

Company: Noble Energy Inc

Well: Bison Ridge Y22-764

Field: Wattenberg

County: Weld State: CO

UltraSonic Summary Print

|                                 |                         |
|---------------------------------|-------------------------|
| County:                         | Weld                    |
| Field:                          | Wattenberg              |
| Location:                       | NESW Sec. 10, T2N, R64W |
| Well:                           | Bison Ridge Y22-764     |
| Company:                        | Noble Energy Inc        |
| Location:                       |                         |
| NESW Sec. 10, T2N, R64W         | Elev.: K.B. 4961.00 ft  |
| SHL: 2230' FSL & 2092' FEL      | G.L. 4931.00 ft         |
| Lat/Long: 40.151830/-104.539580 | D.F. 4961.00 ft         |
| Permanent Datum:                | Ground Level            |
| Log Measured From:              | Kelly Bushing           |
| Drilling Measured From:         | Kelly Bushing           |
| API Serial No. 05-123-45376     | Section: 10             |
|                                 | Township: 2N            |
|                                 | Range: 64W              |
| Logging Date                    | 02-Feb-2018             |

|                           |                     |
|---------------------------|---------------------|
| Run Number                | ONE                 |
| Depth Driller             | 17059.00 ft         |
| Schlumberger Depth        | 6704.00 ft          |
| Bottom Log Interval       | 6704.00 ft          |
| Top Log Interval          | 100.00 ft           |
| Casing Fluid Type         | Brine               |
| Salinity                  |                     |
| Density                   | 8.4 lbm/gal         |
| Fluid Level               | 0.00 ft             |
| BIT/CASING/TUBING STRING  |                     |
| Bit Size                  | 8.50 in             |
| From                      | 2050.00 ft          |
| To                        | 6704.00 ft          |
| Casing/Tubing Size        | 5.5 in              |
| Weight                    | 20 lbm/ft           |
| Grade                     | P110                |
| From                      | 0.00 ft             |
| To                        | 17045.70 ft         |
| Max Recorded Temperatures | 169 degF            |
| Logger on Bottom          | 02-Feb-2018         |
| Unit Number               | 2161                |
| Recorded By               | A.Rosacker/T.Savoie |
| Witnessed By              | Bill Mansfield      |

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

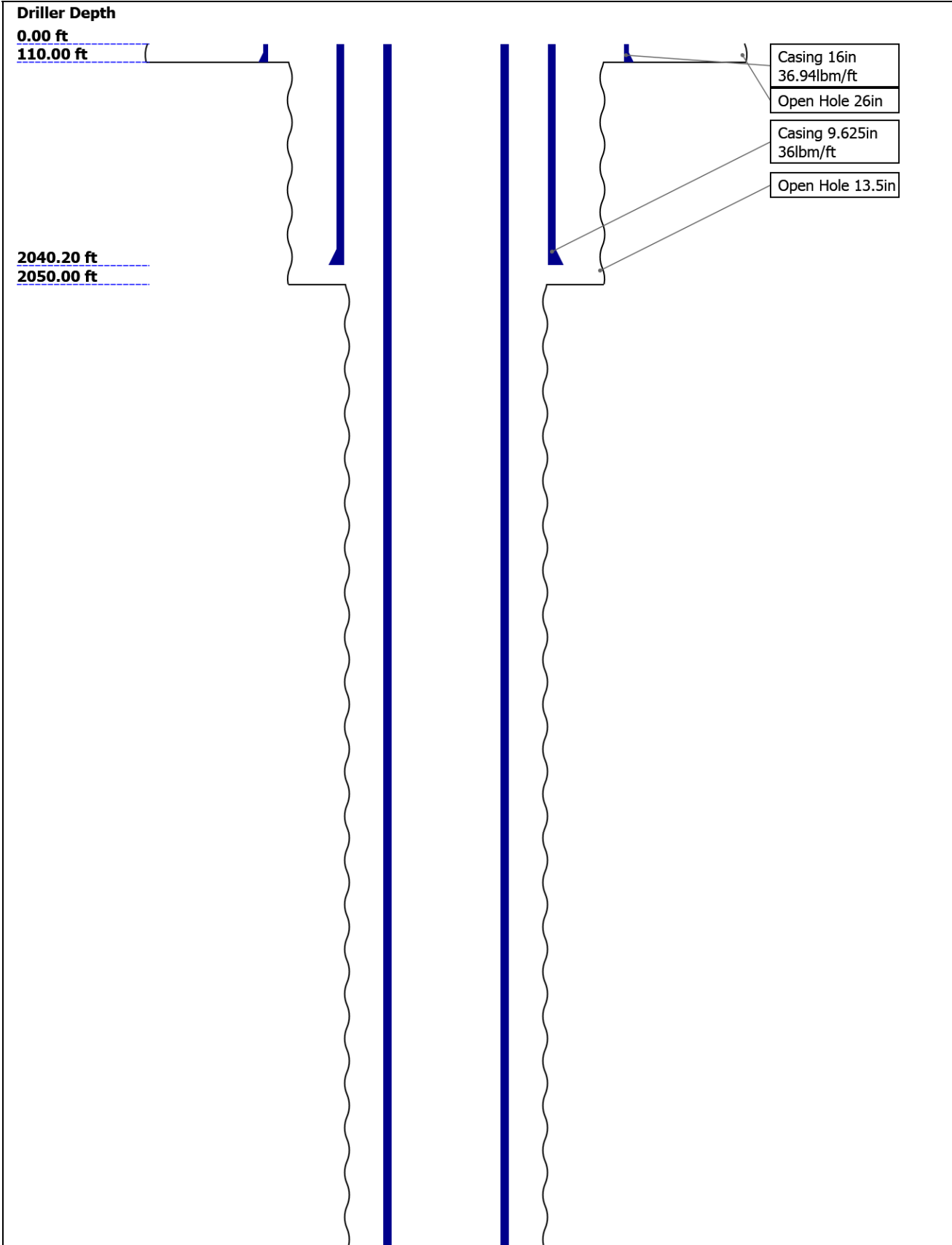
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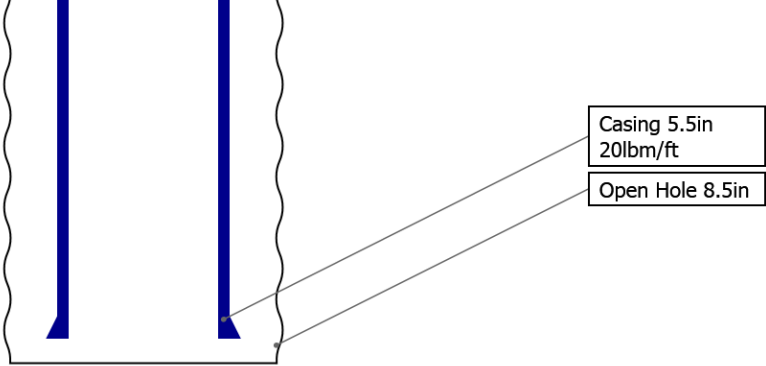
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Well Sketch



17045.70 ft


17059.00 ft



Borehole Size/Casing/Tubing Record

|                       |        |        |         |  |  |  |
|-----------------------|--------|--------|---------|--|--|--|
| Bit                   |        |        |         |  |  |  |
| Bit Size ( in )       | 26     | 13.5   | 8.5     |  |  |  |
| Top Driller ( ft )    | 0      | 110    | 2050    |  |  |  |
| Top Logger ( ft )     | 0      | 110    | 2050    |  |  |  |
| Bottom Driller ( ft ) | 110    | 2050   | 17059   |  |  |  |
| Bottom Logger ( ft )  | 110    | 2050   | 6704    |  |  |  |
| Casing                |        |        |         |  |  |  |
| Size ( in )           | 16     | 9.625  | 5.5     |  |  |  |
| Weight ( lbm/ft )     | 36.94  | 36     | 20      |  |  |  |
| Inner Diameter ( in ) | 15.572 | 8.921  | 4.778   |  |  |  |
| Grade                 | N/A    | J55    | P110    |  |  |  |
| Top Driller ( ft )    | 0      | 0      | 0       |  |  |  |
| Top Logger ( ft )     | 0      | 0      | 0       |  |  |  |
| Bottom Driller ( ft ) | 110    | 2040.2 | 17045.7 |  |  |  |
| Bottom Logger ( ft )  | 110    | 2040.2 | 17045.7 |  |  |  |

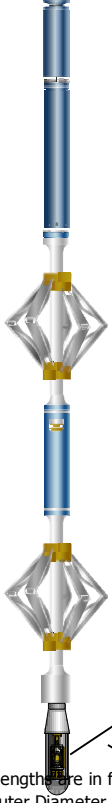
Remarks and Equipment Summary

| ONE: Toolstring   |   |  |  | ONE: Remarks |  |
|---|---|--|--|--------------|--|
| <div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT:233.83353LEH-QT:2353</div><div>SAH-F:1830.9117</div><div>EDTC-B:826.06424EDTH-B:8432EDTG-BEDTC-B:8424</div><div>AH-184[2]:276519.56</div><div>AH-184[2]:276517.56</div></div><div></div><div><div>CTEM22.56</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamma Ray20.69</div><div>TelStatu19.56</div></div></div> | Thank you for choosing Schlumberger                           |  |  |              |  |
|   | Toolstring run as per tool sketch and client logging program. |  |  |              |  |
|   | 4.75" Gemcos ran on USAC and EDTC for centralization.         |  |  |              |  |
|   | This is the first log in well.                                |  |  |              |  |
|   | Main pass logged at 2500 PSI; Repeat pass logged at 0 PSI     |  |  |              |  |
|   | Estimated Top of Cement is 2000 ft                            |  |  |              |  |
|   | BHT: 169 degF   |  |  |              |  |
|   |   |  |  |              |  |

1J:2826

USIT-E:94 15.56  
3

ECH-MFA:  
1928  
USAC-A:9  
43  
USIS-A:27  
20  
USSC-B:75  
8  
USRS-AB:  
873  
USI-SENS  
OR  
USI-TX



Depth Summary

ONE

Depth Measuring Device

|                          |             |
|--------------------------|-------------|
| Type                     | IDW-JA      |
| Serial Number            | 6483        |
| Calibration Date         |             |
| Calibrator Serial Number |             |
| Calibration Cable Type   | 7-46 PI-XXS |
| Wheel Correction 1       | -4          |
| Wheel Correction 2       | -5          |

Tension Device

|                                    |             |
|------------------------------------|-------------|
| Type                               | CMTD-B/A    |
| Serial Number                      | 466         |
| Calibration Date                   | 11-Jan-2018 |
| Calibrator Serial Number           | 84749A      |
| Number of Calibration Points       | 10          |
| Calibration Root Mean Square Error | 15          |
| Calibration Peak Error             | 24          |

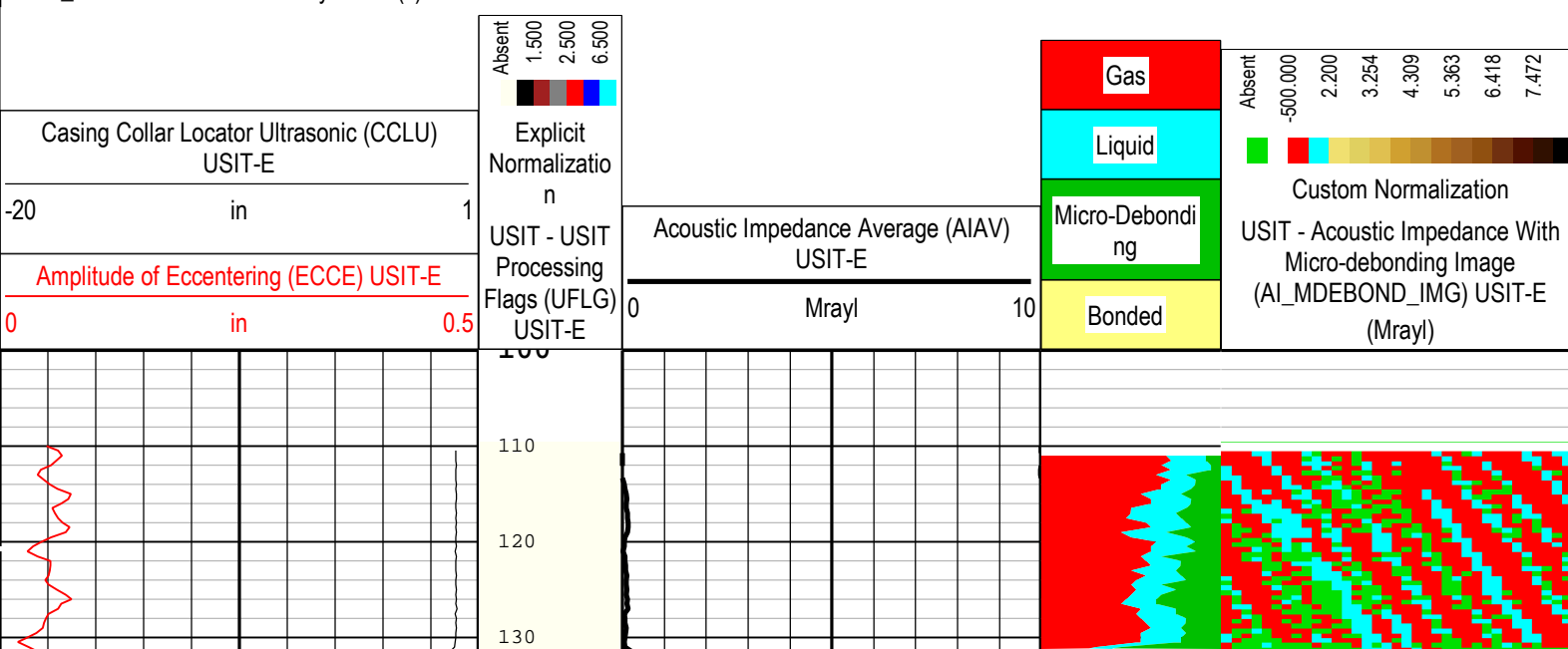
Logging Cable

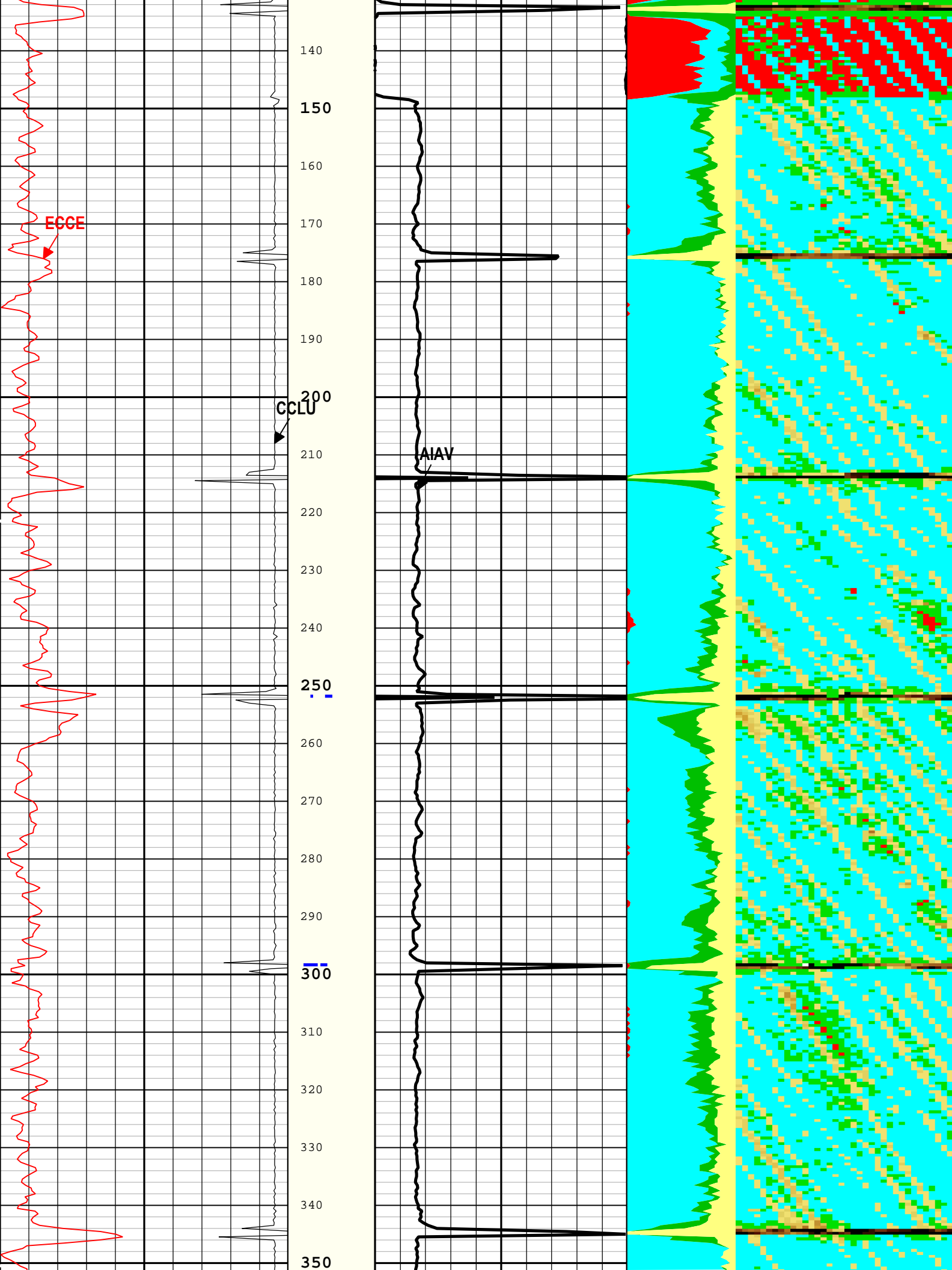
|                 |             |
|-----------------|-------------|
| Type            | 7-46PI-XXS  |
| Serial Number   | F716045     |
| Length          | 24000.00 ft |
| Conveyance Type | Wireline    |
| Rig Type        | Crane       |

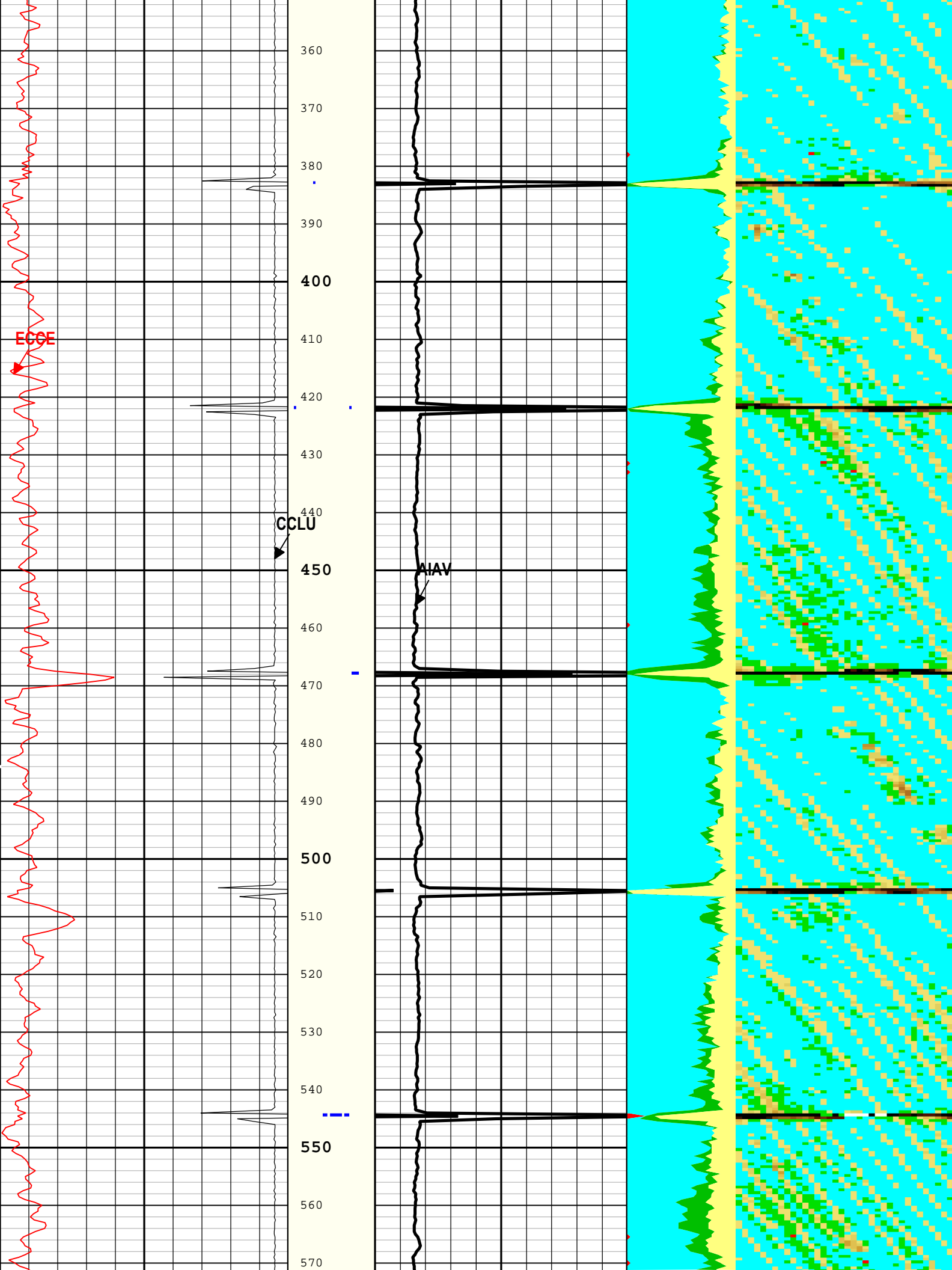
ONE:Depth Control Parameters

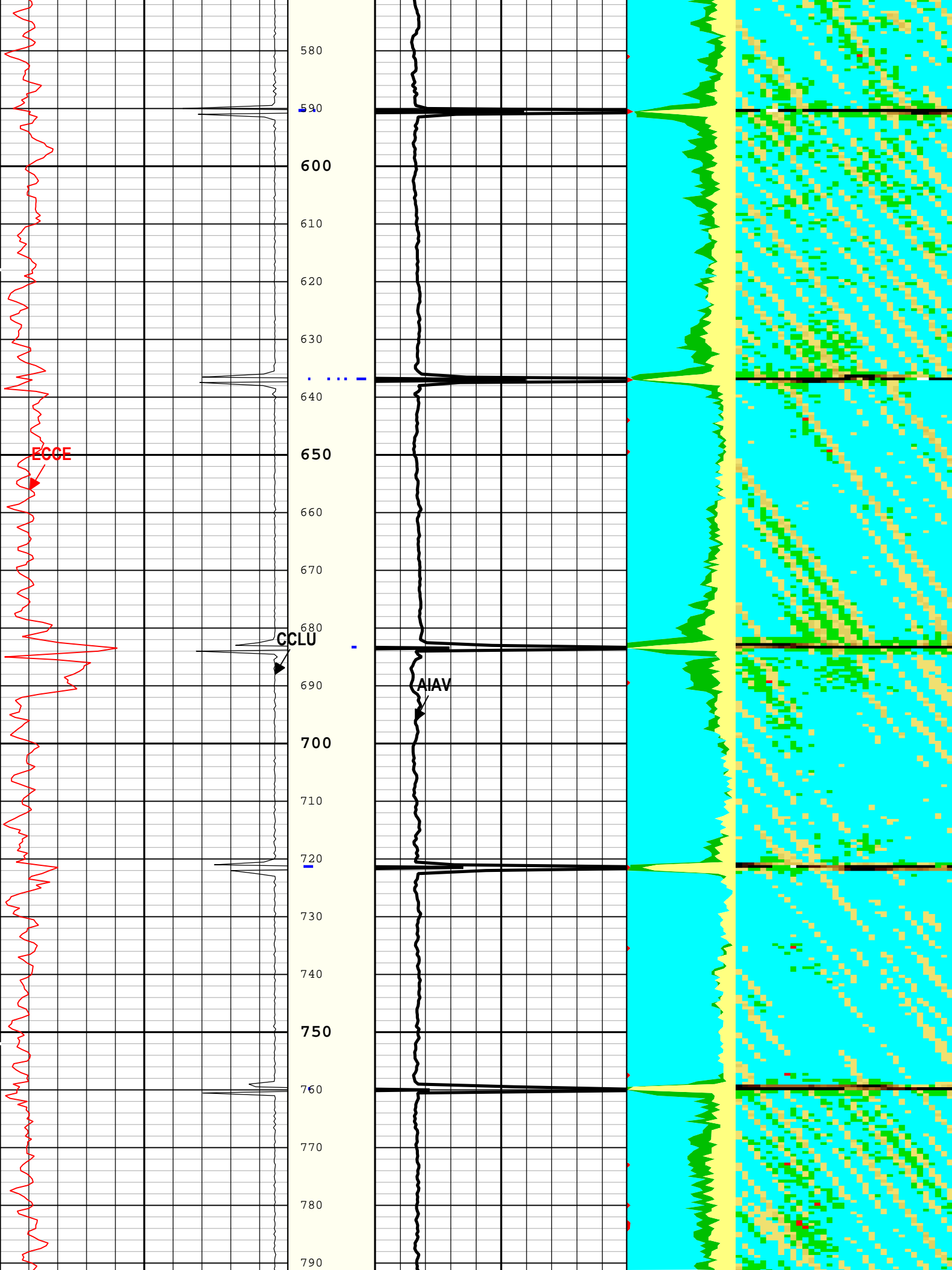
Depth Control Remarks

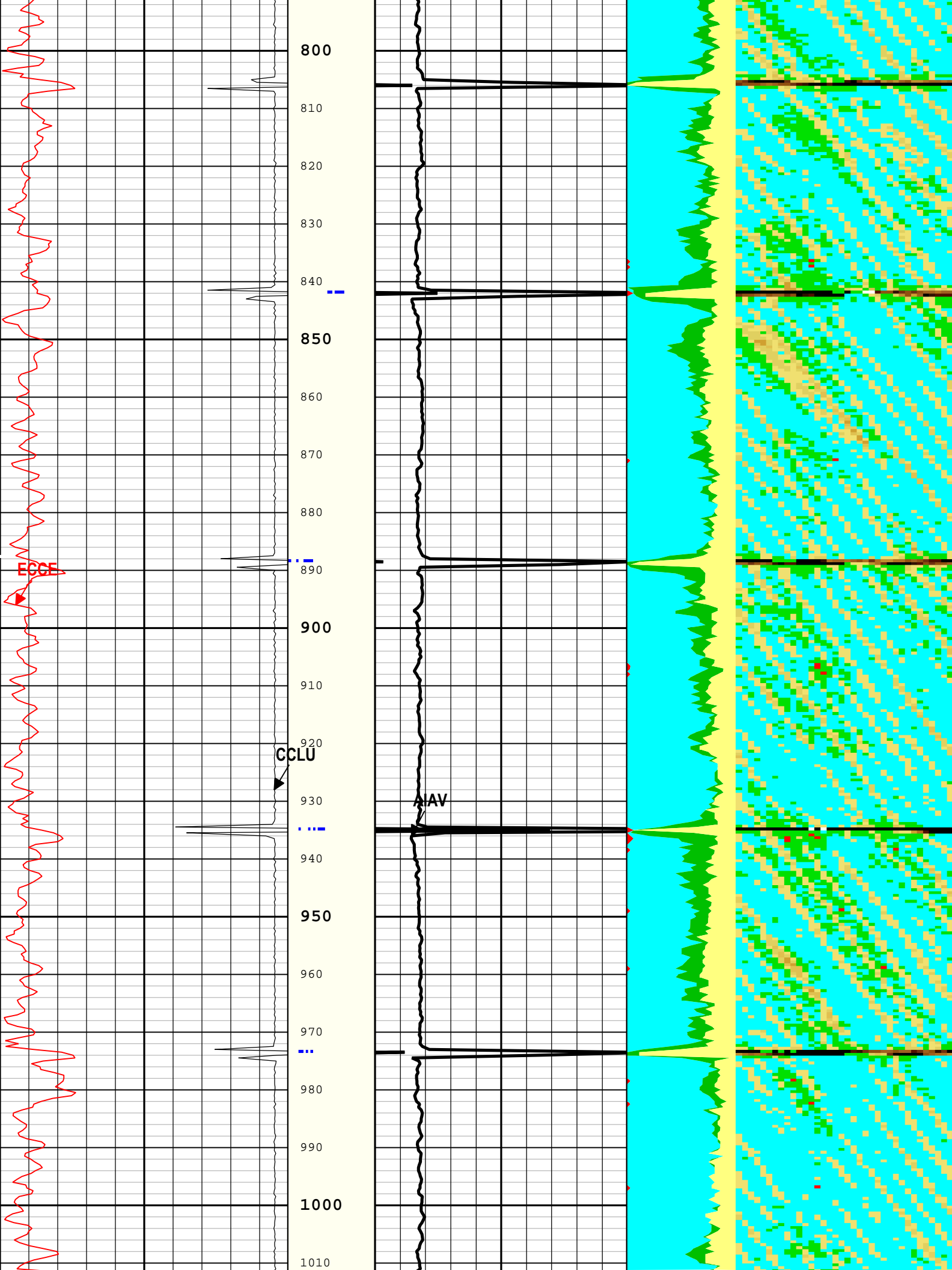
All Schlumberger depth control policies followed.

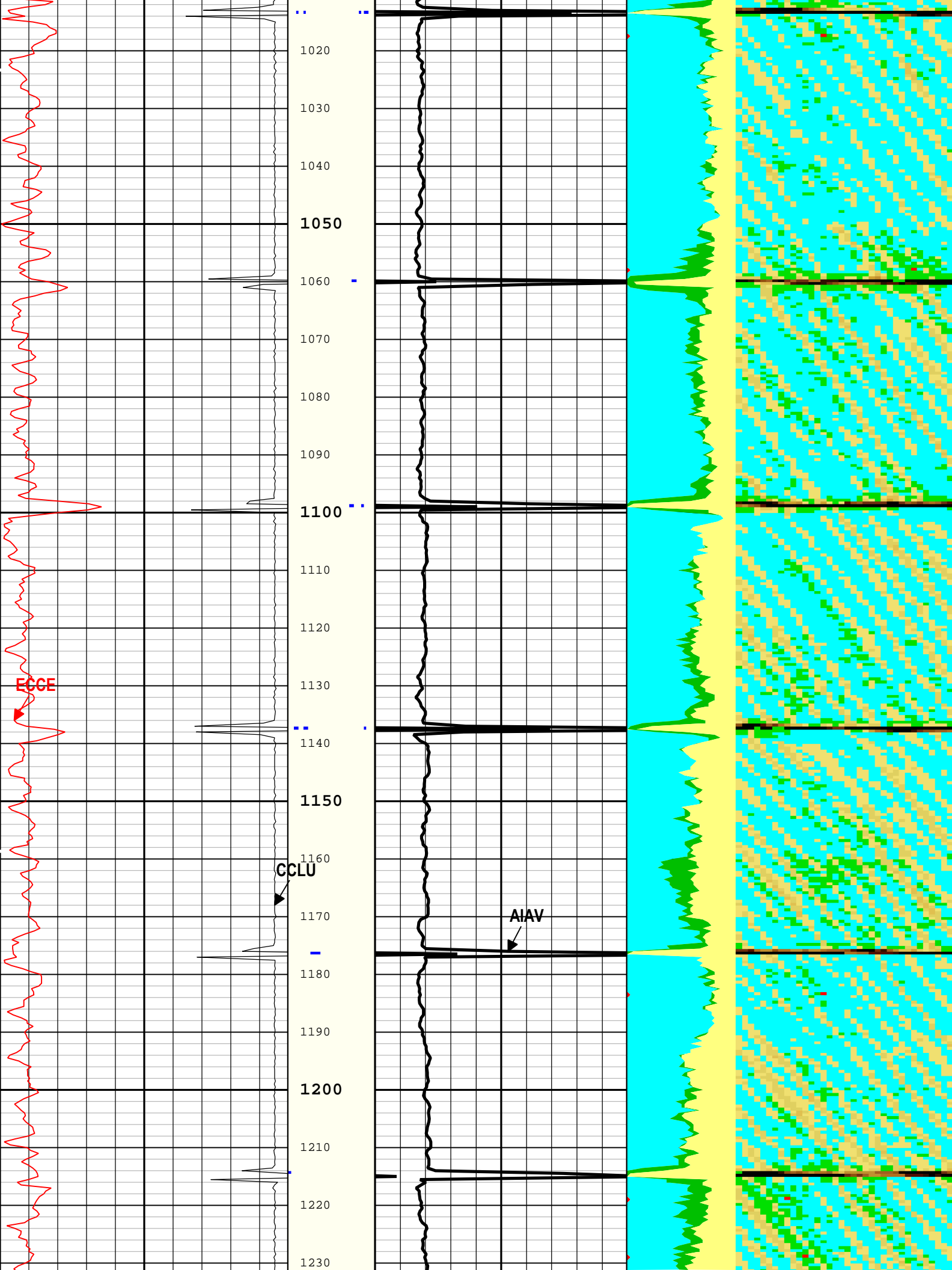


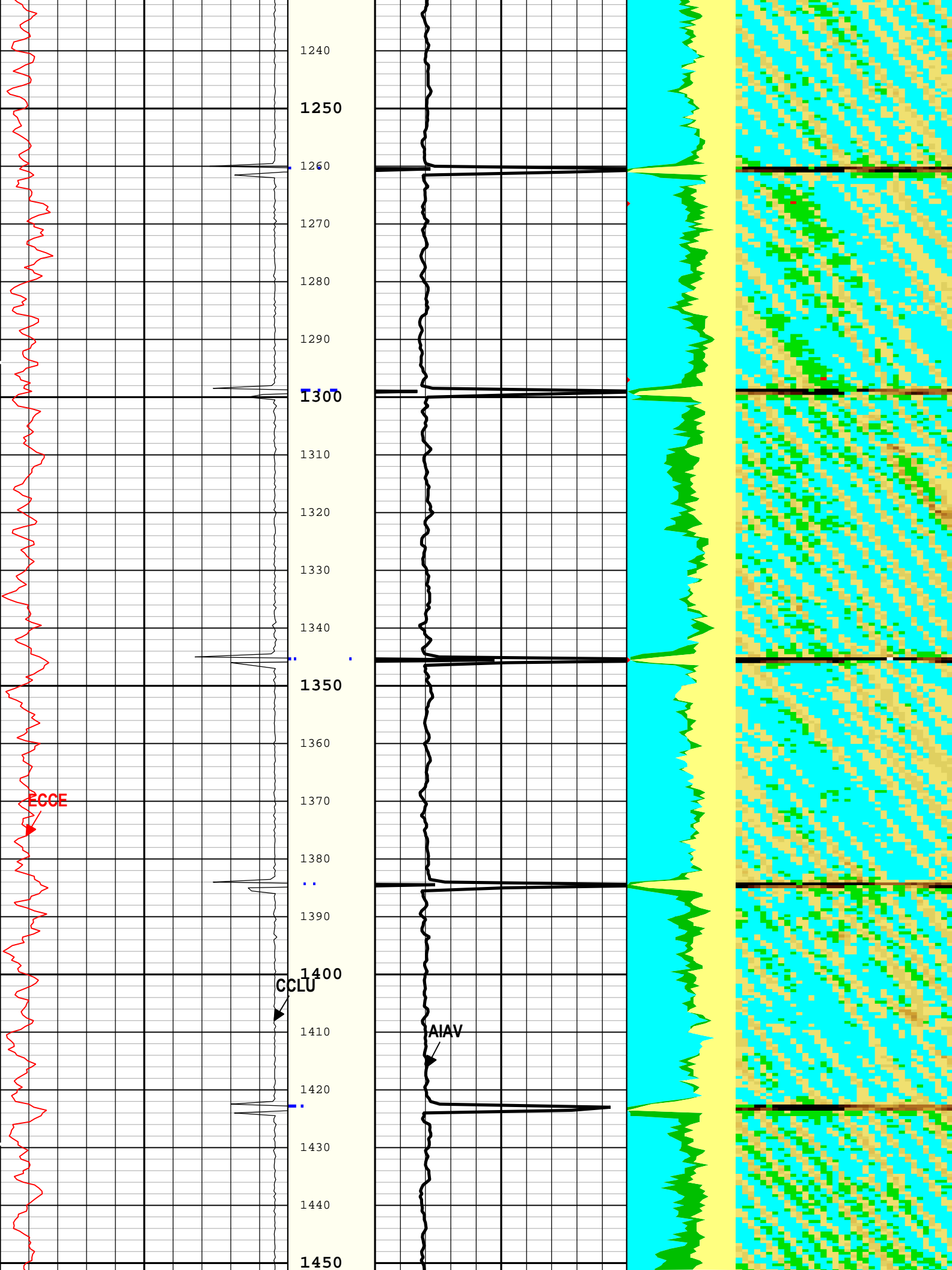


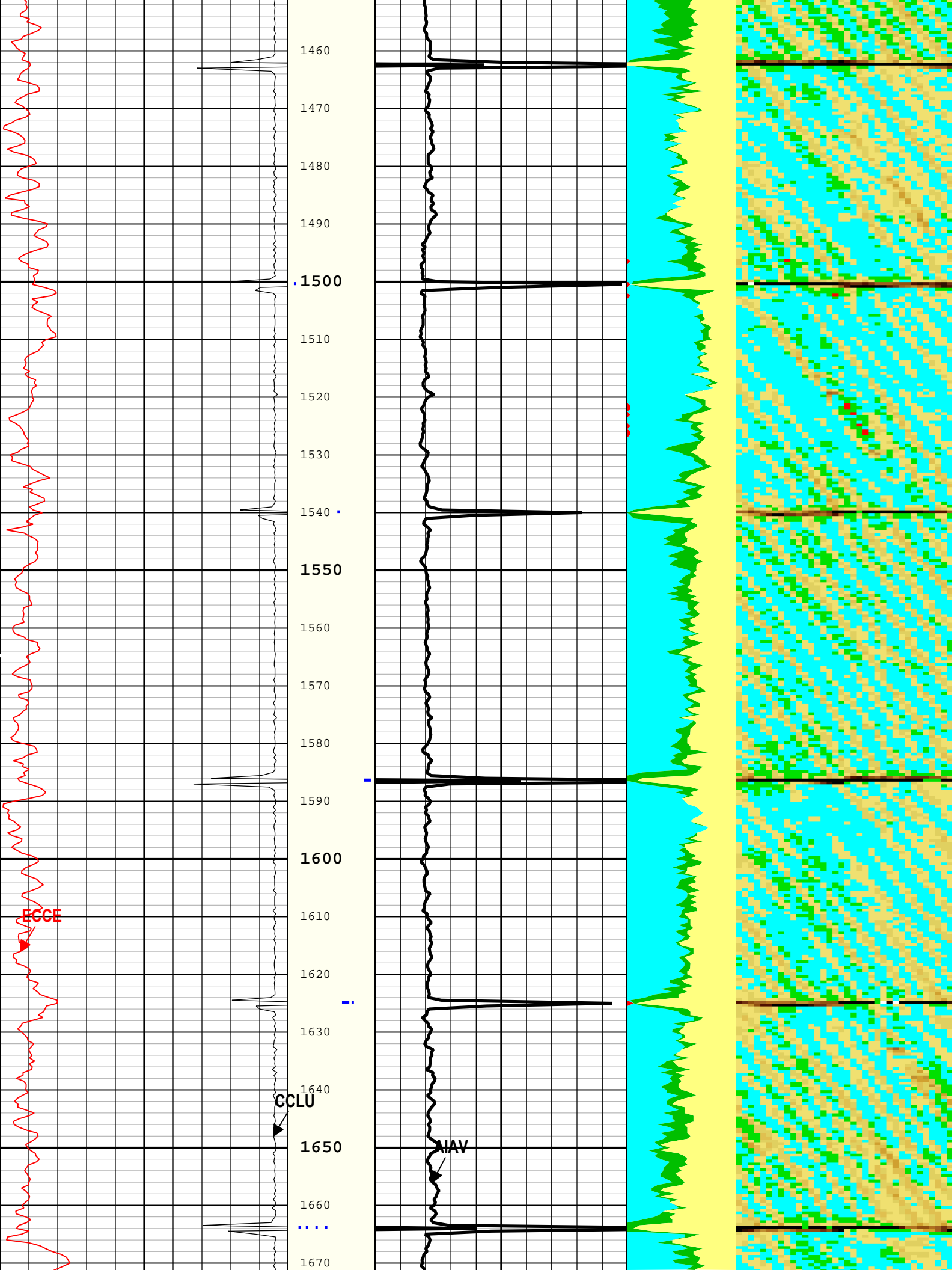


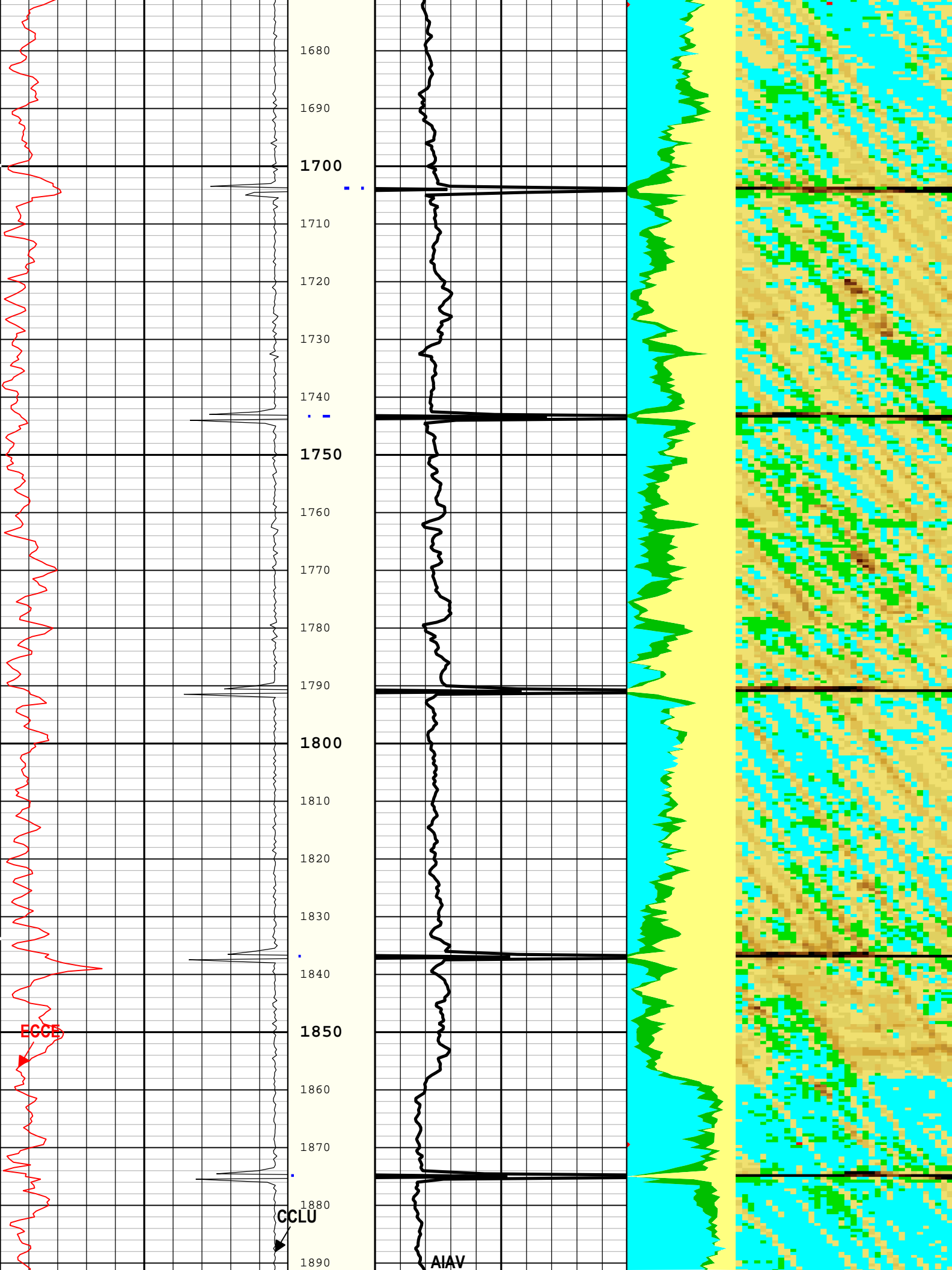


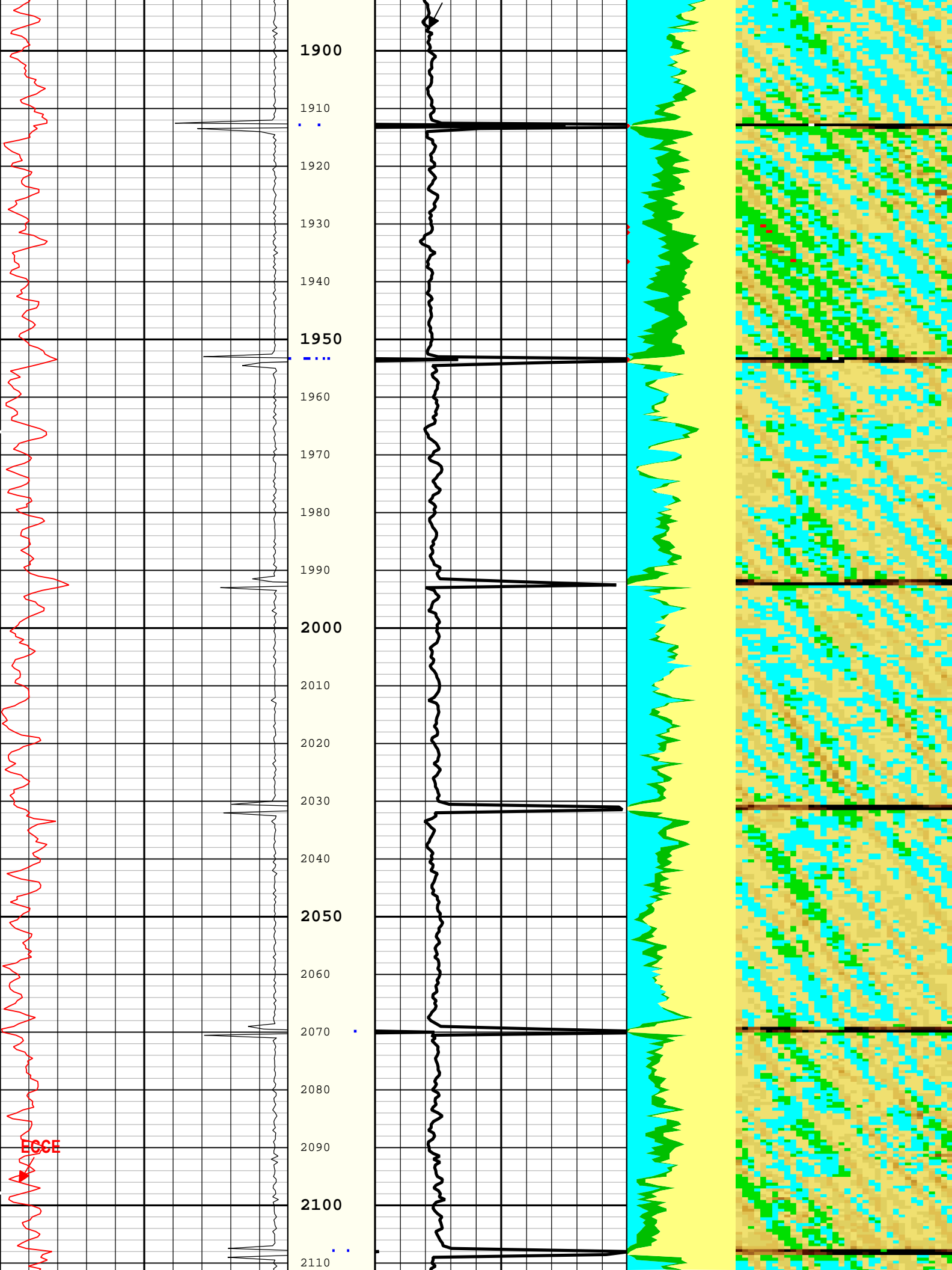


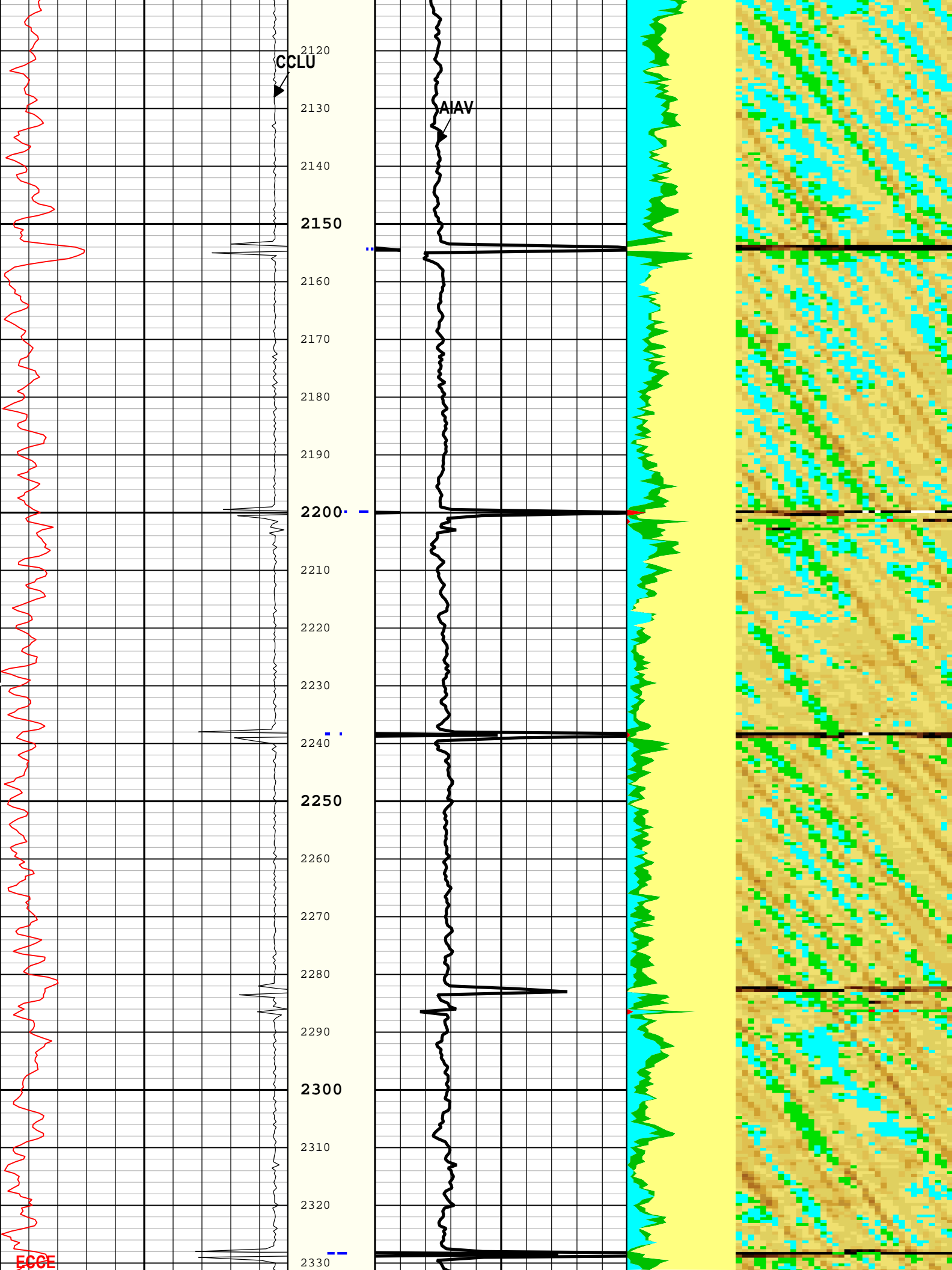


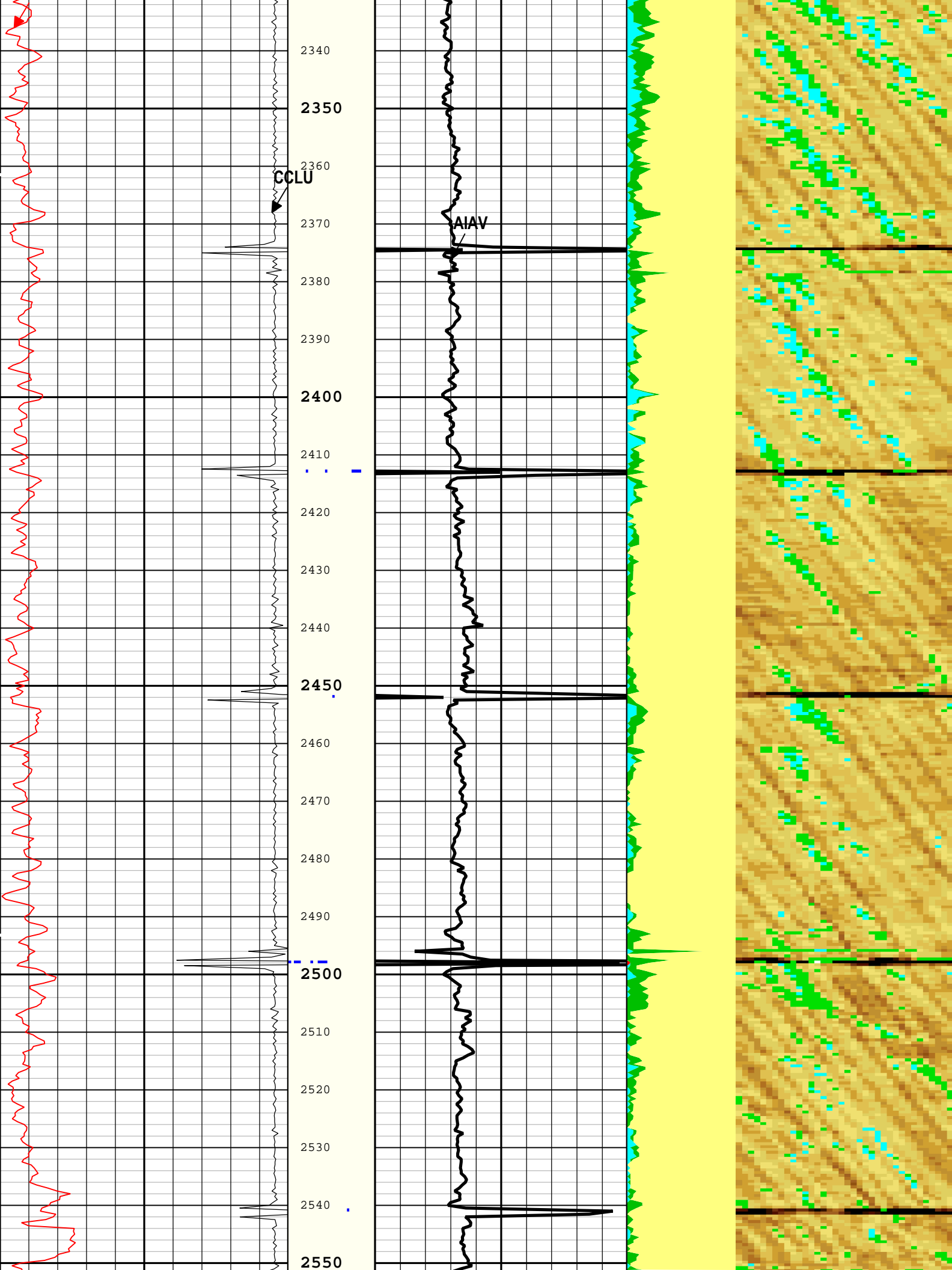


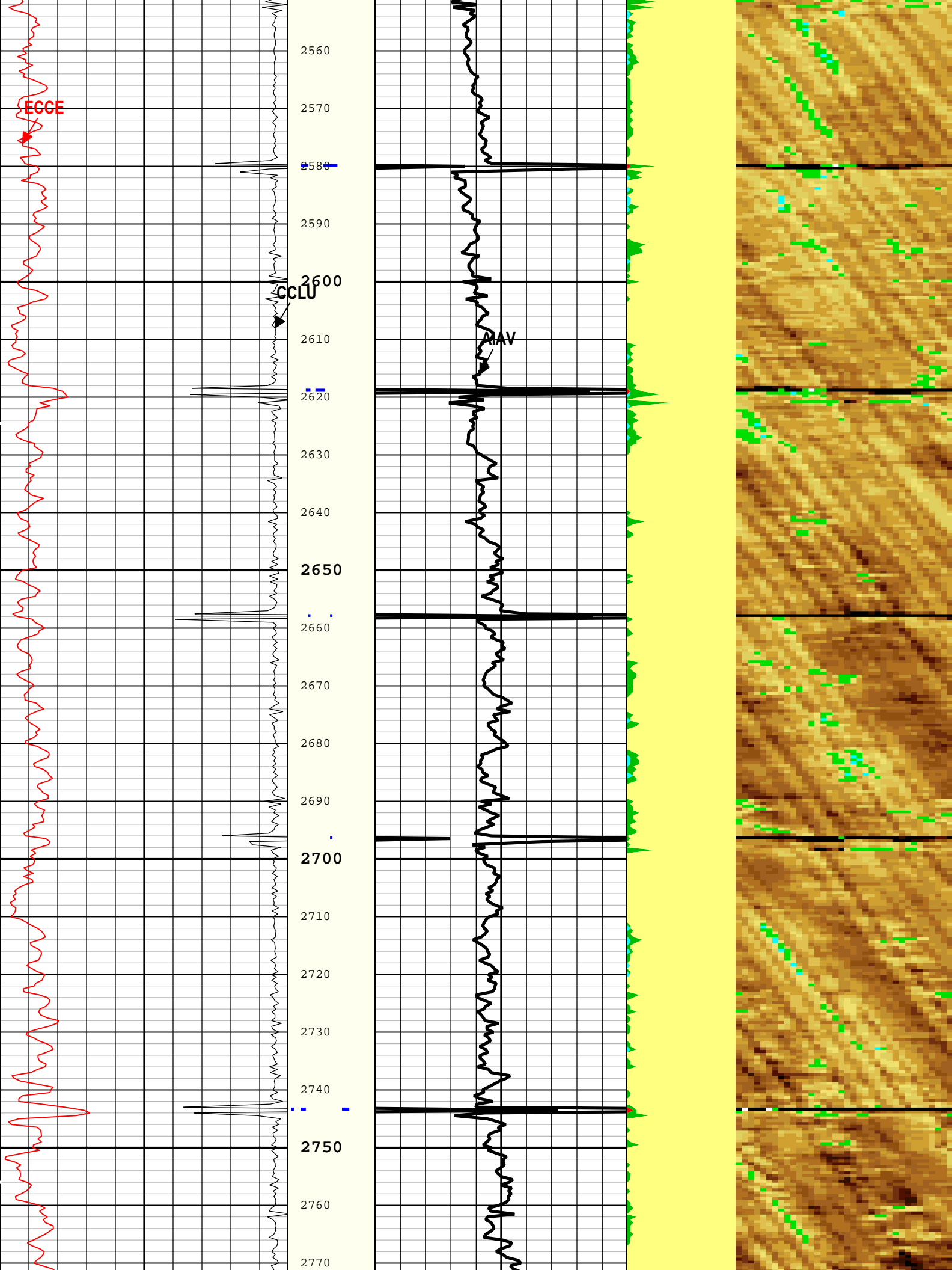


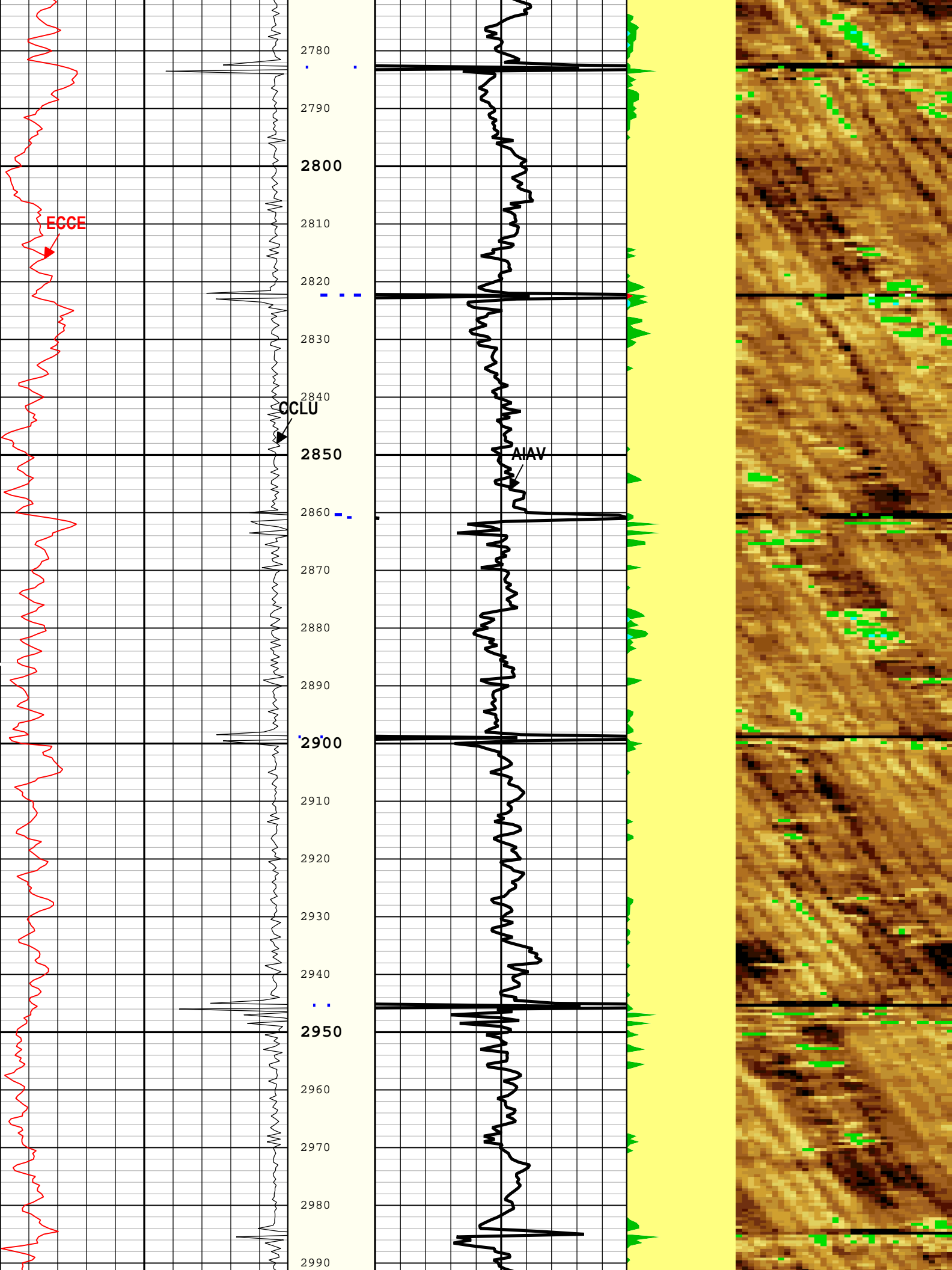


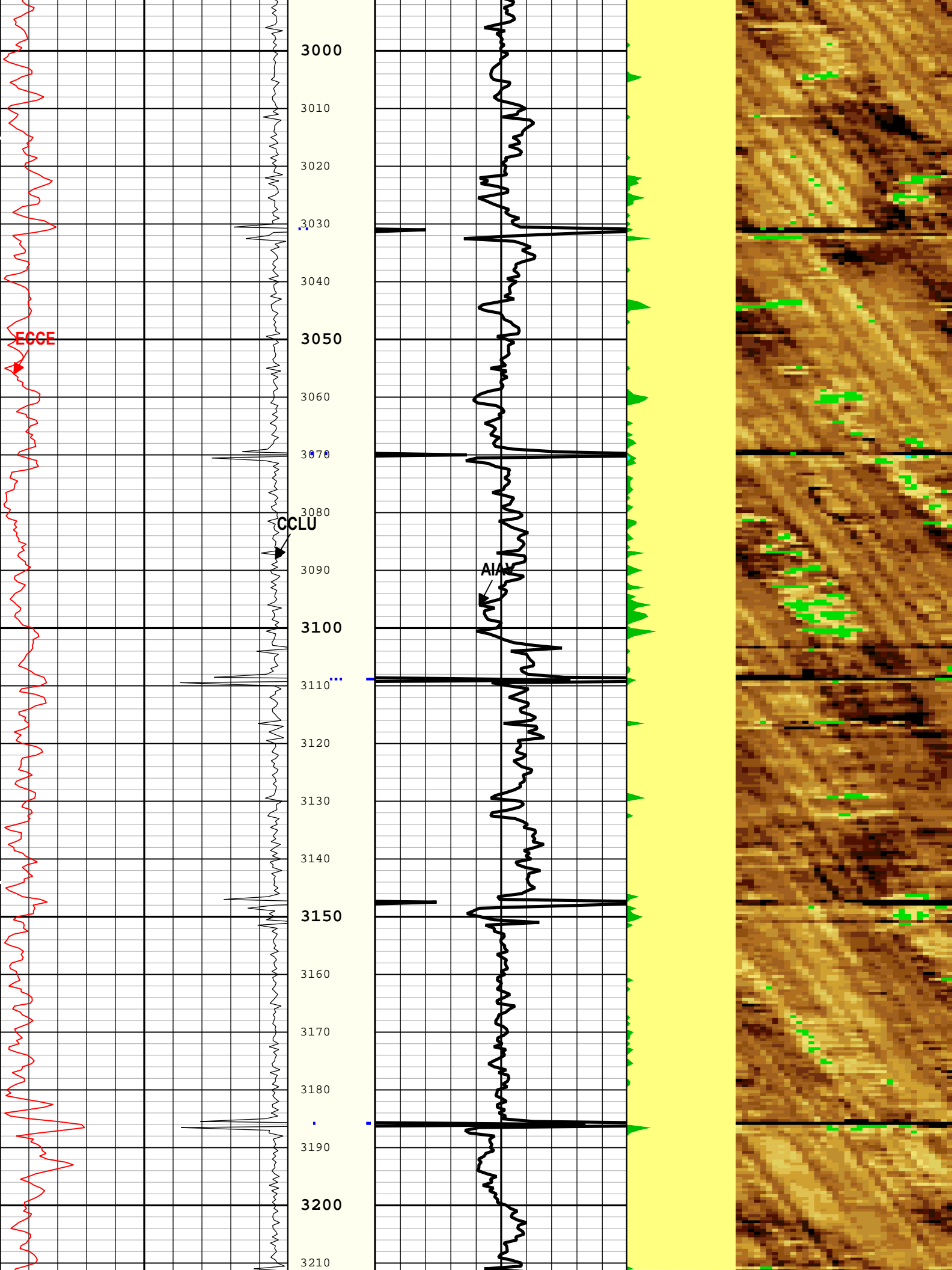


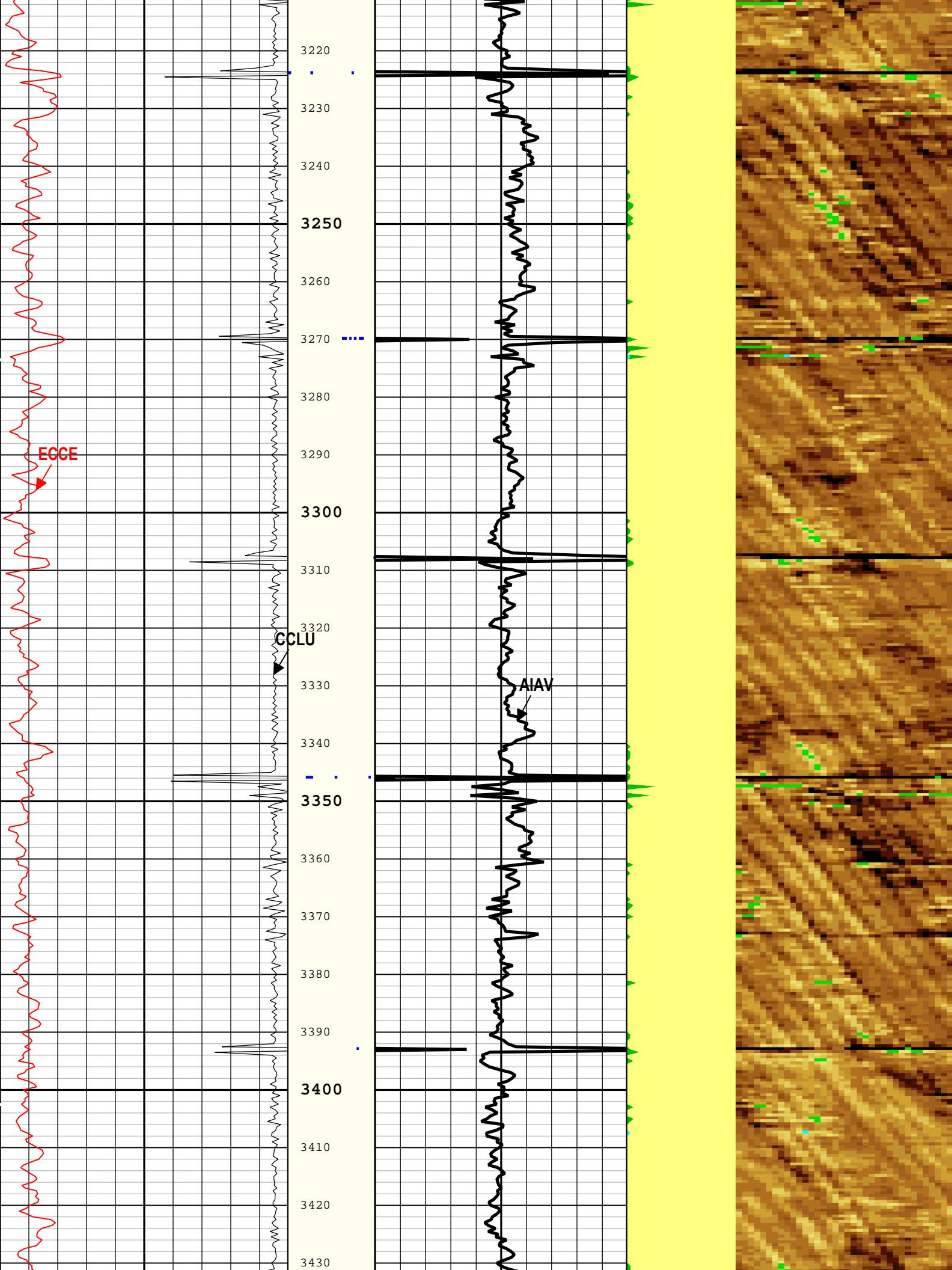


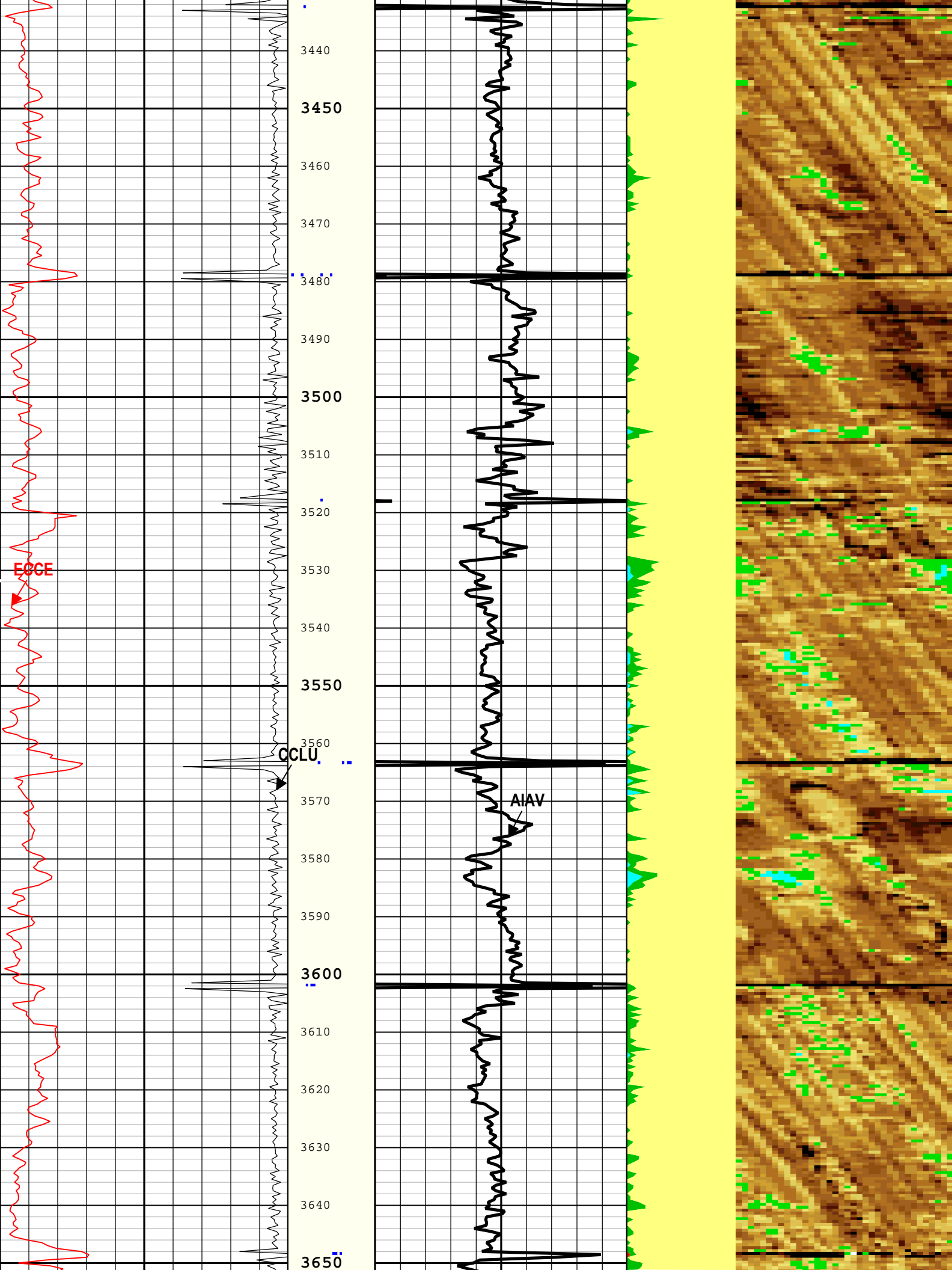


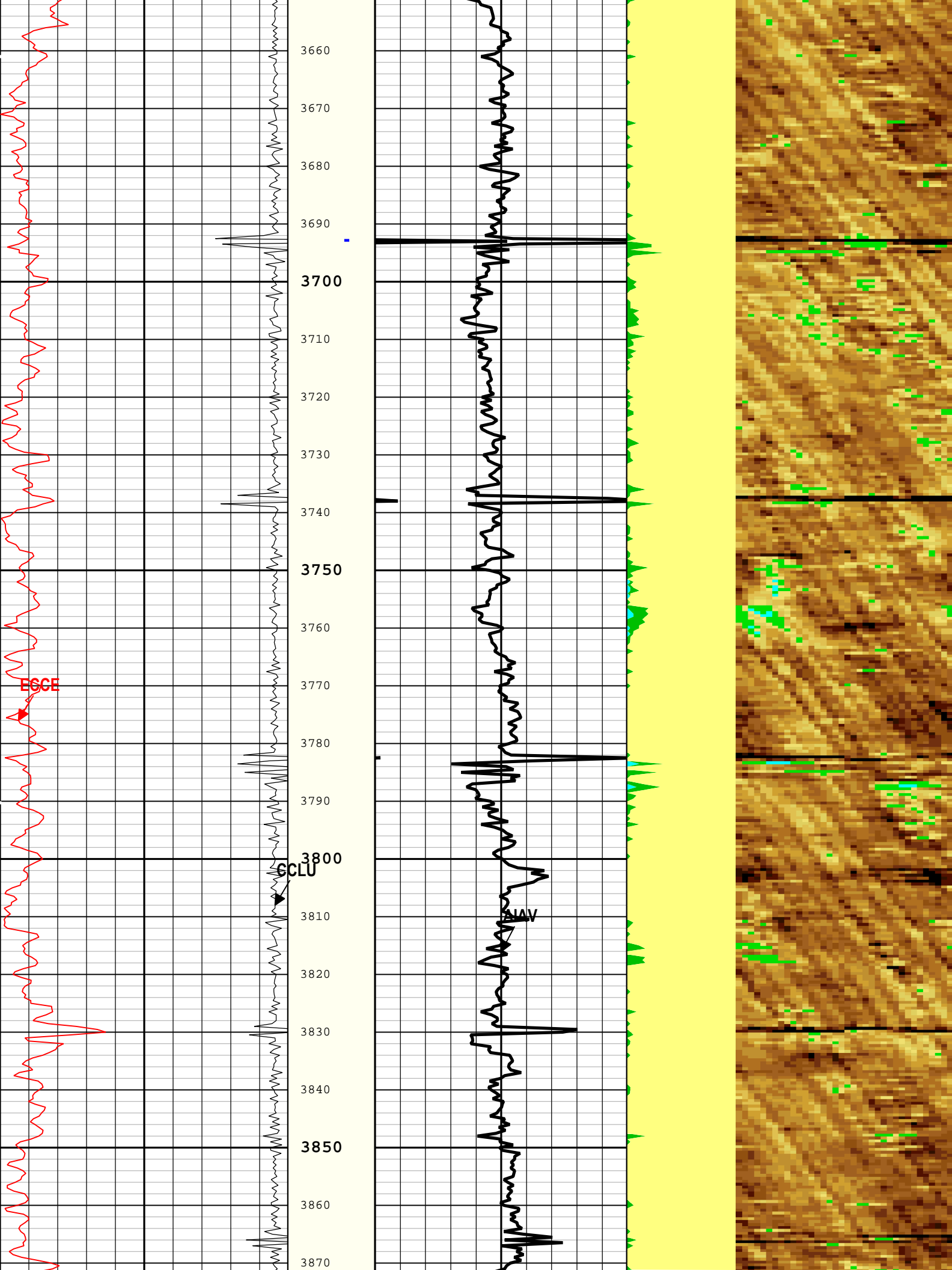


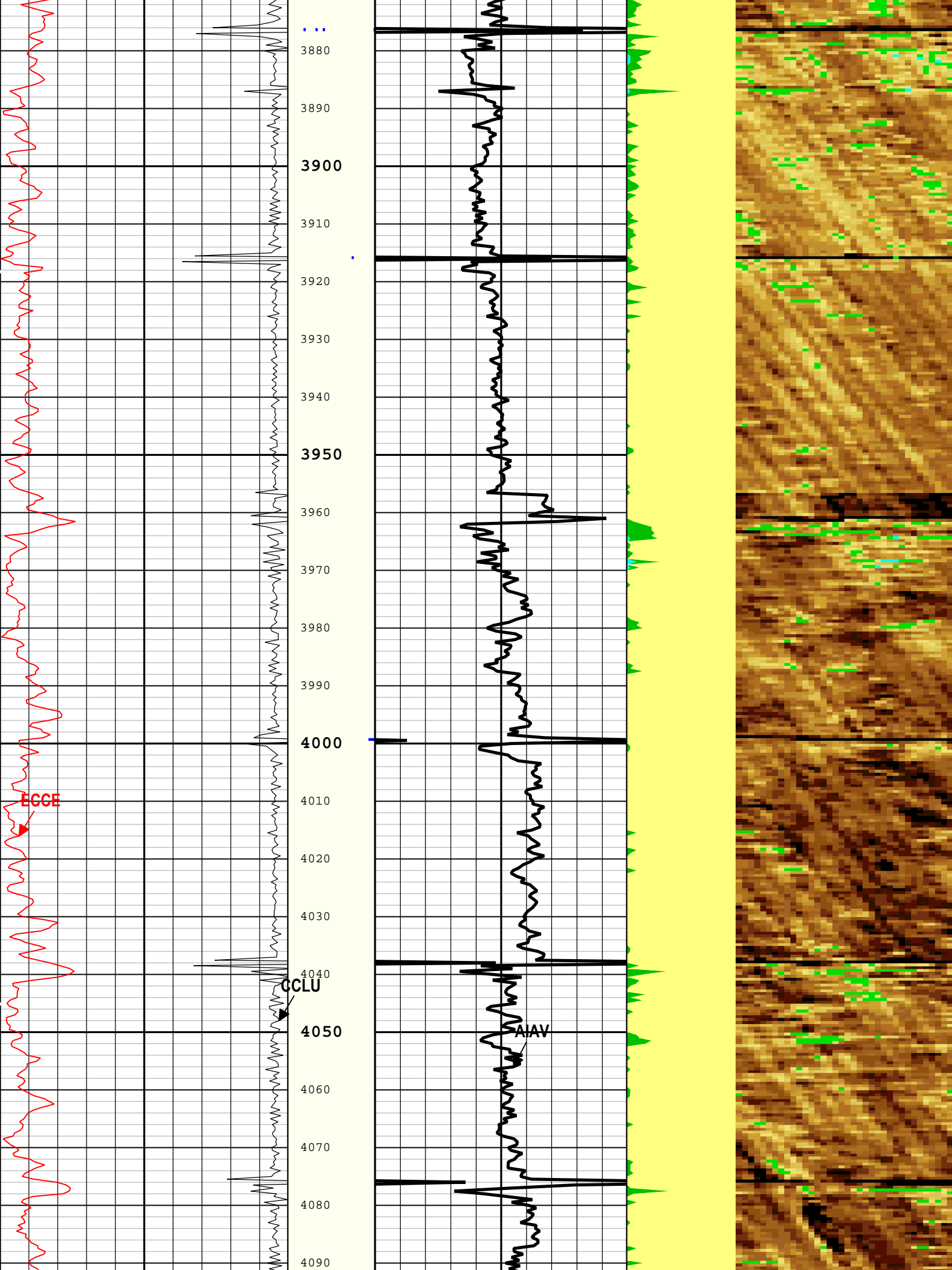


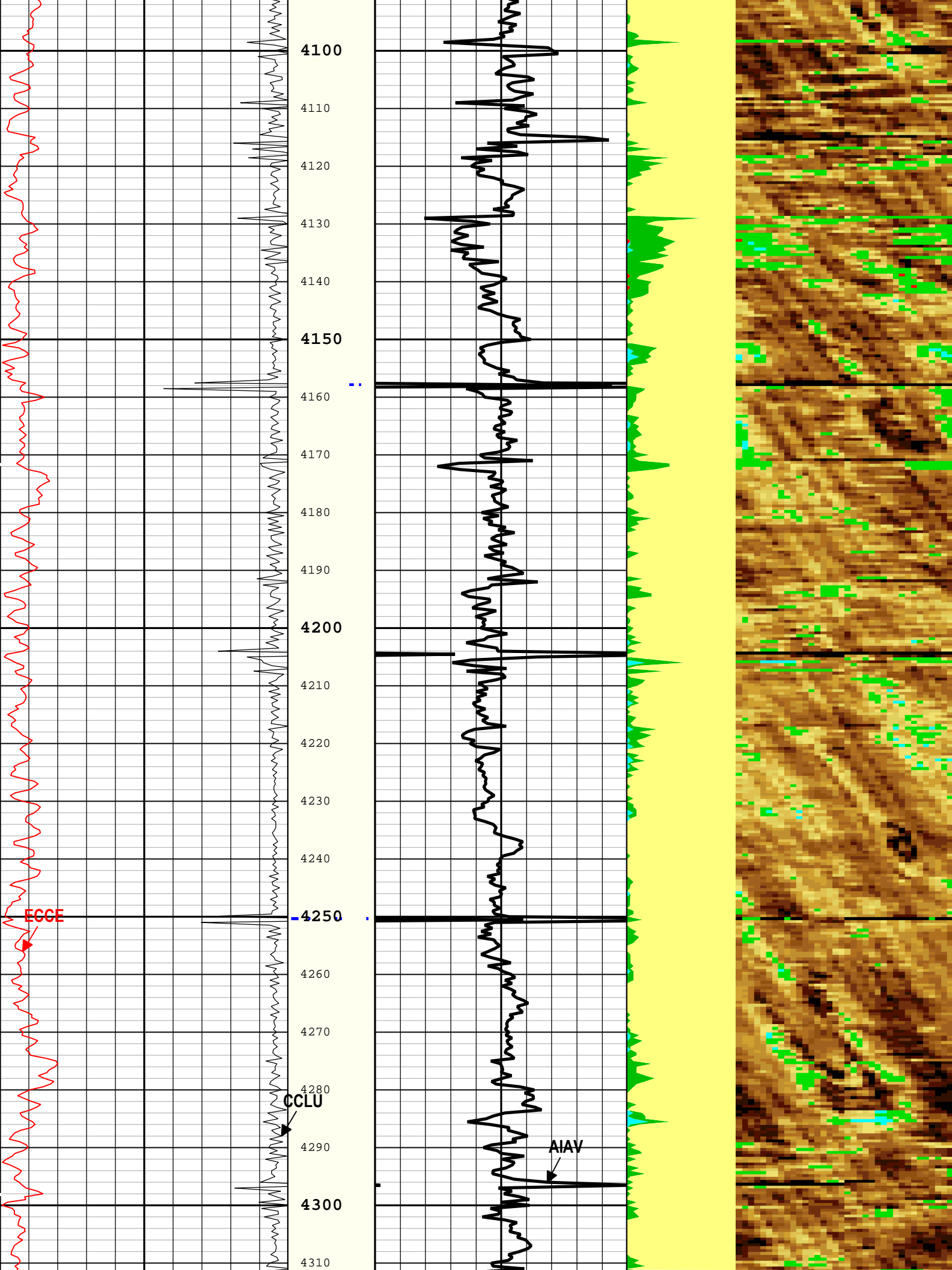


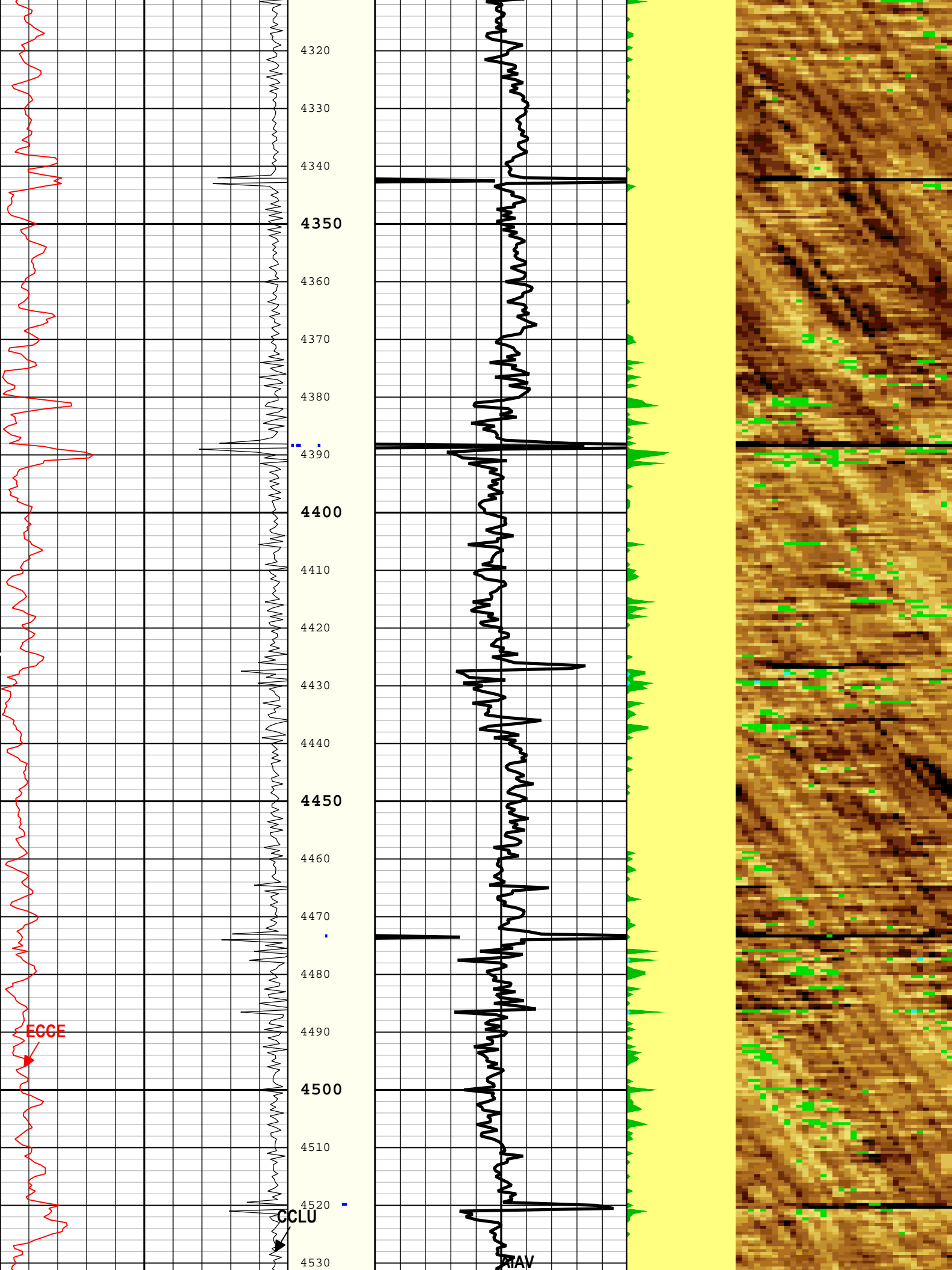


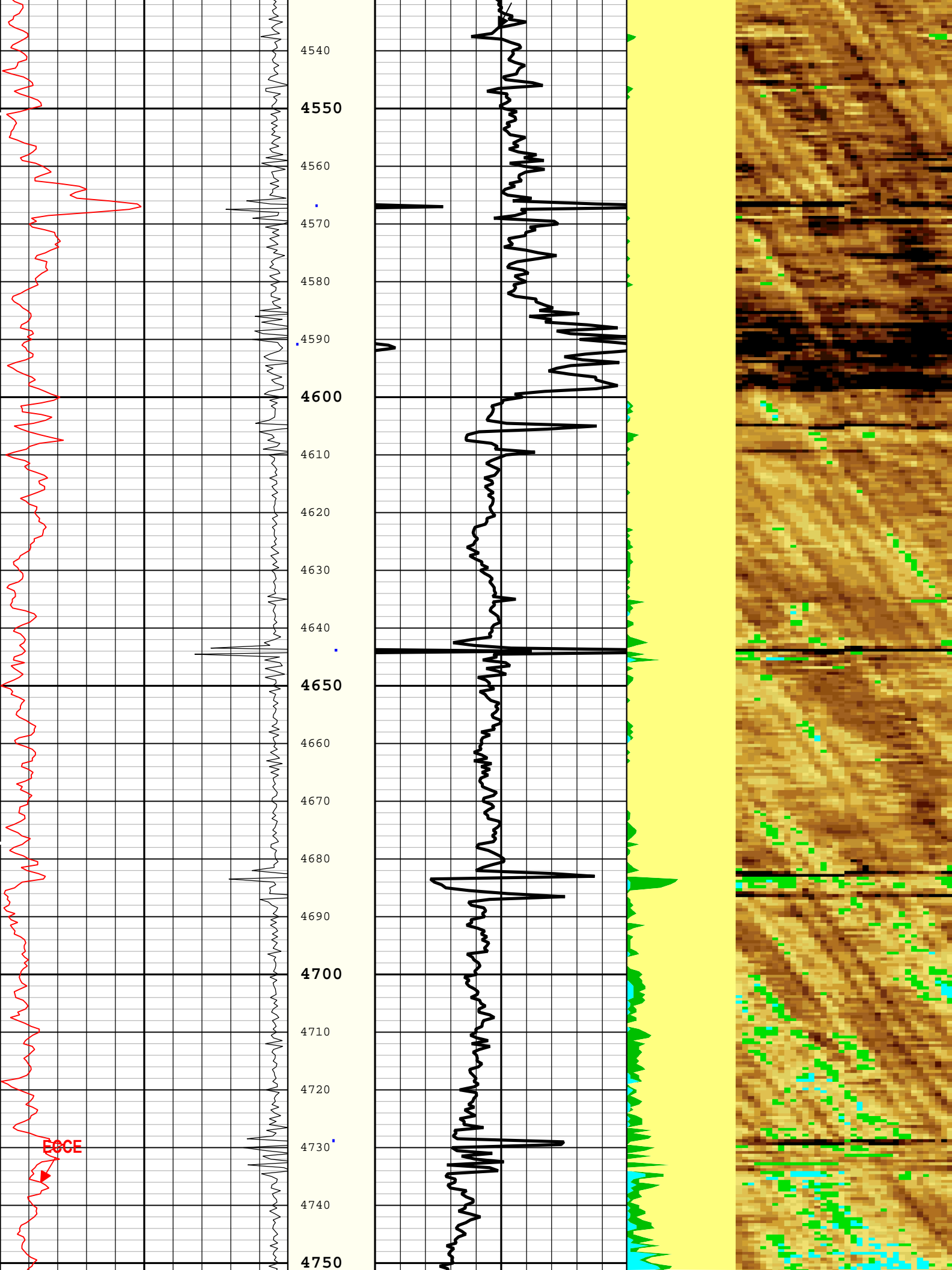


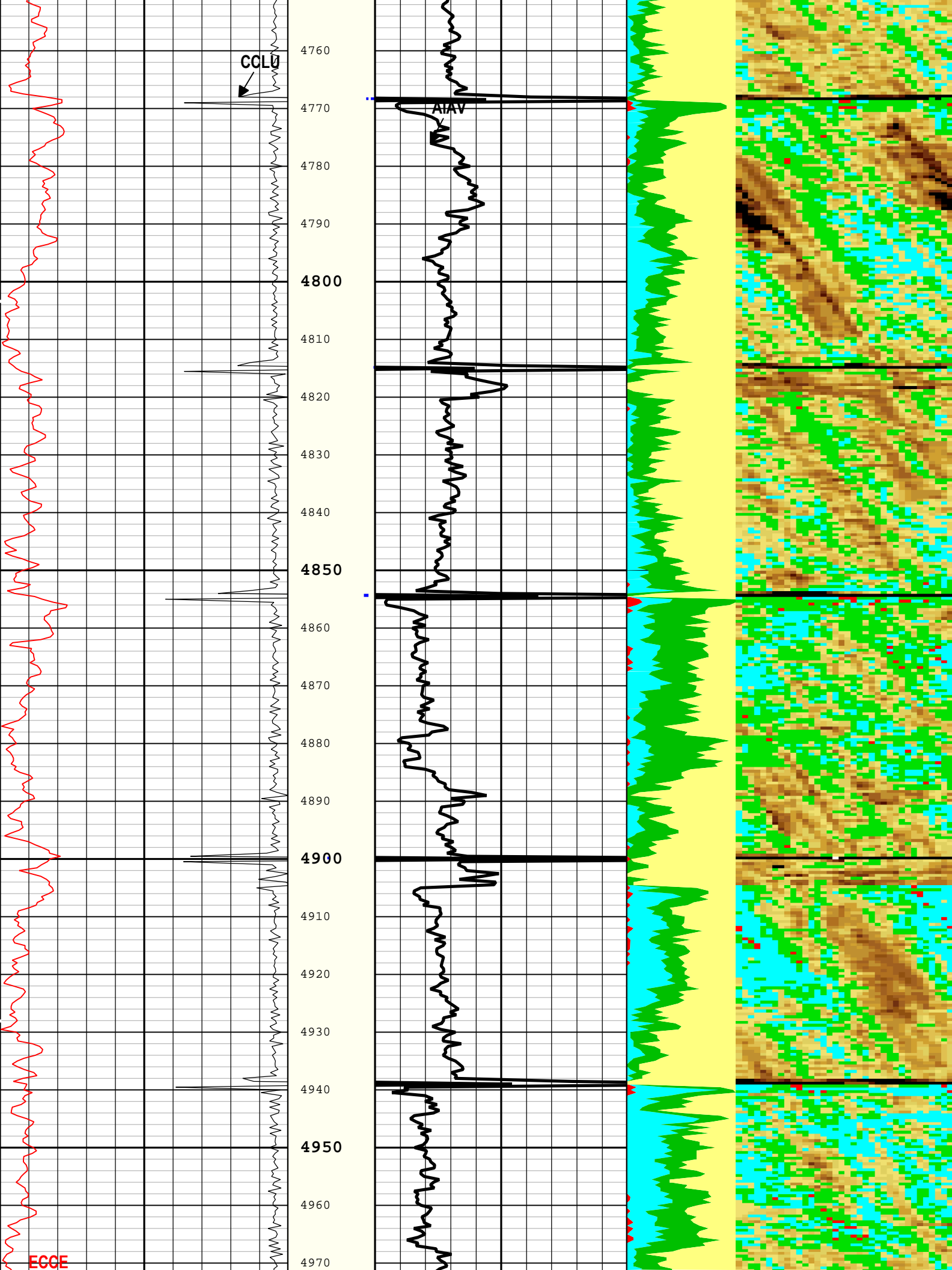


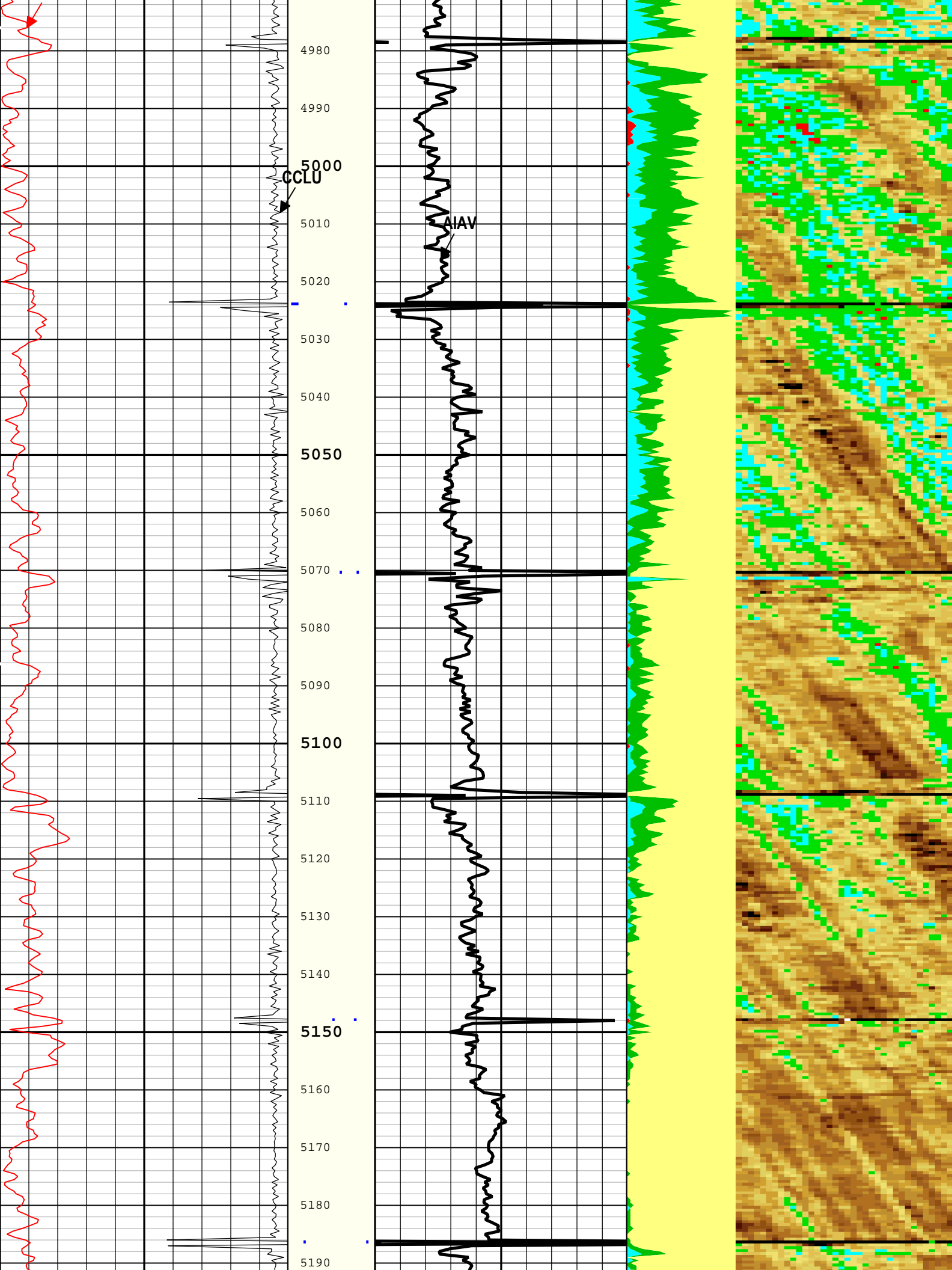


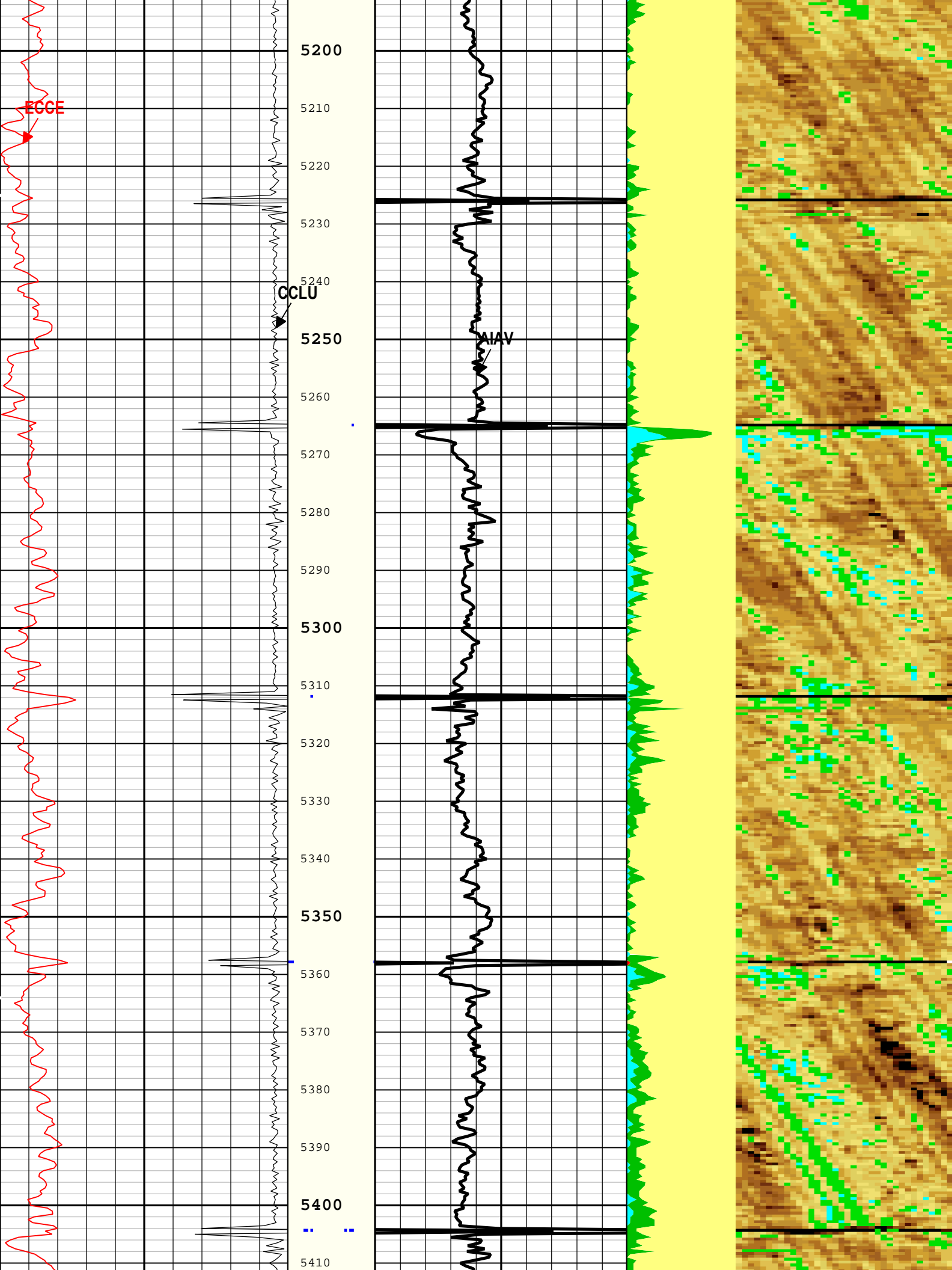


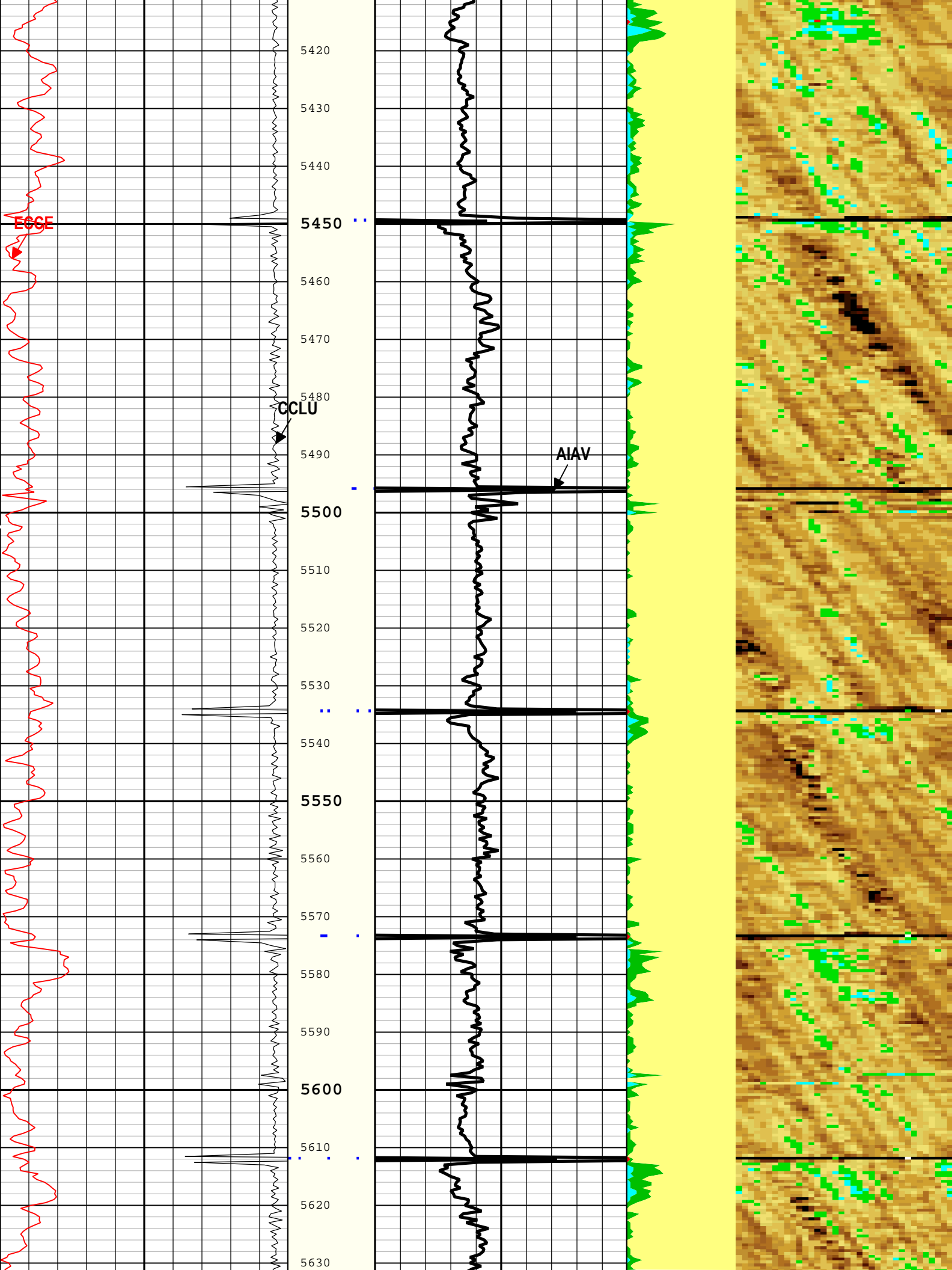


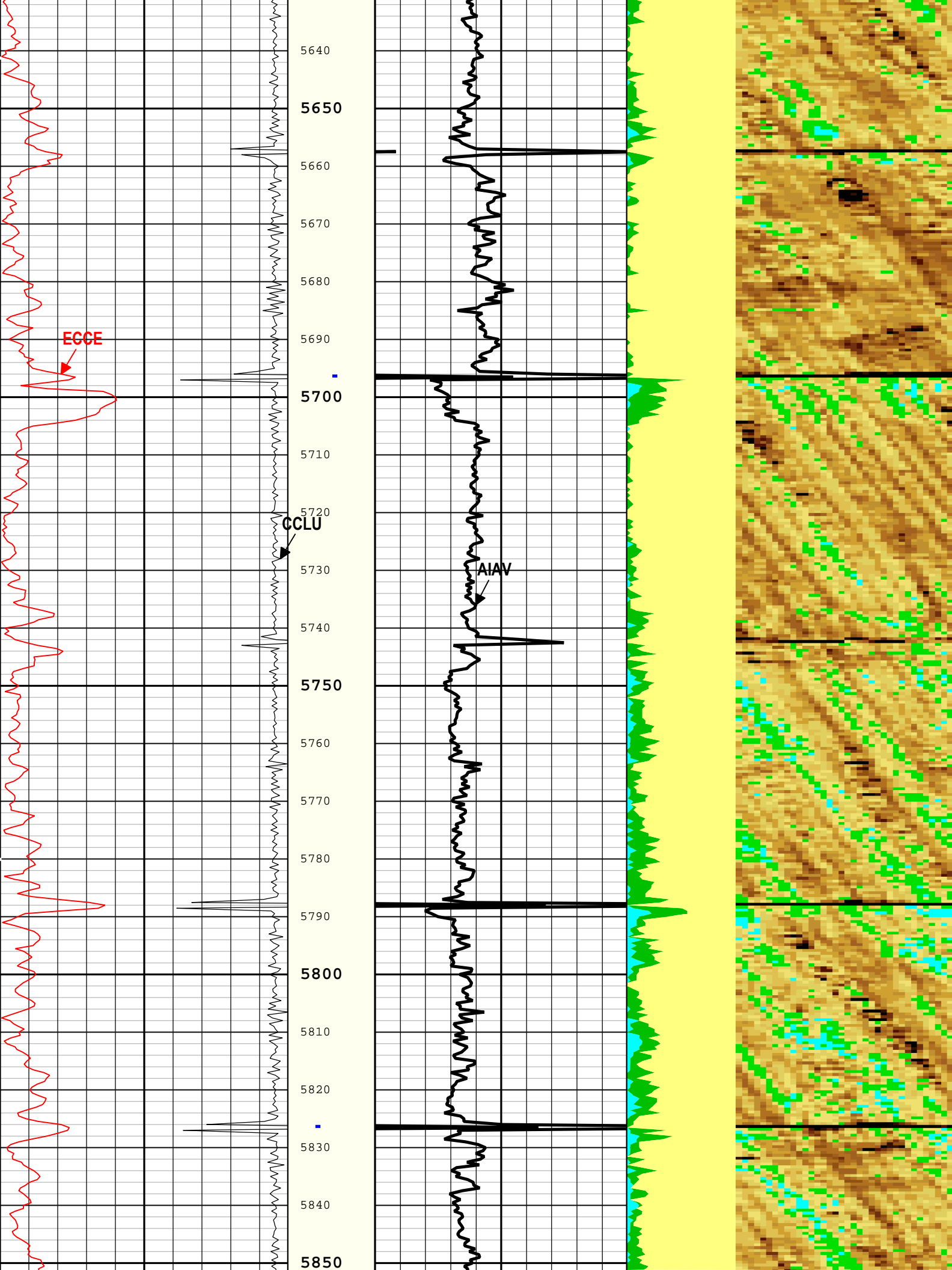


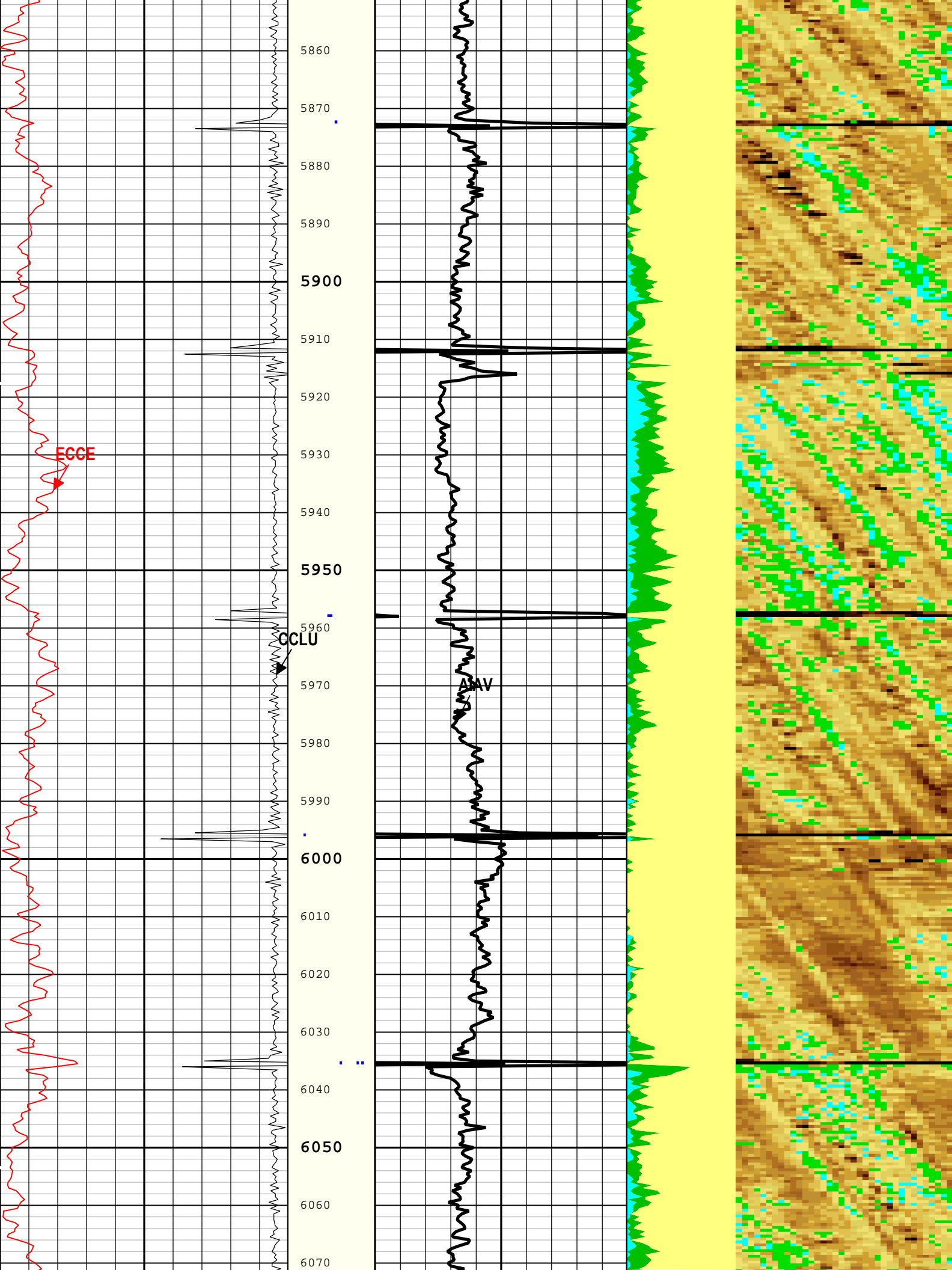


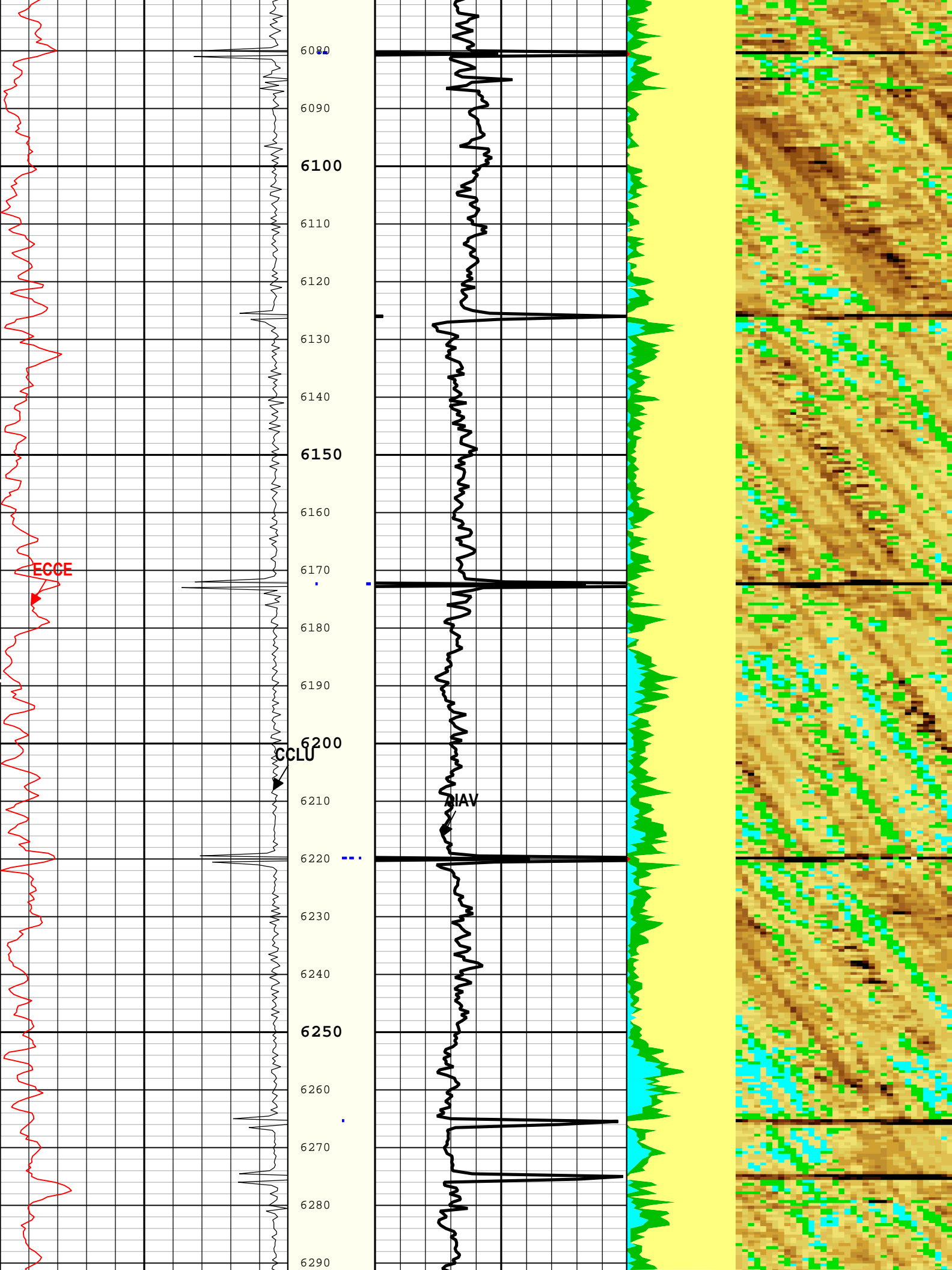


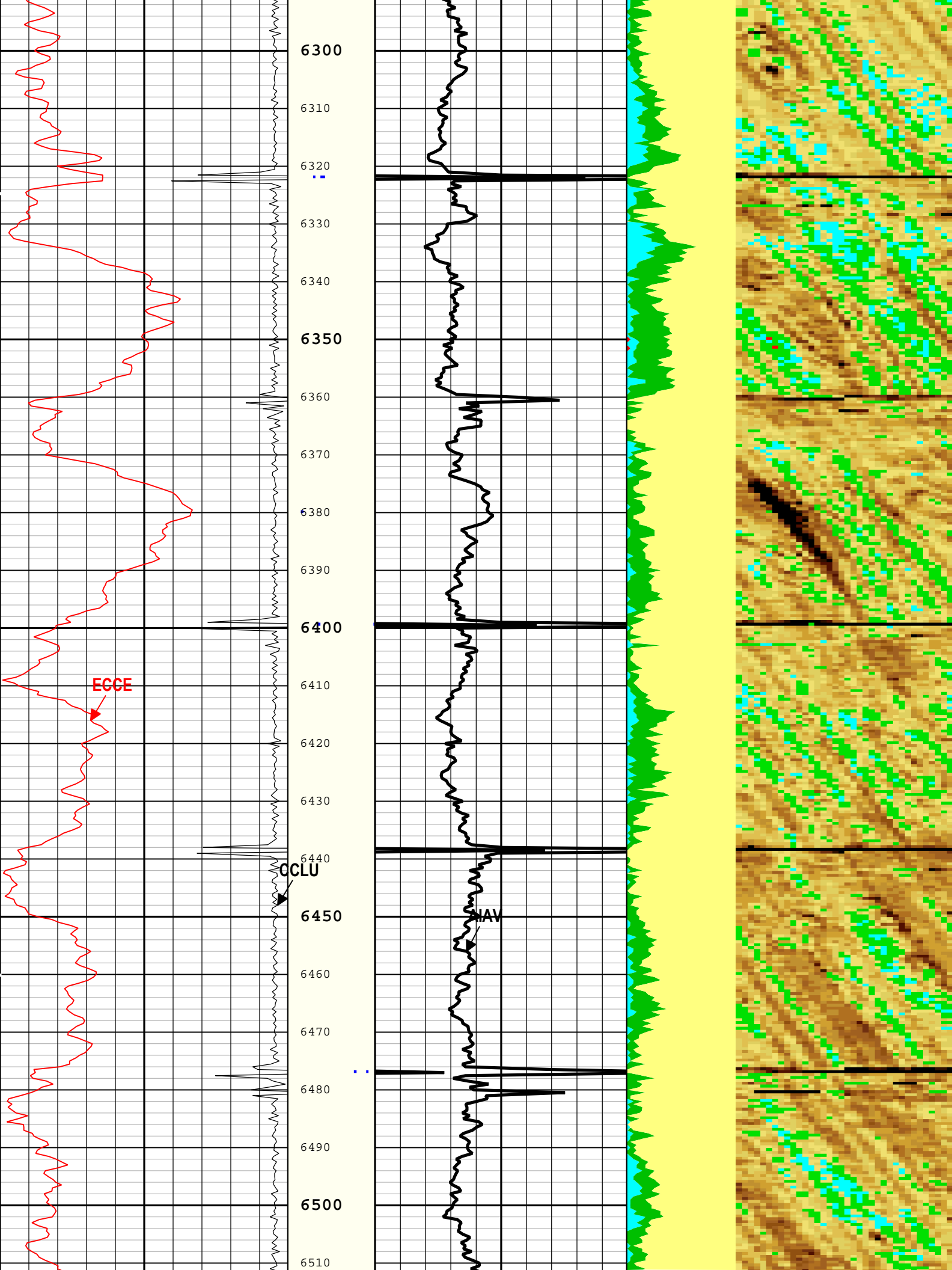


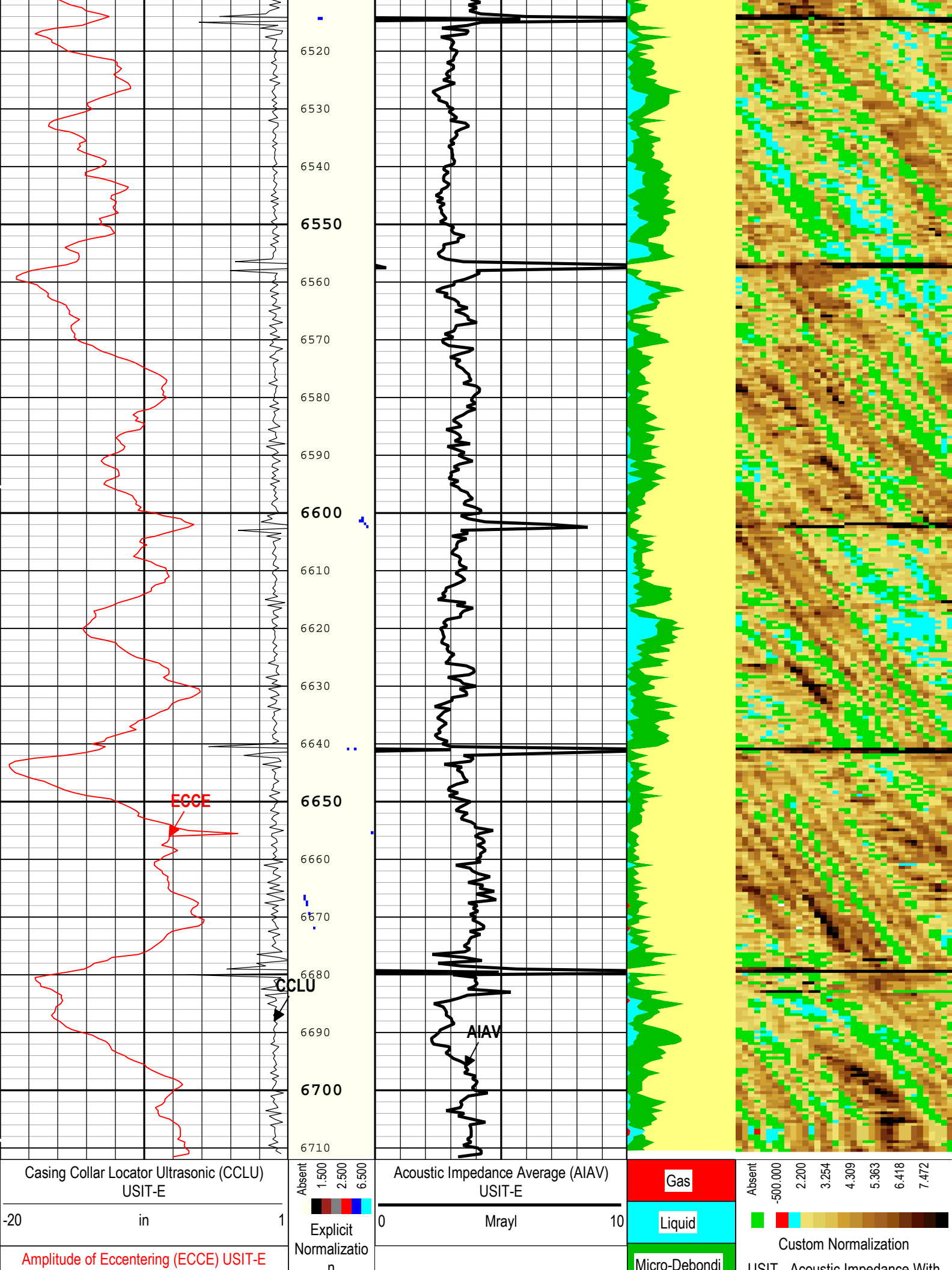












|   |    |     |  |    |  |
|---|----|-----|--|----|--|
| 0   | in | 0.5 | USIT - USIT Processing Flags (UFLG) USIT-E | ng | USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl) |
| TIME_1900 - Time Marked every 60.00 (s)   |    |     |  |    |  |
| Description:    Format: Log ( DJ Basin Ultrasonic Cement Summary Report )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth |    |     |  |    |  |
| Creation Date: 03-Feb-2018 12:28:36   |    |     |  |    |  |

| 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  | 8.4            | lbm/gal |
| DFT_CATEGORY                  | Drilling Fluid Type                                | Borehole  | Water          |         |
| DTMD                          | Borehole Fluid Slowness                            | Borehole  | 206            | us/ft   |
| FDII                          | FPM Data Interpolation Interval                    | USIT-E    | 0              | ft      |
| HEMA                          | Hematite Presence Flag                             | Borehole  | No             |         |
| 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    | 1.1            |         |
| U-USIT_DFSZ                   | Drilling Fluid Specific Acoustic Impedance         | USIT-E    | 0.1            | Mrayl   |
| 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                    | 26    | 100          | 110         |
| BS                    | 13.5  | 110          | 2050        |
| BS                    | 8.5   | 2050         | 6704        |
| 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 | 18                            | dB   |
| EMXV                    | EMEX Voltage                  | USIT-E | Time Zoned                    | V    |
| HRES                    | Horizontal Resolution         | USIT-E | 10 deg                        |      |
| ULOG                    | Logging Objective             | USIT-E | MEASUREMENT                   |      |
| USFR                    | Ultrasonic Sampling Frequency | USIT-E | 666667                        | Hz   |
| UPAT                    | USIT Emission Pattern         | USIT-E | Pattern 375 KHz               |      |
| UWKM                    | USIT Working Mode             | USIT-E | Uncompressed 10 deg at 6.0 in |      |
| WINB                    | Window Begin Time             | USIT-E | Time Zoned                    | us   |
| WINE                    | Window End Time               | USIT-E | Time Zoned                    | us   |

| Time Zone Parameters |       |            |           |                    |                   |
|----------------------|-------|------------|-----------|--------------------|-------------------|
| Parameter            | Value | Start Time | Stop Time | Start Depth ( ft ) | Stop Depth ( ft ) |

|      |       |                      |                      |         |         |
|------|-------|----------------------|----------------------|---------|---------|
| EMXV | 45    | 02-Feb-2018 16:06:38 | 02-Feb-2018 16:07:20 | 6712.39 | 6708.67 |
| EMXV | 55    | 02-Feb-2018 16:07:20 | 02-Feb-2018 17:06:58 | 6708.67 | 109.68  |
| WINB | 31.88 | 02-Feb-2018 16:06:38 | 02-Feb-2018 16:12:33 | 6712.39 | 6655.99 |
| WINB | 28.44 | 02-Feb-2018 16:12:33 | 02-Feb-2018 17:06:58 | 6655.99 | 109.68  |
| WINE | 71.88 | 02-Feb-2018 16:06:38 | 02-Feb-2018 16:12:39 | 6712.39 | 6642.67 |
| WINE | 75.22 | 02-Feb-2018 16:12:39 | 02-Feb-2018 16:12:45 | 6642.67 | 6627.23 |
| WINE | 69.72 | 02-Feb-2018 16:12:45 | 02-Feb-2018 16:13:03 | 6627.23 | 6587.04 |
| WINE | 71.37 | 02-Feb-2018 16:13:03 | 02-Feb-2018 16:13:10 | 6587.04 | 6571.28 |
| WINE | 68.62 | 02-Feb-2018 16:13:10 | 02-Feb-2018 16:13:46 | 6571.28 | 6491.38 |
| WINE | 71.92 | 02-Feb-2018 16:13:46 | 02-Feb-2018 17:06:58 | 6491.38 | 109.68  |

All depth are at tool zero.

ONE

0 PSI Repeat Pass

|                                     |  |
|-------------------------------------|--|
| Software Version                    |  |
| Acquisition System                  |  |
| Maxwell 2017 SP3                    |  |
| Application Patch                   |  |
| Version                             |  |
| 7.3.92069.3100                      |  |
| Wireline_NPD-ICE2-2017SP3_7.3.93033 |  |

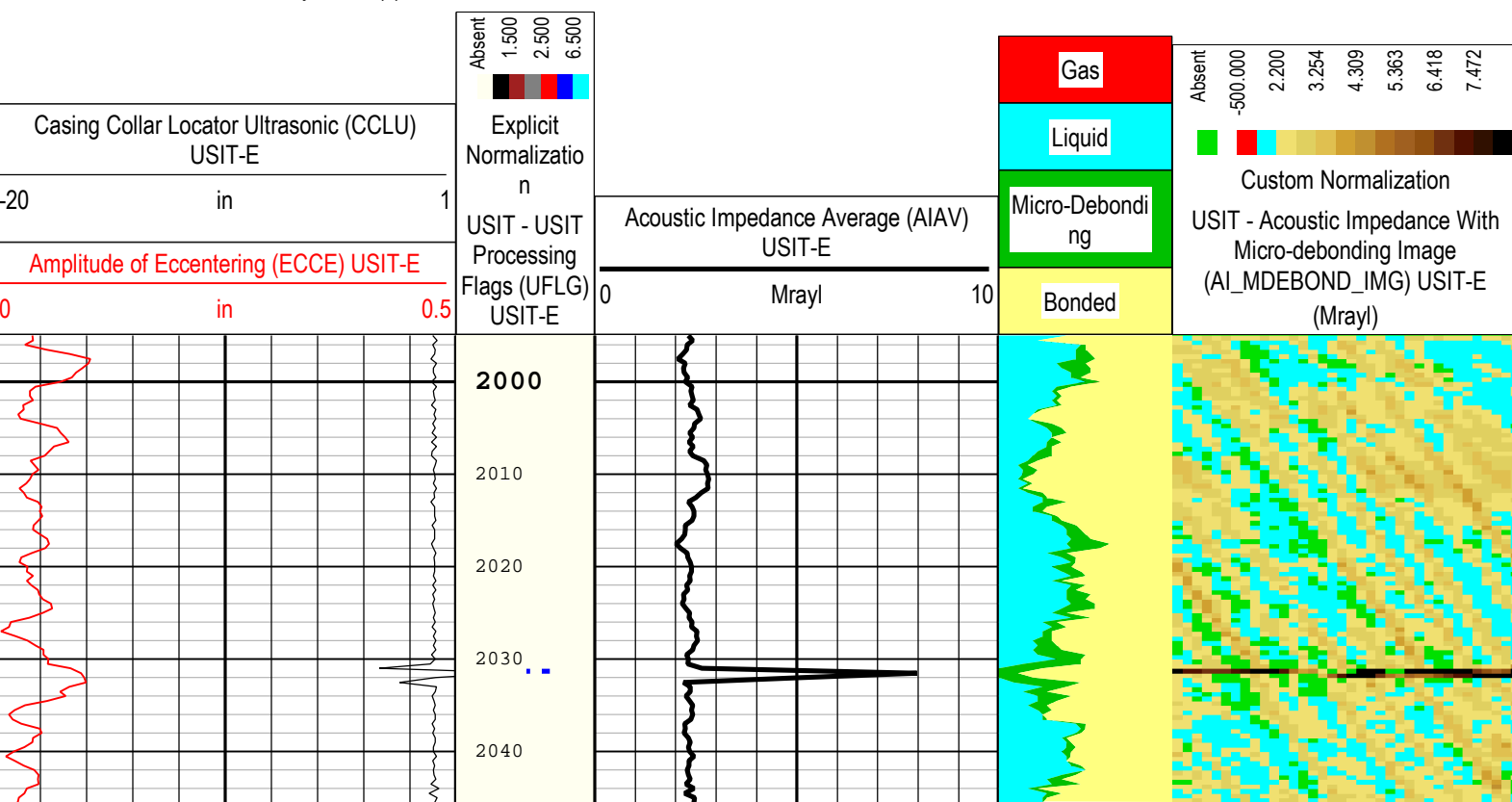
| Pass Summary |                |           |            |            |                        |                        |          |             |                       |
|--------------|----------------|-----------|------------|------------|------------------------|------------------------|----------|-------------|-----------------------|
| Run Name     | Pass Objective | Direction | Top        | Bottom     | Start                  | Stop                   | DSC Mode | Depth Shift | Include Parallel Data |
| ONE          | Log[3]:Up      | Up        | 1994.94 ft | 2503.03 ft | 02-Feb-2018 3:48:55 PM | 02-Feb-2018 3:52:16 PM | ON       | 4.43 ft     | Yes                   |

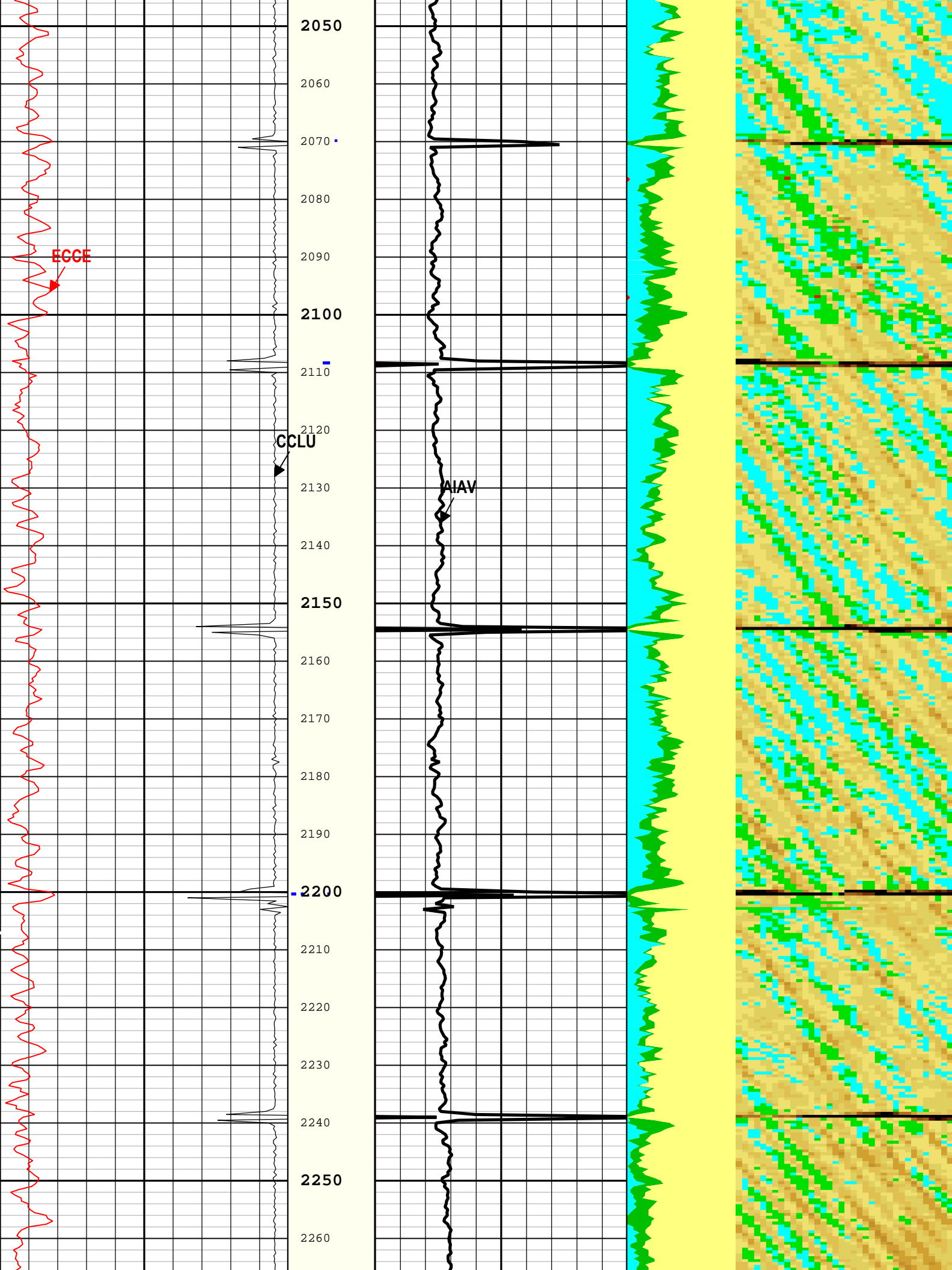
All depths are referenced to toolstring zero

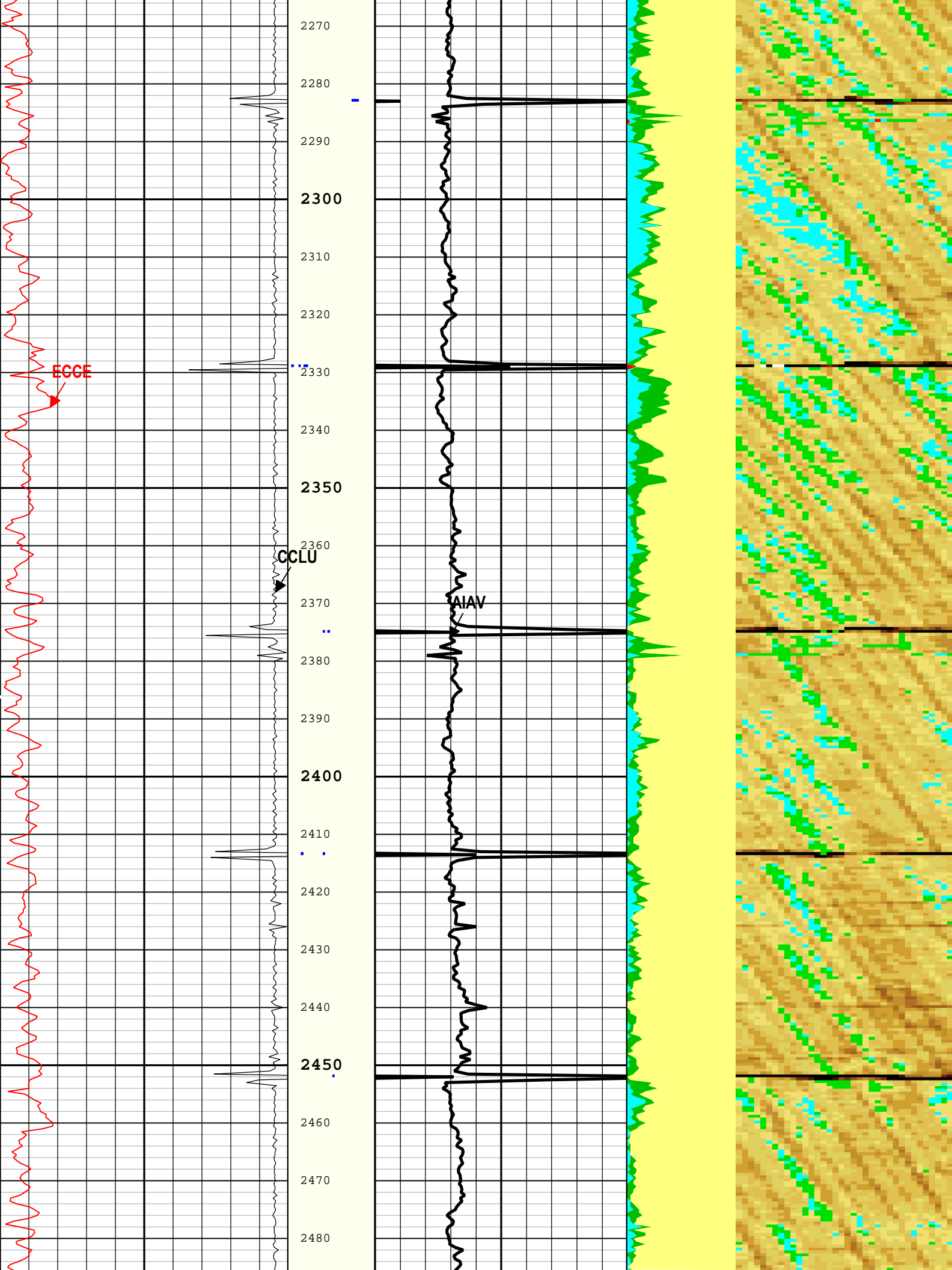
|     |                          |                          |
|-----|--------------------------|--------------------------|
| Log | Company:Noble Energy Inc | Well:Bison Ridge Y22-764 |
|     |                          | ONE: Log[3]:Up:S005      |

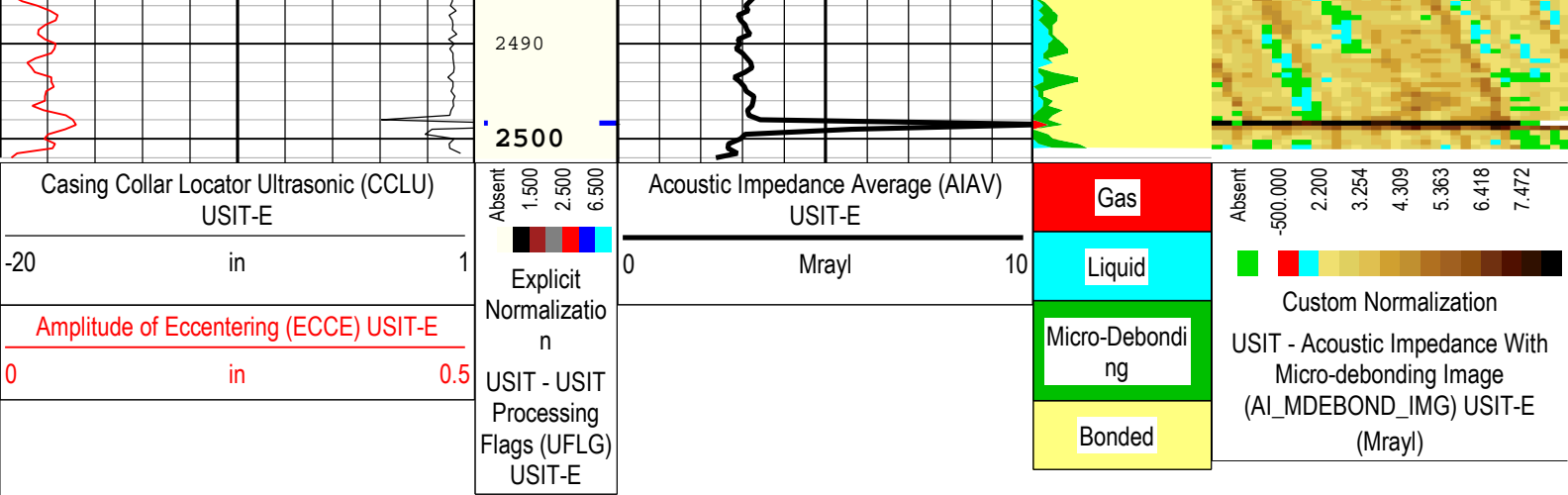
Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth  
Creation Date: 03-Feb-2018 12:28:43

TIME\_1900 - Time Marked every 60.00 (s)









TIME\_1900 - Time Marked every 60.00 (s)

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: 03-Feb-2018 12:28:43

## 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  | 8.4            | lbm/gal |
| DFT_CATEGORY      | Drilling Fluid Type                                | Borehole  | Water          |         |
| DTMD              | Borehole Fluid Slowness                            | Borehole  | 206            | us/ft   |
| FDII              | FPM Data Interpolation Interval                    | USIT-E    | 0              | ft      |
| HEMA              | Hematite Presence Flag                             | Borehole  | No             |         |
| 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    | 1.1            |         |
| U-USIT_DFSZ       | Drilling Fluid Specific Acoustic Impedance         | USIT-E    | 0.1            | Mrayl   |
| 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                    | 13.5  | 1995         | 2050        |
| BS                    | 8.5   | 2050         | 2502.5      |
| All depth are actual. |       |              |             |

## Tool Control Parameters

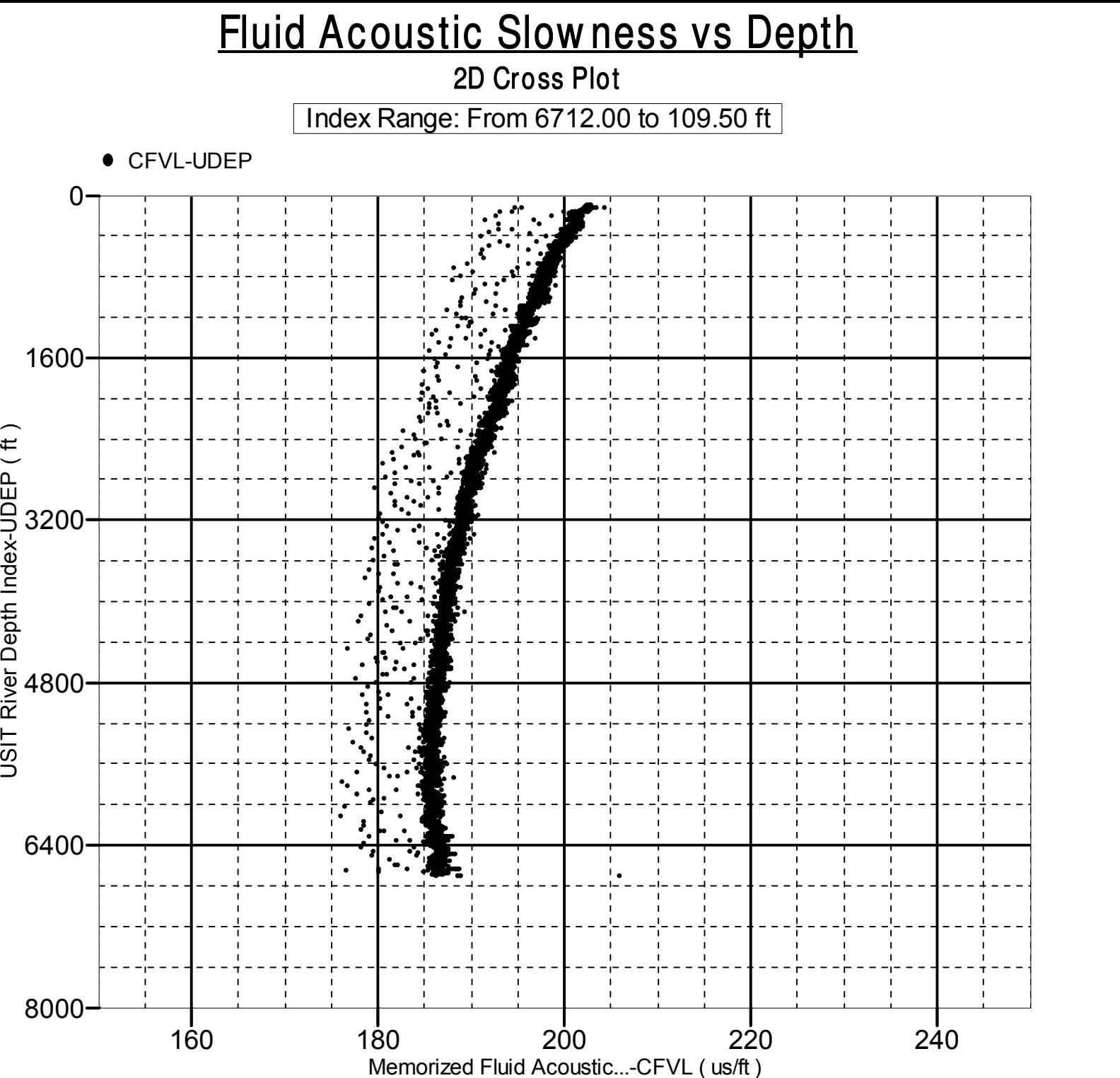
### ONE: Parameters

| Parameter | Description               | Tool   | Value       | Unit |
|-----------|---------------------------|--------|-------------|------|
| AGMN      | Minimum Gain of Cartridge | USIT-E | -12         | dB   |
| AGMX      | Maximum Gain of Cartridge | USIT-E | 18          | dB   |
| EMXV      | EMEX Voltage              | USIT-E | 45          | V    |
| HRES      | Horizontal Resolution     | USIT-E | 10 deg      |      |
| ULOG      | Logging Objective         | USIT-E | MEASUREMENT |      |

|      |                               |        |                               |    |
|------|-------------------------------|--------|-------------------------------|----|
| USFR | Ultrasonic Sampling Frequency | USIT-E | 666667                        | Hz |
| UPAT | USIT Emission Pattern         | USIT-E | Pattern 375 KHz               |    |
| UWKM | USIT Working Mode             | USIT-E | Uncompressed 10 deg at 6.0 in |    |
| WINB | Window Begin Time             | USIT-E | Time Zoned                    | us |
| WINE | Window End Time               | USIT-E | 71.88                         | us |

| Time Zone Parameters        |       |                      |                      |                    |                   |
|-----------------------------|-------|----------------------|----------------------|--------------------|-------------------|
| Parameter                   | Value | Start Time           | Stop Time            | Start Depth ( ft ) | Stop Depth ( ft ) |
| WINB                        | 17.39 | 02-Feb-2018 15:48:55 | 02-Feb-2018 15:49:31 | 2503.02            | 2468.39           |
| WINB                        | 20.46 | 02-Feb-2018 15:49:31 | 02-Feb-2018 15:52:16 | 2468.39            | 1994.94           |
| All depth are at tool zero. |       |                      |                      |                    |                   |

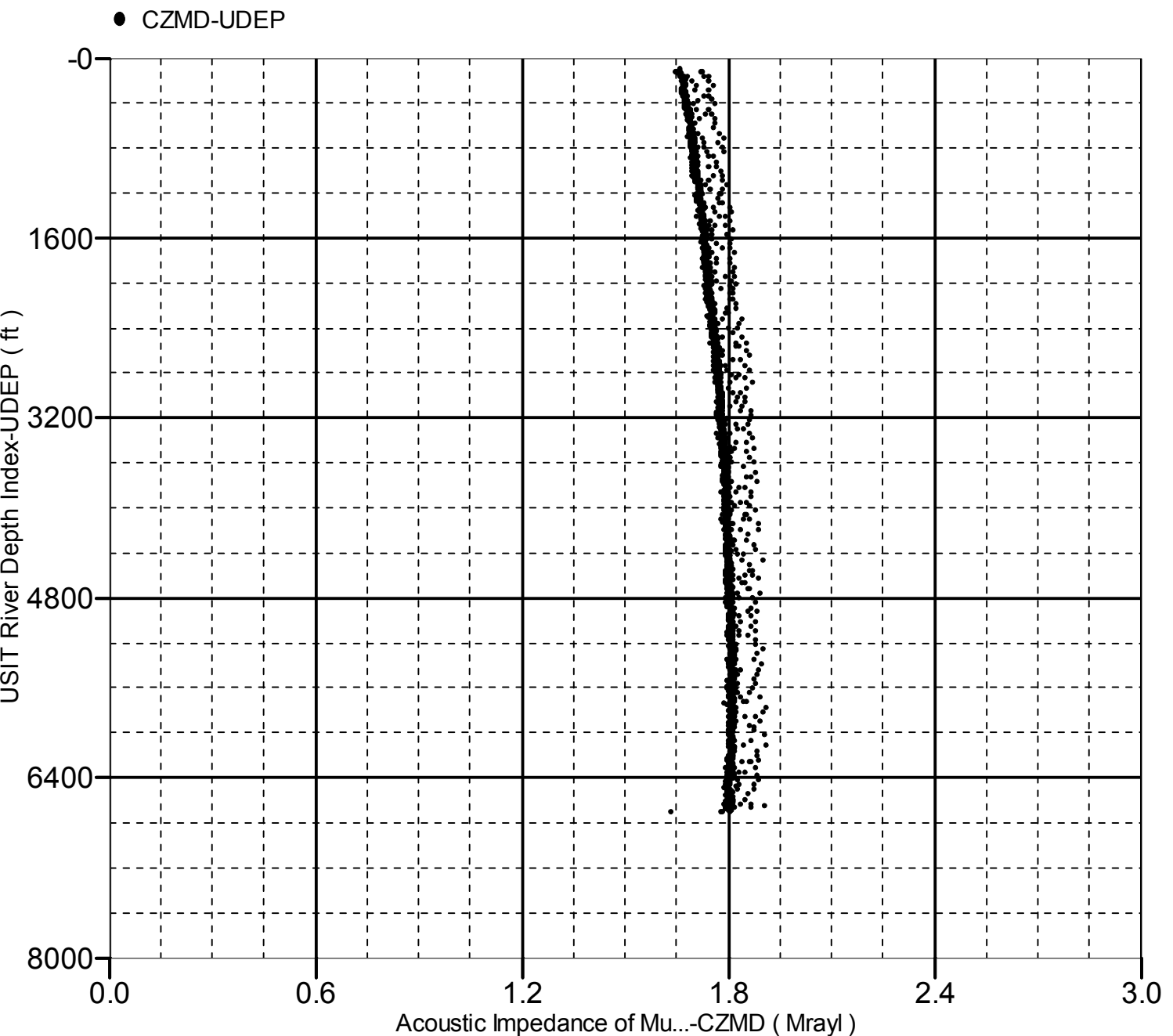
|     |  |
|-----|--|
| XYZ | Company:Noble Energy Inc Well:Bison Ridge Y22-764<br>ONE: Log[5]:Up:S005 |
|-----|--|



# Acoustic Impedance of Mud vs Depth

## 2D Cross Plot

Index Range: From 6712.00 to 109.50 ft



Company: Noble Energy Inc

**Schlumberger**

Well: Bison Ridge Y22-764

Field: Wattenberg

|                          |      |
|--------------------------|------|
| County:                  | Weld |
| State:                   | CO   |
| UltraSonic Summary Print |      |