



Radial Cement Bond  
Gamma Ray  
Casing Collar Log

Company Noble Energy Inc.		Company Noble Energy Inc.	
Well Wells Ranch AE32-665		Well Wells Ranch AE32-665	
Field Wattenberg		Field Wattenberg	
County Weld		County Weld	
State Colorado		State Colorado	
Location:		API #: 05-123-41726	
SEC 32 TWP 6N RGE 62W		Other Services	
Permanent Datum		Ground Level	
Log Measured From Kelly Bushing		Elevation 4728'	
Drilling Measured From Kelly Bushing		Elevation K.B. 4758'	
		D.F. 4757'	
		G.L. 4728'	
Date		15-OCT-2015	
Run Number		One	
Depth Driller		16025 FT	
Depth Logger		6676 FT	
Bottom Logged Interval		6671 FT	
Top Log Interval		Surface	
Open Hole Size		8.750"	
Type Fluid		Water	
Density / Viscosity		8.34 lbm/gal	
Max. Recorded Temp.		221°F	
Estimated Cement Top		114 FT	
Time Well Ready		ROA	
Time Logger on Bottom		12:15 PM	
Equipment Number		HD-0340	
Location		Fort Lupton, CO	
Recorded By		B. Kalkwarf	
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	
J-55		30 FT	
Intermediate #1		7	
P-110		30 FT	
Intermediate #2		4 1/2	
P-110IC		6648.2 FT	
Liner		11.6	
P-110IC		6648.2 FT	
16010 FT			

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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  
Log ran from liner top to Surface  
Log was correlated to Casing Tally liner top of 6648.2 FT  
Adjusted log 6 FT from KB to correlate with liner top  
Recorded with 2500 PSI surface induced pressure  
Logging tools were clean and free of any debris upon completion of operations  
  
Thank you for choosing FMC Technologies Completion Services, Inc.!!



Main Pass

Recorded with 2500 PSI Surface Induced Pressure

Database File: c:\warrior\data\noble energy\_wells ranch ae32-665\10-15-15\_noble energy\_wells ranch ae32-665\_mit

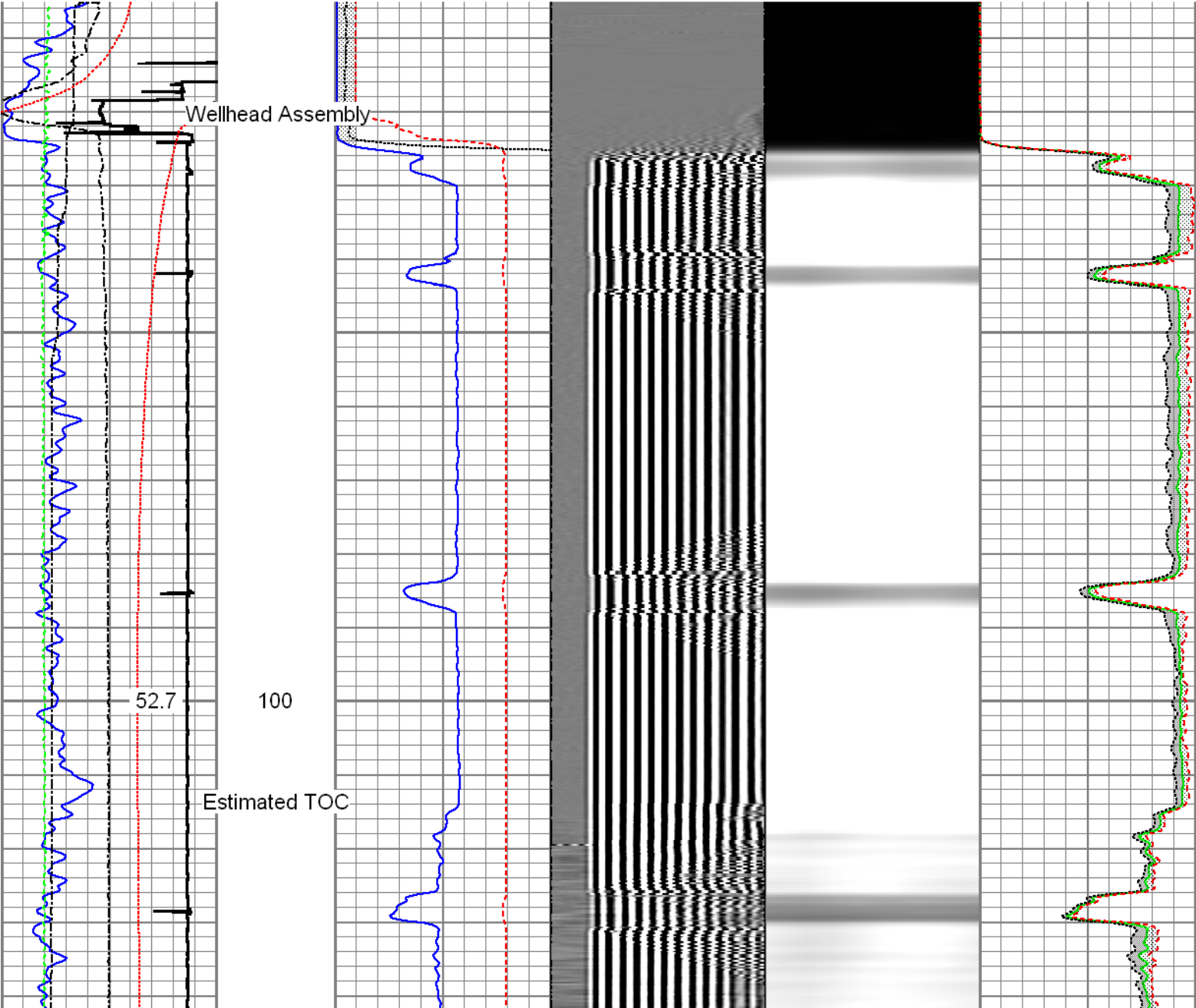
Dataset Pathname: pass4

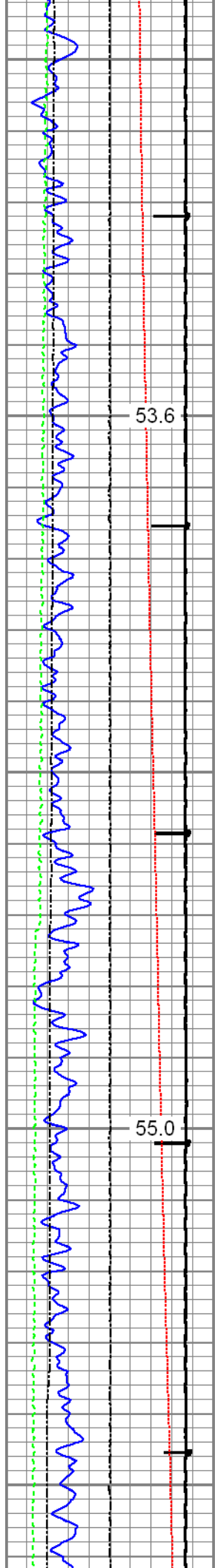
Presentation Format: rbt4\_mit

Dataset Creation: Thu Oct 15 12:28:02 2015 by Log 7.0 B1

Charted by: Depth in Feet scaled 1:240

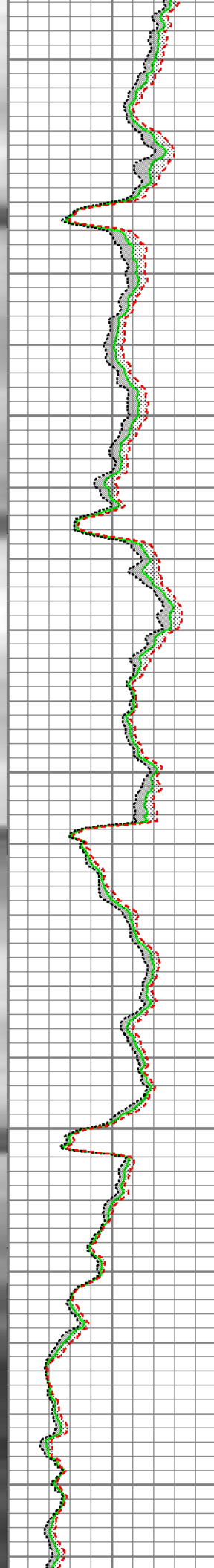
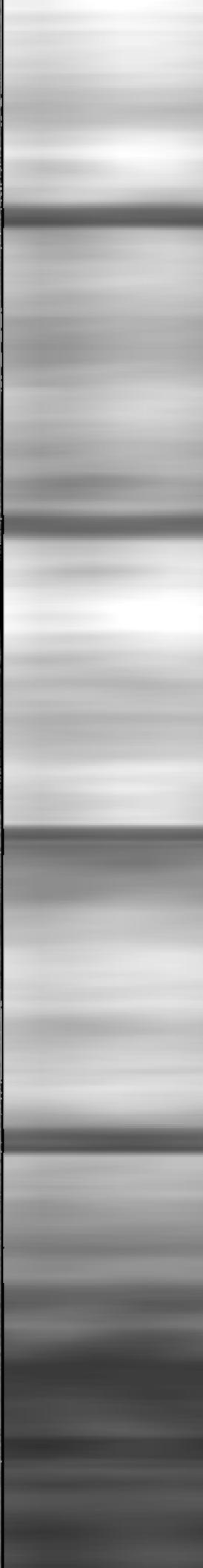
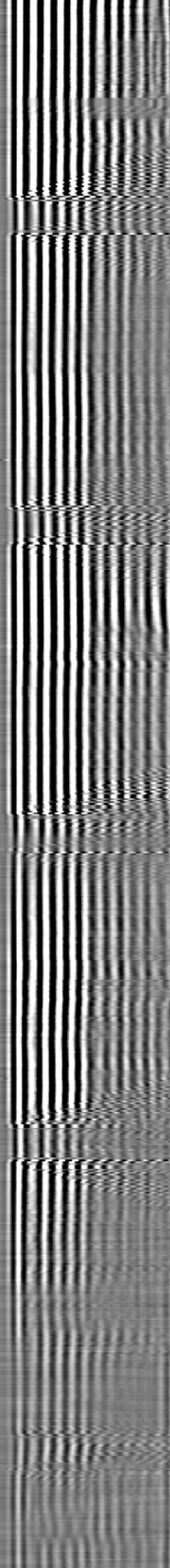
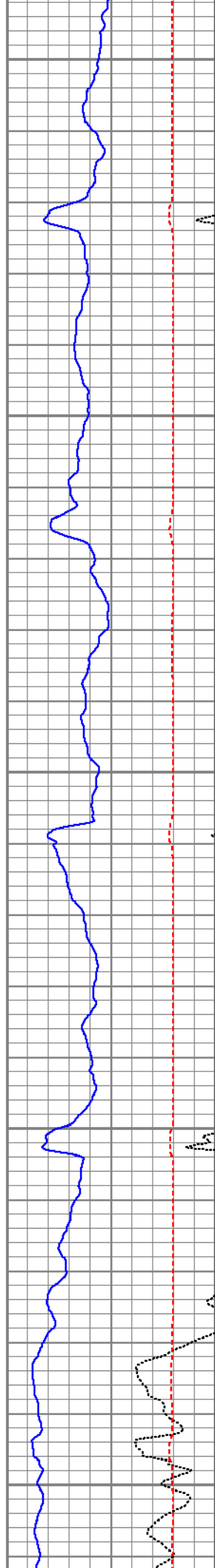
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000				
Differential Temperature				
-2 (degF) 2				
Temperature				
0 (degF) 20				

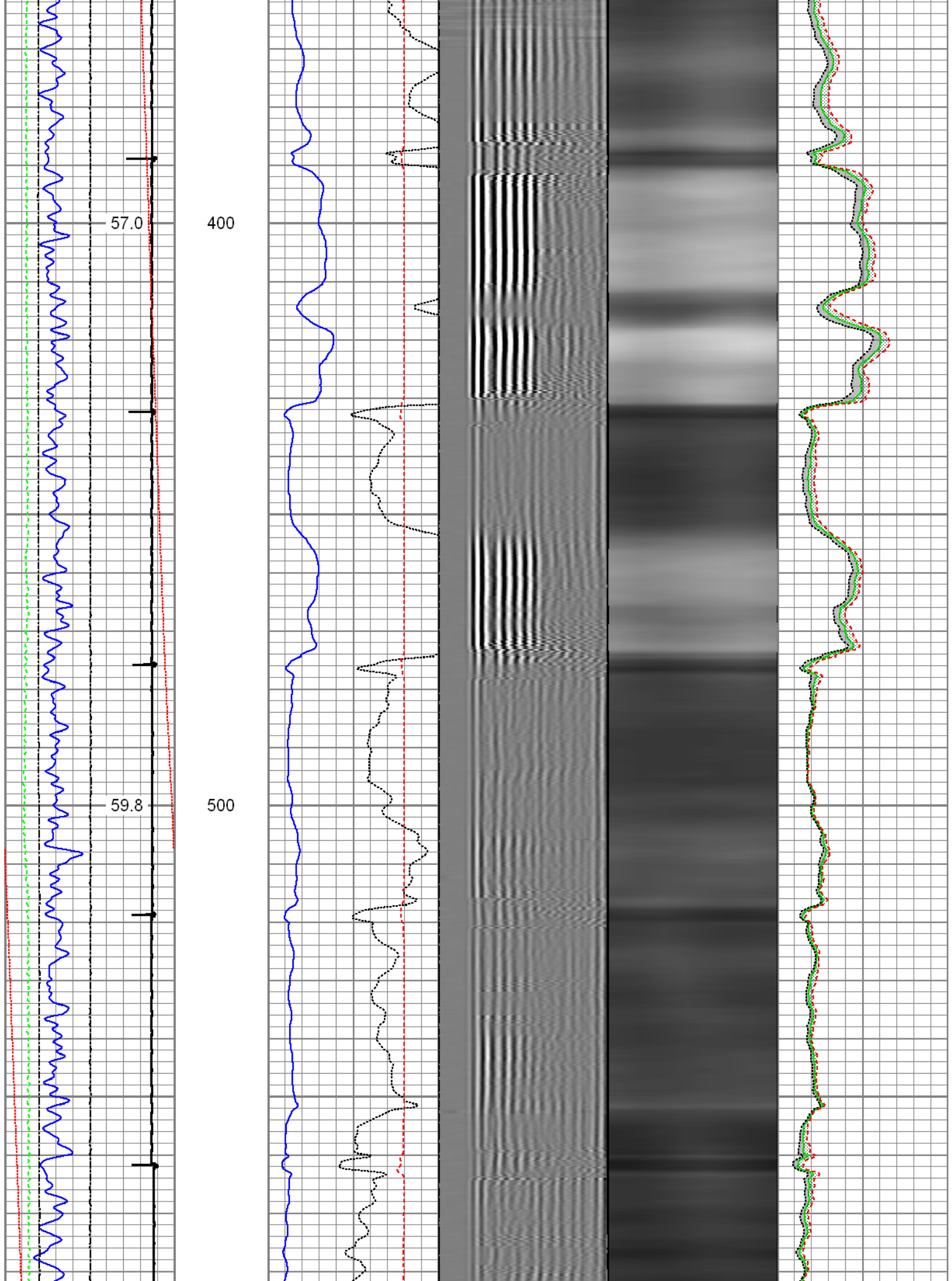




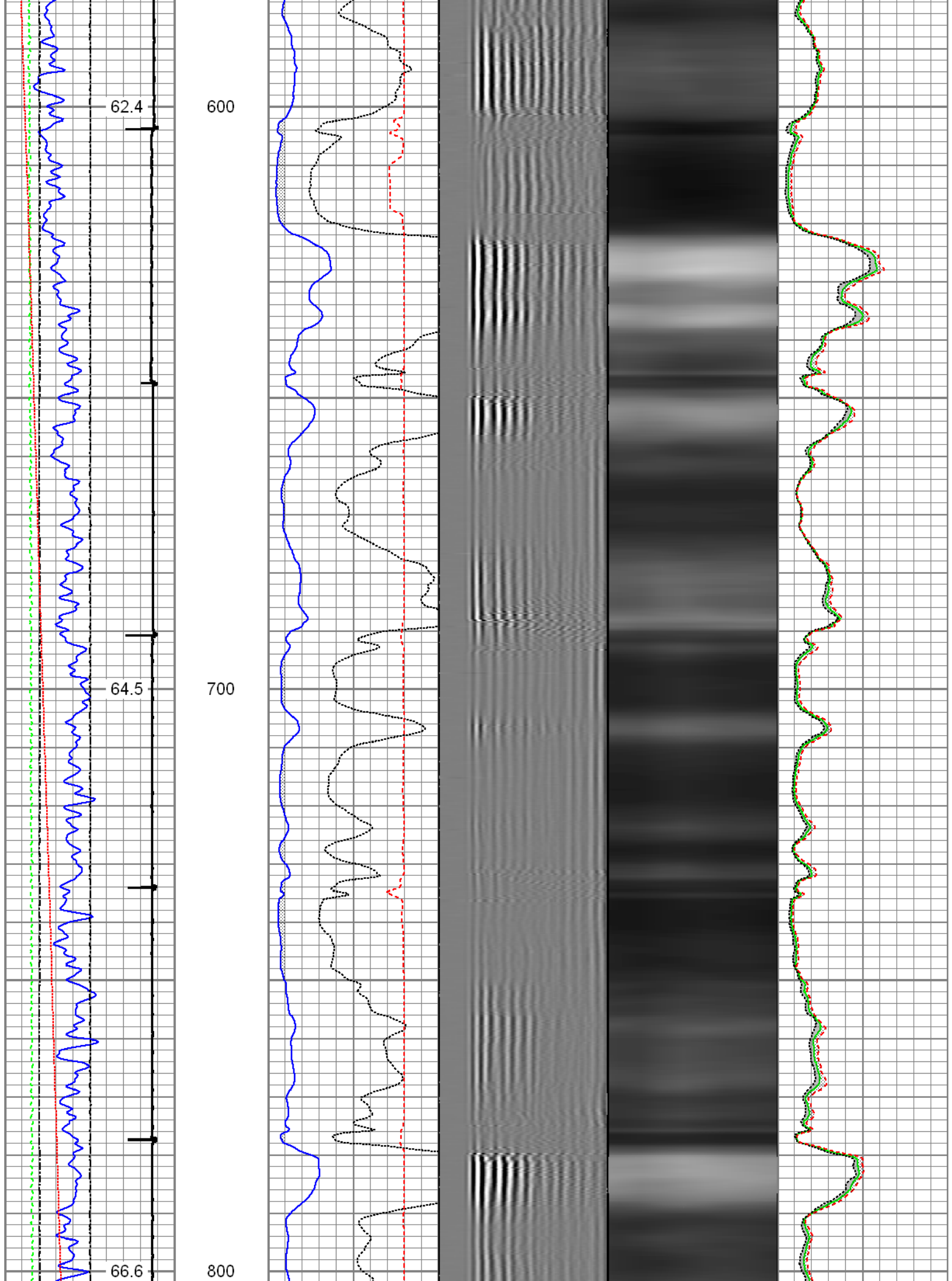
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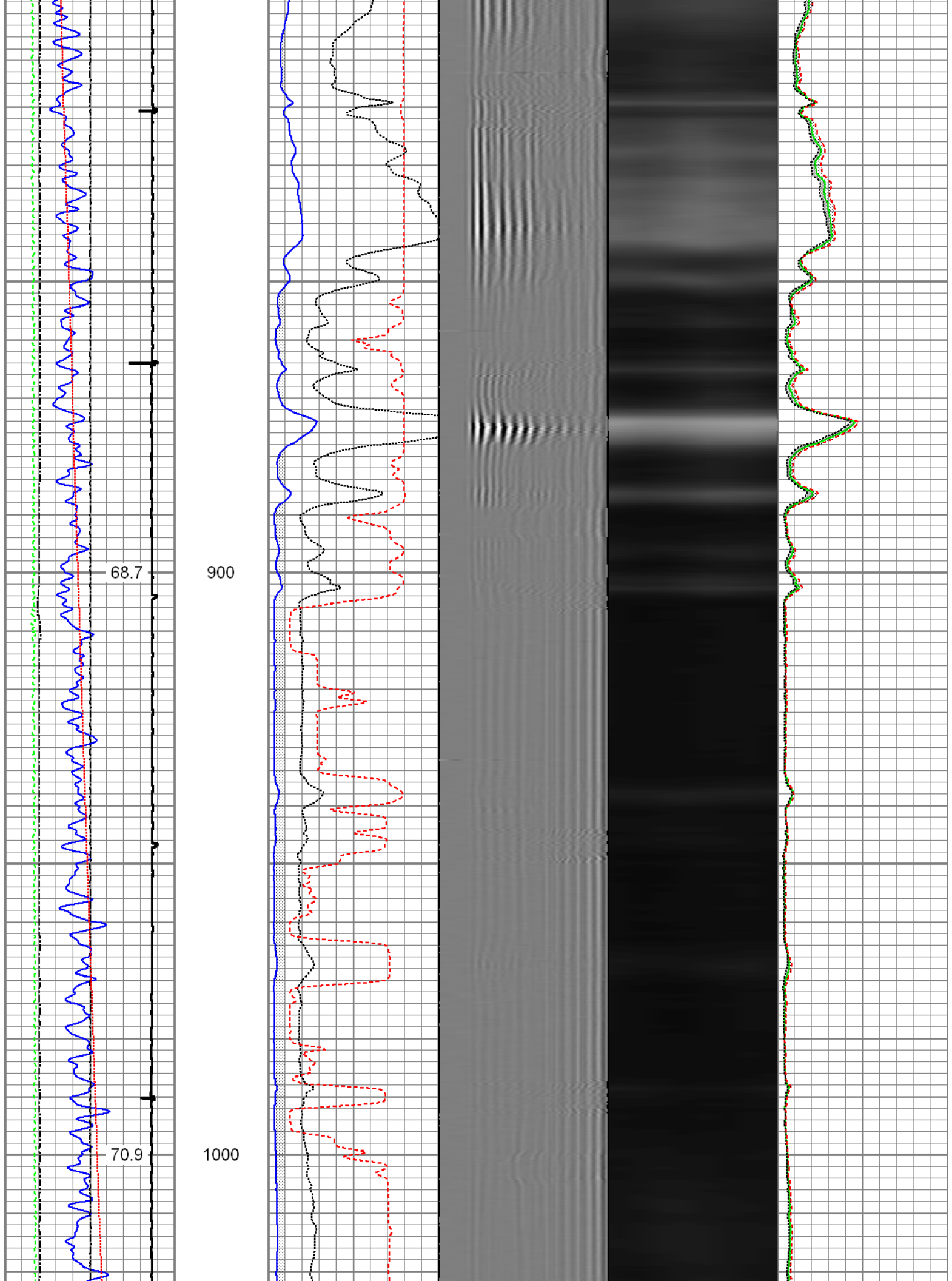
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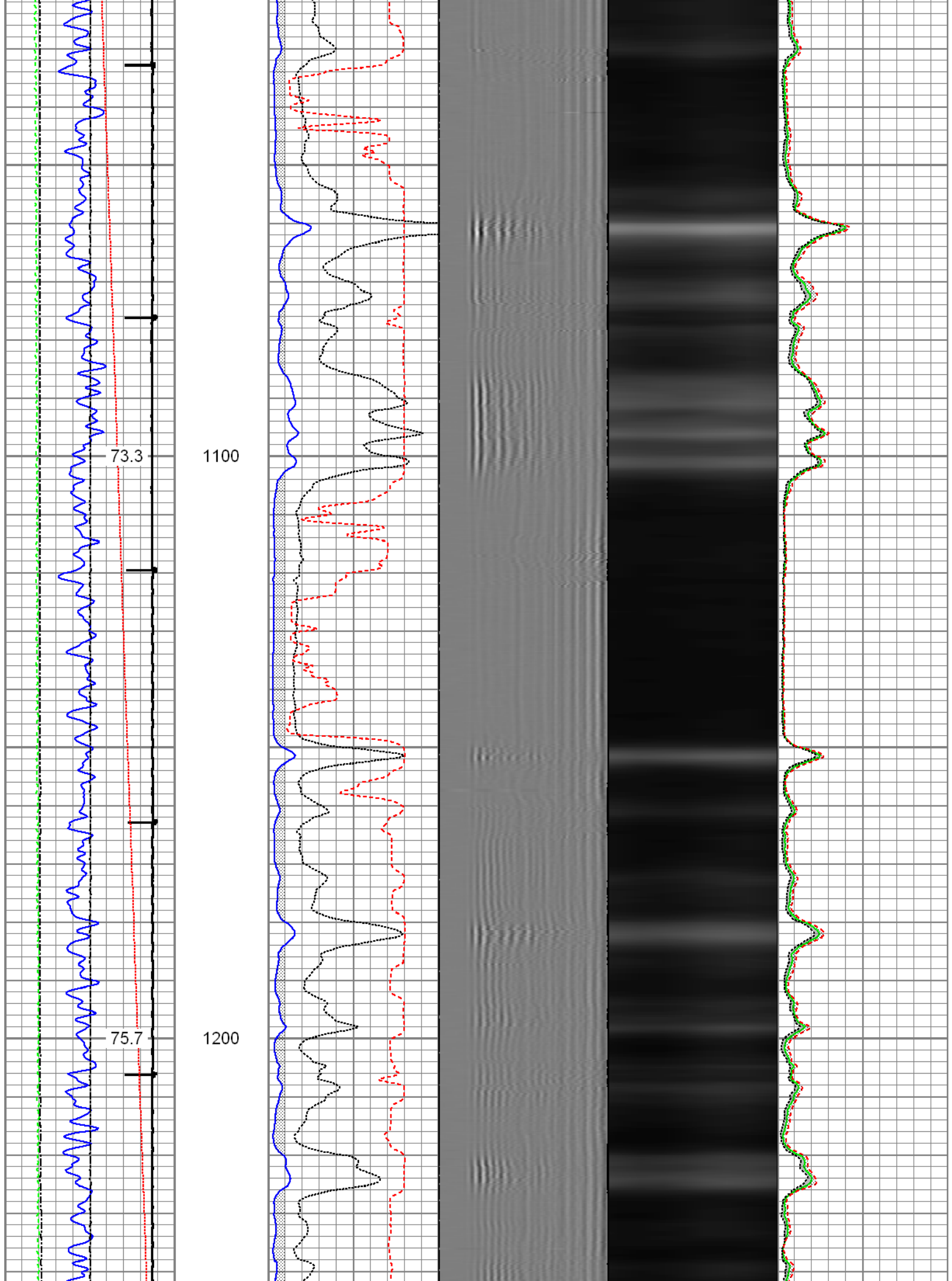


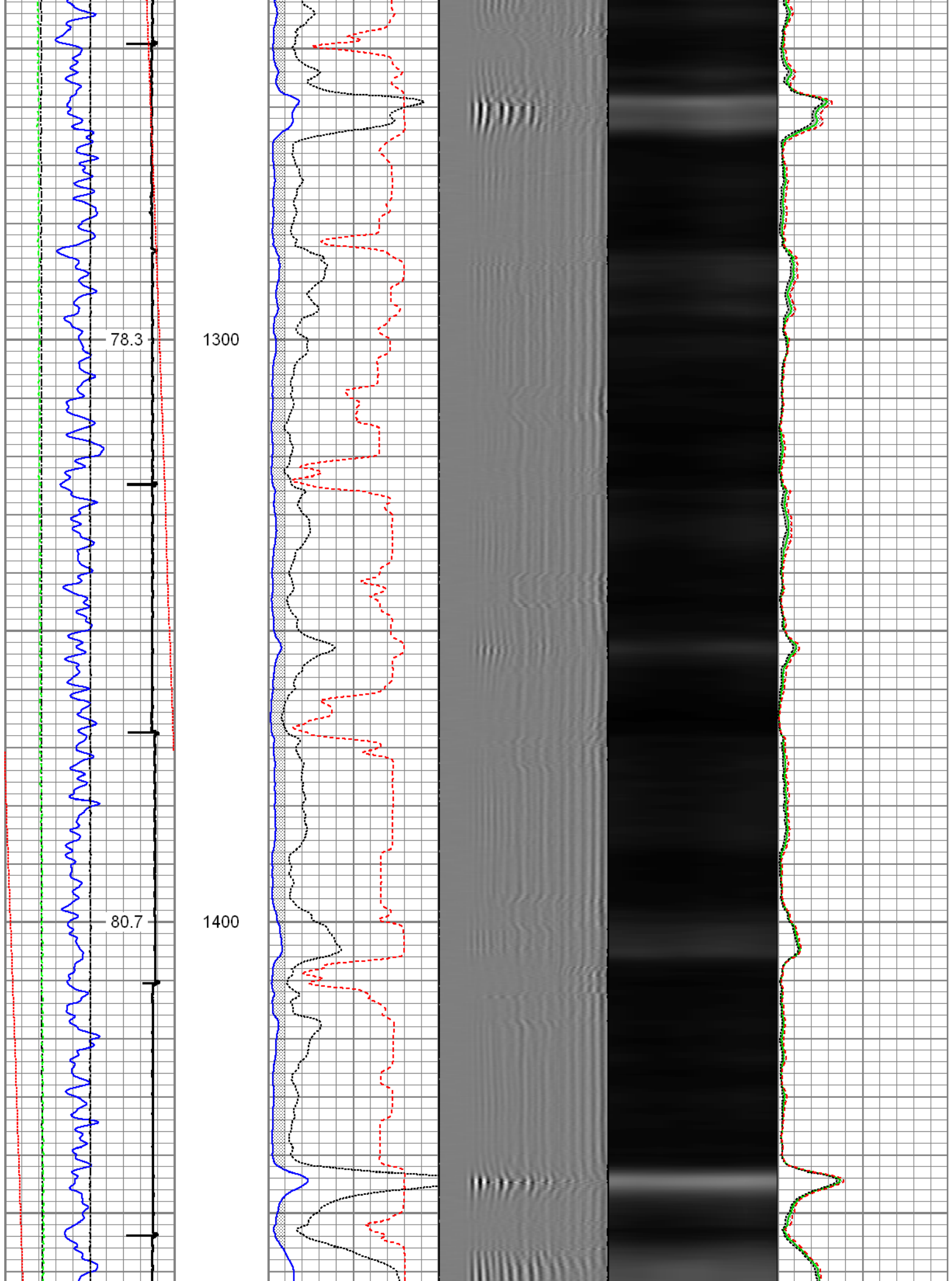




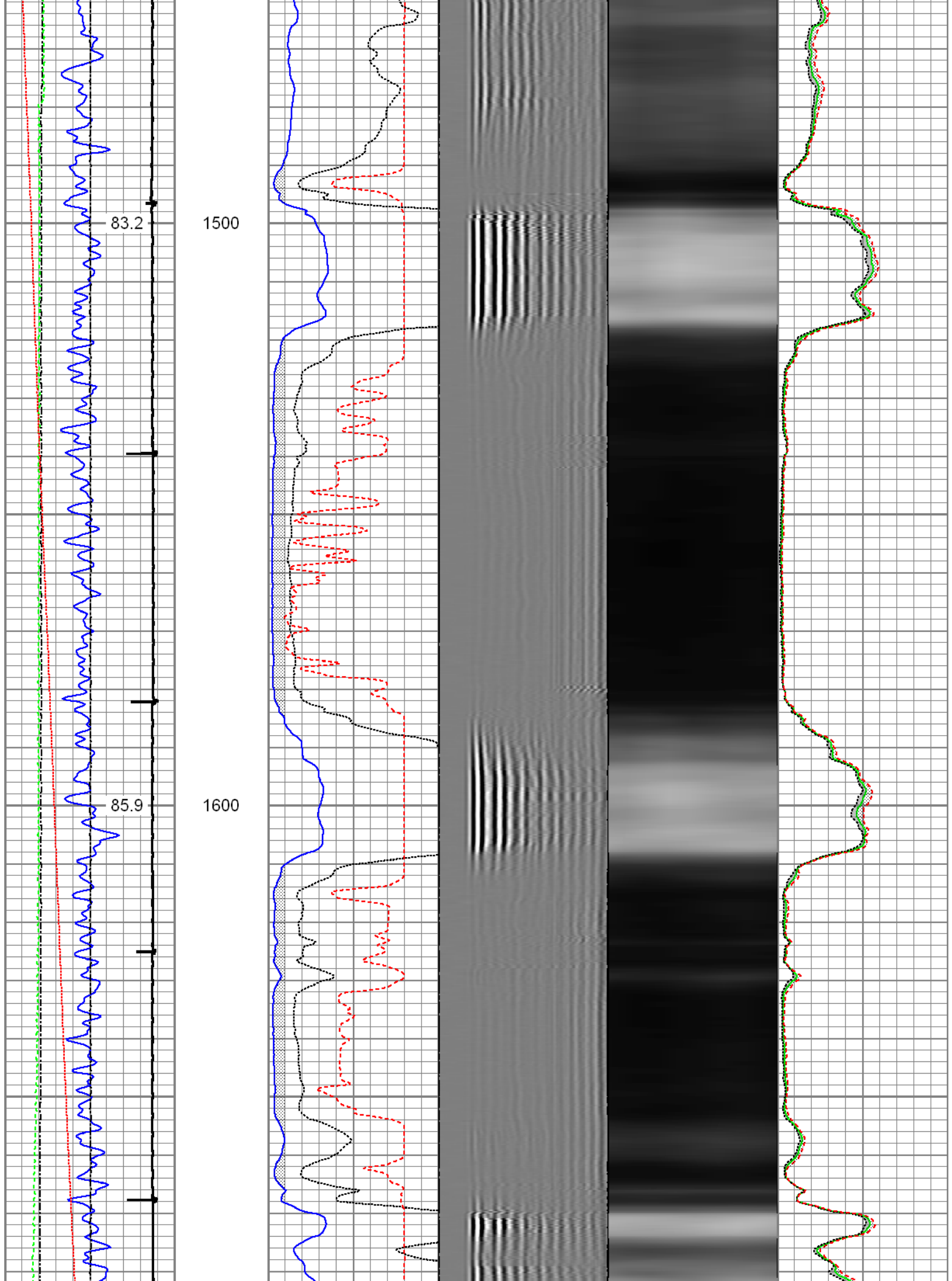


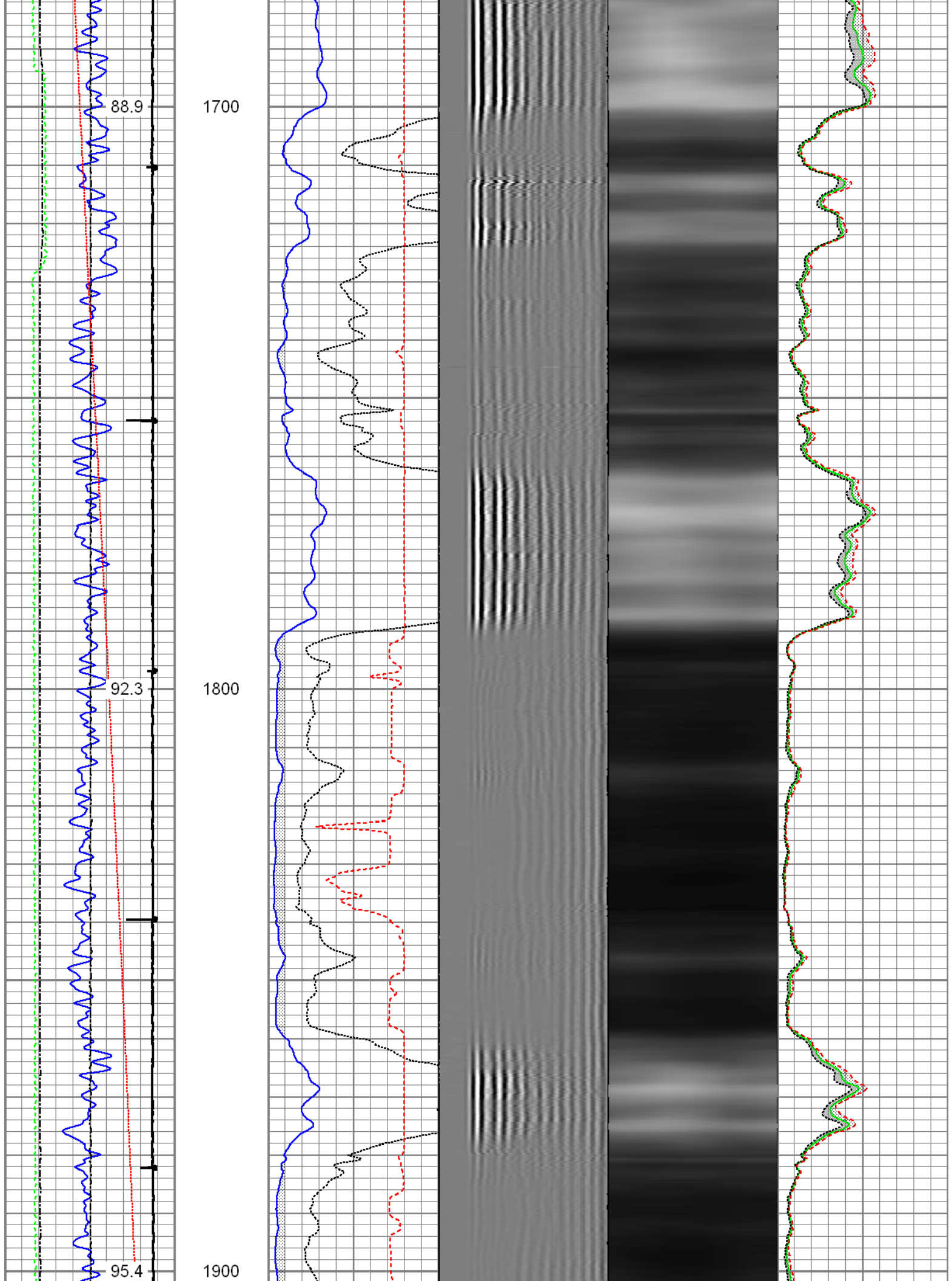


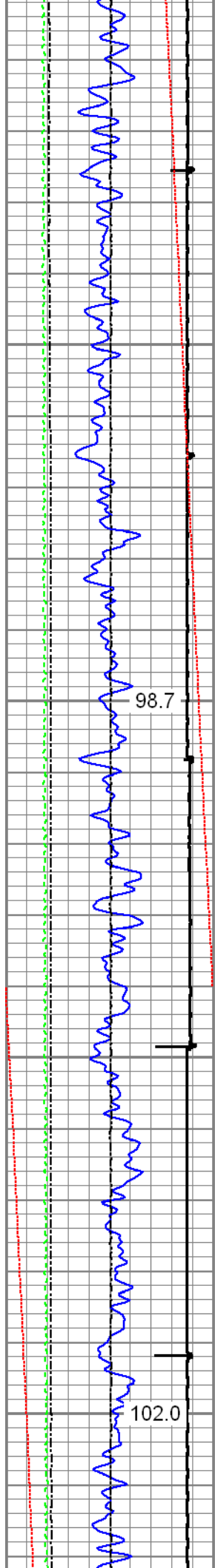






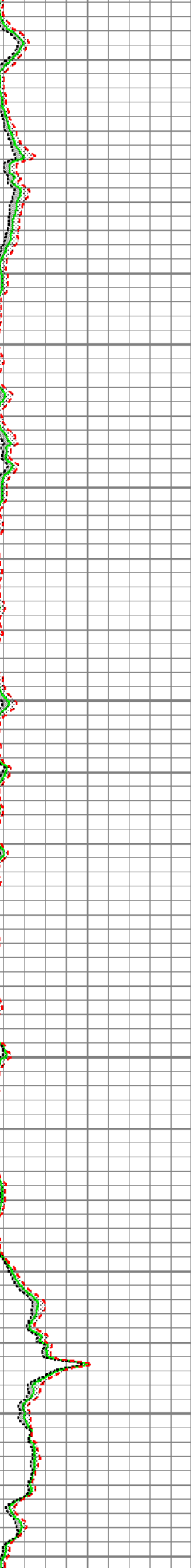
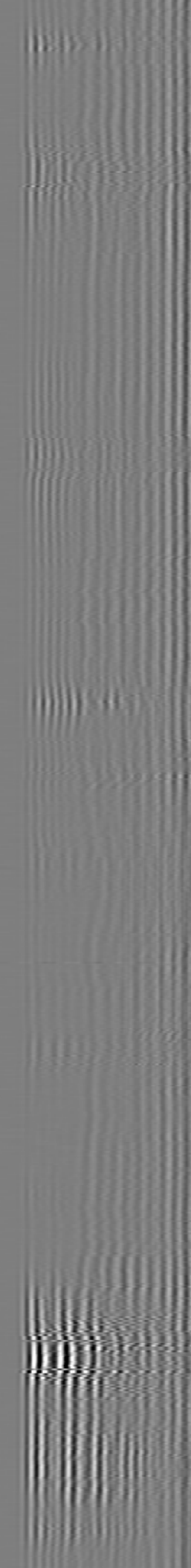
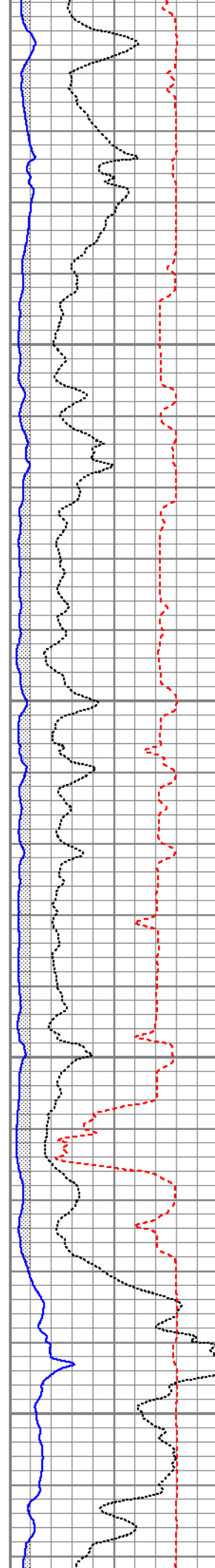


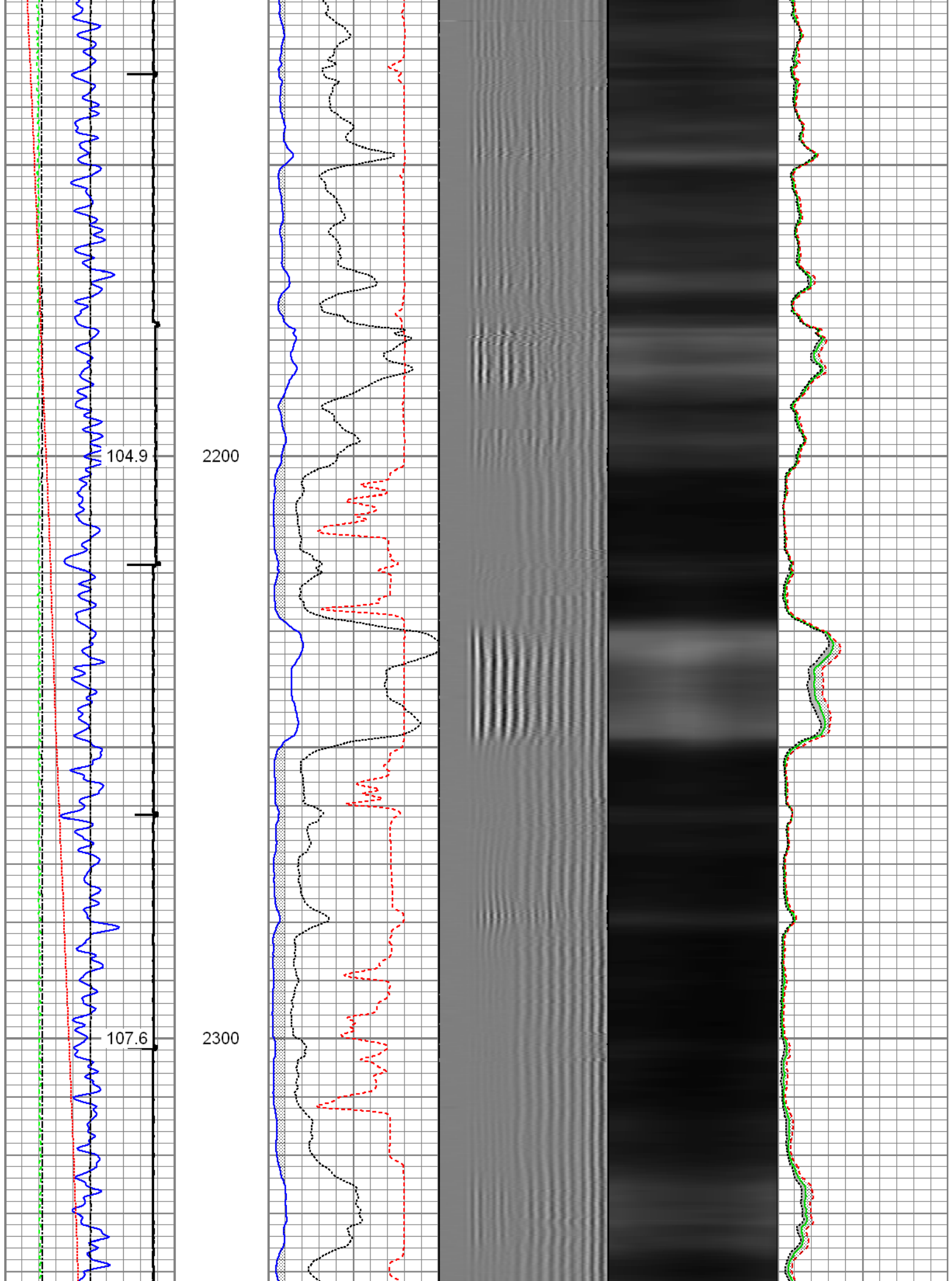




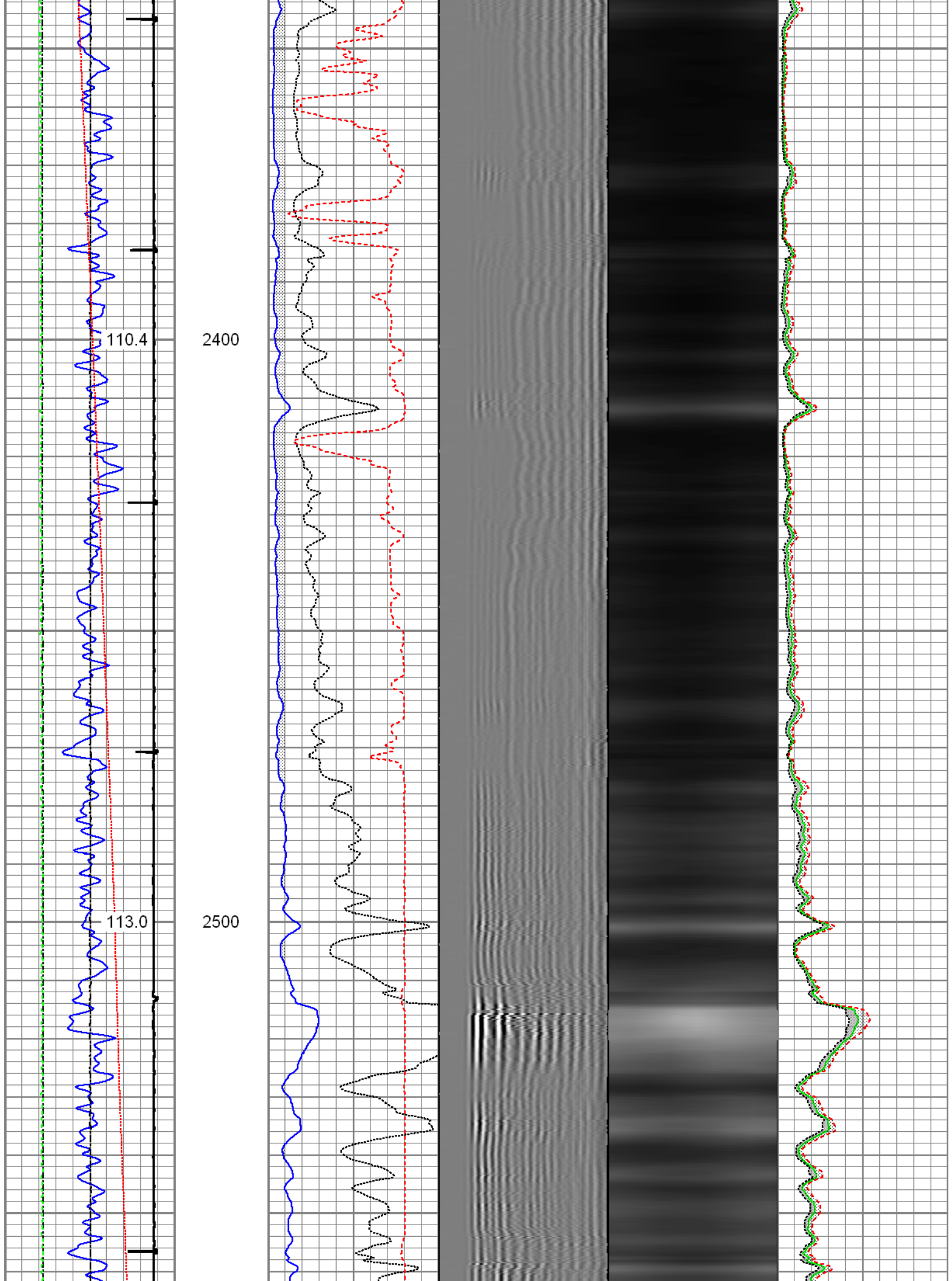
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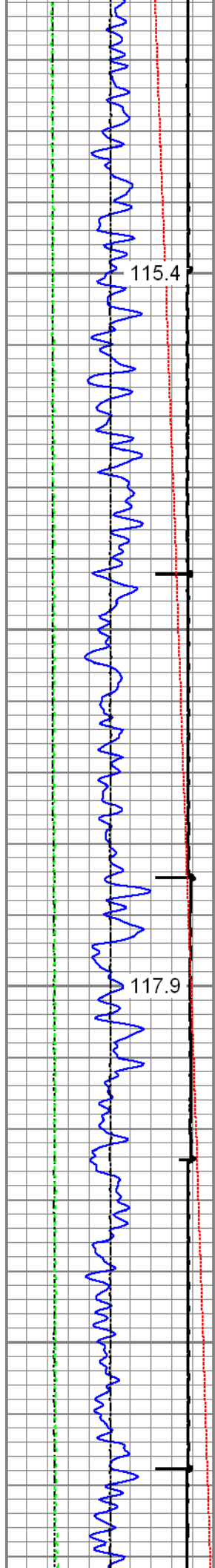
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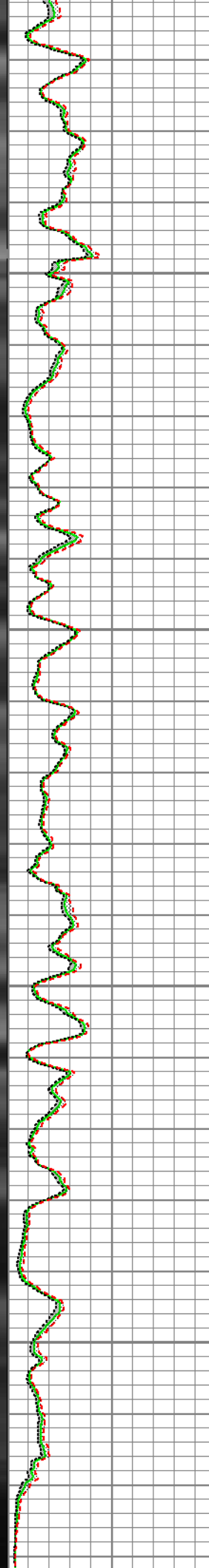
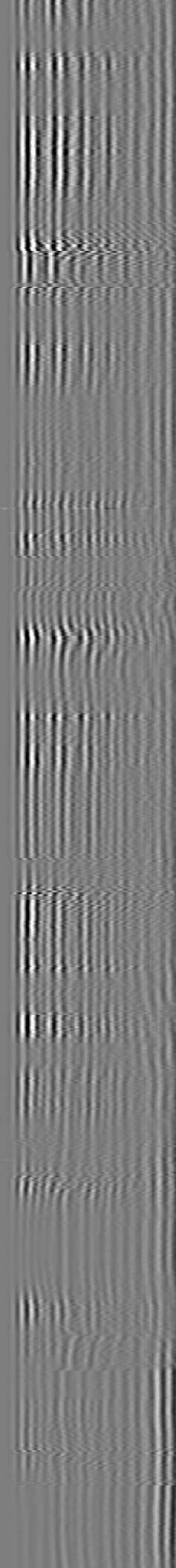
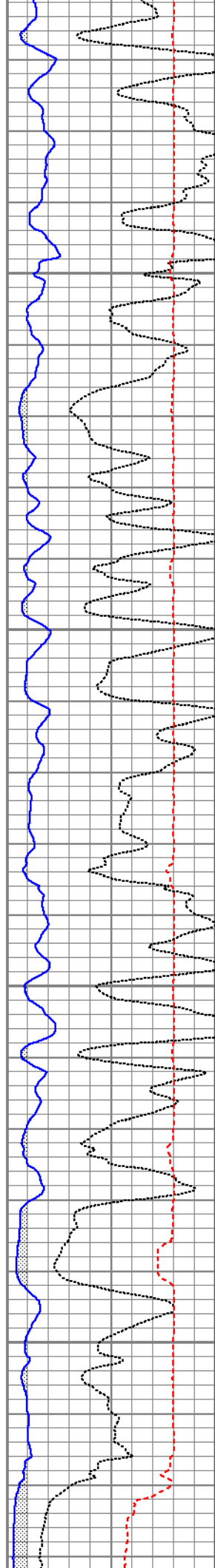


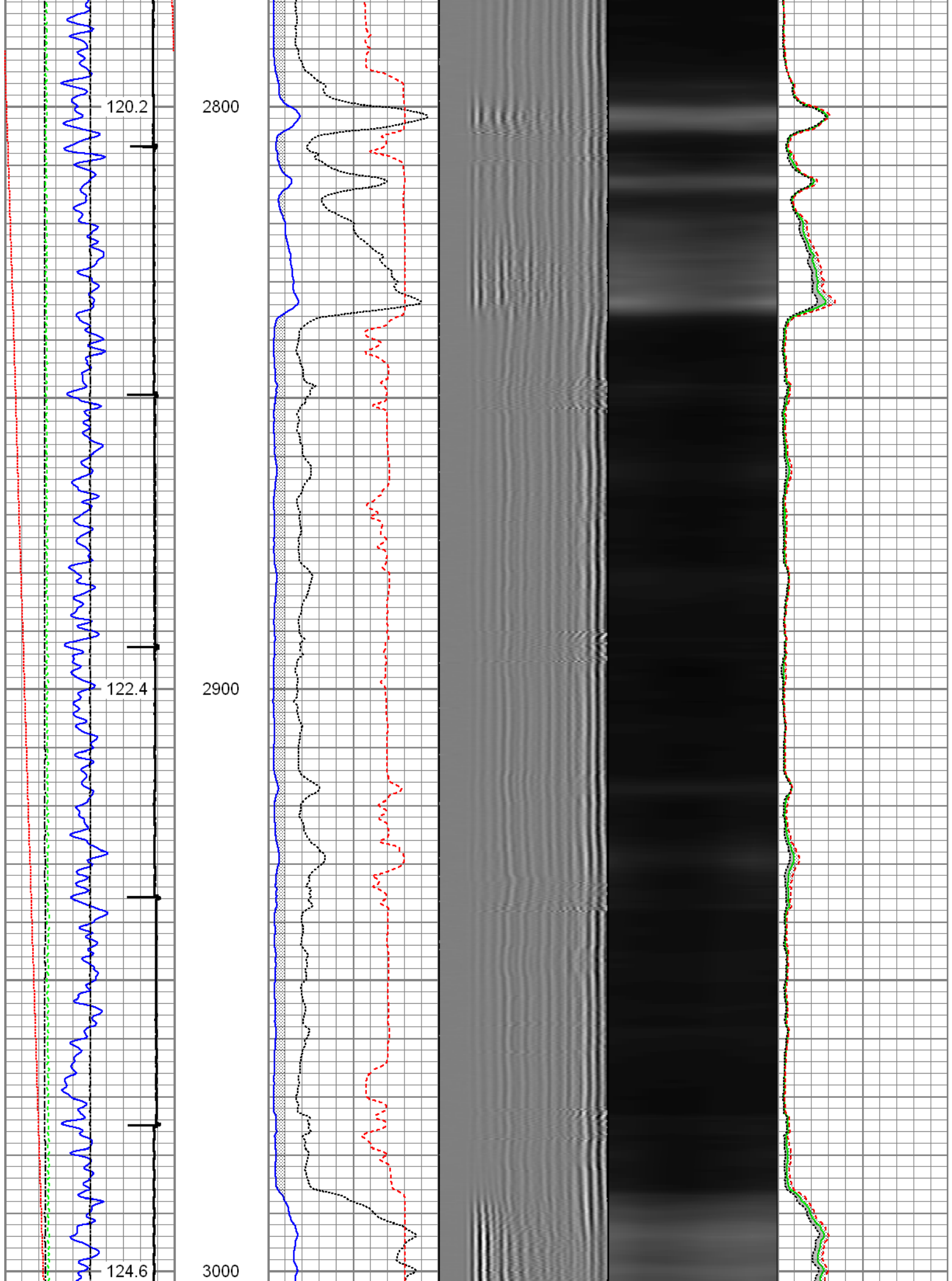


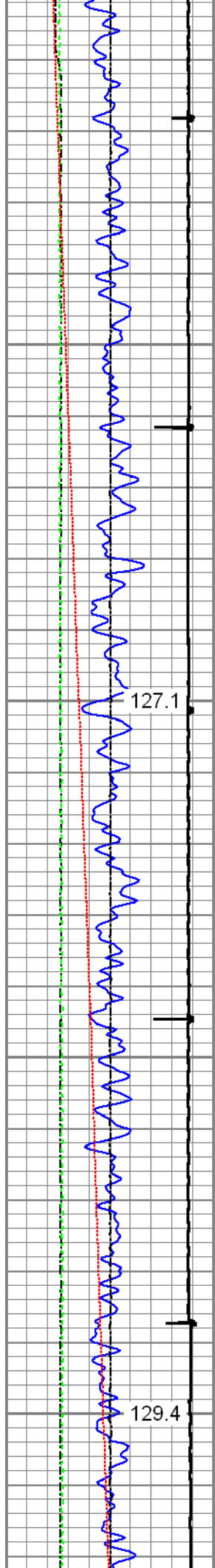


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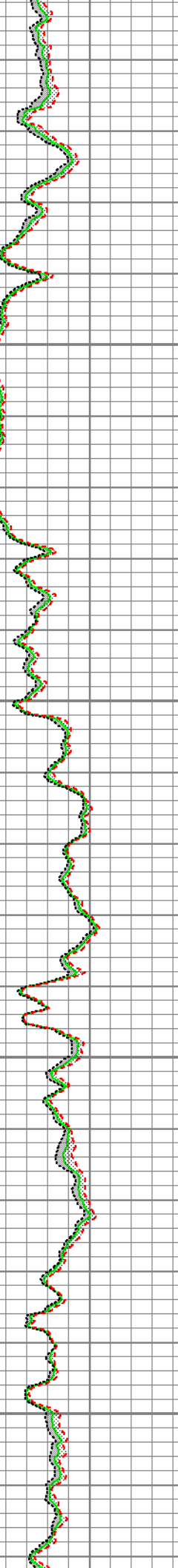
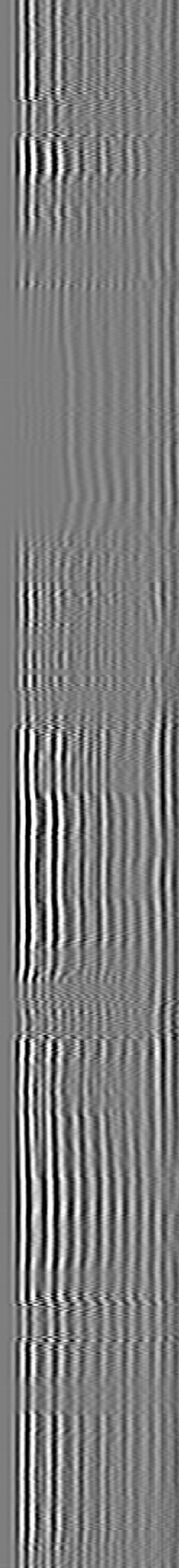
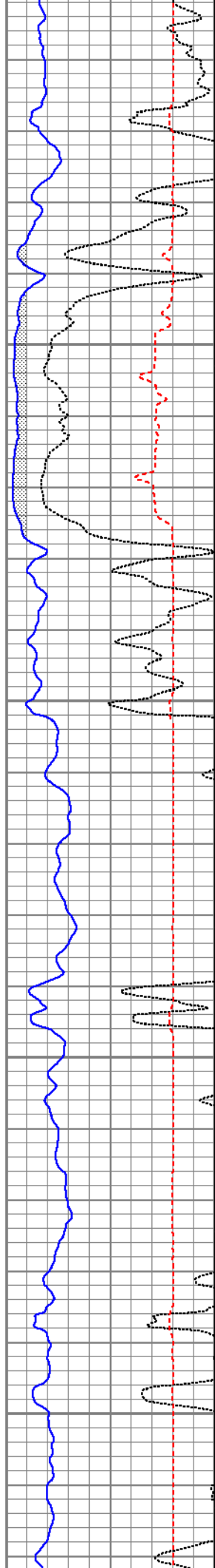




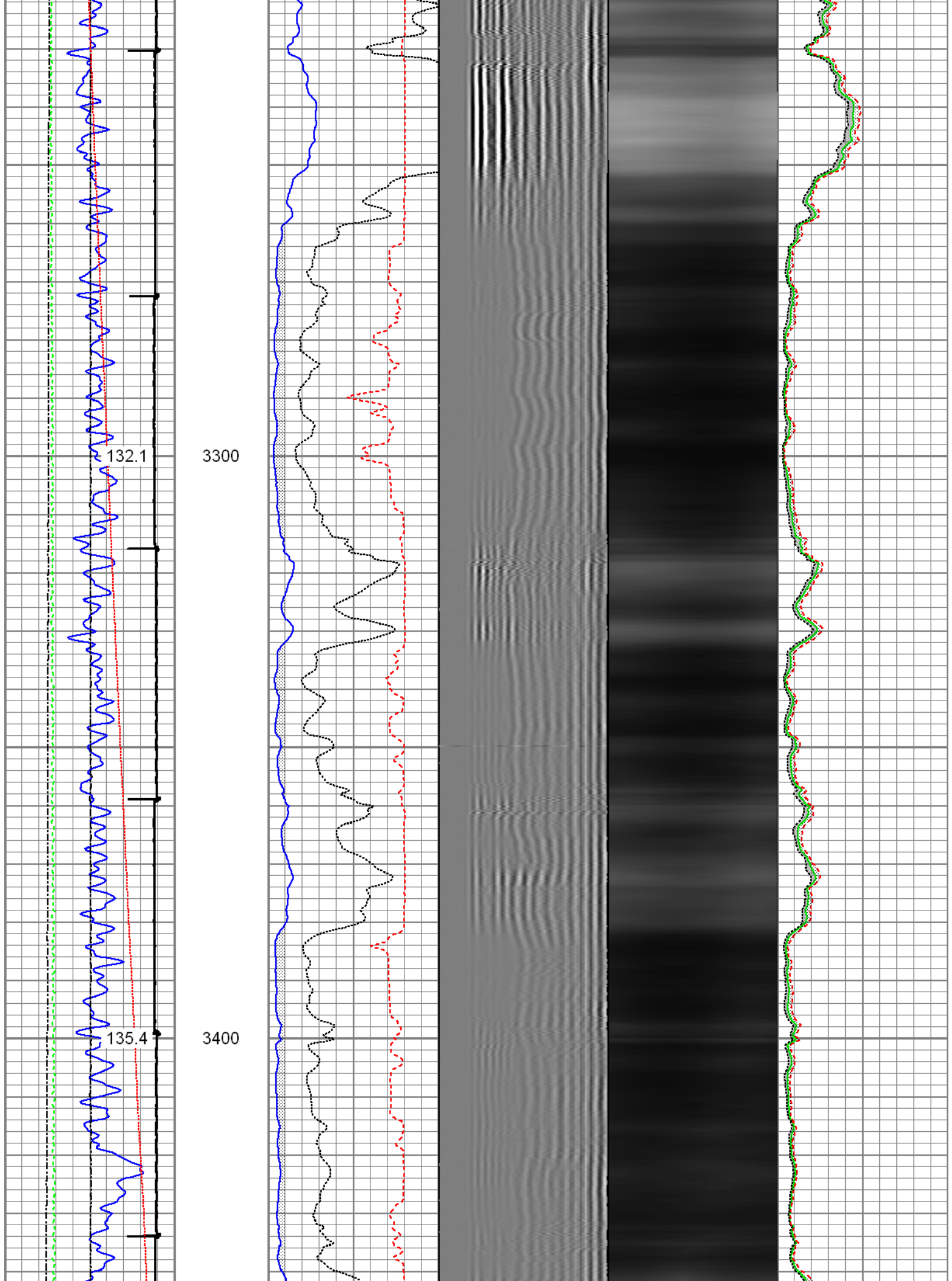


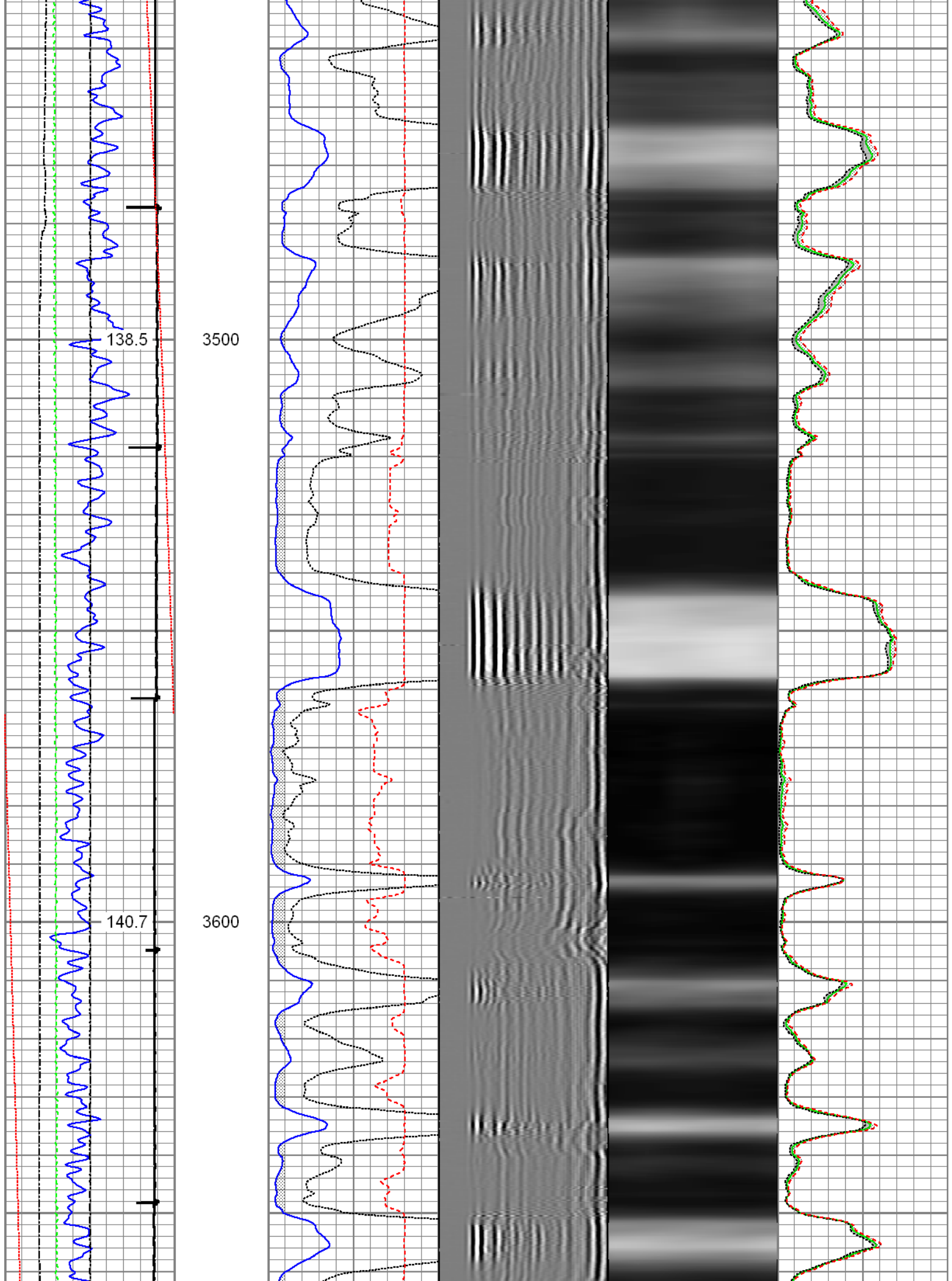
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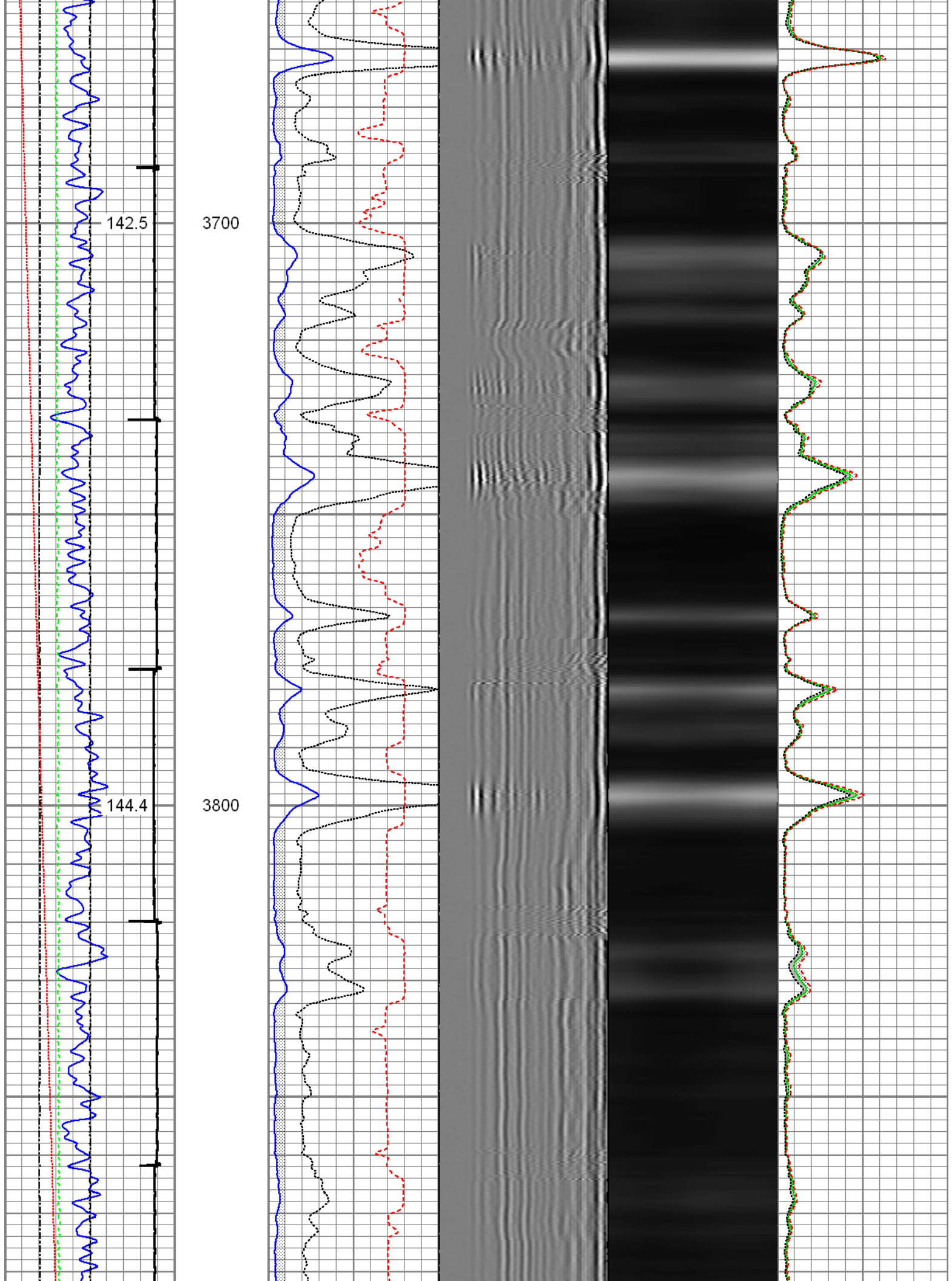
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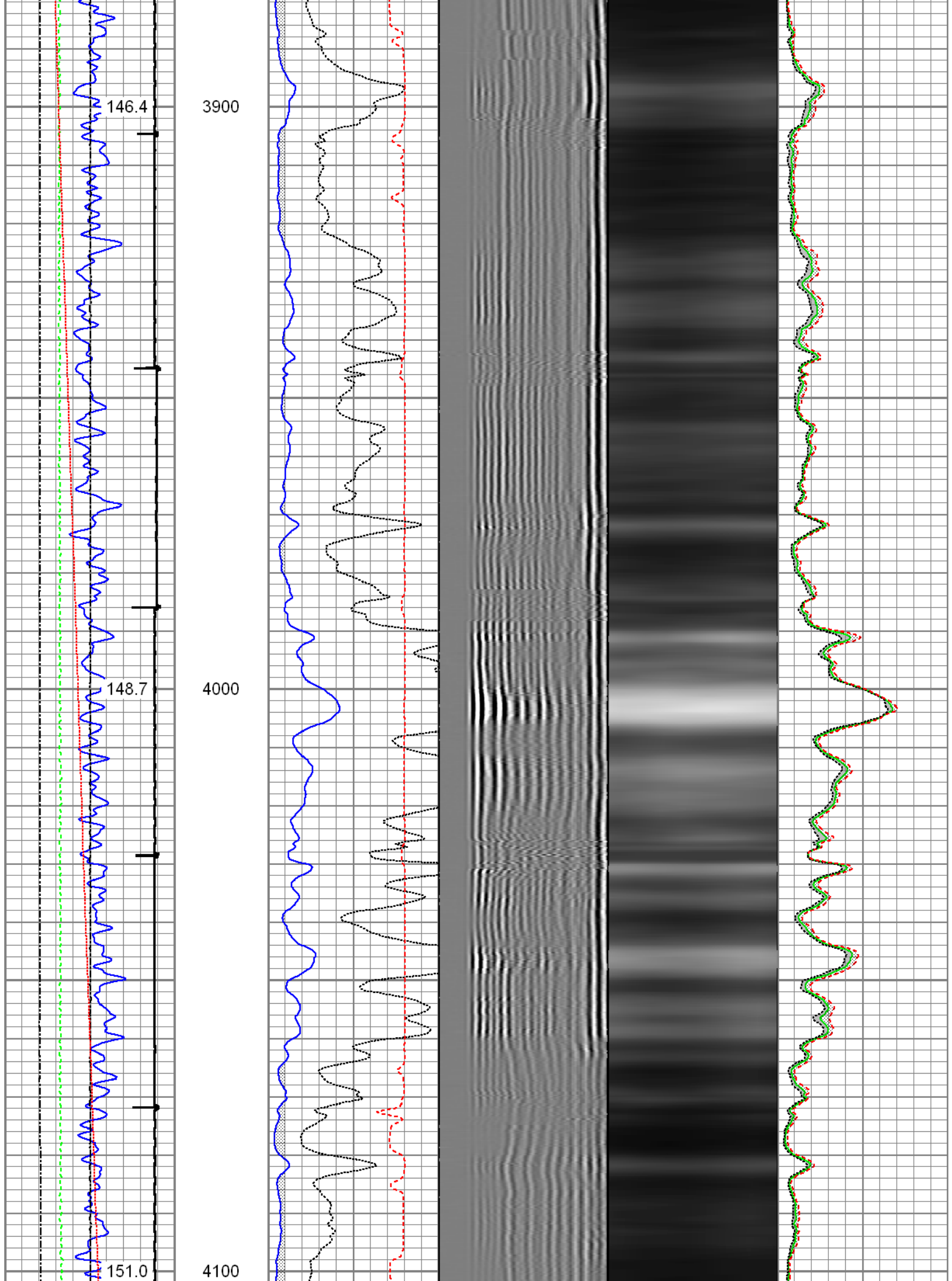




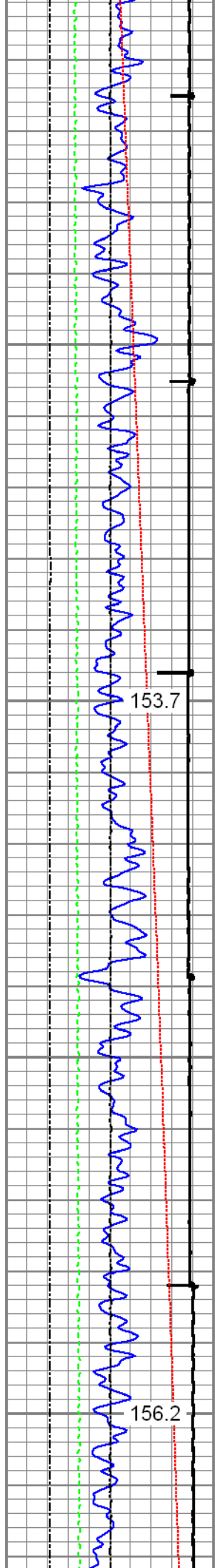






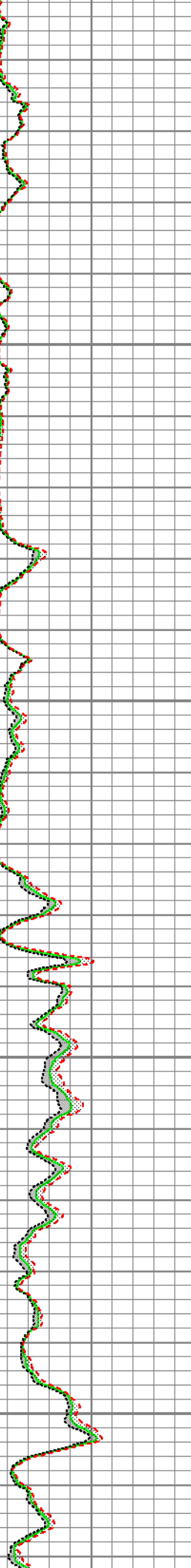
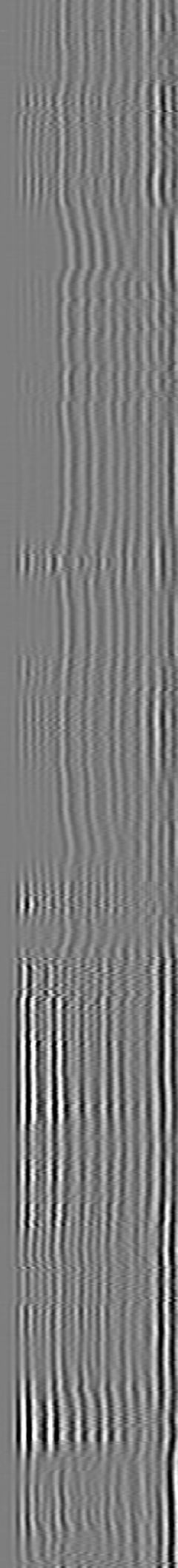
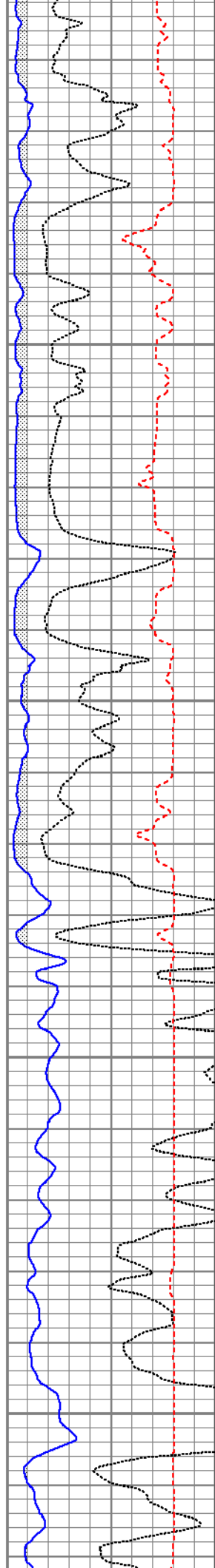


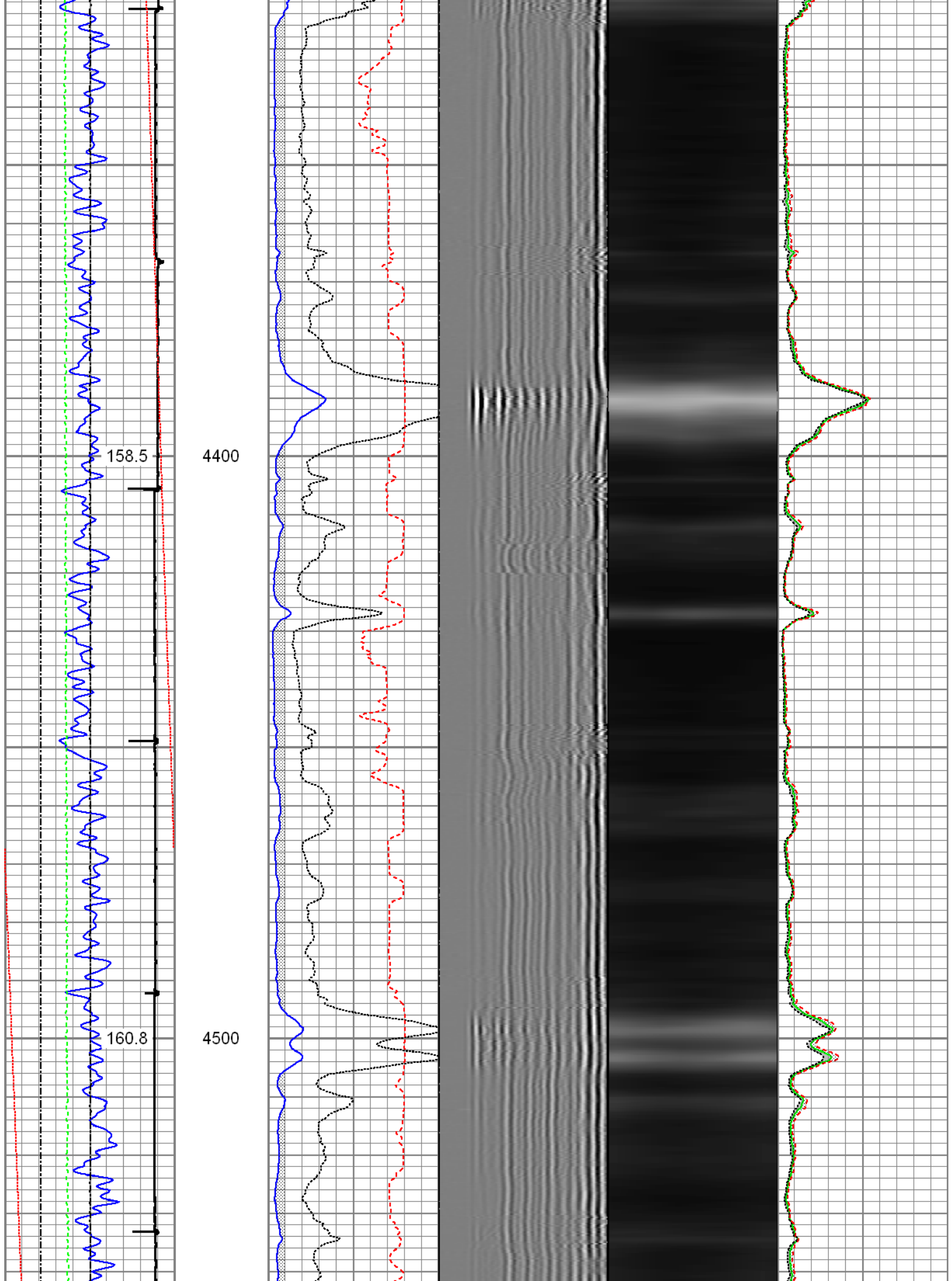


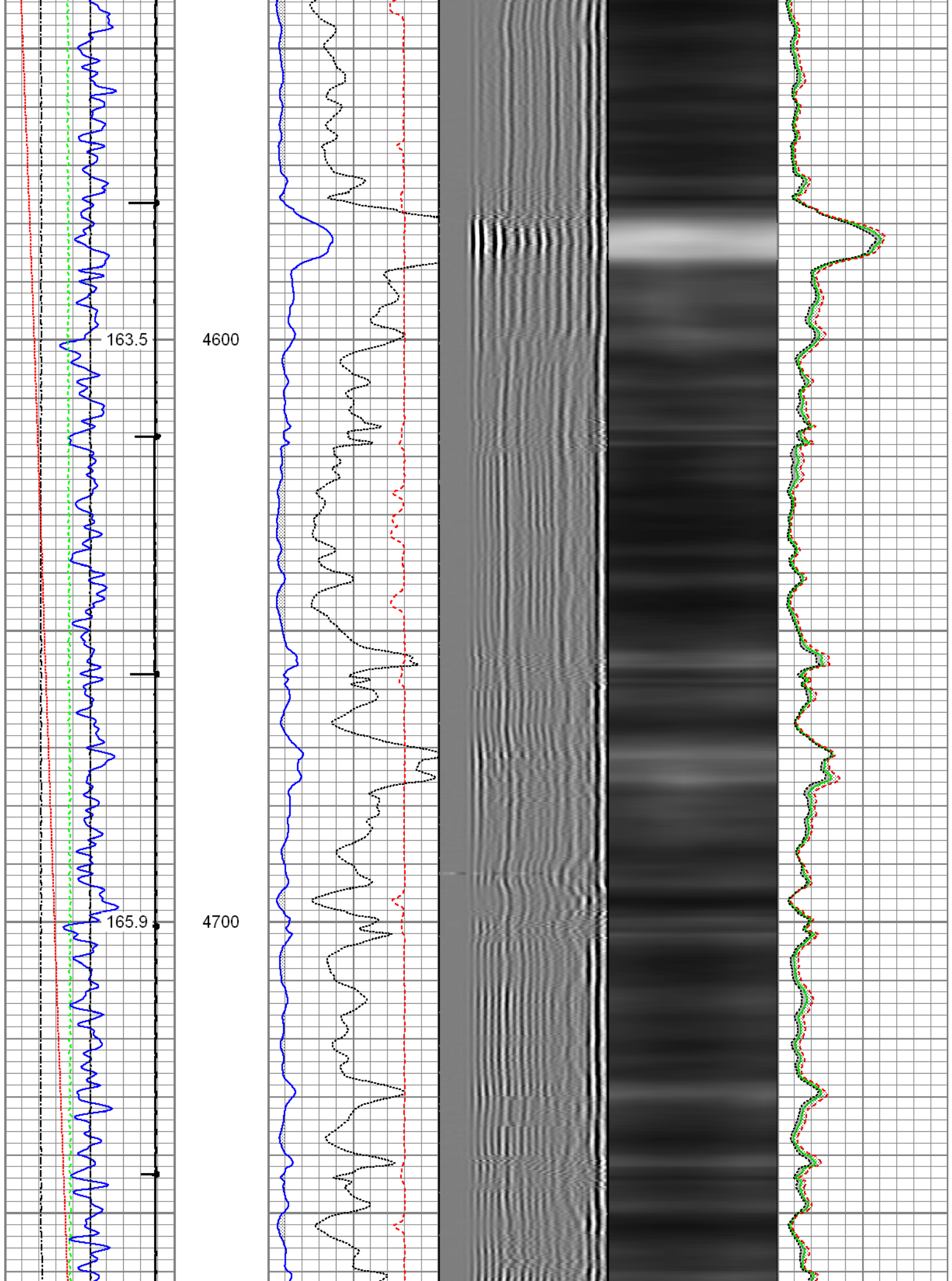


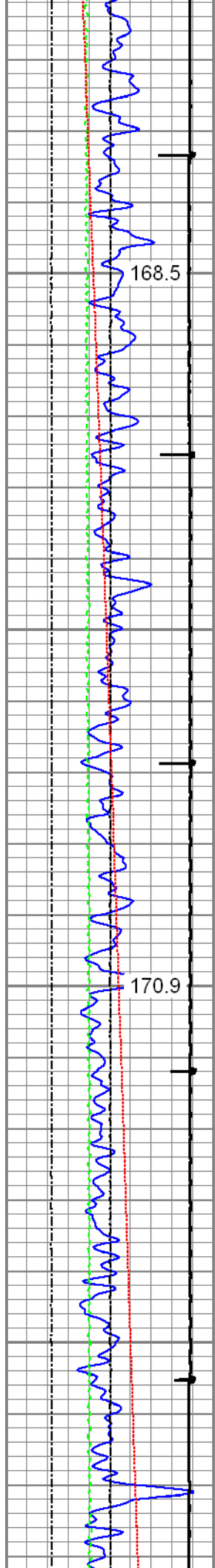
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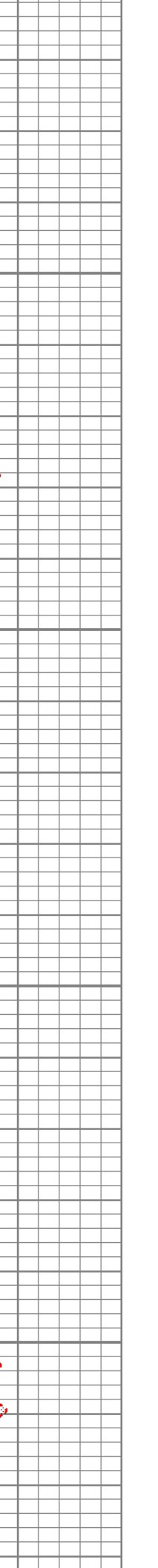
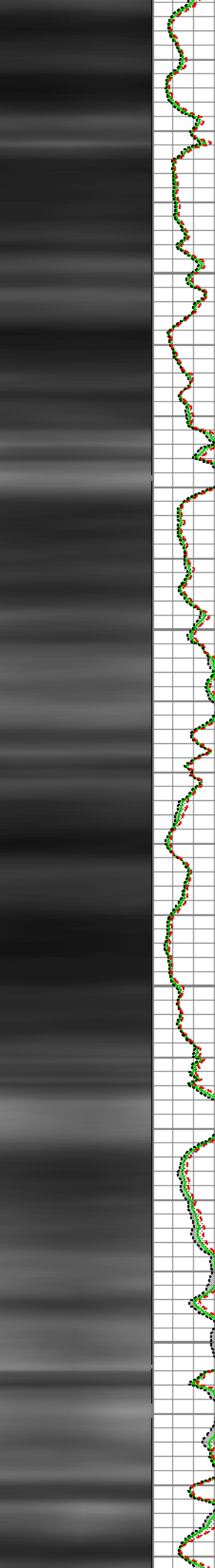
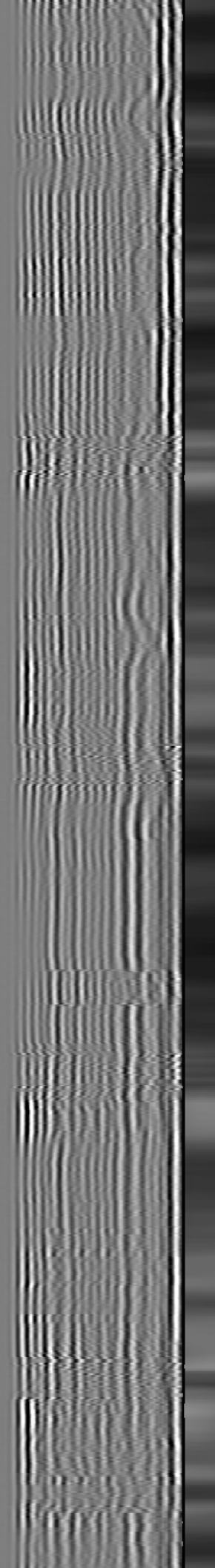
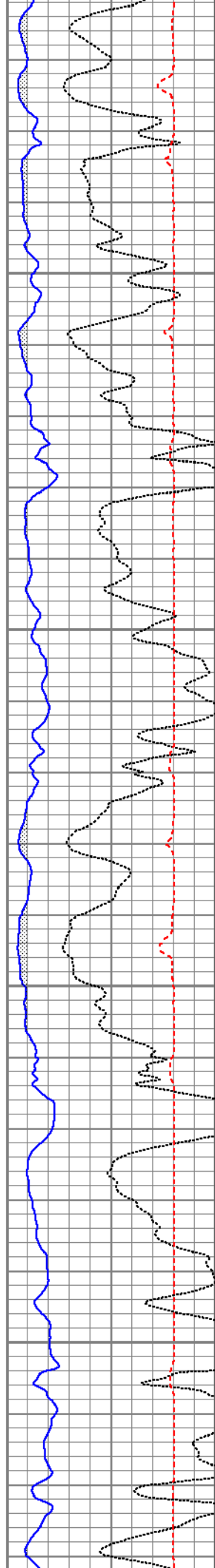




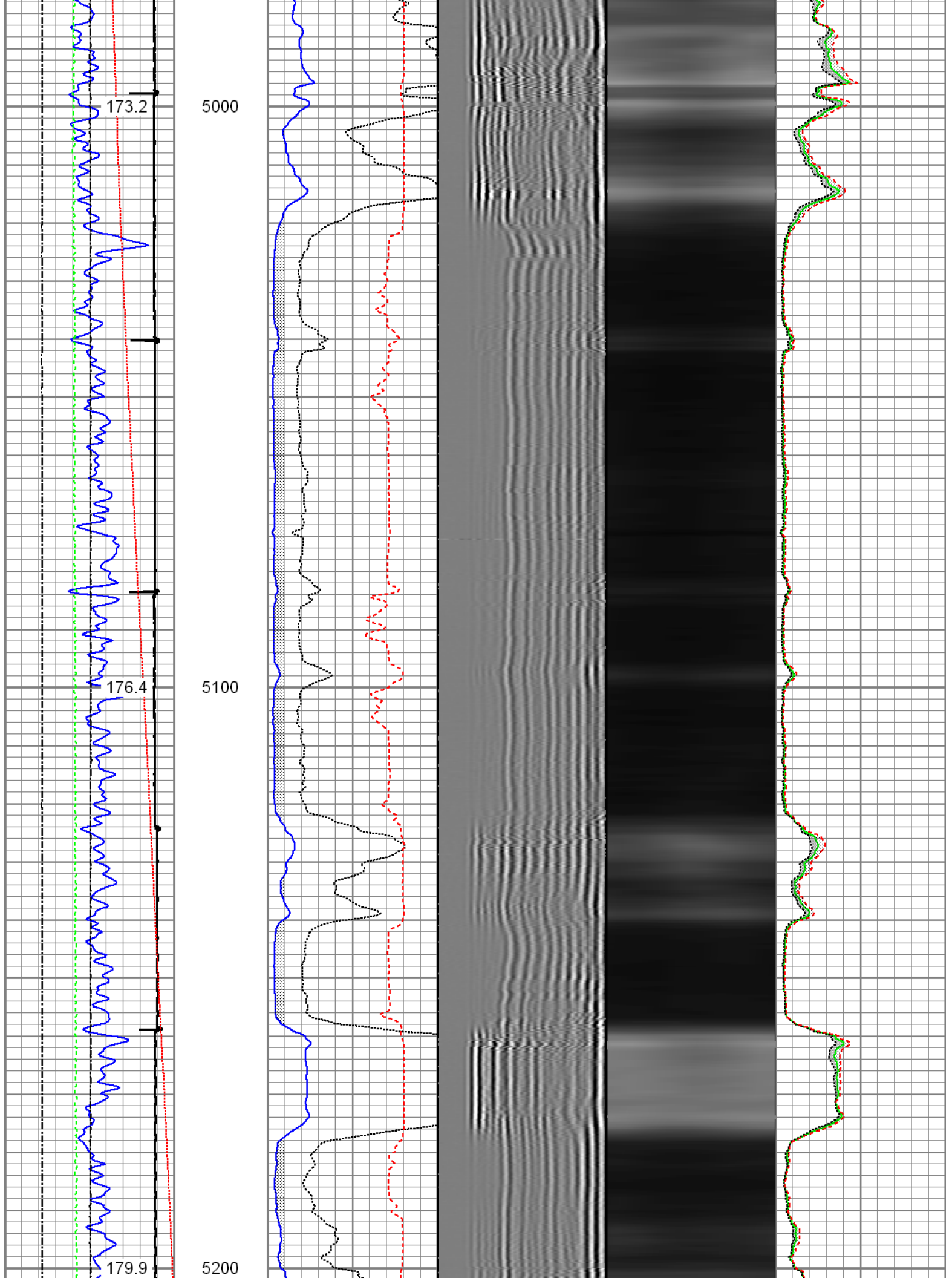


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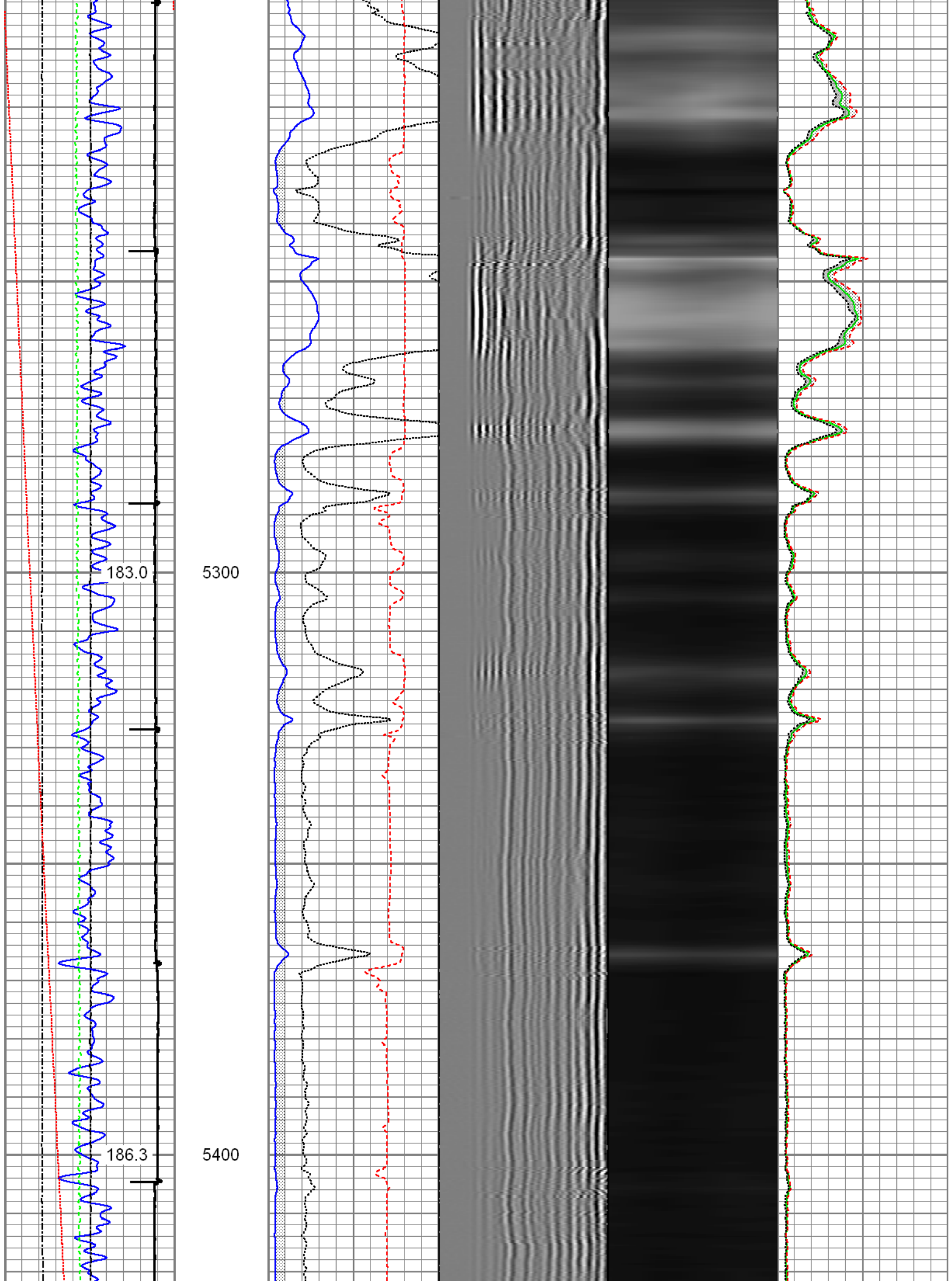
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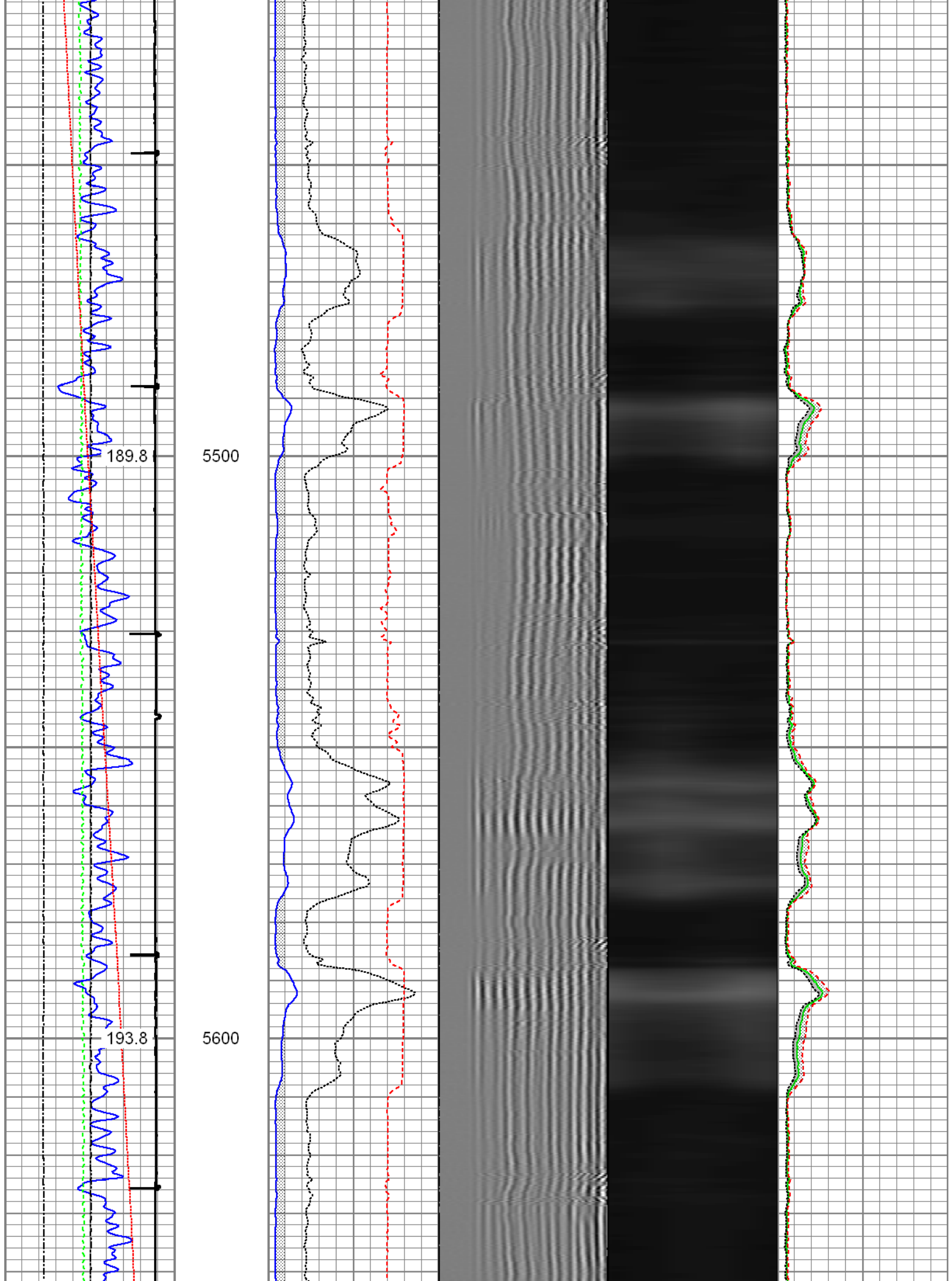


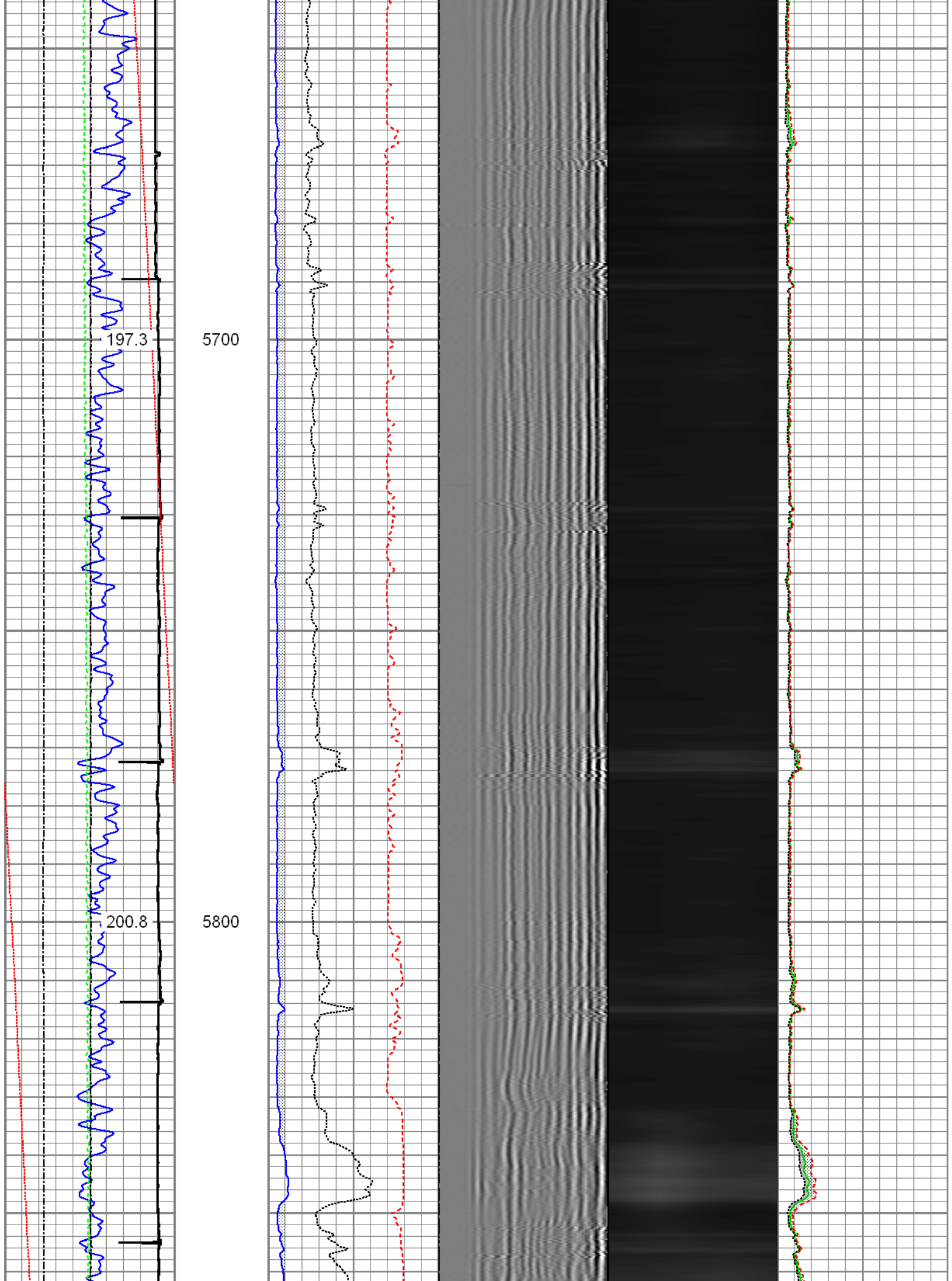


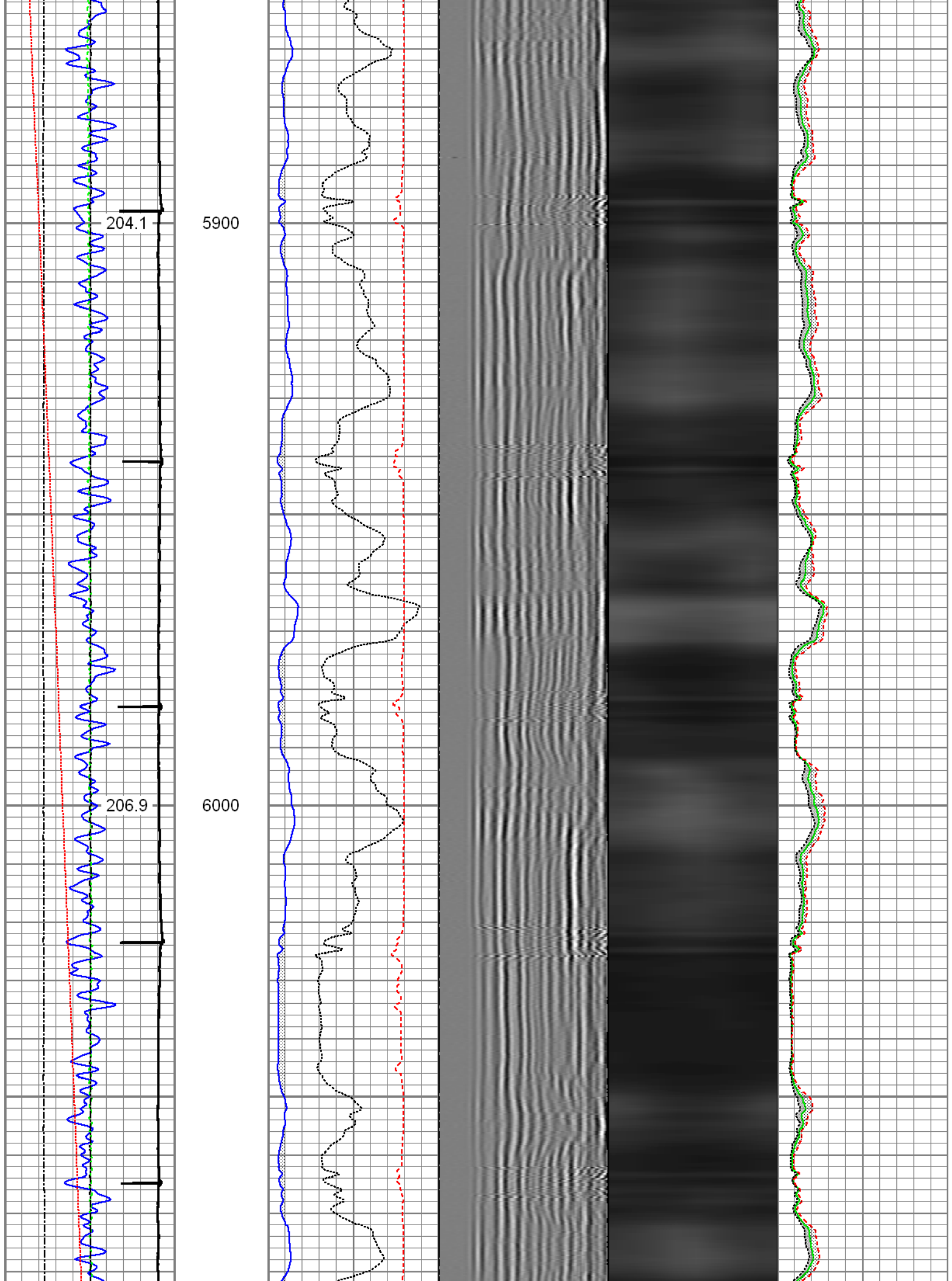




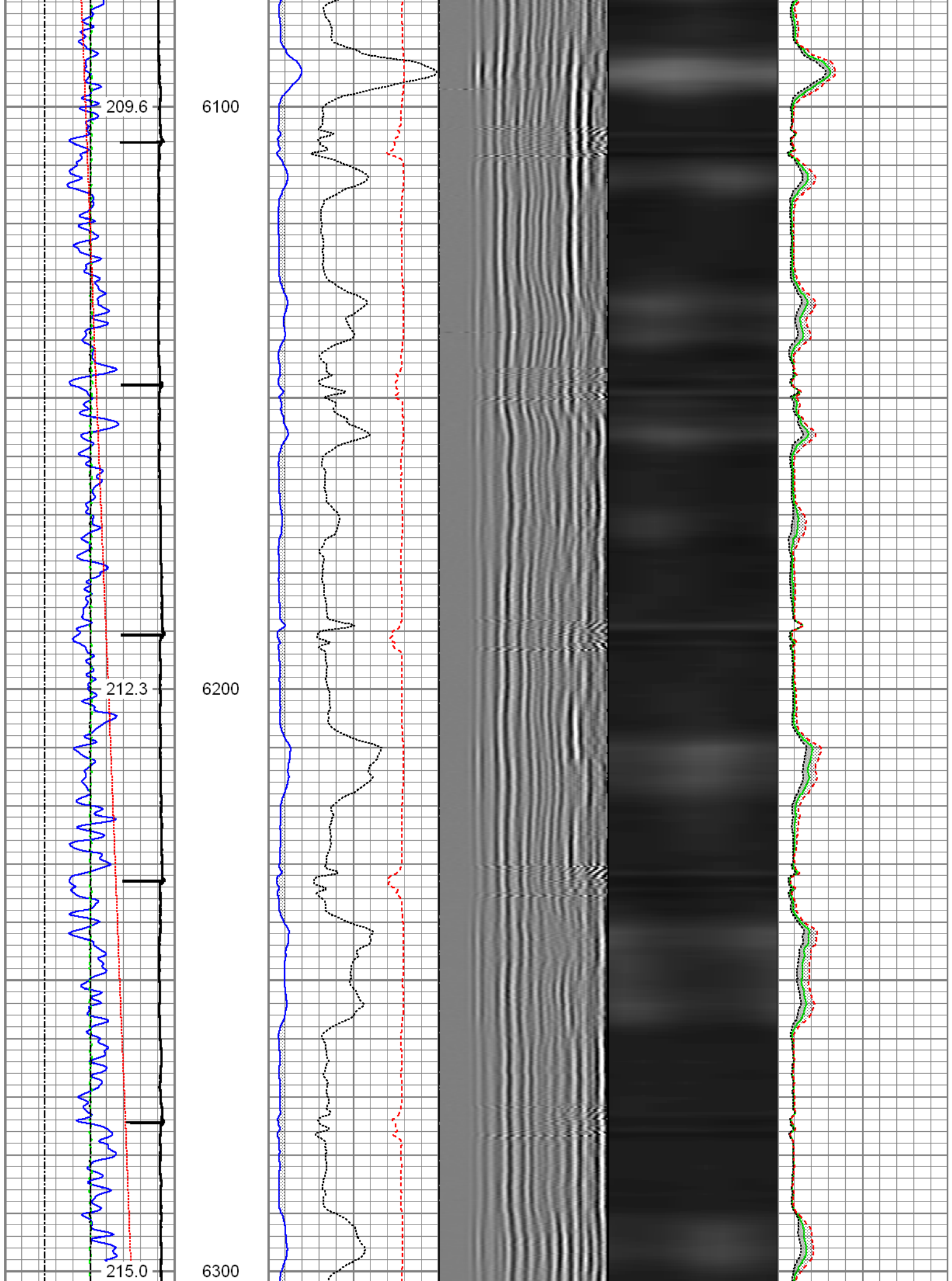




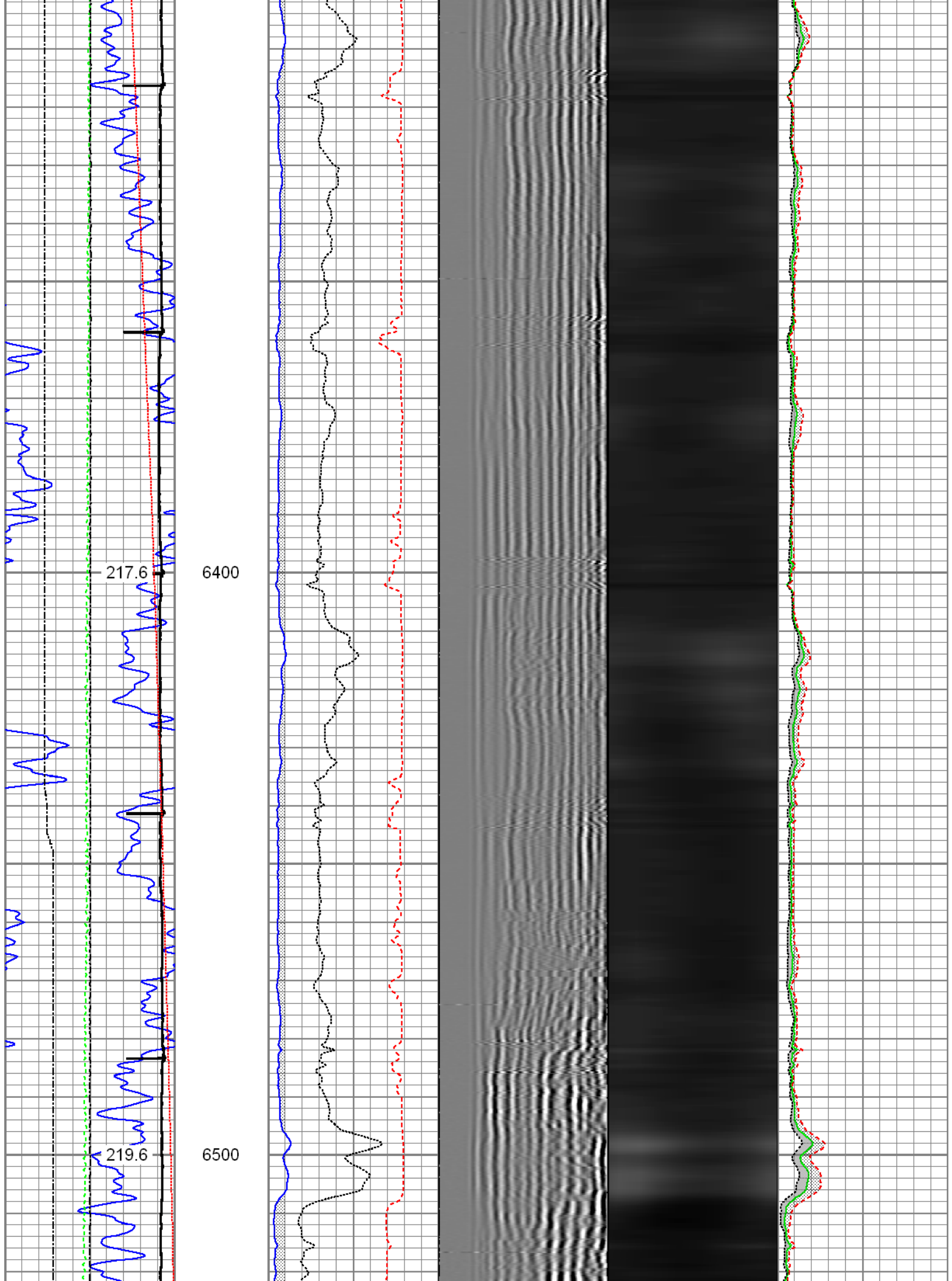


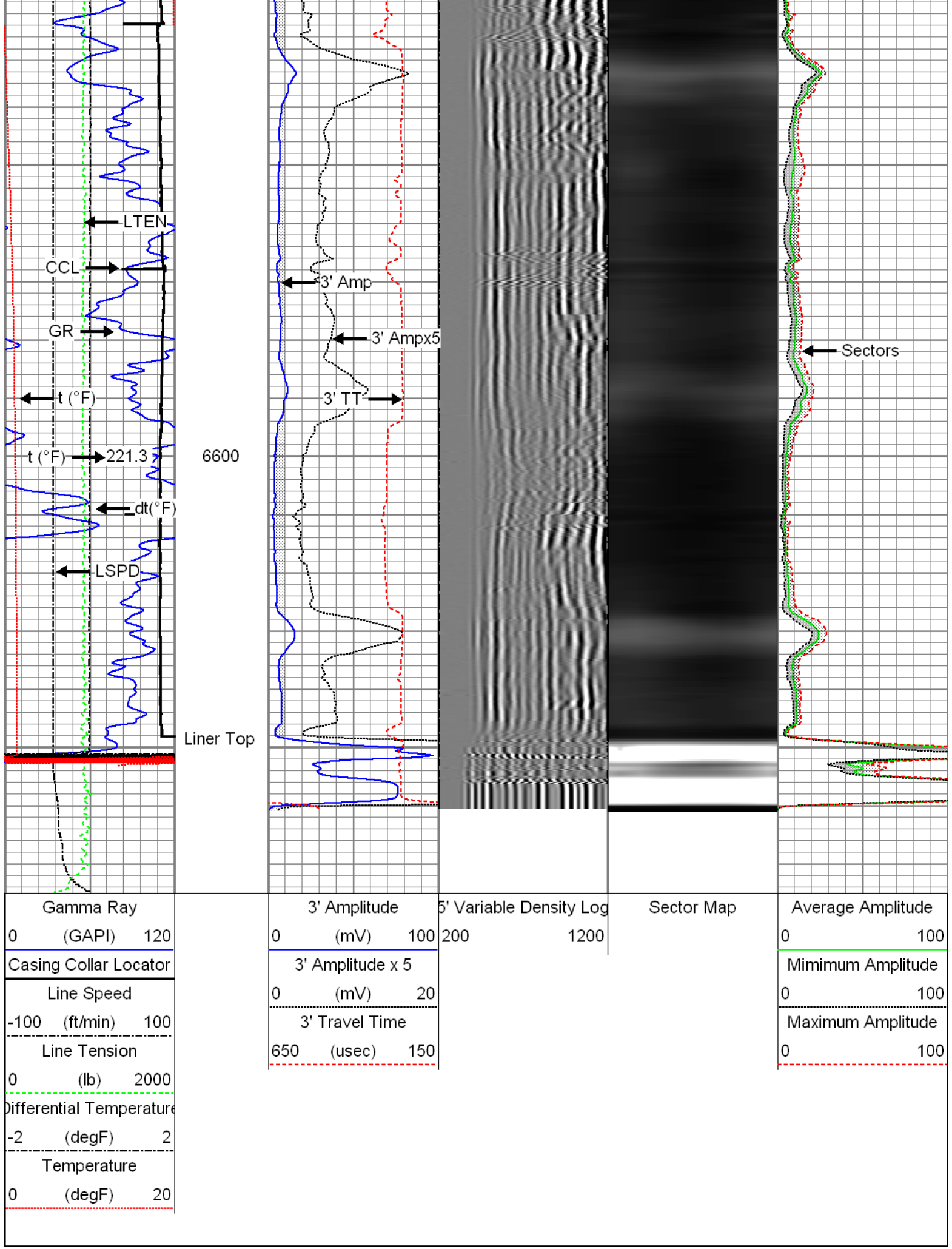






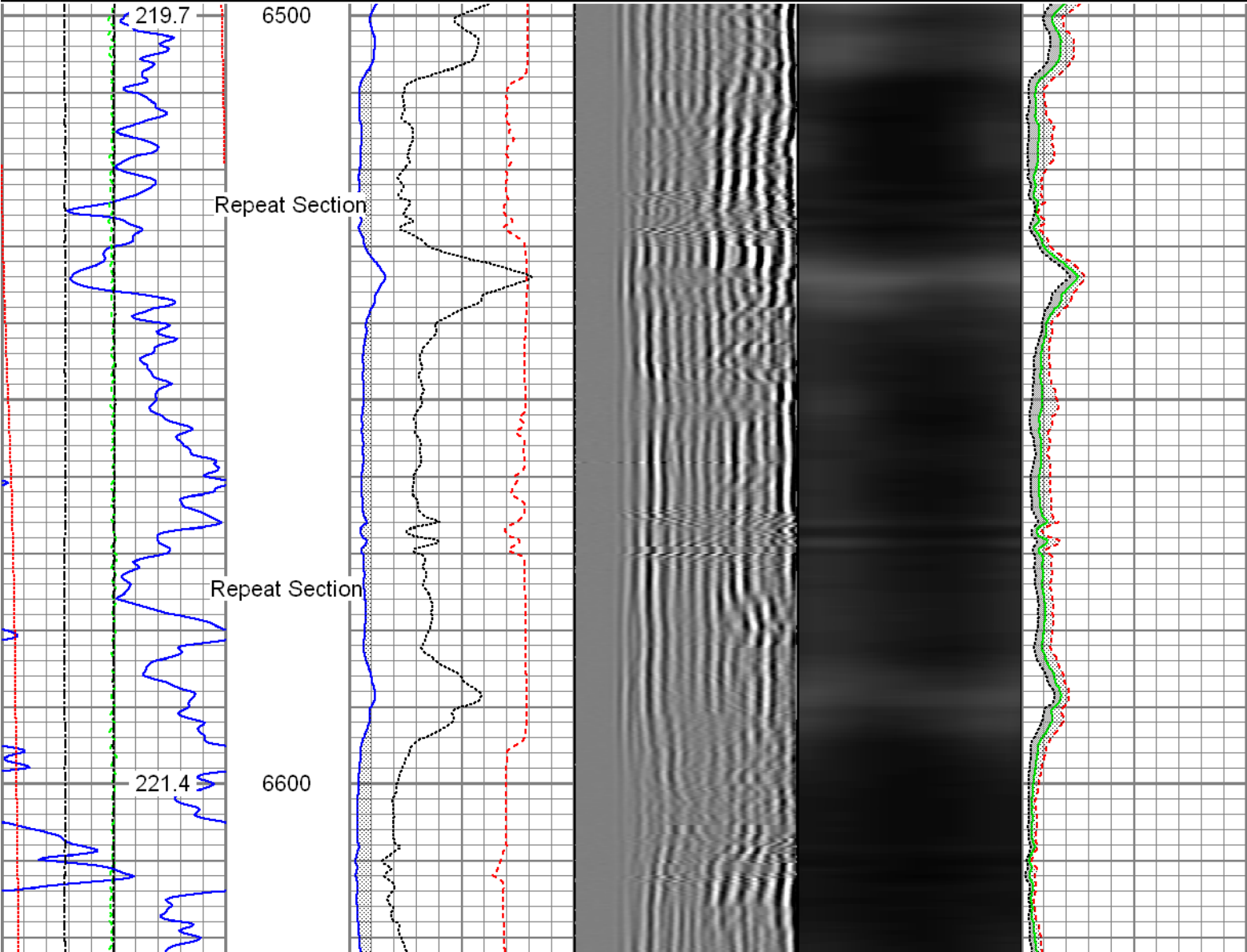


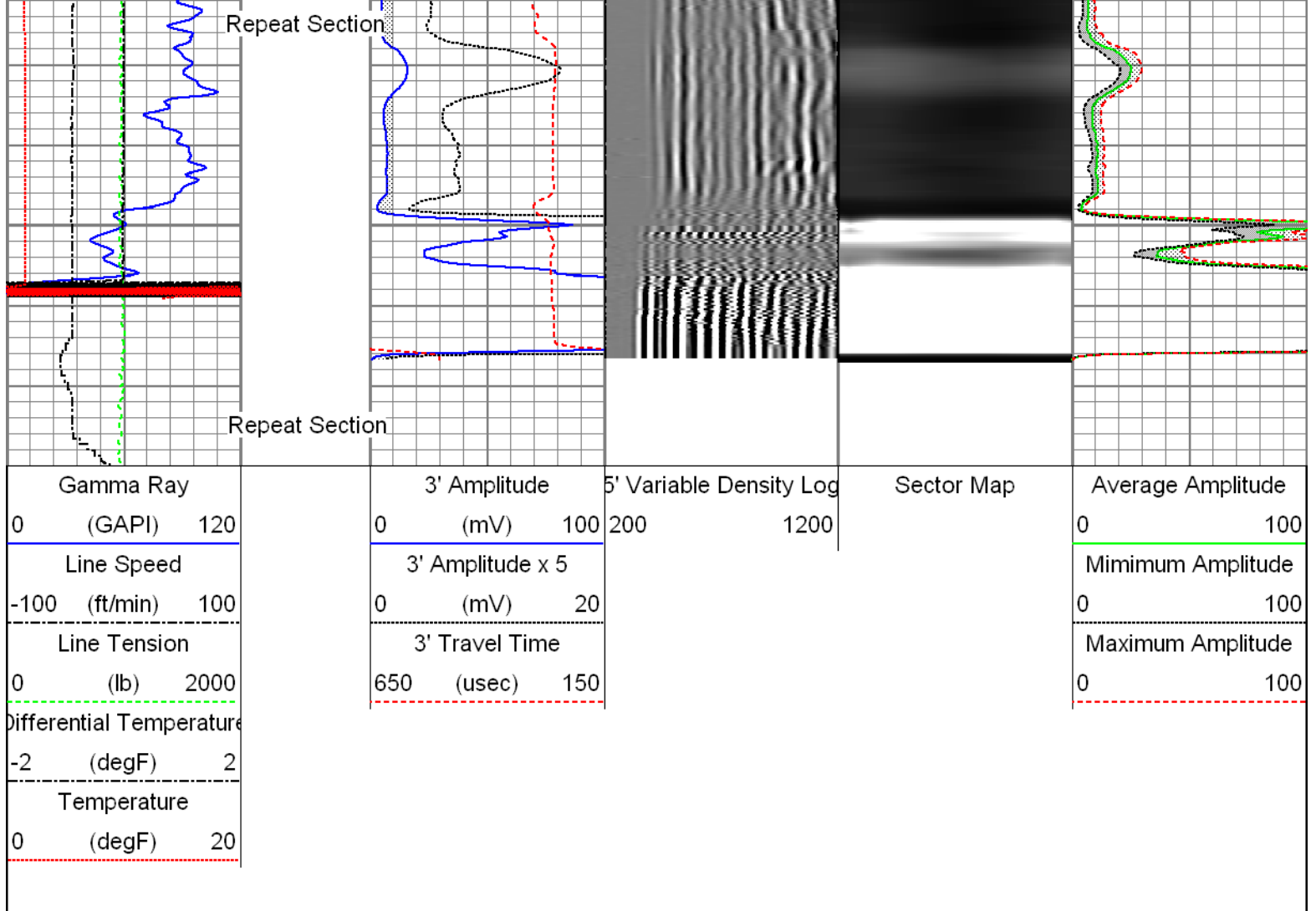




Database File: c:\warrior\data\noble energy\_wells ranch ae32-665\10-15-15\_noble energy\_wells ranch ae32-665\_mit  
Dataset Pathname: pass3  
Presentation Format: rbt4\_mit  
Dataset Creation: Thu Oct 15 12:19:58 2015 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Line Speed	3' Amplitude x 5			Minimum Amplitude
-100 (ft/min) 100	0 (mV) 20			0 100
Line Tension	3' Travel Time			Maximum Amplitude
0 (lb) 2000	650 (usec) 150			0 100
Differential Temperature				
-2 (degF) 2				
Temperature				
0 (degF) 20				





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	23.85		T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00
			UW_AGS-UW_AGS_001 (215017) Sondex Adapter - GO Box to Sondex Pin	0.21	1.69	1.00
			UW_XTU-UW_XTU_002 (218874) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50
			UW_PGR-UW_PGR_020 (10013899) Production Gamma Ray	1.93	1.69	9.50
			UW_PRT-UW_PRT_016 (10025097) Platinum Resistance Thermometer	1.04	1.69	5.20
TEMP	22.45		UW_PRC-DSSRAC (080) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
WVF3FT	15.42					
WVFS1	15.42					
WVF20	15.42					
			UW_RBT-UW_RBT_004 (1063) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00

[illegible]

Finger Calibration Report	
Performed:	Thu Oct 15 11:38:14 2015



Ring size: (in)	4	Sens	5	Sens	6	Sens	7
Finger 01:	1057	372.0	1429	390.0	1819	404.0	2223
Finger 02:	1180	385.0	1565	390.0	1955	395.0	2350
Finger 03:	1062	390.0	1452	412.0	1864	424.0	2288
Finger 04:	1112	382.0	1494	401.0	1895	413.0	2308
Finger 05:	1124	392.0	1516	406.0	1922	412.0	2334
Finger 06:	1119	393.0	1512	407.0	1919	412.0	2331
Finger 07:	1062	389.0	1451	403.0	1854	412.0	2266
Finger 08:	1132	389.0	1521	406.0	1927	413.0	2340
Finger 09:	1094	388.0	1482	401.0	1883	409.0	2292
Finger 10:	1078	388.0	1466	401.0	1867	407.0	2274
Finger 11:	1171	399.0	1570	405.0	1975	408.0	2383
Finger 12:	1066	384.0	1450	393.0	1843	408.0	2251
Finger 13:	1094	383.0	1477	395.0	1872	395.0	2267
Finger 14:	1073	391.0	1464	400.0	1864	410.0	2274
Finger 15:	1033	389.0	1422	410.0	1832	426.0	2258
Finger 16:	1055	393.0	1448	412.0	1860	431.0	2291
Finger 17:	954	365.0	1319	389.0	1708	426.0	2134
Finger 18:	1083	374.0	1457	385.0	1842	405.0	2247
Finger 19:	1074	375.0	1449	394.0	1843	418.0	2261
Finger 20:	1027	379.0	1406	400.0	1806	430.0	2236
Finger 21:	1033	379.0	1412	398.0	1810	418.0	2228
Finger 22:	1010	378.0	1388	400.0	1788	433.0	2221
Finger 23:	1011	380.0	1391	406.0	1797	444.0	2241
Finger 24:	1052	382.0	1434	388.0	1822	409.0	2231
Finger 25:	984	378.0	1362	402.0	1764	441.0	2205
Finger 26:	1124	358.0	1482	374.0	1856	404.0	2260
Finger 27:	1048	372.0	1420	384.0	1804	430.0	2234
Finger 28:	1069	367.0	1436	378.0	1814	410.0	2224
Finger 29:	1010	373.0	1383	395.0	1778	433.0	2211
Finger 30:	1053	370.0	1423	390.0	1813	424.0	2237
Finger 31:	1111	367.0	1478	385.0	1863	413.0	2276
Finger 32:	1046	375.0	1421	399.0	1820	430.0	2250
Finger 33:	1191	370.0	1561	372.0	1933	387.0	2320
Finger 34:	1070	359.0	1429	380.0	1809	410.0	2219
Finger 35:	1060	376.0	1436	407.0	1843	438.0	2281
Finger 36:	1055	373.0	1428	399.0	1827	425.0	2252
Finger 37:	1137	382.0	1519	391.0	1910	407.0	2317
Finger 38:	1169	374.0	1543	384.0	1927	392.0	2319
Finger 39:	1182	374.0	1556	383.0	1939	393.0	2332
Finger 40:	1089	383.0	1472	399.0	1871	413.0	2284

Segmented Cement Bond Log Calibration Report							
Serial Number:				1063			
Tool Model:				UW_RBT_004			
Calibration Casing Diameter:				7.000	in		
Calibration Depth:				-79.986	ft		

Master Calibration, performed Thu Oct 15 11:35:21 2015:							
	Raw (v)		Calibrated (mv)		Results		
	Zero	Cal	Zero	Cal	Gain	Offset	
3FT	-0.003	0.740	1.000	62.165	82.361	1.211	
5FT	-0.006	0.828	1.000	62.165	73.361	1.448	
S1	-0.004	0.716	0.000	100.000	138.876	0.509	
S2	-0.003	0.743	0.000	100.000	134.016	0.429	
S3	-0.004	0.749	0.000	100.000	132.802	0.486	
S4	-0.004	0.768	0.000	100.000	129.598	0.475	
S5	-0.002	0.759	0.000	100.000	131.413	0.310	
S6	-0.003	0.743	0.000	100.000	134.109	0.347	

S7	-0.002	0.721	0.000	100.000	138.176	0.337
S8	-0.002	0.702	0.000	100.000	141.868	0.352

### Temperature Calibration Report

Serial Number:	10025097
Tool Model:	UW_PRT_016
Performed:	Wed Feb 11 13:44:44 2015

Point #	Reading		Reference	
1	13053.00	cps	68.00	degF
2	18014.00	cps	104.00	degF
3	29668.00	cps	176.00	degF
4	41181.00	cps	248.00	degF
5	52983.00	cps	320.00	degF
6	58931.00	cps	356.00	degF
7		cps		degF
8		cps		degF
9		cps		degF
10		cps		degF

### Gamma Ray Calibration Report

Serial Number:	10013899	
Tool Model:	UW_PGR_020	
Performed:	Sun Jun 13 13:33:21 1993	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	1.0000	GAPI/cps



Company	Noble Energy Inc.
Well	Wells Ranch AE32-665
Field	Wattenberg
County	Weld
State	Colorado