Company TEP Rocky Mountain LLC
Well Federal RU 13-17
Field Rulison
County Garfield
State Colorado

RELIANCE OILFIELD SERVICES

# Radial Cement Bond
# Gamma Ray
# Casing Collar Log

Company TEP Rocky Mountain LLC
Well Federal RU 13-17
Field Rulison
County Garfield State Colorado
Location: API # : 05-045-23748
Other Services ---

SEC 17 TWP 7S RGE 93W

| | | | | Elevation |
|---|---|---|---|---|
| Permanent Datum | Ground Level | Elevation | 8365.6' | K.B. 8389.6' |
| Log Measured From | Kelly Bushing | 24 FT | | D.F. 8388.6' |
| Drilling Measured From | Kelly Bushing | | | G.L. 8365.6' |

| | | | |
|---|---|---|---|
| Date | 11-APR-2018 | | |
| Run Number | One | | |
| Depth Driller | 10720 FT | | |
| Depth Logger | 10614 FT | | |
| Bottom Logged Interval | 10600 FT | | |
| Top Log Interval | Surface | | |
| Open Hole Size | 8.750" | | |
| Type Fluid | Water | | |
| Density / Viscosity | 8.34 lb/gal | | |
| Max. Recorded Temp. | 250°F | | |
| Estimated Cement Top | See Log | | |
| Time Well Ready | ROA | | |
| Time Logger on Bottom | 18:50 | | |
| Equipment Number | HD-0359 | | |
| Location | Grand Junction, CO | | |
| Recorded By | Z. Fisher | | |
| Witnessed By | Dustin Welsh | | |

| | 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 | 1108 FT |
| Intermediate #1 | 4 1/2 | 11.6 | P-110 | Surface | 10680 FT |
| Intermediate #2 | | | | | |
| Liner | | | | | |
| | | | | | |

<<< 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 Kelly Bushing at 24 FT
Marker Joint Logged from 6937-6959 FT
Log ran from 10600 FT to Surface
Recorded with 0 PSI Surface Induced Pressure

Thank you for choosing Reliance Oilfield Services, LLC!

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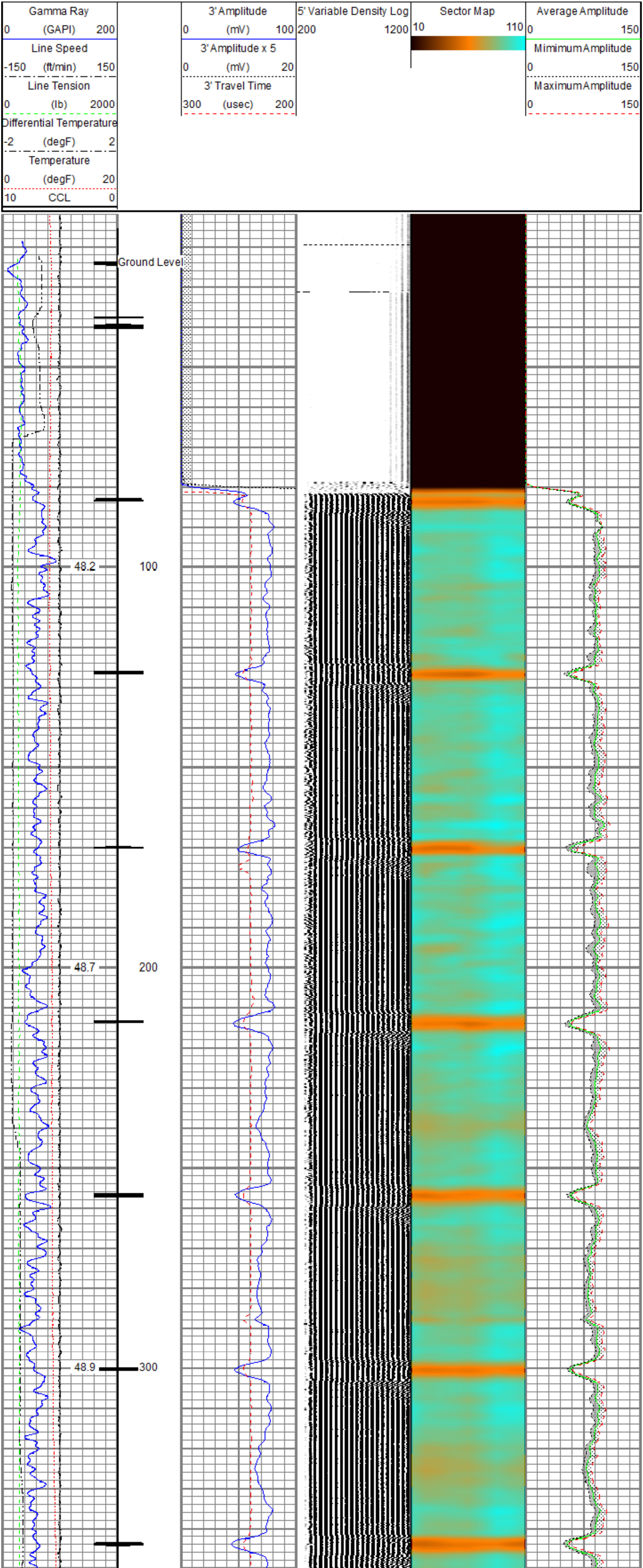
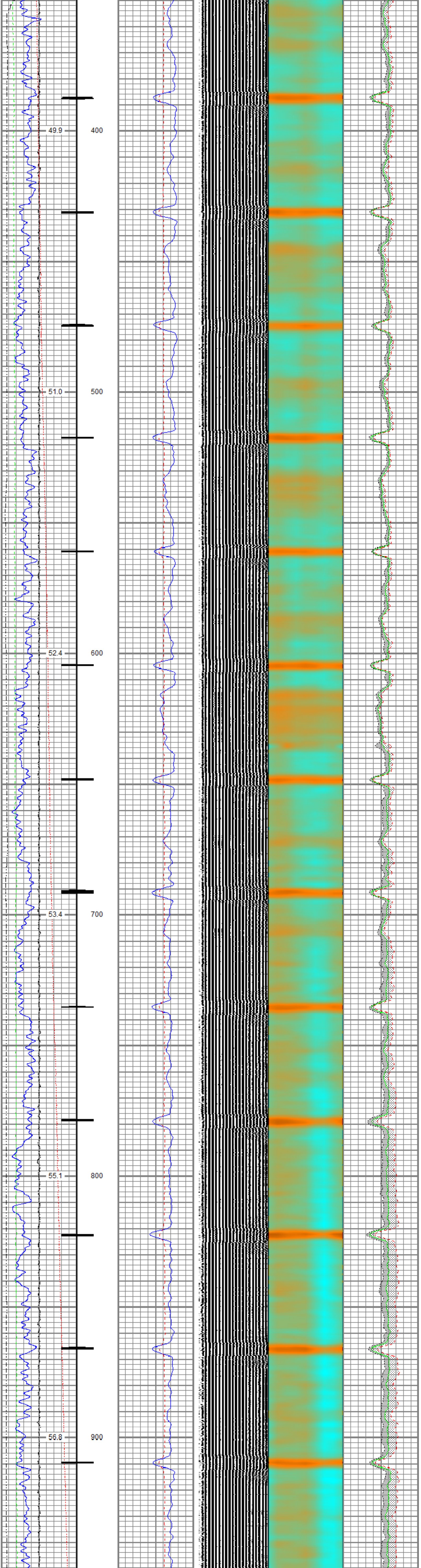
RELIANCE OILFIELD SERVICES

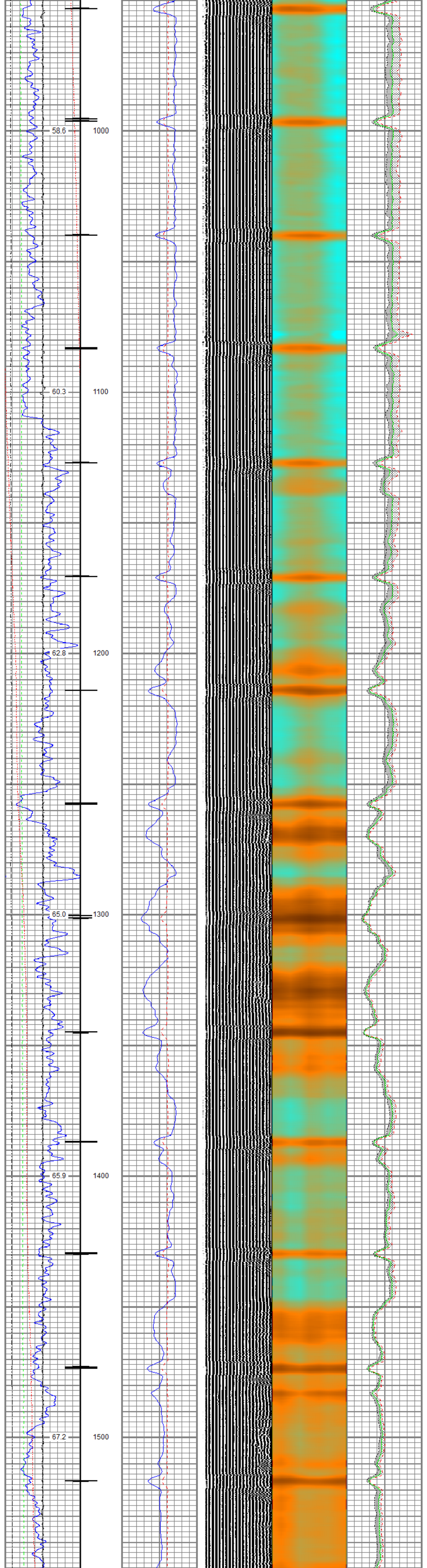
## Main Pass

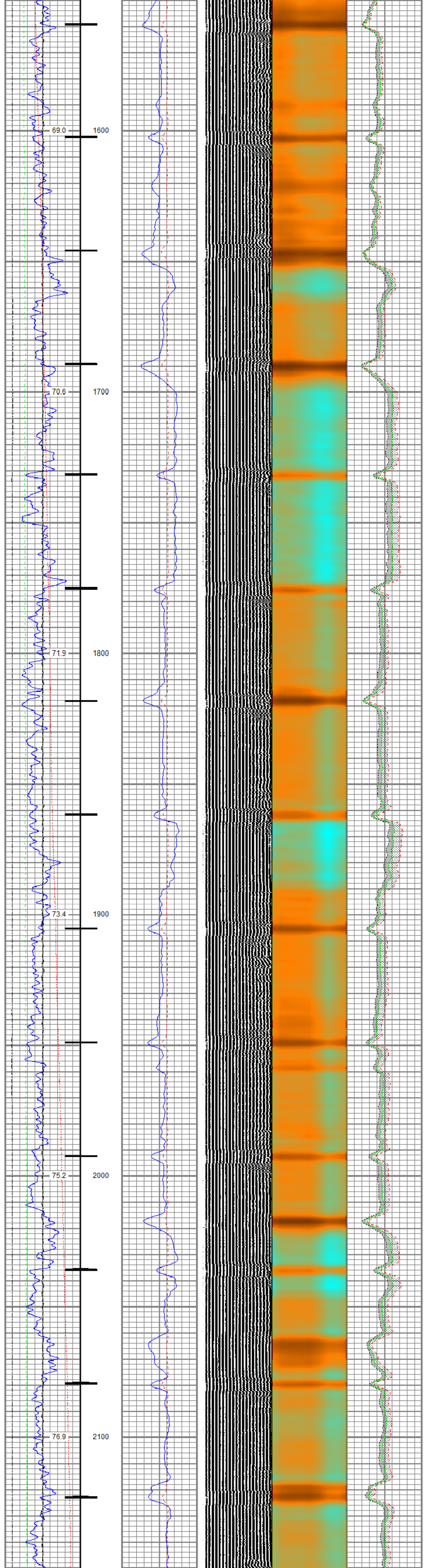
Recorded With 0 PSI Surface Induced Pressure

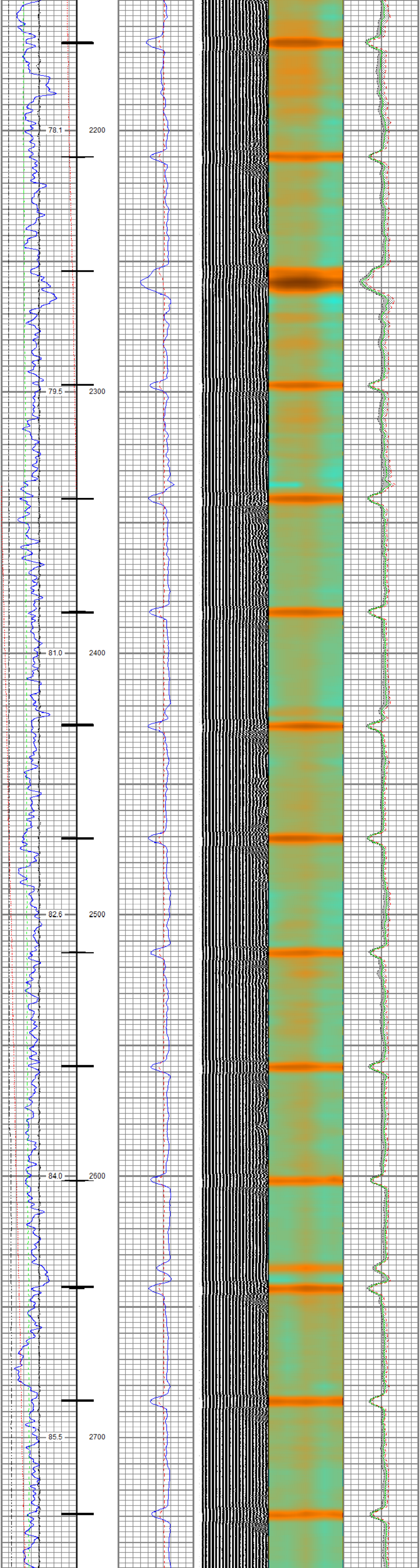
| | |
|---|---|
| Database File | tep_federal ru 13-17\tep_federal ru 13-17_rbl_04-11-18.db |
| Dataset Pathname | main.3 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Fri Apr 13 13:35:21 2018 |
| Charted by | Depth in Feet scaled 1:240 |

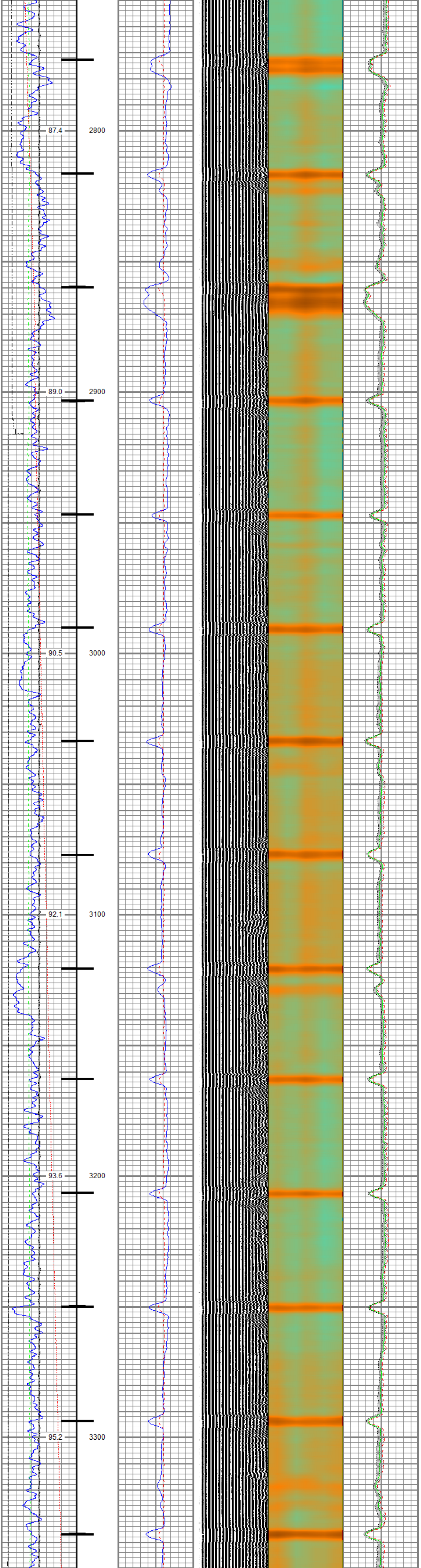


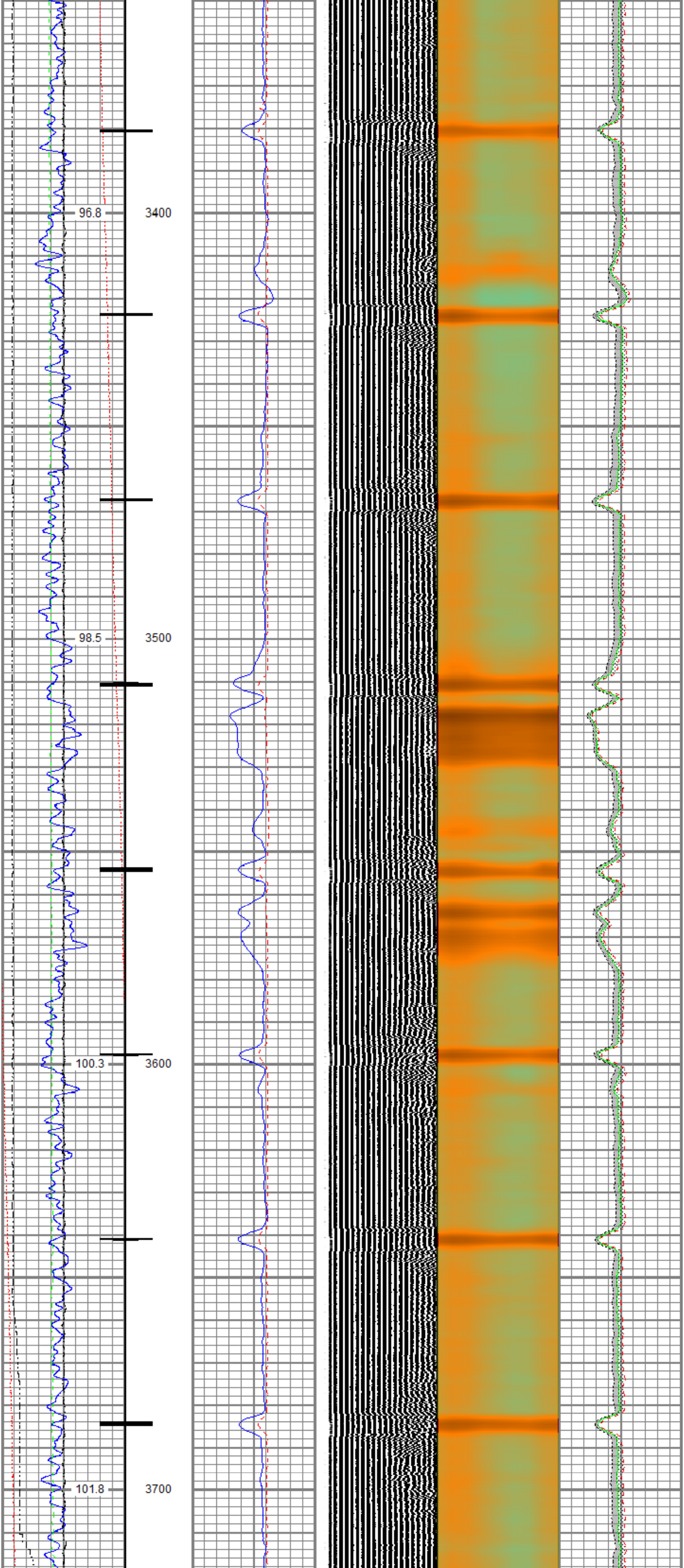


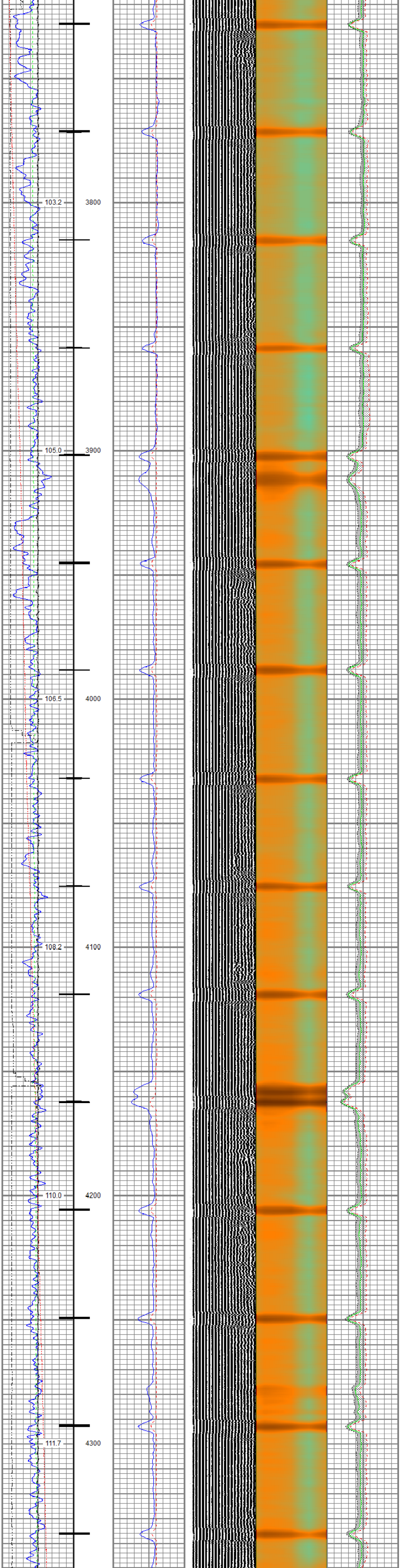












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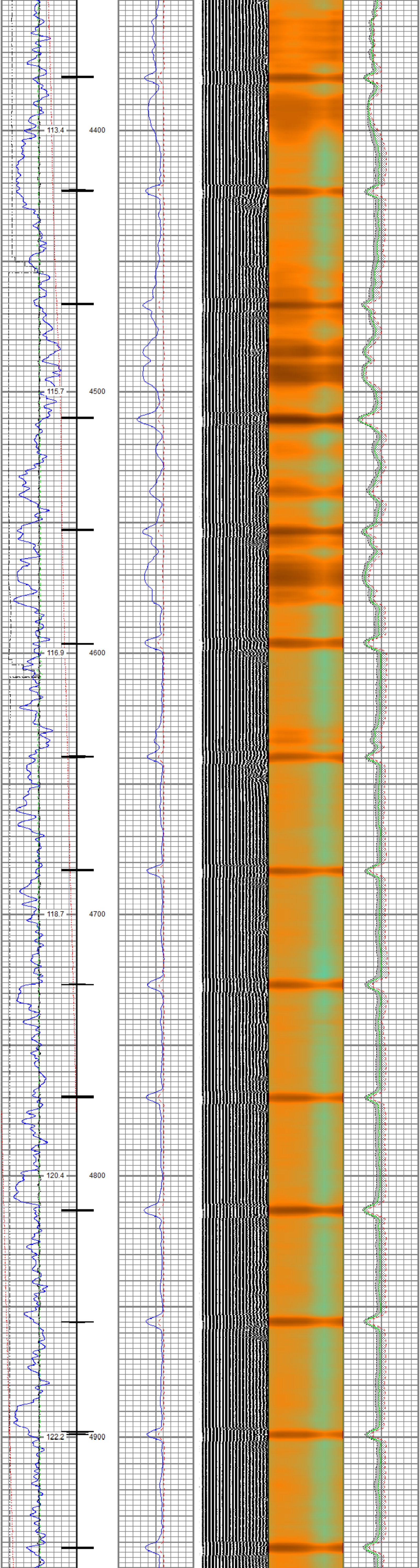
3800
105.0
3900
106.5
4000
108.2
4100
110.0
4200
111.7
4300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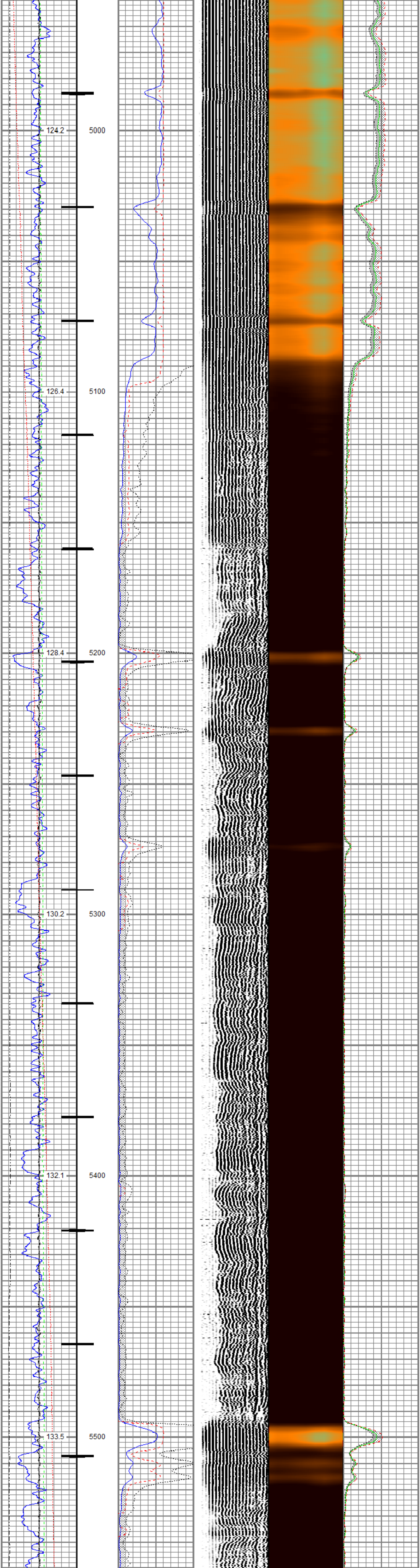
4400
115.7
4500
116.9
4600
118.7
4700
120.4
4800
122.2
4900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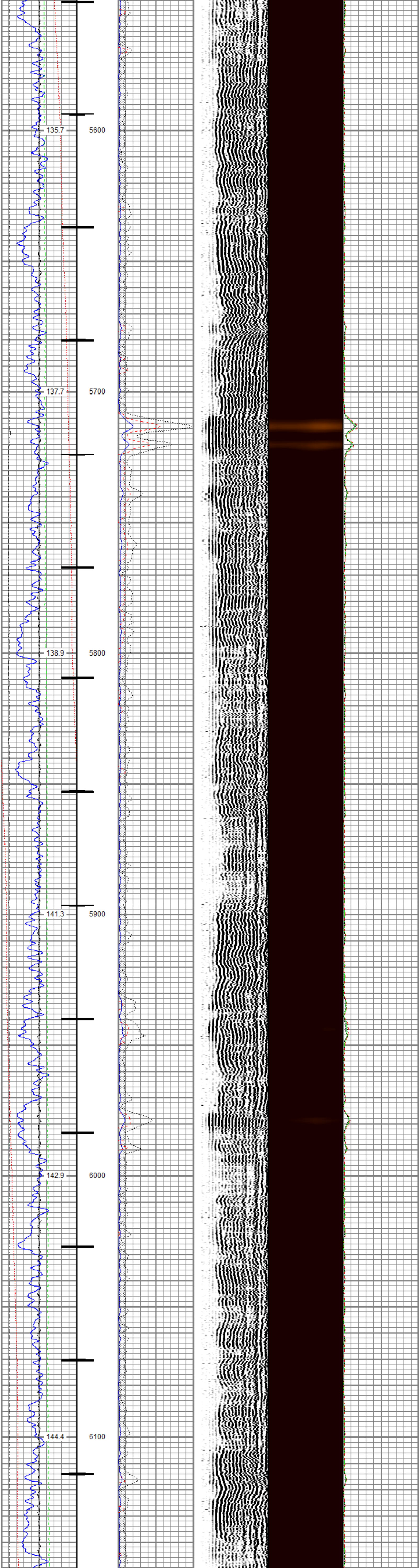
5000
126.4
5100
128.4
5200
130.2
5300
132.1
5400
133.5
5500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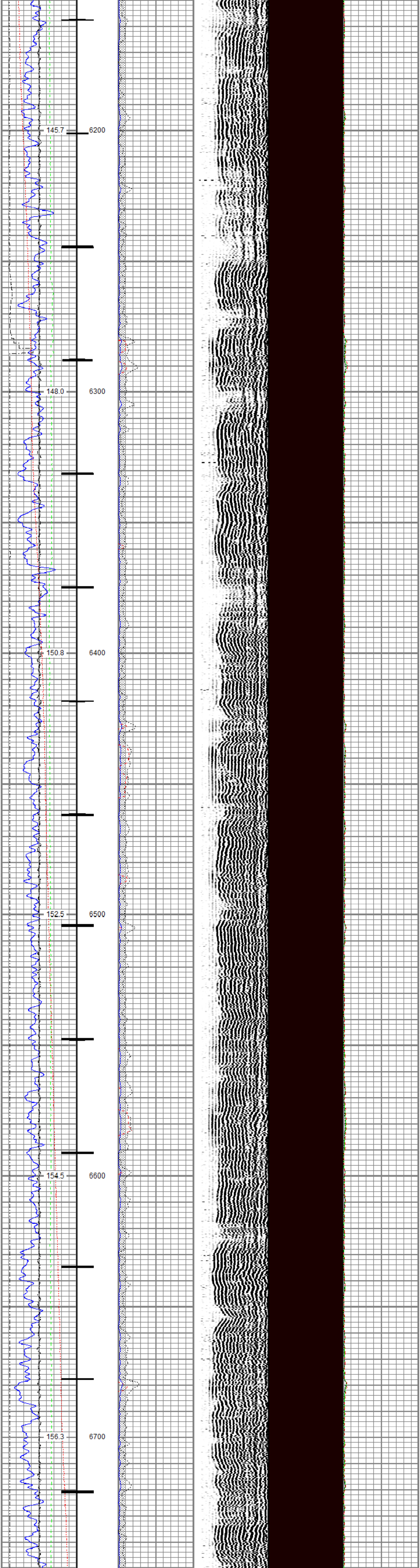
5600
137.7
5700
138.9
5800
141.3
5900
142.9
6000
144.4
6100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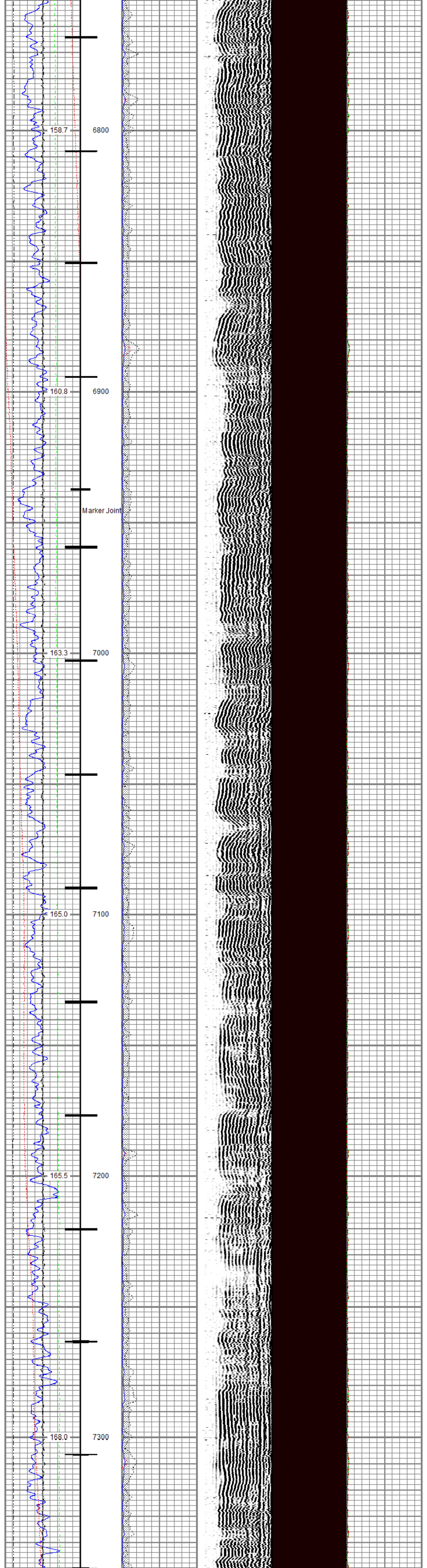
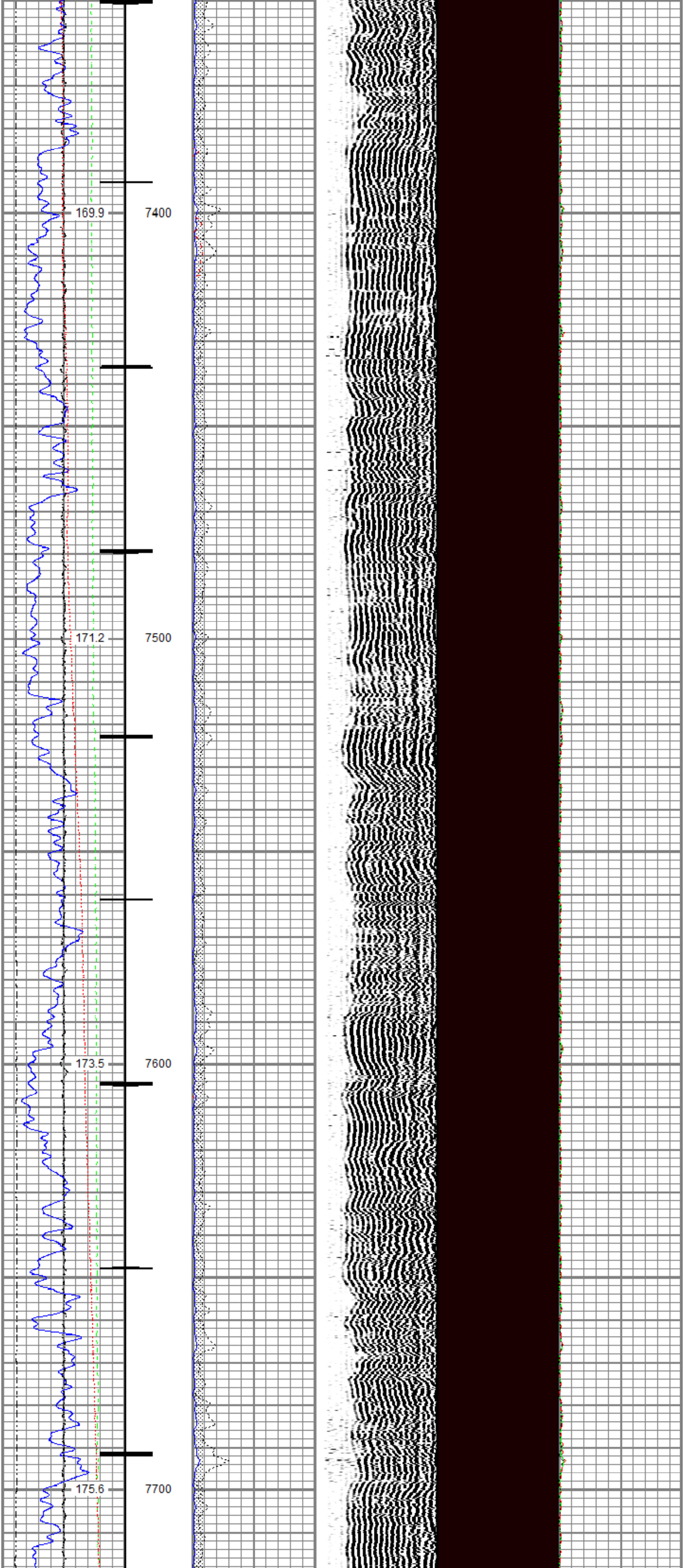
6200
148.0
6300
150.8
6400
152.5
6500
154.5
6600
156.3
6700


158.7
6800
160.8
6900
Marker Joint
163.3
7000
165.0
7100
165.5
7200
168.0
7300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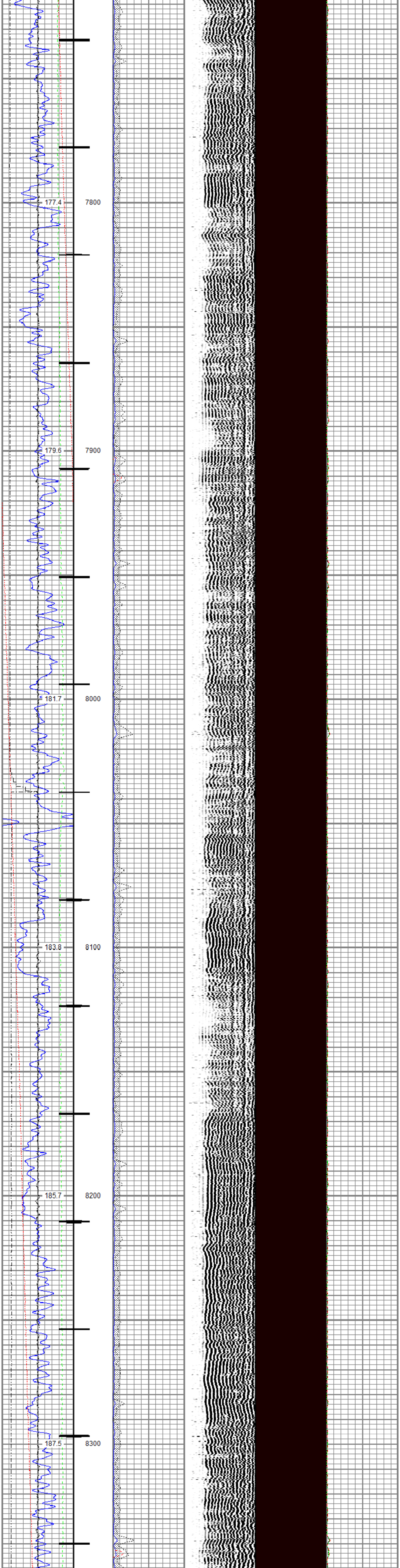
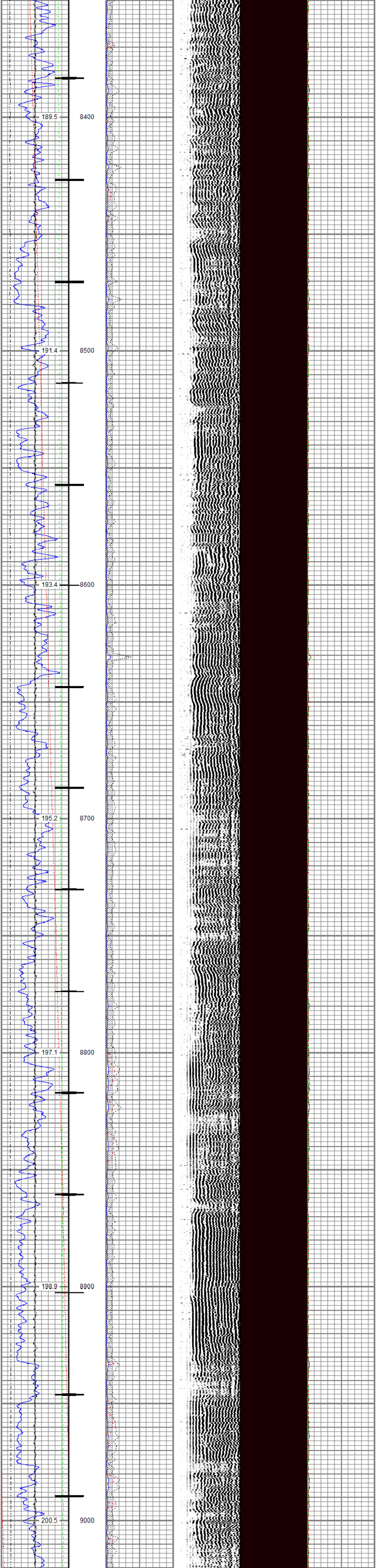
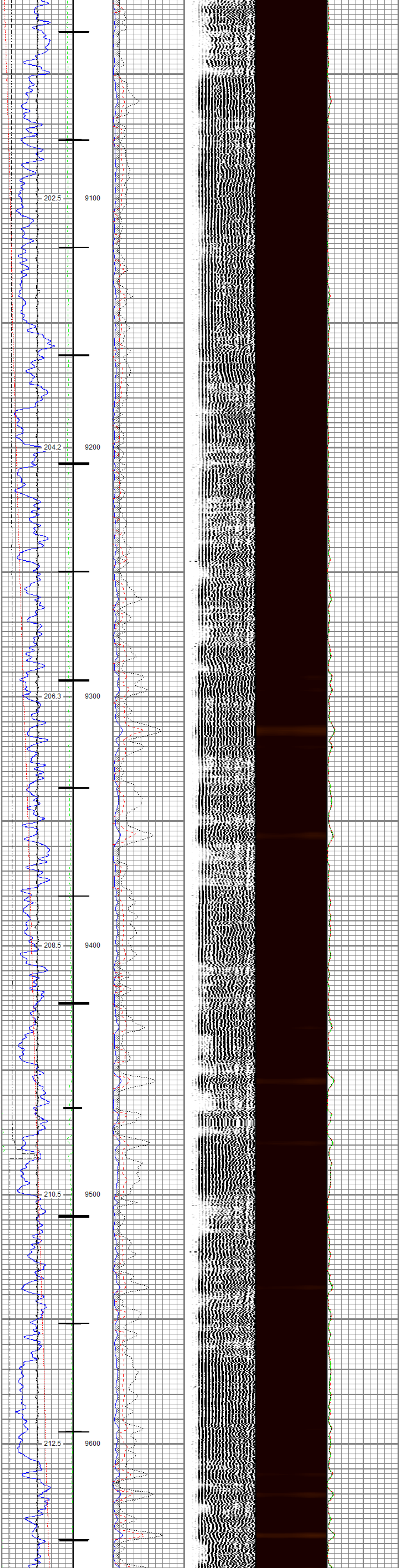
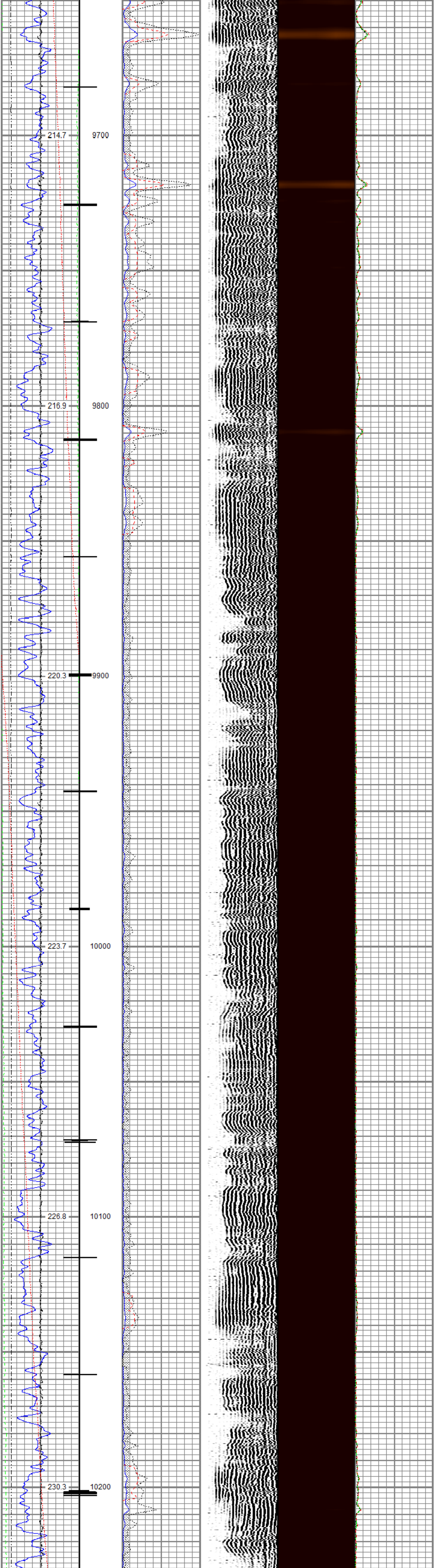
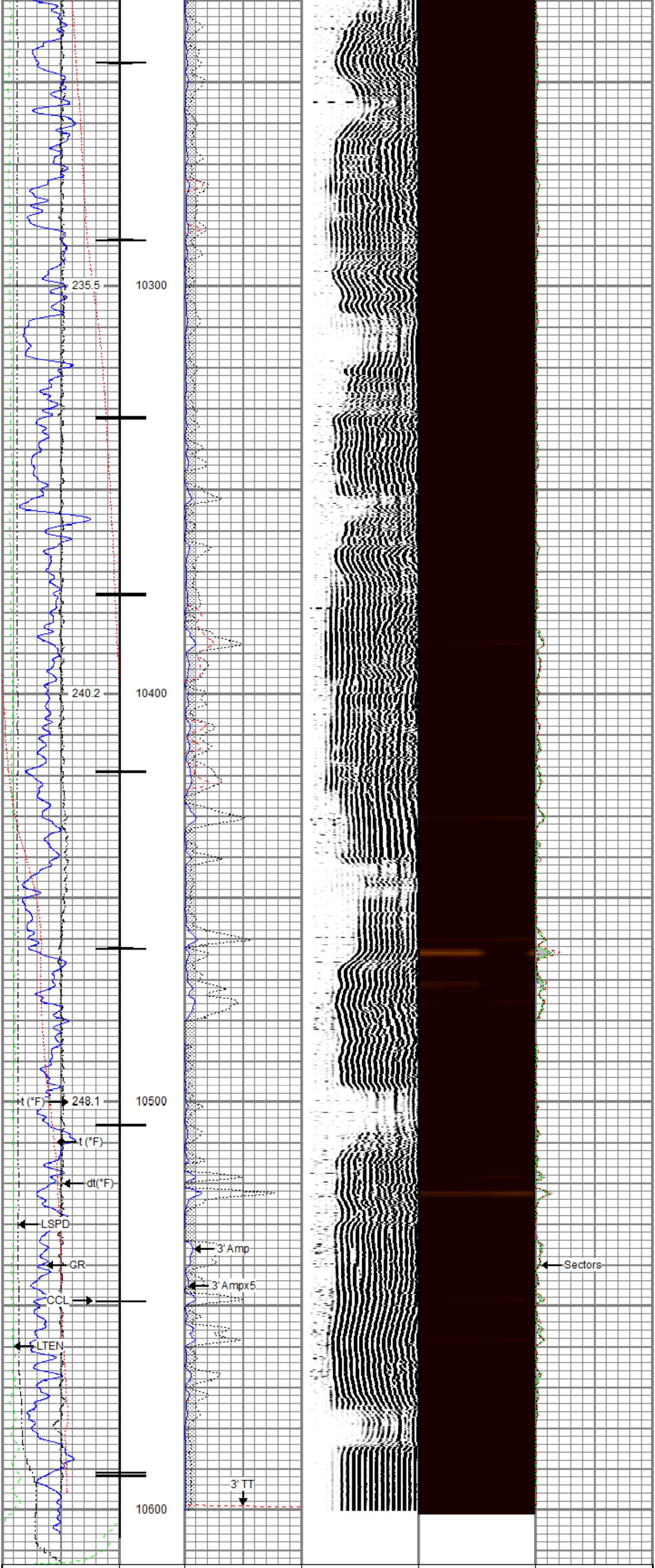
7400
171.2
7500
173.5
7600
175.6
7700











| Gamma Ray<br>0 (GAPI) 200 | 3' Amplitude<br>0 (mV) 100 | 5' Variable Density Log<br>200 1200 | Sector Map<br>10 110 | Average Amplitude<br>0 150 |
|---|---|---|---|---|
| Line Speed<br>-150 (ft/min) 150 | 3' Amplitude x 5<br>0 (mV) 20 | | | Mimimum Amplitude<br>0 150 |
| Line Tension<br>0 (lb) 2000 | 3' Travel Time<br>300 (usec) 200 | | | Maximum Amplitude<br>0 150 |
| Differential Temperature<br>-2 (degF) 2 | | | | |
| Temperature<br>0 (degF) 20 | | | | |
| 10 CCL 0 | | | | |

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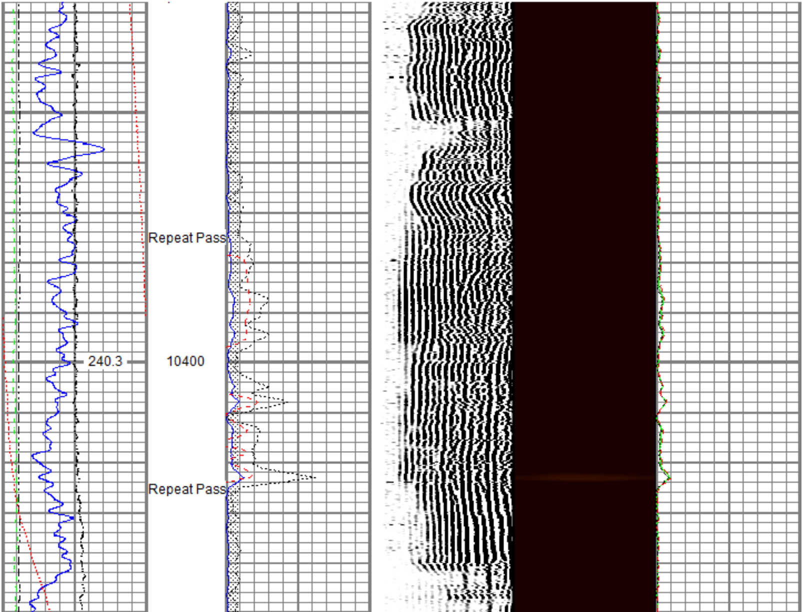
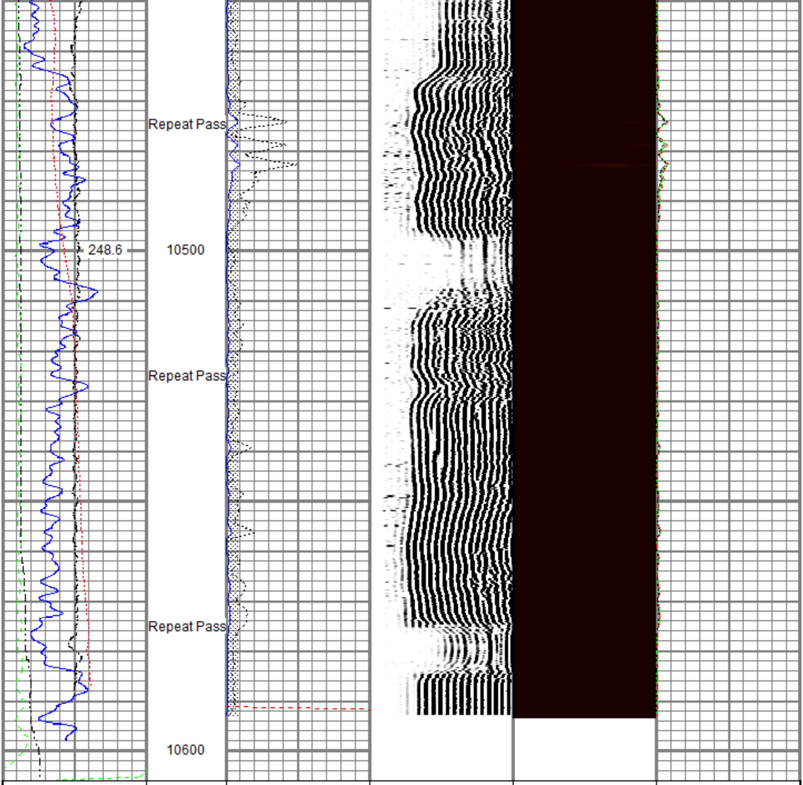
# Repeat Pass

Recorded With 0 PSI Surface Induced Pressure

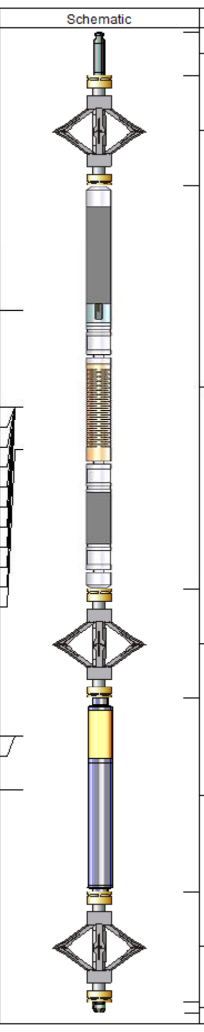
| | |
|---|---|
| Database File | tep_federal ru 13-17\tep_federal ru 13-17_rbl_04-11-18.db |
| Dataset Pathname | repeat1.2 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Fri Apr 13 14:10:35 2018 |
| Charted by | Depth in Feet scaled 1:240 |

| Gamma Ray<br>0 (GAPI) 200 | 3' Amplitude<br>0 (mV) 100 | 5' Variable Density Log<br>200 1200 | Sector Map<br>10 110 | Average Amplitude<br>0 150 |
|---|---|---|---|---|
| Line Speed<br>-150 (ft/min) 150 | 3' Amplitude x 5<br>0 (mV) 20 | | | Mimimum Amplitude<br>0 150 |
| Line Tension<br>0 (lb) 2000 | 3' Travel Time<br>300 (usec) 200 | | | Maximum Amplitude<br>0 150 |
| Differential Temperature<br>-2 (degF) 2 | | | | |
| Temperature<br>0 (degF) 20 | | | | |





| | | | | | |
|---|---|---|---|---|---|
| Gamma Ray<br>0 (GAPI) 200 | | 3' Amplitude<br>0 (mV) 100 | 5' Variable Density Log<br>200 1200 | Sector Map<br>10 110 | Average Amplitude<br>0 150 |
| Line Speed<br>-150 (ft/min) 150 | | 3' Amplitude x 5<br>0 (mV) 20 | | | Mimimum Amplitude<br>0 150 |
| Line Tension<br>0 (lb) 2000 | | 3' Travel Time<br>300 (usec) 200 | | | Maximum Amplitude<br>0 150 |
| Differential Temperature<br>-2 (degF) 2 | | | | | |
| Temperature<br>0 (degF) 20 | | | | | |

| Sensor | Offset (ft) | Schematic | Description | Length (ft) | O.D. (in) | Weight (lb) |
|---|---|---|---|---|---|---|
| | |  | Titan CHD-14375 GO<br>Titan 1-7/16" Assembled Electric Cable Head w/ 1" Fishing Neck | 1.03 | 1.44 | 3.60 |
| | | | DSS RAC-2750 5A GO<br>DSS 2-3/4" Roller 5 Arm Centralizer w/ GO Ends | 2.55 | 2.75 | 32.00 |
| TEMP | 16.33 | | | | | |
| | | | Probe Radii-2750 RBT (27125)<br>Probe 2-3/4" Radial Cement Bond Tool with Integral Temperature Sub | 9.39 | 2.75 | 105.00 |
| WVFS8 | 14.10 | | | | | |
| WVFS7 | 14.10 | | | | | |
| WVFS6 | 14.10 | | | | | |
| WVFS5 | 14.10 | | | | | |
| WVFS4 | 14.10 | | | | | |
| WVFS3 | 14.10 | | | | | |
| WVFS2 | 14.10 | | | | | |
| WVFS1 | 14.10 | | | | | |
| WVFCAL | 14.10 | | | | | |
| WVF3FT | 14.10 | | | | | |
| WVF5FT | 13.10 | | | | | |
| | | | DSS RAC-2750 5A GO<br>DSS 2-3/4" Roller 5 Arm Centralizer w/ GO Ends | 2.55 | 2.75 | 32.00 |
| CCL$2 | 6.42 | | | | | |
| CCL$1 | 6.42 | | | | | |
| GR | 5.18 | | Probe GR-CCL-2750 GOB (FW1307-038)<br>Probe 2-3/4" rev.2 Digital Scintillation Gamma Ray/CCL Combined | 4.51 | 2.75 | 55.00 |
| | | | DSS RAC-2750 5A GO<br>DSS 2-3/4" Roller 5 Arm Centralizer w/ GO Ends | 2.55 | 2.75 | 32.00 |
| | | | GO BN-14375<br>GO 1 7/16" Bull Nose with Go Box Top | 0.25 | 1.44 | 1.00 |

| | |
|---|---|
| Dataset: | tep_federal ru 13-17_rbl_04-11-18.db: field/well/run1/main.3 |
| Total length: | 22.82 ft |
| Total weight: | 260.60 lb |
| O.D.: | 2.75 in |

## Calibration Report

| | |
|---|---|
| Database File | c:\programdata\warrior\data\tep_federal ru 13-17\tep_federal ru 13-17_rbl_04-11-18.db |
| Dataset Pathname | main.3 |
| Dataset Creation | Fri Apr 13 13:35:21 2018 |

### Gamma Ray Calibration Report

| | | |
|---|---|---|
| Serial Number: | FW1307-038 | |
| Tool Model: | 2750 GOB | |
| Performed: | Sun Nov 12 12:44:12 2017 | |
| Calibrator Value: | 637.0 | GAPI |
| Background Reading: | 113.2 | cps |
| Calibrator Reading: | 1022.4 | cps |
| Sensitivity: | 0.7007 | GAPI/cps |

### Segmented Cement Bond Log Calibration Report

| | | |
|---|---|---|
| Serial Number: | 27125 | |
| Tool Model: | 2750 RBT | |
| Calibration Casing Diameter: | 4.500 | in |
| Calibration Depth: | 32.948 | ft |

Master Calibration, performed (Derived):

| | Raw (v) | | Calibrated (mv) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3' | -0.005 | 0.800 | 0.000 | 81.196 | 100.878 | 0.475 |
| CAL | -0.006 | 0.743 | | | | |
| 5' | -0.002 | 0.612 | 0.000 | 81.196 | 132.169 | 0.319 |
| SUM | | | | | | |
| S1 | -0.003 | 0.808 | 0.000 | 100.000 | 123.263 | 0.354 |
| S2 | -0.004 | 0.847 | 0.000 | 100.000 | 117.550 | 0.449 |
| S3 | -0.006 | 0.807 | 0.000 | 100.000 | 122.957 | 0.759 |
| S4 | -0.003 | 0.802 | 0.000 | 100.000 | 124.198 | 0.425 |
| S5 | -0.004 | 0.810 | 0.000 | 100.000 | 122.939 | 0.471 |
| S6 | -0.003 | 0.780 | 0.000 | 100.000 | 127.719 | 0.407 |
| S7 | -0.005 | 0.740 | 0.000 | 100.000 | 134.125 | 0.683 |
| S8 | -0.003 | 0.790 | 0.000 | 100.000 | 126.150 | 0.353 |

Internal Reference Calibration, performed (Not Performed):

| | Raw (v) | | Calibrated (v) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| CAL | 0.000 | 0.000 | -0.006 | 0.743 | 1.000 | 0.000 |

Air Zero Calibration, performed Wed Apr 11 17:09:09 2018:

| | Raw (v) | Calibrated (v) | Results |
|---|---|---|---|
| | Zero | Zero | Offset |
| 3' | -0.005 | 0.000 | 0.000 |
| 5' | -0.004 | 0.000 | 0.000 |
| SUM | | | |
| S1 | -0.005 | 0.000 | -0.000 |
| S2 | -0.004 | 0.000 | -0.000 |
| S3 | -0.005 | 0.000 | -0.000 |
| S4 | -0.005 | 0.000 | -0.000 |
| S5 | -0.004 | 0.000 | -0.000 |
| S6 | -0.005 | 0.000 | -0.001 |
| S7 | -0.005 | 0.000 | 0.000 |
| S8 | -0.005 | 0.000 | 0.000 |

### Temperature Calibration Report

| | | |
|---|---|---|
| Serial Number: | 27125 | |
| Tool Model: | 2750 RBT | |
| Performed: | (Not Performed) | |
| | Reference | Reading |
| Low Reference: | 100.00 degF | 112.30 degF |
| High Reference: | 350.00 degF | 394.75 degF |
| Gain: | 0.89 | |
| Offset: | 0.60 | |
| Delta Spacing | 1 | |

RELIANCE
OILFIELD SERVICES

| | |
|---|---|
| Company | TEP Rocky Mountain LLC |
| Well | Federal RU 13-17 |
| Field | Rulison |
| County | Garfield |
| State | Colorado |