

Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Company	Noble Energy Inc.
Well	Wells Ranch AA11-667	Well	Wells Ranch AA11-667
Field	Wattenberg	Field	Wattenberg
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-41254		
Permanent Datum	SEC 11 TWP 6N RGE 63W	Ground Level	Elevation 4869'
Log Measured From	Kelly Bushing	Drilling Measured From	Kelly Bushing
			Elevation K.B. 4893' D.F. 4892' G.L. 4869'
			MIT
			Other Services

Date	26-JUN-2015
Run Number	One
Depth Driller	13782 FT
Depth Logger	7034 FT
Bottom Logged Interval	7029 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	223°F
Estimated Cement Top	314 FT
Time Well Ready	ROA
Time Logger on Bottom	09:21
Equipment Number	HD-0324
Location	Ft. Lupton, CO
Recorded By	Rob Cameron
Witnessed By	Bill Mansfield
	Sam Hopper

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	644 FT		
Intermediate #1	7	26	P-110IC	24 FT	7058 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110IC	6987.1 FT	13772 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 casing tally reported liner top at 6987.1 FT
 Adjusted log -31 FT to correlate with liner top
 Log ran from just below liner top to surface
 Logging tools had heavy grease coating on tools upon completion of operations
 Thank you for choosing FMC Technologies Completion Services, Inc.!!

Database File:06-26-15_noble energy_wells ranch aa11-667_mit_rbl.db

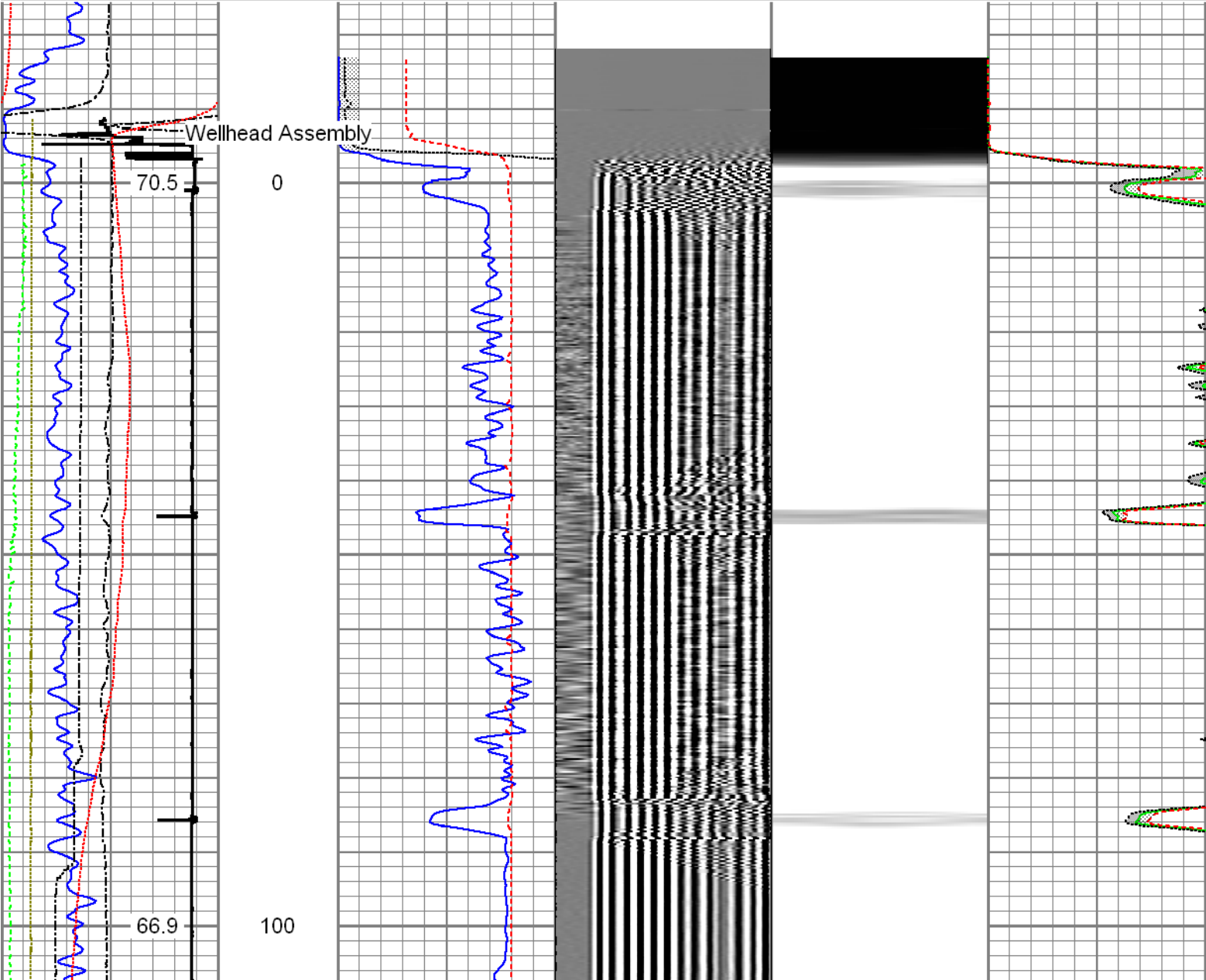
Dataset Pathname:merge1

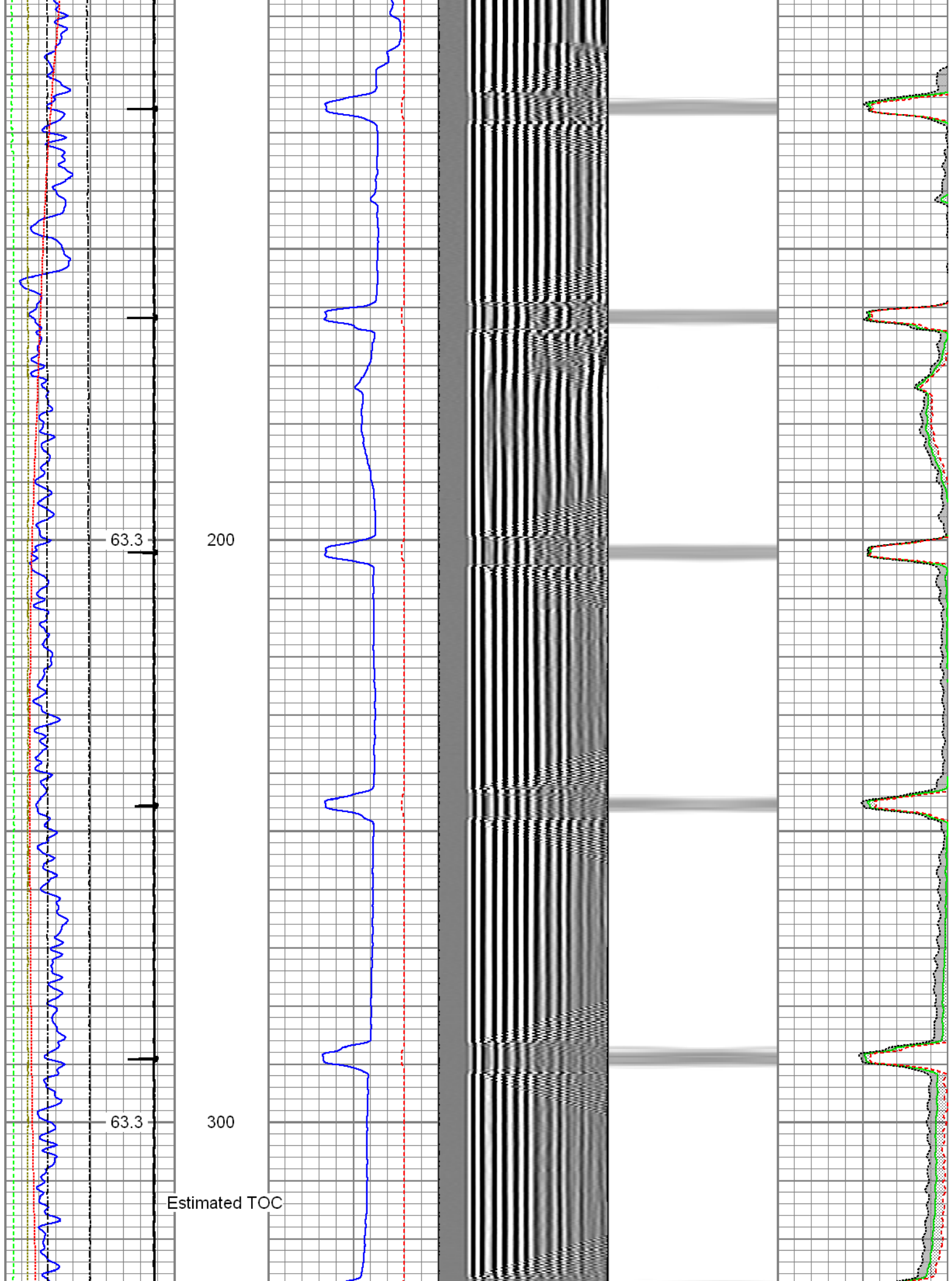
Presentation Format:rbt4_mit

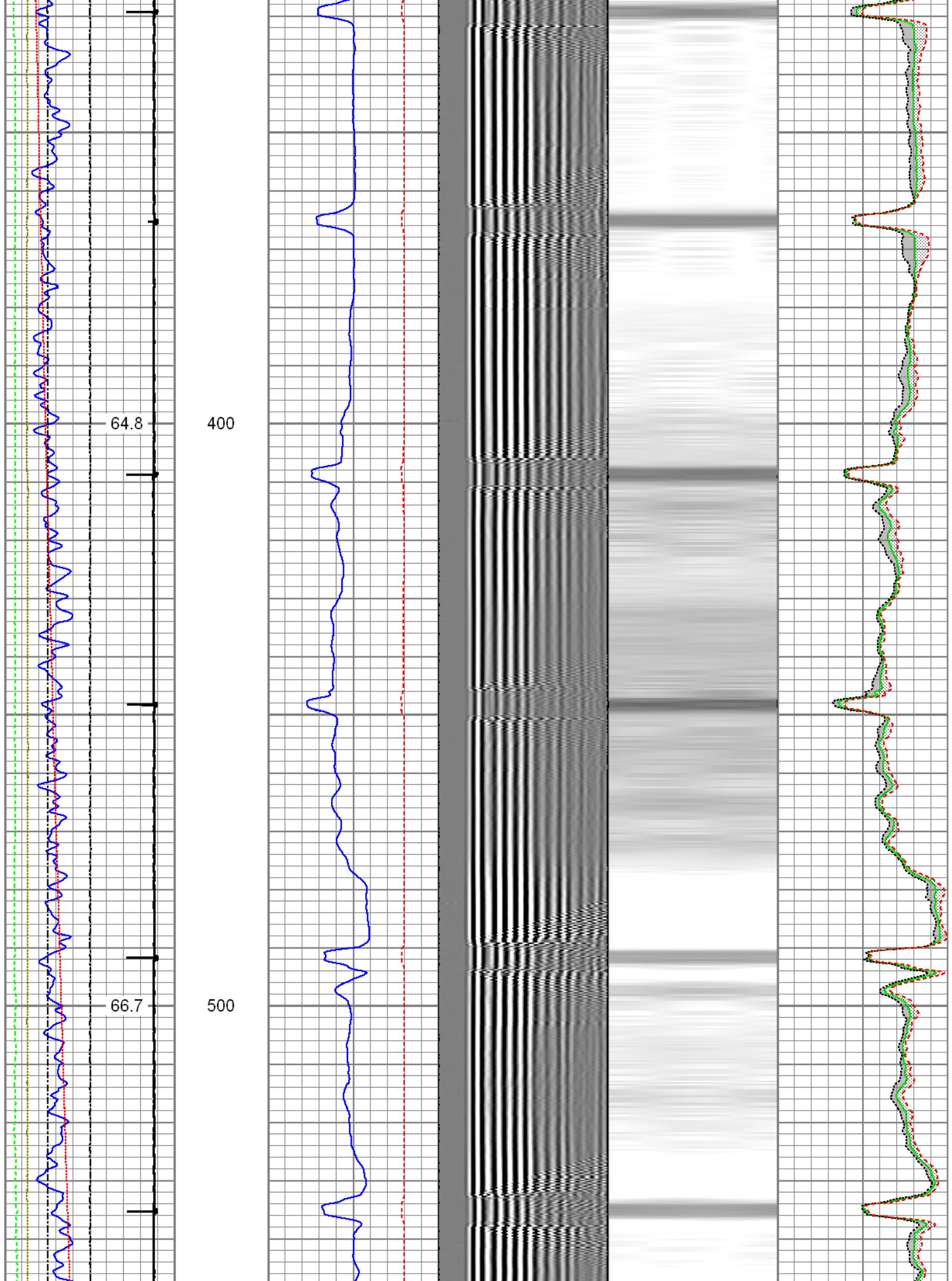
Dataset Creation:Fri Jun 26 18:38:09 2015

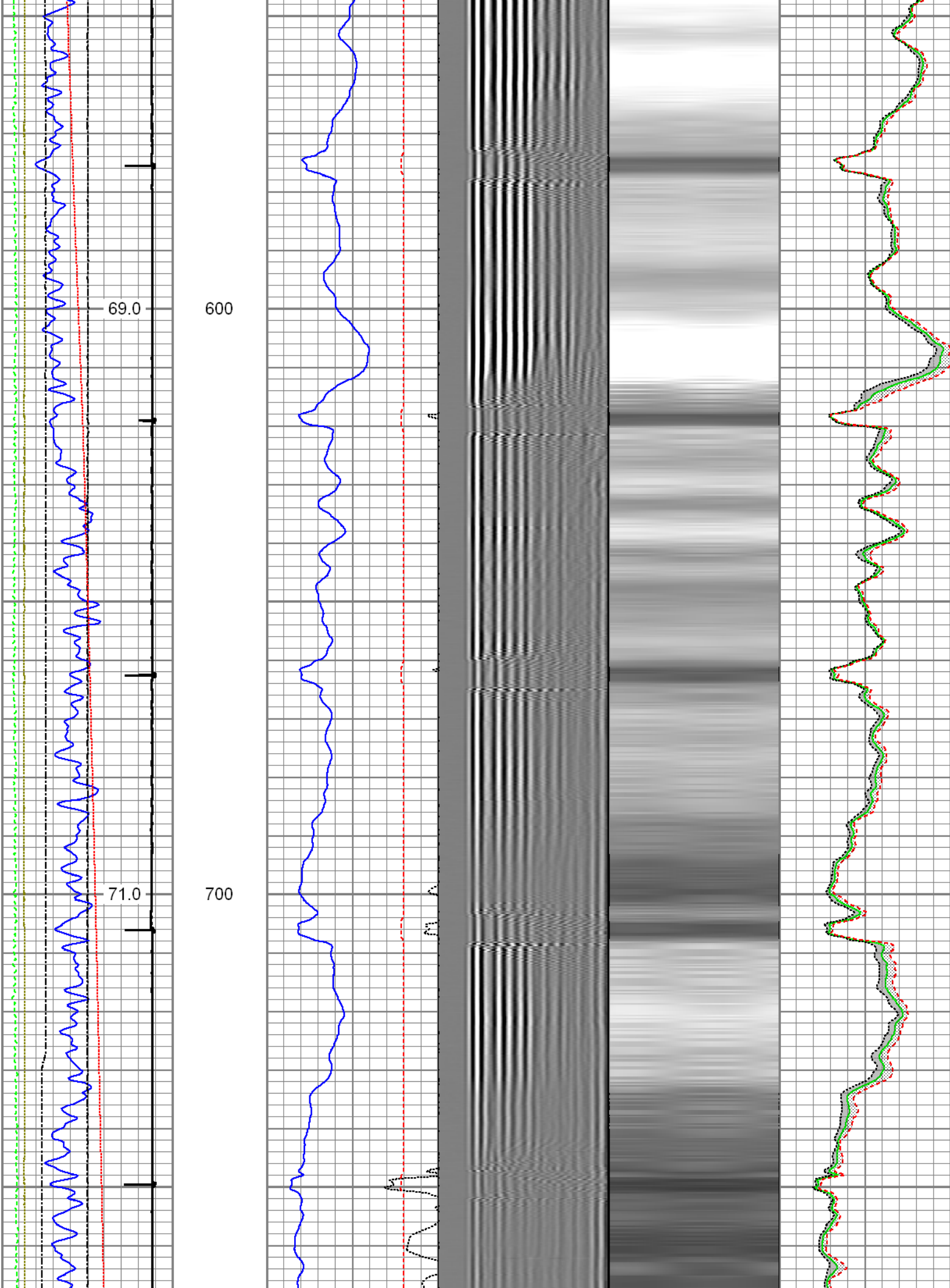
Charted by:Depth in Feet scaled 1:240

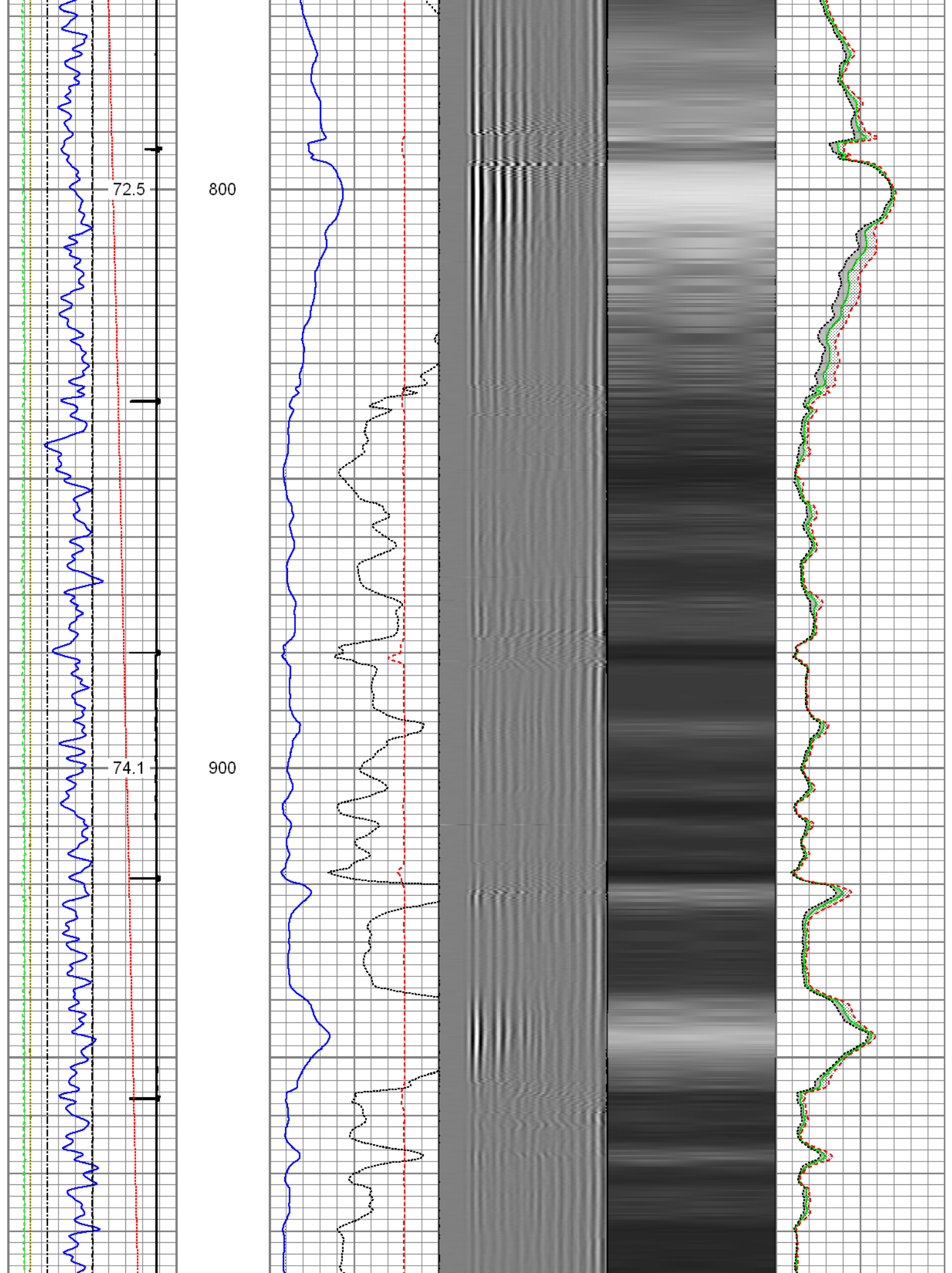
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

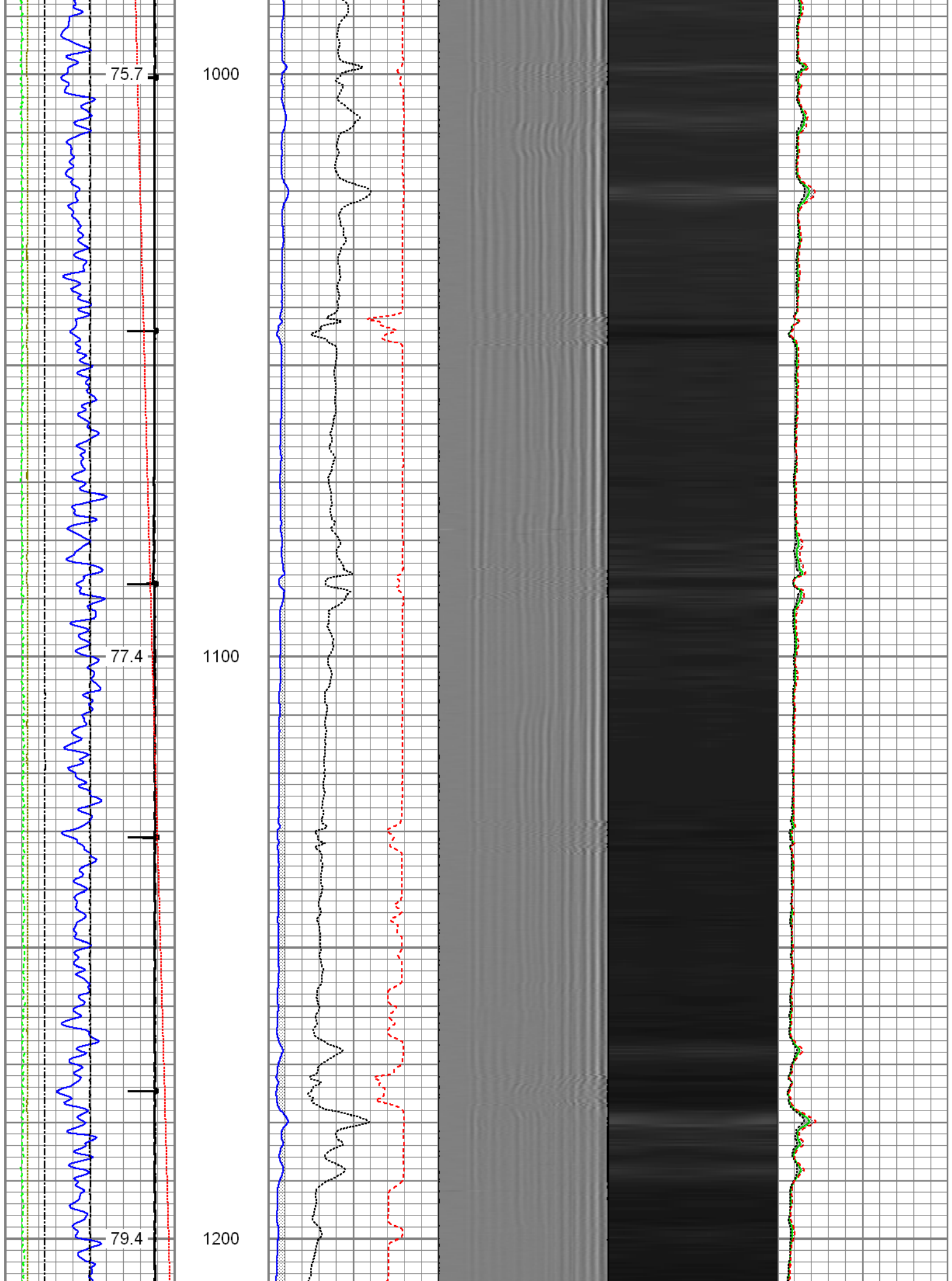


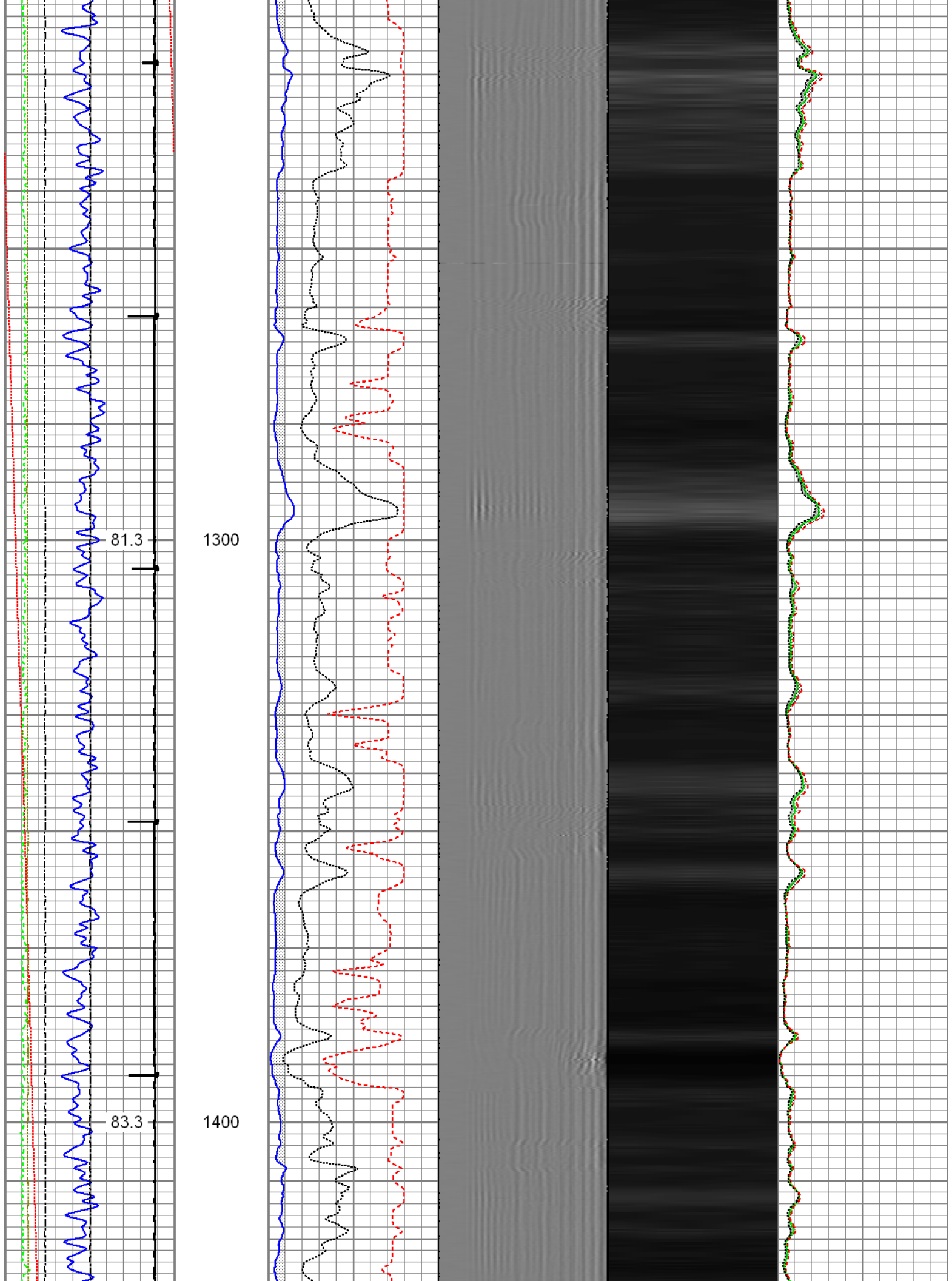


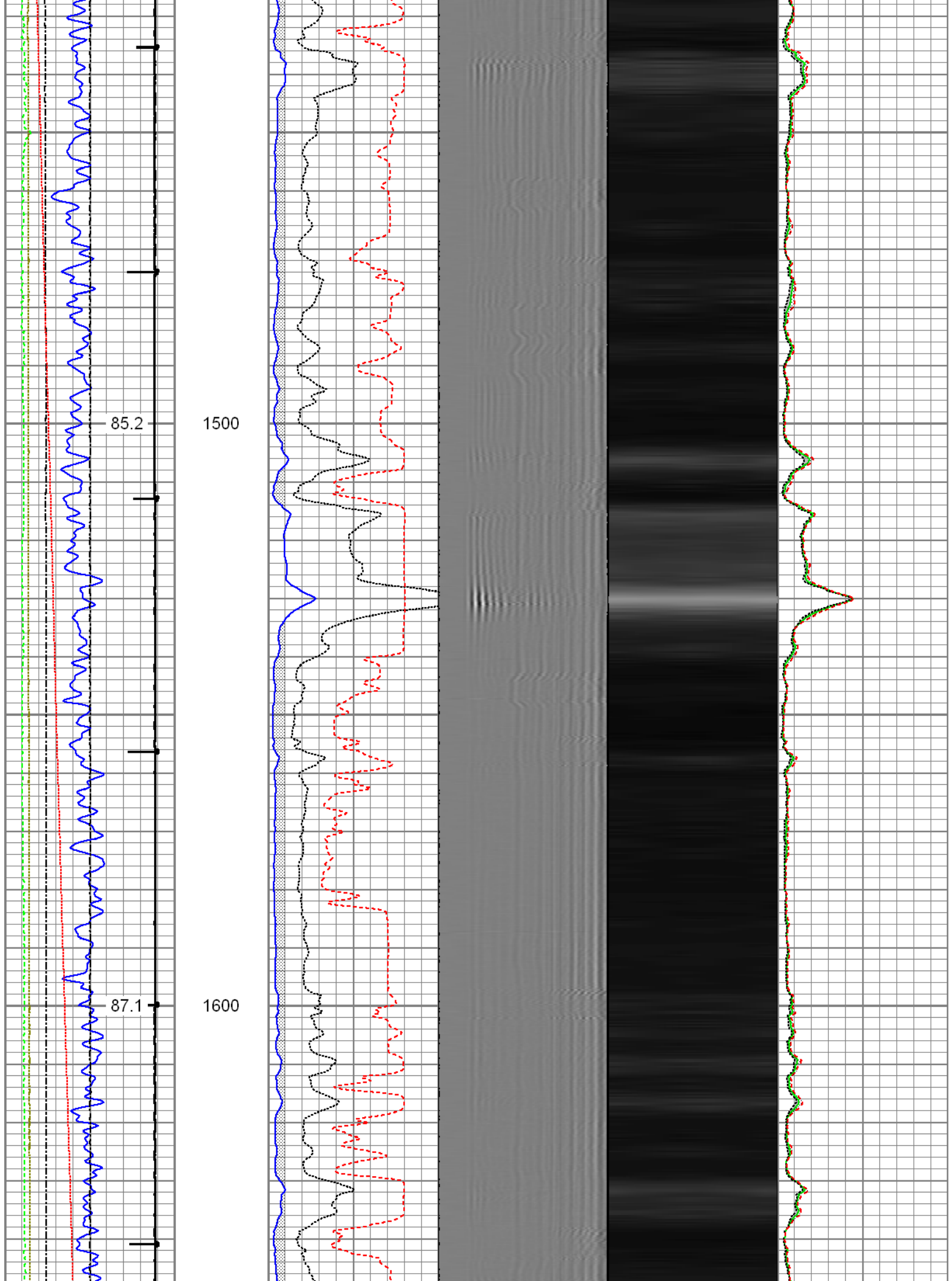


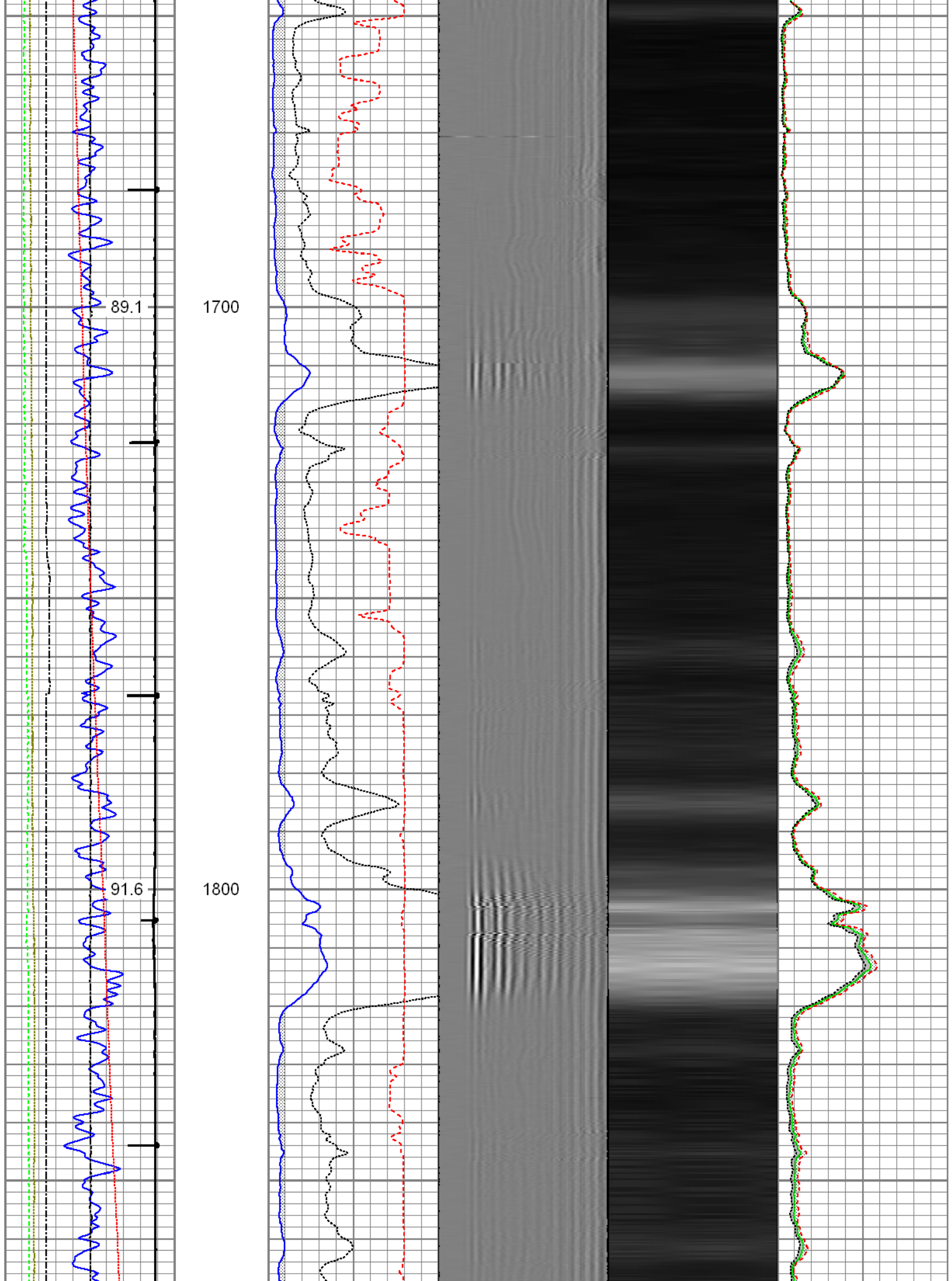


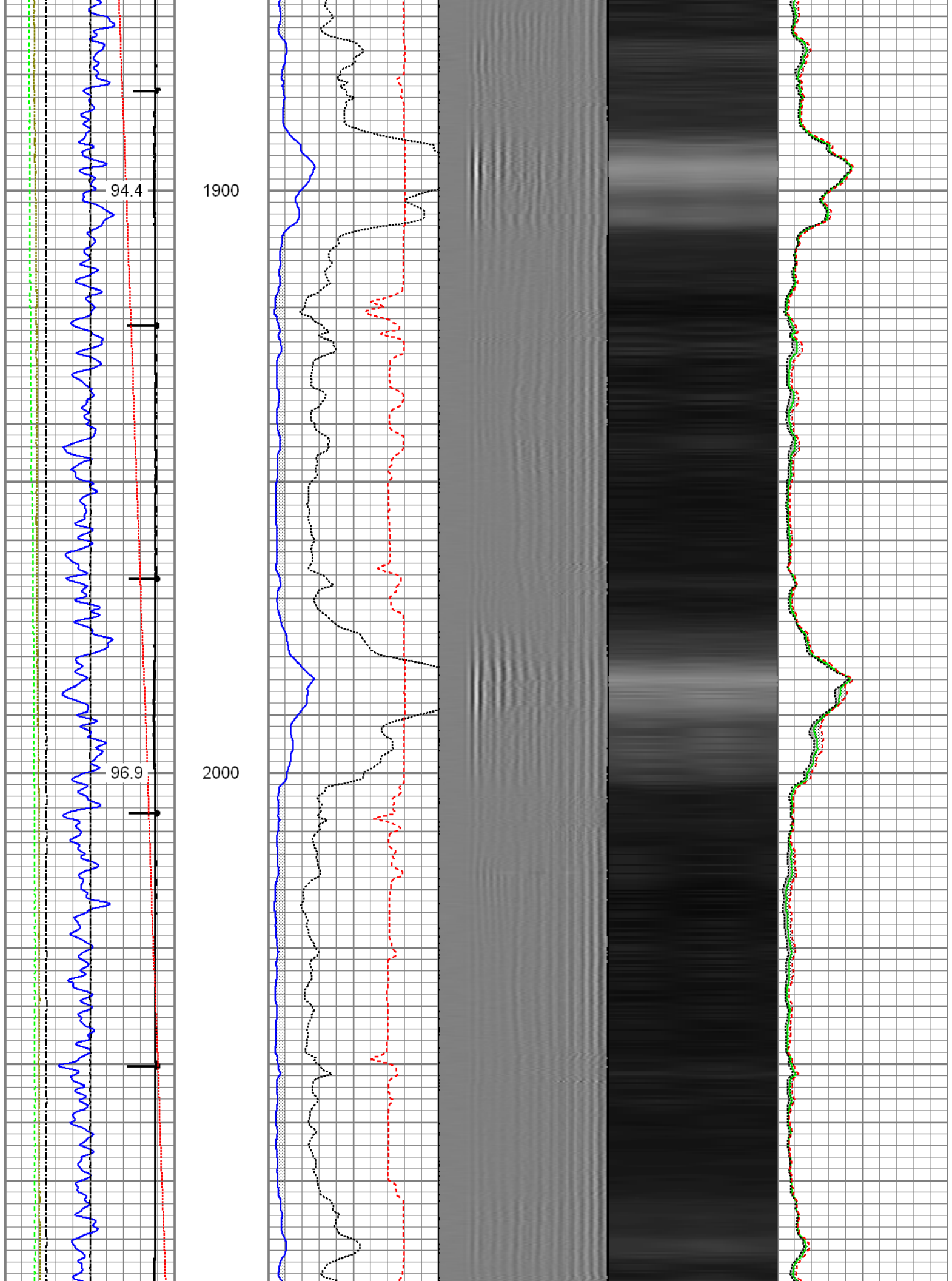


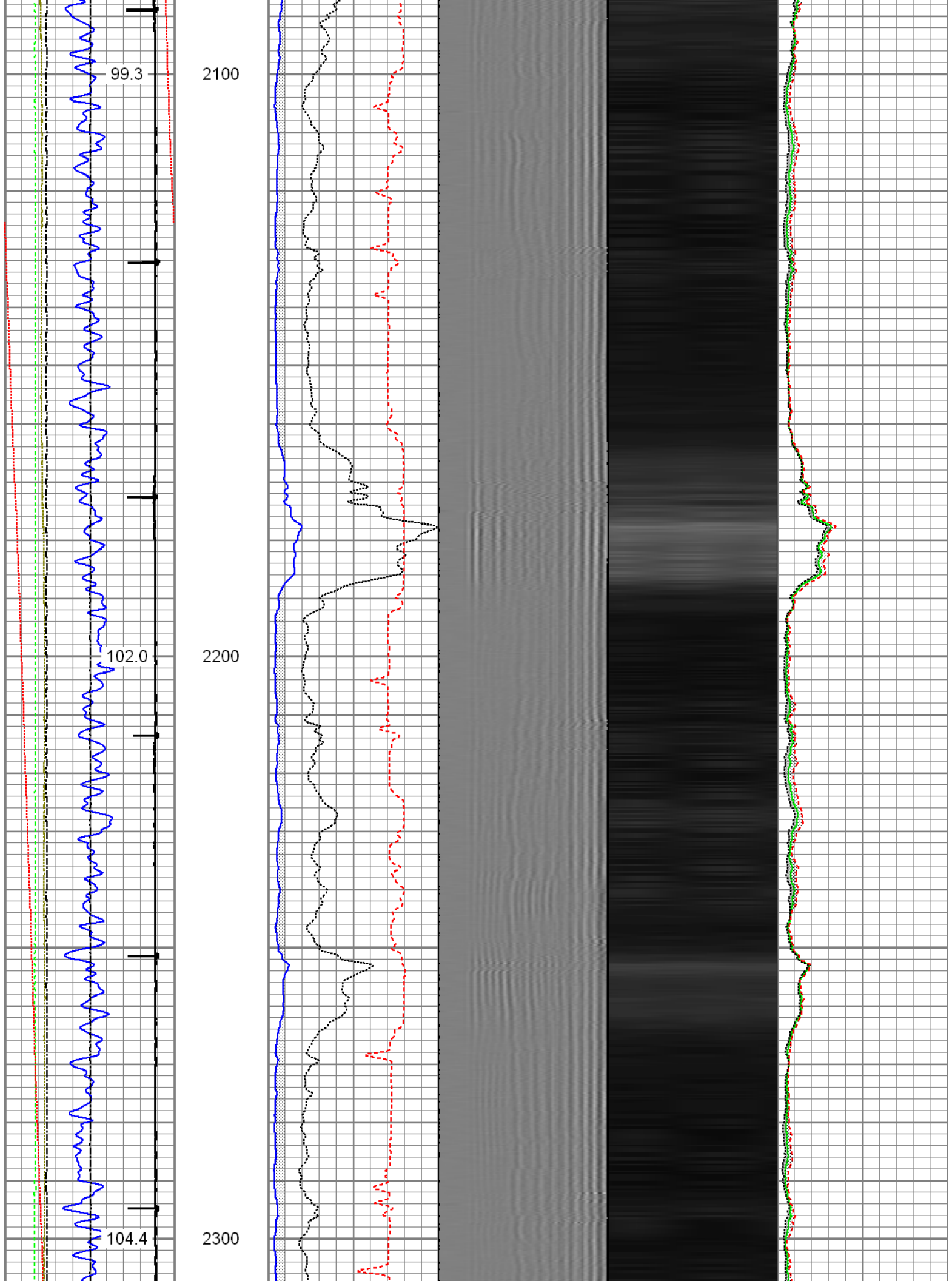


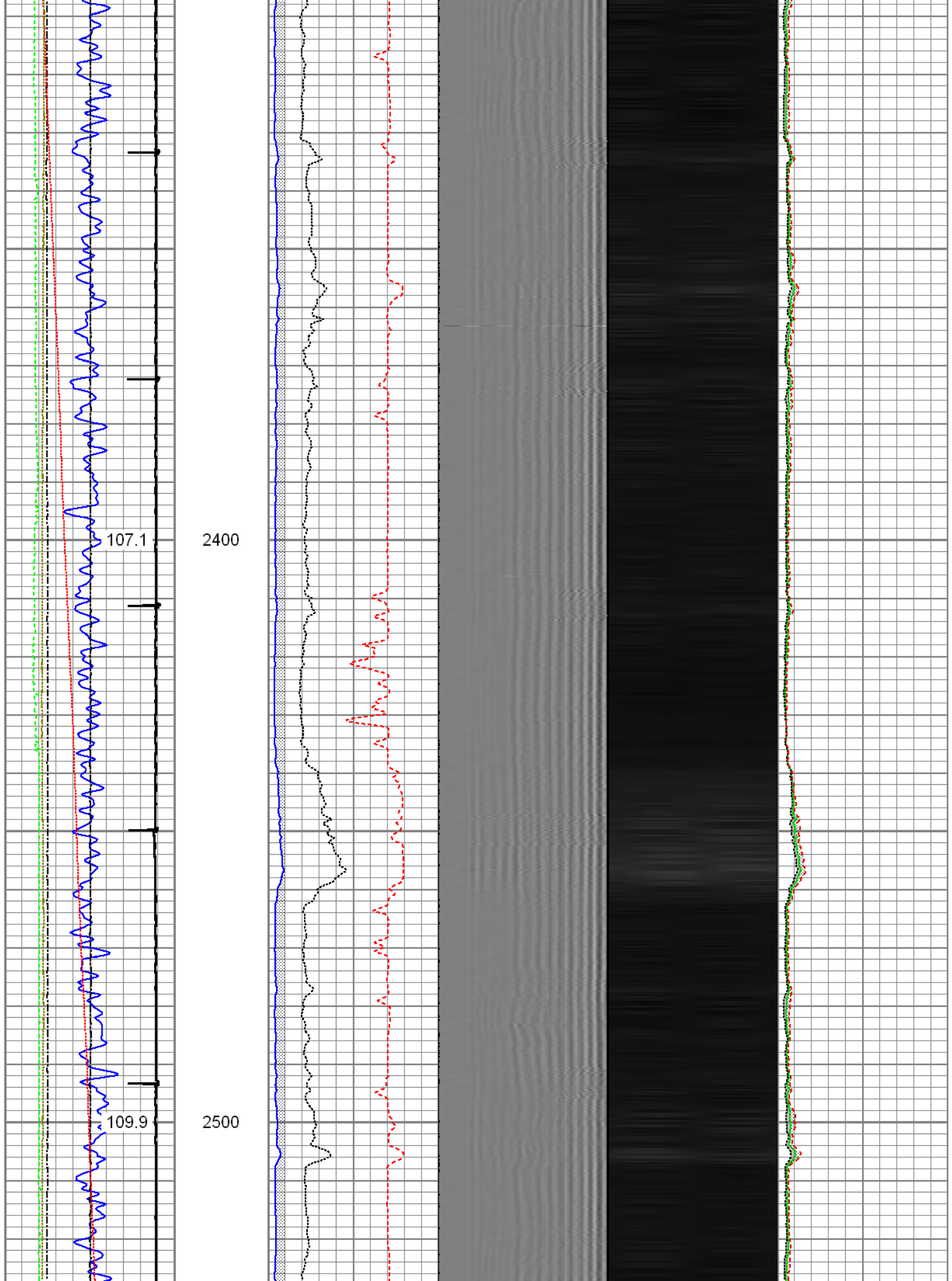


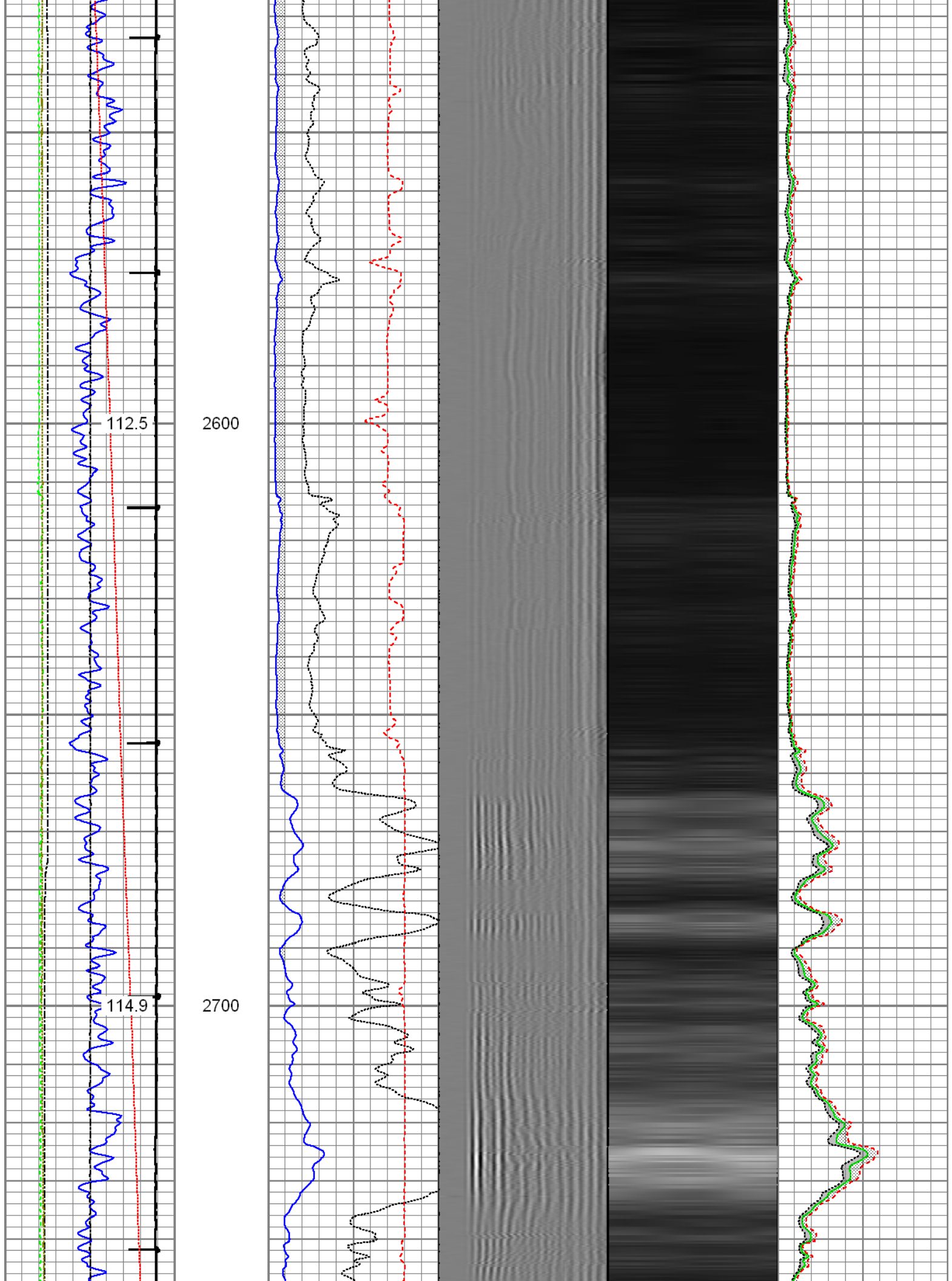


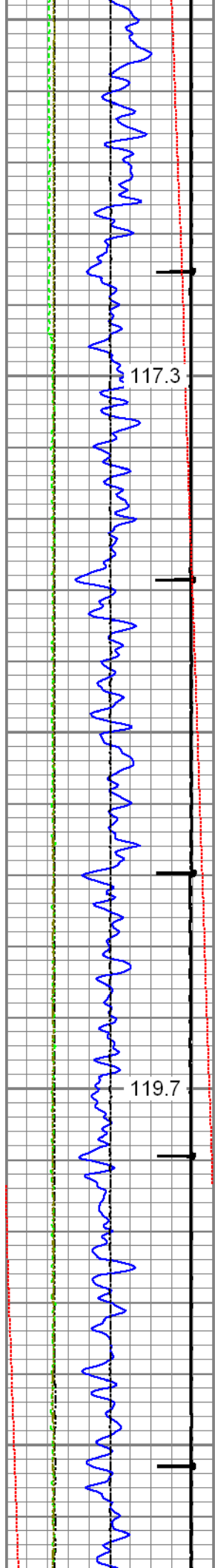










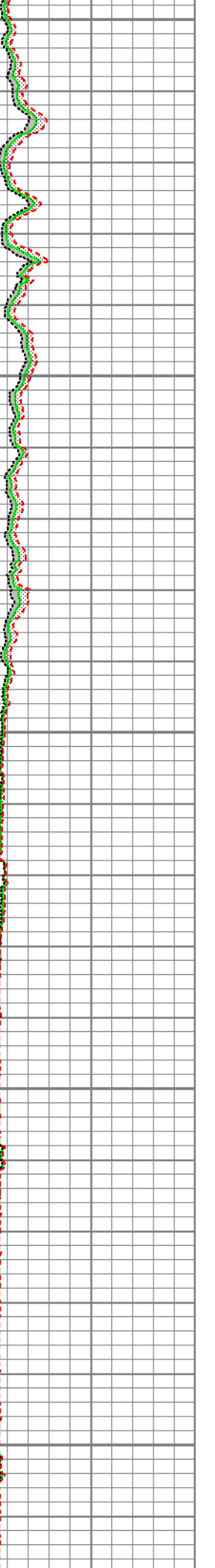
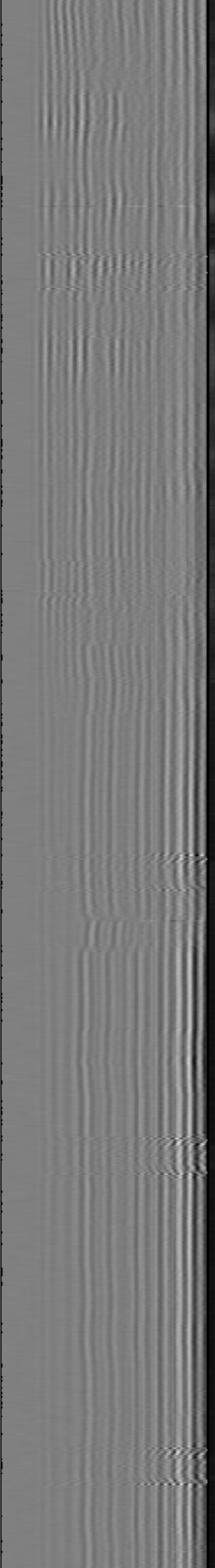
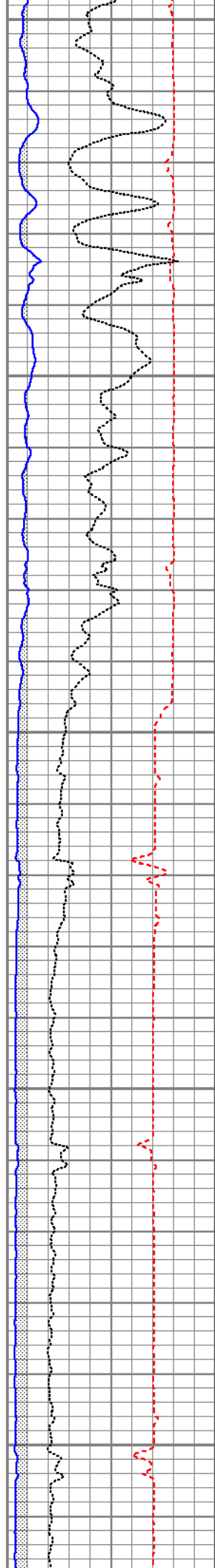


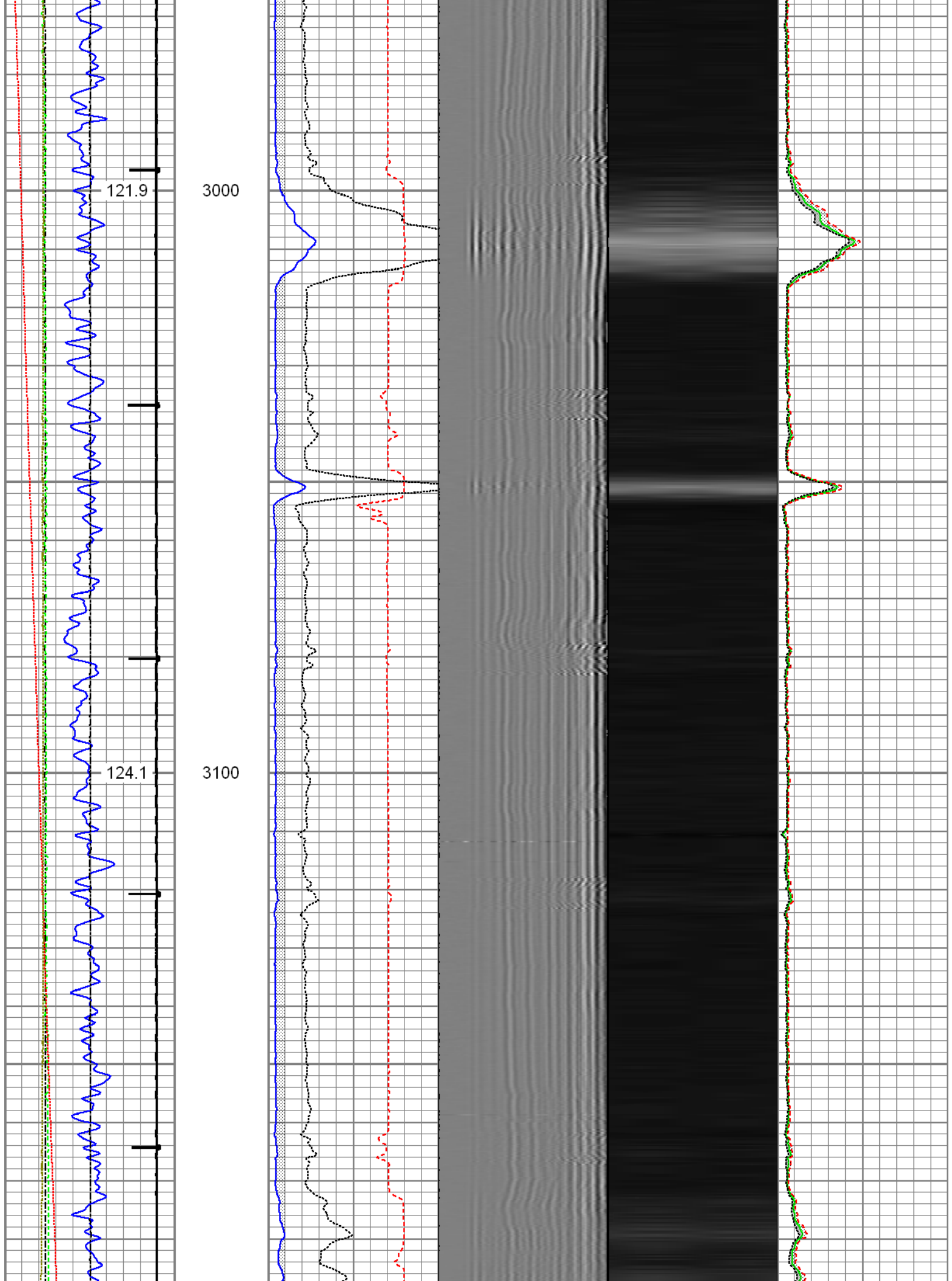
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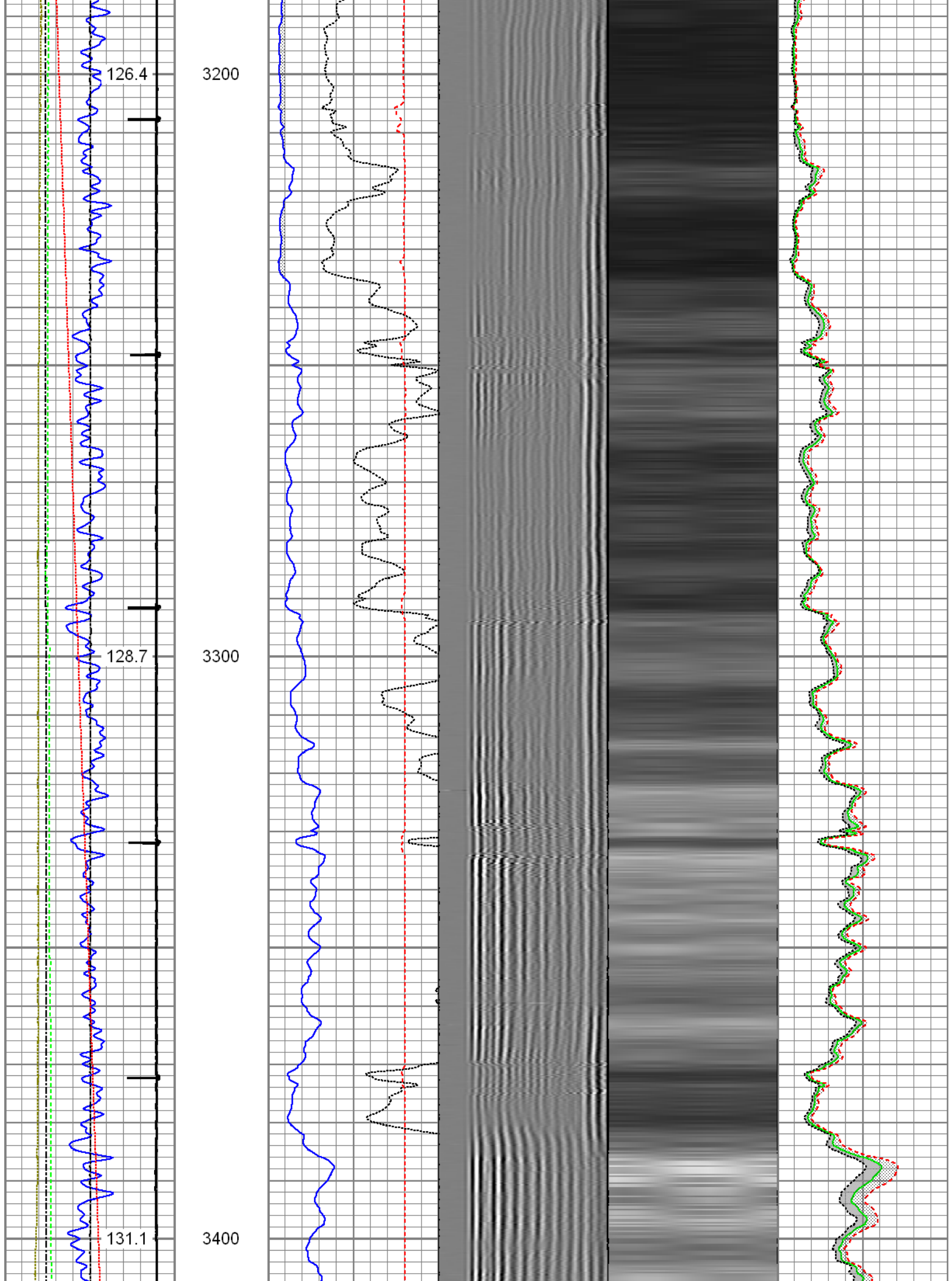
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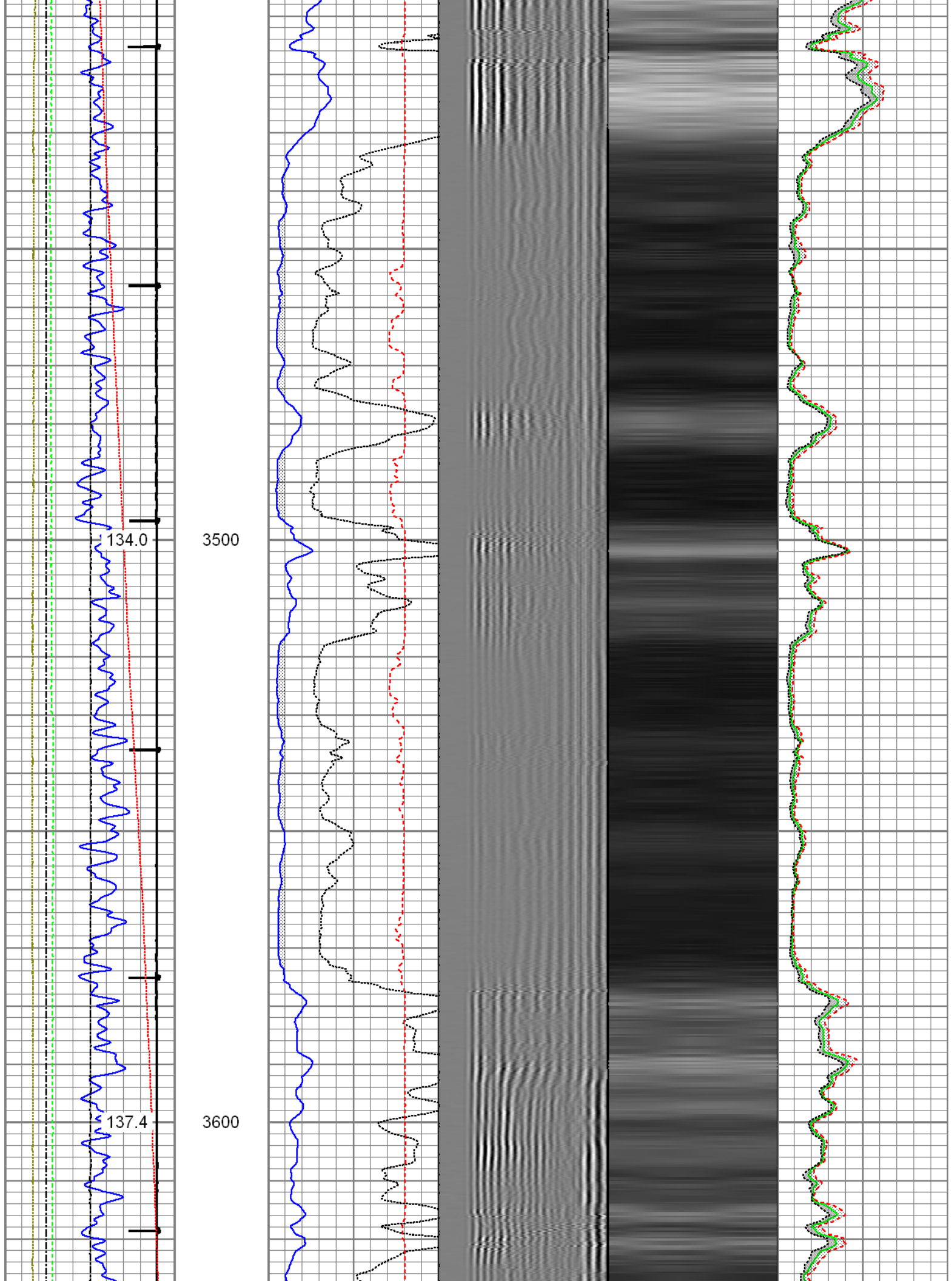
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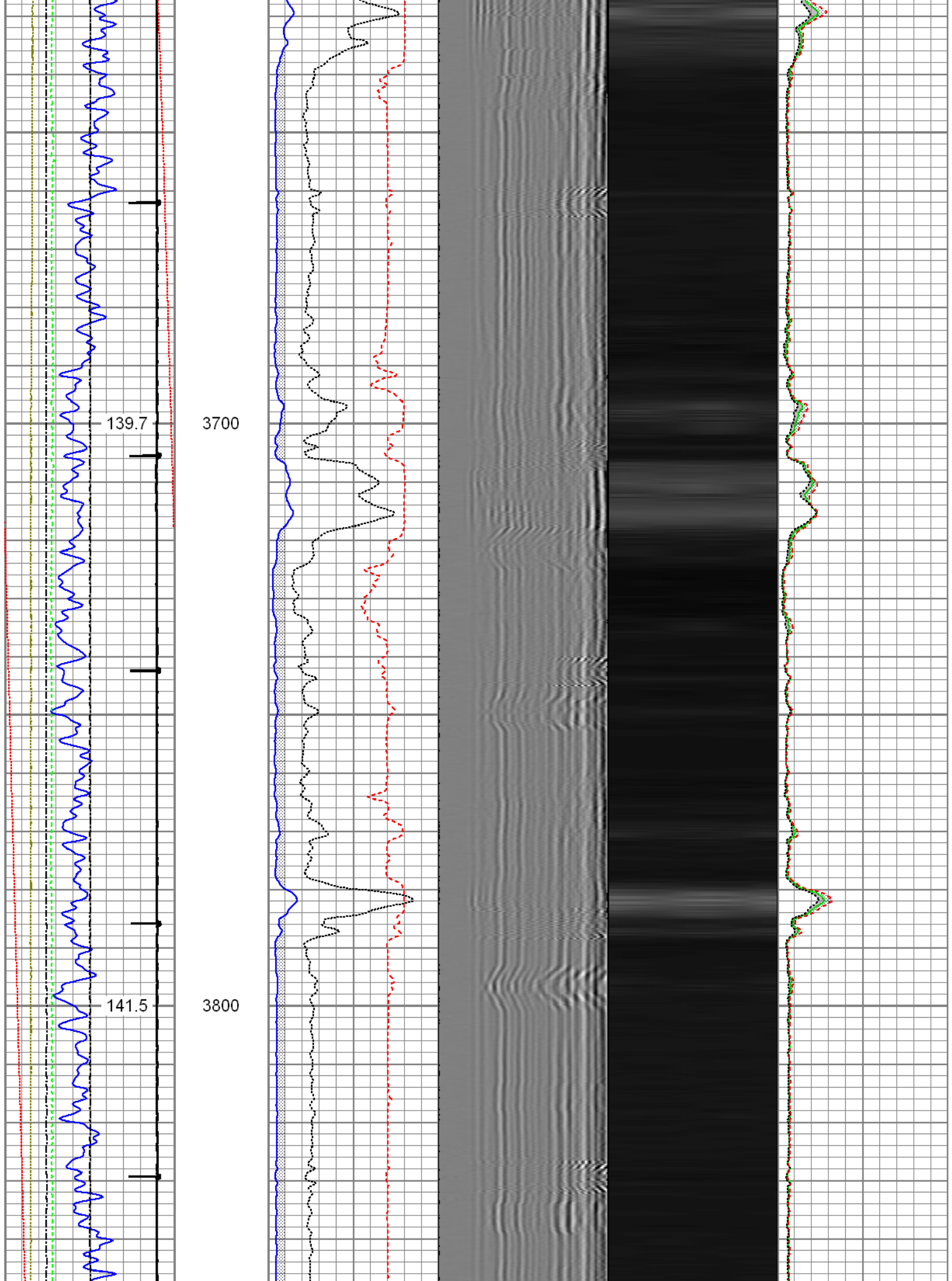
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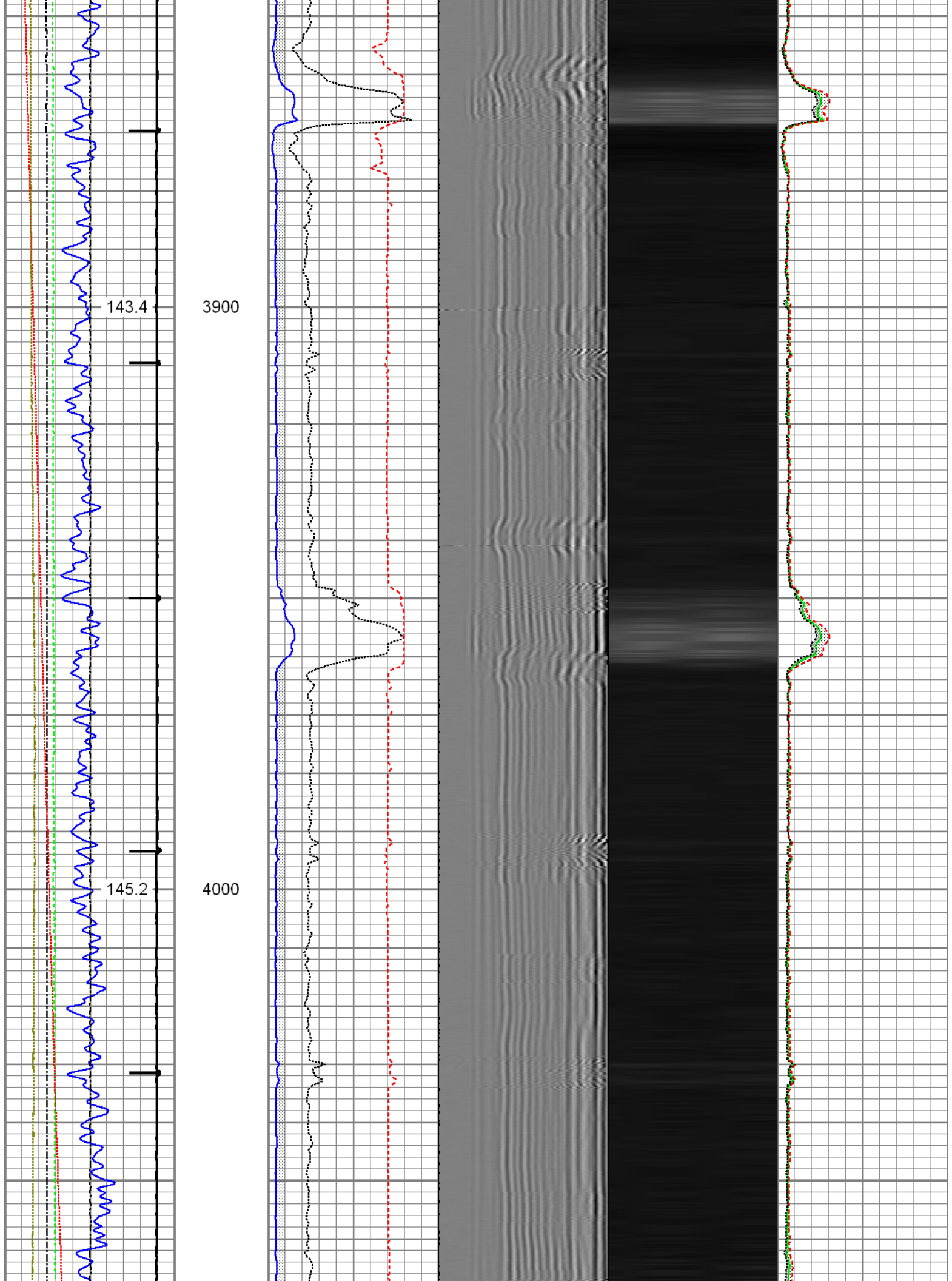


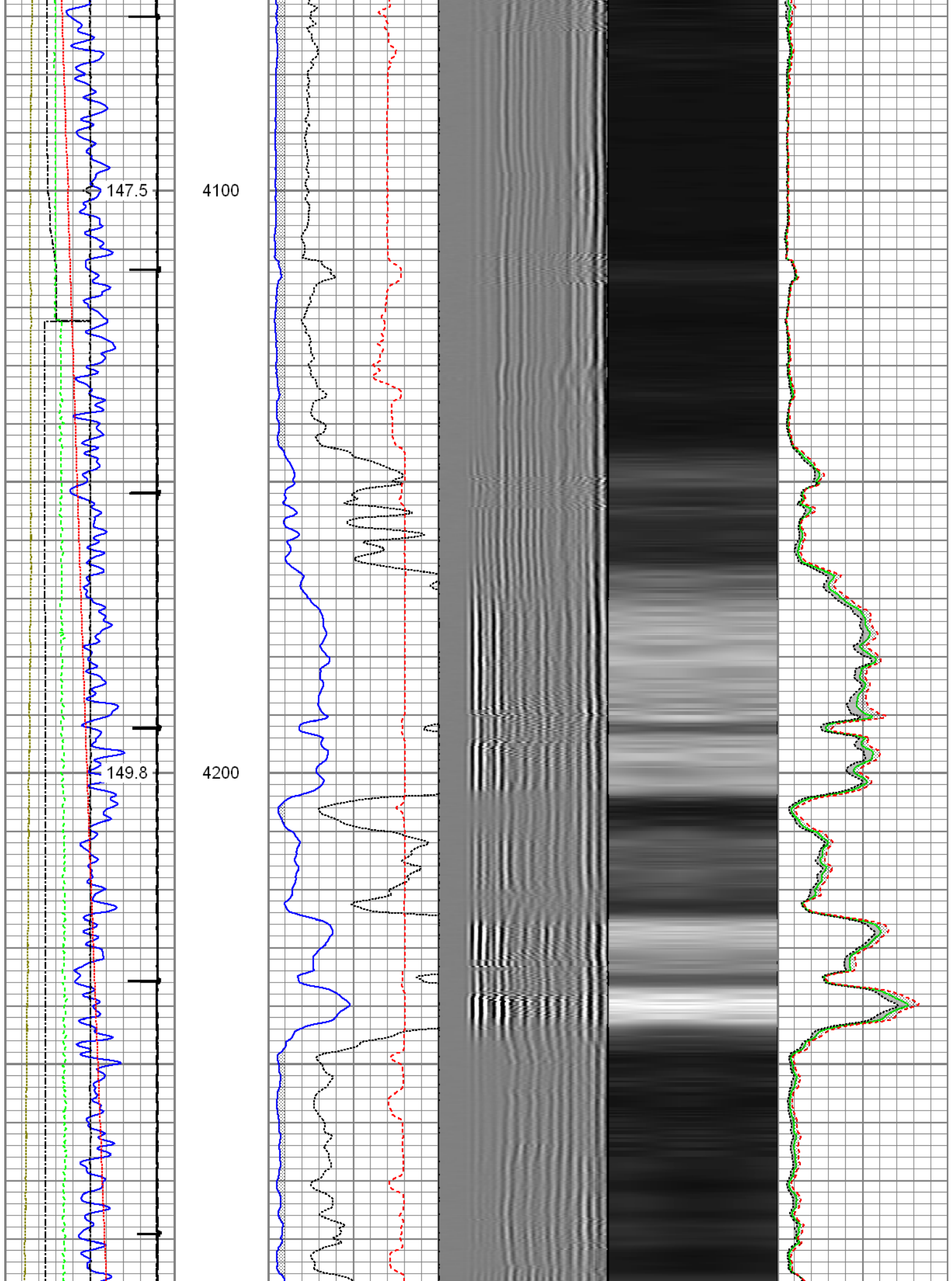


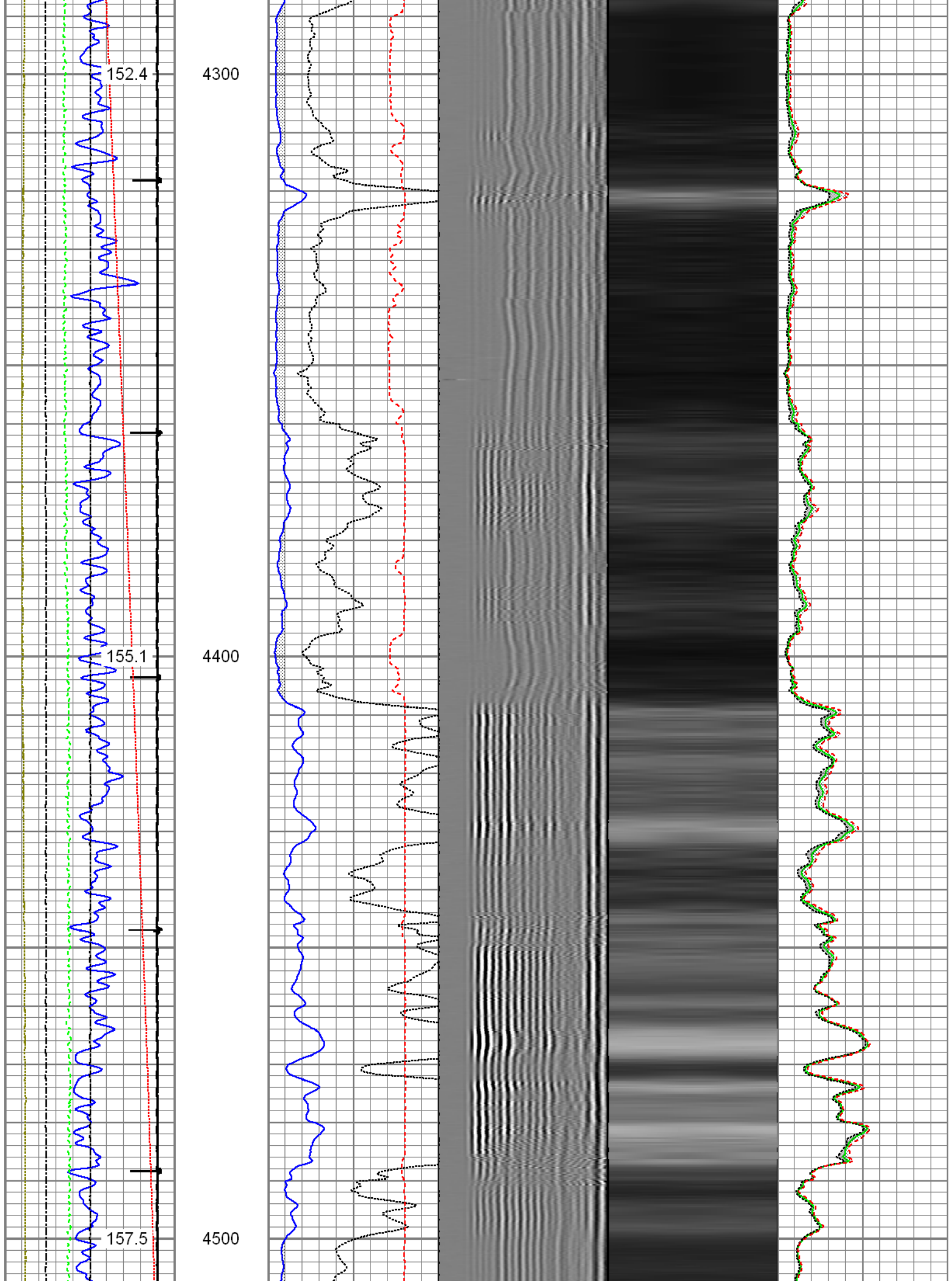


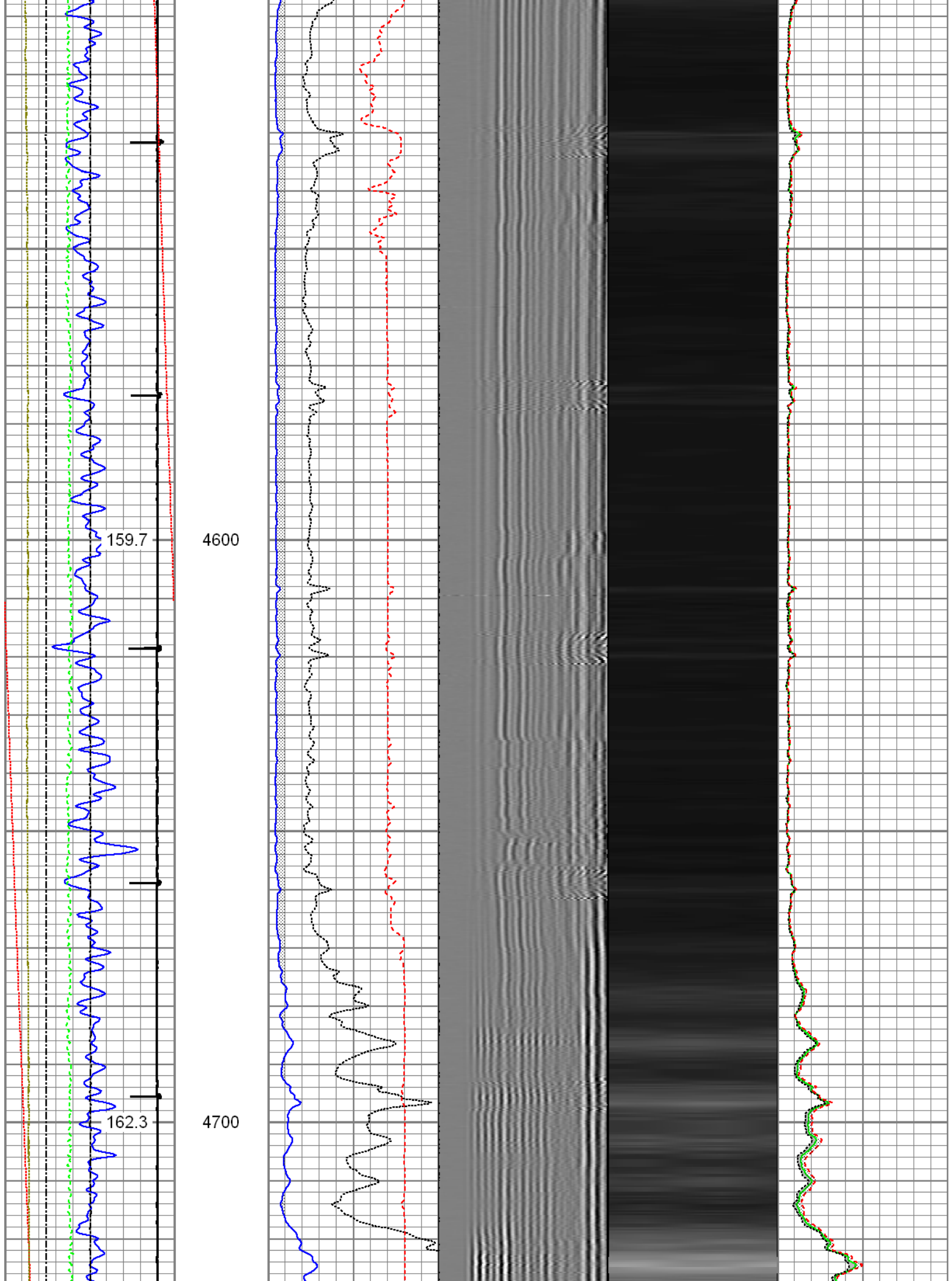


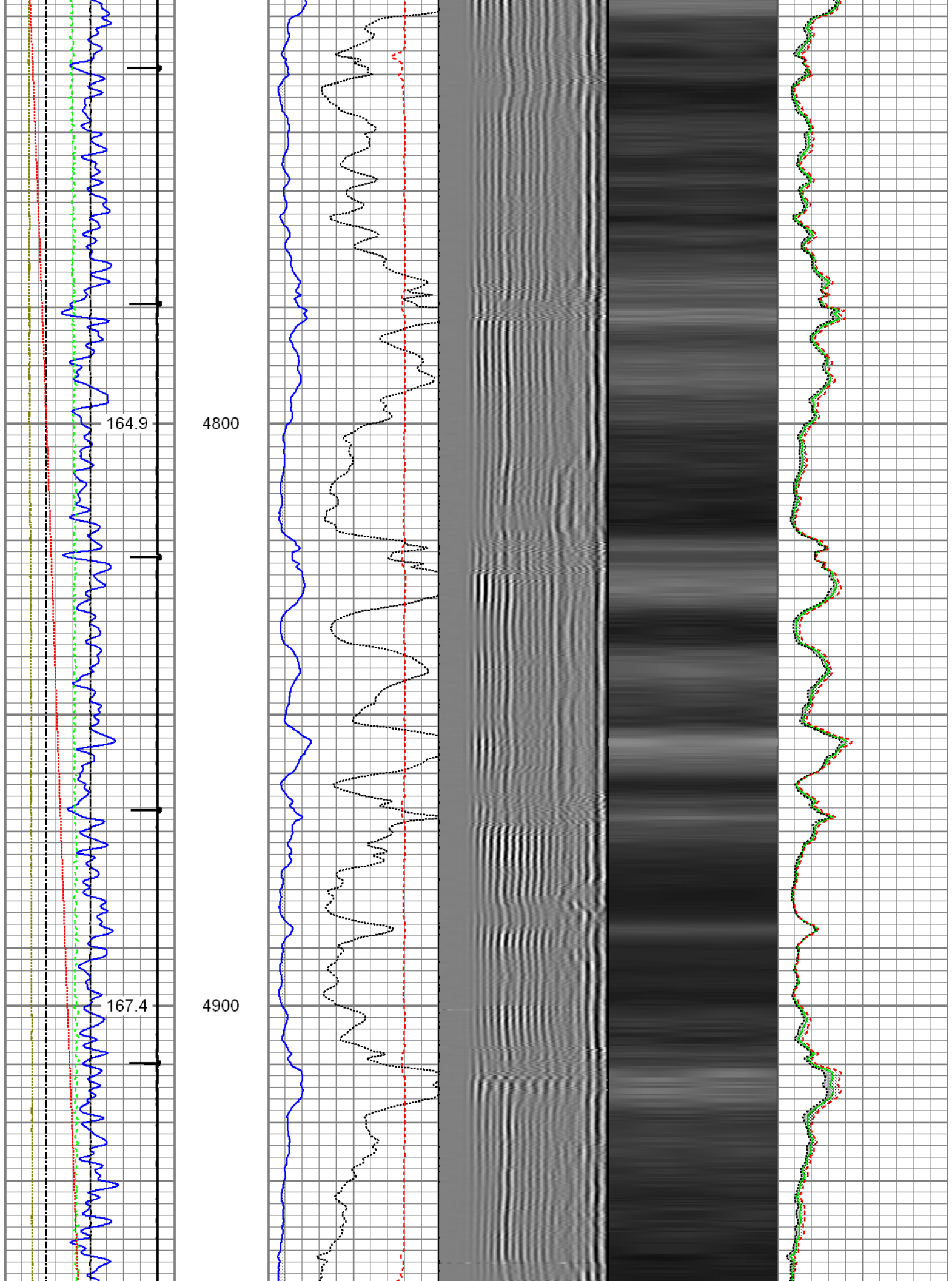


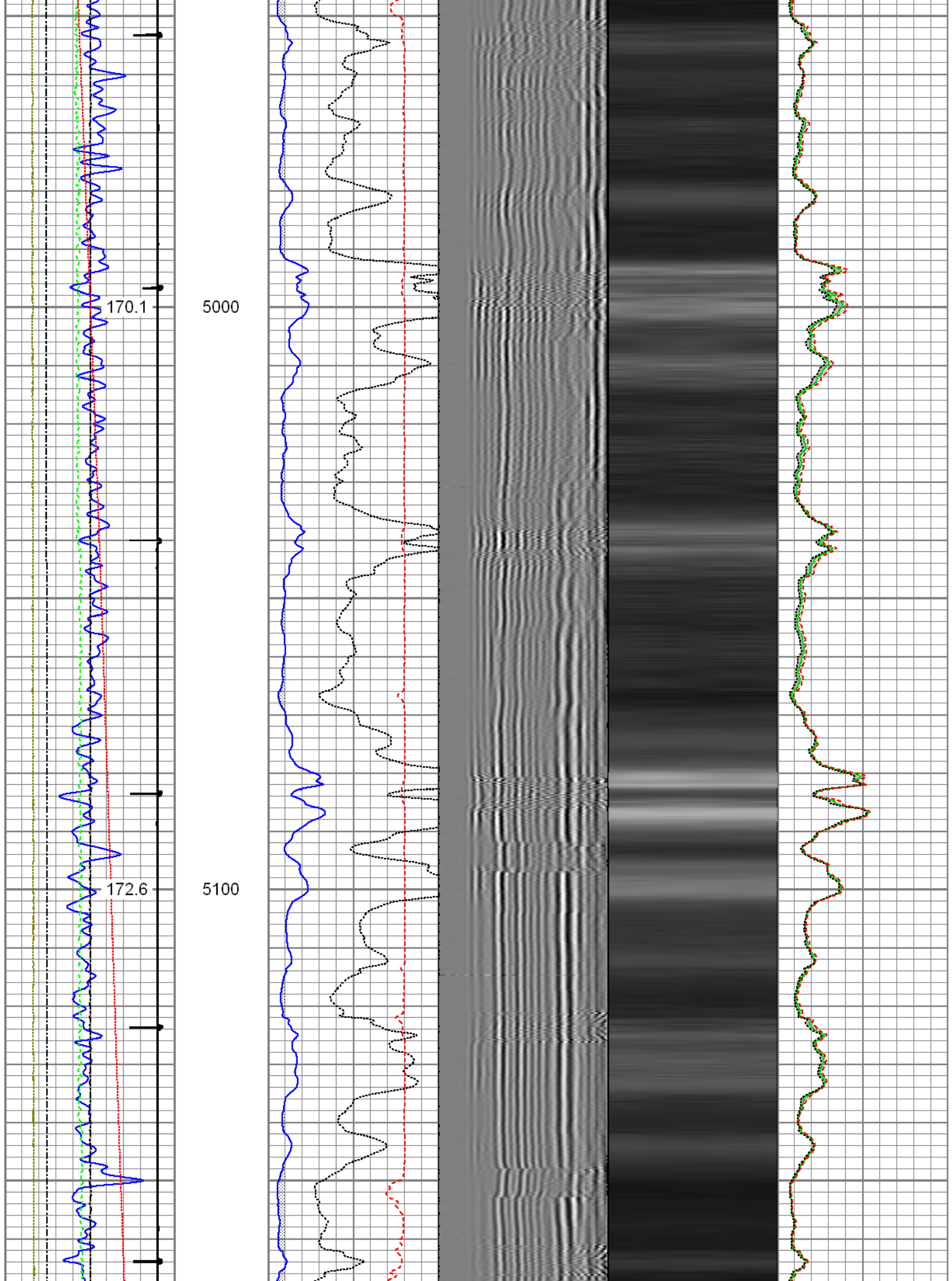


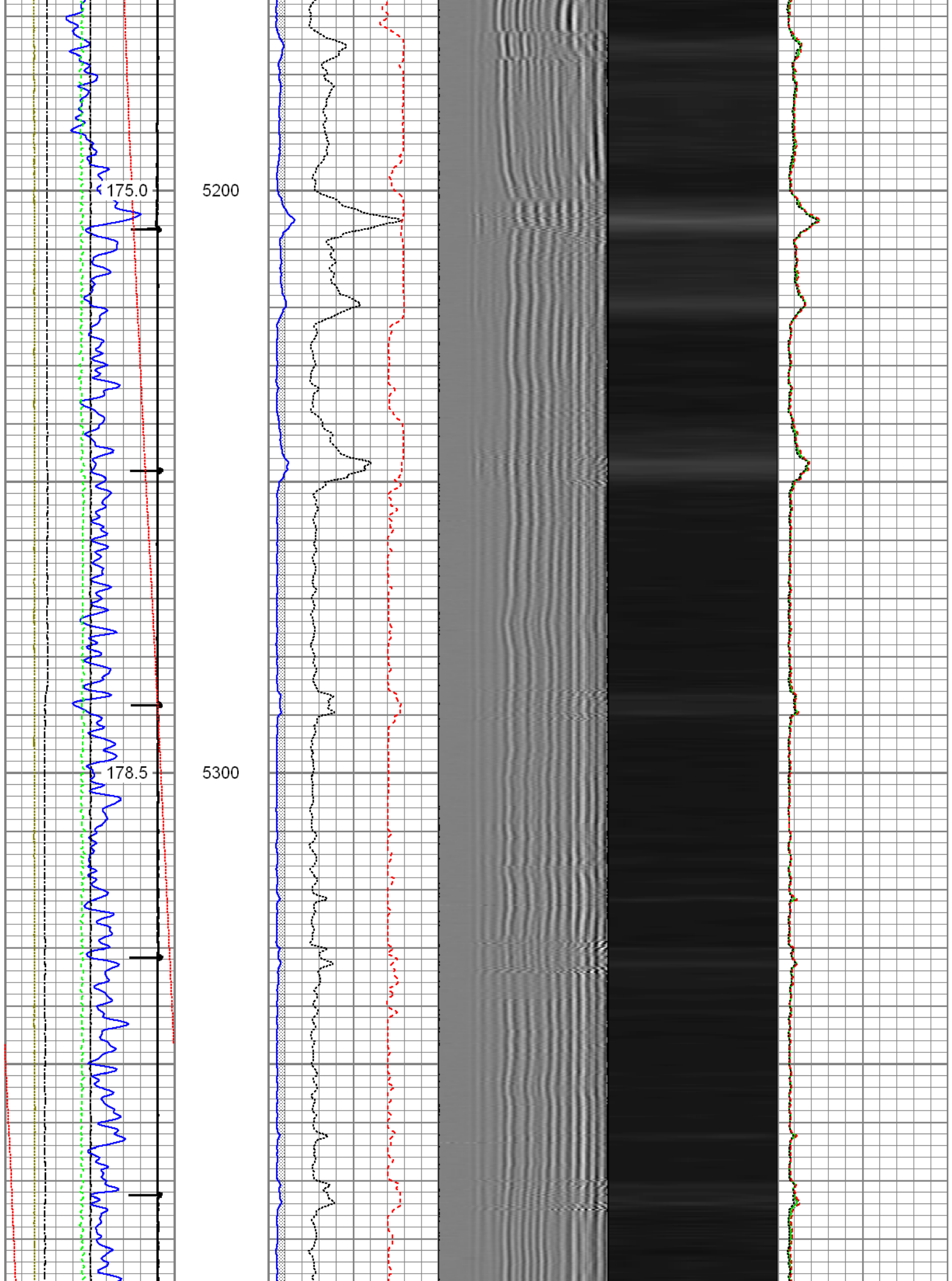


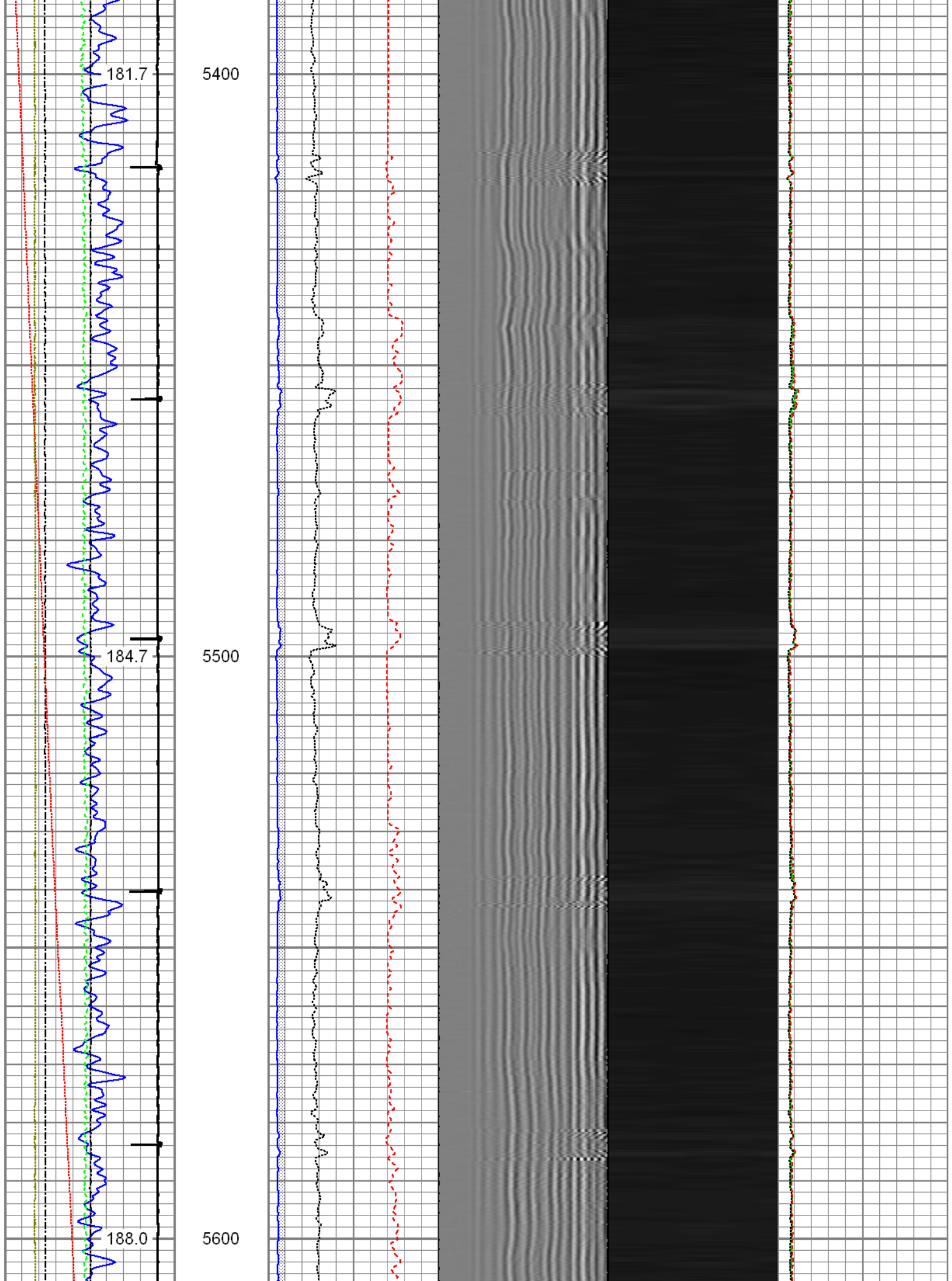


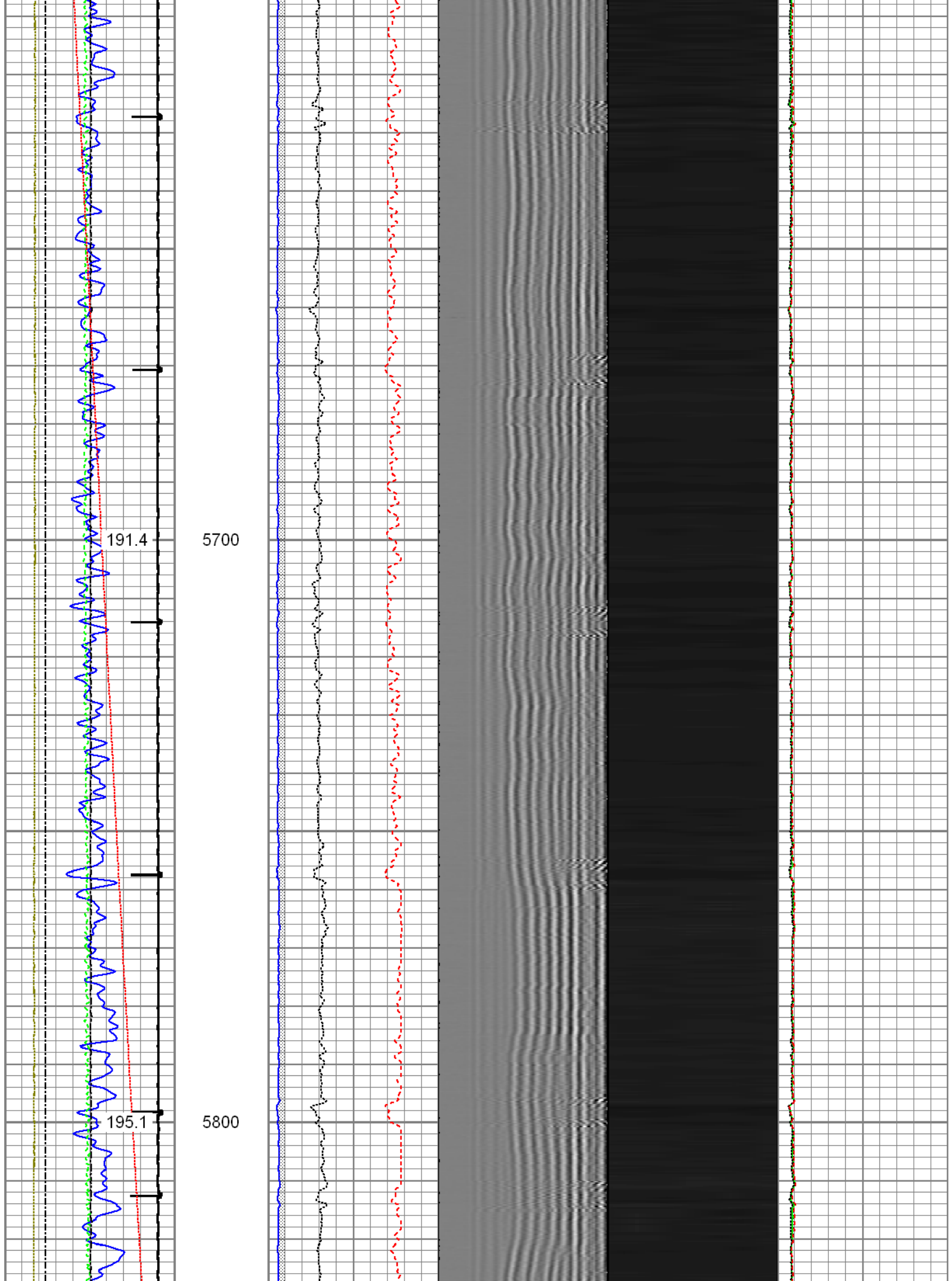


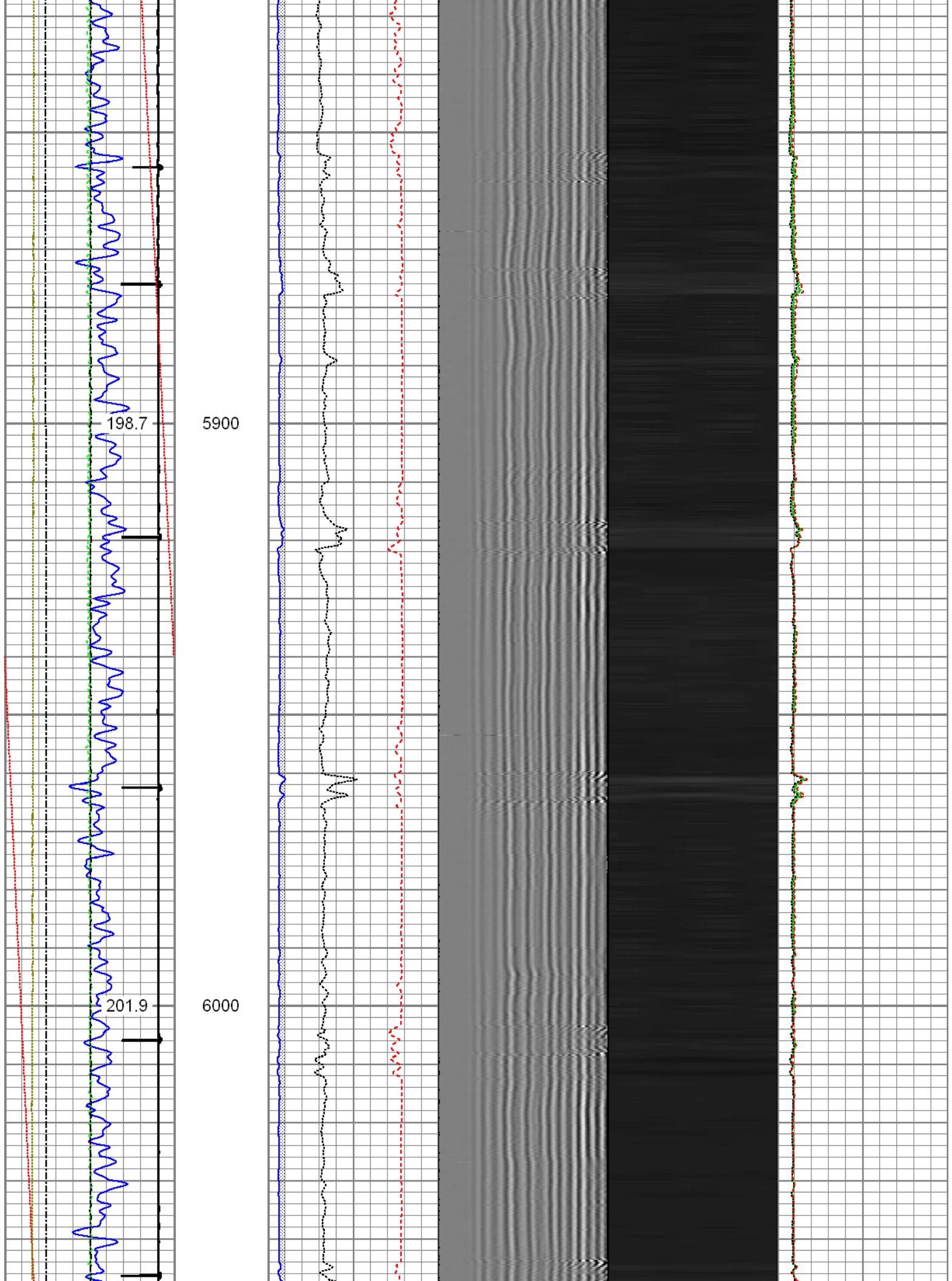


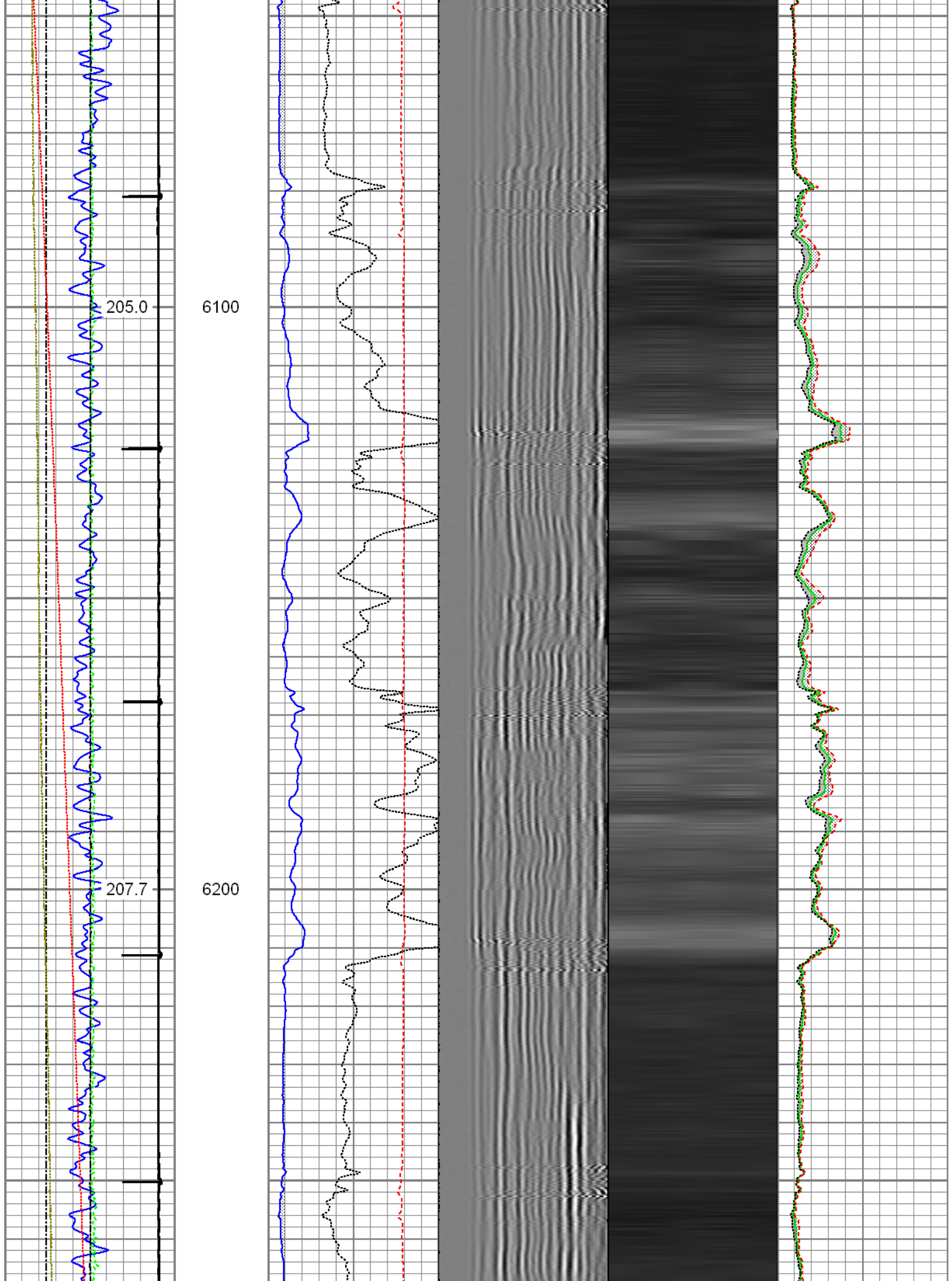


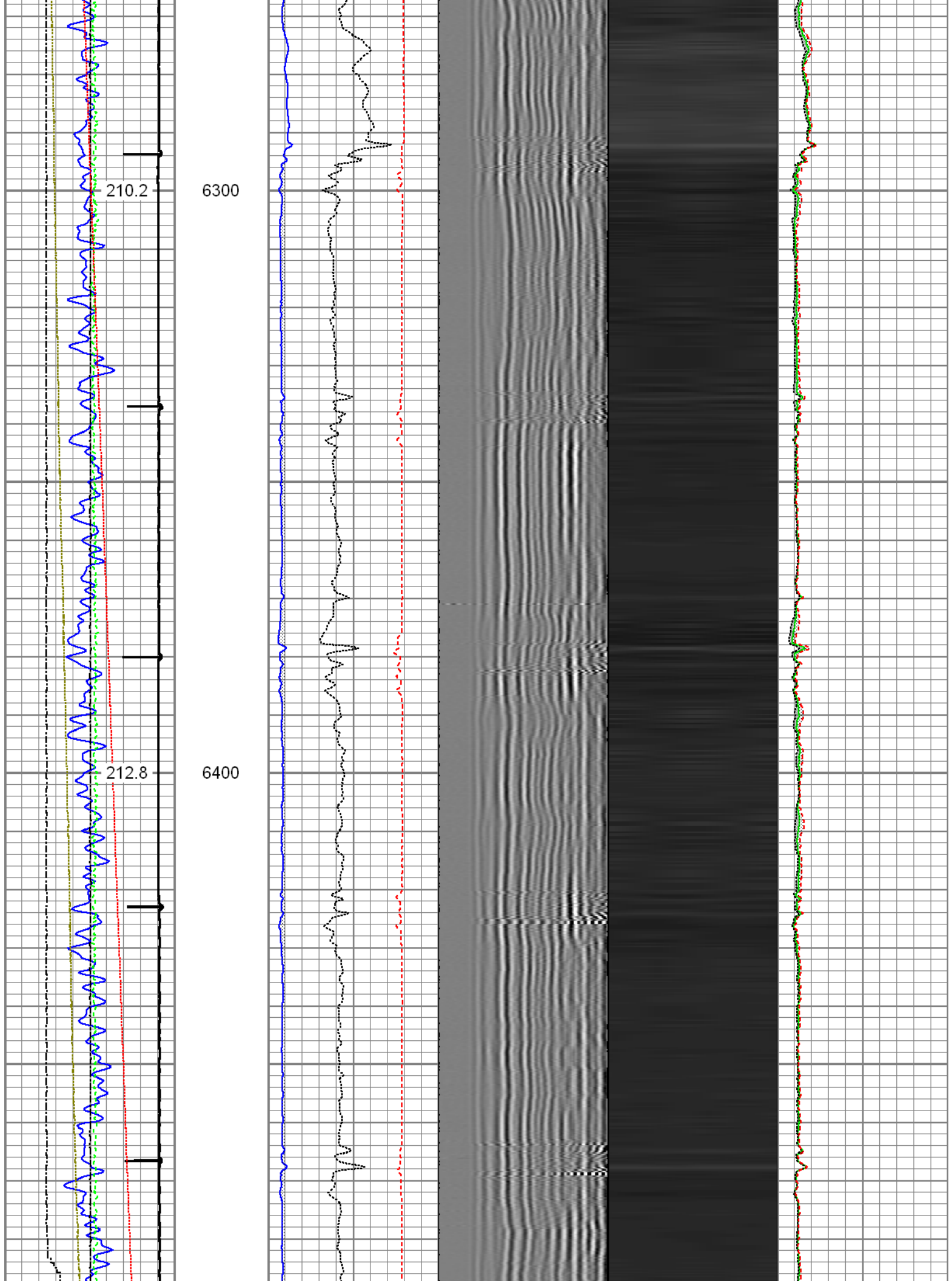


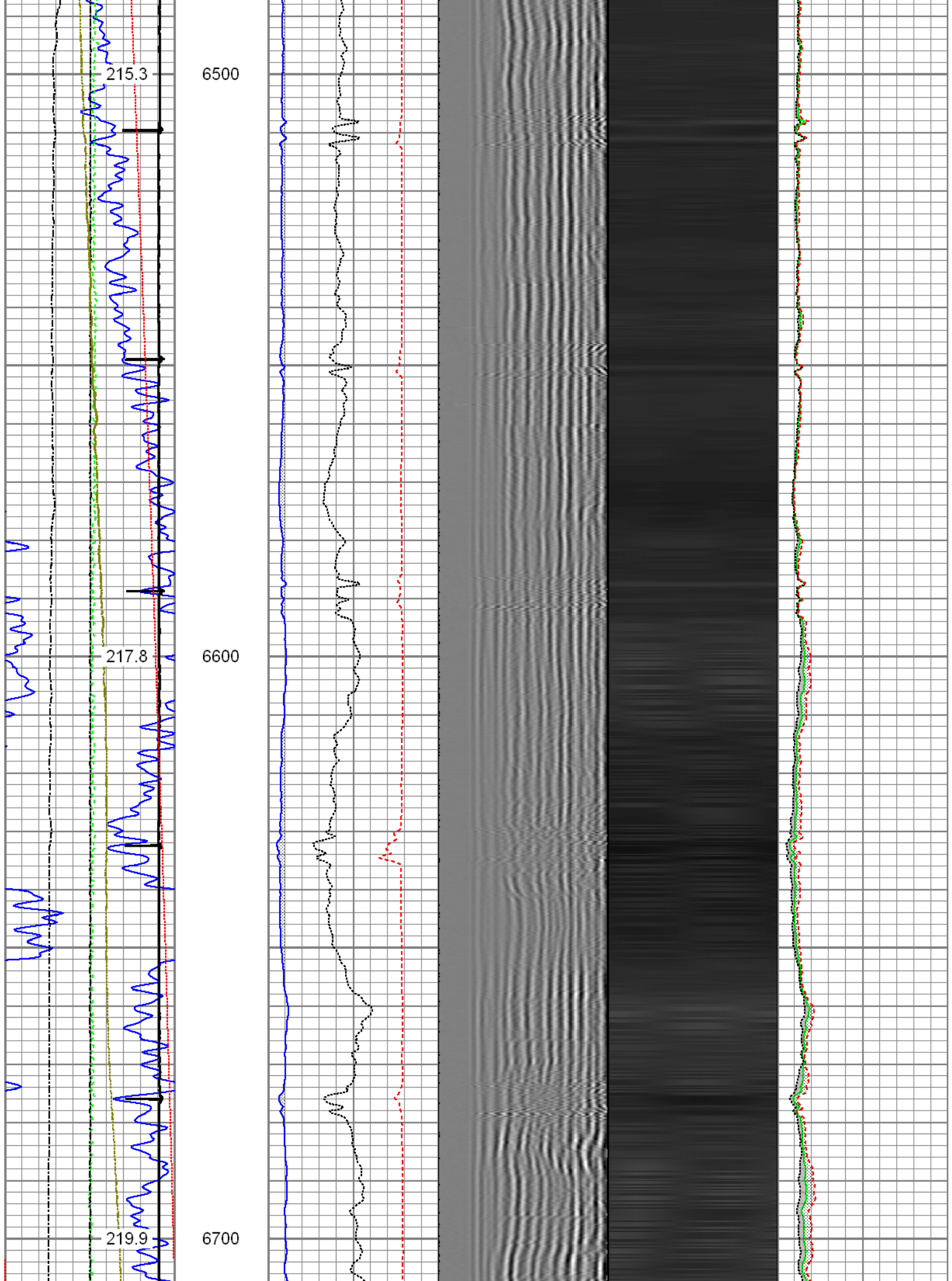


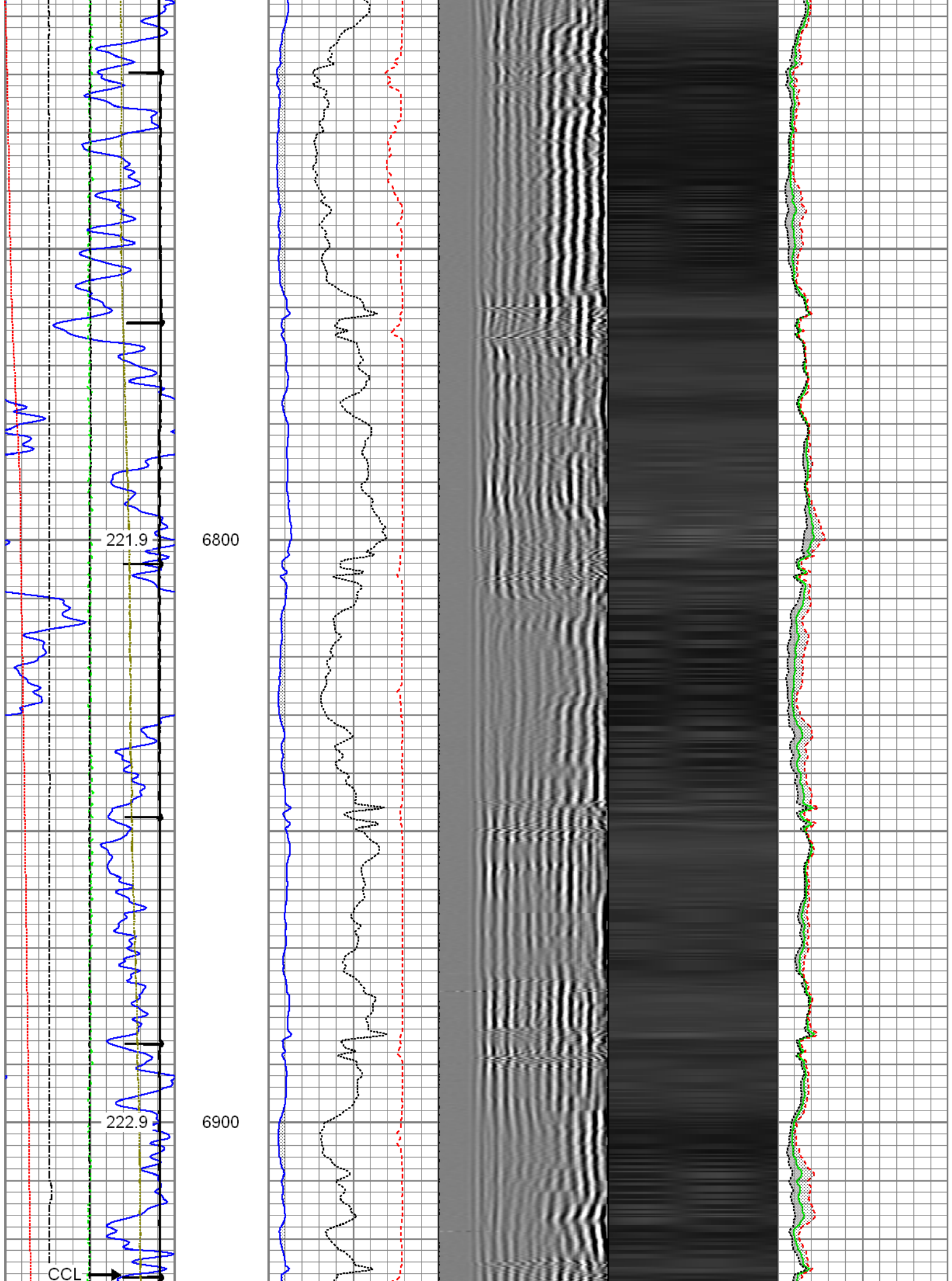


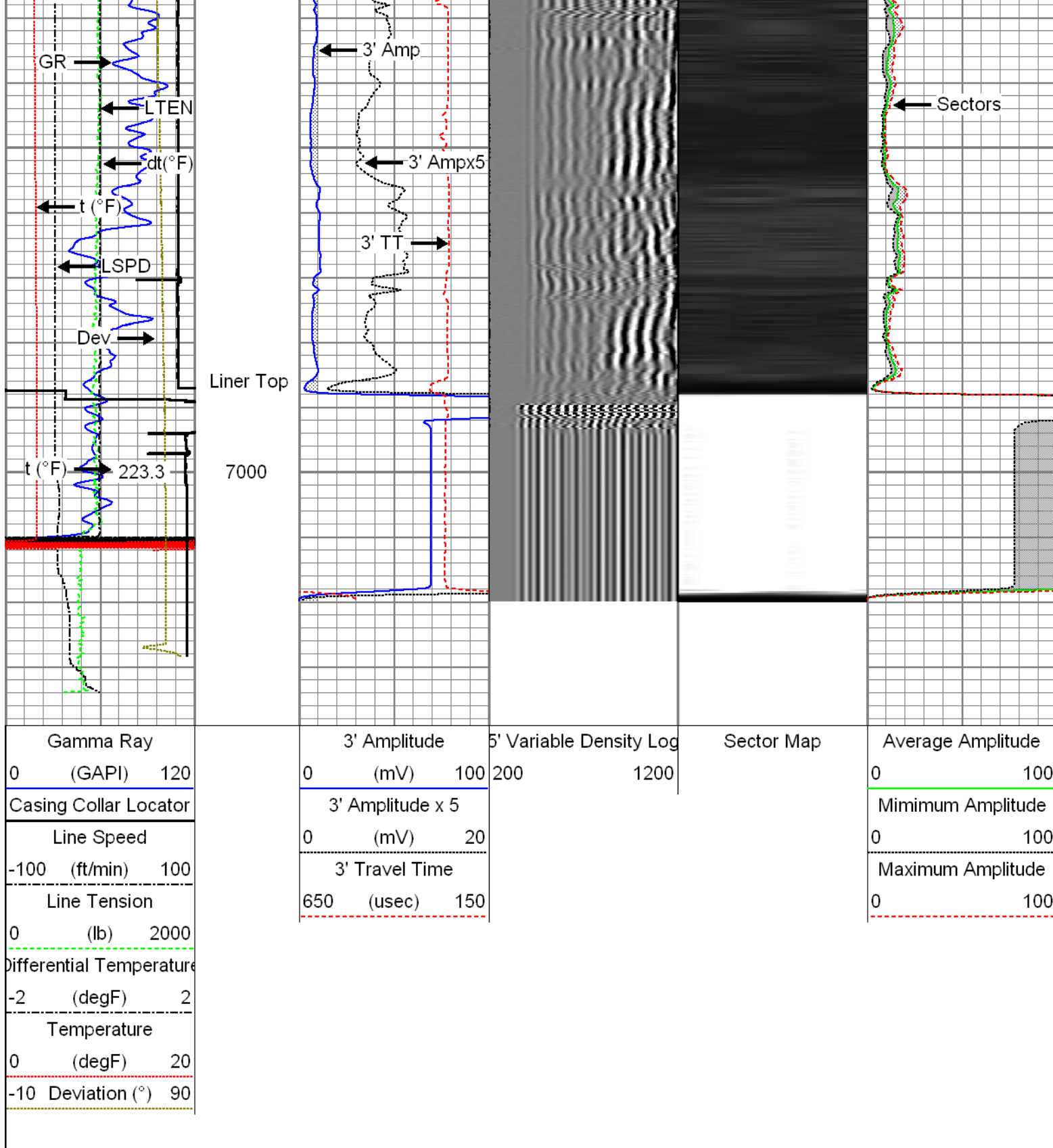










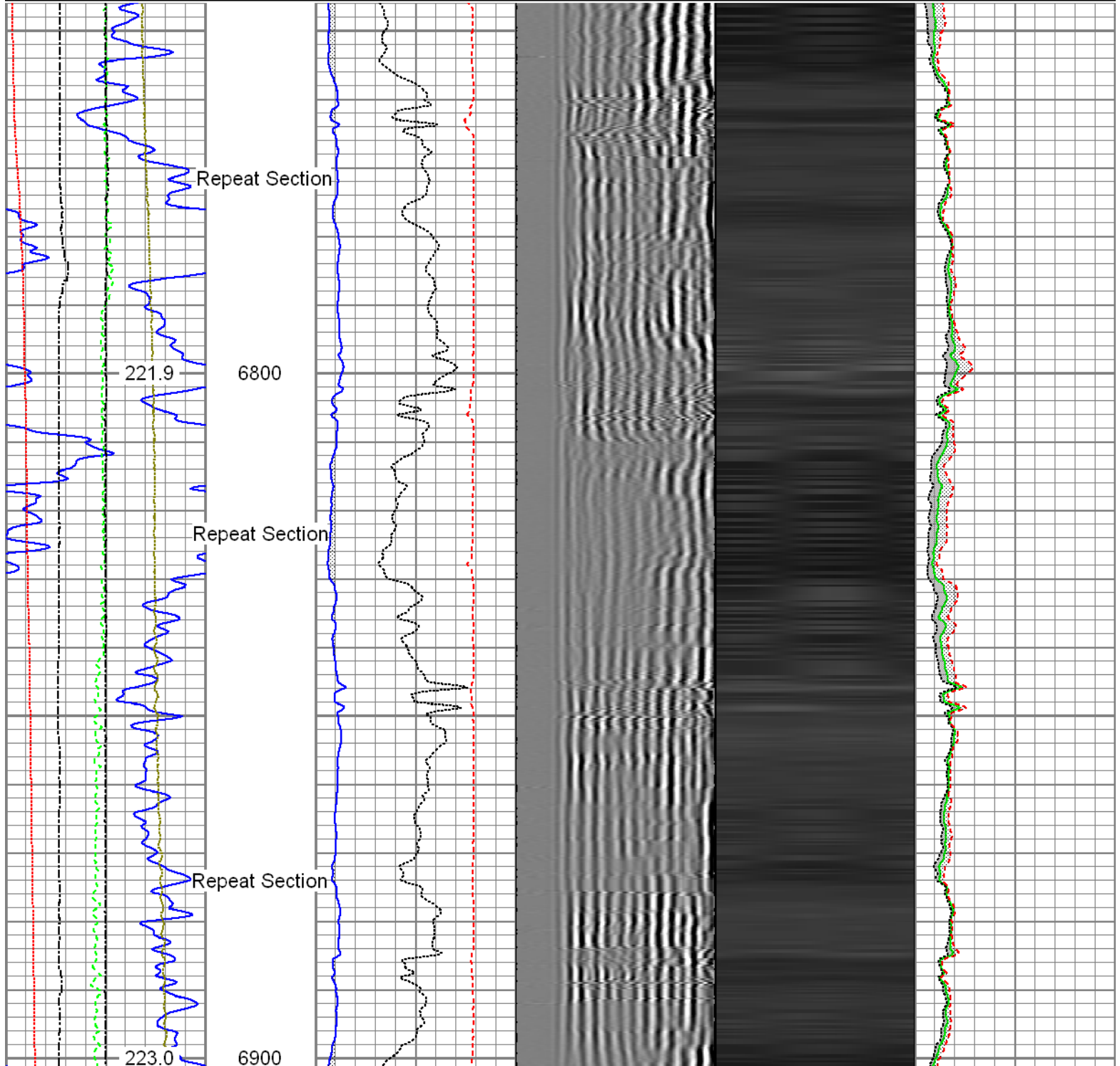


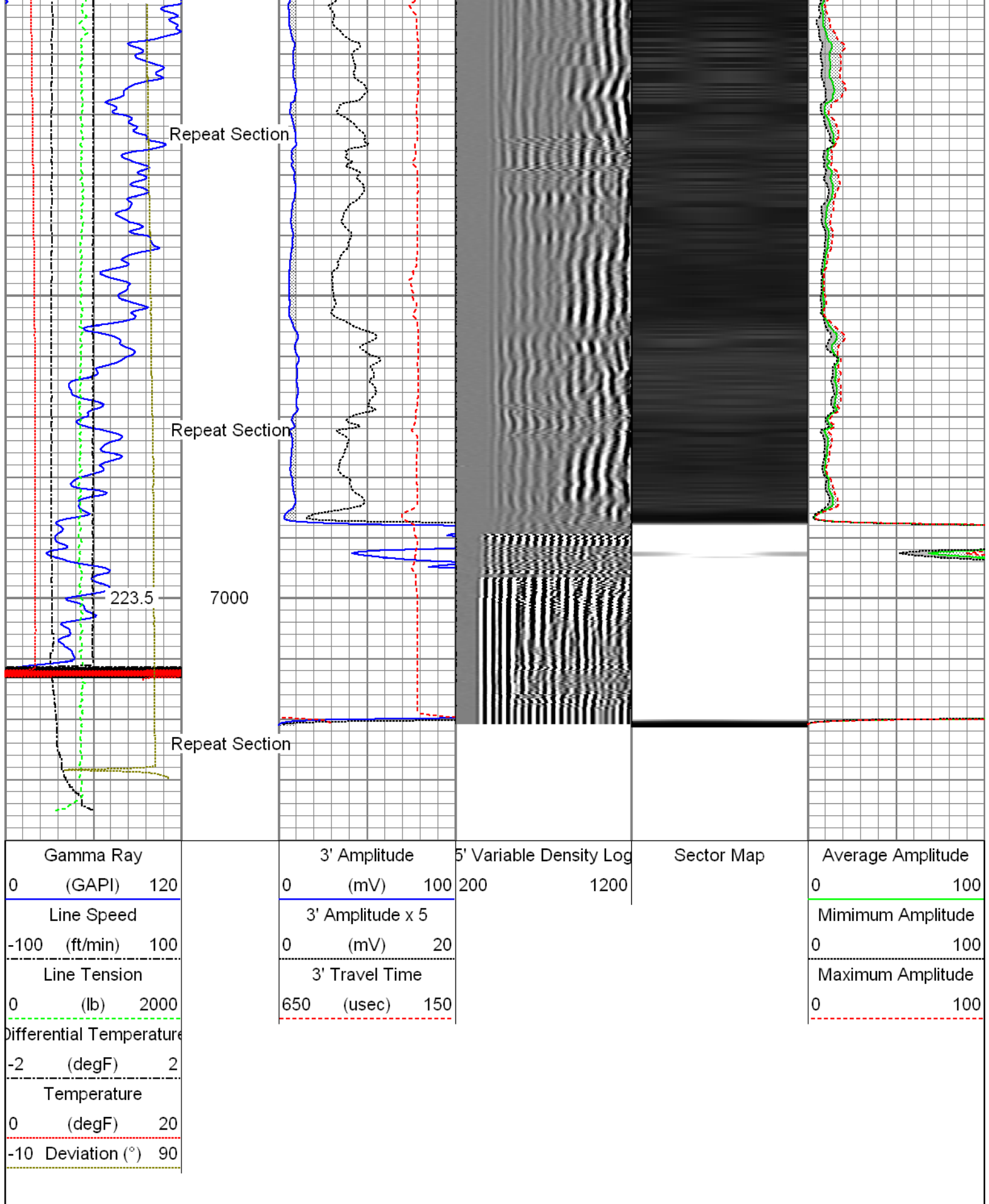
Repeat Section


Recorded with 2500 PSI Surface Induced Pressure


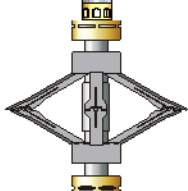
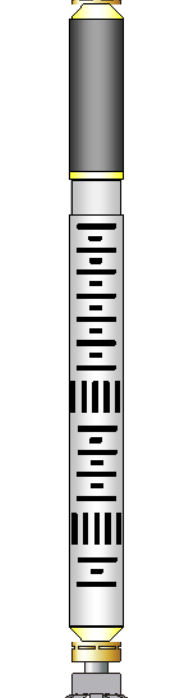
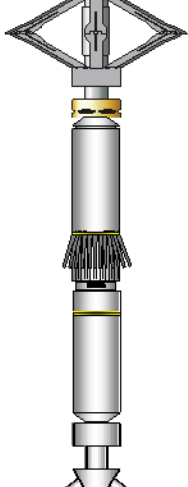
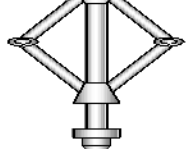
Database File: 06-26-15_noble energy_wells ranch aa11-667_mit_rbl.db
 Dataset Pathname: pass4
 Presentation Format: rbt4_mit
 Dataset Creation: Fri Jun 26 09:05:24 2015 by Log 7.0 B1
 Charted by: Depth in Feet scaled 1:240

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								
-10	Deviation (°) 90								





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00

GR	23.85		UW_AGS-UW_AGS_001 (215017) Sondex Adapter - GO Box to Sondex Pin	0.21	1.69	1.00
			UW_XTU-UW_XTU_002 (051219) 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 (10024052) 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
WVFS1 WVFS2 WVFS3 WVFS4 WVFS5 WVFS6 WVFS7 WVFS8 CBLTEMP CBLROT WVF5FT	15.42		UW_RBT-UW_RBT_004 (1066) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00
	15.42					
	15.42					
	15.42					
	15.42					
	15.42					
	15.42					
	15.42					
	15.42					
	14.42					
MIT	5.41		UW_PRC-DSSRAC (080) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
			UW_MIT-UW_MIT40_027 (218949) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC #4 -UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
TSTAMP	0.00		UW_BUL-UW_BUL_006 (218707) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
Dataset: 06-26-15_Noble Energy_Wells Ranch AA11-667_MIT_RBL.db: field/well/run1/merge1 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in						

Multi-finger Imaging Tool Calibration Report

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 Jun 26 07:46:09 2015

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	1363	287.0	1650	295.0	1945	306.0	2251
Finger 02:	1425	286.0	1711	293.0	2004	303.0	2307
Finger 03:	1642	283.0	1925	289.0	2214	288.0	2502
Finger 04:	1654	284.0	1938	282.0	2220	282.0	2502
Finger 05:	1520	266.0	1786	274.0	2060	280.0	2340
Finger 06:	1514	263.0	1777	267.0	2044	274.0	2318
Finger 07:	1330	275.0	1605	289.0	1894	299.0	2193
Finger 08:	1521	265.0	1786	268.0	2054	276.0	2330
Finger 09:	1397	279.0	1676	285.0	1961	300.0	2261
Finger 10:	1467	272.0	1739	279.0	2018	285.0	2303
Finger 11:	1458	271.0	1729	272.0	2001	285.0	2286
Finger 12:	1303	281.0	1584	297.0	1881	311.0	2192
Finger 13:	1560	283.0	1843	292.0	2135	295.0	2430
Finger 14:	1402	283.0	1685	297.0	1982	309.0	2291
Finger 15:	1519	266.0	1785	275.0	2060	288.0	2348
Finger 16:	1390	282.0	1672	296.0	1968	309.0	2277
Finger 17:	1620	275.0	1895	282.0	2177	290.0	2467
Finger 18:	1365	288.0	1653	309.0	1962	327.0	2289
Finger 19:	1623	265.0	1888	262.0	2150	268.0	2418
Finger 20:	1492	276.0	1768	275.0	2043	292.0	2335
Finger 21:	1579	256.0	1835	259.0	2094	272.0	2366
Finger 22:	1517	278.0	1795	287.0	2082	300.0	2382
Finger 23:	1336	280.0	1616	288.0	1904	305.0	2209
Finger 24:	1672	264.0	1936	272.0	2208	282.0	2490
Finger 25:	1353	292.0	1645	305.0	1950	327.0	2277
Finger 26:	1532	285.0	1817	295.0	2112	311.0	2423
Finger 27:	1456	263.0	1719	273.0	1992	285.0	2277
Finger 28:	1622	282.0	1904	283.0	2187	297.0	2484
Finger 29:	1467	271.0	1738	285.0	2023	301.0	2324
Finger 30:	1416	276.0	1692	291.0	1983	311.0	2294
Finger 31:	1519	272.0	1791	277.0	2068	290.0	2358
Finger 32:	1332	275.0	1607	281.0	1888	296.0	2184
Finger 33:	1599	304.0	1903	313.0	2216	321.0	2537
Finger 34:	1533	272.0	1805	277.0	2082	284.0	2366
Finger 35:	1432	267.0	1699	282.0	1981	291.0	2272
Finger 36:	1580	285.0	1865	289.0	2154	298.0	2452
Finger 37:	1591	280.0	1871	283.0	2154	291.0	2445
Finger 38:	1481	281.0	1762	287.0	2049	294.0	2343
Finger 39:	1450	285.0	1735	286.0	2024	297.0	2320

Finger 39: 1450 285.0 1735 296.0 2031 307.0 2338
Finger 40: 1575 288.0 1863 297.0 2160 305.0 2465

Segmented Cement Bond Log Calibration Report

Serial Number: 1066
Tool Model: UW_RBT_004

Calibration Casing Diameter: 5.500 in
Calibration Depth: 24.000 ft

Master Calibration, performed Fri Jun 26 07:49:35 2015:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.005	0.689	0.800	71.921	103.927	0.296
5FT	-0.001	0.665	0.800	71.921	106.827	0.889
S1	0.005	0.666	0.000	100.000	151.275	-0.716
S2	0.004	0.665	0.000	100.000	151.387	-0.638
S3	0.005	0.662	0.000	100.000	152.279	-0.749
S4	0.004	0.675	0.000	100.000	148.984	-0.618
S5	0.004	0.691	0.000	100.000	145.607	-0.635
S6	0.004	0.713	0.000	100.000	140.948	-0.516
S7	0.005	0.724	0.000	100.000	139.065	-0.626
S8	0.004	0.695	0.000	100.000	144.807	-0.636

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: 211727
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 AA11-667

