

# Radial Cement Bond Gamma Ray Casing Collar Log

Company	Whiting Oil & Gas Corporation
Well	Horsetail 30F-3108
Field	Wildcat
County	Weld
State	Colorado
Company	Whiting Oil & Gas Corporation
Well	Horsetail 30F-3108
Field	Wildcat
County	Weld
State	Colorado
Location:	API #: 05-123-39199
Permanent Datum	SEC 30 TWP 10N RGE 57W
Log Measured From	Ground Level
Drilling Measured From	Kelly Bushing
	Elevation 4780'
	Other Services
	JB/GR
	RBP
	MIT
	Elevation
	K.B. 4797'
	D.F. 4796'
	G.L. 4780'

Date	Nov 21, 2014
Run Number	One
Depth Driller	13,060 FT
Depth Logger	4960 FT
Bottom Logged Interval	4955 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	185°F
Estimated Cement Top	58 FT
Time Well Ready	ROA
Time Logger on Bottom	3:30 PM
Equipment Number	HD-0119
Location	Fort Lupton, CO
Recorded By	B. Kalkwarf
Witnessed By	Gary Chandler

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 LTC	Surface	1610 FT		
Intermediate #1	7	29	P-110	Surface	6069 FT		
Intermediate #2							
Liner	4 1/2	11.6	HCP-110	4906 FT	13,050 FT		

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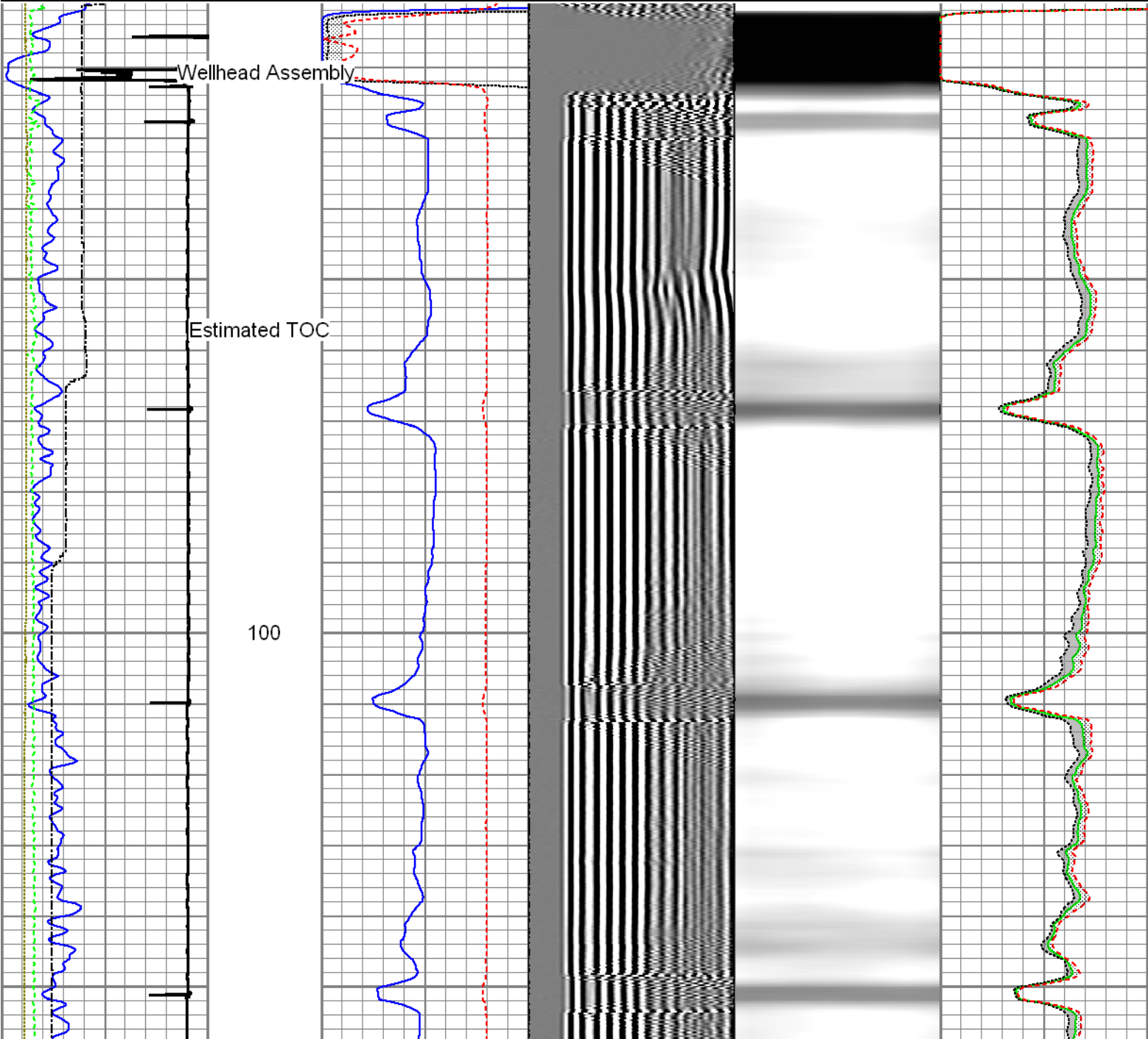
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs,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

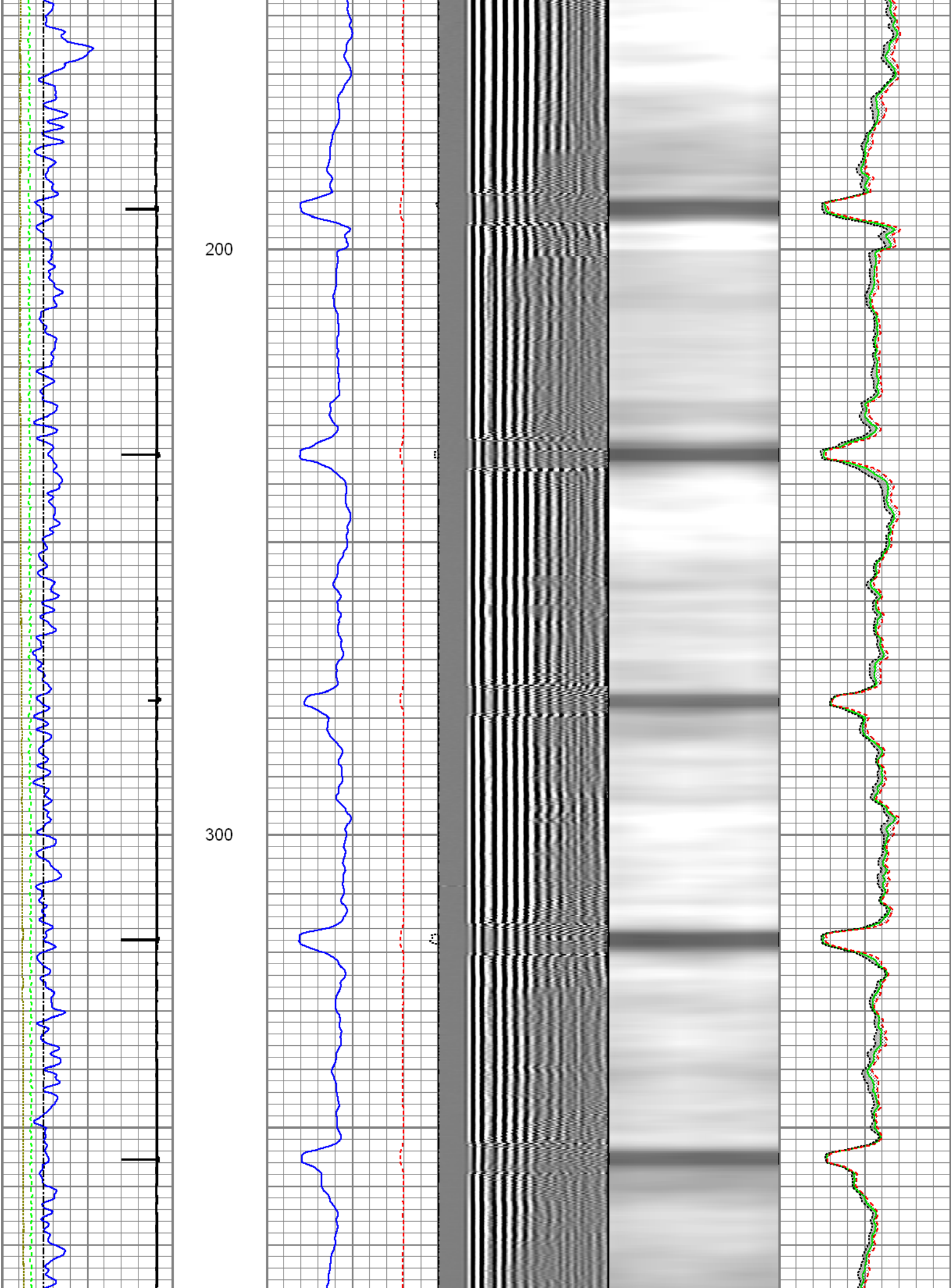
## Comments

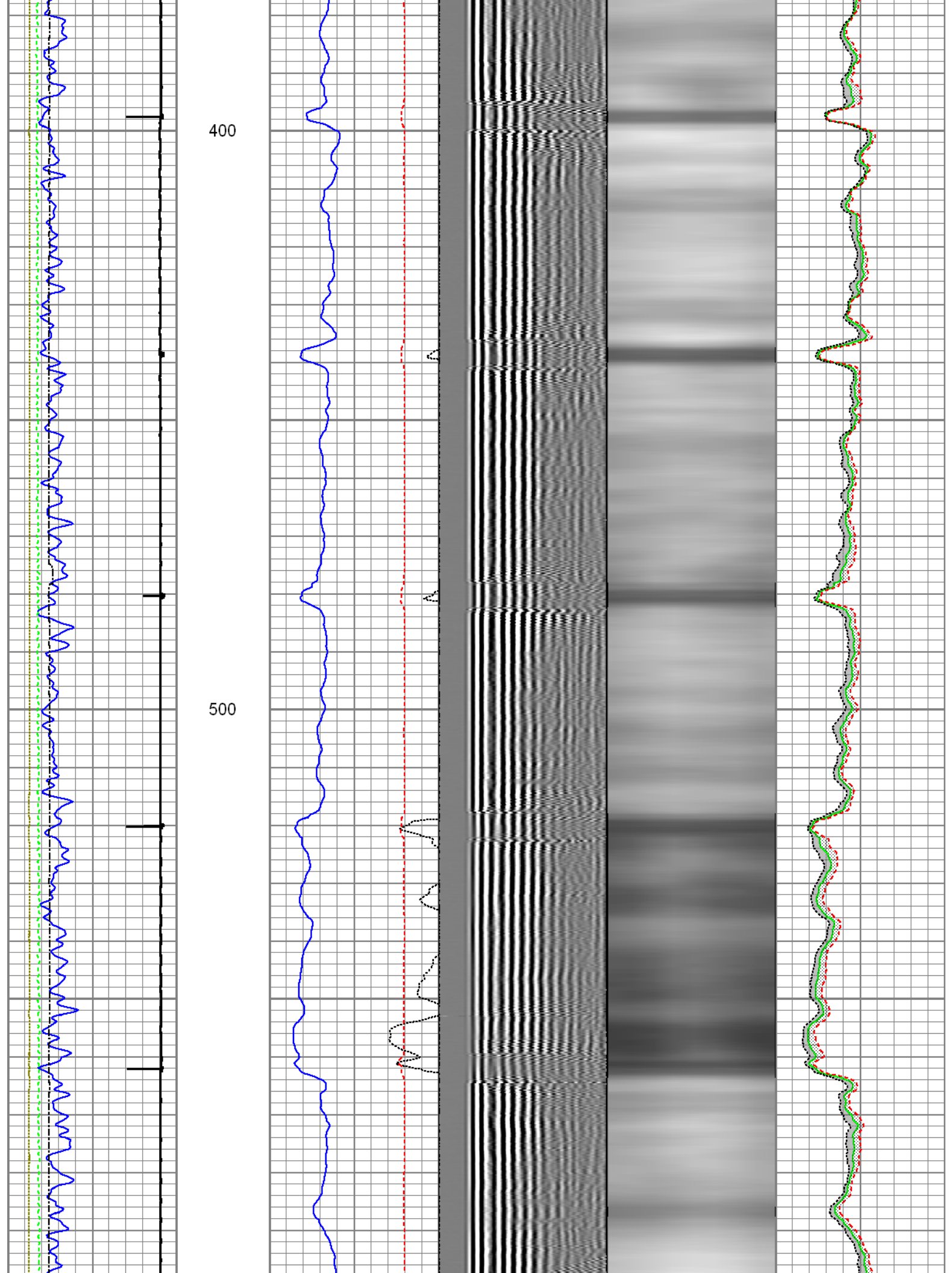
Log ran as per Customer request.  
 Depth reference to Casing Talley reported Liner Top @ 4906'.  
 Adjusted log -2.5 FT to correlate with Liner Top.  
 Set RBP at 5000'  
 Log ran from below liner top to surface.  
 Log ran with 1500 PSI surface induced pressure.  
 No debris found on logging tools upon completion of operations.  
 Thank you for choosing FMC Technologies Completion Services, Inc.!!

Database File: 11-21-14\_whiting\_horsetail 30f-3108\_mit\_rbl.db  
Dataset Pathname: pass43  
Presentation Format: rbt4\_mit  
Dataset Creation: Fri Nov 21 16:00:49 2014 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

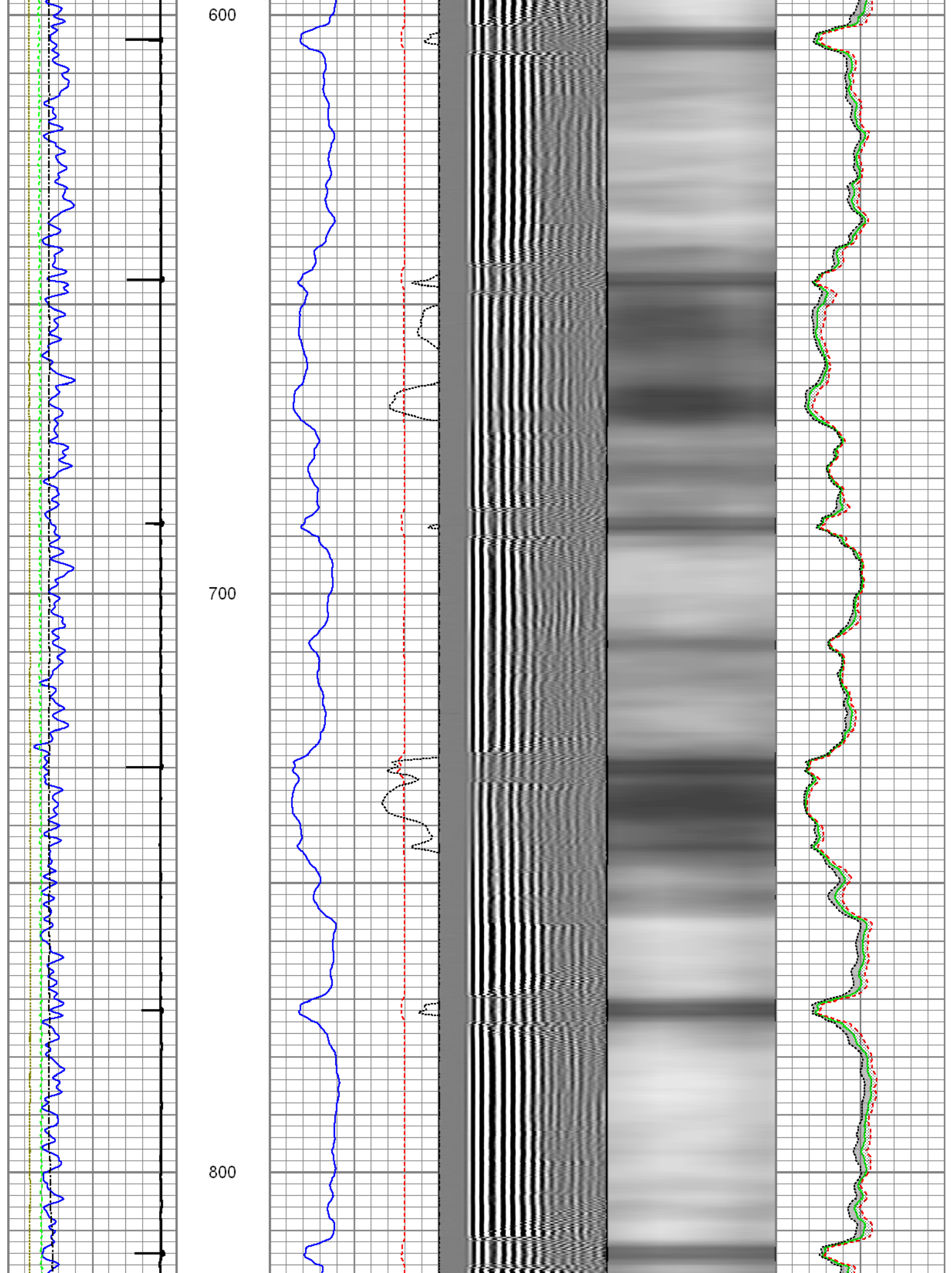
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

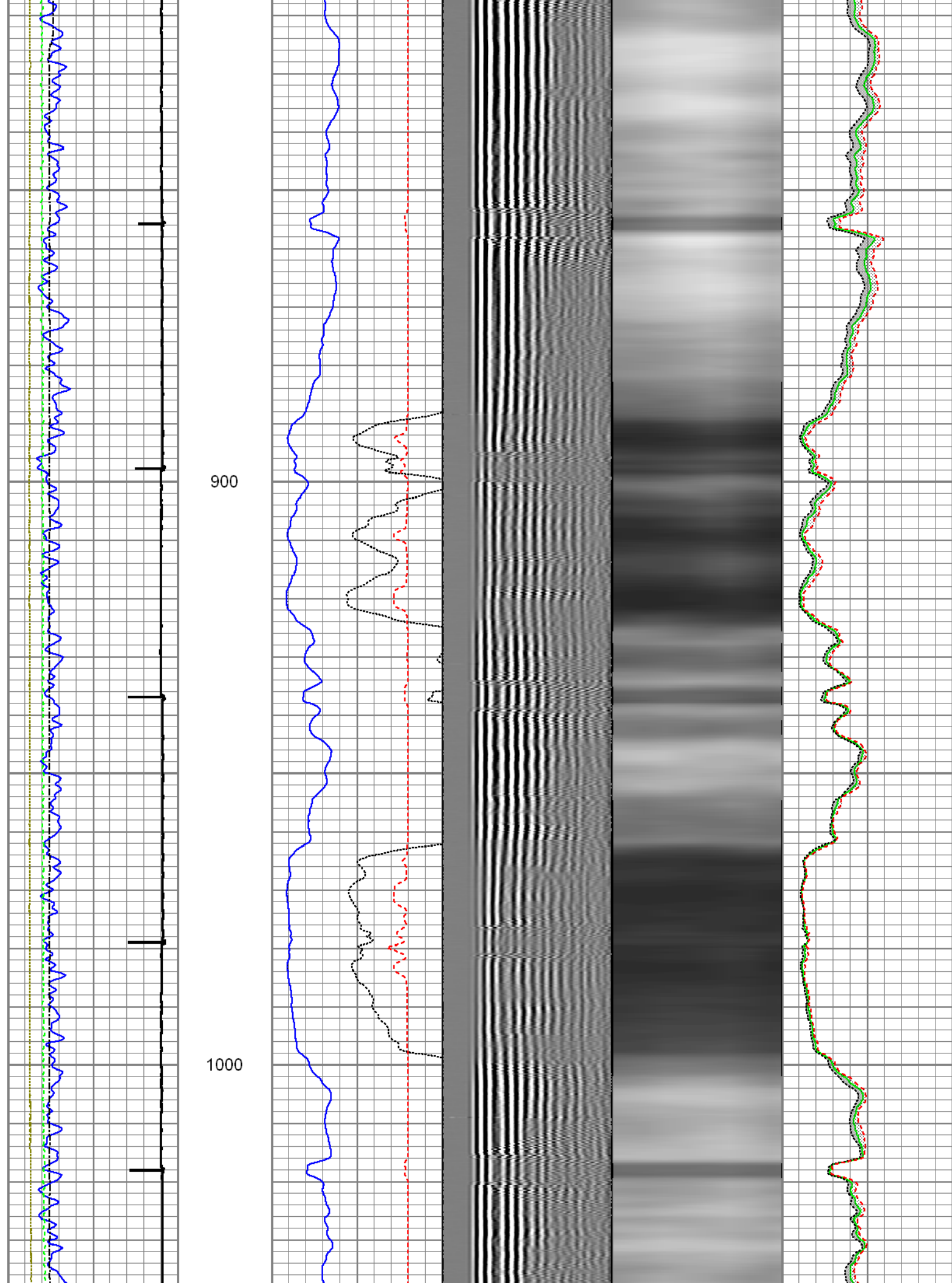


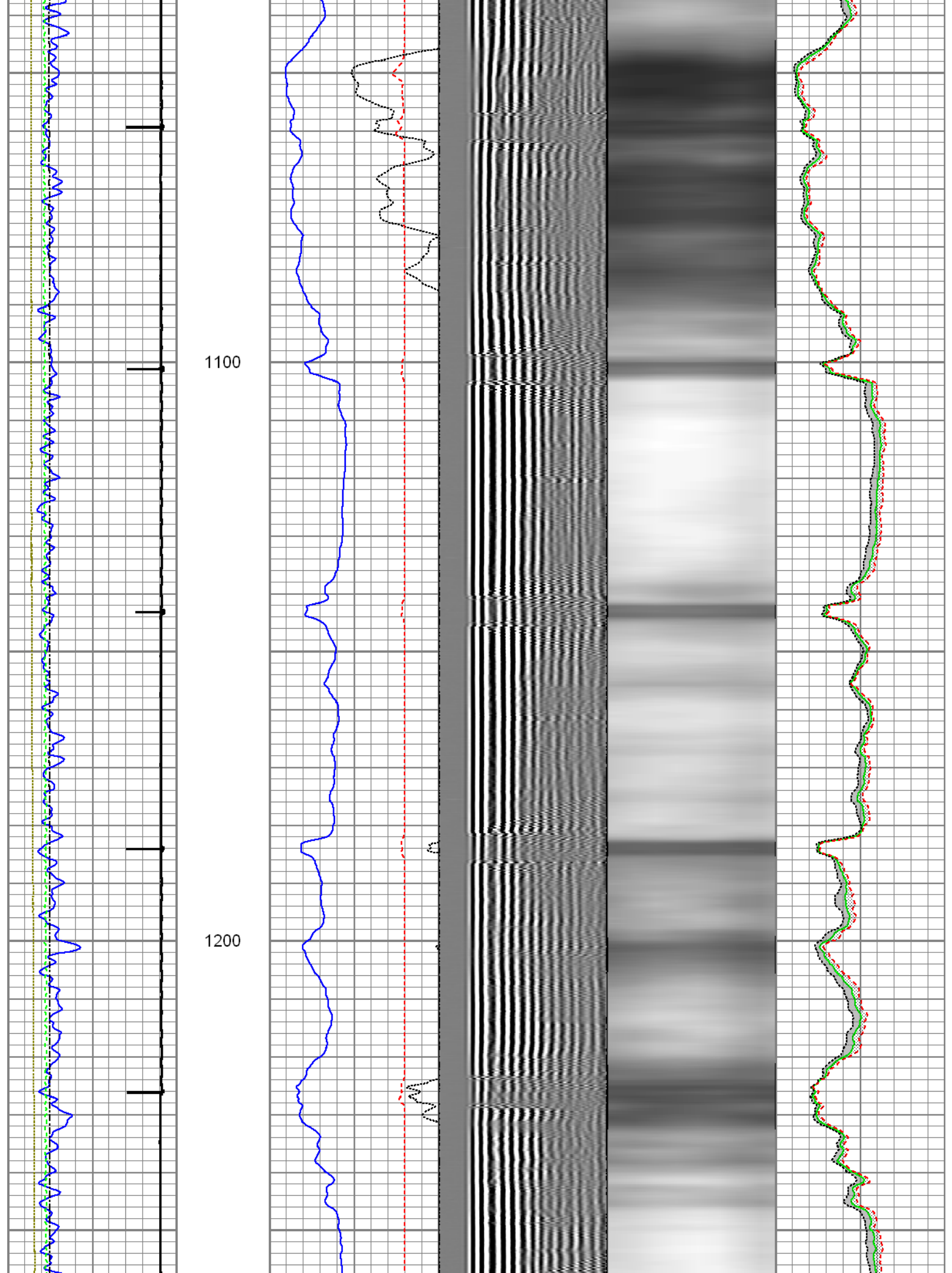




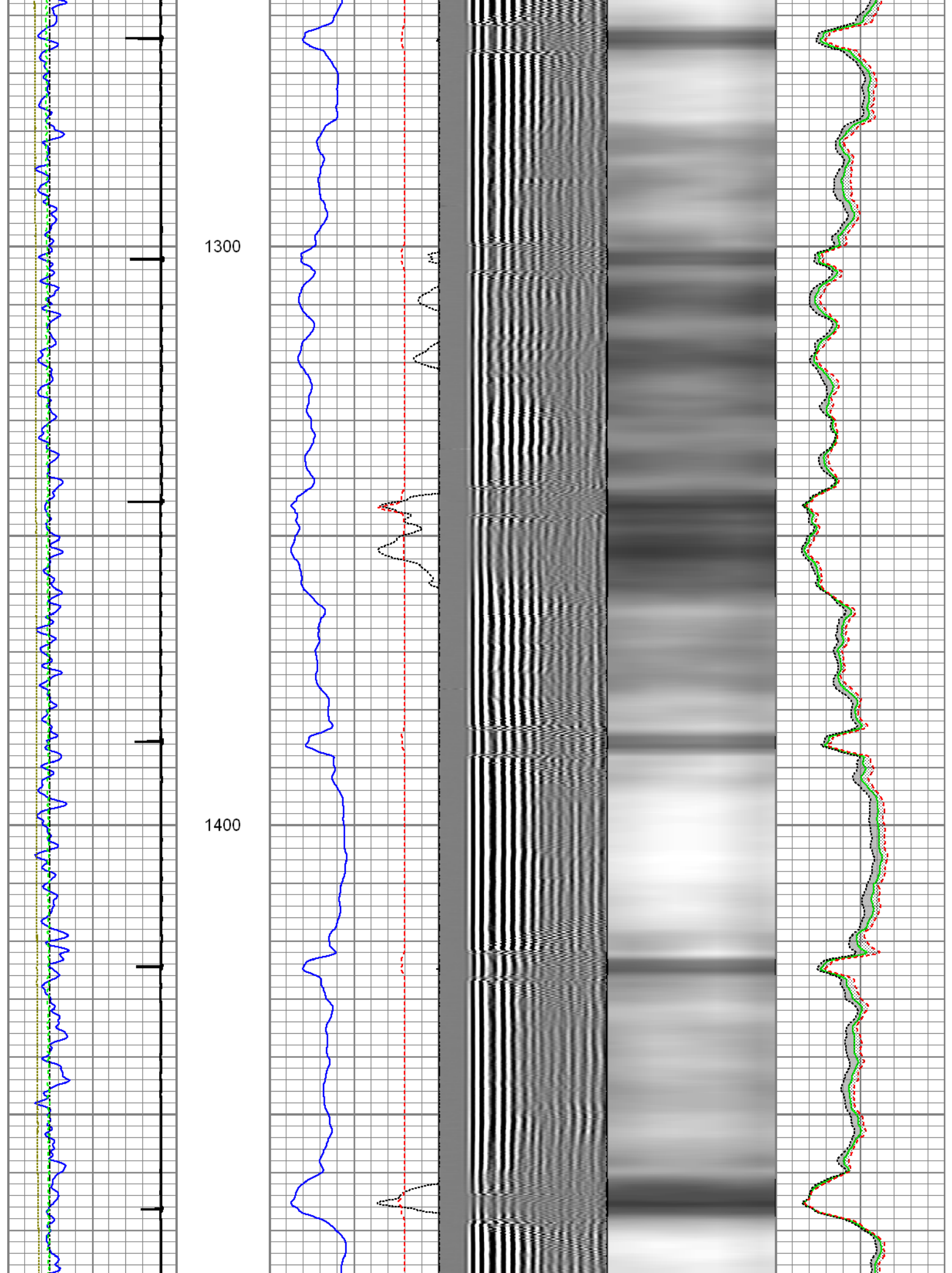




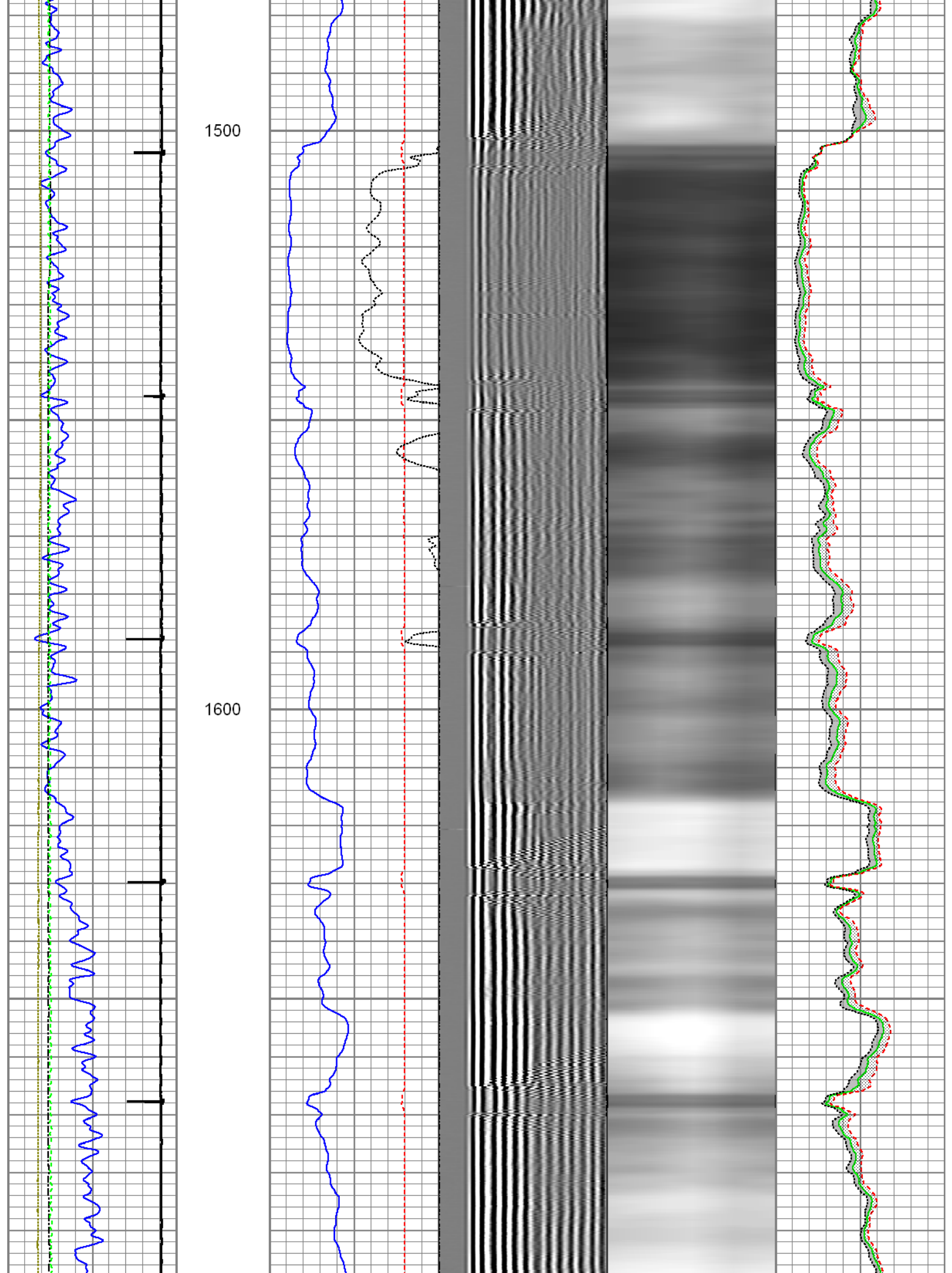








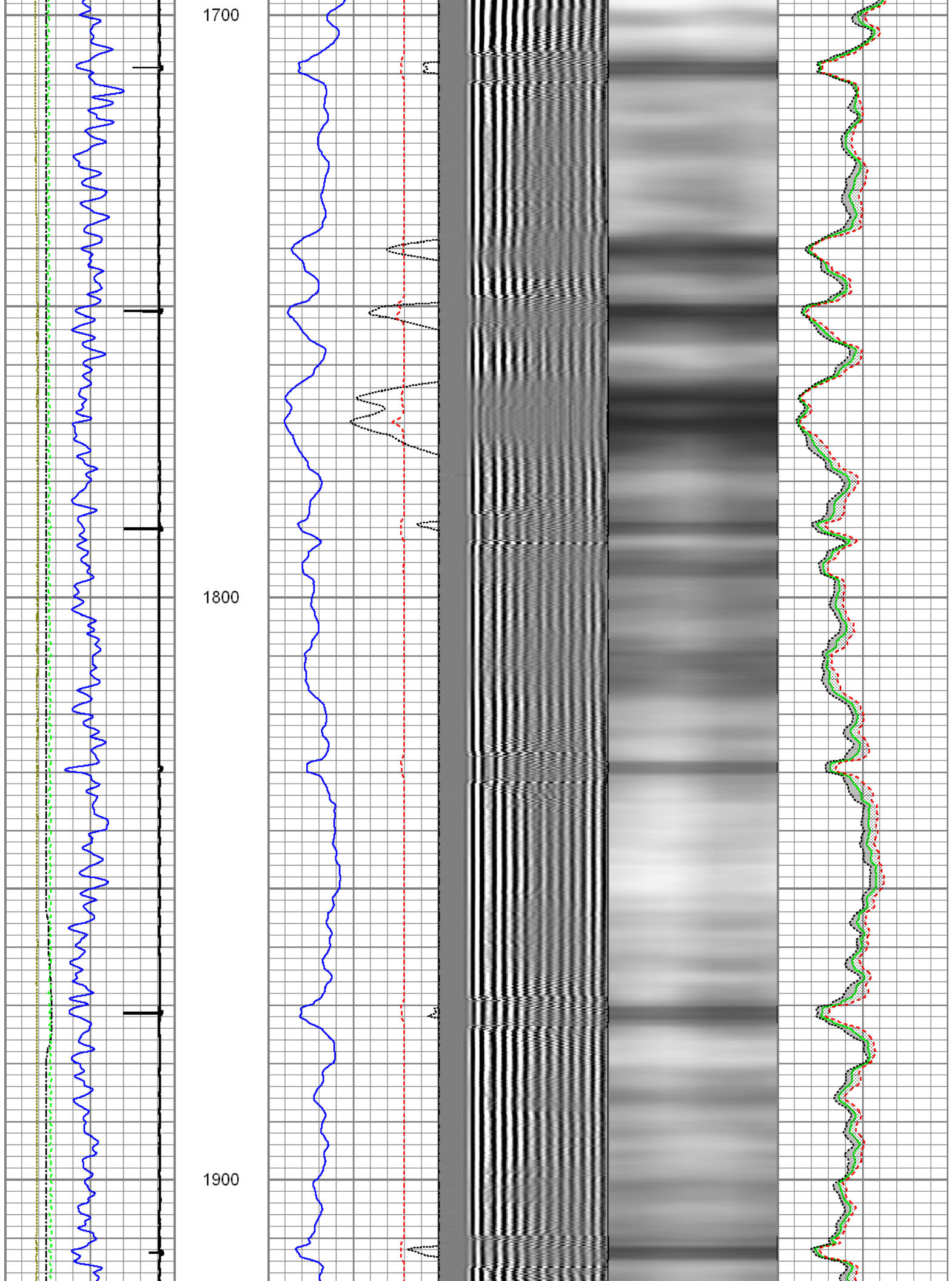


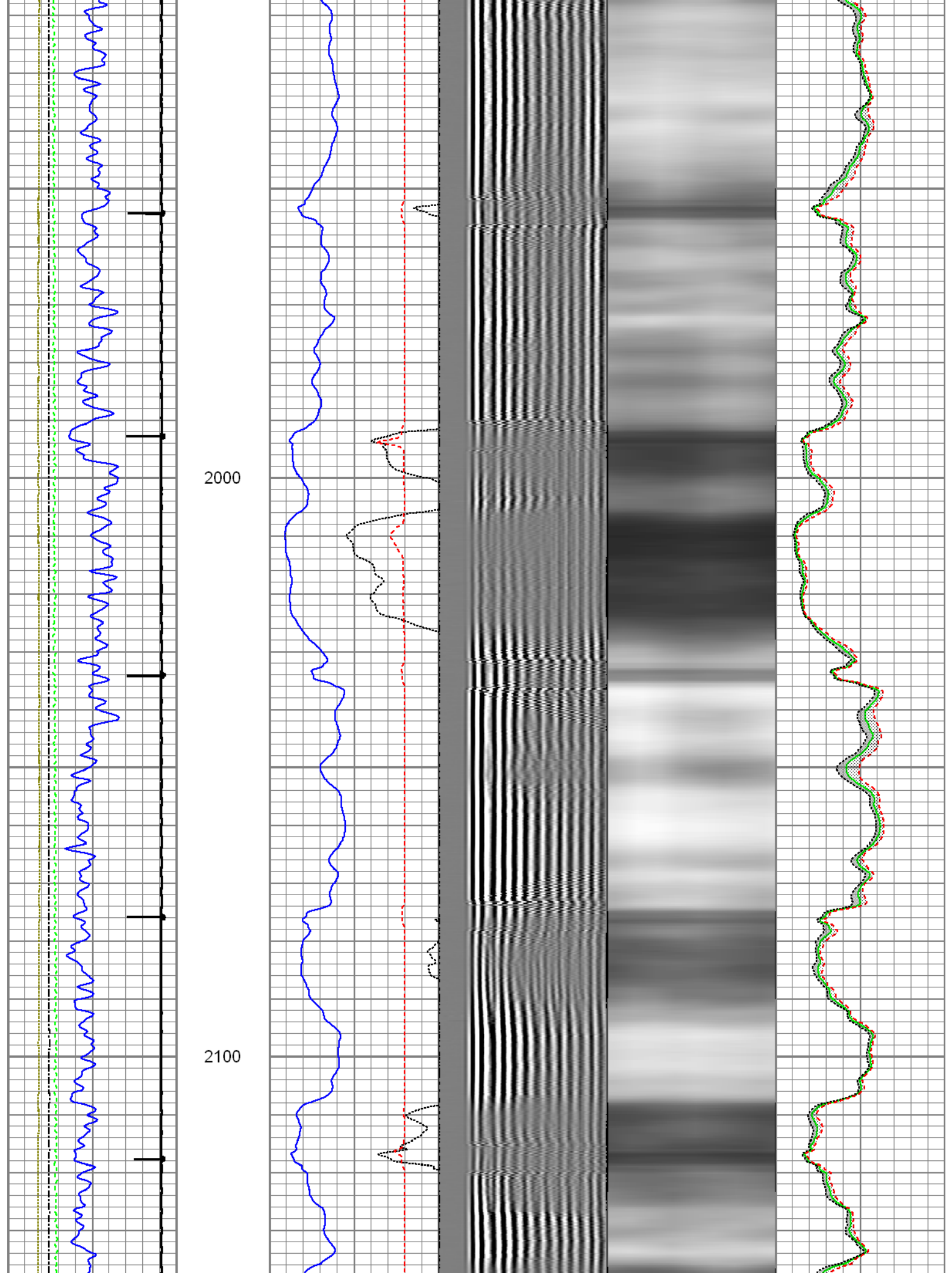


1700

1800

1900

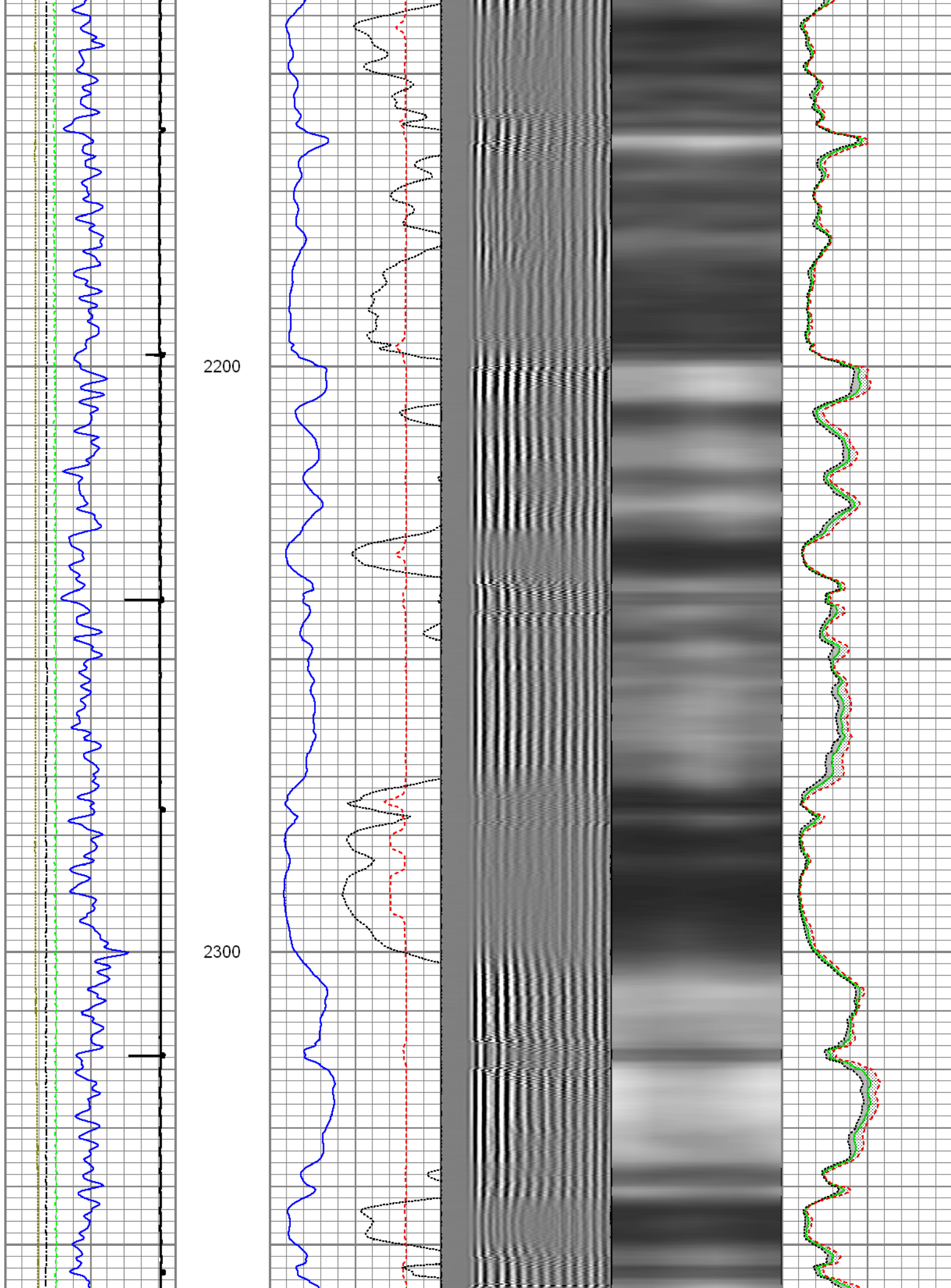




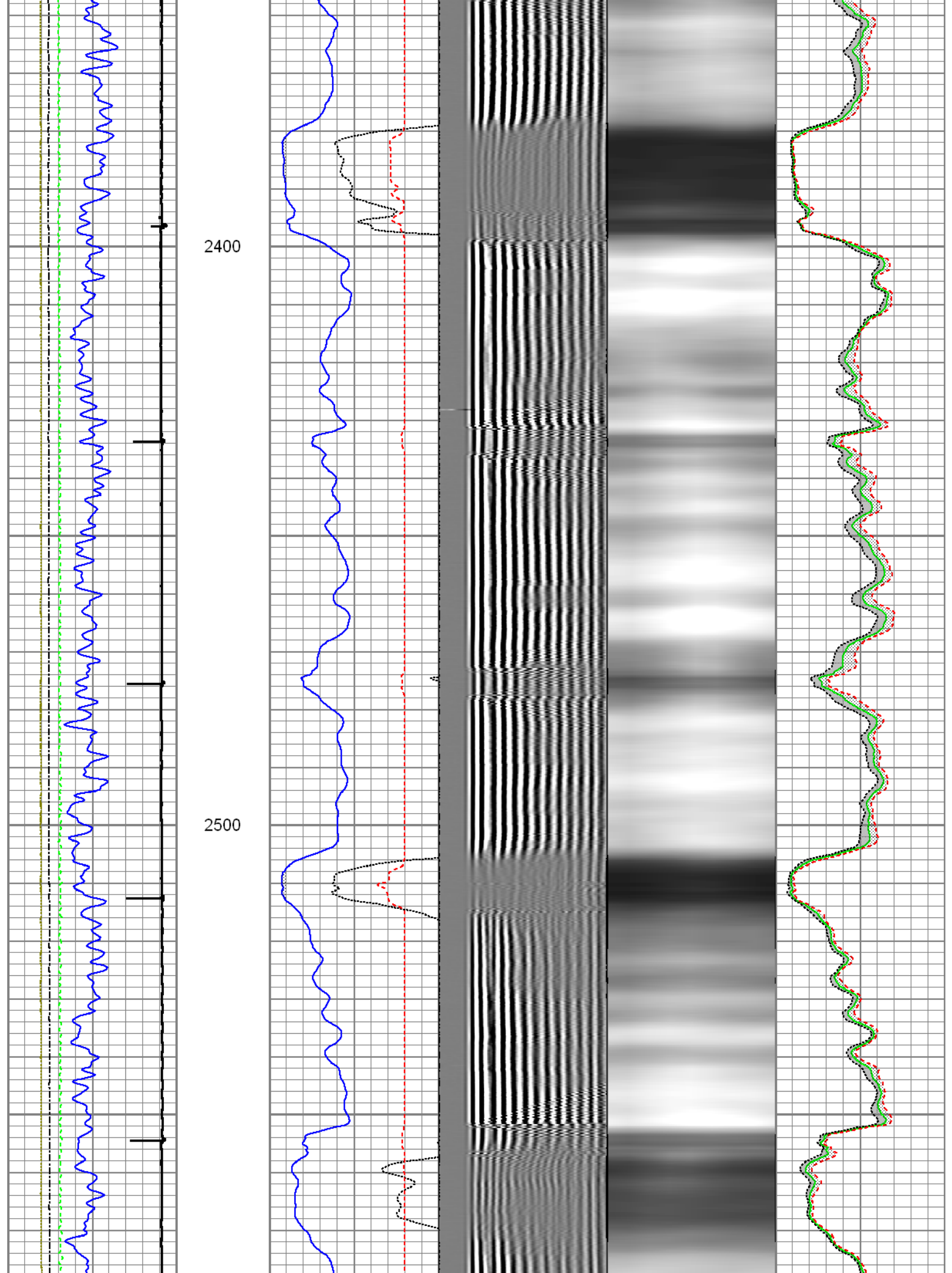


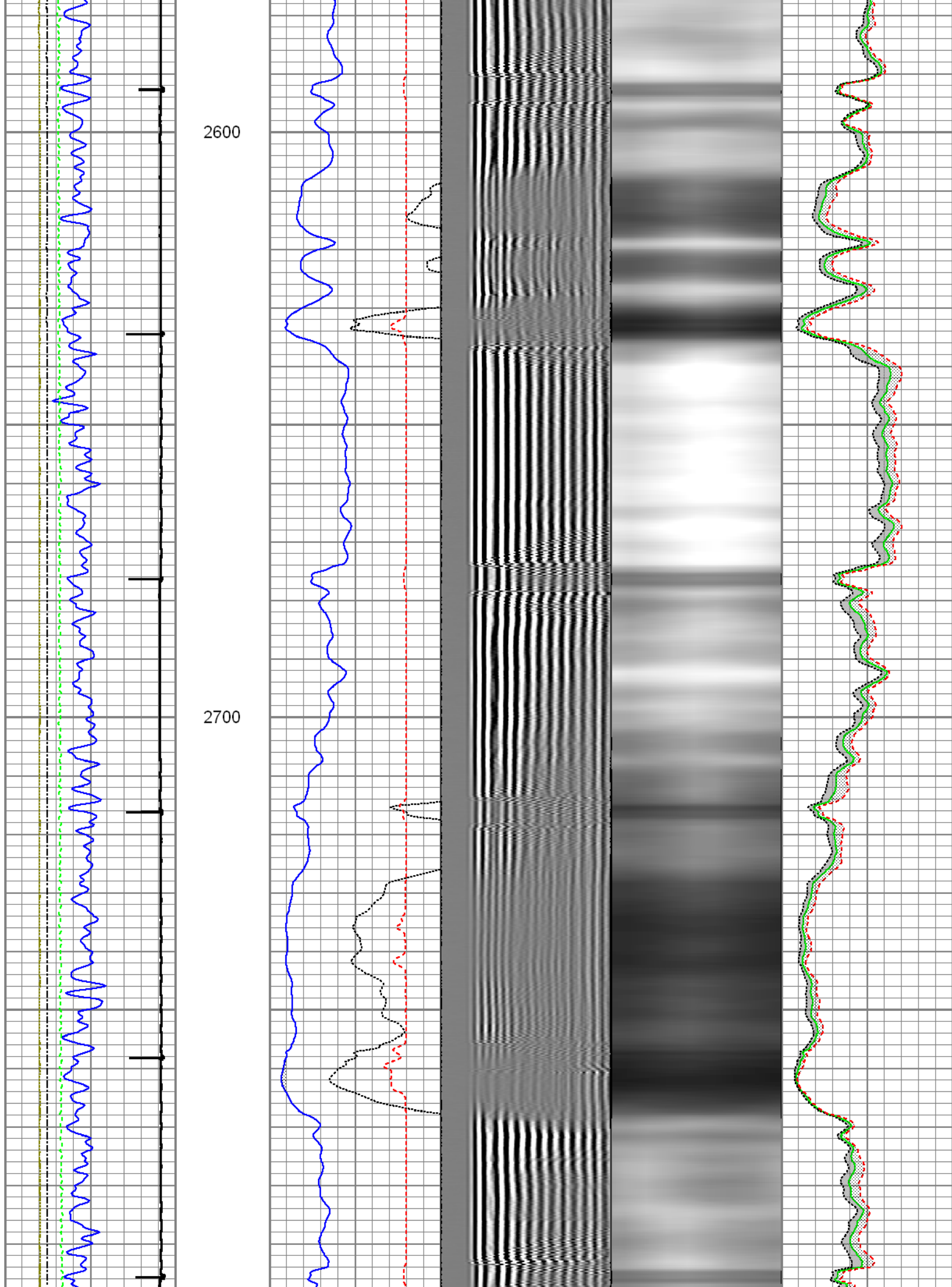
2200

2300





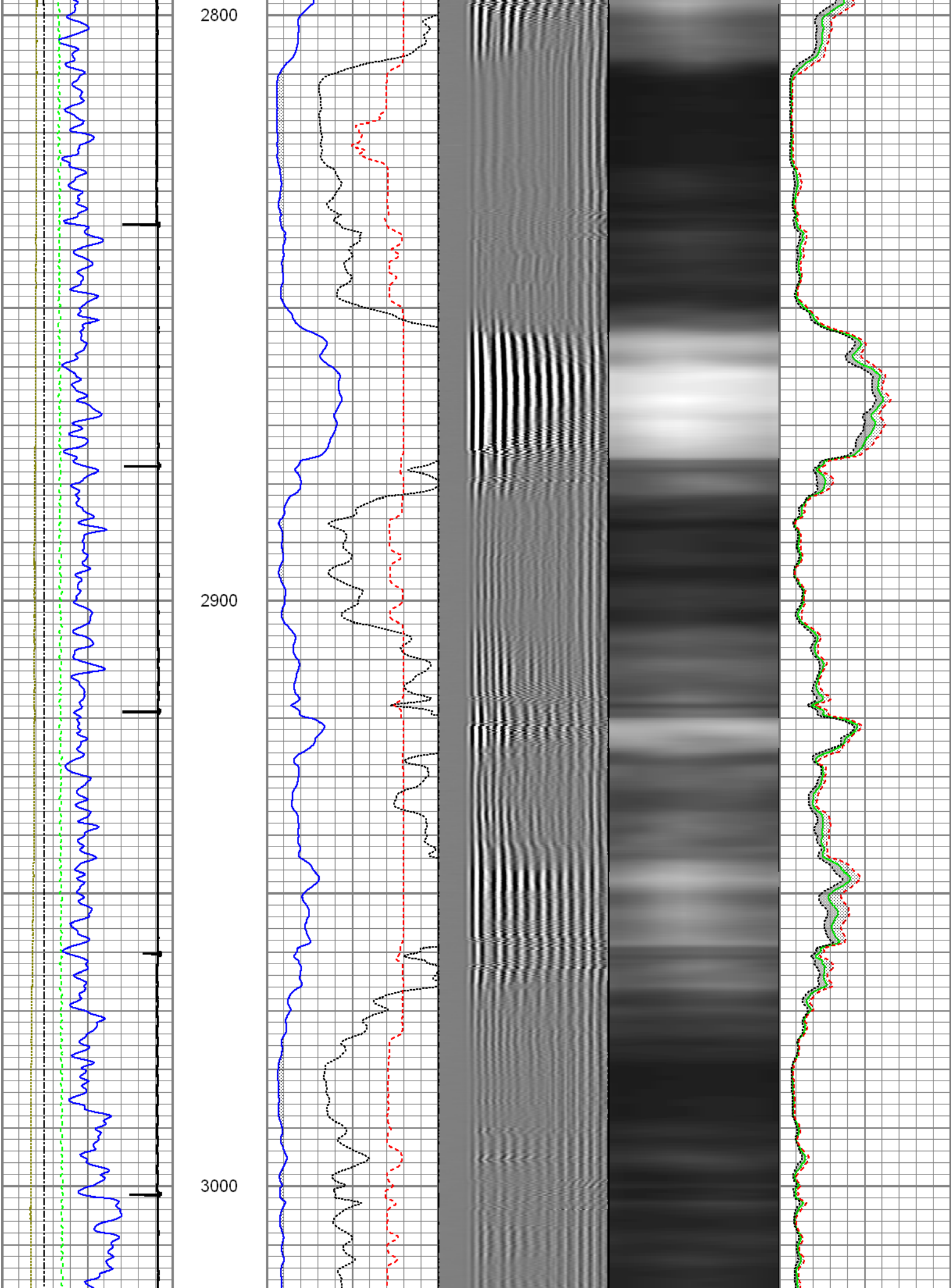




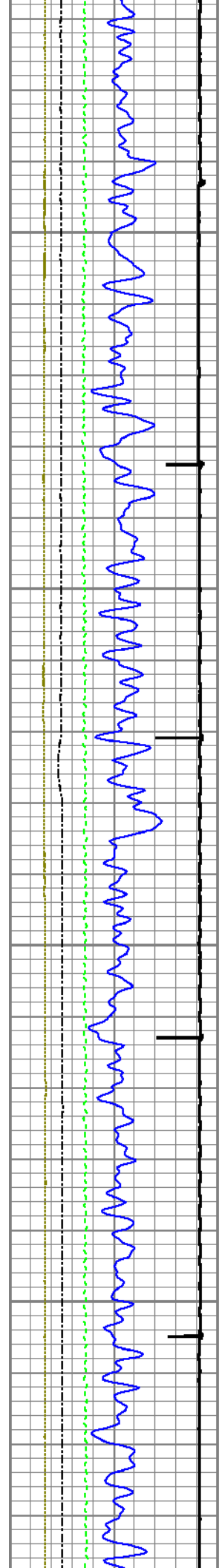
2800

2900

3000

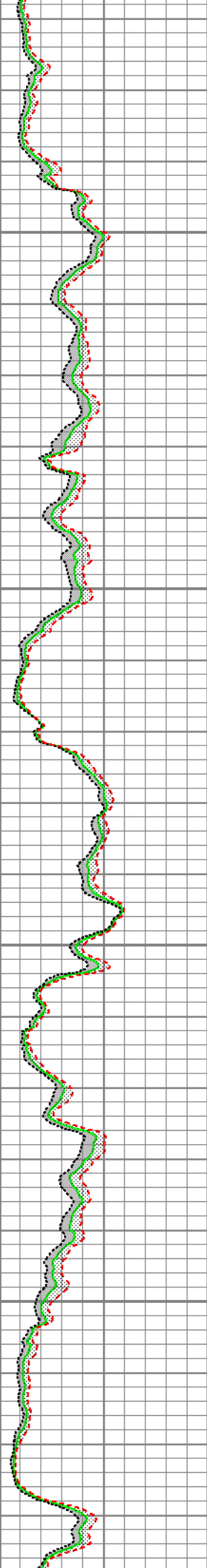
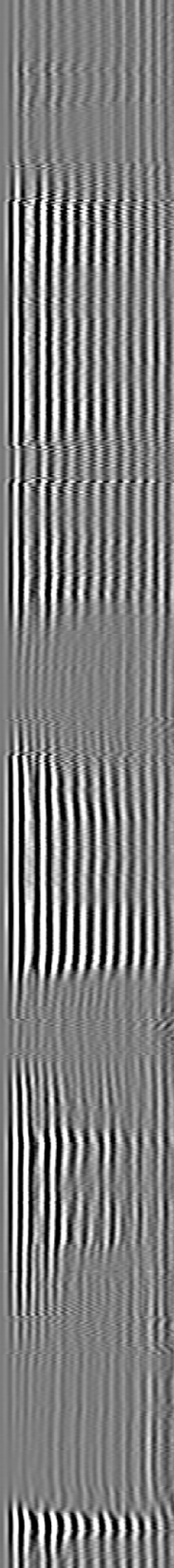
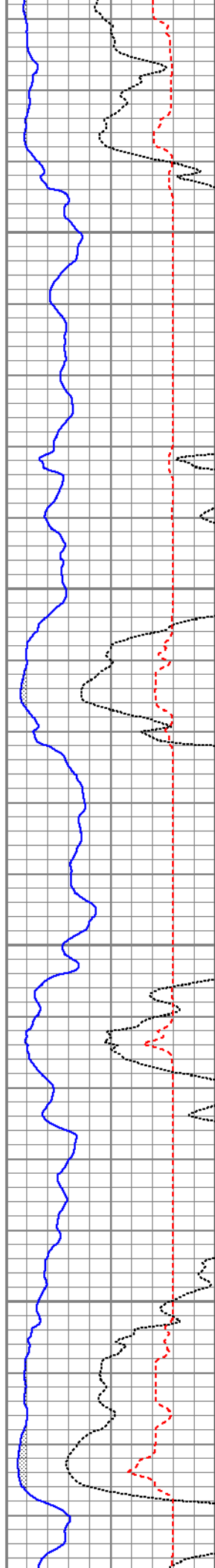




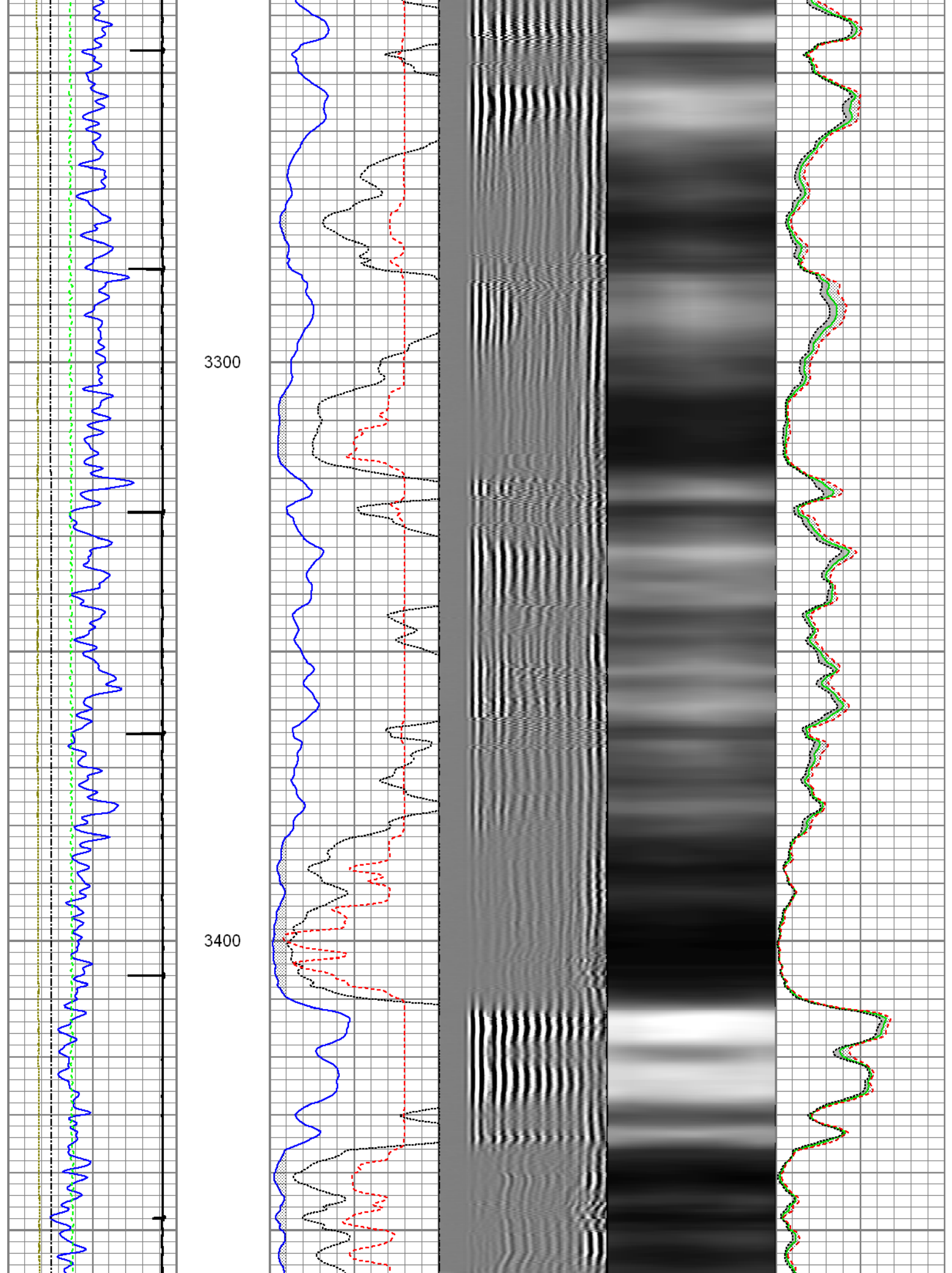


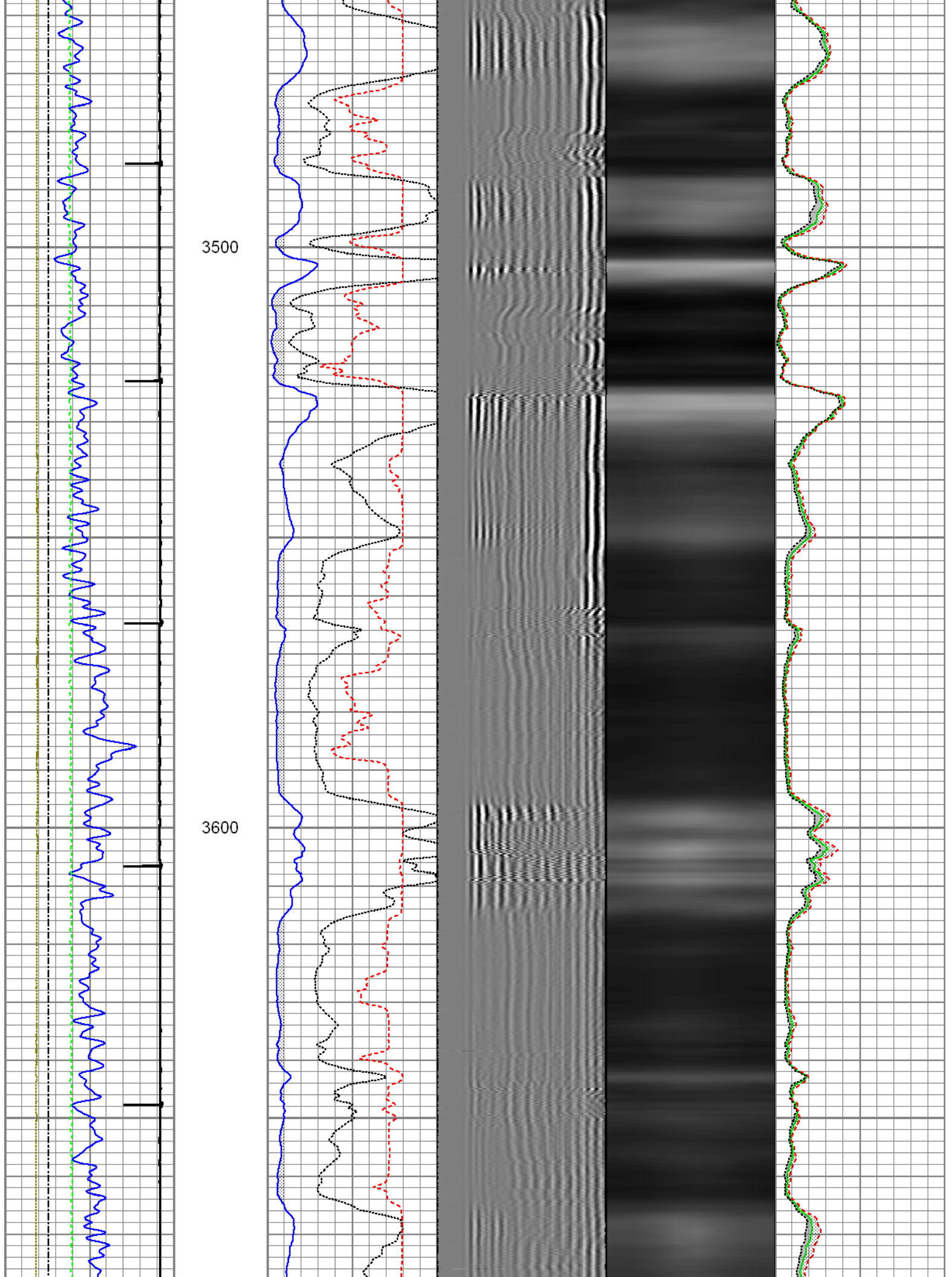
3100

3200



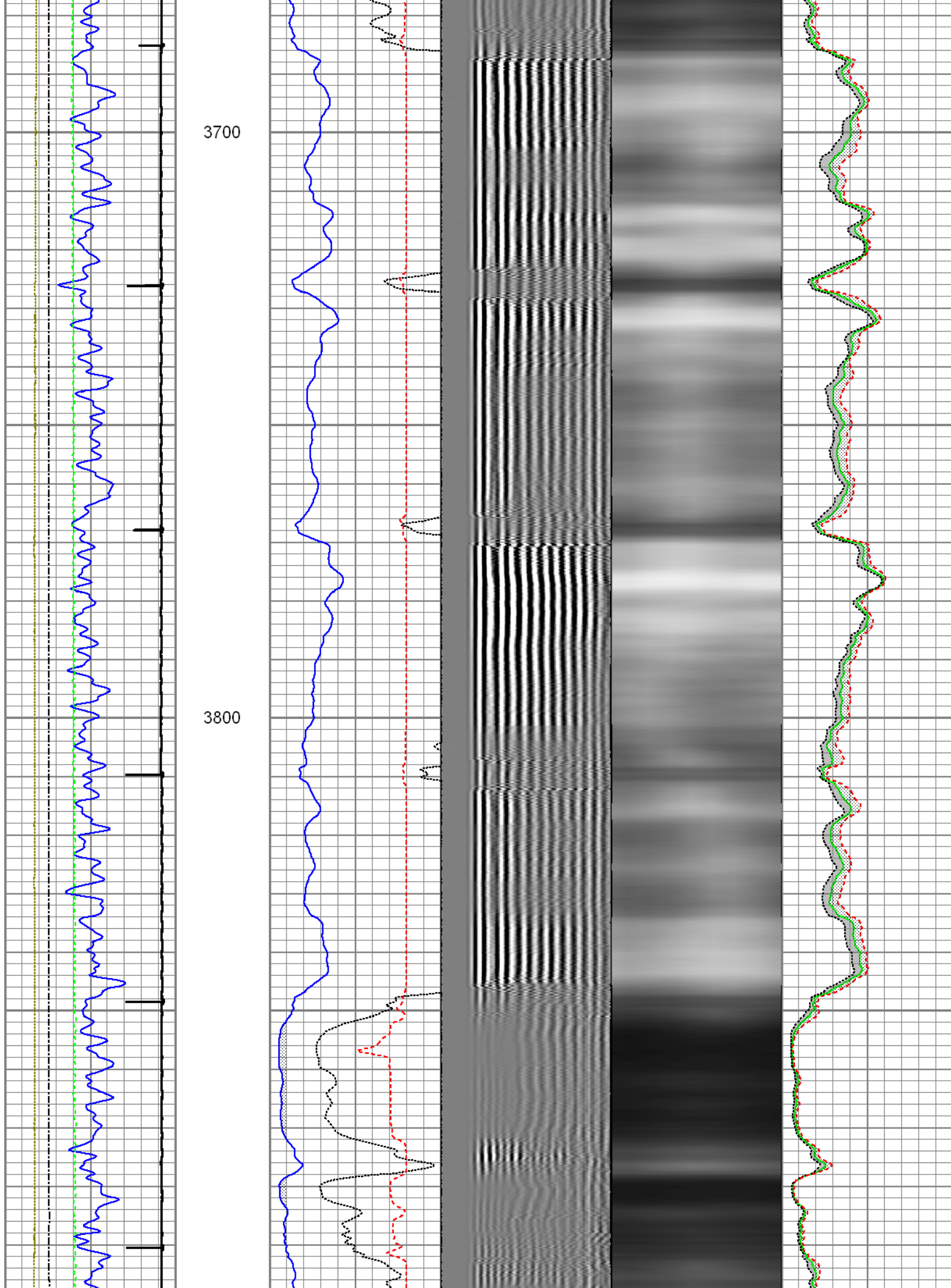






3700

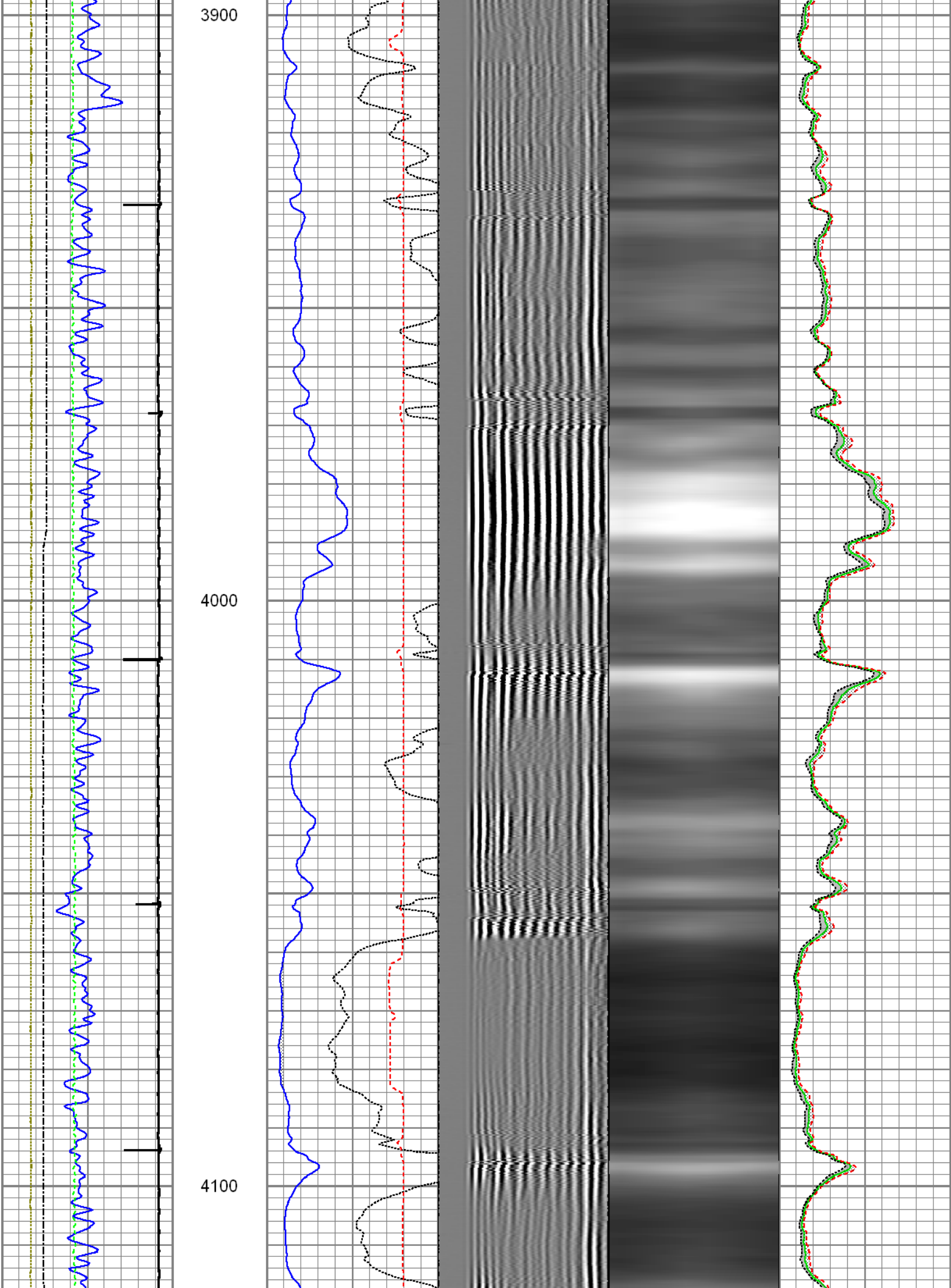
3800



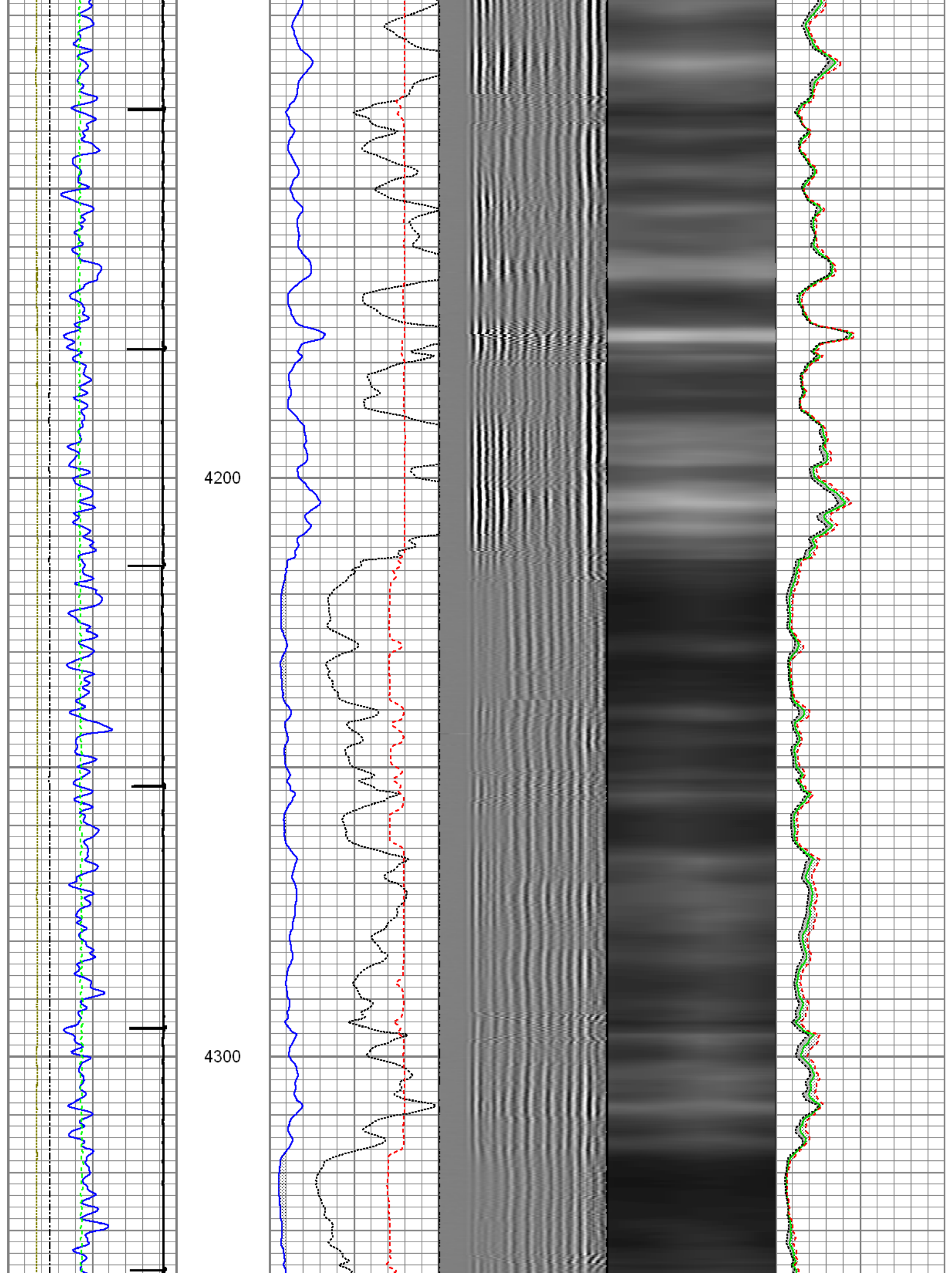
3900

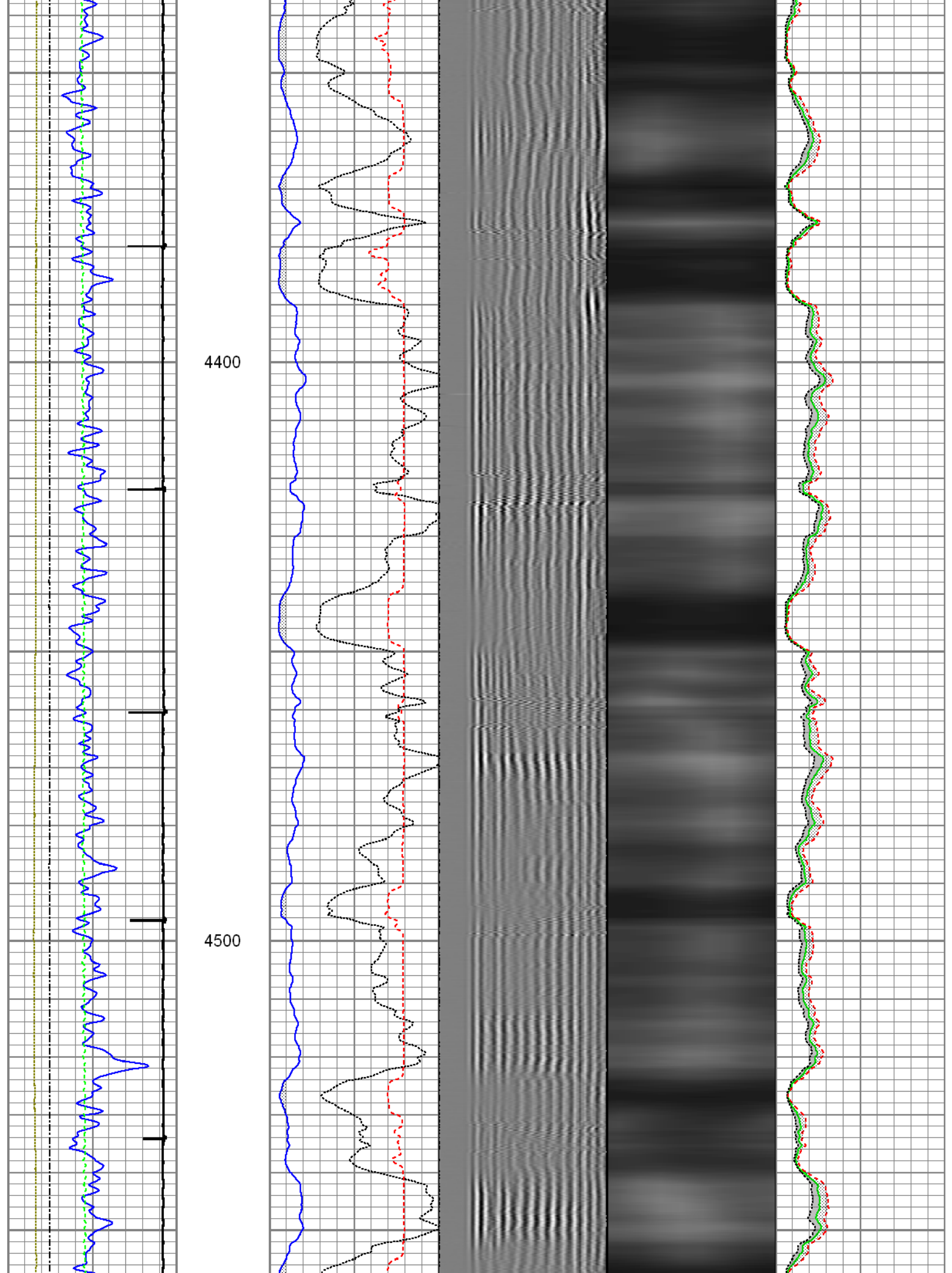
4000

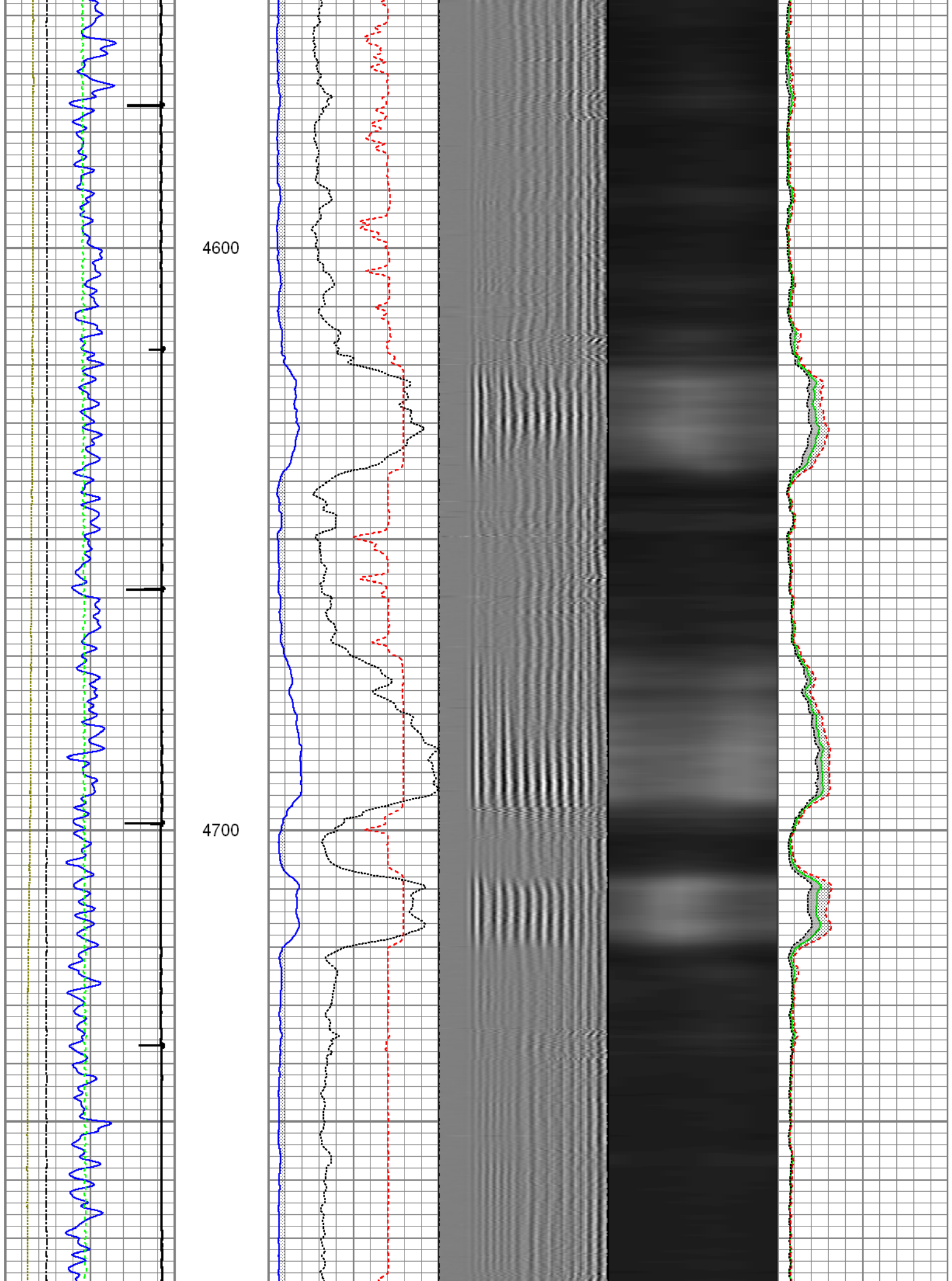
4100

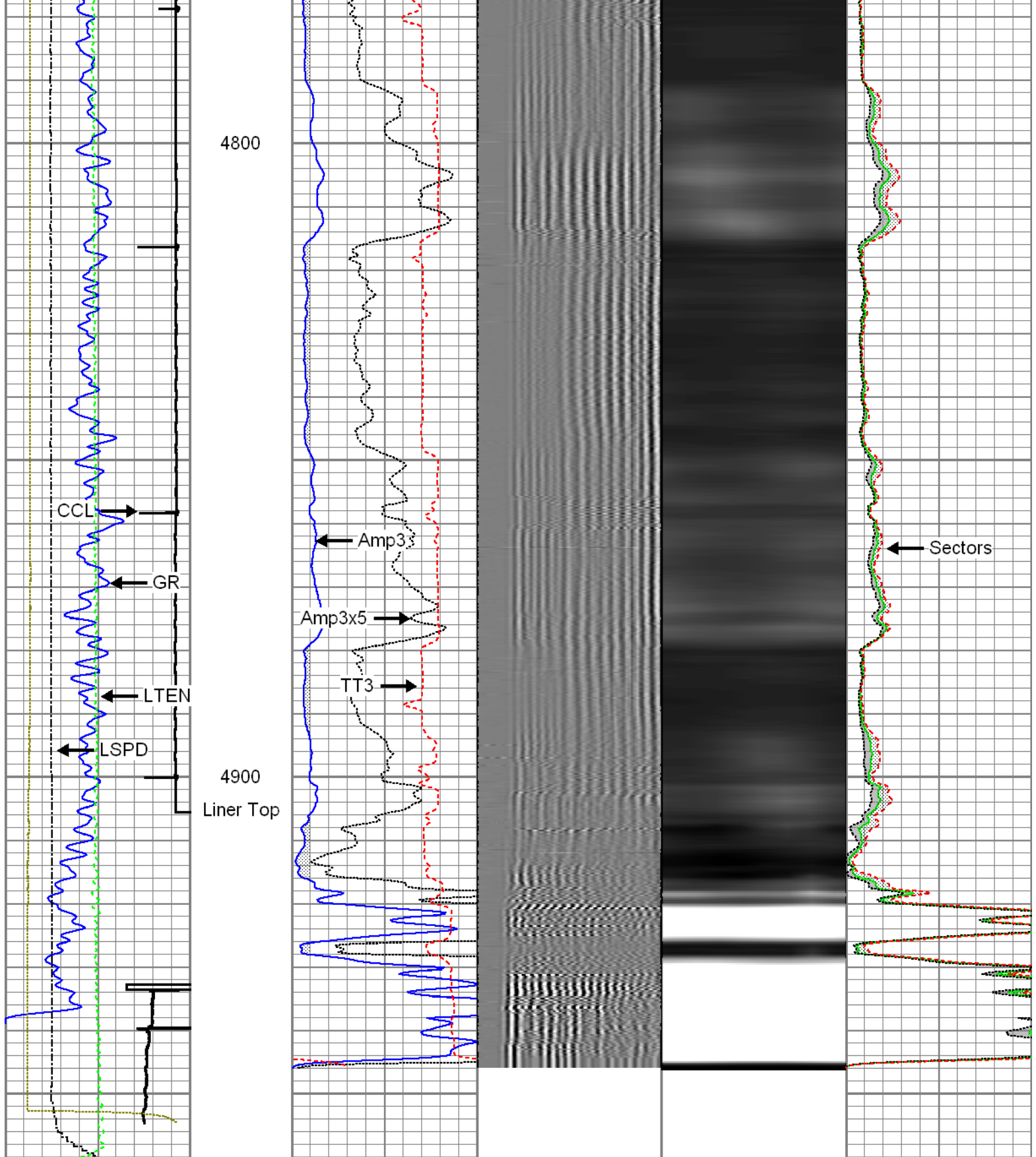












Gamma Ray 0 (GAPI) 120	3' Amplitude 0 (mV) 100	5' Variable Density Log 200 1200	Sector Map	Average Amplitude 0 100
Casing Collar Locator	3' Amplitude x 5 0 (mV) 20			Minimum Amplitude 0 100
Line Speed -100 (ft/min) 100	3' Travel Time 650 (usec) 150			Maximum Amplitude 0 100
Line Tension 0 (lb) 2000	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



Wellbore Deviation  
-10 (°) 90

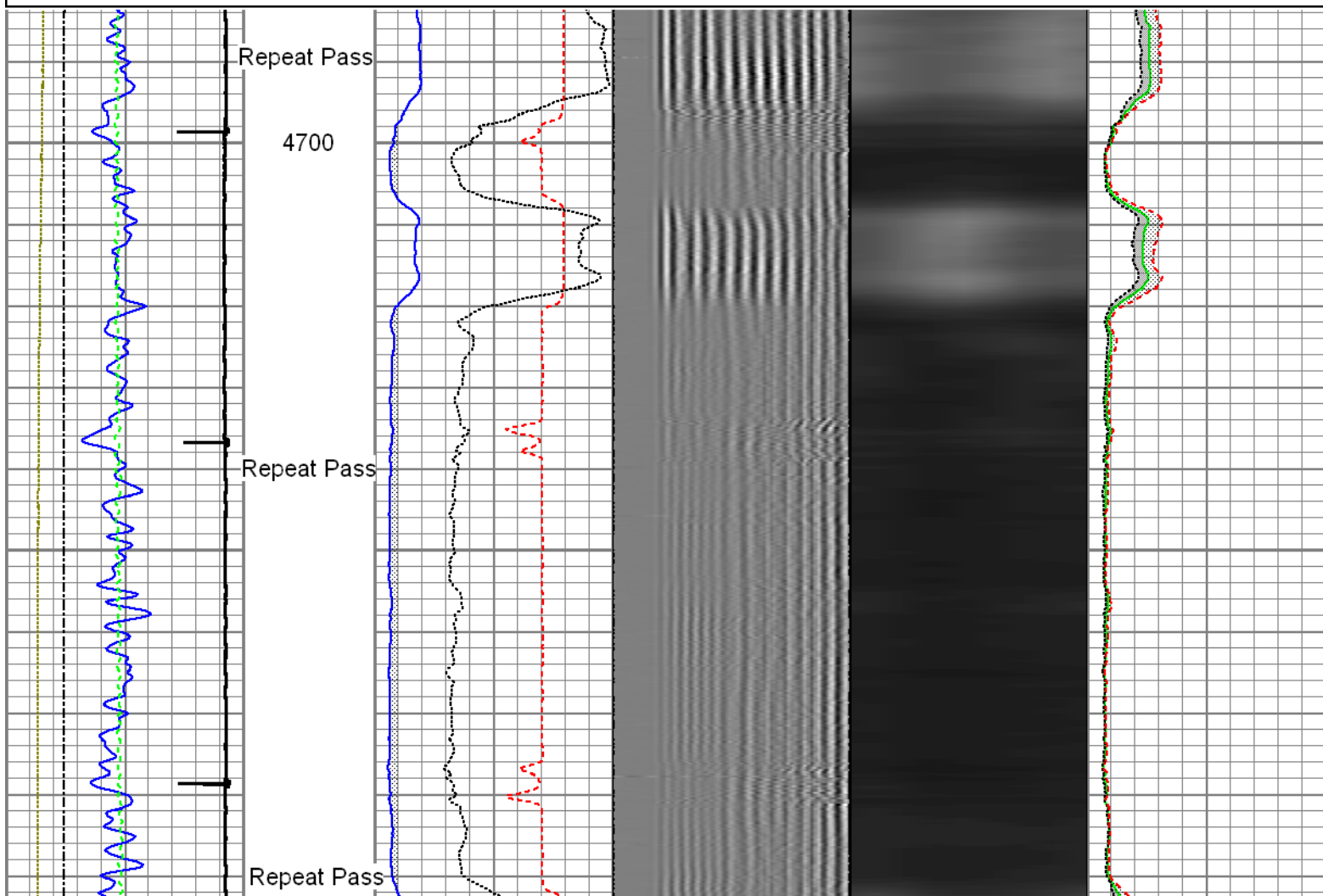


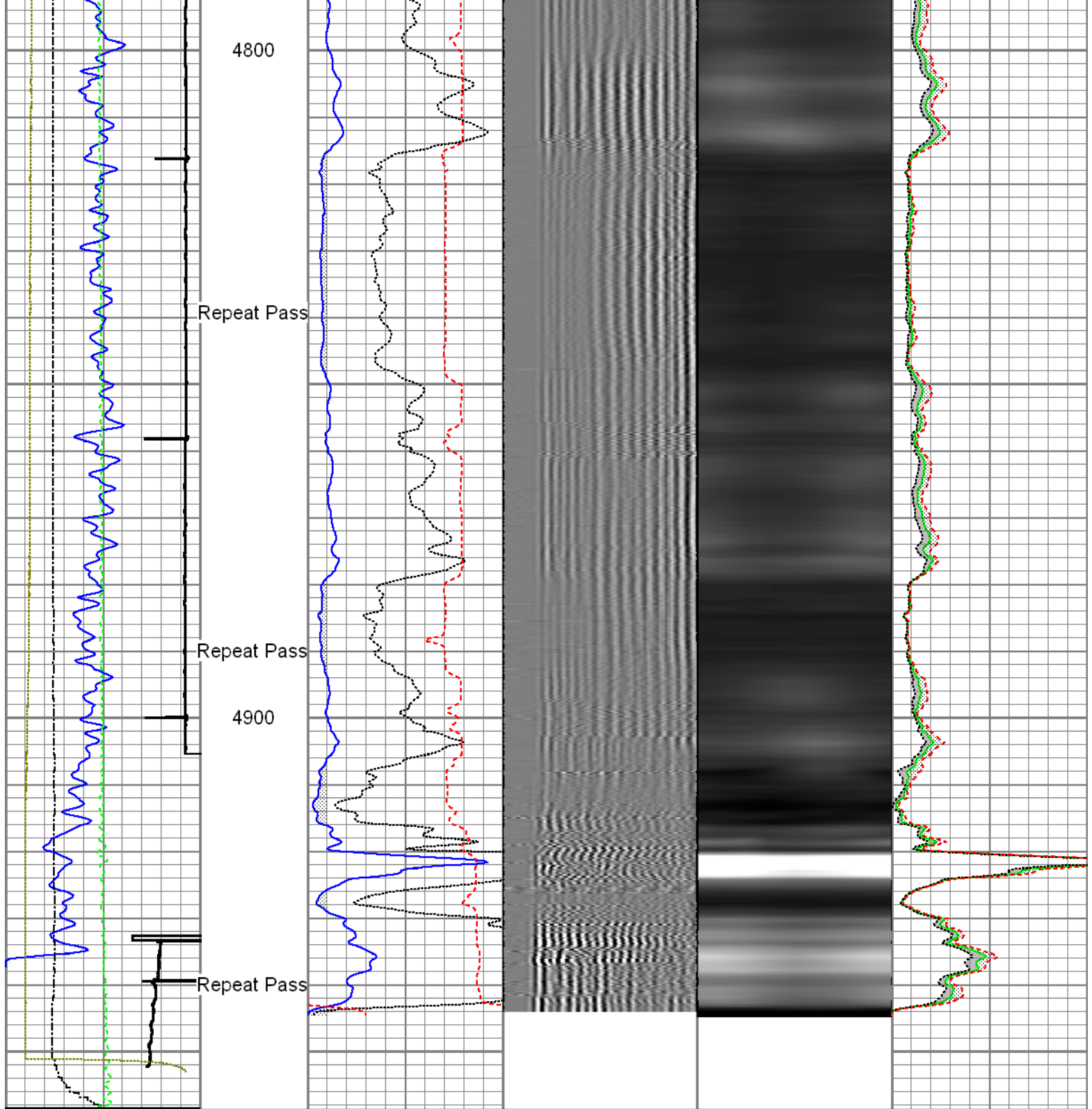
## Repeat Pass

Recorded At 1500 PSI Surface Induced Pressure

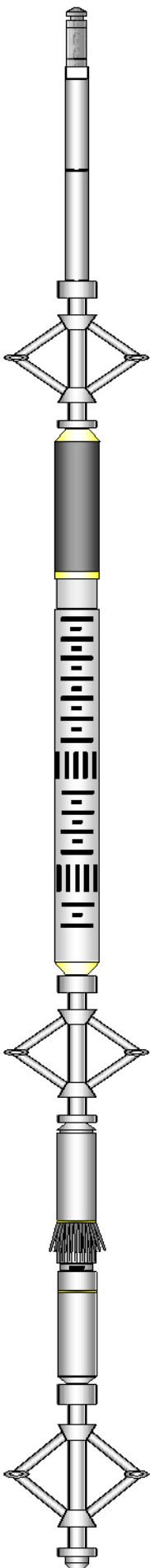

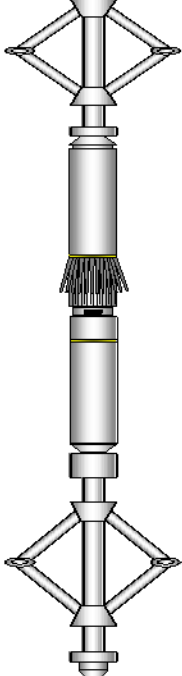
Database File: 11-21-14\_whiting\_horsetail 30f-3108\_mit\_rbl.db  
Dataset Pathname: pass42  
Presentation Format: rbt4\_mit  
Dataset Creation: Fri Nov 21 15:52:11 2014 by Log 7.0 B1  
Charted by: Depth in Feet scaled 1:240

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





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				
Wellbore Deviation				
-10 (°) 90				

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	22.81		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 (211461) 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_PRC #4 -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					
CBLROT	15.42					
WV5FT	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_042 (10014703) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC #3 -UW_PRC_057 (1102) 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: 11-21-14\_Whiting\_Horsetail 30F-3108\_MIT\_RBL.db: field/well/run1/pass44  
 Total Length: 27.05 ft  
 Total Weight: 319.30 lb  
 O D: 3.13 in

# Calibration Report

Database File: 11-21-14\_whiting\_horsetail 30f-3108\_mit\_rbl.db  
 Dataset Pathname: pass43  
 Dataset Creation: Fri Nov 21 16:00:49 2014 by Log 7.0 B1

## Multi-finger Imaging Tool Calibration Report

Serial Number: 10014703  
 Number of Fingers: 40  
 Tool Model: UW\_MIT40\_042

## Inclinometer Calibration Report

Performed: Fri Sep 20 11:47:48 2013  
 Calibration Angle: 45

	Inc X	Inc Y
Vertical:	1963	1960
Finger 1 up:	1748	1727
Finger 31 up:	2195	1742
Finger 21 up:	2178	2188
Finger 11 up:	1727	2173
Sensitivity ratio:	1.00706	
X-axis angle:	132.825	
Deviation const.:	317.775	

## Finger Calibration Report

Performed: Fri Nov 21 14:43:55 2014

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	1067	374.0	1441	374.0	1815	399.0	2214
Finger 02:	1044	379.0	1423	388.0	1811	422.0	2233
Finger 03:	1036	367.0	1403	378.0	1781	410.0	2191
Finger 04:	993	377.0	1370	400.0	1770	438.0	2208
Finger 05:	1014	356.0	1370	375.0	1745	402.0	2147
Finger 06:	974	359.0	1333	384.0	1717	416.0	2133
Finger 07:	1018	366.0	1384	384.0	1768	411.0	2179
Finger 08:	989	363.0	1352	398.0	1750	429.0	2179
Finger 09:	1053	366.0	1419	388.0	1807	401.0	2208
Finger 10:	1009	357.0	1366	389.0	1755	408.0	2163
Finger 11:	999	357.0	1356	394.0	1750	417.0	2167
Finger 12:	1089	355.0	1444	377.0	1821	382.0	2203
Finger 13:	1059	356.0	1415	393.0	1808	410.0	2218
Finger 14:	1015	364.0	1379	409.0	1788	426.0	2214
Finger 15:	981	361.0	1342	410.0	1752	429.0	2181
Finger 16:	1020	364.0	1384	401.0	1785	414.0	2199
Finger 17:	1070	355.0	1425	391.0	1816	398.0	2214
Finger 18:	1070	350.0	1420	385.0	1805	394.0	2199
Finger 19:	1070	363.0	1433	399.0	1832	408.0	2240
Finger 20:	973	359.0	1332	409.0	1741	424.0	2165
Finger 21:	1075	361.0	1436	395.0	1831	409.0	2240
Finger 22:	1069	366.0	1435	398.0	1833	412.0	2245
Finger 23:	1112	369.0	1481	397.0	1878	410.0	2288
Finger 24:	1100	345.0	1445	369.0	1814	385.0	2199
Finger 25:	1102	379.0	1481	402.0	1883	412.0	2295
Finger 26:	1047	363.0	1410	389.0	1799	410.0	2209
Finger 27:	1226	389.0	1615	397.0	2012	400.0	2412
Finger 28:	1072	359.0	1431	376.0	1807	403.0	2210
Finger 29:	1057	374.0	1431	392.0	1823	418.0	2241
Finger 30:	1042	378.0	1420	396.0	1816	424.0	2240
Finger 31:	1230	402.0	1632	403.0	2035	421.0	2456
Finger 32:	1084	374.0	1458	376.0	1834	395.0	2229
Finger 33:	1078	396.0	1474	398.0	1872	432.0	2304



Finger 34:	1061	376.0	1437	380.0	1817	409.0	2226
Finger 35:	1146	400.0	1546	400.0	1946	423.0	2369
Finger 36:	1038	362.0	1400	364.0	1764	396.0	2160
Finger 37:	1109	394.0	1503	394.0	1897	423.0	2320
Finger 38:	1075	371.0	1446	373.0	1819	403.0	2222
Finger 39:	1076	364.0	1440	361.0	1801	392.0	2193
Finger 40:	989	390.0	1379	403.0	1782	441.0	2223

Segmented Cement Bond Log Calibration Report

Serial Number:	1066
Tool Model:	UW_RBT_004
Calibration Casing Diameter:	5.500 in
Calibration Depth:	36.410 ft

Master Calibration, performed Fri Nov 21 10:24:45 2014:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.005	1.000	1.000	71.921	71.251	0.670
5FT	-0.001	1.000	1.000	71.921	70.835	1.086
S1	0.005	1.000	0.000	100.000	100.540	-0.540
S2	0.004	1.000	0.000	100.000	100.368	-0.368
S3	0.004	1.000	0.000	100.000	100.375	-0.375
S4	0.004	1.000	0.000	100.000	100.368	-0.368
S5	0.004	1.000	0.000	100.000	100.450	-0.450
S6	0.004	1.000	0.000	100.000	100.368	-0.368
S7	0.004	1.000	0.000	100.000	100.412	-0.412
S8	0.004	1.000	0.000	100.000	100.396	-0.396

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	Whiting Oil & Gas Corporation
Well	Horsetail 30F-3108
Field	Wildcat
County	Weld
State	Colorado