



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

Company	ANTERO RESOURCES CORPORATION	Country	US
Well	RICHMOND UNIT 2H	Company	ANTERO RESOURCES CORPORATION
Field	MARCELLUS	Well	RICHMOND UNIT 2H
County	TYLER	Field	MARCELLUS
State	WV	County	TYLER
		State	WV
		Country	US

Location:	API # : 47095026910000	Other Services	
	API # A11021		
Permanent Datum	SEC	TWP	RGE
Log Measured From	KB 25.5 FT	Elevation	N/A
Drilling Measured From	KB 25.5 FT		
		Elevation	K.B. D.F. G.L.

Date	25 AUG 2020			
Run Number	1			
Depth Driller	22.838			
Depth Logger	6838			
Bottom Logged Interval	6836			
Top Log Interval	SURFACE			
Open Hole Size	N/A			
Type Fluid	WATER			
Density / Viscosity	N/A			
Max. Recorded Temp.	134			
Estimated Cement Top	6270			
Time Well Ready	ON ARRIVAL			
Time Logger on Bottom	11:09			
Equipment Number	214182			
Location	BRIDGEPORT			
Recorded By	KLINGER			
Witnessed By	JIMMY DARQUENNE			

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

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	13.375	N/A	SURFACE	556
Prot. String	9.625	N/A	SURFACE	2683
Production String	5.5	23	SURFACE	22.818
Liner				

<<< 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**

CORRELATED TO PIPE TALLY  
SHIFTED 0 FT TO MATCH  
LOG RAN UNDER 1500 PSI  
TOP OF CEMENT @ 6270  
MARKER JOINT @ 5729 - 5738

REC  
Office Of Oil and Gas  
FEB 08 2011  
WV Department of  
Environmental Protection



**MAIN PASS 1500 PSI**



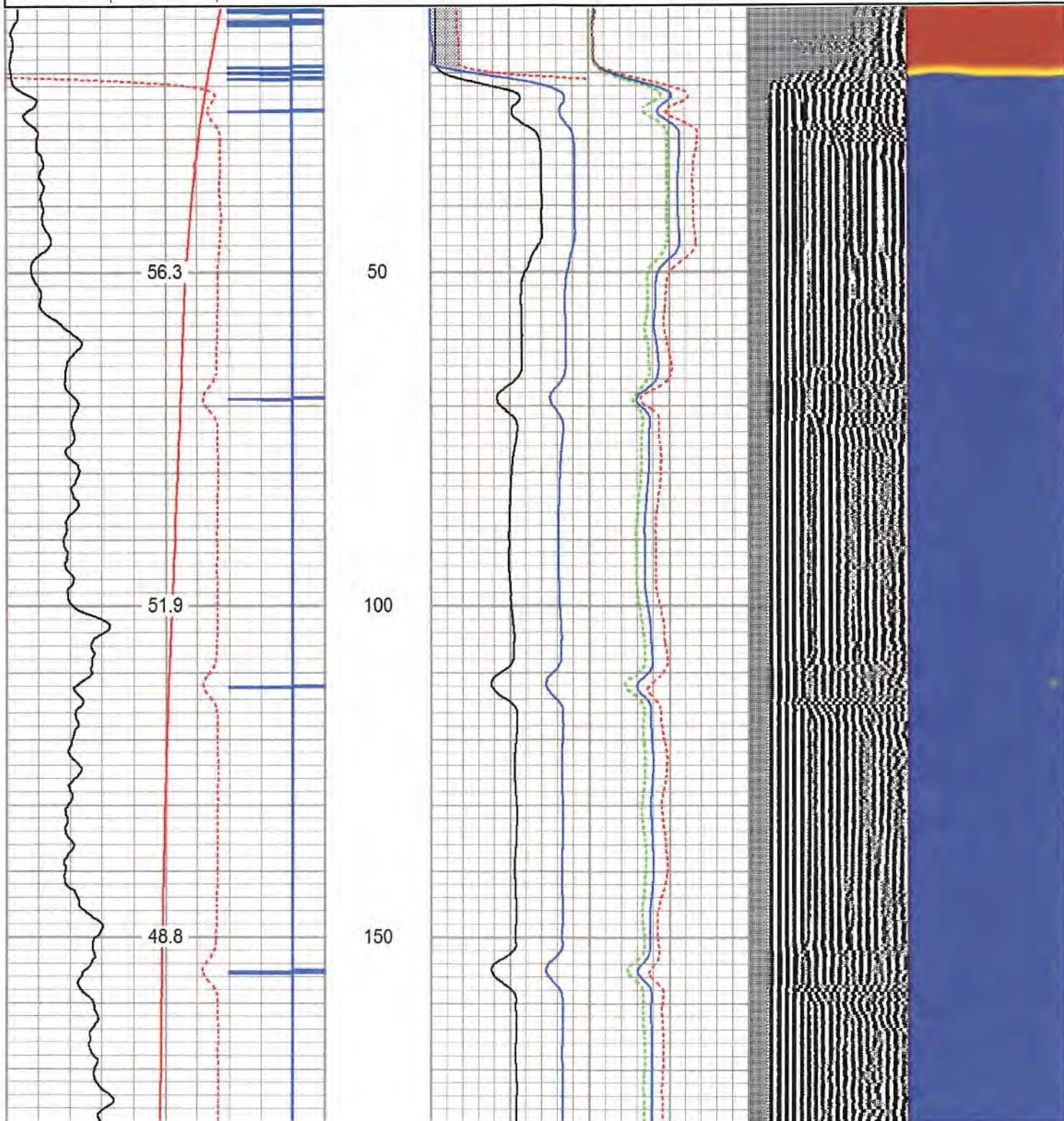
Database File e:\antero 2020\8\_25\_20\_antero\_richmond\_2h.db  
 Dataset Pathname pass3  
 Presentation Format antero  
 Dataset Creation Tue Aug 25 11:31:21 2020  
 Charted by Depth in Feet scaled 1:240

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

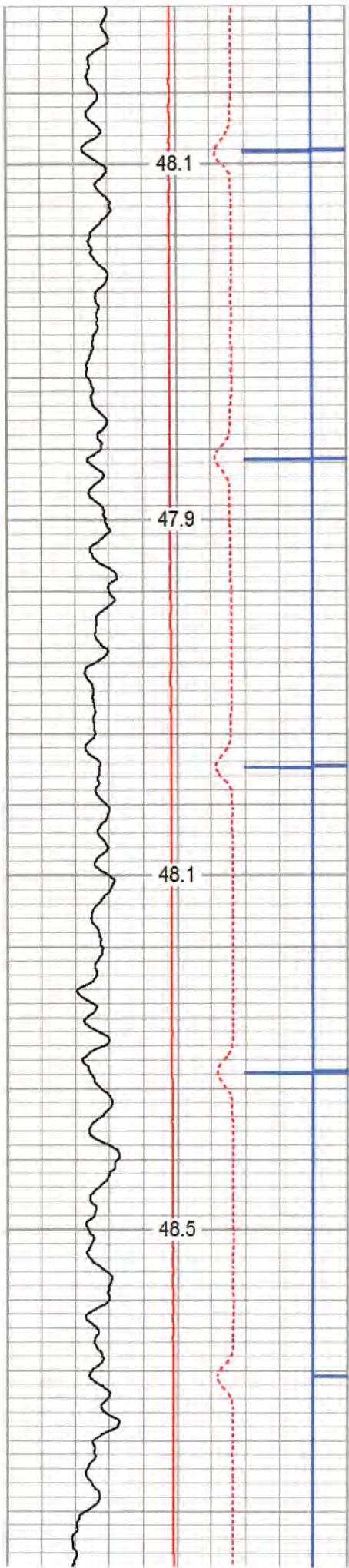
Amplitude		Sector Amp AVG
0	(mV) 100	Sector Amp MAX
Amp X5		Sector Amp MIN
0	(mV) 20	
1	BONDIX 0	

VDL 200 (usec) 1200  
 1 Sector Map 12

TEMP (degF)





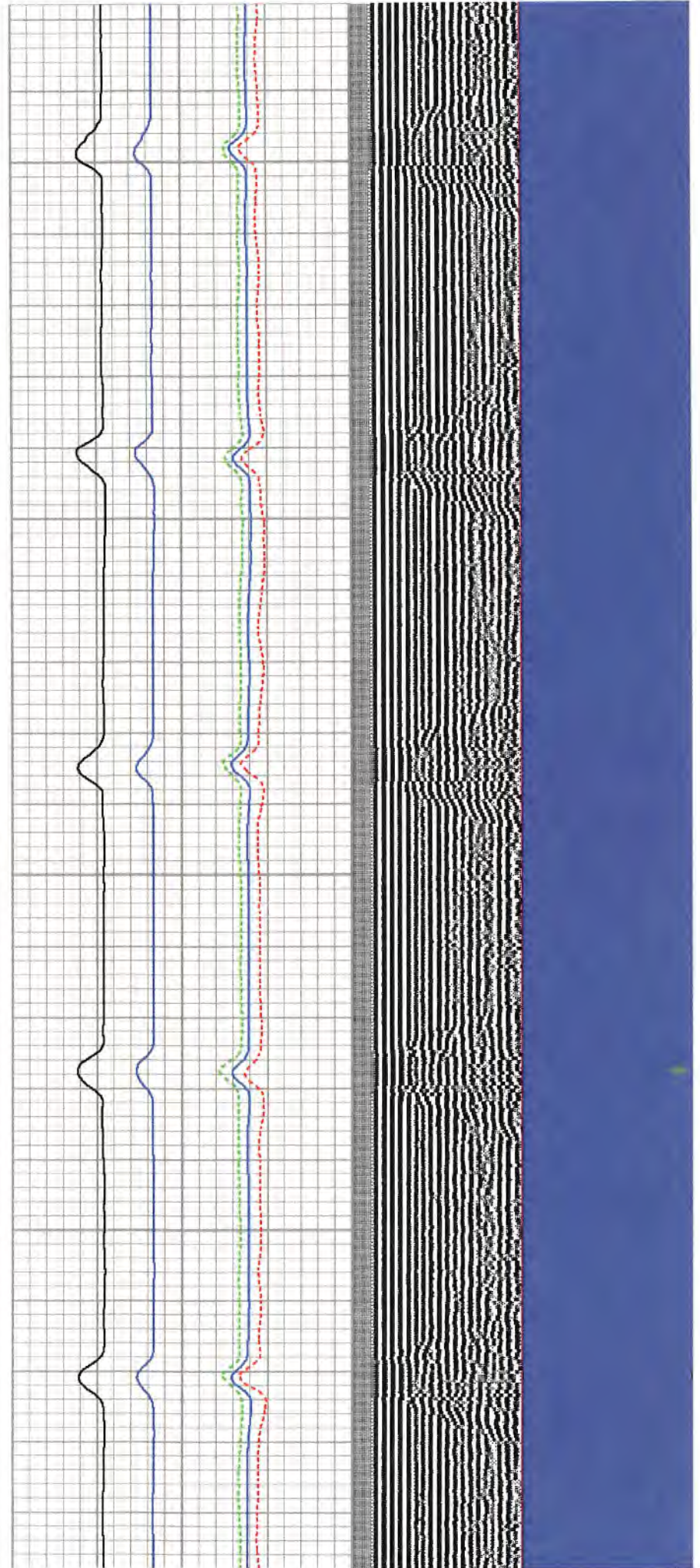


200

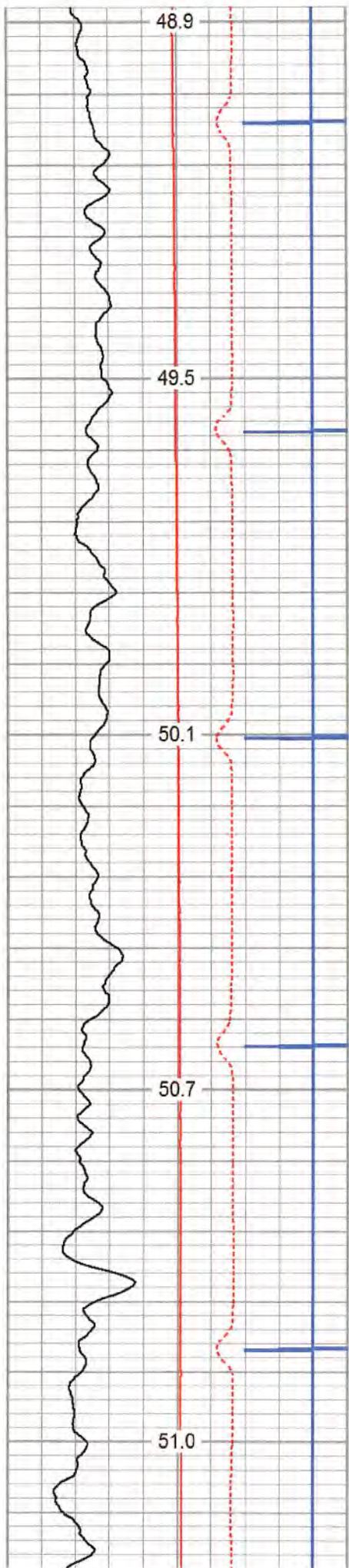
250

300

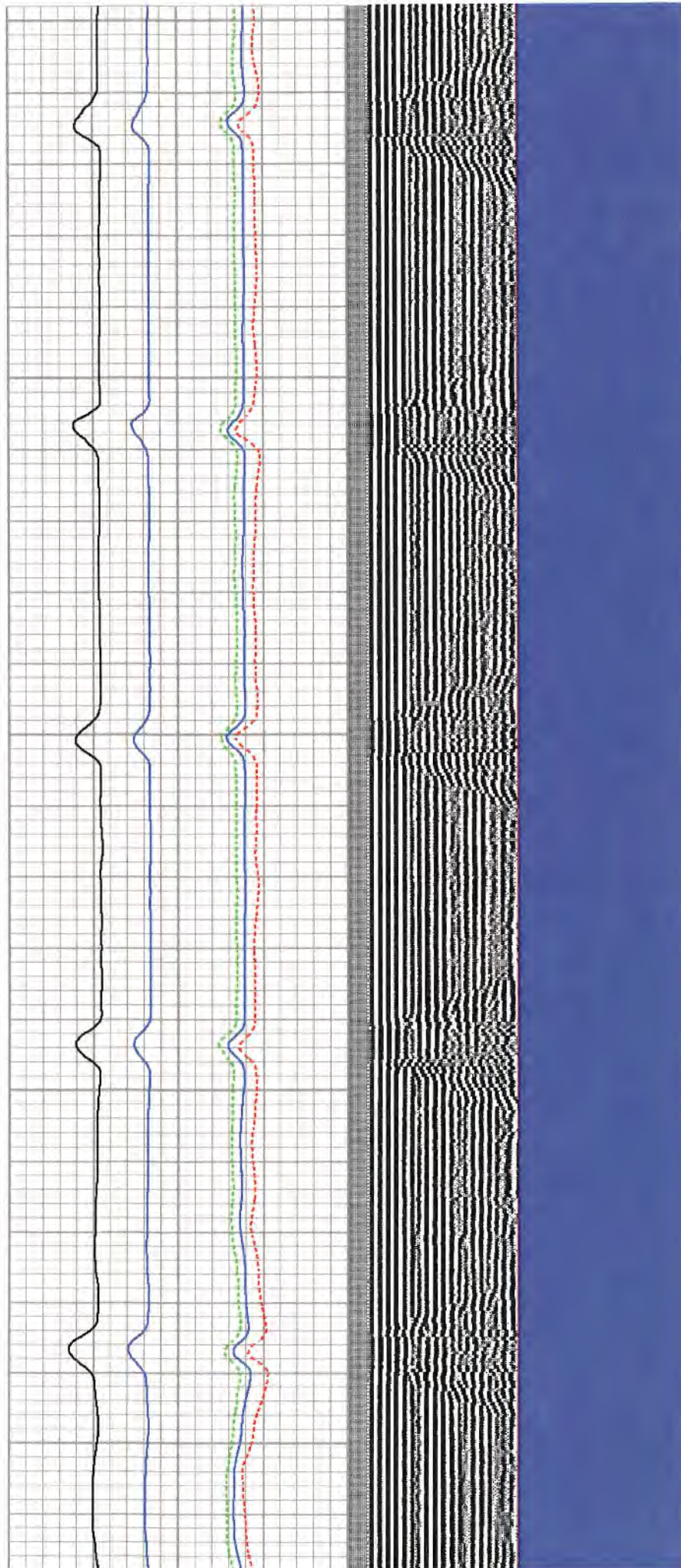
350



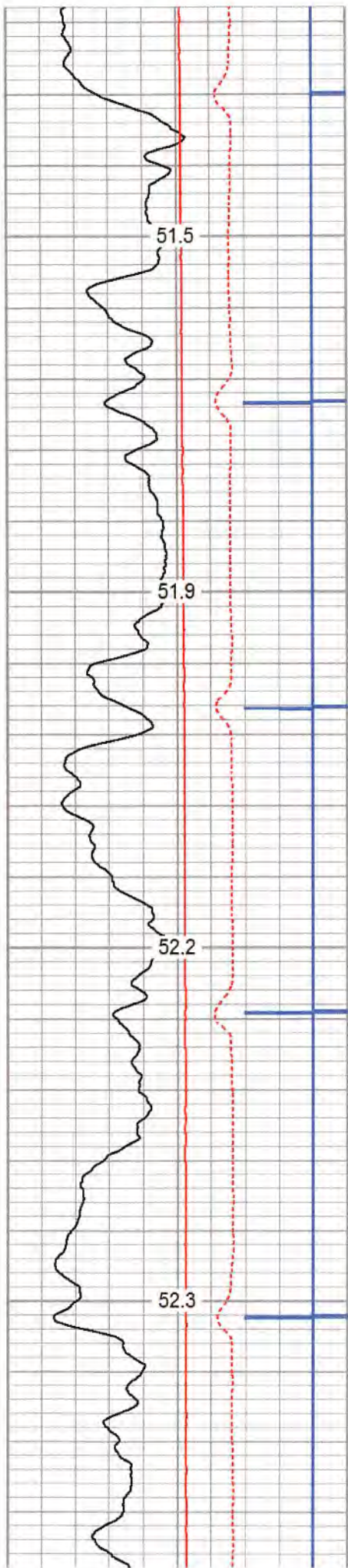




400  
450  
500  
550  
600





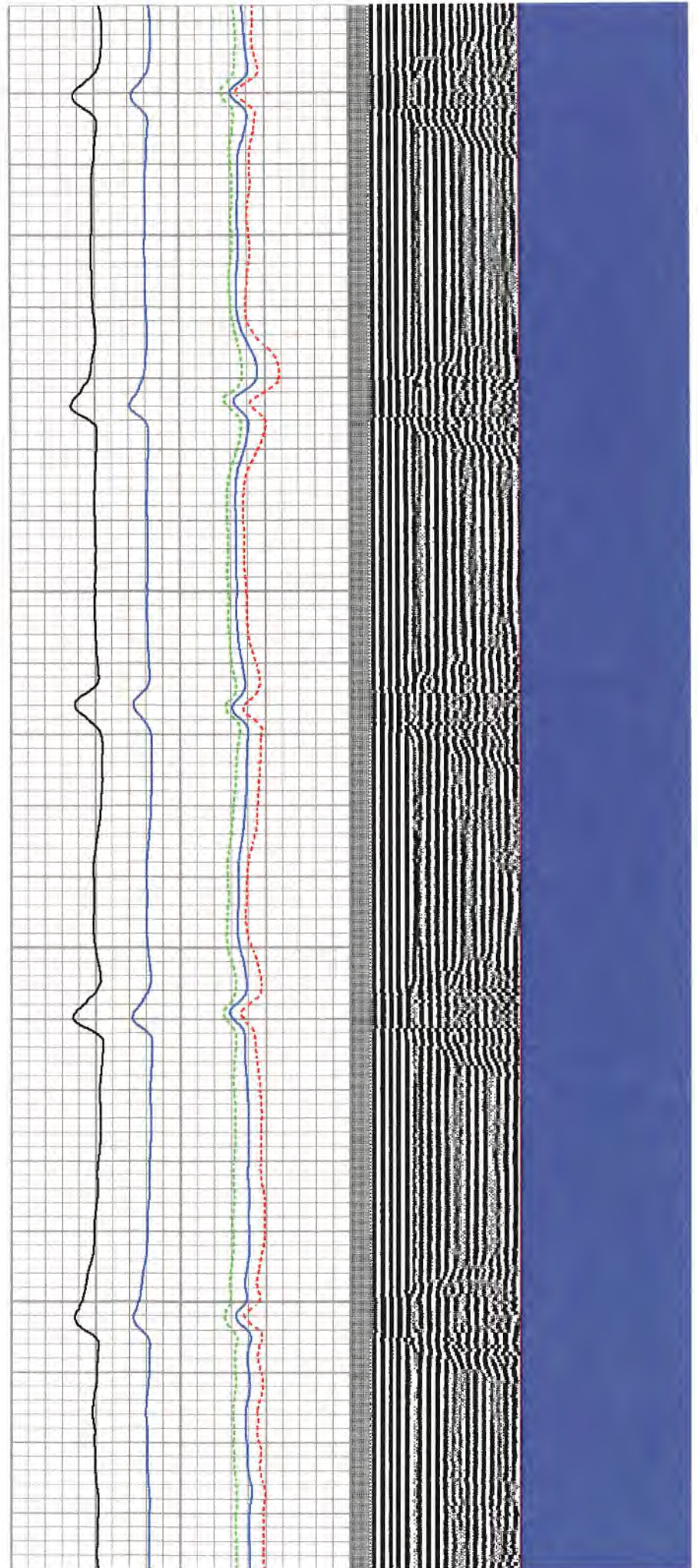


650

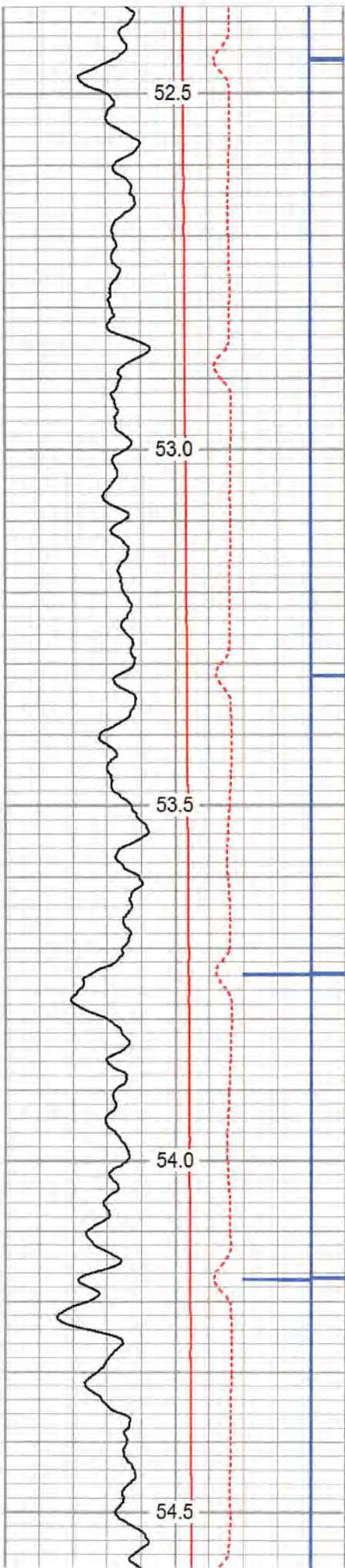
700

750

800







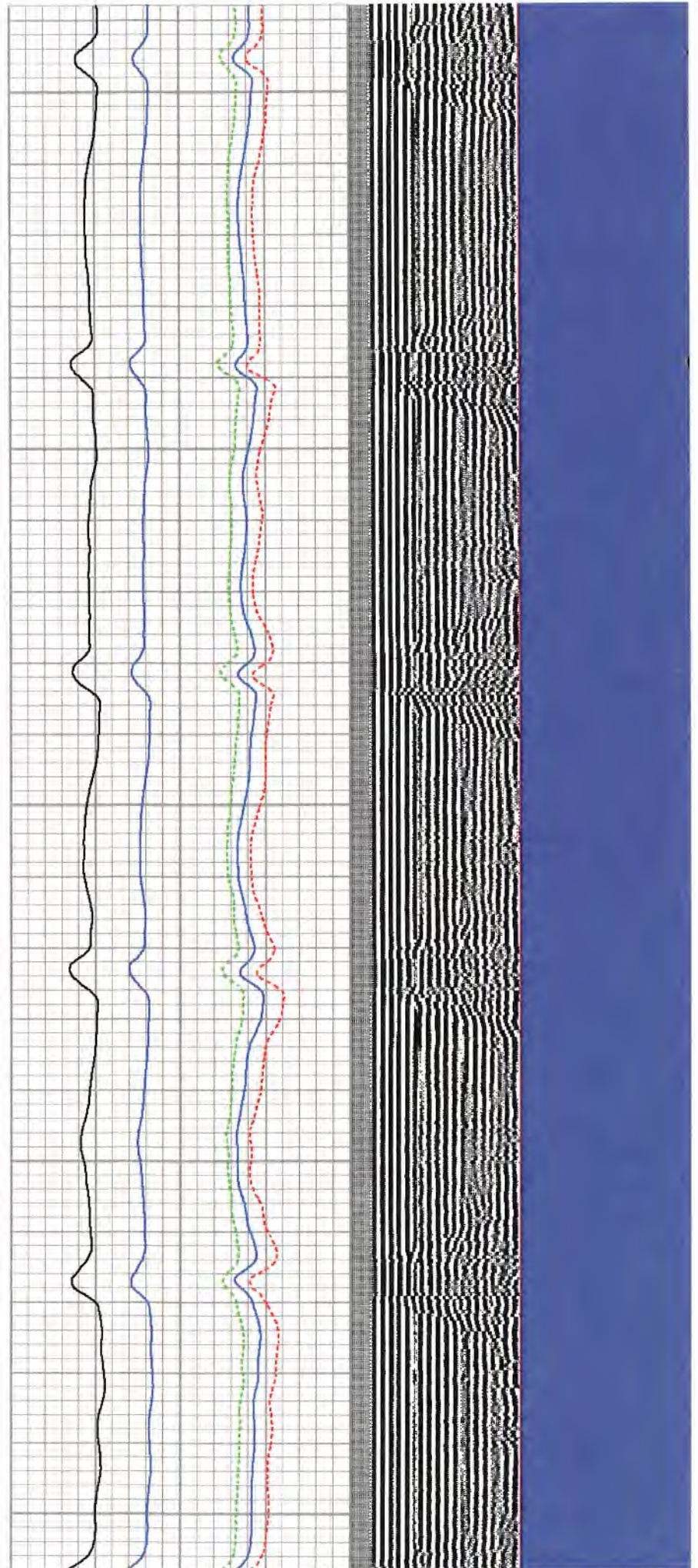
850

900

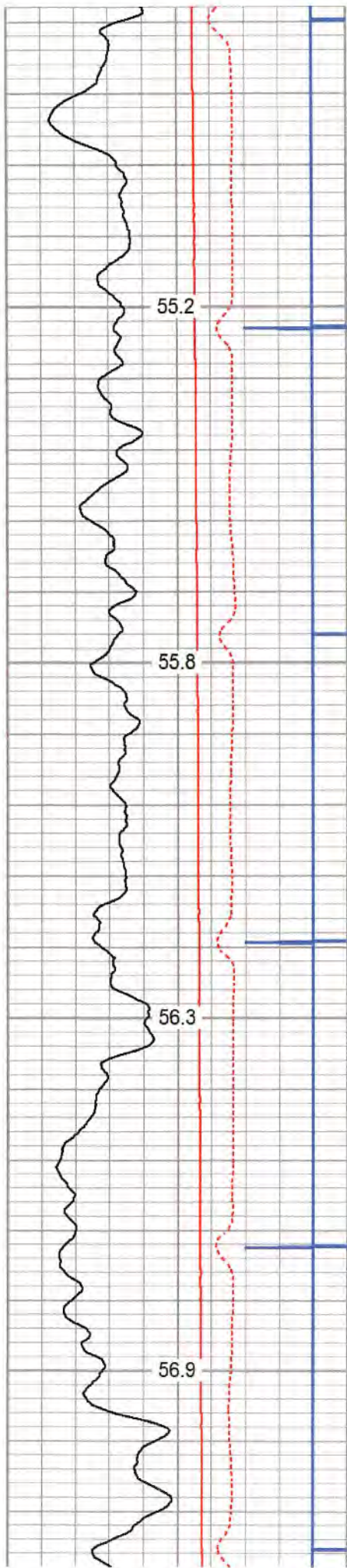
950

1000

1050





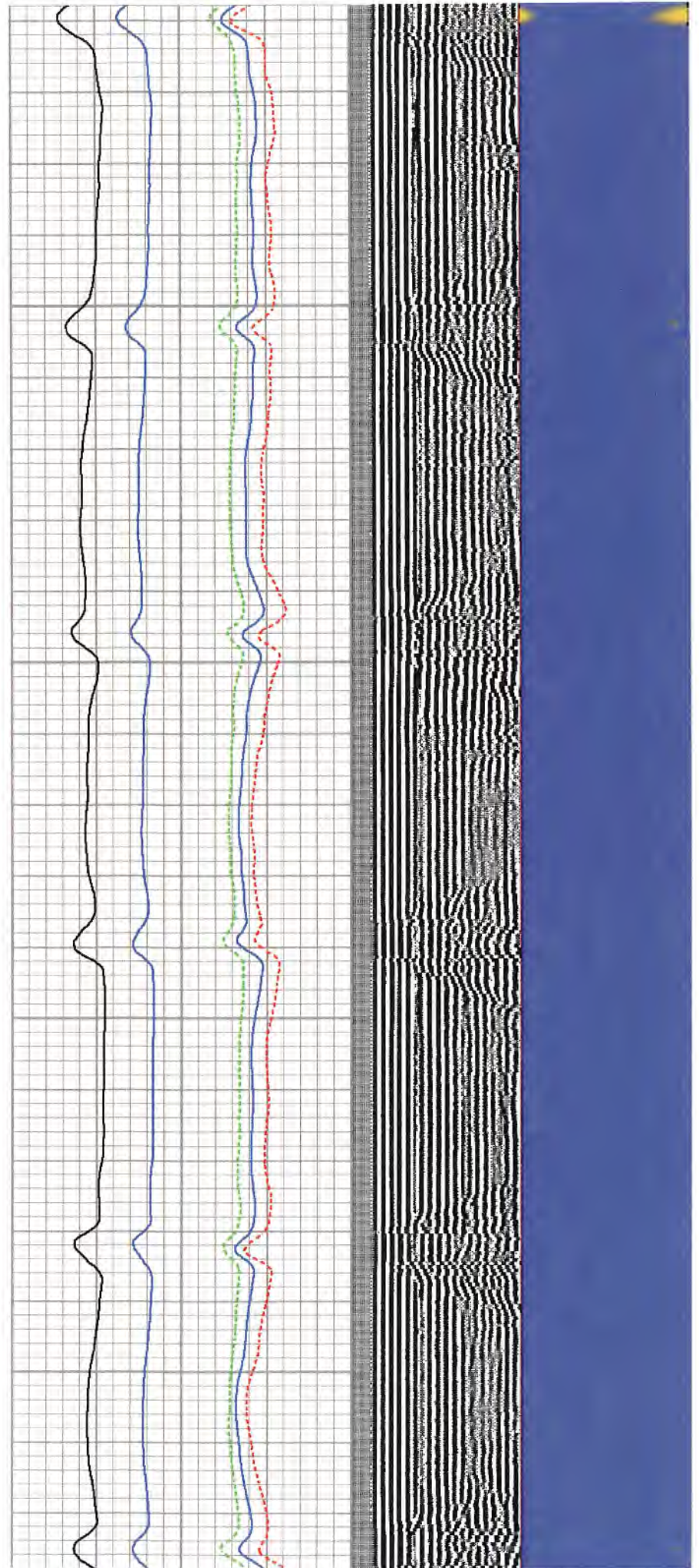


1100

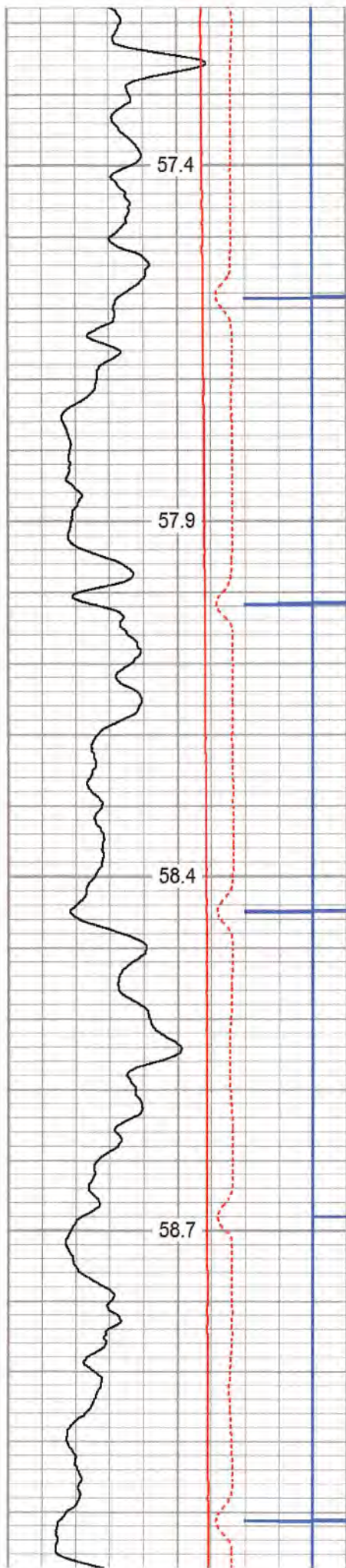
1150

1200

1250





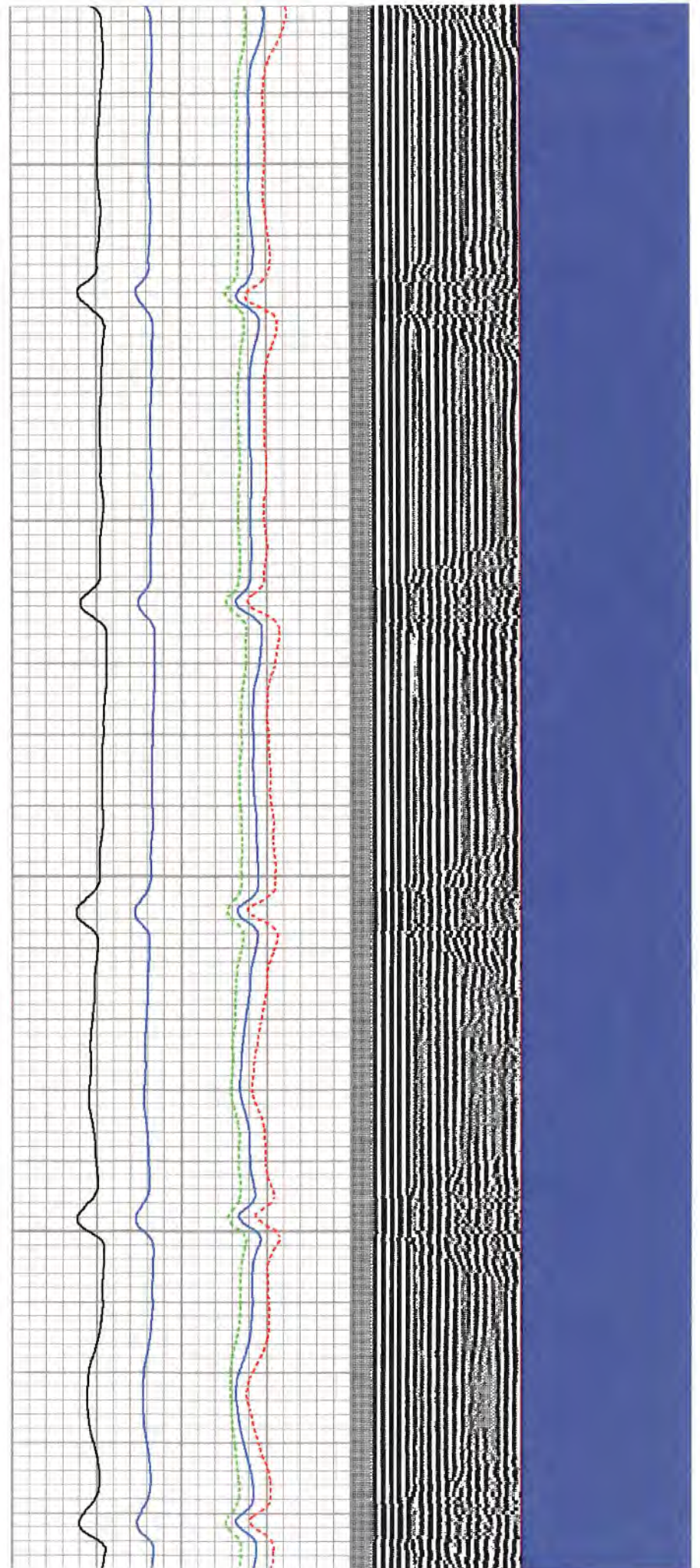


1300

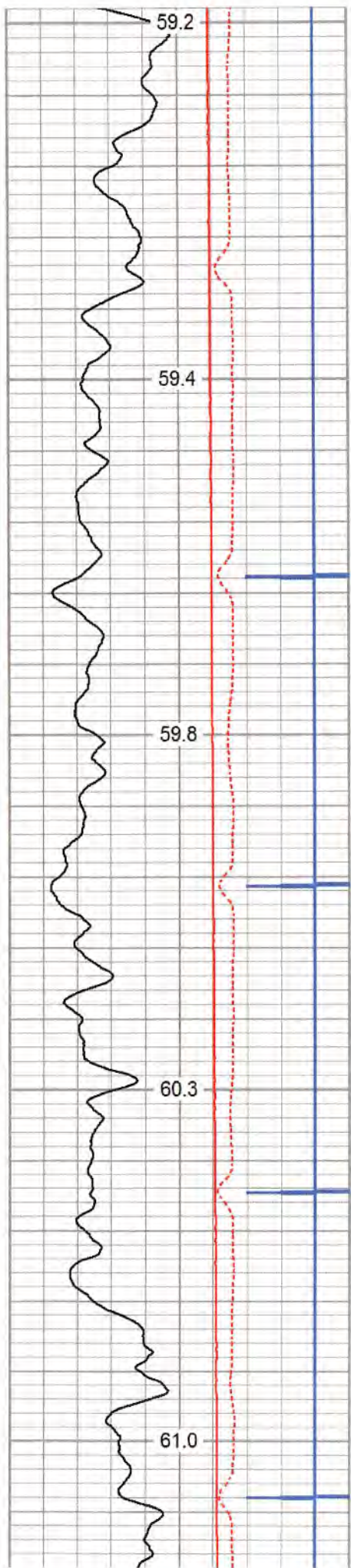
1350

1400

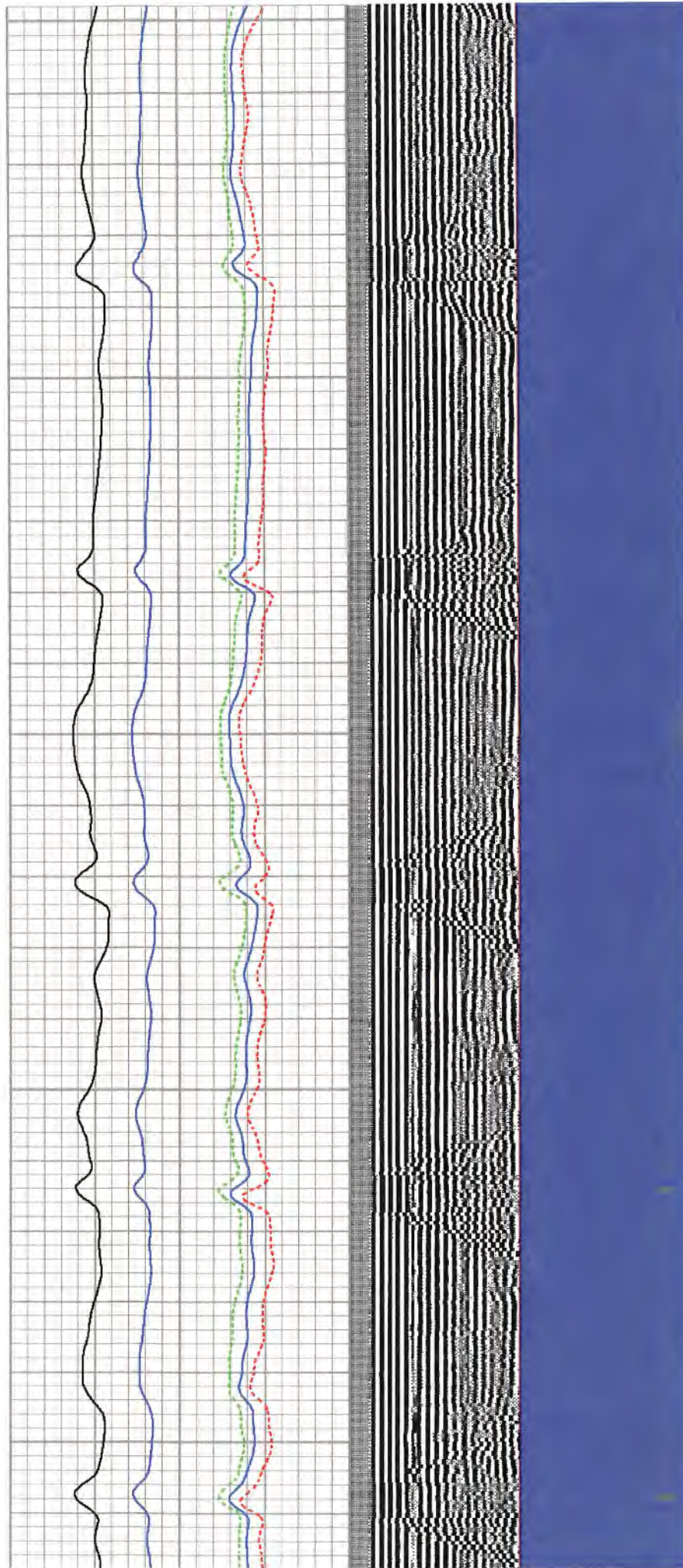
1450



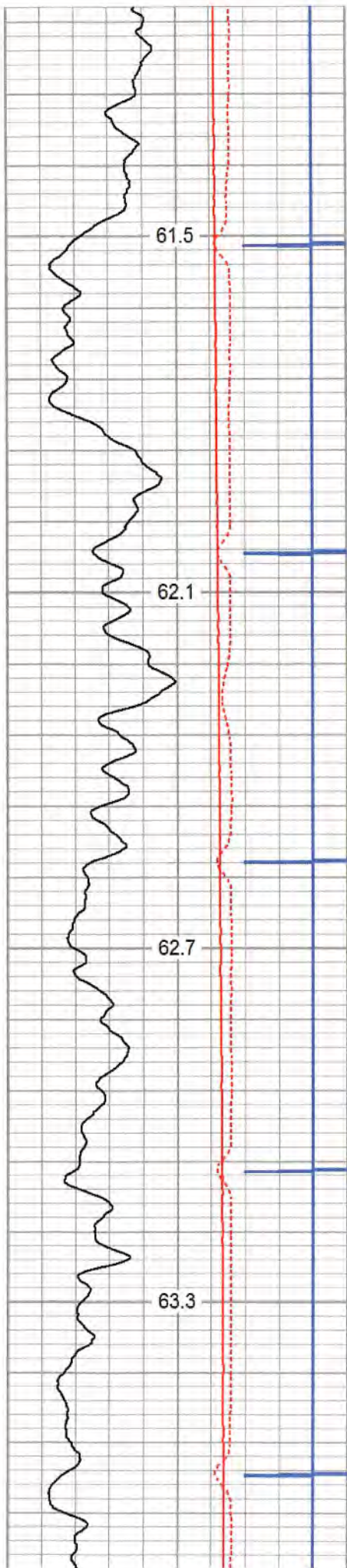




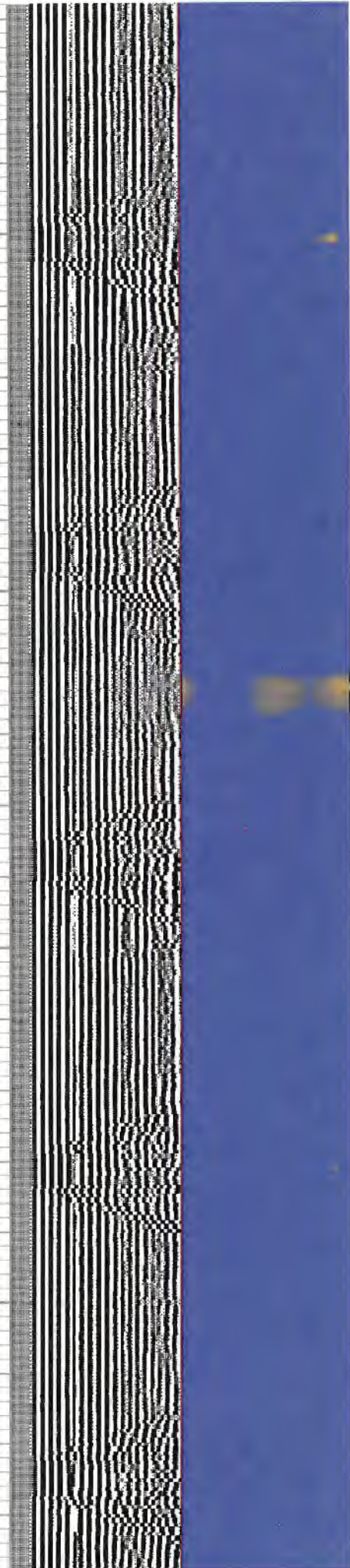
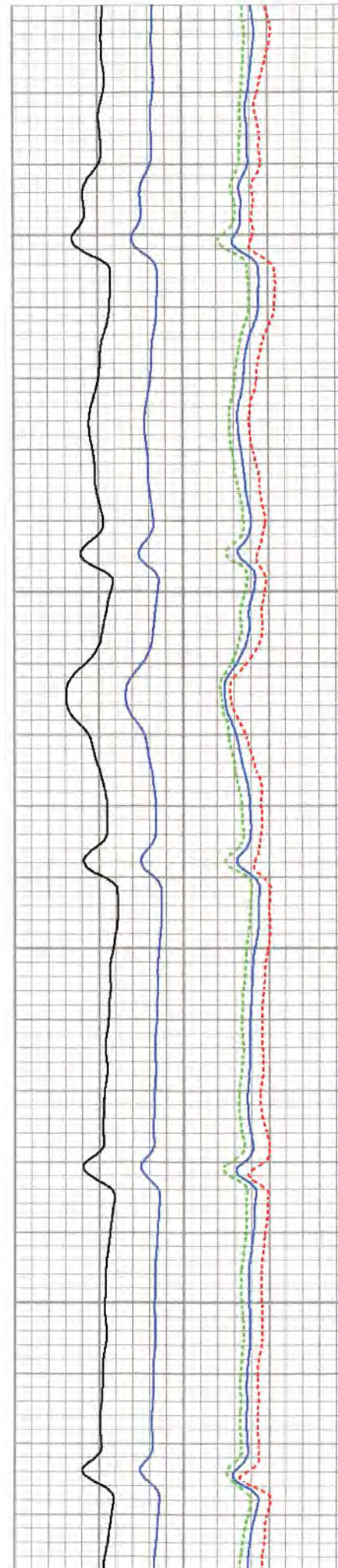
1500  
1550  
1600  
1650  
1700



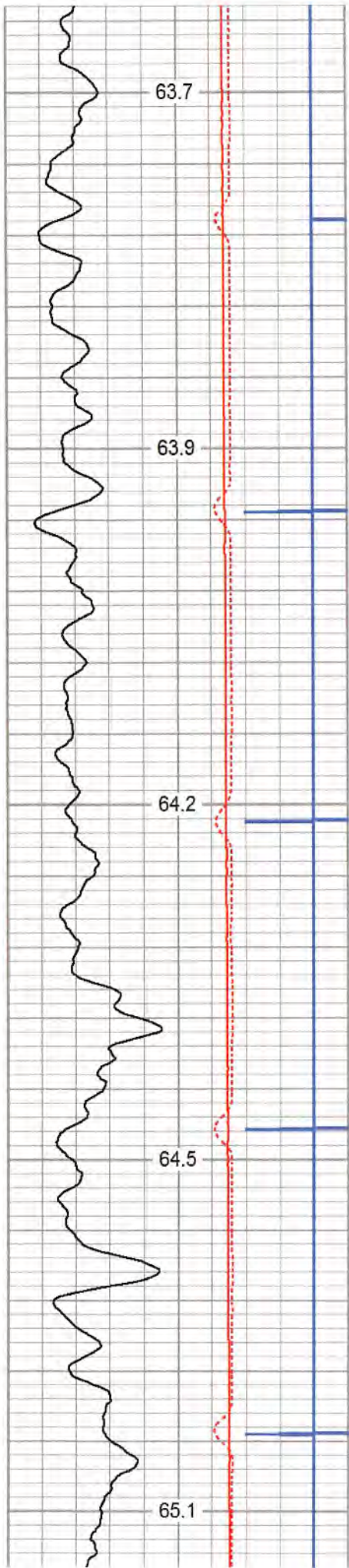




1750  
1800  
1850  
1900







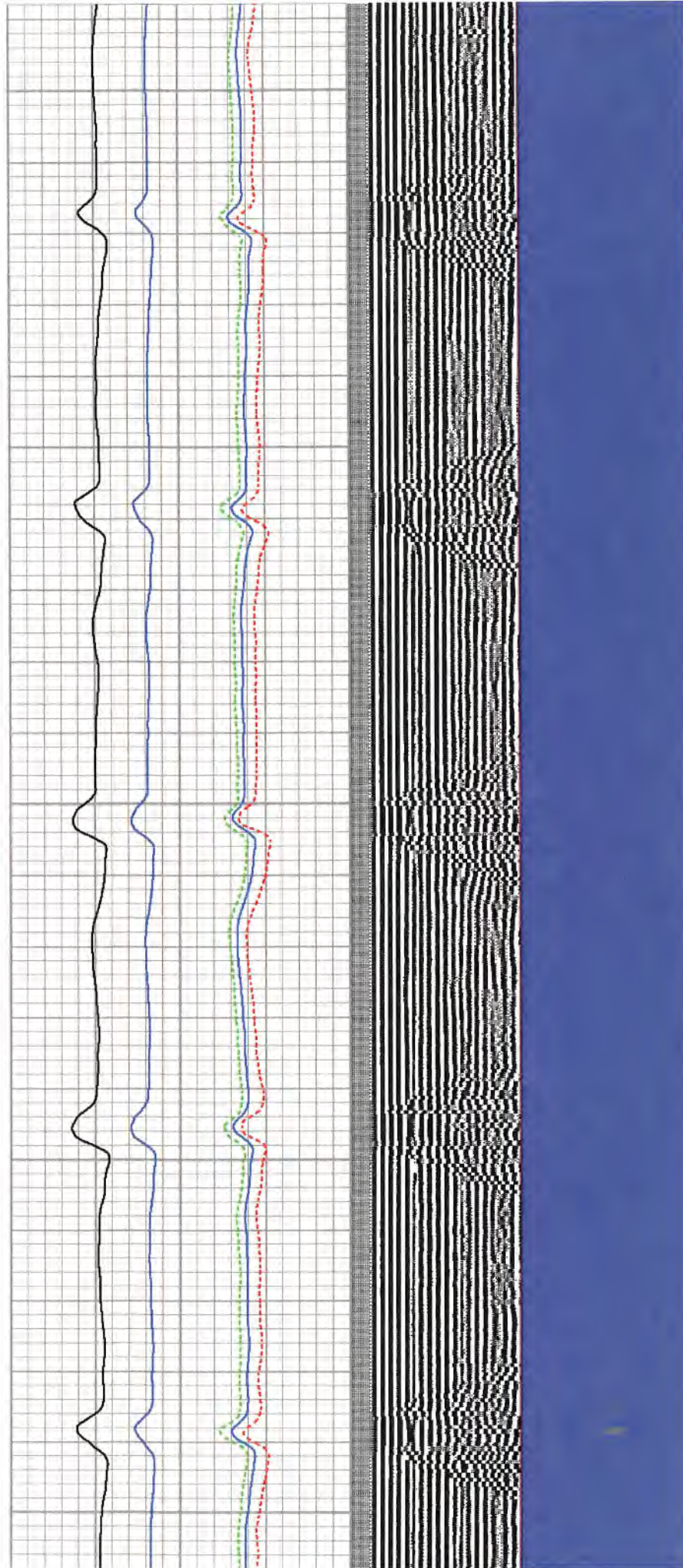
1950

2000

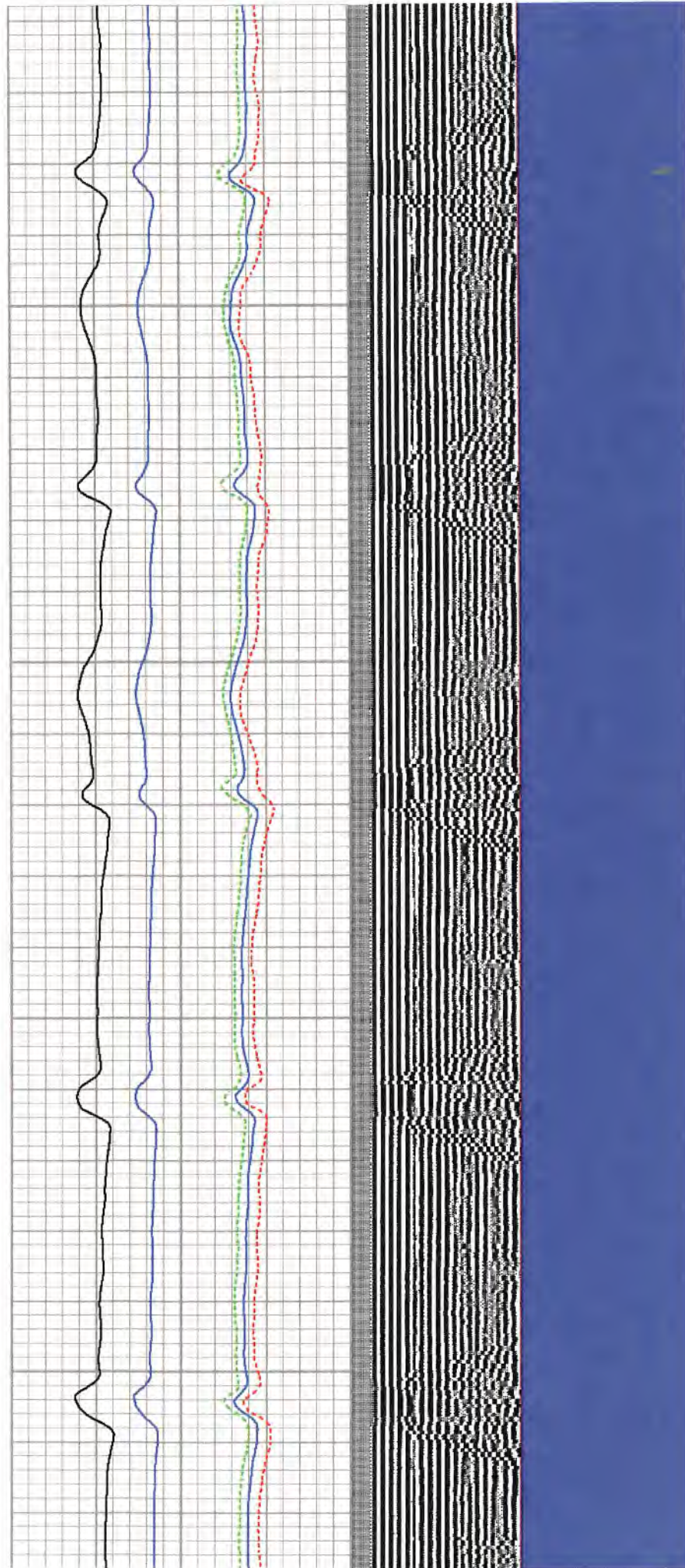
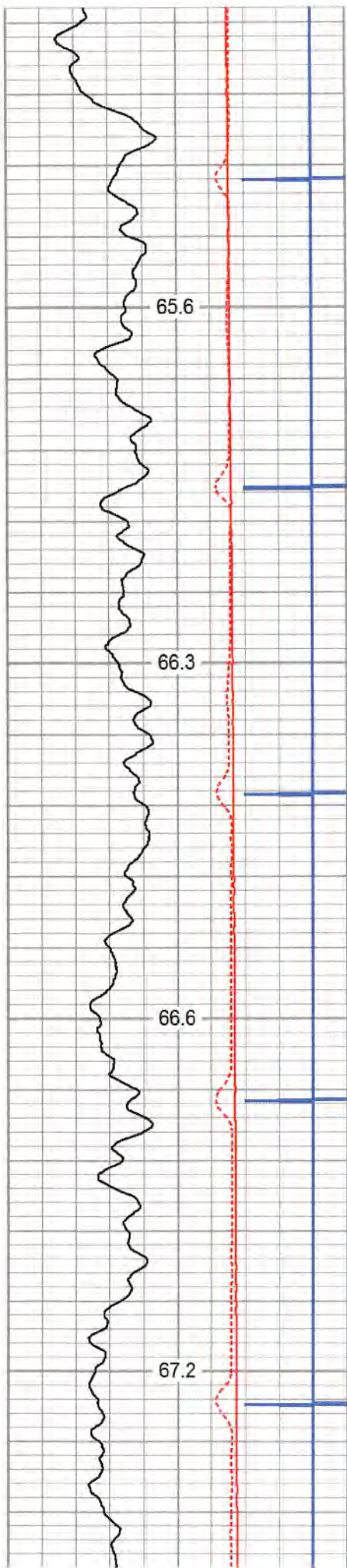
2050

2100

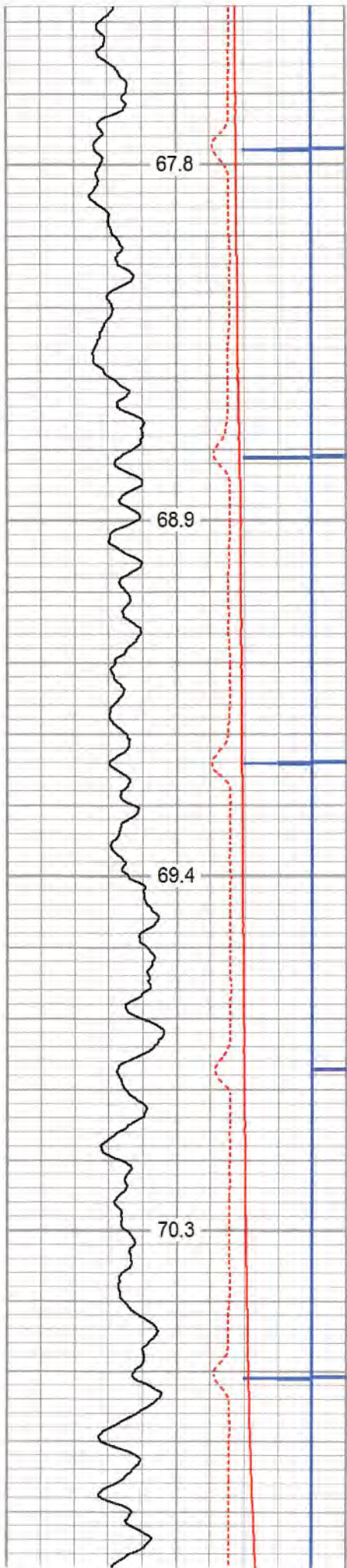
2150









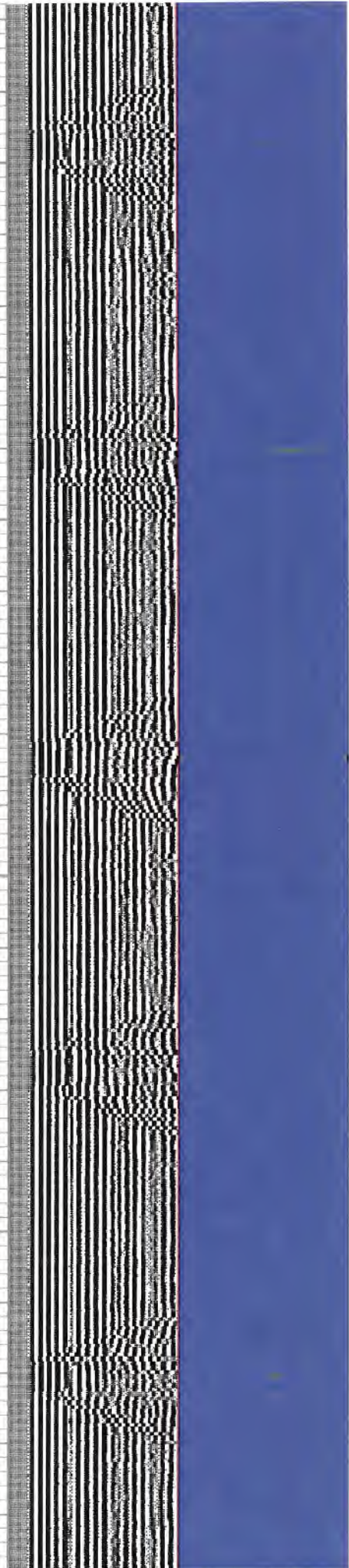
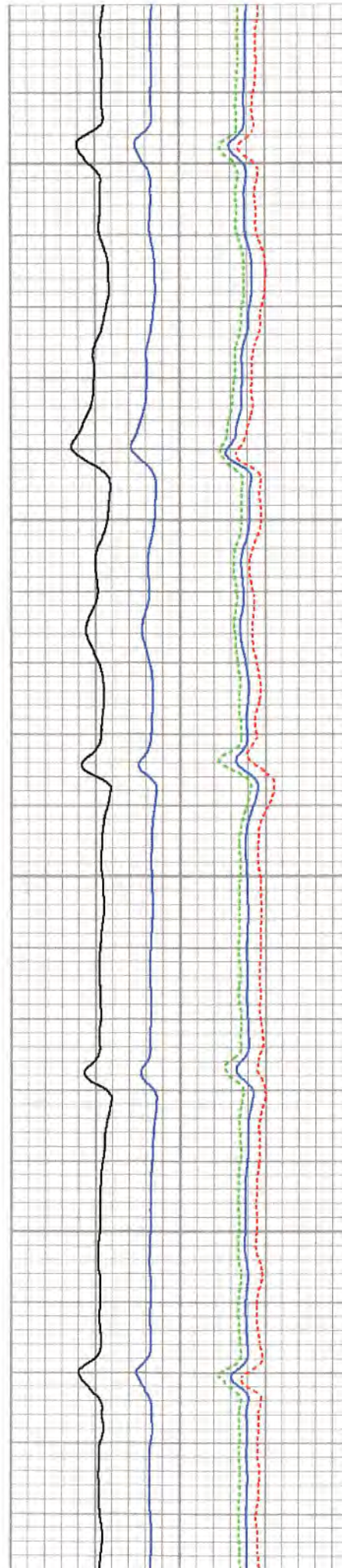


2400

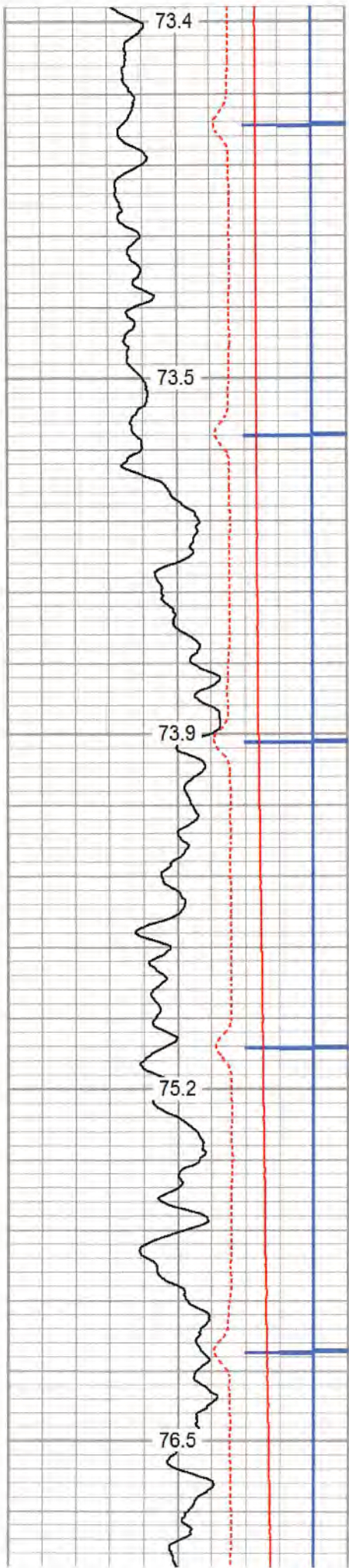
2450

2500

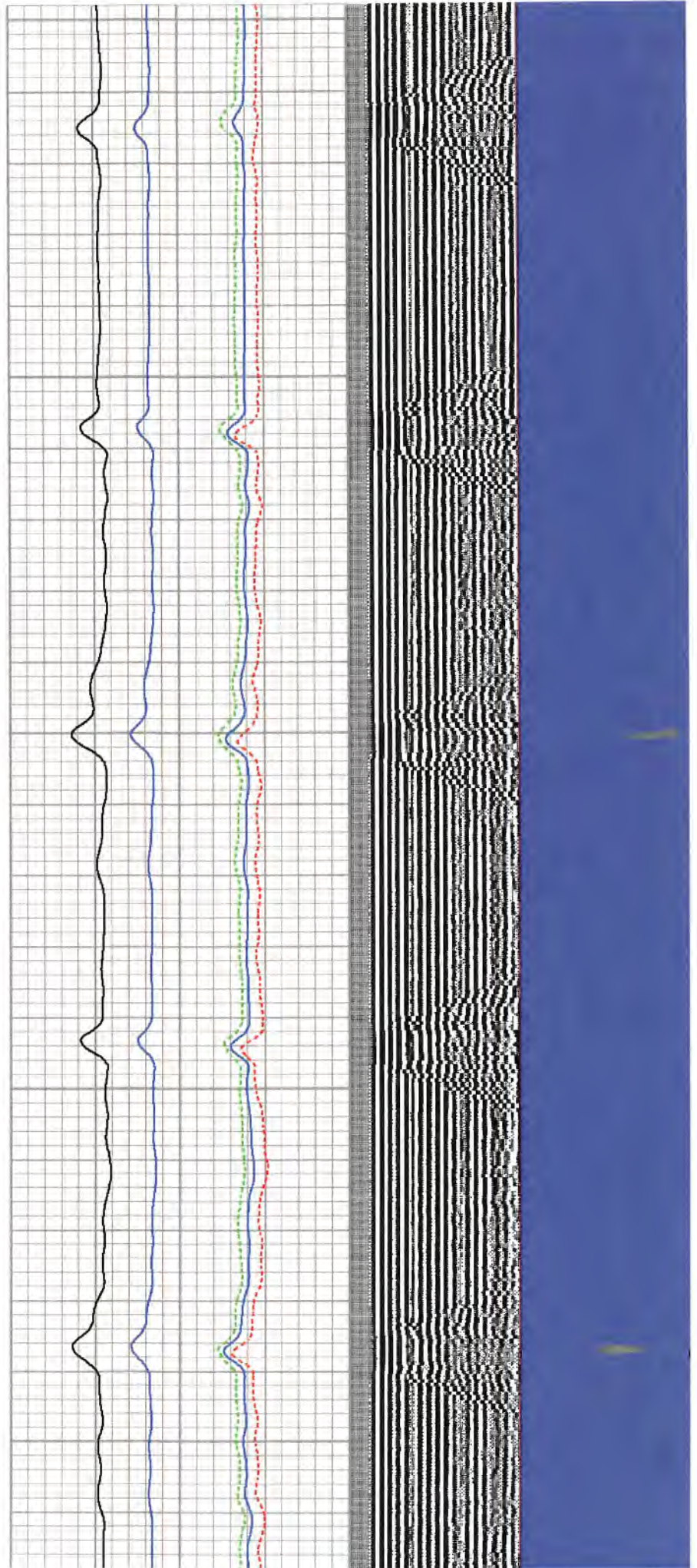
2550



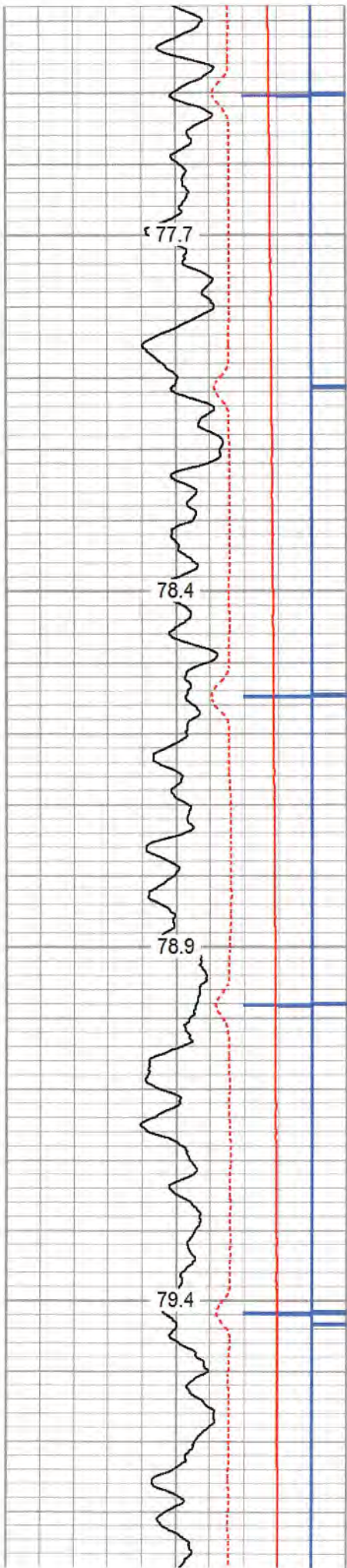




2600  
2650  
2700  
2750  
2800

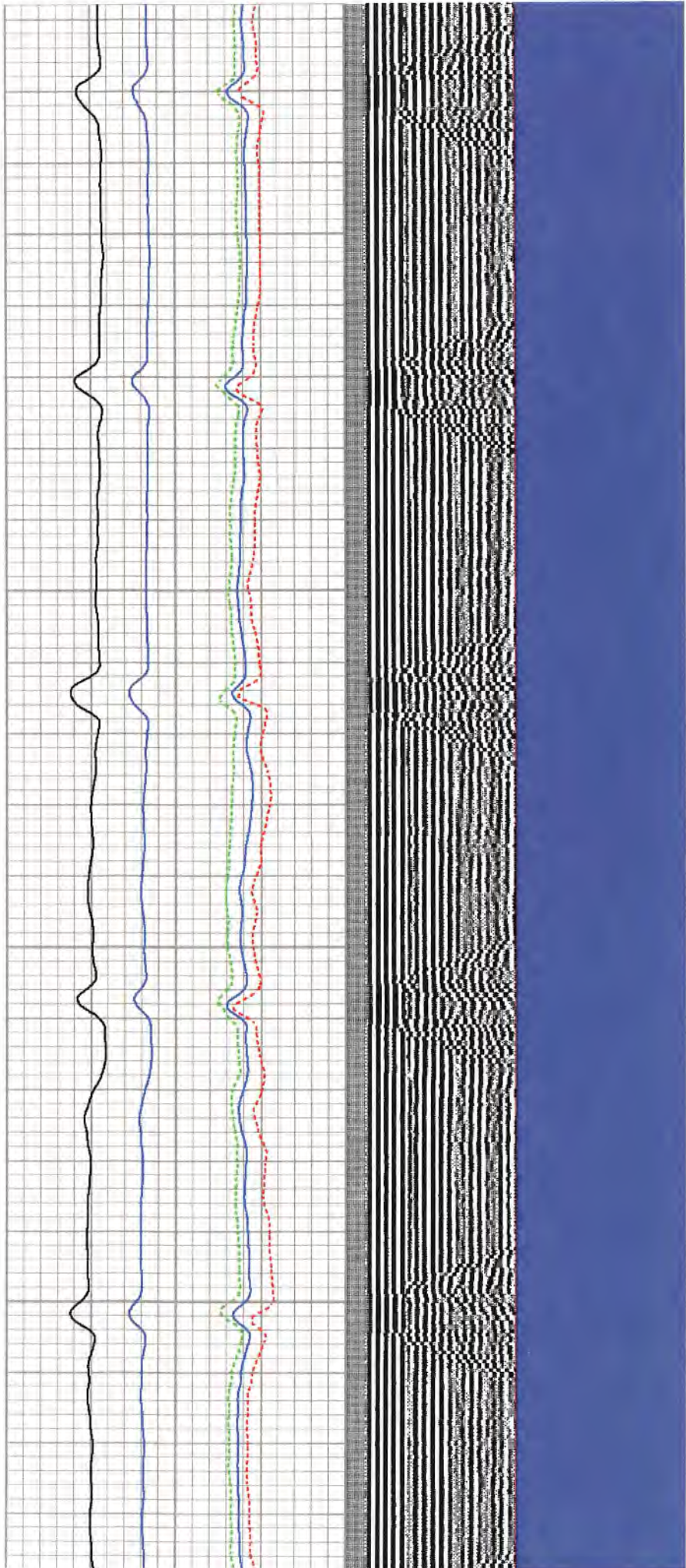






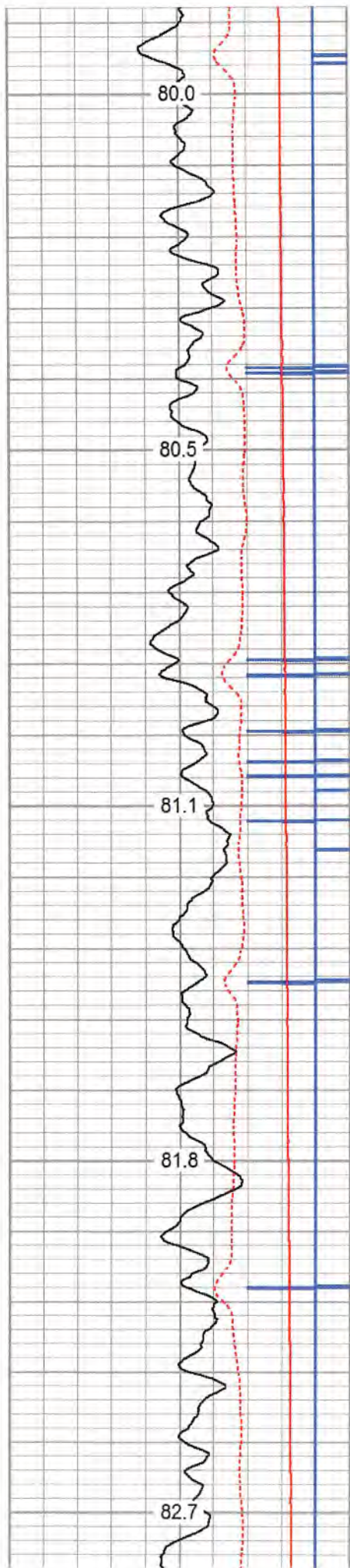
2850  
2900  
2950  
3000

77.7  
78.4  
78.9  
79.4



2850  
2900  
2950  
3000





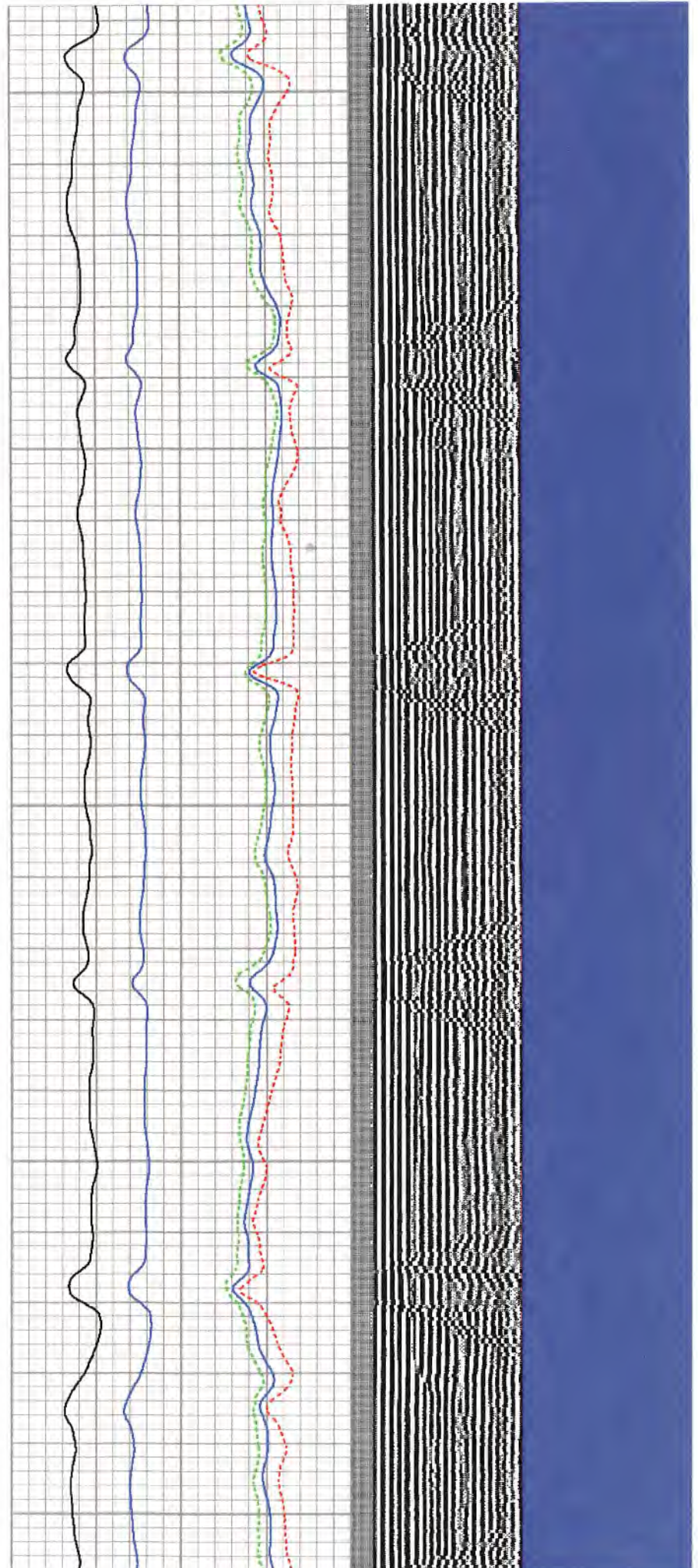
3050

3100

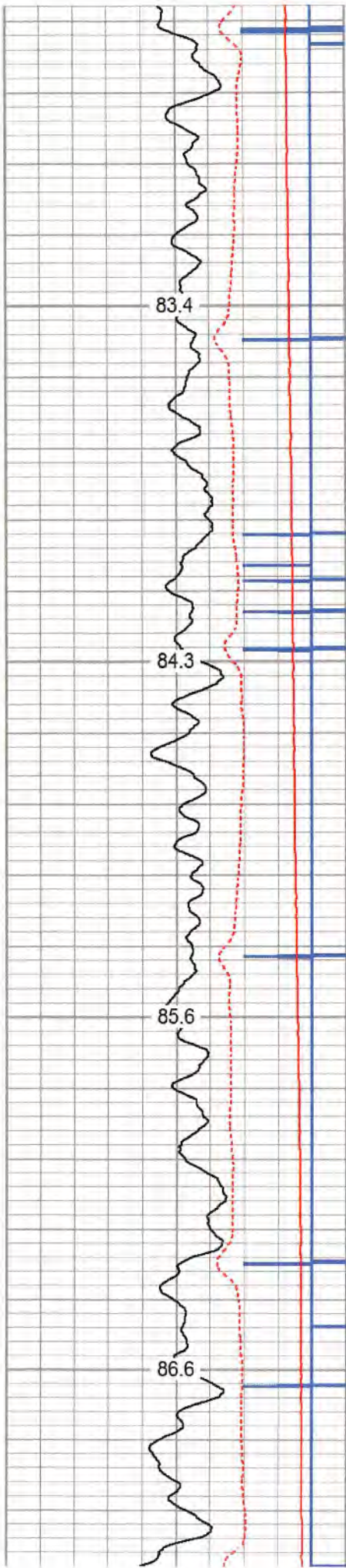
3150

3200

3250





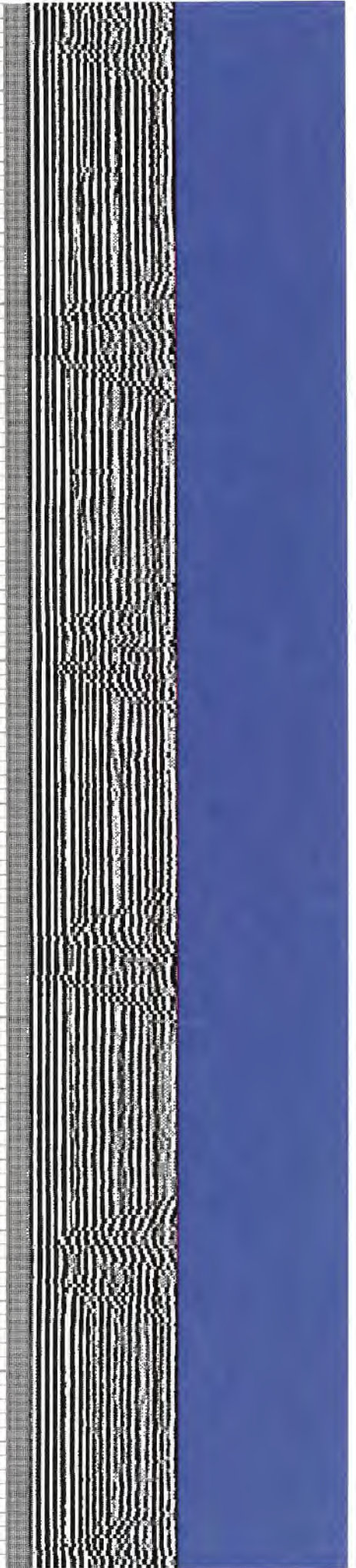
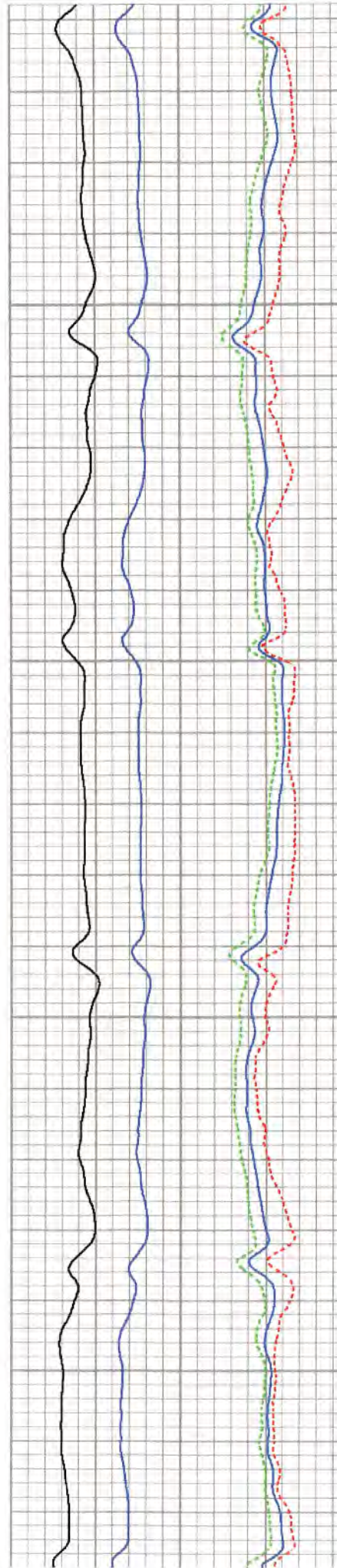


3300

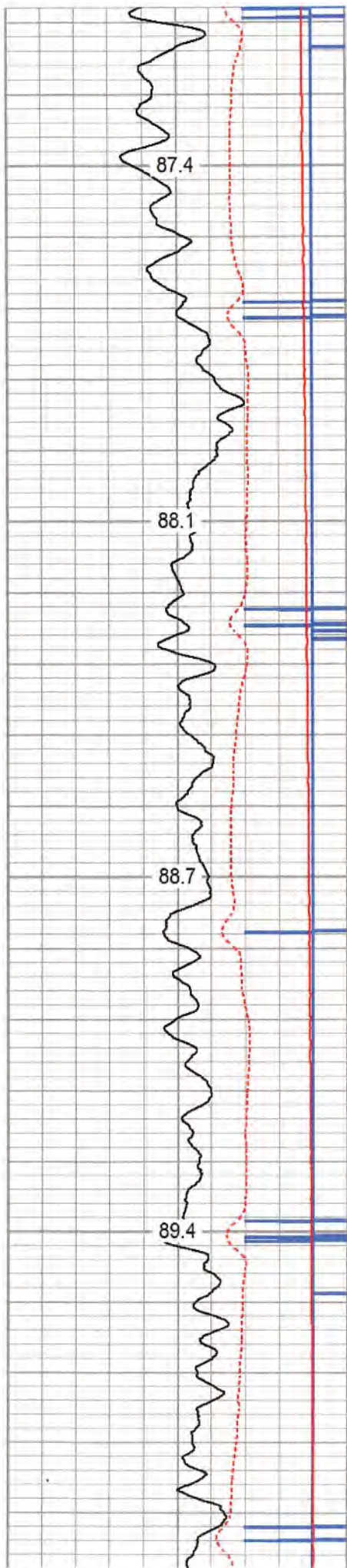
3350

3400

3450





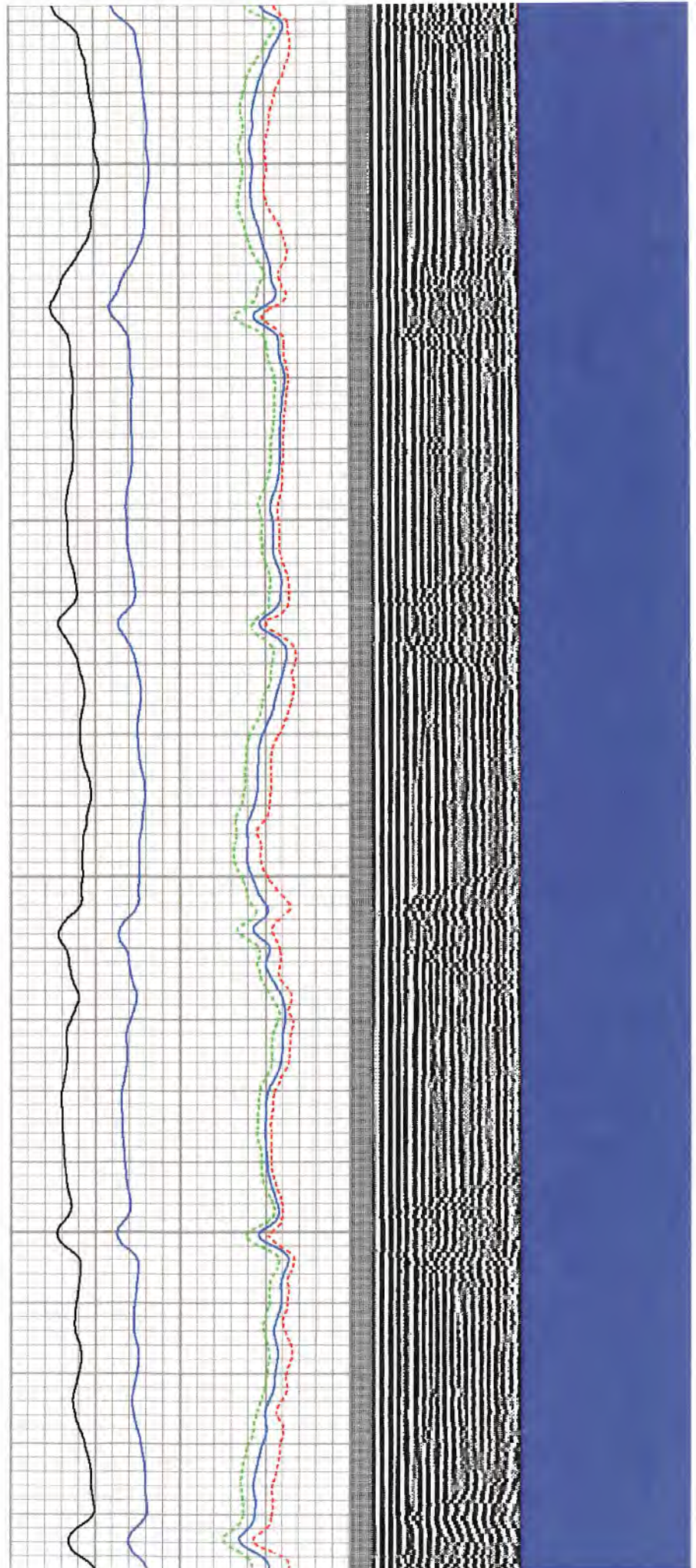


3500

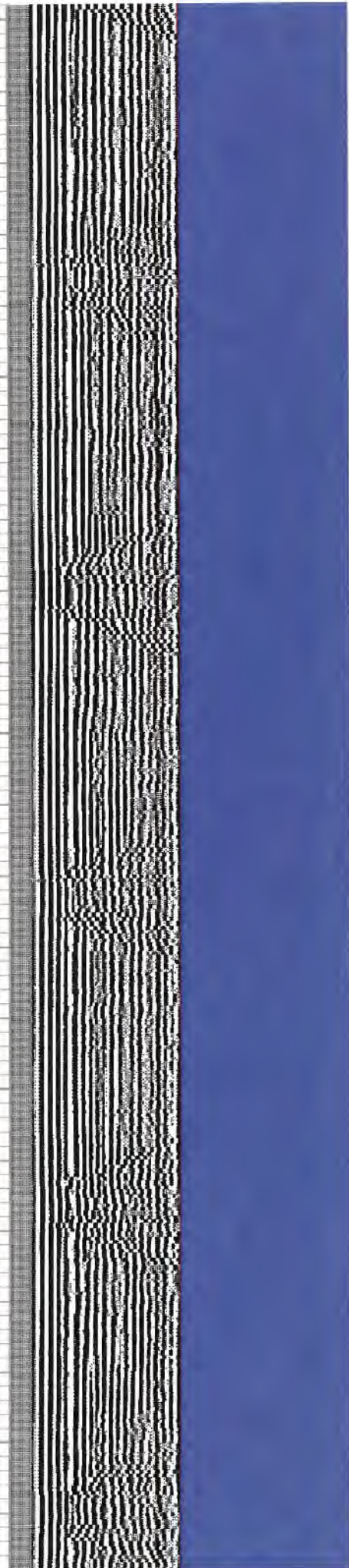
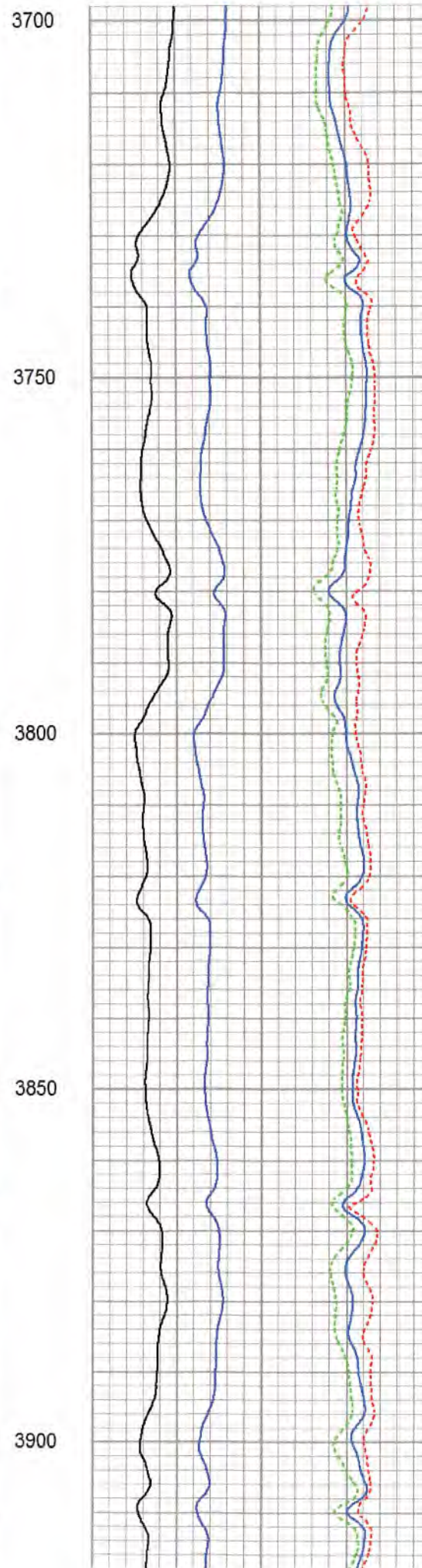
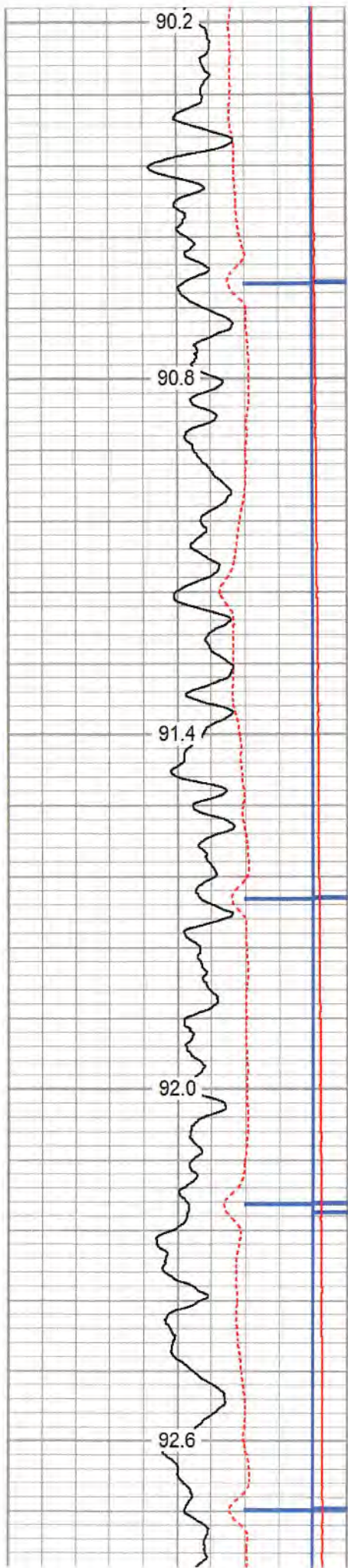
3550

3600

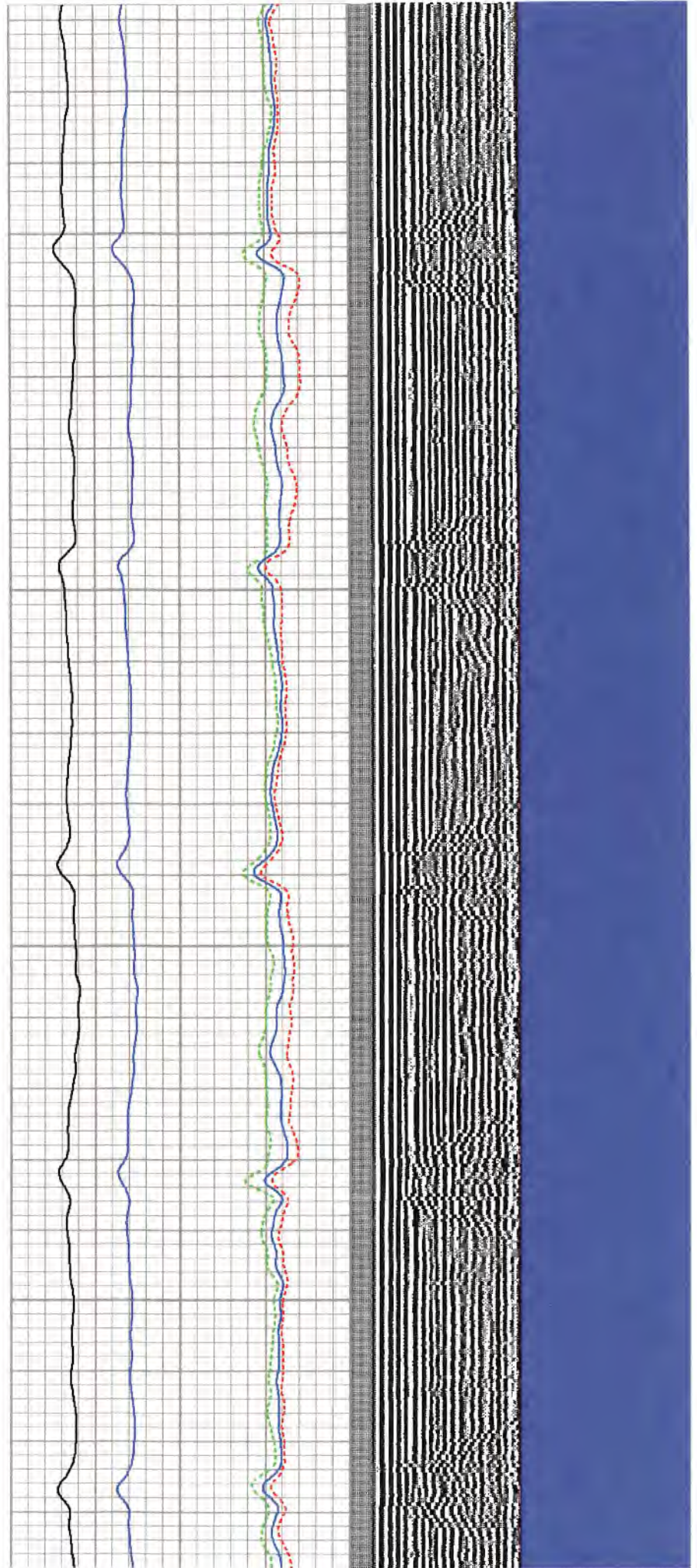
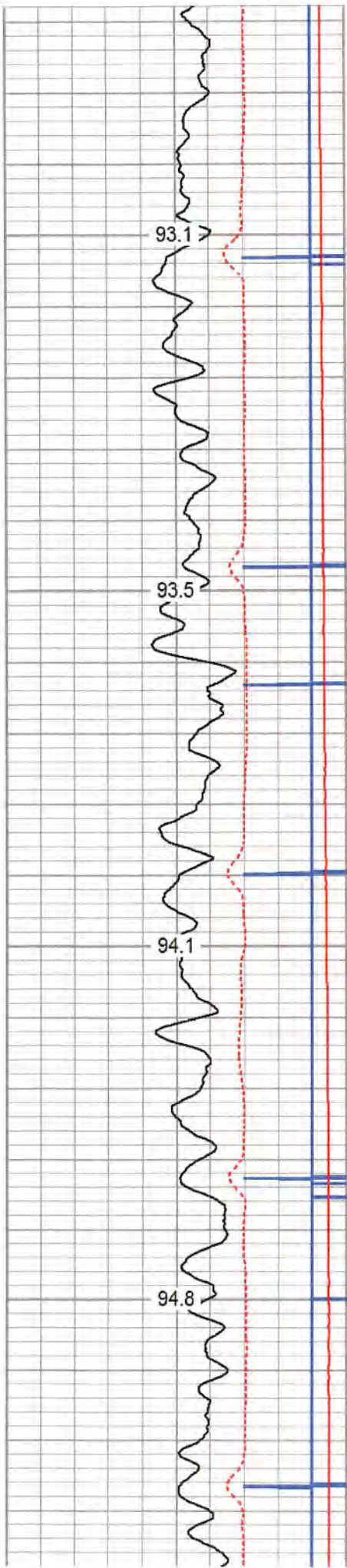
3650



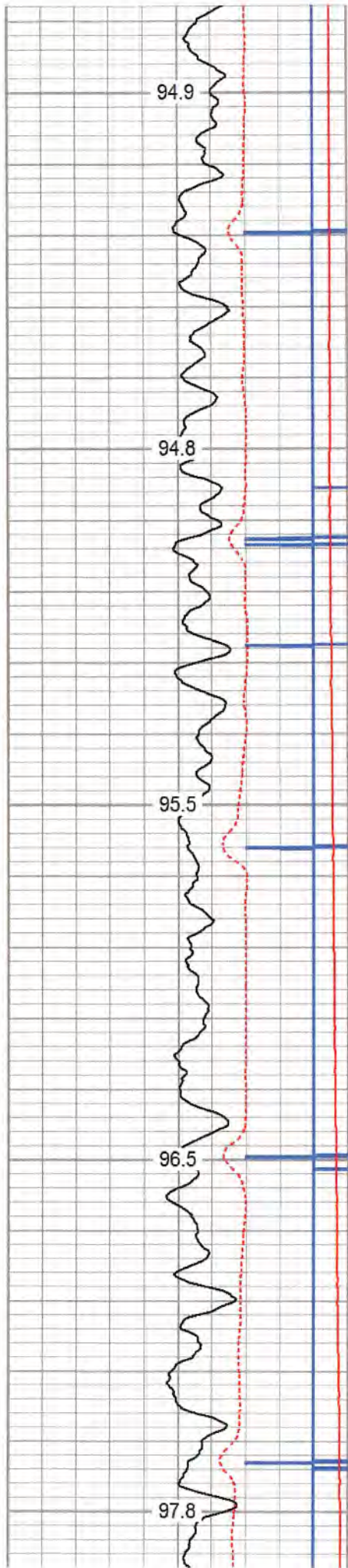












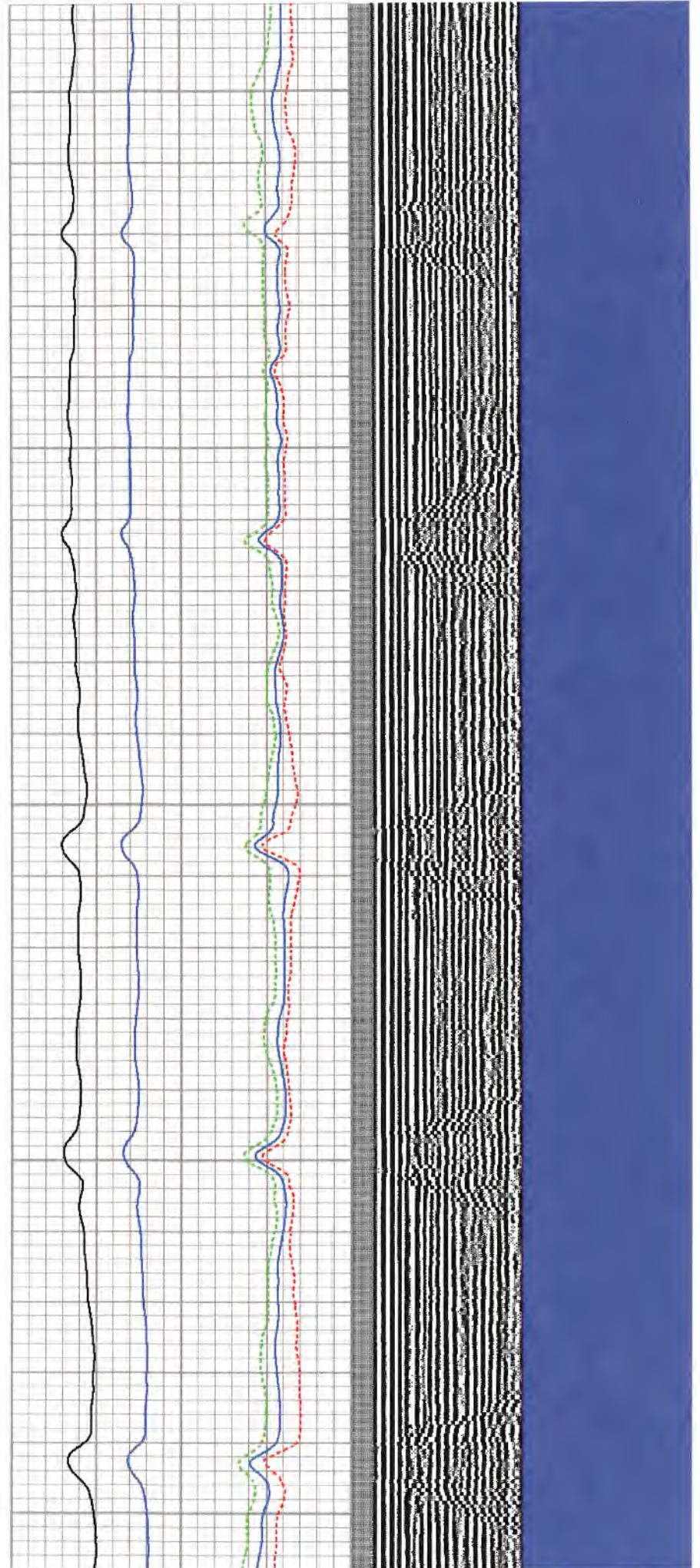
4150

4200

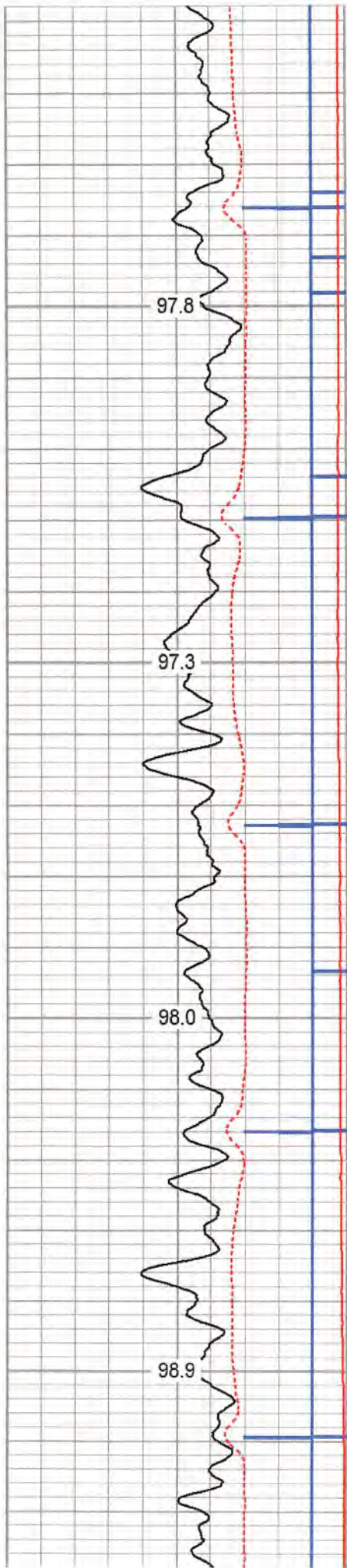
4250

4300

4350







4400

4450

4500

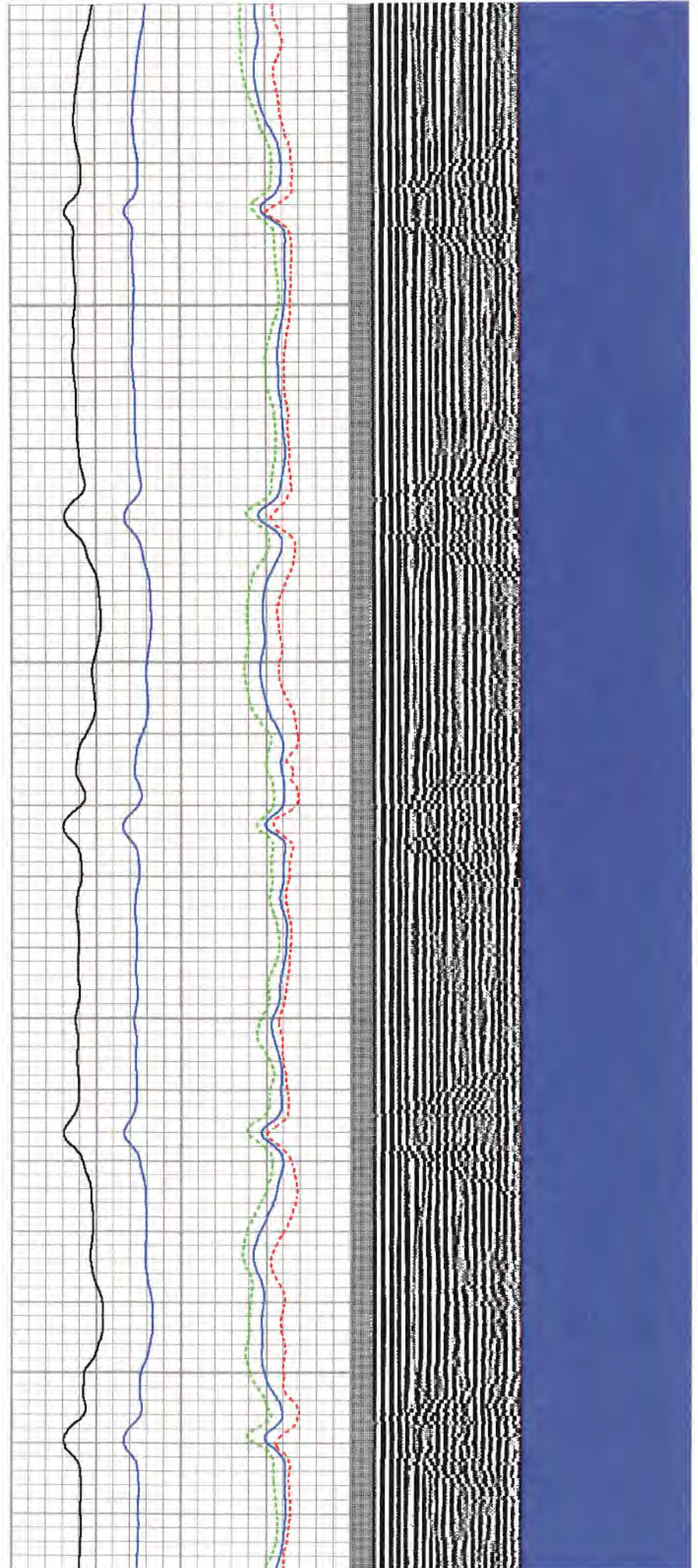
4550

97.8

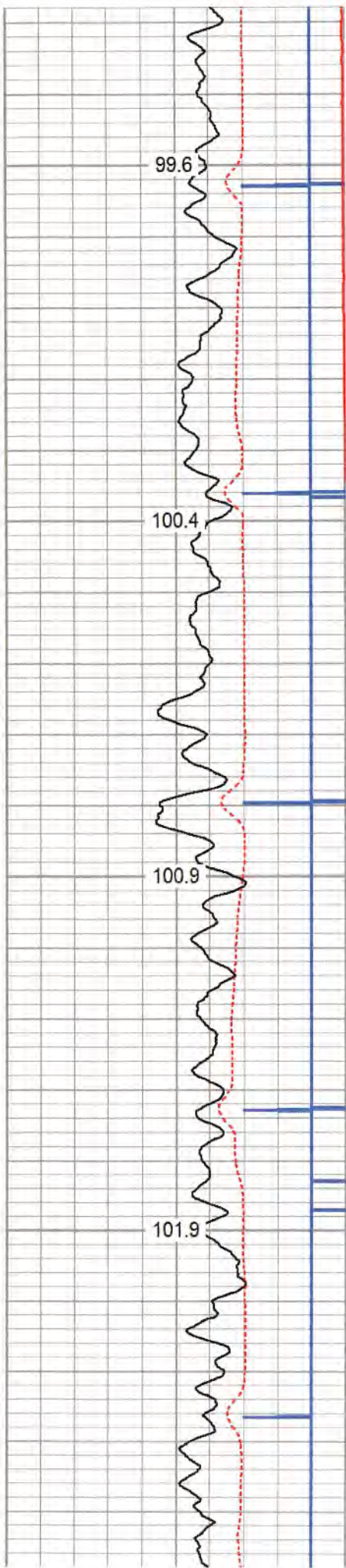
97.3

98.0

98.9





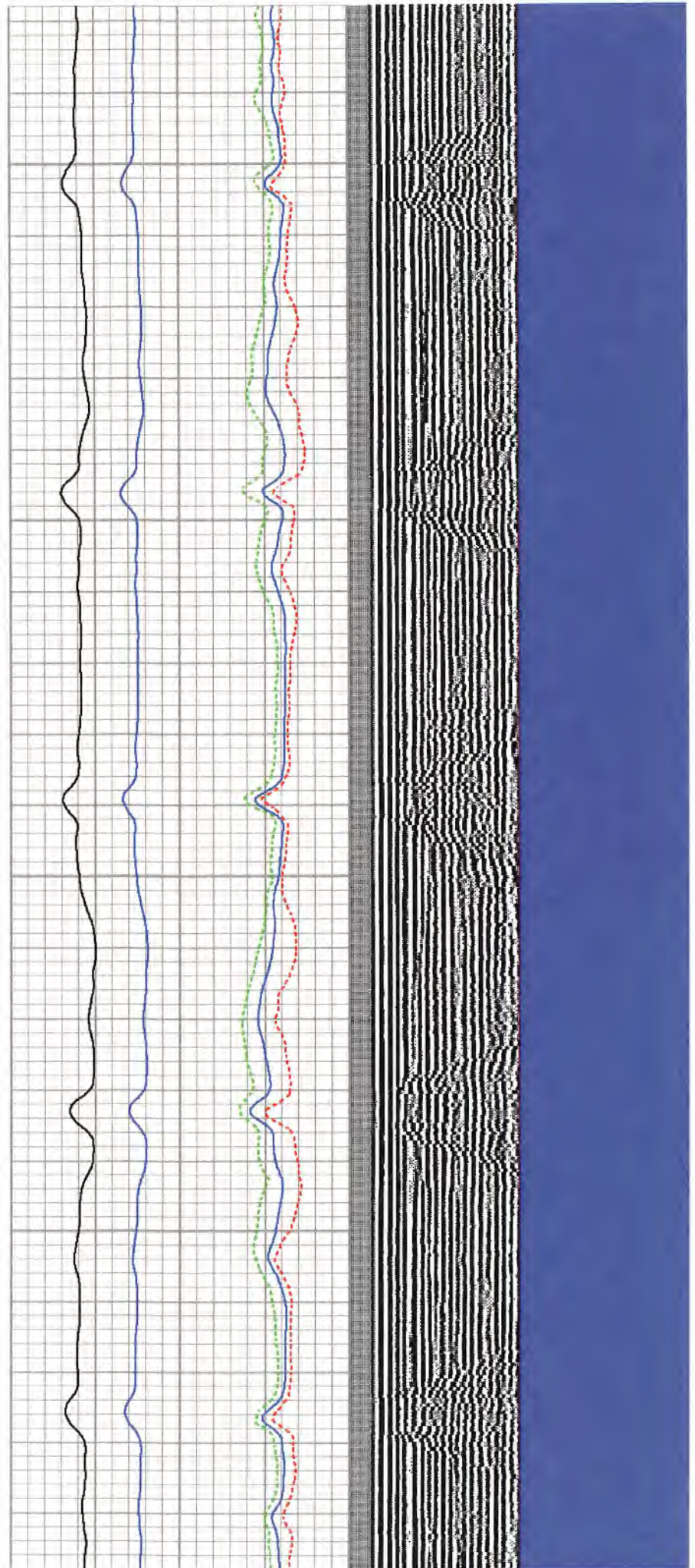


4600

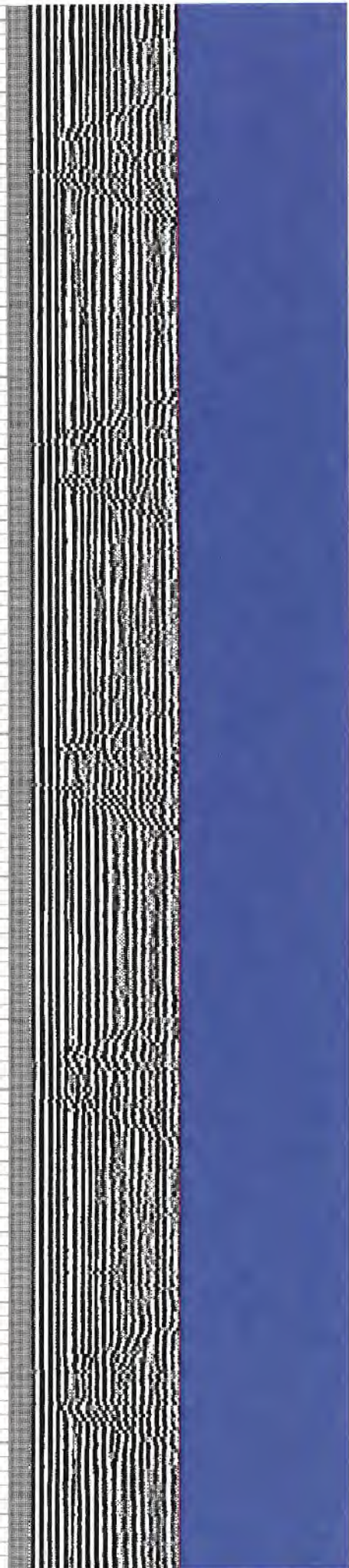
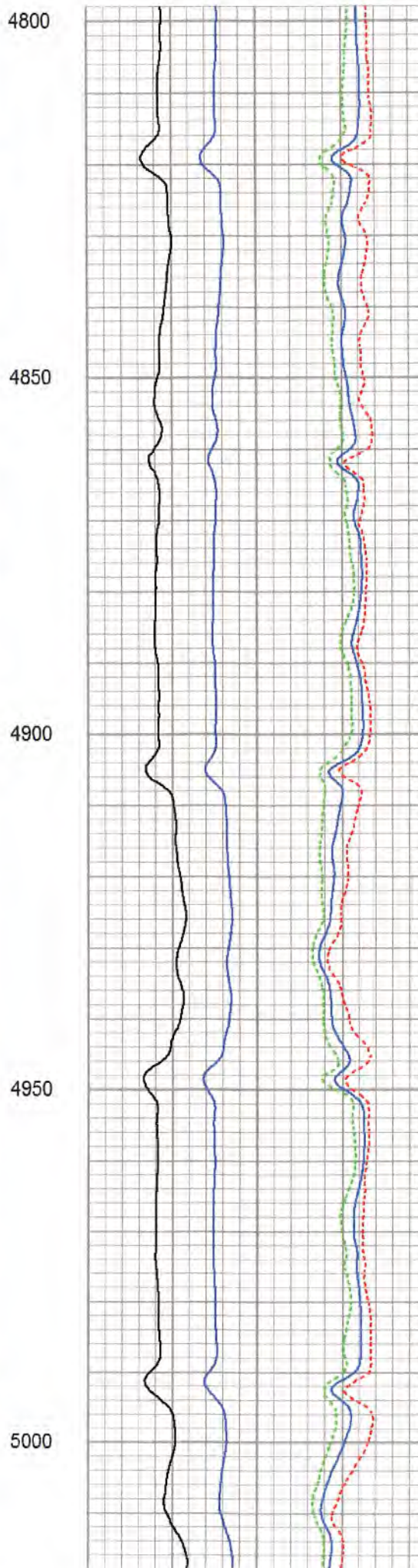
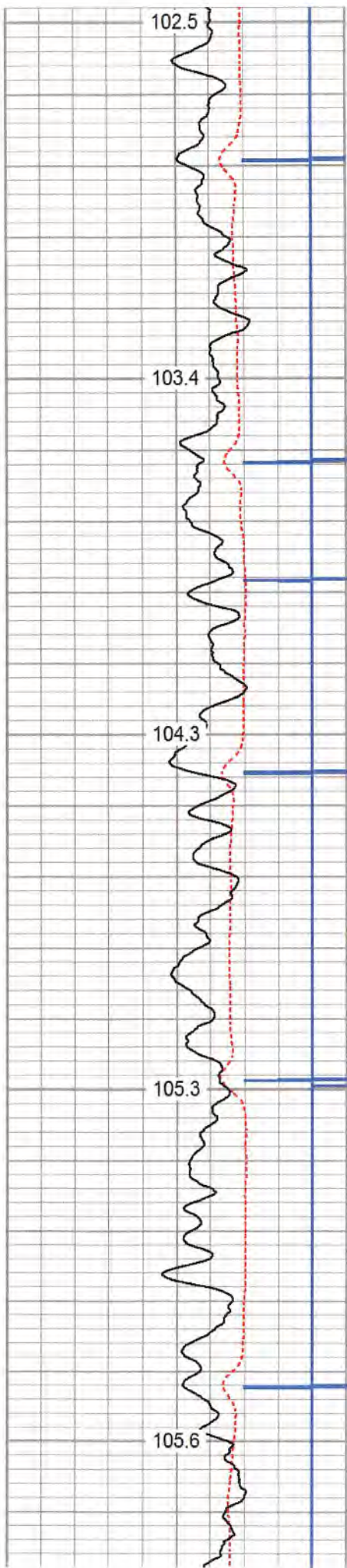
4650

4700

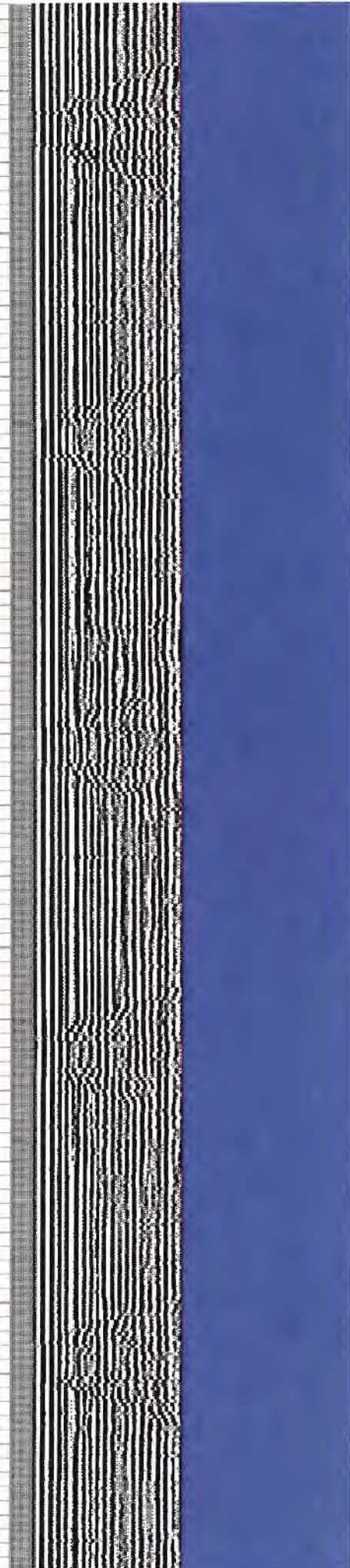
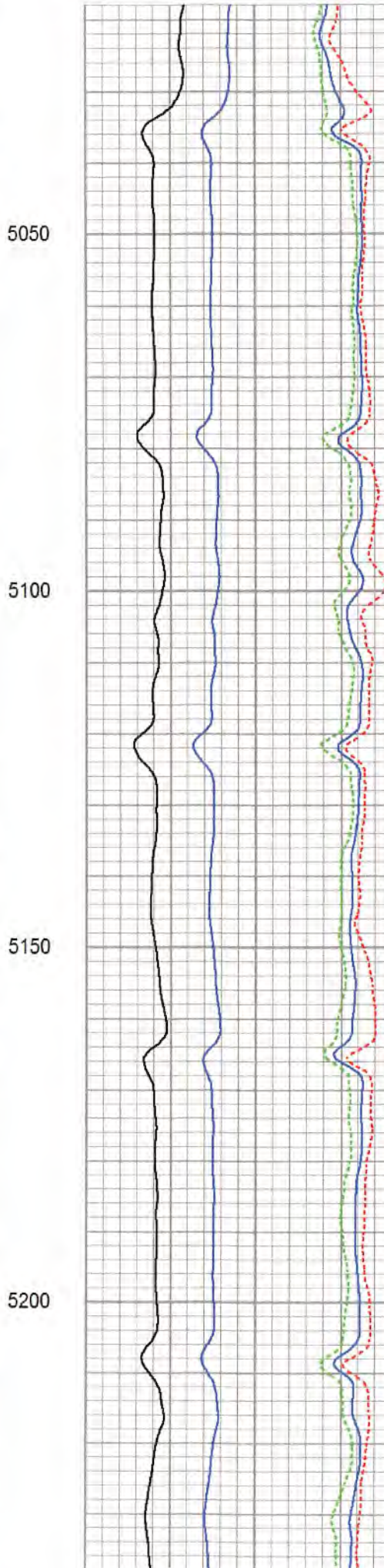
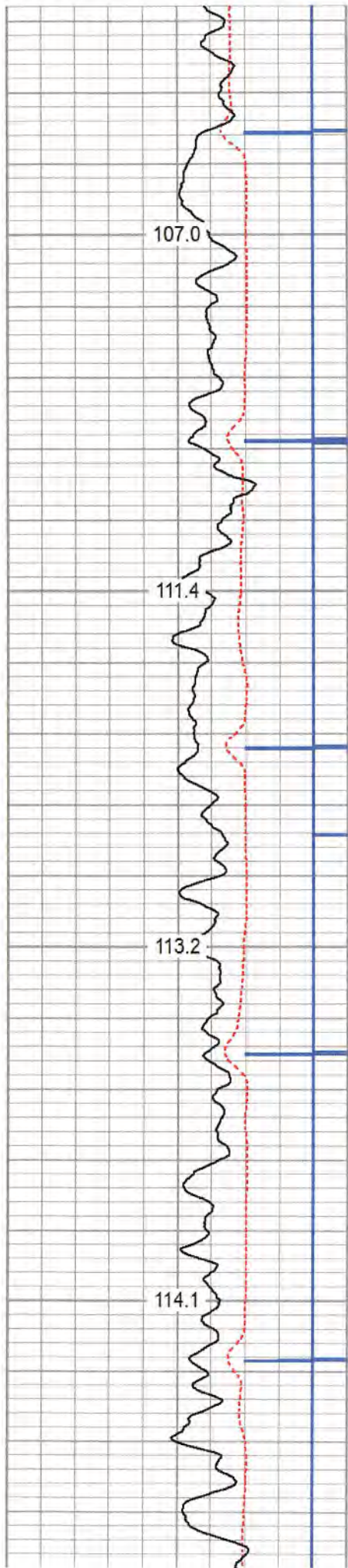
4750



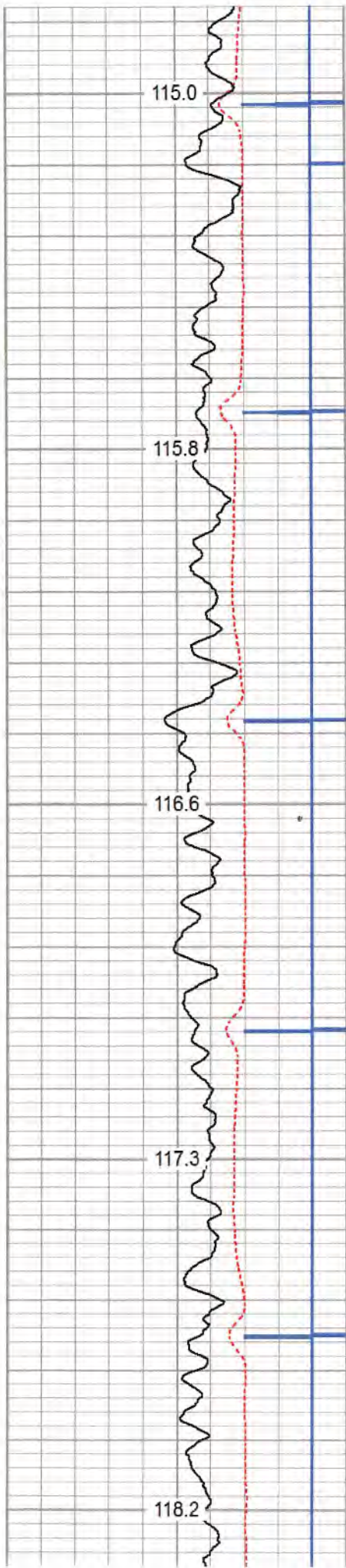












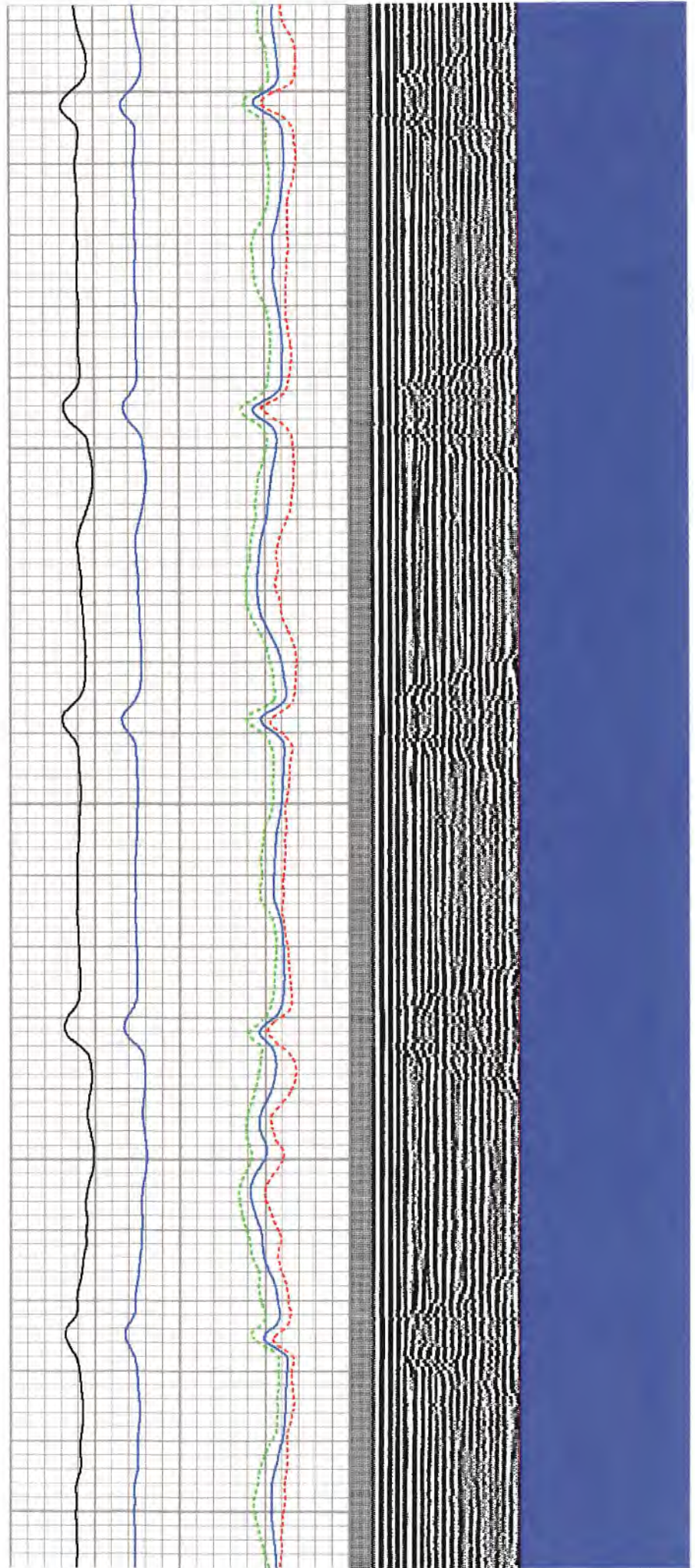
5250

5300

5350

5400

5450





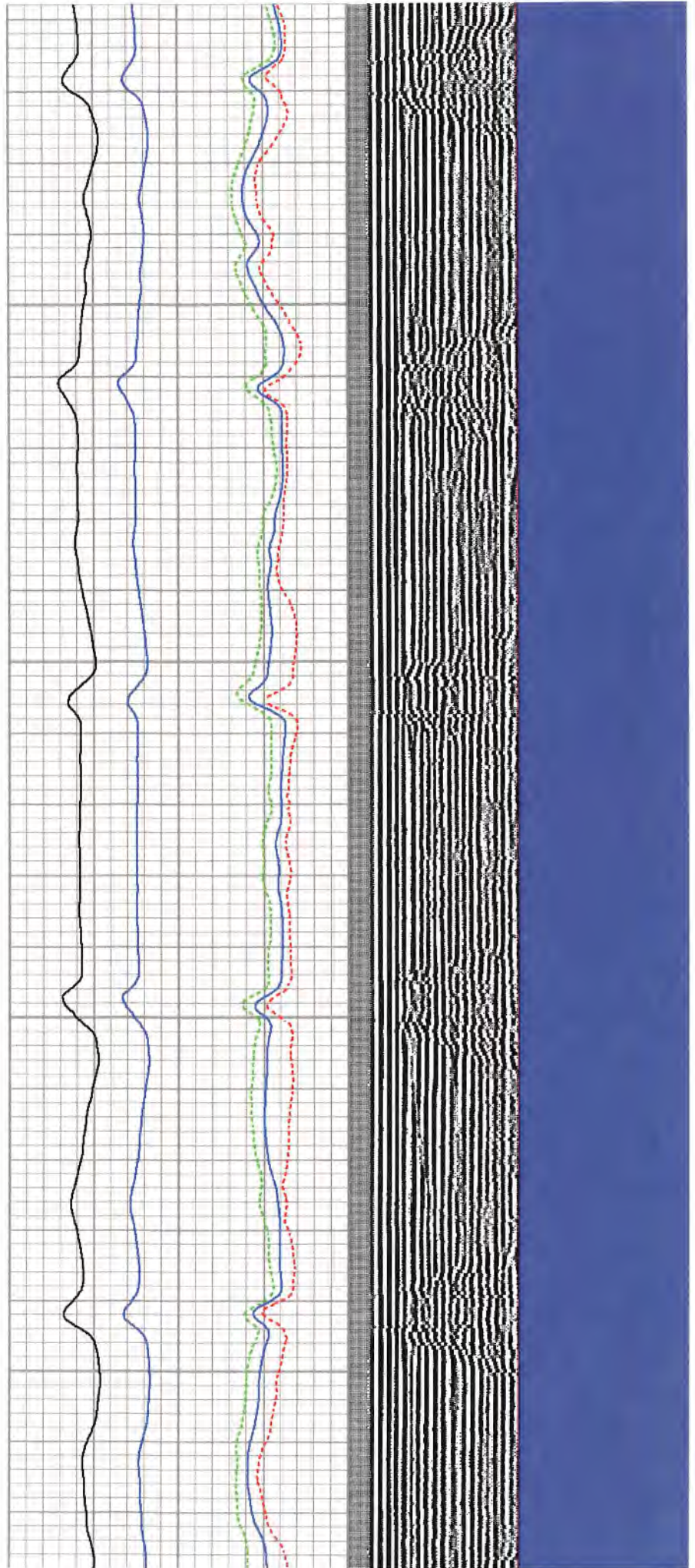


5500

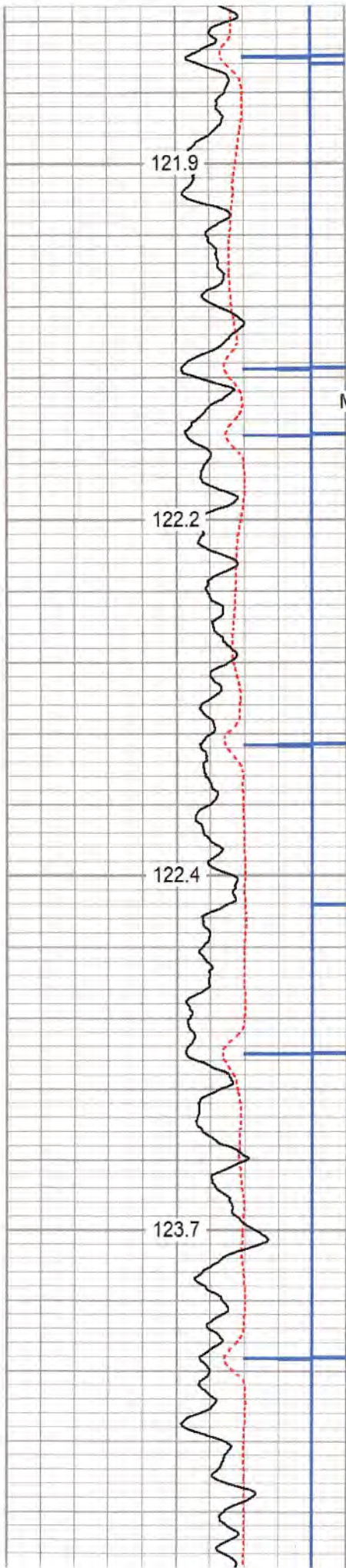
5550

5600

5650







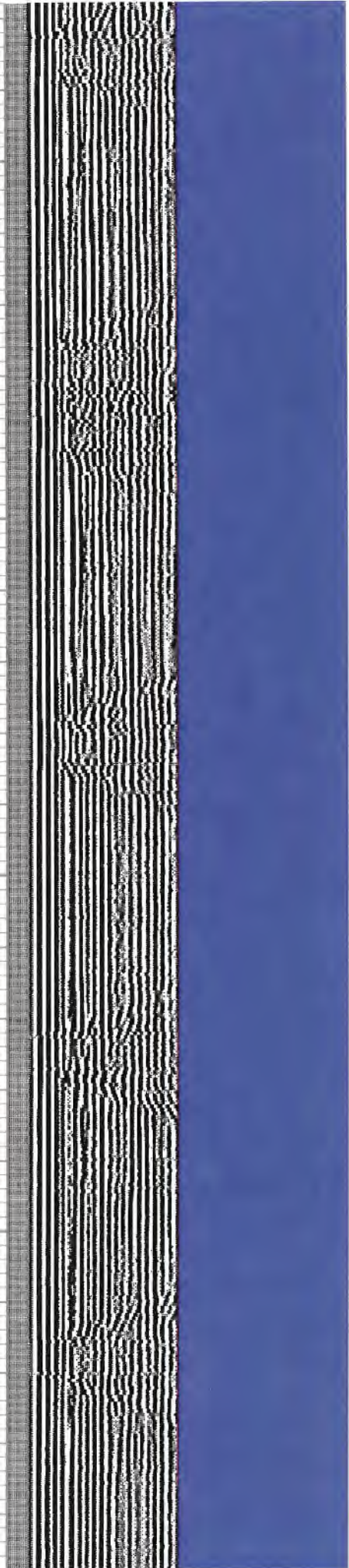
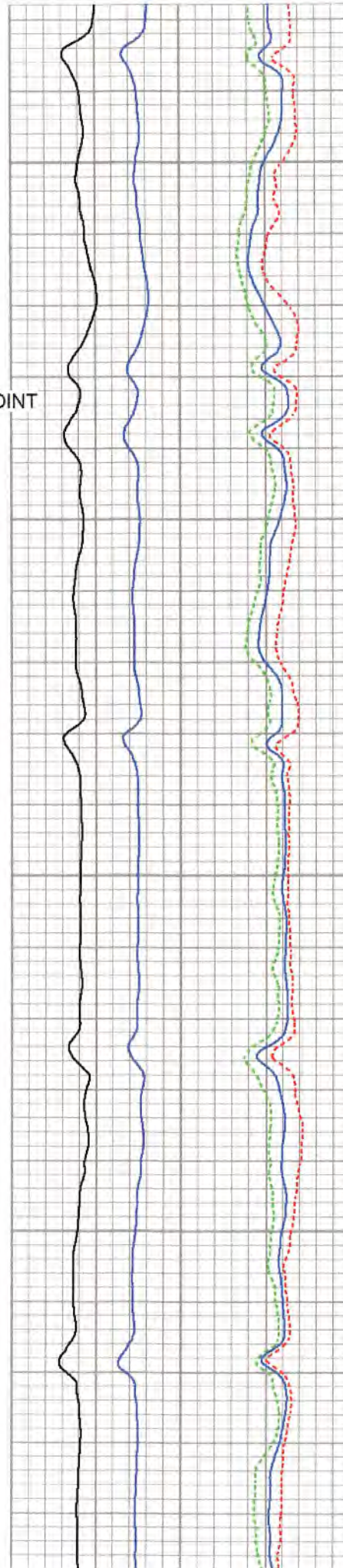
5700

MARKER JOINT

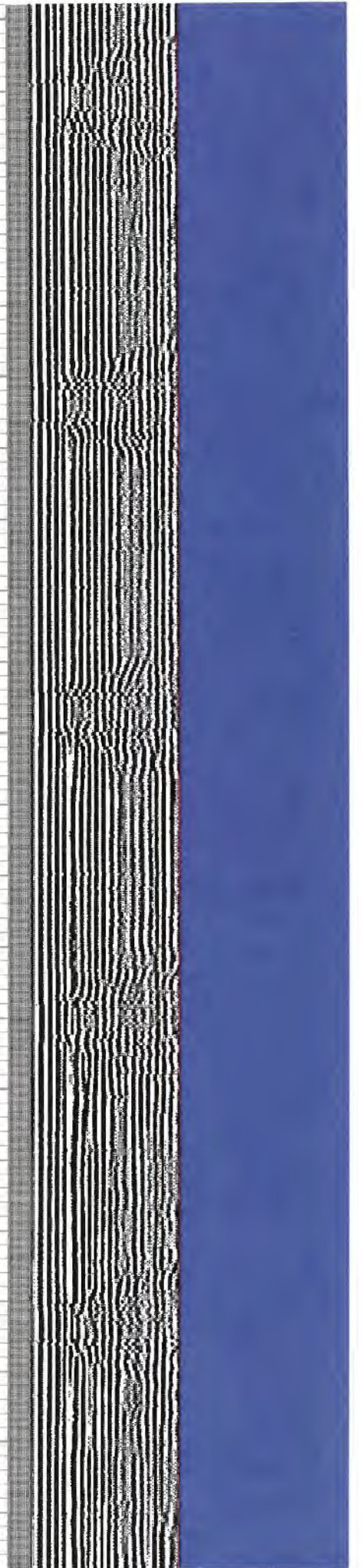
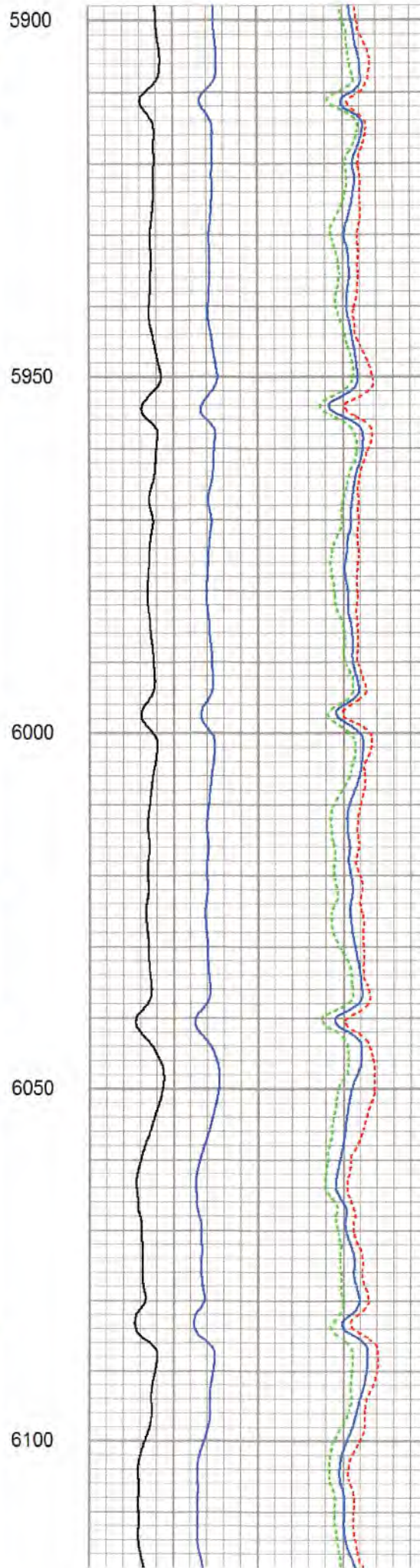
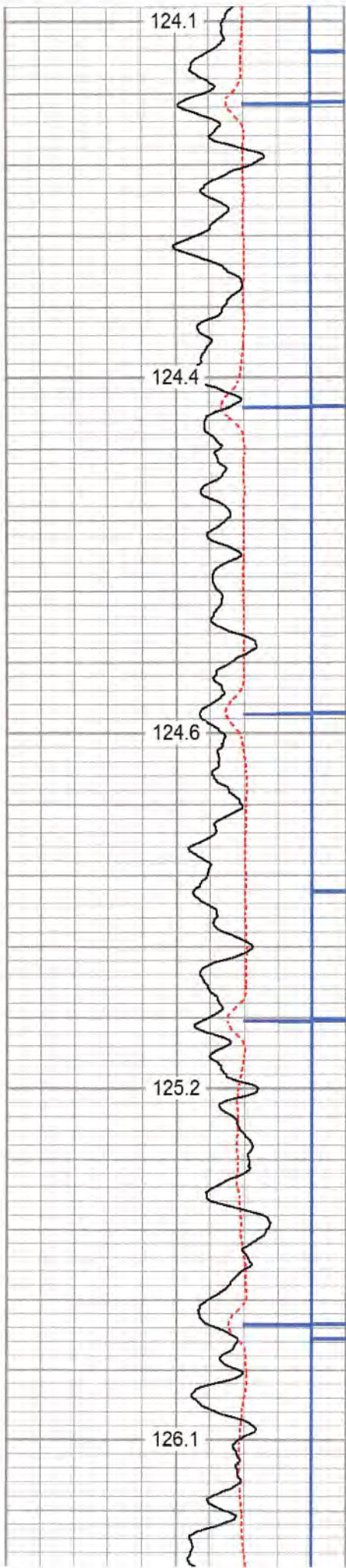
5750

5800

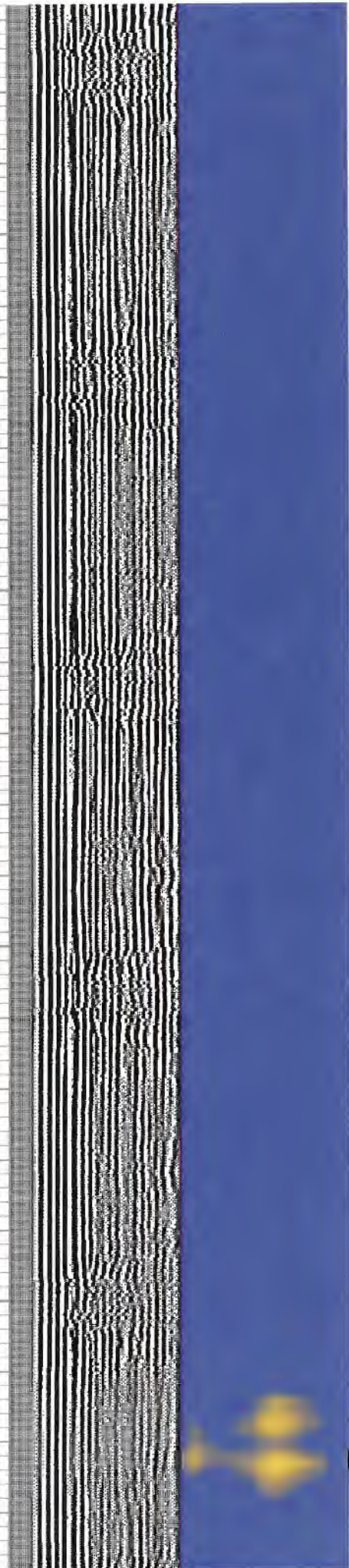
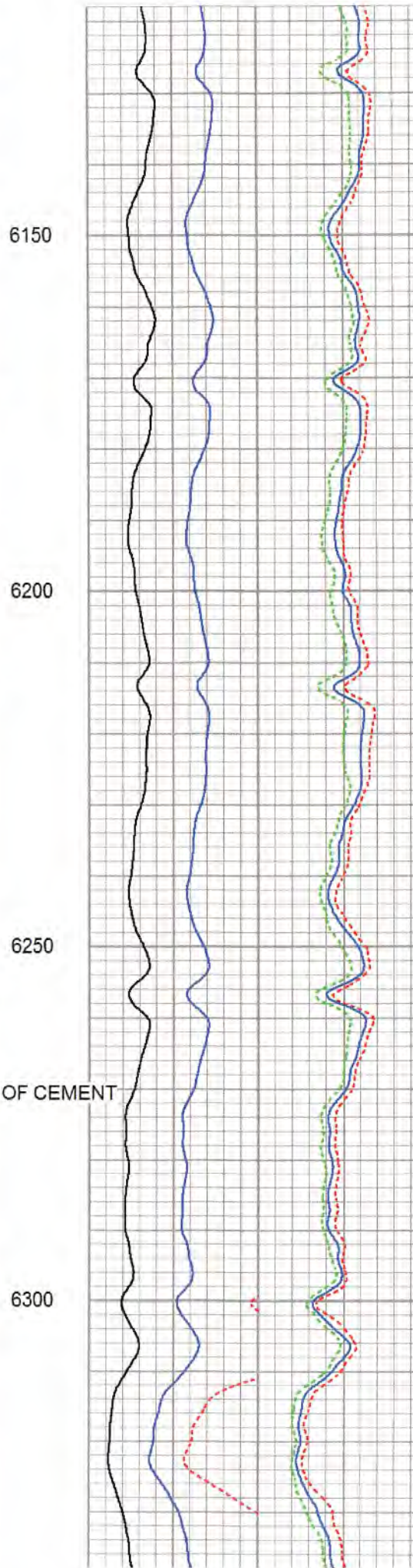
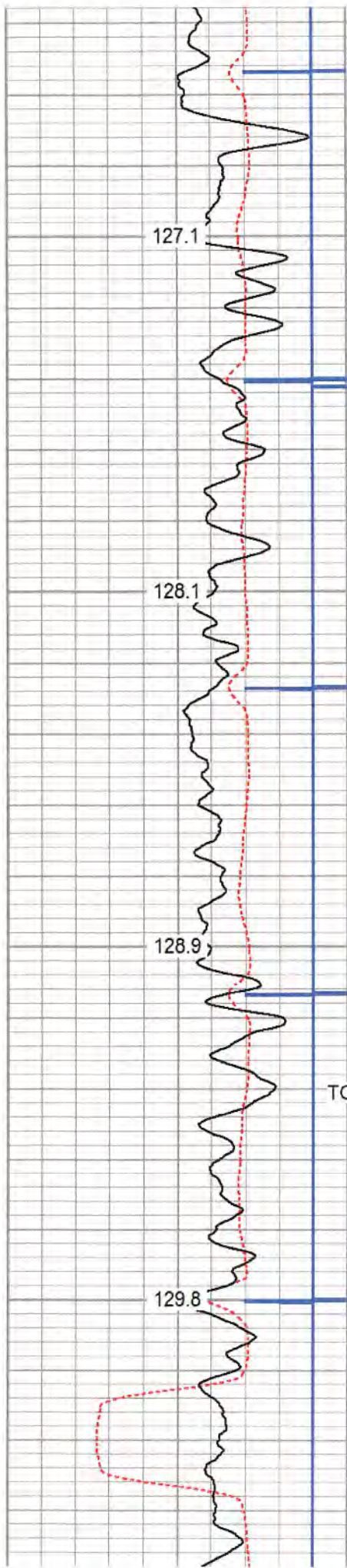
5850



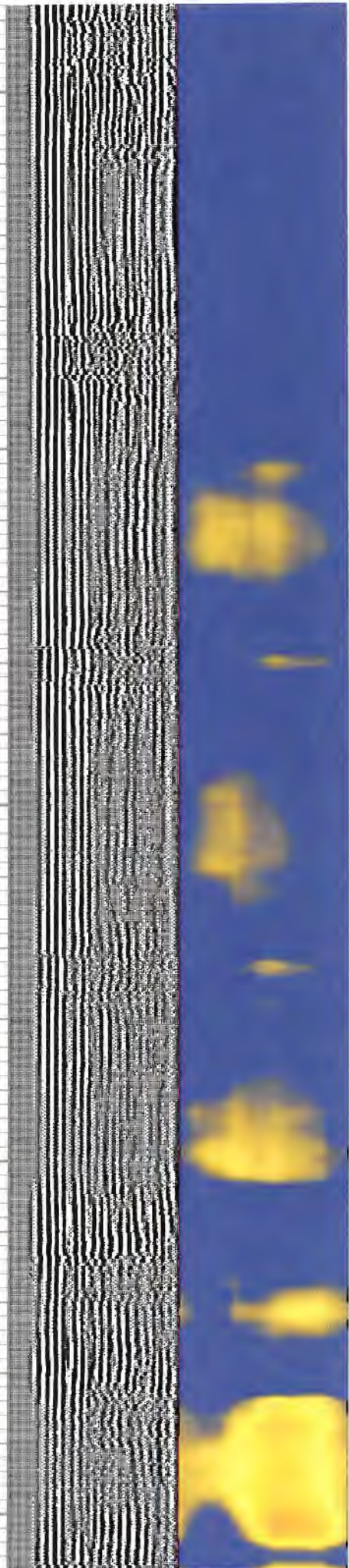
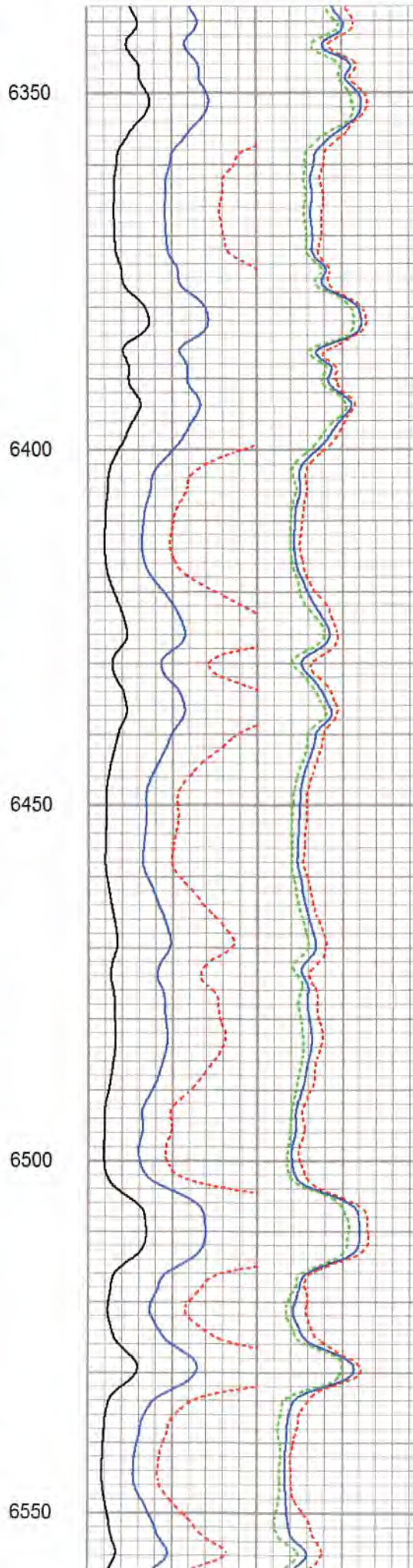
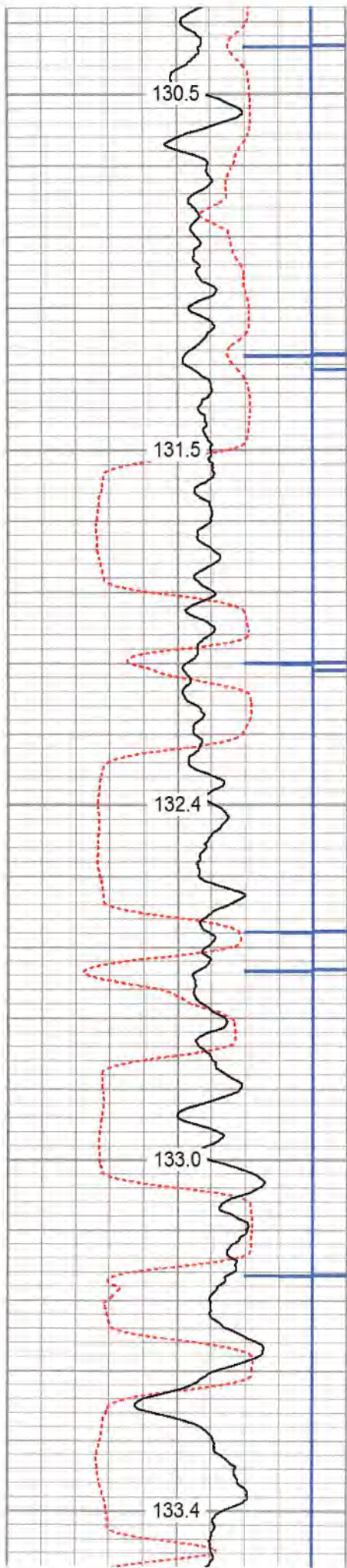




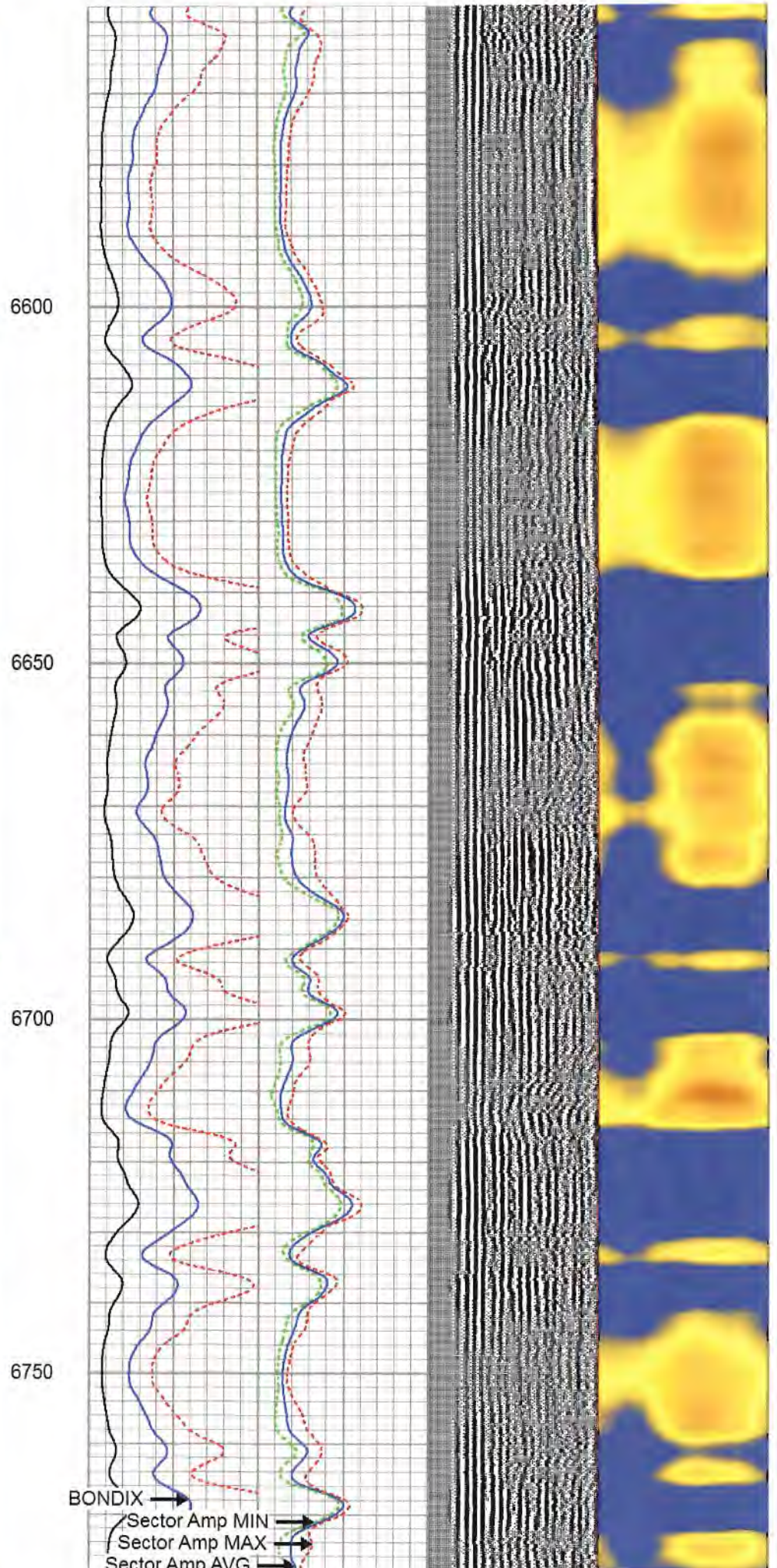
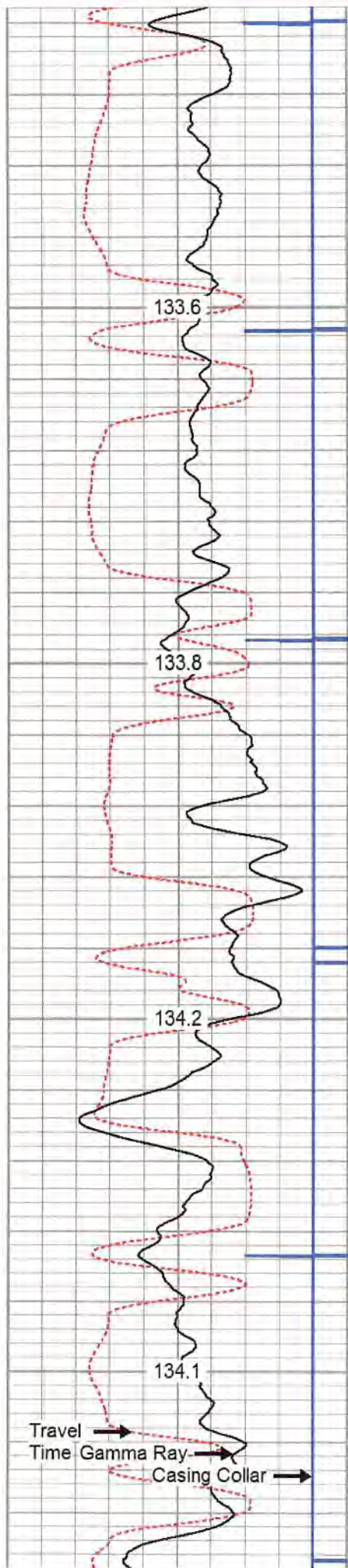




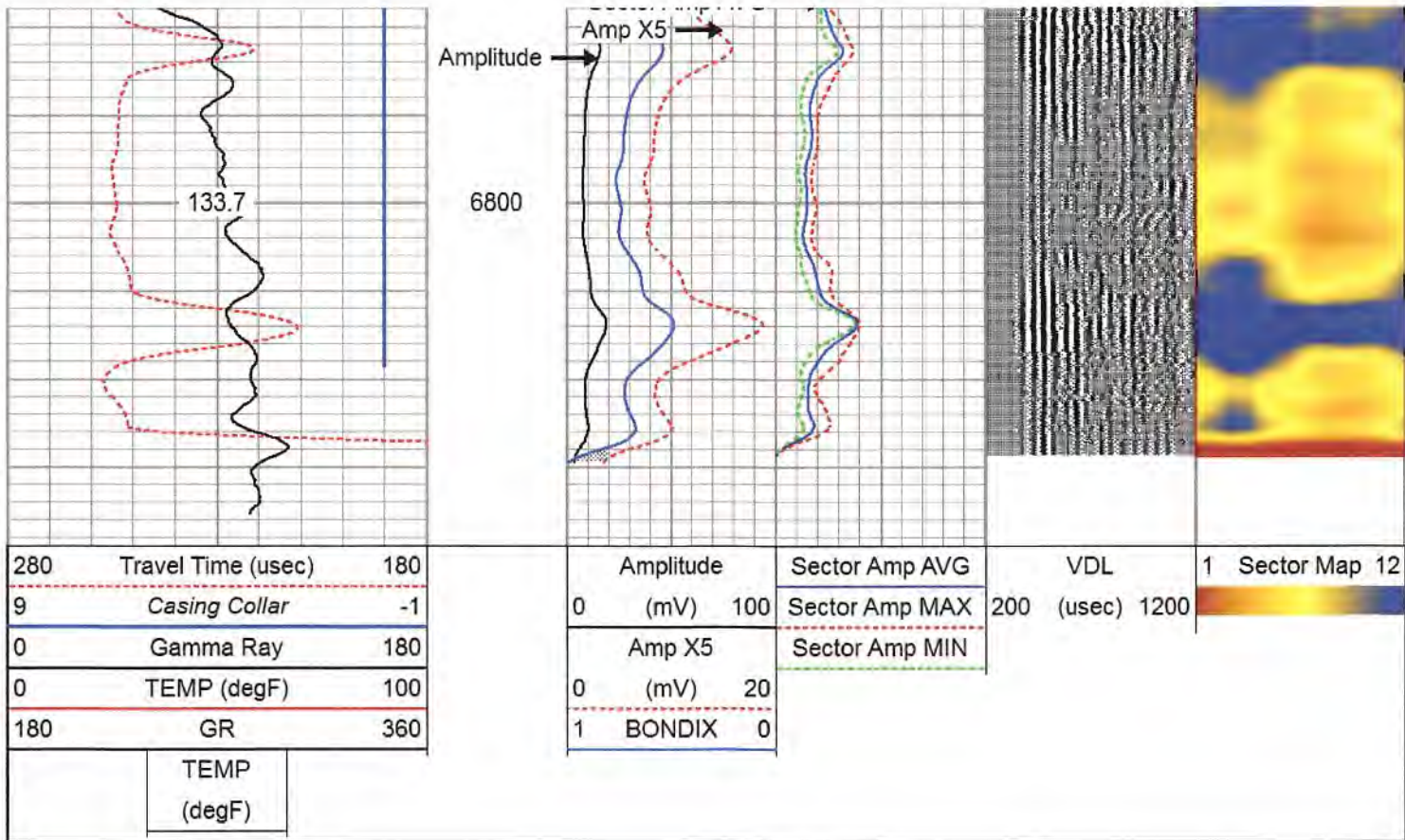






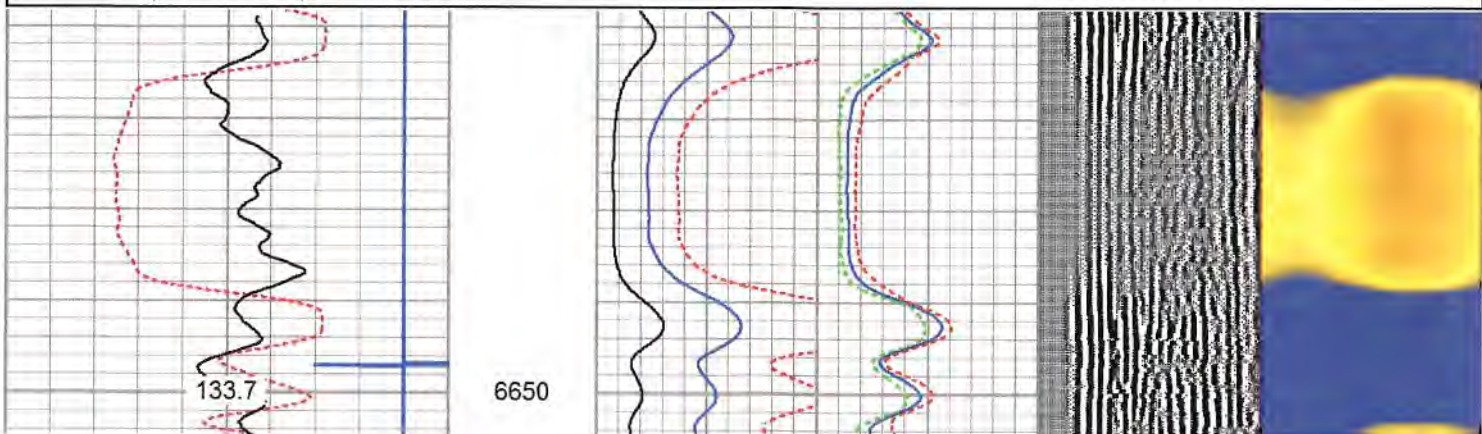
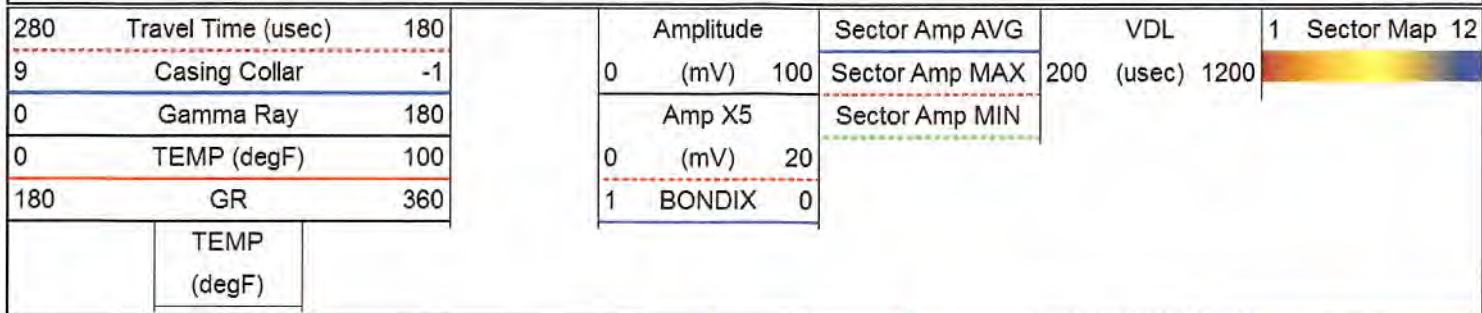




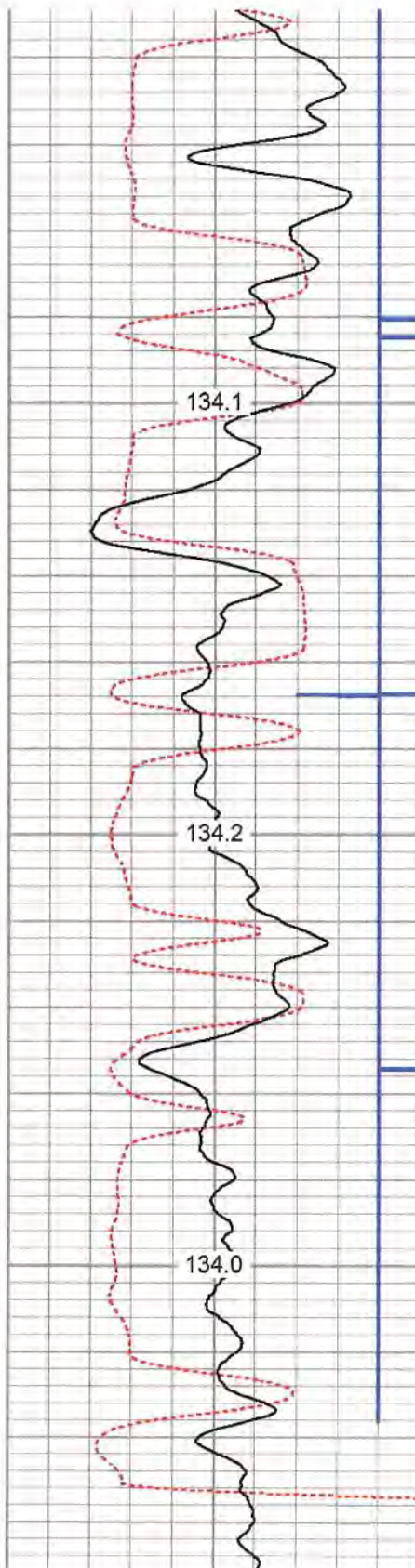


# REPEAT PASS 1500 PSI

Database File e:\antero 2020\8\_25\_20\_antero\_richmond\_2h.db  
 Dataset Pathname pass2  
 Presentation Format antero  
 Dataset Creation Tue Aug 25 11:14:39 2020  
 Charted by Depth in Feet scaled 1:240



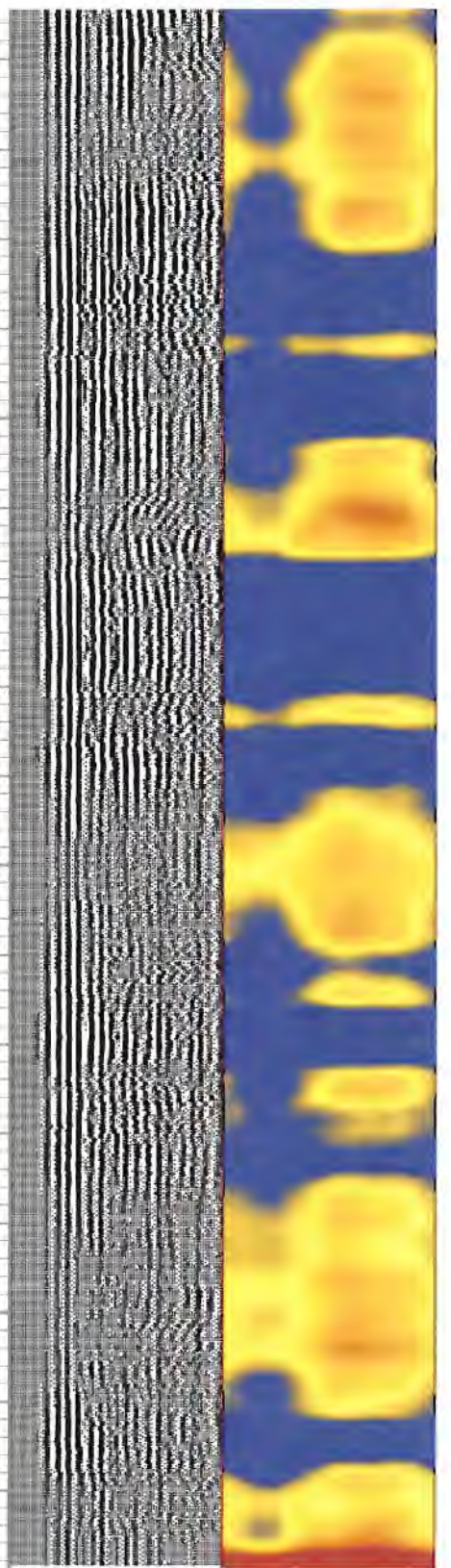
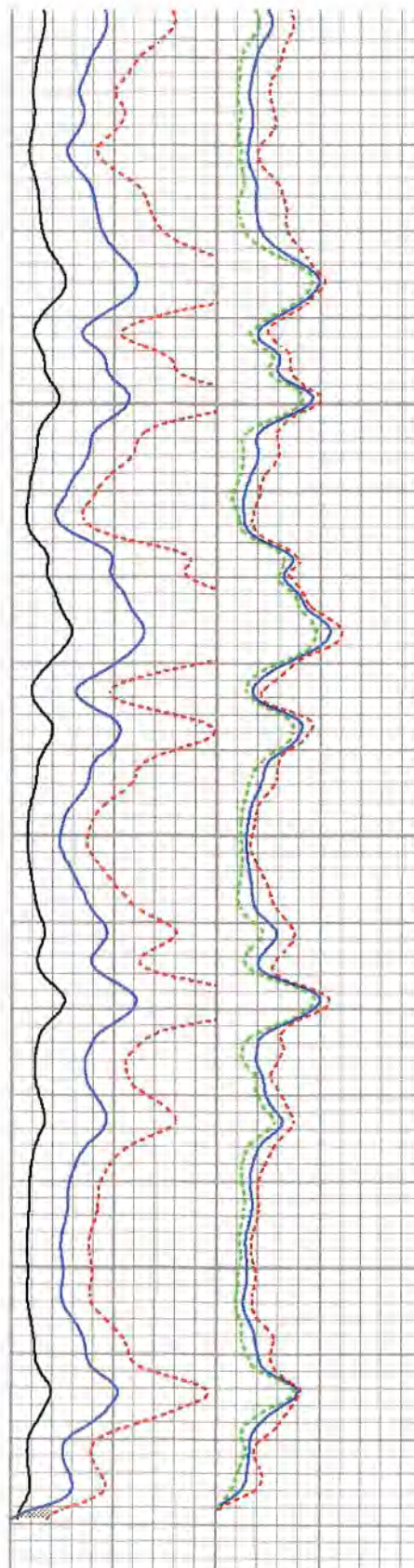




6700

6750

6800



280	Travel Time (usec)	180
9	Casing Collar	-1
0	Gamma Ray	180
0	TEMP (degF)	100
180	GR	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
200 (usec) 1200

1 Sector Map 12





Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)	
CCL	20.30		CCL-312tekco (I08X3-01) Tekco 3 1/8" 450 Deg. "F" SmCo Logging CCL	1.82	3.12	25.00	
			Tek-3.125 3 1/8" Titan Adjustable Centralizer	3.42	3.13	50.00	
TEMP	13.46						
WVFS12	12.17			SCBL-Tek12 (IOL40-03_5_5) Tekco 400 Deg F 12 Sector RIB with Temp	9.13	3.25	135.00
WVFS11	12.17						
WVFS10	12.17						
WVFS9	12.17						
WVFS8	12.17						
WVFS7	12.17						
WVFS6	12.17						
WVFS5	12.17						
WVFS4	12.17						
WVFS3	12.17						
WVFS2	12.17						
WVFS1	12.17						
WVFCAL	11.42						
WVF3FT	11.42						
WVF5FT	10.42						
WVFSYNC	7.08						
WVFTEMP	7.08						
		Tek-3.125 3 1/8" Titan Adjustable Centralizer	3.42	3.13	50.00		
GR	1.04		GR-Tek-Co 2 3/4 (IPSNO-03) Tekco 2 3/4" 400 Deg. F Logging Gamma Ray	3.67	2.75	40.00	

Dataset: 8\_25\_20\_antero\_richmond\_2h.db: field/well/run1/pass3  
 Total length: 21.44 ft  
 Total weight: 300.00 lb



Calibration Report

Database File E:\antero 2020\8\_25\_20\_antero\_richmond\_2h.db  
 Dataset Pathname pass3  
 Dataset Creation Tue Aug 25 11:31:21 2020

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: IOL40-03\_5\_5  
 Tool Model: Tek12  
 Calibration Casing Diameter: 5.500 in  
 Calibration Depth: 388.083 ft

Master Calibration, performed Tue Aug 25 07:12:11 2020:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.001	0.701	3.400	71.921	97.878	3.338
CAL	0.865	0.408				
5'	-0.002	0.748	1.000	71.921	94.617	1.169
SUM						
S1	0.006	1.637	0.000	100.000	61.287	-0.344
S2	0.006	1.500	0.000	100.000	66.925	-0.407
S3	0.006	1.414	0.000	100.000	71.015	-0.416
S4	0.005	1.460	0.000	100.000	68.730	-0.356
S5	0.004	1.595	0.000	100.000	62.854	-0.274
S6	0.004	1.757	0.000	100.000	57.065	-0.244
S7	0.004	1.715	0.000	100.000	58.440	-0.227
S8	0.004	1.625	0.000	100.000	61.675	-0.217
S9	0.004	1.572	0.000	100.000	63.755	-0.232
S10	0.004	1.549	0.000	100.000	64.697	-0.244
S11	0.004	1.554	0.000	100.000	64.514	-0.246
S12	0.005	1.648	0.000	100.000	60.865	-0.276

Temperature Calibration Report

Serial Number: IOL40-03\_5\_5  
 Tool Model: Tek12  
 Performed: Fri Oct 20 09:51:21 2017  
 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





Company	ANTERO RESOURCES CORPORATION		
Well	RICHMOND UNIT 2H		
Field	MARCELLUS		
County	TYLER		
State	WV	Country	US