



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

Company	ANTERO RESOURCES CORPORATION	Country	US
Well	REMO UNIT 1H	Company	ANTERO RESOURCES CORPORATION
Field	MARCELLUS	Well	REMO UNIT 1H
County	TYLER	Field	MARCELLUS
State	WV	County	TYLER
		State	WV
		Country	US

Location:	SEC N/A TWP N/A RGE N/A	API # :	47095025780000	Other Services	NONE
Permanent Datum	GROUND LEVEL	Elevation			
Log Measured From	R.K.B. 25'				
Drilling Measured From	R.K.B.				

Date	28-OCT-2019
Run Number	ONE
Depth Driller	20092'
Depth Logger	6380'
Bottom Logged Interval	6380'
Top Log Interval	SURFACE
Open Hole Size	8.25"
Type Fluid	FW
Density / Viscosity	8.6
Max. Recorded Temp.	135 degF
Estimated Cement Top	1152'
Time Well Ready	07:00
Time Logger on Bottom	07:30
Equipment Number	214181
Location	BRIDGEPORT,WV
Recorded By	S.BUTLER
Witnessed By	JAYSON LUKES

Borehole Record		Tubing Record				
Run Number	Bit Size	From	To	Weight	From	To
ONE	24" SURFACE	95'	95'			
TWO	17.5" 379'	2620'				
THREE	12.25" 379'	2620'				
FOUR	8.25" 2620'	20092'				

Casing Record	Surface String	Prot. String	Production String	Liner
Size	13.375"	9.625"	5.5	
Weight	54.5	40	20	
Top	SURFACE	SURFACE	SURFACE	
Bottom	379'	2620'	20092'	

<<< Fold Here >>>

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: 5703' - 5713'  
LOG TD:6380'  
LOG RAN UNDER 1500 PSI

RECEIVED  
Office of Oil and Gas  
SEP 24 2020  
WV Department of  
Environmental Protection



**Main Pass**

Database File antero\_remo\_unit\_1h.db  
 Dataset Pathname pass1.1  
 Presentation Format antero1  
 Dataset Creation Tue Oct 29 15:08:07 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

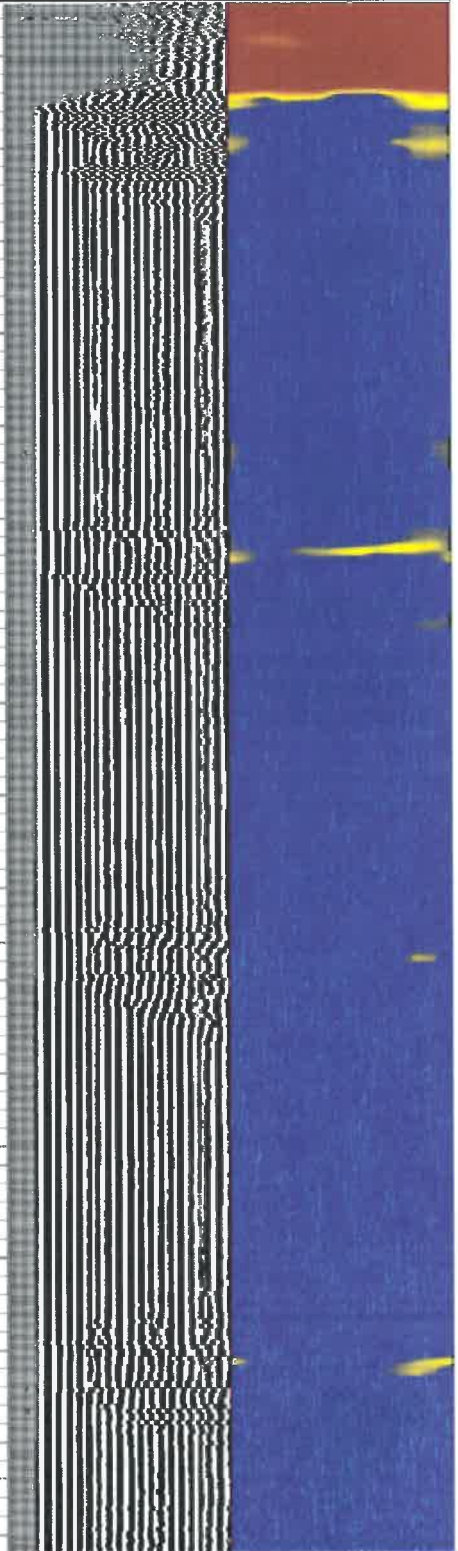
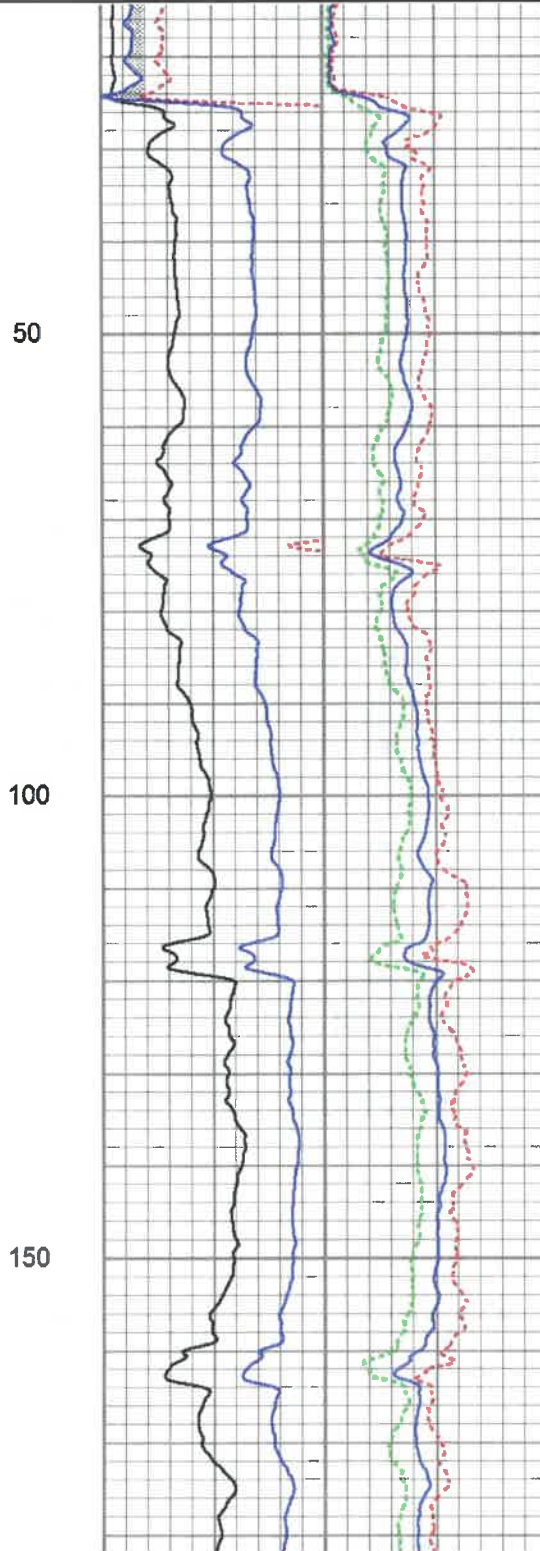
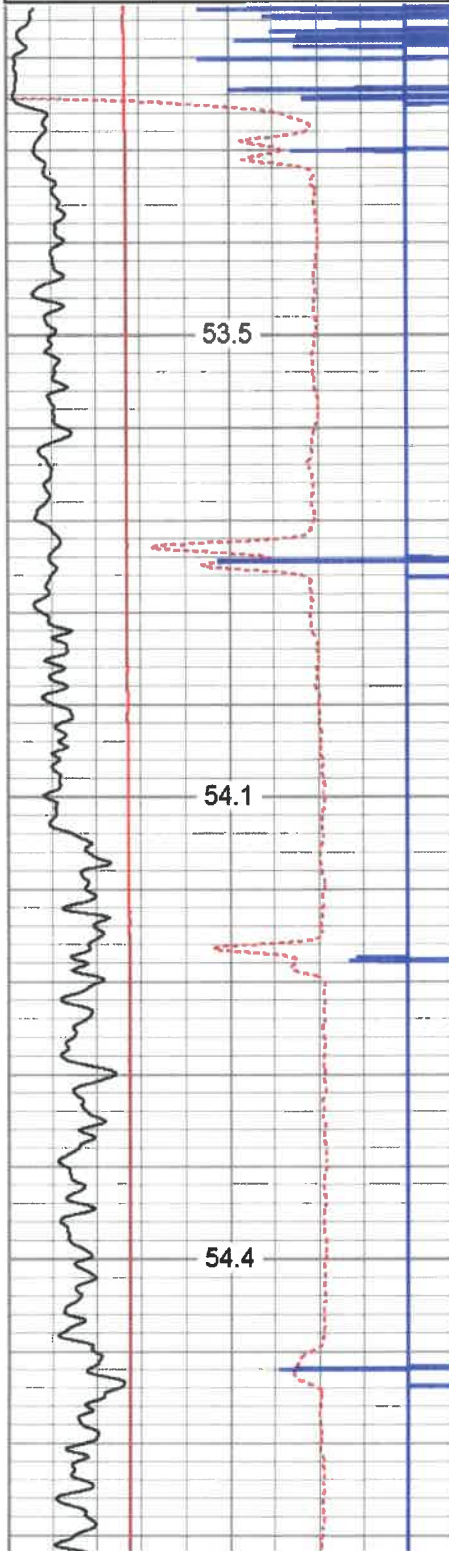
Amplitude		Sector Amp AVG
0	(mV) 100	Sector Amp MAX
Amp X5		Sector Amp MIN
0	(mV) 20	
1	BONDIX 0	

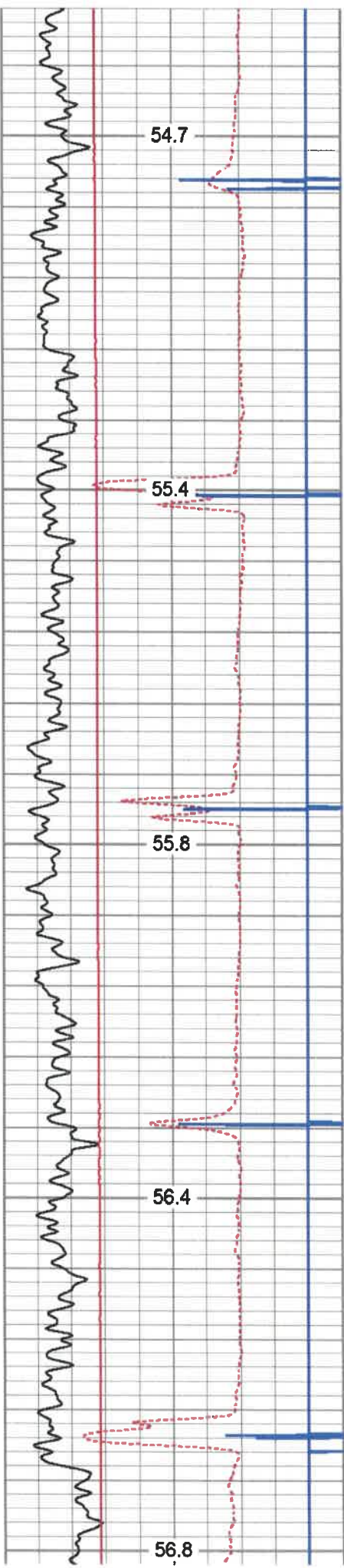
VDL  
 200 (usec) 1200

1 Sector Map 12

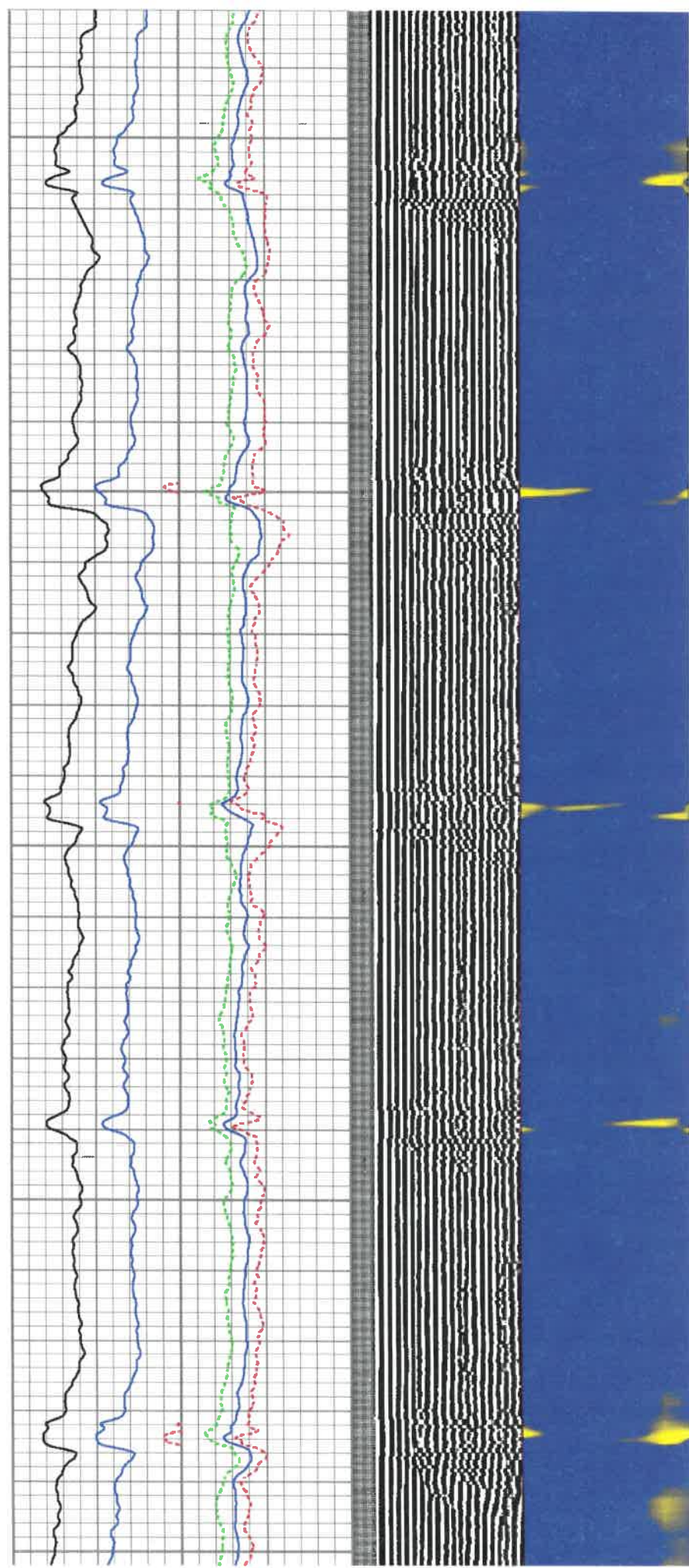


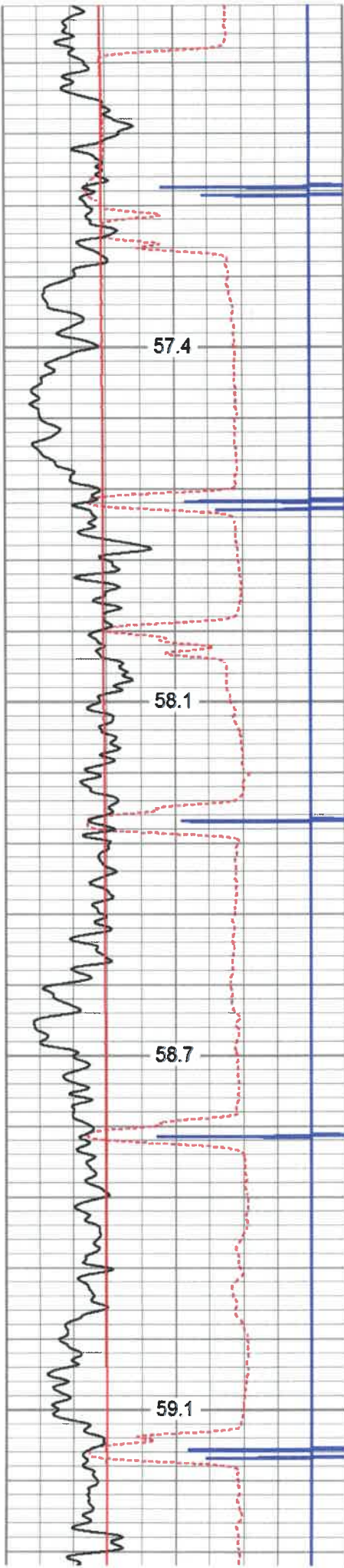
TEMP  
 (degF)





200  
250  
300  
350  
400



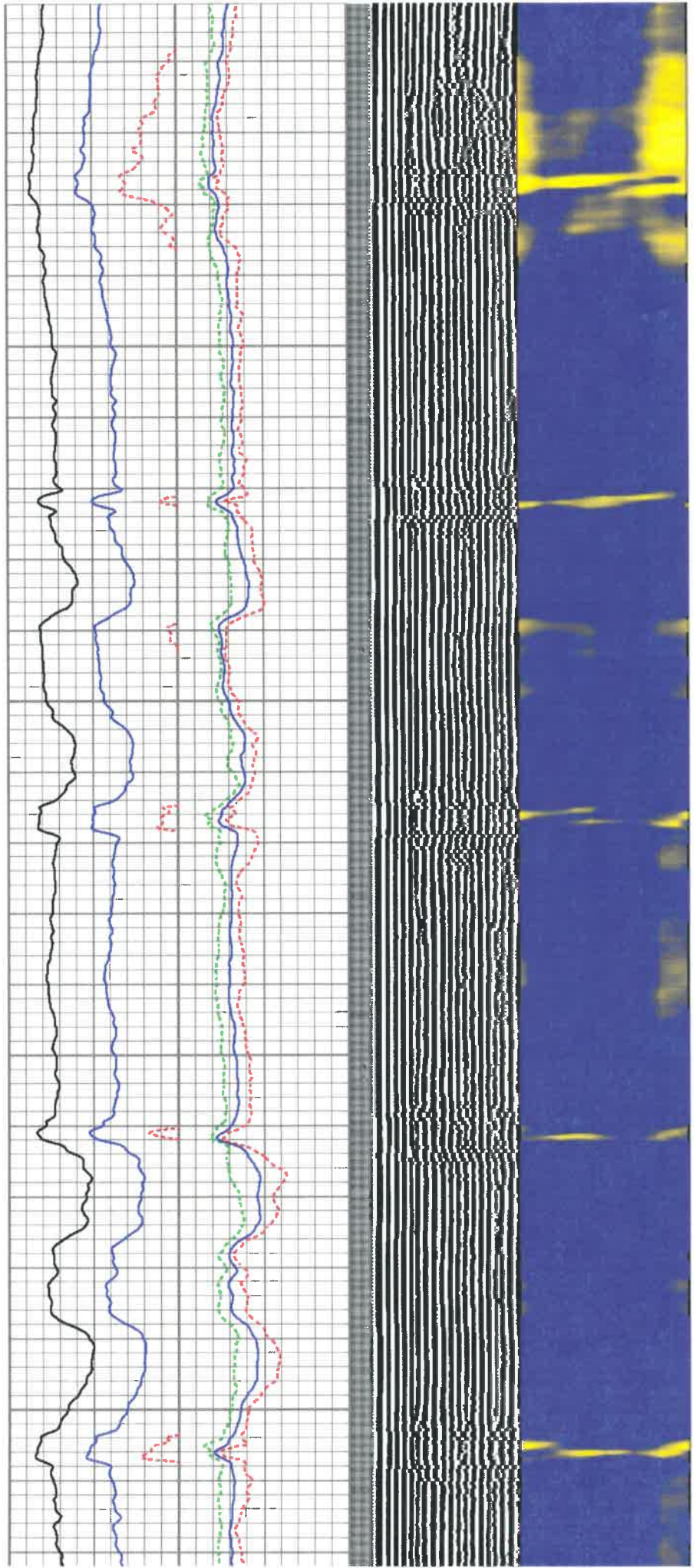


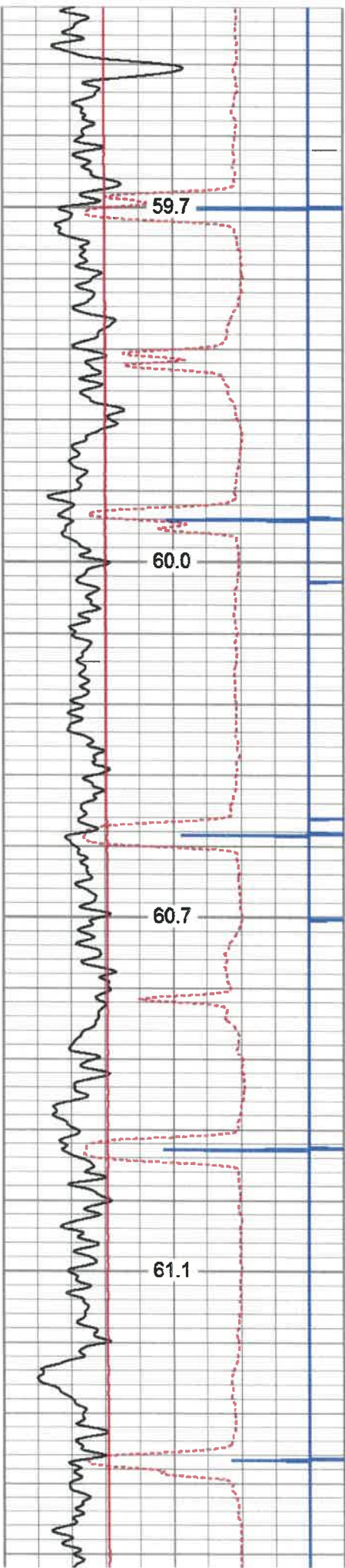
450

500

550

600



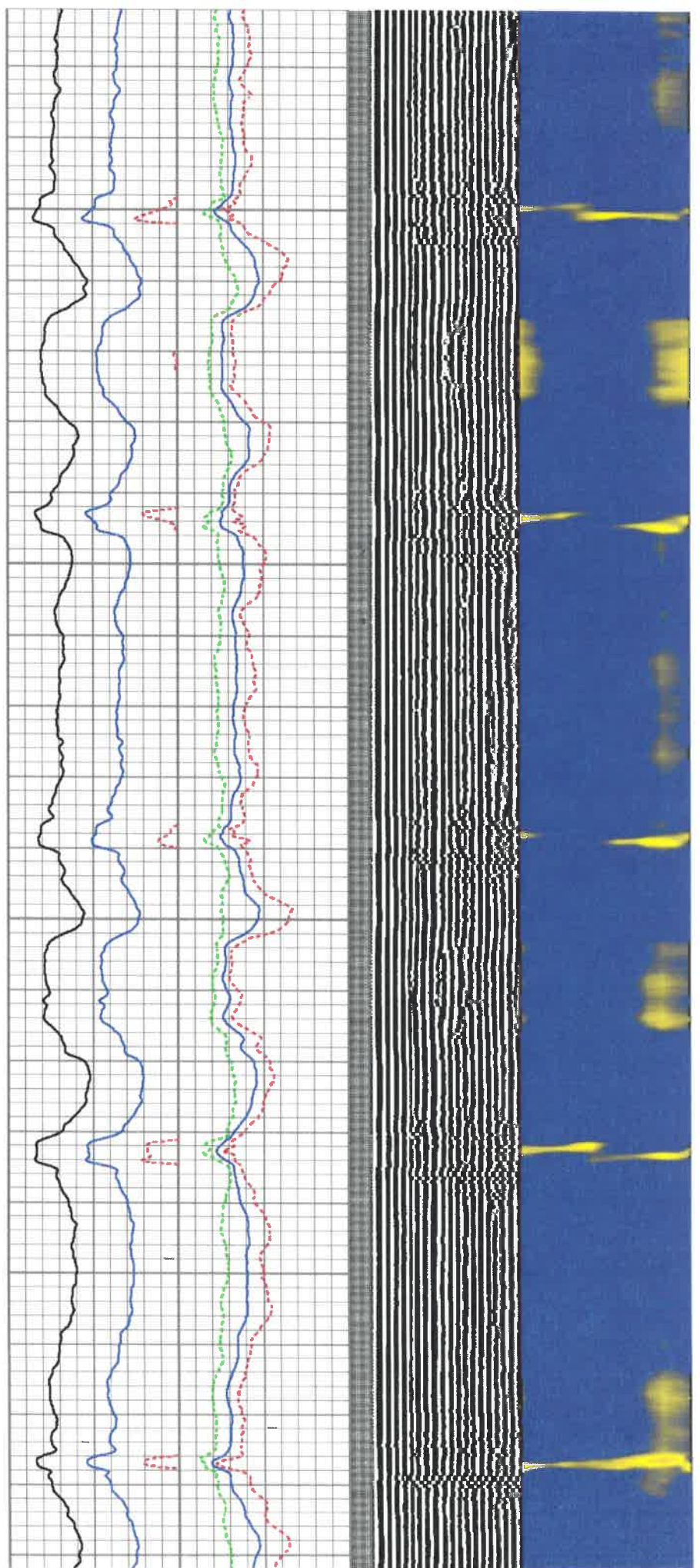


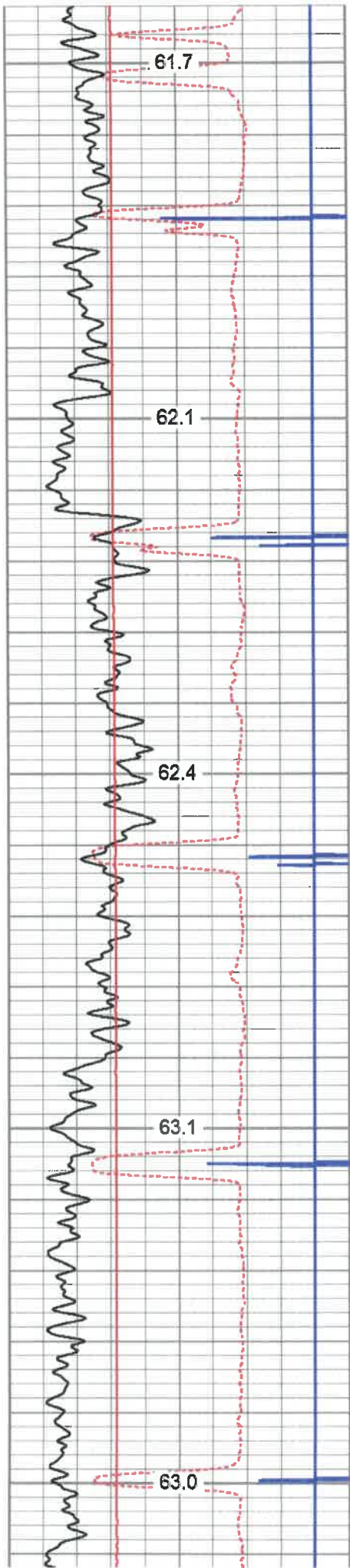
650

700

750

800





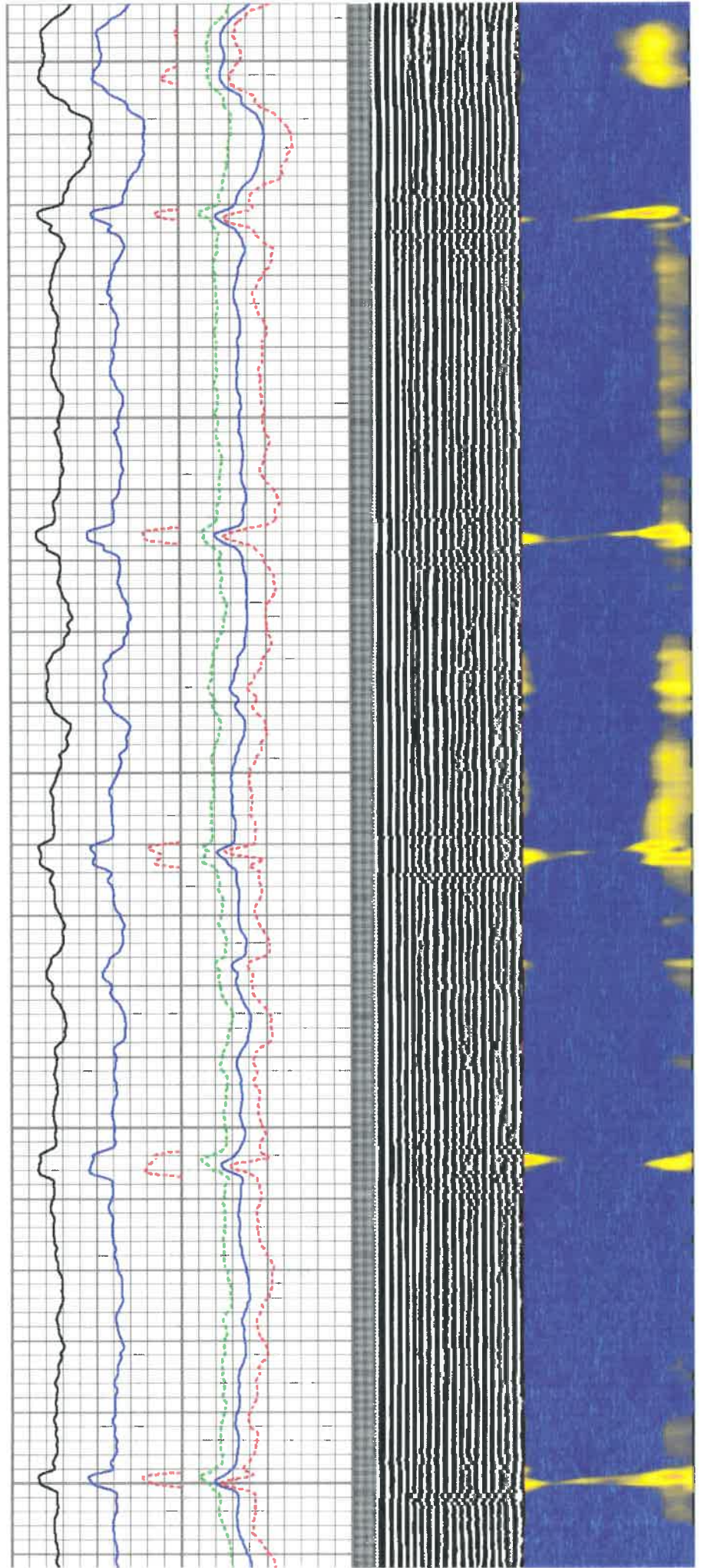
850

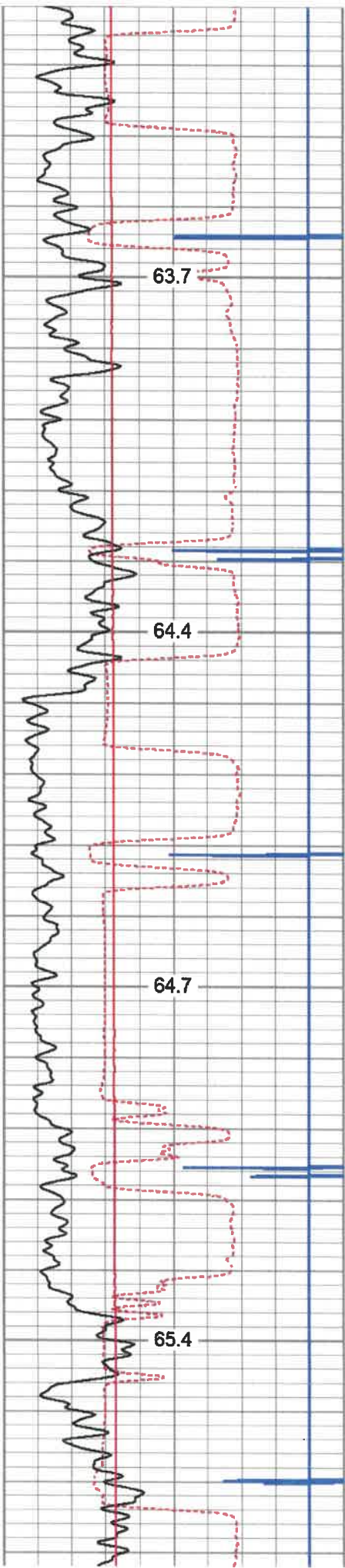
900

950

1000

1050



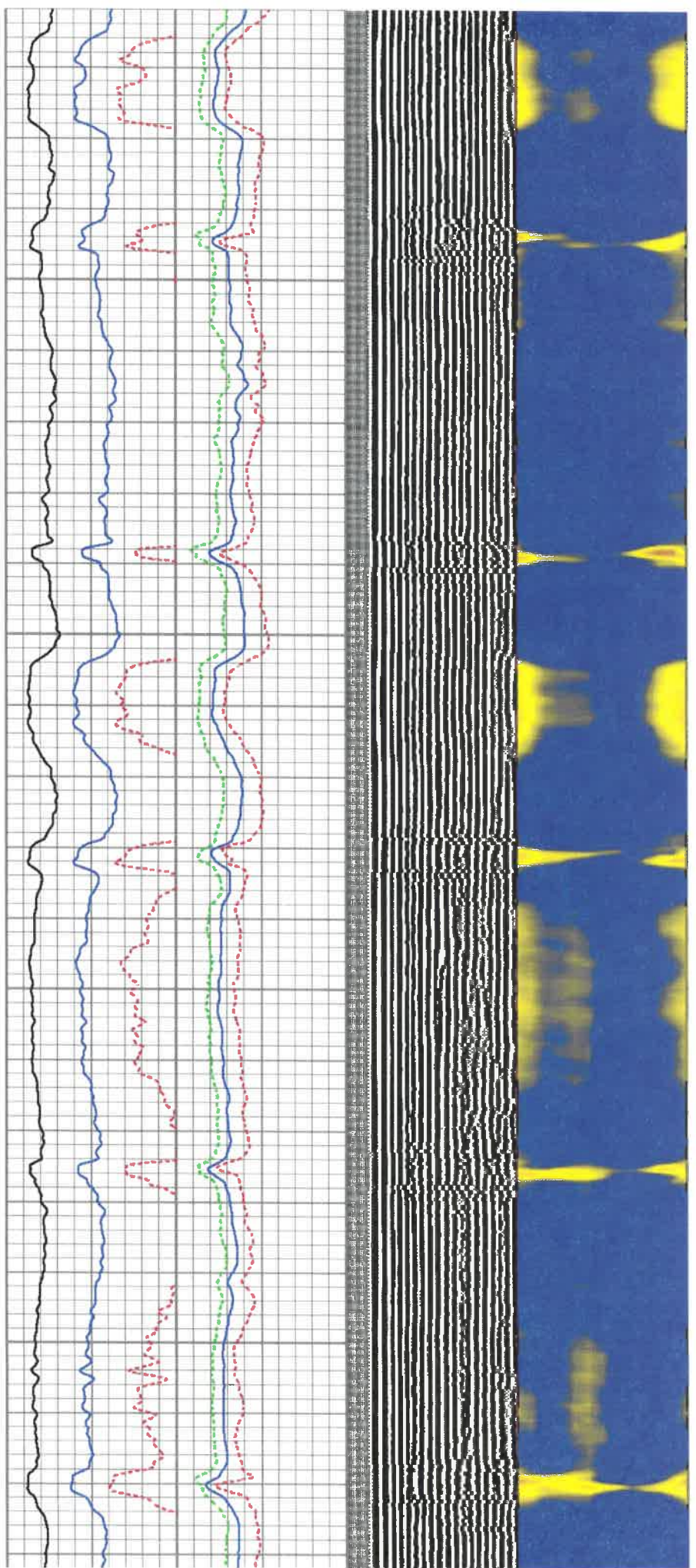


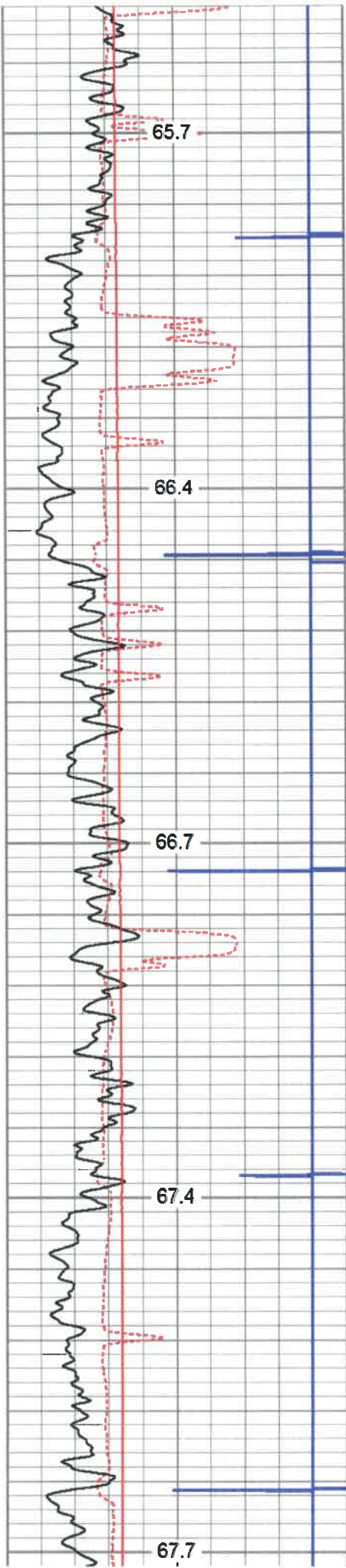
1100

1150

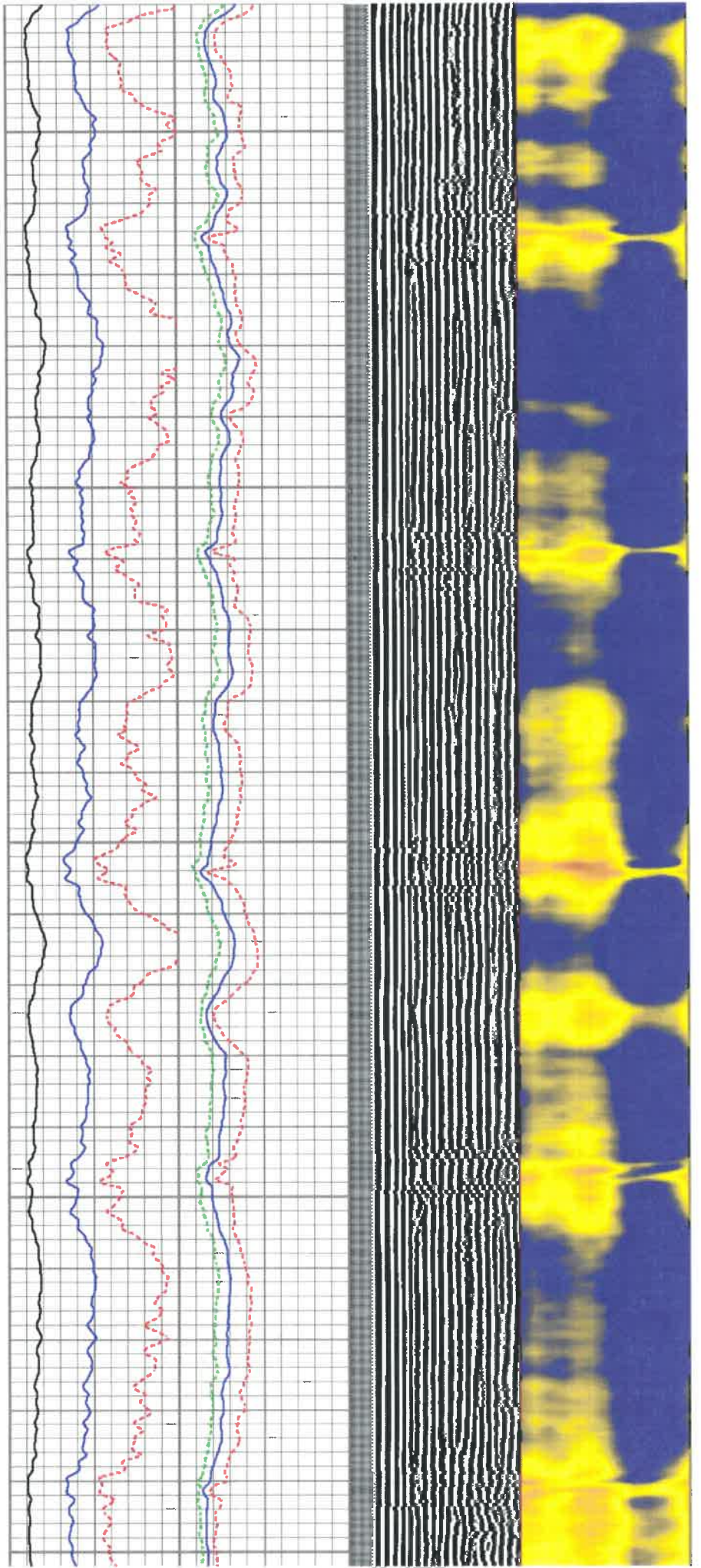
1200

1250

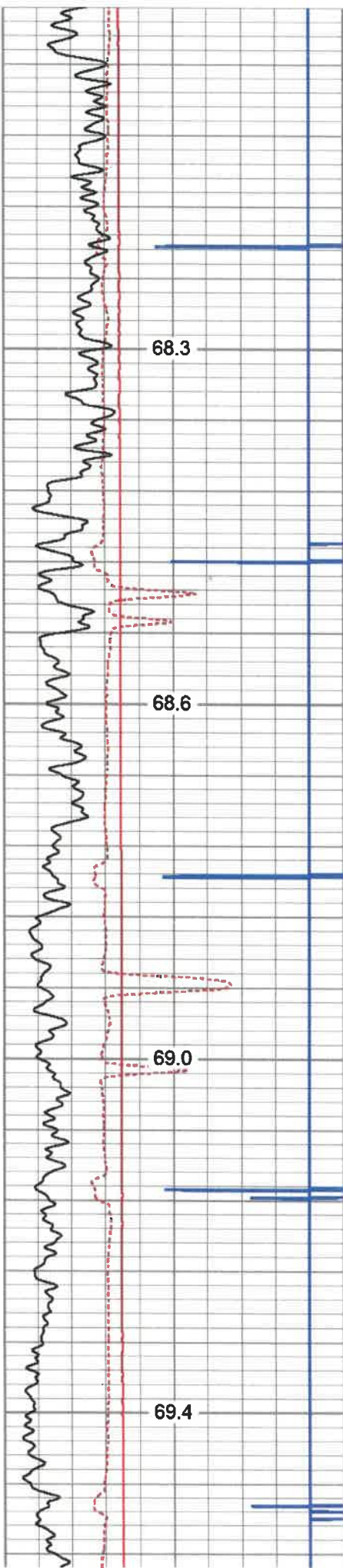




1300  
1350  
1400  
1450  
1500





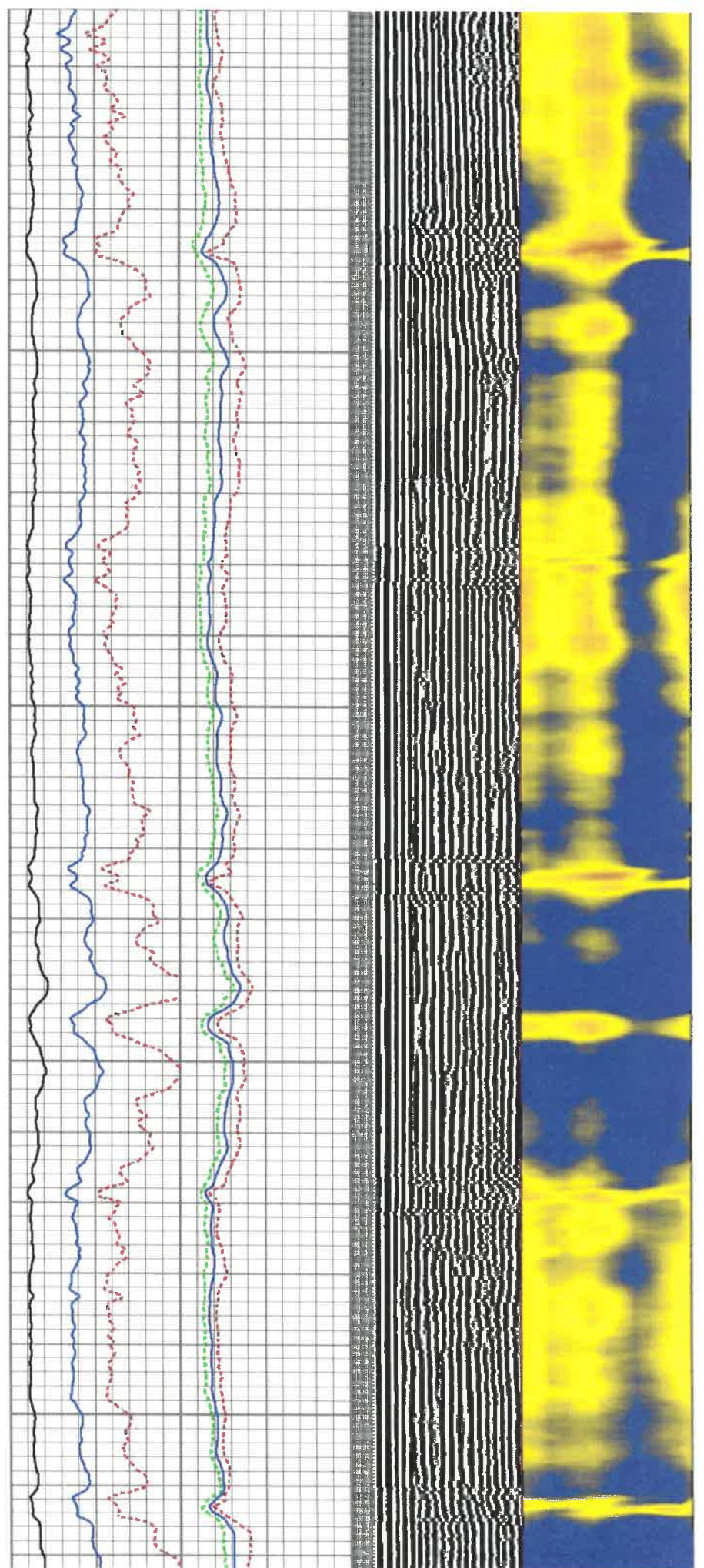


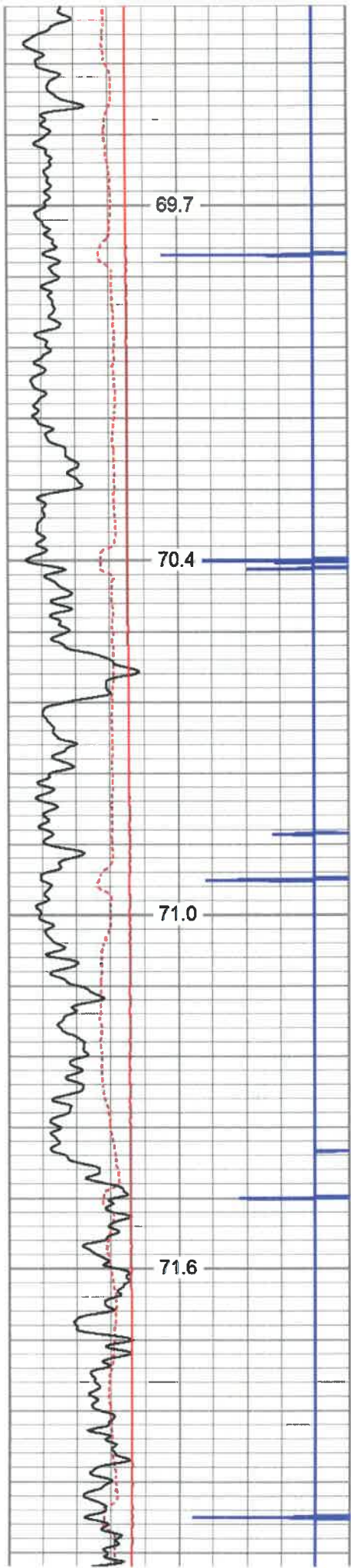
1550

1600

1650

1700



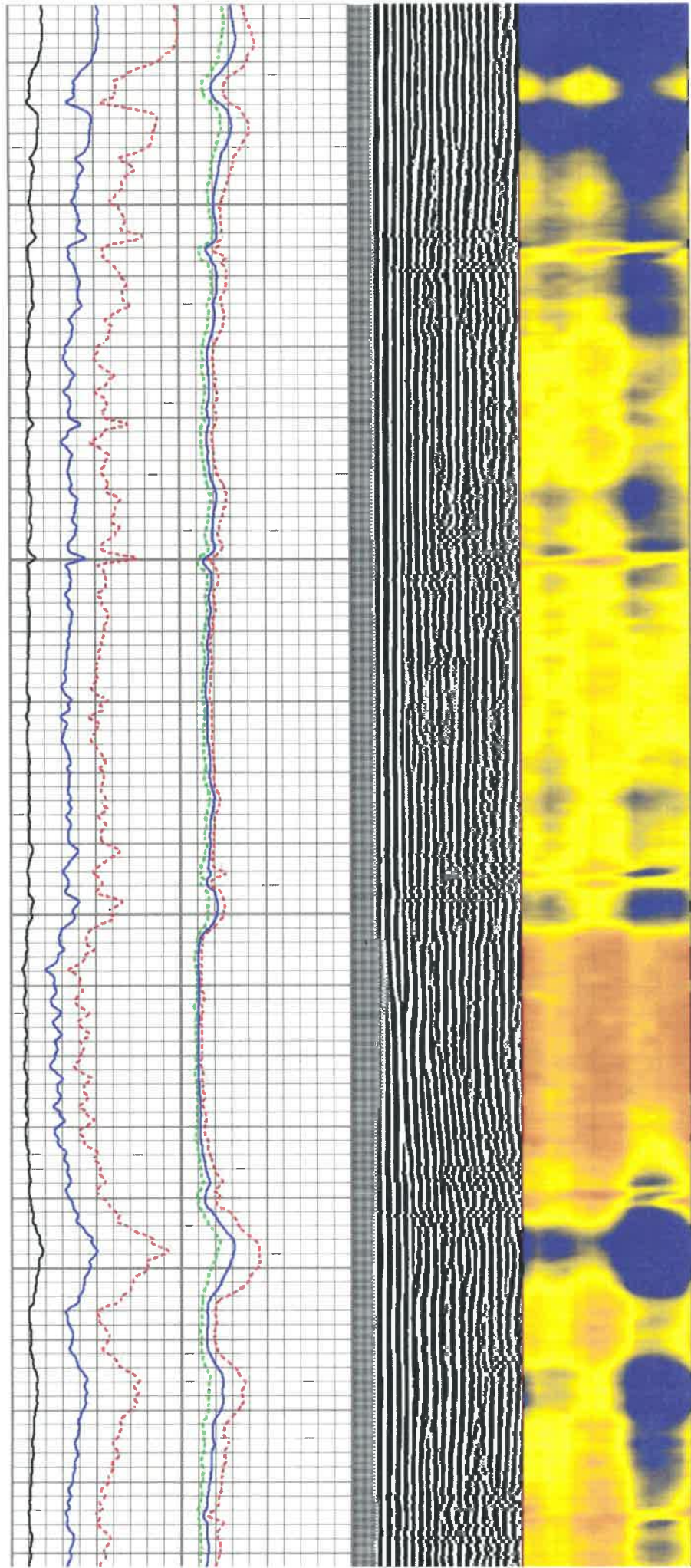


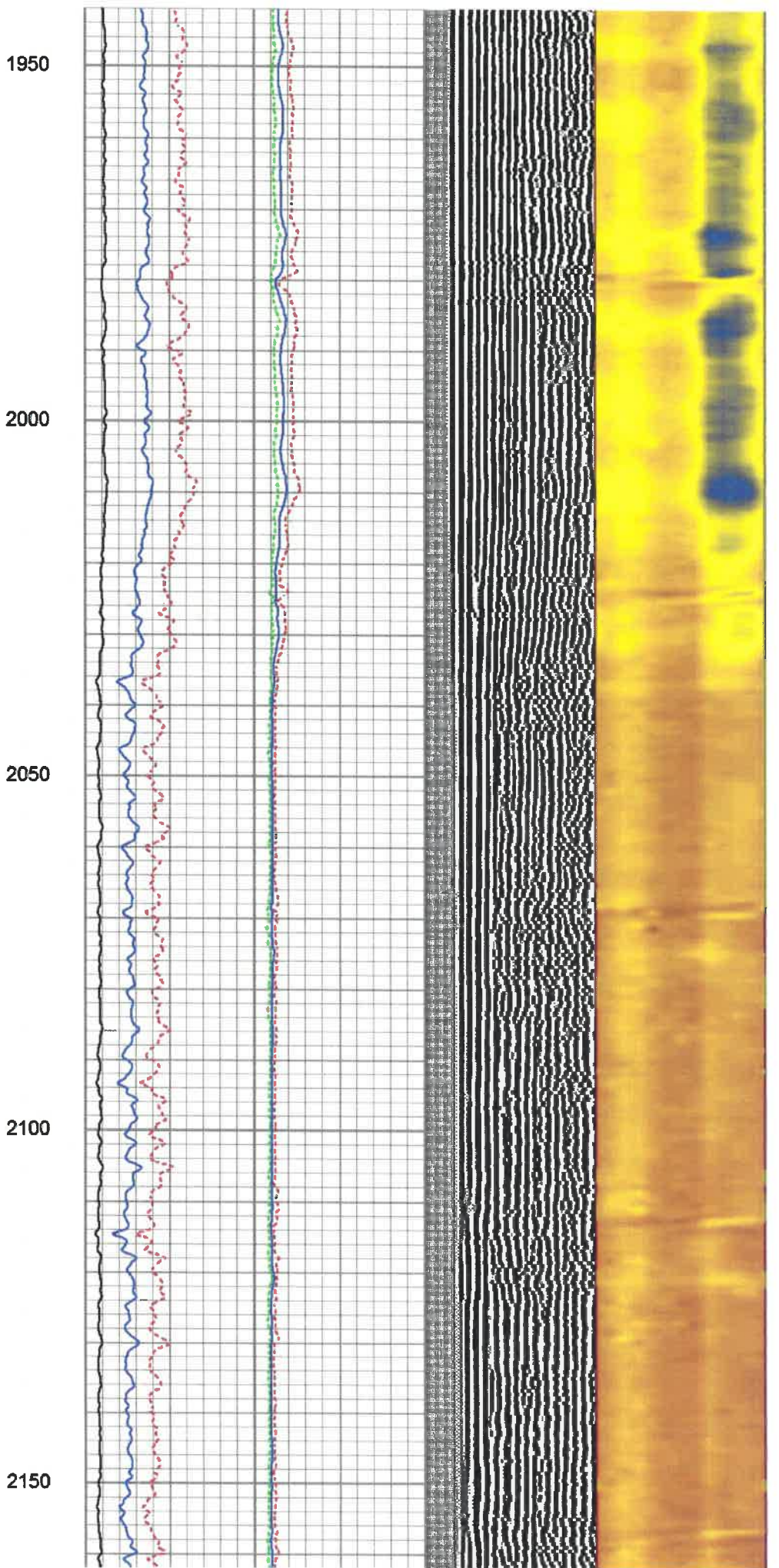
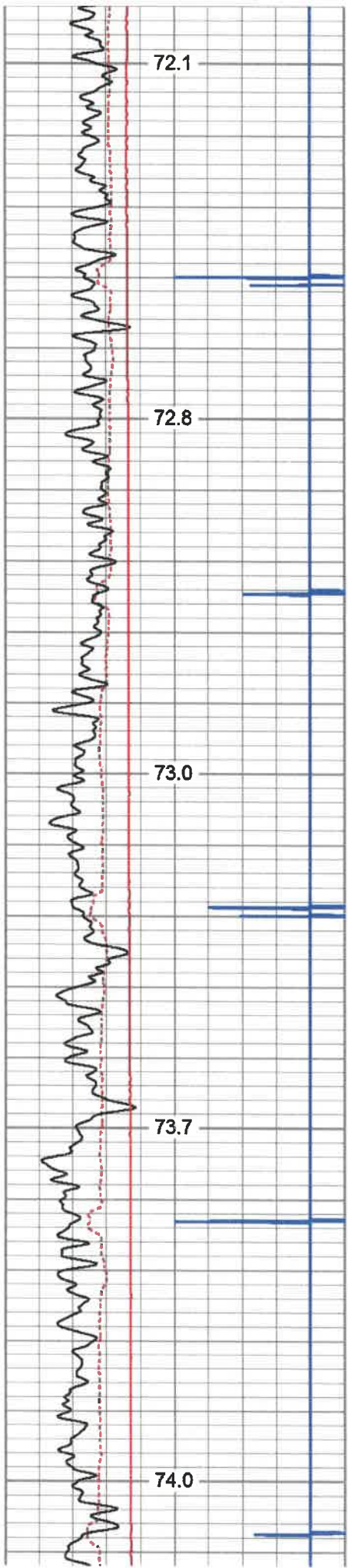
1750

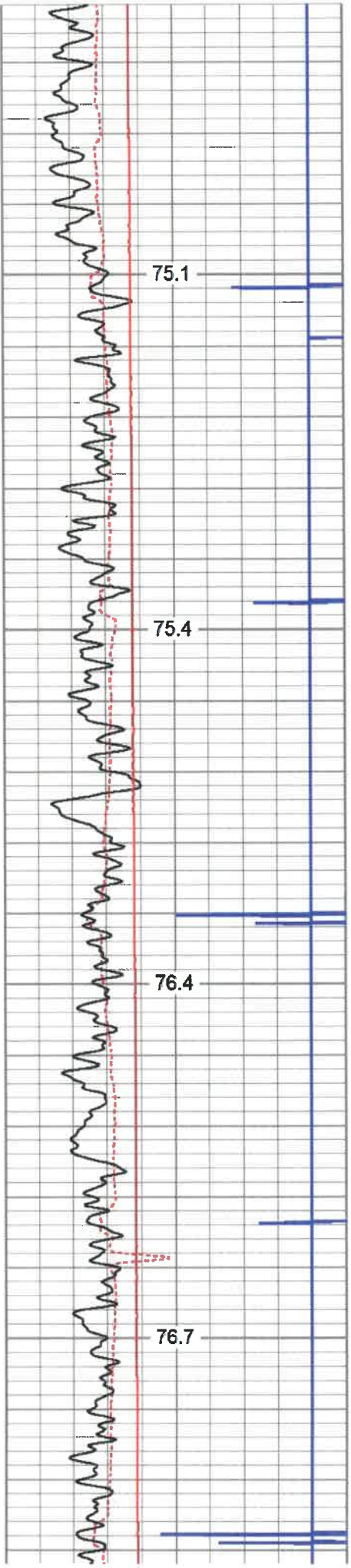
1800

1850

1900





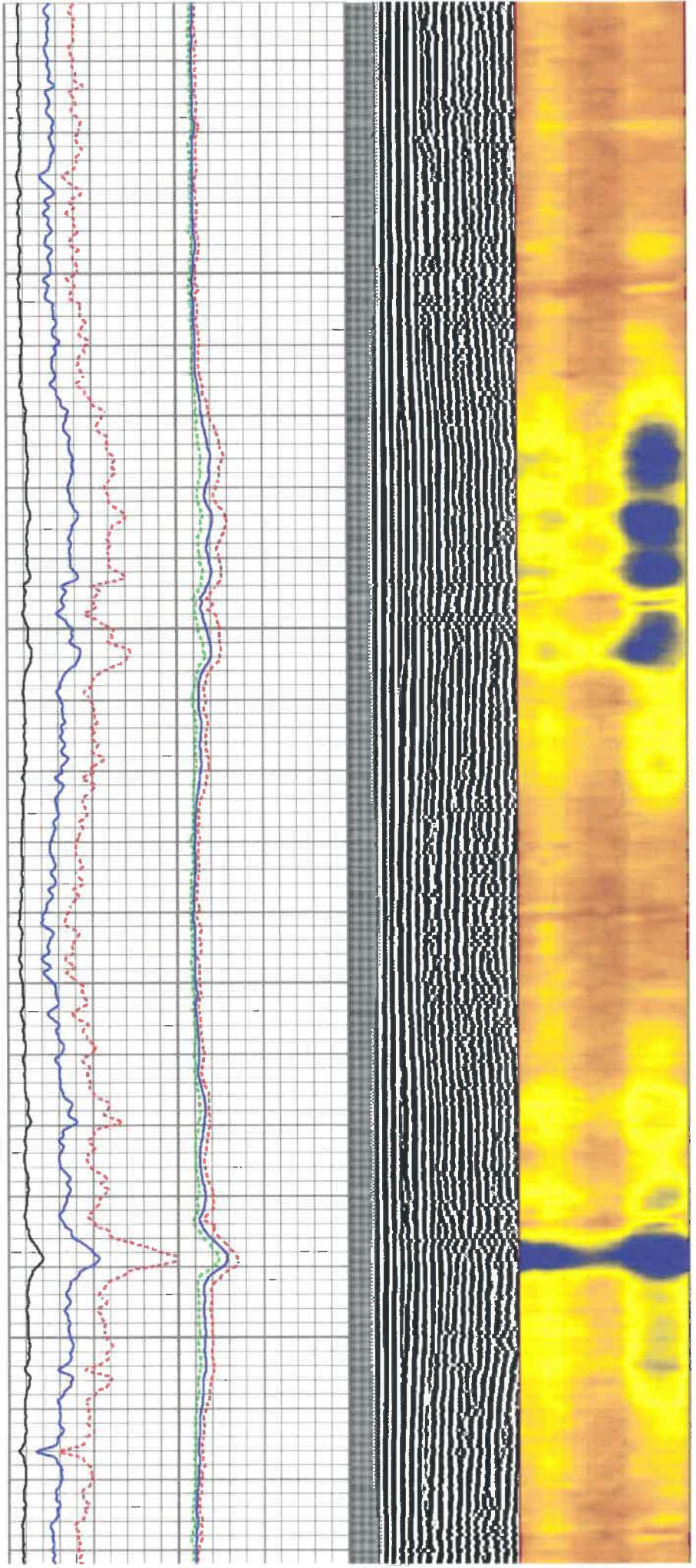


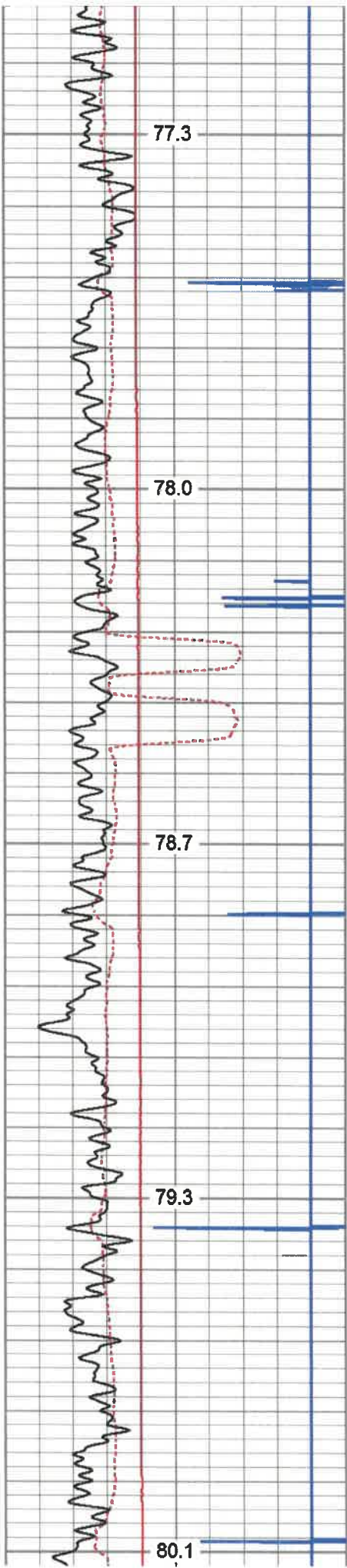
2200

2250

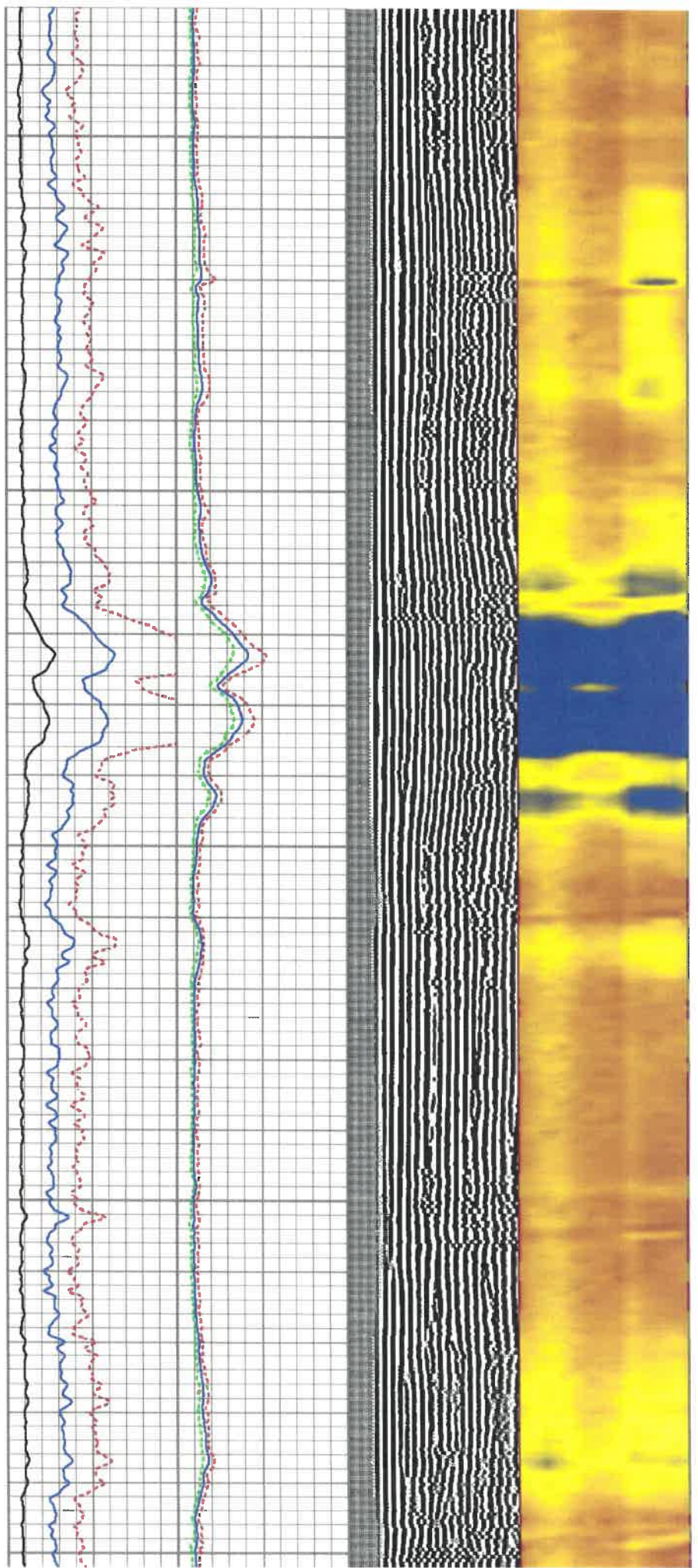
2300

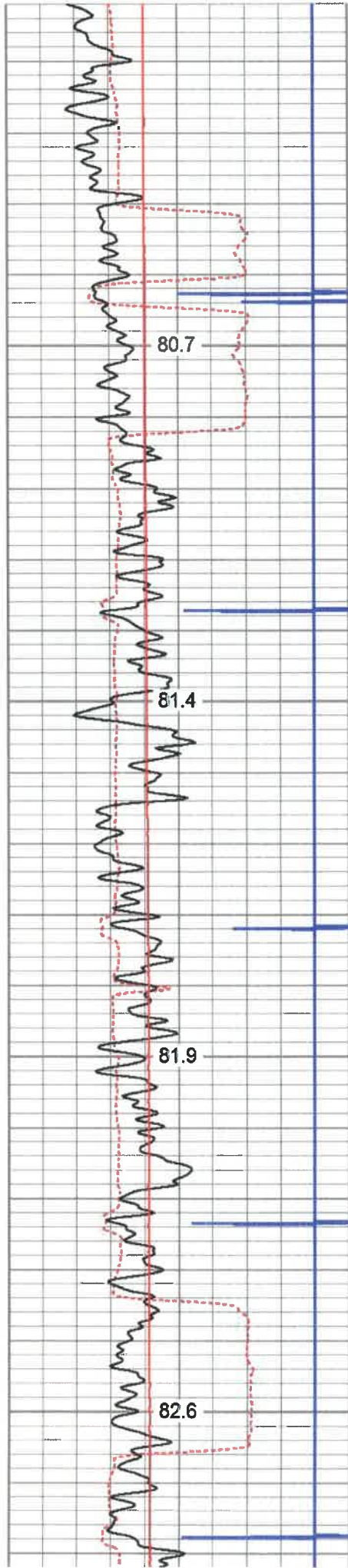
2350





2400  
2450  
2500  
2550  
2600



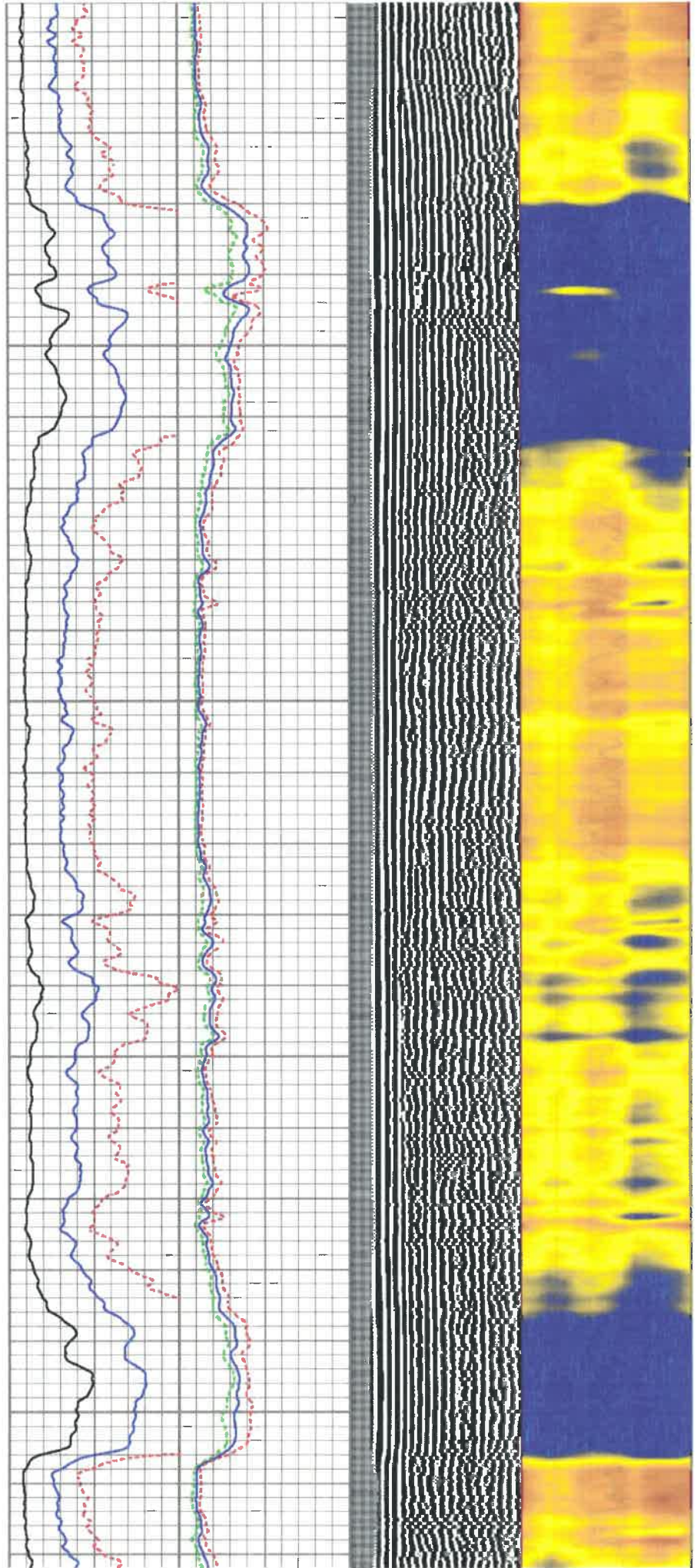


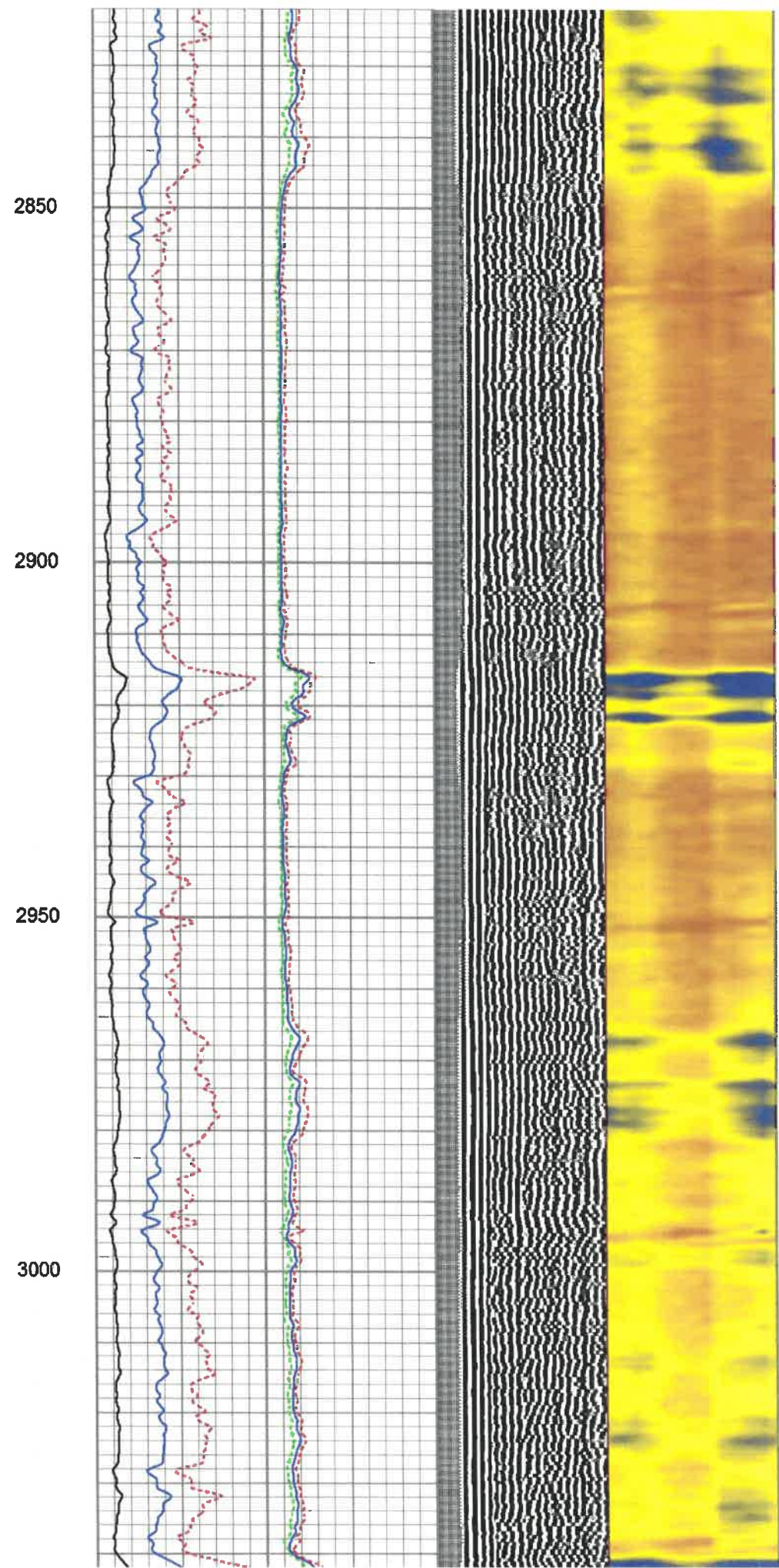
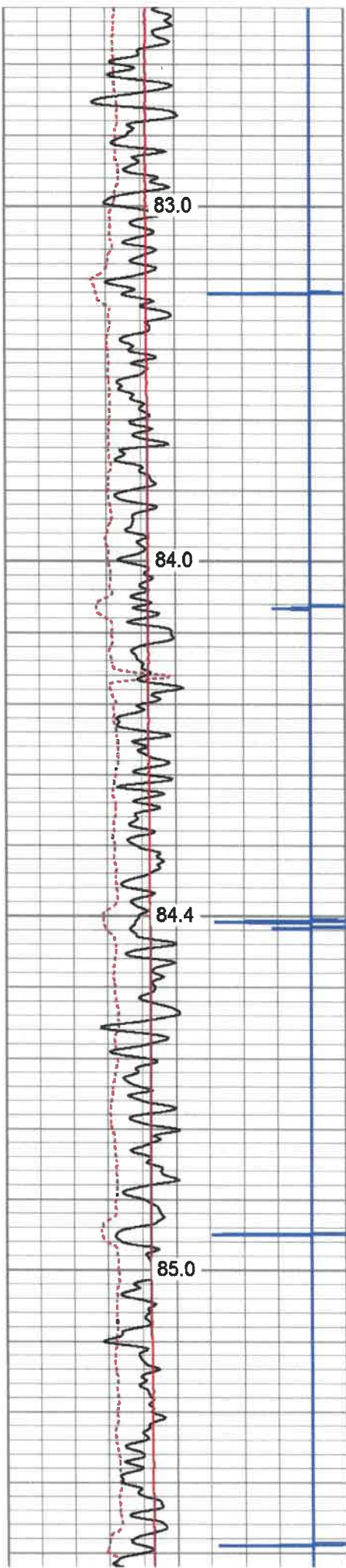
2650

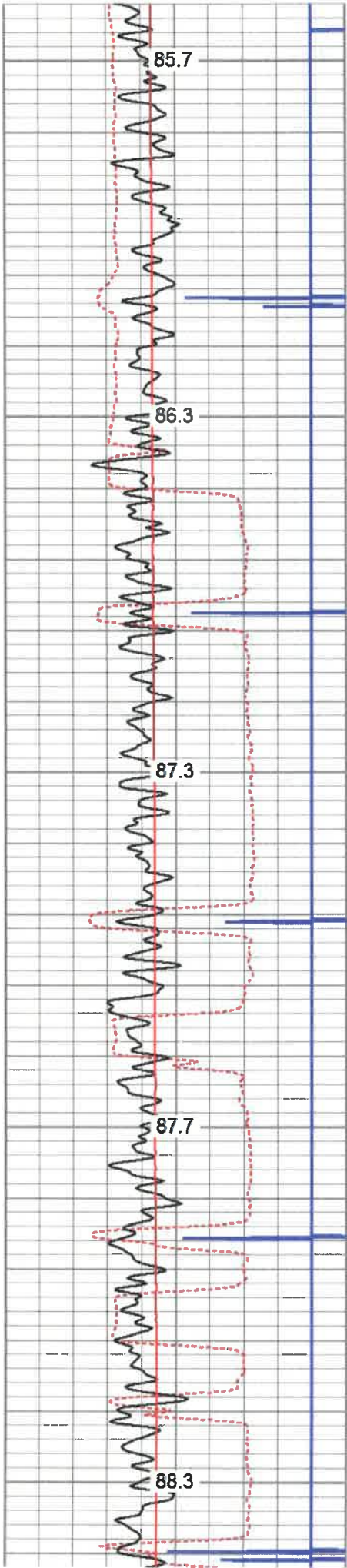
2700

2750

2800







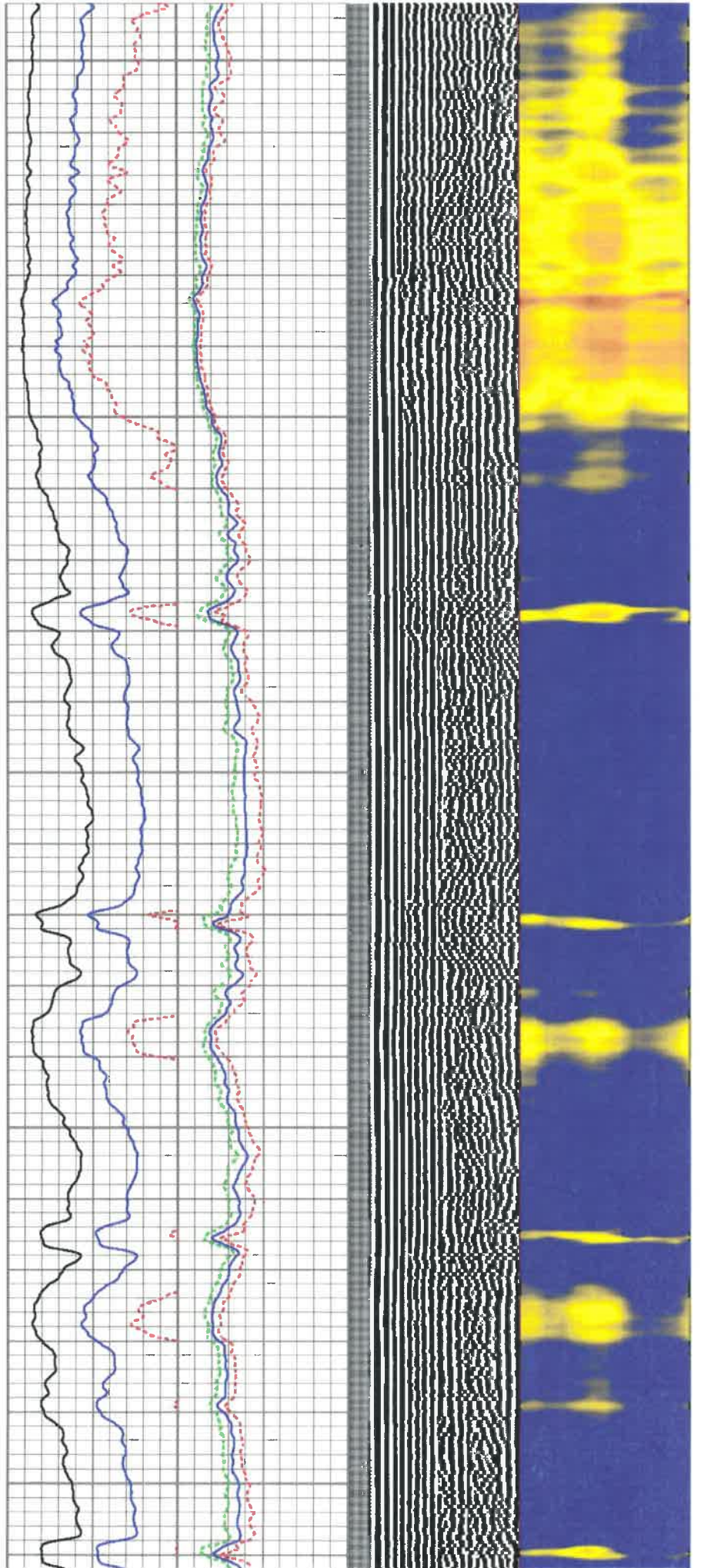
3050

3100

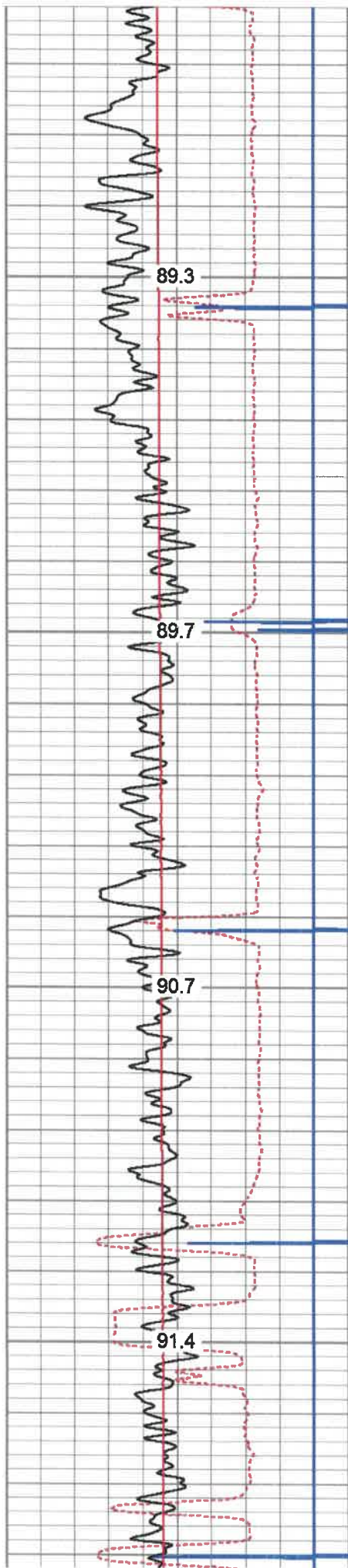
3150

3200

3250





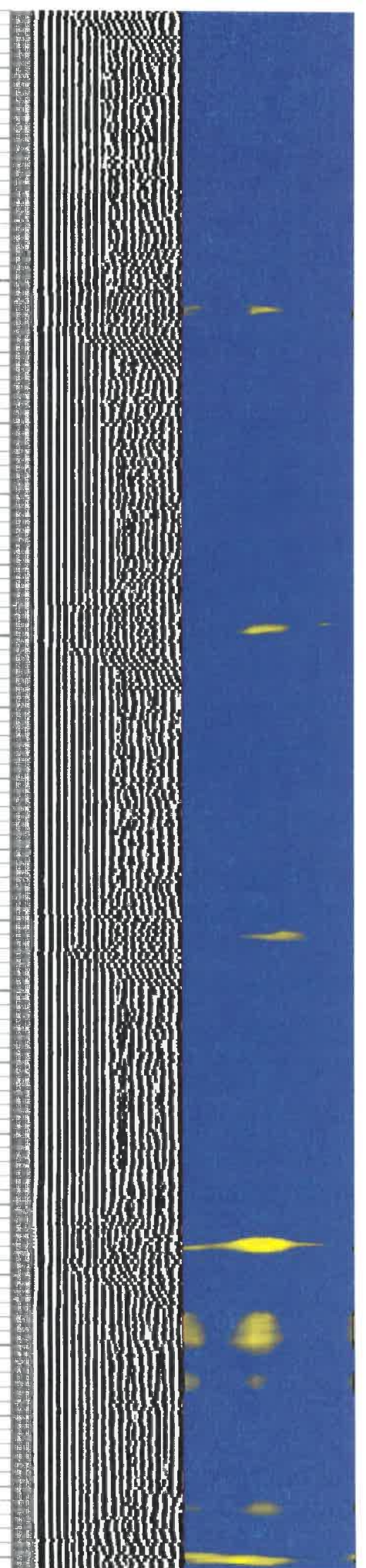
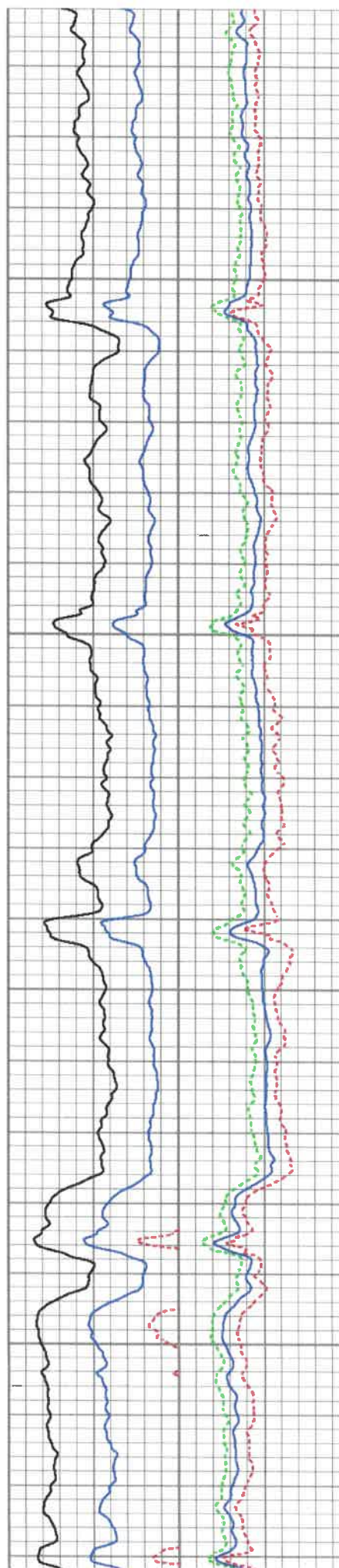


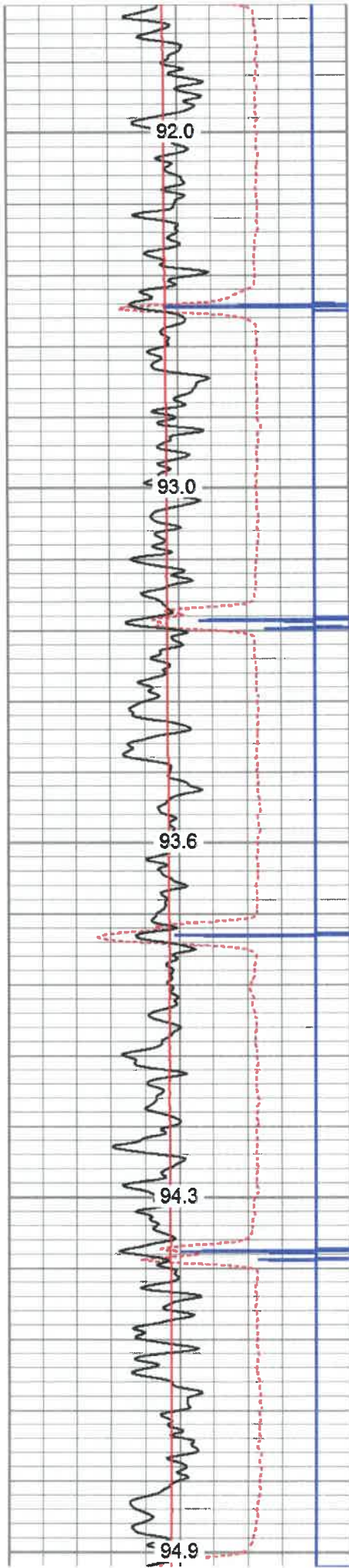
3300

3350

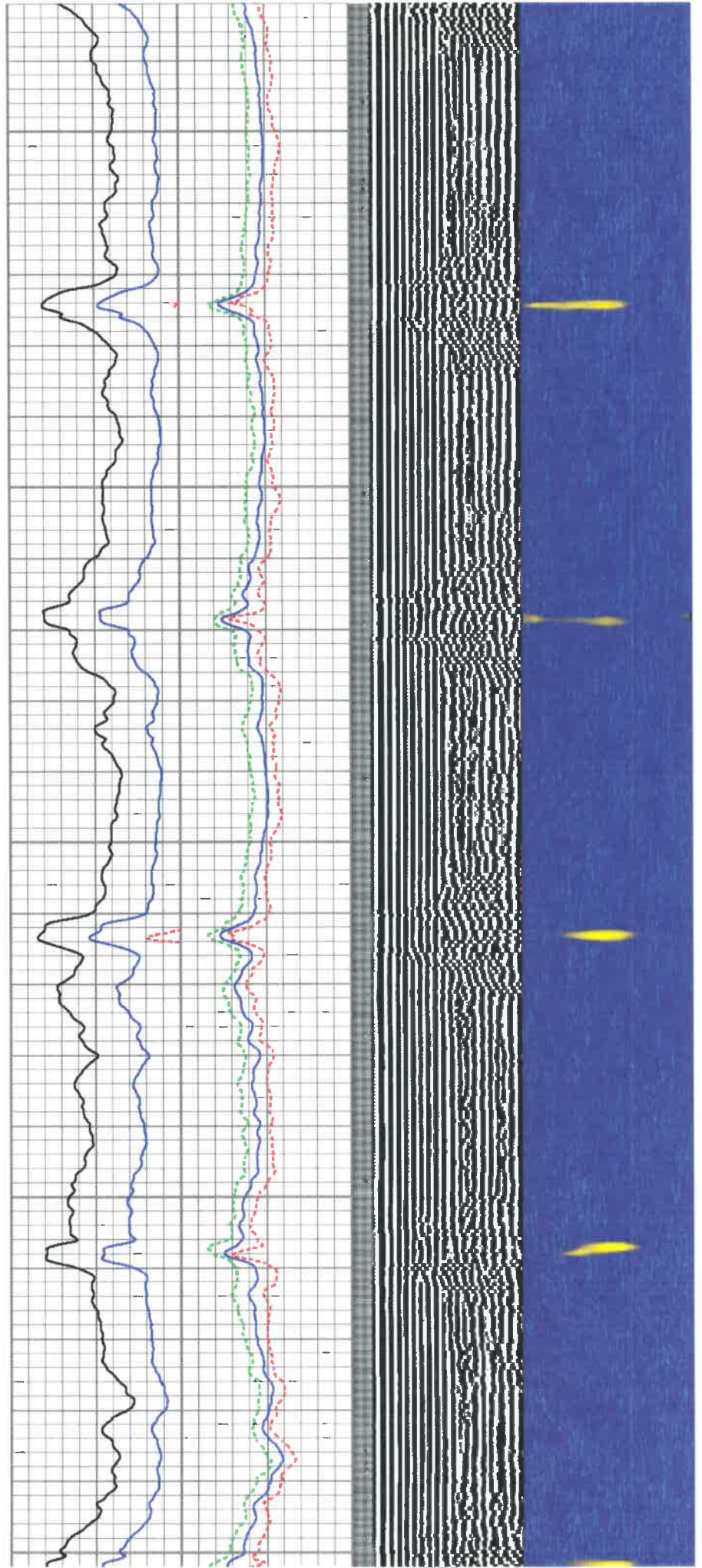
3400

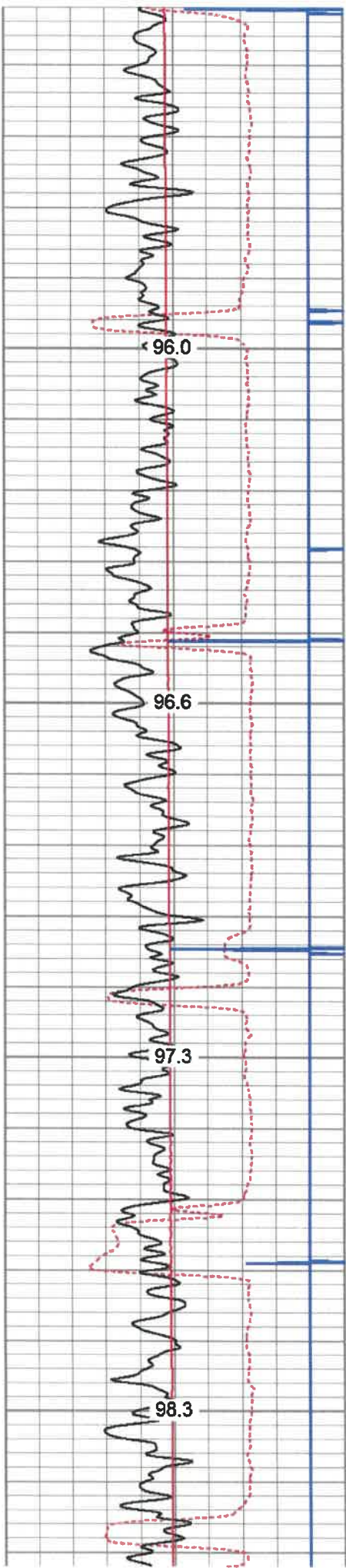
3450





3500  
3550  
3600  
3650  
3700



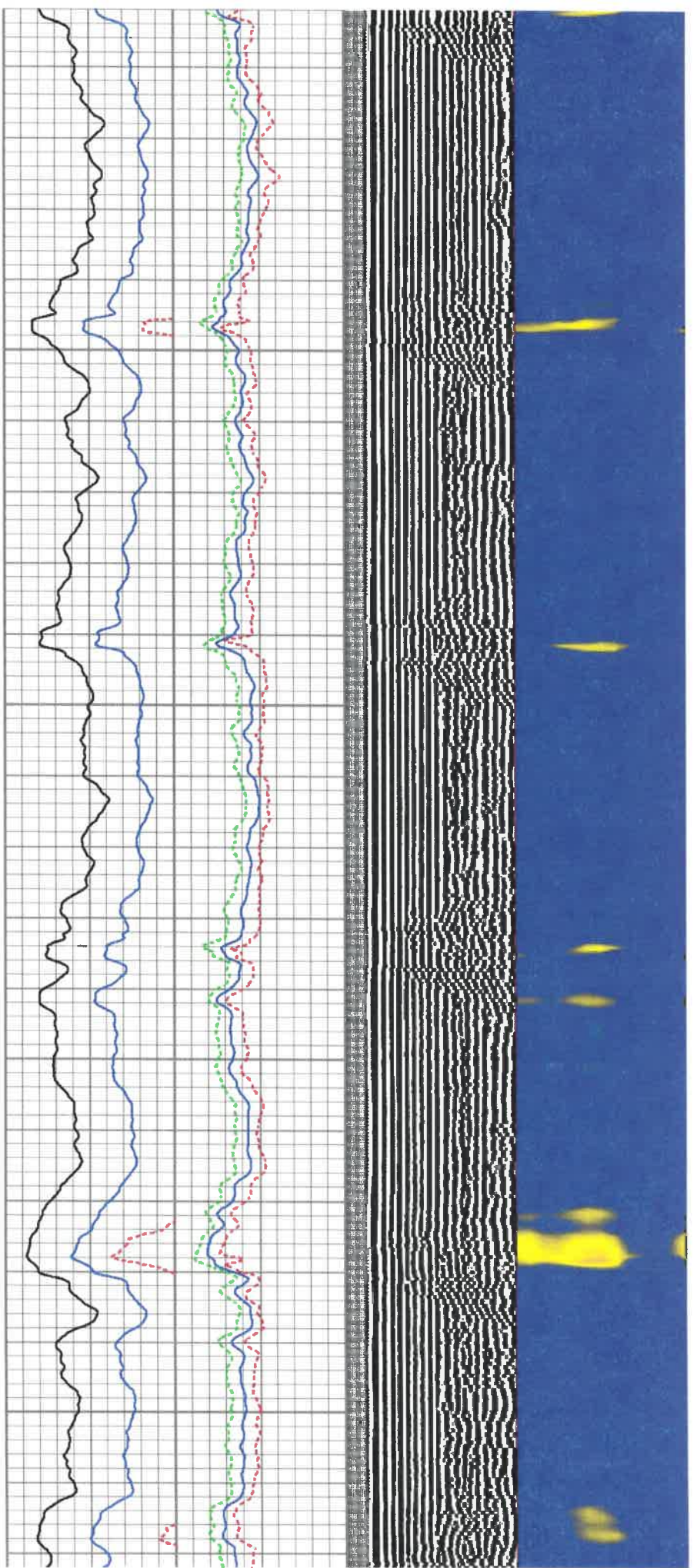


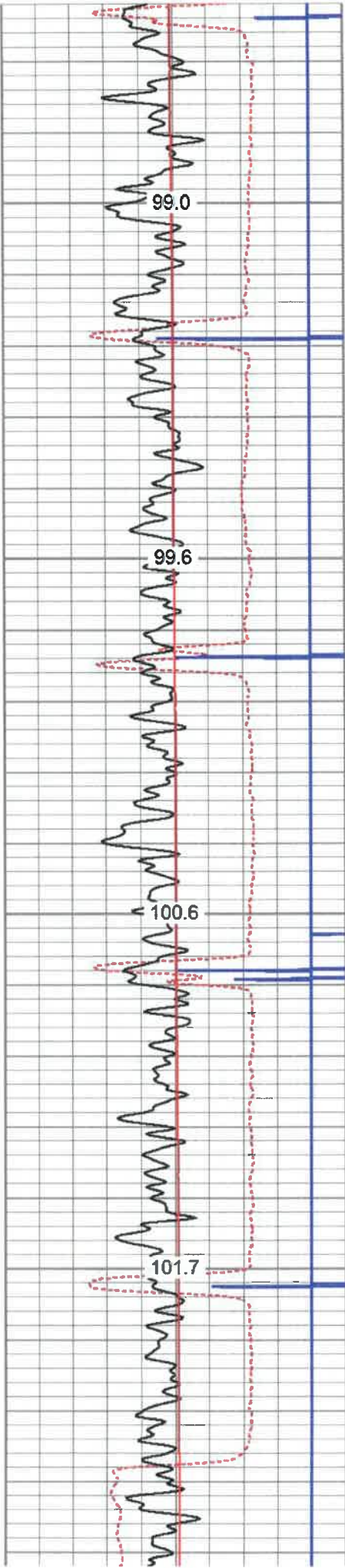
3750

3800

3850

3900



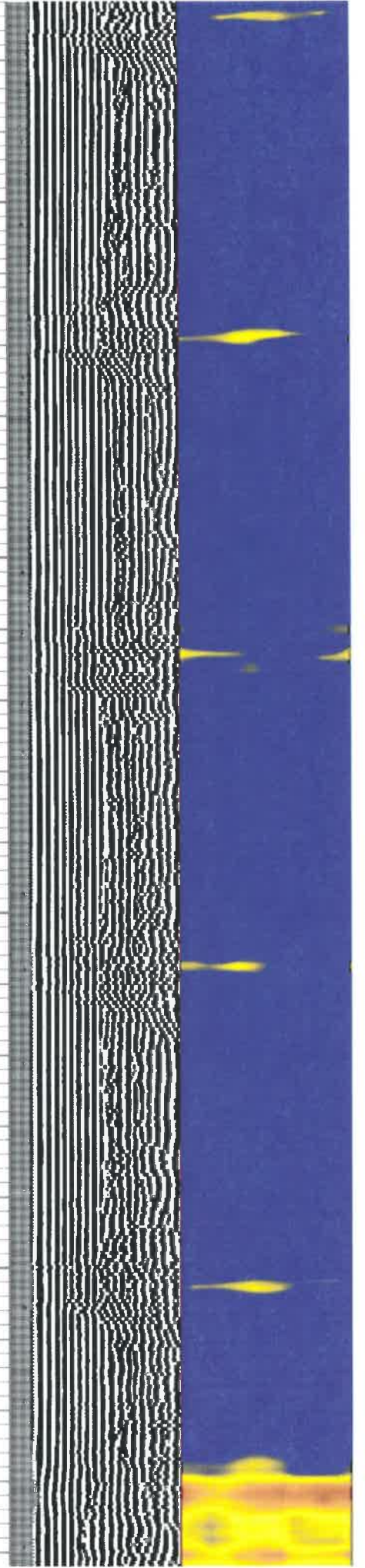
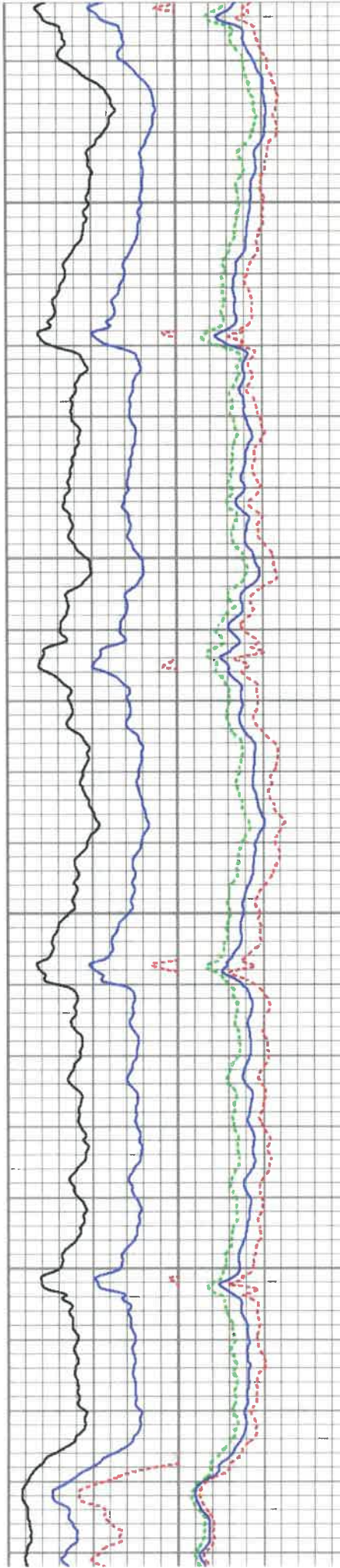


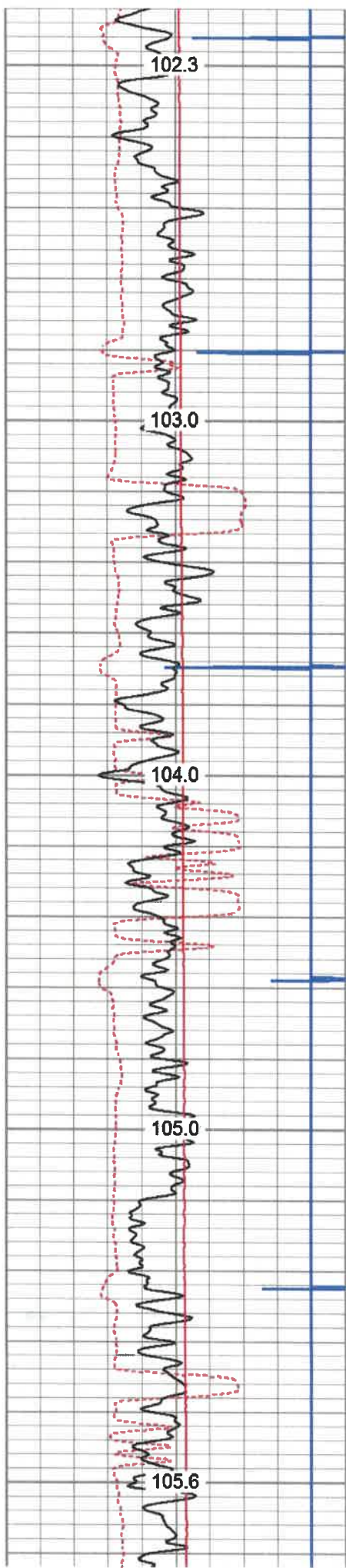
3950

4000

4050

4100





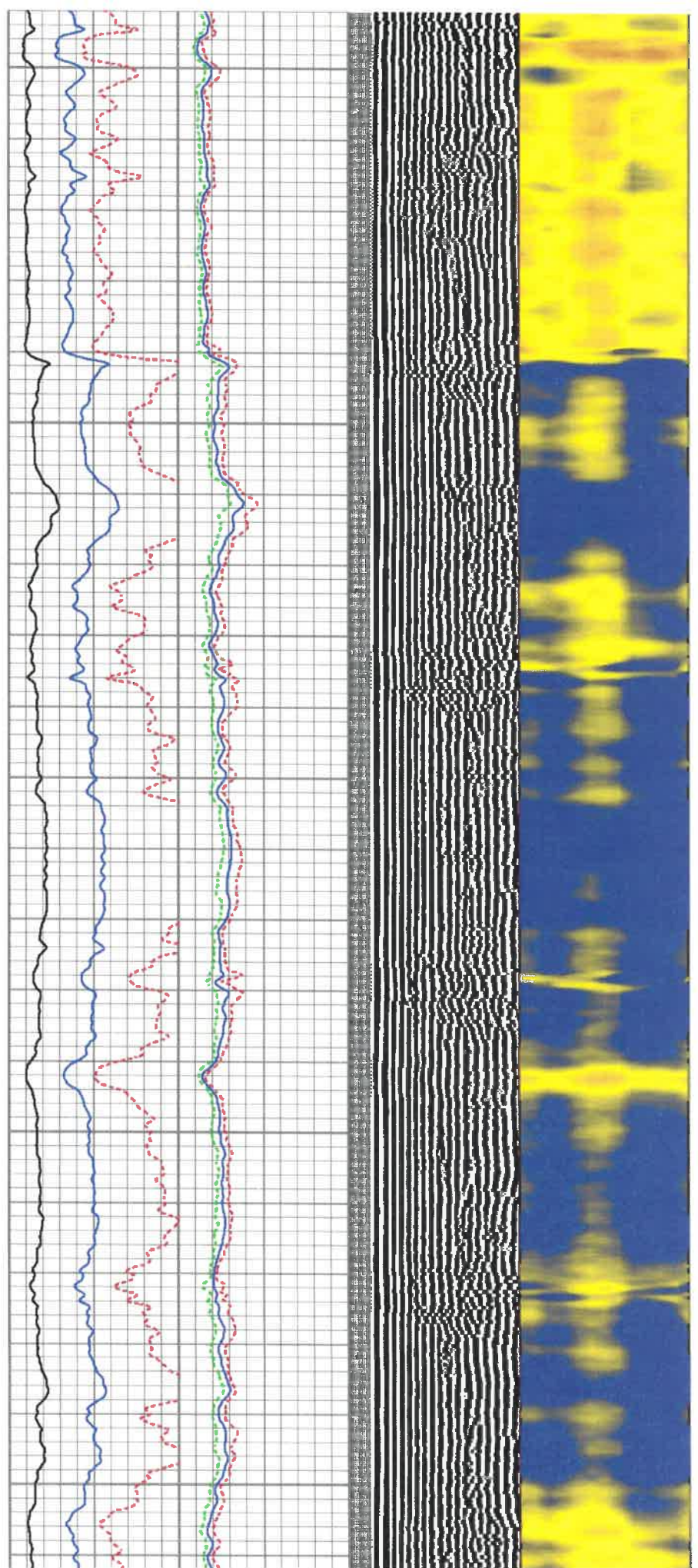
4150

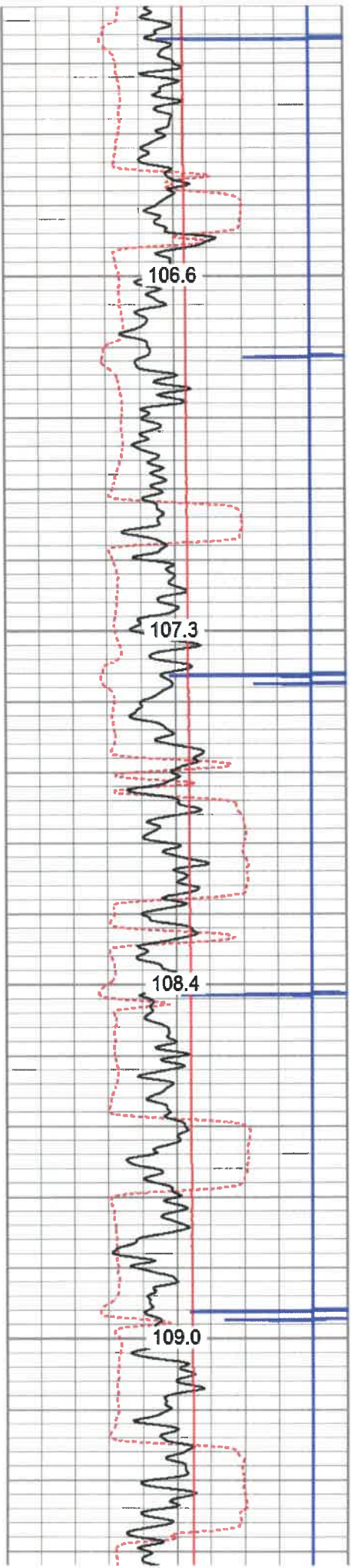
4200

4250

4300

4350



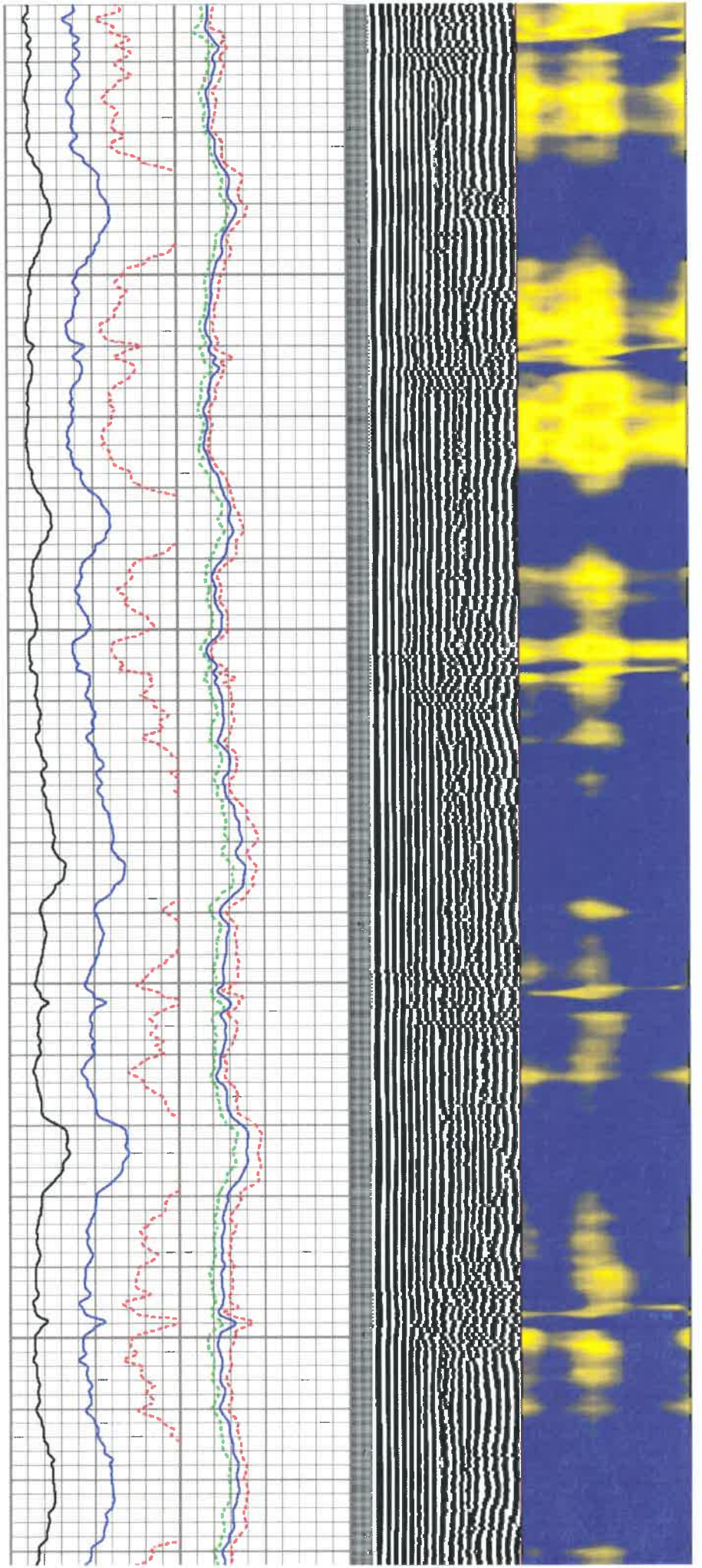


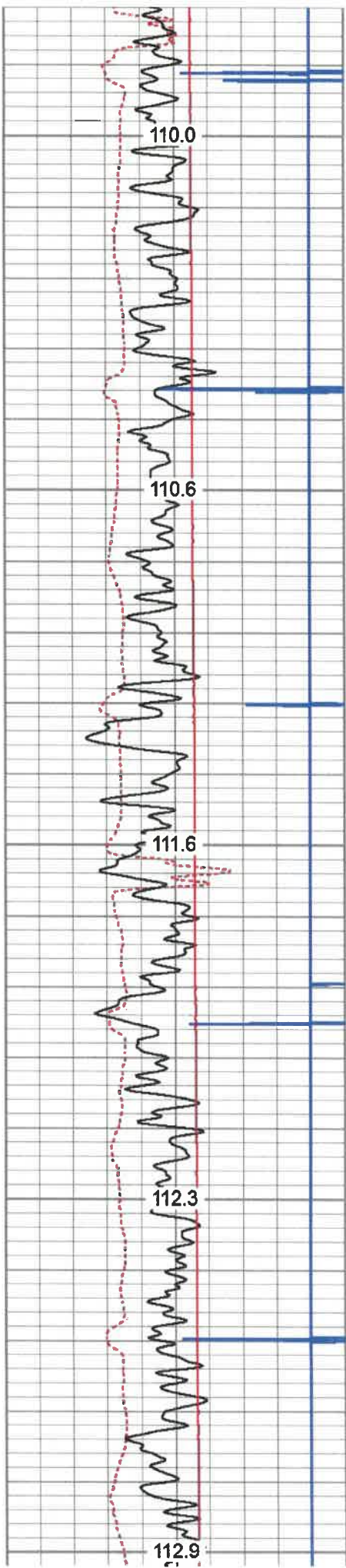
4400

4450

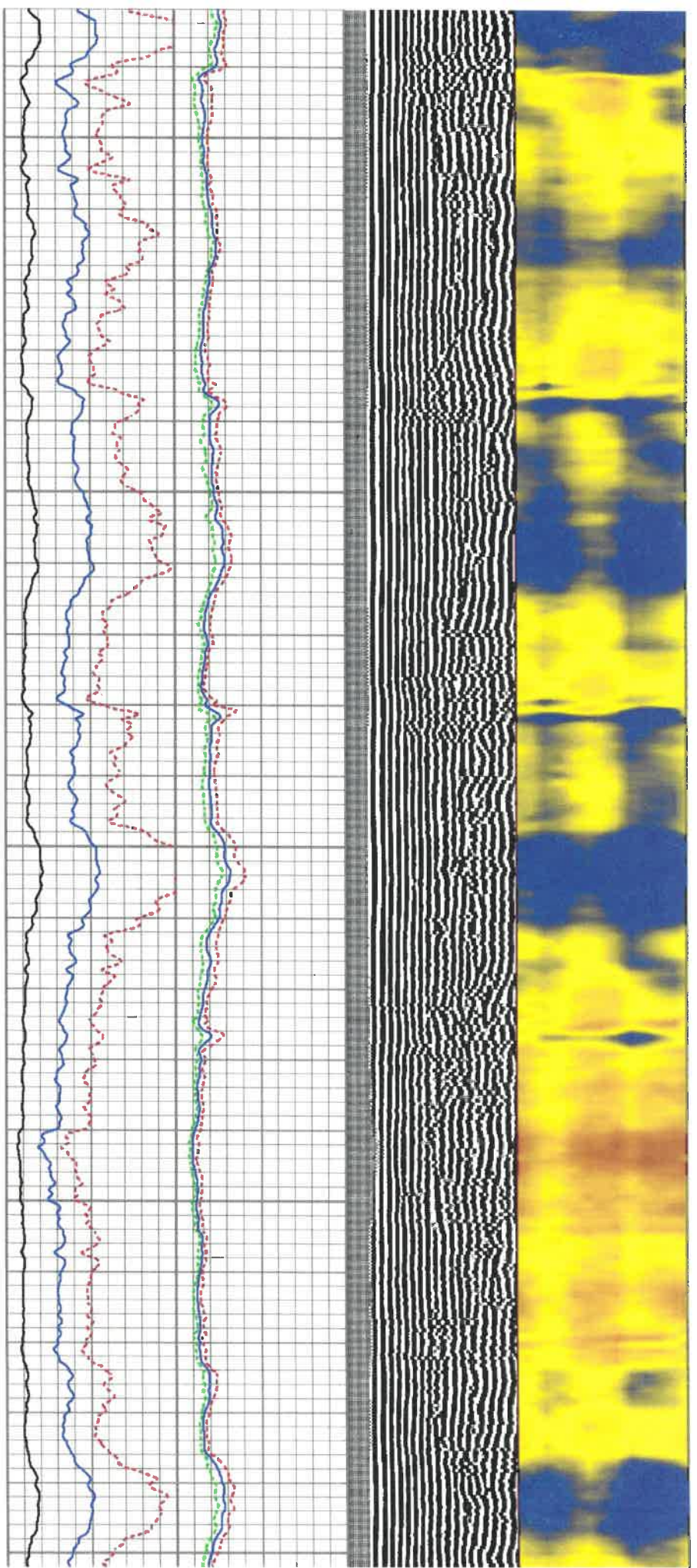
4500

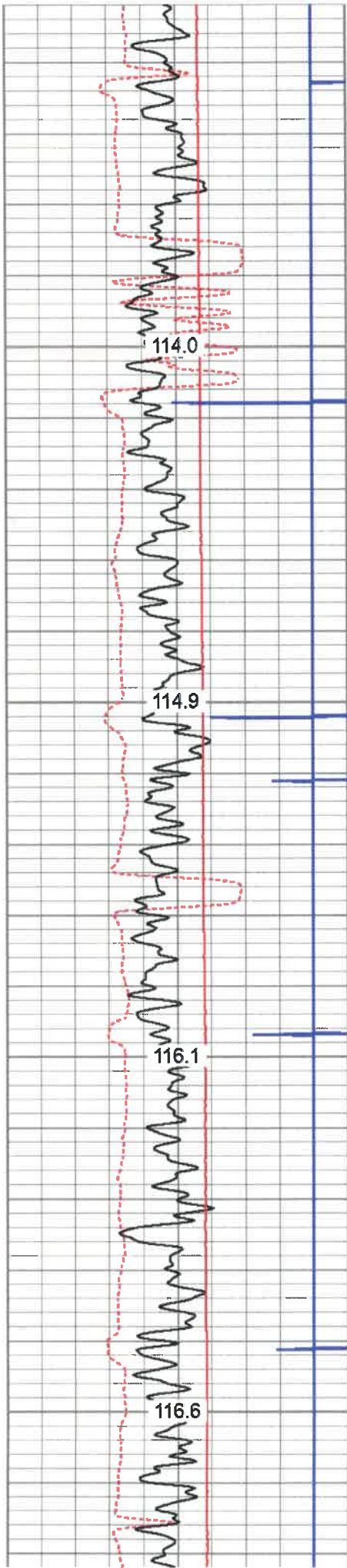
4550





4600  
4650  
4700  
4750  
4800



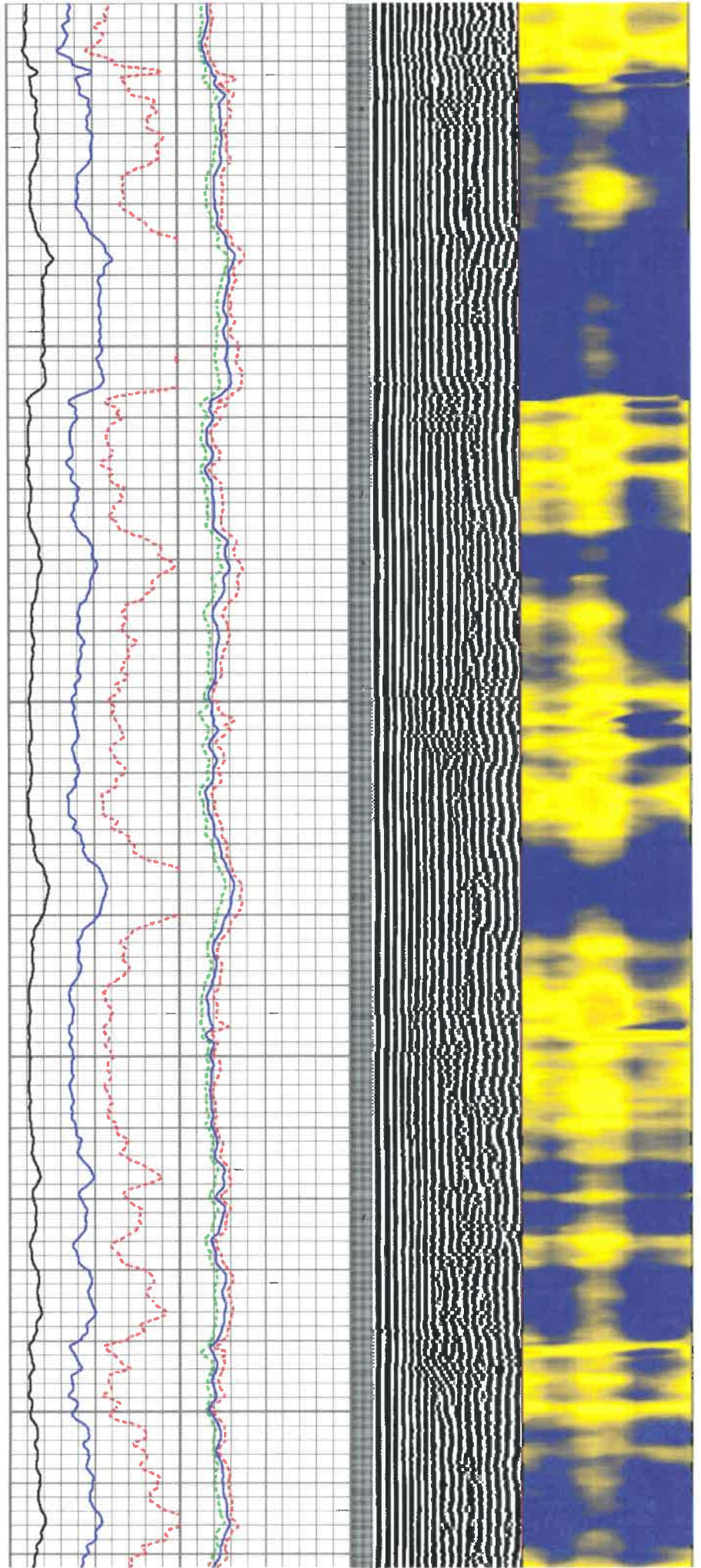


4850

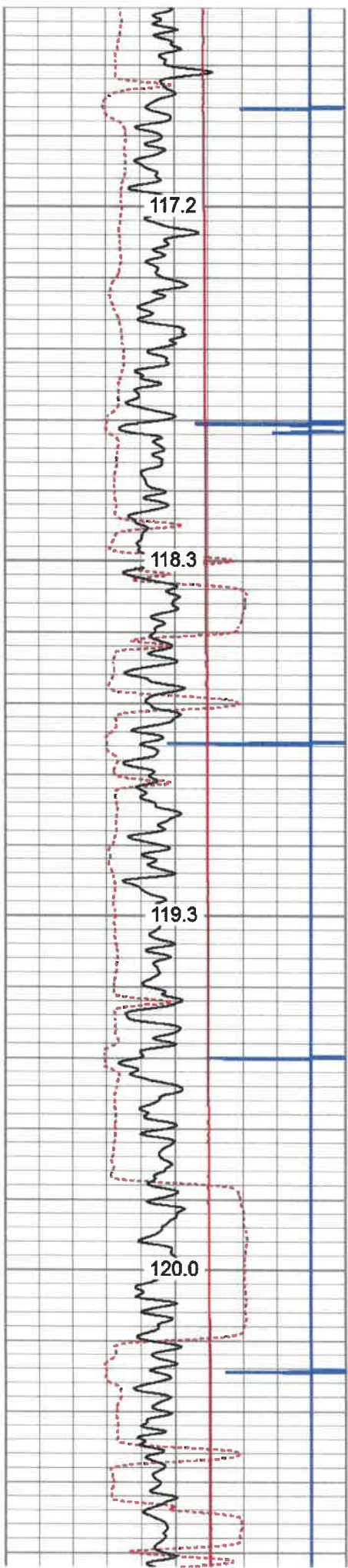
4900

4950

5000





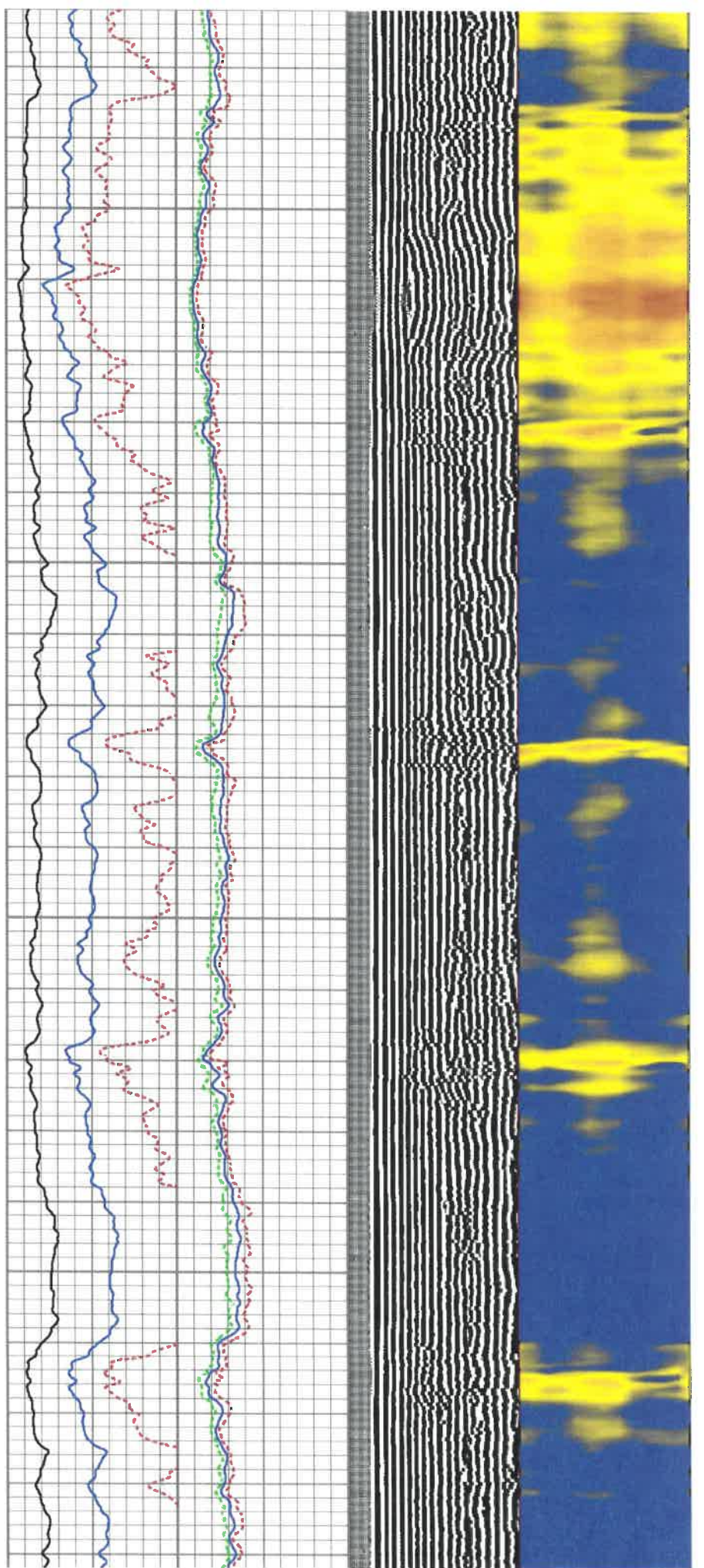


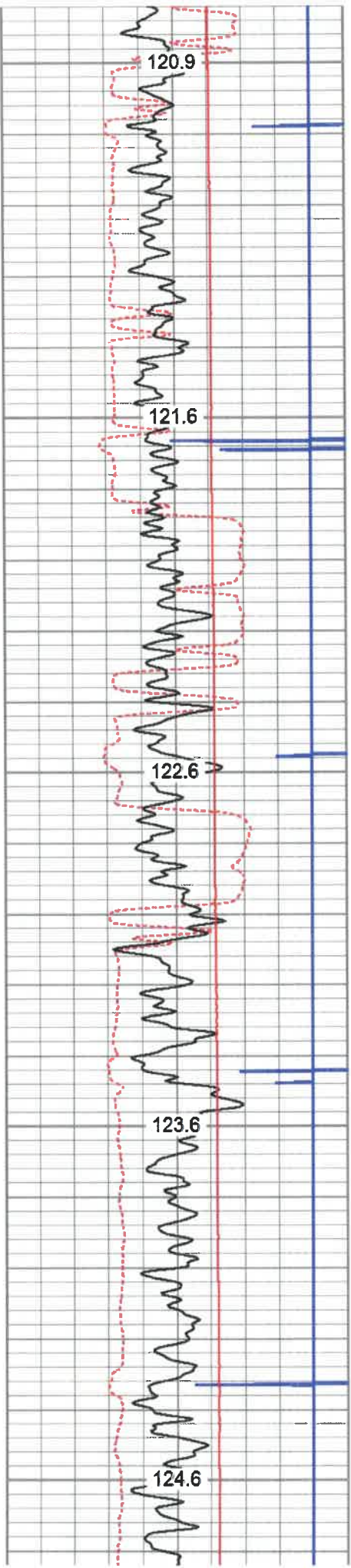
5050

5100

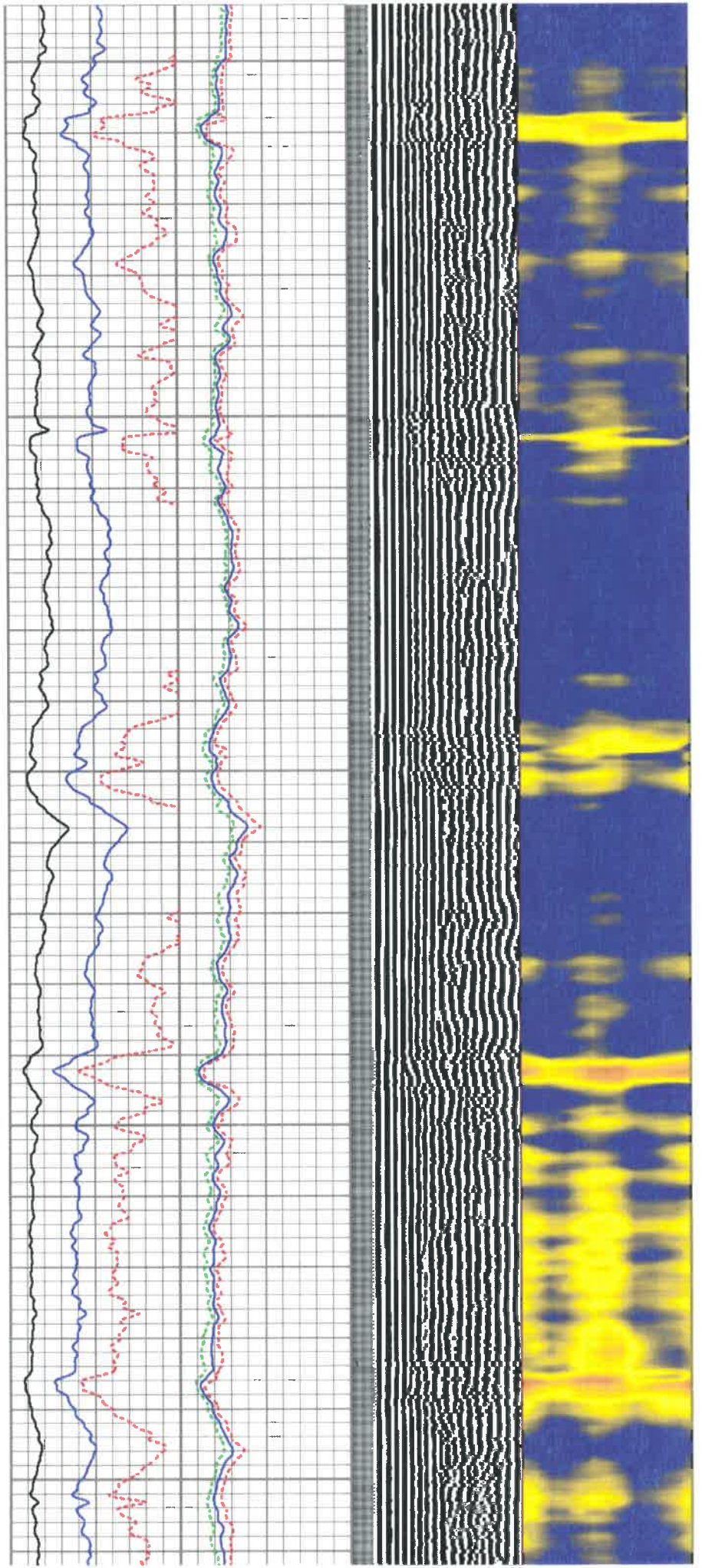
5150

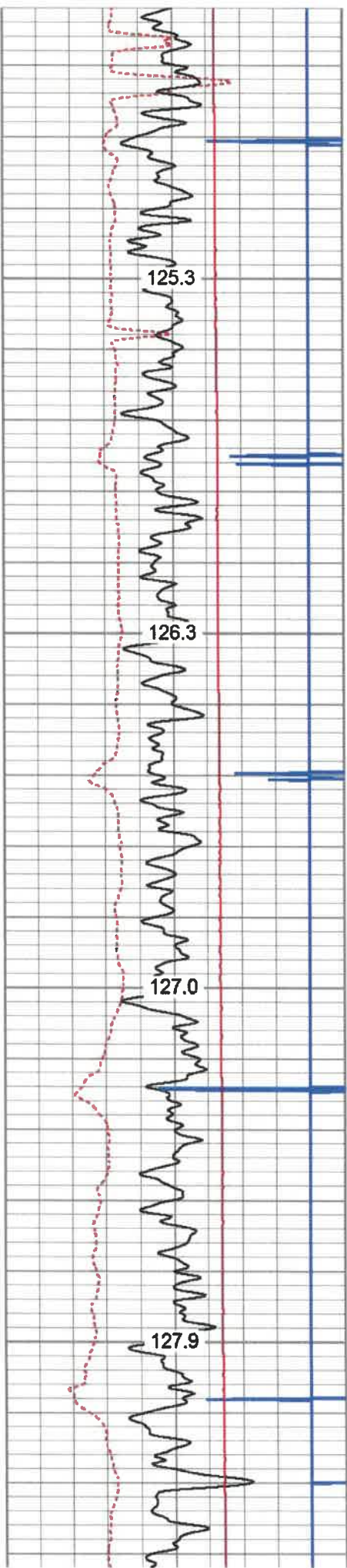
5200





5250  
5300  
5350  
5400  
5450



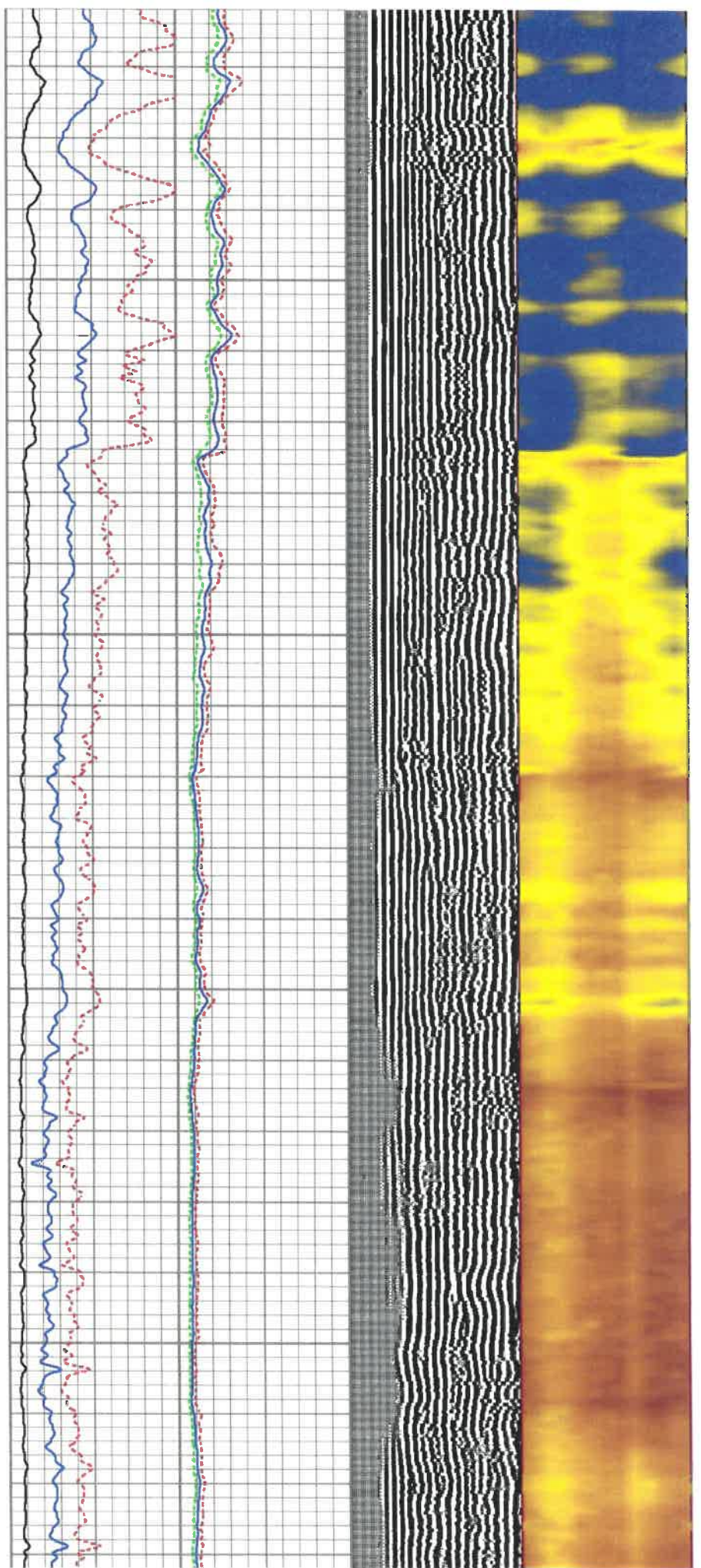


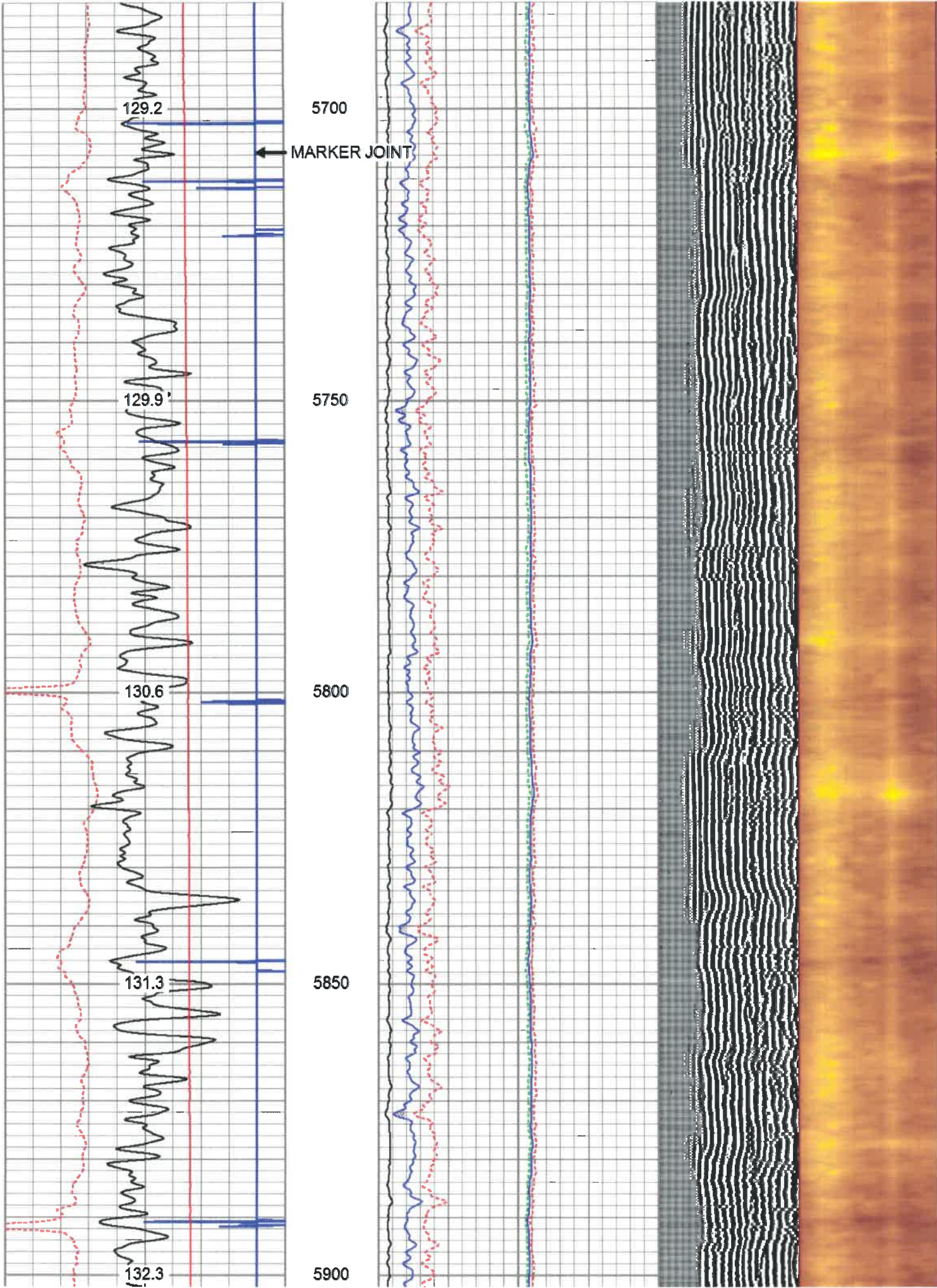
5500

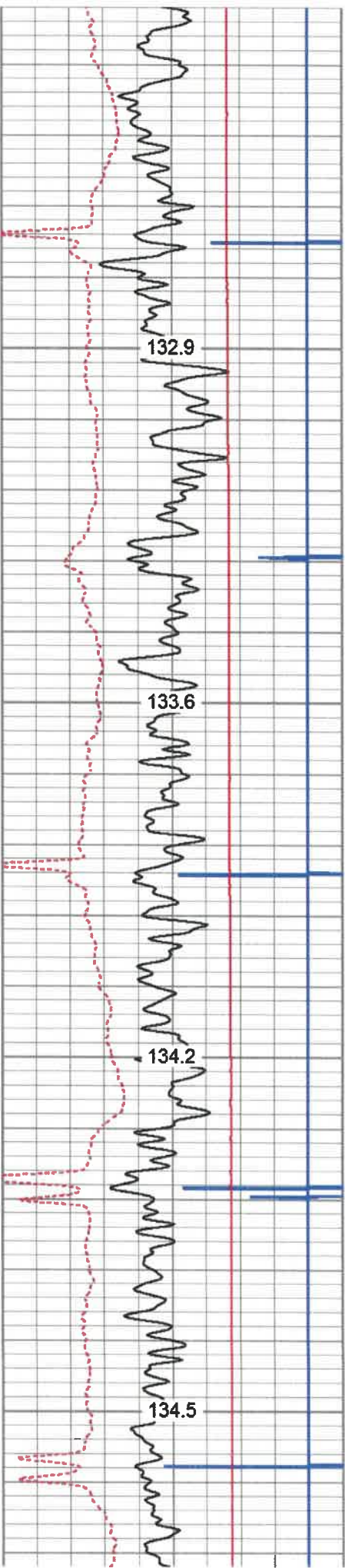
5550

5600

5650





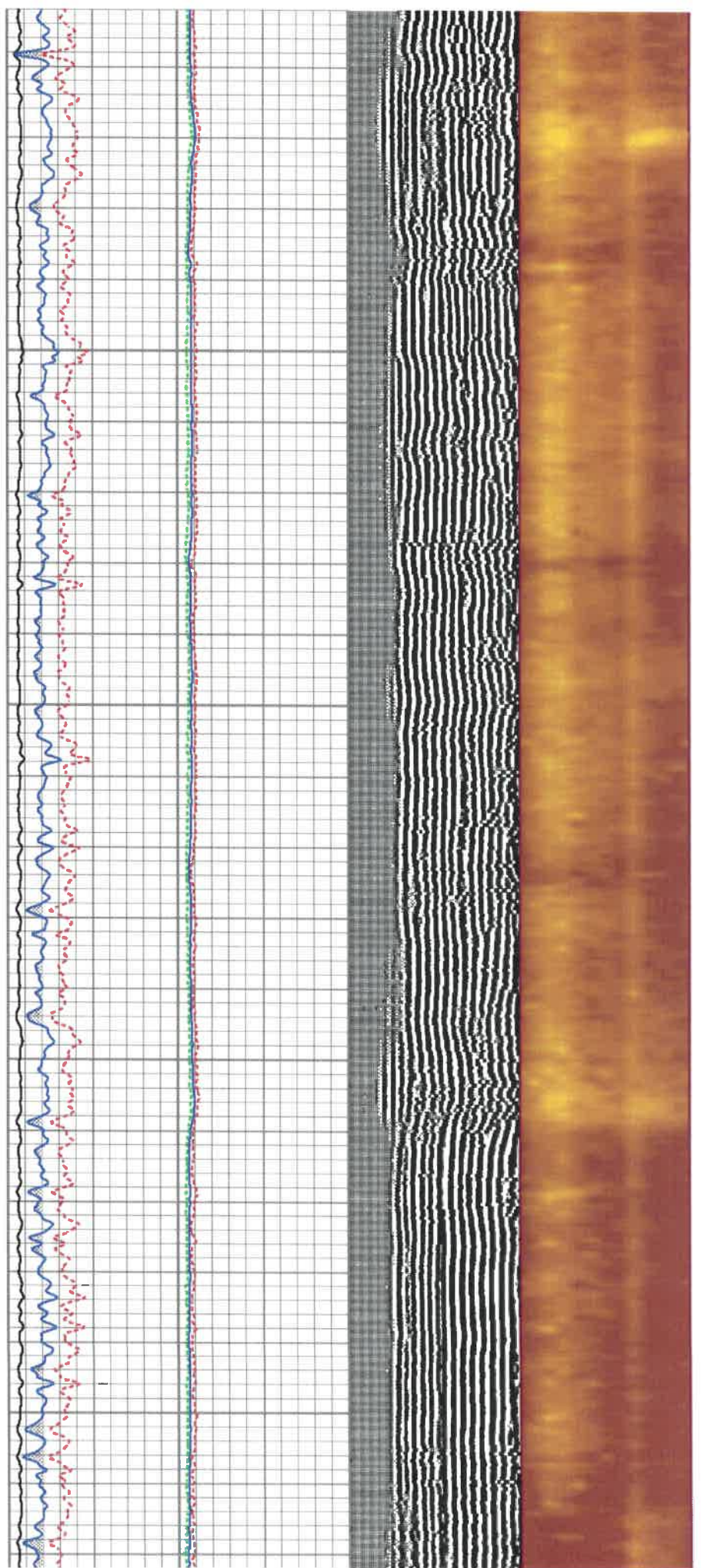


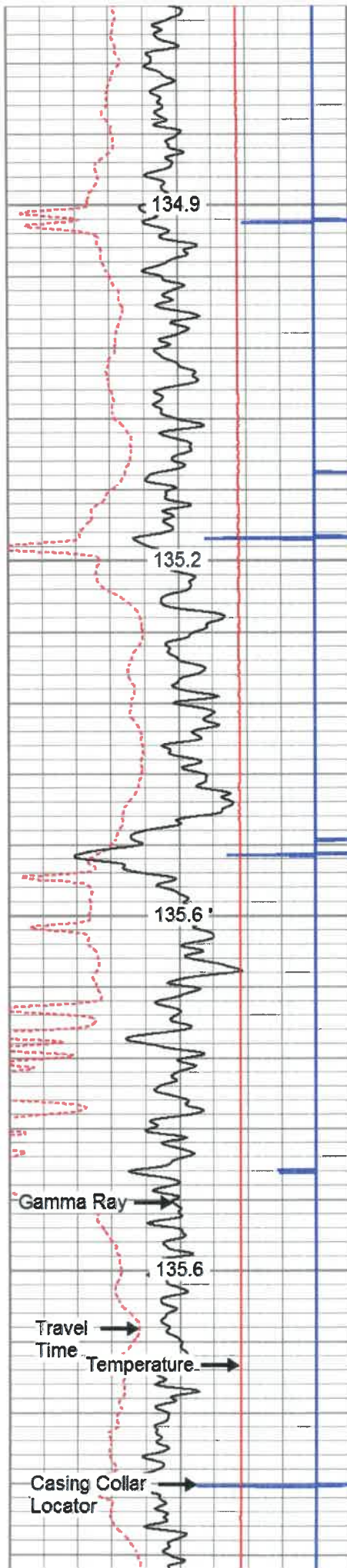
5950

6000

6050

6100



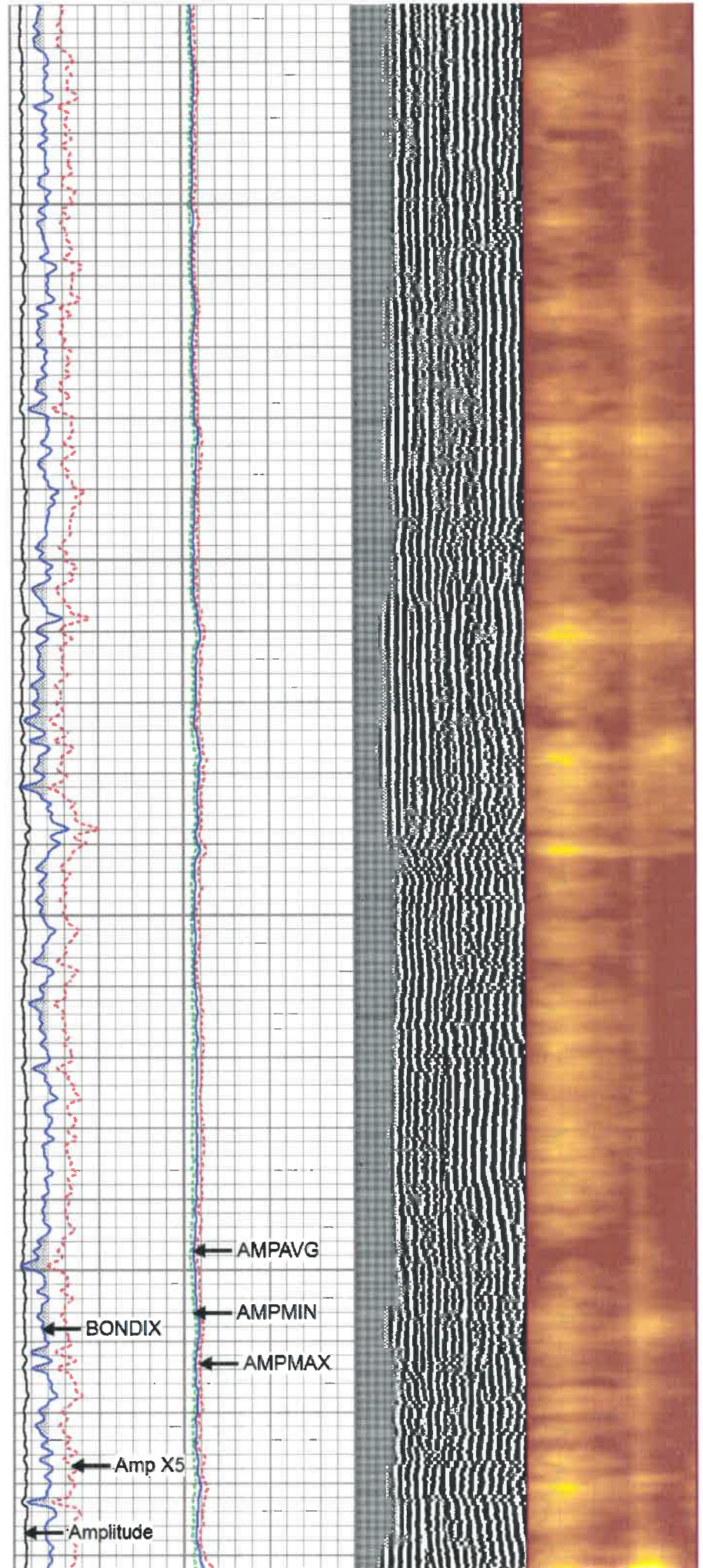


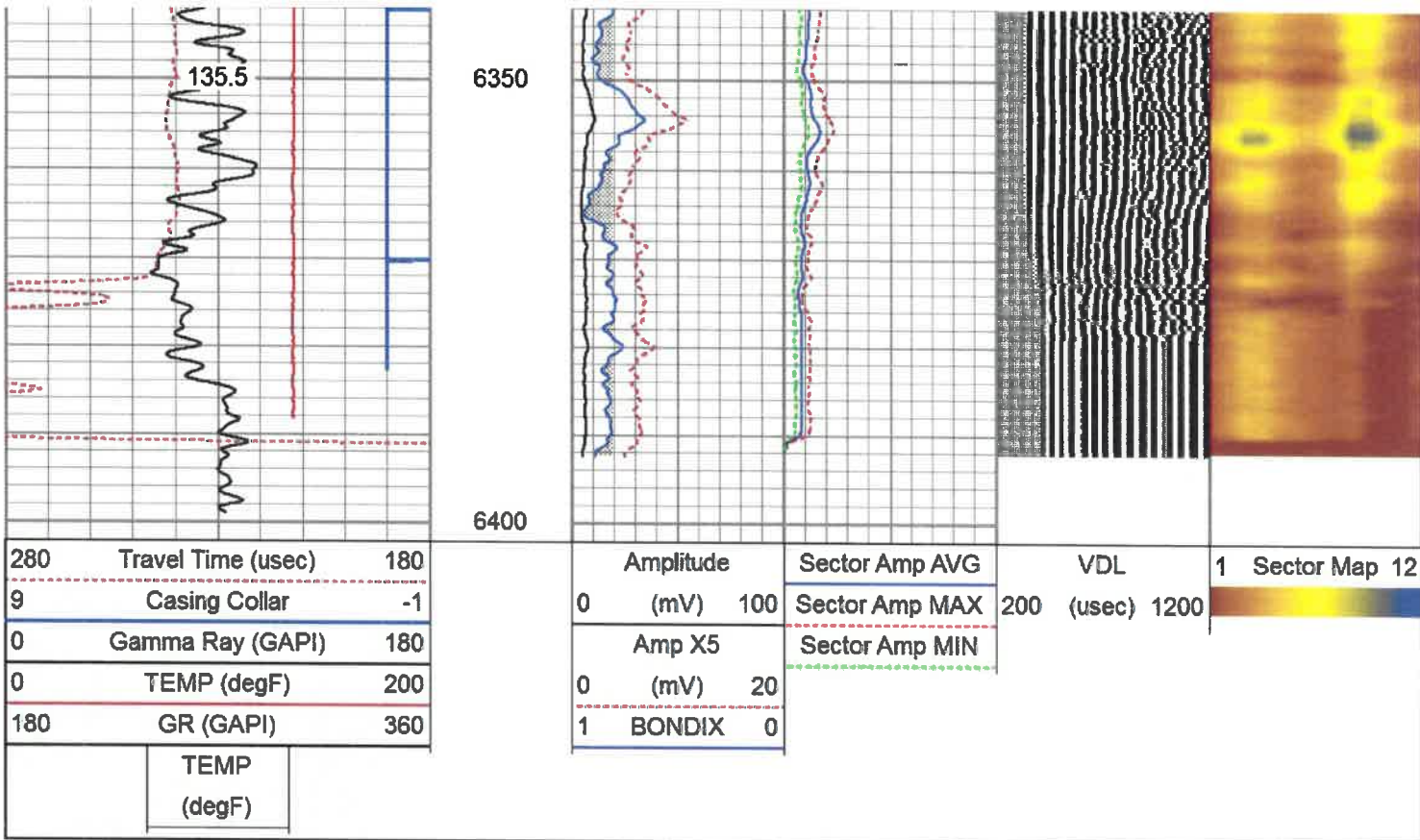
6150


6200

6250

6300

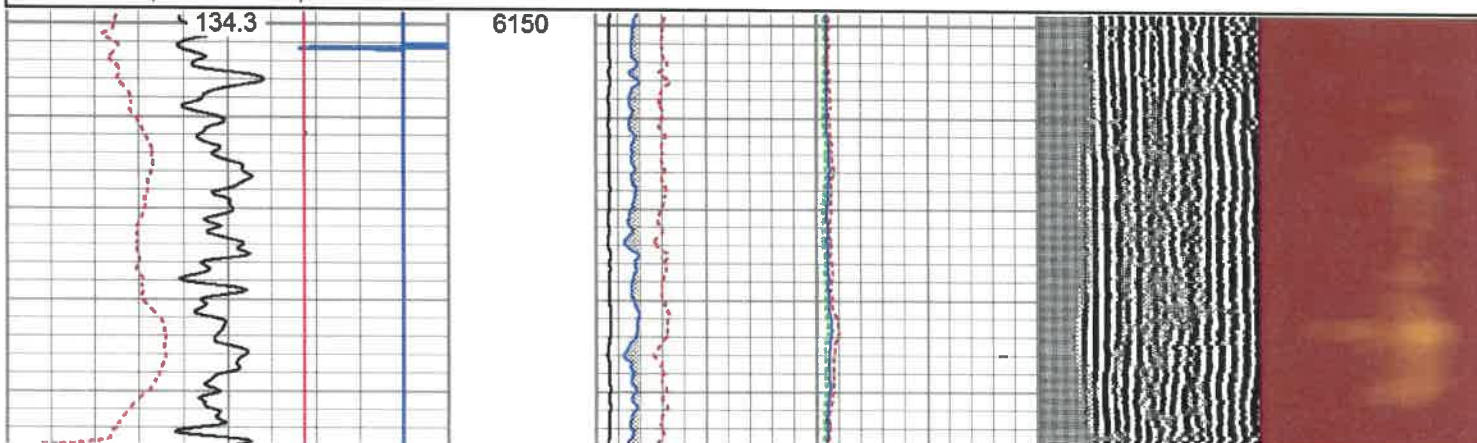
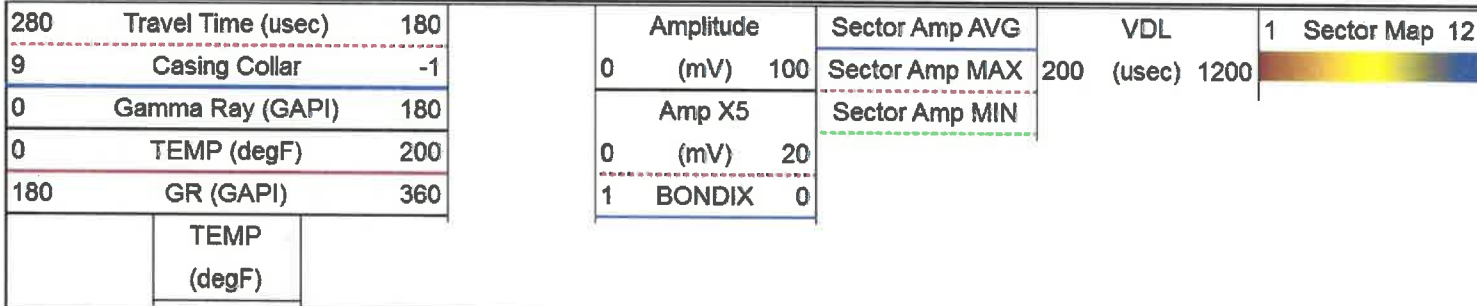


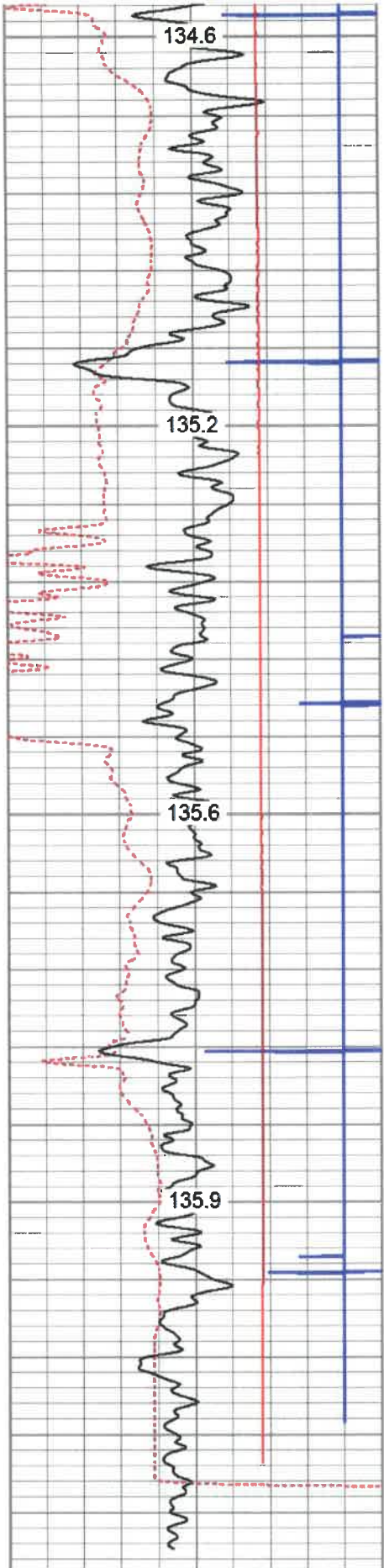




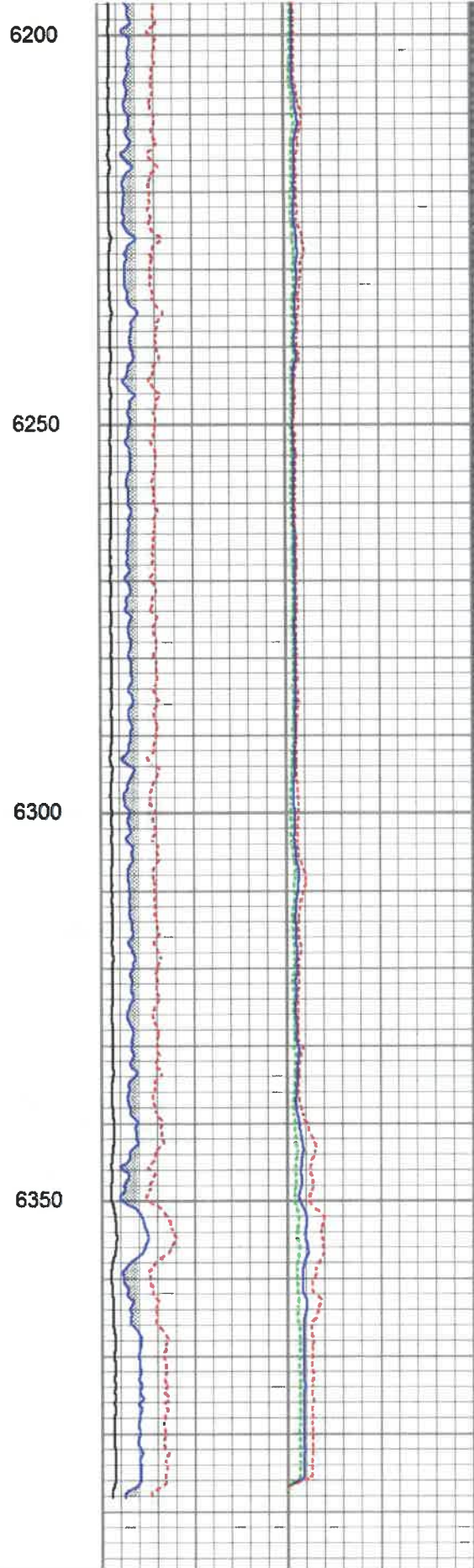
## Repeat Pass

Database File      antero\_remo\_unit\_1h.db  
 Dataset Pathname    pass2  
 Presentation Format   antero1  
 Dataset Creation    Mon Oct 28 08:42:29 2019  
 Charted by            Depth in Feet scaled 1:240

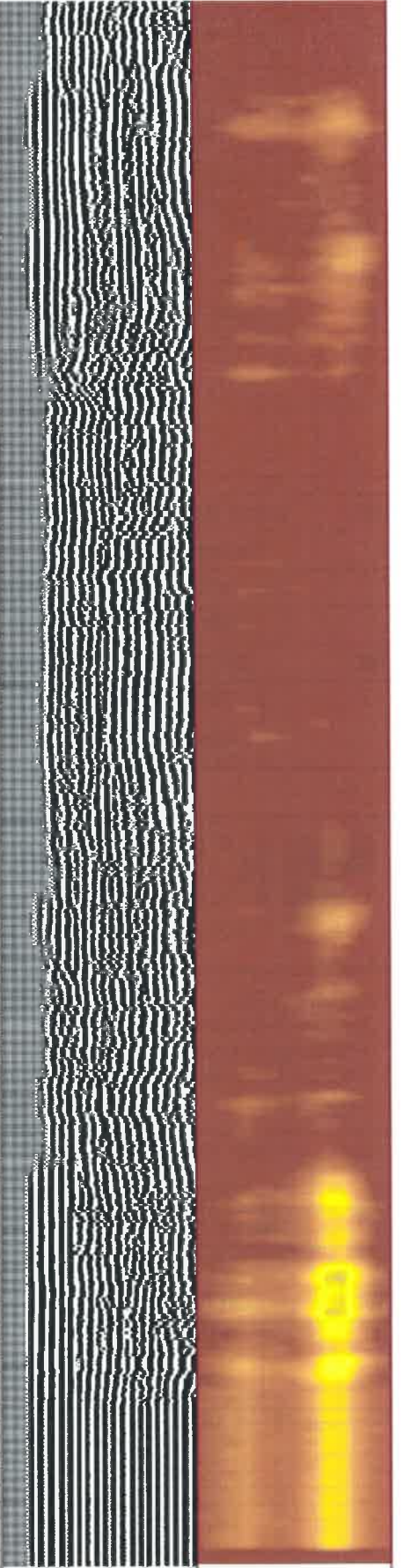




280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray (GAPI)	180
0	TEMP (degF)	200



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



200	Sector Amp MAX	1200
200	Sector Amp MIN	1200
	VDL	(usec)
1	Sector Map 12	



180 GR (GAPI) 360

1 BONDIX 0

TEMP  
(degF)

# Log Variables

Database: C:\ProgramData\Warrior\Data\antero\_remo\_unit\_1h.db  
Dataset: field/well/run1/pass1/\_vars\_

## Top - Bottom

BHTEMP_Src TEMP	BOREID in 8.25	BOTTEMP degF 100	CASEOD in 5.5	CASETHCK in 0	CASEWGHT lb/ft 20	MAXAMPL mV 71.9
MINAMPL mV 3.5	MINATTN db/ft 0.8	PERFS No	PPT usec 219	SRFTEMP degF 0	TDEPTH 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 antero\_remo\_unit\_1h.db  
Dataset Pathname pass1  
Dataset Creation Mon Oct 28 09:37:17 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

RECEIVED  
Office of Oil and Gas

SEP 24 2020

WV Department of  
Environmental Protection

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						
01	0.000	1.100	0.000	100.000	50.542	0.000

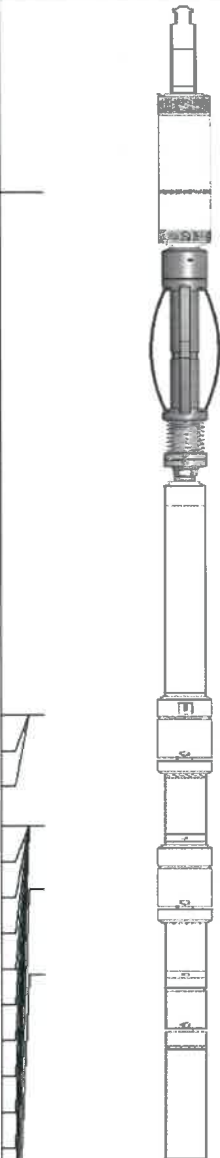
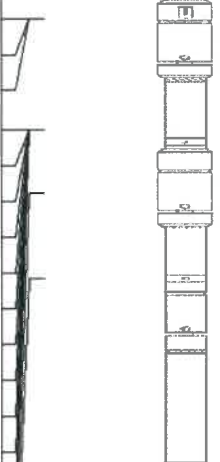
S1	0.000	1.103	0.000	100.000	56.343	-0.001
S2	0.000	1.088	0.000	100.000	61.007	-0.001
S3	0.000	1.122	0.000	100.000	64.737	-0.001
S4	0.000	1.089	0.000	100.000	72.448	-0.001
S5	0.000	1.045	0.000	100.000	71.838	-0.001
S6	0.000	0.965	0.000	100.000	74.574	-0.001
S7	0.000	0.897	0.000	100.000	76.604	-0.001
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	19.20		Titan-1.4375 1 7/16 Titan Type II Cable Head	1.03	1.44	5.00
			CCL-312tekco (3.12TEKCO) 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	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		Tek-2.75 2 3/4" Tekco Adjustable Centralizer	2.73	2.75	25.00
WVFS1	11.75					
WVF3FT	11.00					
WVF5FT	10.00					
WVFTEMP	6.67					
GR	1.31		GR-Tek-Co 2 3/4 (0111) Tekco 2 3/4" 400 Deg. F Logging Gamma Ray	3.67	2.75	40.00
			Titan-1.4375_Cap Titan 1 7/16" Cap	0.27	1.44	1.00

Dataset: antero\_remo\_unit\_1h.db: field/well/run1/pass1  
 Total length: 21.37 ft  
 Total weight: 256.00 lb  
 O.D.: 3.25 in

	Company	ANTERO RESOURCES	
	Well	REMO UNIT 1H	
	Field	RABBIT EARS	
	County	TYLER	
	State	WW	Country

