

# Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.		
Well	Wells Ranch State A36-675		
Field	Wattenberg		
County	Weld		
State	Colorado		
Company	Noble Energy Inc.	Well	Wells Ranch State A36-675
Field	Wattenberg	County	Weld
State	Colorado	Location:	API #: 05-123-41508
Permanent Datum	SEC 31 TWP 6N RGE 63W	Ground Level	Elevation 4655'
Log Measured From	Kelly Bushing	30 FT	Elevation 4685'
Drilling Measured From	Kelly Bushing		D.F. 4684'
			G.L. 4655'

Date	25-JUL-2015
Run Number	One
Depth Driller	16,336.0 FT
Depth Logger	6905 FT
Bottom Logged Interval	6905 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	228 °F
Estimated Cement Top	264 FT
Time Well Ready	ROA
Time Logger on Bottom	08:30
Equipment Number	HD-0119
Location	Fort Lupton, CO
Recorded By	Matt Steinman
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	812 FT		
Intermediate #1	7	26	P-110 IC	30 FT	7074 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110 IC	6,915 FT	16,291 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.

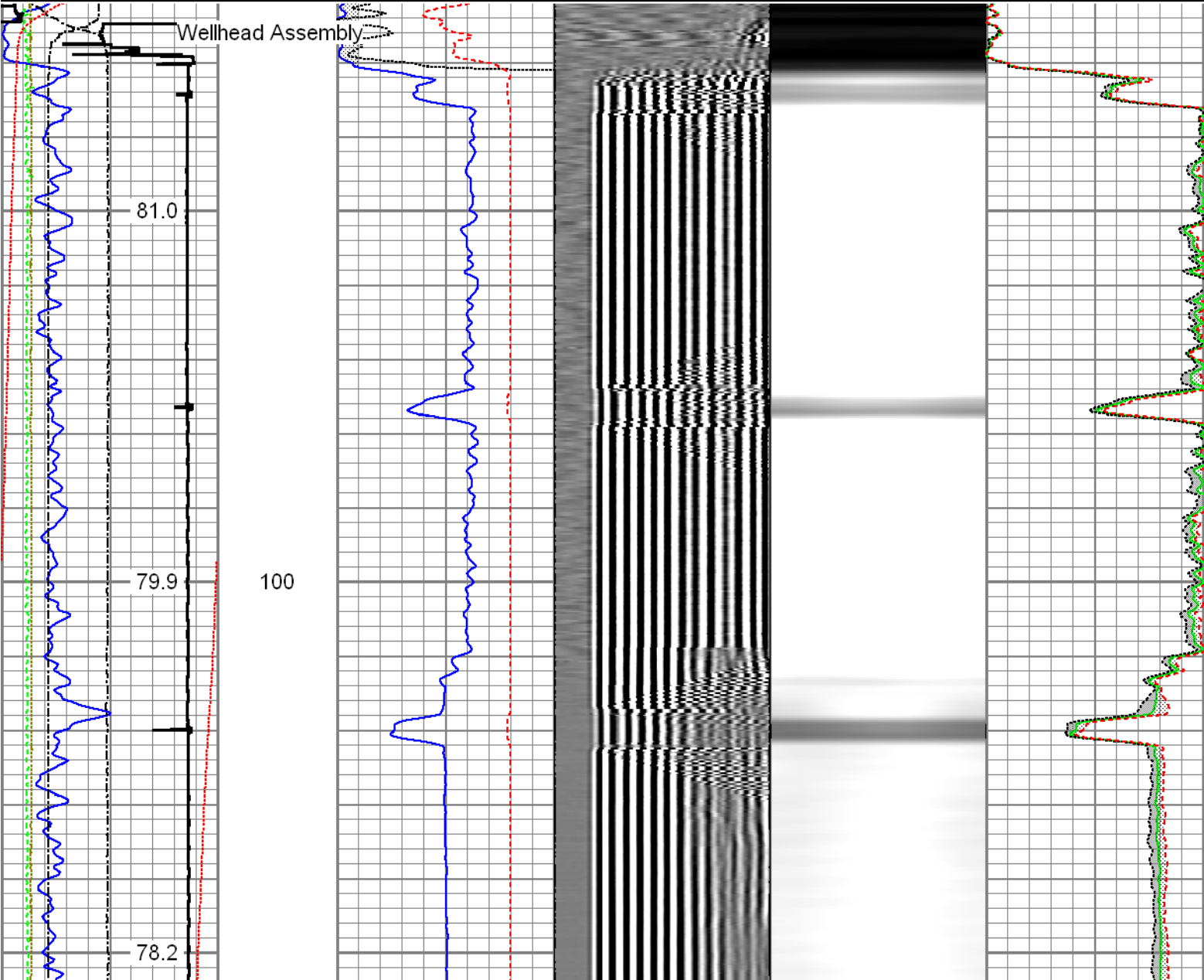
Comments

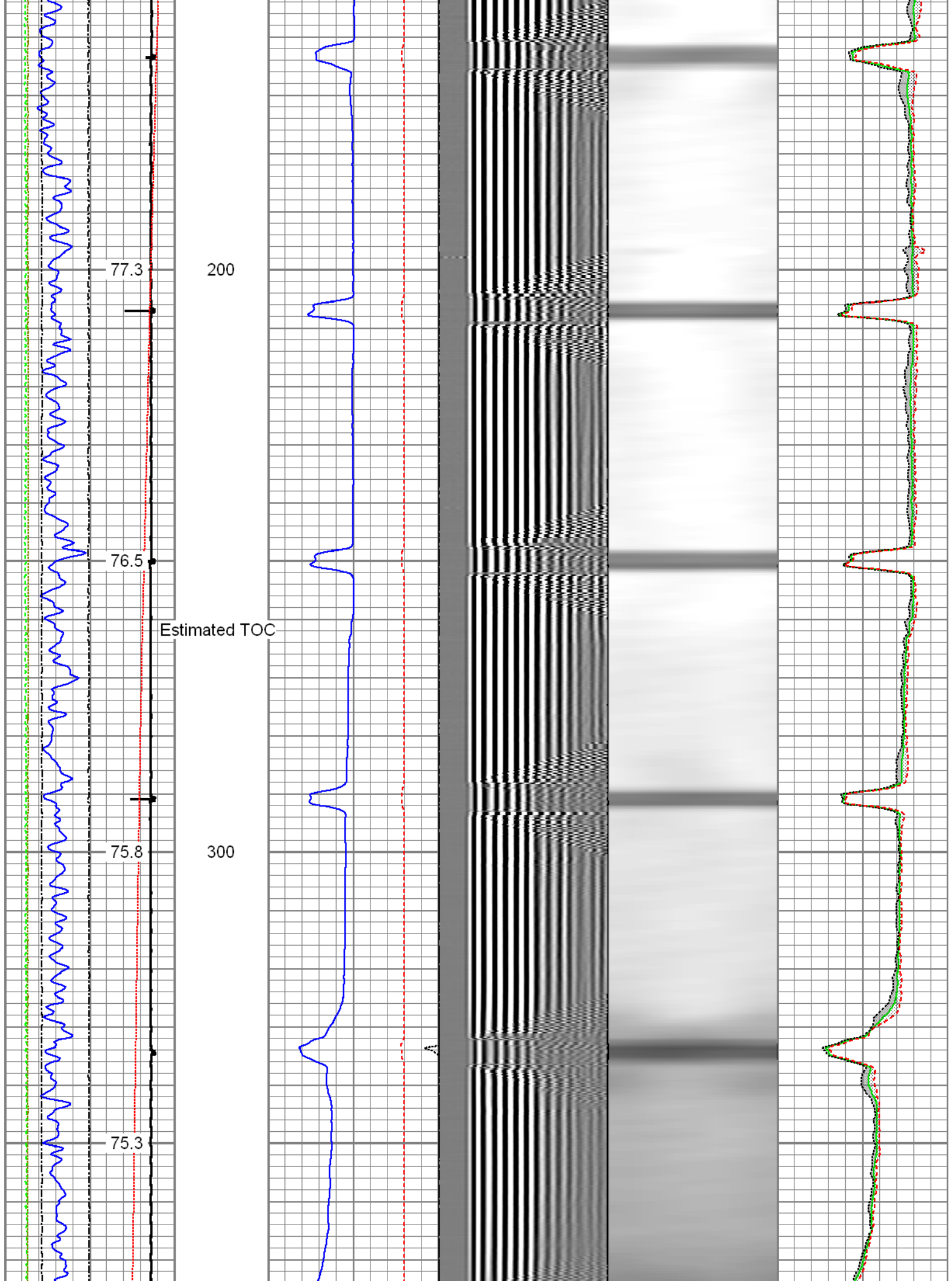
Log ran as per customer request  
 Depth referenced to Kelly Bushing at 30 FT  
 Adjusted -2 FT to correlate with Kelly Bushing  
 Log ran from 6905' above liner top to surface  
 Recorded with 1800-2000 PSI surface induced pressure  
 Logging tools were coated with debris upon completion of operations  
 Could not maintain 2500 PSI pressure tester kept slowly pumping on us to maintain 1800-2000 PSI

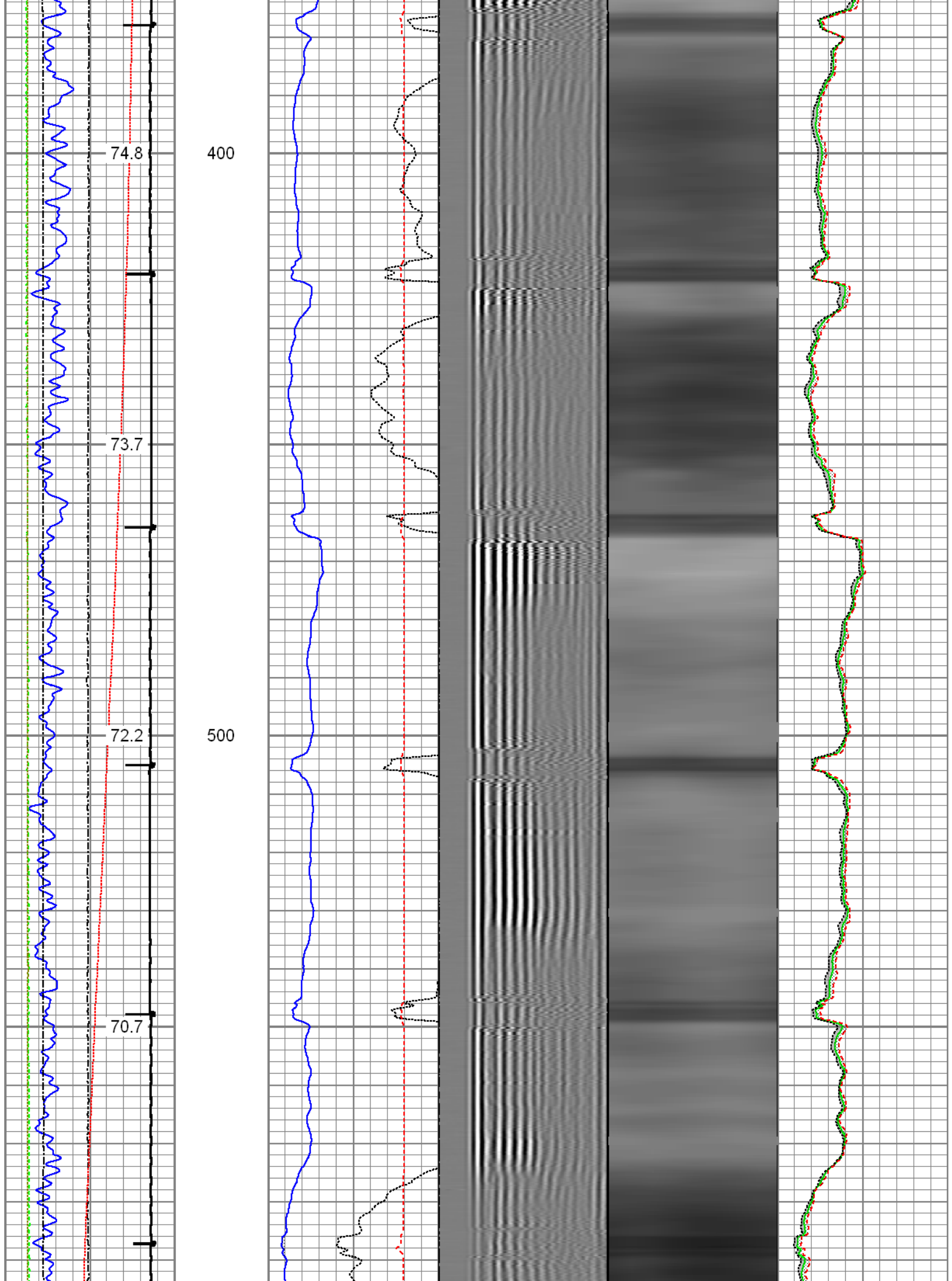
Thank you for choosing FMC Technologies Completion Services, Inc.!!

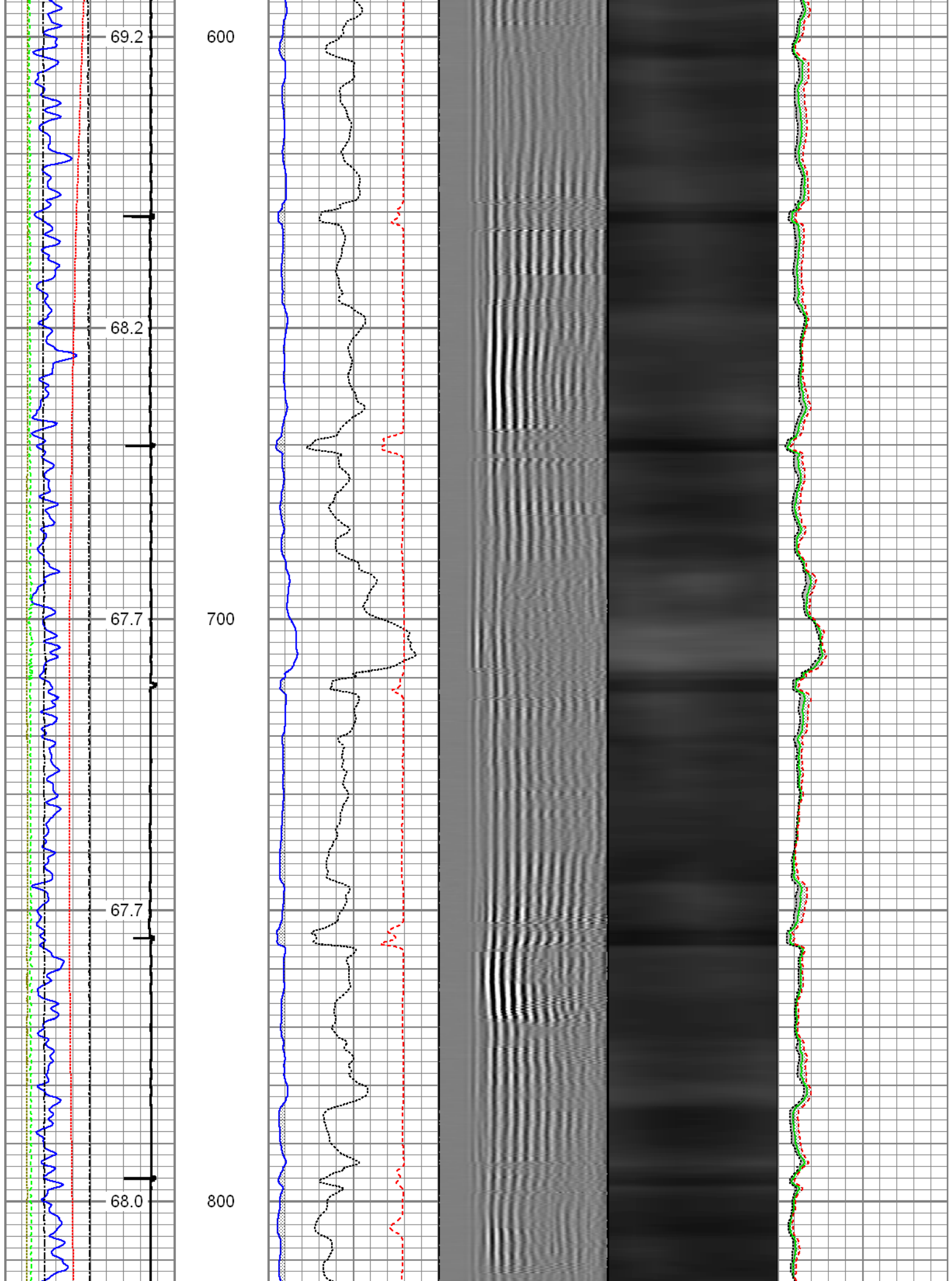
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Presentation Format: rbt4\_mit  
Dataset Creation: Sat Jul 25 10:34:58 2015 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

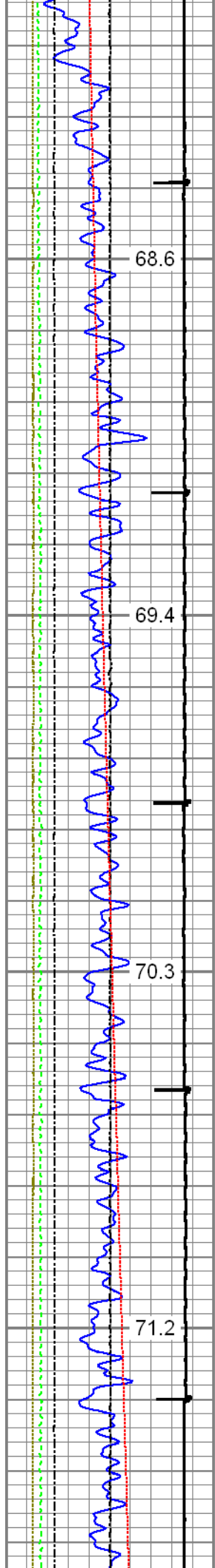
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000				
Differential Temperature				
-2 (degF) 2				
-10 Deviation (°) 90				
Temperature				
0 (degF) 20				





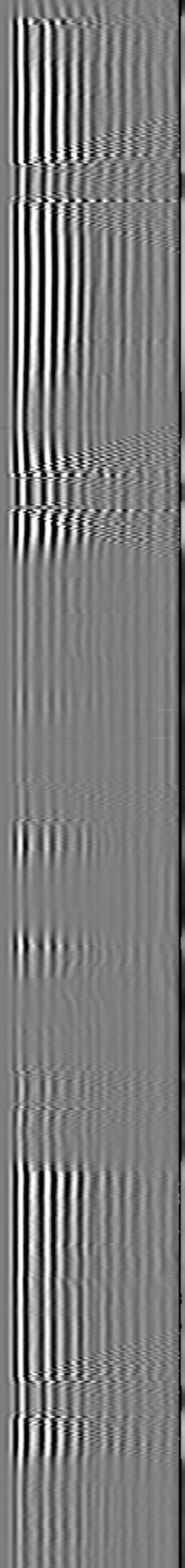
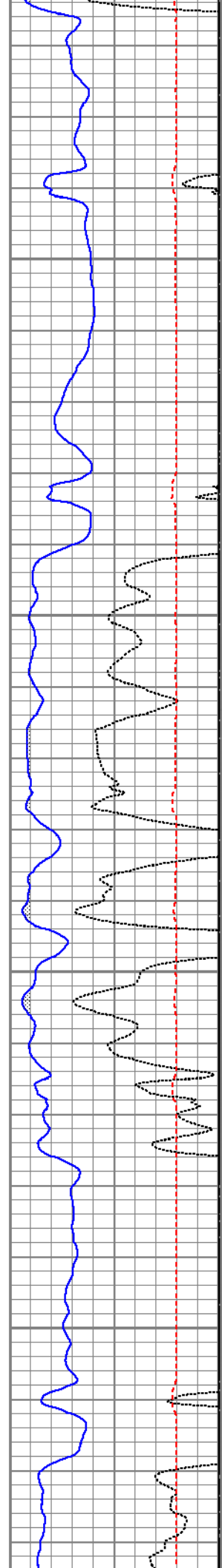


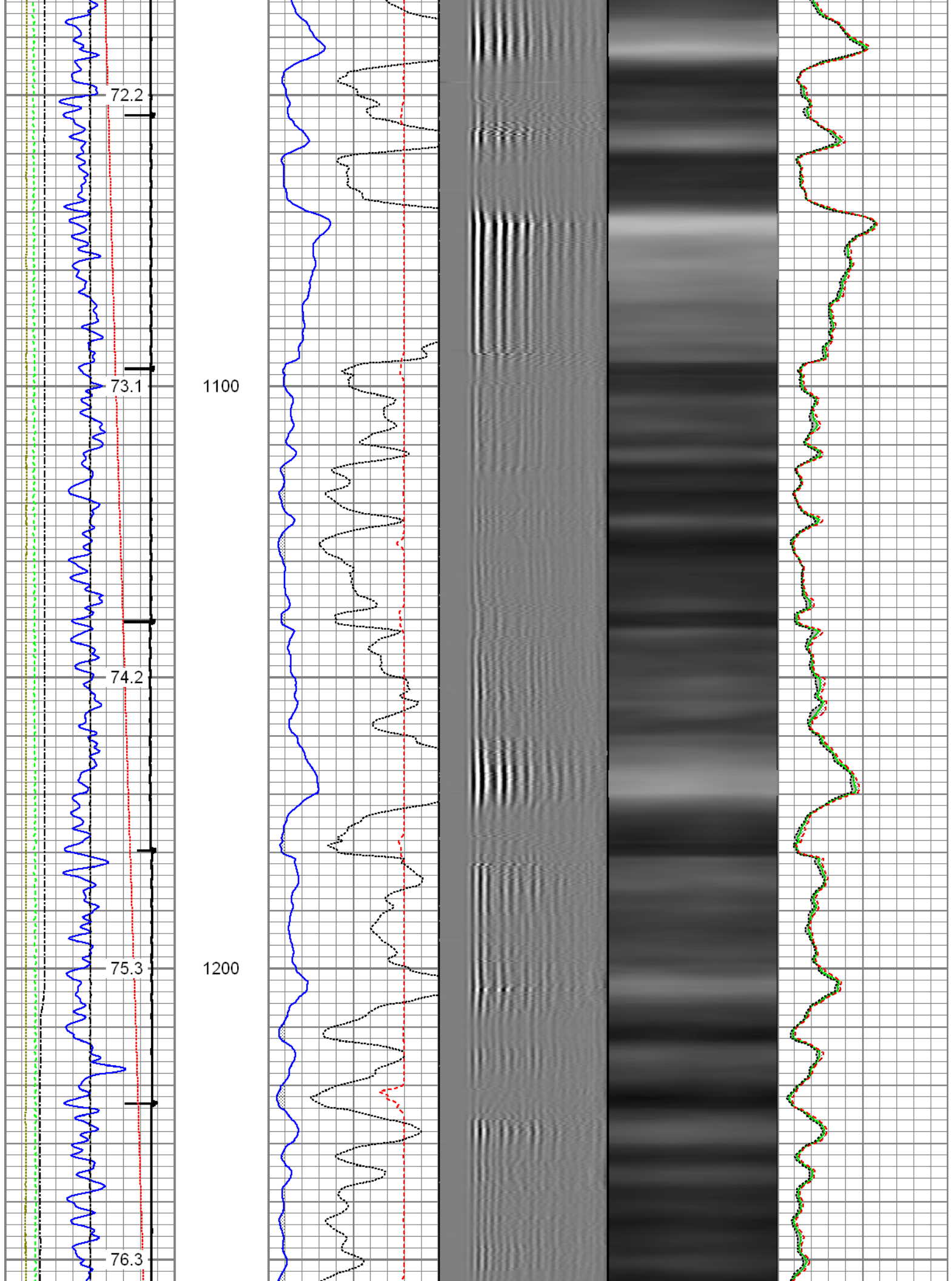


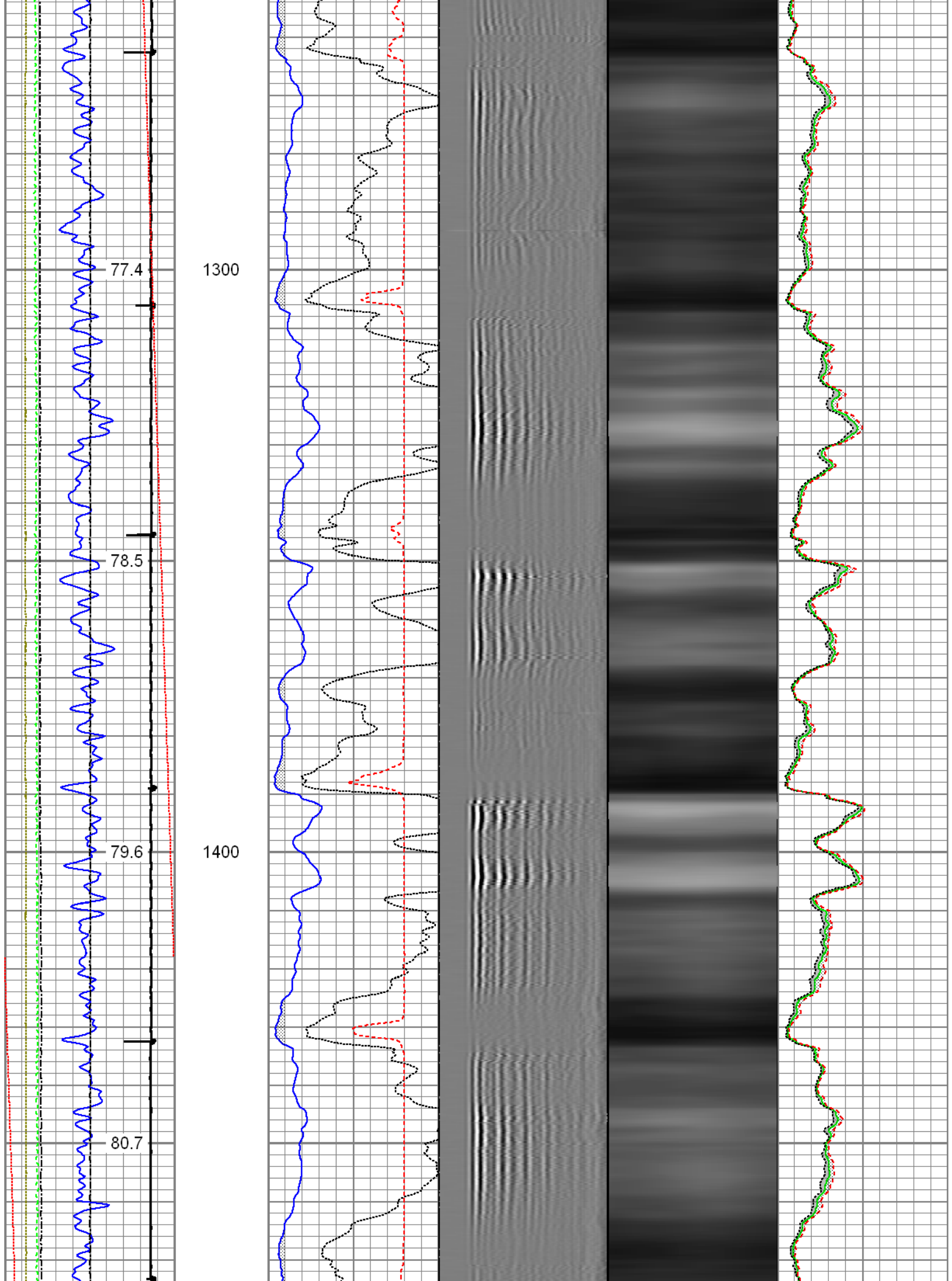


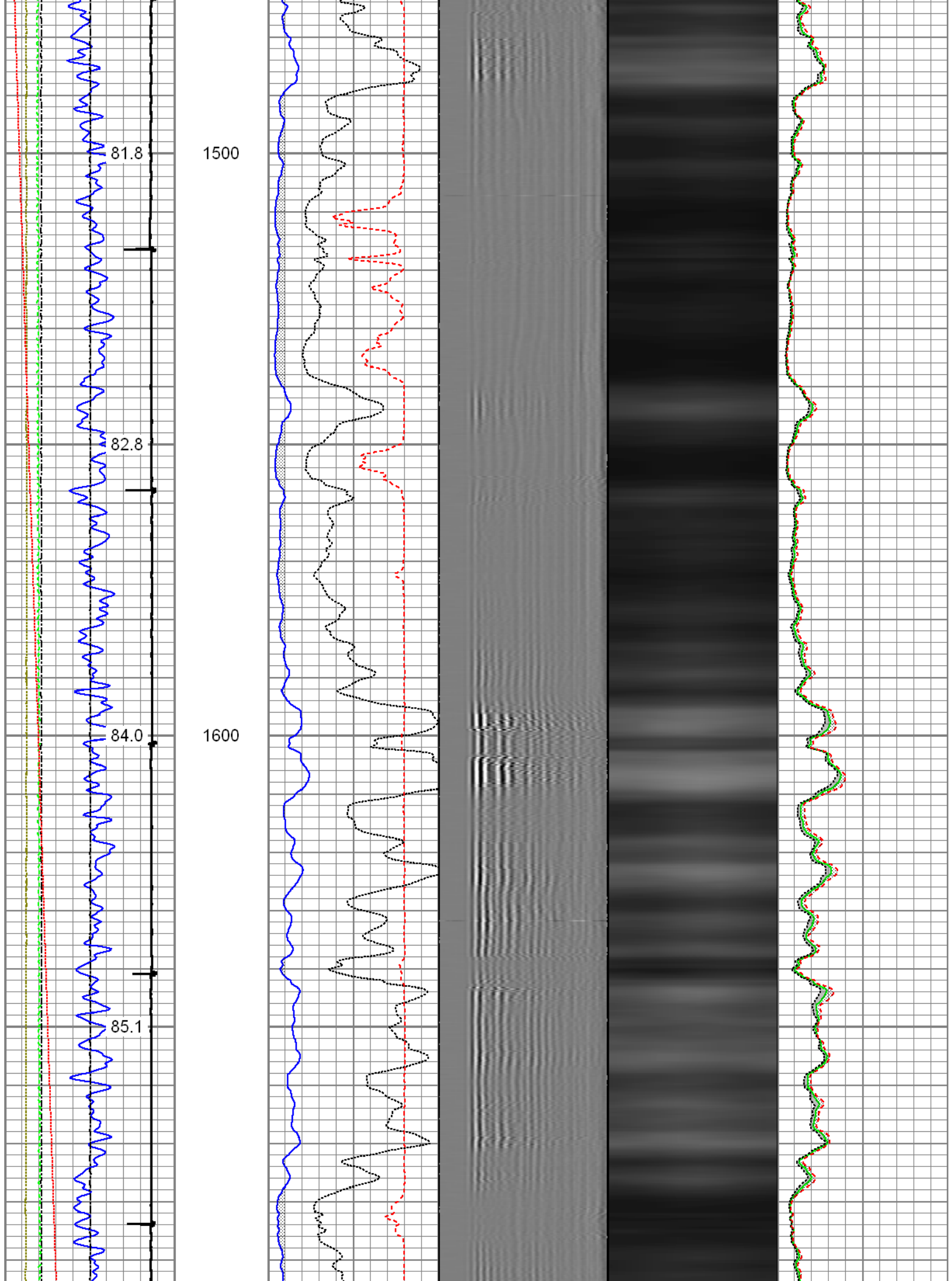
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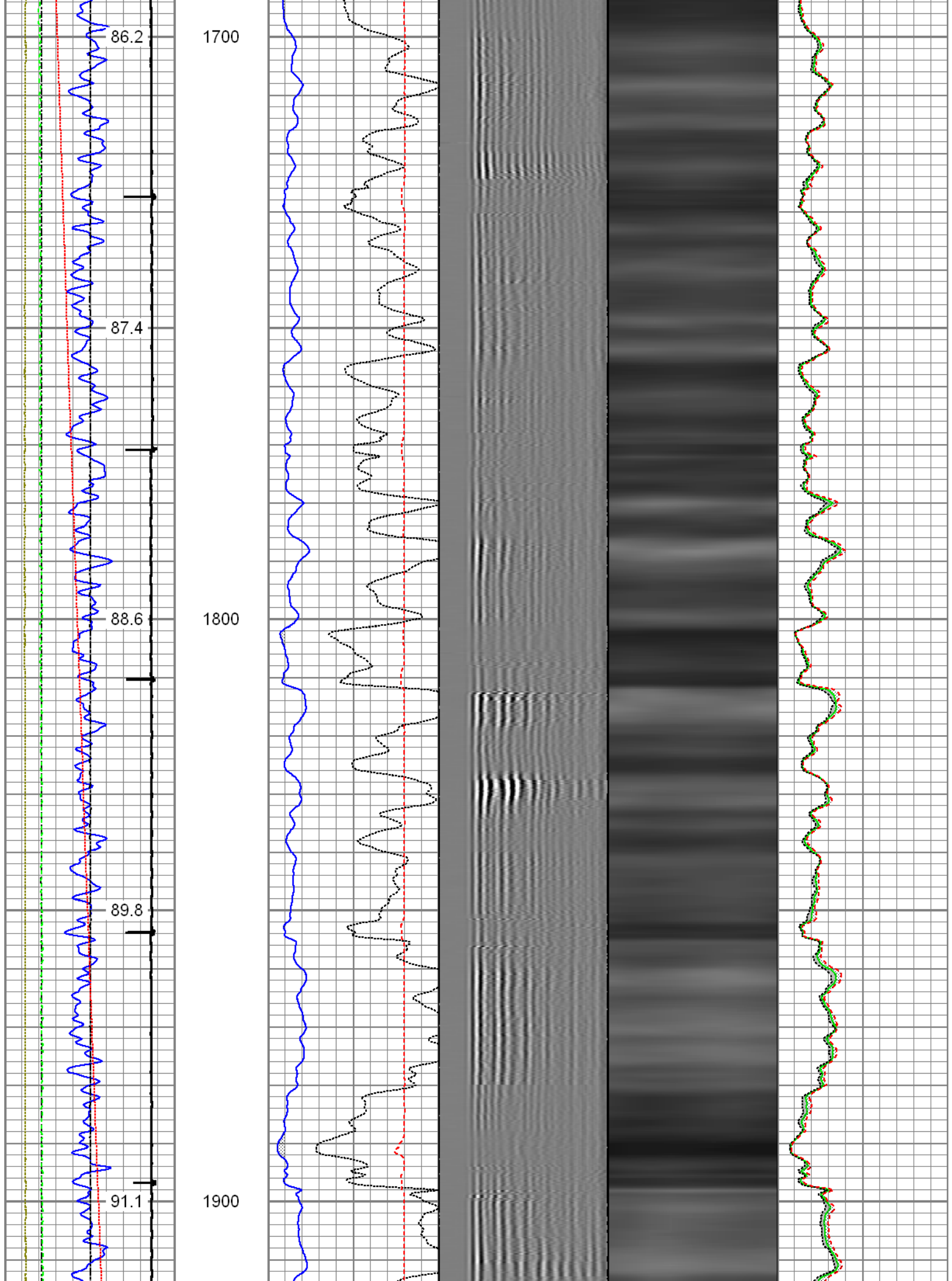
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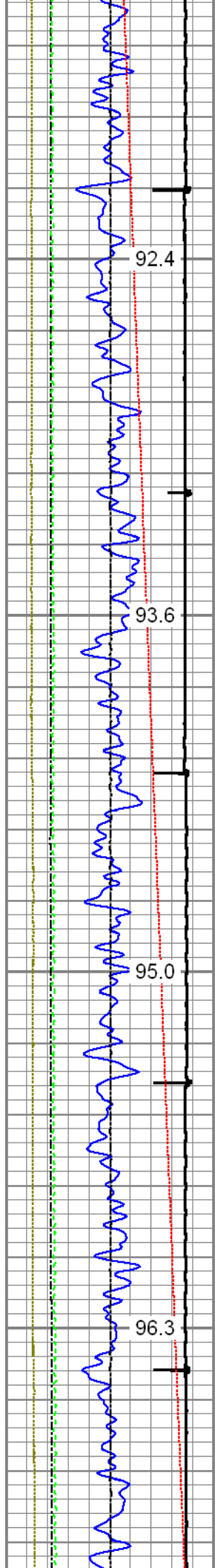






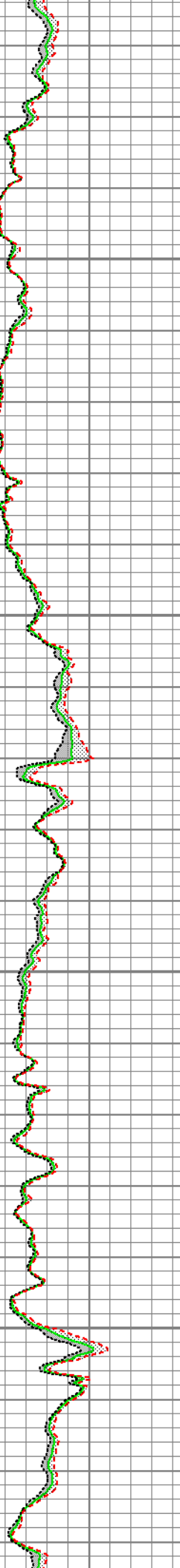
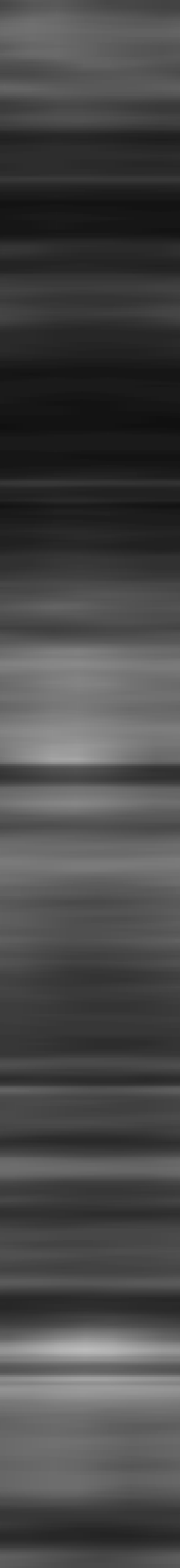
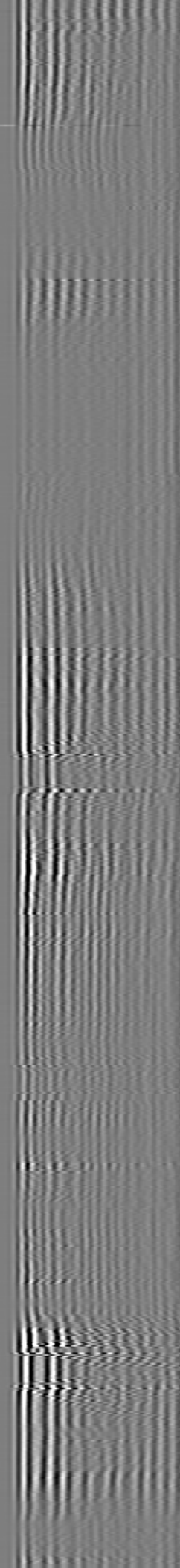
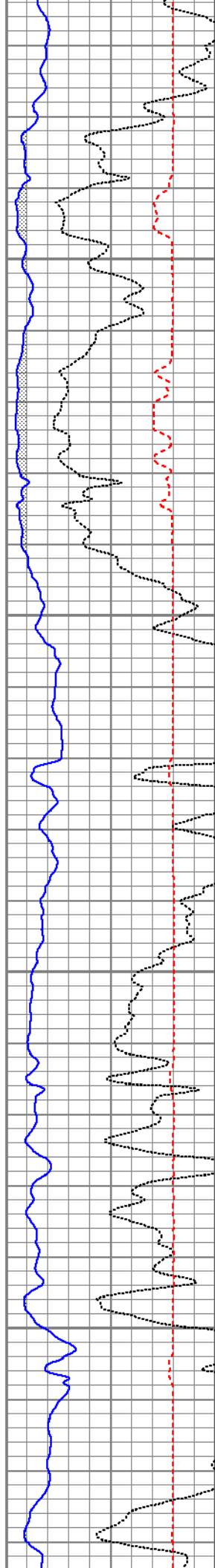


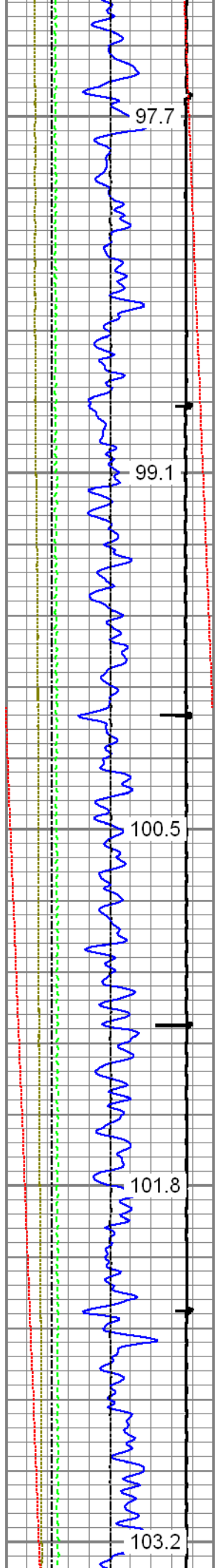




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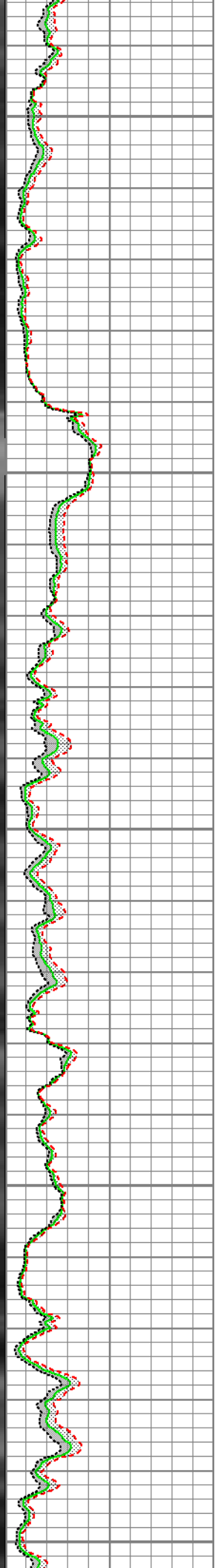
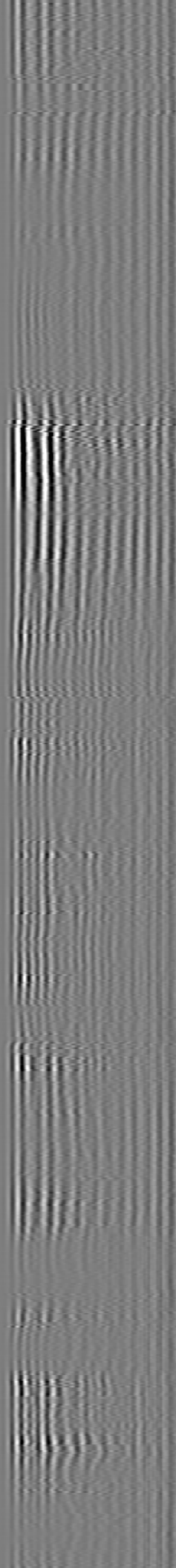
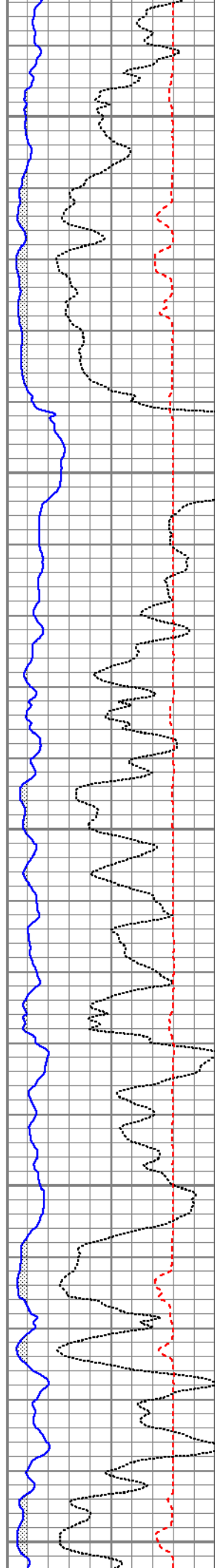
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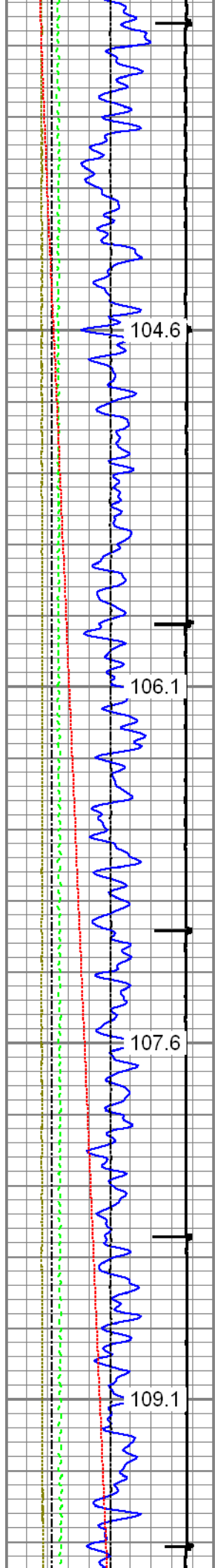




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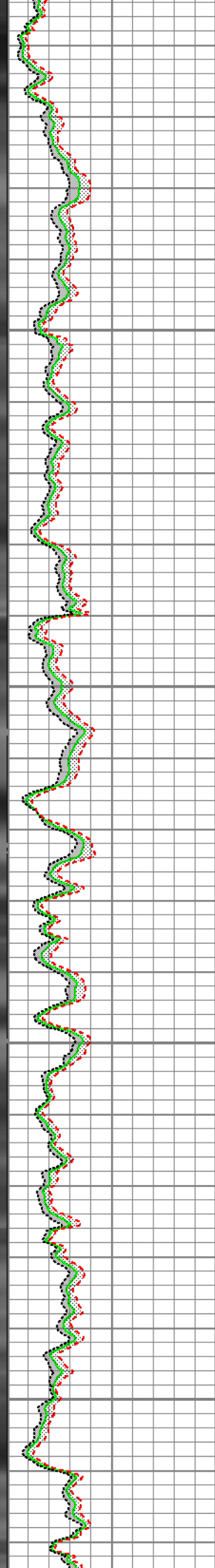
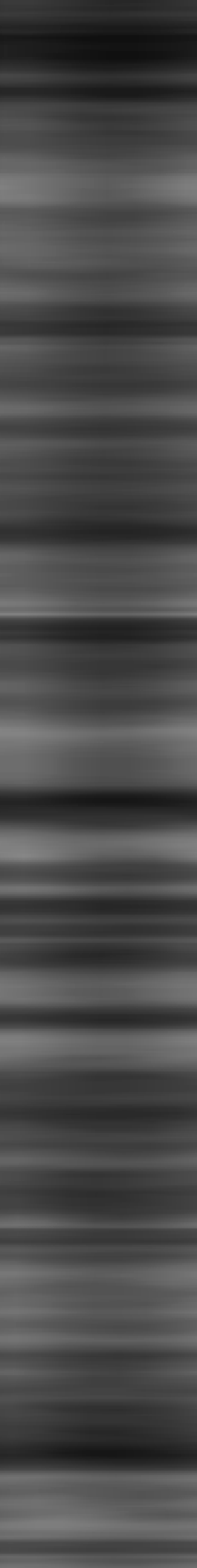
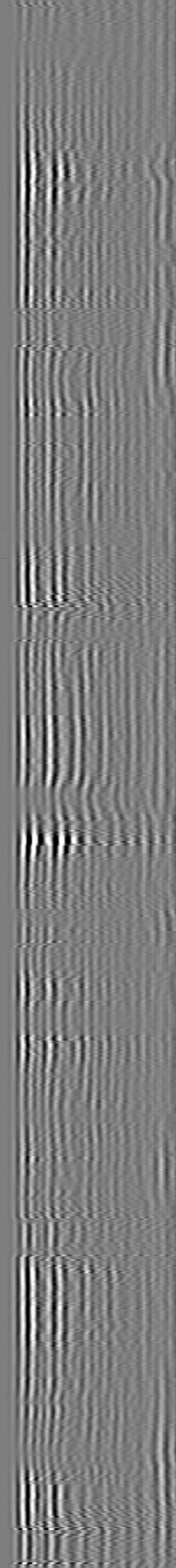
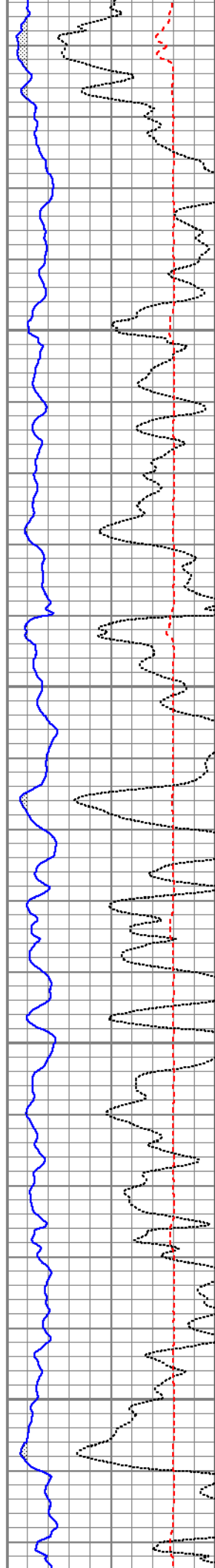
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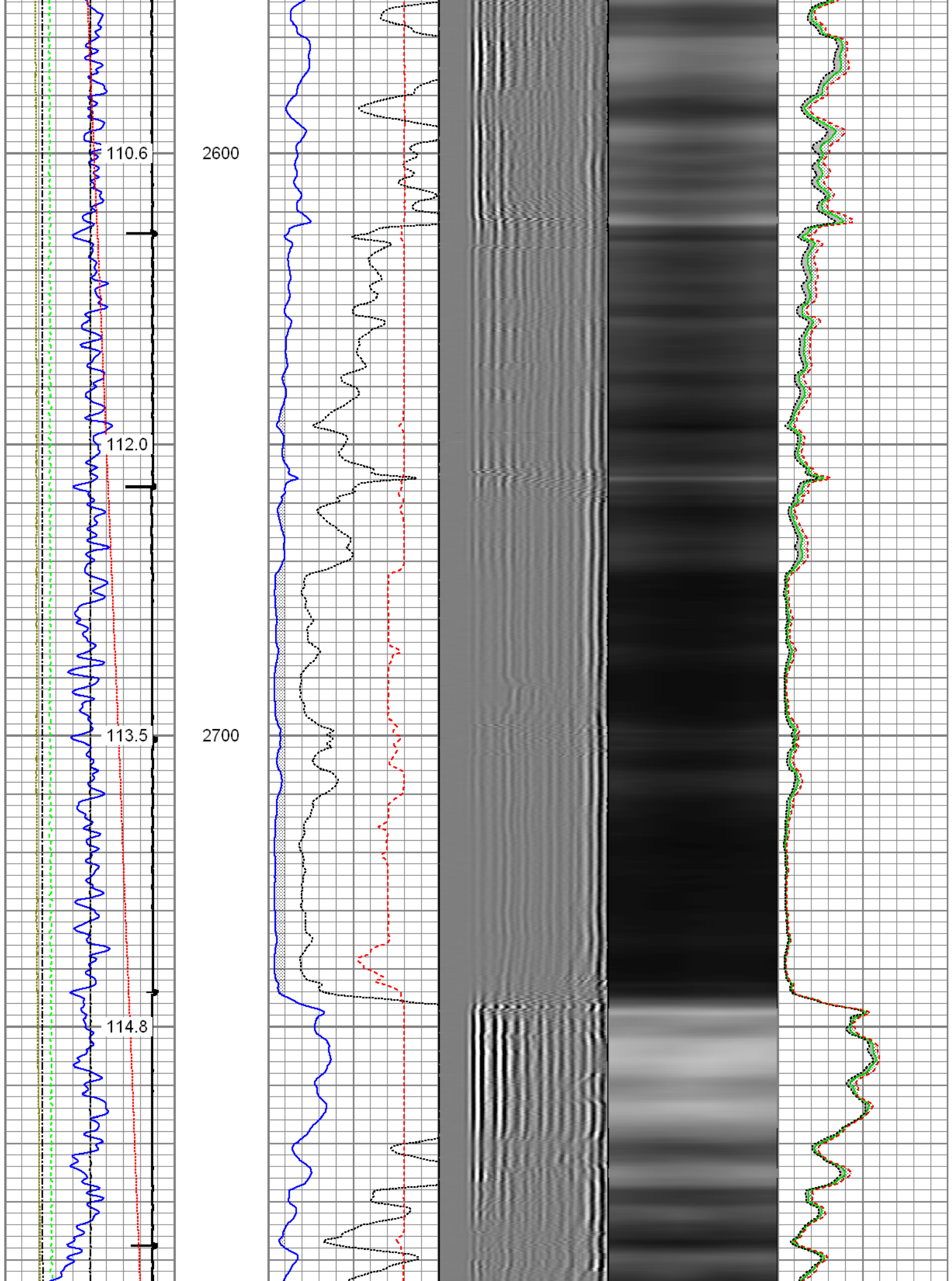


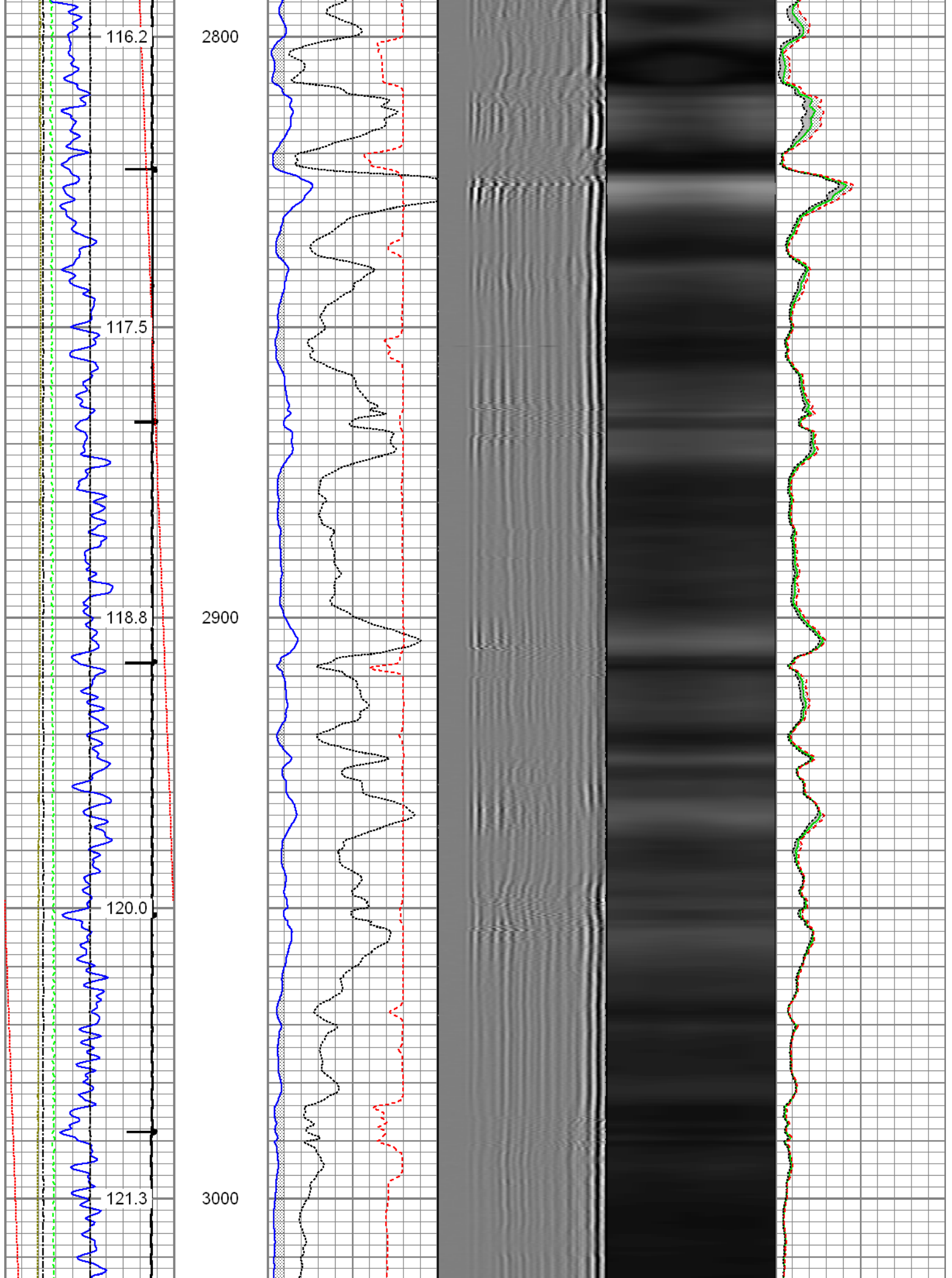


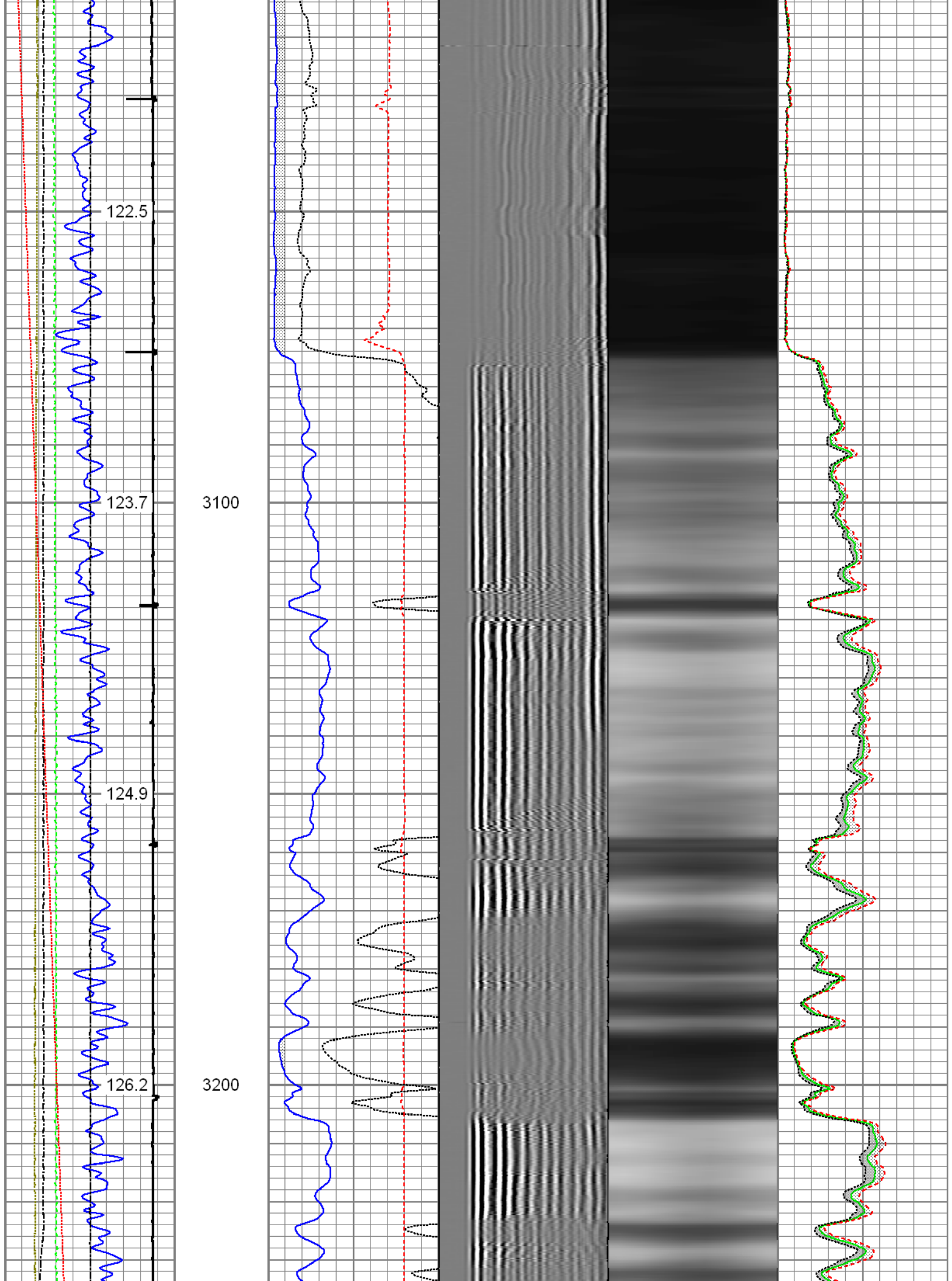
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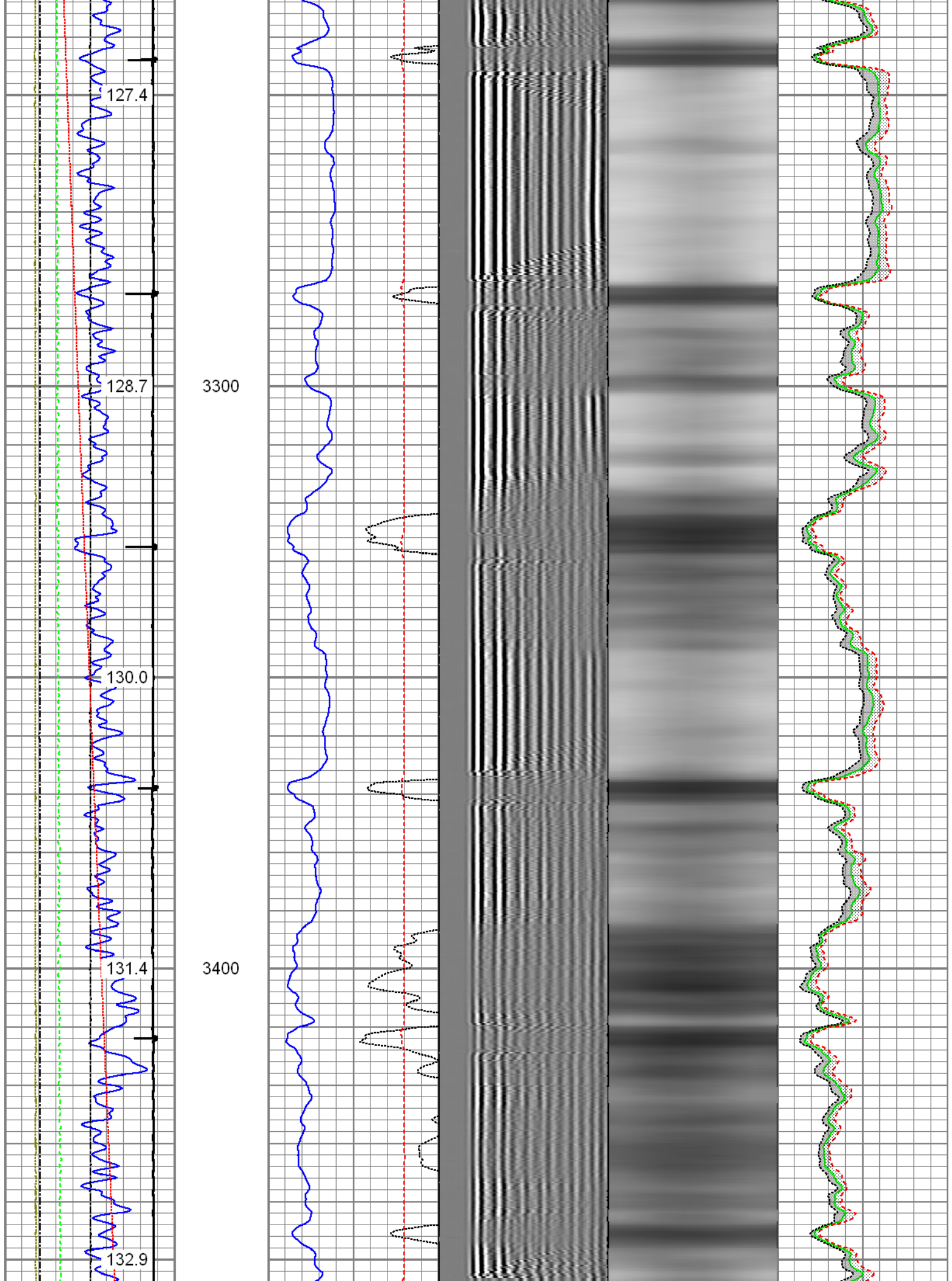
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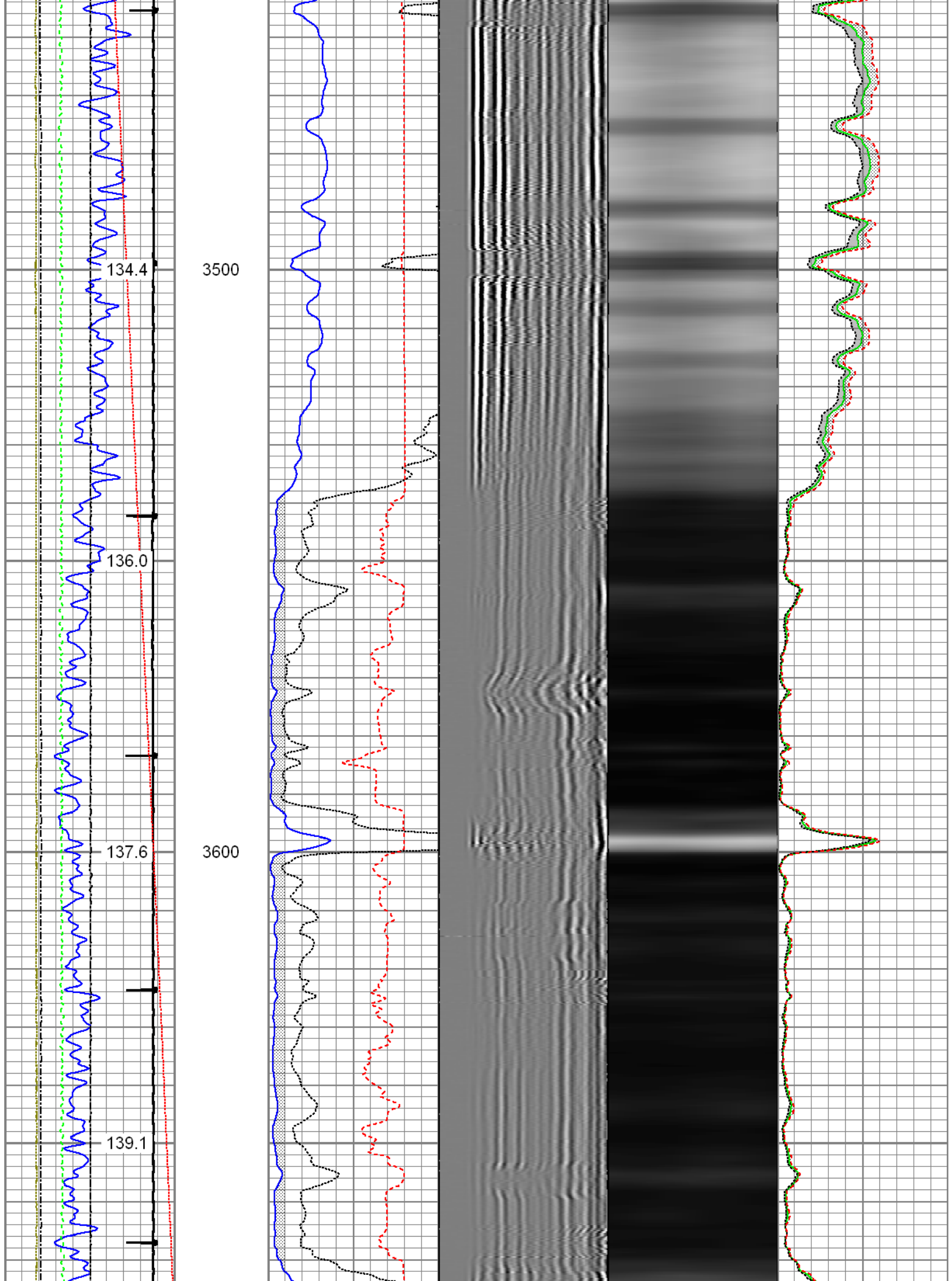


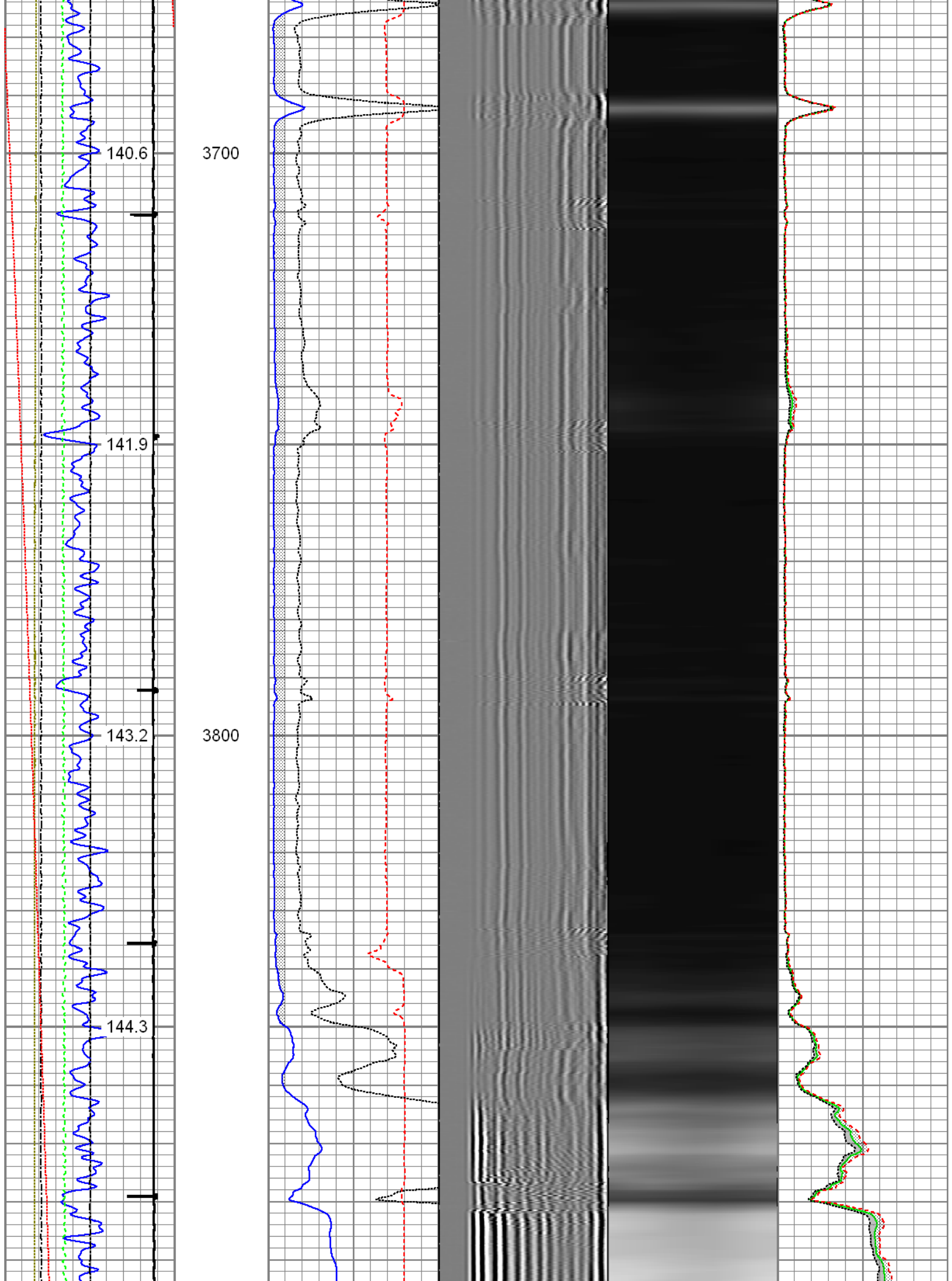


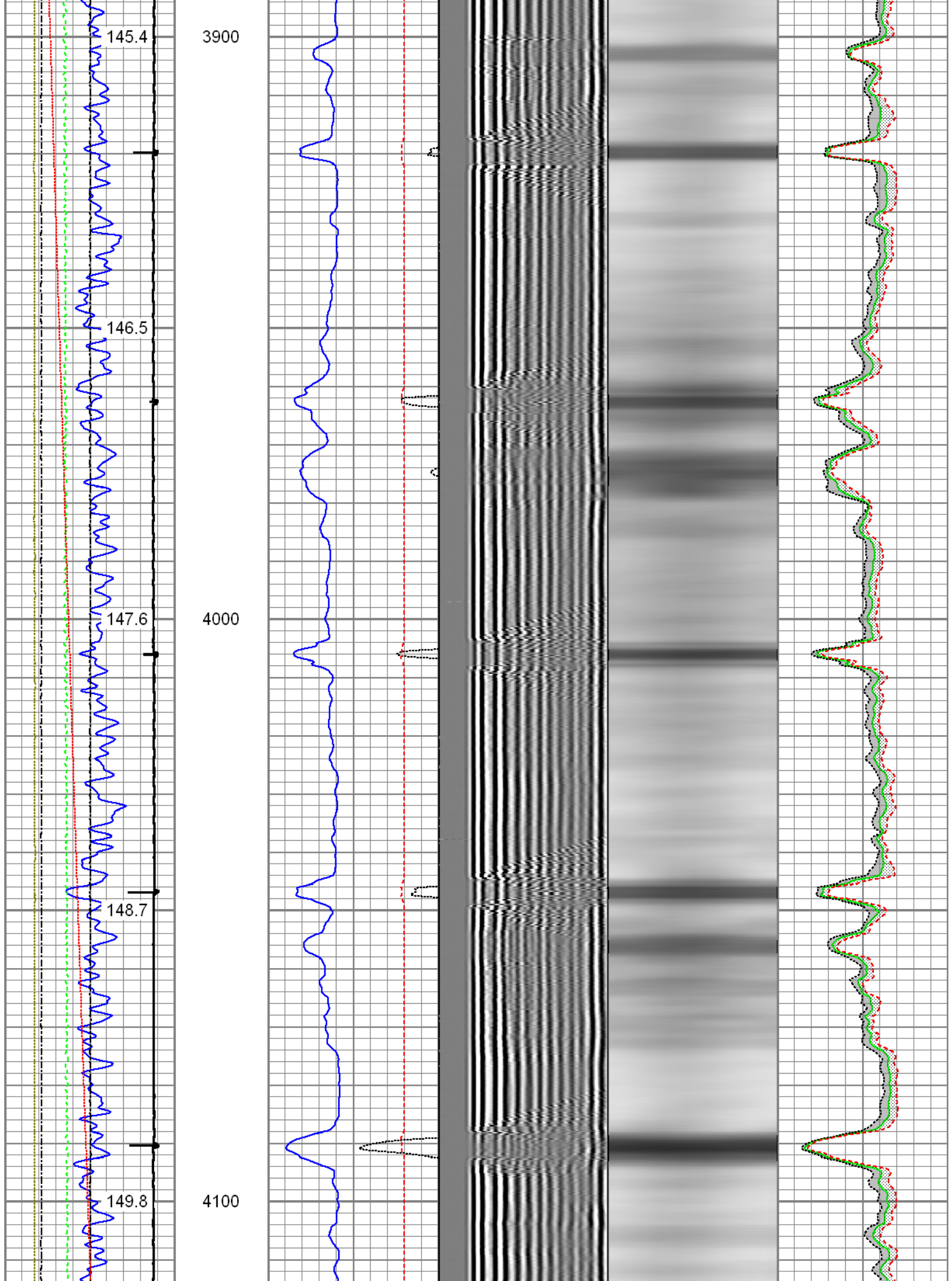


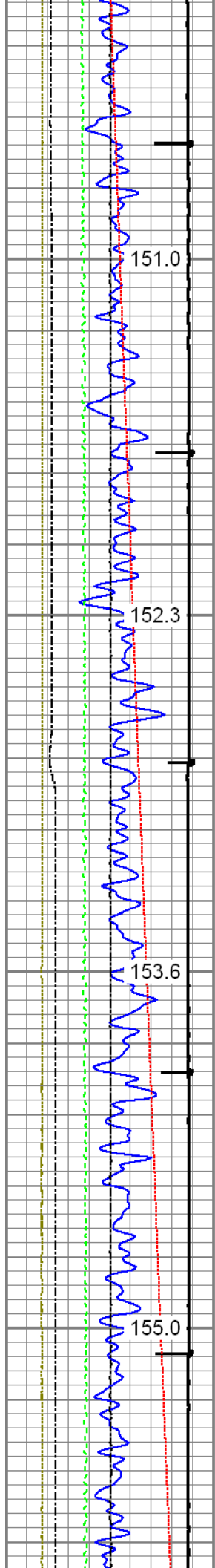






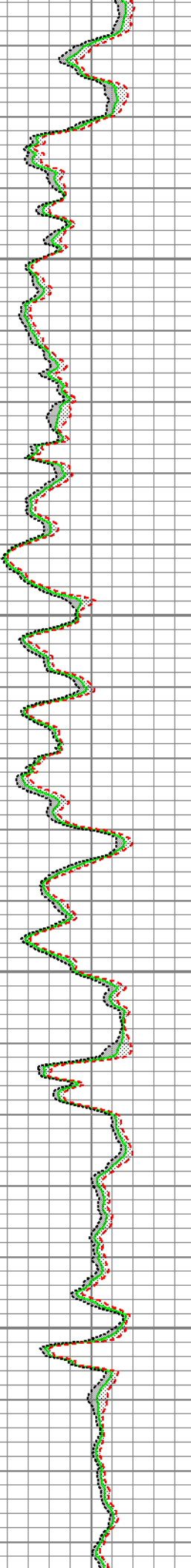
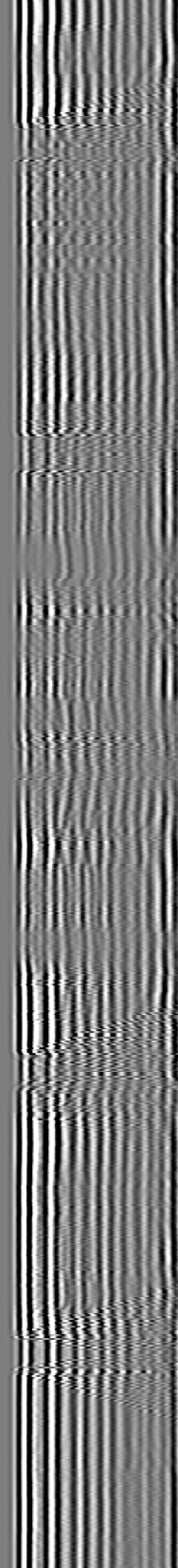
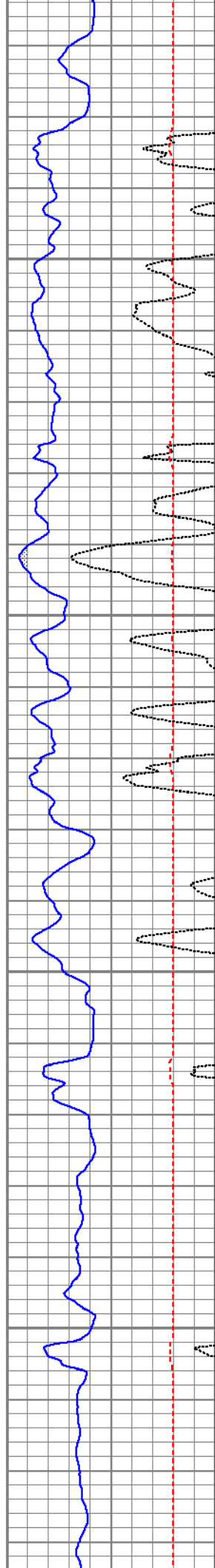


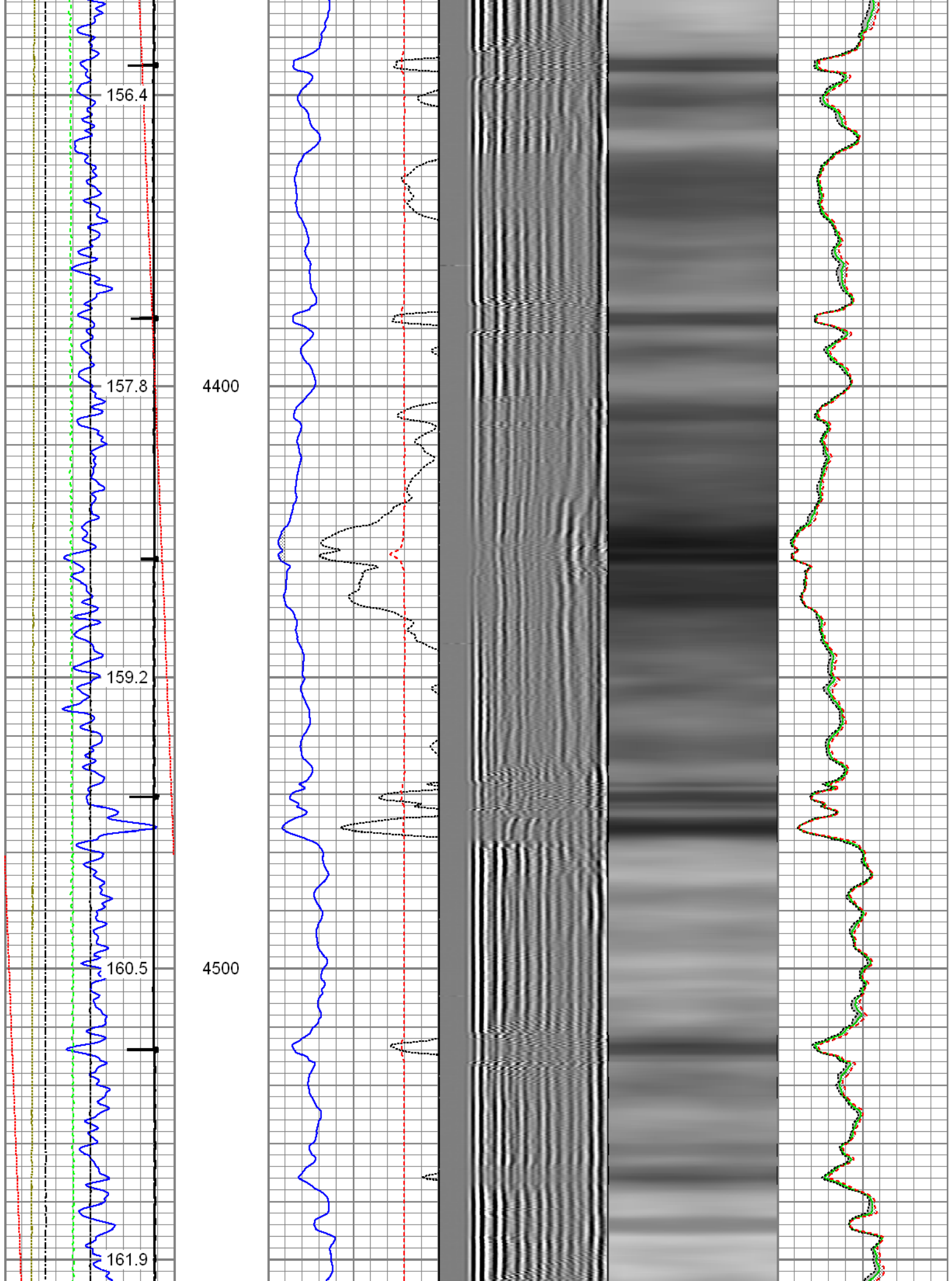


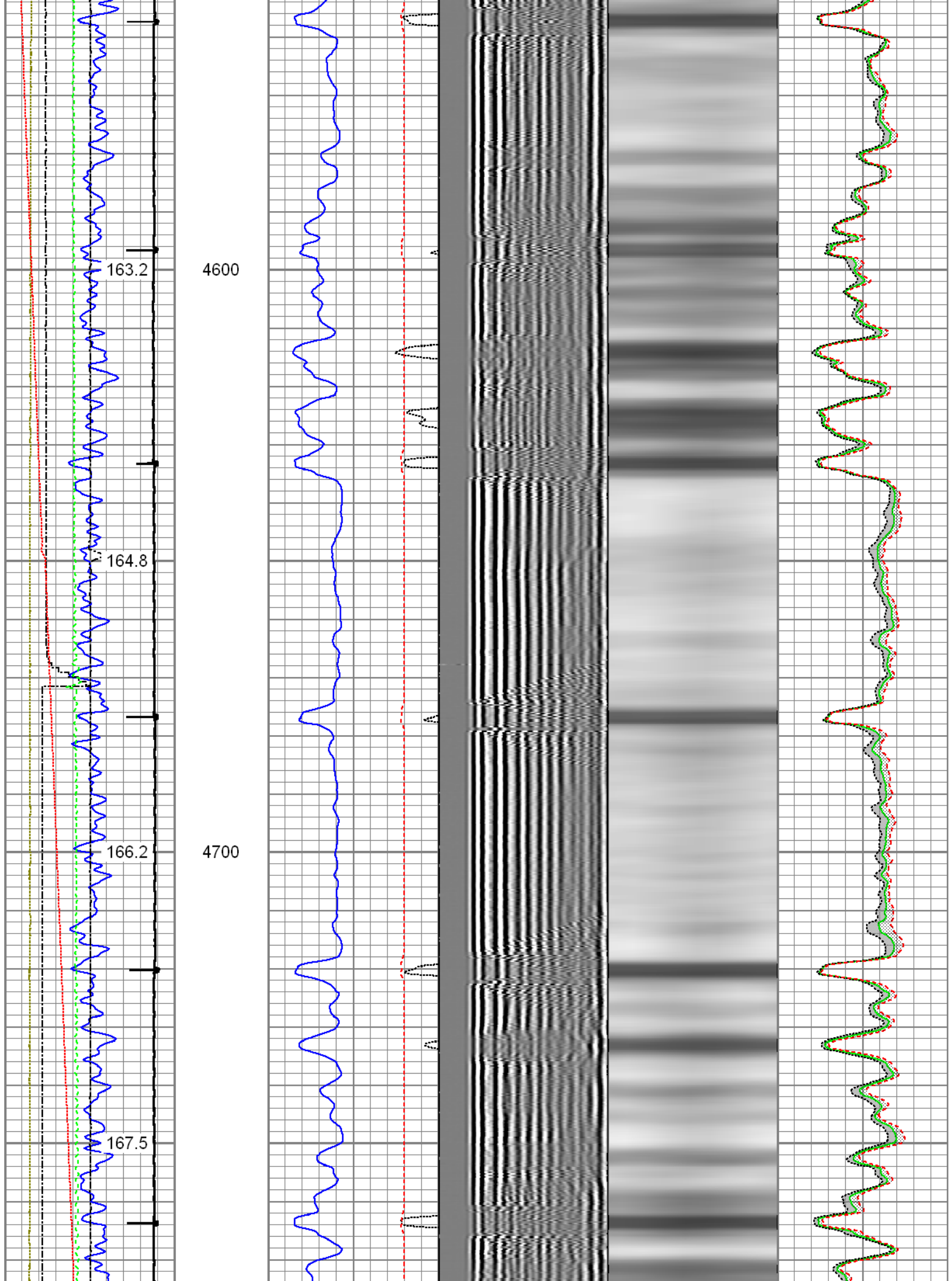


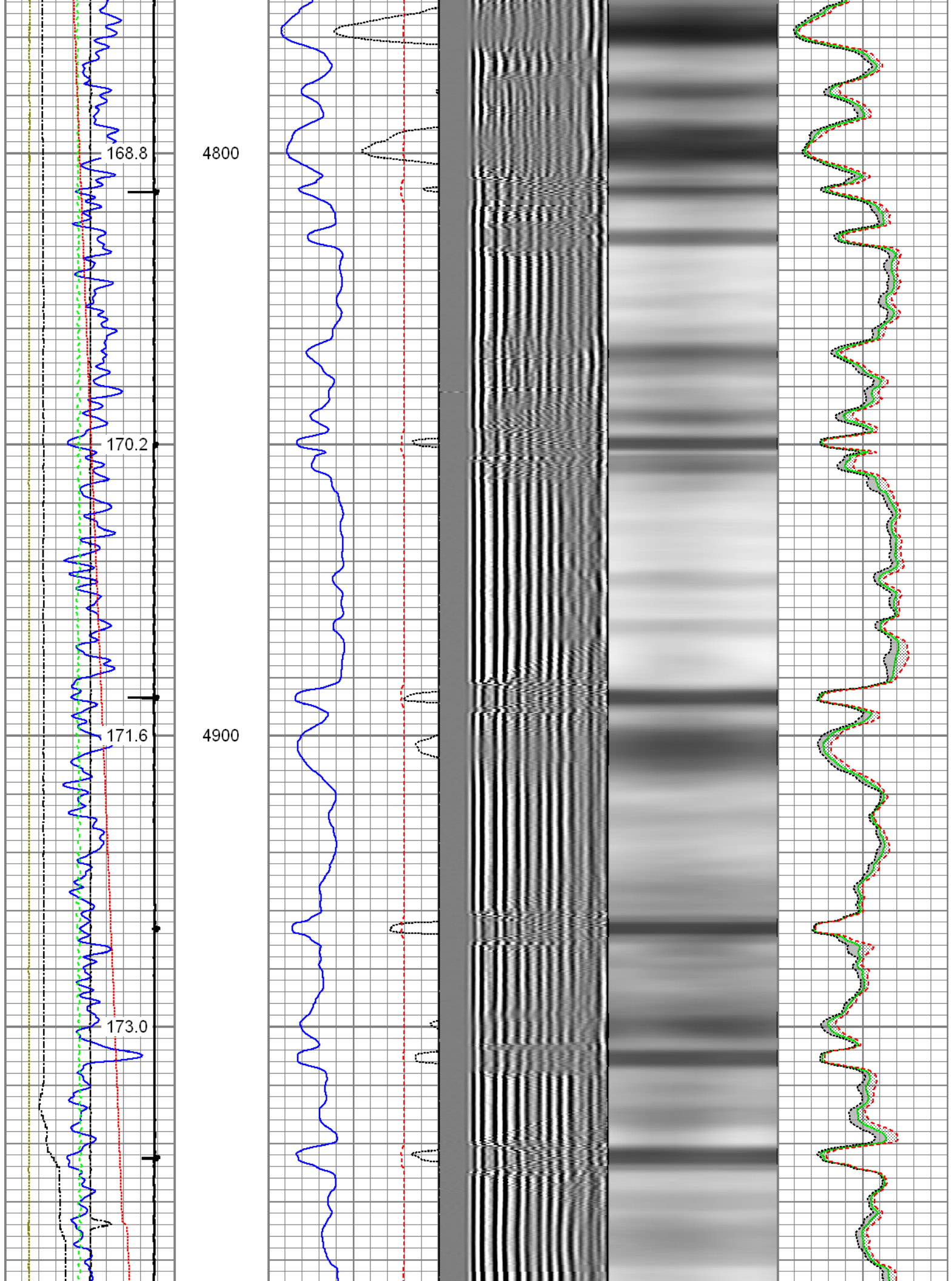
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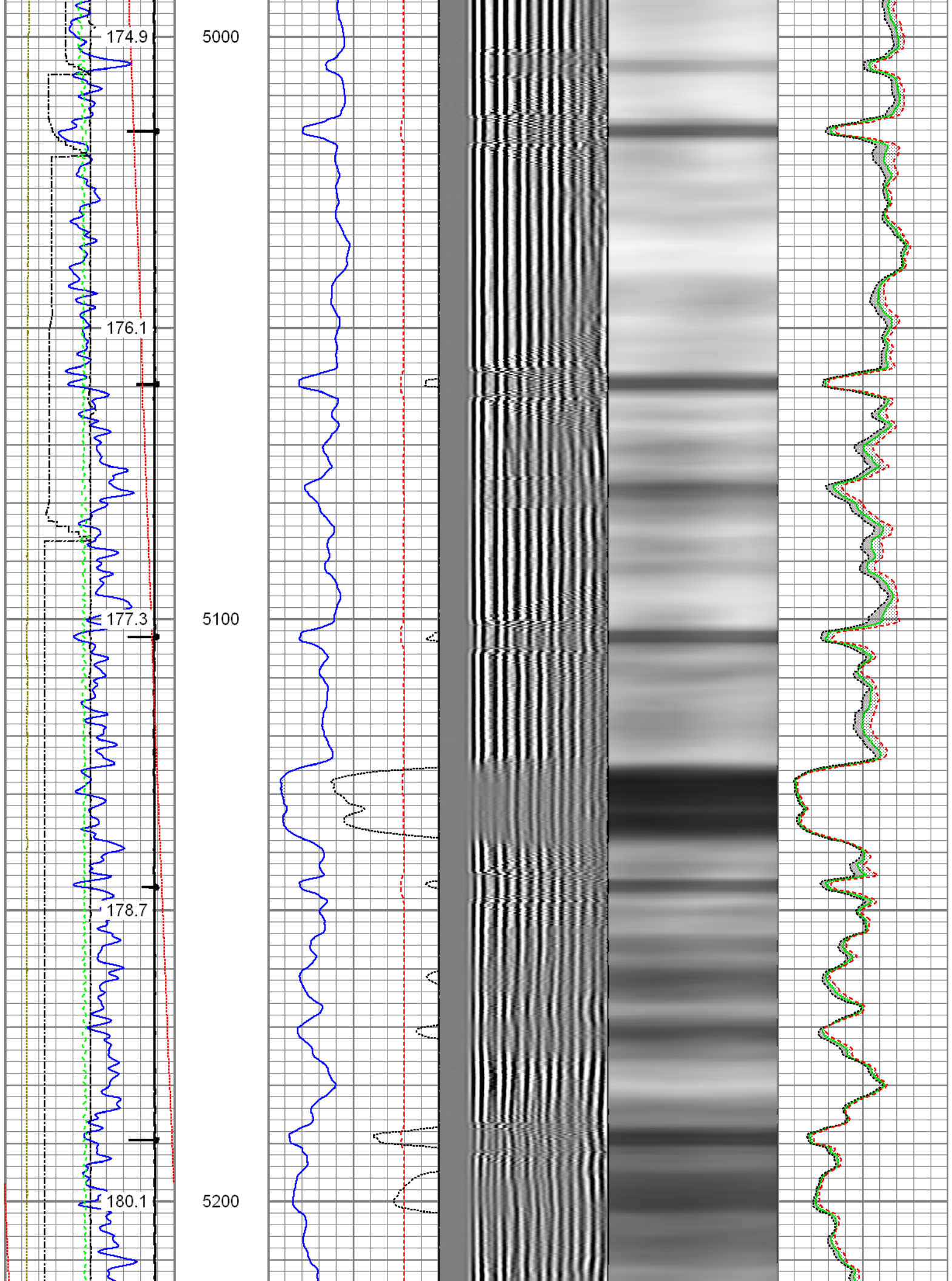
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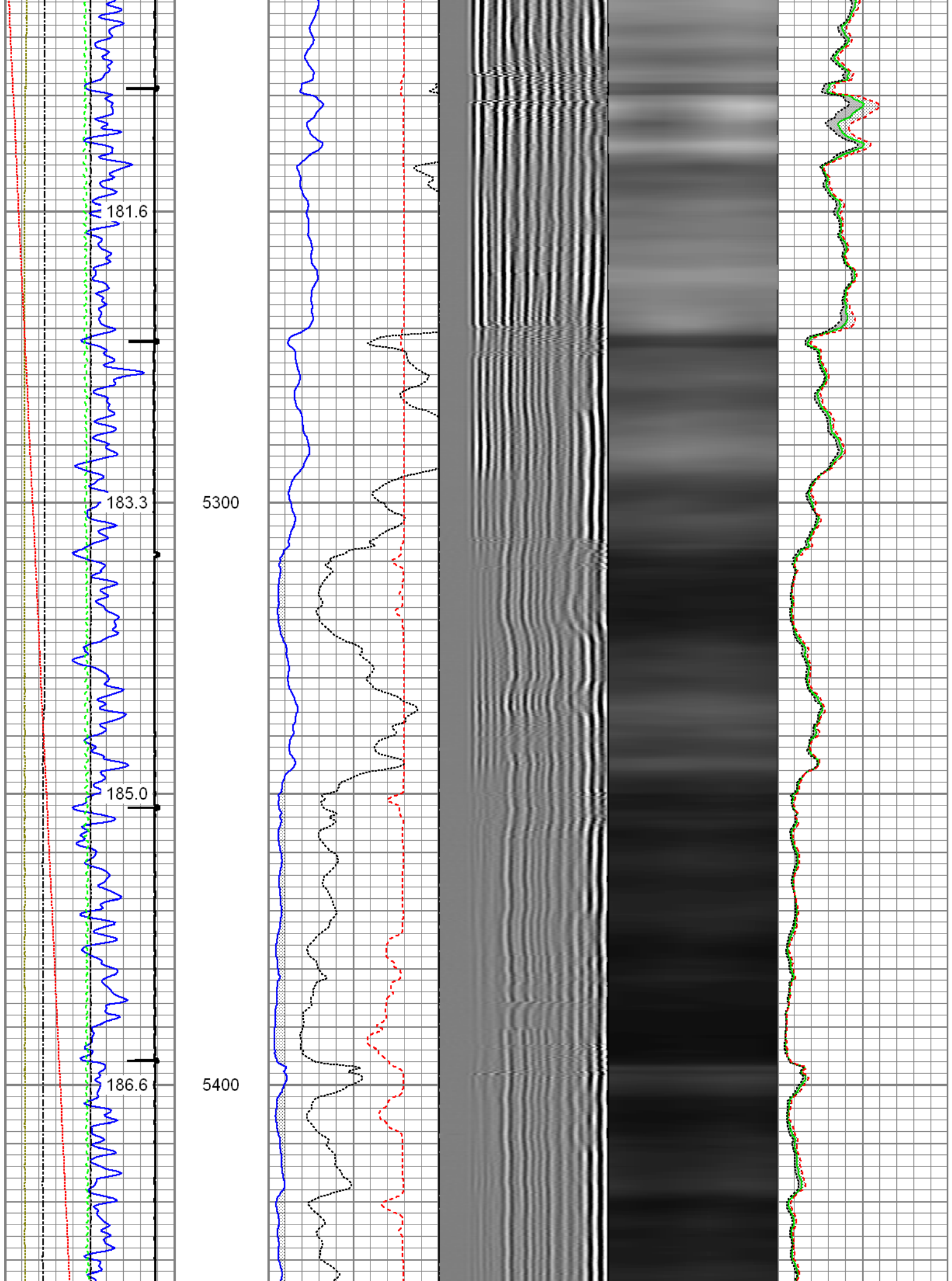


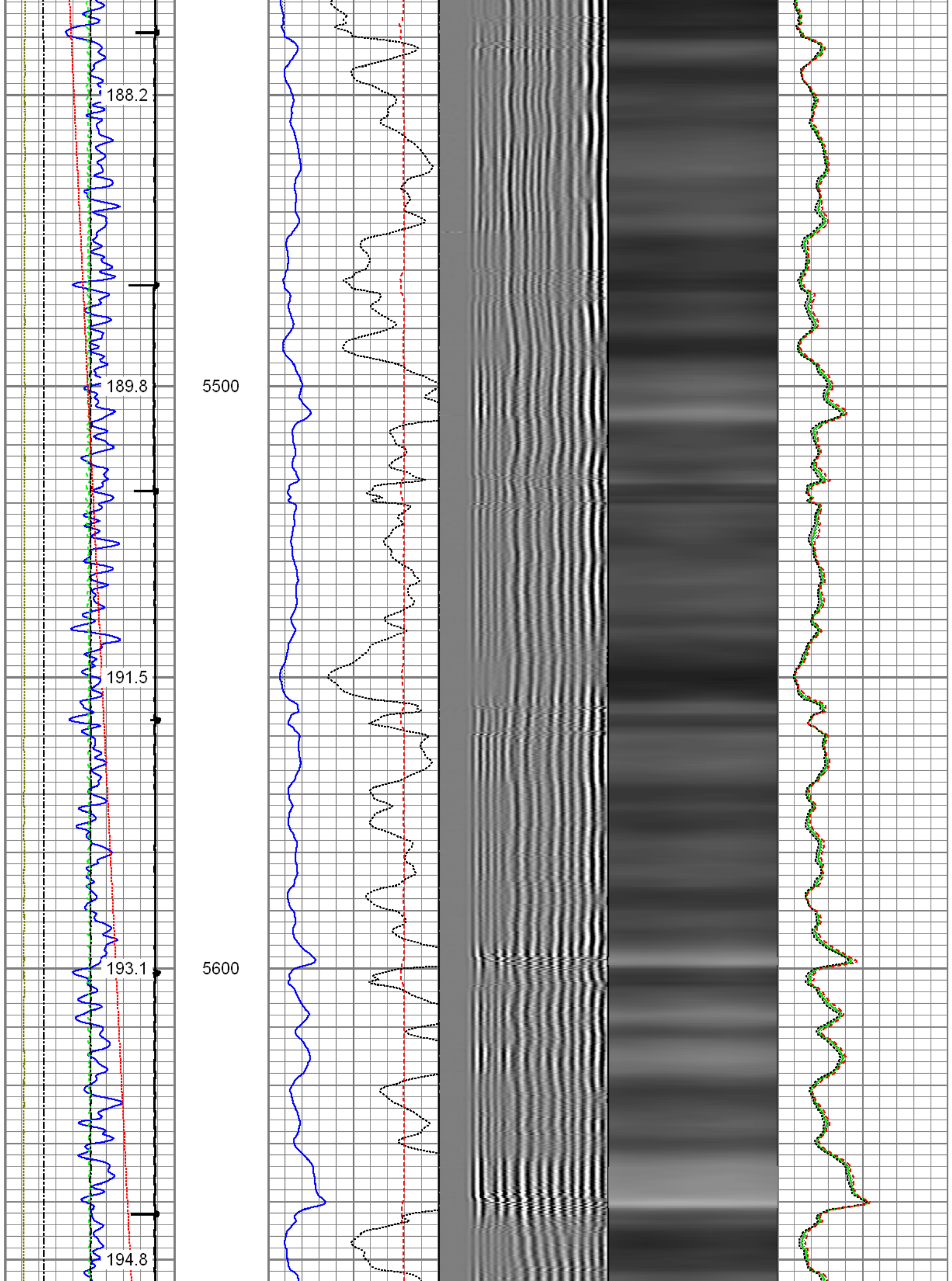


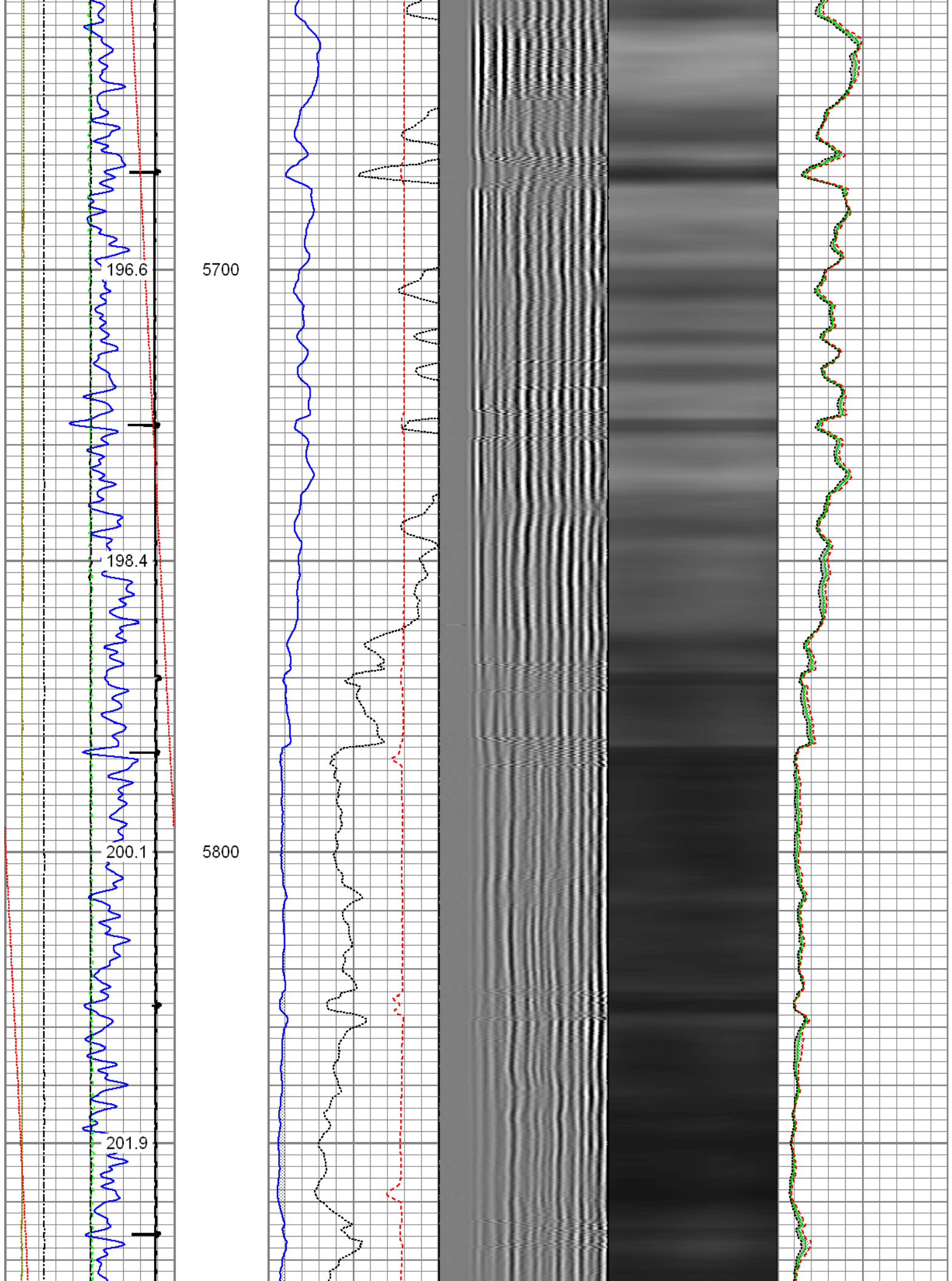


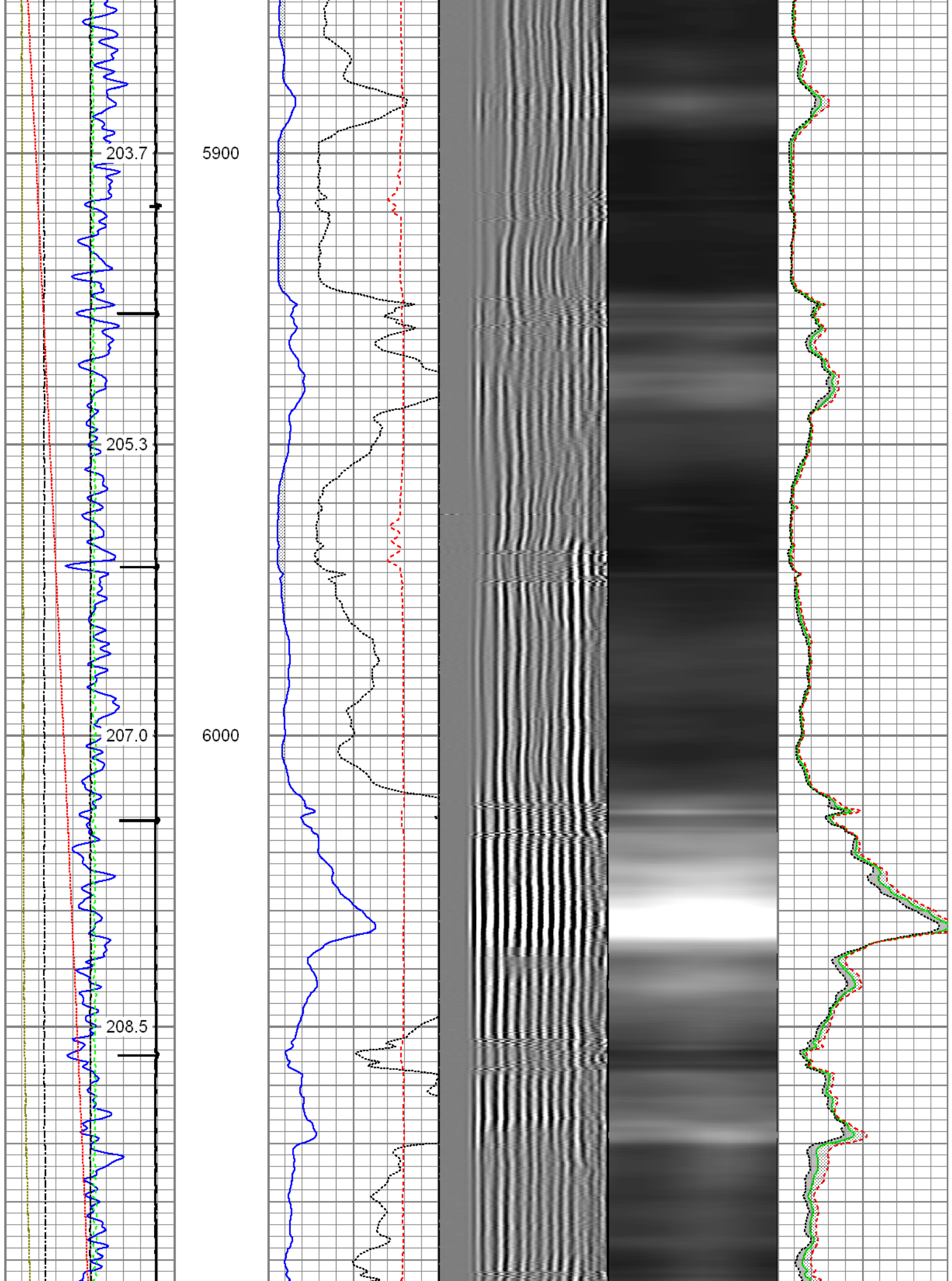


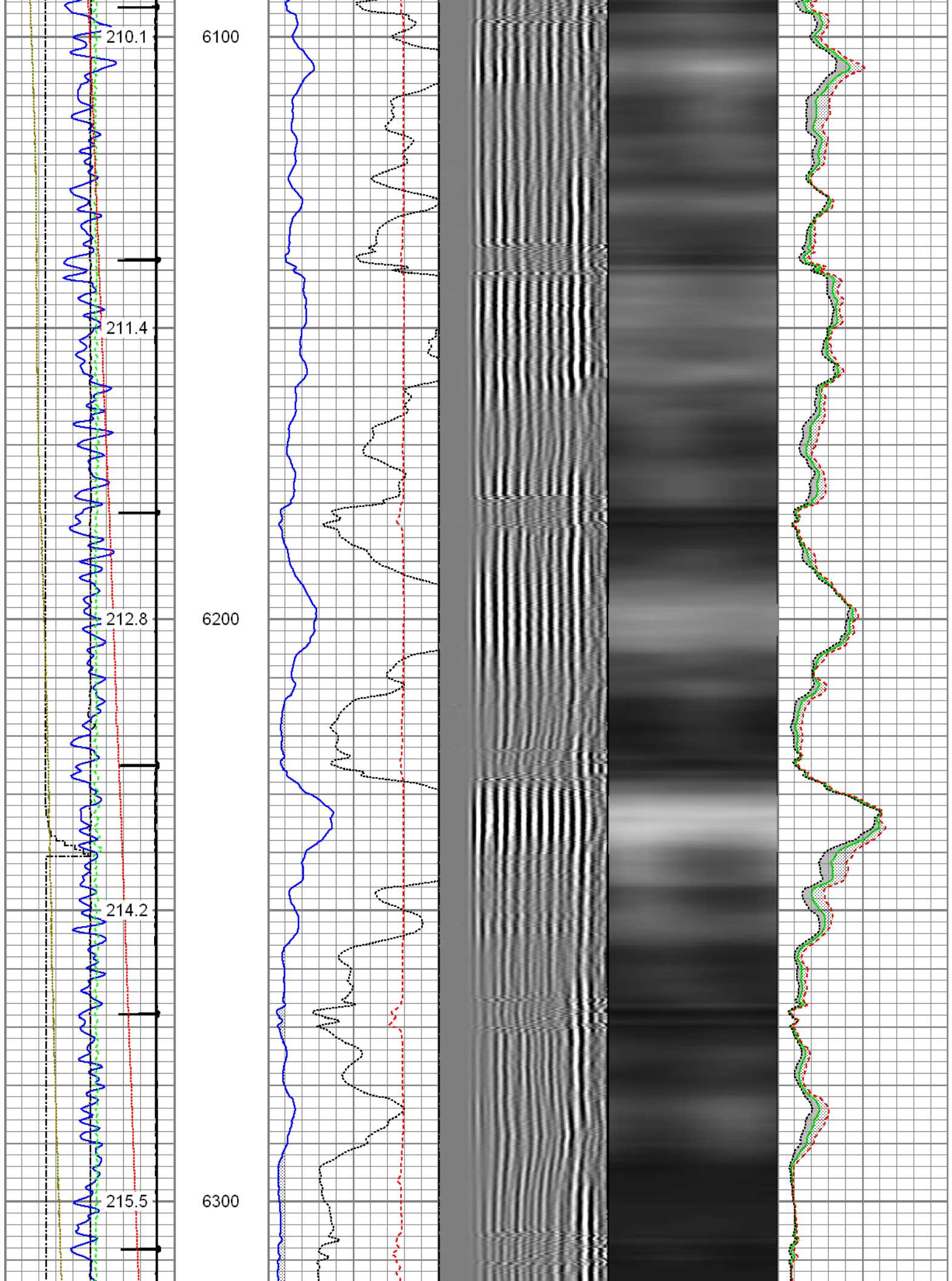


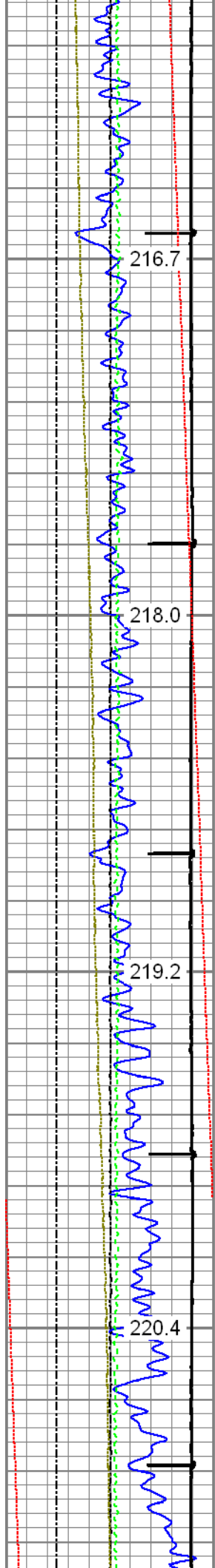






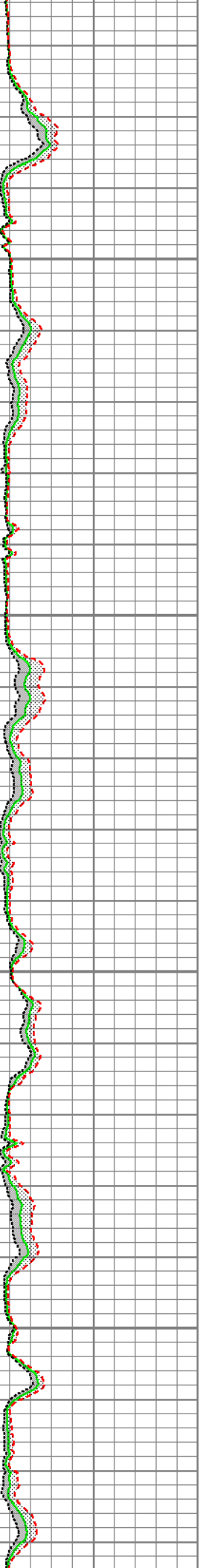
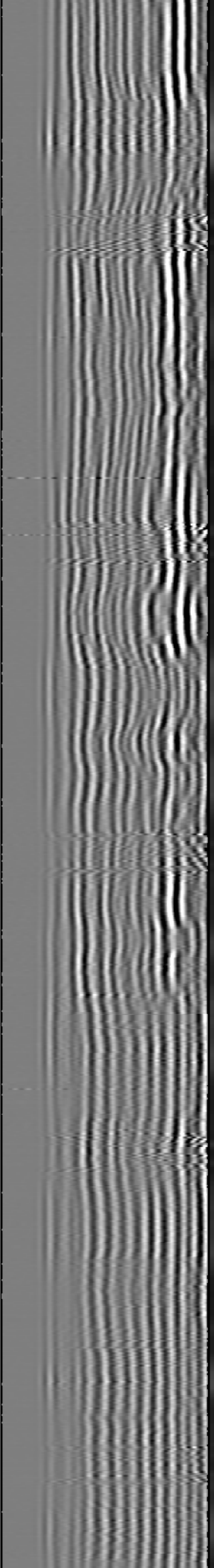
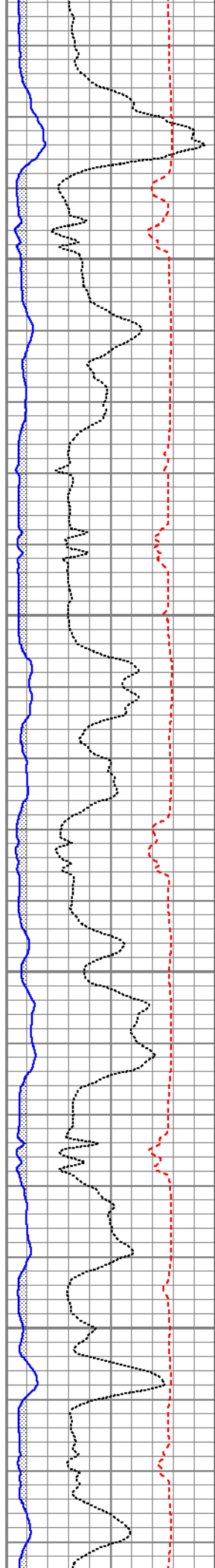


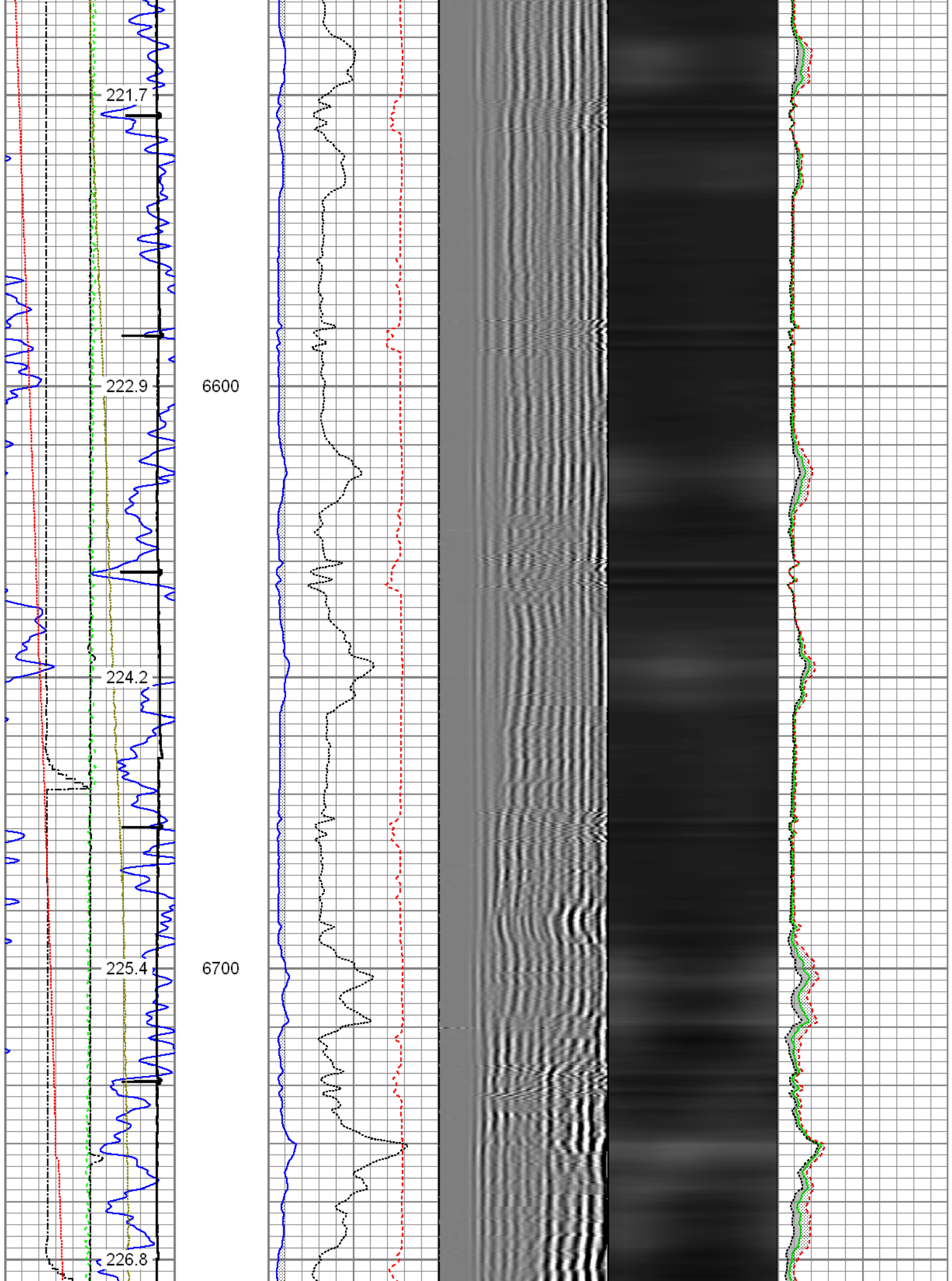




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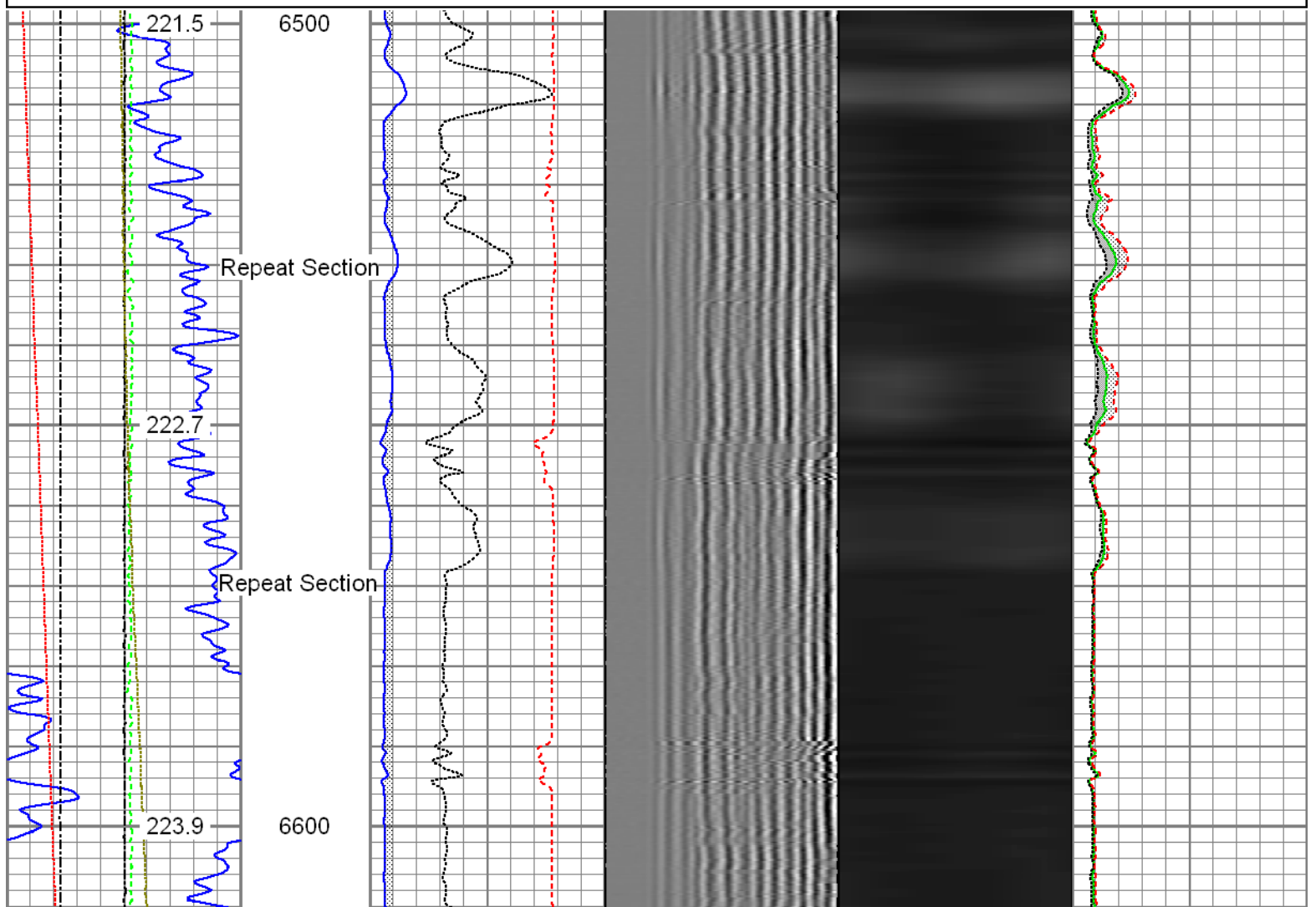


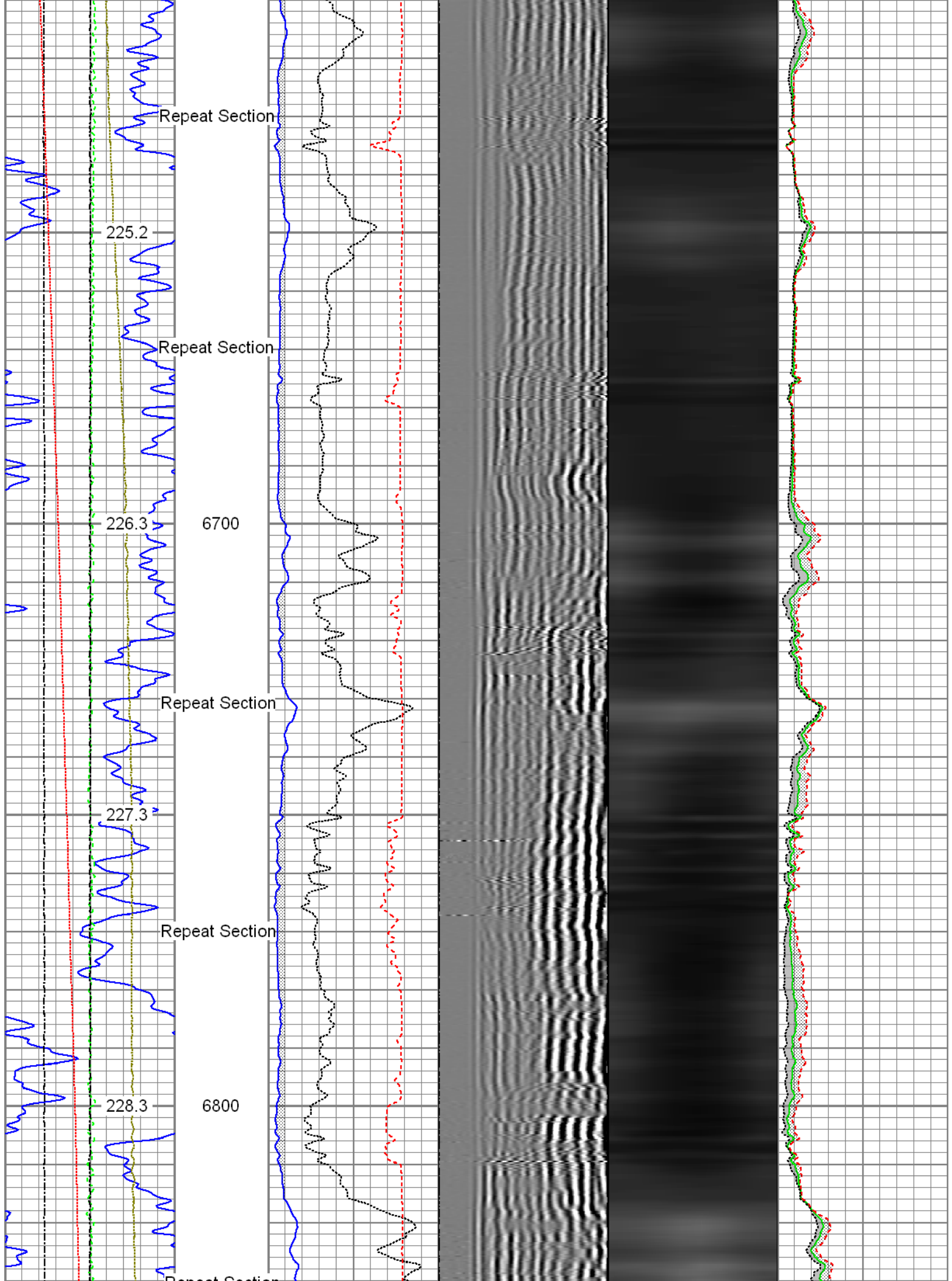


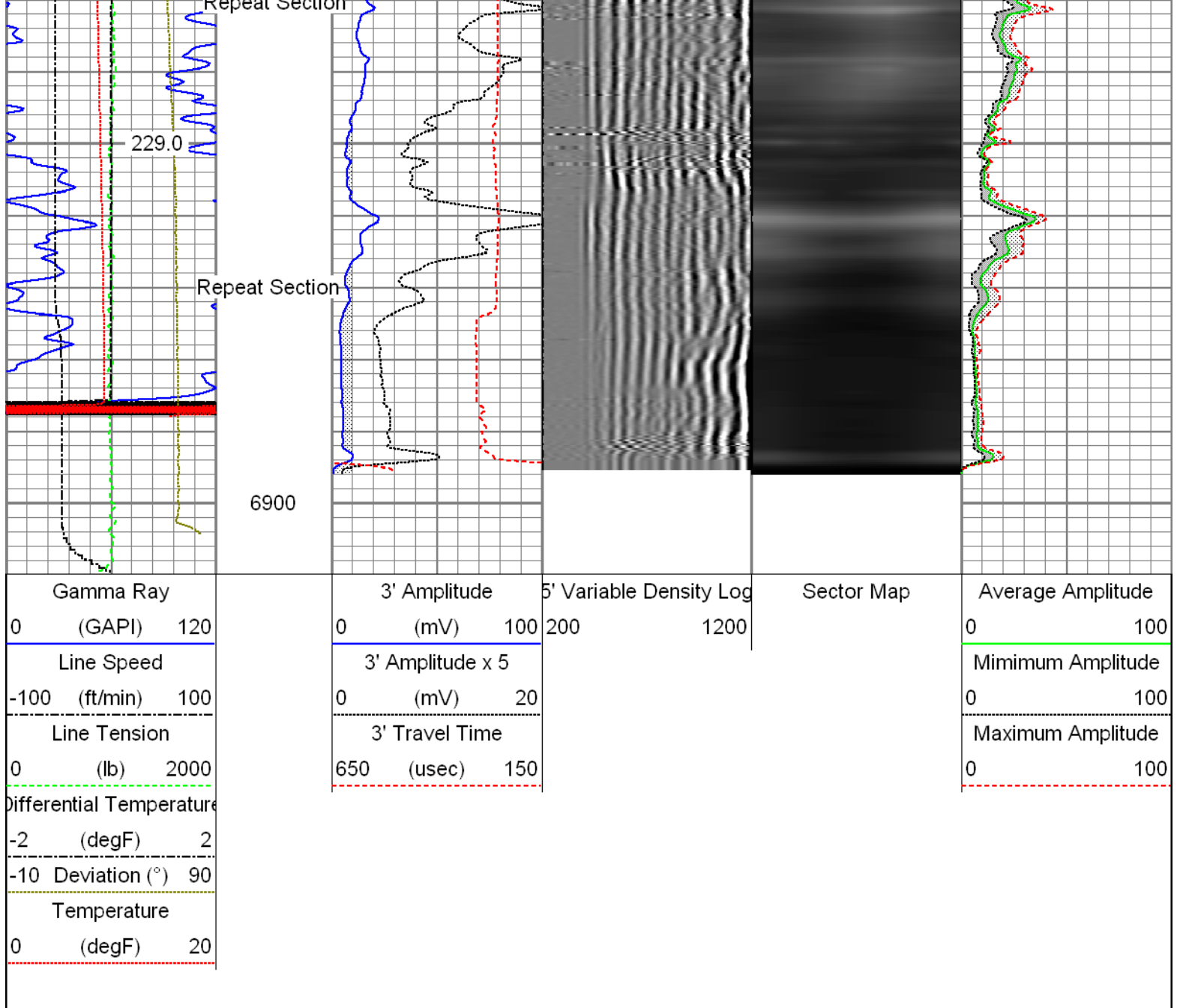


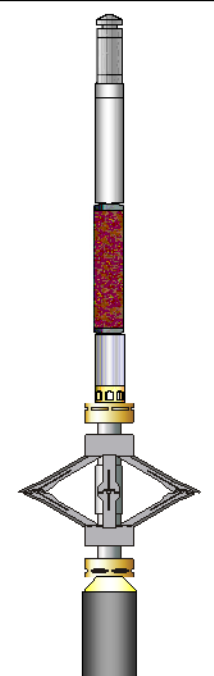
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 Presentation Format: rbt4\_mit  
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 Charted by: Depth in Feet scaled 1:240

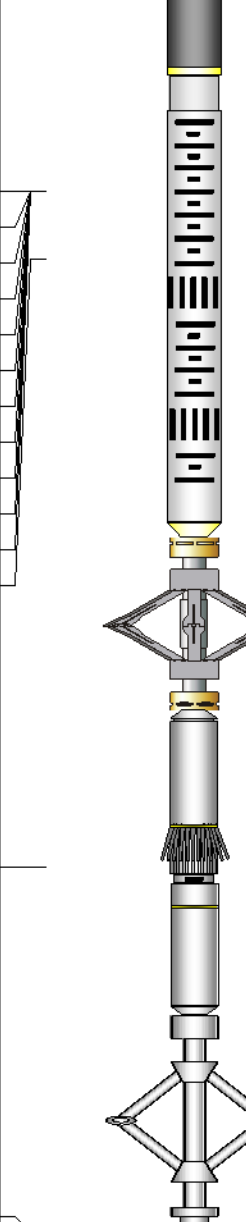
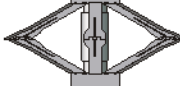
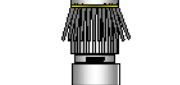

Gamma Ray 0 (GAPI) 120	3' Amplitude 0 (mV) 100	5' Variable Density Log 200 1200	Sector Map	Average Amplitude 0 100
Line Speed -100 (ft/min) 100	3' Amplitude x 5 0 (mV) 20			Minimum Amplitude 0 100
Line Tension 0 (lb) 2000	3' Travel Time 650 (usec) 150			Maximum Amplitude 0 100
Differential Temperature -2 (degF) 2				
-10 Deviation (°) 90				
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 (218874) 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 (10024052) 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		UW_RBT-UW_RBT_004 (1063) 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 (084) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
CBLROT	15.42					
WVF5FT	14.42					
MIT	5.41		UW_MIT-UW_MIT40_042 (10012912) 40 Multifinger Imaging Tool	4.54	2.75	61.10
TSTAMP	0.00		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: 07-25-15_noble energy_wells ranch state a36-675_mit_rbl.db: field/well/run1/main4 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in						

Calibration Report			
Database File:	07-25-15_noble energy_wells ranch state a36-675_mit_rbl.db		
Dataset Pathname:	main4		
Dataset Creation:	Sat Jul 25 10:34:58 2015 by Log 7.0 B1		
Multi-finger Imaging Tool Calibration Report			
Serial Number:	10012912		
Number of Fingers:	40		
Tool Model:	UW_MIT40_042		
Inclinometer Calibration Report			
Performed:	Mon Jul 15 09:39:36 2013		
Calibration Angle:	45		
	Inc X	Inc Y	
Vertical:	1968	1974	
Finger 1 up:	1740	1744	
Finger 31 up:	2215	1741	
Finger 21 up:	2205	2224	

Finger 11 up:	1731	2217
Sensitivity ratio:	0.992868	
X-axis angle:	134.307	
Deviation const.:	335.589	

Finger Calibration Report  
Performed: Sat Jul 25 07:05:06 2015

Ring size: (in)	4	Sens	5	Sens	6	Sens	7
Finger 01:	1019	369.0	1388	384.0	1772	411.0	2183
Finger 02:	1156	385.0	1541	389.0	1930	403.0	2333
Finger 03:	1076	396.0	1472	404.0	1876	427.0	2303
Finger 04:	1063	373.0	1436	394.0	1830	418.0	2248
Finger 05:	1060	383.0	1443	401.0	1844	419.0	2263
Finger 06:	1065	387.0	1452	403.0	1855	416.0	2271
Finger 07:	1045	390.0	1435	405.0	1840	418.0	2258
Finger 08:	1067	389.0	1456	399.0	1855	413.0	2268
Finger 09:	1055	392.0	1447	398.0	1845	412.0	2257
Finger 10:	1057	391.0	1448	398.0	1846	409.0	2255
Finger 11:	1051	402.0	1453	391.0	1844	404.0	2248
Finger 12:	1057	396.0	1453	396.0	1849	409.0	2258
Finger 13:	1059	394.0	1453	388.0	1841	397.0	2238
Finger 14:	1045	403.0	1448	397.0	1845	410.0	2255
Finger 15:	987	410.0	1397	407.0	1804	421.0	2225
Finger 16:	1006	407.0	1413	403.0	1816	421.0	2237
Finger 17:	922	385.0	1307	388.0	1695	418.0	2113
Finger 18:	1058	399.0	1457	386.0	1843	403.0	2246
Finger 19:	1020	397.0	1417	393.0	1810	409.0	2219
Finger 20:	1009	404.0	1413	402.0	1815	423.0	2238
Finger 21:	1032	406.0	1438	397.0	1835	408.0	2243
Finger 22:	989	403.0	1392	402.0	1794	423.0	2217
Finger 23:	954	401.0	1355	407.0	1762	435.0	2197
Finger 24:	1023	397.0	1420	386.0	1806	397.0	2203
Finger 25:	969	397.0	1366	401.0	1767	430.0	2197
Finger 26:	1113	387.0	1500	375.0	1875	393.0	2268
Finger 27:	1043	395.0	1438	391.0	1829	414.0	2243
Finger 28:	1059	391.0	1450	378.0	1828	406.0	2234
Finger 29:	996	394.0	1390	396.0	1786	427.0	2213
Finger 30:	1039	406.0	1445	392.0	1837	420.0	2257
Finger 31:	1062	382.0	1444	384.0	1828	412.0	2240
Finger 32:	1034	388.0	1422	397.0	1819	428.0	2247
Finger 33:	1121	382.0	1503	373.0	1876	392.0	2268
Finger 34:	1088	373.0	1461	384.0	1845	409.0	2254
Finger 35:	1024	388.0	1412	410.0	1822	439.0	2261
Finger 36:	1040	380.0	1420	398.0	1818	425.0	2243
Finger 37:	1097	379.0	1476	389.0	1865	413.0	2278
Finger 38:	1122	379.0	1501	385.0	1886	401.0	2287
Finger 39:	1120	369.0	1489	383.0	1872	404.0	2276
Finger 40:	1066	375.0	1441	399.0	1840	421.0	2261

Segmented Cement Bond Log Calibration Report

Serial Number:	1063
Tool Model:	UW_RBT_004
Calibration Casing Diameter:	7.000 in
Calibration Depth:	89.166 ft

Master Calibration, performed Sat Jul 25 07:36:14 2015:

Raw (v)		Calibrated (mv)		Results	
Zero	Cal	Zero	Cal	Gain	Offset

3FT	-0.002	0.709	0.800	62.165	86.269	1.014
5FT	-0.006	0.635	0.800	62.165	95.706	1.384
S1	-0.004	0.711	0.000	100.000	140.013	0.513
S2	-0.004	0.730	0.000	100.000	136.252	0.482
S3	-0.004	0.734	0.000	100.000	135.603	0.492
S4	-0.004	0.748	0.000	100.000	132.972	0.487
S5	-0.002	0.731	0.000	100.000	136.331	0.321
S6	-0.003	0.701	0.000	100.000	142.237	0.358
S7	-0.002	0.690	0.000	100.000	144.330	0.352
S8	-0.002	0.688	0.000	100.000	144.835	0.341

#### Temperature Calibration Report

Serial Number: 10024052  
 Tool Model: UW\_PRT\_016  
 Performed: Wed Feb 11 16:41:28 2015

Point #	Reading		Reference	
1	12242.00	cps	68.00	degF
2	18329.00	cps	104.00	degF
3	29563.00	cps	176.00	degF
4	41222.00	cps	248.00	degF
5	52988.00	cps	320.00	degF
6	58824.00	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 State A36-675  
 Field: Wattenberg  
 County: Weld  
 State: Colorado