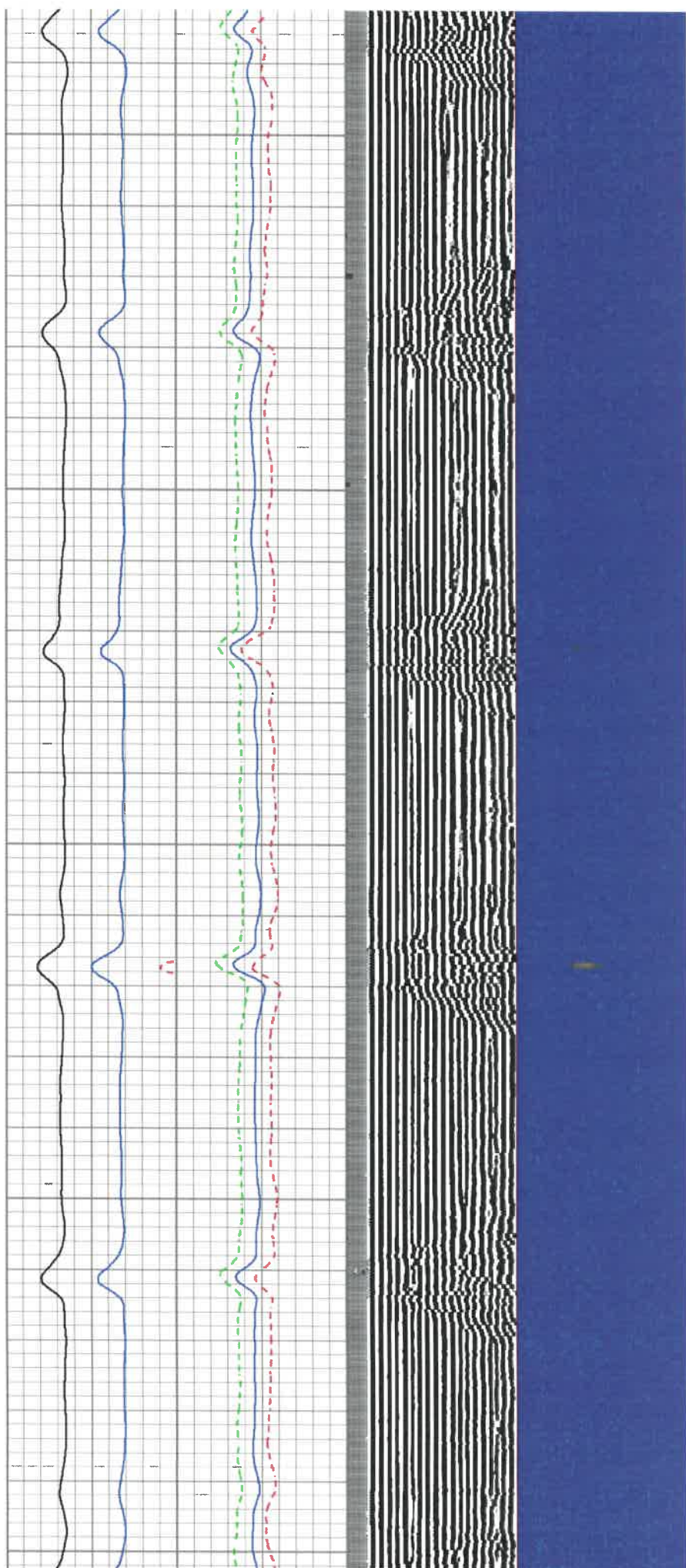
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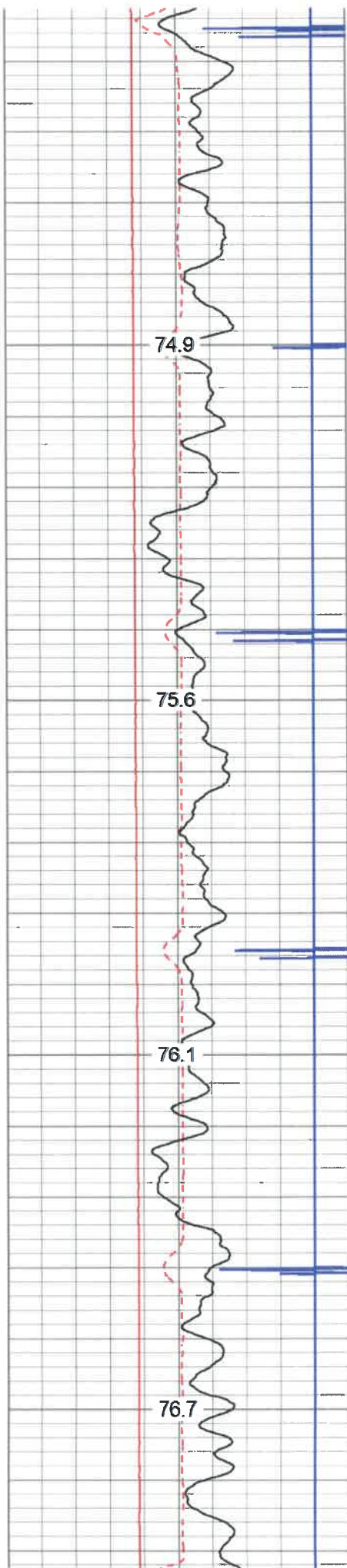
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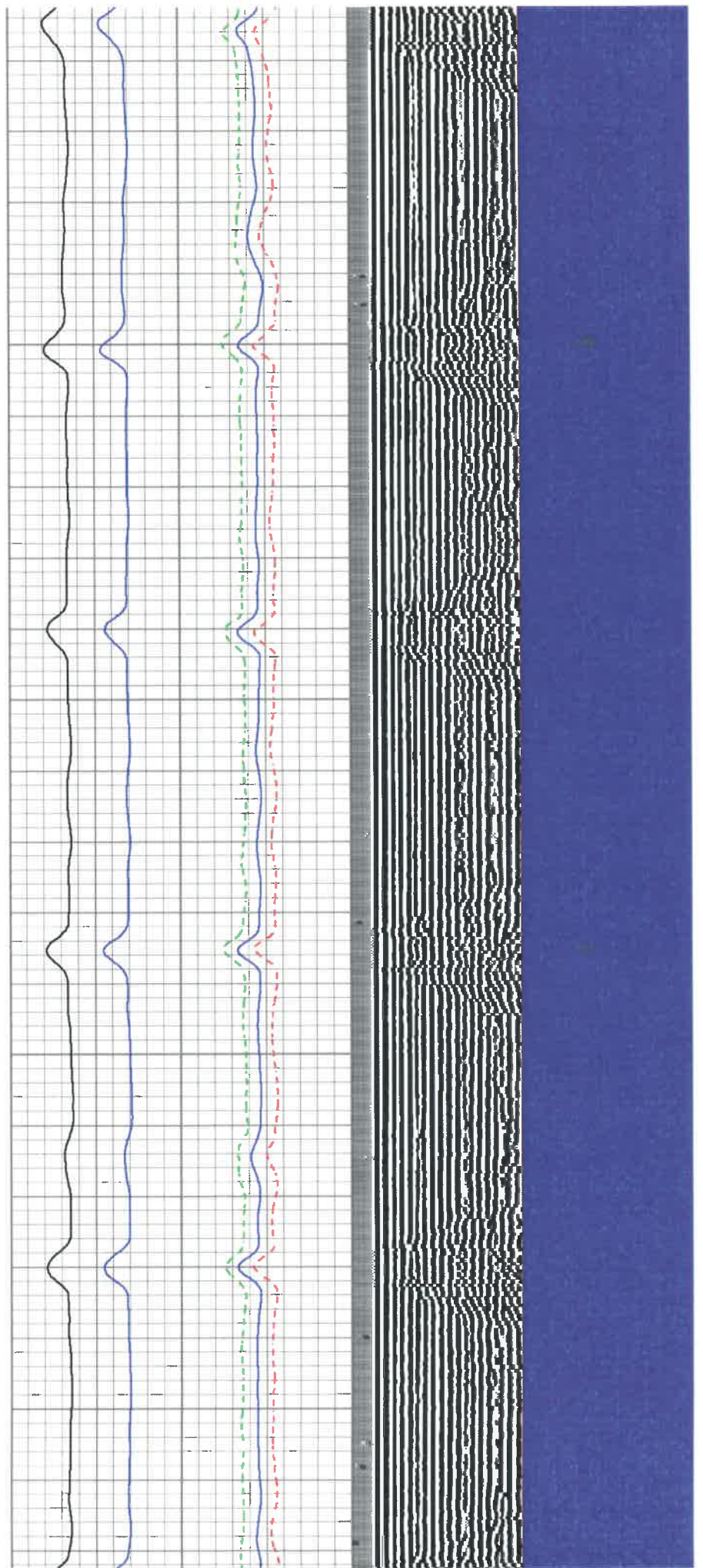


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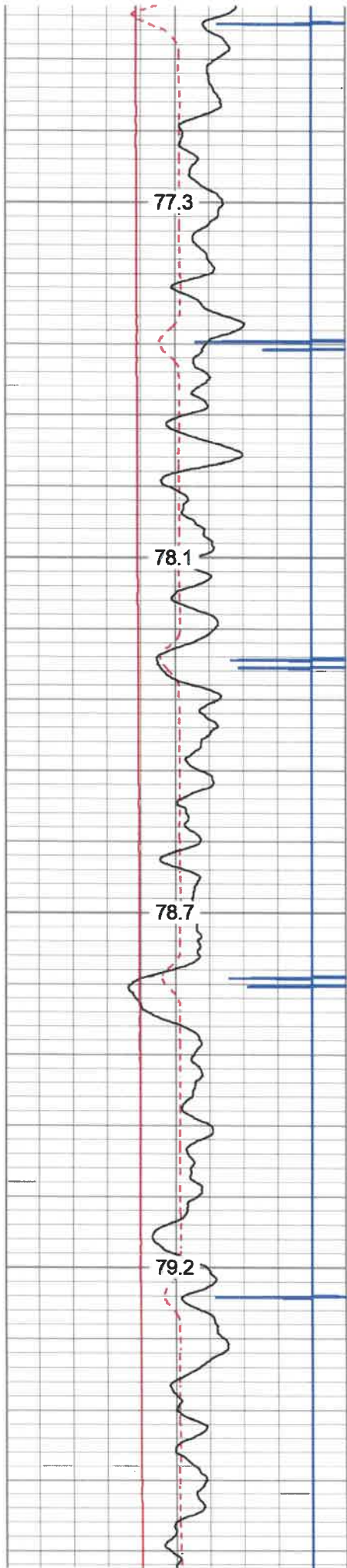
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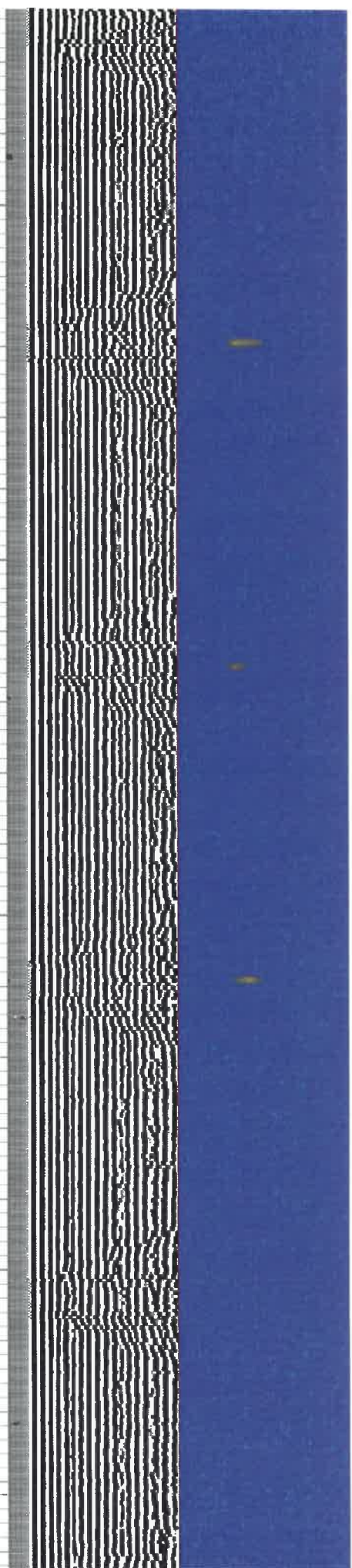
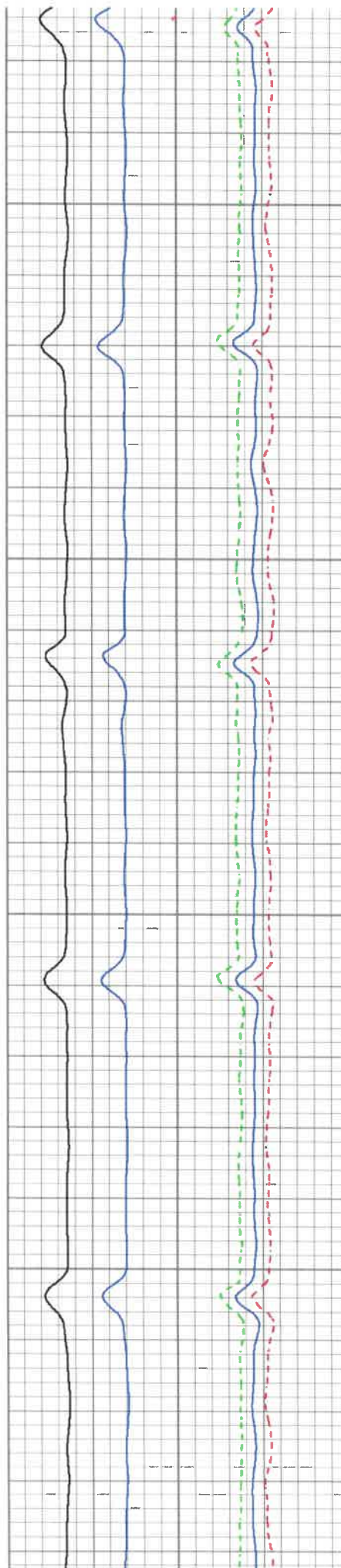
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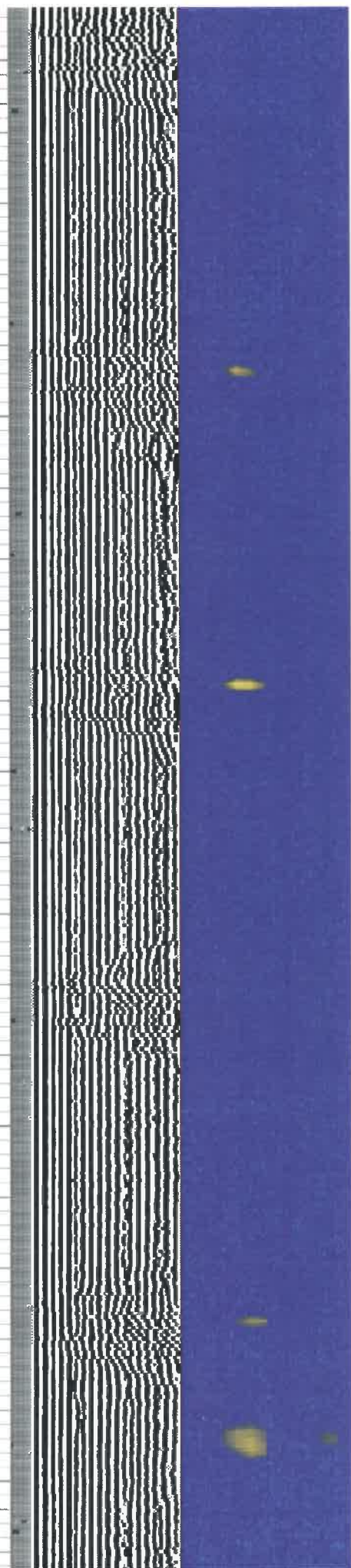
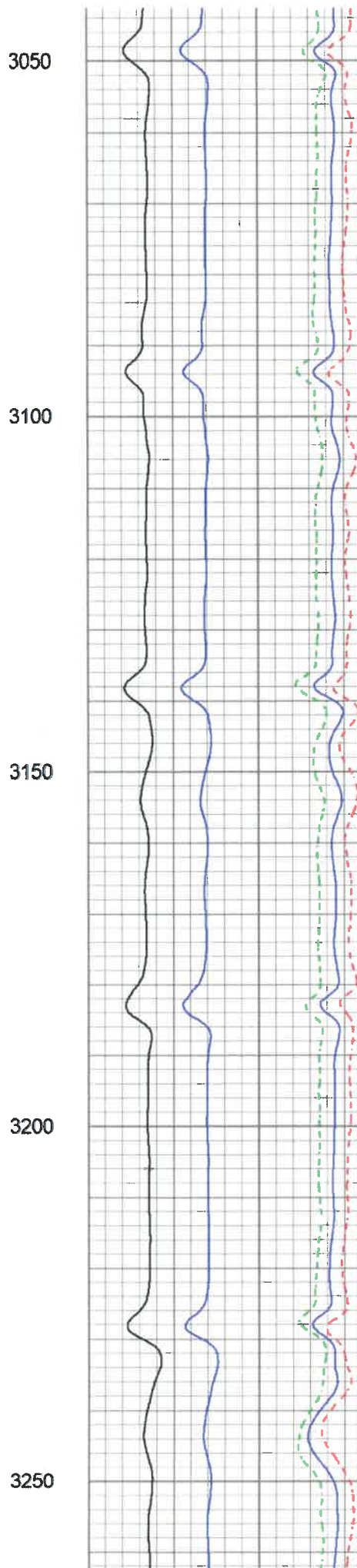
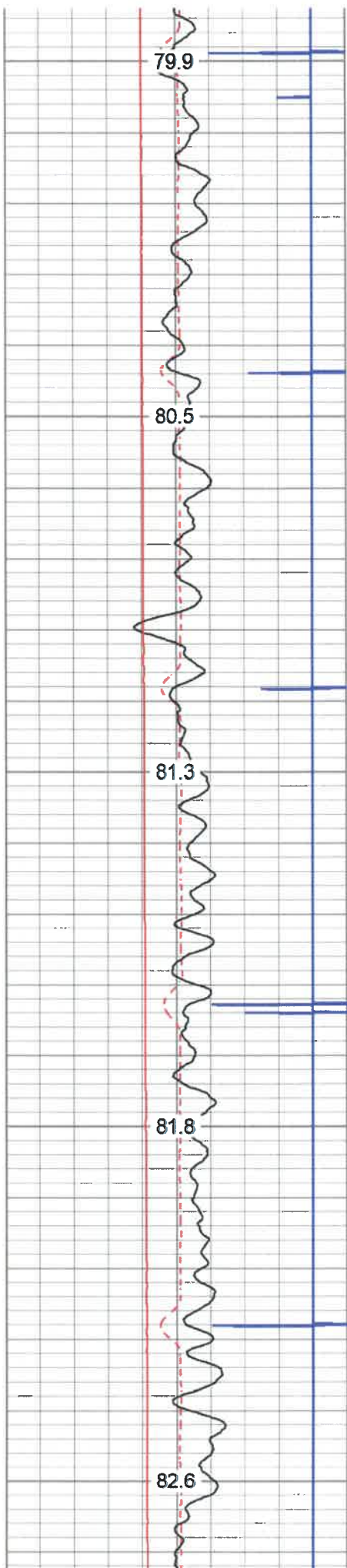




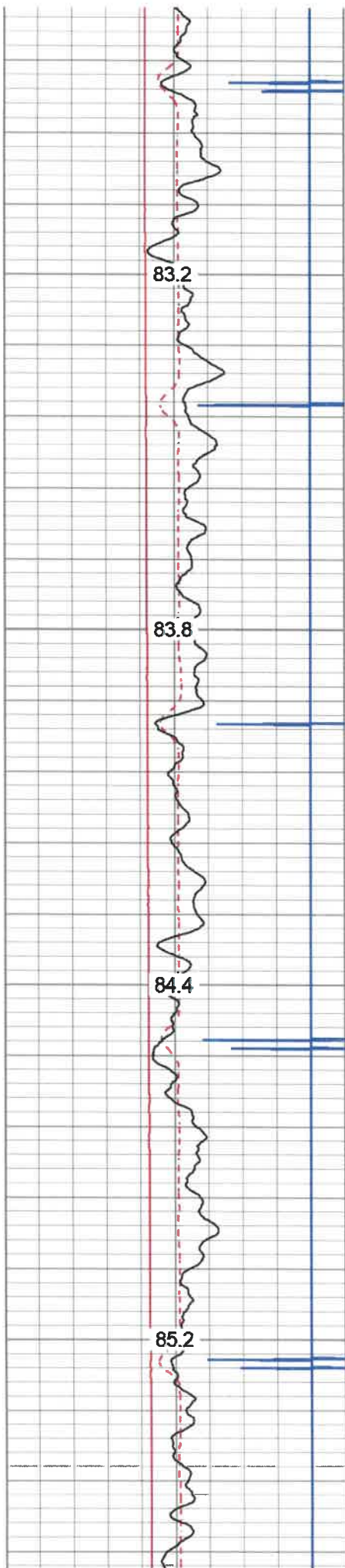


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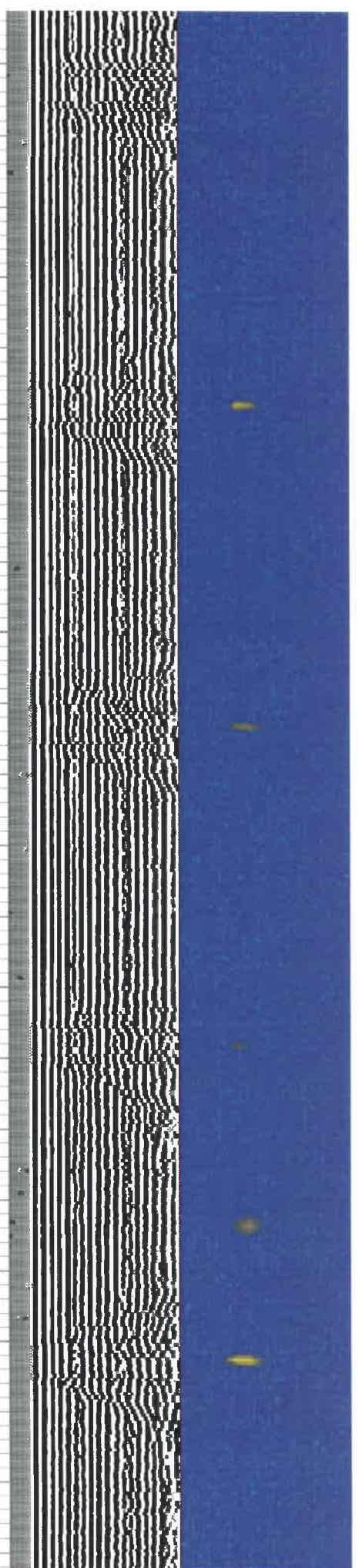
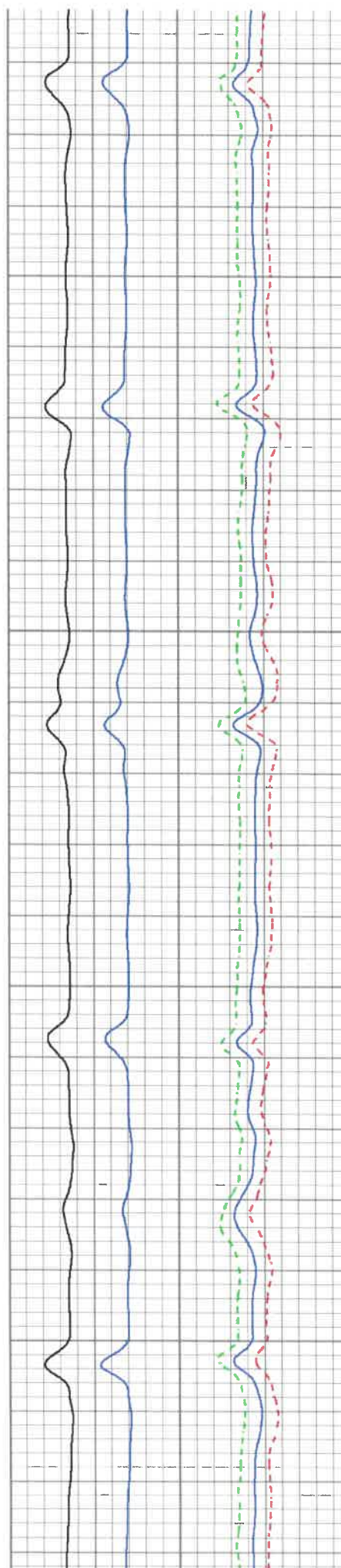


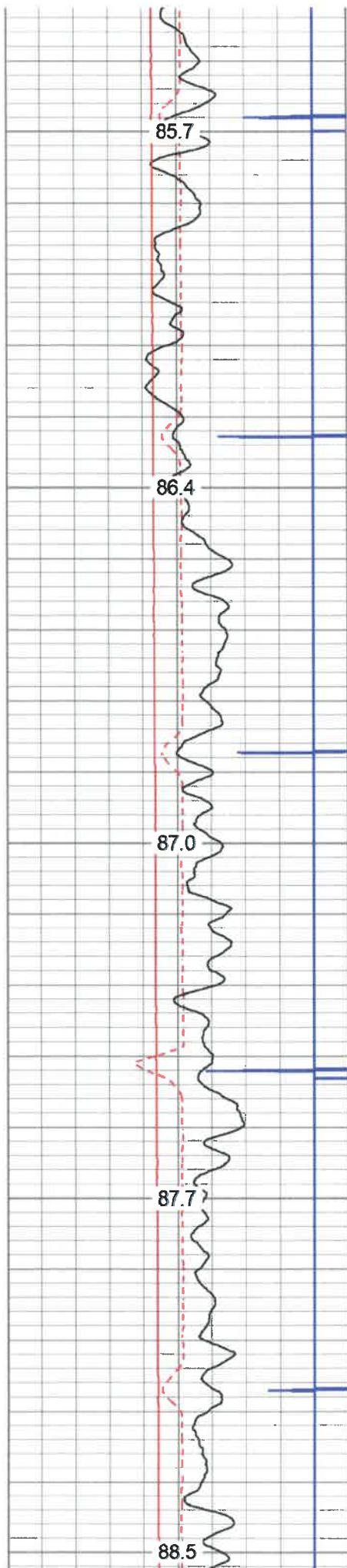
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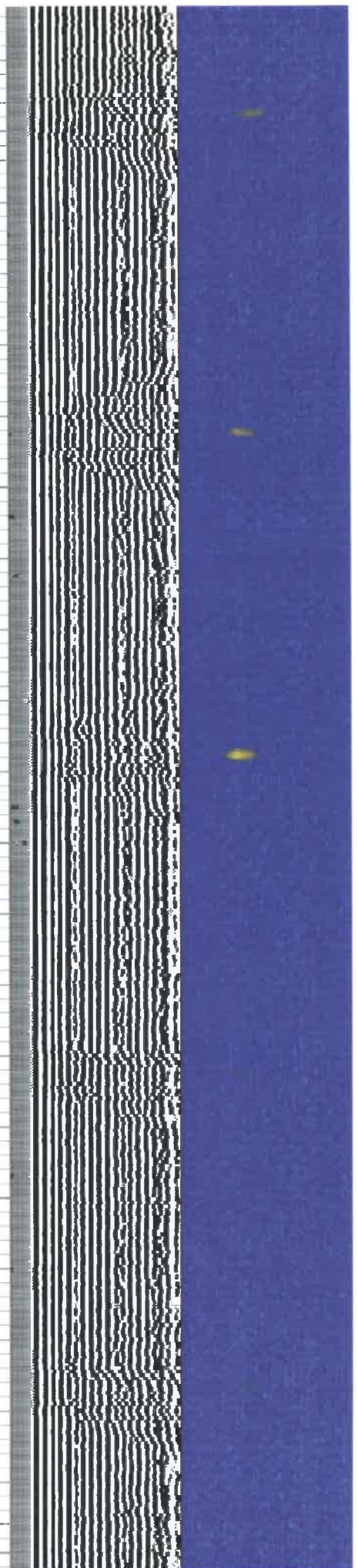
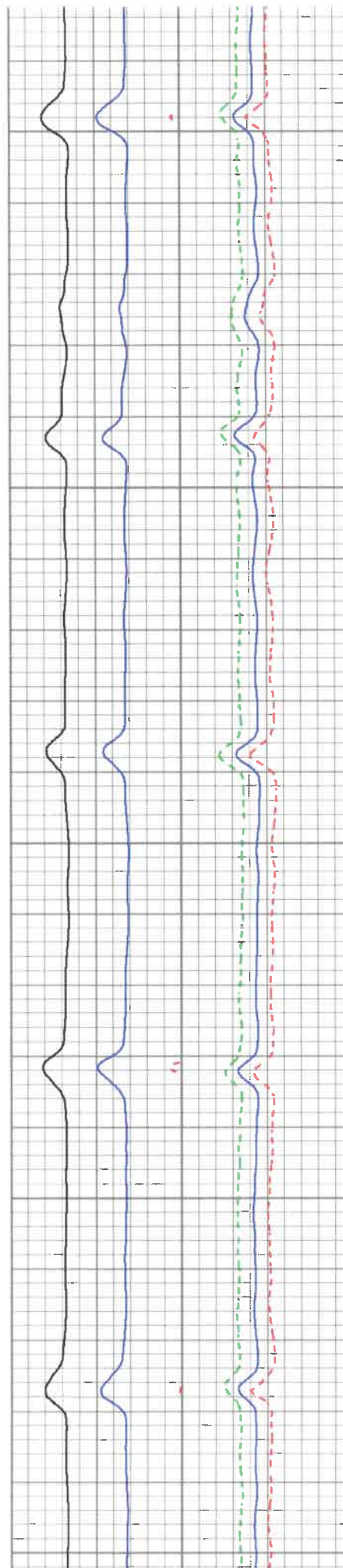
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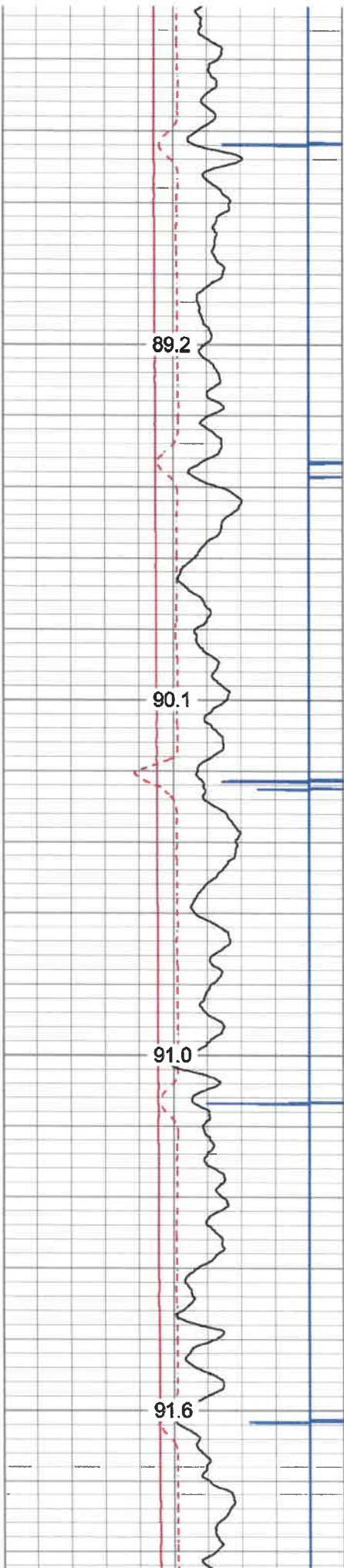
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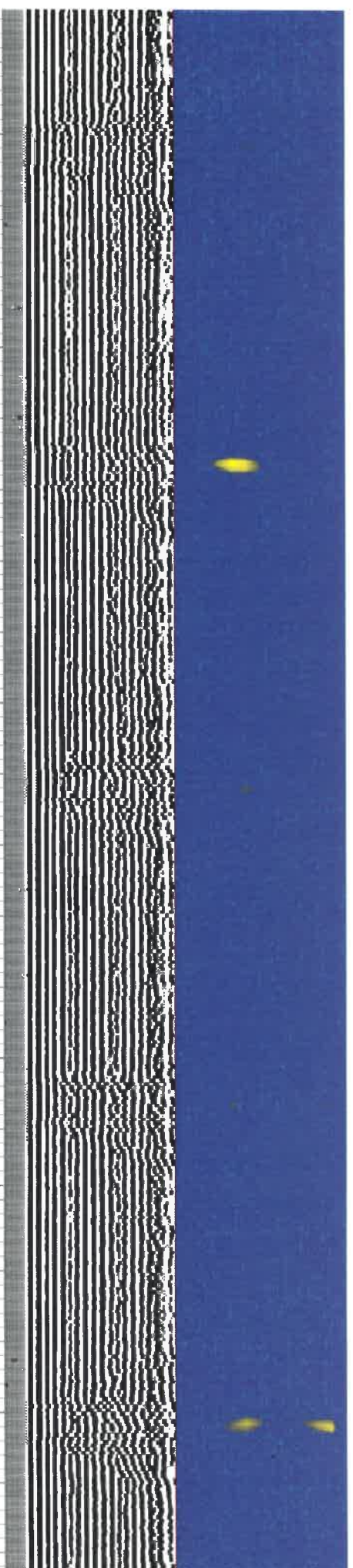
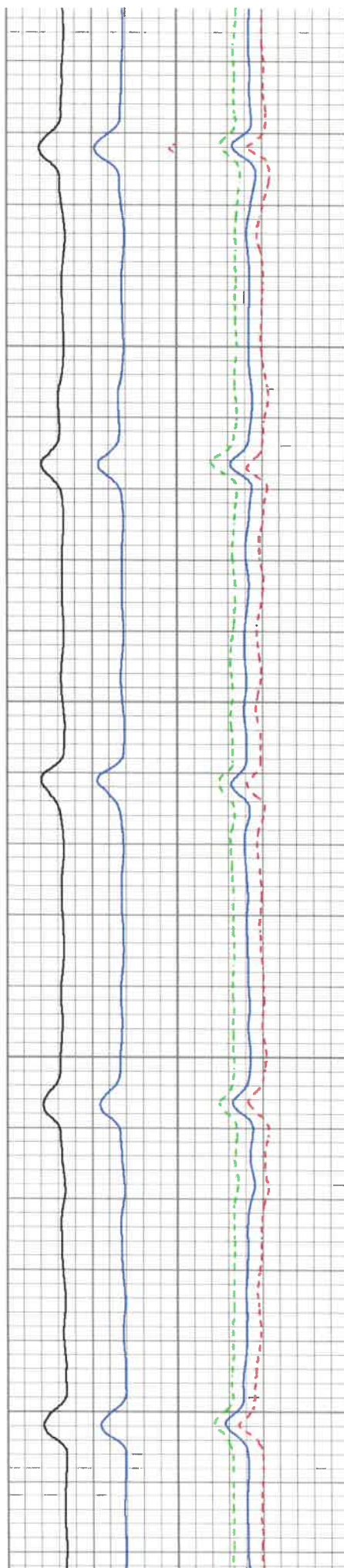


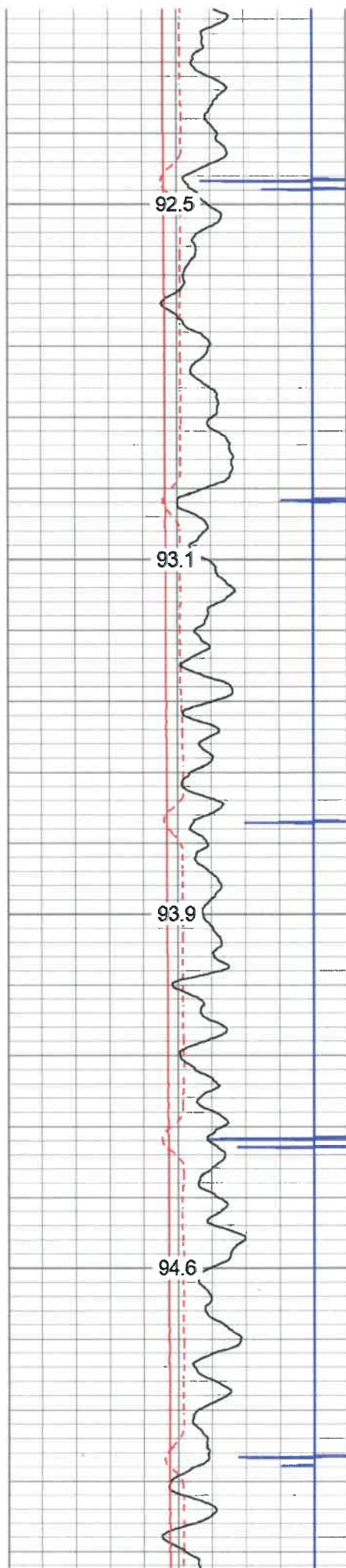
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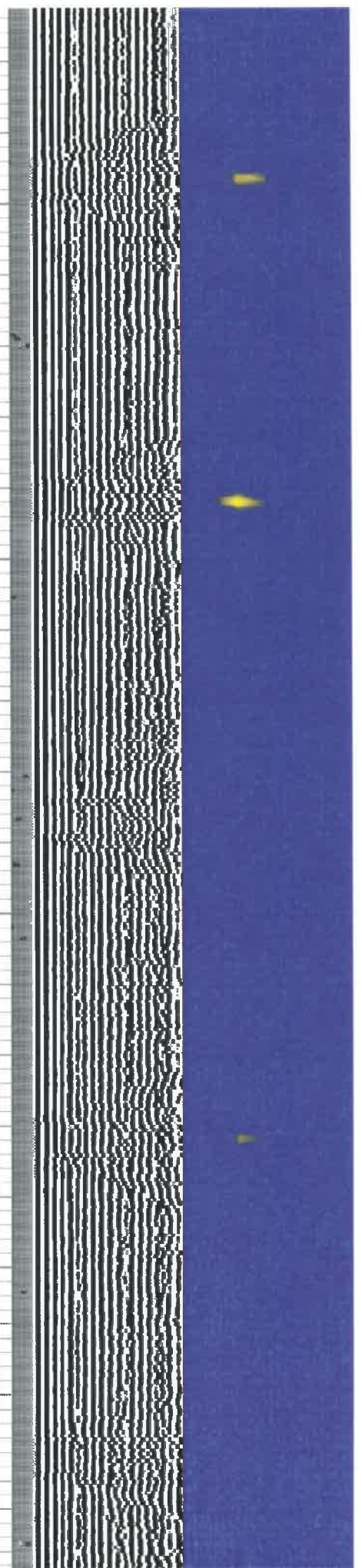
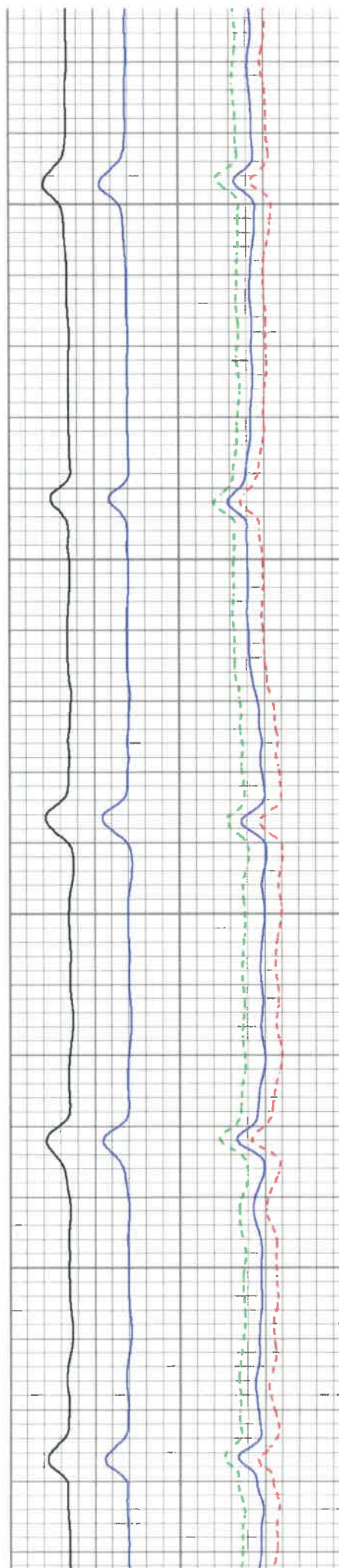


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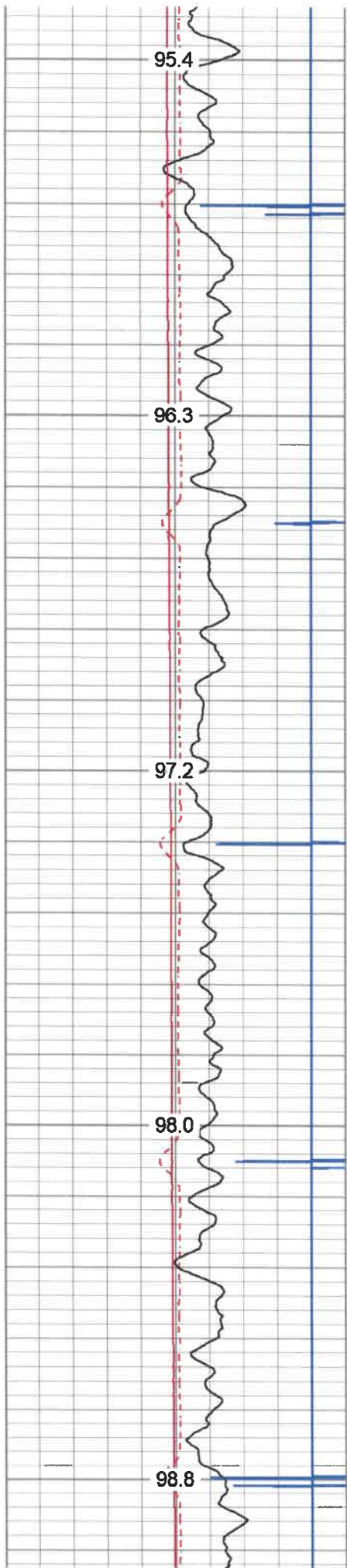
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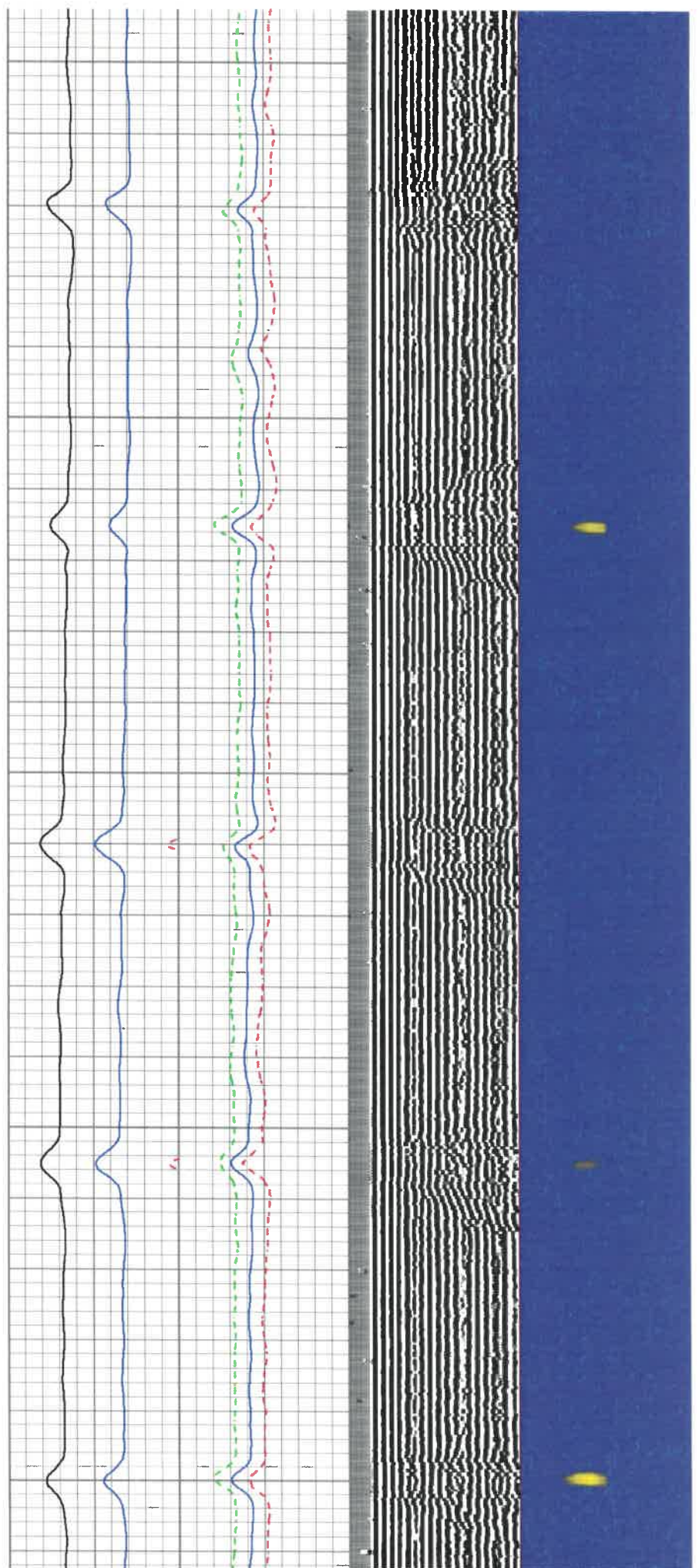
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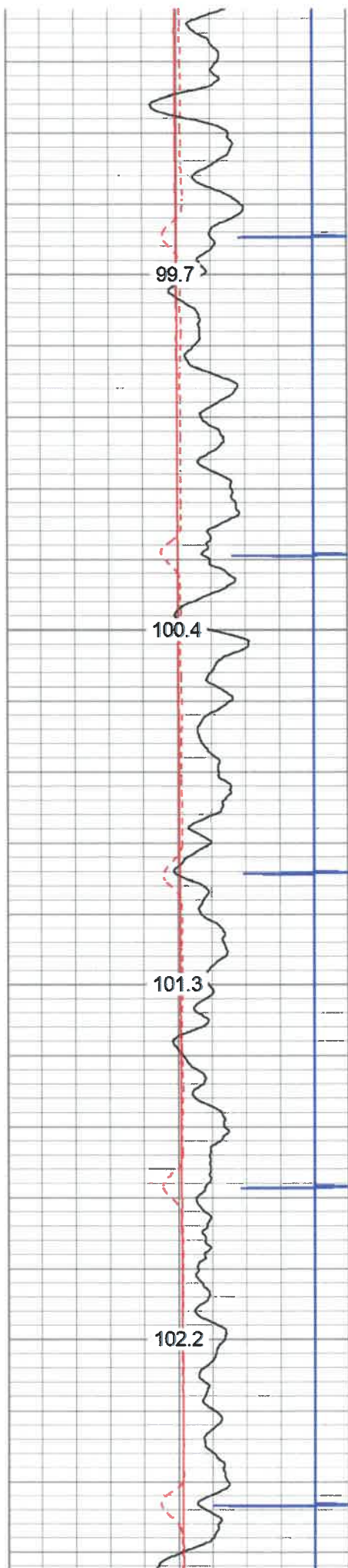
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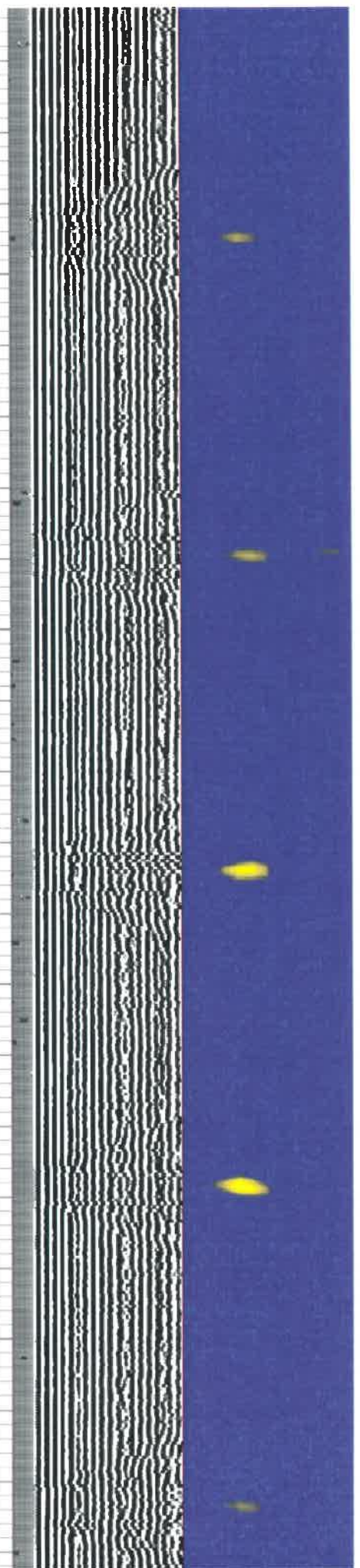
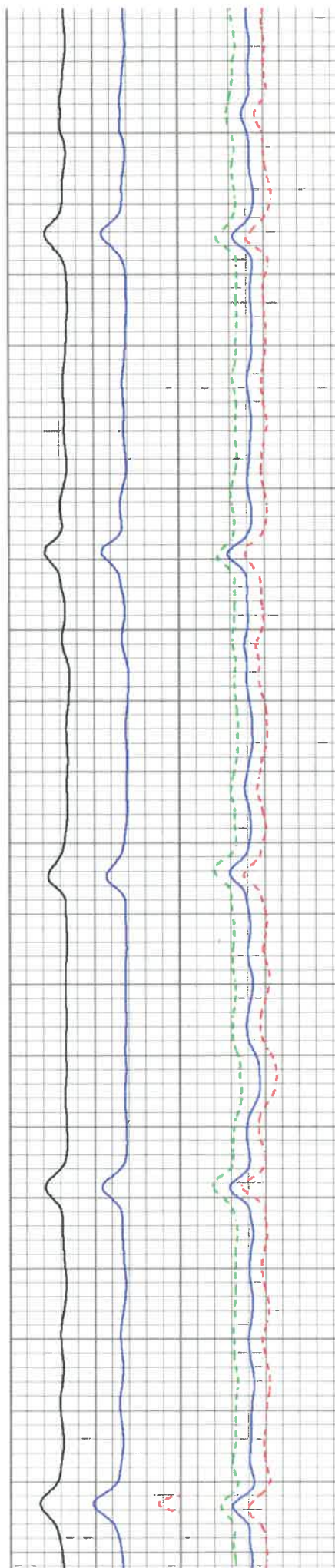


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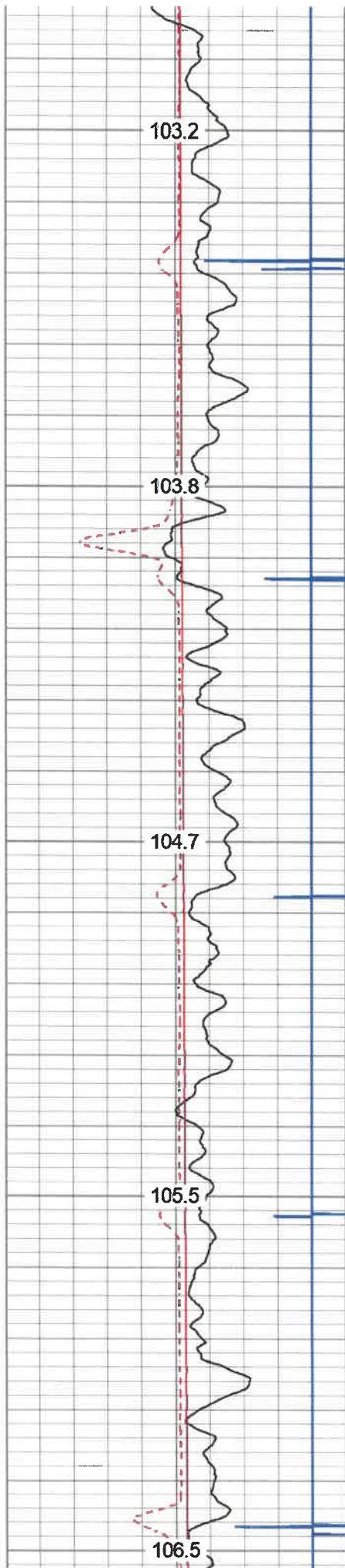
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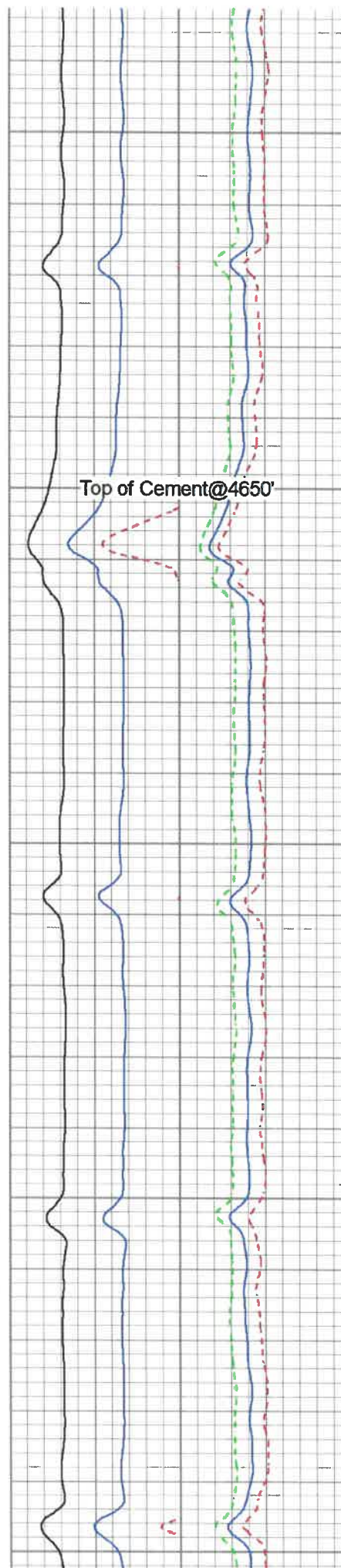
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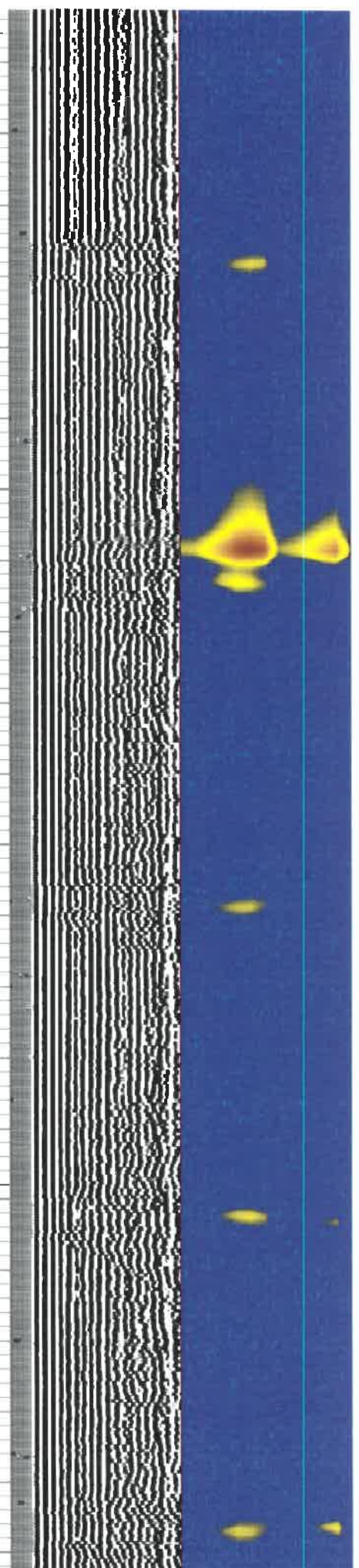
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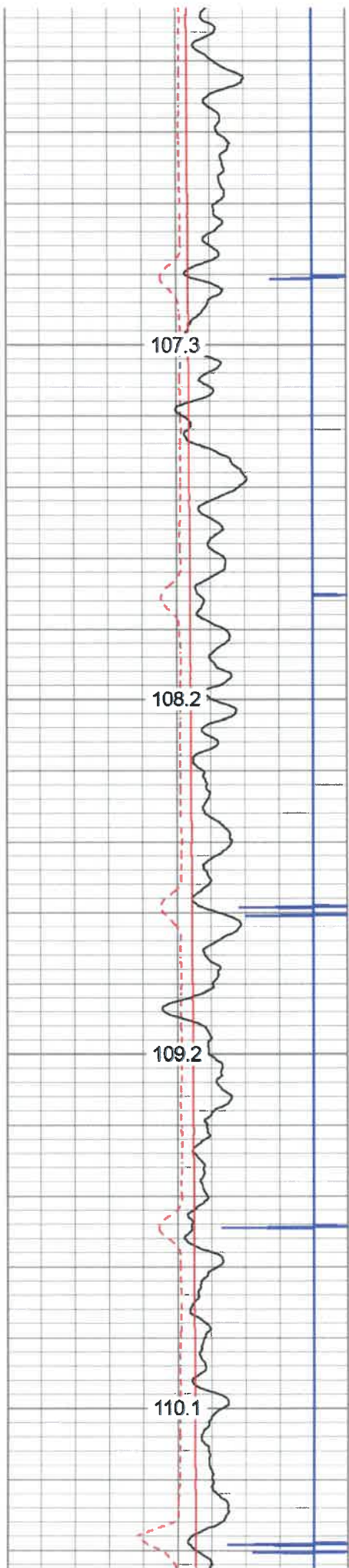
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Top of Cement@4650'





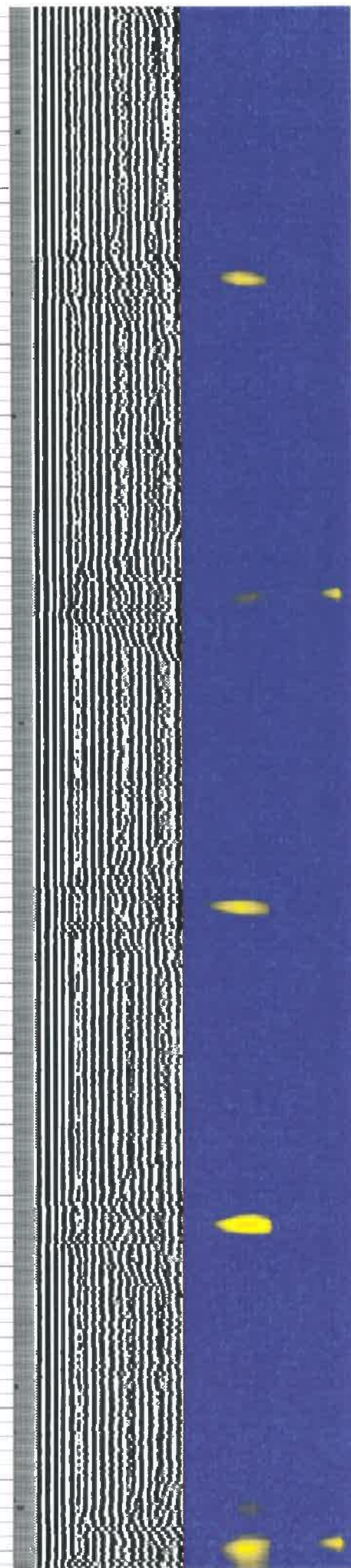
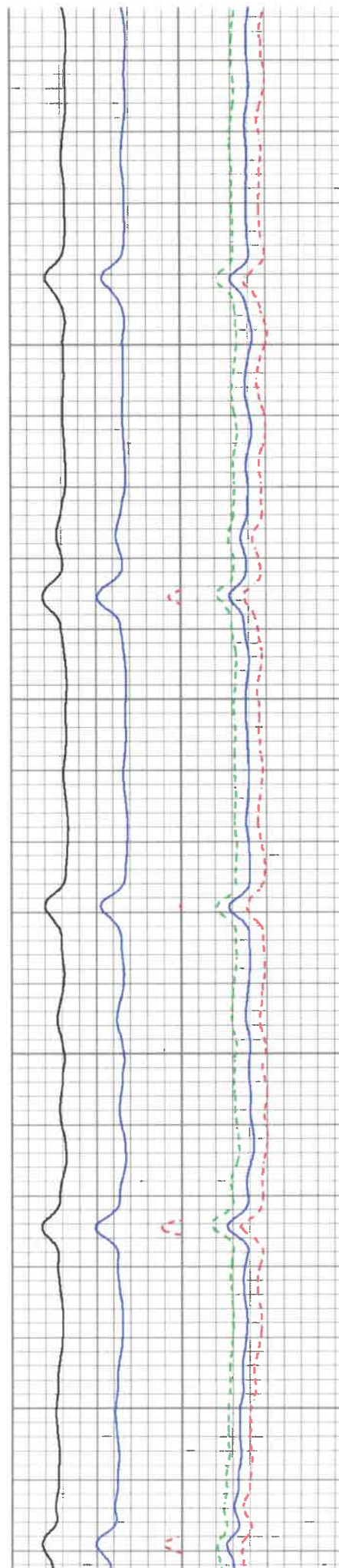


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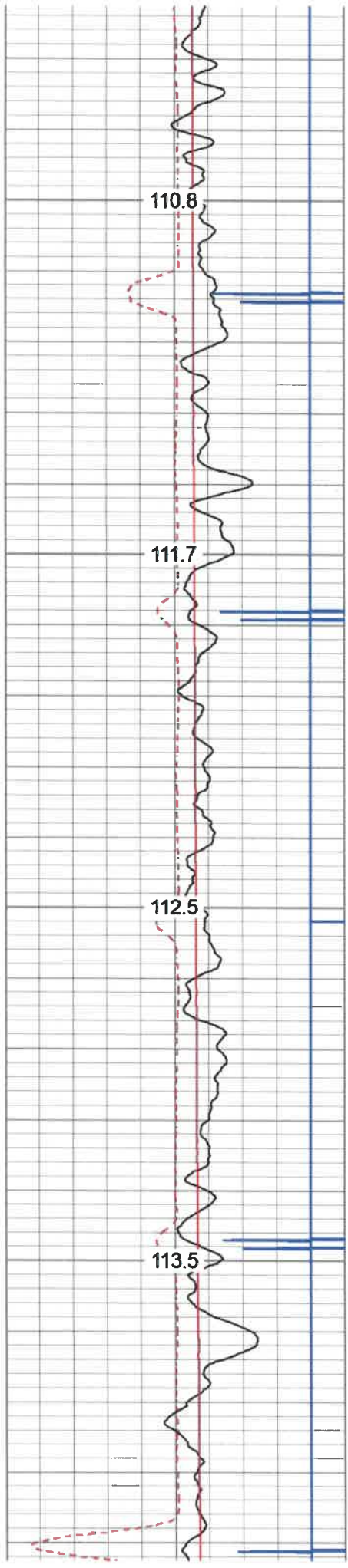
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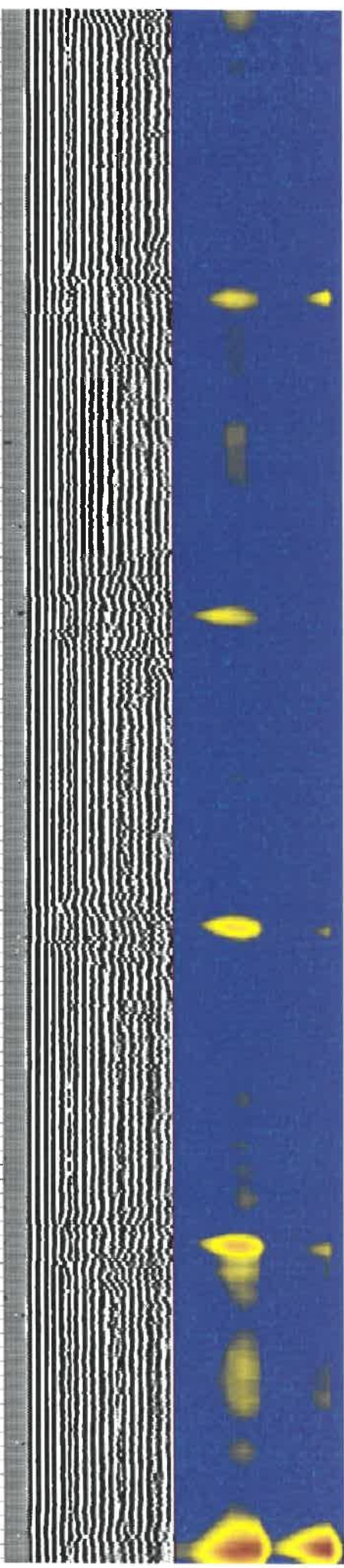
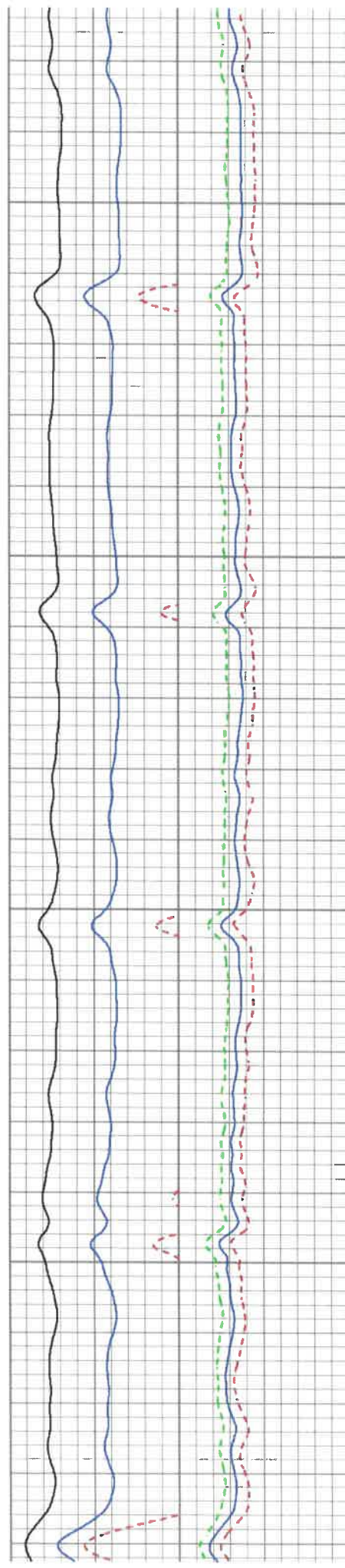


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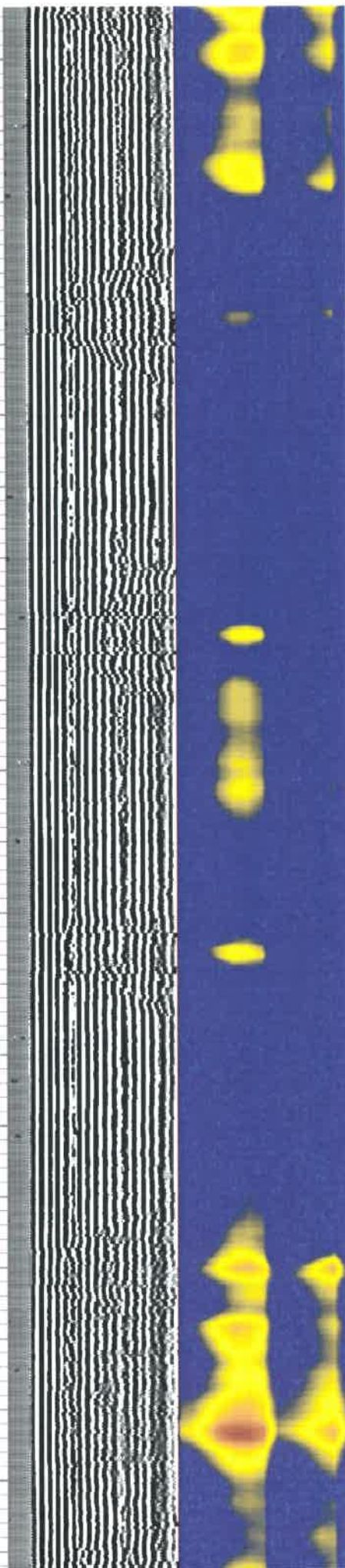
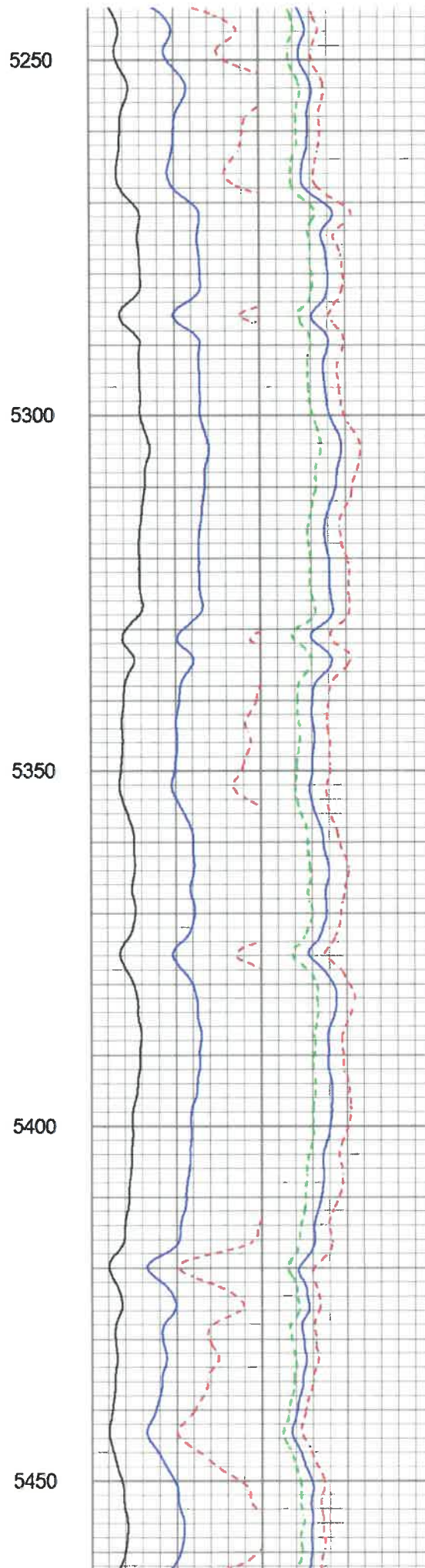
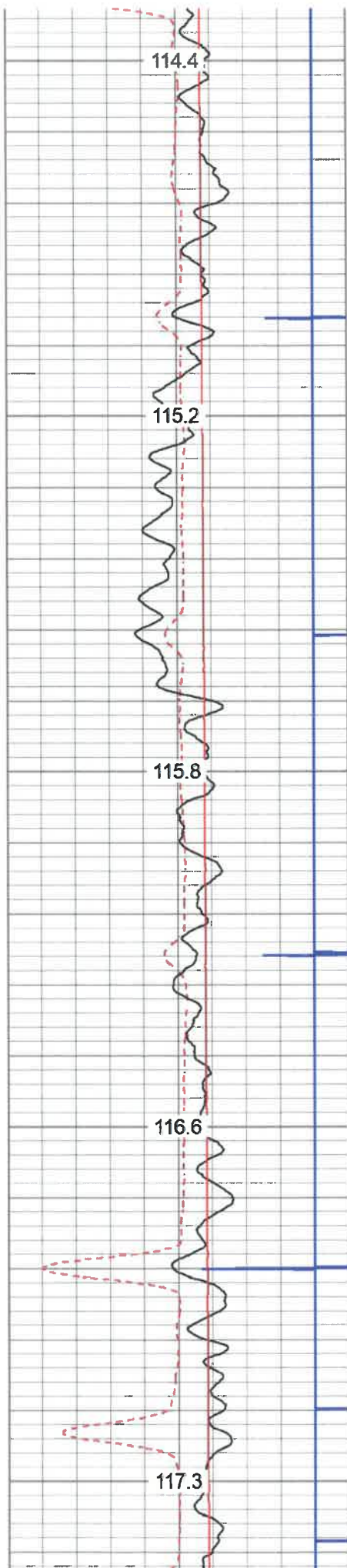
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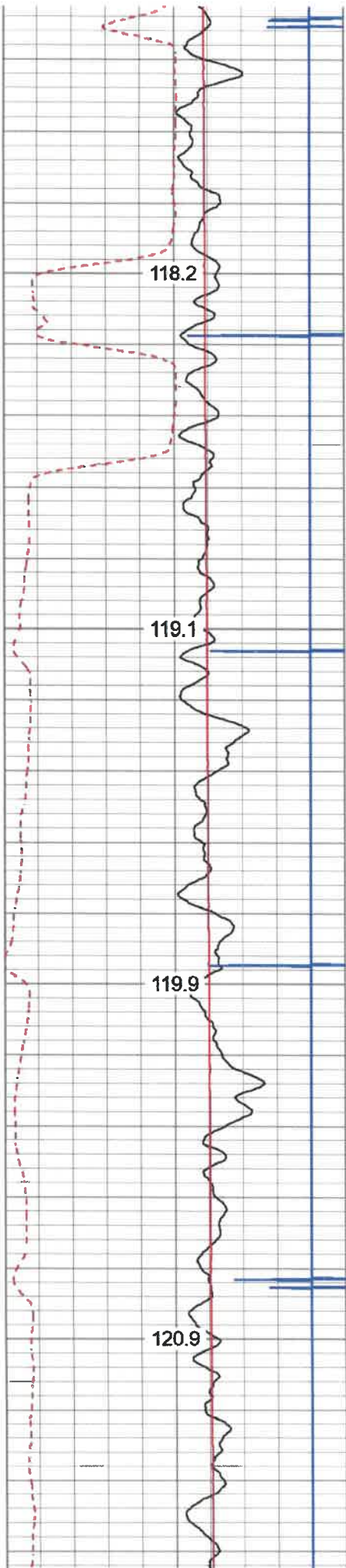
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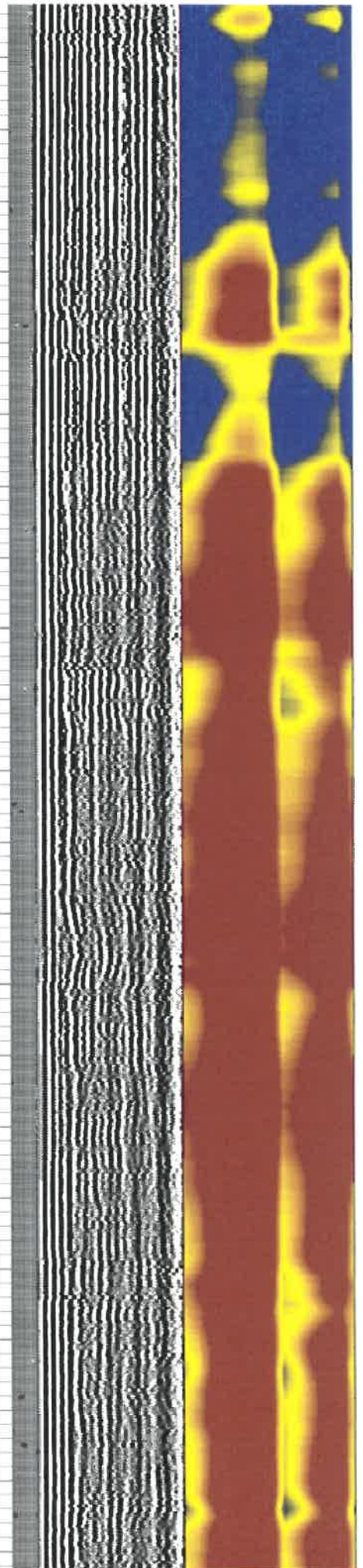
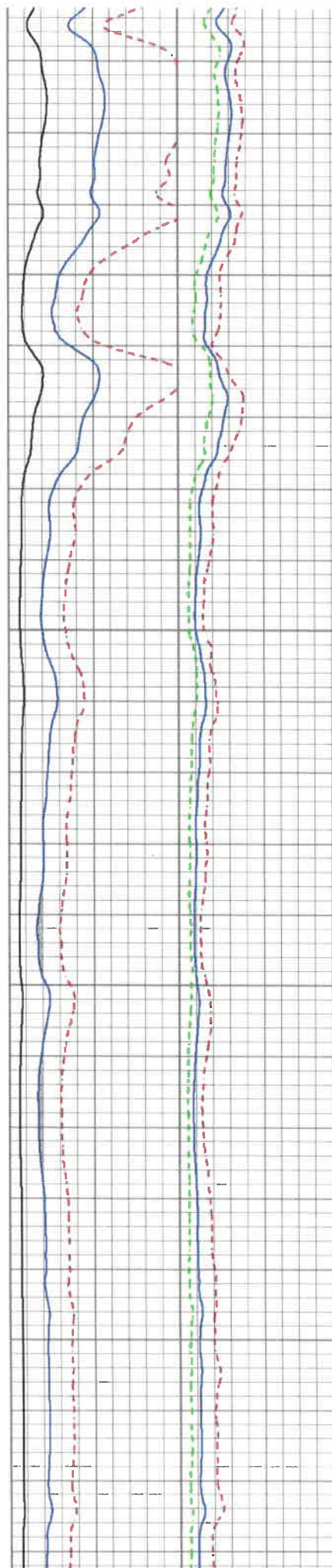


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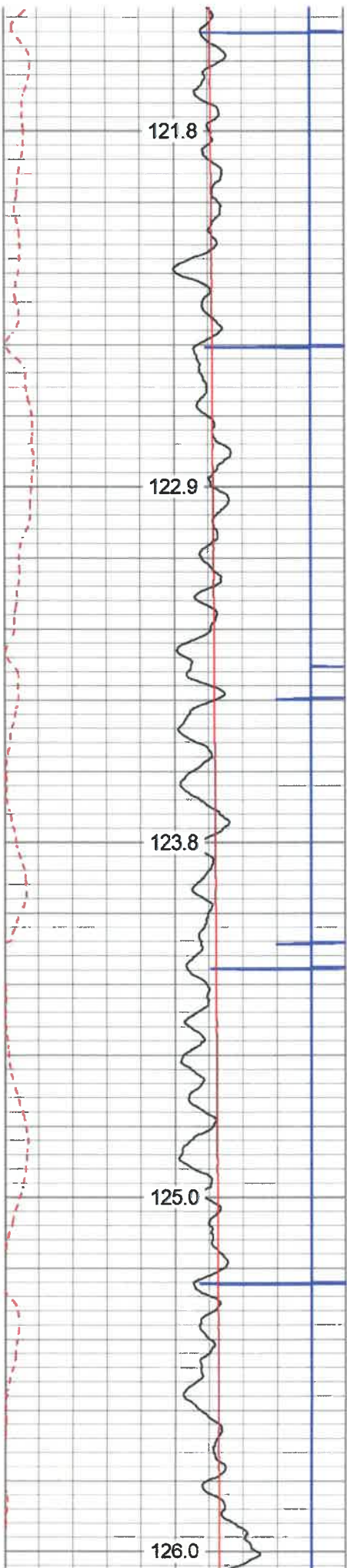
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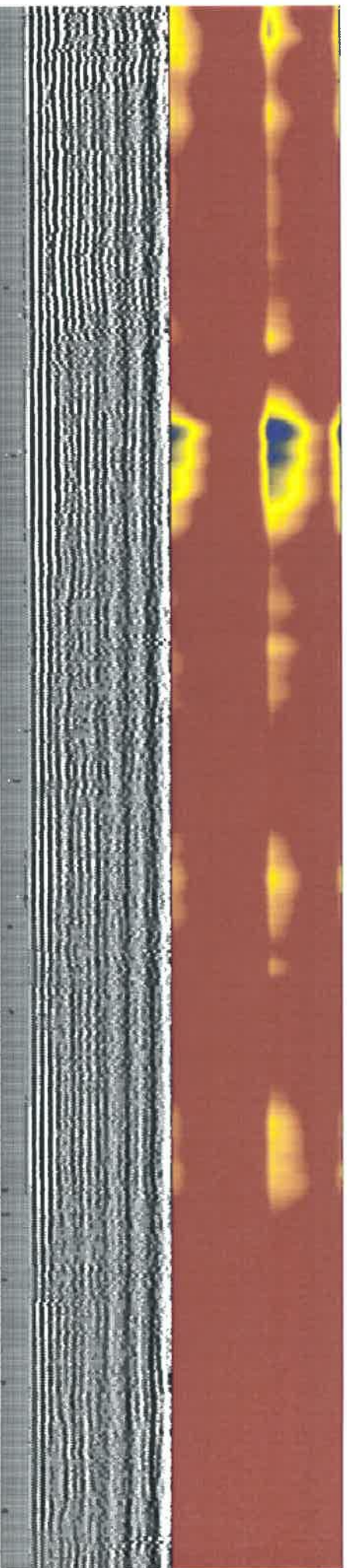
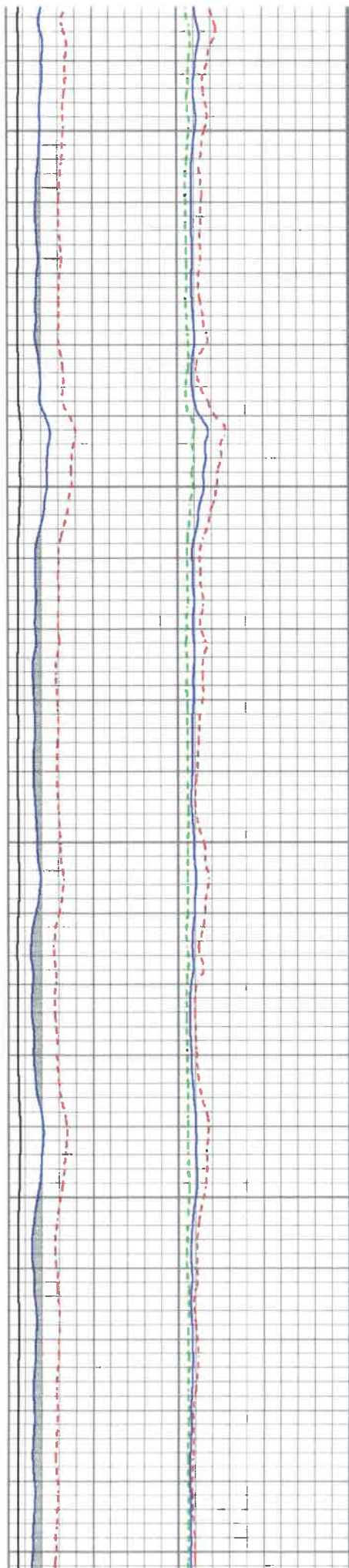
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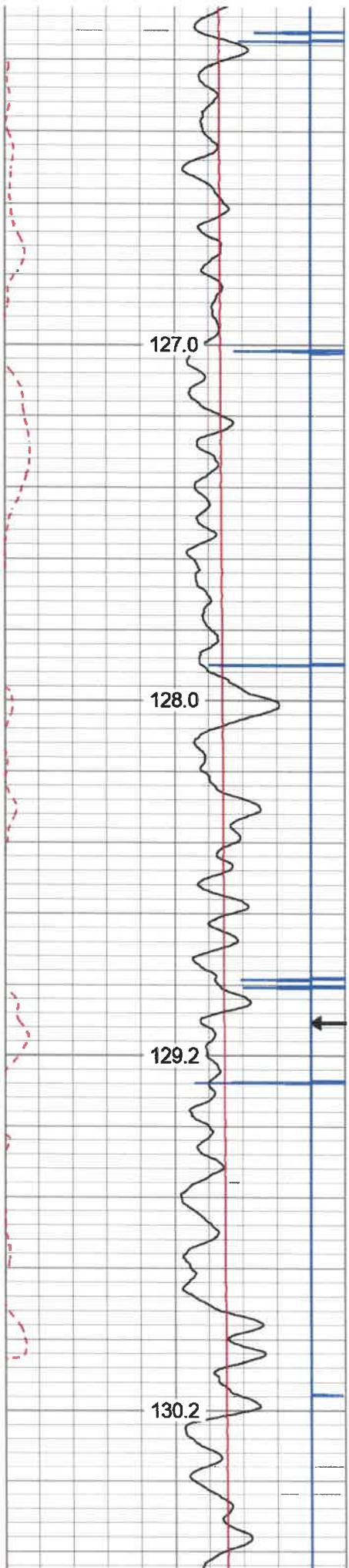
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5900







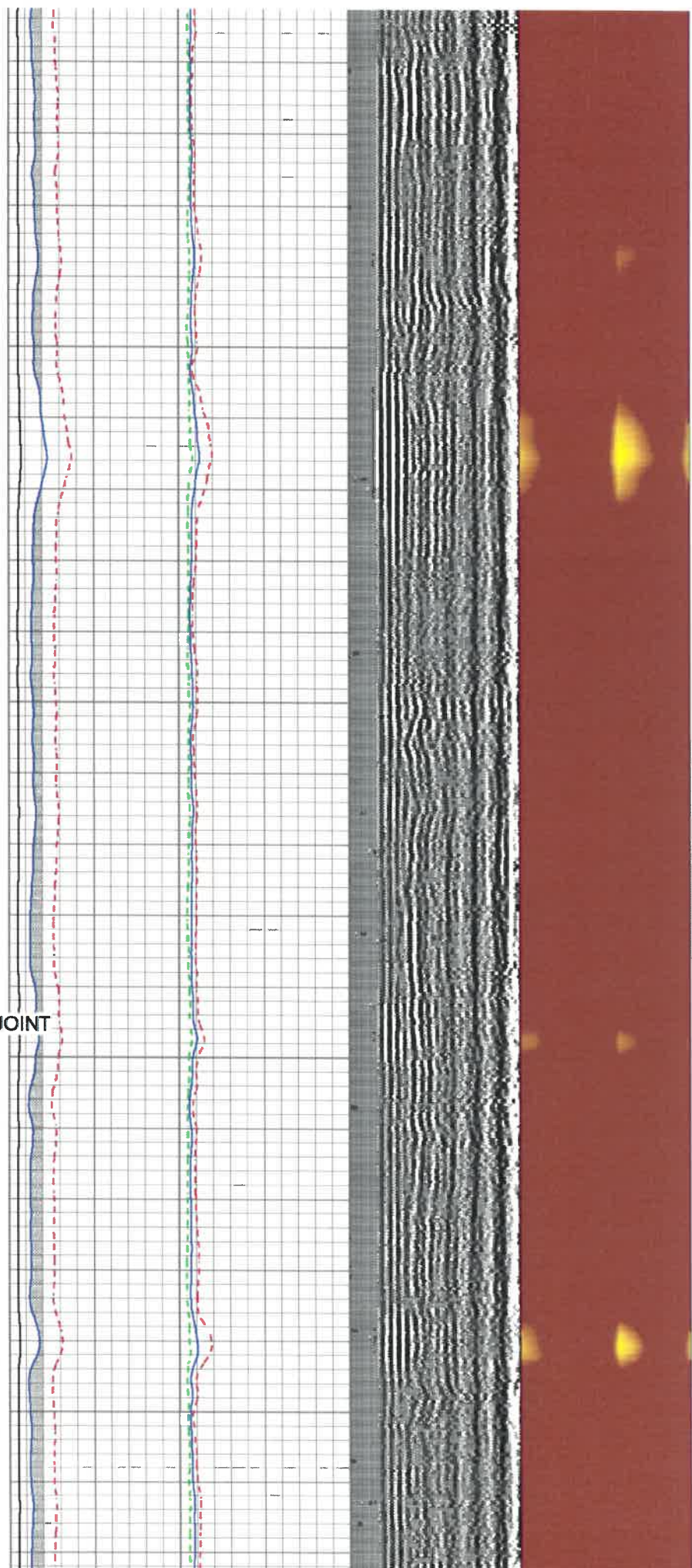
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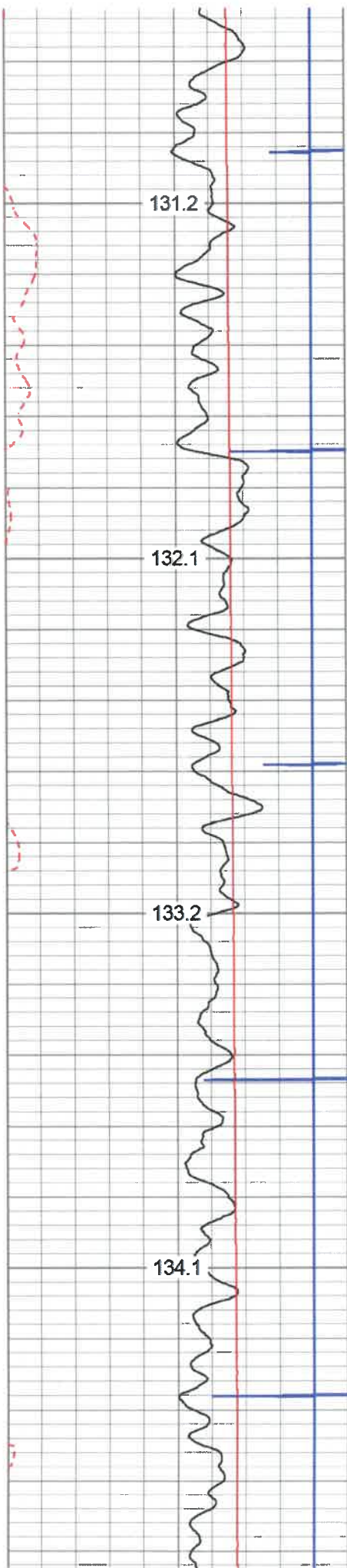
← MARKER JOINT

6050

6100





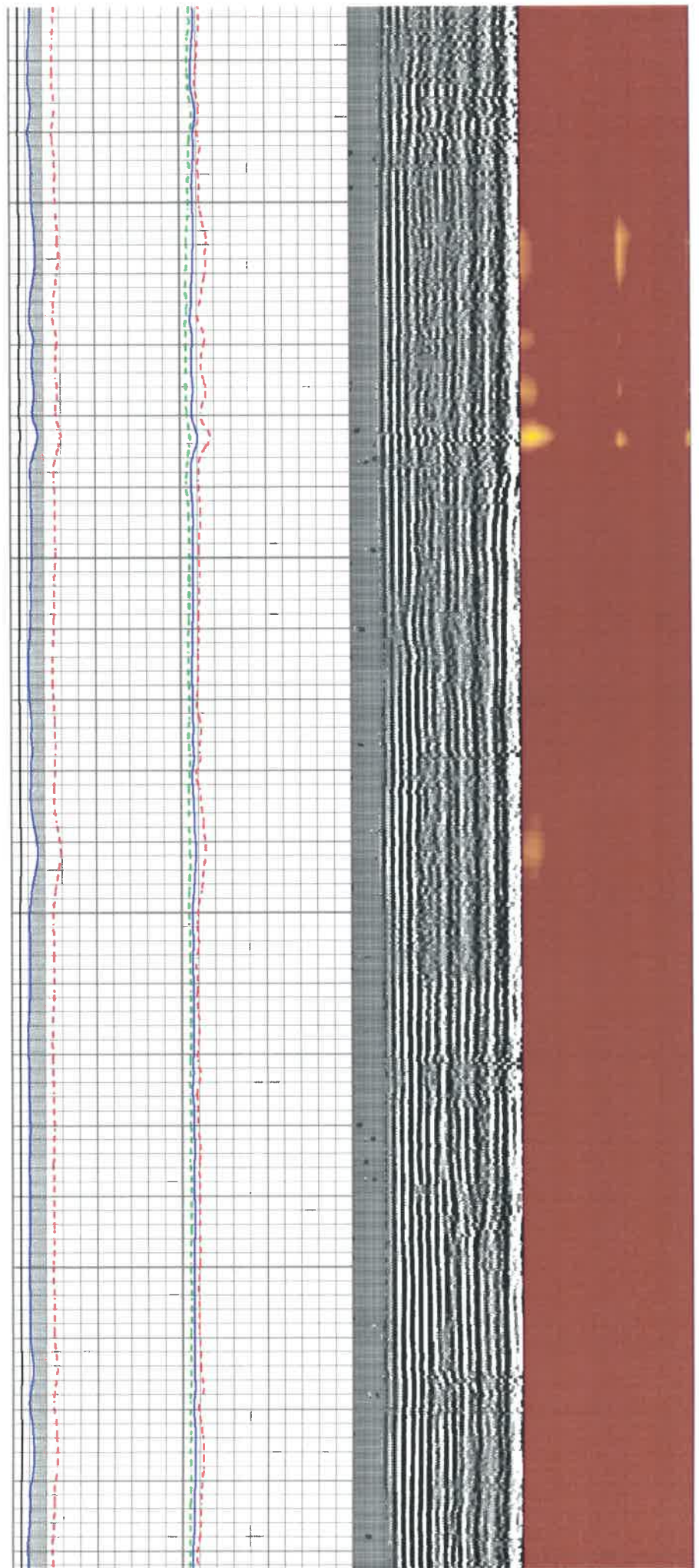


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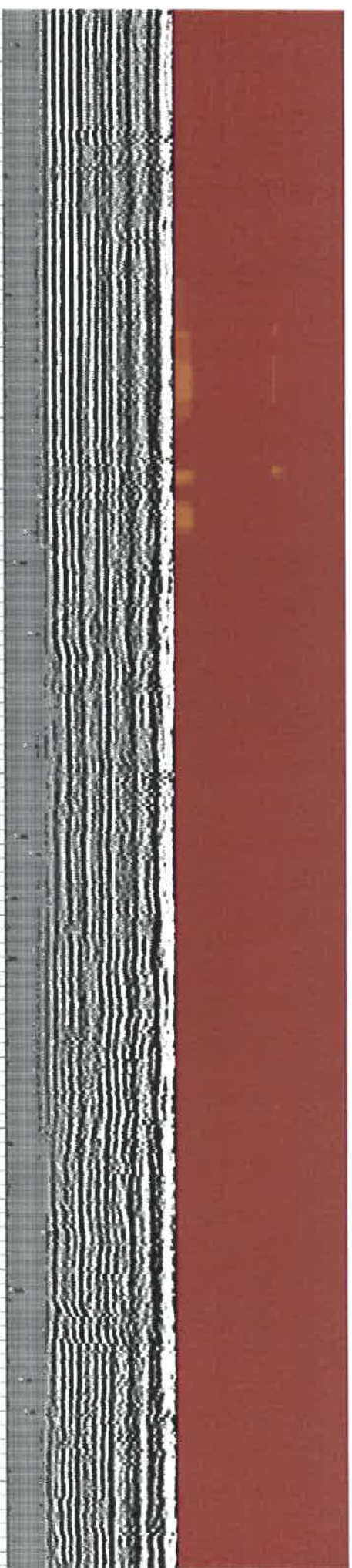
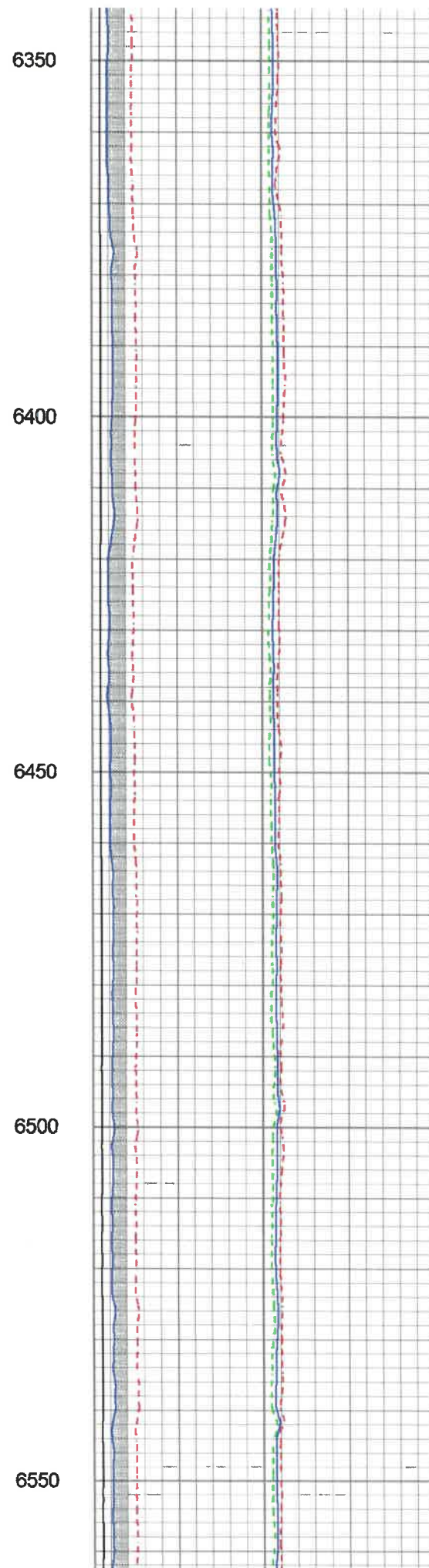
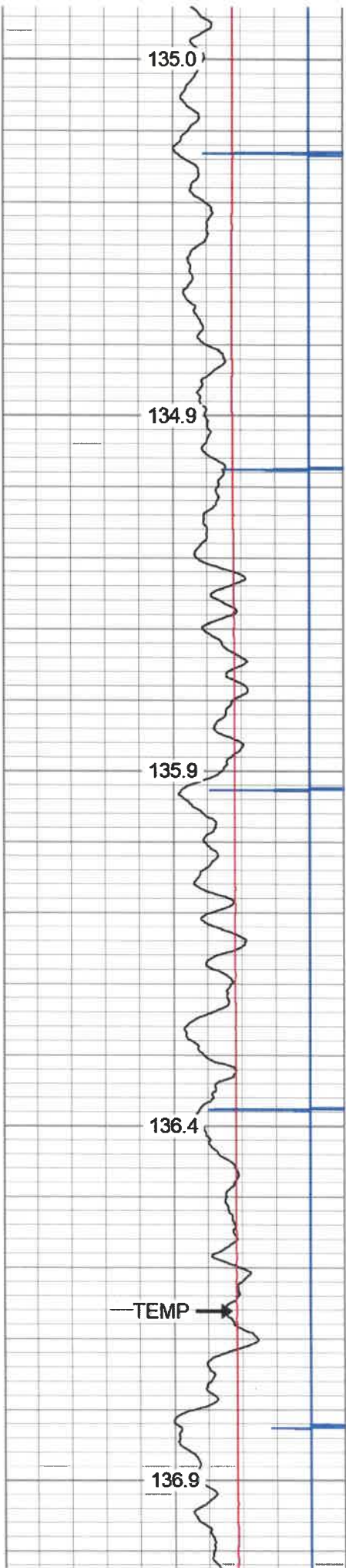
6200

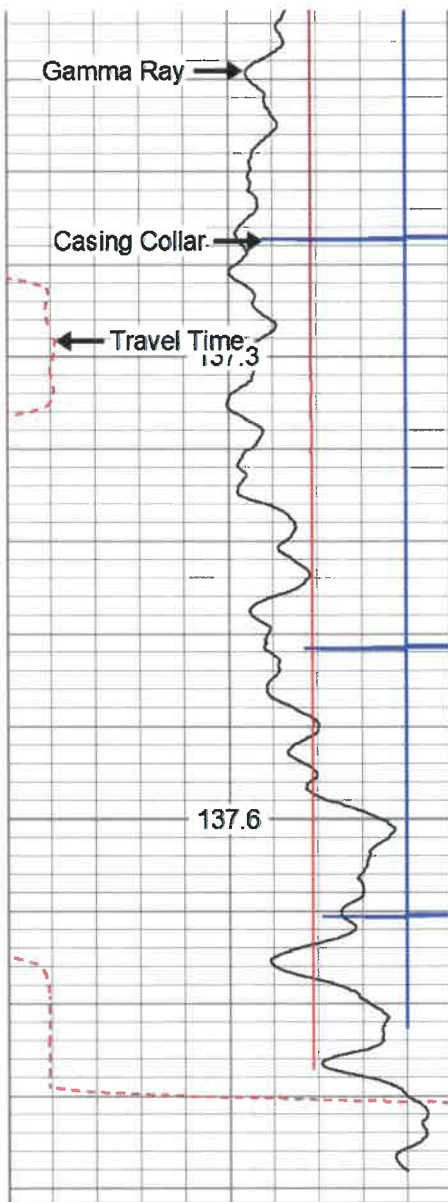
6250

6300



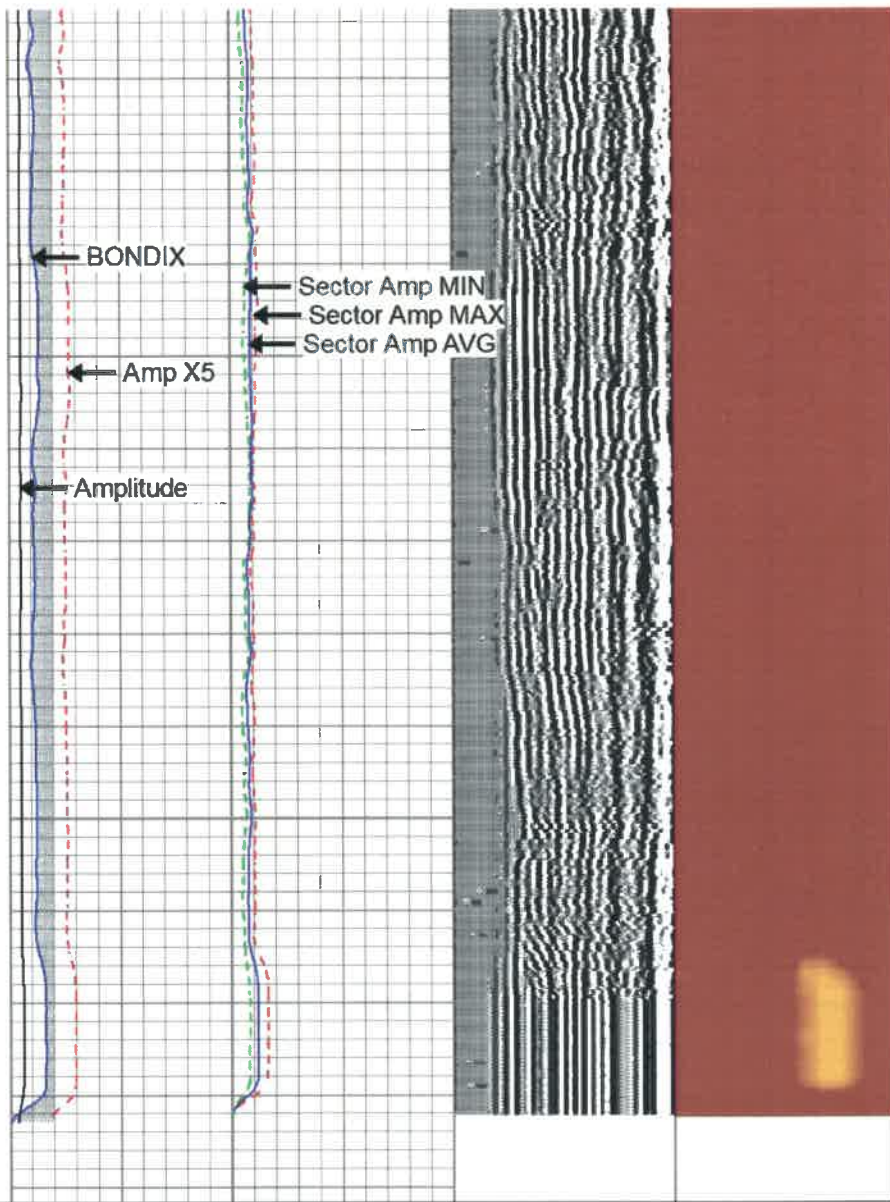






6600

6650



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

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

TEMP  
(degF)



## Repeat Pass

Database File antero\_buzzard\_1h.db  
 Dataset Pathname pass1  
 Presentation Format antero  
 Dataset Creation Sun Nov 17 08:26:49 2019  
 Charted by Depth in Feet scaled 1:240

280	Travel Time (usec)	180
9	Casing Collar	-1

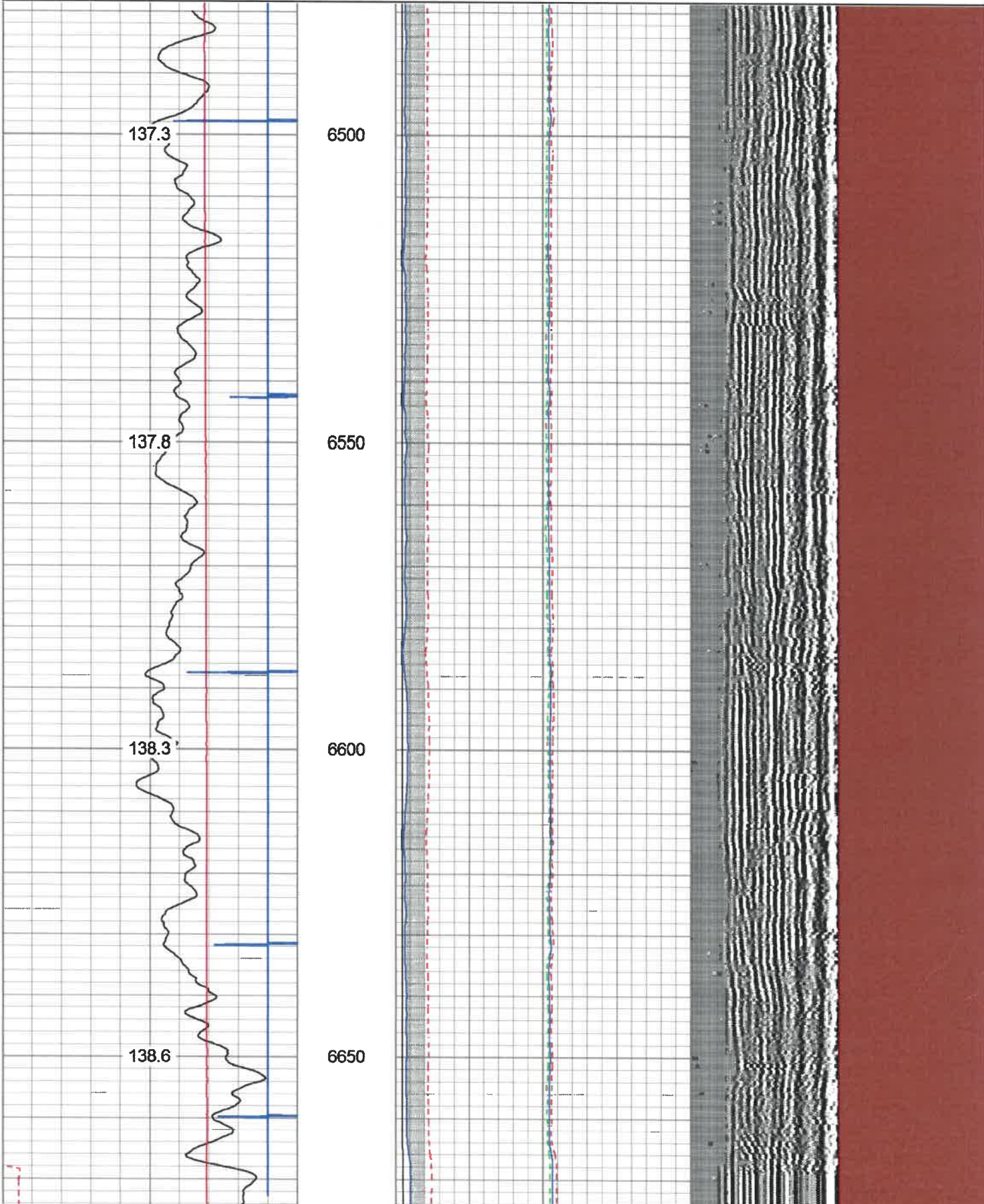
0	Amplitude	100	Sector Amp AVG	200	VDL	1	Sector Map 12
0	(mV)	100	Sector Amp MAX	200	(usec)	1200	

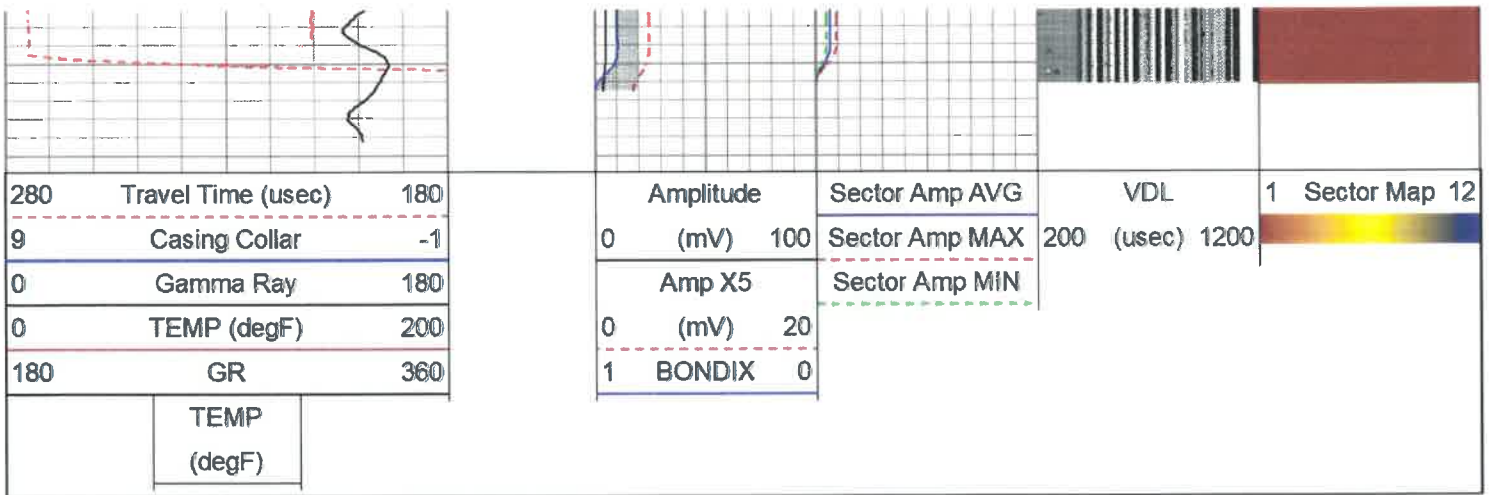


0	Gamma Ray	180
0	TEMP (degF)	200
180	GR	360

Amp X5		Sector Amp MIN
0	(mV)	20
1	BONDIX	0

TEMP  
(degF)





## Log Variables

DatabaseC:\ProgramData\Warrior\Data\antero\_buzzard\_1h.db  
Dataset field/well/run1/pass2/\_vars\_

**Top - Bottom**

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

**Variable Description**

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

**Calibration Report**

Database File antero\_buzzard\_1h.db  
Dataset Pathname pass2  
Dataset Creation Sun Nov 17 08:32:27 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:	55.075	ft



Master Calibration, performed Sat Nov 16 18:08:28 2019:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.002	2.098	3.500	71.921	32.648	3.420
CAL	0.012	0.516				
5'	-0.012	2.146	3.500	71.921	31.695	3.894
SUM						
S1	0.014	2.431	0.000	100.000	41.363	-0.570
S2	0.013	2.443	0.000	100.000	41.150	-0.543
S3	0.012	2.370	0.000	100.000	42.411	-0.496
S4	0.011	2.269	0.000	100.000	44.294	-0.487
S5	0.010	2.168	0.000	100.000	46.352	-0.486
S6	0.010	2.115	0.000	100.000	47.514	-0.473
S7	0.011	2.241	0.000	100.000	44.828	-0.475
S8	0.014	2.479	0.000	100.000	40.566	-0.554
S9	0.011	2.451	0.000	100.000	40.990	-0.458
S10	0.010	2.409	0.000	100.000	41.686	-0.436
S11	0.009	2.318	0.000	100.000	43.317	-0.403
S12	0.009	2.249	0.000	100.000	44.658	-0.415

Temperature Calibration Report

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

	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					

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WVFS12	11.48		SCBL-Tek12 (IOL40-05) Tekco 400 Deg F 12 Sector RIB with Temp	9.13	3.25	135.00
WVFS11	11.48					
WVFS10	11.48					
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					
WV3FT	10.73					
WV5FT	9.73	Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00	
WVFSYNC	6.40	GR-Tek-Co 2 3/4 (IPSNO-03) Tekco 2 3/4" 400 Deg. F Logging Gamma Ray	3.67	2.75	40.00	
WVTEMP	6.40					
GR	1.04					

Dataset: antero\_buzzard\_1h.db: field/well/run1/pass2  
 Total length: 20.07 ft  
 Total weight: 250.00 lb  
 O.D.: 3.25 in



Company	Antero Resources Corporation
Well	Buzzard Unit 1H
Field	Marcellus
County	Ritchie
State	WV
Country	US