



Radial Cement Bond  
Gamma Ray  
Casing Collar Log

Company	Noble Energy Inc.			Company	Noble Energy Inc.		
Well	Moser State H22-785			Well	Moser State H22-785		
Field	Wattenberg			Field	Wattenberg		
County	Weld			County	Weld		
State	Colorado			State	Colorado		
Location:				API # : 05-123-40734			
SEC 22 TWP 3N RGE 65W				Other Services			
Permanent Datum				MIT			
Log Measured From				Elevation			
Drilling Measured From				K.B. 4836'			
				D.F. 4835'			
				G.L. 4812'			

Date	22-Dec-2015						
Run Number	One						
Depth Driller	11773 FT						
Depth Logger	7212 FT						
Bottom Logged Interval	7207 FT						
Top Log Interval	Surface						
Open Hole Size	8.750"						
Type Fluid	Water						
Density / Viscosity	8.34 lbm/gal						
Max. Recorded Temp.	253°F						
Estimated Cement Top	106 FT						
Time Well Ready	ROA						
Time Logger on Bottom	8:57 AM						
Equipment Number	HD-0324						
Location	Fort Lupton, CO						
Recorded By	Andrew Olmsted						
Witnessed By	Bill Mansfield						
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	847 FT		
Intermediate #1	7	26	P-110IC	24 FT	7425 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110IC	7200 FT	17406 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 24 FT  
Log ran from Liner Top to surface  
Liner top found at 7200 FT  
Marker Joints found at 5889 FT and 6033 FT  
Recorded with 2500 PSI surface induced pressure  
Logging tools were clean and free of debris upon completion of operations  
  
Thank you for choosing FMC Technologies Surface Integrated Services.



Main Pass

Recorded with 2500 PSI Surface Induced Pressure

Database File: x:\logs\_for\_processing\logs to be reviewed\12-22-15\_noble\_moser state h22-785\12-22-15\_noble\_m

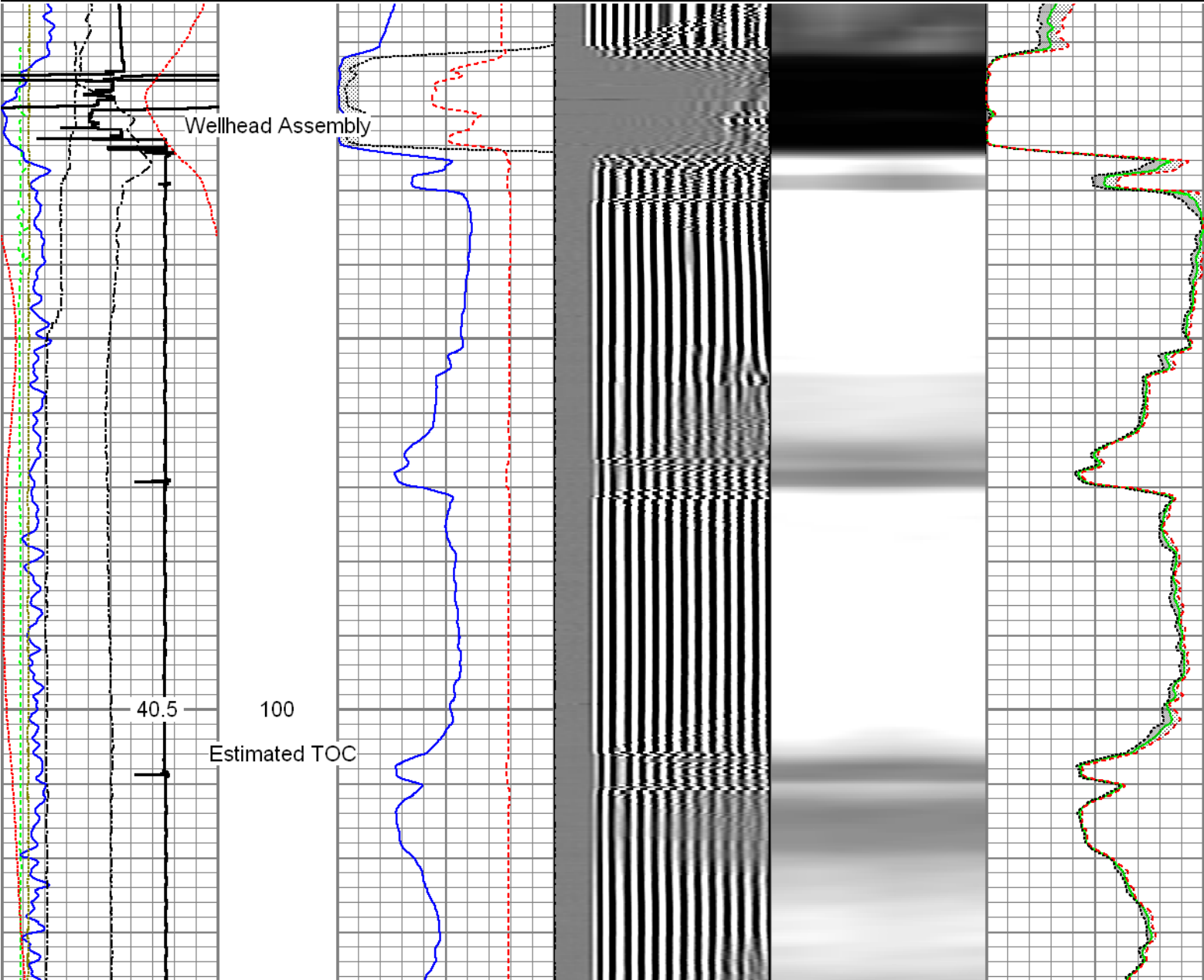
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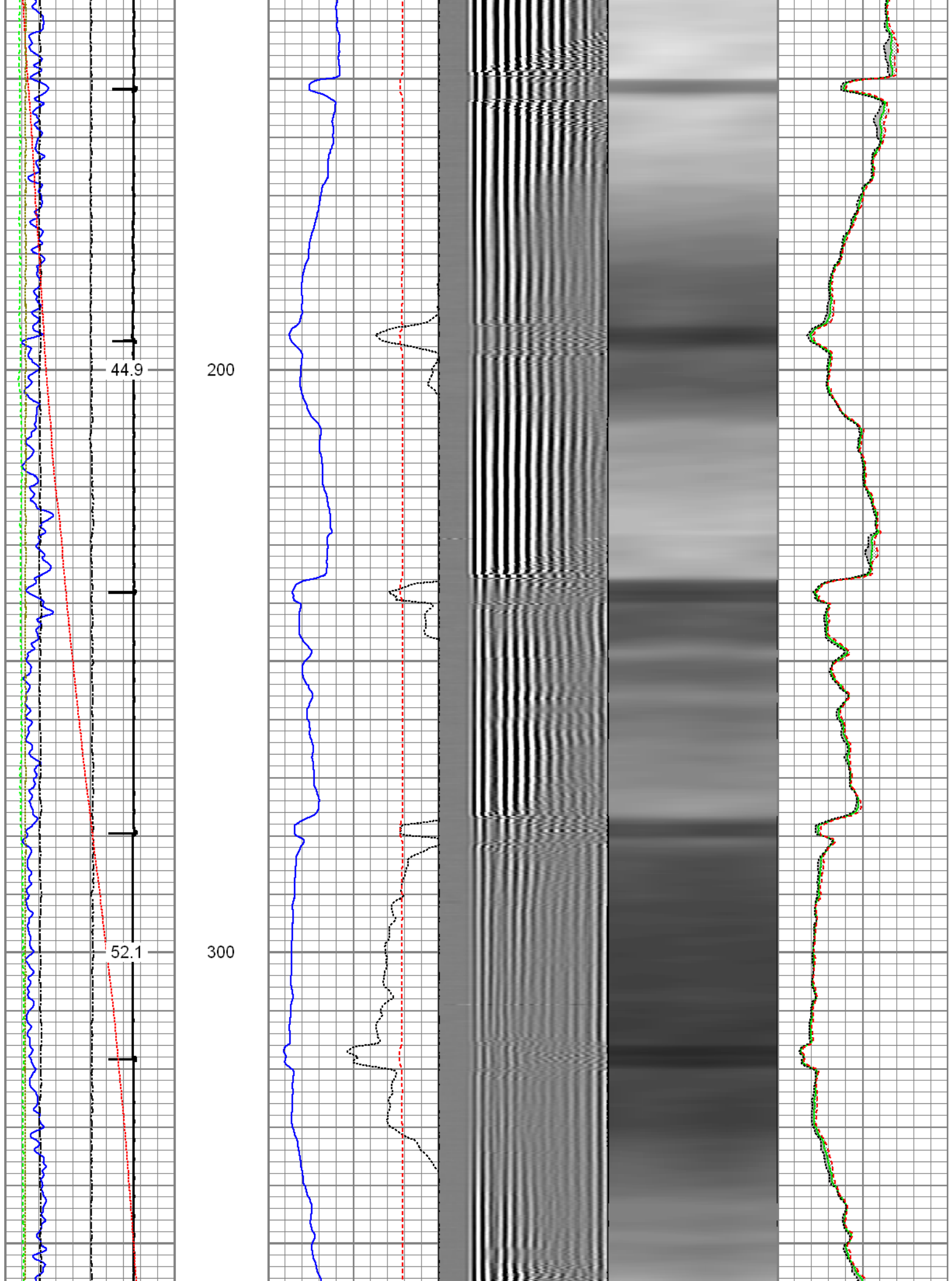
Presentation Format: rbt4\_mit

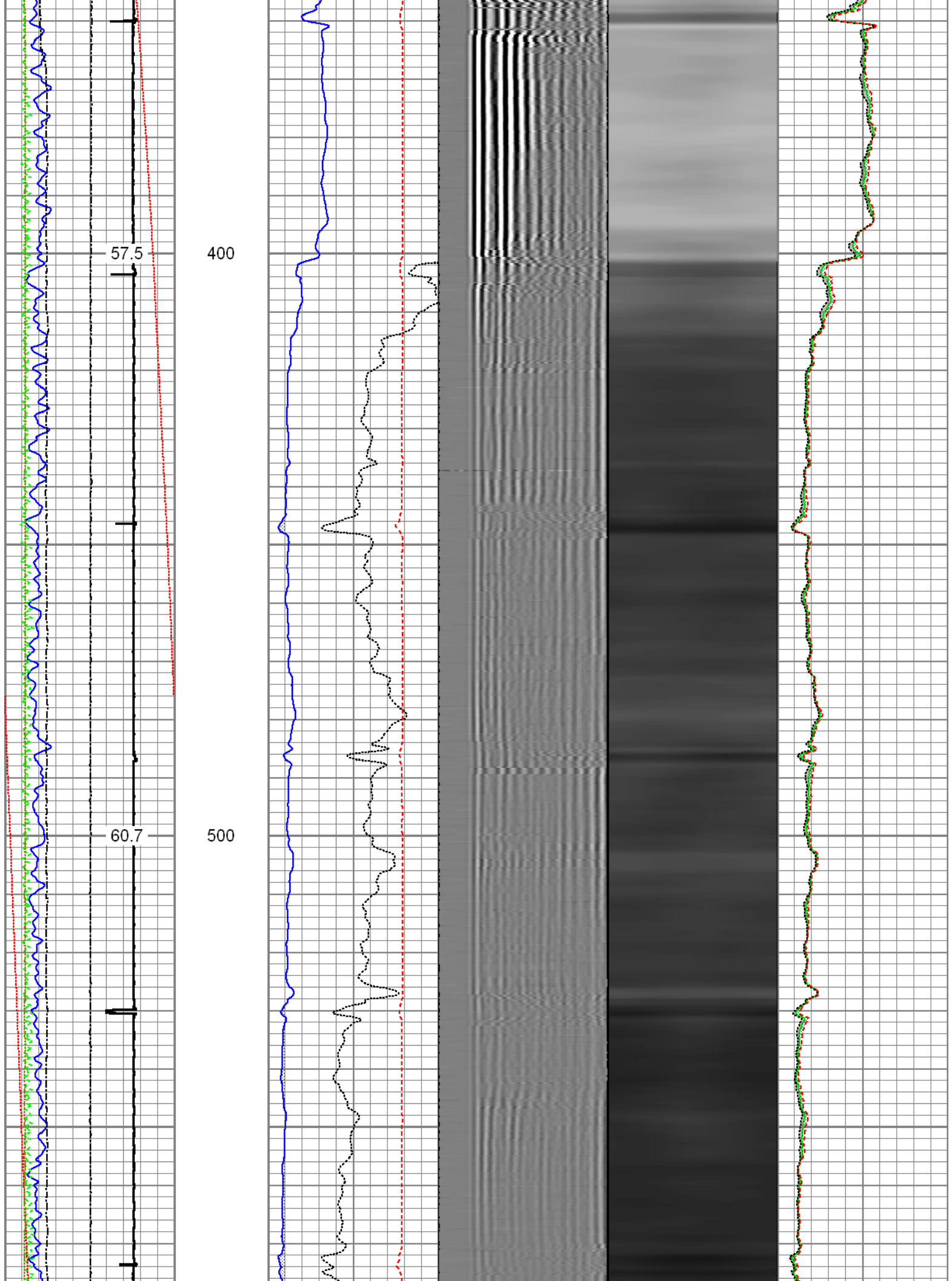
Dataset Creation: Tue Jan 05 09:37:45 2016

Charted by: Depth in Feet scaled 1:240

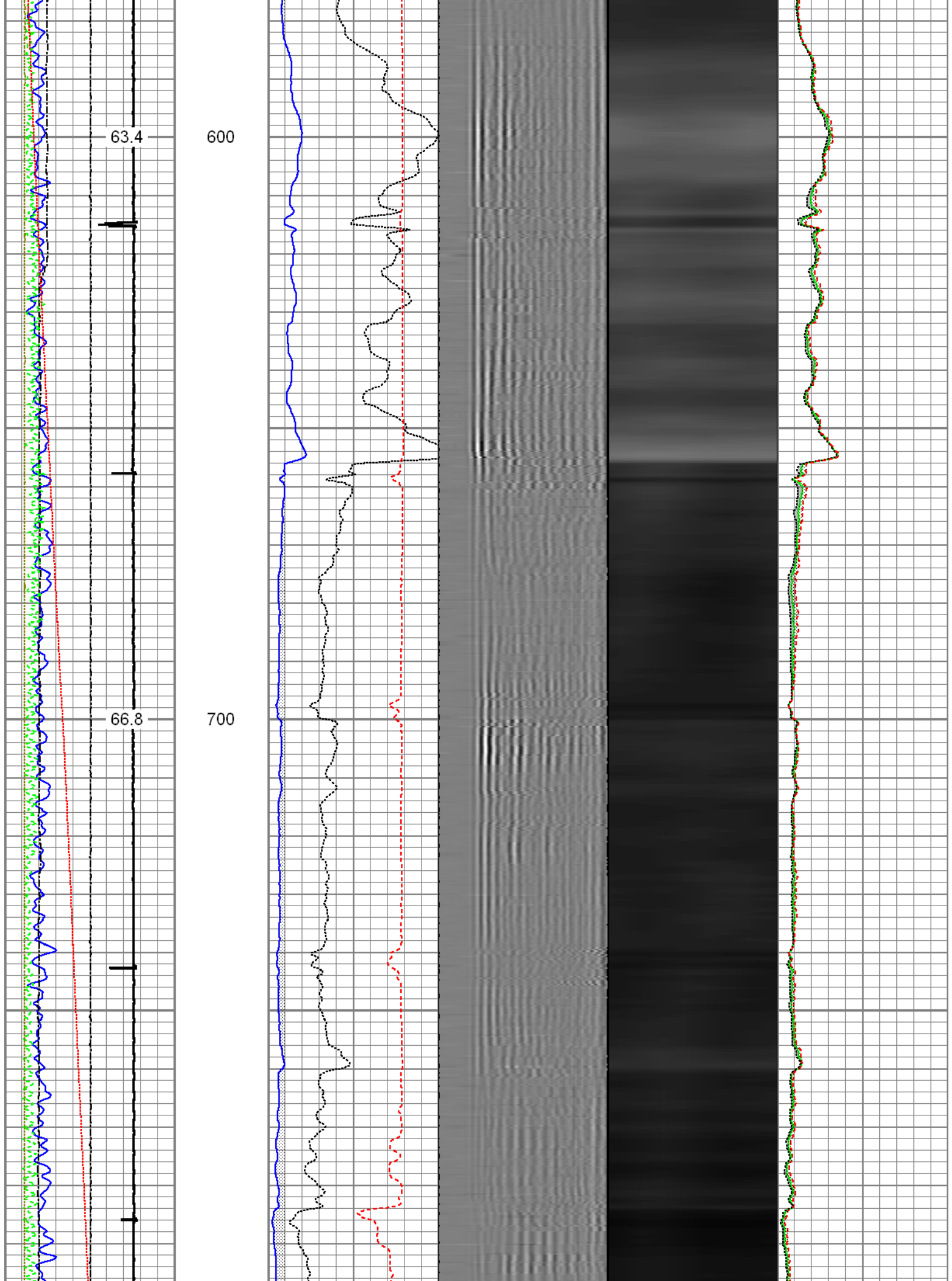
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Minimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

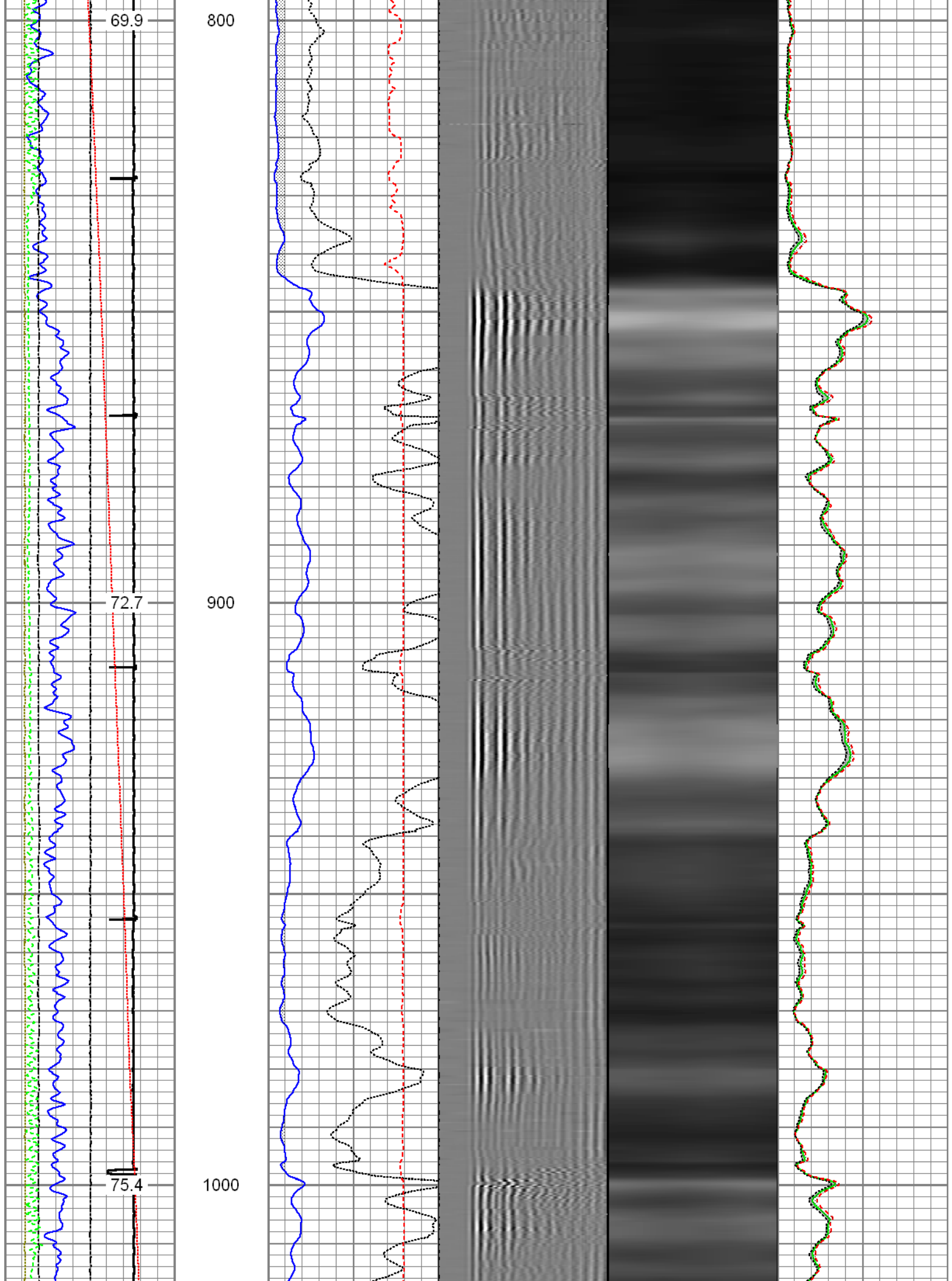


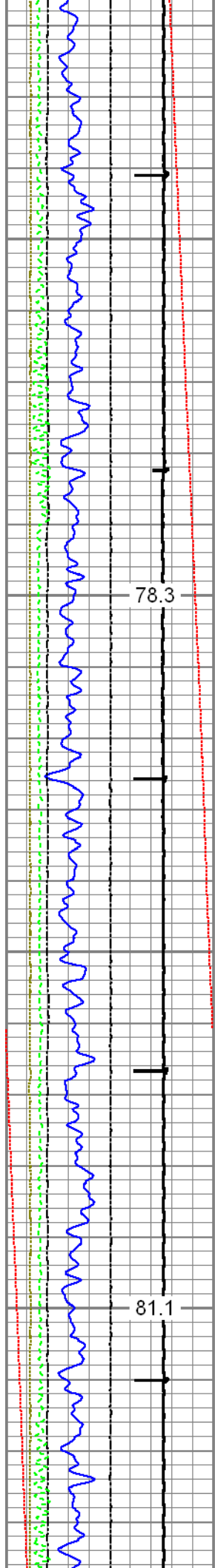






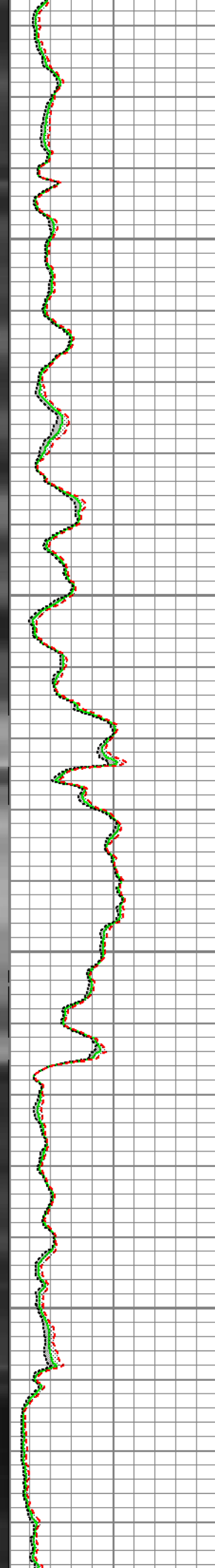
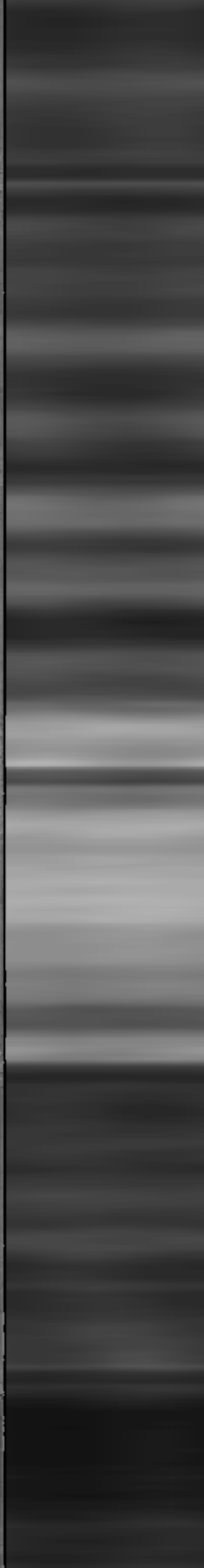
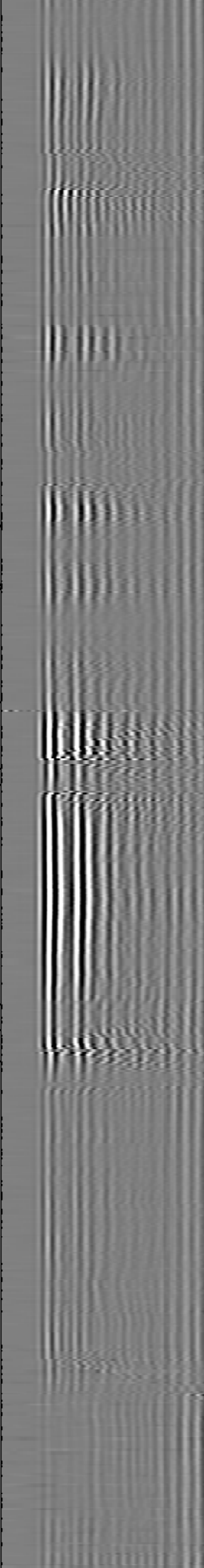
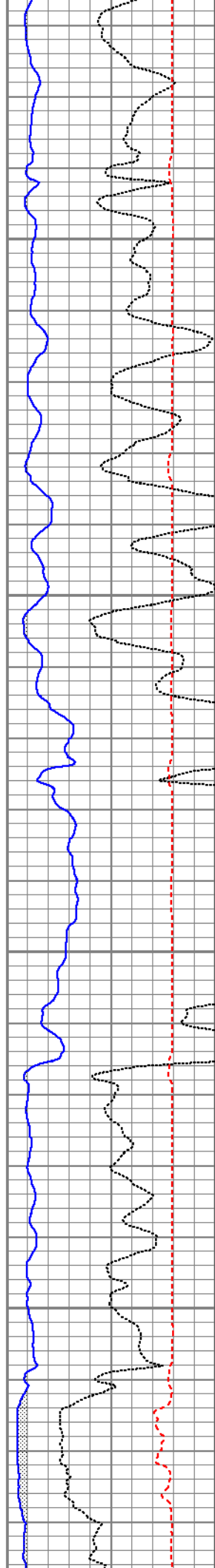


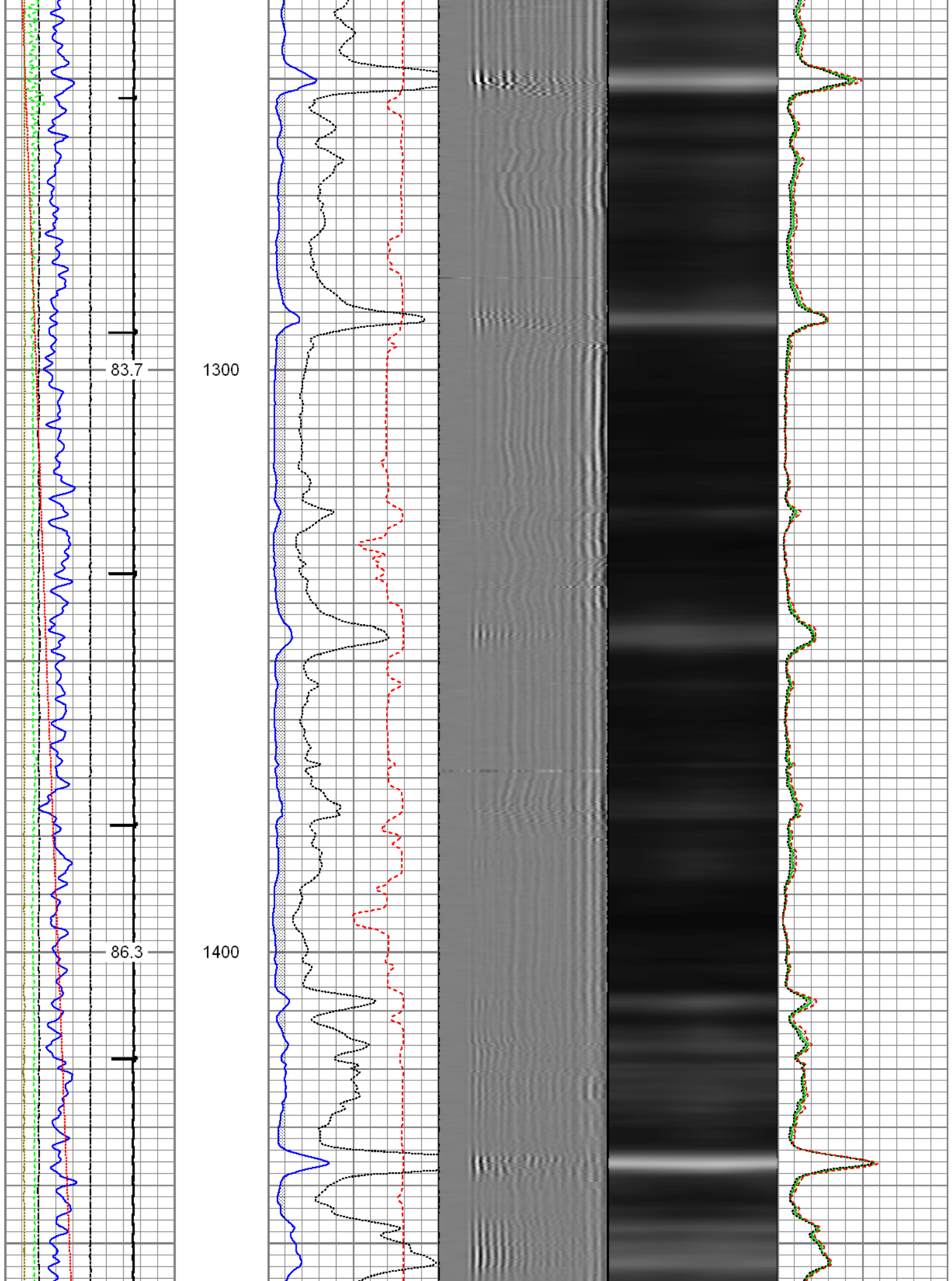


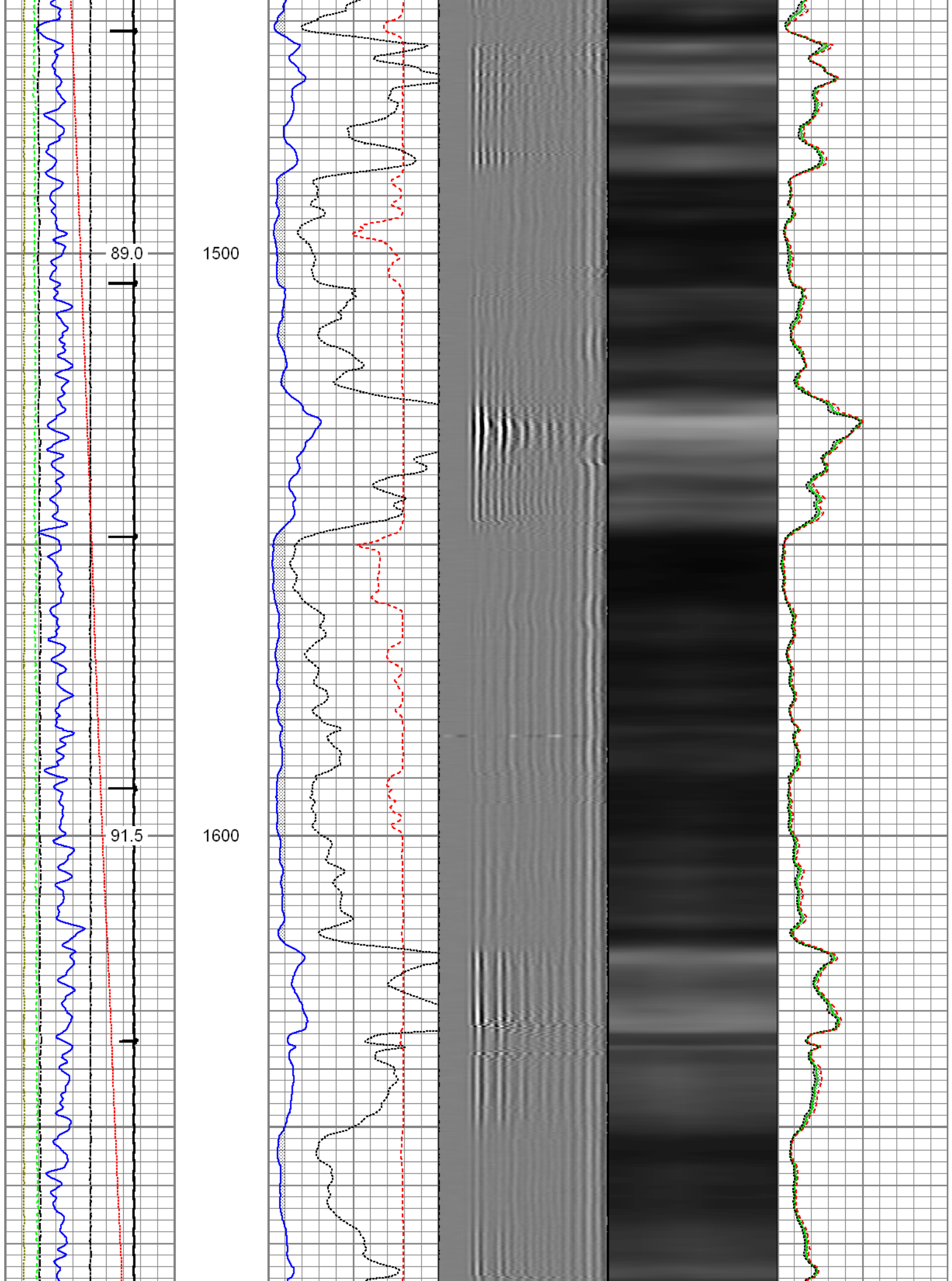


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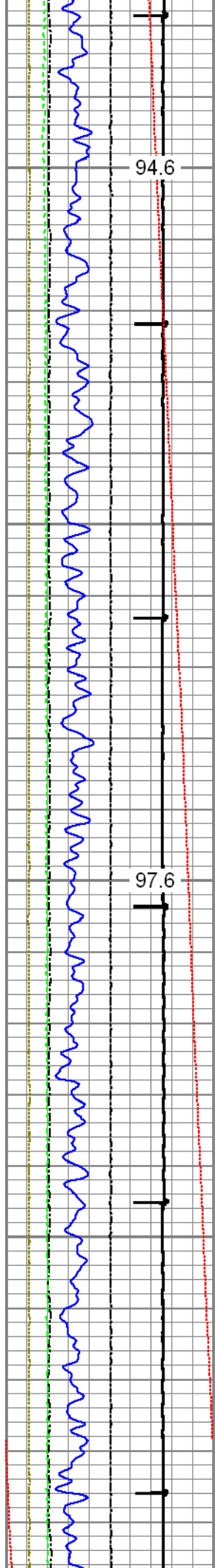
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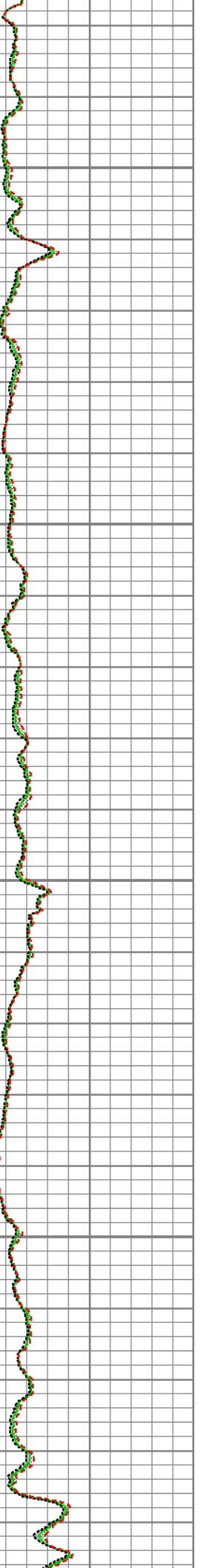
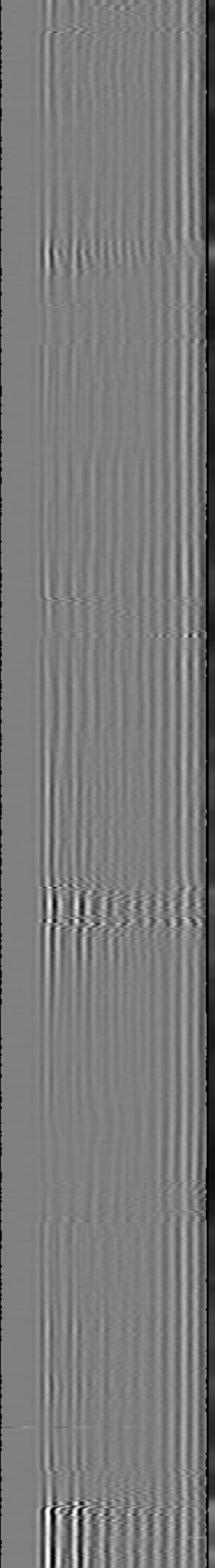
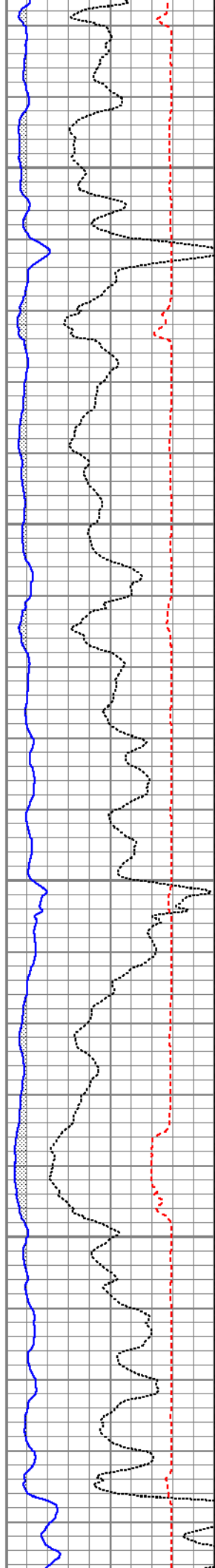


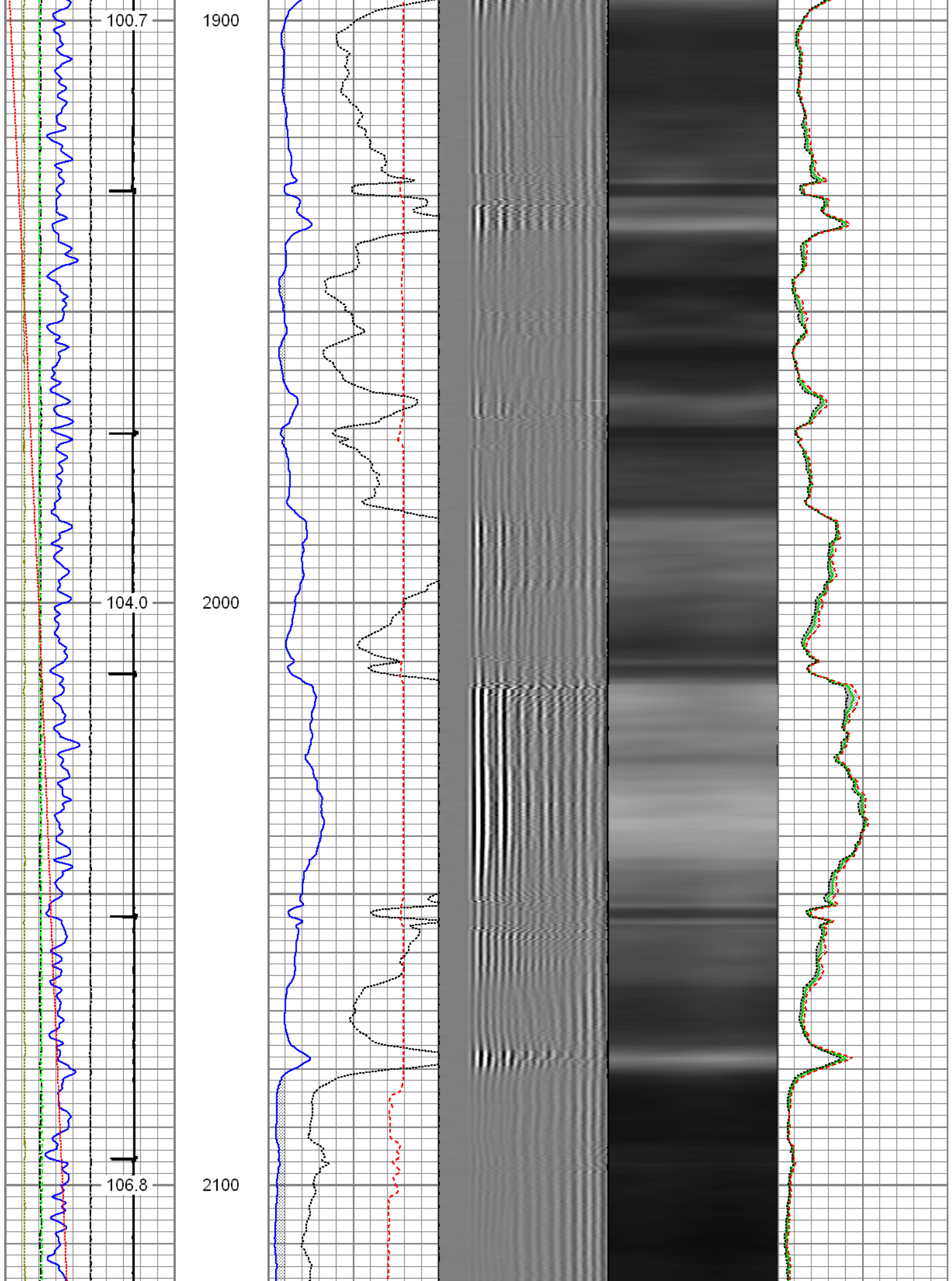


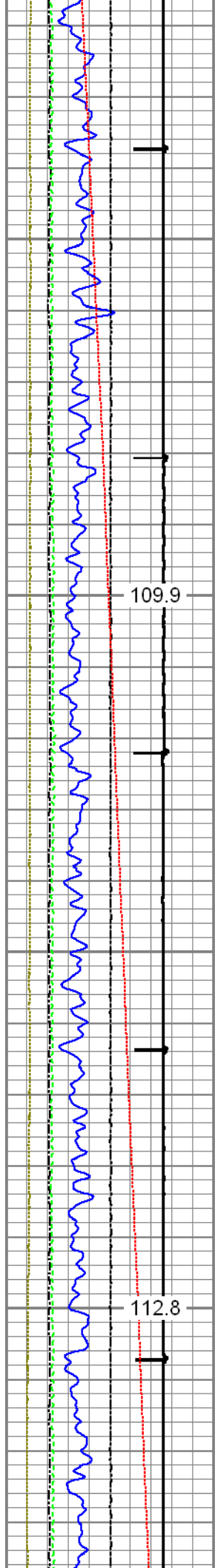


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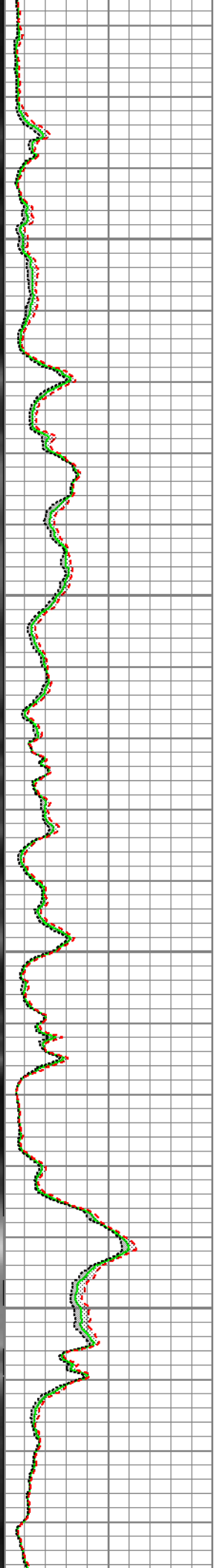
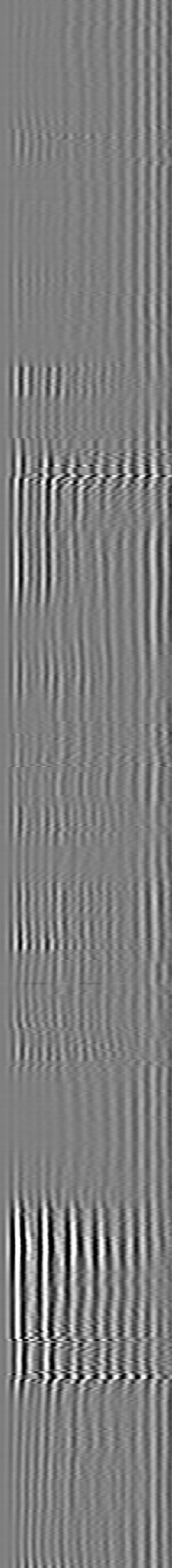
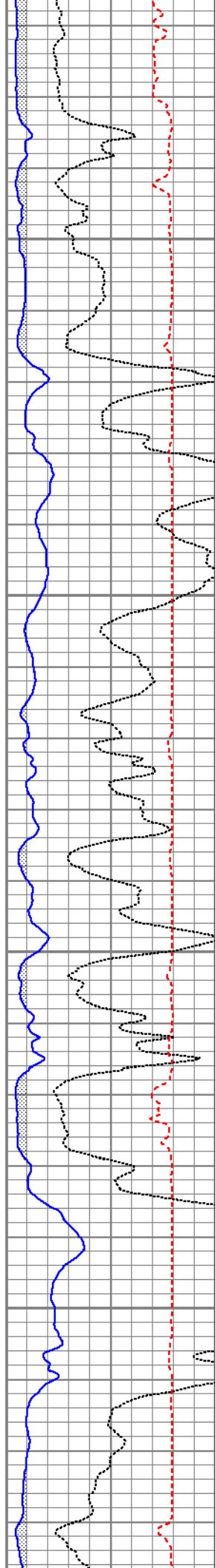


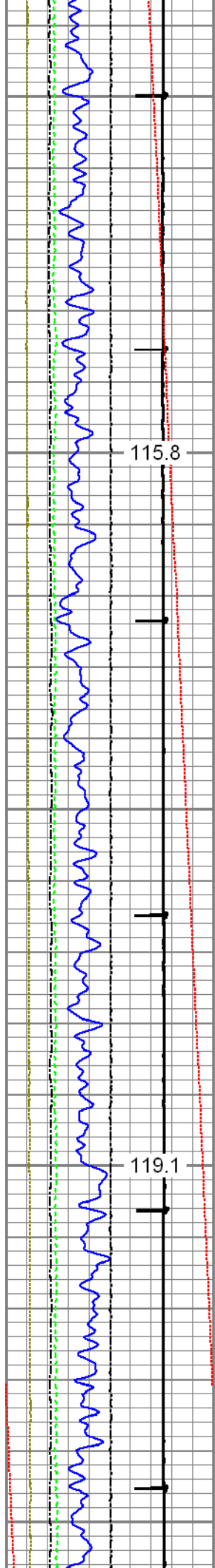




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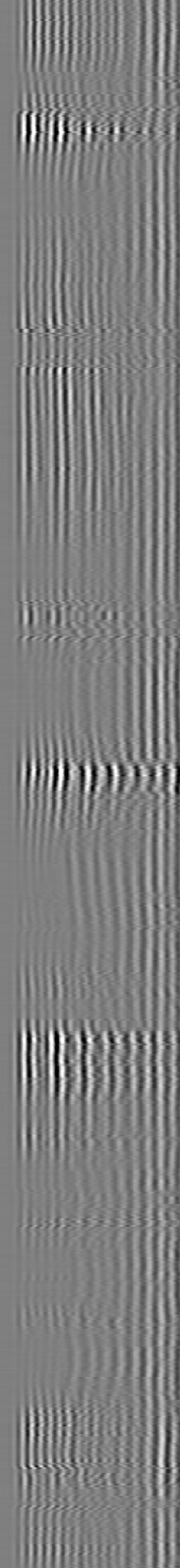
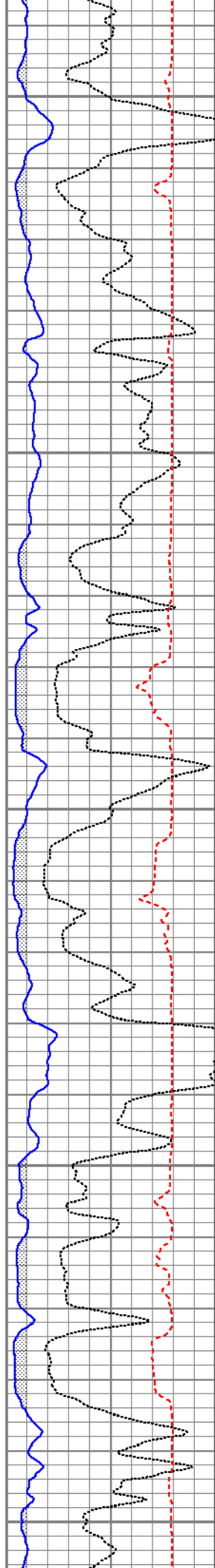
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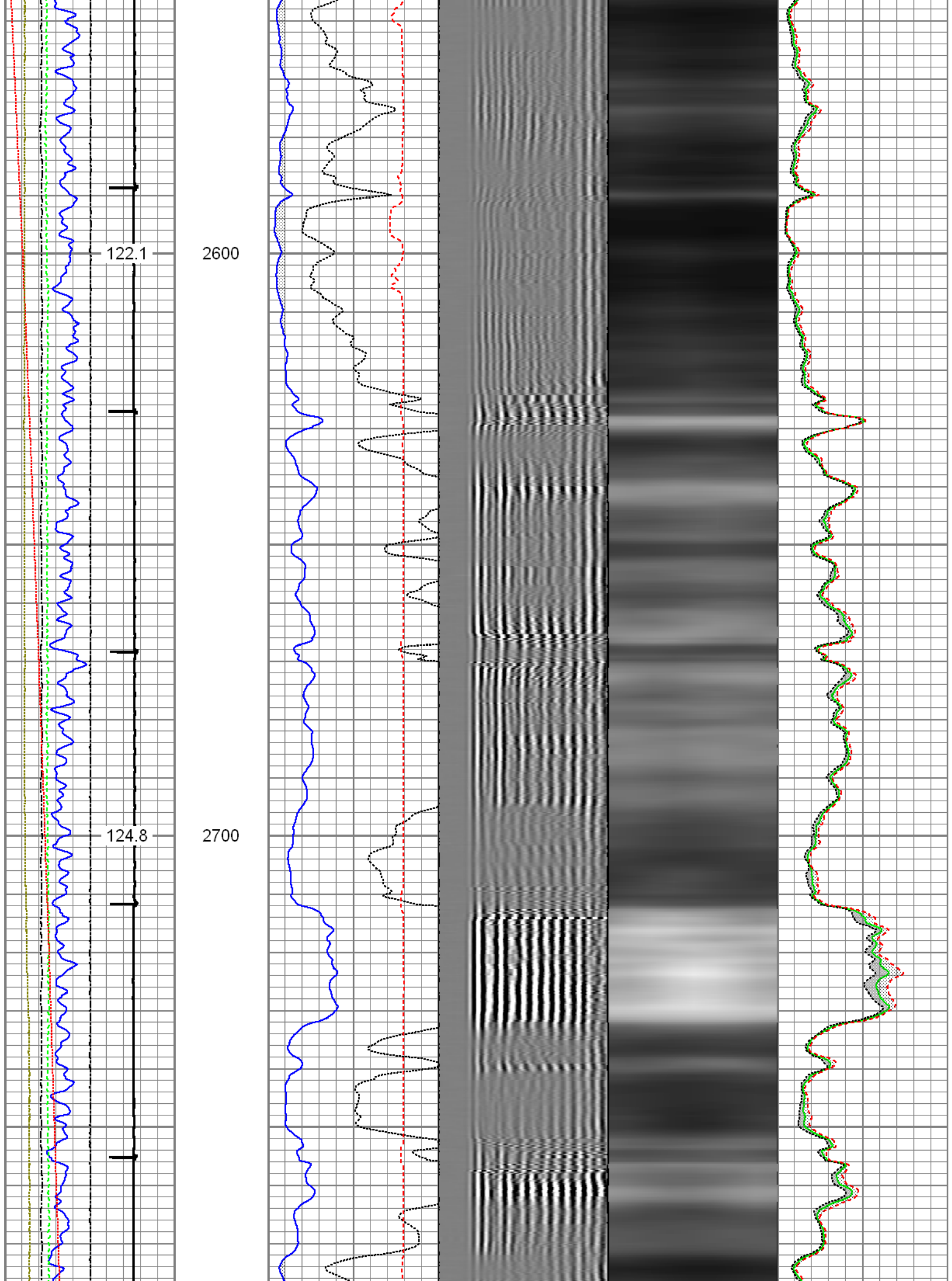


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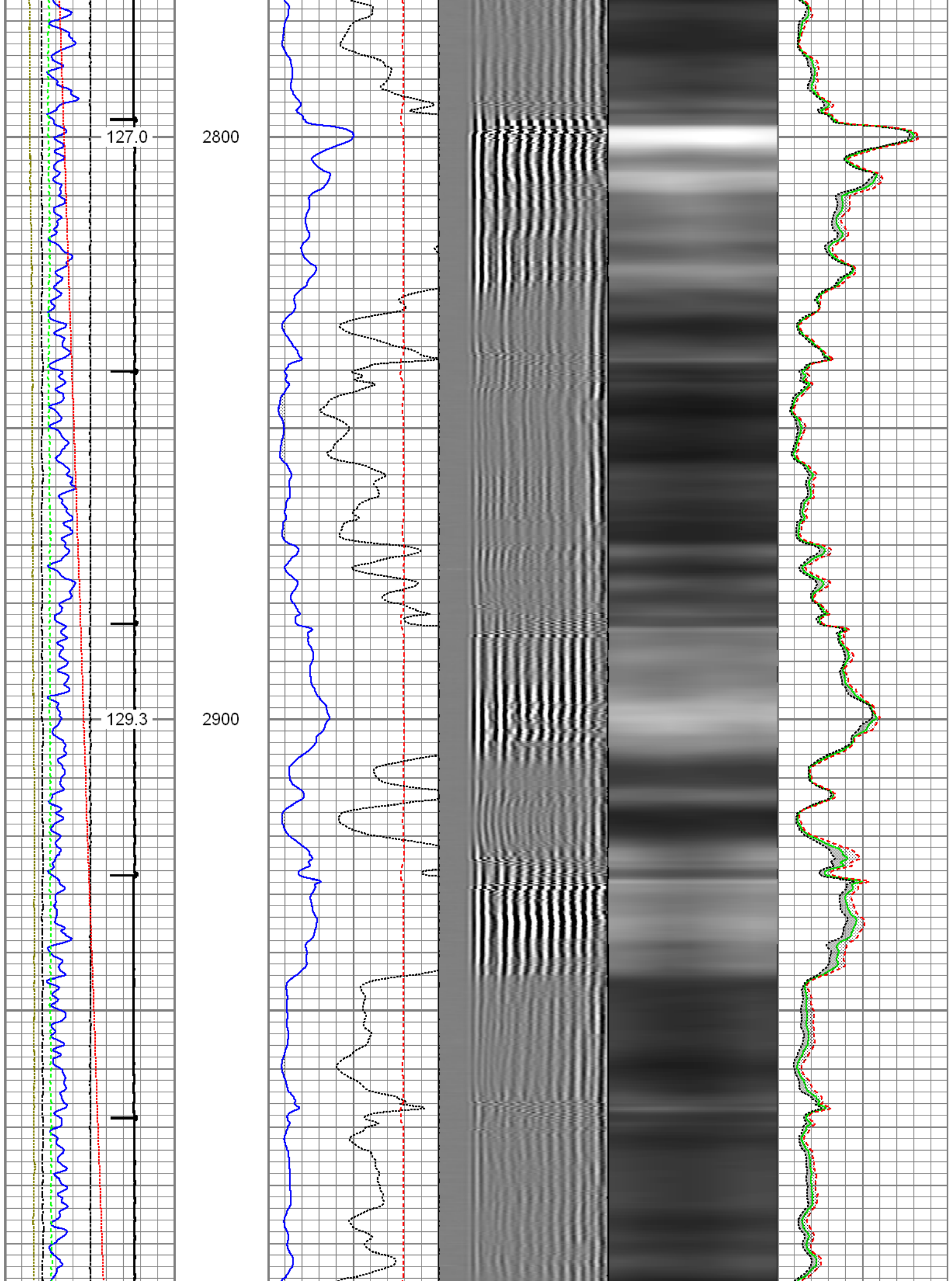
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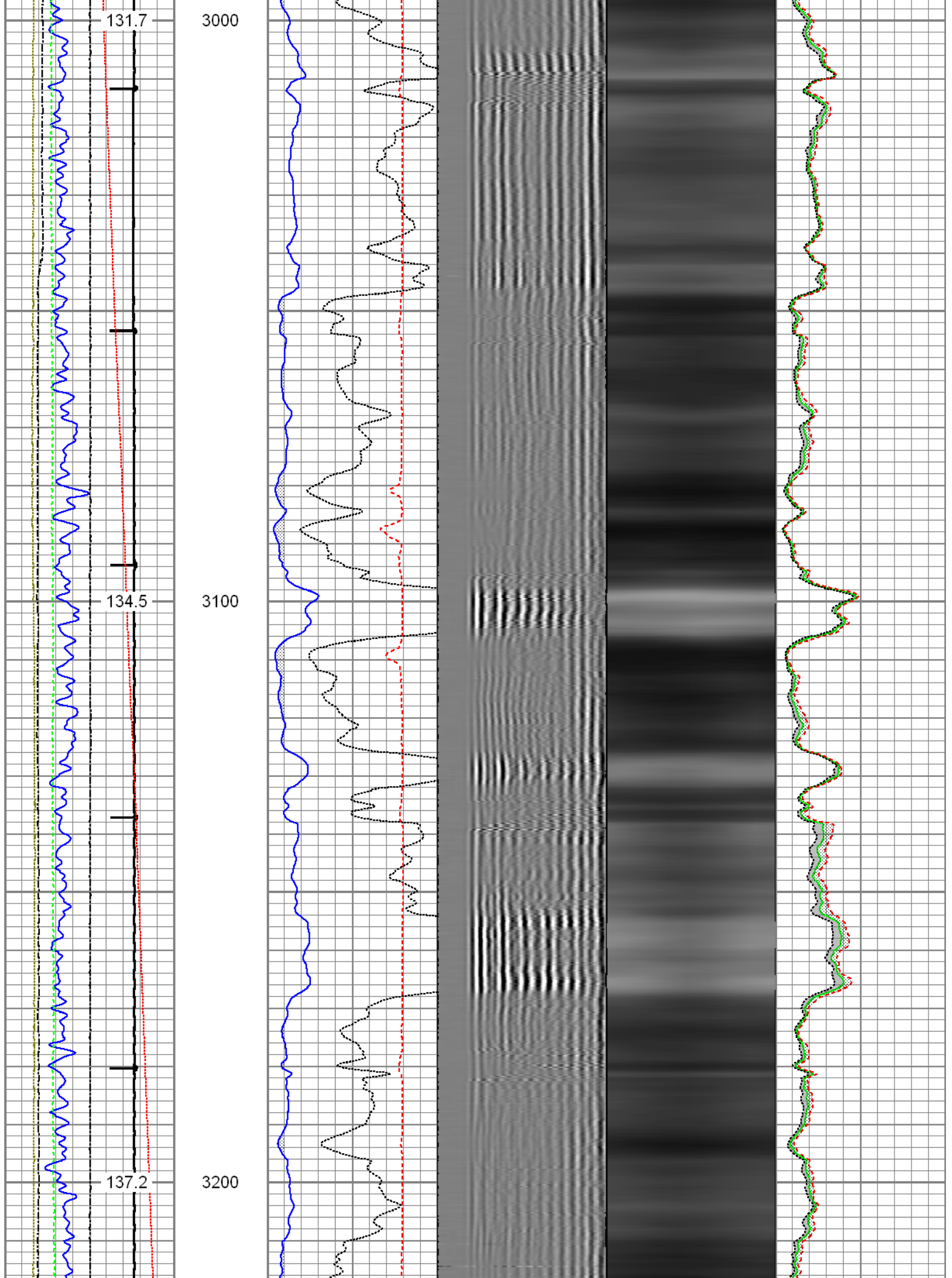


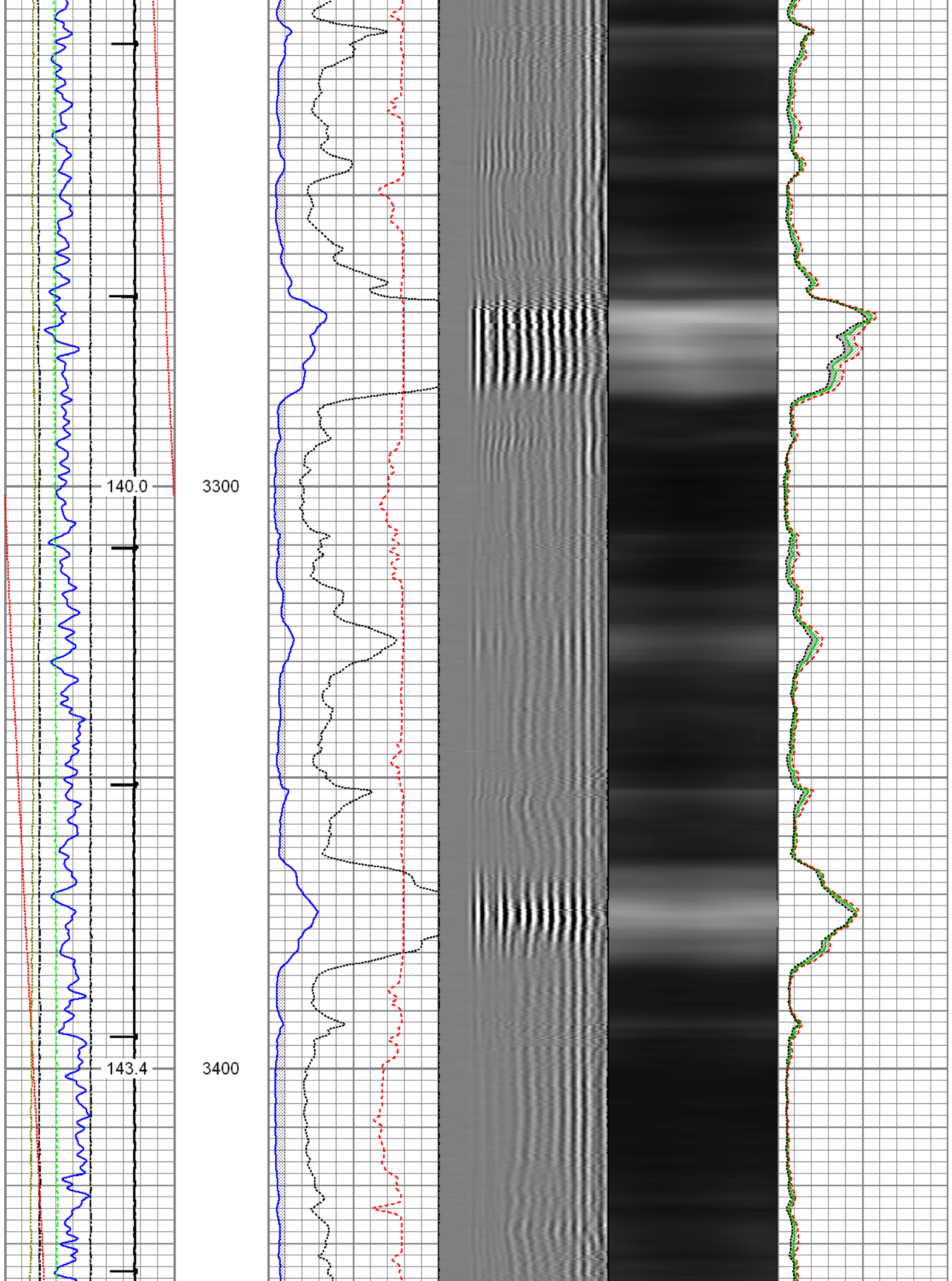


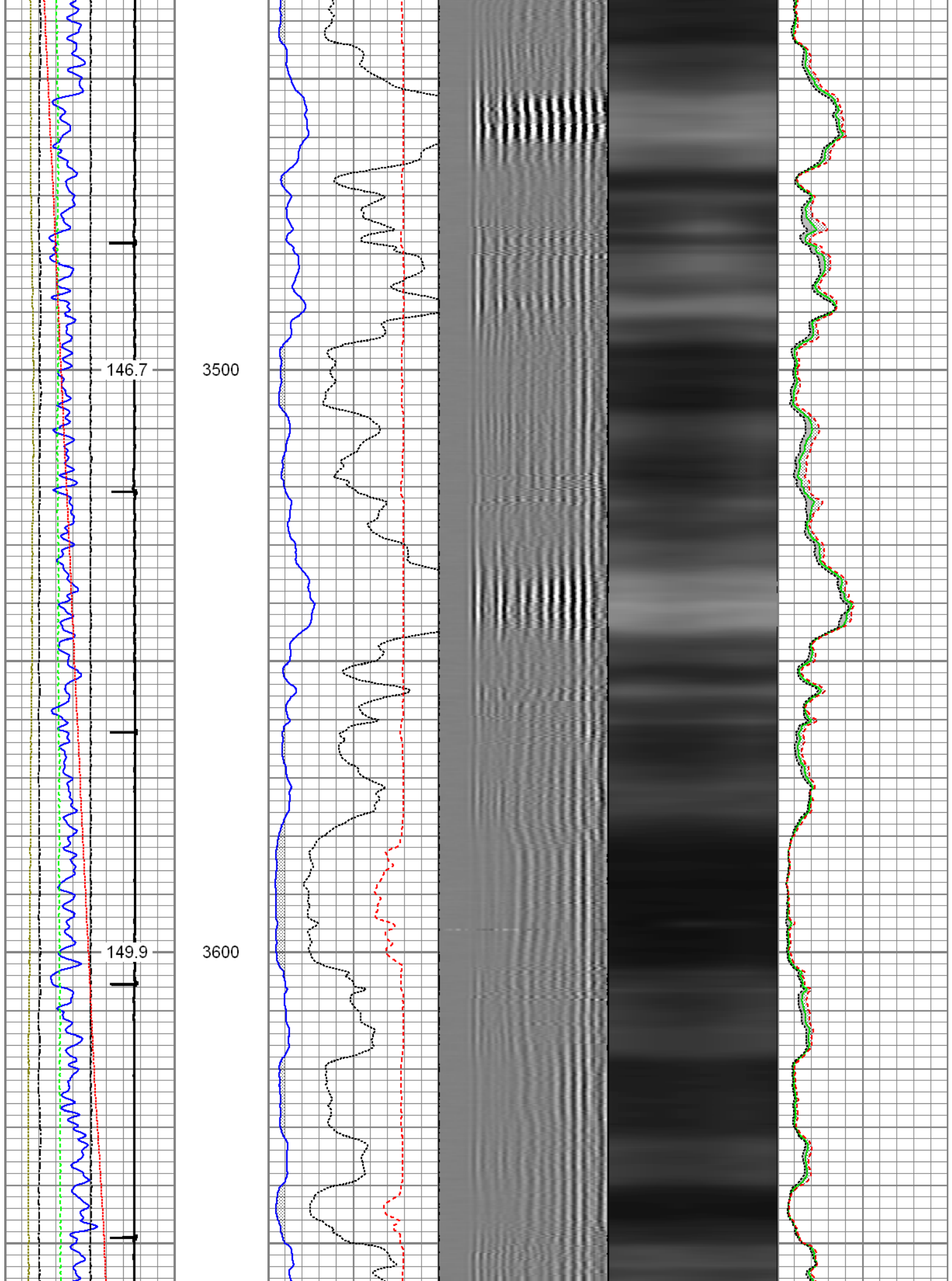




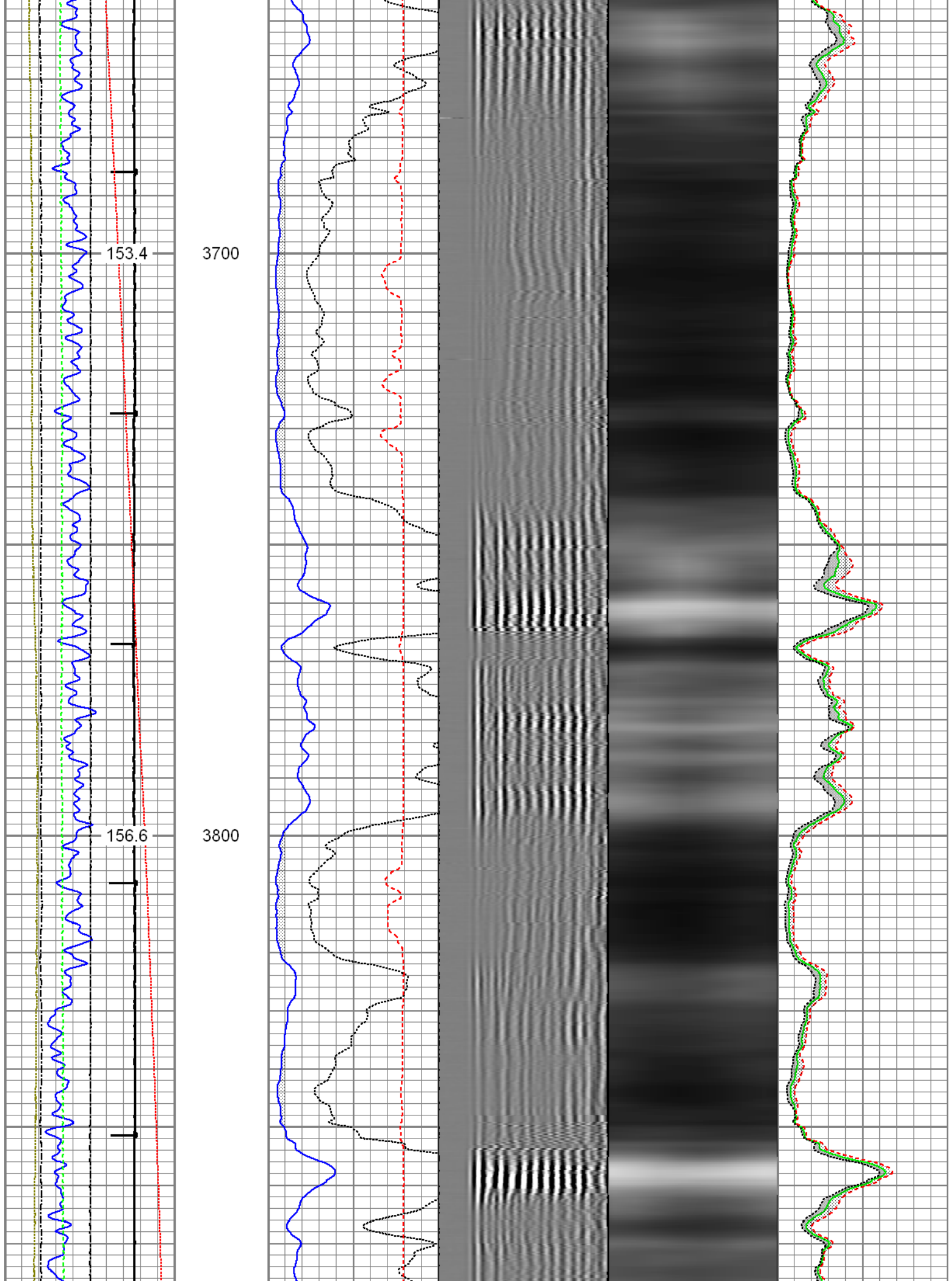




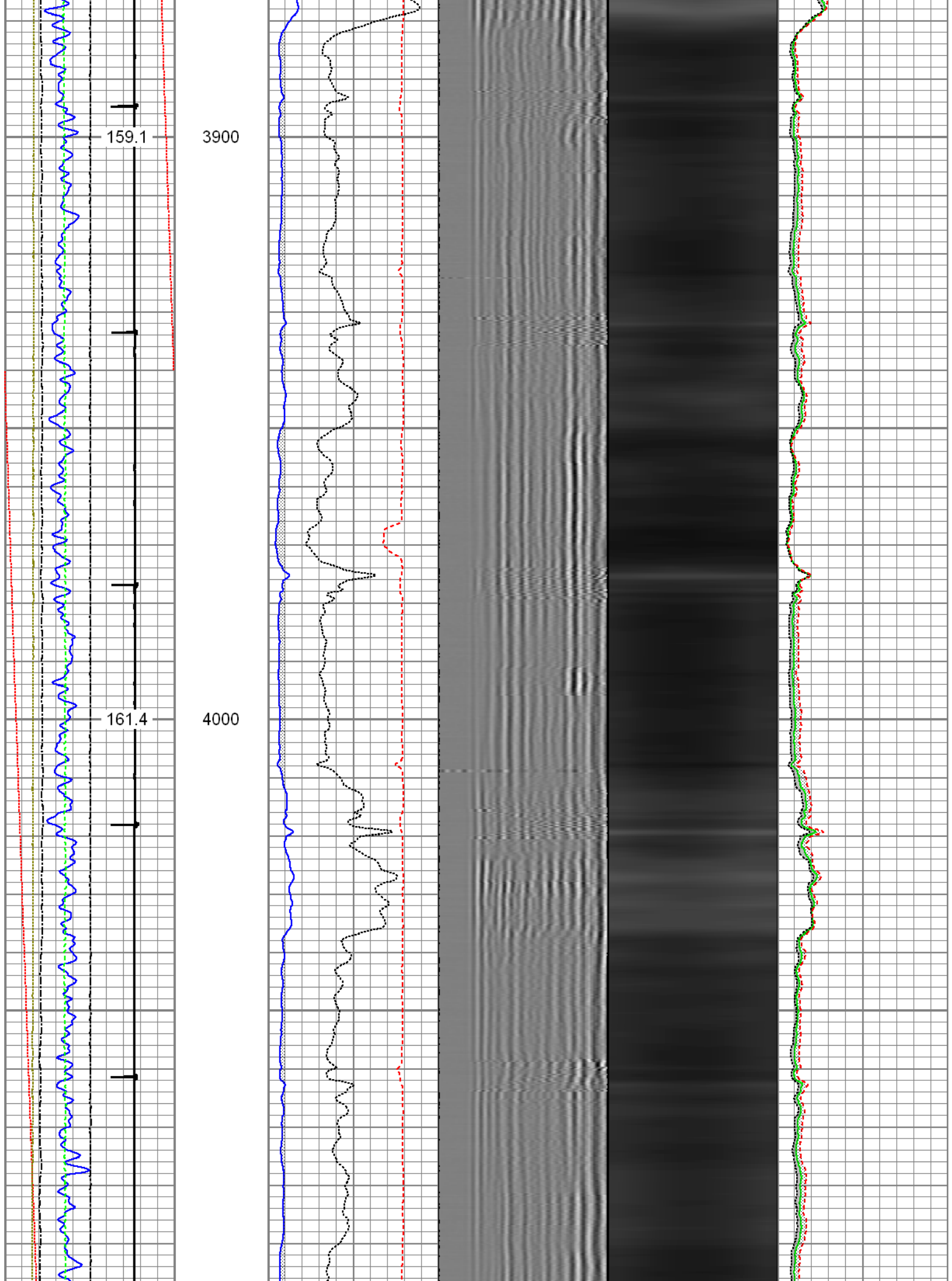


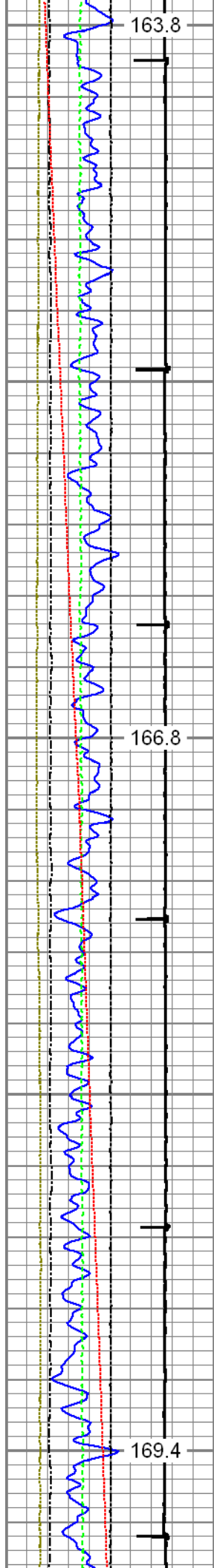








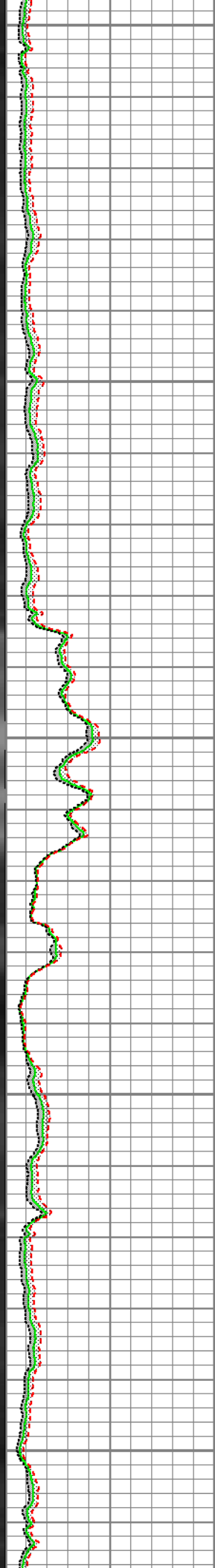
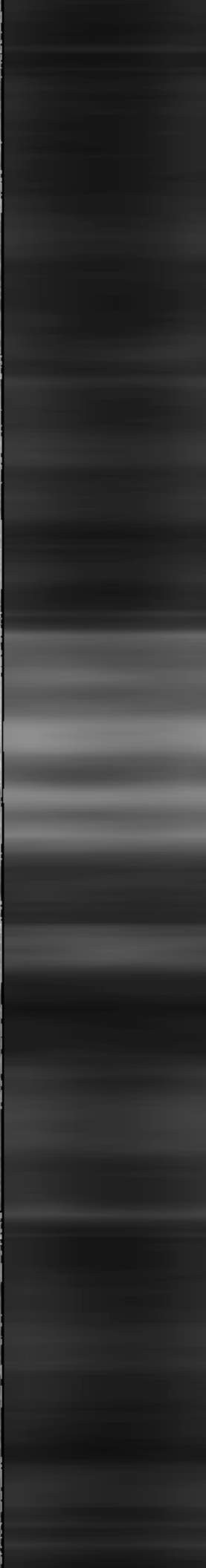
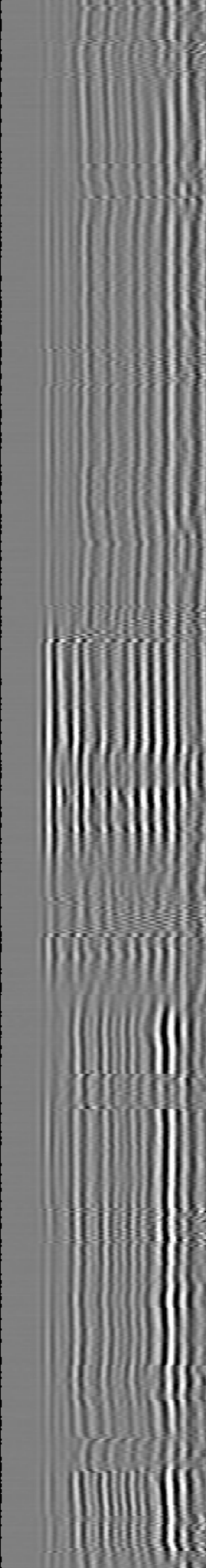
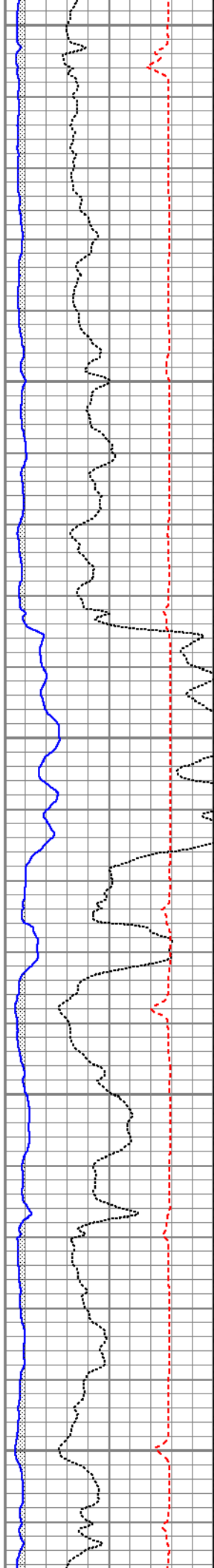


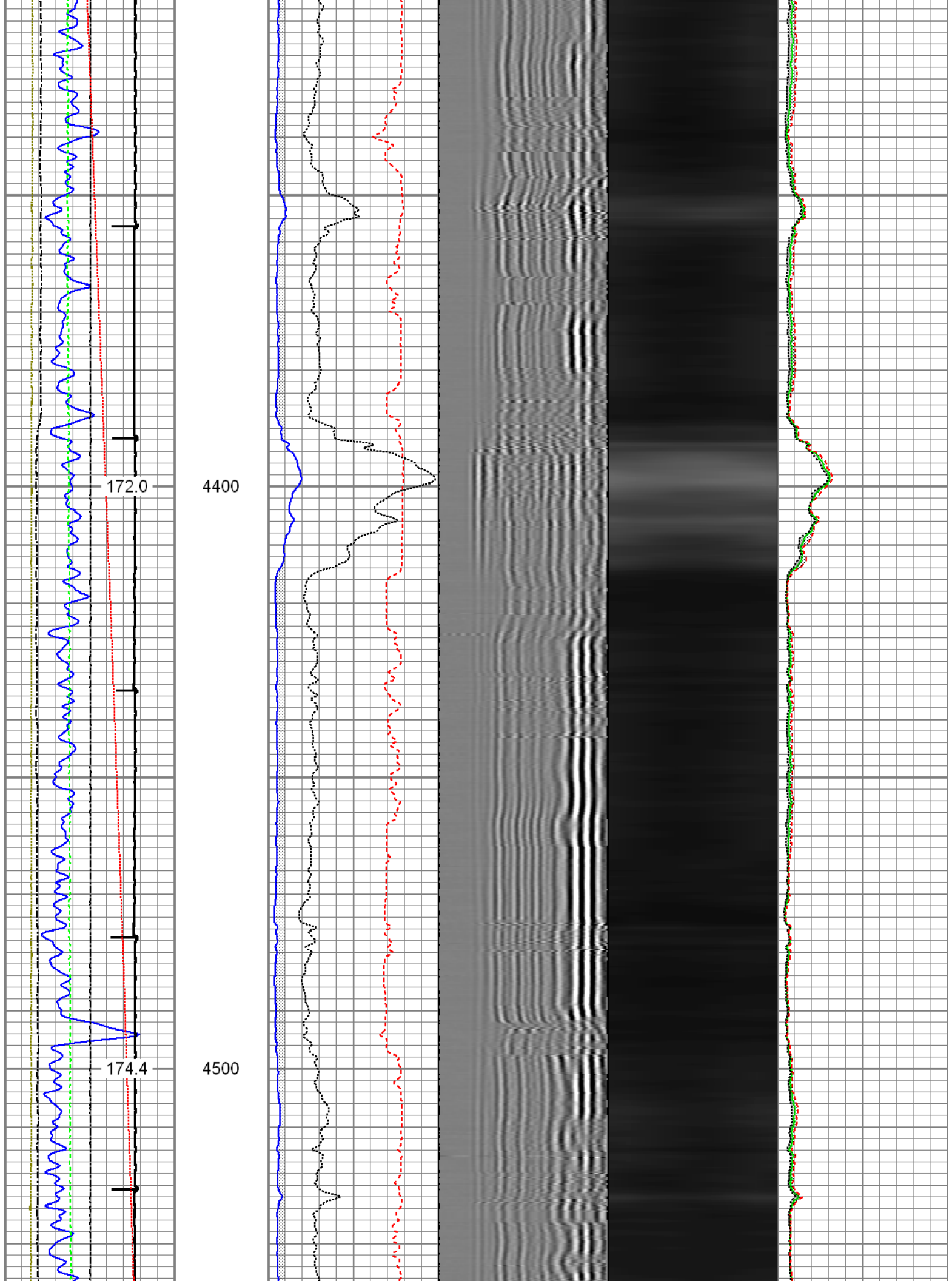


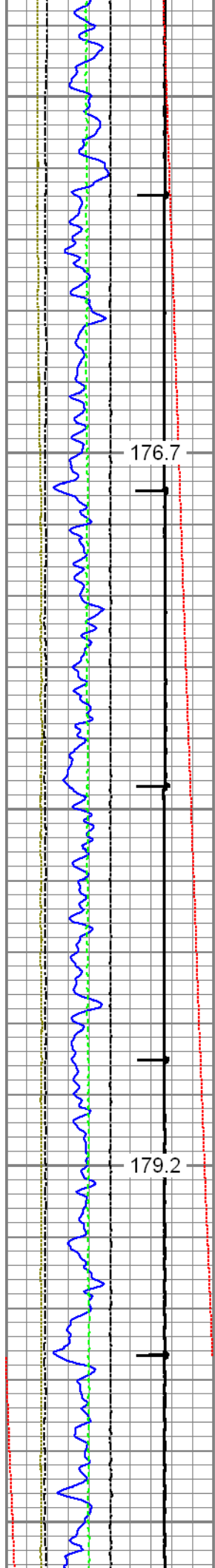
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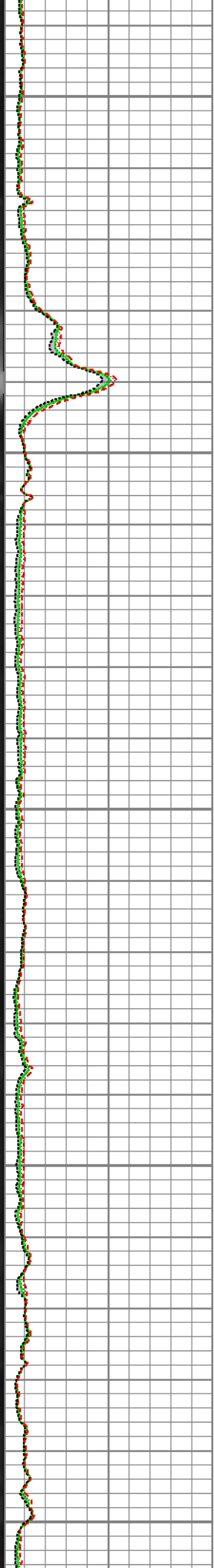
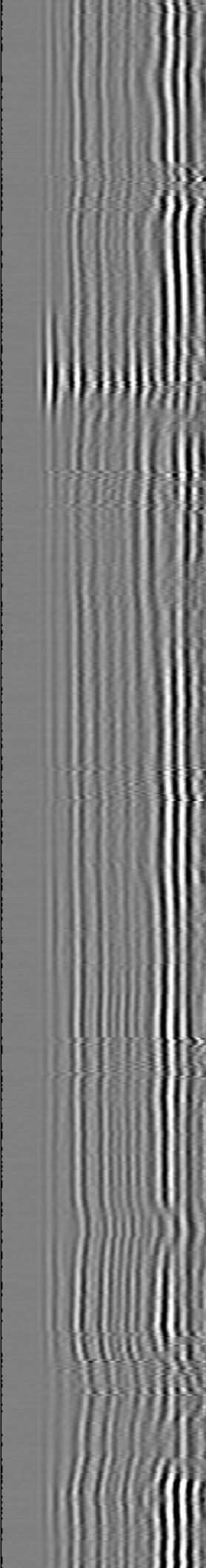
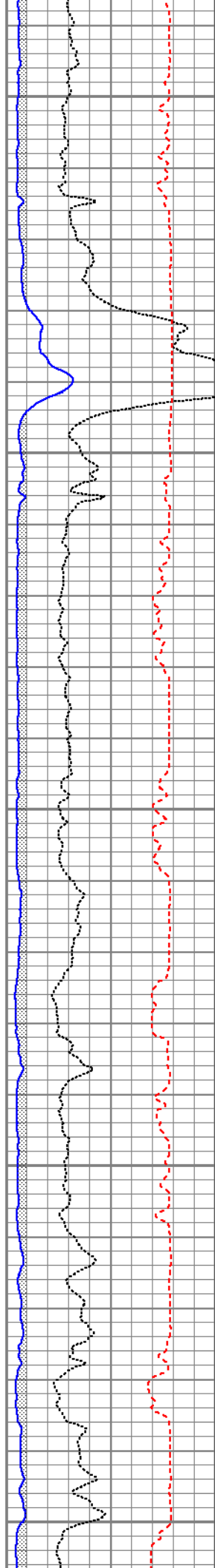




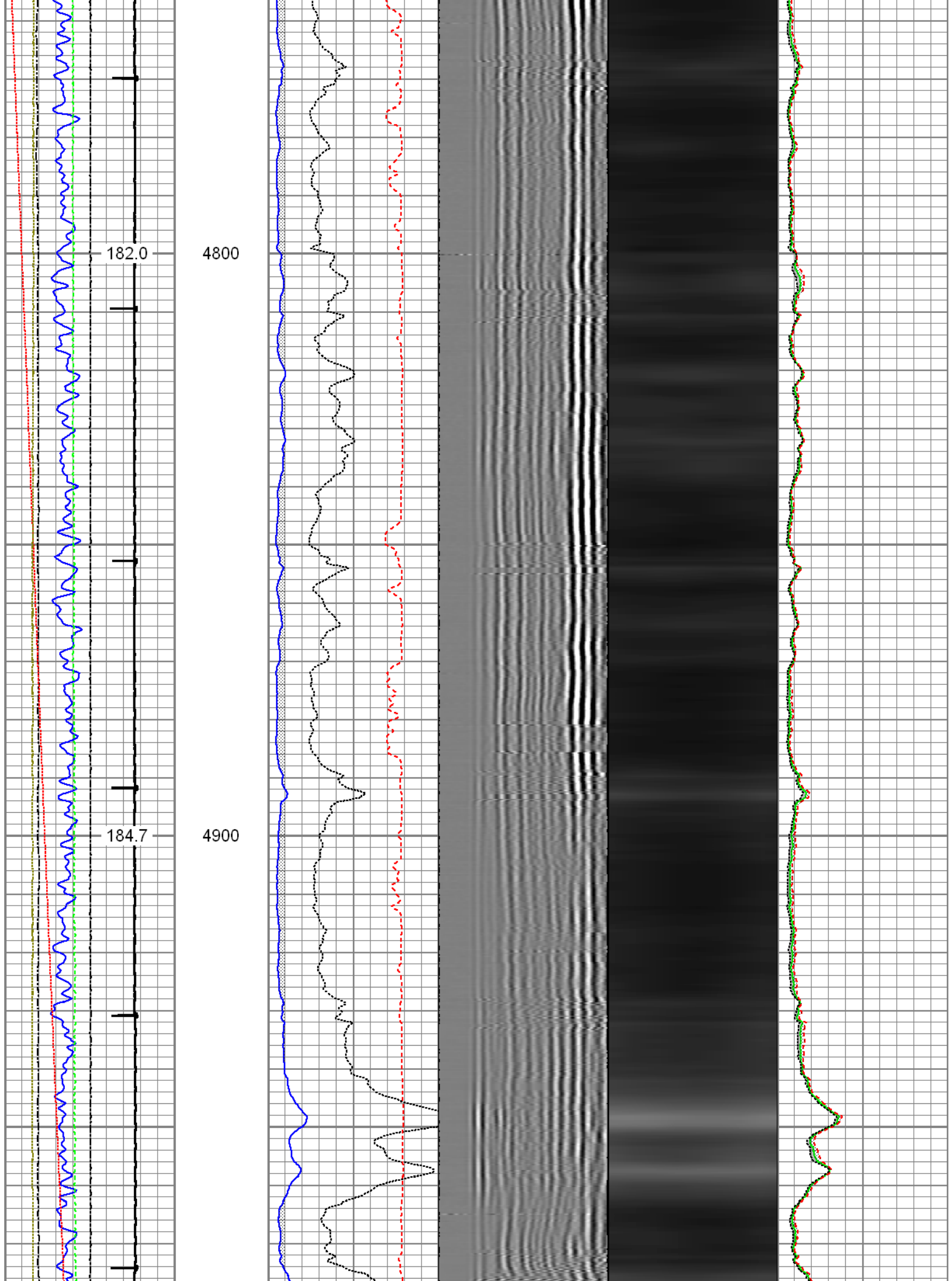


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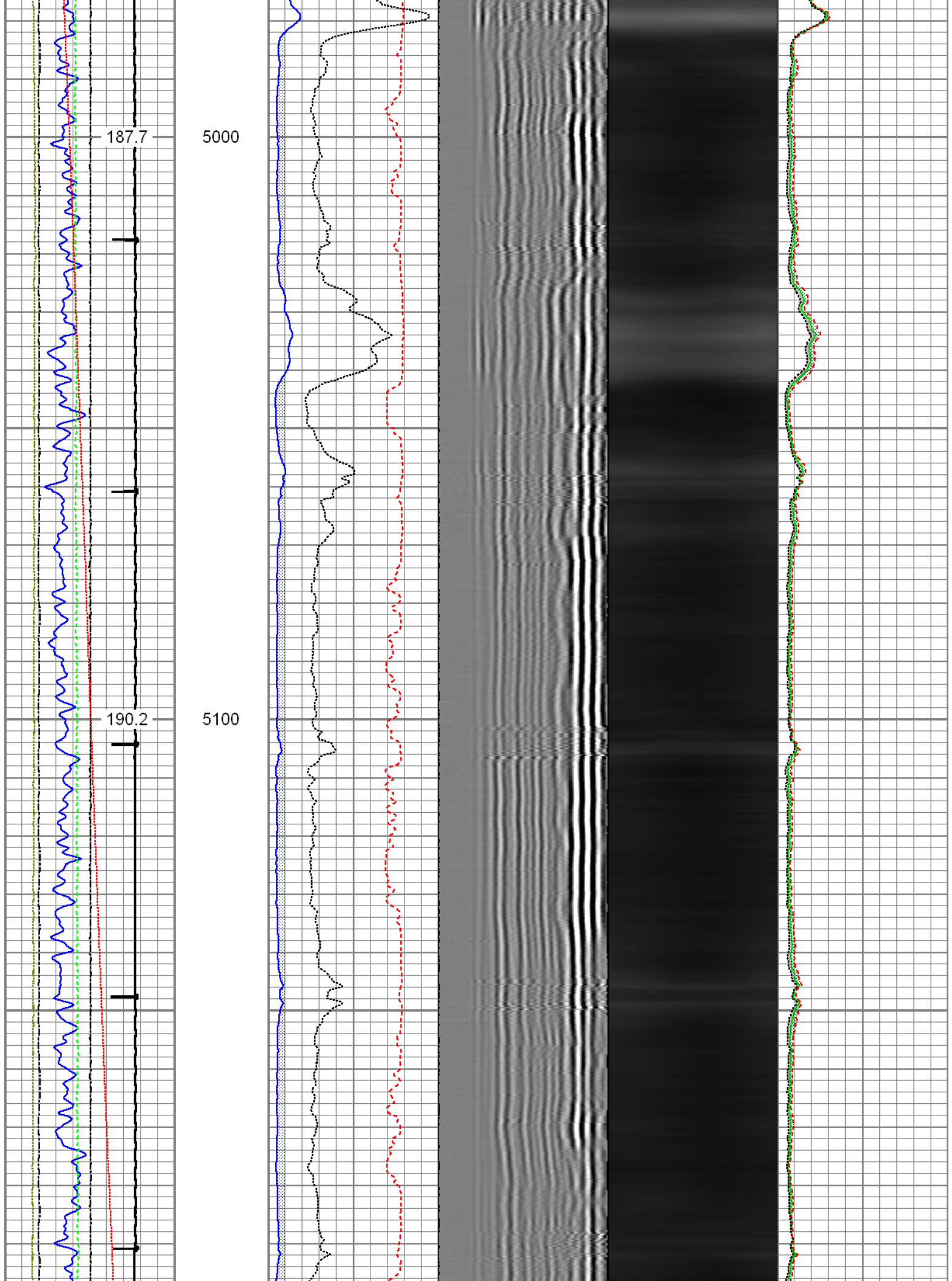
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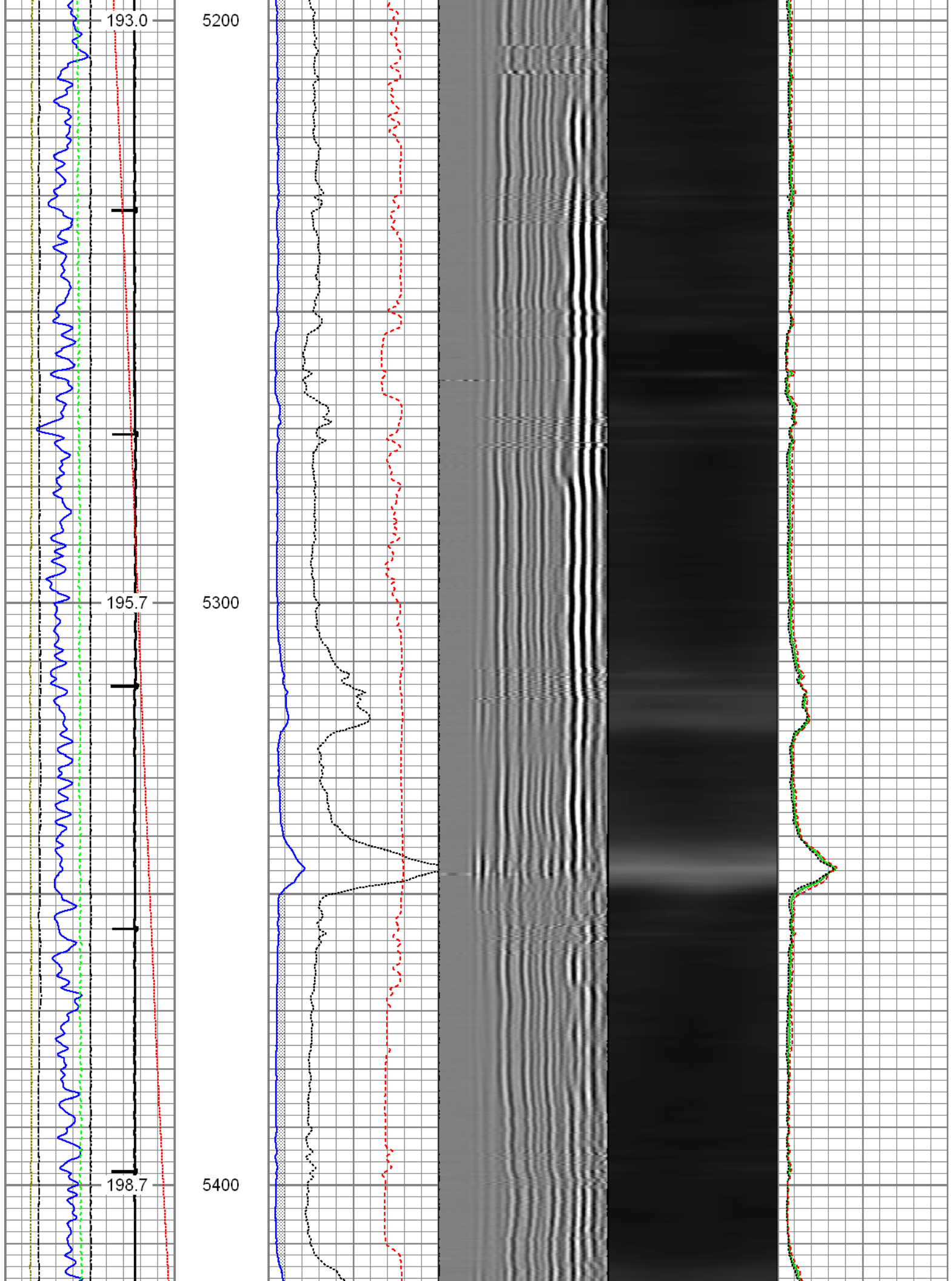


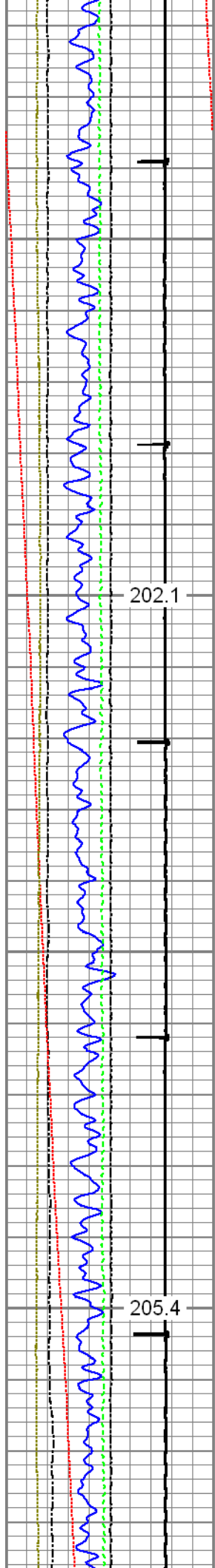






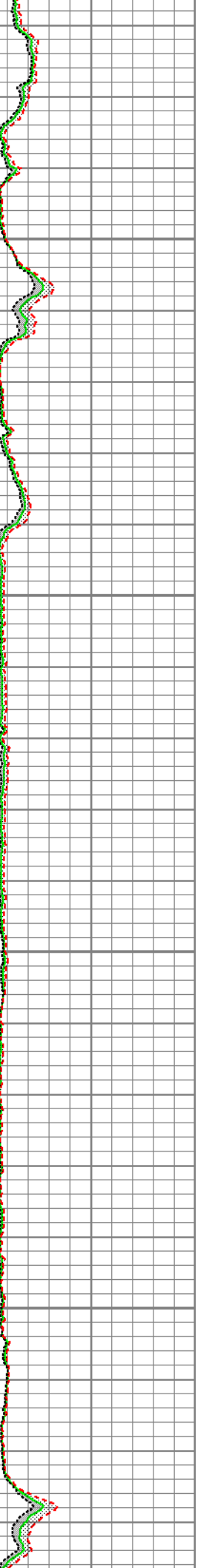
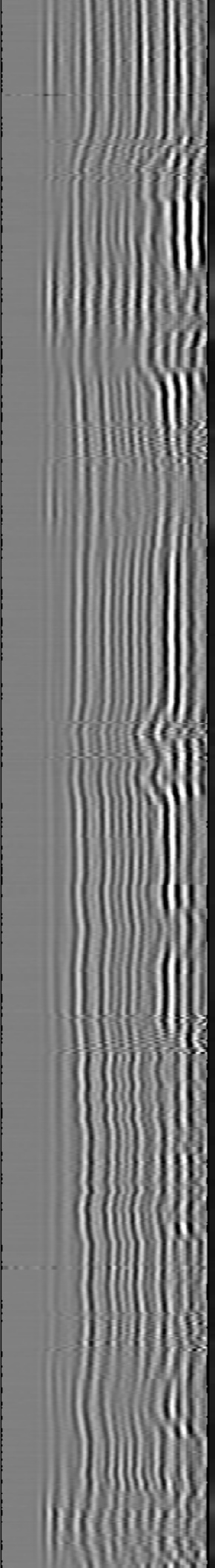
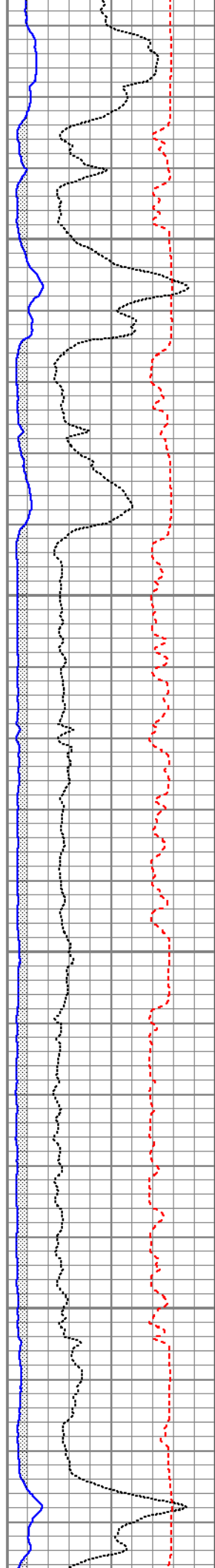


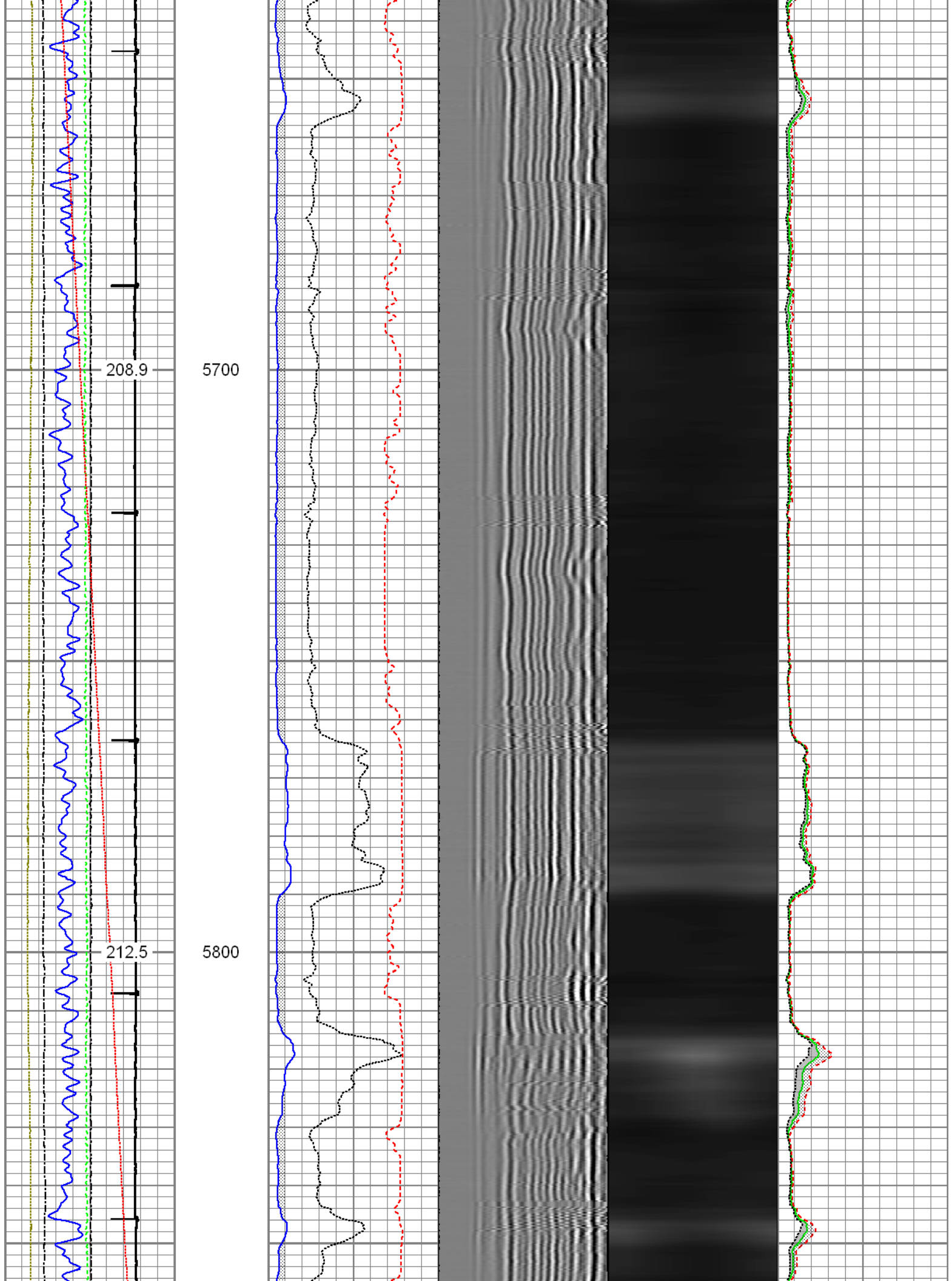




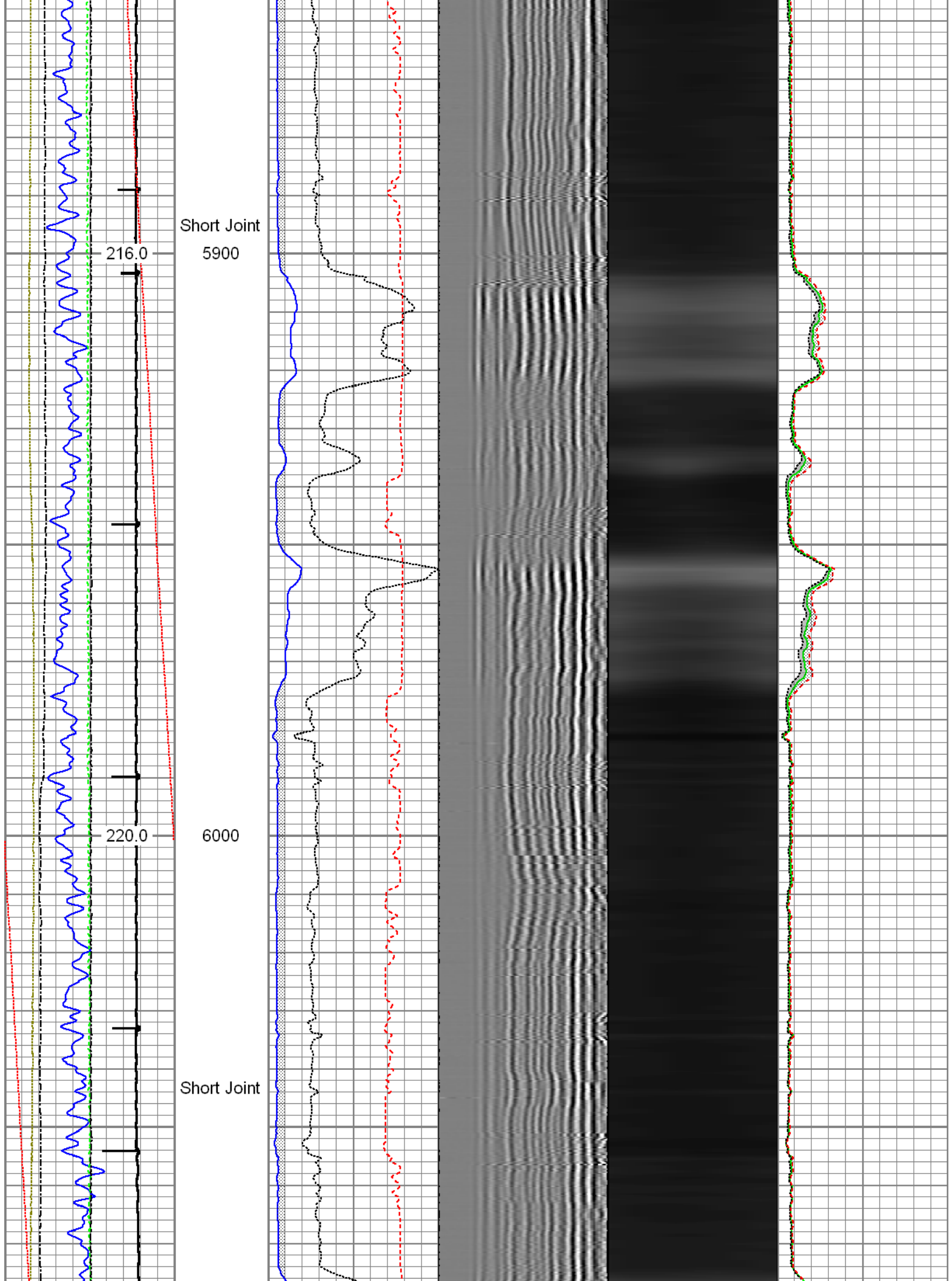
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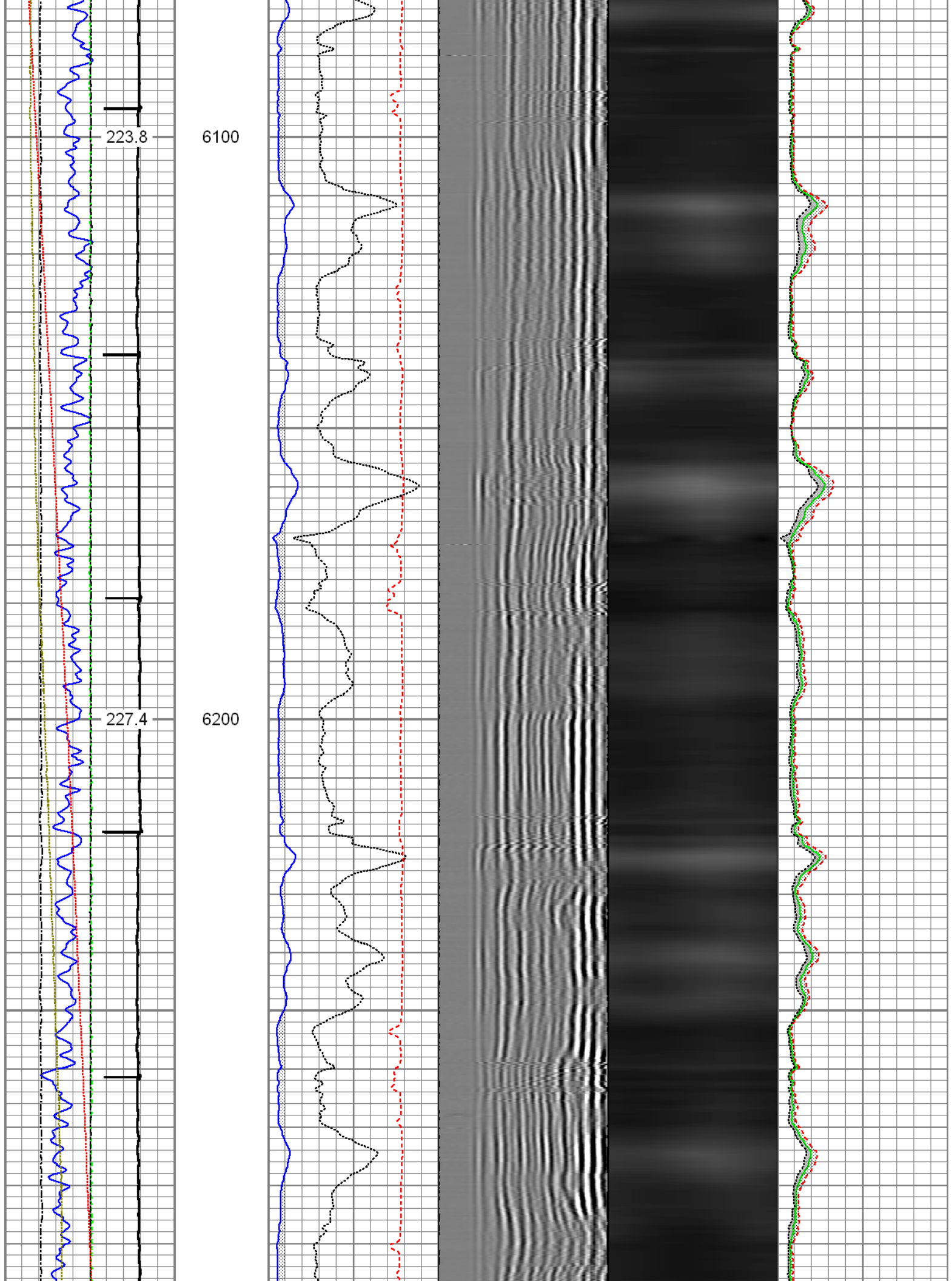
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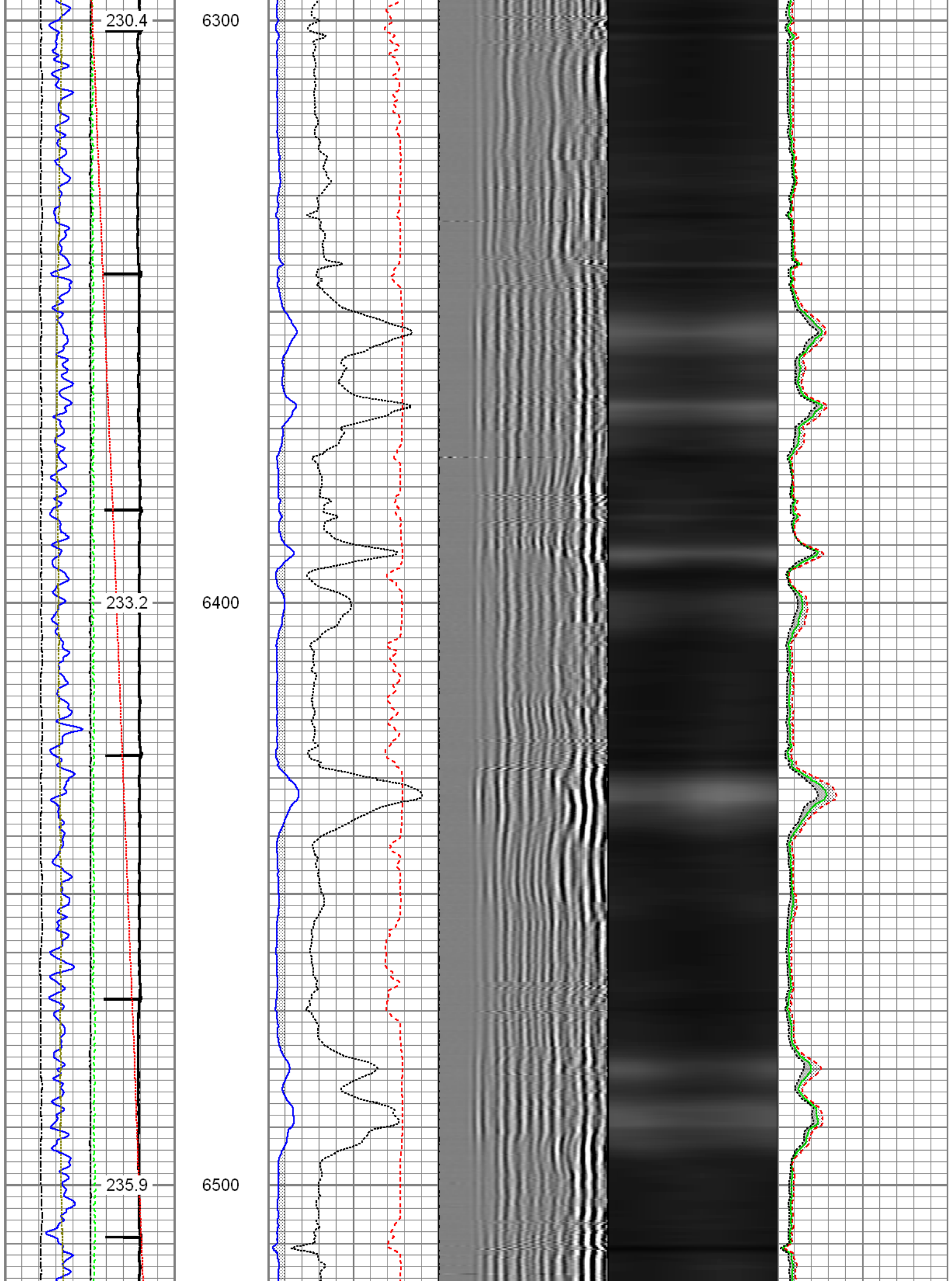


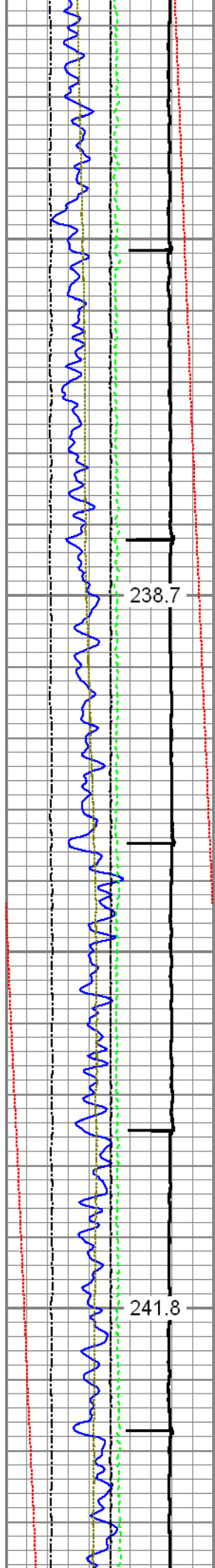










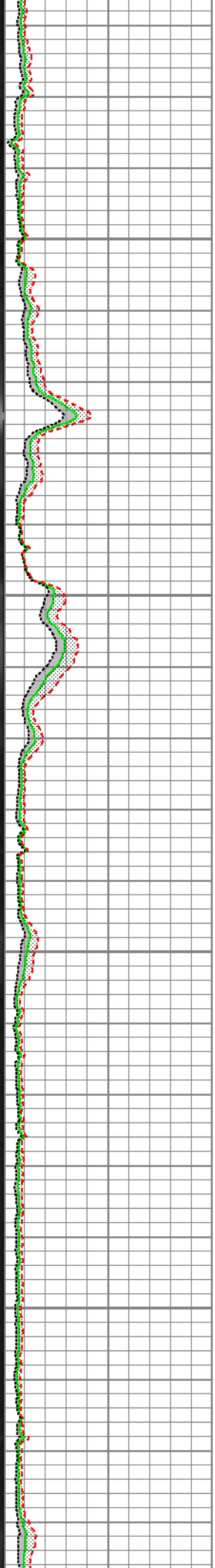
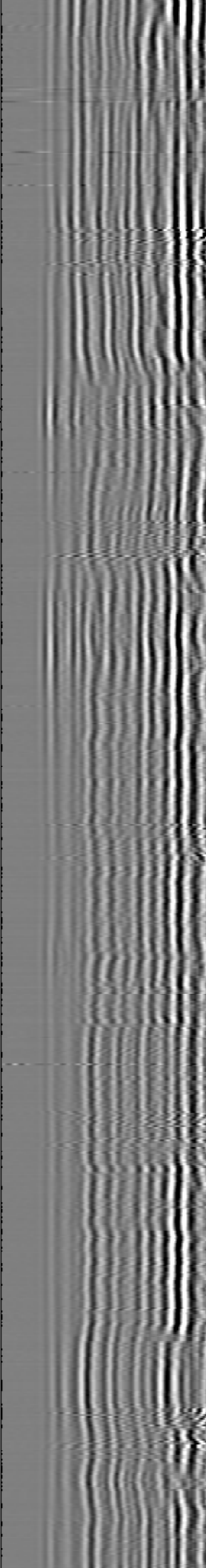
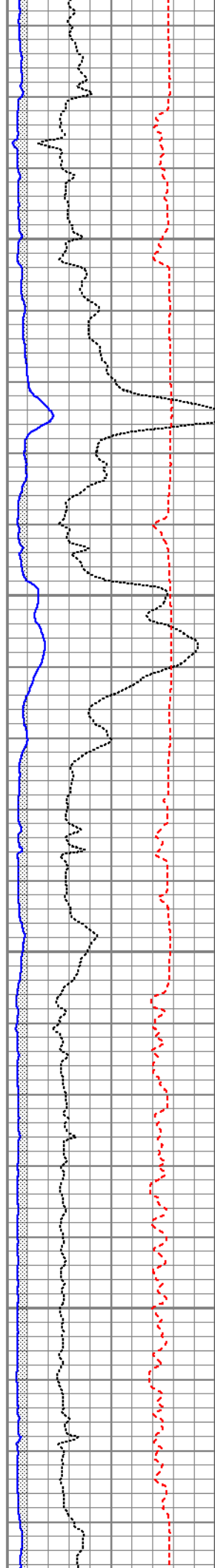


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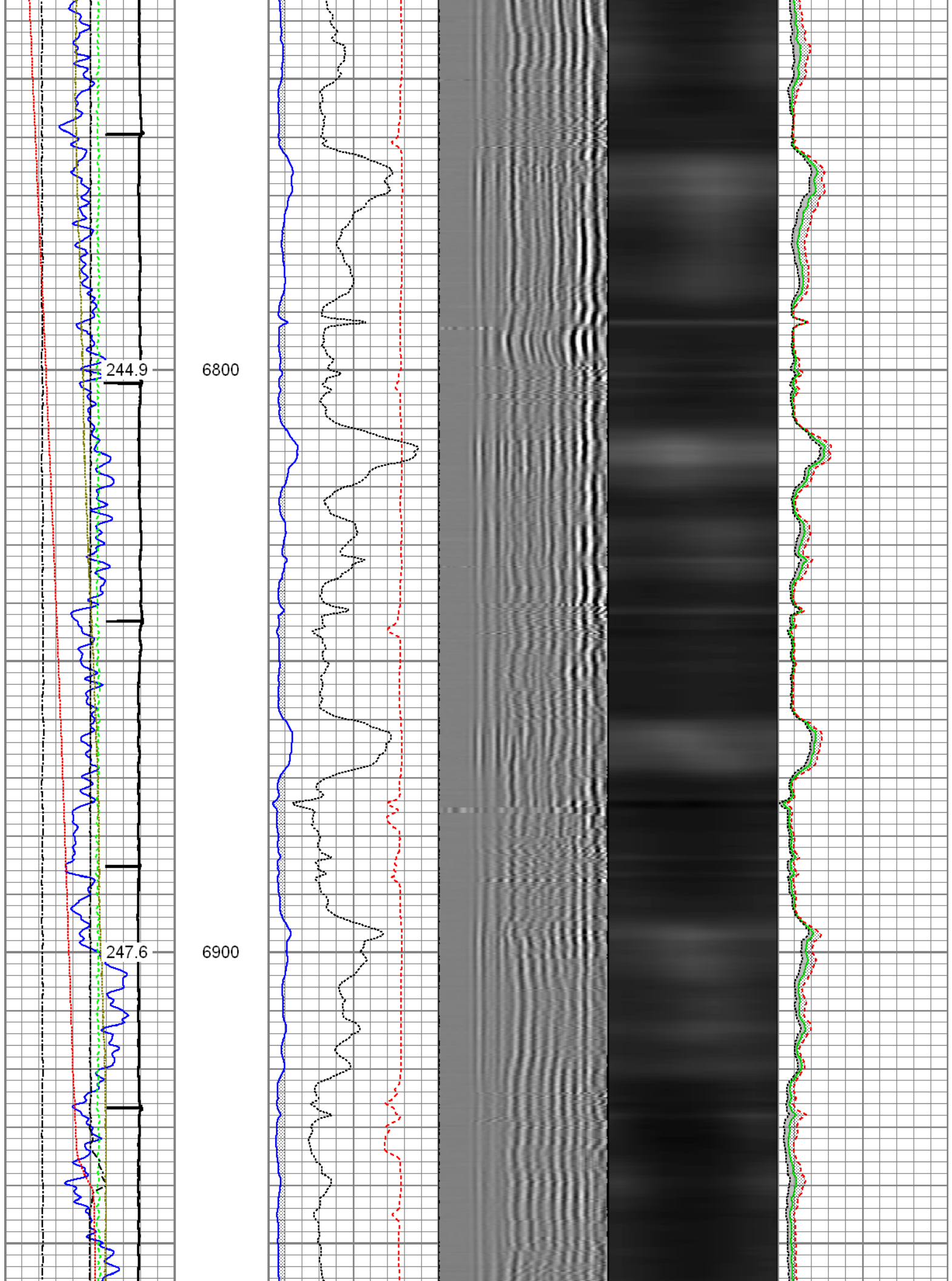
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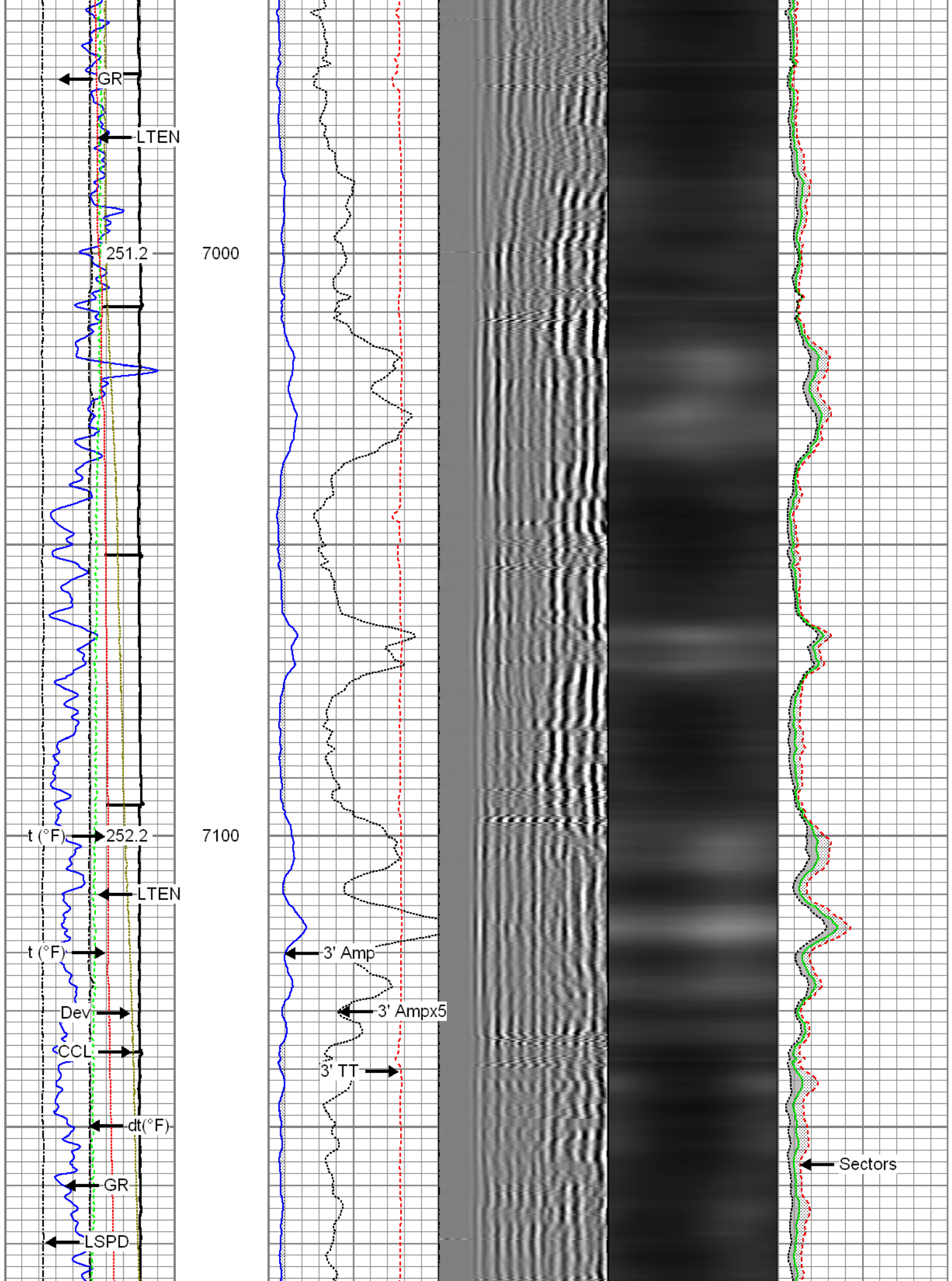
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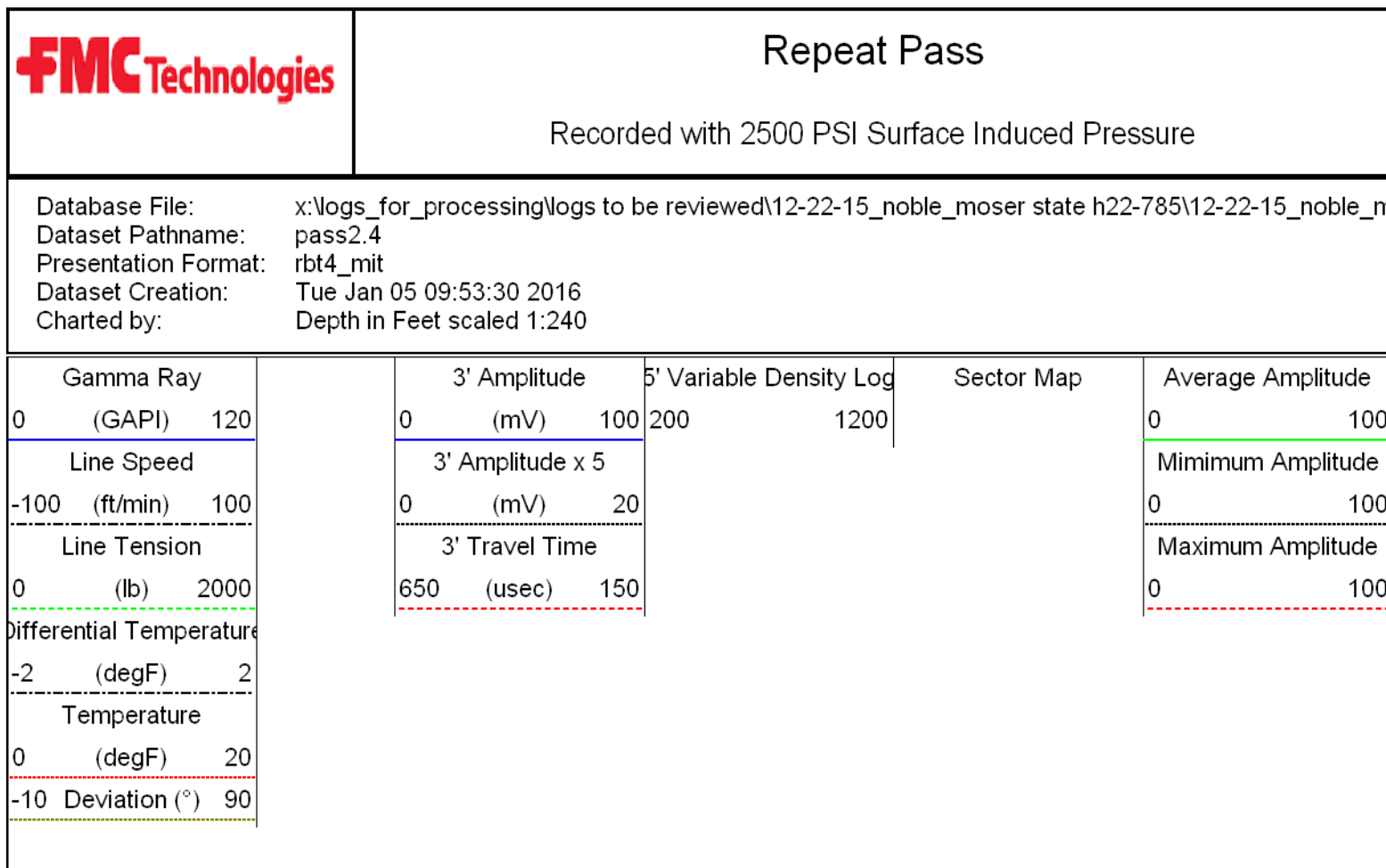
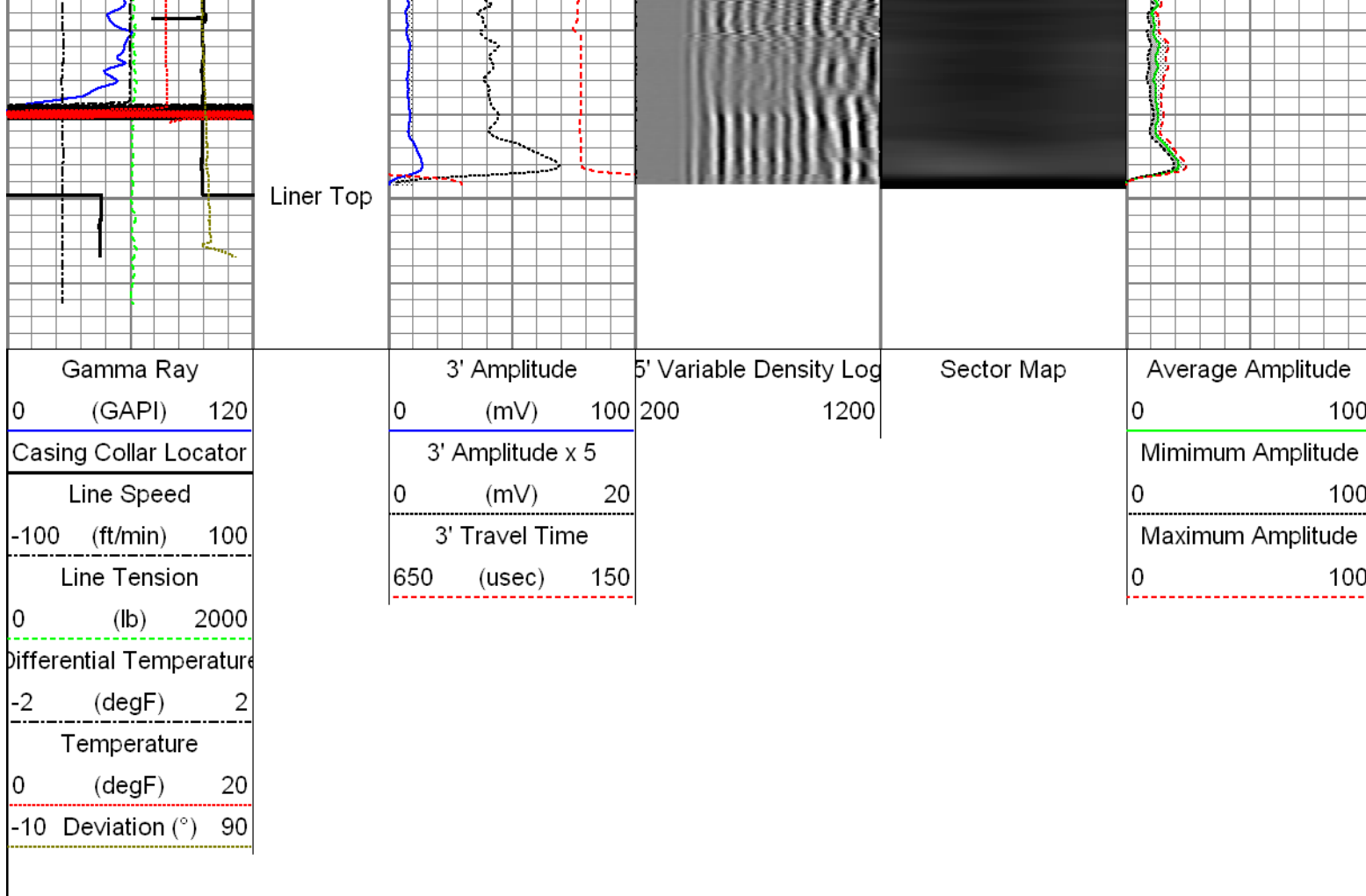
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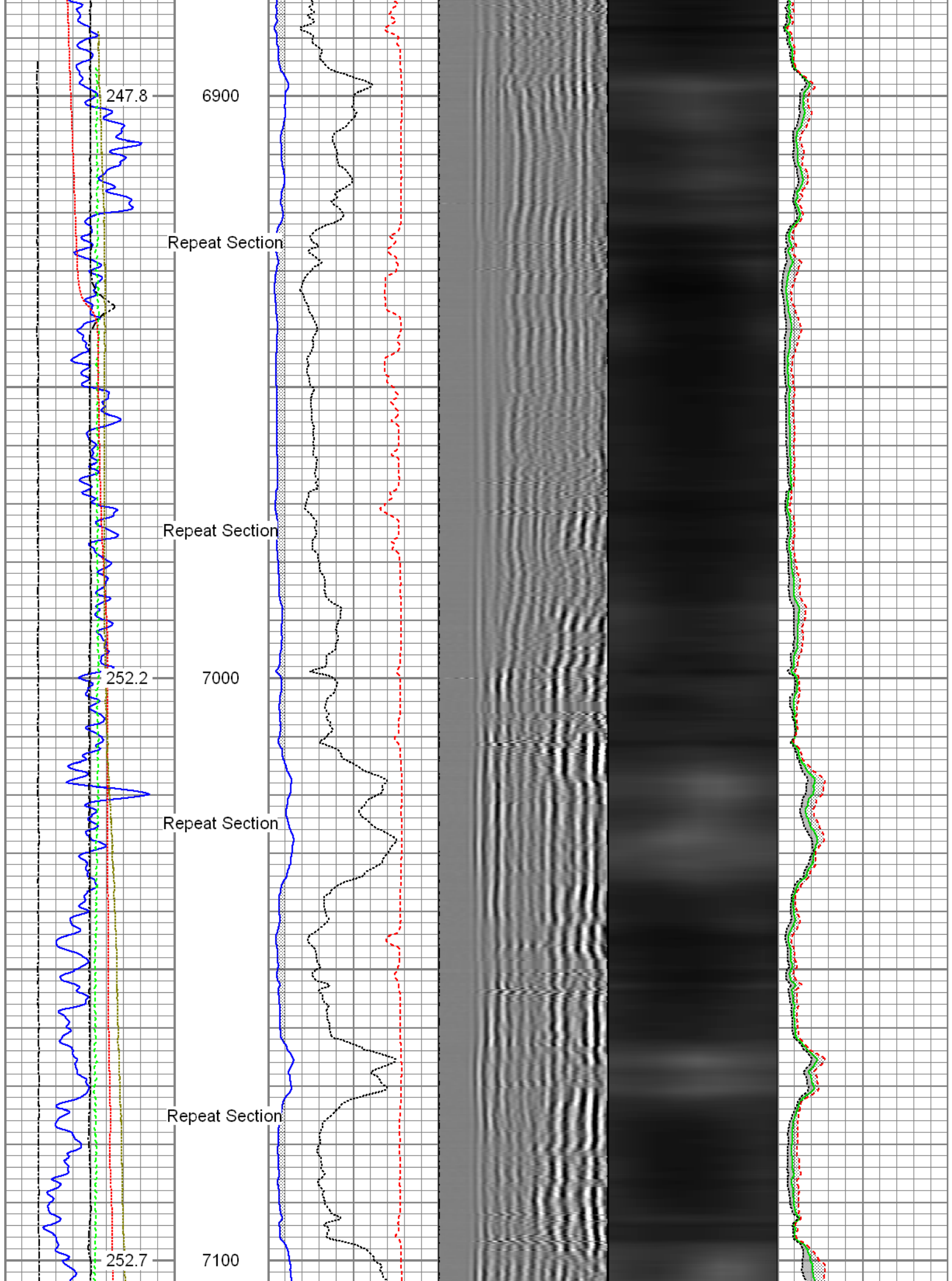




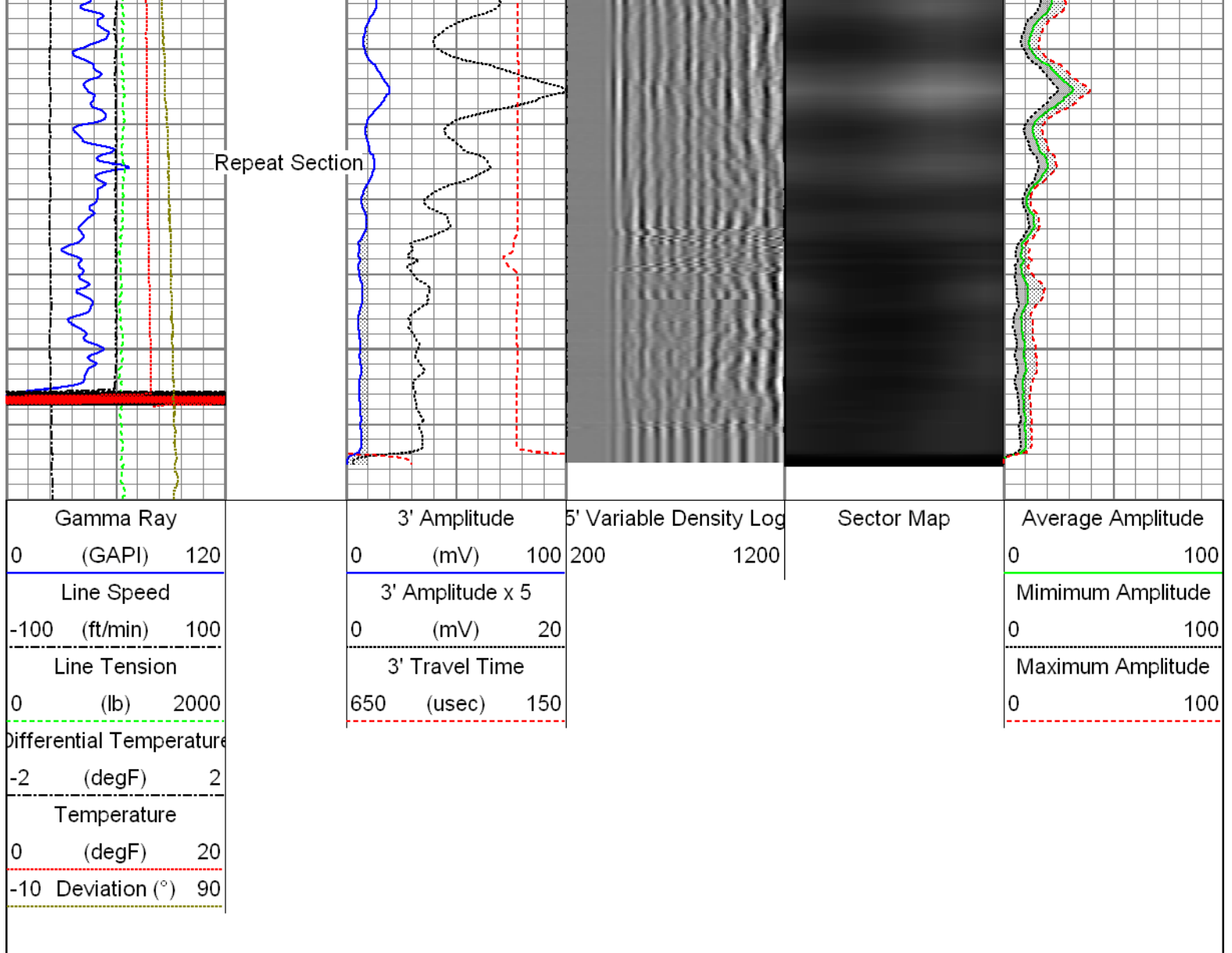




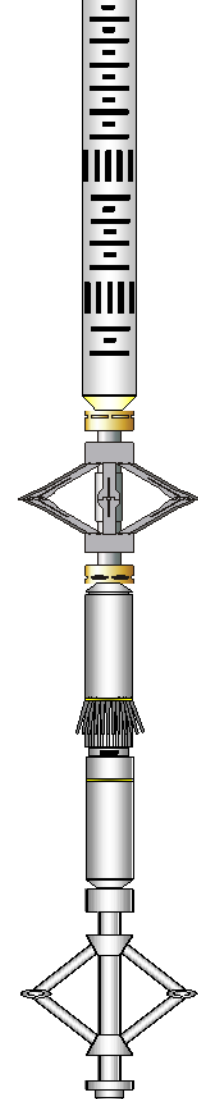








Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	23.85		T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00
			UW_AGS-UW_AGS_001 (215017) Sondex Adapter - GO Box to Sondex Pin	0.21	1.69	1.00
			UW_XTU-UW_XTU_002 (10010522) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50
			UW_PGR-UW_PGR_020 (211727) 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-DSSRAC (081) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00

WVF3FT	15.42		UW_RBT-UW_RBT_004 (10022773) 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 #3 -DSSRAC (082) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
CBLROT	15.42					
WVF5FT	14.42					
MIT	5.41		UW_MIT-UW_MIT40_042 (10014703) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC #4 -UW_PRC_057 (1037) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			UW_BUL-UW_BUL_006 (10019616) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
TSTAMP	0.00					
Dataset: 12-22-15_Noble_Moser State H22-785_RBL.db: field/well/run1/pass5 Total Length: 28.09 ft Total Weight: 324.50 lb O.D. 3.13 in						

Calibration Report			
Database File:	X:\Logs_For_Processing\Logs to be reviewed\12-22-15_Noble_Moser State H22-785\12-22-15_Noble		
Dataset Pathname:	pass5.4		
Dataset Creation:	Tue Jan 05 09:37:45 2016		
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:				Tue Dec 22 08:13:59 2015			
Ring size: (in)	4	Sens	5	Sens	6	Sens	7
Finger 01:	1083	376.0	1459	380.0	1839	400.0	2239
Finger 02:	1050	375.0	1425	396.0	1821	420.0	2241
Finger 03:	1036	364.0	1400	378.0	1778	410.0	2188
Finger 04:	1004	376.0	1380	401.0	1781	437.0	2218
Finger 05:	1017	353.0	1370	375.0	1745	405.0	2150
Finger 06:	1019	371.0	1390	389.0	1779	423.0	2202
Finger 07:	1026	365.0	1391	380.0	1771	414.0	2185
Finger 08:	997	366.0	1363	394.0	1757	432.0	2189
Finger 09:	1066	368.0	1434	382.0	1816	405.0	2221
Finger 10:	1028	366.0	1394	384.0	1778	414.0	2192
Finger 11:	1008	354.0	1362	384.0	1746	421.0	2167
Finger 12:	1101	363.0	1464	365.0	1829	382.0	2211
Finger 13:	1038	350.0	1388	381.0	1769	414.0	2183
Finger 14:	1020	363.0	1383	400.0	1783	429.0	2212
Finger 15:	989	359.0	1348	401.0	1749	431.0	2180
Finger 16:	1042	358.0	1400	390.0	1790	417.0	2207
Finger 17:	1081	352.0	1433	388.0	1821	394.0	2215
Finger 18:	1111	354.0	1465	382.0	1847	402.0	2249
Finger 19:	1071	357.0	1428	390.0	1818	408.0	2226
Finger 20:	989	357.0	1346	399.0	1745	427.0	2172
Finger 21:	1074	346.0	1420	387.0	1807	407.0	2214
Finger 22:	1079	351.0	1430	396.0	1826	409.0	2235
Finger 23:	1103	351.0	1454	396.0	1850	409.0	2259
Finger 24:	1084	330.0	1414	365.0	1779	381.0	2160
Finger 25:	1096	367.0	1463	403.0	1866	409.0	2275
Finger 26:	1051	345.0	1396	387.0	1783	407.0	2190
Finger 27:	1221	369.0	1590	396.0	1986	399.0	2385
Finger 28:	1080	336.0	1416	379.0	1795	400.0	2195
Finger 29:	1055	354.0	1409	397.0	1806	418.0	2224
Finger 30:	1030	357.0	1387	401.0	1788	422.0	2210
Finger 31:	1259	386.0	1645	409.0	2054	418.0	2472
Finger 32:	1011	363.0	1374	387.0	1761	397.0	2158
Finger 33:	1115	380.0	1495	413.0	1908	429.0	2337
Finger 34:	990	357.0	1347	392.0	1739	411.0	2150
Finger 35:	1147	393.0	1540	407.0	1947	421.0	2368
Finger 36:	1062	356.0	1418	372.0	1790	390.0	2180
Finger 37:	1145	387.0	1532	409.0	1941	420.0	2361
Finger 38:	1103	363.0	1466	383.0	1849	398.0	2247
Finger 39:	1091	353.0	1444	367.0	1811	388.0	2199
Finger 40:	987	382.0	1369	412.0	1781	437.0	2218

Segmented Cement Bond Log Calibration Report							
Serial Number:				10022773			
Tool Model:				UW_RBT_004			
Calibration Casing Diameter:				7.000	in		
Calibration Depth:				24.001	ft		

Master Calibration, performed Tue Dec 22 10:59:52 2015:							
	Raw (v)		Calibrated (mv)		Results		
	Zero	Cal	Zero	Cal	Gain	Offset	
3FT	0.001	0.809	0.800	62.165	75.937	0.709	
5FT	-0.001	0.814	0.800	62.165	75.212	0.906	
S1	0.002	0.768	0.000	100.000	130.555	-0.304	
S2	-0.000	0.797	0.000	100.000	125.412	0.058	

S3	0.001	0.795	0.000	100.000	125.874	-0.106
S4	-0.000	0.795	0.000	100.000	125.715	0.054
S5	0.001	0.816	0.000	100.000	122.593	-0.087
S6	0.000	0.803	0.000	100.000	124.552	-0.020
S7	0.001	0.789	0.000	100.000	126.956	-0.169
S8	0.001	0.777	0.000	100.000	128.924	-0.157

### Temperature Calibration Report

Serial Number: 10025097  
Tool Model: UW\_PRT\_016  
Performed: 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: 211727  
Tool Model: UW\_PGR\_020  
Performed: Mon Nov 23 09:56:50 2015

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps

### Calibration Report

Database File: X:\Logs\_For\_Processing\Logs to be reviewed\12-22-15\_Noble\_Moser State H22-785\12-22-15\_Noble  
Dataset Pathname: pass6  
Dataset Creation: Tue Dec 22 11:13:18 2015 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:

Tue Dec 22 08:13:59 2015

Ring size: (in)	4	Sens	5	Sens	6	Sens	7
Finger 01:	1083	376.0	1459	380.0	1839	400.0	2239
Finger 02:	1050	375.0	1425	396.0	1821	420.0	2241
Finger 03:	1036	364.0	1400	378.0	1778	410.0	2188
Finger 04:	1004	376.0	1380	401.0	1781	437.0	2218
Finger 05:	1017	353.0	1370	375.0	1745	405.0	2150
Finger 06:	1019	371.0	1390	389.0	1779	423.0	2202
Finger 07:	1026	365.0	1391	380.0	1771	414.0	2185
Finger 08:	997	366.0	1363	394.0	1757	432.0	2189
Finger 09:	1066	368.0	1434	382.0	1816	405.0	2221
Finger 10:	1028	366.0	1394	384.0	1778	414.0	2192
Finger 11:	1008	354.0	1362	384.0	1746	421.0	2167
Finger 12:	1101	363.0	1464	365.0	1829	382.0	2211
Finger 13:	1038	350.0	1388	381.0	1769	414.0	2183
Finger 14:	1020	363.0	1383	400.0	1783	429.0	2212
Finger 15:	989	359.0	1348	401.0	1749	431.0	2180
Finger 16:	1042	358.0	1400	390.0	1790	417.0	2207
Finger 17:	1081	352.0	1433	388.0	1821	394.0	2215
Finger 18:	1111	354.0	1465	382.0	1847	402.0	2249
Finger 19:	1071	357.0	1428	390.0	1818	408.0	2226
Finger 20:	989	357.0	1346	399.0	1745	427.0	2172
Finger 21:	1074	346.0	1420	387.0	1807	407.0	2214
Finger 22:	1079	351.0	1430	396.0	1826	409.0	2235
Finger 23:	1103	351.0	1454	396.0	1850	409.0	2259
Finger 24:	1084	330.0	1414	365.0	1779	381.0	2160
Finger 25:	1096	367.0	1463	403.0	1866	409.0	2275
Finger 26:	1051	345.0	1396	387.0	1783	407.0	2190
Finger 27:	1221	369.0	1590	396.0	1986	399.0	2385
Finger 28:	1080	336.0	1416	379.0	1795	400.0	2195
Finger 29:	1055	354.0	1409	397.0	1806	418.0	2224
Finger 30:	1030	357.0	1387	401.0	1788	422.0	2210
Finger 31:	1259	386.0	1645	409.0	2054	418.0	2472
Finger 32:	1011	363.0	1374	387.0	1761	397.0	2158
Finger 33:	1115	380.0	1495	413.0	1908	429.0	2337
Finger 34:	990	357.0	1347	392.0	1739	411.0	2150
Finger 35:	1147	393.0	1540	407.0	1947	421.0	2368
Finger 36:	1062	356.0	1418	372.0	1790	390.0	2180
Finger 37:	1145	387.0	1532	409.0	1941	420.0	2361
Finger 38:	1103	363.0	1466	383.0	1849	398.0	2247
Finger 39:	1091	353.0	1444	367.0	1811	388.0	2199
Finger 40:	987	382.0	1369	412.0	1781	437.0	2218

## Post Survey Calibration Check

Performed:

Tue Dec 22 11:12:36 2015

Ring size: (in)	4	Nom. wear	5	Nom. wear	6	Nom. wear	7	Nom. wear
Finger 01:	4.026	0.013	5.011	0.006	6.015	0.007	7.011	0.006
Finger 02:	4.006	0.003	5.005	0.002	6.008	0.004	7.012	0.006
Finger 03:	4.006	0.003	5.095	0.047	6.058	0.029	7.040	0.020
Finger 04:	3.994	-0.003	4.991	-0.004	6.000	0.000	7.001	0.001
Finger 05:	4.005	0.003	5.032	0.016	6.041	0.020	7.027	0.013
Finger 06:	4.016	0.008	5.010	0.005	6.012	0.006	7.005	0.003
Finger 07:	4.011	0.006	5.017	0.009	6.019	0.009	7.016	0.008
Finger 08:	4.010	0.005	5.005	0.002	6.009	0.004	7.002	0.001
Finger 09:	3.996	-0.002	5.017	0.008	6.022	0.011	7.031	0.016
Finger 10:	4.025	0.012	5.015	0.007	6.014	0.007	7.009	0.004
Finger 11:	3.988	-0.006	5.004	0.002	6.010	0.005	7.019	0.010
Finger 12:	4.022	0.011	4.998	-0.001	6.000	0.000	7.005	0.002
Finger 13:	3.999	-0.000	5.001	0.000	6.004	0.002	7.007	0.004
Finger 14:	4.007	0.004	5.016	0.008	6.014	0.007	7.015	0.007
Finger 15:	3.997	-0.001	5.006	0.003	6.001	0.000	7.002	0.001


Finger 16:	4.015	0.008	5.011	0.006	6.016	0.008	7.019	0.009
Finger 17:	3.990	-0.005	4.990	-0.005	5.967	-0.017	6.978	-0.011
Finger 18:	4.012	0.006	5.016	0.008	6.012	0.006	7.008	0.004
Finger 19:	4.004	0.002	5.008	0.004	6.008	0.004	7.011	0.006
Finger 20:	4.022	0.011	5.024	0.012	6.025	0.012	7.021	0.010
Finger 21:	4.007	0.003	5.020	0.010	6.015	0.008	7.011	0.006
Finger 22:	4.004	0.002	5.021	0.010	6.016	0.008	7.020	0.010
Finger 23:	4.002	0.001	5.019	0.009	6.013	0.006	7.012	0.006
Finger 24:	4.012	0.006	5.017	0.008	6.021	0.010	7.025	0.013
Finger 25:	4.024	0.012	5.014	0.007	6.009	0.004	7.006	0.003
Finger 26:	4.003	0.002	5.016	0.008	6.028	0.014	7.028	0.014
Finger 27:	3.998	-0.001	5.015	0.008	6.015	0.007	7.019	0.010
Finger 28:	3.997	-0.002	5.018	0.009	6.028	0.014	7.025	0.013
Finger 29:	4.005	0.003	5.021	0.010	6.021	0.010	7.009	0.005
Finger 30:	4.010	0.005	5.015	0.007	6.013	0.007	7.014	0.007
Finger 31:	4.000	0.000	5.011	0.005	6.020	0.010	7.009	0.005
Finger 32:	4.025	0.013	5.006	0.003	5.999	-0.001	6.995	-0.003
Finger 33:	4.003	0.001	5.010	0.005	6.007	0.004	6.999	-0.000
Finger 34:	4.012	0.006	5.008	0.004	6.003	0.002	7.010	0.005
Finger 35:	4.009	0.005	5.002	0.001	6.001	0.000	7.007	0.004
Finger 36:	4.002	0.001	4.998	-0.001	5.997	-0.001	7.017	0.008
Finger 37:	4.002	0.001	5.003	0.002	5.997	-0.002	7.001	0.000
Finger 38:	3.989	-0.005	5.002	0.001	6.000	0.000	7.012	0.006
Finger 39:	4.010	0.005	5.010	0.005	6.009	0.005	7.014	0.007
Finger 40:	4.009	0.005	5.007	0.003	6.001	0.001	7.010	0.005
Average:	4.007	0.003	5.013	0.006	6.012	0.006	7.012	0.006

Segmented Cement Bond Log Calibration Report						
Serial Number:		10022773				
Tool Model:		UW_RBT_004				
Calibration Casing Diameter:		7.000	in			
Calibration Depth:		24.001	ft			
Master Calibration, performed Tue Dec 22 07:57:12 2015:						
	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.002	0.863	0.800	62.165	71.240	0.660
5FT	-0.001	0.874	0.800	62.165	70.131	0.886
S1	0.002	0.837	0.000	100.000	119.660	-0.190
S2	0.001	0.846	0.000	100.000	118.247	-0.084
S3	0.001	0.828	0.000	100.000	121.012	-0.148
S4	0.001	0.816	0.000	100.000	122.683	-0.150
S5	0.001	0.846	0.000	100.000	118.437	-0.145
S6	0.001	0.849	0.000	100.000	117.995	-0.144
S7	0.001	0.856	0.000	100.000	117.014	-0.143
S8	0.001	0.852	0.000	100.000	117.453	-0.125

Temperature Calibration Report					
Serial Number:			10025097		
Tool Model:			UW_PRT_016		
Performed:			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:	211727			
Tool Model:	UW_PGR_020			
Performed:	Mon Nov 23 09:56:50 2015			
Calibrator Value:	1.0	GAPI		
Background Reading:	0.0	cps		
Calibrator Reading:	1.0	cps		
Sensitivity:	0.6000	GAPI/cps		

	Company	Noble Energy Inc.
	Well	Moser State H22-785
	Field	Wattenberg
	County	Weld
	State	Colorado