



**Radial Cement Bond
Variable Density Log
W/Gamma Ray/CCL/Temp**

Company Antero Resources
Well Avalanche Unit 1H
Field North Canton
County Tyler
State West Virginia

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Well Avalanche Unit 1H
Field North Canton
County Tyler State West Virginia

Location: API #: 47-095-02603
SEC N/A TWP N/A RGE N/A
Permanent Datum Ground Level Elevation
Log Measured From Kelly Bushing (25')
Drilling Measured From Kelly Bushing
Other Services
Elevation
K.B.
D.F.
G.L.

| | | |
|------------------------|----------------|----------------------------|
| Date | 15-Mar-2020 | |
| Run Number | One | |
| Depth Driller | 17,890 ft. | |
| Depth Logger | 6,708 ft. | |
| Bottom Logged Interval | 6,708 ft. | |
| Top Log Interval | Surface | |
| Open Hole Size | N/A | |
| Type Fluid | Water | |
| Density / Viscosity | N/A | |
| Max. Recorded Temp. | 148 Deg. F. | |
| Estimated Cement Top | 4,324 ft. | |
| Time Well Ready | 06:30 | |
| Time Logger on Bottom | 09:42 | |
| Equipment Number | 132 | |
| Location | Marietta, Ohio | |
| Recorded By | Tom Weese | |
| Witnessed By | Dan Fisher | |
| Borehole Record | | |
| Run Number | Bit | From To |
| Tubing Record | | |
| Run Number | Size | Weight From To |
| Casing Record | | |
| Surface String | Size | Wgt/Ft Top Bottom |
| Prot. String | 13 3/8 in. | 54.5 lbs. Surface 428 ft. |
| Production String | 9 5/8 in. | 36 lbs. Surface 2,596 ft. |
| Liner | 5 1/2 in. | 20 lbs. Surface 17,890 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

Primary Log on Well

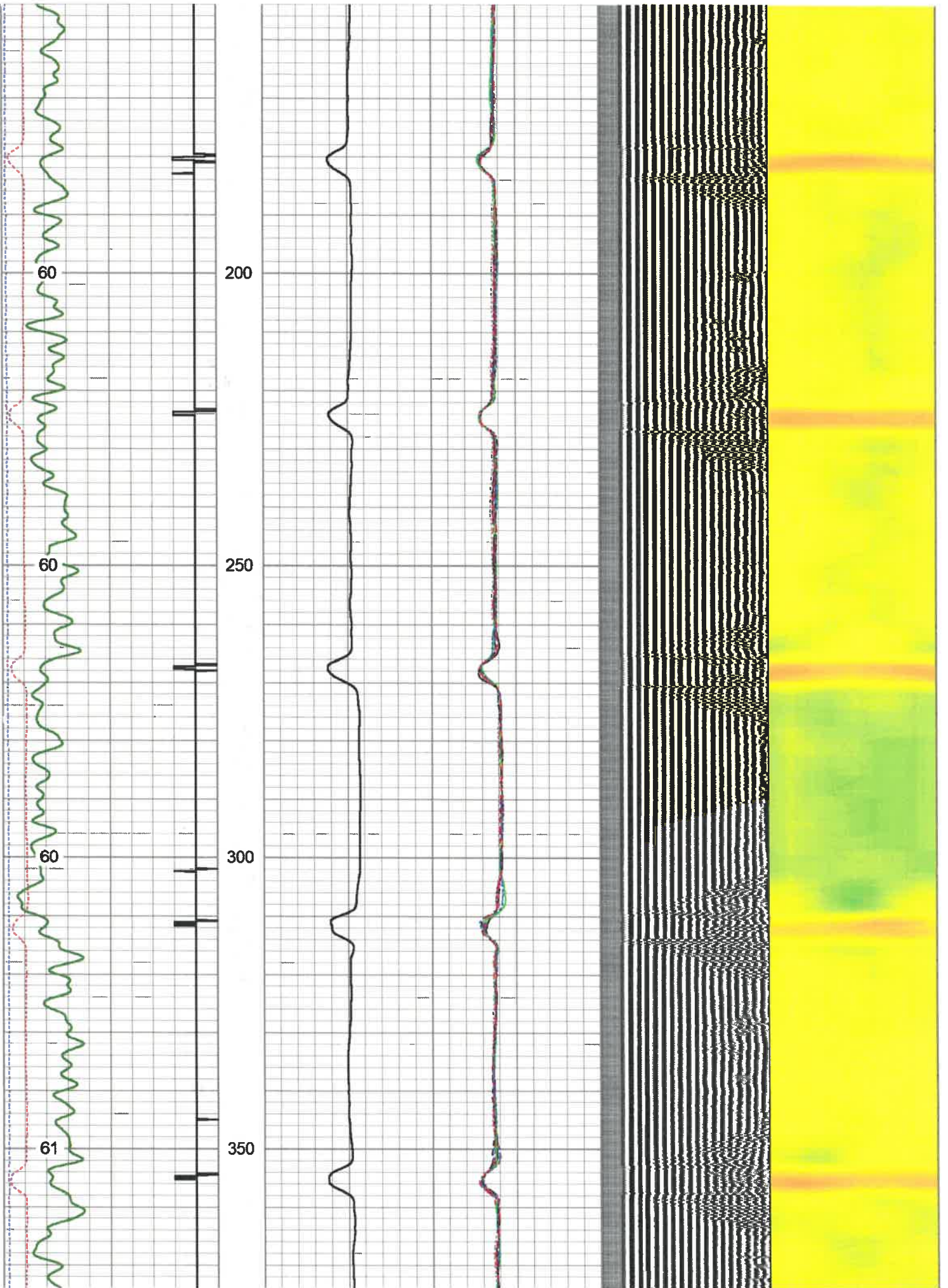
Marker Joint @ 6,514 - 6,525 ft.
Correction to Pipe Tally Depth Shifted (-11)

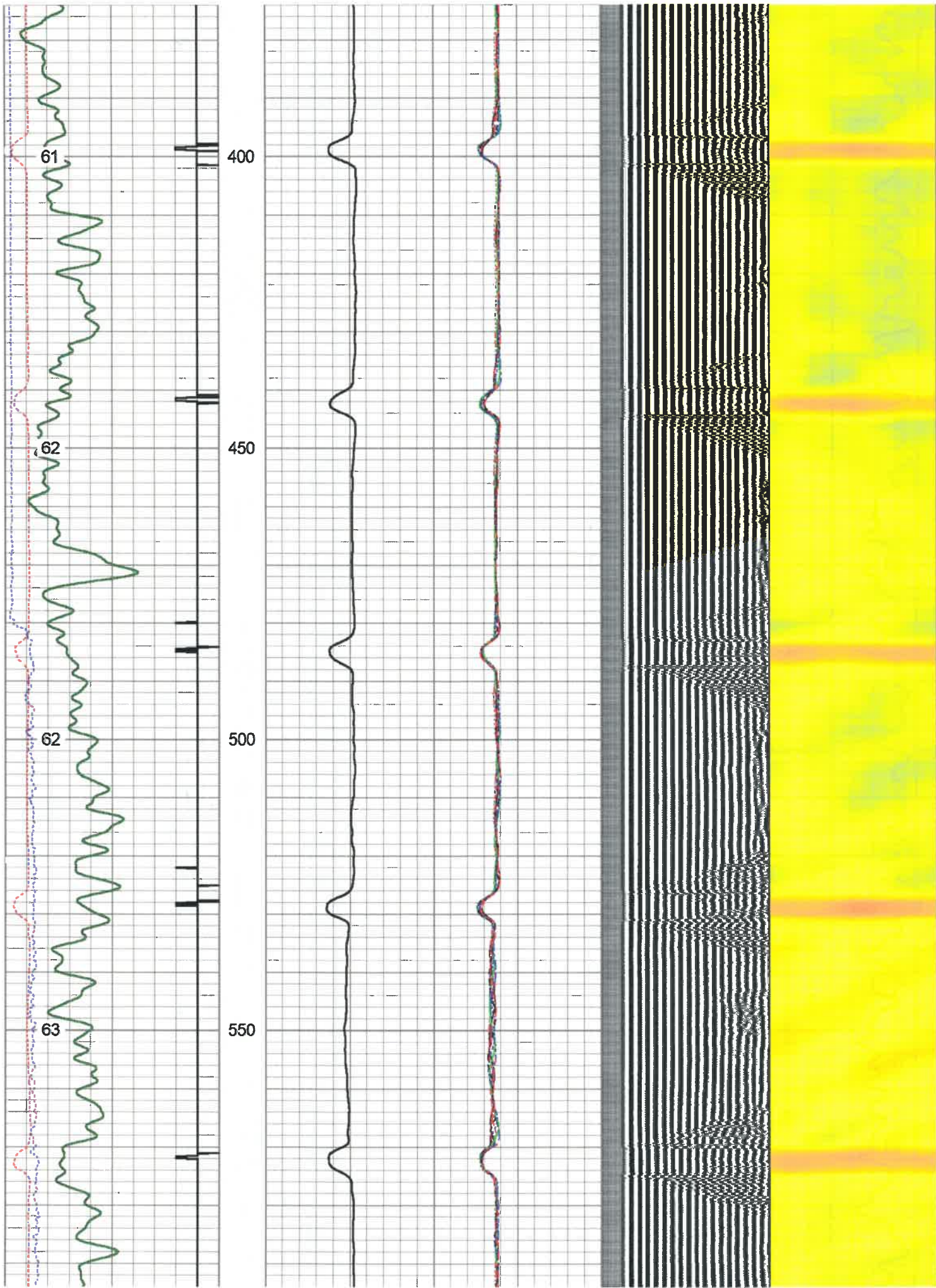
Main Pass 1,500 PSI
Repeat Pass 0 PSI

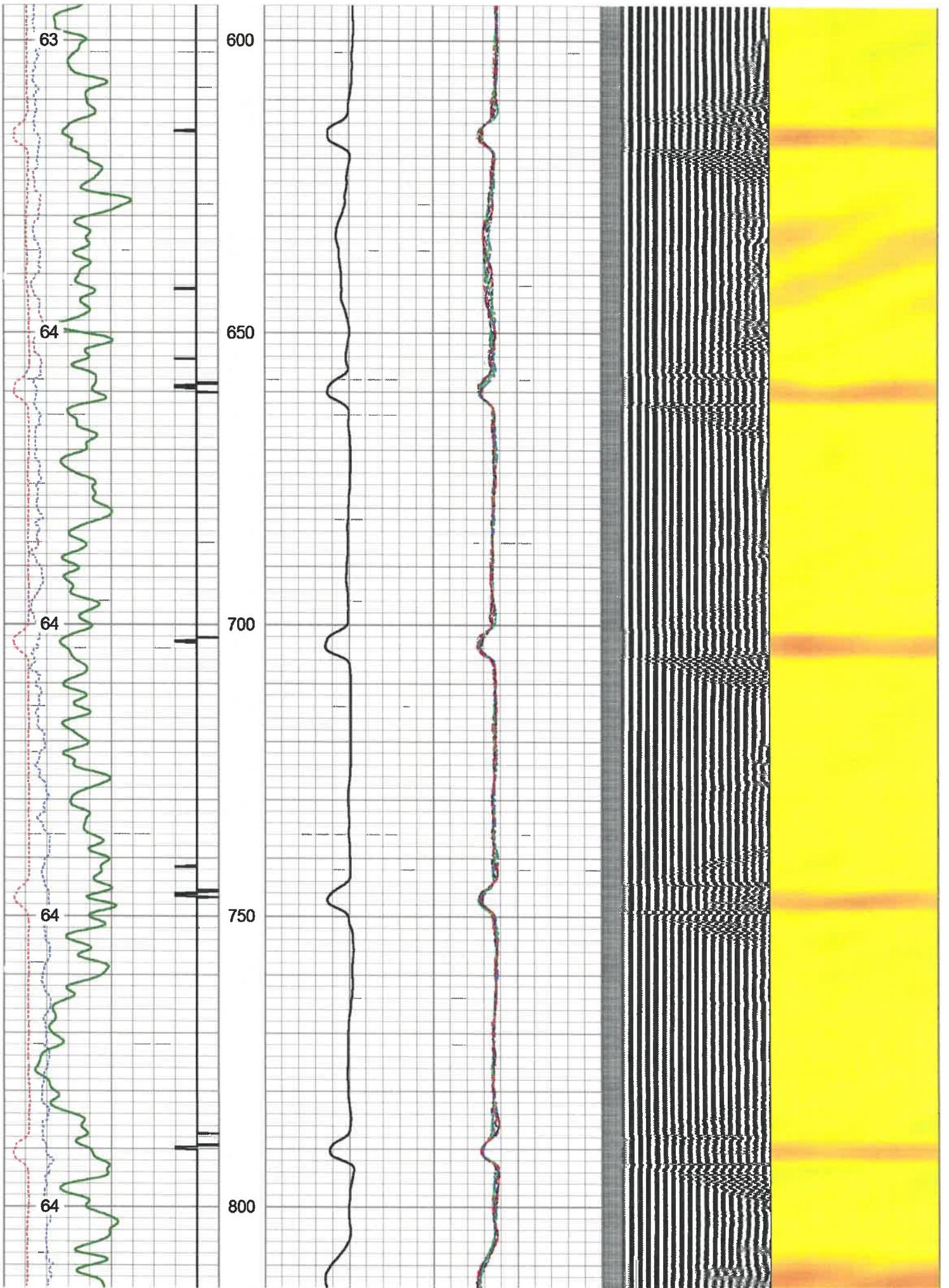
Thank You For Choosing Nine Energy Service Wireline. Marietta, Ohio

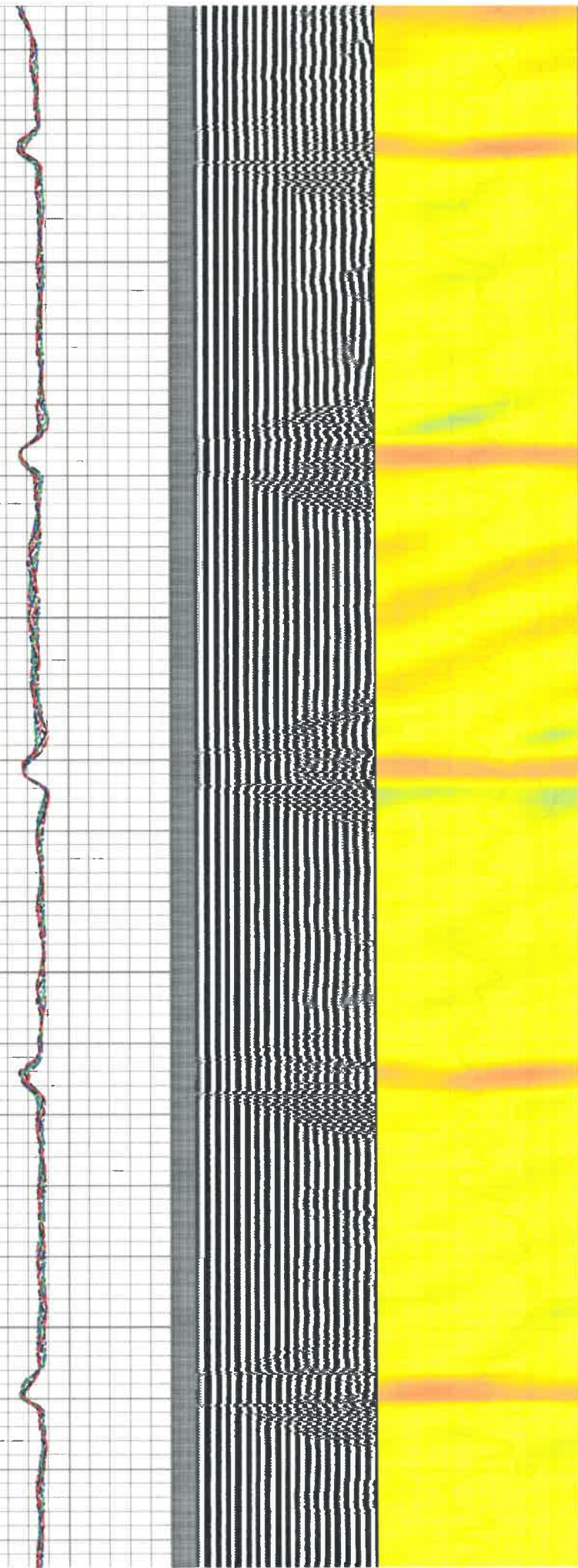
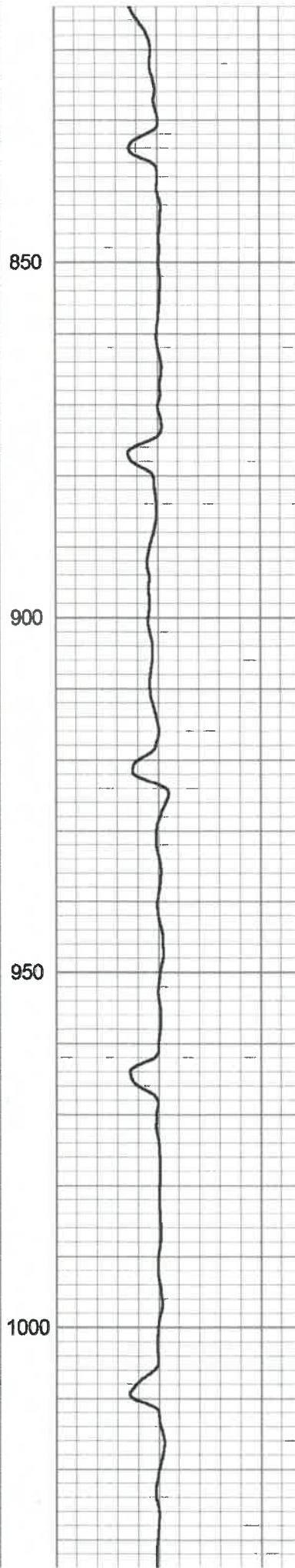
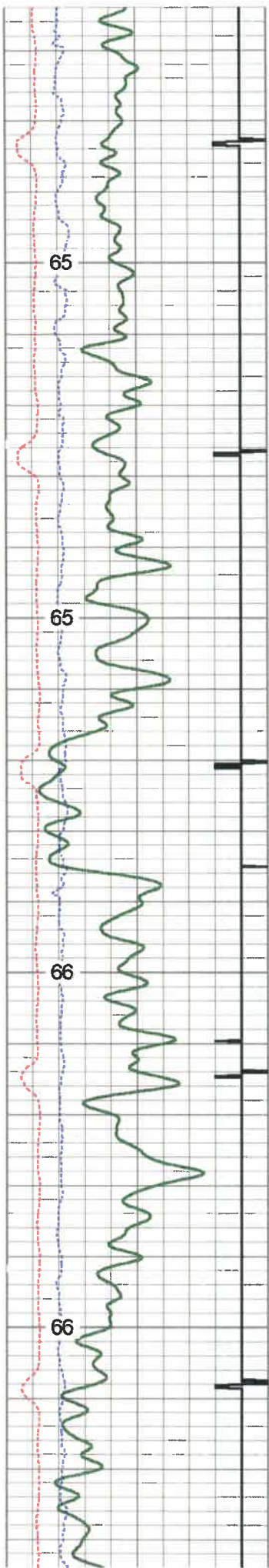


Main Pass 1,500 PSI

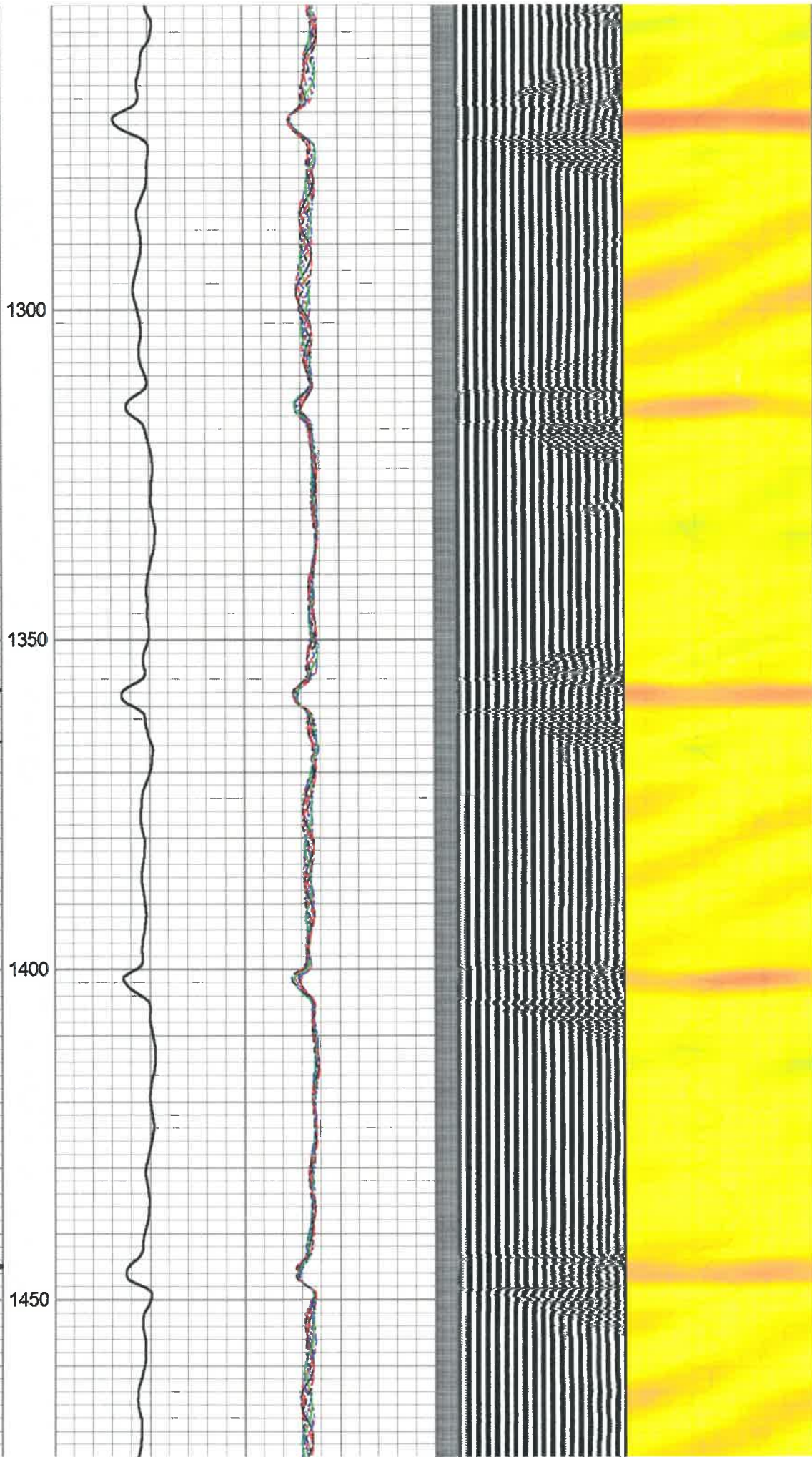
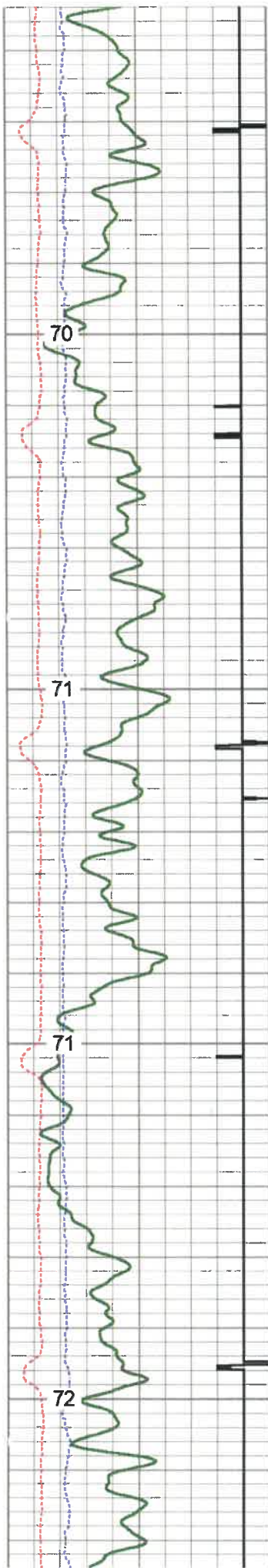


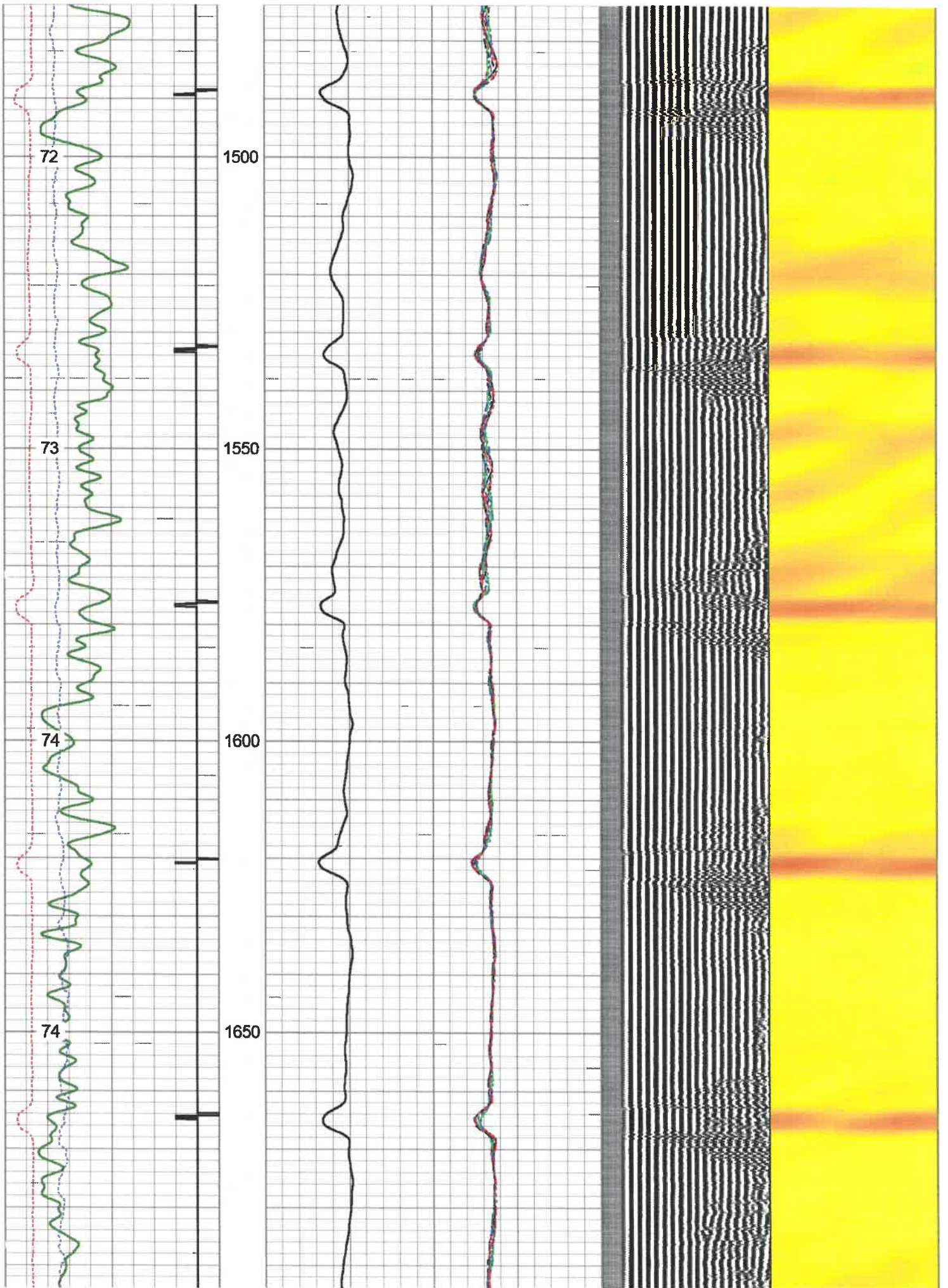




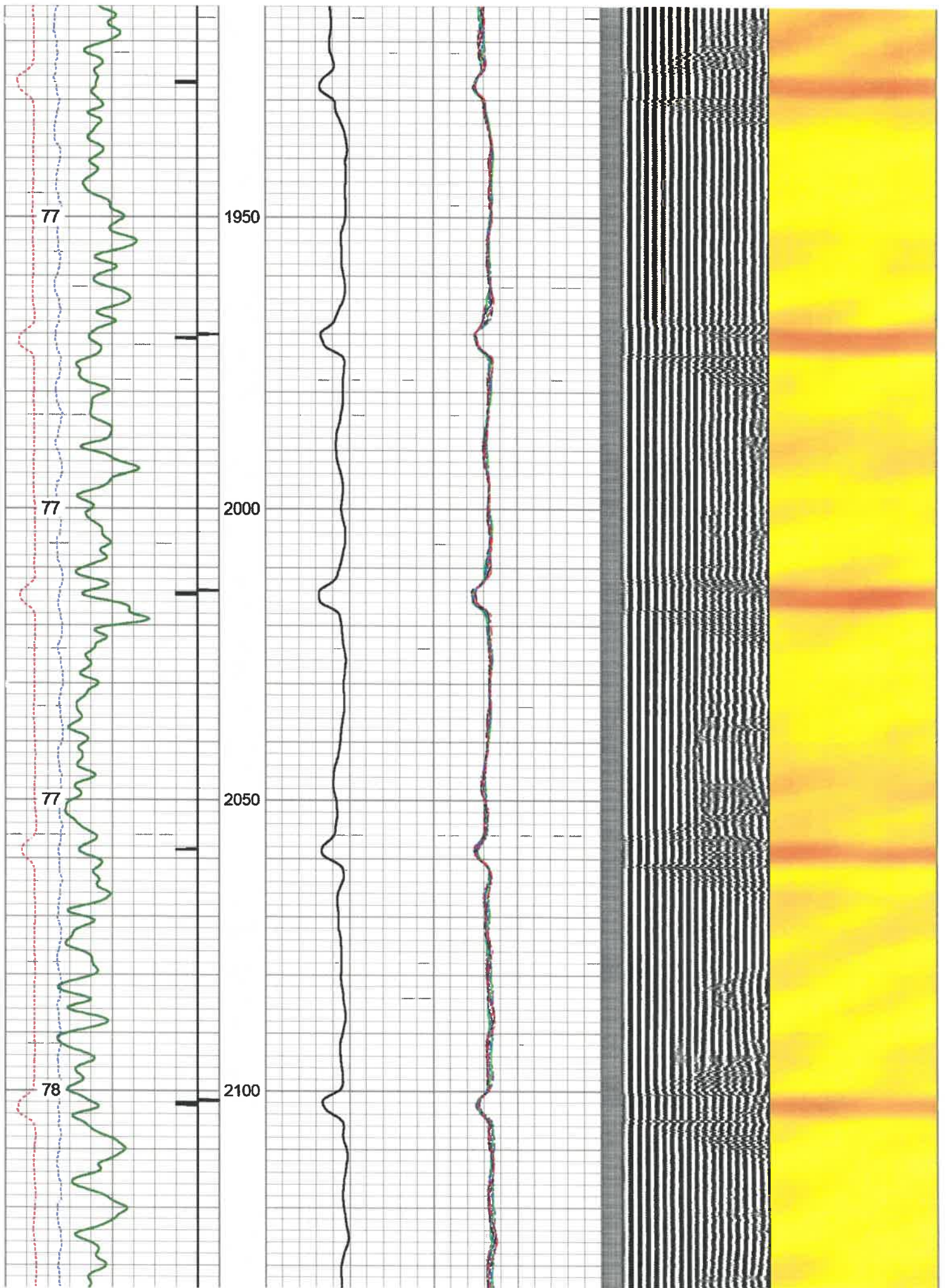




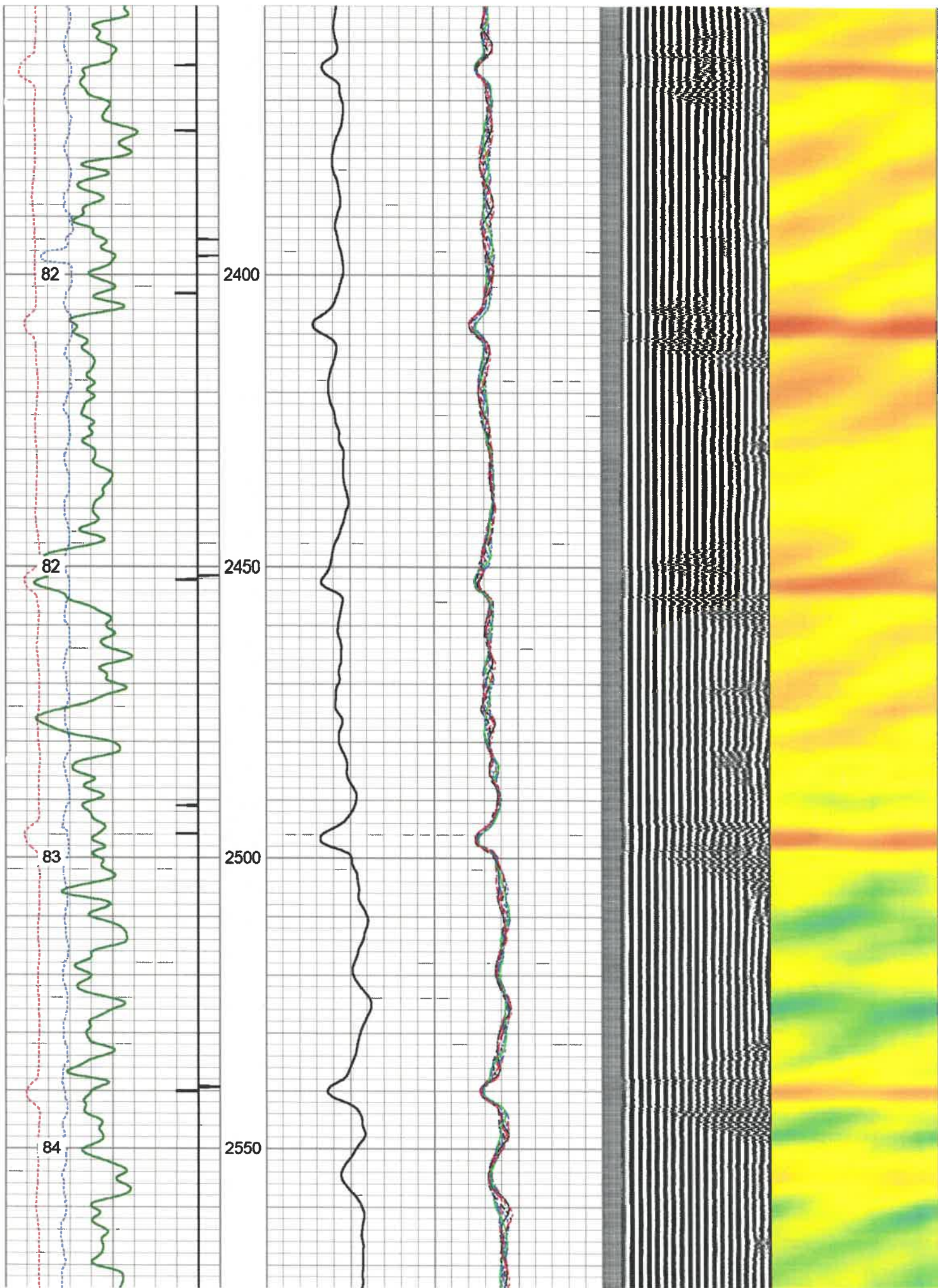


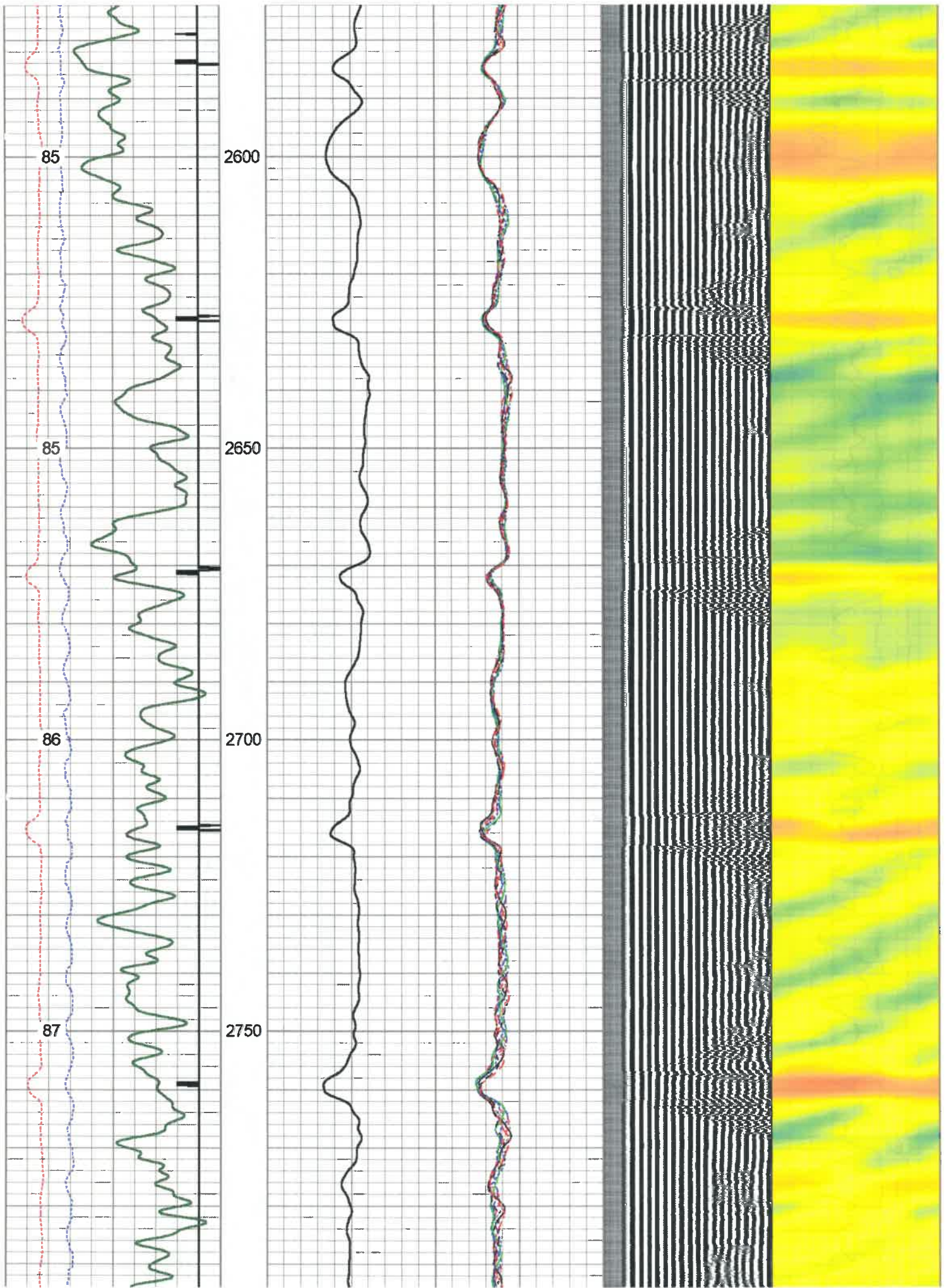


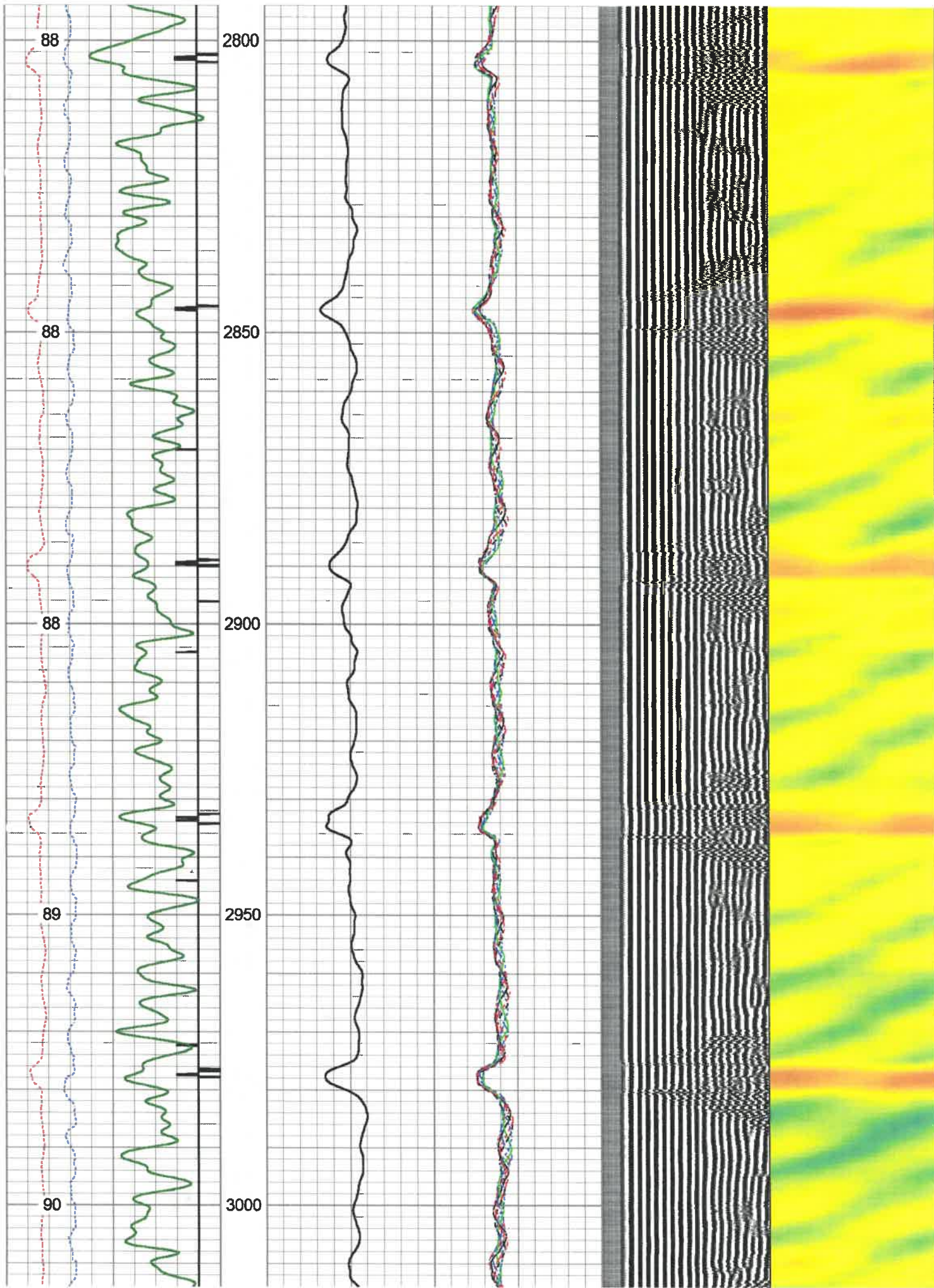


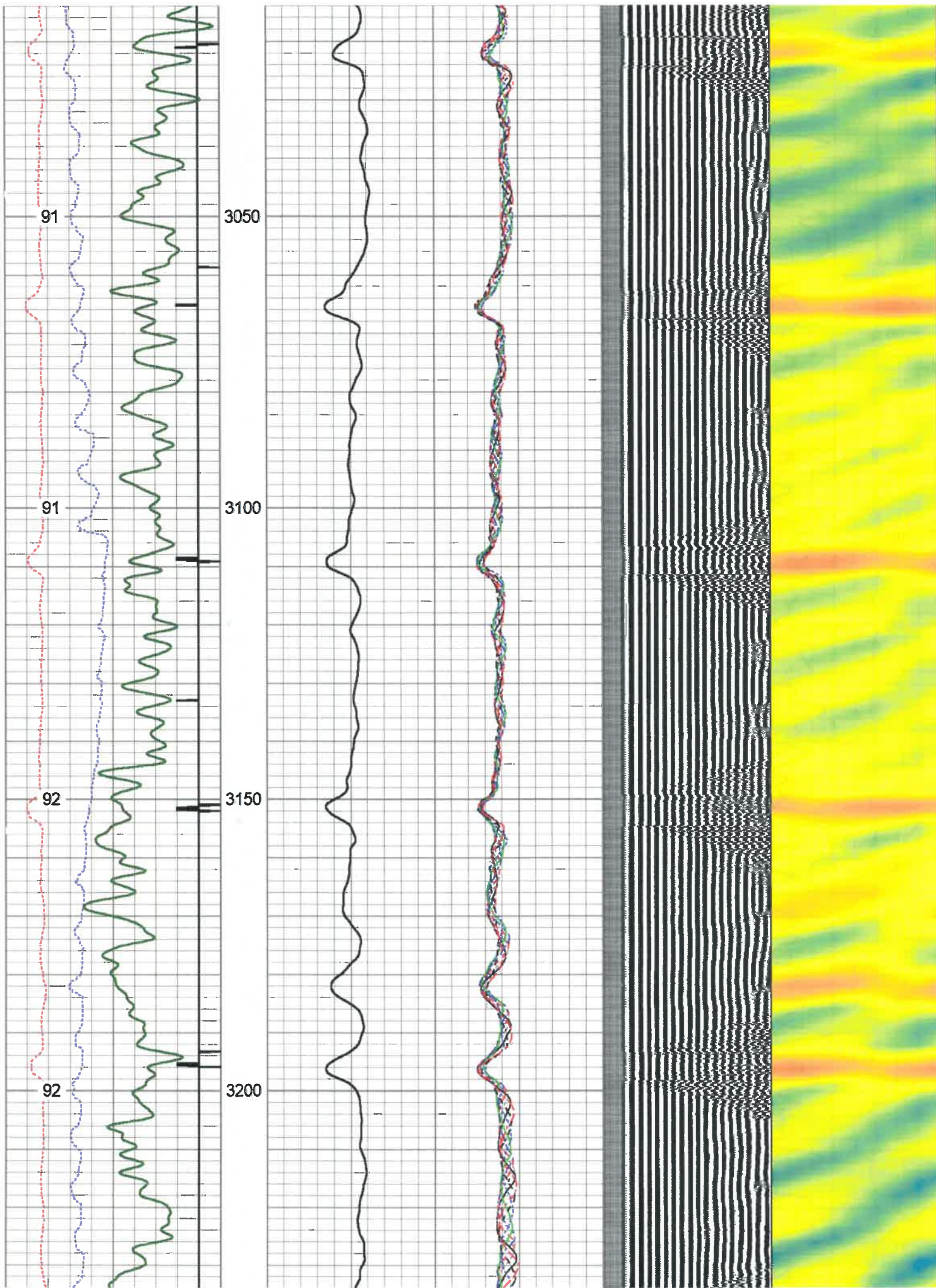


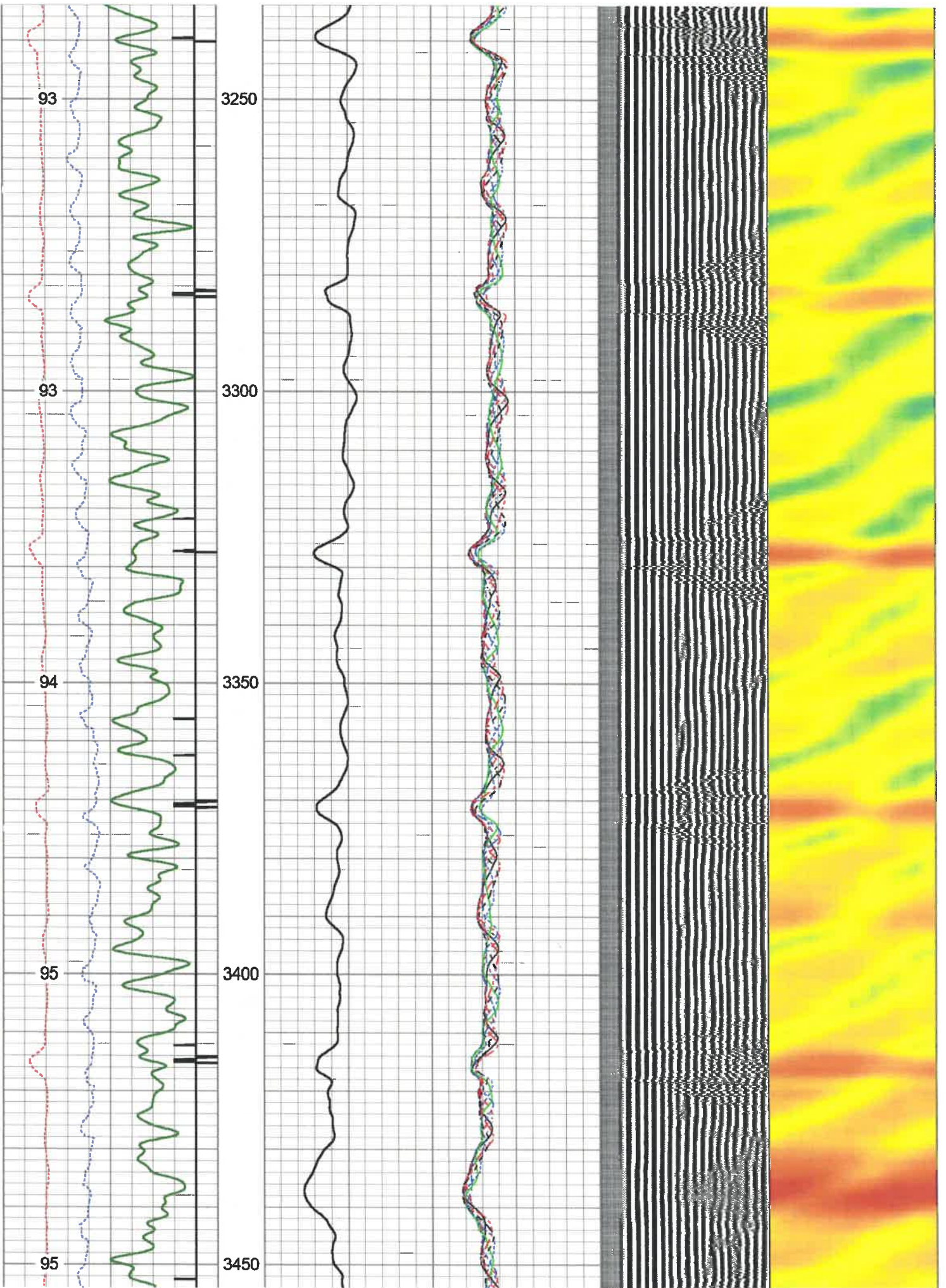


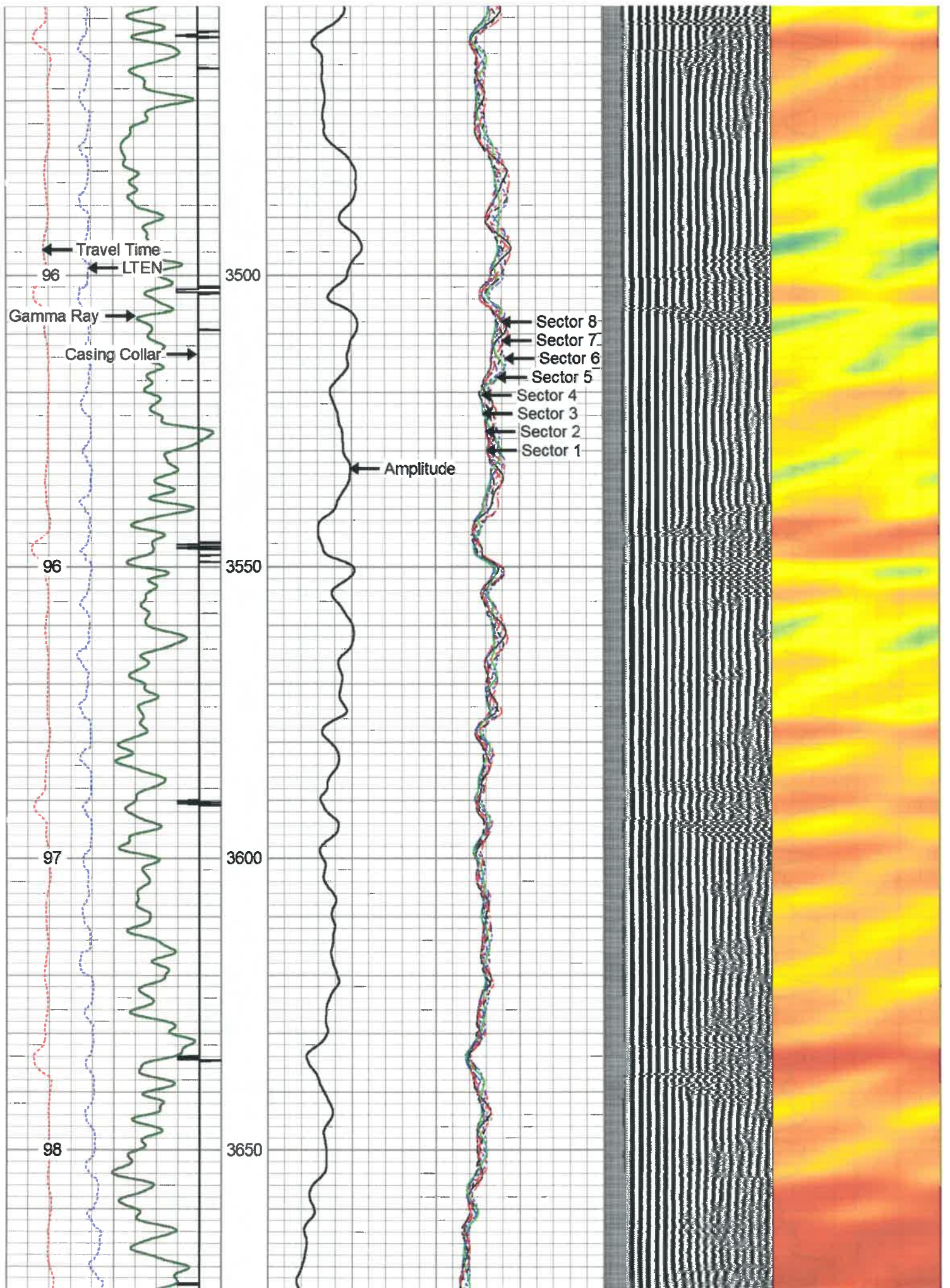


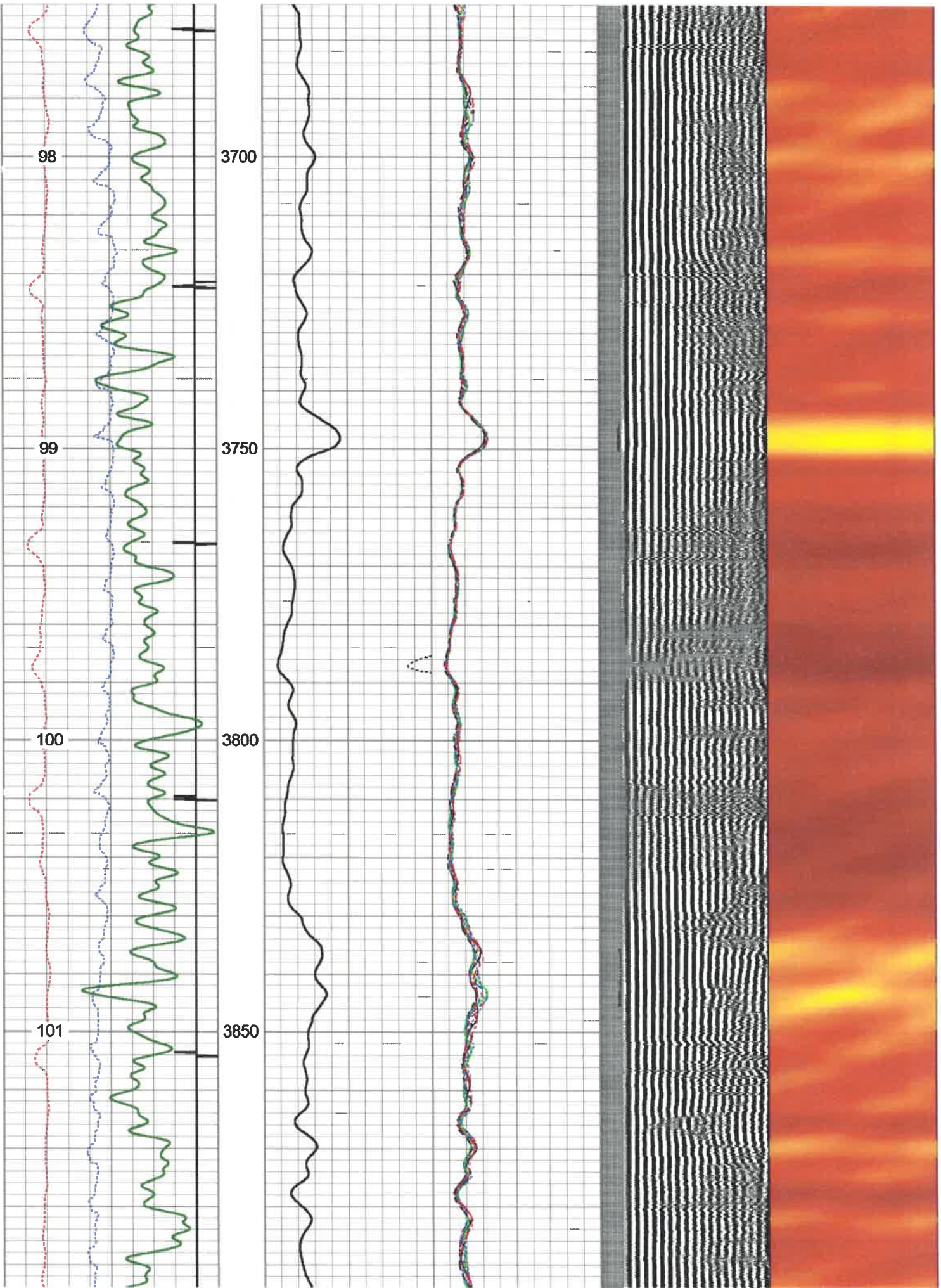


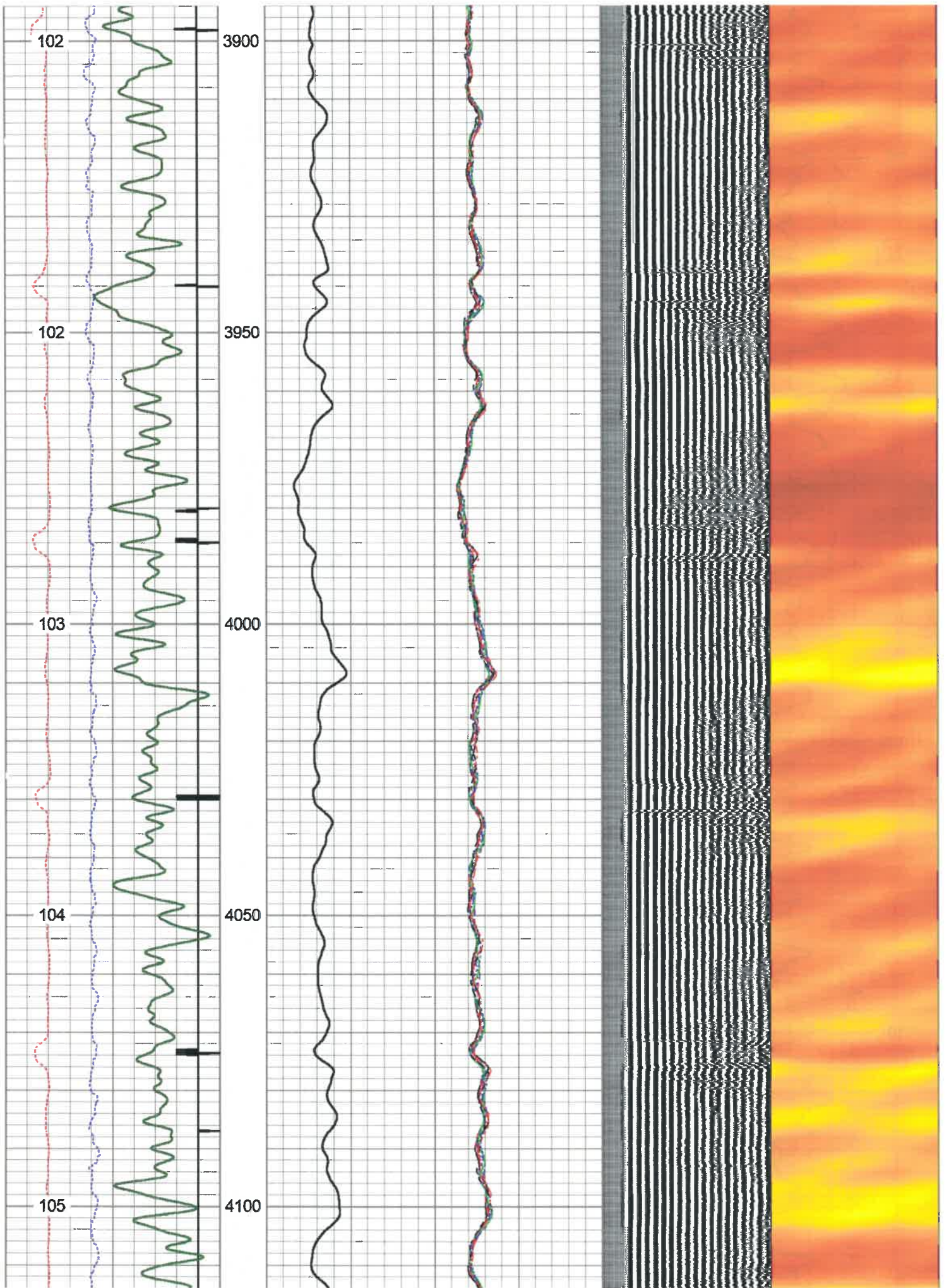


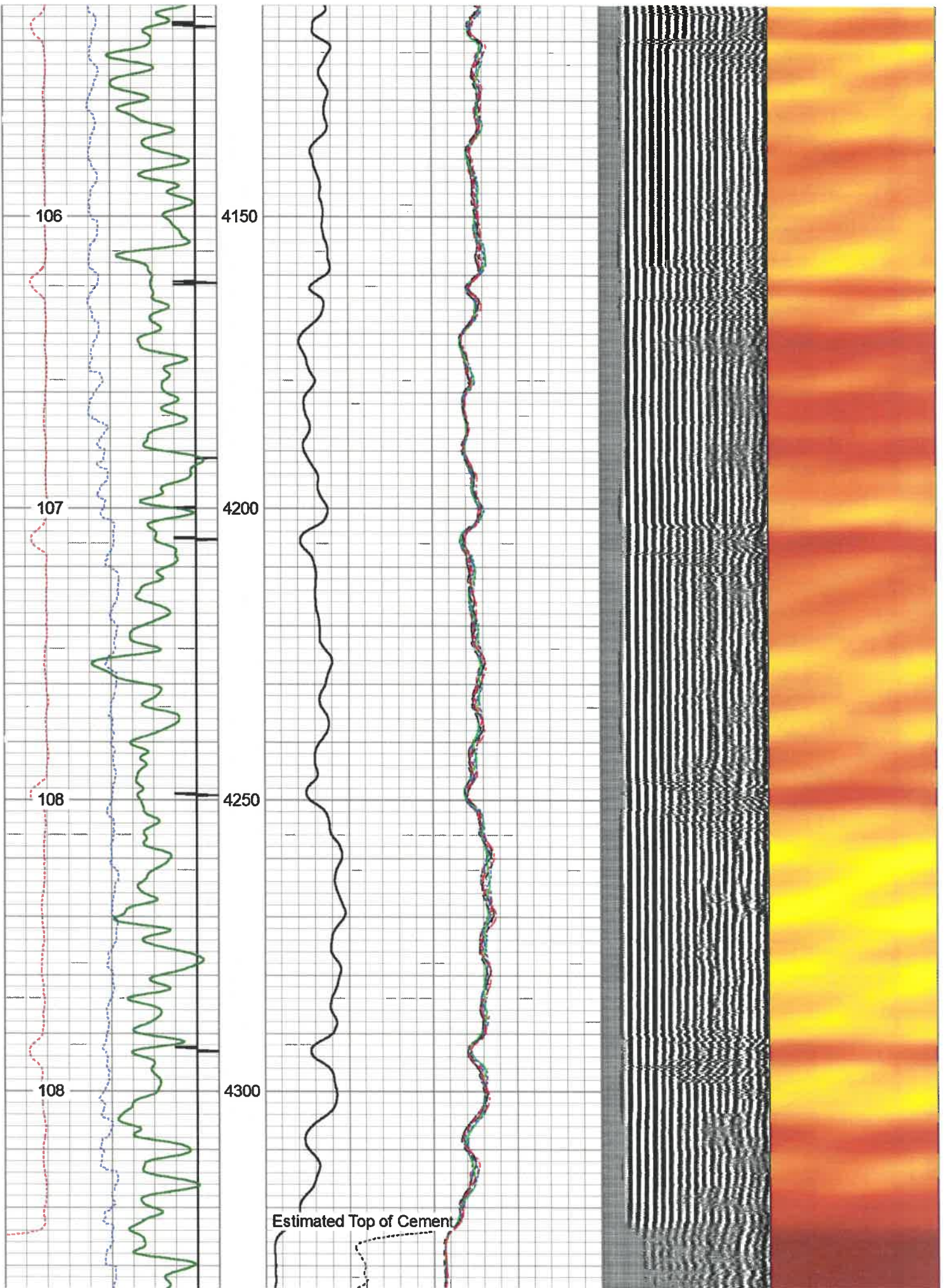


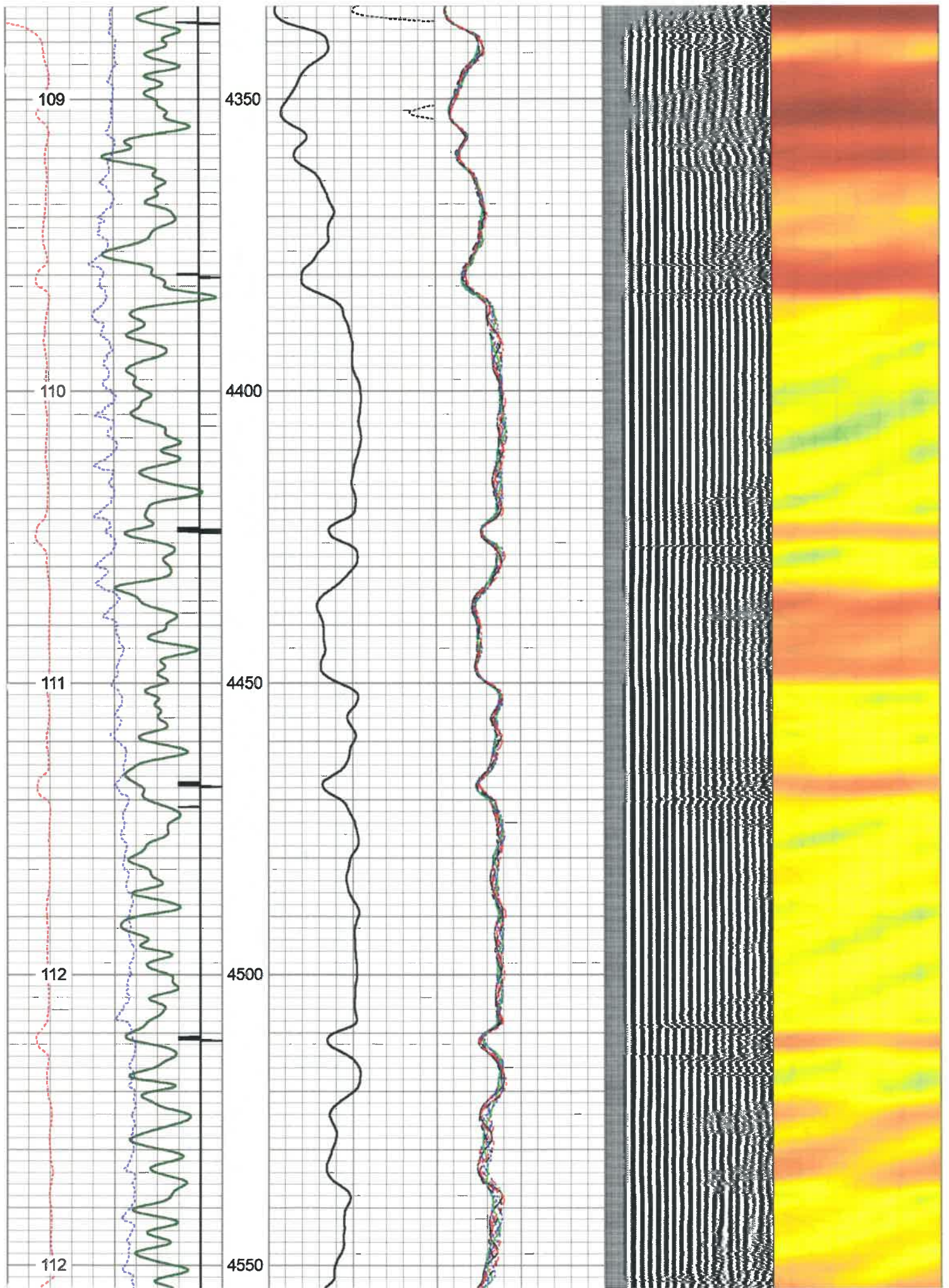


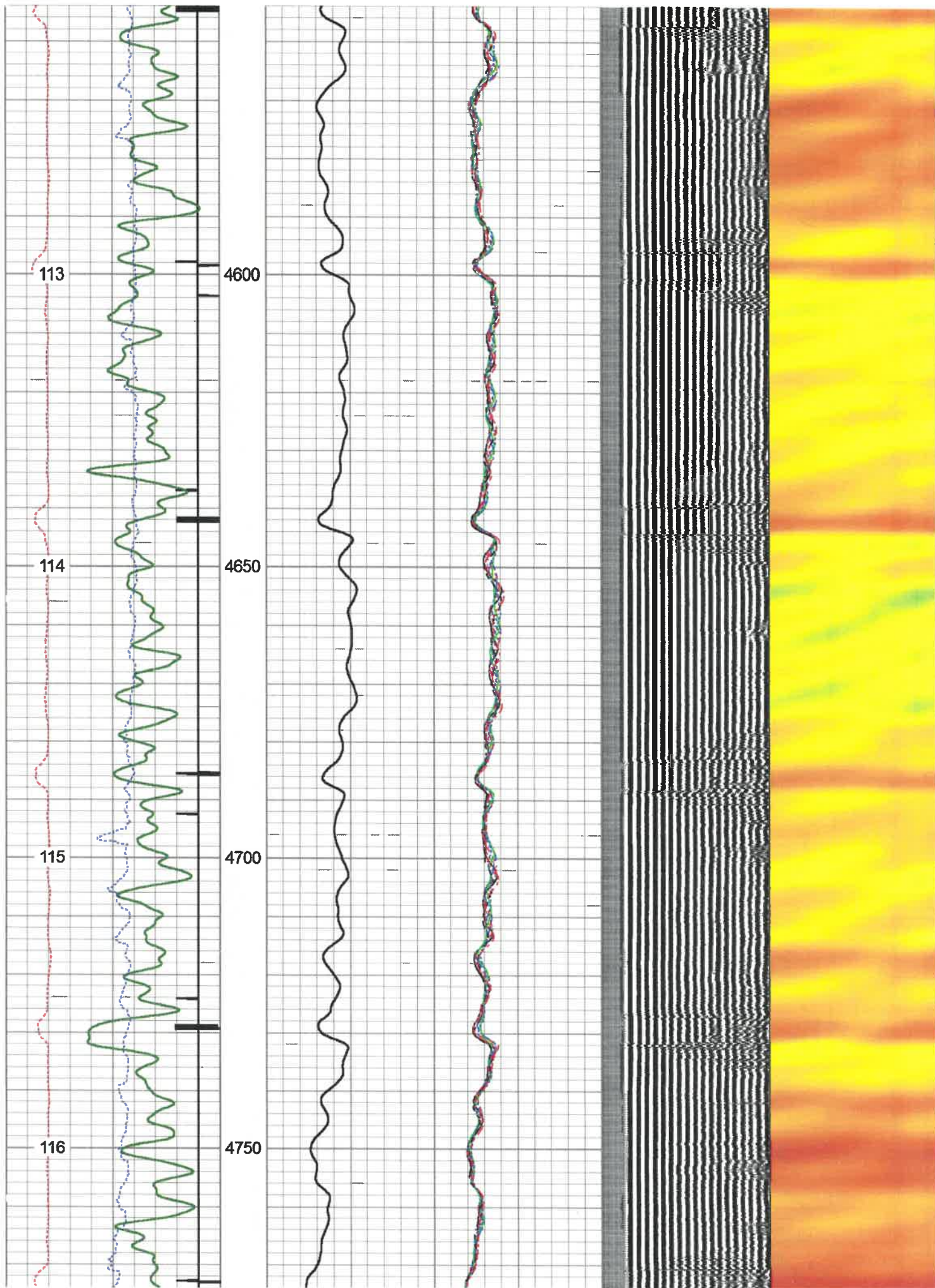


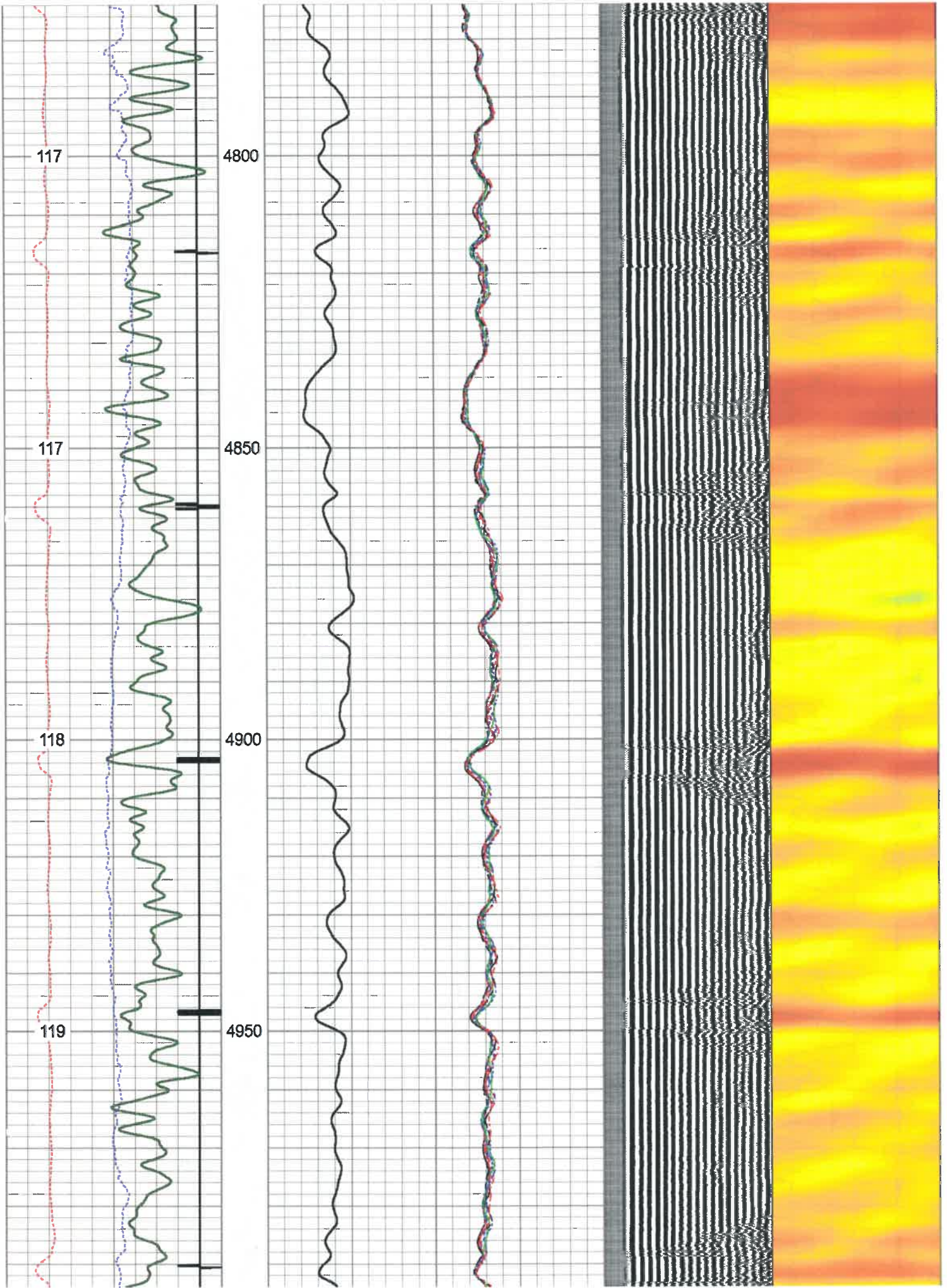


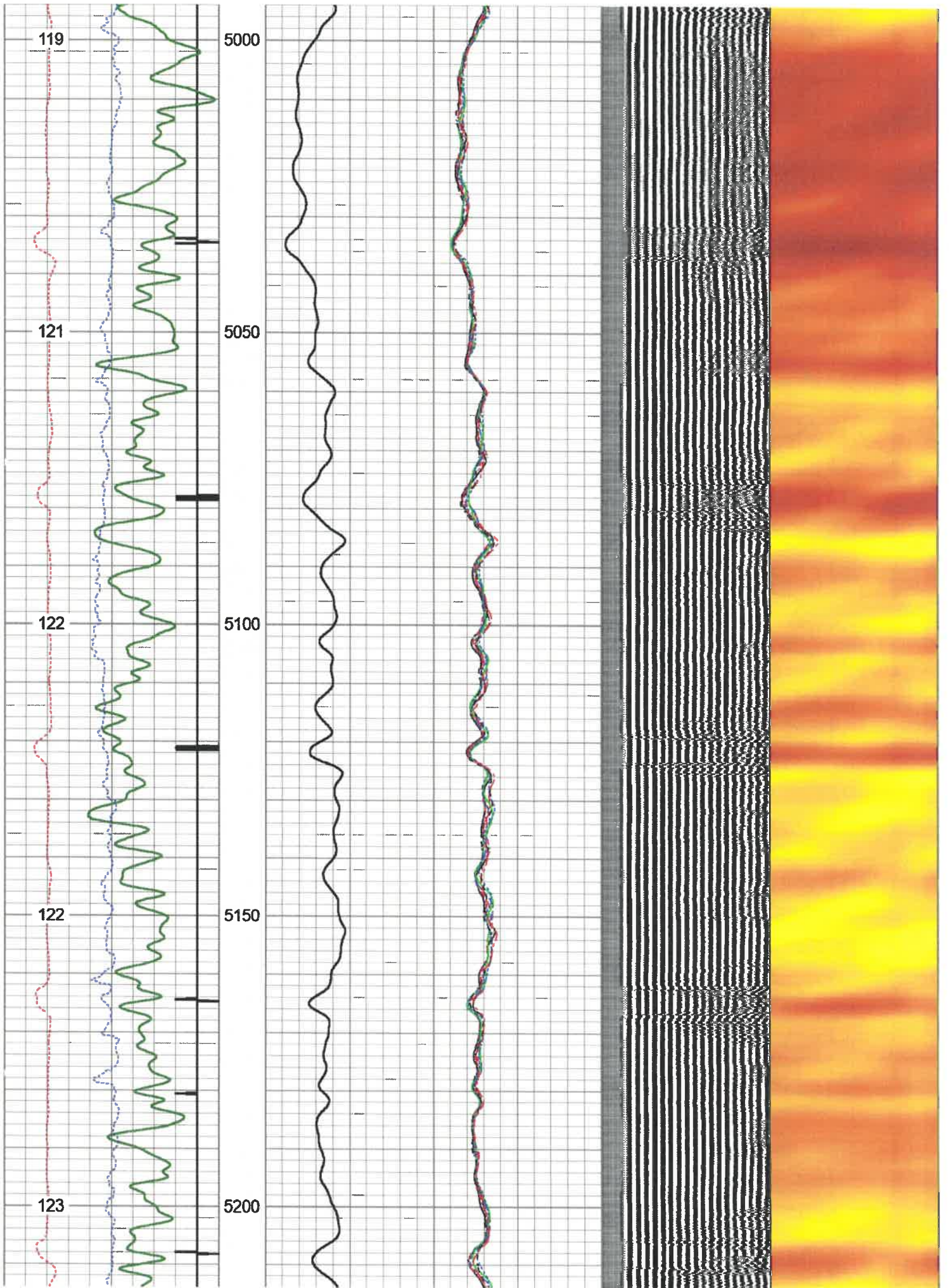


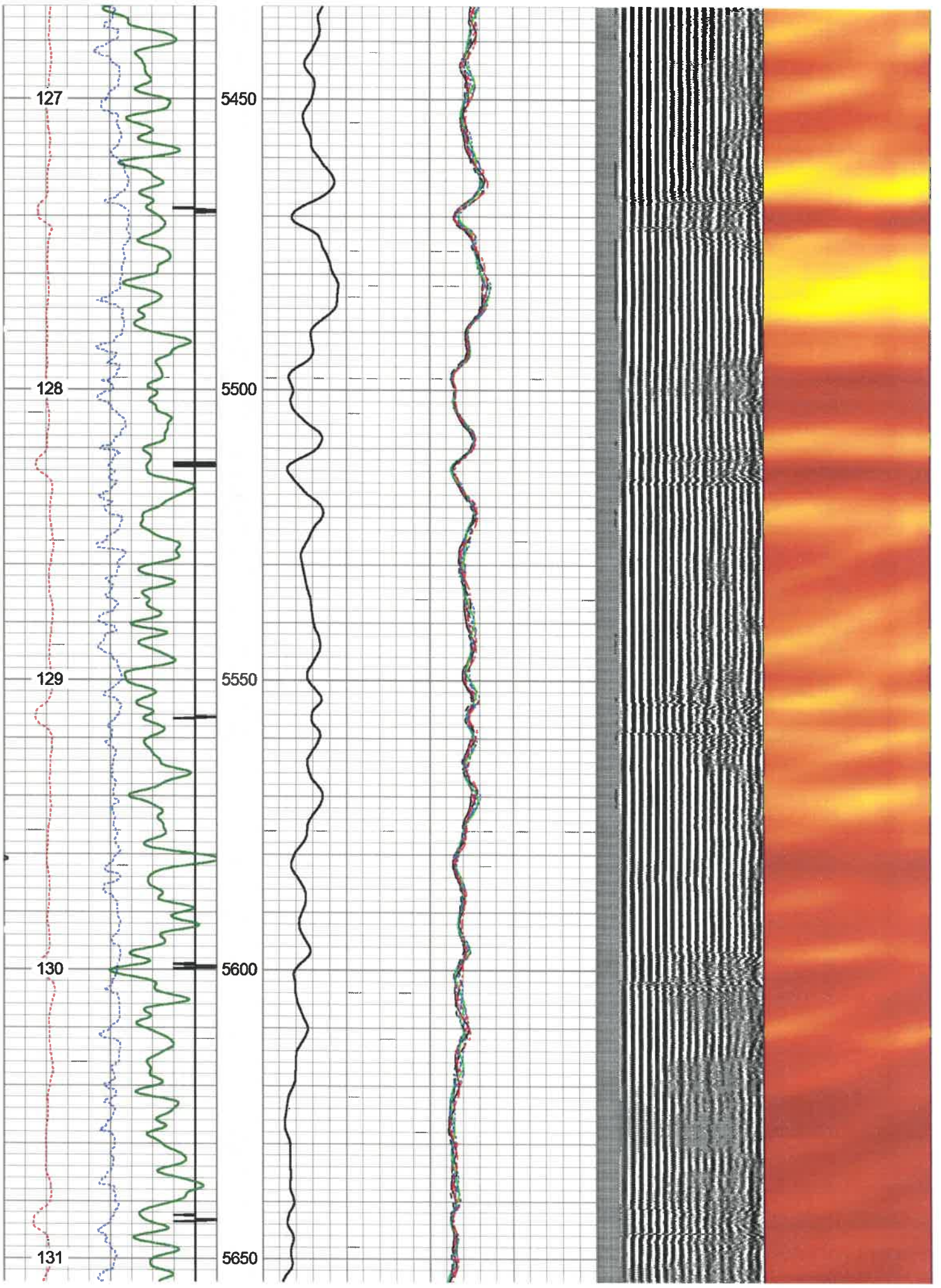


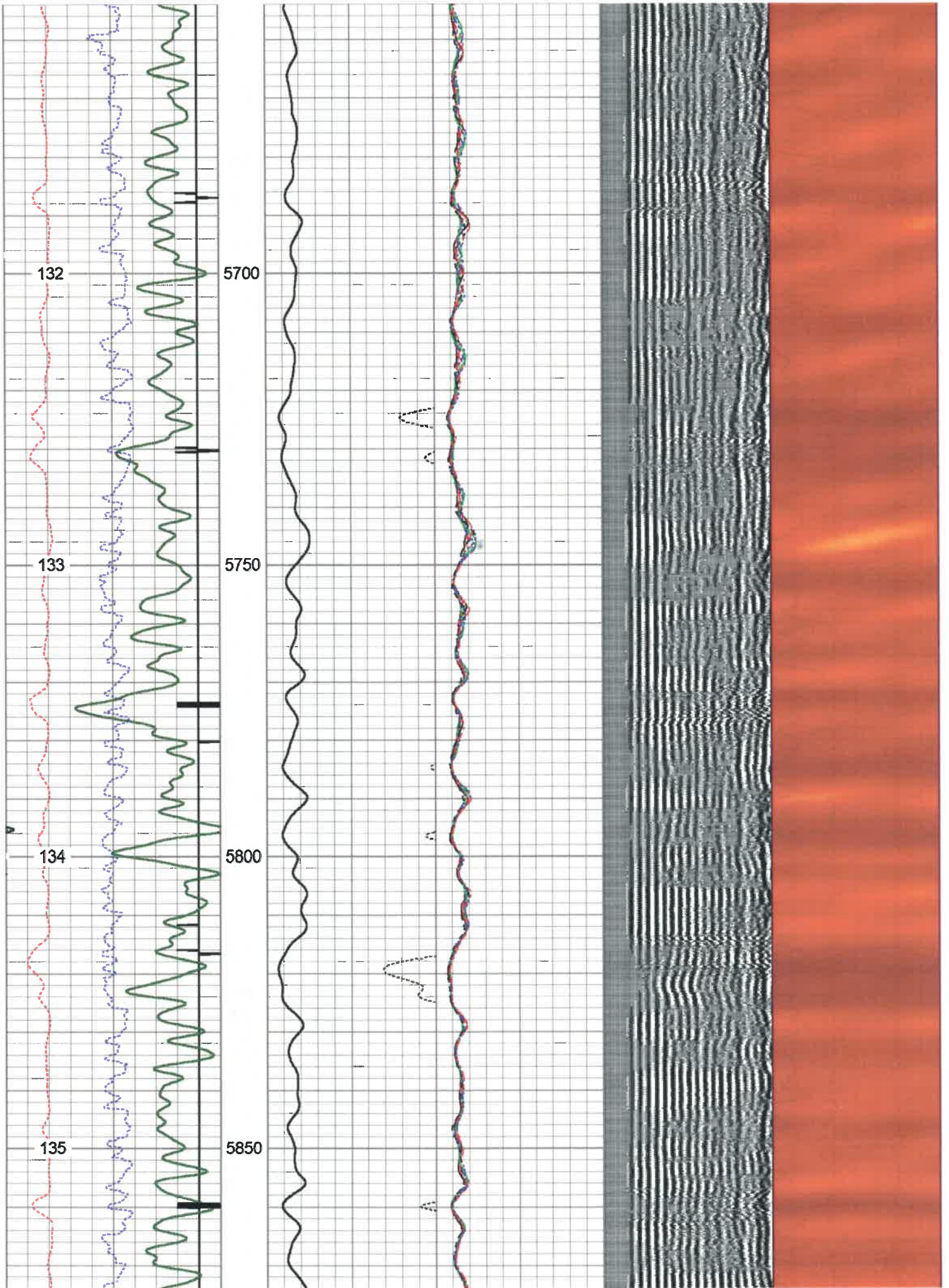


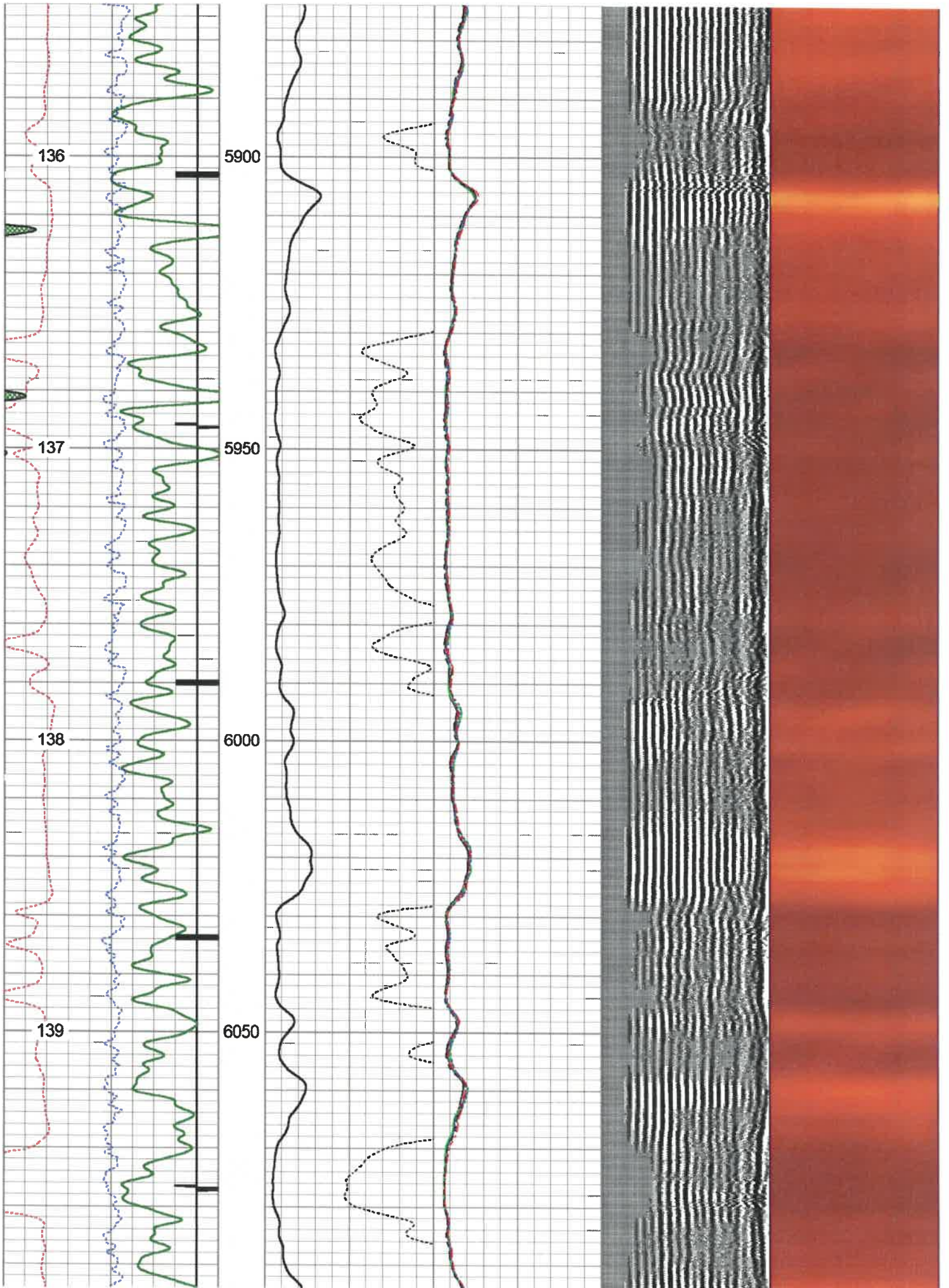


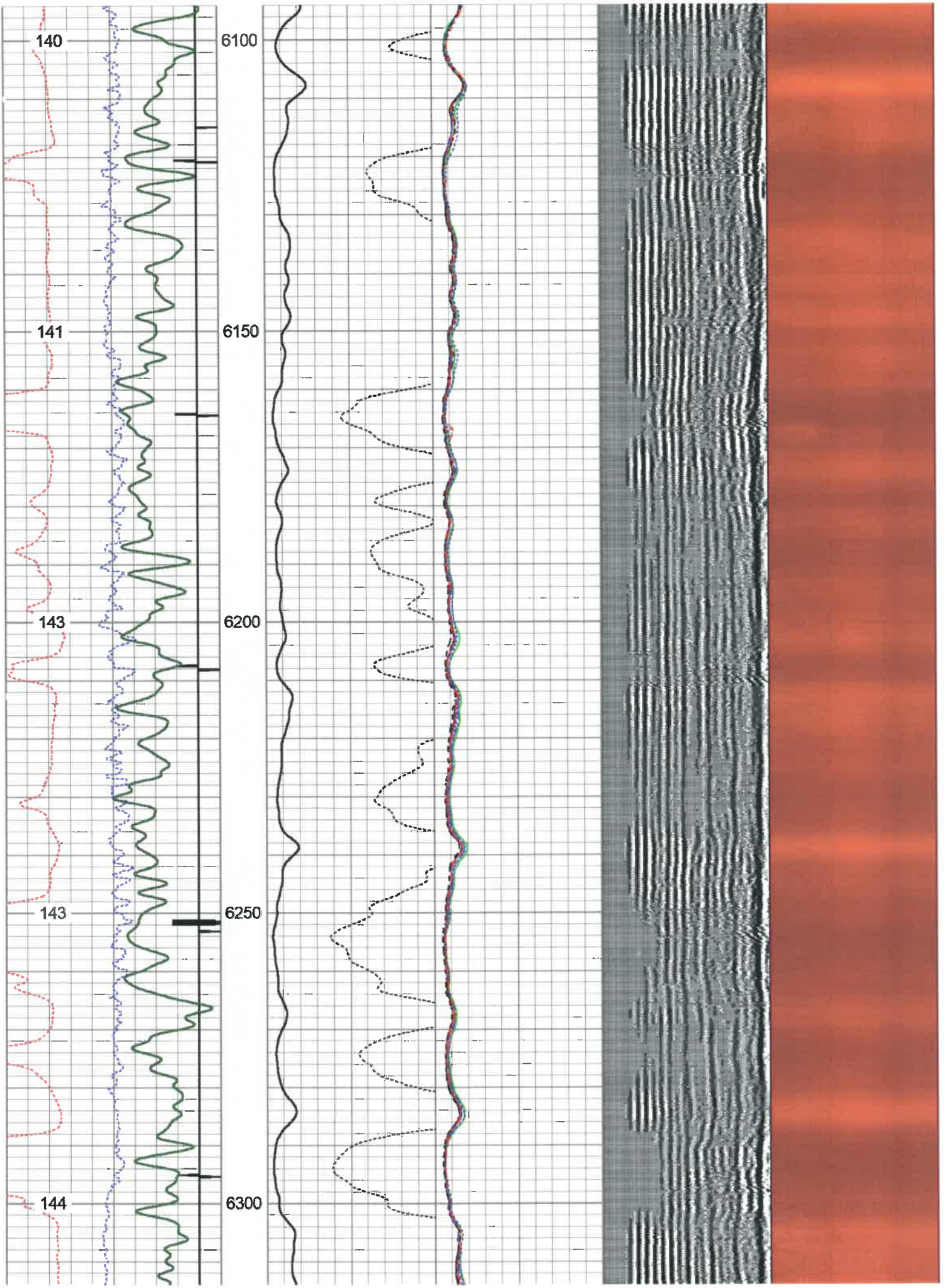


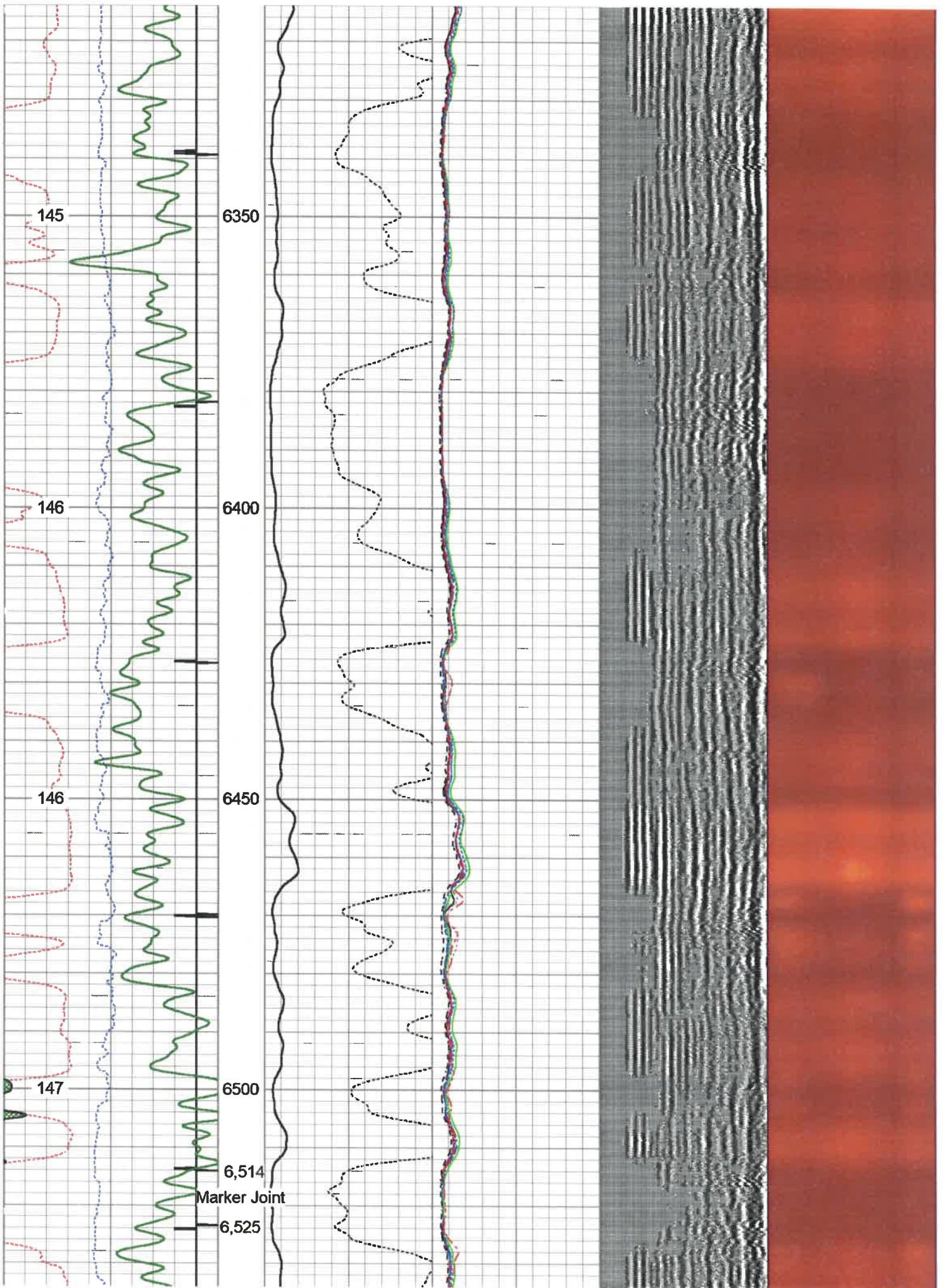


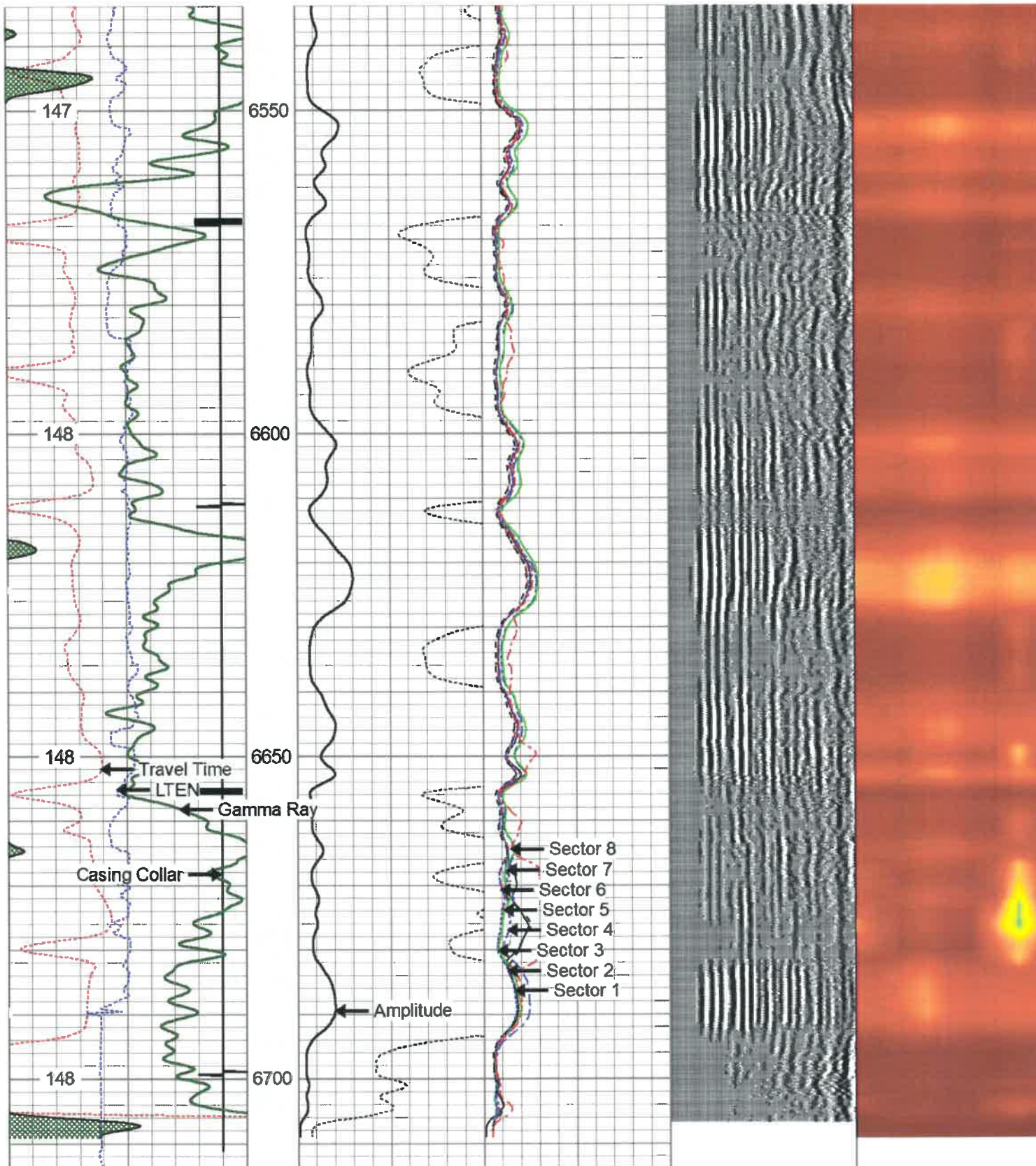












| | | |
|---------------|--------------------|------|
| 260 | Travel Time (usec) | 200 |
| Casing Collar | | |
| 0 | Gamma Ray (GAPI) | 150 |
| 0 | LTEN (lb) | 2500 |

Temp
(degF)

| | | | | | |
|---|---------------------|-----|----|----------|-----|
| 0 | Amplitude (mV) | 100 | -5 | Sector 1 | 150 |
| | Amplified Amplitude | | -5 | Sector 2 | 150 |
| 0 | (mV) | 10 | -5 | Sector 3 | 150 |
| | | | -5 | Sector 4 | 150 |
| | | | -5 | Sector 5 | 150 |
| | | | -5 | Sector 6 | 150 |
| | | | -5 | Sector 7 | 150 |
| | | | -5 | Sector 8 | 150 |

| | | | |
|------------------|--------|------------|---|
| Variable Density | 1 | Cement Map | 8 |
| 200 | (usec) | | |

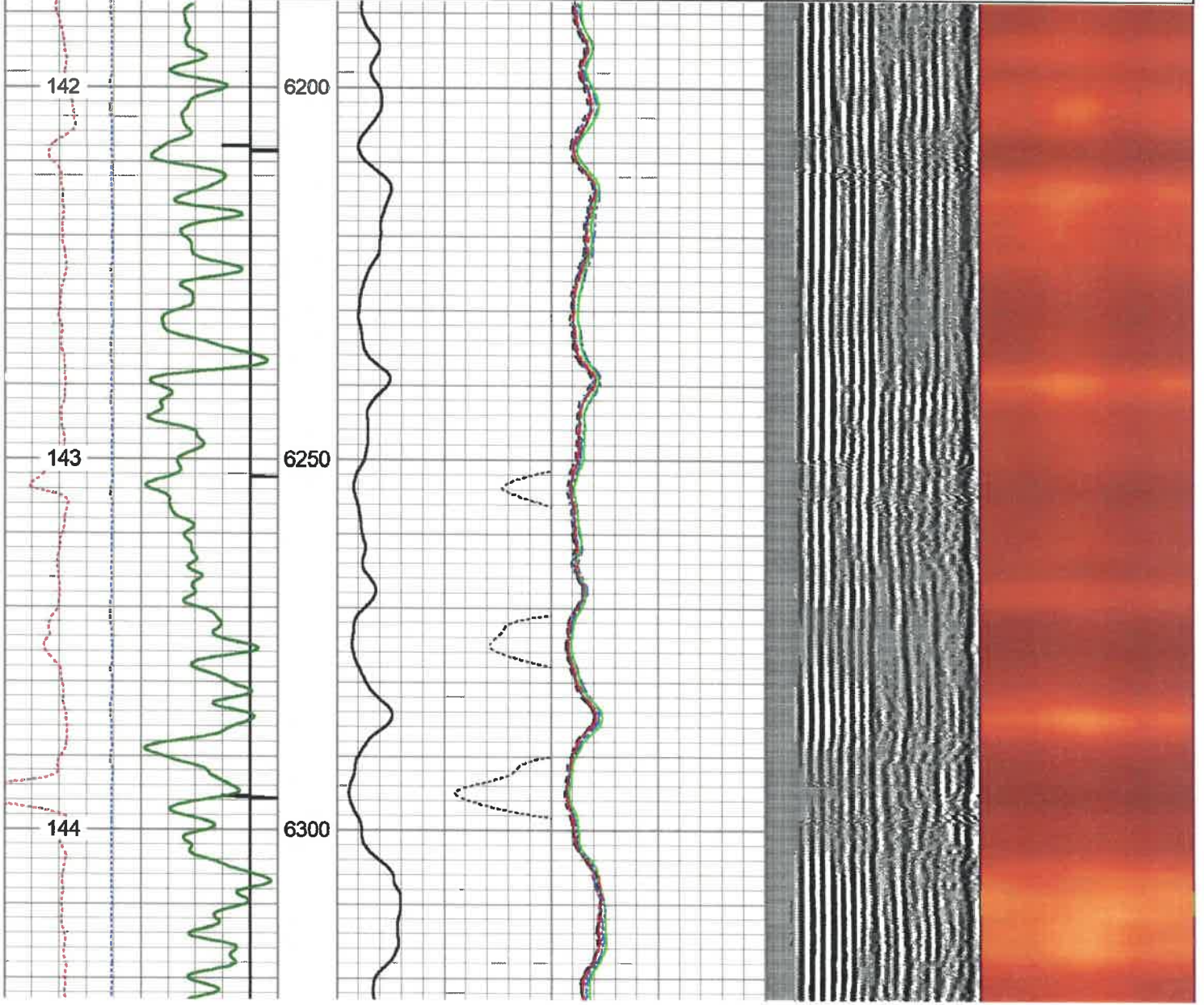


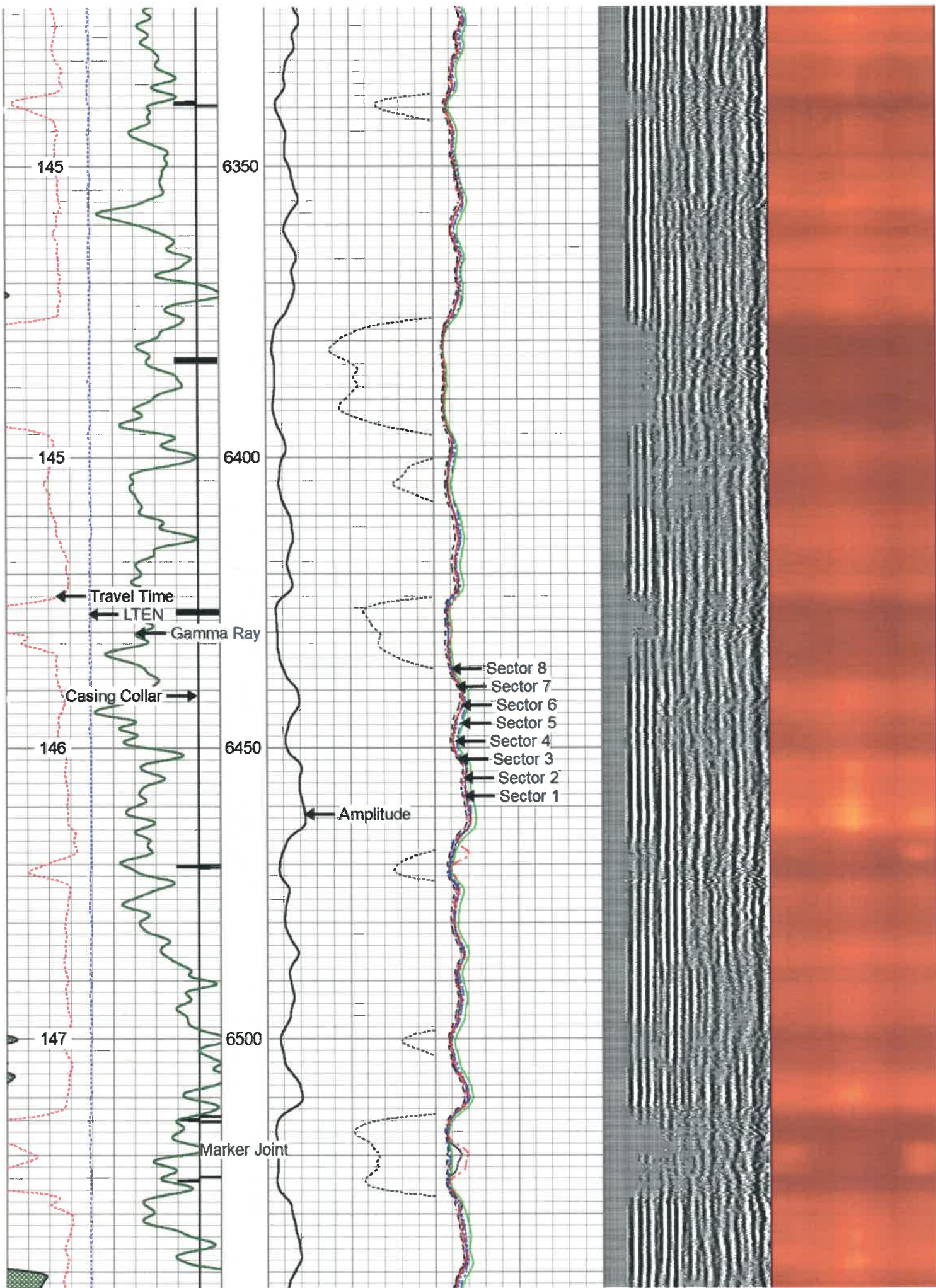


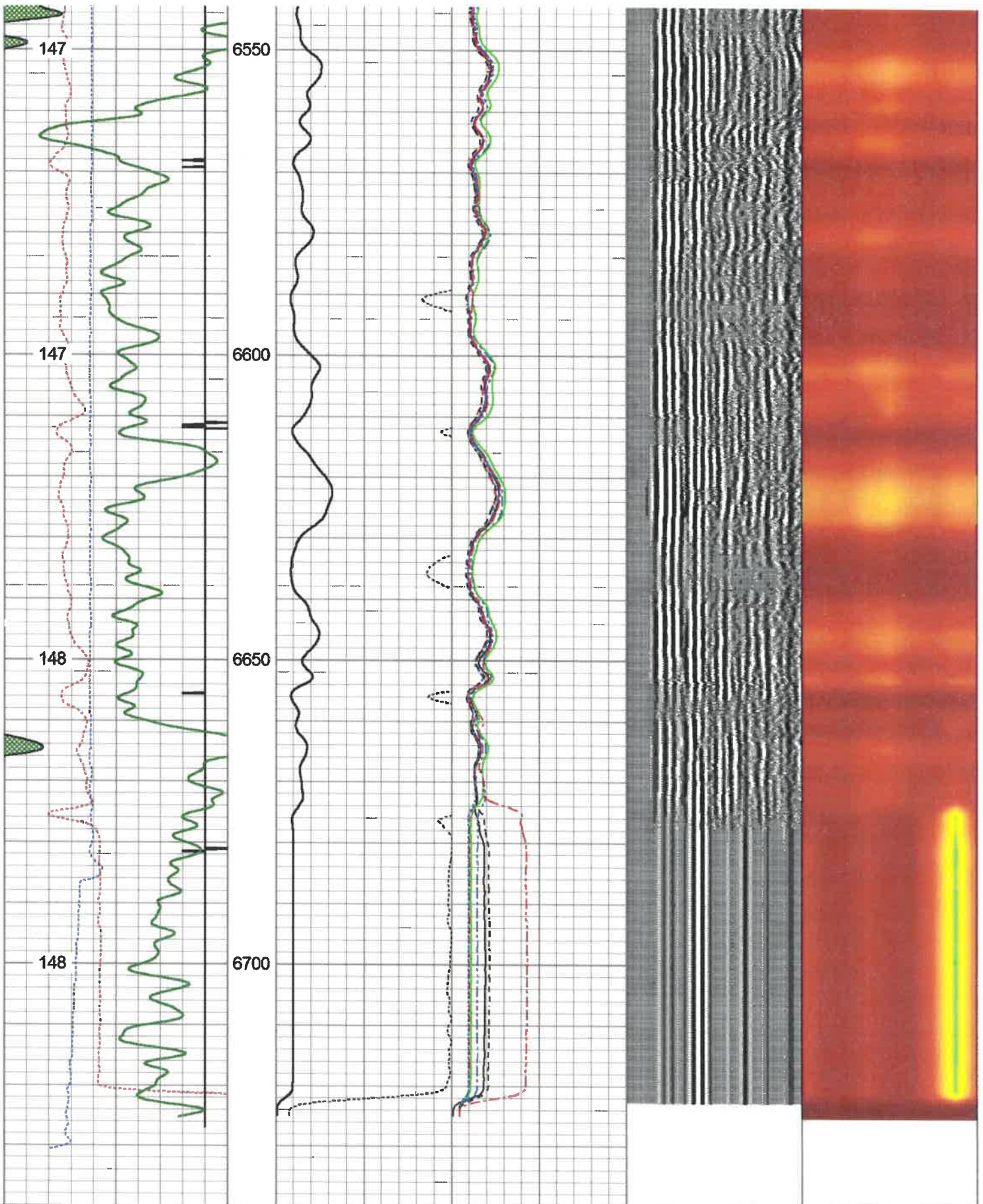
Repeat Pass 0 PSI

Database File c:\users\thomas.weese\desktop\bond logs\antero\colorado east\antero_colorado_east_avalanche_1h_rcbl
 Dataset Pathname Marcellus/Avalanche_1H/RCBL_1/pass2
 Presentation Format scbl03
 Dataset Creation Sun Mar 15 09:24:33 2020
 Charted by Depth in Feet scaled 1:240

| | | | | | | | | | | | | |
|---------------|--------------------|------|---------------------|----------------|-----|----|----------|-----|------------------|--------|------------|---|
| 260 | Travel Time (usec) | 200 | 0 | Amplitude (mV) | 100 | -5 | Sector 1 | 150 | Variable Density | 1 | Cement Map | 8 |
| Casing Collar | | | Amplified Amplitude | | | -5 | Sector 2 | 150 | 200 | (usec) | | |
| 0 | Gamma Ray (GAPI) | 150 | 0 | (mV) | 10 | -5 | Sector 3 | 150 | | | | |
| 0 | LTEN (lb) | 2500 | | | | -5 | Sector 4 | 150 | | | | |
| Temp (degF) | | | | | | -5 | Sector 5 | 150 | | | | |
| | | | | | | -5 | Sector 6 | 150 | | | | |
| | | | | | | -5 | Sector 7 | 150 | | | | |
| | | | | | | -5 | Sector 8 | 150 | | | | |







| | | |
|---------------|--------------------|------|
| 260 | Travel Time (usec) | 200 |
| Casing Collar | | |
| 0 | Gamma Ray (GAPI) | 150 |
| 0 | LTEN (lb) | 2500 |
| Temp | | |

| | | | | | |
|---------------------|----------------|-----|----|----------|-----|
| 0 | Amplitude (mV) | 100 | -5 | Sector 1 | 150 |
| Amplified Amplitude | | | | | |
| 0 | (mV) | 10 | -5 | Sector 2 | 150 |
| ----- | | | | | |
| | | | -5 | Sector 3 | 150 |
| ----- | | | | | |
| | | | -5 | Sector 4 | 150 |
| ----- | | | | | |
| | | | -5 | Sector 5 | 150 |

| | | | |
|------------------|--------|------------|---|
| Variable Density | 1 | Cement Map | 8 |
| 200 | (usec) | 1200 | |

(degF)

| | | |
|----|----------|-----|
| -5 | Sector 6 | 150 |
| -5 | Sector 7 | 150 |
| -5 | Sector 8 | 150 |

Log Variables

Database: C:\Users\thomas.weese\Desktop\Bond Logs\Antero\Colorado East\antero_colorado_east
 Dataset: Marcellus/Avalanche_1H/RCBL_1/pass4/_vars_

Top - Bottom

| | | | | | | | |
|-------------------------|-----------------------|------------------------|----------------------|-------------------------|-------------------------|-------------------------|----------------------|
| BHTEMP_Src TEMP | BOREID in 7.875 | BOTTEMP degF 148 | CASEOD in 5.5 | CASETHCK in 0.361 | CASEWGHT lb/ft 20 | MAXAMPL mV 71.921 | MINAMPL mV 2.2 |
| MINATTN db/ft 0.8 | PERFS No | PPT usec 0 | SRFTEMP degF 0 | TDEPTH ft 0 | | | |

Variable Description

BHTEMP_Src : BHTEMP Input Source Selector
 BOREID : Borehole I.D.
 BOTTEMP : Bottom Hole Temperature
 CASEOD : Casing O.D.
 CASETHCK : Casing Thickness
 CASEWGHT : Casing Weight
 MAXAMPL : Maximum Amplitude

MINAMPL : Minimum Amplitude
 MINATTN : Minimum Attenuation
 PERFS : Perforation Flag
 PPT : Predicted Pipe Time
 SRFTEMP : Surface Temperature
 TDEPTH : Total Depth

Calibration Report

Database File C:\Users\thomas.weese\Desktop\Bond Logs\Antero\Colorado East\antero_colorado_east_avalanche_1h_rc
 Dataset Pathname Marcellus/Avalanche_1H/RCBL_1/pass4
 Dataset Creation Sun Mar 15 09:32:23 2020

Gamma Ray Calibration Report

Serial Number: FW1211-86
 Tool Model: Probe
 Performed: Mon Feb 03 15:18:32 2014

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 0.8000 GAPI/cps

Segmented Cement Bond Log Calibration Report

Serial Number: FW1312-32
 Tool Model: Probe275T

Calibration Casing Diameter: 5.500 in
 Calibration Depth: 14.583 ft

Master Calibration, performed Sun Mar 15 06:52:23 2020:

| | Raw (v) | | Calibrated (mv) | | Results | |
|-----|---------|-------|-----------------|--------|---------|--------|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3' | 0.017 | 0.831 | 2.200 | 71.921 | 105.629 | 0.746 |
| CAL | 1.030 | 1.032 | | | | |
| 5' | 0.006 | 0.818 | 2.200 | 71.921 | 105.860 | 1.672 |

| | | | | | | |
|-----|-------|-------|-------|--------|---------|--------|
| SUM | 0.000 | 0.810 | 2.200 | 71.921 | 106.000 | 1.972 |
| S1 | 0.068 | 0.875 | 2.200 | 71.921 | 106.476 | -3.710 |
| S2 | 0.001 | 0.814 | 2.200 | 71.921 | 105.692 | 2.136 |
| S3 | 0.008 | 0.814 | 2.200 | 71.921 | 106.553 | 1.492 |
| S4 | 0.006 | 0.808 | 2.200 | 71.921 | 106.952 | 1.639 |
| S5 | 0.006 | 0.815 | 2.200 | 71.921 | 106.159 | 1.721 |
| S6 | 0.006 | 0.823 | 2.200 | 71.921 | 105.408 | 1.670 |
| S7 | 0.006 | 0.815 | 2.200 | 71.921 | 106.155 | 1.667 |
| S8 | 0.007 | 0.818 | 2.200 | 71.921 | 105.973 | 1.591 |

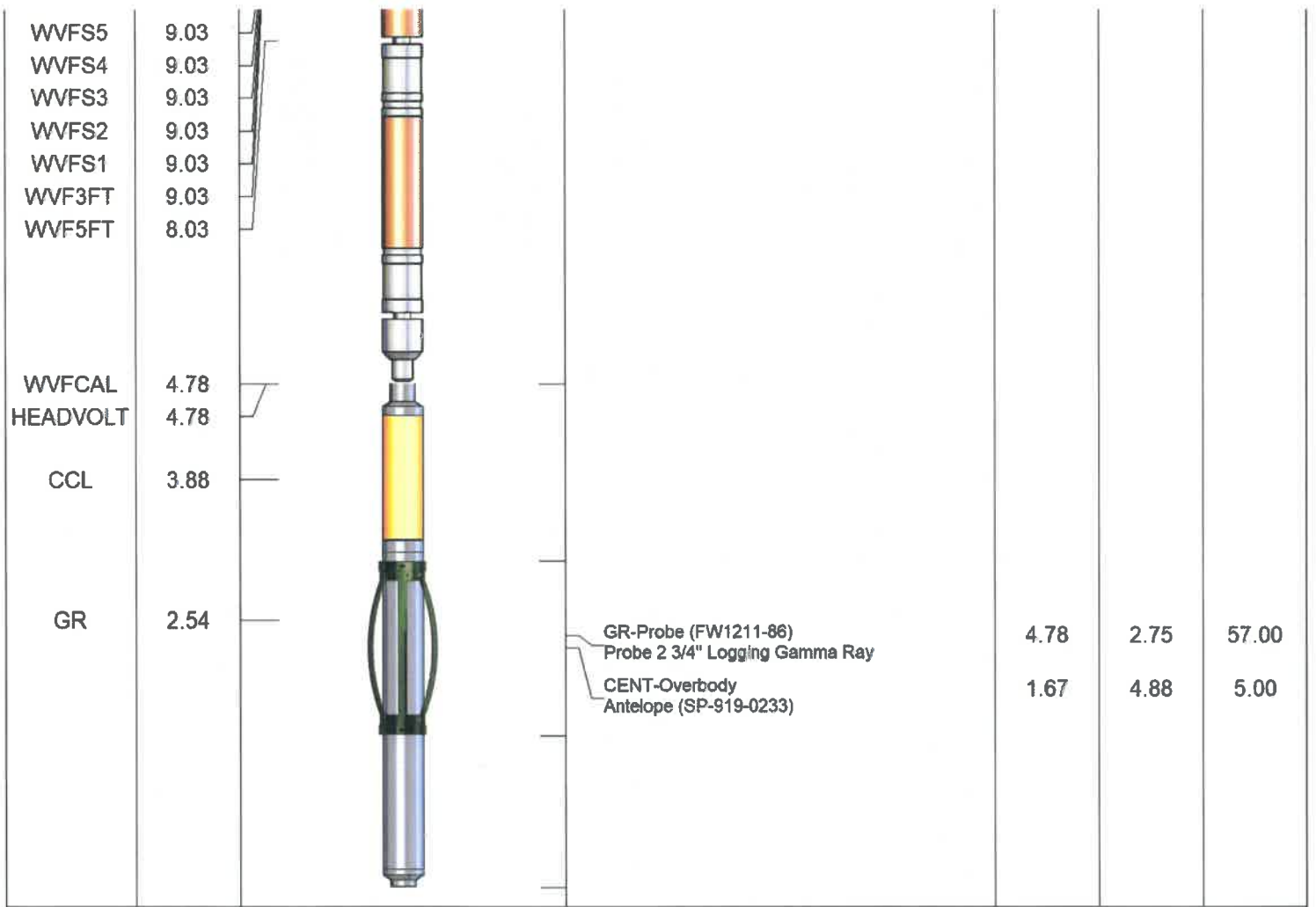
Internal Reference Calibration, performed (Not Performed):

| | Raw (v) | | Calibrated (v) | | Results | |
|-----|---------|-------|----------------|-------|---------|--------|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| CAL | 0.000 | 0.000 | 1.030 | 1.032 | 1.000 | 0.000 |

Air Zero Calibration, performed Sun Mar 15 06:44:47 2020:

| | 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 | |

| Sensor | Offset (ft) | Schematic | Description | Length (ft) | O.D. (in) | Weight (lb) |
|-------------------------|----------------------|-----------|---|-------------|-----------|-------------|
| HeadVolt | 14.11 | | CHD-Titan Titan 1 7/16" GO Cablehead | 1.00 | 1.44 | 5.00 |
| Temp | 11.27 | | CENT-Overbody Antelope (SP-919-0233) | 1.67 | 4.88 | 5.00 |
| WVFS8 WVFS7 WVFS6 | 9.03 9.03 9.03 | | RBT-Probe275T (FW1312-32) Probe 2.75" Radial with Integral Temperature Sub | 9.39 | 2.75 | 90.00 |



Dataset: antero_colorado_east_avalanche_1h_rcbl_nineenergy_15_mar_2020.db: Marcellus/Avalanche_1H/RCBL_1/pass4
 Total length: 15.17 ft
 Total weight: 162.00 lb
 O.D.: 4.88 in

| | | |
|---|----------------|-------------------|
|  | Company | Antero Resources |
| | Well | Avalanche Unit 1H |
| | Field | North Canton |
| | County | Tyler |
| | State | West Virginia |