



Radial Cement Bond
Gamma Ray
Casing Collar Log

Company Noble Energy Inc.		Company Noble Energy Inc.	
Well Wells Ranch AE32-645		Well Wells Ranch AE32-645	
Field Wattenberg		Field Wattenberg	
County Weld		County Weld	
State Colorado		State Colorado	
Location:		API #: 05-123-41728	
SEC 32 TWP 6N RGE 62W		Other Services	
Permanent Datum		Ground Level	
Log Measured From Kelly Bushing		Elevation 4723'	
Drilling Measured From Kelly Bushing		Elevation	
		K.B. 4747'	
		D.F. 4746'	
		G.L. 4723'	
Date		12-OCT-2015	
Run Number		One	
Depth Driller		15,953 FT	
Depth Logger		6688 FT	
Bottom Logged Interval		6673 FT	
Top Log Interval		24 FT	
Open Hole Size		8.750"	
Type Fluid		Water	
Density / Viscosity		8.34 lbm/gal	
Max. Recorded Temp.		220 °F	
Estimated Cement Top		115 FT	
Time Well Ready		ROA	
Time Logger on Bottom		12:00 PM	
Equipment Number		HD-0119	
Location		Fort Lupton, CO	
Recorded By		A. Olmsted	
Witnessed By		Bill Mansfield	
Borehole Record			
Tubing Record			
Run Number		To	
Bit		From	
Size		Weight	
From		To	
Casing Record		Size (in)	
Surface Casing		Wgt (lbs/ft)	
Intermediate #1		Grade	
Intermediate #2		Top	
Liner		Bottom	
4 1/2		11.6	
P-110		6708 FT	
		15948 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 24 FT
Adjusted -2.5 FT to correlate with Kelly Bushing
Log ran from 6688 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.!!

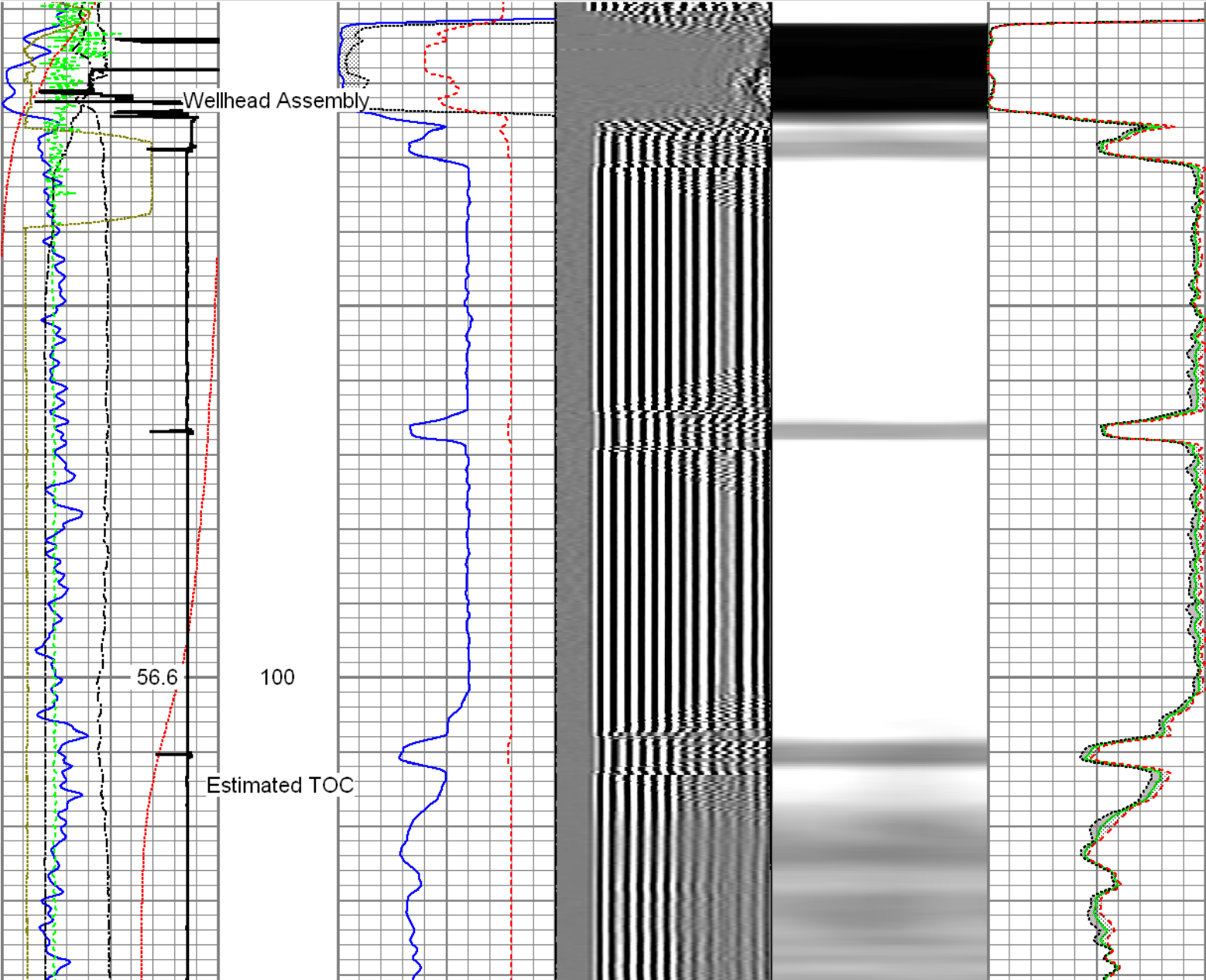


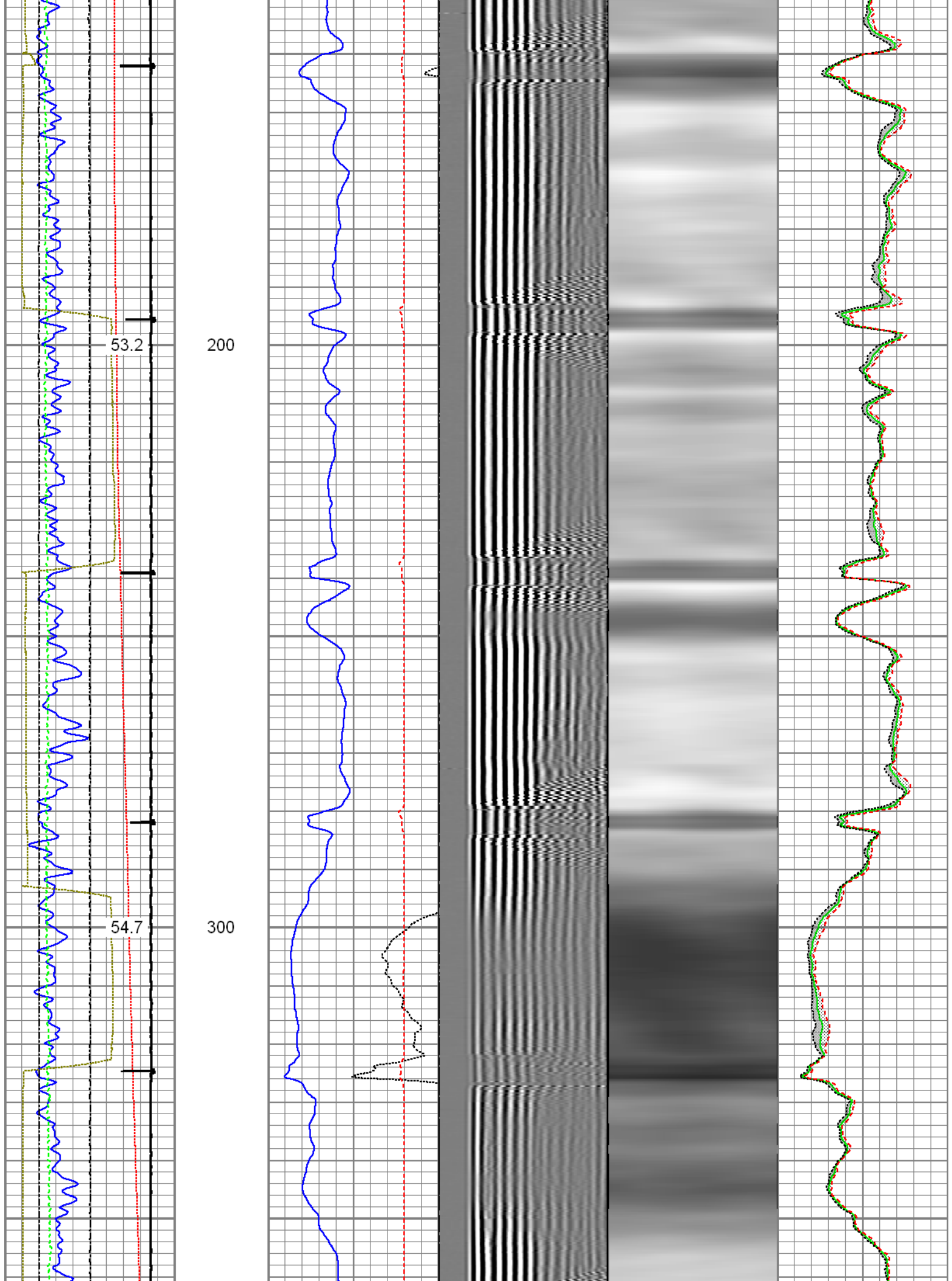
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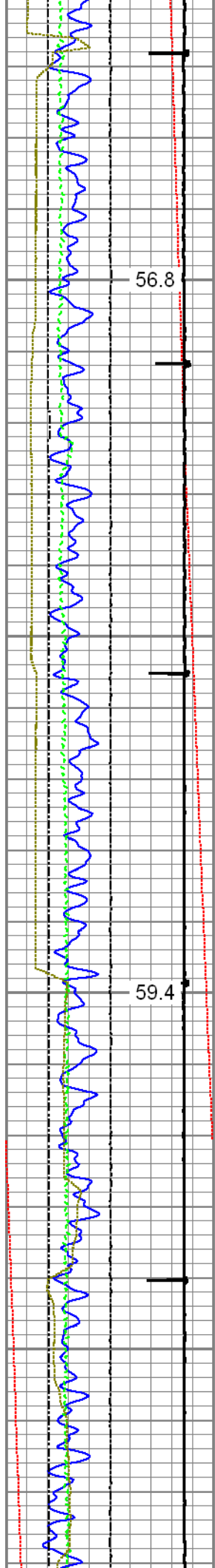
Recorded At 2500 PSI Surface Induced Pressure

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Dataset Pathname: pass3.1
Presentation Format: rbt4_mit
Dataset Creation: Tue Oct 13 15:51:57 2015 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
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				
Casing Collar Locator				

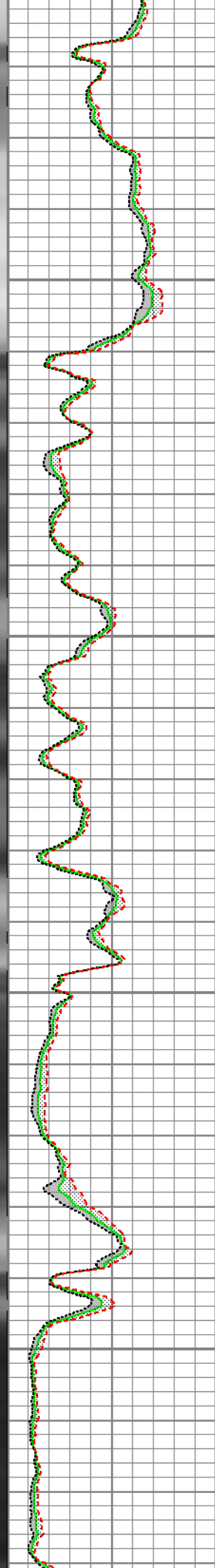
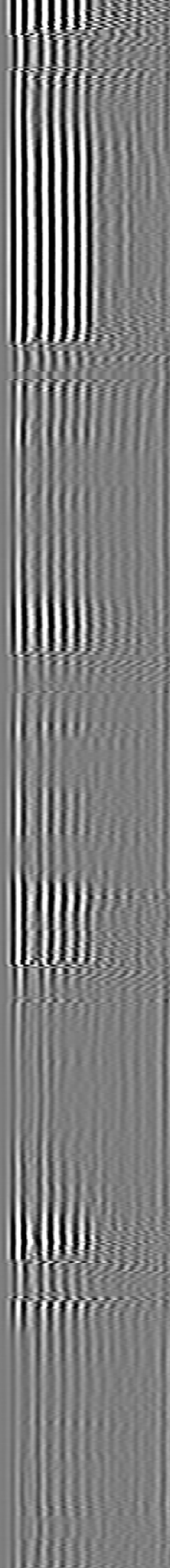
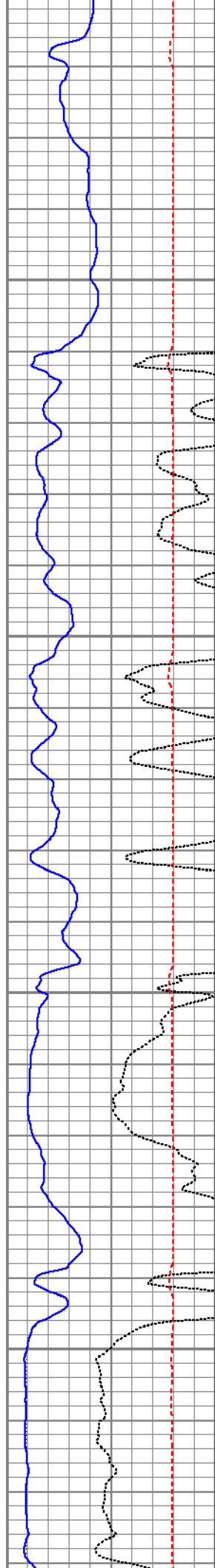


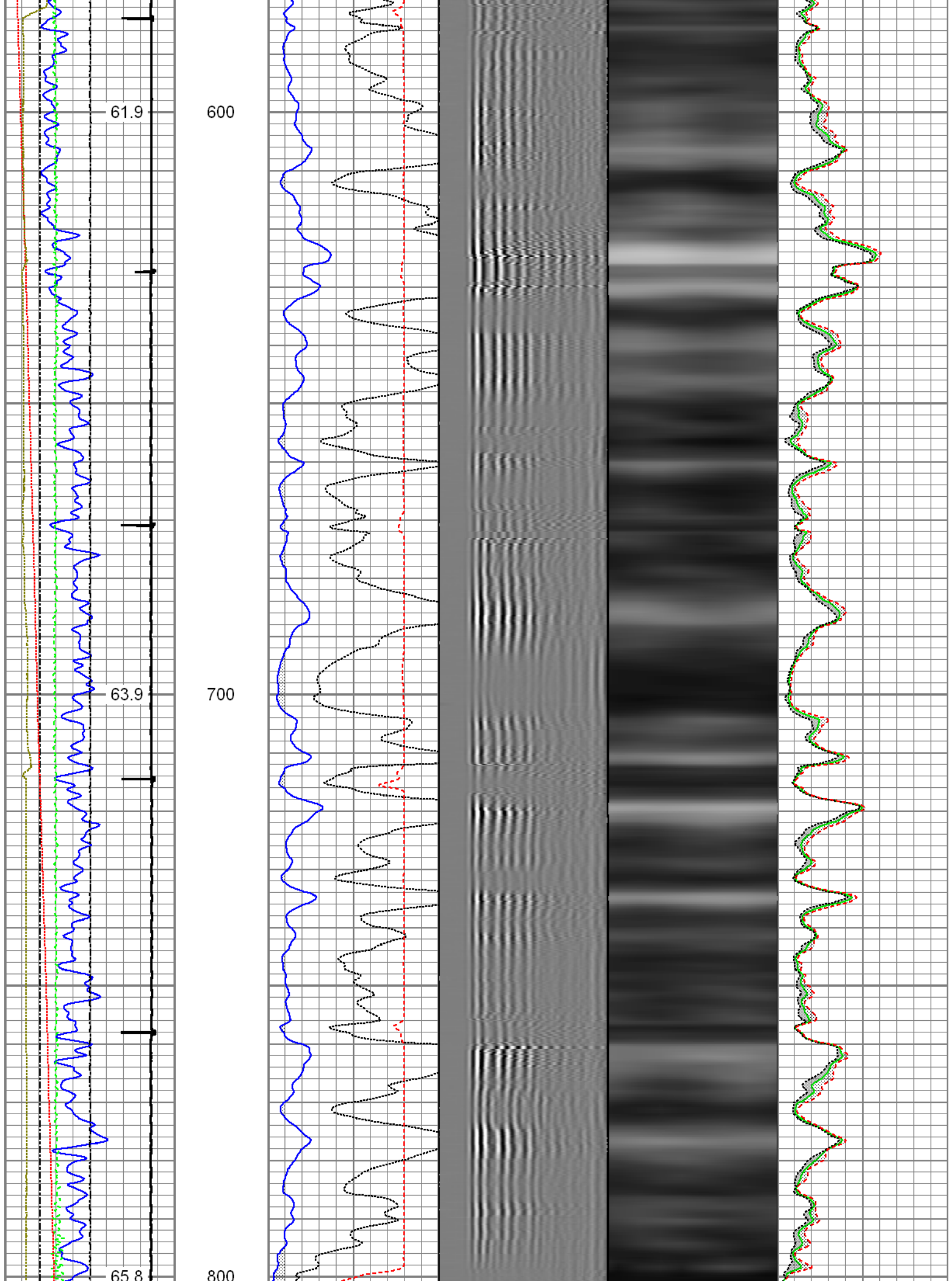


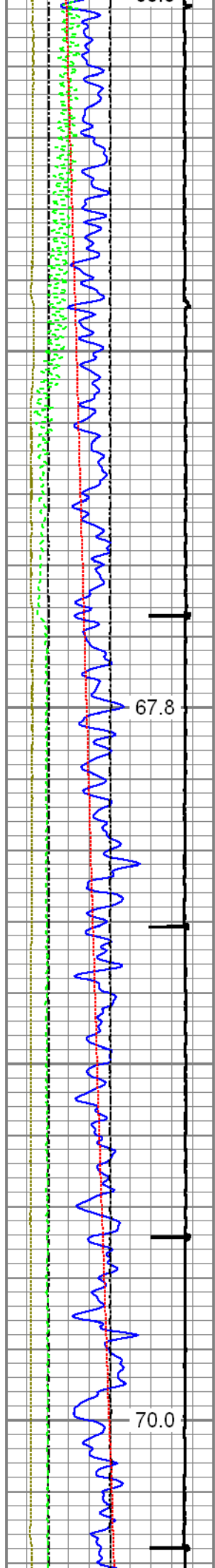


400

500





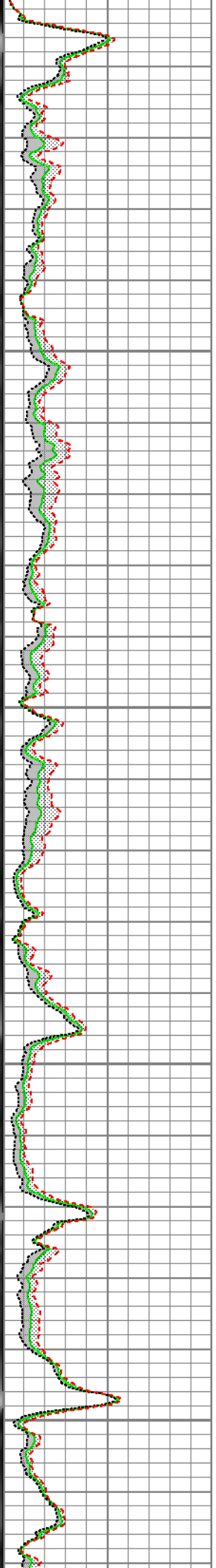
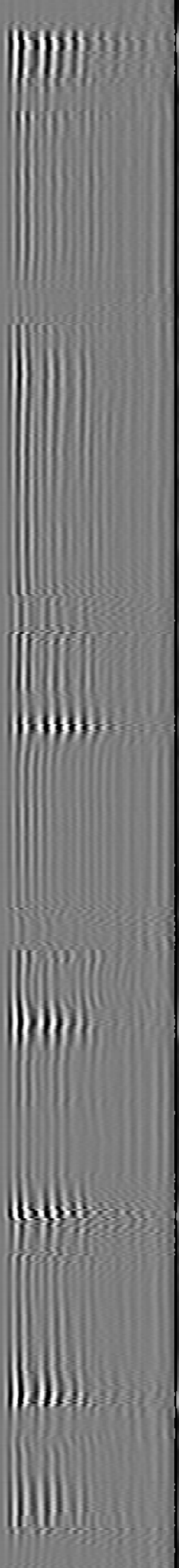
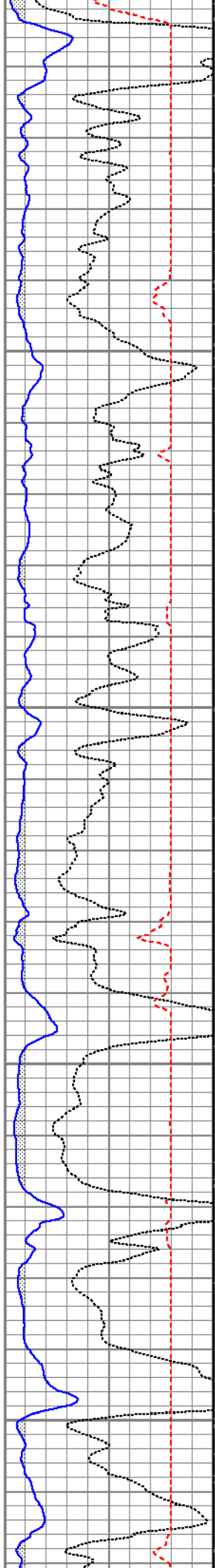


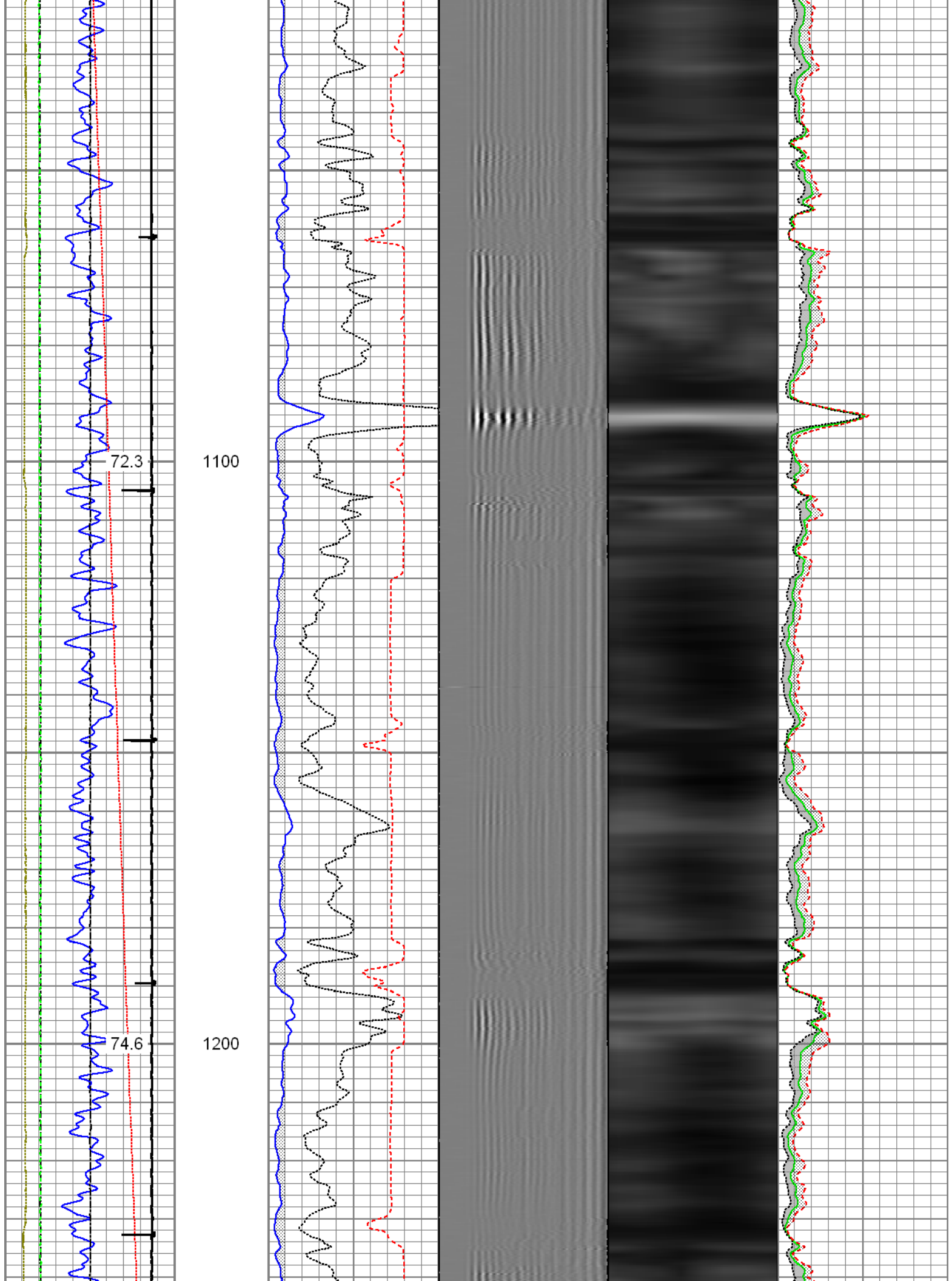
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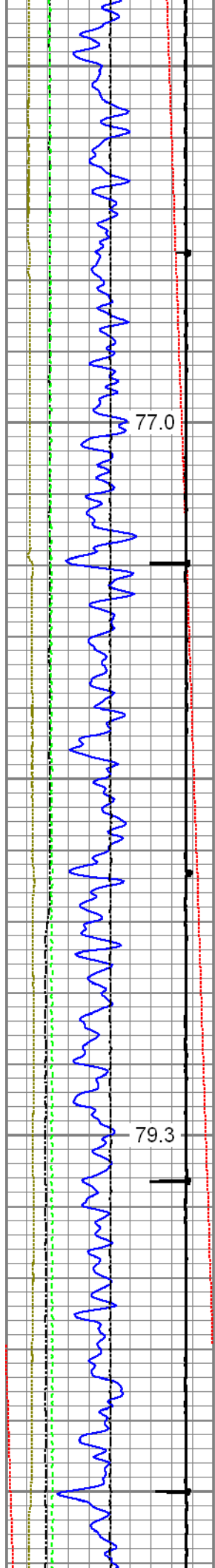
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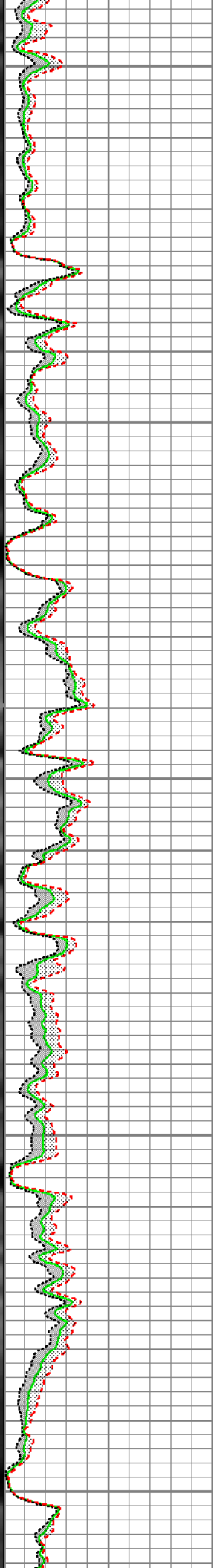
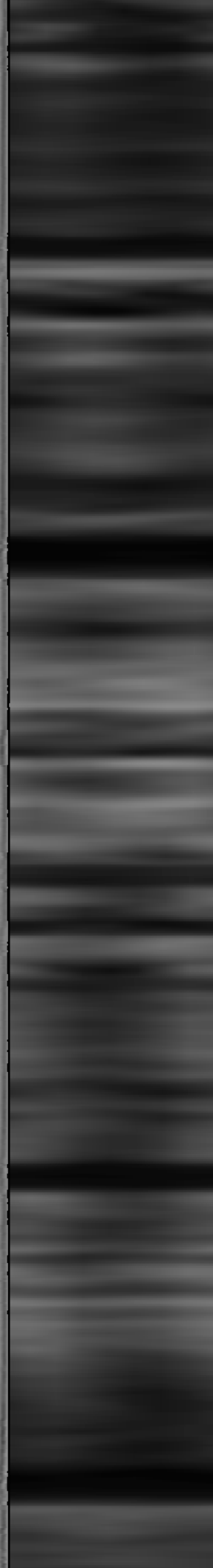
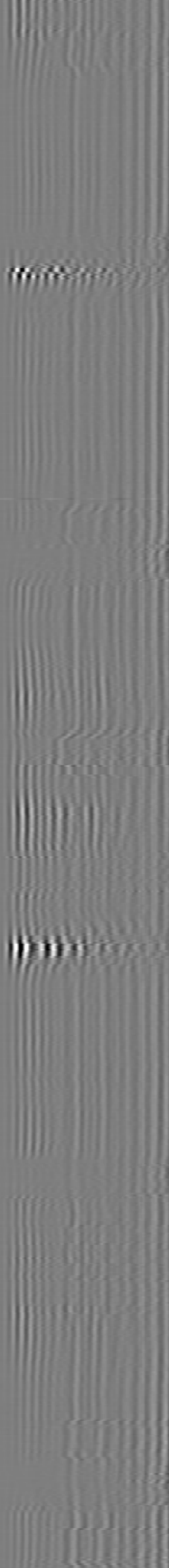
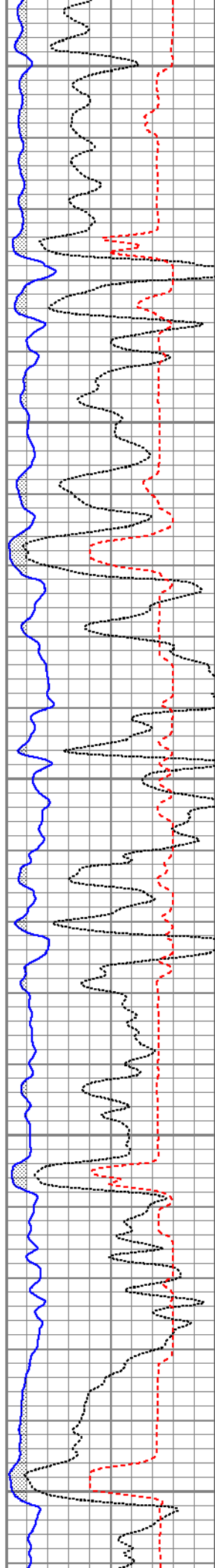


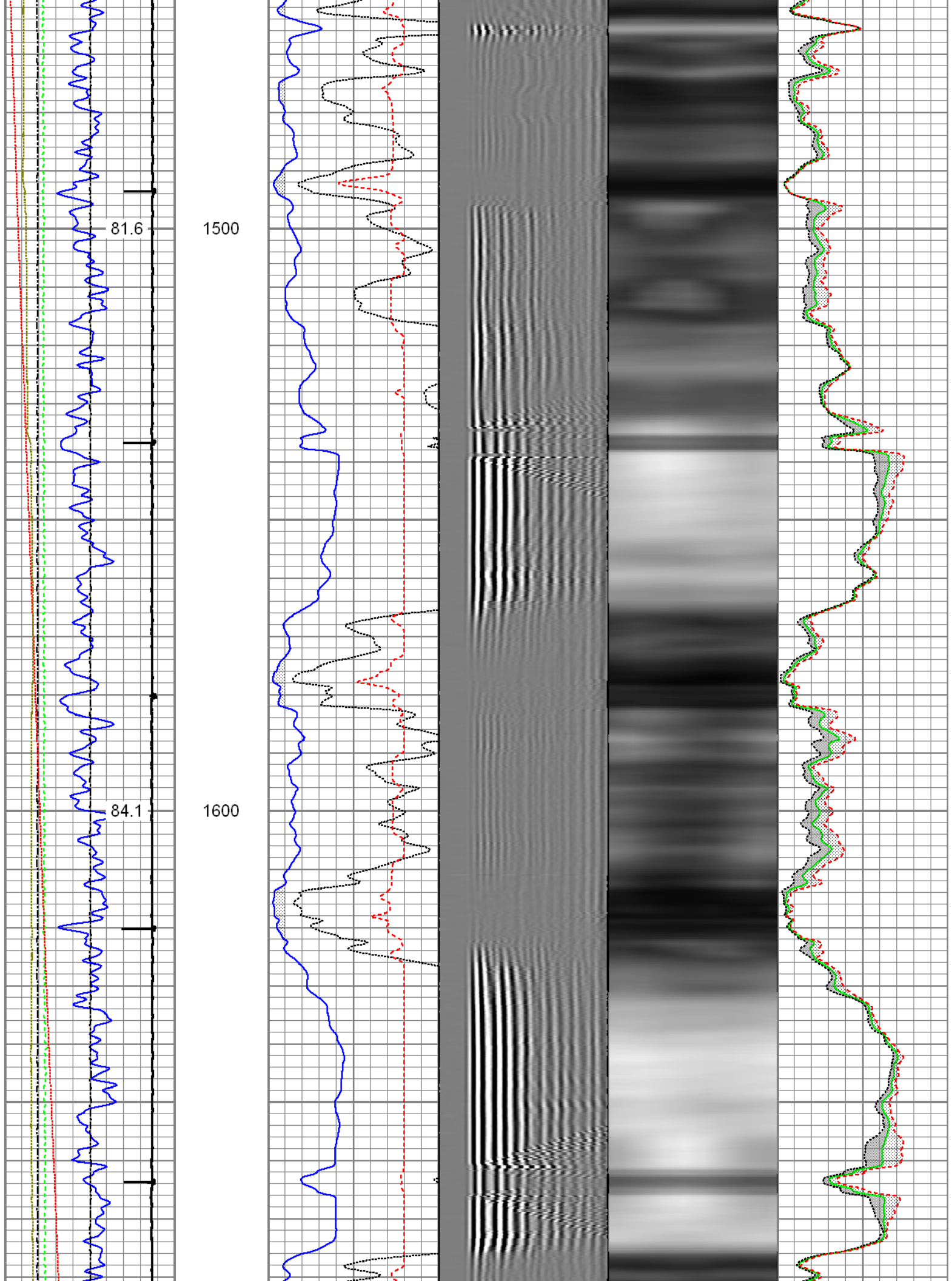


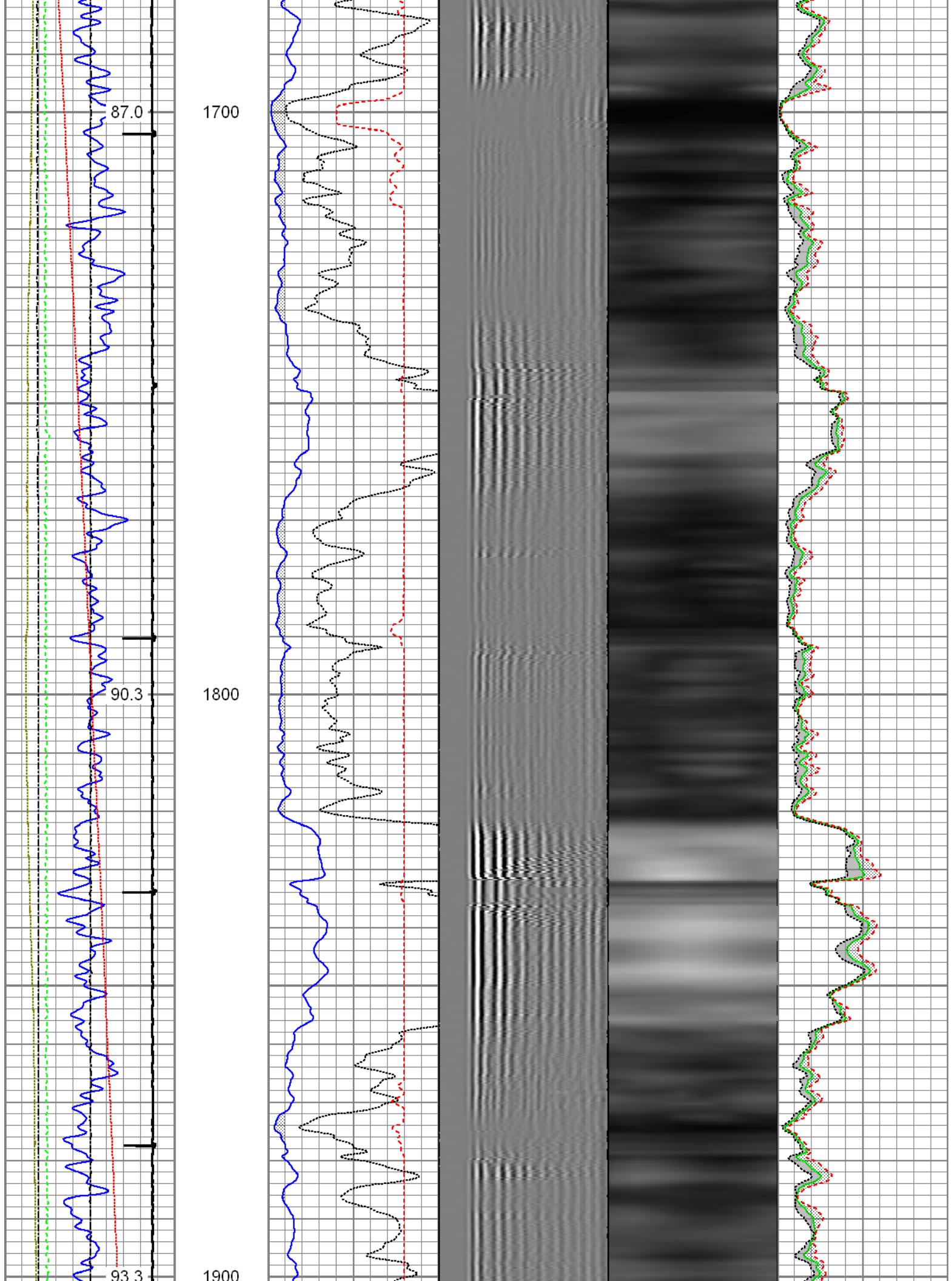


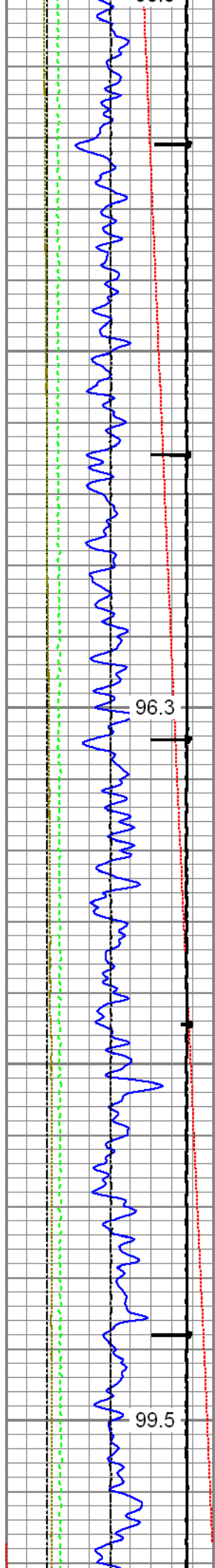
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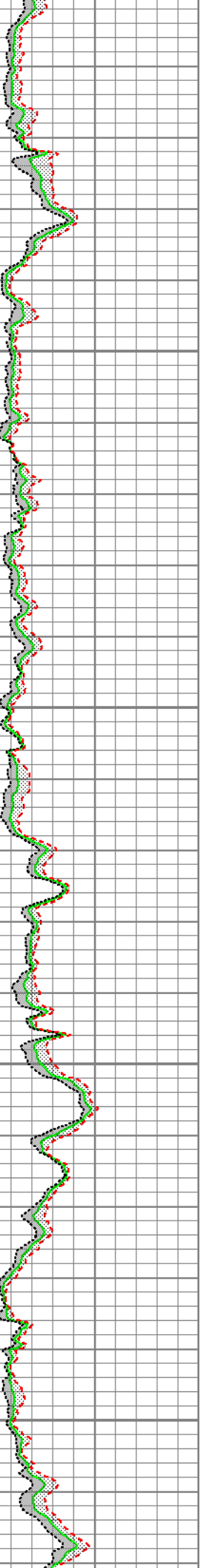
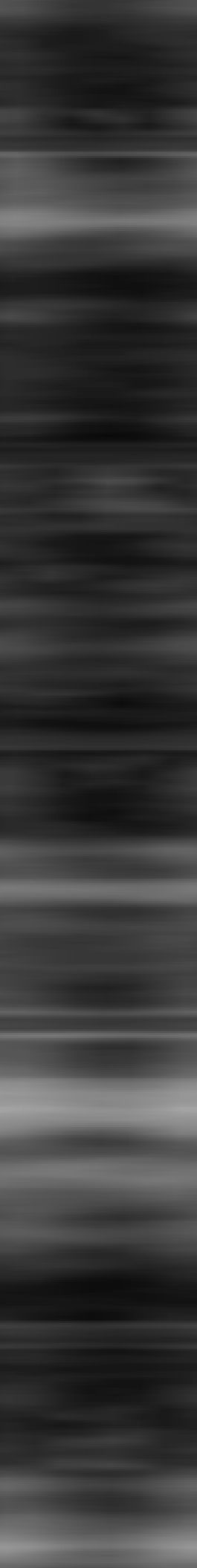
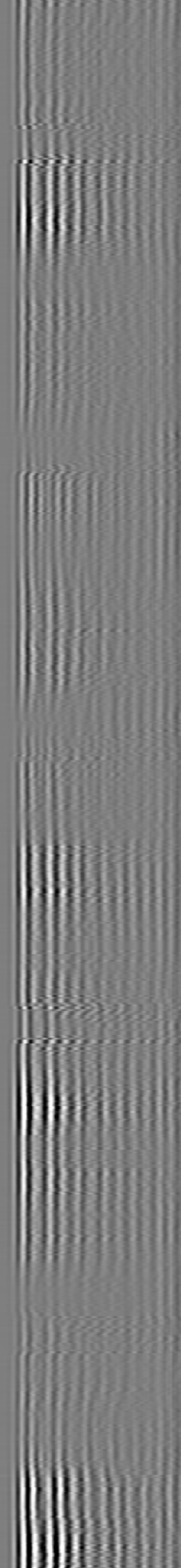
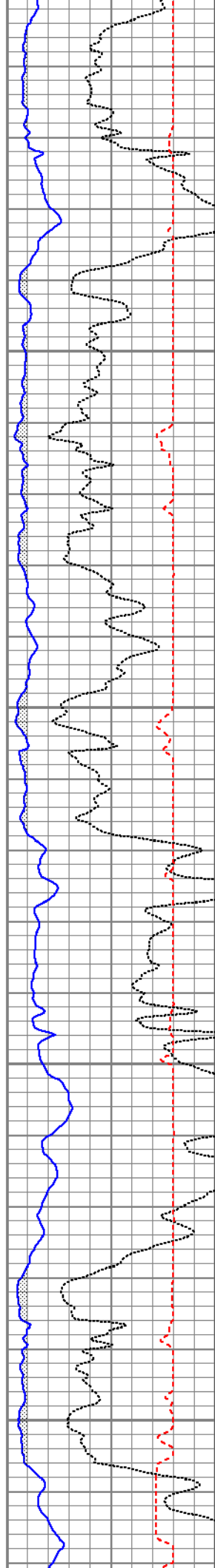


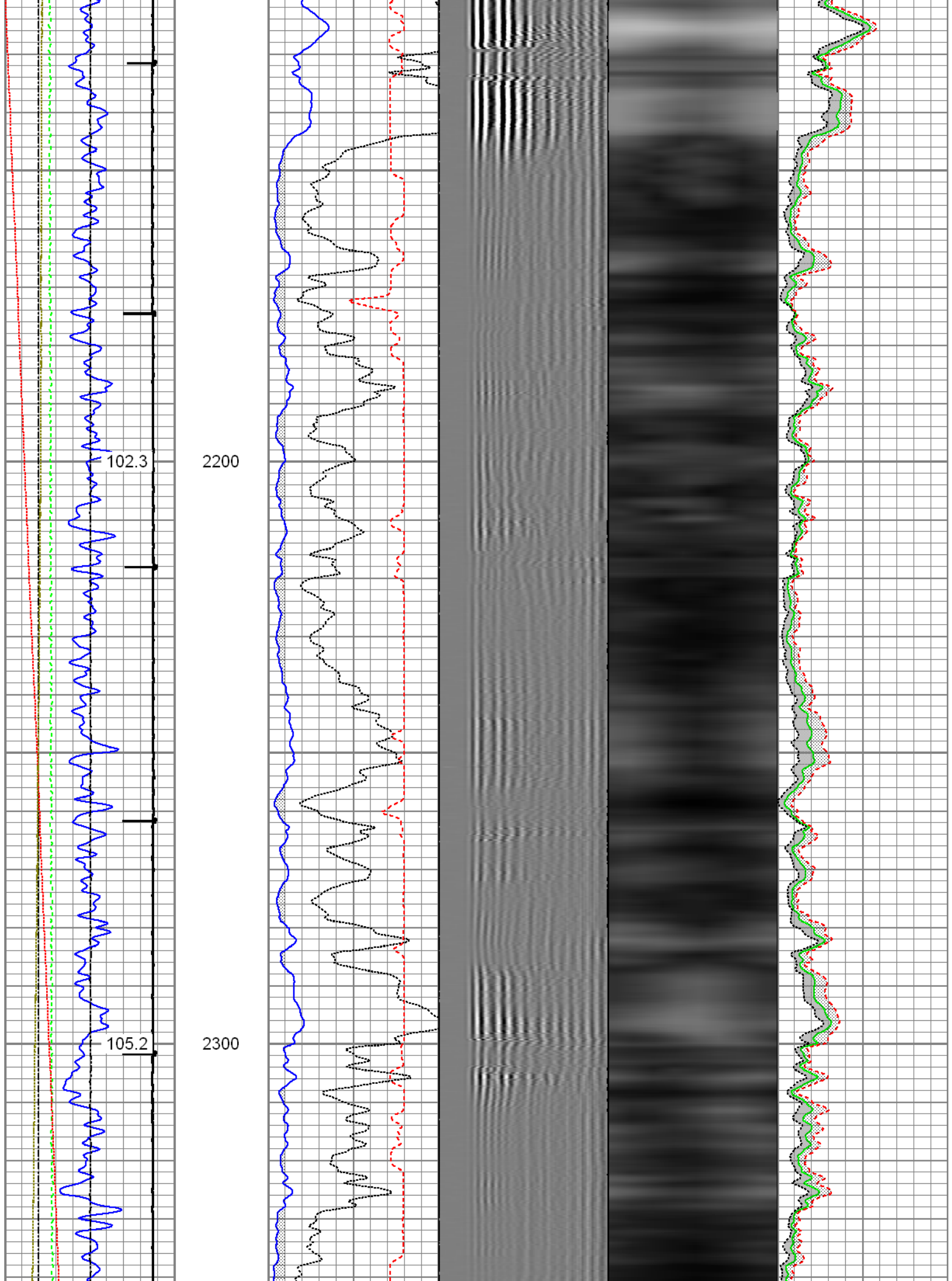


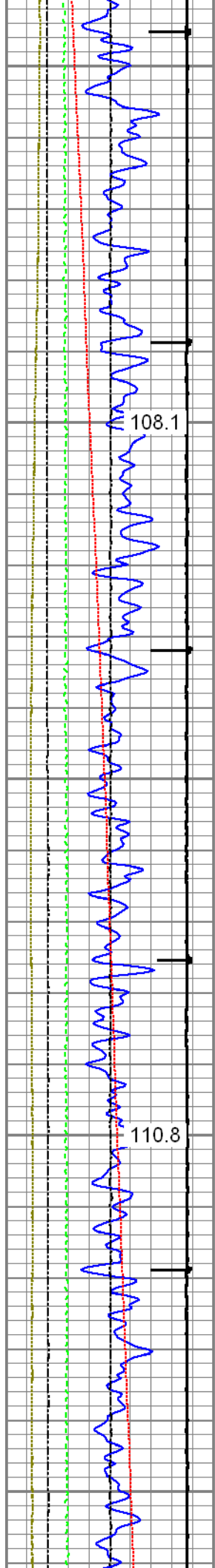


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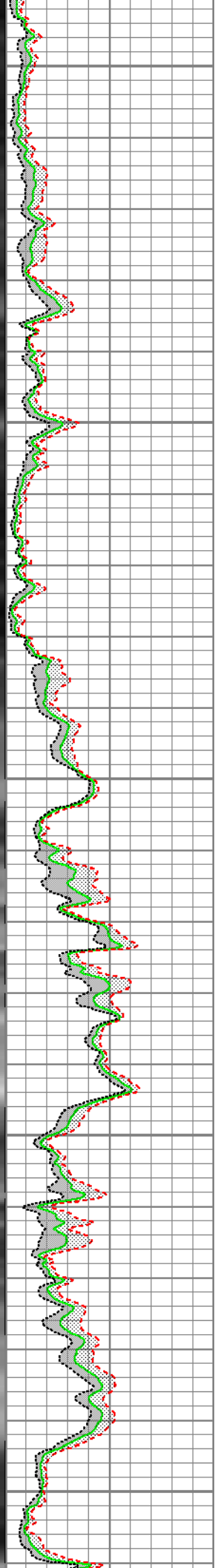
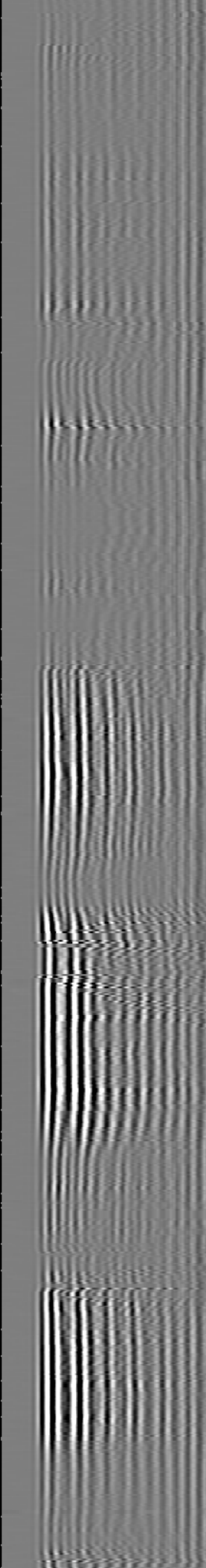
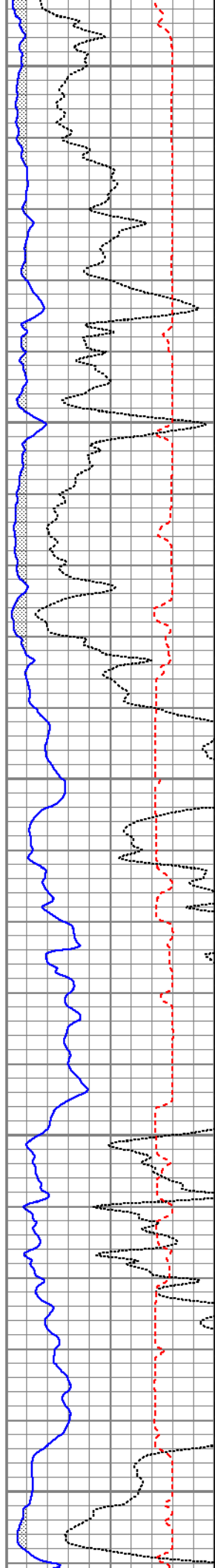


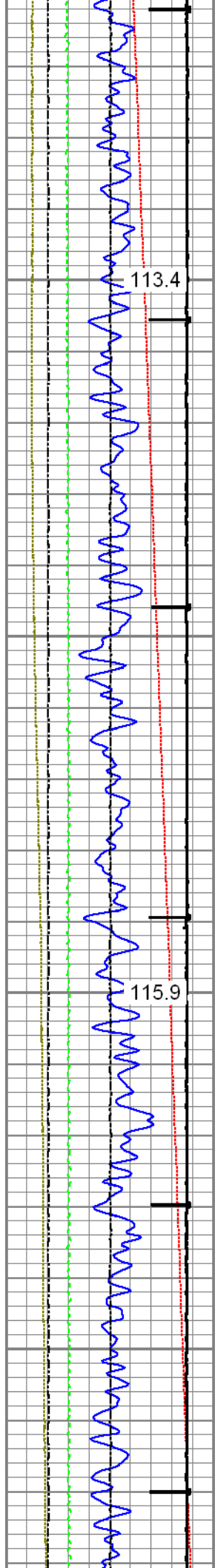




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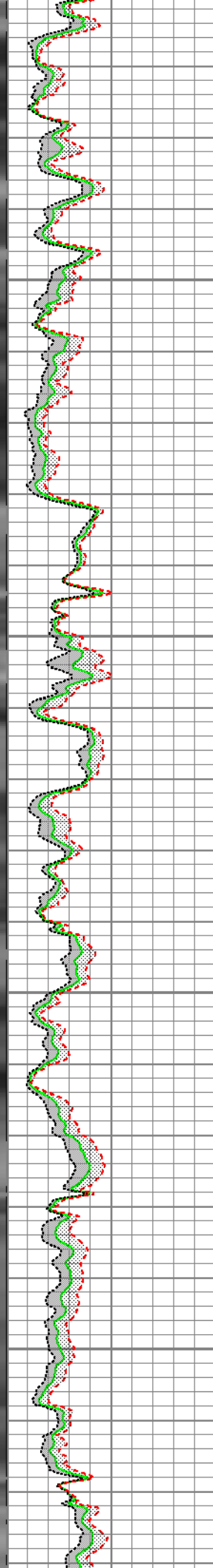
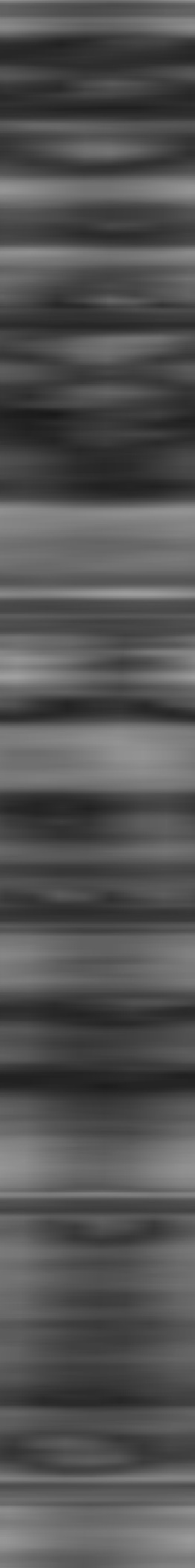
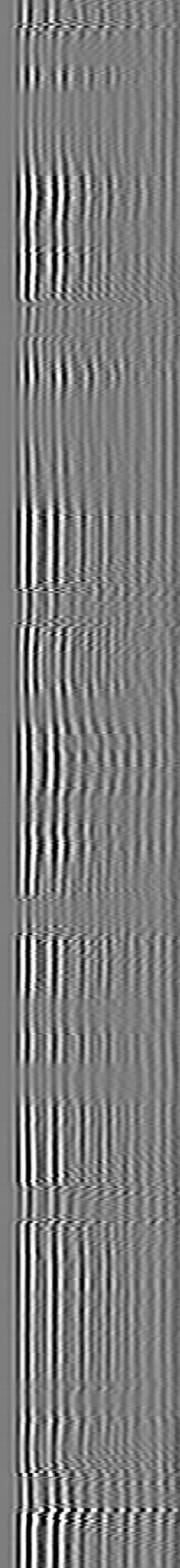
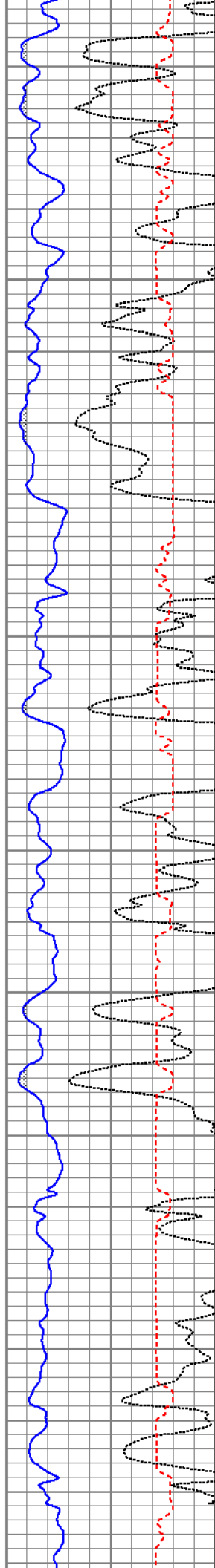
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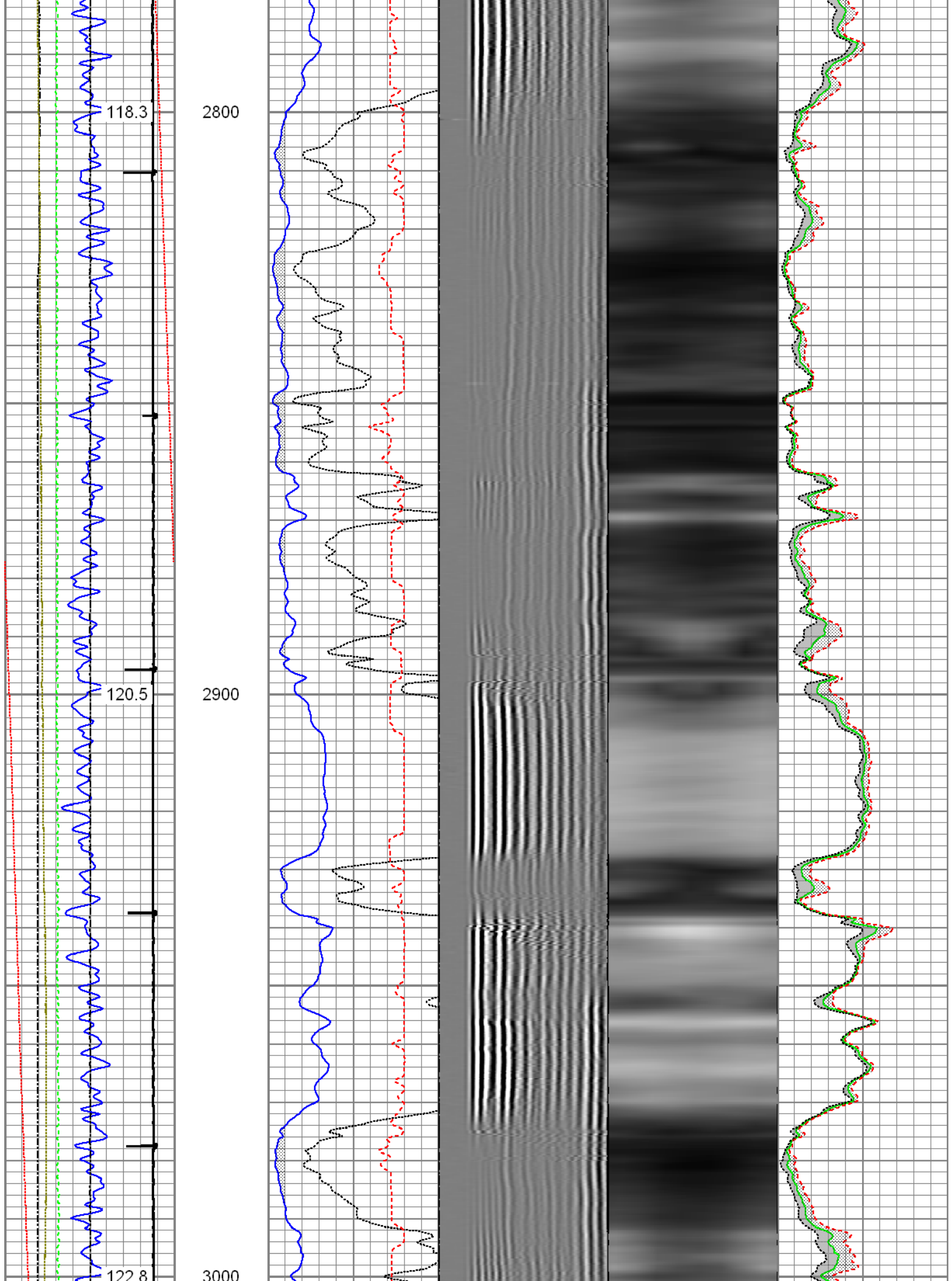


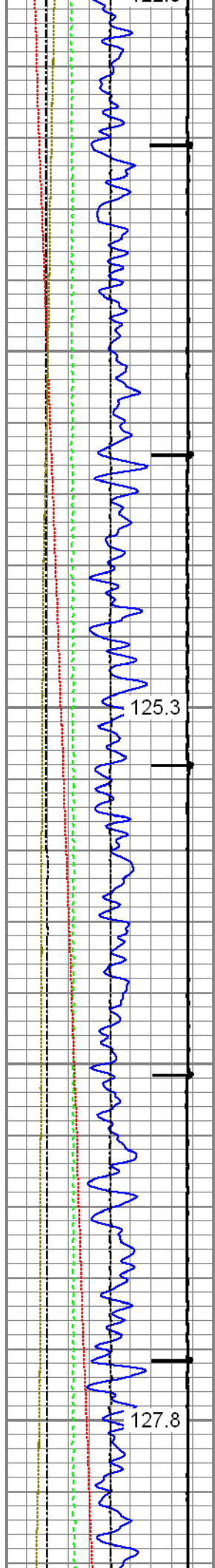


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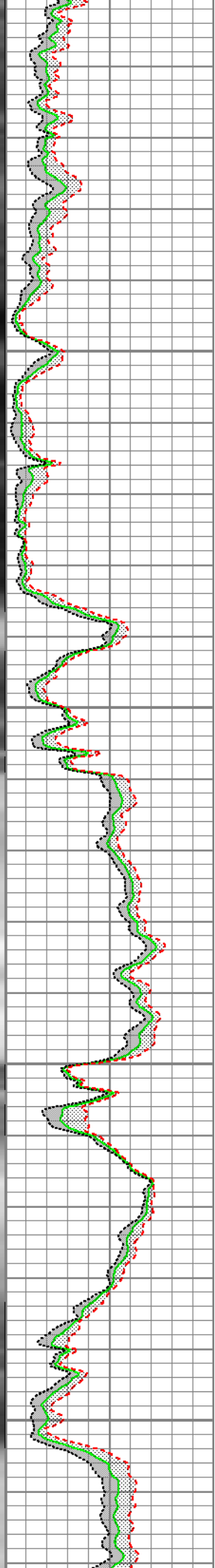
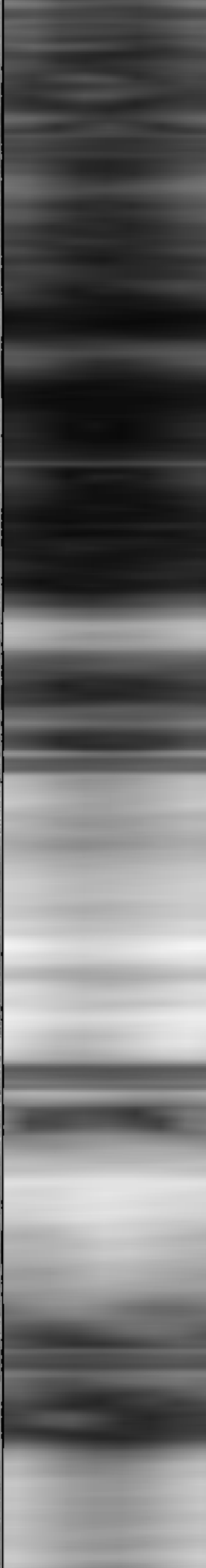
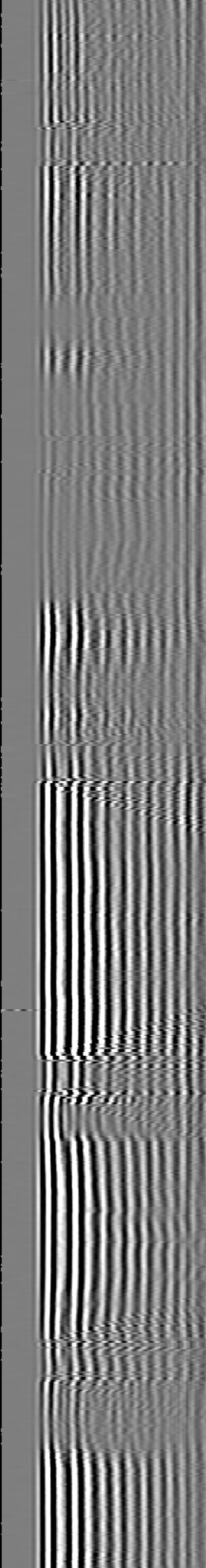
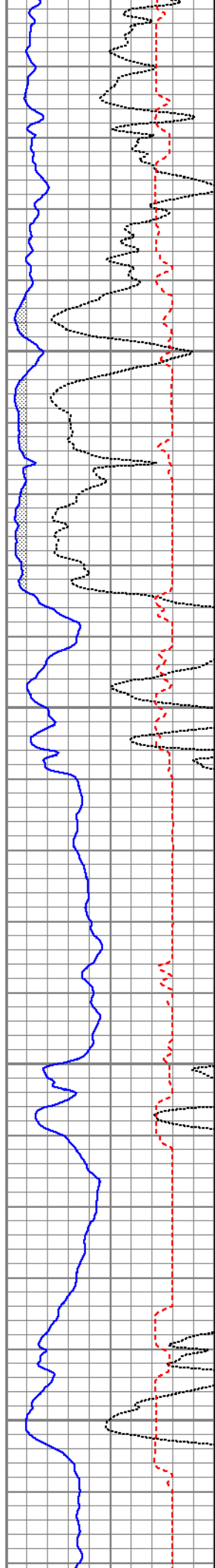


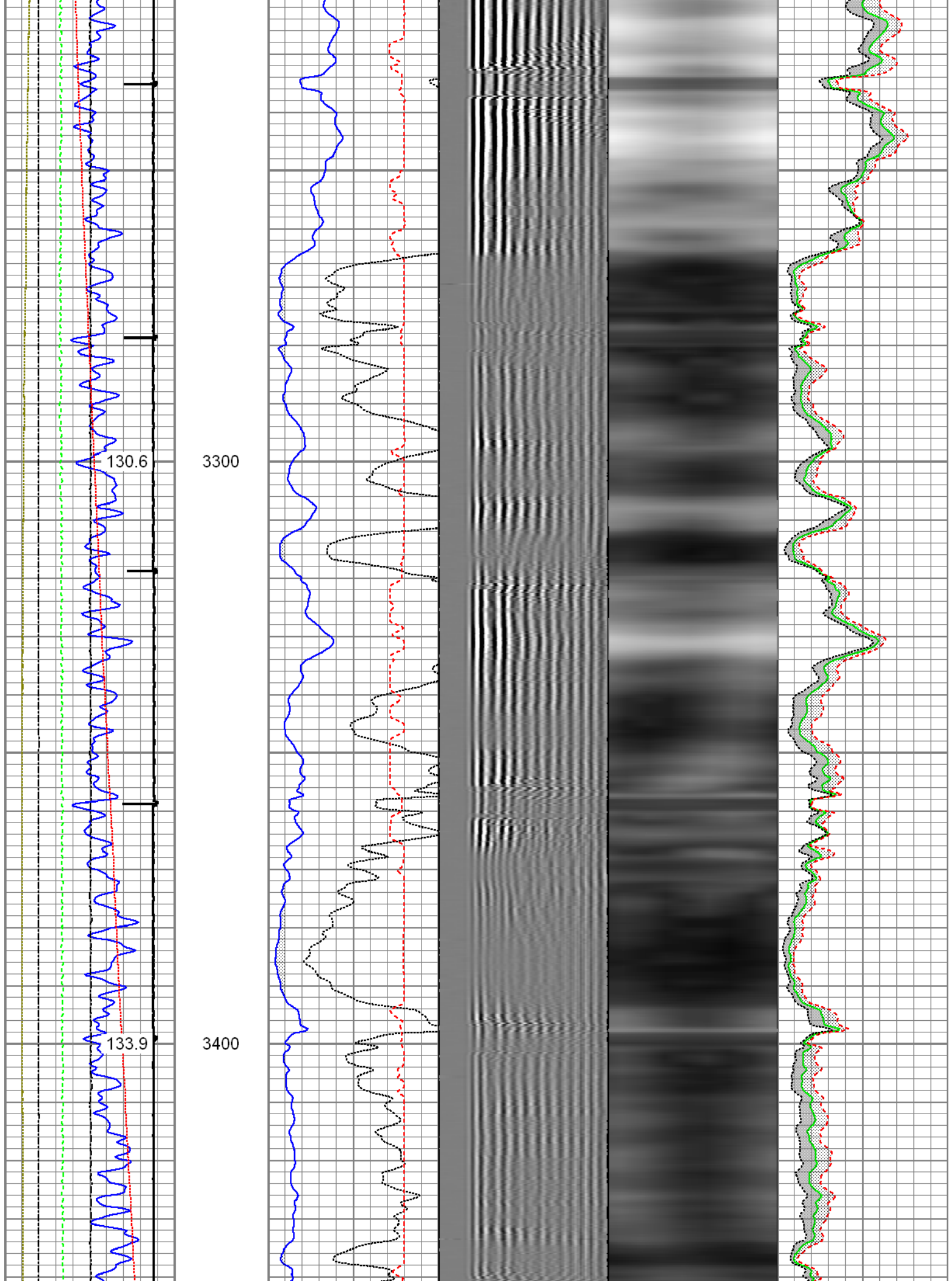


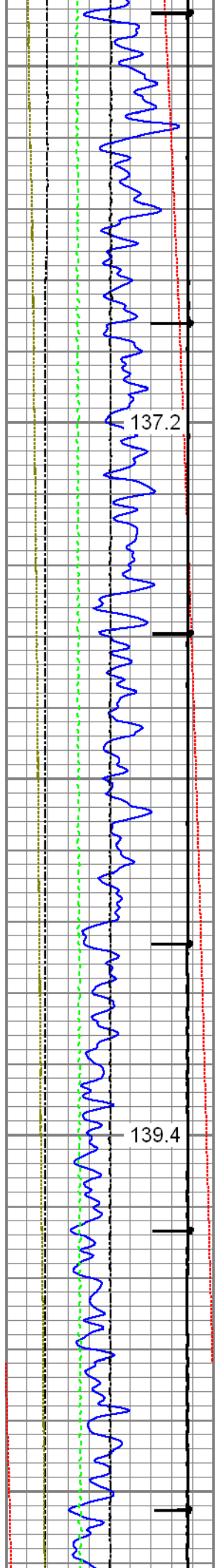


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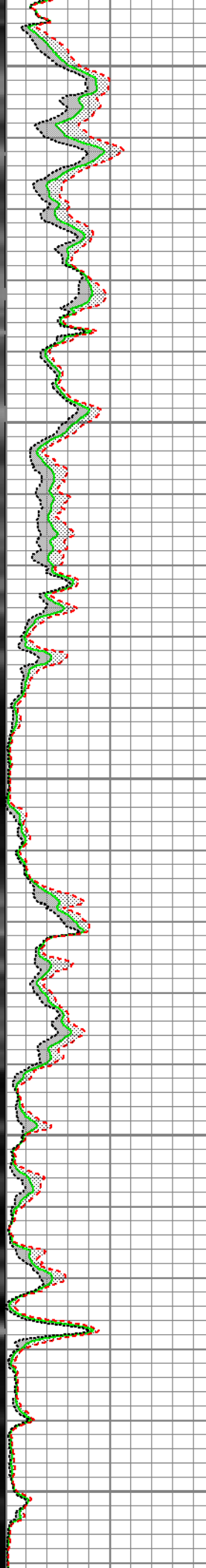
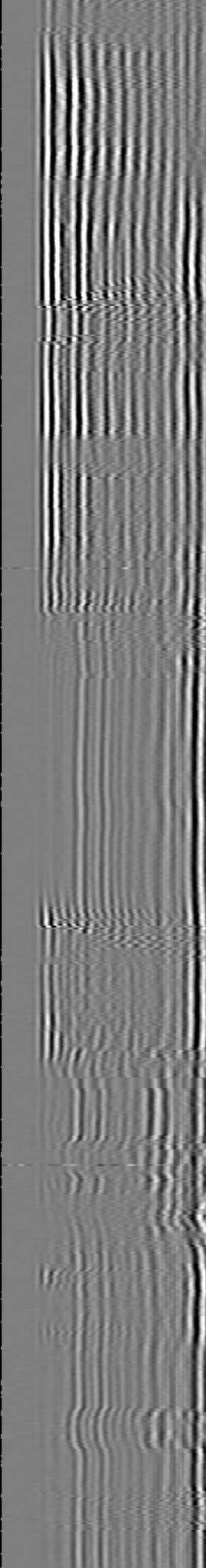
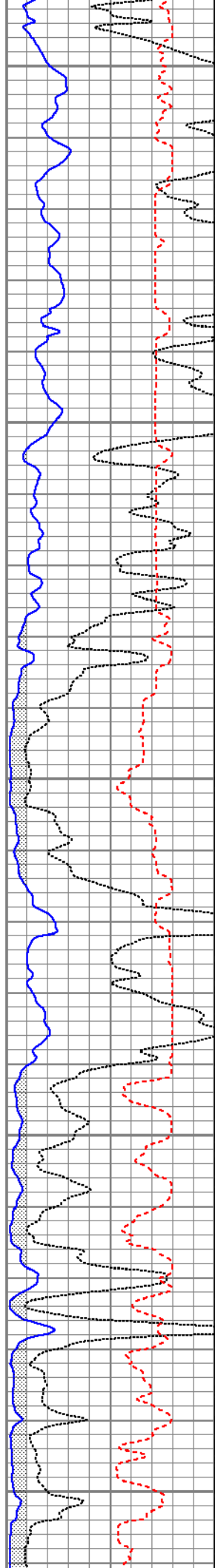


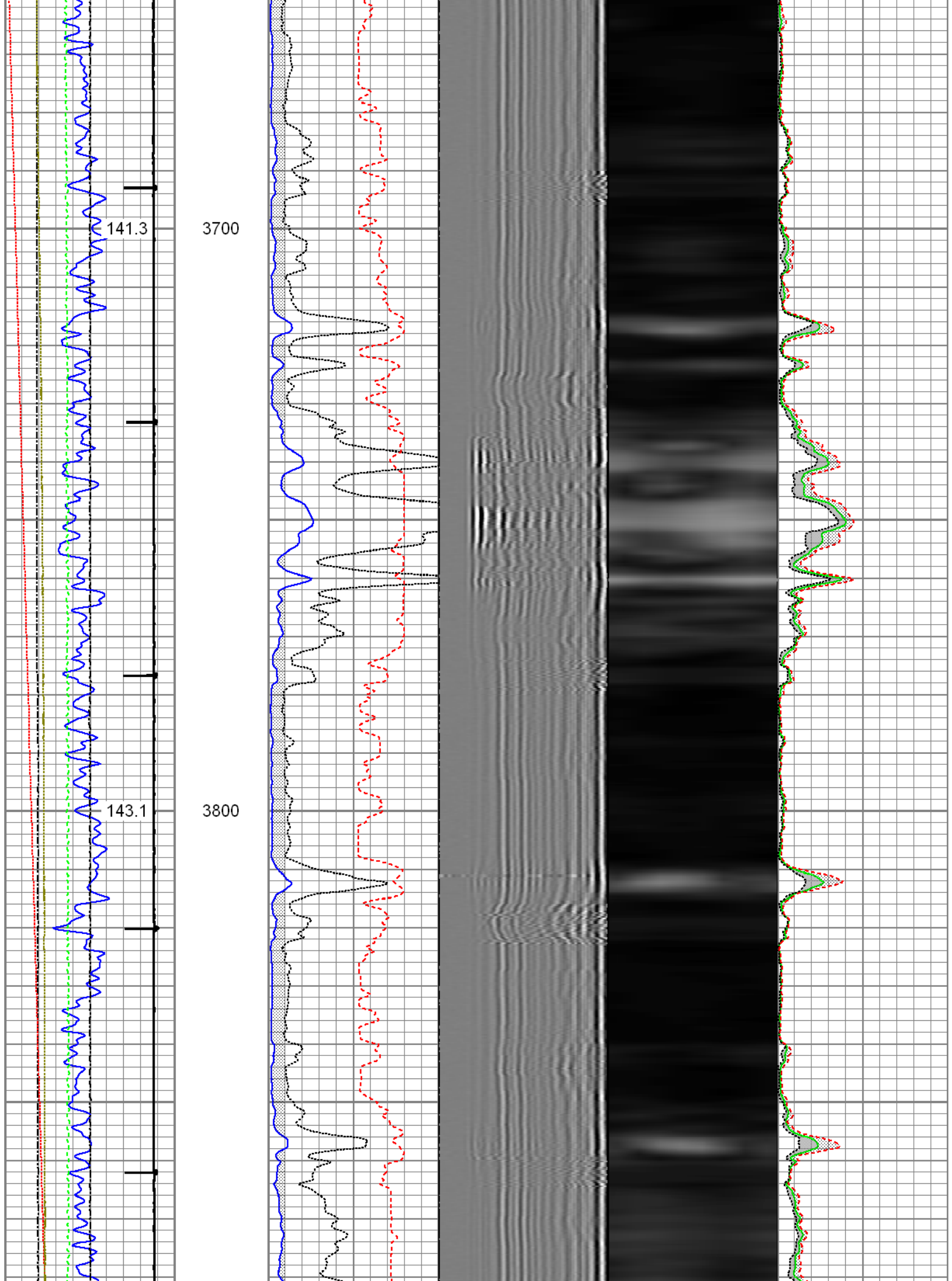


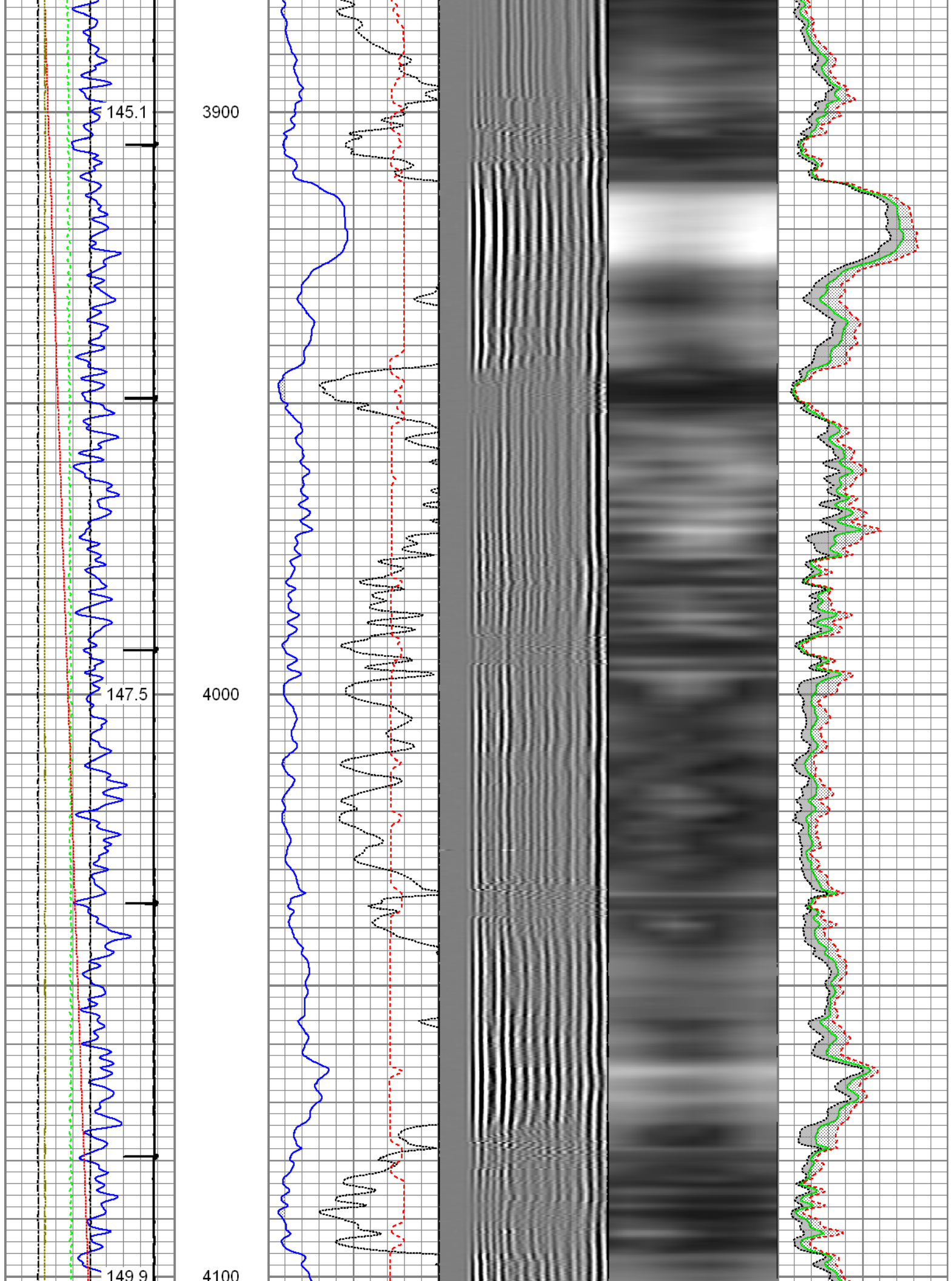


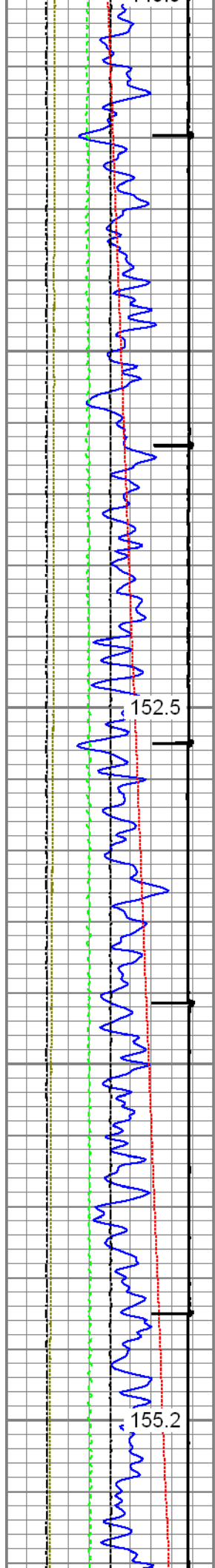
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3600



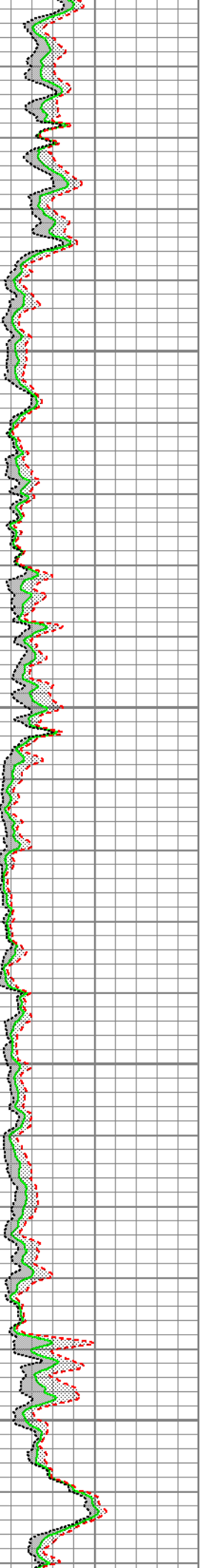
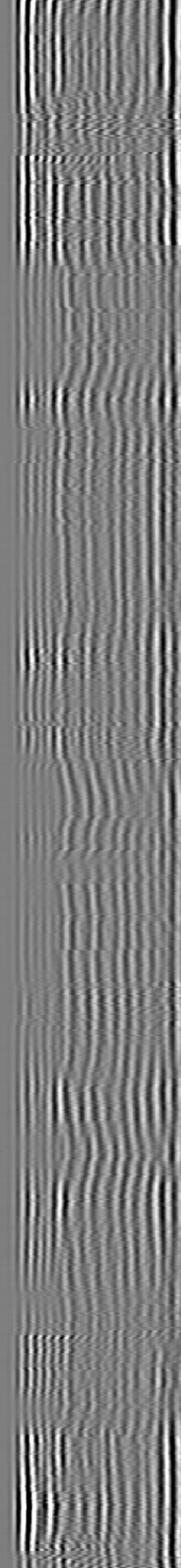
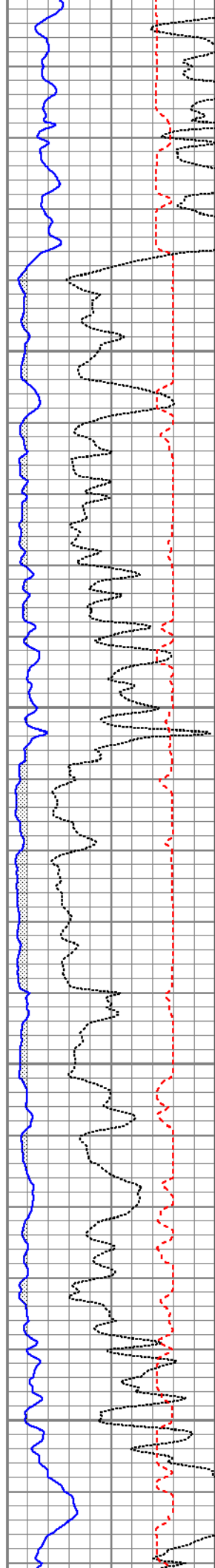


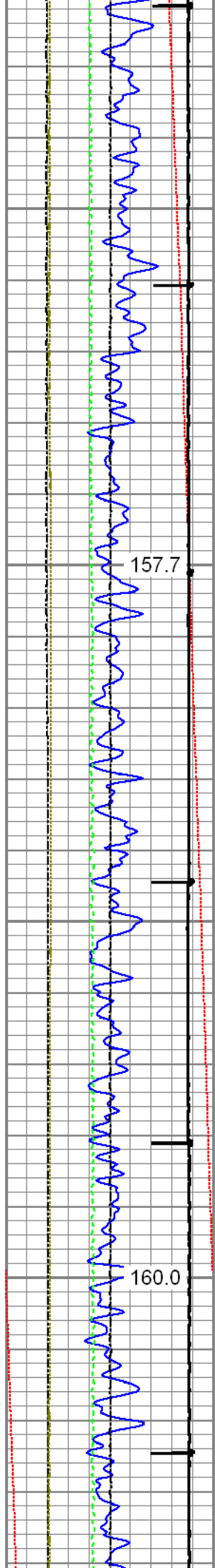




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4300



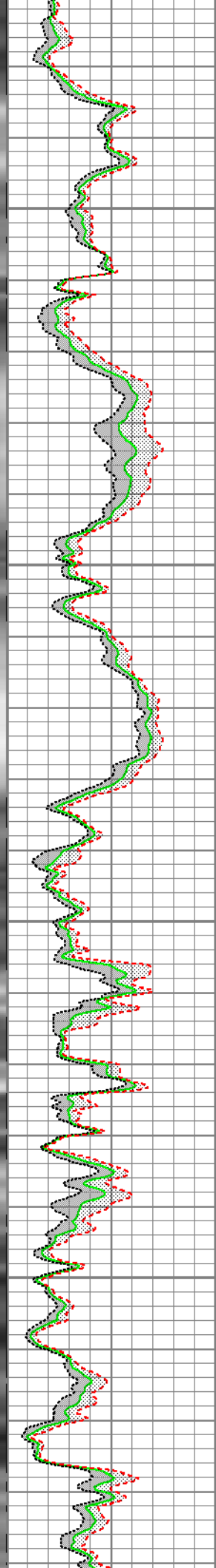
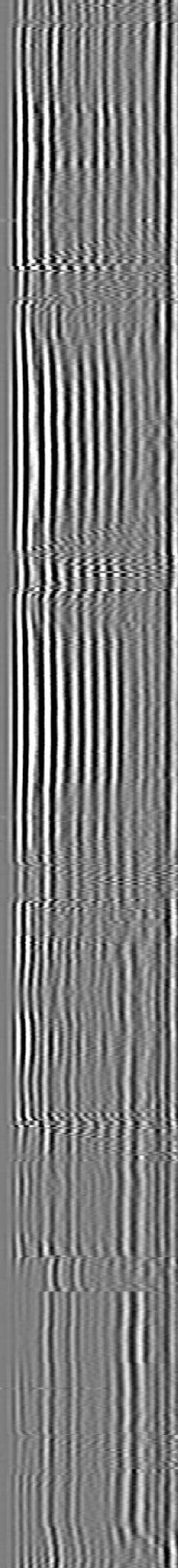
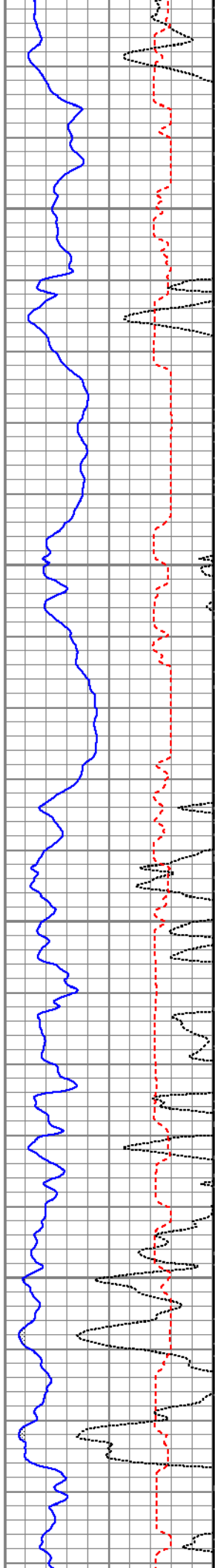


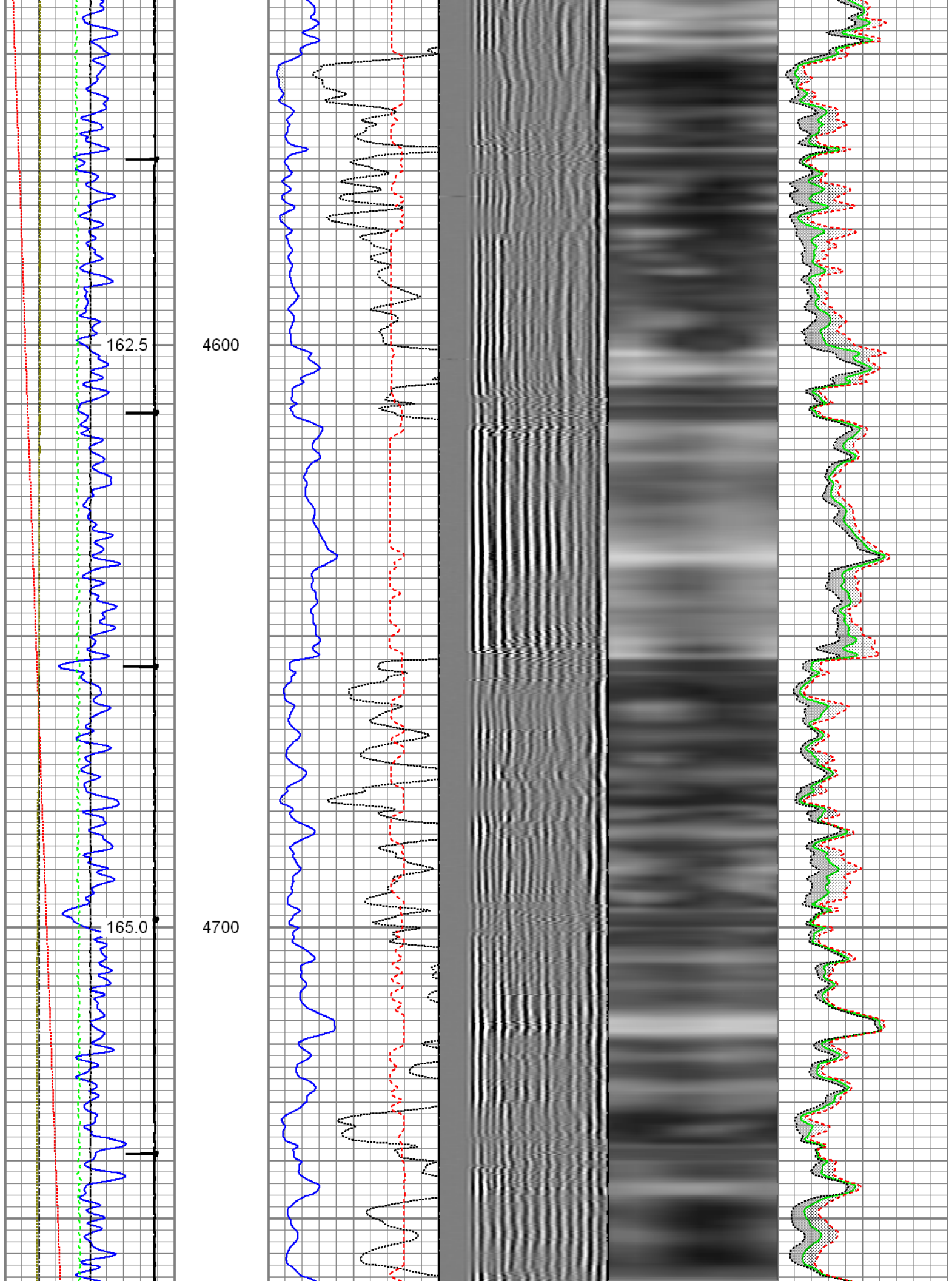
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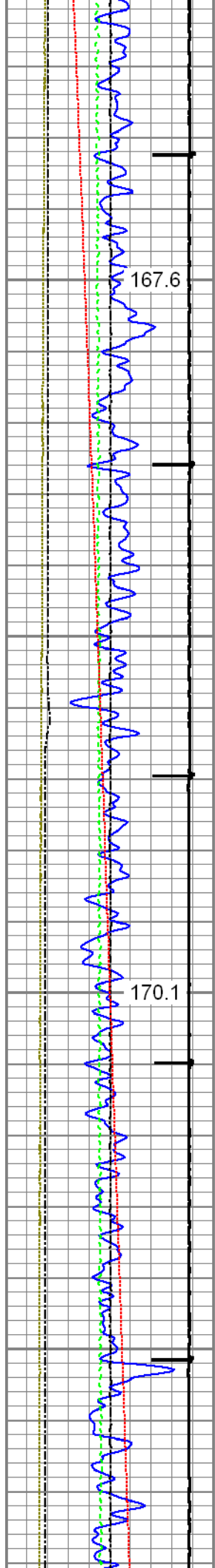
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4500





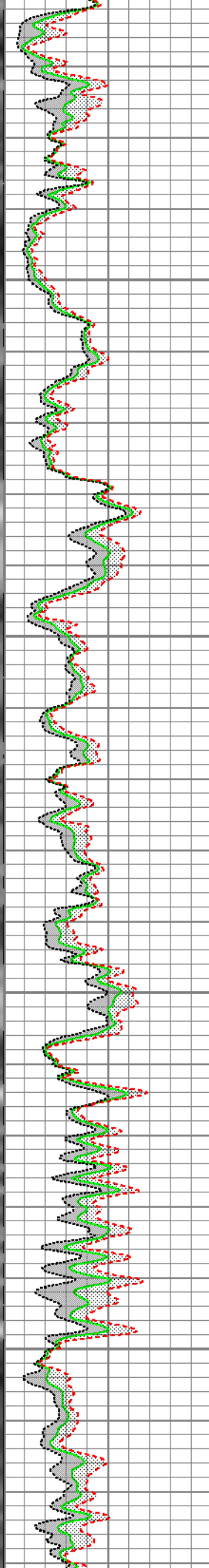
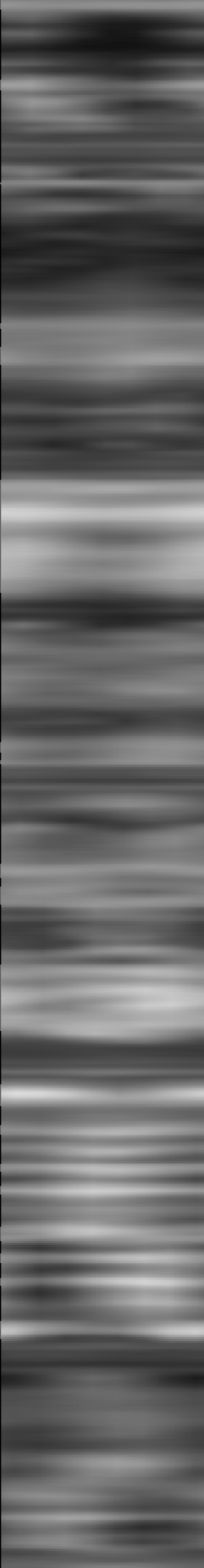
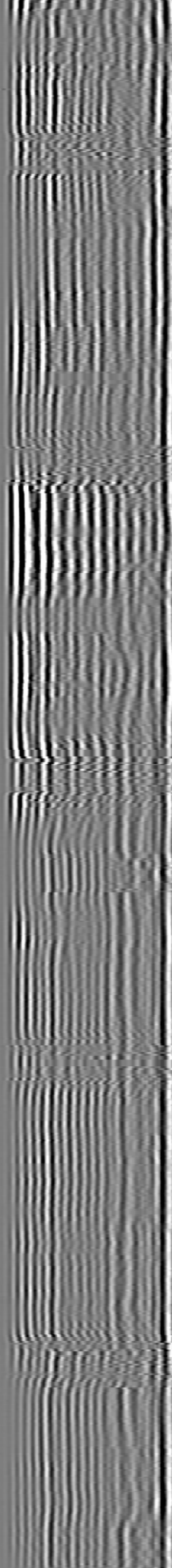
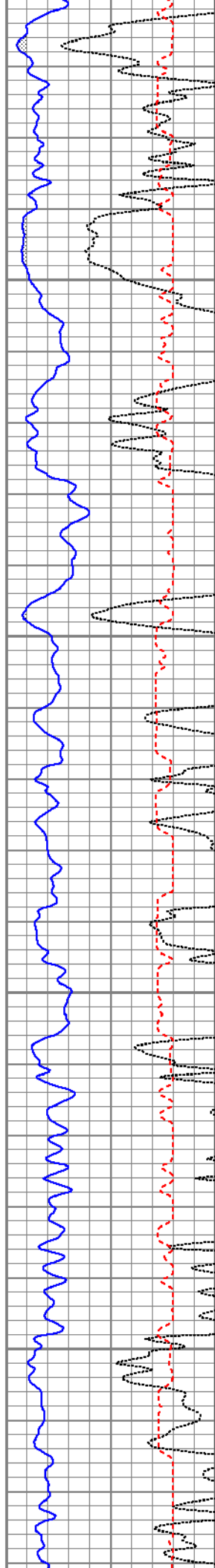


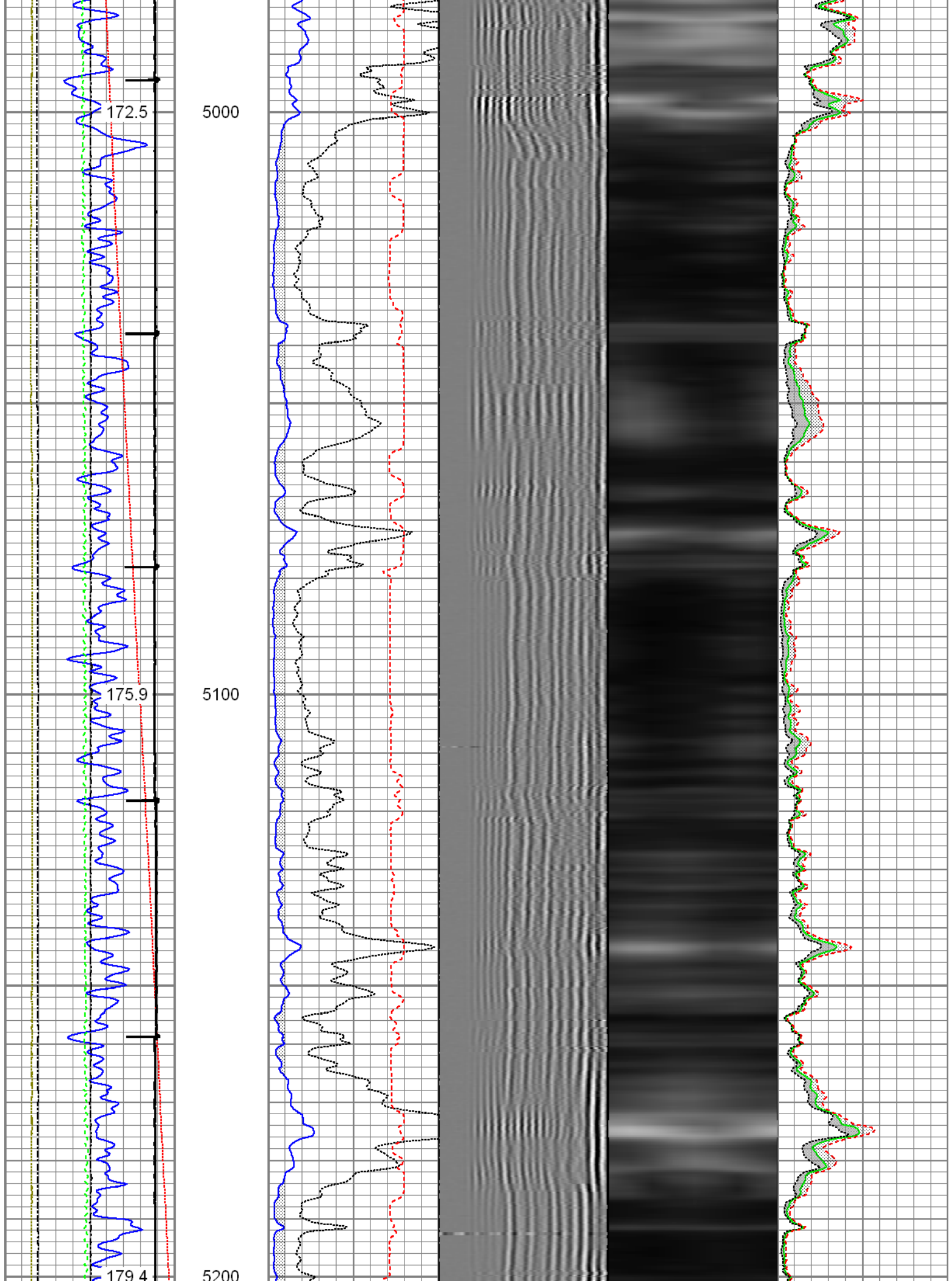
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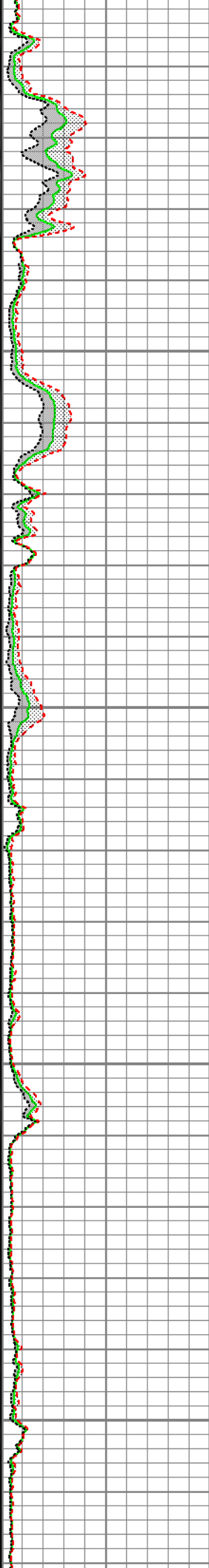
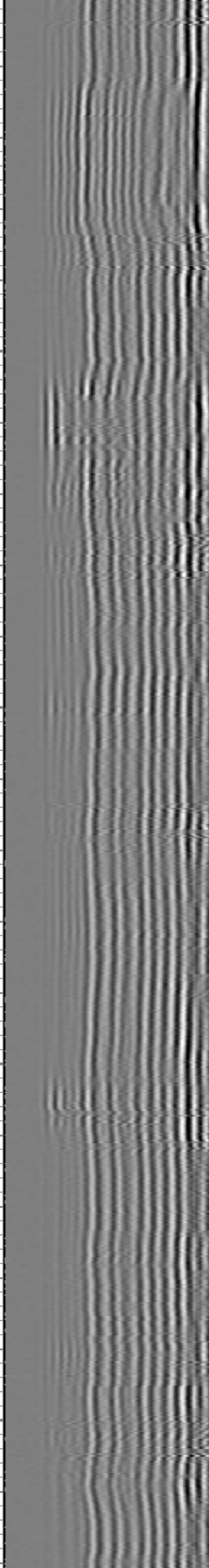
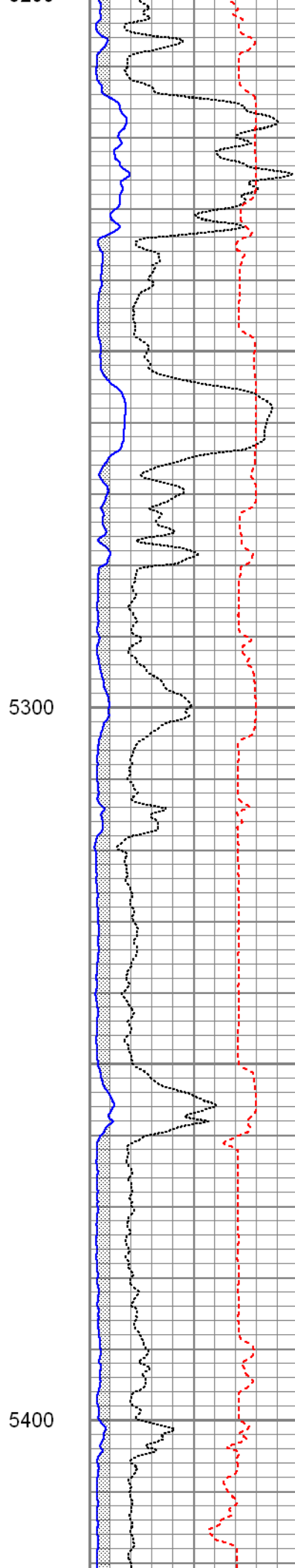
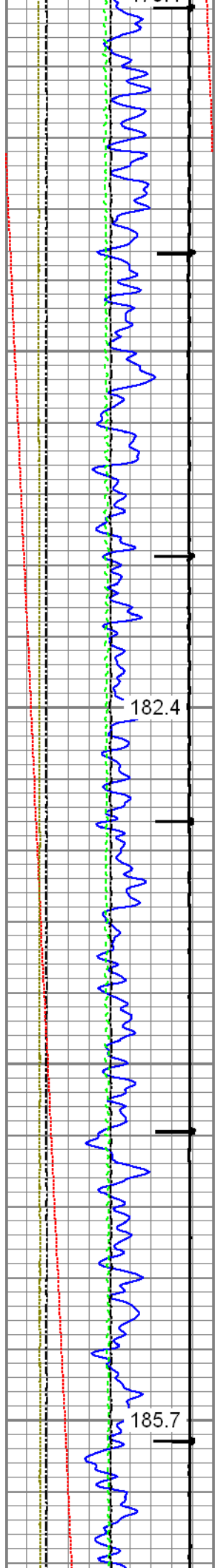
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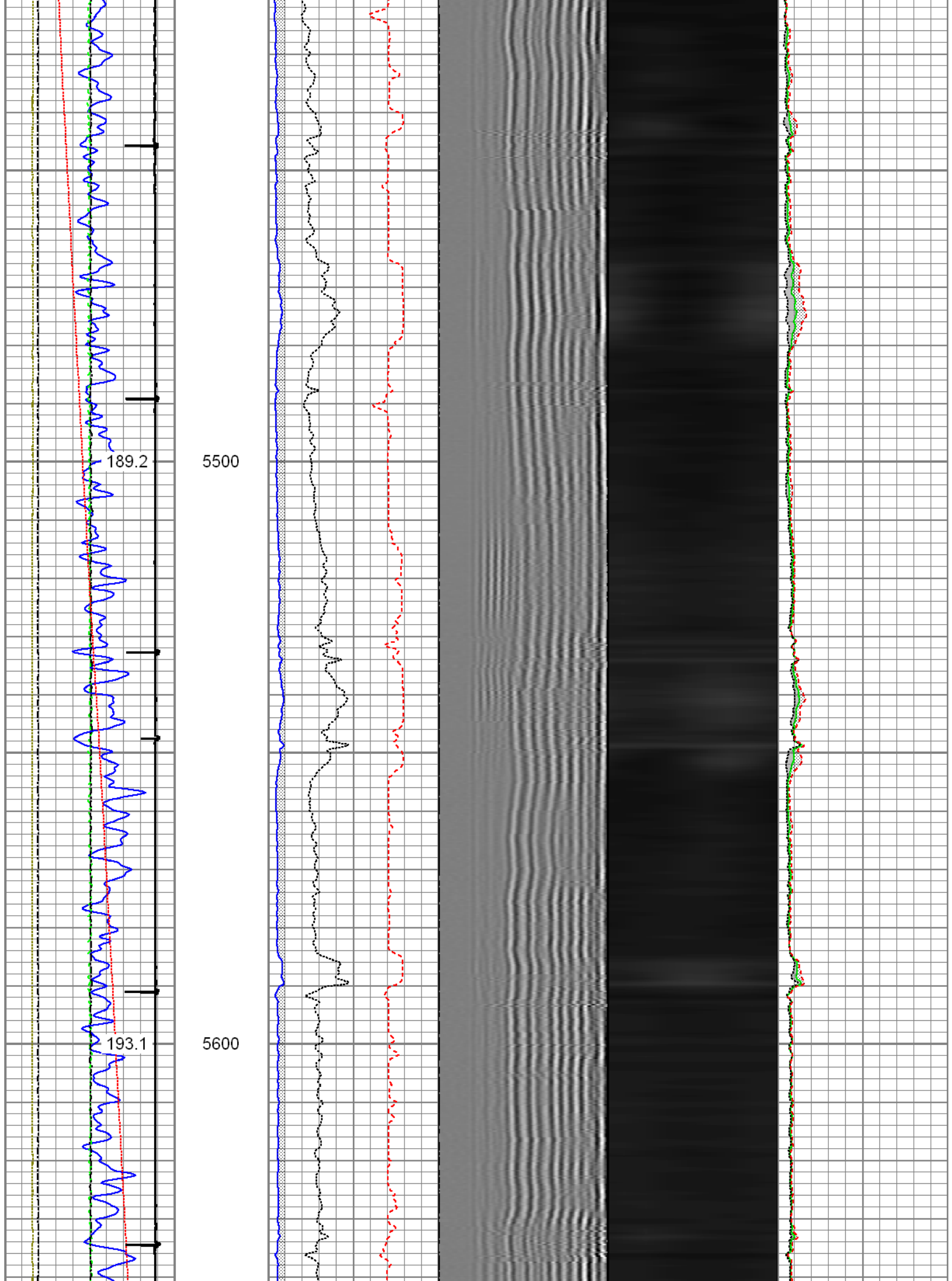
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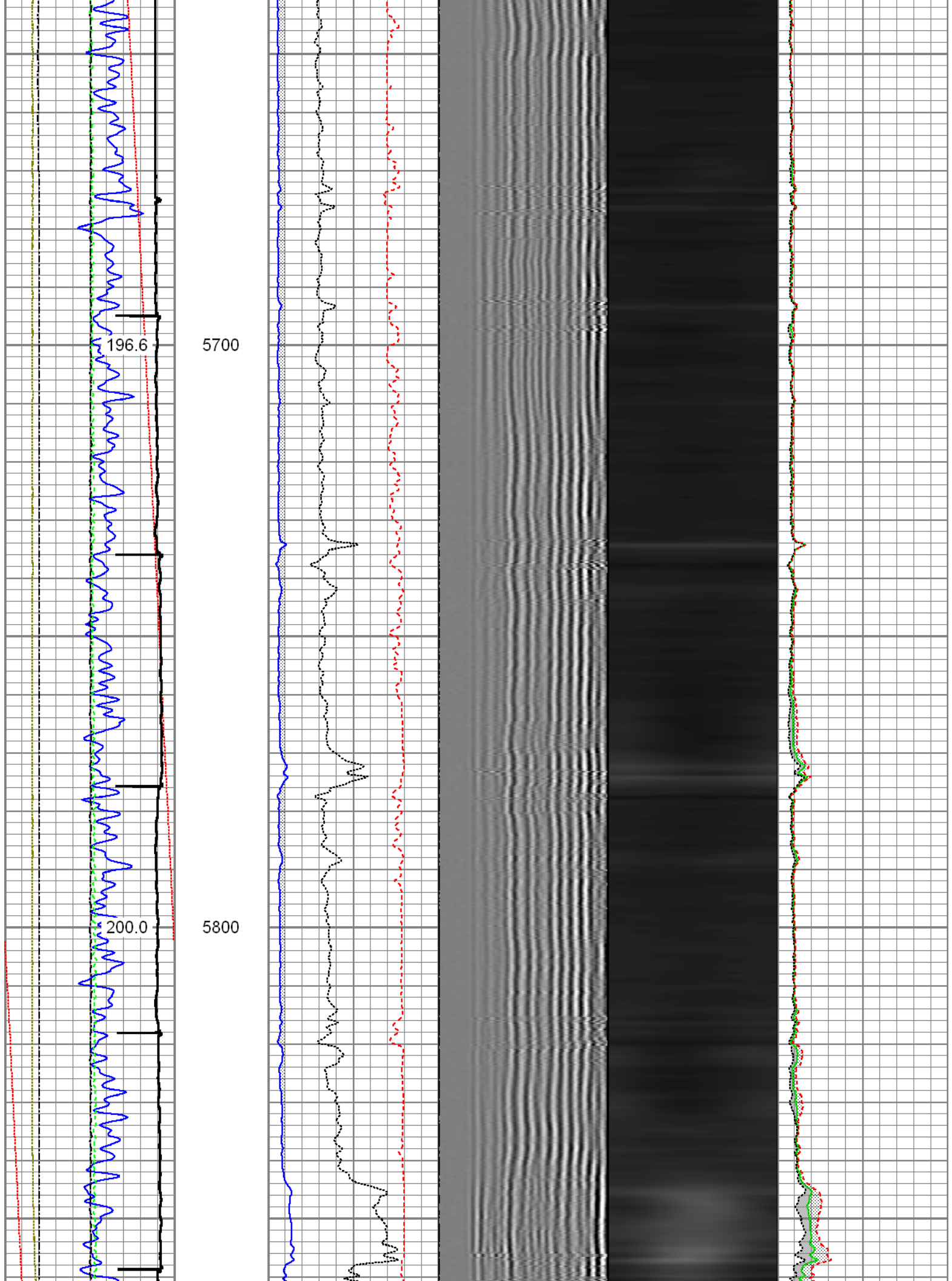
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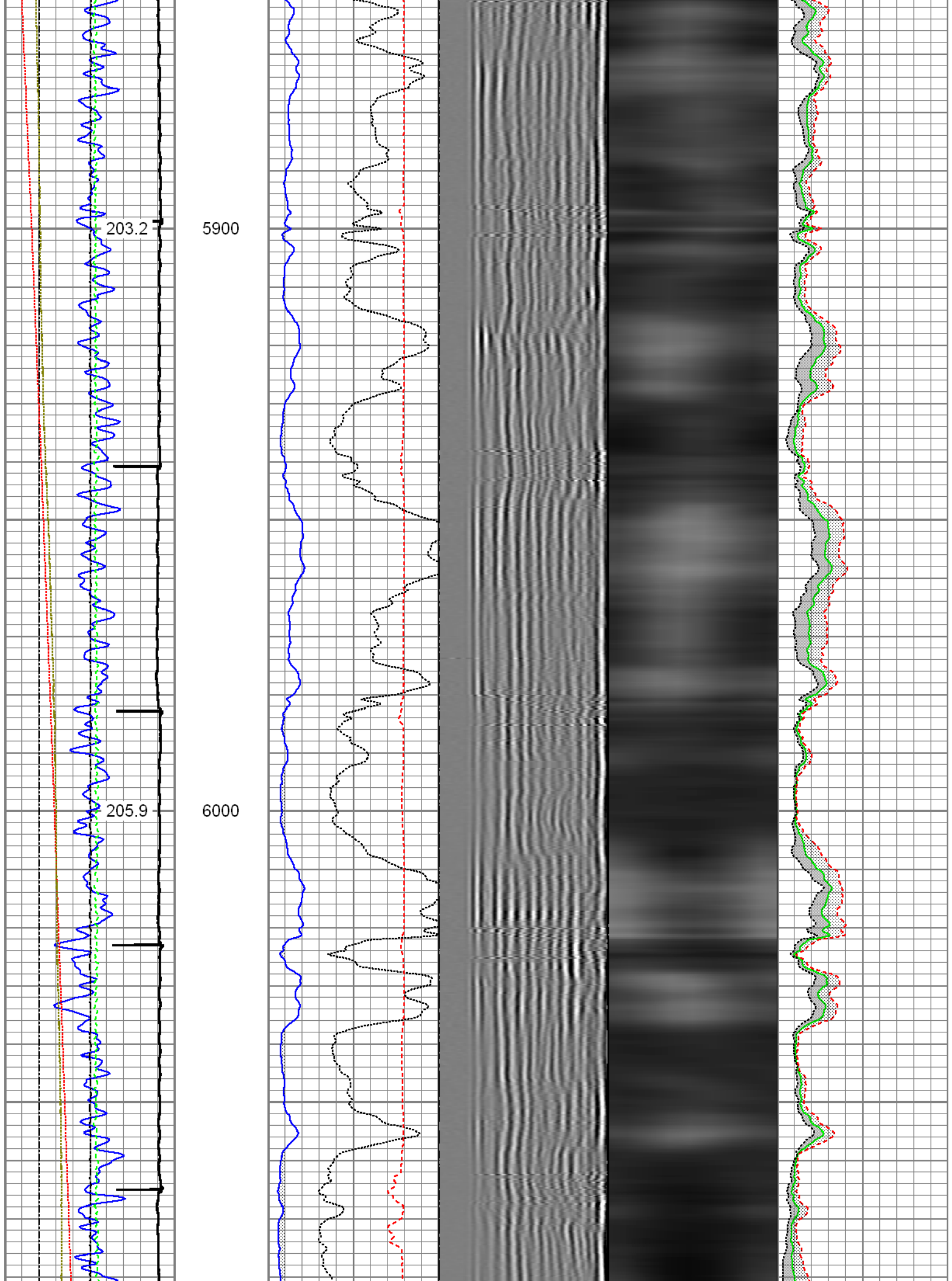


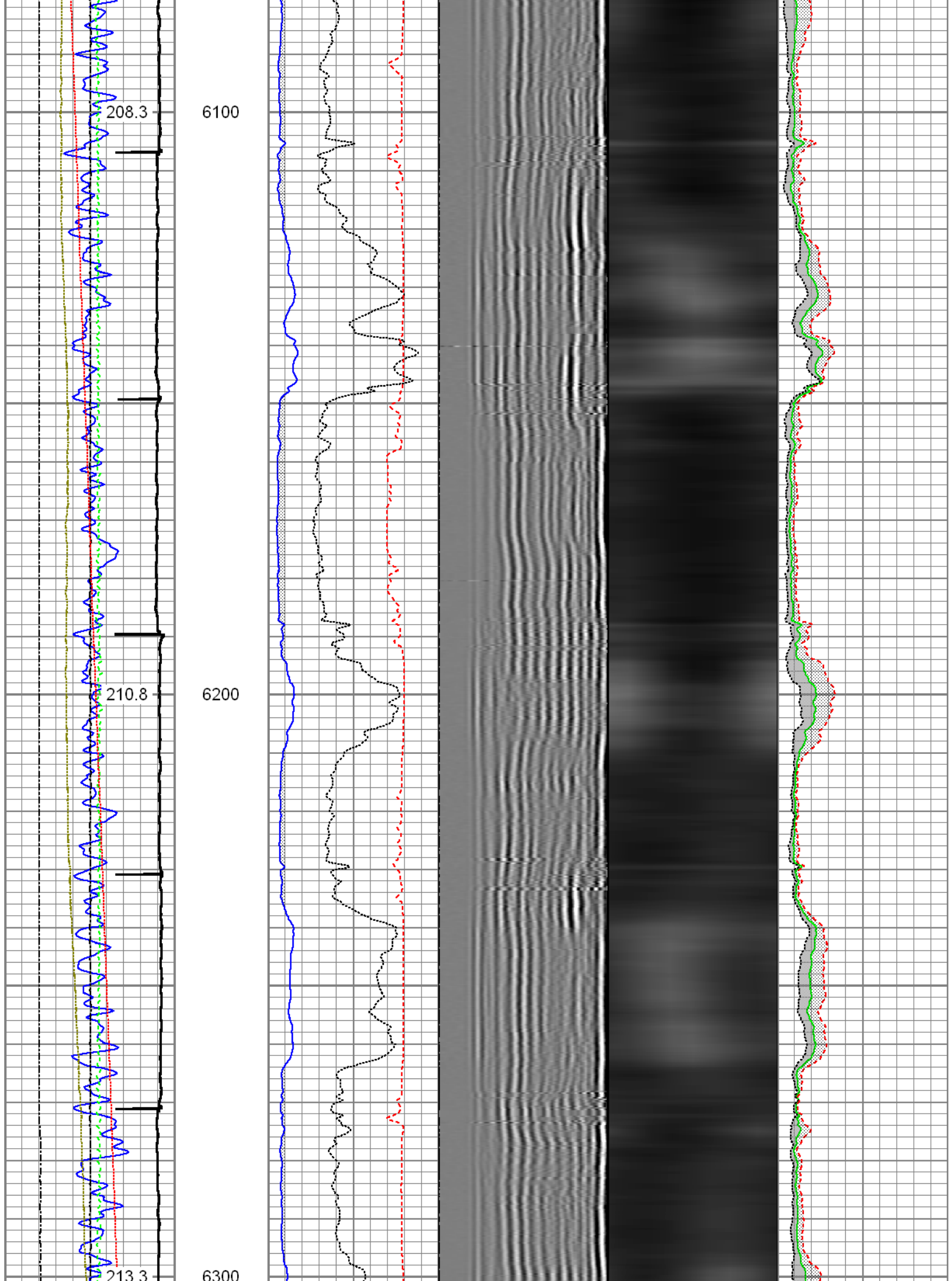


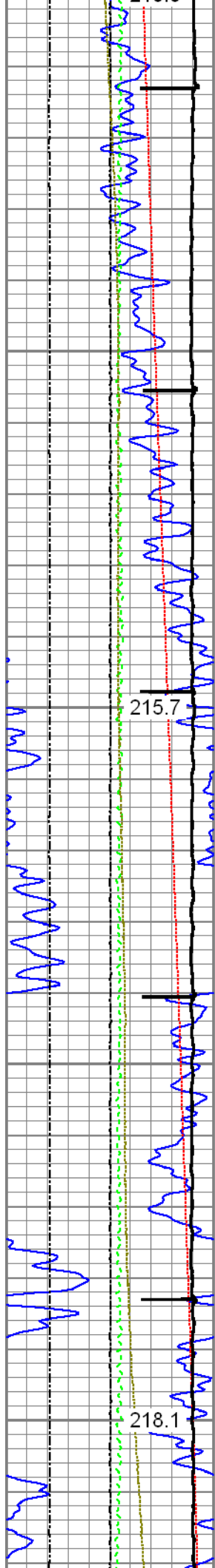






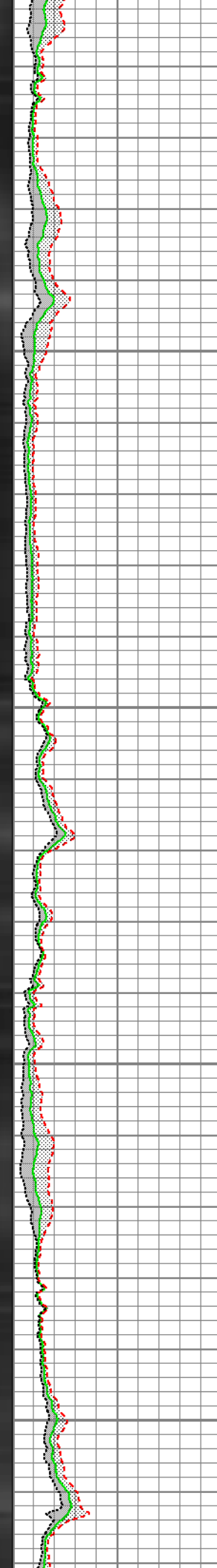
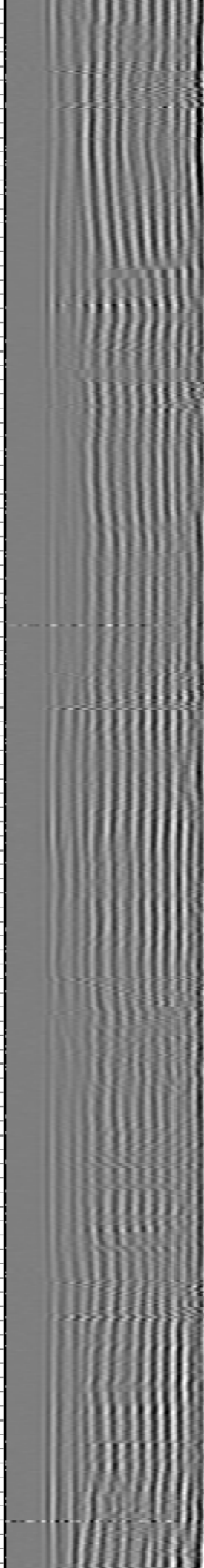
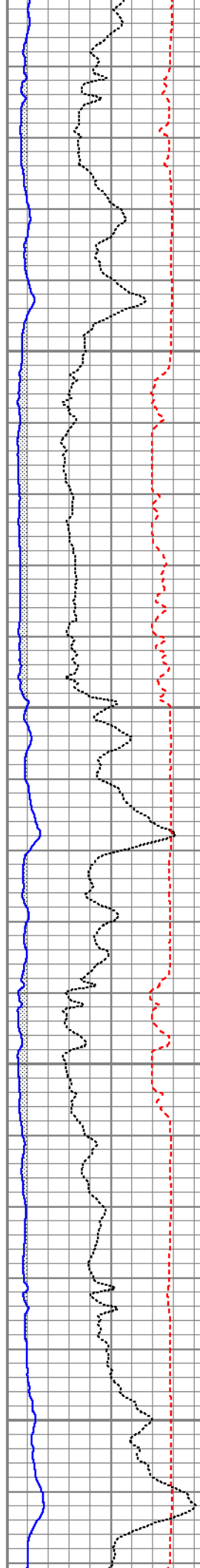


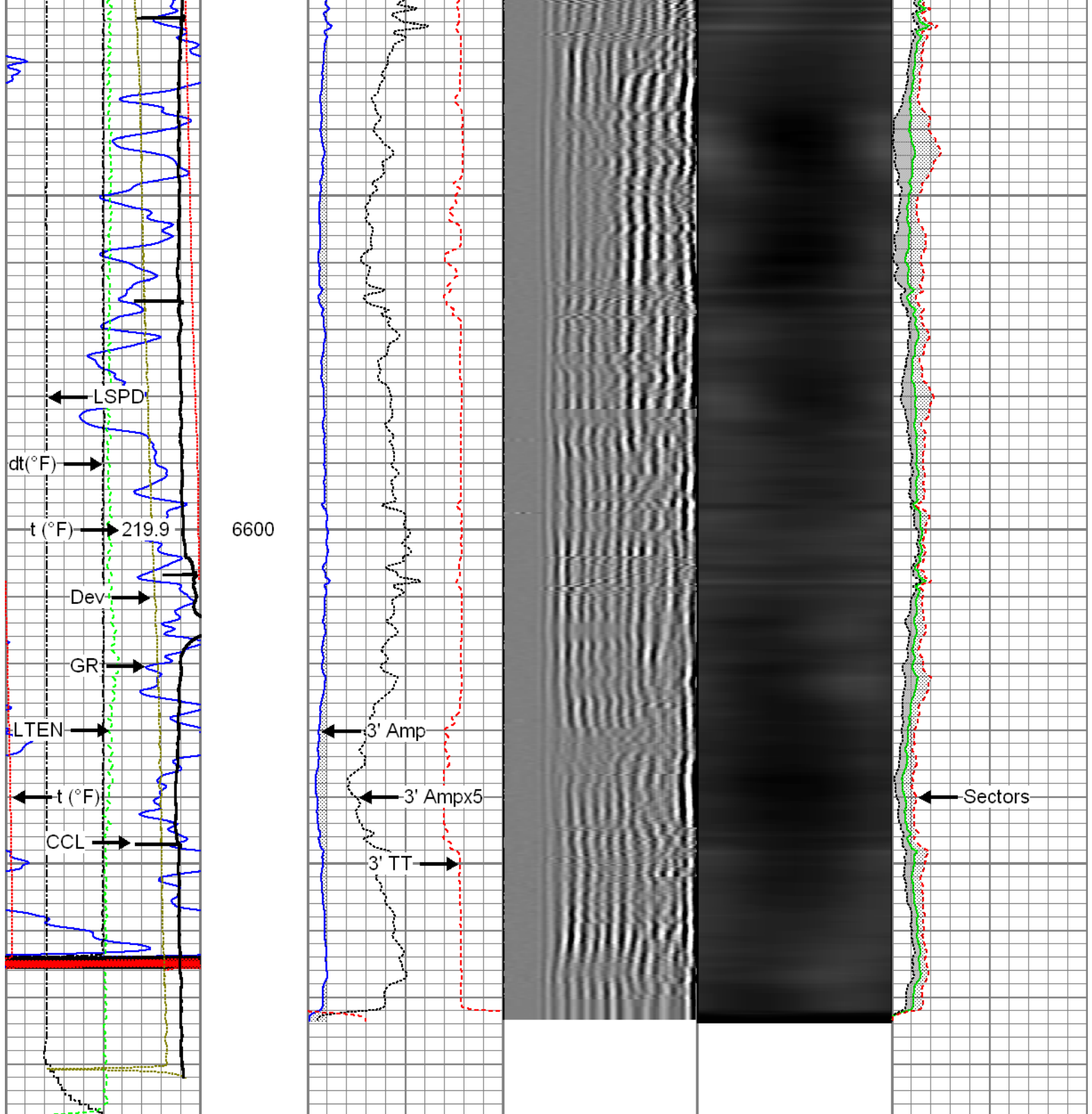




6400

6500





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)				
0 20				
-10 Deviation (°)				
90				

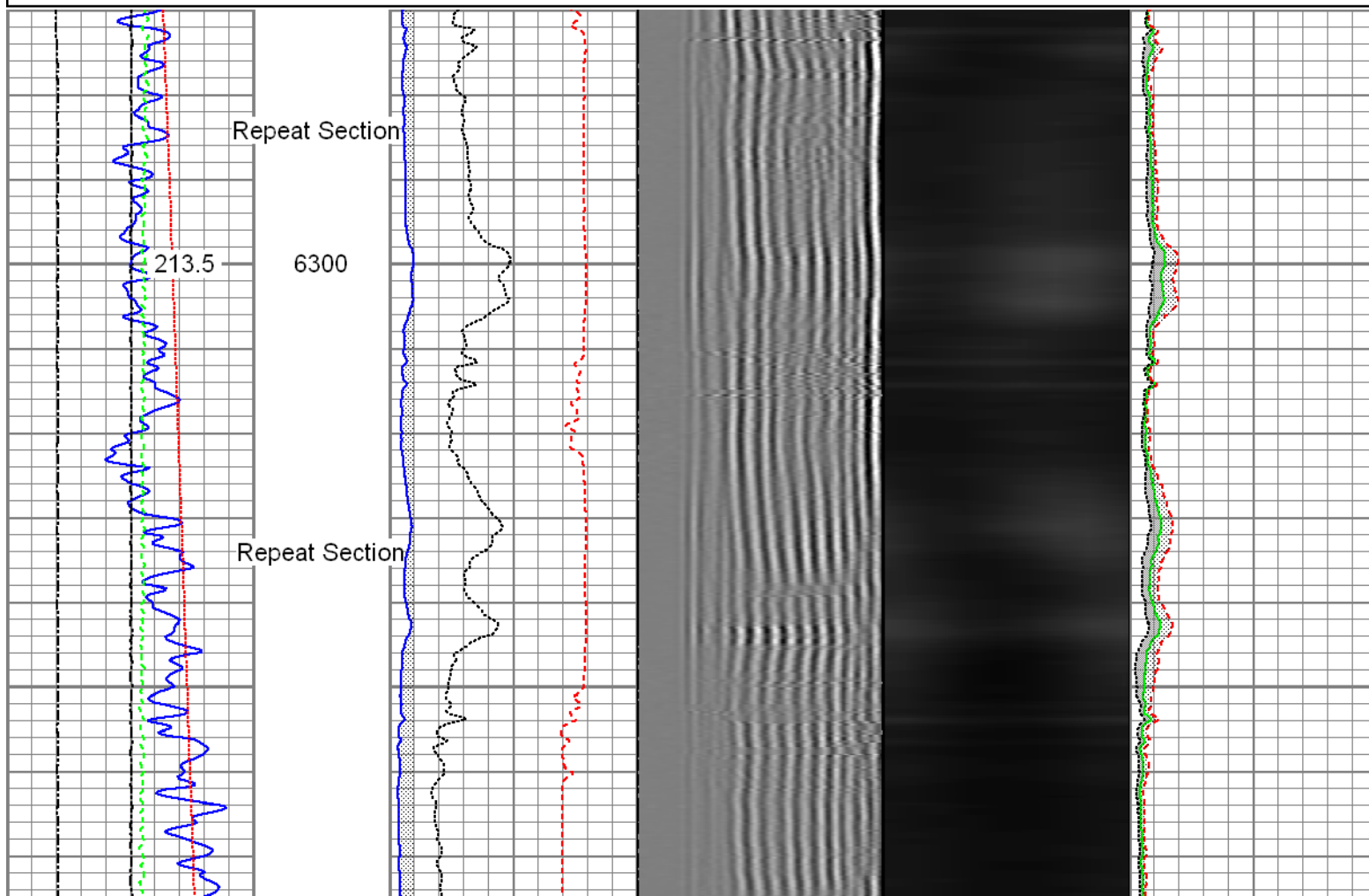


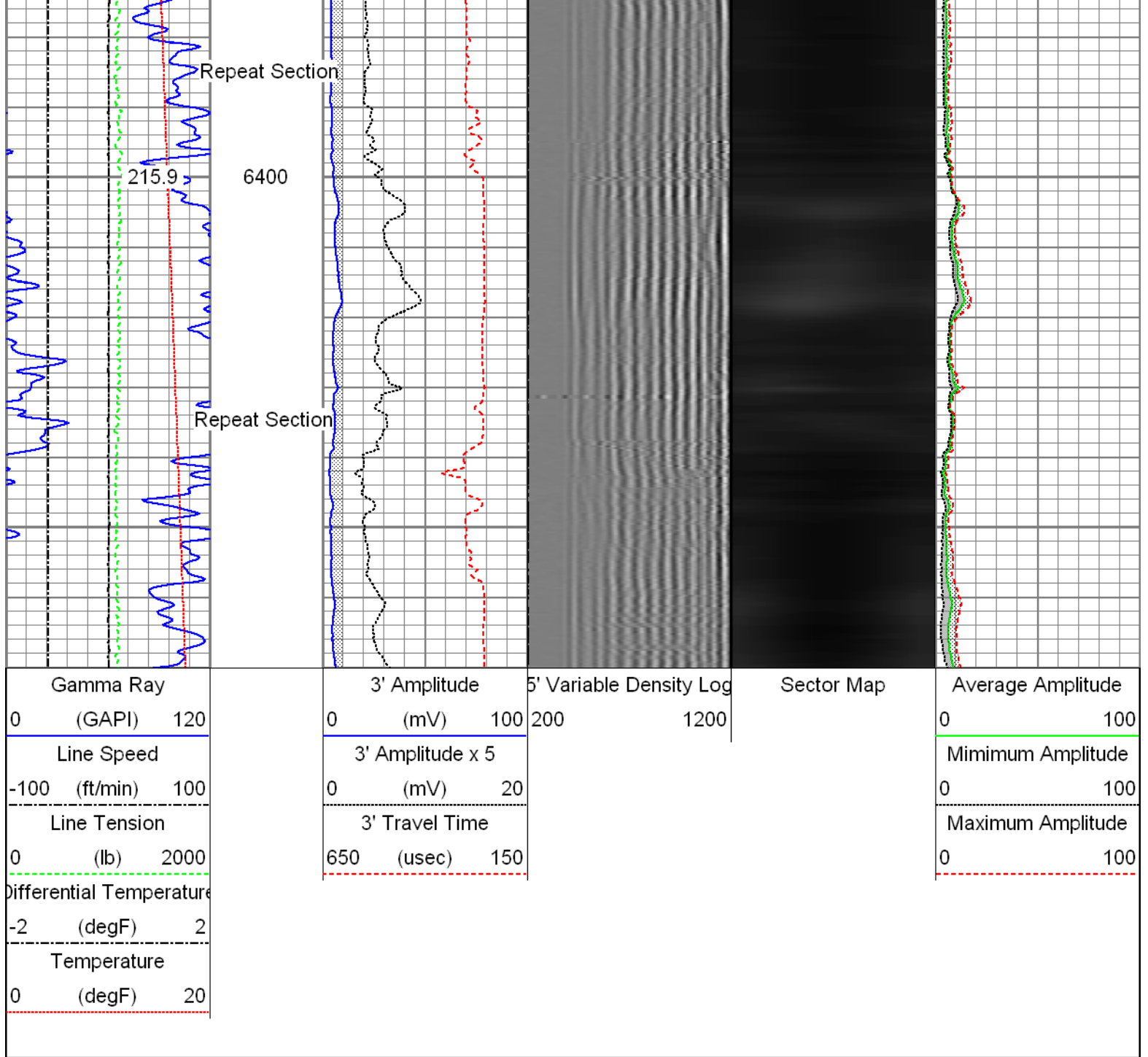
Repeat Pass

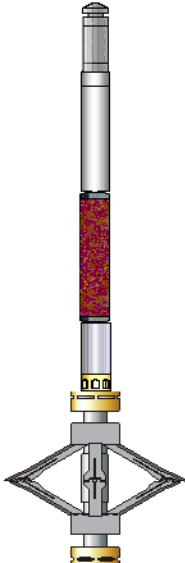
Recorded with 2500 PSI Surface Induced Pressure

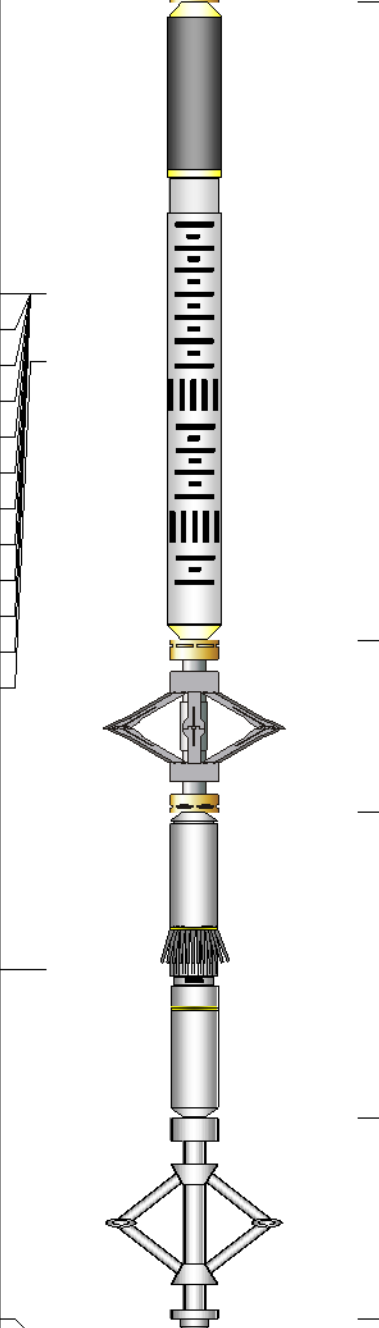
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 Dataset Pathname: pass2
 Presentation Format: rbt4_mit
 Dataset Creation: Mon Oct 12 11:56:39 2015 by Log 7.0 B1
 Charted by: Depth in Feet scaled 1:240

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				





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 (219135) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50
			UW_PGR-UW_PGR_020 (10013902) Production Gamma Ray	1.93	1.69	9.50
			UW_PRT-UW_PRT_016 (10025100) Platinum Resistance Thermometer	1.04	1.69	5.20
TEMP	22.45		UW_PRC-DSSRAC (081) 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					
CBLROT	15.42					
WVF5FT	14.42					
			UW_PRC-DSSRAC (082) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
MIT	5.41		UW_MIT-UW_MIT40_027 (218949) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC #4 -UW_PRC_057 (1038) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			UW_BUL-UW_BUL_006 (031422) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
TSTAMP	0.00					
Dataset: PROCESSED_10-12-15_Noble Energy_Wells Ranch AE32-645_MIT_RBL.db: field/well/run1/pass3 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in						

Calibration Report		
Database File:	C:\Warrior\Data\10-12-15_Noble Energy_Wells Ranch AE32-645_MIT_RBL\PROCESSED_10-12-15_	
Dataset Pathname:	pass3.1	
Dataset Creation:	Tue Oct 13 15:51:57 2015 by Calc SCH 120430	
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	
Vertical:	Inc X 1996	Inc Y 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: Mon Oct 12 11:28:46 2015

Ring size: (in)	4		5		6		7
		Sens		Sens		Sens	
Finger 01:	1379	283.0	1662	293.0	1955	279.0	2234
Finger 02:	1447	278.0	1725	288.0	2013	274.0	2287
Finger 03:	1654	287.0	1941	286.0	2227	259.0	2486
Finger 04:	1670	284.0	1954	276.0	2230	255.0	2485
Finger 05:	1540	264.0	1804	266.0	2070	254.0	2324
Finger 06:	1535	259.0	1794	259.0	2053	244.0	2297
Finger 07:	1351	274.0	1625	281.0	1906	269.0	2175
Finger 08:	1544	258.0	1802	259.0	2061	245.0	2306
Finger 09:	1418	270.0	1688	284.0	1972	271.0	2243
Finger 10:	1488	268.0	1756	270.0	2026	253.0	2279
Finger 11:	1473	262.0	1735	271.0	2006	249.0	2255
Finger 12:	1318	279.0	1597	289.0	1886	277.0	2163
Finger 13:	1576	280.0	1856	283.0	2139	262.0	2401
Finger 14:	1419	281.0	1700	291.0	1991	273.0	2264
Finger 15:	1532	262.0	1794	270.0	2064	253.0	2317
Finger 16:	1396	280.0	1676	293.0	1969	273.0	2242
Finger 17:	1630	270.0	1900	278.0	2178	255.0	2433
Finger 18:	1367	286.0	1653	306.0	1959	286.0	2245
Finger 19:	1626	259.0	1885	263.0	2148	234.0	2382
Finger 20:	1493	262.0	1755	279.0	2034	259.0	2293
Finger 21:	1578	250.0	1828	262.0	2090	239.0	2329
Finger 22:	1441	282.0	1723	295.0	2018	249.0	2267
Finger 23:	1333	273.0	1606	293.0	1899	271.0	2170
Finger 24:	1665	259.0	1924	278.0	2202	251.0	2453
Finger 25:	1347	285.0	1632	316.0	1948	288.0	2236
Finger 26:	1519	283.0	1802	306.0	2108	275.0	2383
Finger 27:	1461	256.0	1717	279.0	1996	253.0	2249
Finger 28:	1614	279.0	1893	294.0	2187	260.0	2447
Finger 29:	1460	270.0	1730	296.0	2026	269.0	2295
Finger 30:	1408	279.0	1687	295.0	1982	273.0	2255
Finger 31:	1518	263.0	1781	287.0	2068	259.0	2327
Finger 32:	1336	261.0	1597	292.0	1889	268.0	2157
Finger 33:	1603	297.0	1900	320.0	2220	288.0	2508
Finger 34:	1534	267.0	1801	286.0	2087	258.0	2345
Finger 35:	1435	265.0	1700	288.0	1988	266.0	2254
Finger 36:	1585	279.0	1864	298.0	2162	271.0	2433
Finger 37:	1601	275.0	1876	285.0	2161	262.0	2423
Finger 38:	1491	273.0	1764	289.0	2053	269.0	2322
Finger 39:	1466	280.0	1746	298.0	2044	278.0	2322
Finger 40:	1585	288.0	1873	298.0	2171	274.0	2445

Segmented Cement Bond Log Calibration Report

Serial Number:	1063
Tool Model:	UW_RBT_004
Calibration Casing Diameter:	7.000 in
Calibration Depth:	31.647 ft

Master Calibration, performed Tue Oct 13 15:51:51 2015:

Raw (v)	Calibrated (mv)	Results
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	Zero	Cal	Zero	Cal	Gain	Offset
3FT	-0.002	0.681	0.800	62.165	89.769	1.003
5FT	-0.006	0.674	0.800	62.165	90.336	1.305
S1	-0.003	0.698	0.000	100.000	142.589	0.421
S2	-0.002	0.708	0.000	100.000	140.869	0.301
S3	-0.002	0.691	0.000	100.000	144.228	0.328
S4	-0.003	0.685	0.000	100.000	145.288	0.411
S5	-0.002	0.670	0.000	100.000	148.748	0.308
S6	-0.003	0.659	0.000	100.000	151.139	0.451
S7	-0.003	0.668	0.000	100.000	149.193	0.396
S8	-0.002	0.677	0.000	100.000	147.164	0.308

Temperature Calibration Report

Serial Number: 10025100
 Tool Model: UW_PRT_016
 Performed: Wed Feb 11 13:47:59 2015

Point #	Reading		Reference	
1	13249.00	cps	68.00	degF
2	18454.00	cps	104.00	degF
3	29735.00	cps	176.00	degF
4	41457.00	cps	248.00	degF
5	52851.00	cps	320.00	degF
6	59128.00	cps	356.00	degF
7		cps		degF
8		cps		degF
9		cps		degF
10		cps		degF

Gamma Ray Calibration Report

Serial Number: 10013902
 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 AE32-645
 Field: Wattenberg
 County: Weld
 State: Colorado