

Radial Cement Bond Gamma Ray Casing Collar Log

Company Kerr-McGee Oil and Gas Onshore LP
Well Cruickshank 1C-24HZ
Field Wattenberg
County Weld
State Colorado

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Location: API #: 05-123-39498
SHL: 634' FSL 664' FEL
Lat/Long: 40.205369/-104.718134
SEC 24 TWP 3N RGE 66W
Permanent Datum Ground Level Elevation 5014'
Log Measured From Kelly Bushing 13 FT
Drilling Measured From Kelly Bushing
Other Services
MIT
GR
Elevation
K.B. 5027'
D.F. 5026'
G.L. 5014'

| | |
|------------------------|----------------|
| Date | 11-Oct-2014 |
| Run Number | One |
| Depth Driller | 13661 FT |
| Depth Logger | 7300 FT |
| Bottom Logged Interval | 7300 FT |
| Top Log Interval | Surface |
| Open Hole Size | --- |
| Type Fluid | Water |
| Density / Viscosity | 8.34 lbm/gal |
| Max. Recorded Temp. | 235°F |
| Estimated Cement Top | 6 FT |
| Time Well Ready | 10:00 AM |
| Time Logger on Bottom | 12:30 PM |
| Equipment Number | HD-0134 |
| Location | Ft. Lupton, CO |
| Recorded By | Robert Fogarty |
| Witnessed By | Mike Aspa |

| Borehole Record | | | | Tubing Record | | | |
|-----------------|-----|------|----|---------------|--------|------|----|
| Run Number | Bit | From | To | Size | Weight | From | To |
| | | | | | | | |
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|-----------------|-----------|--------------|-------|---------|----------|
| Casing Record | Size (in) | Wgt (lbs/ft) | Grade | Top | Bottom |
| Surface Casing | 9-5/8" | 36 | J-55 | Surface | 1228 FT |
| Intermediate #1 | 7" | 26 | P-110 | Surface | 8047 FT |
| Intermediate #2 | | | | | |
| Liner | 4.5" | 11.6 | P-110 | 7046 FT | 13661 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.

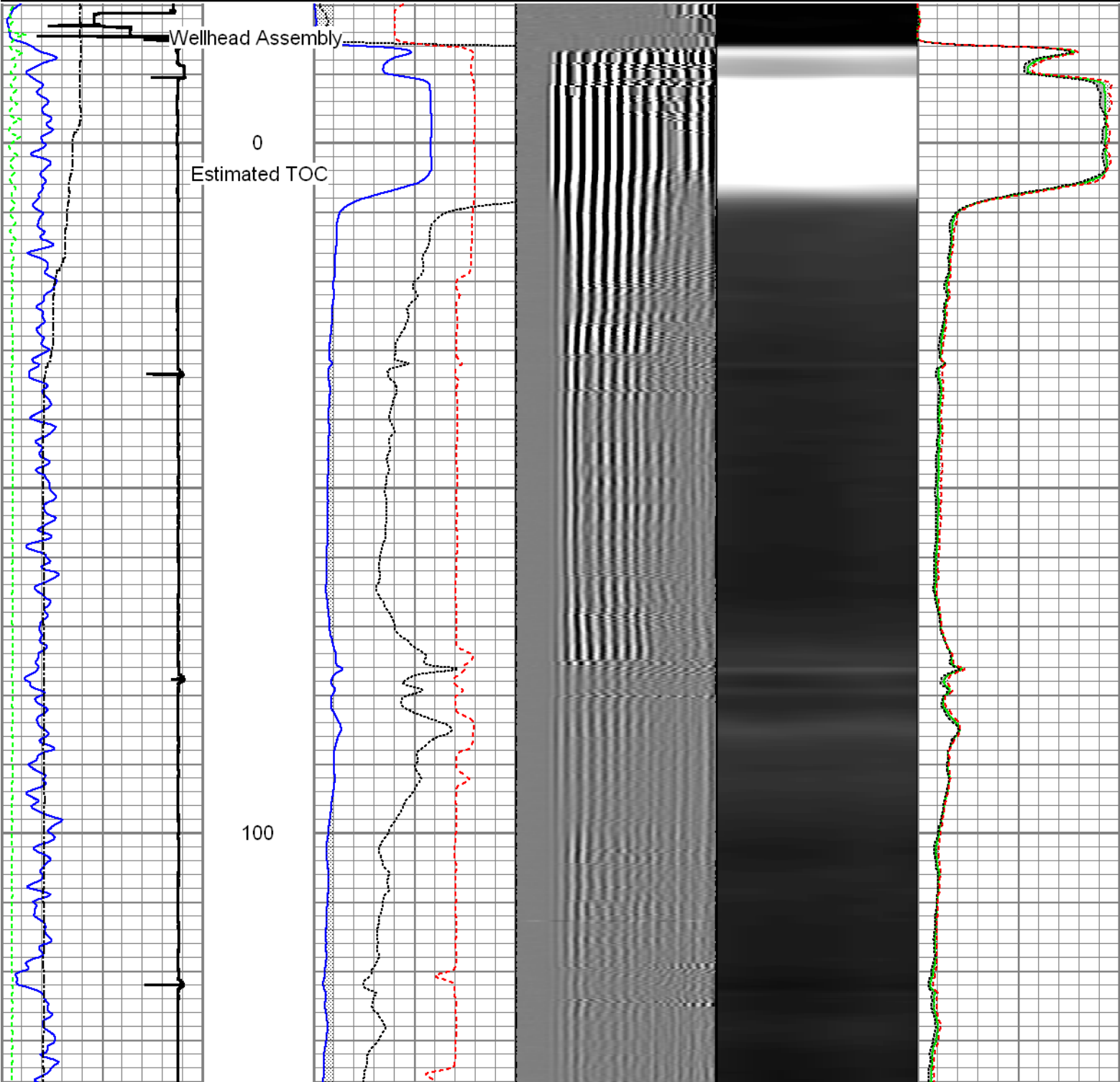
Comments

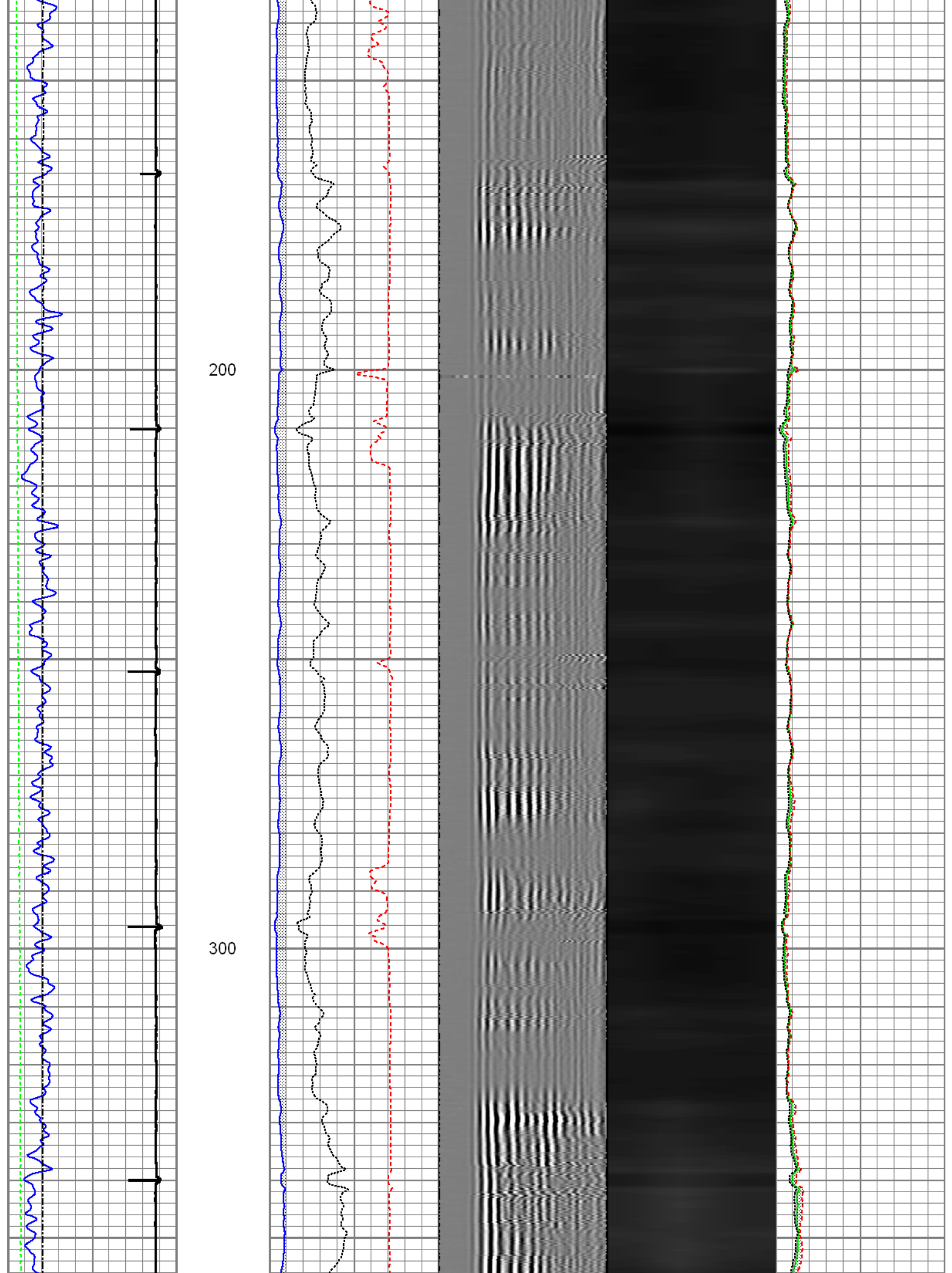
Log ran as per Customer Request.
Depth reference to Casing Tally reported Liner Top at 7046 FT.
Adjusted log -30.7 FT to correlate with Liner Top.
Log ran from as deep as possible to surface
Log ran with 2800 PSI surface Induced pressure.
No debris found on logging tools after run.
There was a removable plug set at 6850 FT

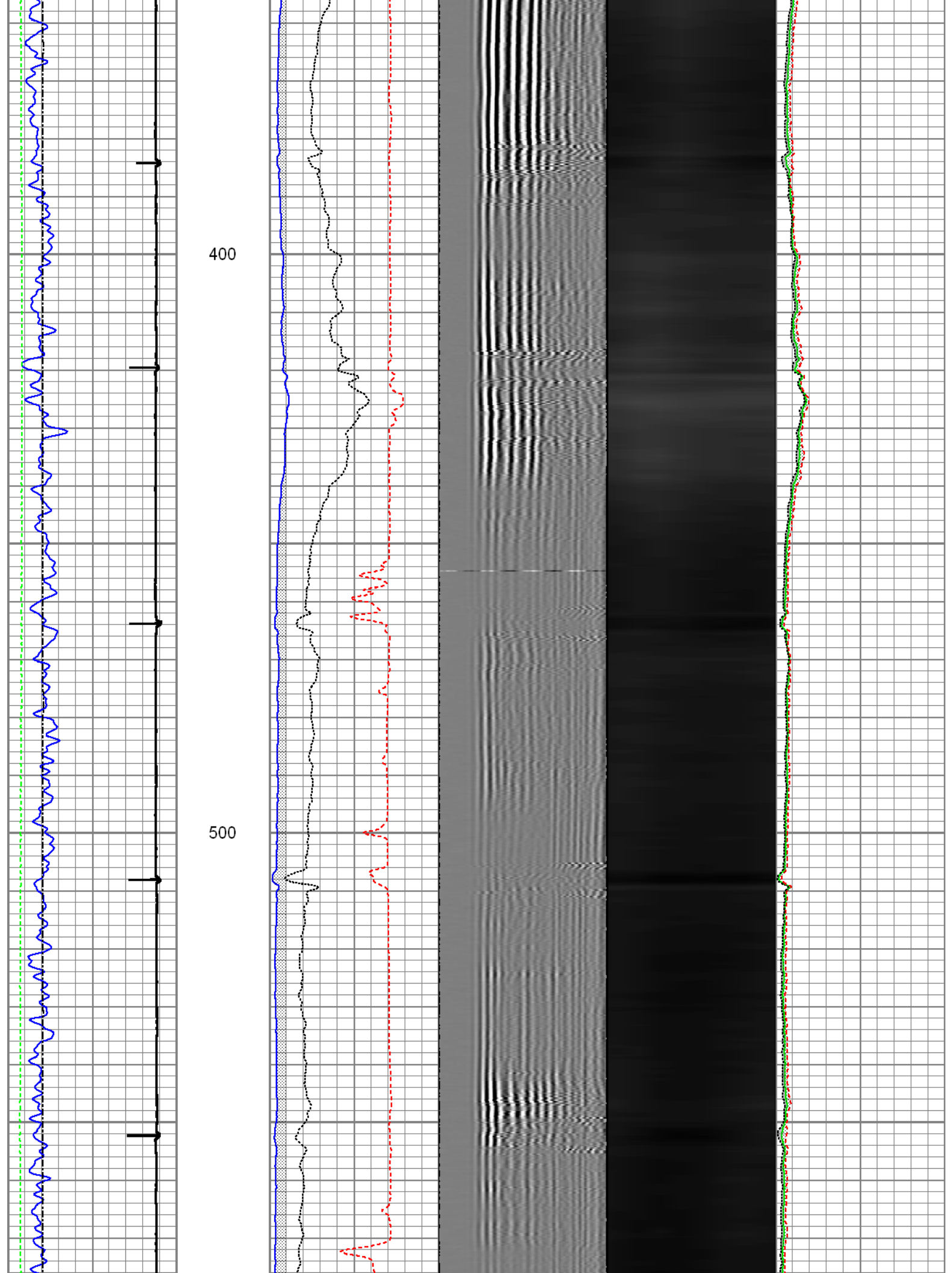
Thank you for Choosing FMC Technologies Completion Services, Inc.!!

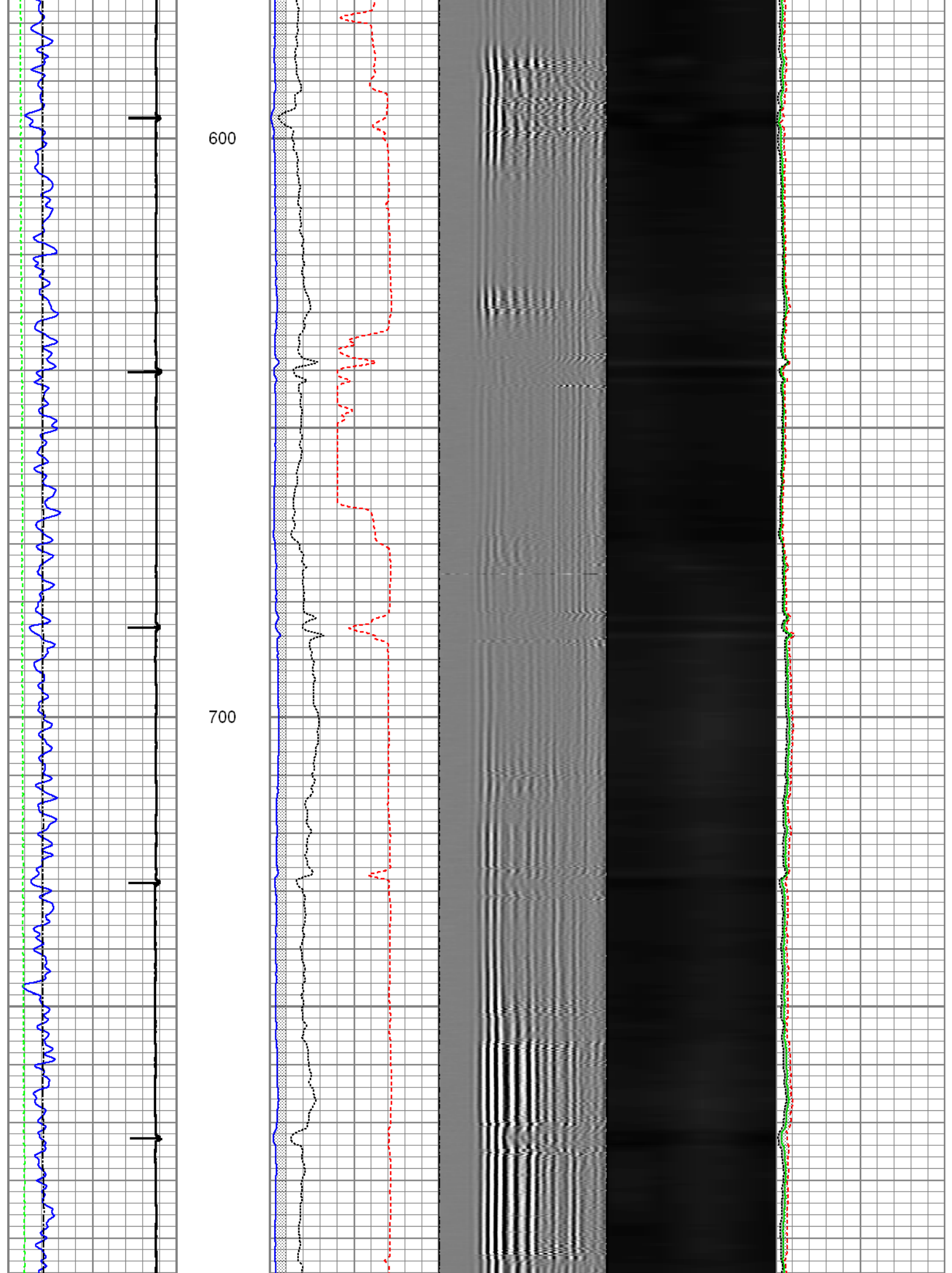
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Dataset Pathname: 7main
Presentation Format: rbt4_mit
Dataset Creation: Sat Oct 11 13:30:13 2014 by Log 7.0 B1
Charted by: Depth in Feet scaled 1:240

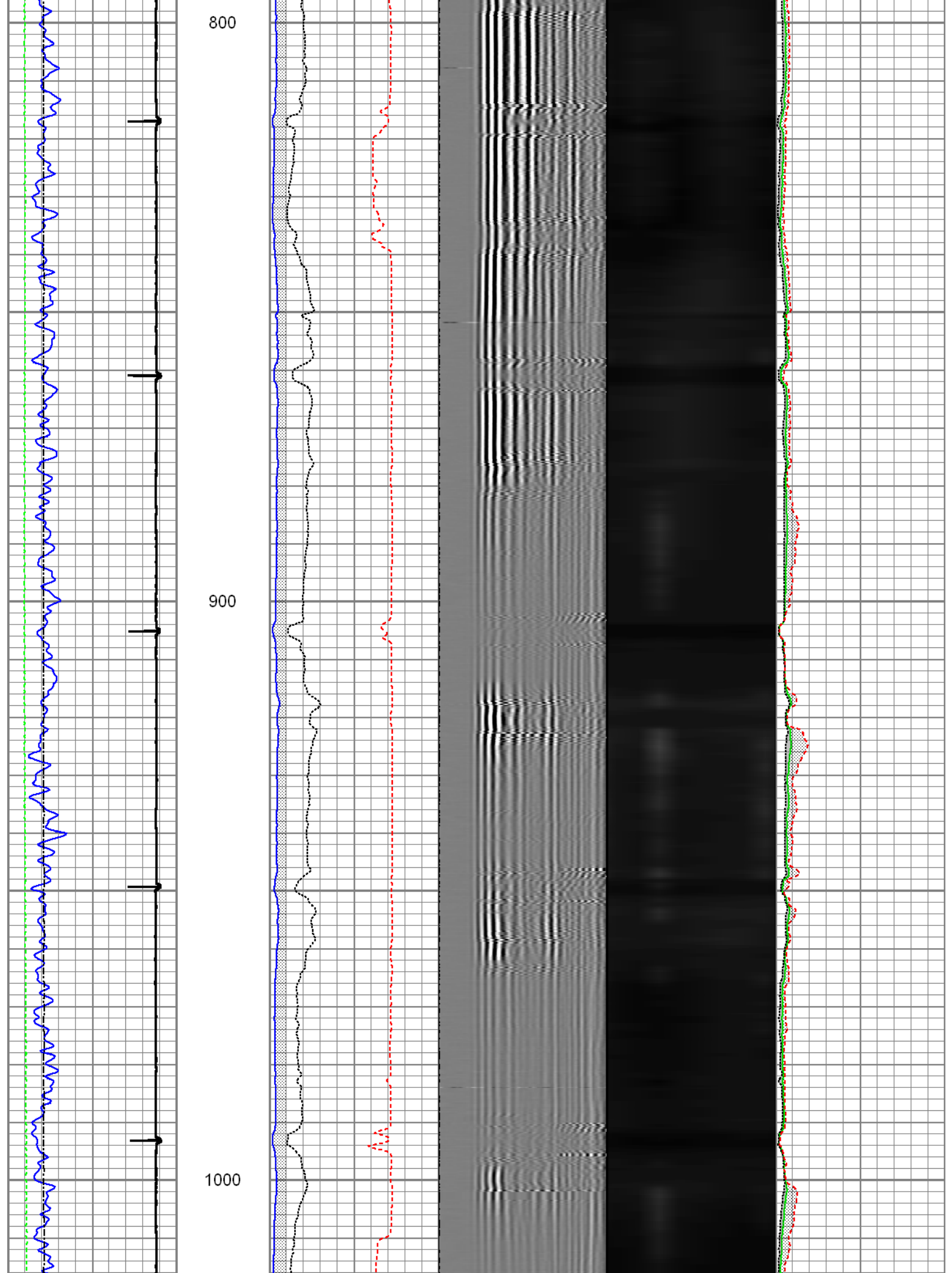
| | | | | |
|-----------------------|------------------|-------------------------|------------|-------------------|
| Gamma Ray | 3' Amplitude | 5' Variable Density Log | Sector Map | Average Amplitude |
| 0 (GAPI) 120 | 0 (mV) 100 | 200 1200 | | 0 100 |
| Casing Collar Locator | 3' Amplitude x 5 | | | 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 | | | | |

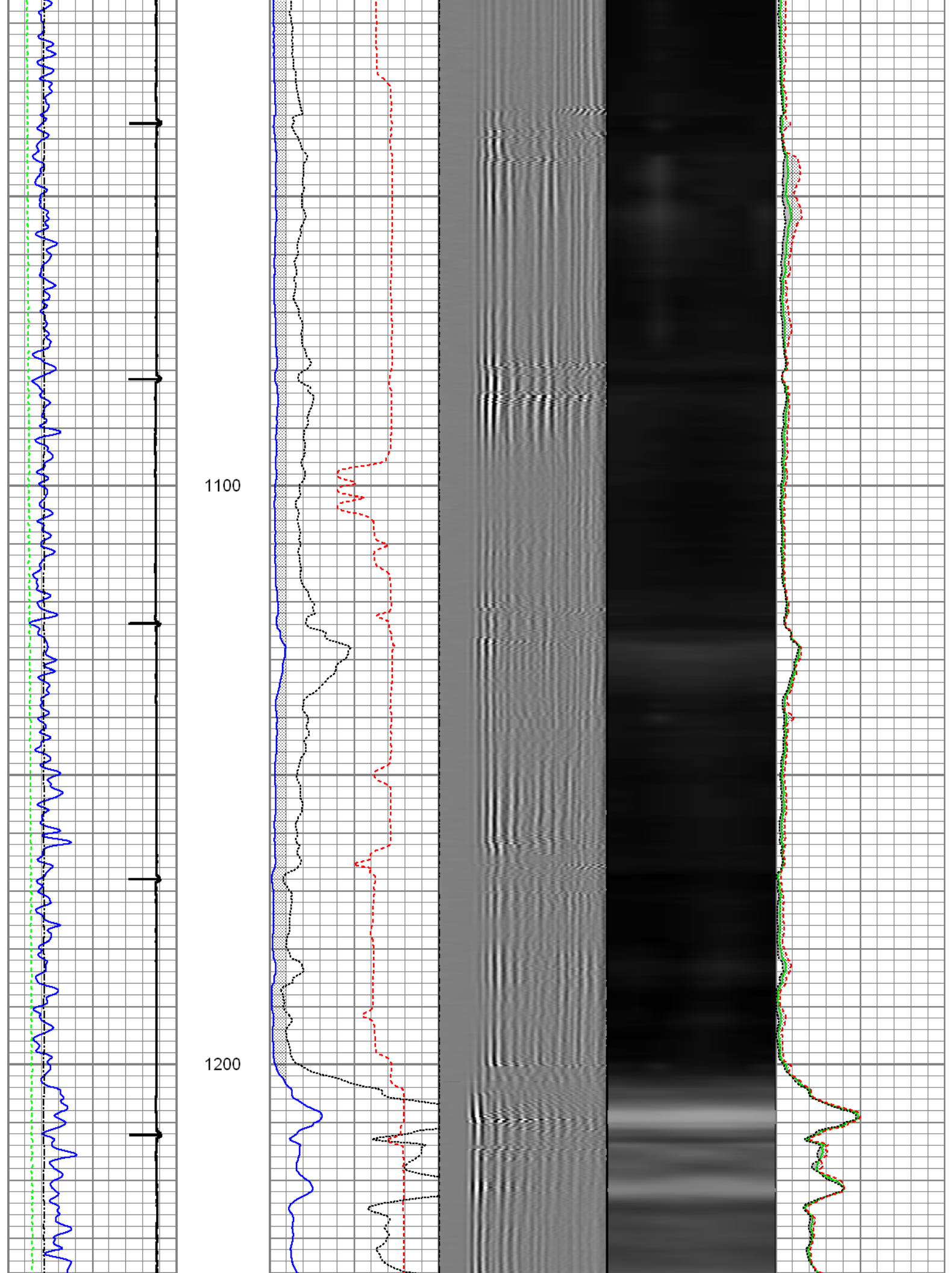


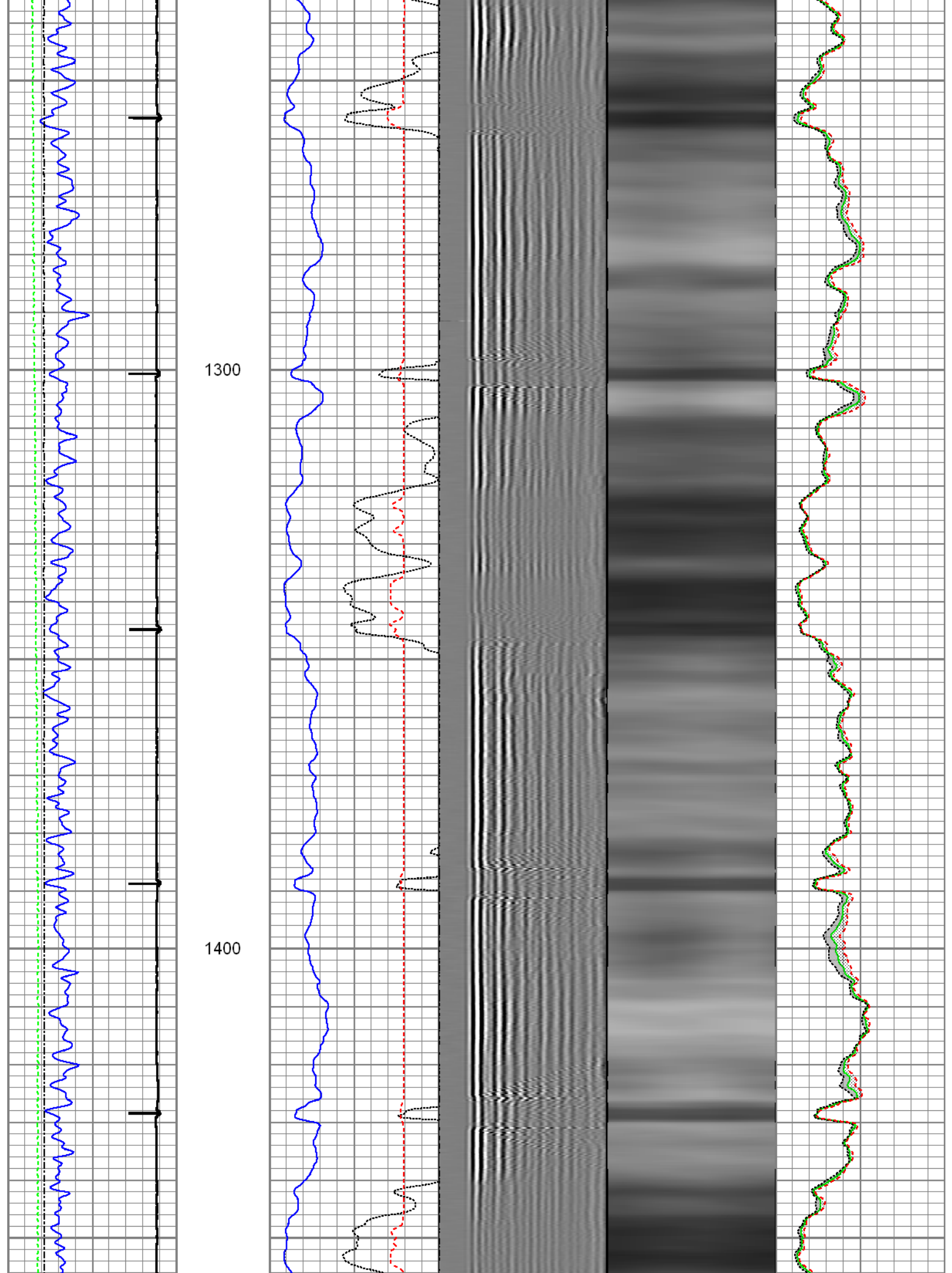


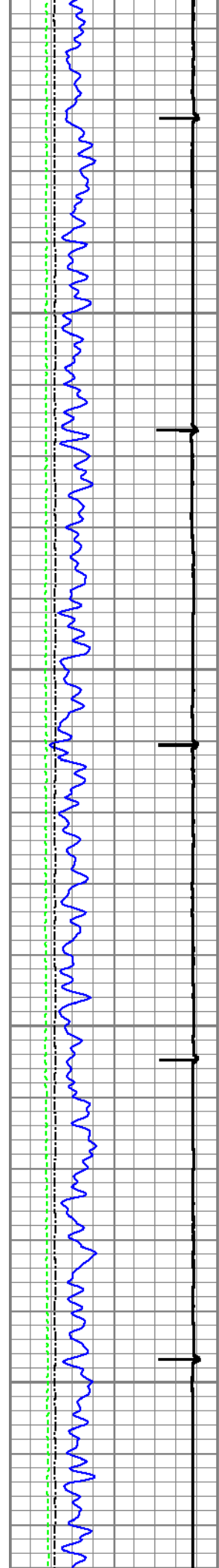






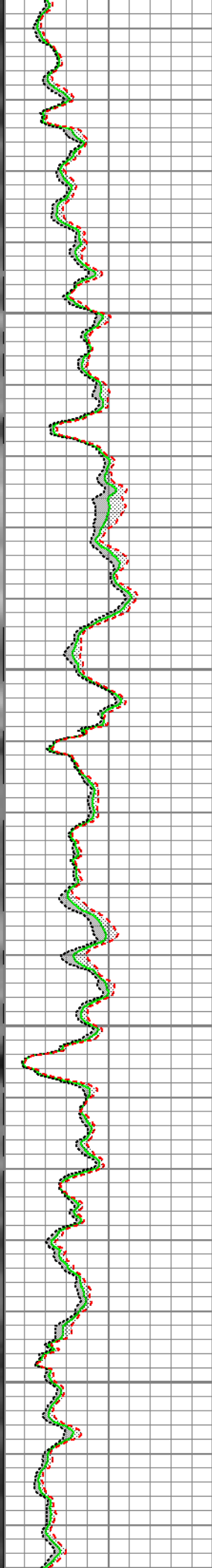
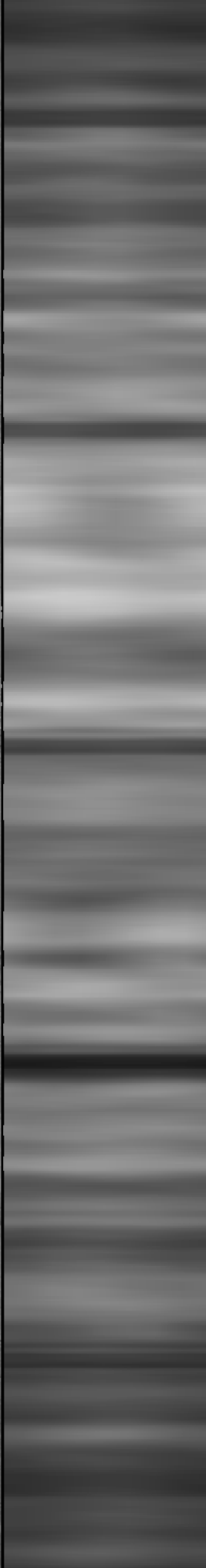
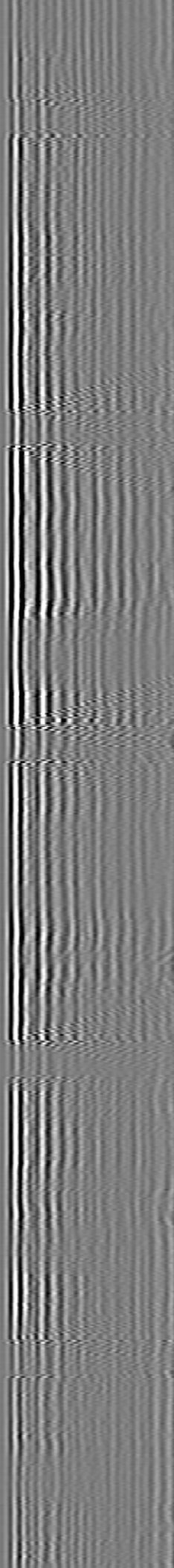
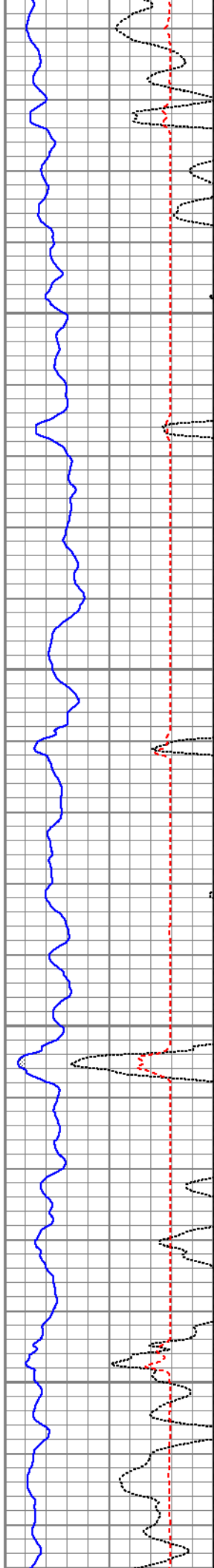


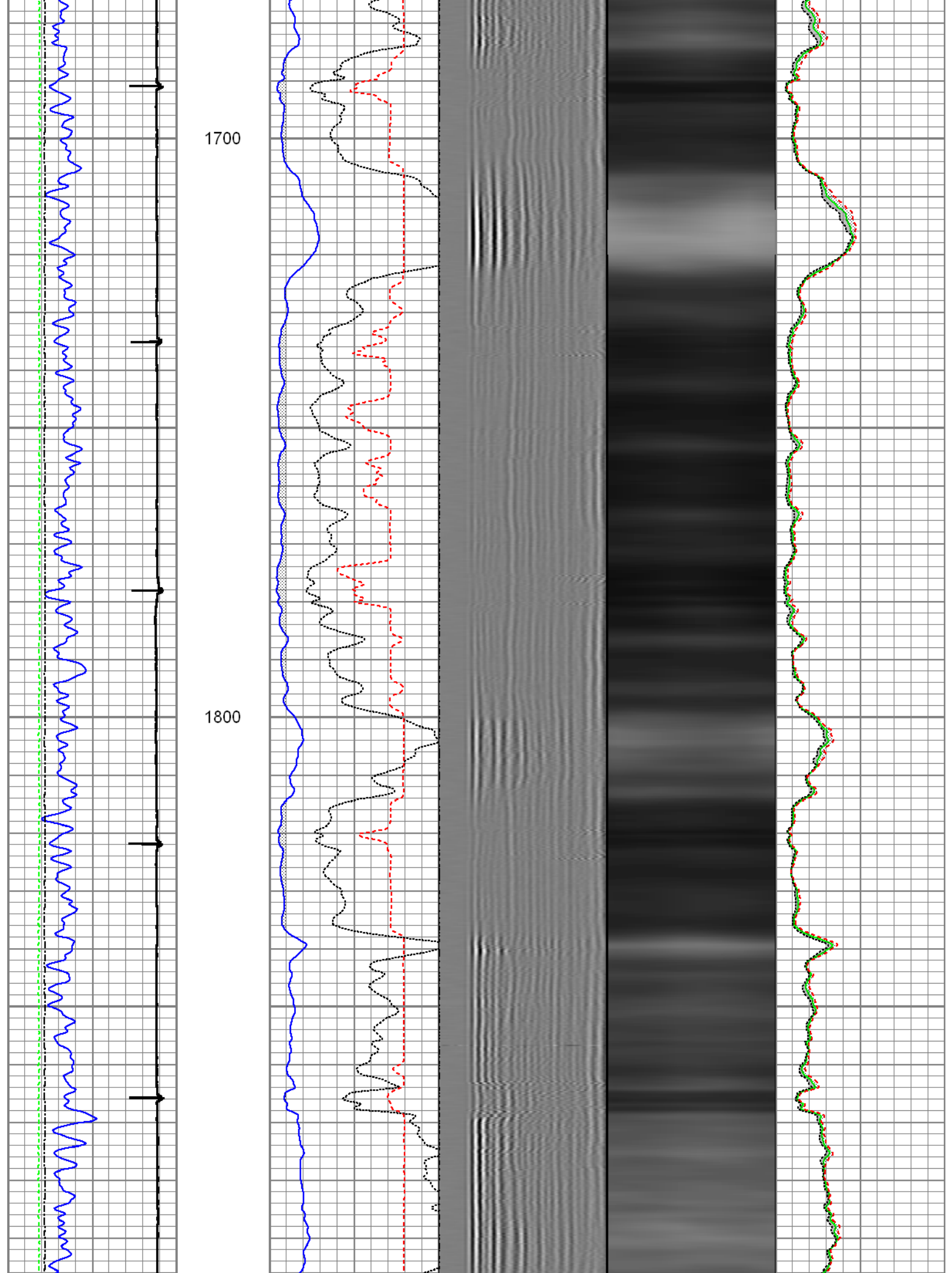




1500

1600

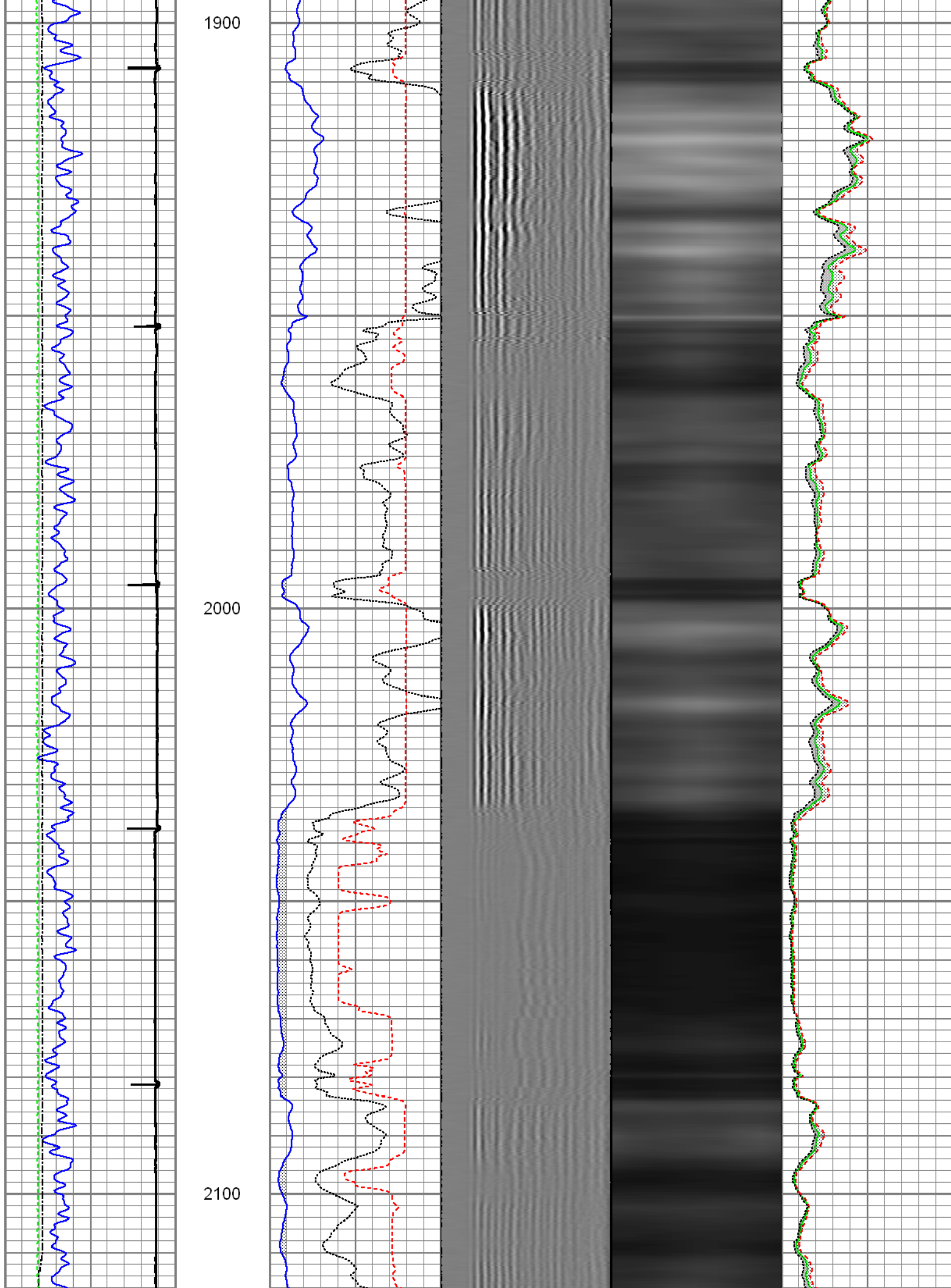


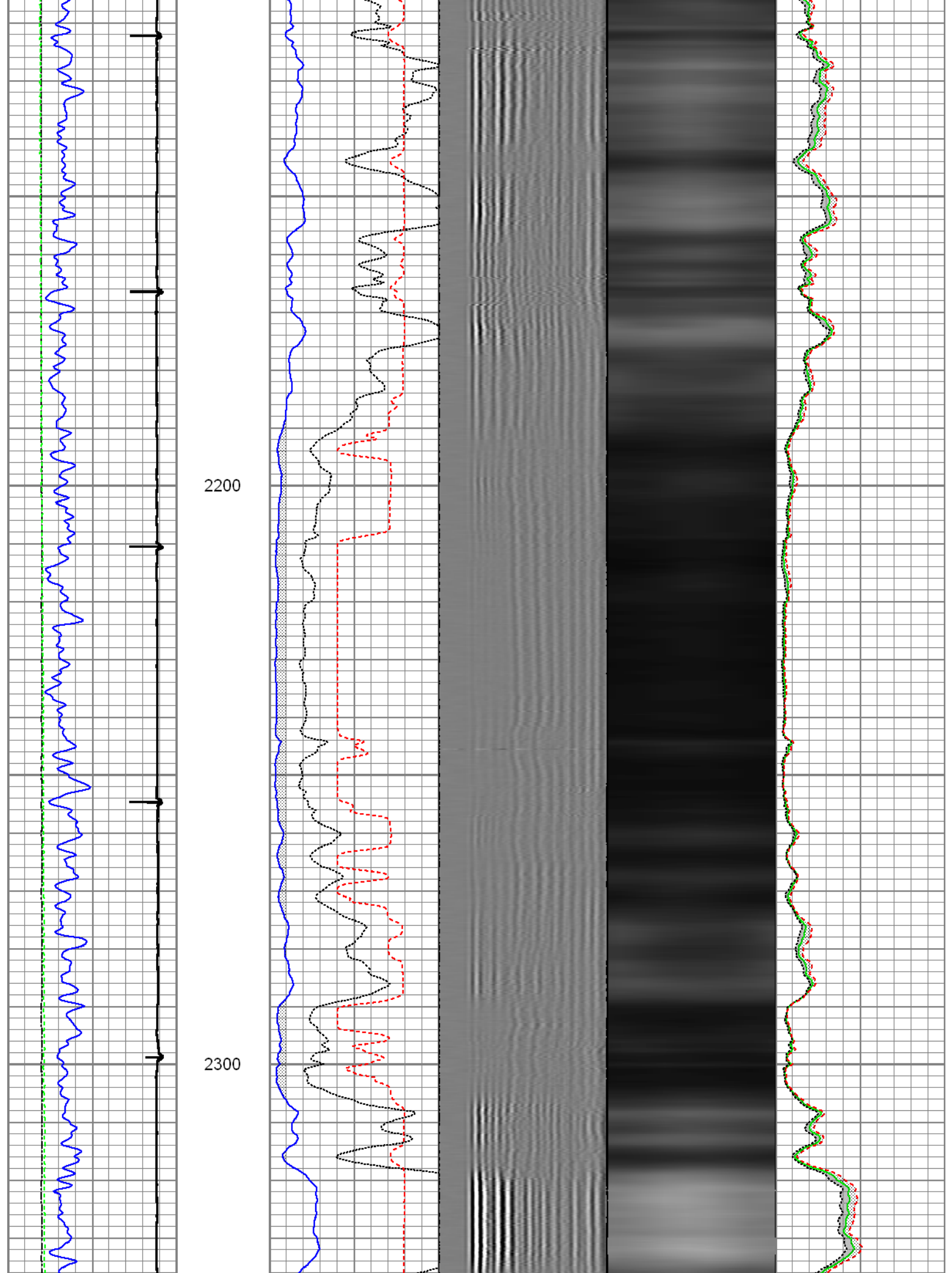


1900

2000

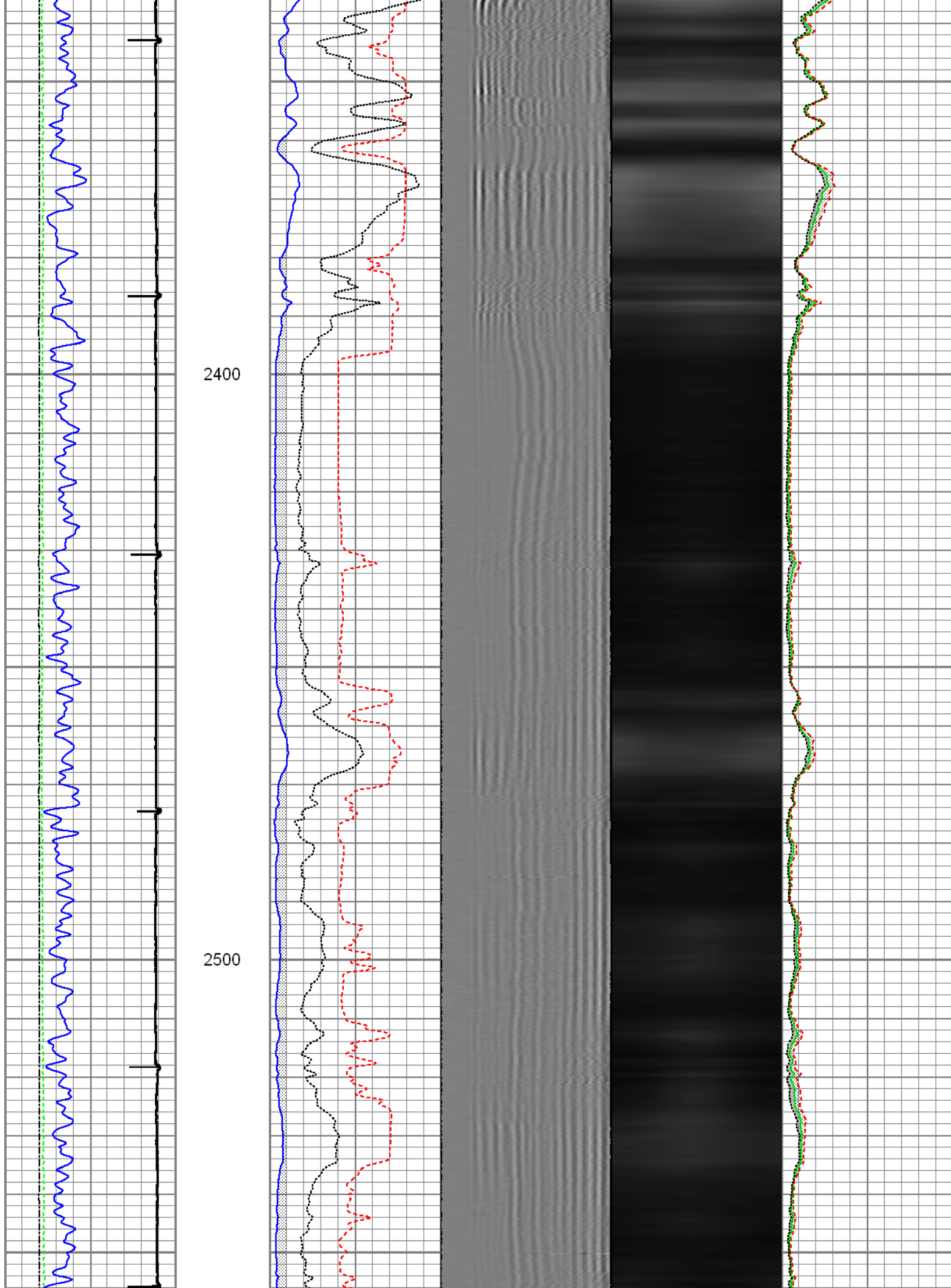
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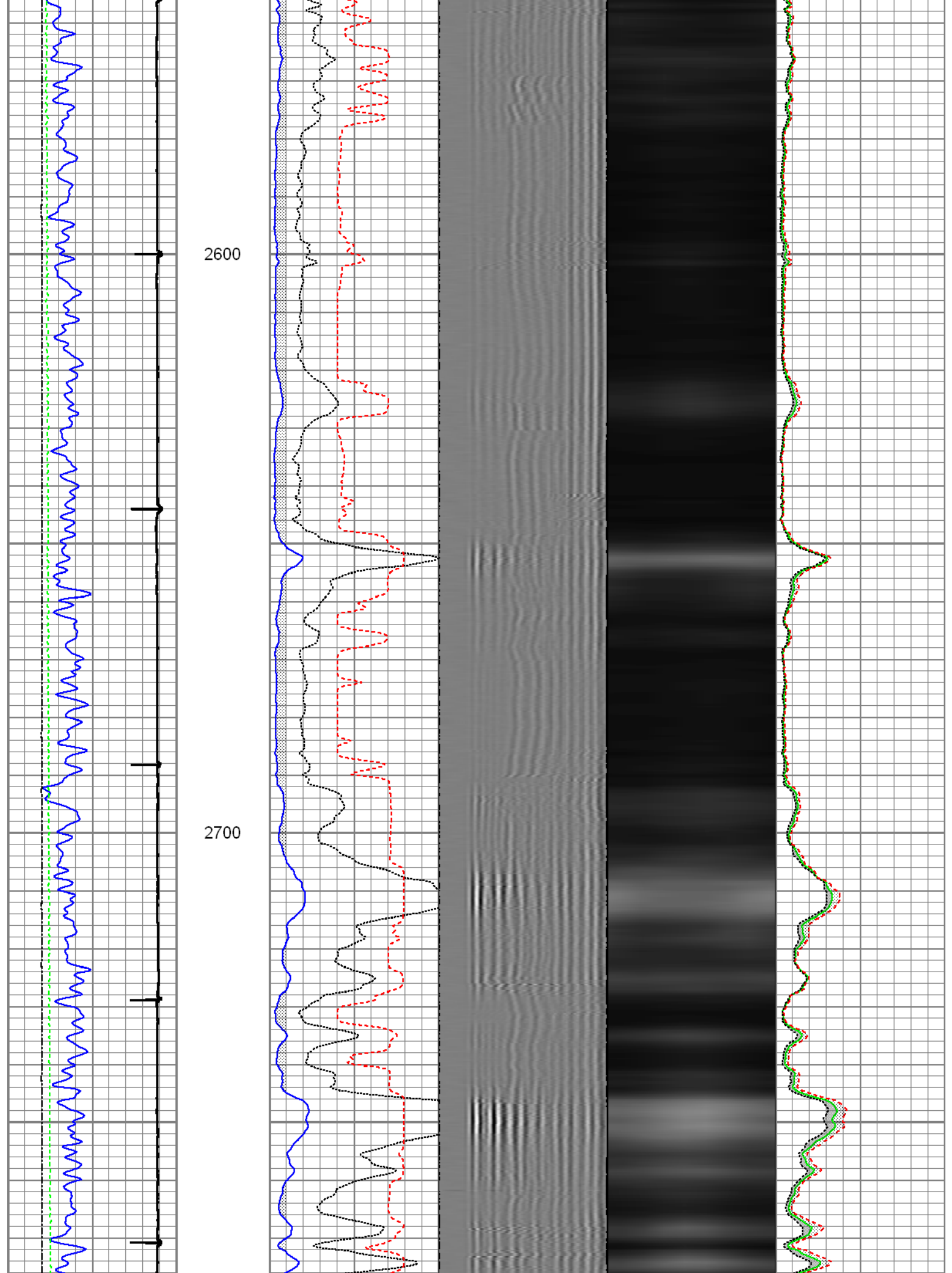




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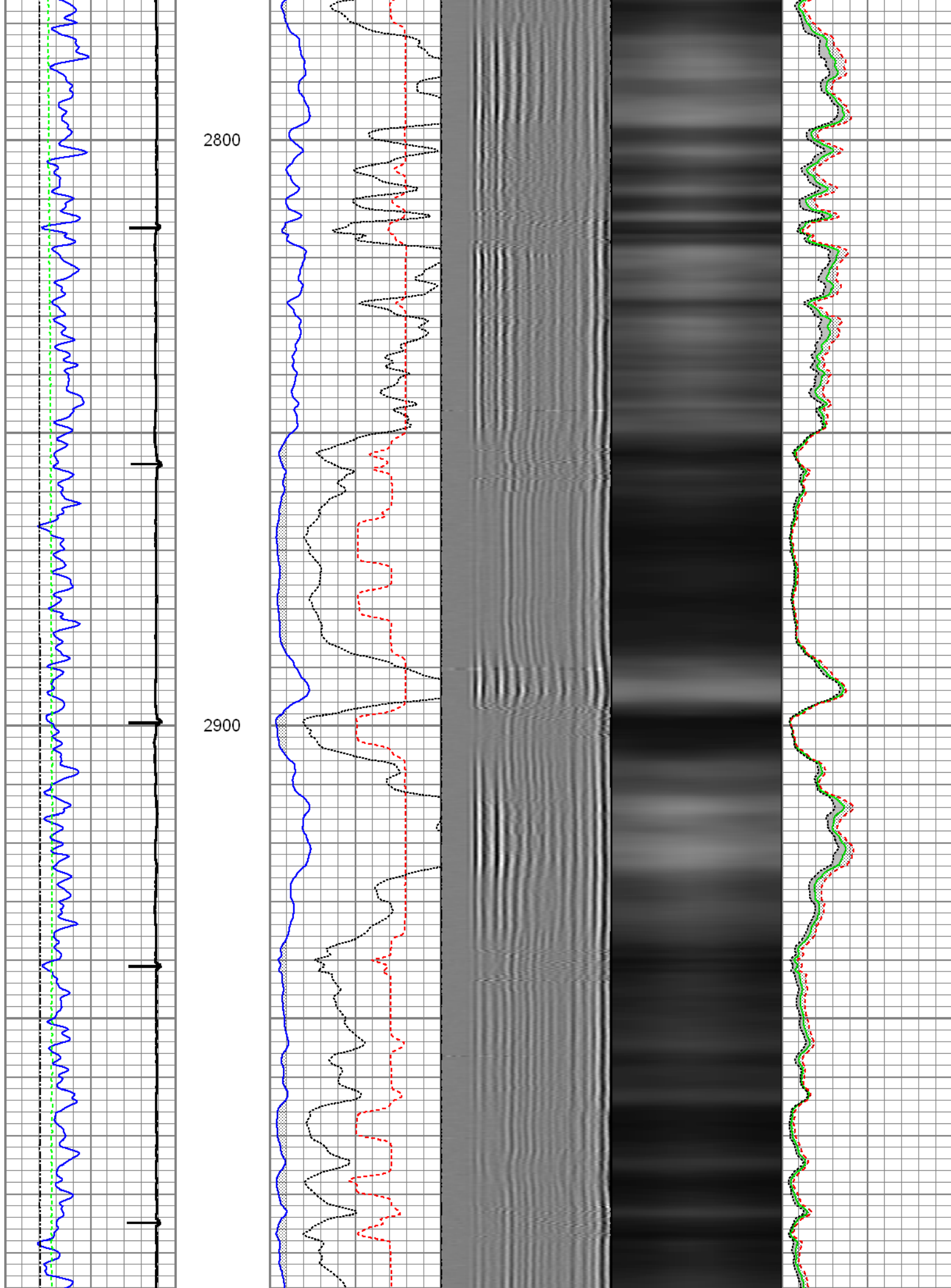
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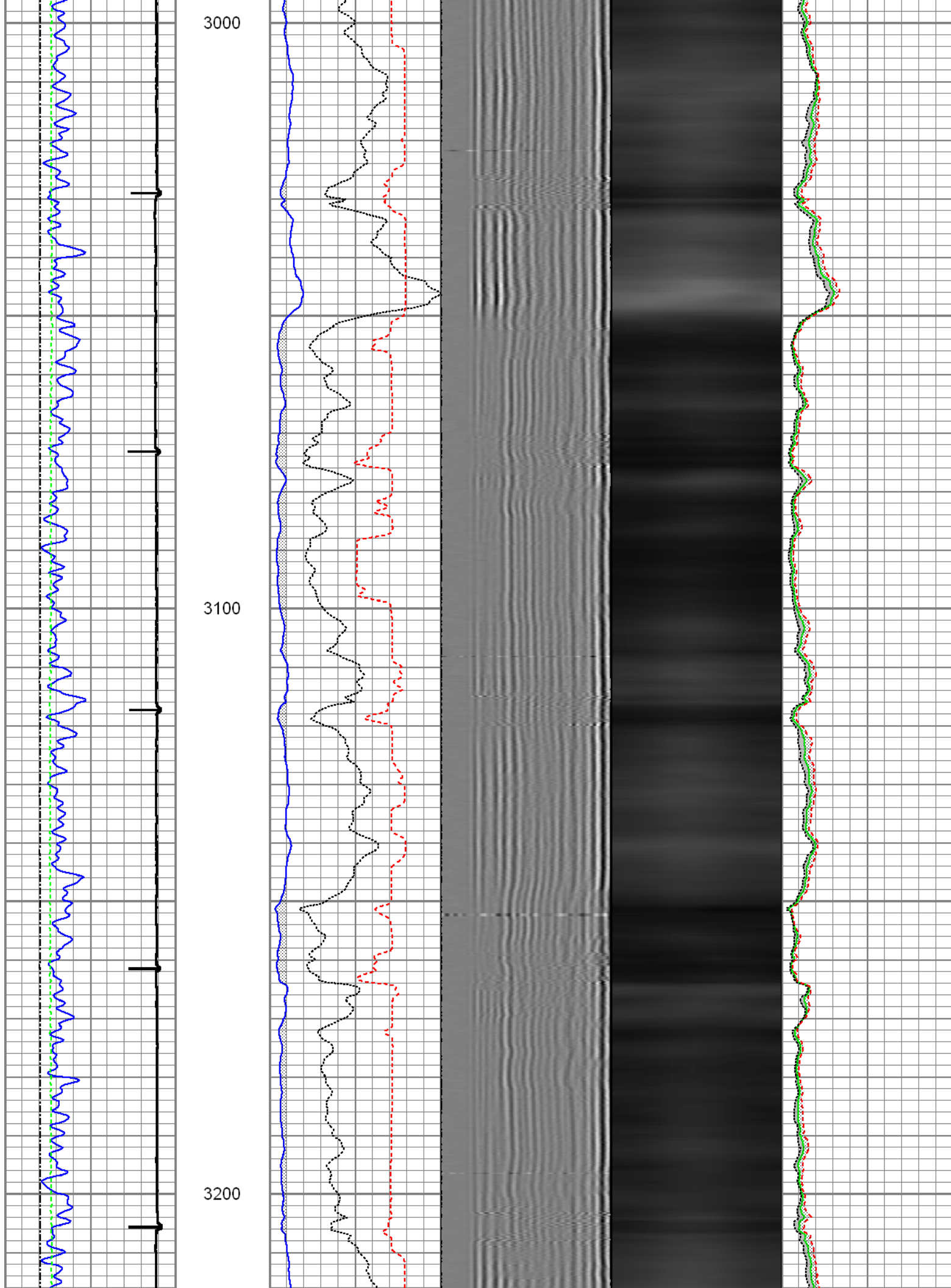




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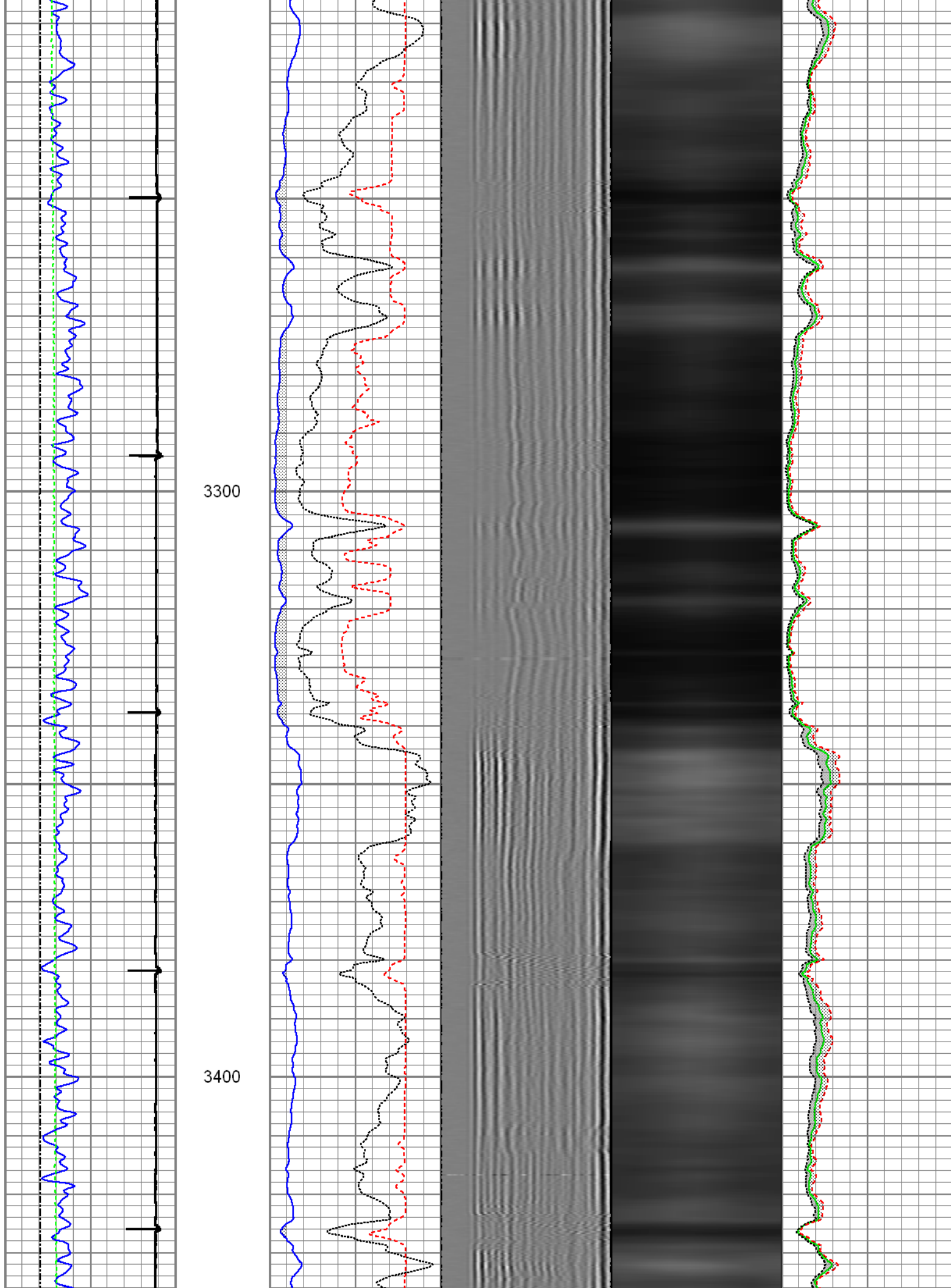
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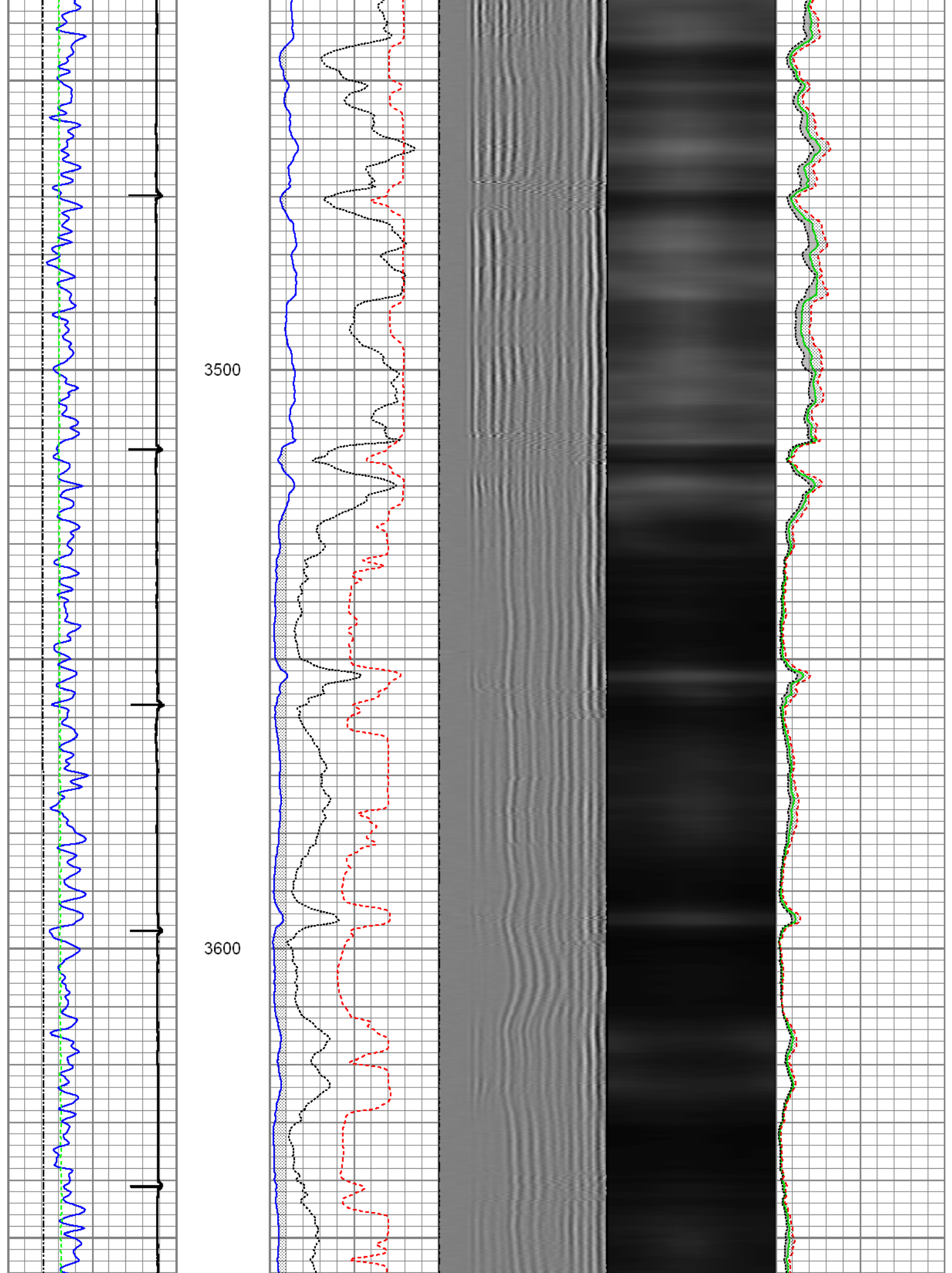


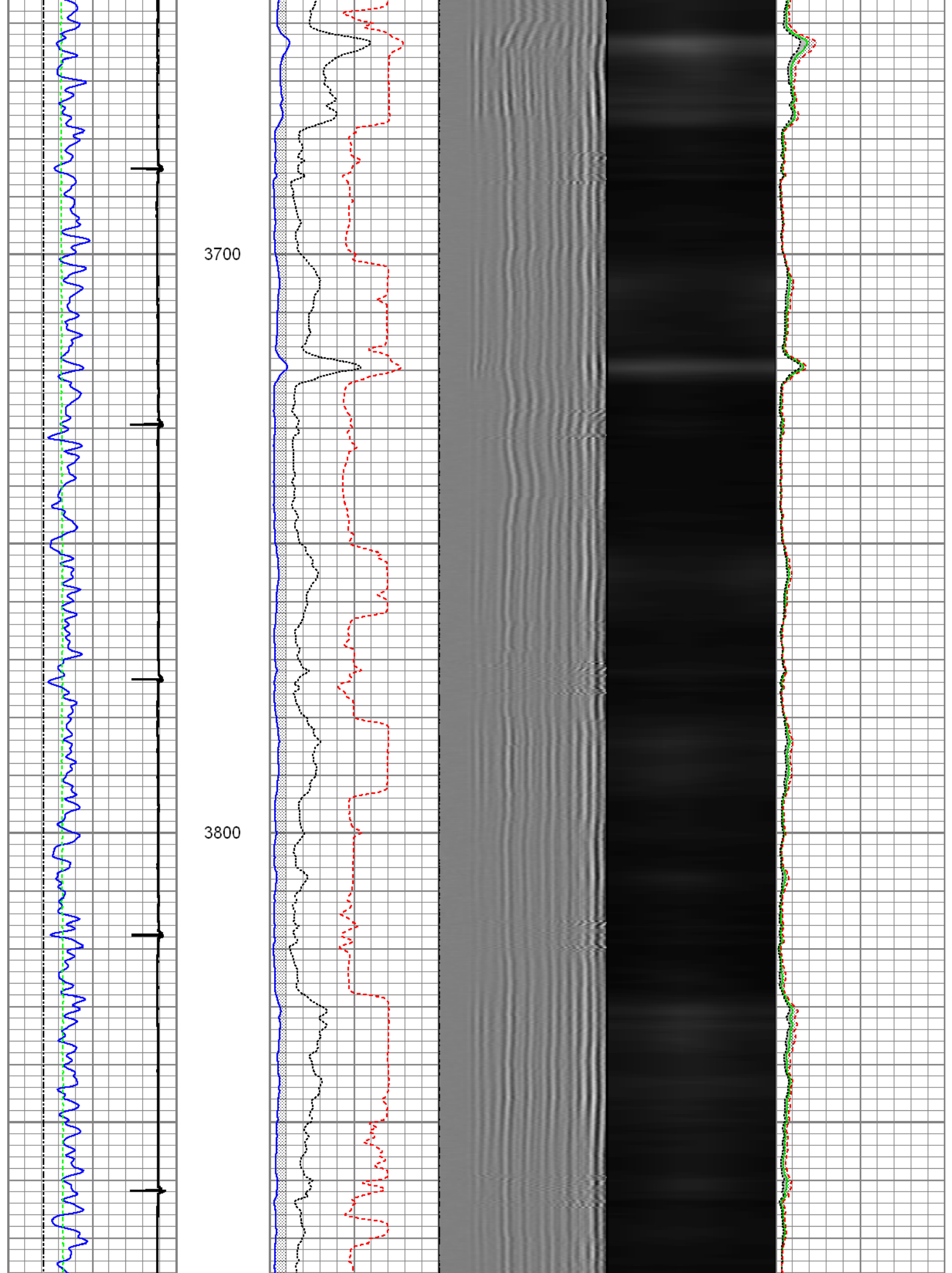


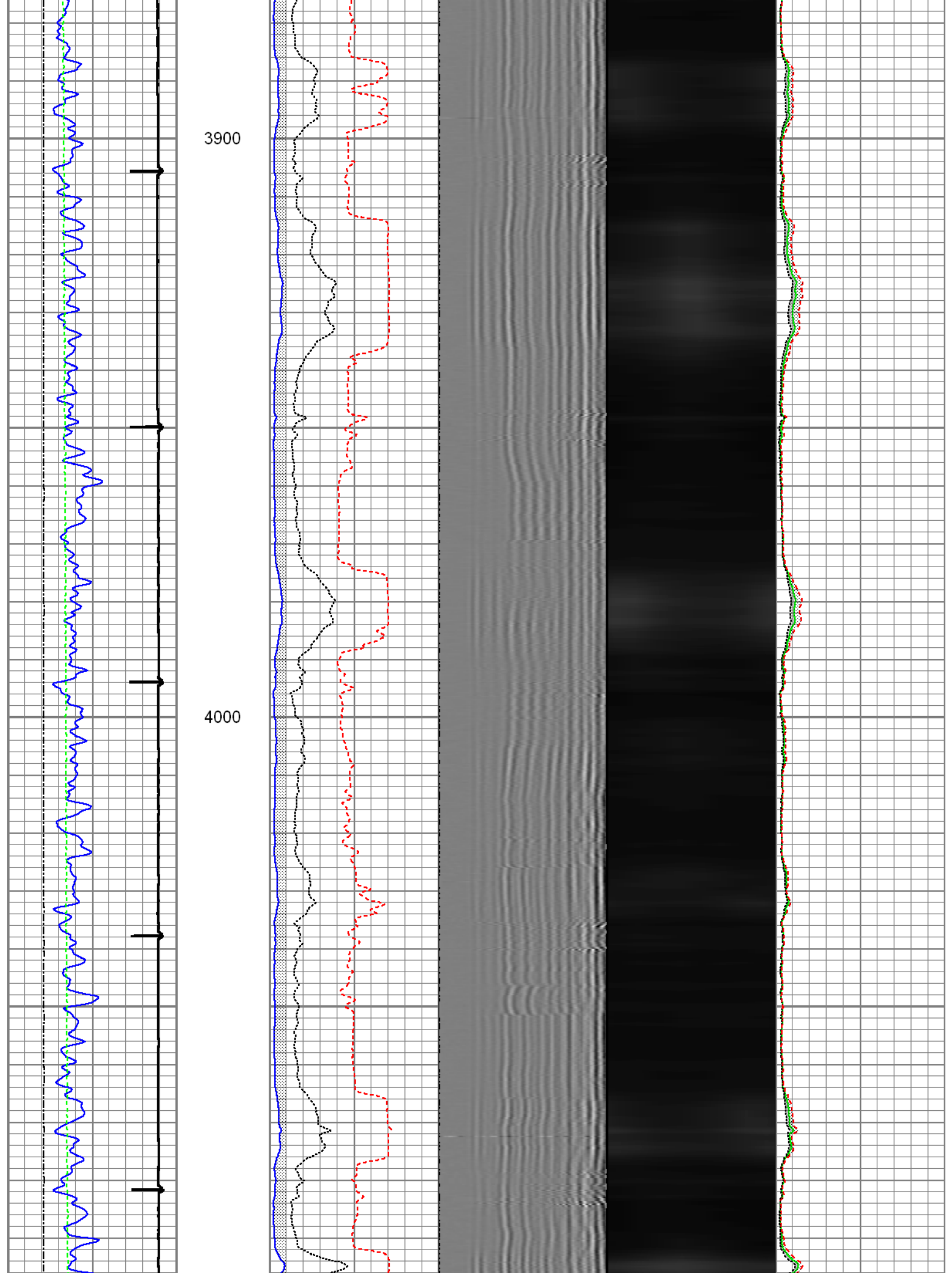
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3400





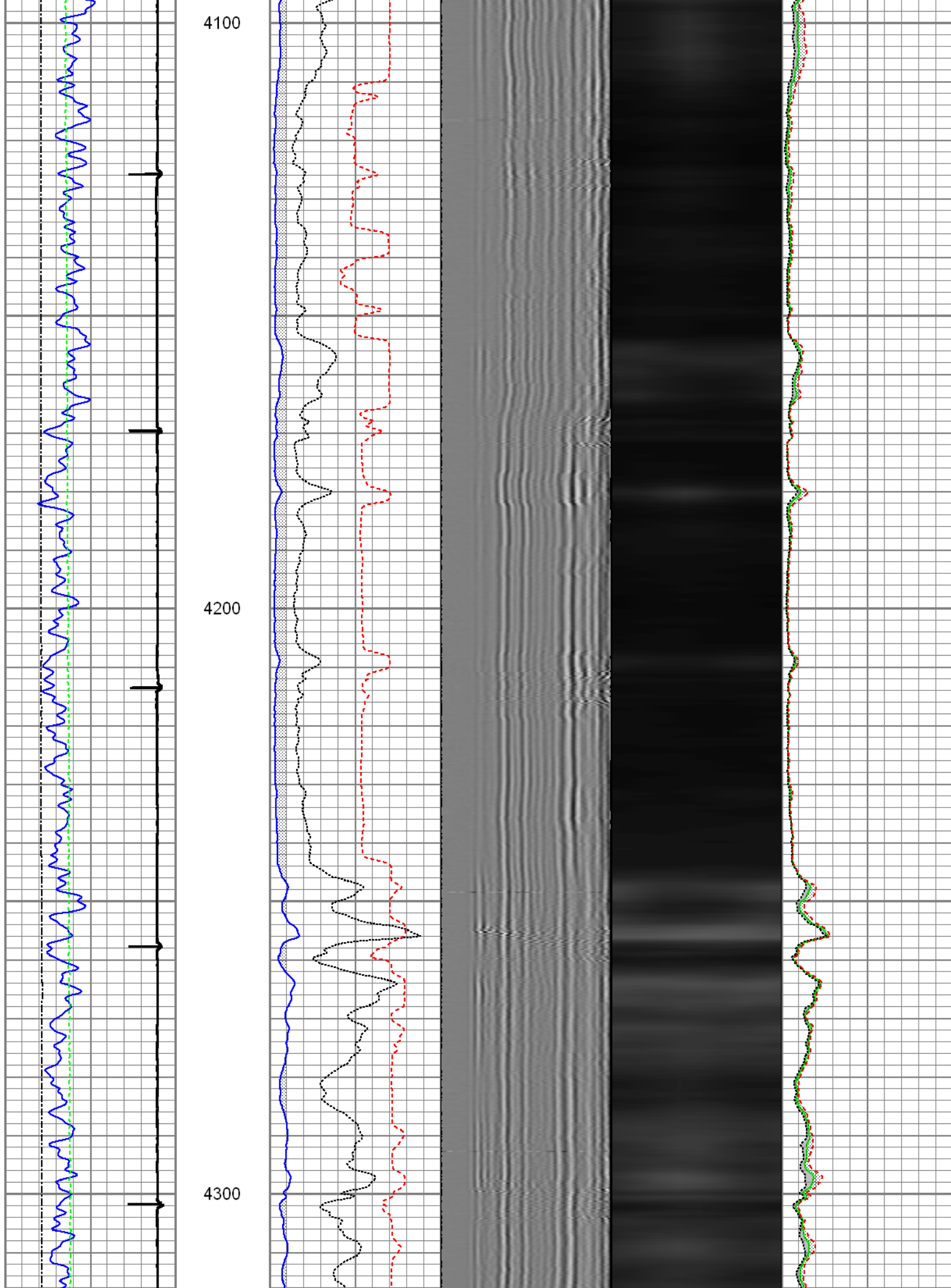


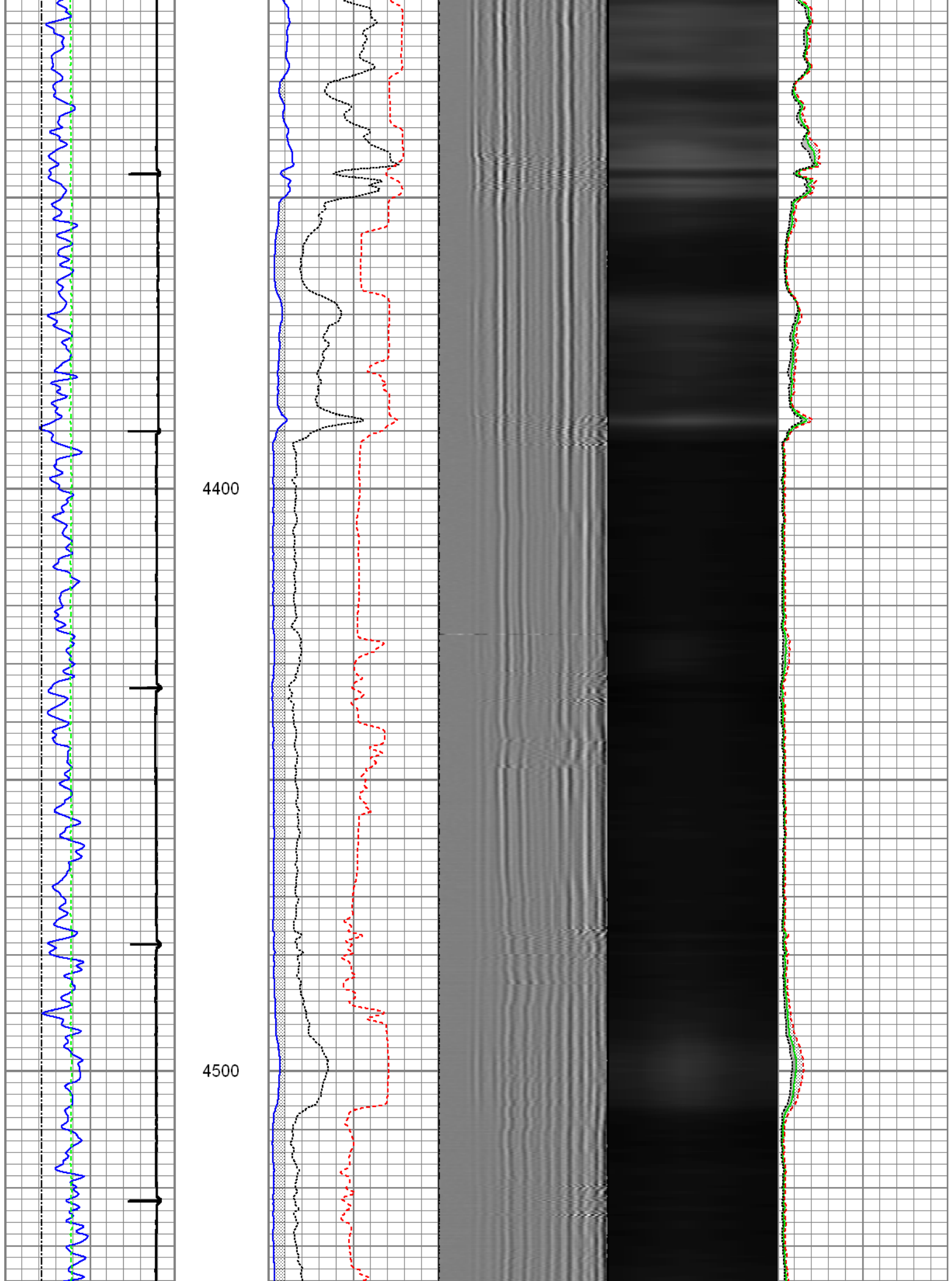


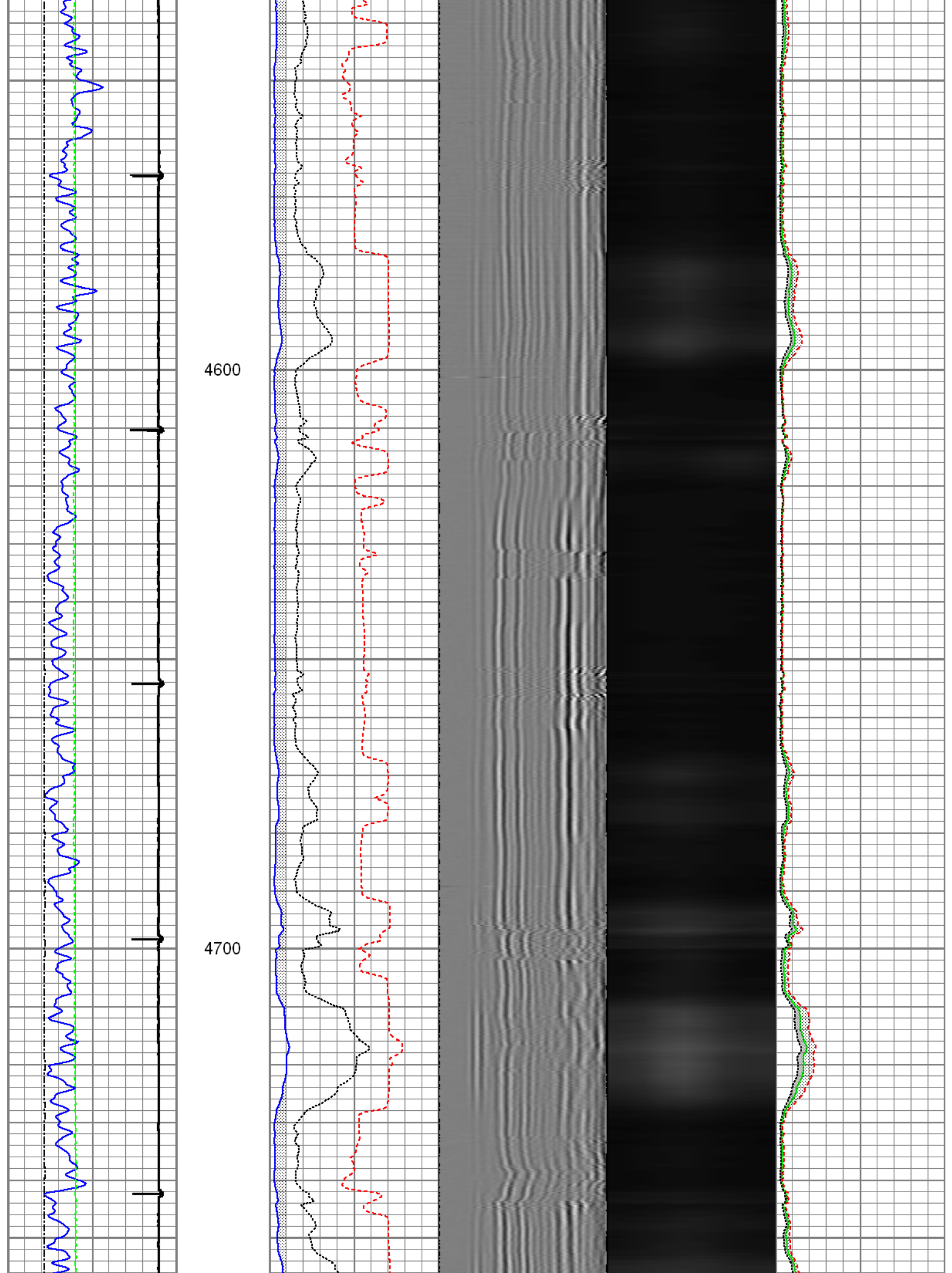
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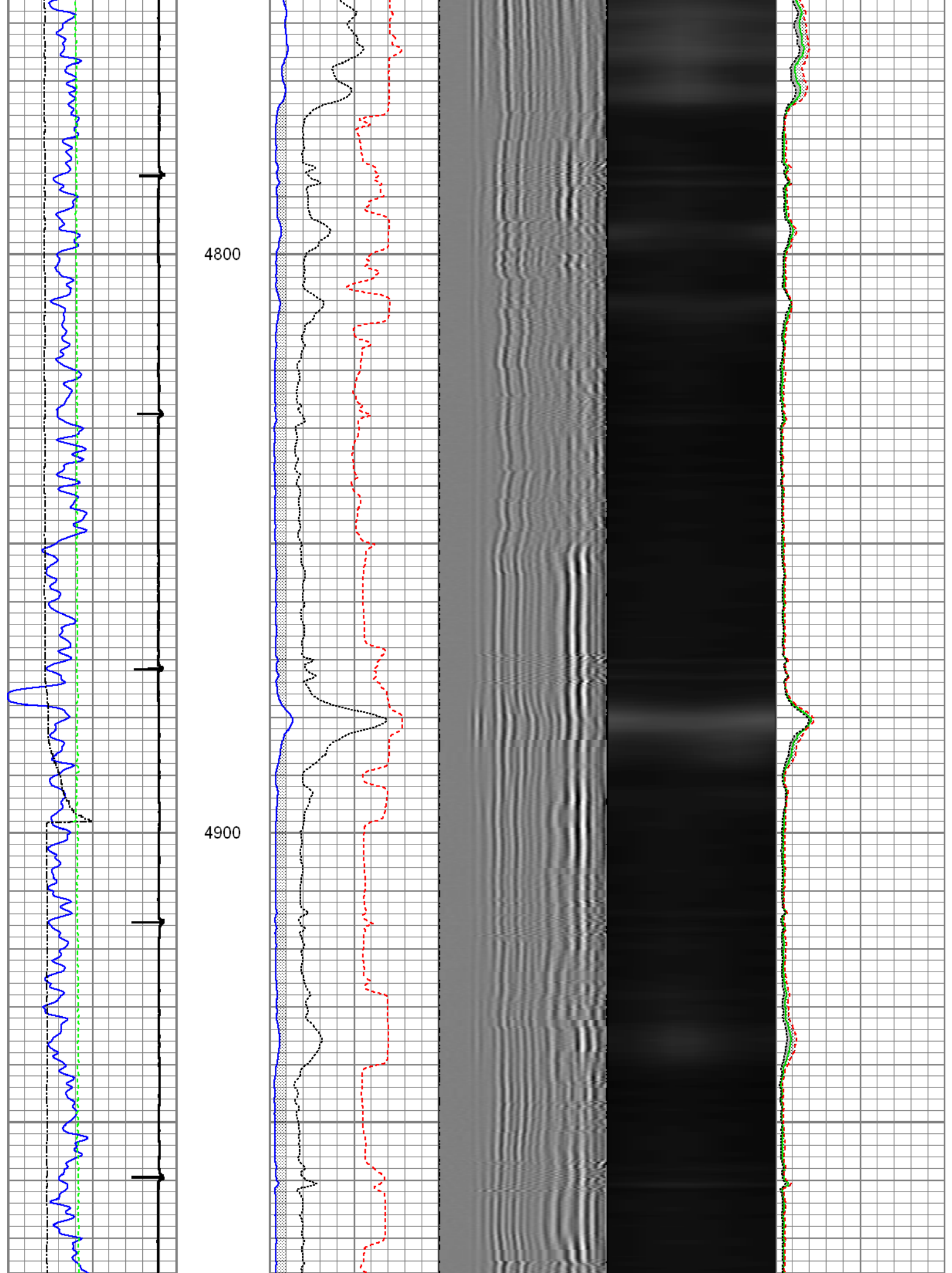
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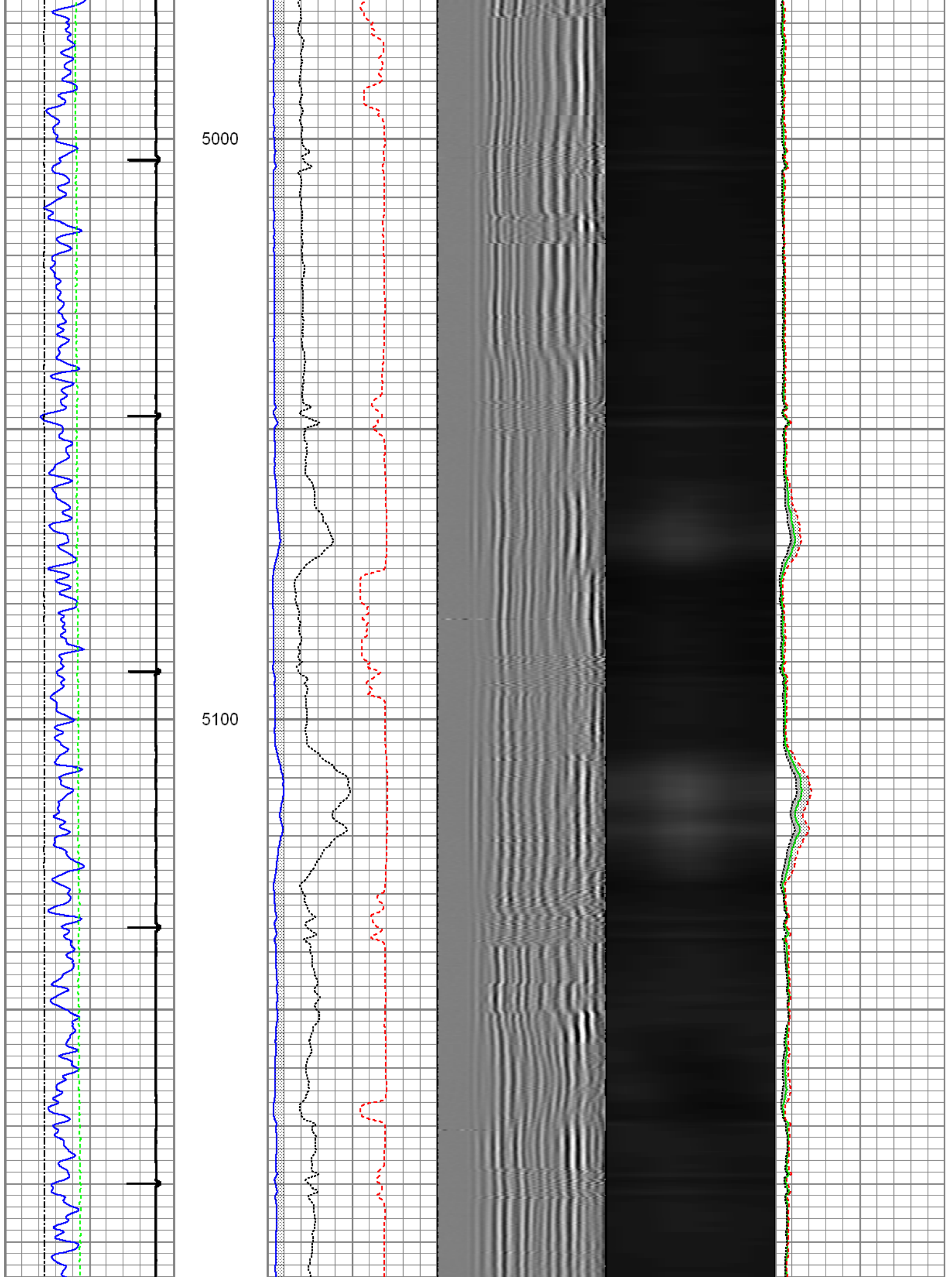
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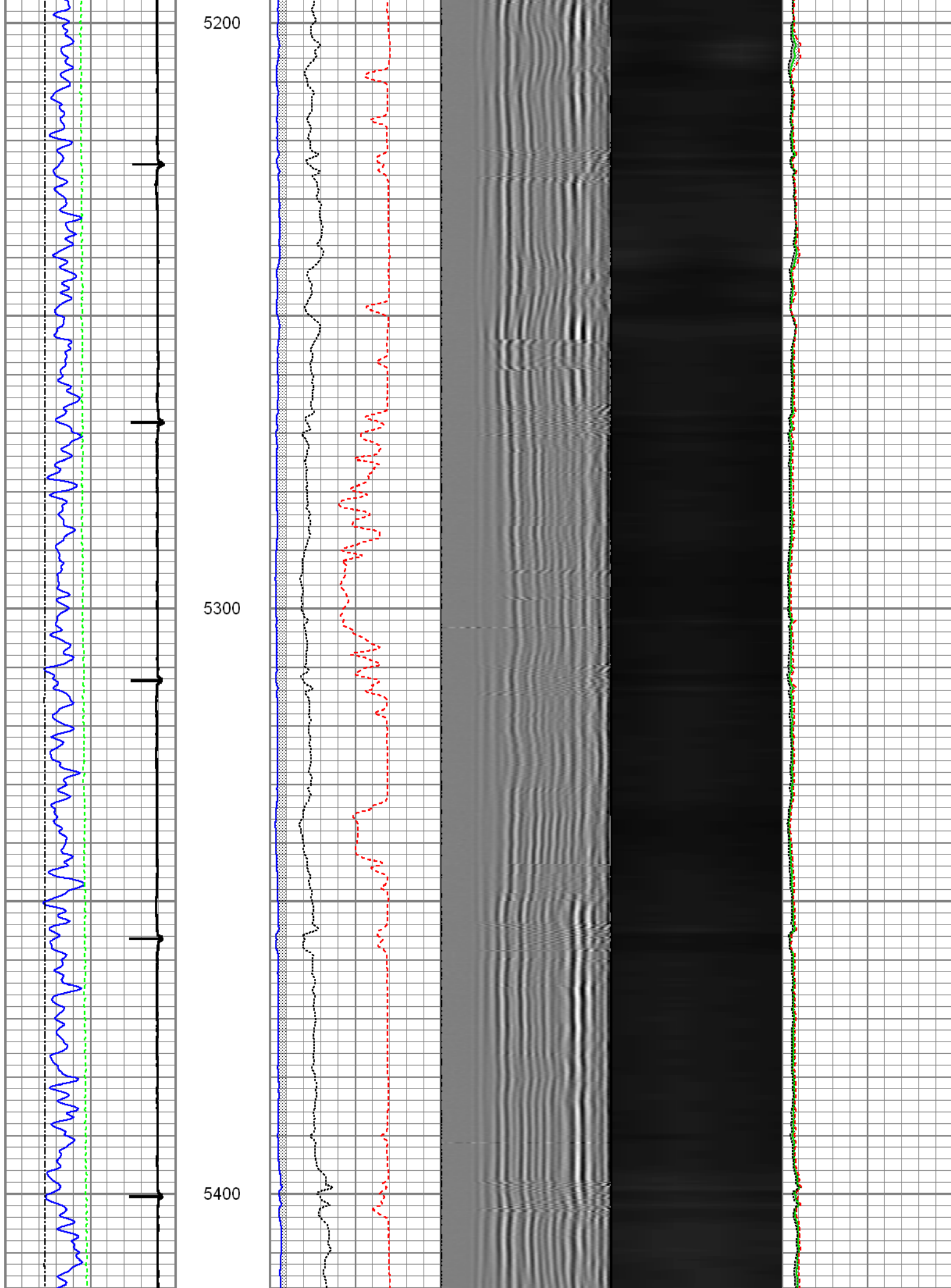




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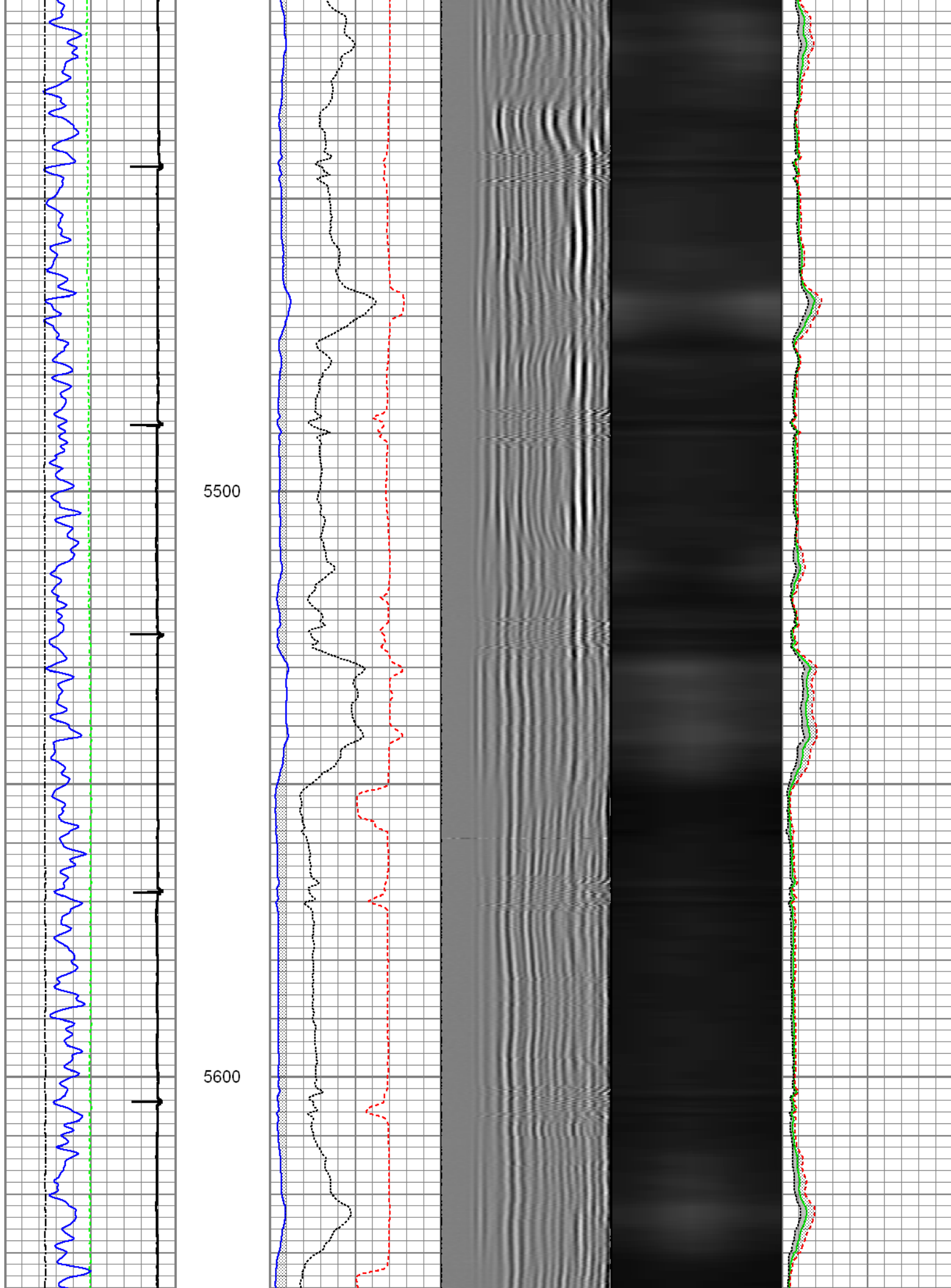
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5400



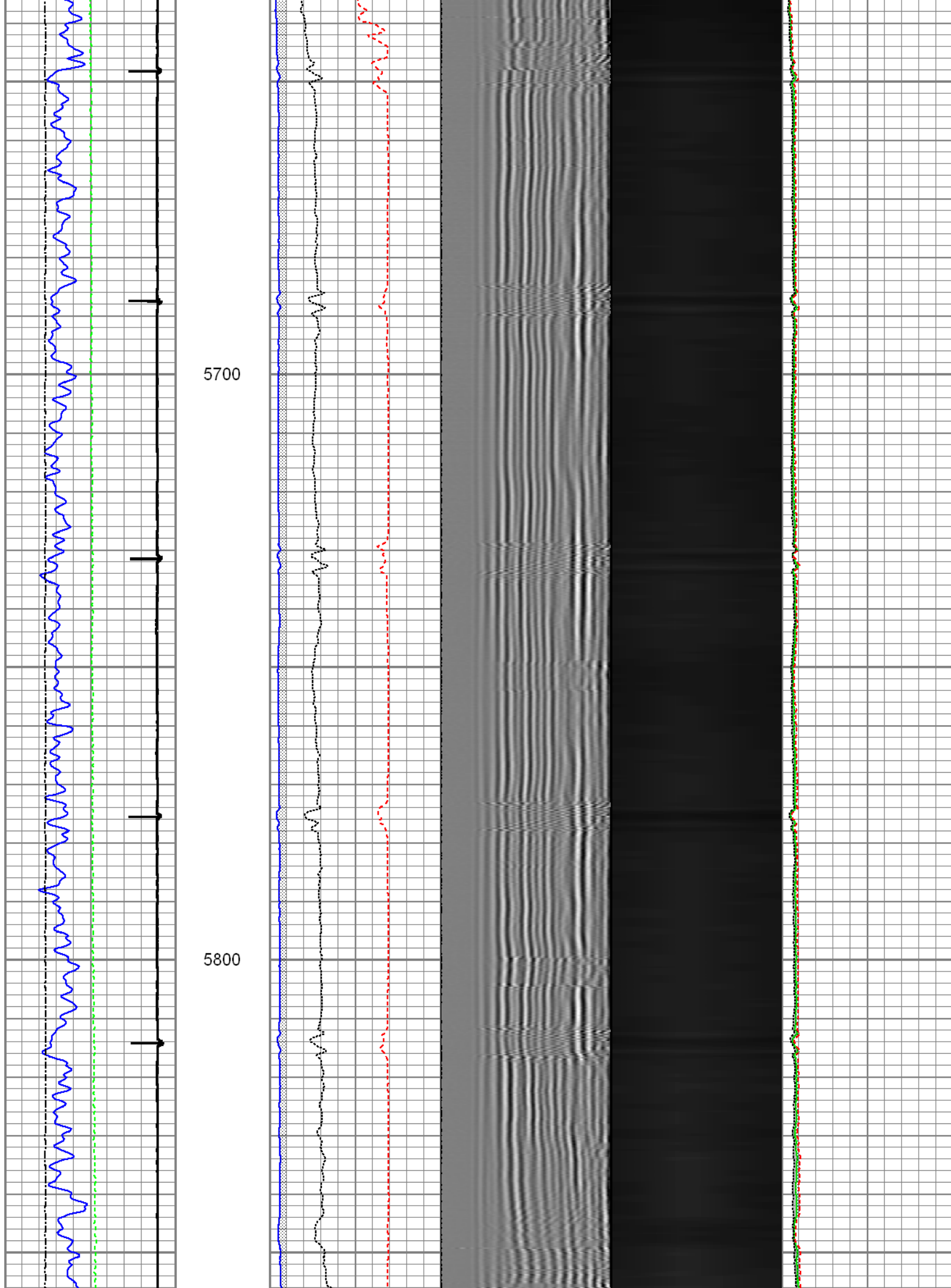
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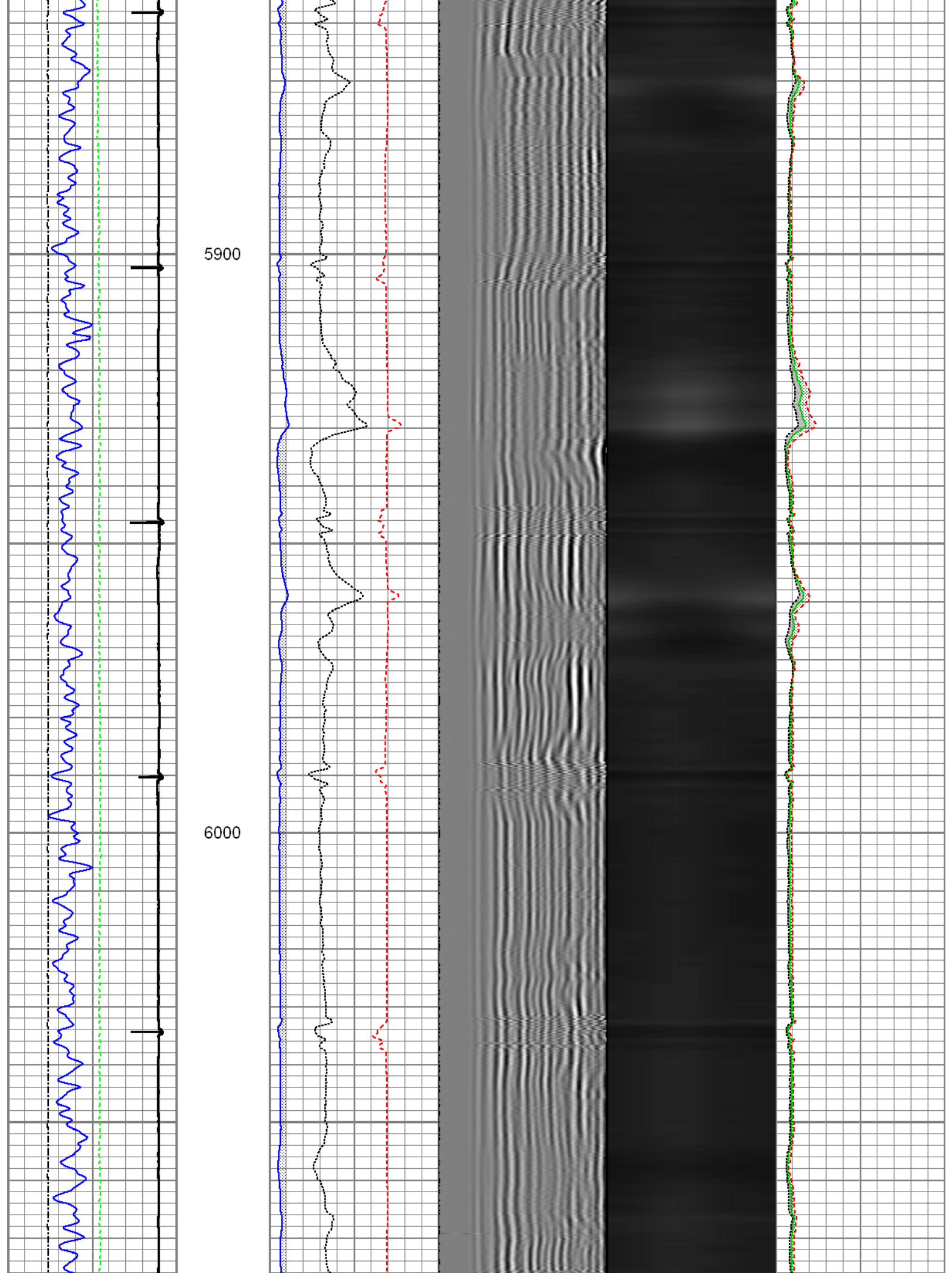
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5700

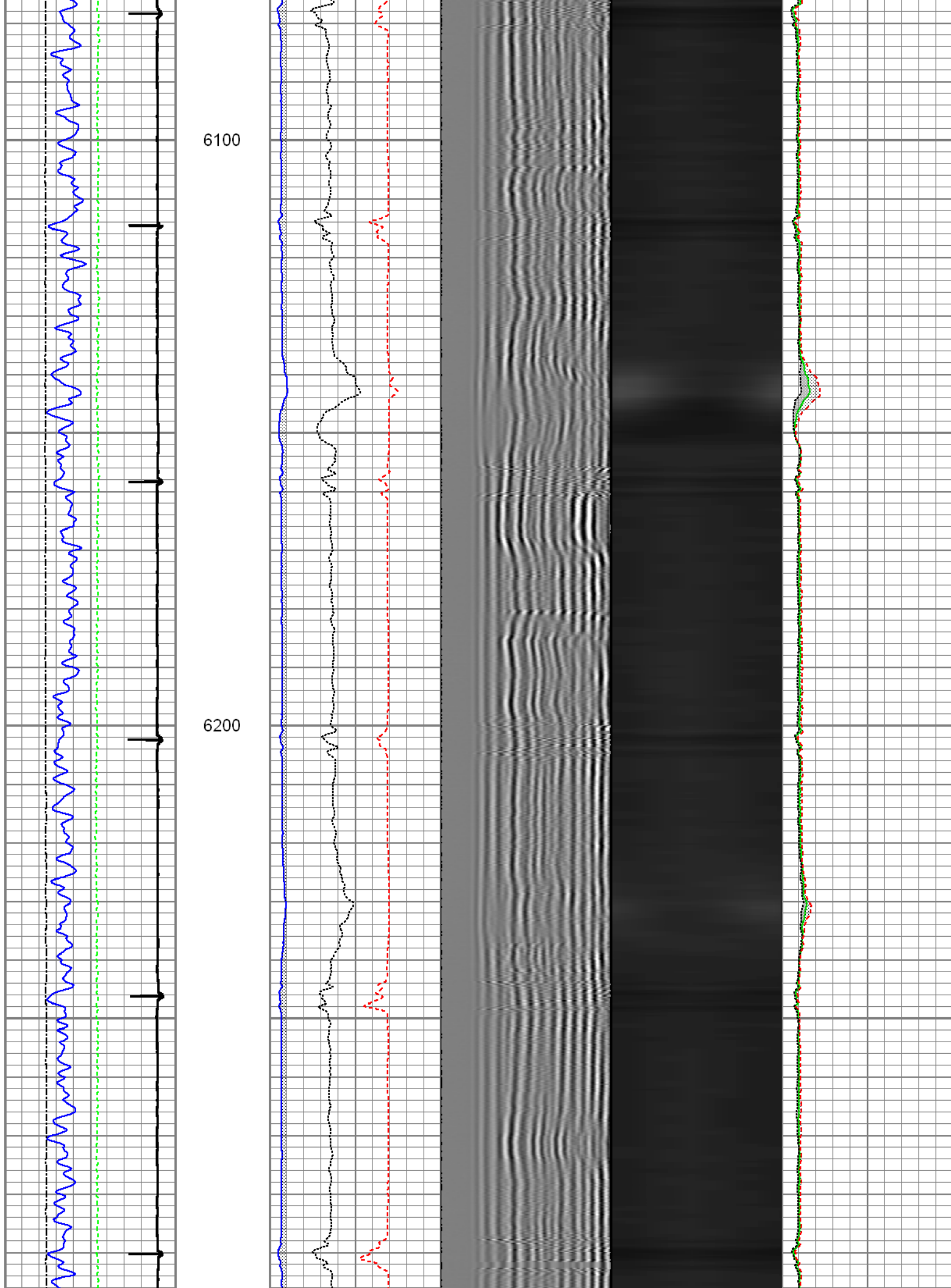
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6100

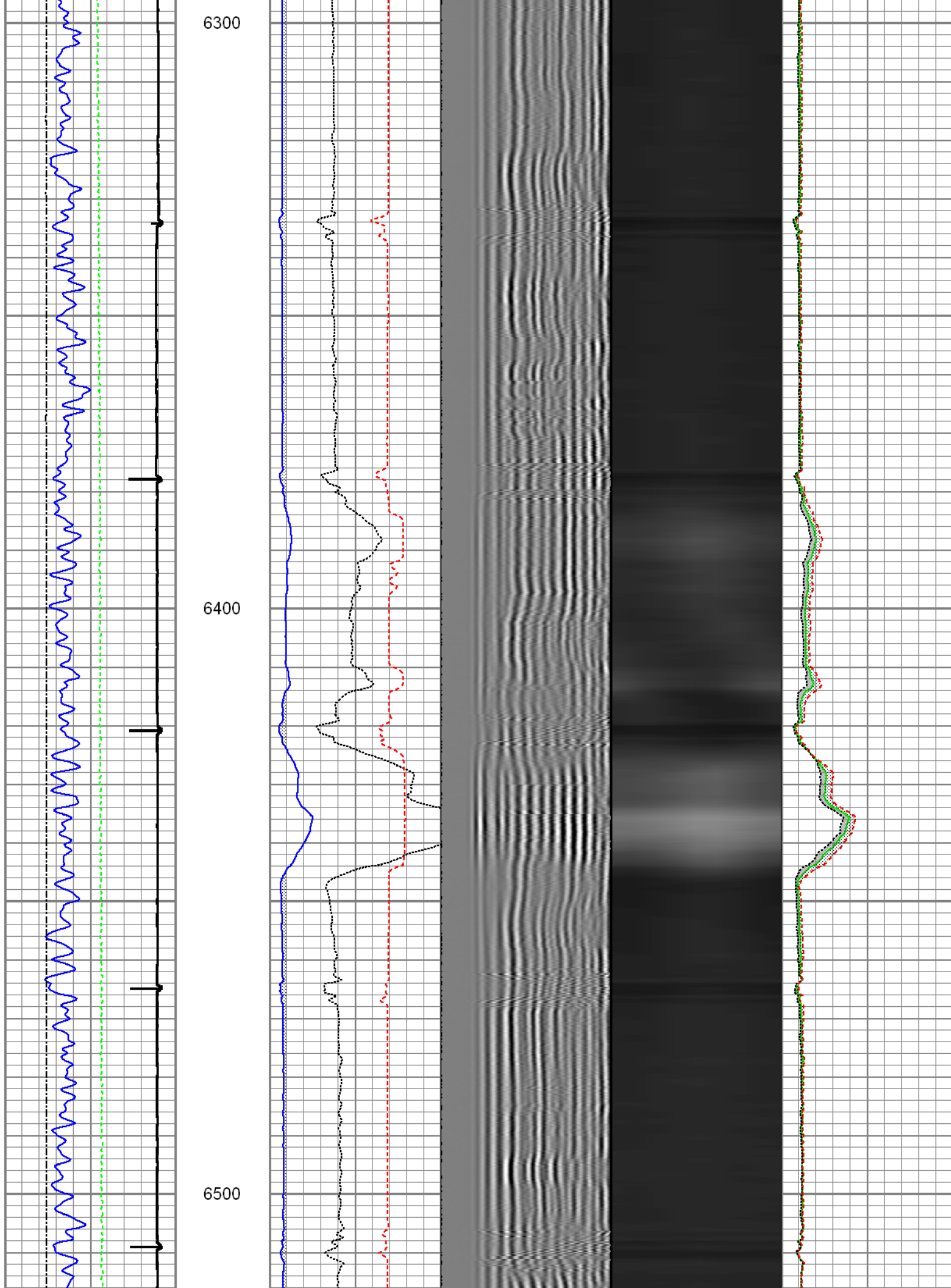
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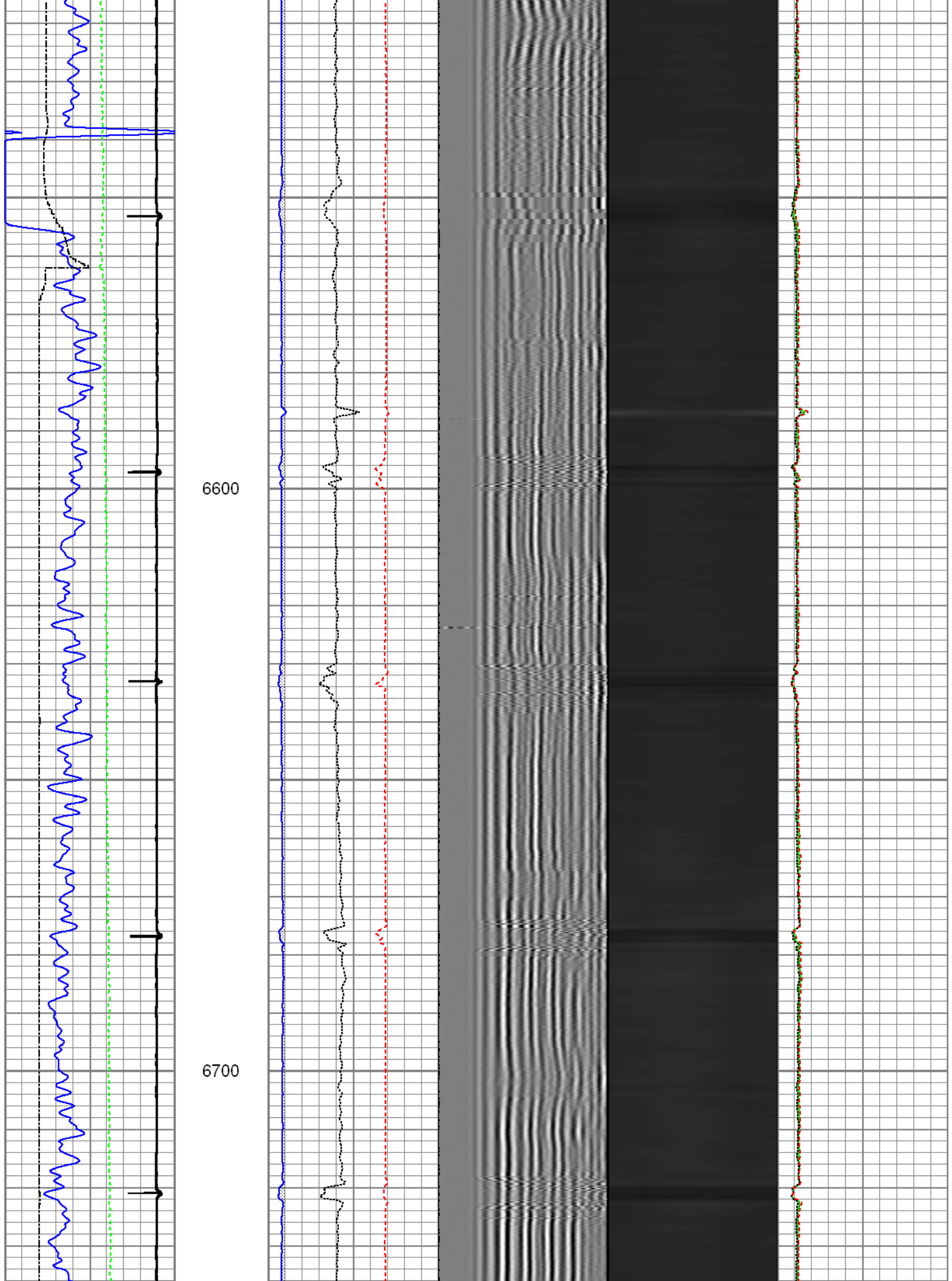


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6400

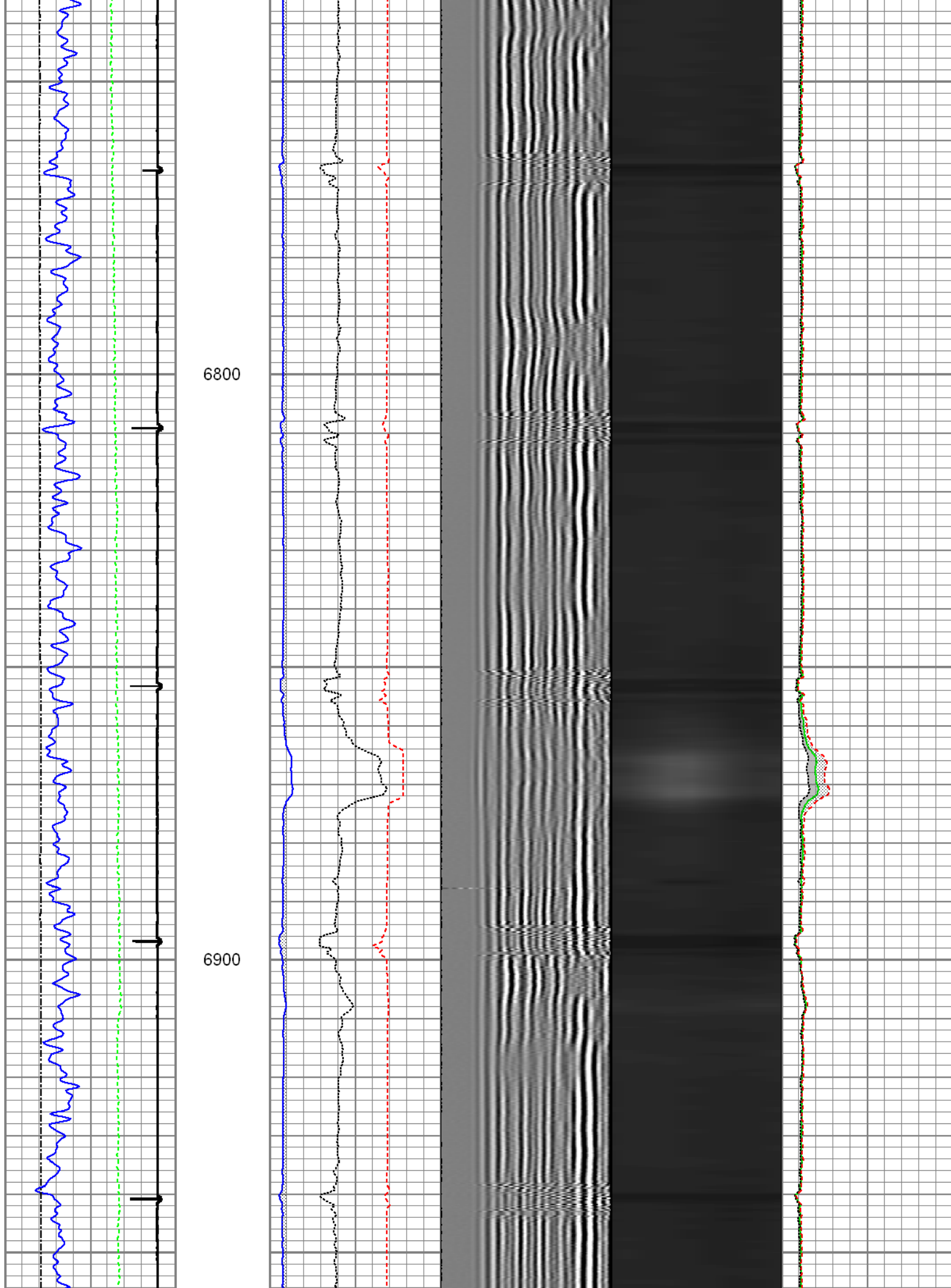
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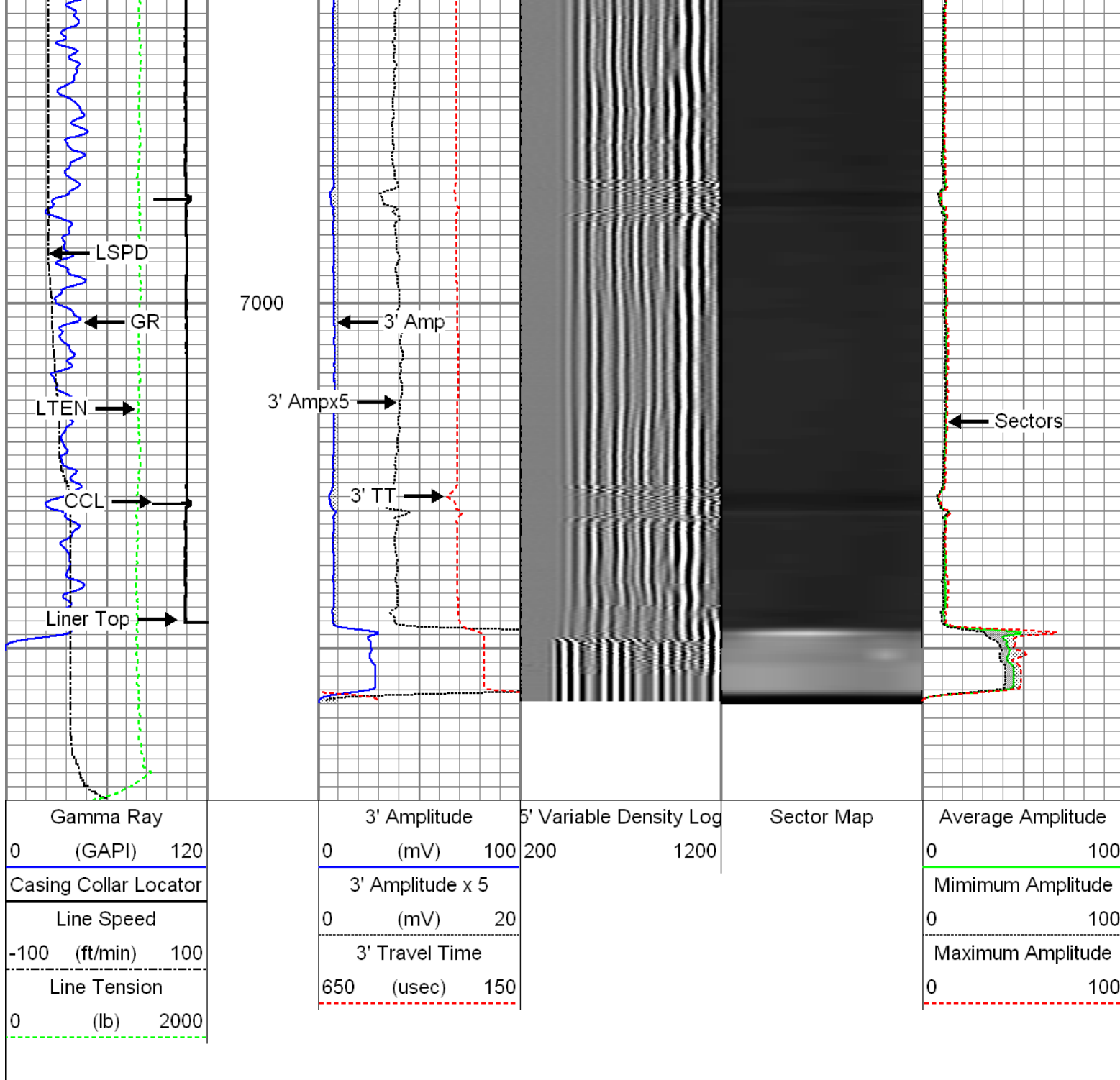




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6900

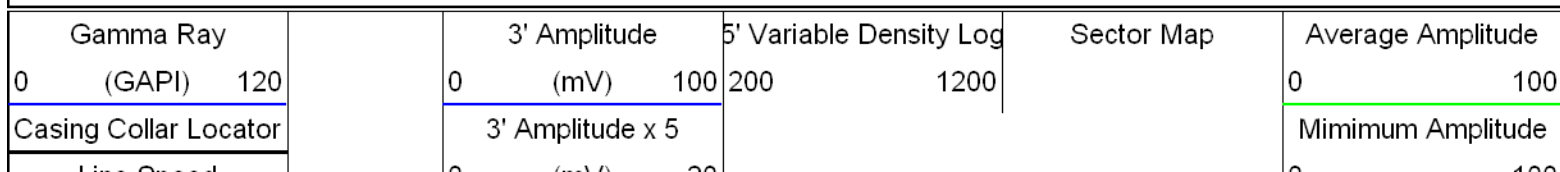


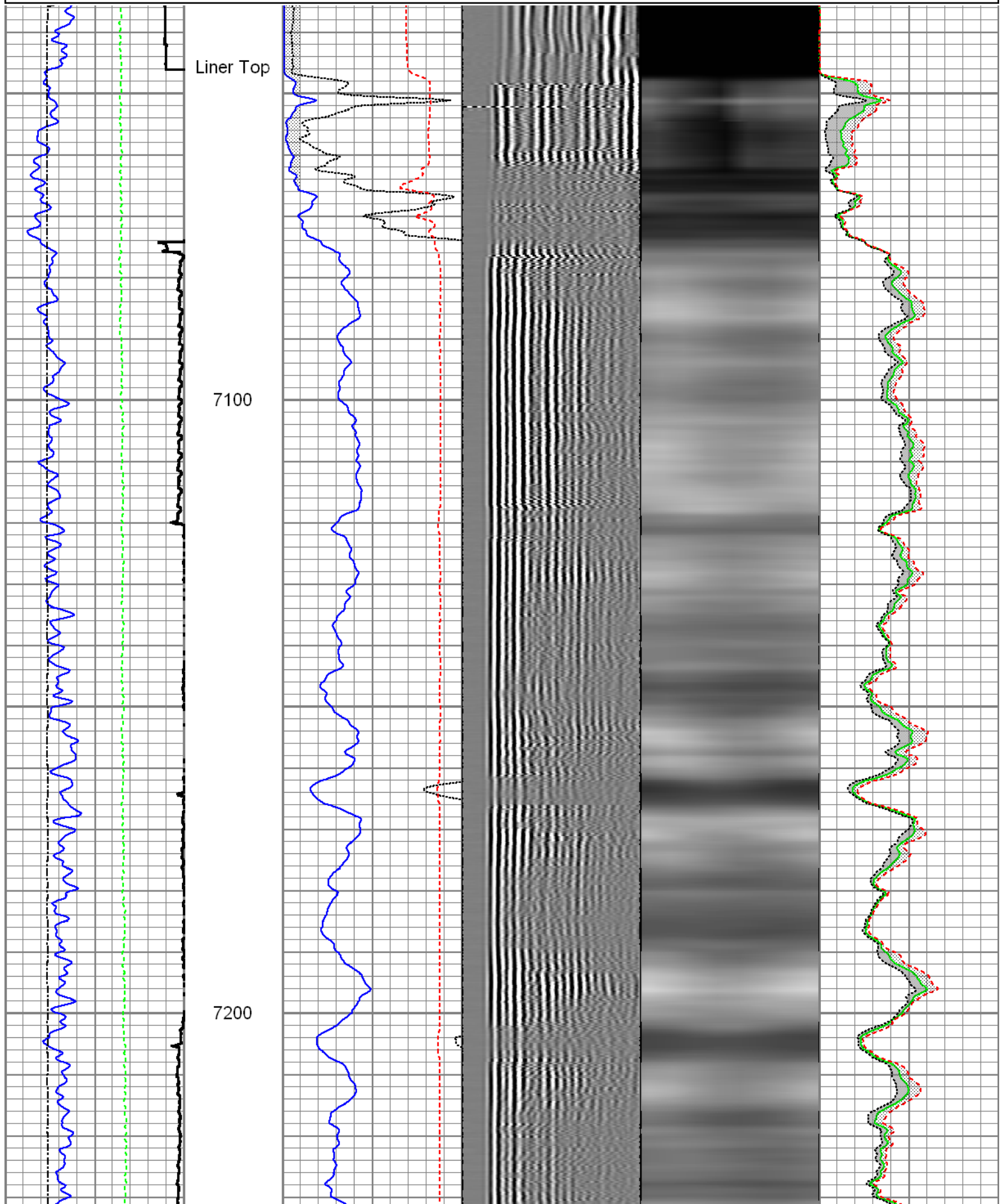
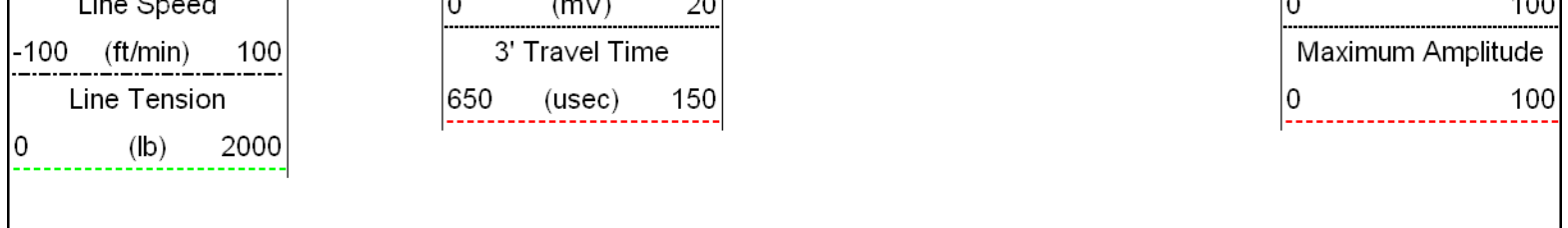


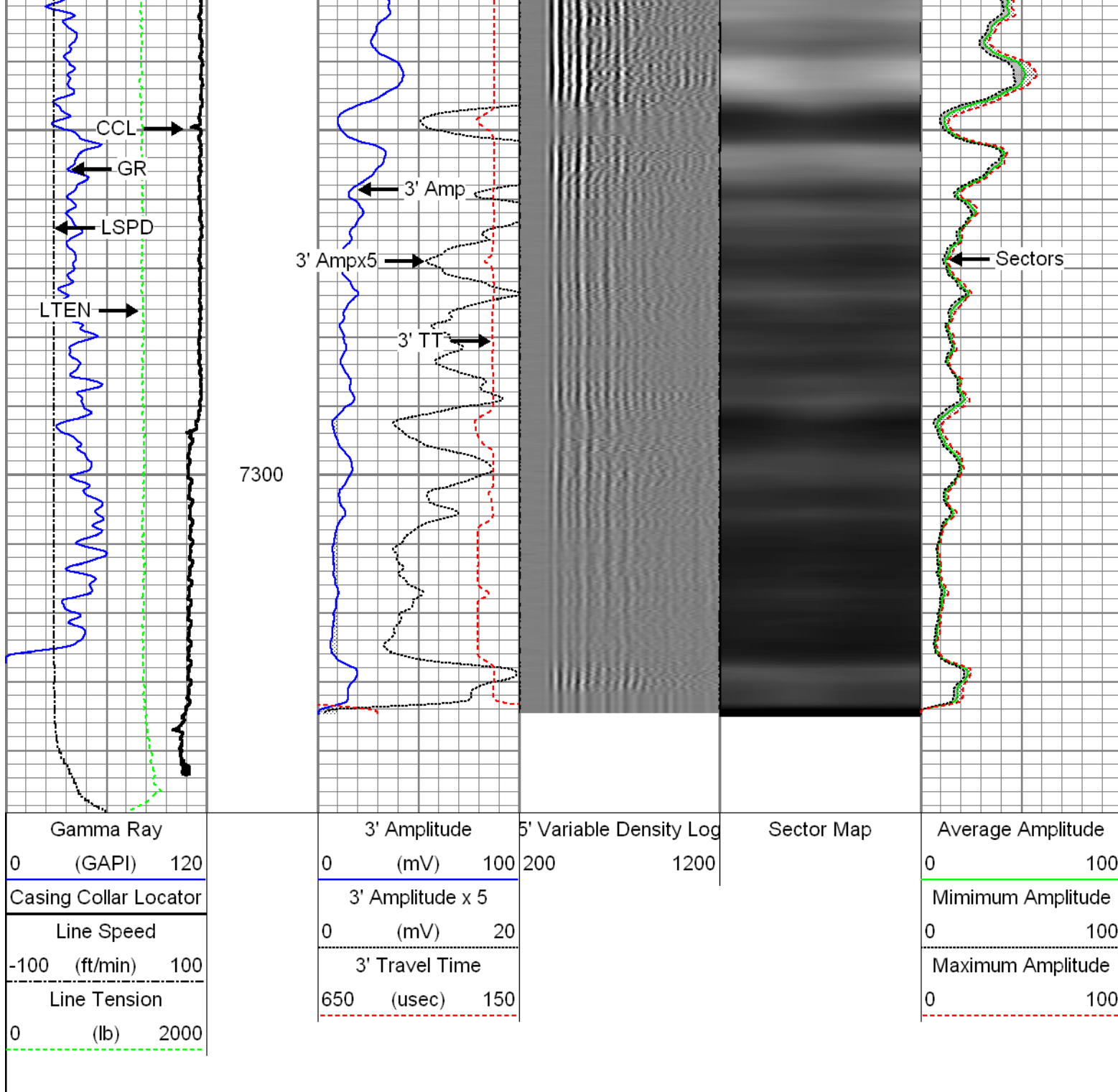
4.5" Main Pass

Recorded Under 2800 PSI Surface Induced Pressure

Database File: 0512339498_anadarko_cruickshank 1c-24hz_10-11-14_mit_rbl.db
 Dataset Pathname: 4.5main
 Presentation Format: rbt4_mit
 Dataset Creation: Sat Oct 11 13:17:42 2014 by Log 7.0 B1
 Charted by: Depth in Feet scaled 1:240

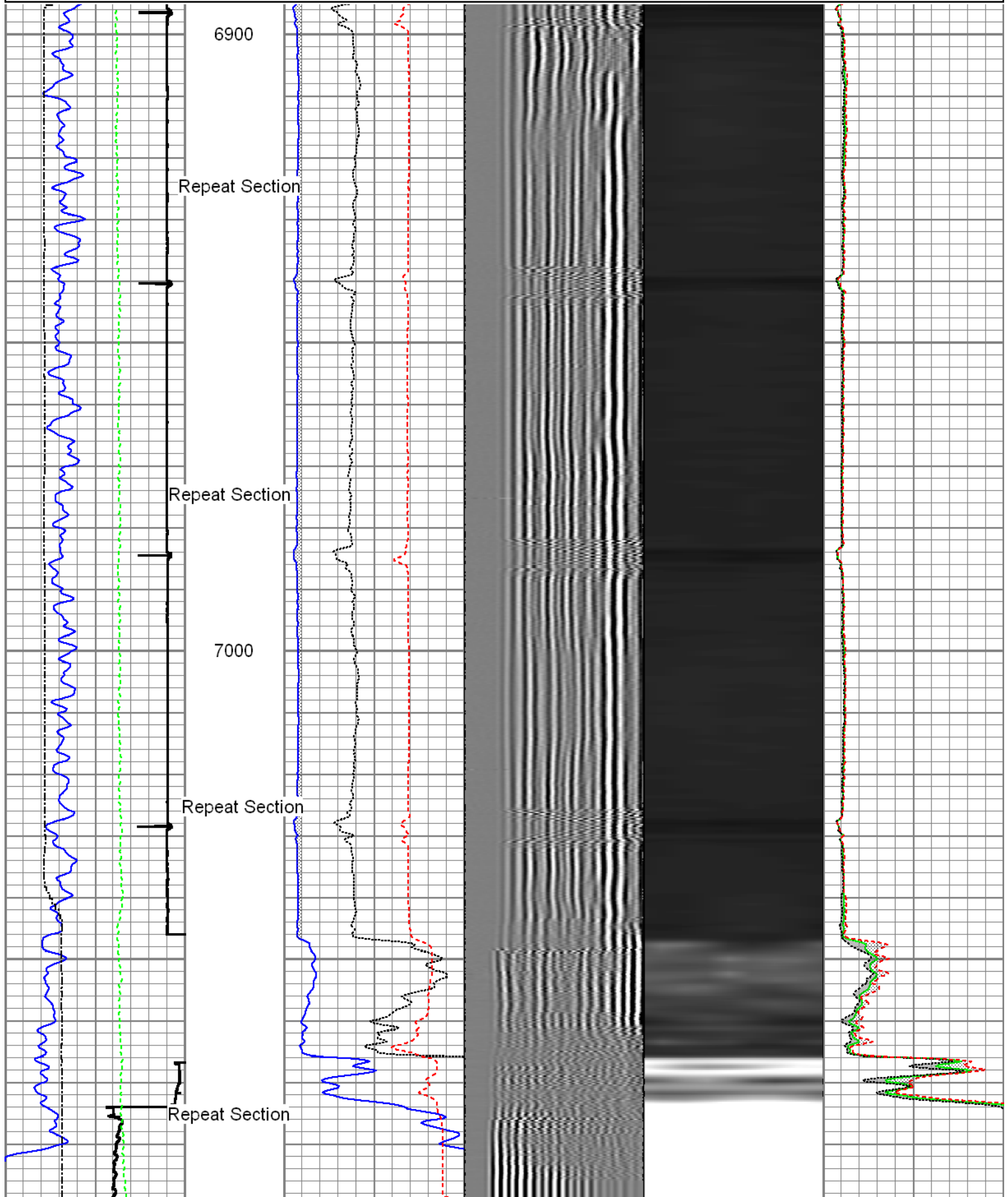


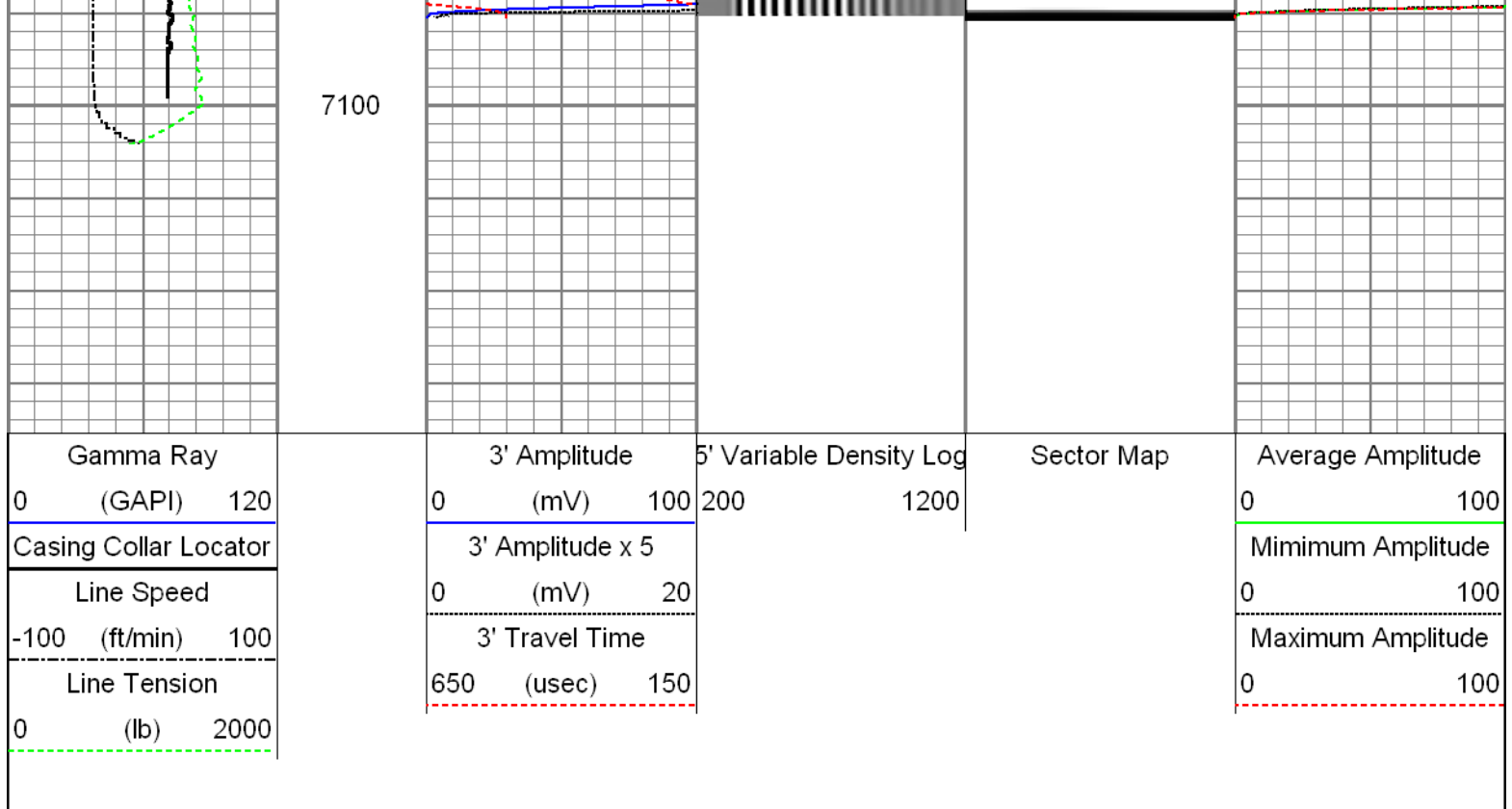




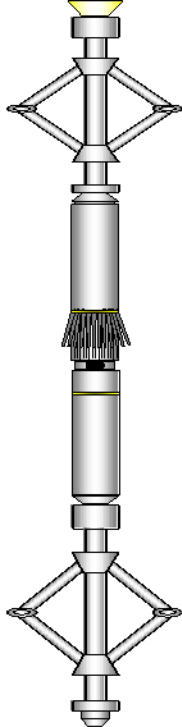
| | | | | |
|---|----------------------------|---|------------|----------------------------|
| FMC Technologies | | Repeat Pass | | |
| | | Recoded Under 2800 PSI Surface Induced Pressure | | |
| Database File: 0512339498_anadarko_cruickshank 1c-24hz_10-11-14_mit_rbl.db Dataset Pathname: repeat Presentation Format: rbt4_mit Dataset Creation: Sat Oct 11 12:08:05 2014 by Log 7.0 B1 Charted by: Depth in Feet scaled 1:240 | | | | |
| 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 | | | 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 | 23.24 | | 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 (211461) Crossover Ultrawire Toolbus to Ultralink | 1.58 | 1.69 | 6.50 |
| | | | UW_PGR-UW_PGR_020 (10013899) Production Gamma Ray | 1.93 | 1.69 | 9.50 |
| | | | UW_PRC #4 -UW_PRC_057 (1101) Sondex 2-3/4" 4-Arm Production Roller Centraliser | 2.98 | 2.75 | 32.00 |
| WVFS3FT | 15.42 | | UW_RBT-UW_RBT_004 (1066) 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 | | | | | |

| | | | | | | |
|--|----------------|---|---|------|------|-------|
| CBLROT WVF5FT | 15.42 14.42 |  | UW_PRC-DSSRAC (080) 2-3/4" DSS 5 Arm Roller Centralizer | 2.55 | 2.75 | 32.00 |
| MIT | 5.41 | | UW_MIT-UW_MIT40_042 (10014703) 40 Multifinger Imaging Tool | 4.54 | 2.75 | 61.10 |
| | | | UW_PRC #3 -UW_PRC_057 (1038) Sondex 2-3/4" 4-Arm Production Roller Centraliser | 2.98 | 2.75 | 32.00 |
| TSTAMP | 0.00 | | UW_BUL-UW_BUL_006 (218707) Sondex Ultrawire Bullnose Terminator | 0.22 | 1.69 | 1.20 |
| Dataset: 0512339498_anadarko_cruickshank 1c-24hz_10-11-14_mit_rbl.db: field/well/run1/7main Total Length: 27.49 ft Total Weight: 319.30 lb O.D. 3.13 in | | | | | | |

| | | |
|--|---|-------|
| Calibration Report | | |
| Database File: | 0512339498_anadarko_cruickshank 1c-24hz_10-11-14_mit_rbl.db | |
| Dataset Pathname: | 7main | |
| Dataset Creation: | Sat Oct 11 13:30:13 2014 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: | | | | Sat Oct 11 10:57:27 2014 | | | |
| Ring size: | 4 | 5 | 6 | 7 | | | |
| (in) | | | | | | | |
| | Sens | Sens | Sens | | | | |
| Finger 01: | 948 410.0 | 1358 521.0 | 1879 347.0 | 2226 | | | |
| Finger 02: | 974 428.0 | 1402 544.0 | 1946 352.0 | 2298 | | | |
| Finger 03: | 911 412.0 | 1323 522.0 | 1845 338.0 | 2183 | | | |
| Finger 04: | 879 415.0 | 1294 543.0 | 1837 353.0 | 2190 | | | |
| Finger 05: | 922 403.0 | 1325 509.0 | 1834 318.0 | 2152 | | | |
| Finger 06: | 918 422.0 | 1340 525.0 | 1865 332.0 | 2197 | | | |

| | | | | | | | |
|-------------|------|-------|------|-------|------|-------|------|
| Finger 07: | 926 | 413.0 | 1339 | 511.0 | 1850 | 323.0 | 2173 |
| Finger 08: | 895 | 413.0 | 1308 | 528.0 | 1836 | 341.0 | 2177 |
| Finger 09: | 961 | 420.0 | 1381 | 510.0 | 1891 | 323.0 | 2214 |
| Finger 10: | 998 | 412.0 | 1410 | 503.0 | 1913 | 330.0 | 2243 |
| Finger 11: | 969 | 413.0 | 1382 | 516.0 | 1898 | 351.0 | 2249 |
| Finger 12: | 1073 | 408.0 | 1481 | 482.0 | 1963 | 323.0 | 2286 |
| Finger 13: | 990 | 404.0 | 1394 | 503.0 | 1897 | 382.0 | 2279 |
| Finger 14: | 911 | 402.0 | 1313 | 526.0 | 1839 | 394.0 | 2233 |
| Finger 15: | 901 | 401.0 | 1302 | 525.0 | 1827 | 406.0 | 2233 |
| Finger 16: | 974 | 394.0 | 1368 | 520.0 | 1888 | 404.0 | 2292 |
| Finger 17: | 956 | 379.0 | 1335 | 497.0 | 1832 | 402.0 | 2234 |
| Finger 18: | 981 | 378.0 | 1359 | 499.0 | 1858 | 410.0 | 2268 |
| Finger 19: | 933 | 381.0 | 1314 | 518.0 | 1832 | 438.0 | 2270 |
| Finger 20: | 857 | 370.0 | 1227 | 525.0 | 1752 | 464.0 | 2216 |
| Finger 21: | 930 | 362.0 | 1292 | 508.0 | 1800 | 450.0 | 2250 |
| Finger 22: | 932 | 375.0 | 1307 | 521.0 | 1828 | 467.0 | 2295 |
| Finger 23: | 994 | 345.0 | 1339 | 481.0 | 1820 | 439.0 | 2259 |
| Finger 24: | 919 | 373.0 | 1292 | 535.0 | 1827 | 485.0 | 2312 |
| Finger 25: | 902 | 356.0 | 1258 | 524.0 | 1782 | 489.0 | 2271 |
| Finger 26: | 931 | 361.0 | 1292 | 522.0 | 1814 | 472.0 | 2286 |
| Finger 27: | 967 | 360.0 | 1327 | 515.0 | 1842 | 476.0 | 2318 |
| Finger 28: | 927 | 374.0 | 1301 | 539.0 | 1840 | 487.0 | 2327 |
| Finger 29: | 946 | 375.0 | 1321 | 551.0 | 1872 | 495.0 | 2367 |
| Finger 30: | 891 | 364.0 | 1255 | 545.0 | 1800 | 487.0 | 2287 |
| Finger 31: | 937 | 378.0 | 1315 | 534.0 | 1849 | 459.0 | 2308 |
| Finger 32: | 919 | 384.0 | 1303 | 556.0 | 1859 | 469.0 | 2328 |
| Finger 33: | 872 | 382.0 | 1254 | 545.0 | 1799 | 461.0 | 2260 |
| Finger 34: | 866 | 380.0 | 1246 | 553.0 | 1799 | 456.0 | 2255 |
| Finger 35: | 922 | 382.0 | 1304 | 521.0 | 1825 | 418.0 | 2243 |
| Finger 36: | 890 | 399.0 | 1289 | 550.0 | 1839 | 428.0 | 2267 |
| Finger 37: | 960 | 396.0 | 1356 | 522.0 | 1878 | 391.0 | 2269 |
| Finger 38: | 985 | 400.0 | 1385 | 517.0 | 1902 | 376.0 | 2278 |
| Finger 39:X | 944 | 413.0 | 1357 | 276.0 | 1633 | 637.0 | 2270 |
| Finger 40: | 851 | 414.0 | 1265 | 565.0 | 1830 | 392.0 | 2222 |

| Segmented Cement Bond Log Calibration Report | | | | | | |
|---|---------|------------|-----------------|---------|---------|--------|
| Serial Number: | | 1066 | | | | |
| Tool Model: | | UW_RBT_004 | | | | |
| Calibration Casing Diameter: | | 7.000 | in | | | |
| Calibration Depth: | | 445.416 | ft | | | |
| Master Calibration, performed Sat Oct 11 11:15:51 2014: | | | | | | |
| | Raw (v) | | Calibrated (mv) | | Results | |
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3FT | 0.001 | 0.847 | 0.800 | 62.165 | 72.527 | 0.757 |
| 5FT | -0.006 | 0.812 | 0.800 | 62.165 | 75.006 | 1.258 |
| S1 | 0.002 | 0.791 | 0.000 | 100.000 | 126.839 | -0.294 |
| S2 | -0.001 | 0.816 | 0.000 | 100.000 | 122.424 | 0.114 |
| S3 | 0.000 | 0.845 | 0.000 | 100.000 | 118.392 | -0.048 |
| S4 | -0.001 | 0.876 | 0.000 | 100.000 | 114.063 | 0.072 |
| S5 | 0.001 | 0.889 | 0.000 | 100.000 | 112.600 | -0.129 |
| S6 | -0.000 | 0.885 | 0.000 | 100.000 | 112.912 | 0.037 |
| S7 | 0.000 | 0.868 | 0.000 | 100.000 | 115.142 | 0.000 |
| S8 | 0.000 | 0.822 | 0.000 | 100.000 | 121.635 | -0.009 |

| Gamma Ray Calibration Report | | | |
|------------------------------|--|--------------------------|--|
| Serial Number: | | 10013899 | |
| 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 |



| | |
|---------|-----------------------------------|
| Company | Kerr-McGee Oil and Gas Onshore LP |
| Well | Cruickshank 1C-24HZ |
| Field | Wattenberg |
| County | Weld |
| State | Colorado |