

Radial Cement Bond Gamma Ray Casing Collar Log

Company	Noble Energy Inc.	Company	Noble Energy Inc.
Well	70 Ranch State BB18-615	Well	70 Ranch State BB18-615
Field	Wattenberg	Field	Wattenberg
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-41537		
Permanent Datum	SEC 17 TWP 5N RGE 63W	Ground Level	Elevation 4646'
Log Measured From	Kelly Bushing	Drilling Measured From	Kelly Bushing
			Elevation K.B. 4670' D.F. 4669' G.L. 4646'
			MIT
			Other Services

Date	01-AUG-2015
Run Number	One
Depth Driller	16208 FT
Depth Logger	6696 FT
Bottom Logged Interval	6691 FT
Top Log Interval	Surface
Open Hole Size	8.750"
Type Fluid	Water
Density / Viscosity	8.34 lbm/gal
Max. Recorded Temp.	229°F
Estimated Cement Top	92 FT
Time Well Ready	ROA
Time Logger on Bottom	07:30
Equipment Number	HD-0340
Location	Fort Lupton, CO
Recorded By	Robert Fogarty
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	755.3 FT		
Intermediate #1	7	26	P-110IC	24 FT	6945.1 FT		
Intermediate #2							
Liner	4 1/2	11.6	P-110	6748 FT	16217 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

Log ran from just above liner top to surface

Recorded with 2500 PSI surface induced pressure

Logging tools were clean and free of any debris upon completion of operations

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

Database File:08-01-15_noble energy_70 ranch state bb18-615_mit_rbl.db

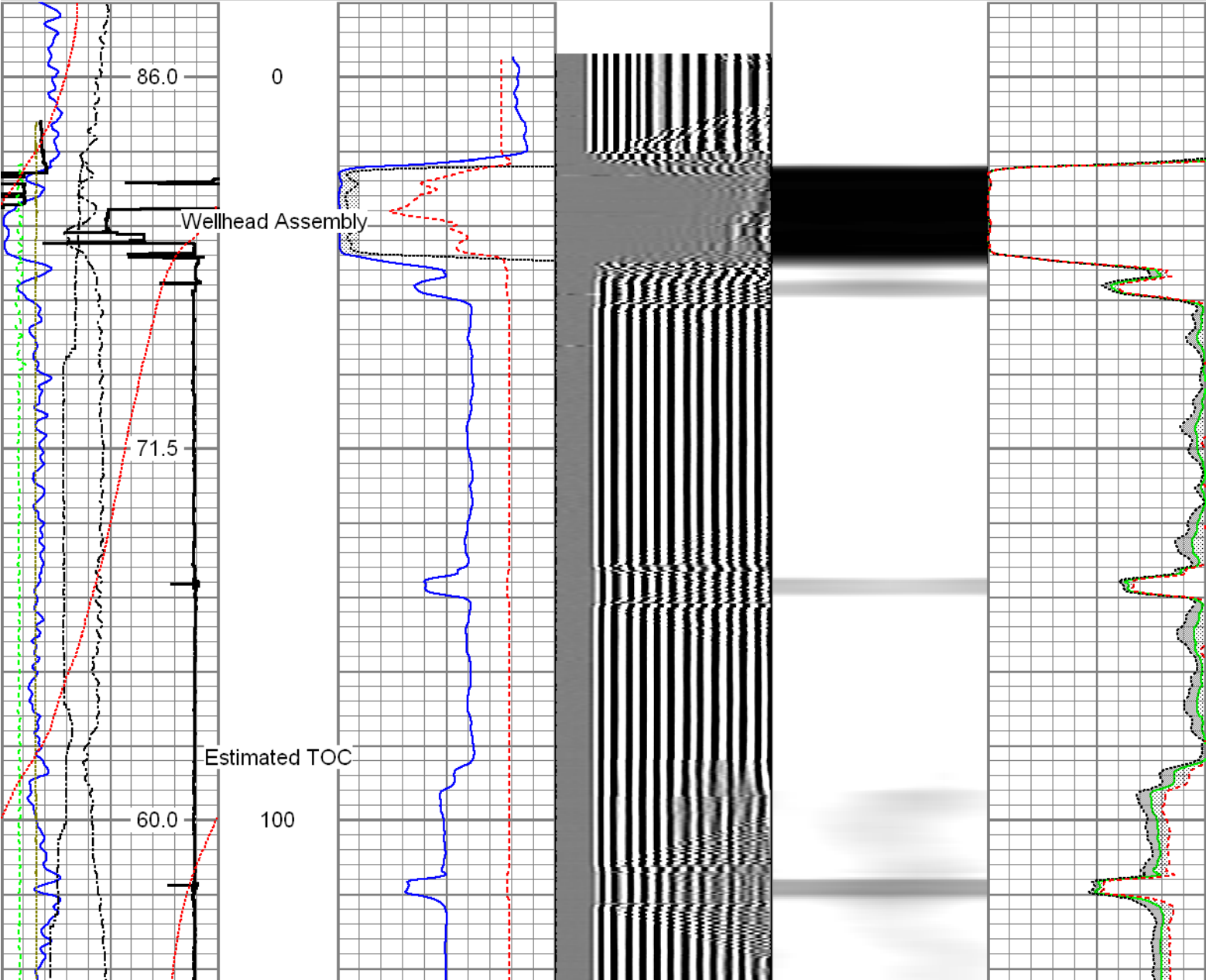
Dataset Pathname:pass6.2

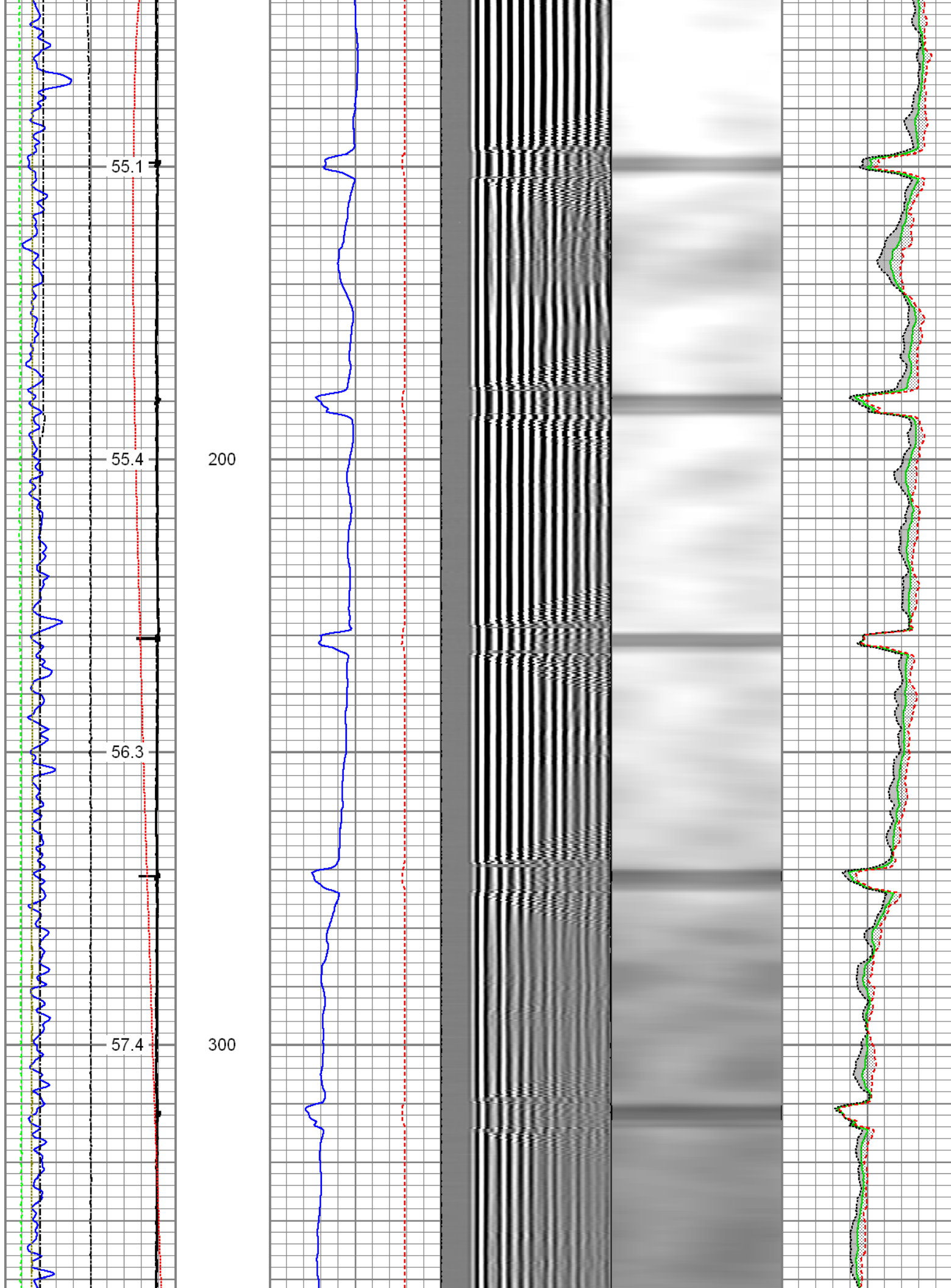
Presentation Format:rbt4_mit

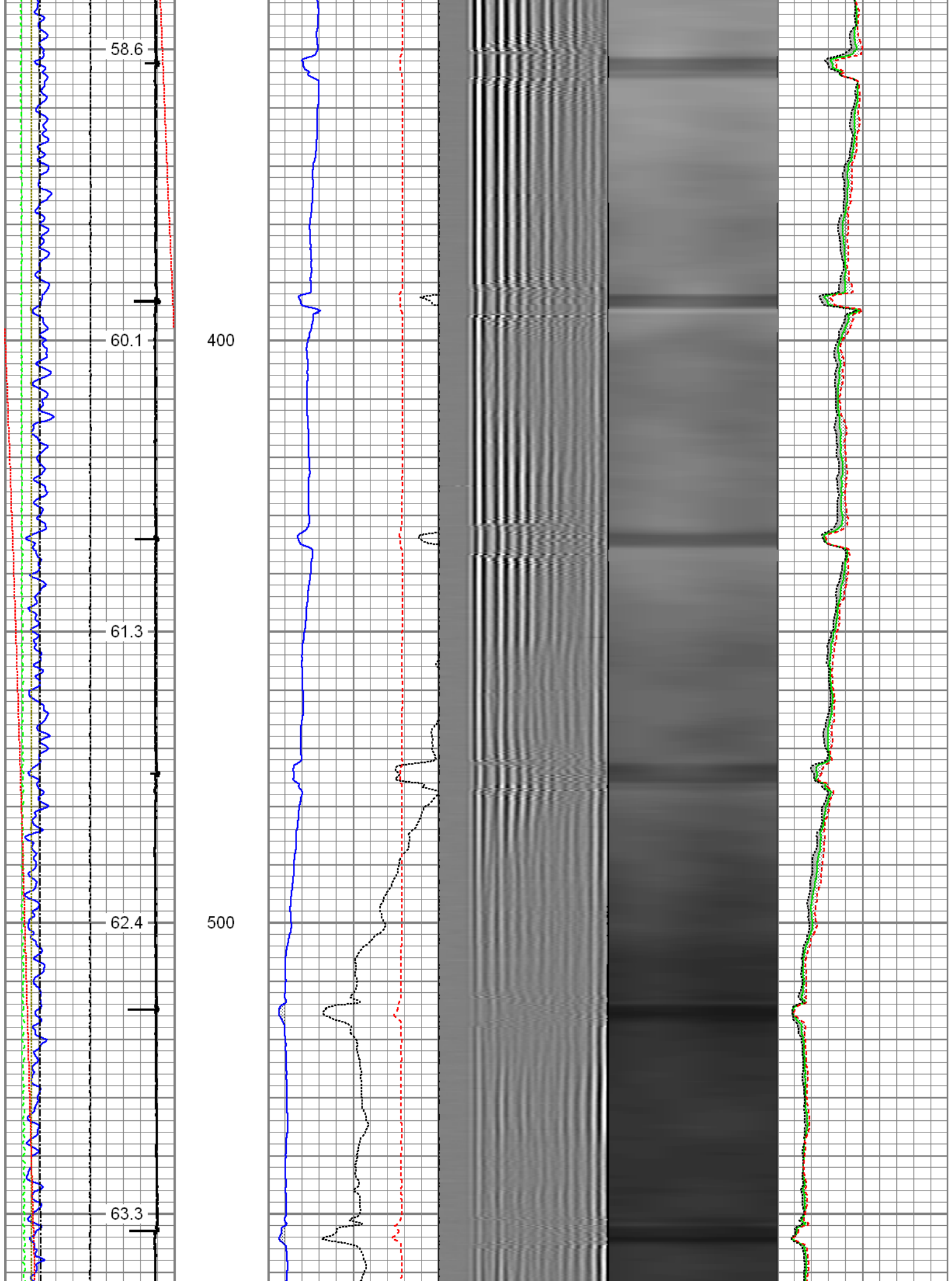
Dataset Creation:Sun Aug 02 13:06:07 2015 by Calc 7.0 B1

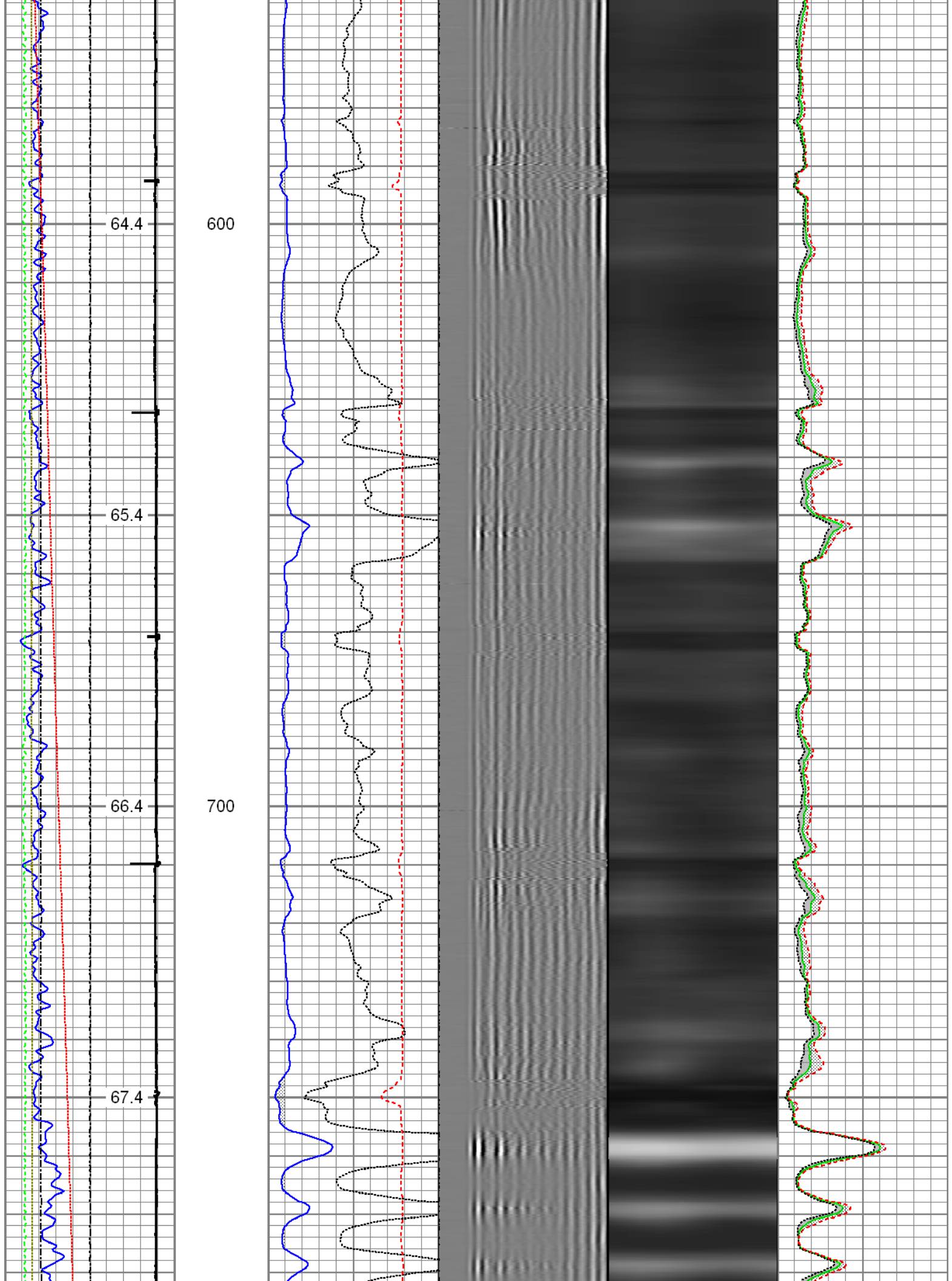
Charted by:Depth in Feet scaled 1:240

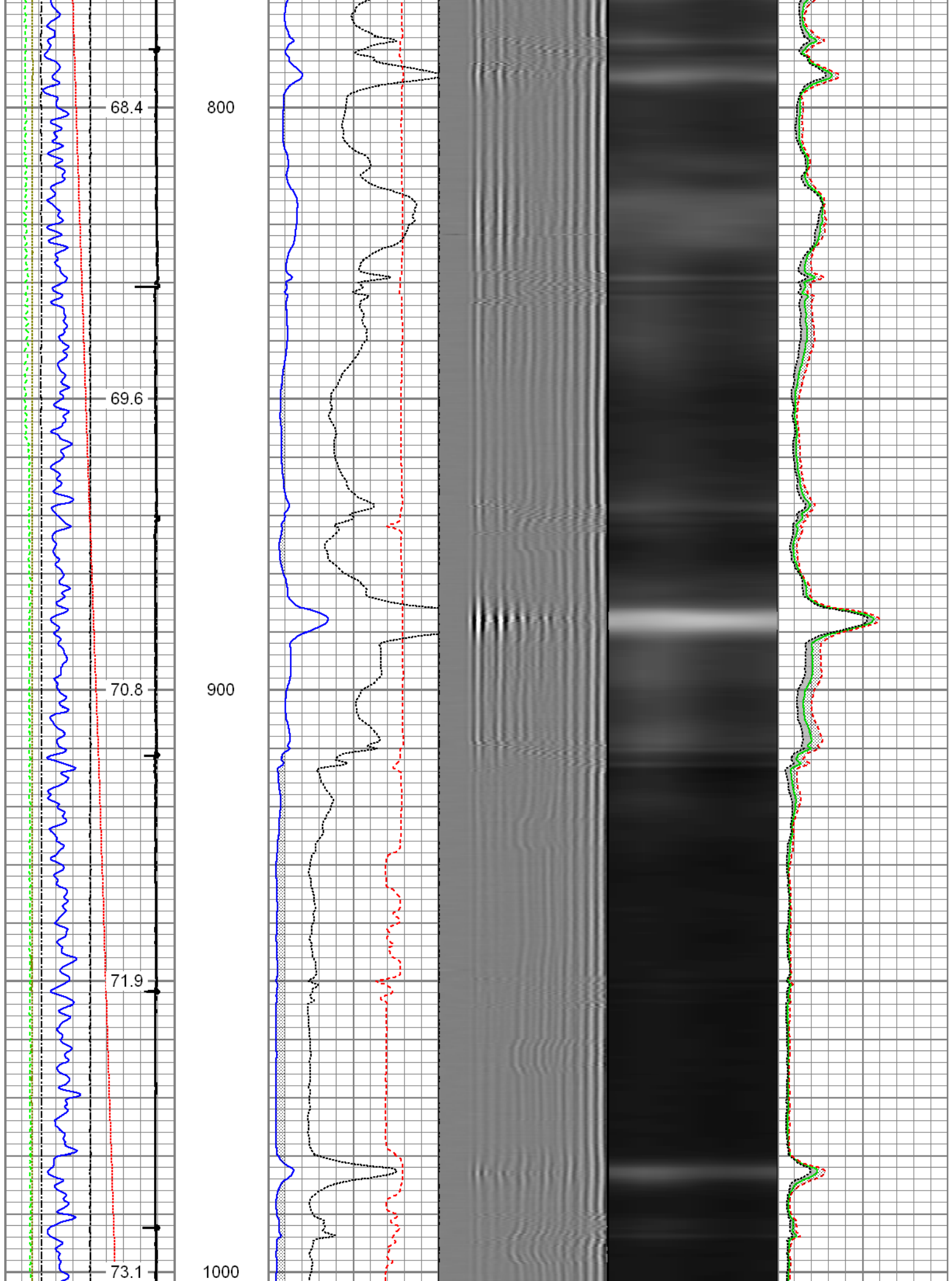
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Mimimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000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

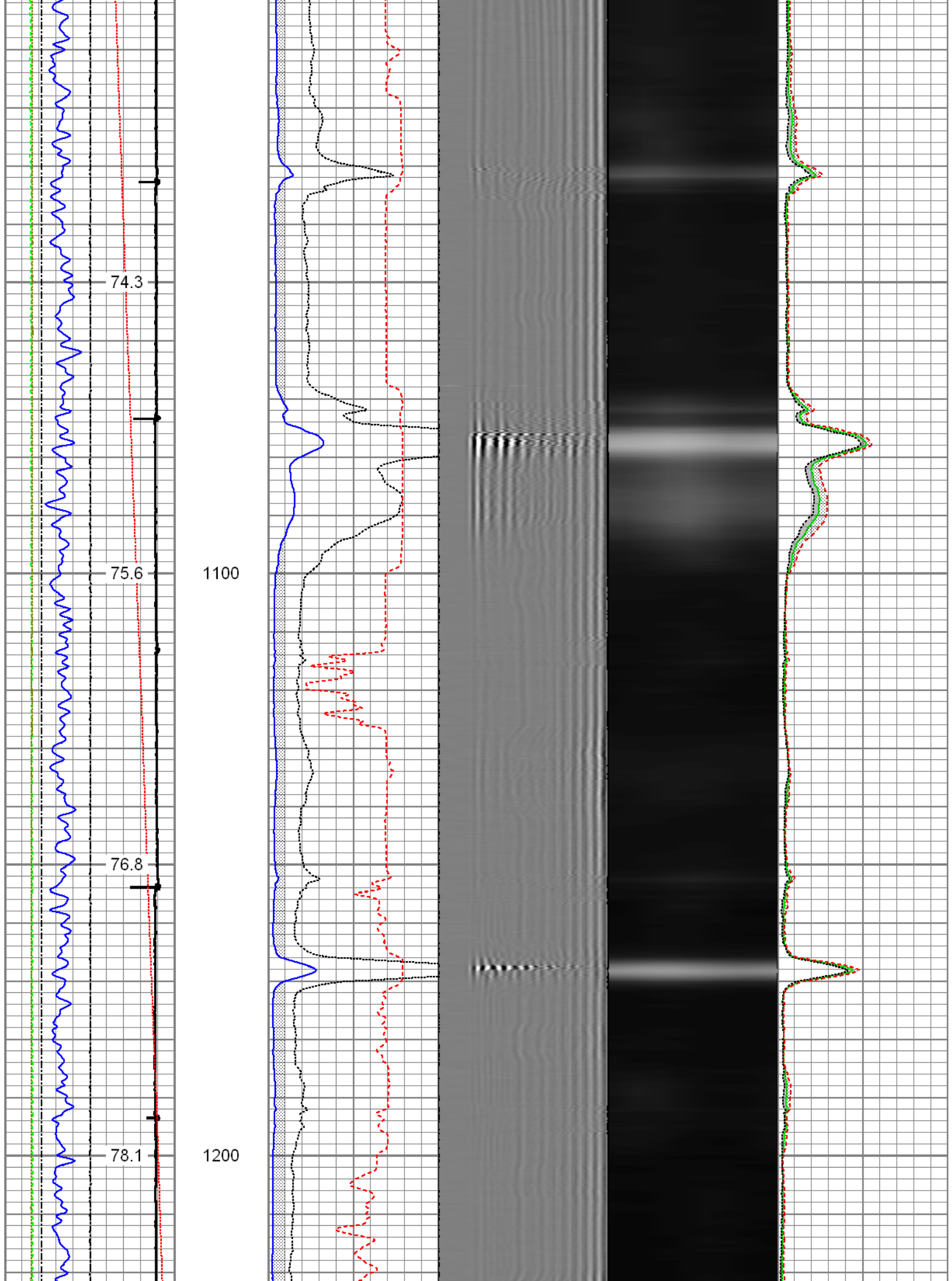


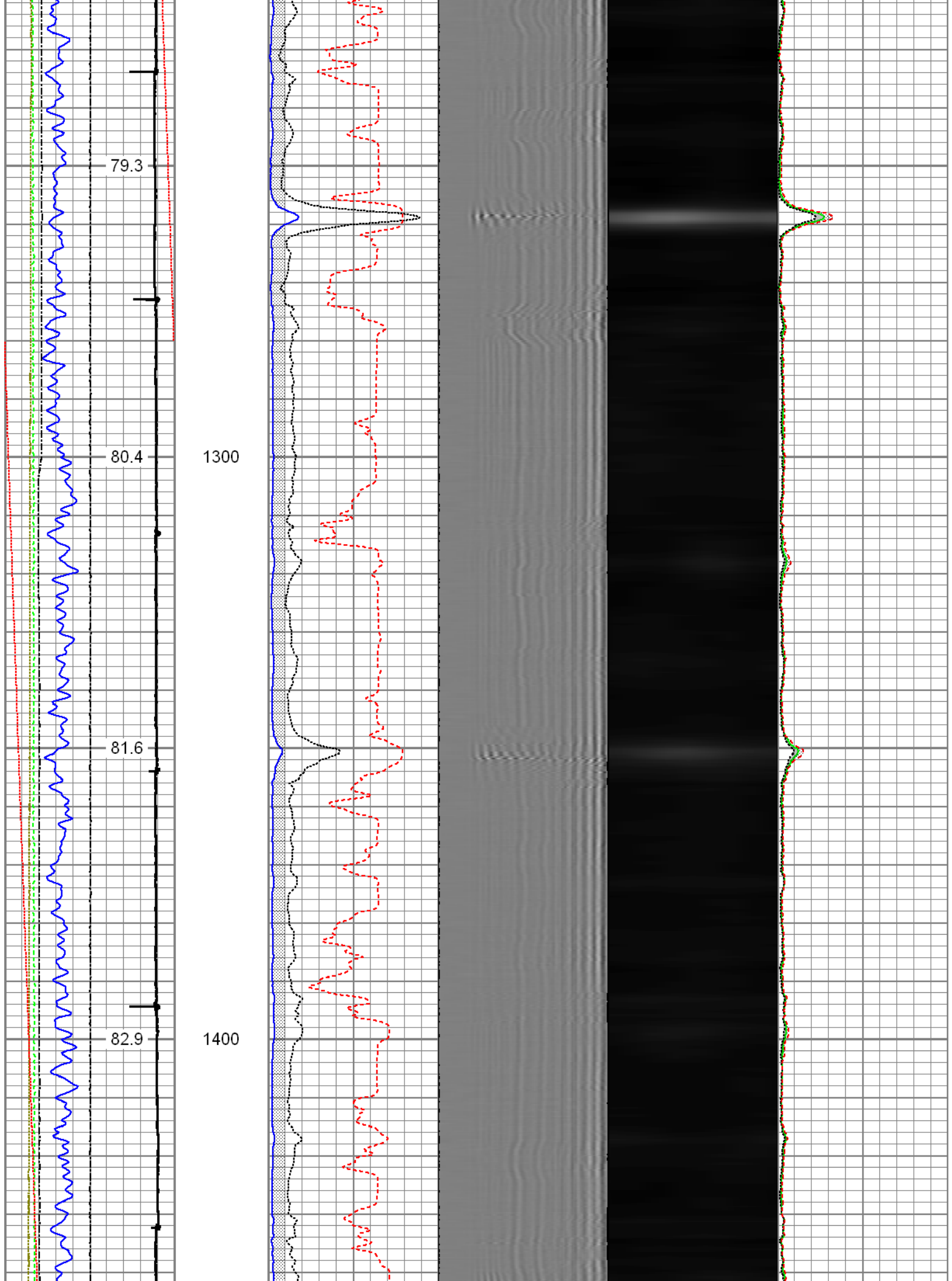


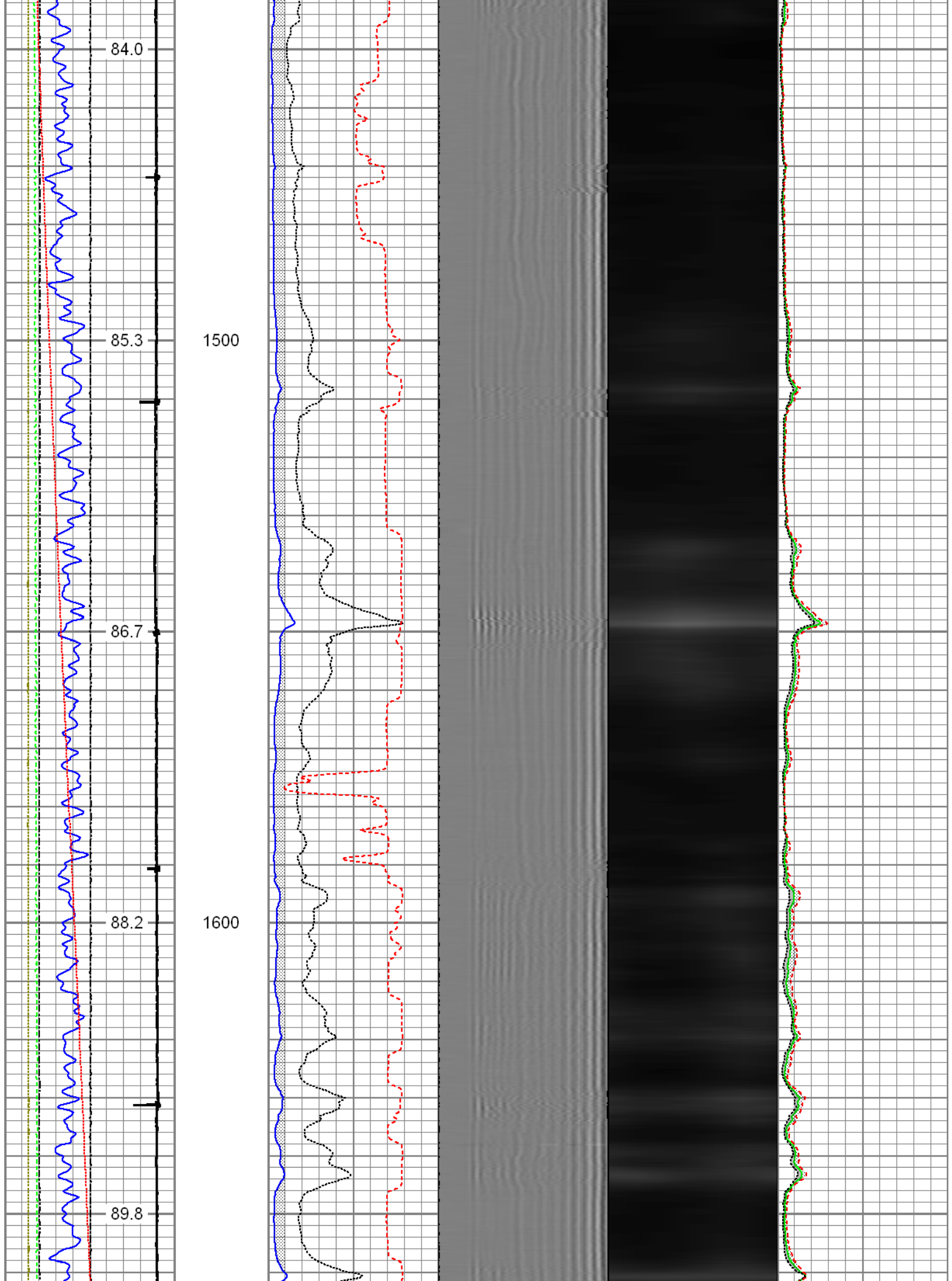


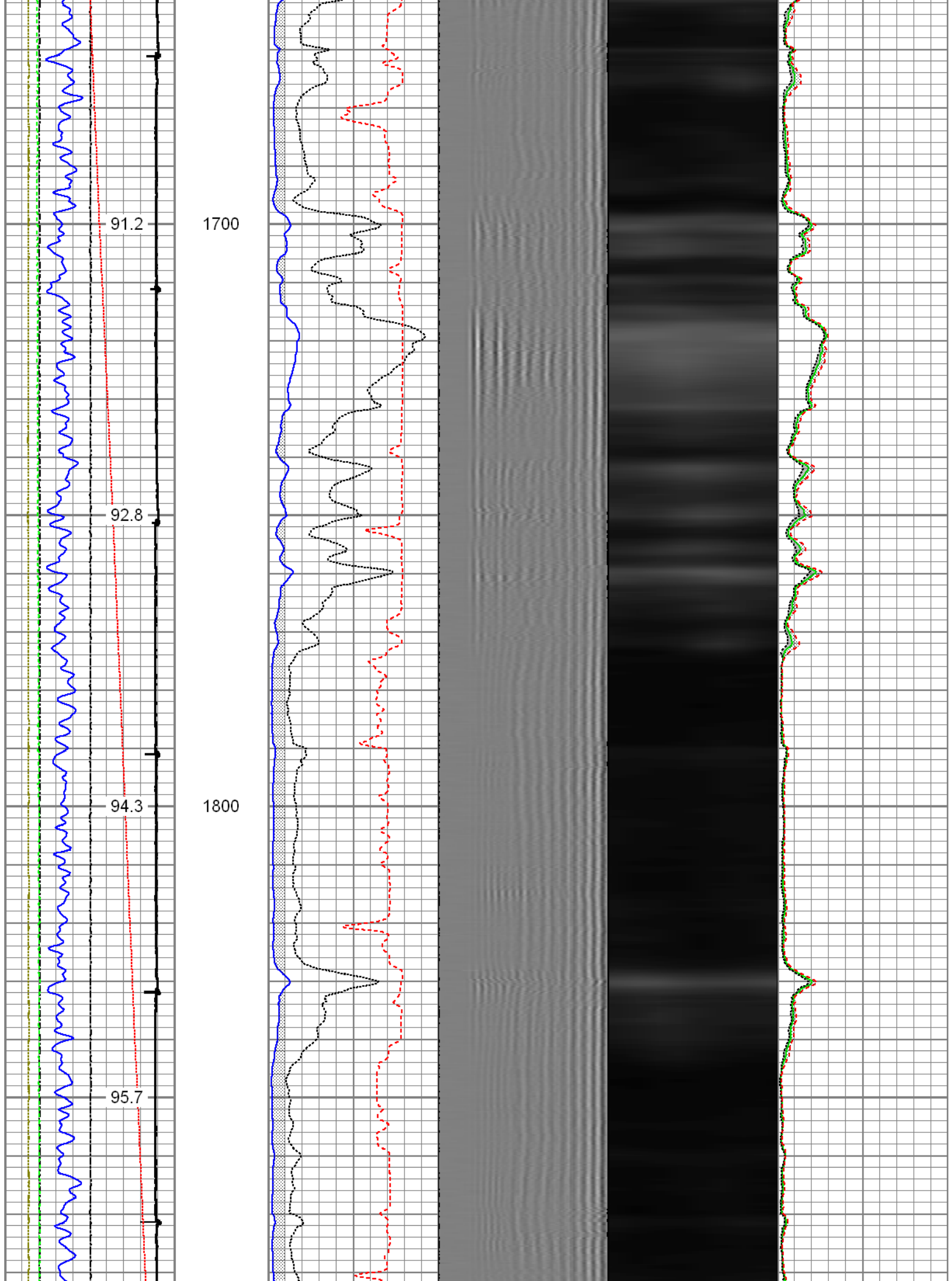


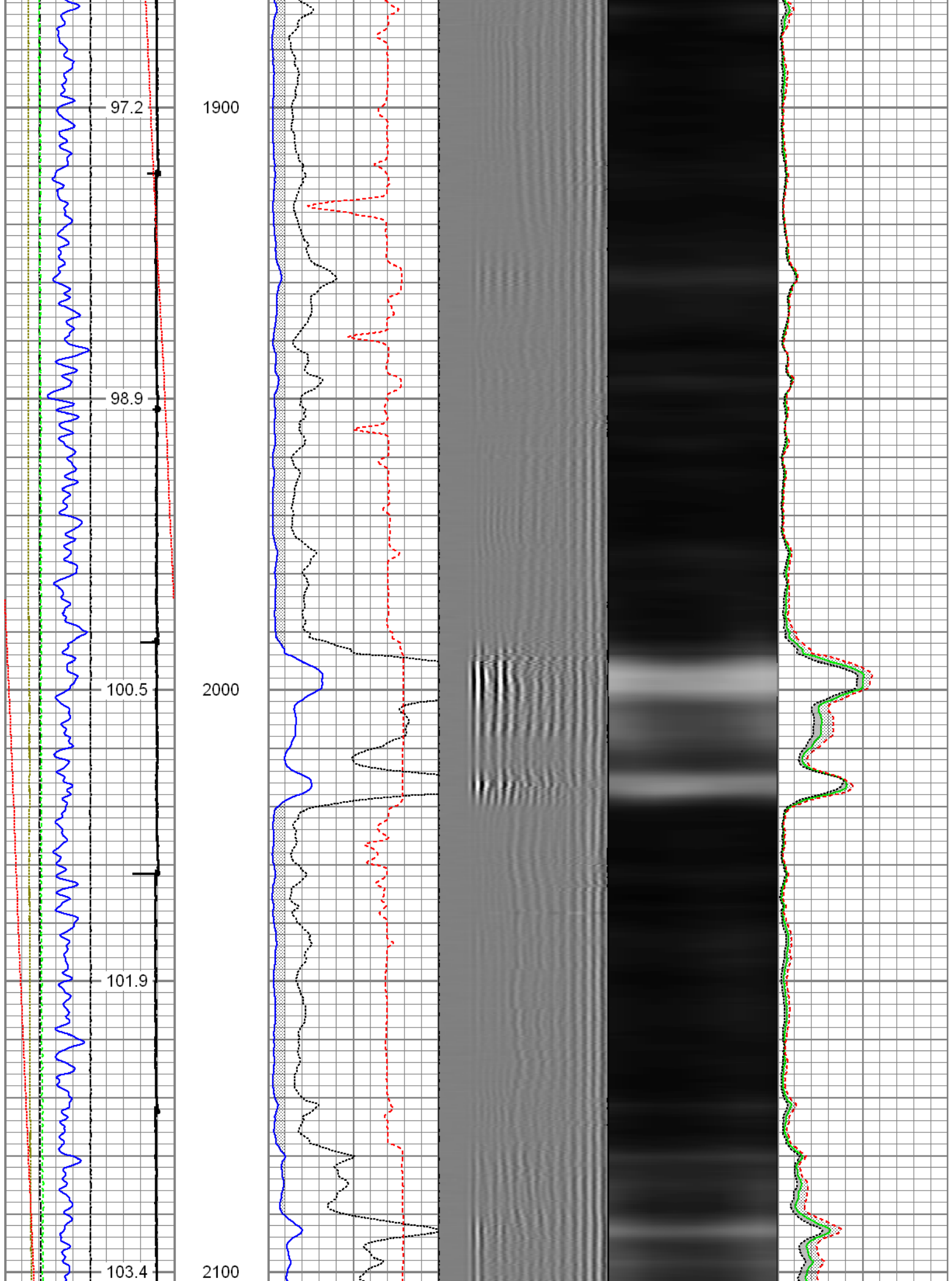


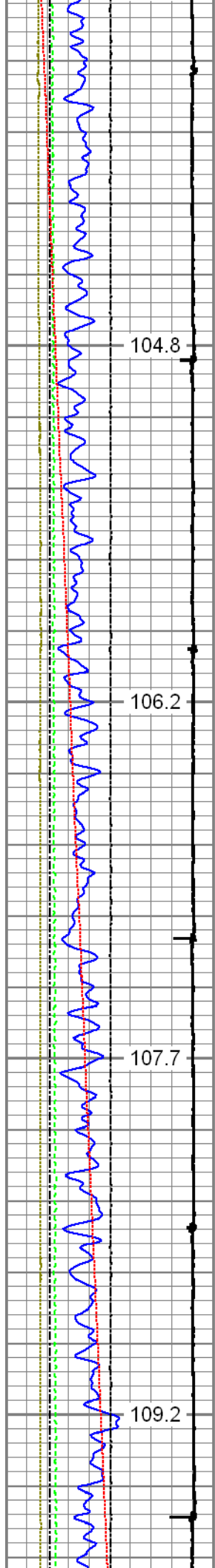






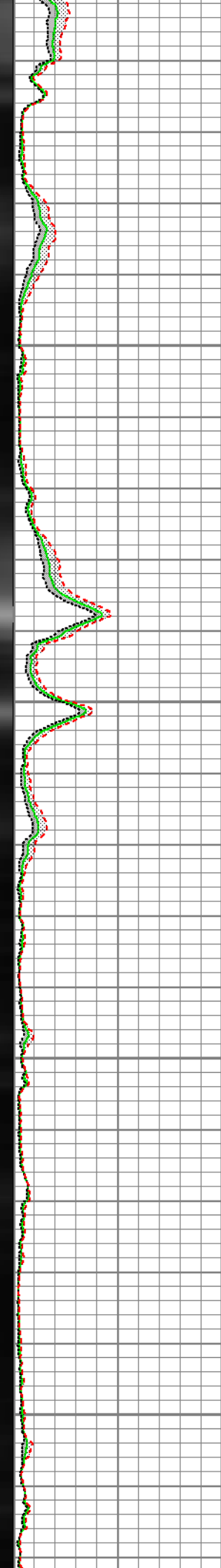
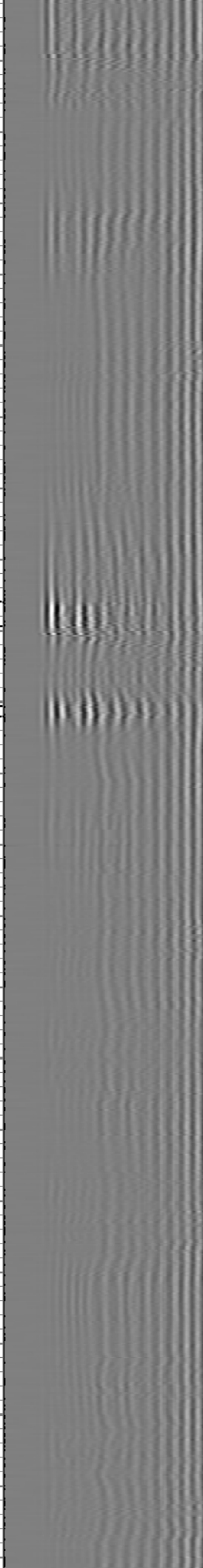
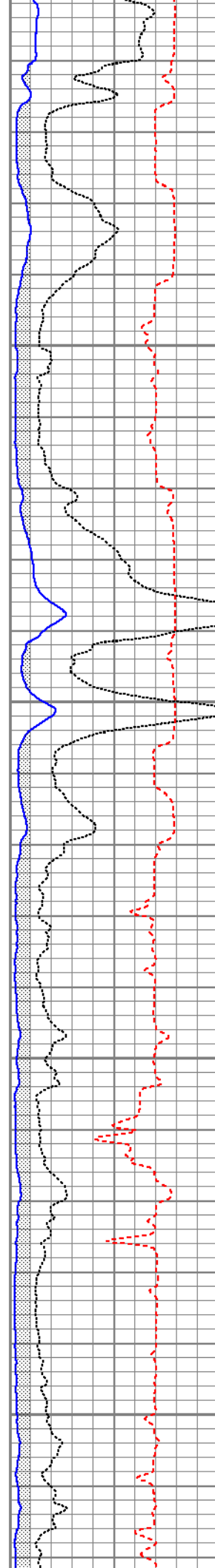


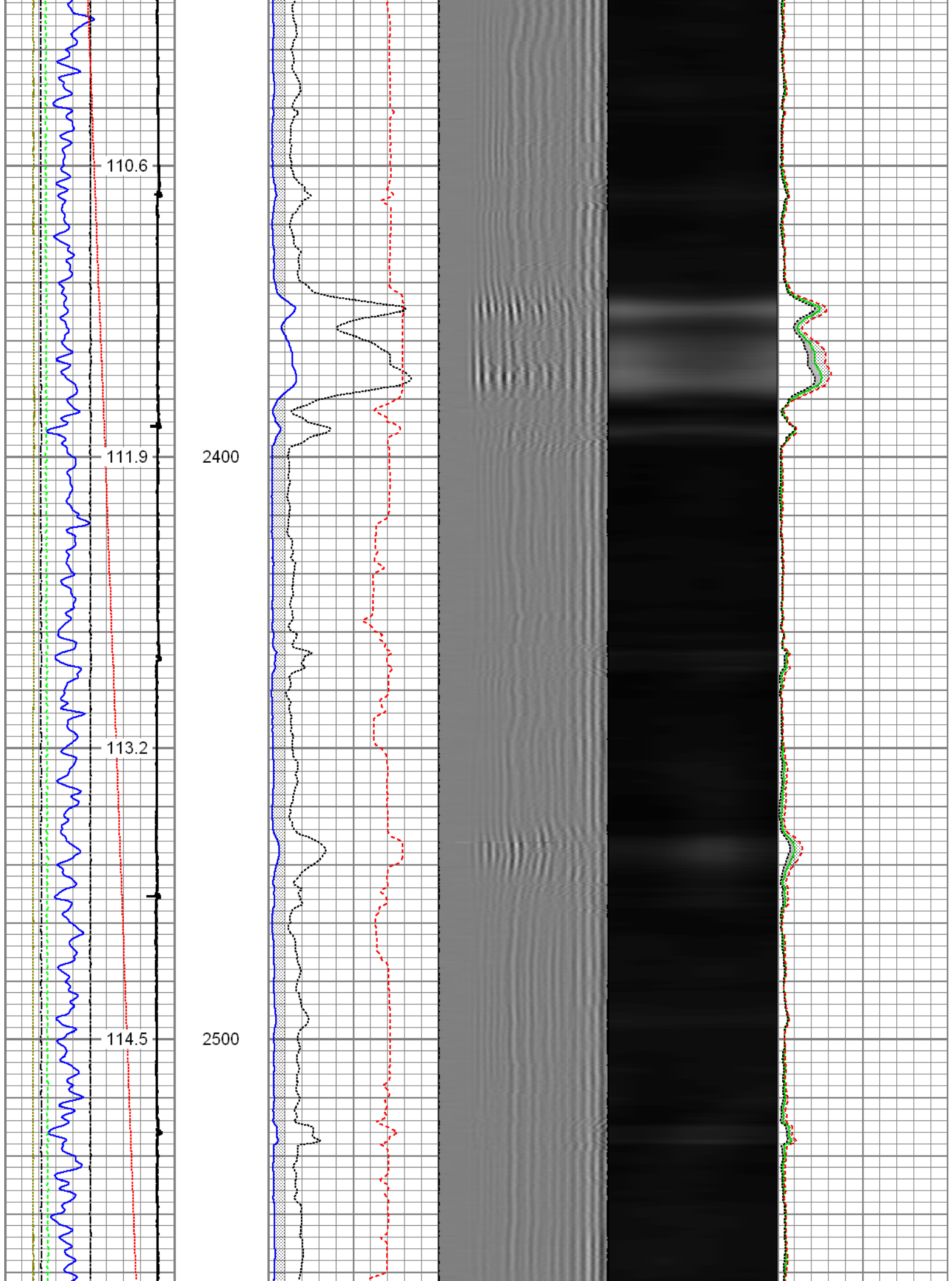


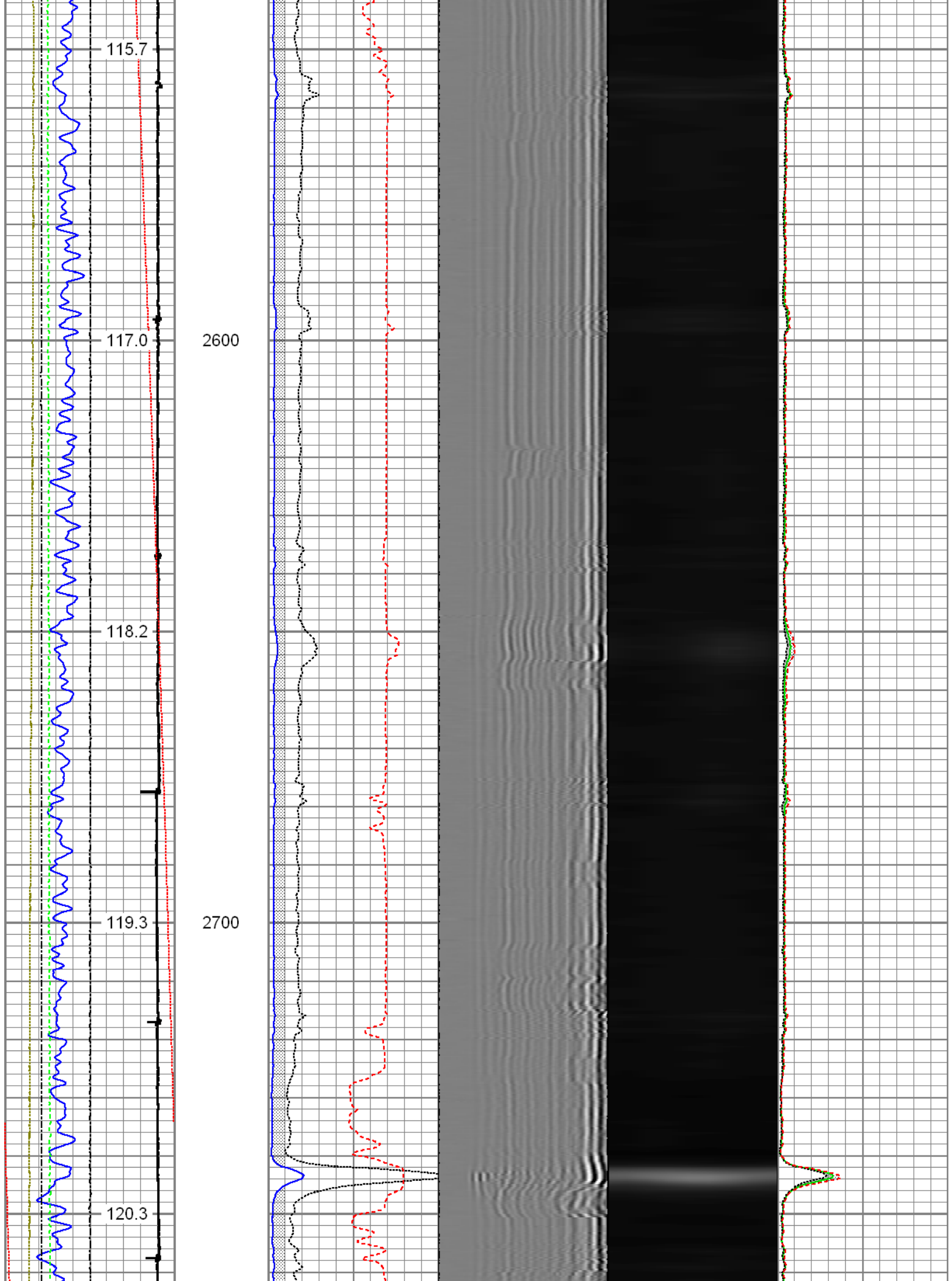


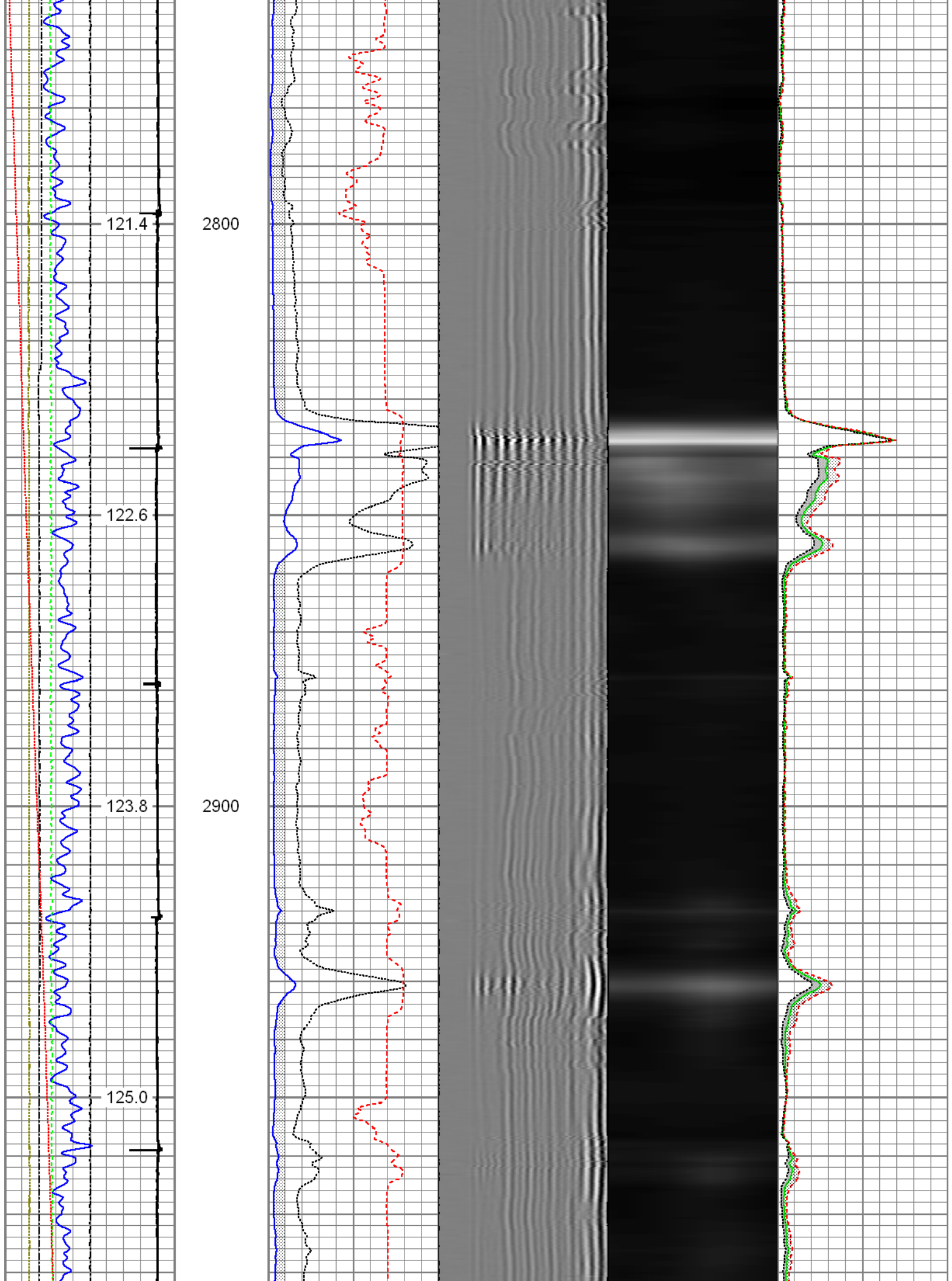
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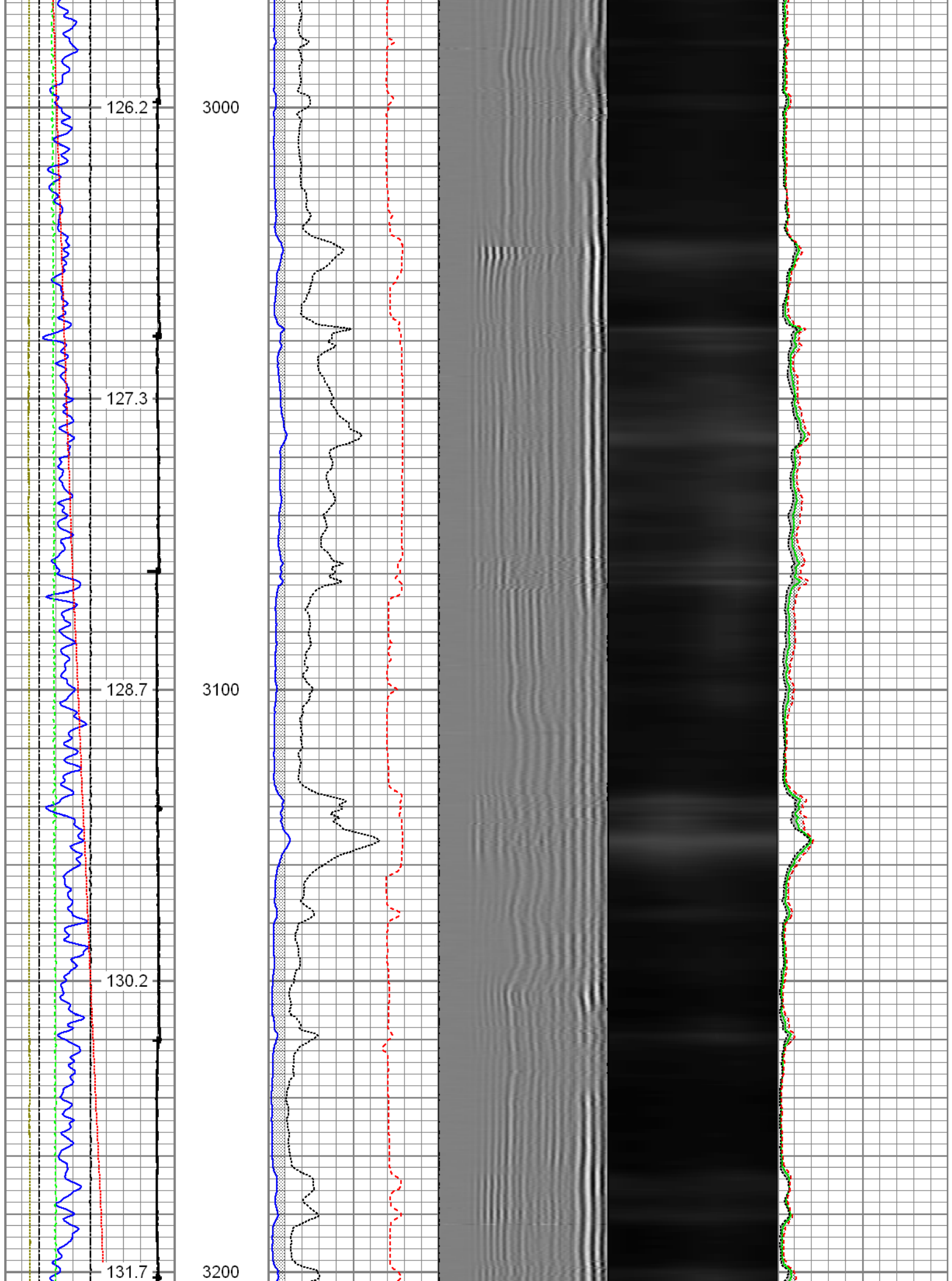
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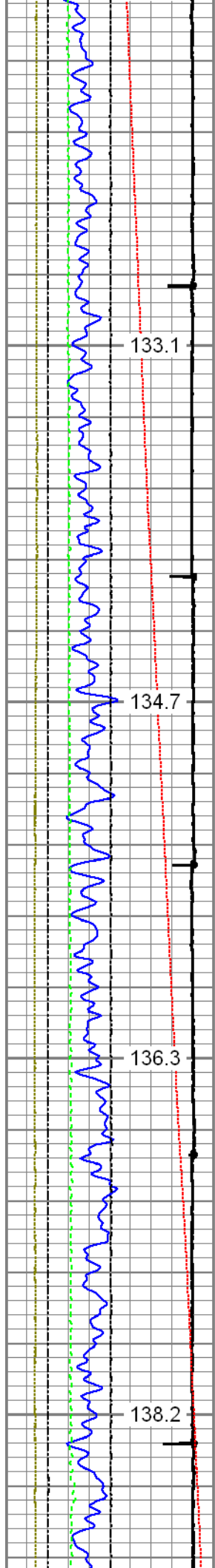






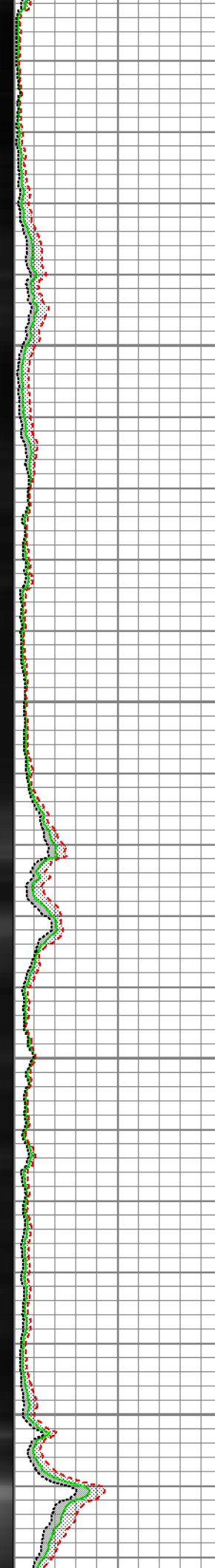
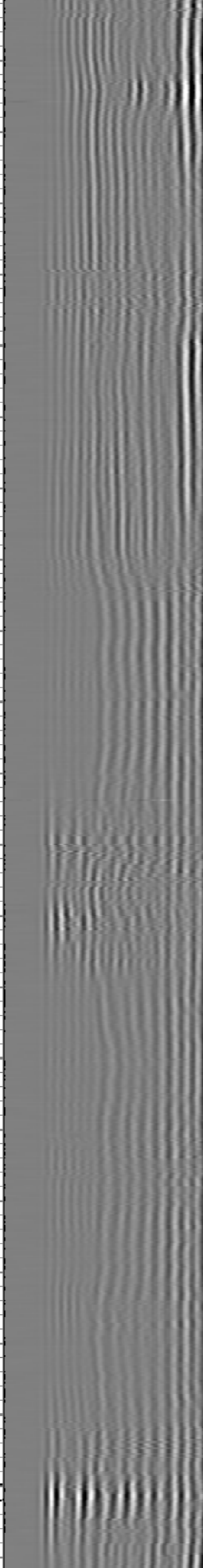
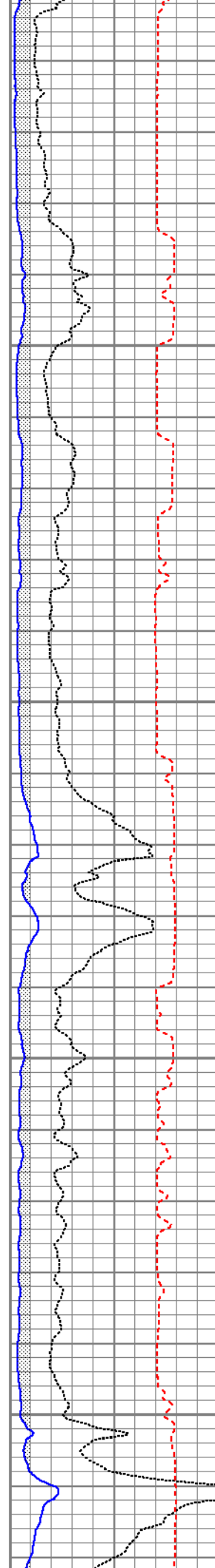


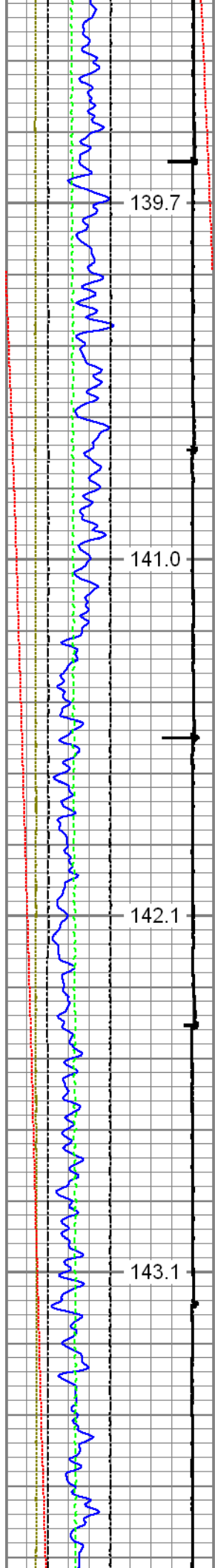




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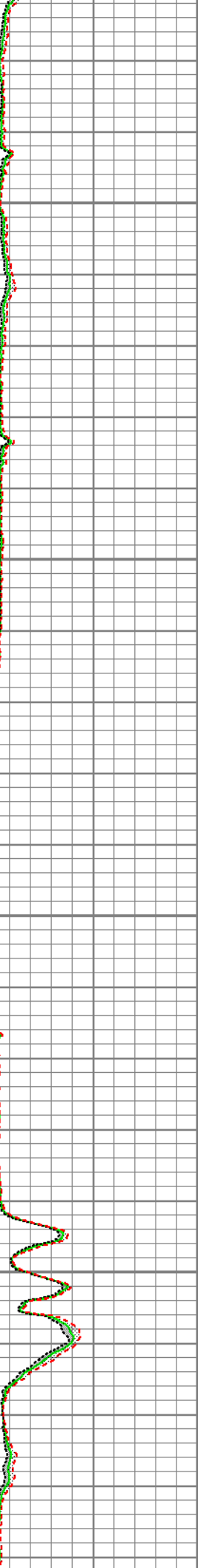
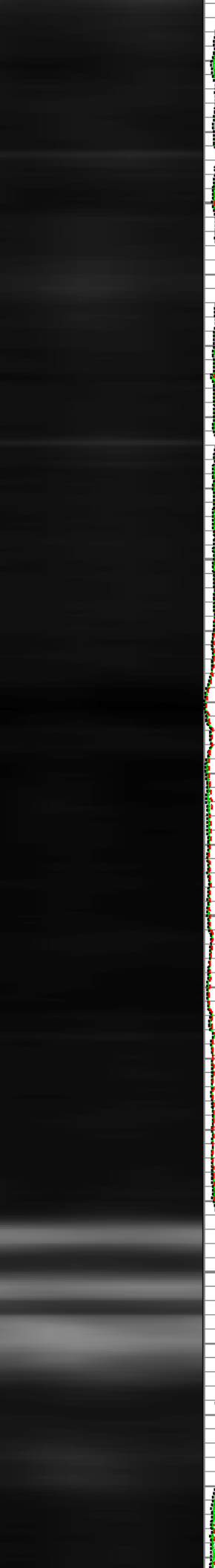
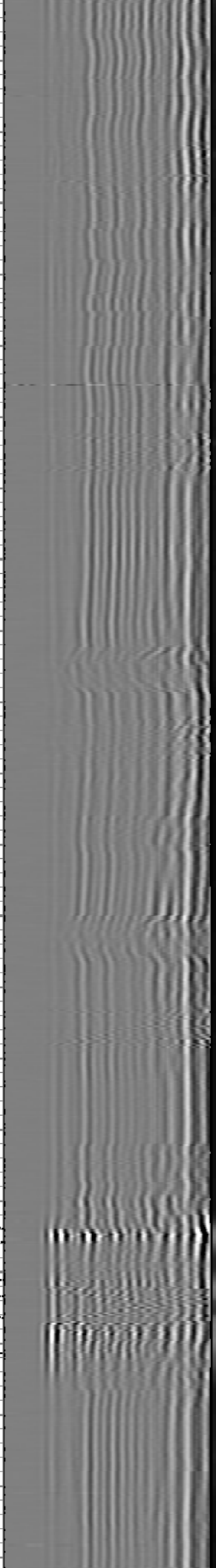
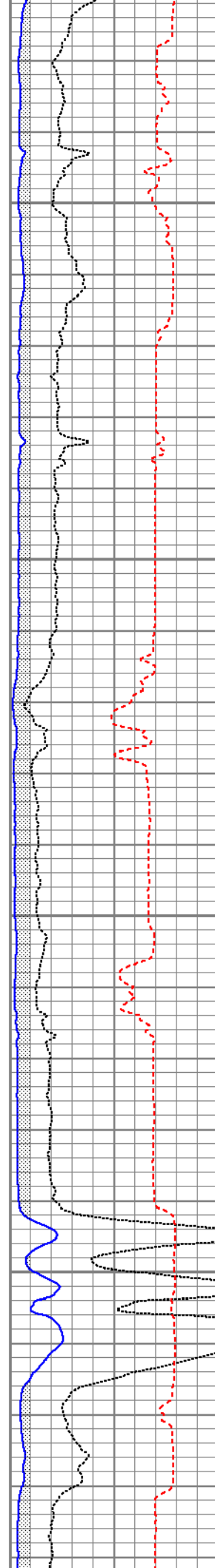
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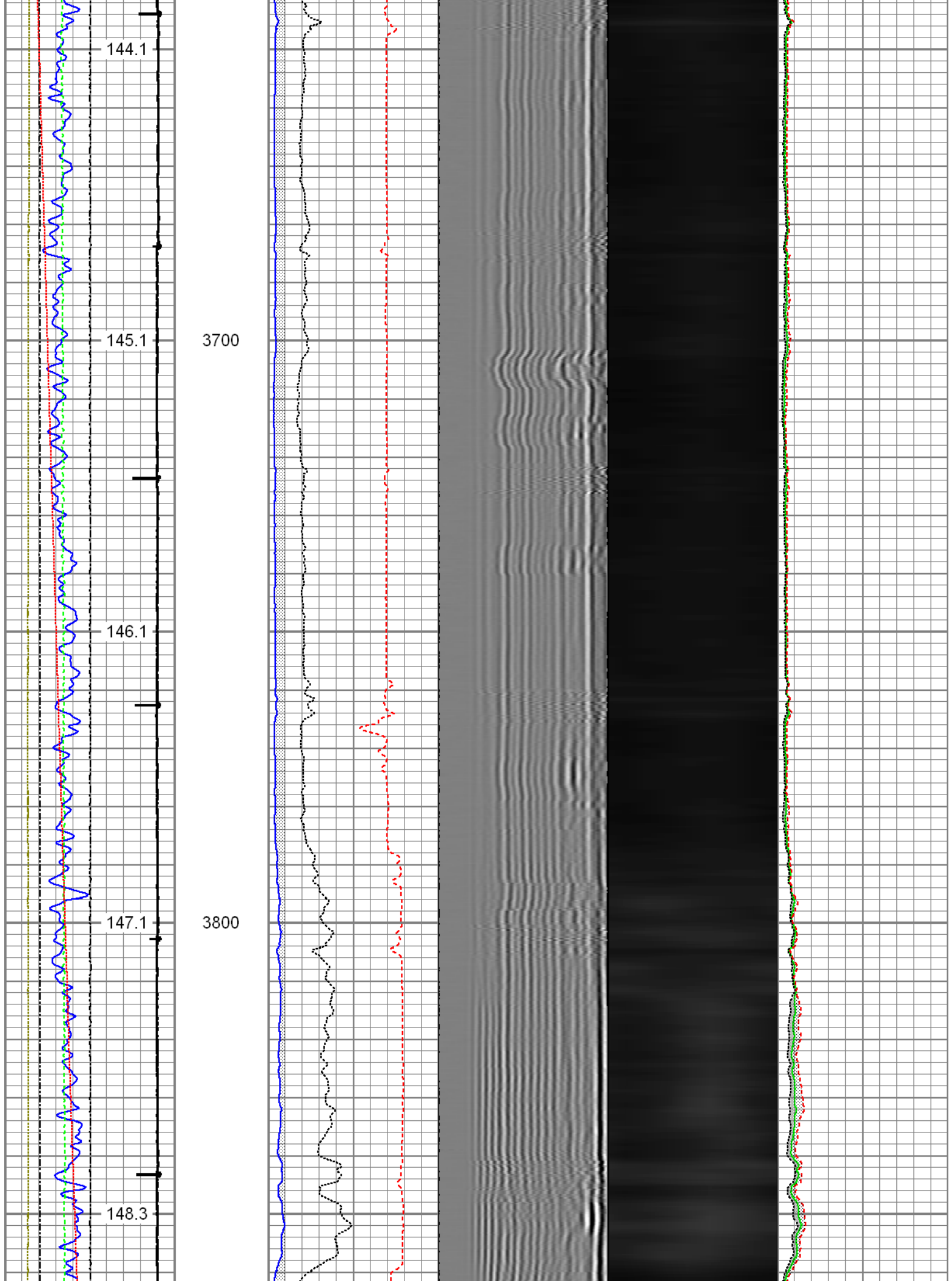


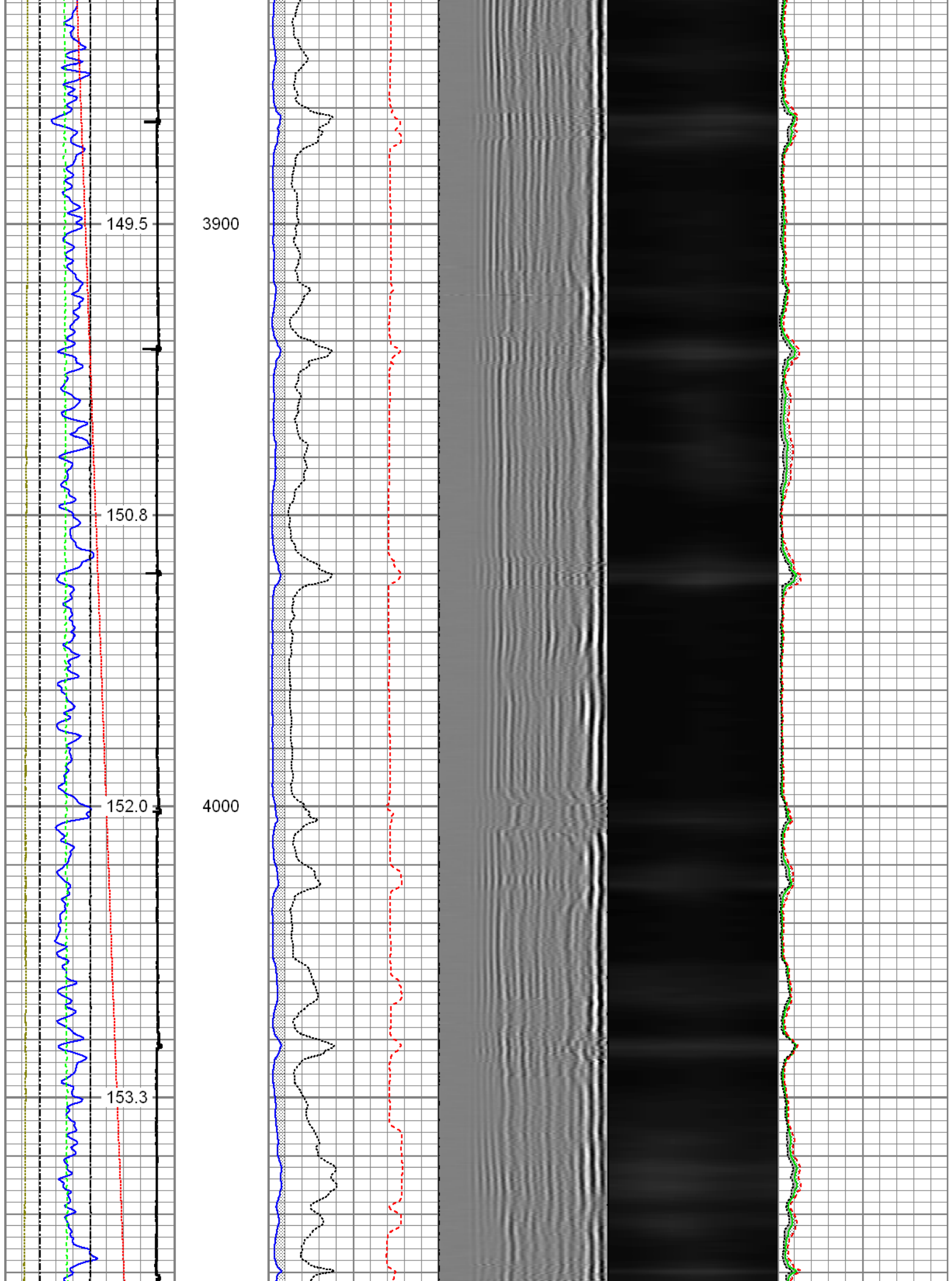


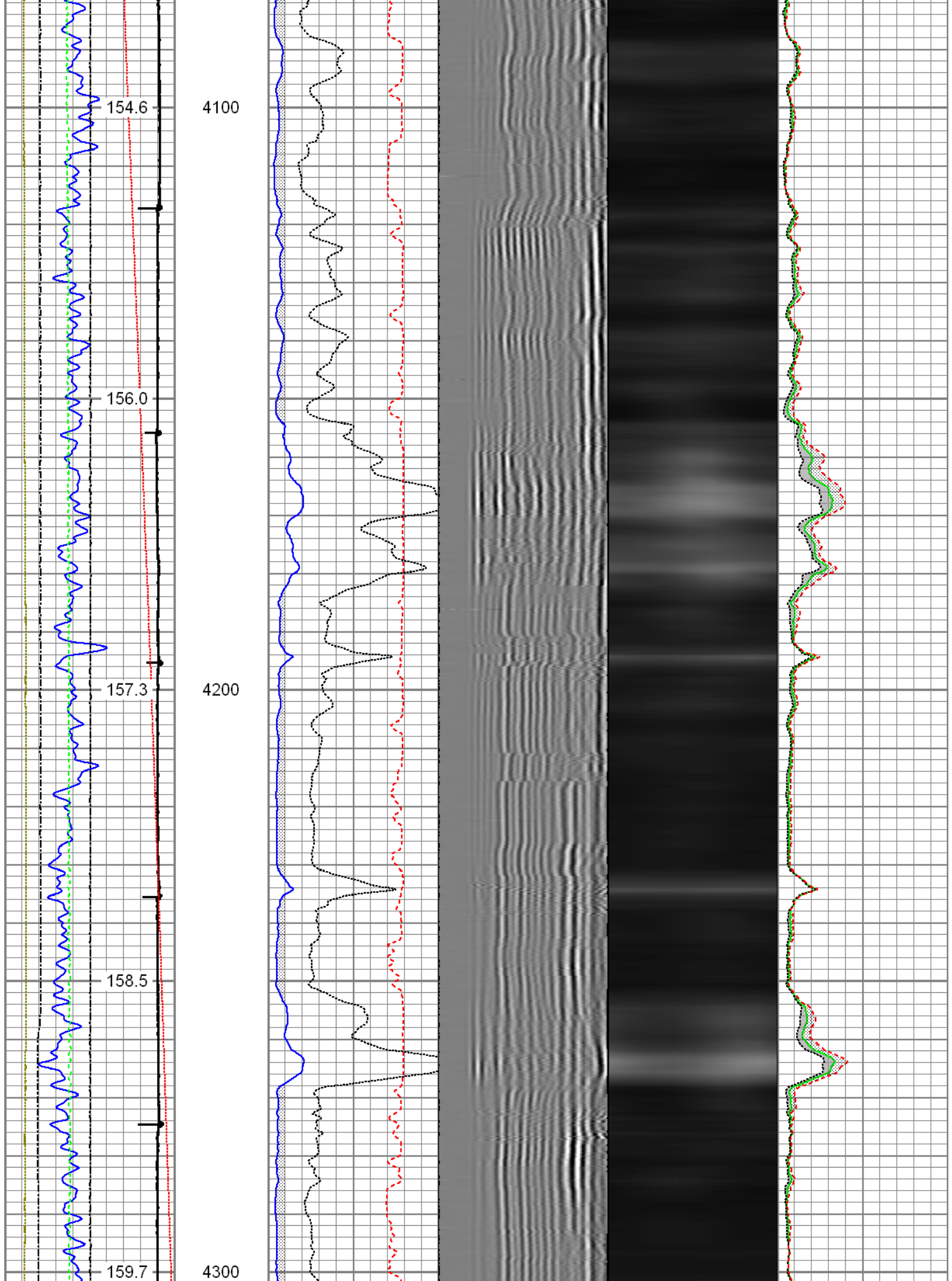
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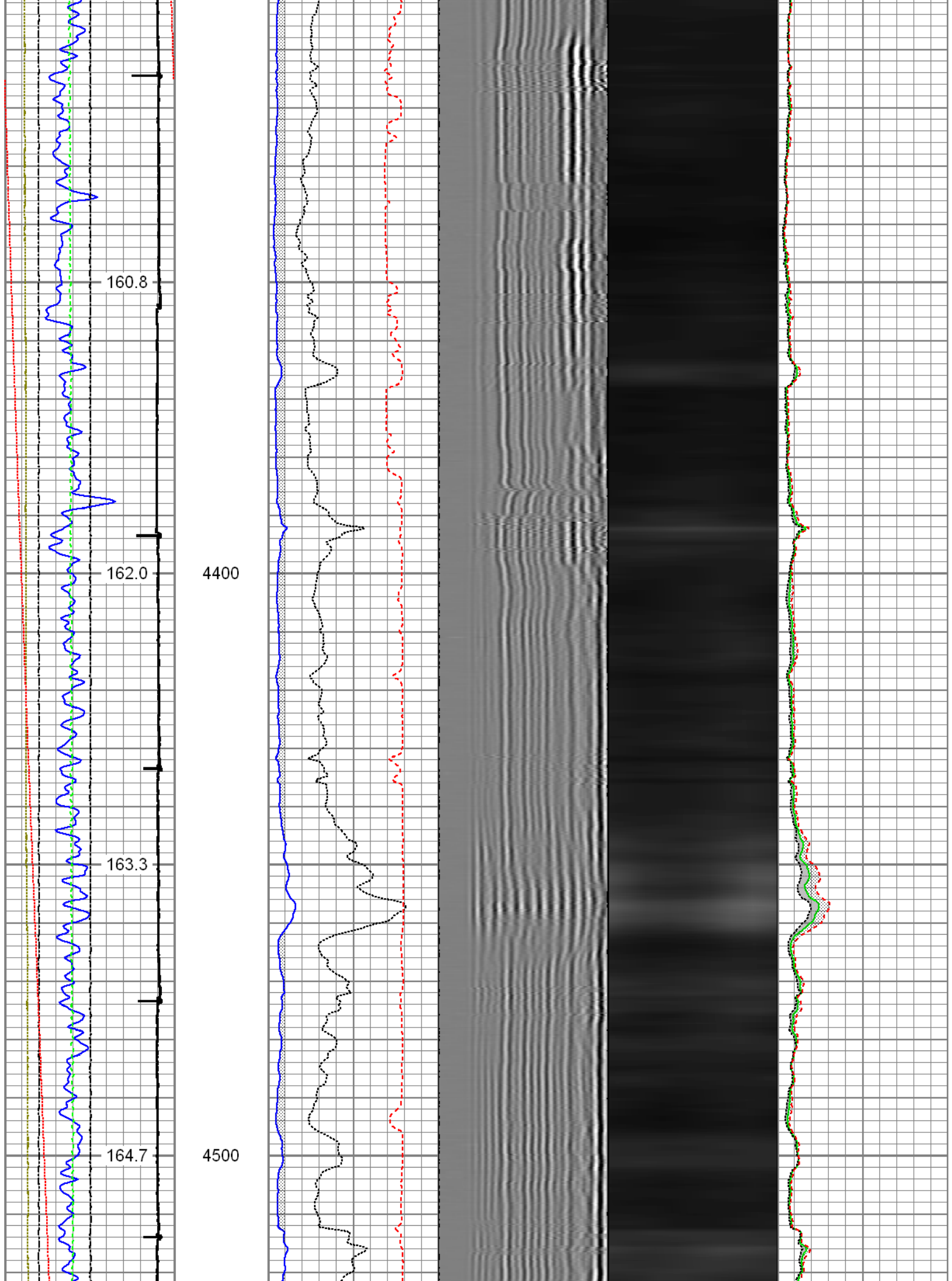
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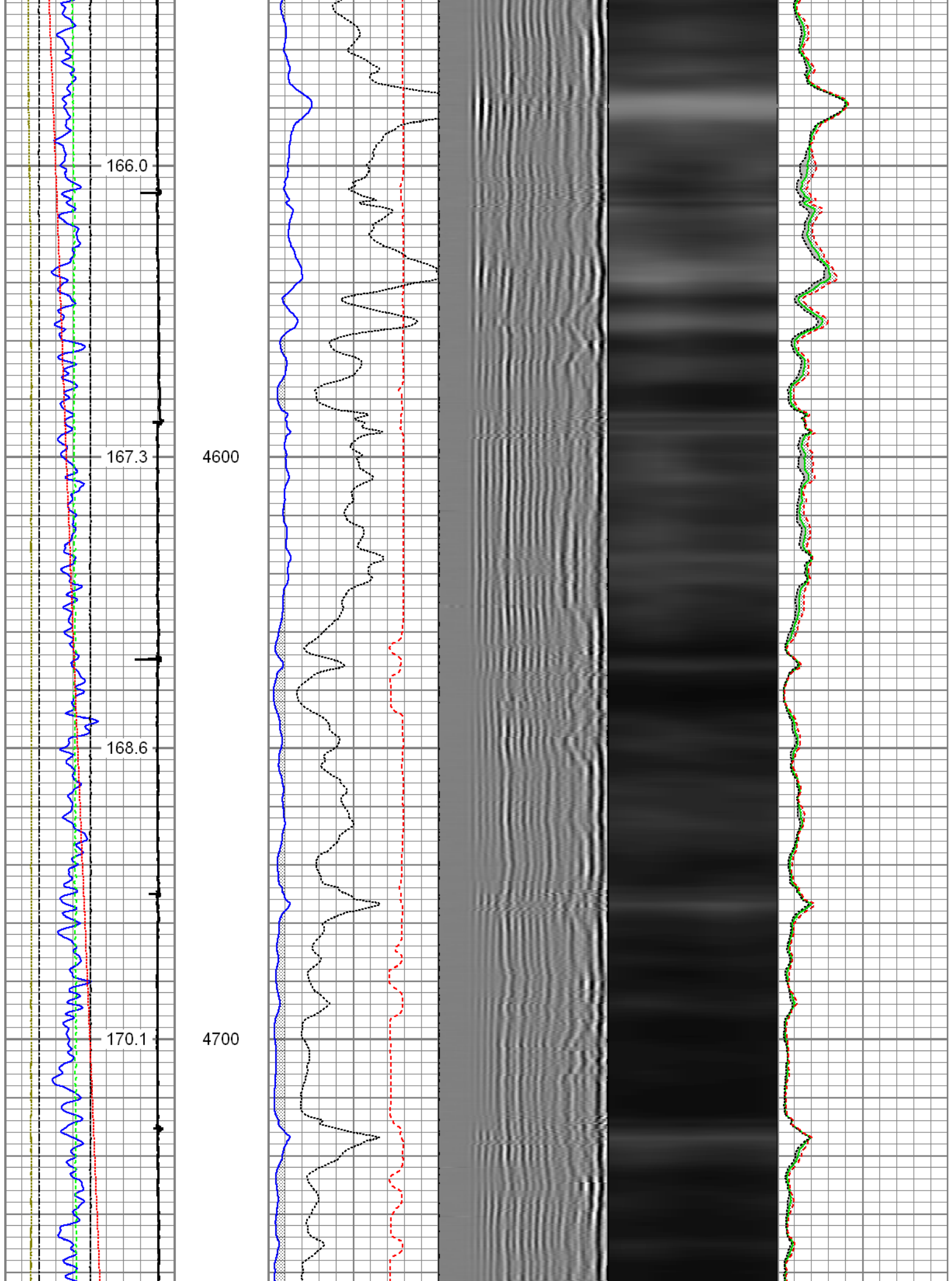


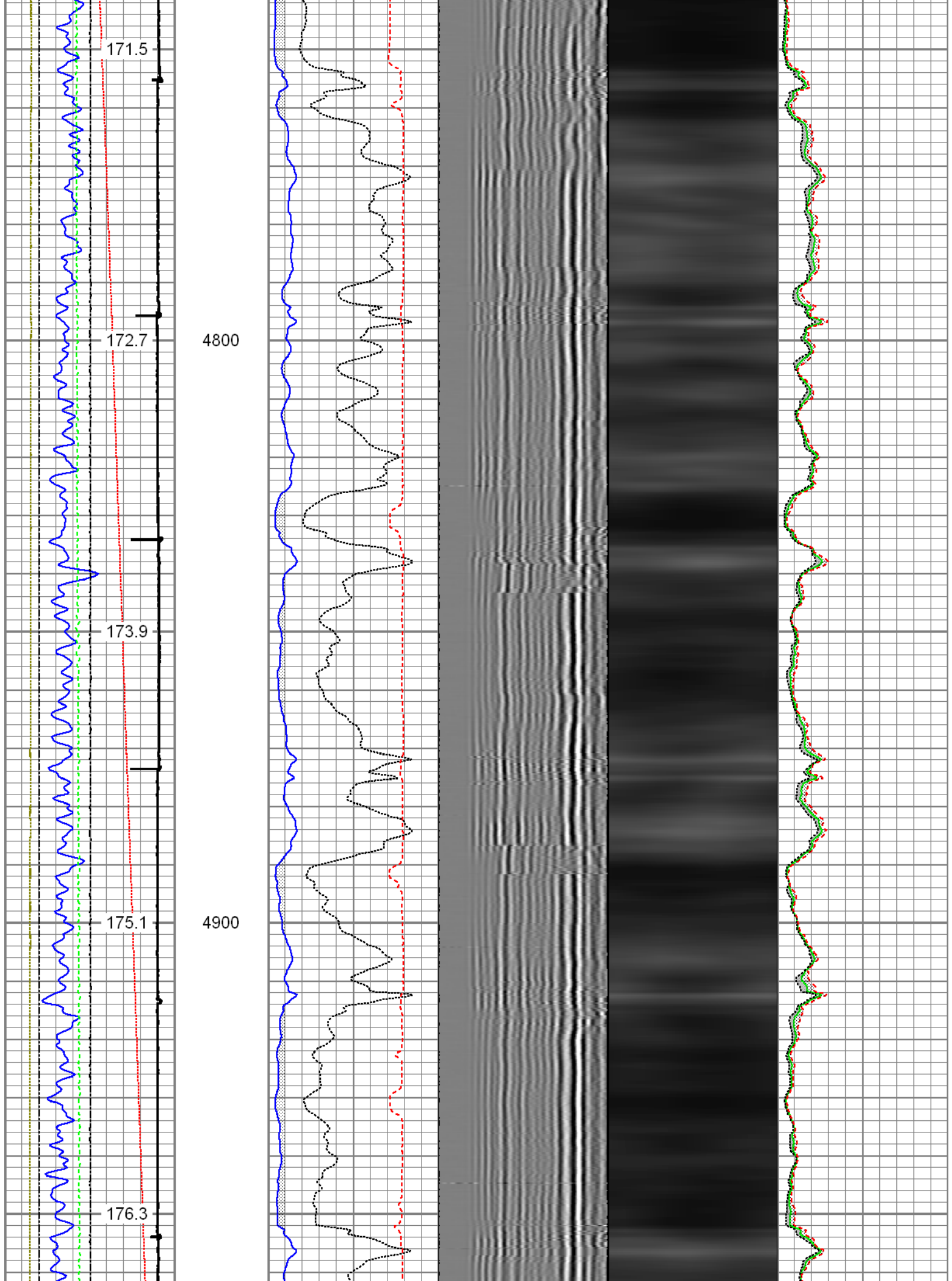


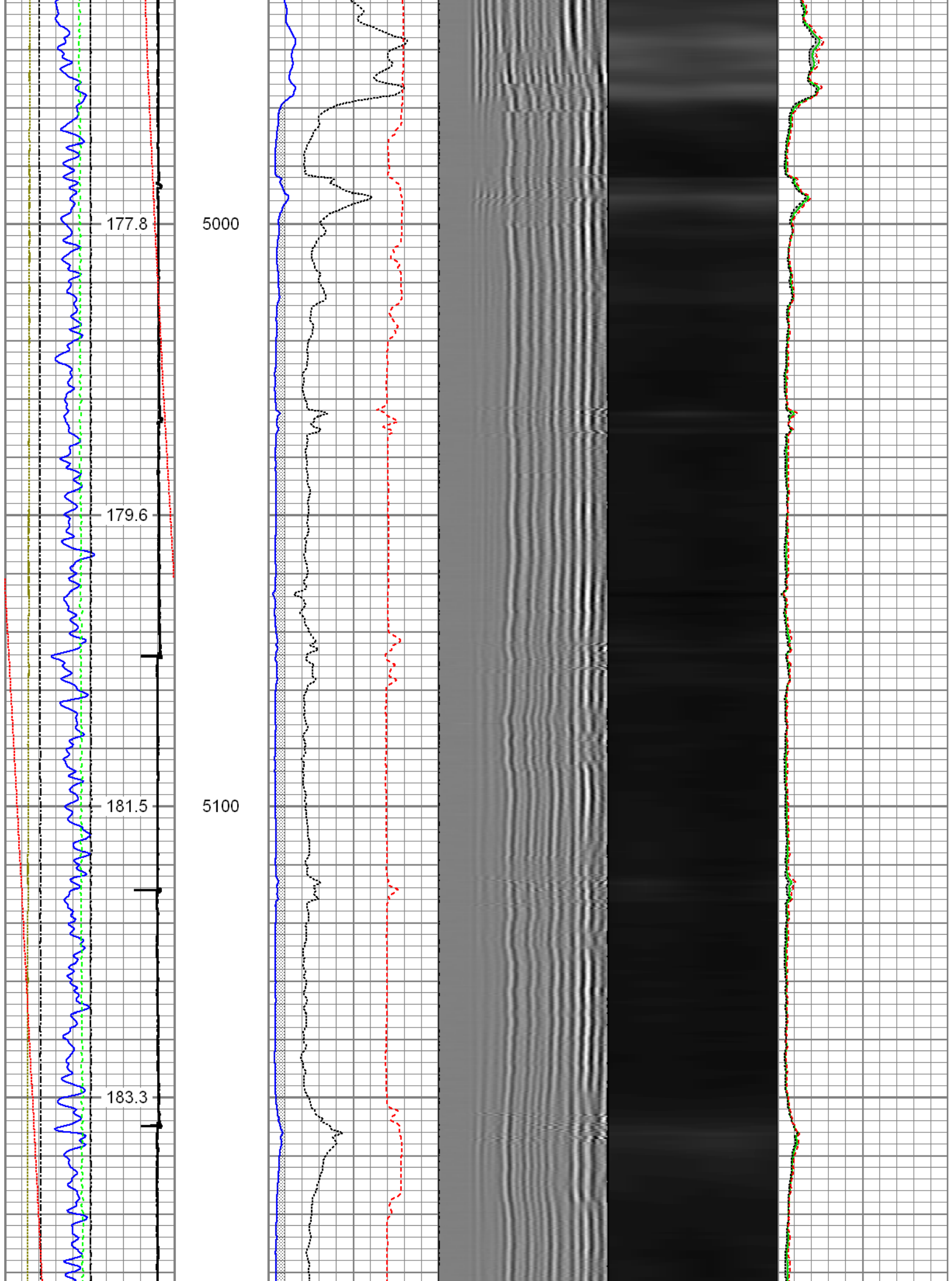


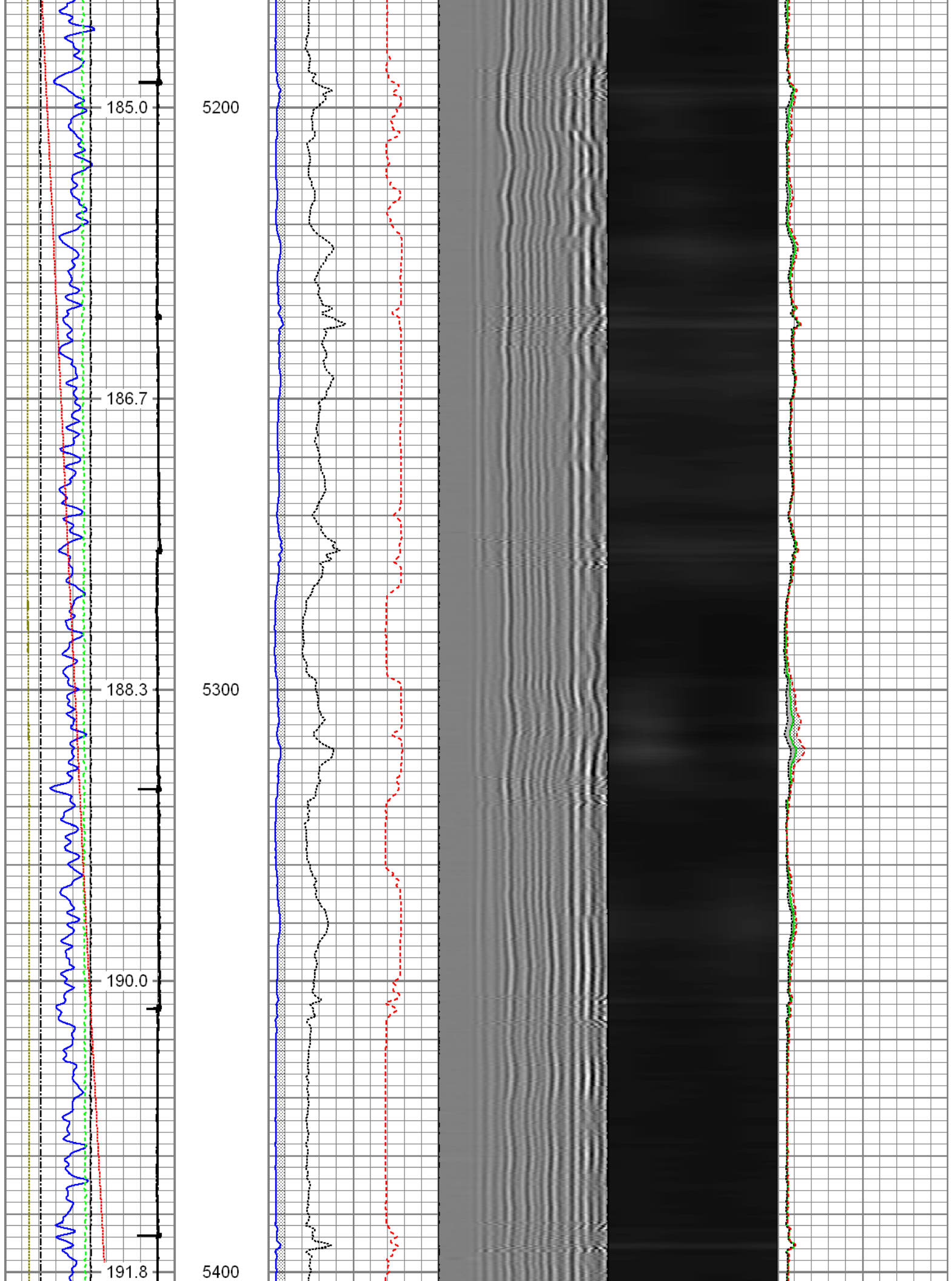


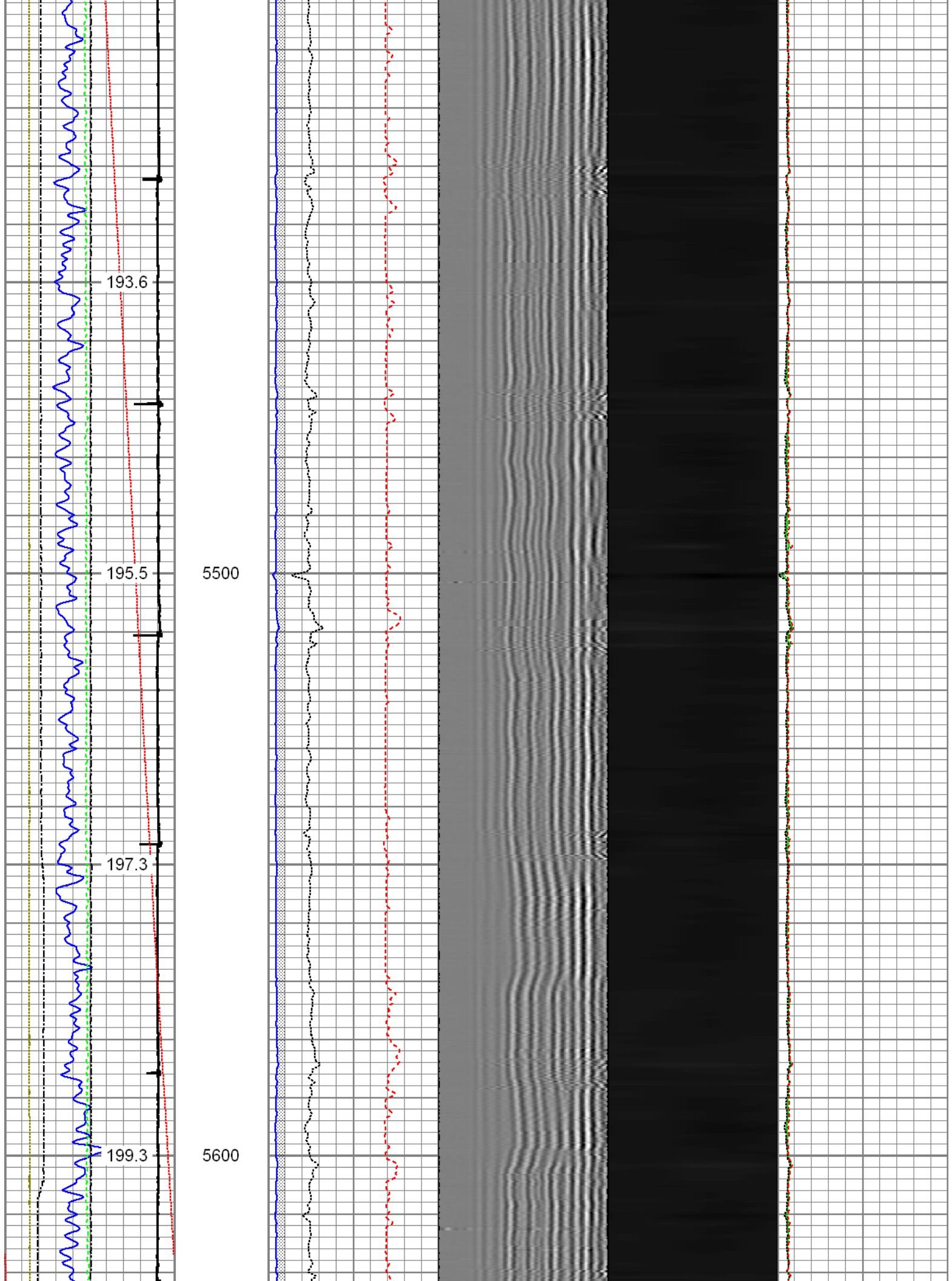


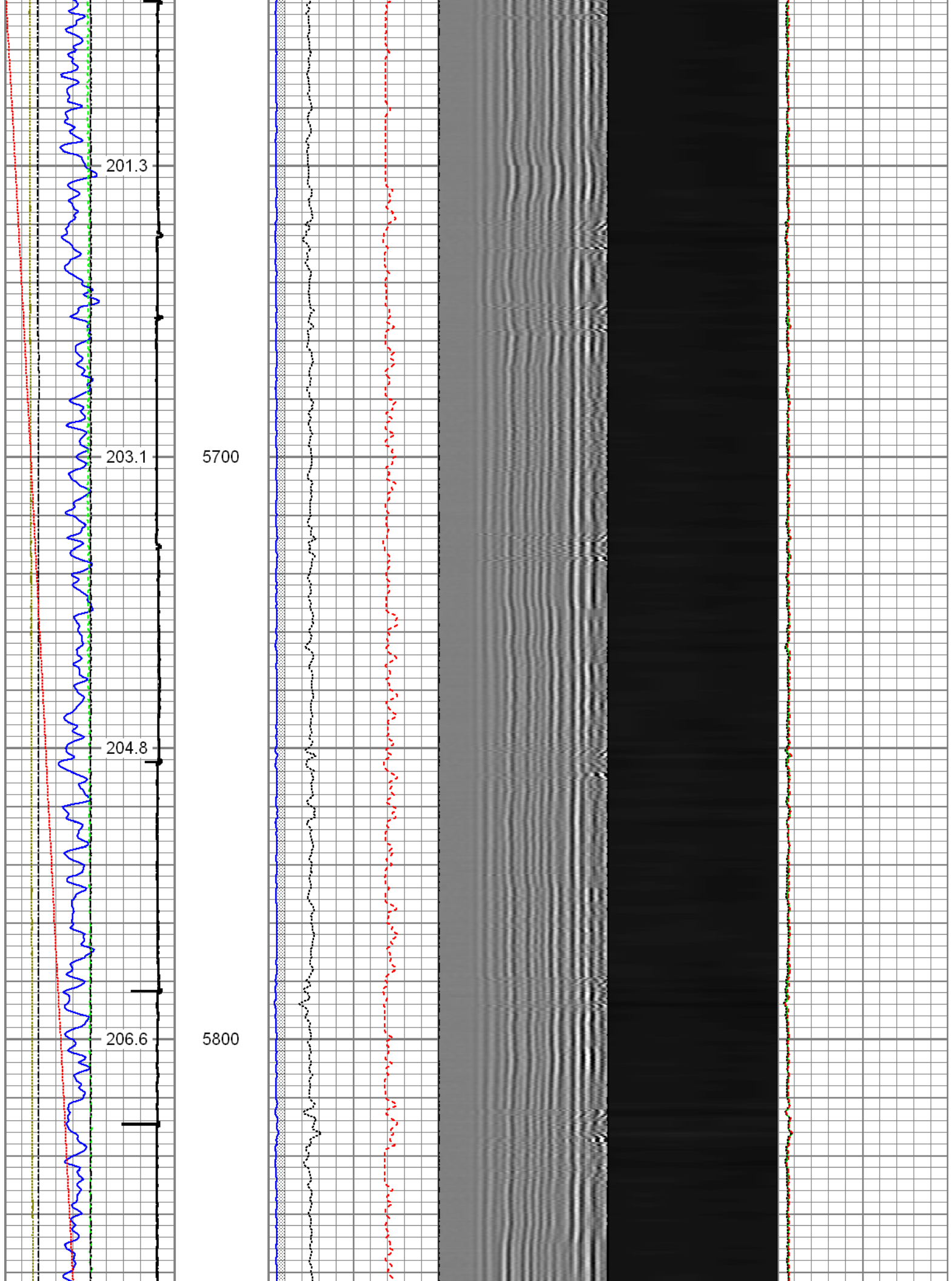


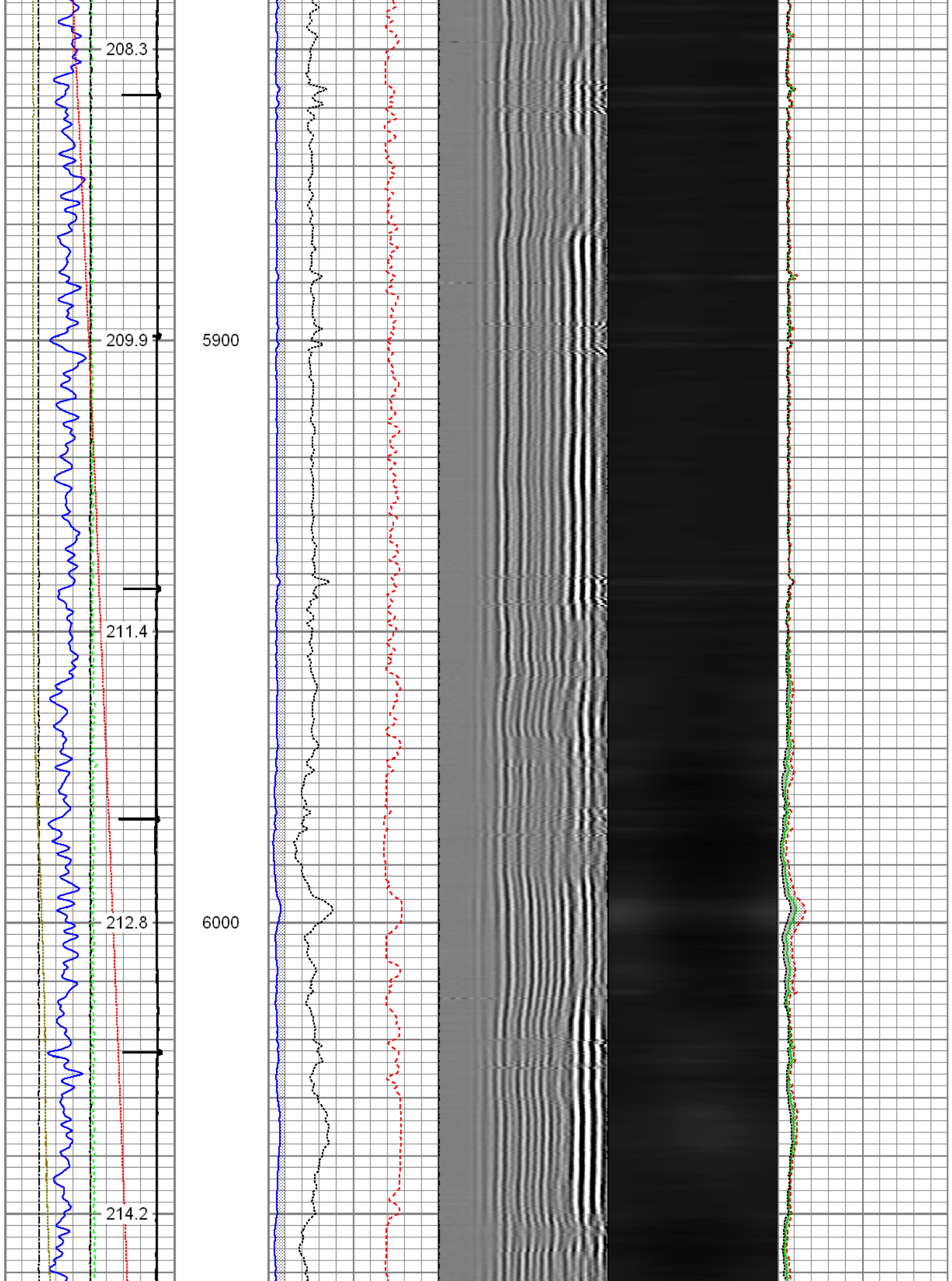


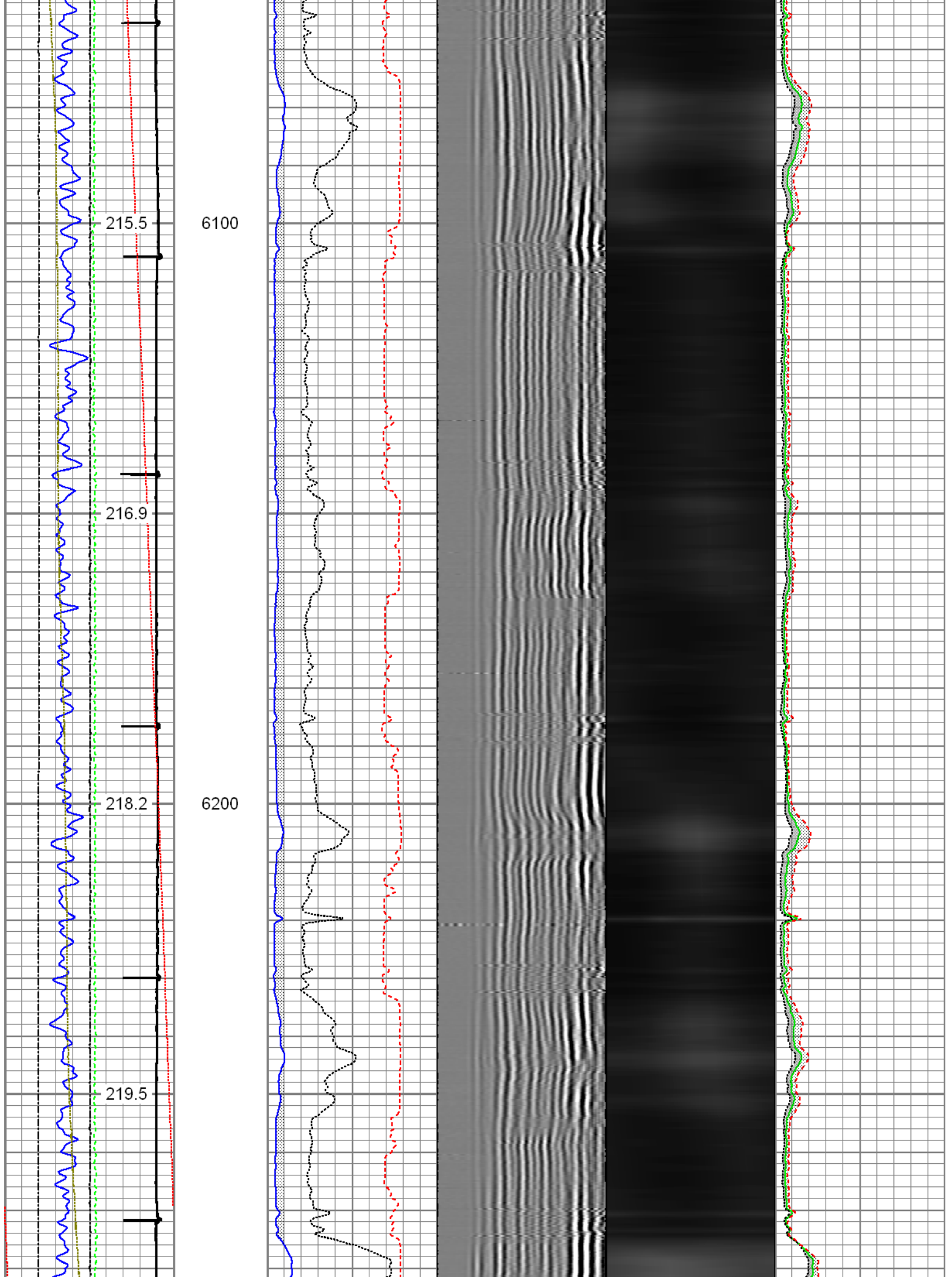


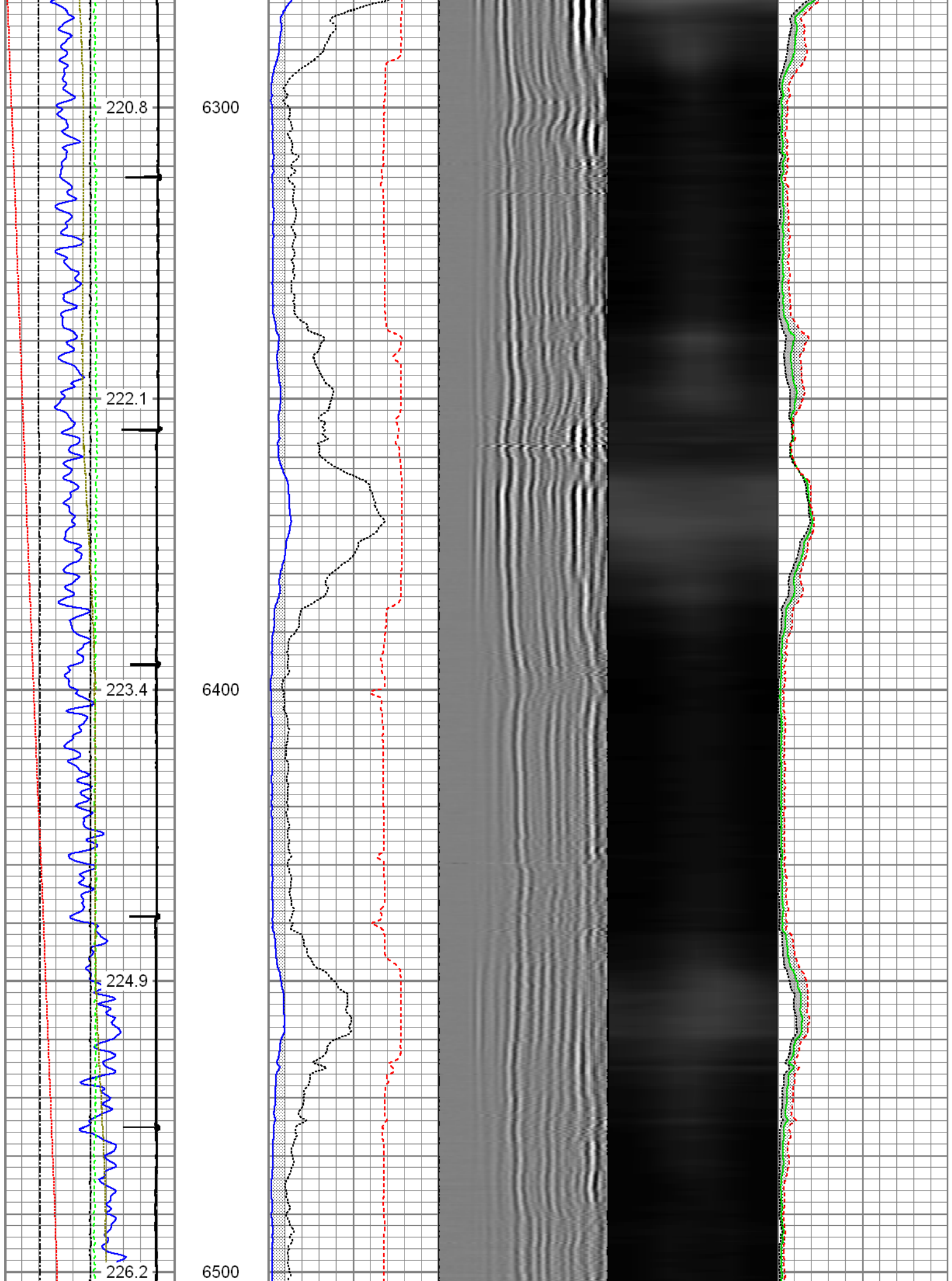


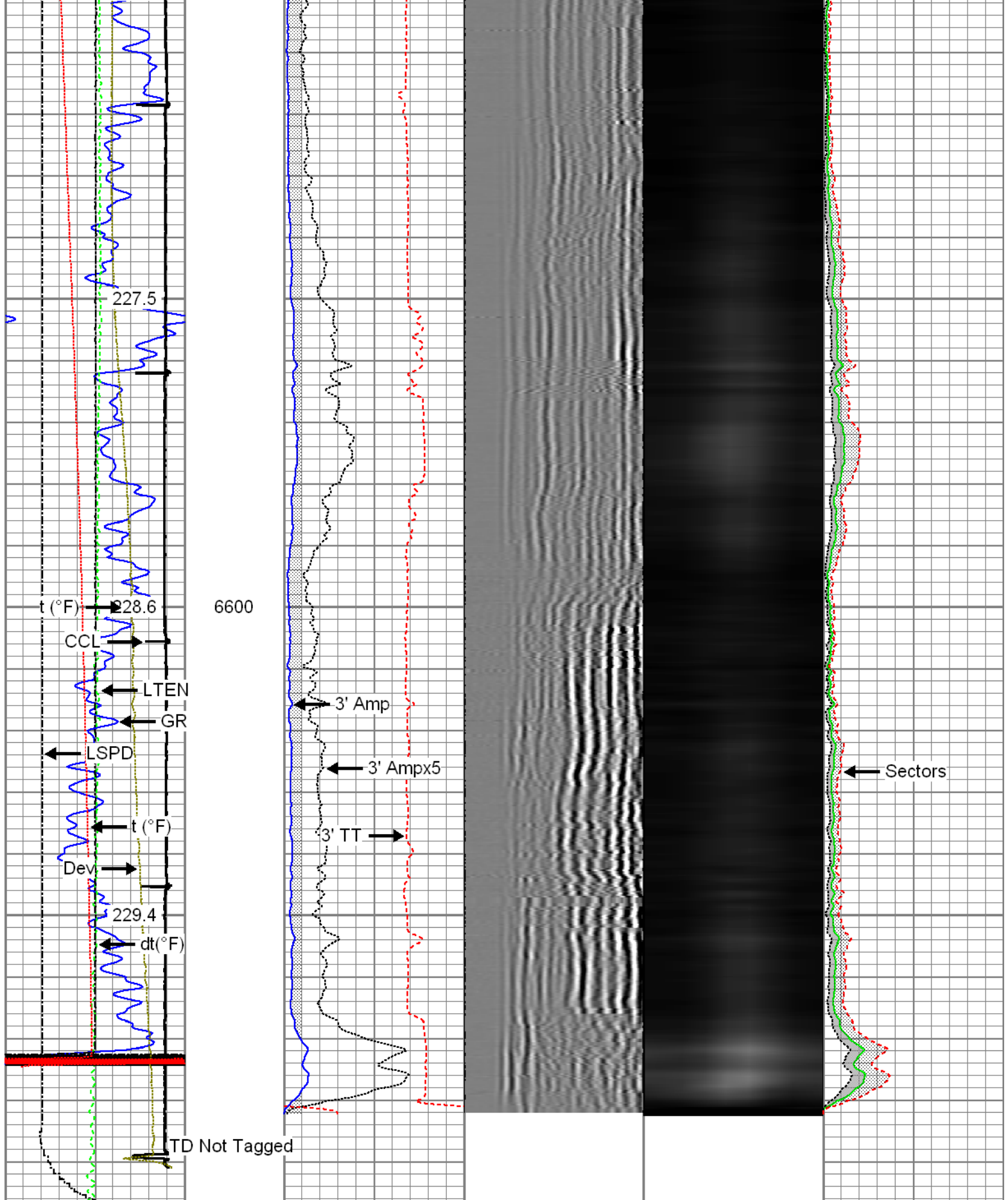













Gamma Ray 0 (GAPI) 120	3' Amplitude 0 (mV) 100	5' Variable Density Log 200 1200	Sector Map	Average Amplitude 0 100
Casing Collar Locator	3' Amplitude x 5 0 (mV) 20			Minimum Amplitude 0 100
Line Speed -100 (ft/min) 100	3' Travel Time			Maximum Amplitude

Line Tension	650	(usec)	150	0	100
0	(lb)	2000			
Differential Temperature					
-2	(degF)	2			
-10	Deviation (°)	90			
Temperature					
0	(degF)	20			

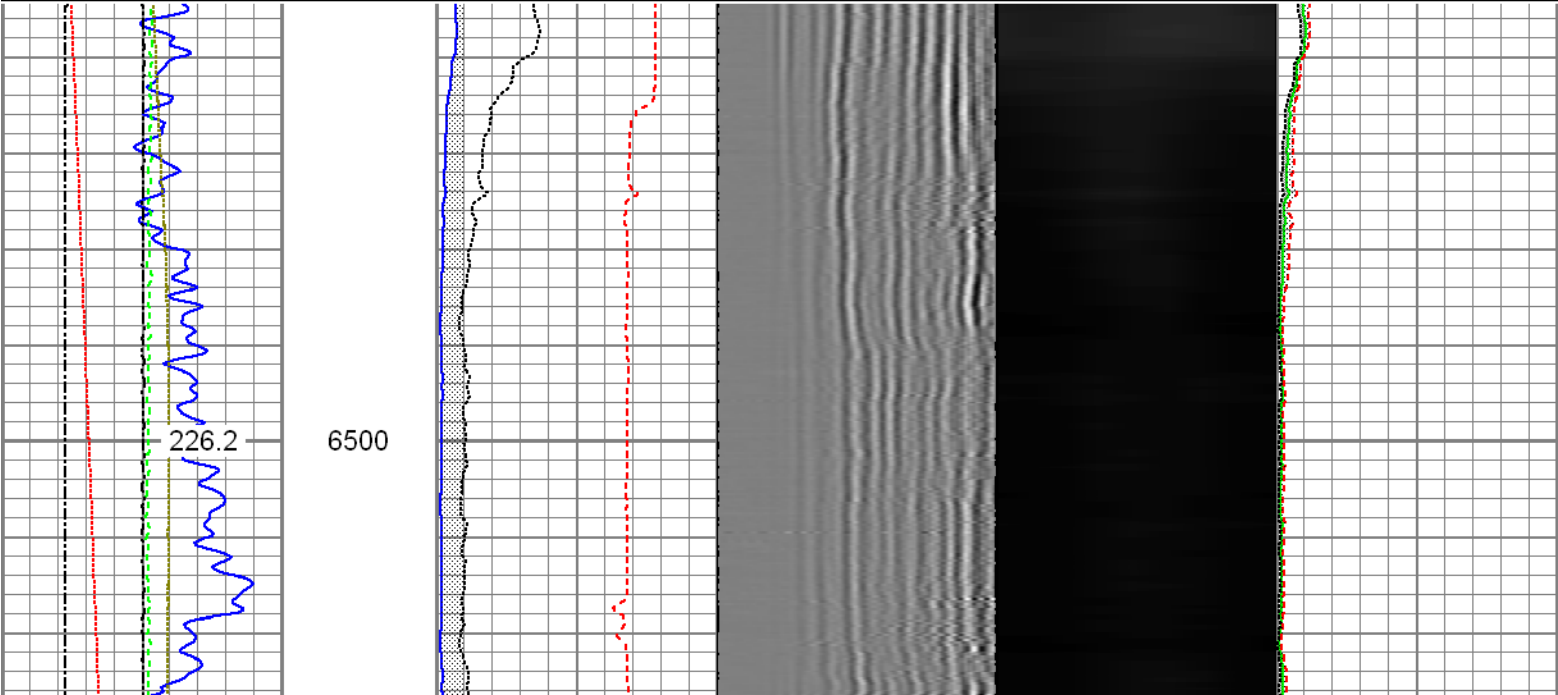


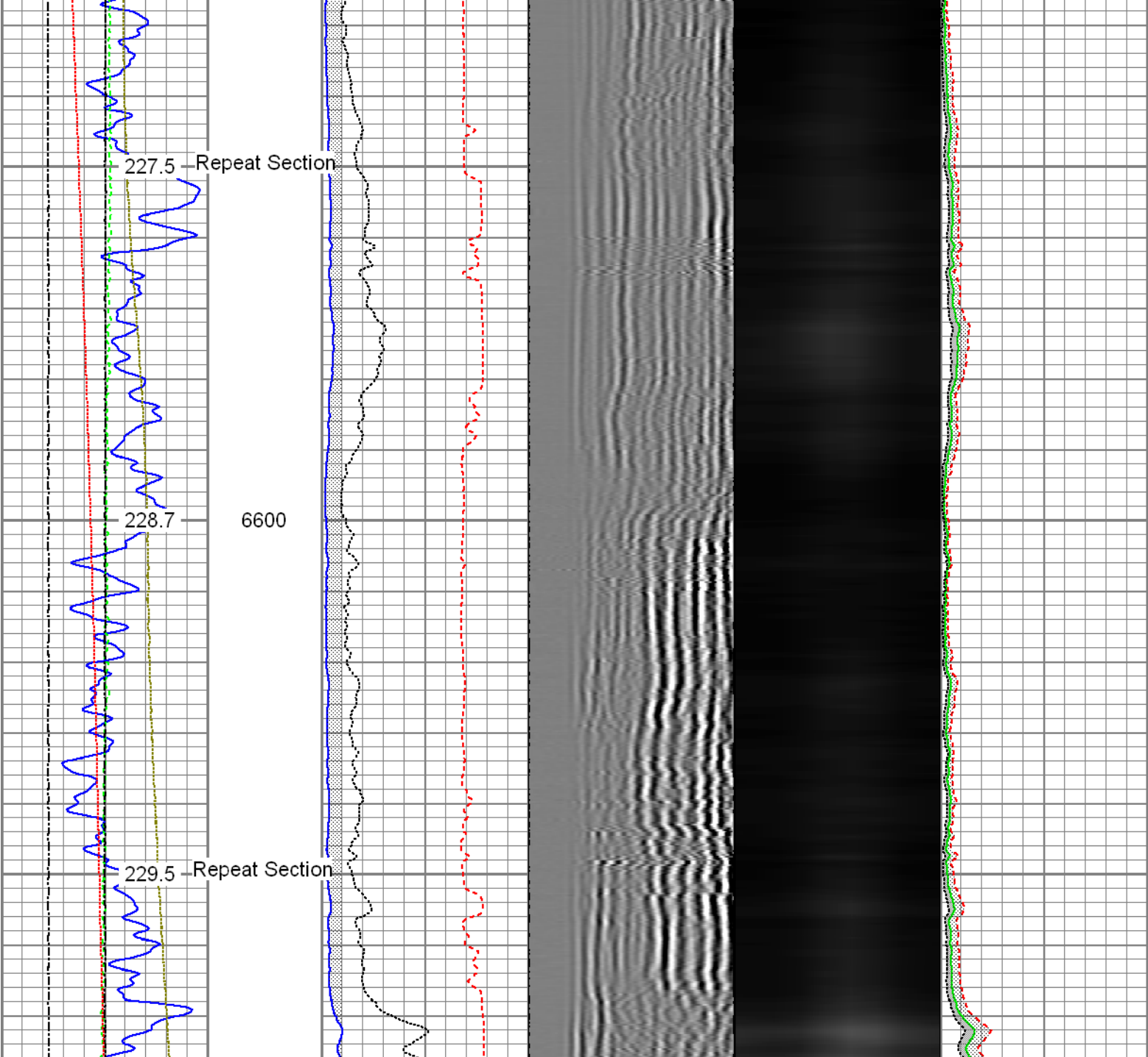
Repeat Section

Recorded with 2500 PSI Surface Induced Pressure

Database File: 08-01-15_noble energy_70 ranch state bb18-615_mit_rbl.db
Dataset Pathname: pass5
Presentation Format: rbt4_mit
Dataset Creation: Sat Aug 01 07:58:25 2015 by Log 7.0 B1
Charted by: Depth in Feet scaled 1:240

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

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
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Calibration Report

Database File: 08-01-15_noble energy_70 ranch state bb18-615_mit_rbl.db
 Dataset Pathname: pass6.2
 Dataset Creation: Sun Aug 02 13:06:07 2015 by Calc 7.0 B1

Multi-finger Imaging Tool Calibration Report

Serial Number: 10020664
 Number of Fingers: 40
 Tool Model: UW_MIT40_042

Inclinometer Calibration Report

Performed: Wed Nov 26 12:28:41 2014
 Calibration Angle: 45

		Inc X	Inc Y
Vertical:		1946	1932
Finger 1 up:		1712	1699
Finger 31 up:		2180	1700
Finger 21 up:		2165	2167
Finger 11 up:		1708	2156
Sensitivity ratio:	1.00121		
X-axis angle:	134.04		
Deviation const.:	327.106		

Finger Calibration Report

Performed: Sat Aug 01 07:00:40 2015

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	1172	346.0	1518	372.0	1890	380.0	2270
Finger 02:	1184	353.0	1537	380.0	1917	381.0	2298
Finger 03:	1129	346.0	1475	377.0	1852	384.0	2236
Finger 04:	1138	362.0	1500	394.0	1894	403.0	2297
Finger 05:	1124	352.0	1476	391.0	1867	393.0	2260
Finger 06:	1157	351.0	1508	384.0	1892	379.0	2271
Finger 07:	1065	363.0	1428	413.0	1841	413.0	2254
Finger 08:	1121	352.0	1473	393.0	1866	398.0	2264
Finger 09:	1086	359.0	1445	403.0	1848	403.0	2251
Finger 10:	1006	361.0	1367	418.0	1785	429.0	2214
Finger 11:	1094	354.0	1448	385.0	1833	388.0	2221
Finger 12:	1071	360.0	1431	397.0	1828	407.0	2235
Finger 13:	1045	353.0	1398	389.0	1787	405.0	2192
Finger 14:	1023	351.0	1374	392.0	1766	409.0	2175
Finger 15:	1087	355.0	1442	371.0	1813	388.0	2201
Finger 16:	1040	359.0	1399	382.0	1781	404.0	2185
Finger 17:	1045	364.0	1409	387.0	1796	408.0	2204
Finger 18:	993	363.0	1356	390.0	1746	427.0	2173
Finger 19:	999	361.0	1360	388.0	1748	420.0	2168
Finger 20:	1040	367.0	1407	387.0	1794	419.0	2213
Finger 21:	1057	360.0	1417	375.0	1792	414.0	2206
Finger 22:	1058	371.0	1429	383.0	1812	416.0	2228
Finger 23:	1172	352.0	1524	346.0	1870	382.0	2252
Finger 24:	1029	365.0	1394	384.0	1778	427.0	2205
Finger 25:	1010	364.0	1374	384.0	1758	430.0	2188
Finger 26:	1082	365.0	1447	375.0	1822	421.0	2243
Finger 27:	1115	368.0	1483	382.0	1865	419.0	2284
Finger 28:	1098	366.0	1464	380.0	1844	419.0	2263
Finger 29:	1041	368.0	1409	379.0	1788	429.0	2217
Finger 30:	1144	362.0	1506	373.0	1879	404.0	2283
Finger 31:	1144	362.0	1506	375.0	1881	403.0	2284
Finger 32:	1182	356.0	1538	362.0	1900	390.0	2290
Finger 33:	1210	367.0	1577	375.0	1952	392.0	2344
Finger 34:	1149	367.0	1516	383.0	1899	406.0	2305
Finger 35:	1176	360.0	1536	383.0	1919	403.0	2322

Finger 36:	1215	354.0	1569	370.0	1939	389.0	2328
Finger 37:	1145	362.0	1507	391.0	1898	409.0	2307
Finger 38:	1104	371.0	1475	404.0	1879	418.0	2297
Finger 39:	1131	360.0	1491	389.0	1880	403.0	2283
Finger 40:	1164	356.0	1520	382.0	1902	391.0	2293

Segmented Cement Bond Log Calibration Report

Serial Number:	10013454
Tool Model:	UW_RBT_004
Calibration Casing Diameter:	7.000 in
Calibration Depth:	-122.510 ft

Master Calibration, performed Sun Aug 02 13:05:58 2015:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.004	0.712	0.800	62.165	86.721	0.429
5FT	0.002	0.796	0.800	62.165	77.220	0.672
S1	0.005	0.664	0.000	100.000	151.687	-0.696
S2	0.003	0.700	0.000	100.000	143.434	-0.431
S3	0.004	0.745	0.000	100.000	135.085	-0.594
S4	0.003	0.778	0.000	100.000	129.006	-0.413
S5	0.004	0.773	0.000	100.000	130.087	-0.559
S6	0.003	0.737	0.000	100.000	136.167	-0.422
S7	0.004	0.684	0.000	100.000	146.955	-0.517
S8	0.004	0.659	0.000	100.000	152.523	-0.565

Temperature Calibration Report

Serial Number:	10025095
Tool Model:	UW_PRT_016
Performed:	Wed Feb 11 13:43:20 2015

Point #	Reading		Reference	
1	12798.00	cps	68.00	degF
2	18136.00	cps	104.00	degF
3	29513.00	cps	176.00	degF
4	40905.00	cps	248.00	degF
5	52487.00	cps	320.00	degF
6	58362.00	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:	Fri Jul 31 10:08:21 2015
Calibrator Value:	1.0 GAPI
Background Reading:	0.0 cps
Calibrator Reading:	1.0 cps
Sensitivity:	0.6500 GAPI/cps



Company	Noble Energy Inc.
Well	70 Ranch State BB18-615
Field	Wattenberg
County	Weld
State	Colorado