

# Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Location:	API # : 05-123-41563	Other Services
Well	Gracie LD22-740	Well	Gracie LD22-740	
Field	Wildcat	Field	Wildcat	
County	Weld	County	Weld	
State	Colorado	State	Colorado	
Permanent Datum	SEC 22 TWP 9N RGE 58W	Ground Level	Elevation 4828'	Elevation
Log Measured From	Kelly Bushing	30 FT	K.B. 4858'	D.F. 4857'
Drilling Measured From	Kelly Bushing		G.L. 4828'	

Date	4-SEP-2015	One		
Run Number		10.427 FT		
Depth Driller		6006 FT		
Depth Logger		5996 FT		
Bottom Logged Interval		Surface		
Top Log Interval		8.750"		
Open Hole Size		Water		
Type Fluid		8.34 lbm/gal		
Density / Viscosity		208°F		
Max. Recorded Temp.		92 FT		
Estimated Cement Top		ROA		
Time Well Ready		08:42		
Time Logger on Bottom		HD-0119		
Equipment Number		Fort Lupton, CO		
Location		J. Amidei		
Recorded By		Sam Hopper		
Witnessed By				

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	765 FT		
Intermediate #1	7	26	P-110/C	30 FT	6132 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110/C	6016 FT	10407 FT		

<<< Fold Here >>>

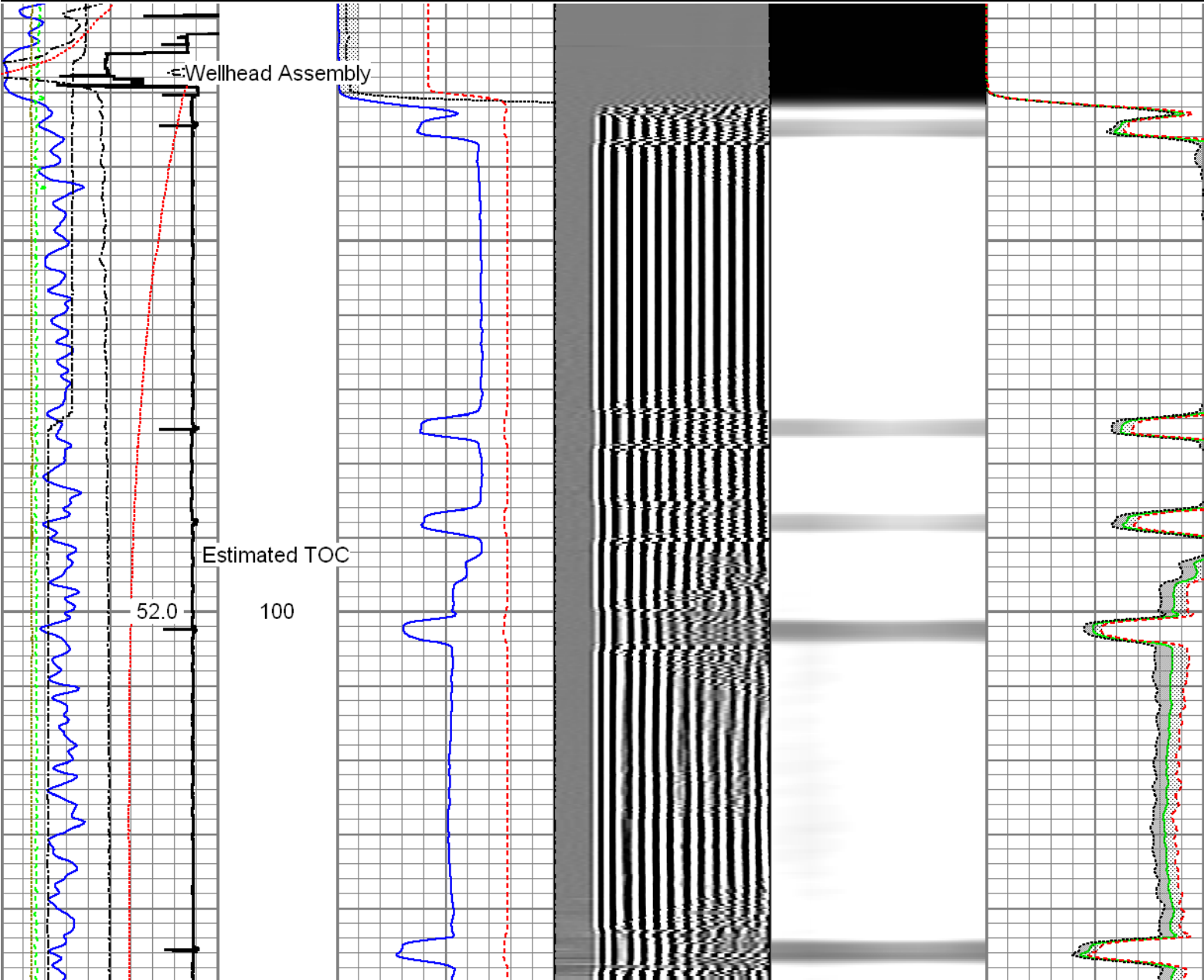
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs,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

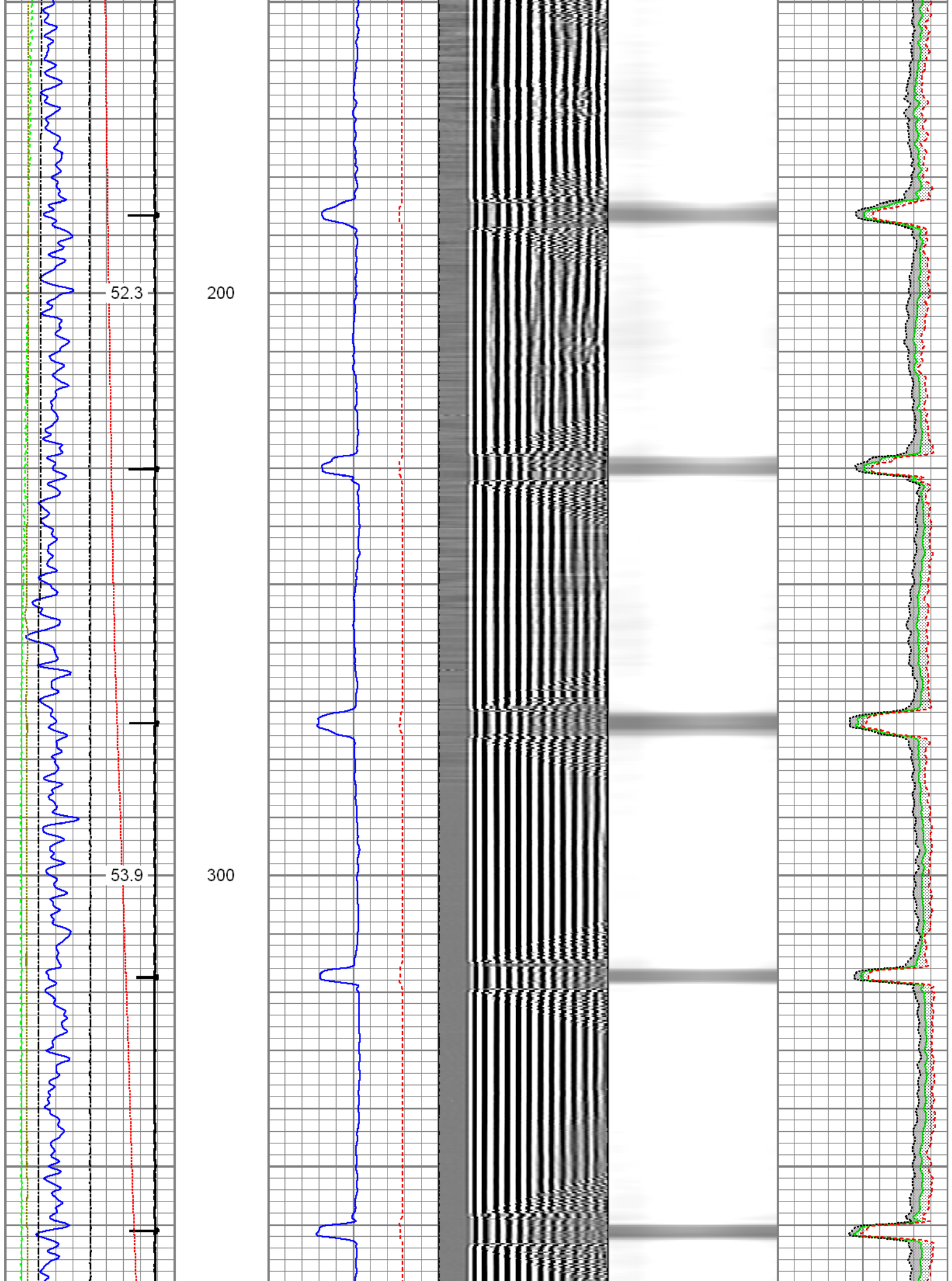
## Comments

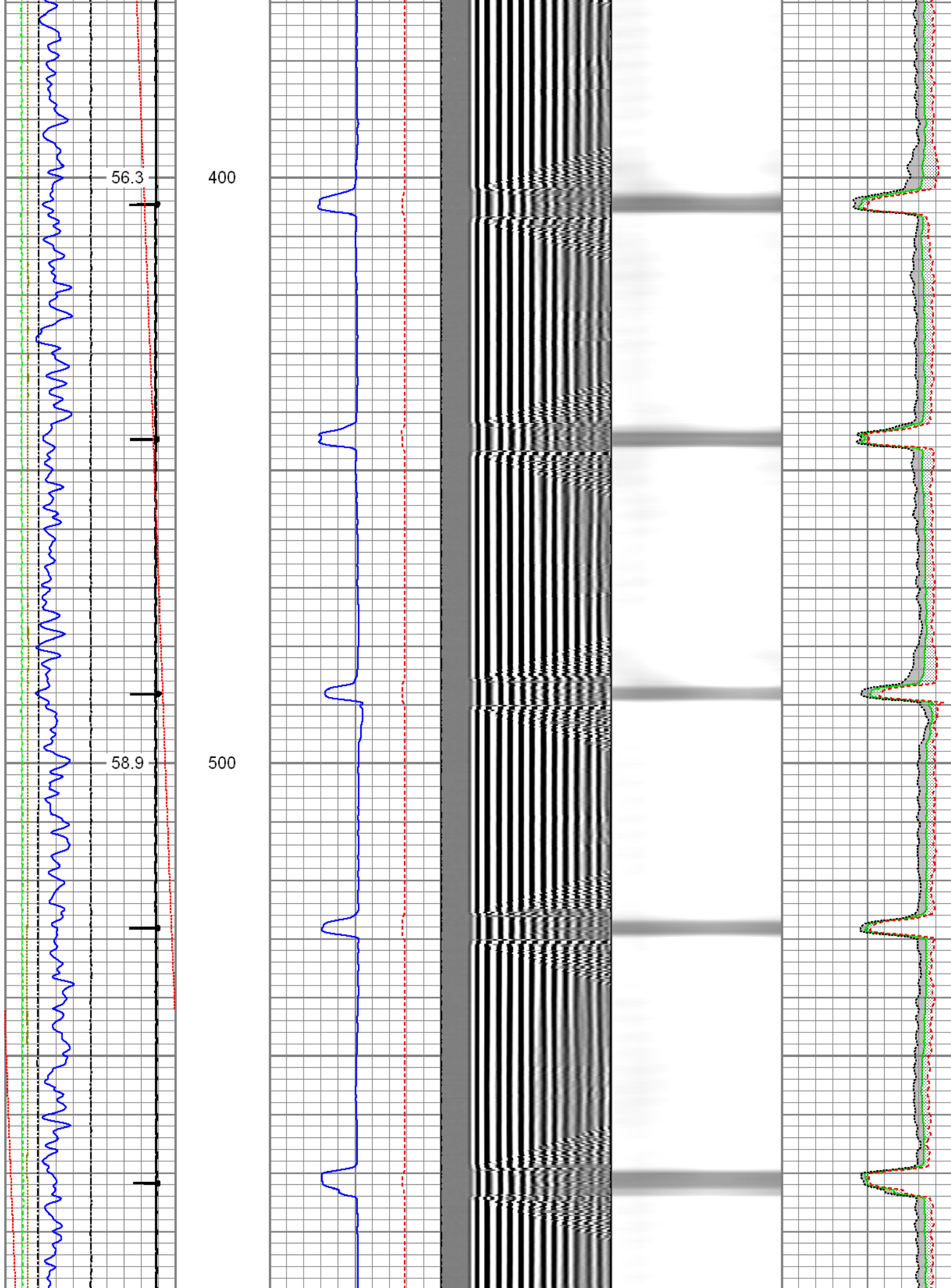
Log ran as per customer request  
Depth referenced to Kelly Bushing at 30 FT  
Adjusted +2 FT to correlate with Kelly Bushing  
Log ran from 6006 FT to surface  
Recorded with 2500 PSI surface induced pressure  
Logging tools were coated with debris upon completion of operations  
Thank you for choosing FMC Technologies Completion Services, Inc.!!

Database File: 09-04-15\_noble energy\_gracie Id22-740\_mit\_rbl.db  
Dataset Pathname: pass9  
Presentation Format: rbt4\_mit  
Dataset Creation: Fri Sep 04 08:47:58 2015 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

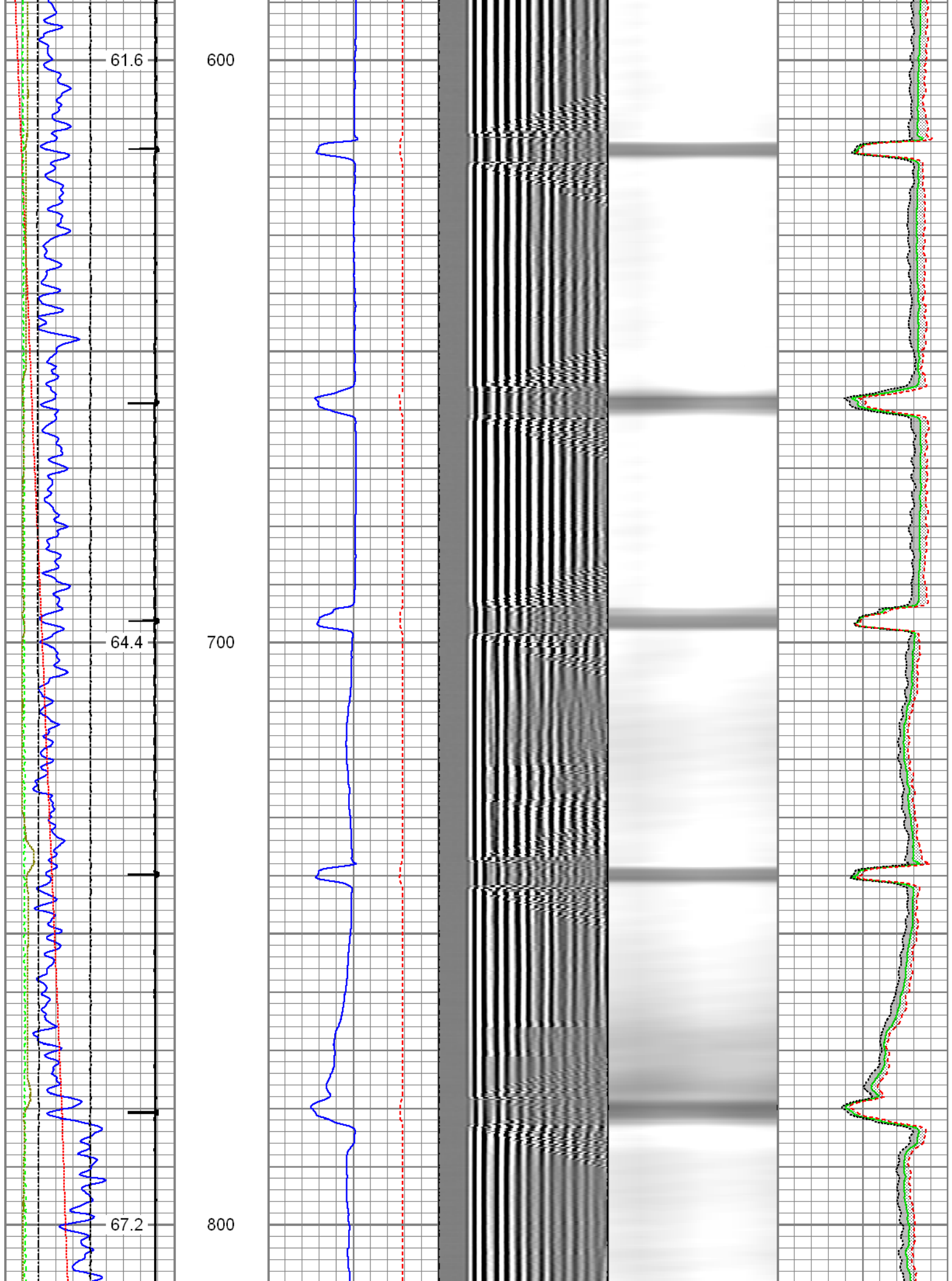
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Temperature	0 (mV) 20			0 100
0 (degF) 20	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000	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

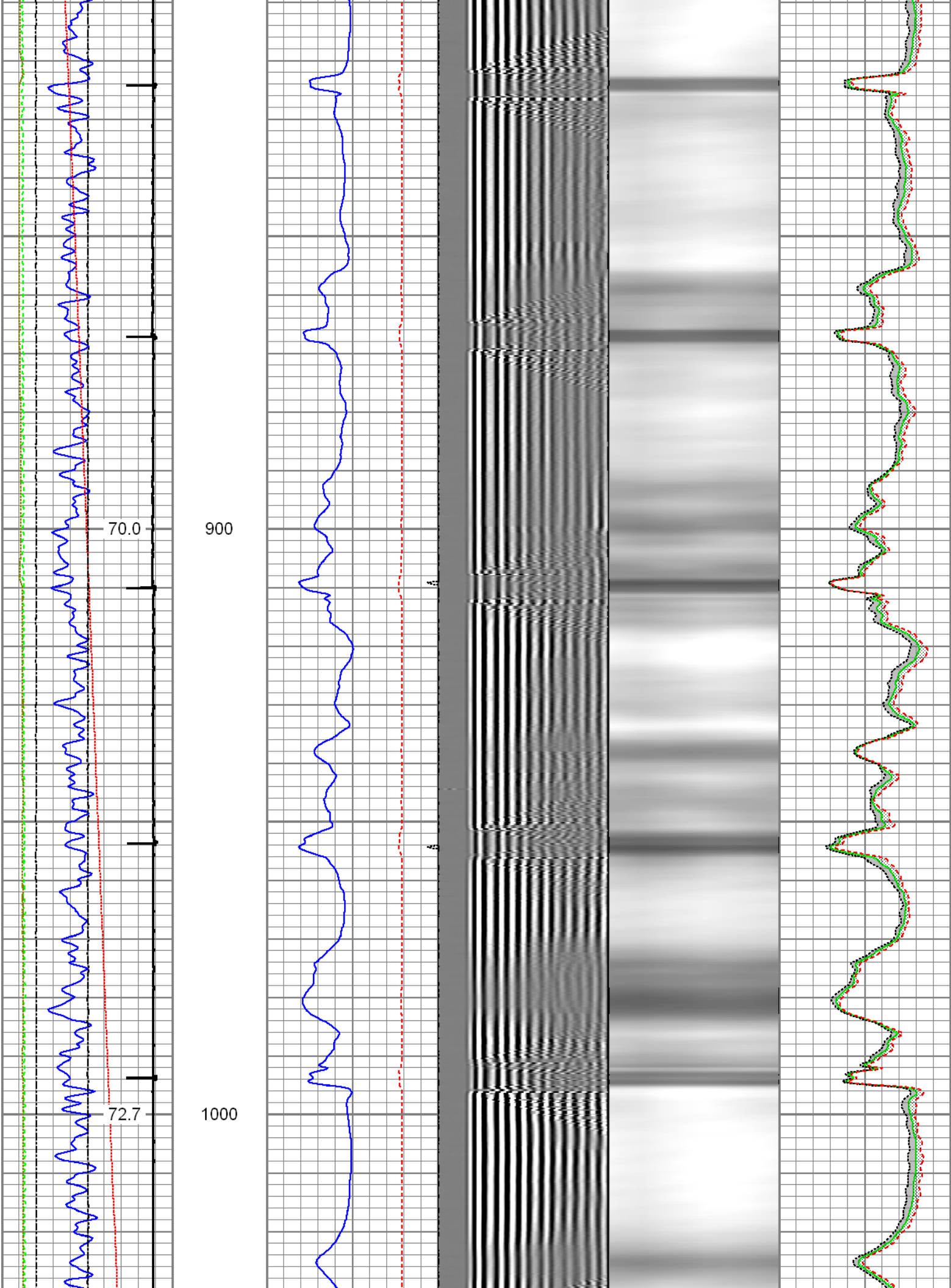


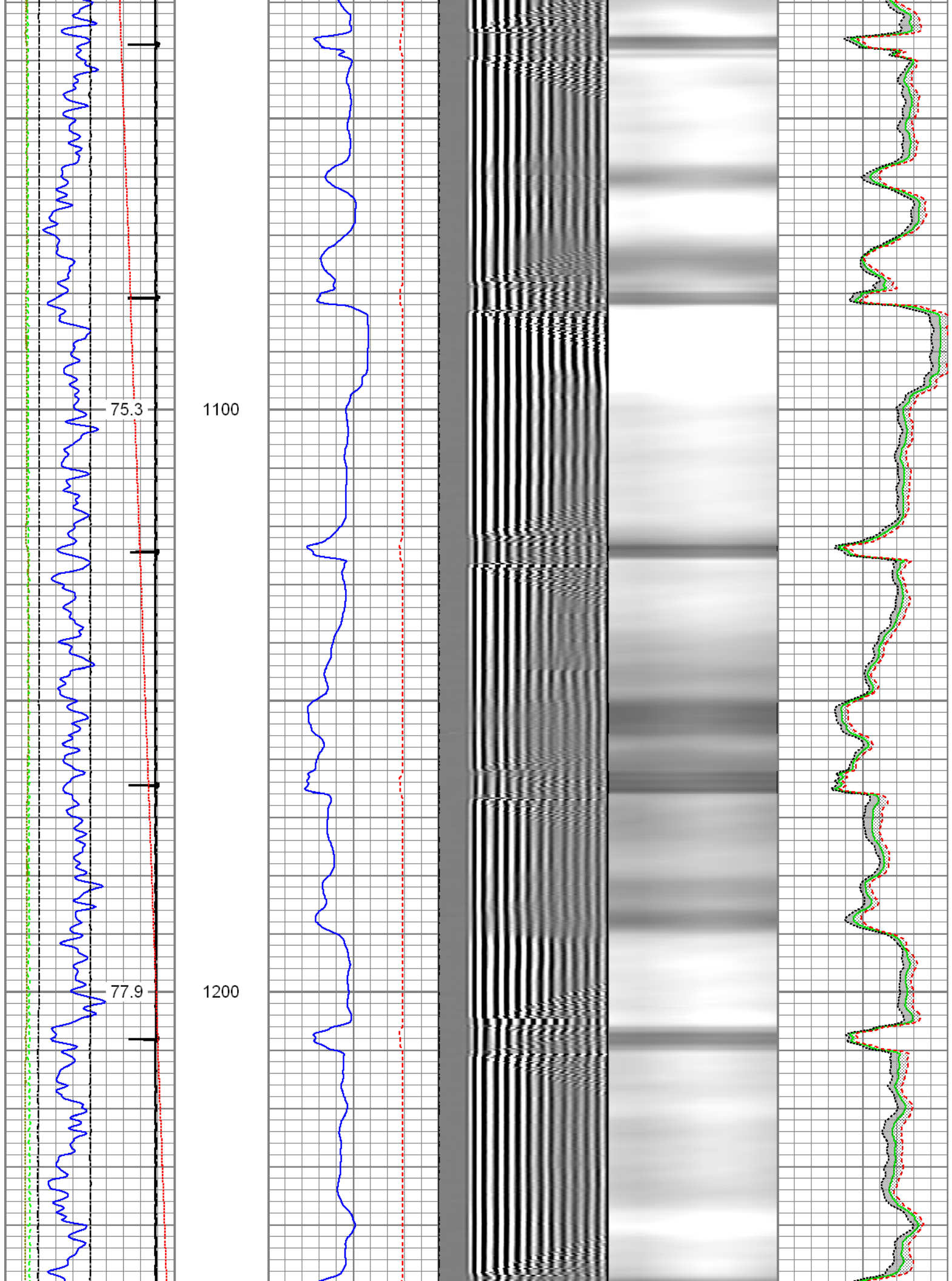


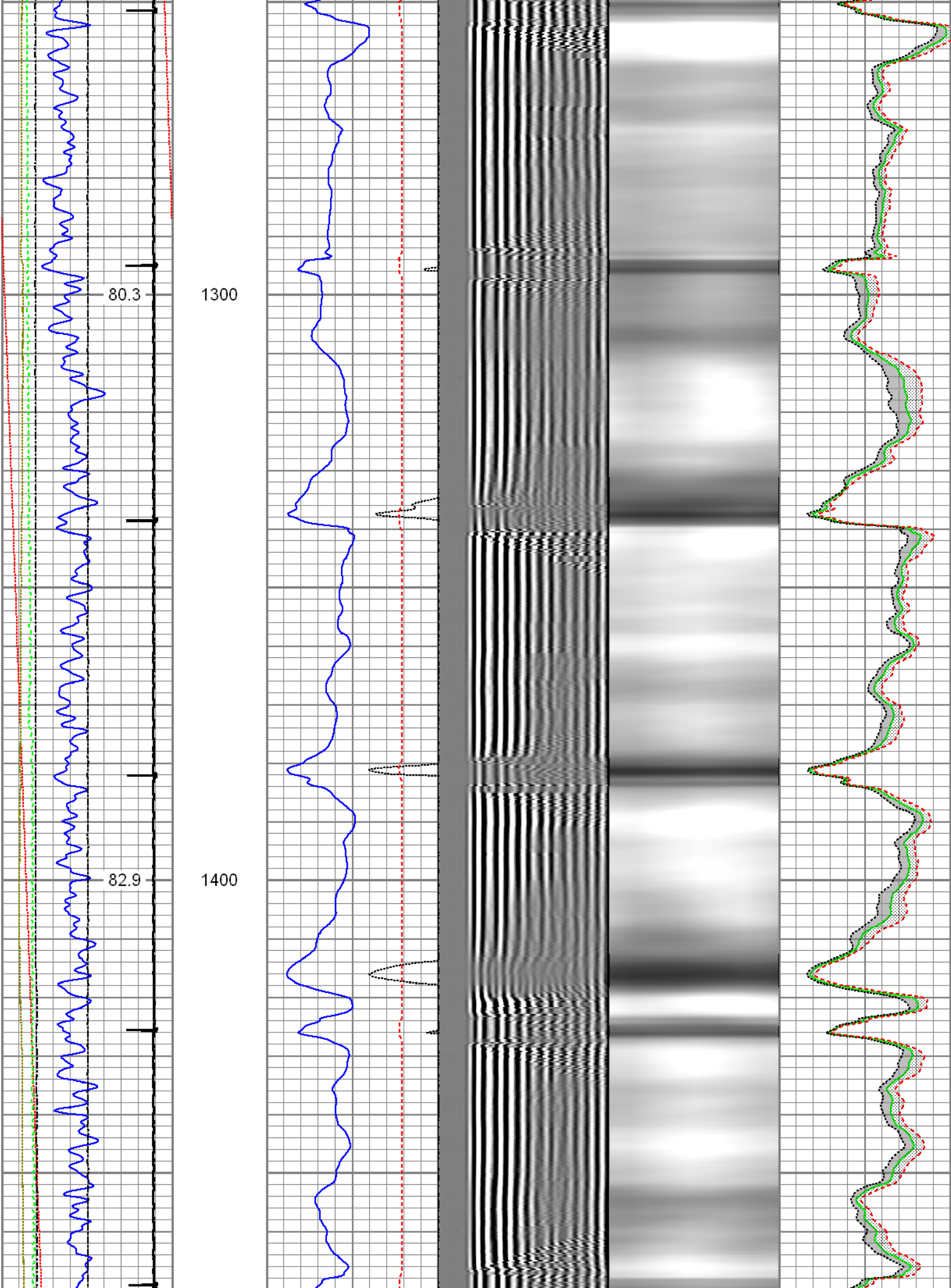




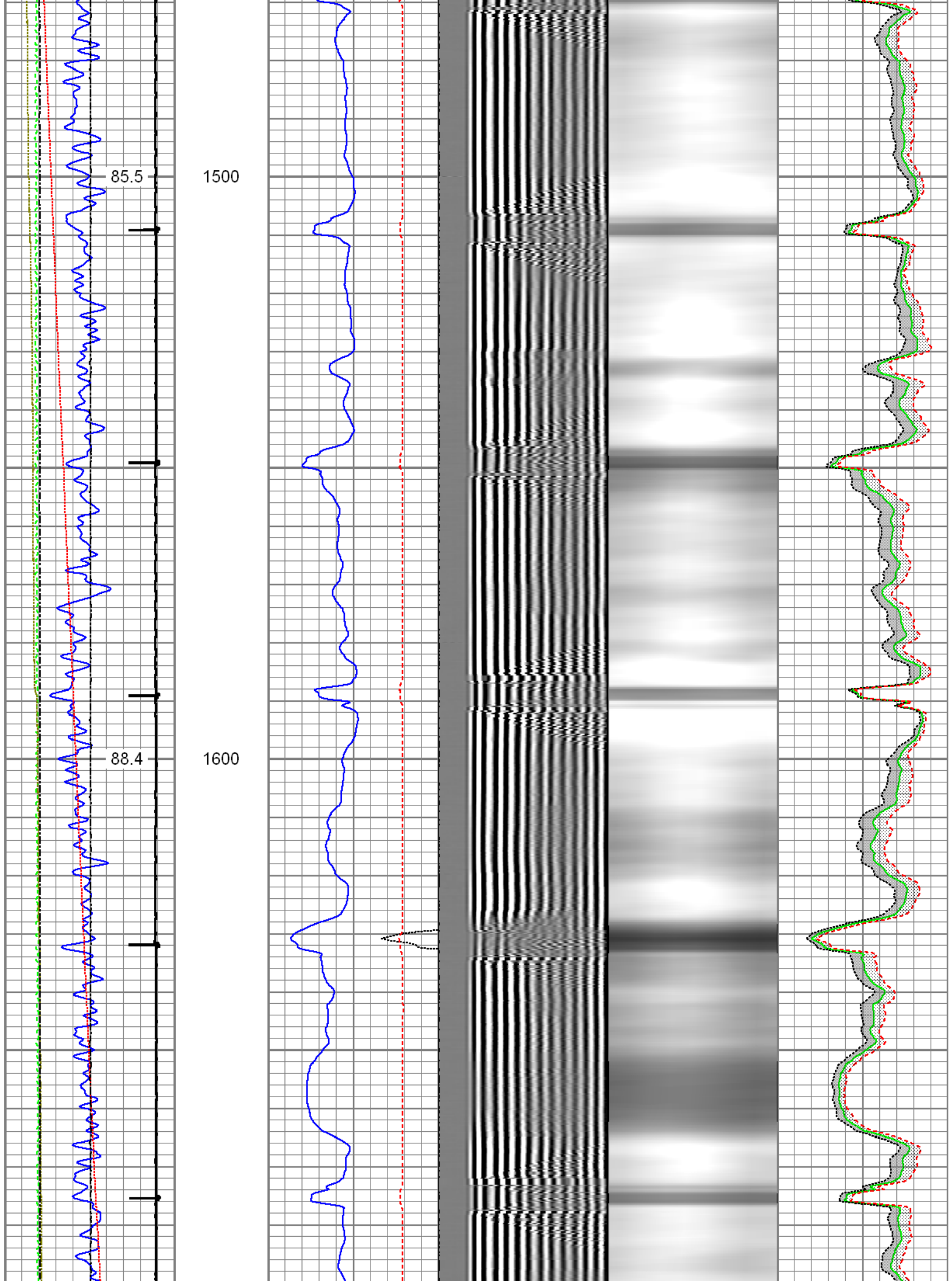


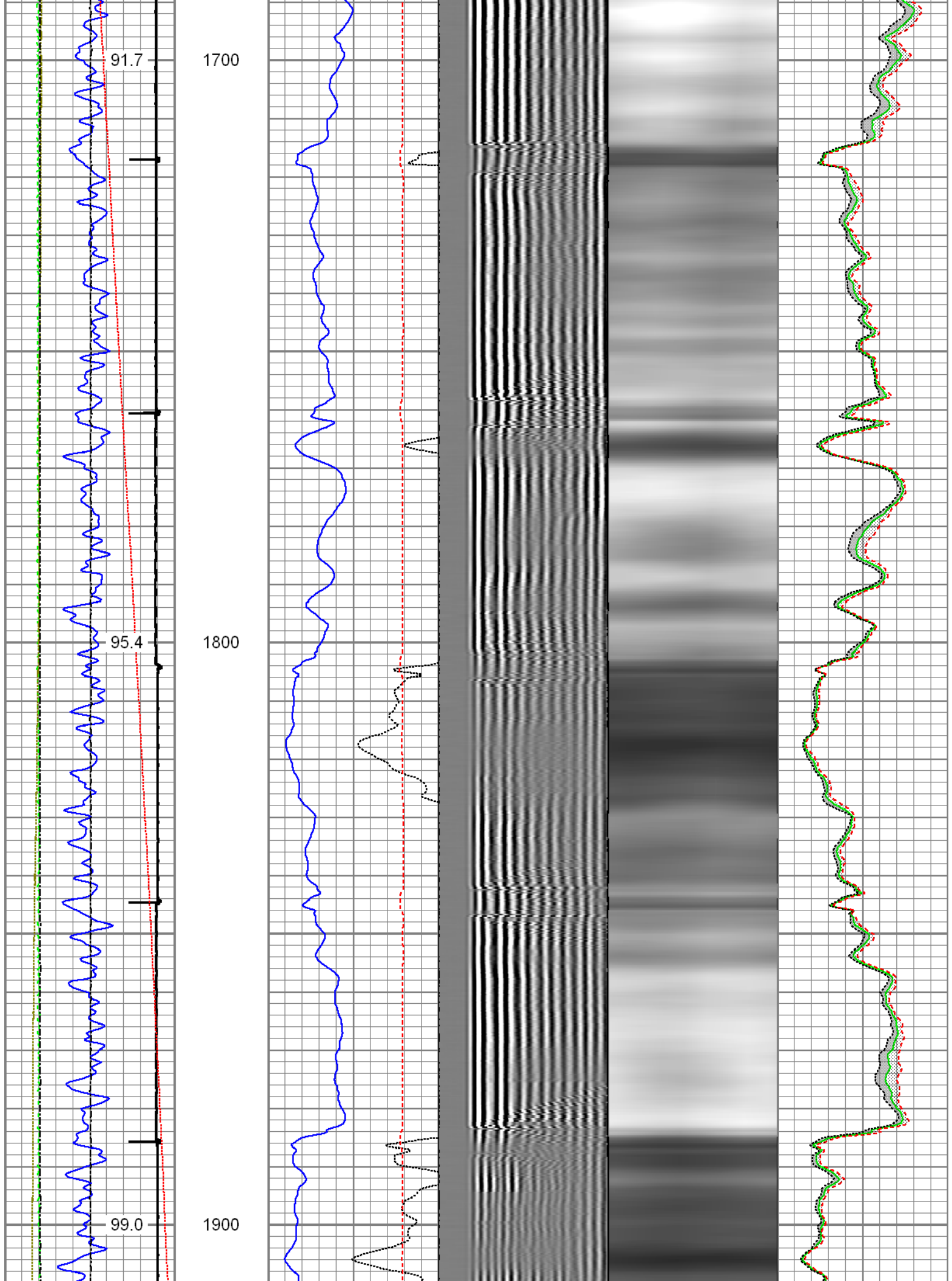


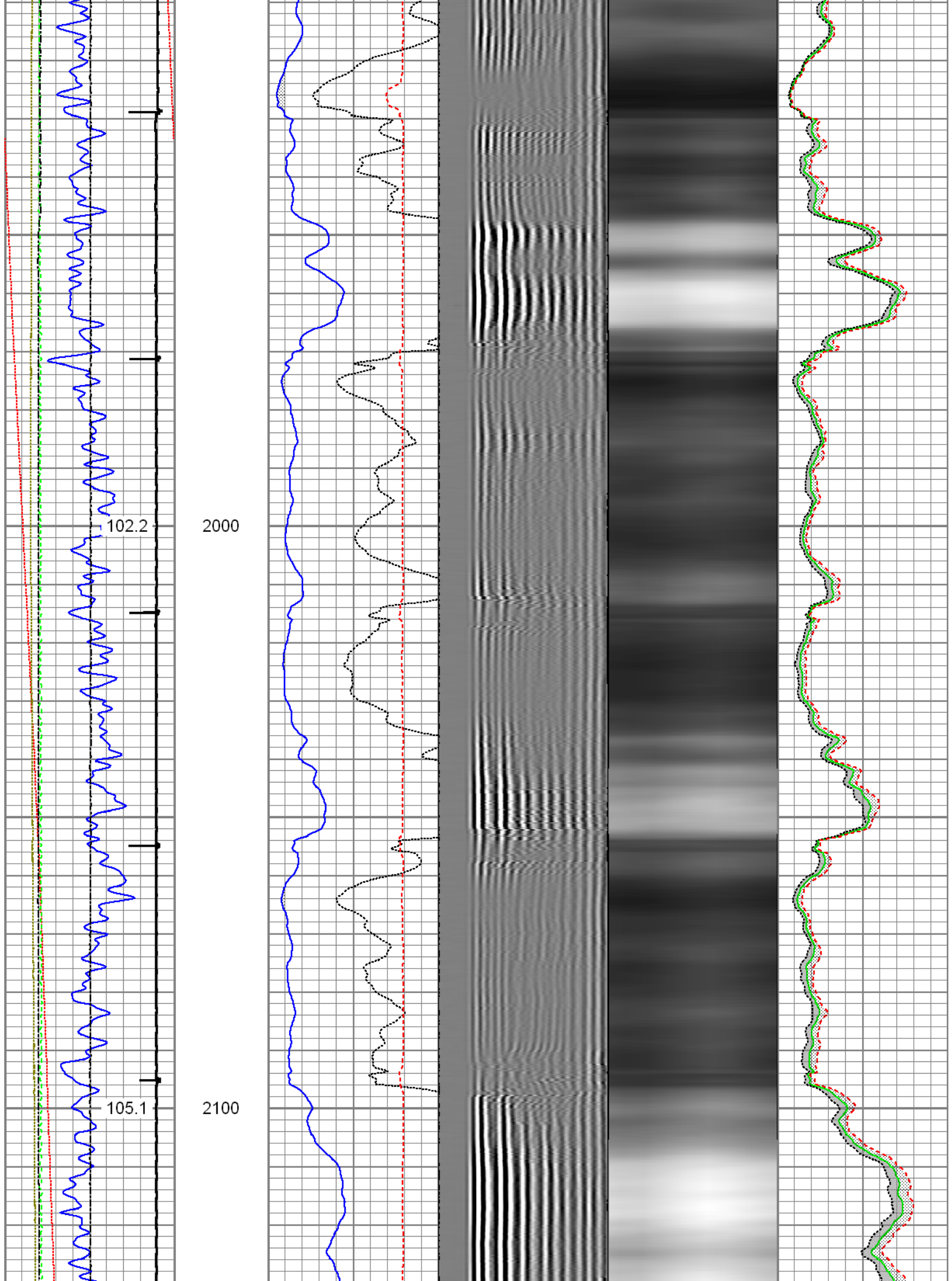


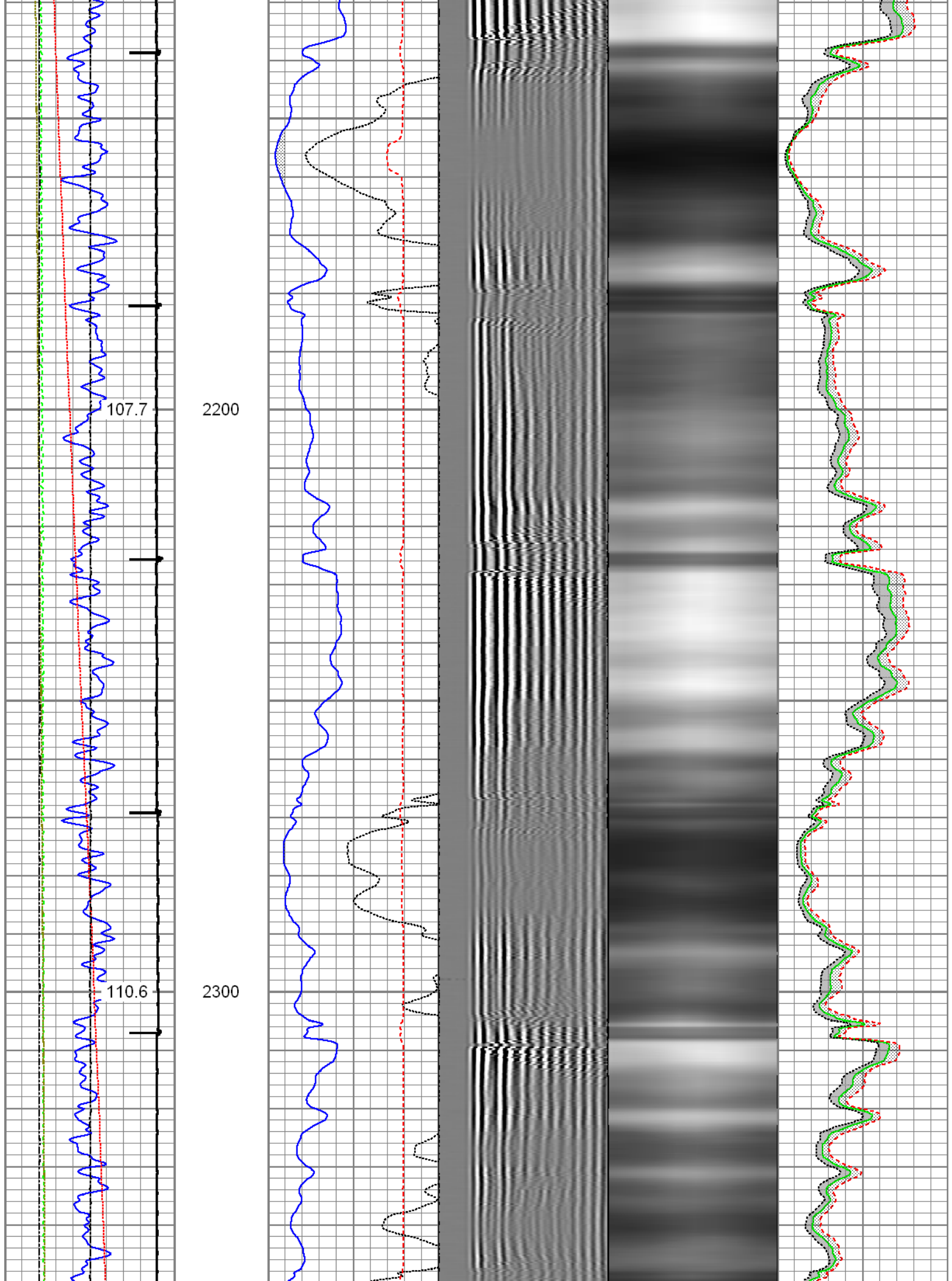




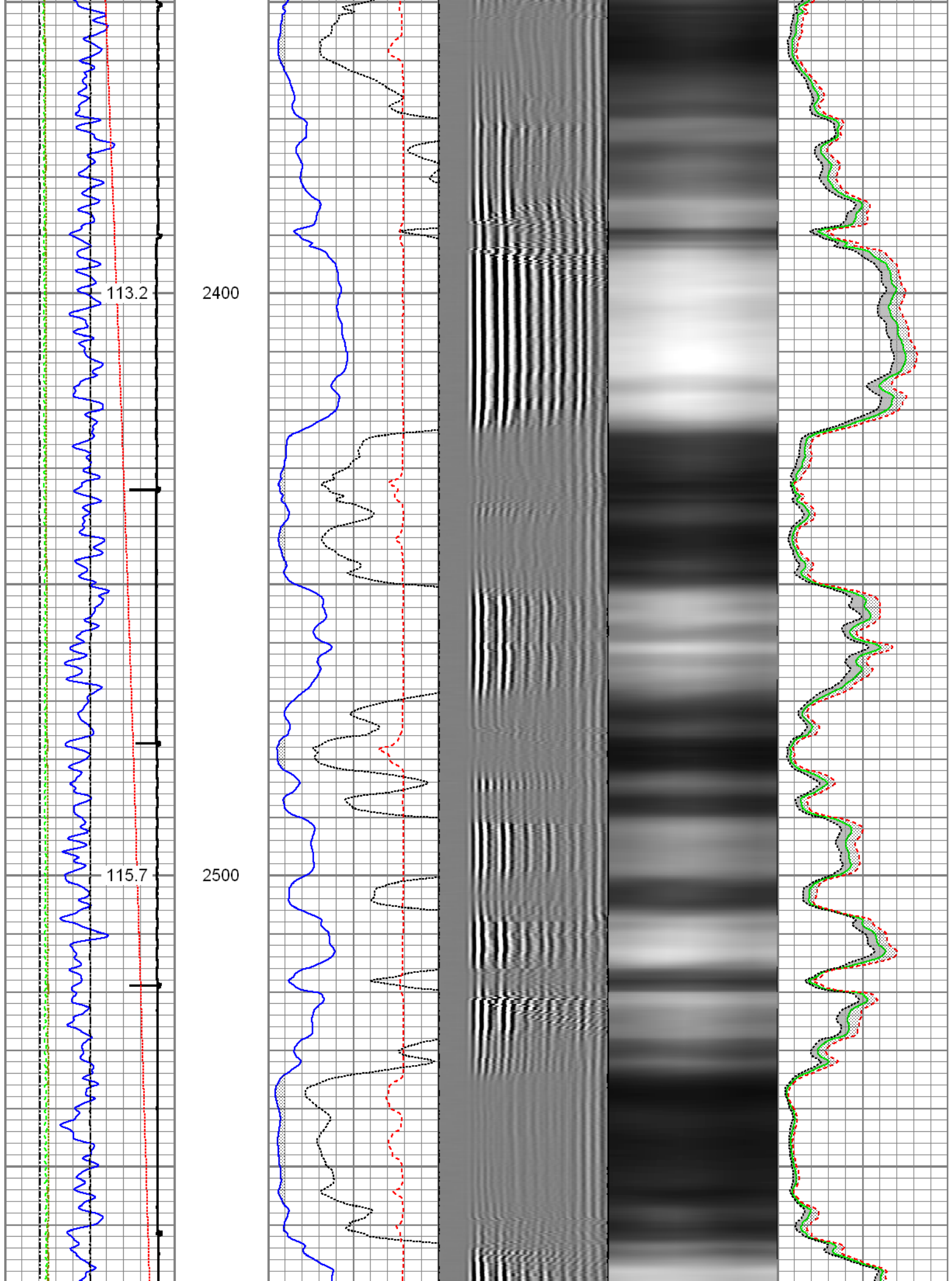


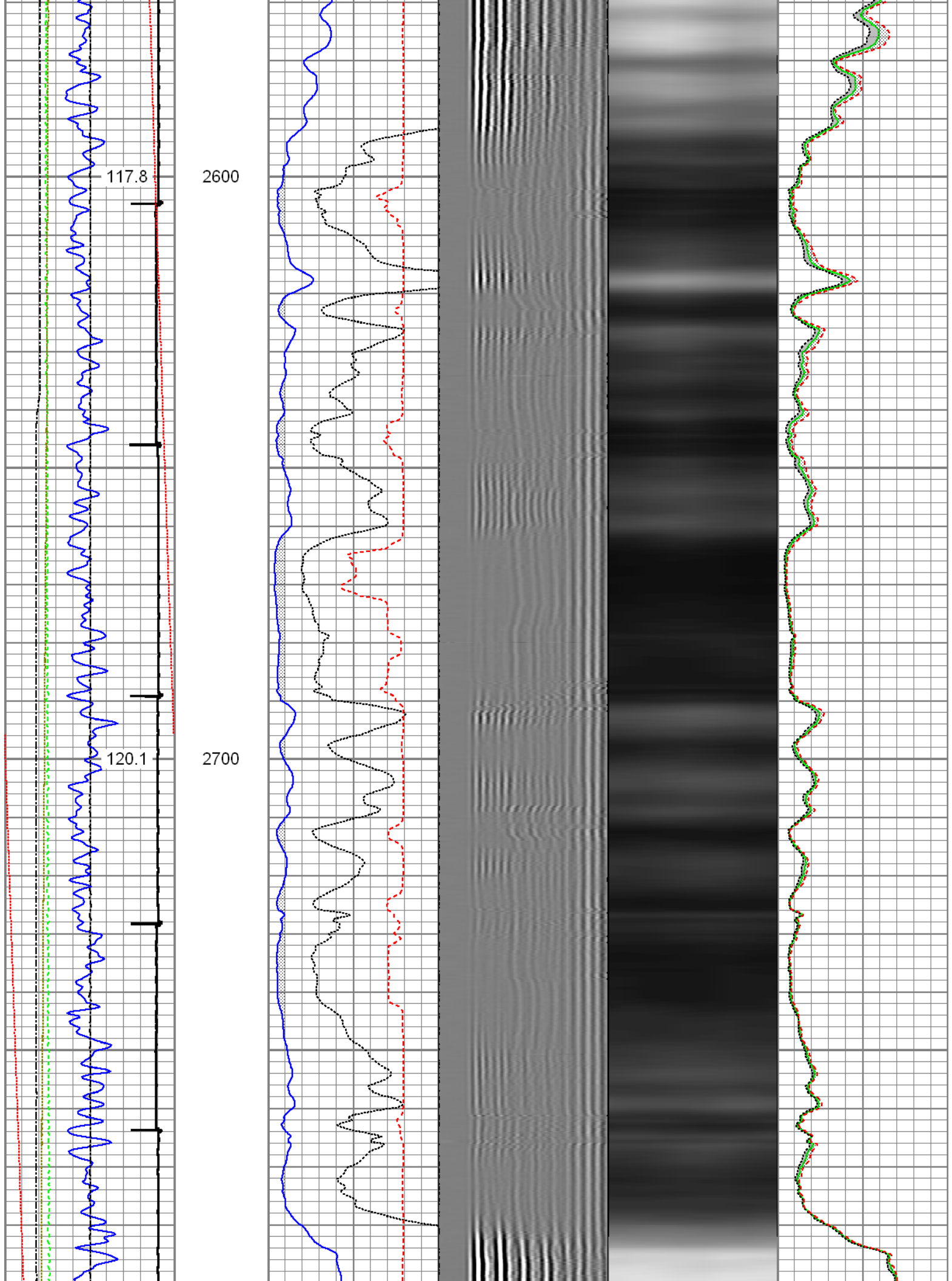


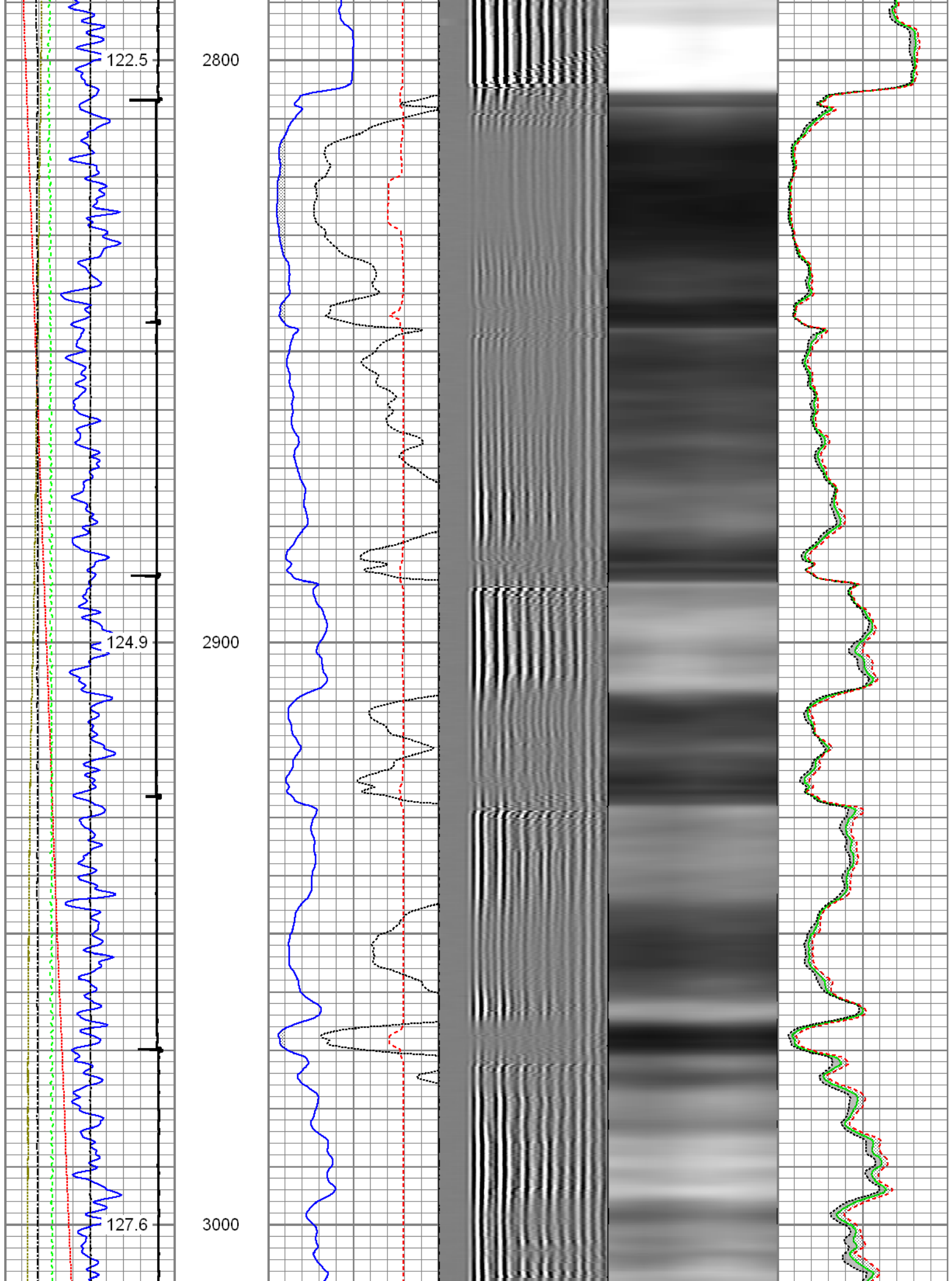


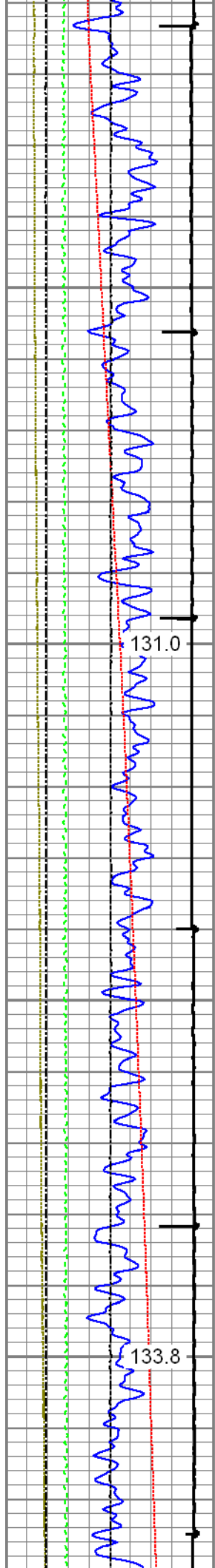






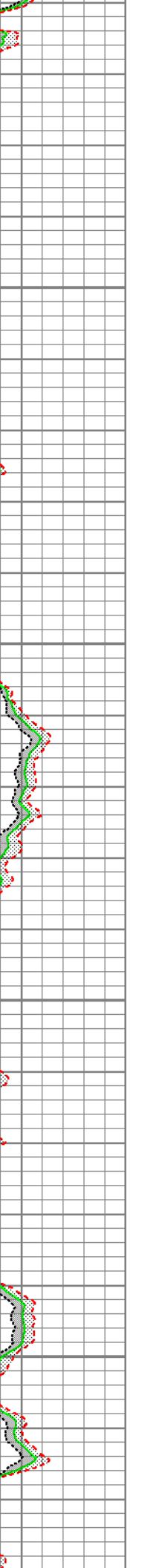
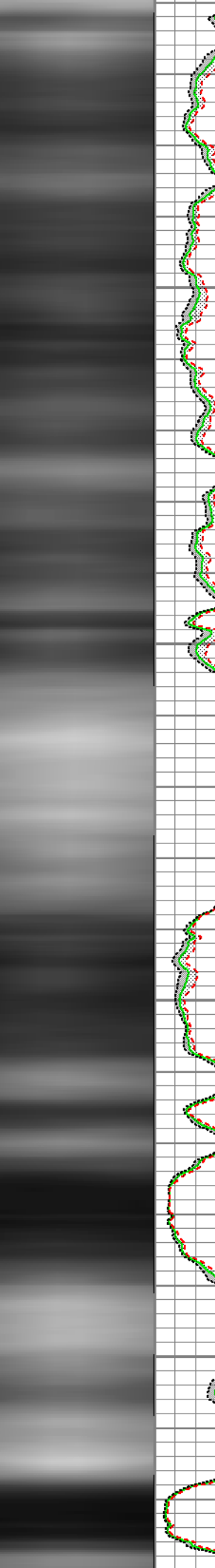
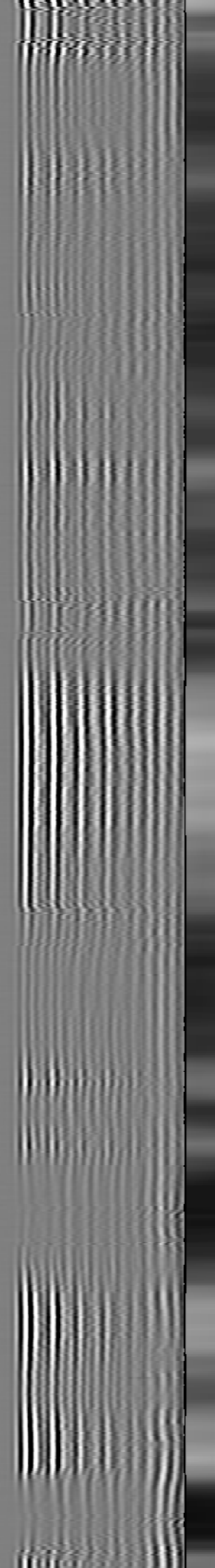
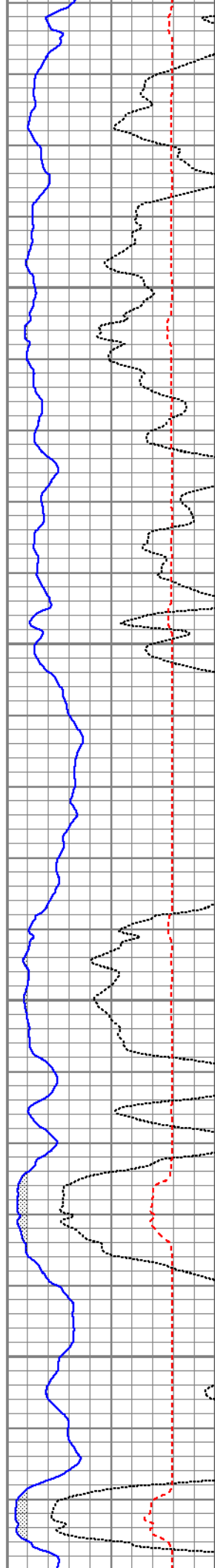




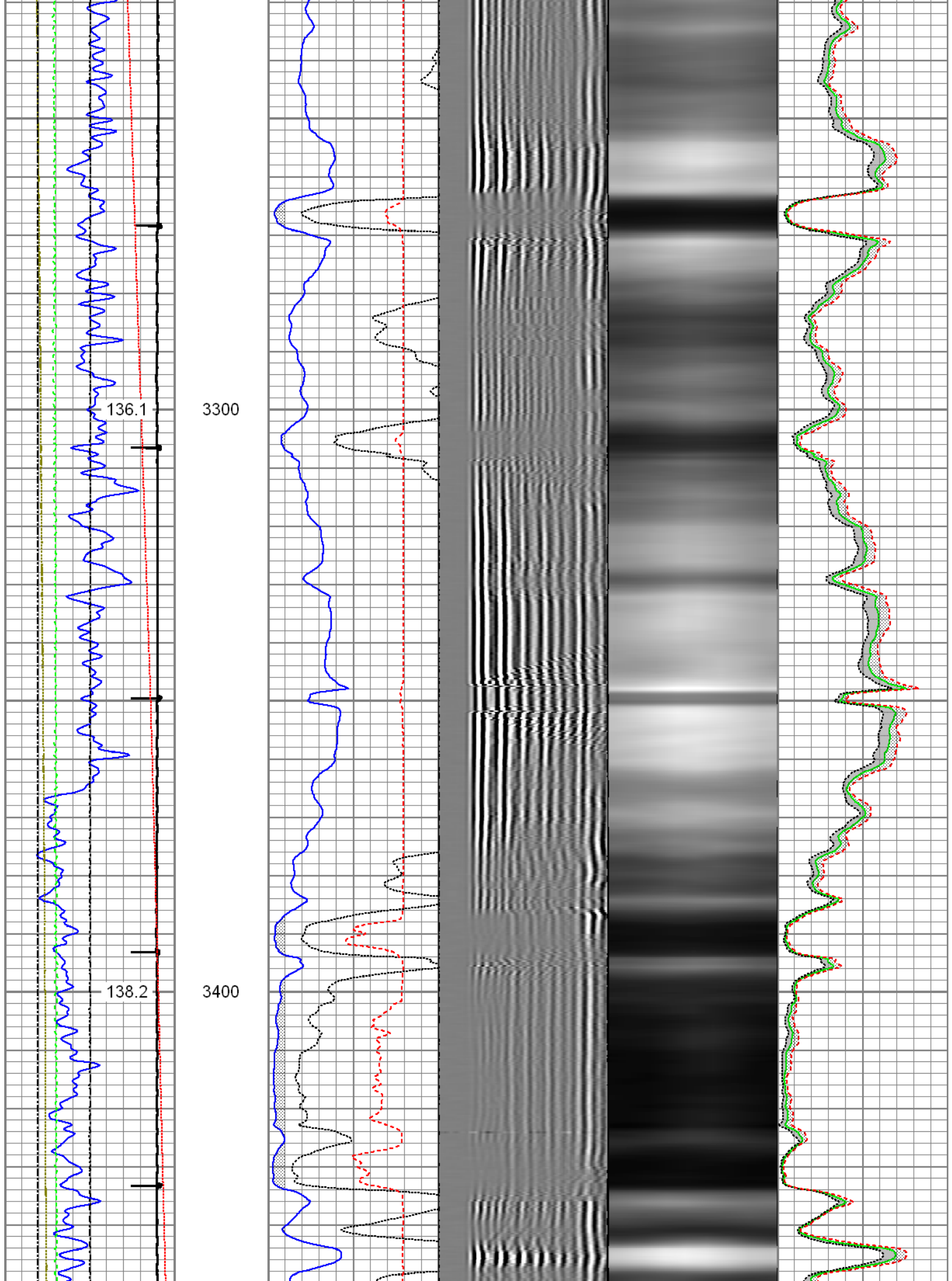


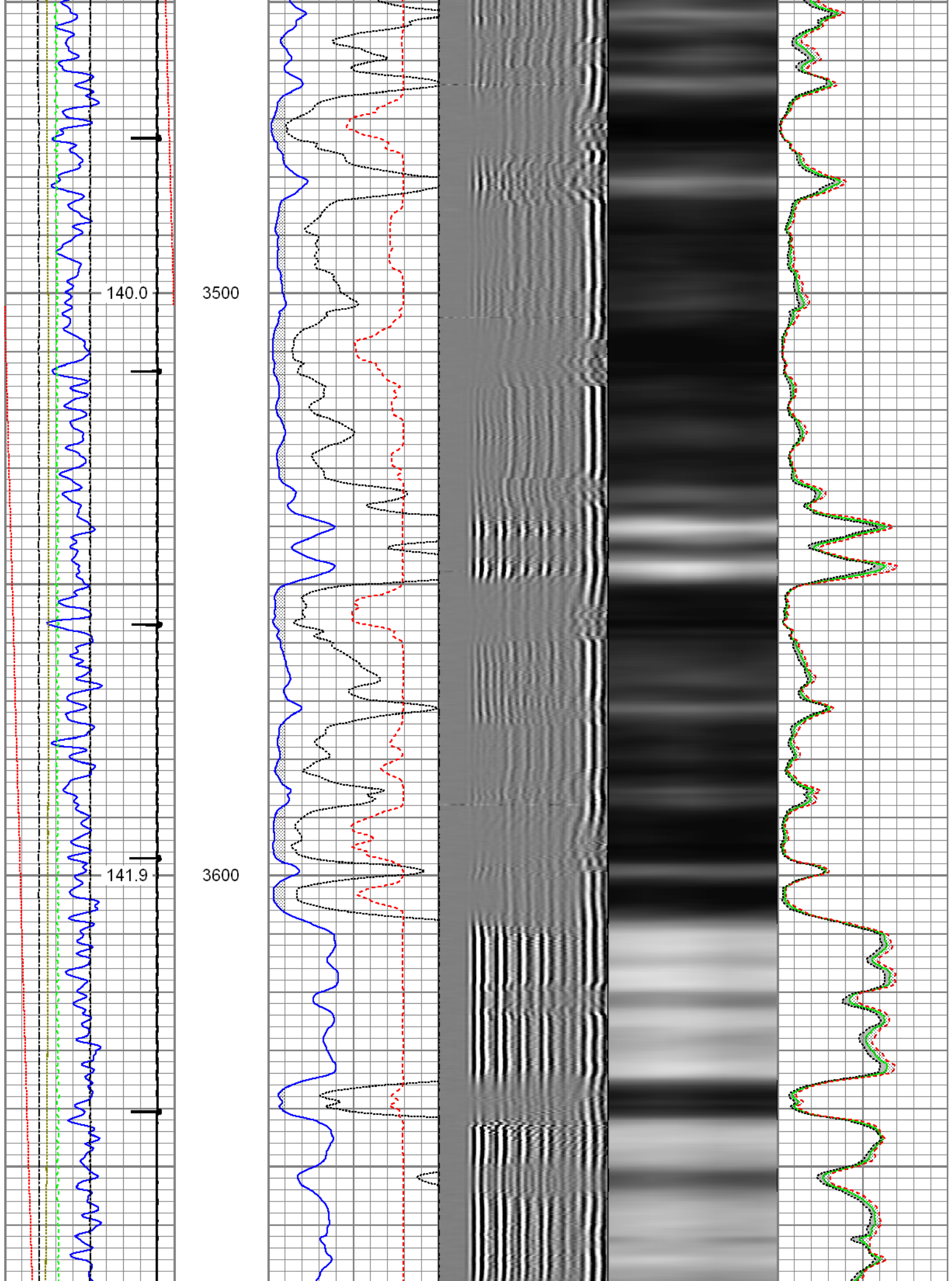
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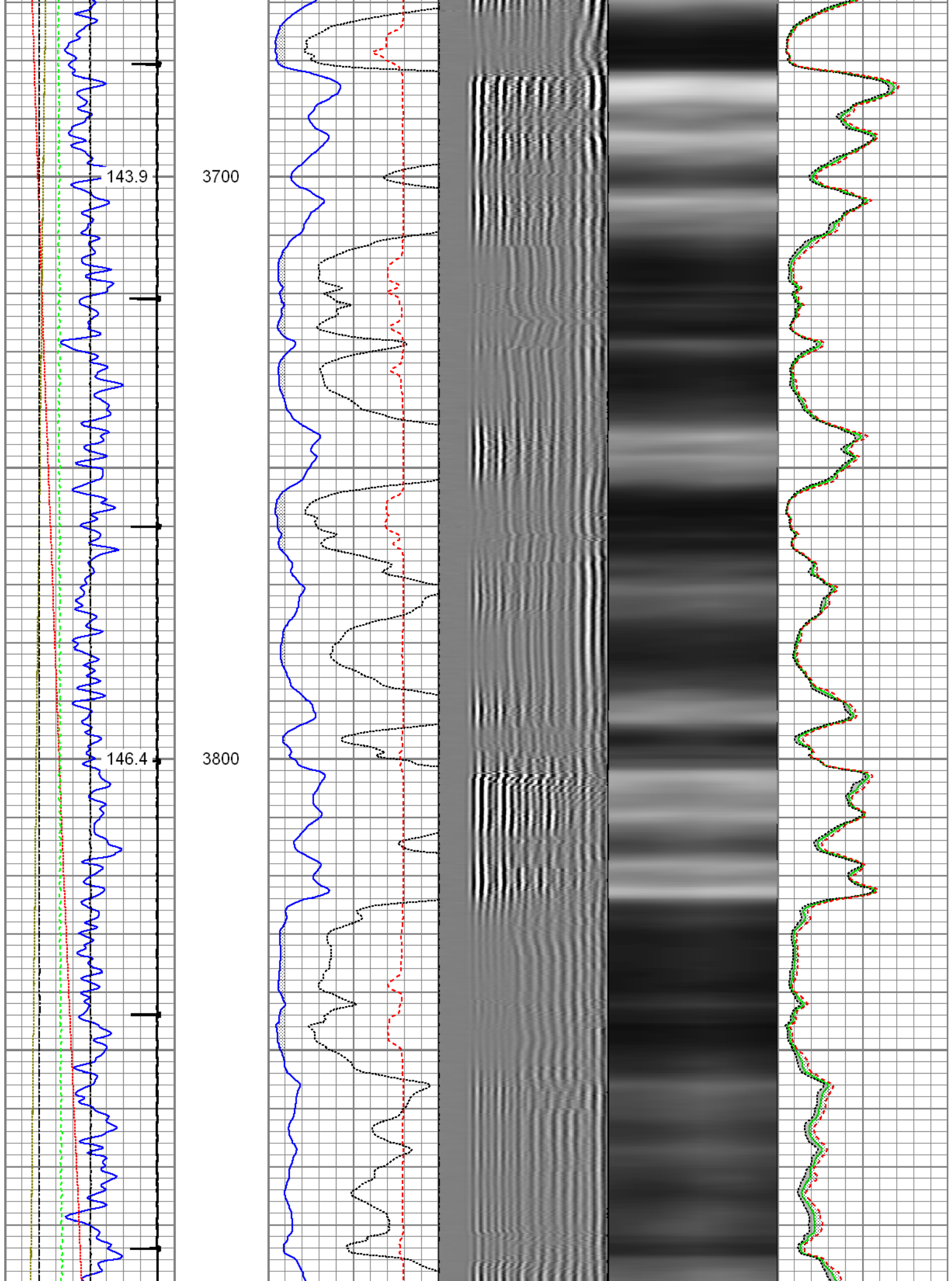
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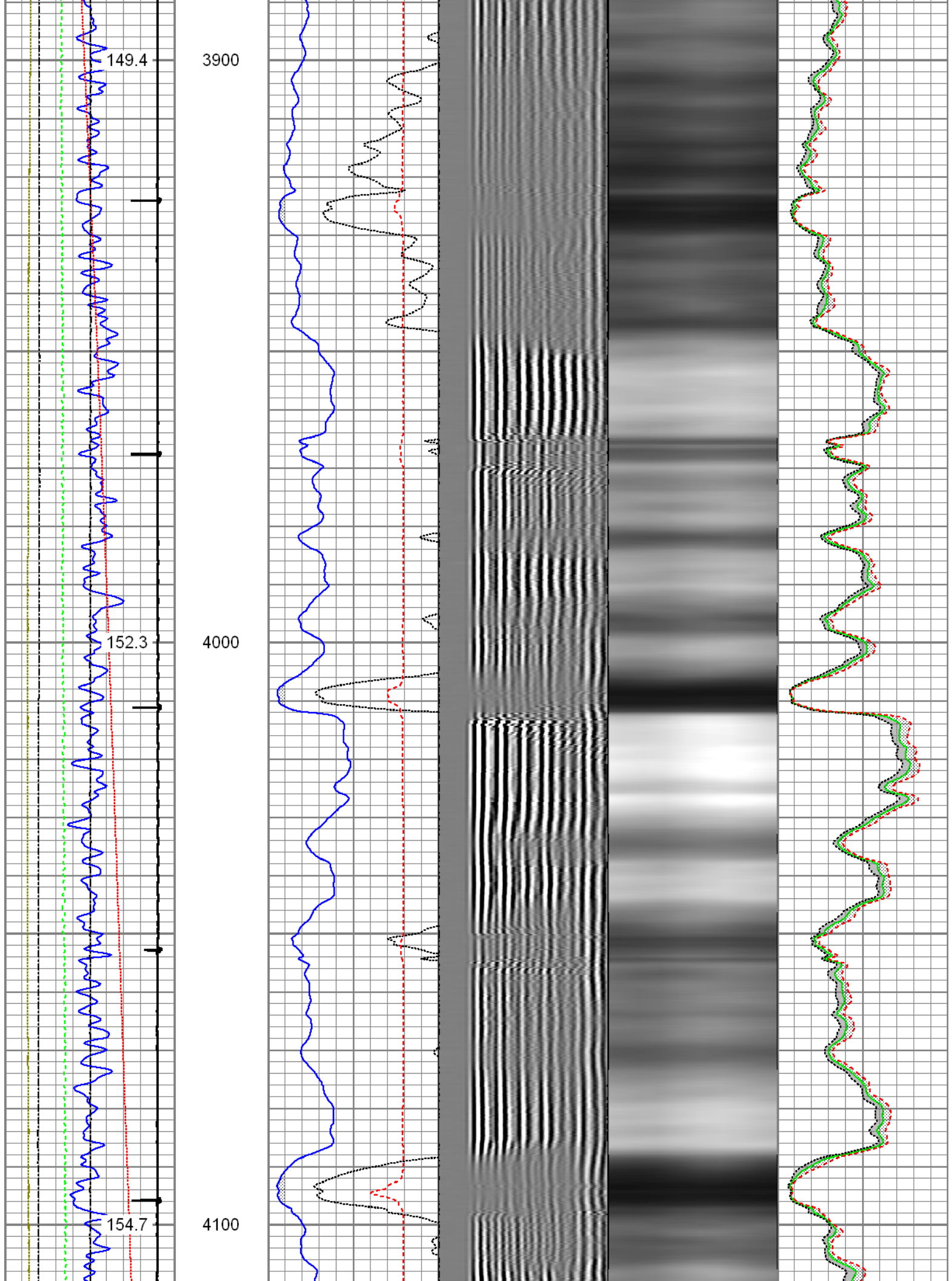




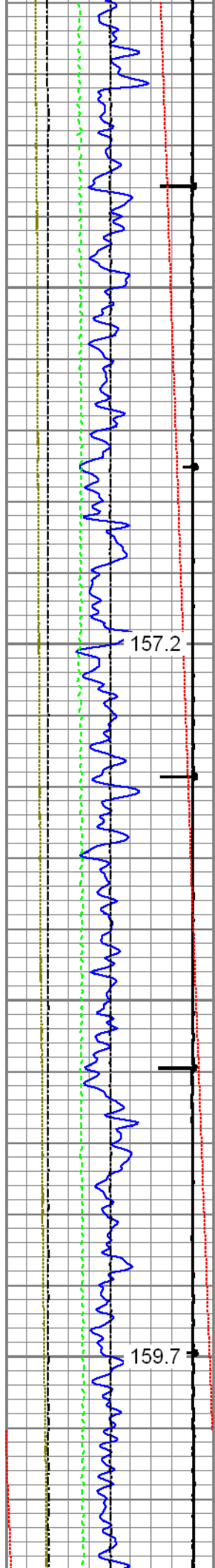






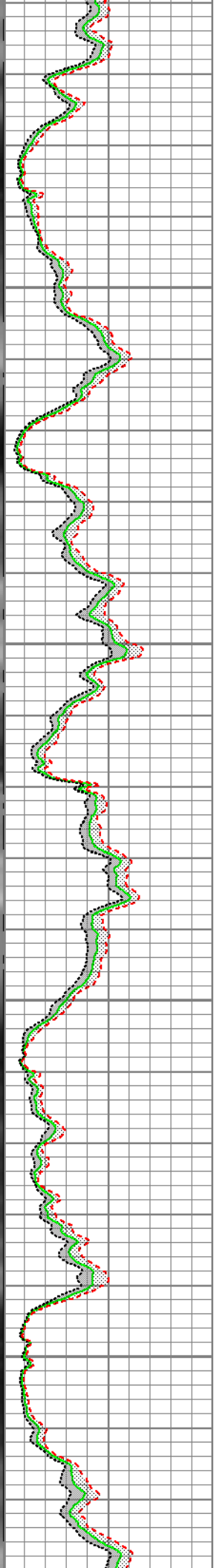
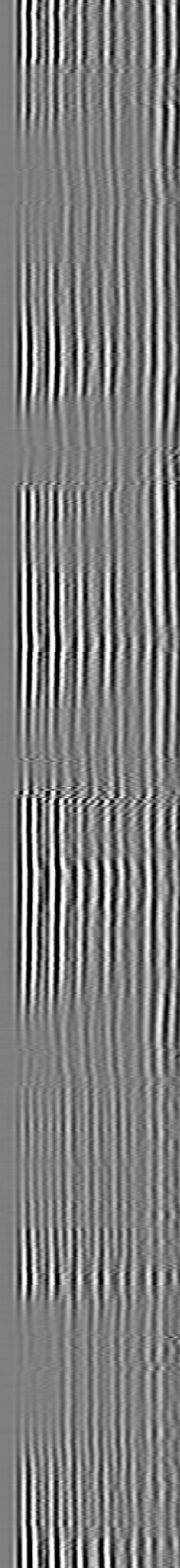
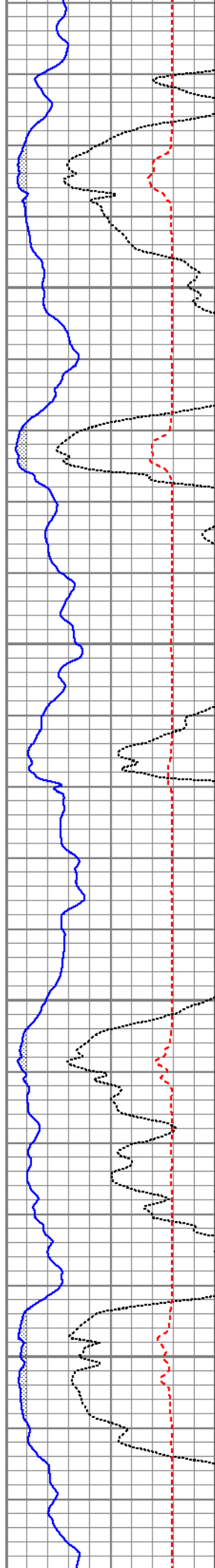


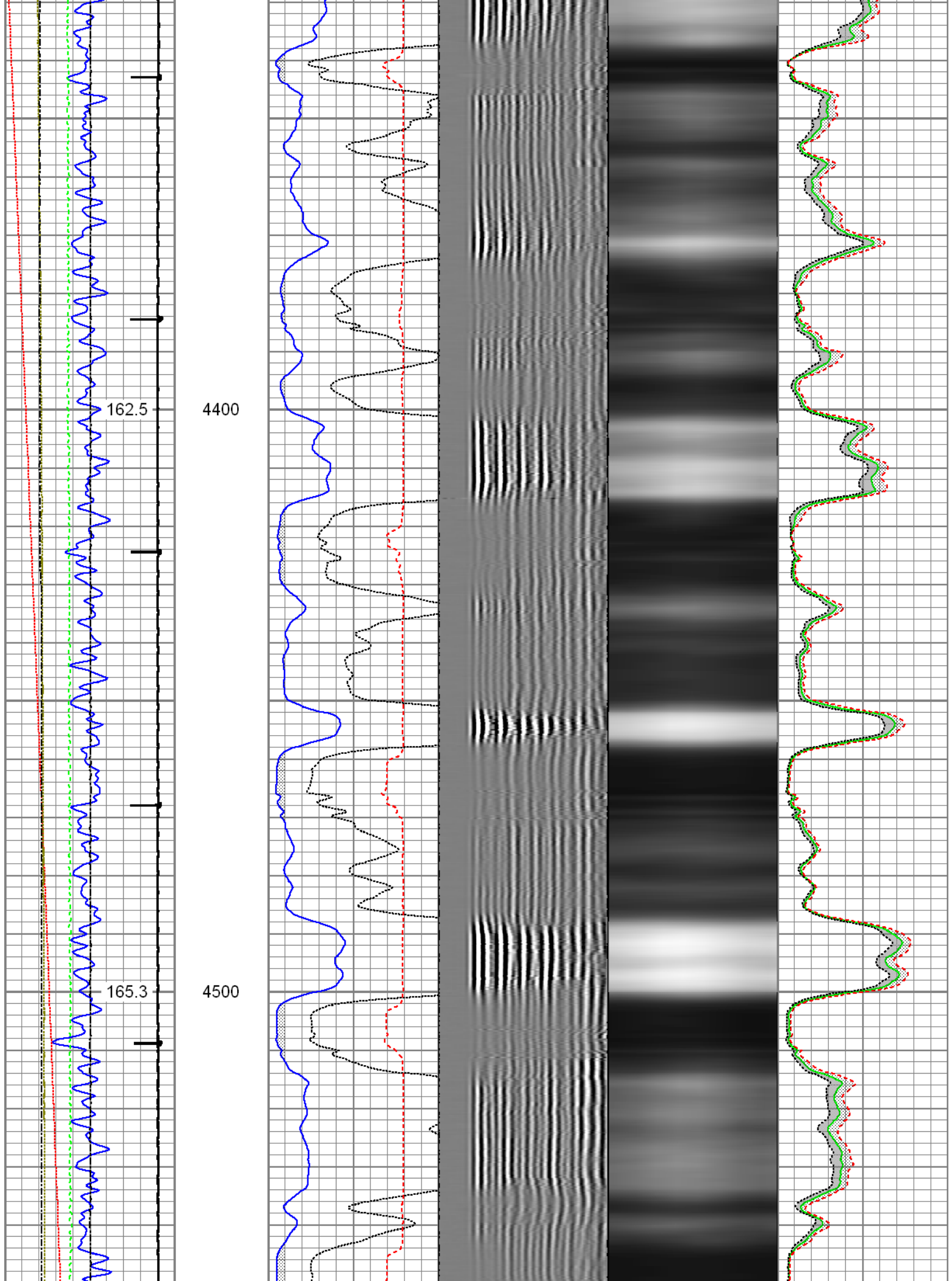




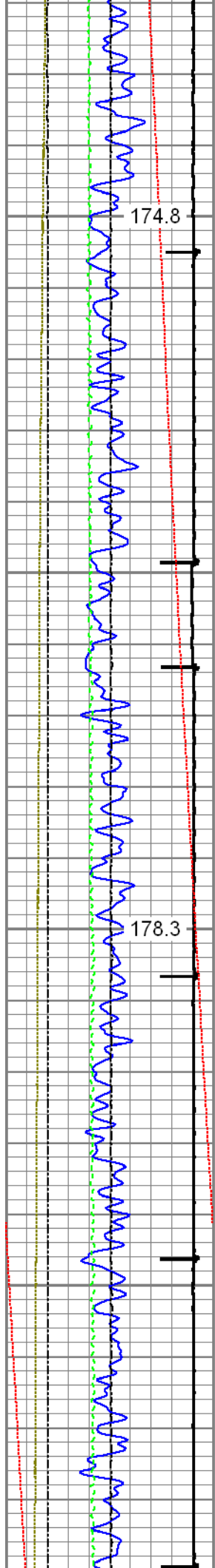
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4300



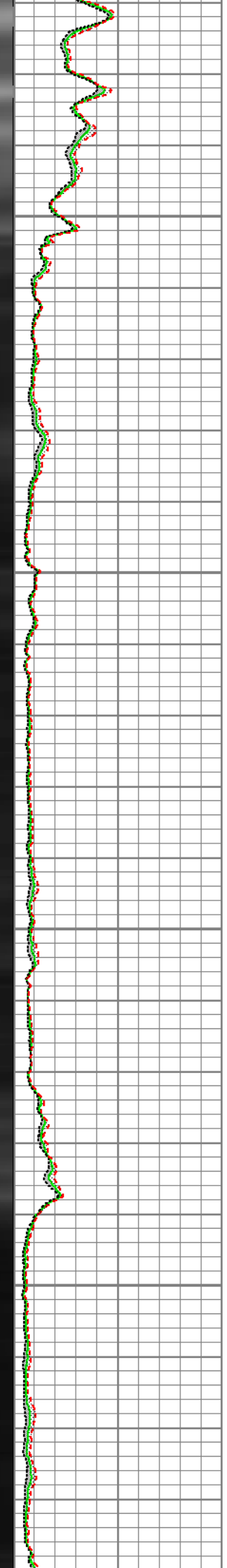
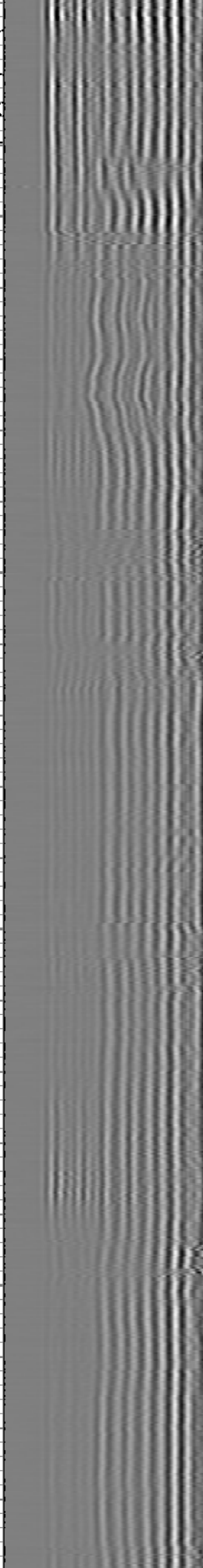
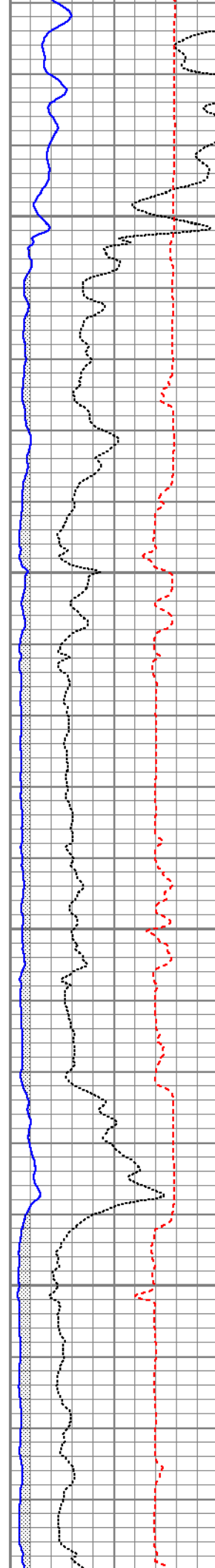




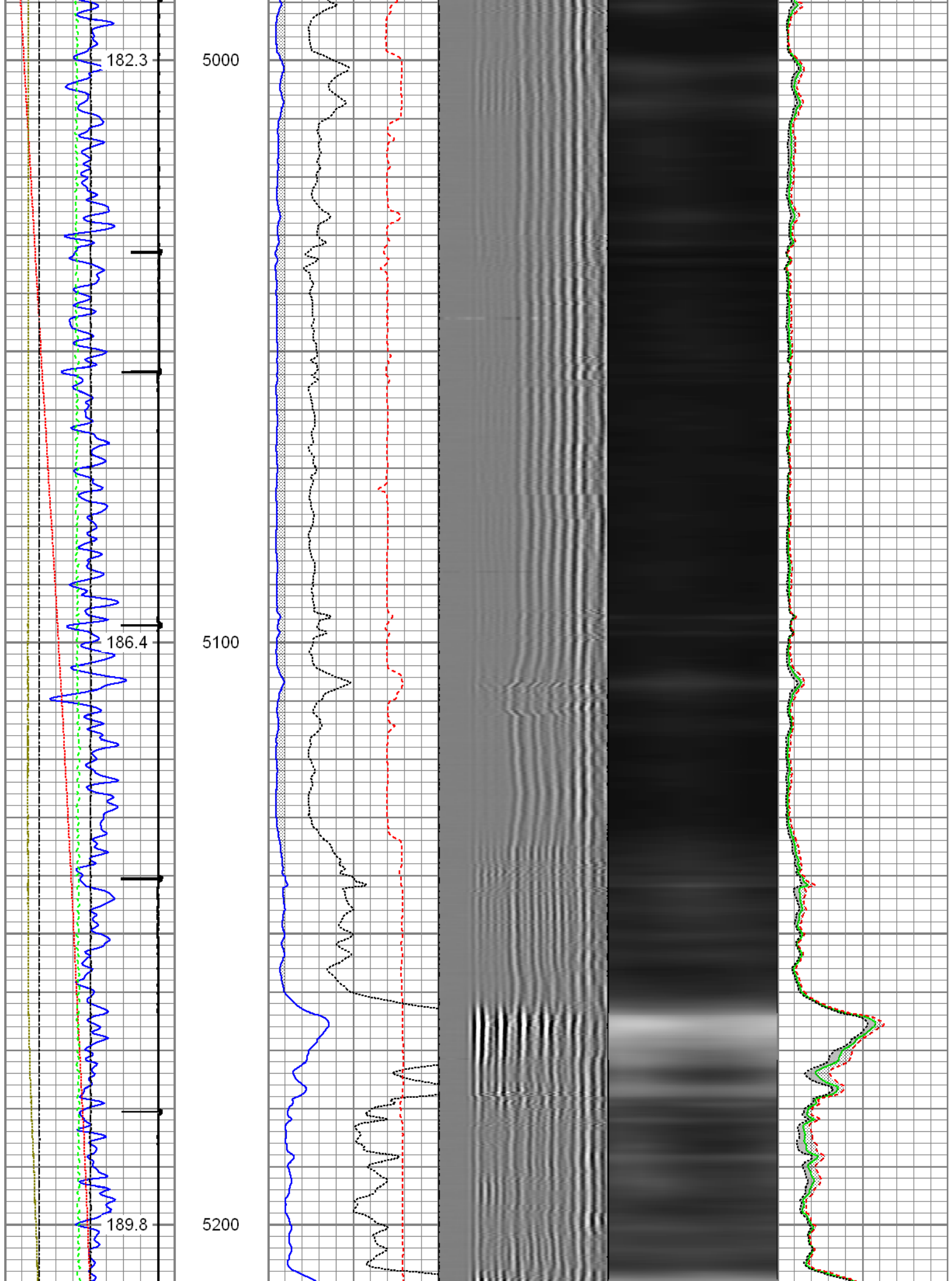


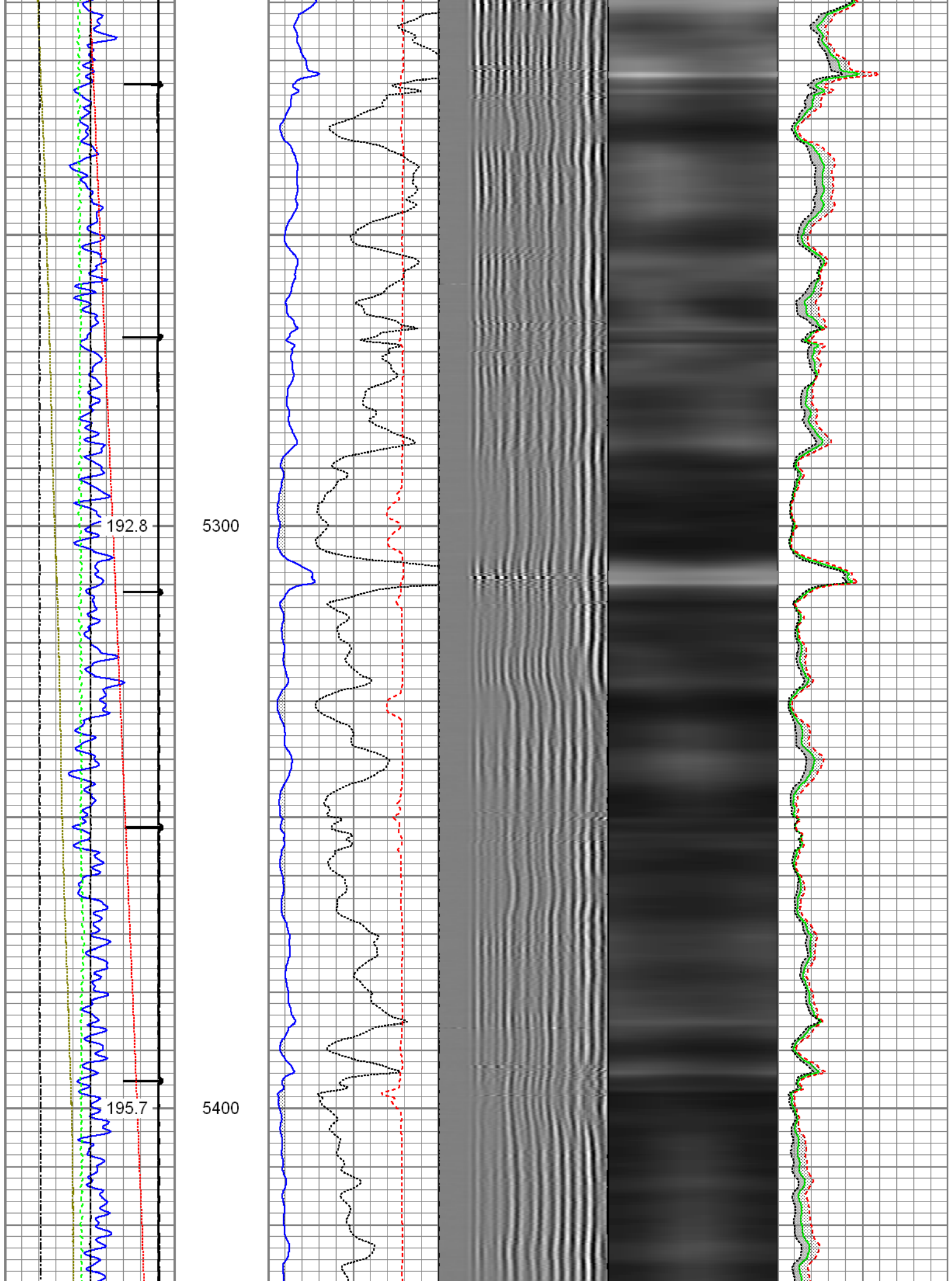
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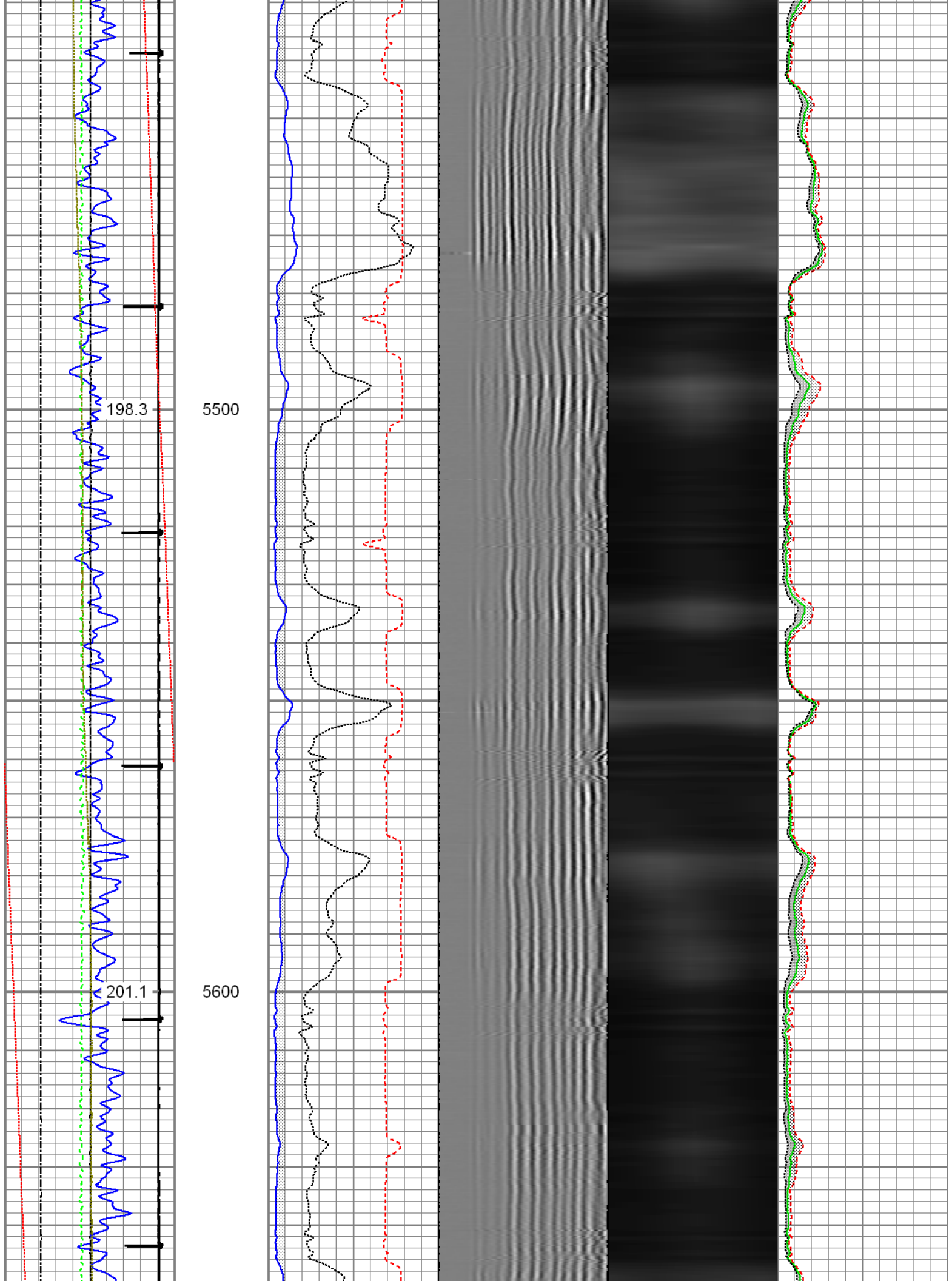
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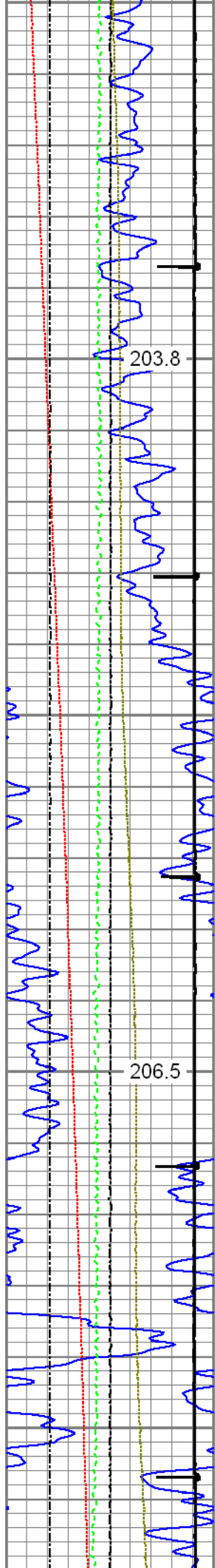






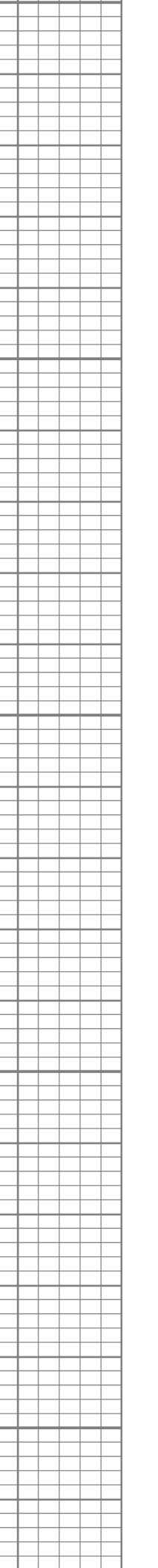
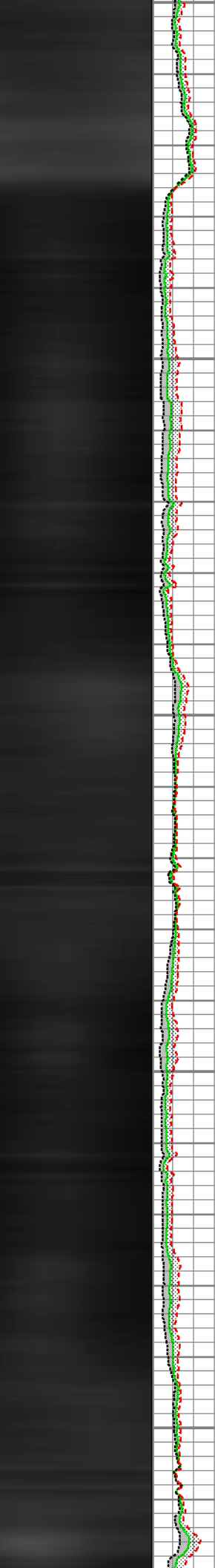
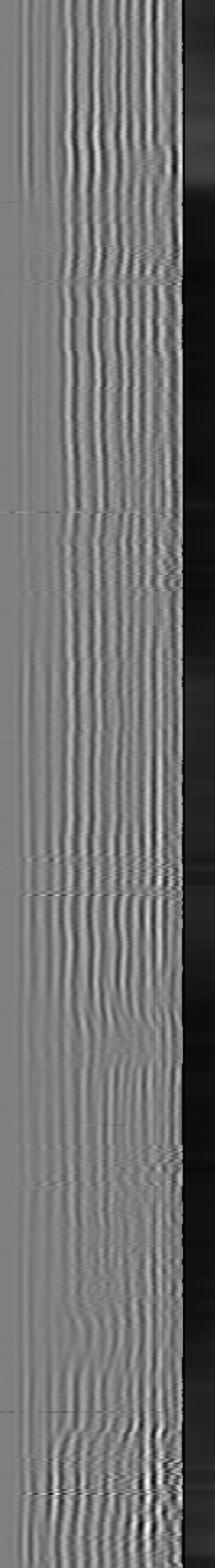
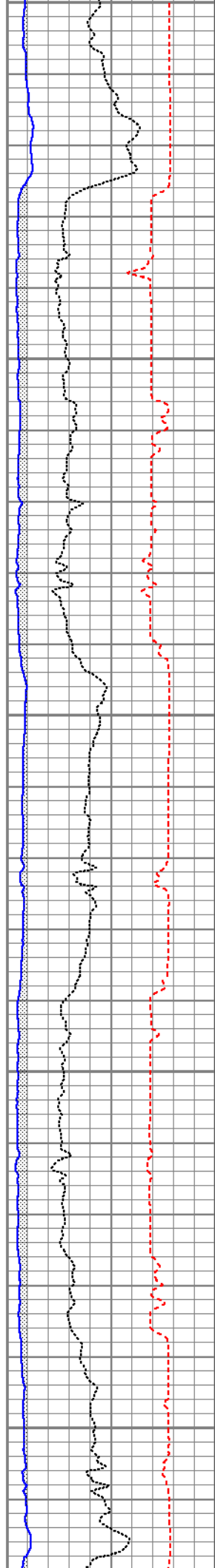




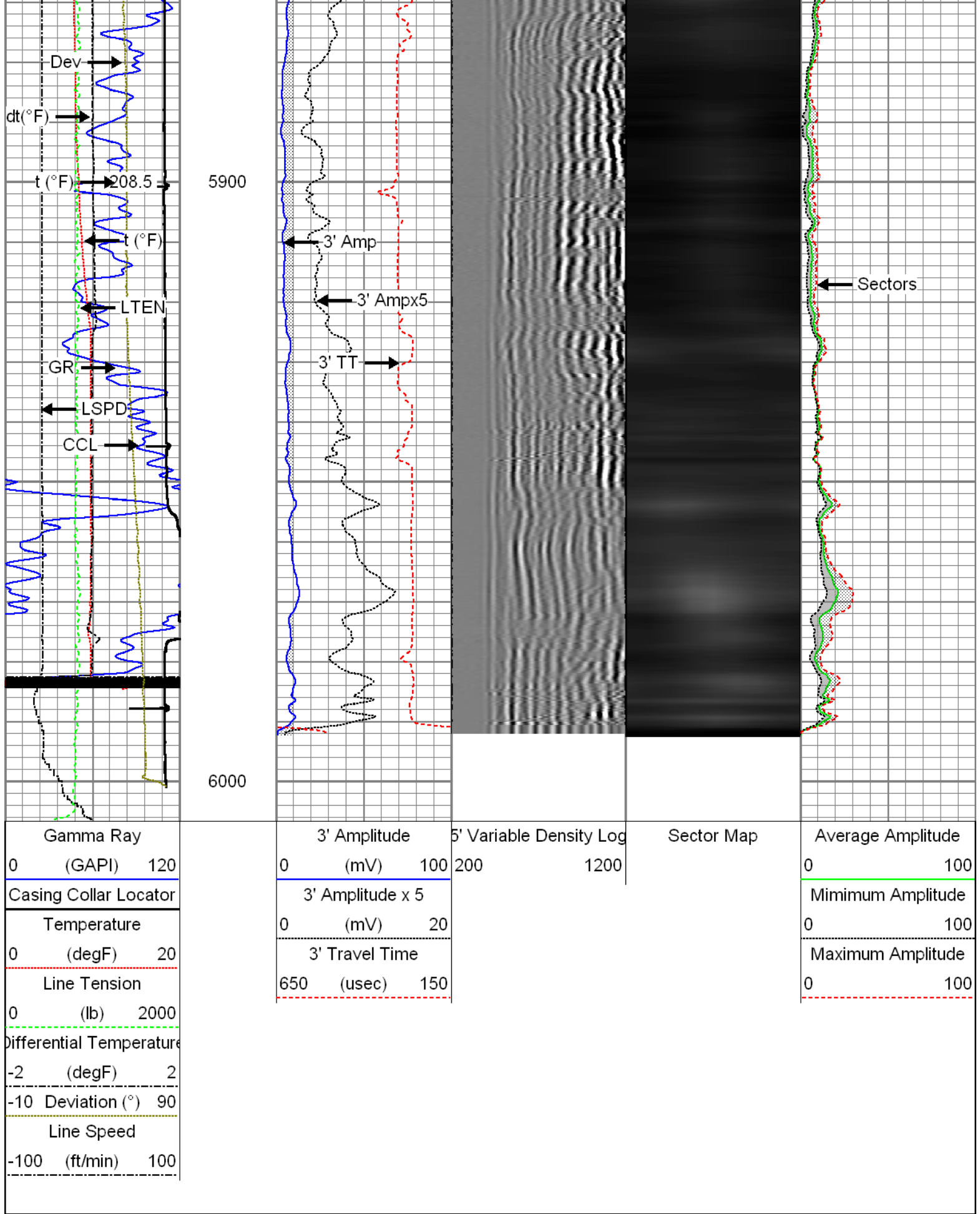


5700

5800

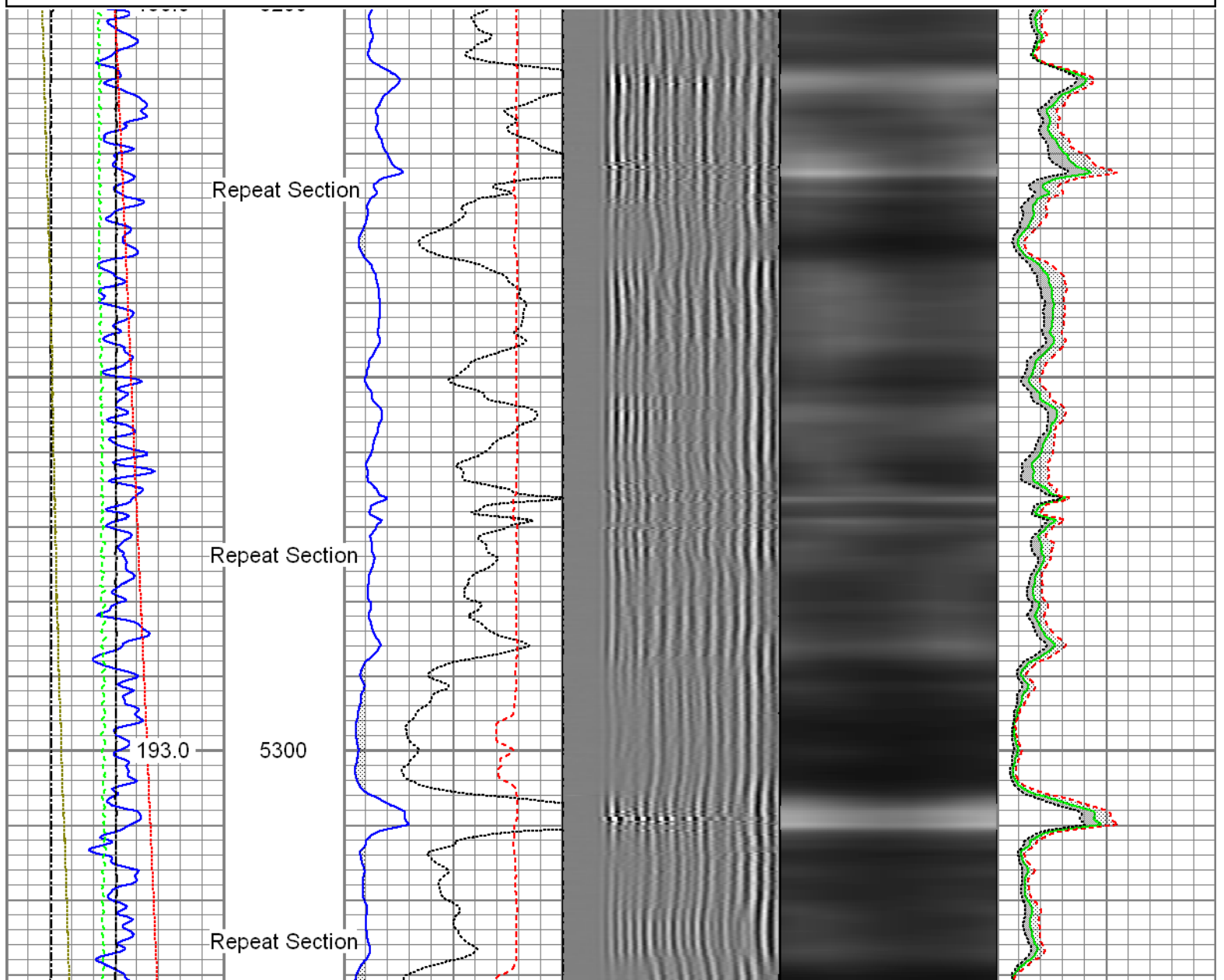


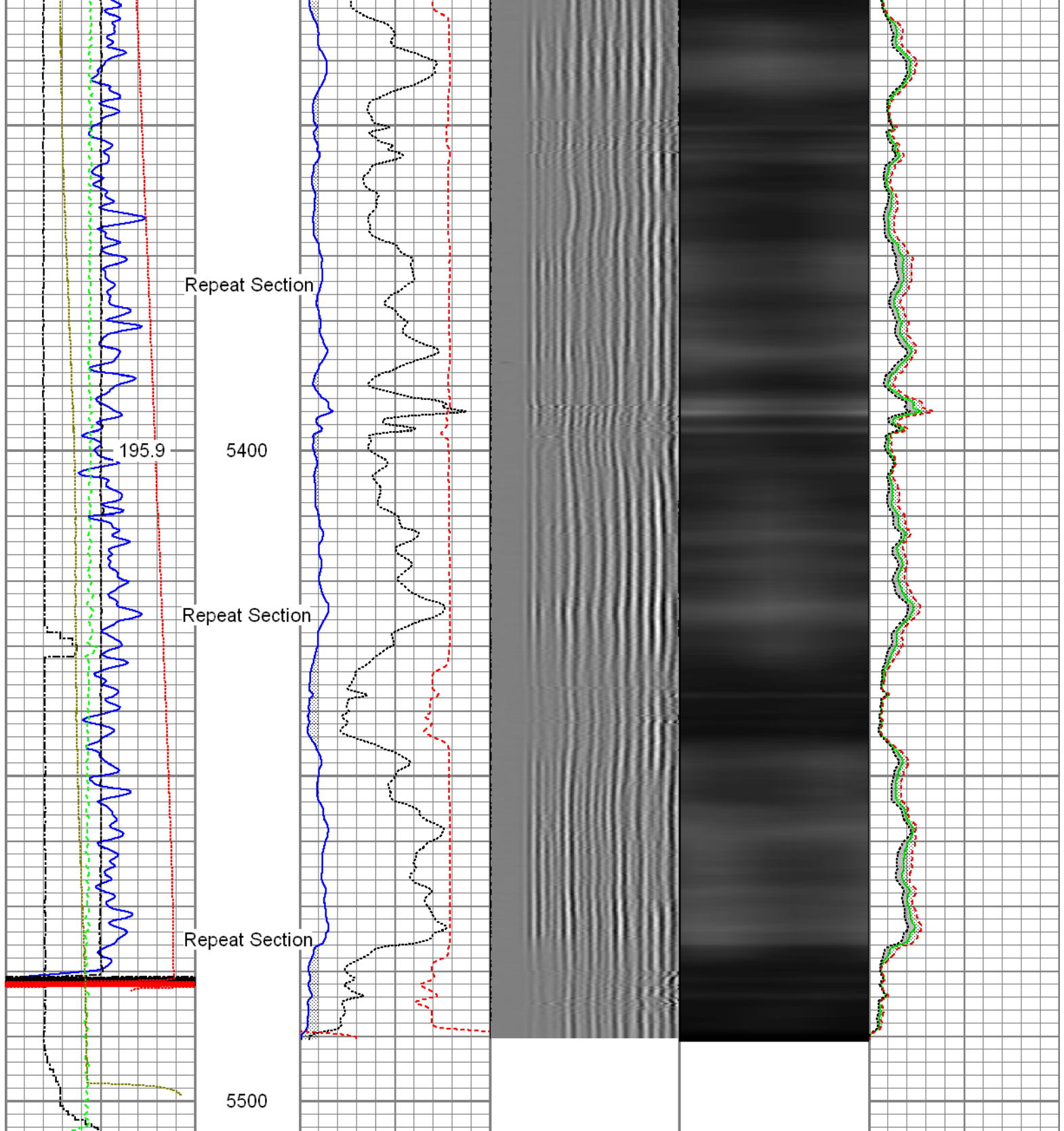




Database File: 09-04-15\_noble energy\_gracie Id22-740\_mit\_rbl.db  
Dataset Pathname: pass7  
Presentation Format: rbt4\_mit  
Dataset Creation: Fri Sep 04 08:35:47 2015 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

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				
Temperature 0 (degF) 20				
-10 Deviation (°) 90				





Gamma Ray (GAPI)	3' Amplitude (mV)	5' Variable Density Log	Sector Map	Average Amplitude
0 120	0 100	200 1200		0 100
Line Speed (ft/min)	3' Amplitude x 5 (mV)			Minimum Amplitude
-100 100	0 20			0 100
Line Tension (lb)	3' Travel Time (usec)			Maximum Amplitude
0 2000	650 150			0 100
Differential Temperature (degF)				
-2 2				
Temperature (degF)				
2 22				

(degF)	20
-10 Deviation (°)	90

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 (10010522) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50			
			UW_PGR-UW_PGR_020 (10019371) Production Gamma Ray	1.93	1.69	9.50			
TEMP	22.45		UW_PRT-UW_PRT_016 (10025097) Platinum Resistance Thermometer	1.04	1.69	5.20			
			UW_PRC #3 -DSSRAC (082) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00			
WVF3FT	15.42		UW_RBT-UW_RBT_004 (10013454) 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								
WVF5FT	14.42	UW_MIT-UW_MIT40_027 (218949) 40 Multifinger Imaging Tool	4.54	2.75	61.10				
MIT	5.41					UW_PRC #4 -UW_PRC_057 (1037) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00



TSTAMP	0.00				Sondex Ultrawire Bullnose Terminator			
Dataset: 09-04-15_Noble Energy_Gracie LD22-740_MIT_RBL.db: field/well/run1/pass9 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in								

Calibration Report	
Database File:	09-04-15_noble energy_gracie ld22-740_mit_rbl.db
Dataset Pathname:	pass9
Dataset Creation:	Fri Sep 04 08:47:58 2015 by Log 7.0 B1

Multi-finger Imaging Tool Calibration Report
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Serial Number:	218949
Number of Fingers:	40
Tool Model:	UW_MIT40_027

Inclinometer Calibration Report		
Performed:	Mon, Oct, 06 14:03:04 2008	
Calibration Angle:	45	
	Inc X	Inc Y
Vertical:	1996	1984
Finger 1 up:	1780	1738
Finger 31 up:	2235	1756
Finger 21 up:	2216	2228
Finger 11 up:	1736	2196
Sensitivity ratio:	1.0062	
X-axis angle:	131.534	
Deviation const.:	331.322	

Finger Calibration Report							
Performed:				Fri Sep 04 08:02:02 2015			
Ring size:	4	5	6	7			
(in)							
	Sens	Sens	Sens				
Finger 01:	1374 278.0	1652 298.0	1950 311.0	2261			
Finger 02:	1441 274.0	1715 292.0	2007 304.0	2311			
Finger 03:	1653 275.0	1928 284.0	2212 290.0	2502			
Finger 04:	1667 274.0	1941 280.0	2221 287.0	2508			
Finger 05:	1531 262.0	1793 271.0	2064 281.0	2345			
Finger 06:	1531 254.0	1785 264.0	2049 273.0	2322			
Finger 07:	1347 269.0	1616 286.0	1902 302.0	2204			
Finger 08:	1540 253.0	1793 263.0	2056 275.0	2331			
Finger 09:	1418 268.0	1686 281.0	1967 295.0	2262			
Finger 10:	1488 262.0	1750 275.0	2025 283.0	2308			
Finger 11:	1478 260.0	1738 269.0	2007 279.0	2286			
Finger 12:	1319 276.0	1595 293.0	1888 308.0	2196			
Finger 13:	1578 277.0	1855 287.0	2142 291.0	2433			
Finger 14:	1419 282.0	1701 292.0	1993 306.0	2299			
Finger 15:	1536 261.0	1797 273.0	2070 282.0	2352			
Finger 16:	1401 279.0	1680 293.0	1973 305.0	2278			
Finger 17:	1638 270.0	1908 277.0	2185 284.0	2469			
Finger 18:	1376 286.0	1662 305.0	1967 319.0	2286			
Finger 19:	1637 257.0	1894 260.0	2154 261.0	2415			
Finger 20:	1504 264.0	1768 275.0	2043 287.0	2330			
Finger 21:	1590 249.0	1839 259.0	2098 265.0	2363			
Finger 22:	1524 273.0	1797 287.0	2084 294.0	2378			
Finger 23:	1344 272.0	1616 290.0	1906 301.0	2207			
Finger 24:	1675 261.0	1936 272.0	2208 278.0	2486			
Finger 25:	1356 288.0	1644 309.0	1953 323.0	2276			
Finger 26:	1529 285.0	1814 298.0	2112 320.0	2432			
Finger 27:	1463 260.0	1723 272.0	1995 285.0	2280			
Finger 28:	1628 274.0	1902 286.0	2188 292.0	2480			

Finger 29:	1465	270.0	1735	290.0	2025	301.0	2326
Finger 30:	1414	272.0	1686	294.0	1980	308.0	2288
Finger 31:	1521	265.0	1786	280.0	2066	290.0	2356
Finger 32:	1338	264.0	1602	285.0	1887	298.0	2185
Finger 33:	1602	299.0	1901	315.0	2216	321.0	2537
Finger 34:	1534	268.0	1802	282.0	2084	288.0	2372
Finger 35:	1433	264.0	1697	282.0	1979	297.0	2276
Finger 36:	1582	280.0	1862	292.0	2154	298.0	2452
Finger 37:	1594	274.0	1868	287.0	2155	297.0	2452
Finger 38:	1488	273.0	1761	284.0	2045	300.0	2345
Finger 39:	1458	279.0	1737	295.0	2032	310.0	2342
Finger 40:	1576	285.0	1861	296.0	2157	306.0	2463

Segmented Cement Bond Log Calibration Report

Serial Number:
Tool Model:

10013454
UW\_RBT\_004

Calibration Casing Diameter:
Calibration Depth:

7.000
75.767

in
ft

Master Calibration, performed Fri Sep 04 08:11:49 2015:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	-0.002	0.698	0.800	62.165	87.602	1.007
5FT	-0.004	0.762	0.800	62.165	80.186	1.094
S1	-0.002	0.689	0.000	100.000	144.567	0.353
S2	-0.004	0.691	0.000	100.000	143.982	0.554
S3	-0.004	0.683	0.000	100.000	145.651	0.533
S4	-0.004	0.693	0.000	100.000	143.415	0.618
S5	-0.003	0.698	0.000	100.000	142.823	0.378
S6	-0.004	0.703	0.000	100.000	141.500	0.523
S7	-0.003	0.699	0.000	100.000	142.470	0.363
S8	-0.003	0.702	0.000	100.000	141.819	0.462

Temperature Calibration Report

Serial Number:
Tool Model:
Performed:

10025097
UW\_PRT\_016
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:
Tool Model:
Performed:

10019371
UW\_PGR\_020
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	Gracie LD22-740
	Field	Wildcat
	County	Weld
	State	Colorado