



PIONEER

Pioneer Energy Services

RADIAL BOND LOG WITH GAMMA RAY

Company PDC ENERGY INC.		Company PDC ENERGY INC.	
Well THISTLE DOWN 31G-402		Well THISTLE DOWN 31G-402	
Field WATTENBERG		Field WATTENBERG	
County WELD		County WELD	
State COLORADO		State COLORADO	
Location: 1519' FSL & 1357' FWL NE SW SEC 31 TWP 5N RGE 64W		API # : 05-123-45746 Other Services CNL	
Permanent Datum	GL	Elevation	K.B.
Log Measured From	KB	23'	Above Perm. Datum
Drilling Measured From	KB		G.L.
31 JANUARY 2019			
Run Number	ONE		
Depth Driller or PBTD	N/A		
Depth Logger	7618'		
Bottom Log Interval	7618'		
Top Log Interval	SURFACE		
Open Hole Size	8.5"		
Type Fluid	WATER		
Fluid Level	FULL		
Fluid Density	N/A		
Max. Recorded Temperature	281 F		
Max. Wellhead Pressure	ZERO		
Wellhead Connection	OPEN		
Estimated Cement Top	N/A		
Unit Number	P-132		
Wireline Size	9/32"		
Location	FORT MORGAN		
Recorded By	SCHOENROGGE		
Witnessed By	MR. MYERS		
Size	Wt/Ft	Top	Bottom
Tubing Record			
Surface Casing	9.625"	36#	SURFACE
Production Casing	5.5"	20#	SURFACE
Liner Record			

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.
CORRELATED TO CUSTOMER MARKER JOINT
NO FREE PIPE PASS. LOADED HOLE FROM 1700' WHILE LOGGING.

THANK YOU FOR USING PIONEER ENERGY SERVICES!

Your Pioneer Energy Services Crew	Tool Data - Services	Serial Number
Engineer: SCHOENROGGE Operator: TRAHAN Operator: PAXTON Operator:	SEE DIAGRAM PLUS OVERBODIES	

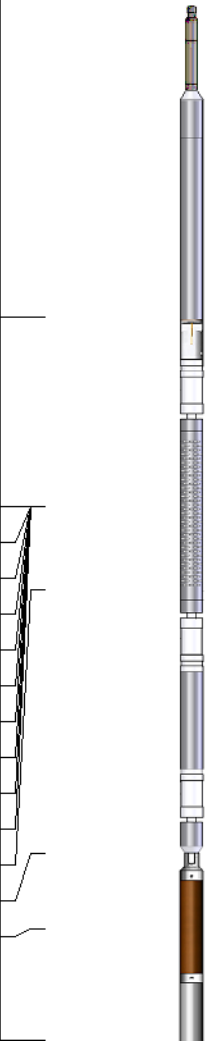
Top - Bottom

BHTEMP_Src TEMP	BOREID in 8.5	BOTTEMP degF 220	CASED? Yes	CASEOD in 5.5	CASETHCK in 0.361	CASEWGHT lb/ft 20
CMNTTHCK in 1.5	CMTTKCOR Off	CSTKCOR Off	MAXAMPL mV 71.2	MINAMPL mV 2.2	MINATTN db/ft 0.8	NPORSEL Limestone
PERFS 0	PPT usec 261	SRFTEMP degF 50	SZCOR Off	TDEPTH ft 7900		


Variable Description

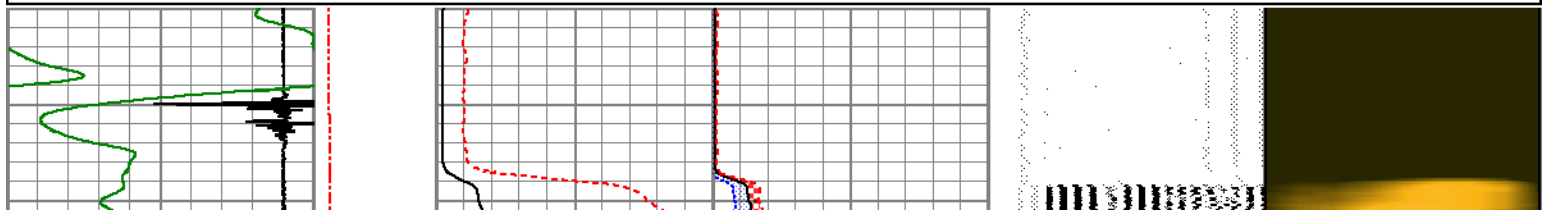
BHTEMP_Src : BHTEMP Input Source Selector
BOREID : Borehole I.D.
BOTTEMP : Bottom Hole Temperature
CASED? : Cased hole ?
CASEOD : Casing O.D.
CASETHCK : Casing Thickness
CASEWGHT : Casing Weight
CMNTTHCK : Cement Thickness
CMTTKCOR : CN CemThk. Cor. ?
CSTKCOR : CN CasThk. Cor. ?

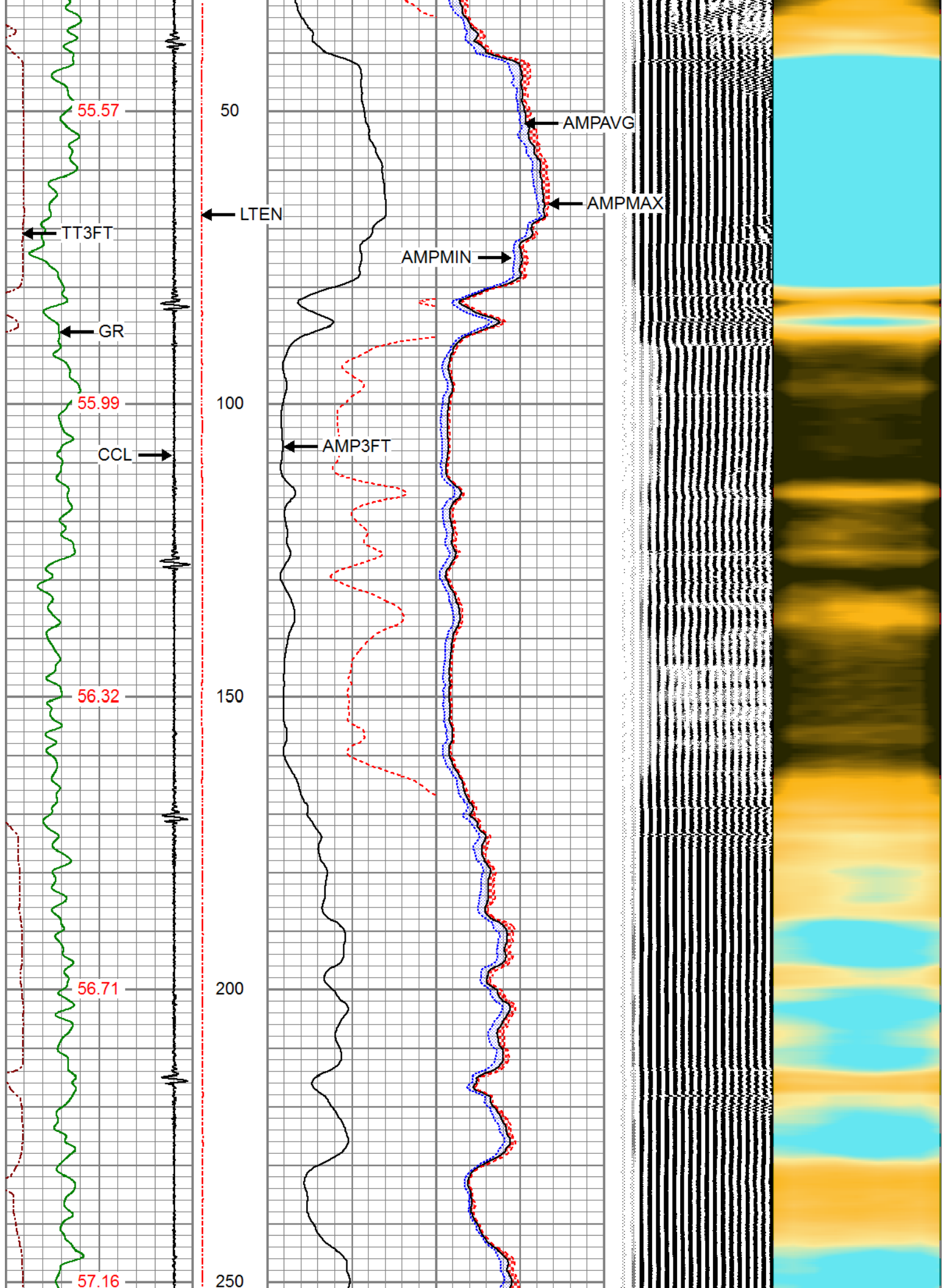
MAXAMPL : Maximum Amplitude
MINAMPL : Minimum Amplitude
MINATTN : Minimum Attenuation
NPORSEL : Neutron Porosity Curve Select
PERFS : Perforation Flag
PPT : Predicted Pipe Time
SRFTEMP : Surface Temperature
SZCOR : CN Size Cor. ?
TDEPTH : Total Depth

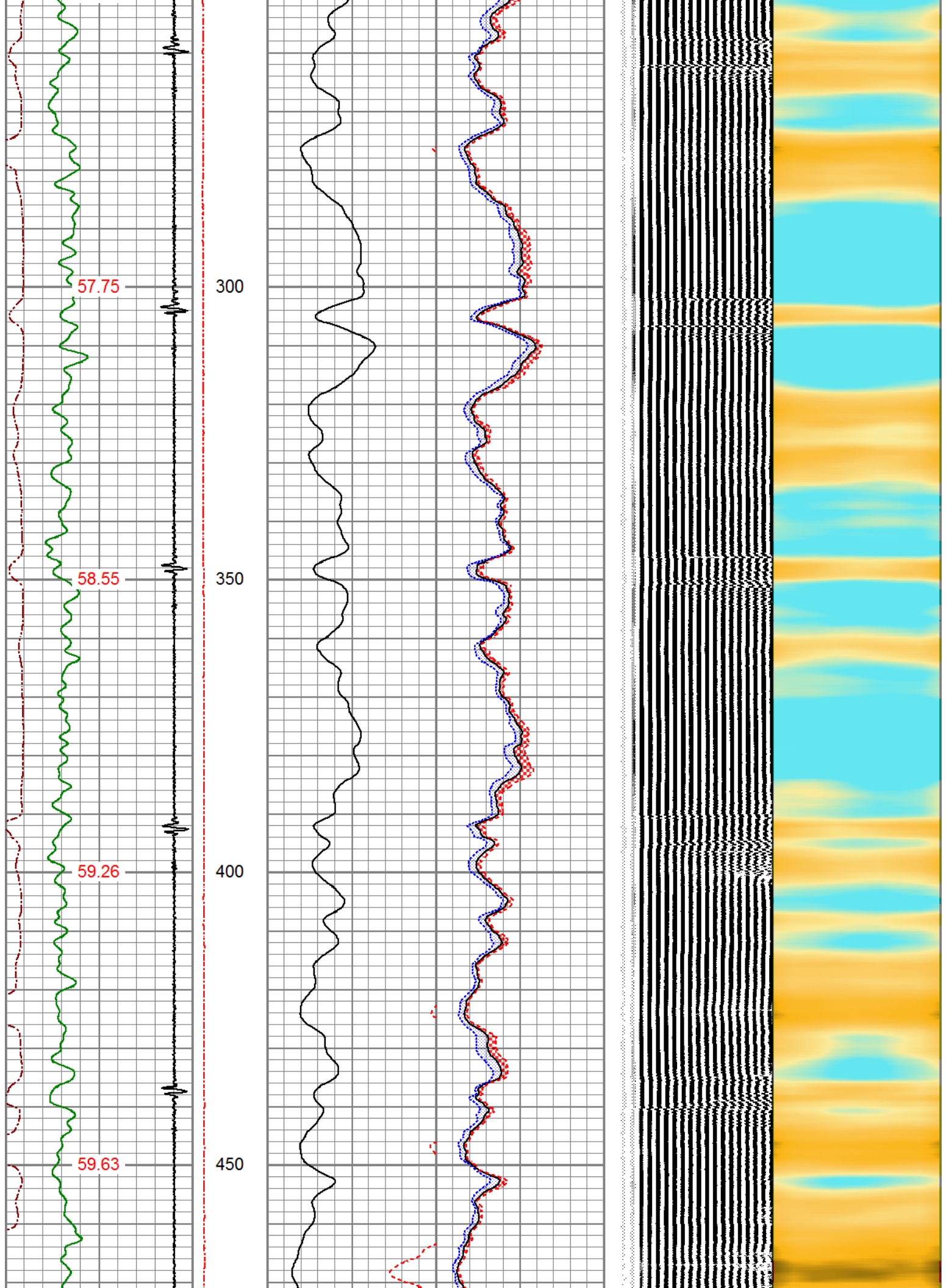
Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
TEMP	19.11		Cable Head-Titan_144 1 7/16" Titan Cable Head	1.03	1.44	2.00
			PROBE-RBT-DIGITAL-RBL-DCT (FW1411-9.21) Probe 2 3/4" Radii Bond with Temp-Corrosion Package		2.75	105.00
WVFS8	16.82					
WVFS7	16.82					
WVFS6	16.82					
WVFS5	16.82					
WVFS4	16.82					
WVFS3	16.82					
WVFS2	16.82					
WVFS1	16.82					
WVFCAL	16.82					
WVF3FT	16.82					
WVF5FT	15.82					
HEADVOLT	12.63					
CCL	11.71					
GR	10.38					

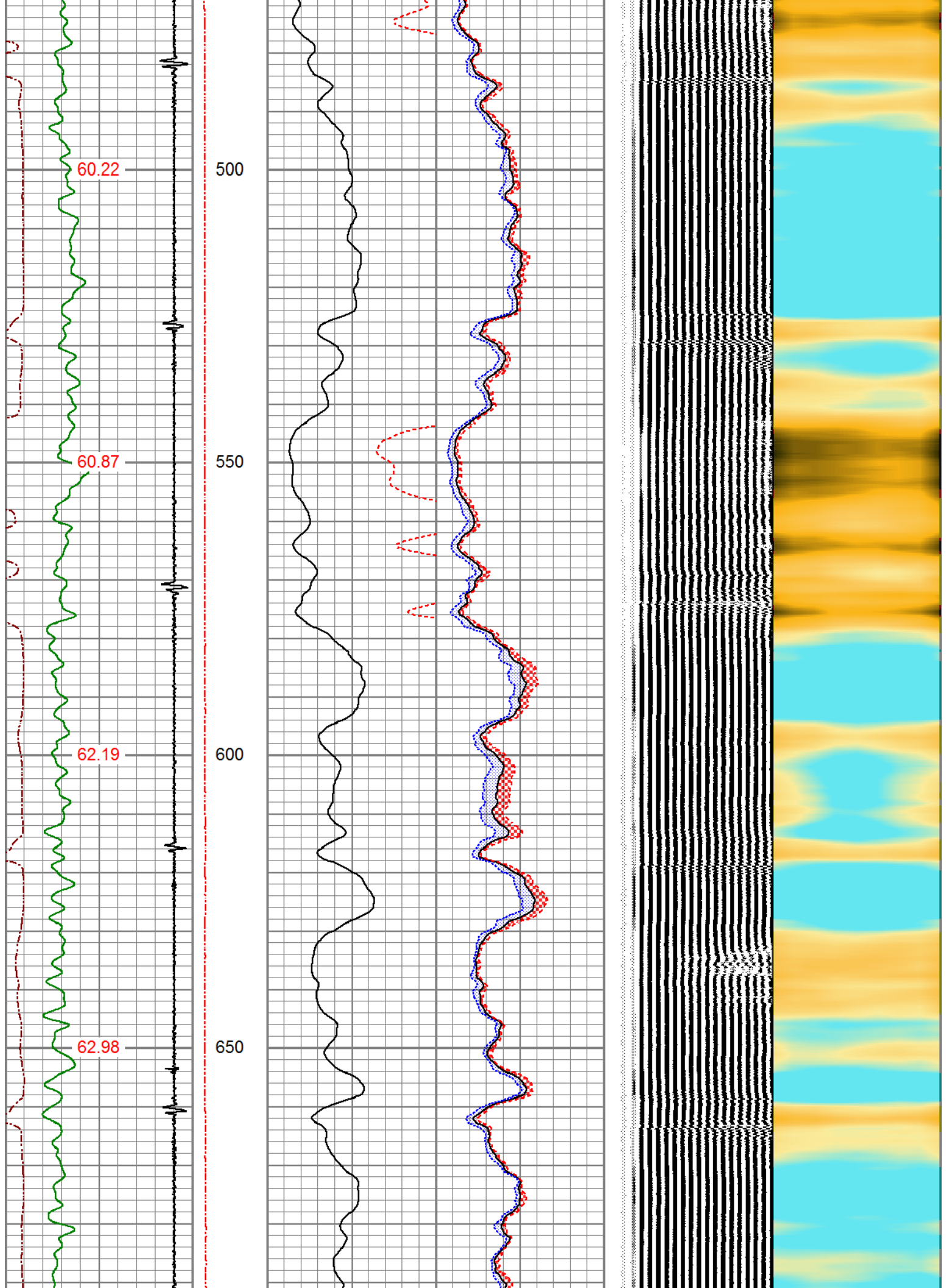
GR	10.38		PROBE-GR/CCL-DIGITAL-275_6-PIN (1114.83) Probe 2 3/4" Gamma CCL 6-pin Bottom for CNT	2.75	50.00
CNLSC	4.99				
CNSSC	4.58		PROBE-CNT-DIGITAL-PRB_DIG (120509) Probe 2.75 Digital CNT	4.58	2.75
			Centralizer-275 Probe 2 3/4" Probe Adjustable Spring Centralizer	2.88	2.75
			Bullnose-PROBE Probe Go Pin Pressure Cap	0.33	1.38
Dataset: pdc_thistle down31g-402_0512345746_20180131_scbl-cn1.db: field/well/run1/pass6 Total length: 22.87 ft Total weight: 242.00 lb O.D.: 2.75 in					

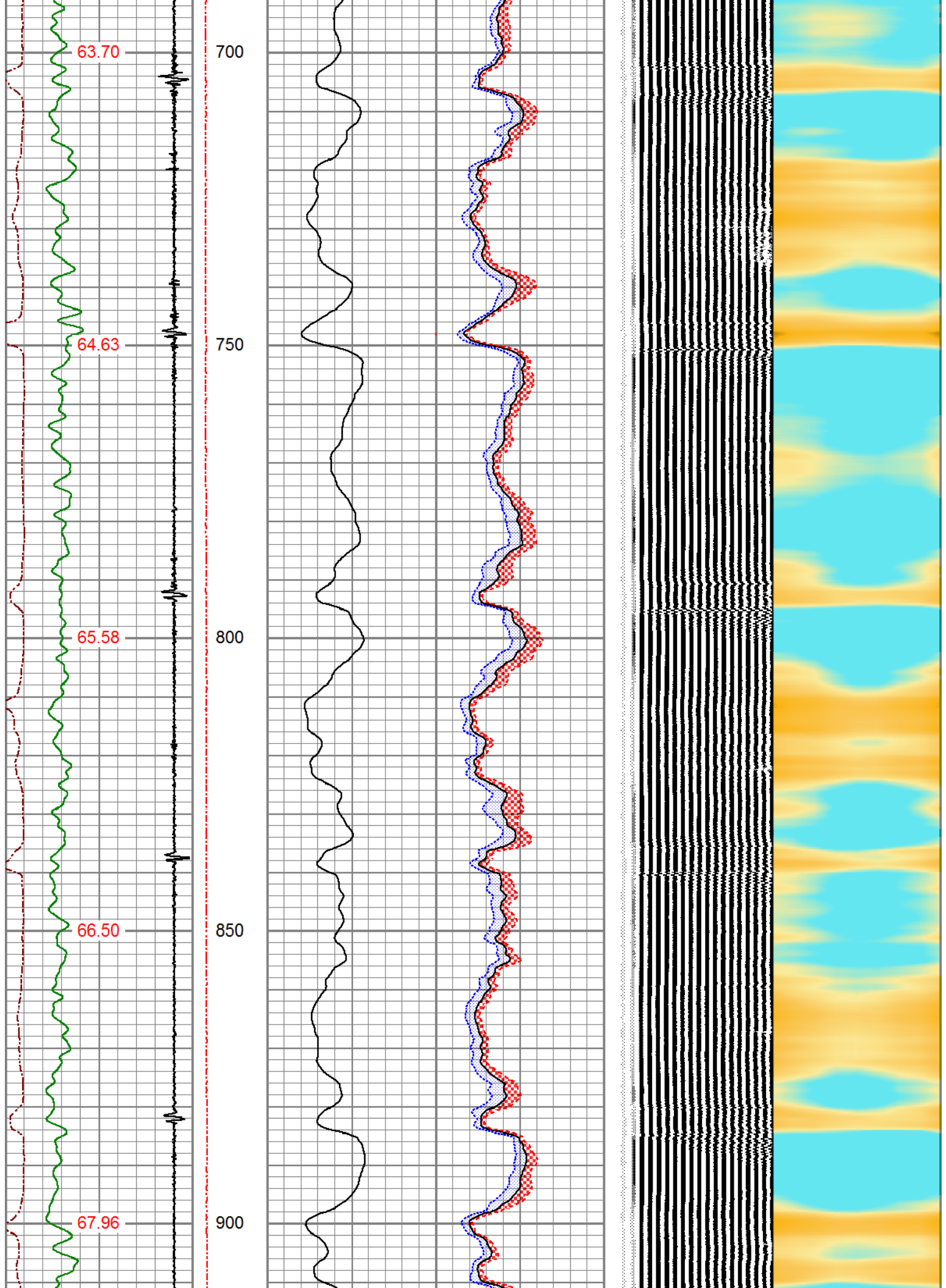
		MAIN LOG ZERO PSI APPLIED AT SURFACE			
Database File	pdc_thistle down31g-402_0512345746_20180131_scbl-cn1.db				
Dataset Pathname	main				
Presentation Format	pinr_scbl_co				
Dataset Creation	Thu Jan 31 10:29:03 2019				
Charted by	Depth in Feet scaled 1:240				
3Ft Travel Time (usec)	ineTensio (lb)	3' Amplitude (mV)	Sector Amplitude Average	VDL (usec)	1 Sector Map 8
270 170	0 2000	0 100	0 150	200 1200	
-9 Collar Locator 1		3' Amplified Amplitude X 5	Sector Amplitude Maximum		
Gamma Ray (GAPI)		0 20	0 150		
0 150			Sector Amplitude Minimum		
TEMP (degF)			0 150		

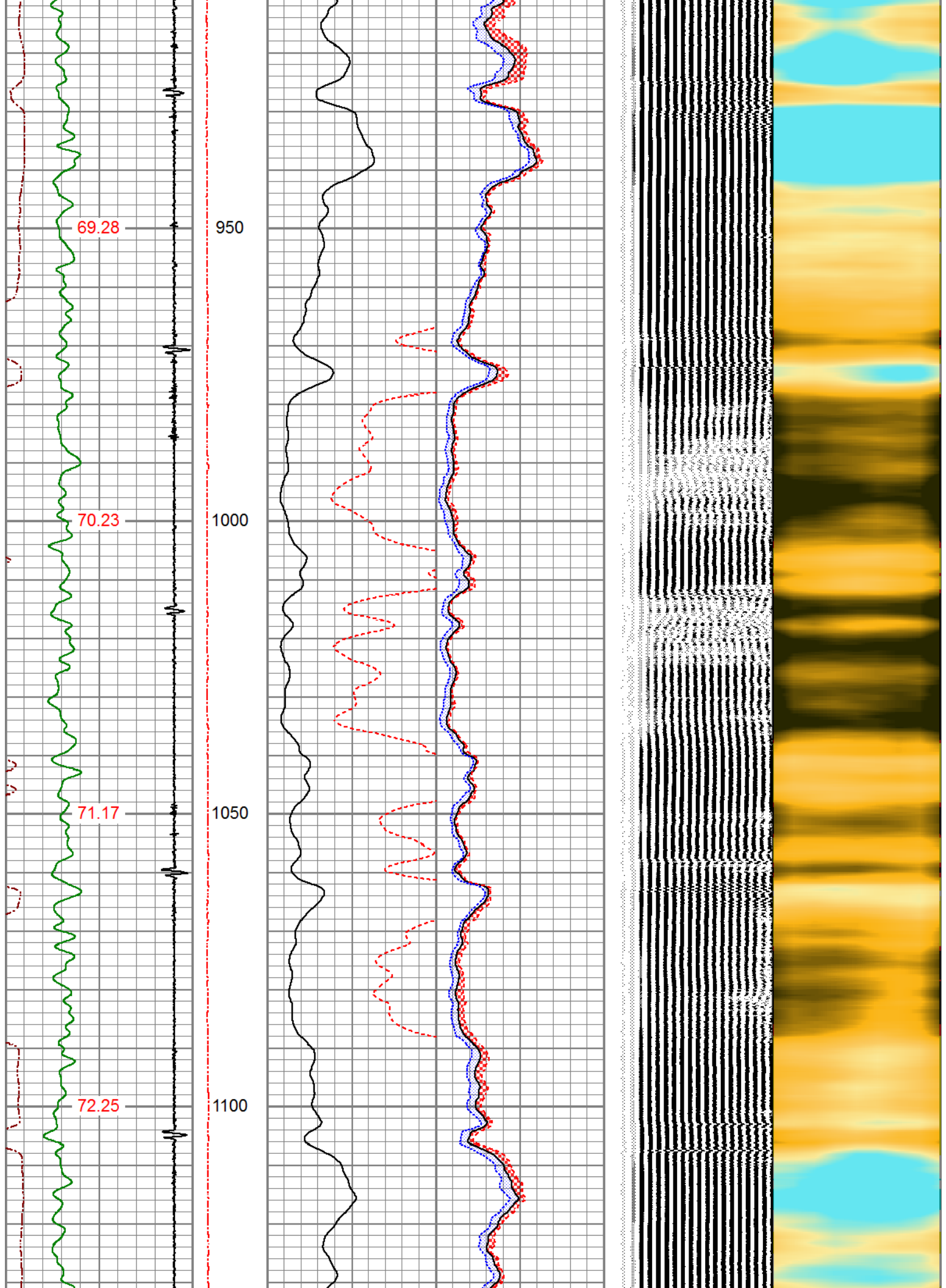


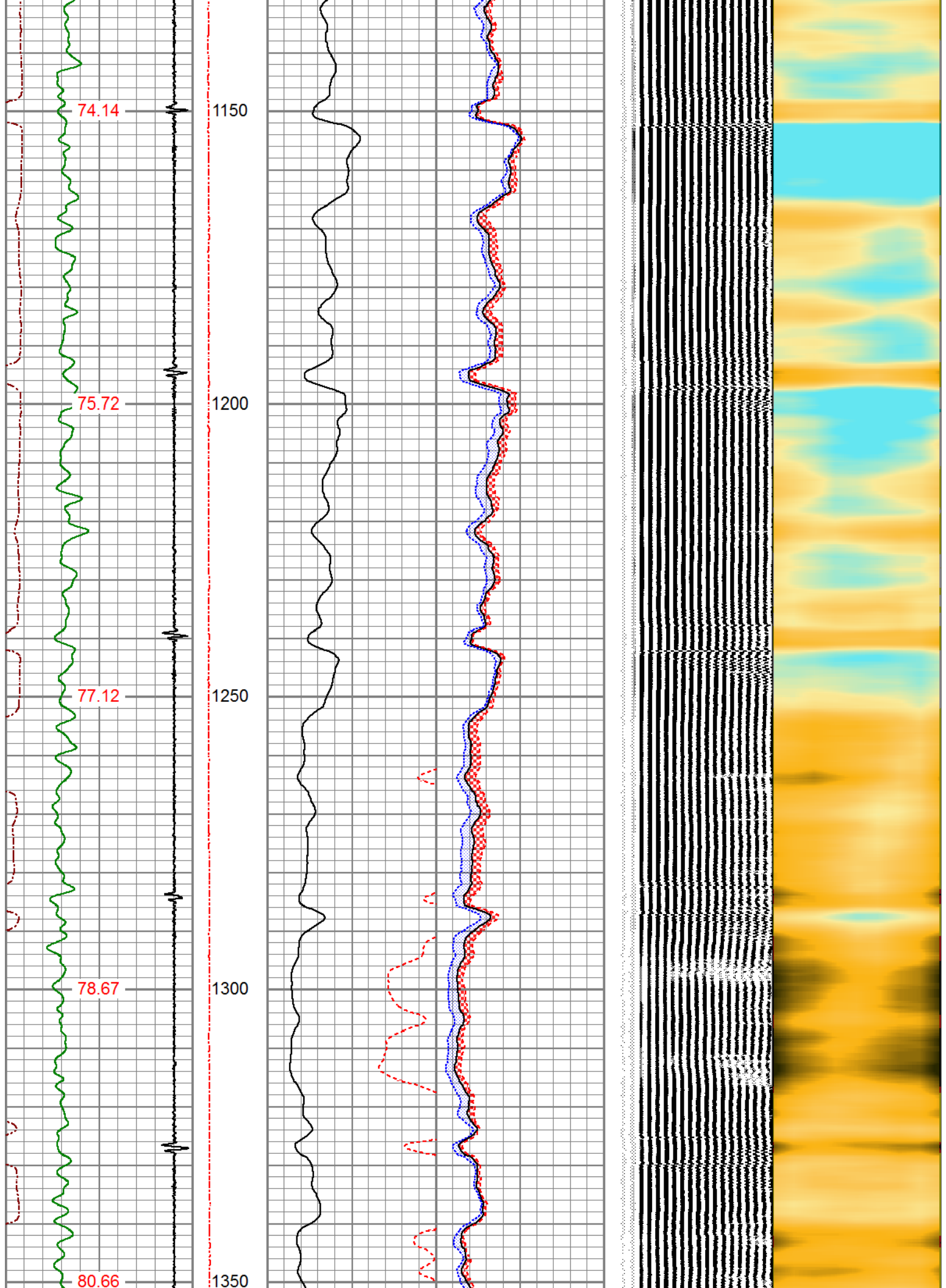


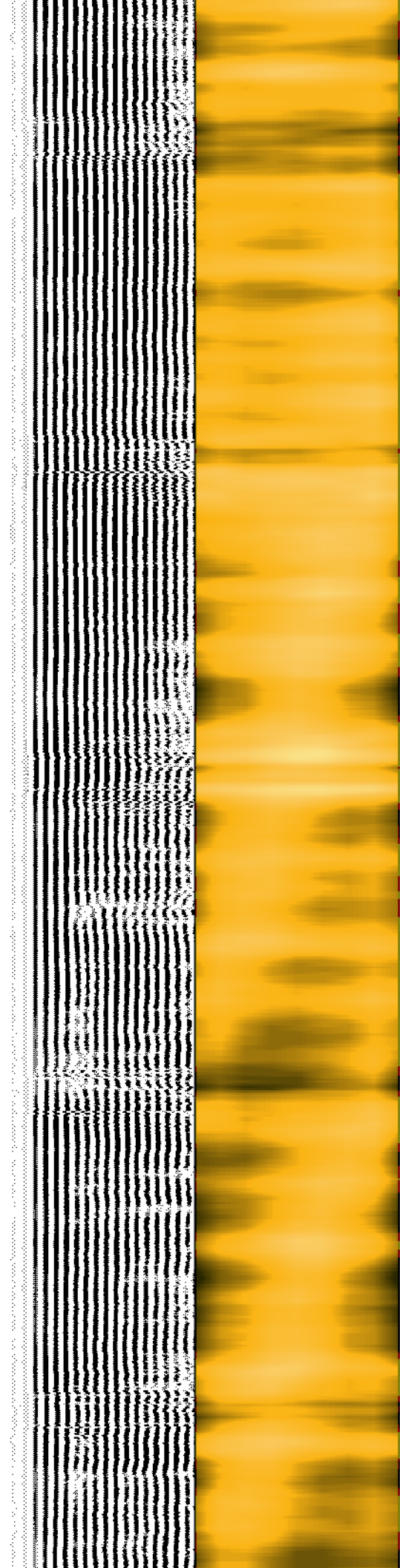
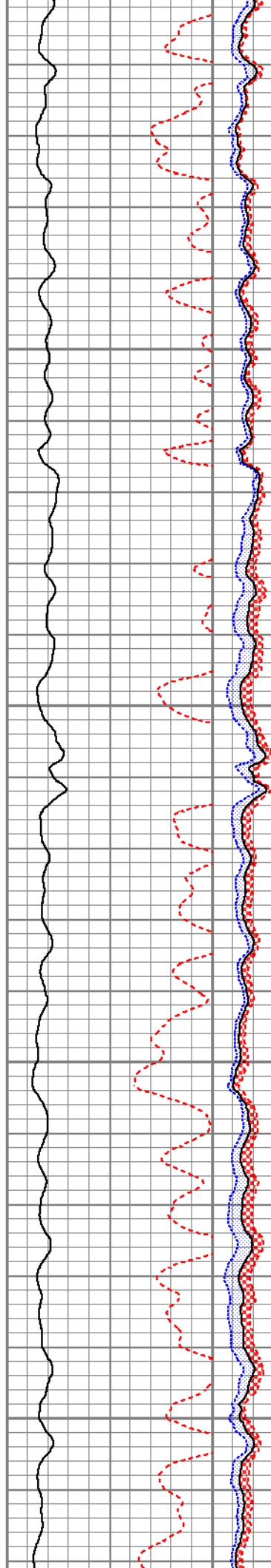
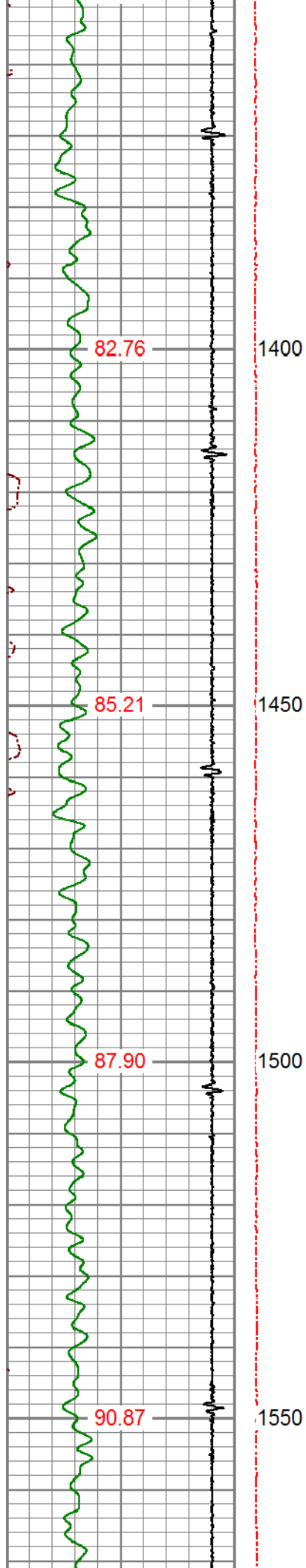


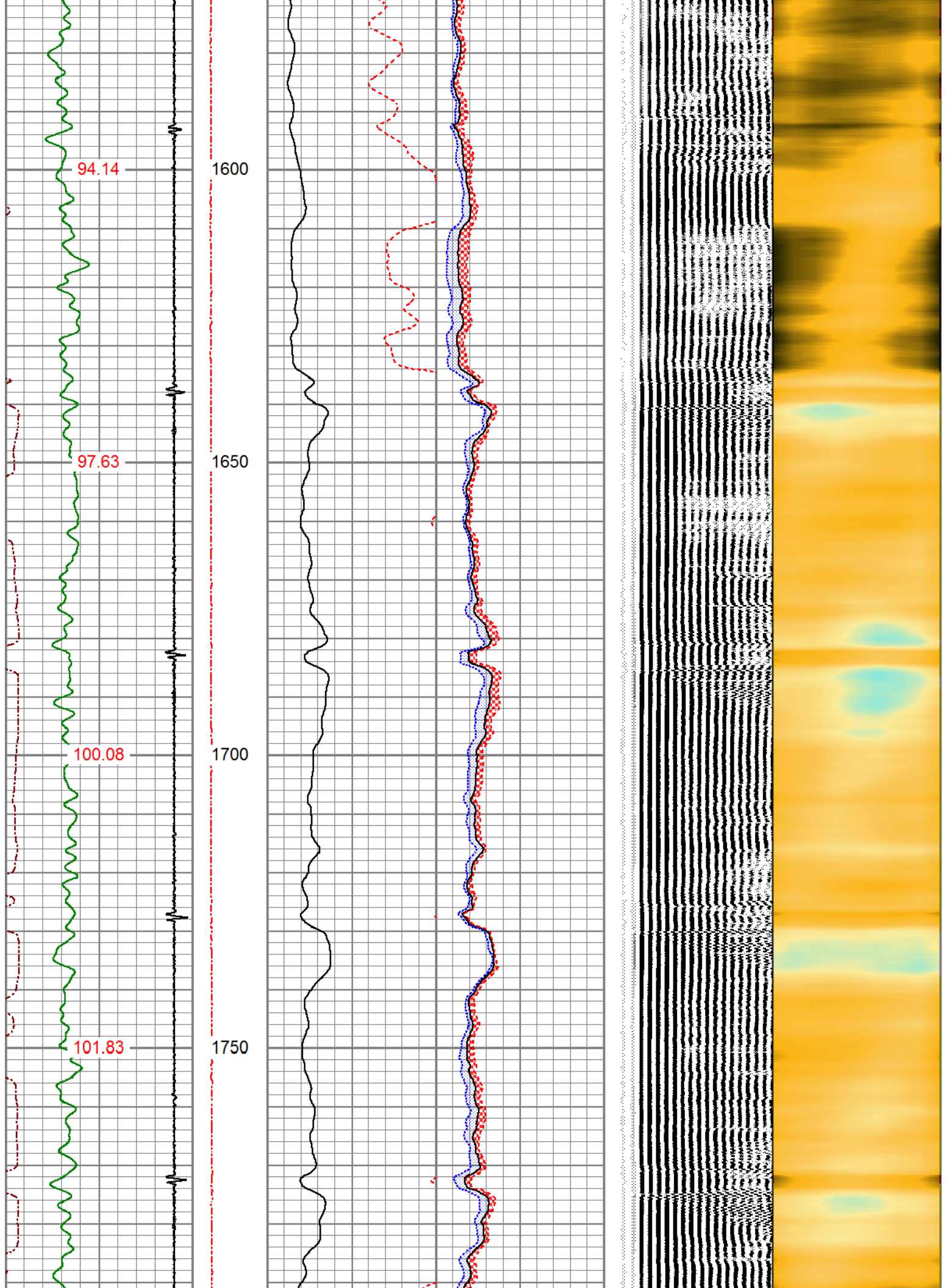


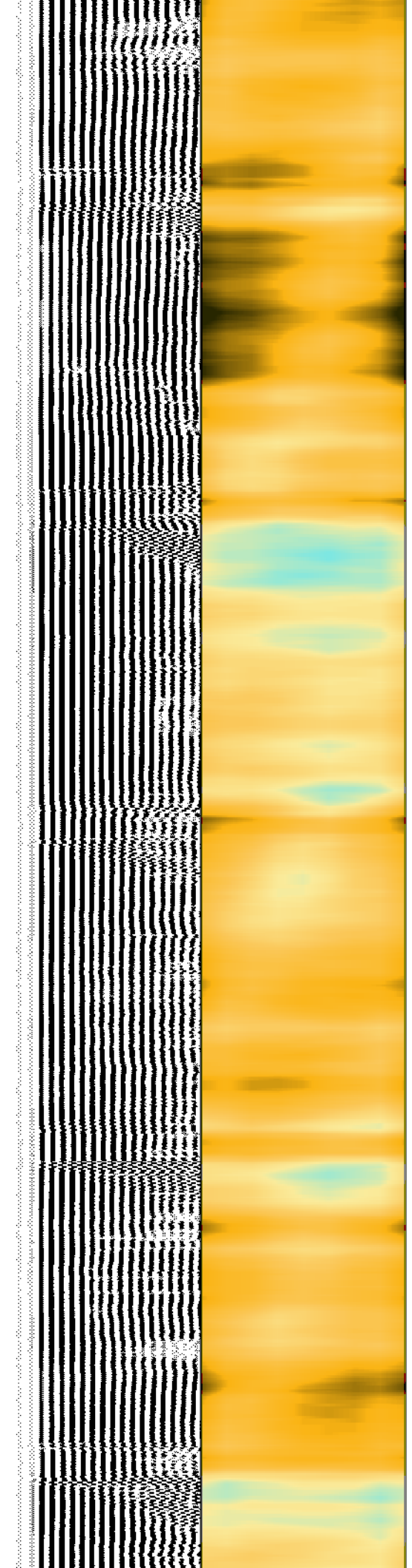
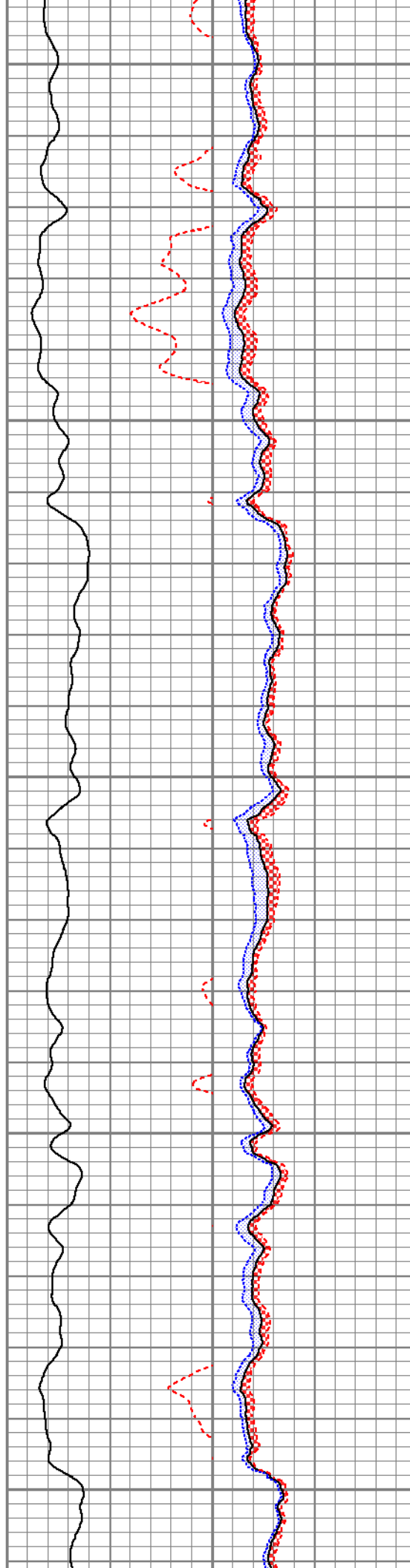
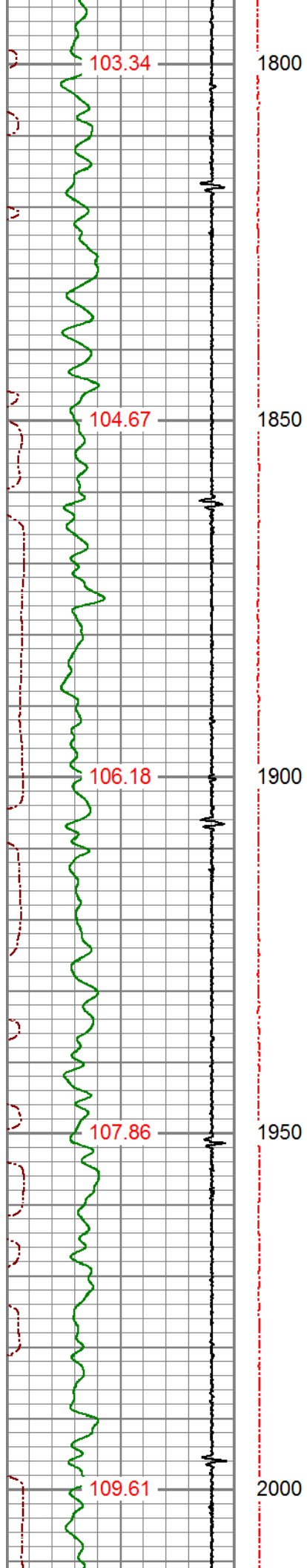


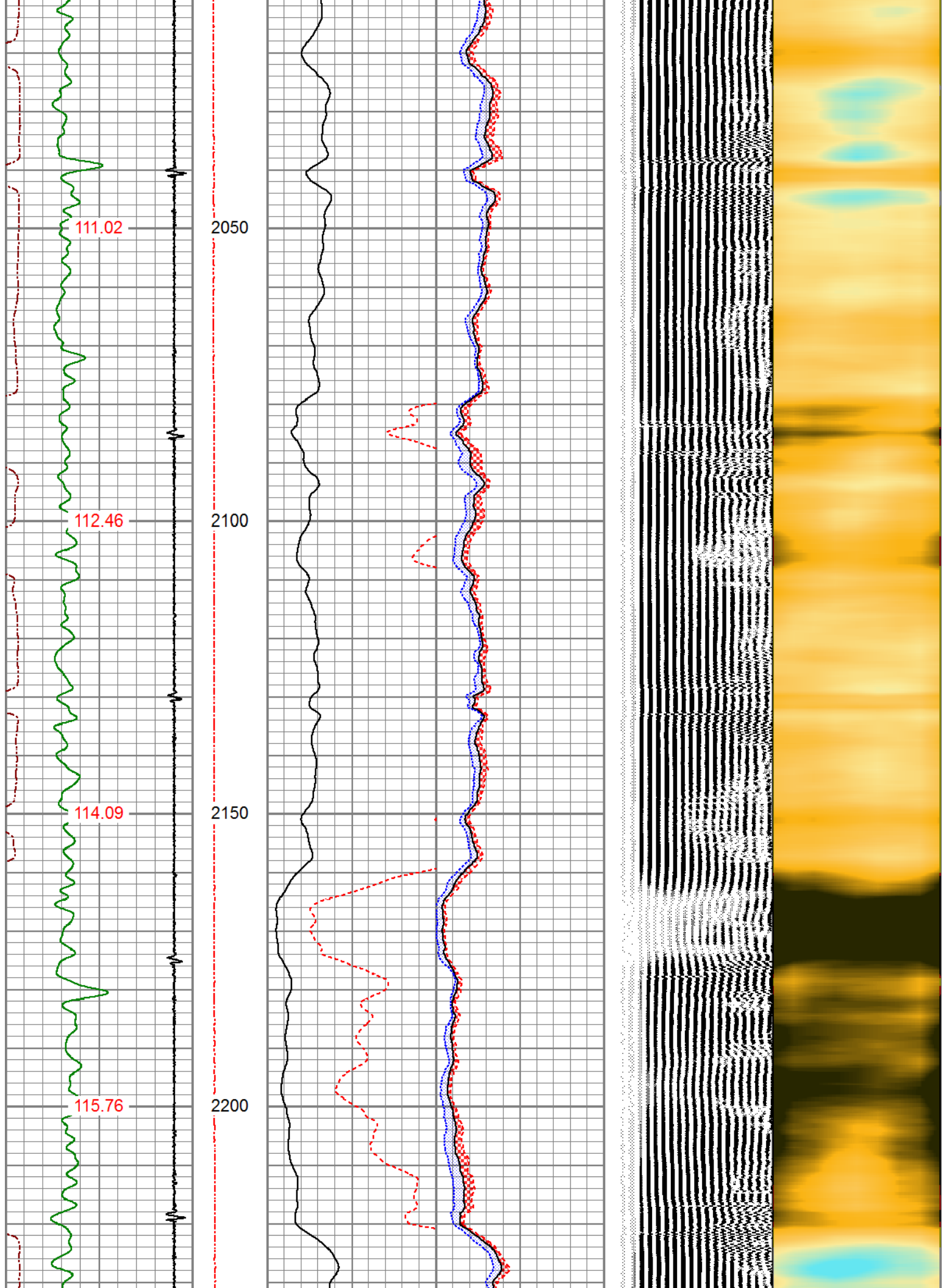


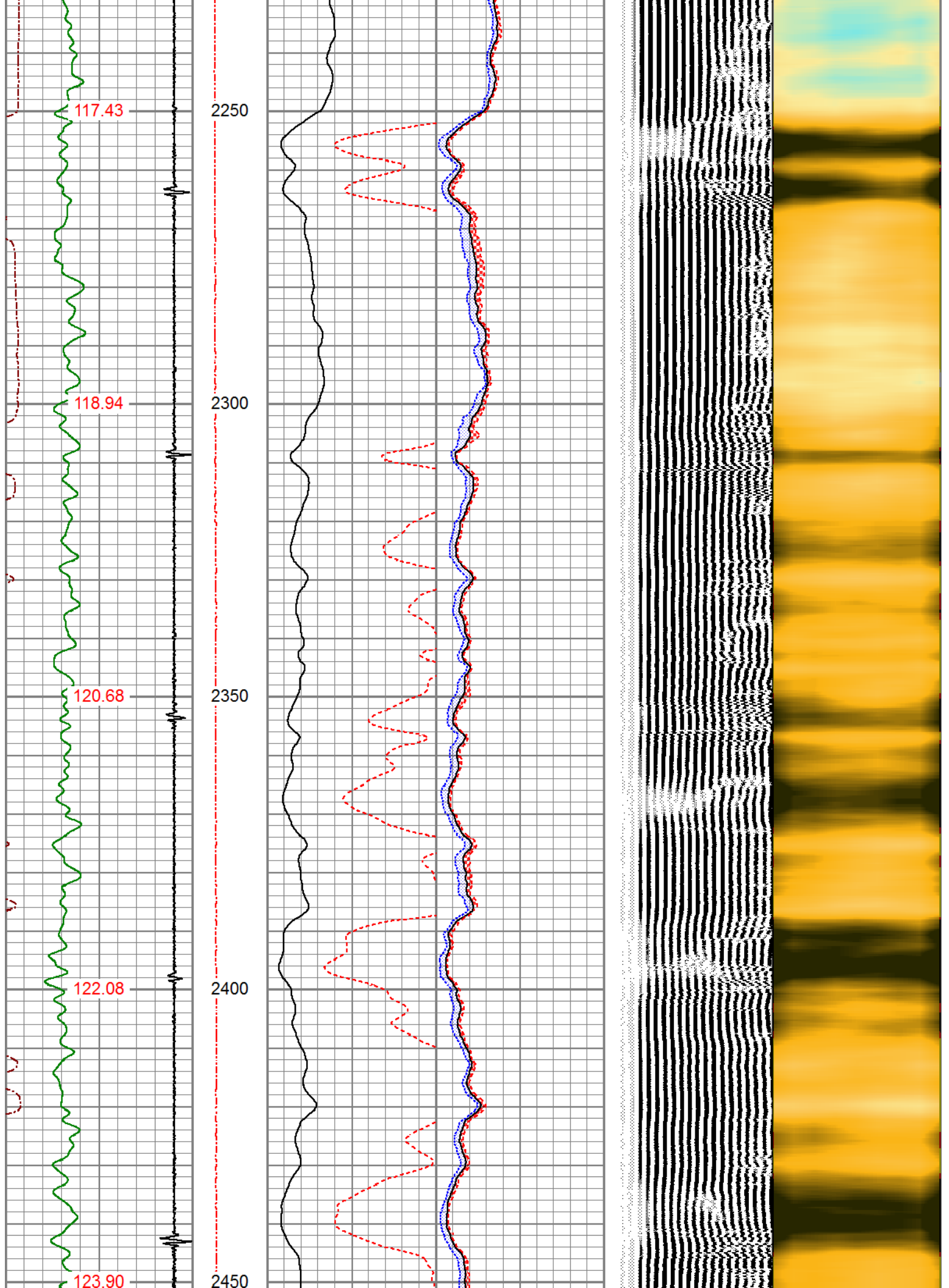


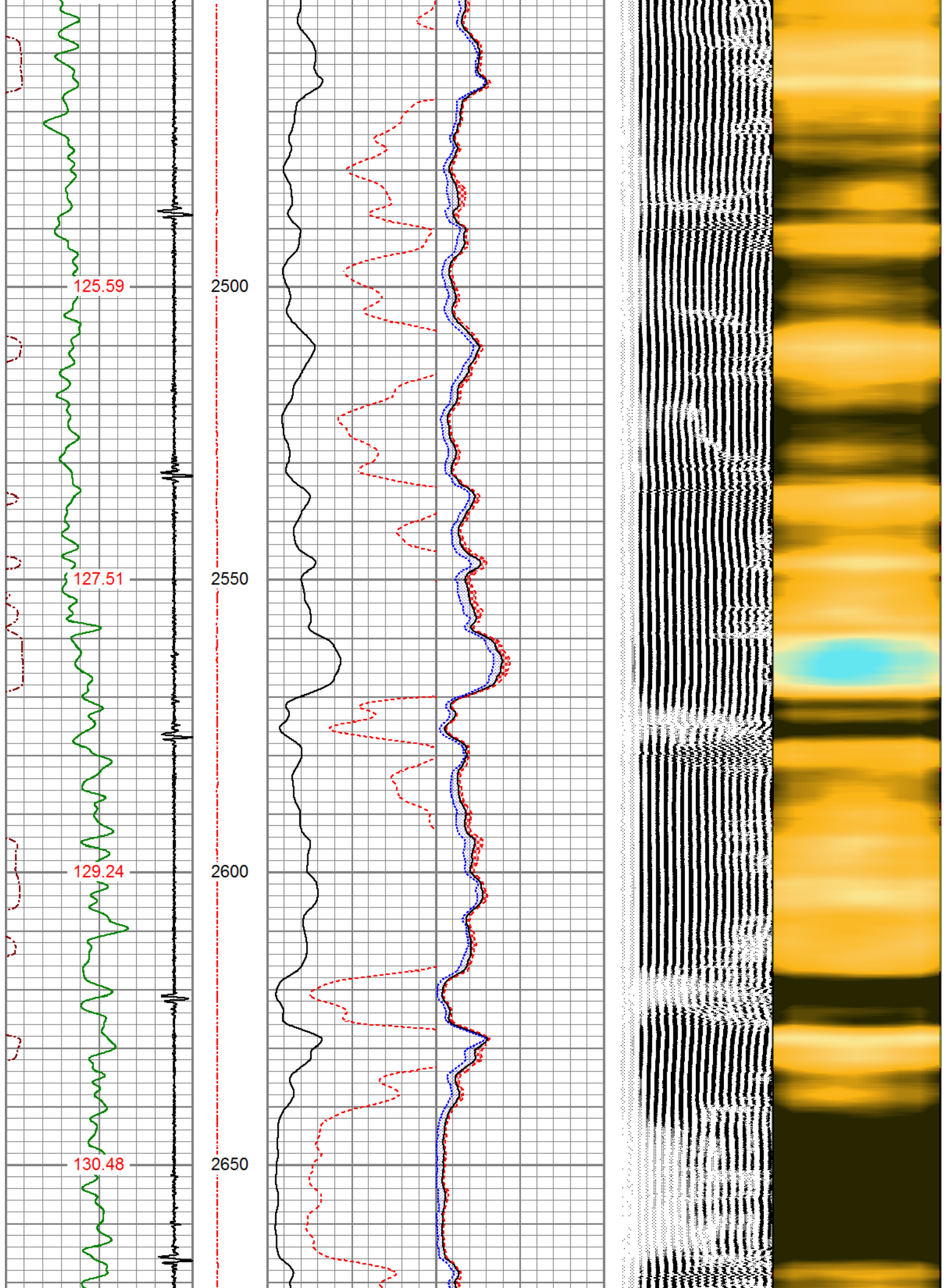


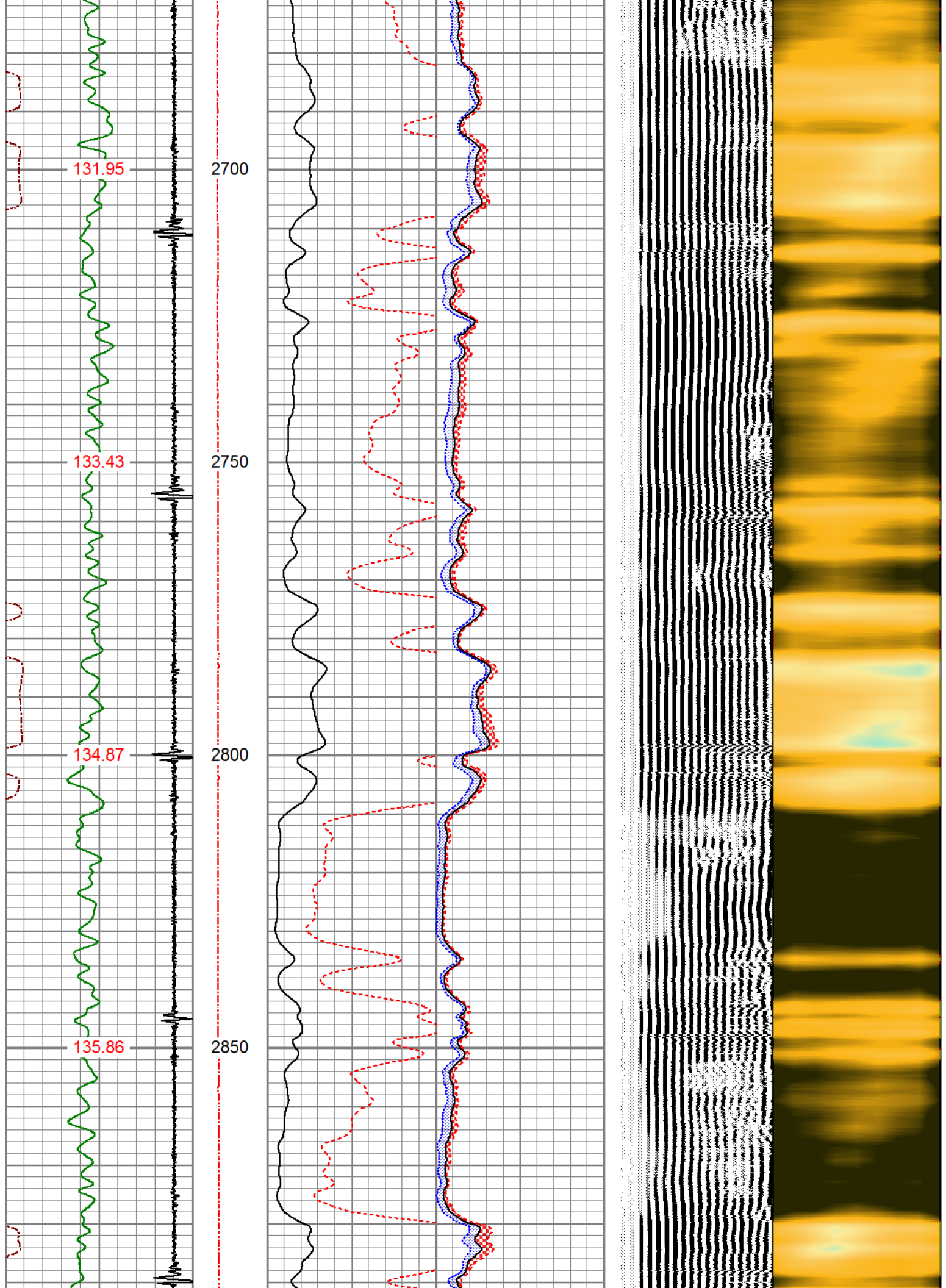


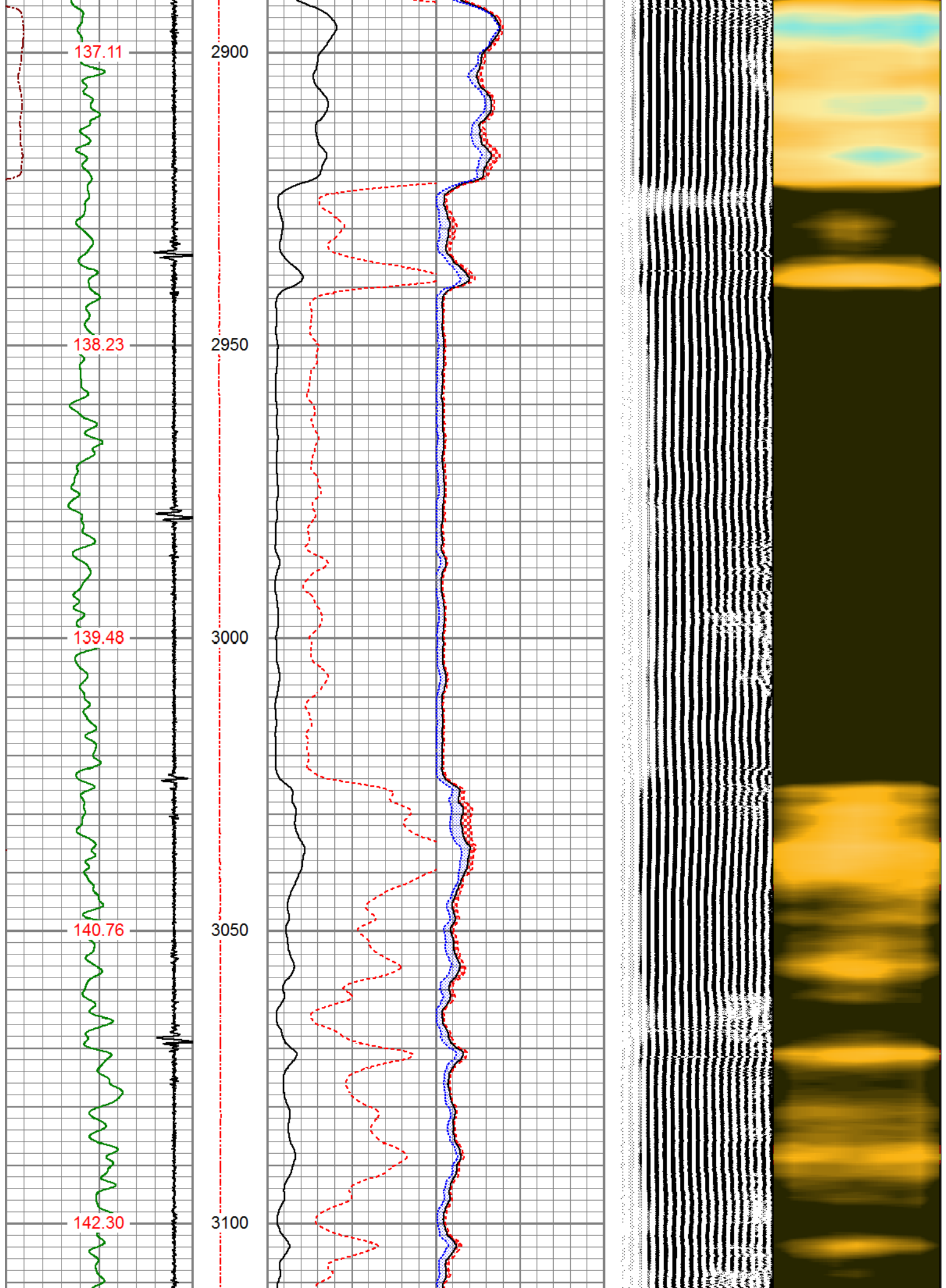


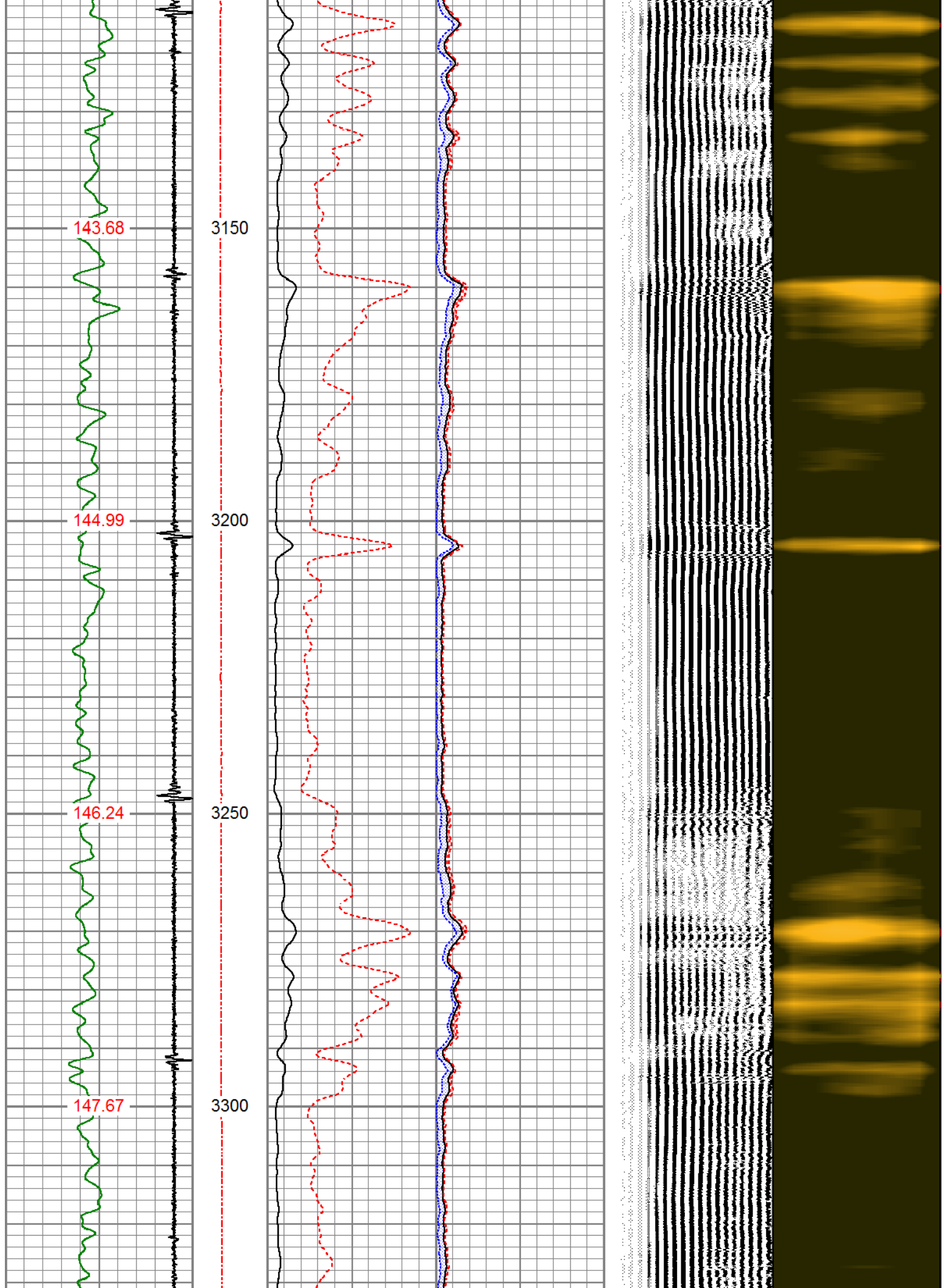


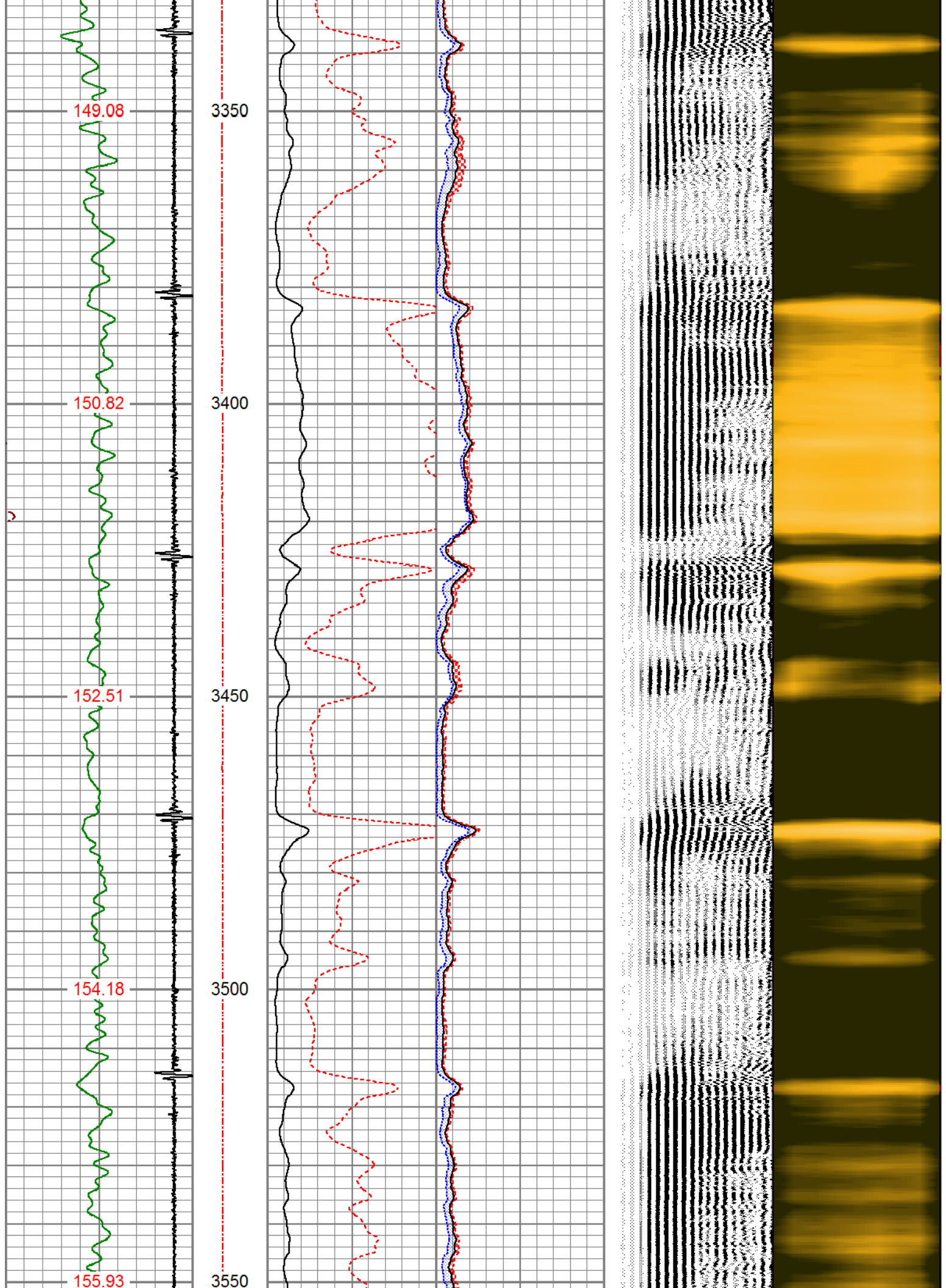


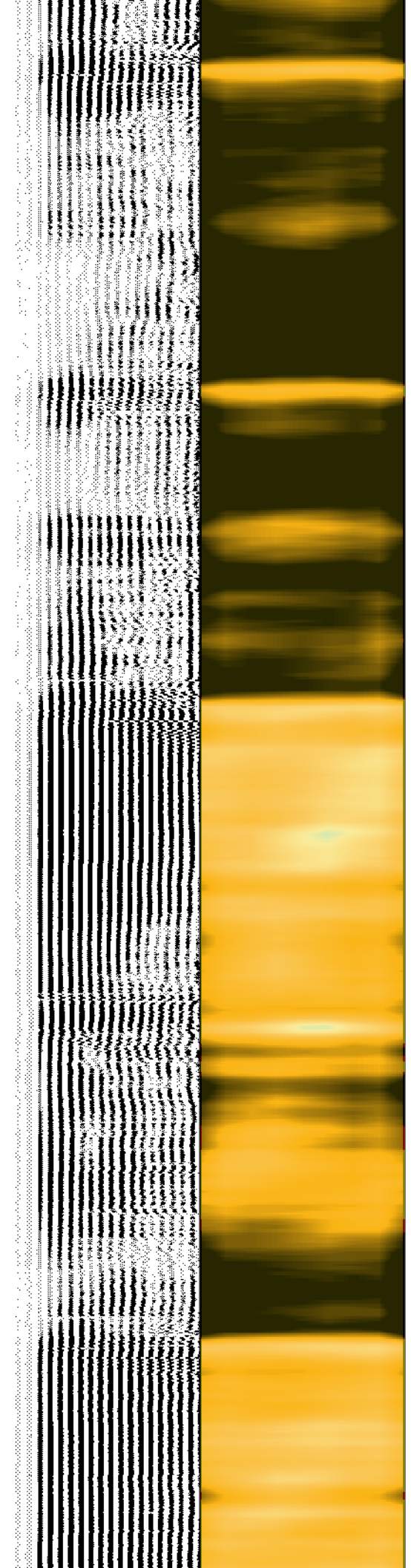
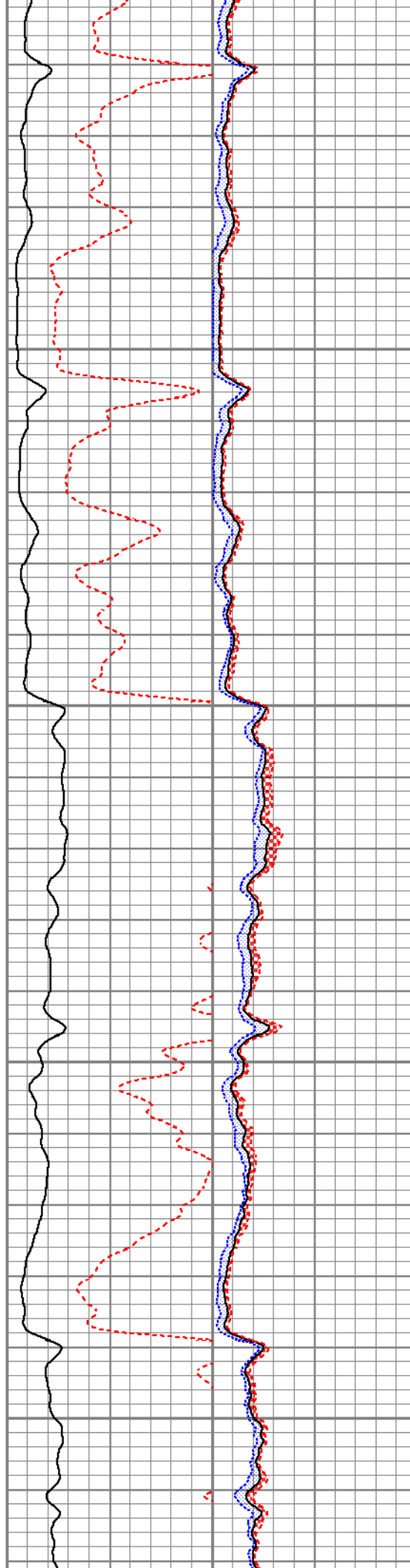
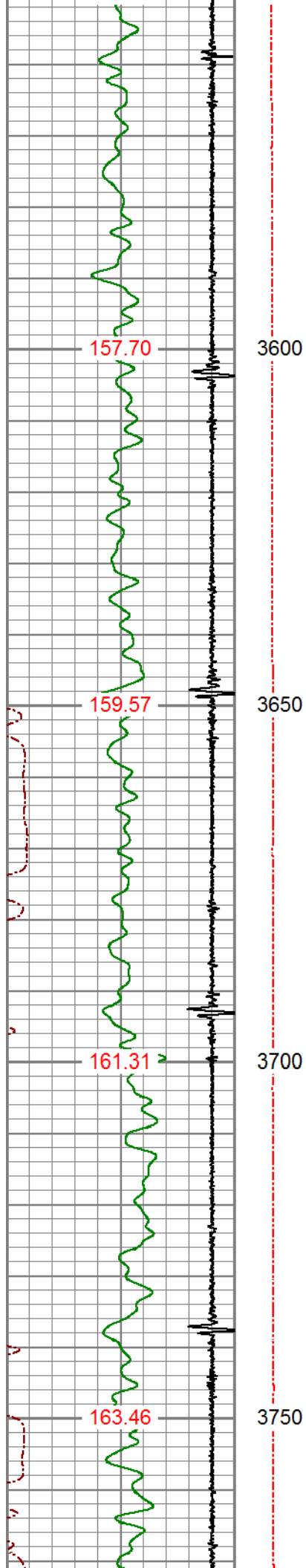


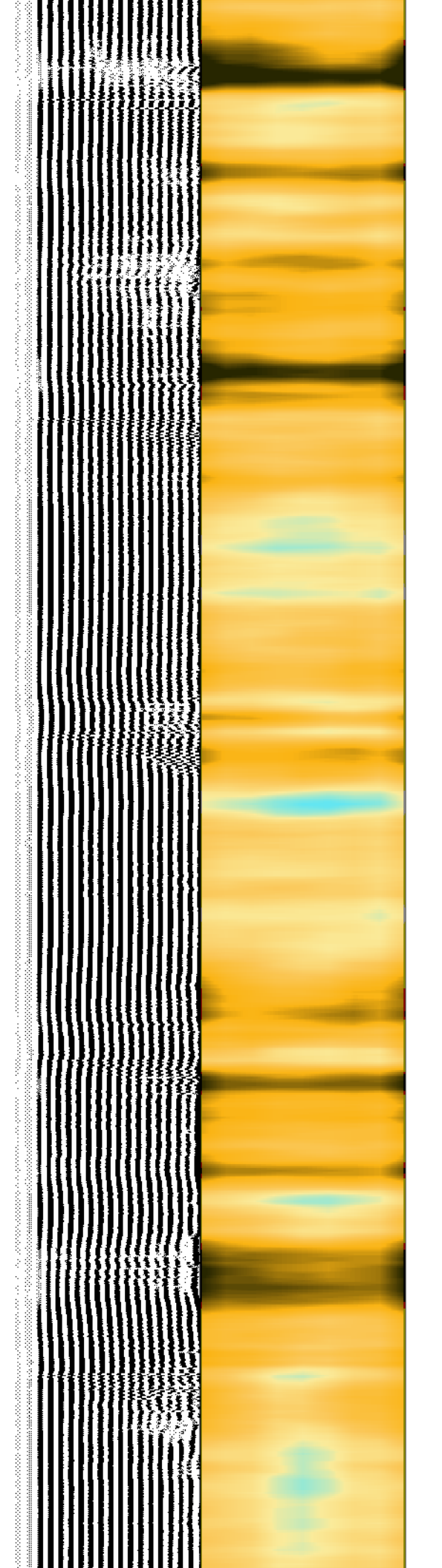
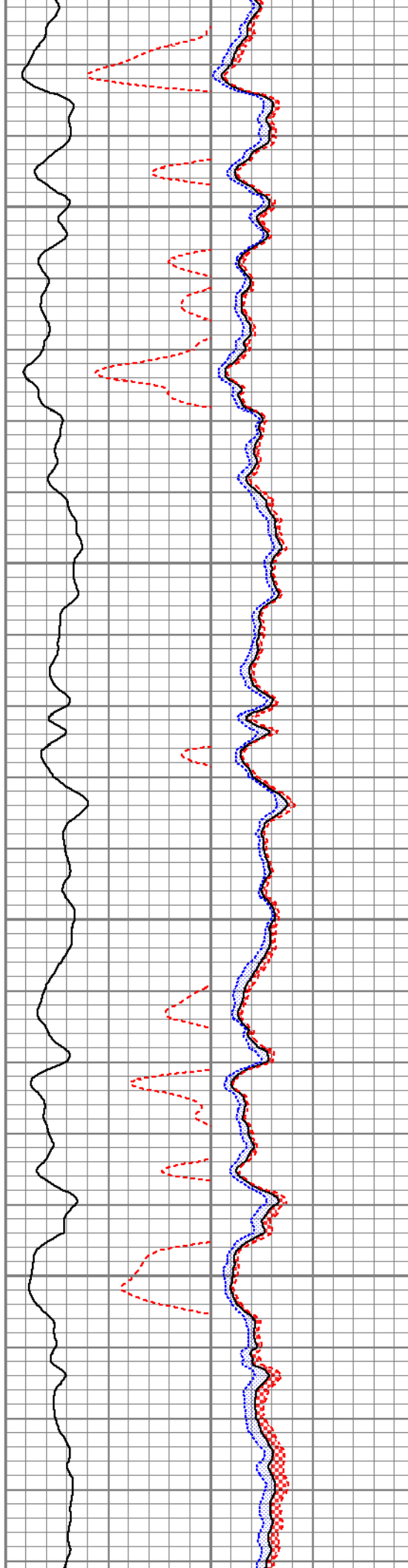
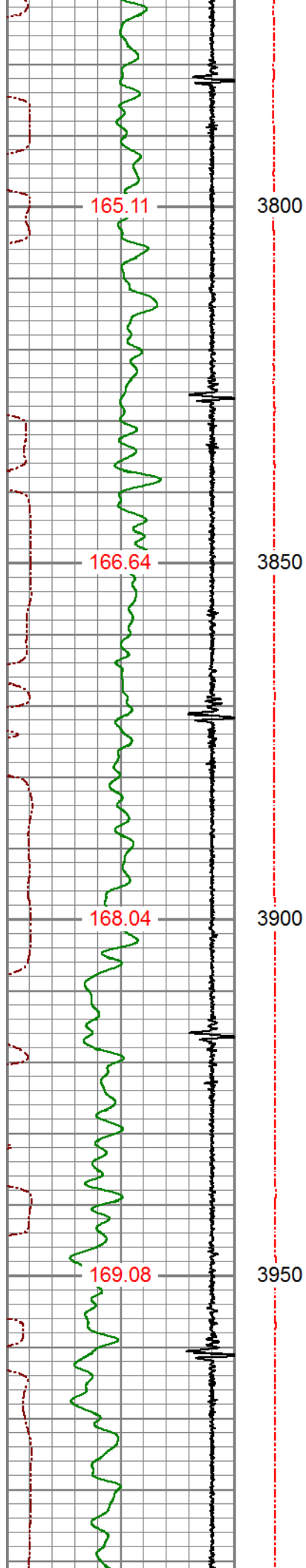


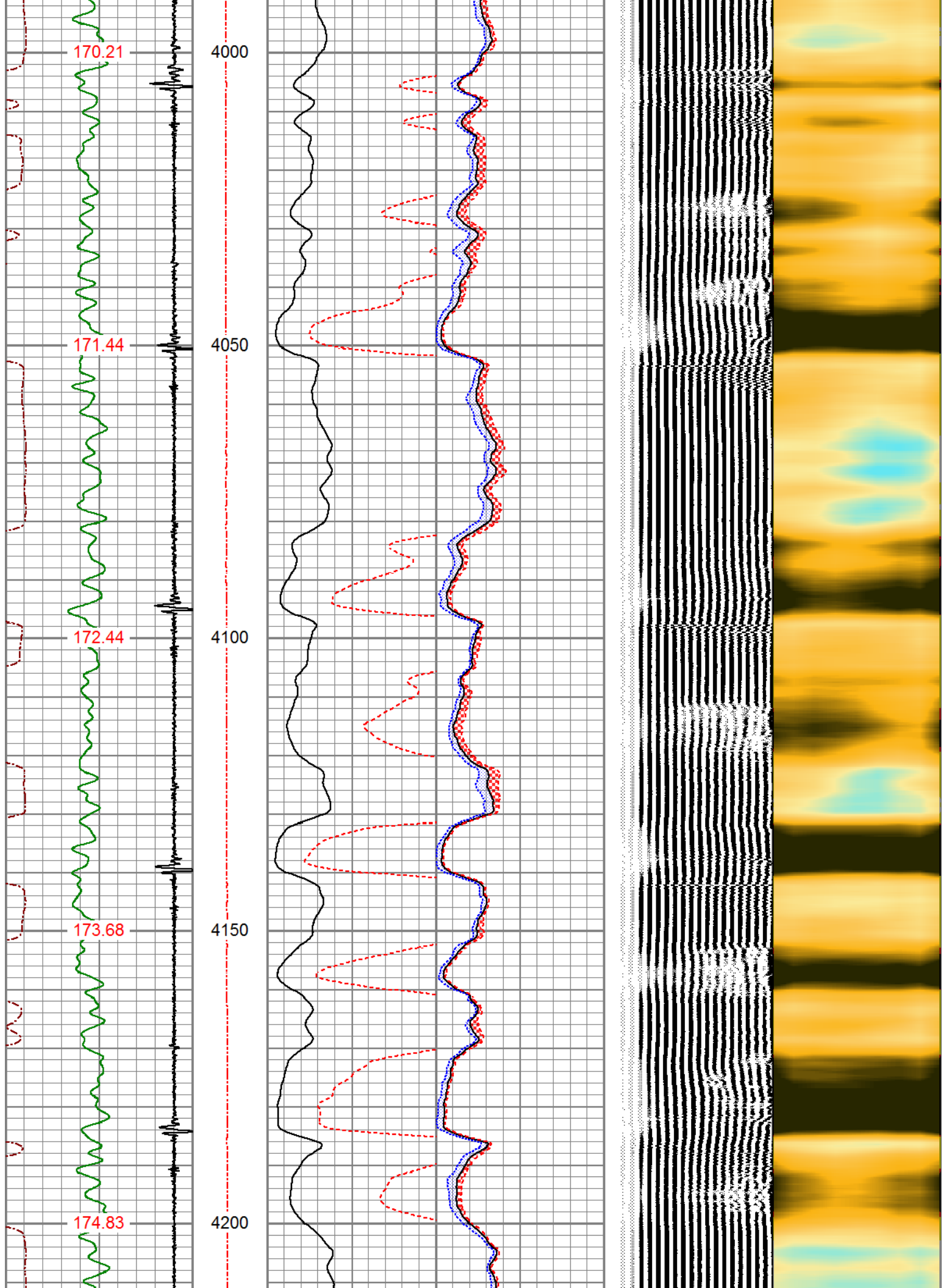


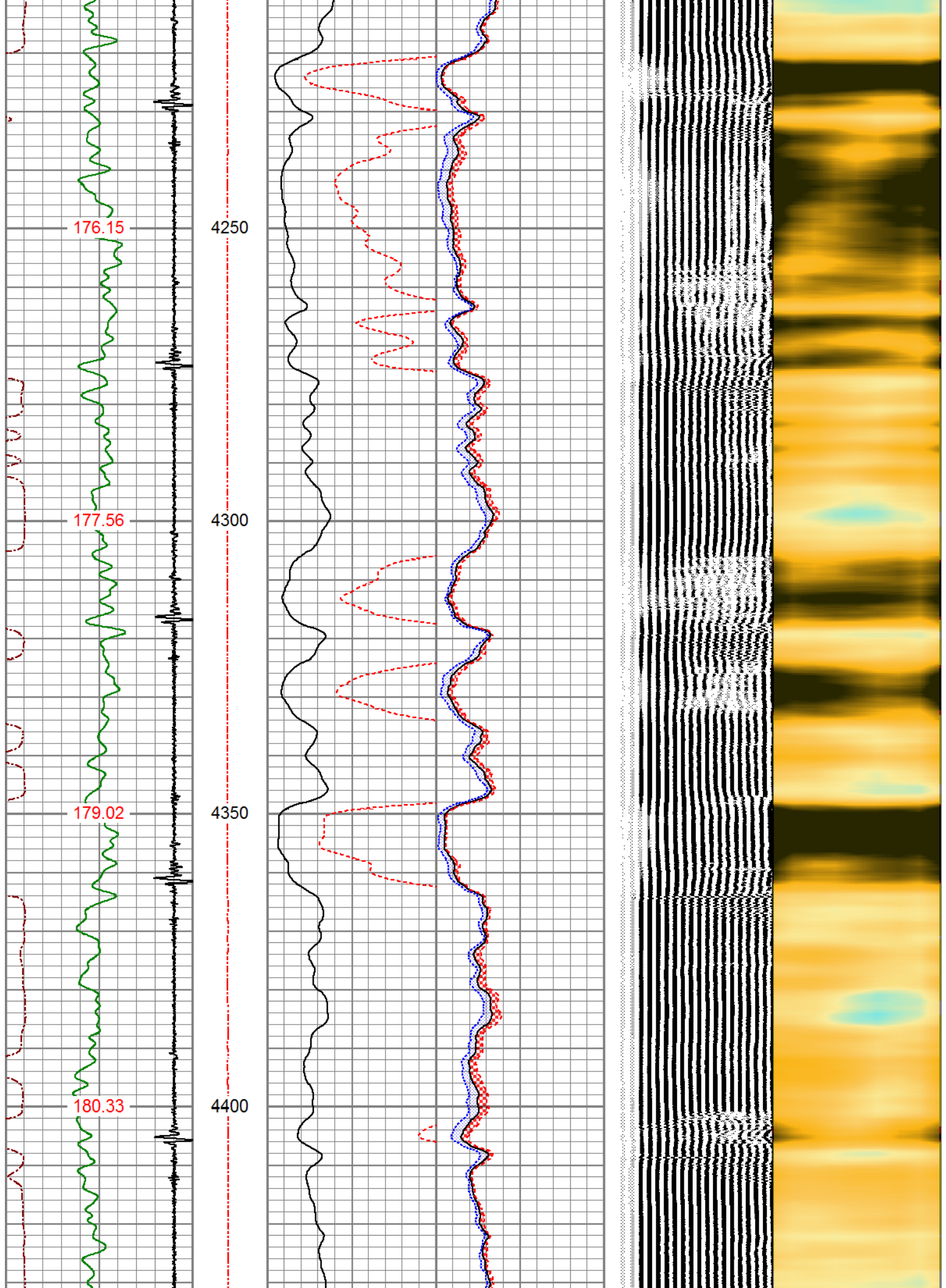


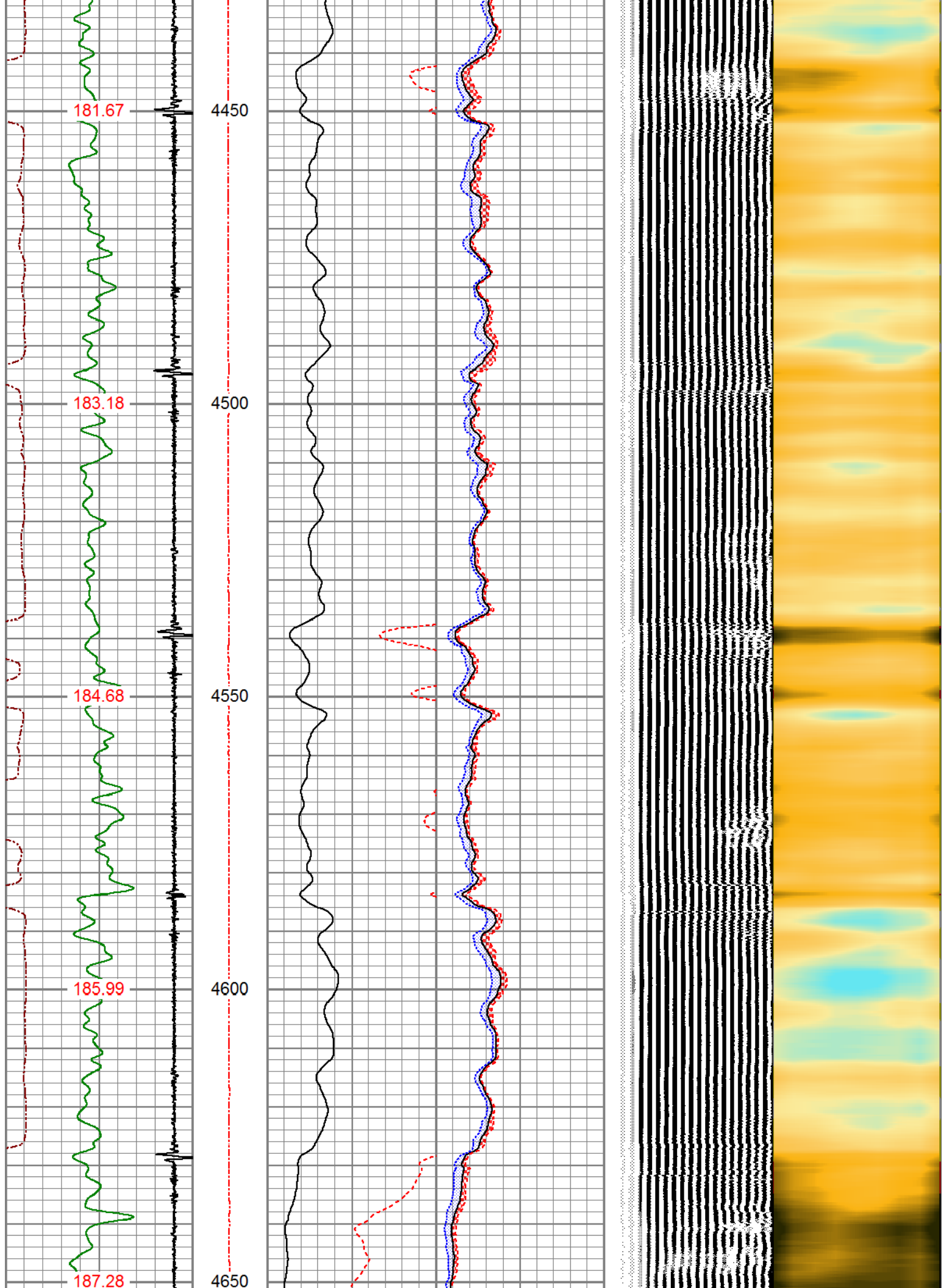


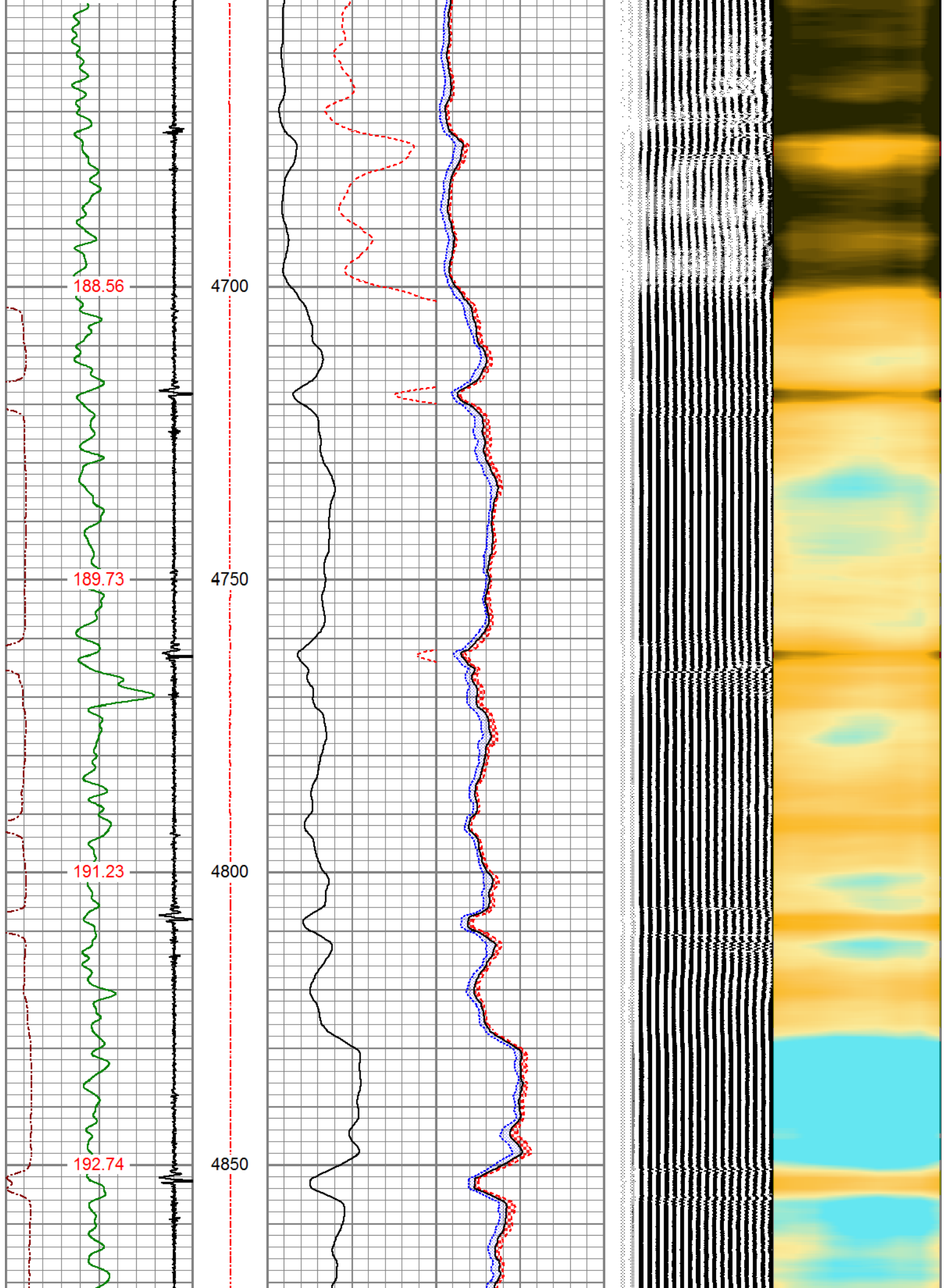


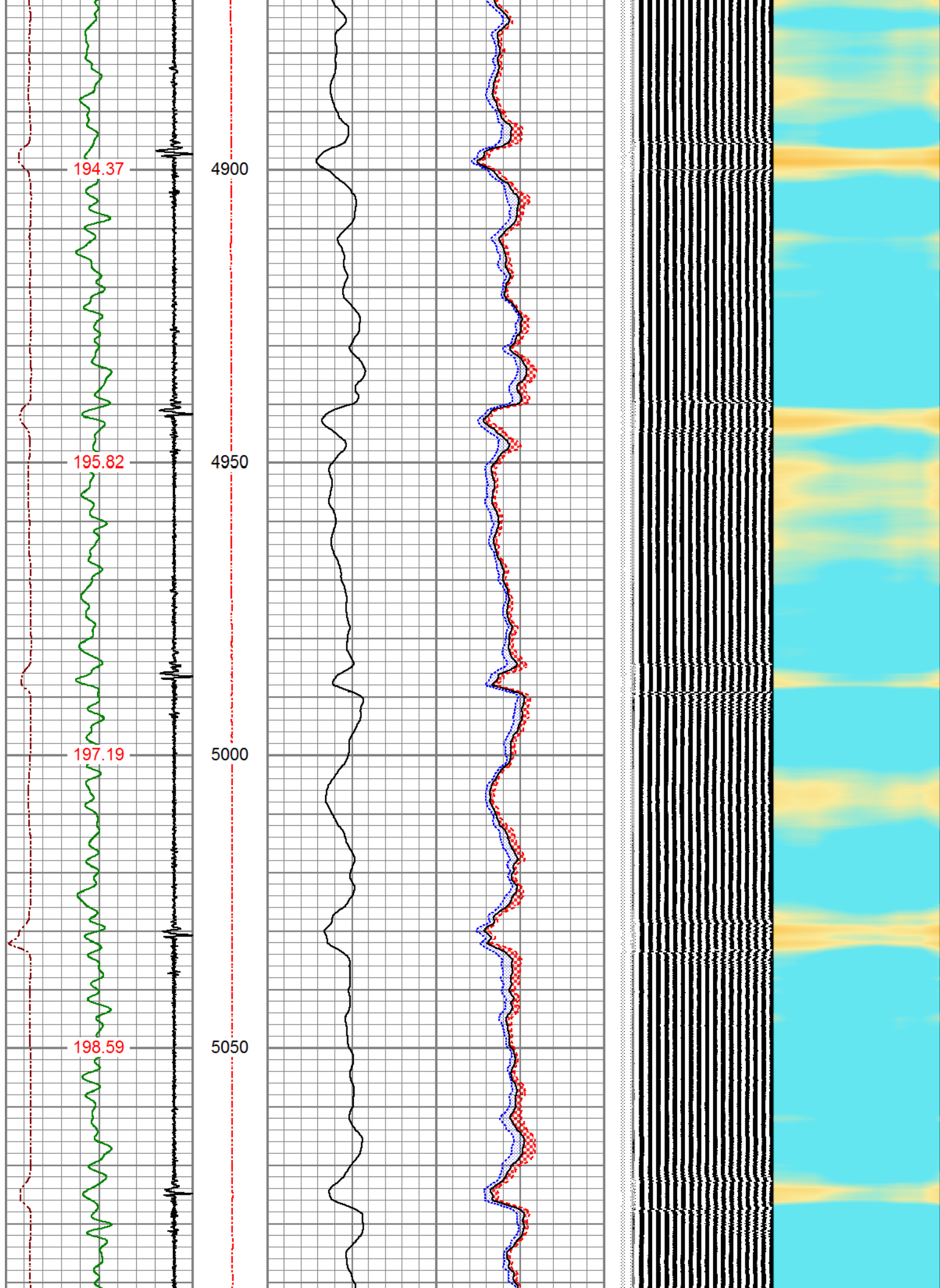


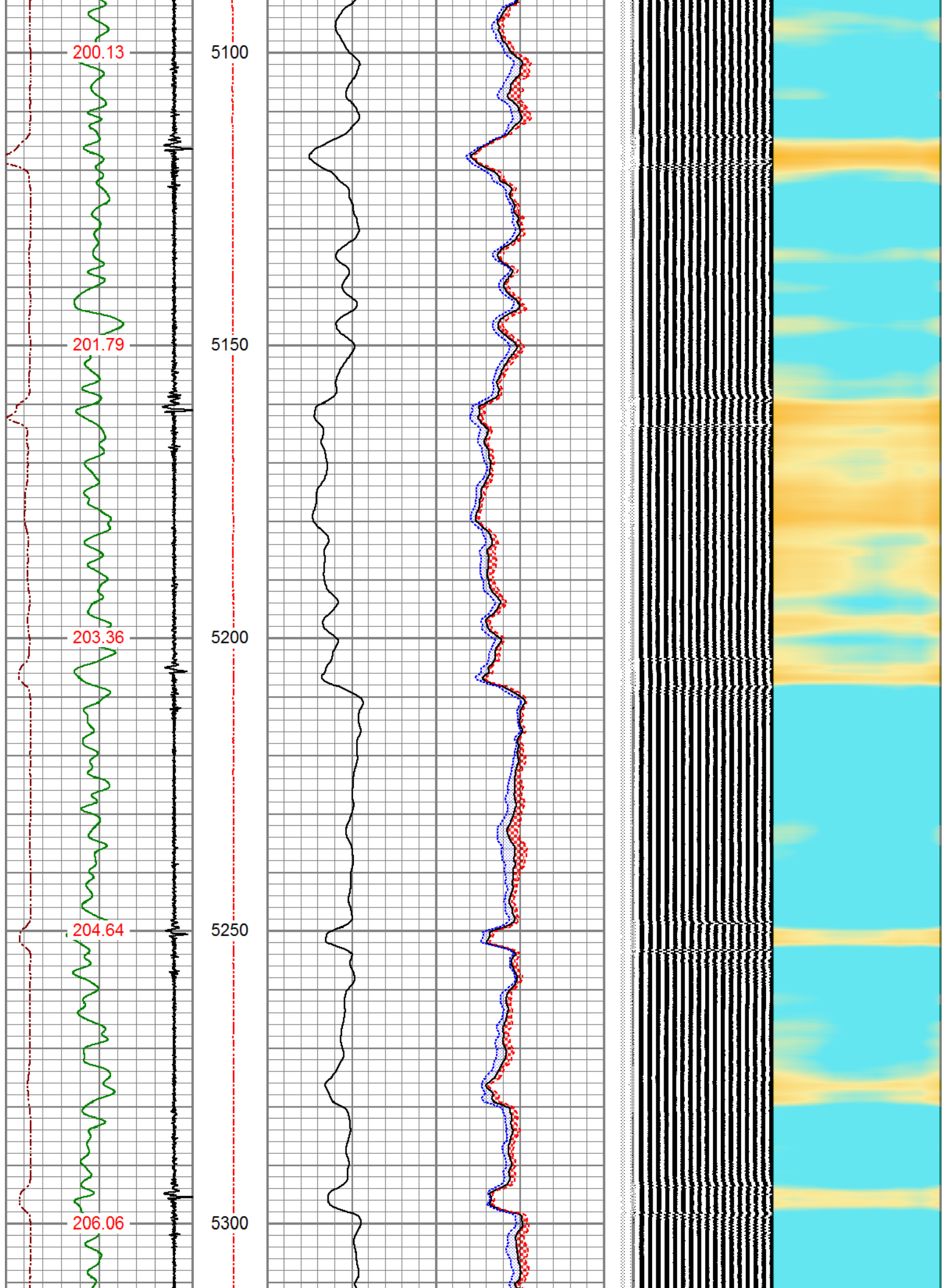


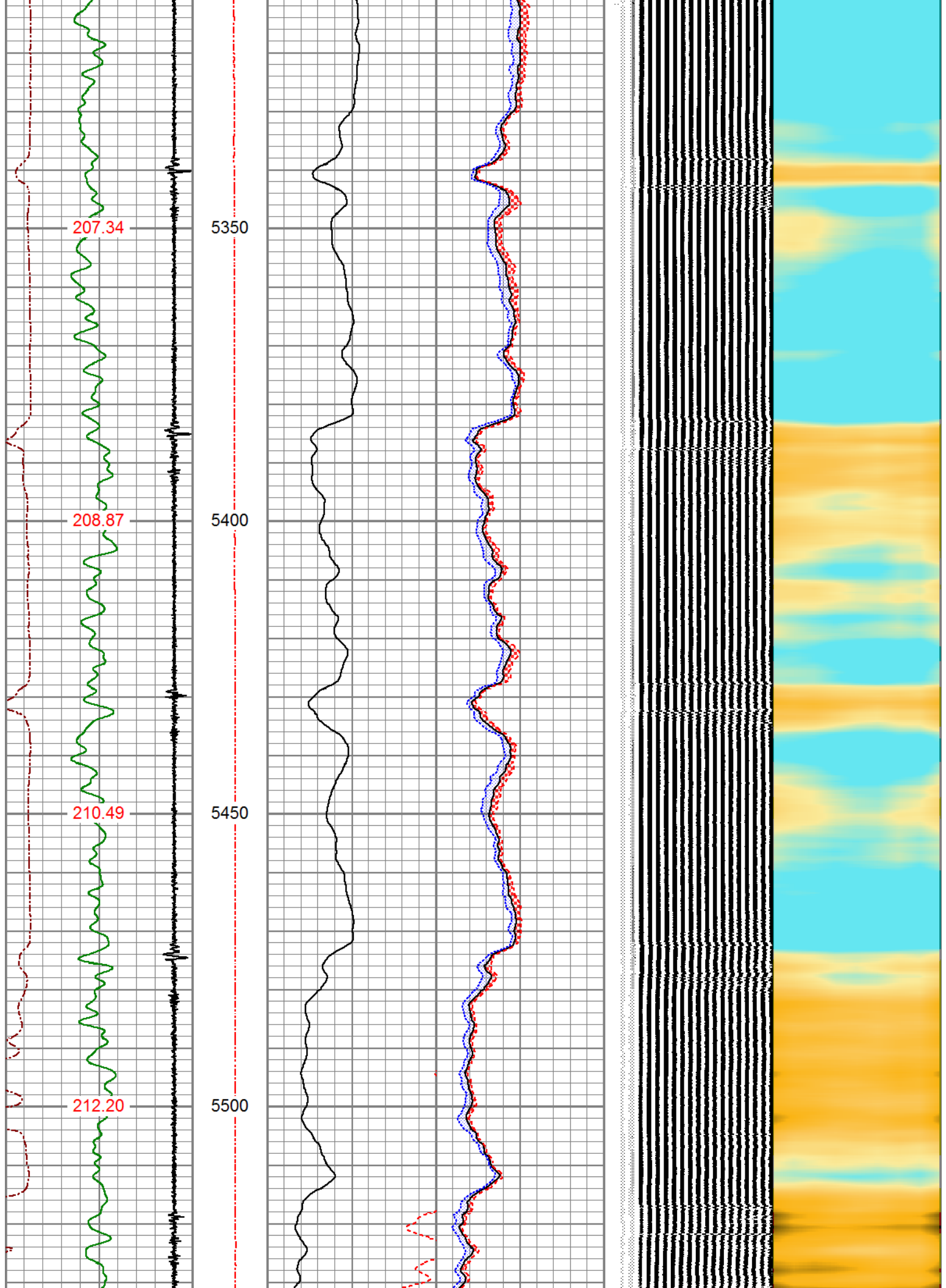


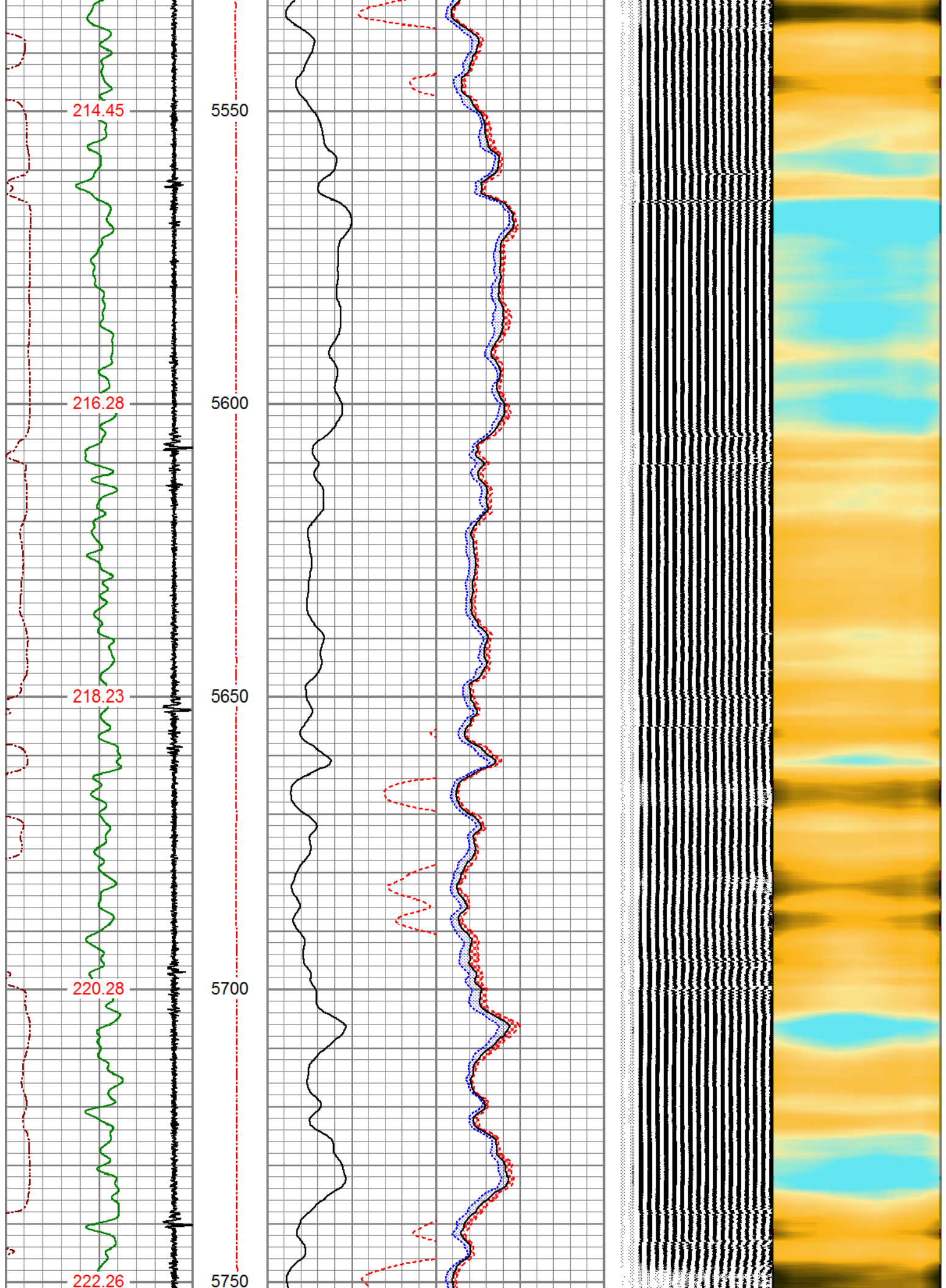


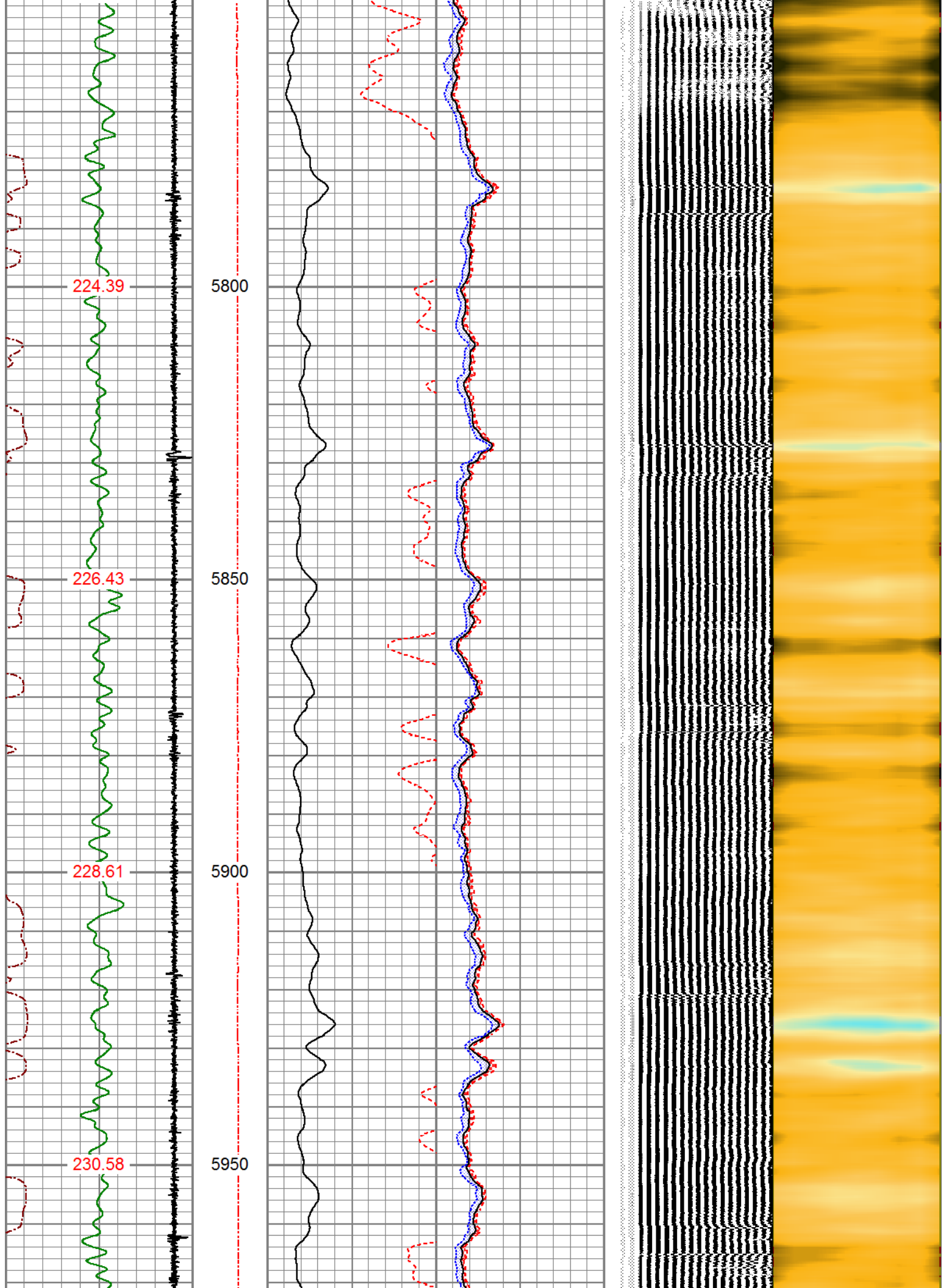


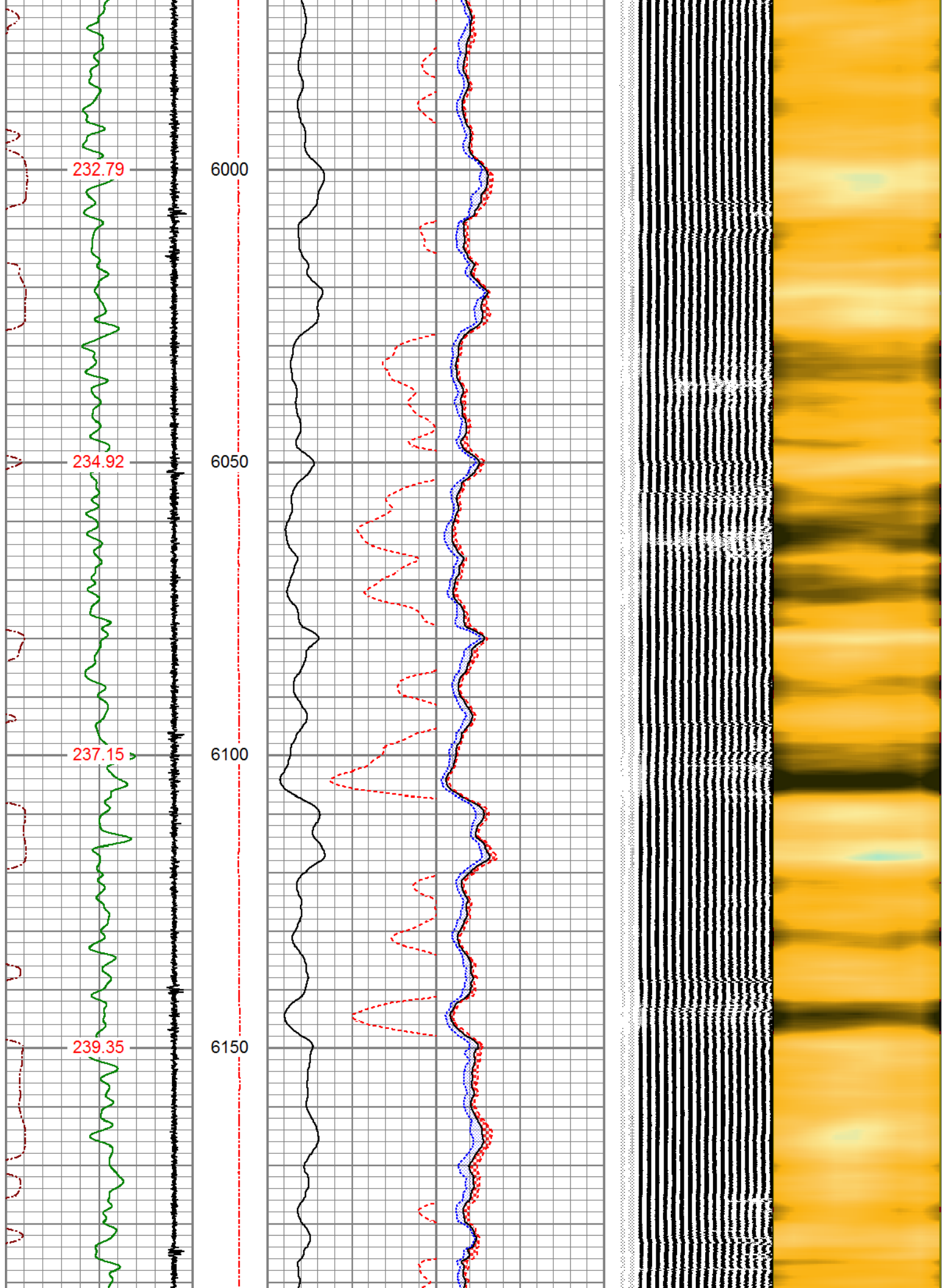


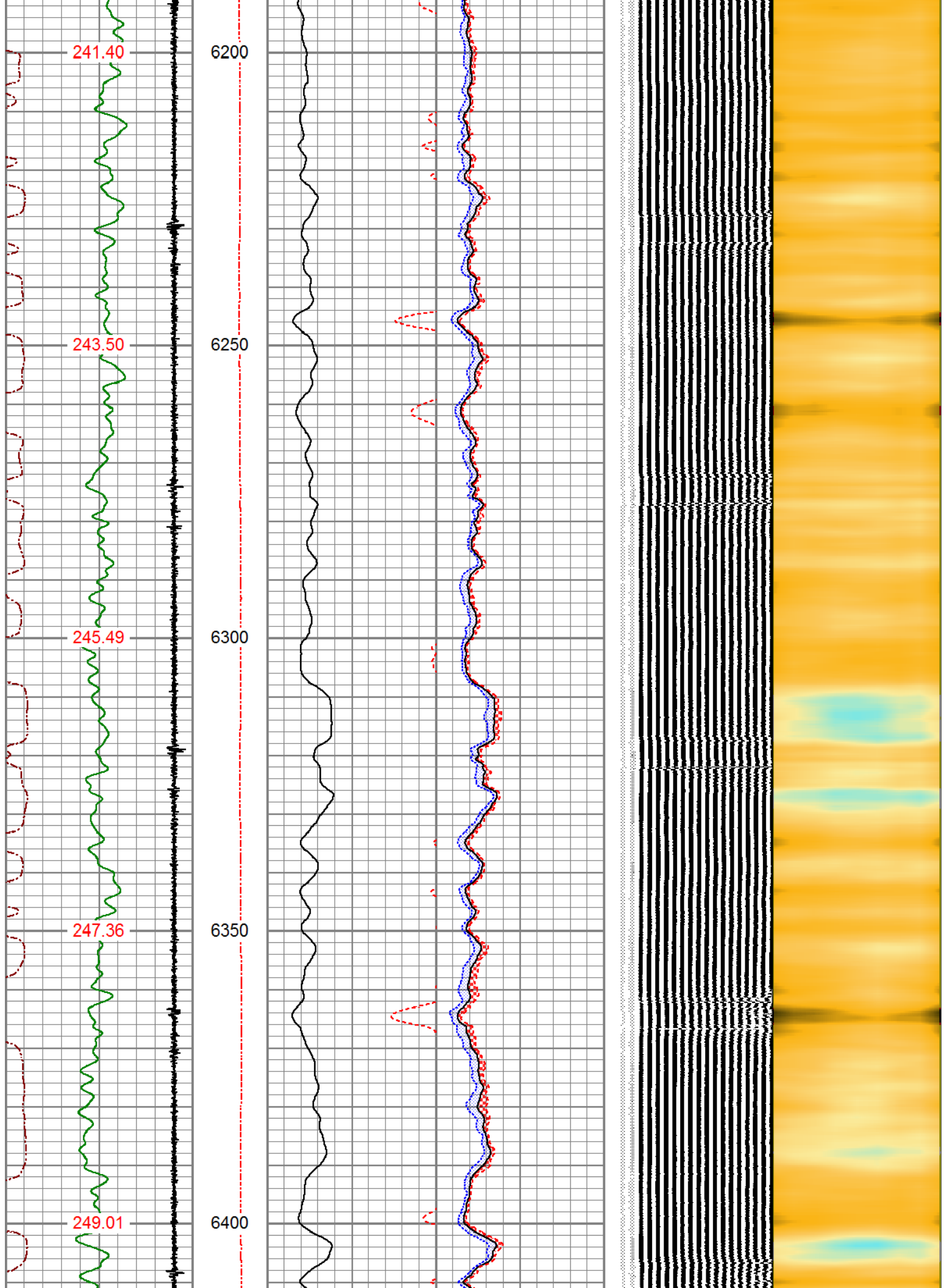


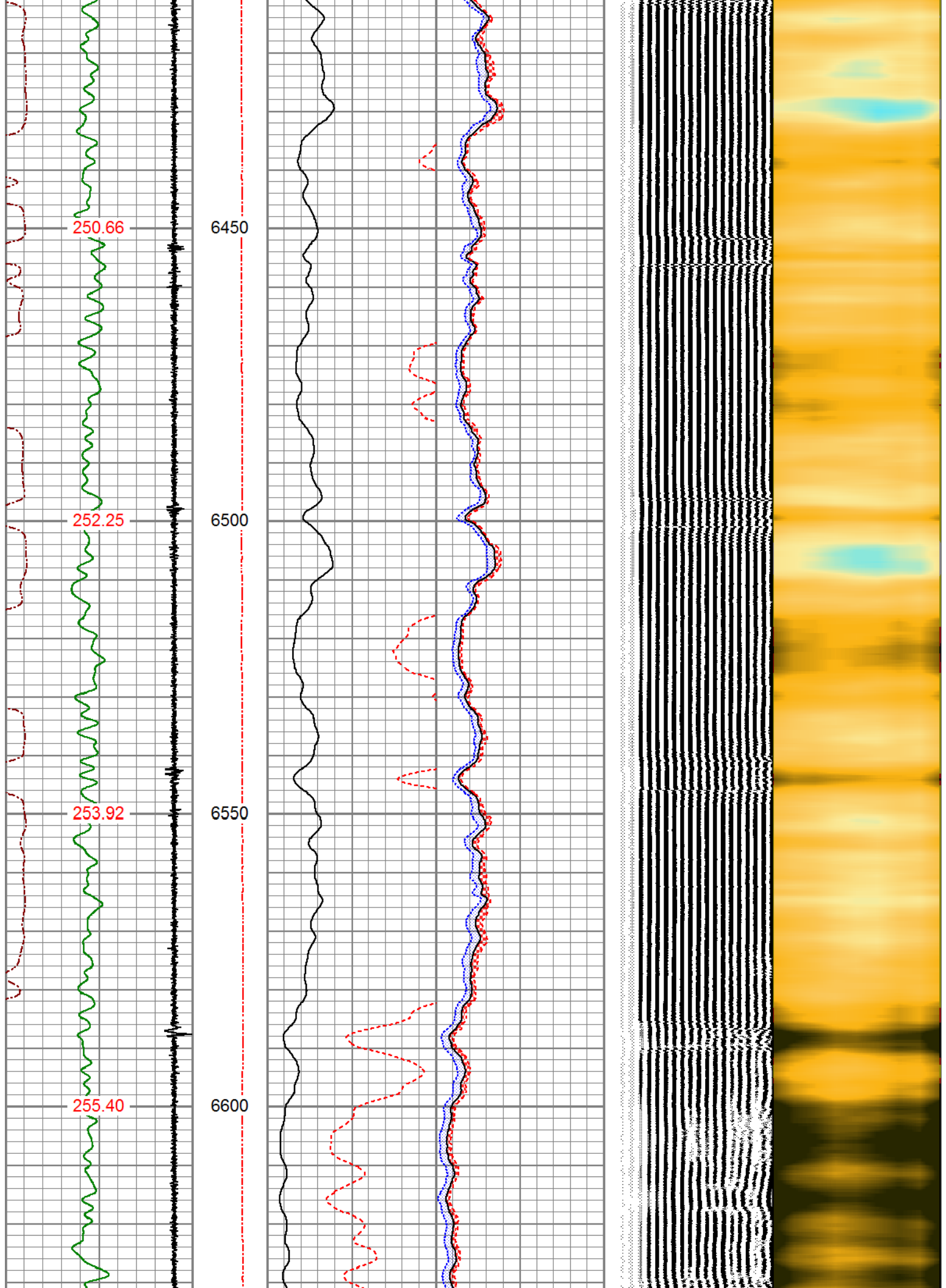


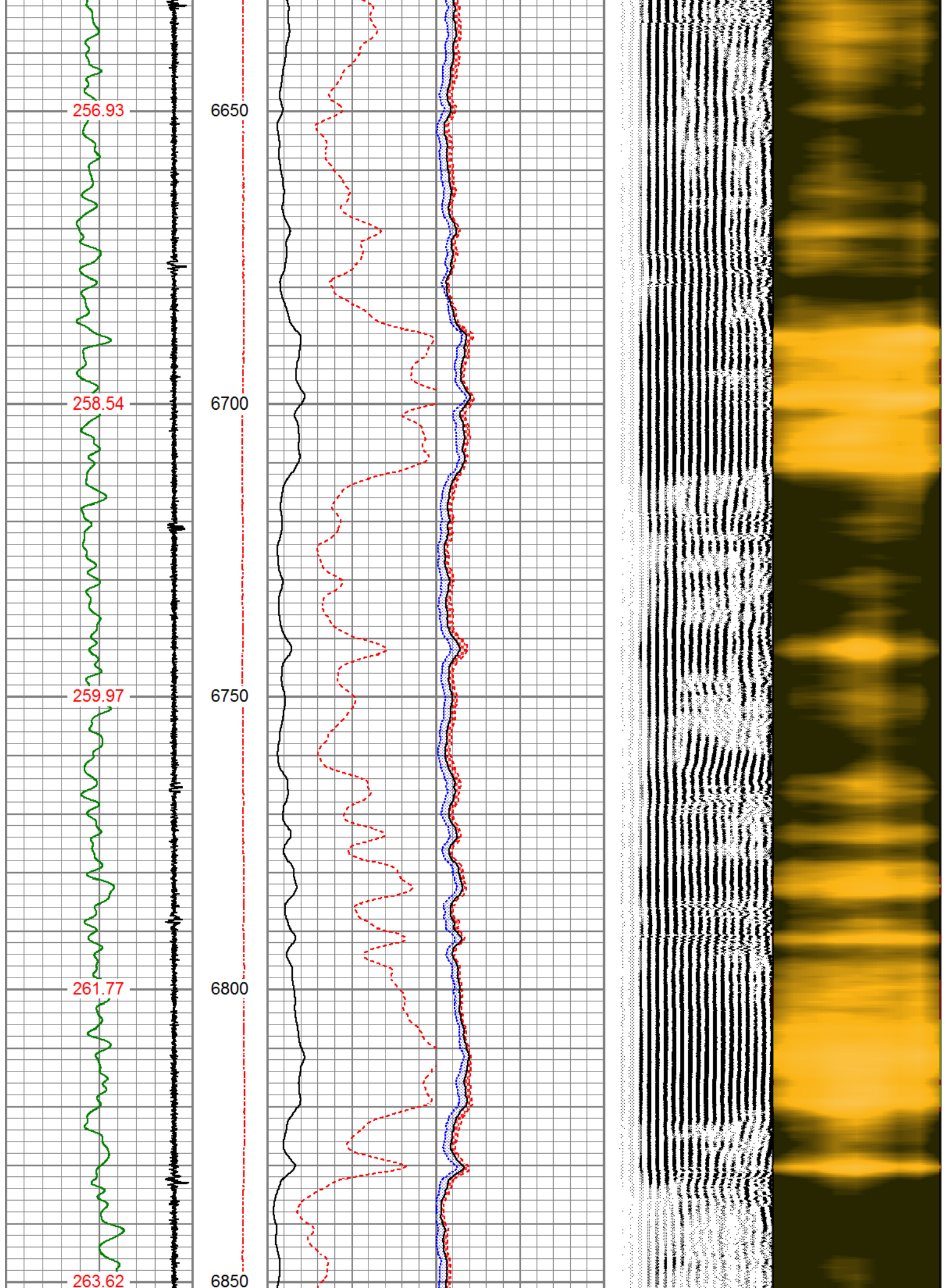


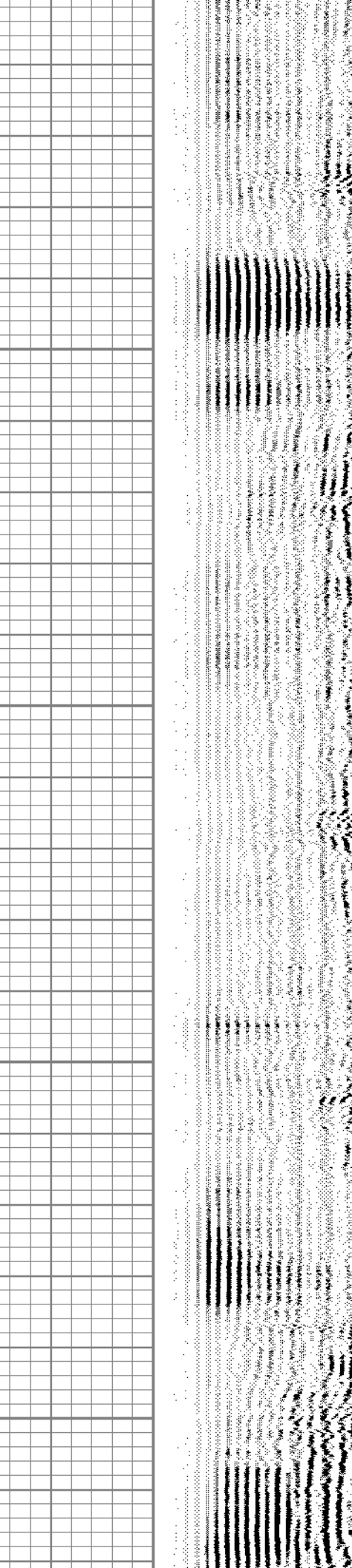
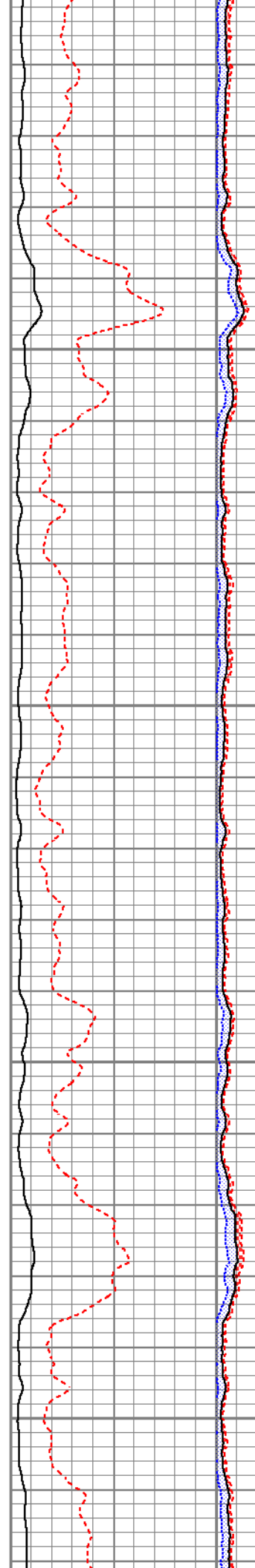
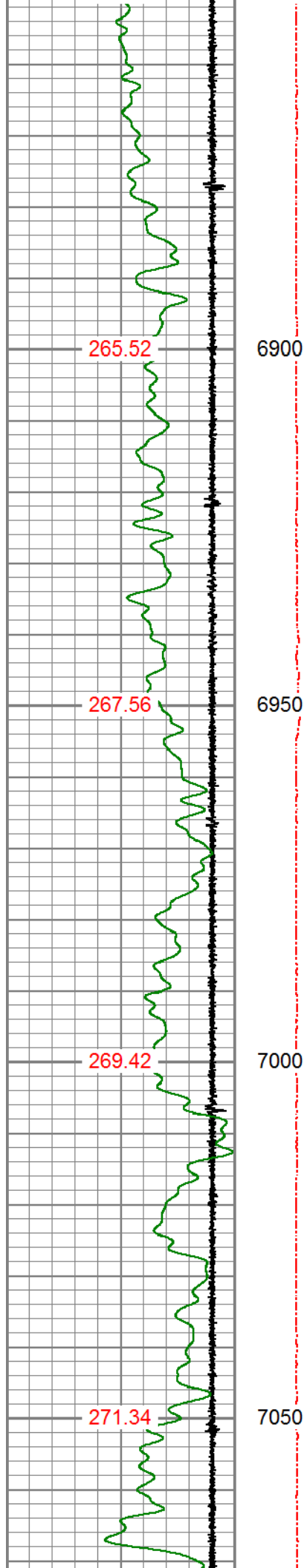


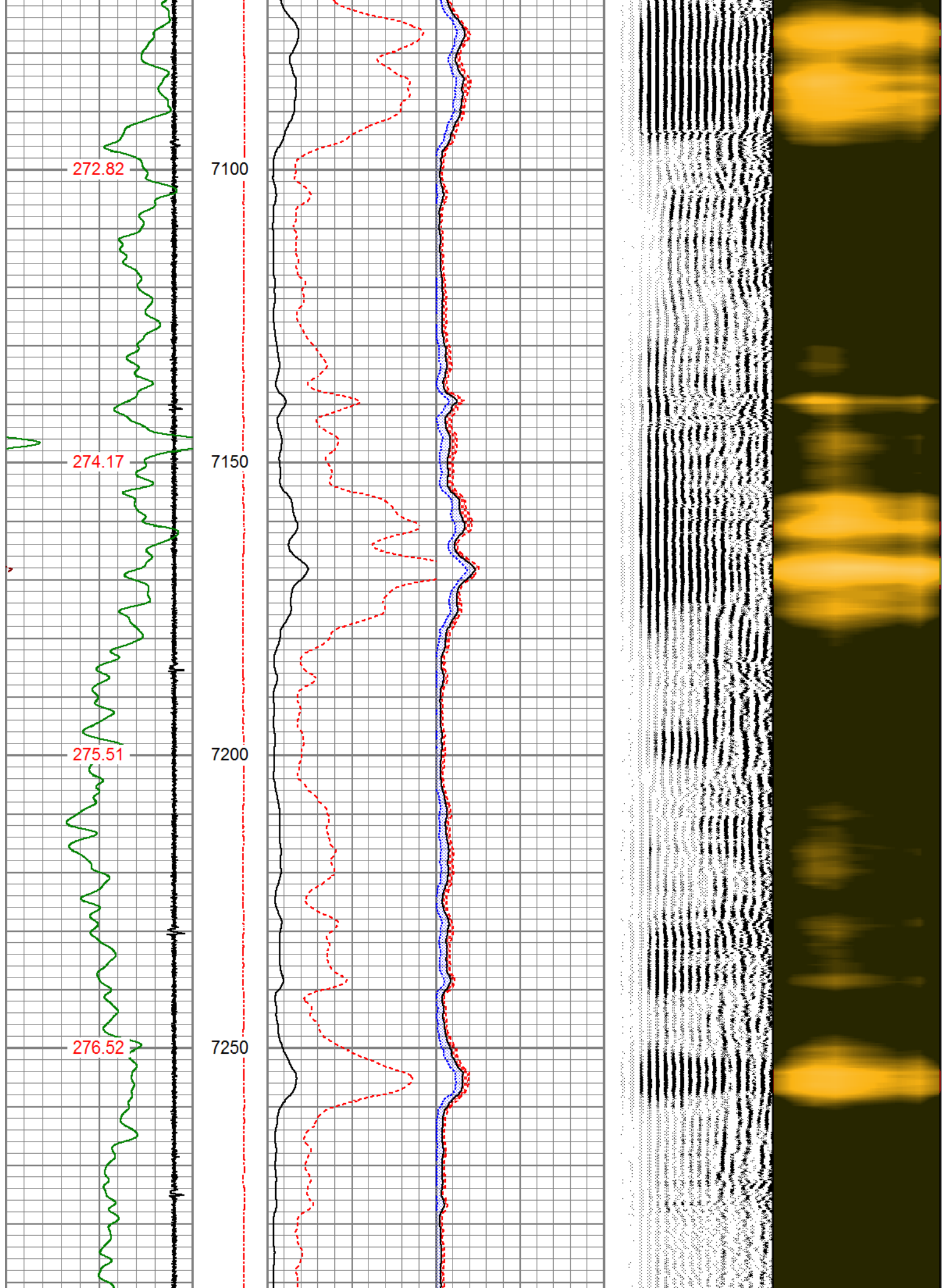


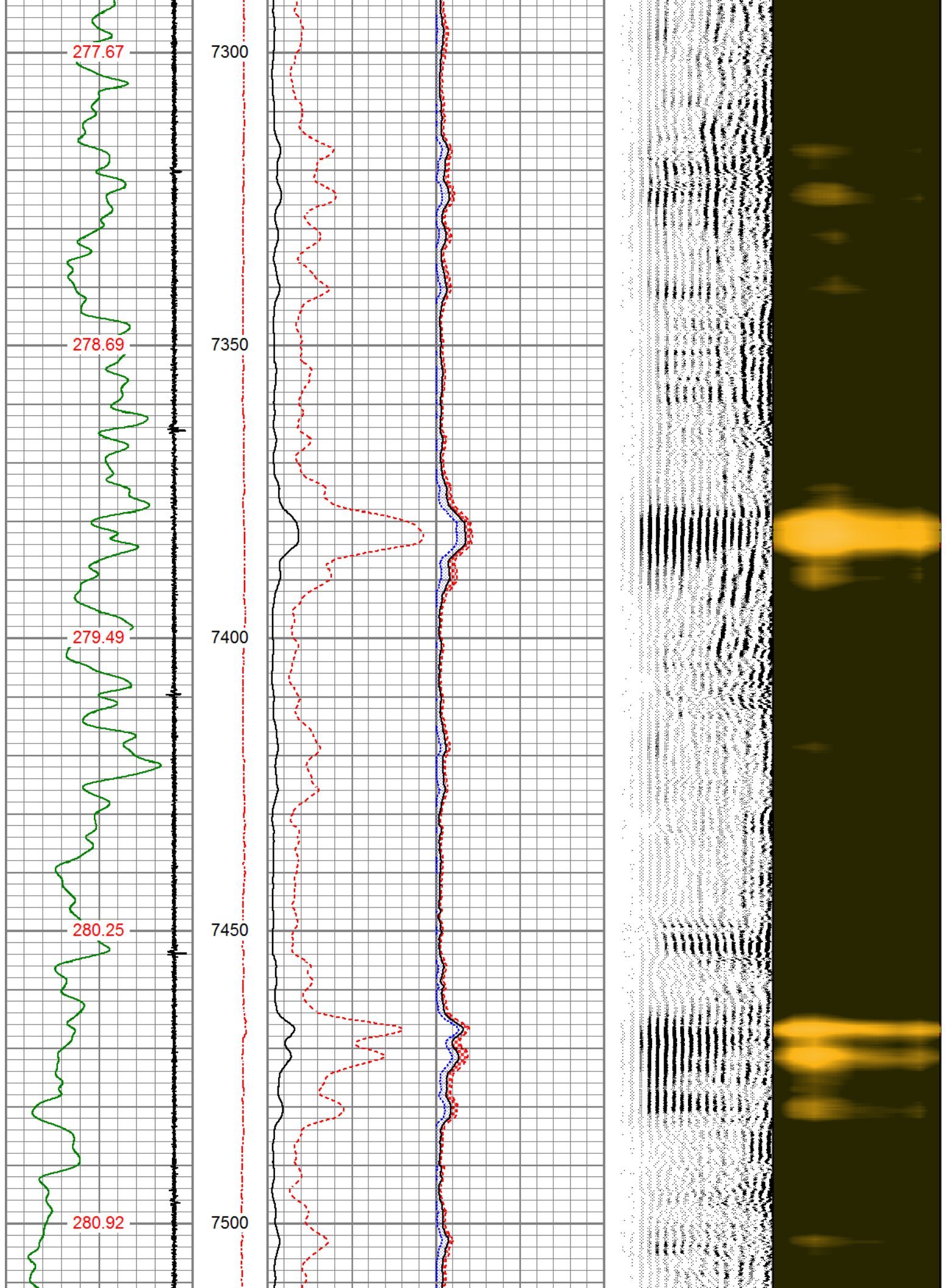


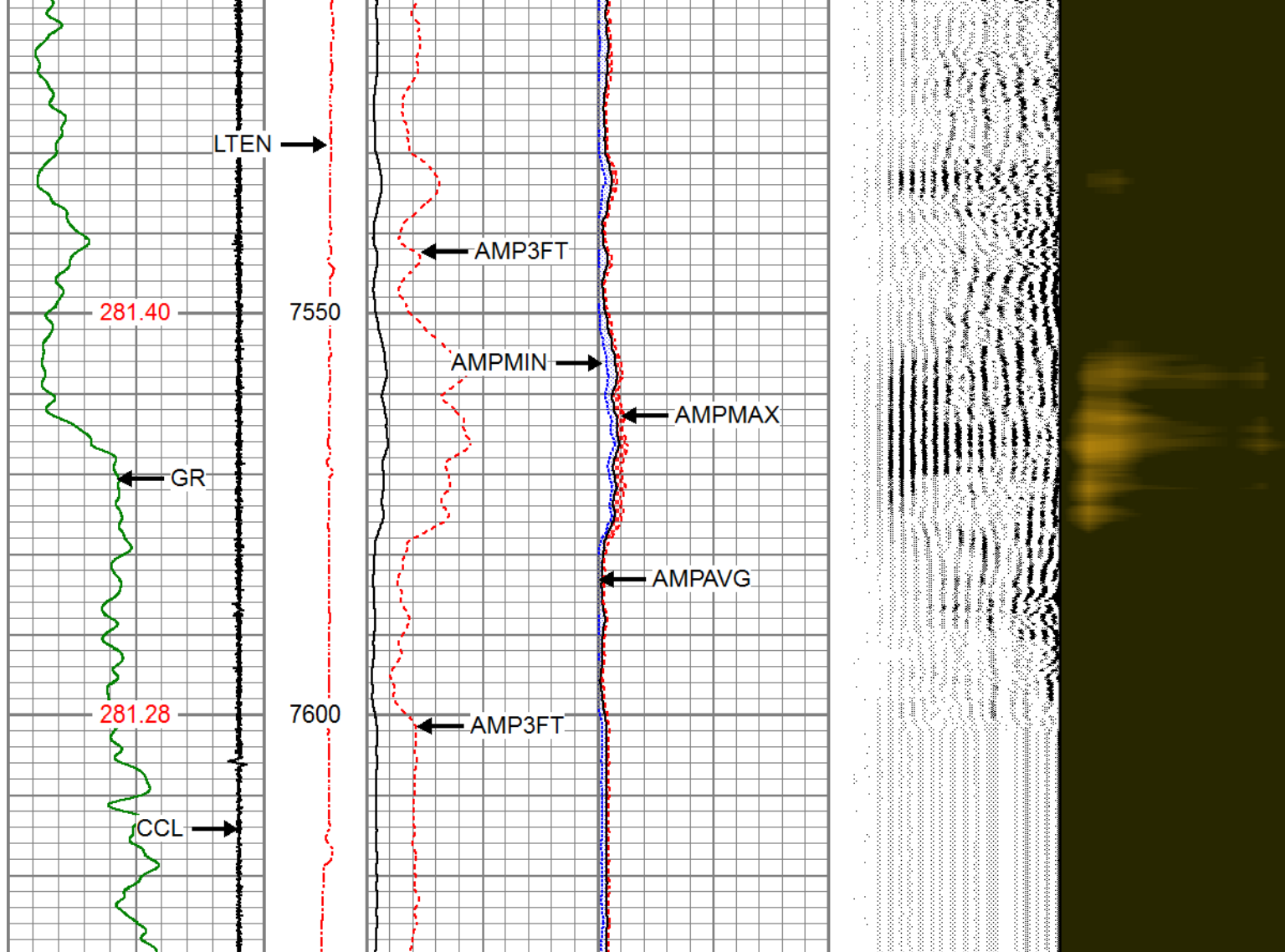














3Ft Travel Time 270 (usec) 170	Line Tension (lb) 0 2000	3' Amplitude (mV) 0 100	Sector Amplitude Average 0 150	VDL (usec) 200 1200	1 Sector Map 8
-9 Collar Locator 1		3' Amplified Amplitude X 5 (mV) 0 20	Sector Amplitude Maximum 0 150		
Gamma Ray (GAPI) 0 150			Sector Amplitude Minimum 0 150		
TEMP (degF)					





MAIN LOG

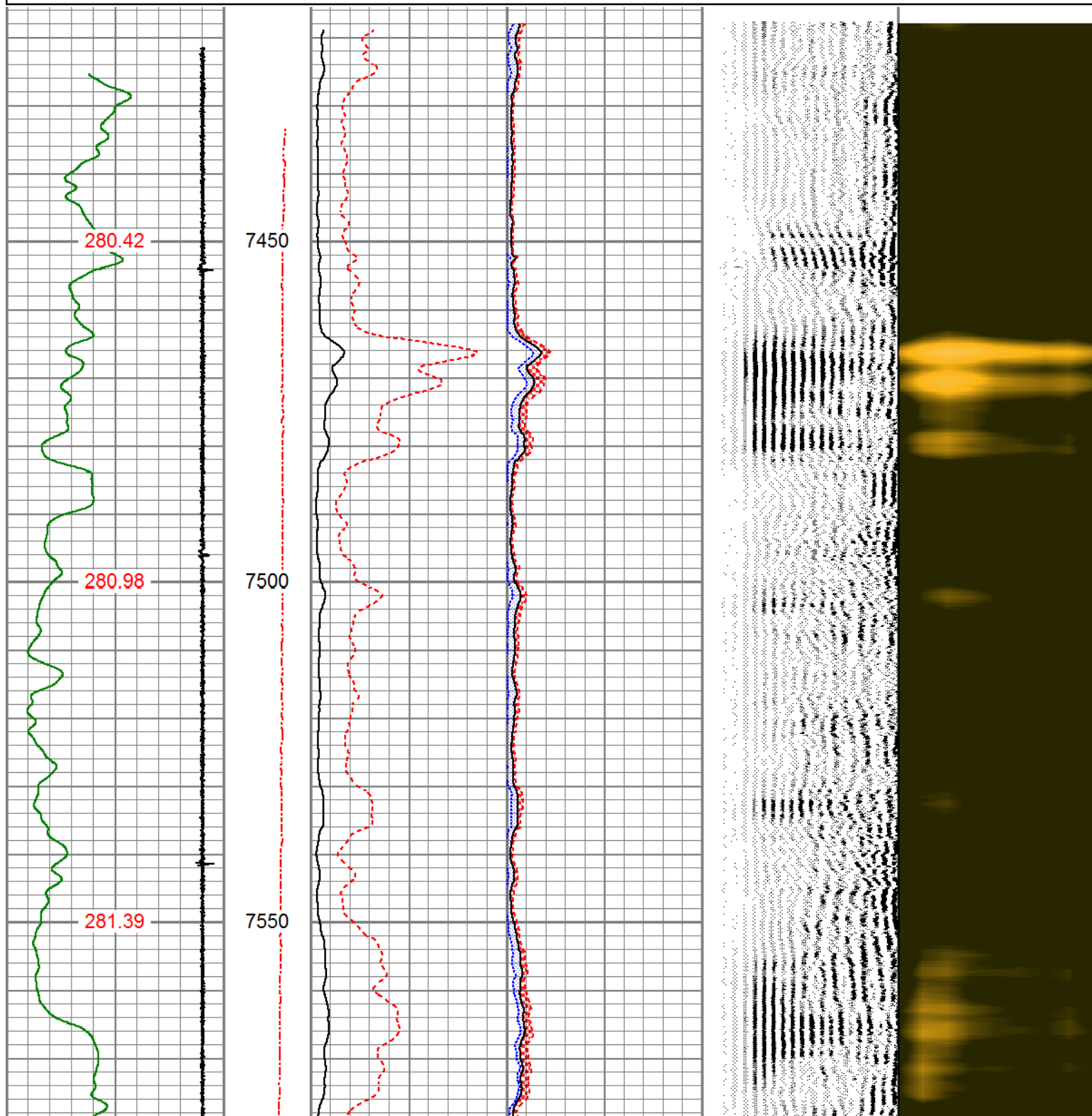
ZERO PSI APPLIED AT SURFACE

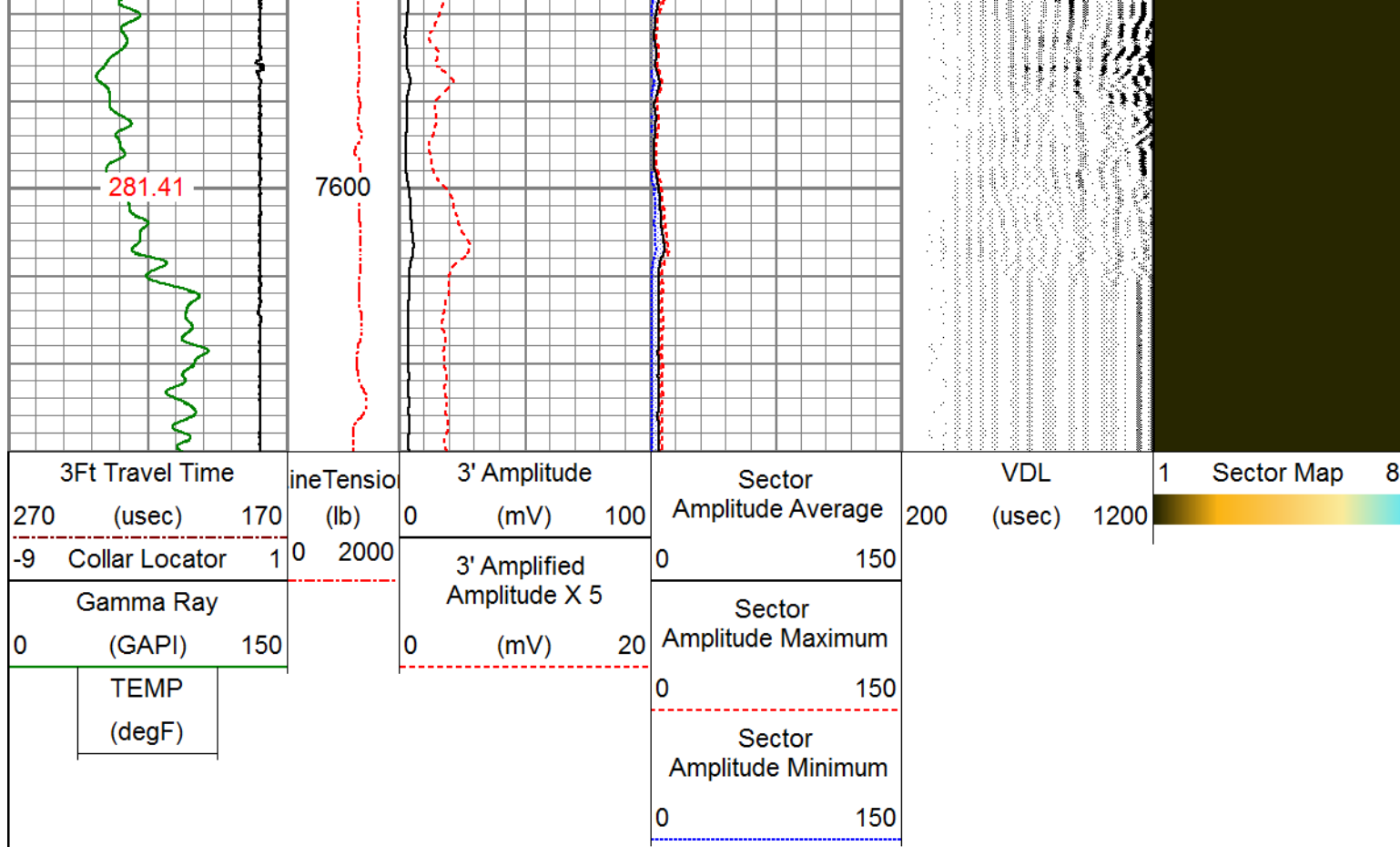


REPEAT SECTION

ZERO PSI APPLIED AT SURFACE

3Ft Travel Time			ineTensio (lb)	3' Amplitude		Sector		VDL			1	Sector Map	8		
270	(usec)	170		0	(mV)	100	Amplitude Average		200	(usec)				1200	
-9	Collar Locator	1		3' Amplified Amplitude X 5		0	150								
Gamma Ray				0		20		Sector Amplitude Maximum							
0	(GAPI)	150													
TEMP						0	150								
(degF)								Sector Amplitude Minimum							
						0	150								





Calibration Report				
Database File	pdc_thistle down31g-402_0512345746_20180131_scbl-cn1.db			
Dataset Pathname	pass6			
Dataset Creation	Thu Jan 31 08:39:19 2019			
Compensated Neutron Calibration Report				
Type / Serial:		PRB_DIG / 120509		
Source / Verifier:		/		
Temperature:				
SHOP CALIBRATION		Tue Nov 20 10:02:13 2012		
	Cal Tube	Units		
Tank Ratio		SS/LS		
Tank Porosity		pu		
LS Detector		cps		
SS Detector		cps		
Tool Ratio		SS/LS		
Tool Porosity		pu		
Tool Constant =				
Field Verifier	SS Detector	LS Detector	Ratio	Porosity
PRE-SURVEY VERIFICATION				
	SS Detector	LS Detector	Ratio	Porosity
POST-SURVEY VERIFICATION				
	SS Detector	LS Detector	Ratio	Porosity

Gamma Ray Calibration Report

Serial Number:	111212	
Tool Model:	275_6-PIN	
Performed:	Mon Oct 01 12:13:05 2018	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	0.6900	GAPI/cps

Segmented Cement Bond Log Calibration Report

Serial Number:	FW1411-67-T	
Tool Model:	RBL-DCT	
Calibration Casing Diameter:	5.500	in
Calibration Depth:	0.000	ft

Master Calibration, performed Wed Jan 02 13:04:30 2019:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.002	1.194	0.700	71.921	59.742	0.597
CAL	0.011	1.509				
5'	0.133	1.145	0.700	71.921	70.399	-8.656
SUM						
S1	0.068	1.236	0.000	100.000	85.601	-5.830
S2	0.004	1.293	0.000	100.000	77.576	-0.327
S3	0.004	1.247	0.000	100.000	80.502	-0.351
S4	0.001	1.227	0.000	100.000	81.611	-0.112
S5	0.004	1.232	0.000	100.000	81.393	-0.314
S6	0.001	1.206	0.000	100.000	83.012	-0.098
S7	0.000	1.209	0.000	100.000	82.718	-0.039
S8	0.000	1.195	0.000	100.000	83.716	-0.036

Air Zero Calibration, performed Thu Nov 29 15:51:21 2018:

	Raw (v)	Calibrated (v)	Results
	Zero	Zero	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

Temperature Calibration Report

Serial Number:	FW1411-67-T
Tool Model:	RBL-DCT

Performed: (Not Performed)

	Reference	Reading
Low Reference:	0.00 degF	0.00 degF
High Reference:	1.00 degF	1.00 degF
Gain:	1.00	
Offset:	0.00	
Delta Spacing	1	



PIONEER

Pioneer Energy Services

Company	PDC ENERGY INC.
Well	THISTLE DOWN 31G-402
Field	WATTENBERG
County	WELD
State	COLORADO