**RELIANCE**
OILFIELD SERVICES

# Radial Cement Bond
# Gamma Ray
# Casing Collar Log

Company TEP Rocky Mountain LLC
Well Federal GM 33-10
Field Grand Valley
County Garfield
State Colorado
Country

| | |
|---|---|
| Company | TEP Rocky Mountain LLC |
| Well | Federal GM 33-10 |
| Field | Grand Valley |
| County | Garfield |
| State | Colorado |
| Country | |
| Location: | 2110' FNL & 1939' FWL SENW |
| API # | 05-045-22700 |
| SEC 10 BLK 7S ABS 96W | |
| Other Services | PDN |

| | | | |
|---|---|---|---|
| Permanent Datum | Ground Level | Elevation 6148' | Elevation |
| Log Measured From | Kelly Bushing | 24 FT | K.B. 6172' |
| Drilling Measured From | Kelly Bushing | | D.F. 6171' |
| | | | G.L. 6148' |

| | |
|---|---|
| Date | 12-OCT-2017 |
| Run Number | One |
| Depth Driller | 7862 FT |
| Depth Logger | 7812 FT |
| Bottom Logged Interval | 7812 FT |
| Top Log Interval | Surface |
| Open Hole Size | 8.750" |
| Type Fluid | Fresh Water |
| Density / Viscosity | 8.34 lb/gal |
| Max. Recorded Temp. | 200°F |
| Estimated Cement Top | See Log |
| Time Well Ready | ROA |
| Time Logger on Bottom | 06:25 |
| Equipment Number | HD-359 |
| Location | Grand Junction, CO |
| Recorded By | J.Donnelly |
| Witnessed By | D.Welsh |

| Borehole Record | | | Tubing Record | | | |
|---|---|---|---|---|---|---|
| Run Number | Bit | From | To | Size | Weight | From | To |

| Casing Record | Size | Wgt/Ft | Top | Bottom |
|---|---|---|---|---|
| Surface String | 9 5/8 | 32.3 | Surface | 1015 FT |
| Prot. String | | | | |
| Production String | 4 1/2 | 11.6 | Surface | 7822 FT |
| 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 at 4114 FT - 4136 FT
Log ran from 7812 FT to Surface
Recorded with 0 PSI Surface Induced Pressure

Thank you for choosing Reliance Oilfield Services, LLC!!

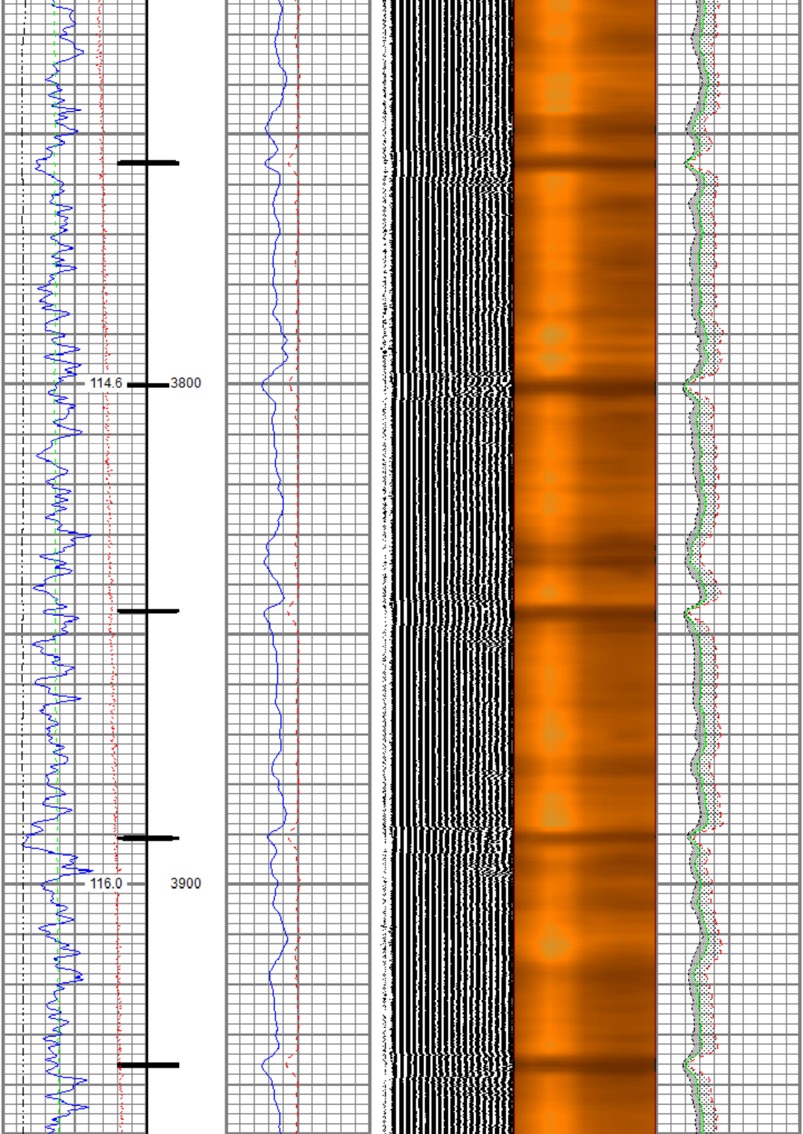
---

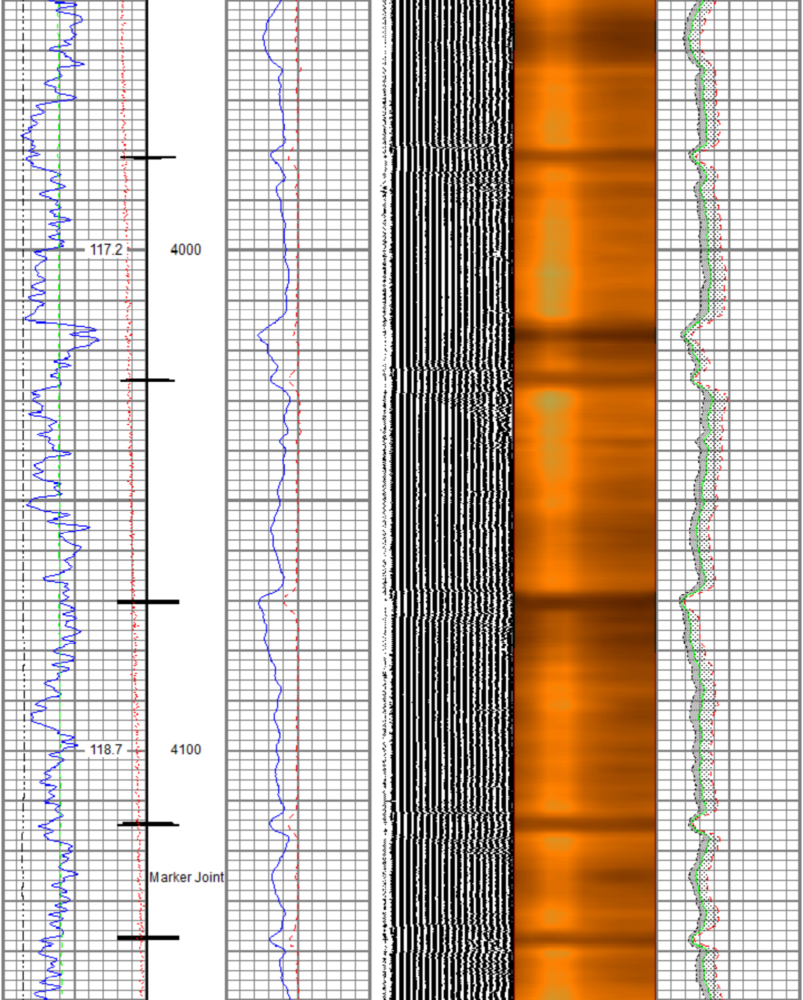
**RELIANCE**
OILFIELD SERVICES

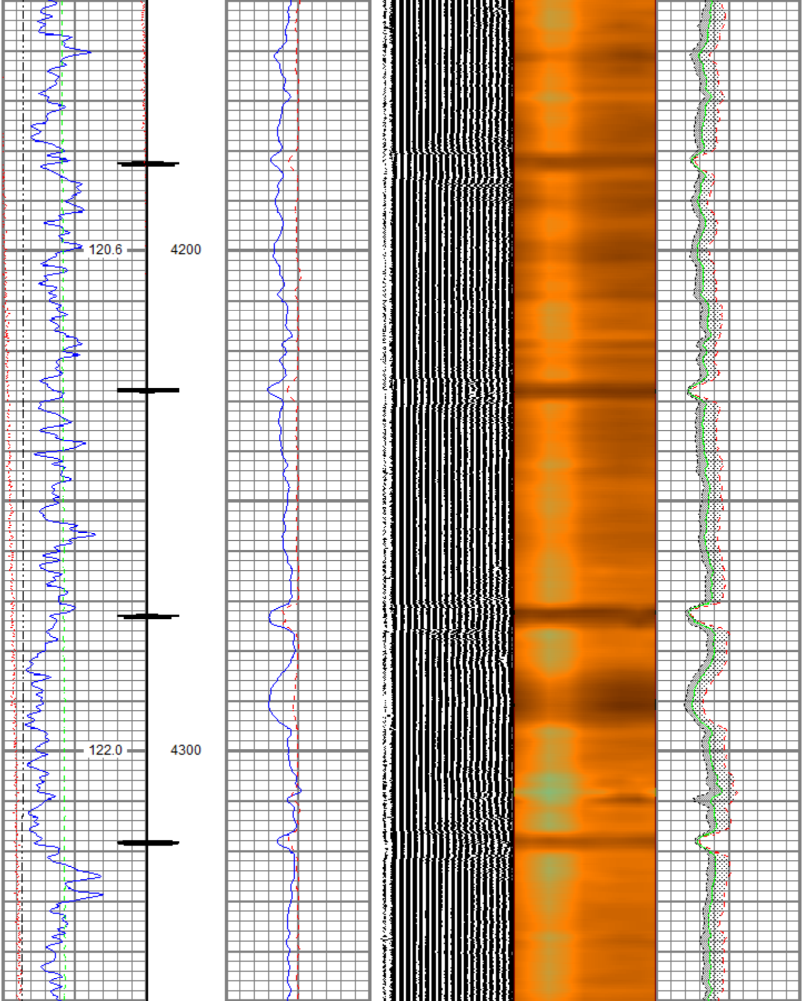
## Main Pass

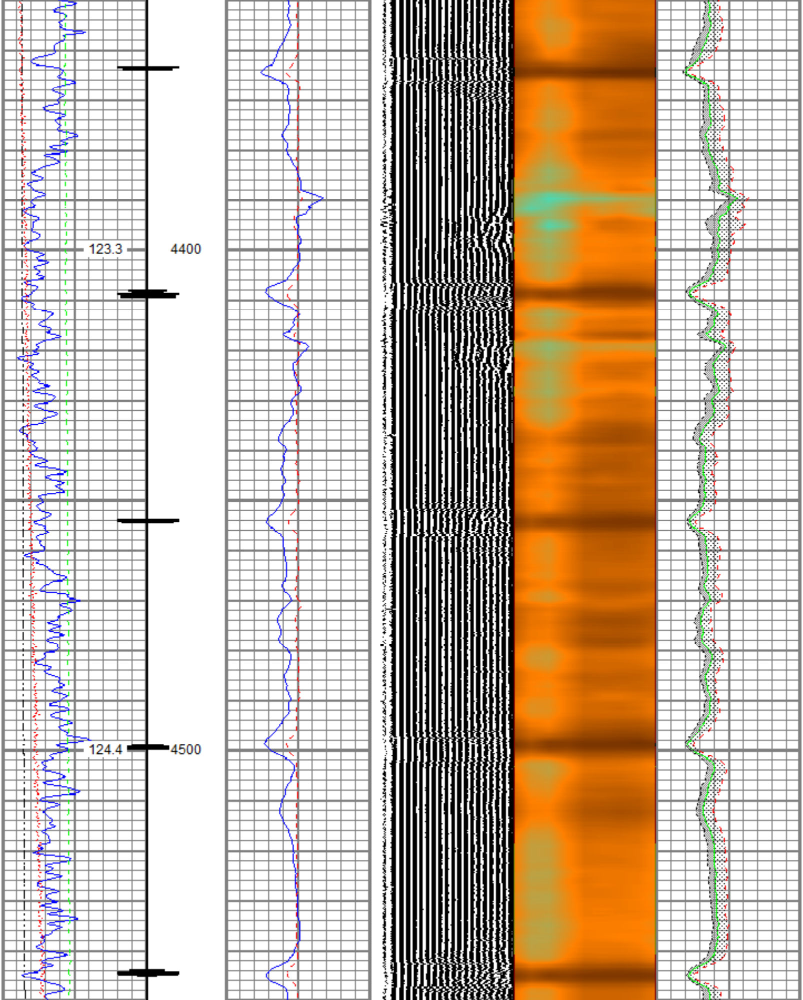
Recorded With 0 PSI Surface Induced Pressure

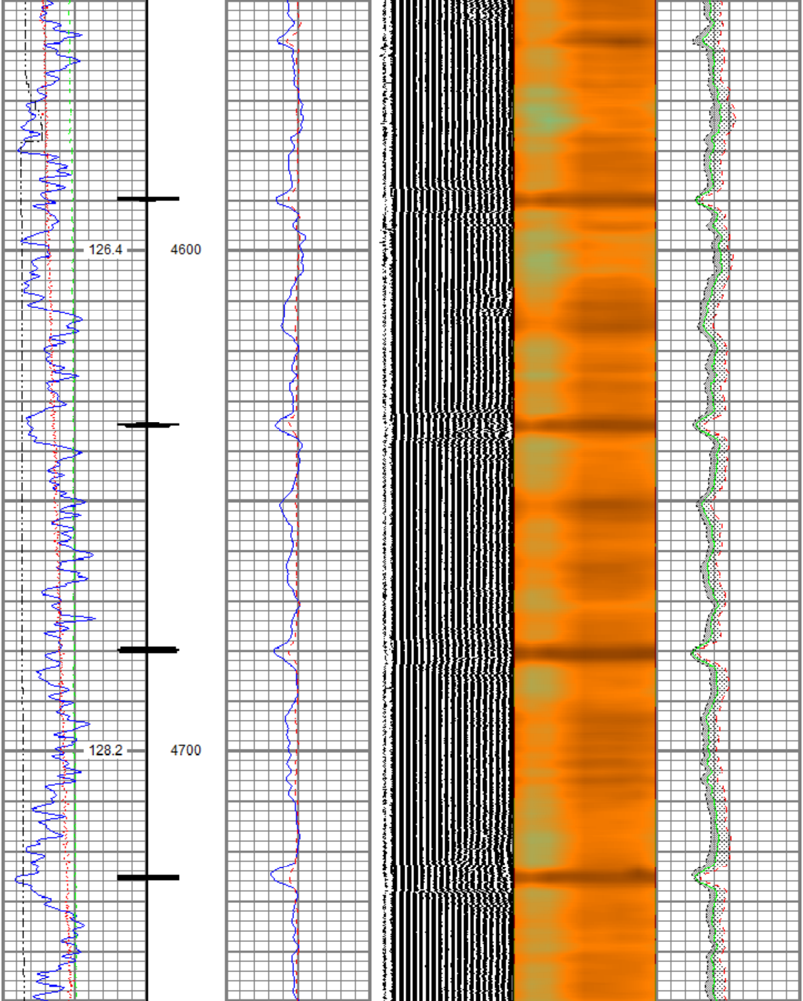
| | |
|---|---|
| Database File | tep_federal gm 33-10_rbl_10-12-17\processed_tep_federal gm 33-10_rbl_10-12-17.db |
| Dataset Pathname | main_1.1 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Thu Oct 12 15:39:14 2017 |
| Charted by | Depth in Feet scaled 1:240 |

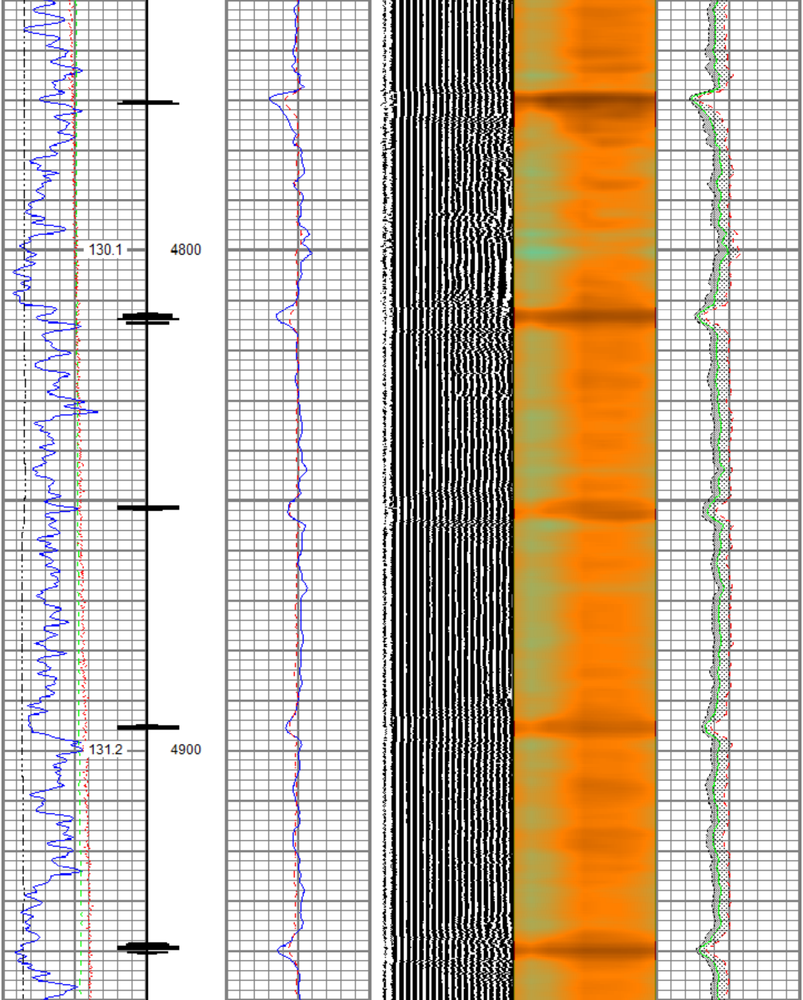

114.6
3800
116.0
3900

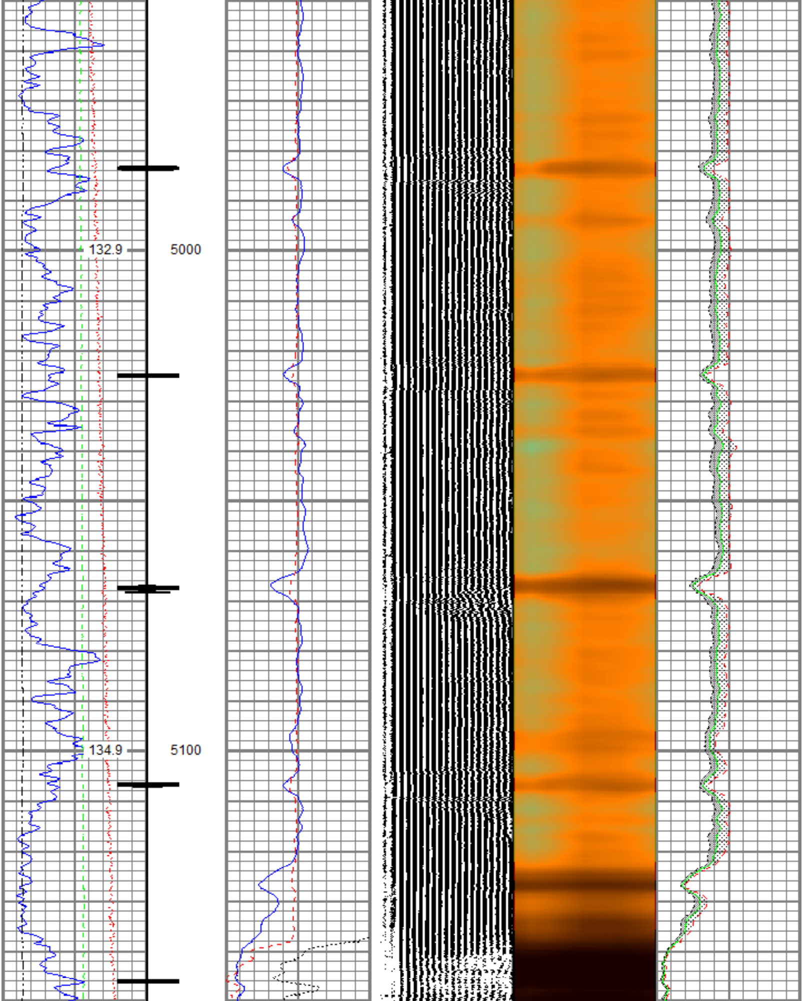

117.2
4000
118.7
4100
Marker Joint

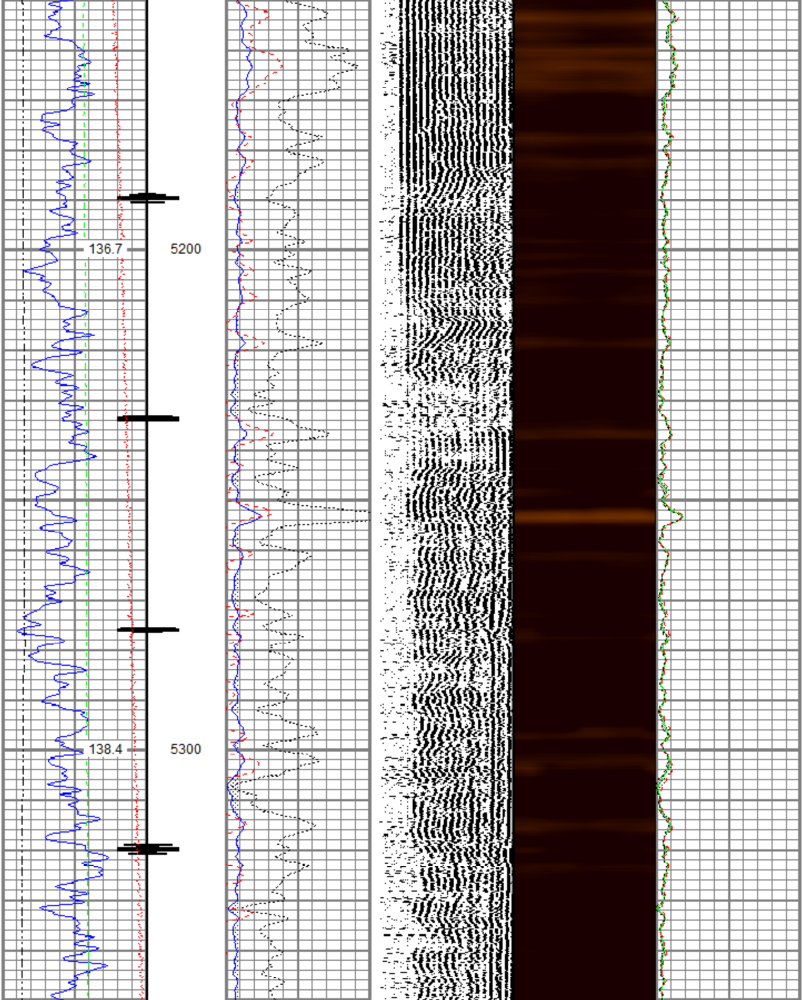

120.6
4200
122.0
4300

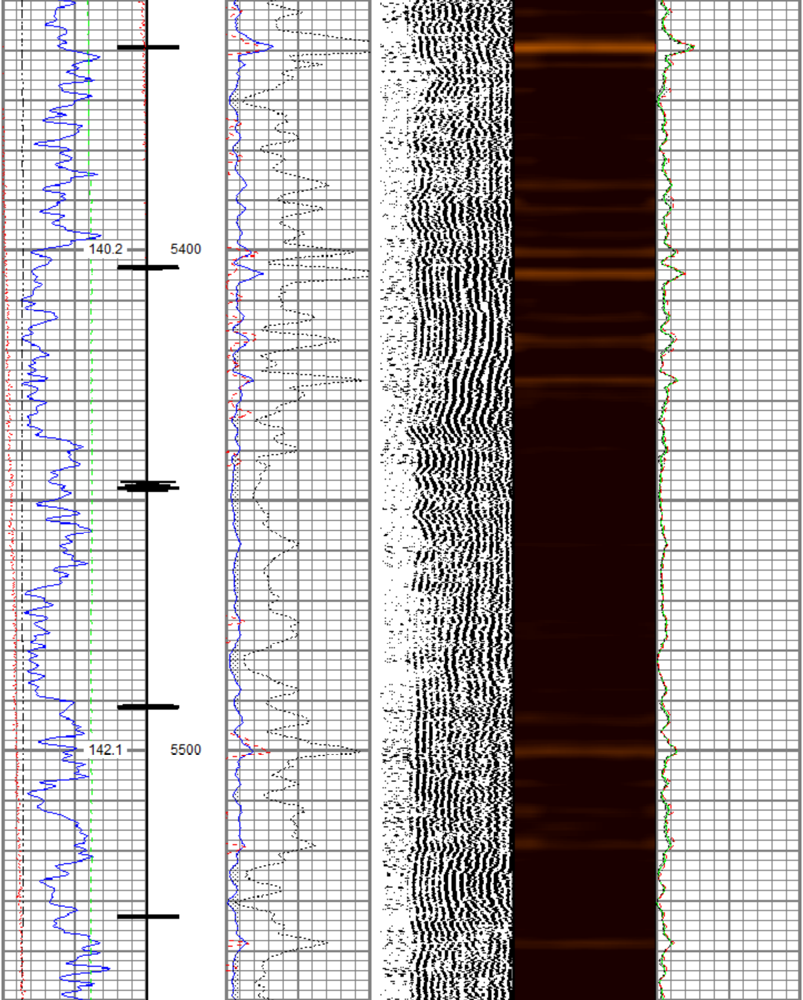

123.3
4400
124.4
4500

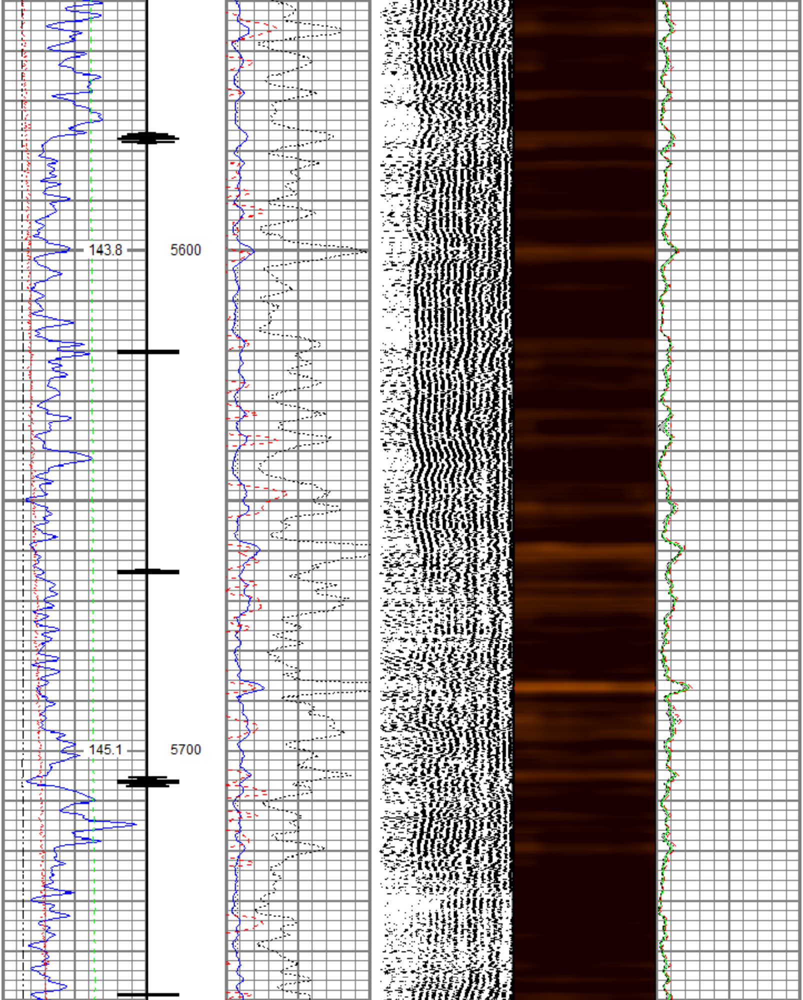

126.4
4600
128.2
4700

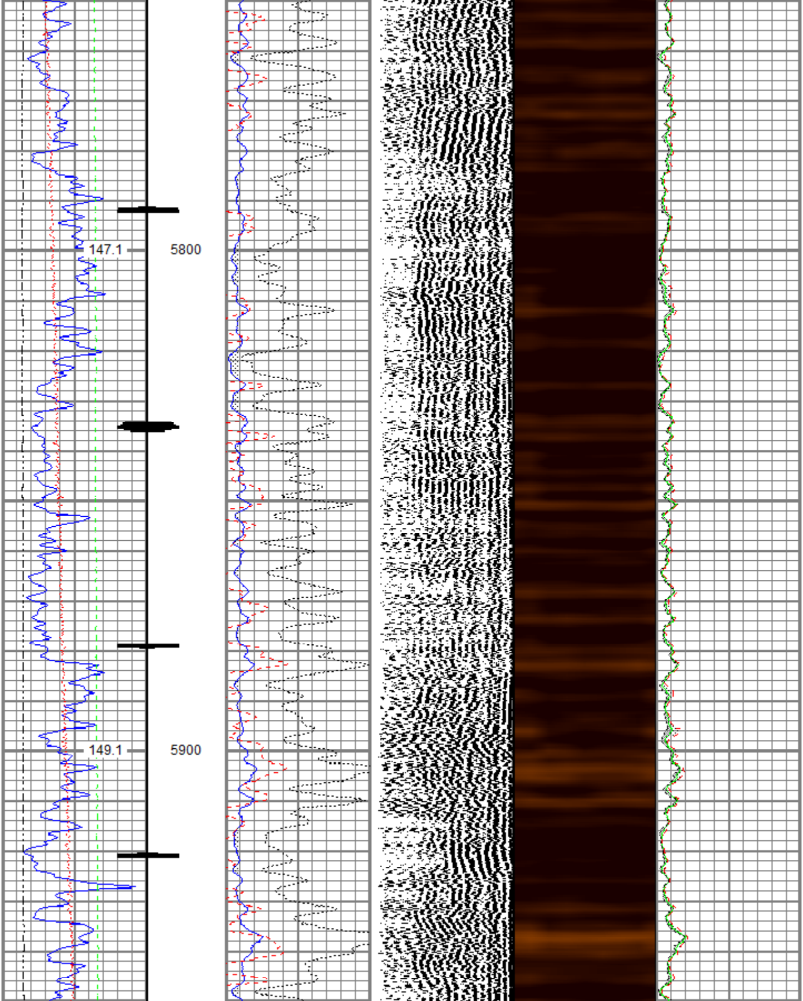

130.1
4800
131.2
4900

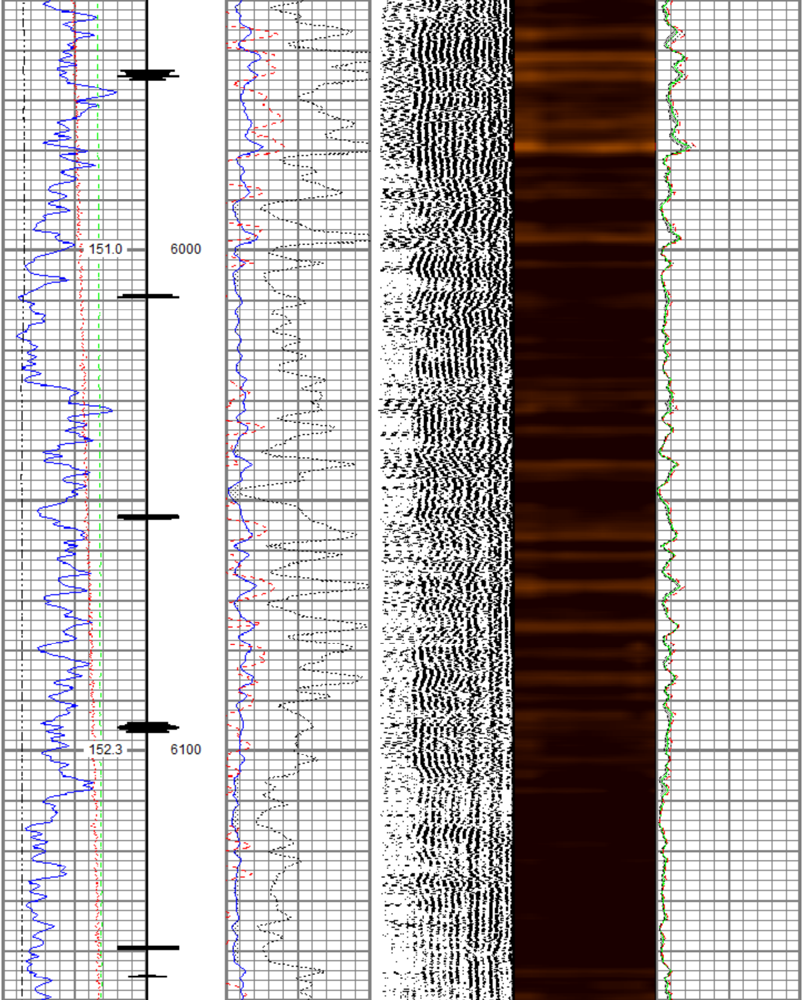

132.9
5000
134.9
5100

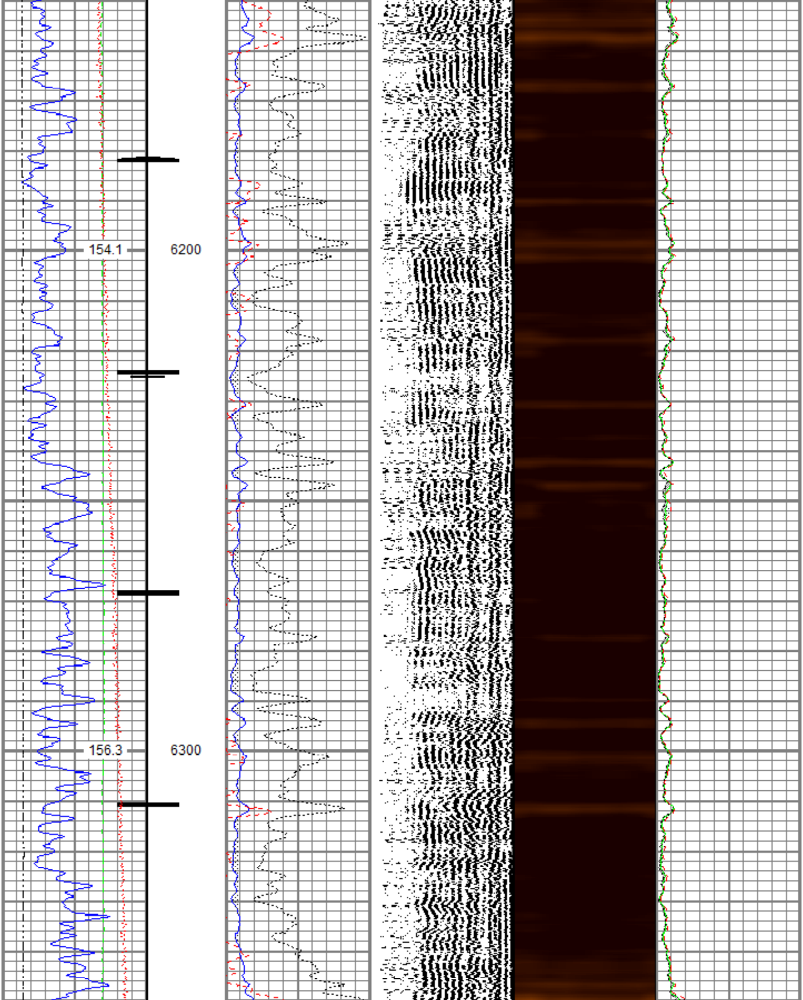

136.7
5200
138.4
5300

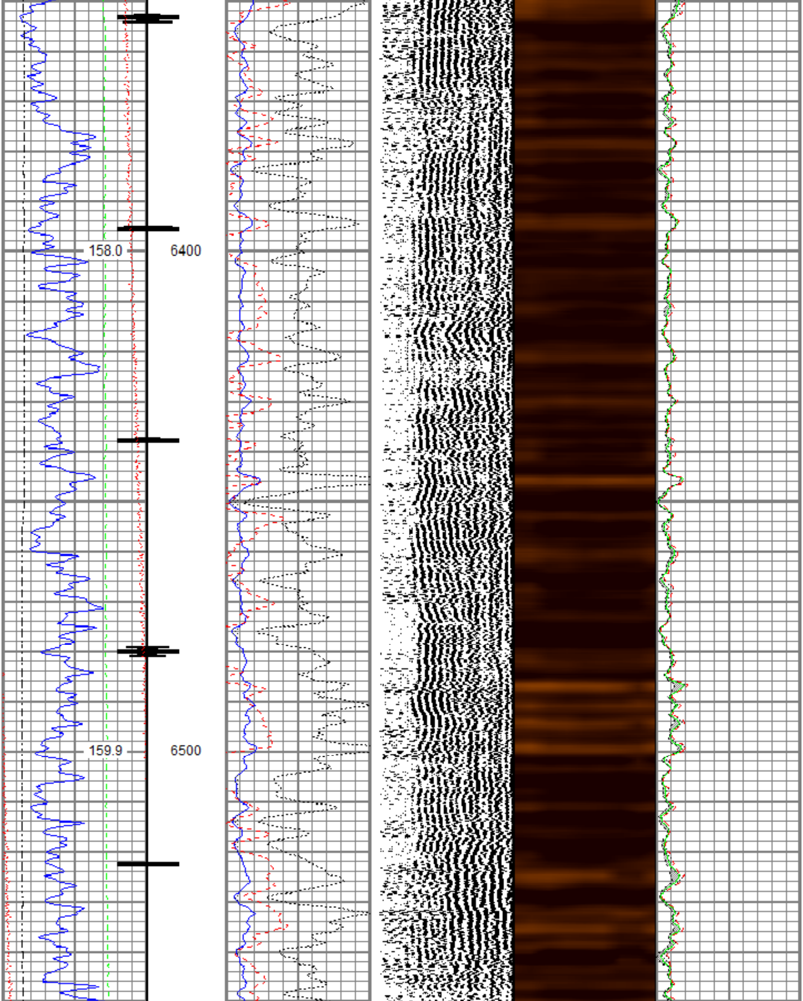

140.2
5400
142.1
5500

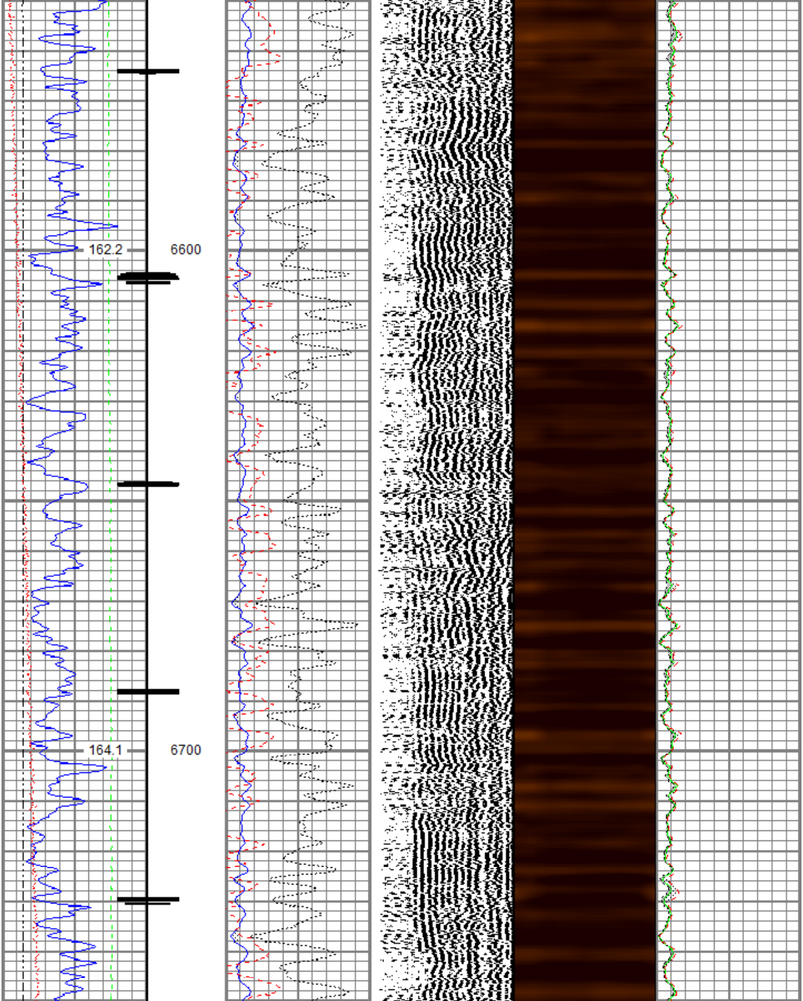

143.8
5600
145.1
5700

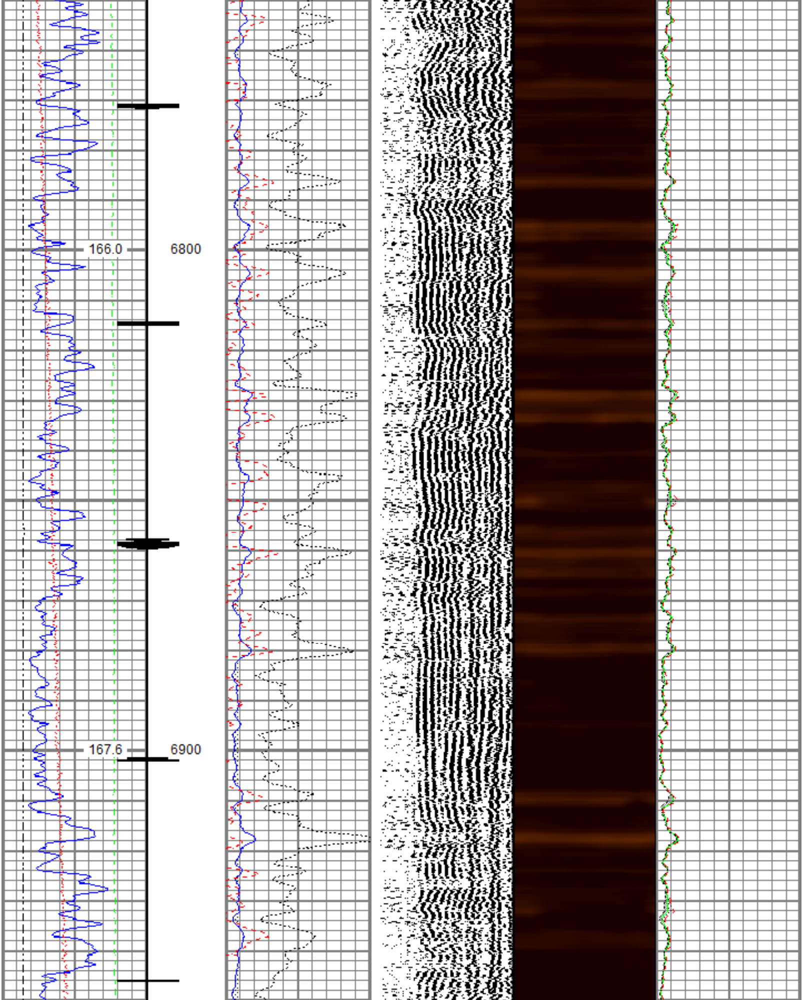

147.1
5800
149.1
5900

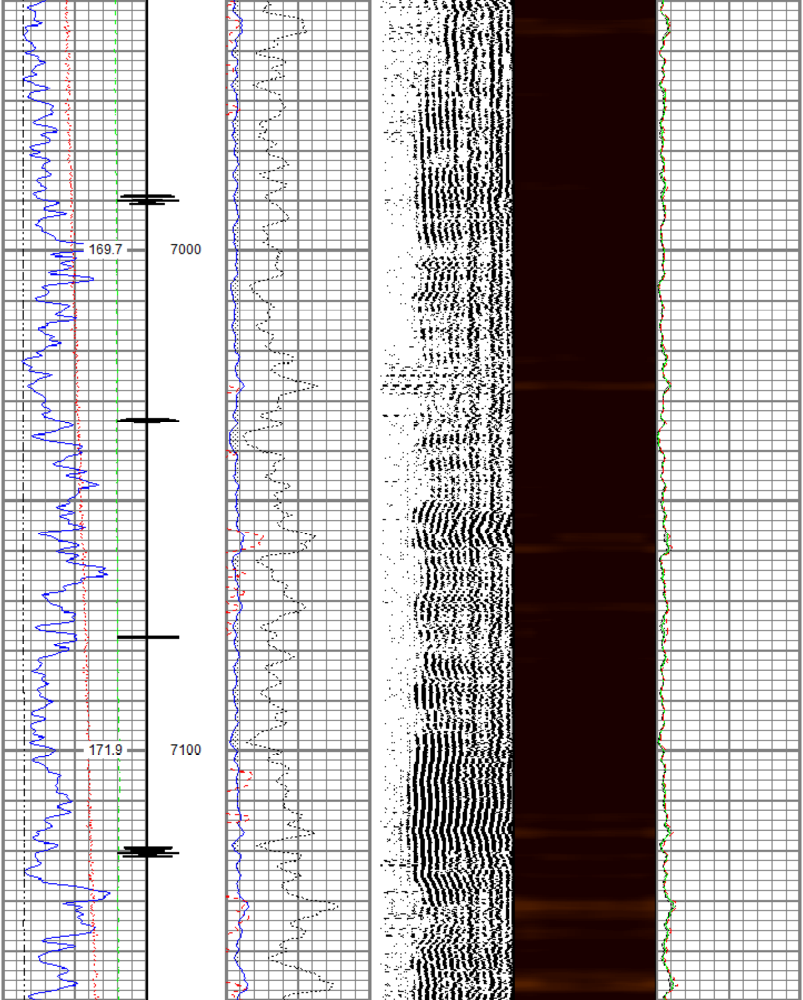

151.0
6000
152.3
6100

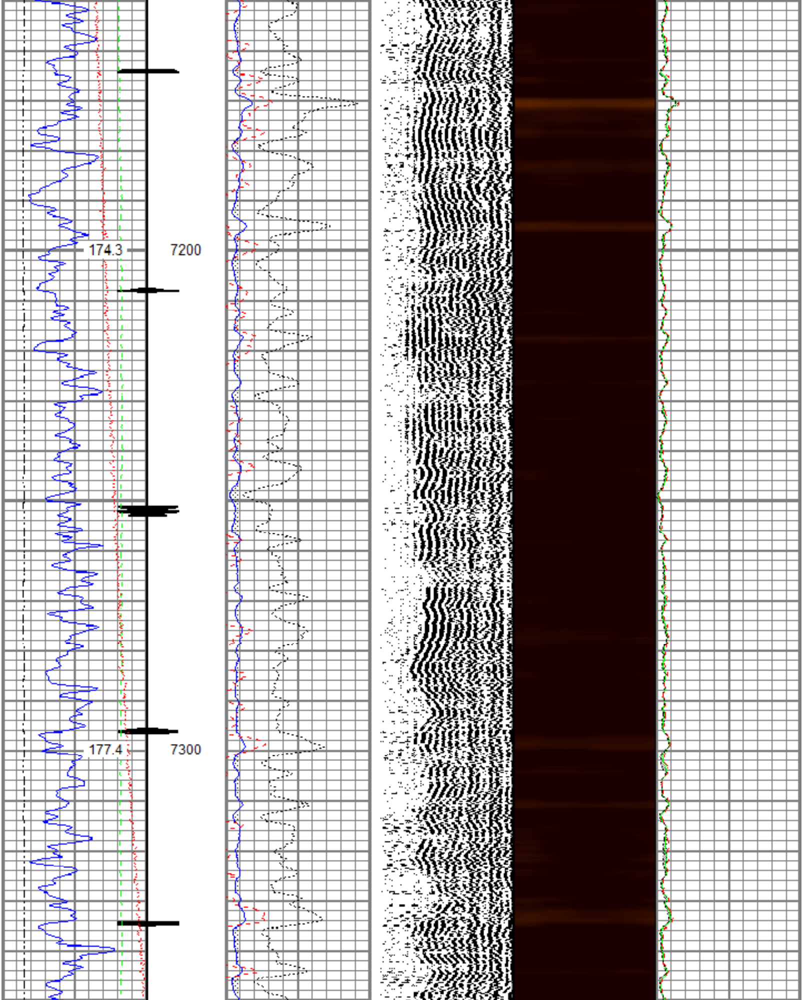

154.1
6200
156.3
6300

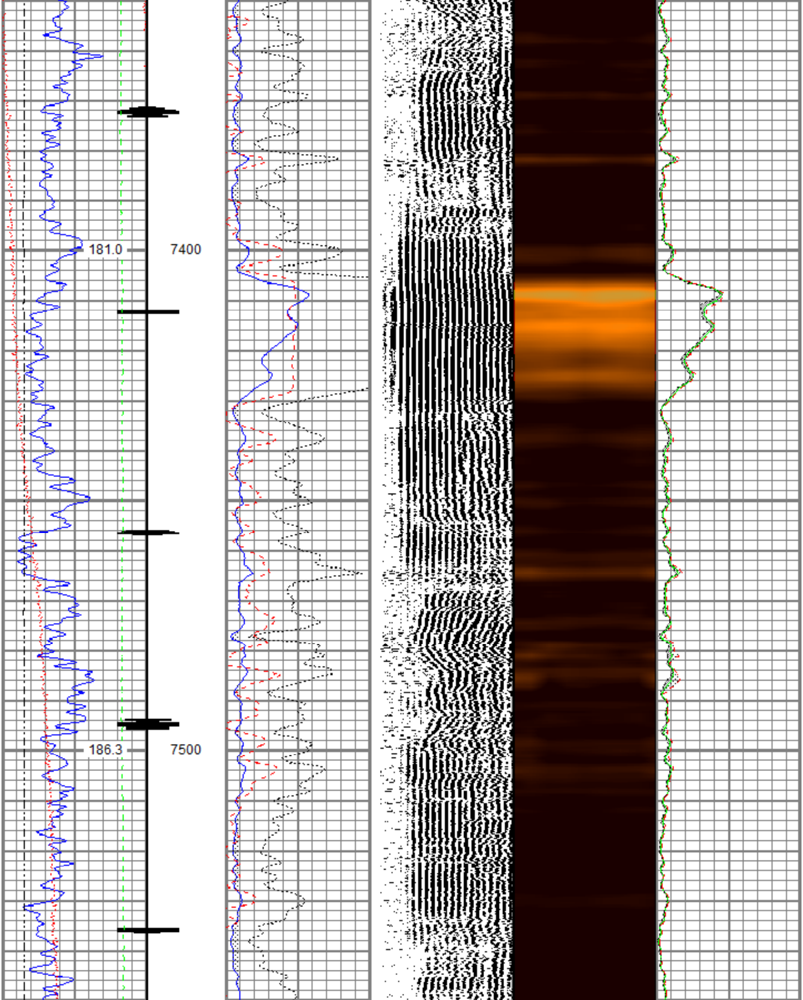

158.0
6400
159.9
6500

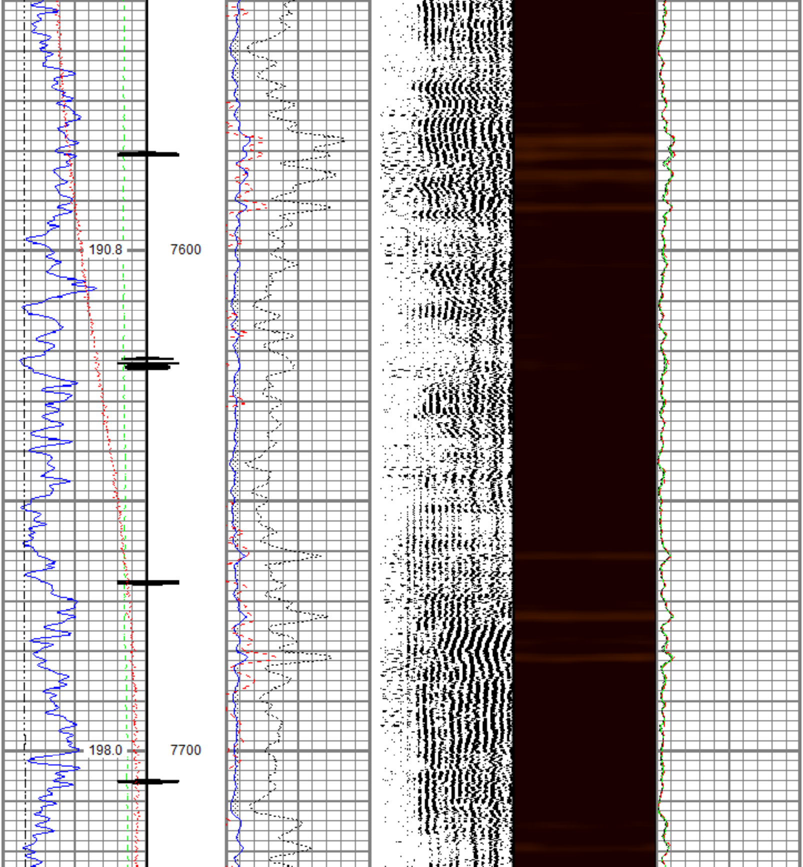

162.2
6600
164.1
6700

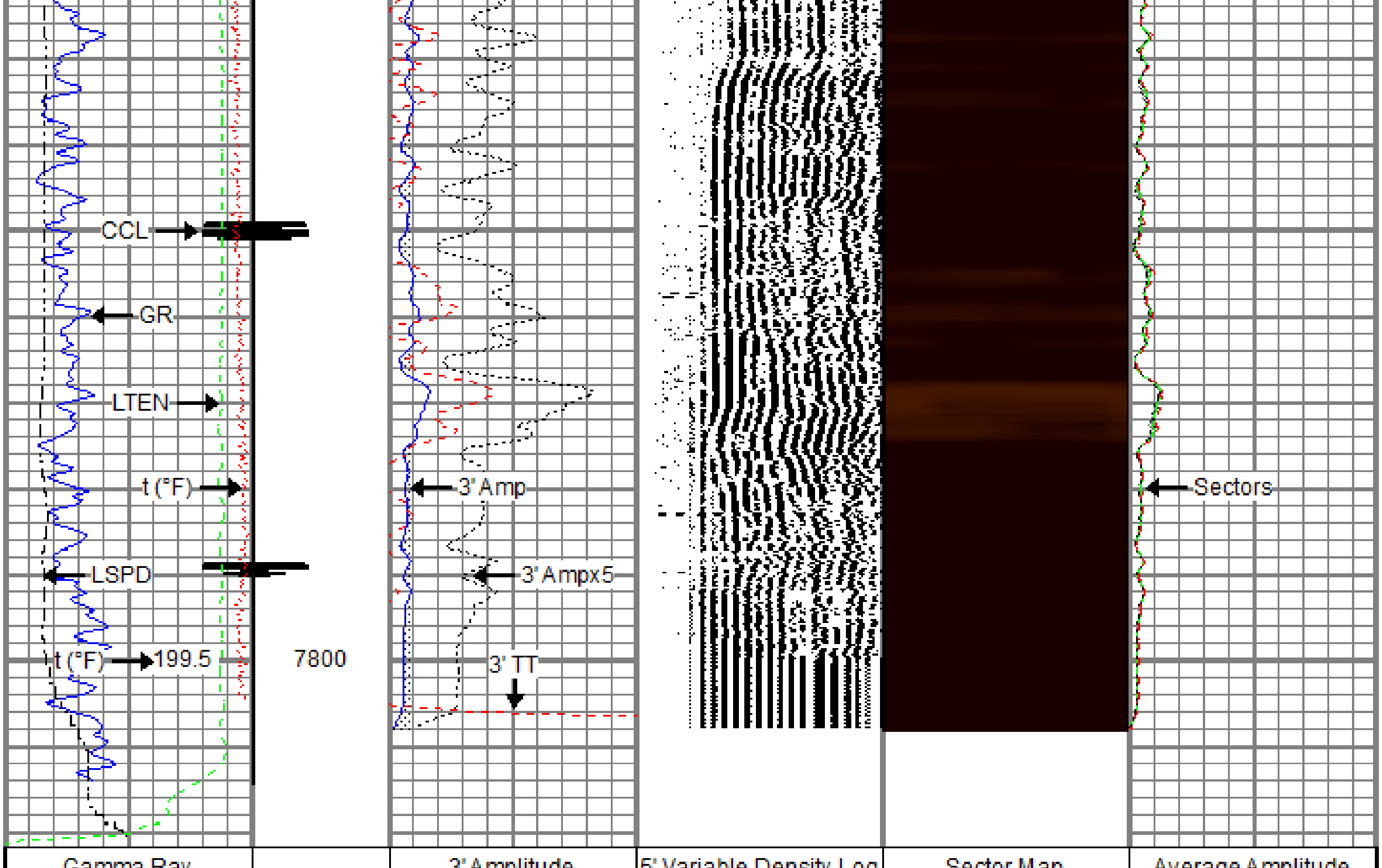

166.0
6800
167.6
6900


169.7
7000
171.9
7100


174.3
7200
177.4
7300


181.0
7400
186.3
7500


190.8
7600
198.0
7700



| 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 | | | | |

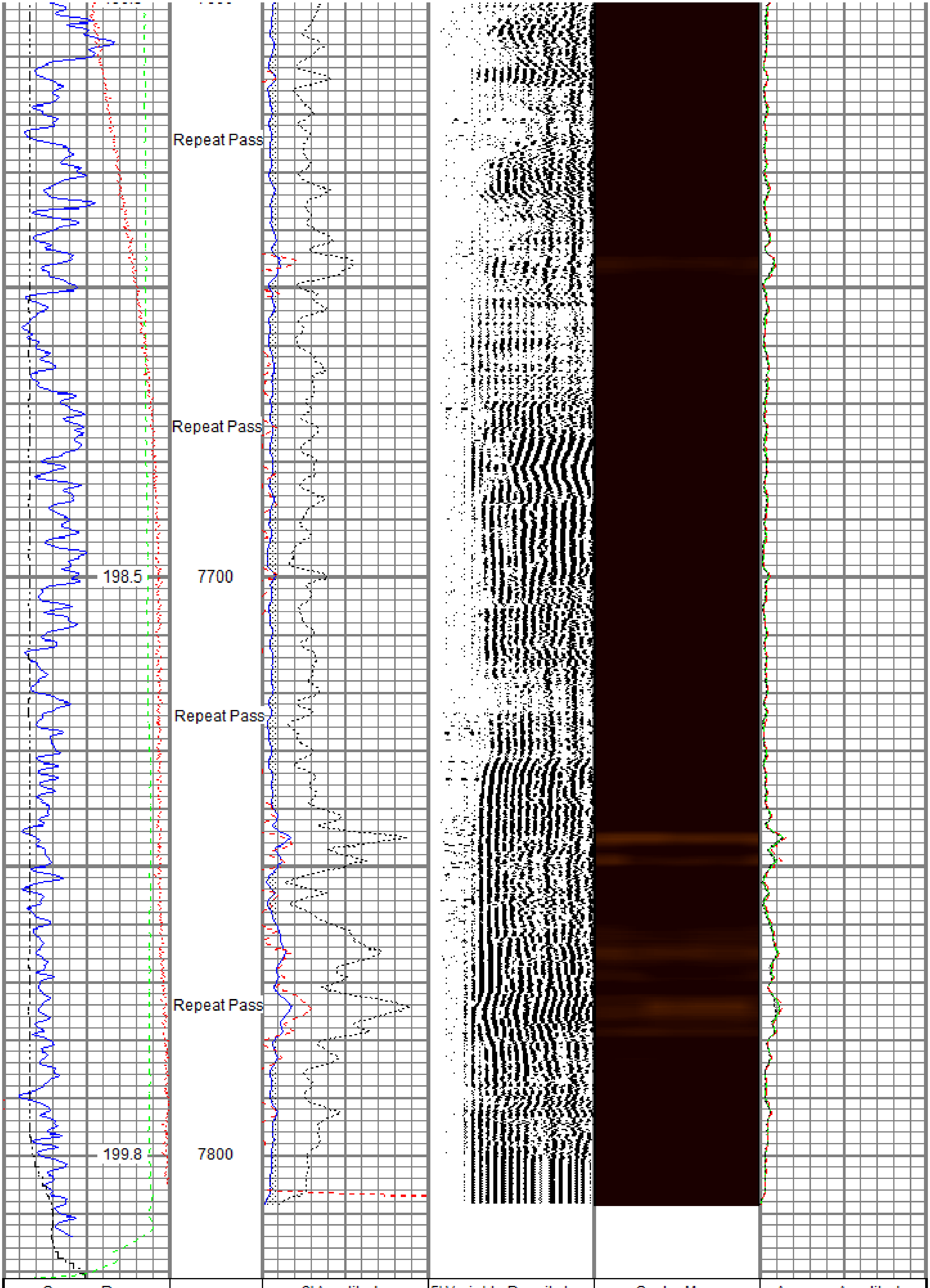
RELIANCE OILFIELD SERVICES

# Repeat Pass

Recorded With 0 PSI Surface Induced Pressure

| | |
|---|---|
| Database File | tep_federal gm 33-10_rbl_10-12-17\processed_tep_federal gm 33-10_rbl_10-12-17.db |
| Dataset Pathname | repeat1.1 |
| Presentation Format | ros_rbt004_tep |
| Dataset Creation | Thu Oct 12 15:46:21 2017 |
| Charted by | Depth in Feet scaled 1:240 |

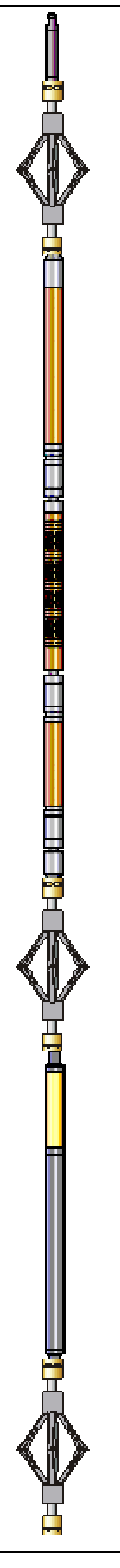
| Gamma Ray | 3' Amplitude | 5' Variable Density Log | Sector Map | Average Amplitude |
|---|---|---|---|---|
| 0 (GAPI) 200 | 0 (mV) 100 | 200 1200 | 10 110 | 0 150 |
| Line Speed | 3' Amplitude x 5 | | | Mimimum Amplitude |
| -150 (ft/min) 150 | 0 (mV) 20 | | | 0 150 |
| Line Tension | 3' Travel Time | | | 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) |
|---|---|
| HeadVolt | 18.84 |
| 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_1-1<br>Electric Cable Head with 1" Fishing Neck | 1/11.03 | 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<br>Probe 2-3/4" Sector Cement Bond Tool with Temperature Probe | -099.19 | 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 (FW1<br>Probe 2-3/4" Digital CCL / Gamma Ray Combined | 214.541) | 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_Federal GM 33-10_RBL_10-12-17.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_federal gm 33-10_rbl_10-12-17\processed_tep_federal gm 33-10_rbl_10-12 |
| Dataset Pathname | main_1.1 |
| Dataset Creation | Thu Oct 12 15:39:14 2017 |

### Gamma Ray Calibration Report

| | | |
|---|---|---|
| Serial Number: | FW1211-081 | |
| Tool Model: | P_CGR_2750_S | |
| Performed: | Sat Feb 06 11:31:52 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: | 28.652 | ft |

Master Calibration, performed (Derived):

| | Raw (v) | | Calibrated (mv) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3' | -0.010 | 0.715 | 0.800 | 81.196 | 110.865 | 1.892 |
| CAL | 0.782 | 0.781 | | | | |
| 5' | -0.016 | 0.661 | 0.800 | 81.196 | 118.737 | 2.675 |
| SUM | | | | | | |
| S1 | -0.009 | 0.778 | 0.000 | 100.000 | 127.100 | 1.165 |
| S2 | -0.005 | 0.743 | 0.000 | 100.000 | 133.562 | 0.723 |
| S3 | -0.009 | 0.729 | 0.000 | 100.000 | 135.597 | 1.213 |
| S4 | -0.010 | 0.745 | 0.000 | 100.000 | 132.465 | 1.368 |
| S5 | -0.010 | 0.788 | 0.000 | 100.000 | 125.182 | 1.298 |
| S6 | -0.006 | 0.756 | 0.000 | 100.000 | 131.183 | 0.832 |
| S7 | -0.009 | 0.734 | 0.000 | 100.000 | 134.543 | 1.189 |
| S8 | -0.006 | 0.745 | 0.000 | 100.000 | 133.181 | 0.798 |

Internal Reference Calibration, performed Fri May 05 10:29:14 2017:

| | Raw (v) | | Calibrated (v) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| CAL | 0.000 | 0.000 | 0.782 | 0.781 | 1.000 | 0.000 |

Air Zero Calibration, performed Mon Oct 09 10:29:46 2017:

| | Raw (v) | Calibrated (v) | Results |
|---|---|---|---|
| | Zero | Zero | Offset |
| 3' | -0.006 | 0.000 | -0.000 |
| 5' | -0.002 | 0.000 | -0.000 |
| SUM | | | |
| S1 | -0.008 | 0.000 | 0.000 |
| S2 | -0.005 | 0.000 | 0.000 |
| S3 | -0.005 | 0.000 | 0.000 |
| S4 | -0.005 | 0.000 | 0.000 |
| S5 | -0.006 | 0.000 | 0.000 |
| S6 | -0.005 | 0.000 | 0.001 |
| S7 | -0.006 | 0.000 | 0.000 |
| S8 | -0.005 | 0.000 | -0.000 |

RELIANCE OILFIELD SERVICES

| | |
|---|---|
| Company | TEP Rocky Mountain LLC |
| Well | Federal GM 33-10 |
| Field | Grand Valley |
| County | Garfield |
| State | Colorado |