Radial Cement Bond Gamma Ray Casing Collar Log

FMC Technologies

Company	Noble Energy Inc.
Well	Wells Ranch AA11-628
Field	Wattenberg
County	Weld
State	Colorado

Location: API # : 05-123-41247

SEC 11 TWP 6N RGE 63W

Other Services: MIT

Permanent Datum	Ground Level	Elevation	4834'
Log Measured From	Kelly Bushing	24 FT	
Drilling Measured From	Kelly Bushing		

Elevation: K.B. 4858' D.F. 4857' G.L. 4834'

Date	13-JUL-2015		
Run Number	One		
Depth Driller	13844 FT		
Depth Logger	6701 FT		
Bottom Logged Interval	6696 FT		
Top Log Interval	Surface		
Open Hole Size	8.750"		
Type Fluid	Water		
Density / Viscosity	8.34 lbm/gal		
Max. Recorded Temp.	219°F		
Estimated Cement Top	144 FT		
Time Well Ready	ROA		
Time Logger on Bottom	08:10		
Equipment Number	HD-0119		
Location	Fort Lupton, CO		
Recorded By	Jack Amidei	Sam Hopper	
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	592 FT
Intermediate #1	7	26	P-110IC	24 FT	7043.1 FT
Intermediate #2					
Liner	4 1/2	11.6	P-110 IC	6631.2 FT	13605 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 casing tally liner top at 6631.2 FT
Adjusted -24 FT to correlate with liner top
Log ran from just below 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.!!

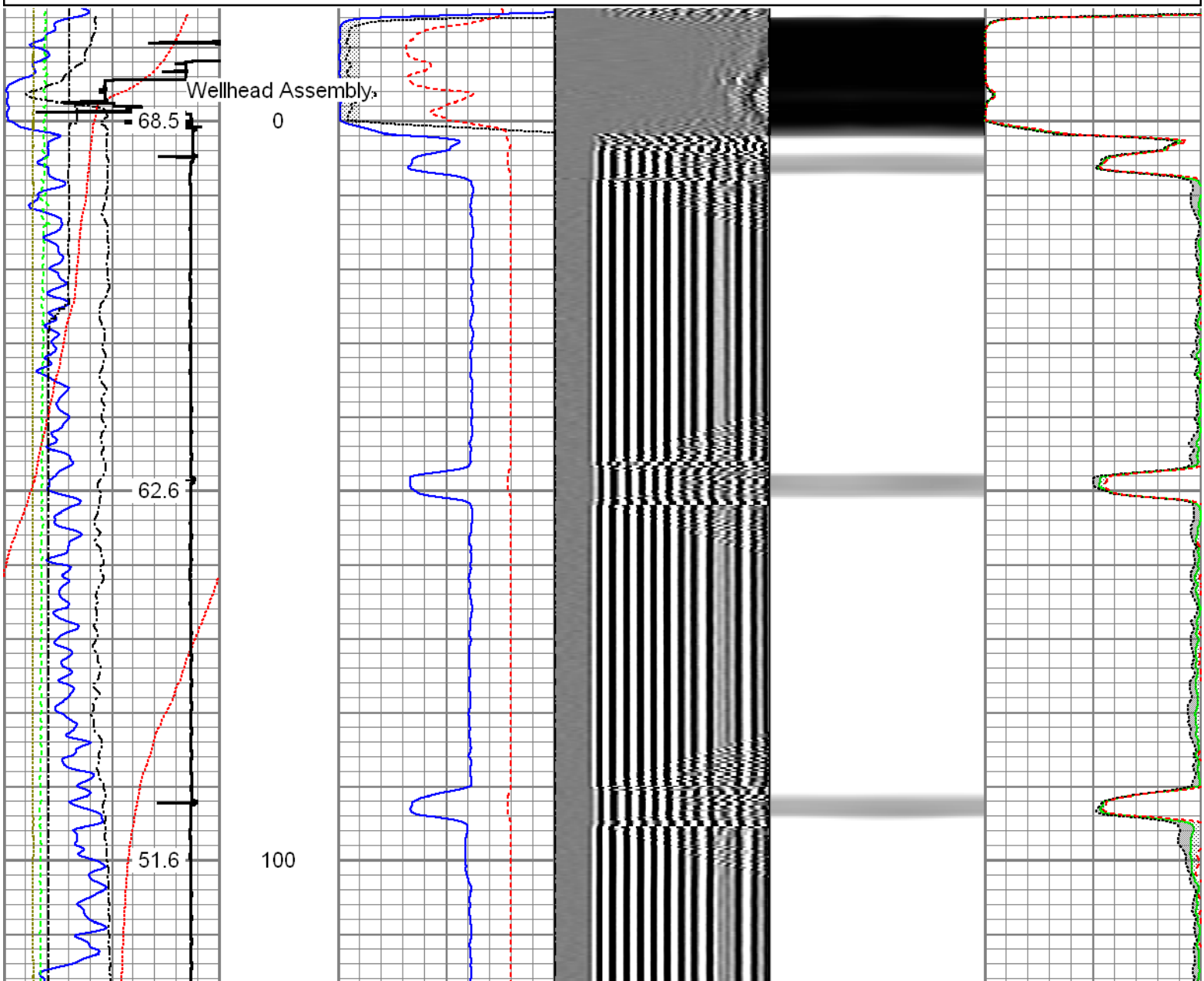
Main Pass

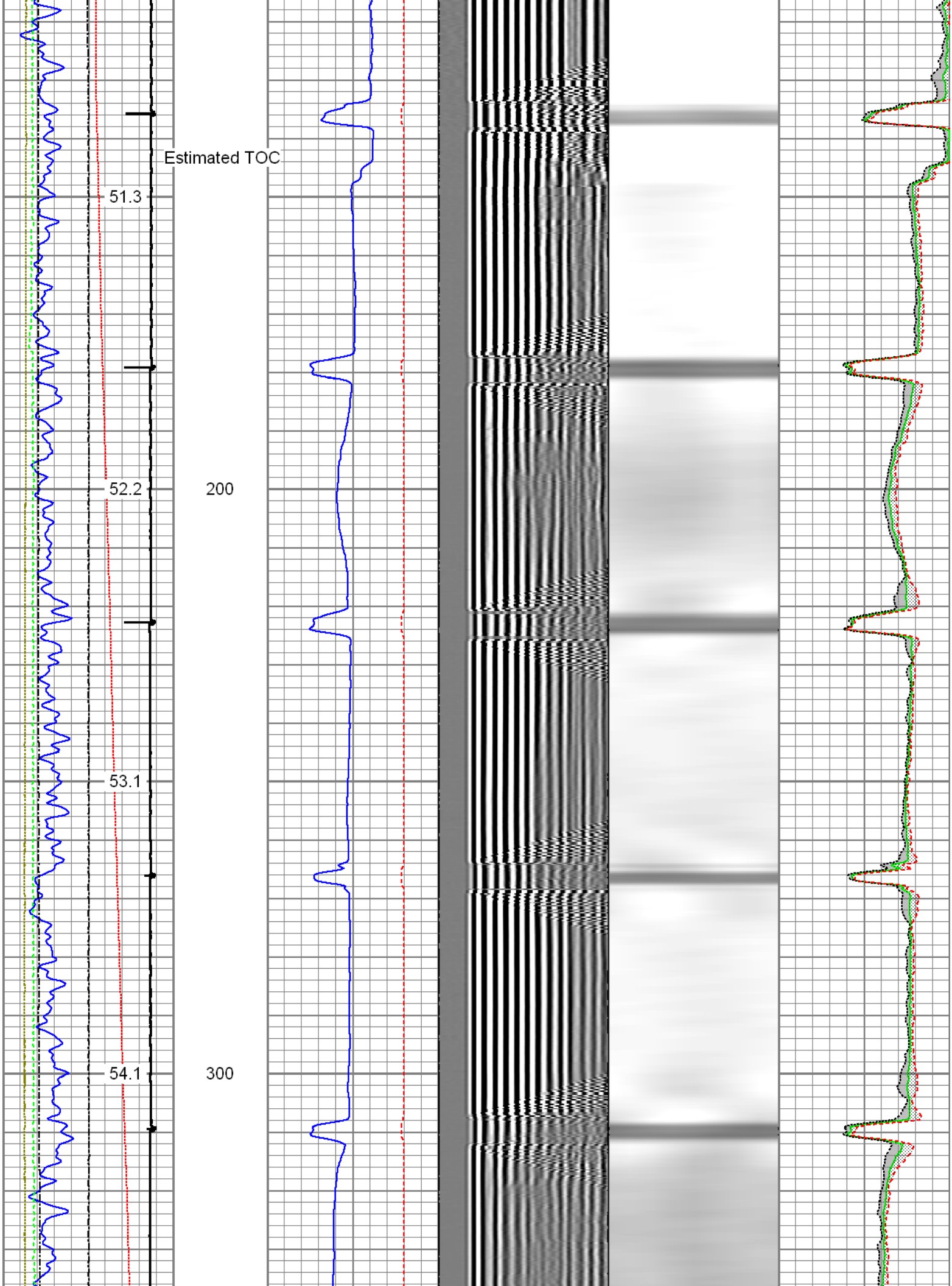
Recorded with 2500 PSI Surface Induced Pressure

FMC Technologies

Database File:	07-13-15_noble energy_wells ranch aa11-628_mit_rbl.db
Dataset Pathname:	pass8.1
Presentation Format:	rbt4_mit
Dataset Creation:	Mon Jul 13 21:04:09 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
Line Speed	3' Amplitude x 5			Mimimum 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				
-10 Deviation (°) 90				
Temperature				
0 (degF) 20				
Casing Collar Locator				




Estimated TOC
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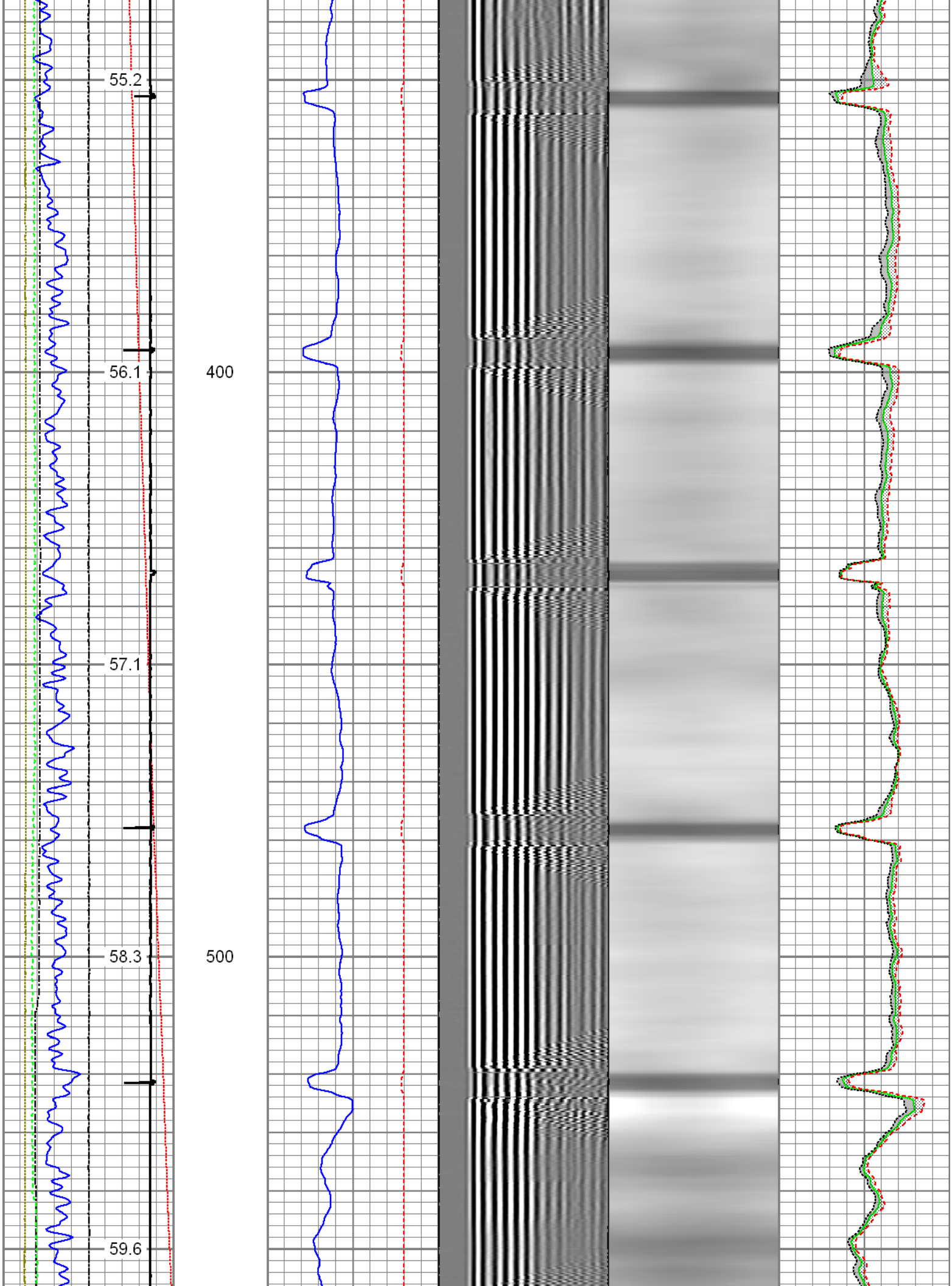
52.2
200
53.1
54.1
300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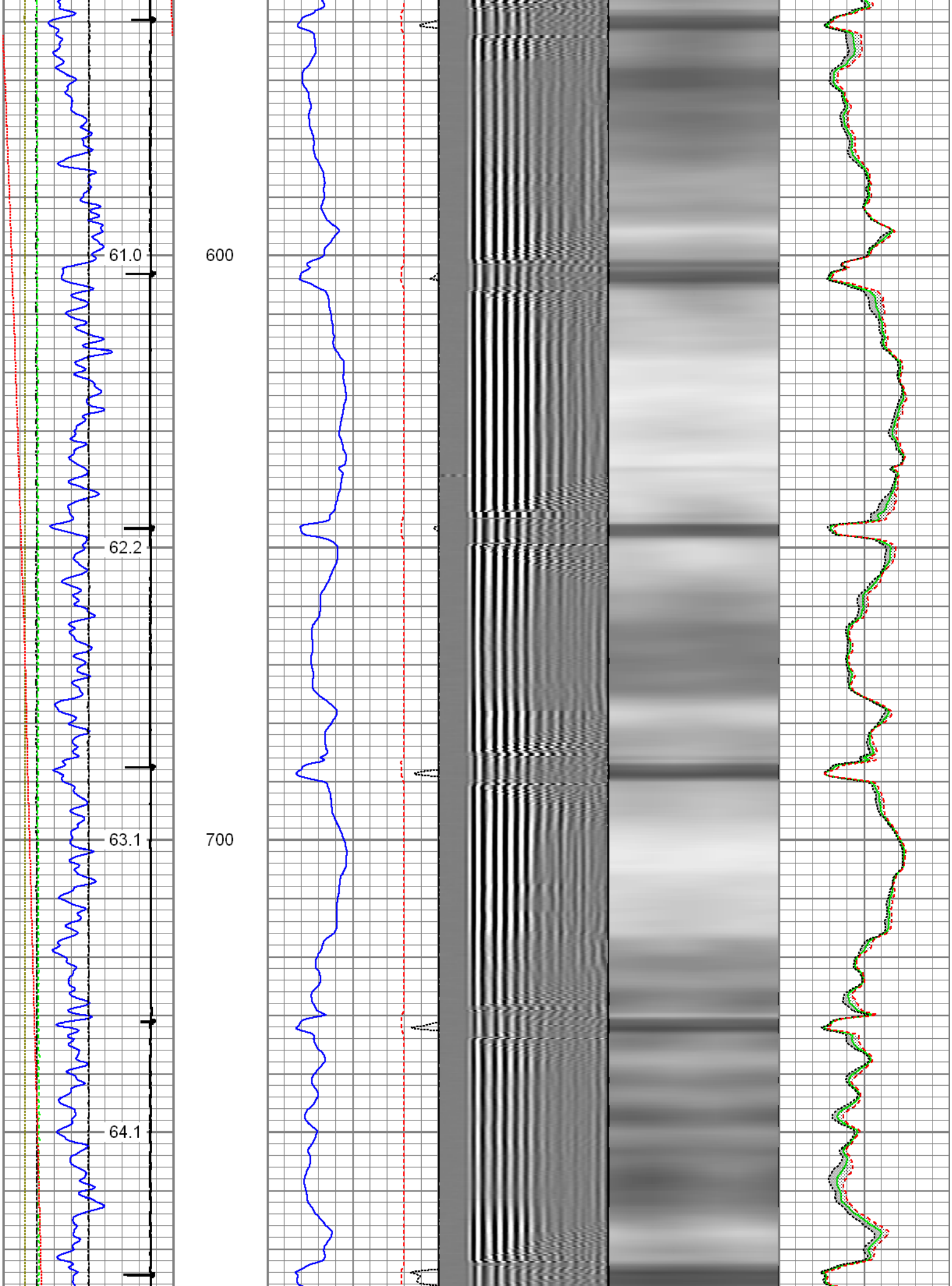
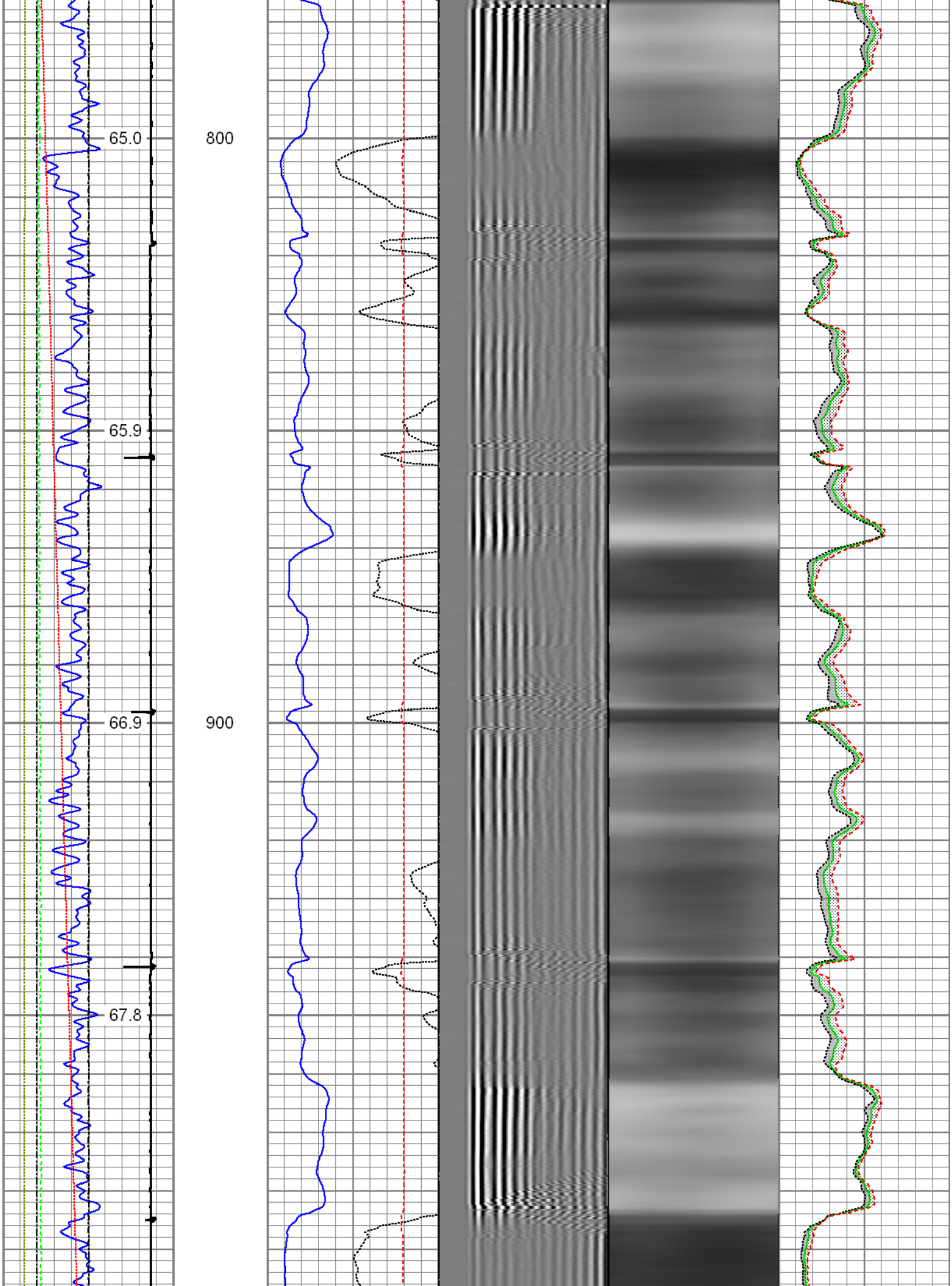
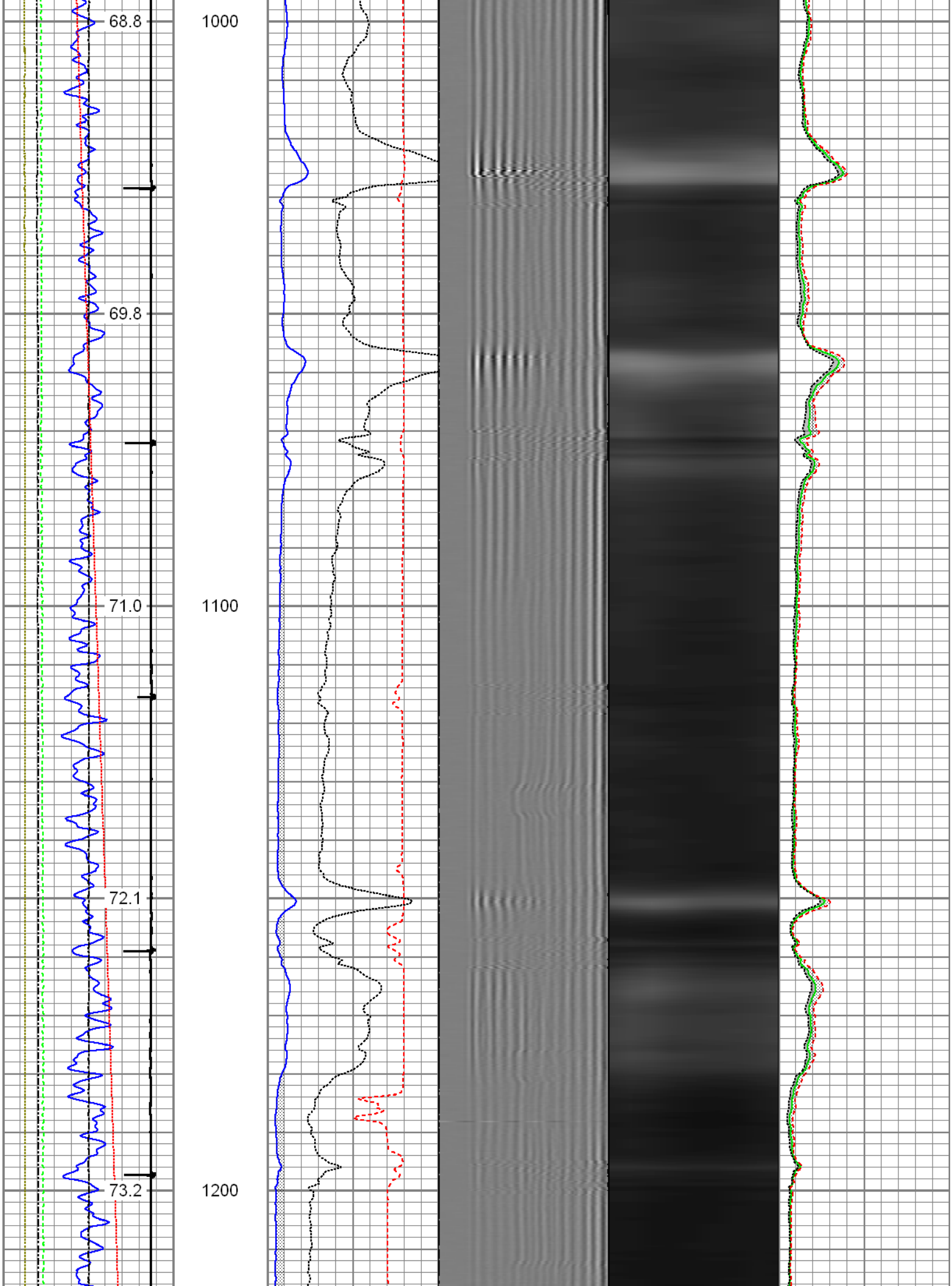
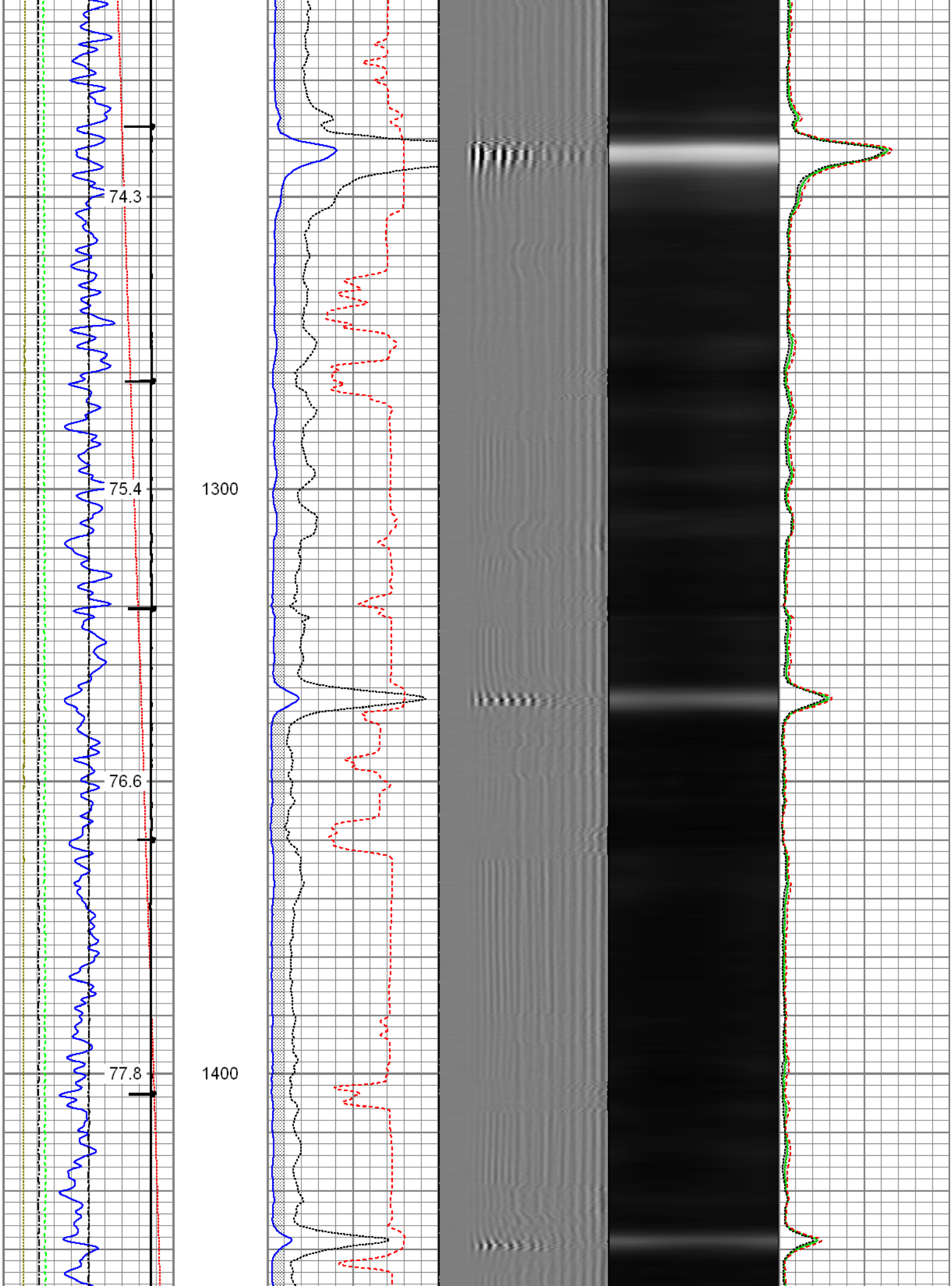
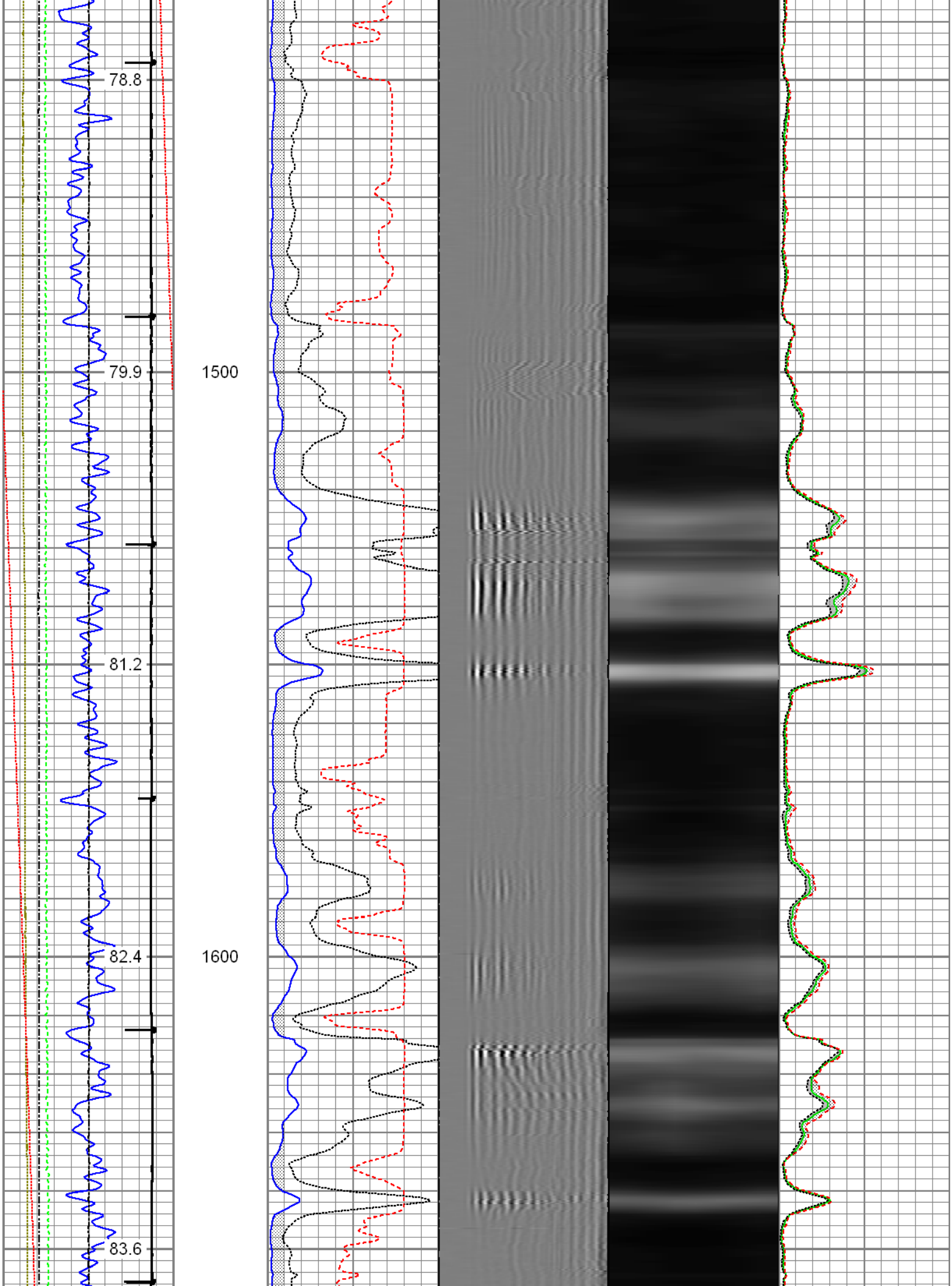
56.1
400
57.1
58.3
500
59.6


61.0
600
62.2
63.1
700
64.1


65.0
800
65.9
66.9
900
67.8


68.8
1000
69.8
71.0
1100
72.1
73.2
1200


74.3
75.4
1300
76.6
77.8
1400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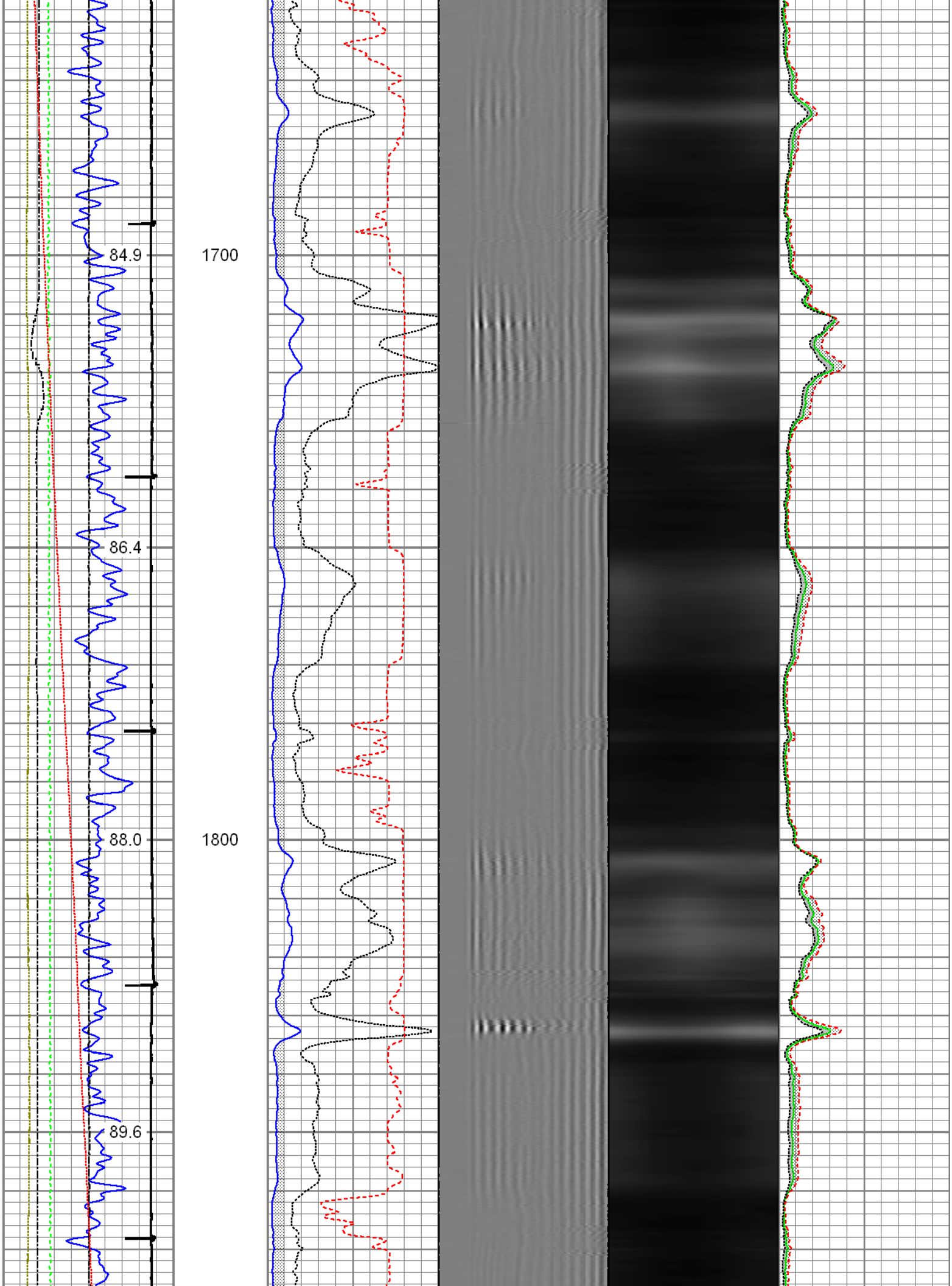
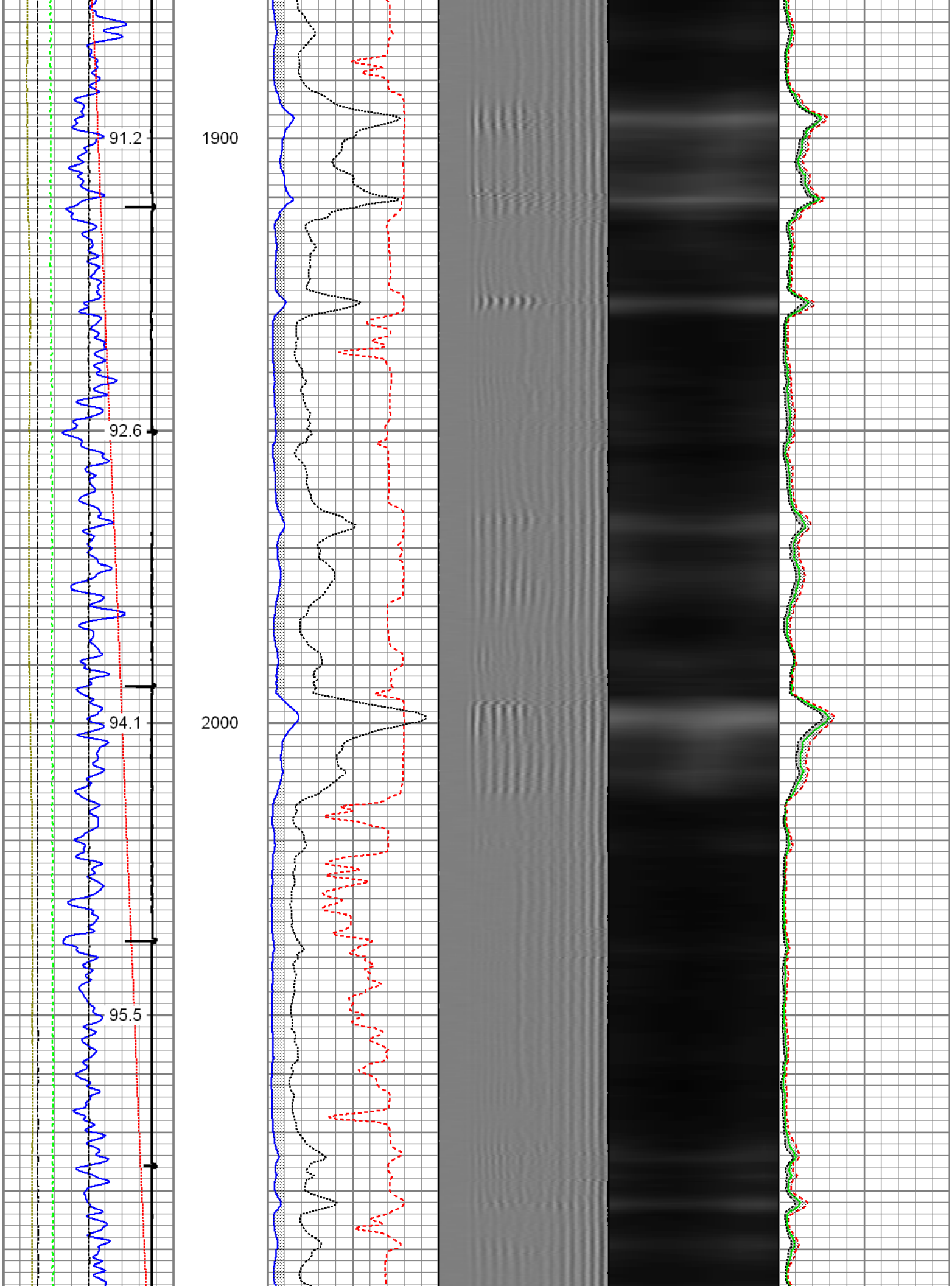
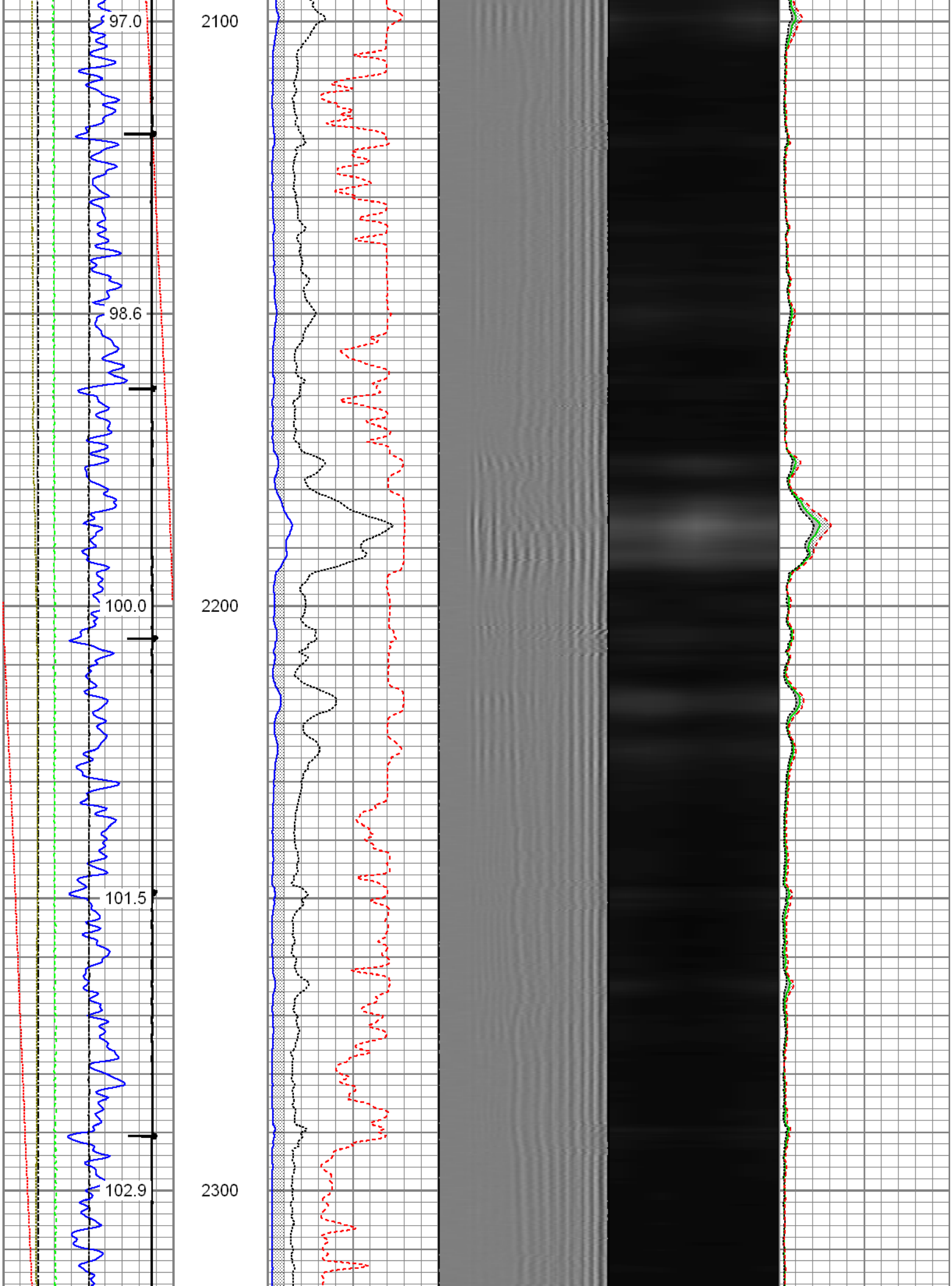
1500
81.2
82.4
1600
83.6


84.9
1700
86.4
88.0
1800
89.6


91.2
1900
92.6
94.1
2000
95.5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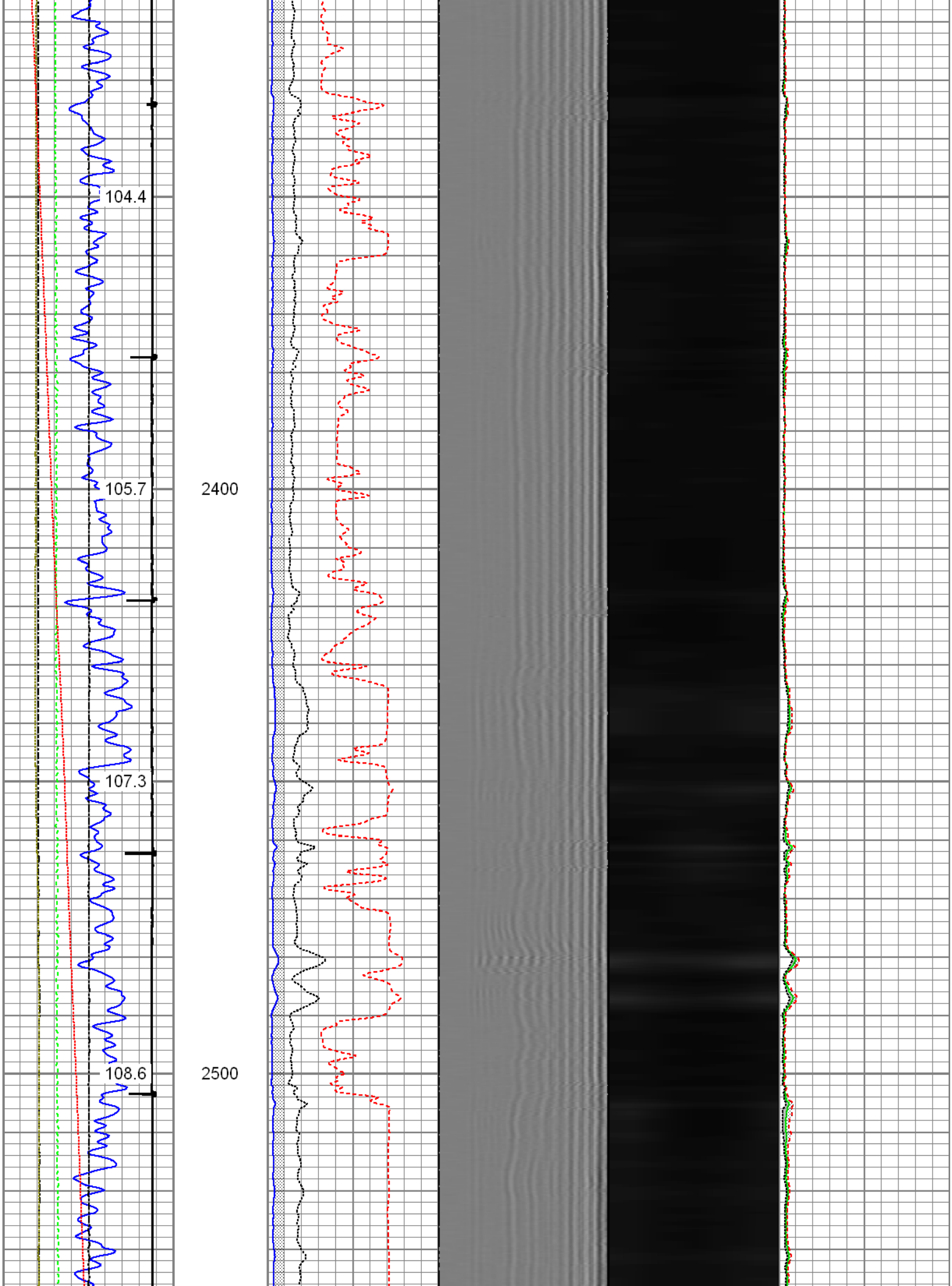
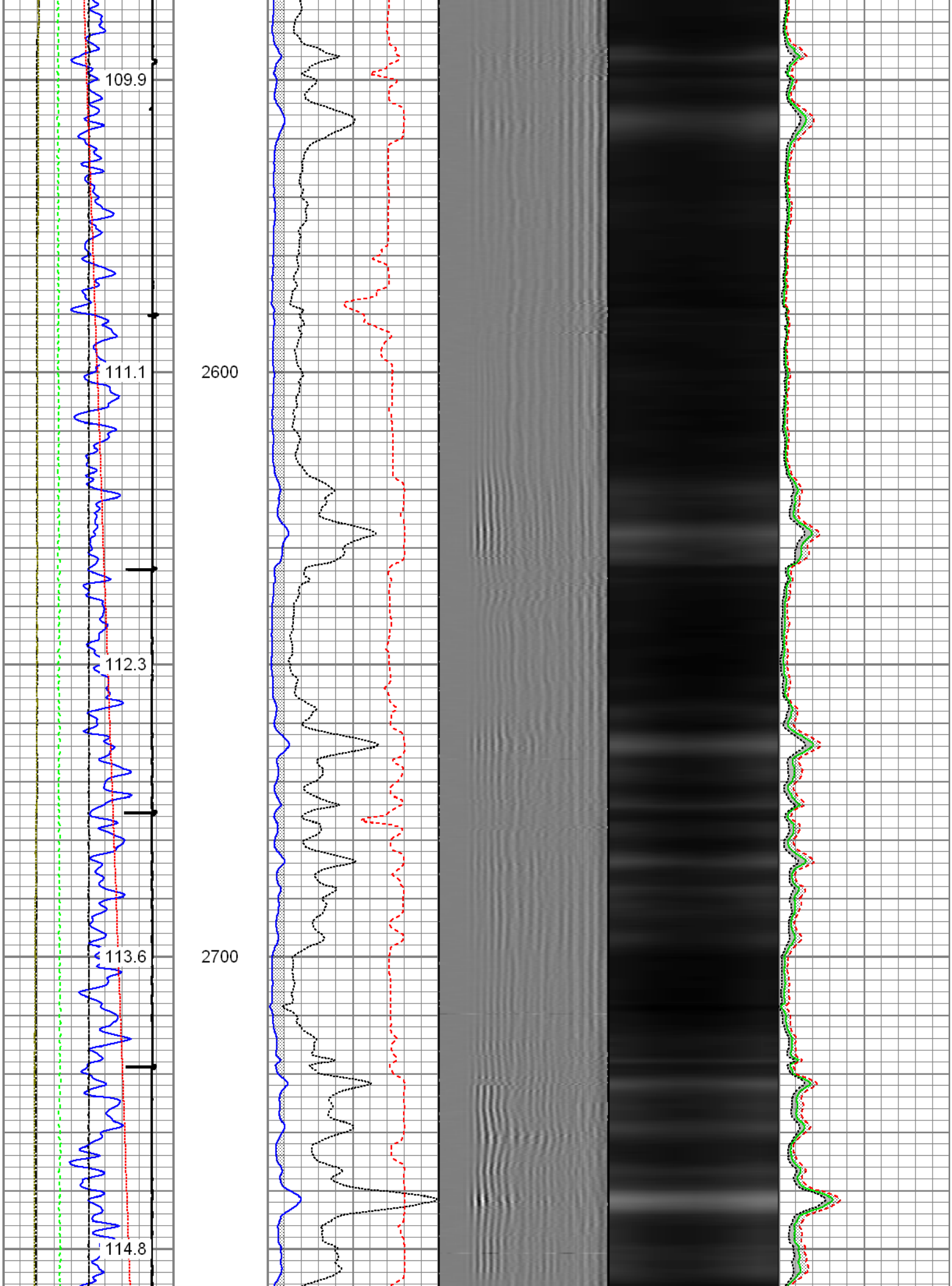
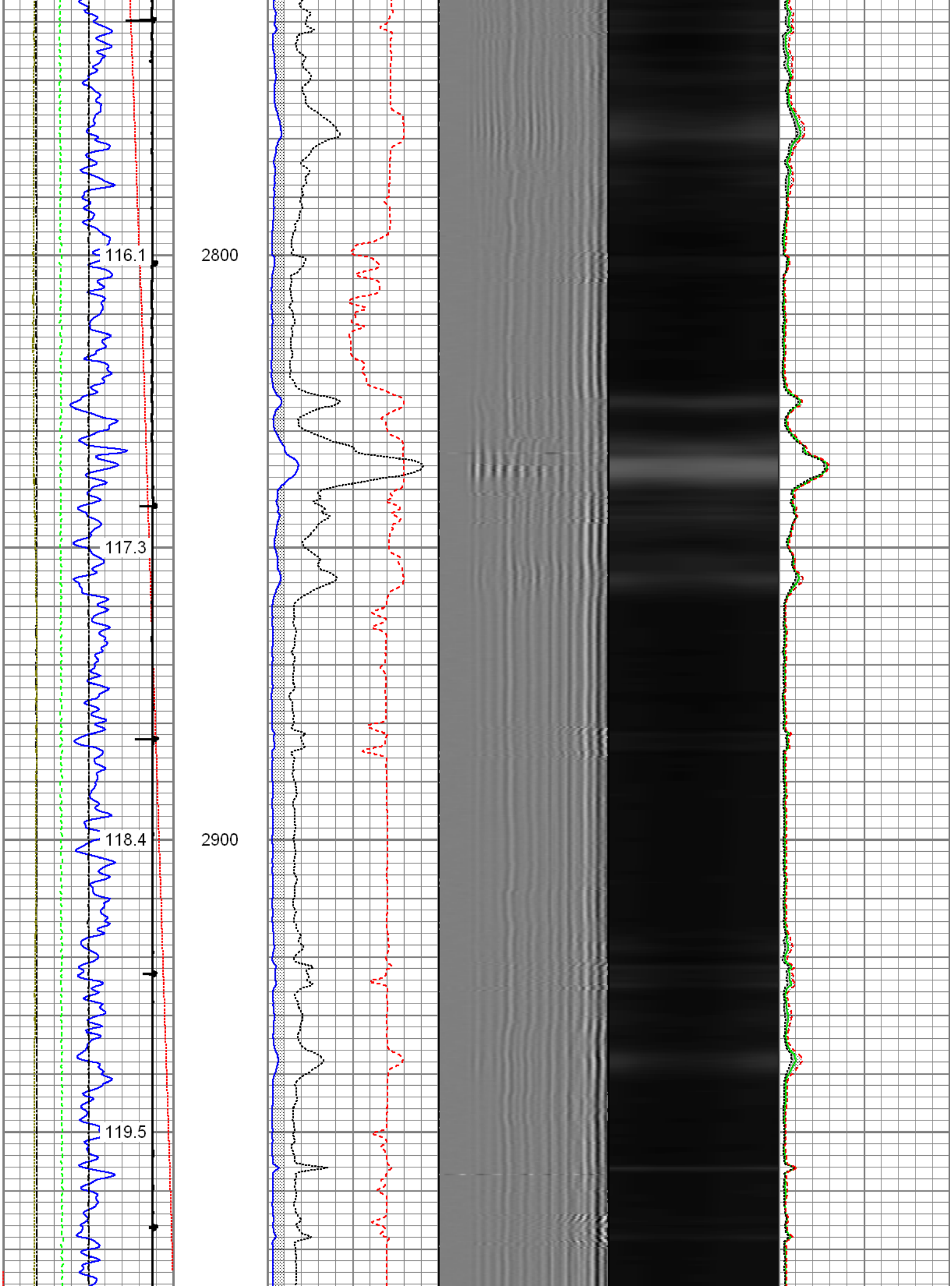
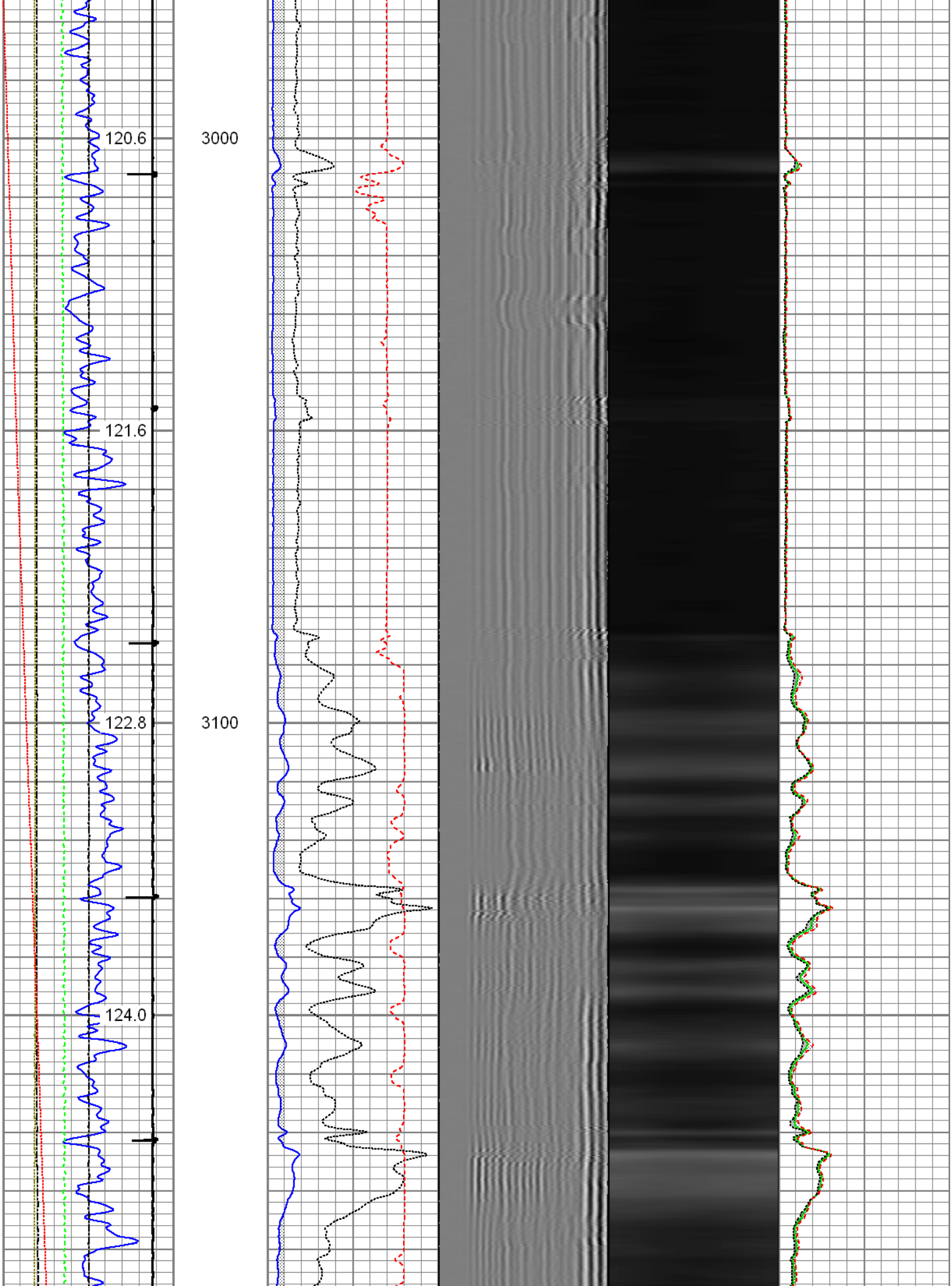
2100
98.6
100.0
2200
101.5
102.9
2300


104.4
105.7
2400
107.3
108.6
2500


109.9
111.1
2600
112.3
113.6
2700
114.8


116.1
2800
117.3
118.4
2900
119.5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121.6
122.8
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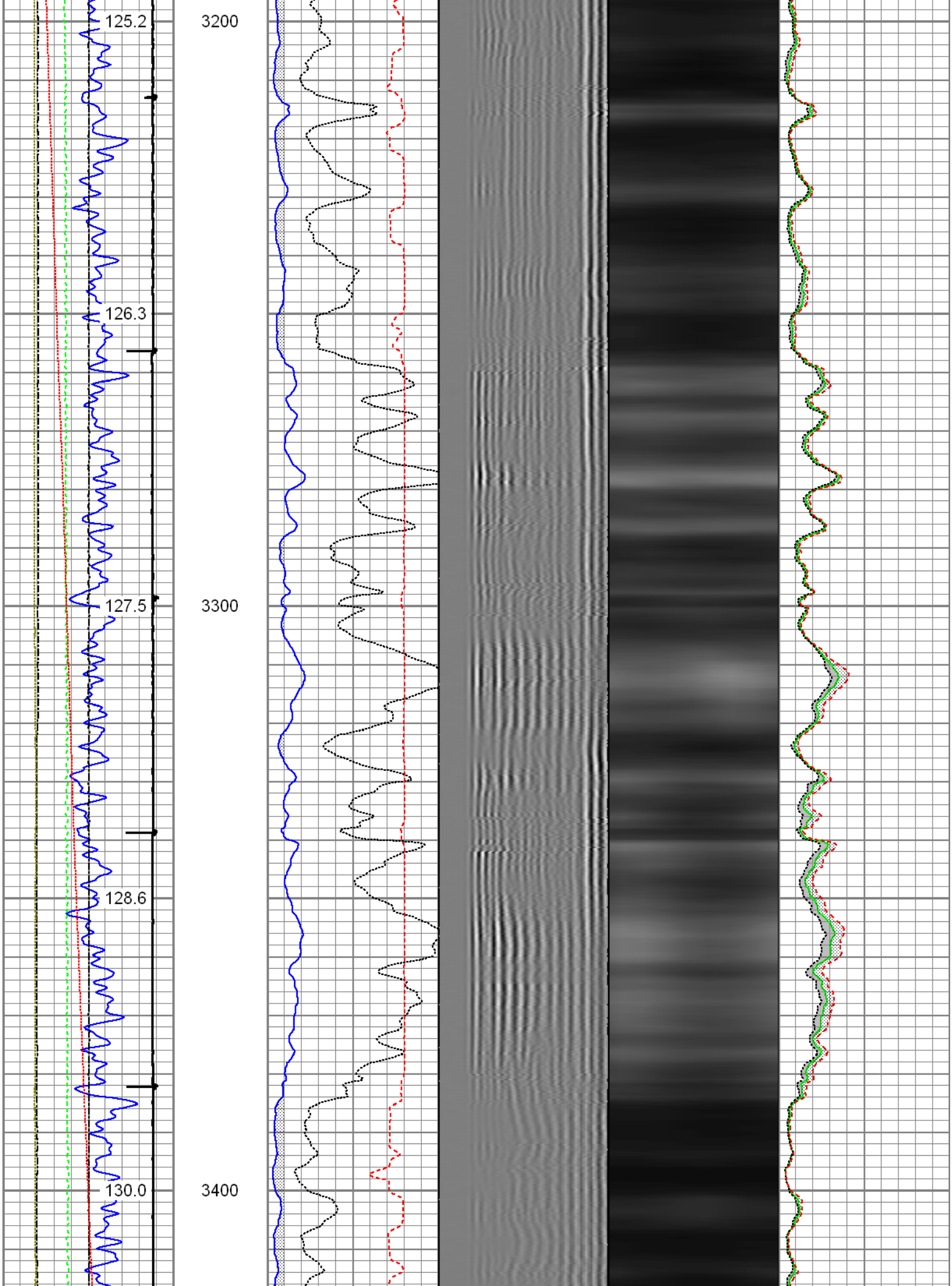
124.0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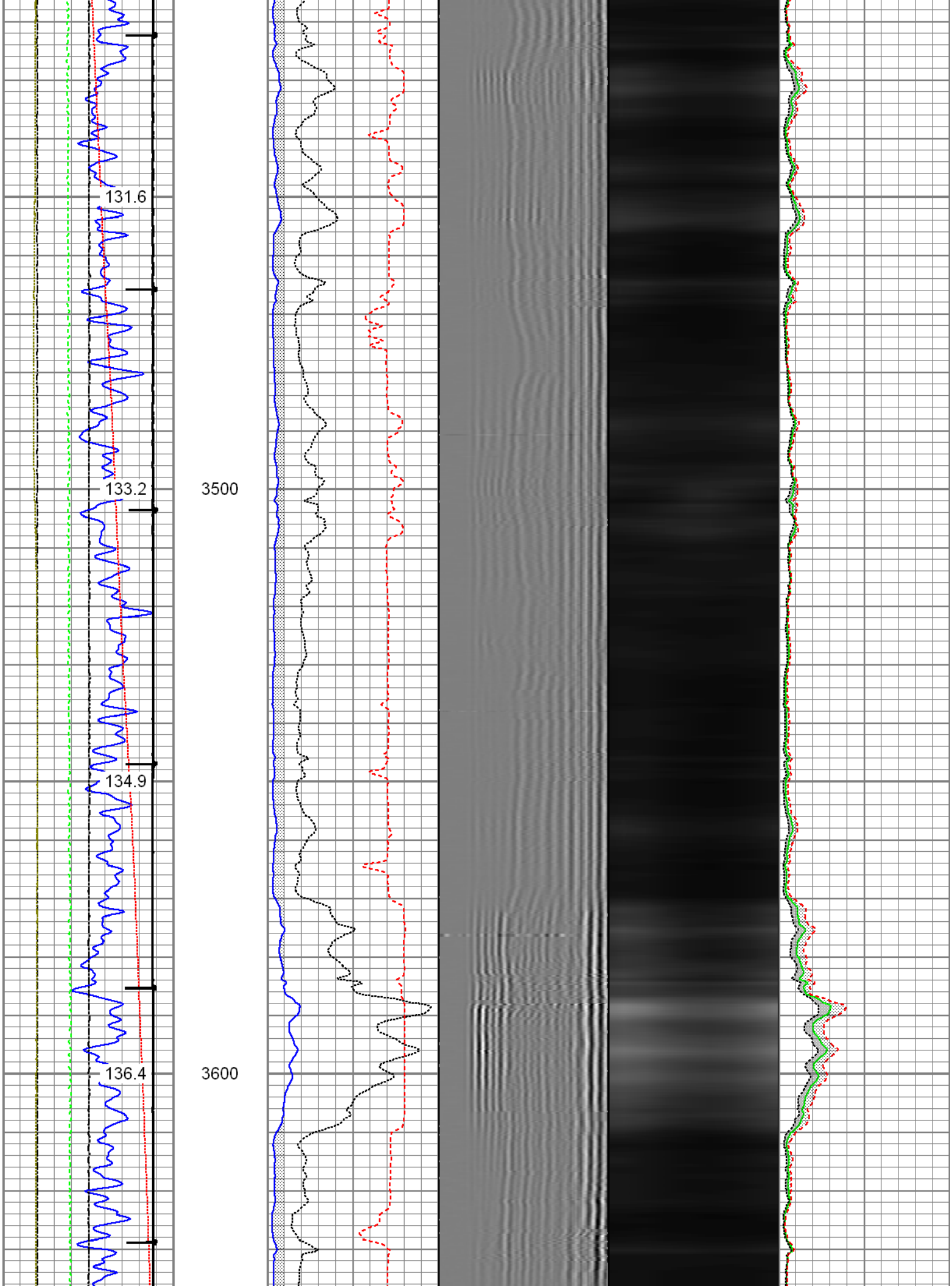
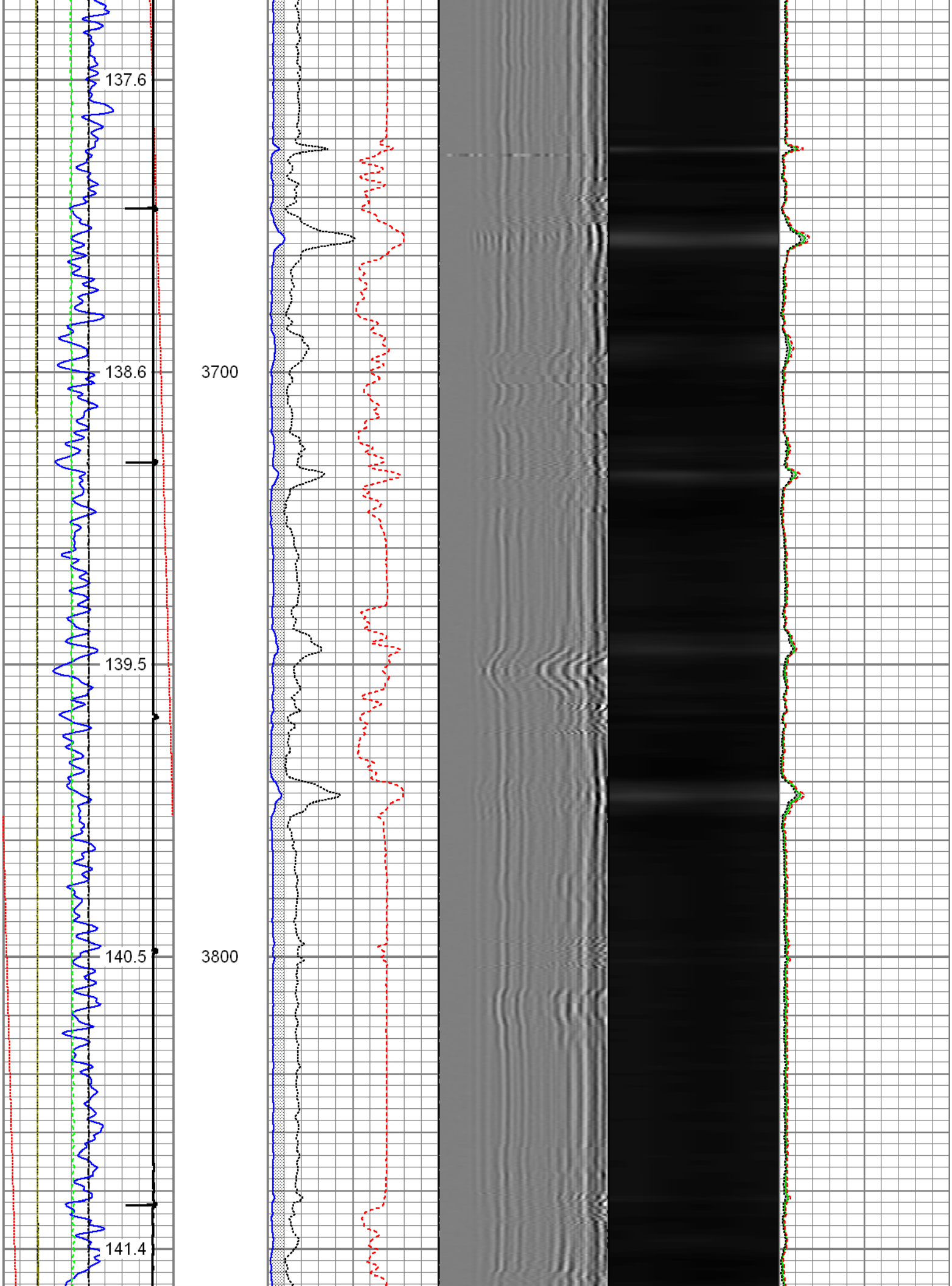
3200
126.3
127.5
3300
128.6
130.0
3400


131.6
133.2
3500
134.9
136.4
3600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138.6
3700
139.5
140.5
3800
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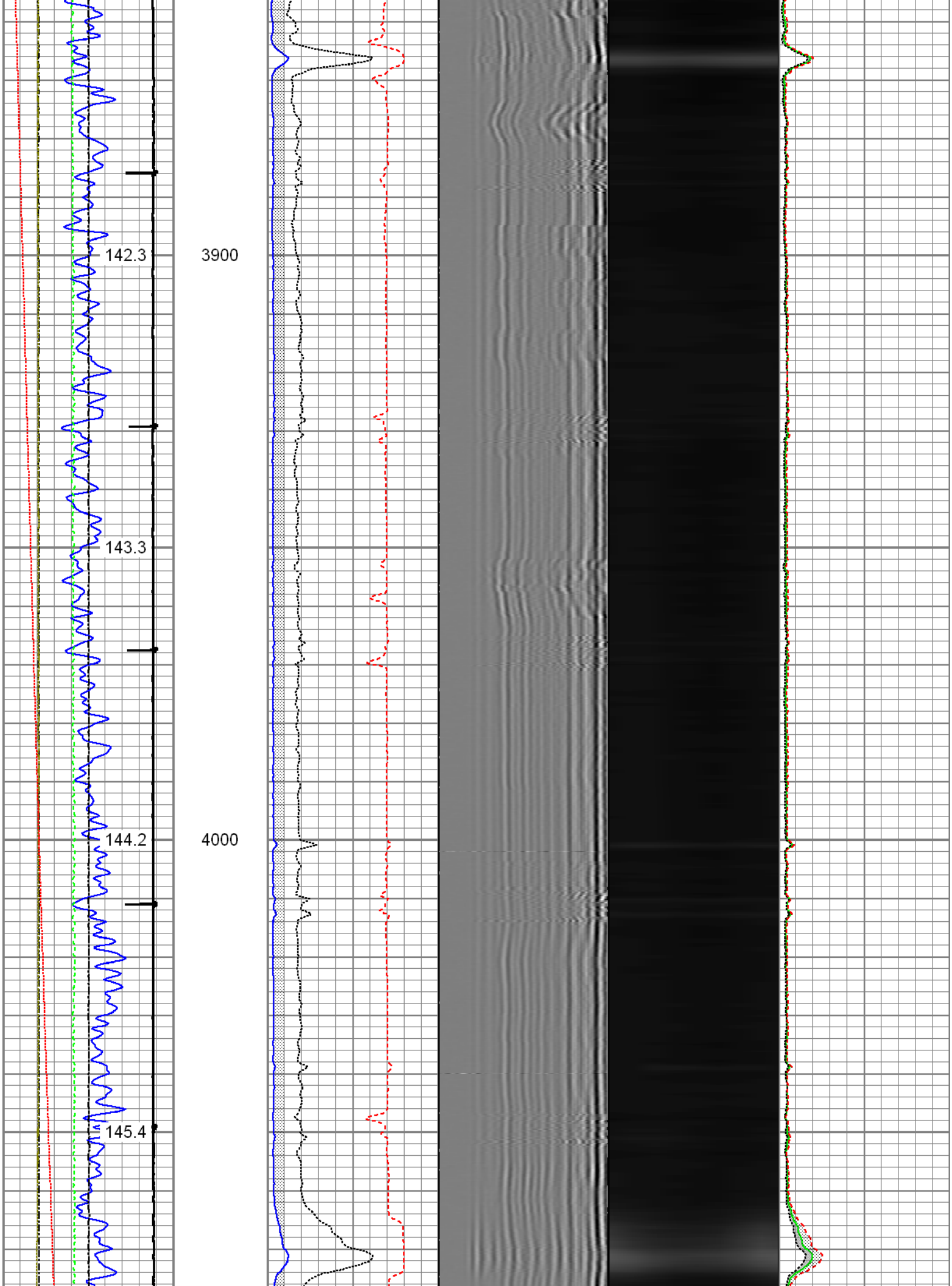
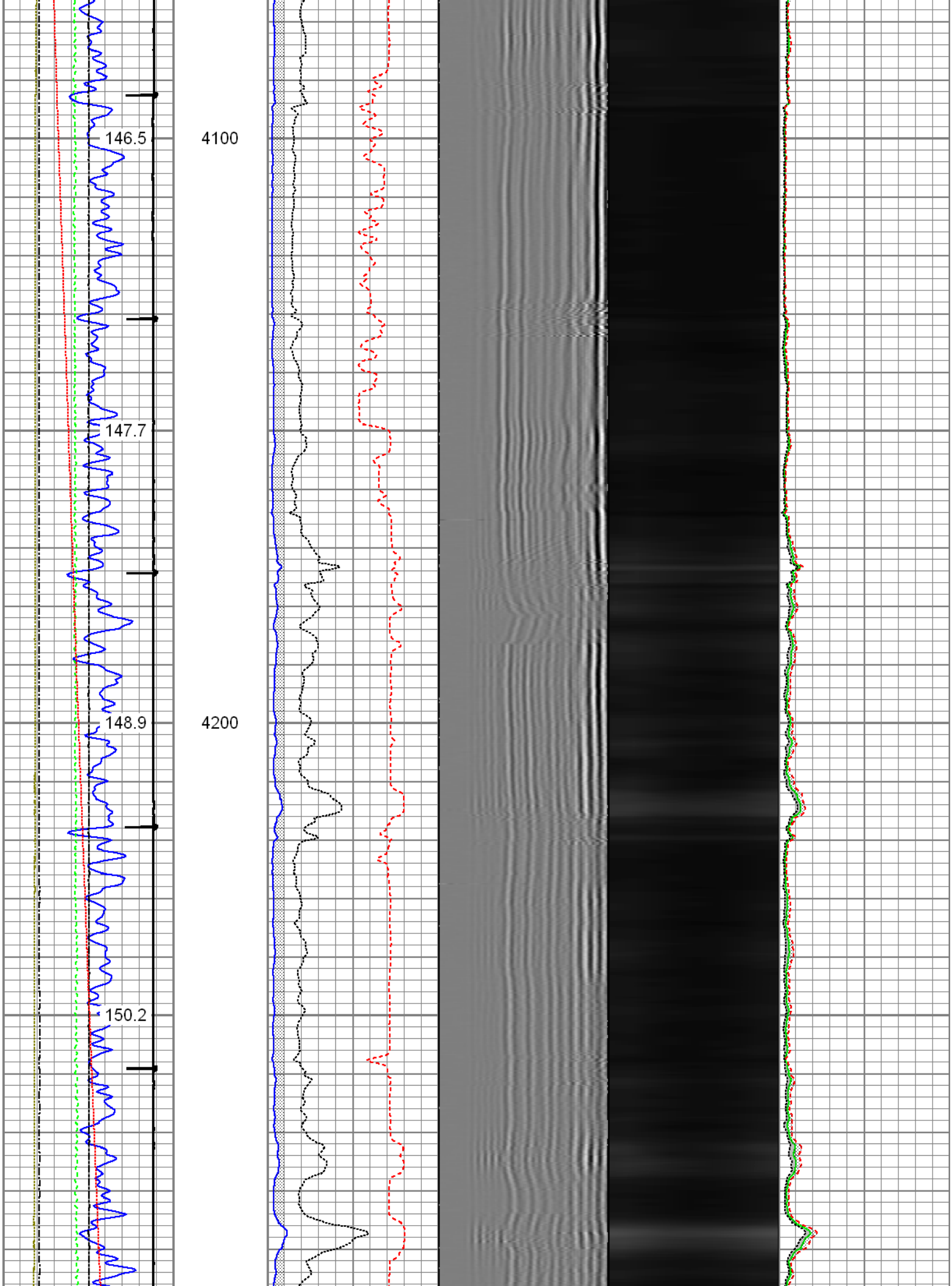

142.3
3900
143.3
144.2
4000
145.4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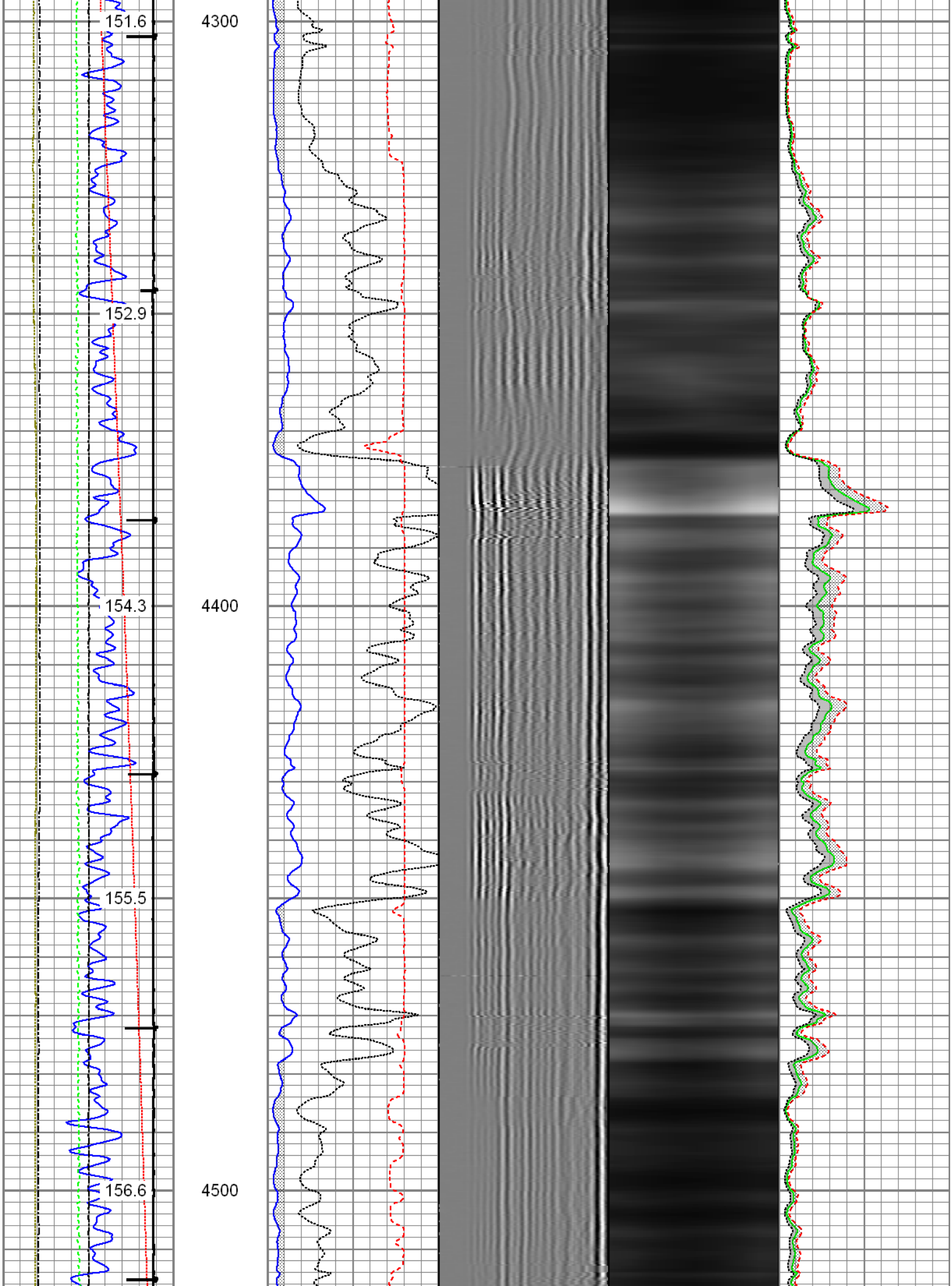
4100
147.7
148.9
4200
150.2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4300
152.9
154.3
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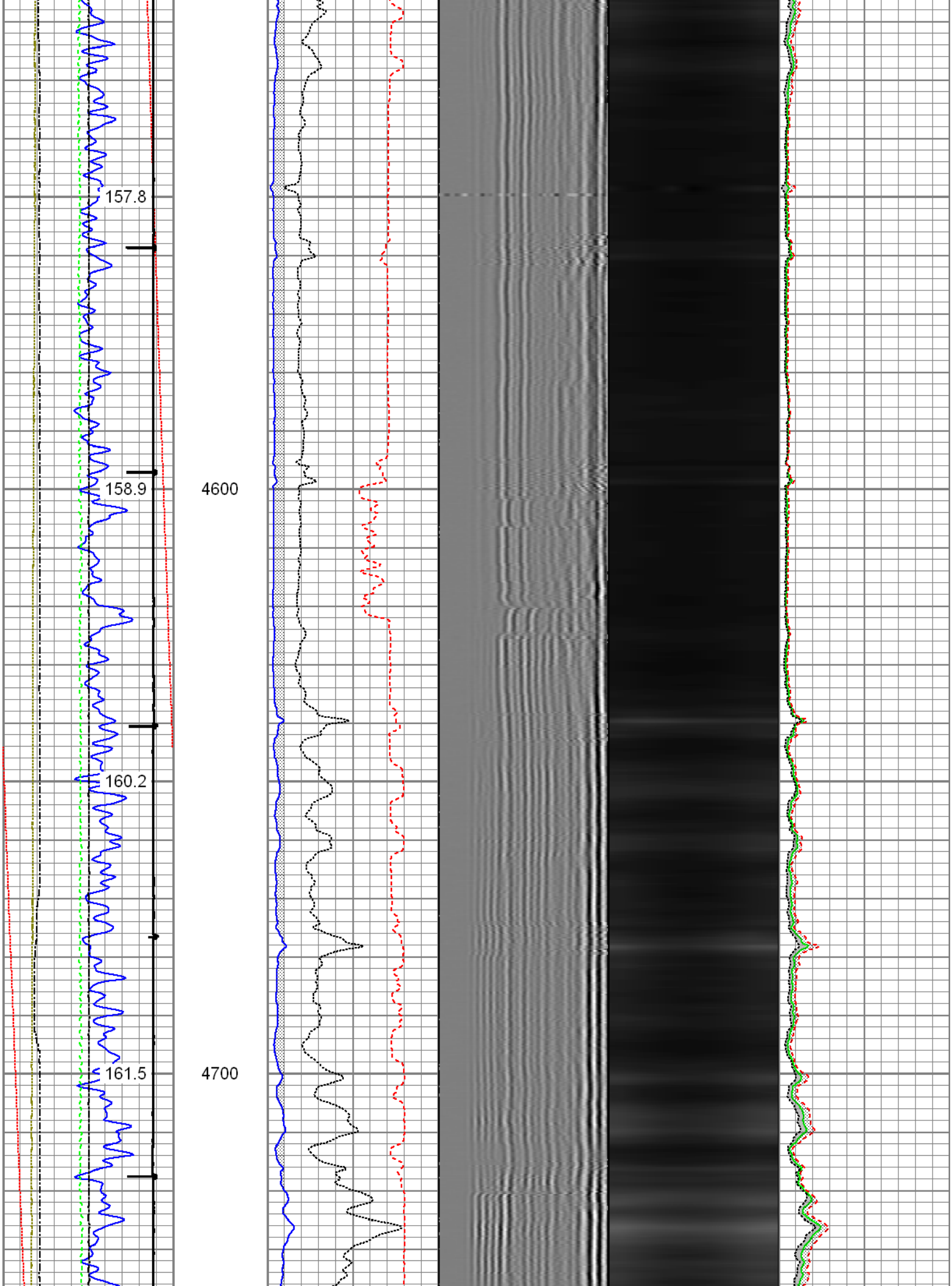
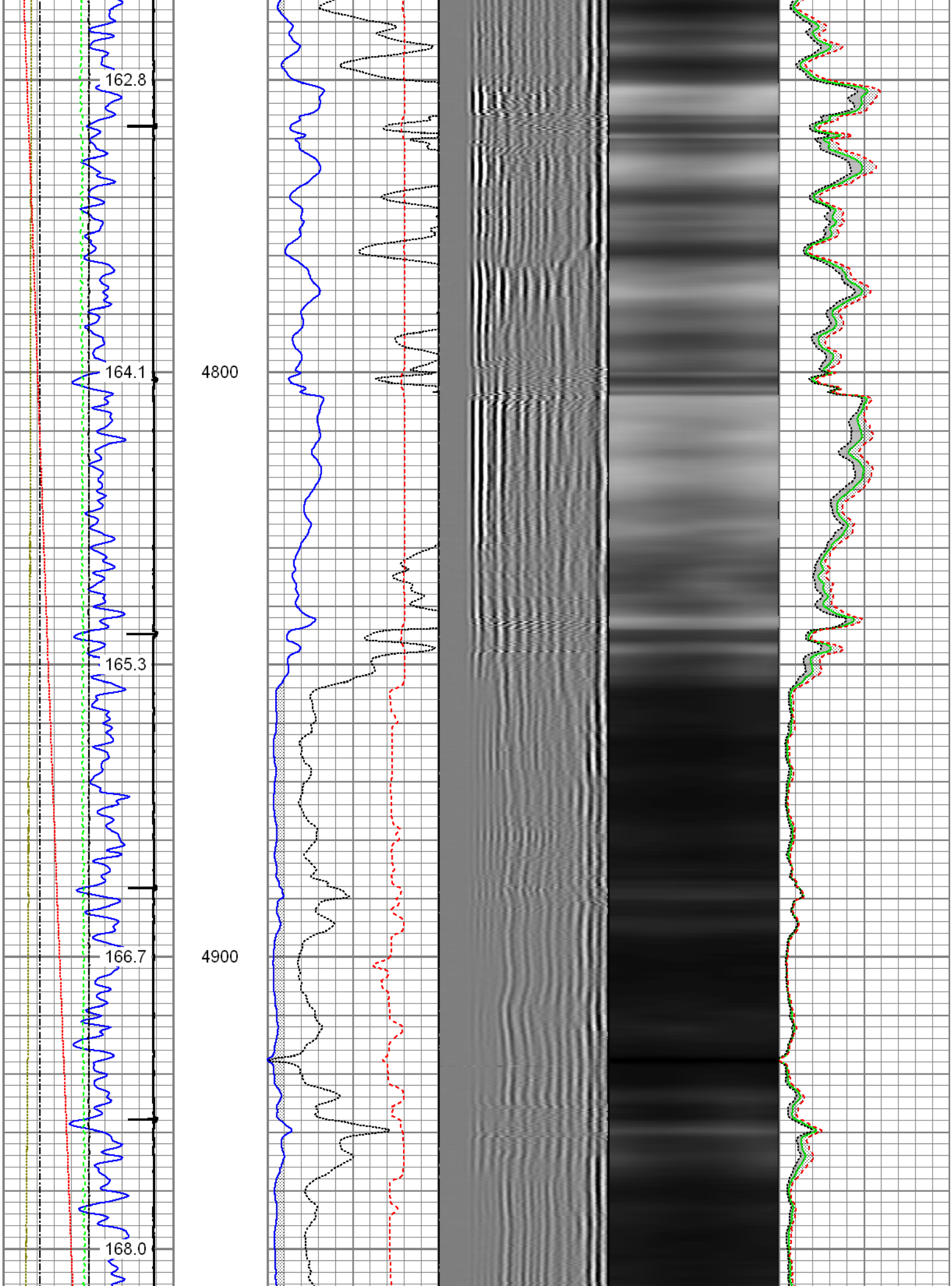
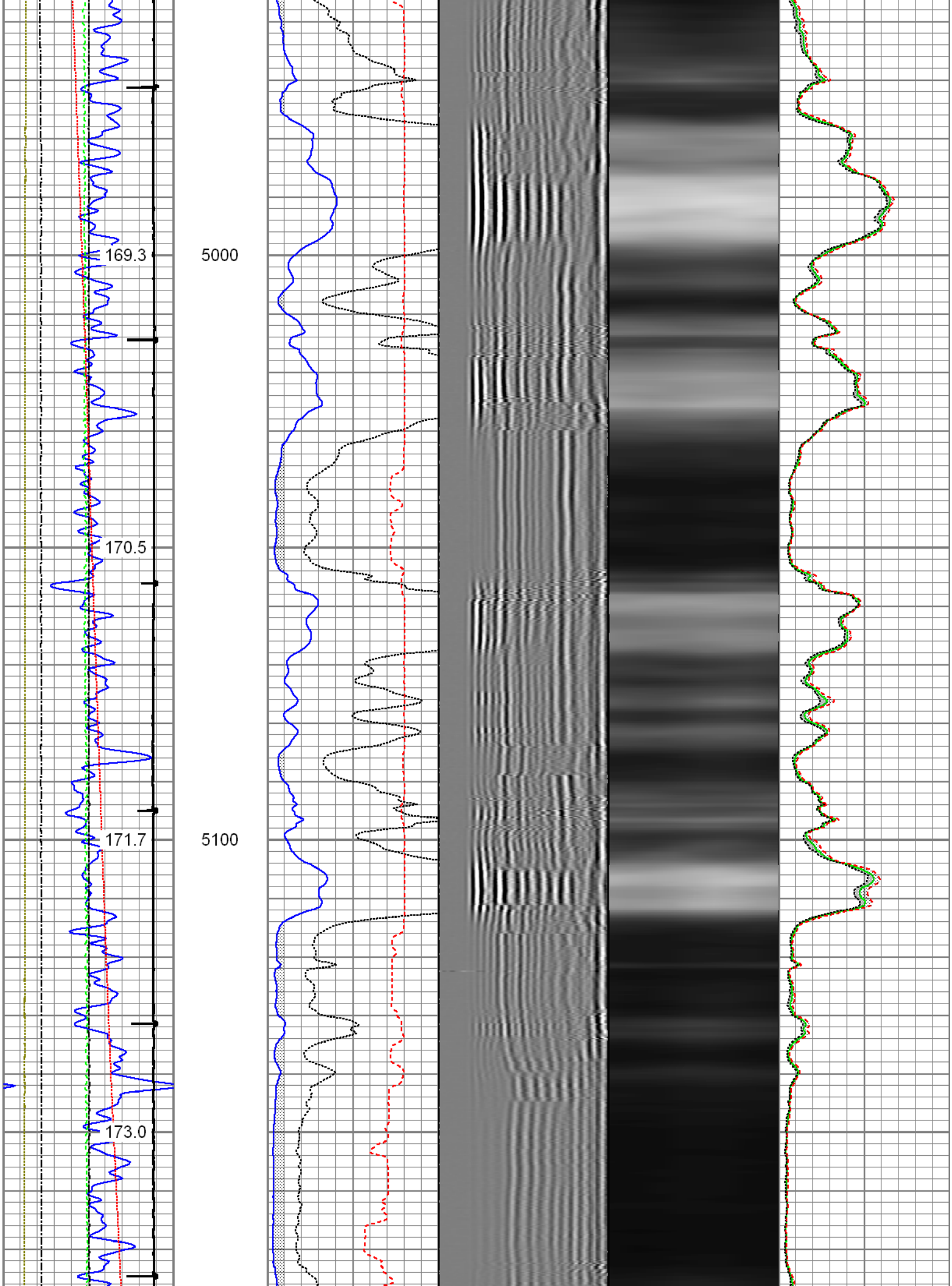
155.5
156.6
4500


157.8
158.9
4600
160.2
161.5
4700


162.8
164.1
4800
165.3
166.7
4900
168.0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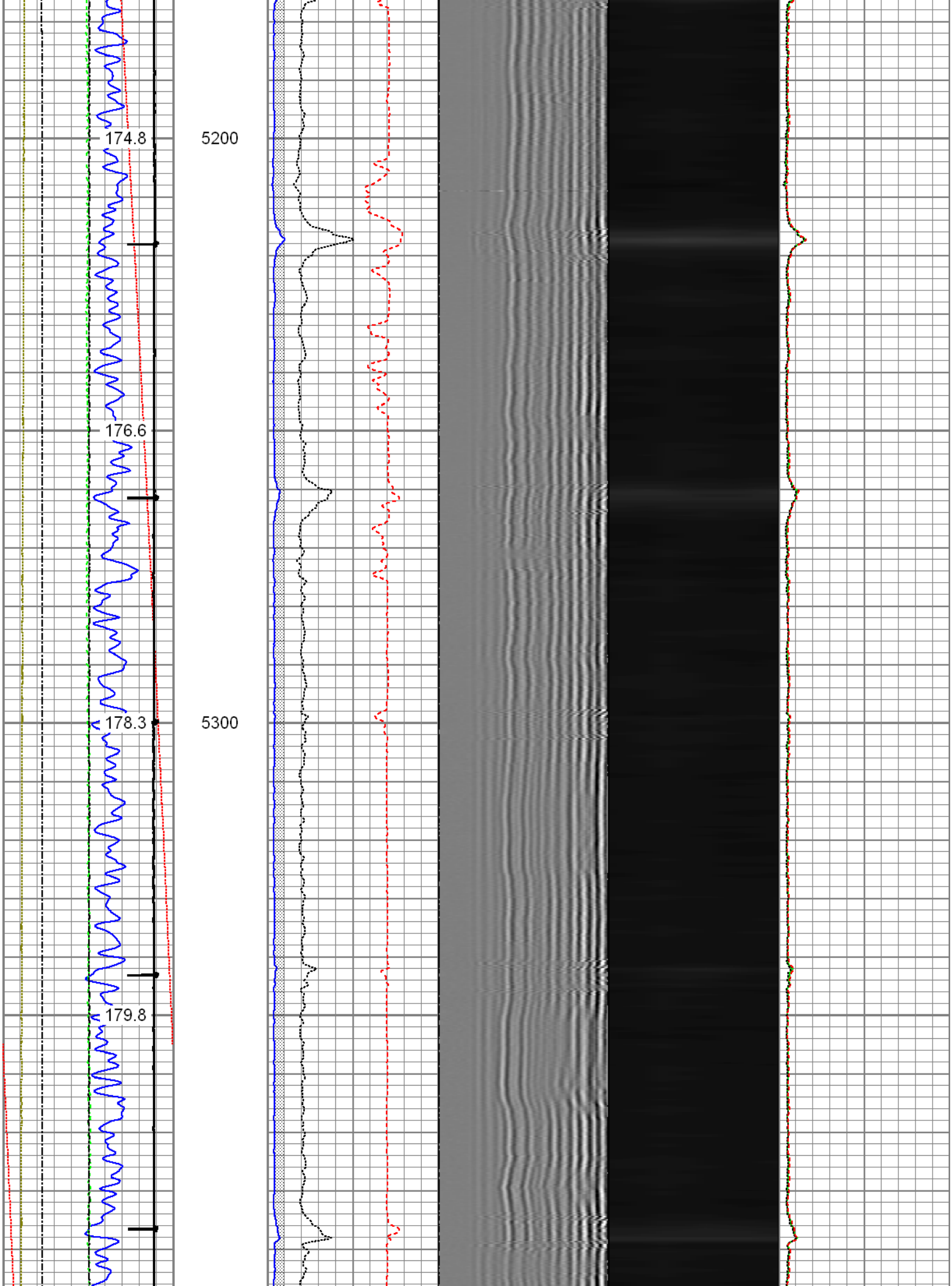
170.5
171.7
5100
173.0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176.6
178.3
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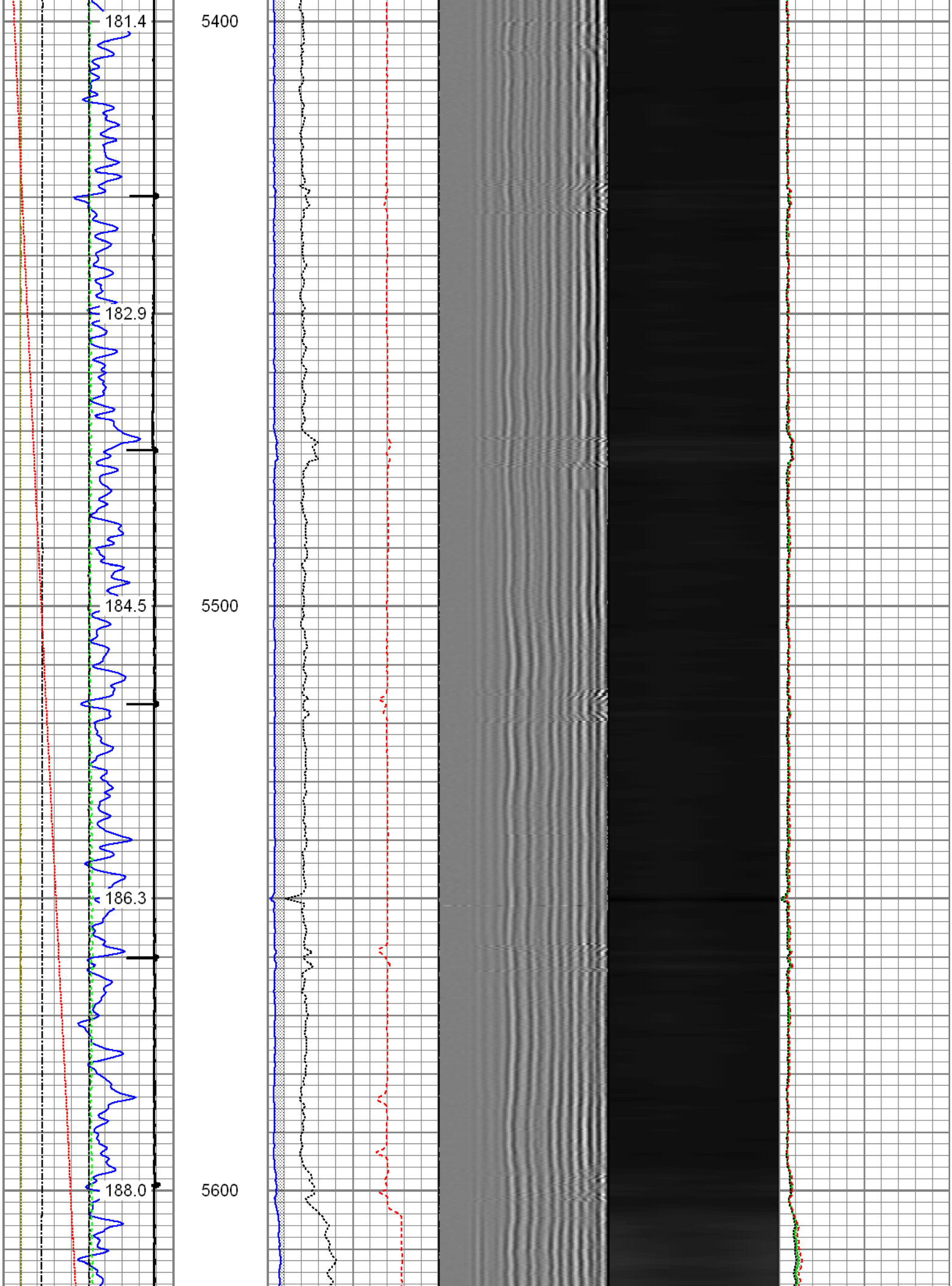
179.8


181.4
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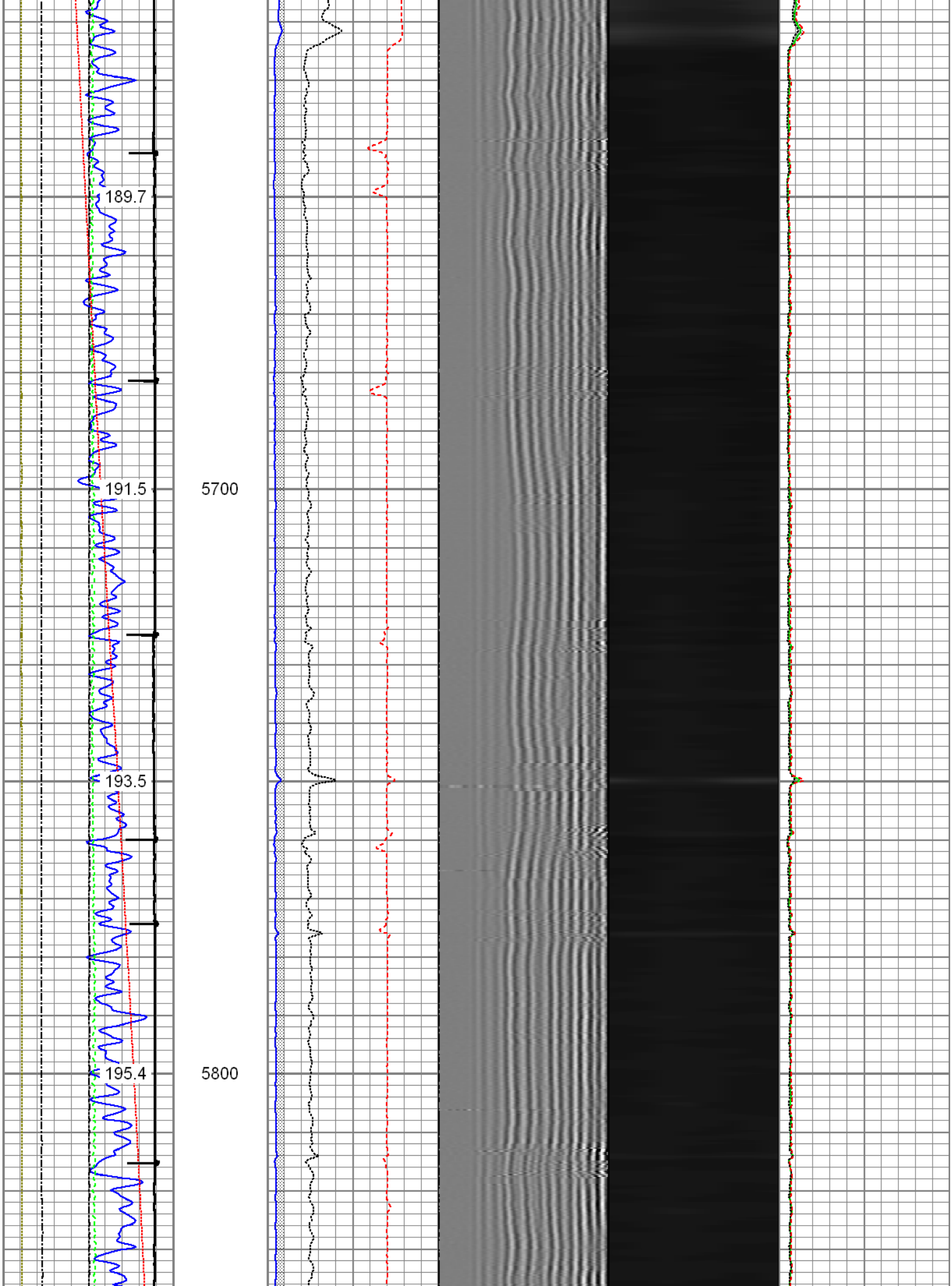
184.5
5500
186.3
188.0
5600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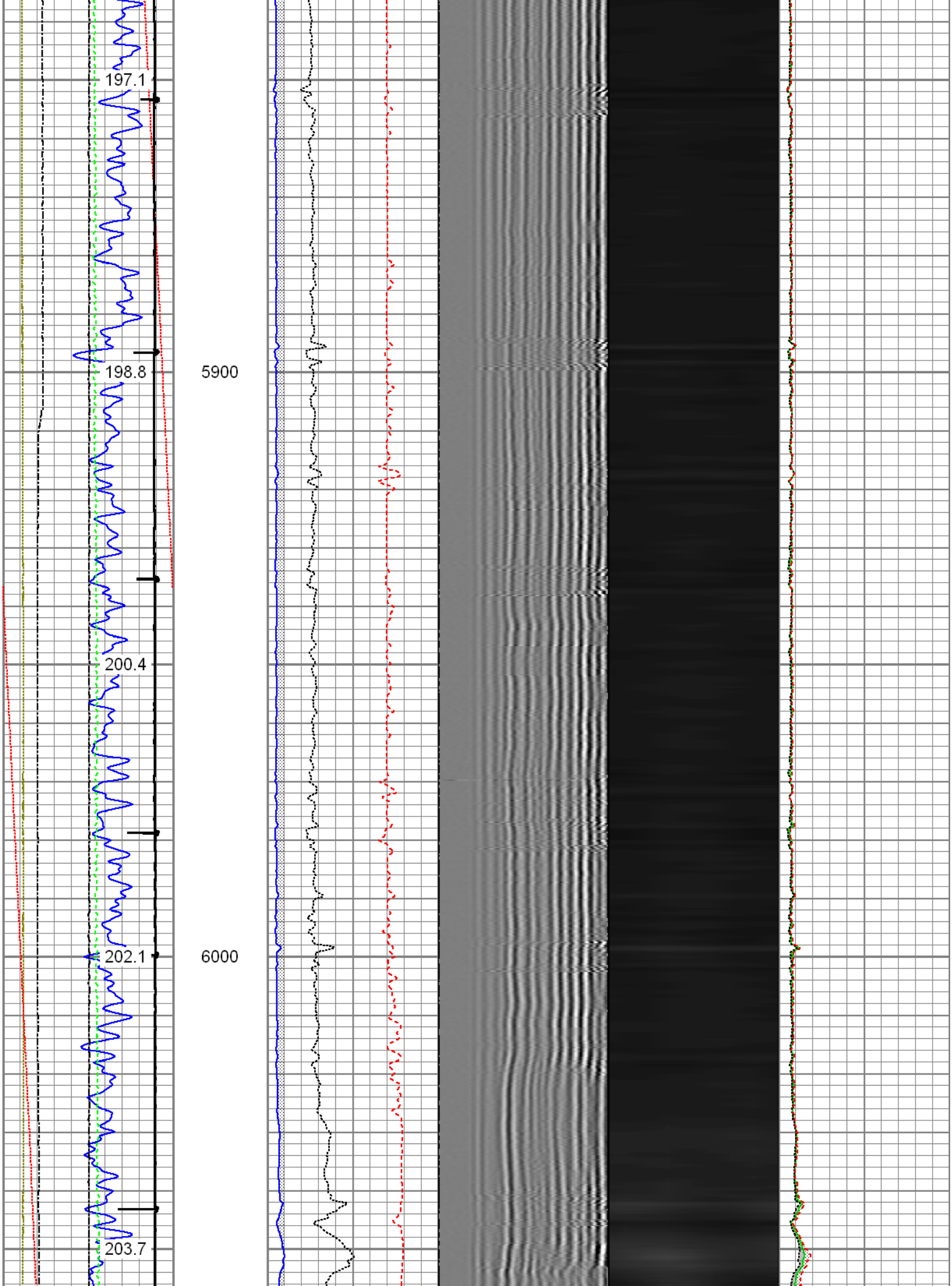
193.5
195.4
5800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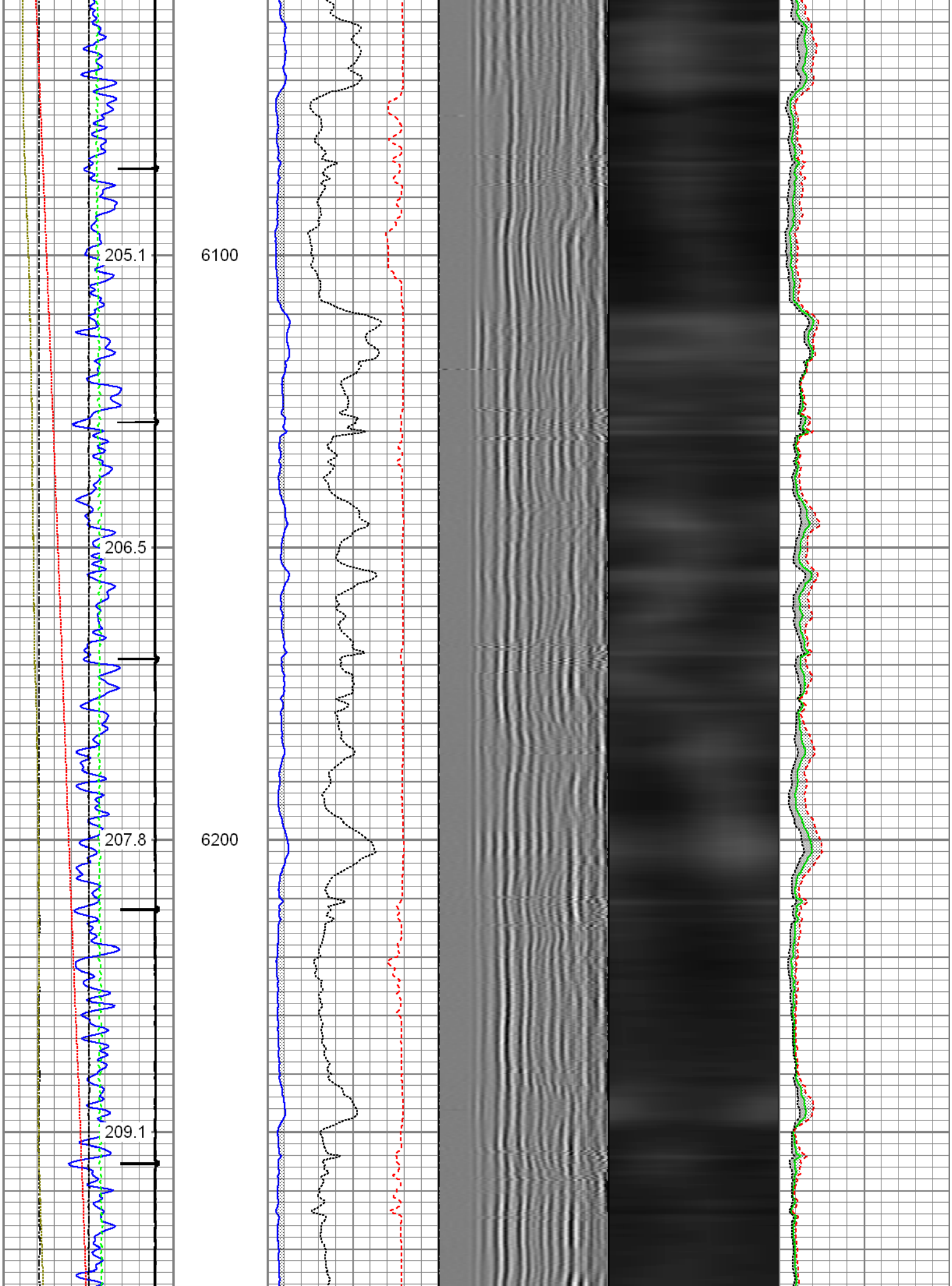
200.4
202.1
6000
203.7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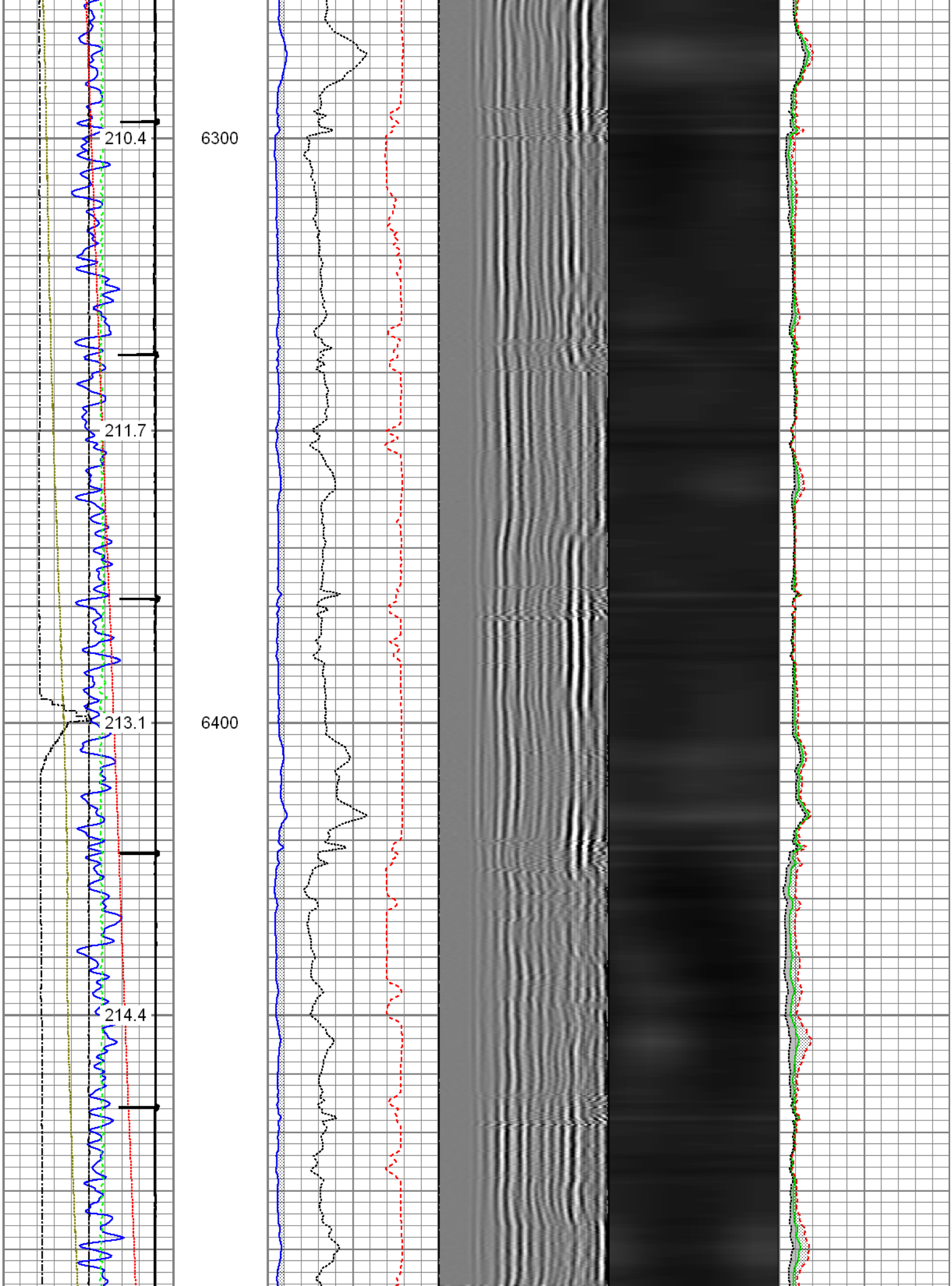
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6300
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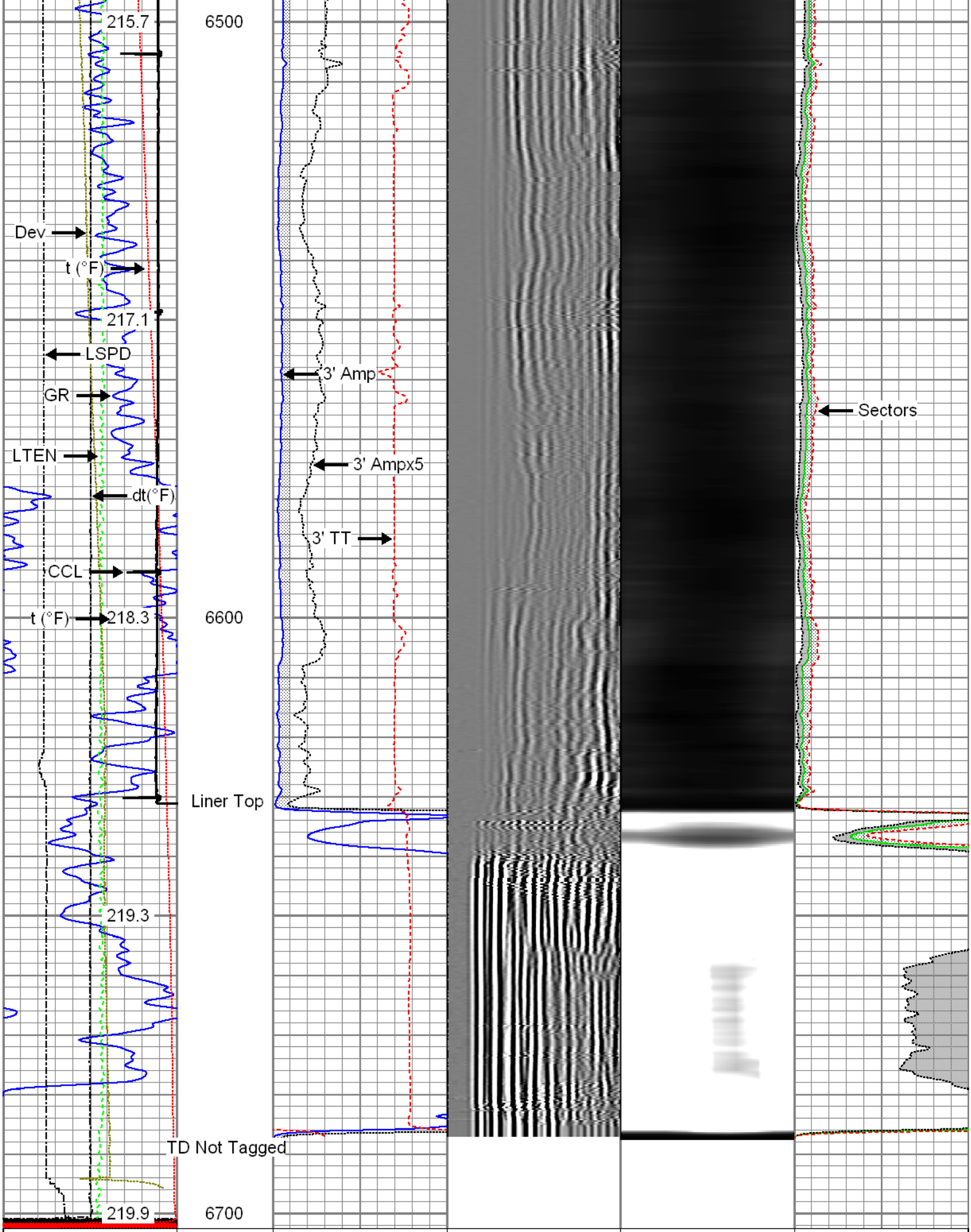

215.7
6500
Dev
t (°F)
217.1
LSPD
GR
LTEN
dt(°F)
CCL
t (°F)
218.3
6600
Liner Top
219.3
TD Not Tagged
219.9
6700
3' Amp
3' Ampx5
3' TT
Sectors
Gamma Ray
0 (GAPI) 120
Line Speed
3' Amplitude
0 (mV) 100
3' Amplitude x 5
5' Variable Density Log
200 1200
Sector Map
Average Amplitude
0 100
Mimimum Amplitude

-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		
-10 Deviation (°) 90		
Temperature		
0 (degF) 20		
Casing Collar Locator		

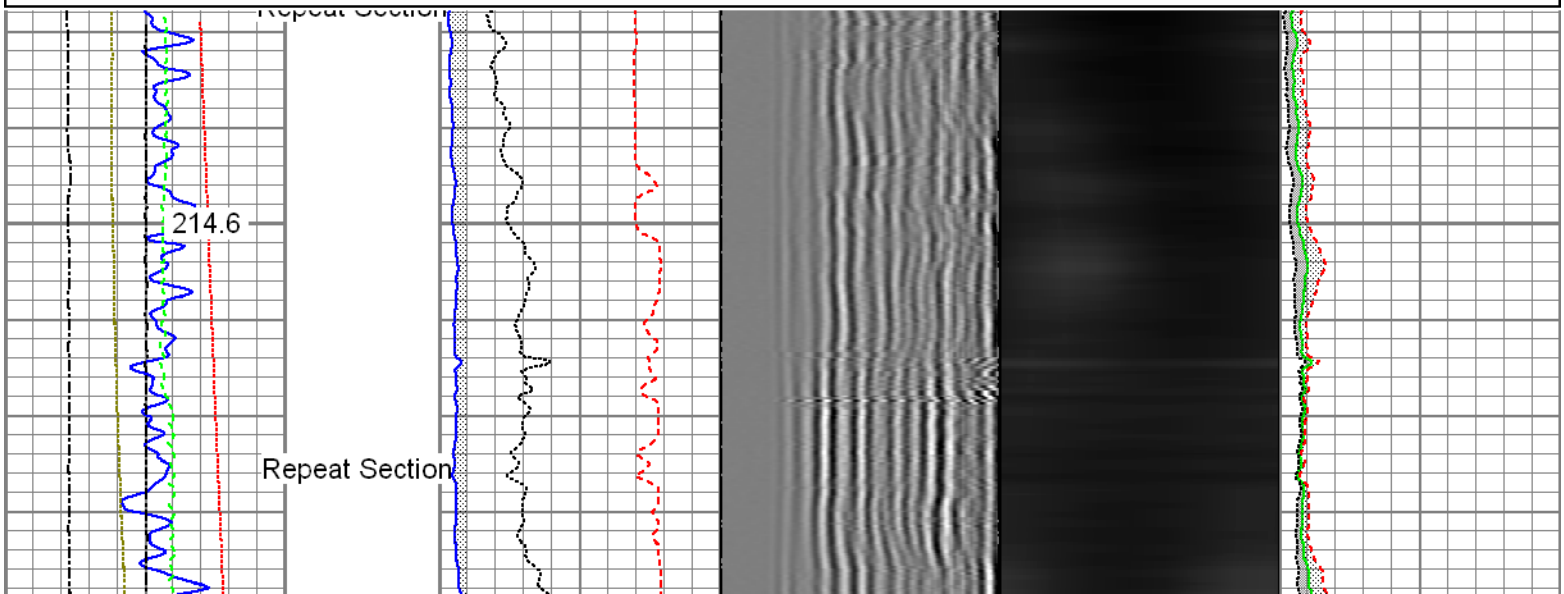
FMC Technologies

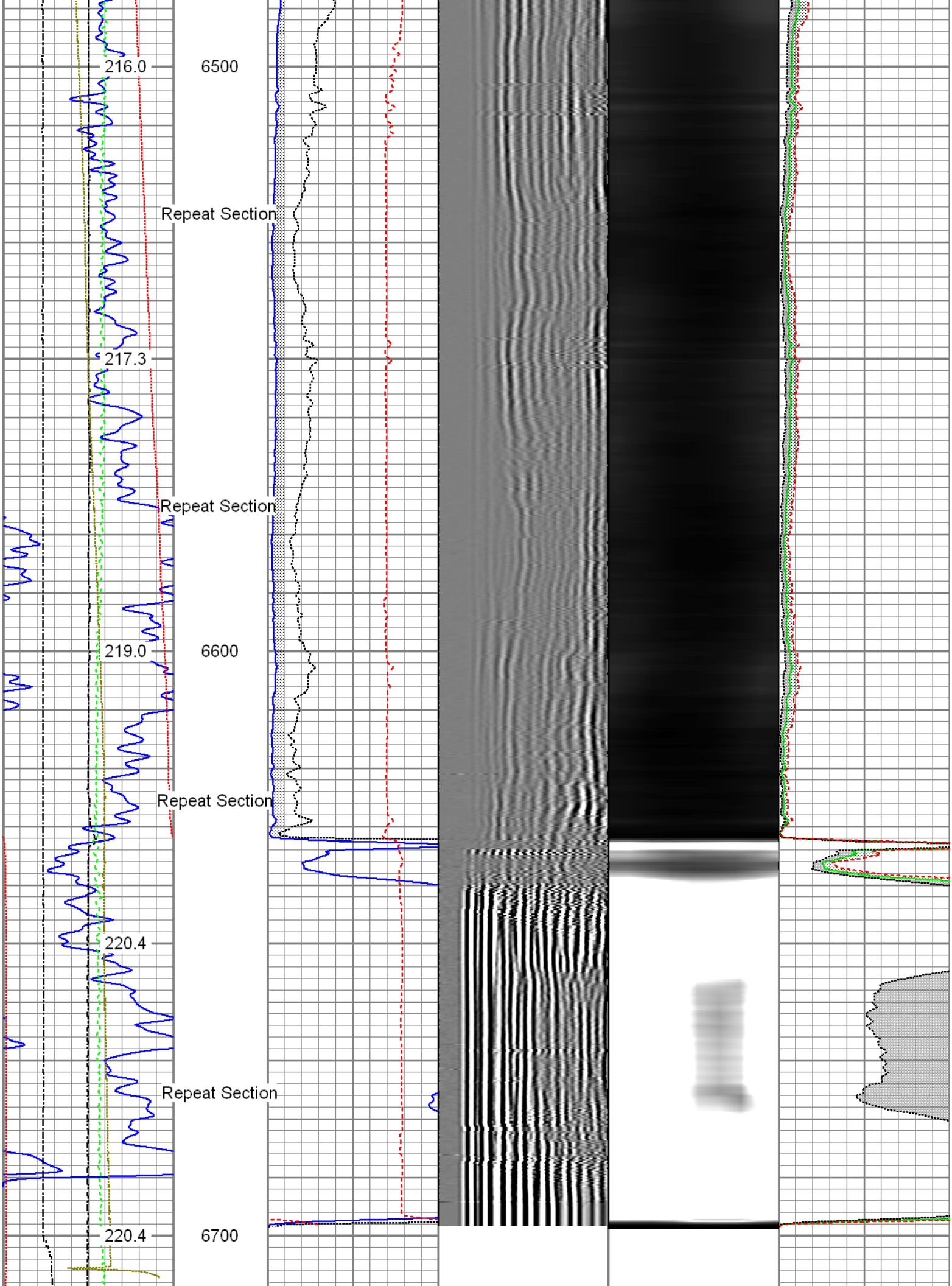
Repeat Section

Recorded with 2500 PSI Surface Induced Pressure

Database File:	07-13-15_noble energy_wells ranch aa11-628_mit_rbl.db
Dataset Pathname:	pass6
Presentation Format:	rbt4_mit
Dataset Creation:	Mon Jul 13 08:06:39 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			Mimimum 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				
-10 Deviation (°) 90				
Temperature				
0 (degF) 20				

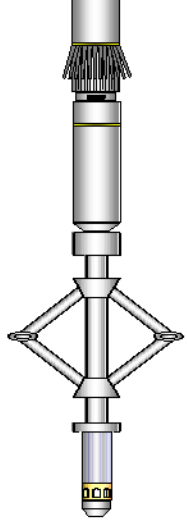



216.0
6500
Repeat Section
217.3
Repeat Section
219.0
6600
Repeat Section
220.4
Repeat Section
220.4
6700

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			Mimimum 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				
-10 Deviation (°) 90				
Temperature				
0 (degF) 20				

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00
			GOpin-GOpin 2" GO Pin to GO Pin Connection	0.23	2.00	5.00
			UW_AGS-UW_AGS_001 (218874) 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
GR	23.85		UW_PGR-UW_PGR_020 (10013902) Production Gamma Ray	1.93	1.69	9.50
			UW_PRC-DSSRAC (084) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00
WVF3FT	16.46					
WVFS1	16.46		UW_RBT-UW_RBT_004 (1063) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00
WVFS2	16.46					
WVFS3	16.46					
WVFS4	16.46					
WVFS5	16.46					
WVFS6	16.46					
WVFS7	16.46					
WVFS8	16.46					
CBLTEMP	16.46					
CBLROT	16.46					
WVF5FT	15.46					
			UW_PRC-DSSRAC (083) 2-3/4" DSS 5 Arm Roller Centralizer	2.55	2.75	32.00

MIT	6.45	UW_MIT-UW_MIT40_042 (10012912) 40 Multifinger Imaging Tool	4.54	2.75	61.10
		UW_PRC #4 -UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
		UW_PRT-UW_PRT_016 (10025100) Platinum Resistance Thermometer	1.04	1.69	5.20
TEMP	0.37	UW_BUL-UW_BUL_006 (218707) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
TSTAMP	0.00				



Dataset: 07-13-15_Noble Energy_Wells Ranch AA11-628_MIT_RBL.db: field/well/run1/pass8.1
Total Length: 28.32 ft
Total Weight: 329.50 lb
O.D. 3.13 in

Calibration Report

Database File: 07-13-15_noble energy_wells ranch aa11-628_mit_rbl.db
Dataset Pathname: pass8.1
Dataset Creation: Mon Jul 13 21:04:09 2015 by Calc 7.0 B1

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

Multi-finger Imaging Tool Calibration Report

Serial Number: 10012912
Number of Fingers: 40
Tool Model: UW_MIT40_042

Inclinometer Calibration Report

Performed: Mon Jul 15 09:39:36 2013
Calibration Angle: 45

	Inc X	Inc Y
Vertical:	1968	1974
Finger 1 up:	1740	1744
Finger 31 up:	2215	1741
Finger 21 up:	2205	2224
Finger 11 up:	1731	2217

Sensitivity ratio: 0.992868
X-axis angle: 134.307
Deviation const.: 335.589

Deviation const.: 335.589

Finger Calibration Report

Performed: Mon Jul 13 07:25:35 2015

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	1021	385.0	1406	384.0	1790	410.0	2200
Finger 02:	1166	393.0	1559	385.0	1944	401.0	2345
Finger 03:	1066	414.0	1480	402.0	1882	428.0	2310
Finger 04:	1064	391.0	1455	391.0	1846	418.0	2264
Finger 05:	1051	404.0	1455	397.0	1852	420.0	2272
Finger 06:	1063	405.0	1468	393.0	1861	417.0	2278
Finger 07:	1039	410.0	1449	396.0	1845	419.0	2264
Finger 08:	1068	401.0	1469	388.0	1857	417.0	2274
Finger 09:	1056	406.0	1462	388.0	1850	413.0	2263
Finger 10:	1061	404.0	1465	388.0	1853	414.0	2267
Finger 11:	1057	404.0	1461	386.0	1847	408.0	2255
Finger 12:	1047	417.0	1464	385.0	1849	414.0	2263
Finger 13:	1054	409.0	1463	380.0	1843	402.0	2245
Finger 14:	1042	416.0	1458	389.0	1847	413.0	2260
Finger 15:	989	414.0	1403	404.0	1807	426.0	2233
Finger 16:	1002	415.0	1417	402.0	1819	424.0	2243
Finger 17:	919	392.0	1311	390.0	1701	421.0	2122
Finger 18:	1042	401.0	1443	412.0	1855	413.0	2268
Finger 19:	1014	405.0	1419	393.0	1812	413.0	2225
Finger 20:	1000	412.0	1412	406.0	1818	427.0	2245
Finger 21:	1013	423.0	1436	404.0	1840	410.0	2250
Finger 22:	979	412.0	1391	407.0	1798	426.0	2224
Finger 23:	943	413.0	1356	414.0	1770	438.0	2208
Finger 24:	1012	408.0	1420	395.0	1815	401.0	2216
Finger 25:	957	406.0	1363	414.0	1777	432.0	2209
Finger 26:	1098	399.0	1497	386.0	1883	395.0	2278
Finger 27:	1034	401.0	1435	405.0	1840	415.0	2255
Finger 28:	1055	394.0	1449	393.0	1842	404.0	2246
Finger 29:	990	400.0	1390	411.0	1801	428.0	2229
Finger 30:	1033	428.0	1461	404.0	1865	416.0	2281
Finger 31:	1056	391.0	1447	398.0	1845	411.0	2256
Finger 32:	1028	400.0	1428	411.0	1839	427.0	2266
Finger 33:	1119	393.0	1512	386.0	1898	390.0	2288
Finger 34:	1084	385.0	1469	393.0	1862	409.0	2271
Finger 35:	1021	399.0	1420	418.0	1838	437.0	2275
Finger 36:	1037	394.0	1431	403.0	1834	429.0	2263
Finger 37:	1092	394.0	1486	393.0	1879	412.0	2291
Finger 38:	1122	390.0	1512	389.0	1901	398.0	2299
Finger 39:	1118	384.0	1502	383.0	1885	401.0	2286
Finger 40:	1064	393.0	1457	398.0	1855	418.0	2273

Segmented Cement Bond Log Calibration Report

Serial Number: 1063
Tool Model: UW_RBT_004

Calibration Casing Diameter: 7.000 in
Calibration Depth: 86.426 ft

Master Calibration, performed Mon Jul 13 21:04:02 2015:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	-0.002	0.682	0.800	62.165	89.687	1.000
5FT	-0.008	0.715	0.800	62.165	84.861	1.520
S1	-0.003	0.683	0.000	100.000	145.694	0.482

S2	-0.003	0.667	0.000	100.000	149.216	0.464
S3	-0.003	0.648	0.000	100.000	153.623	0.449
S4	-0.003	0.667	0.000	100.000	149.225	0.439
S5	-0.002	0.684	0.000	100.000	145.784	0.349
S6	-0.002	0.696	0.000	100.000	143.147	0.331
S7	-0.003	0.711	0.000	100.000	140.027	0.481
S8	-0.003	0.698	0.000	100.000	142.771	0.389

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

FMC Technologies

Company	Noble Energy Inc.
Well	Wells Ranch AA11-628
Field	Wattenberg
County	Weld
State	Colorado