

Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Company	Noble Energy Inc.
Well	Wells Ranch AF05-645	Well	Wells Ranch AF05-645
Field	Wattenberg	Field	Wattenberg
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-42140	Other Services	---
Permanent Datum	SEC 5 TWP 5N RGE 62W	Elevation	
Log Measured From	Ground Level		
Drilling Measured From	Kelly Bushing		
	Kelly Bushing		
	30 FT		
	4681'		
	K.B. 4711'		
	D.F. 4710'		
	G.L. 4681'		

Date	03-Mar-2016
Run Number	One
Depth Driller	16168 FT
Depth Logger	6712 FT
Bottom Logged Interval	6708 FT
Top Log Interval	Surface
Open Hole Size	8.50"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	219°F
Estimated Cement Top	Surface
Time Well Ready	ROA
Time Logger on Bottom	16:45
Equipment Number	HD-0361
Location	Fort Lupton, CO
Recorded By	Sam Hopper
Witnessed By	Bill Mansfield

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
Casing Record	Size (in)	Wgt (lbs/Ft)	Grade	Top	Bottom		
Surface Casing	9 5/8	36	J-55	30 FT	1872.2 FT		
Intermediate #1	5 1/2	20	P110-XP	30 FT	16161.3 FT		
Intermediate #2							
Liner							

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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.

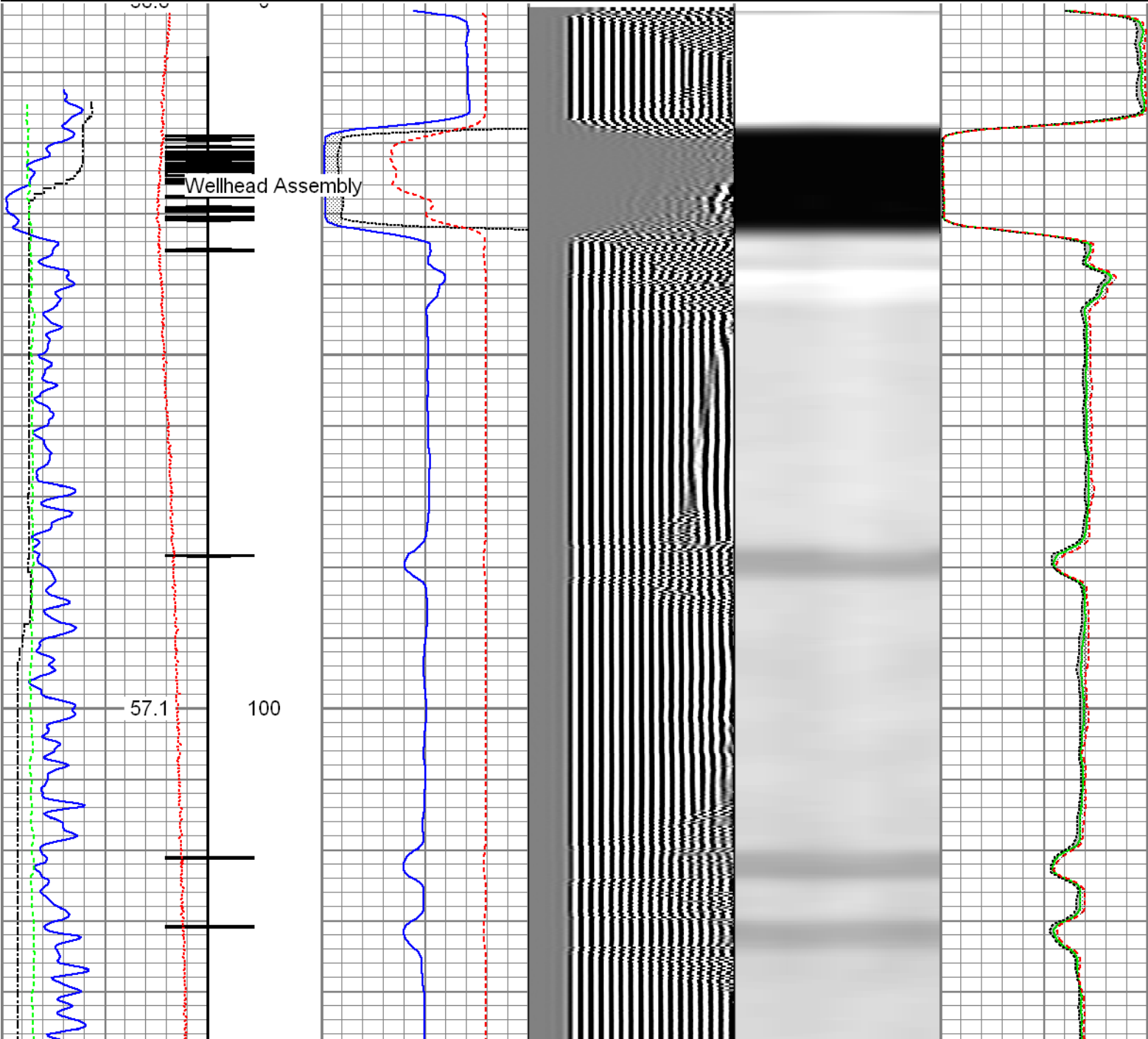
Comments

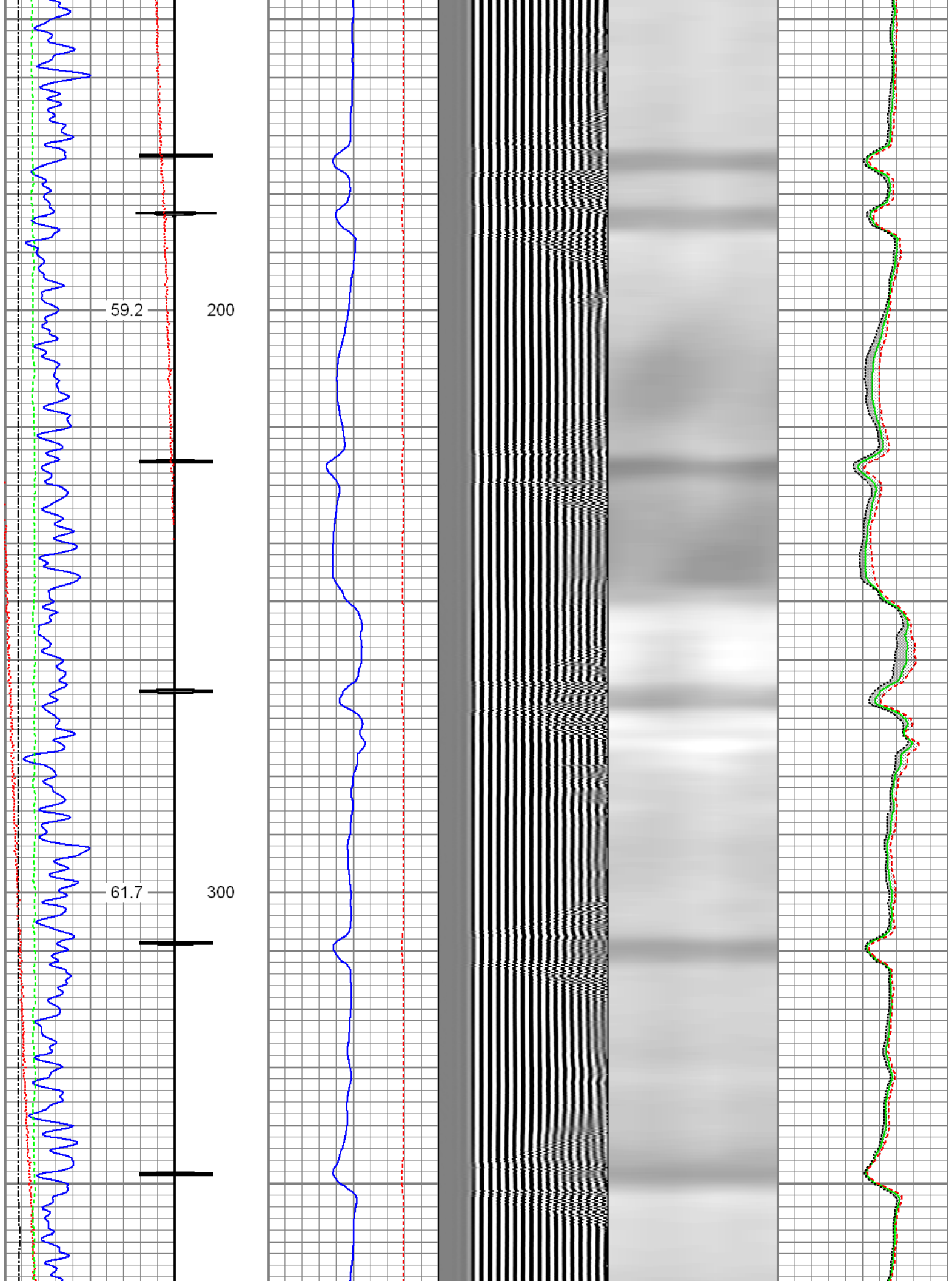
Log ran as per customer request
 Depth referenced to Kelly Bushing at 30 FT
 Recorded Marker Joint at 5680-5690 FT
 Log ran from as deep as possible in heel to surface
 Recorded with 2500 PSI surface induced pressure
 Logging tools were clean and free of any debris upon completions of operations

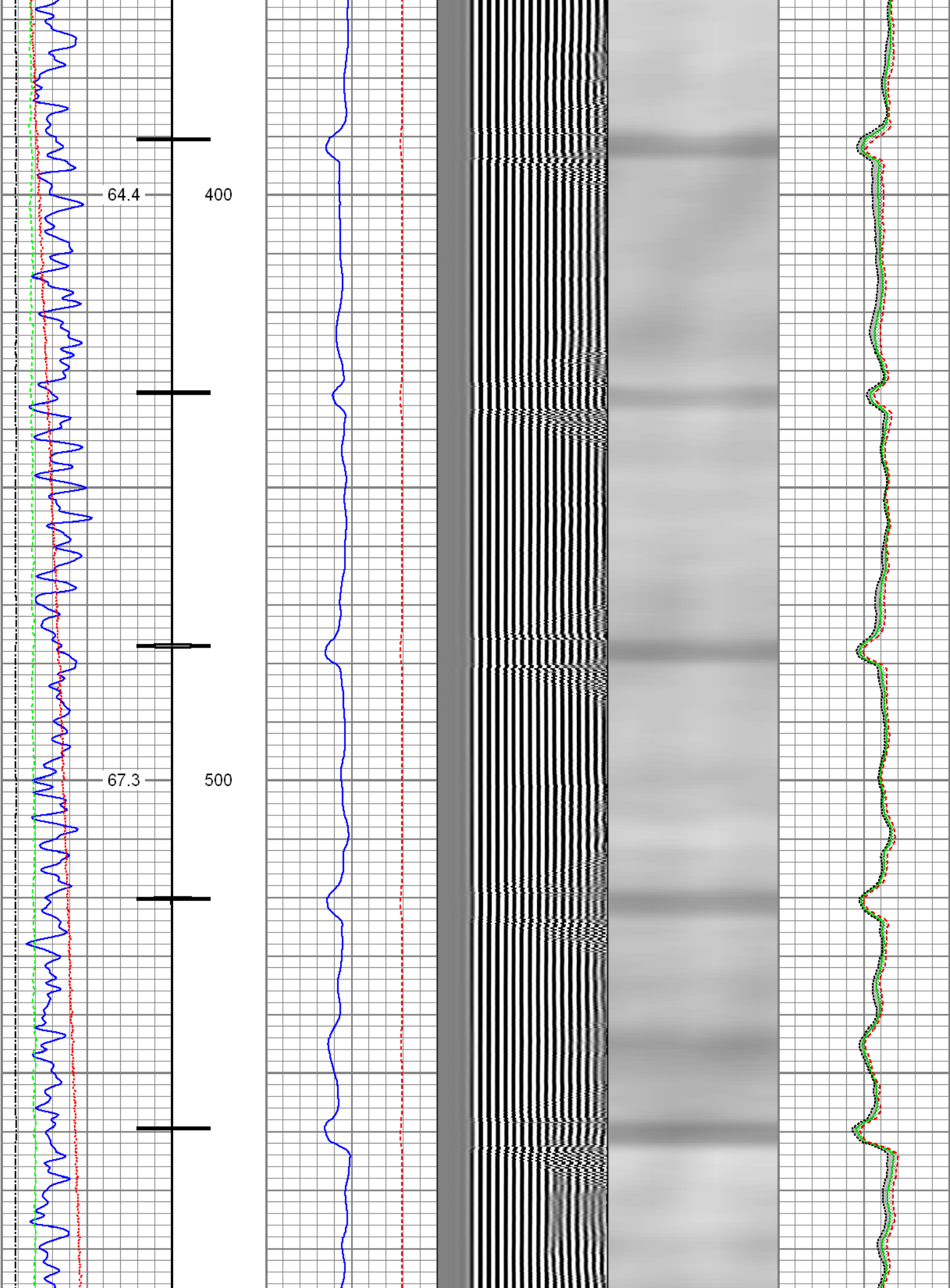
Thank you for choosing FMC Technologies Surface Integrated Services.

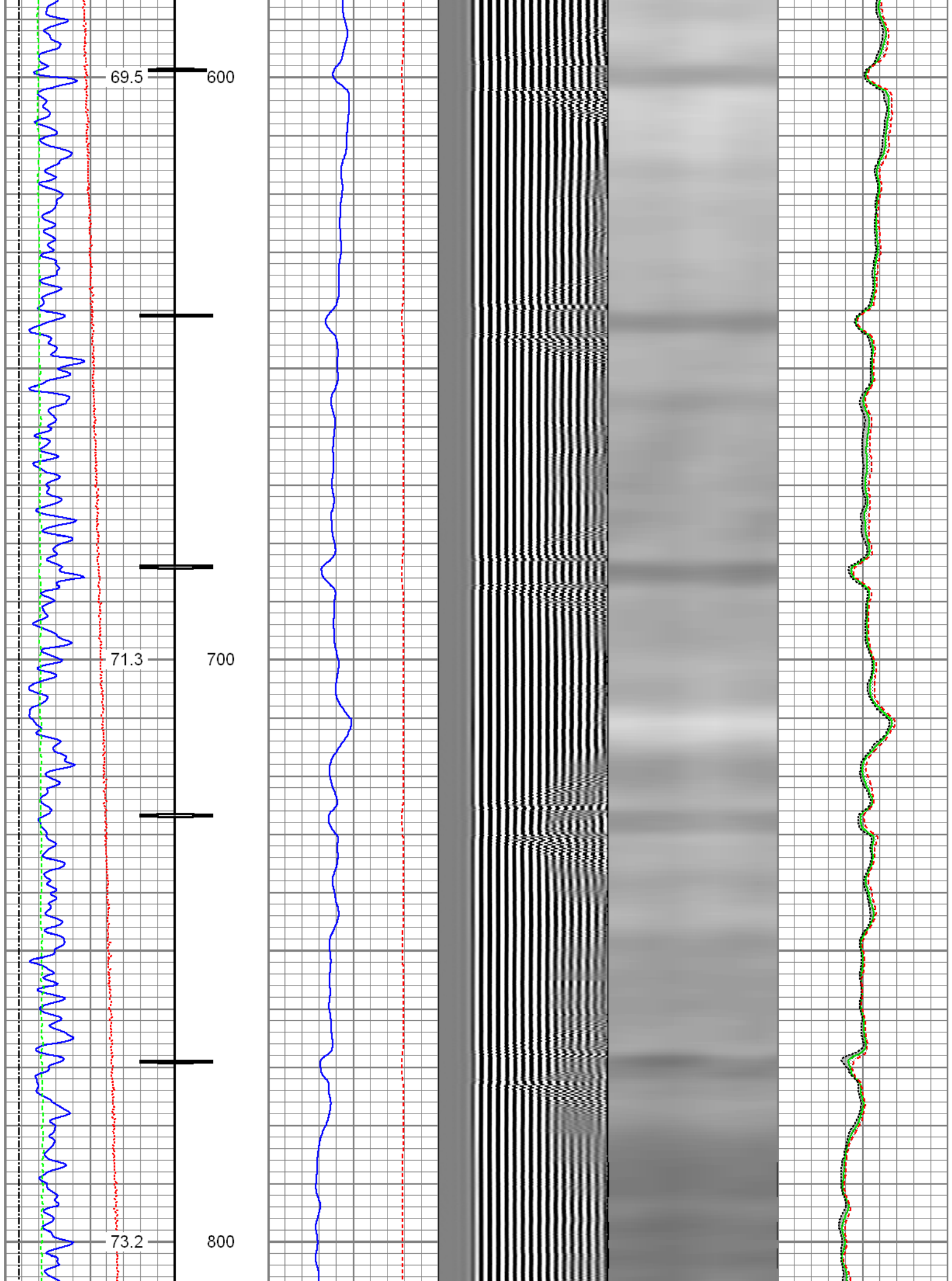
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Dataset Pathname: pass5.1
Presentation Format: radii
Dataset Creation: Sat Mar 05 10:40:06 2016 by Calc 7.0 B1
Charted by: Depth in Feet scaled 1:240

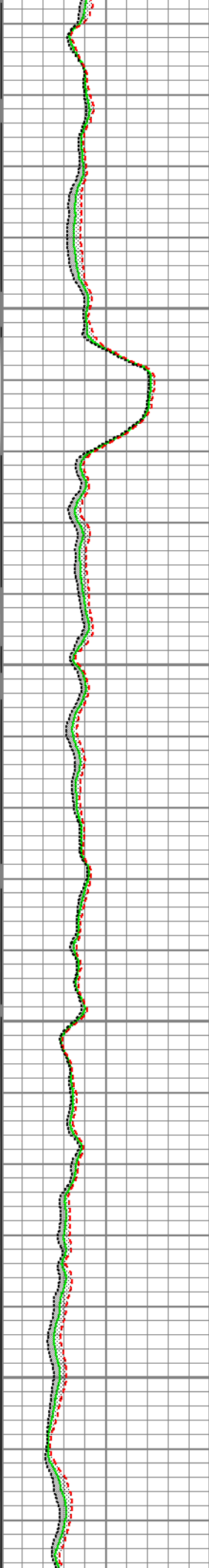
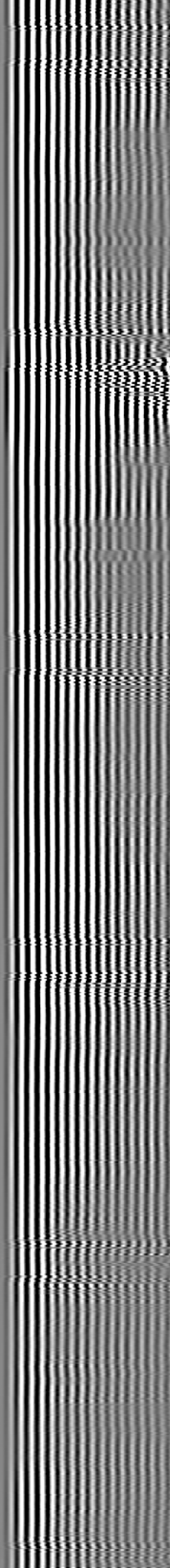
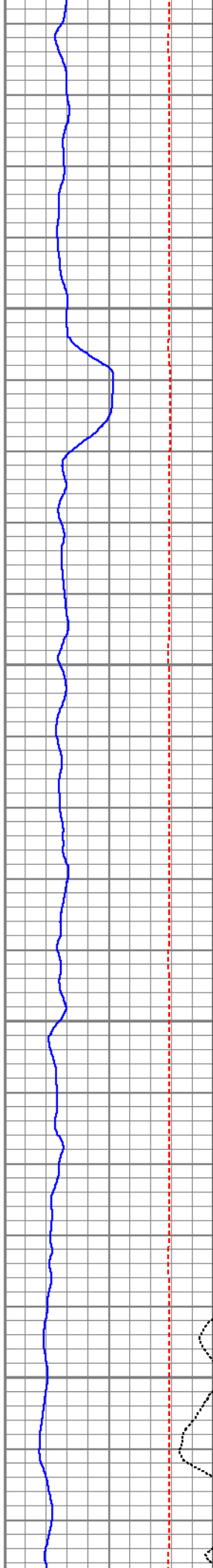
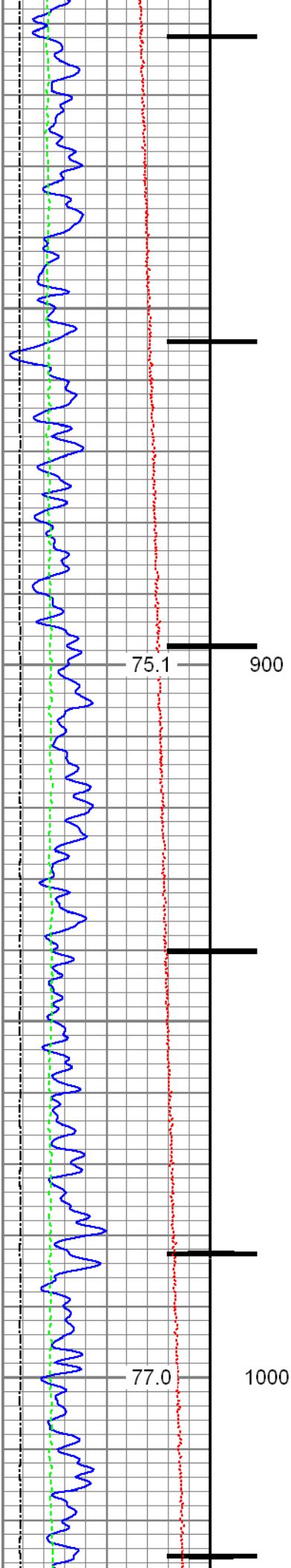
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Temperature	0 (mV) 20			0 100
0 (degF) 20	3' Travel Time			Maximum Amplitude
Line Speed	650 (usec) 150			0 100
-150 (ft/min) 150				
Line Tension				
0 (lb) 2000				

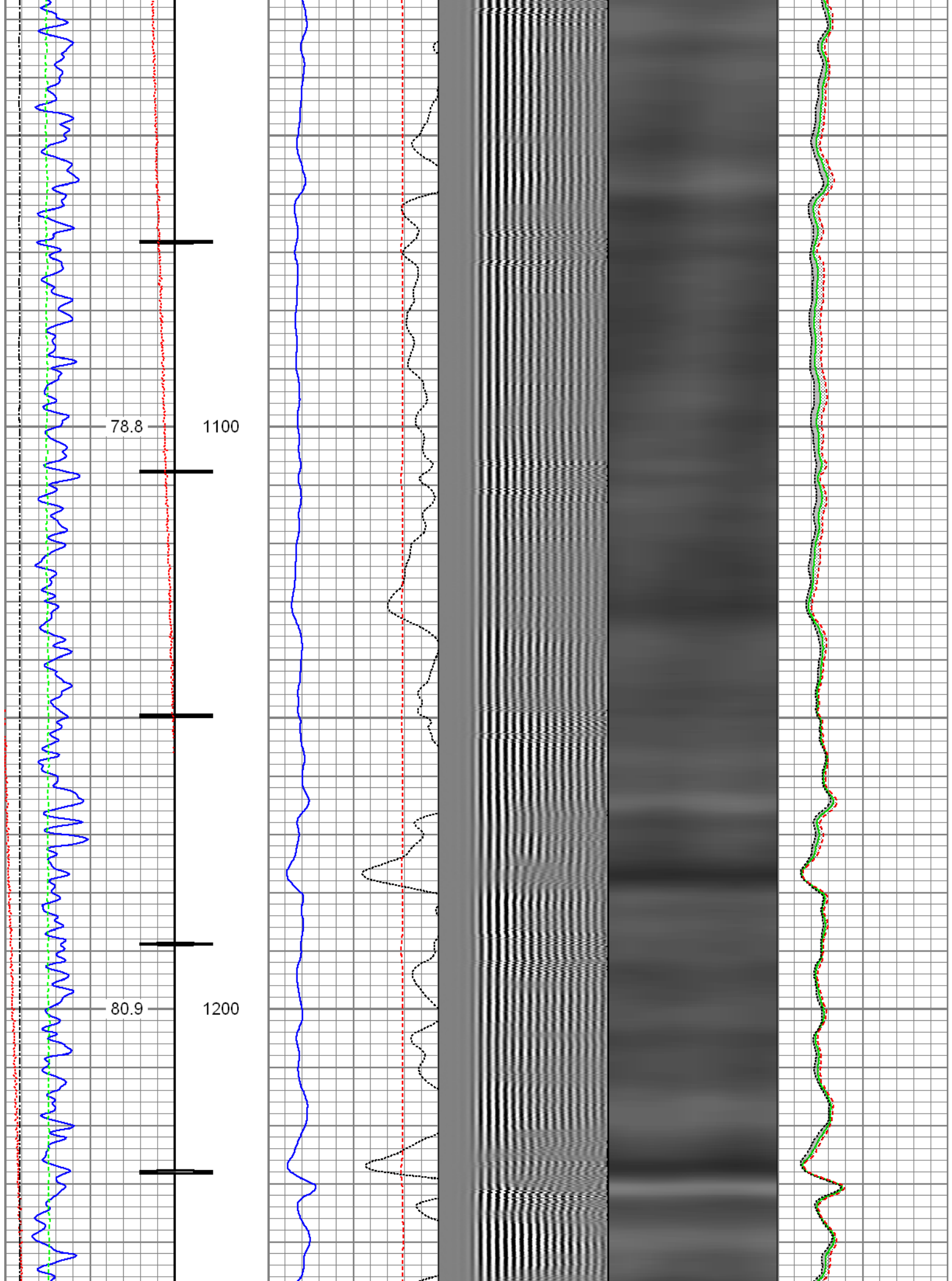


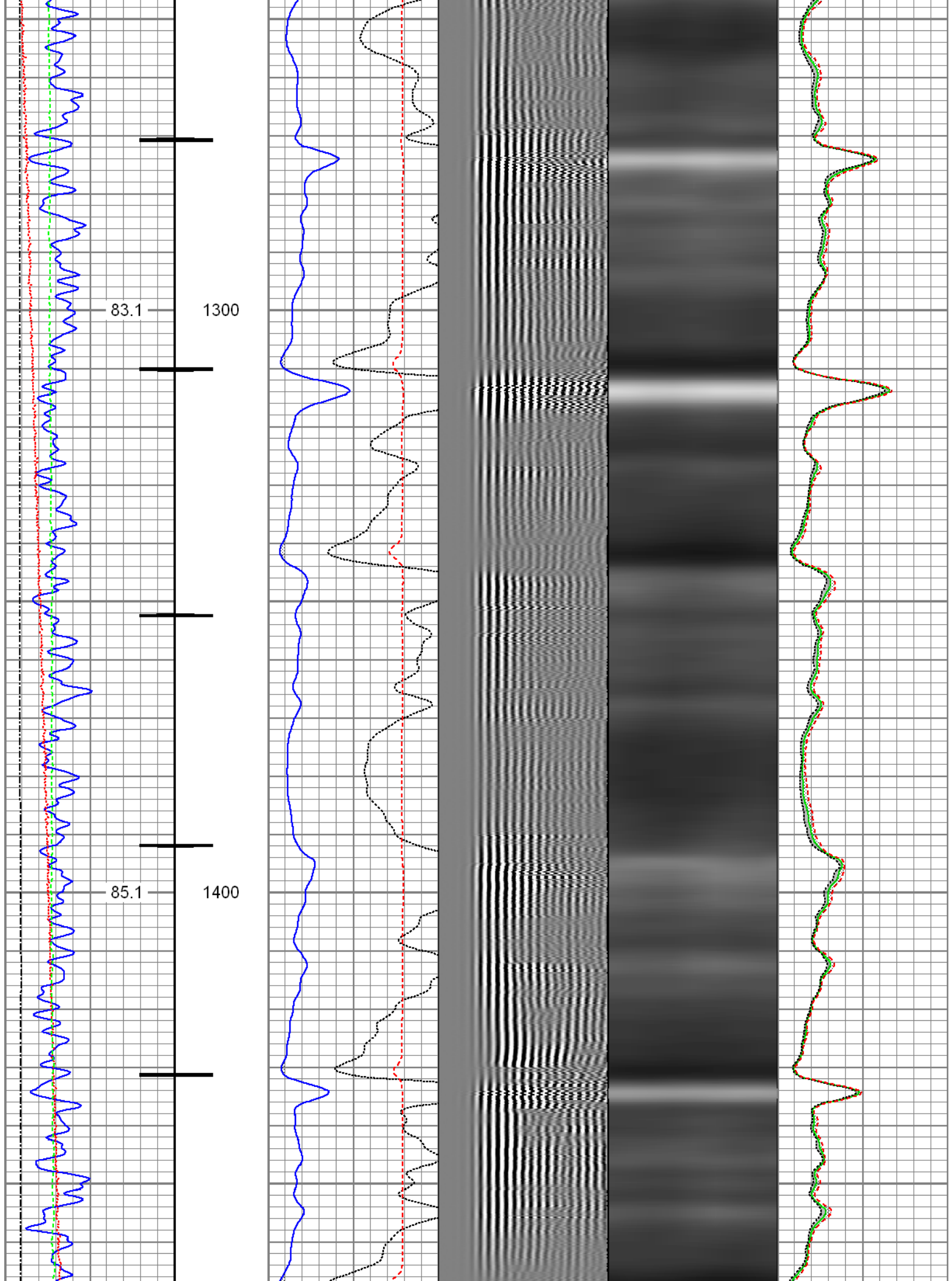


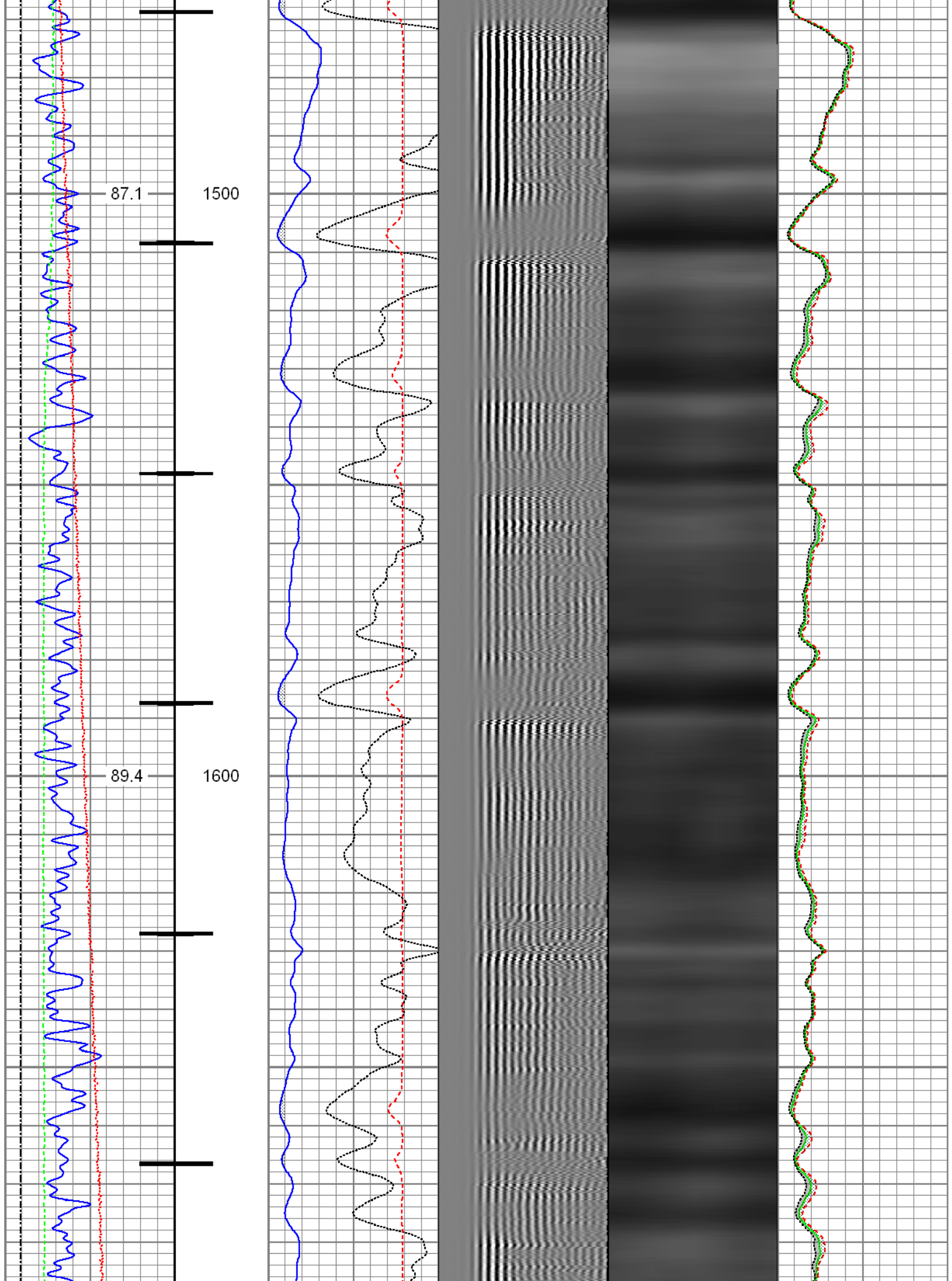


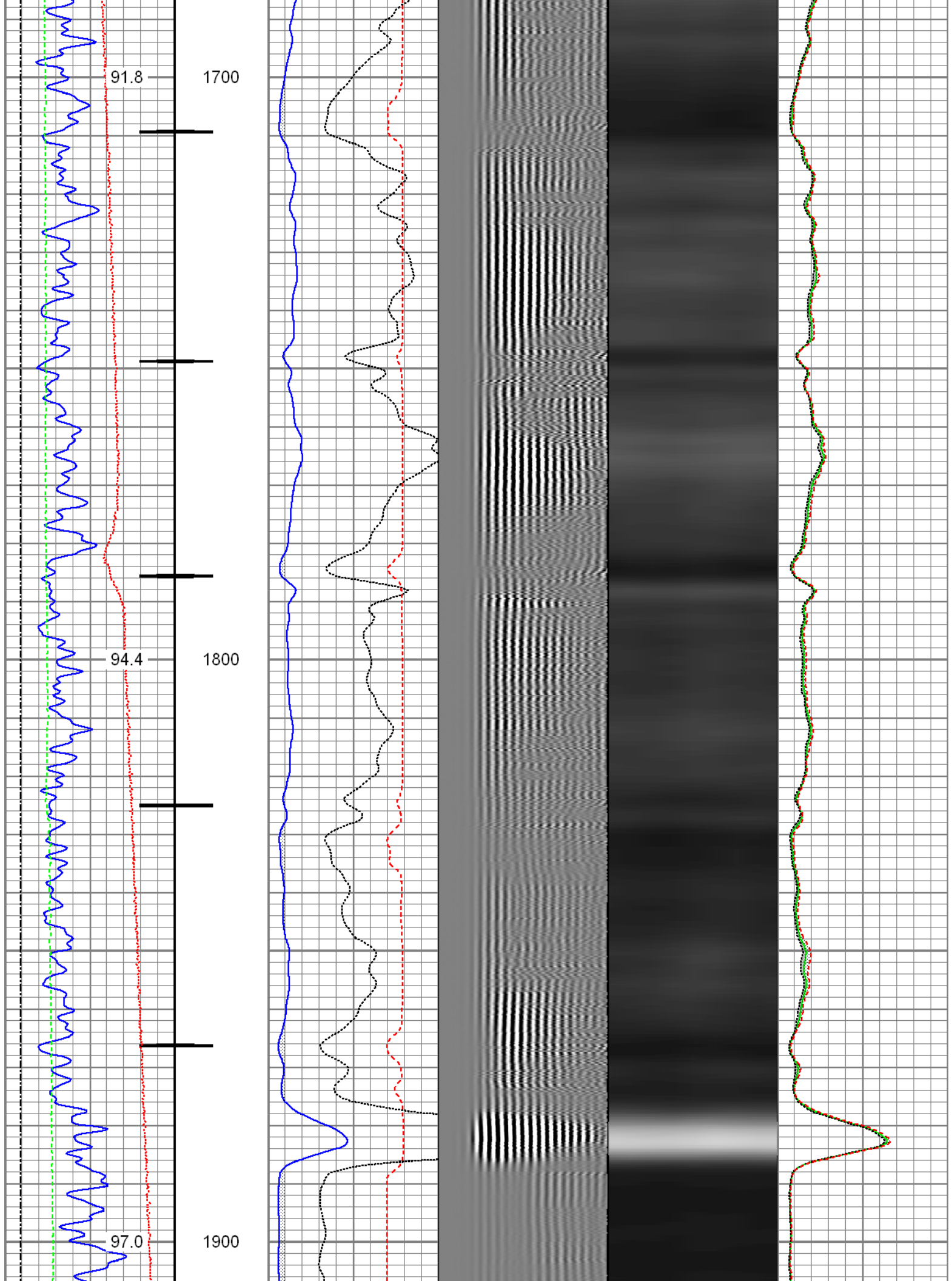


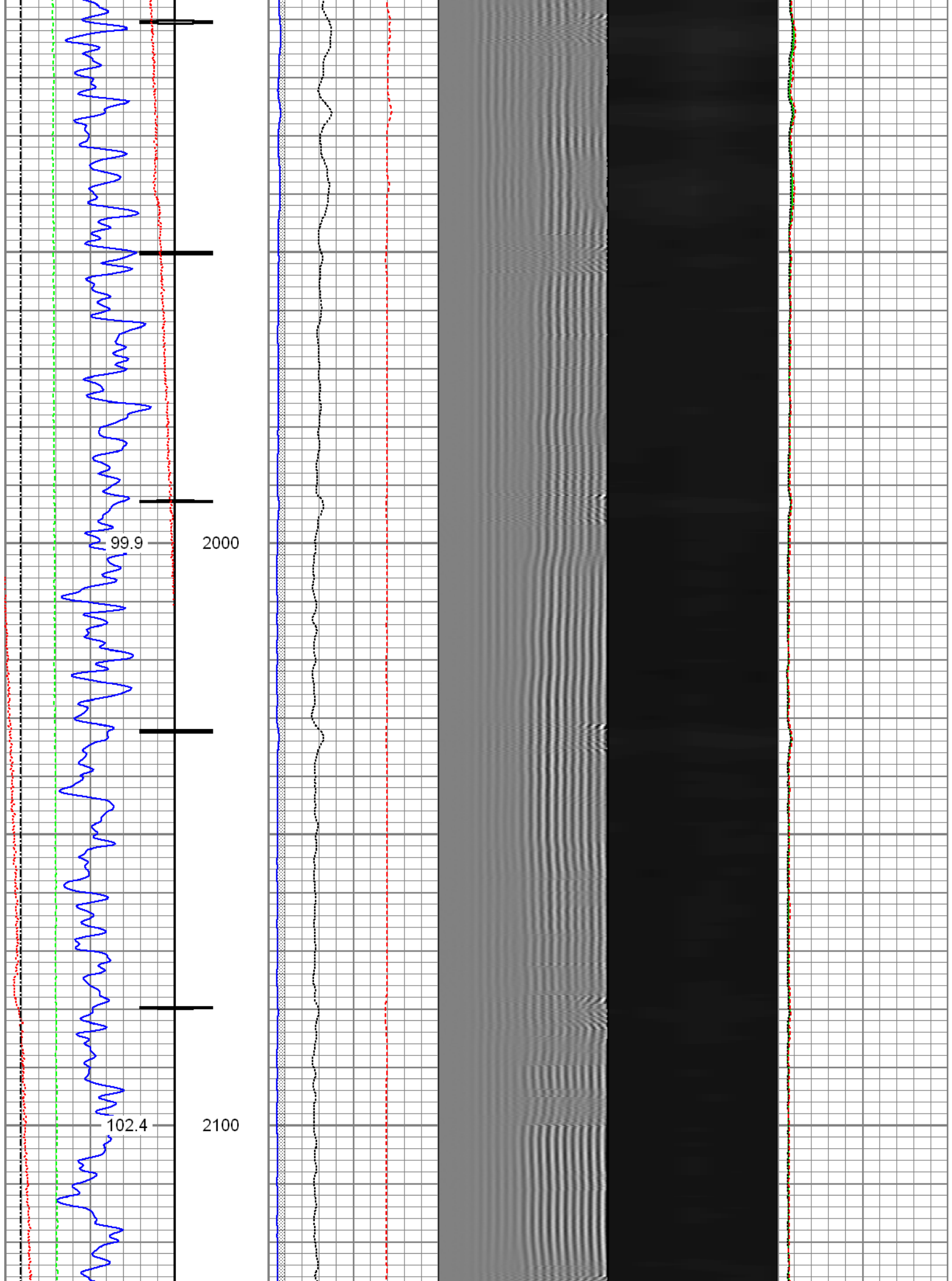


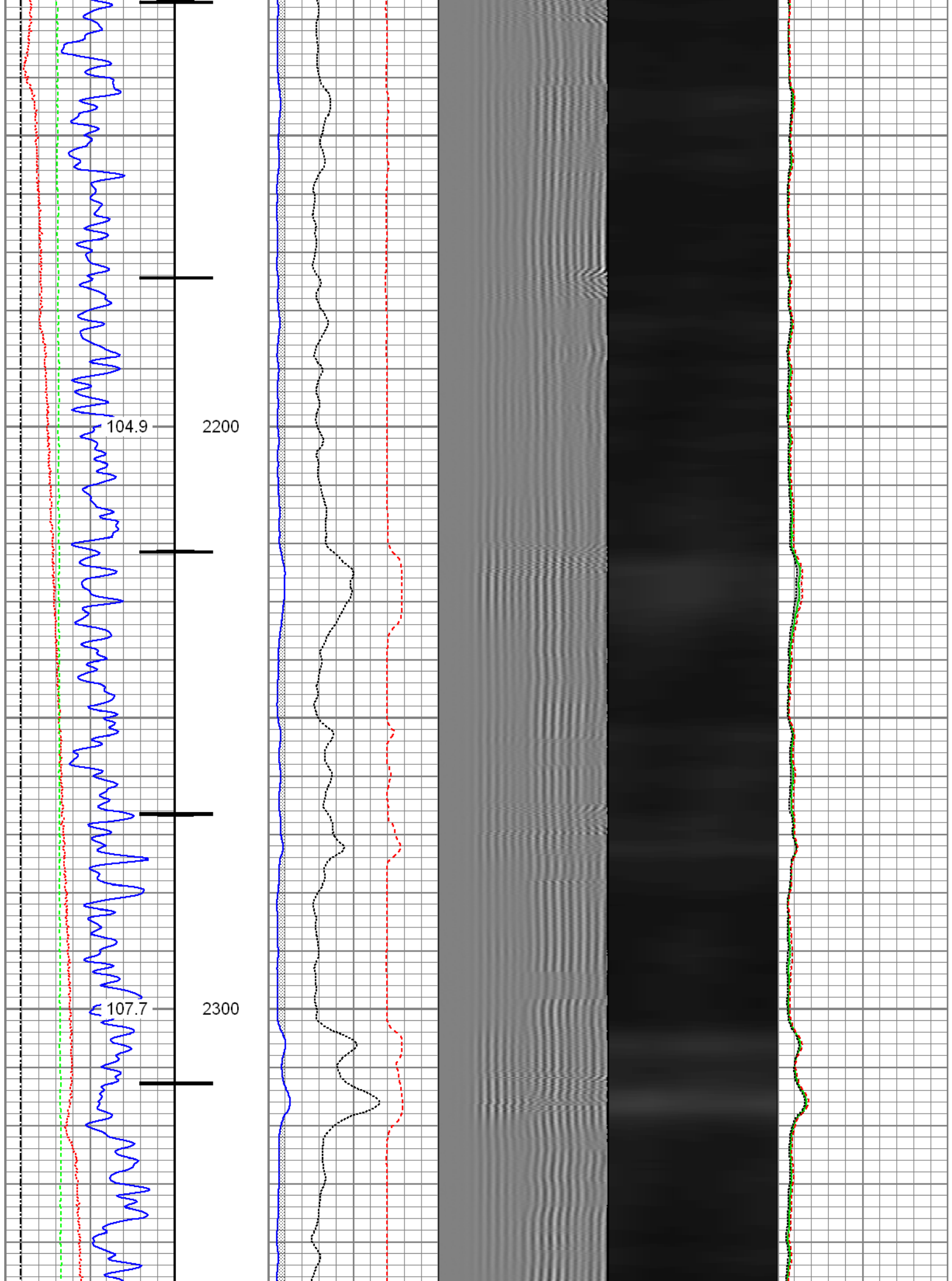


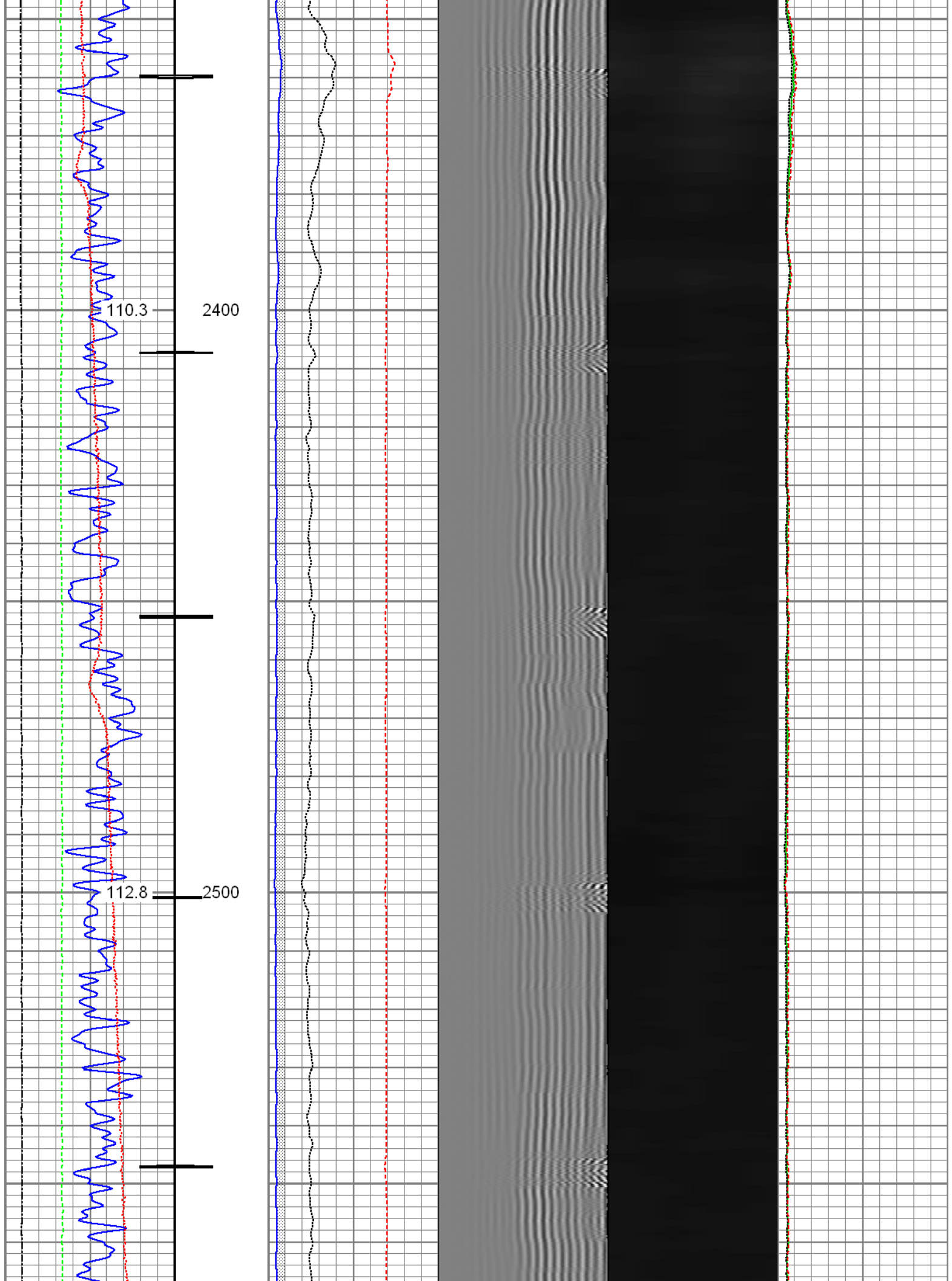


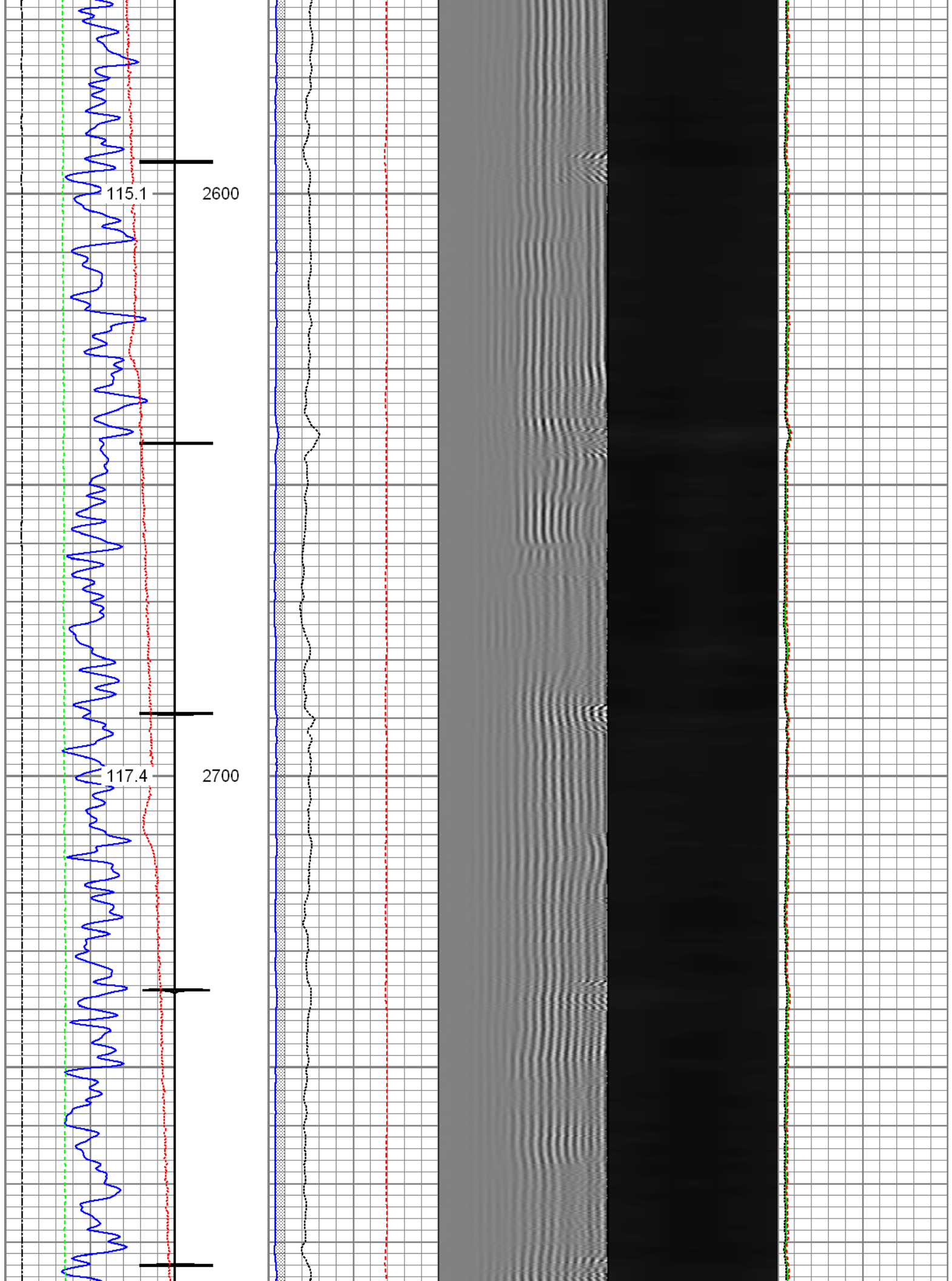


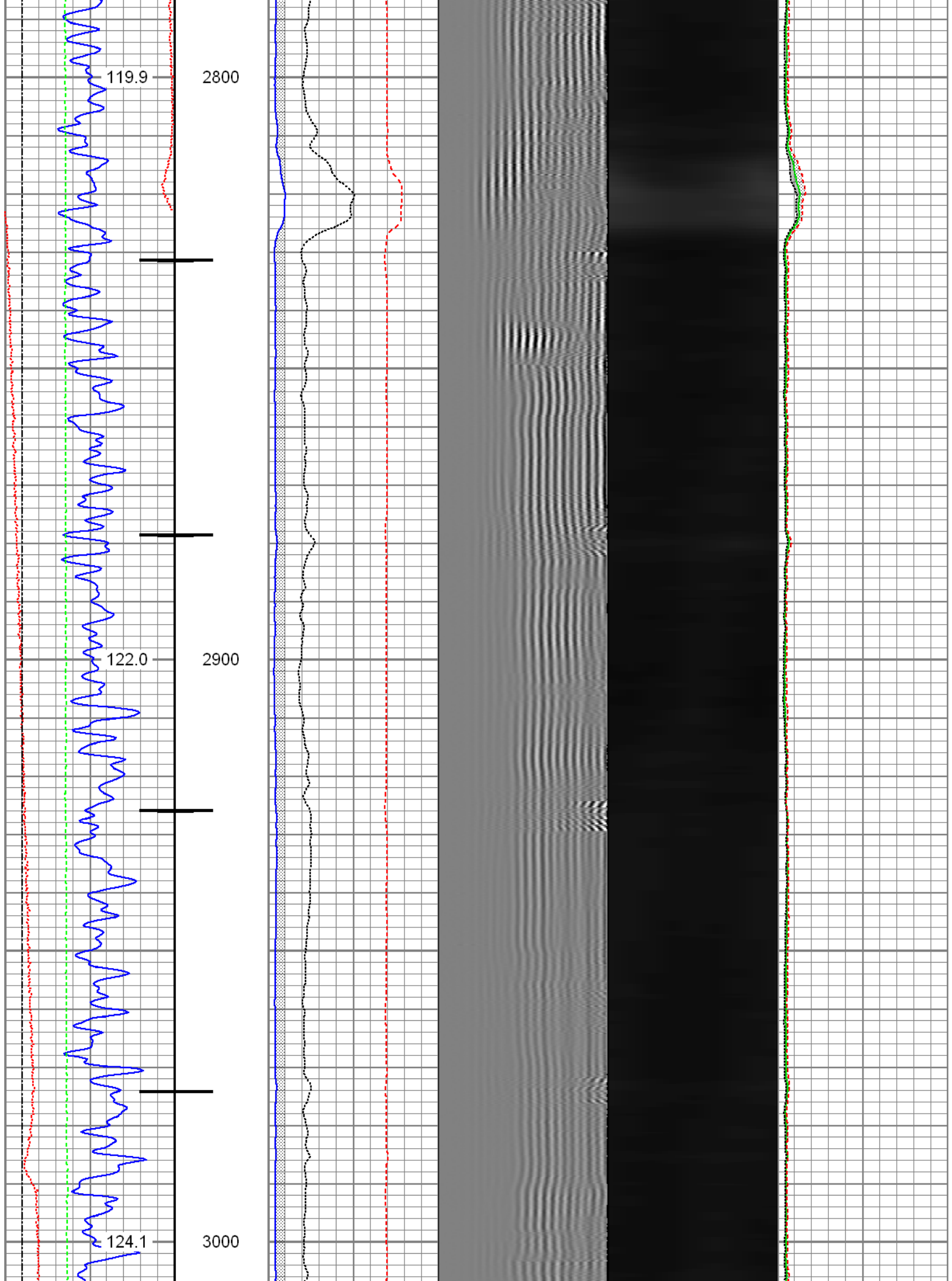


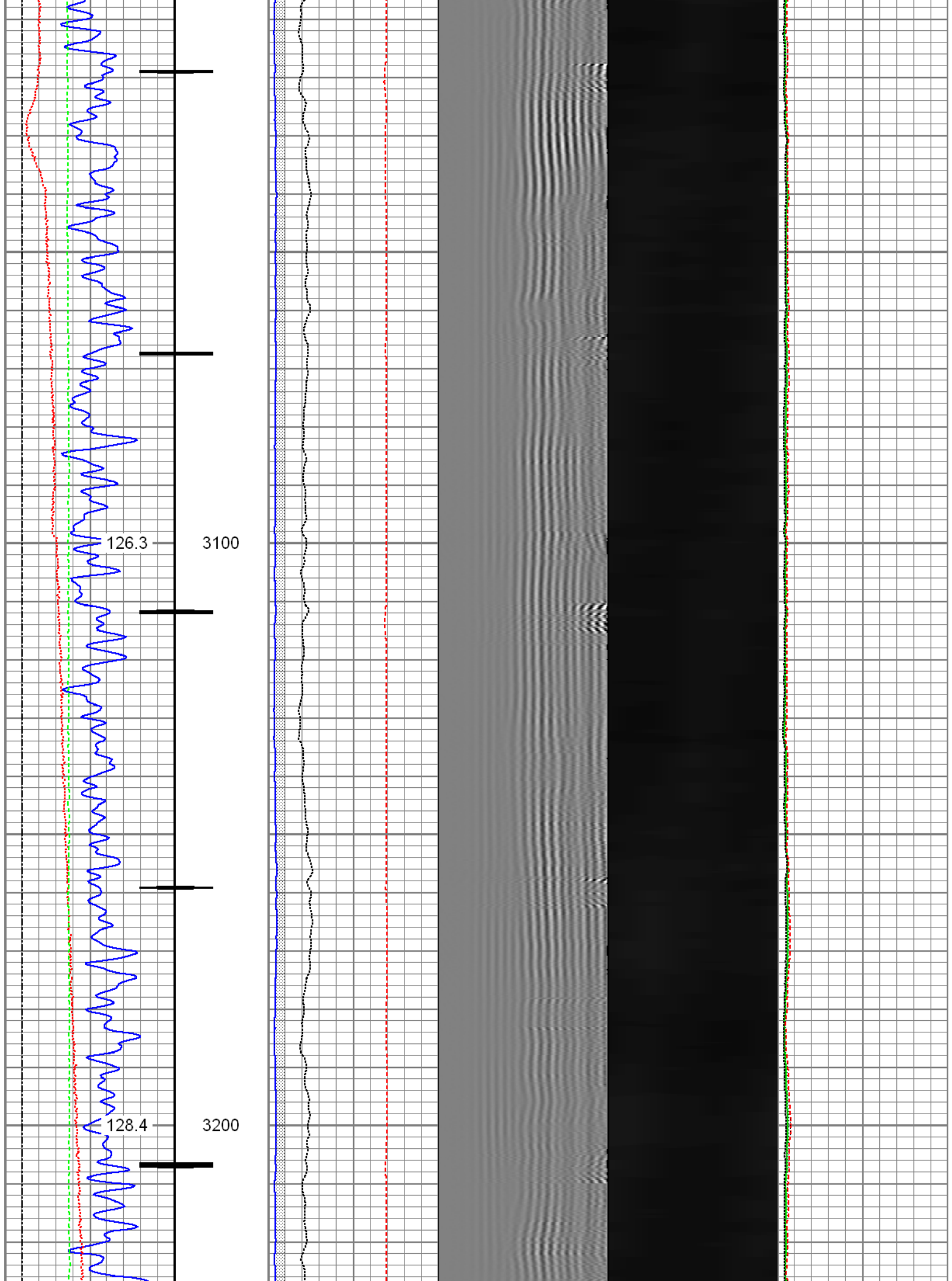


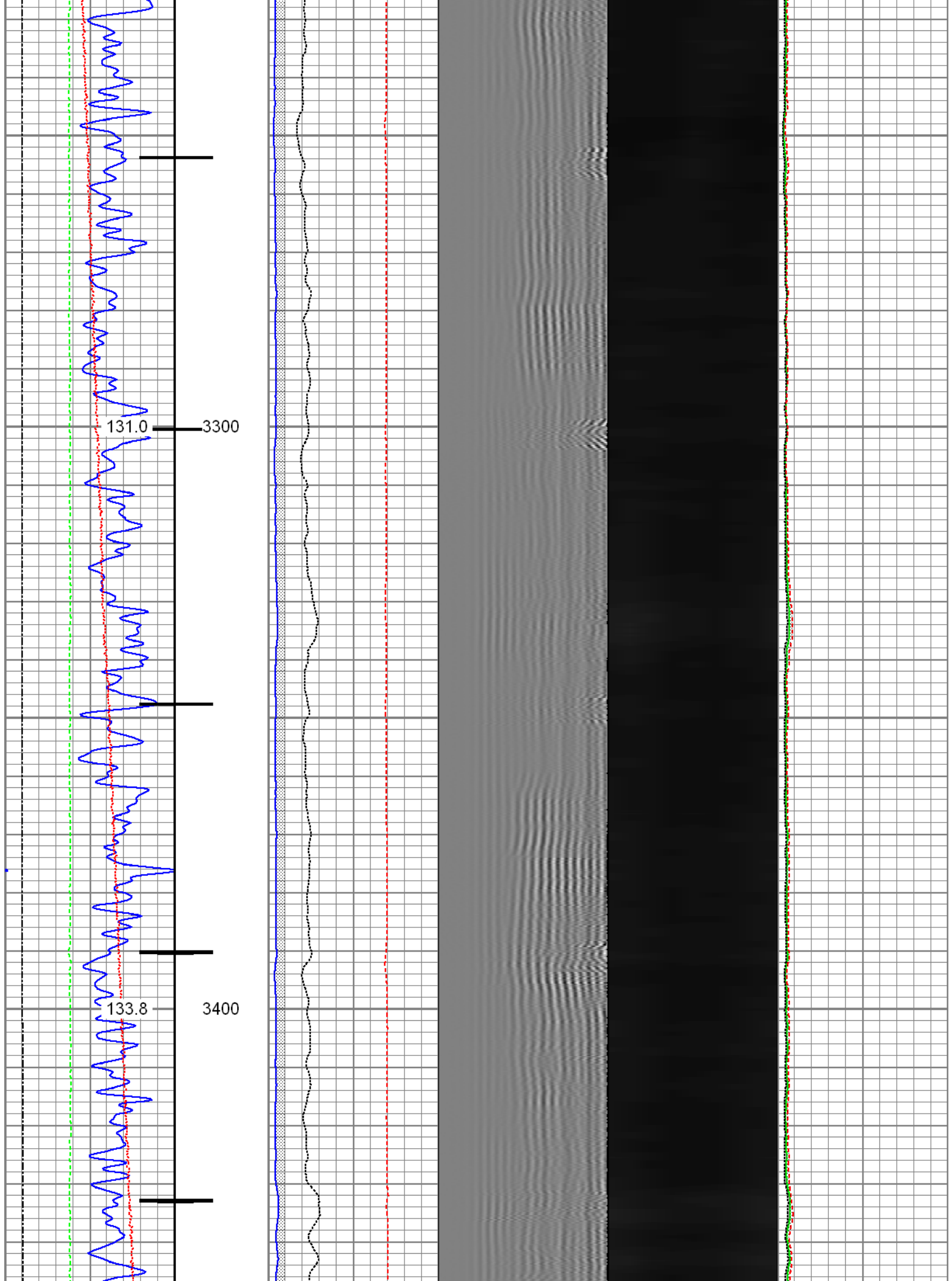


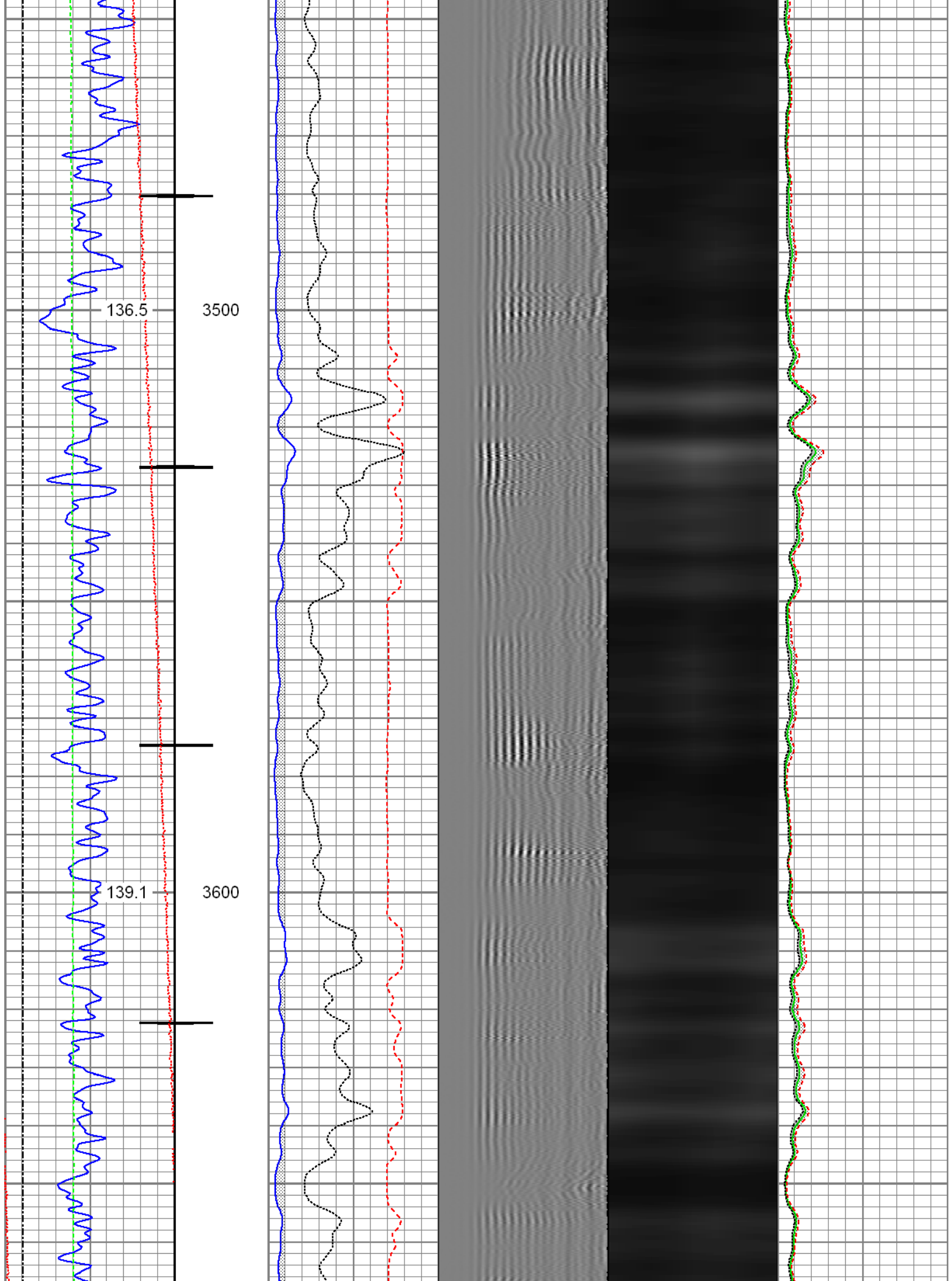


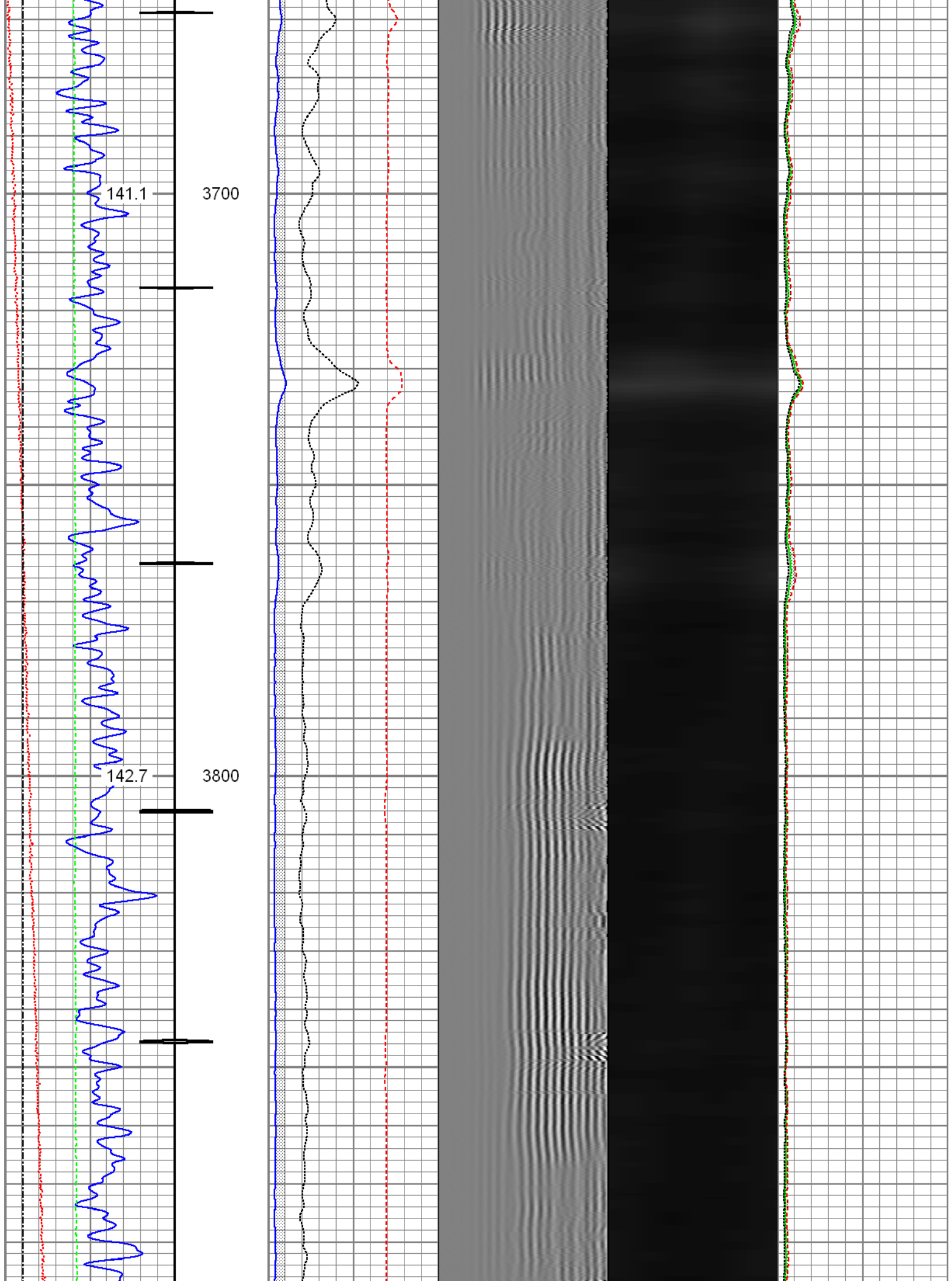


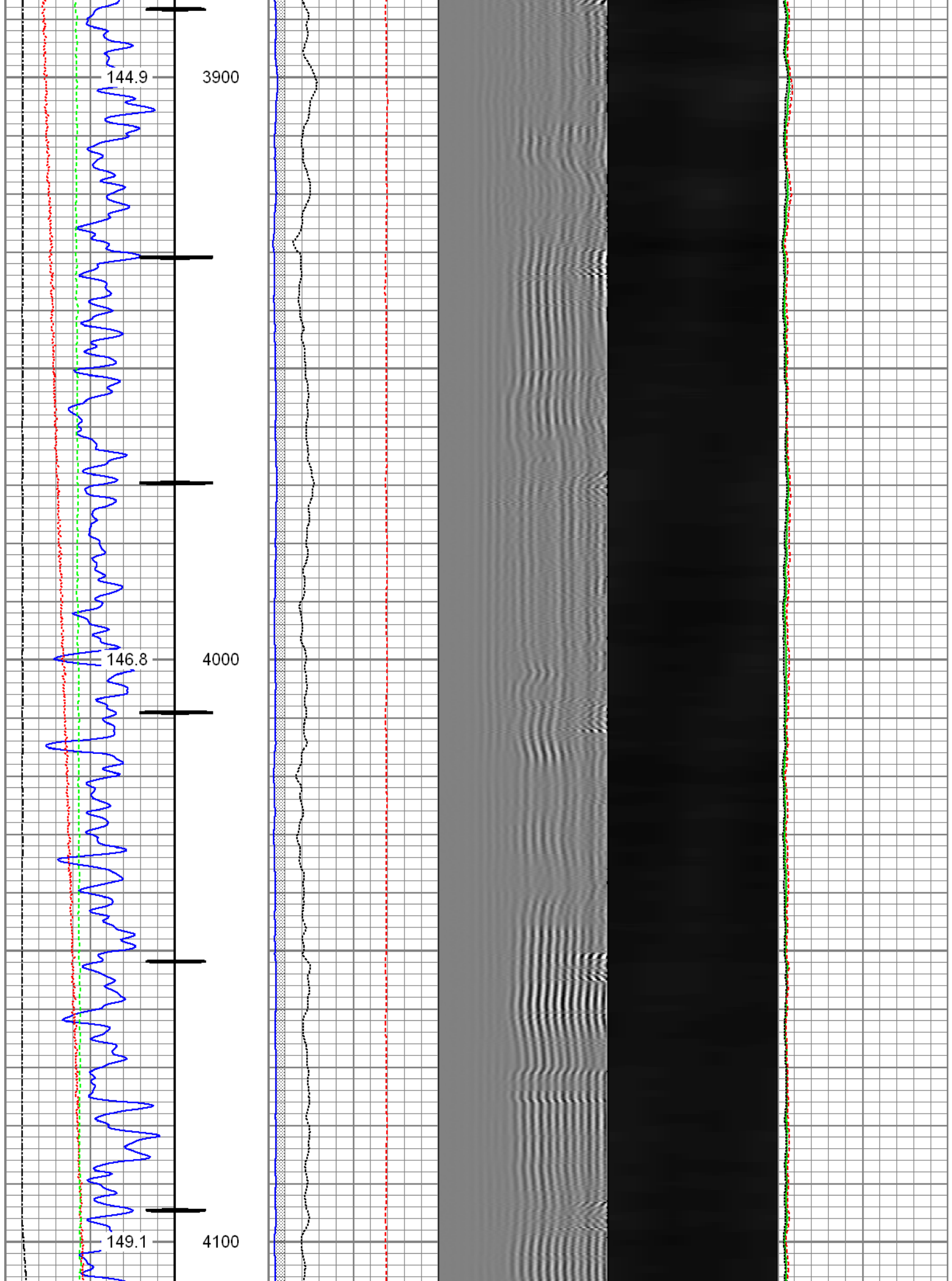


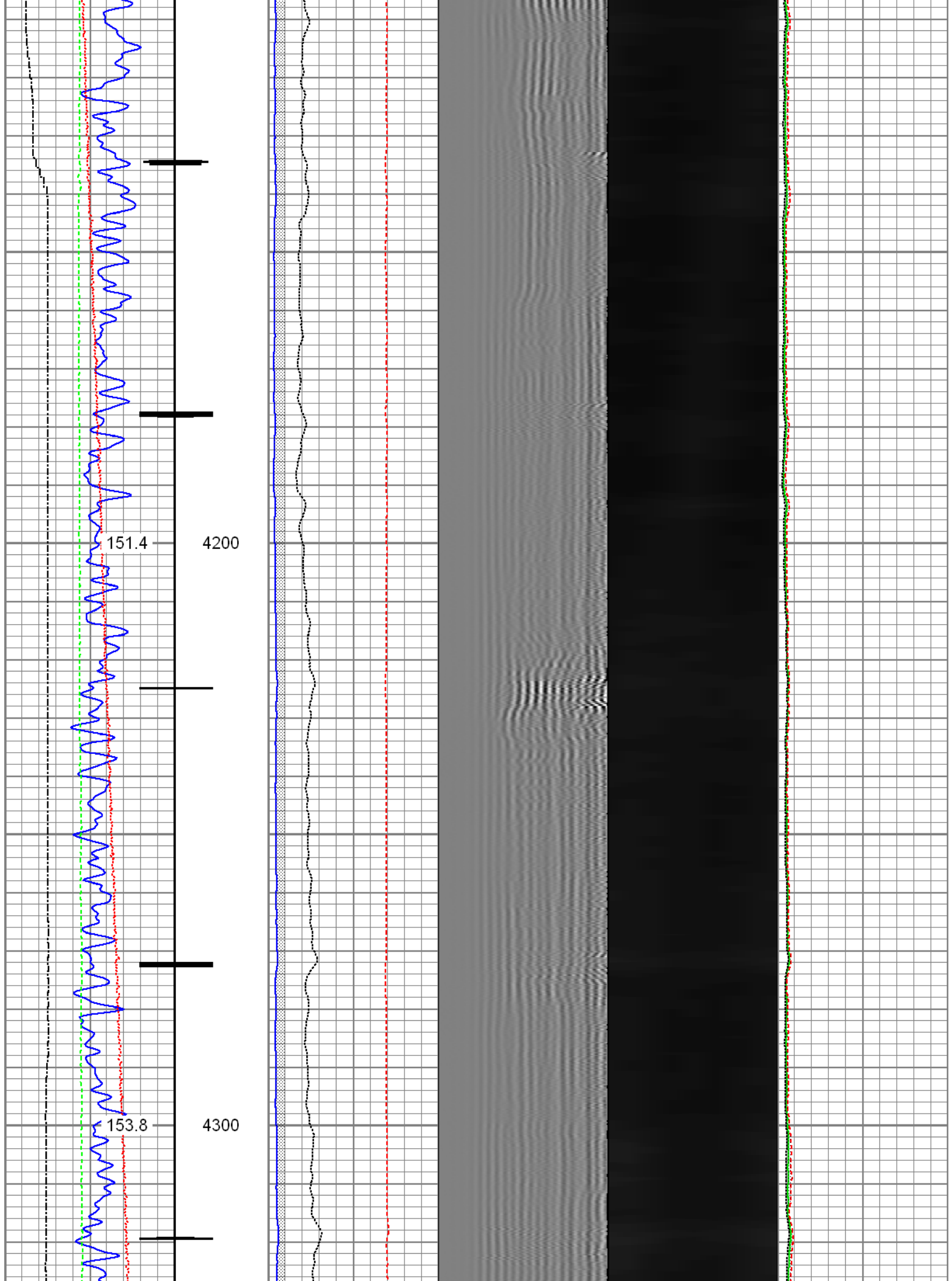


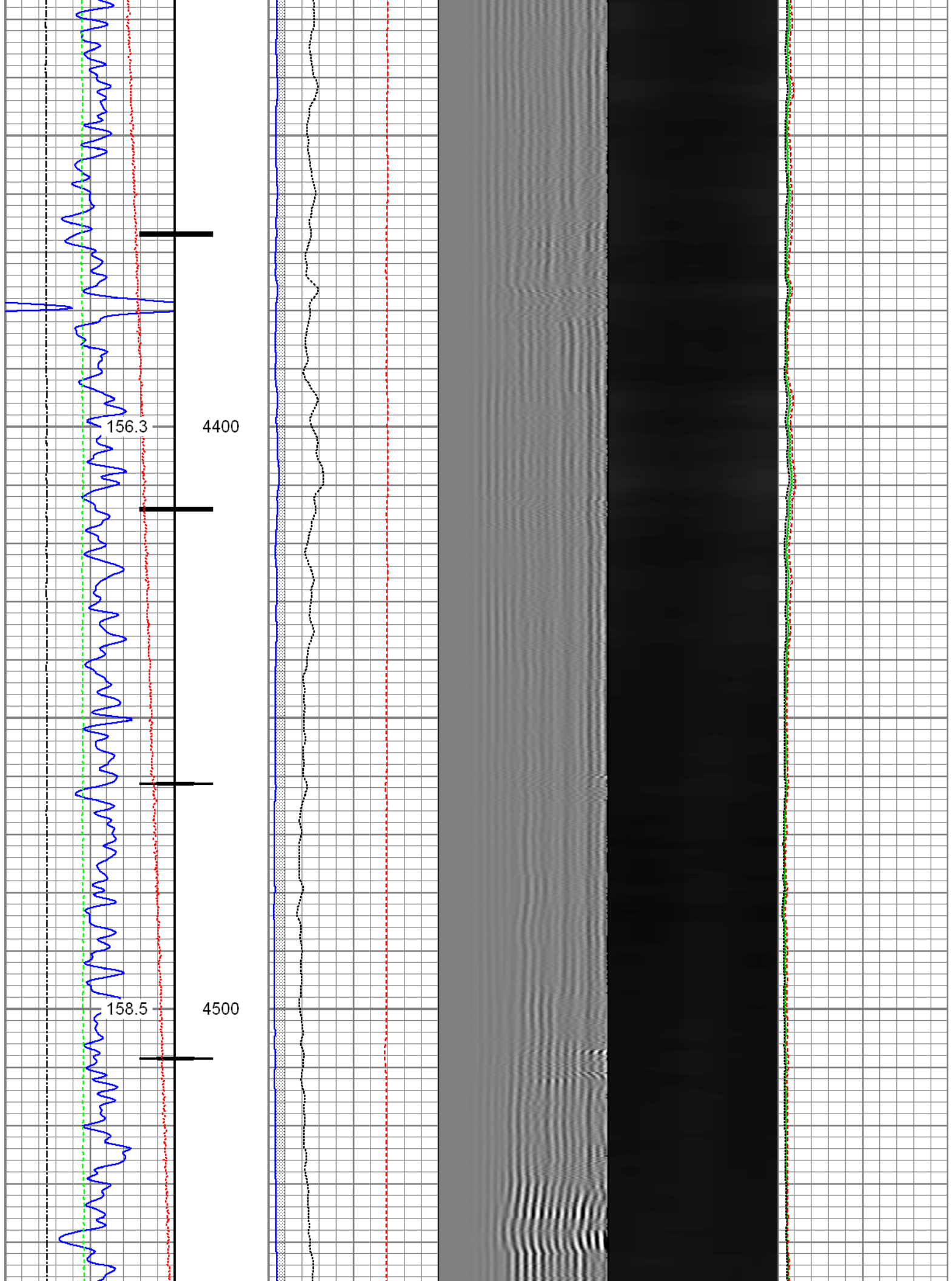


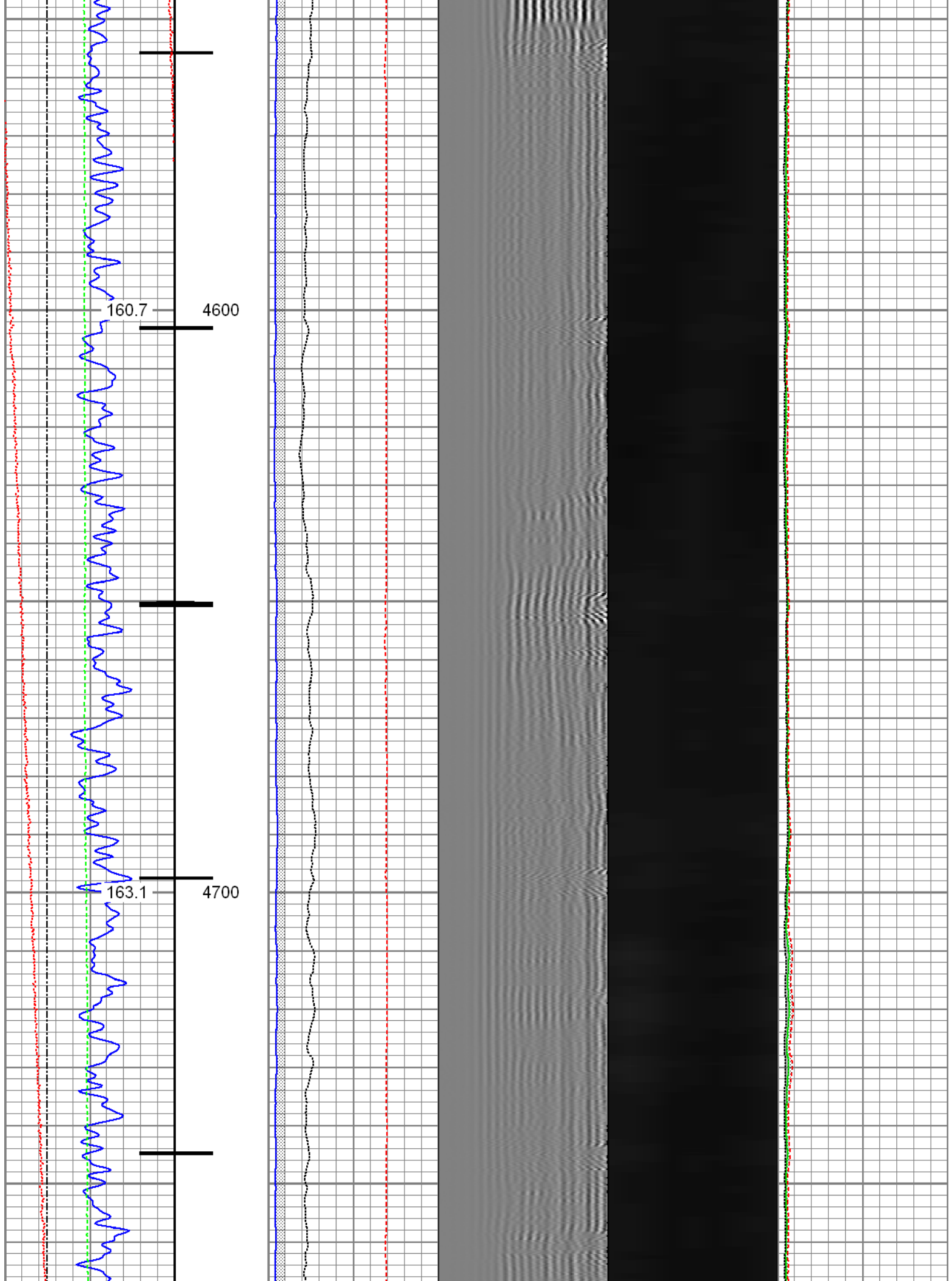


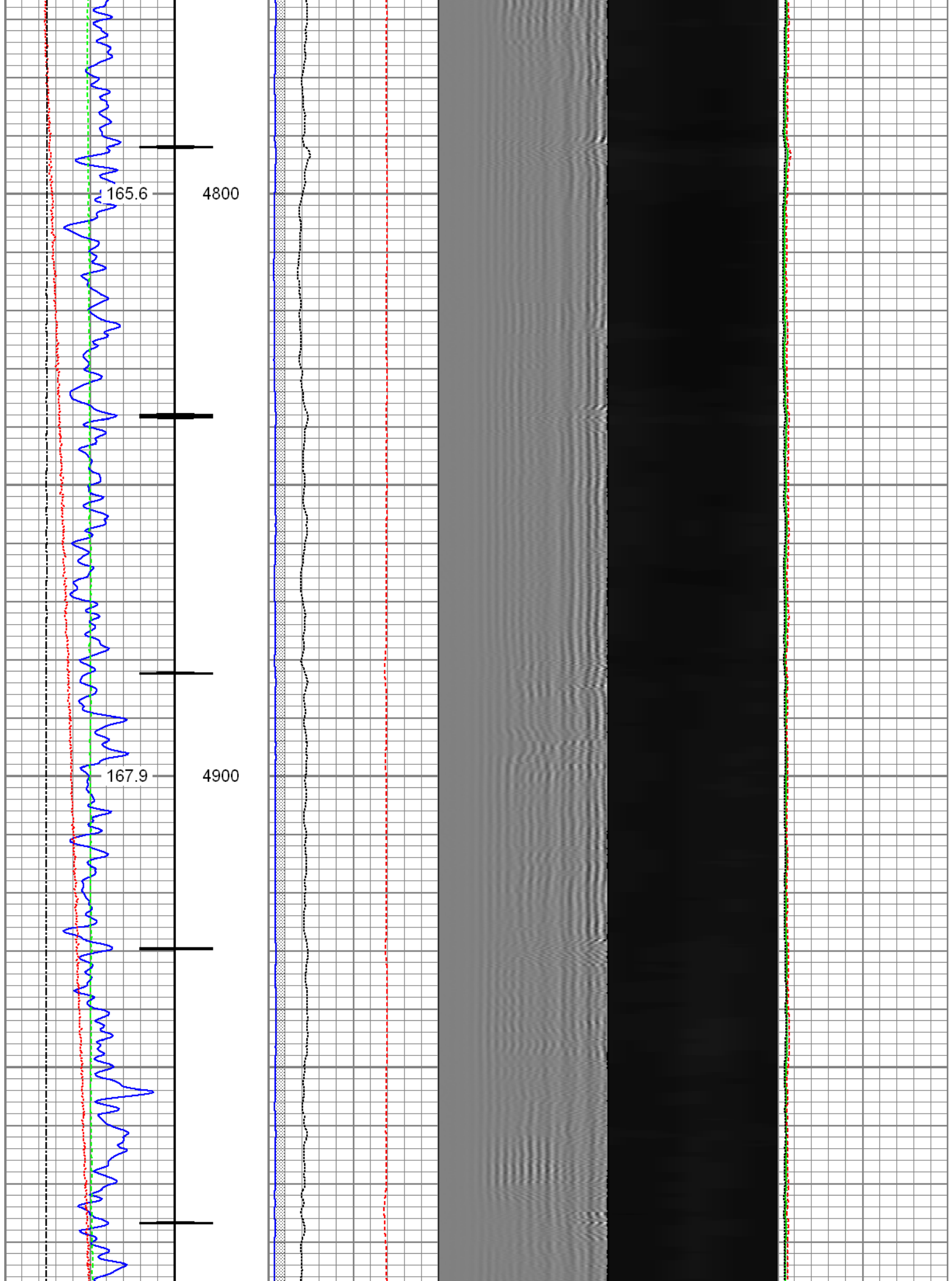


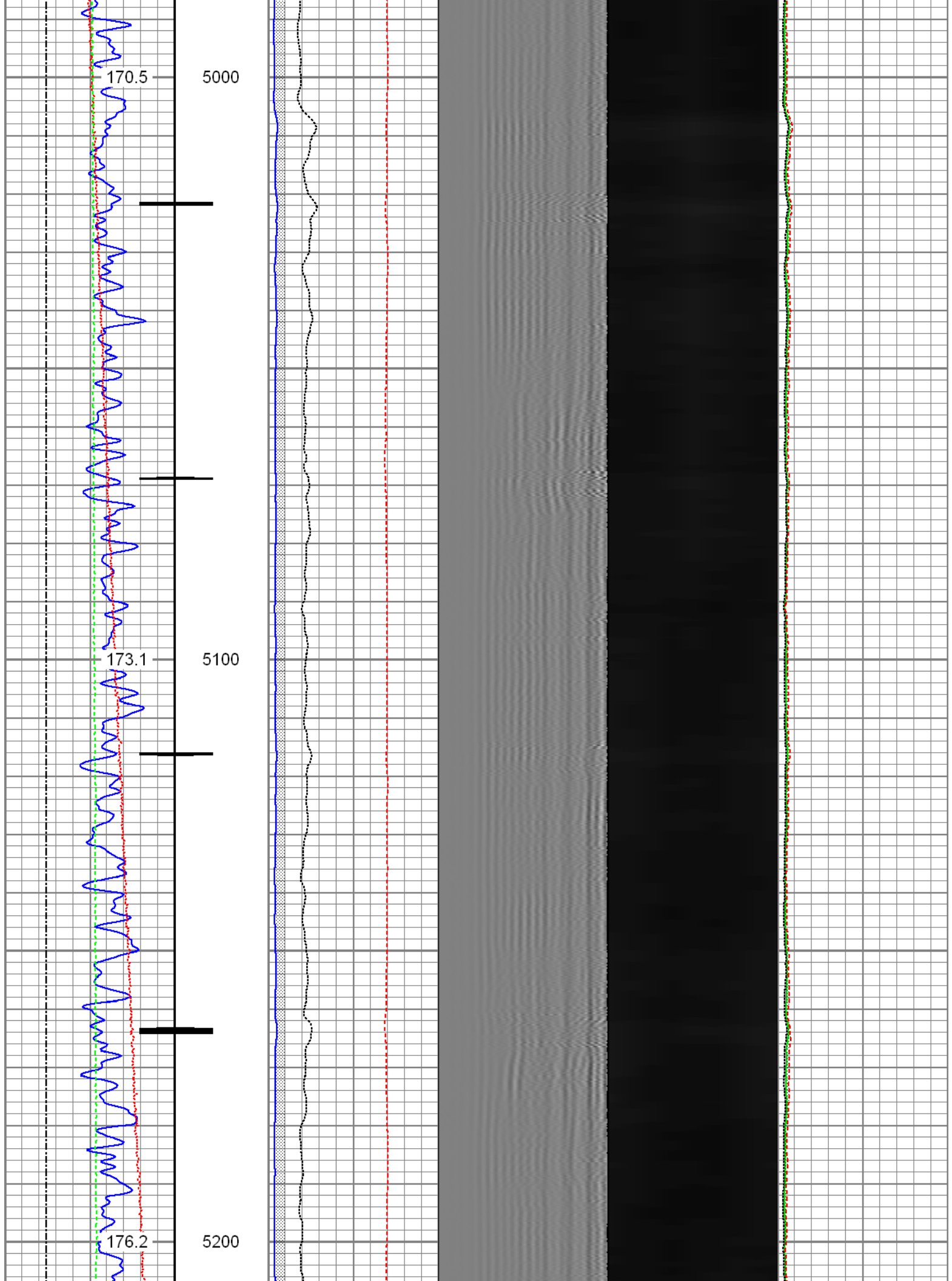


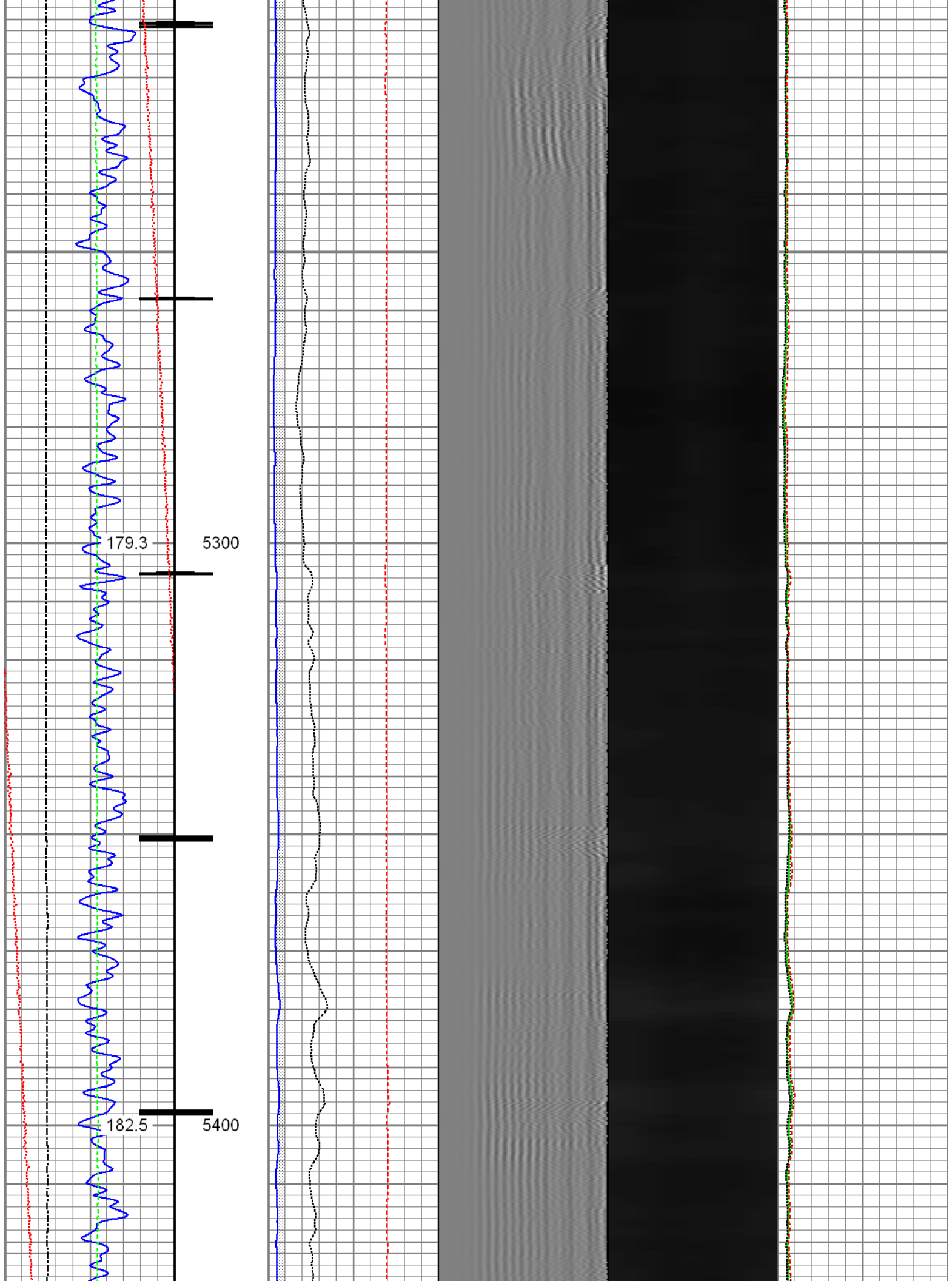


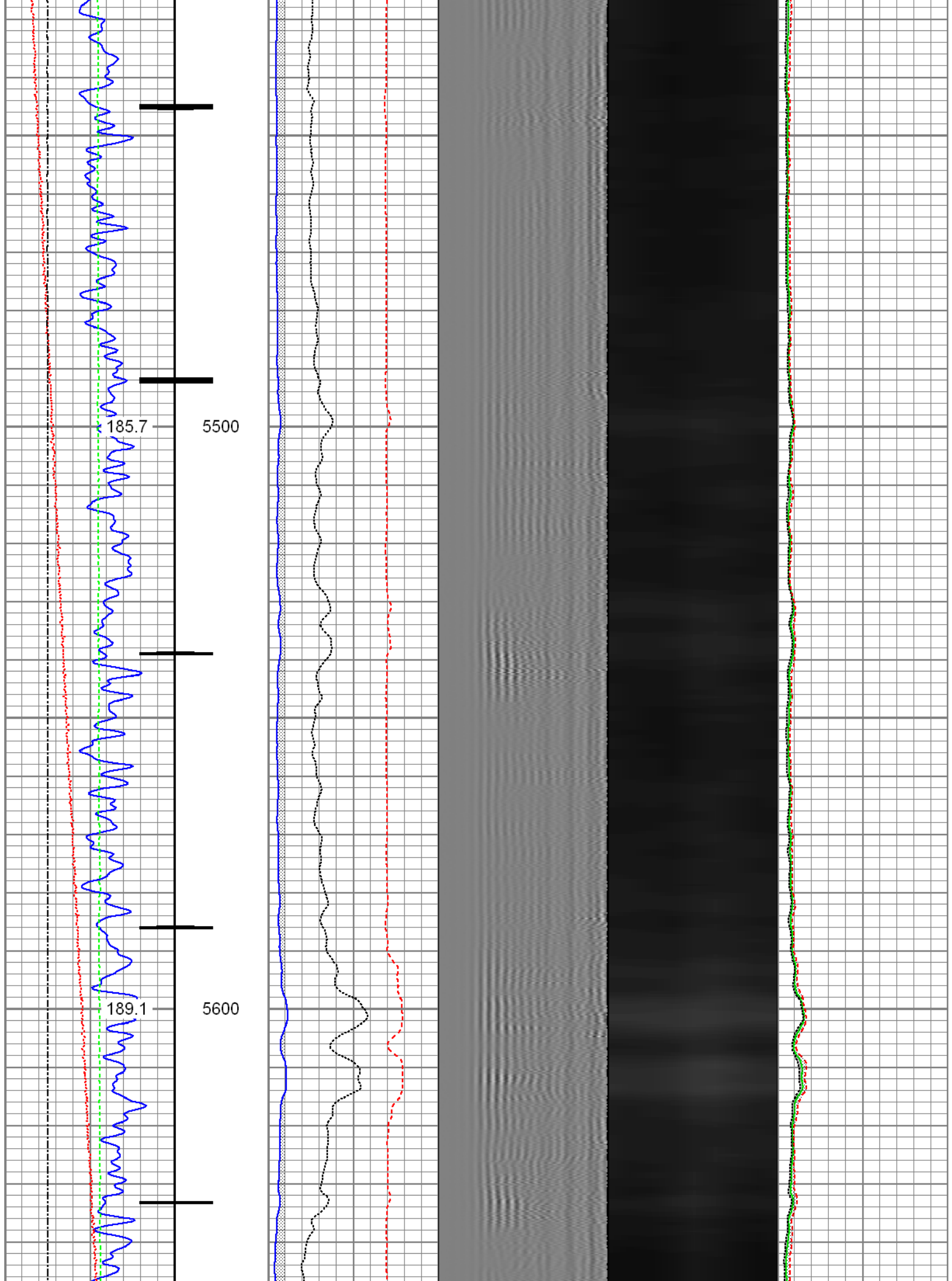


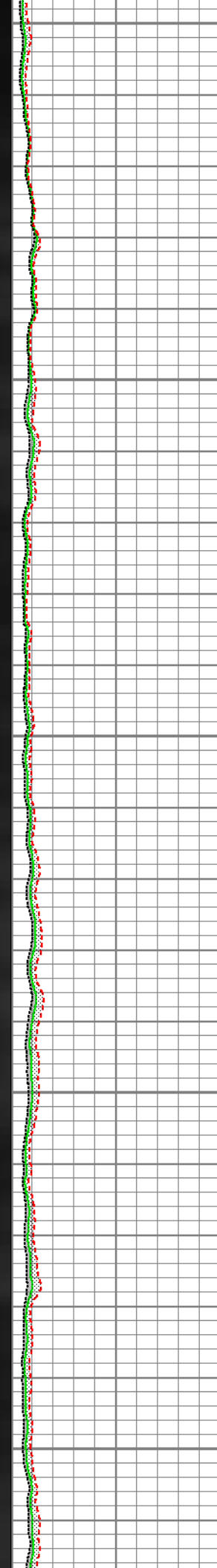
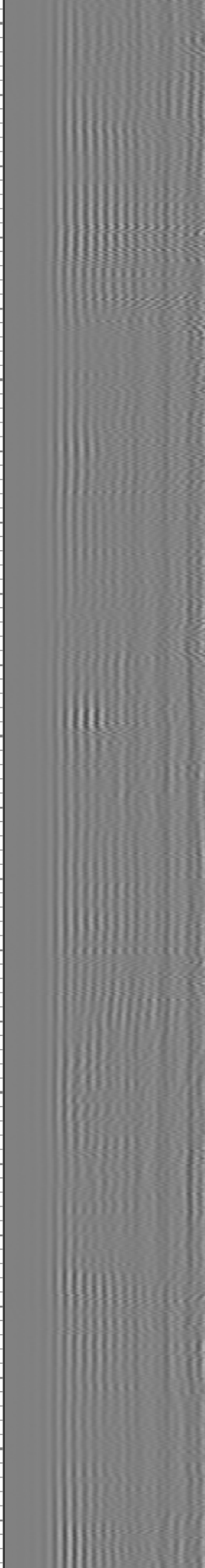
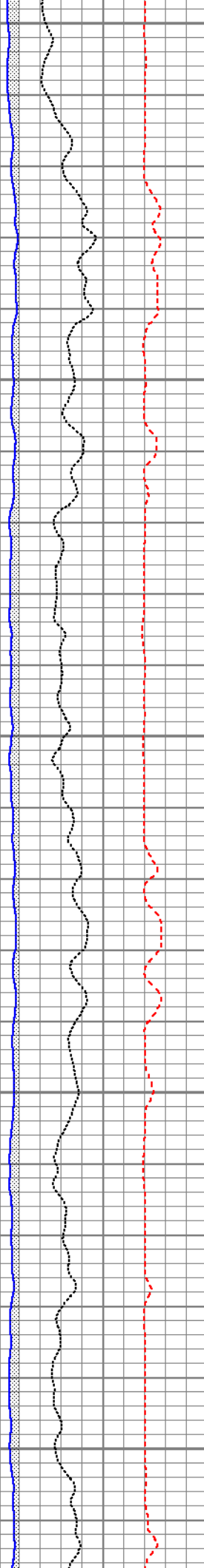
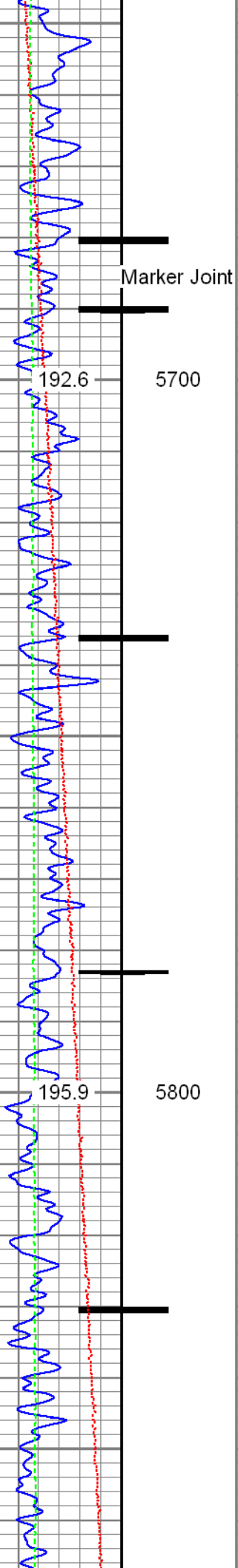


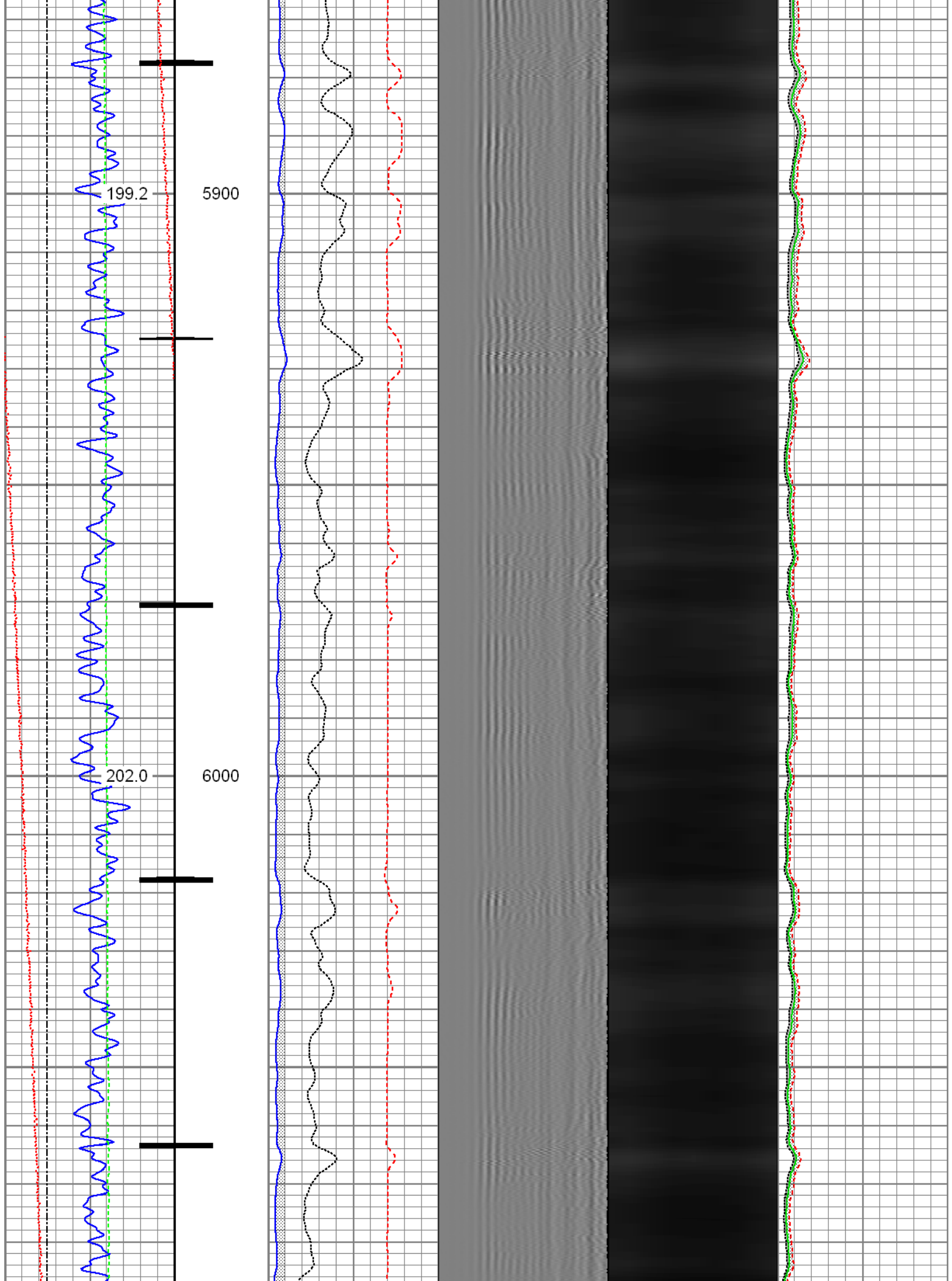


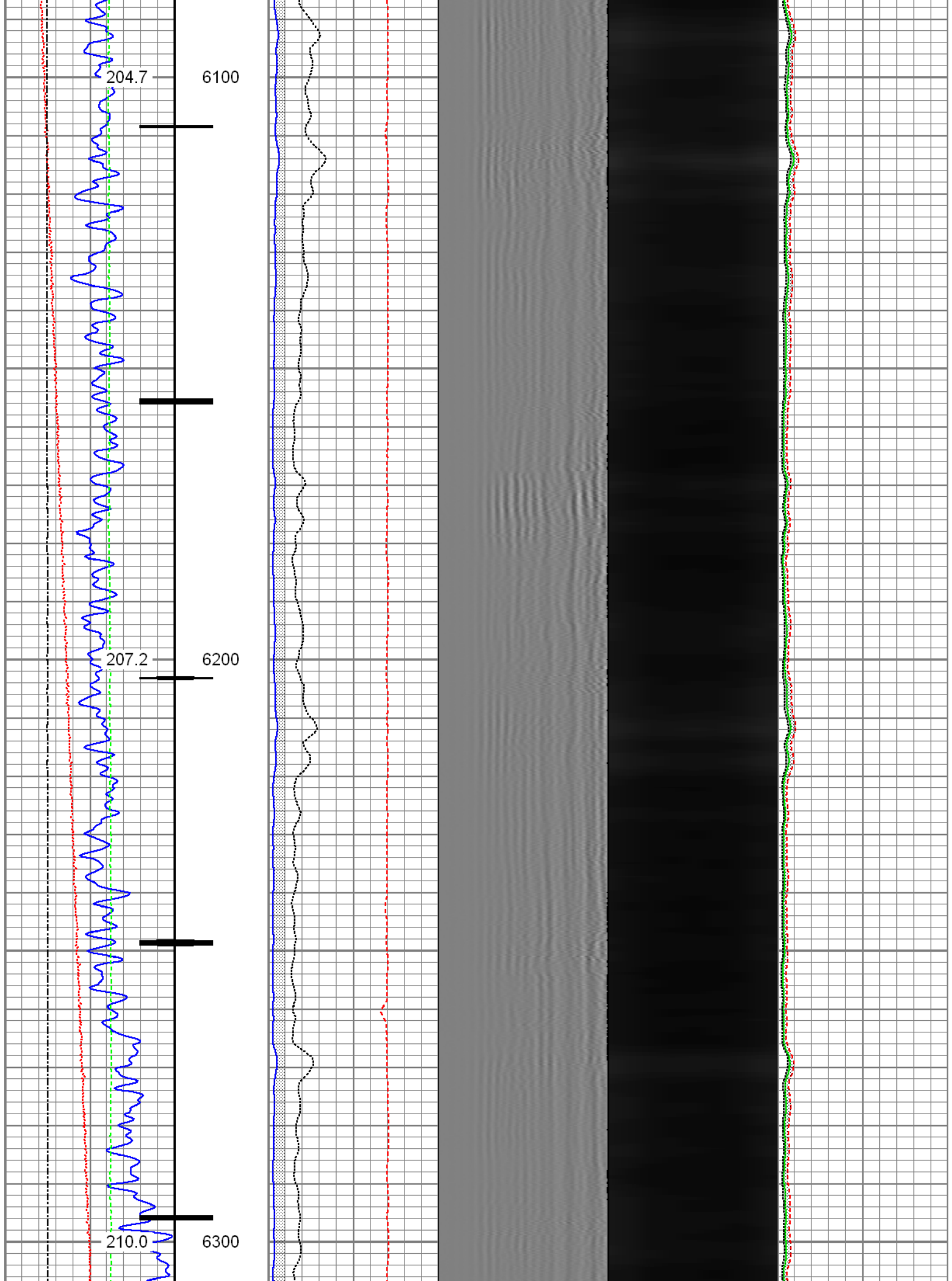


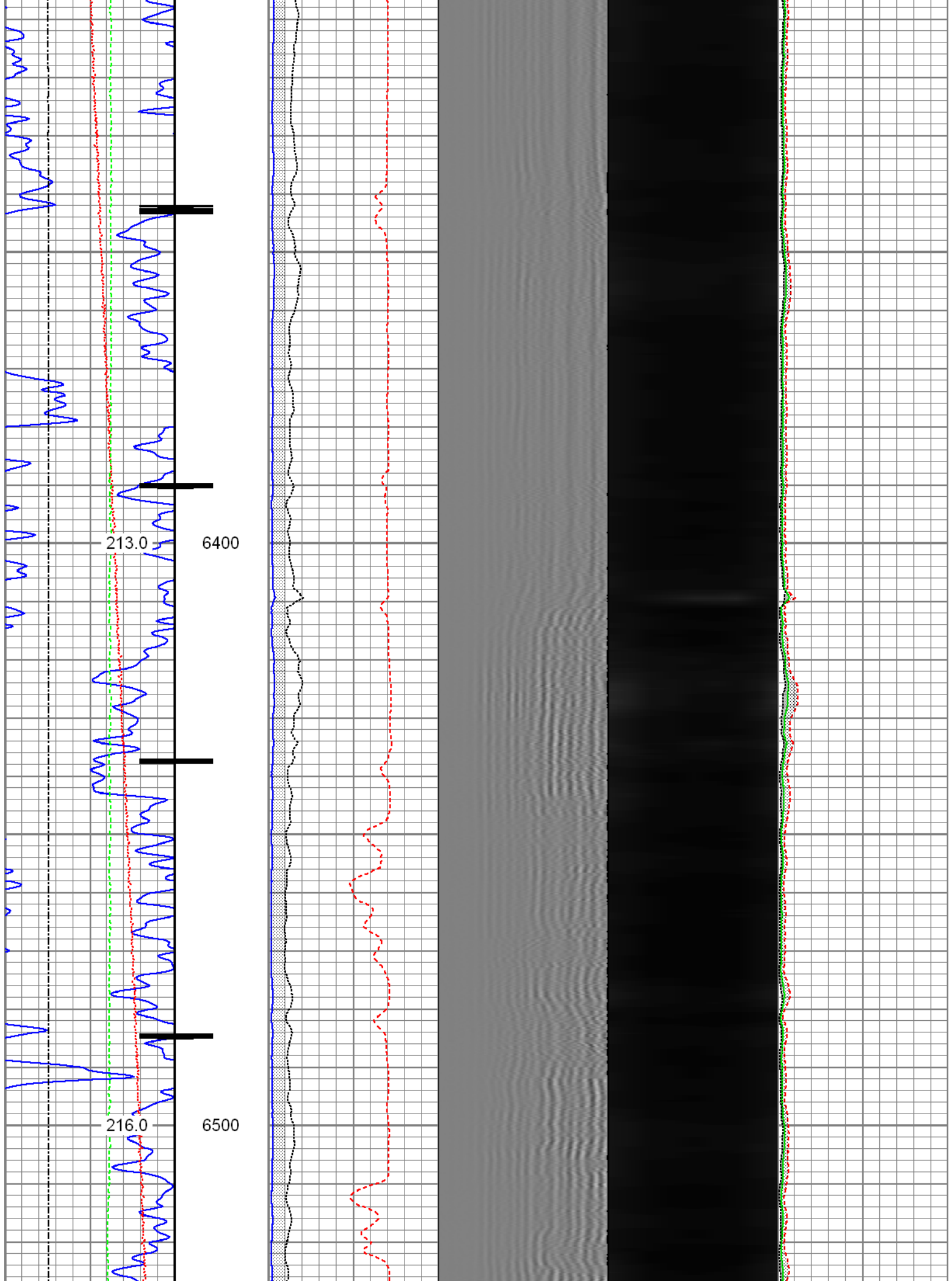


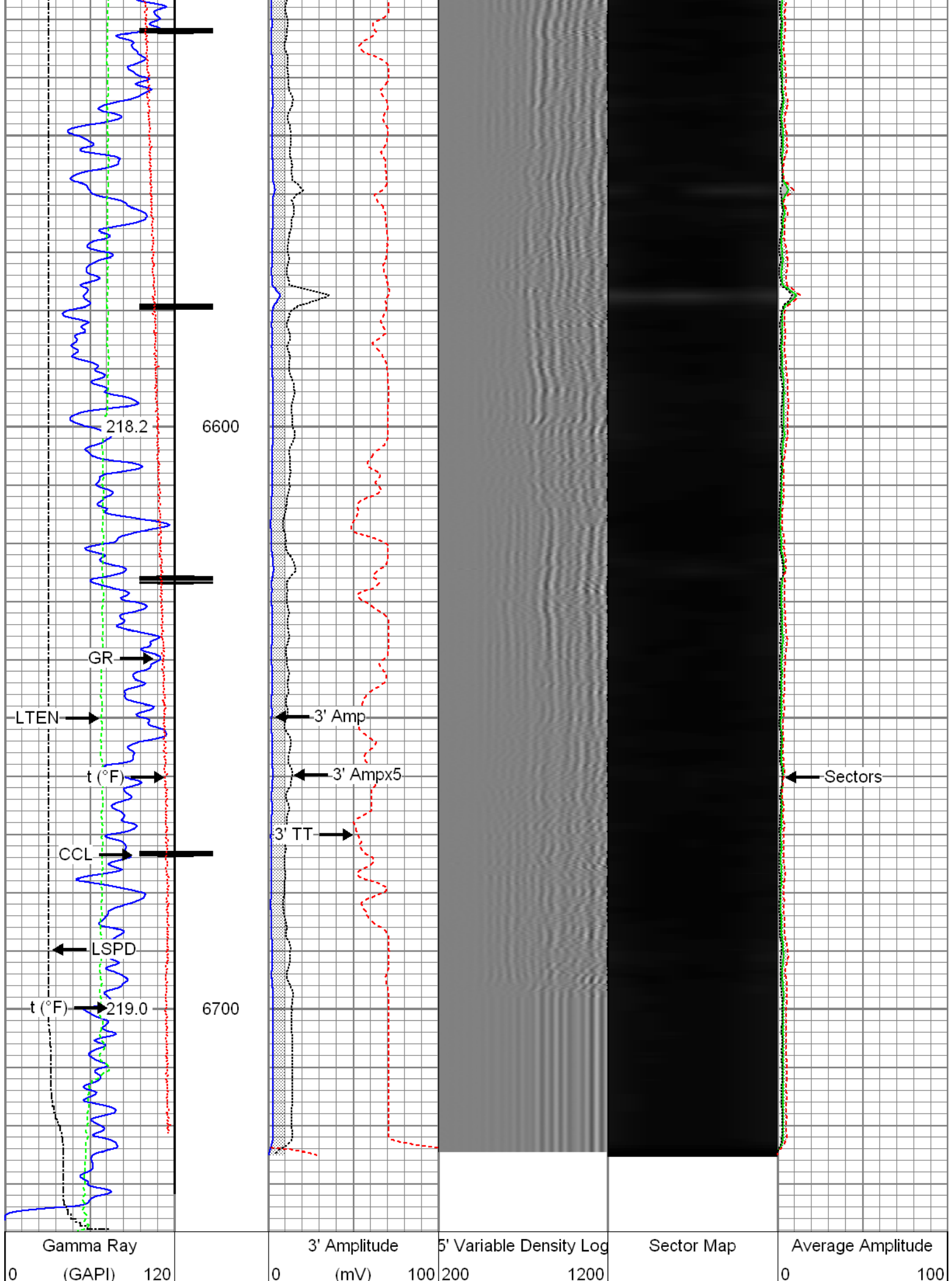












Casing Collar Locator		
Temperature		
0	(degF)	20
Line Speed		
-150	(ft/min)	150
Line Tension		
0	(lb)	2000

3' Amplitude x 5		
0	(mV)	20
3' Travel Time		
650	(usec)	150

Mimimum Amplitude	
0	100
Maximum Amplitude	
0	100



Repeat Section

Recorded With 2500 PSI Surface Induced Pressure

Database File:
03-03-16_noble energy_wells ranch af05-645_rbl.db

Dataset Pathname:
pass3.1

Presentation Format:
radii

Dataset Creation:
Sat Mar 05 10:43:03 2016 by Calc 7.0 B1

Charted by:
Depth in Feet scaled 1:240

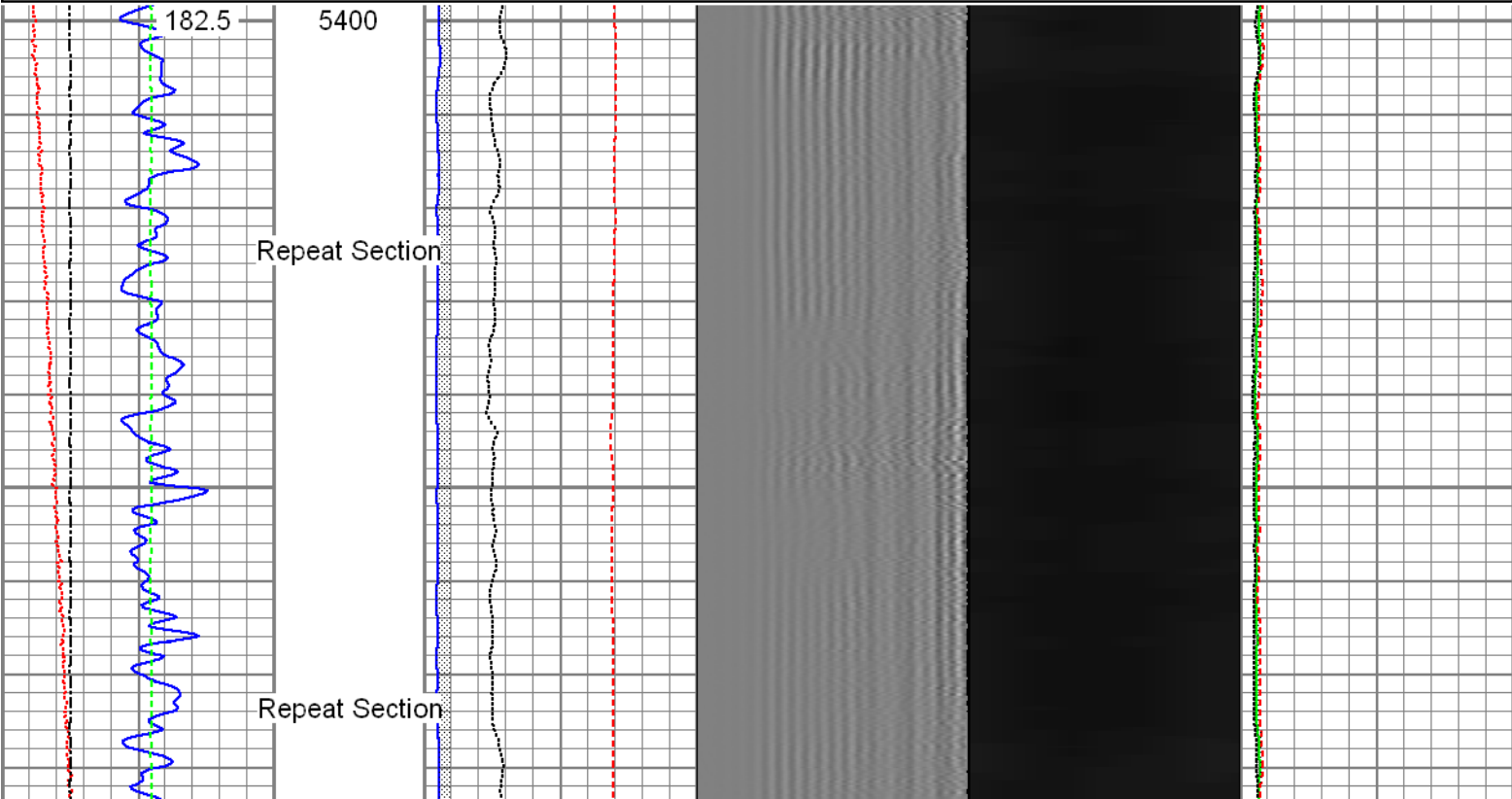
Gamma Ray		
0	(GAPI)	120
Temperature		
0	(degF)	20
Line Speed		
-150	(ft/min)	150
Line Tension		
0	(lb)	2000

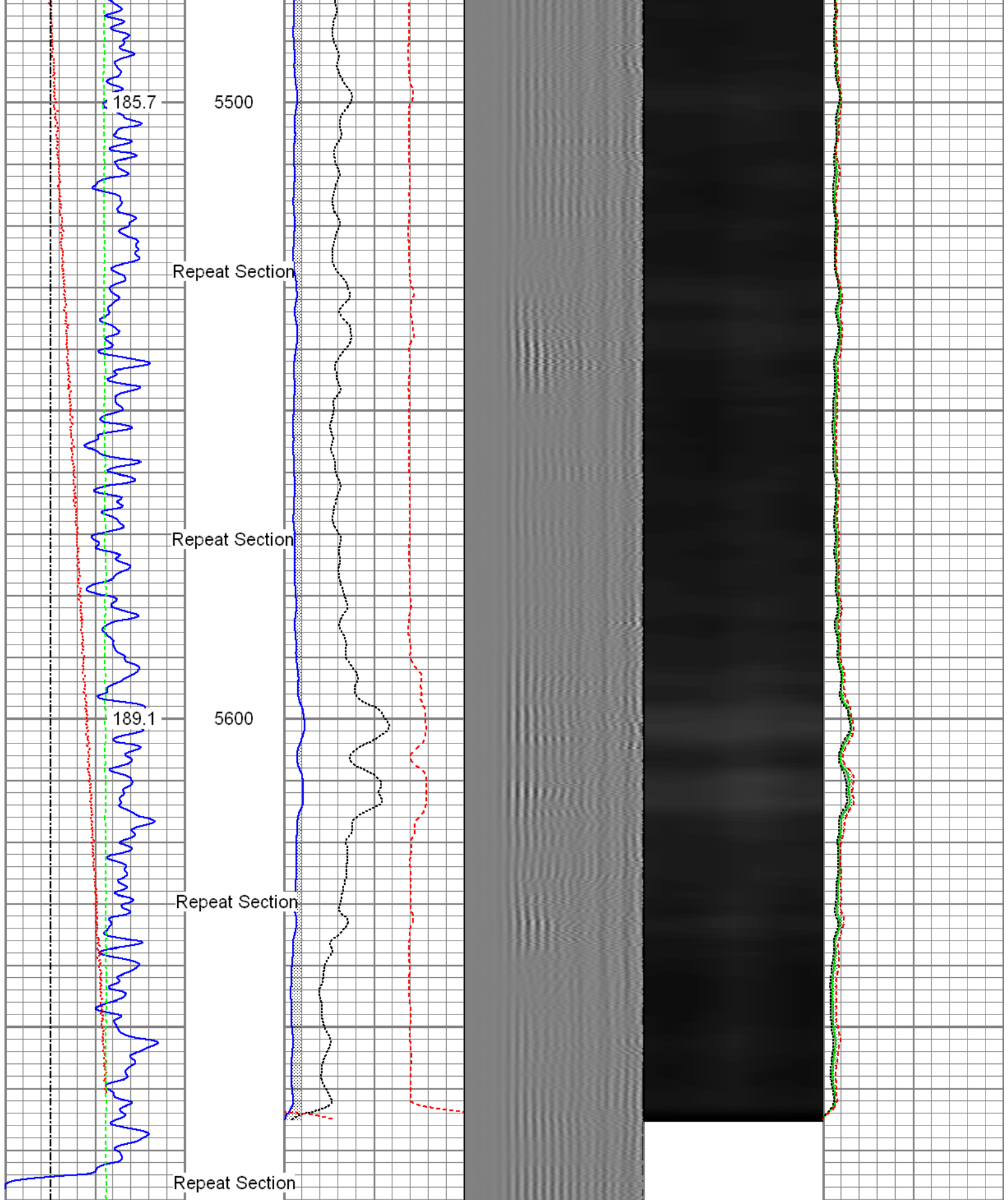
3' Amplitude		
0	(mV)	100
3' Amplitude x 5		
0	(mV)	20
3' Travel Time		
650	(usec)	150

5' Variable Density Log	
200	1200

Sector Map



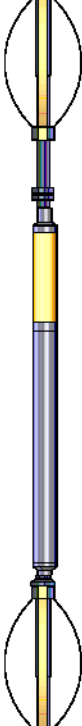
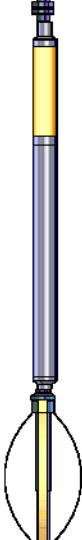
Average Amplitude	
0	100
Mimimum Amplitude	
0	100
Maximum Amplitude	
0	100






Gamma Ray (GAPI)		3' Amplitude (mV)		5' Variable Density Log		Sector Map		Average Amplitude	
0	120	0	100	200	1200			0	100
Temperature (degF)		3' Amplitude x 5 (mV)						Minimum Amplitude	
0	20	0	20					0	100
Line Speed		3' Travel Time						Maximum Amplitude	

-150	(ft/min)	150	650	(usec)	150	0	100
Line Tension							
0	(lb)	2000					

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)	
HeadVolt	19.49		T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00	
			Probe_IL_BS_Cent Probe 2-3/4" Inline Electrical Inline Bowspring Centralizer	2.88	2.75	10.00	
Temp	16.72						
WVFS3FT	14.55			Probe_RADII-C-2-3/4" (FW1302-002) Probe 2-3/4" Sector Cement Bond Tool with Temperature Probe	9.19	2.75	105.00
WVFCAL	14.55						
WVFS1	14.55						
WVFS2	14.55						
WVFS3	14.55						
WVFS4	14.55						
WVFS5	14.55						
WVFS6	14.55						
WVFS7	14.55						
WVFS8	14.55						
WVFS5FT	13.55						
CCL DCCL	6.51		Probe_IL_BS_Cent Probe 2-3/4" Inline Electrical Inline Bowspring Centralizer	2.88	2.75	10.00	
	6.51						
GR	3.77		Probe_CCL_GR-2.75"Digital (FW1211-026) Probe 2-3/4" Digital CCL / Gamma Ray Combined	4.54	2.75	55.00	
			Probe_IL_BS_Cent Probe 2-3/4" Inline Electrical Inline Bowspring Centralizer	2.88	2.75	10.00	

			Centralizer			
Dataset: 03-03-16_Noble Energy_Wells Ranch AF05-645_RBL.db: field/well/run1/pass5.1 Total Length: 23.40 ft Total Weight: 194.00 lb O.D. 2.75 in						

Calibration Report	
Database File:	03-03-16_Noble Energy_Wells Ranch AF05-645_RBL.db
Dataset Pathname:	pass5.1
Dataset Creation:	Sat Mar 05 10:40:06 2016 by Calc 7.0 B1

Gamma Ray Calibration Report		
Serial Number:	FW1211-026	
Tool Model:	2.75"Digital	
Performed:	Wed Feb 24 10:35:47 2016	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.6	cps
Sensitivity:	0.6061	GAPI/cps

Segmented Cement Bond Log Calibration Report		
Serial Number:	FW1302-002	
Tool Model:	2-3/4"	
Calibration Casing Diameter:	5.500	in
Calibration Depth:	560.035	ft

Master Calibration, performed Sat Mar 05 10:39:16 2016:						
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.000	0.554	0.800	71.921	128.429	0.752
CAL	0.006	0.635				
5'	0.000	0.476	0.800	71.921	149.632	0.768
SUM						
S1	0.001	0.537	0.000	100.000	186.551	-0.130
S2	0.000	0.531	0.000	100.000	188.581	-0.094
S3	0.000	0.545	0.000	100.000	183.524	-0.048
S4	0.000	0.563	0.000	100.000	177.724	-0.038
S5	0.000	0.578	0.000	100.000	172.949	-0.043
S6	0.000	0.577	0.000	100.000	173.452	-0.056
S7	0.000	0.570	0.000	100.000	175.411	-0.051
S8	0.000	0.565	0.000	100.000	177.166	-0.086

Internal Reference Calibration, performed Thu Mar 03 16:04:00 2016:						
	Raw (v)		Calibrated (v)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
CAL	0.006	0.634	0.006	0.635	1.003	-0.000

	Raw (v)	Calibrated (v)	Results
	Zero	Zero	Offset
3'	0.006	0.000	0.000
5'	0.006	0.000	0.000
SUM			
S1	0.007	0.000	0.000
S2	0.006	0.000	0.000
S3	0.007	0.000	-0.000
S4	0.006	0.000	-0.000
S5	0.006	0.000	-0.000
S6	0.006	0.000	0.000
S7	0.006	0.000	-0.000
S8	0.006	0.000	0.000



Company	Noble Energy Inc.
Well	Wells Ranch AF05-645
Field	Wattenberg
County	Weld
State	Colorado