



Radial Cement Bond  
Gamma Ray  
Casing Collar Log

Company Kerr-McGee Oil & Gas Onshore, L.P.  
Well Howard 29N-21HZ  
Field Wattenberg  
County Weld  
State Colorado

Company Kerr-McGee Oil & Gas Onshore, L.P.  
Well Howard 29N-21HZ  
Field Wattenberg  
County Weld State Colorado

Location:

API #: 05-123-36792  
431 FSL, 1522 FWL, SESW  
Lat / Lon 40.030503 / -104.899549  
SEC 21 TWP 1N RGE 87W  
Permanent Datum Ground Level  
Log Measured From Kelly Bushing (16 FT)  
Drilling Measured From Kelly Bushing

Other Services  
Gauge Ring  
MIT

Elevation

K.B. 5041'  
D.F. 5040'  
G.L. 5025'

Date 03-Dec-2018

Run Number Two

Depth Driller 12,009'

Depth Logger 6960'

Bottom Logged Interval 6960'

Top Log Interval Surface

Open Hole Size 8.750"

Type Fluid Water

Density / Viscosity 8.34 lbm/gal

Max. Recorded Temp. 224 degF

Estimated Cement Top 335'

Time Well Ready 10:30

Time Logger on Bottom 11:30

Equipment Number HD-255

Location Fort Lupton, CO.

Recorded By H. Raby

Witnessed By Noe Pulido

Borehole Record

Run Number Bit From To Size Weight

Size (in) Wgt (lbs/ft) Grade Top Bottom

Surface Casing 9-5/8" 36# J-55 LTC Surface 932'

Intermediate #1 7" 26# HCP-110 Surface 7994'

Intermediate #2 4-1/2" 11.6# P-110 Surface 6916'

Liner 4-1/2" 11.6# P-110 6916' 11,994'

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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

Radial Cement Bond Log - Casing Inspection Log is first recorded log in hole.  
Depth reference to Casing Tally reported Top of Liner at 6916'.  
Adjusted 10' for liner top at 6916' from a 16' KB zero  
RCBL-CIL ran at 2800 PSI surface induced pressure.  
Estimated Cement Top recorded at 335'

Thank you for choosing FMC Technologies Completion Services!!

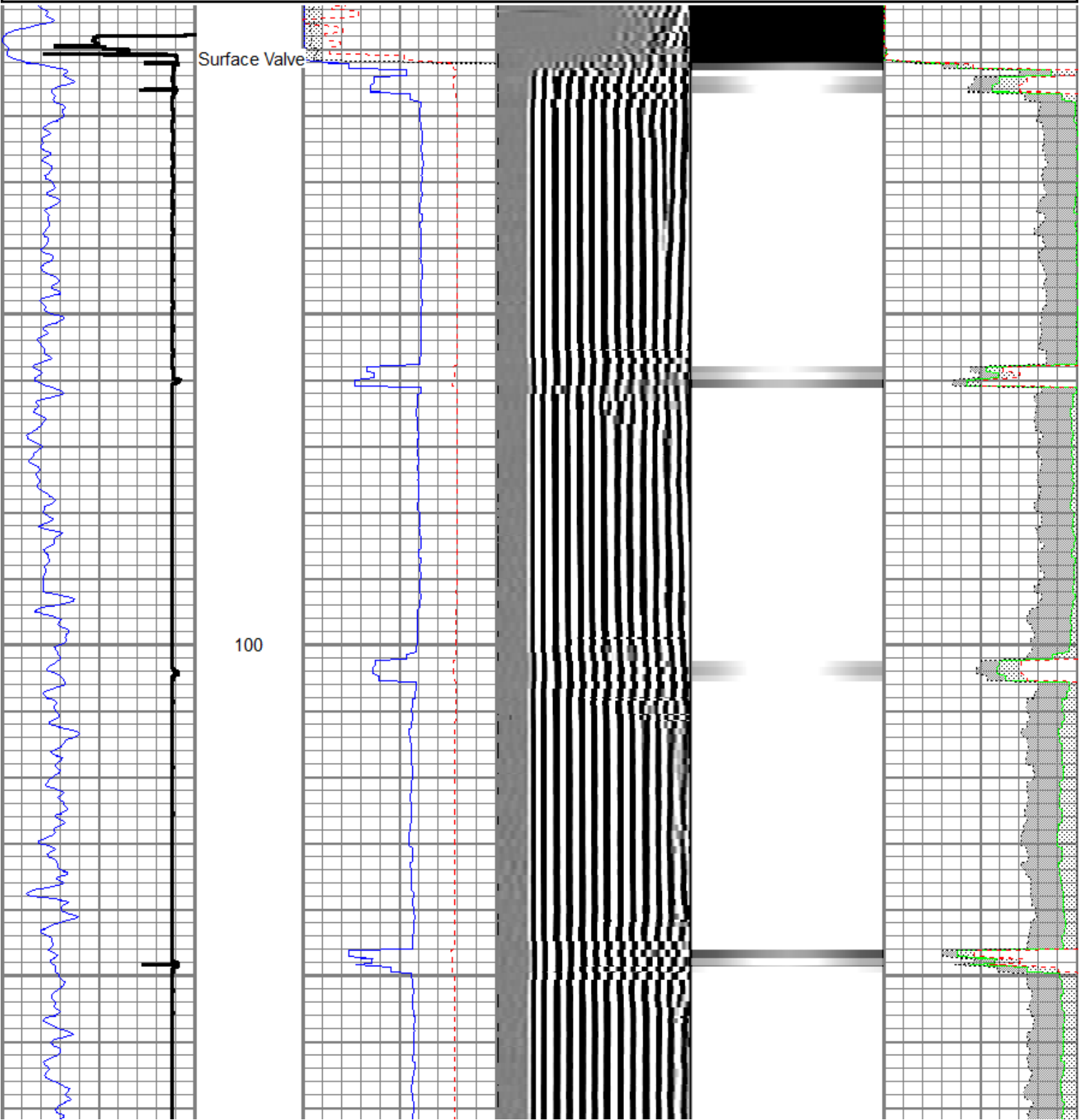


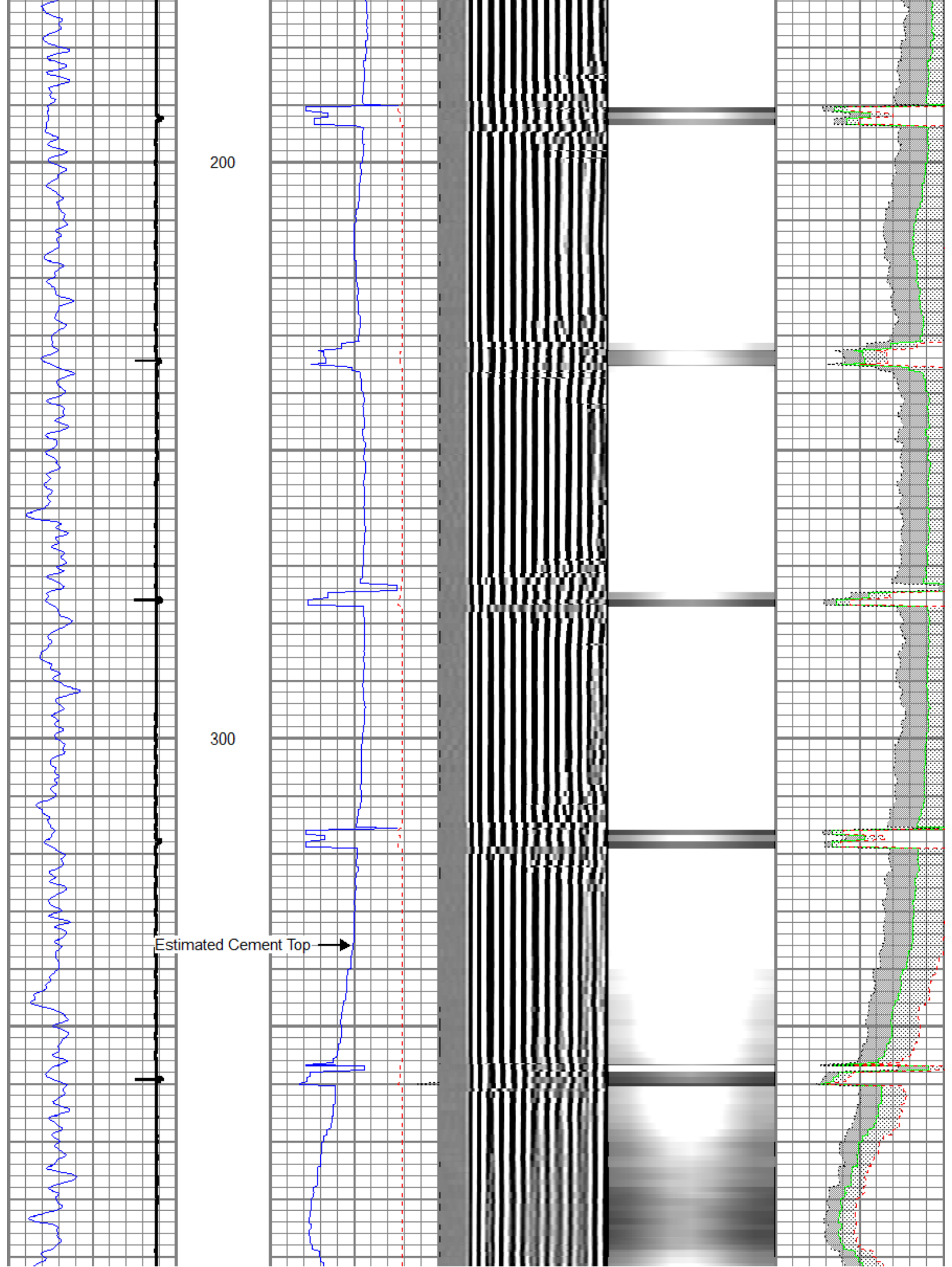
Main Pass

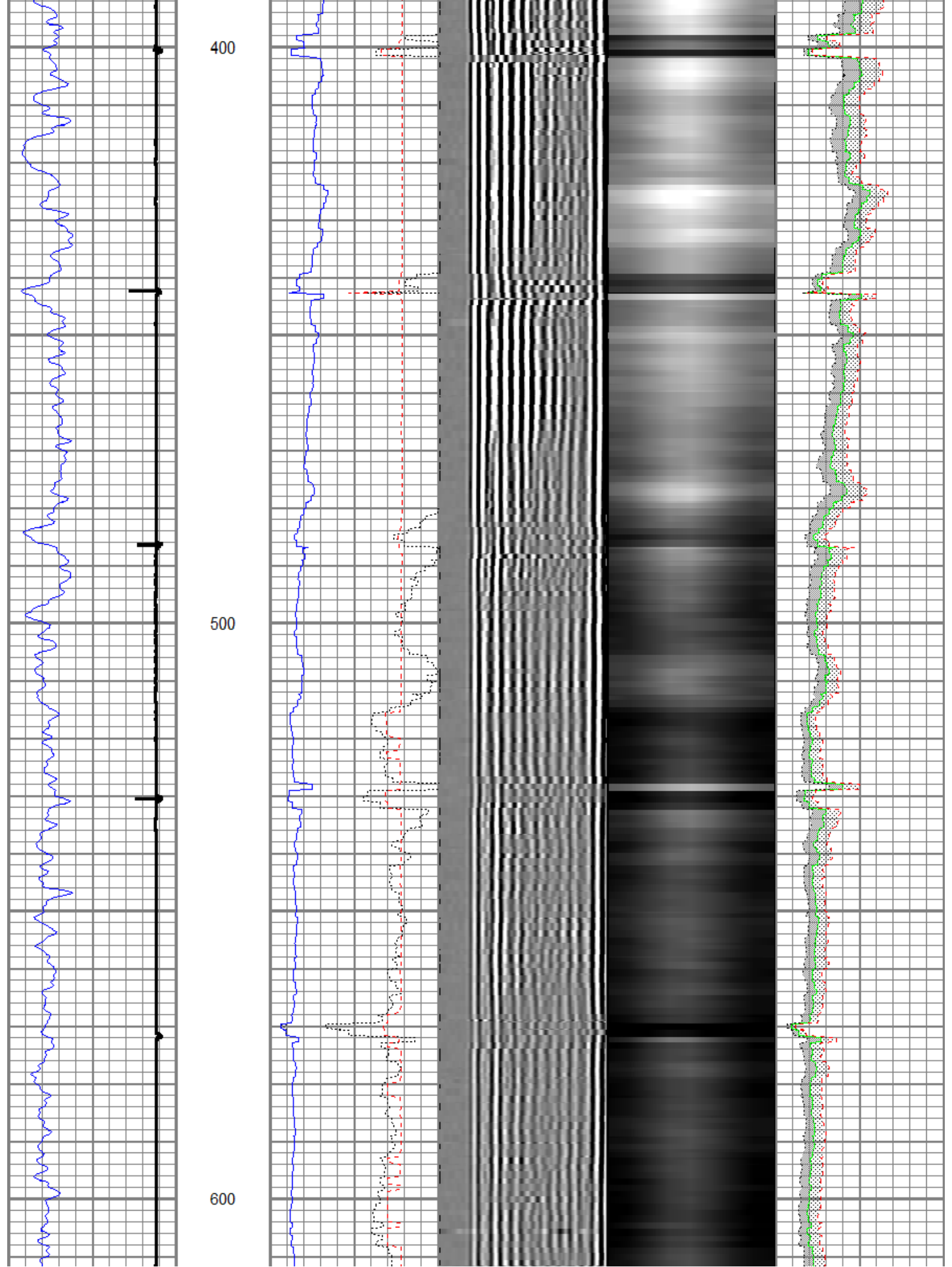
Recorded With 2800 PSI Surface Induced Pressure

Database File: anadarko\_howard 29n-21hz\_03-dec-2013\_rcbl-mit\_w7.db  
Dataset Pathname: main3  
Presentation Format: rib  
Dataset Creation: Tue Dec 03 15:08:58 2013 by Log Sondex V7.03  
Charted by: Depth in Feet scaled 1:240

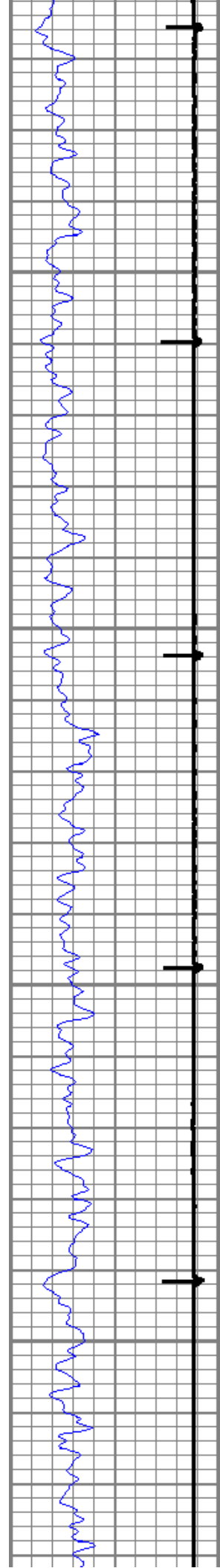
0	GR (GAPI)	120	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
	CCL		0 (mV) 100	200 1200		0 100
			3' Amplitude x 5			Minimum Amplitude
			0 (mV) 20			0 100
			3' Travel Time			Maximum Amplitude
			650 (usec) 150			0 100





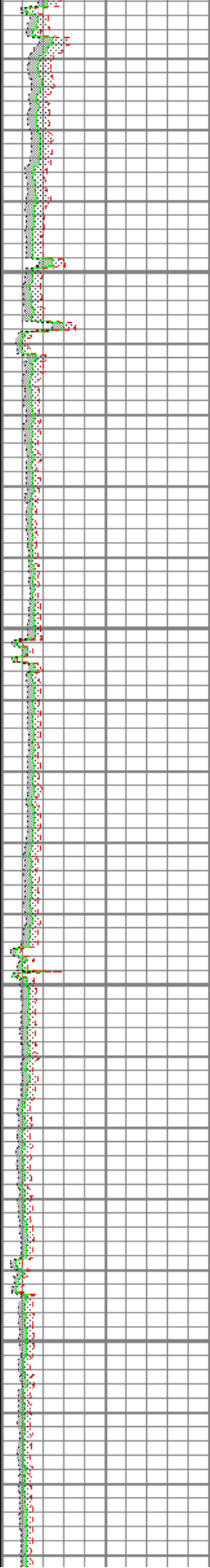
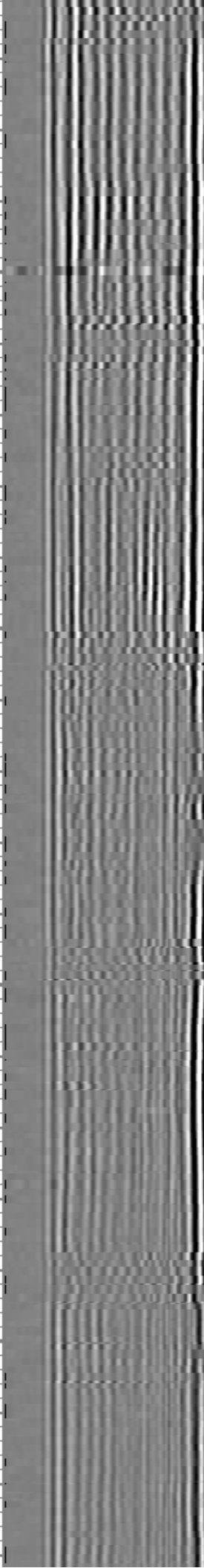
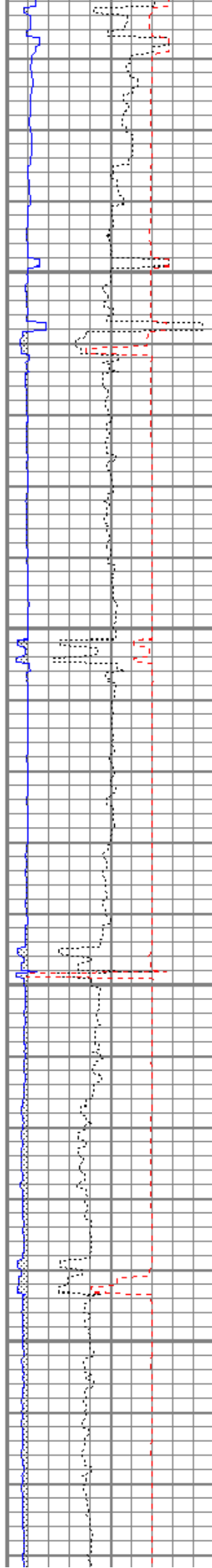


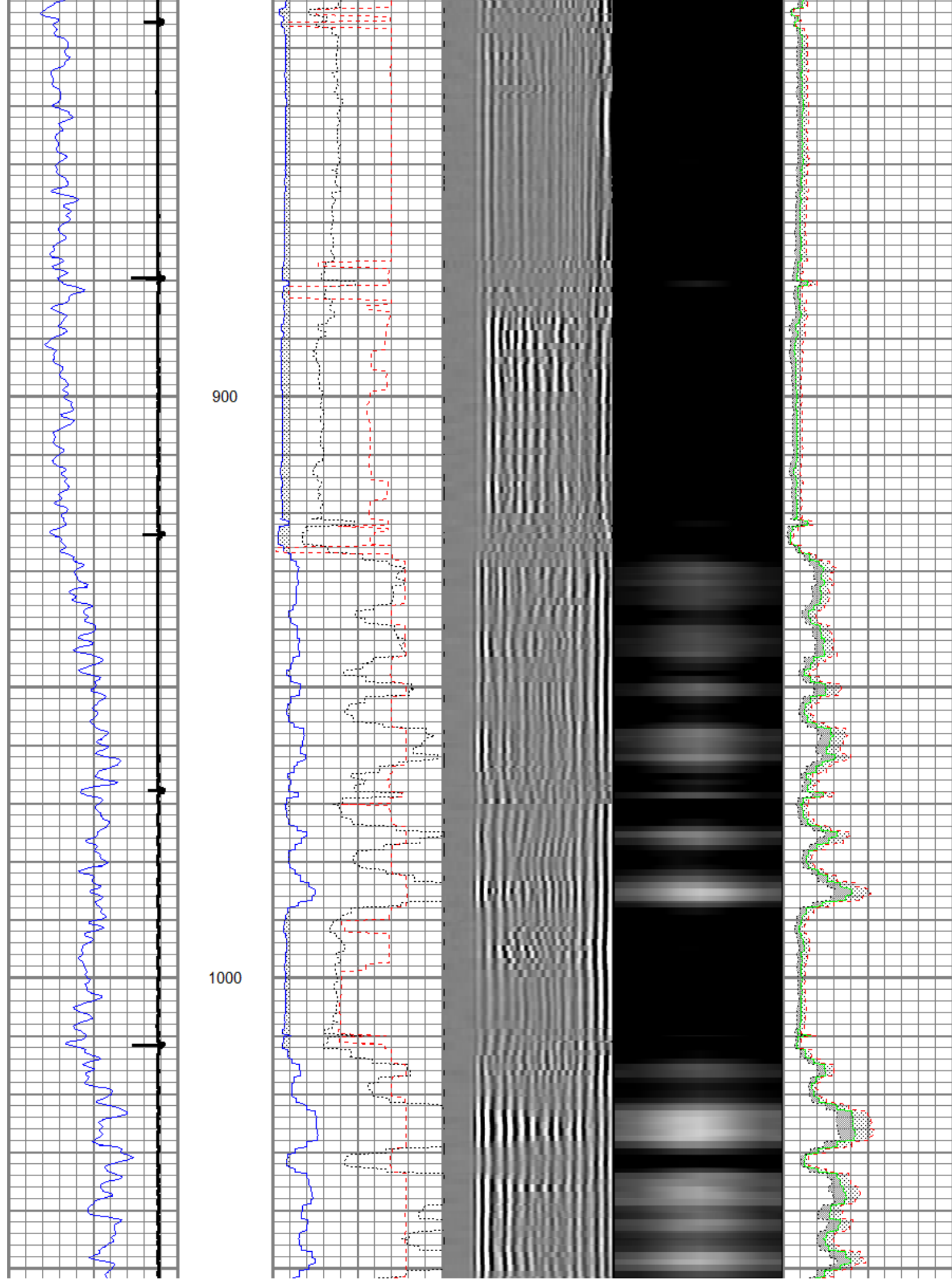


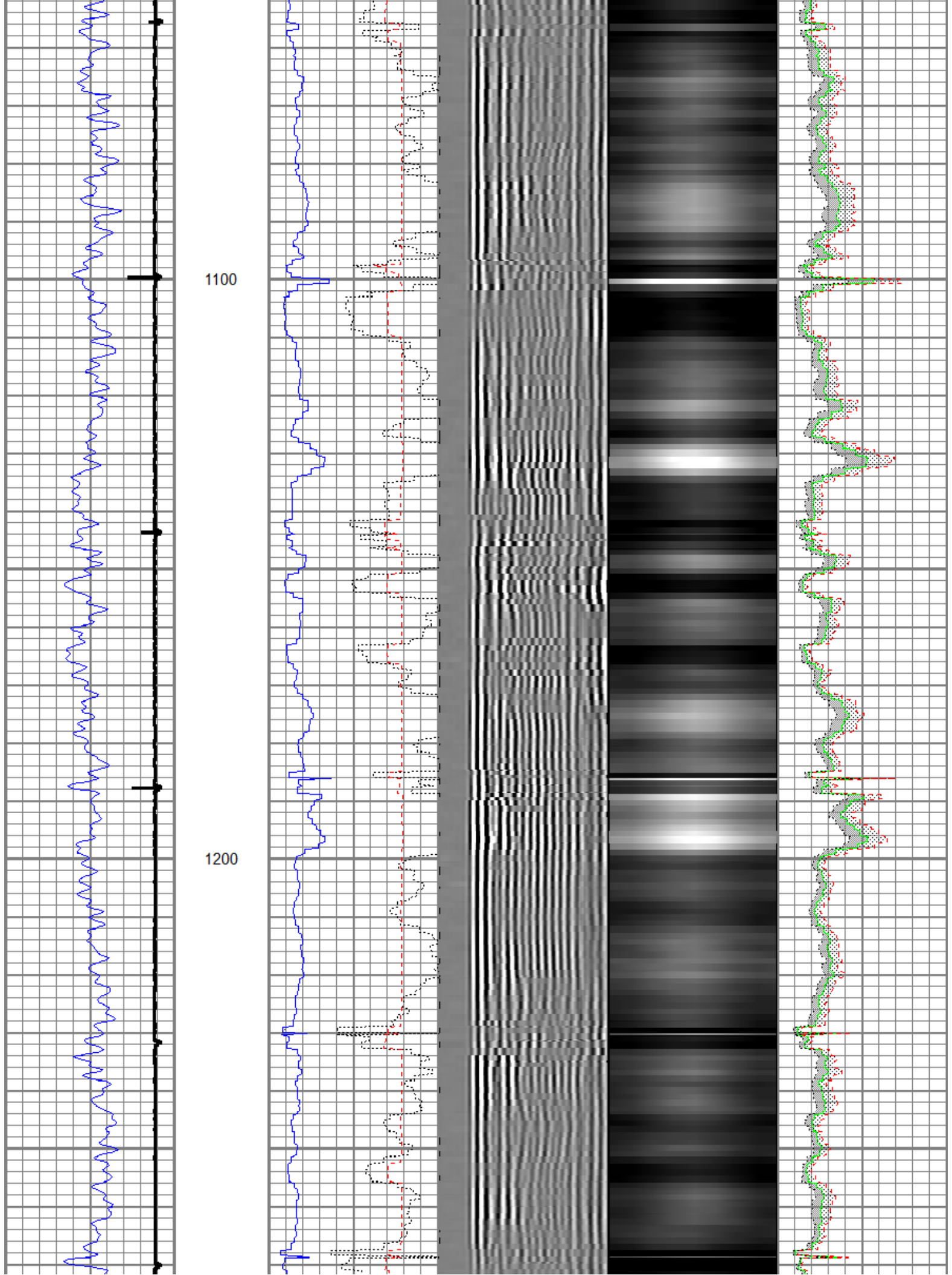


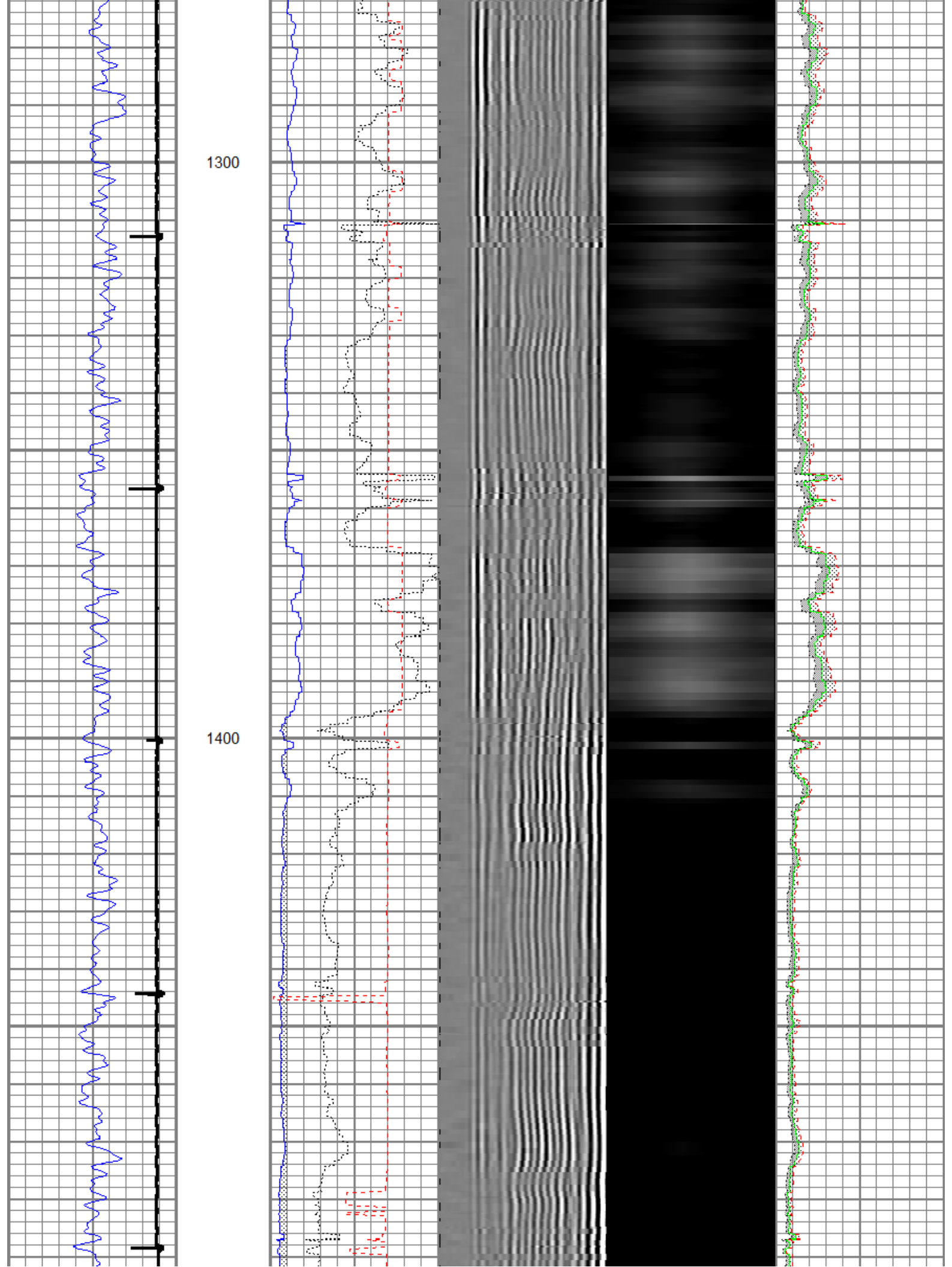
700

800

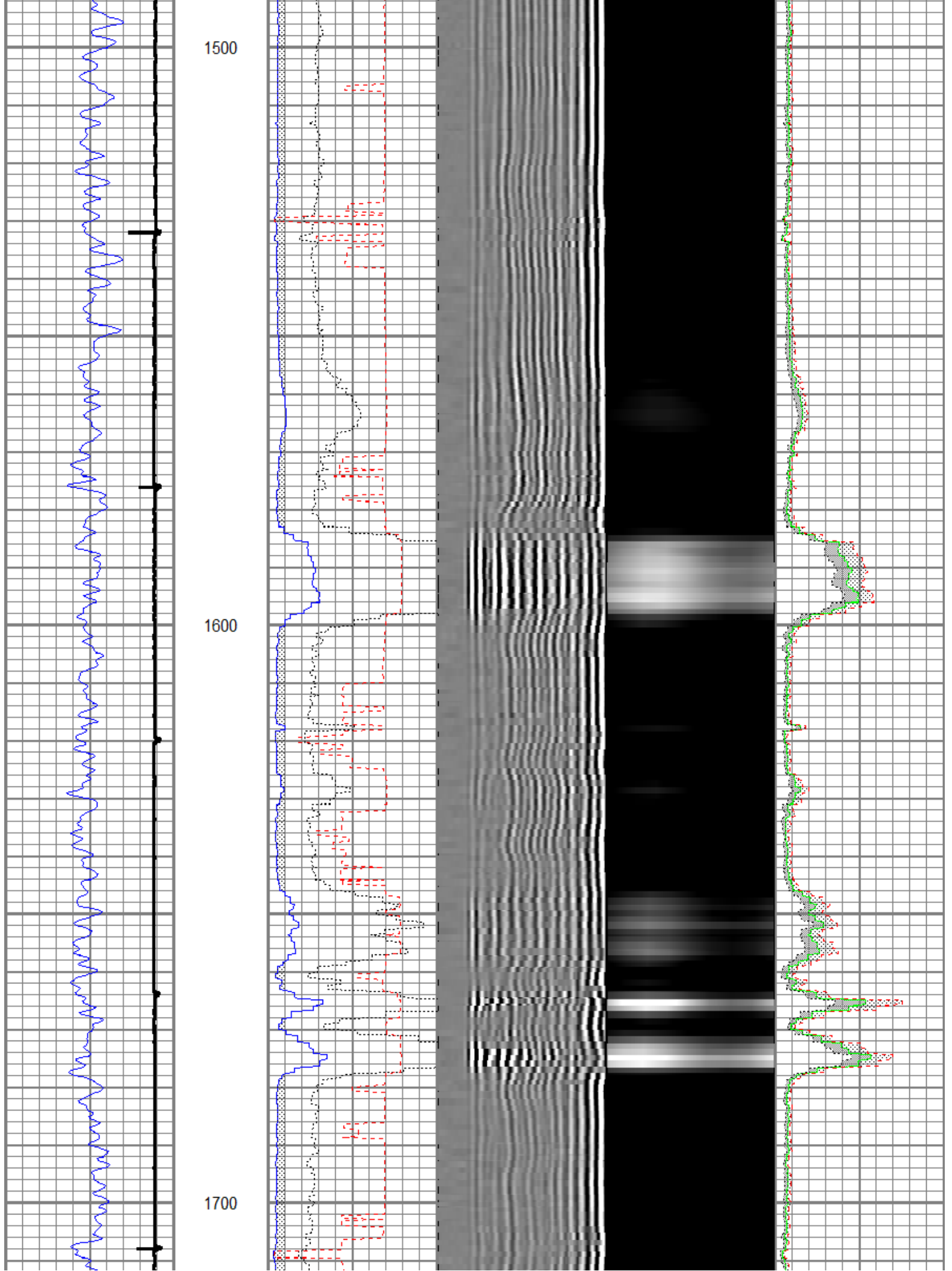


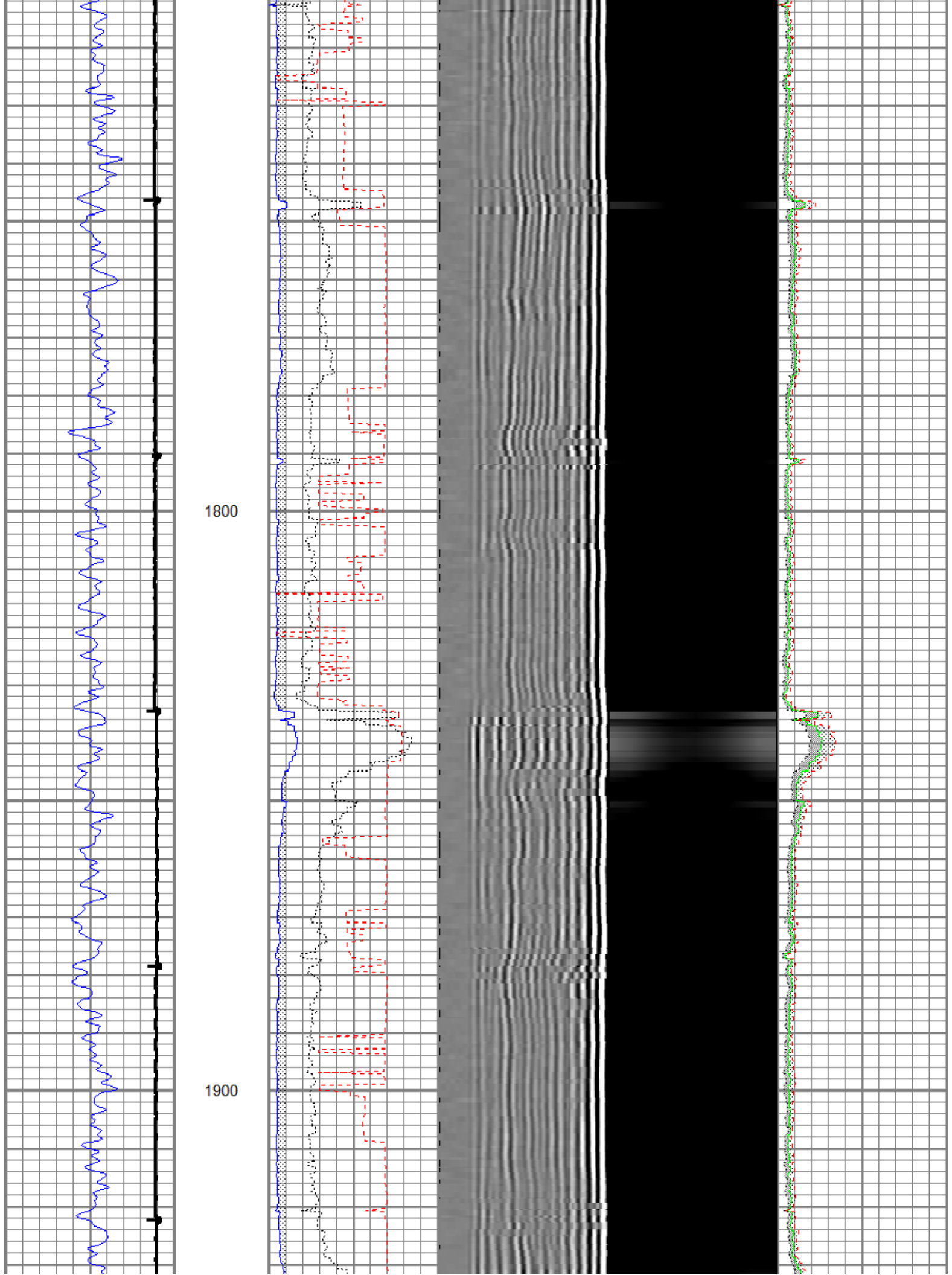


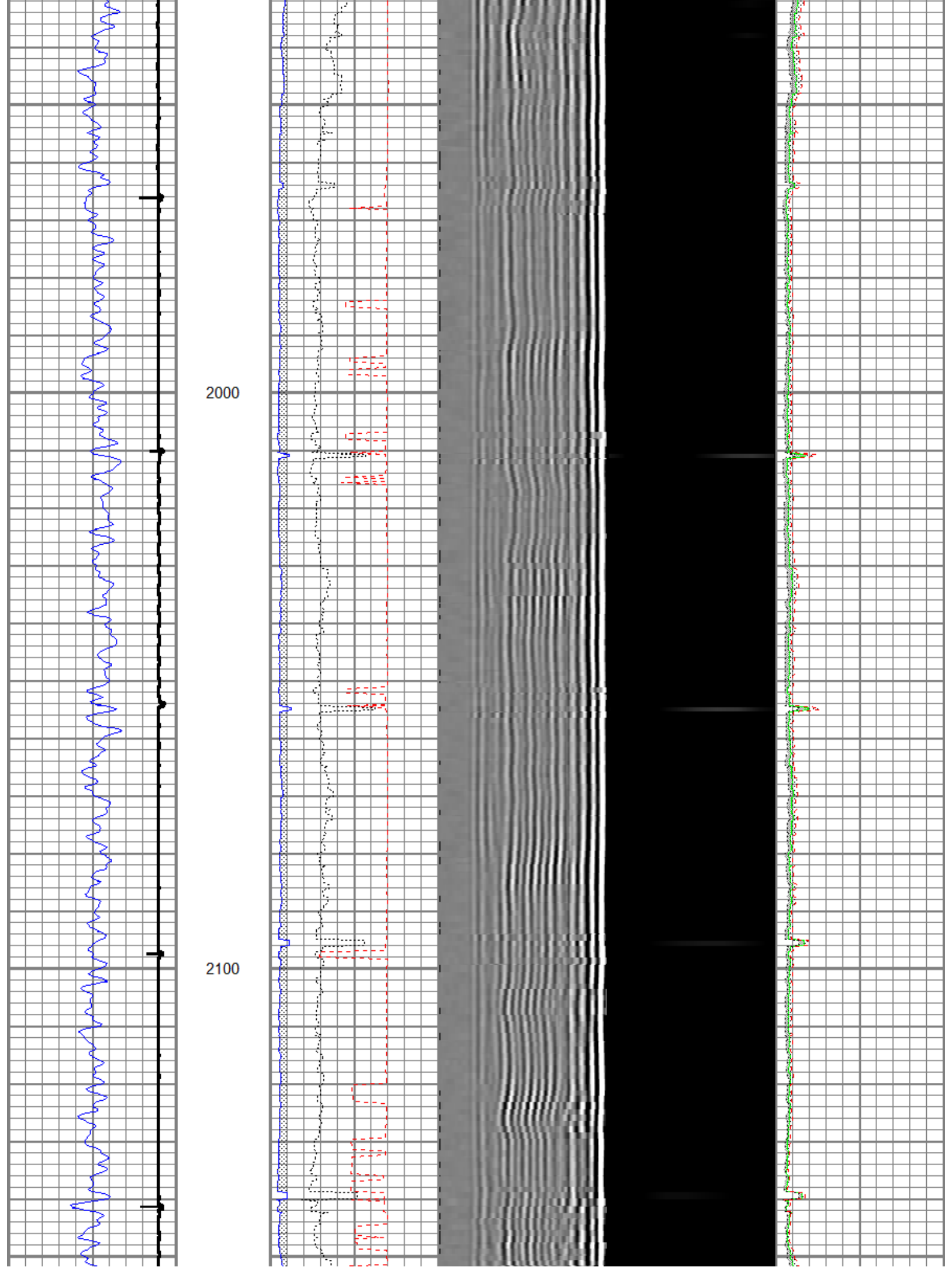


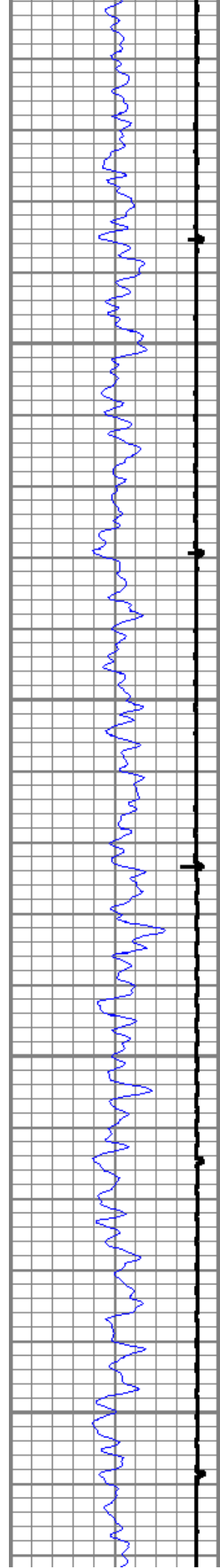






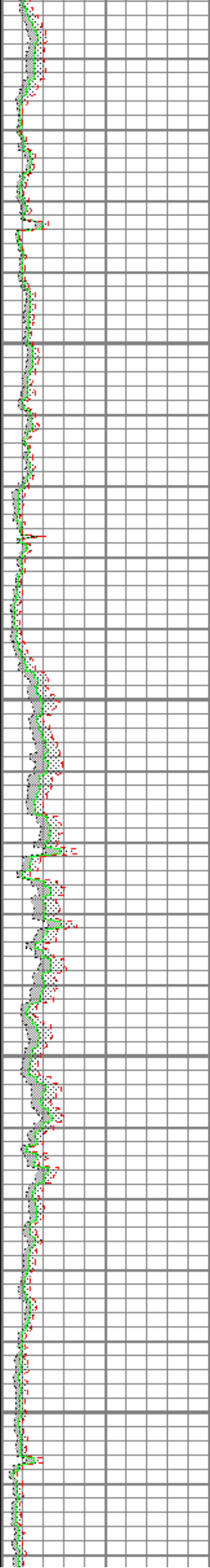
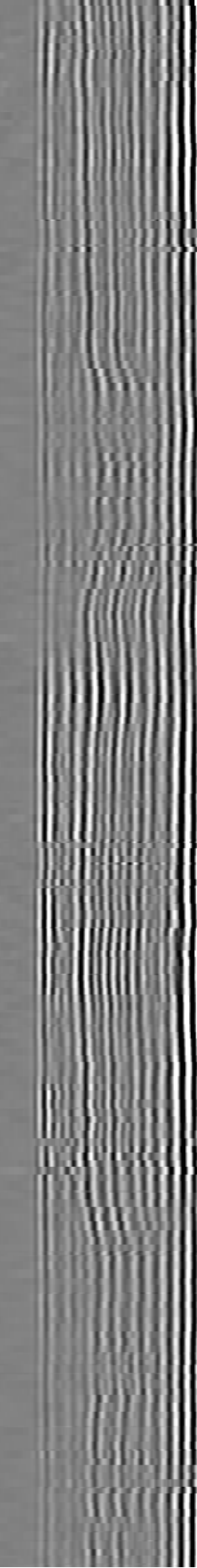
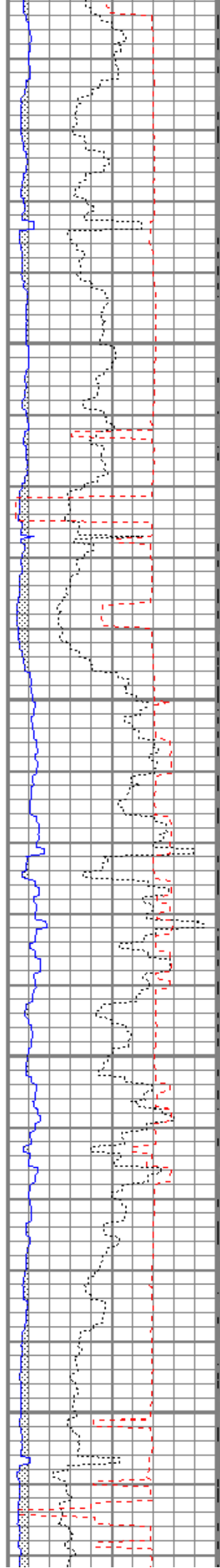


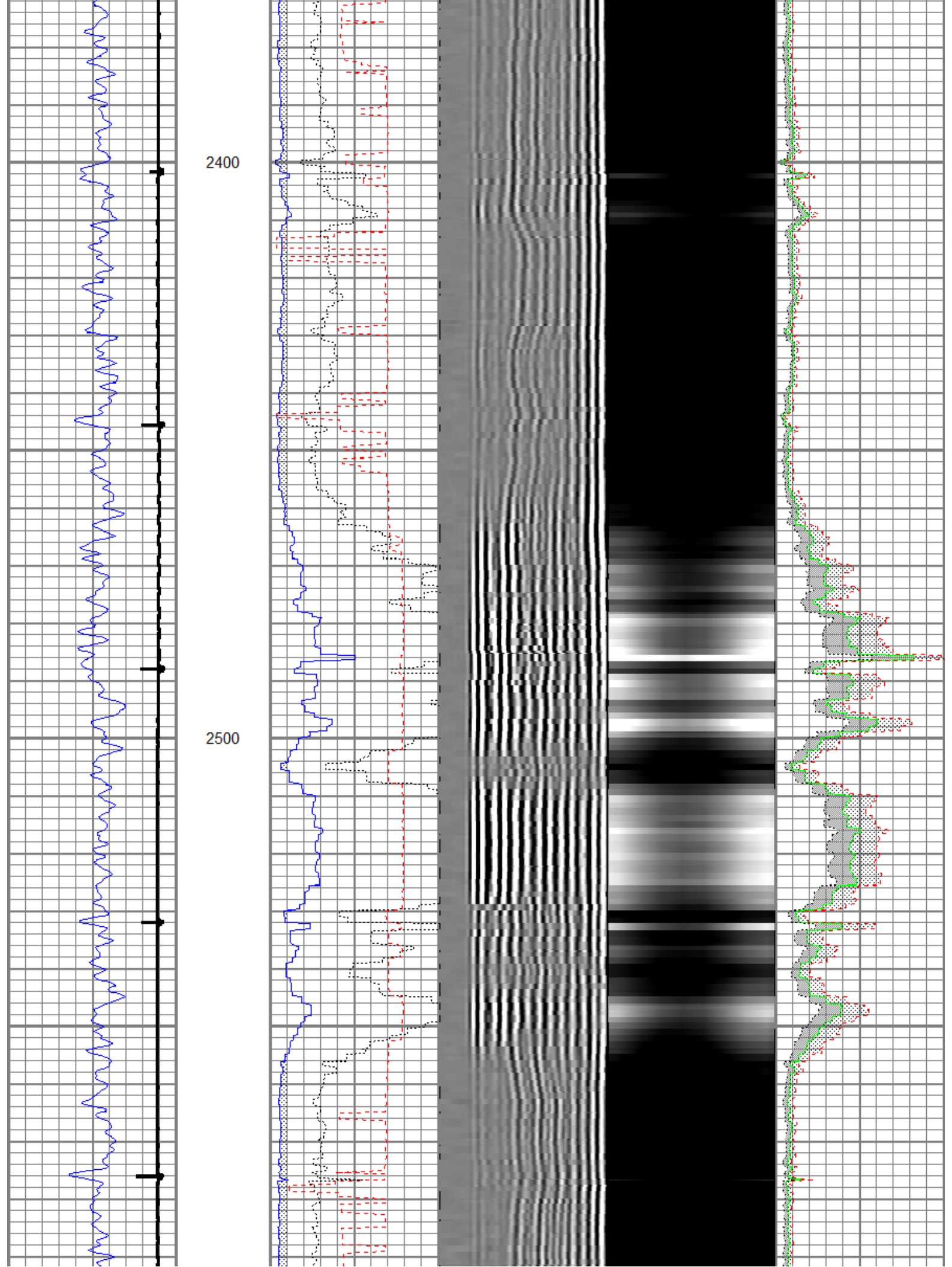




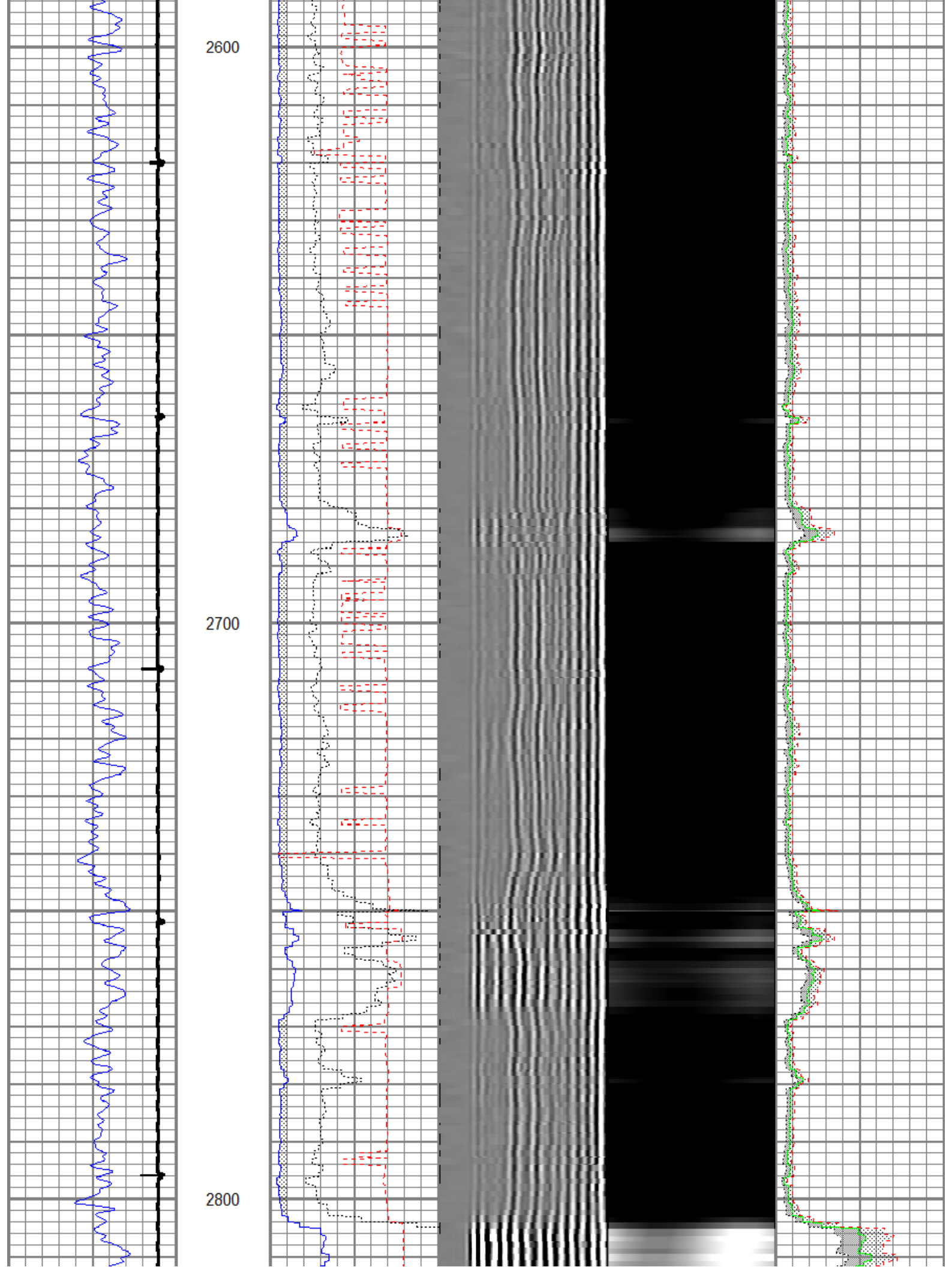
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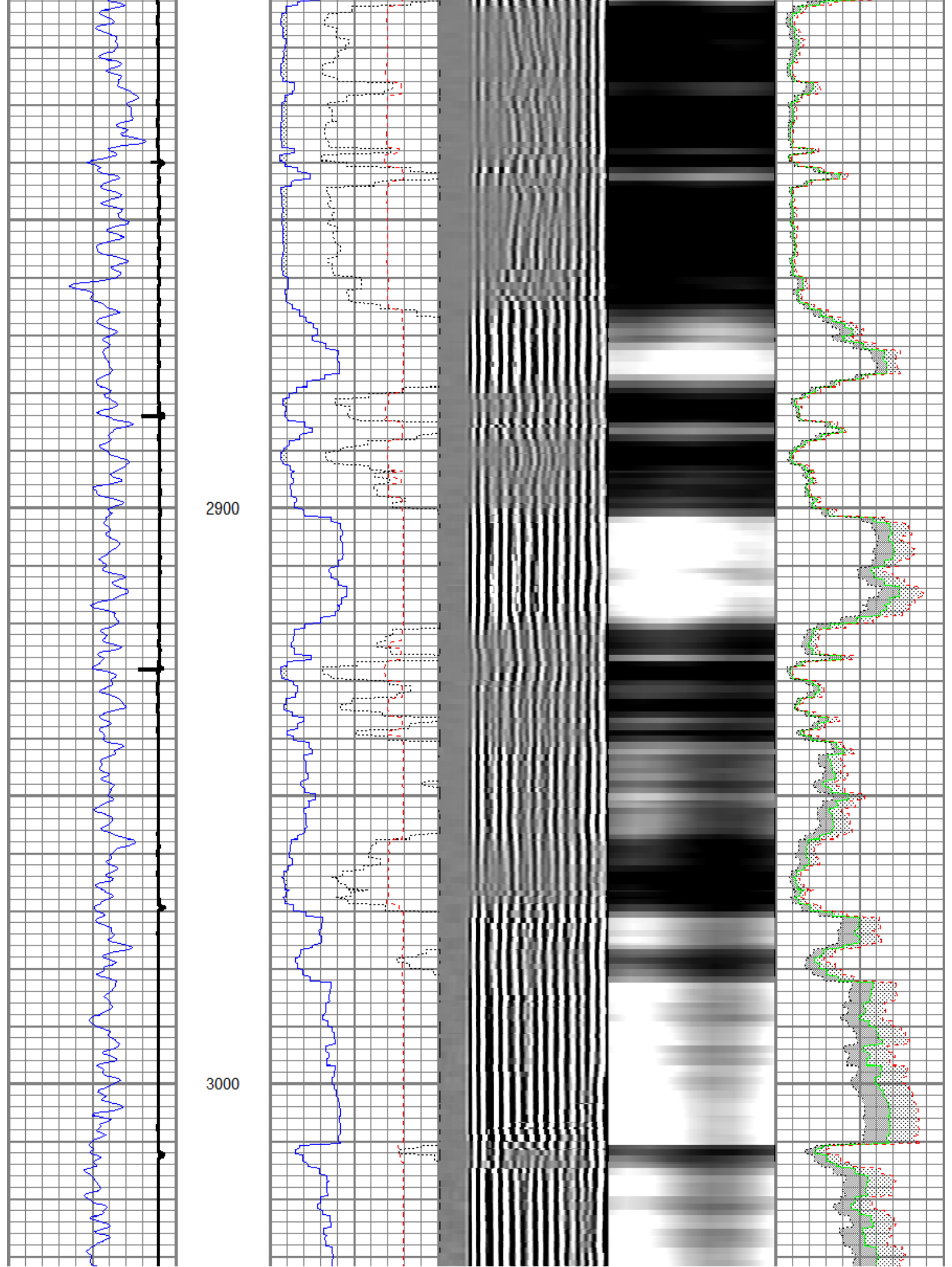
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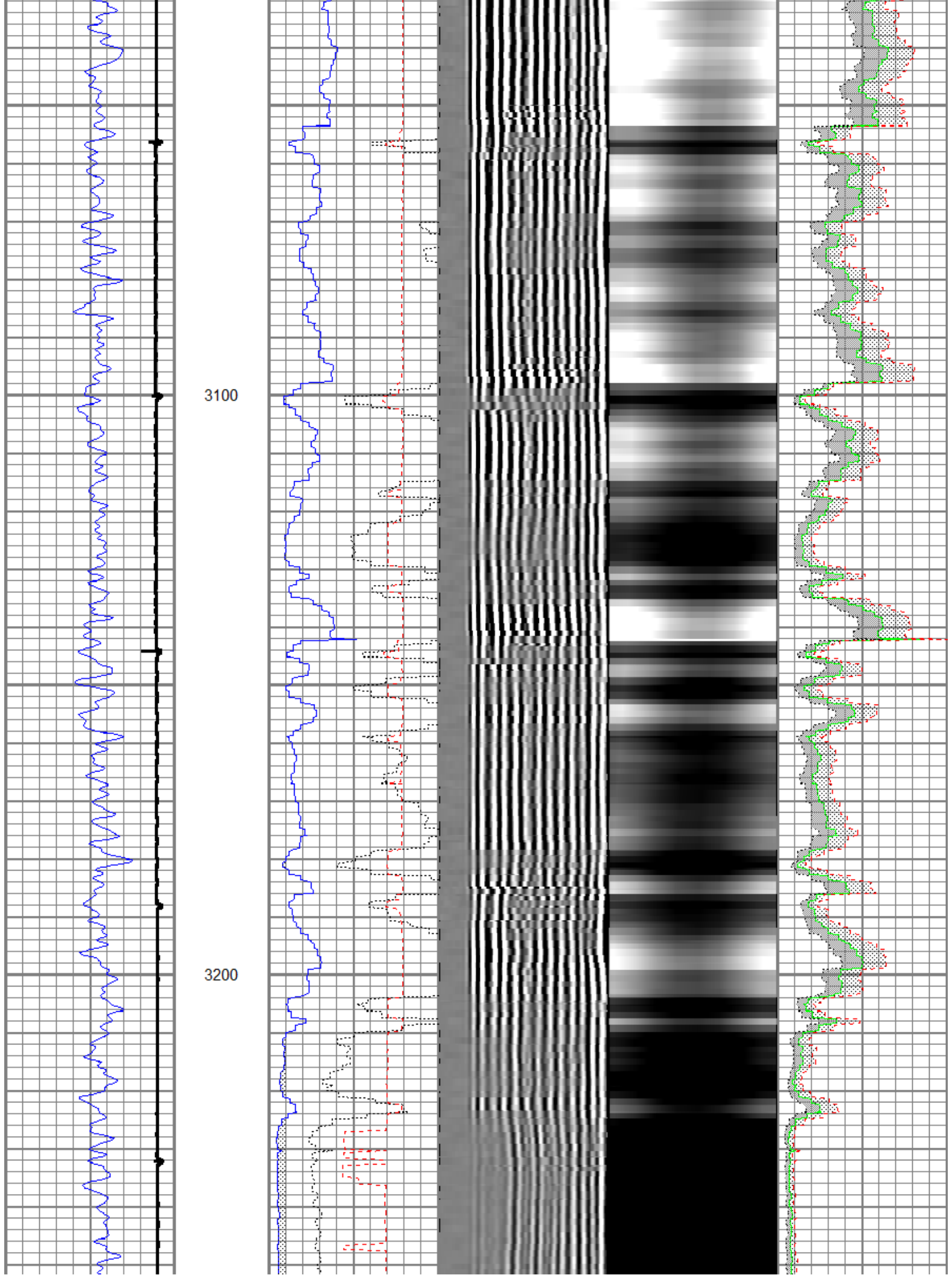


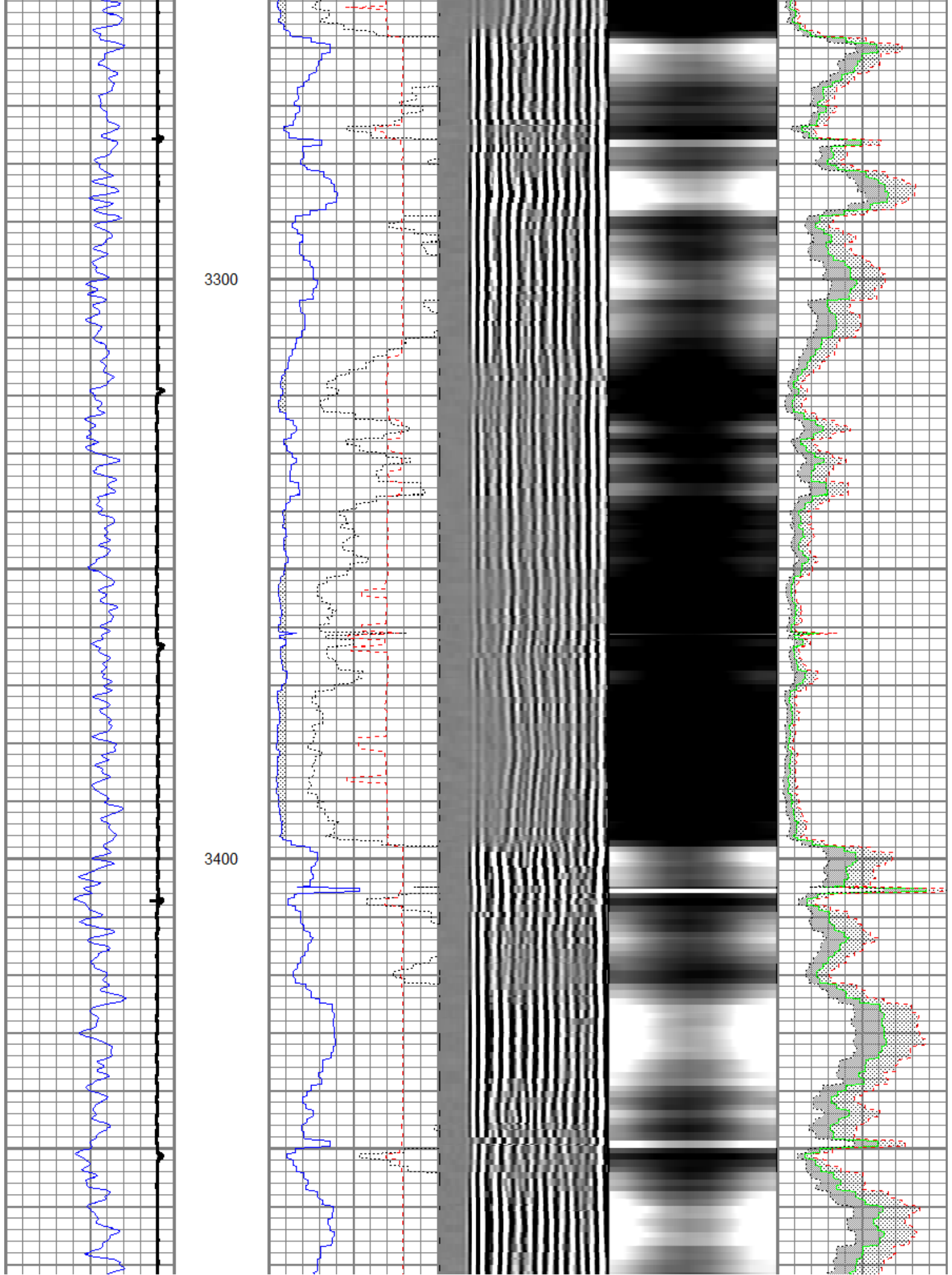




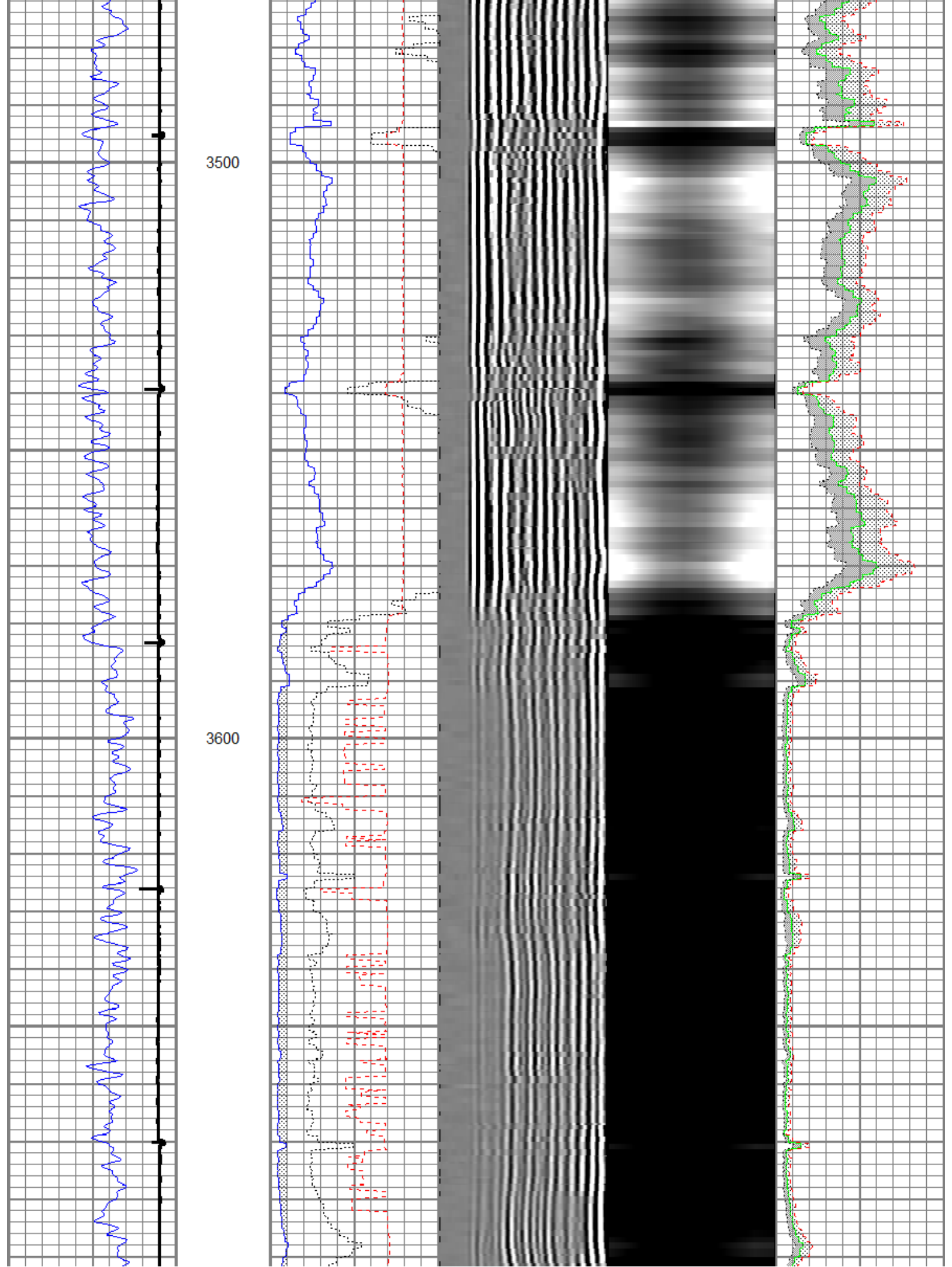




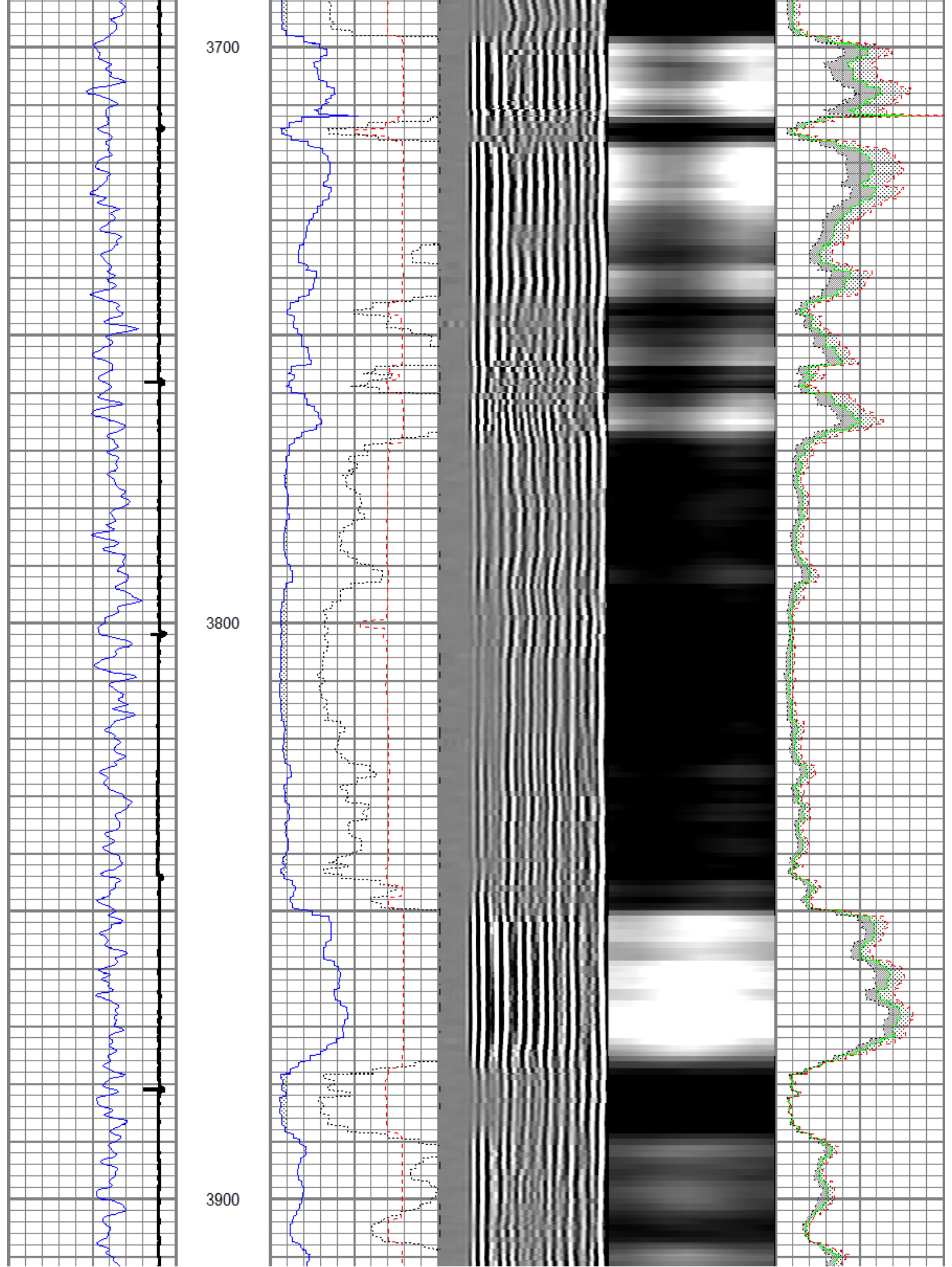


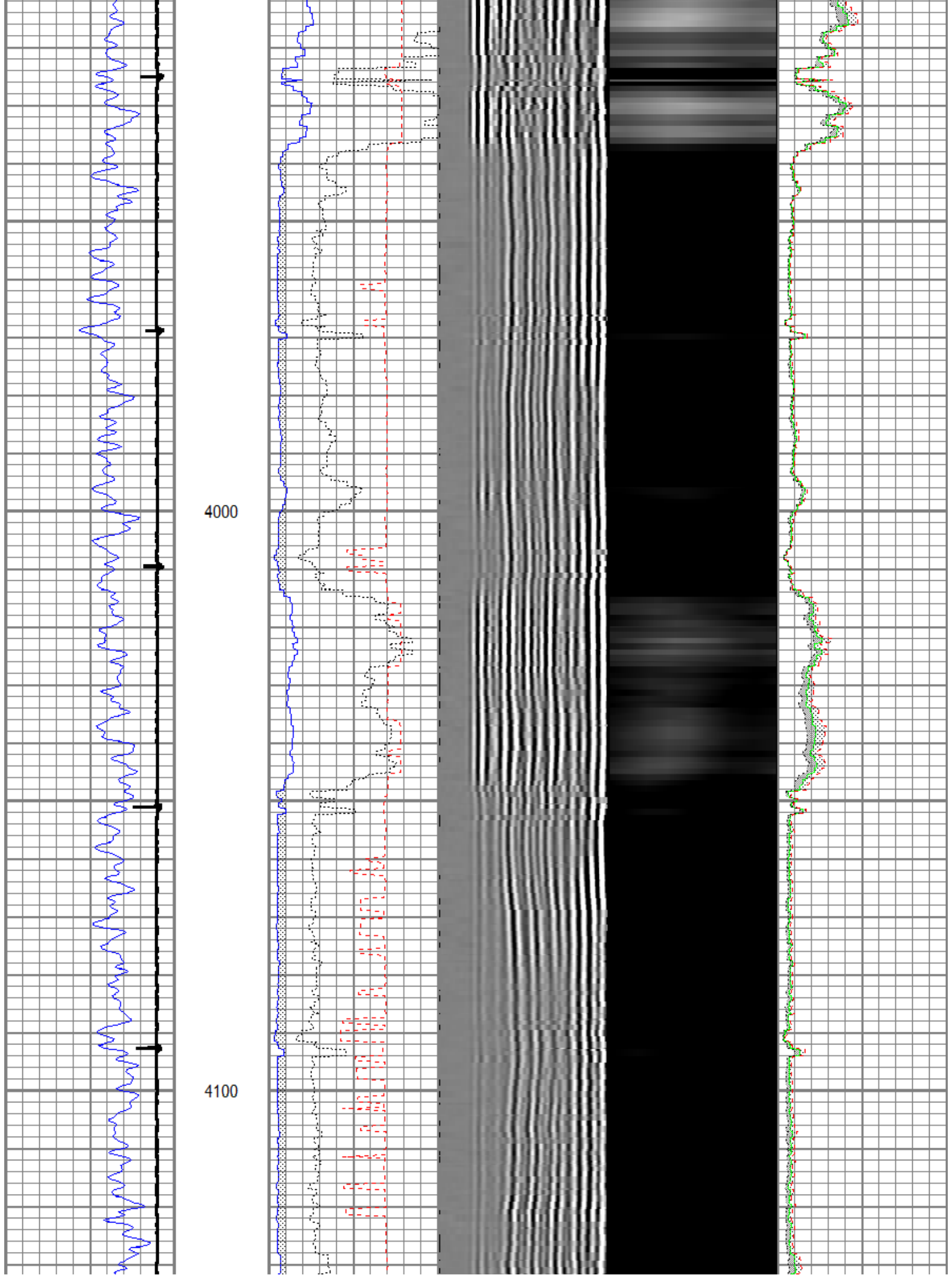


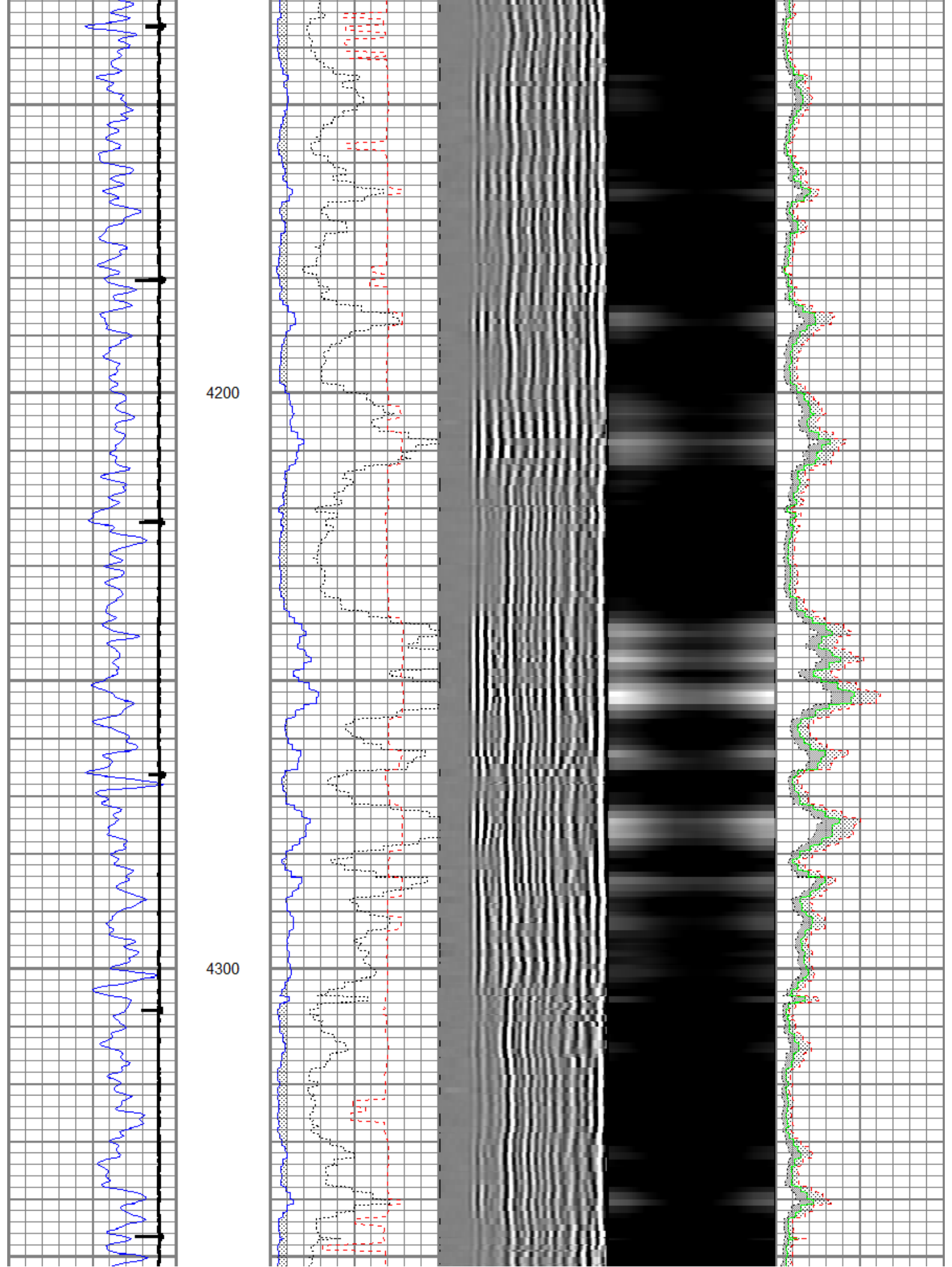


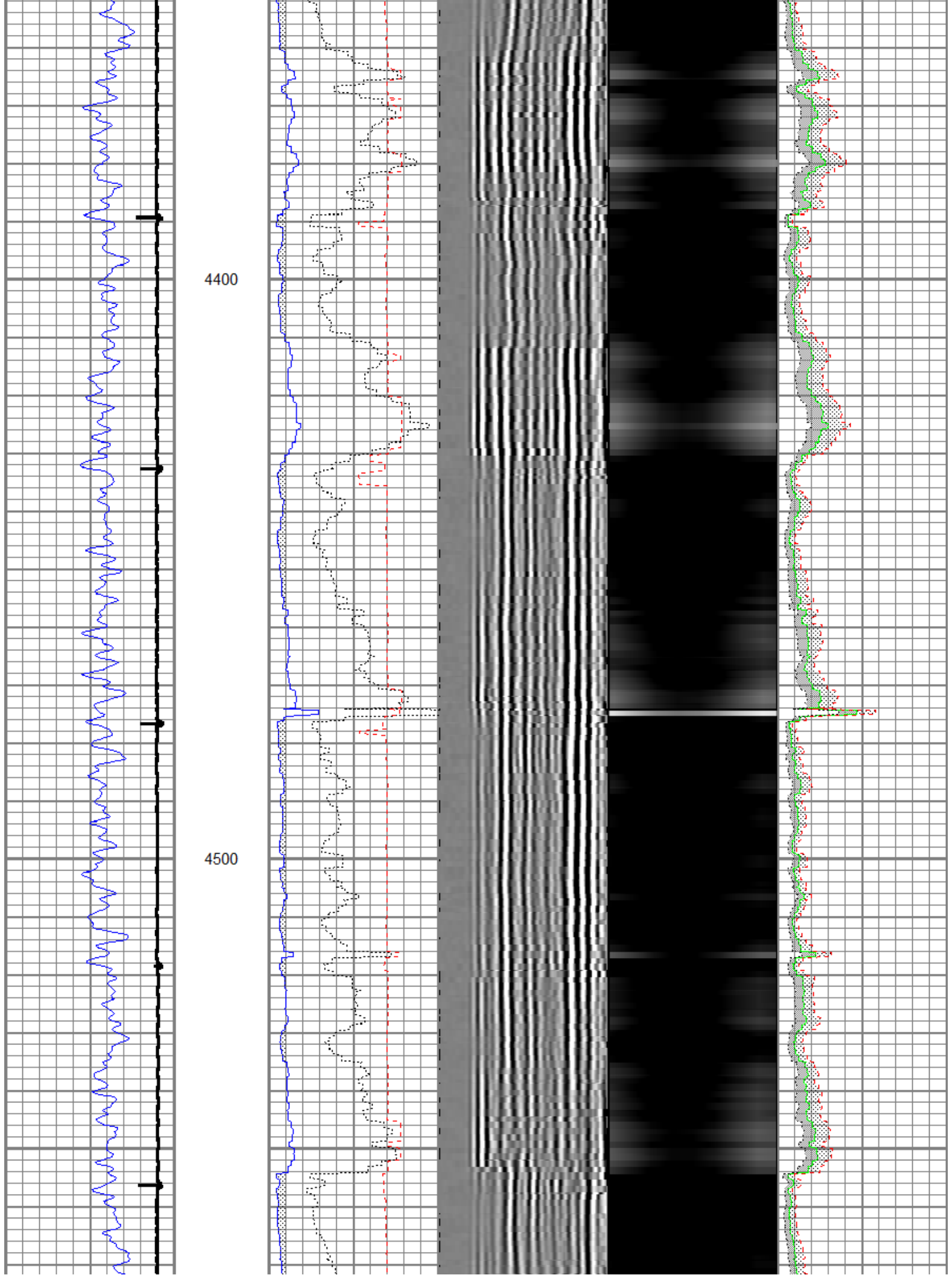


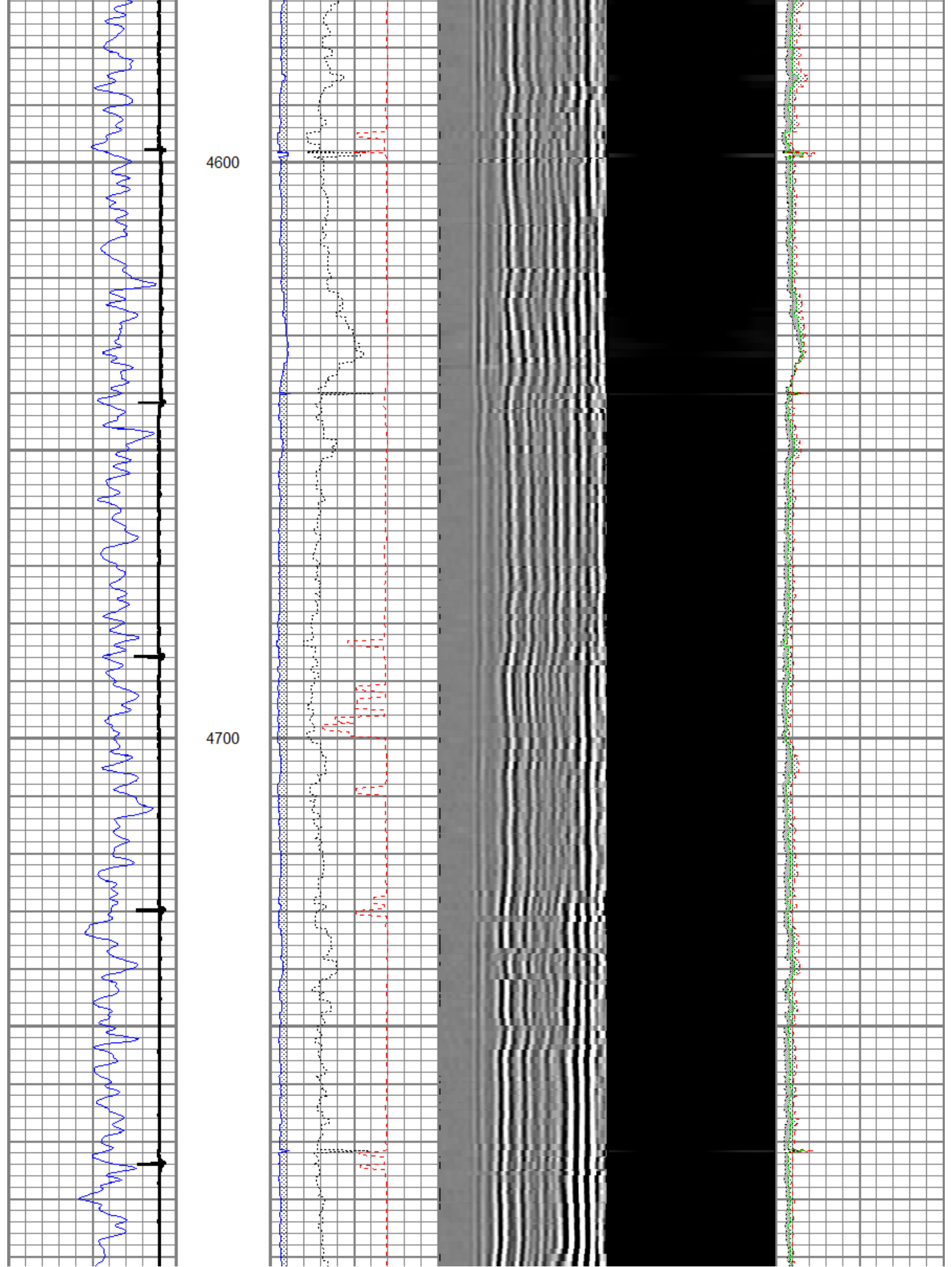




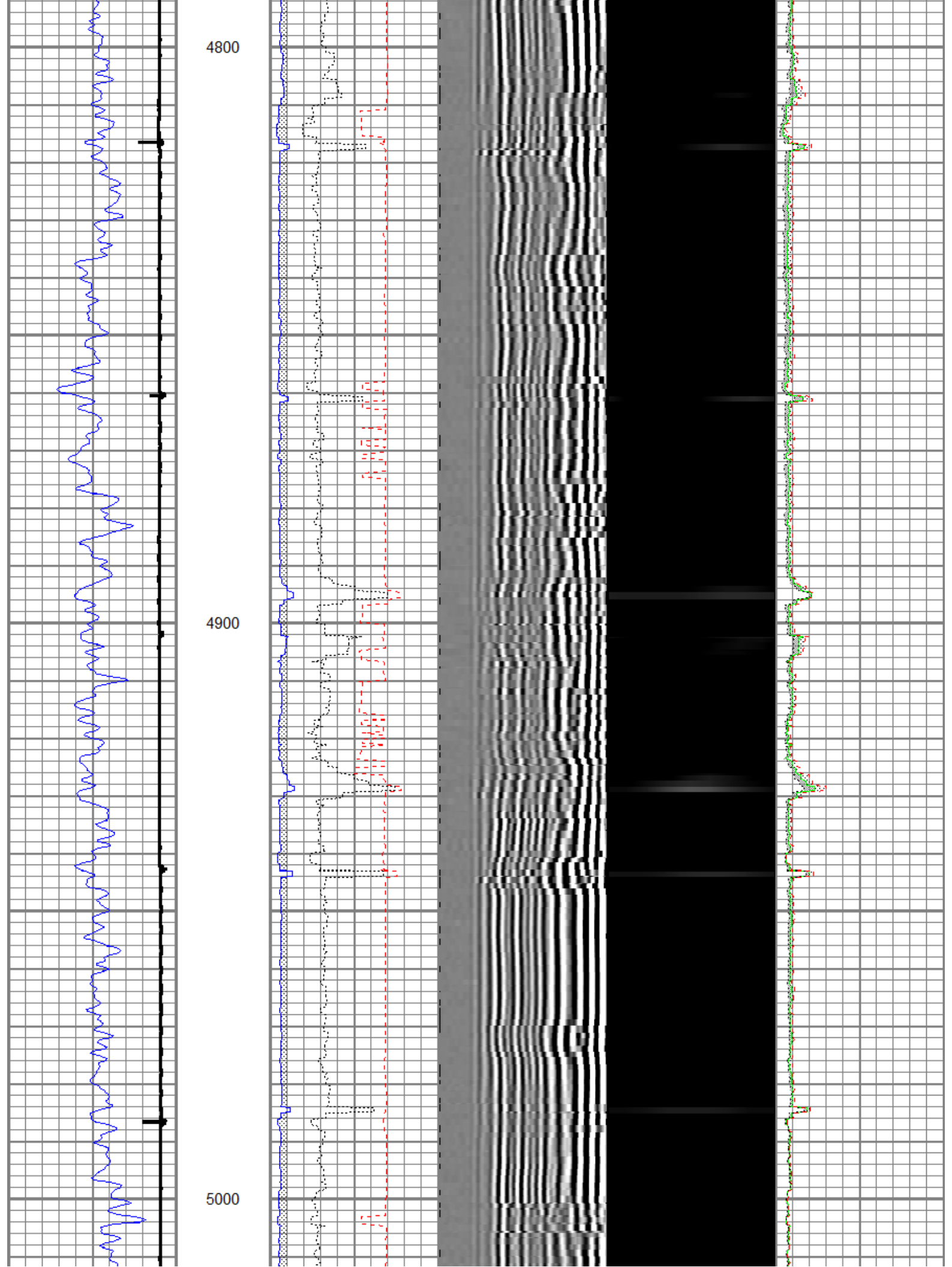


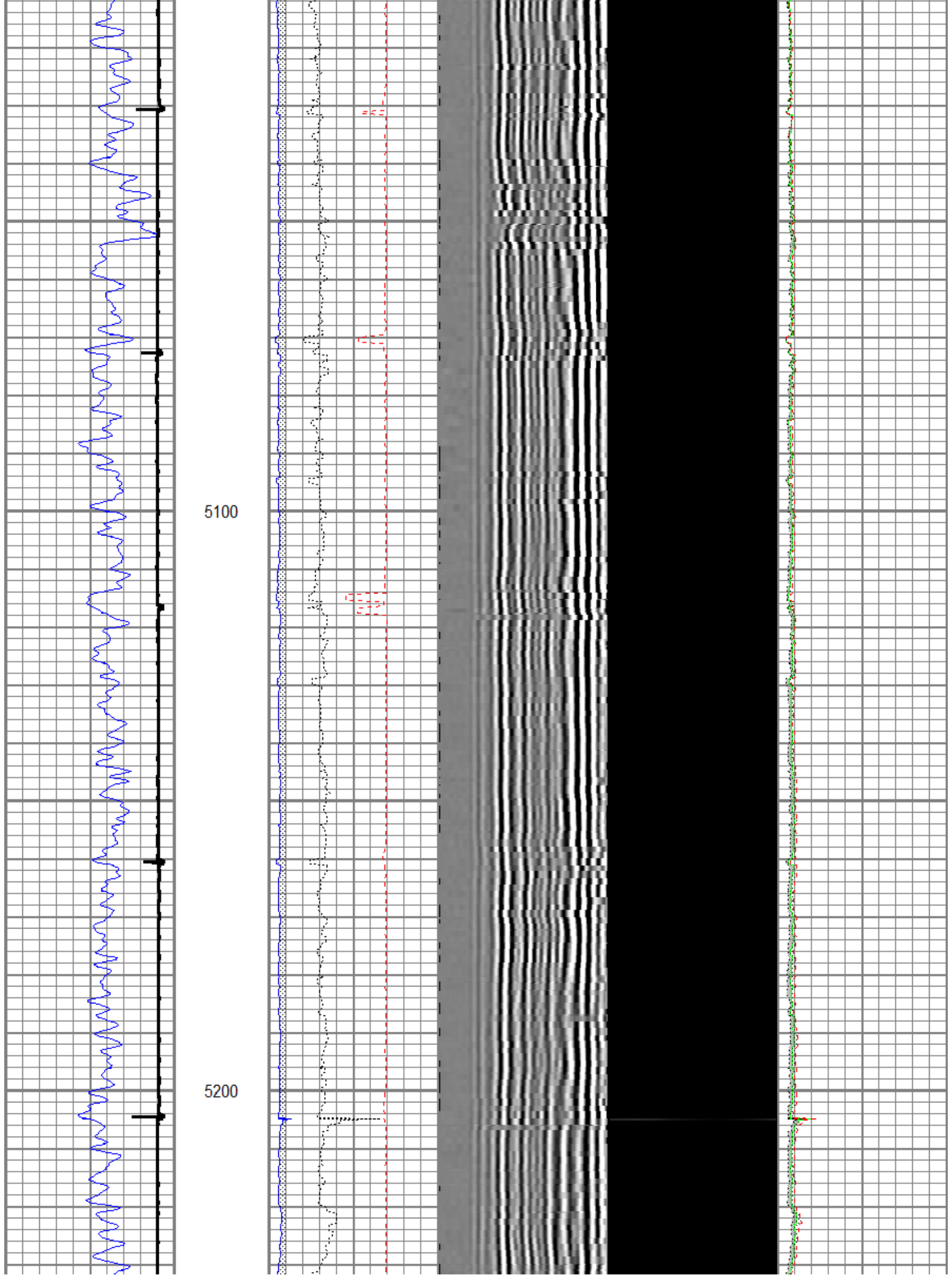


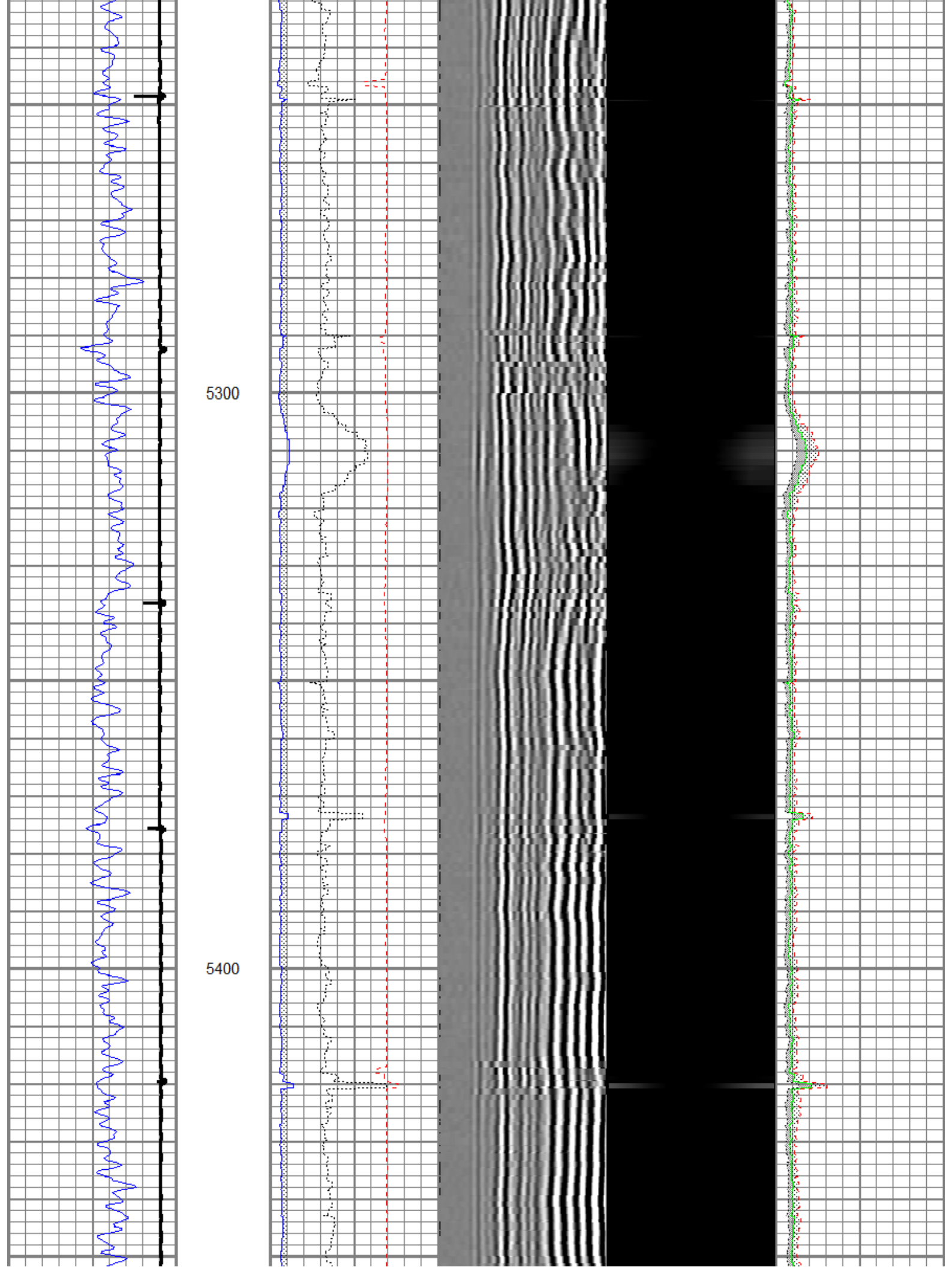


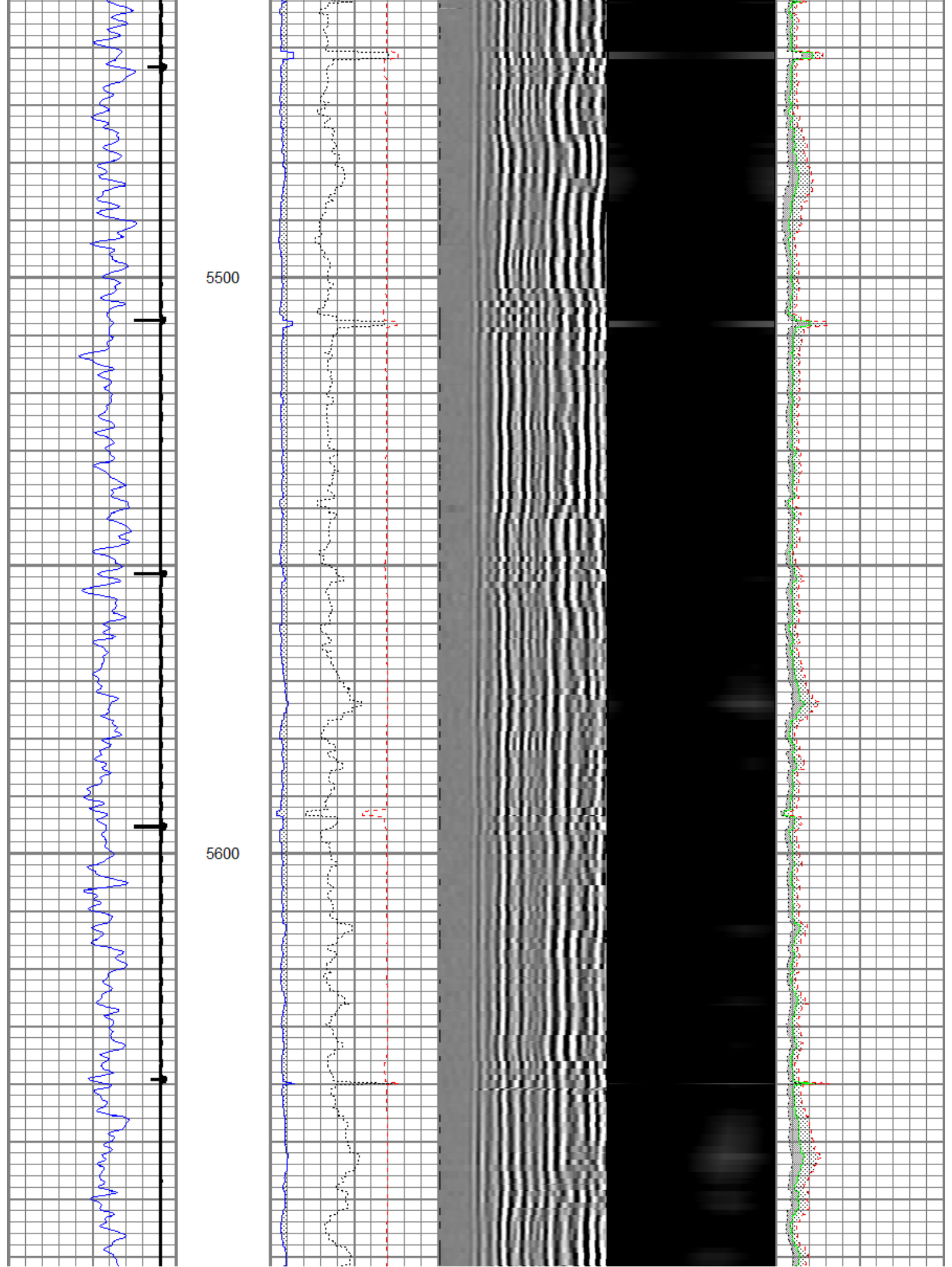


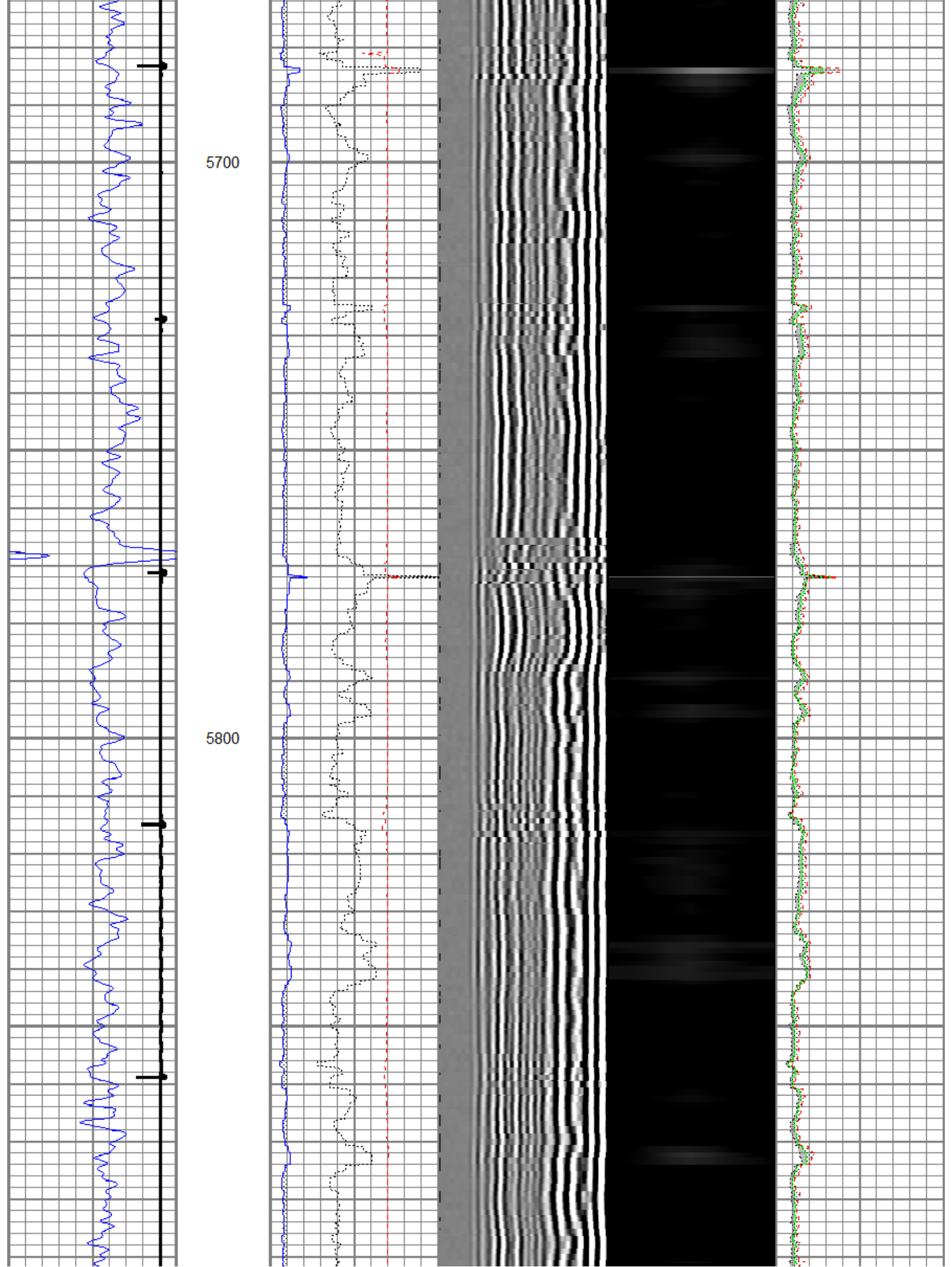




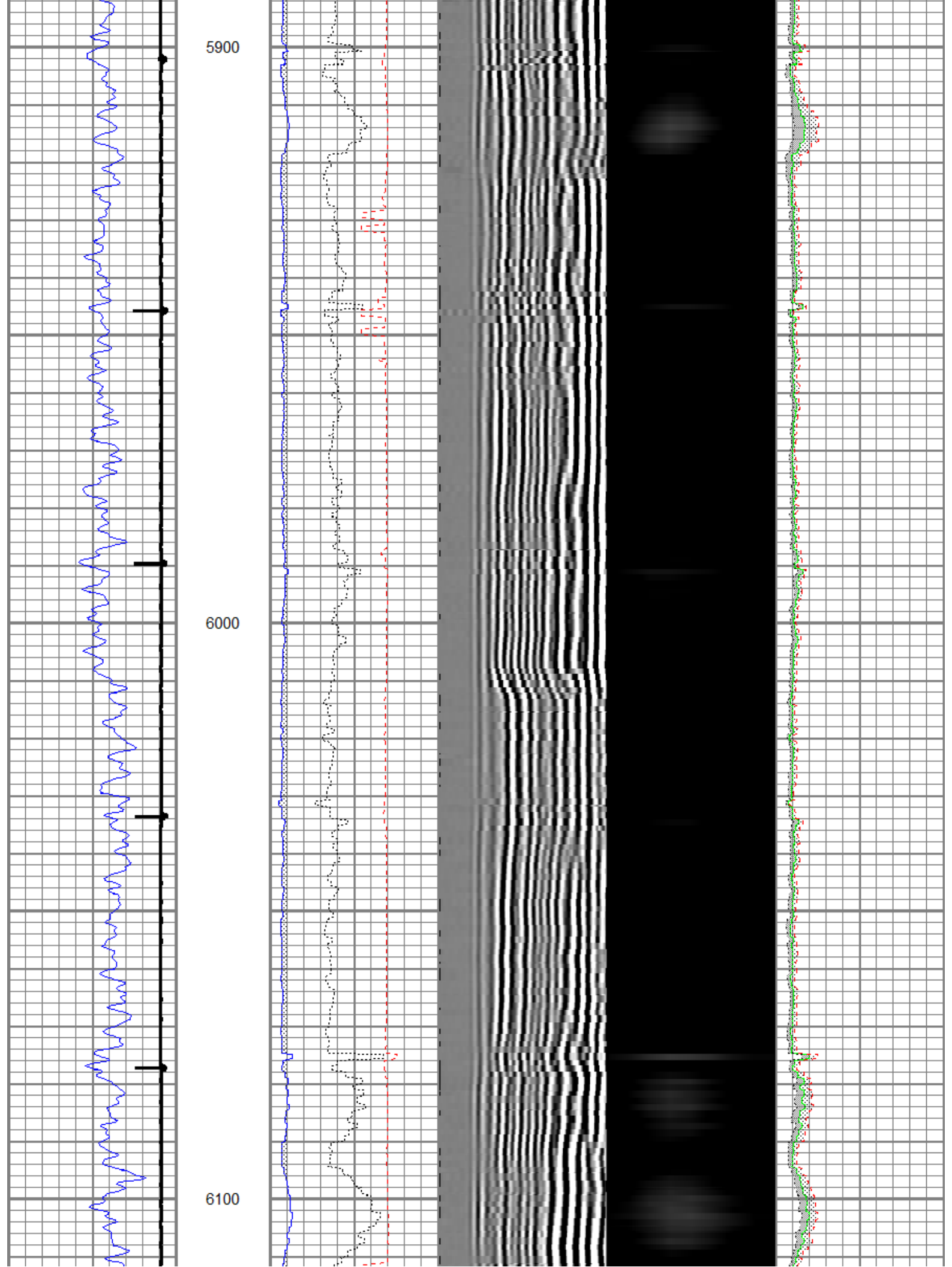


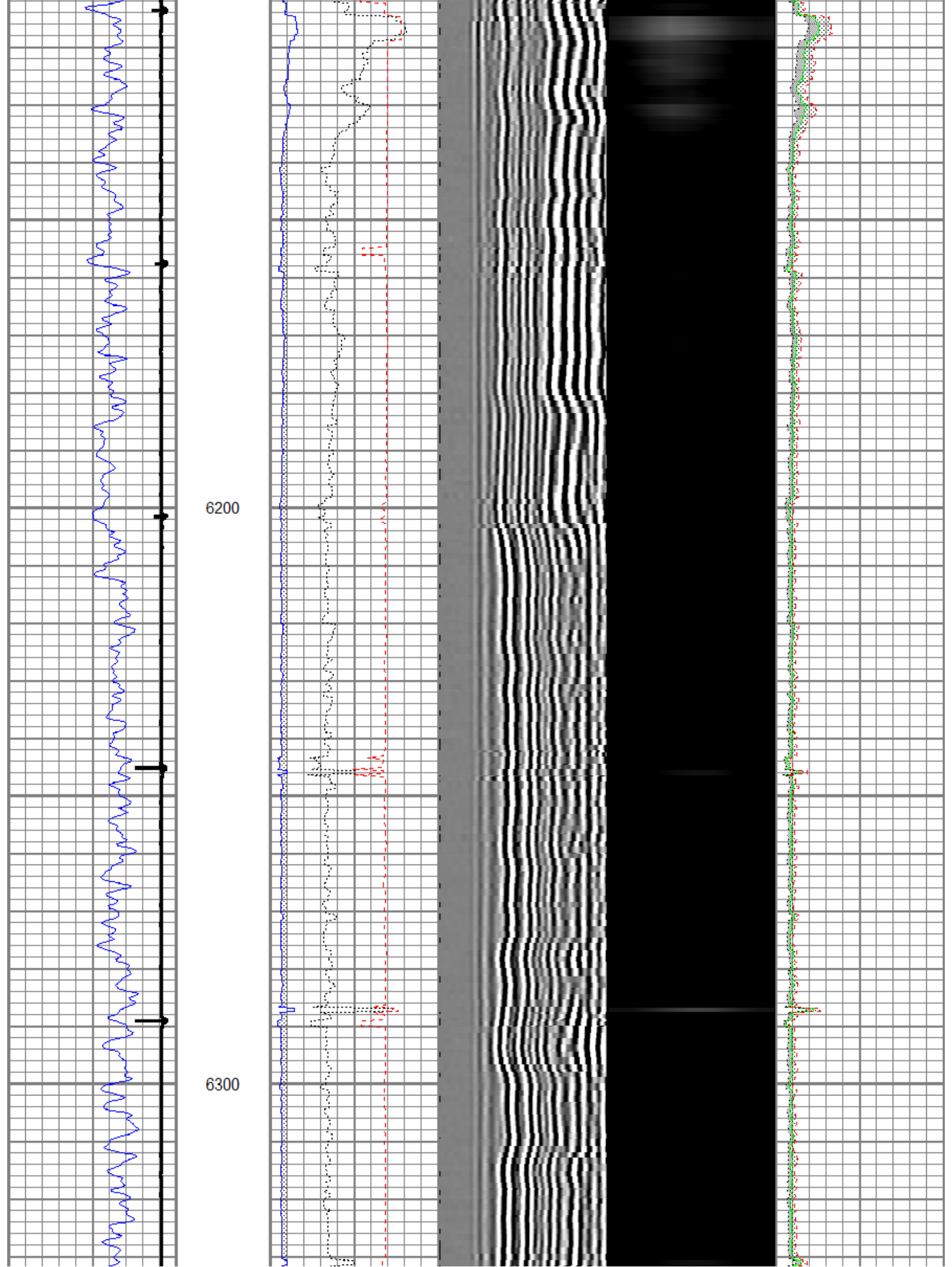


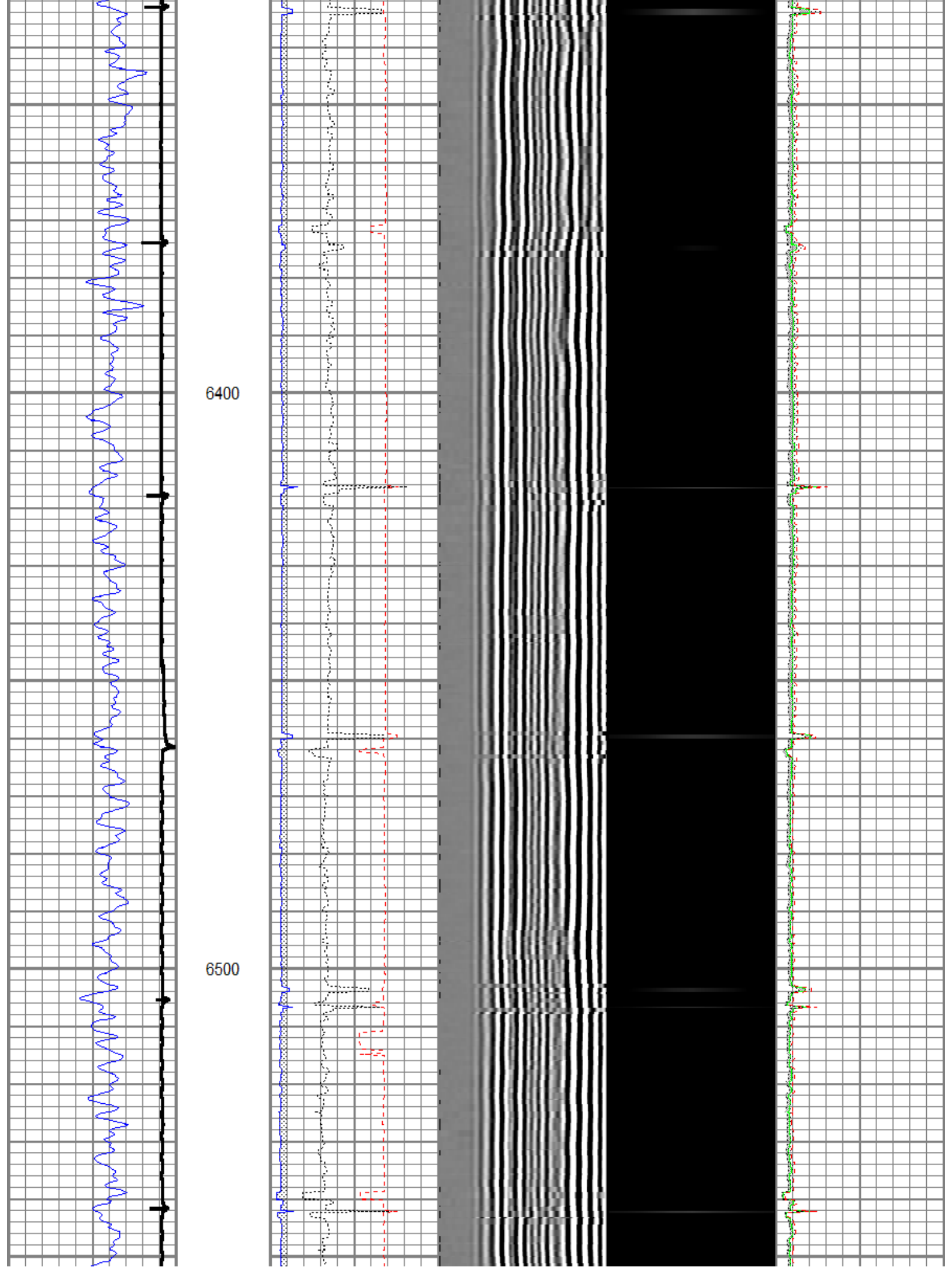


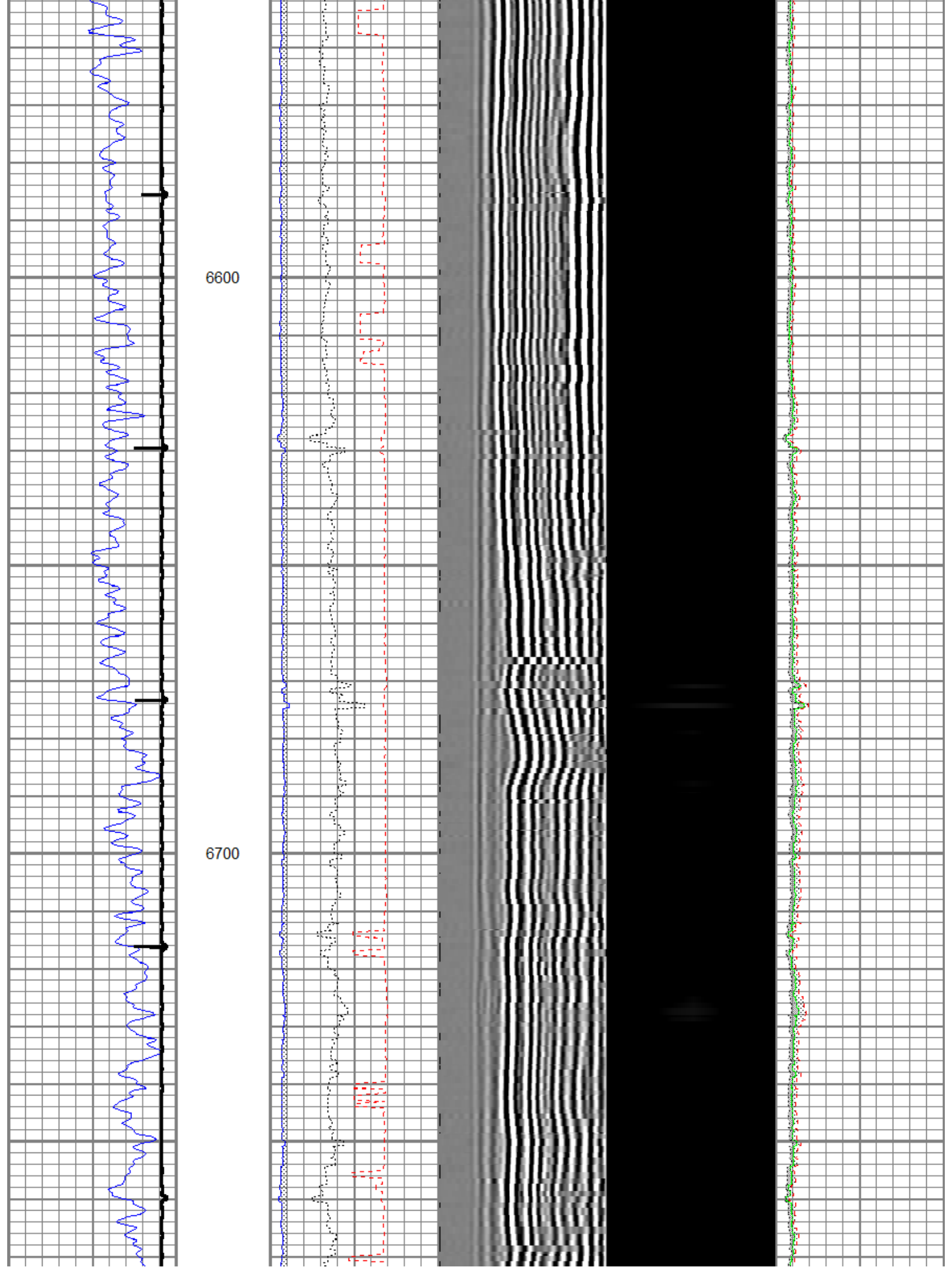


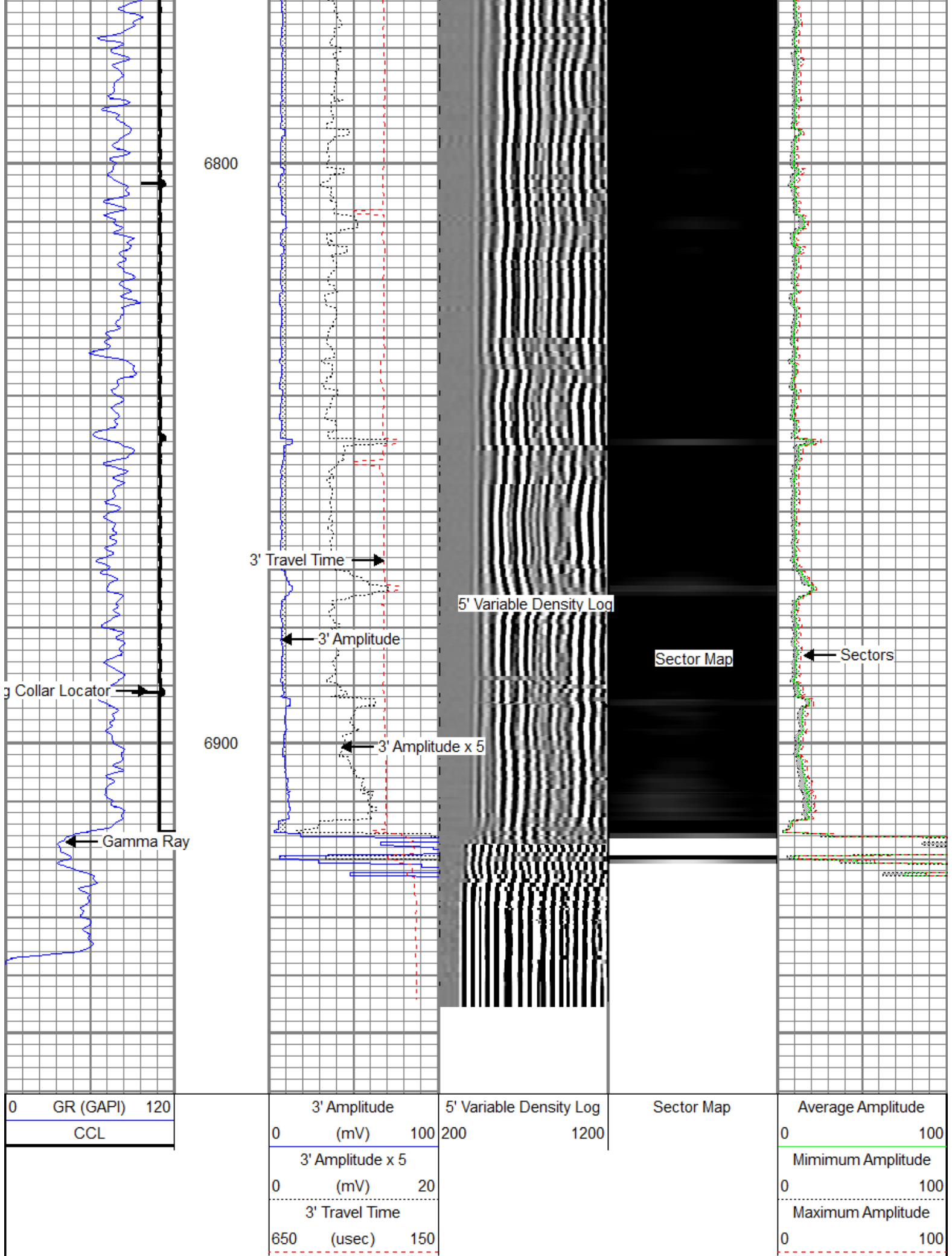








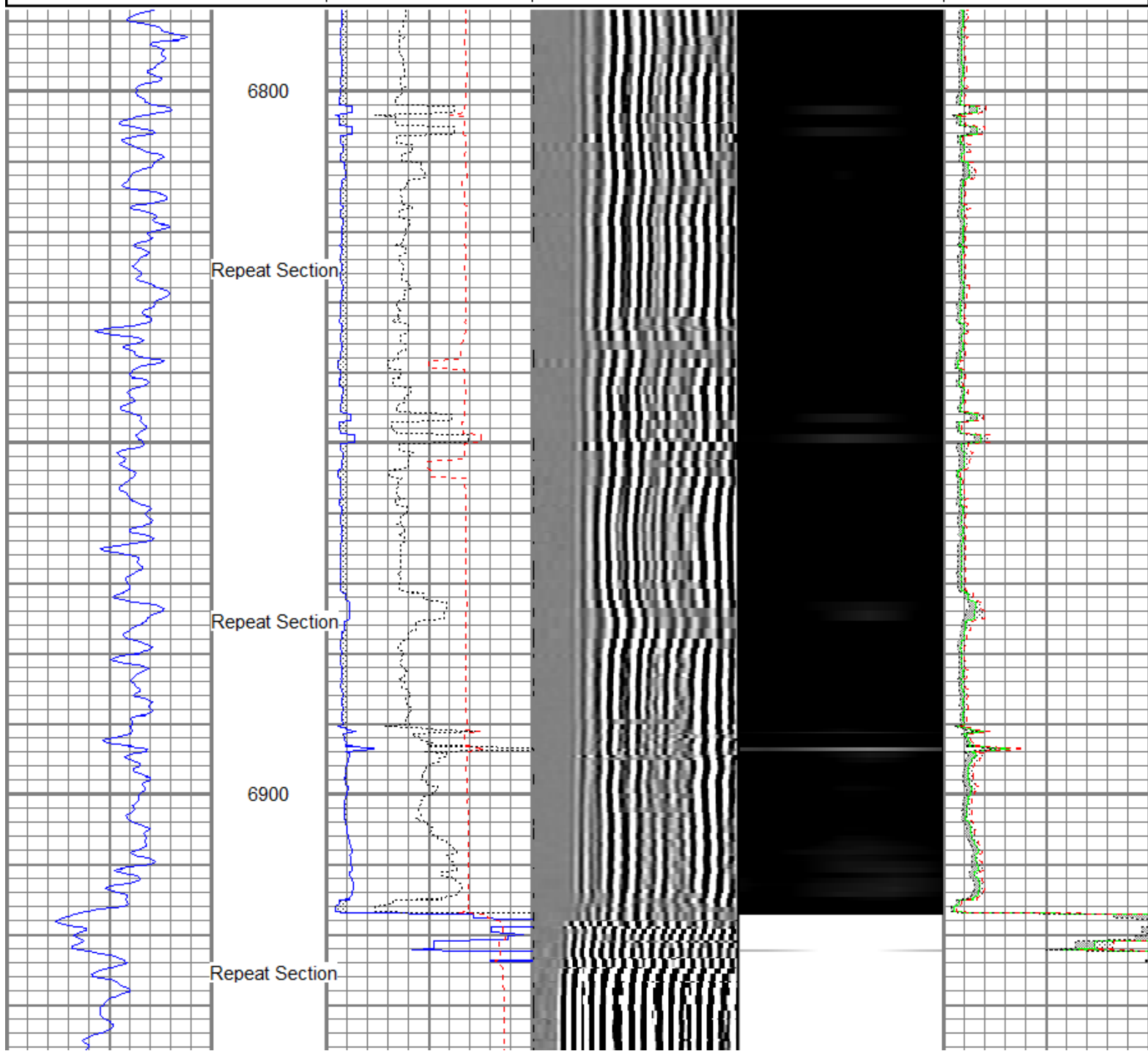


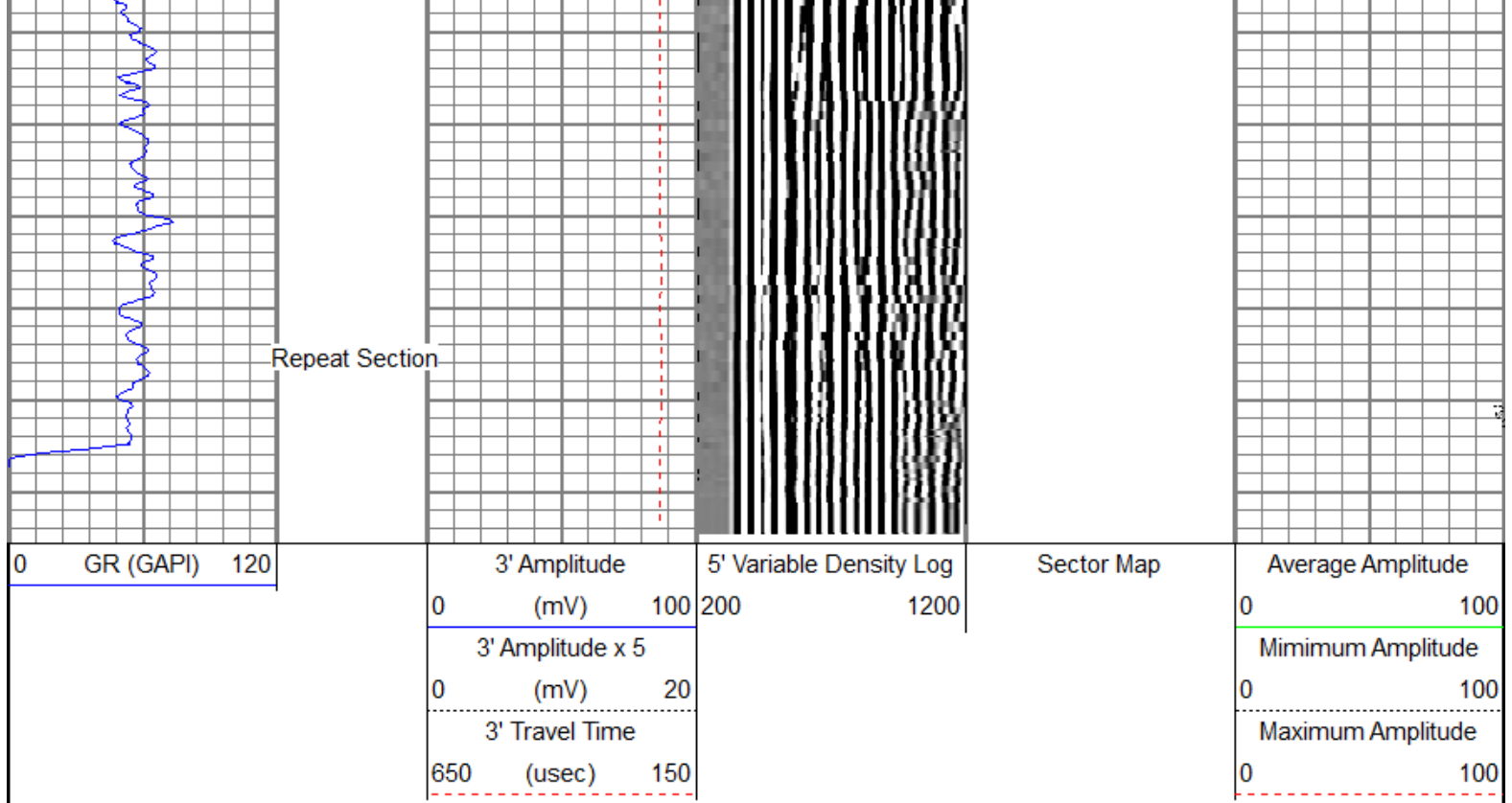


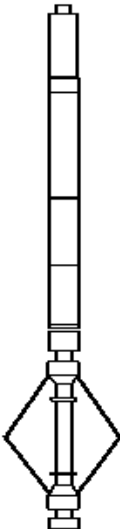




Database File: anadarko\_howard 29n-21hz\_03-dec-2013\_rcbl-mit\_w7.db  
 Dataset Pathname: repeat  
 Presentation Format: rib  
 Dataset Creation: Tue Dec 03 14:02:27 2013 by Log Sondex V7.03  
 Charted by: Depth in Feet scaled 1:240

0	GR (GAPI)	120	3' Amplitude	5' Variable Density Log	Sector Map	Average Amplitude
			0 (mV) 100	200 1200		0 100
			3' Amplitude x 5			Minimum Amplitude
			0 (mV) 20			0 100
			3' Travel Time			Maximum Amplitude
			650 (usec) 150			0 100





Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	23.67		AES 1-7/16" Cablehead	1.08	1.44	1.00
			AGS-001 (219135) Adaptor GO to Sondex	0.21	1.69	1.00
			XTU-002 (051219) Crossover Ultrawire Toolbus to Ultralink	1.58	1.69	6.50
			PGR-020 (10013899) Production Gamma Ray	1.93	1.69	9.50
			PRC-057 (1037) 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
WV3FT	15.85		RBT-004 (10013454in7) Radial Bond Tool (UW 3 1/8)	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					

CBLROT WVF5FT	15.85 14.85		PRC-057 (1102) 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
MIT	5.41		MIT-042 (10012912) 40 Multifinger Imaging Tool	4.54	2.75	61.10
			PRC-057 (1101) 2-3/4" 4-Arm Production Roller Centraliser	2.98	2.75	32.00
			BUL-006 (219228) Bullnose Terminator	0.22	1.69	1.20
Dataset: anadarko_howard 29n-21hz_03-dec-2013_rcbl-mit_w7.db: field/well/run1/main3 Total Length: 27.97 ft Total Weight: 316.30 lb O.D. 3.13 in						

Calibration Report	
Database File:	anadarko_howard 29n-21hz_03-dec-2013_rcbl-mit_w7.db
Dataset Pathname:	main4
Dataset Creation:	Tue Dec 03 17:58:43 2013 by Log Sondex V7.03

Multi-finger Imaging Tool Calibration Report
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Serial Number:	10012912
Number of Fingers:	40
Tool Model:	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	

Finger Calibration Report							
				Performed:	Tue Dec 03 13:21:48 2013		
Ring size:	4	5	6	7			
(in)							
	Sens	Sens	Sens				
Finger 01:	1198 397.0	1595 354.0	1949 399.0	2348			
Finger 02:	1180 390.0	1570 370.0	1940 405.0	2345			
Finger 03:	1135 399.0	1534 398.0	1932 419.0	2351			
Finger 04:	1153 375.0	1528 394.0	1922 412.0	2334			
Finger 05:	1151 374.0	1525 411.0	1936 405.0	2341			
Finger 06:	1185 366.0	1551 421.0	1972 399.0	2371			
Finger 07:	1149 359.0	1508 440.0	1948 405.0	2353			
Finger 08:	1181 341.0	1522 436.0	1958 403.0	2361			
Finger 09:	1171 340.0	1511 443.0	1954 397.0	2351			

Finger 10:	1181	330.0	1511	448.0	1959	393.0	2352
Finger 11:	1192	323.0	1515	449.0	1964	387.0	2351
Finger 12:	1187	316.0	1503	457.0	1960	395.0	2355
Finger 13:	1197	307.0	1504	449.0	1953	386.0	2339
Finger 14:	1201	311.0	1512	457.0	1969	392.0	2361
Finger 15:	1154	314.0	1468	470.0	1938	408.0	2346
Finger 16:	1159	316.0	1475	462.0	1937	408.0	2345
Finger 17:	1162	308.0	1470	459.0	1929	413.0	2342
Finger 18:	1231	301.0	1532	435.0	1967	388.0	2355
Finger 19:	1190	304.0	1494	436.0	1930	400.0	2330
Finger 20:	1190	311.0	1501	433.0	1934	409.0	2343
Finger 21:	1188	318.0	1506	426.0	1932	396.0	2328
Finger 22:	1174	321.0	1495	417.0	1912	412.0	2324
Finger 23:	1131	333.0	1464	419.0	1883	430.0	2313
Finger 24:	1202	333.0	1535	383.0	1918	389.0	2307
Finger 25:	1148	348.0	1496	392.0	1888	425.0	2313
Finger 26:	1258	338.0	1596	349.0	1945	387.0	2332
Finger 27:	1195	360.0	1555	360.0	1915	416.0	2331
Finger 28:	1218	364.0	1582	341.0	1923	408.0	2331
Finger 29:	1161	385.0	1546	347.0	1893	432.0	2325
Finger 30:	1191	390.0	1581	335.0	1916	422.0	2338
Finger 31:	1196	392.0	1588	324.0	1912	416.0	2328
Finger 32:	1174	410.0	1584	333.0	1917	430.0	2347
Finger 33:	1250	402.0	1652	305.0	1957	394.0	2351
Finger 34:	1208	406.0	1614	314.0	1928	418.0	2346
Finger 35:	1162	433.0	1595	337.0	1932	438.0	2370
Finger 36:	1164	421.0	1585	329.0	1914	428.0	2342
Finger 37:	1181	419.0	1600	327.0	1927	416.0	2343
Finger 38:	1213	411.0	1624	328.0	1952	400.0	2352
Finger 39:	1223	405.0	1628	333.0	1961	403.0	2364
Finger 40:	1173	410.0	1583	353.0	1936	412.0	2348

#### Post Survey Calibration Check

Performed:

Tue Dec 03 17:58:31 2013

Ring size: (in)	4	Nom. wear	5	Nom. wear	6	Nom. wear	7	Nom. wear
Finger 01:	3.988	-0.006	5.002	0.001	6.005	0.003	7.004	0.002
Finger 02:	3.989	-0.005	5.002	0.001	6.003	0.002	7.003	0.002
Finger 03:	3.992	-0.004	5.008	0.004	6.005	0.002	7.010	0.005
Finger 04:	3.991	-0.005	5.002	0.001	6.007	0.004	7.009	0.004
Finger 05:	3.998	-0.001	5.008	0.004	6.004	0.002	7.008	0.004
Finger 06:	4.000	-0.000	5.004	0.002	6.000	0.000	7.010	0.005
Finger 07:	4.006	0.003	5.006	0.003	6.001	0.000	7.010	0.005
Finger 08:	4.007	0.003	5.004	0.002	6.009	0.005	7.011	0.005
Finger 09:	4.002	0.001	4.991	-0.004	6.002	0.001	7.012	0.006
Finger 10:	4.002	0.001	4.992	-0.004	6.001	0.001	7.009	0.005
Finger 11:	3.995	-0.002	4.989	-0.006	6.006	0.003	7.007	0.004
Finger 12:	3.997	-0.001	4.991	-0.005	5.998	-0.001	7.002	0.001
Finger 13:	3.992	-0.004	4.992	-0.004	6.006	0.003	7.003	0.001
Finger 14:	3.993	-0.003	4.983	-0.008	6.004	0.002	7.008	0.004
Finger 15:	3.994	-0.003	4.983	-0.008	6.006	0.003	7.004	0.002
Finger 16:	3.993	-0.003	4.974	-0.013	6.000	-0.000	7.003	0.001
Finger 17:	3.992	-0.004	4.984	-0.008	6.009	0.004	7.007	0.003
Finger 18:	3.989	-0.005	4.986	-0.007	5.998	-0.001	6.998	-0.001
Finger 19:	3.987	-0.007	4.995	-0.003	6.006	0.003	7.007	0.003
Finger 20:	3.981	-0.010	4.992	-0.004	6.007	0.003	6.998	-0.001
Finger 21:	3.989	-0.006	5.005	0.002	6.003	0.002	7.008	0.004
Finger 22:	3.993	-0.003	5.009	0.005	6.008	0.004	7.009	0.005
Finger 23:	3.992	-0.004	5.006	0.003	6.003	0.002	7.005	0.002
Finger 24:	4.000	-0.000	5.013	0.006	6.008	0.004	7.013	0.006
Finger 25:	4.003	0.001	5.013	0.007	6.009	0.004	7.015	0.007
Finger 26:	3.998	-0.001	5.010	0.005	6.002	0.001	7.009	0.005
Finger 27:	3.996	-0.002	5.000	0.000	6.003	0.001	7.008	0.004
Finger 28:	4.001	0.001	4.998	-0.001	6.003	0.001	7.004	0.002
Finger 29:	3.999	-0.000	4.991	-0.005	6.001	0.001	7.004	0.002
Finger 30:	4.001	0.001	4.991	-0.004	6.005	0.003	7.009	0.005
Finger 31:	4.000	-0.000	4.989	-0.005	6.001	0.000	7.004	0.002
Finger 32:	4.003	0.001	4.988	-0.006	6.006	0.003	7.011	0.006
Finger 33:	3.996	-0.002	4.981	-0.010	6.003	0.002	7.008	0.004
Finger 34:	3.994	-0.003	4.978	-0.011	6.004	0.002	7.002	0.001

Finger 35:	3.990	-0.005	4.987	-0.006	5.996	-0.002	7.010	0.005
Finger 36:	3.989	-0.006	4.983	-0.009	6.002	0.001	7.002	0.001
Finger 37:	3.990	-0.005	4.984	-0.008	6.001	0.001	7.001	0.000
Finger 38:	3.990	-0.005	4.994	-0.003	6.009	0.004	7.007	0.003
Finger 39:	3.996	-0.002	4.999	-0.000	6.017	0.009	7.006	0.003
Finger 40:	3.983	-0.008	4.996	-0.002	6.002	0.001	6.999	-0.000
Average:	3.995	-0.003	4.995	-0.002	6.004	0.002	7.006	0.003

#### Segmented Cement Bond Log Calibration Report

Serial Number: 10013454in7  
Tool Model: 004

Calibration Casing Diameter: 5.500 in  
Calibration Depth: -0.010 ft

Master Calibration, performed Tue Dec 03 13:18:13 2013:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3FT	-0.002	0.732	0.800	71.921	96.899	1.037
5FT	-0.004	0.767	0.800	71.921	92.316	1.127
S1	-0.002	0.701	0.000	100.000	142.200	0.347
S2	-0.004	0.770	0.000	100.000	129.204	0.539
S3	-0.004	0.819	0.000	100.000	121.529	0.430
S4	-0.004	0.816	0.000	100.000	121.999	0.481
S5	-0.002	0.759	0.000	100.000	131.261	0.320
S6	-0.004	0.695	0.000	100.000	143.185	0.524
S7	-0.003	0.646	0.000	100.000	154.203	0.408
S8	-0.003	0.653	0.000	100.000	152.367	0.474

#### Gamma Ray Calibration Report

Serial Number: 10013899  
Tool Model: 020  
Performed: Sun Jun 13 13:33:21 1993

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 1.0 cps

Sensitivity: 1.0000 GAPI/cps



Company Kerr-McGee Oil & Gas Onshore, L.P.  
Well Howard 29N-21HZ  
Field Wattenberg  
County Weld  
State Colorado