

Company: Noble Energy Inc

Well: ELLIE LD26-635

Field: Wildcat

County: Weld Country: US

| | | | | | | |
|---|--------------------------|--|--|-----------------------------|---|--------------------------------|
| County: Weld Field: Wildcat Location: SHL: SESE S28, T9N, R58W Well: ELLIE LD26-635 Company: Noble Energy Inc | UltraSonic Summary Print | | | | | |
| | Location: | SHL: SESE S28, T9N, R58W 1650' FSL & 330' FEL Lat: 40.71839 / Long: -103.86054 | | Elev.: | K.B. 4856.00 ft G.L. 4826.00 ft D.F. 4856.00 ft | |
| | | Permanent Datum: Ground Level | | Elev.: | 4826.00 f | |
| | | Log Measured From: Kelly Bushing | | 30.00 ft | above Perm.Datum | |
| | | Drilling Measured From: Kelly Bushing | | | | |
| | | API Serial No. 05-123-43319 | | Max.Hole Deviation 0 deg | Longitude: -103.86054 degrees | Latitude: 40.718390 degrees |
| | | | | | | |

| | | | | | |
|-----------------------------|------------------|-----------------|-----------------|-------------|--|
| Logging Date | | 20-Oct-2016 | | | |
| Run Number | | One | | | |
| Depth Driller | | 16070.00 ft | | | |
| Schlumberger Depth | | 16070.00 ft | | | |
| Bottom Log Interval | | 5500.00 ft | | | |
| Top Log Interval | | 60.00 ft | | | |
| Casing Driller Size @ Depth | | 5.5 in | @ | 16055.70 ft | |
| Casing Schlumberger | | 16055.7 ft | | | |
| Bit Size | | 8.5 in | | | |
| Type Fluid In Hole | | Water | | | |
| MUD | Density | Viscosity | 9.3 lbm/gal | 26 s | |
| | Fluid Loss | PH | | | |
| | Source of Sample | | Active Tank | | |
| RM @ Meas Temp | | 0.2 ohm.m | @ | 68 degF | |
| RMF @ Meas Temp | | 0.15 ohm.m | @ | 68 degF | |
| RMC @ Meas Temp | | | | | |
| Source RMF | RMC | | Pressed | | |
| RM @ BHT | RMF @ BHT | 0.07 @ 201 | 0.05 @ 201 | | |
| Max Recorded Temperatures | | 201 degF | | | |
| Circulation Stopped Time | | | | | |
| Logger on Bottom Time | | | | | |
| Unit Number | Location: | 9108 | Fort Morgan, CO | | |
| Recorded By | | Benjamin Marmon | | | |
| Witnessed By | | Bill Mansfield | | | |

Disclaimer

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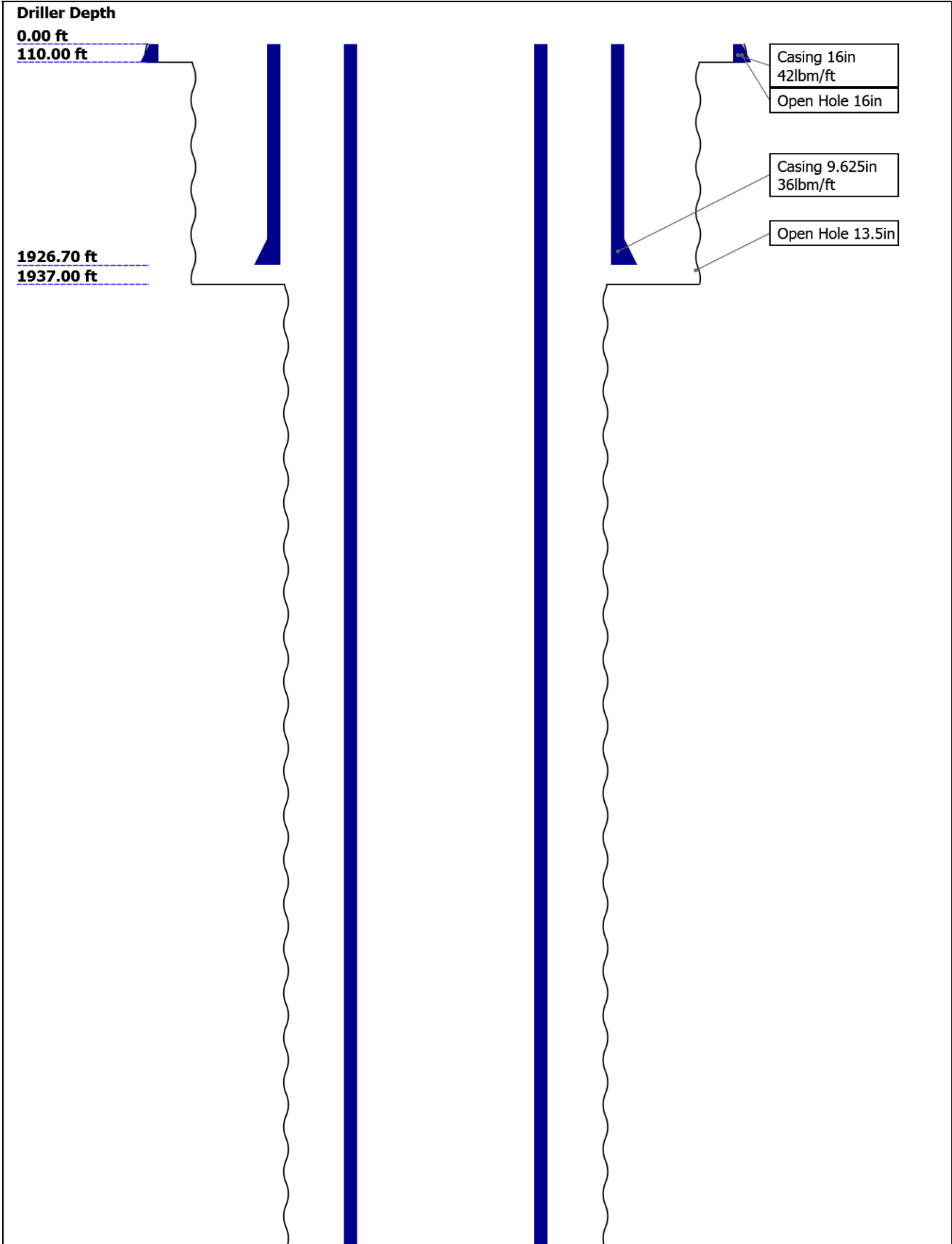
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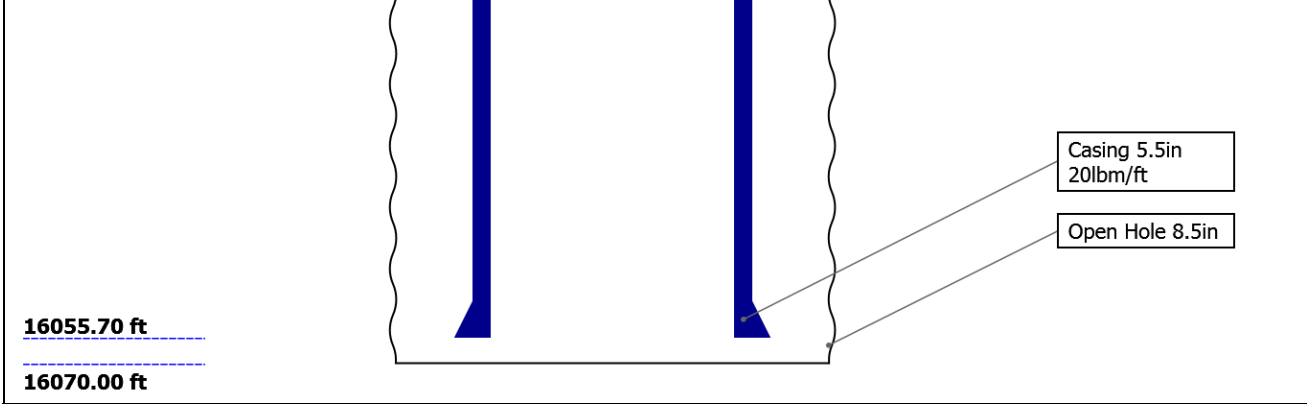
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14. Tail

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Well Sketch





Borehole Size/Casing/Tubing Record

| Bit | | | | | | |
|-----------------------|--------|--------|---------|--|--|--|
| Bit Size (in) | 16 | 13.5 | 8.5 | | | |
| Top Driller (ft) | 0 | 110 | 1937 | | | |
| Top Logger (ft) | 0 | 110 | 1937 | | | |
| Bottom Driller (ft) | 110 | 1937 | 16070 | | | |
| Bottom Logger (ft) | 110 | 1937 | 16070 | | | |
| Casing | | | | | | |
| Size (in) | 16 | 9.625 | 5.5 | | | |
| Weight (lbm/ft) | 42 | 36 | 20 | | | |
| Inner Diameter (in) | 15.512 | 8.921 | 4.778 | | | |
| Grade | N/A | N/A | N/A | | | |
| Top Driller (ft) | 0 | 0 | 0 | | | |
| Top Logger (ft) | 0 | 0 | 0 | | | |
| Bottom Driller (ft) | 110 | 1926.7 | 16055.7 | | | |
| Bottom Logger (ft) | 110 | 1926.7 | 16055.7 | | | |

Operational Run Summary

| Parameter (unit) | One | | | | | |
|----------------------------------|-----------------|--|--|--|--|--|
| Date Log Started | 20-Oct-2016 | | | | | |
| Time Log Started | 05:09:12 | | | | | |
| Date Log Finished | 20-Oct-2016 | | | | | |
| Time Log Finished | 06:46:11 | | | | | |
| | | | | | | |
| Top Log Interval (ft) | 60.00 | | | | | |
| Bottom Log Interval (ft) | 5500.00 | | | | | |
| | | | | | | |
| Total Depth (ft) | | | | | | |
| Max Hole Deviation (deg) | 0.00 | | | | | |
| Azimuth of Max Deviation (deg) | 0.00 | | | | | |
| Bit Size (in) | 8.500 | | | | | |
| | | | | | | |
| Logging Unit Number | 9108 | | | | | |
| Logging Unit Location | Fort Morgan, CO | | | | | |
| Recorded By | Benjamin Marmon | | | | | |

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|----------------------|----------------|--|--|--|--|--|
| Witnessed By | Bill Mansfield | | | | | |
| Service Order Number | D5ND-00132 | | | | | |

Remarks and Equipment Summary

| One: Toolstring | | | One: Remarks | |
|--|------------------------------------|--------------------------------------|--|--|
| <div>Equip name</div> <div>LEH-Q</div> | <div>Length</div> <div>33.11</div> | <div>MP name</div> <div>Offset</div> | This is the first log in the well | |
| | | | Tool string ran as per tool sketch. | |
| <div>SAH-F</div> | <div>30.91</div> | | BHT: 201 degF | |
| | | | Estimated TOC: 816' | |
| | | | | |
| <div>EDTC-B</div> <div>EDTH-B</div> <div>EDTG-A</div> <div>EDTC-B</div> | <div>26.06</div> | | <div>CTEM</div> <div>22.56</div> | |
| | | | <div>ACCZ</div> <div>0.00</div> | |
| | | | <div>HV</div> <div>0.00</div> | |
| | | | <div>Gamma</div> <div>20.69</div> | |
| | | | <div>Ray</div> <div>TelStatu</div> <div>s</div> <div>19.56</div> | |
| <div>AH-184[2]</div> | <div>19.56</div> | | | |
| <div>AH-184[1]</div> | <div>17.56</div> | | | |
| <div>USIT-E</div> <div>ECH-MFA</div> <div>USAC-A</div> <div>USIS-A</div> <div>USSC-B</div> <div>USRS-A</div> <div>USI-SENS</div> <div>OR</div> | <div>15.56</div> | | | |
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Depth Summary

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|--|-----|--|--|
| | One | | |
|--|-----|--|--|

Depth Measuring Device

| | | | |
|------------------|-------|--|--|
| Type | IDW-B | | |
| Serial Number | | | |
| Calibration Date | | | |

| | | | |
|--------------------------|---|--|--|
| Calibrator Serial Number | | | |
| Calibration Cable Type | | | |
| Wheel Correction 1 | 0 | | |
| Wheel Correction 2 | 0 | | |

| | | | |
|------------------------------|----------|--|--|
| Tension Device | | | |
| Type | CMTD-B/A | | |
| Serial Number | | | |
| Calibration Date | | | |
| Calibrator Serial Number | | | |
| Number of Calibration Points | 0 | | |

| | | | |
|-----------------|-------------|--|--|
| Logging Cable | | | |
| Type | 7-46NT-XS | | |
| Serial Number | | | |
| Length | 24000.00 ft | | |
| Conveyance Type | Wireline | | |
| Rig Type | Crane | | |

| | | | |
|------------------------------|-----------------------|--------------------------------|--|
| One:Depth Control Parameters | | Depth Control Remarks | |
| Log Sequence | First Log In the Well | All Schlumberger depth control | |
| Rig Up Length At Surface | | | |
| Rig Up Length At Bottom | | | |
| Rig Up Length Correction | | | |
| Stretch Correction | | | |
| Tool Zero Check At Surface | | | |

One

2500 PSI Main Pass

Software Version

| | |
|--------------------|----------------|
| Acquisition System | Version |
| Maxwell 2016 | 6.0.53731.3100 |

Pass Summary

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|----------|------------|------------------------|------------------------|----------|-------------|-----------------------|
| One | Log[5]:Up | Up | 69.07 ft | 6022.99 ft | 20-Oct-2016 5:47:15 AM | 20-Oct-2016 6:45:22 AM | ON | 9.52 ft | Yes |

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:ELLIE LD26-635

One: Log[5]:Up:S009

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 24-Oct-2016 00:10:16

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU)
USIT-E

-20 in 1

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Calibrated Gamma Ray (GR_EDTC) EDTC-B

Absent 1.500 2.500 6.500

Explicit Normalization

USIT - USIT Processing Flags (UFLG)

Acoustic Impedance Average (AIAV)
USIT-E

0 Measured 10

Gas

Liquid

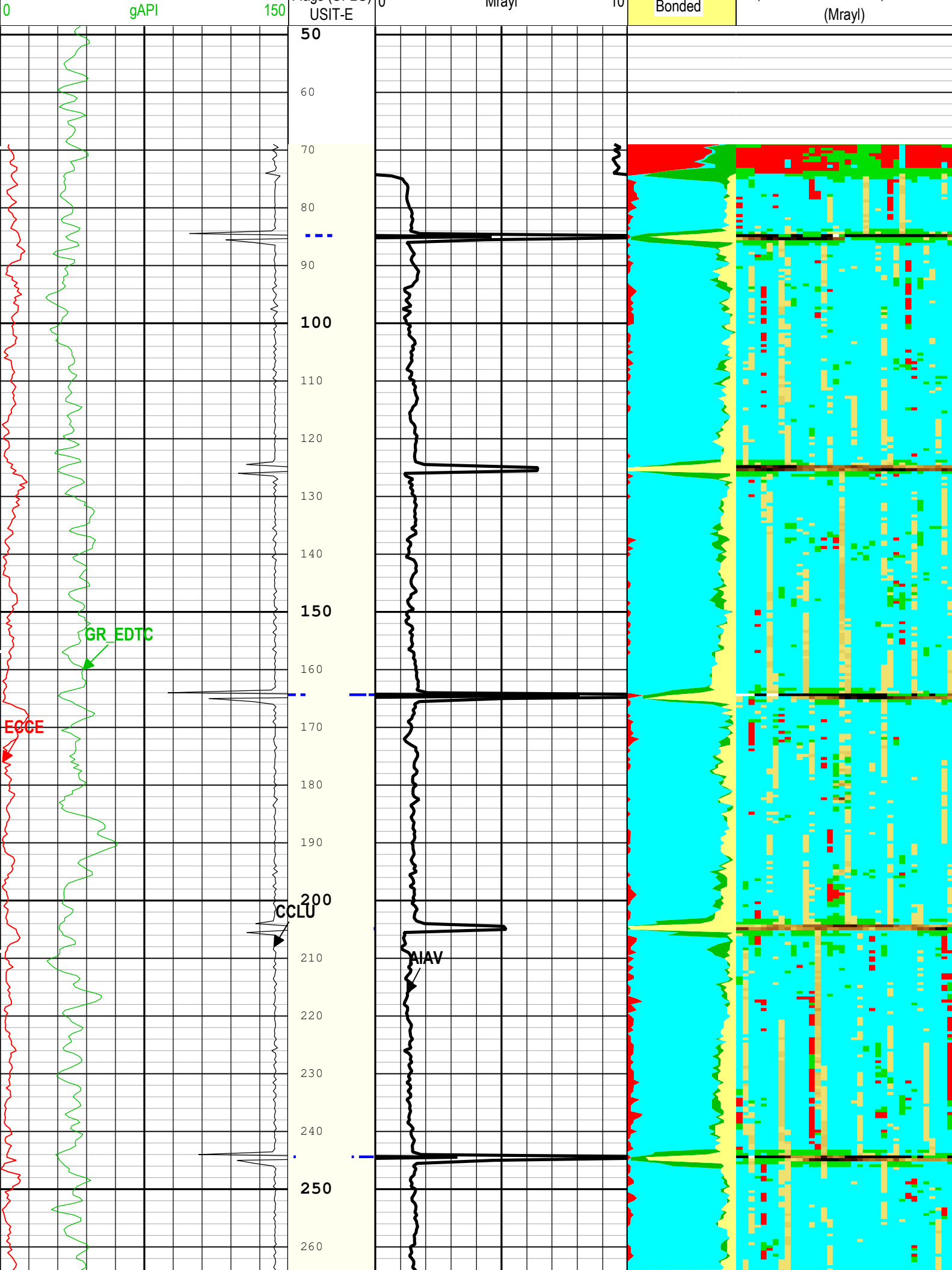
Micro-Debonding

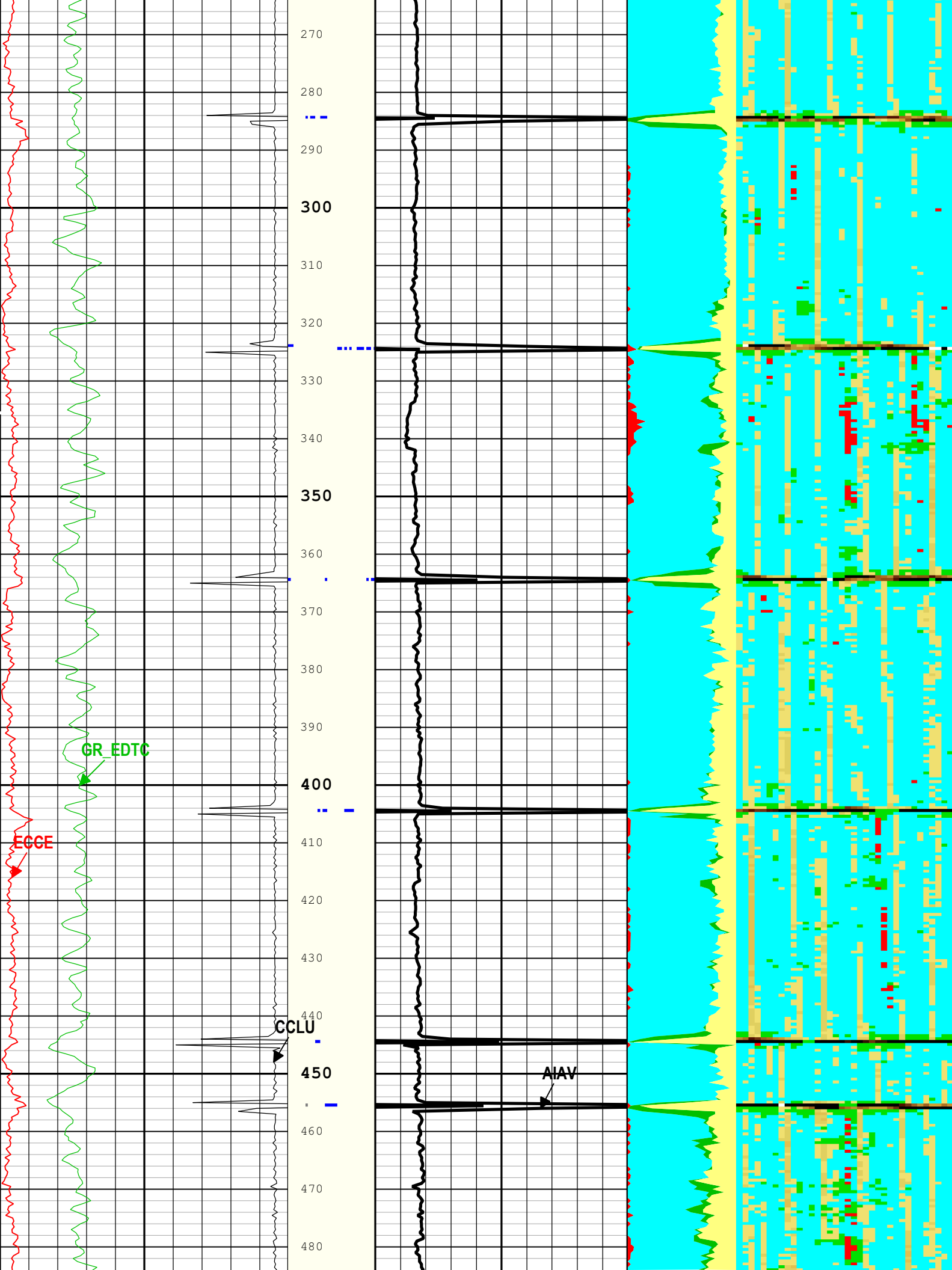
Fracture

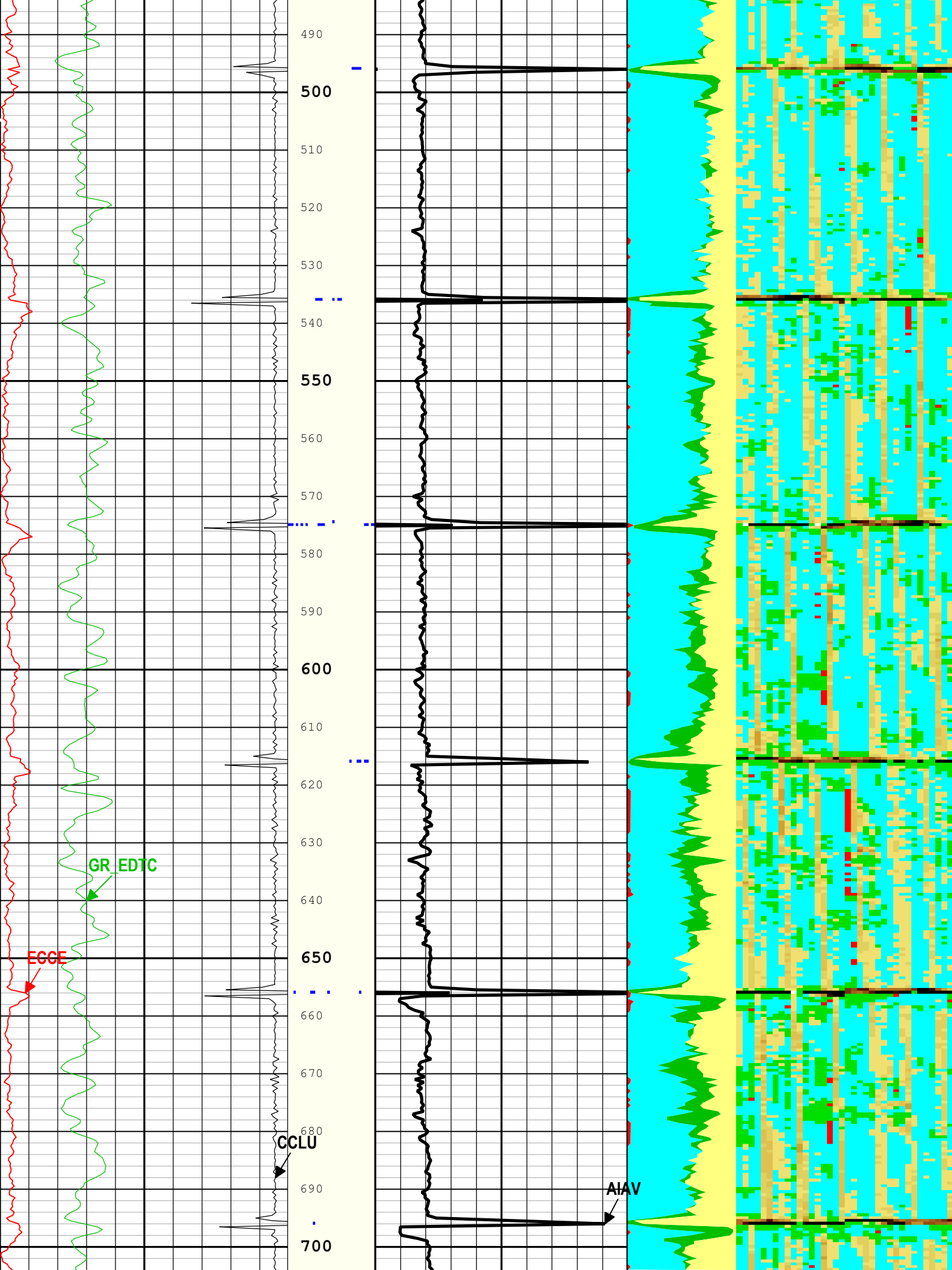
Absent -500.000 2.200 3.254 4.309 5.363 6.418 7.472

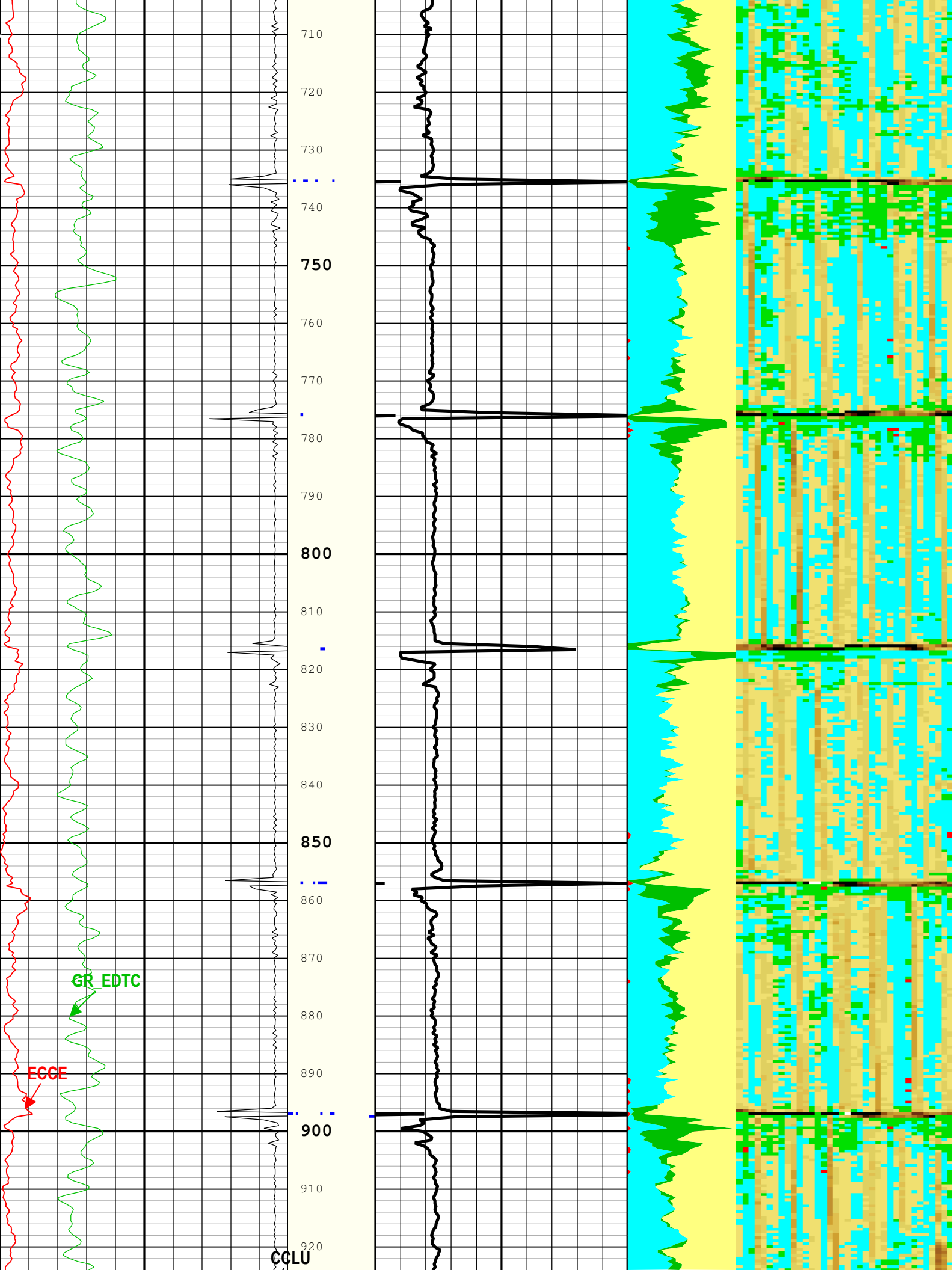
Custom Normalization

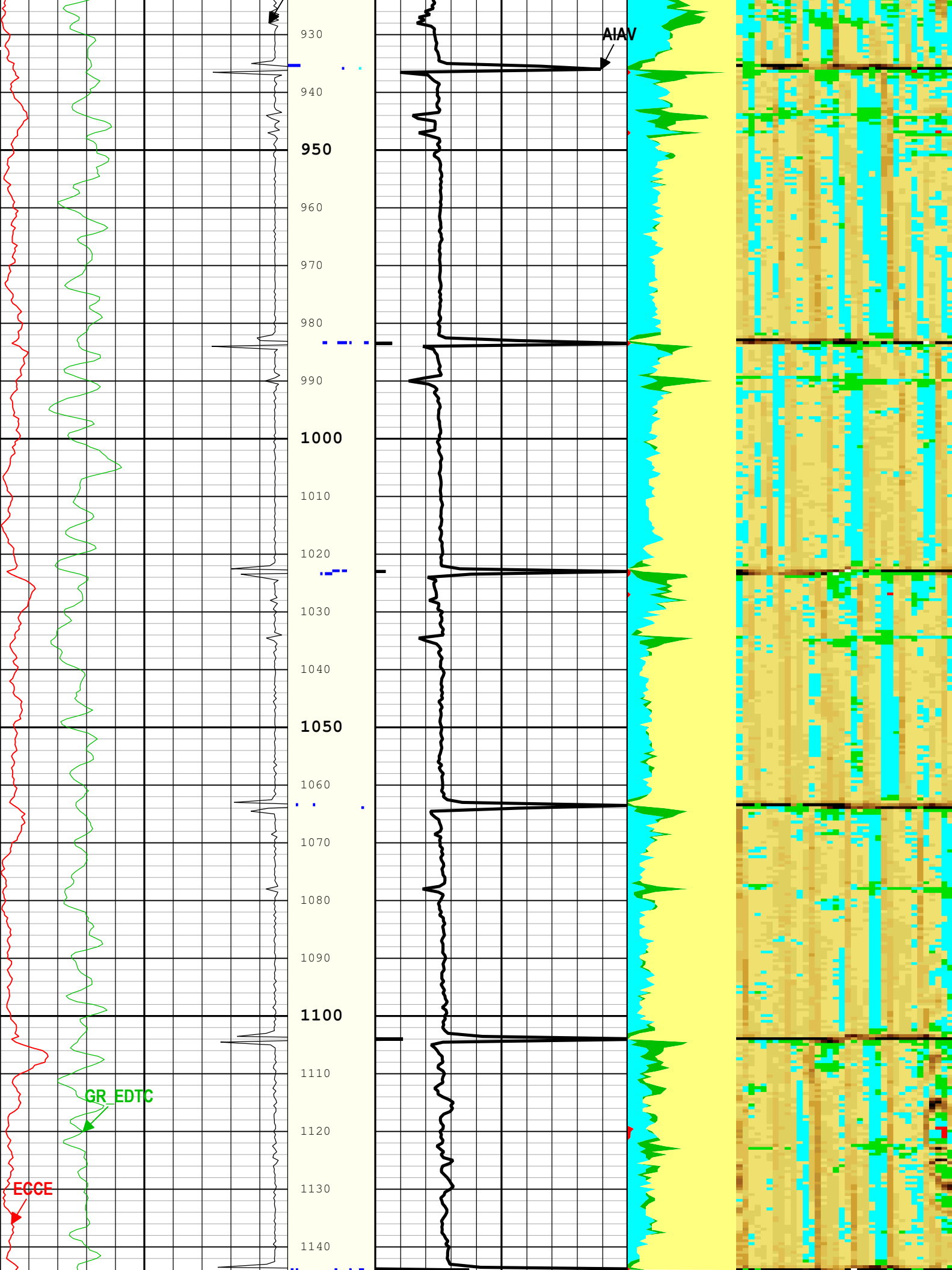
USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E

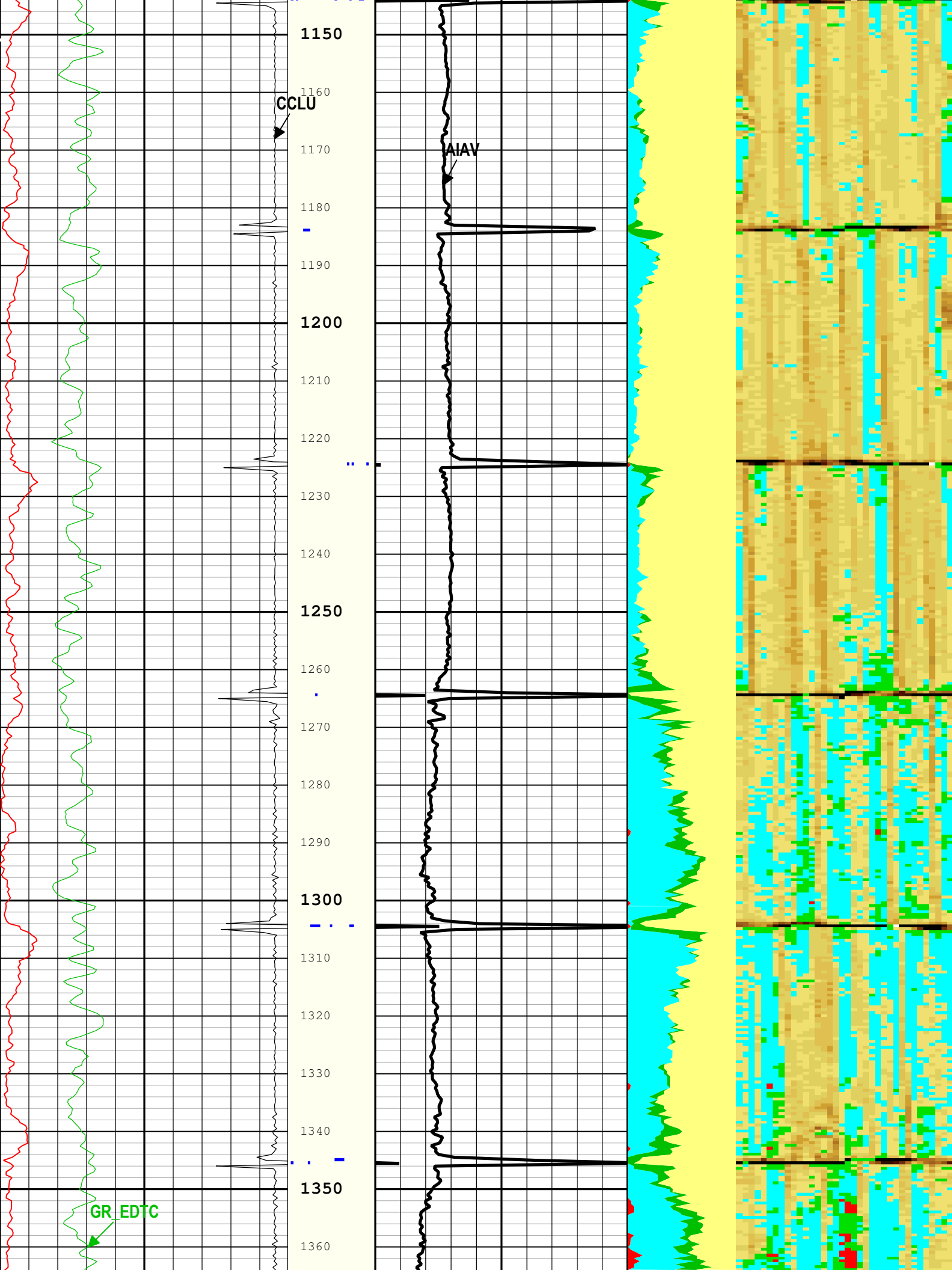


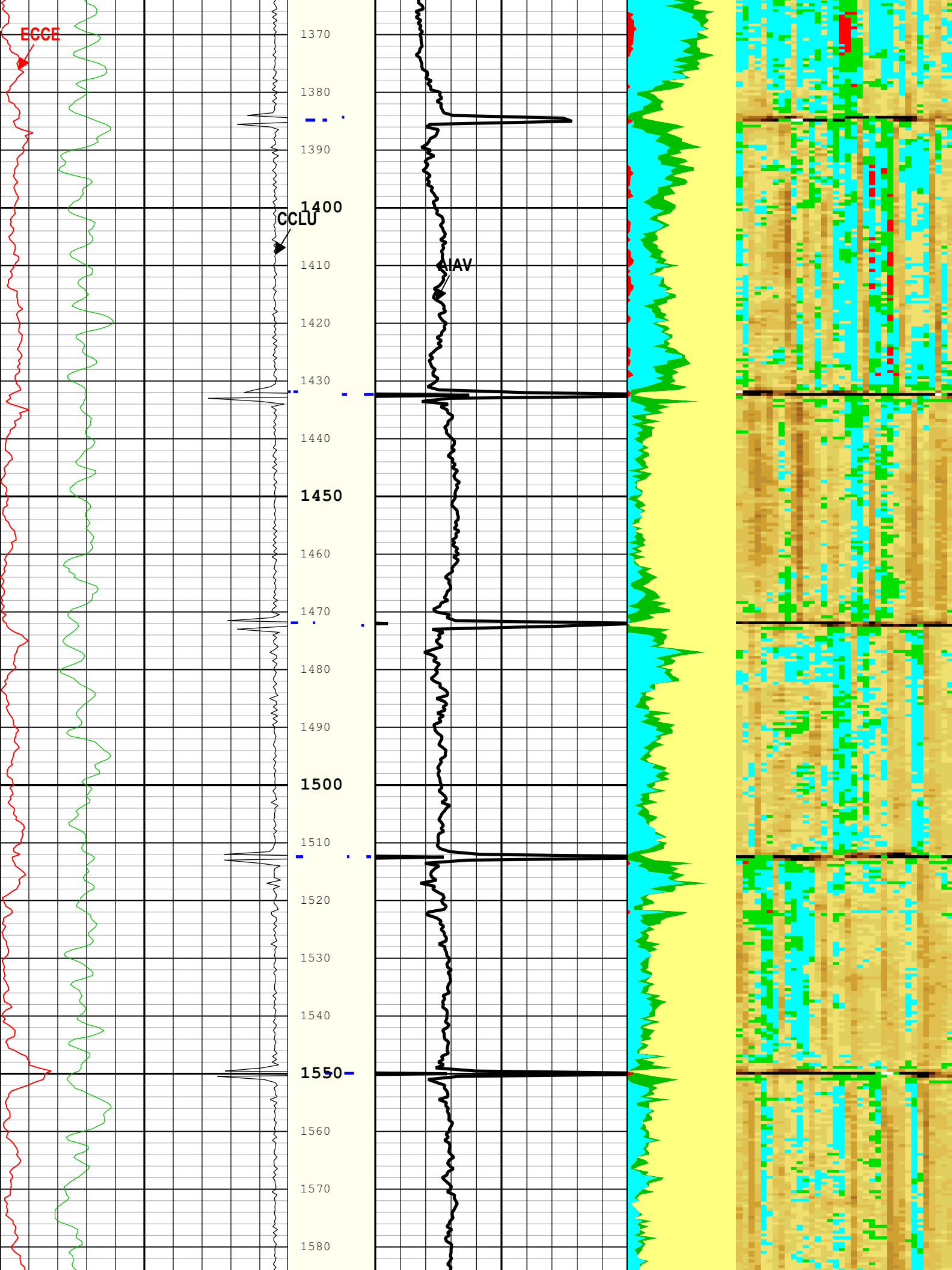


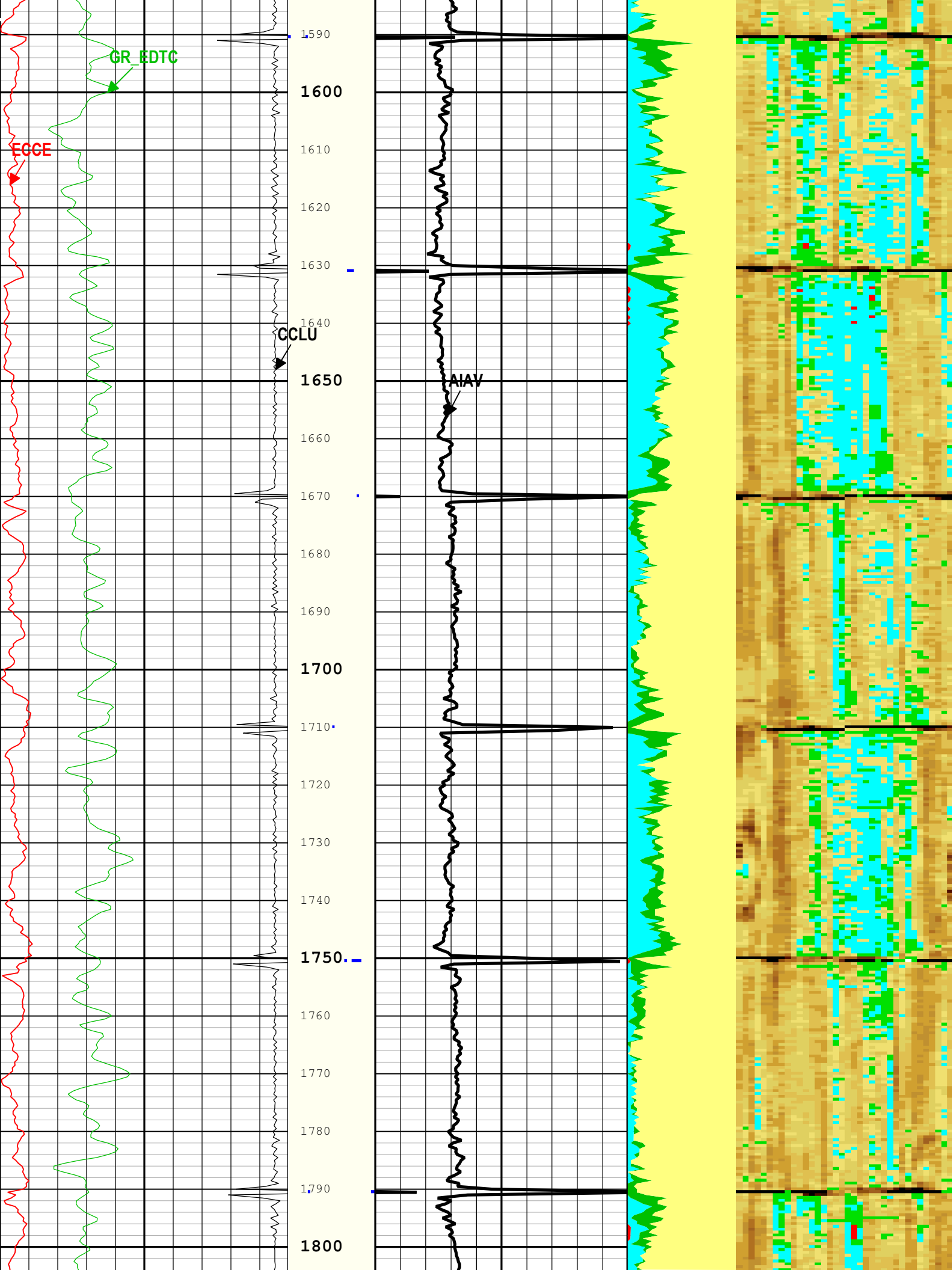


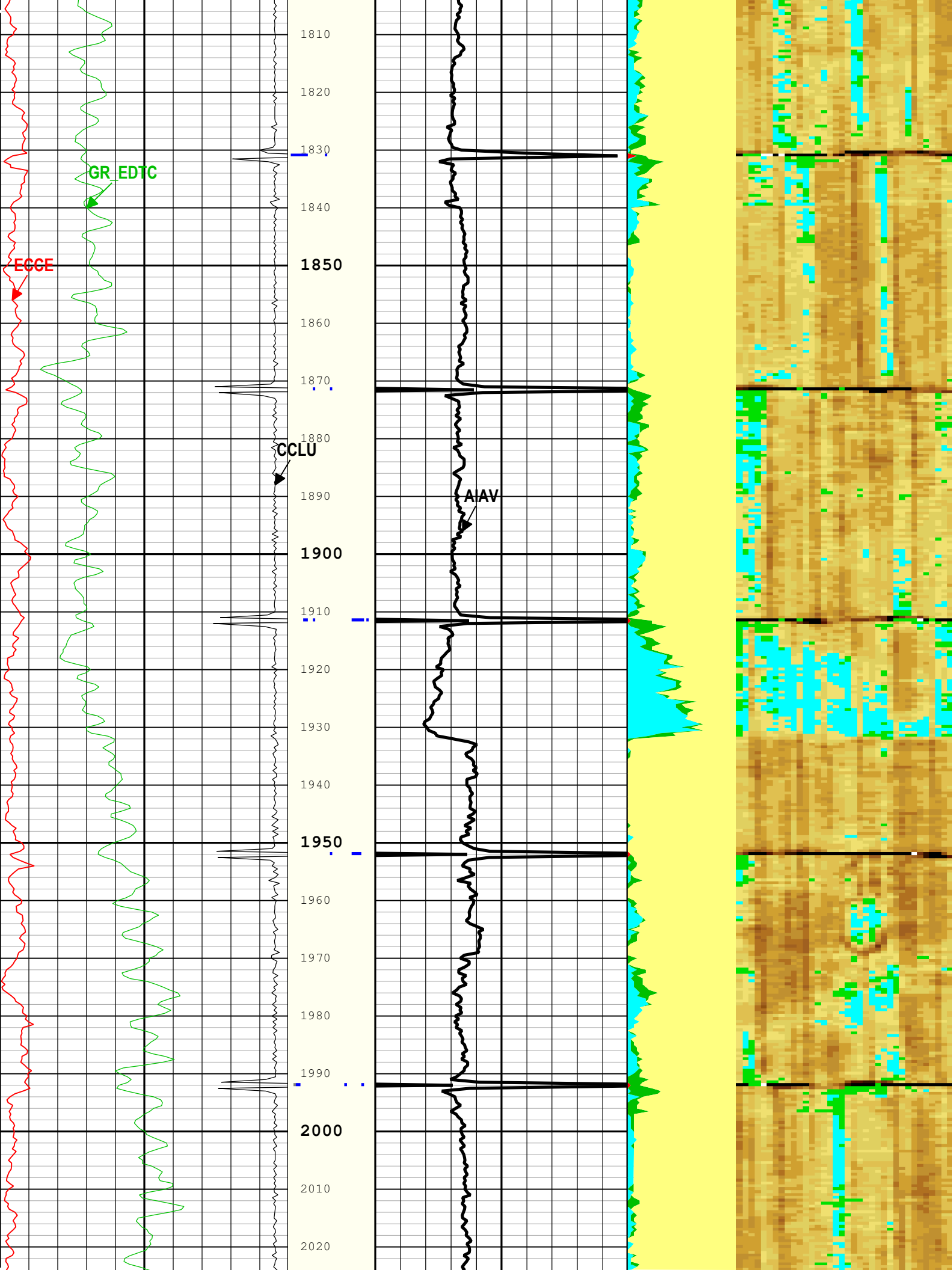


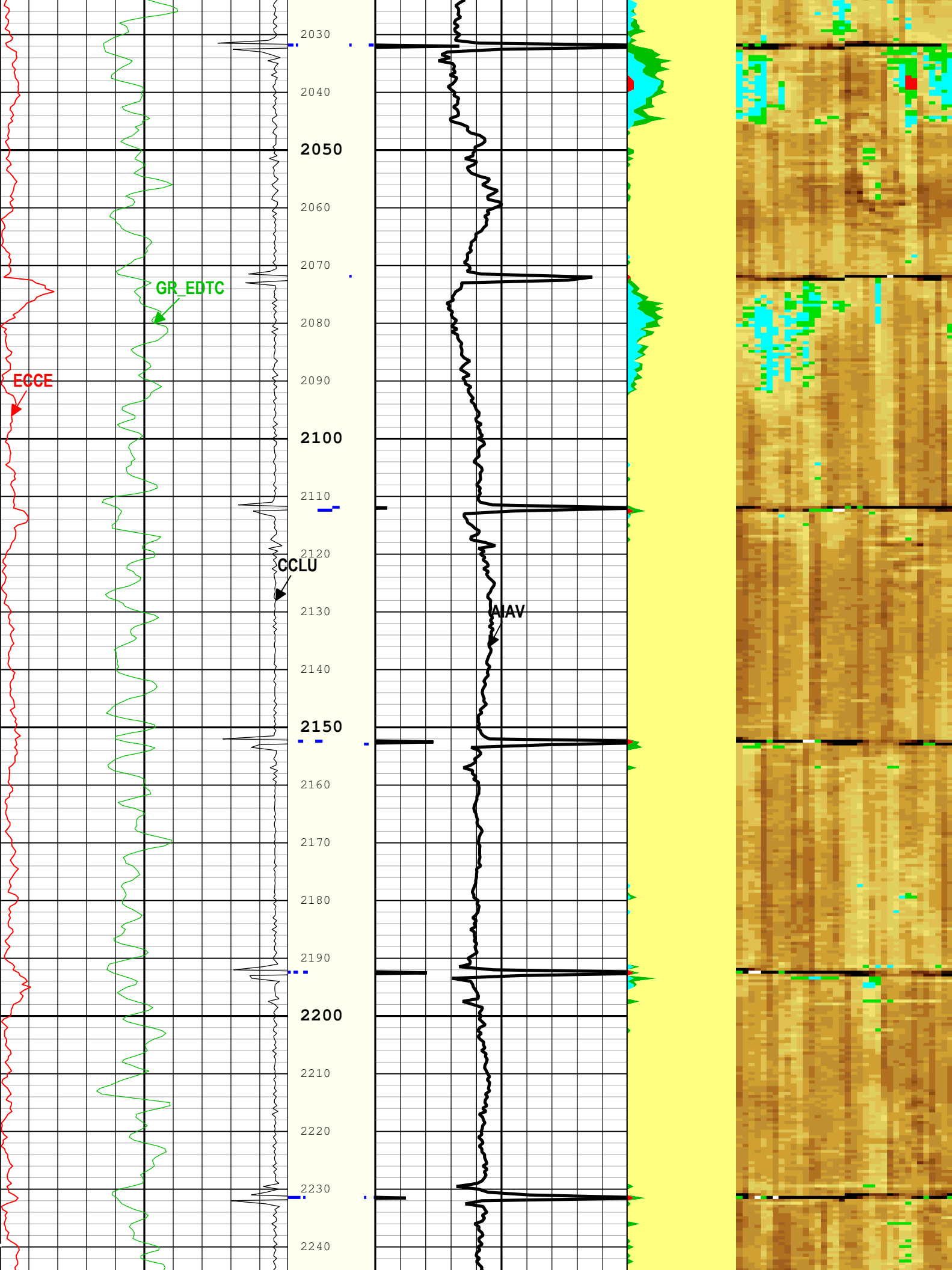


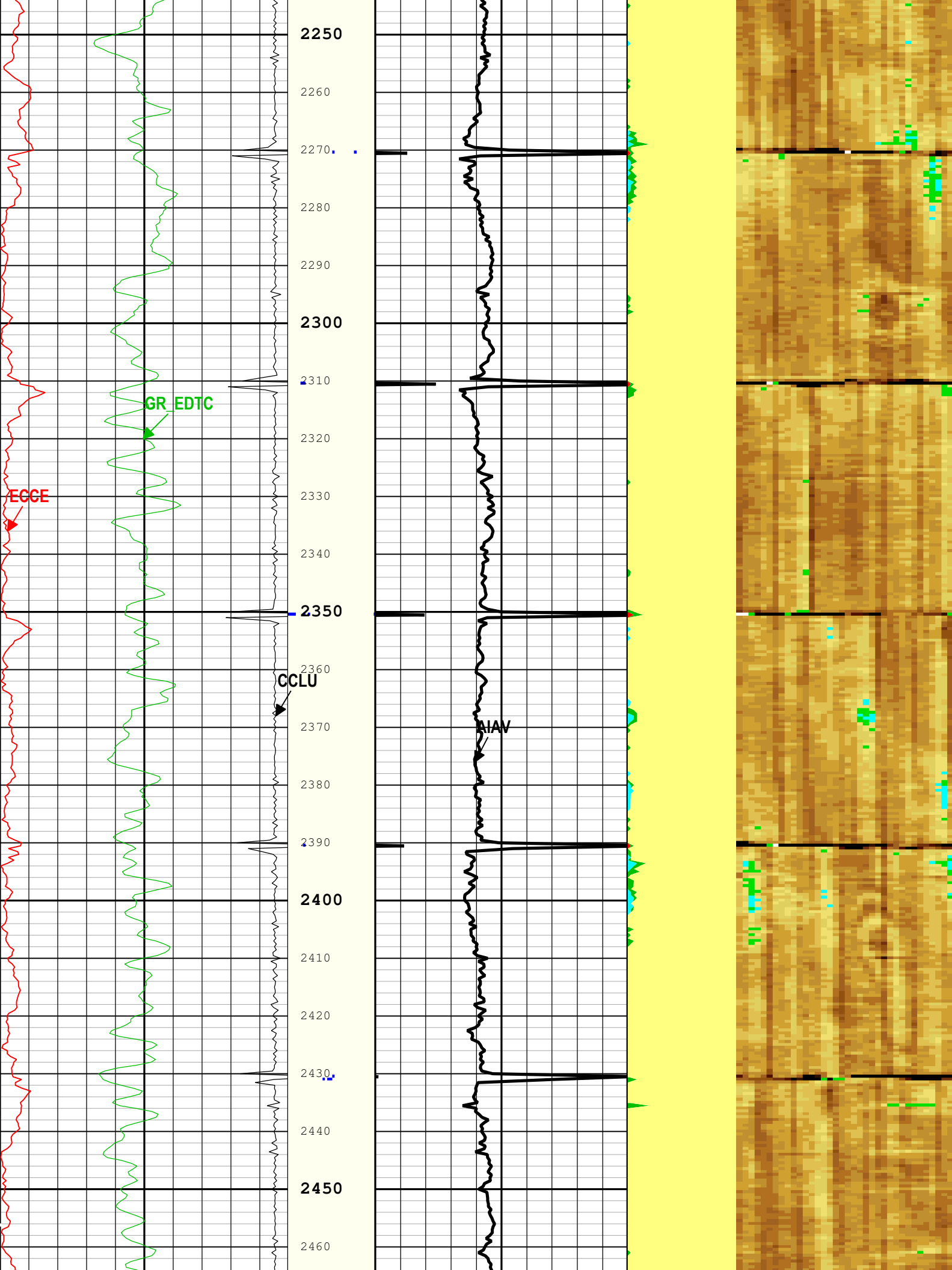


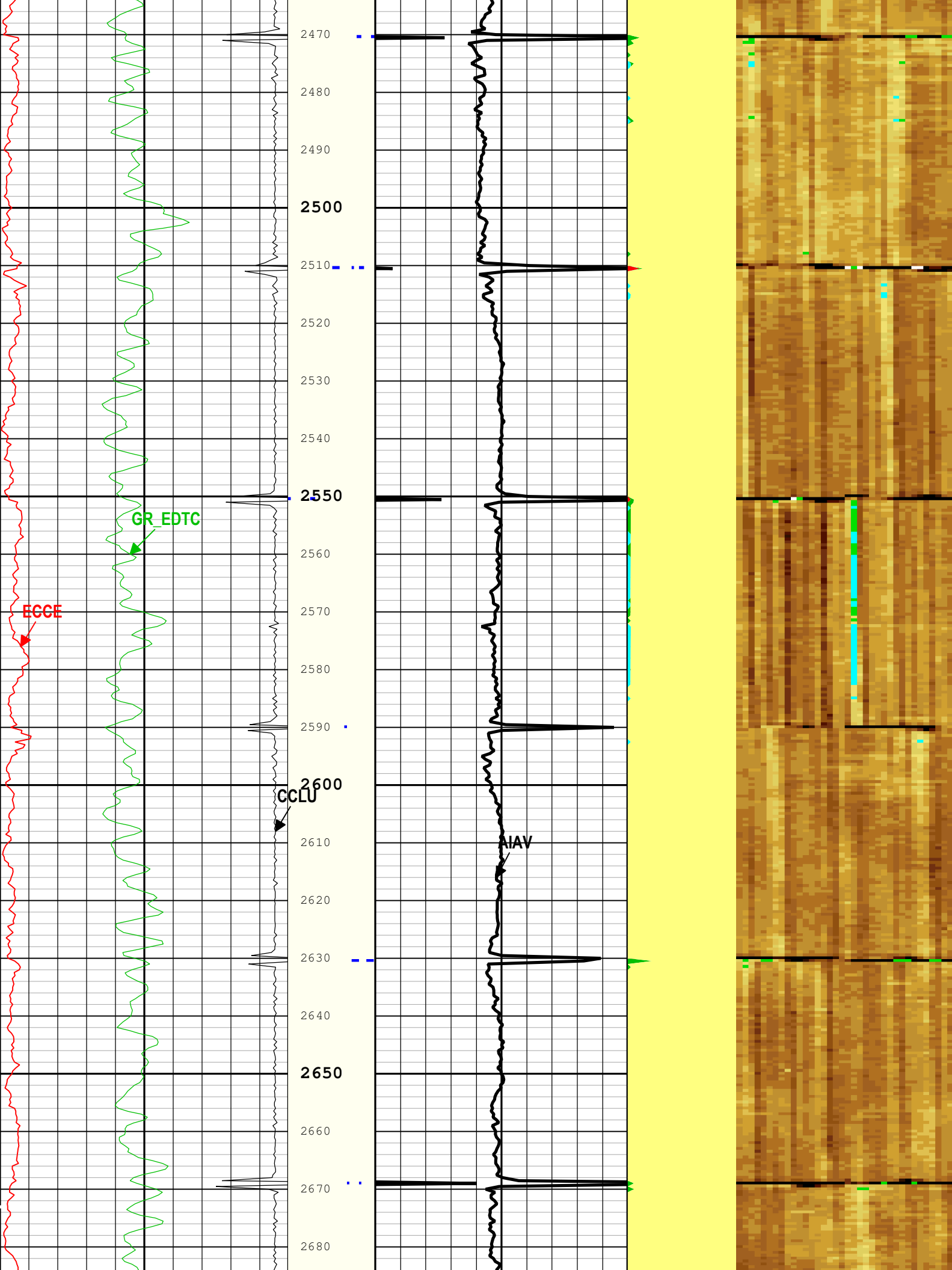


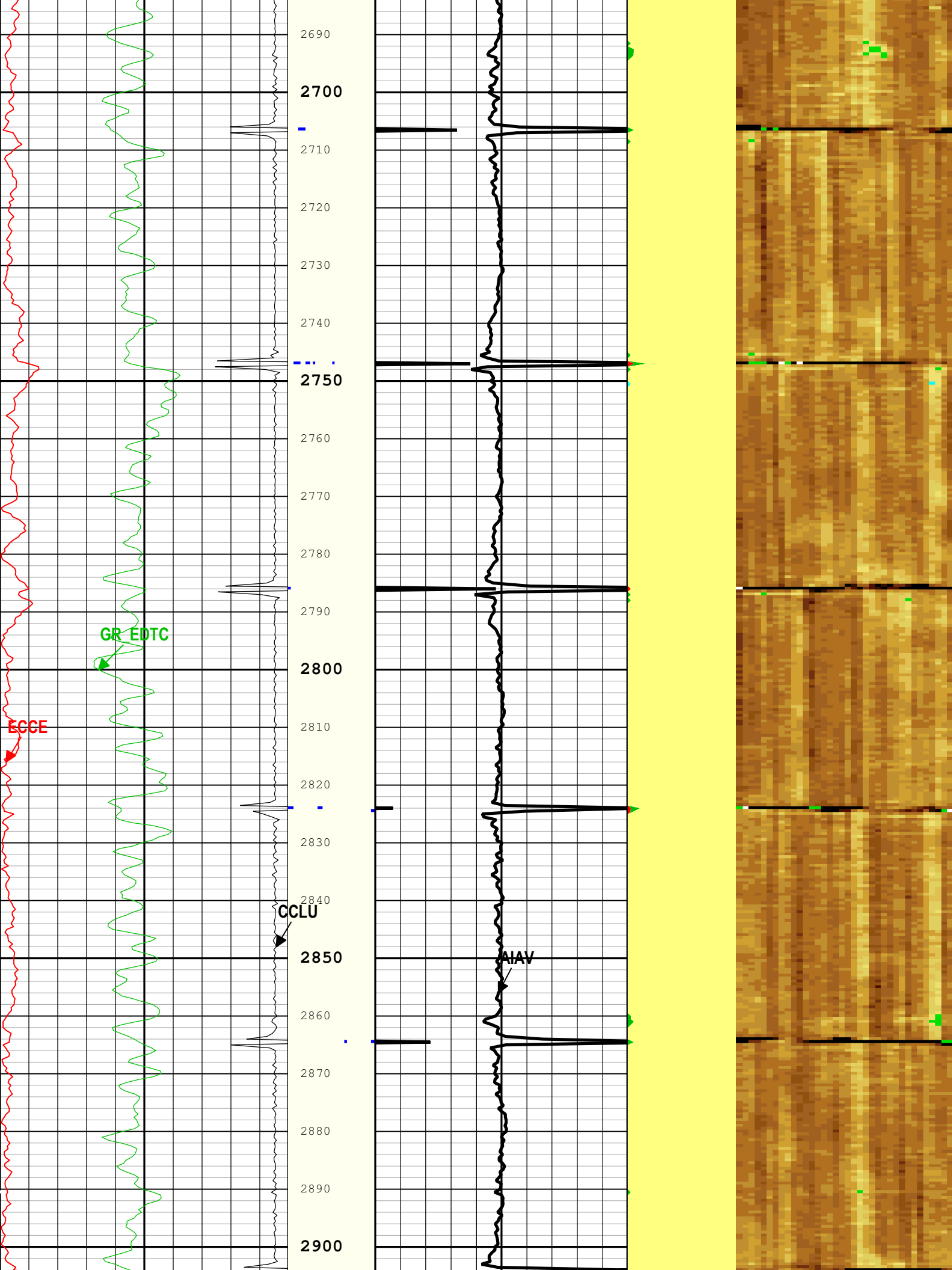


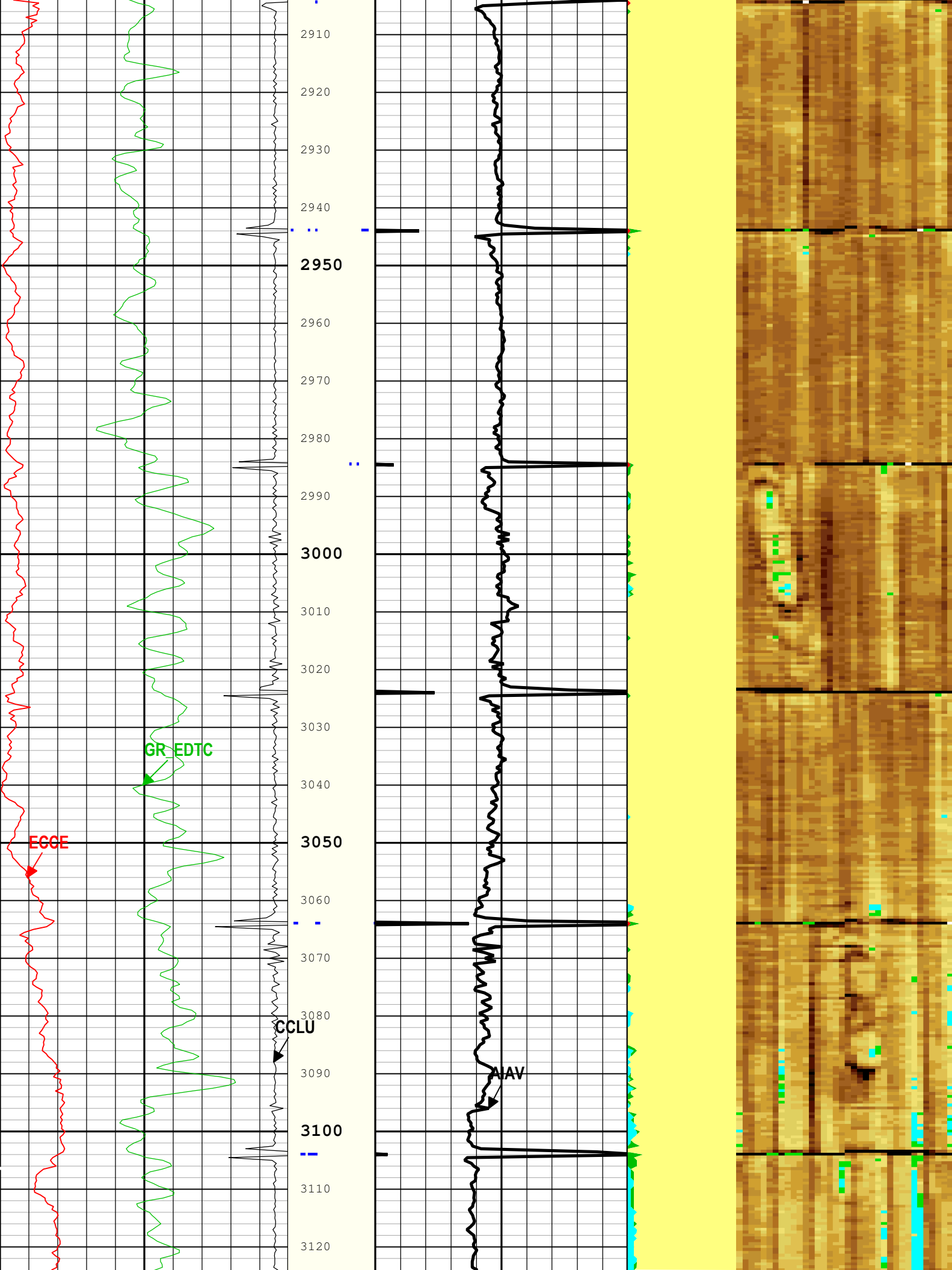


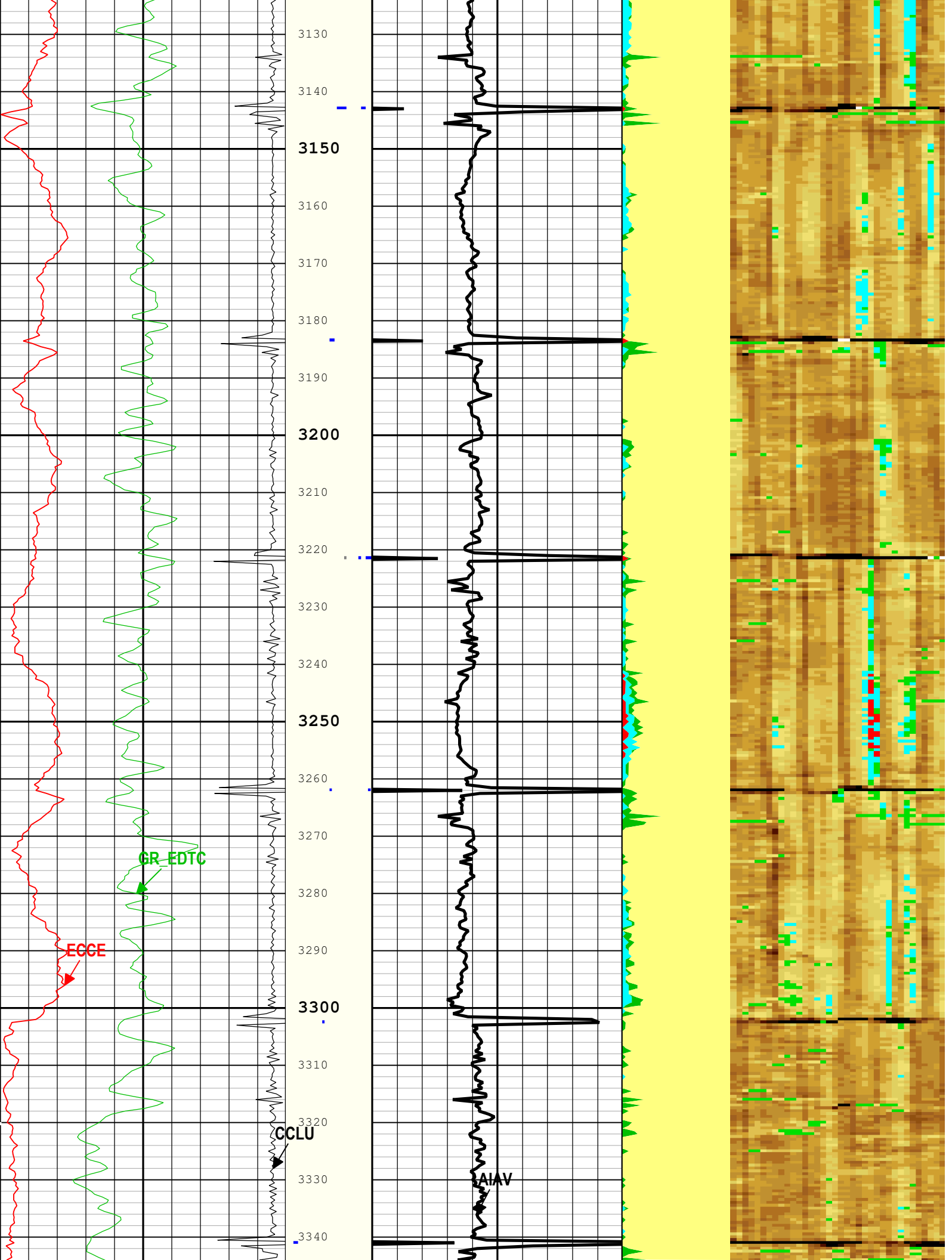


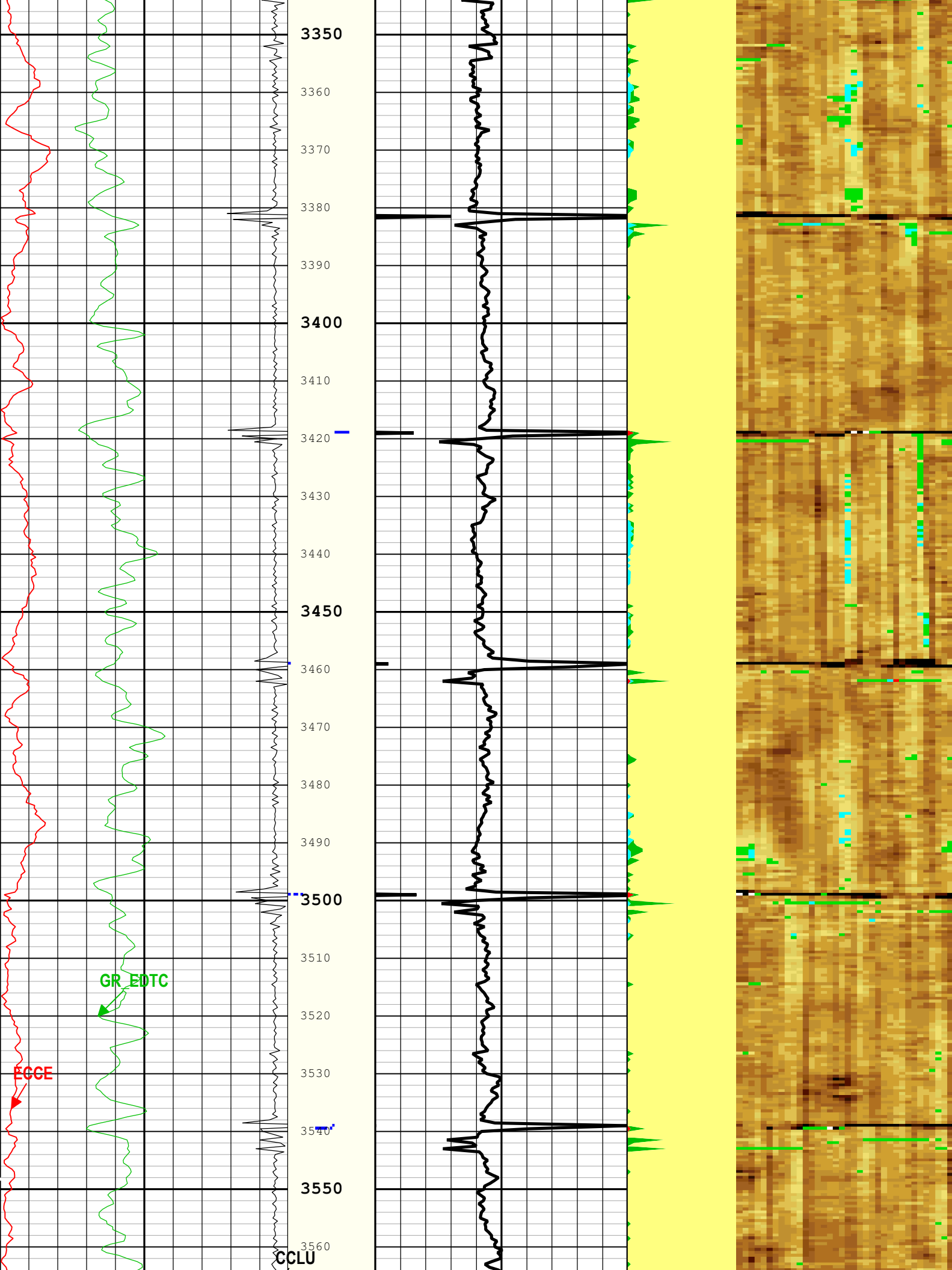


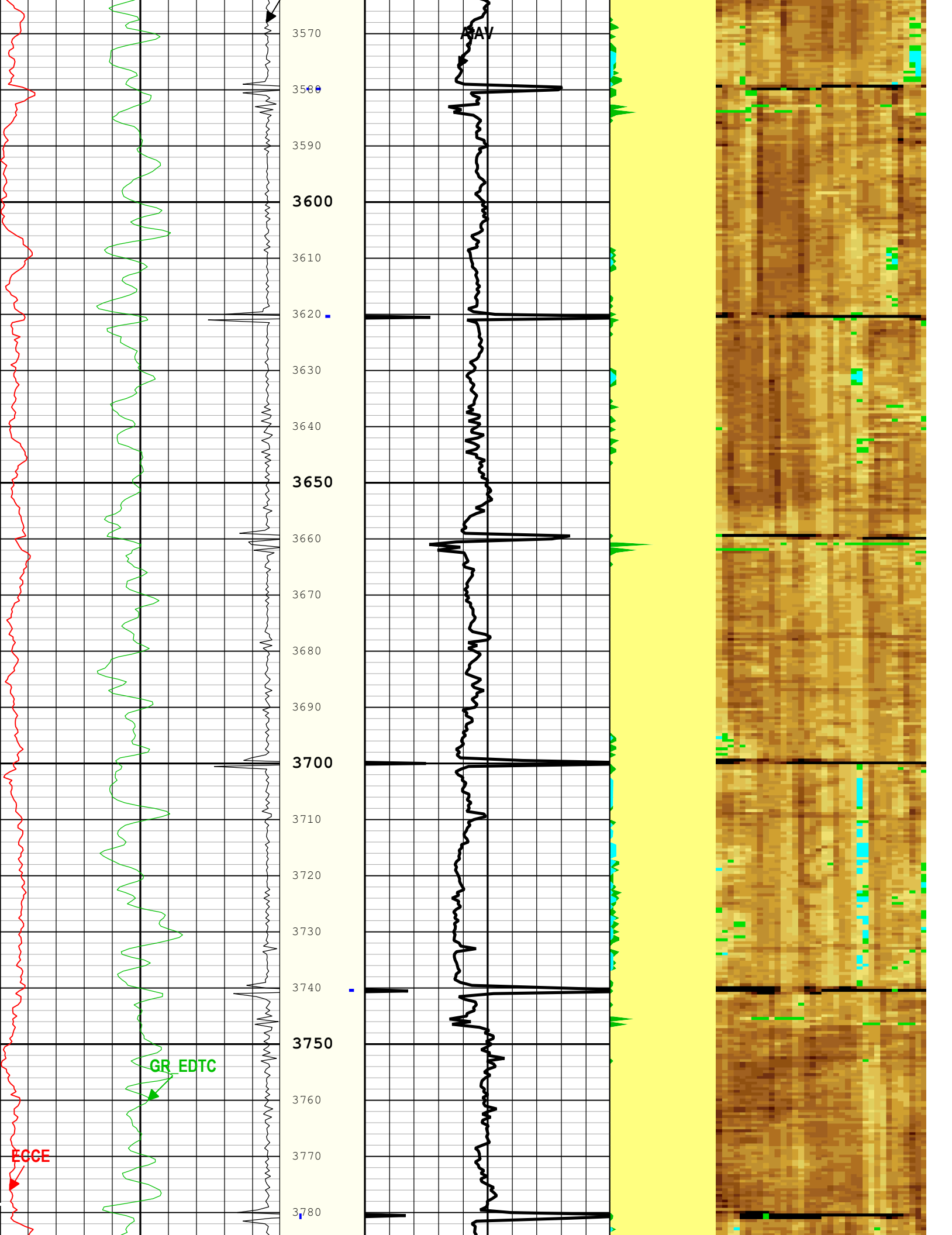


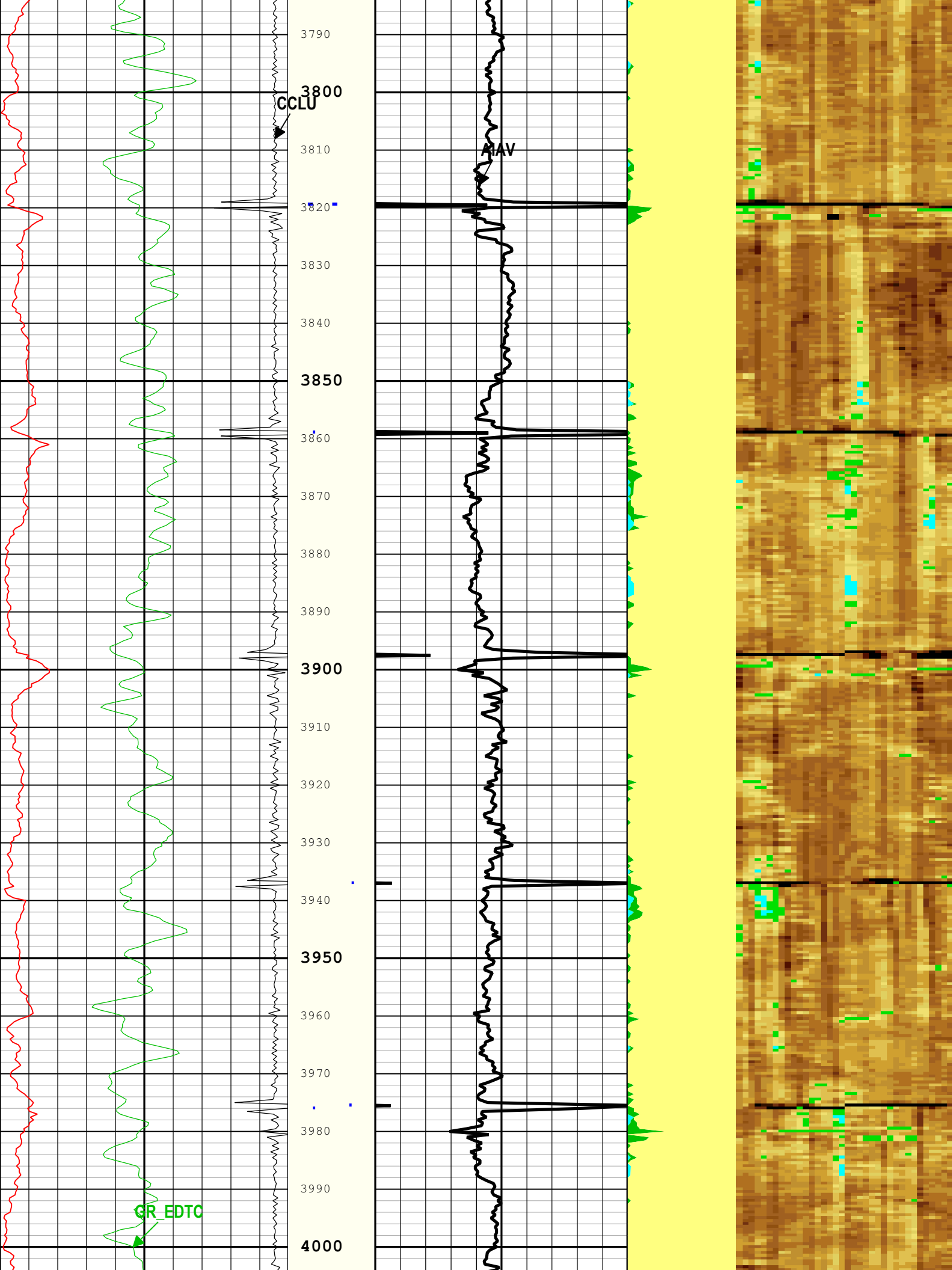


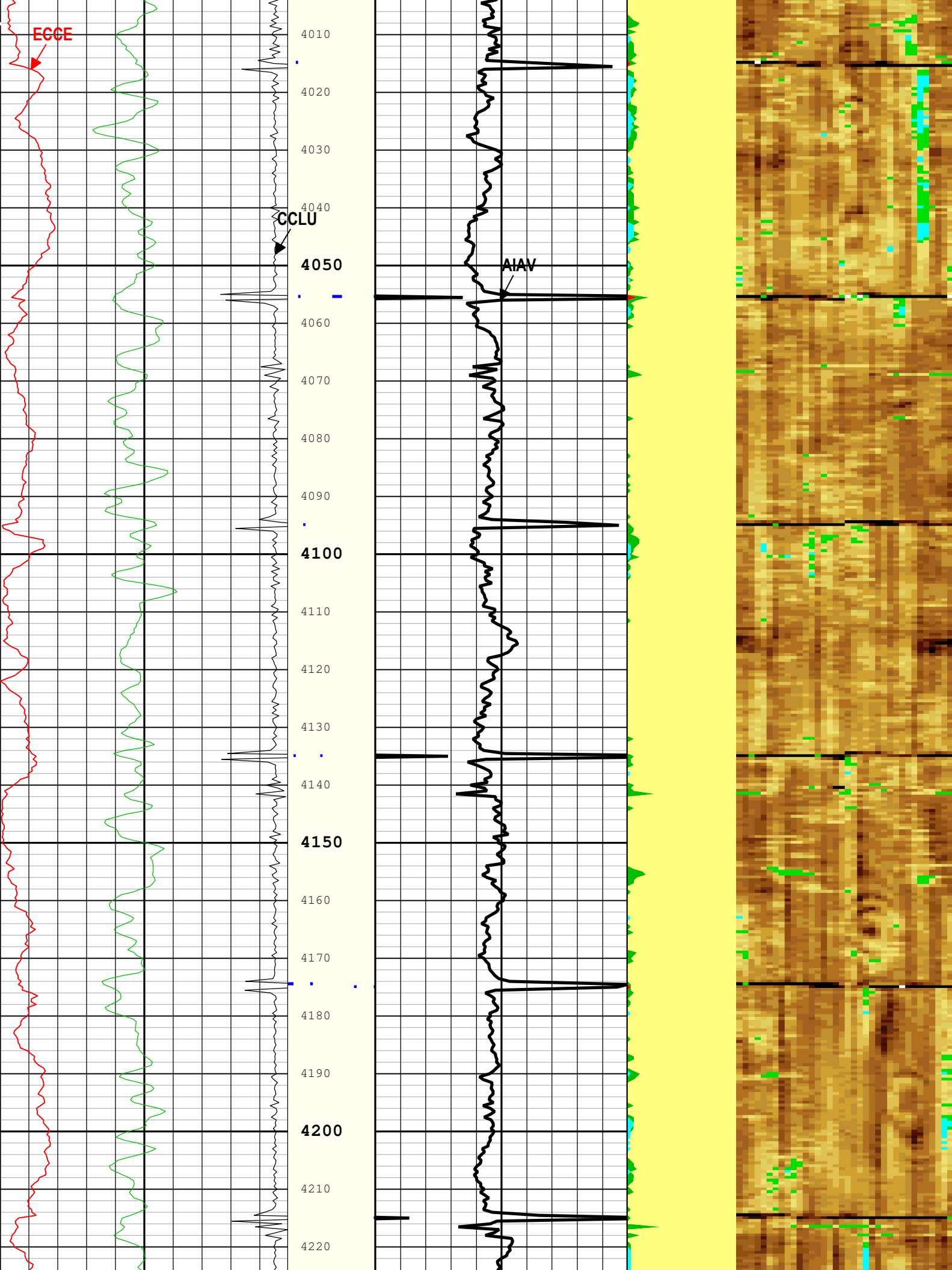


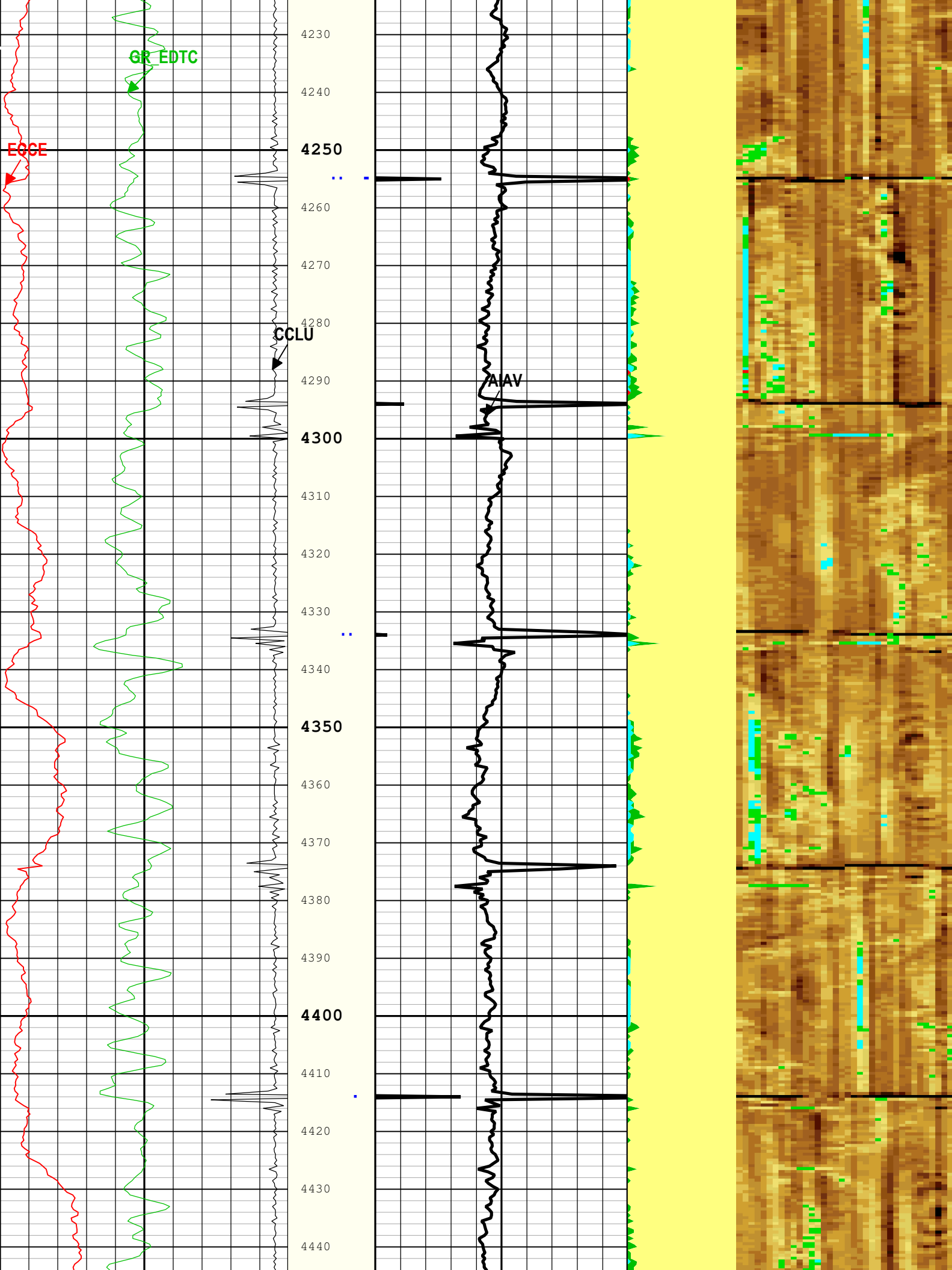


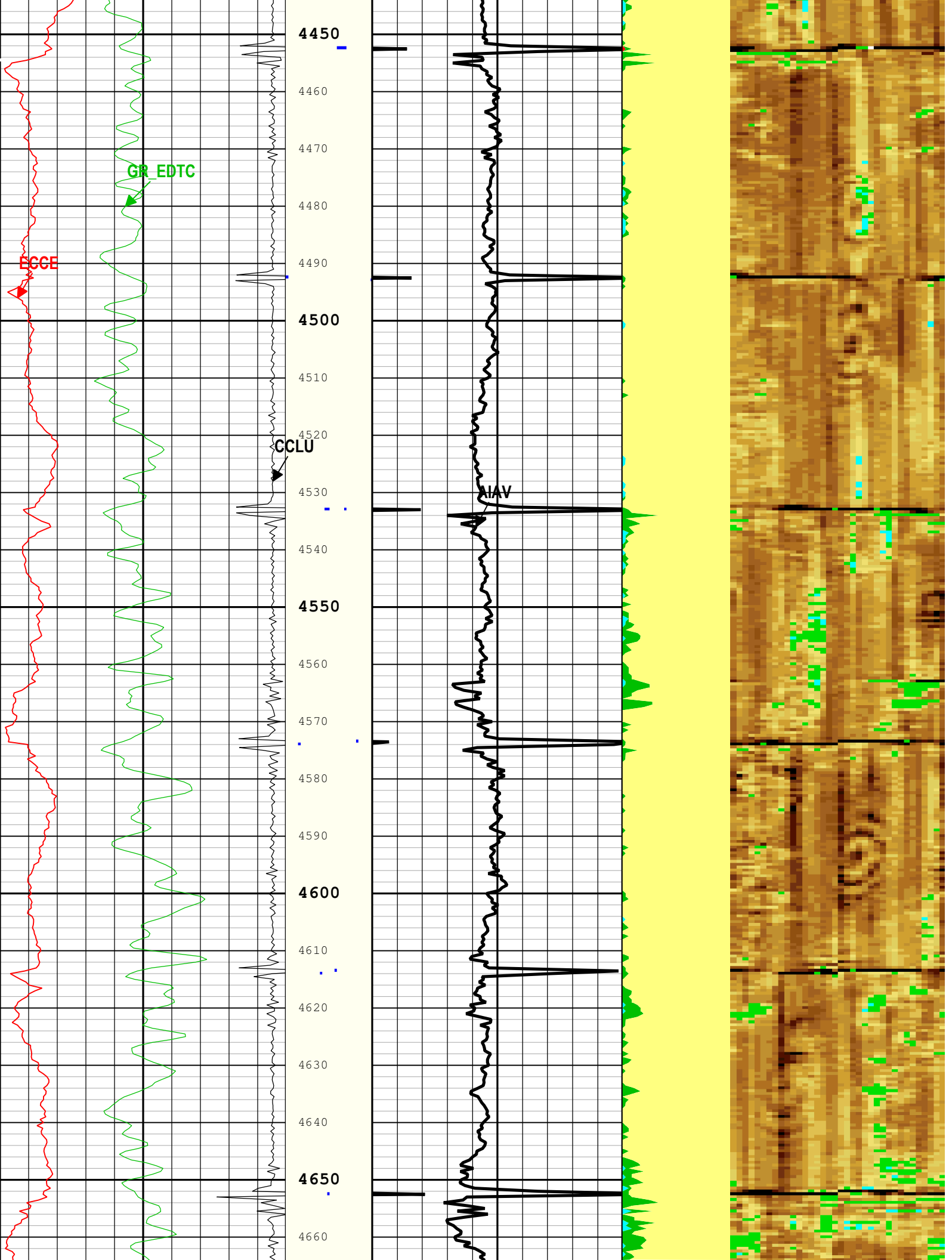


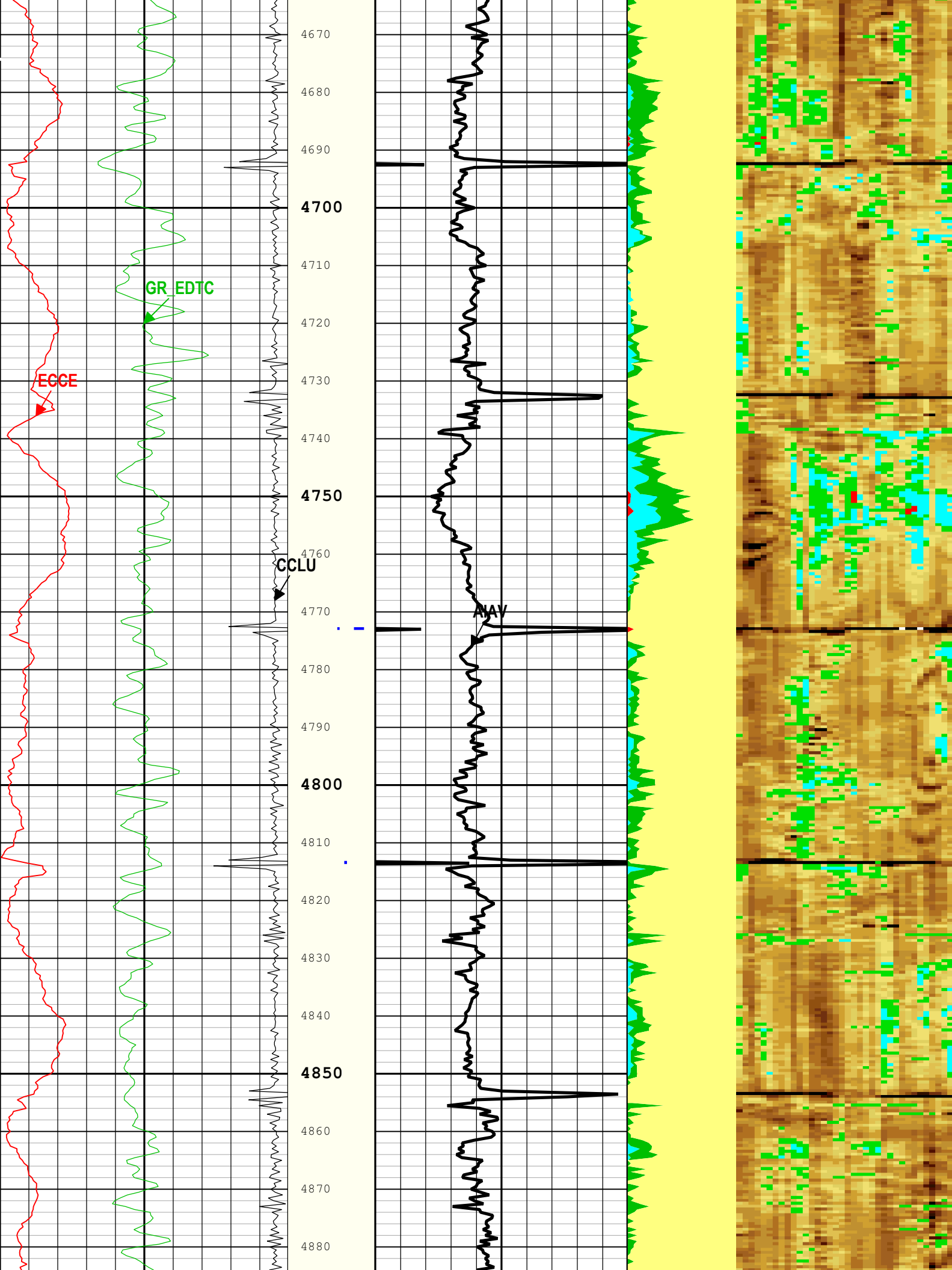


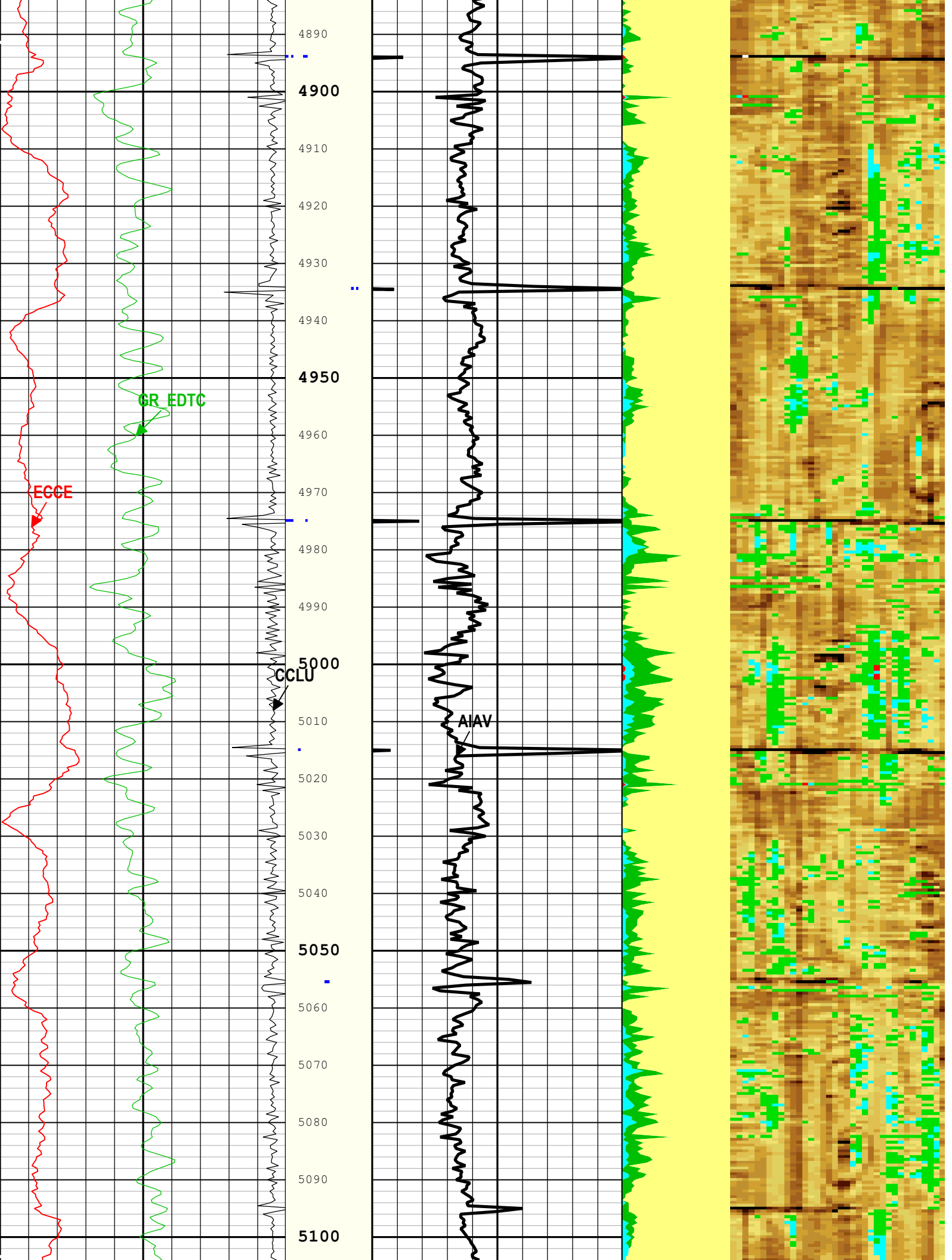


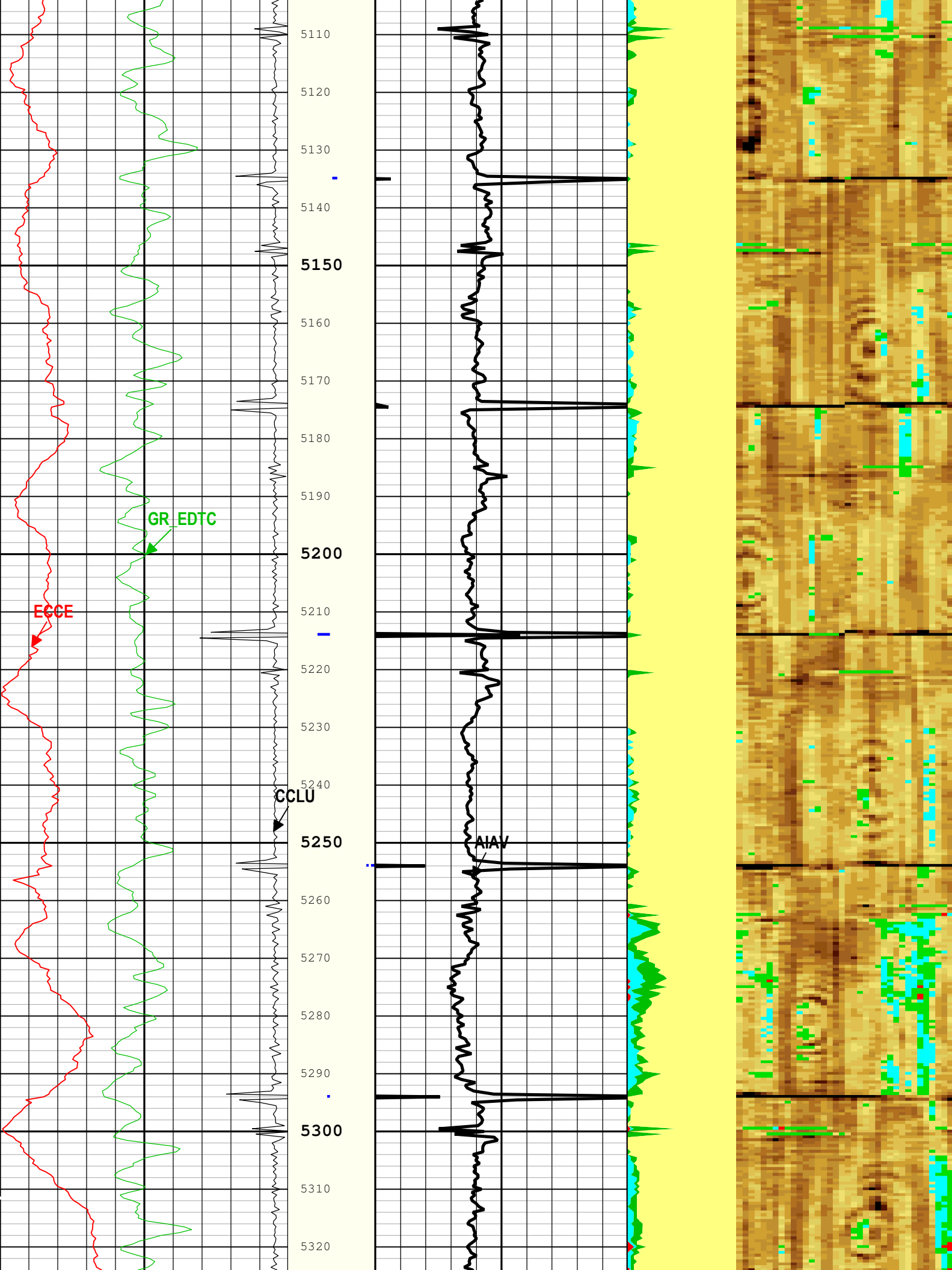


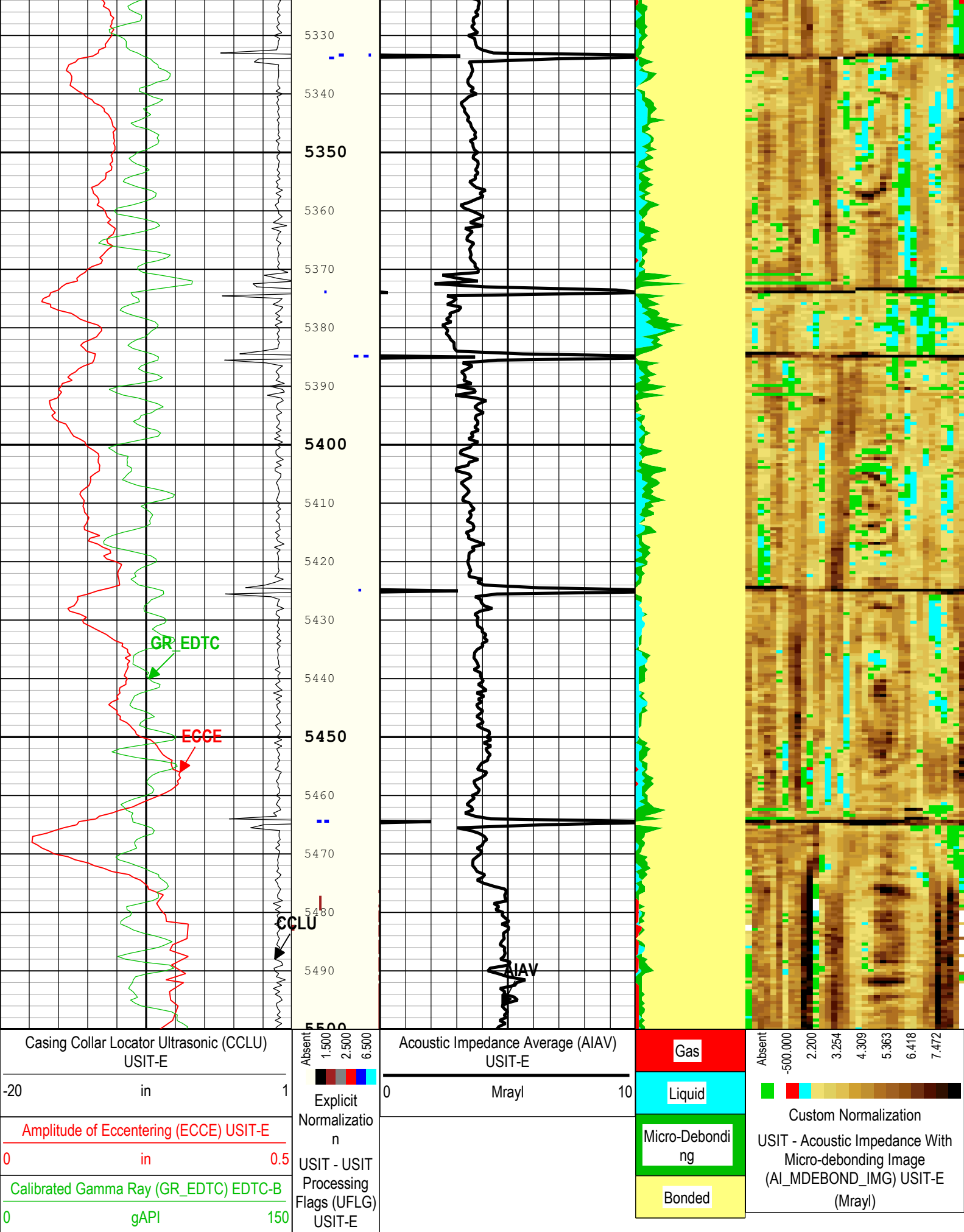












Channel Processing Parameters

One: Parameters

| Parameter | Description | Tool | Value | Unit |
|-------------------|--|-----------|----------------|---------|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BS | Bit Size | WLSESSION | Depth Zoned | in |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| DFD | Drilling Fluid Density | Borehole | 9.3 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DTMD | Borehole Fluid Slowness | Borehole | 198 | us/ft |
| FDII | FPM Data Interpolation Interval | USIT-E | 0 | ft |
| HEMA | Hematite Presence Flag | Borehole | No | |
| ICE_PROCESS | ICE Processing | USIT-E | Yes | |
| IMAR | Image Rotation | USIT-E | Off | |
| MEAS_WLEN | Tcube Processing Window Length in Measurement Mode | USIT-E | 22.44 | us |
| MUD_N_FRP | Free Pipe Mud Normalization Factor | USIT-E | 0.99 | |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 0.1 | Mrayl |
| UFGDE | Fiberglass Density | USIT-E | 16.27 | lbm/gal |
| UFGPS | Fiberglass Processing Selection | USIT-E | No | |
| UFGVL | Fiberglass Velocity | USIT-E | 9678.48 | ft/s |
| USI_FSOD | USIT USI Fluid Slowness Fits Casing Outer Diameter | USIT-E | 0_OFF | |
| USI_FVEL_SEL | USI Fluid Velocity Selection | USIT-E | Automatic | |
| USI_ZMUD_SEL | USI Mud Impedance Selection | USIT-E | FreePipe Norm. | |
| ZMUD | Acoustic Impedance of Mud | Borehole | 1.48 | Mrayl |
| ZTCM | Acoustic Impedance Threshold for Cement | USIT-E | 2.2 | Mrayl |
| ZTGS | Acoustic Impedance Threshold for Gas | USIT-E | 0.3 | Mrayl |

Depth Zone Parameters

| Parameter | Value | Start (ft) | Stop (ft) |
|-----------|-------|--------------|-------------|
| BS | 16 | 48.5 | 110 |
| BS | 13.5 | 110 | 1937 |
| BS | 8.5 | 1937 | 5500 |

All depth are actual.

Tool Control Parameters

One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---------------|--------------------------------------|--------|----------------------------------|------|
| AGMN | Minimum Gain of Cartridge | USIT-E | -12 | dB |
| AGMX | Maximum Gain of Cartridge | USIT-E | 48 | dB |
| U-USIT_DDT5 | USIC Downhole Decimation for T5 only | USIT-E | 0_NONE | |
| EMXV | EMEX Voltage | USIT-E | 55 | V |
| HRES | Horizontal Resolution | USIT-E | 10 deg | |
| TMUC | Type of Mud | USIT-E | BRI | |
| ULOG | Logging Objective | USIT-E | MEASUREMENT | |
| UMFR | Modulation Frequency | USIT-E | 333333 | Hz |
| USFR | Ultrasonic Sampling Frequency | USIT-E | 500000 | Hz |
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in LF | |
| USIT_DEPTHLOG | Starting Depth Log for Ultrasonics | USIT-E | 6000 | ft |
| WINB | Window Begin Time | USIT-E | 15 | us |

| | | | | |
|------|-----------------|--------|----|----|
| WINE | Window End Time | USIT-E | 80 | us |
|------|-----------------|--------|----|----|

One

0 PSI Repeat Pass

Software Version

| Acquisition System | Version |
|--------------------|----------------|
| Maxwell 2016 | 6.0.53731.3100 |

Pass Summary

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|------------|------------|------------------------|------------------------|----------|-------------|-----------------------|
| One | Log[3]:Up | Up | 1942.87 ft | 2612.80 ft | 20-Oct-2016 5:27:44 AM | 20-Oct-2016 5:31:45 AM | ON | 9.90 ft | Yes |

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc

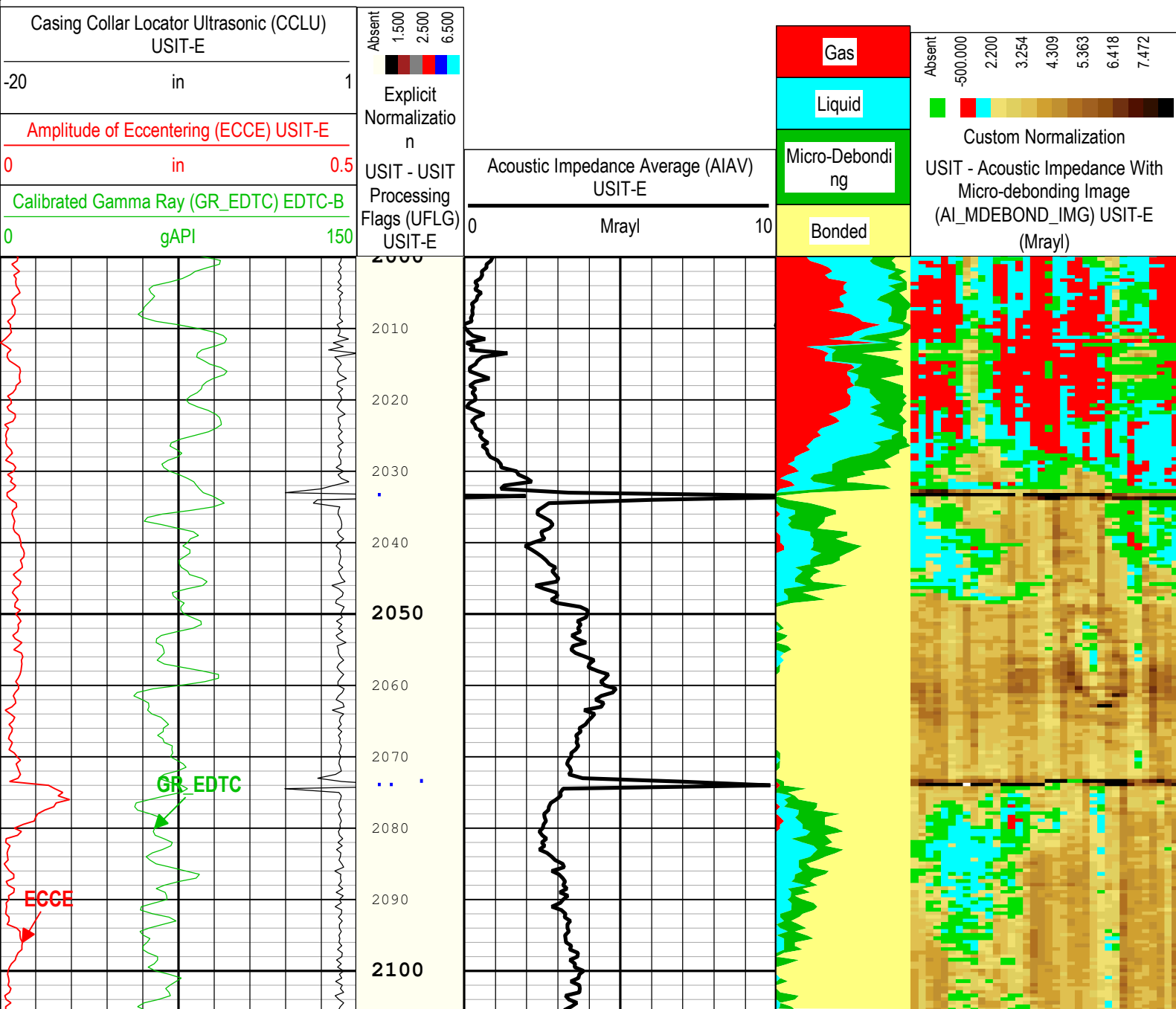
Well:ELLIE LD26-635

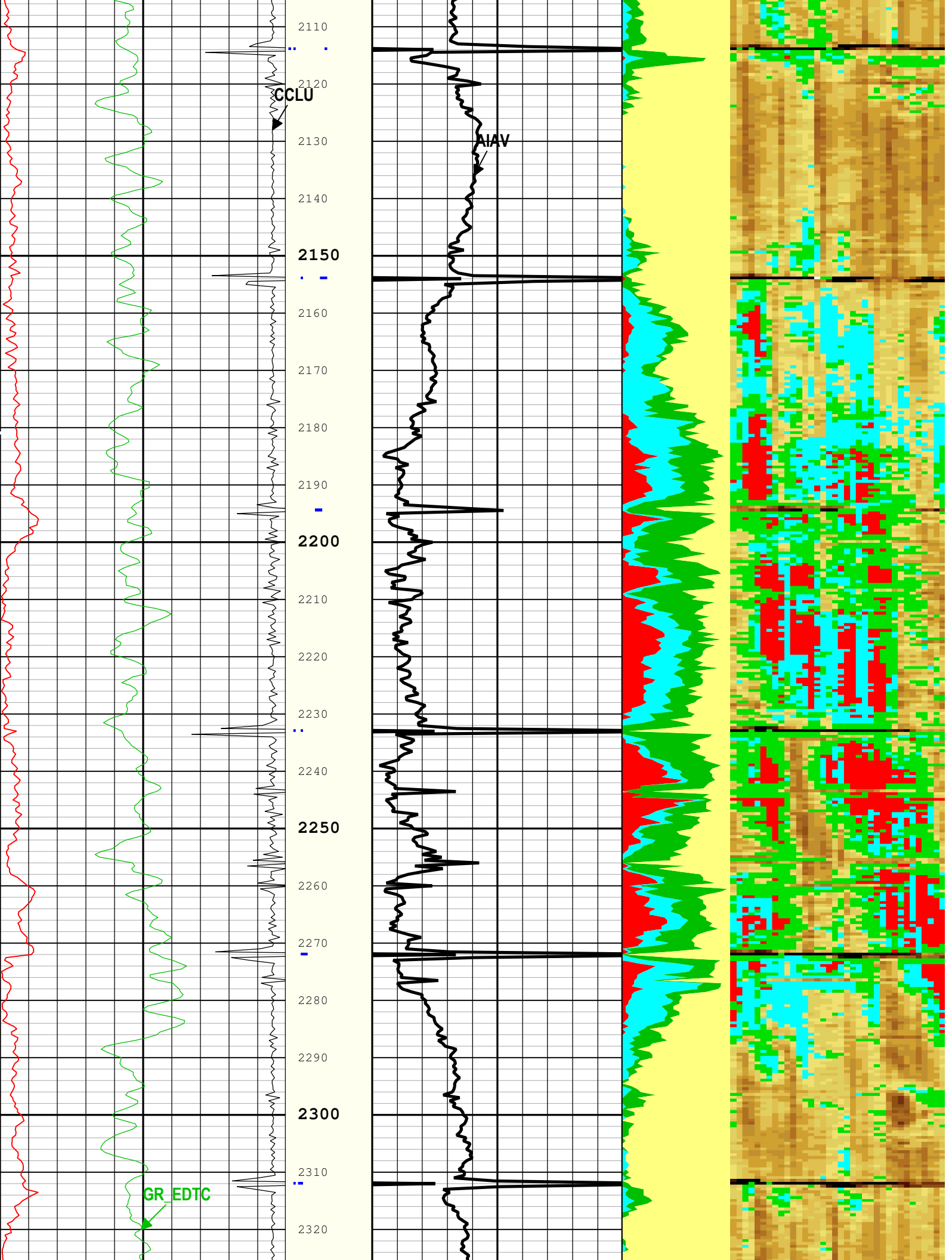
One: Log[3]:Up:S009

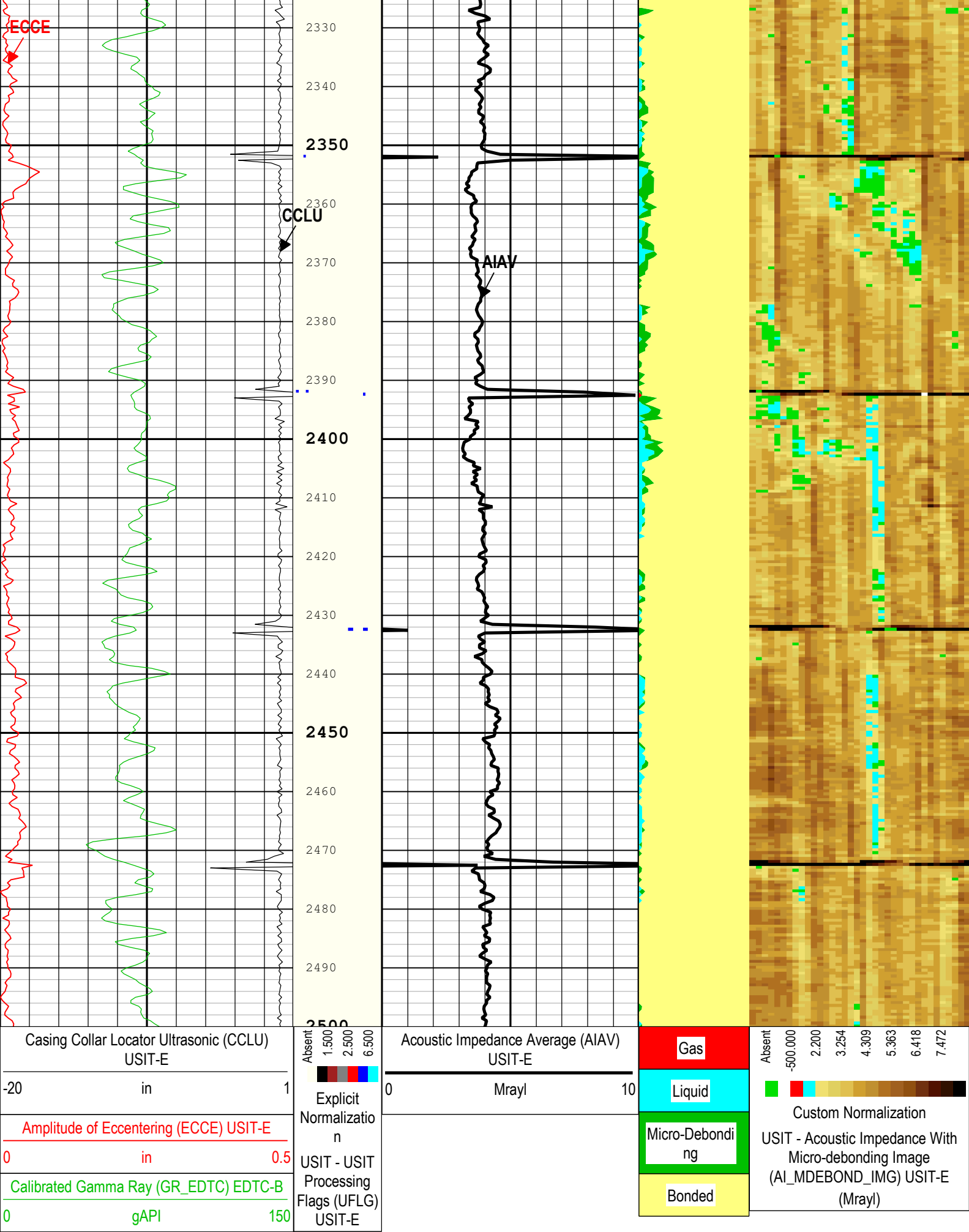
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 24-Oct-2016 00:11:29

TIME_1900 - Time Marked every 60.00 (s)







Channel Processing Parameters

One: Parameters

| Parameter | Description | Tool | Value | Unit |
|-------------------|--|-----------|----------------|---------|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BS | Bit Size | WLSESSION | 8.5 | in |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| DFD | Drilling Fluid Density | Borehole | 9.3 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DTMD | Borehole Fluid Slowness | Borehole | 198 | us/ft |
| FDII | FPM Data Interpolation Interval | USIT-E | 0 | ft |
| HEMA | Hematite Presence Flag | Borehole | No | |
| ICE_PROCESS | ICE Processing | USIT-E | Yes | |
| IMAR | Image Rotation | USIT-E | Off | |
| MEAS_WLEN | Tcube Processing Window Length in Measurement Mode | USIT-E | 22.44 | us |
| MUD_N_FRP | Free Pipe Mud Normalization Factor | USIT-E | 0.99 | |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 0.1 | Mrayl |
| UFGDE | Fiberglass Density | USIT-E | 16.27 | lbm/gal |
| UFGPS | Fiberglass Processing Selection | USIT-E | No | |
| UFGVL | Fiberglass Velocity | USIT-E | 9678.48 | ft/s |
| USI_FSOD | USIT USI Fluid Slowness Fits Casing Outer Diameter | USIT-E | 0_OFF | |
| USI_FVEL_SEL | USI Fluid Velocity Selection | USIT-E | Automatic | |
| USI_ZMUD_SEL | USI Mud Impedance Selection | USIT-E | FreePipe Norm. | |
| ZMUD | Acoustic Impedance of Mud | Borehole | 1.48 | Mrayl |
| ZTCM | Acoustic Impedance Threshold for Cement | USIT-E | 2.2 | Mrayl |
| ZTGS | Acoustic Impedance Threshold for Gas | USIT-E | 0.3 | Mrayl |

Tool Control Parameters

One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---------------|--------------------------------------|--------|----------------------------------|------|
| AGMN | Minimum Gain of Cartridge | USIT-E | -12 | dB |
| AGMX | Maximum Gain of Cartridge | USIT-E | 48 | dB |
| U-USIT_DDT5 | USIC Downhole Decimation for T5 only | USIT-E | 0_NONE | |
| EMXV | EMEX Voltage | USIT-E | 55 | V |
| HRES | Horizontal Resolution | USIT-E | 10 deg | |
| TMUC | Type of Mud | USIT-E | BRI | |
| ULOG | Logging Objective | USIT-E | MEASUREMENT | |
| UMFR | Modulation Frequency | USIT-E | 333333 | Hz |
| USFR | Ultrasonic Sampling Frequency | USIT-E | 500000 | Hz |
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in LF | |
| USIT_DEPTHLOG | Starting Depth Log for Ultrasonics | USIT-E | 2602 | ft |
| WINB | Window Begin Time | USIT-E | 29.86 | us |
| WINE | Window End Time | USIT-E | 69.86 | us |

XYZ

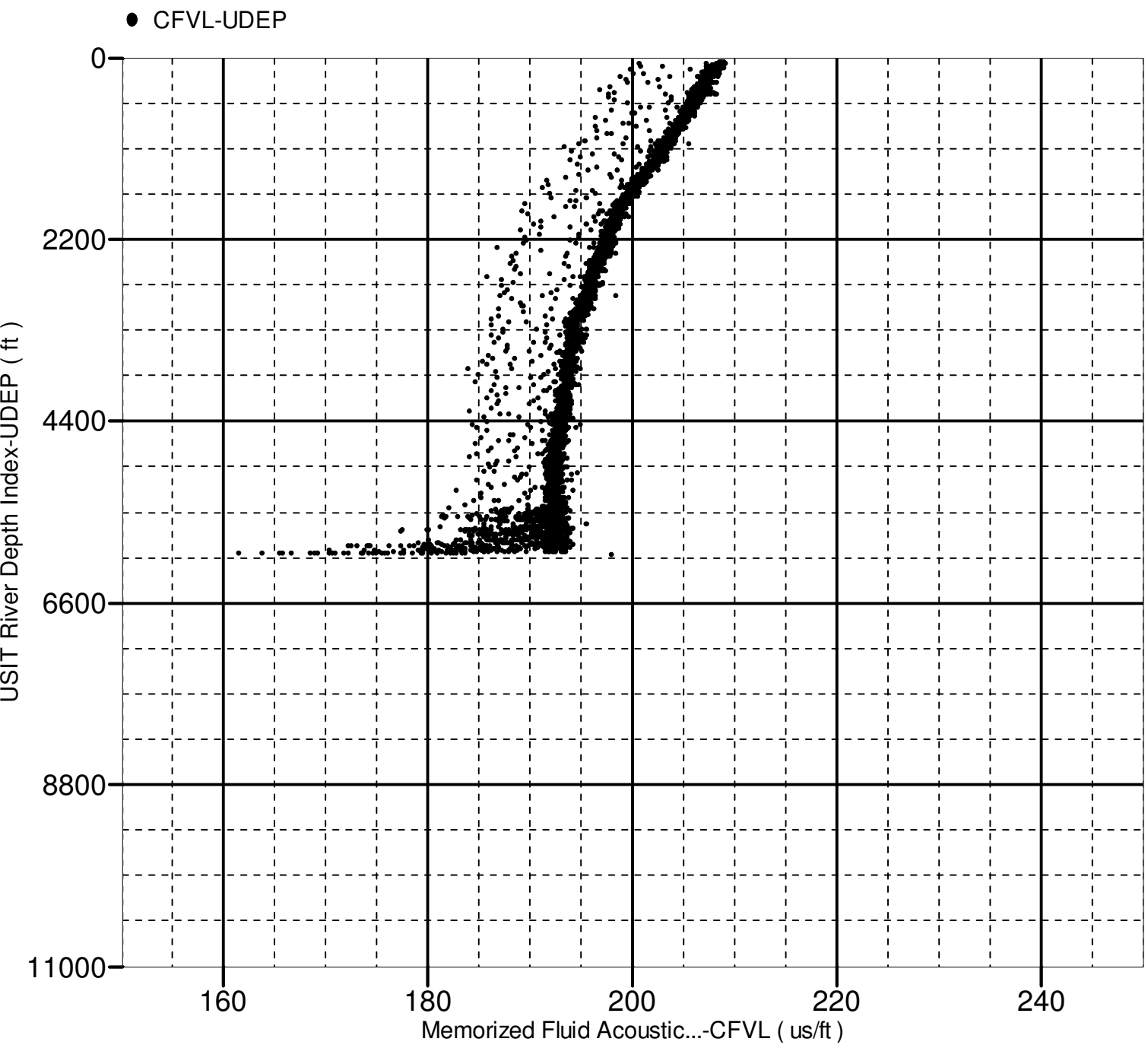
Company:Noble Energy Inc Well:ELLIE LD26-635

One: Log[5]:Up:S009

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6022.50 to 69.00 ft



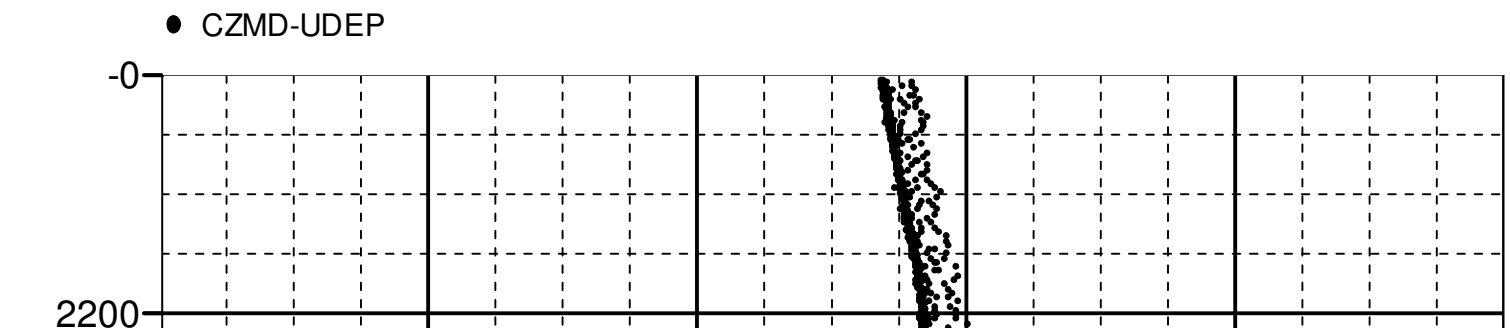
XYZ

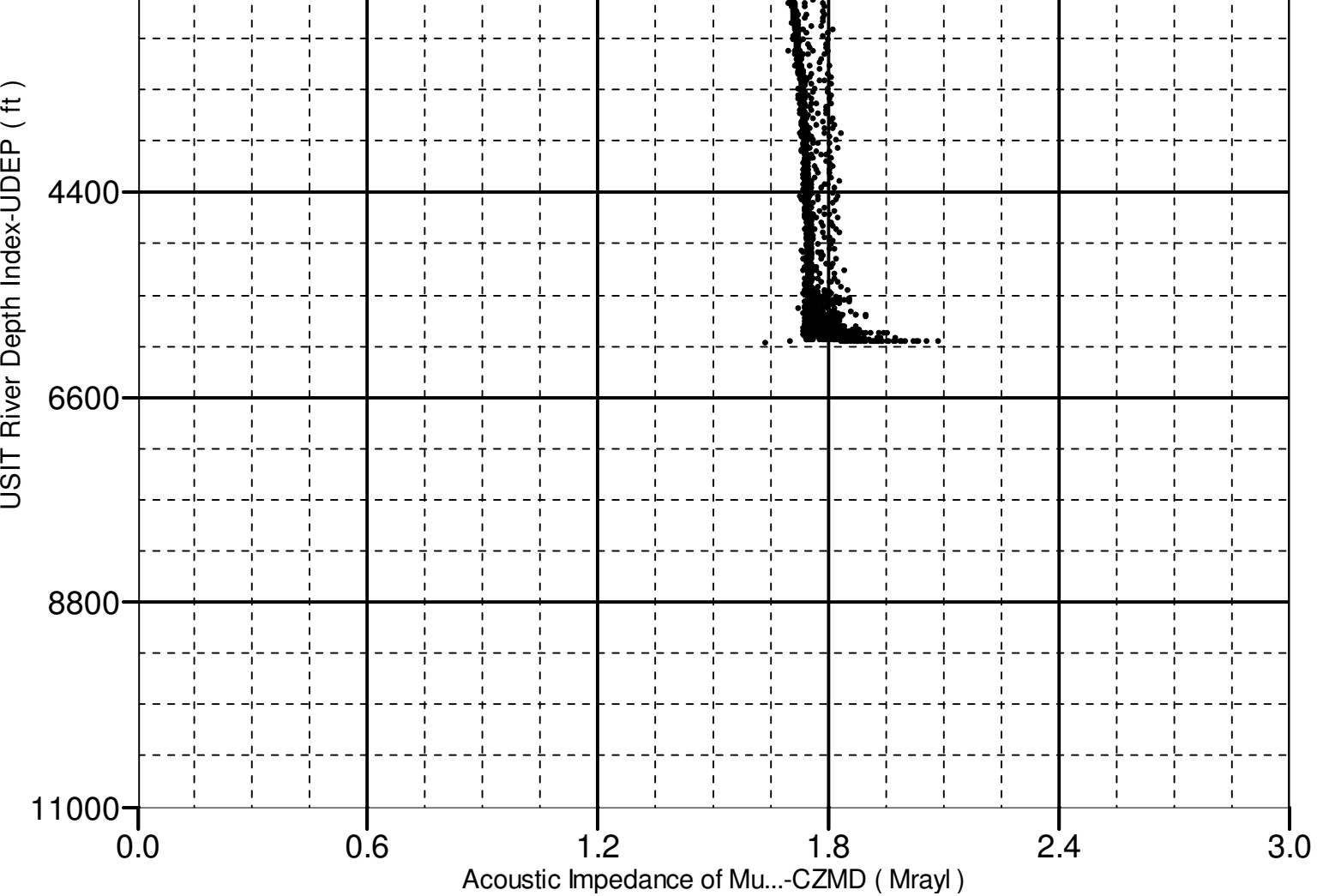
Company:Noble Energy Inc Well:ELLIE LD26-635
One: Log[5]:Up:S009

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6022.50 to 69.00 ft





| | | |
|--------------------------|------------------|--------------|
| Company: | Noble Energy Inc | Schlumberger |
| Well: | ELLIE LD26-635 | |
| Field: | Wildcat | |
| County: | Weld | |
| Country: | US | |
| UltraSonic Summary Print | | |
| | | |