Company TEP Rocky Mountain LLC
Well Ware SR 413-12
Field Rulison
County Garfield
State Colorado

# Radial Cement Bond Gamma Ray Casing Collar Log

Company TEP Rocky Mountain LLC
Well Ware SR 413-12
Field Rulison
County Garfield State Colorado

Location: API # : 05-045-23443

SEC 12 TWP 7S RGE 94W

Other Services
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| | | | |
|---|---|---|---|
| Permanent Datum | Ground Level | Elevation 7479' | Elevation |
| Log Measured From | Kelly Bushing | 24 FT | K.B. 7503'<br>D.F. 7502' |
| Drilling Measured From | Kelly Bushing | | G.L. 7479' |

| | | | |
|---|---|---|---|
| Date | 07-JAN-2018 | | |
| Run Number | One | | |
| Depth Driller | 9844 FT | | |
| Depth Logger | 9783 FT | | |
| Bottom Logged Interval | 9778 FT | | |
| Top Log Interval | Surface | | |
| Open Hole Size | 8.750" | | |
| Type Fluid | Fresh Water | | |
| Density / Viscosity | 8.34 lb/gal | | |
| Max. Recorded Temp. | 242°F | | |
| Estimated Cement Top | See Log | | |
| Time Well Ready | ROA | | |
| Time Logger on Bottom | 17:00 | | |
| Equipment Number | HD-0359 | | |
| Location | Grand Junction, CO | | |
| Recorded By | Z.Fisher | | |
| Witnessed By | C. Applegate | | |

| 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 | 32.3 | H-40 | Surface | 1135 FT |
| Intermediate #1 | 4 1/2 | 11.6 | P-110 | Surface | 9802 FT |
| Intermediate #2 | | | | | |
| Liner | | | | | |

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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 referenced to Kelly Bushing at 24 FT
Marker Joint logged at 5955-5978 FT
Log ran from 9783 FT to Surface
Recorded with 0 PSI Surface Induced Pressure

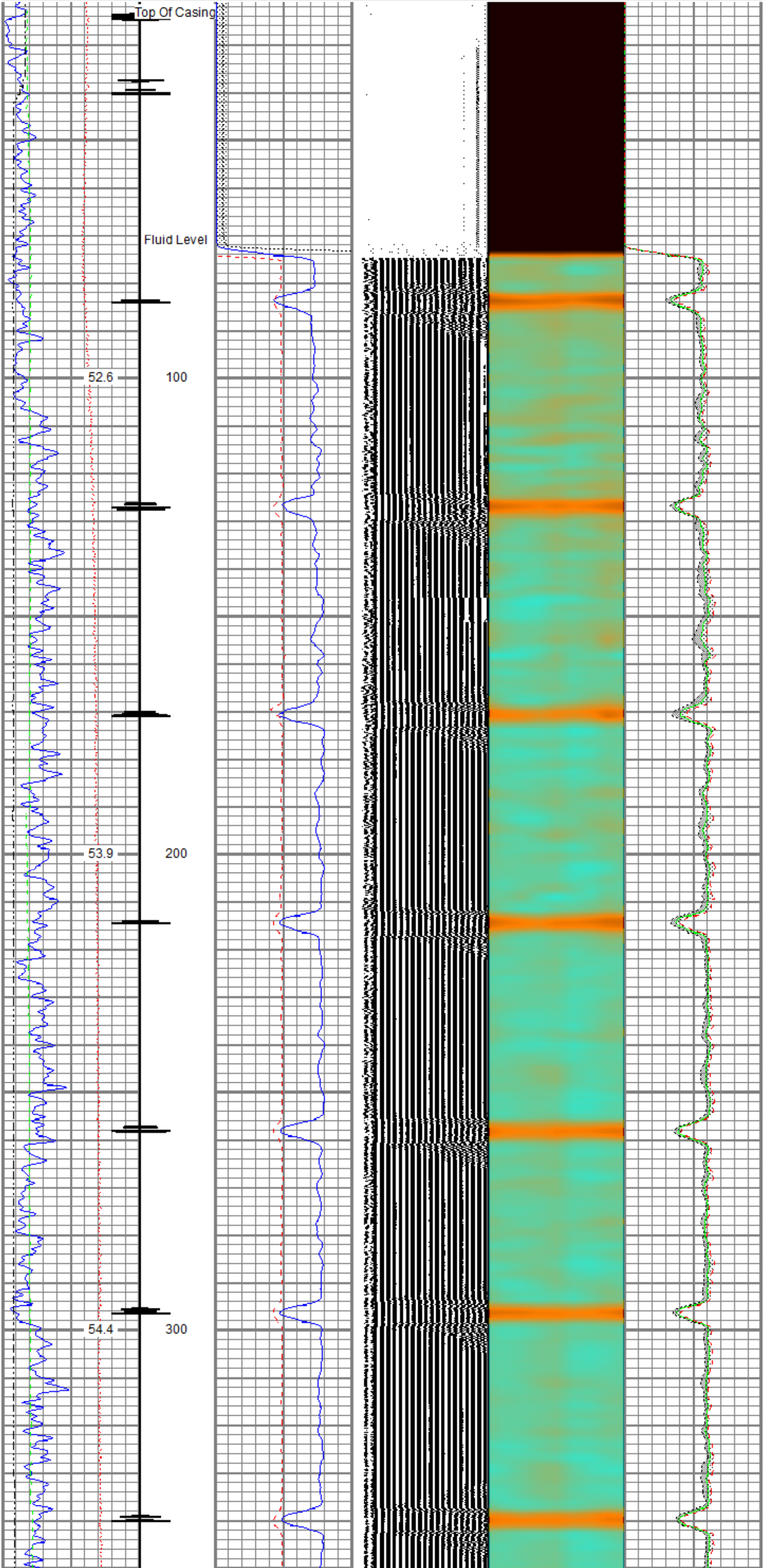
Thank You for choosing Reliance Oilfield Services, LLC!!

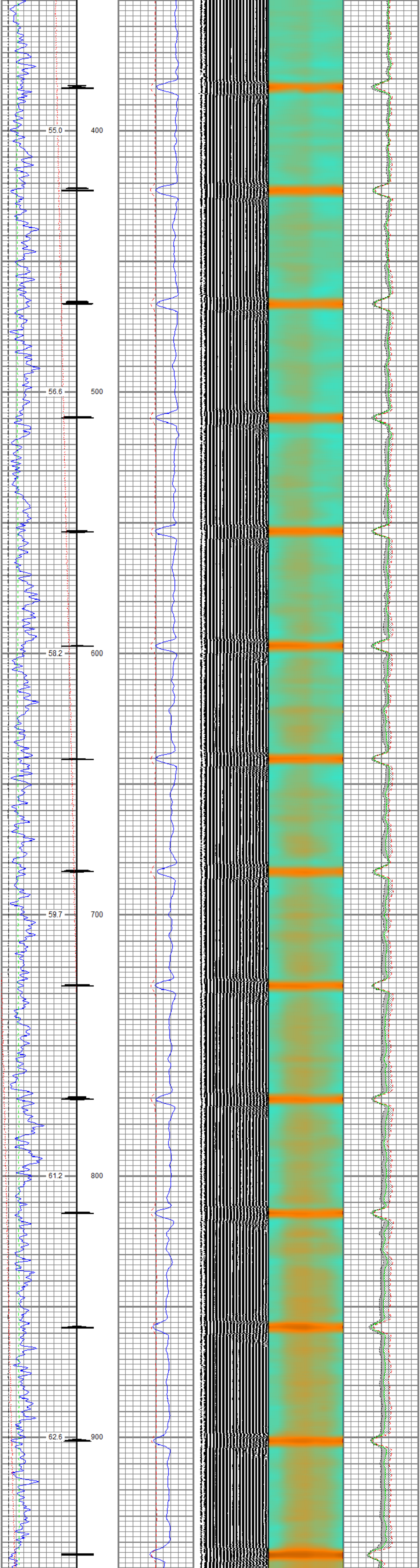
## Main Pass

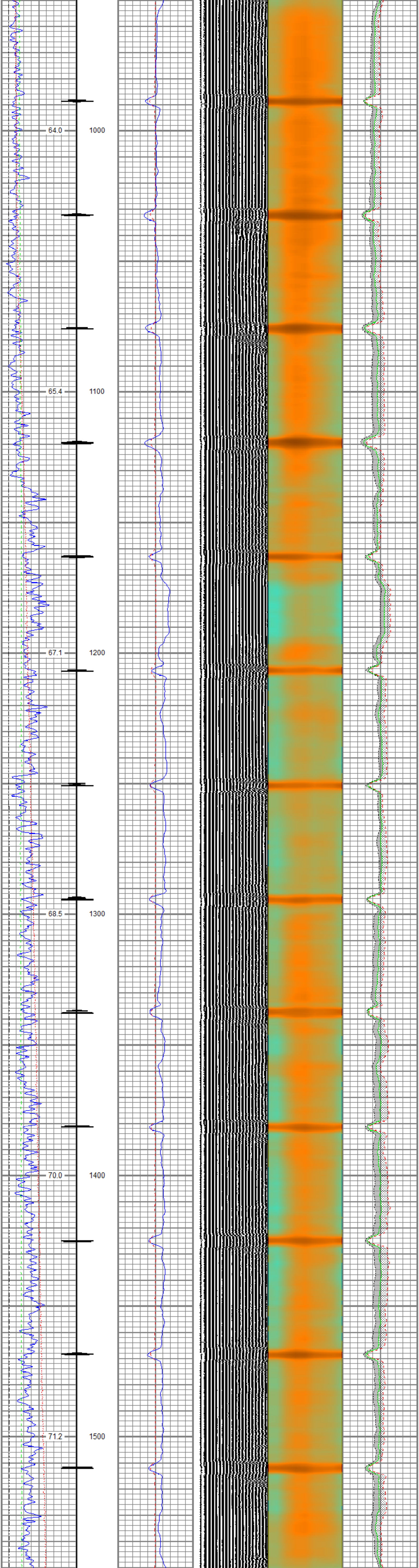
Recorded with 0 PSI Surface Induced Pressure

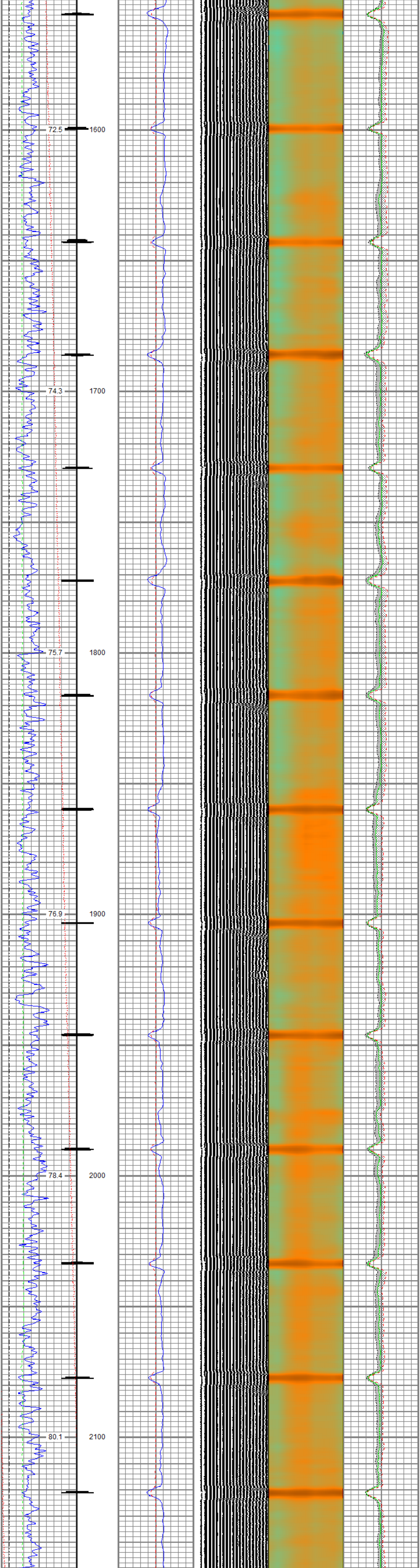
| | |
|---|---|
| Database File | tep_ware sr 413-12_rbl_01-07-18\processed_tep_ware sr 413-12_rbl_01-07-18.db |
| Dataset Pathname | main.1 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Mon Jan 08 14:42:20 2018 |
| Charted by | Depth in Feet scaled 1:240 |

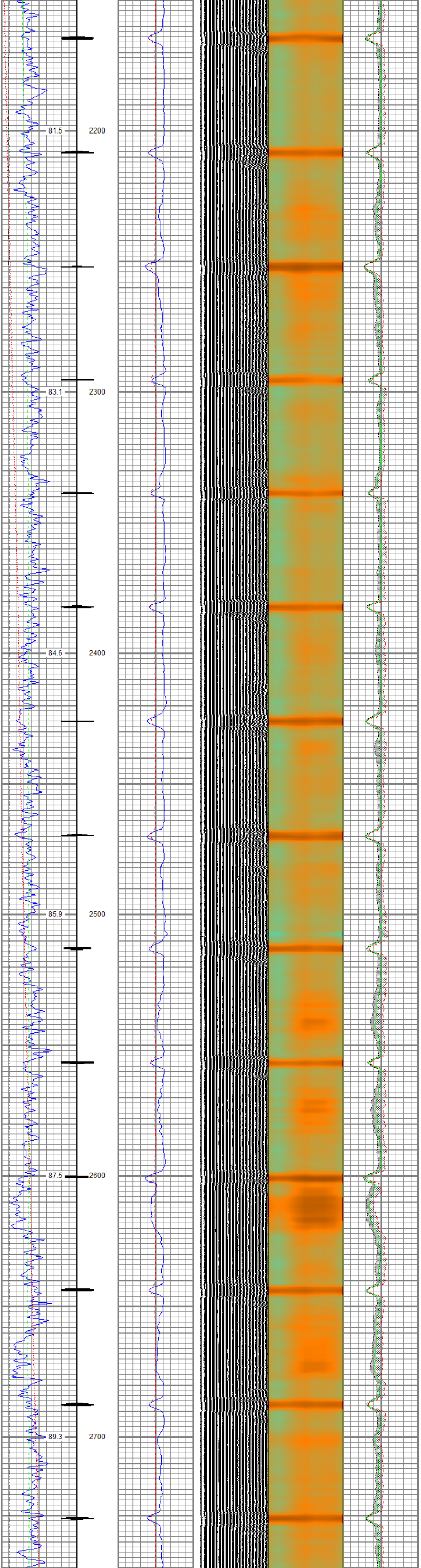
Gamma Ray: 0 (GAPI) 200
Casing Collar Locator
Line Speed: -150 (ft/min) 150
Line Tension: 0 (lb) 2000
Temperature: 0 (degF) 20
3' Amplitude: 0 (mV) 100
3' Amplitude x 5: 0 (mV) 20
3' Travel Time: 300 (usec) 200
5' Variable Density Log: 200 1200
Sector Map: 10 110
Average Amplitude: 0 150
Minimum Amplitude: 0 150
Maximum Amplitude: 0 150

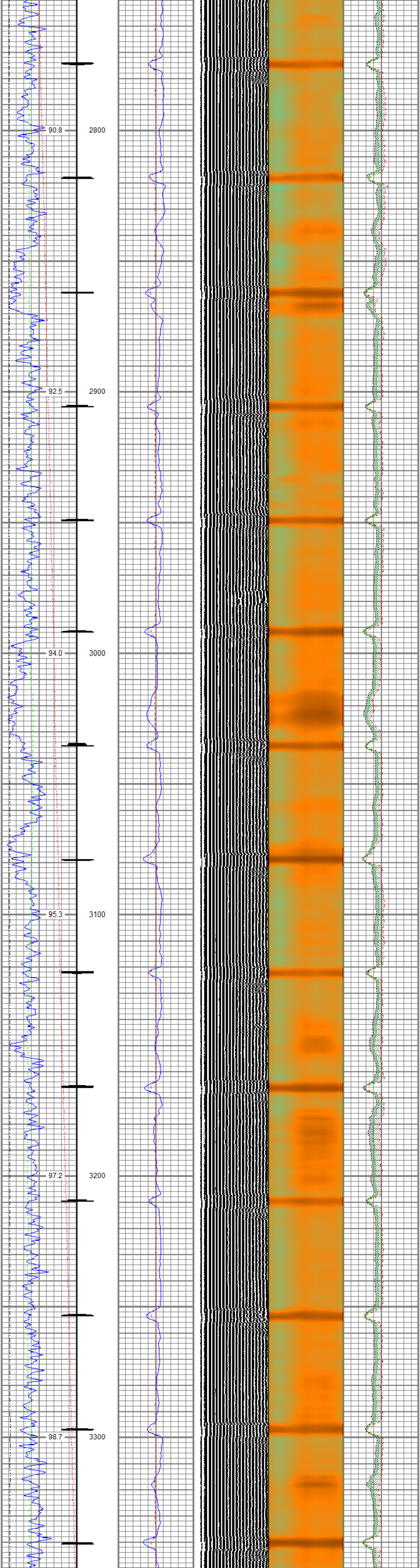


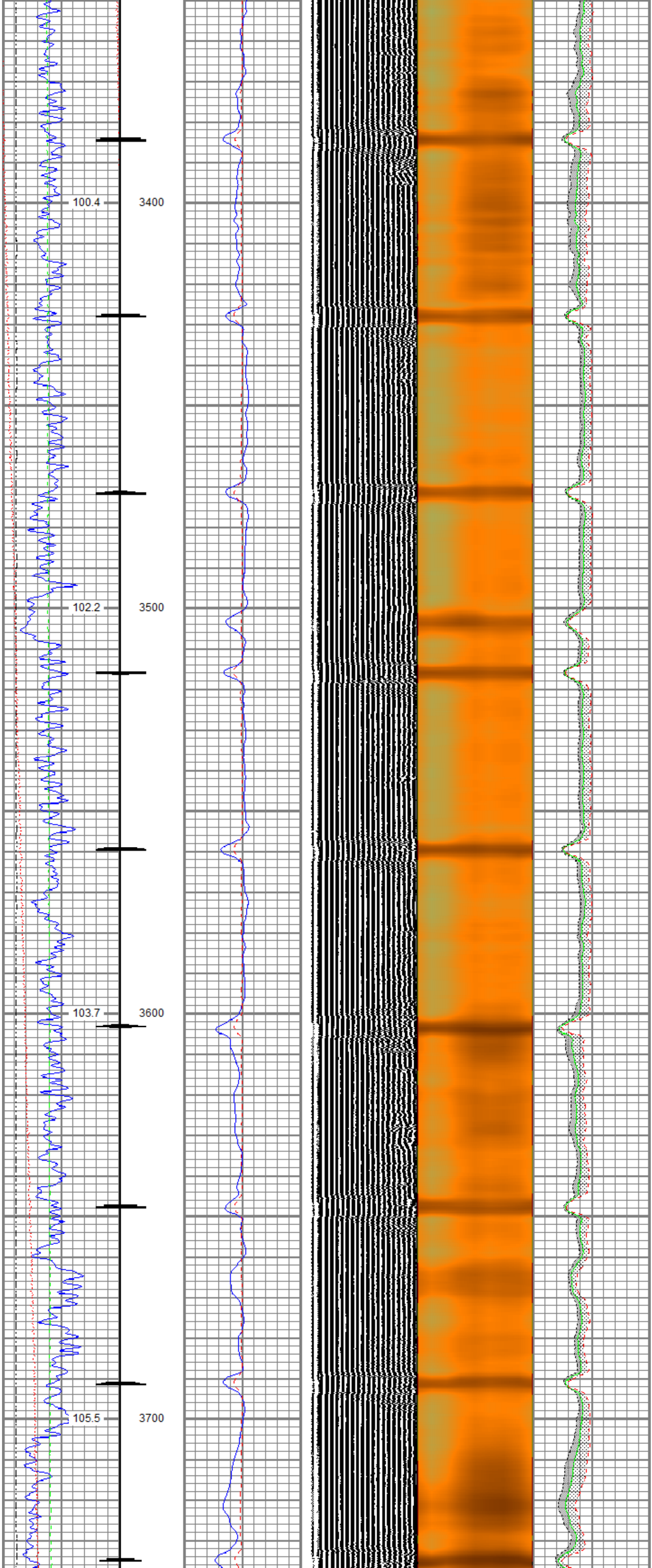


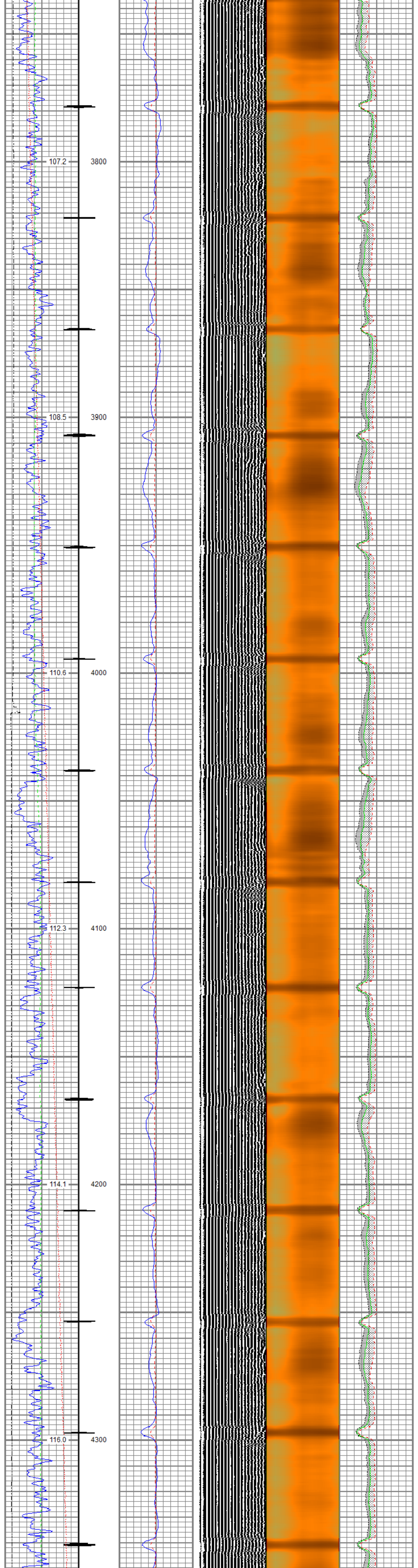








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108.5
3900
110.6
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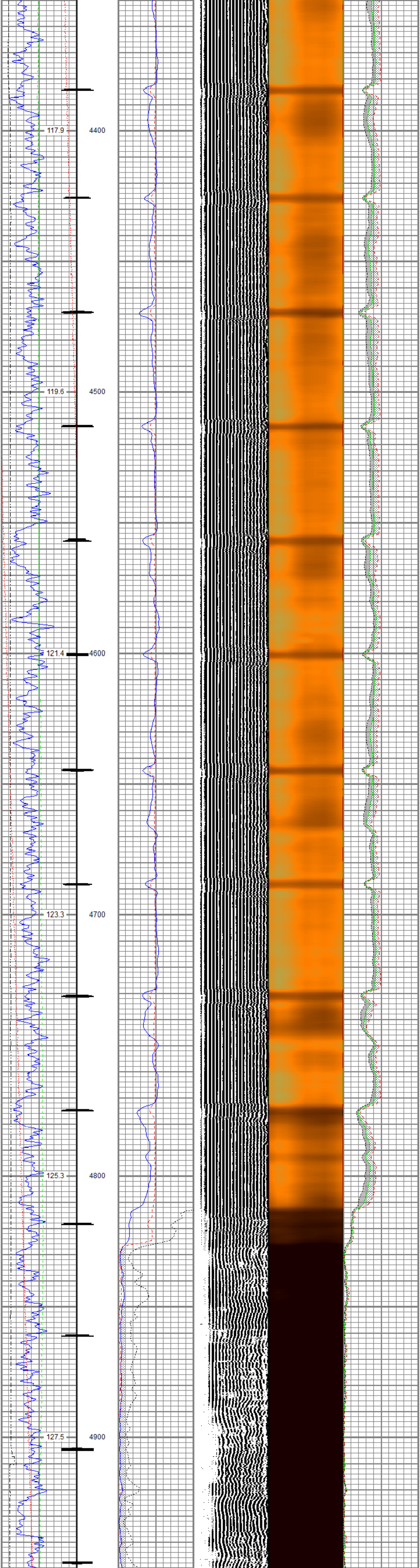
112.3
4100
114.1
4200
116.0
4300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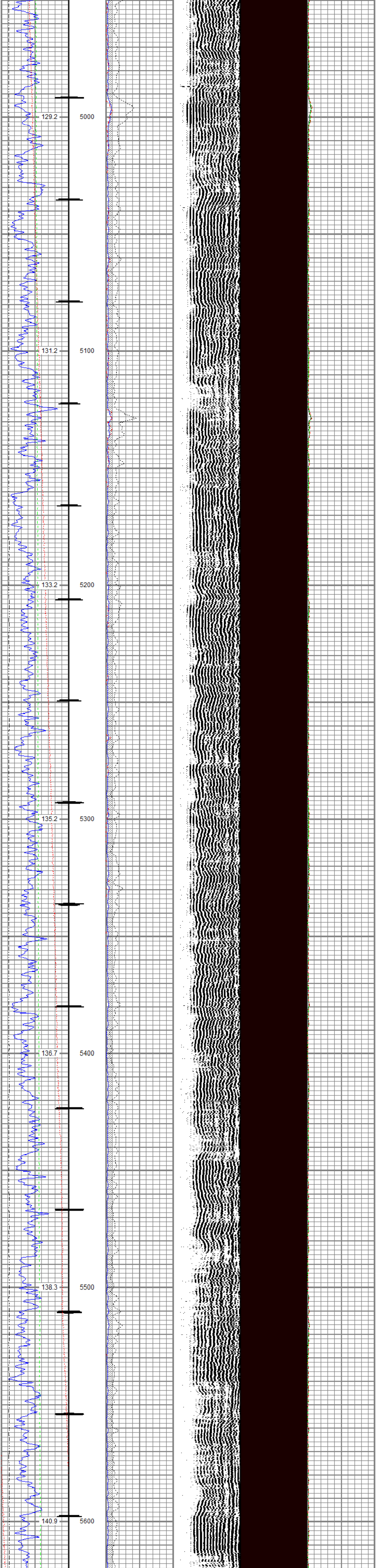
4700
125.3
4800
127.5
4900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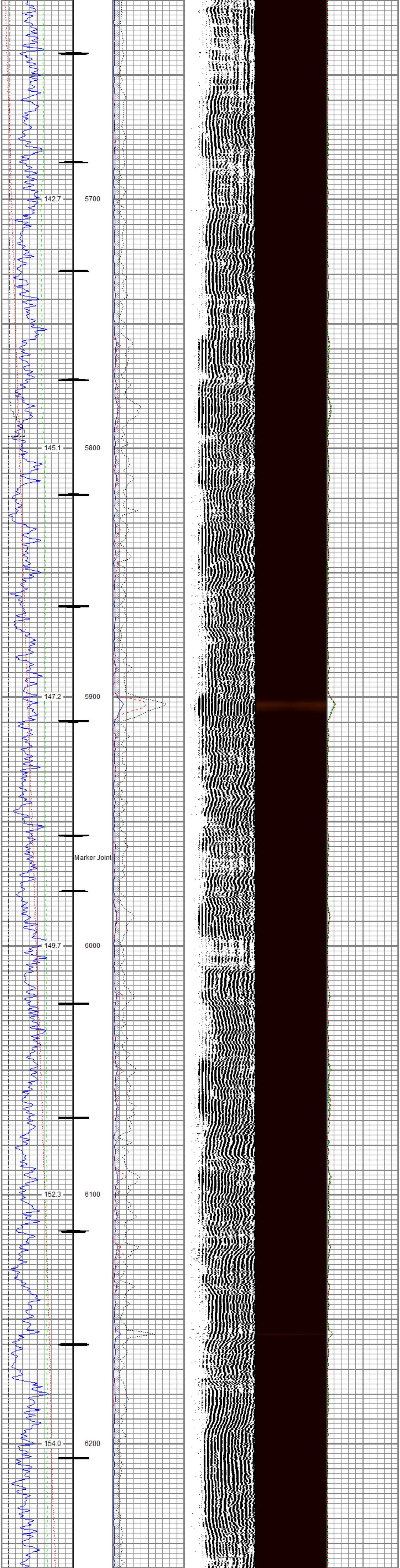
136.7
5400
138.3
5500
140.9
5600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147.2
5900
Marker Joint
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6000
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6100
154.0
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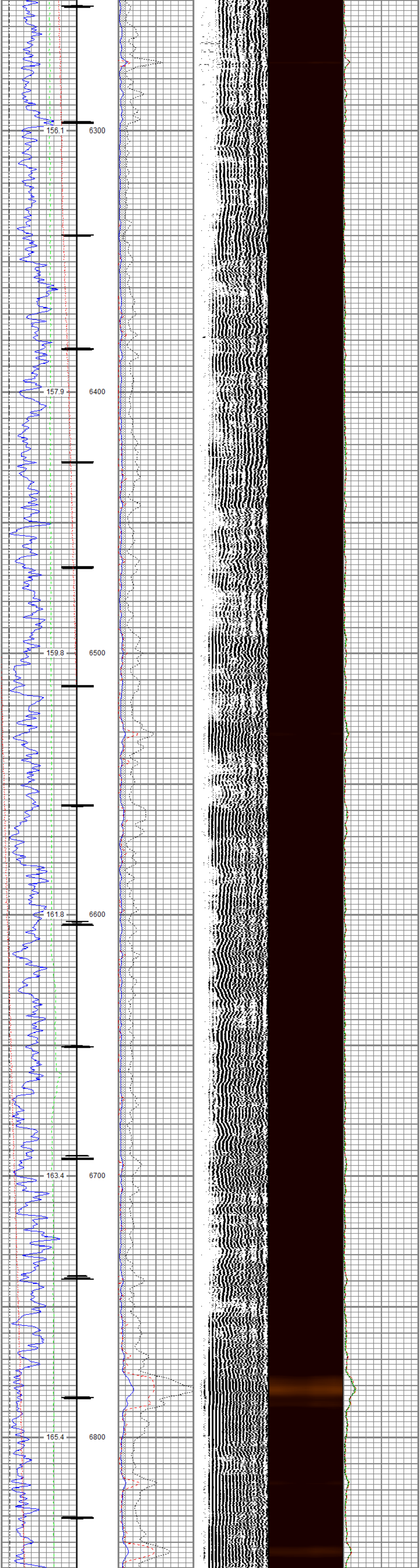
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6400
159.8
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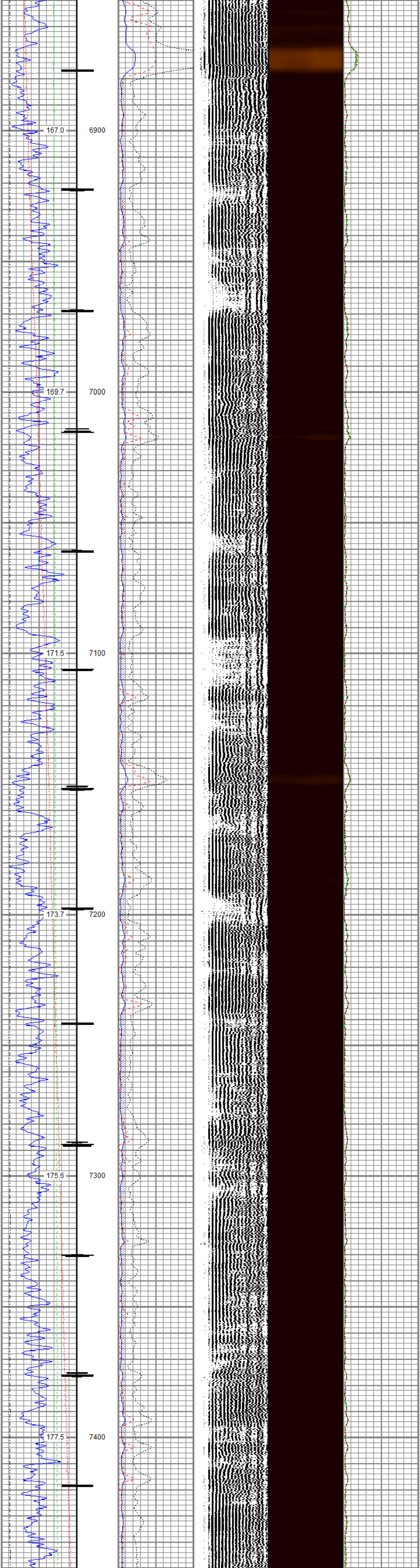
161.8
6600
163.4
6700
165.4
6800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6900
169.7
7000
171.6
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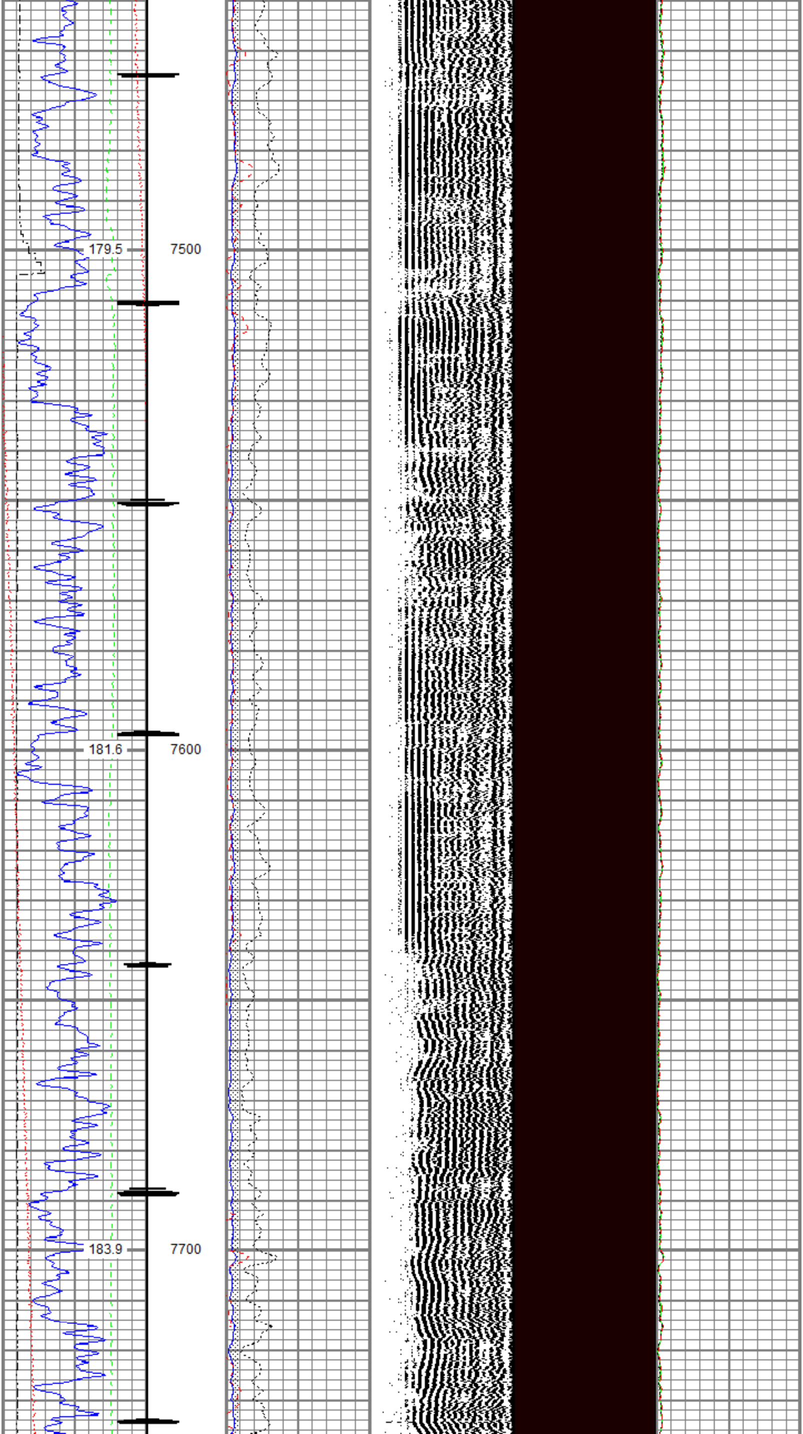
7200
175.6
7300
177.5
7400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7600
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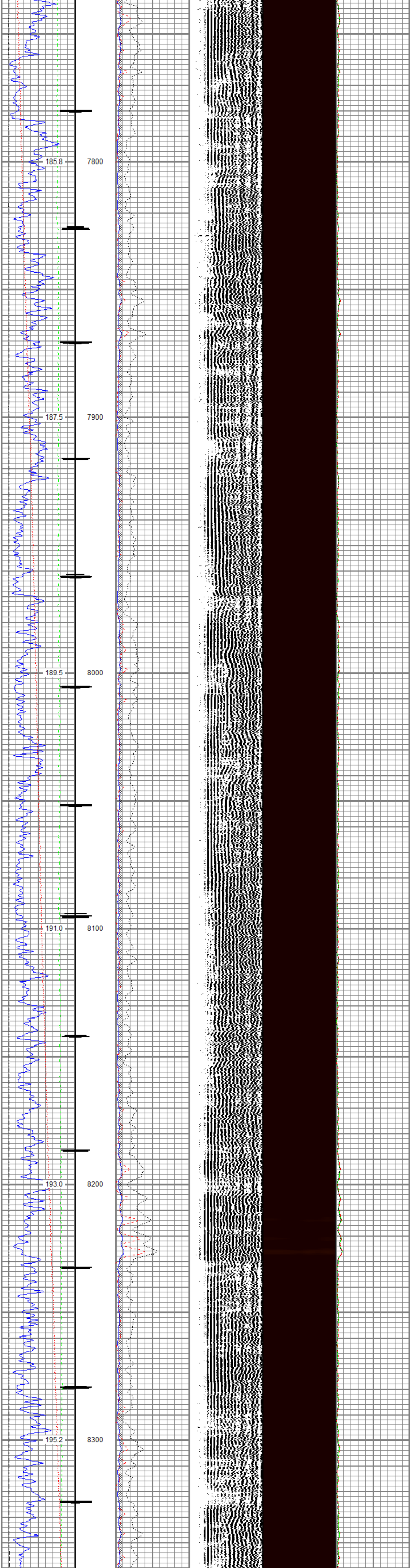

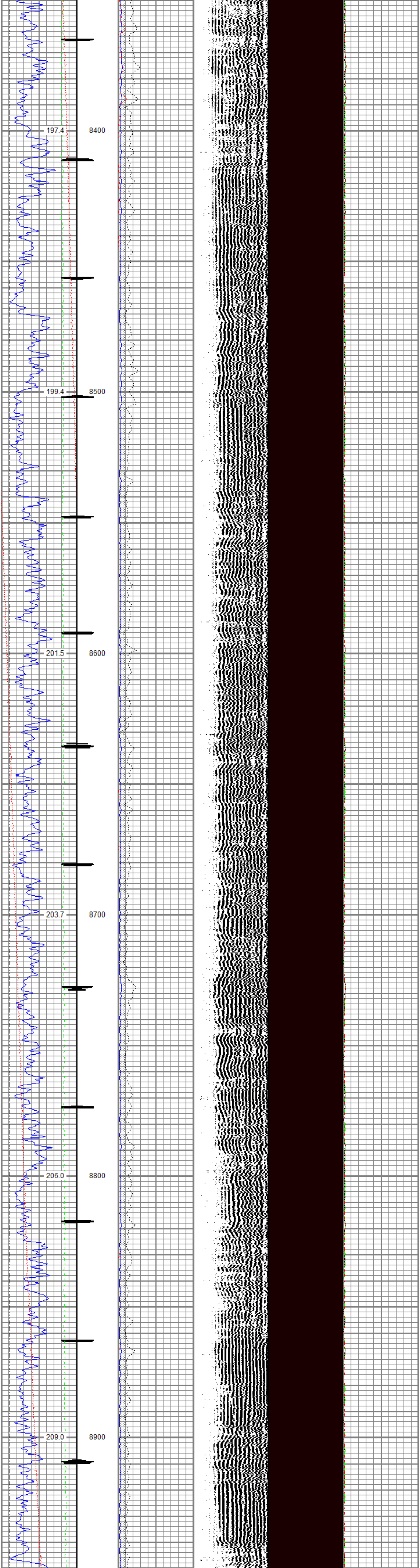

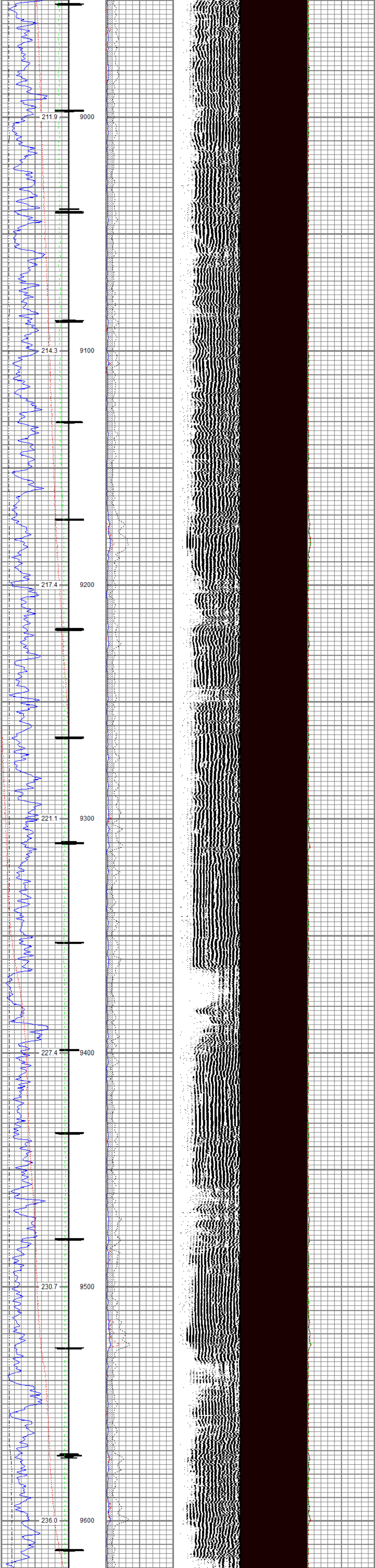

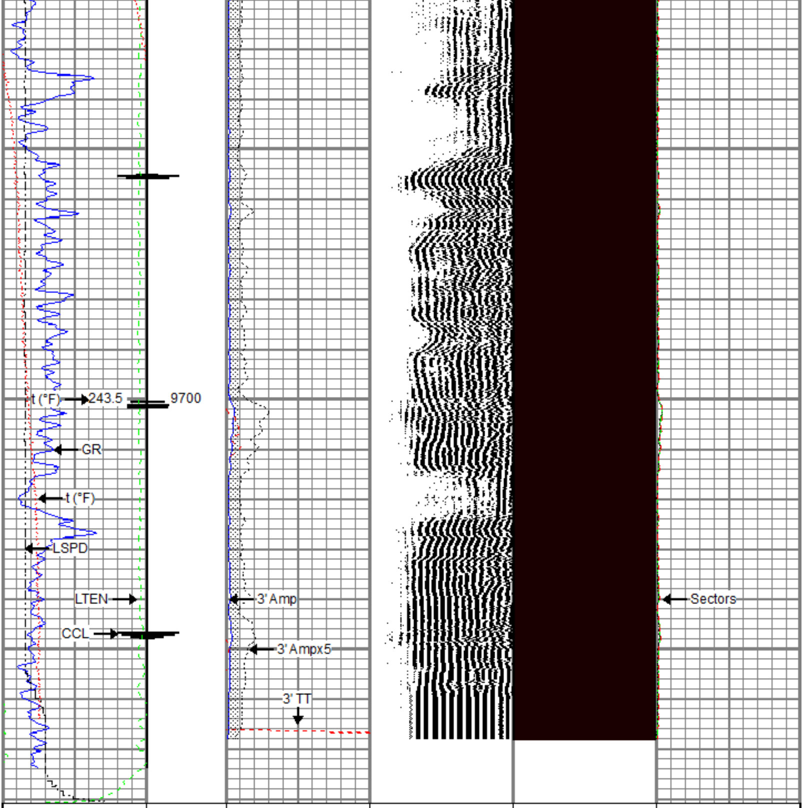

| Gamma Ray | 3' Amplitude | 5' Variable Density Log | Sector Map | Average Amplitude |
|---|---|---|---|---|
| 0 (GAPI) 200 | 0 (mV) 100 | 200 1200 | 10 110 | 0 150 |
| Casing Collar Locator | 3' Amplitude x 5 | | | Mimimum Amplitude |
| Line Speed | 0 (mV) 20 | | | 0 150 |
| -150 (ft/min) 150 | 3' Travel Time | | | Maximum Amplitude |
| Line Tension | 300 (usec) 200 | | | 0 150 |
| 0 (lb) 2000 | | | | |
| Temperature | | | | |
| 0 (degF) 20 | | | | |

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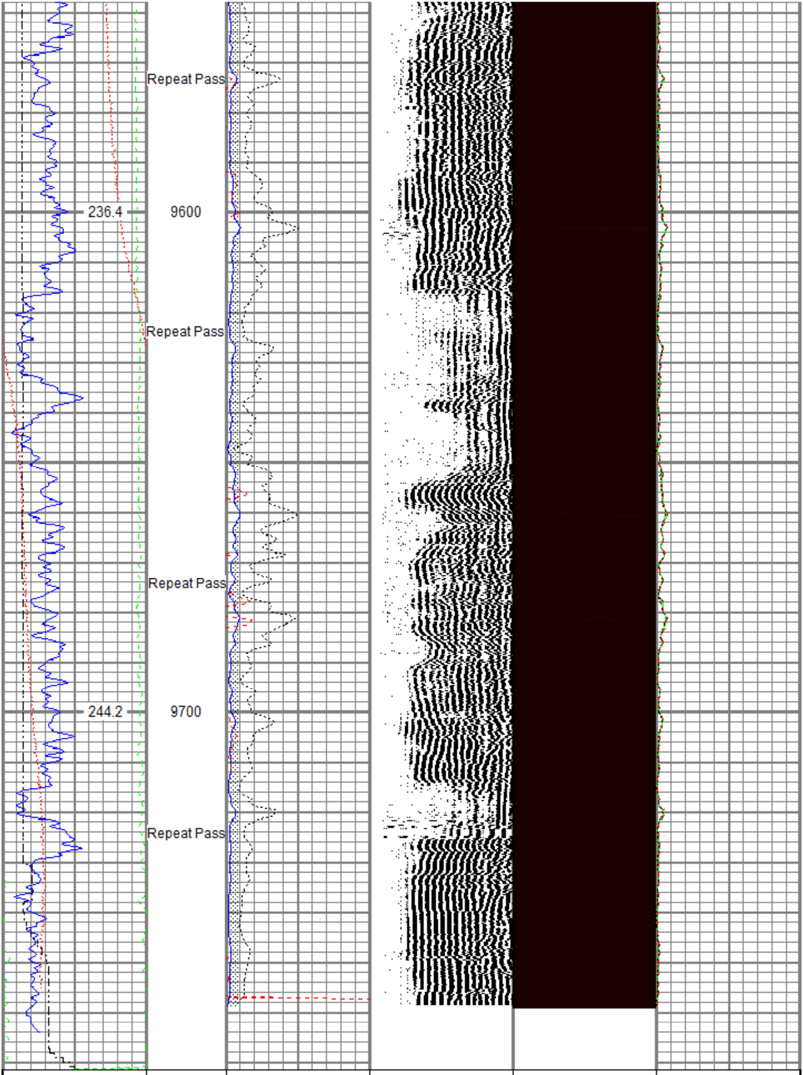
# Repeat Pass

Recorded with 0 PSI Surface Induced Pressure

| | |
|---|---|
| Database File | tep_ware sr 413-12_rbl_01-07-18\processed_tep_ware sr 413-12_rbl_01-07-18.db |
| Dataset Pathname | repeat.1 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Mon Jan 08 14:57:49 2018 |
| Charted by | Depth in Feet scaled 1:240 |

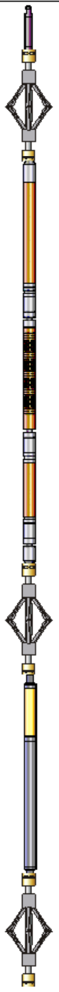
| Gamma Ray | 3' Amplitude | 5' Variable Density Log | Sector Map | Average Amplitude |
|---|---|---|---|---|
| 0 (GAPI) 200 | 0 (mV) 100 | 200 1200 | 10 110 | 0 150 |
| Line Speed | 3' Amplitude x 5 | | | Mimimum Amplitude |
| -150 (ft/min) 150 | 0 (mV) 20 | | | 0 150 |
| Line Tension | 3' Travel Time | | | Maximum Amplitude |
| 0 (lb) 2000 | 300 (usec) 200 | | | 0 150 |
| Temperature | | | | |
| 0 (degF) 20 | | | | |



| Gamma Ray | 3' Amplitude | 5' Variable Density Log | Sector Map | Average Amplitude |
|---|---|---|---|---|
| 0 (GAPI) 200 | 0 (mV) 100 | 200 1200 | 10 110 | 0 150 |
| Line Speed | 3' Amplitude x 5 | | | Mimimum Amplitude |
| -150 (ft/min) 150 | 0 (mV) 20 | | | 0 150 |
| Line Tension | 3' Travel Time | | | Maximum Amplitude |
| 0 (lb) 2000 | 300 (usec) 200 | | | 0 150 |
| Temperature | | | | |
| 0 (degF) 20 | | | | |

| Sensor | Offset (ft) |
|---|---|
| Temp | 16.05 |
| WVFS8 | 13.88 |
| WVFS7 | 13.88 |
| WVFS6 | 13.88 |
| WVFS5 | 13.88 |
| WVFS4 | 13.88 |
| WVFS3 | 13.88 |
| WVFS2 | 13.88 |
| WVFS1 | 13.88 |
| WVFCAL | 13.88 |
| WVF3FT | 13.88 |
| WVF5FT | 12.88 |
| HeadVolt | 9.63 |
| DCCL | 6.18 |
| CCL | 6.18 |
| GR | 4.96 |

Schematic



| Description | Length (ft) | O.D. (in) | Weight (lb) |
|---|---|---|---|
| Titan_Electric_Cable_Heads-Titan_1-11/11.03<br>Electric Cable Head with 1" Fishing Neck | | 1.69 | 5.40 |
| DSS_RAC-RAC_5-Arm<br>5 Arm 2-3/4" Roller Centralizer | 2.55 | 2.75 | 32.00 |
| Probe_RADII-C-P_RBT_2750 (FW1305-09.19<br>Probe 2-3/4" Sector Cement Bond Tool with Temperature Probe | | 2.75 | 105.00 |
| DSS_RAC-RAC_5-Arm<br>5 Arm 2-3/4" Roller Centralizer | 2.55 | 2.75 | 32.00 |
| Probe_GR_CCL-P_CGR_2750_S (FW1304.548)<br>Probe 2-3/4" Digital CCL / Gamma Ray Combined | | 2.75 | 55.00 |
| DSS_RAC-RAC_5-Arm<br>5 Arm 2-3/4" Roller Centralizer | 2.55 | 2.75 | 32.00 |

| | |
|---|---|
| Dataset: | processed_tep_ware sr 413-12_rbl_01-07-18.db: field/well/run1/main.1 |
| Total length: | 22.40 ft |
| Total weight: | 261.40 lb |
| O.D.: | 2.75 in |

## Calibration Report

| | |
|---|---|
| Database File | c:\programdata\warrior\data\tep_ware sr 413-12_rbl_01-07-18\processed_tep_ware sr 413-12_rbl_01-07-18 |
| Dataset Pathname | main.1 |
| Dataset Creation | Mon Jan 08 14:42:20 2018 |

### Gamma Ray Calibration Report

| | | |
|---|---|---|
| Serial Number: | FW1307-038 | |
| Tool Model: | P_CGR_2750_S | |
| Performed: | Sat Feb 06 11:43:09 2016 | |
| Calibrator Value: | 1.0 | GAPI |
| Background Reading: | 0.0 | cps |
| Calibrator Reading: | 1.6 | cps |
| Sensitivity: | 0.6061 | GAPI/cps |

### Segmented Cement Bond Log Calibration Report

| | | |
|---|---|---|
| Serial Number: | FW1305-098 | |
| Tool Model: | P_RBT_2750 | |
| Calibration Casing Diameter: | 4.500 | in |
| Calibration Depth: | 442.974 | ft |

Master Calibration, performed (Derived):

| | Raw (v) | | Calibrated (mv) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3' | -0.006 | 0.863 | 0.800 | 81.196 | 92.538 | 1.319 |
| CAL | 0.722 | 0.722 | | | | |
| 5' | -0.005 | 0.836 | 0.800 | 81.196 | 95.637 | 1.288 |
| SUM | | | | | | |
| S1 | -0.010 | 0.868 | 0.000 | 100.000 | 113.862 | 1.146 |
| S2 | -0.007 | 0.882 | 0.000 | 100.000 | 112.609 | 0.732 |
| S3 | -0.007 | 0.945 | 0.000 | 100.000 | 105.056 | 0.730 |
| S4 | -0.007 | 1.037 | 0.000 | 100.000 | 95.771 | 0.663 |
| S5 | -0.009 | 1.056 | 0.000 | 100.000 | 93.884 | 0.861 |
| S6 | -0.007 | 0.931 | 0.000 | 100.000 | 106.526 | 0.796 |
| S7 | -0.011 | 0.872 | 0.000 | 100.000 | 113.178 | 1.258 |
| S8 | -0.006 | 0.864 | 0.000 | 100.000 | 114.997 | 0.688 |

Internal Reference Calibration, performed Tue Nov 07 10:59:54 2017:

| | Raw (v) | | Calibrated (v) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| CAL | 0.000 | 0.000 | 0.722 | 0.722 | 1.000 | 0.000 |

Air Zero Calibration, performed Sun Jan 07 16:27:52 2018:

| | Raw (v) | Calibrated (v) | Results |
|---|---|---|---|
| | Zero | Zero | Offset |
| 3' | 0.000 | 0.000 | 0.000 |
| 5' | 0.000 | 0.000 | 0.000 |
| SUM | | | |
| S1 | 0.000 | 0.000 | 0.000 |
| S2 | 0.000 | 0.000 | 0.000 |
| S3 | 0.000 | 0.000 | 0.000 |
| S4 | 0.000 | 0.000 | 0.000 |
| S5 | 0.000 | 0.000 | 0.000 |
| S6 | 0.000 | 0.000 | 0.000 |
| S7 | 0.000 | 0.000 | 0.000 |
| S8 | 0.000 | 0.000 | 0.000 |

**RELIANCE**
OILFIELD SERVICES

| | |
|---|---|
| Company | TEP Rocky Mountain LLC |
| Well | Ware SR 413-12 |
| Field | Rulison |
| County | Garfield |
| State | Colorado |