

Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Company	Noble Energy Inc.
Well	Wells Ranch AA11-654	Well	Wells Ranch AA11-654
Field	Wattenberg	Field	Wattenberg
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-41252		
Permanent Datum	SEC 11 TWP 6N RGE 63W	Ground Level	Elevation 4868'
Log Measured From	Kelly Bushing	Drilling Measured From	Kelly Bushing
			Elevation 4892'
			D.F. 4891'
			G.L. 4868'

Date	27-JUN-2015
Run Number	One
Depth Driller	13956 FT
Depth Logger	7167 FT
Bottom Logged Interval	7162 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	225°F
Estimated Cement Top	140 FT
Time Well Ready	ROA
Time Logger on Bottom	8:58 AM
Equipment Number	HD-0324
Location	Ft. Lupton, CO
Recorded By	C. Bryan
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	24 FT	637 FT		
Intermediate #1	7	26	P-110IC	24 FT	7206 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110IC	7105.2 FT	13941 FT		

<<<< Fold Here >>>>

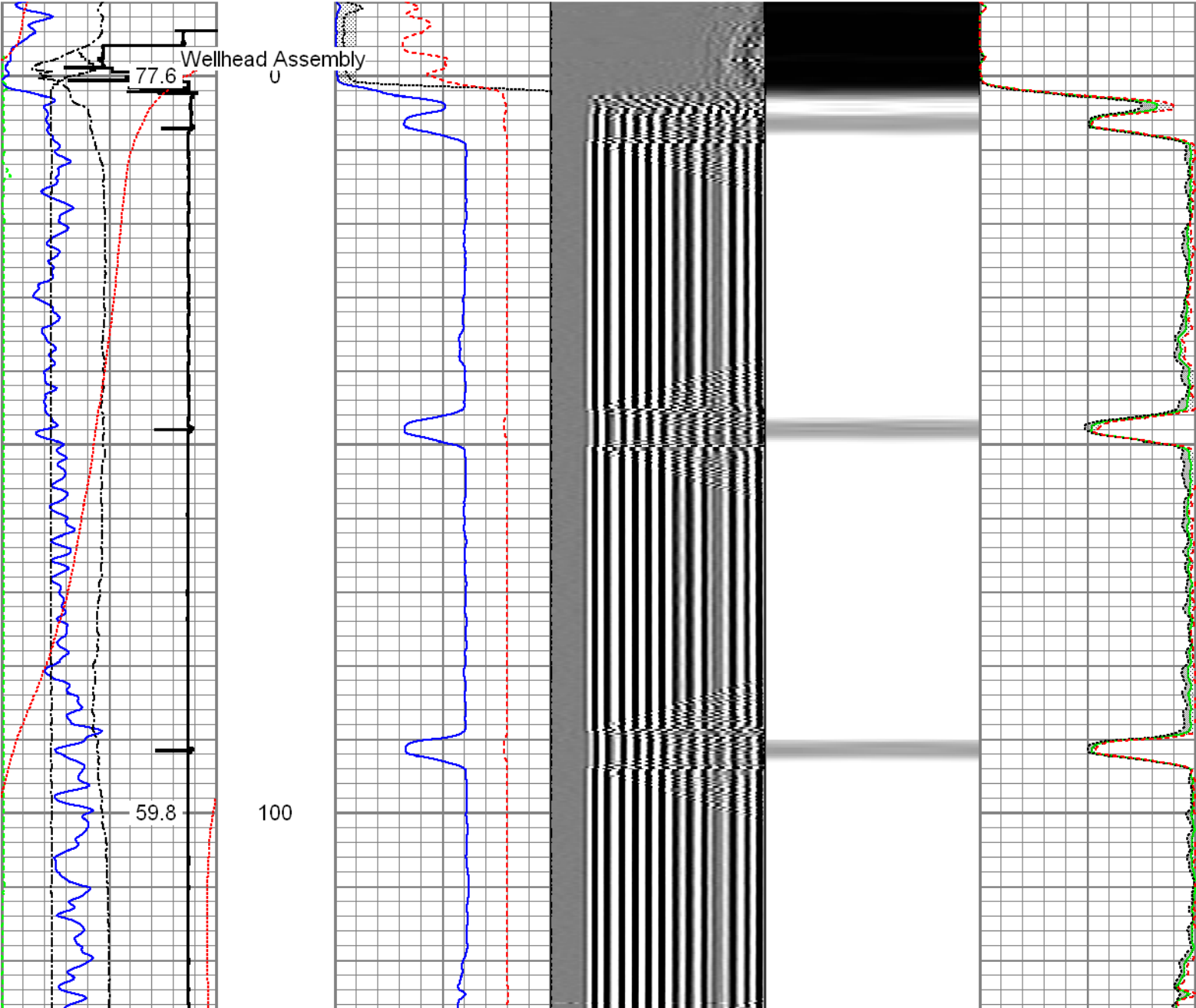
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, 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.

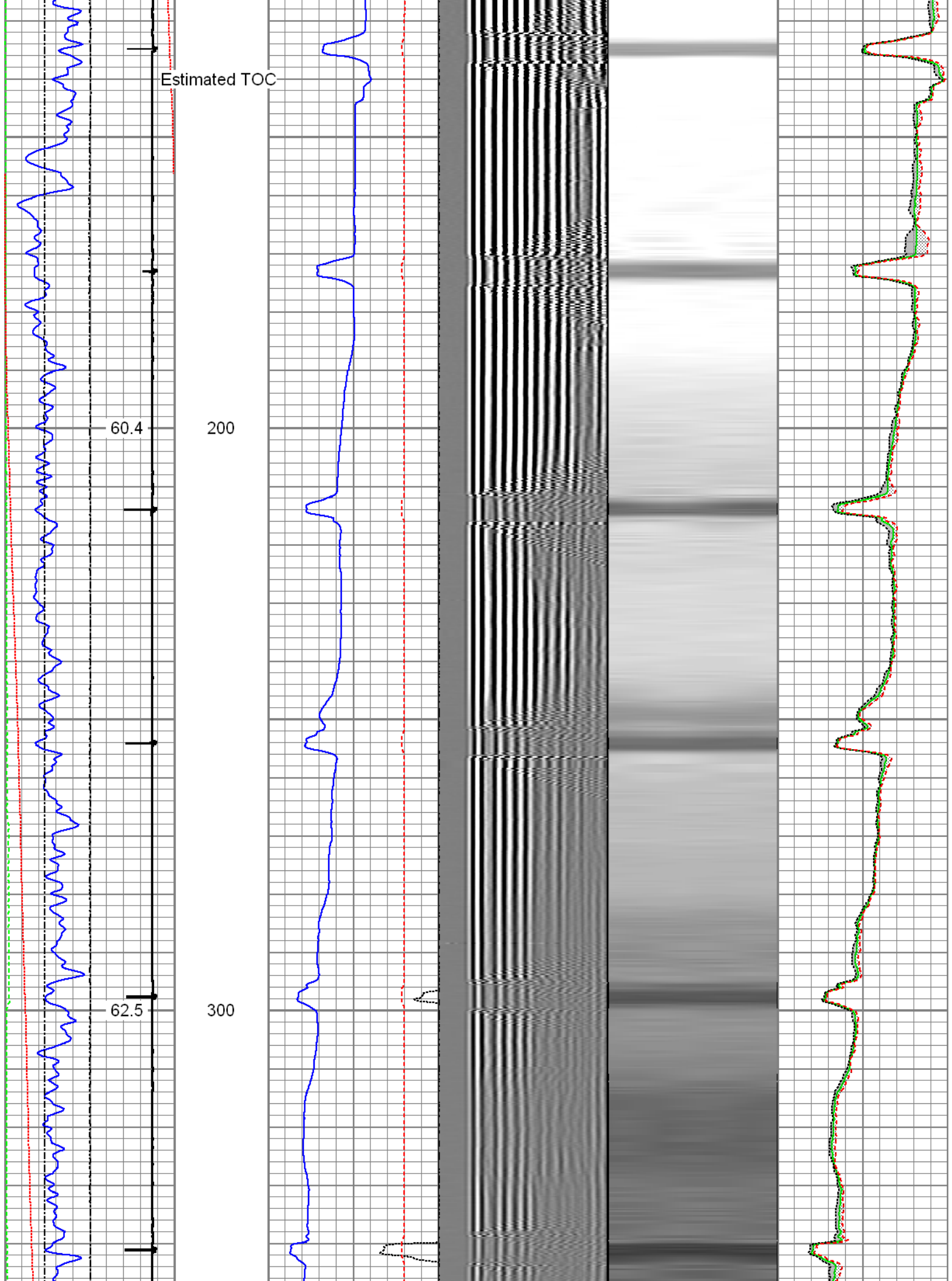
Comments

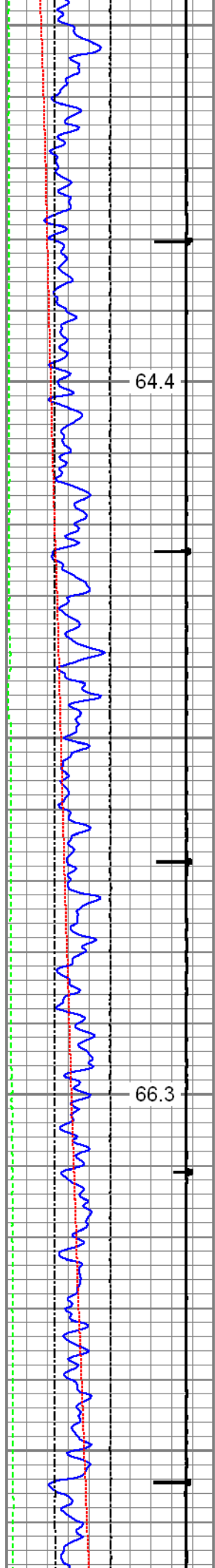
Log ran as per customer request
 Depth referenced to casing tally reported liner top at 7105.2 FT
 Adjusted log -21 FT to correlate with liner top
 Log ran from just below liner top to surface
 Recorded with 2500 PSI surface induced pressure
 Logging tools were clean and free of any debris upon completion of operations
 Thank you for choosing FMC Technologies Completion Services, Inc.!!

Database File: 06-27-15_noble energy_wells ranch aa11-654_mit_rbl.db
Dataset Pathname: main1.1
Presentation Format: rbt4_mit
Dataset Creation: Sat Jun 27 11:46:14 2015 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
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				

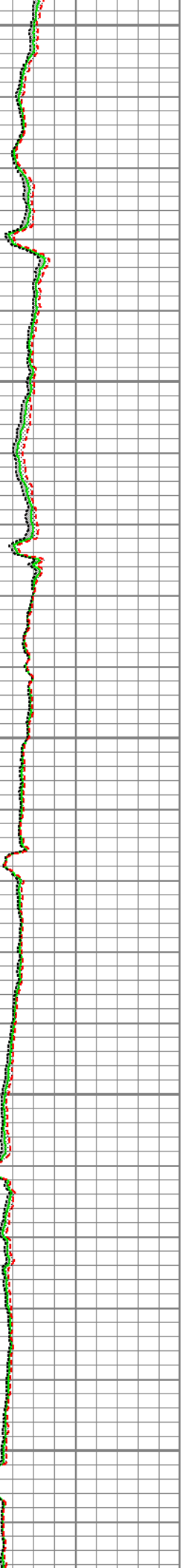
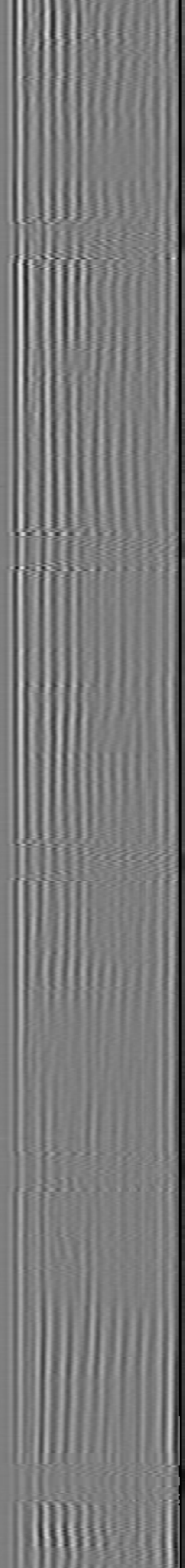
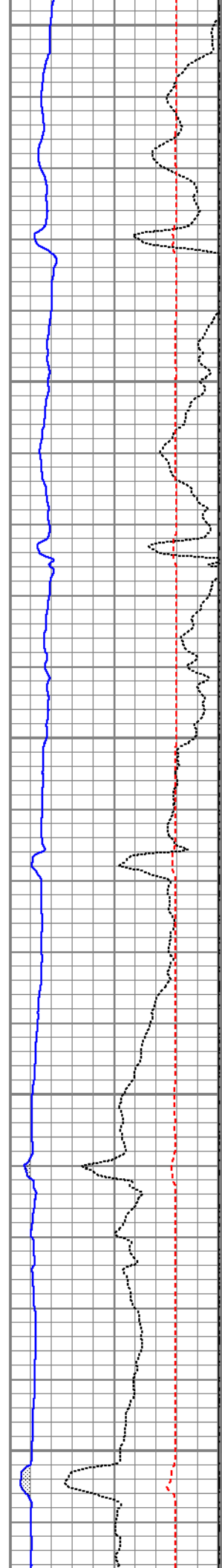


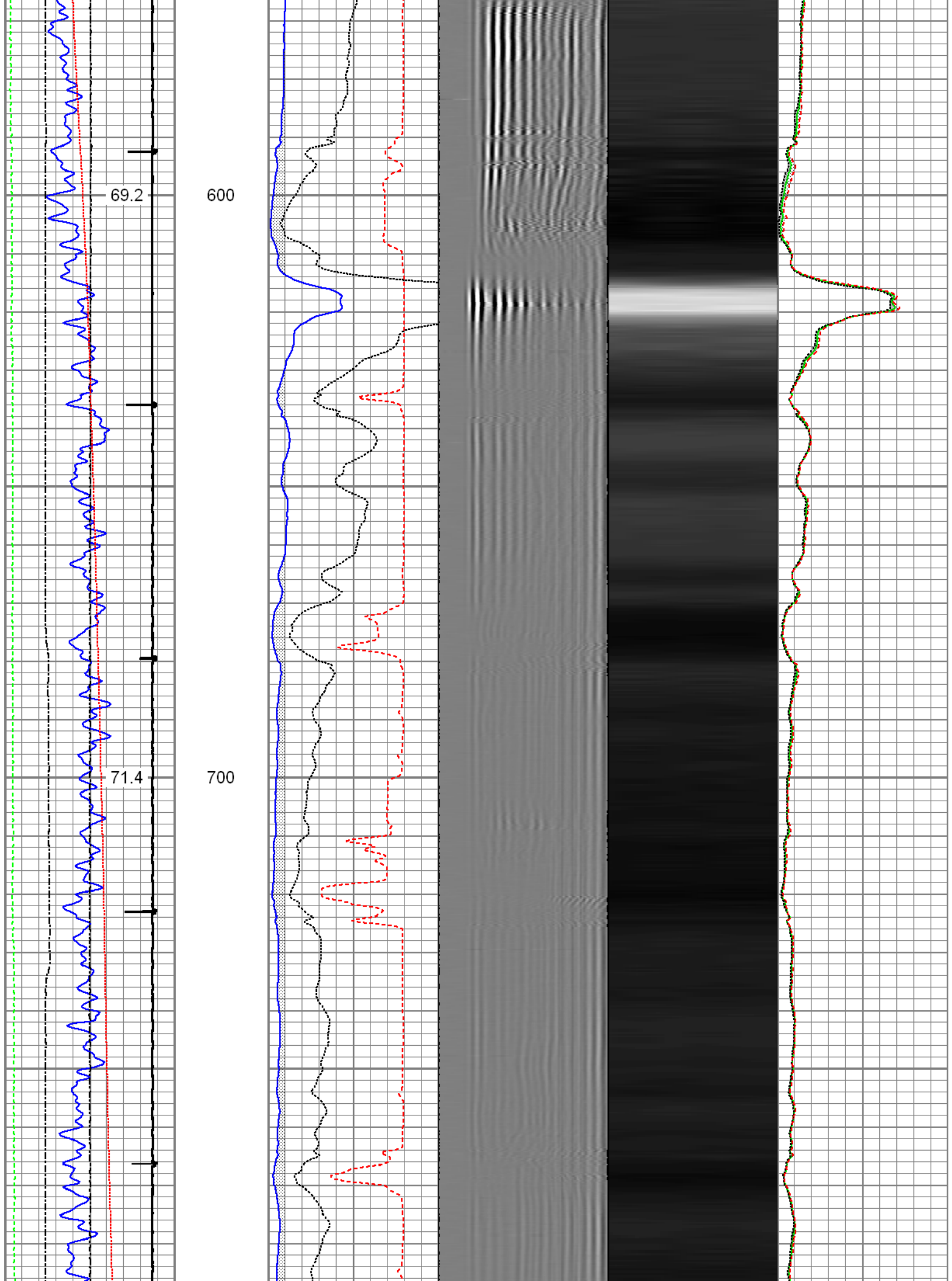


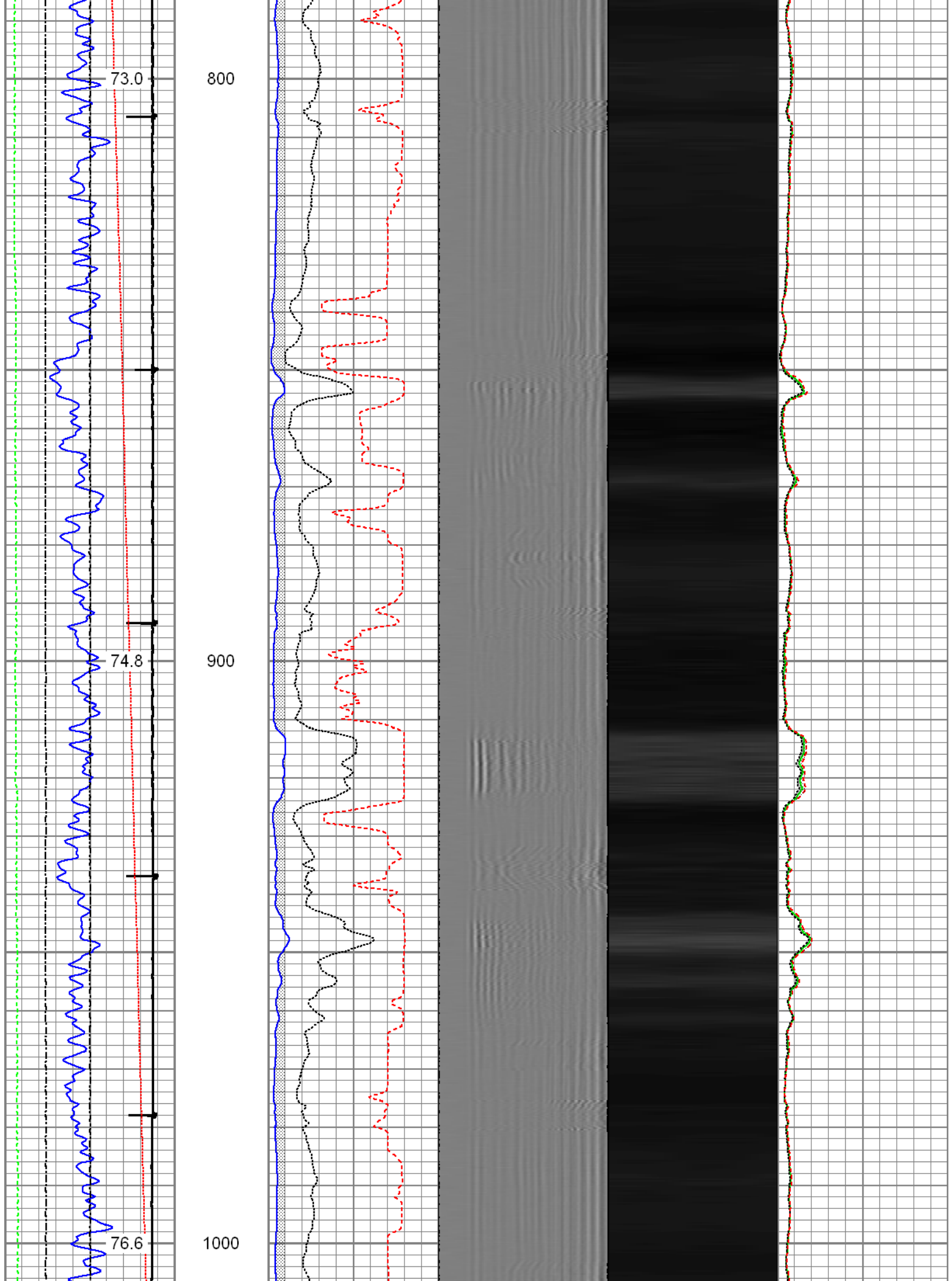


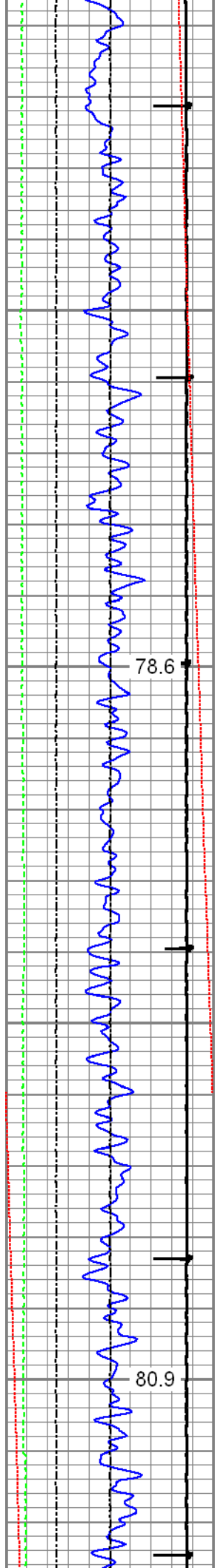
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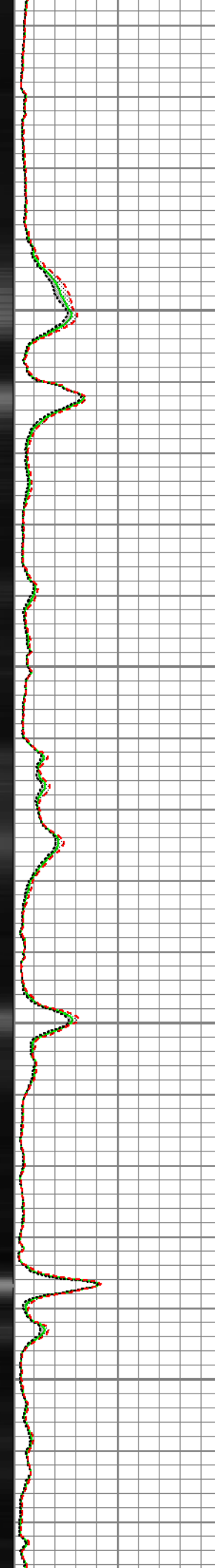
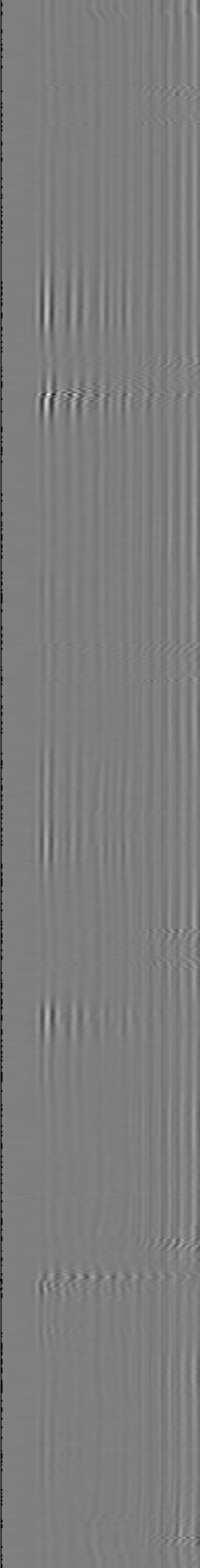
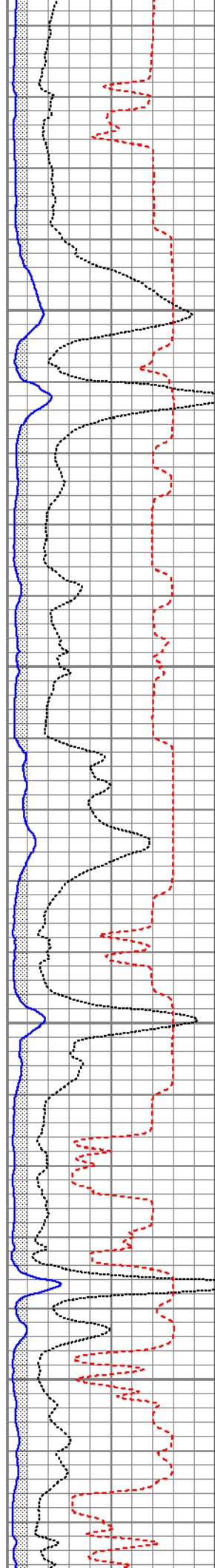


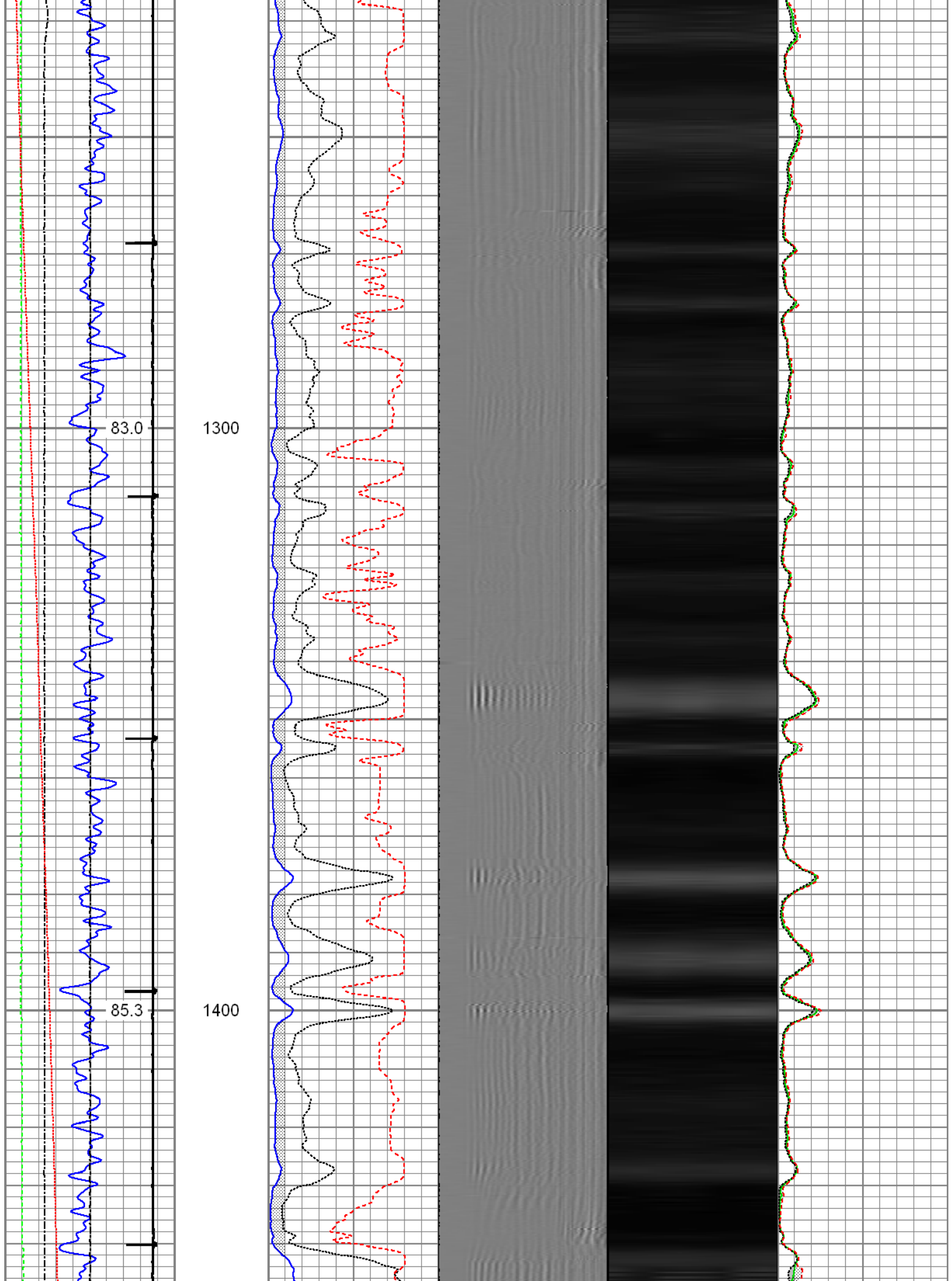
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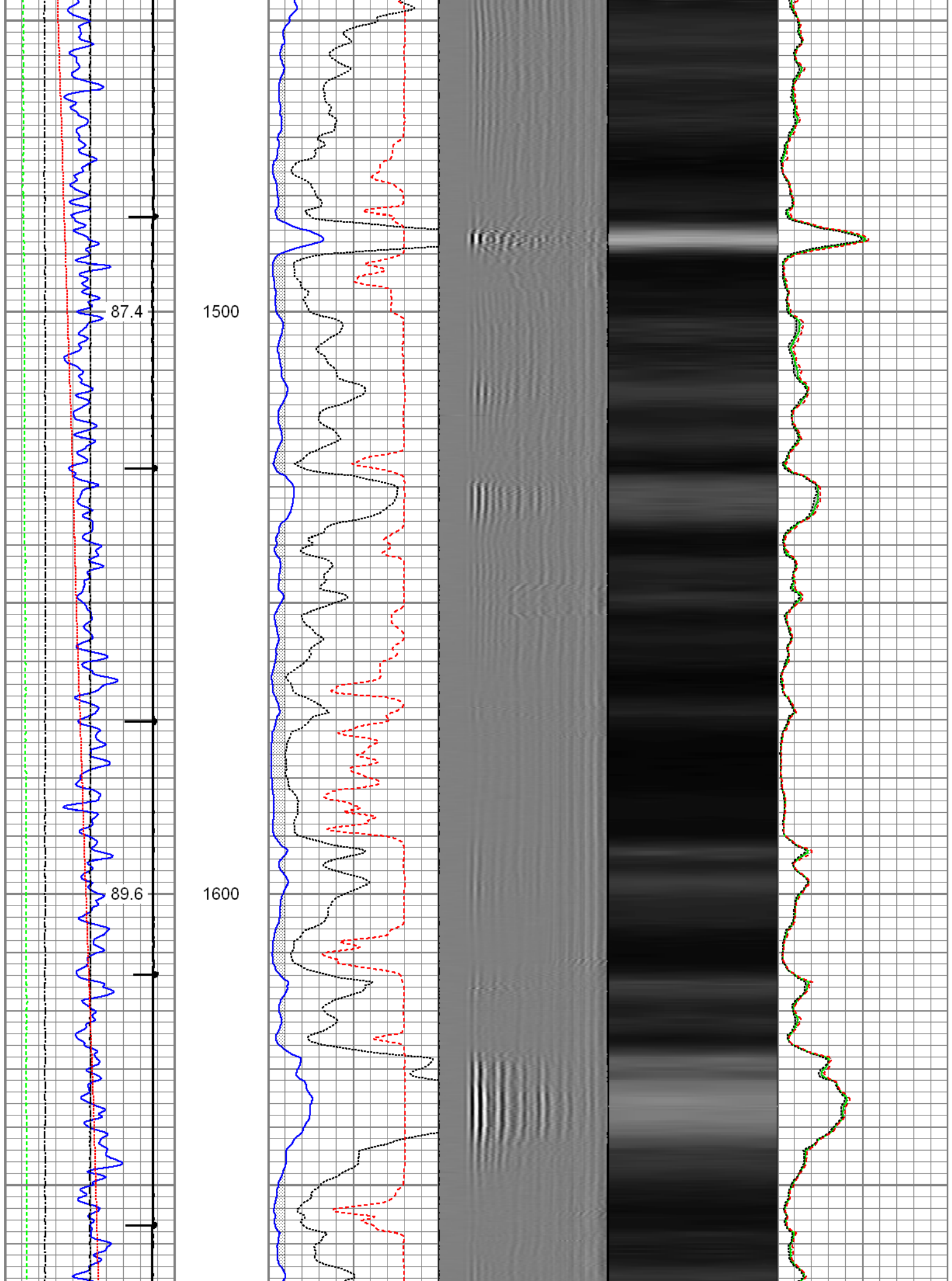
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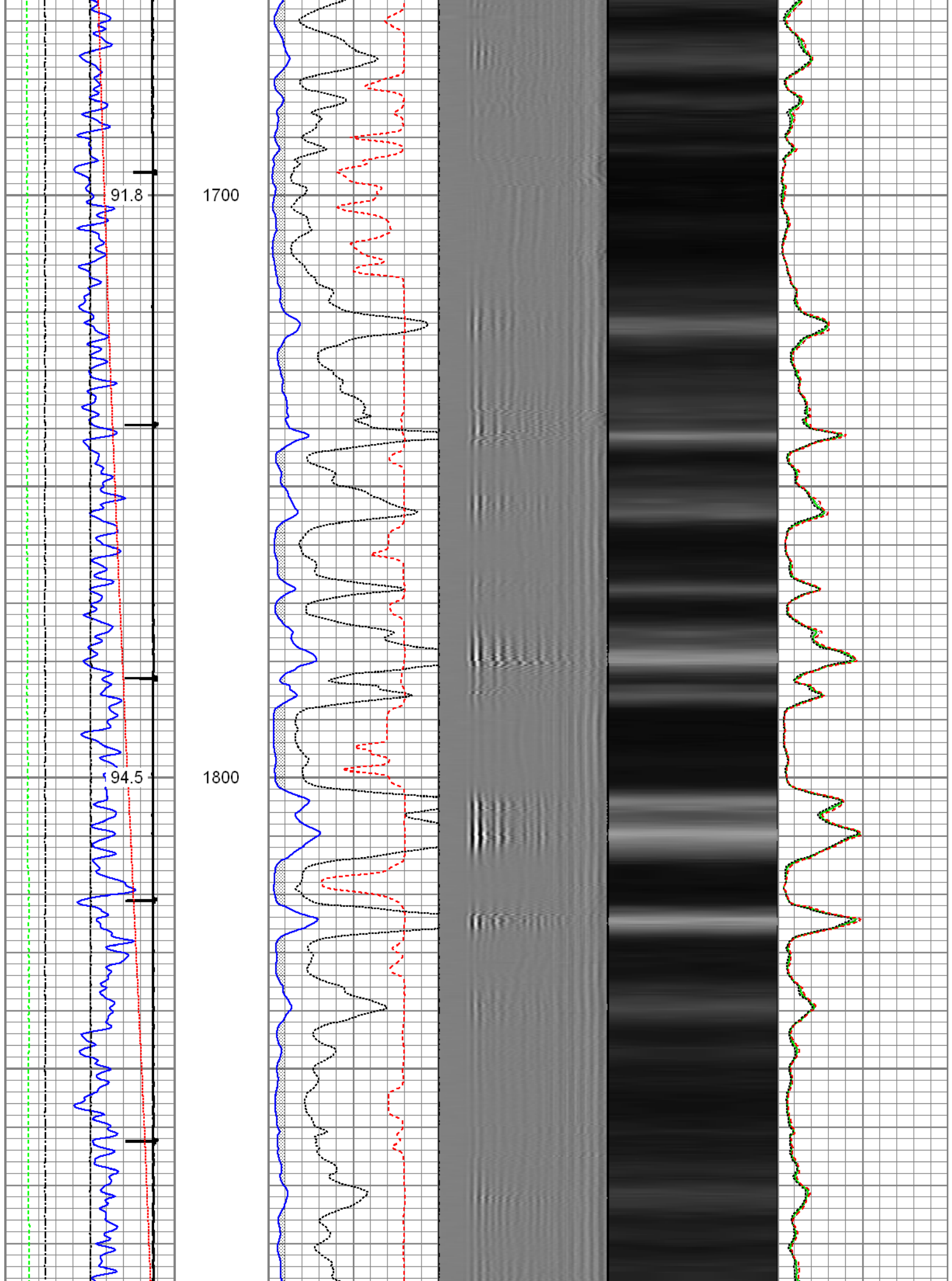
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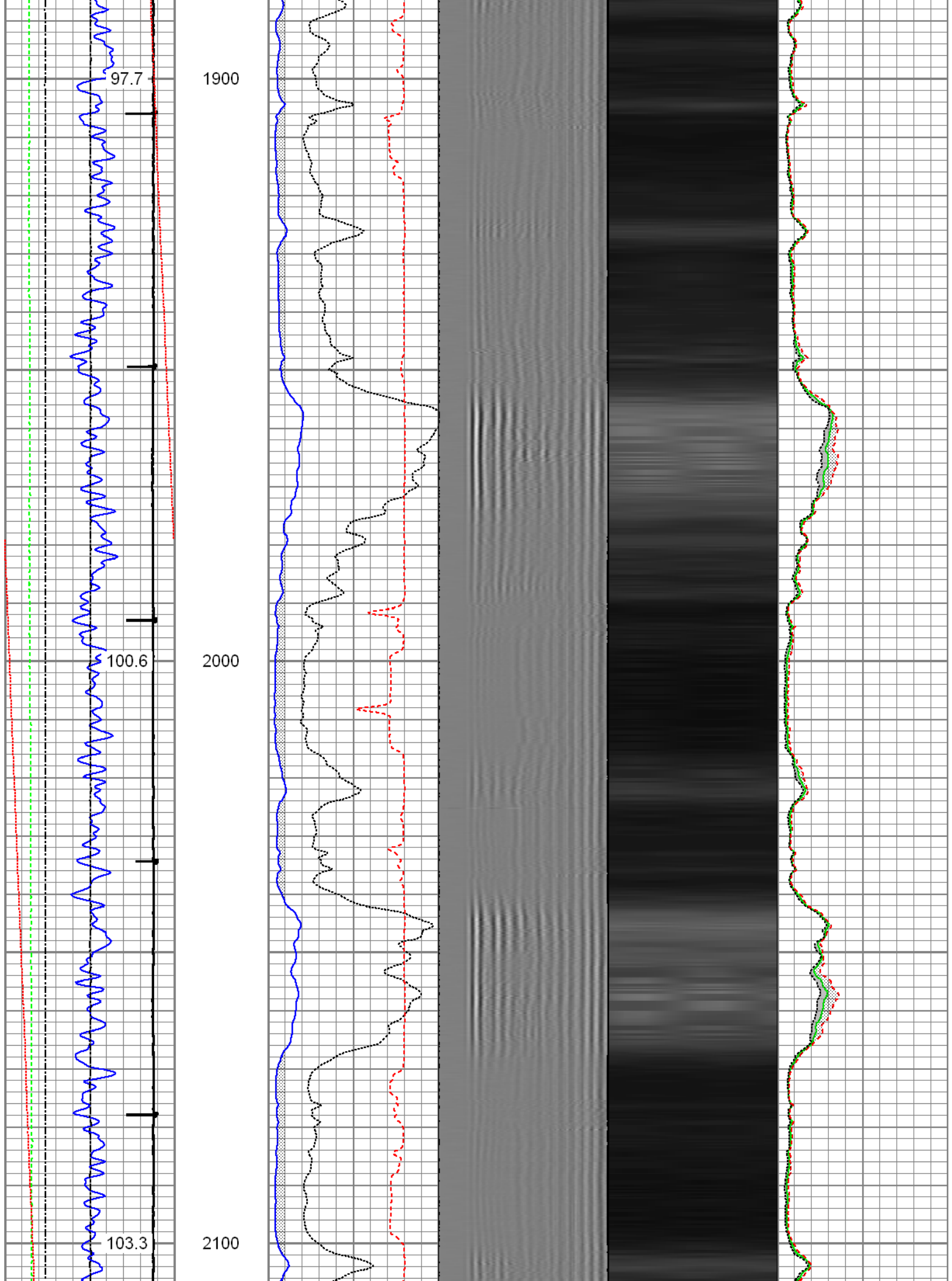
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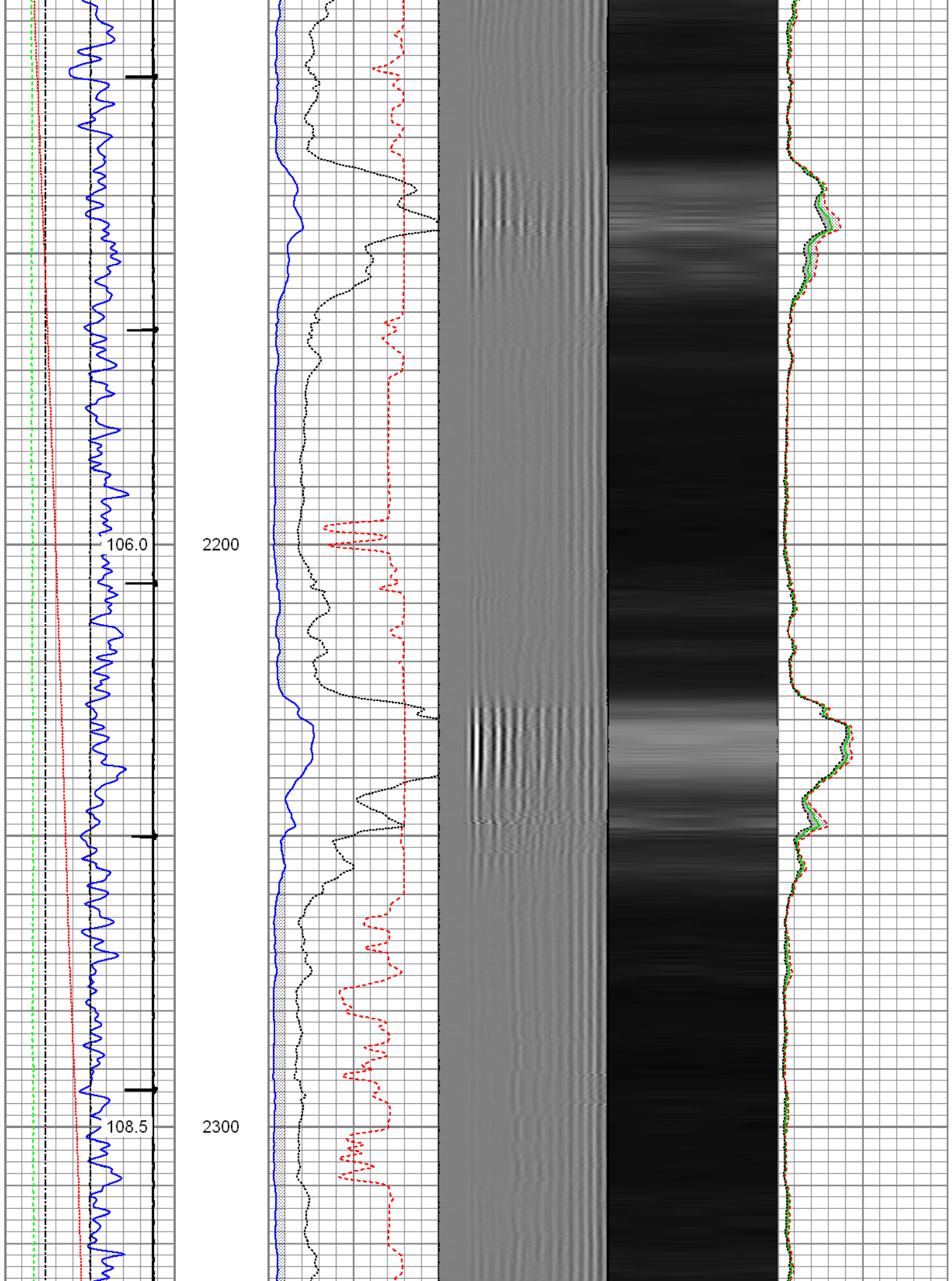


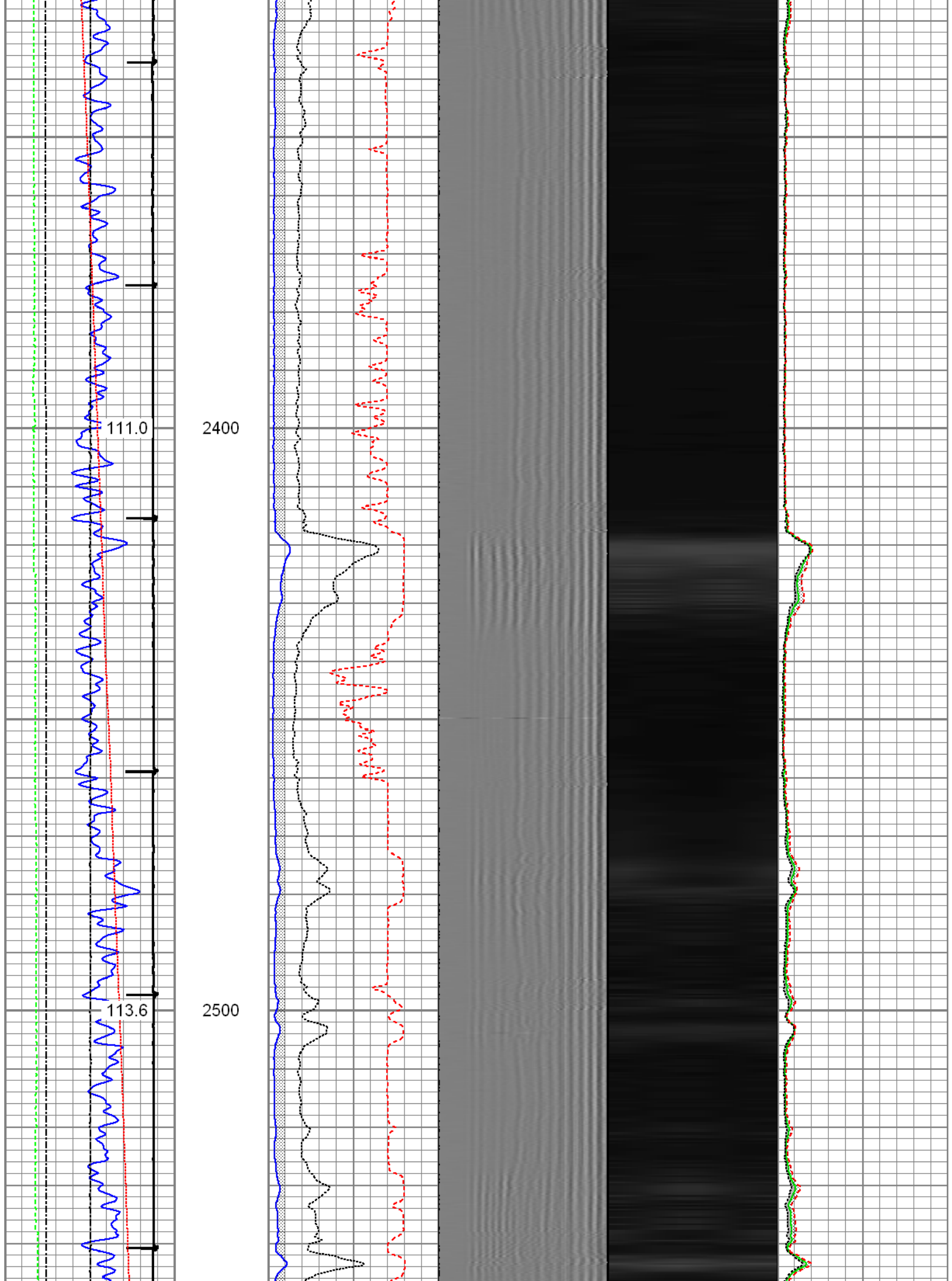


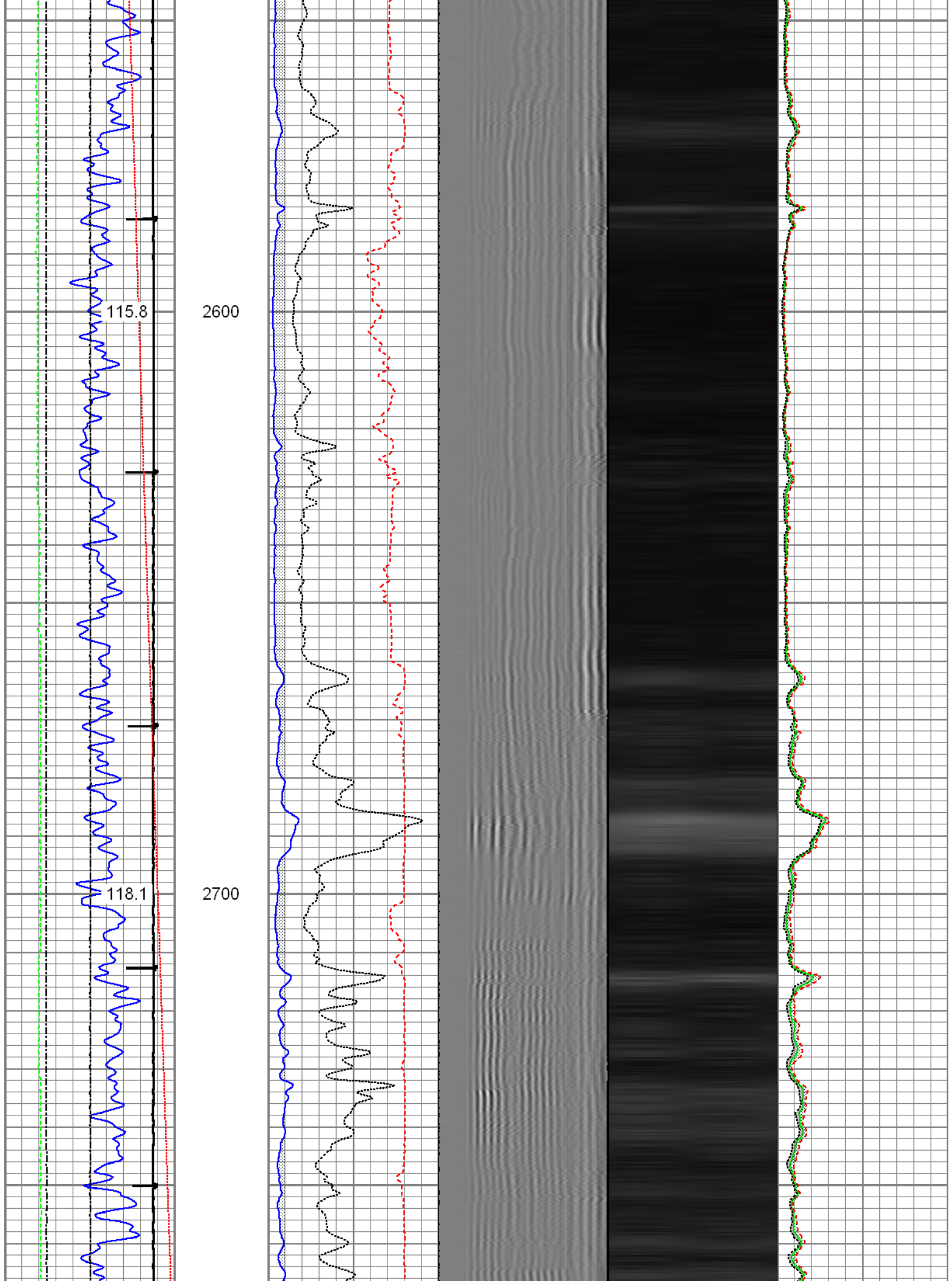


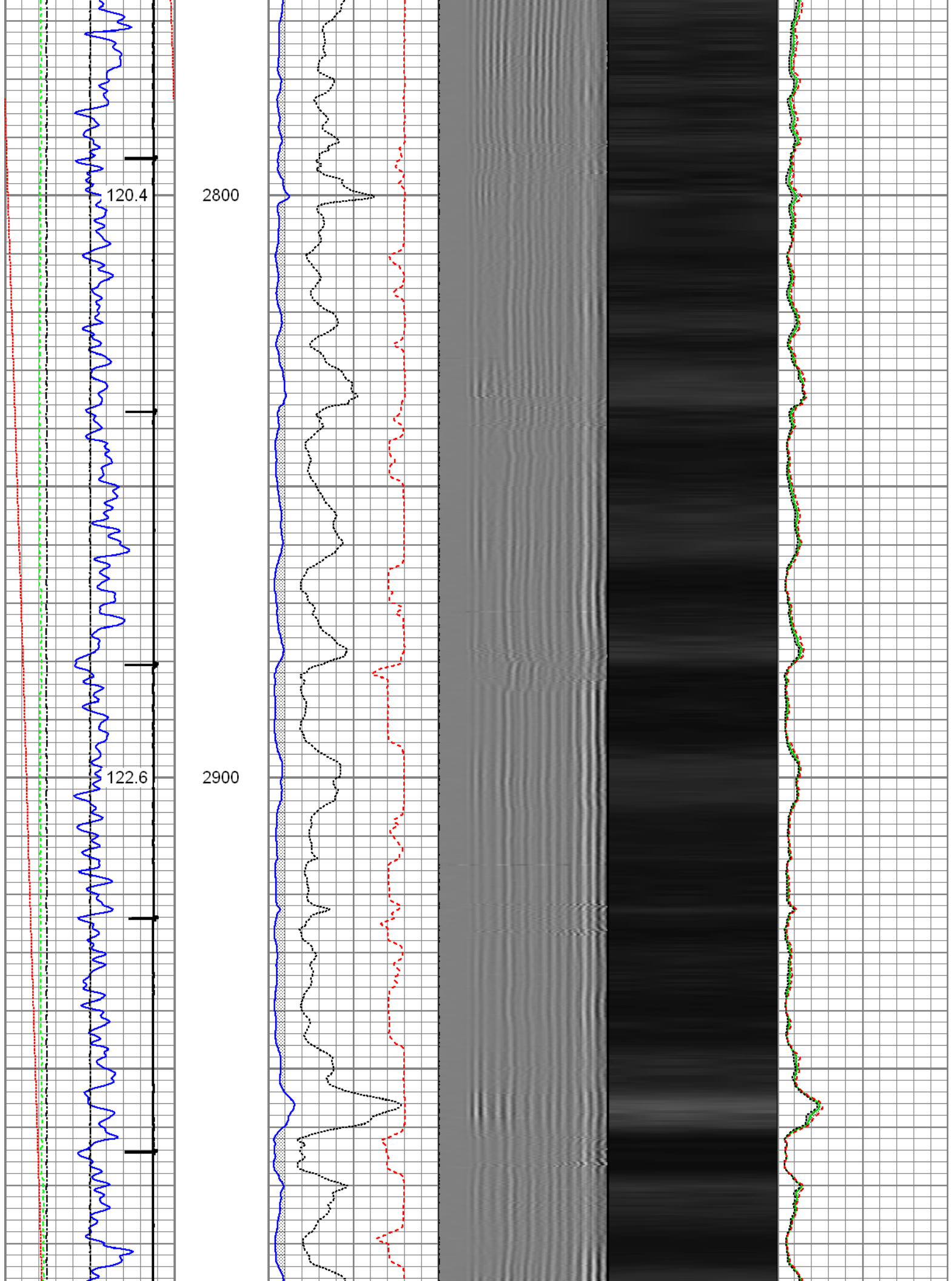


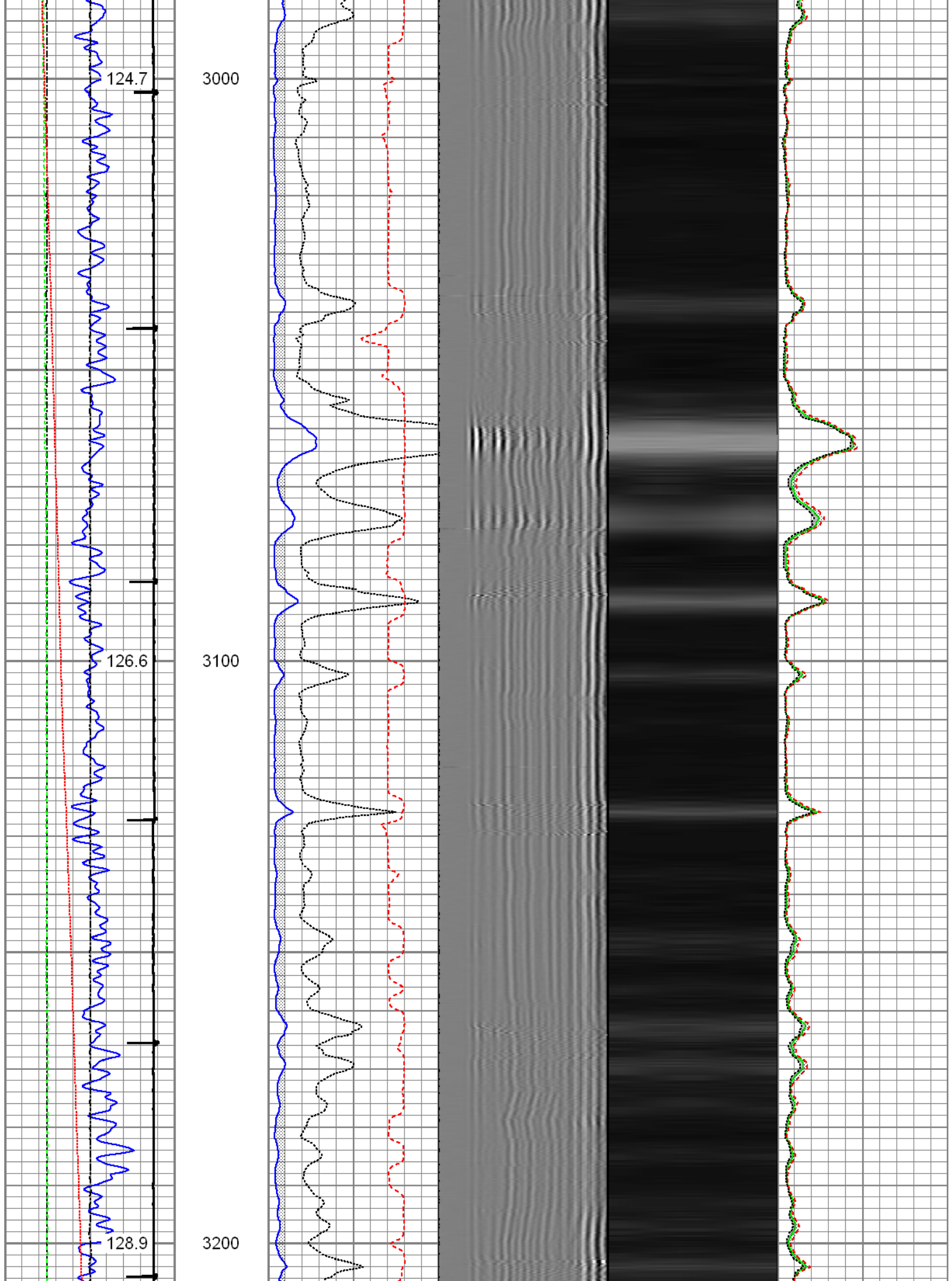


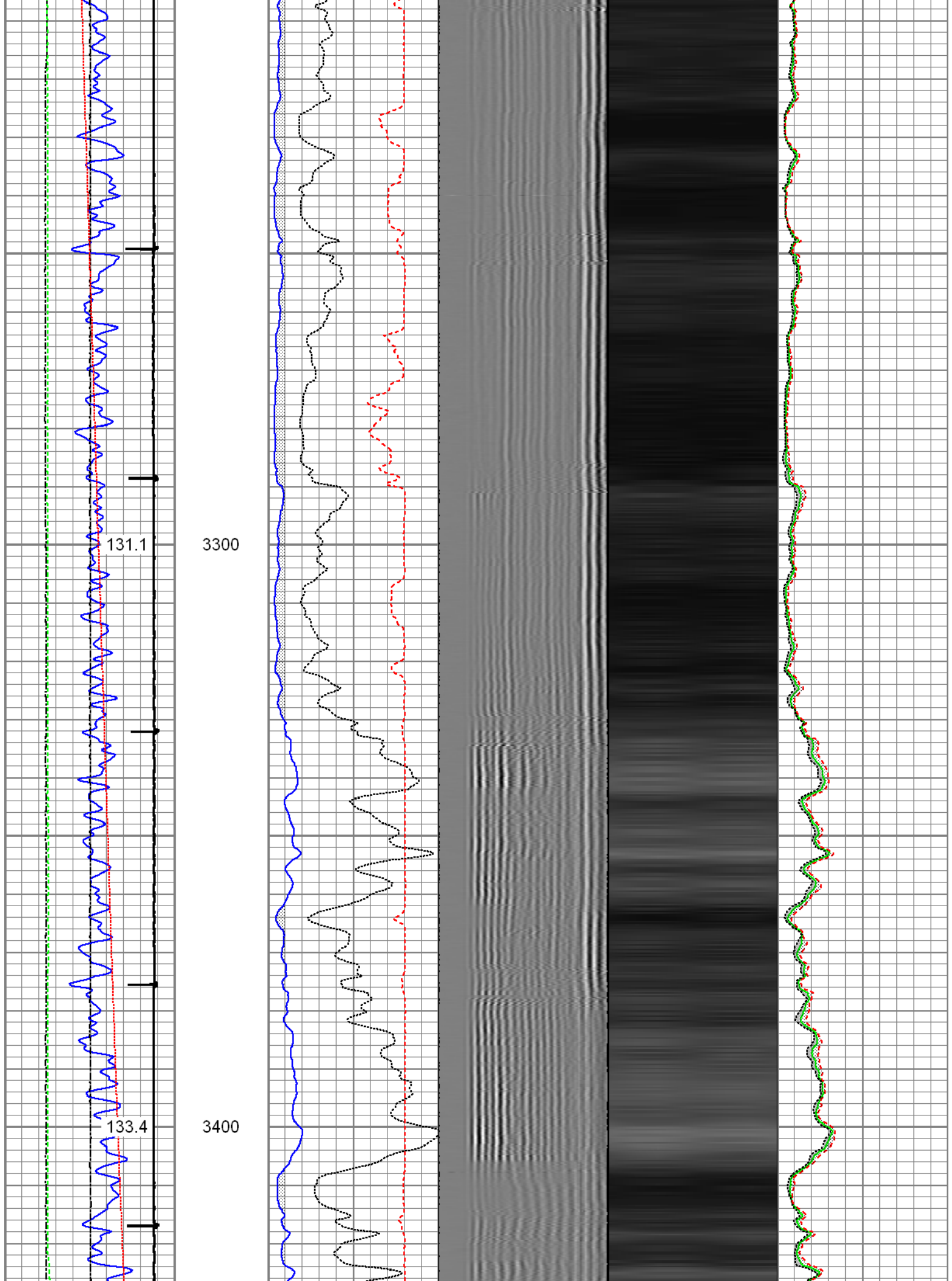


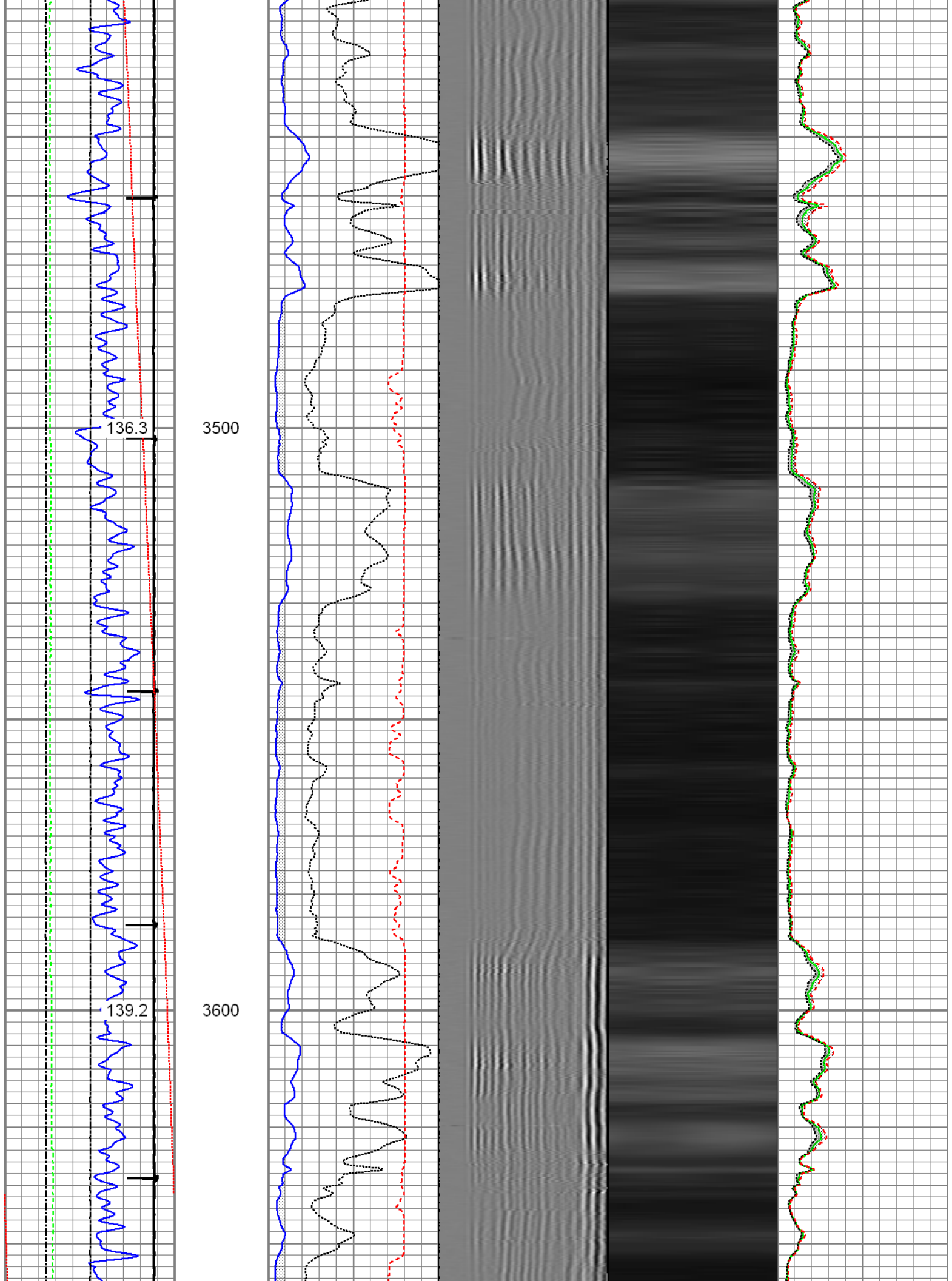


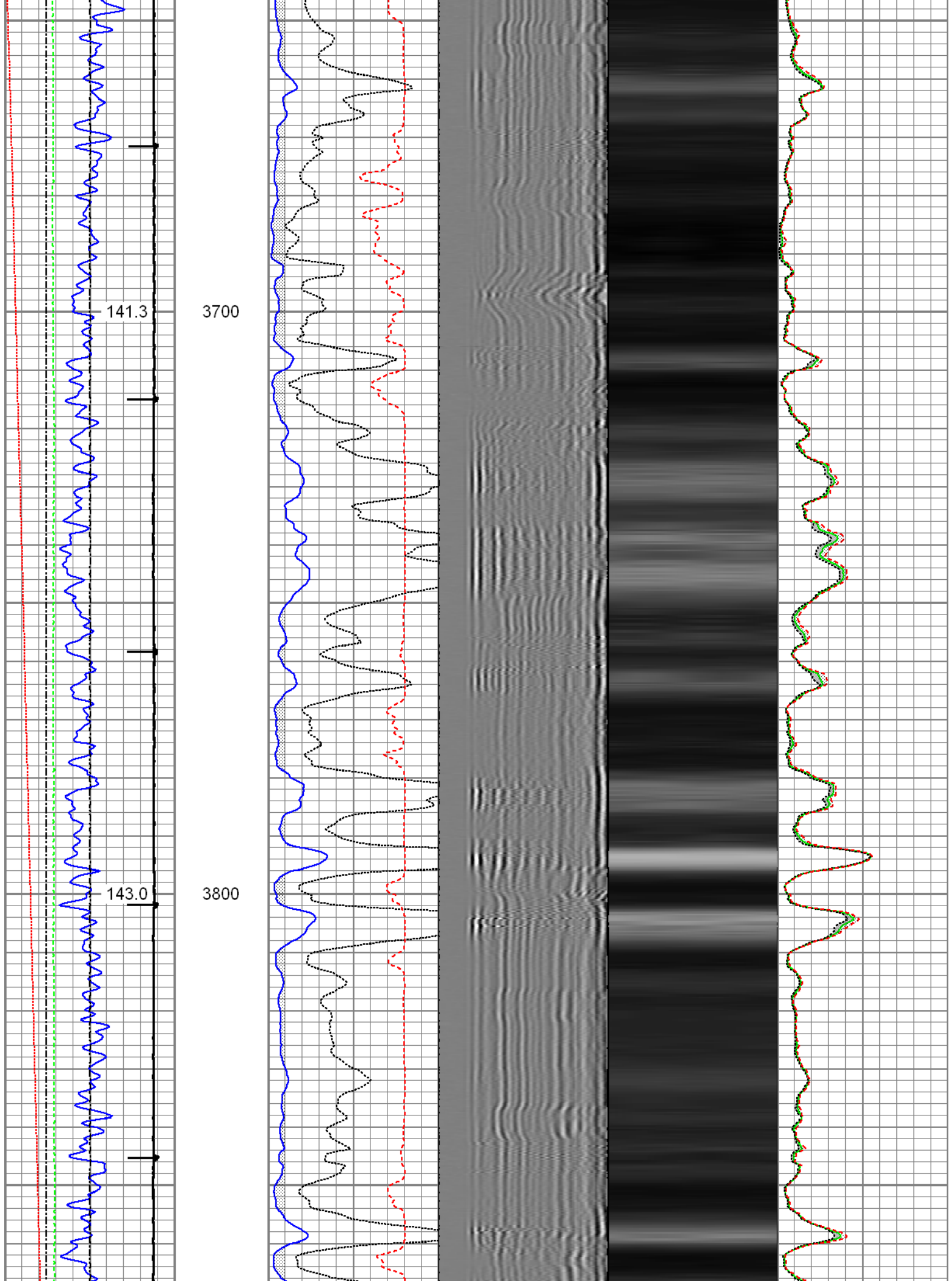


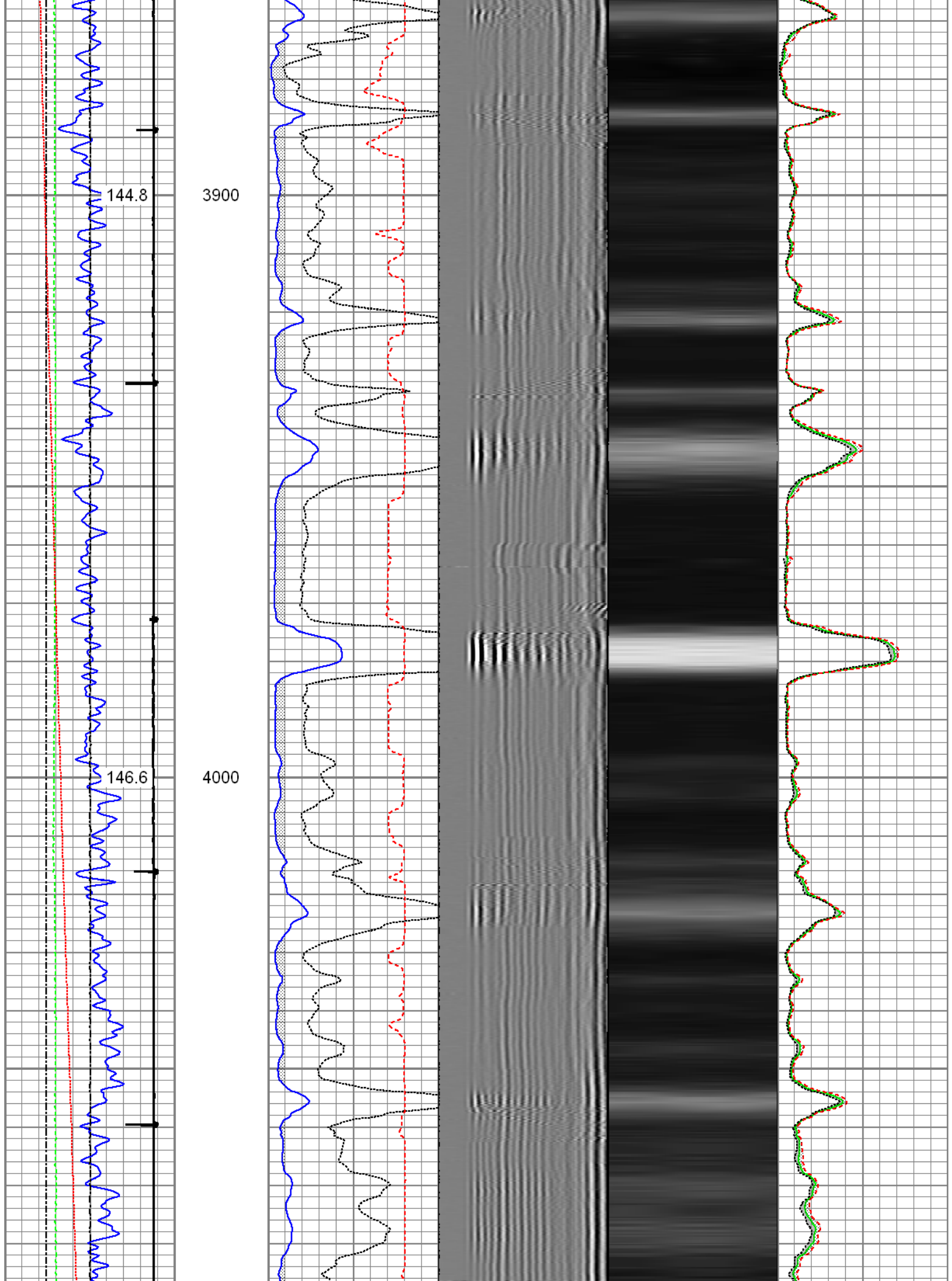


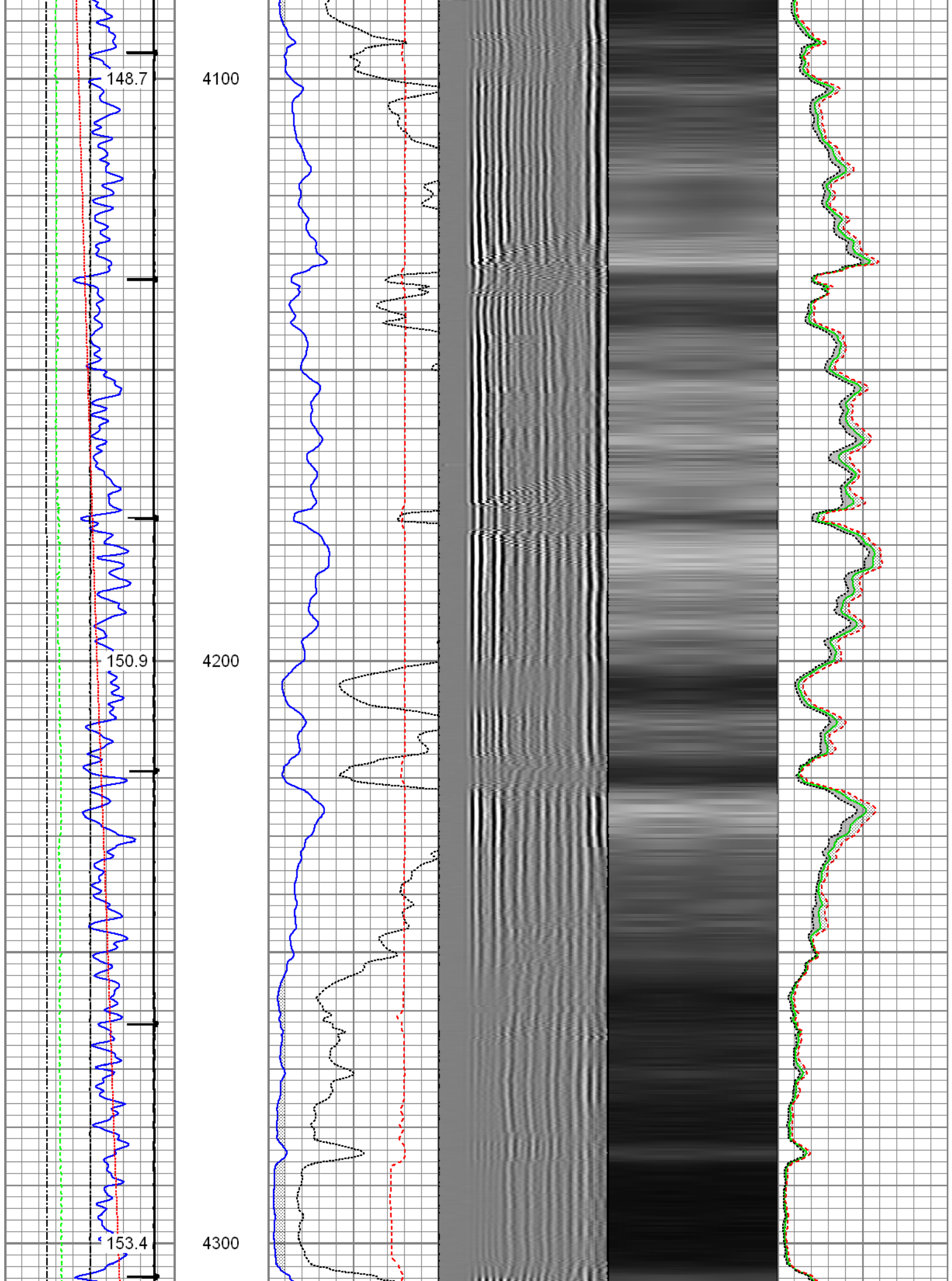


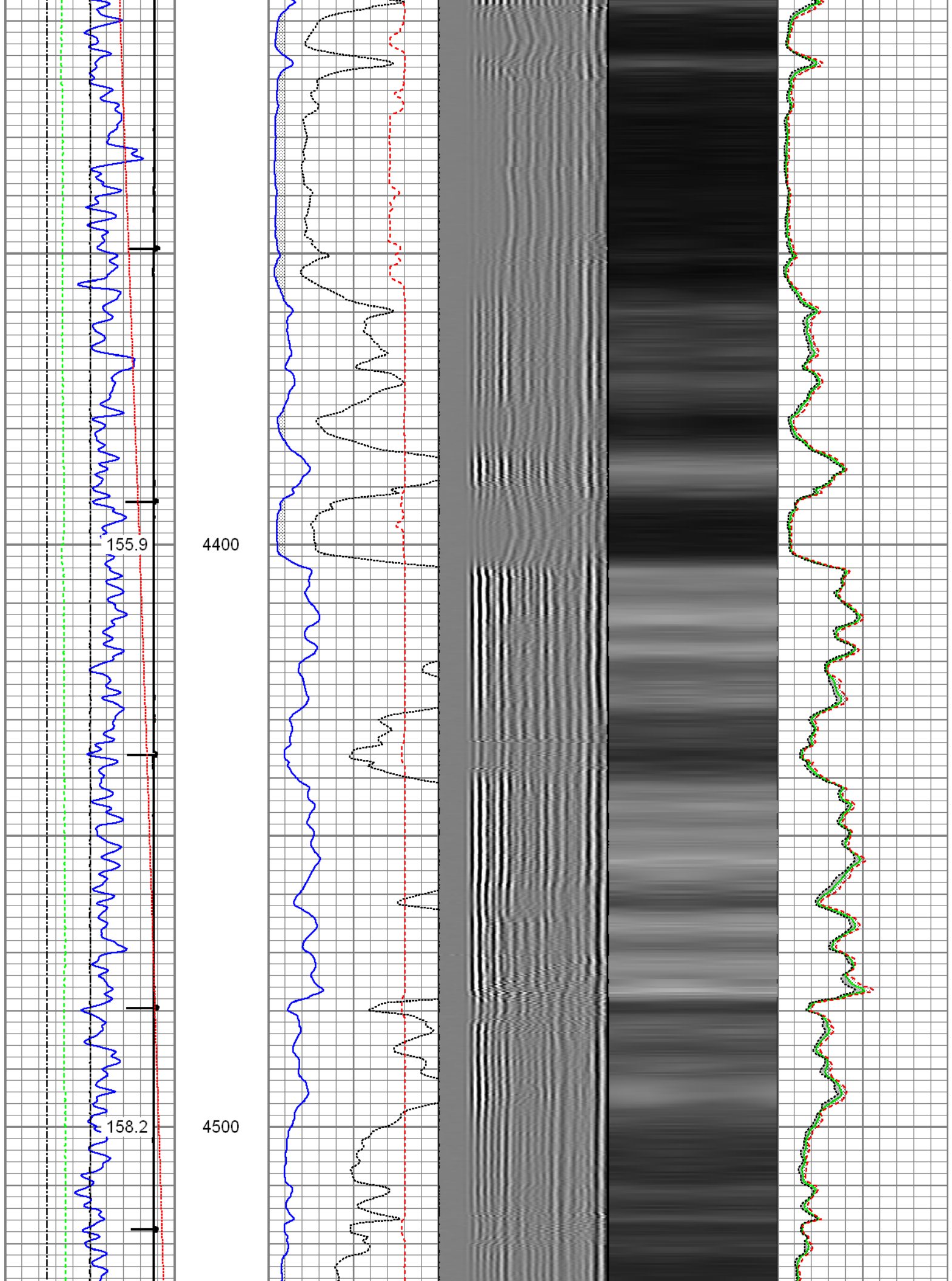


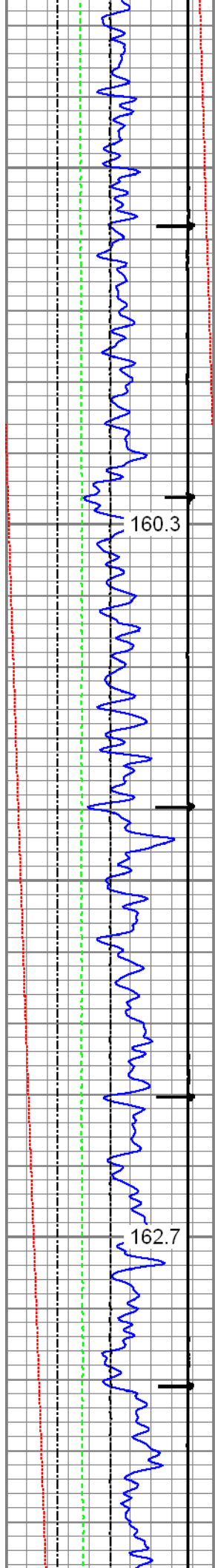










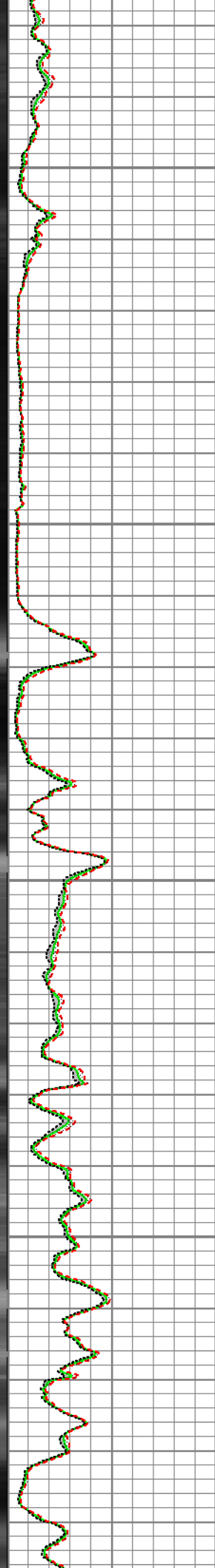
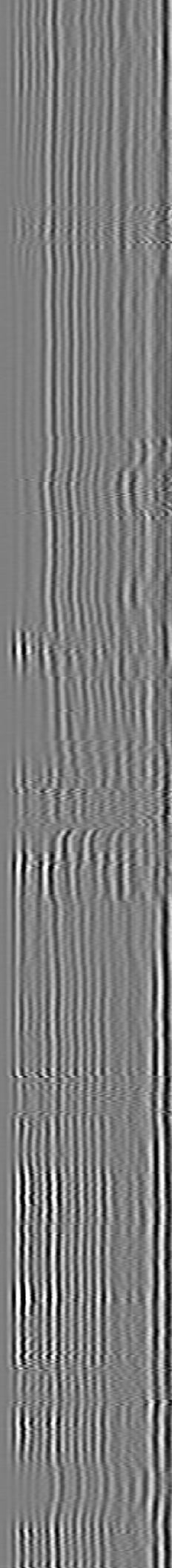
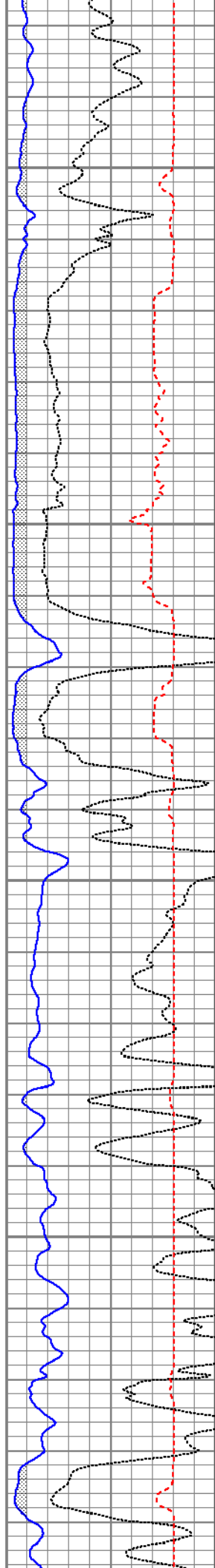


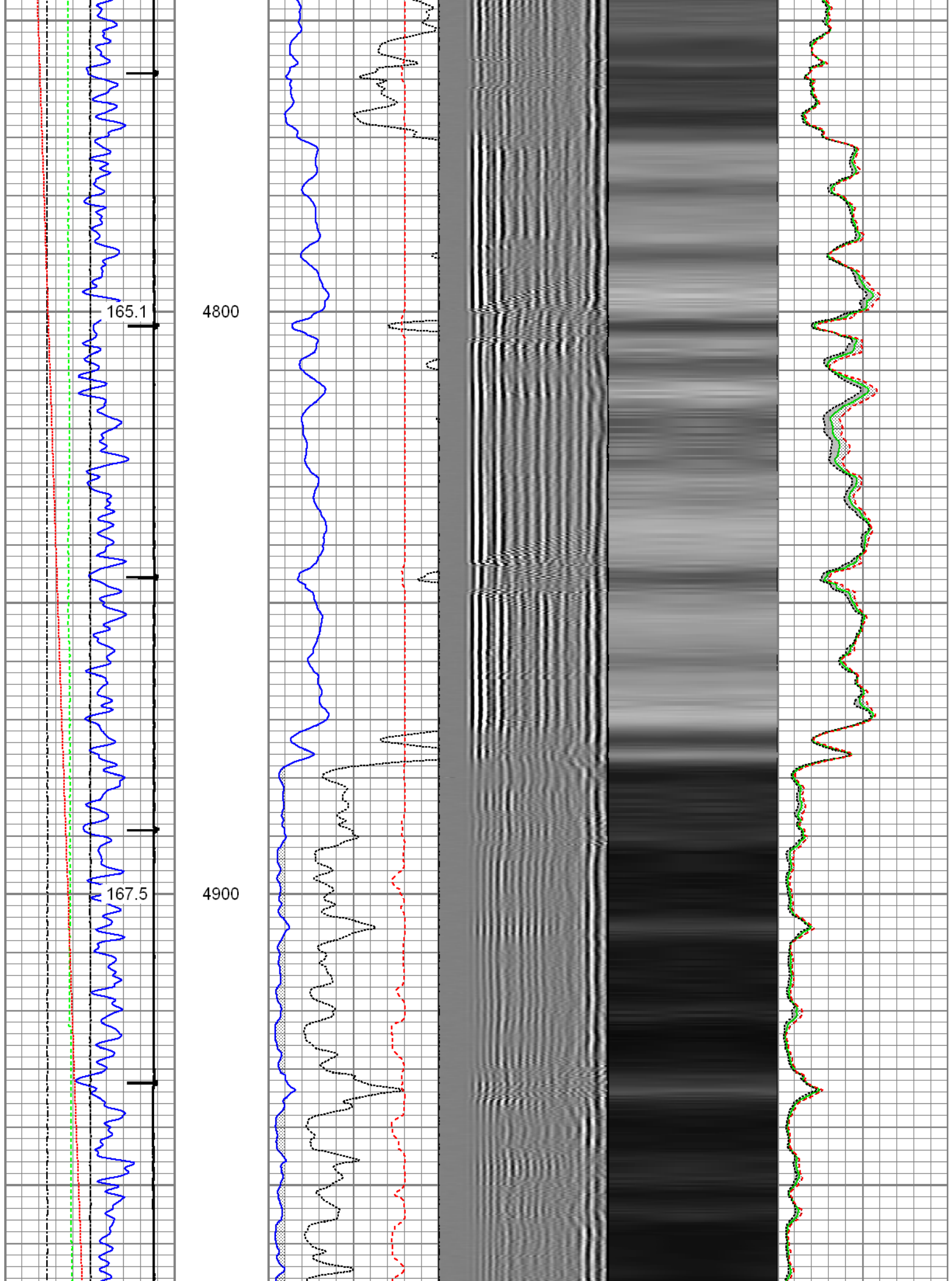
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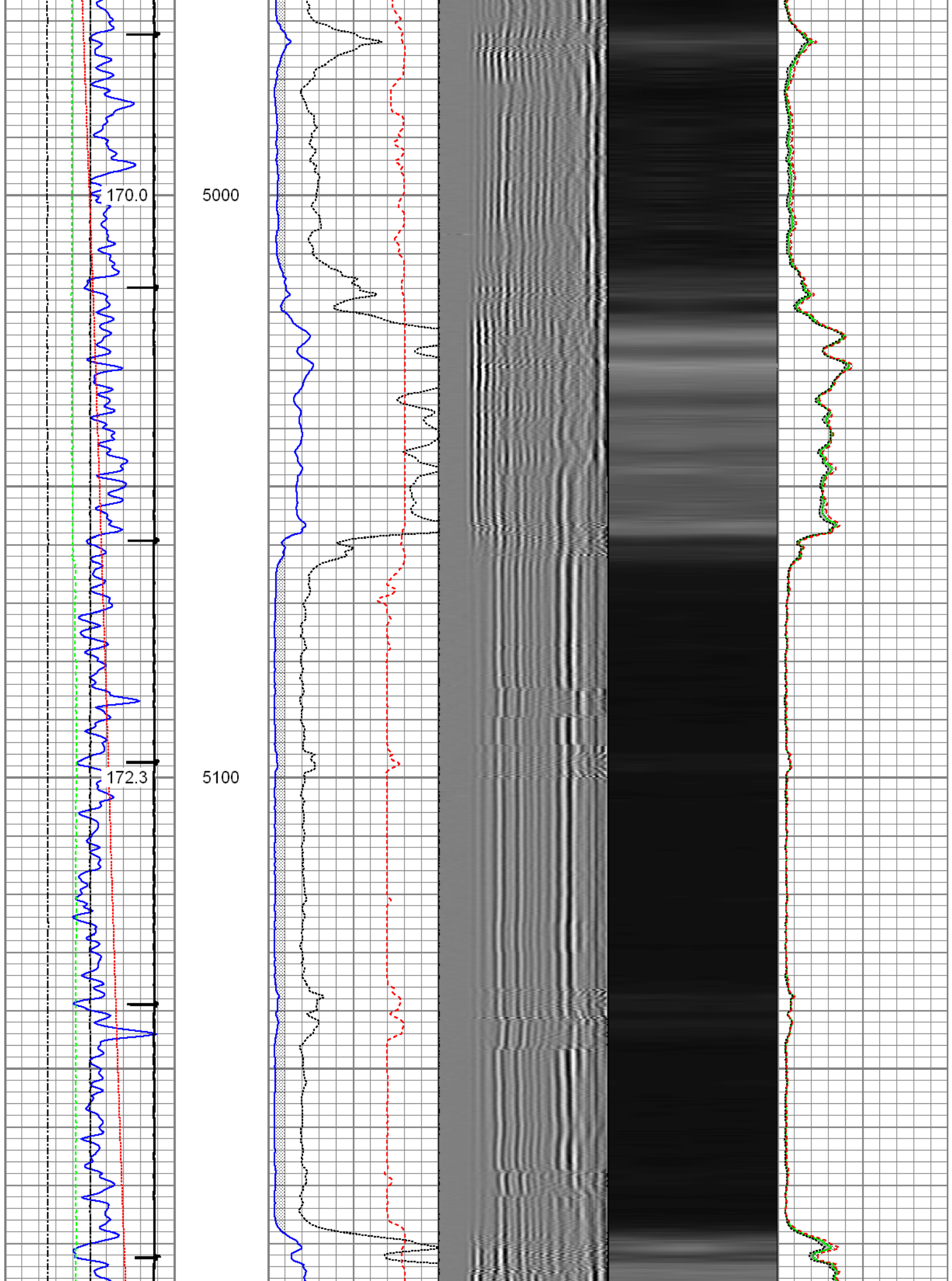
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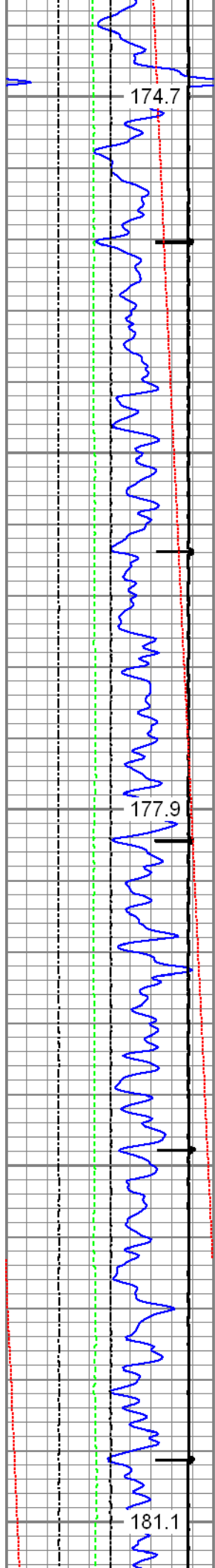
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4700





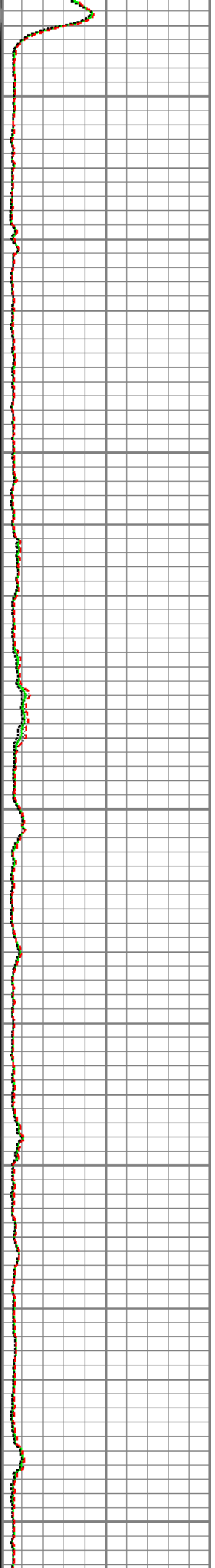
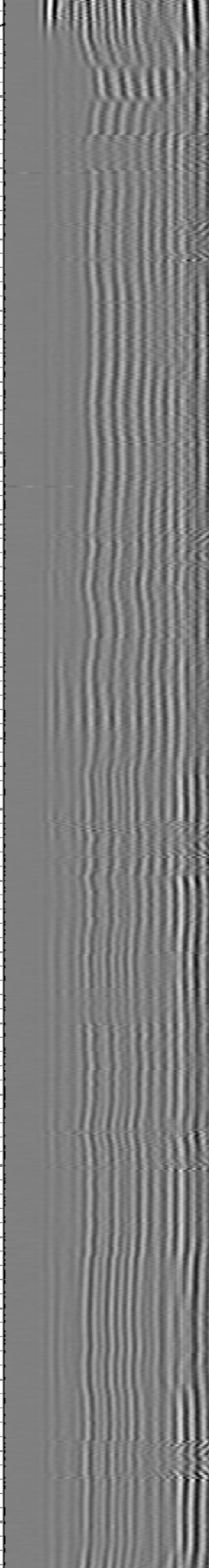
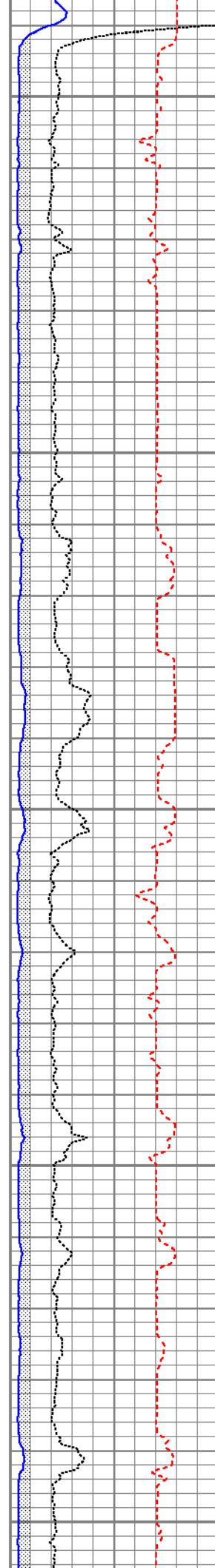


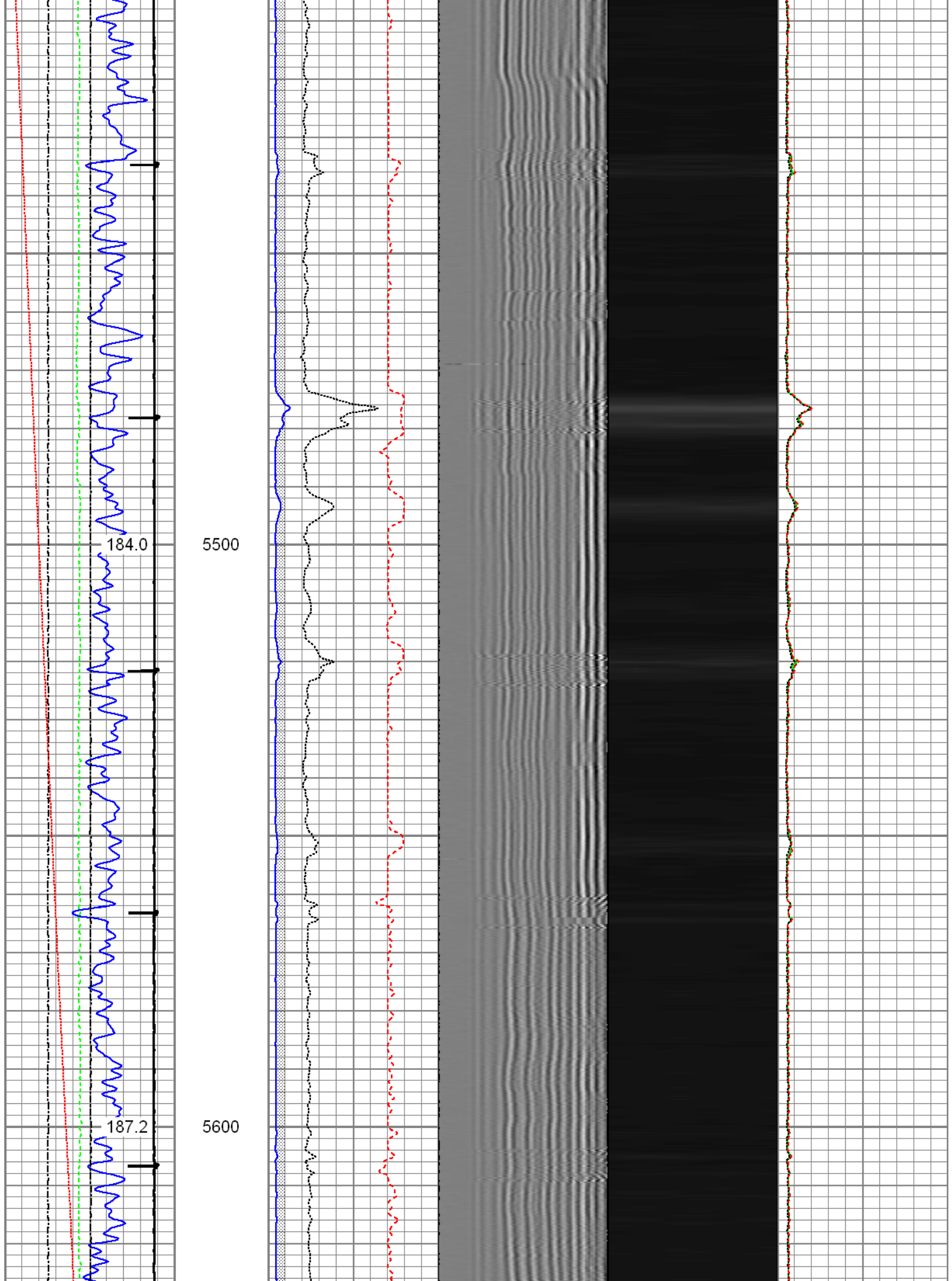


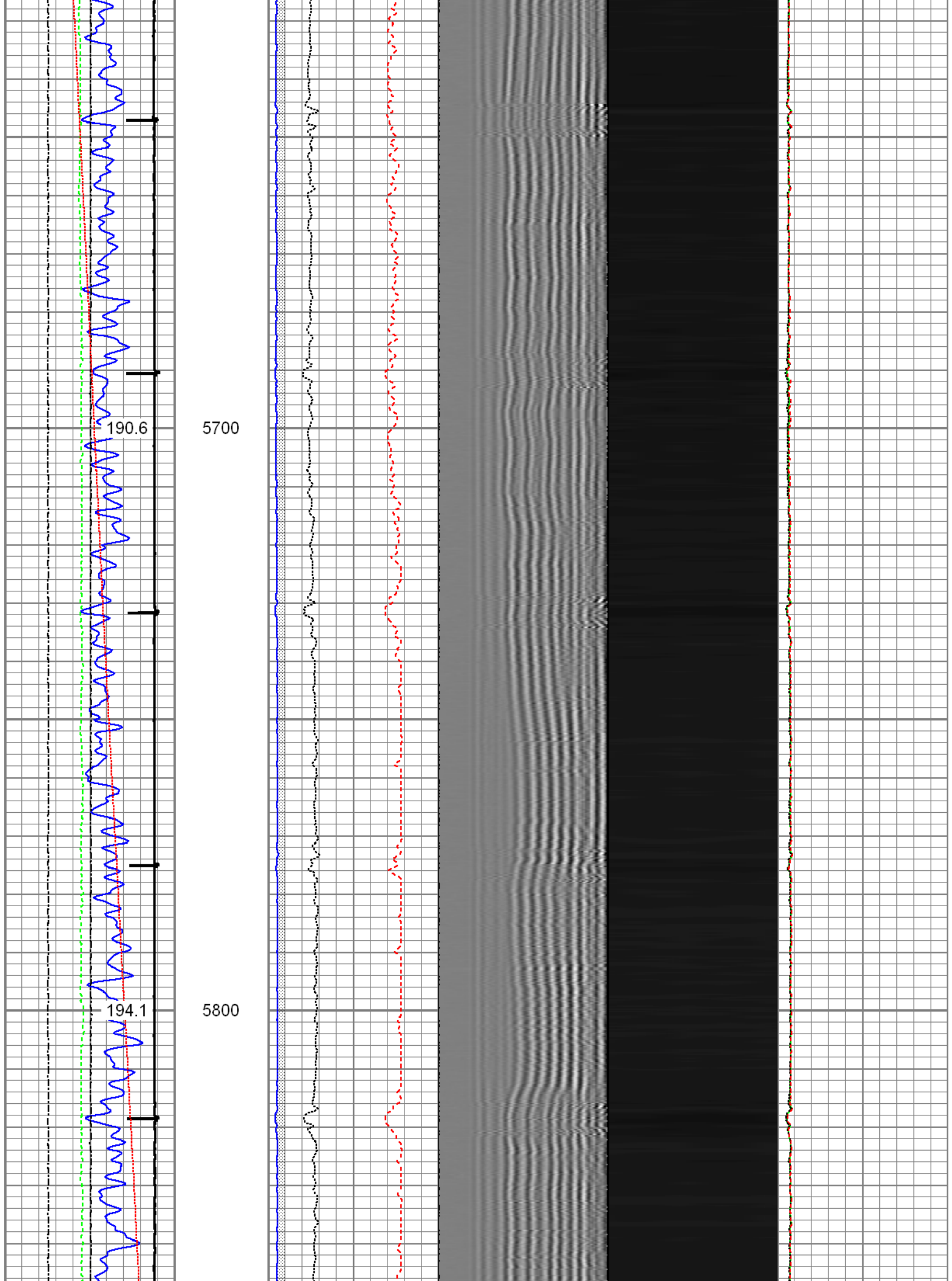
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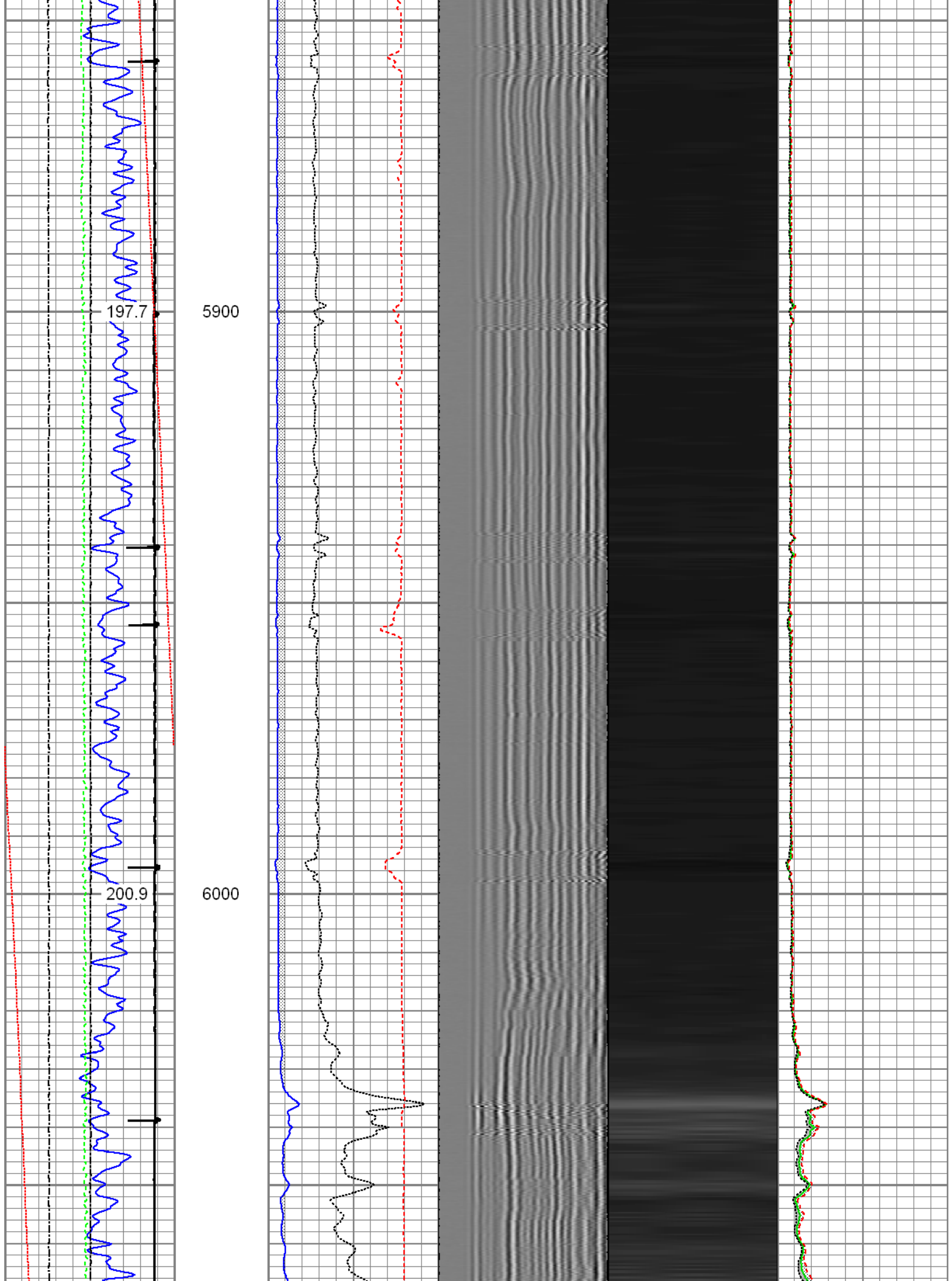
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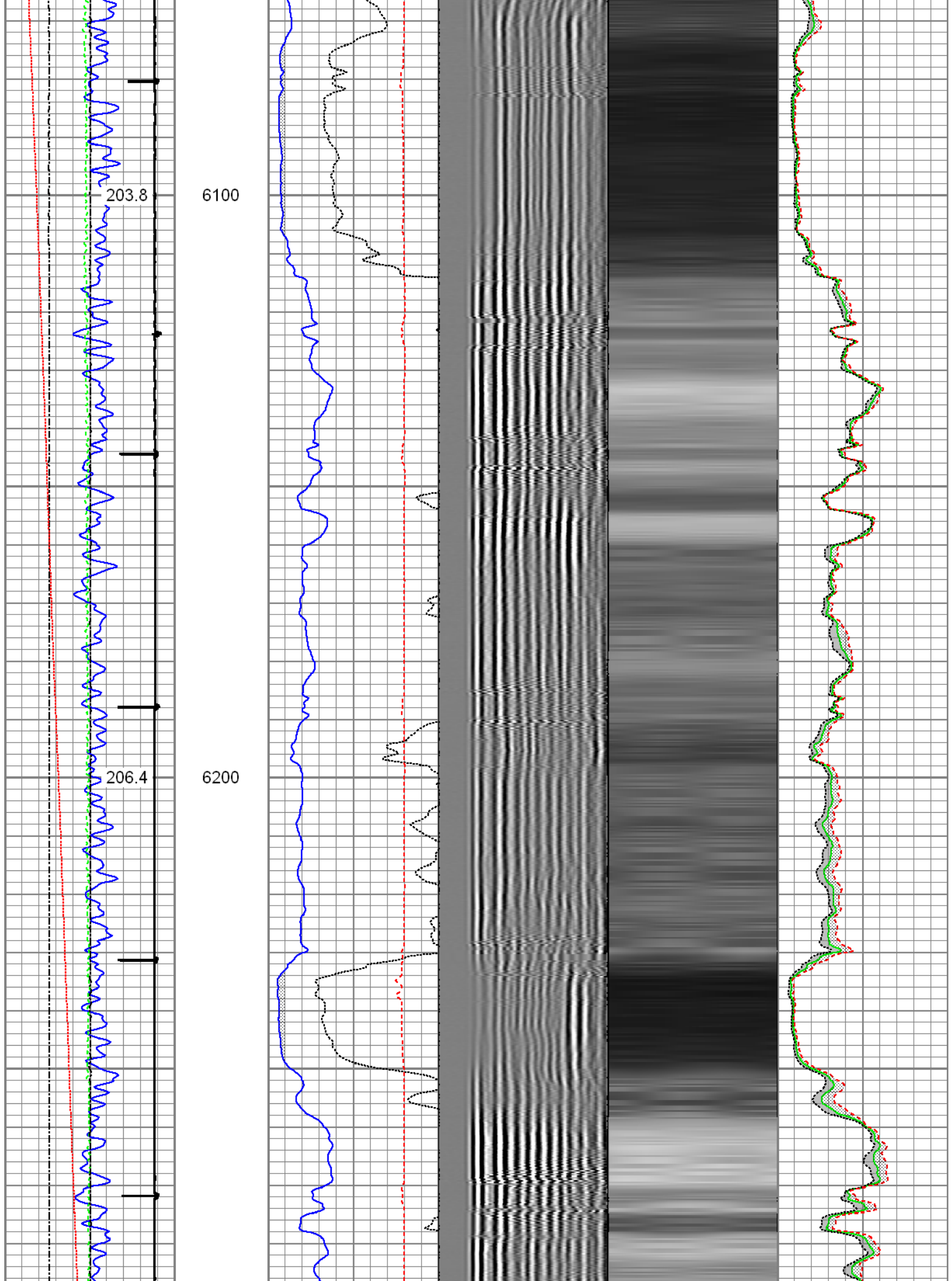
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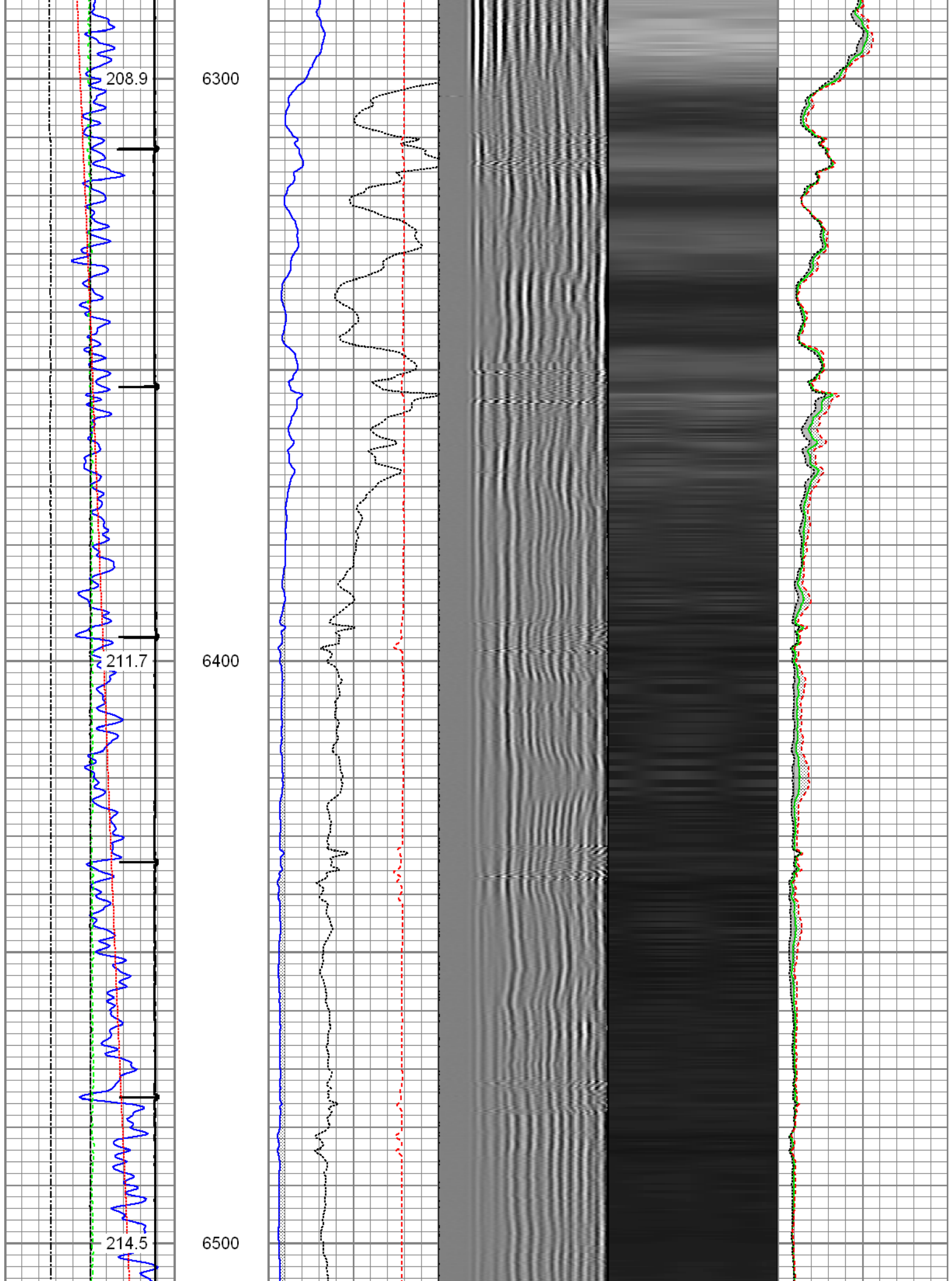


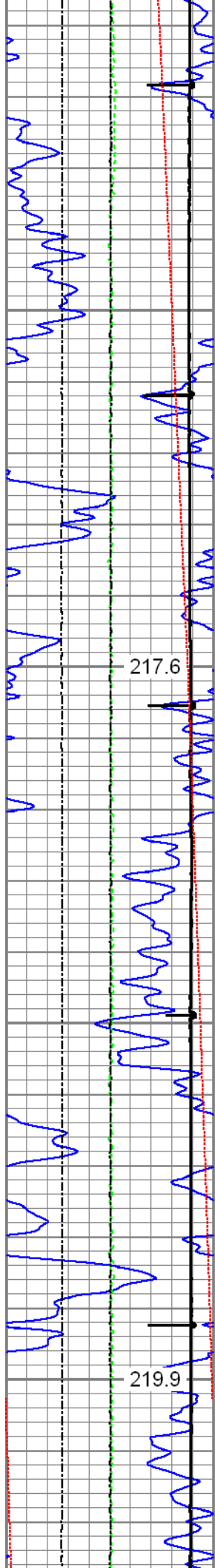










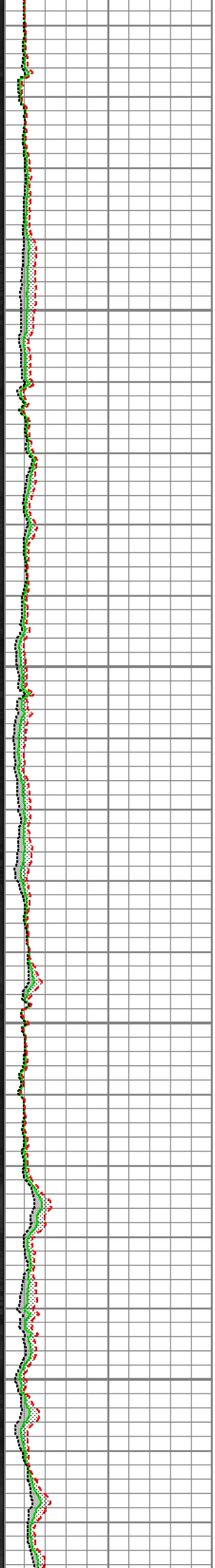
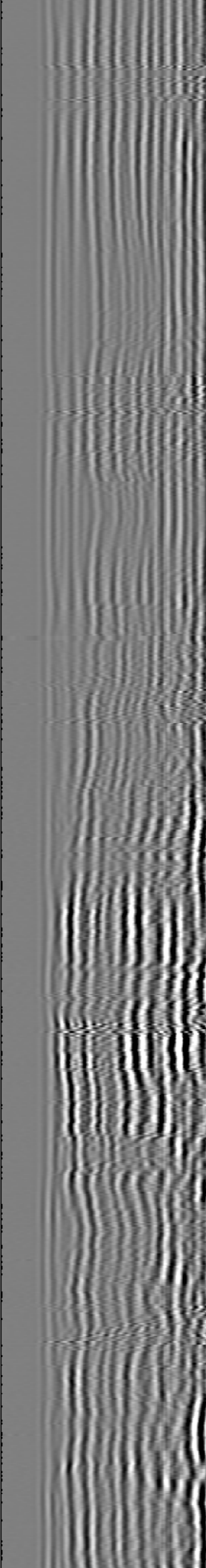
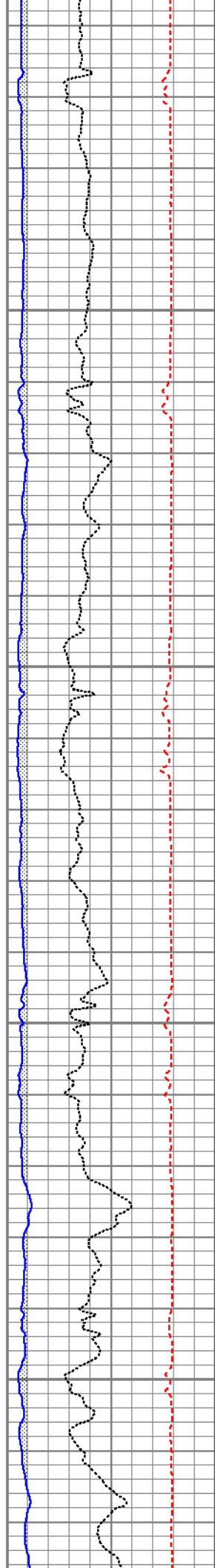


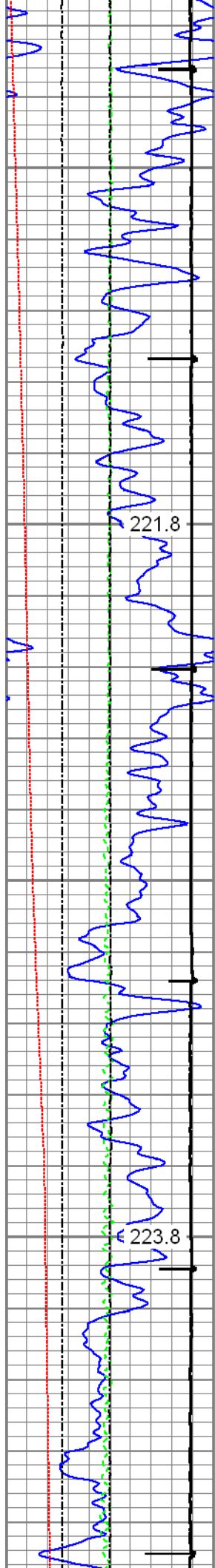
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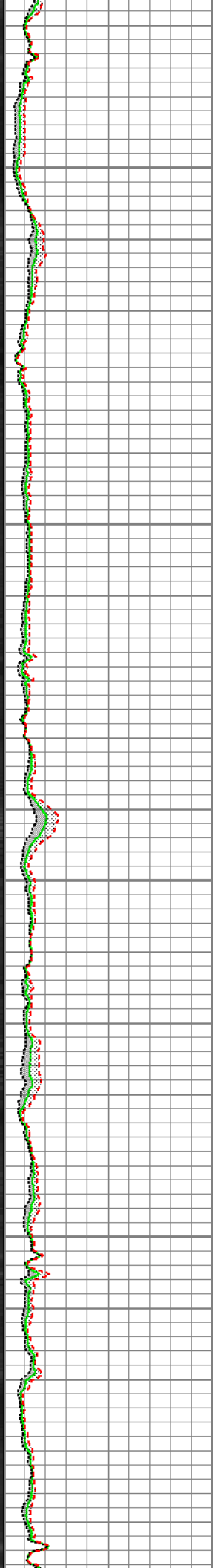
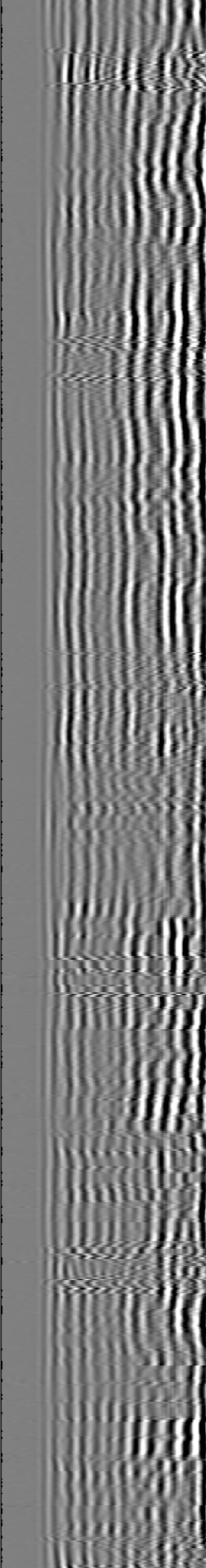
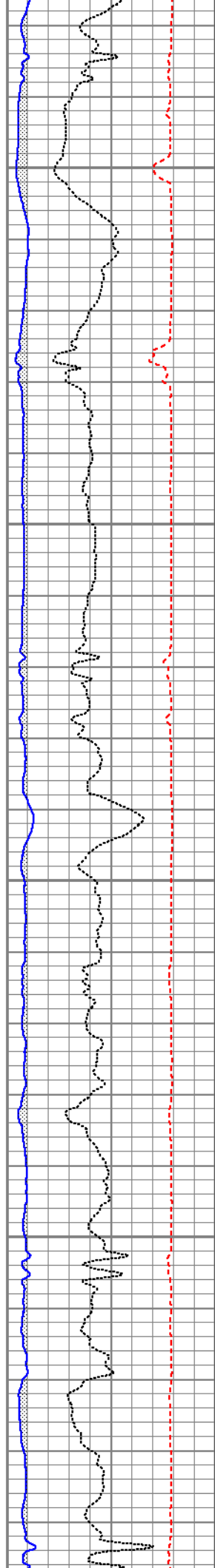


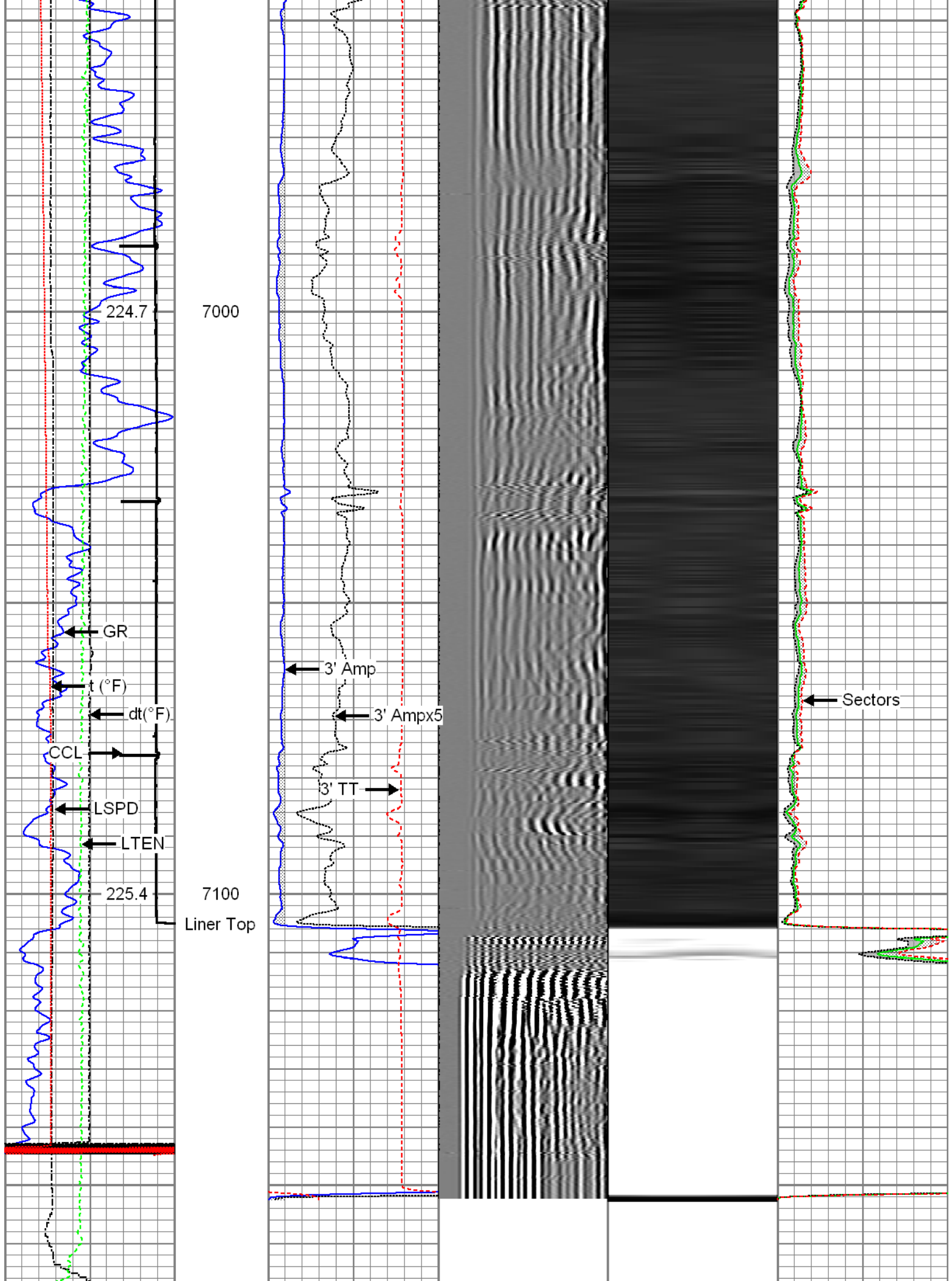
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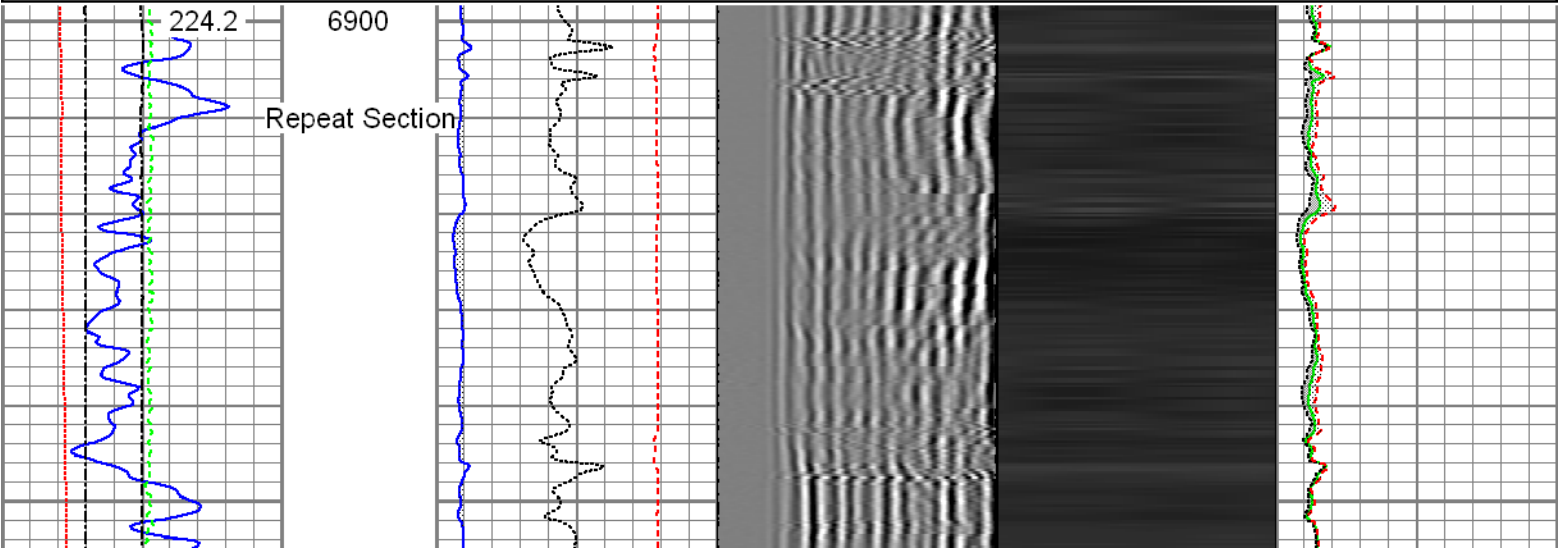
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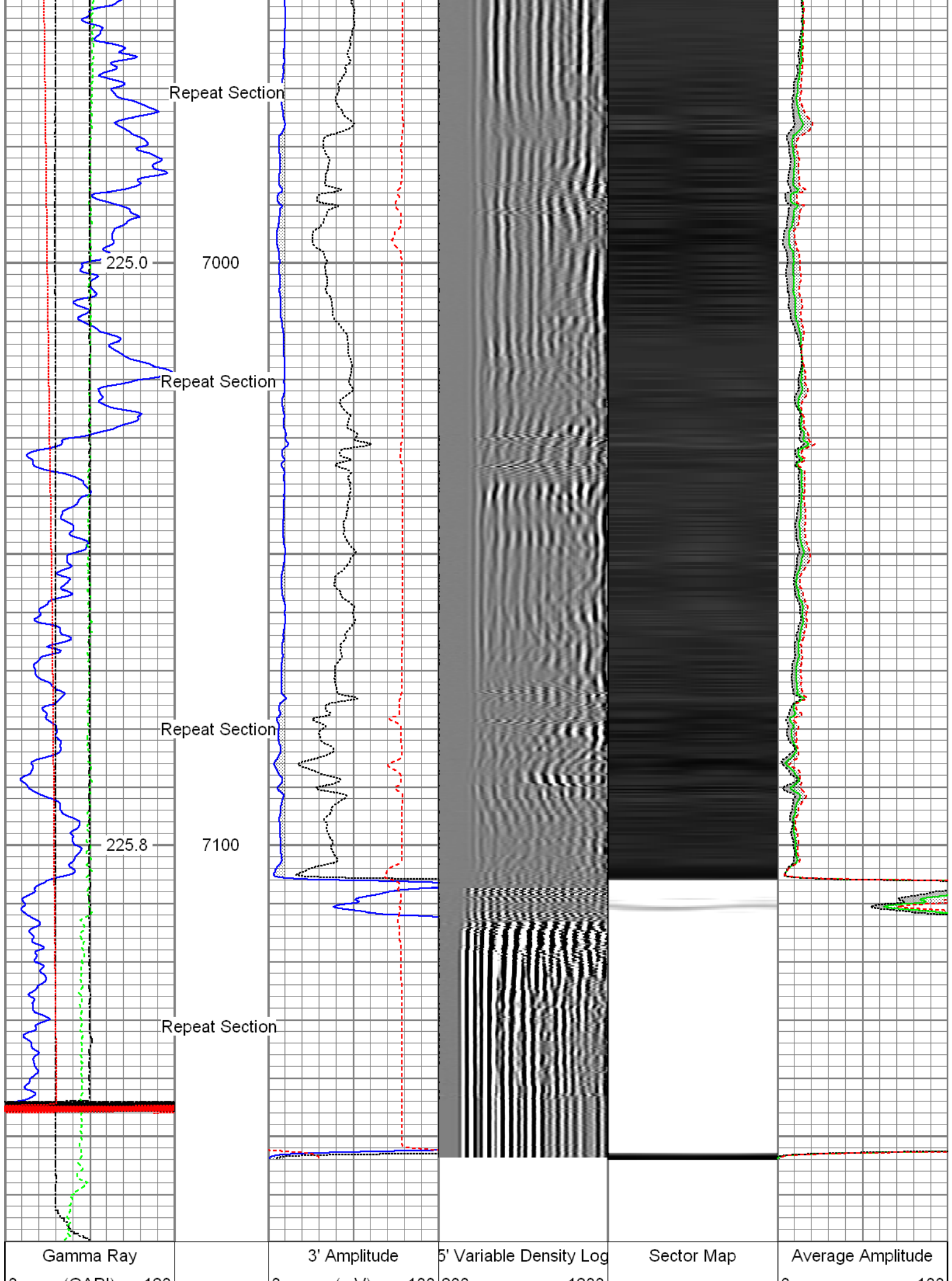




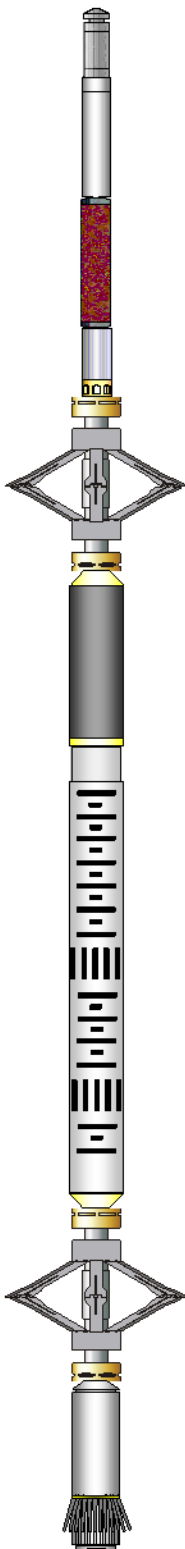
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Minimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

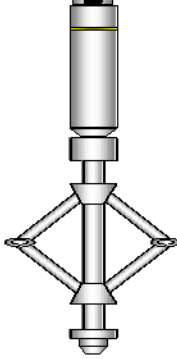
<div>FMC Technologies</div>		<div>Repeat Section</div> <div>Recorded with 2500 PSI Surface Induced Pressure</div>		
<div>Database File: 06-27-15_noble energy_wells ranch aa11-654_mit_rbl.db</div> <div>Dataset Pathname: repeat.1</div> <div>Presentation Format: rbt4_mit</div> <div>Dataset Creation: Sat Jun 27 12:14:14 2015 by Calc 7.0 B1</div> <div>Charted by: Depth in Feet scaled 1:240</div>				
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				





0 (GAPI) 120	0 (mV) 100 200	0 100
Line Speed	3' Amplitude x 5	Mimimum 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 (10017430) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50
			UW_PGR-UW_PGR_020 (211727) Production Gamma Ray	1.93	1.69	9.50
TEMP	22.45		UW_PRT-UW_PRT_016 (10025093) Platinum Resistance Thermometer	1.04	1.69	5.20
			UW_PRC #3 -DSSRAC (081) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
WV3FT	15.42		UW_RBT-UW_RBT_004 (1066) Sondex Ultrawire 3- 1/8" Radial Bond Tool	9.47	3.13	140.00
WVFS1	15.42					
WVFS2	15.42					
WVFS3	15.42					
WVFS4	15.42					
WVFS5	15.42					
WVFS6	15.42					
WVFS7	15.42					
WVFS8	15.42					
CBLTEMP	15.42		UW_PRC-DSSRAC (080) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
CBLROT	15.42					
WV5FT	14.42					
MIT	5.41		UW_MIT-UW_MIT40_042 (10020664)	4.54	2.75	61.10

TSTAMP	0.00		40 Multifinger Imaging Tool			
			UW_PRC #4 -UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			UW_BUL-UW_BUL_006 (218707) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
Dataset: 06-27-15_Noble Energy_Wells Ranch AA11-654_MIT_RBL.db: field/well/run1/main1.1 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in						

Calibration Report			
Database File:	06-27-15_noble energy_wells ranch aa11-654_mit_rbl.db		
Dataset Pathname:	main1.1		
Dataset Creation:	Sat Jun 27 11:46:14 2015 by Calc 7.0 B1		
Multi-finger Imaging Tool Calibration Report			
Serial Number:		10020664	
Number of Fingers:		40	
Tool Model:		UW_MIT40_042	
Inclinometer Calibration Report			
Performed:		Wed Nov 26 12:28:41 2014	
Calibration Angle:		45	
		Inc X	Inc Y
Vertical:		1946	1932
Finger 1 up:		1712	1699
Finger 31 up:		2180	1700
Finger 21 up:		2165	2167
Finger 11 up:		1708	2156
Sensitivity ratio:	1.00121		
X-axis angle:	134.04		
Deviation const.:	327.106		

Finger Calibration Report						
Performed:			Sat Jun 27 07:31:45 2015			
Ring size:	4		5		6	7
(in)		Sens		Sens		Sens
Finger 01:	1174	350.0	1524	378.0	1902	383.0
Finger 02:	1184	358.0	1542	382.0	1924	390.0
Finger 03:	1132	348.0	1480	379.0	1859	392.0
Finger 04:	1144	365.0	1509	400.0	1909	407.0
Finger 05:	1125	359.0	1484	391.0	1875	404.0
Finger 06:	1157	356.0	1513	384.0	1897	389.0
Finger 07:	1070	371.0	1441	407.0	1848	425.0
Finger 08:	1121	354.0	1475	390.0	1865	408.0
Finger 09:	1089	363.0	1452	394.0	1846	415.0
Finger 10:	1009	362.0	1371	412.0	1783	442.0
Finger 11:	1096	350.0	1446	378.0	1824	399.0
Finger 12:	1071	355.0	1426	392.0	1818	417.0
Finger 13:	1052	345.0	1397	384.0	1781	412.0
Finger 14:	1027	347.0	1374	385.0	1759	415.0
Finger 15:	1089	350.0	1439	364.0	1803	390.0
Finger 16:	1044	343.0	1387	377.0	1764	408.0
Finger 17:	1045	345.0	1390	380.0	1770	413.0
Finger 18:	996	352.0	1348	383.0	1731	426.0

Finger 18:	958	332.0	1348	383.0	1731	420.0	2157
Finger 19:	1003	346.0	1349	383.0	1732	417.0	2149
Finger 20:	1040	346.0	1386	384.0	1770	416.0	2186
Finger 21:	1060	337.0	1397	374.0	1771	407.0	2178
Finger 22:	1061	344.0	1405	380.0	1785	411.0	2196
Finger 23:	1174	329.0	1503	347.0	1850	375.0	2225
Finger 24:	1035	341.0	1376	386.0	1762	417.0	2179
Finger 25:	1017	339.0	1356	386.0	1742	421.0	2163
Finger 26:	1088	343.0	1431	375.0	1806	407.0	2213
Finger 27:	1118	346.0	1464	382.0	1846	411.0	2257
Finger 28:	1105	345.0	1450	386.0	1836	409.0	2245
Finger 29:	1101	355.0	1456	395.0	1851	422.0	2273
Finger 30:	1153	344.0	1497	377.0	1874	397.0	2271
Finger 31:	1151	346.0	1497	379.0	1876	396.0	2272
Finger 32:	1186	343.0	1529	367.0	1896	386.0	2282
Finger 33:	1201	350.0	1551	375.0	1926	390.0	2316
Finger 34:	1154	355.0	1509	389.0	1898	403.0	2301
Finger 35:	1181	356.0	1537	389.0	1926	401.0	2327
Finger 36:	1221	349.0	1570	375.0	1945	386.0	2331
Finger 37:	1142	360.0	1502	395.0	1897	410.0	2307
Finger 38:	1109	369.0	1478	408.0	1886	421.0	2307
Finger 39:	1134	360.0	1494	393.0	1887	408.0	2295
Finger 40:	1165	358.0	1523	388.0	1911	397.0	2308

Segmented Cement Bond Log Calibration Report						
Serial Number:		1066				
Tool Model:		UW_RBT_004				
Calibration Casing Diameter:		7.000	in			
Calibration Depth:		176.748	ft			
Master Calibration, performed Sat Jun 27 11:45:03 2015:						
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.000	0.778	0.800	62.165	78.967	0.762
5FT	-0.006	0.746	0.800	62.165	81.607	1.252
S1	0.001	0.726	0.000	100.000	137.954	-0.196
S2	-0.000	0.731	0.000	100.000	136.682	0.038
S3	-0.000	0.751	0.000	100.000	133.098	0.025
S4	-0.001	0.786	0.000	100.000	127.190	0.074
S5	-0.000	0.807	0.000	100.000	123.899	0.010
S6	-0.000	0.818	0.000	100.000	122.164	0.015
S7	0.001	0.813	0.000	100.000	123.170	-0.086
S8	0.001	0.768	0.000	100.000	130.385	-0.164

Temperature Calibration Report					
Serial Number:		10025093			
Tool Model:		UW_PRT_016			
Performed:		Wed Feb 11 13:40:46 2015			
Point #	Reading		Reference		
1	13006.00	cps	68.00	degF	
2	18181.00	cps	104.00	degF	
3	29634.00	cps	176.00	degF	
4	41077.00	cps	248.00	degF	
5	52560.00	cps	320.00	degF	
6	58409.00	cps	356.00	degF	
7		cps		degF	
8		cps		degF	
9		cps		degF	

9
10

cps
cps

degF
degF

Gamma Ray Calibration Report

Serial Number:	211727	
Tool Model:	UW_PGR_020	
Performed:	Fri Jun 26 16:09:02 2015	
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 AA11-654
Field	Wattenberg
County	Weld
State	Colorado