



**RADIAL CEMENT BOND LOG  
VARIABLE DENSITY LOG  
GAMMA/CCL/TEMP**

Company ANTERO RESOURCES  
Well REDWOOD 1H  
Field WEST UNION  
County DODDRIDGE  
State WV

Company ANTERO RESOURCES  
Well REDWOOD 1H  
Field WEST UNION  
County DODDRIDGE State WV

Location: 39.2566436, -80.791916 (ENTERANCE)  
AP1 #: 47-017-06930

Permanent Datum GROUND LEVEL Elevation 25.5"  
Log Measured From KELLY BUSHING  
Drilling Measured From KELLY BUSHING

SEC TWP RGE  
Elevation  
K.B. 1155.5  
D.F. 1145.5  
G.L. 1121

Date	NOVEMBER 14, 2022						
Run Number	ONE						
Depth Driller	13,982'						
Depth Logger	6,950'						
Bottom Logged Interval	6,938'						
Top Log Interval	SURFACE						
Open Hole Size	NA						
Type Fluid	FRESH WATER						
Density / Viscosity	8.6 LBGAL						
Max. Recorded Temp.	149.7						
Estimated Cement Top	5,100'						
Time Well Ready	UPON ARRIVAL						
Time Logger on Bottom	11:45						
Equipment Number	116						
Location	CHARLEROI, PA						
Recorded By	C. DRUMMOND						
Witnessed By	Keith Stansbury						
Borehole Record		Tubing Record					
Run Number	Bit	From	To	Size	Weight	From	To
Casing Record	Size	Wgt/Ft		Top	Bottom		
Conductor String	13.375"	54.5 LBS.		SURFACE	331'		
Surface String	9.625"	36 LBS.		SURFACE	2,607'		
Intermediate String	5.5	20 LBS.		SURFACE	13,982'		
Intermediate String							
Production String							

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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**

LOG CORRELATED TO MARKER JOINT  
DEPTH SHIFT -4  
MARKER JOINT 5,585' - 5,596'  
MAIN PASS LOGGED WITH 1500 PSI  
REPEAT PASS LOGGED WITH 0 PSI

THANK YOU FOR USING NINE ENERGY SERVICES

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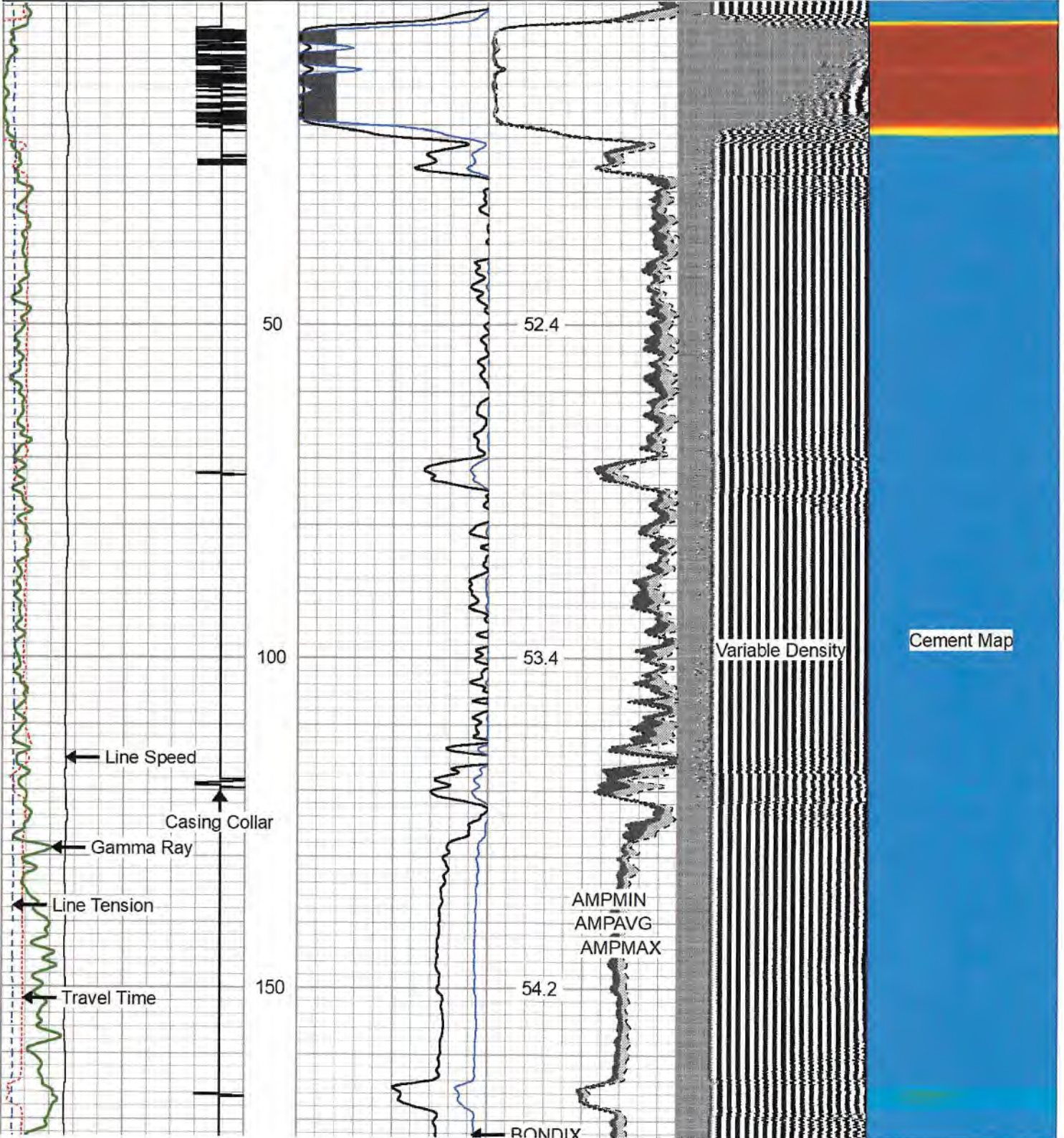
**Main Pass 1500 PSI**

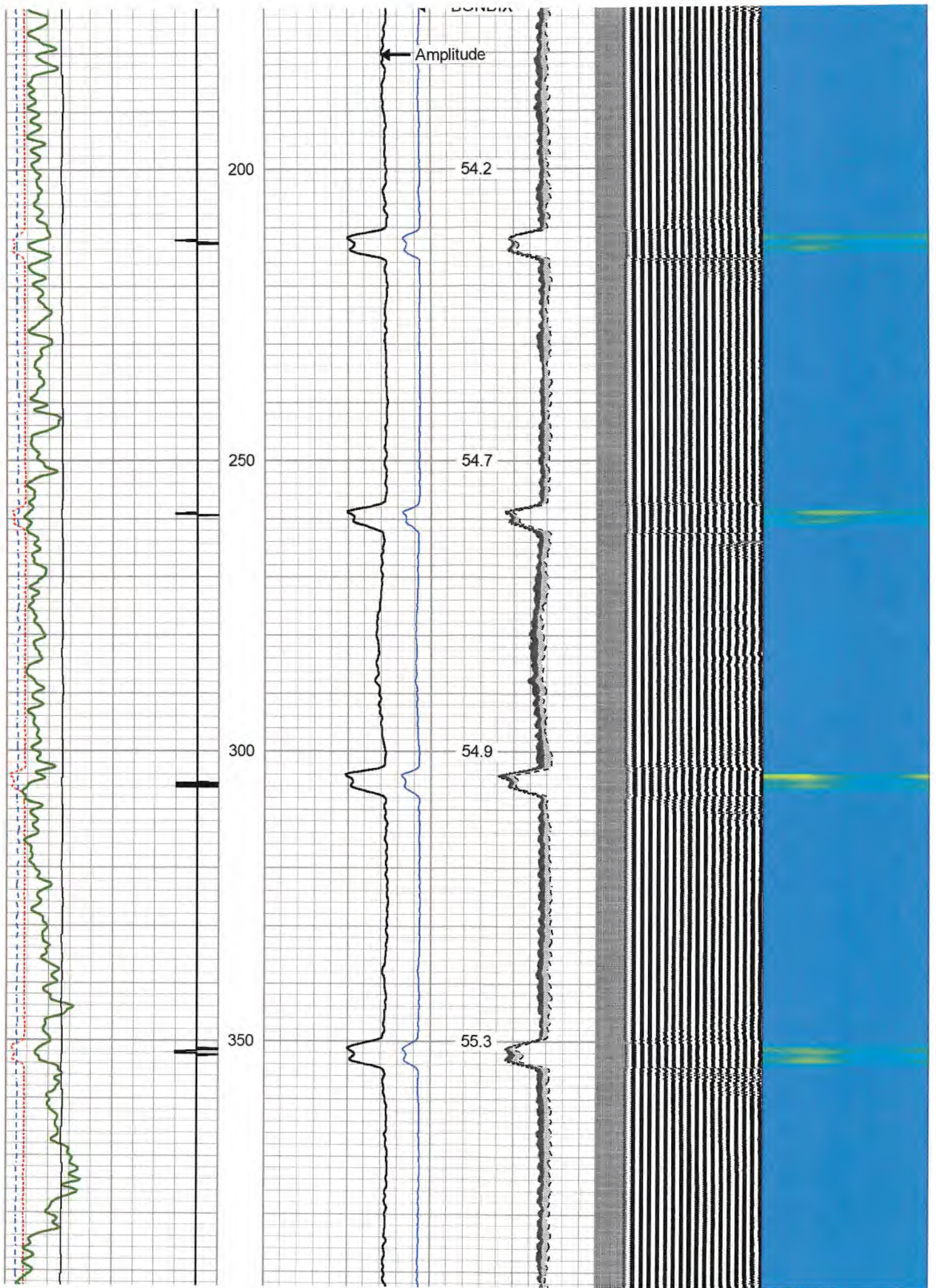
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 Dataset Pathname pass11  
 Presentation Format rcbl-bond index for antero 1020  
 Dataset Creation Mon Nov 14 10:17:25 2022  
 Charted by Depth in Feet scaled 1:240

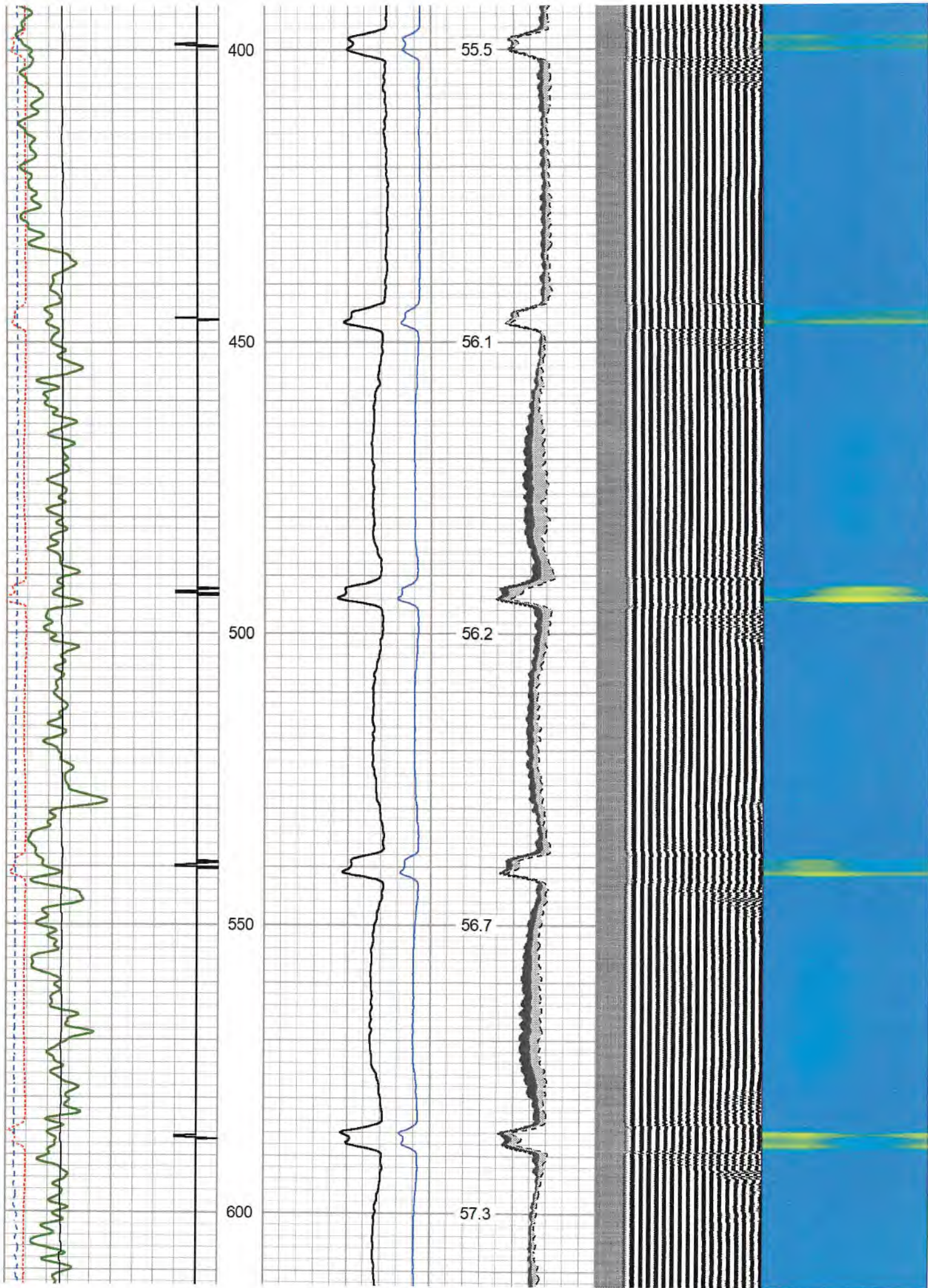
265	Travel Time (usec)	165
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
Line Speed		
-200	(ft/min)	200
0	Line Tension (lb)	4000

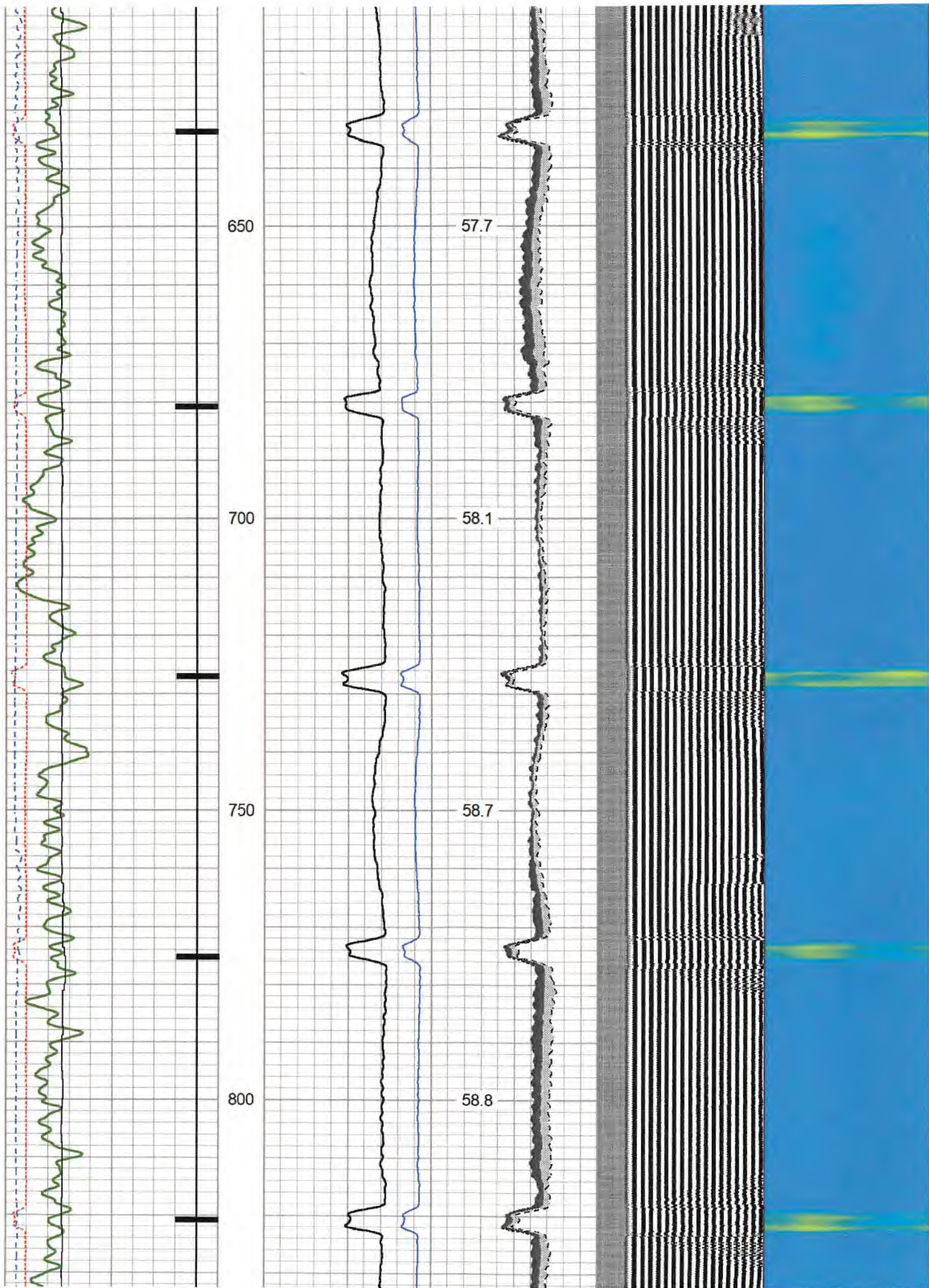
0	Amplitude (mV)	100	-5	AMPMIN	150
1	BONDIX	0	-5	AMPMAX	150
			-5	AMPAVG	150
TEMP					
(degF)					

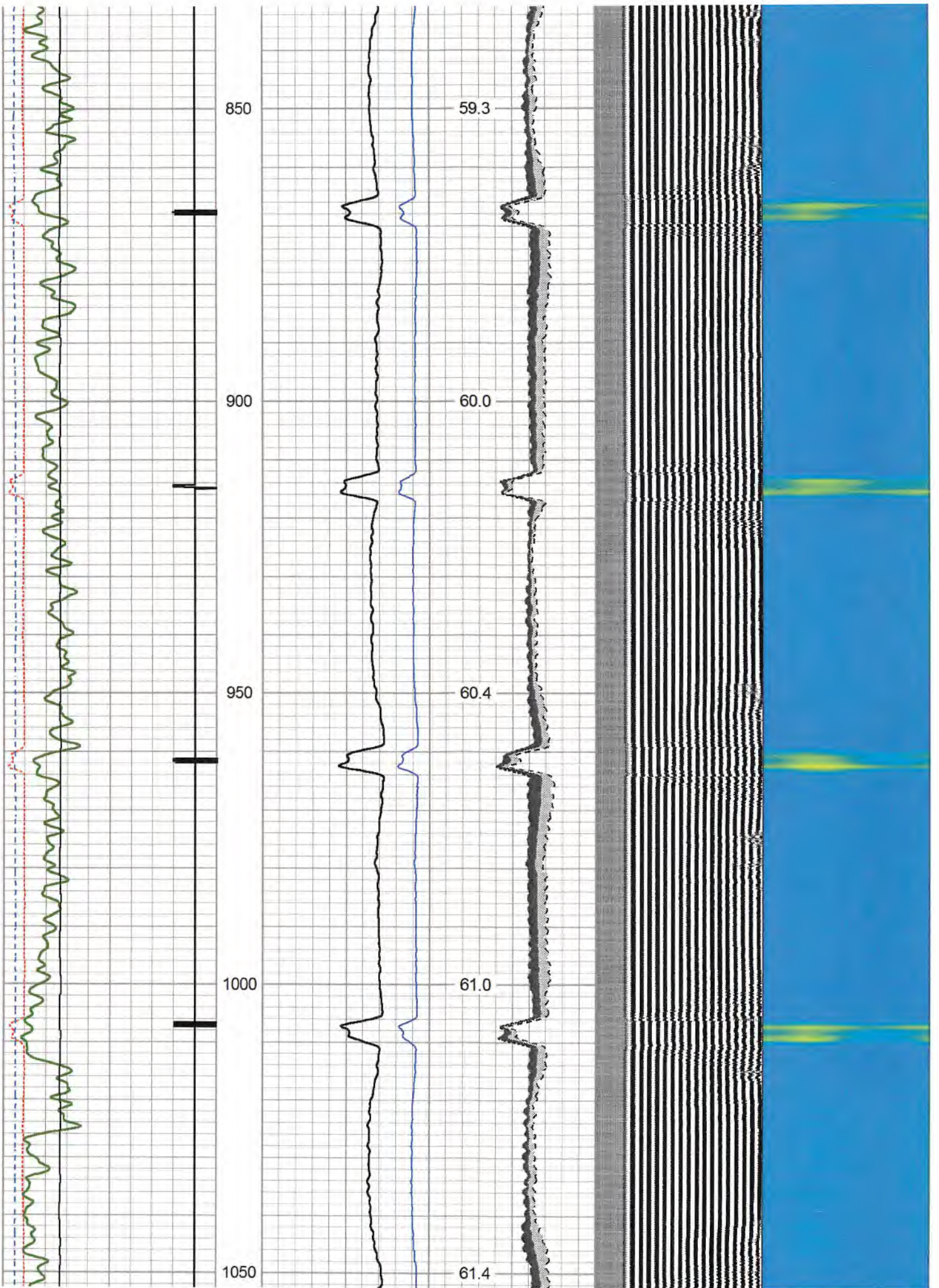
Variable Density 1 Cement Map 8  
 200 (usec) 1200

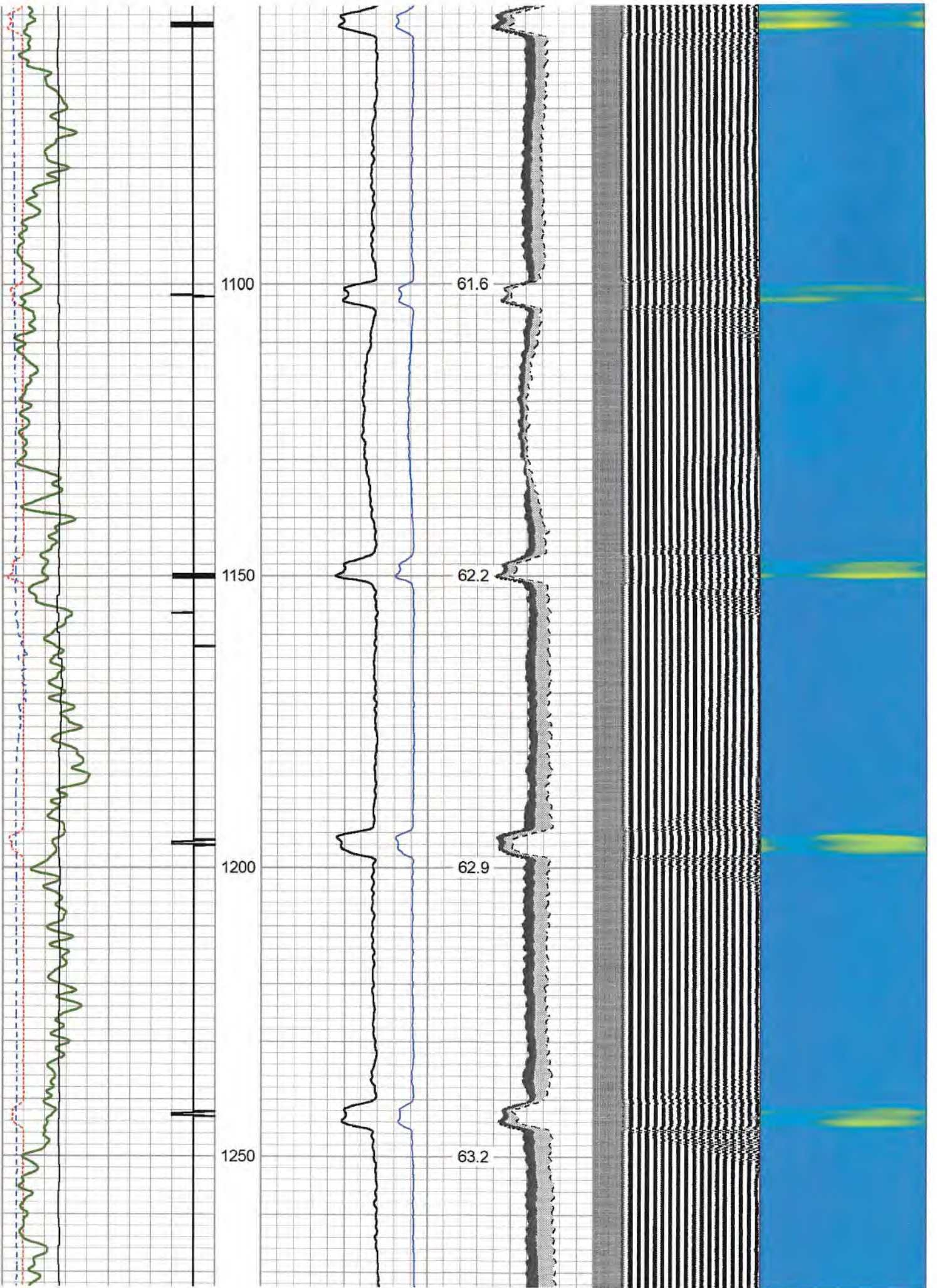


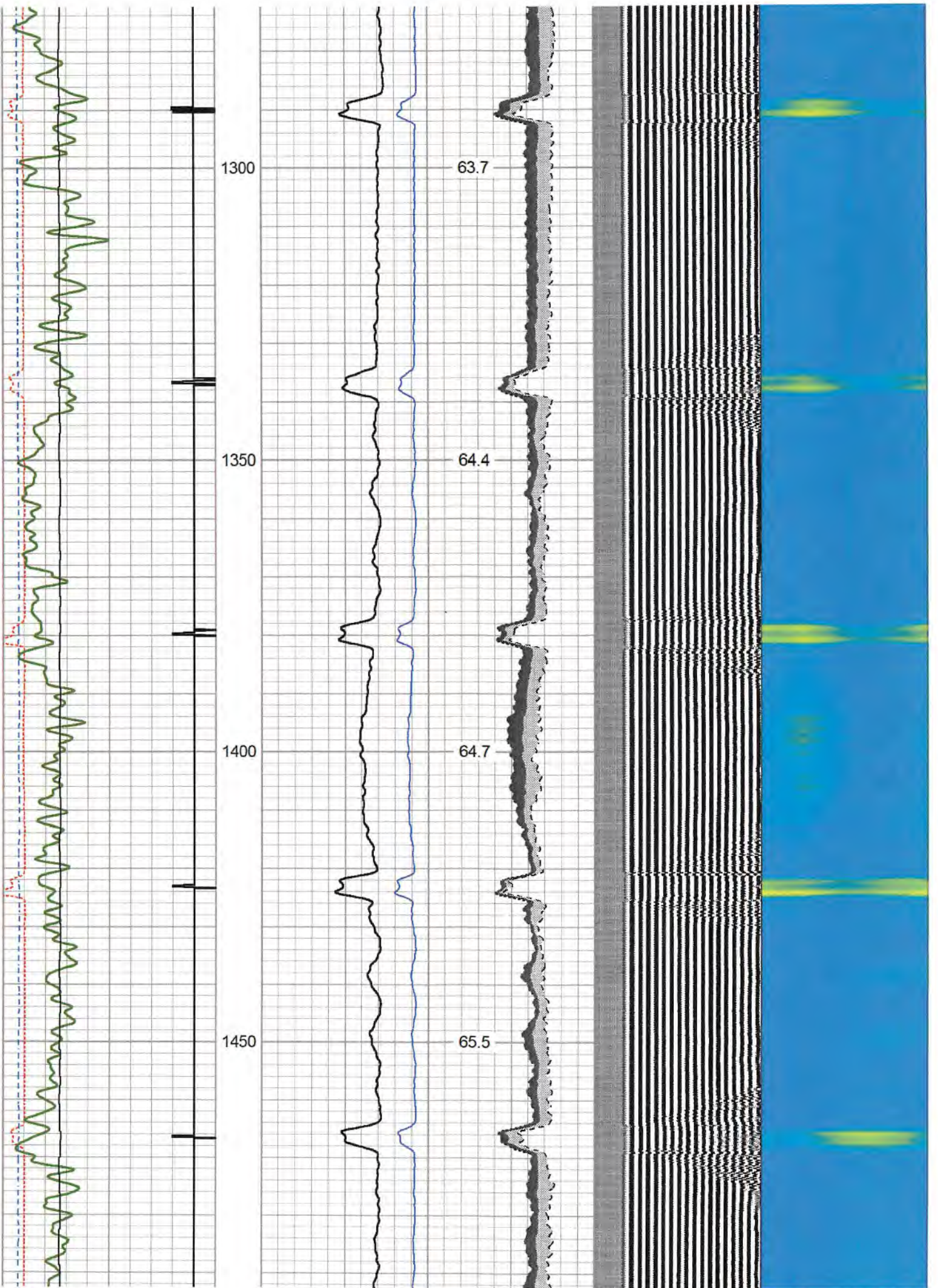




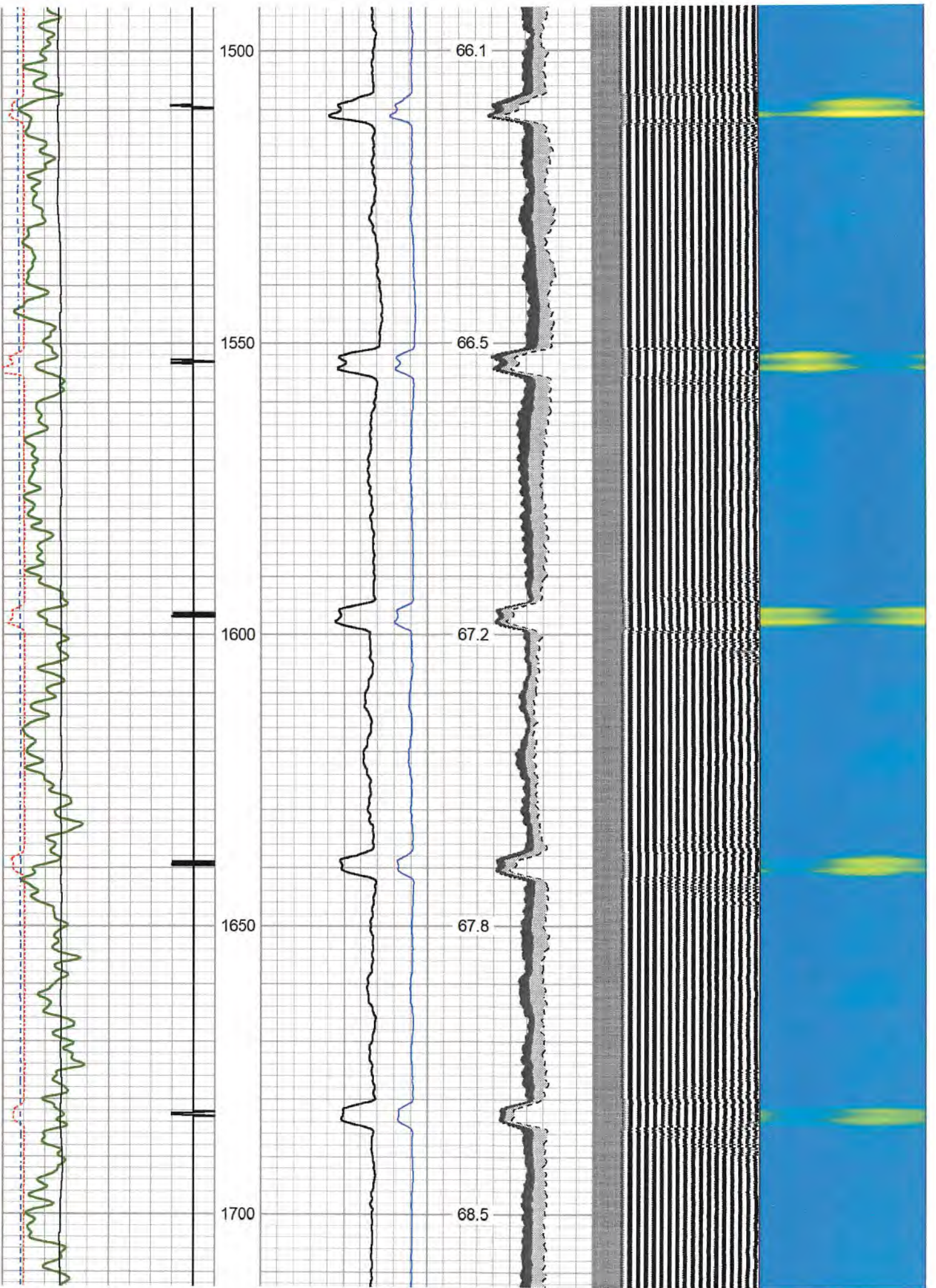


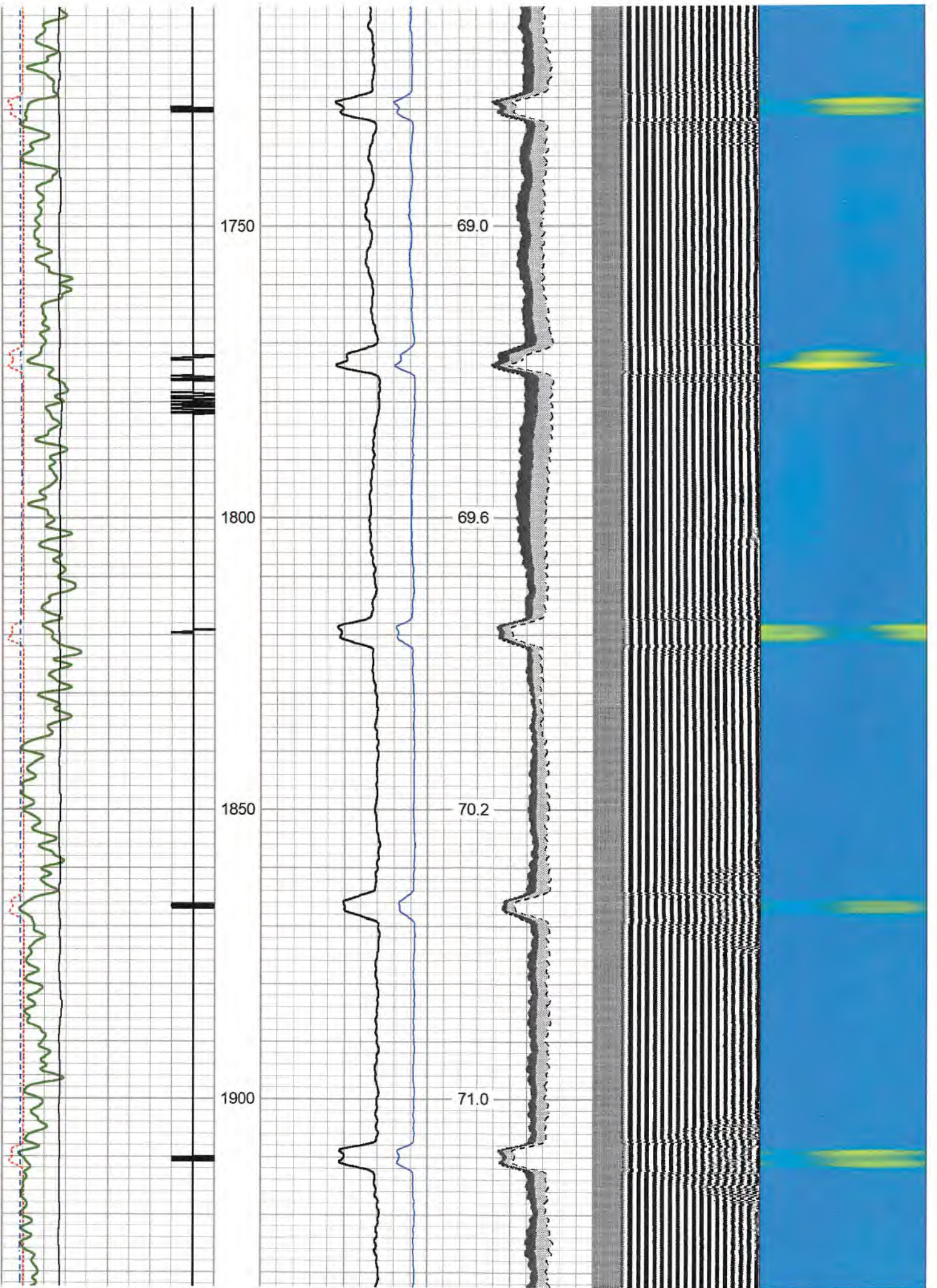


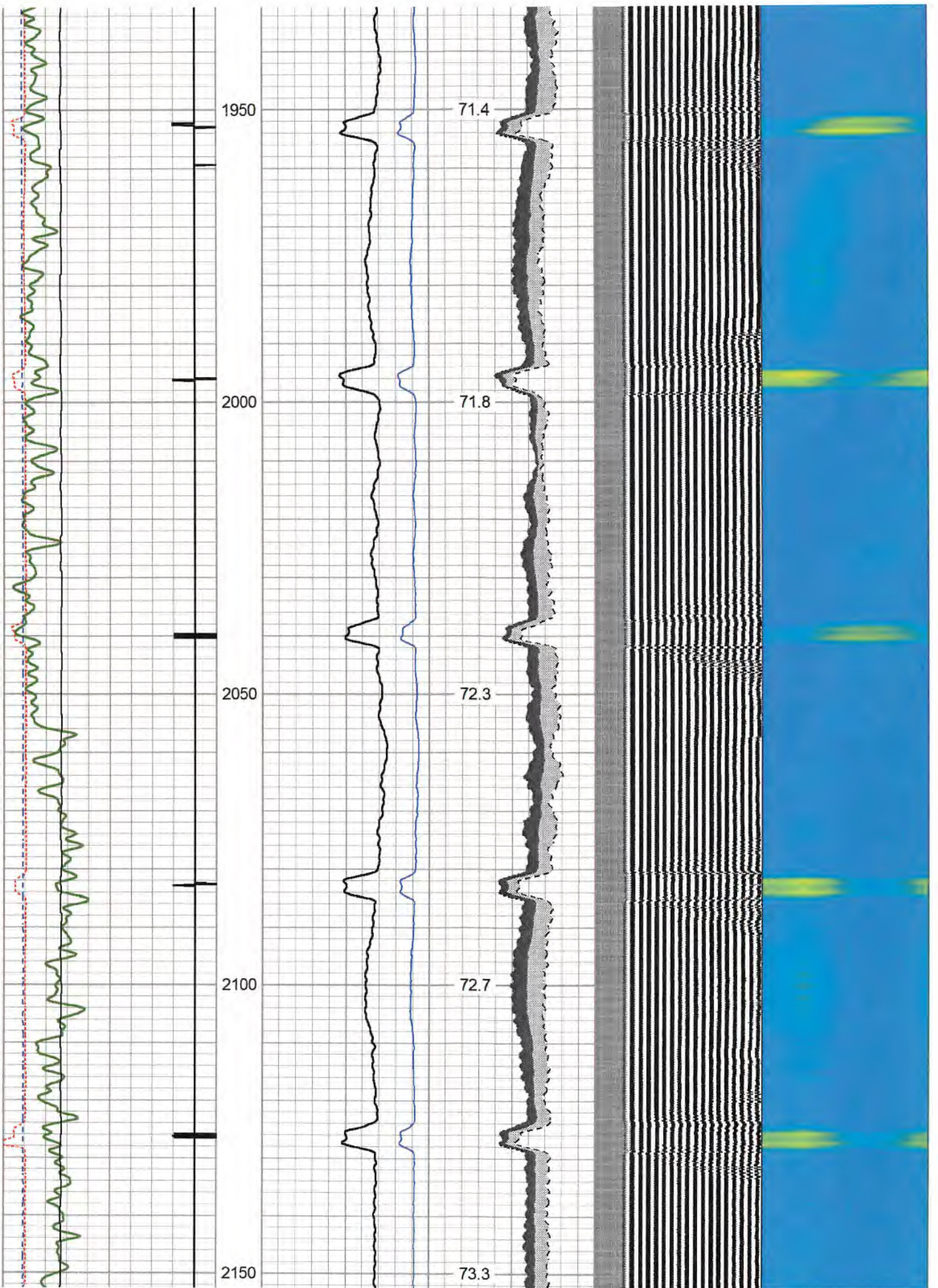


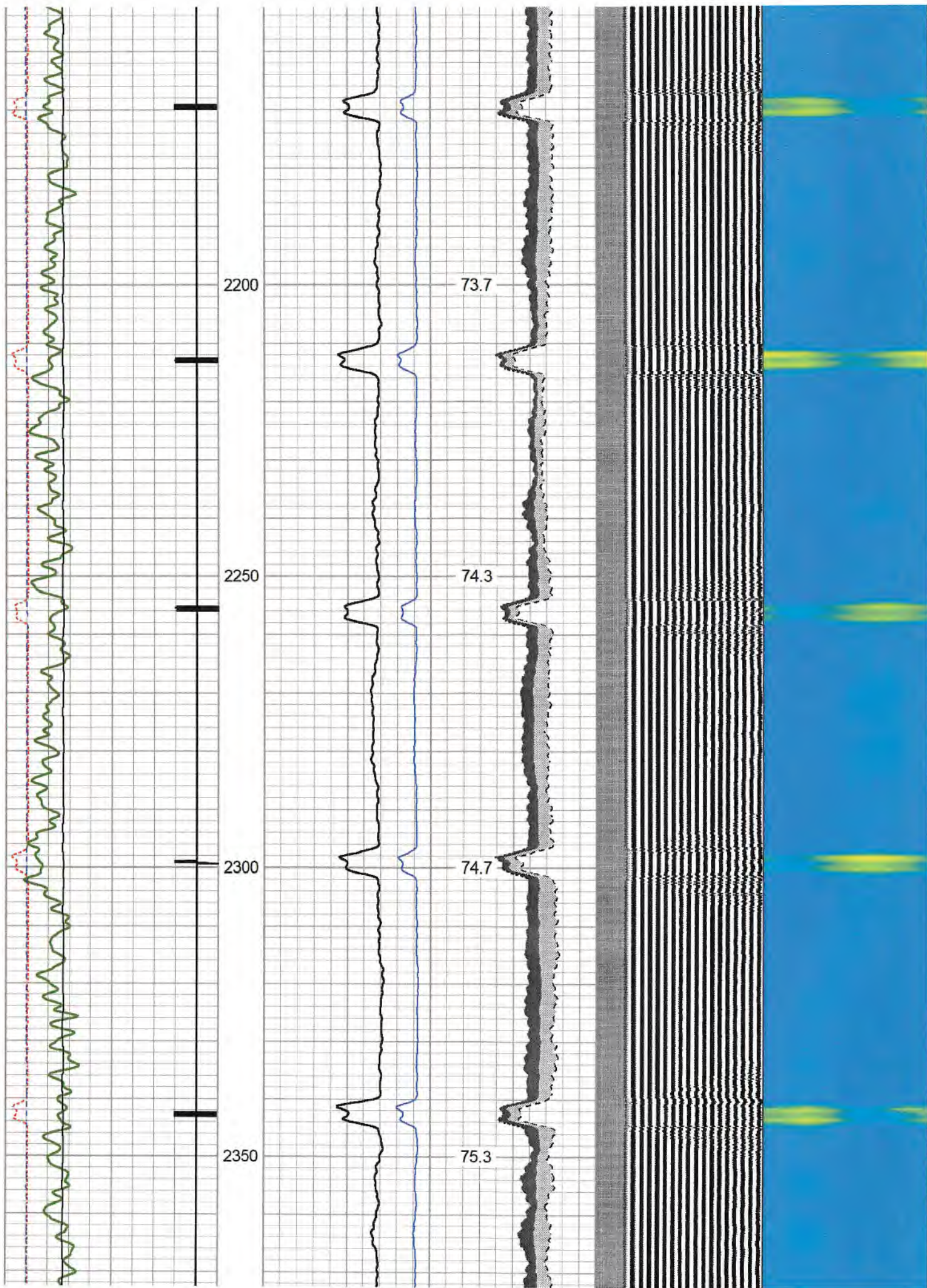


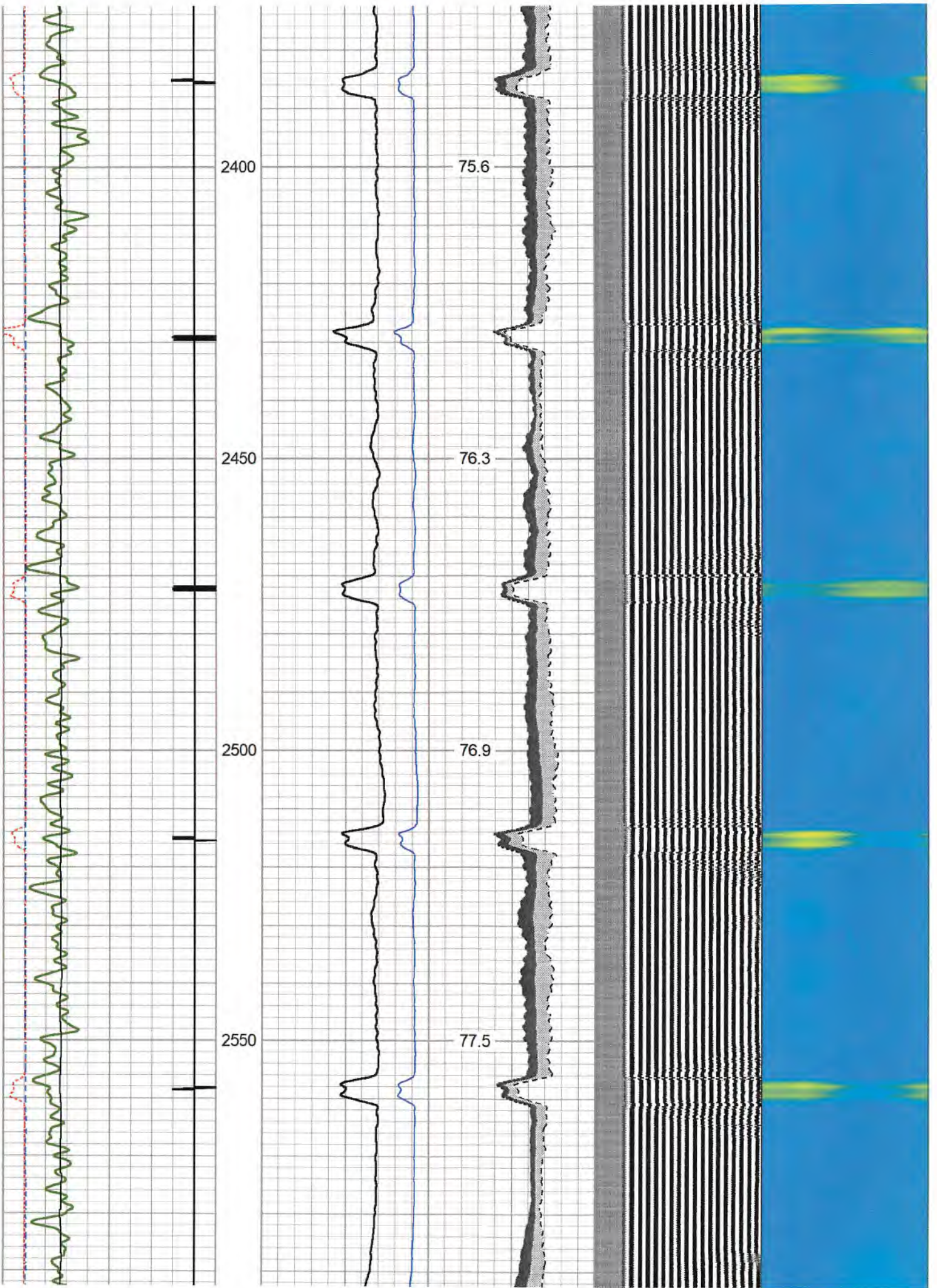


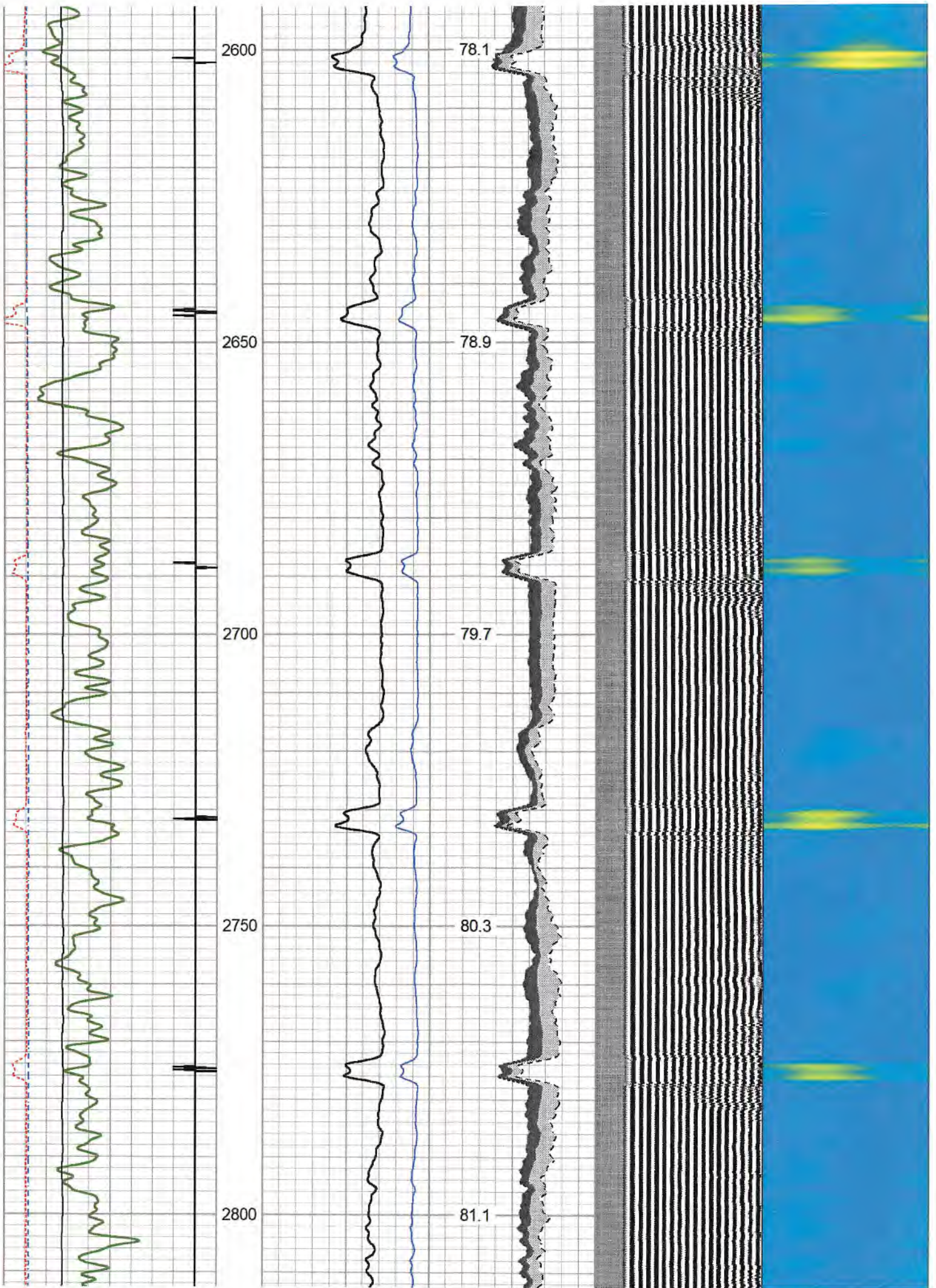


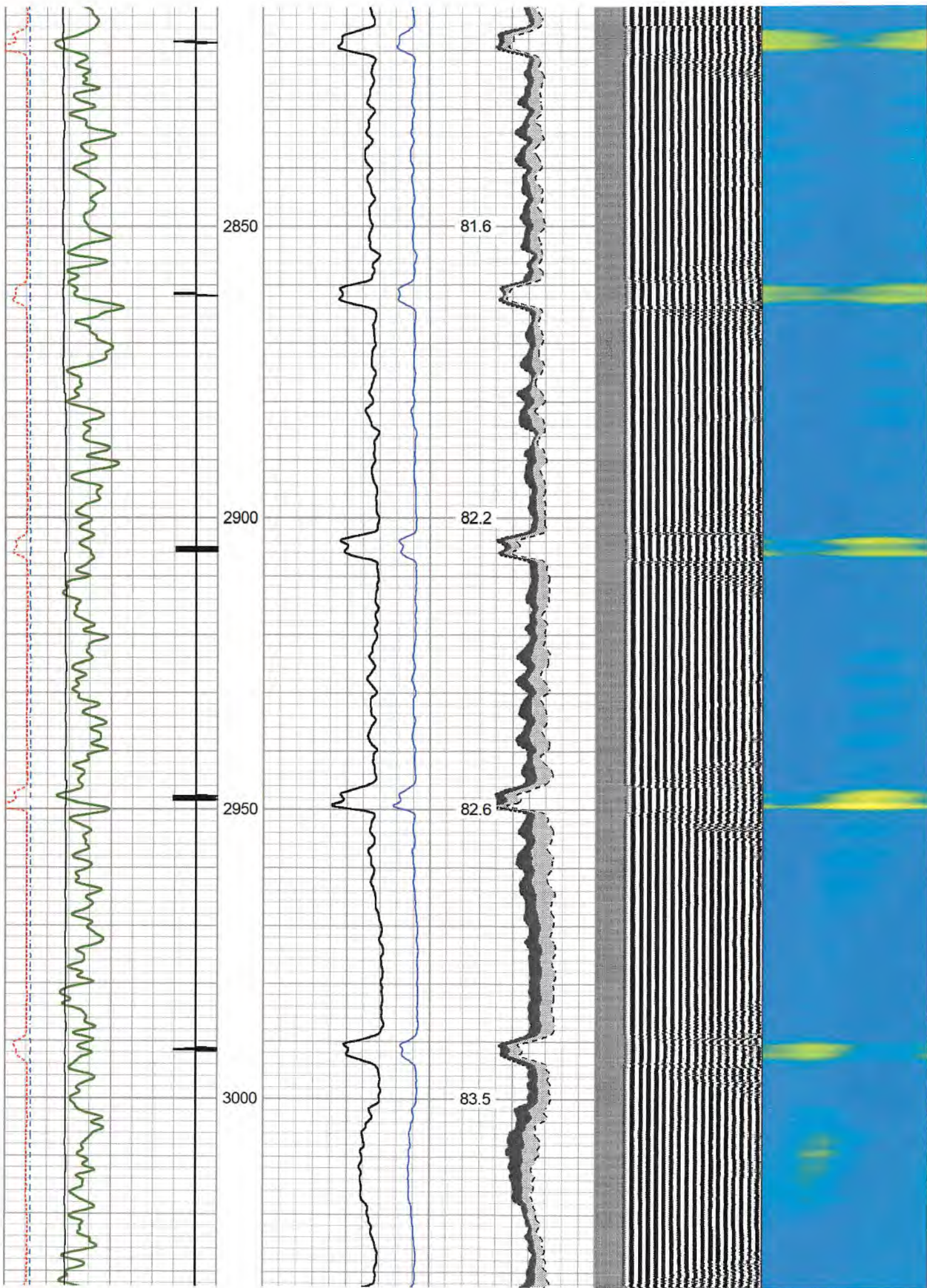


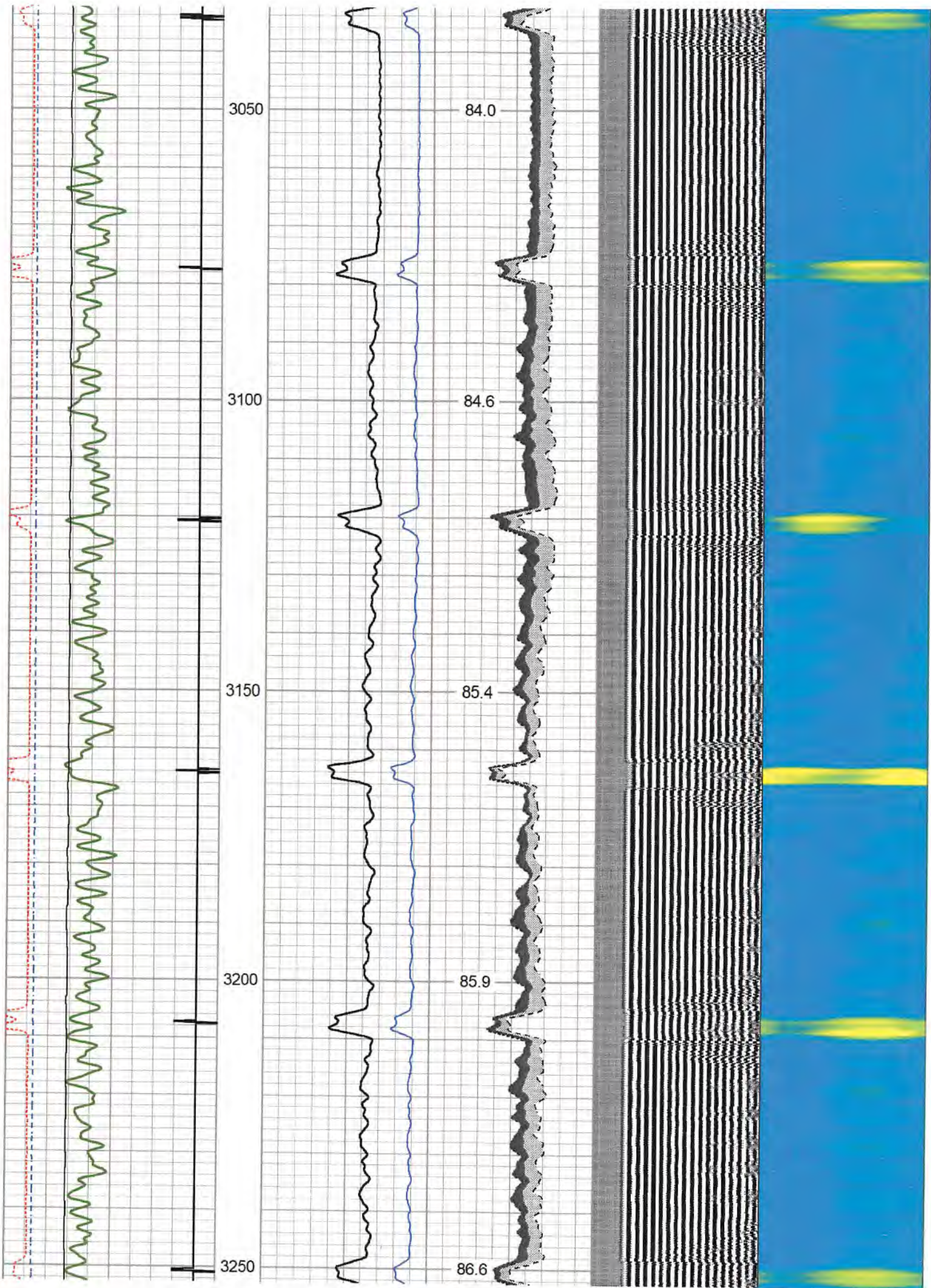




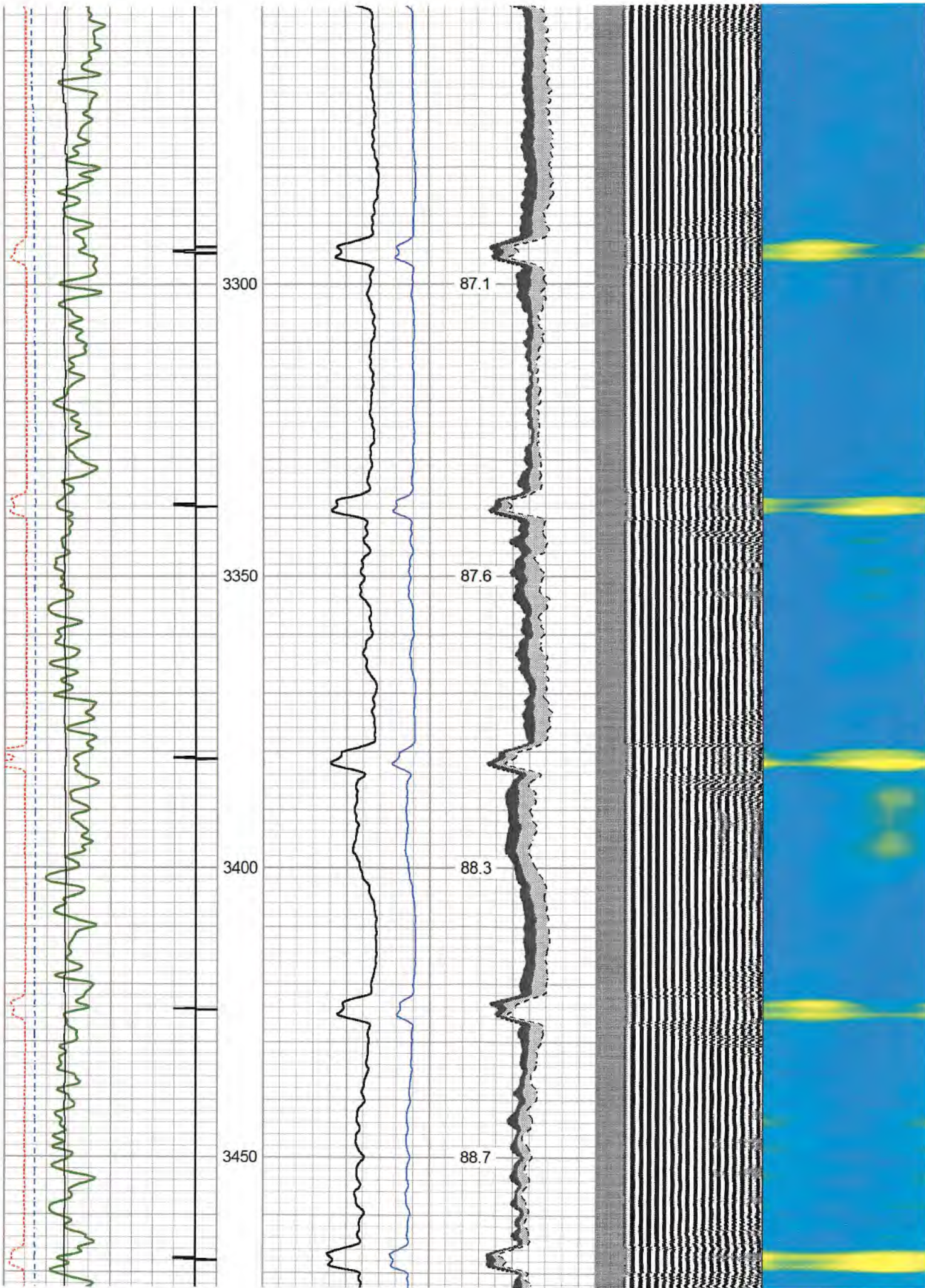


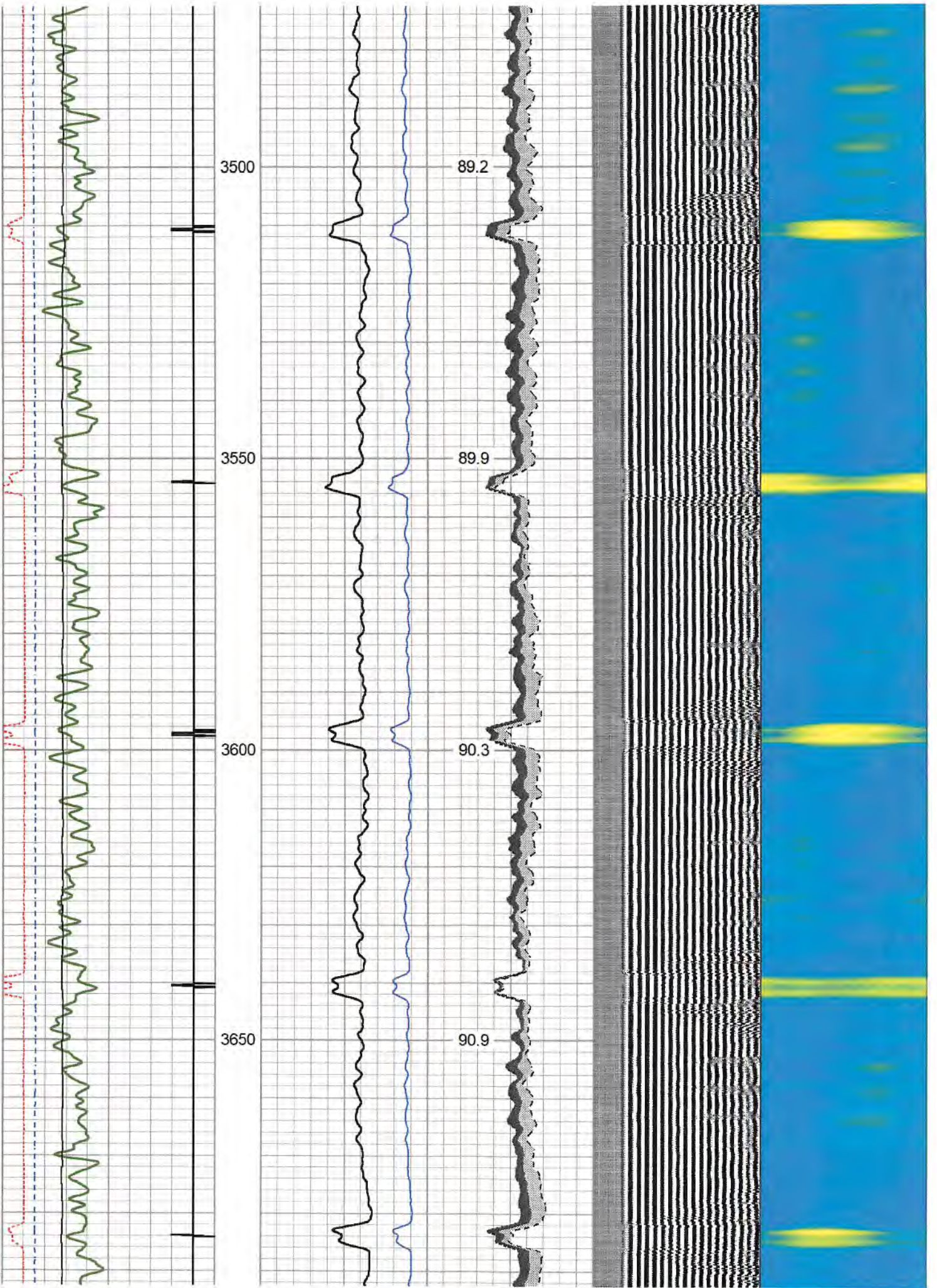


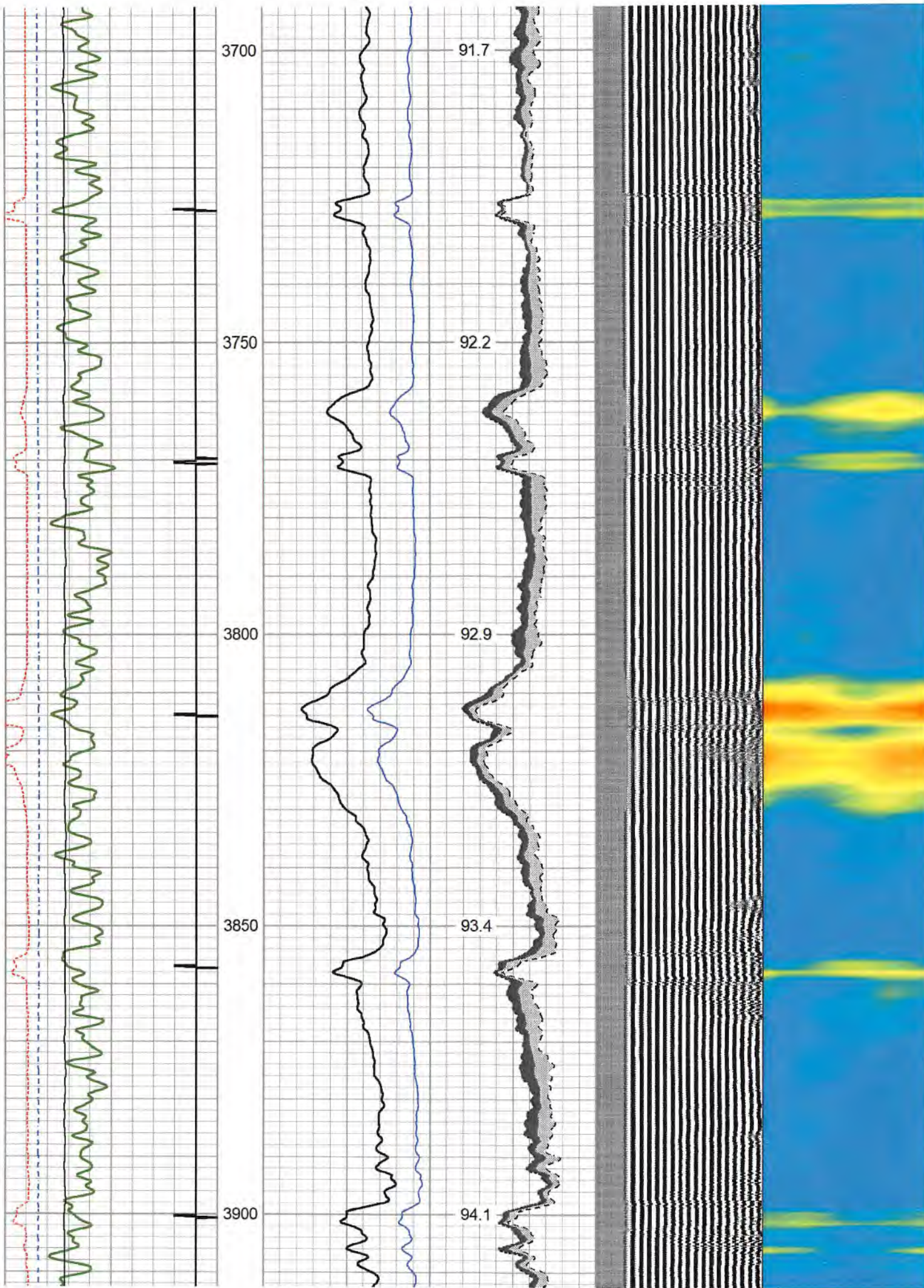


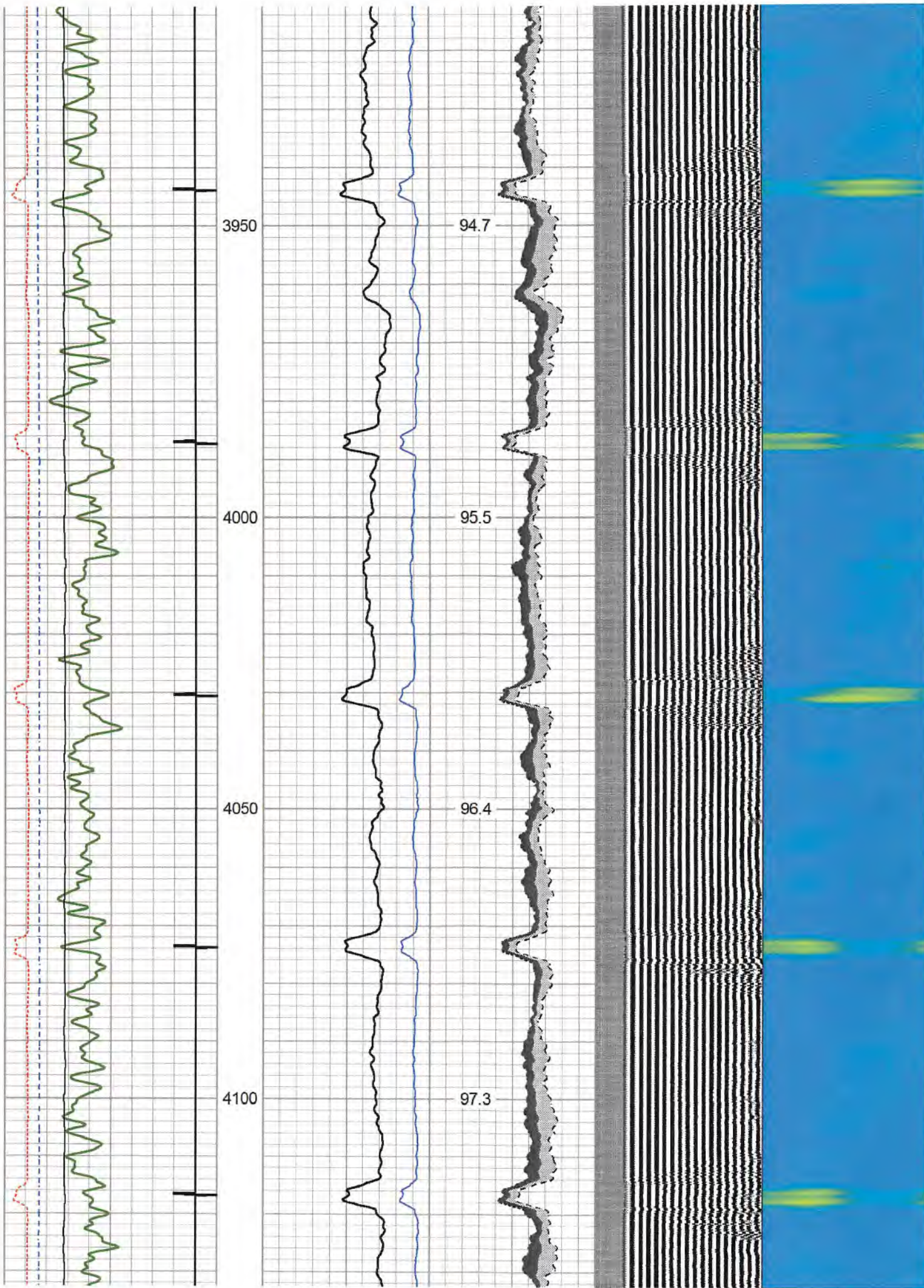


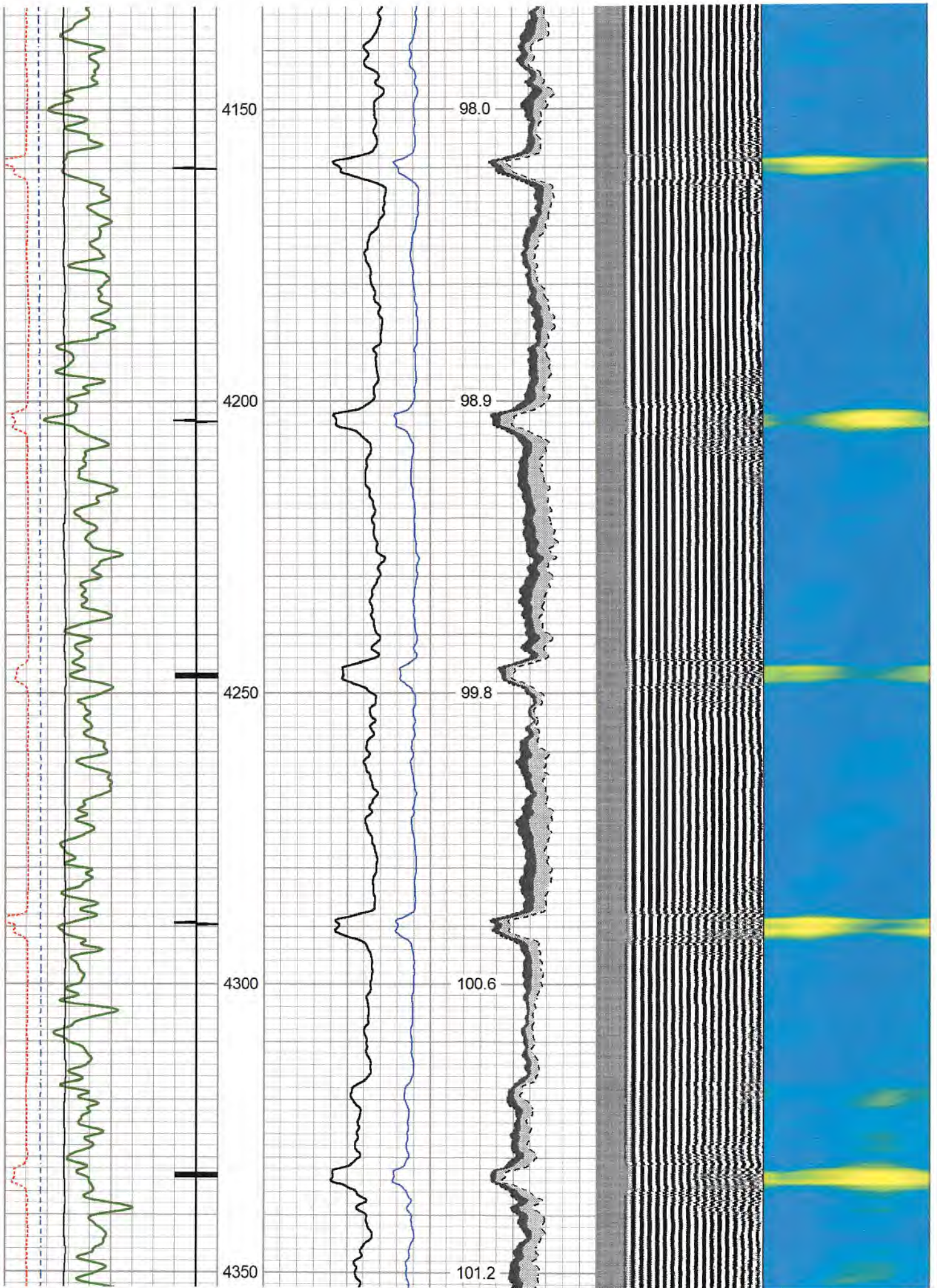


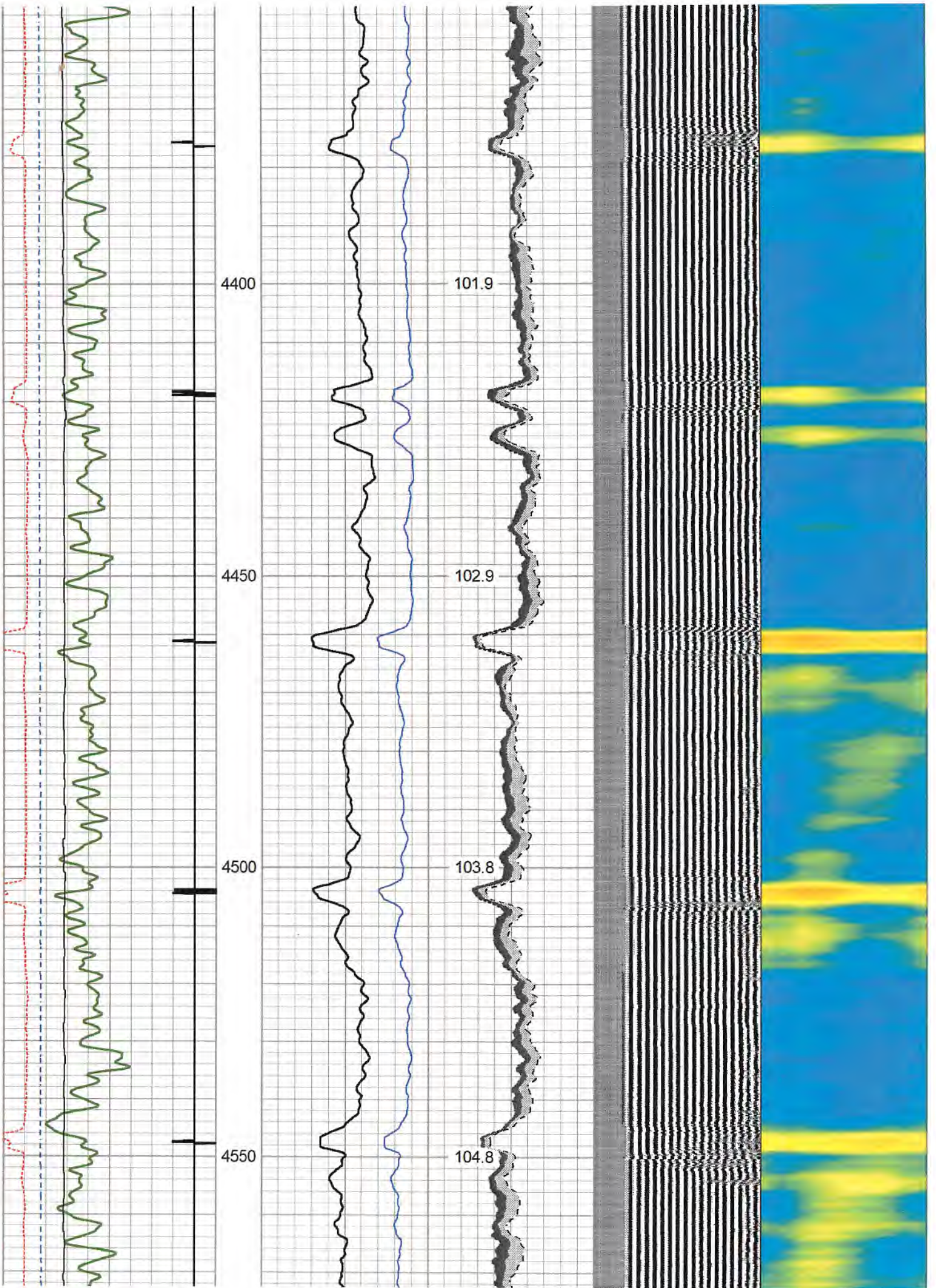


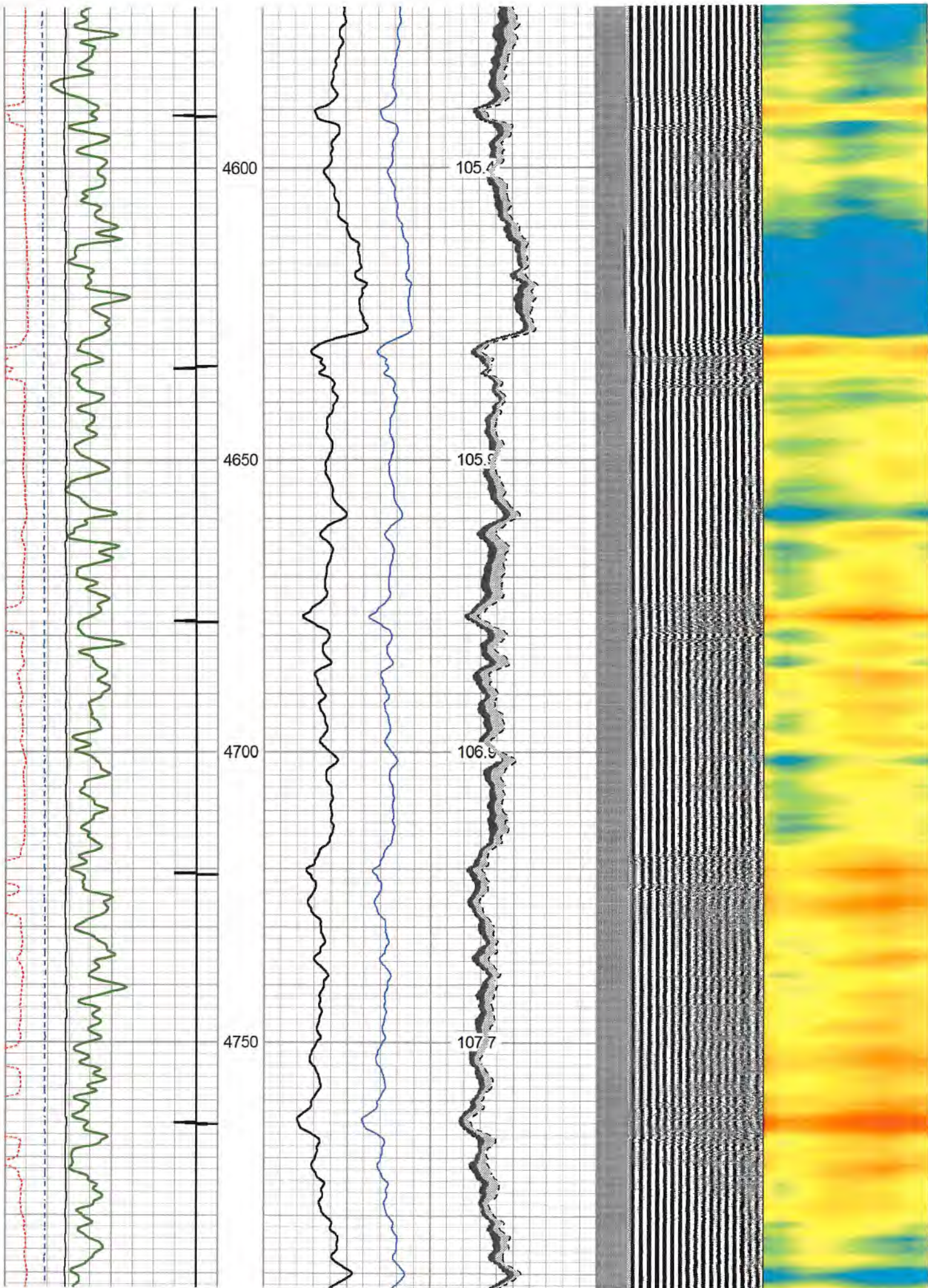


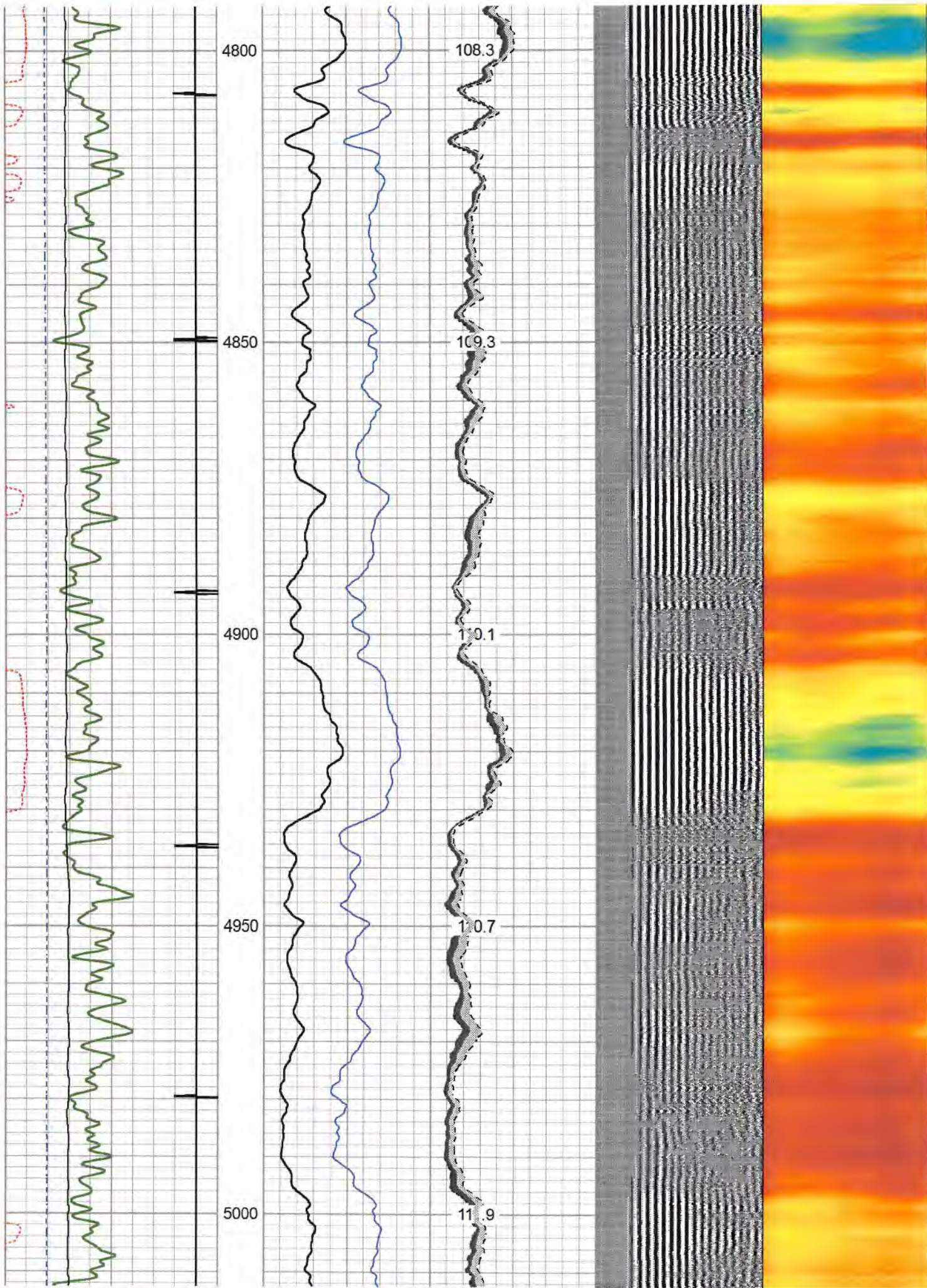




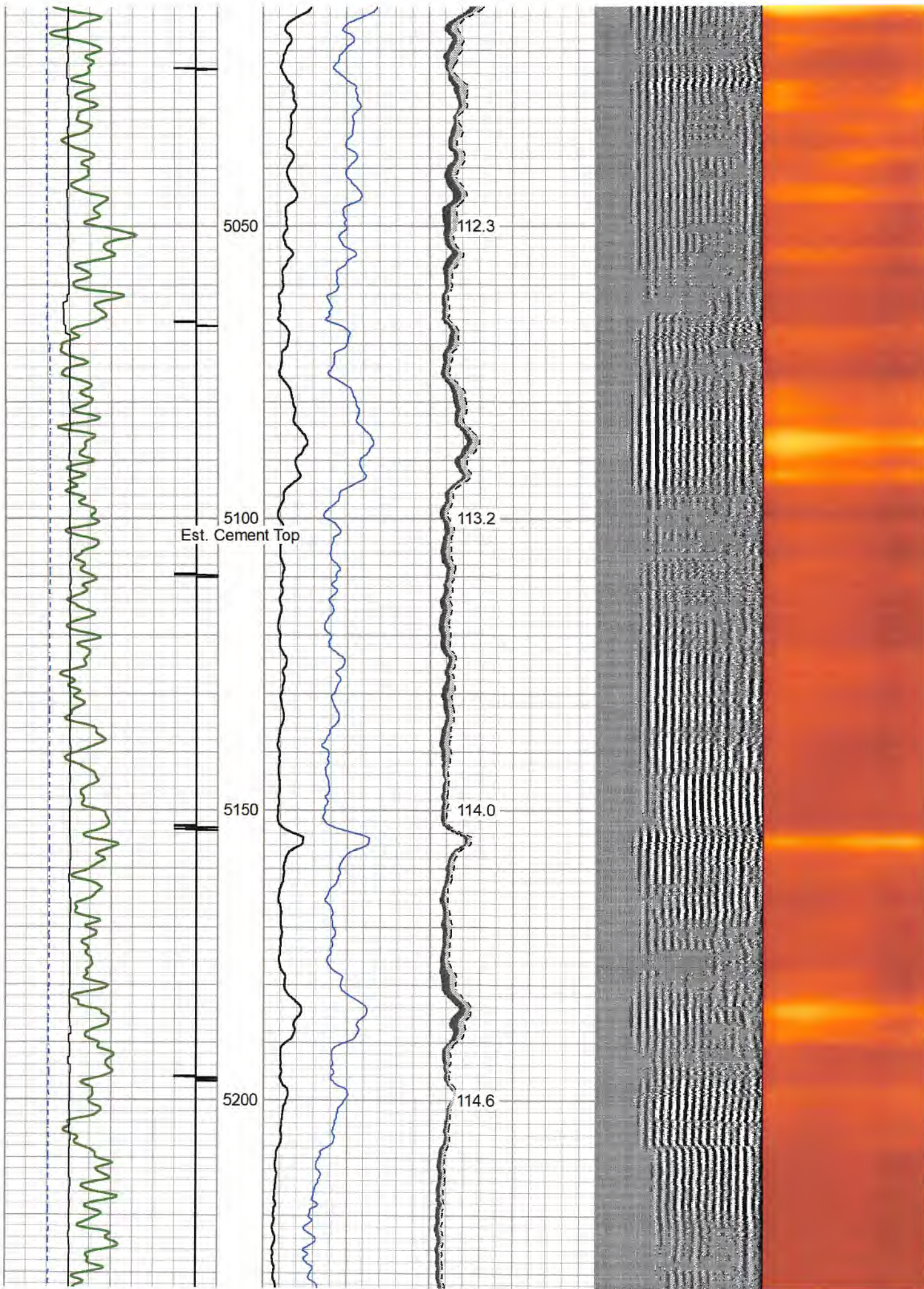


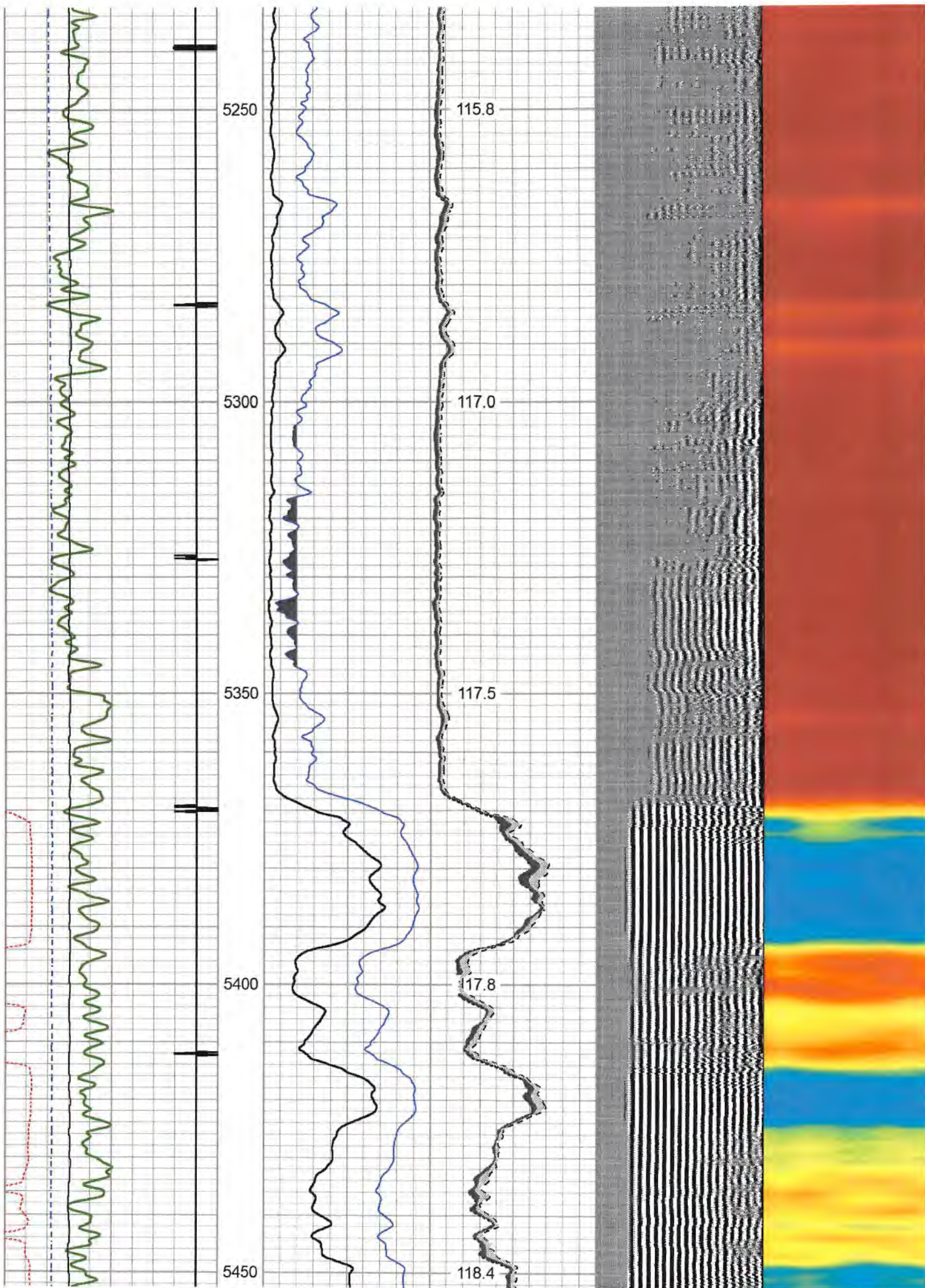


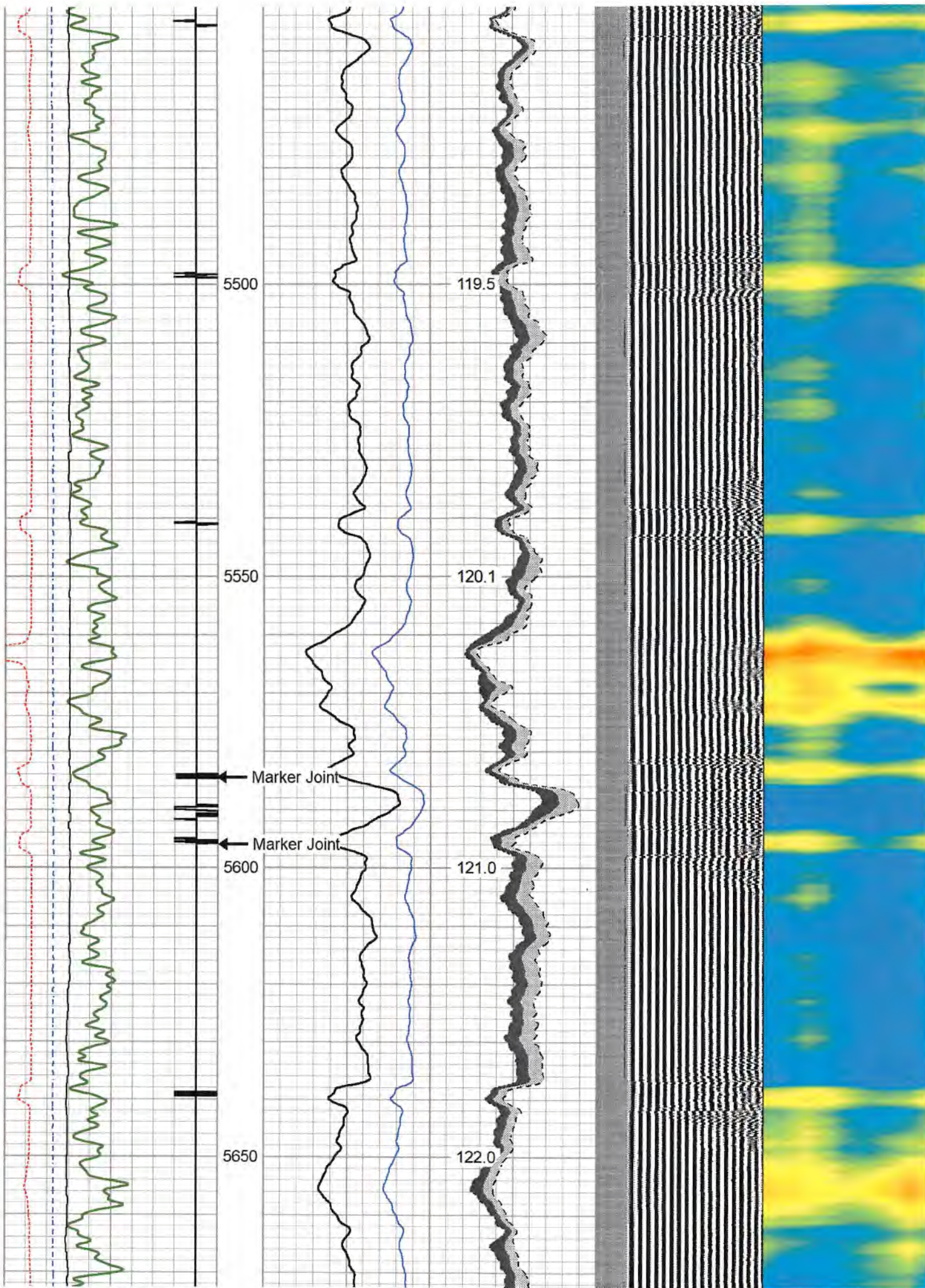


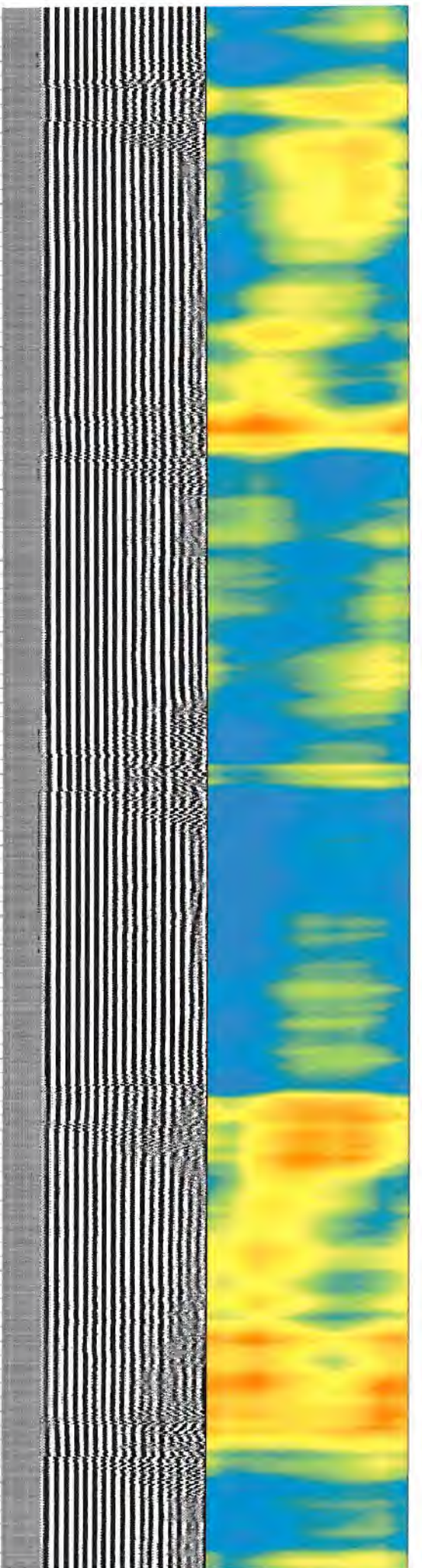
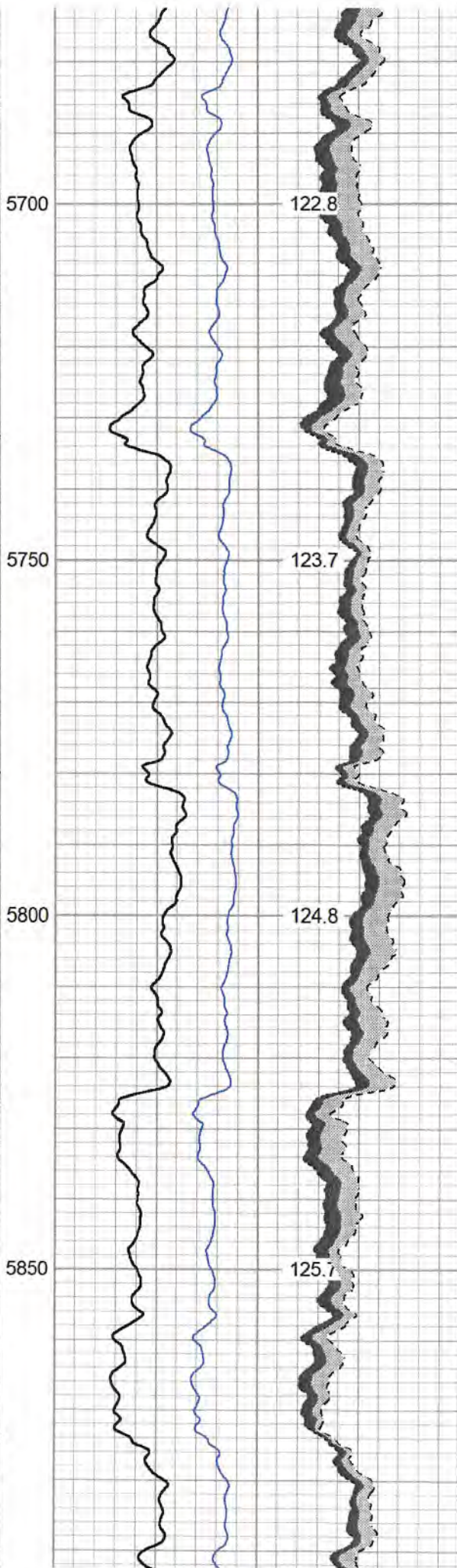
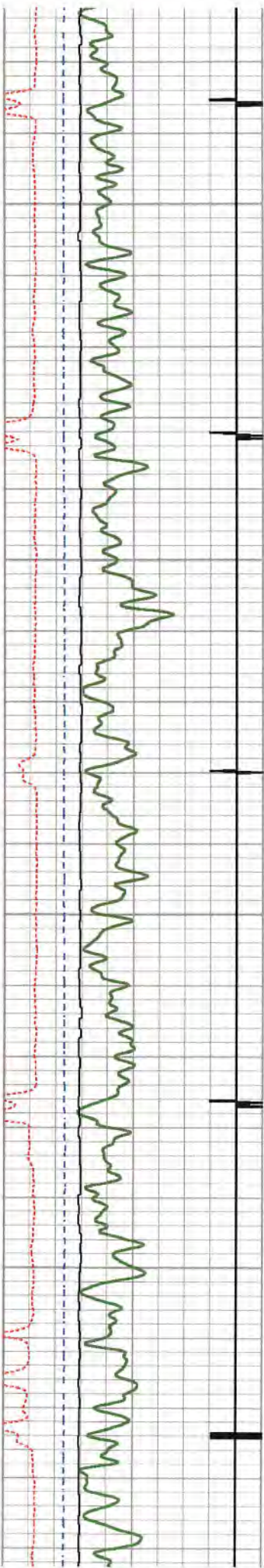


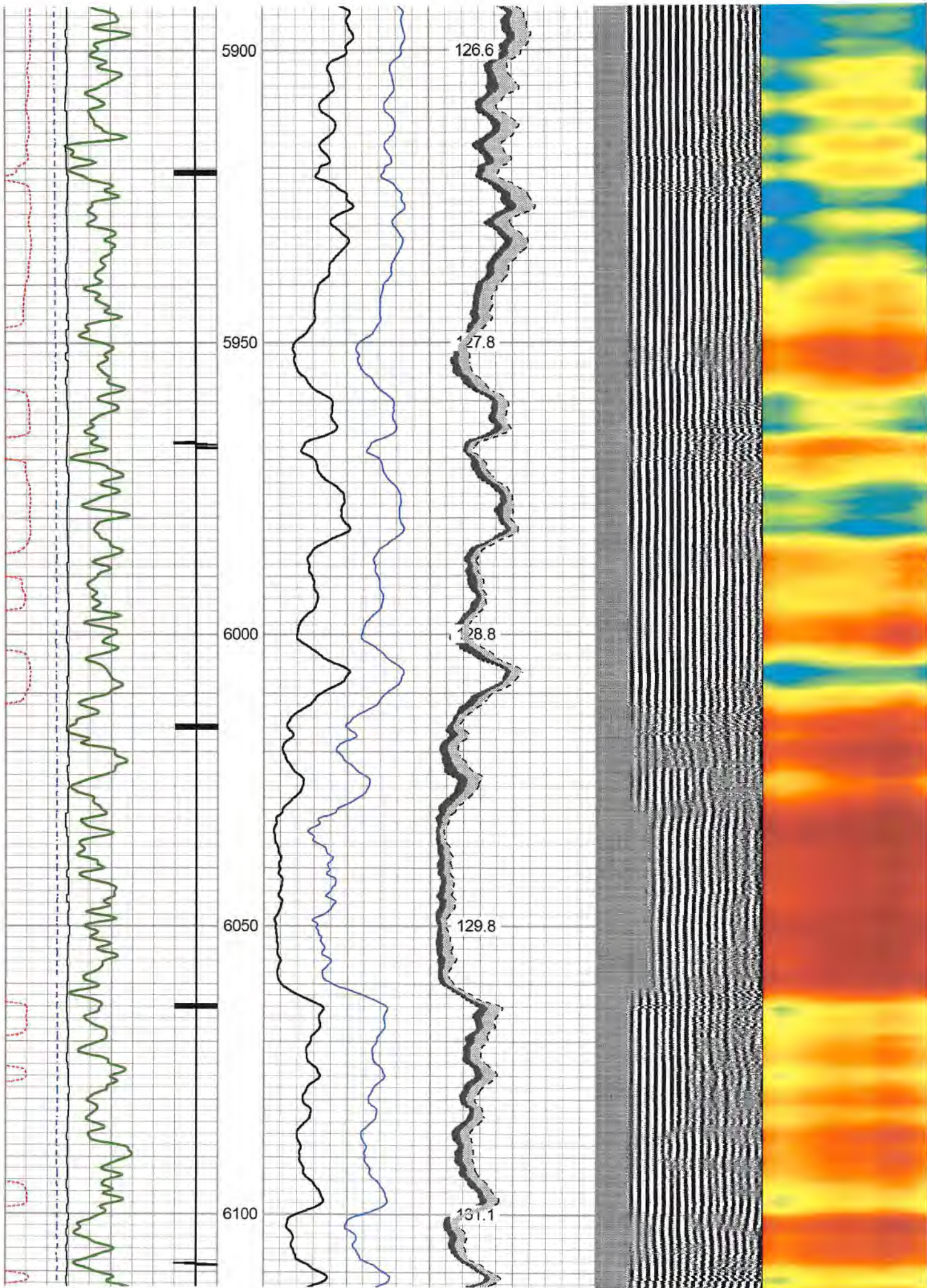


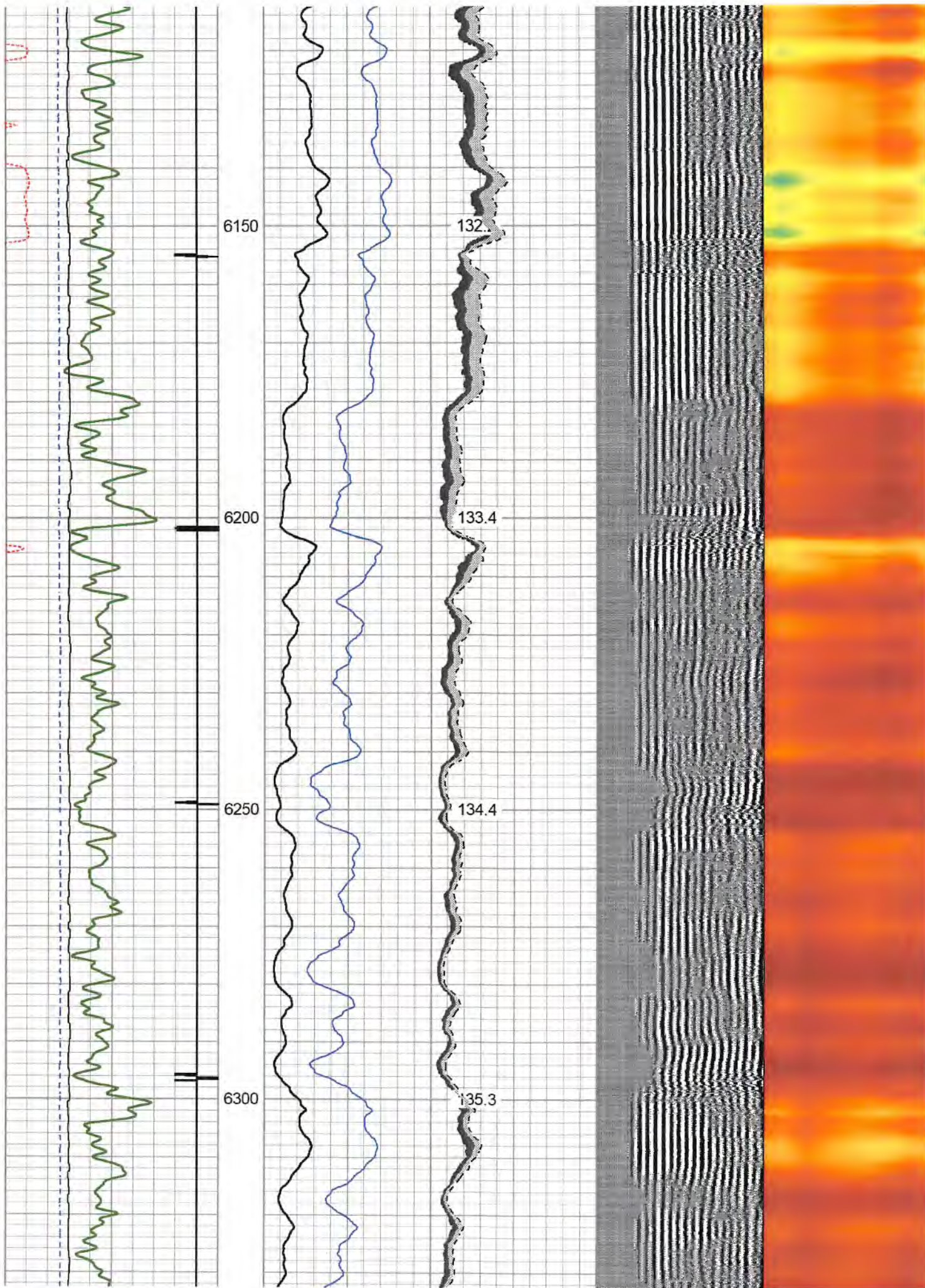


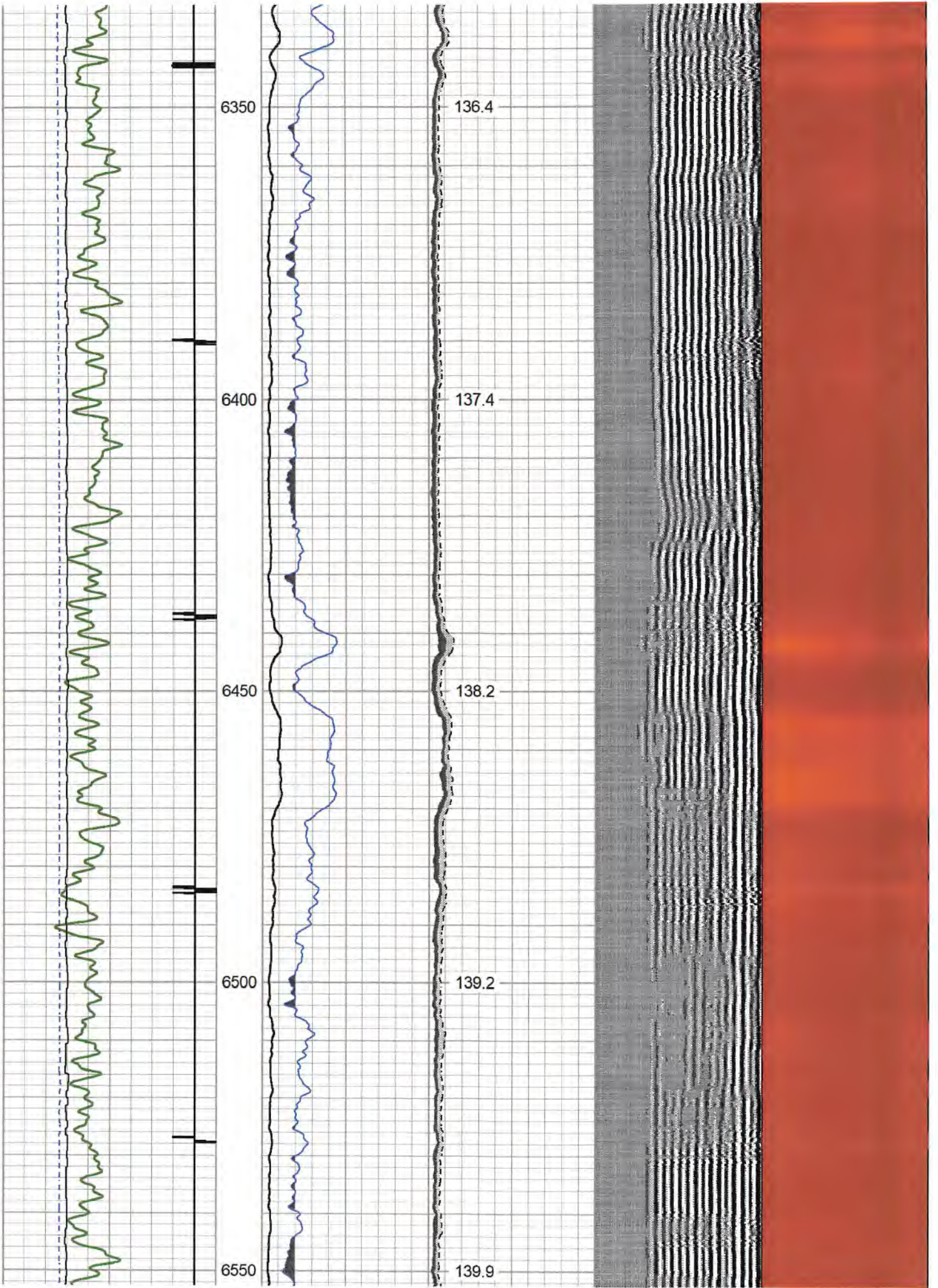


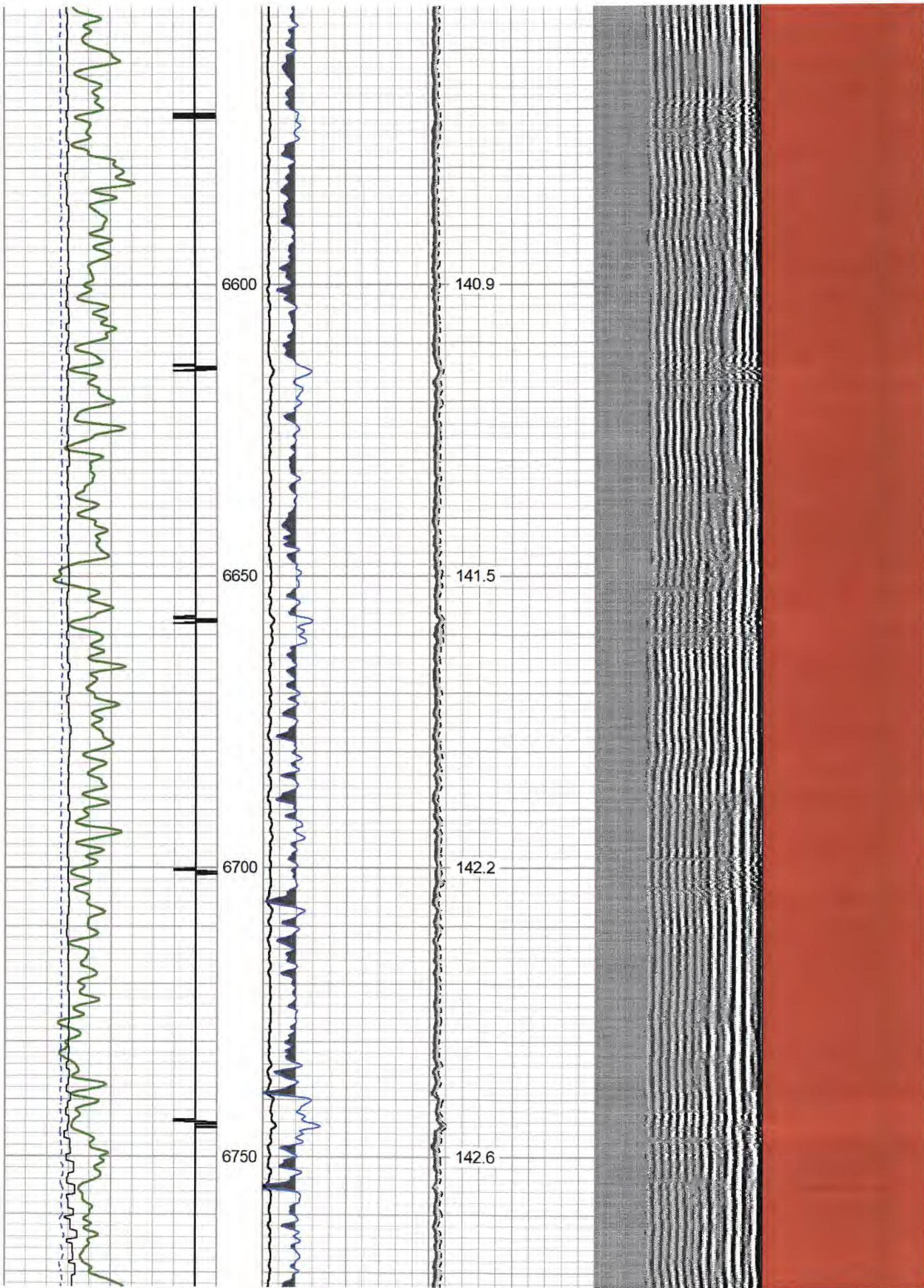




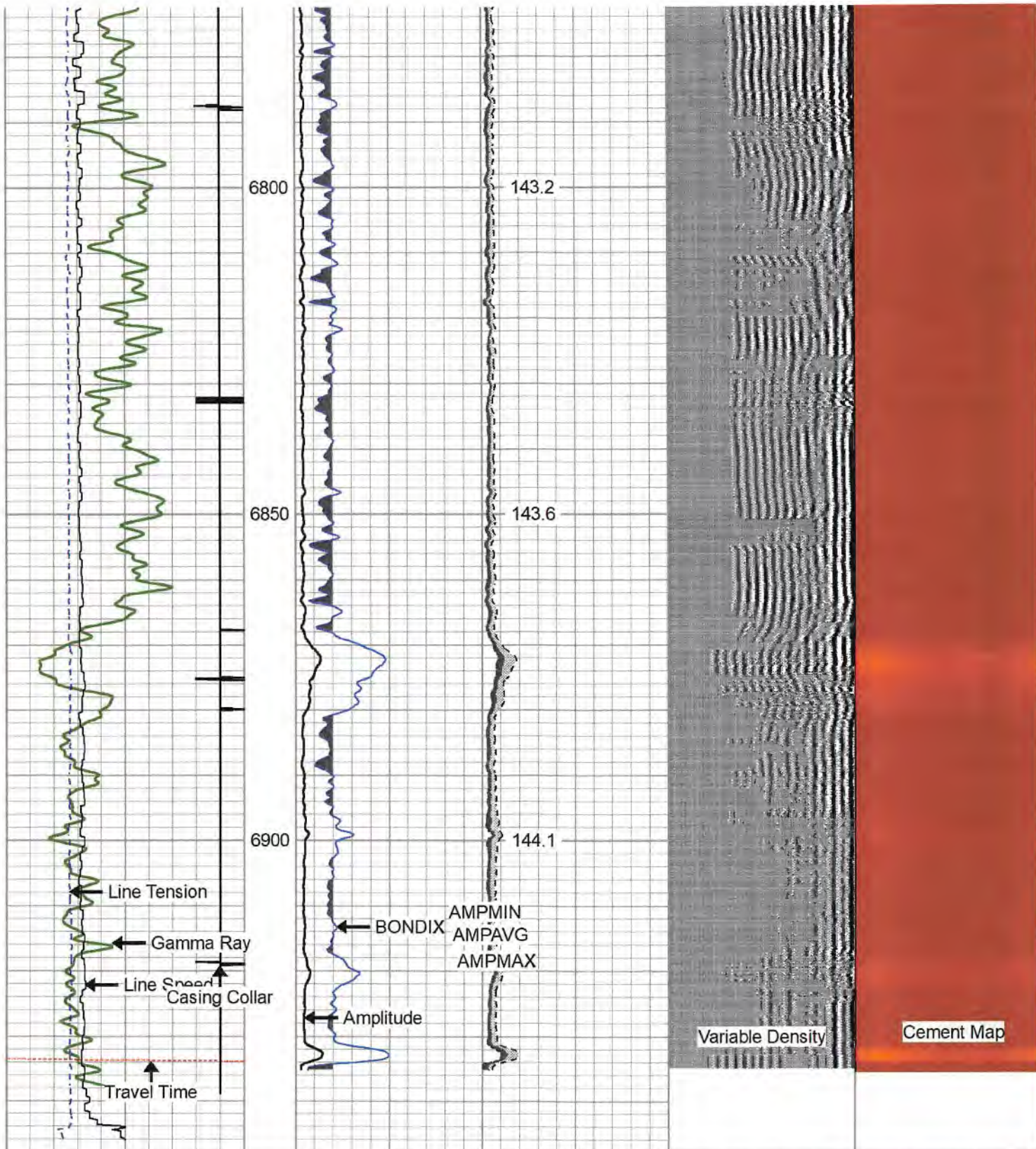












265	Travel Time (usec)	165	0	Amplitude (mV)	100	-5	AMPMIN	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	1	BONDIX	0	-5	AMPMAX	150	200	(usec)	1200	
0	Gamma Ray (GAPI)	150				-5	AMPAVG	150				
	Line Speed						TEMP					
-200	(ft/min)	200					(degF)					
0	Line Tension (lb)	4000										

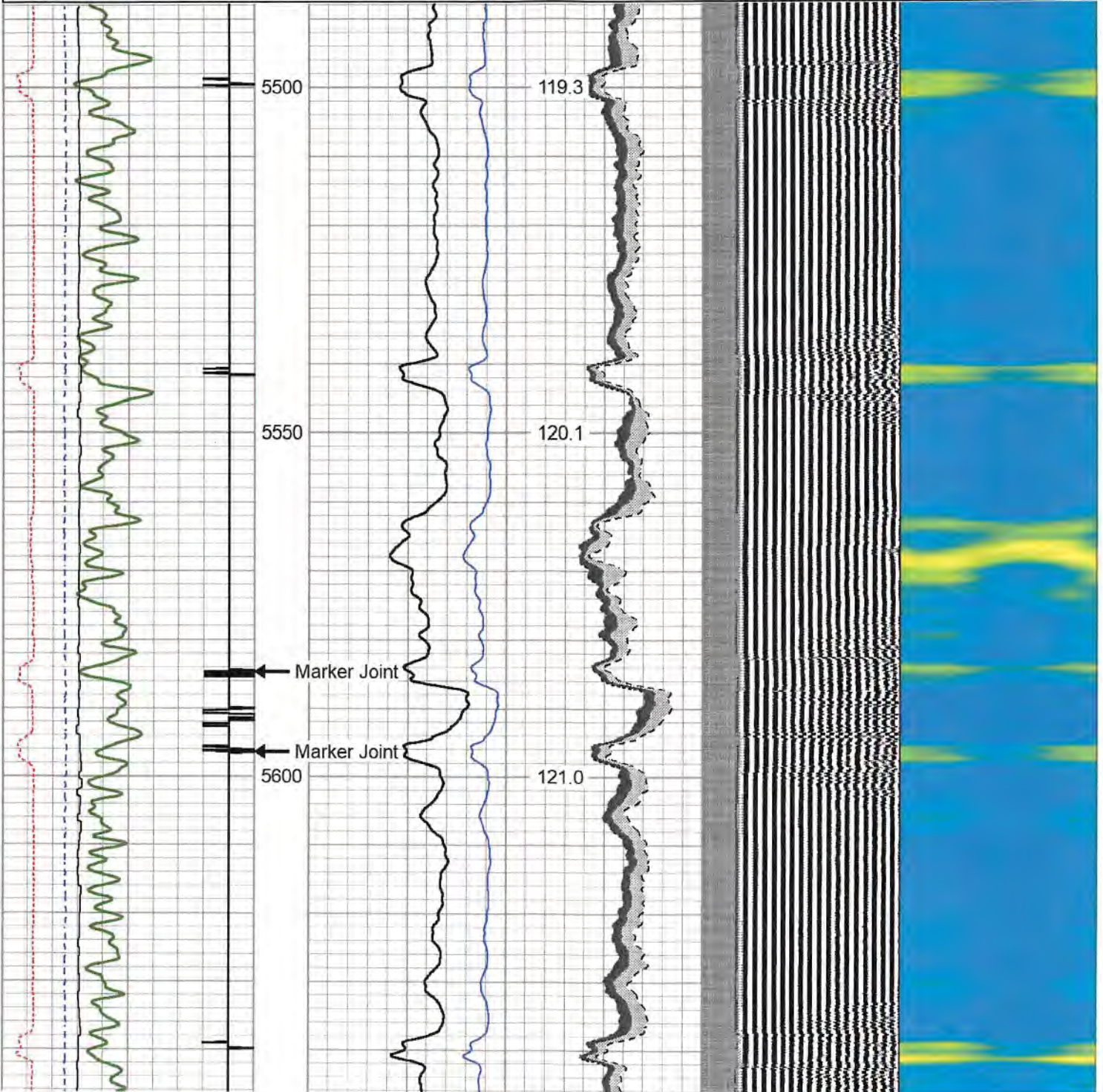


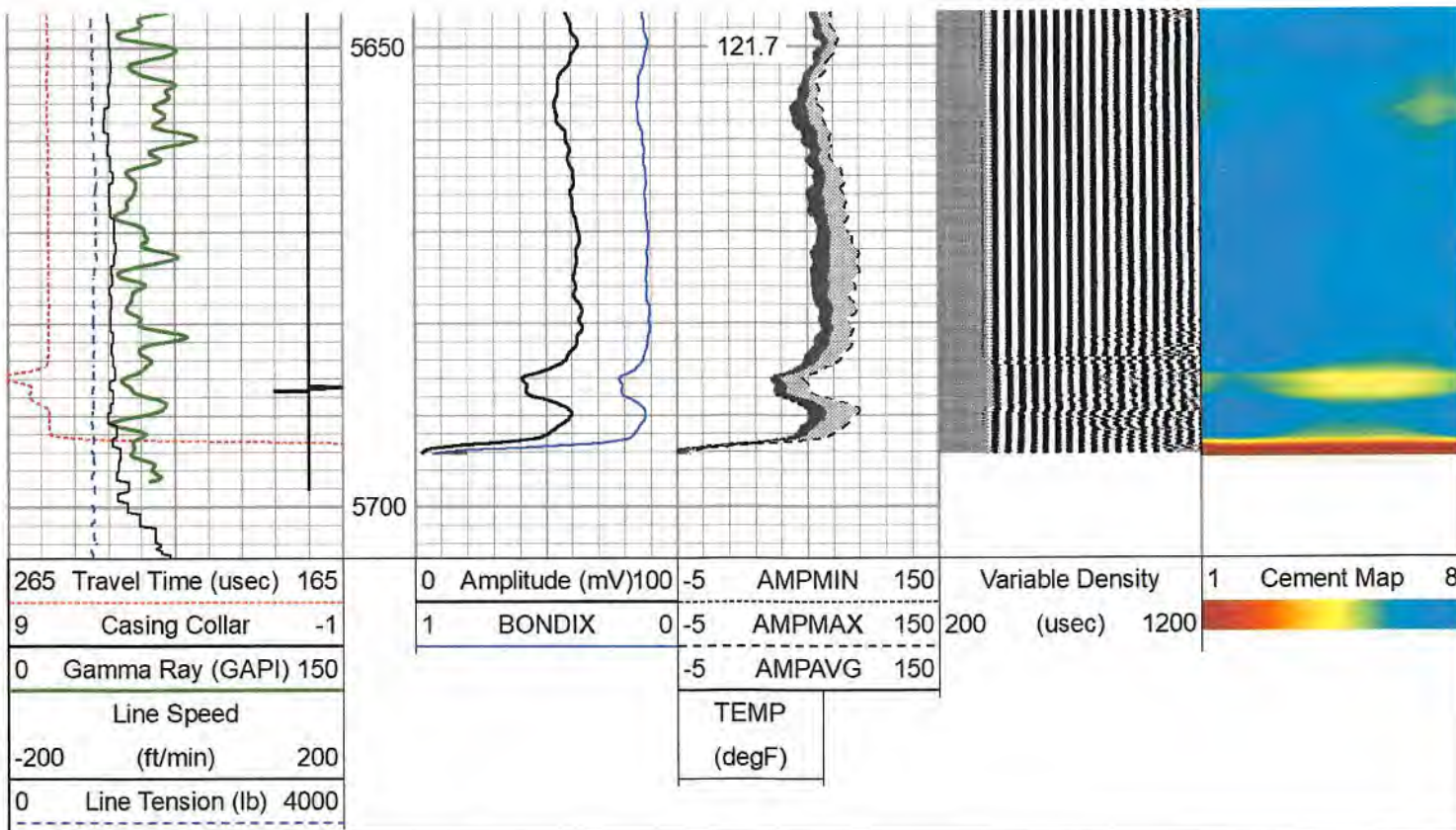
Database File antero\_redwood\_1h\_rcbl\_14\_nov\_2022.db  
 Dataset Pathname pass9  
 Presentation Format rcbl-bond index for antero 1020  
 Dataset Creation Mon Nov 14 10:02:03 2022  
 Charted by Depth in Feet scaled 1:240

265	Travel Time (usec)	165
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
Line Speed		
-200	(ft/min)	200
0	Line Tension (lb)	4000

0	Amplitude (mV)	100	-5	AMPMIN	150
1	BONDIX	0	-5	AMPMAX	150
			-5	AMPAVG	150
TEMP					
(degF)					

Variable Density	1	Cement Map	8
200	(usec)	1200	





### Log Variables

DatabaseC:\ProgramData\Warrior\Data\antero\_redwood\_1h\_rcbl\_14\_nov\_2022.db  
Dataset field/well/run1/pass11/\_vars\_

Top - Bottom							
BHTEMP_Src	BOREID	BOTTEMP	CASEOD	CASETHCK	CASEWGHT	MAXAMPL	MINAMPL
TEMP	in	degF	in	in	lb/ft	mV	mV
	7.875	100	5.5	0	20	71.9	2.2
MINATTN	PERFS	PPT	SRFTEMP	TDEPTH			
db/ft		usec	degF	ft			
0.8	No	261	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		RECEIVED
Database File	antero_redwood_1h_rcbl_14_nov_2022.db	Office of Oil and Gas
Dataset Pathname	pass11	APR 24 2022
Dataset Creation	Mon Nov 14 10:17:25 2022	
Gamma Ray Calibration Report		WV Department of Environmental Protection
Serial Number:	FW1211-86	
Tool Model:	Probe	
Performed:	Sun Nov 13 11:04:25 2022	
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: 2.75"  
 Tool Model: Probe275T  
 Calibration Casing Diameter: 5.500 in  
 Calibration Depth: 260.125 ft

Master Calibration, performed Mon Nov 14 09:45:13 2022:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	-0.003	0.346	2.200	71.921	200.047	2.793
CAL	0.596	0.596				
5'	-0.009	0.358	2.200	71.921	190.195	3.839
SUM						
S1	0.033	0.351	0.000	100.000	314.980	-10.462
S2	-0.011	0.318	0.000	100.000	304.185	3.357
S3	-0.006	0.352	0.000	100.000	279.000	1.727
S4	-0.007	0.371	0.000	100.000	264.651	1.783
S5	-0.006	0.373	0.000	100.000	263.620	1.712
S6	-0.009	0.366	0.000	100.000	266.225	2.434
S7	-0.004	0.353	0.000	100.000	280.155	1.098
S8	-0.009	0.337	0.000	100.000	289.623	2.535


Internal Reference Calibration, performed Wed Nov 23 14:17:52 2011:

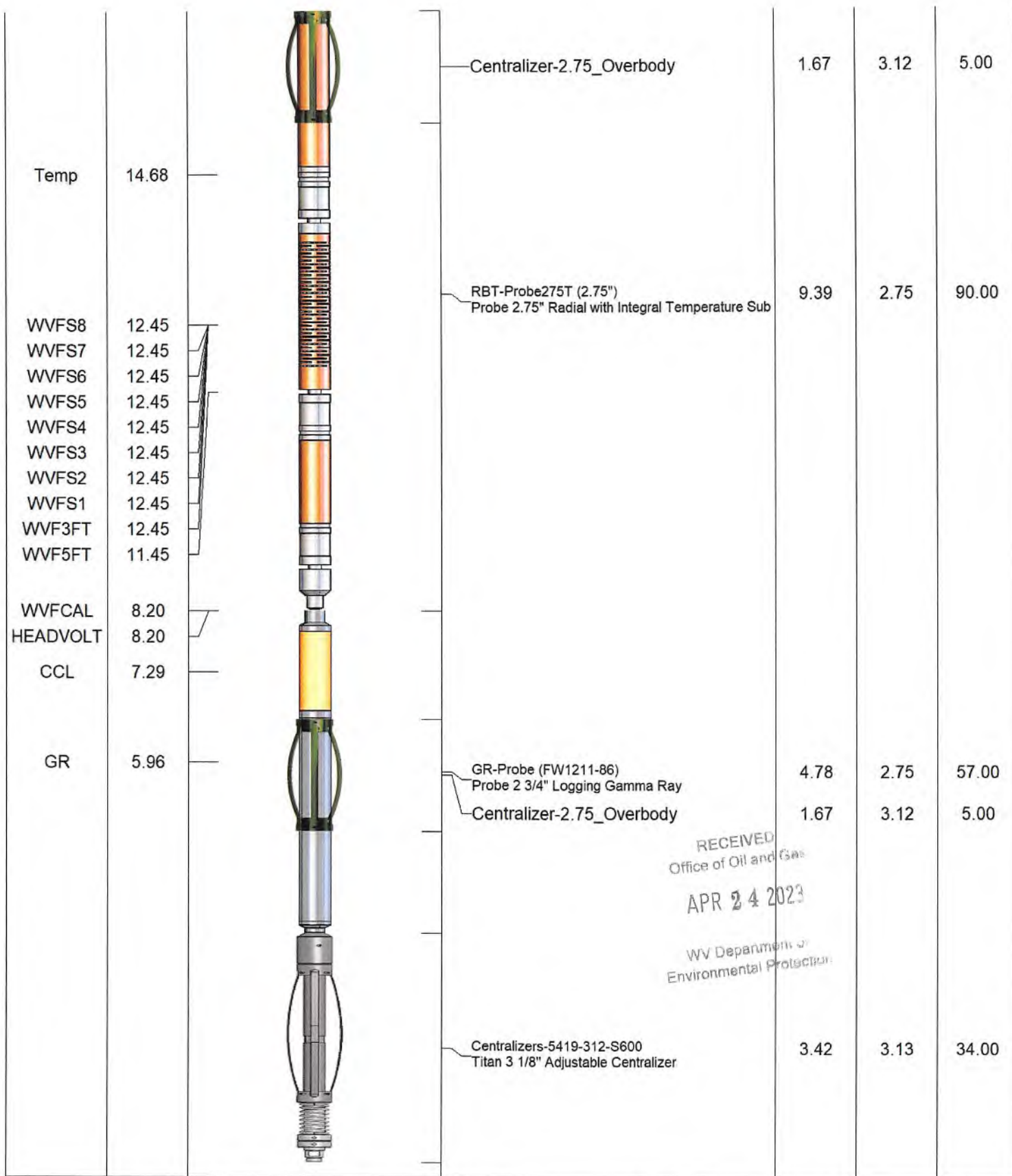
	Raw (v)		Calibrated (v)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
CAL	0.000	0.000	0.596	0.596	1.000	0.000

Air Zero Calibration, performed Mon Nov 14 09:33:23 2022:

	Raw (v)		Calibrated (v)		Results	
	Zero		Zero		Gain	Offset
3'	0.000		0.000			0.000
5'	0.000		0.000			0.000
SUM						
S1	0.000		0.000			0.000
S2	0.000		0.000			0.000
S3	0.000		0.000			0.000
S4	0.000		0.000			0.000
S5	0.000		0.000			0.000
S6	0.000		0.000			0.000
S7	0.000		0.000			0.000
S8	0.000		0.000			0.000

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 APR 24 2023  
 WV Department of  
 Environmental Protection

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
HeadVolt	17.53		CHD-Titan Standard 1 7/16" Cable Head	1.02	1.44	1.00



Dataset: antero\_redwood\_1h\_rcbl\_14\_nov\_2022.db: field/well/run1/pass11  
 Total length: 18.61 ft  
 Total weight: 192.00 lb  
 O.D.: 3.13 in



Company ANTERO RESOURCES  
 Well REDWOOD 1H  
 Field WEST UNION



# Nine

County  
State

DODDRIDGE  
WV

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Office of Oil and Gas

APR 24 2023

WV Department of  
Environmental Protection