

Radial Cement Bond Gamma Ray Casing Collar Log

Company	Kerr-McGee Oil & Gas Onshore, L.P.	Company	Kerr-McGee Oil & Gas Onshore, L.P.
Well	Howard 28N-29HZ	Well	Howard 28N-29HZ
Field	Wattenberg	Field	Wattenberg
County	Weld	County	Weld
State	Colorado	State	Colorado
Location:	API #: 05-123-37864 SHL: 2439' FNL & 1865' FWL SENW Lat / Long: 40.008137/-104.917085 SEC 32 TWP 1N RGE 67W		
Permanent Datum	Ground Level	Elevation	5049'
Log Measured From	Kelly Bushing	Elevation	16 FT
Drilling Measured From	Kelly Bushing	Elevation	5049'
		MIT	JB/GR

Date	25-Sept-2014
Run Number	Two
Depth Driller	15238 FT
Depth Logger	7630 FT
Bottom Logged Interval	7624 FT
Top Log Interval	Surface
Open Hole Size	8.75"
Type Fluid	Water
Density / Viscosity	8.34 lb/gal
Max. Recorded Temp.	227°F
Estimated Cement Top	27 FT
Time Well Ready	ROA
Time Logger on Bottom	10:00
Equipment Number	HD-0311
Location	Fort Lupton, CO
Recorded By	J. Raby
Witnessed By	Sonny Segura

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
Casing Record	Size (in)	Wgt (lbs/ft)	Grade	Top	Bottom		
Surface Casing	9 5/8"	36#	J-55 LTC	Surface	980 FT		
Intermediate #1	7"	26#	P-110 LTC	Surface	7943 FT		
Intermediate #2							
Liner	4 1/2	11.6#	P-110 LTC/DOX	6954 FT	15228 FT		

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

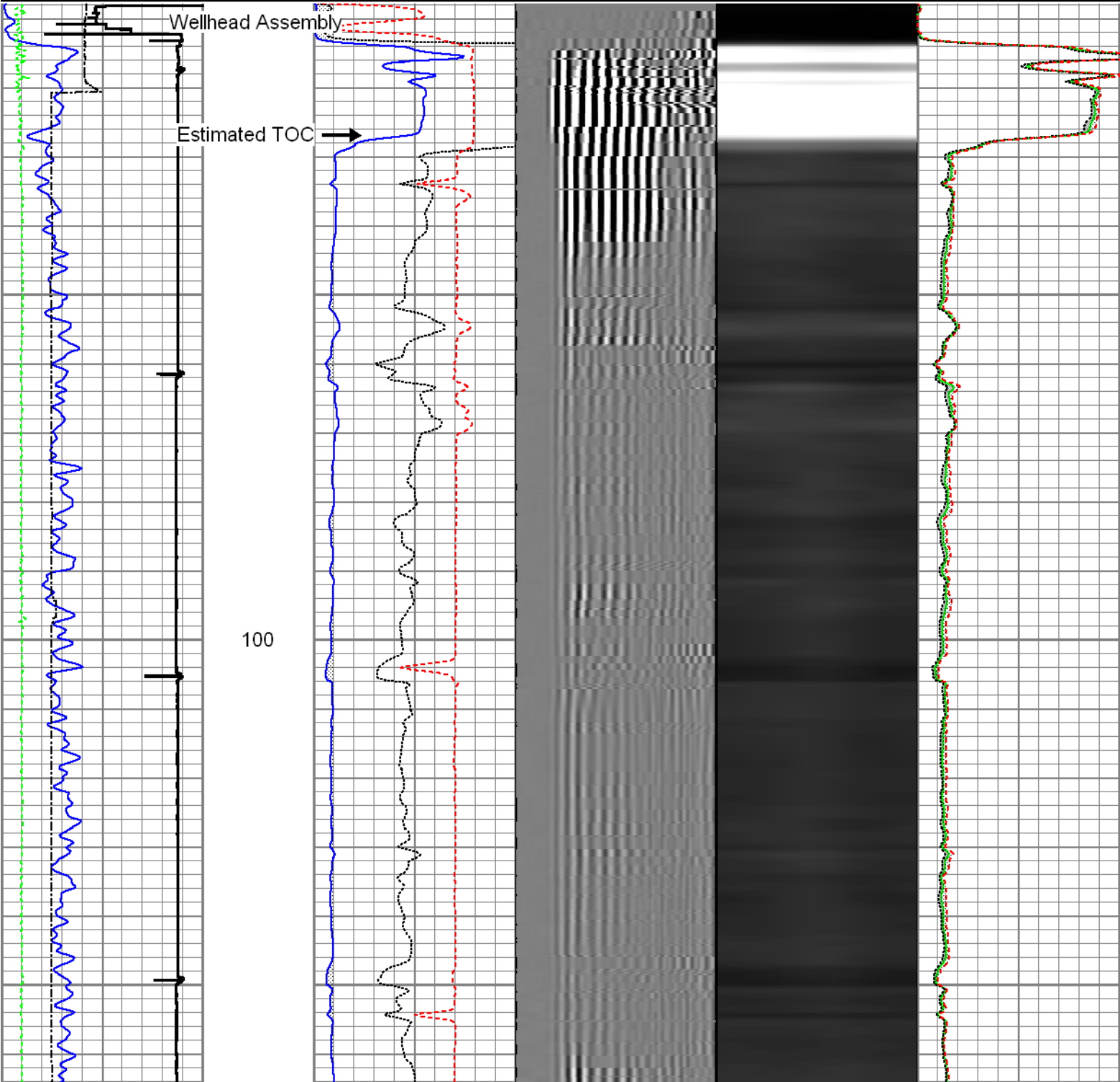
Comments

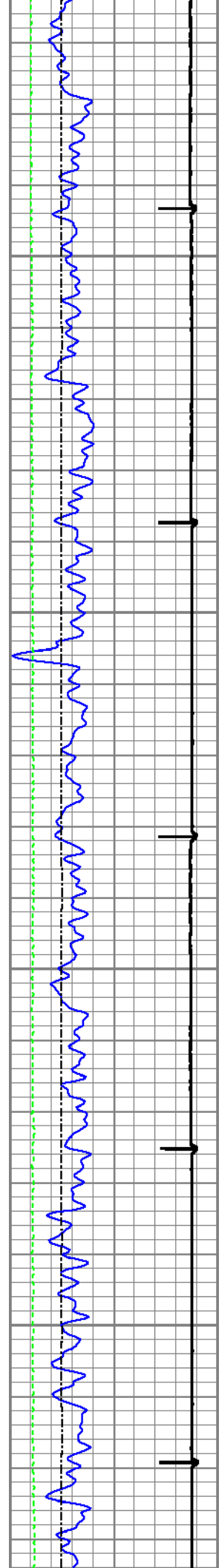
Log ran as per Customer request.
 Depth reference to reported liner top at 6954 FT.
 Log ran from as deep as possible to surface.
 Log ran with 2800 PSI surface induced pressure.
 Depth Corrected -6 FT.

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

Database File: 0512337864_anadarko_howard 28n-29hz_09-25-14_mit_rbl.db
Dataset Pathname: pass11
Presentation Format: rbt4_mit
Dataset Creation: Thu Sep 25 11:05:36 2014 by Log SCH 111116
Charted by: Depth in Feet scaled 1:240

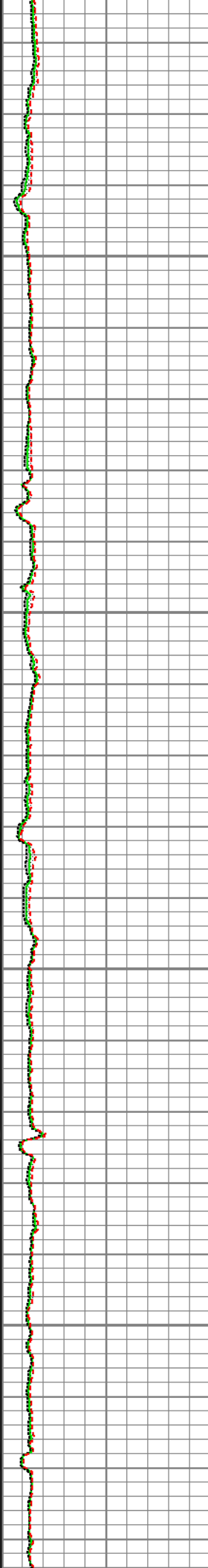
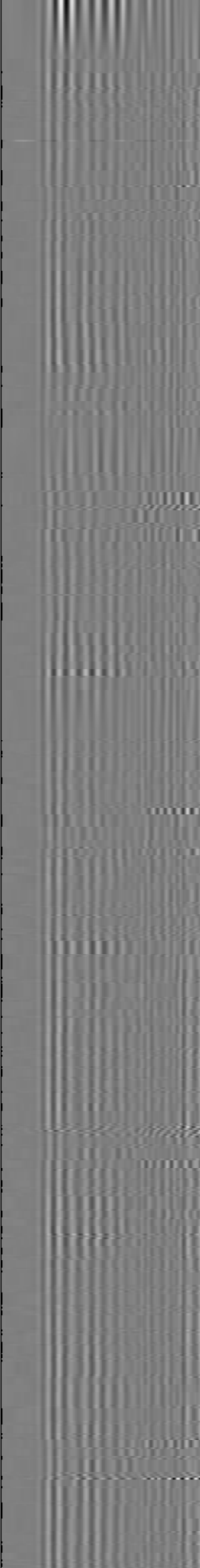
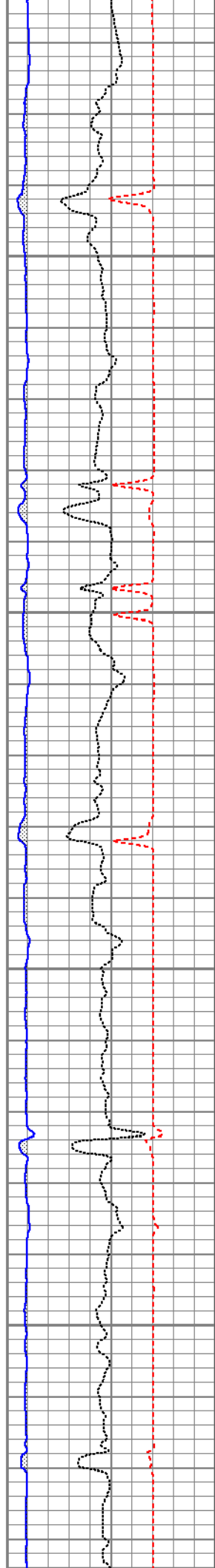
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Minimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000				

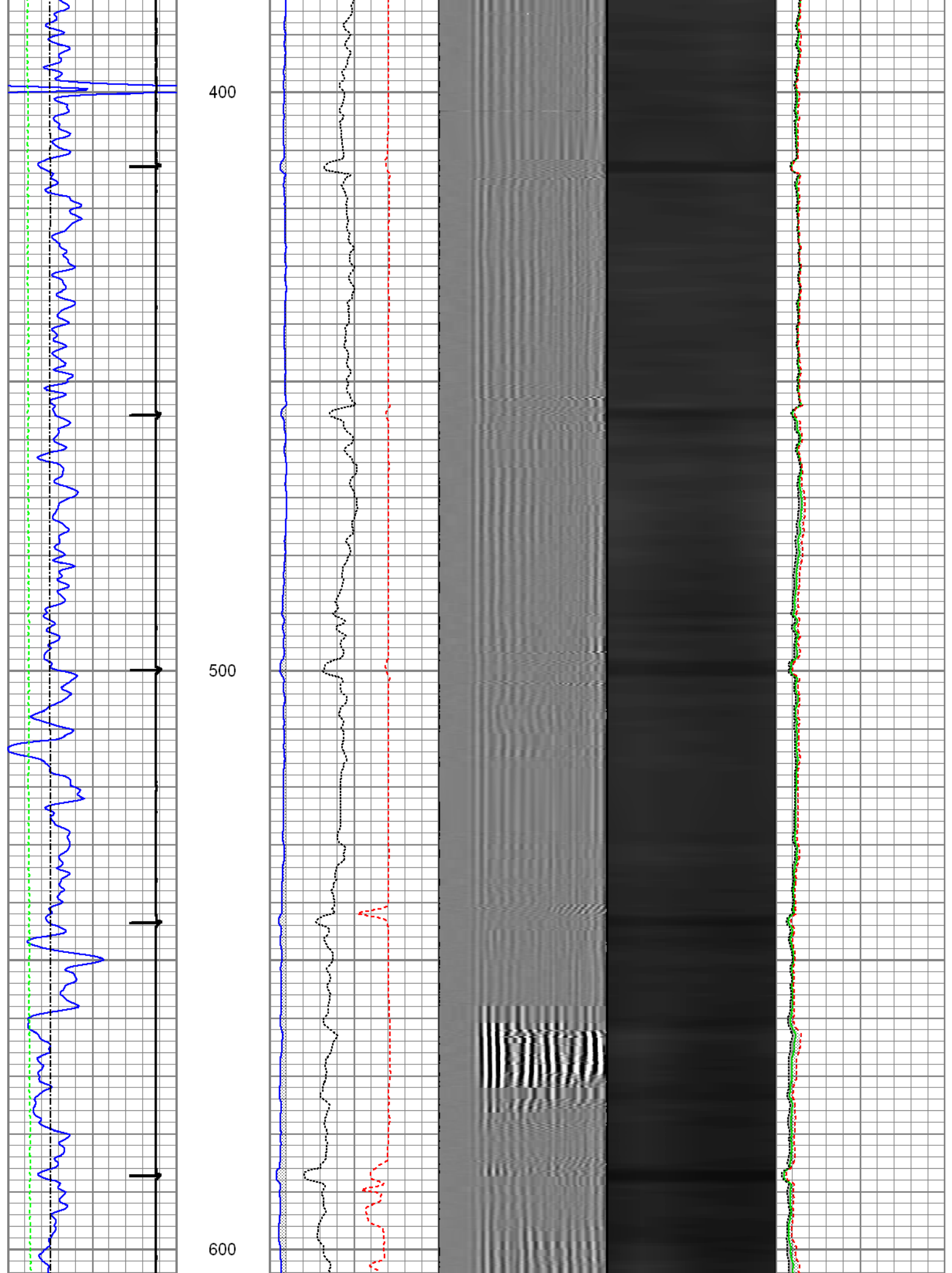


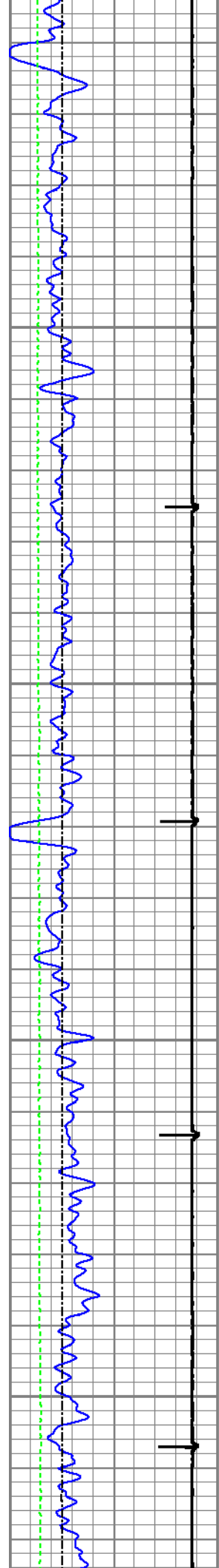


200

300

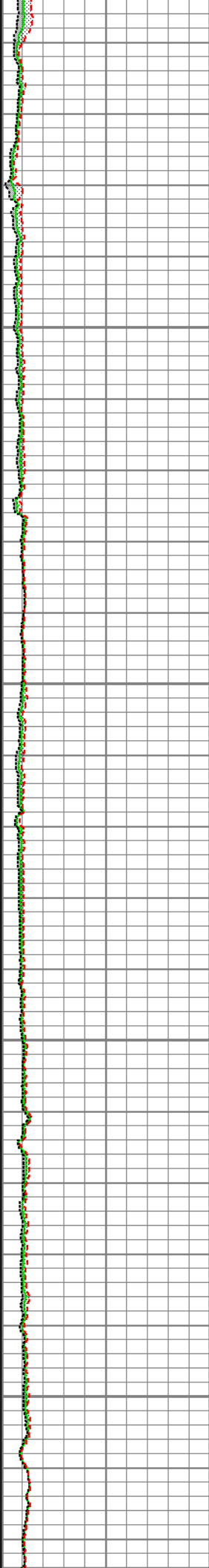
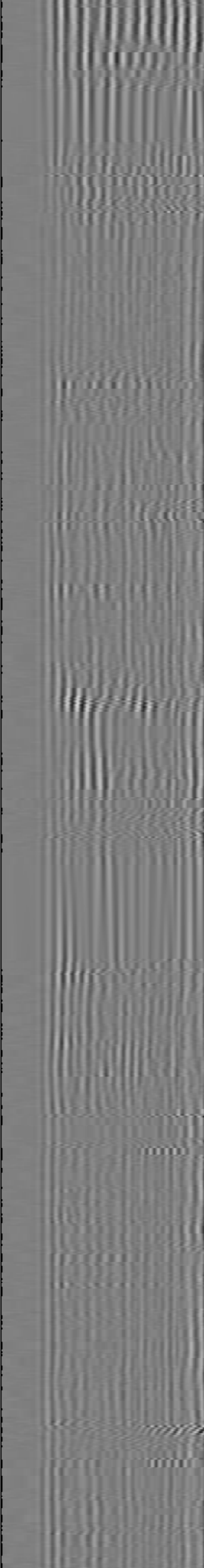
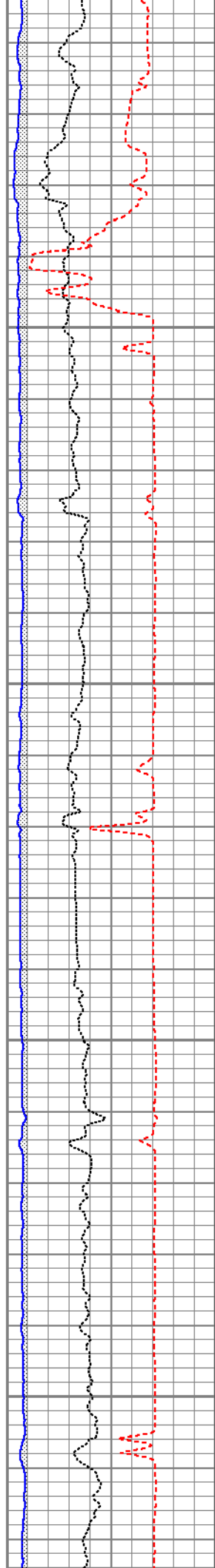


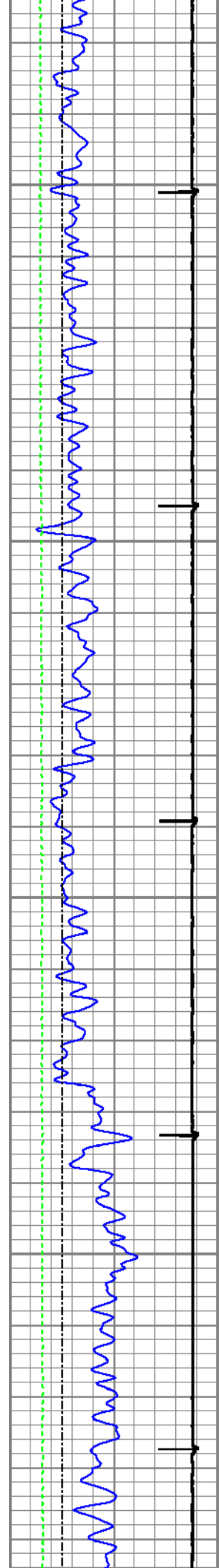




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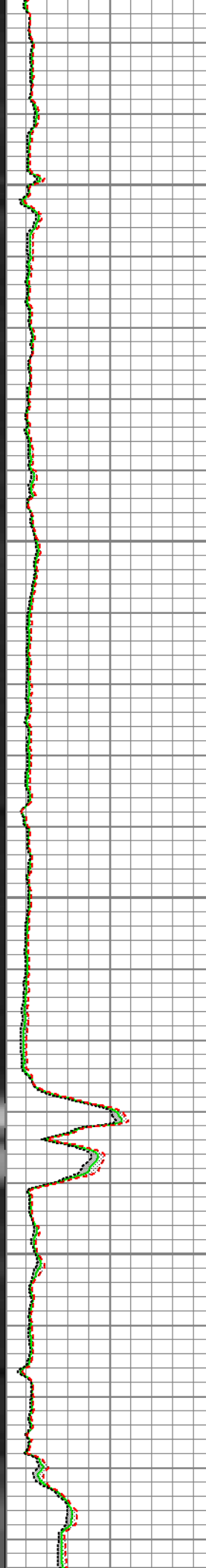
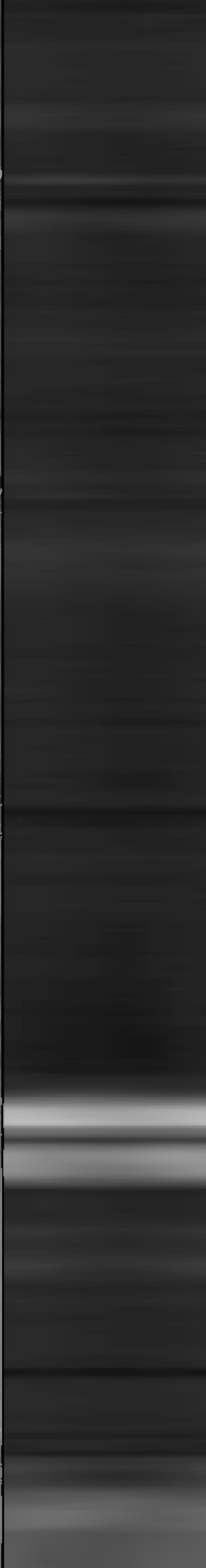
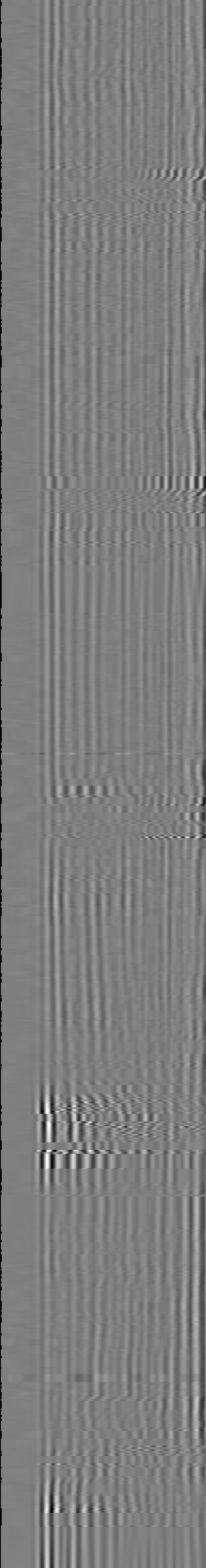
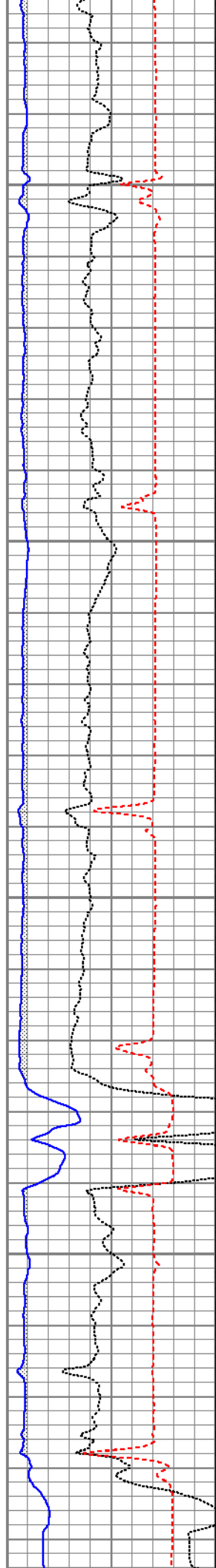
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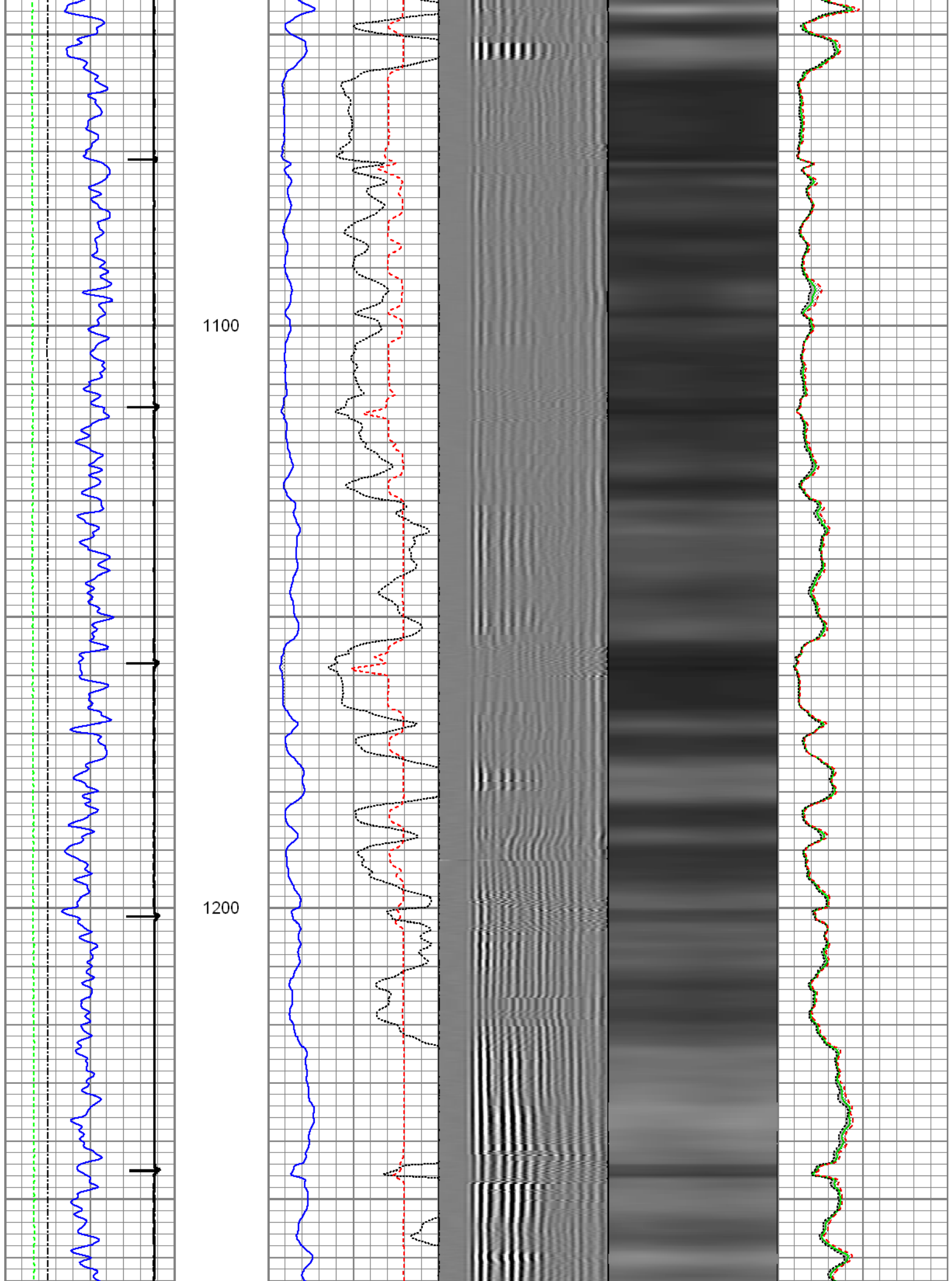


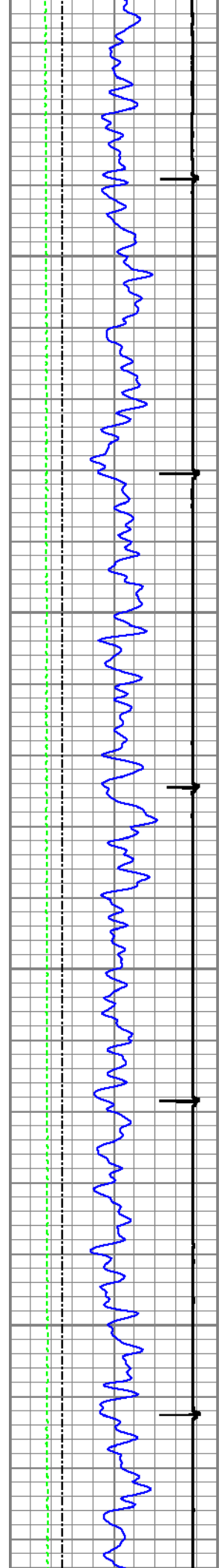


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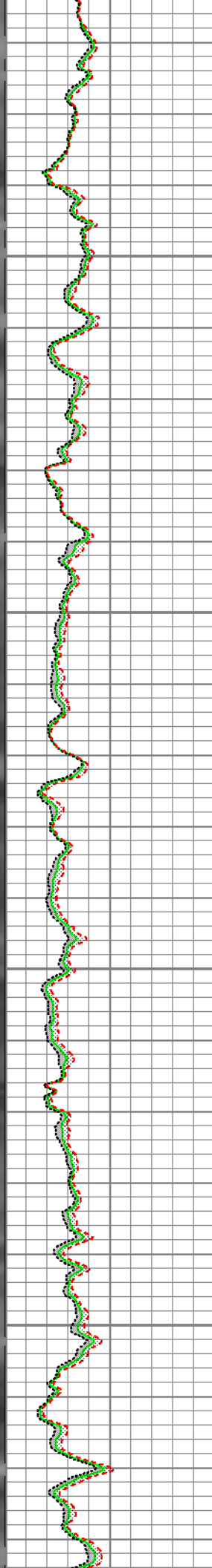
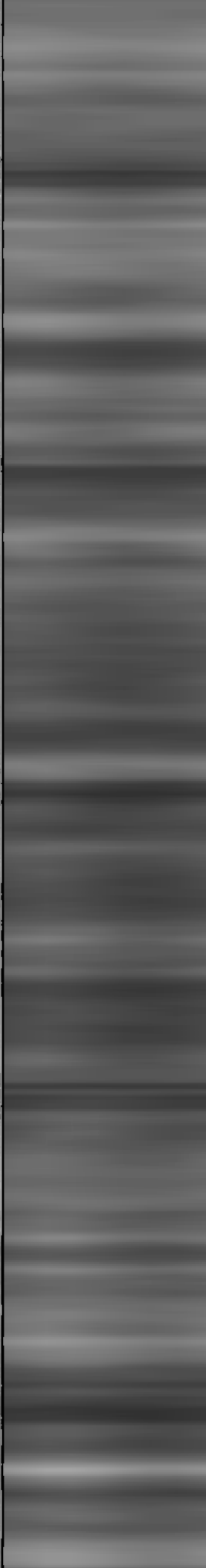
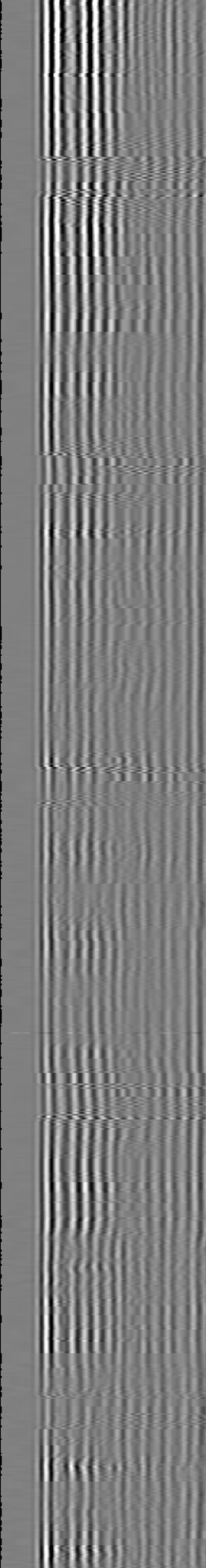
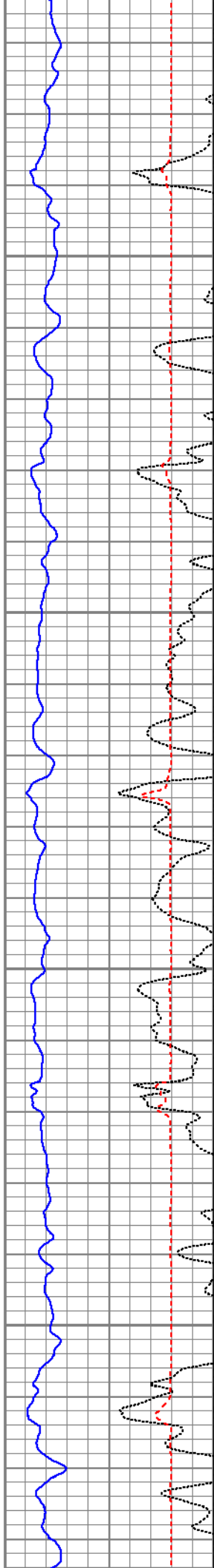


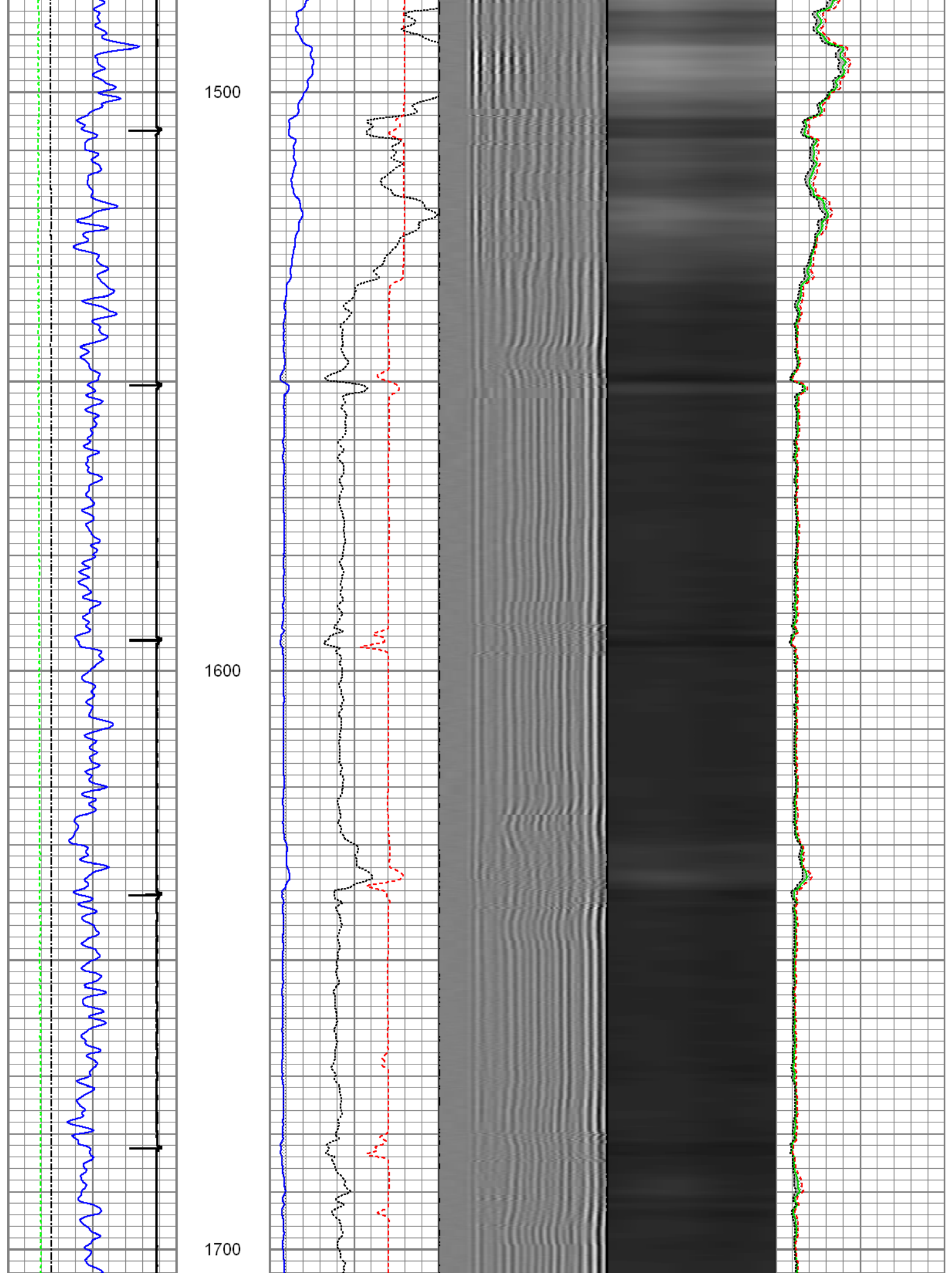


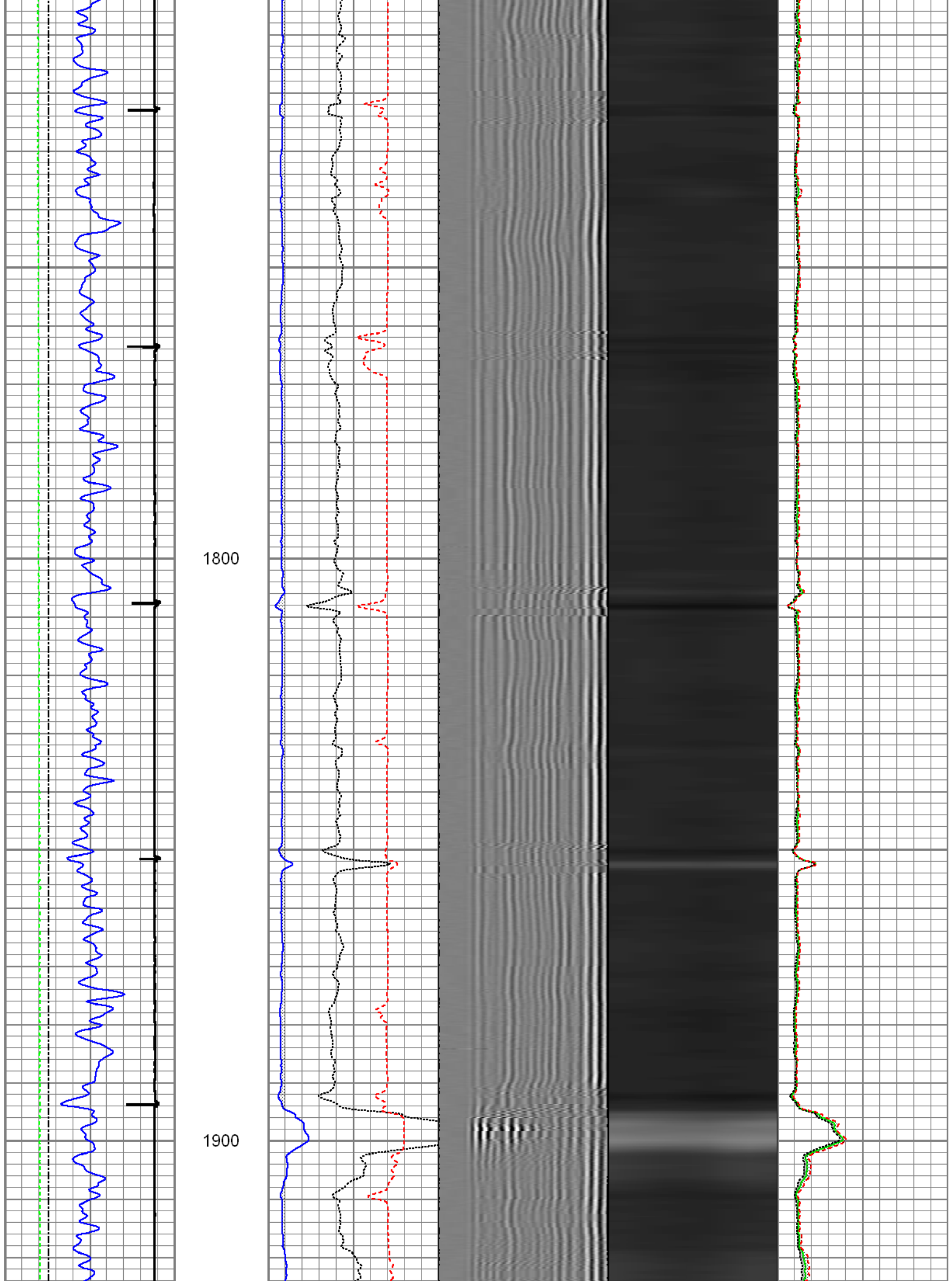


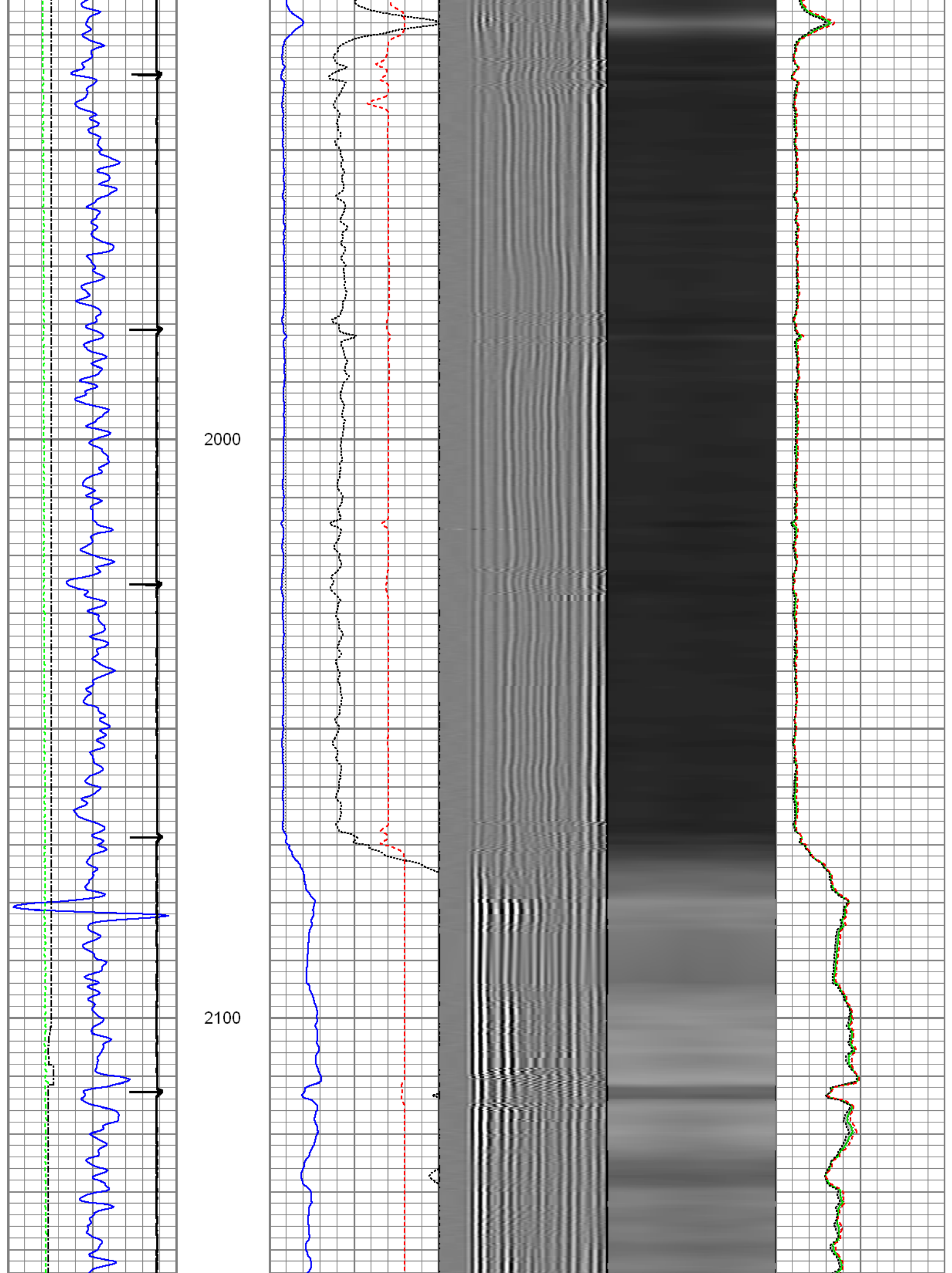
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1400



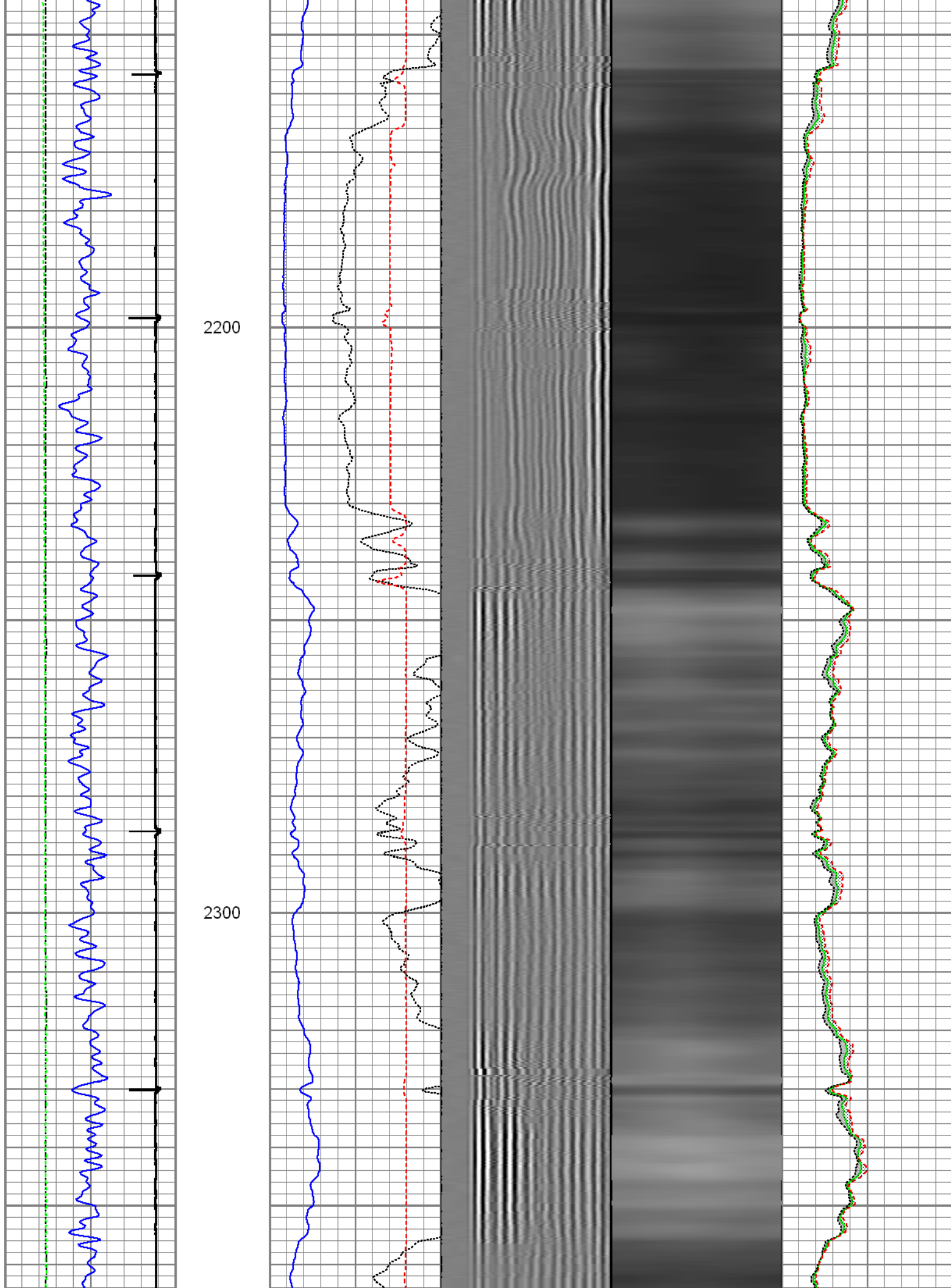






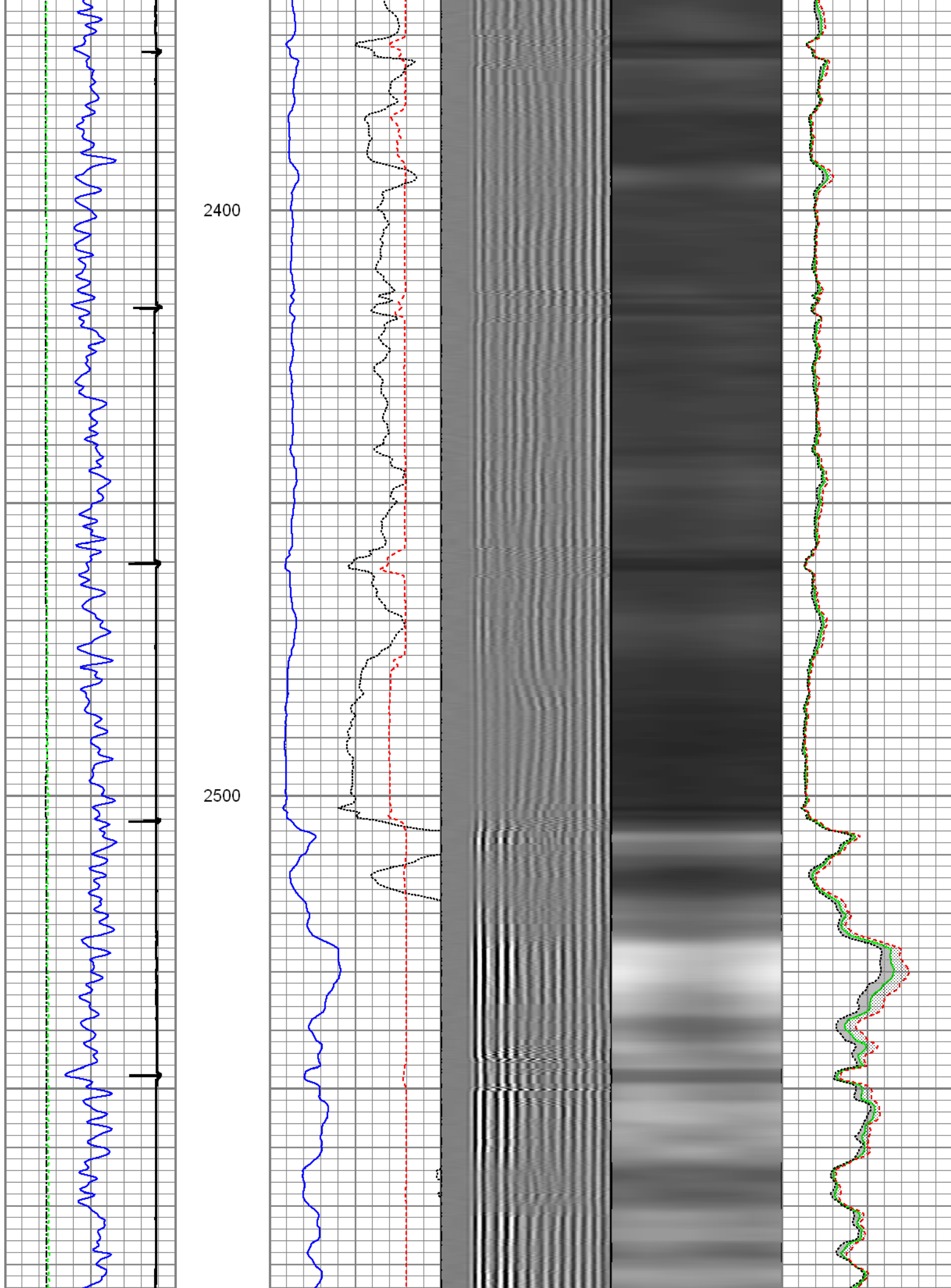
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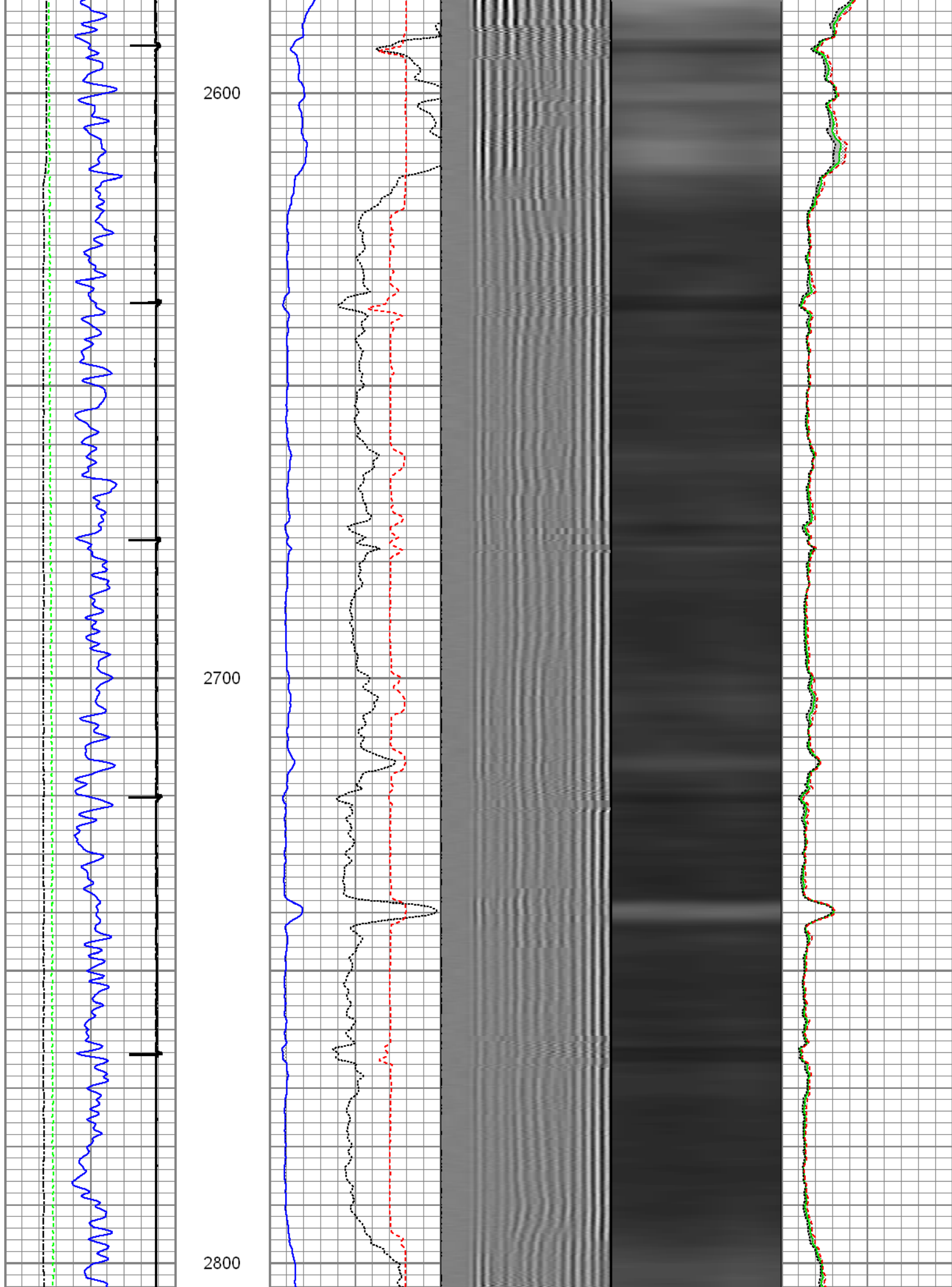
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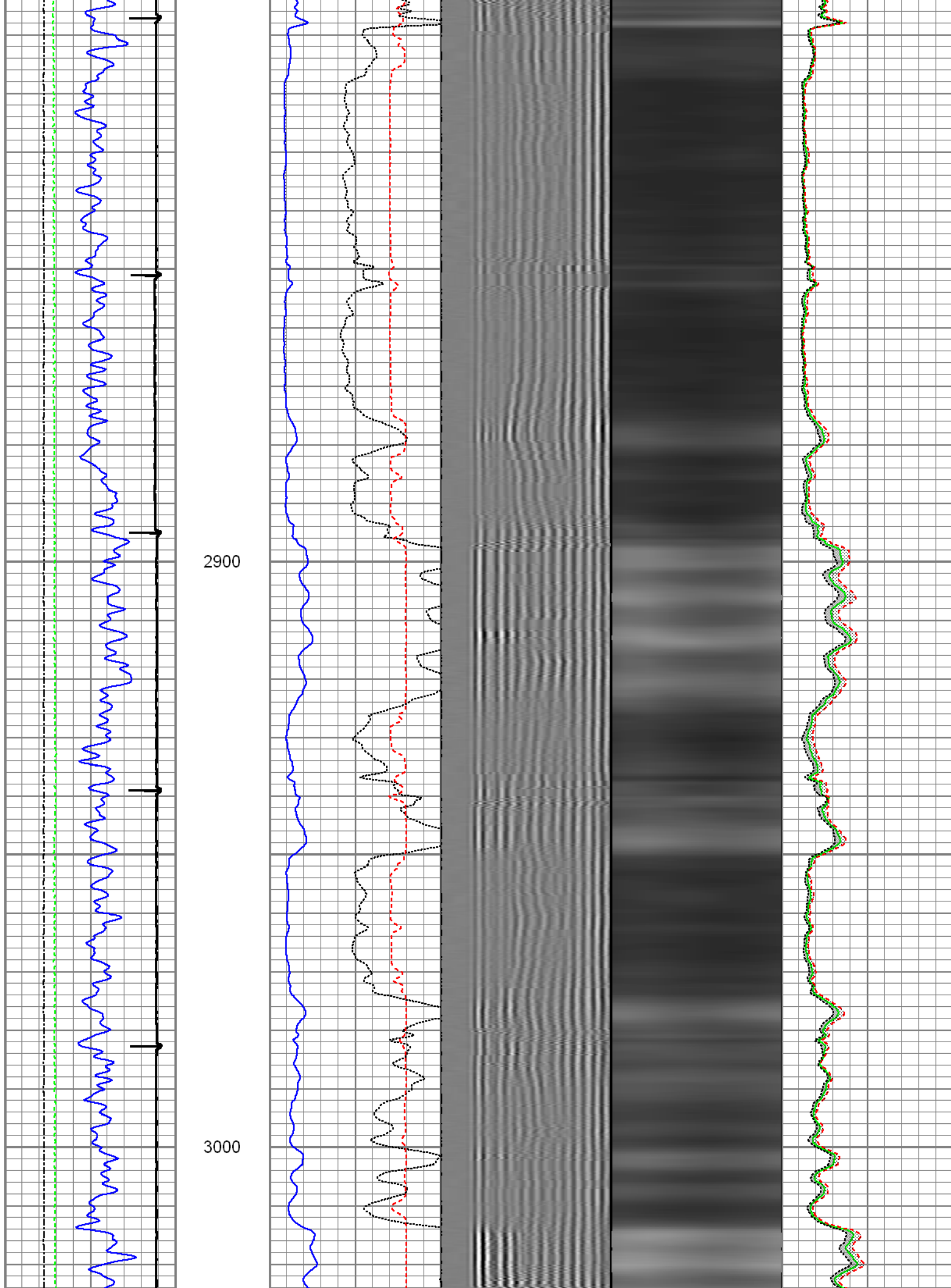
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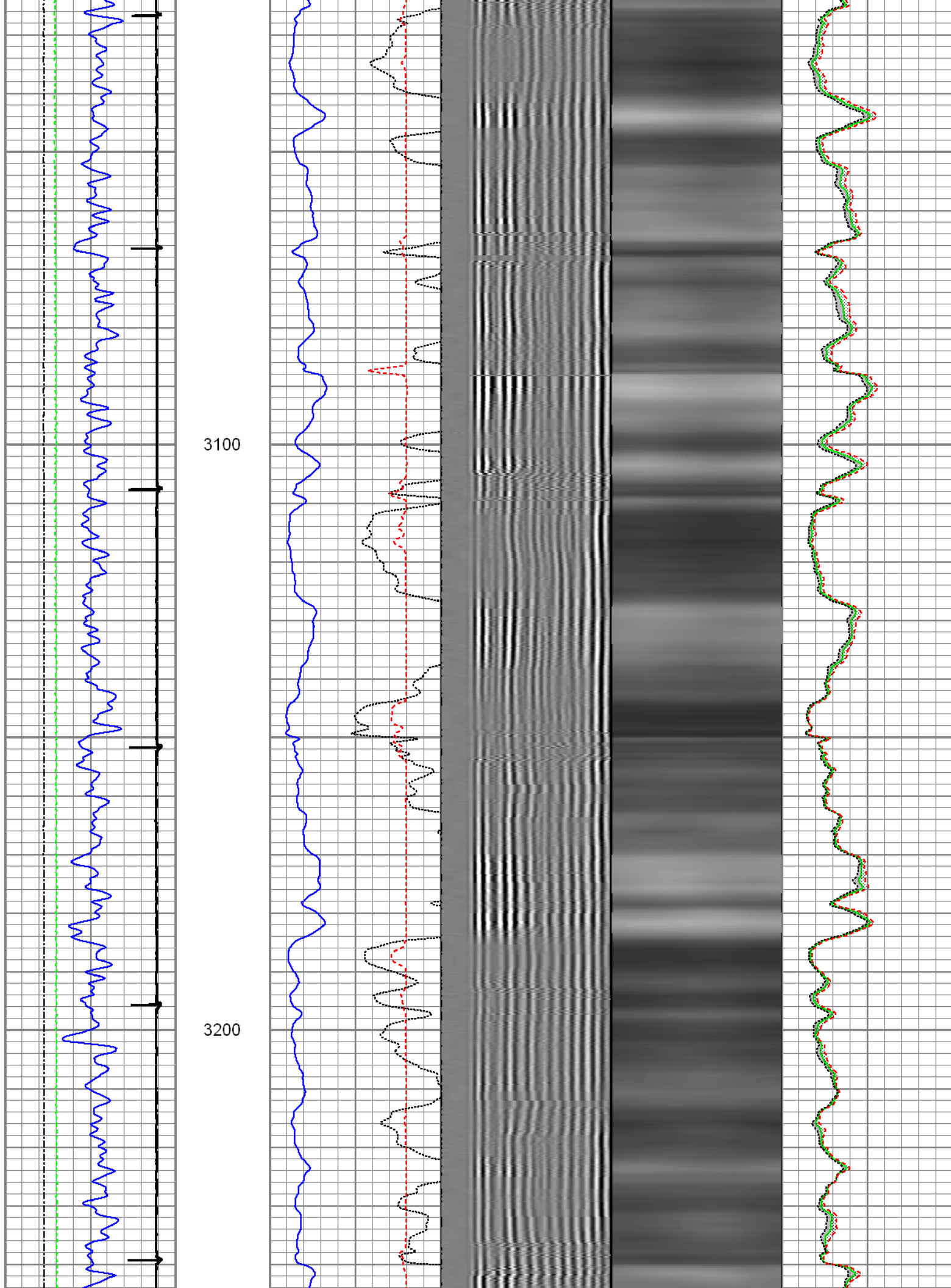
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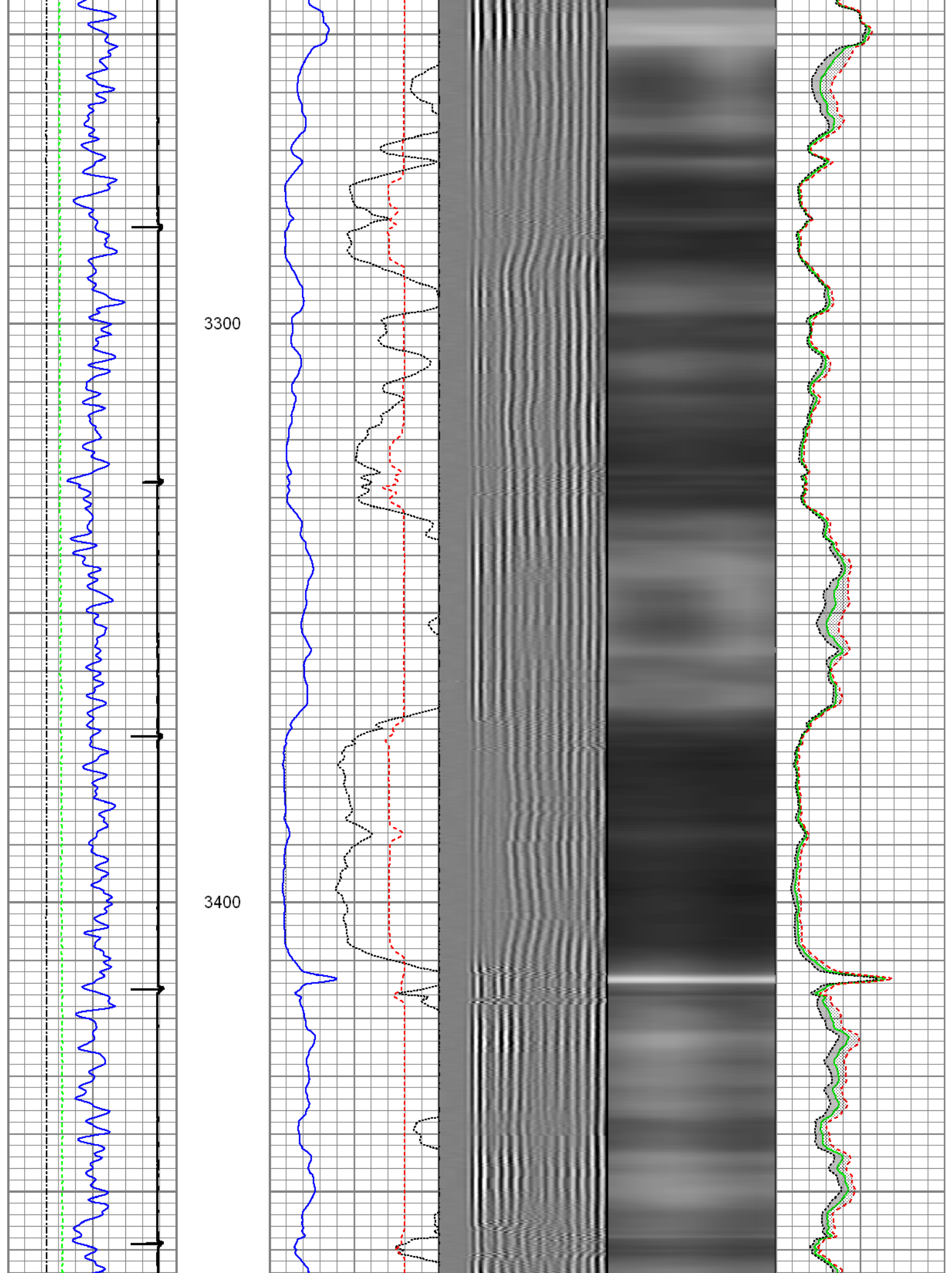
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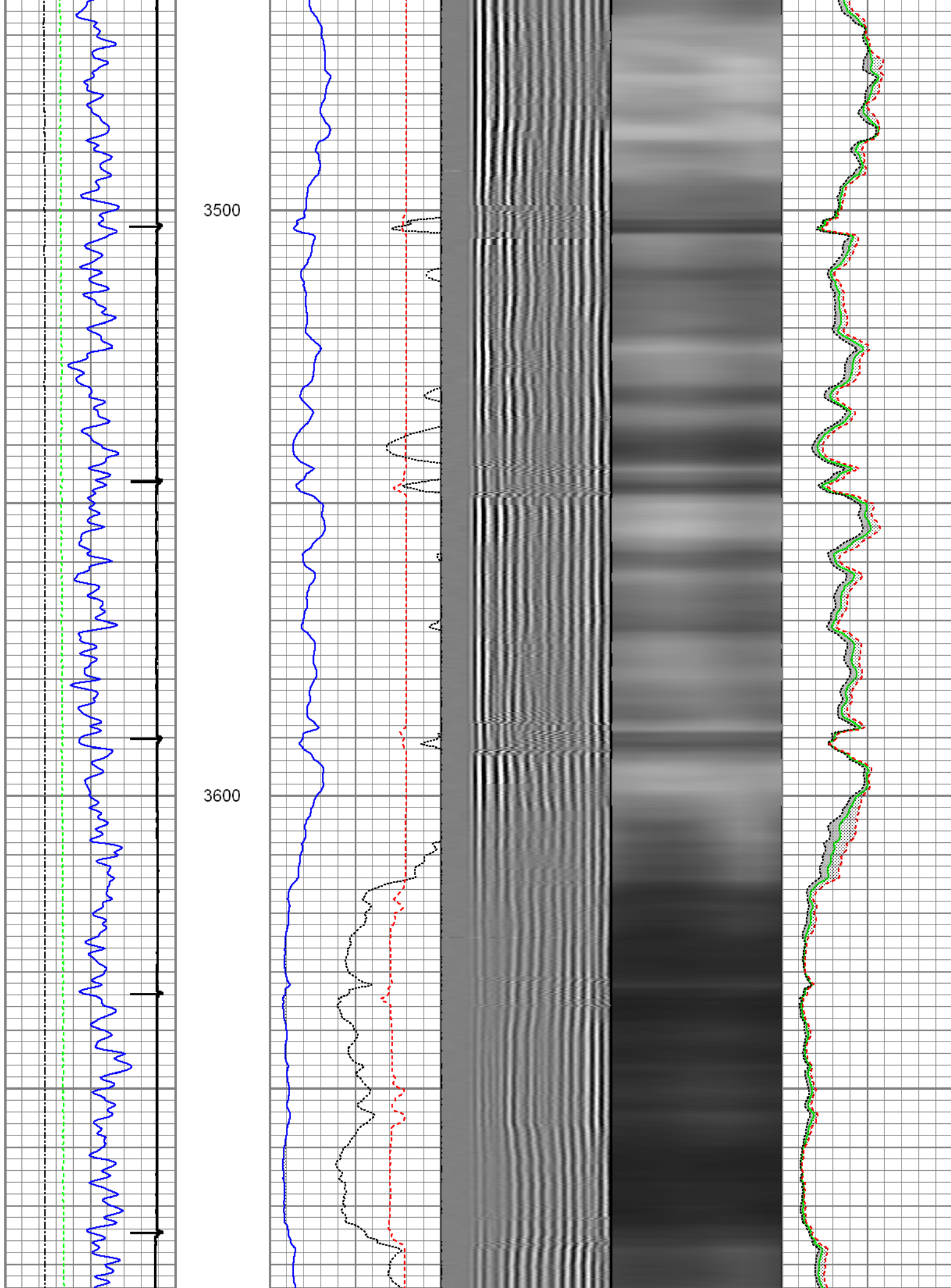
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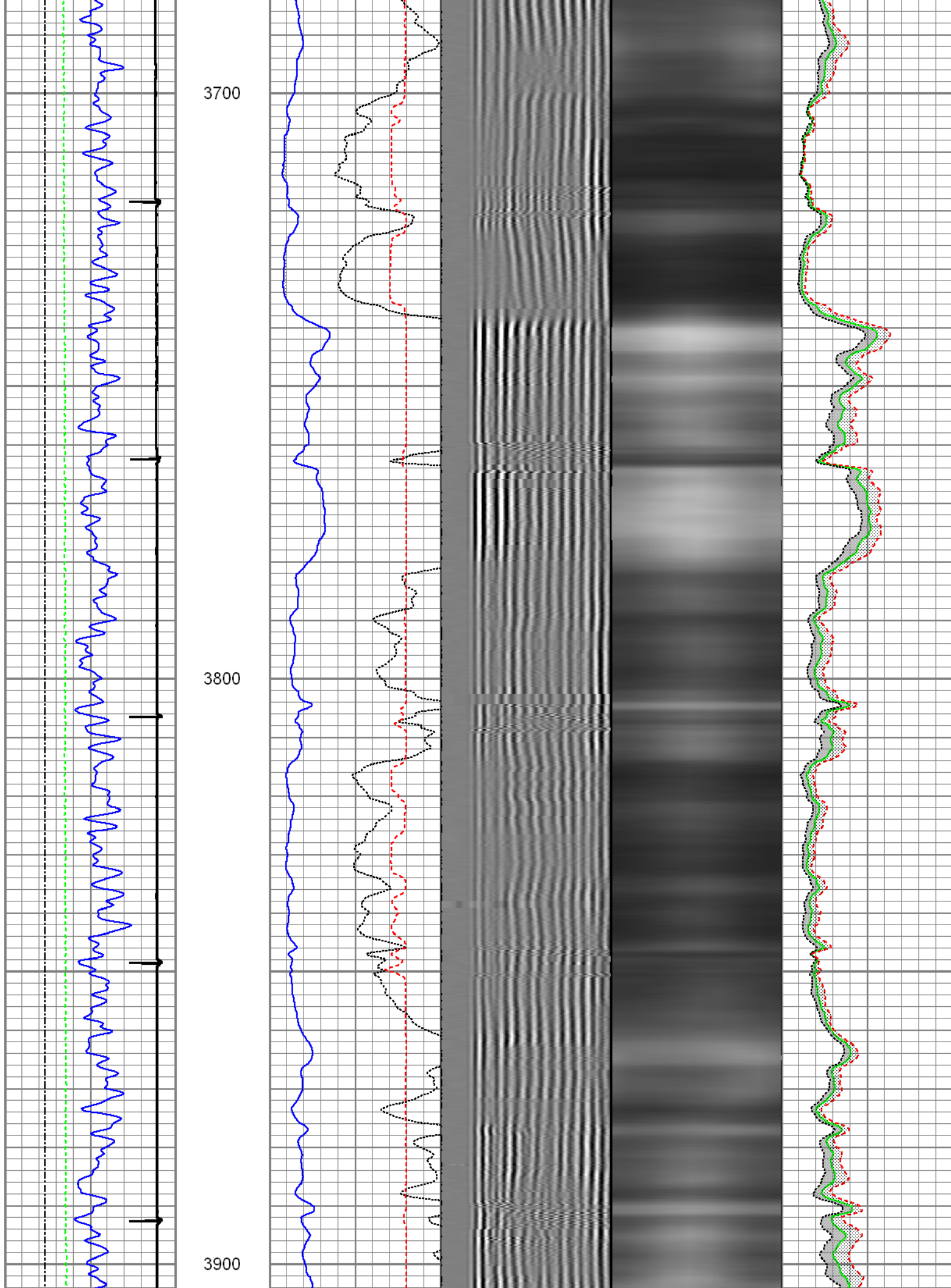
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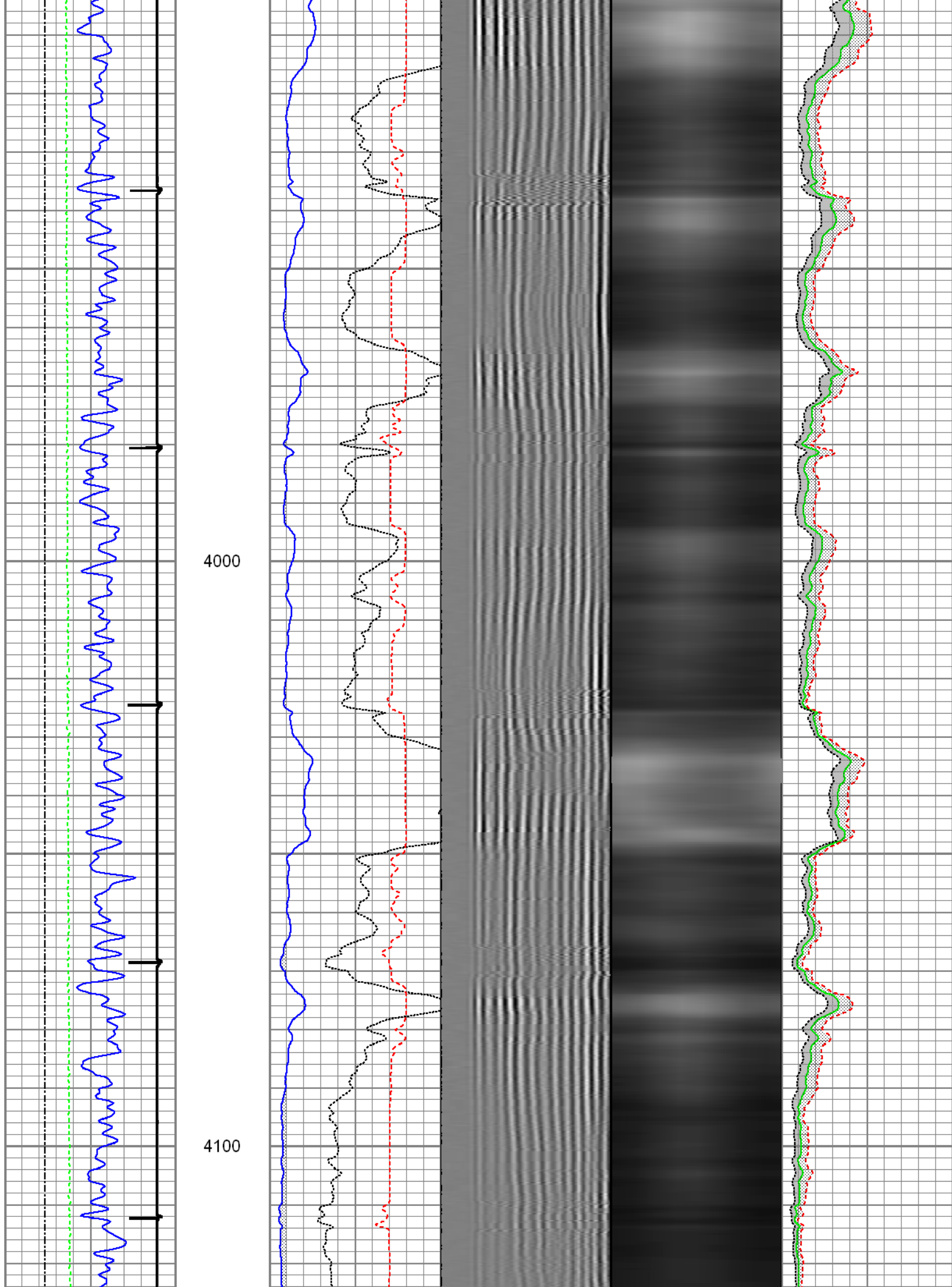


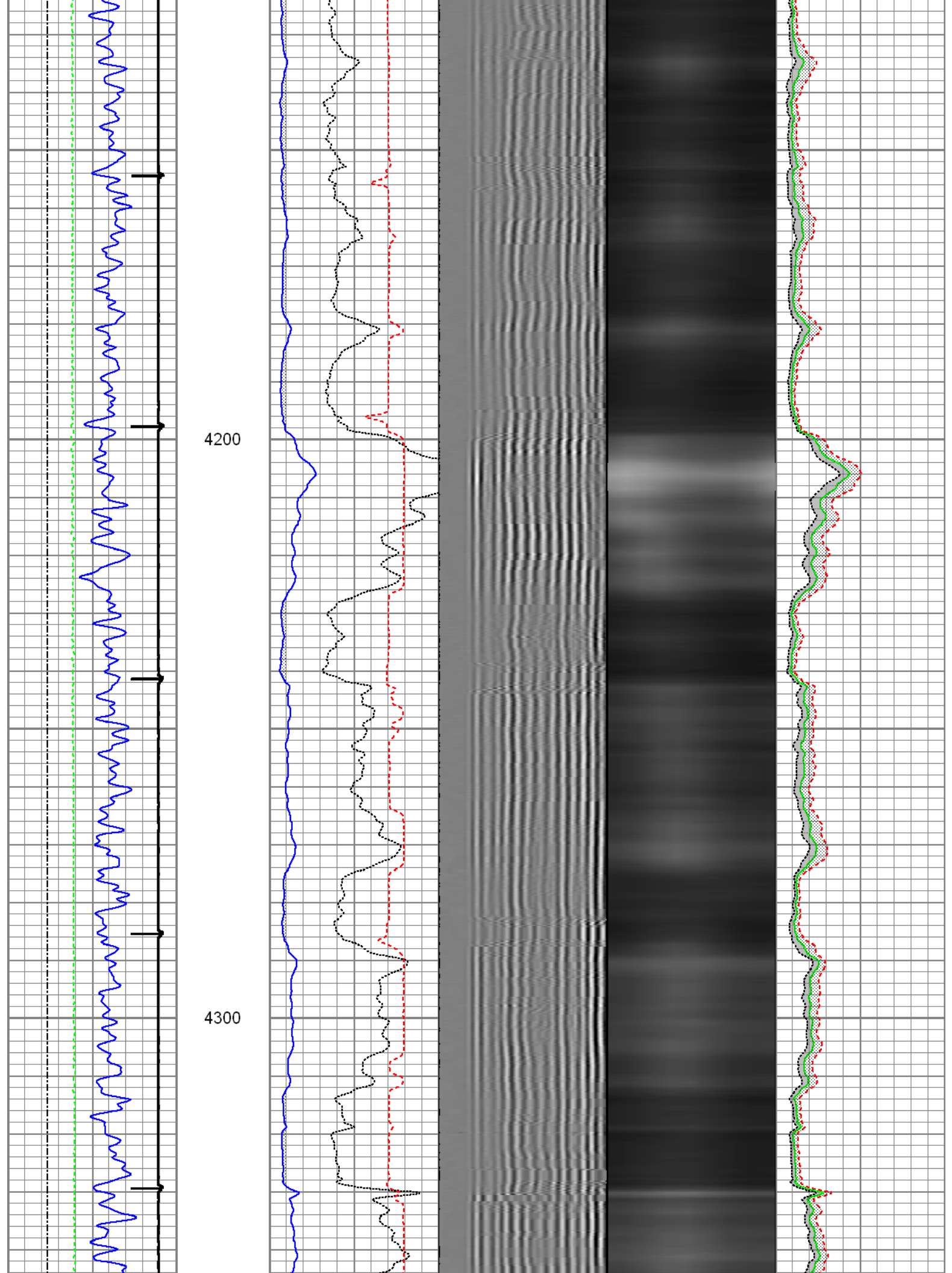
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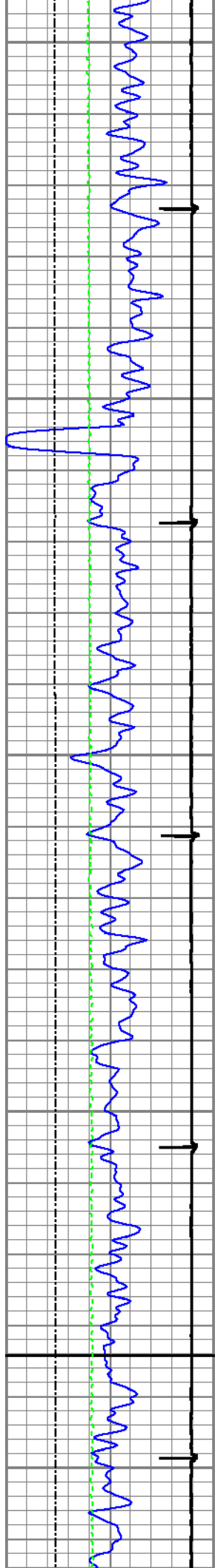
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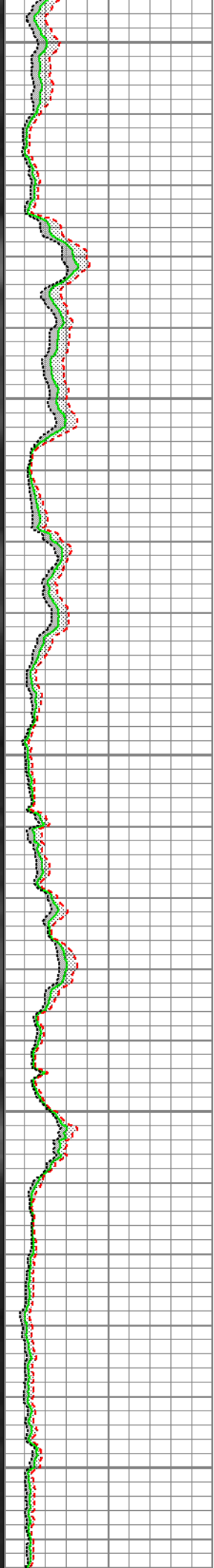
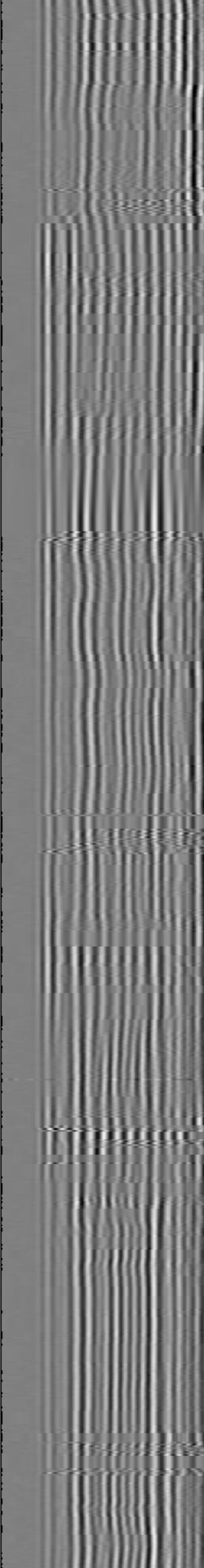
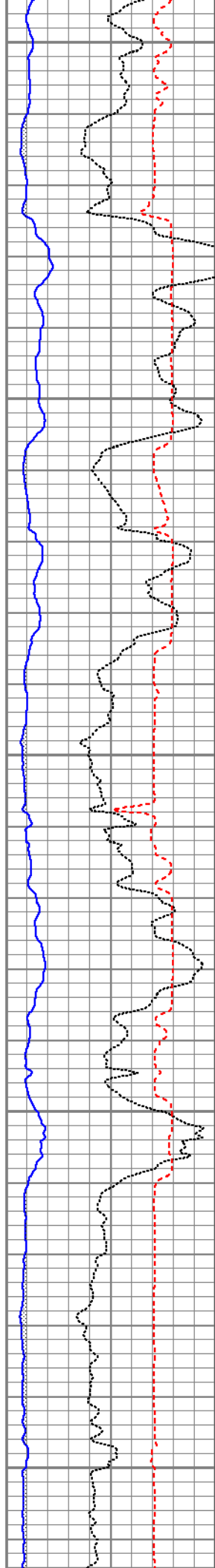






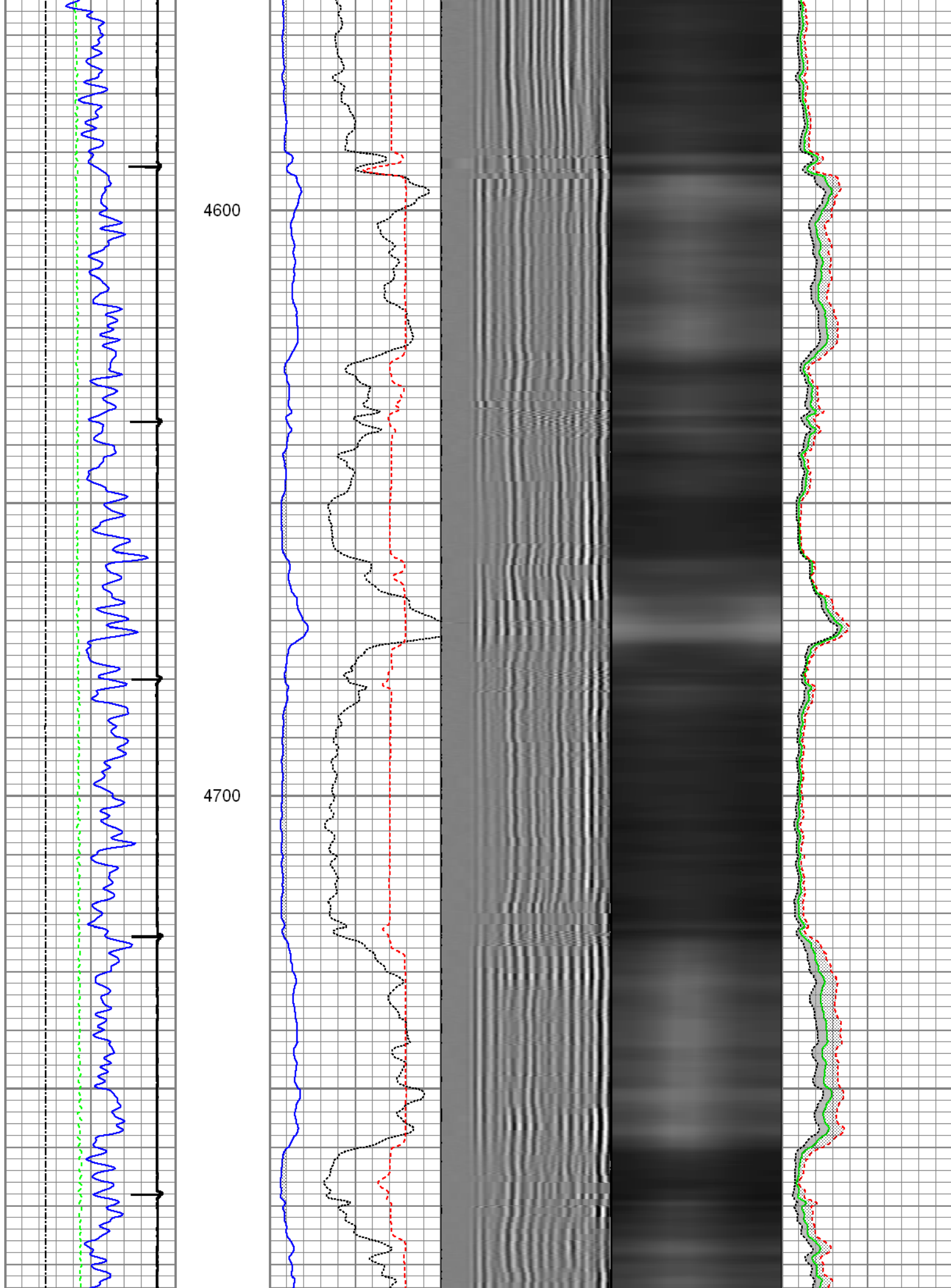
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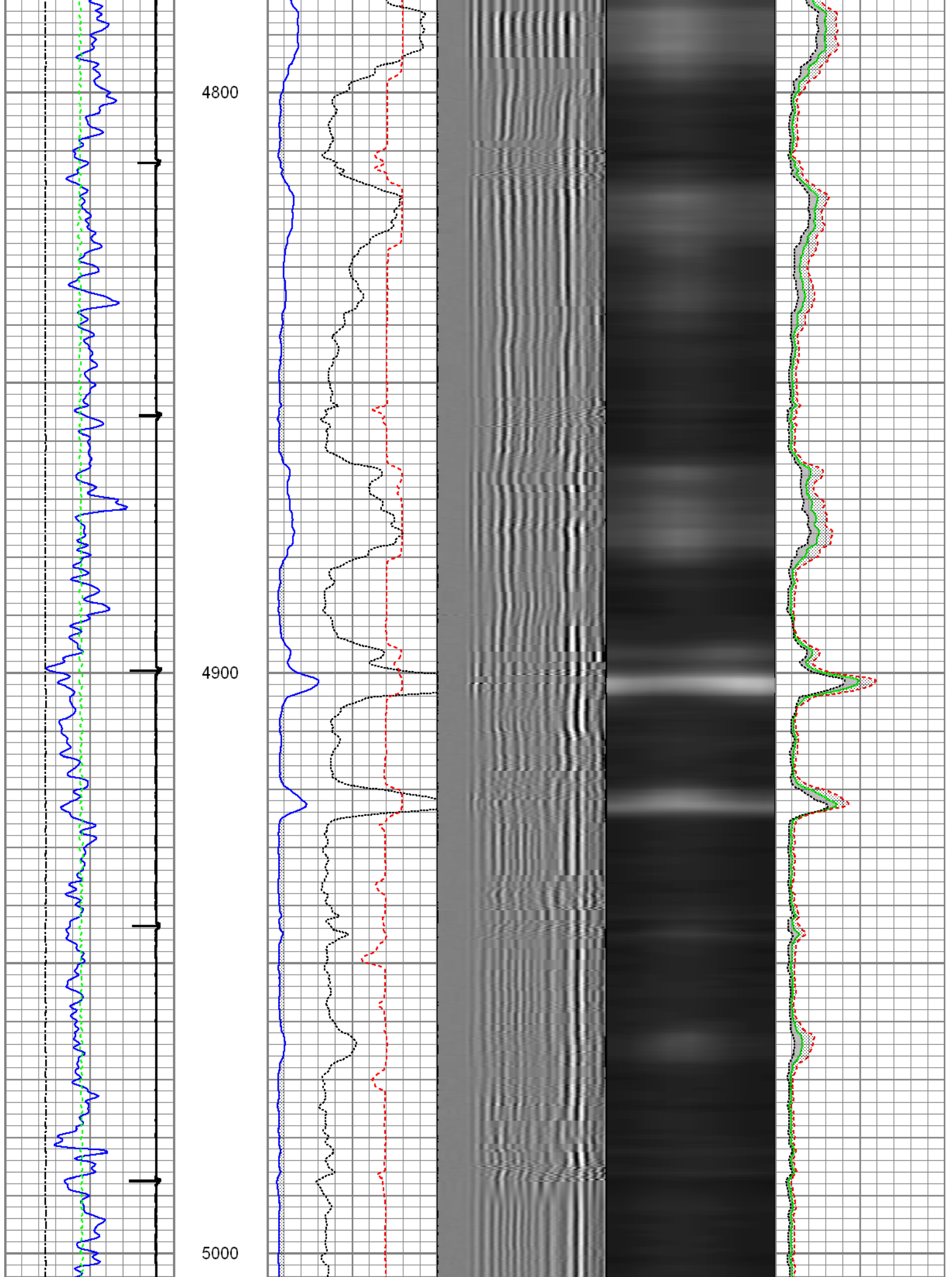
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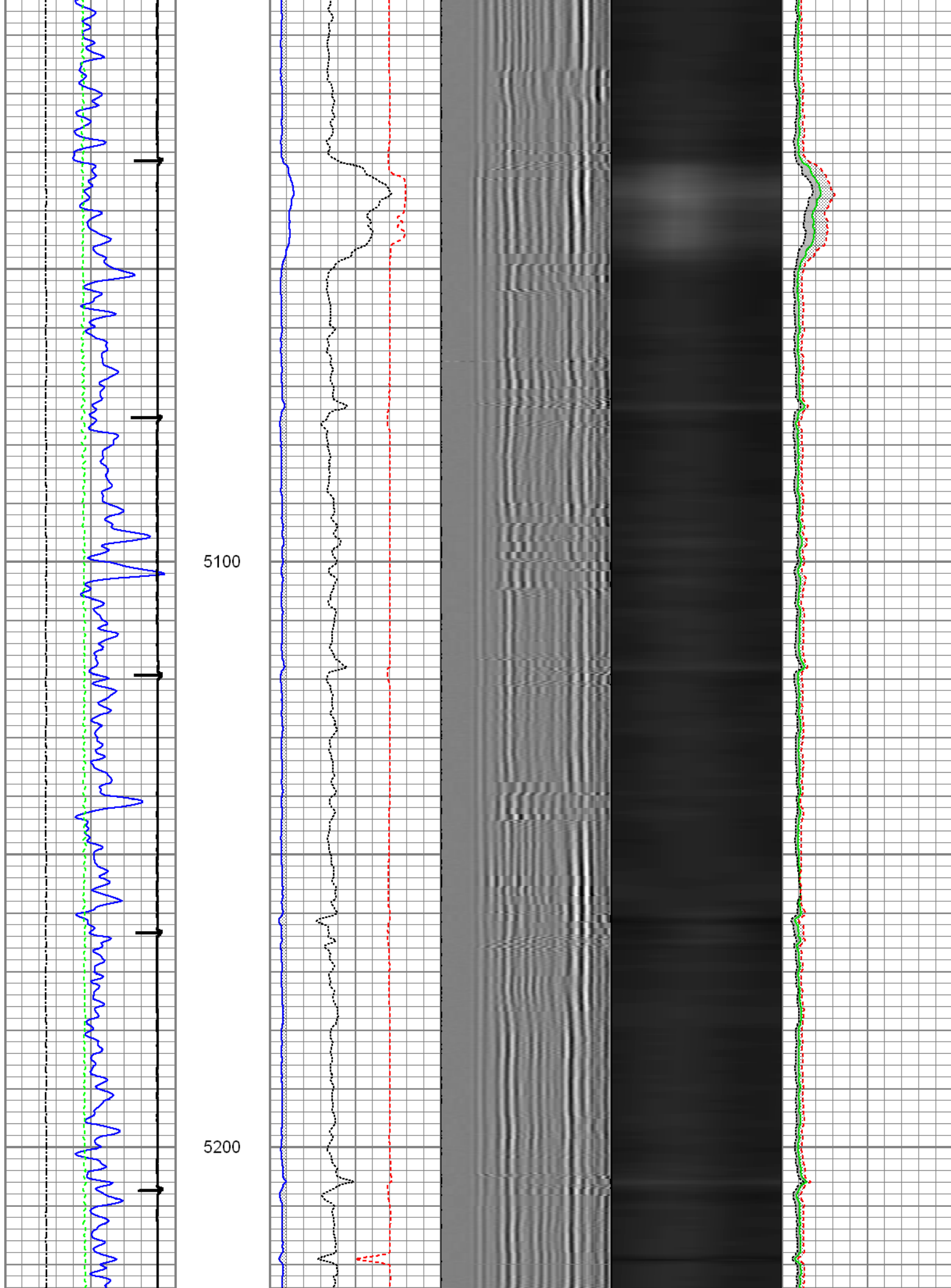
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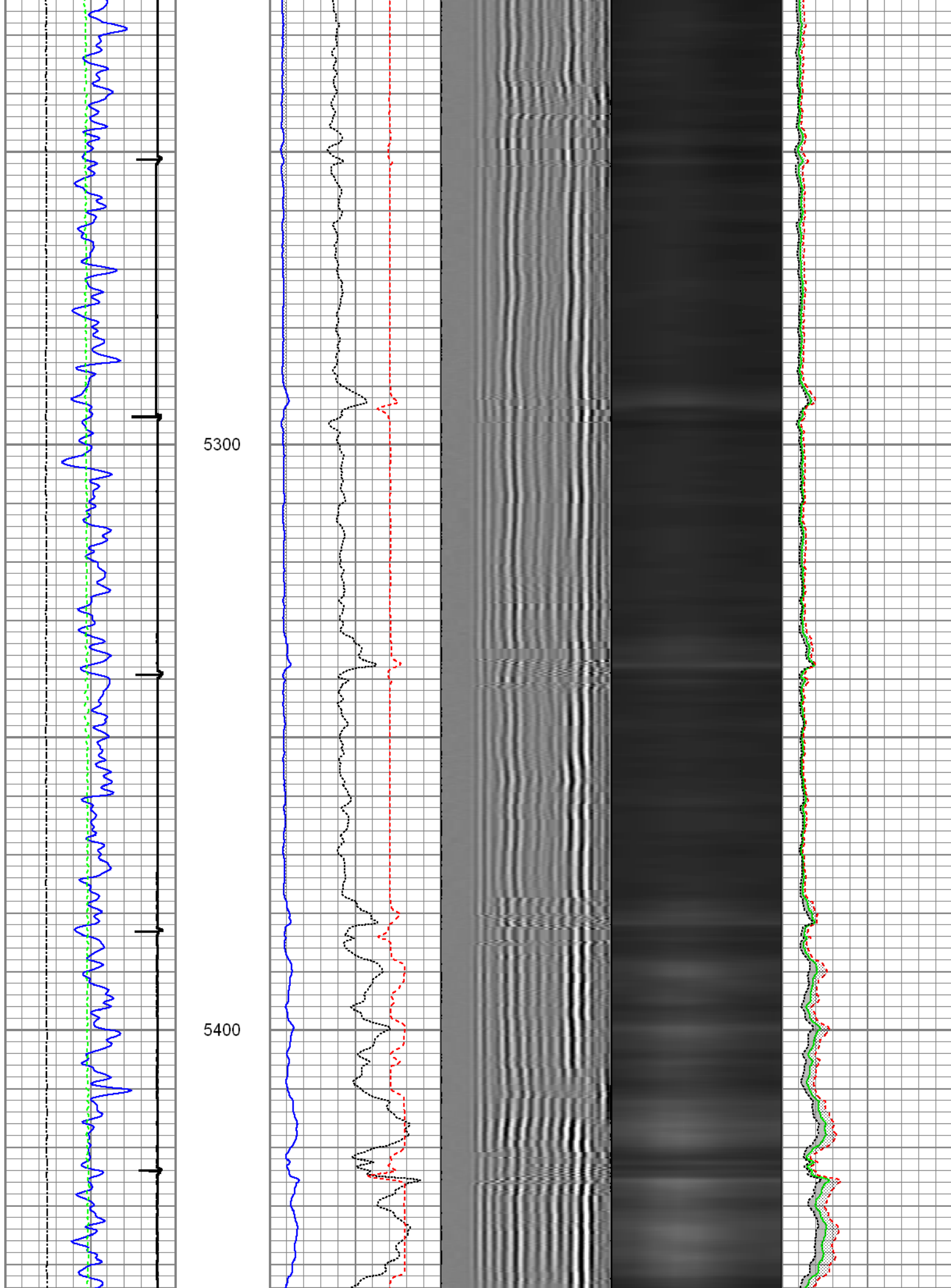
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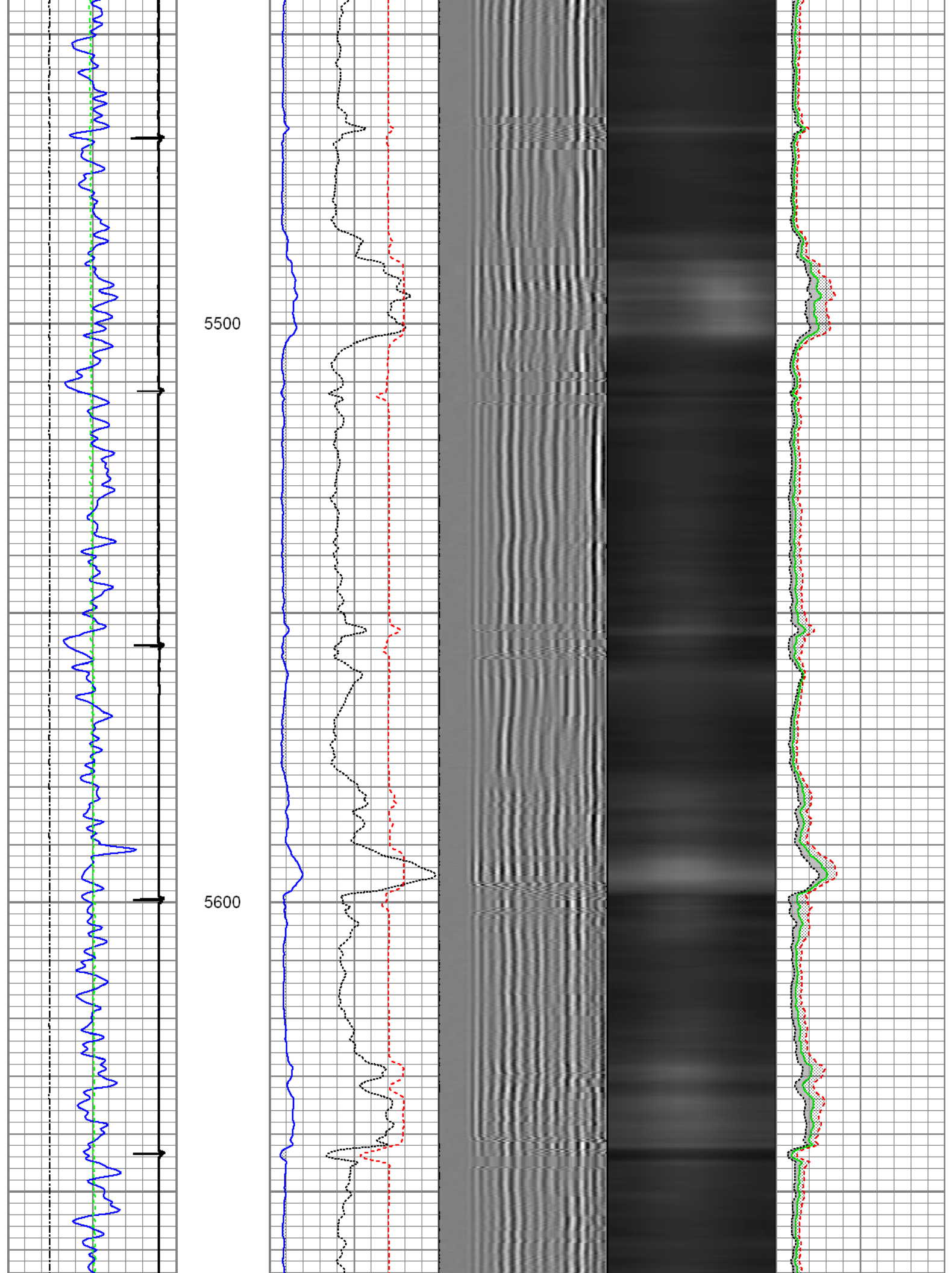
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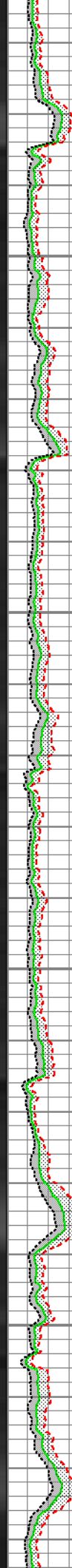
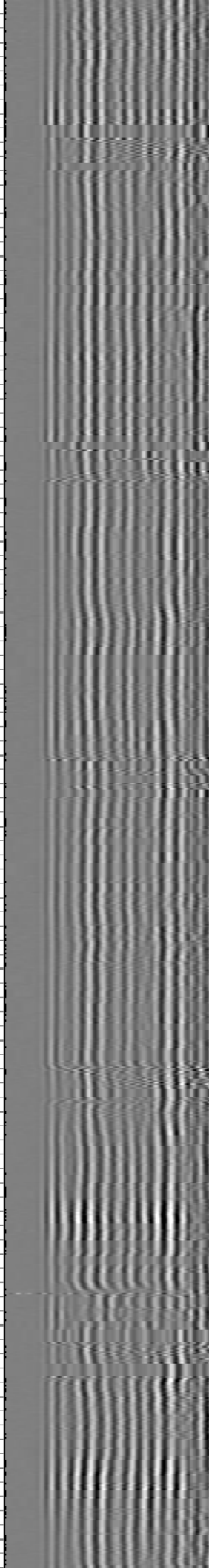
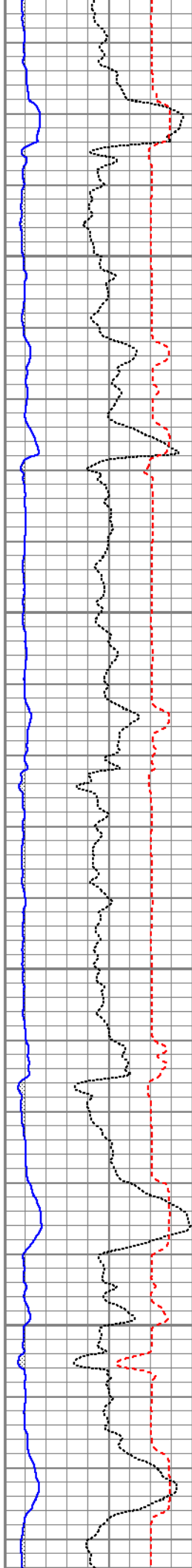
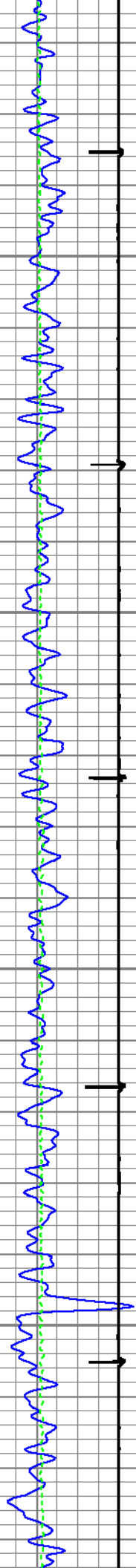
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5700

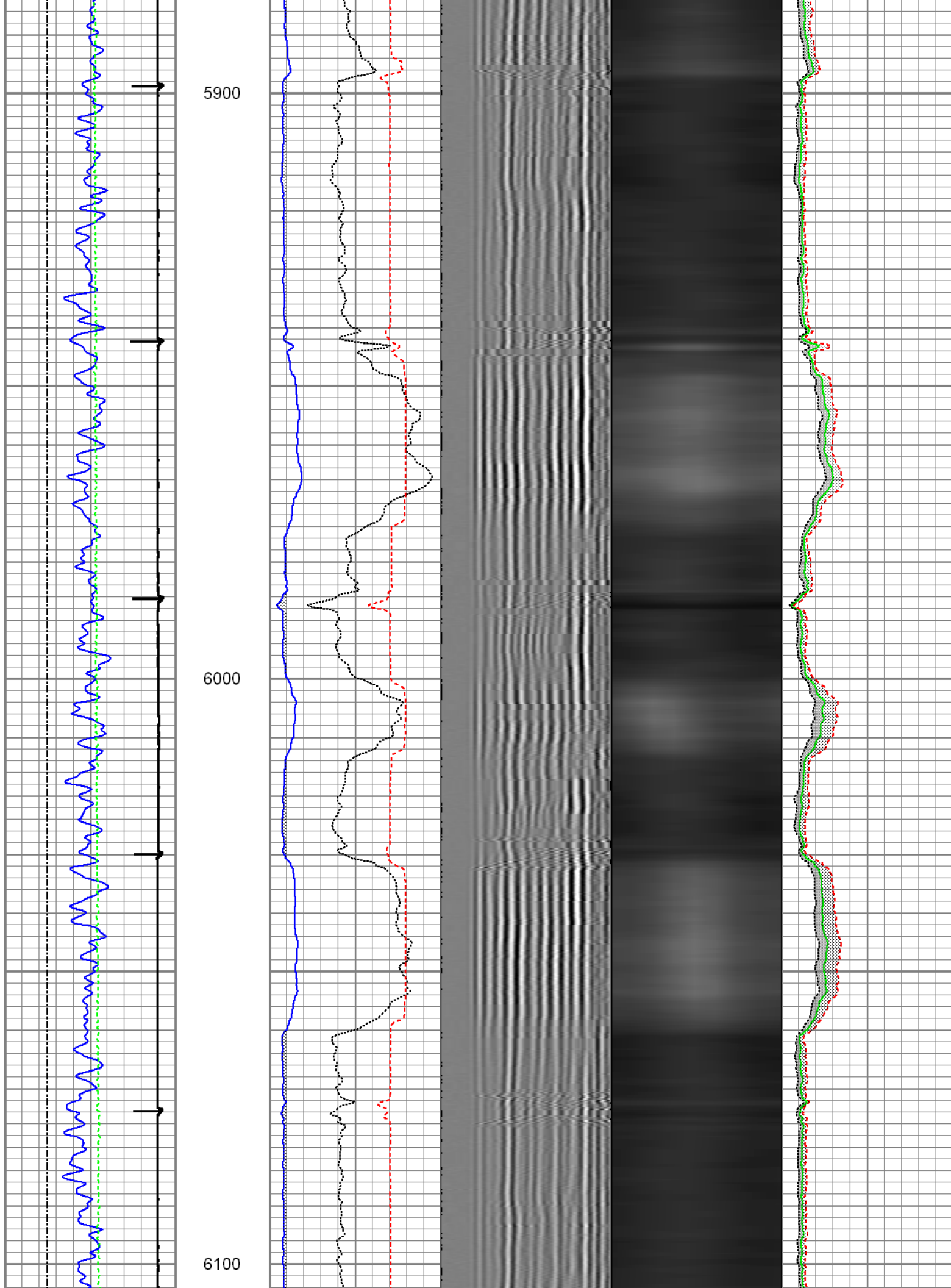
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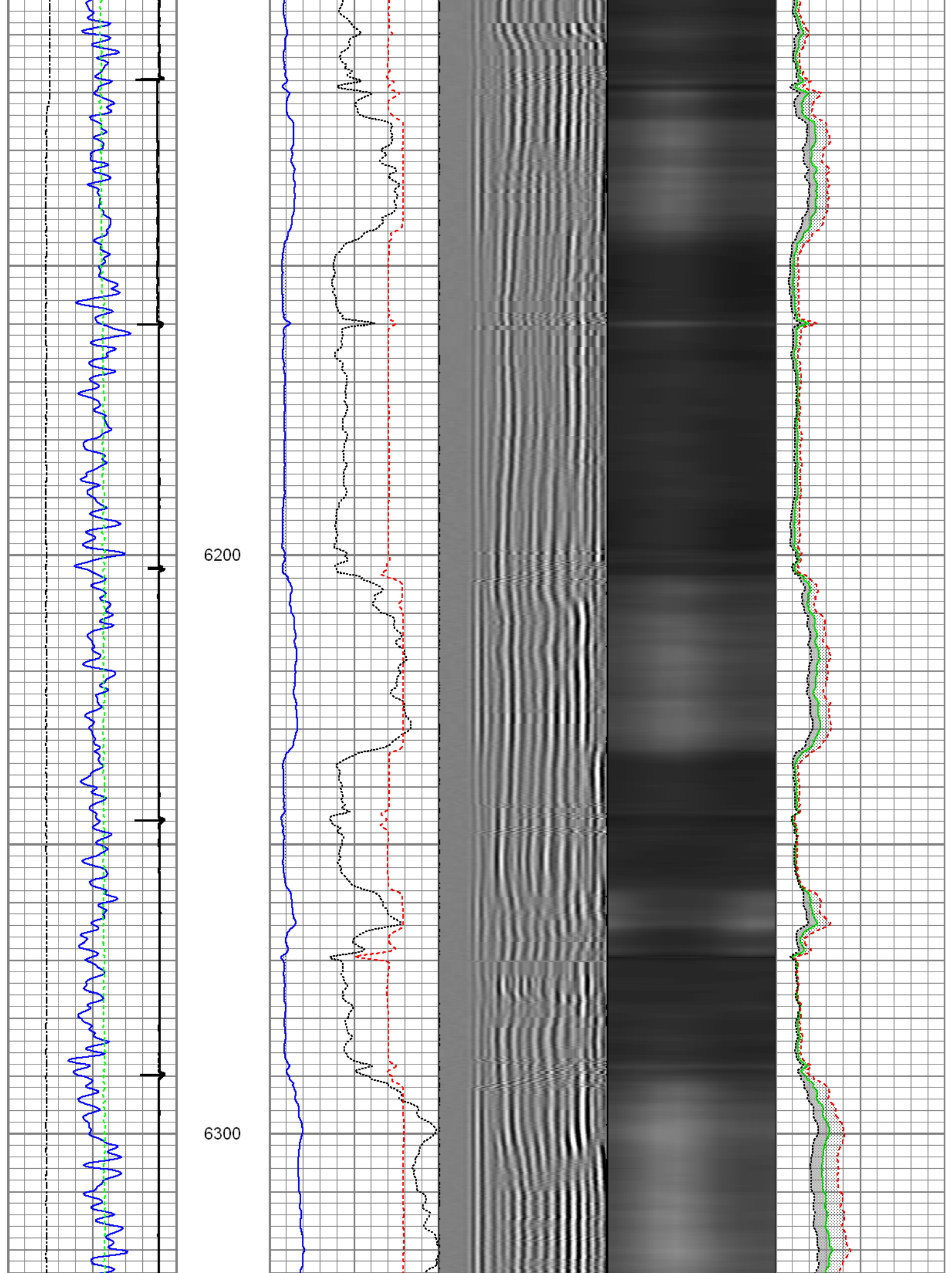


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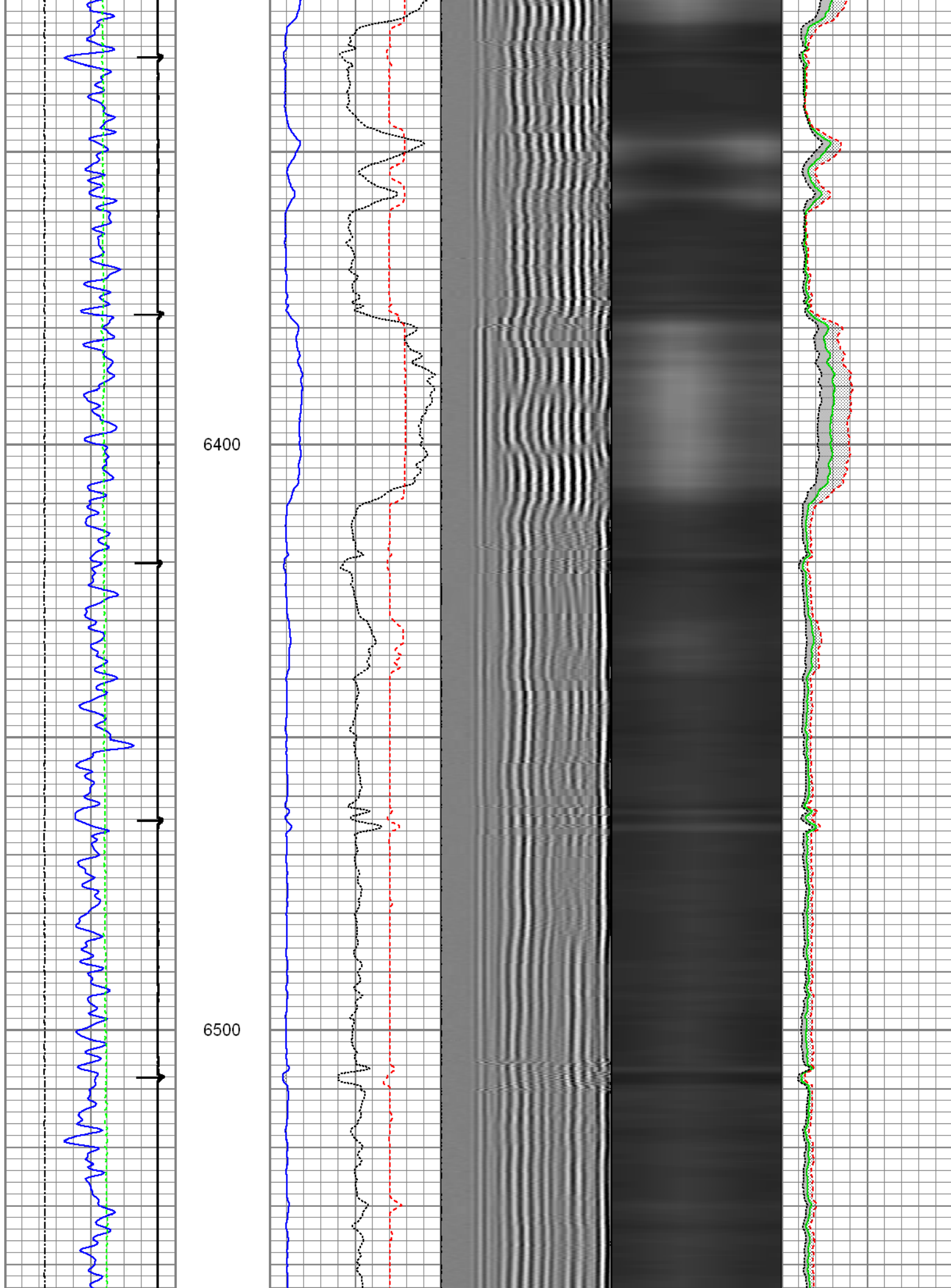
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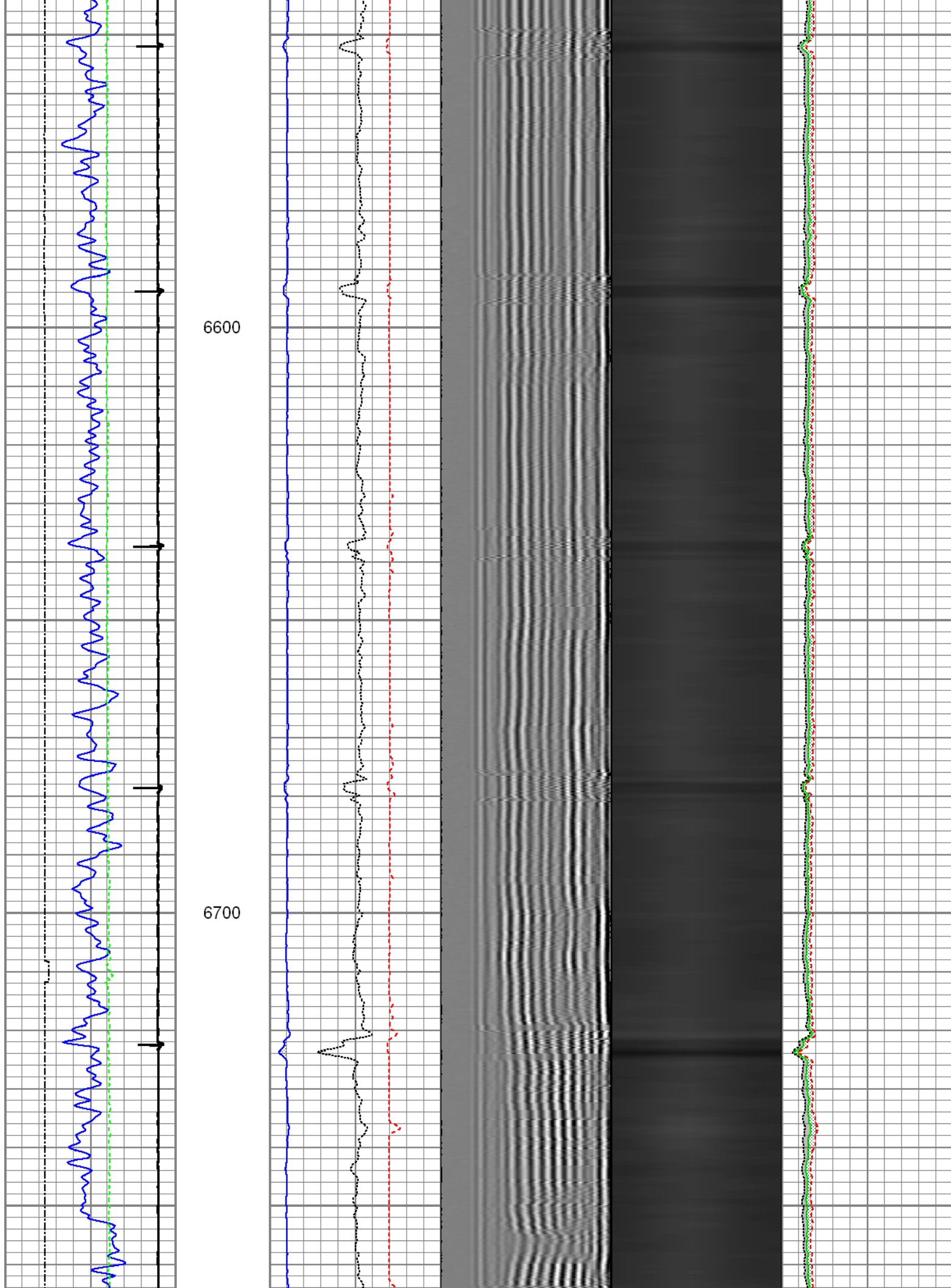
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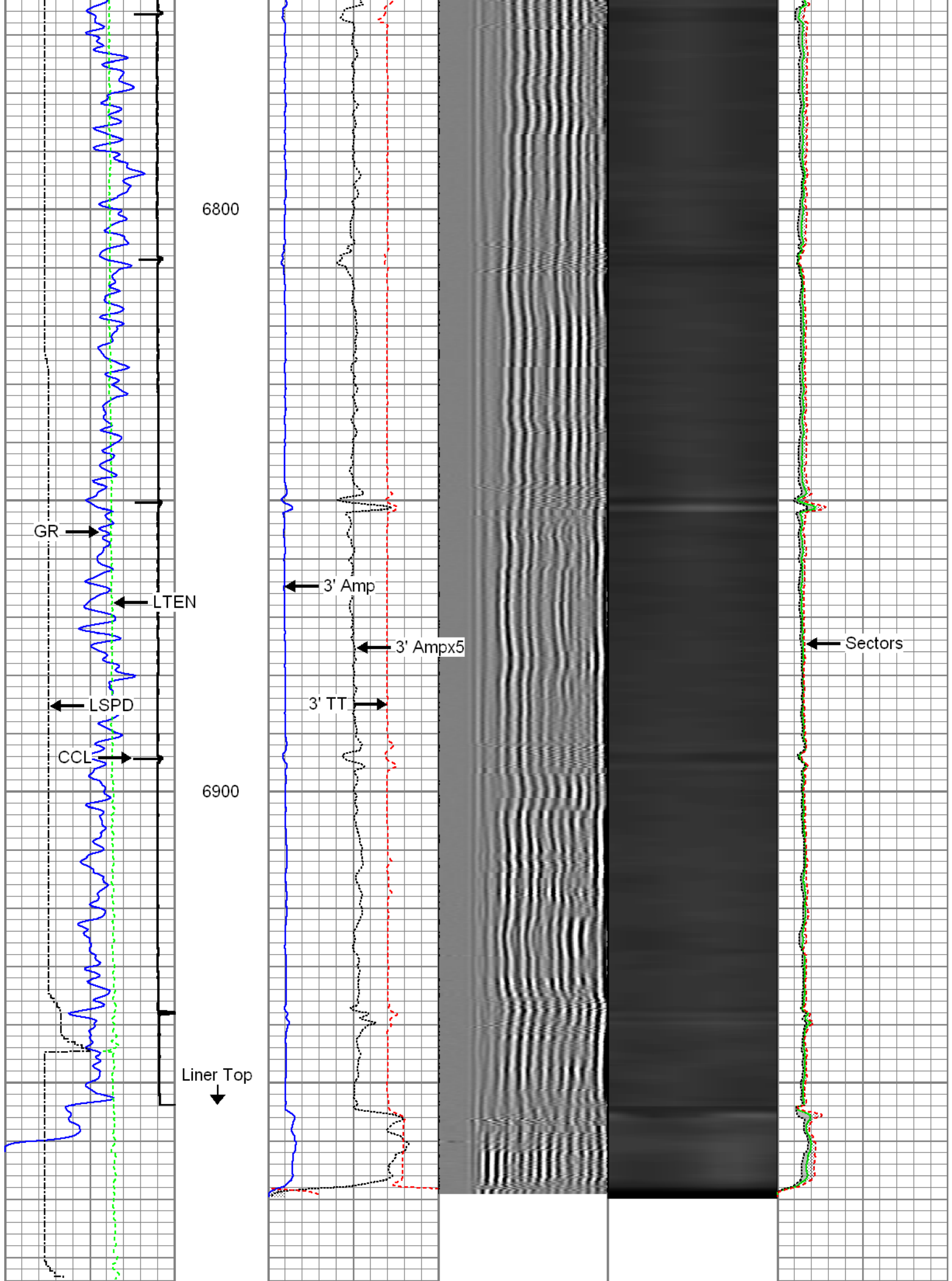
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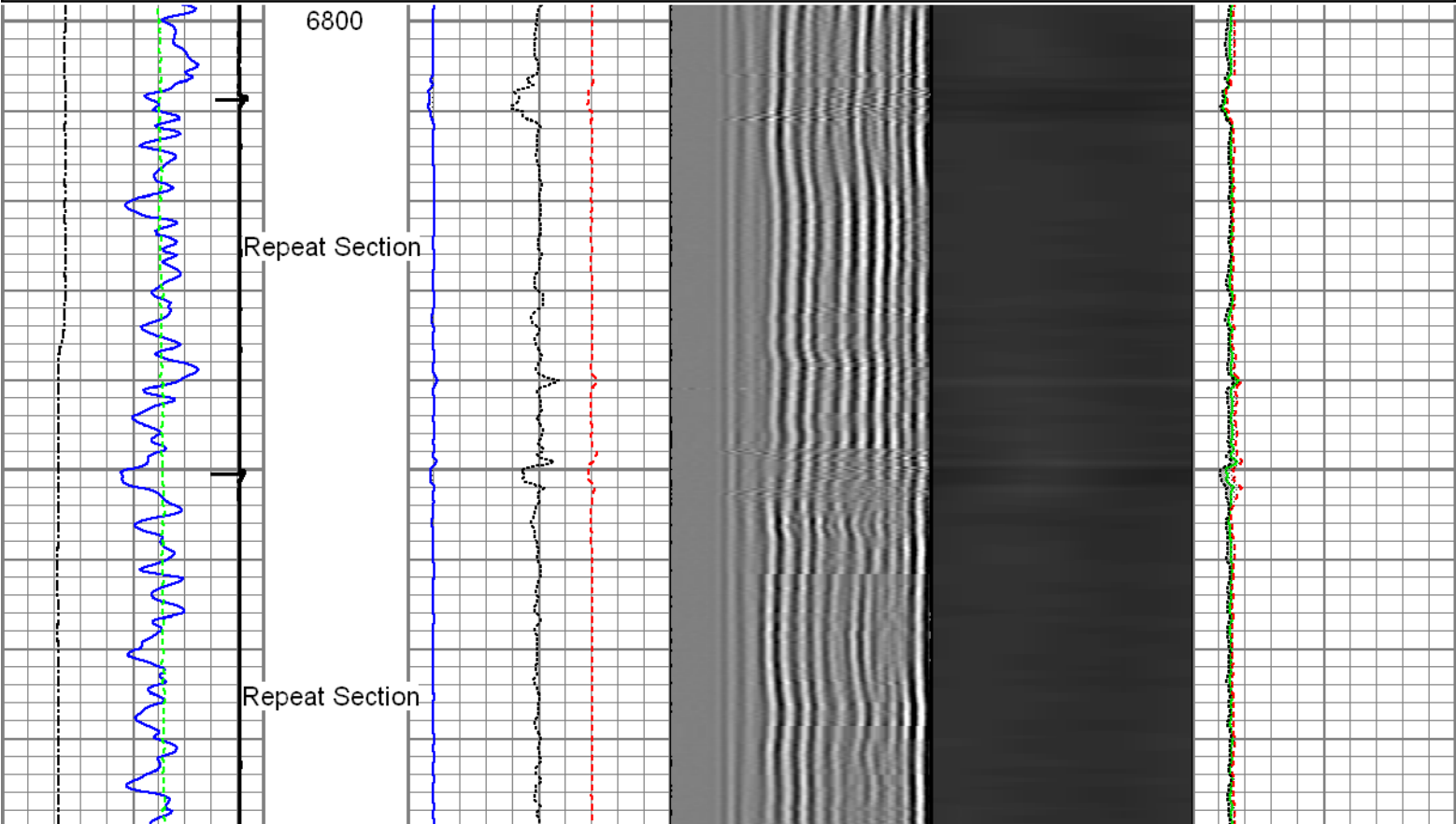
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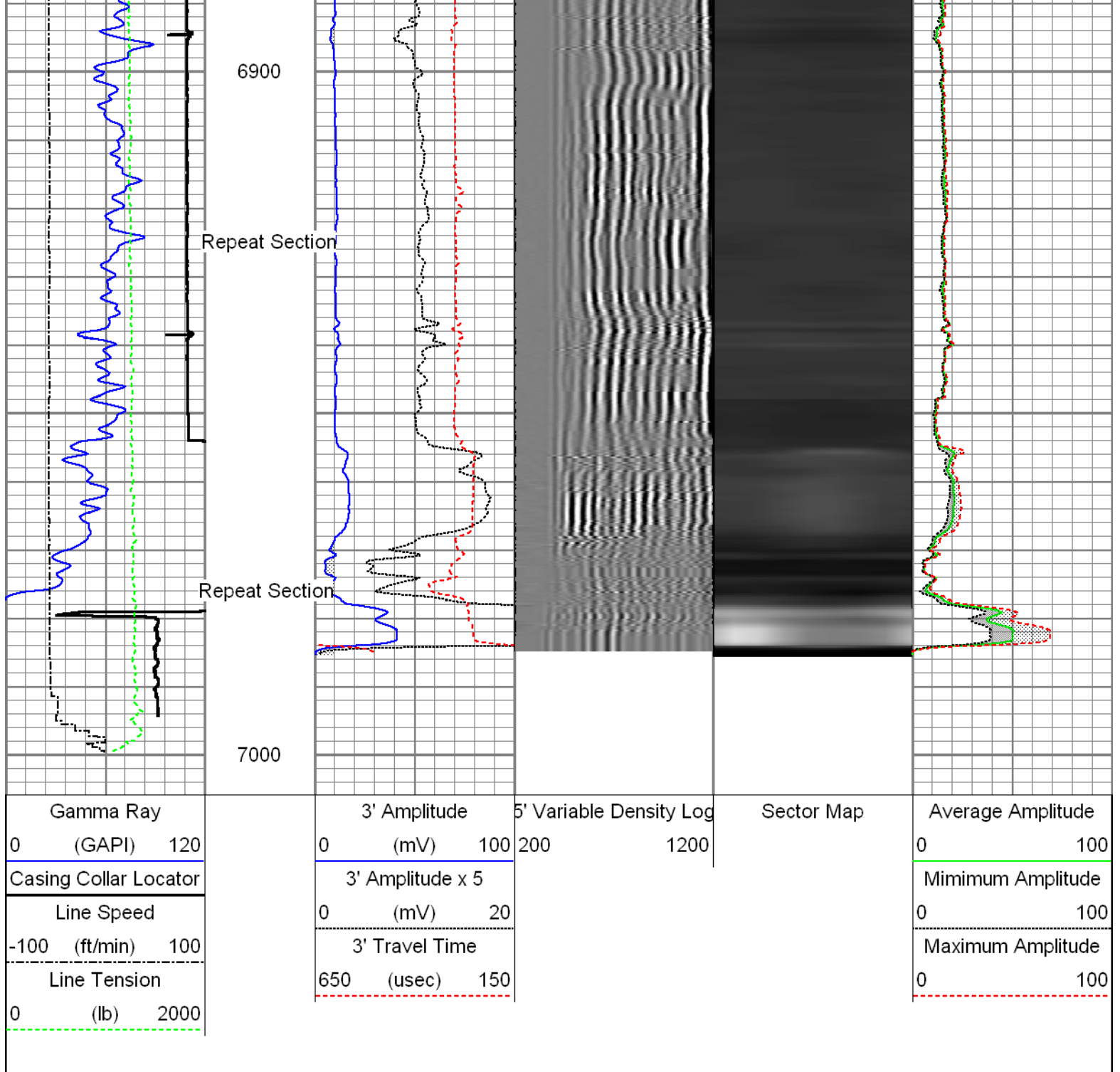




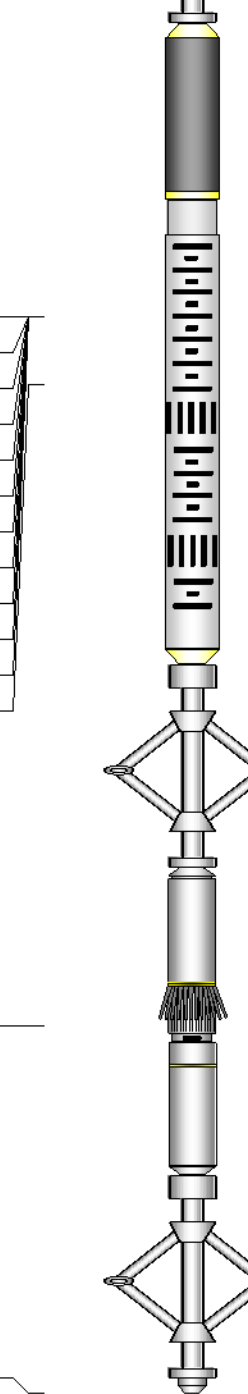
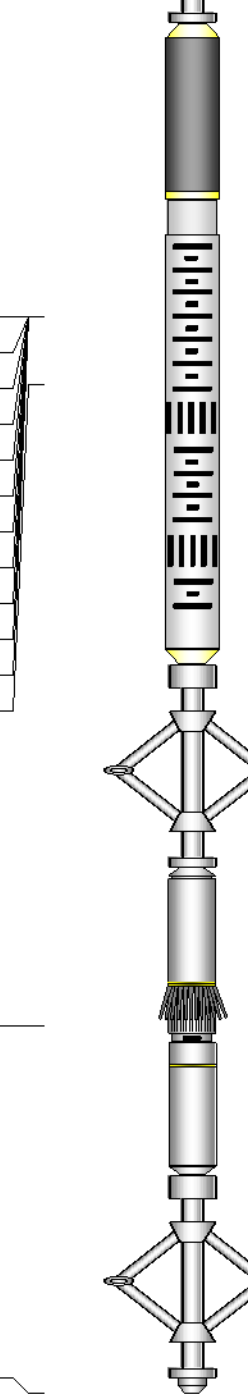
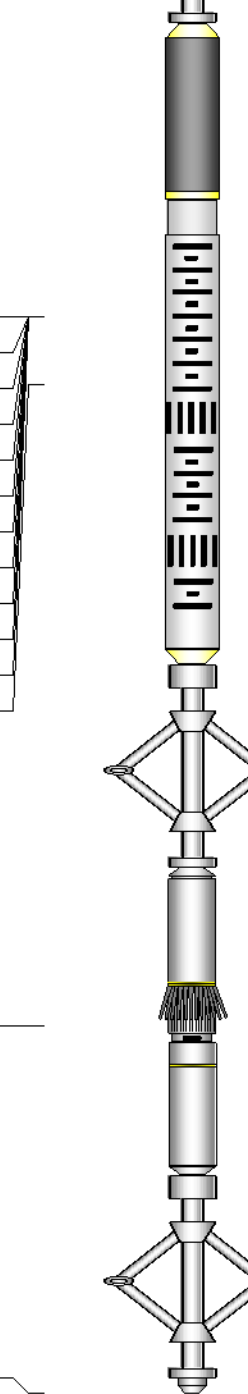
Gamma Ray	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
0 (GAPI) 120	0 (mV) 100	200 1200		0 100
Casing Collar Locator	3' Amplitude x 5			Minimum Amplitude
Line Speed	0 (mV) 20			0 100
-100 (ft/min) 100	3' Travel Time			Maximum Amplitude
Line Tension	650 (usec) 150			0 100
0 (lb) 2000				

<div>FMC Technologies</div>		Repeat Pass		
Database File: 0512337864_anadarko_howard 28n-29hz_09-25-14_mit_rbl.db Dataset Pathname: pass5 Presentation Format: rbt4_mit Dataset Creation: Thu Sep 25 10:04:10 2014 by Log SCH 111116 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				





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	23.67		T_CH14375_1_GO Titan 1-7/16" Assembled Electric Cable Head with 1" Fishing Neck	1.03	1.44	4.00
			UW_AGS-UW_AGS_001 (215017) Sondex Adapter - GO Box to Sondex Pin	0.21	1.69	1.00
			UW_XTU-UW_XTU_002 (10017430) 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_PRC-UW_PRC_057 (1038) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00

WVF3FT	15.85		UW_RBT-UW_RBT_004 (1066) Sondex Ultrawire 3-1/8" Radial Bond Tool	9.47	3.13	140.00
WVFS1	15.85					
WVFS2	15.85					
WVFS3	15.85					
WVFS4	15.85					
WVFS5	15.85					
WVFS6	15.85					
WVFS7	15.85					
WVFS8	15.85					
CBLTEMP	15.85		UW_PRC #4 -UW_PRC_057 (1037) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
CBLROT	15.85					
WVF5FT	14.85					
MIT	5.41		UW_MIT-UW_MIT40_027 (211111) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			UW_PRC-UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			UW_BUL-UW_BUL_006 (218707) Sondex Ultrawire Bullnose Terminator	0.22	1.69	1.20
TSTAMP	0.00					
Dataset: 0512337864_Anadarko_Howard 28N-29HZ_09-25-14_MIT_RBL.db: field/well/run1/pass11 Total Length: 27.92 ft Total Weight: 319.30 lb O.D. 3.13 in						

Calibration Report	
Database File:	0512337864_Anadarko_Howard 28N-29HZ_09-25-14_MIT_RBL.db
Dataset Pathname:	pass12
Dataset Creation:	Thu Sep 25 13:53:19 2014 by Log SCH 111116
Multi-finger Imaging Tool Calibration Report	
Serial Number:	211111
Number of Fingers:	40
Tool Model:	UW_MIT40_027
Inclinometer Calibration Report	
Performed:	Mon Nov 18 15:31:59 2013
Calibration Angle:	46

		Inc X	Inc Y
Vertical:		1931	1952
Finger 1 up:		1959	2266
Finger 31 up:		1608	1962
Finger 21 up:		1927	1623
Finger 11 up:		2253	1930
Sensitivity ratio:	1.0031		
X-axis angle:	272.845		
Deviation const.:	311.818		

Finger Calibration Report

Performed: Thu Sep 25 08:33:10 2014

Ring size:	4		5		6		7
(in)		Sens		Sens		Sens	
Finger 01:	976	370.0	1346	421.0	1767	431.0	2198
Finger 02:	1007	372.0	1379	414.0	1793	425.0	2218
Finger 03:	1006	367.0	1373	412.0	1785	427.0	2212
Finger 04:	962	368.0	1330	414.0	1744	433.0	2177
Finger 05:	986	367.0	1353	408.0	1761	424.0	2185
Finger 06:X	990	383.0	1373	417.0	1790	434.0	2224
Finger 07:	1103	342.0	1445	372.0	1817	397.0	2214
Finger 08:	1012	361.0	1373	403.0	1776	429.0	2205
Finger 09:	1012	379.0	1391	408.0	1799	431.0	2230
Finger 10:	1044	329.0	1373	349.0	1722	372.0	2094
Finger 11:X	1091	386.0	1477	400.0	1877	423.0	2300
Finger 12:	1162	401.0	1563	411.0	1974	435.0	2409
Finger 13:	1101	363.0	1464	381.0	1845	417.0	2262
Finger 14:	1197	349.0	1546	351.0	1897	379.0	2276
Finger 15:	1019	387.0	1406	404.0	1810	444.0	2254
Finger 16:	1132	378.0	1510	386.0	1896	406.0	2302
Finger 17:	1046	381.0	1427	397.0	1824	436.0	2260
Finger 18:	1036	390.0	1426	404.0	1830	439.0	2269
Finger 19:	1028	383.0	1411	405.0	1816	447.0	2263
Finger 20:	1092	372.0	1464	386.0	1850	421.0	2271
Finger 21:	1078	381.0	1459	399.0	1858	437.0	2295
Finger 22:	1104	381.0	1485	401.0	1886	436.0	2322
Finger 23:	1065	372.0	1437	409.0	1846	447.0	2293
Finger 24:	1228	344.0	1572	362.0	1934	389.0	2323
Finger 25:	1204	362.0	1566	384.0	1950	399.0	2349
Finger 26:	1220	349.0	1569	365.0	1934	377.0	2311
Finger 27:	1188	348.0	1536	377.0	1913	392.0	2305
Finger 28:	1236	352.0	1588	371.0	1959	380.0	2339
Finger 29:	1208	343.0	1551	368.0	1919	380.0	2299
Finger 30:	1195	337.0	1532	368.0	1900	385.0	2285
Finger 31:	1212	348.0	1560	380.0	1940	383.0	2323
Finger 32:	1233	336.0	1569	364.0	1933	366.0	2299
Finger 33:	1048	360.0	1408	424.0	1832	436.0	2268
Finger 34:	1099	357.0	1456	406.0	1862	413.0	2275
Finger 35:	1183	335.0	1518	377.0	1895	382.0	2277
Finger 36:	1121	342.0	1463	382.0	1845	384.0	2229
Finger 37:	1055	362.0	1417	412.0	1829	417.0	2246
Finger 38:	1062	358.0	1420	401.0	1821	403.0	2224
Finger 39:X	1119	326.0	1445	478.0	1923	425.0	2348
Finger 40:	973	364.0	1337	414.0	1751	424.0	2175

Post Survey Calibration Check

Performed: Thu Sep 25 13:53:11 2014

Ring size:	4	Nom.	5	Nom.	6	Nom.	7	Nom.
(in)		wear		wear		wear		wear
Finger 01:	4.025	0.013	5.005	0.002	6.008	0.004	7.007	0.004
Finger 02:	4.031	0.016	5.012	0.006	6.017	0.009	7.013	0.007
Finger 03:	4.011	0.006	5.000	-0.000	6.013	0.006	7.012	0.006
Finger 04:	4.030	0.015	5.018	0.009	6.017	0.009	7.013	0.007
Finger 05:	4.028	0.014	5.016	0.008	6.014	0.007	7.009	0.005

Finger 06:	-----	-----	-----	-----	-----	-----	-----	
Finger 07:	4.009	0.004	5.002	0.001	6.015	0.007	7.021	0.011
Finger 08:	4.004	0.002	5.001	0.001	6.005	0.003	7.013	0.006
Finger 09:	4.024	0.012	5.015	0.008	6.012	0.006	7.011	0.006
Finger 10:	4.014	0.007	5.007	0.003	6.010	0.005	7.017	0.009
Finger 11:	-----	-----	-----	-----	-----	-----	-----	
Finger 12:	4.032	0.016	5.017	0.008	6.015	0.008	7.012	0.006
Finger 13:	4.008	0.004	5.003	0.002	6.004	0.002	7.008	0.004
Finger 14:	4.022	0.011	5.014	0.007	6.013	0.006	7.020	0.010
Finger 15:	4.023	0.011	5.013	0.007	6.005	0.003	7.002	0.001
Finger 16:	4.007	0.003	4.999	-0.000	6.000	-0.000	7.018	0.009
Finger 17:	4.027	0.014	5.014	0.007	6.005	0.003	7.004	0.002
Finger 18:	4.032	0.016	5.020	0.010	6.005	0.002	7.000	-0.000
Finger 19:	4.023	0.011	5.010	0.005	6.004	0.002	7.004	0.002
Finger 20:	4.023	0.012	5.012	0.006	6.002	0.001	7.006	0.003
Finger 21:	4.029	0.014	5.015	0.008	6.015	0.008	7.021	0.010
Finger 22:	4.031	0.015	5.016	0.008	6.004	0.002	6.995	-0.003
Finger 23:	4.019	0.009	5.012	0.006	6.000	-0.000	6.994	-0.003
Finger 24:	4.021	0.010	5.016	0.008	6.017	0.009	7.040	0.020
Finger 25:	4.007	0.004	5.002	0.001	6.004	0.002	7.017	0.008
Finger 26:	4.014	0.007	5.007	0.003	5.996	-0.002	6.994	-0.003
Finger 27:	4.024	0.012	5.017	0.009	6.013	0.007	7.009	0.005
Finger 28:	4.015	0.008	5.008	0.004	6.006	0.003	7.004	0.002
Finger 29:	4.018	0.009	5.015	0.007	6.022	0.011	7.020	0.010
Finger 30:	4.032	0.016	5.019	0.009	6.027	0.014	7.027	0.014
Finger 31:	4.018	0.009	5.011	0.006	6.006	0.003	7.004	0.002
Finger 32:	4.017	0.008	5.005	0.002	6.006	0.003	7.001	0.001
Finger 33:	4.023	0.011	5.005	0.003	6.007	0.004	7.010	0.005
Finger 34:	4.012	0.006	5.000	-0.000	6.007	0.004	7.003	0.002
Finger 35:	4.017	0.008	5.004	0.002	6.011	0.006	7.022	0.011
Finger 36:	4.020	0.010	4.999	-0.001	6.011	0.006	7.025	0.012
Finger 37:	4.025	0.012	5.009	0.005	6.010	0.005	7.005	0.002
Finger 38:	4.035	0.017	5.017	0.009	6.023	0.012	7.016	0.008
Finger 39:	-----	-----	-----	-----	-----	-----	-----	
Finger 40:	4.032	0.016	5.017	0.009	6.021	0.011	7.025	0.012
Average:	4.021	0.011	5.010	0.005	6.010	0.005	7.011	0.006

Segmented Cement Bond Log Calibration Report

Serial Number:	1066	
Tool Model:	UW_RBT_004	
Calibration Casing Diameter:	7.000	in
Calibration Depth:	457.875	ft

Master Calibration, performed Thu Sep 25 09:34:35 2014:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	0.004	0.712	0.800	62.165	86.603	0.473
5FT	-0.001	0.624	0.800	62.165	98.056	0.941
S1	0.005	0.662	0.000	100.000	152.172	-0.737
S2	0.003	0.679	0.000	100.000	148.033	-0.477
S3	0.003	0.701	0.000	100.000	143.277	-0.493
S4	0.003	0.730	0.000	100.000	137.471	-0.366
S5	0.004	0.743	0.000	100.000	135.233	-0.500
S6	0.004	0.745	0.000	100.000	134.795	-0.479
S7	0.004	0.731	0.000	100.000	137.482	-0.534
S8	0.004	0.690	0.000	100.000	145.750	-0.576

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
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Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps

Sensitivity:	1.0000	GAPI/cps
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Company	Kerr-McGee Oil & Gas Onshore, L.P.
Well	Howard 28N-29HZ
Field	Wattenberg
County	Weld
State	Colorado