

# Radial Cement Bond Gamma Ray Casing Collar Log

Company	Whiting Oil & Gas Corporation	Company	Whiting Oil & Gas Corporation
Well	Razor 27J-2209A	Well	Razor 27J-2209A
Field	Wildcat	Field	Wildcat
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-38067		
Permanent Datum	SEC 27 TWP 10N RGE 58W	Ground Level	Elevation 4767'
Log Measured From	Kelly Bushing	Drilling Measured From	Kelly Bushing
		Other Services	Plug MTT Gauge ring
			Elevation
			K.B. 4788'
			D.F. ---
			G.L. 4767'

Date	Nov 15, 2014
Run Number	Three
Depth Driller	13677 FT
Depth Logger	4980 FT
Bottom Logged Interval	4974 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	176°F
Estimated Cement Top	228 FT
Time Well Ready	ROA
Time Logger on Bottom	14:00
Equipment Number	HD-0119
Location	Ft. Lupton, CO
Recorded By	J. Raby
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	1595 FT		
Intermediate #1	7	29	P-110	Surface	6082 FT		
Intermediate #2							
Liner	4 1/2	11.6	HCP-110	4930 FT	13667 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.

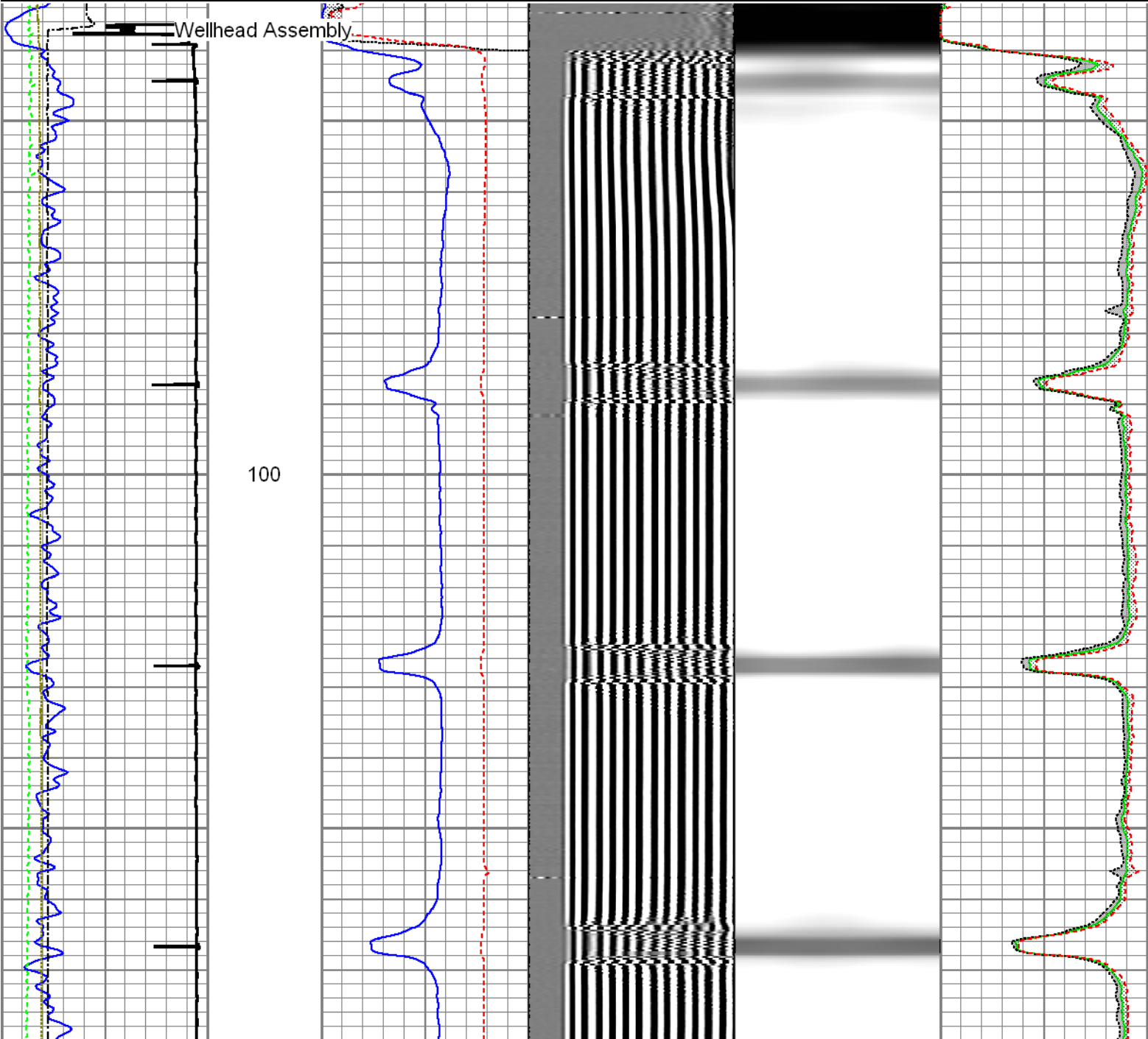
## Comments

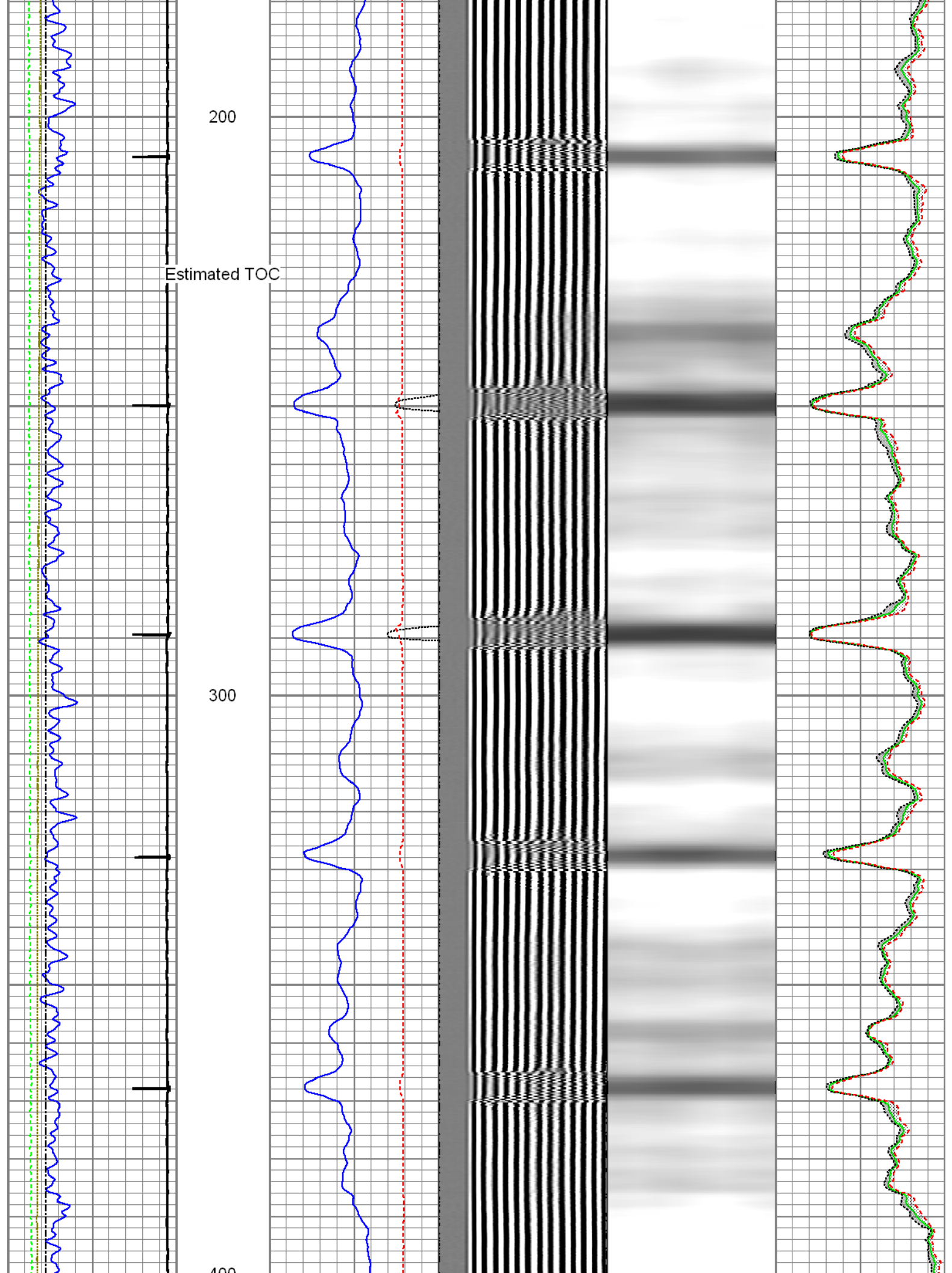
Log ran as per Customer request.  
 Depth reference to Casing Tally reported liner top @ 4930 FT.  
 Adjusted log +6 FT to correlate with liner top.  
 Log ran from below liner top to surface.  
 Log ran with 1500 PSI surface induced pressure.  
 No debris found on logging tools upon completion of operations.

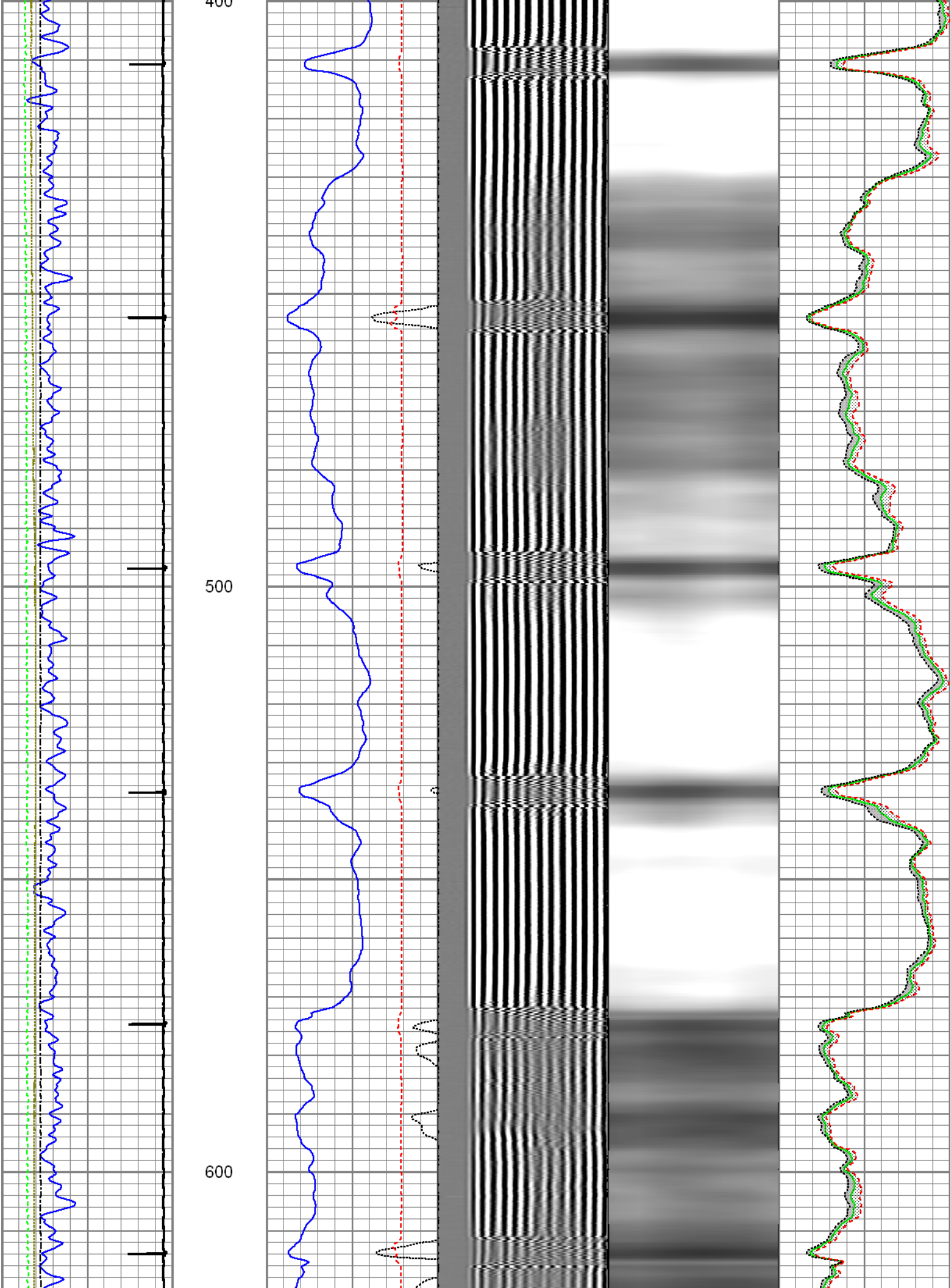
Thank you for choosing FMC Technologies Completion Services, Inc.!!

Database File: processed\_11-15-14\_whiting\_razor 27j-2209a\_mit\_rbl.db  
Dataset Pathname: pass3.2  
Presentation Format: rbt4\_mit  
Dataset Creation: Tue Nov 18 14:46:57 2014 by Calc SCH 120430  
Charted by: Depth in Feet scaled 1:240

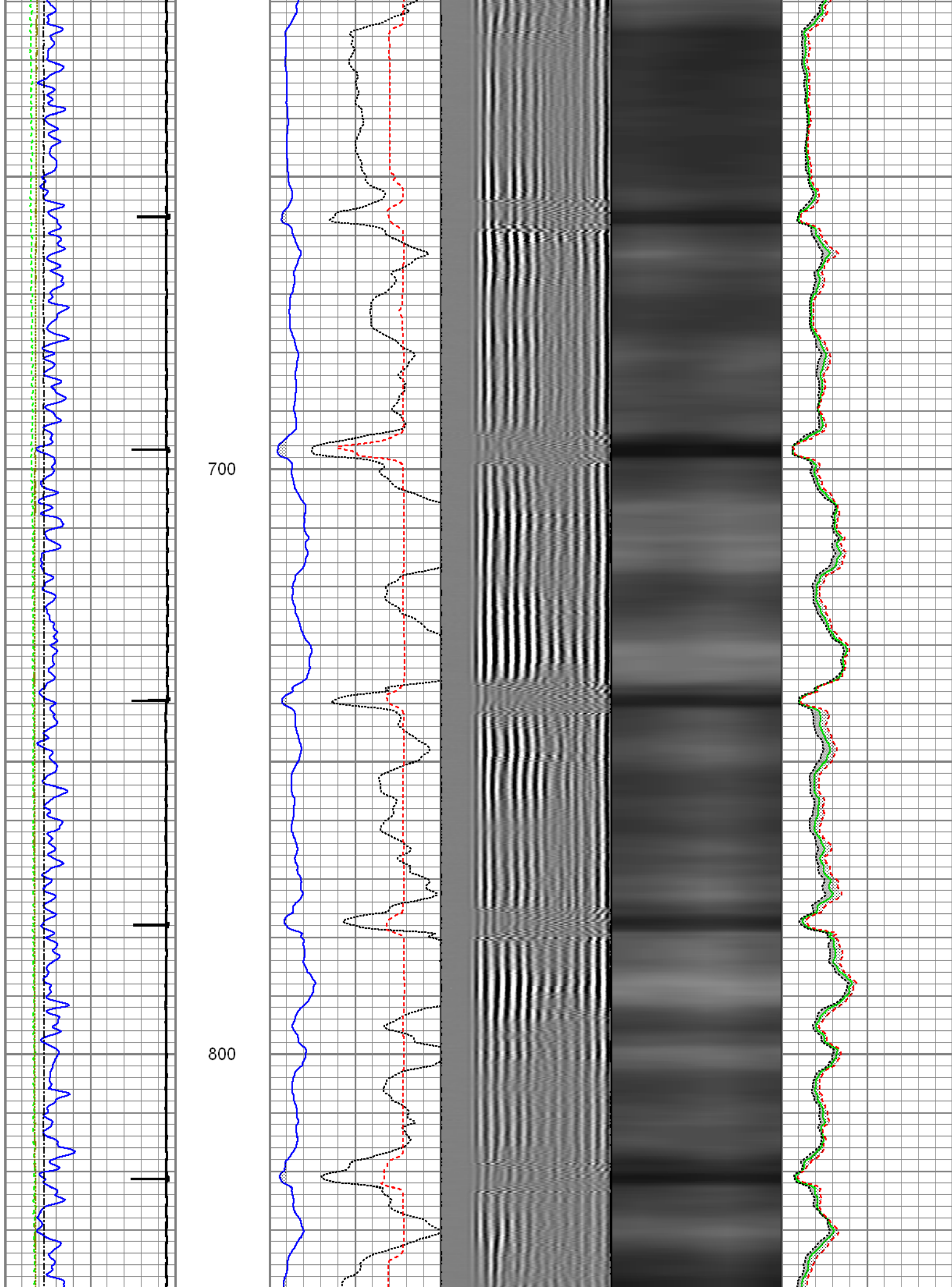
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

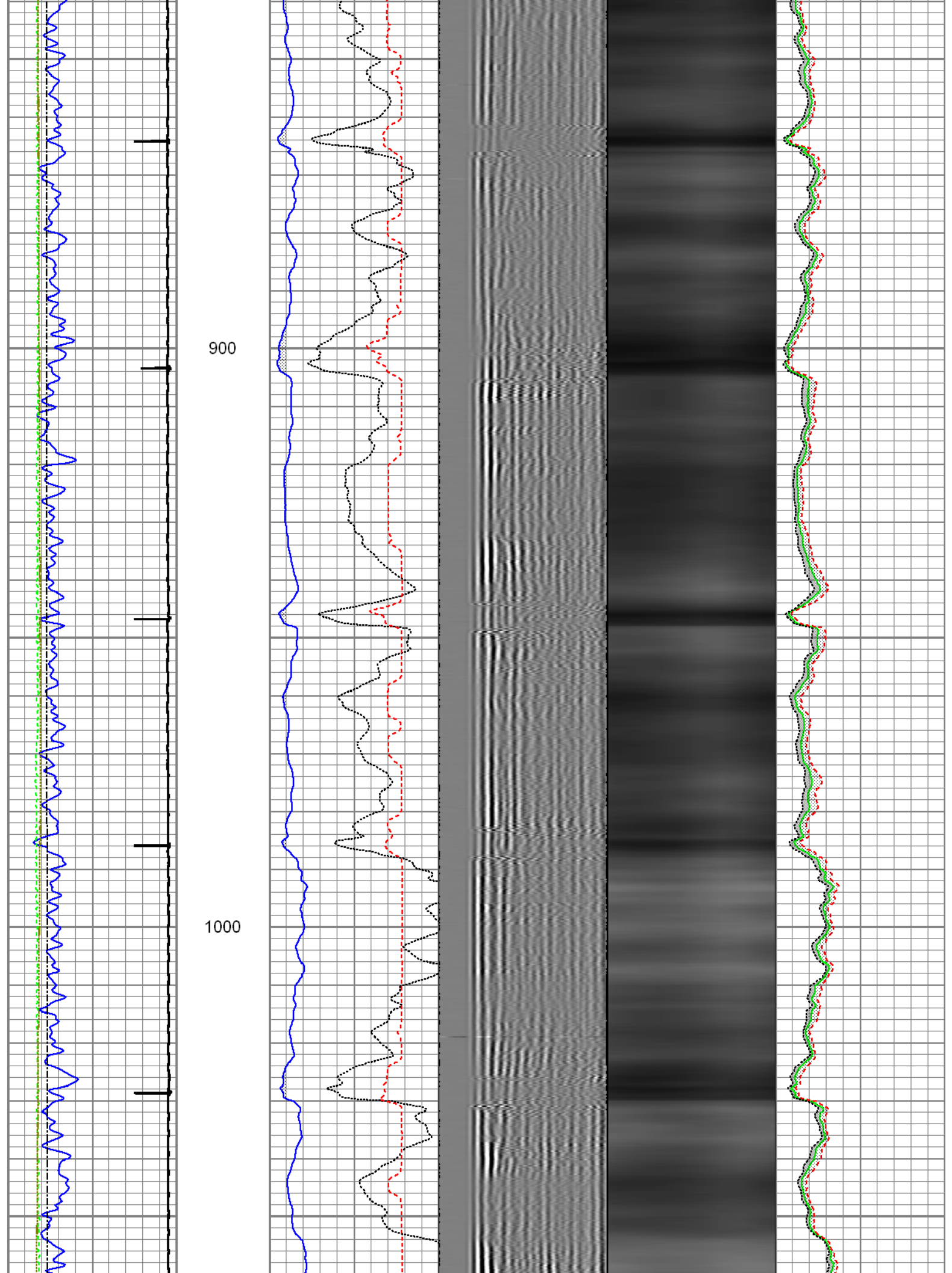


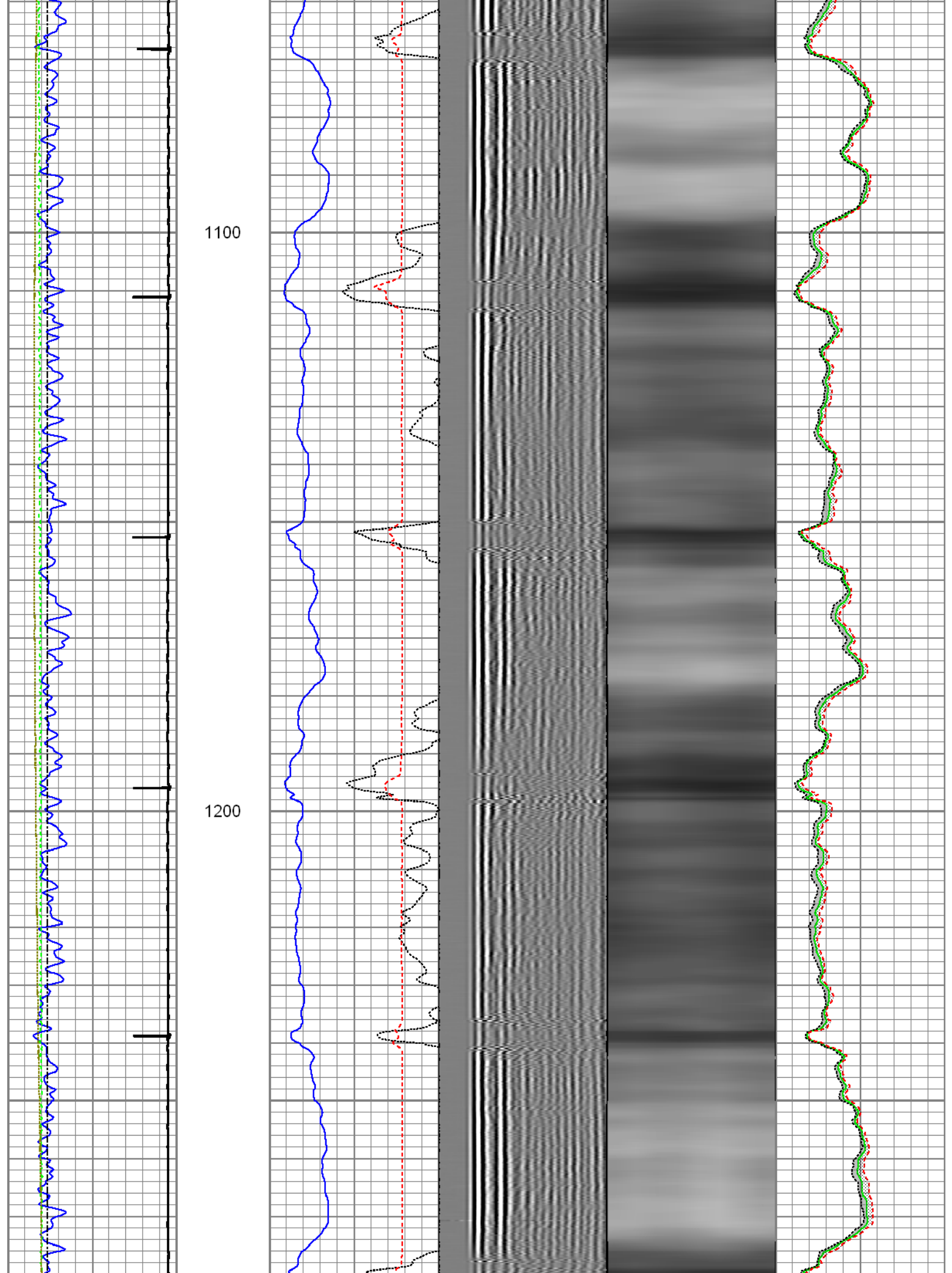


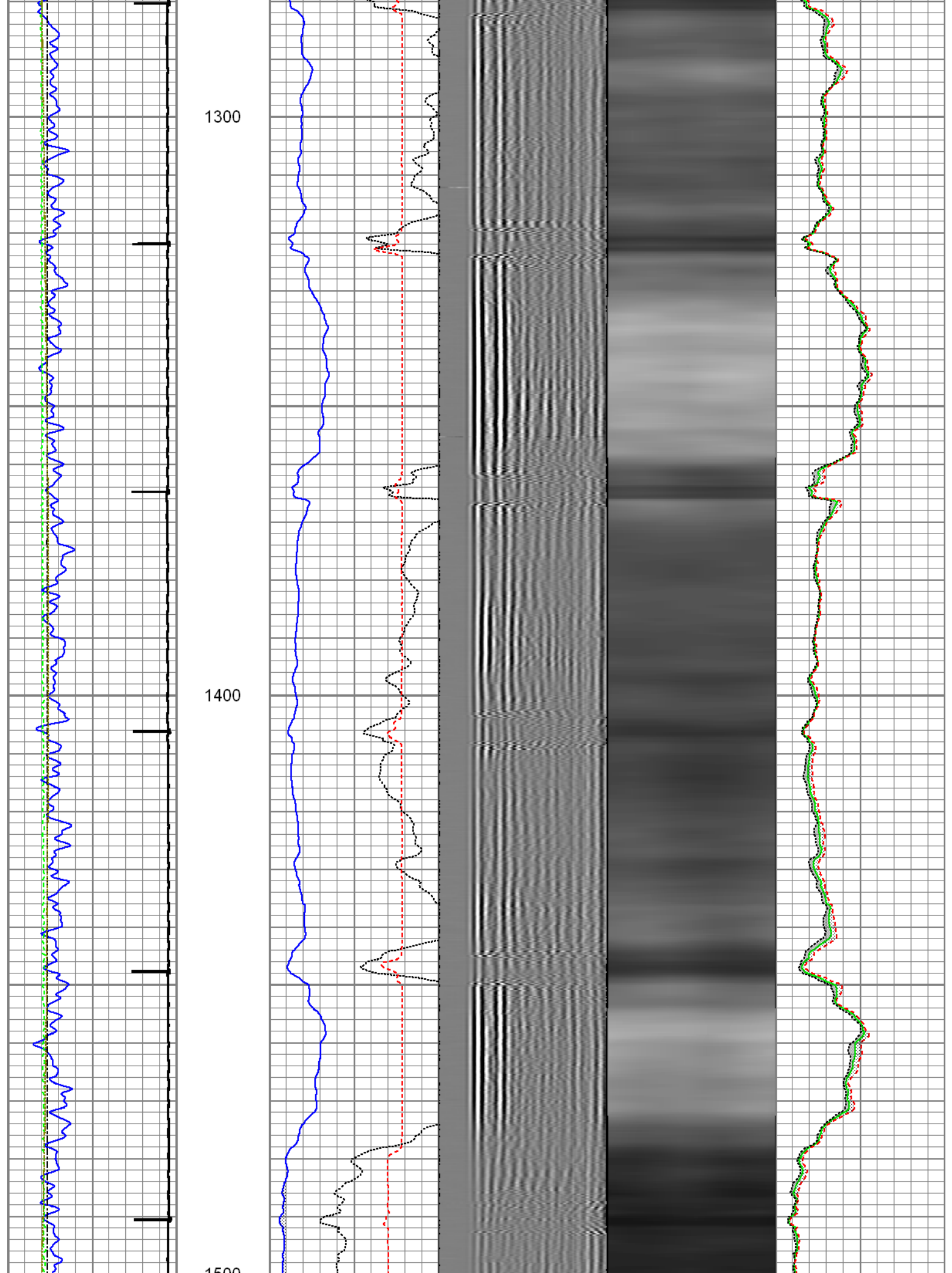




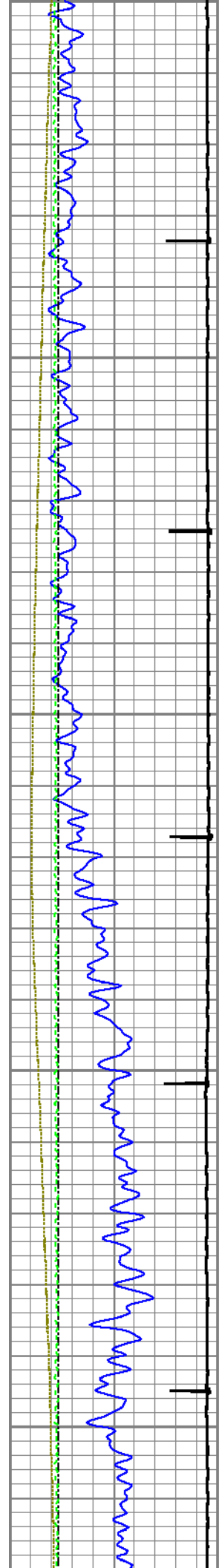








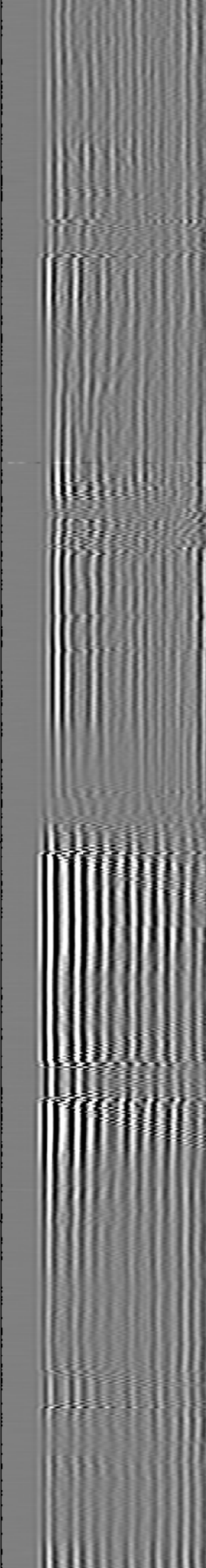
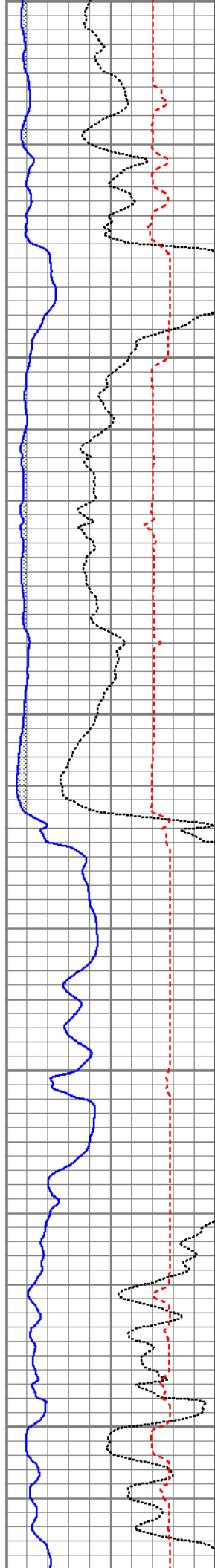


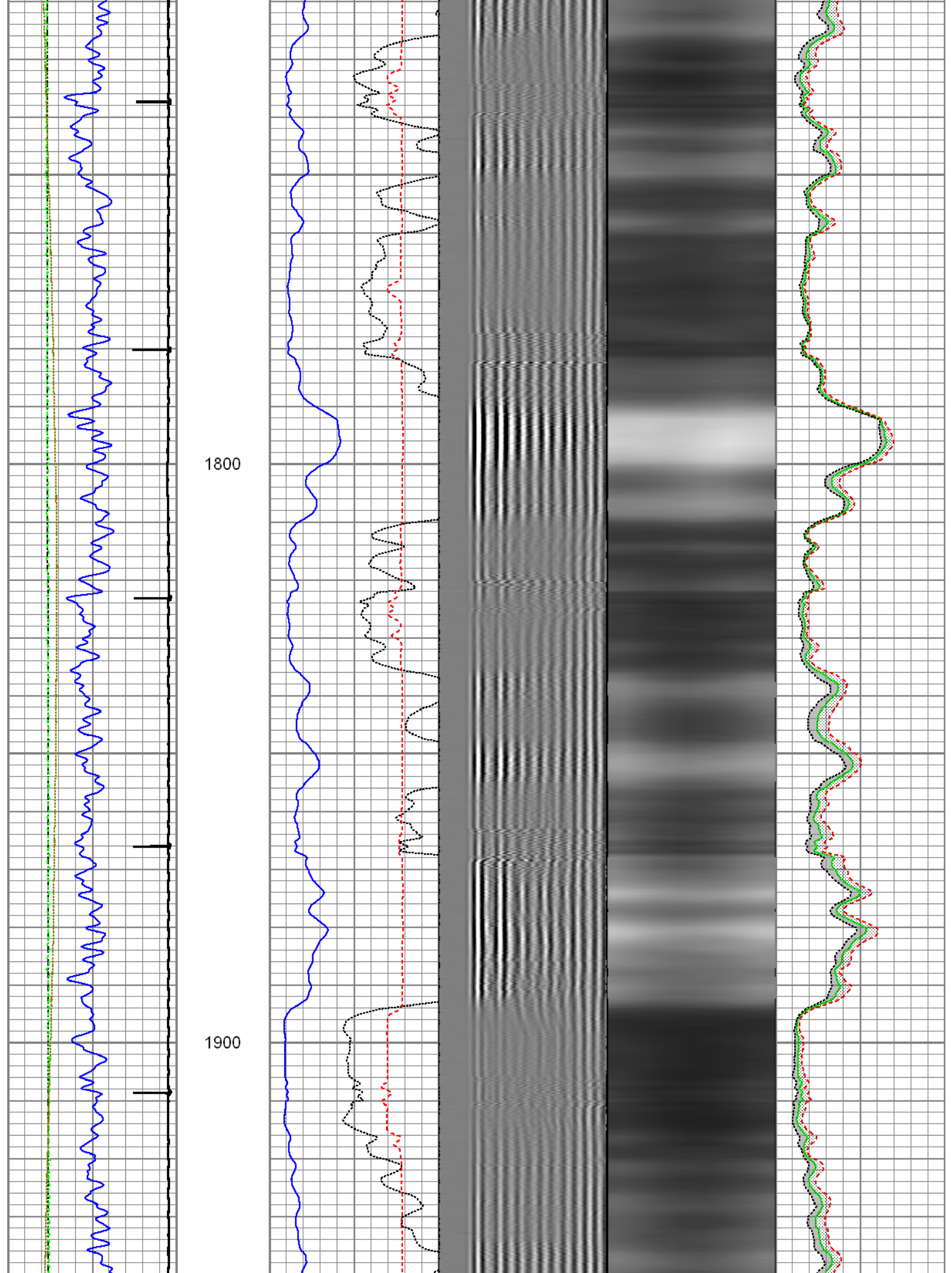


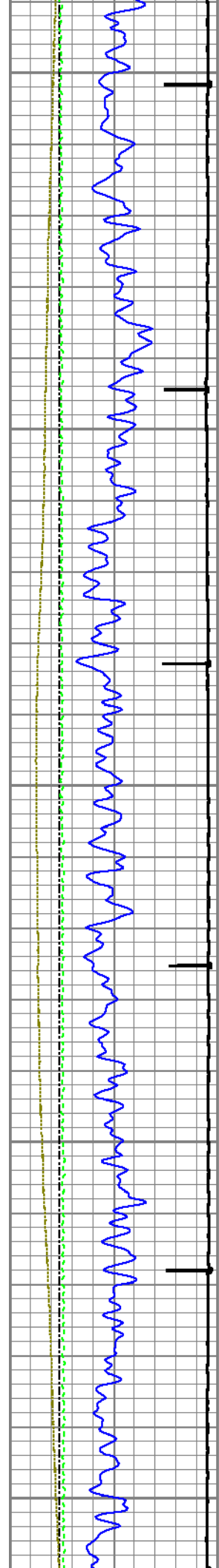
1500

1600

1700

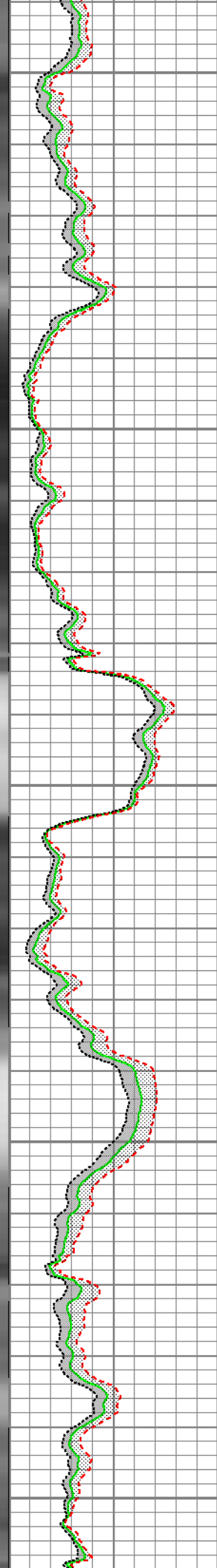
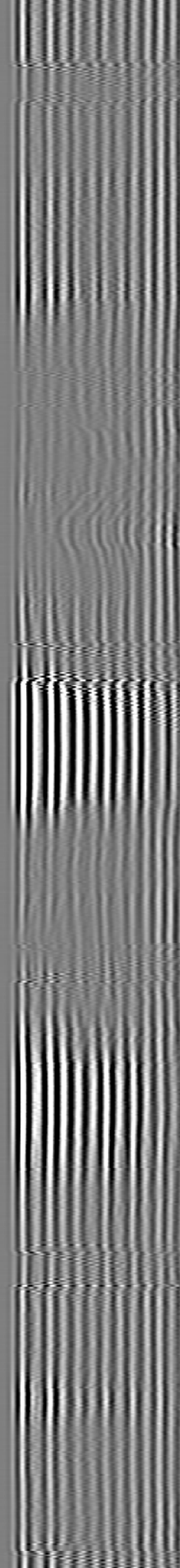
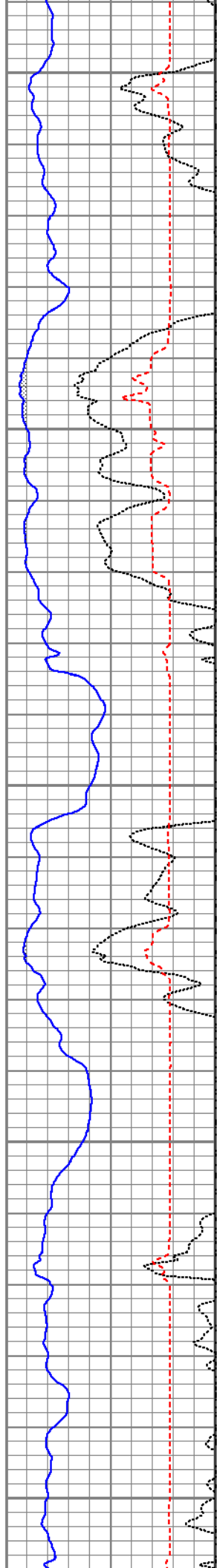


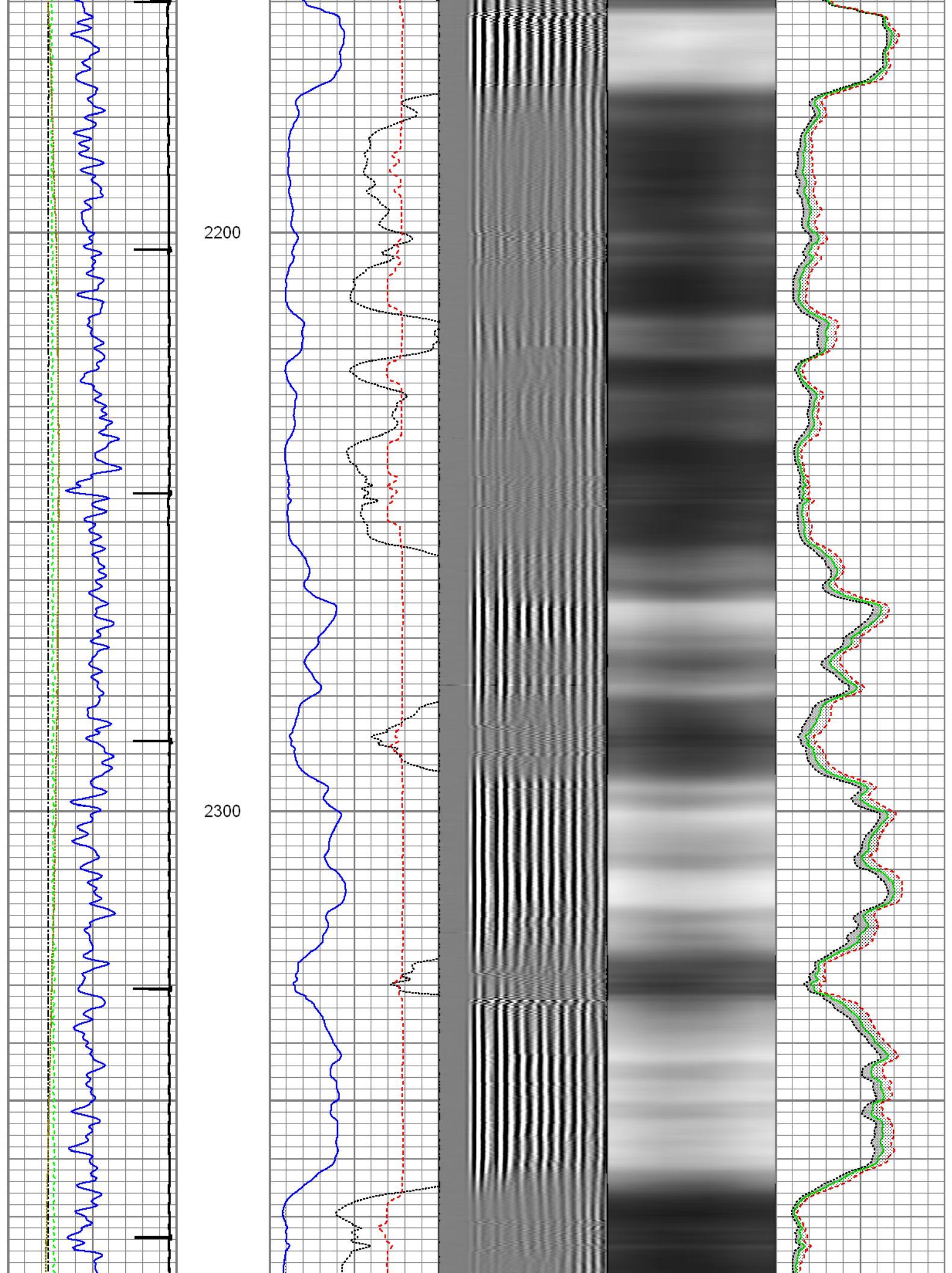




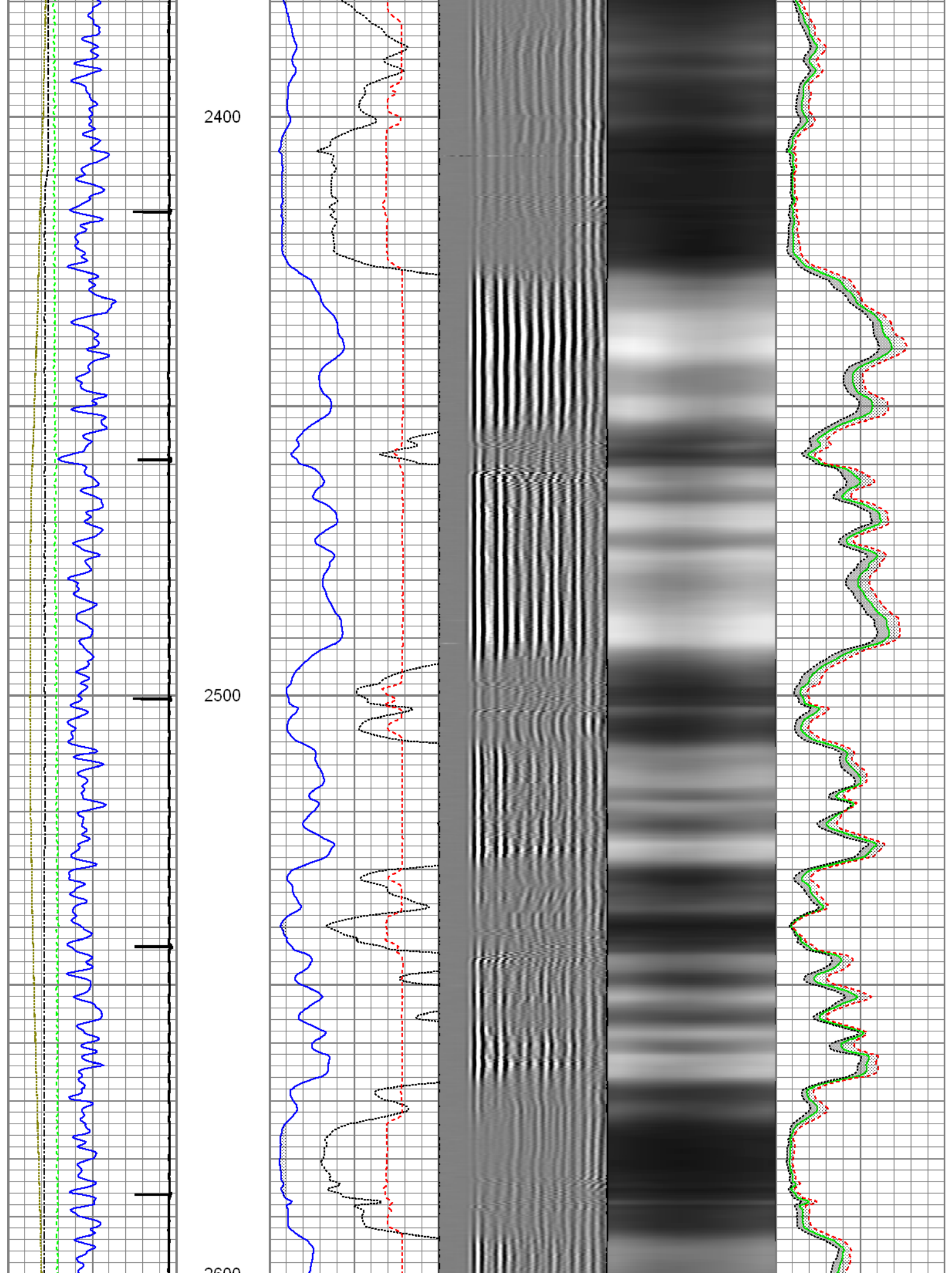
2000

2100





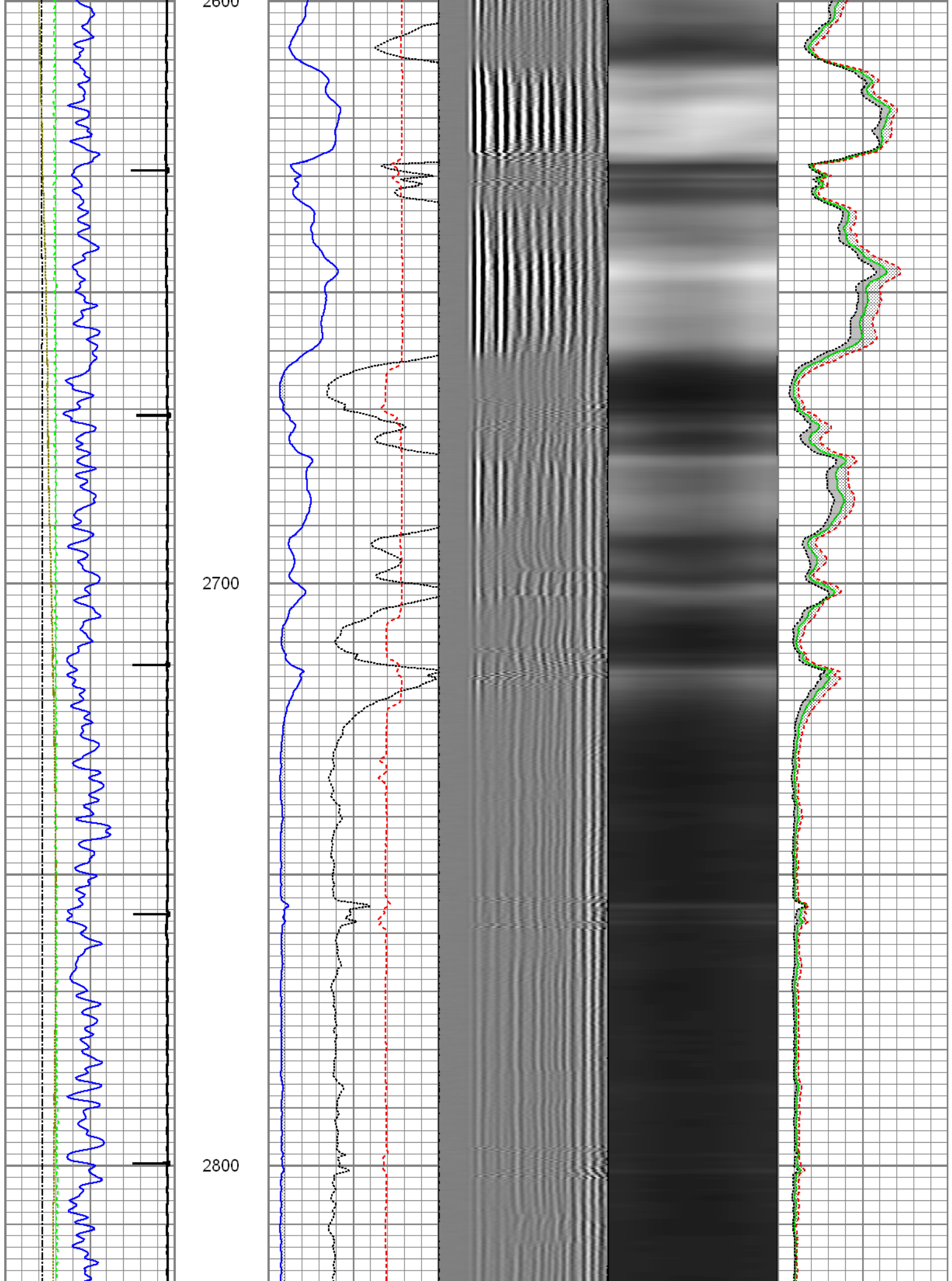




2600

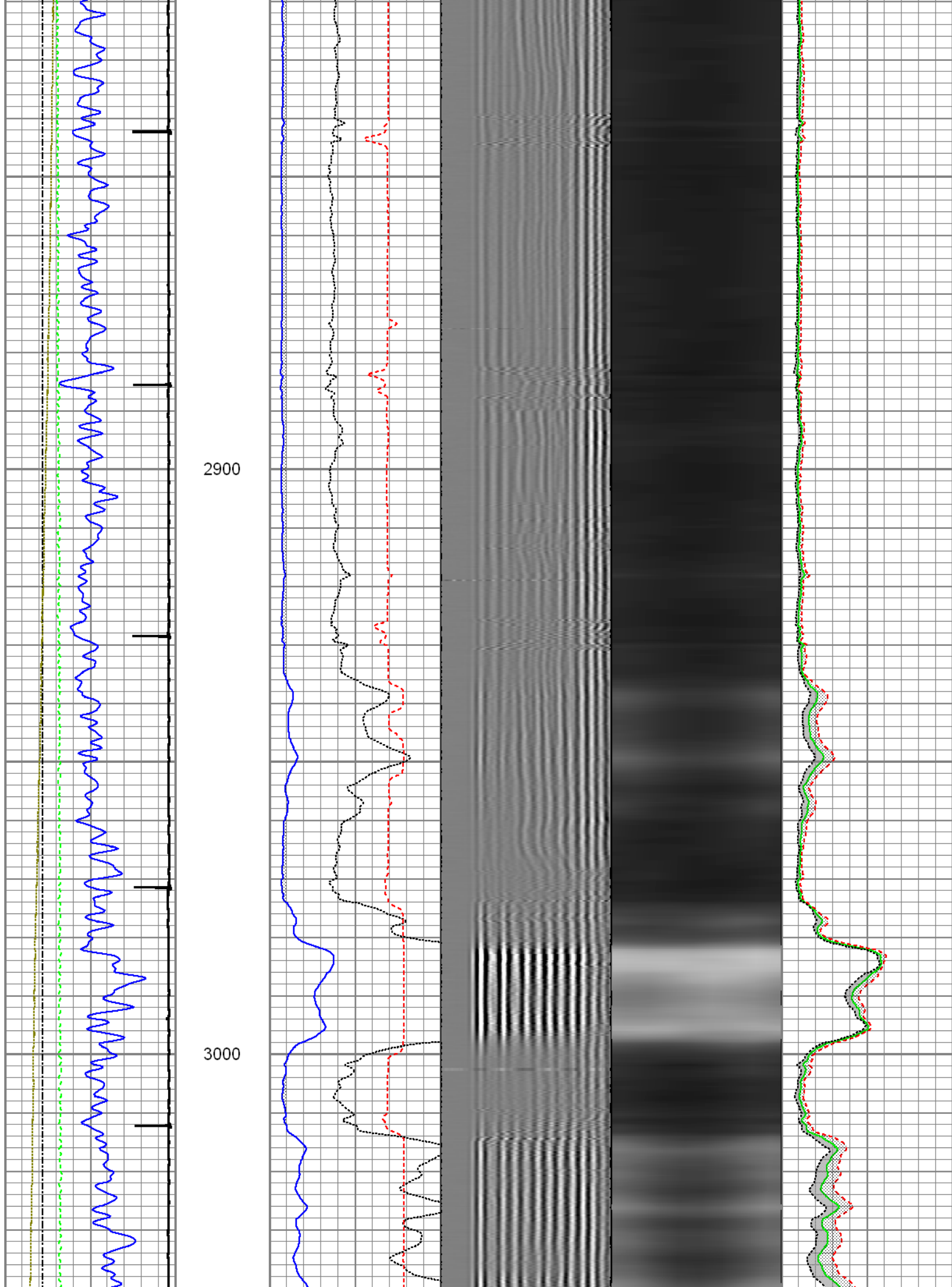
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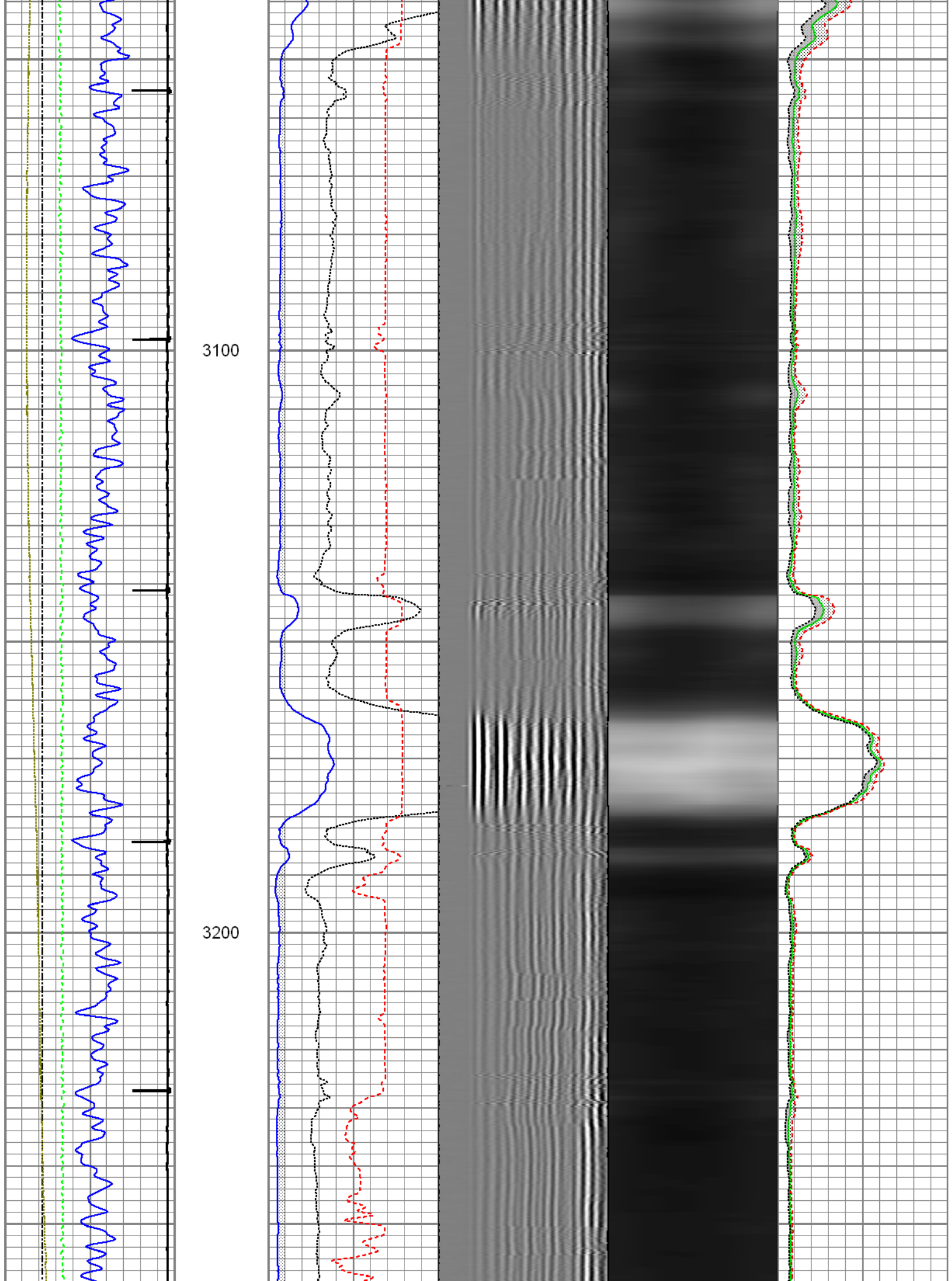
2800



2900

3000

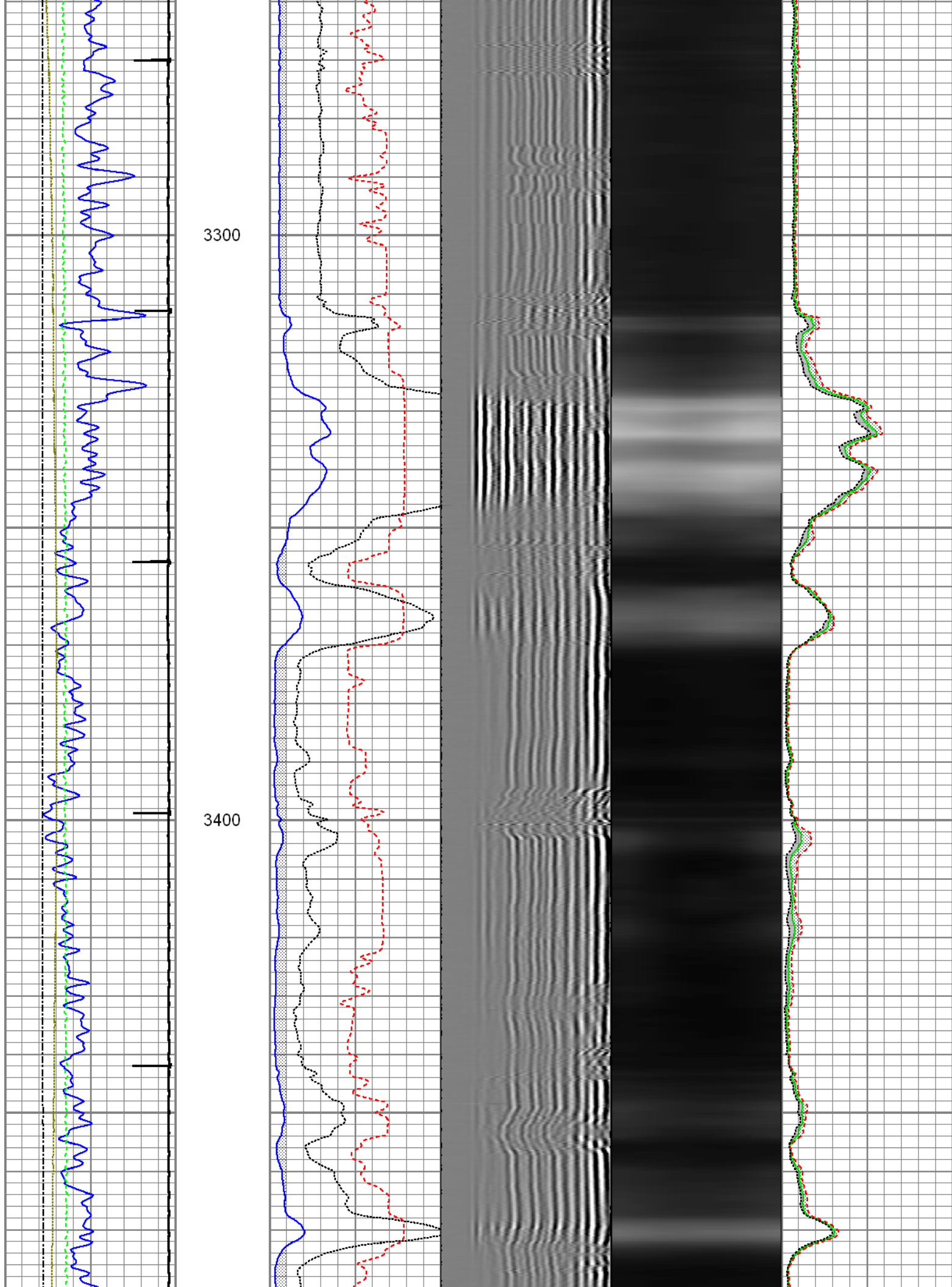


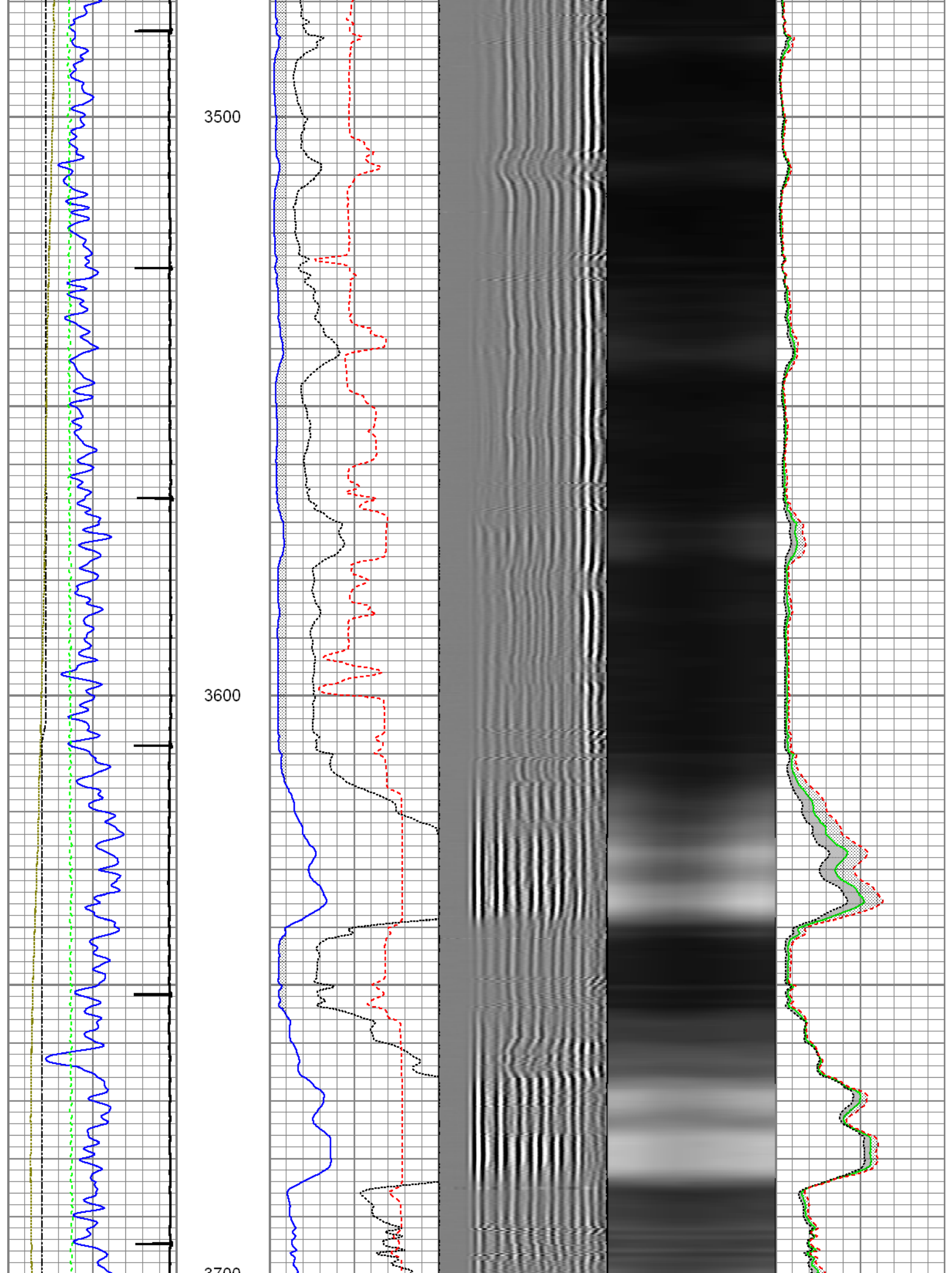


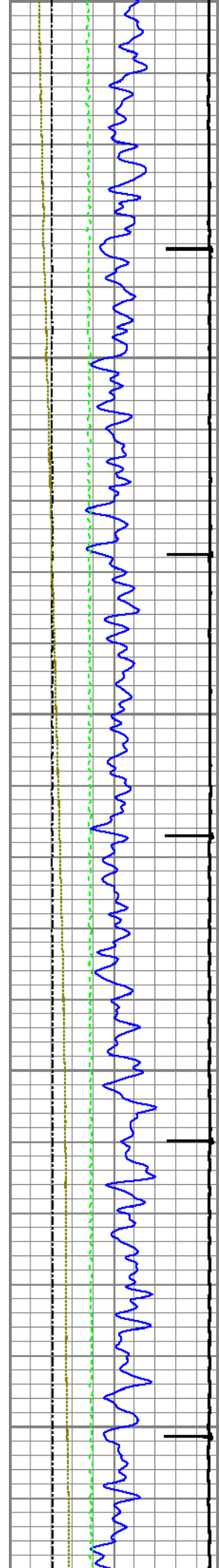


3300

3400



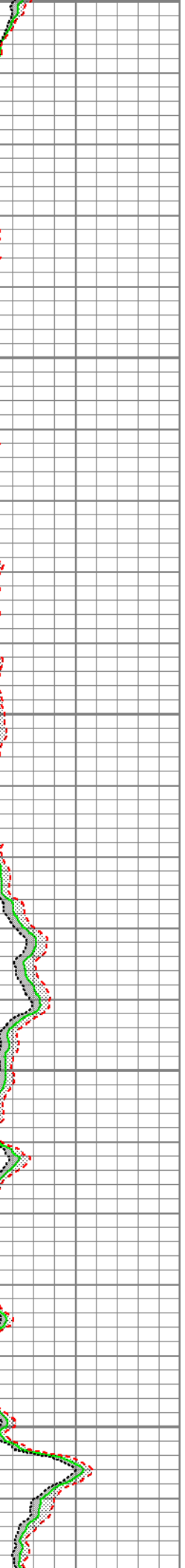
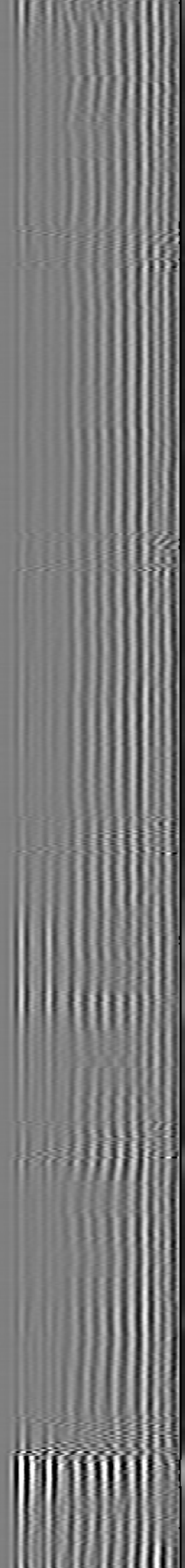
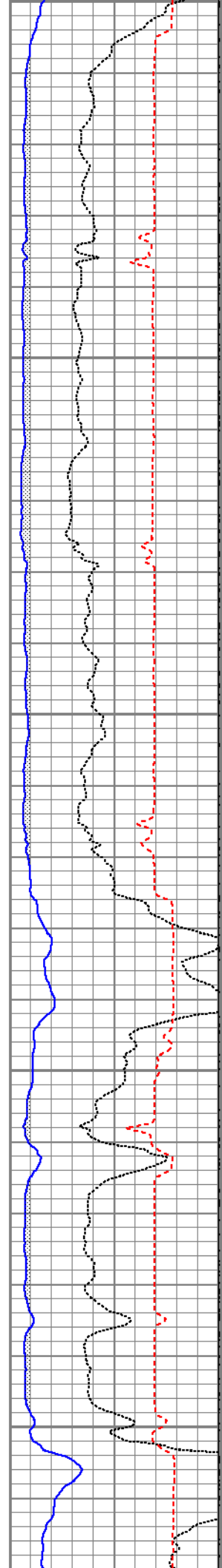


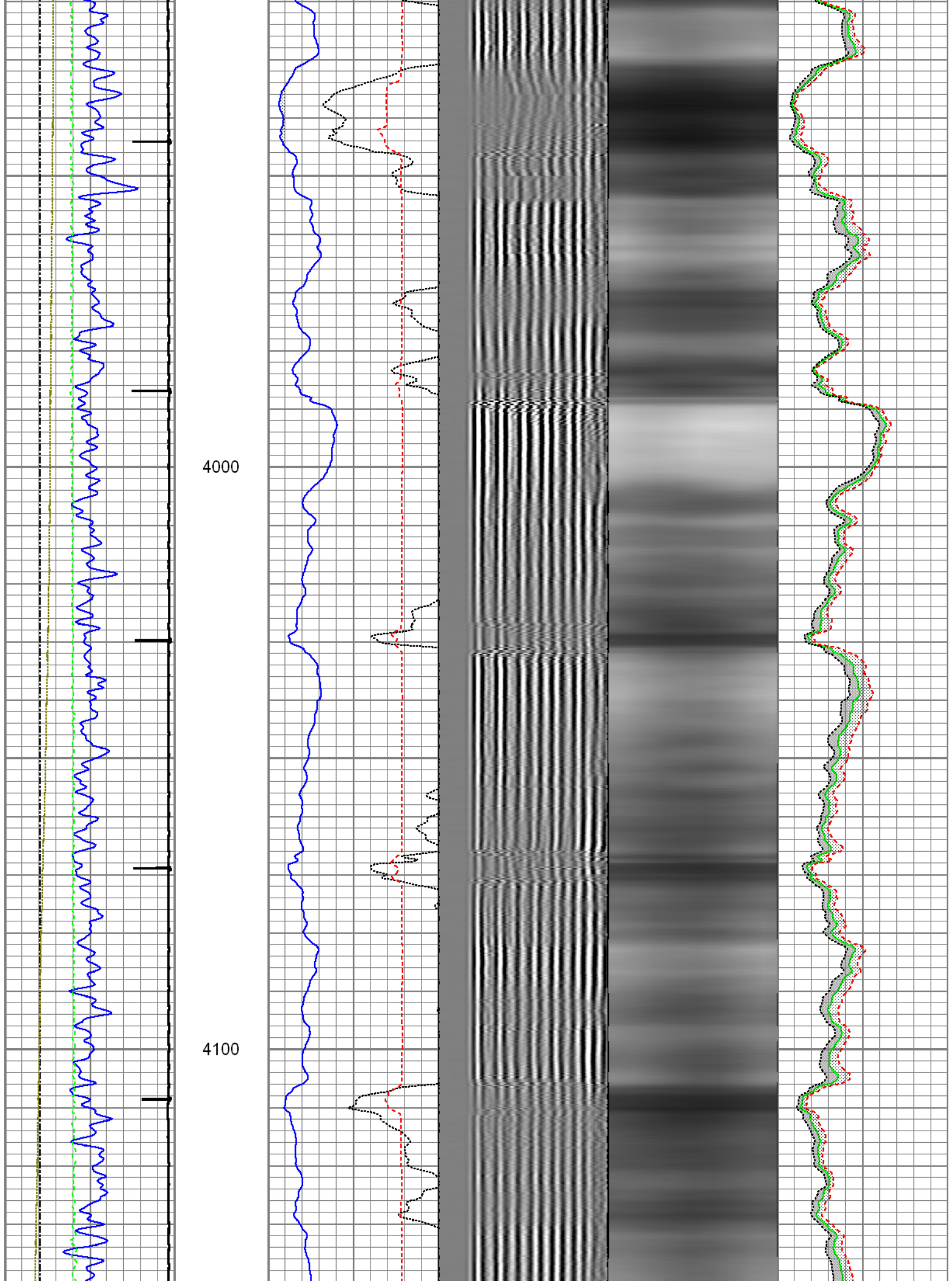


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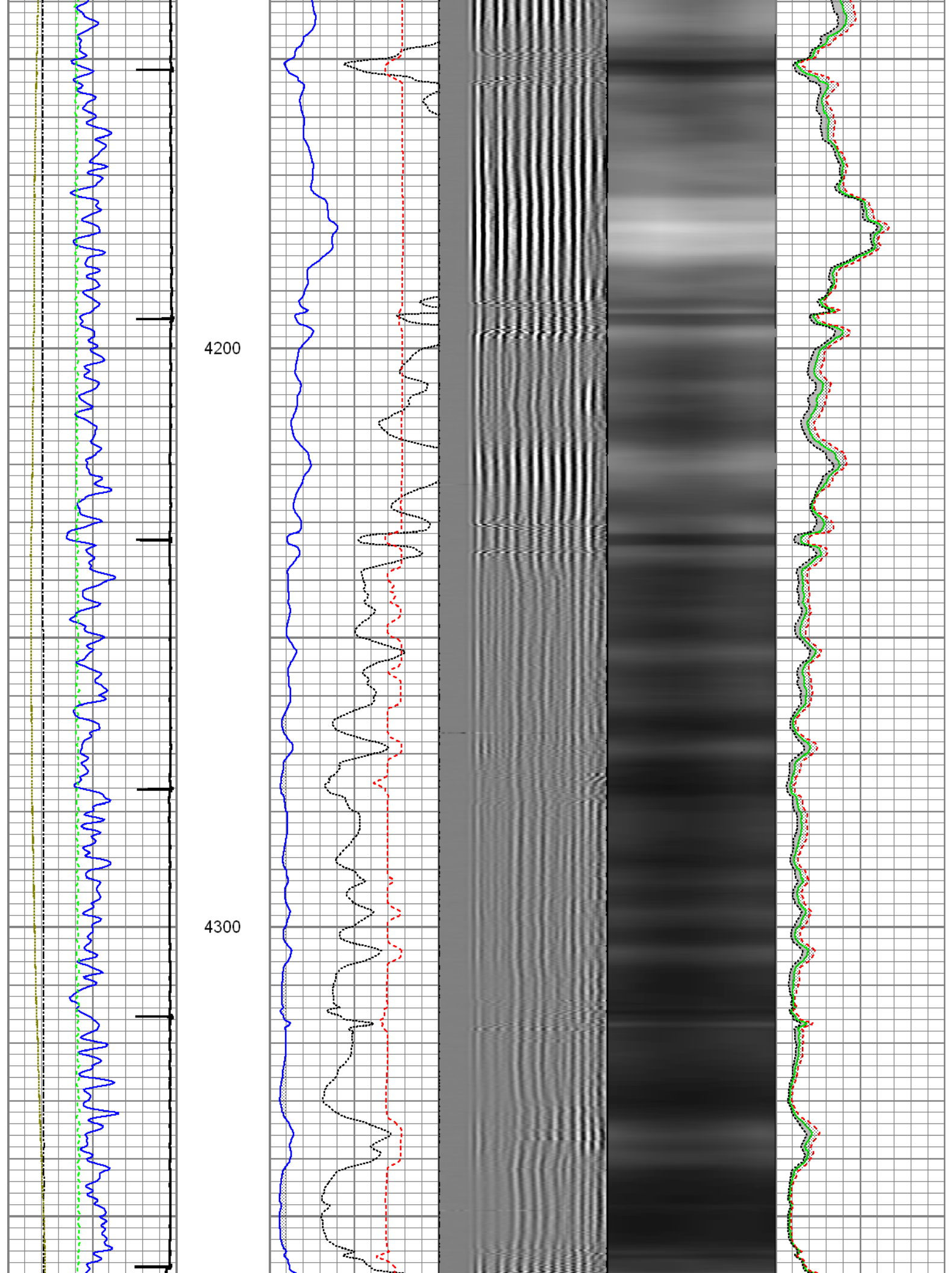
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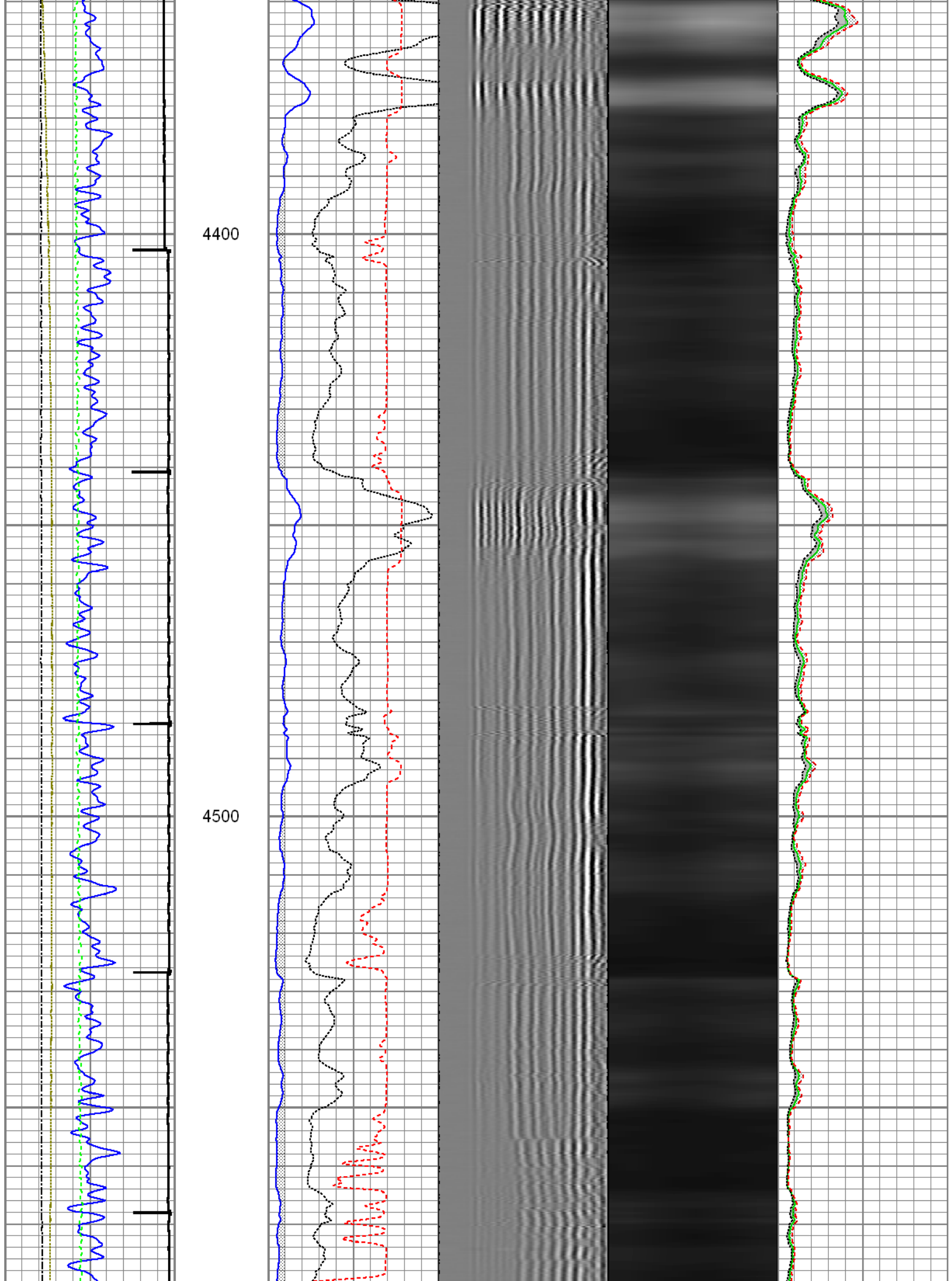
3900







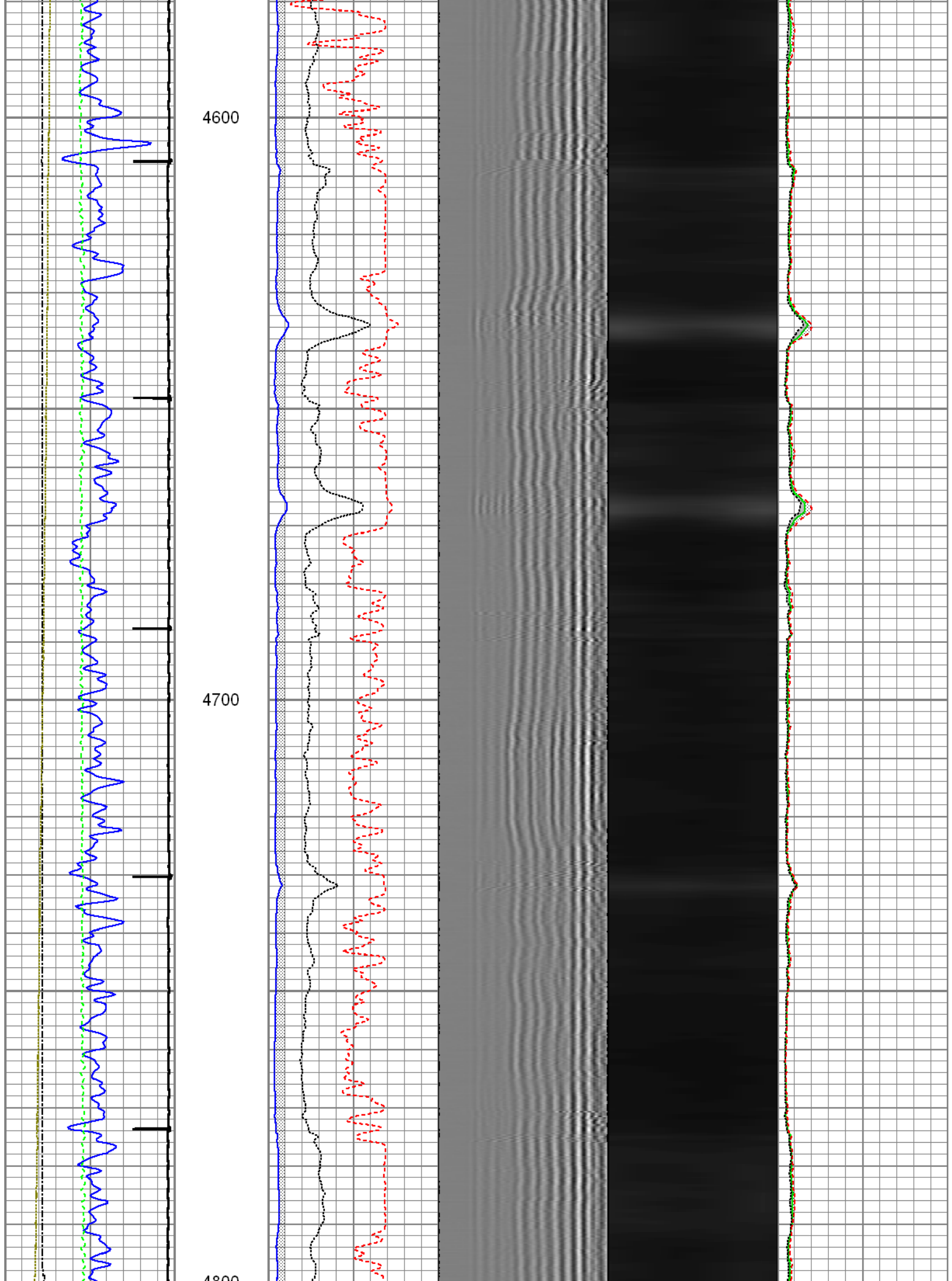


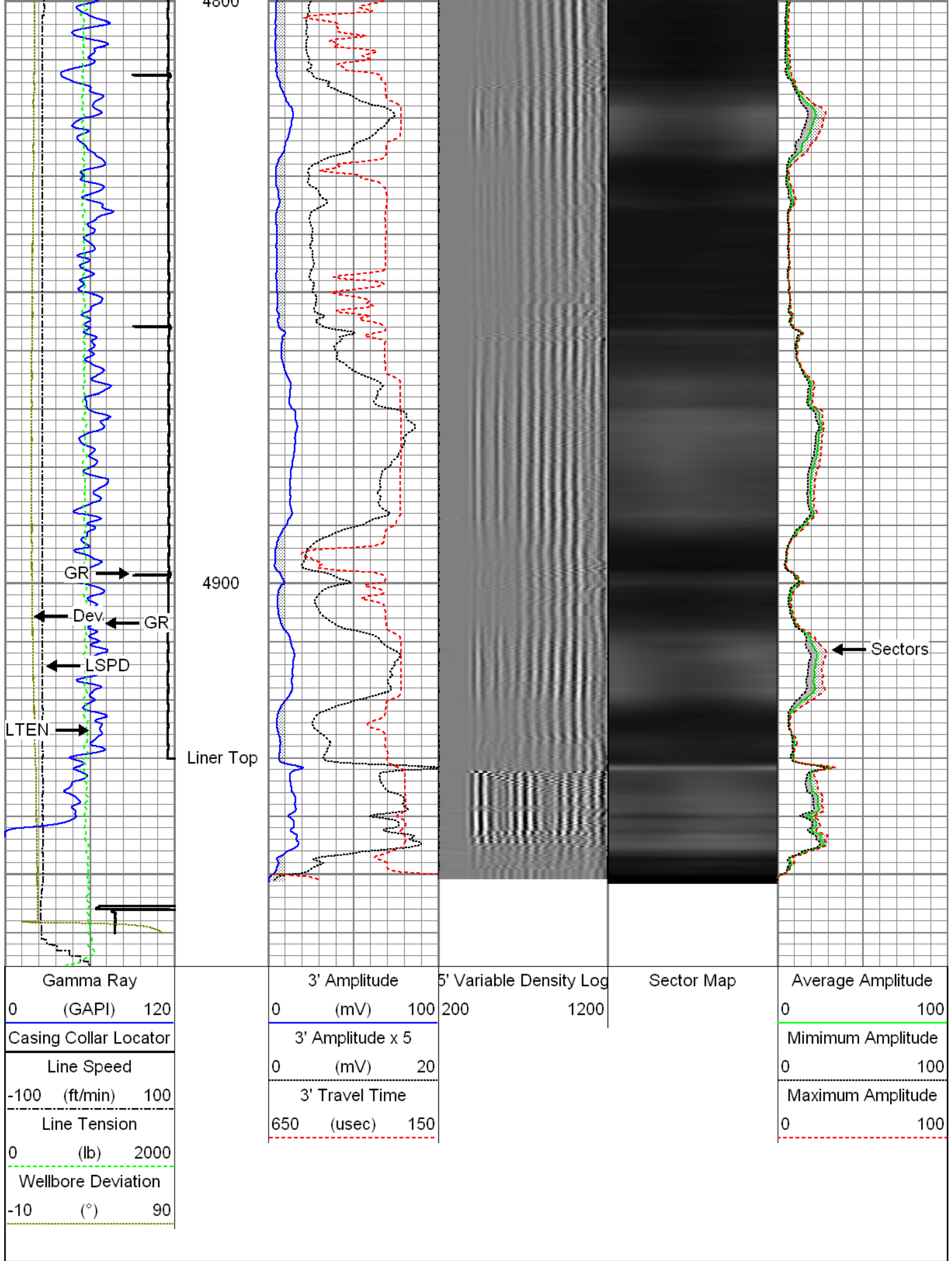


4600

4700

4800





Gamma Ray		
0	(GAPI)	120
Casing Collar Locator		
Line Speed		
-100	(ft/min)	100
Line Tension		
0	(lb)	2000
Wellbore Deviation		
-10	(°)	90

3' Amplitude		
0	(mV)	100
3' Amplitude x 5		
0	(mV)	20
3' Travel Time		
650	(usec)	150

5' Variable Density Log		
0		1200

Sector Map		
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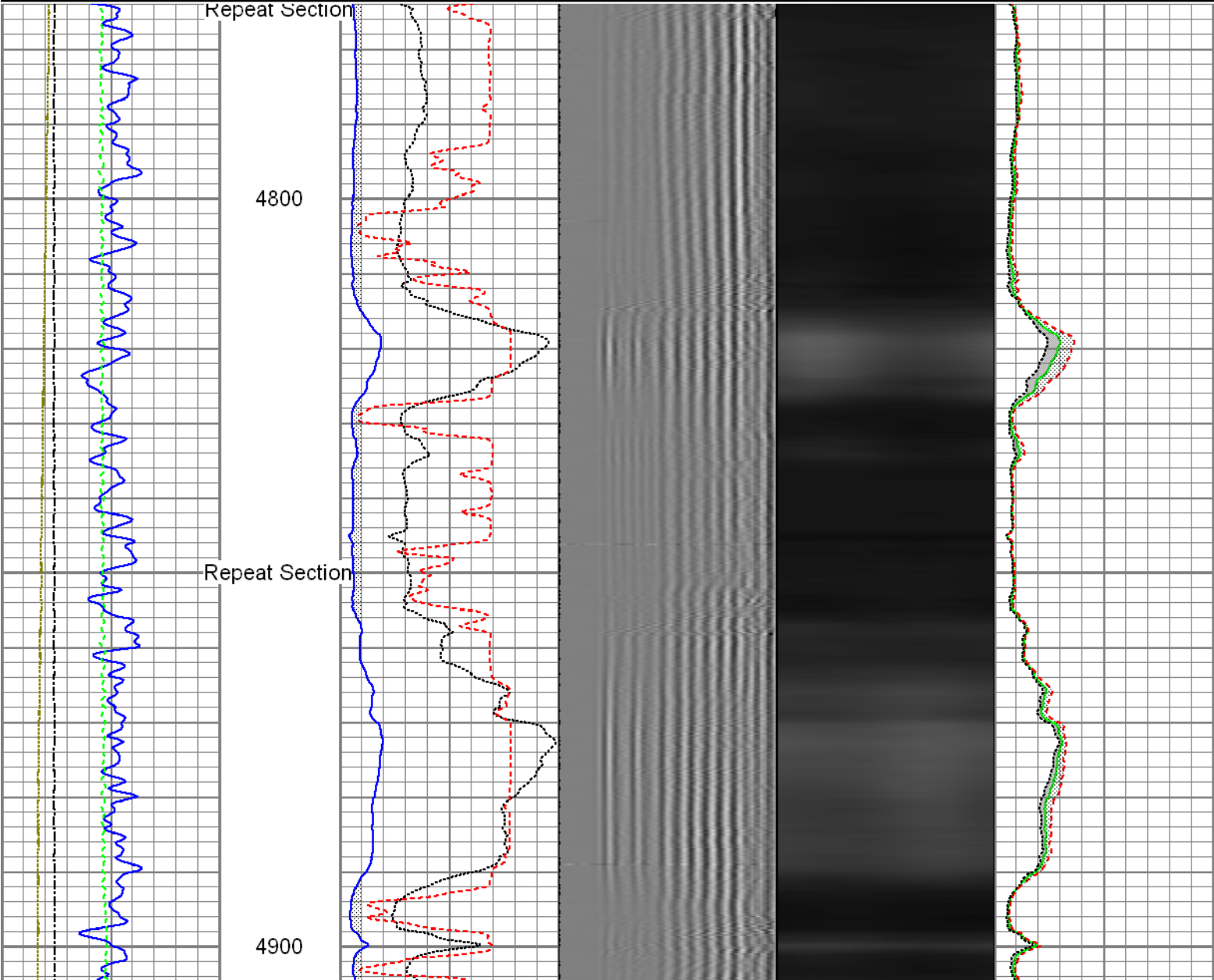
Average Amplitude		
0		100
Minimum Amplitude		
0		100
Maximum Amplitude		
0		100

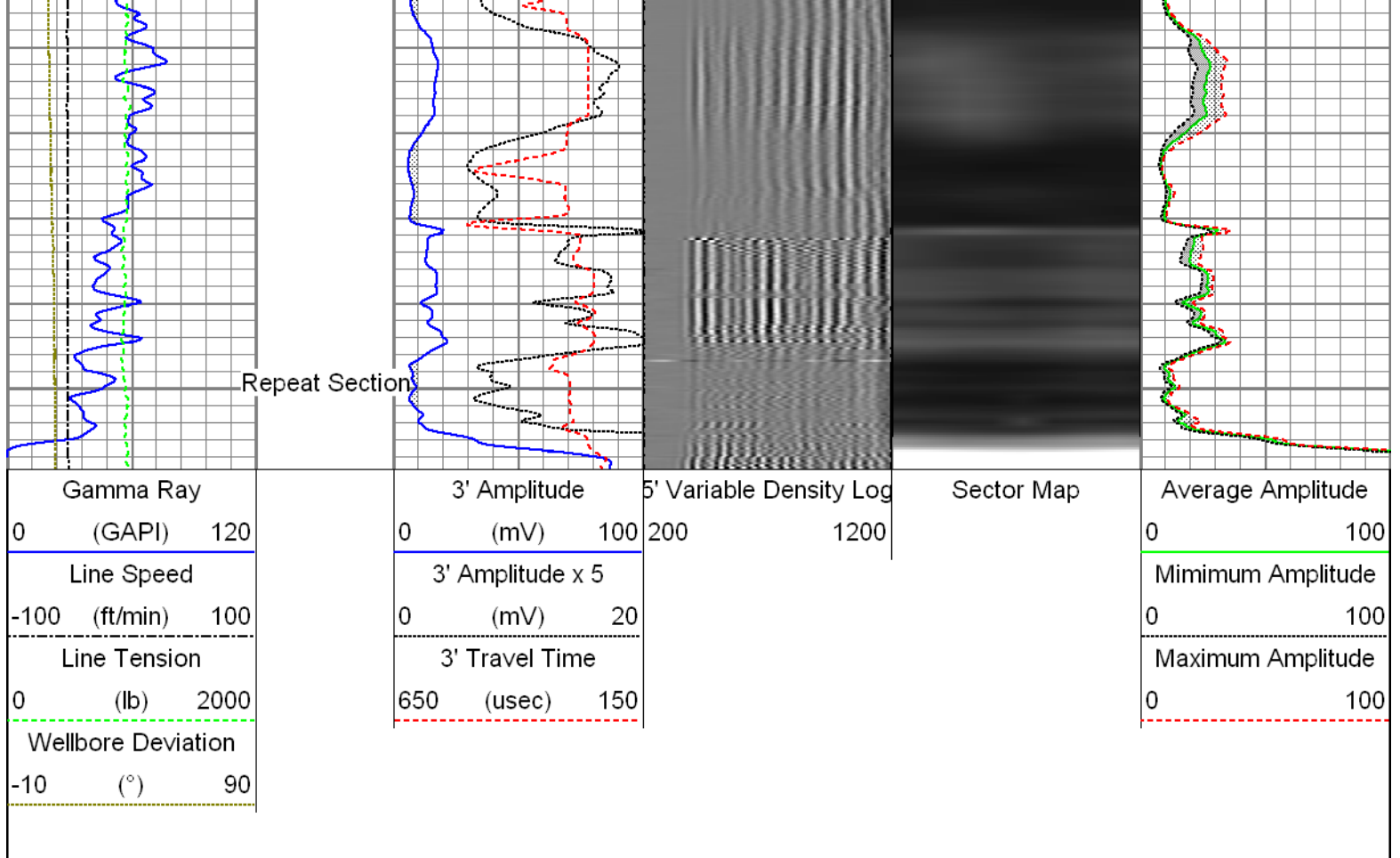


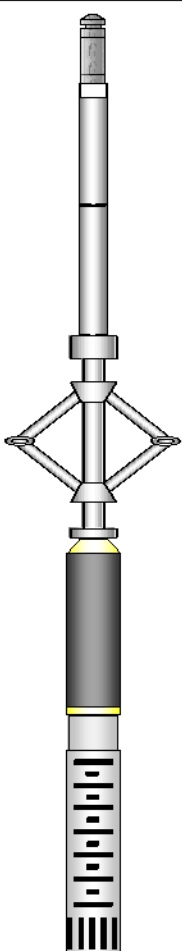

Recorded with 1500 PSI surface induced pressure.

Database File: processed\_11-15-14\_whiting\_razor 27j-2209a\_mit\_rbl.db  
 Dataset Pathname: pass2  
 Presentation Format: rbt4\_mit  
 Dataset Creation: Sat Nov 15 15:02:42 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
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
Wellbore Deviation -10 (°) 90				





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	23.67		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 -UW_PRC_057 (1037) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
WV3FT	15.85		UW_RBT-UW_RBT_004 (10013454) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00
WVFS1	15.85					
WVFS2	15.85					
WVFS3	15.85					
WVFS4	15.85					
WVFS5	15.85					
WVFS6	15.85					

WVFS7	15.85		UW_PRC-UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
WVFS8	15.85					
CBLTEMP	15.85					
CBLROT	15.85					
WVF5FT	14.85					
MIT	5.41		UW_MIT-UW_MIT40_027 (211111) 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: PROCESSED_11-15-14_Whiting_Razor 27J-2209A_MIT_RBL.db: field/well/run1/pass3 Total Length: 27.92 ft Total Weight: 319.30 lb O.D.: 3.13 in						

Calibration Report			
Database File:	PROCESSED_11-15-14_Whiting_Razor 27J-2209A_MIT_RBL.db		
Dataset Pathname:	pass3.2		
Dataset Creation:	Tue Nov 18 14:46:57 2014 by Calc SCH 120430		
Multi-finger Imaging Tool Calibration Report			
Serial Number:		211111	
Number of Fingers:		40	
Tool Model:		UW_MIT40_027	
Inclinometer Calibration Report			
Performed:		Mon Nov 18 15:31:59 2013	
Calibration Angle:		46	
		Inc X	Inc Y
Vertical:		1931	1952
Finger 1 up:		1959	2266
Finger 31 up:		1608	1962
Finger 21 up:		1927	1623
Finger 11 up:		2253	1930
Sensitivity ratio:	1.0031		
X-axis angle:	272.845		
Deviation const.:	311.818		

Finger Calibration Report						
Performed:			Sat Nov 15 14:29:31 2014			
Ring size:	4	5	6	7		
(in)	Sens	Sens	Sens			
Finger 01:	956	375.0	1331	396.0	1727	434.0
Finger 02:	1048	377.0	1425	388.0	1813	418.0
					2161	2231

Finger 03:	1095	364.0	1459	382.0	1841	404.0	2245
Finger 04:	1027	373.0	1400	391.0	1791	420.0	2211
Finger 05:	1051	373.0	1424	389.0	1813	410.0	2223
Finger 06:	1038	380.0	1418	400.0	1818	424.0	2242
Finger 07:	1173	336.0	1509	355.0	1864	378.0	2242
Finger 08:	1089	354.0	1443	390.0	1833	412.0	2245
Finger 09:	1046	368.0	1414	400.0	1814	417.0	2231
Finger 10:	1105	312.0	1417	339.0	1756	352.0	2108
Finger 11:	1075	367.0	1442	405.0	1847	413.0	2260
Finger 12:	1213	375.0	1588	408.0	1996	412.0	2408
Finger 13:	1178	336.0	1514	379.0	1893	391.0	2284
Finger 14:	1255	321.0	1576	353.0	1929	352.0	2281
Finger 15:	1123	372.0	1495	419.0	1914	427.0	2341
Finger 16:	1202	347.0	1549	395.0	1944	389.0	2333
Finger 17:	1139	364.0	1503	417.0	1920	422.0	2342
Finger 18:	1110	365.0	1475	417.0	1892	426.0	2318
Finger 19:	1131	369.0	1500	425.0	1925	429.0	2354
Finger 20:	1185	355.0	1540	404.0	1944	410.0	2354
Finger 21:	1195	364.0	1559	419.0	1978	423.0	2401
Finger 22:	1128	361.0	1489	418.0	1907	427.0	2334
Finger 23:	925	340.0	1265	408.0	1673	434.0	2107
Finger 24:	1199	356.0	1555	403.0	1958	415.0	2373
Finger 25:	1433	377.0	1810	423.0	2233	423.0	2656
Finger 26:	1237	321.0	1558	360.0	1918	375.0	2293
Finger 27:	1337	350.0	1687	386.0	2073	385.0	2458
Finger 28:	1137	362.0	1499	403.0	1902	427.0	2329
Finger 29:	1391	336.0	1727	355.0	2082	363.0	2445
Finger 30:	1249	341.0	1590	367.0	1957	387.0	2344
Finger 31:	1292	341.0	1633	356.0	1989	376.0	2365
Finger 32:	1276	339.0	1615	353.0	1968	368.0	2336
Finger 33:	1026	316.0	1342	345.0	1687	379.0	2066
Finger 34:	1141	349.0	1490	366.0	1856	386.0	2242
Finger 35:	1329	343.0	1672	348.0	2020	370.0	2390
Finger 36:	1429	411.0	1840	411.0	2251	427.0	2678
Finger 37:	1115	343.0	1458	353.0	1811	390.0	2201
Finger 38:	1436	383.0	1819	381.0	2200	395.0	2595
Finger 39:	1230	348.0	1578	346.0	1924	371.0	2295
Finger 40:	1039	376.0	1415	388.0	1803	419.0	2222

## Segmented Cement Bond Log Calibration Report

Serial Number: 10013454  
Tool Model: UW\_RBT\_004

Calibration Casing Diameter:	7.000	in
Calibration Depth:	16.802	ft

Master Calibration, performed Tue Nov 18 14:46:48 2014:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.000	0.744	0.800	62.165	82.519	0.800
5FT	-0.004	0.899	0.800	62.165	67.921	1.089
S1	0.000	0.733	0.000	100.000	136.462	-0.001
S2	-0.002	0.718	0.000	100.000	138.911	0.287
S3	-0.001	0.726	0.000	100.000	137.623	0.117
S4	-0.002	0.749	0.000	100.000	133.296	0.224
S5	-0.000	0.806	0.000	100.000	124.075	0.051
S6	-0.002	0.835	0.000	100.000	119.572	0.217
S7	-0.001	0.806	0.000	100.000	123.926	0.128
S8	-0.001	0.759	0.000	100.000	131.737	0.071

# 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	Razor 27J-2209A
	Field	Wildcat
	County	Weld
	State	Colorado