

Company: Noble Energy Inc.

Well: EMMY H25-718

Field: DJ BASIN

County: Weld State: Colorado

UltraSonic Summary Print

County:		Weld	
Field:		DJ BASIN	
Location:		SW SE SEC:25 TWN:3N RNG: 65W	
Well:		EMMY H25-718	
Company:		Noble Energy Inc.	
<div>API Serial No. 05-123-46967</div> <div>Section: 25</div> <div>Township: 3N</div> <div>Range: 65W</div>		Location:	
		SW SE SEC:25 TWN:3N RNG: 65W	
		Elev.: K.B. 4835.00 ft	
		G.L. 4805.00 ft	
		D.F. 4835.00 ft	
Permanent Datum:		Ground Level	
Log Measured From:		Kelly Bushing	
Drilling Measured From:		Kelly Bushing	
		Elev.: 4805.00 f	
		above Perm. Datum	

Logging Date	02-Nov-2018			
Run Number	ONE			
Depth Driller	17344.00 ft			
Schlumberger Depth	6695.00 ft			
Bottom Log Interval	6695.00 ft			
Top Log Interval	78.00 ft			
Casing Fluid Type	BRINE			
Salinity				
Density	8.4 lbm/gal			
Fluid Level	8.00 ft			
BIT/CASING/TUBING STRING				
Bit Size	8.50 in			
From	1943.00 ft			
To	17344.00 ft			
Casing/Tubing Size	5.5 in			
Weight	20 lbm/ft			
Grade	P110			
From	0.00 ft			
To	17336.00 ft			
Max Recorded Temperatures	218 degF			
Logger on Bottom	Time	02-Nov-2018	10:30:00	
Unit Number	Location:	2377	Fort Morgan, CO	
Recorded By	Justin Ray			
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.

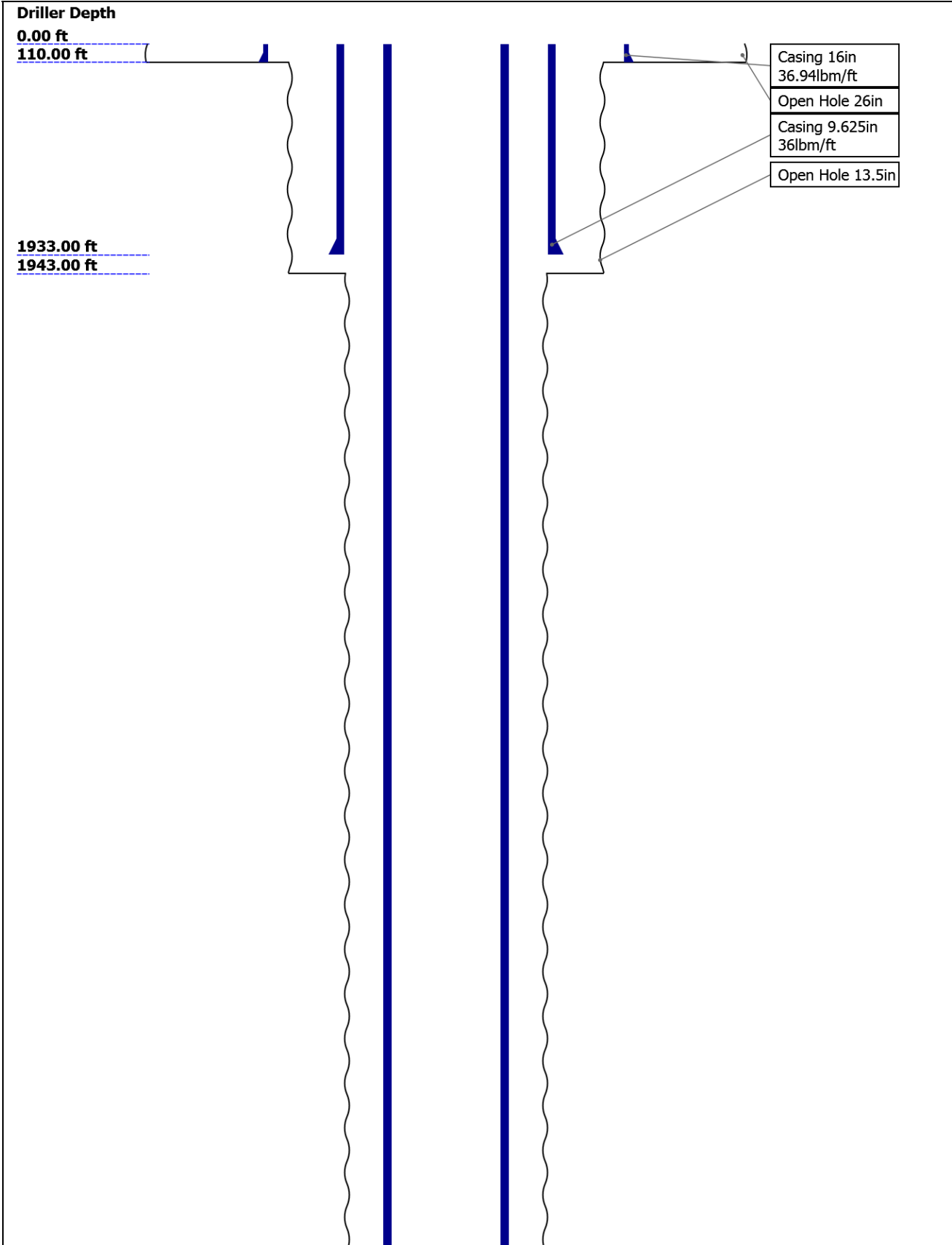
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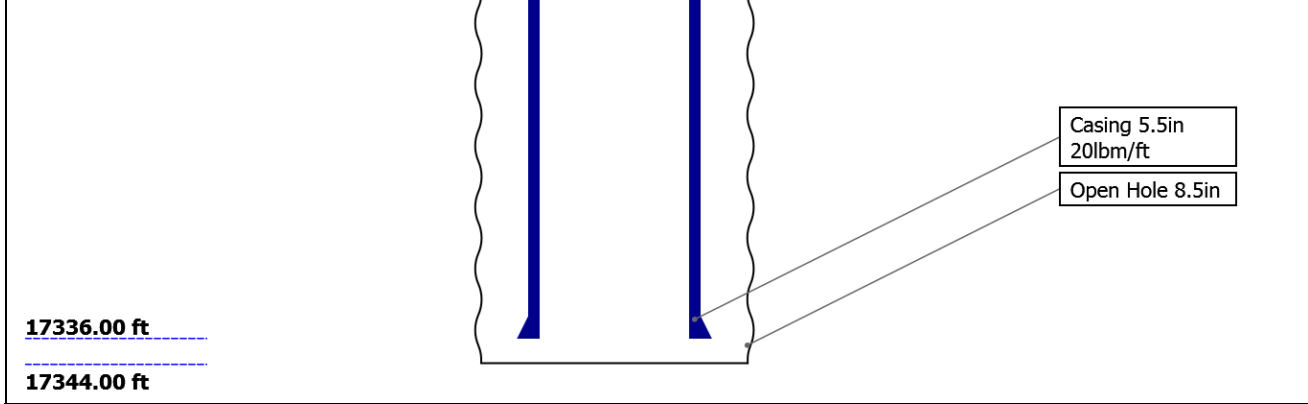
- Header
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- Tail

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Well Sketch





17336.00 ft

17344.00 ft

Casing 5.5in  
20lbm/ft

Open Hole 8.5in

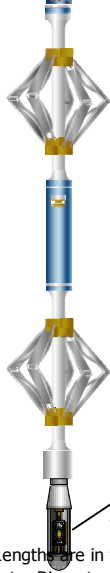
Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.5			
Top Driller ( ft )	0	110	1943			
Top Logger ( ft )	0	110	1943			
Bottom Driller ( ft )	110	1943	17344			
Bottom Logger ( ft )	110	1943	17344			
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	1933	17336			
Bottom Logger ( ft )	110	1933	17336			

Remarks and Equipment Summary

ONE: Toolstring			ONE: Remarks	
<div><div><div>Equip nameLength</div><div>LEH-QT29.54</div><div>LEH-QT</div></div><div><div>EDTC-B:9316</div><div>EDTH-B:9373</div><div>EDTG-A:79527</div><div>EDTC-B:9316</div></div><div><div>AH-184[2]</div><div>AH-184[1]</div><div>USIT-E:1725</div><div>ECH-MFA:1991</div><div>USAC-A:1725</div><div>USIT-A:10</div></div></div> <div></div> <div><div>MP nameOffset</div><div>CTEM22.56</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamma20.69</div><div>Ray</div><div>TelStatu19.56</div><div>s5965</div><div>3763</div></div>	<div>Toolstring ran as per tool sketch</div> <div>Gemco and boosters ran and two knuckles ran for tool centralization</div> <div>Main pass ran with 2500 PSI. Repeat pass ran with 0 PSI</div> <div>BHT: 218 Deg F</div> <div>Thank you for choosing Schlumberger</div>			

USIS-A:18  
26  
USSC-B:99  
2  
USRS-AB:  
373  
USI-SENS  
OR:1064  
USI-TX



Length in ft  
Maximum Outer Diameter = 5.000 in  
Line: Sensor Location, Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

## Depth Summary

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

Log Sequence	First Log In the Well
Rig Up Length At Surface	
Rig Up Length At Bottom	
Rig Up Length Correction	
Stretch Correction	1.30 ft
Tool Zero Check At Surface	

### Depth Control Remarks

All Schlumberger depth control procedures followed  
IDW used as primary depth control device  
Z-Chart used as secondary depth control device  
Logs correlated to marker joint at 6438.9-6449.9 FT

## USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[5]:Up	6697.12	76.99

Fluid Velocity = "Automatic".  
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Mud Impedance = "FreePipe Norm."  
Free Pipe normalization zone is : 23.86m(78.28ft) to 35.16m(115.36ft)  
MUD\_N\_FRP = 1.15  
DFD = 1.01g/cm3(8.40lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.64 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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ONE

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

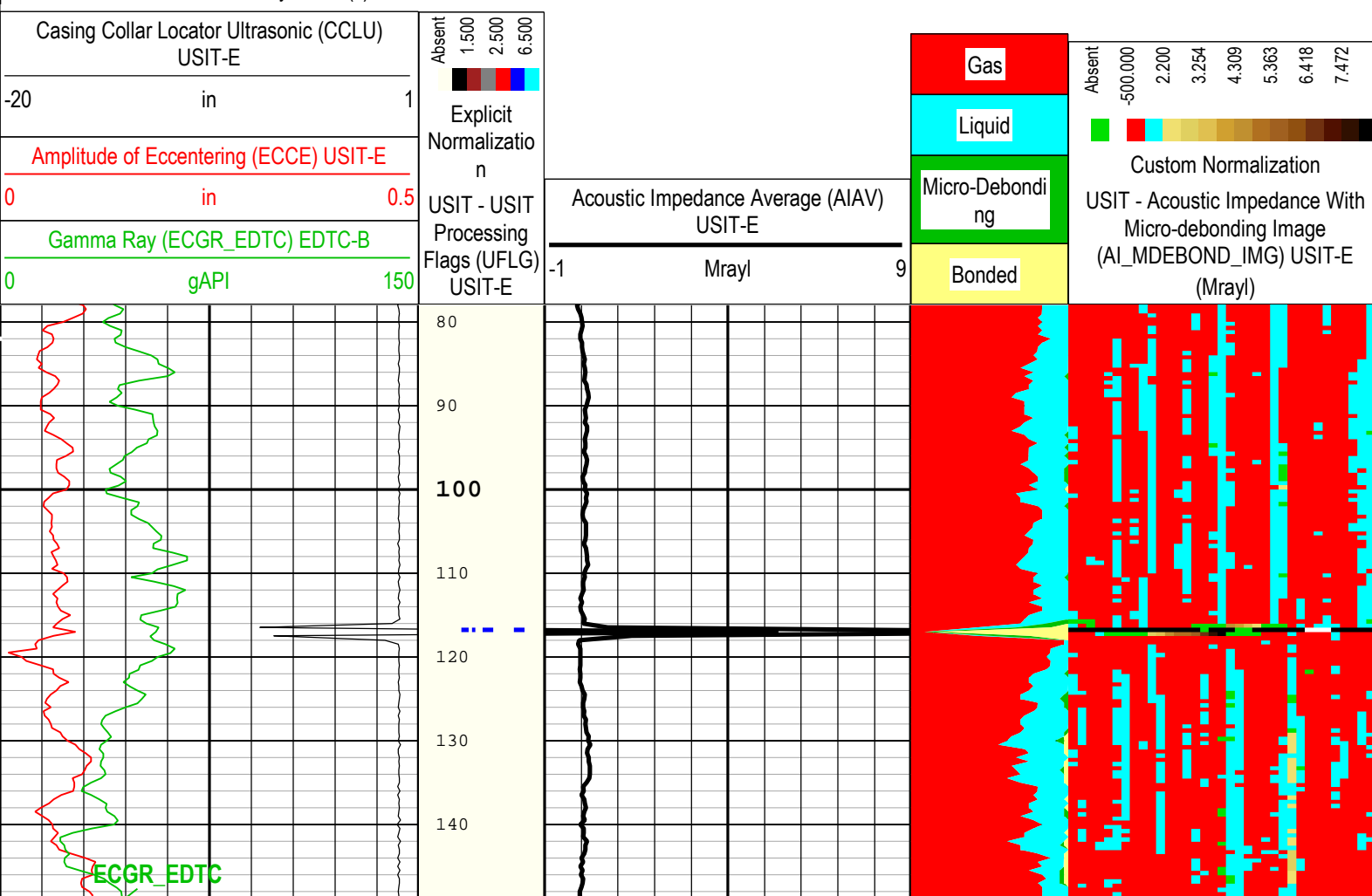
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Main[5]:Up	Up	76.99 ft	6697.13 ft	02-Nov-2018 10:32:52 AM	02-Nov-2018 11:14:35 AM	ON	-2.59 ft	Yes

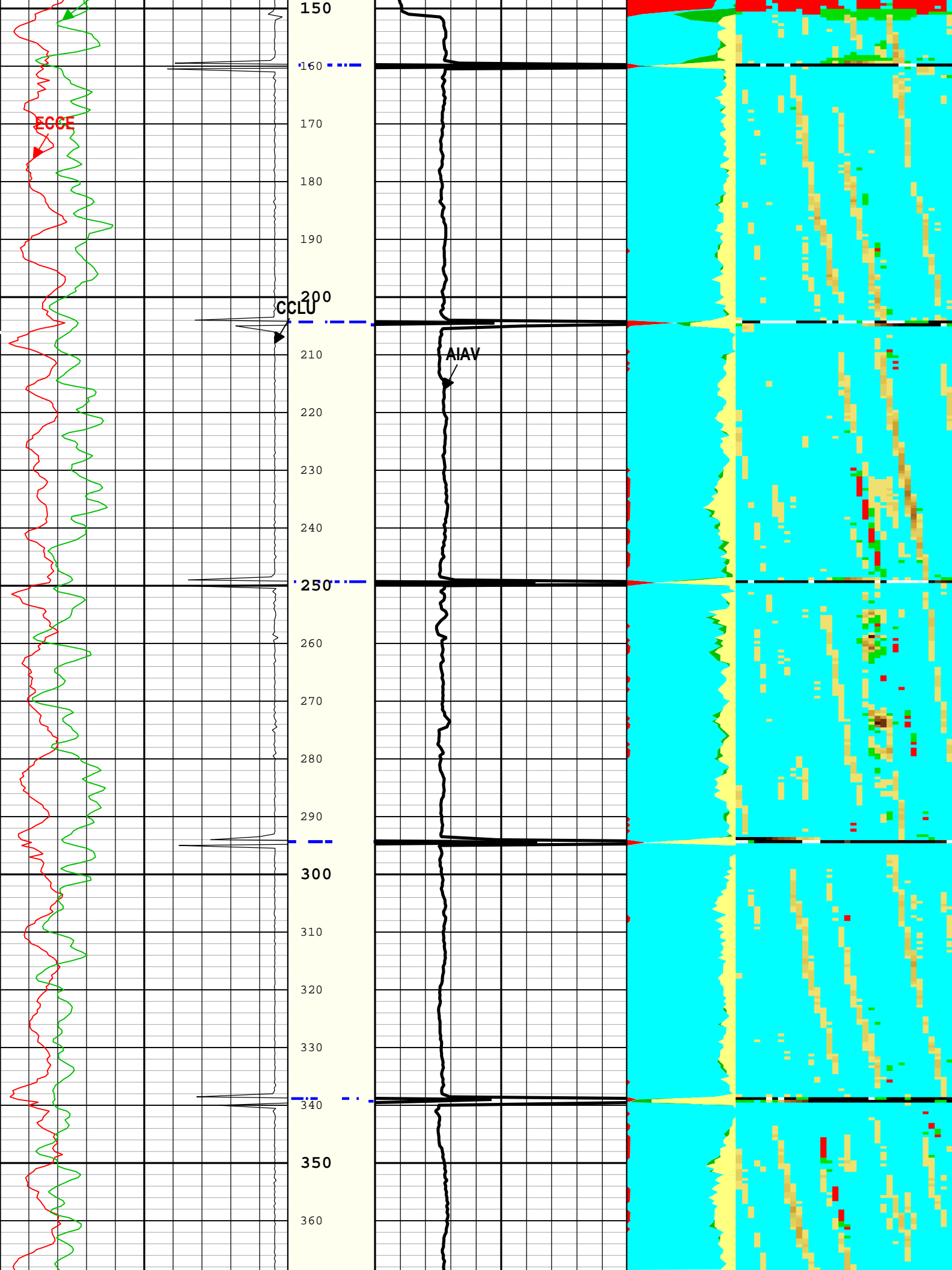
All depths are referenced to toolstring zero

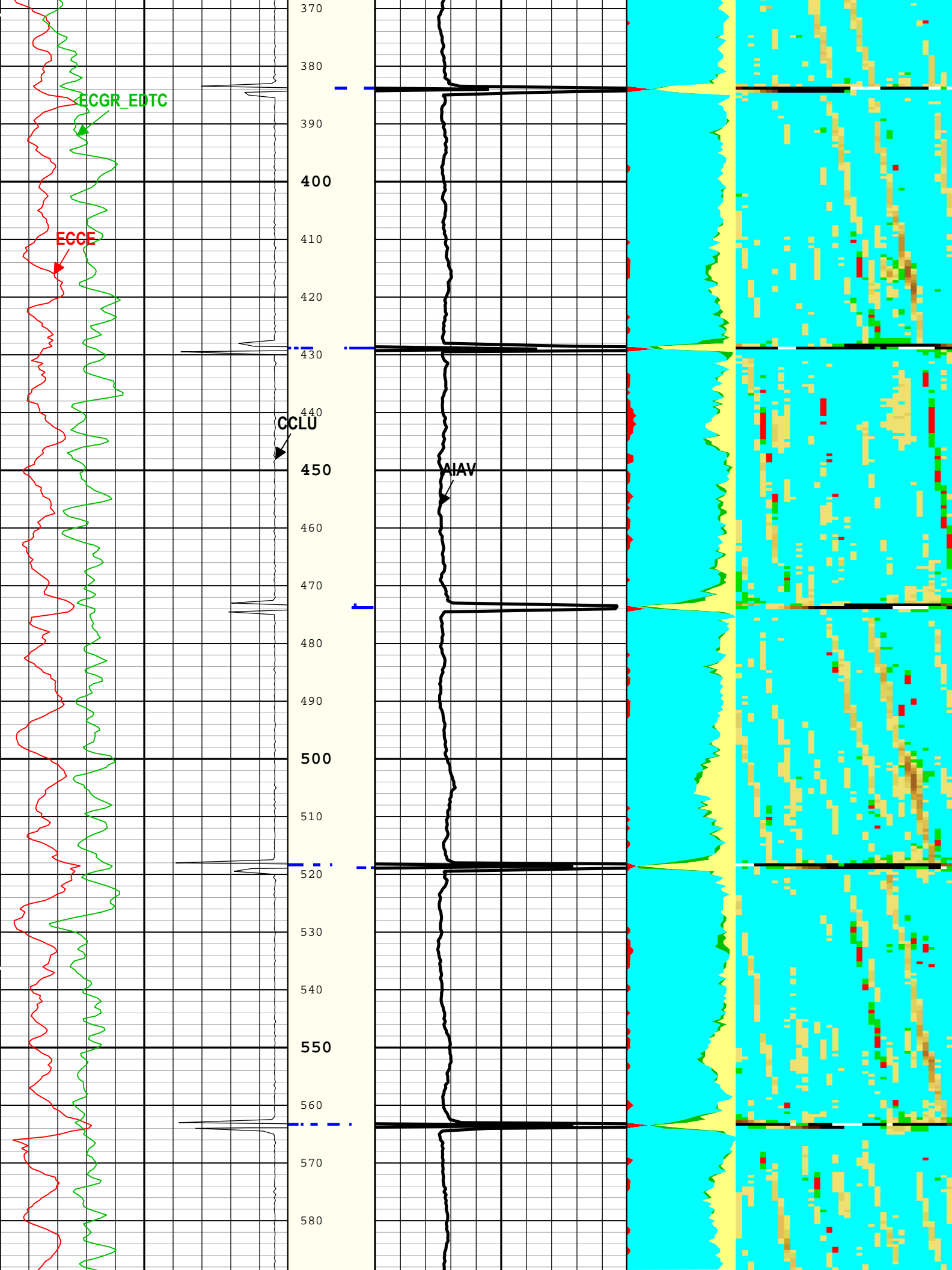
Log Company:Noble Energy Inc. Well:EMMY H25-718  
ONE: Main[5]:Up:S008

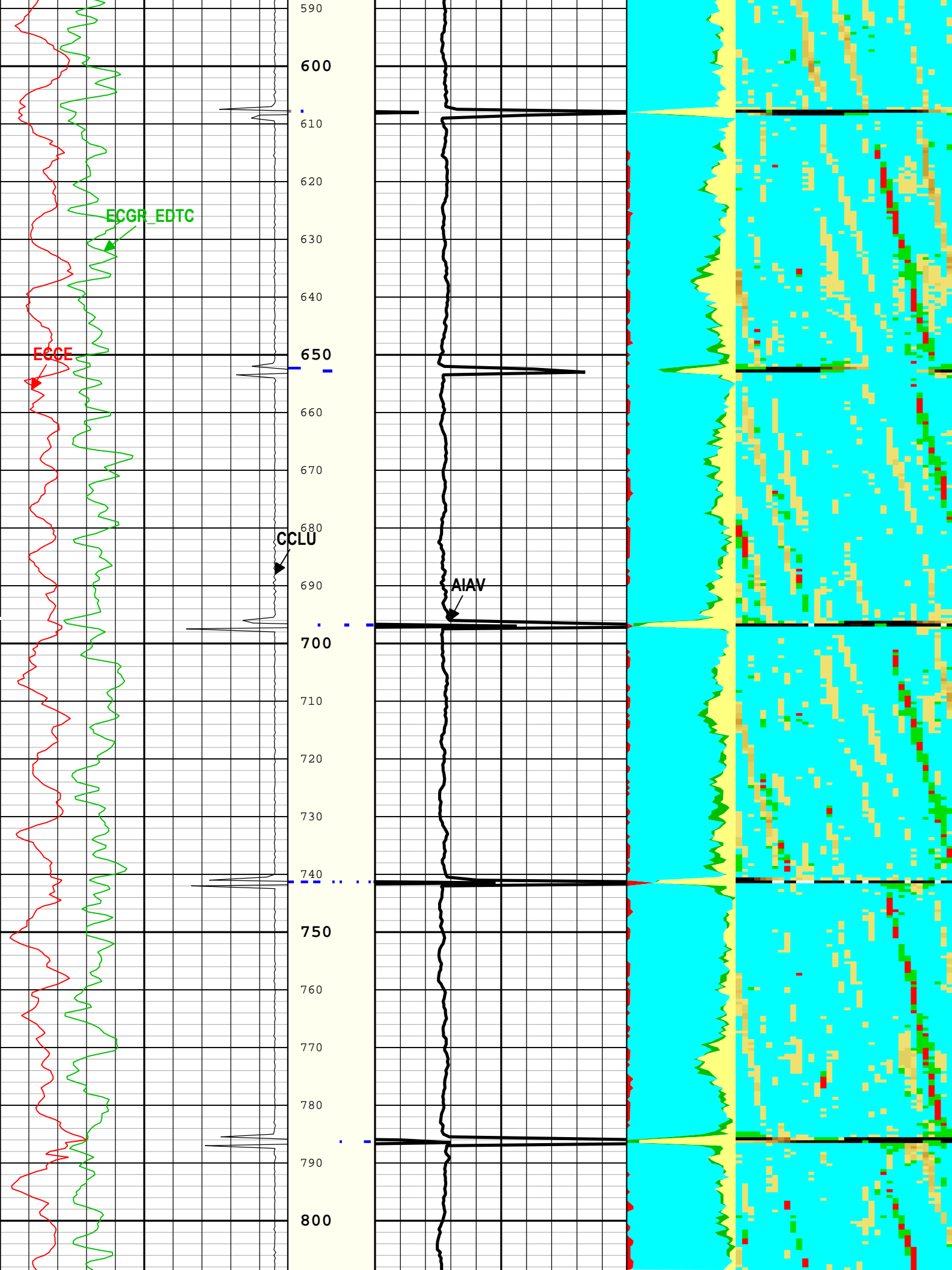
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Creation Date: 03-Nov-2018 17:10:32

TIME\_1900 - Time Marked every 60.00 (s)

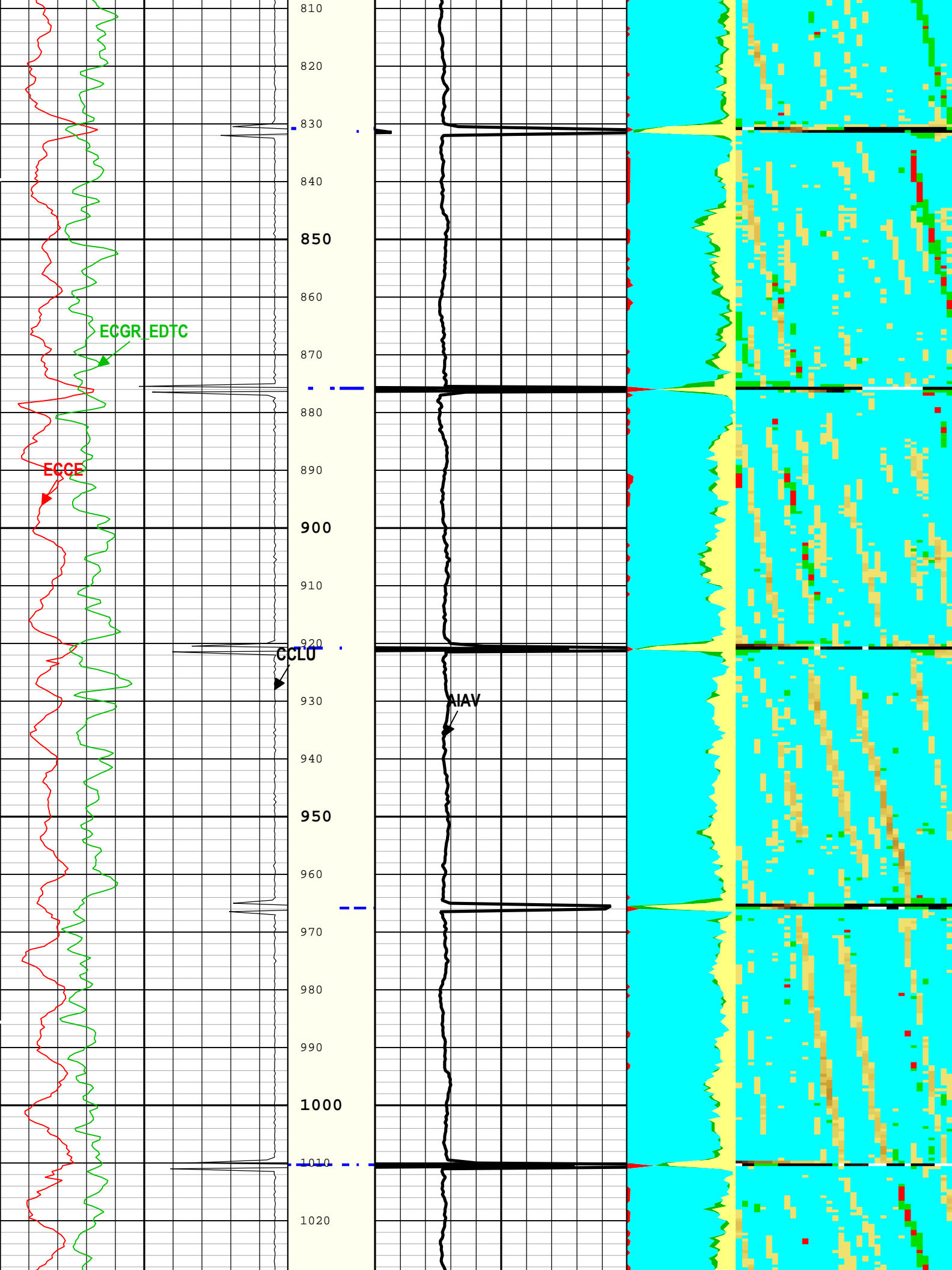


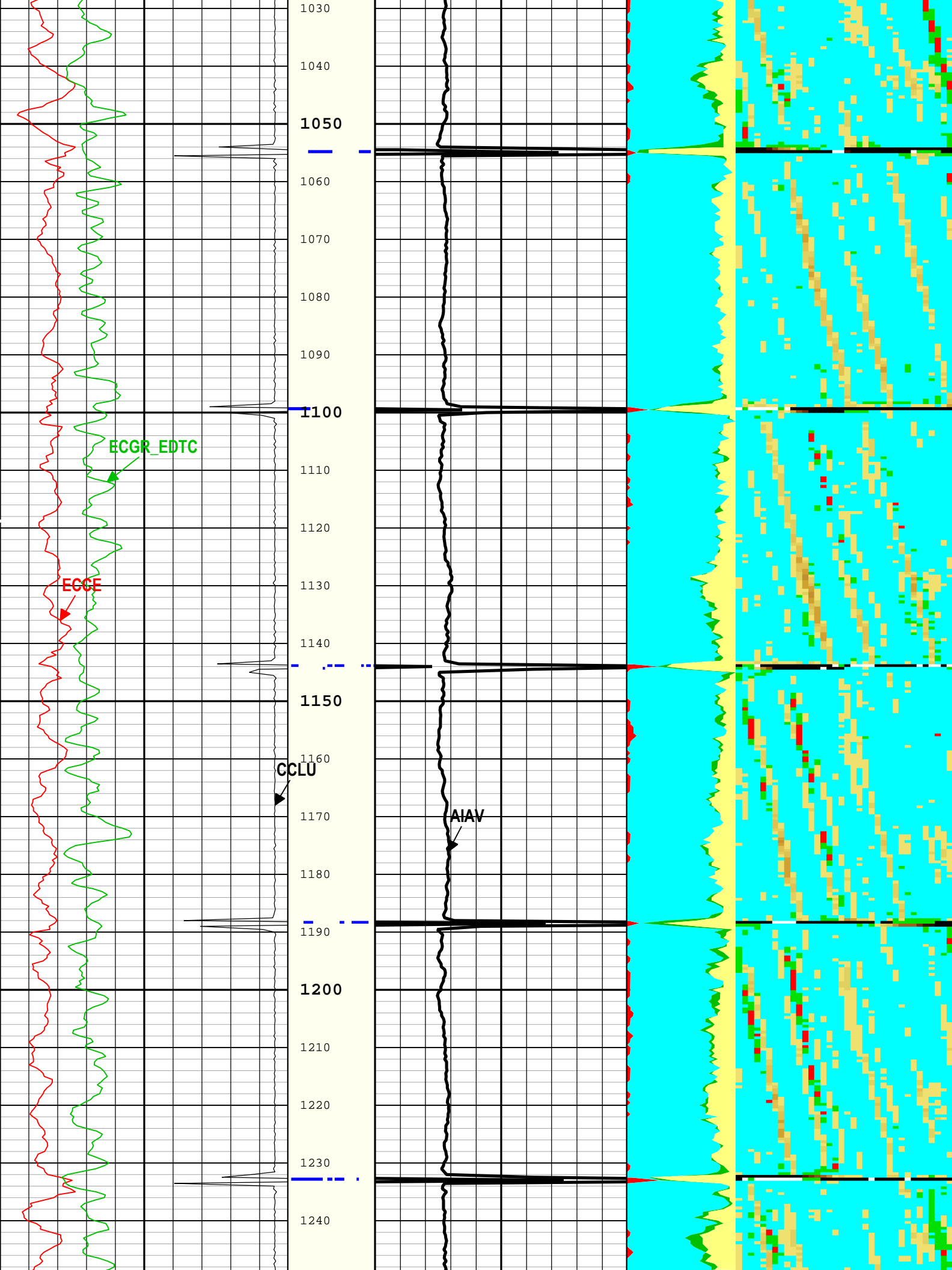


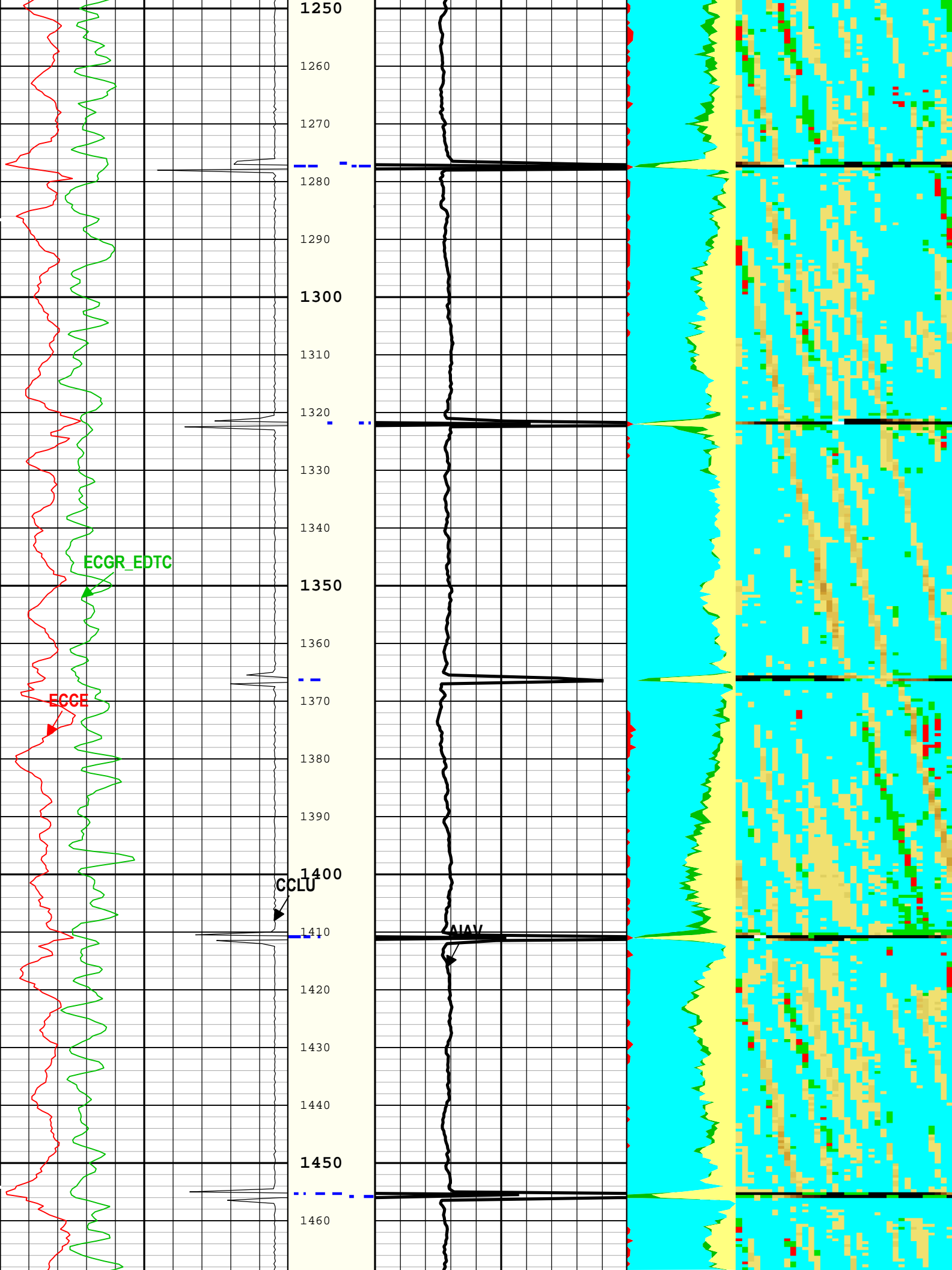


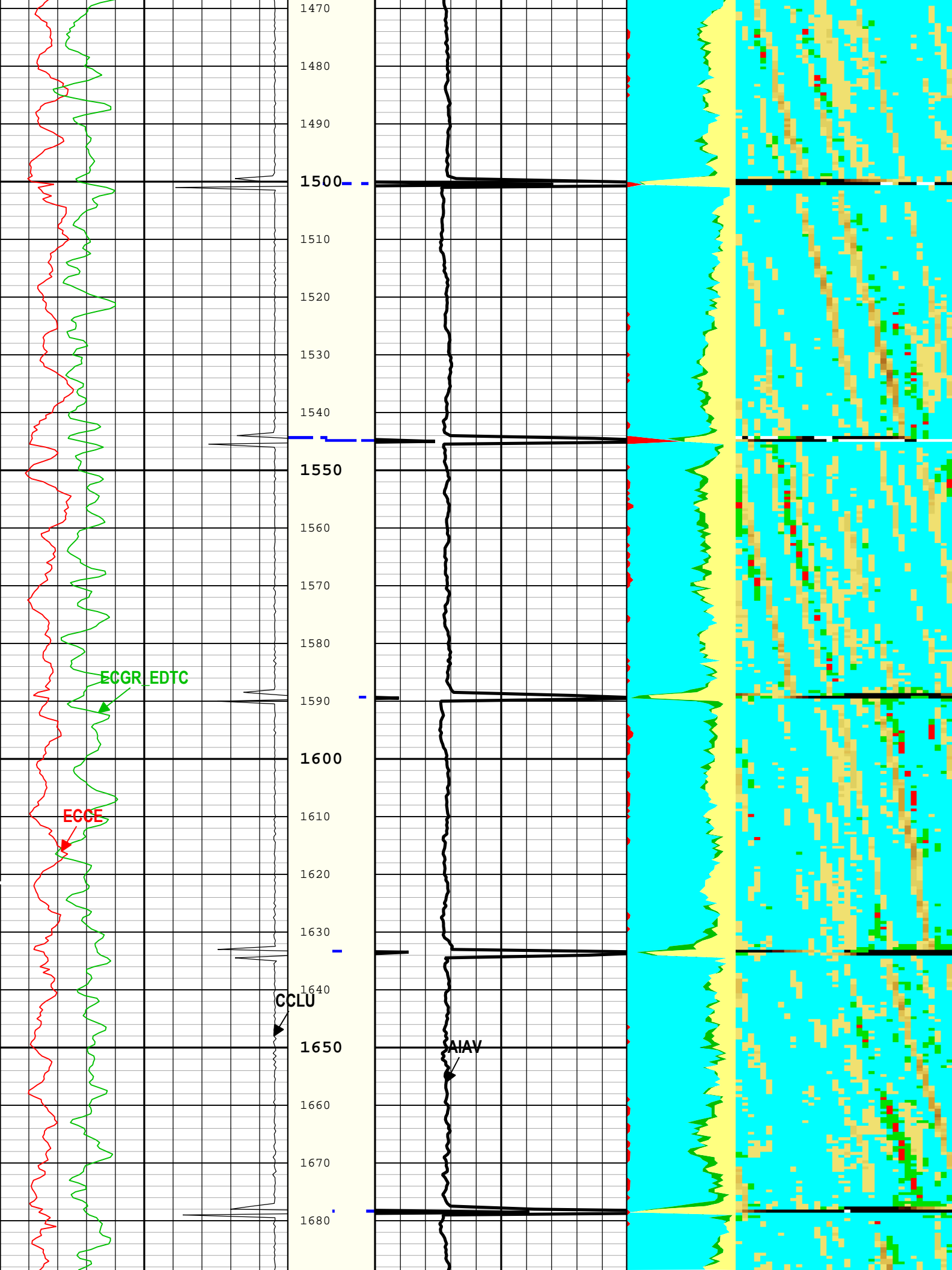


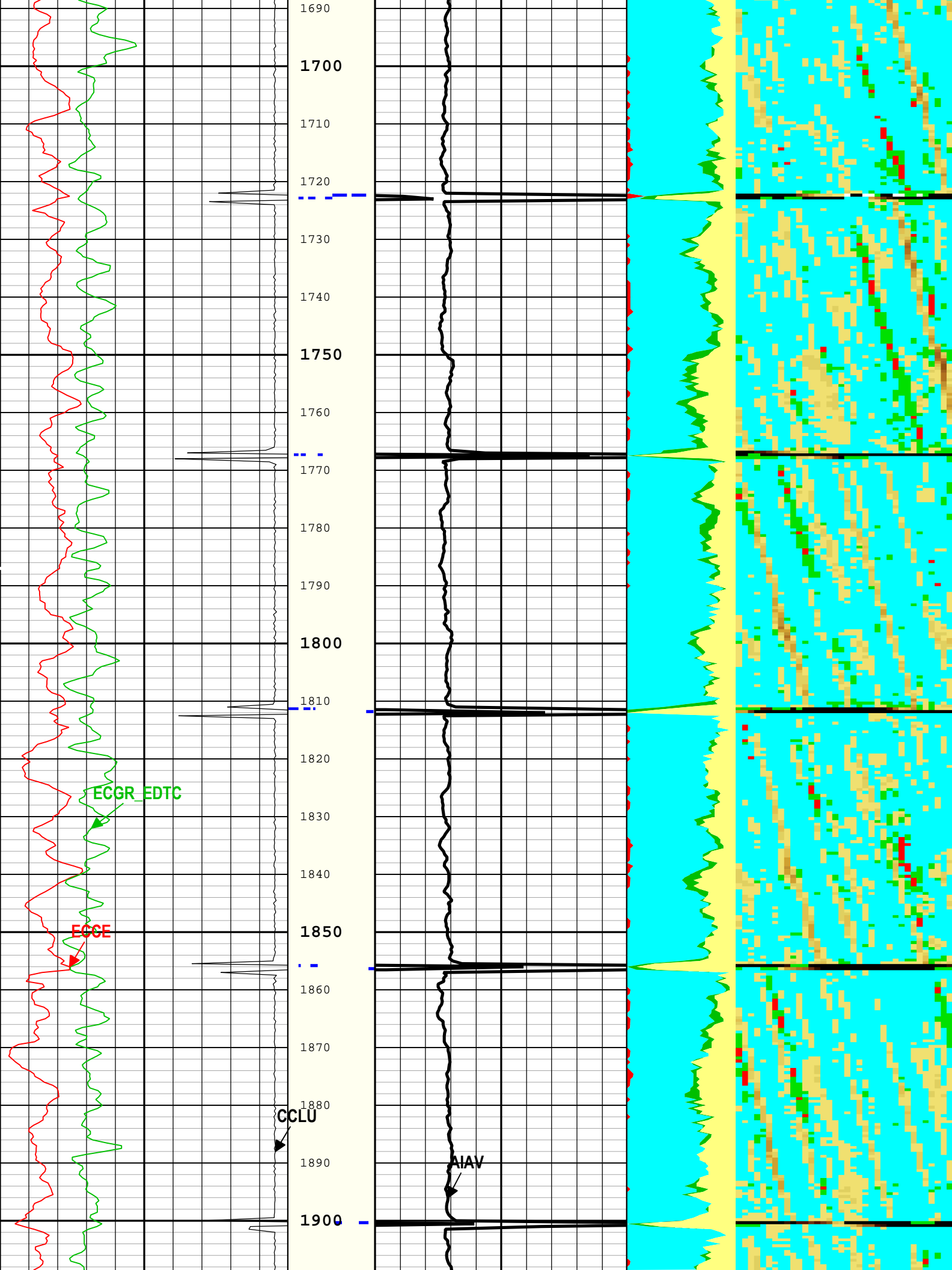


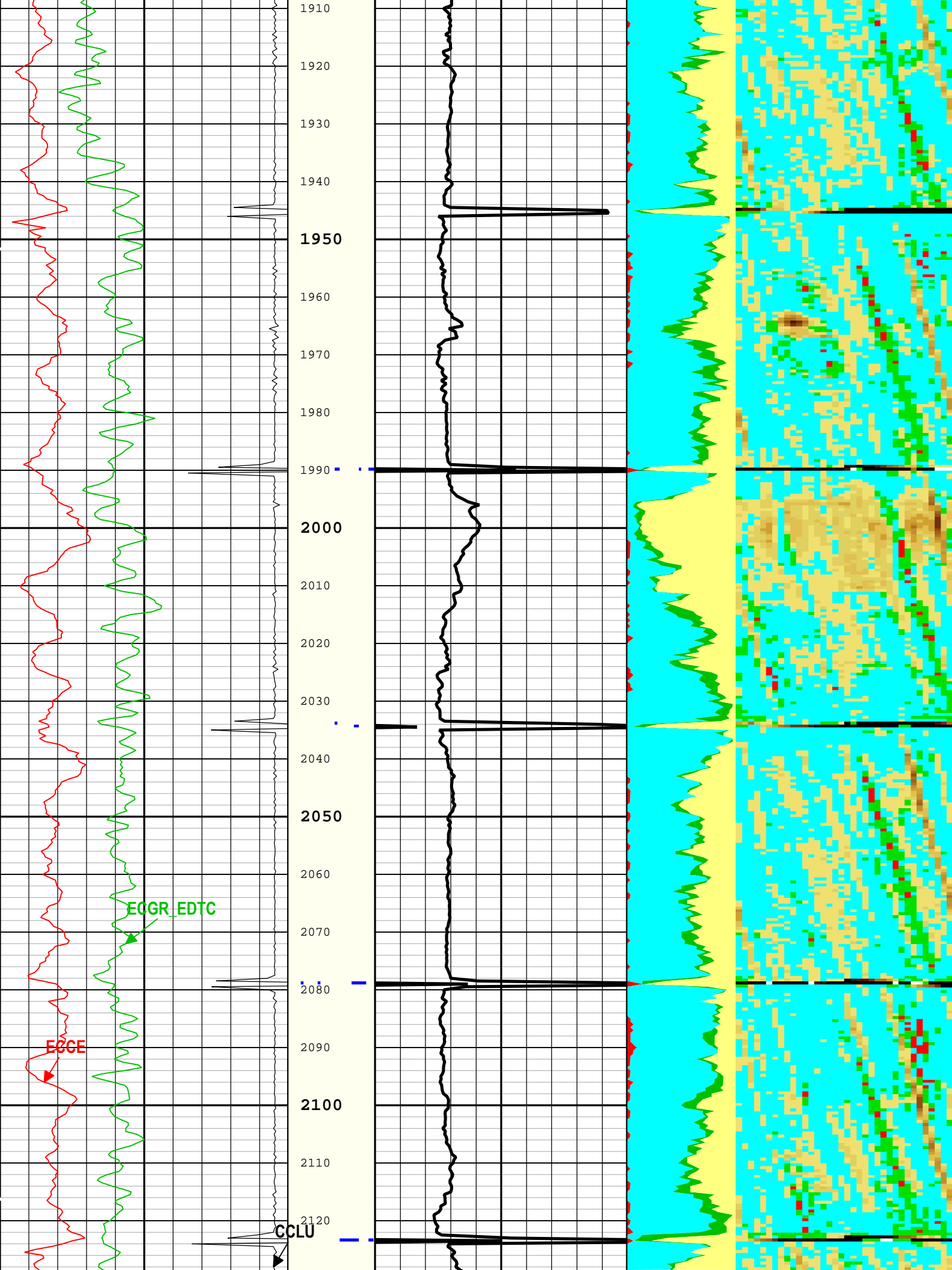


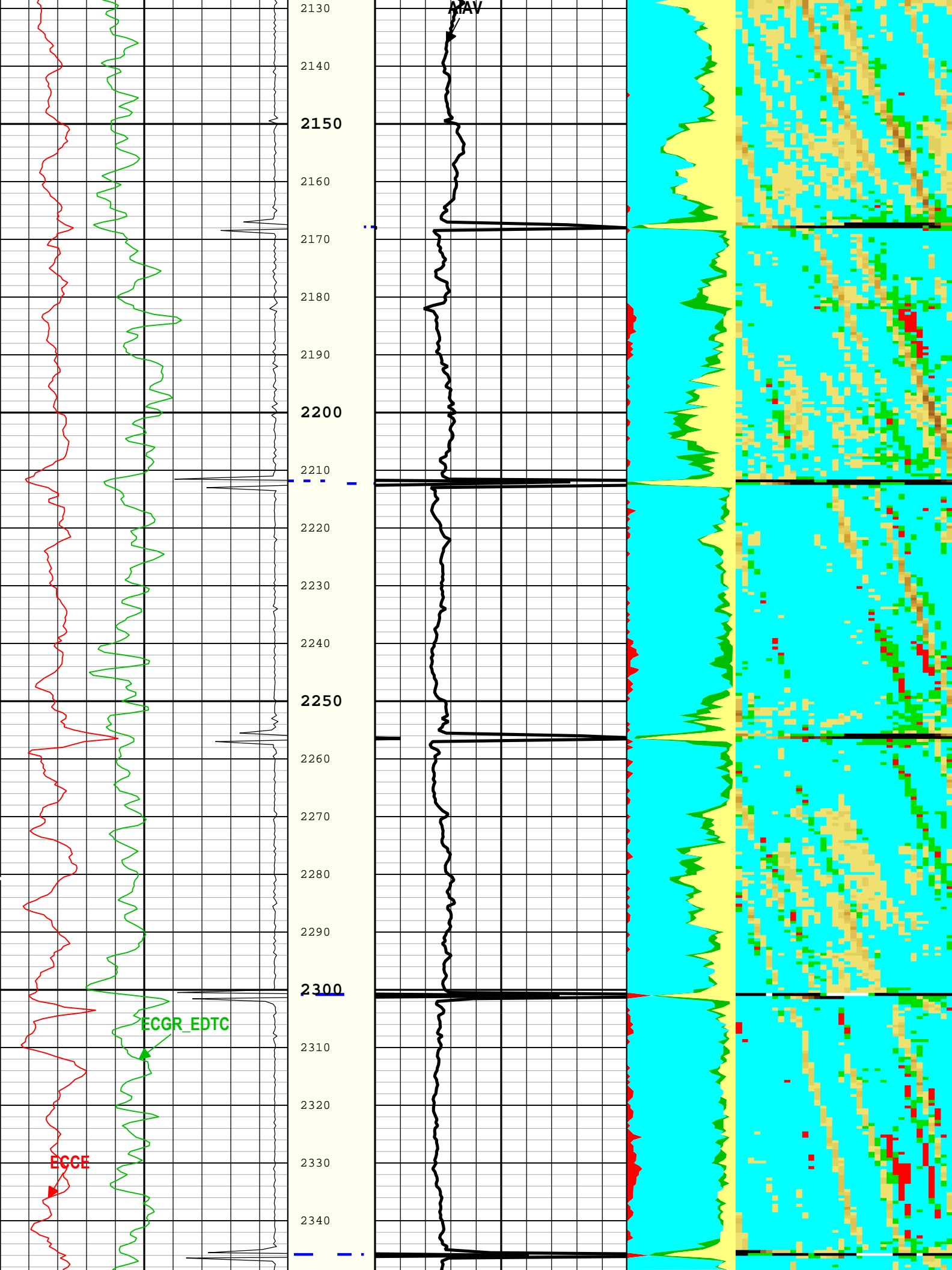


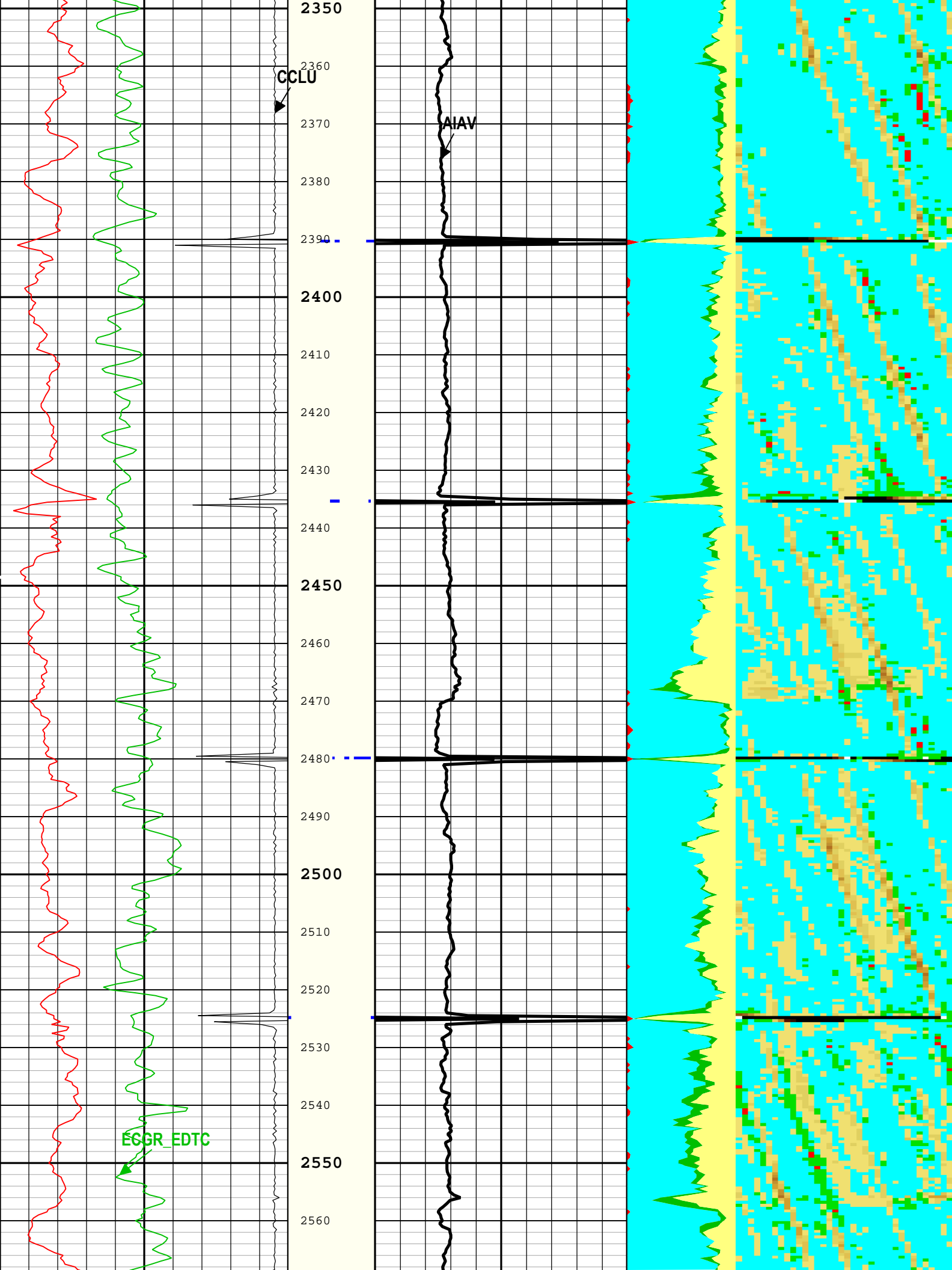




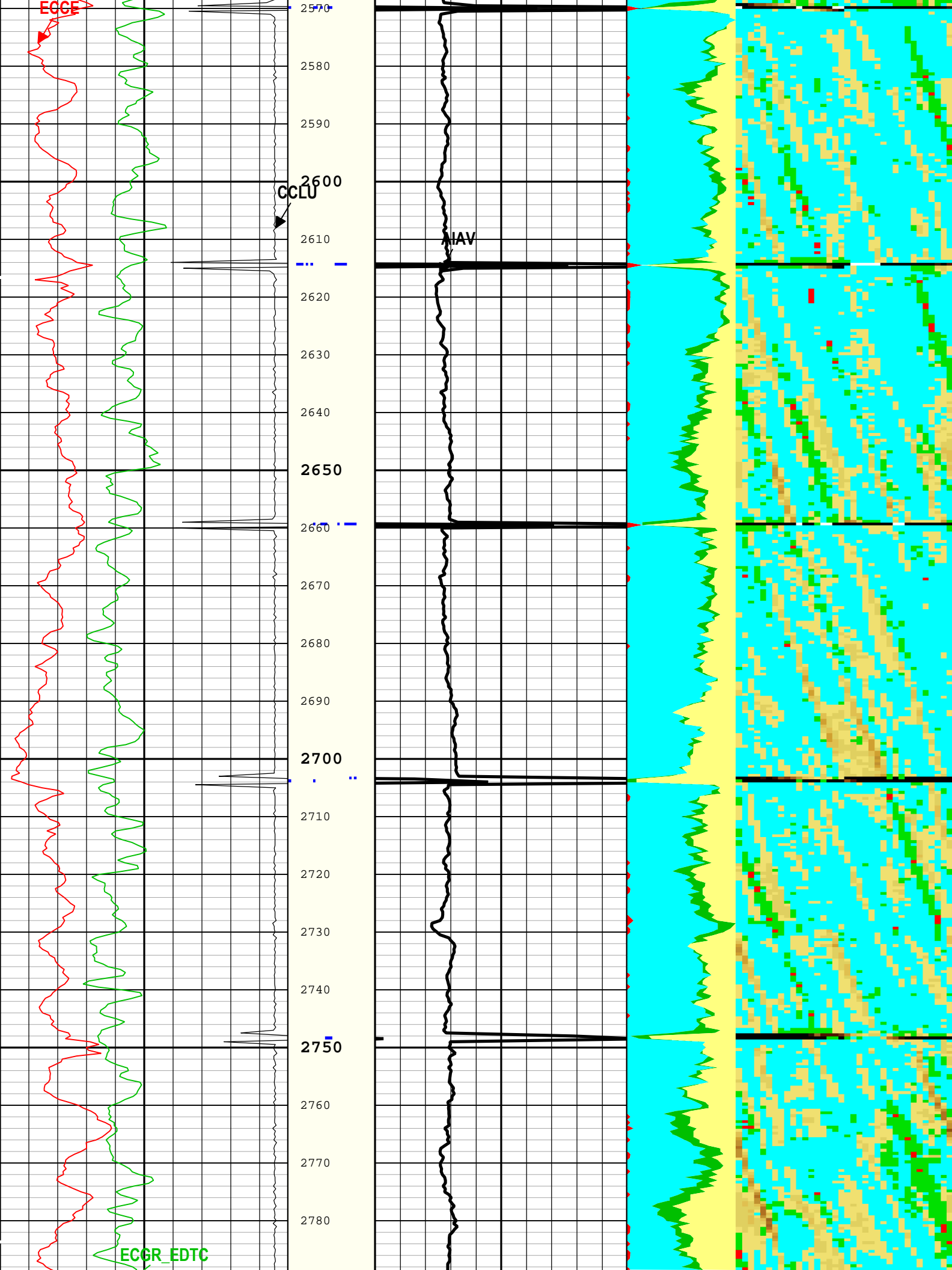


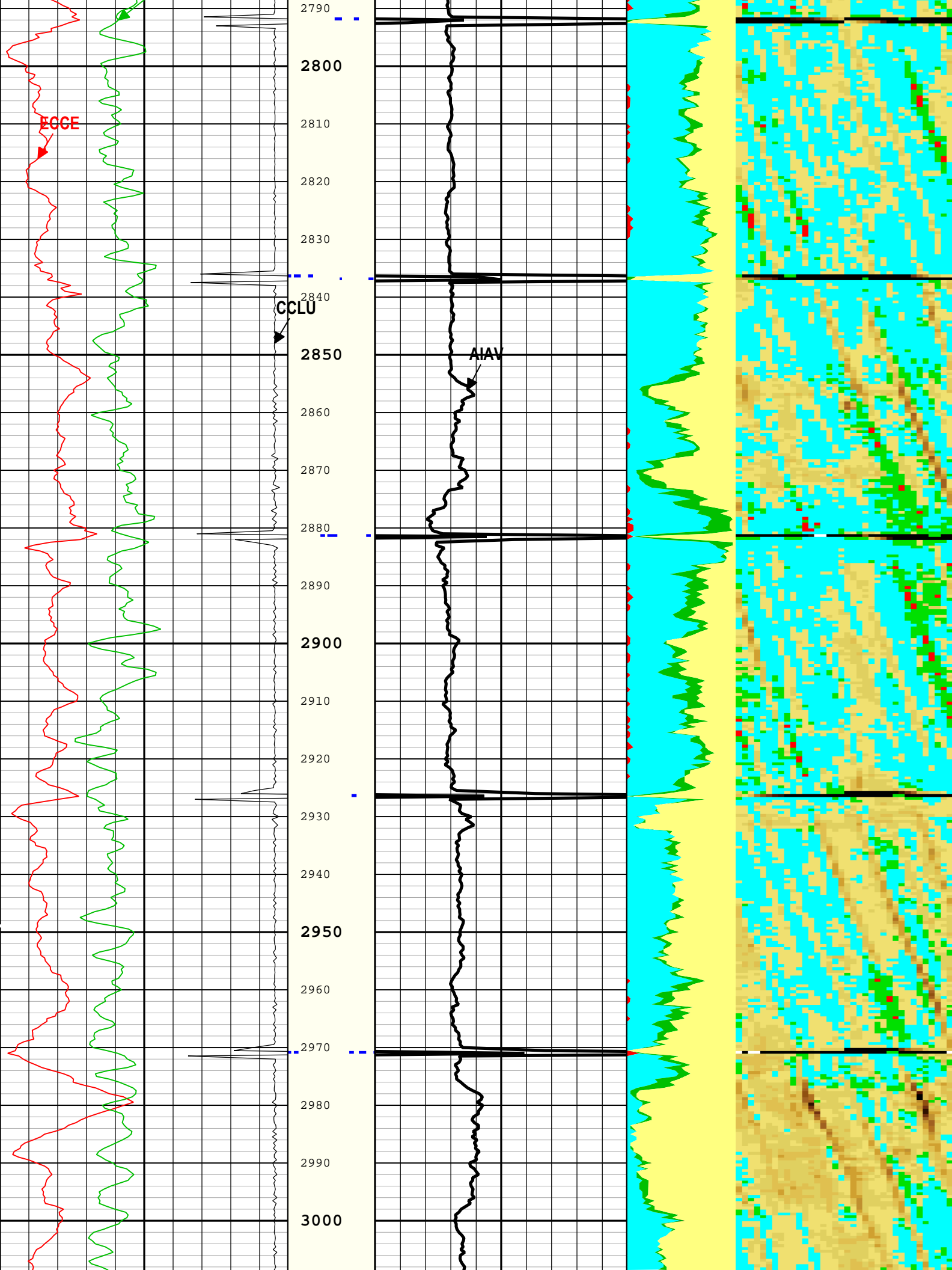


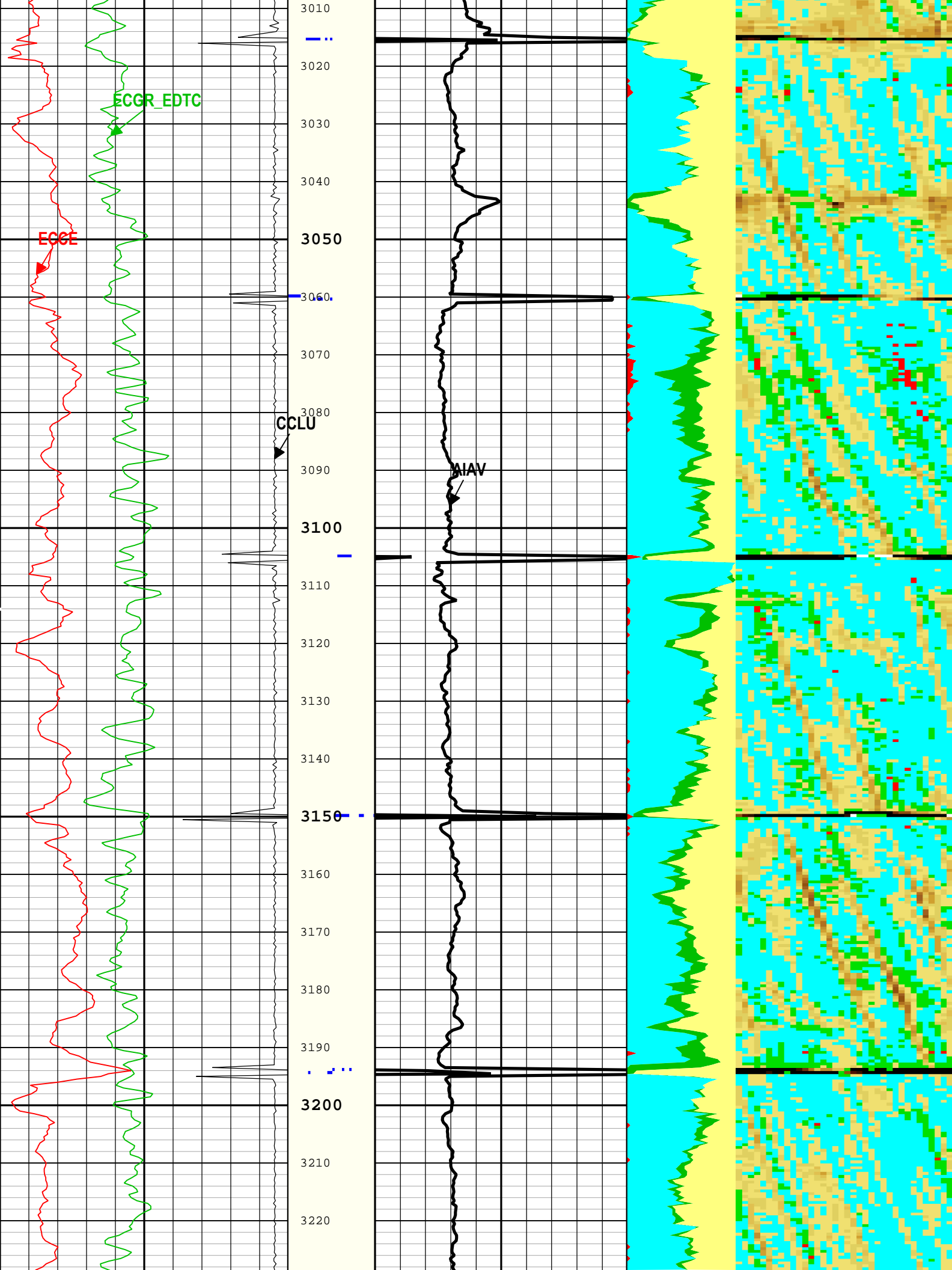


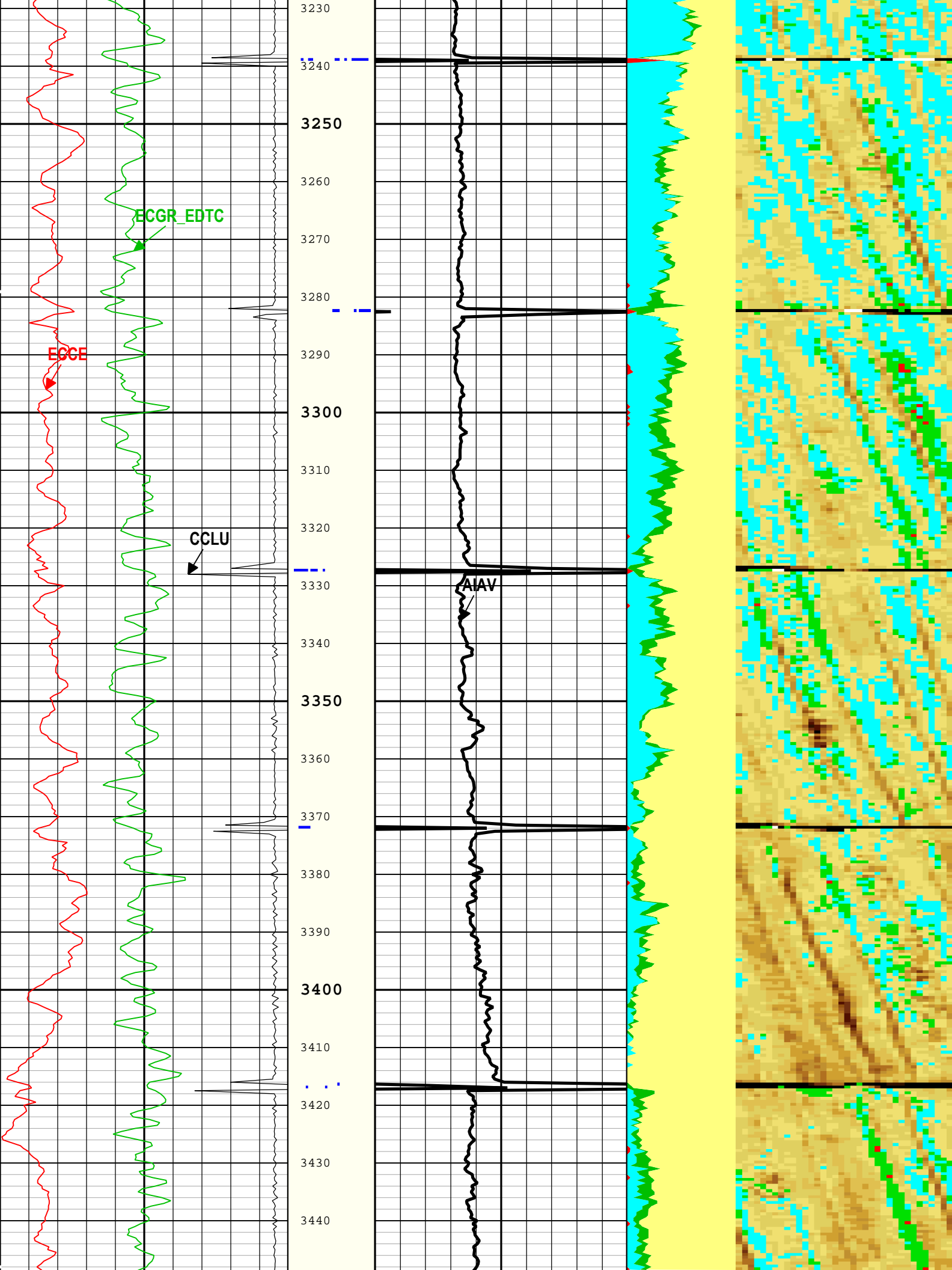


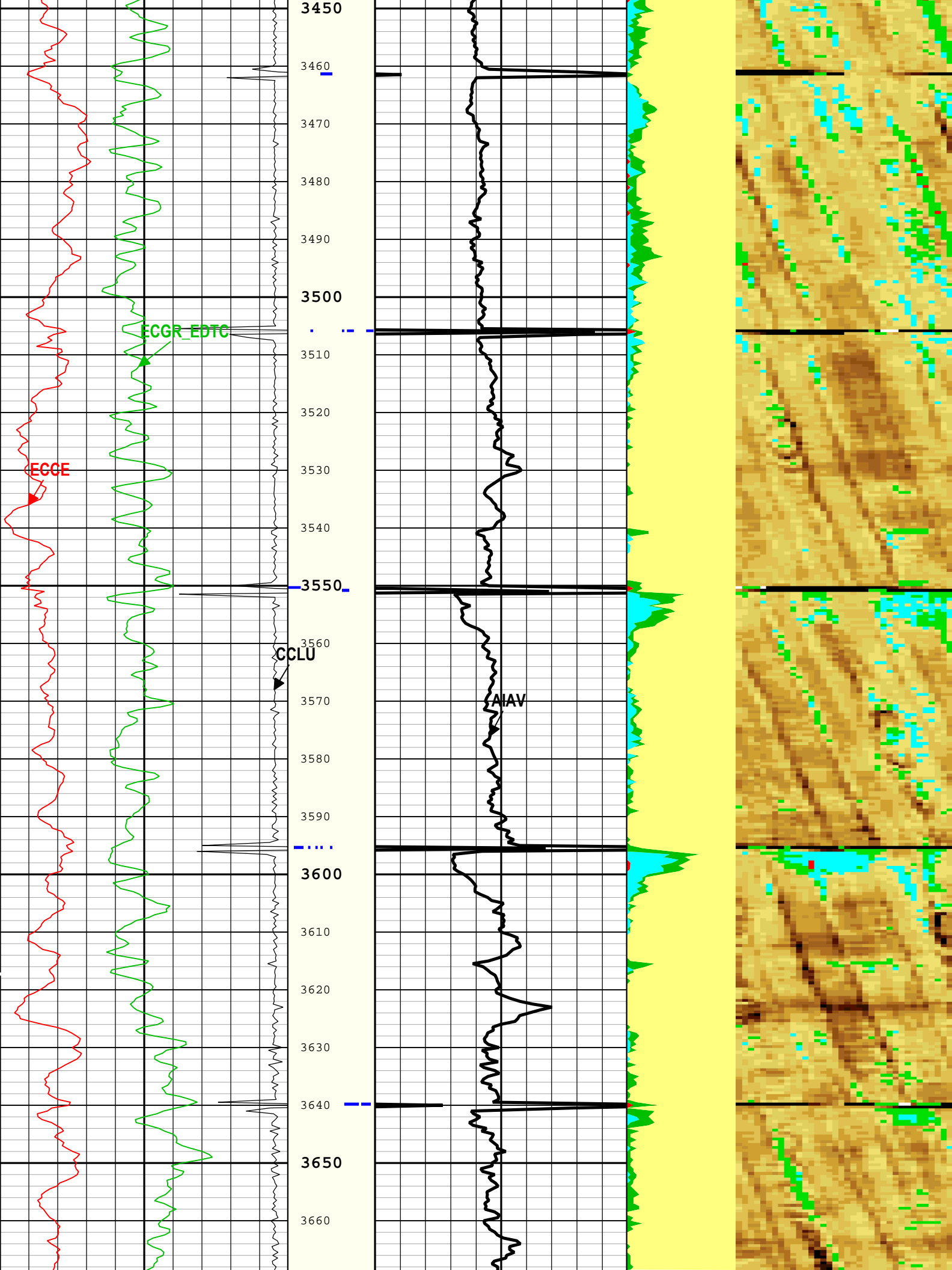


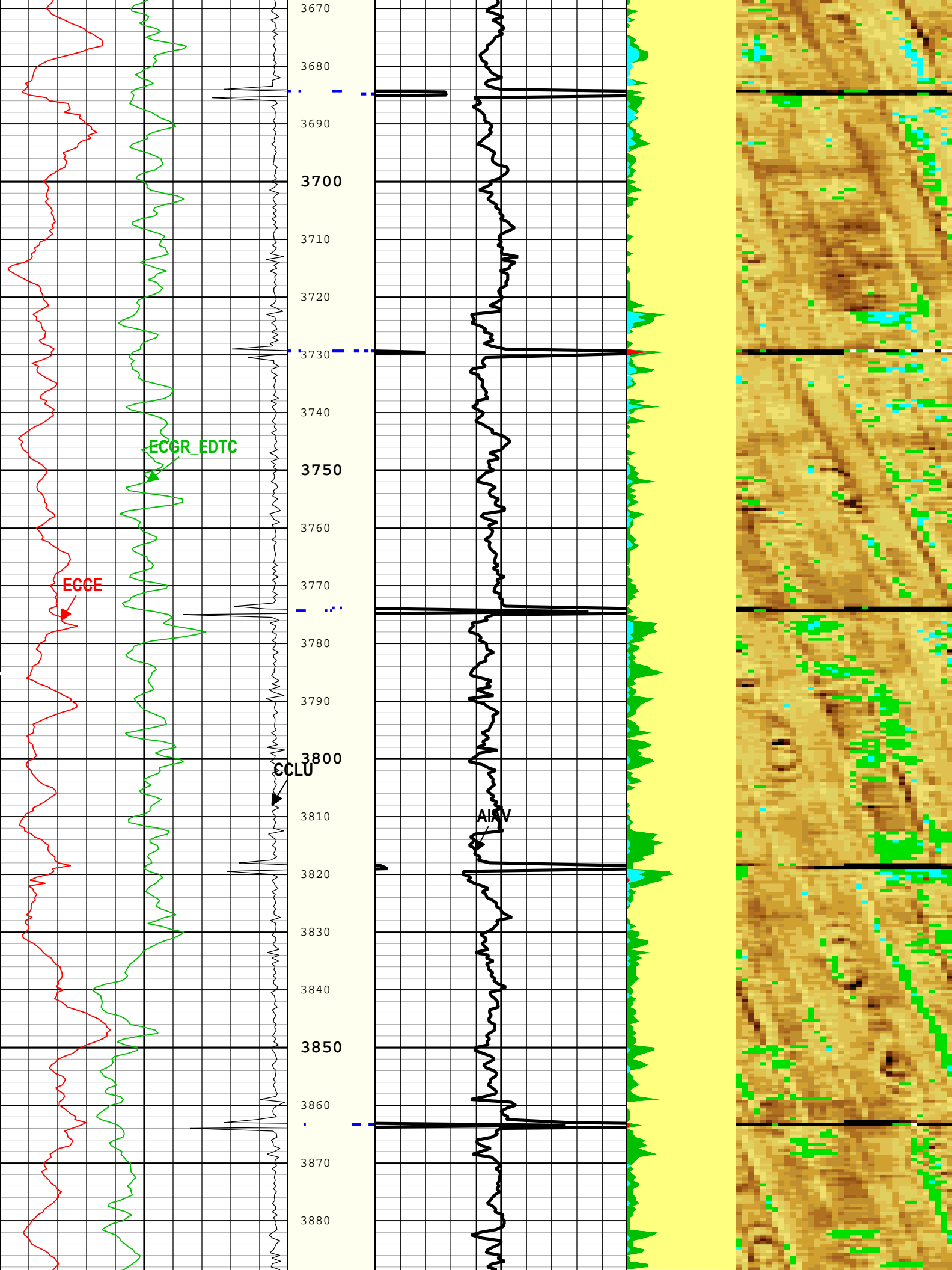


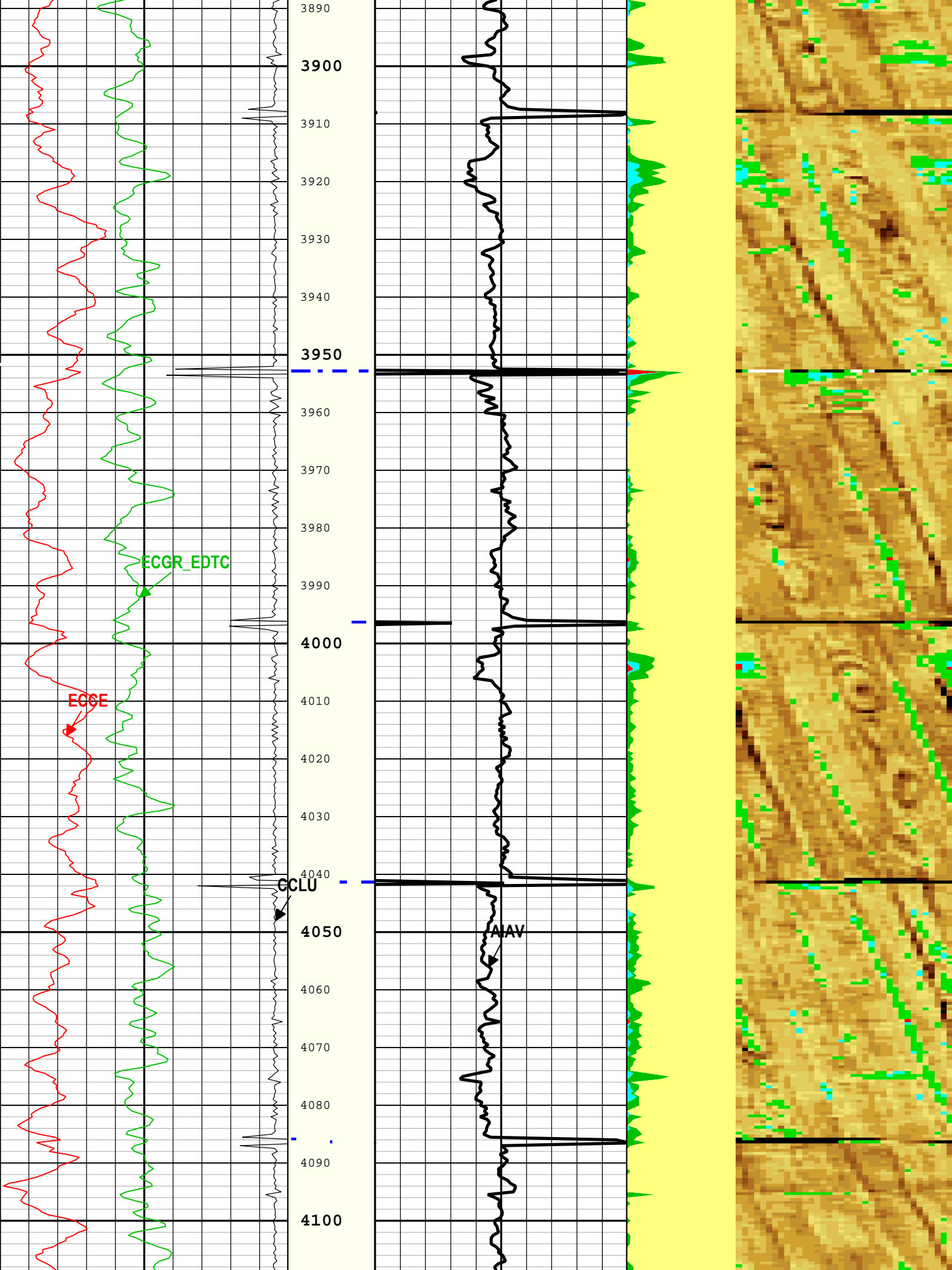


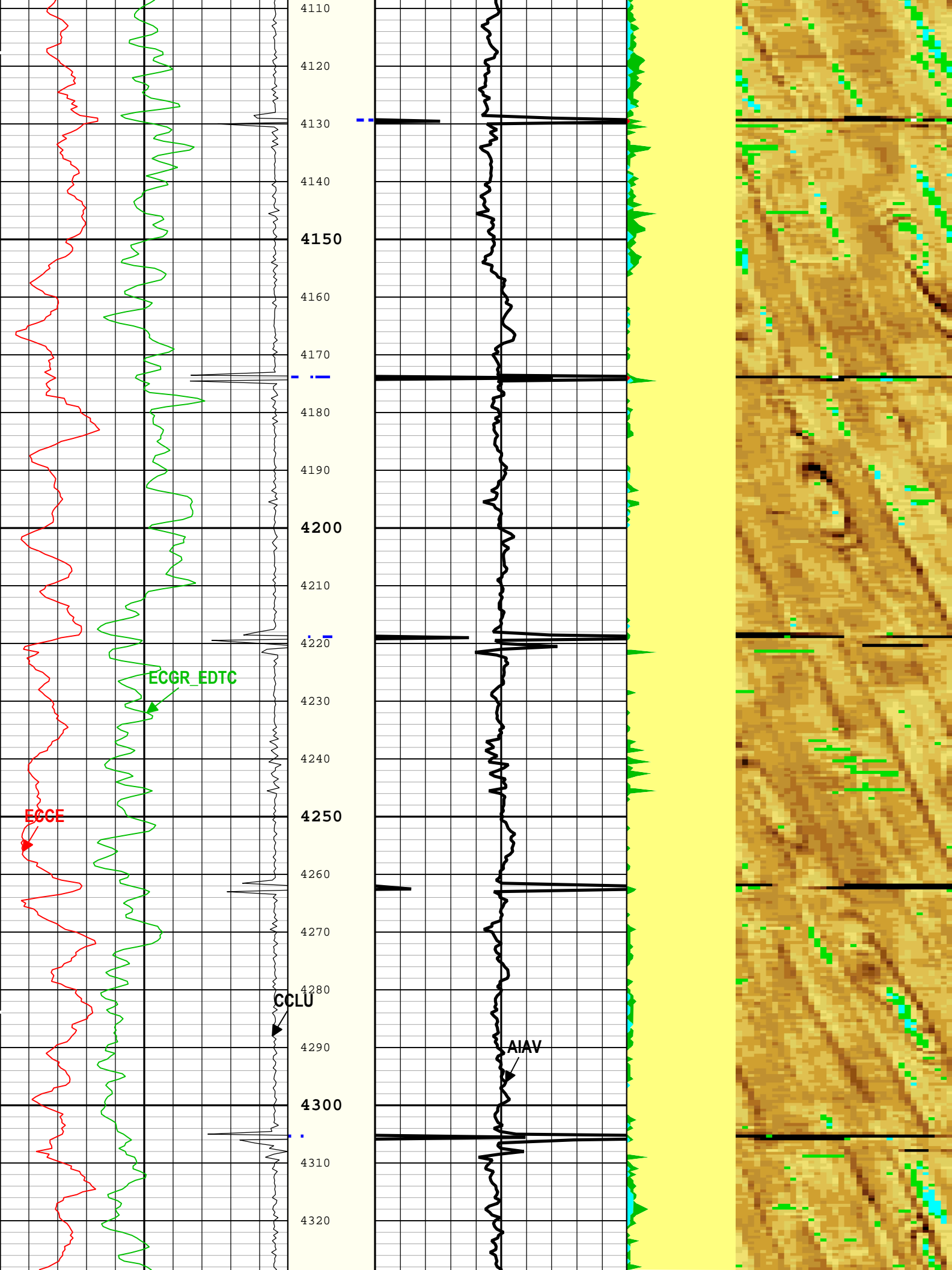




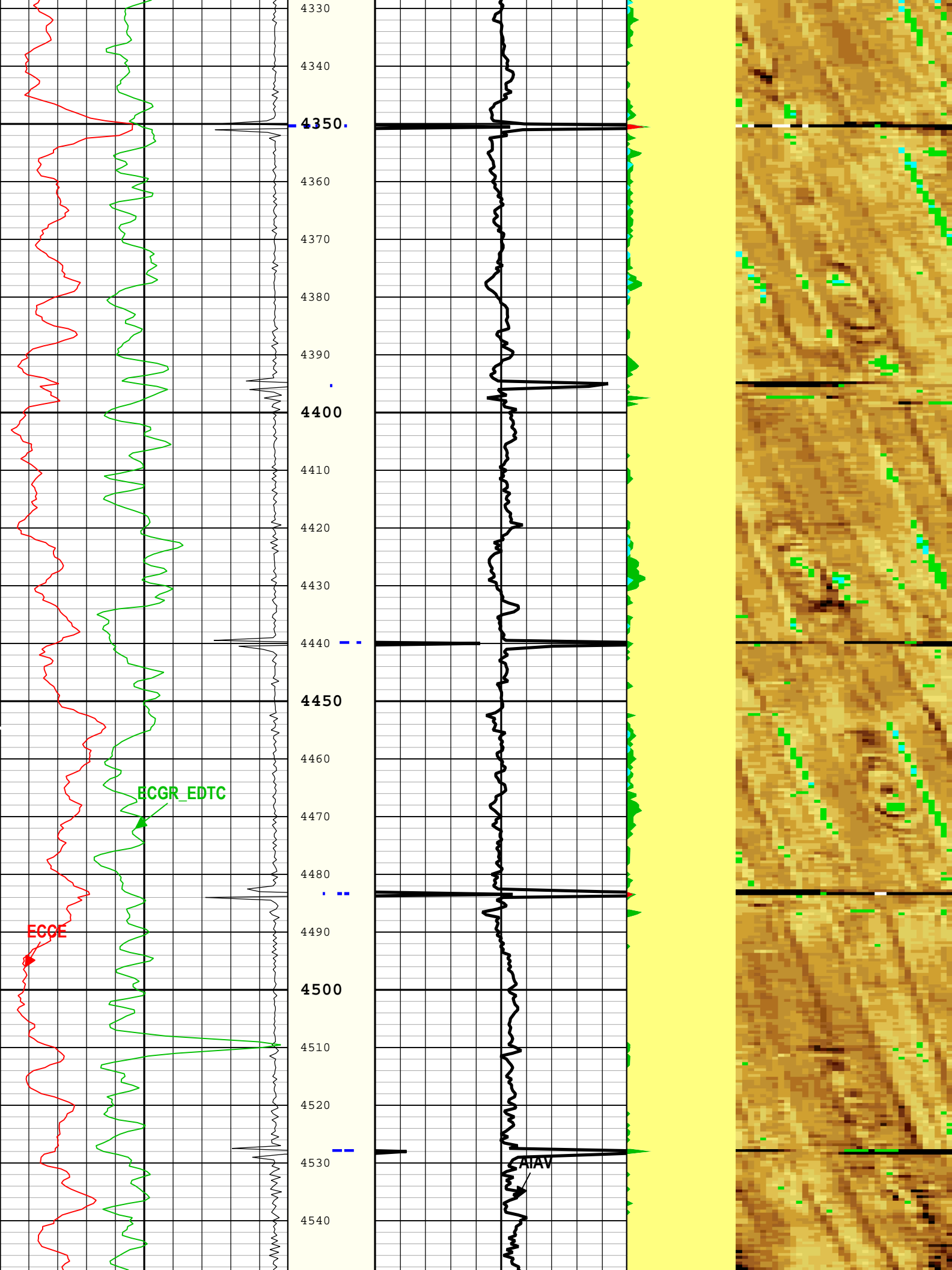


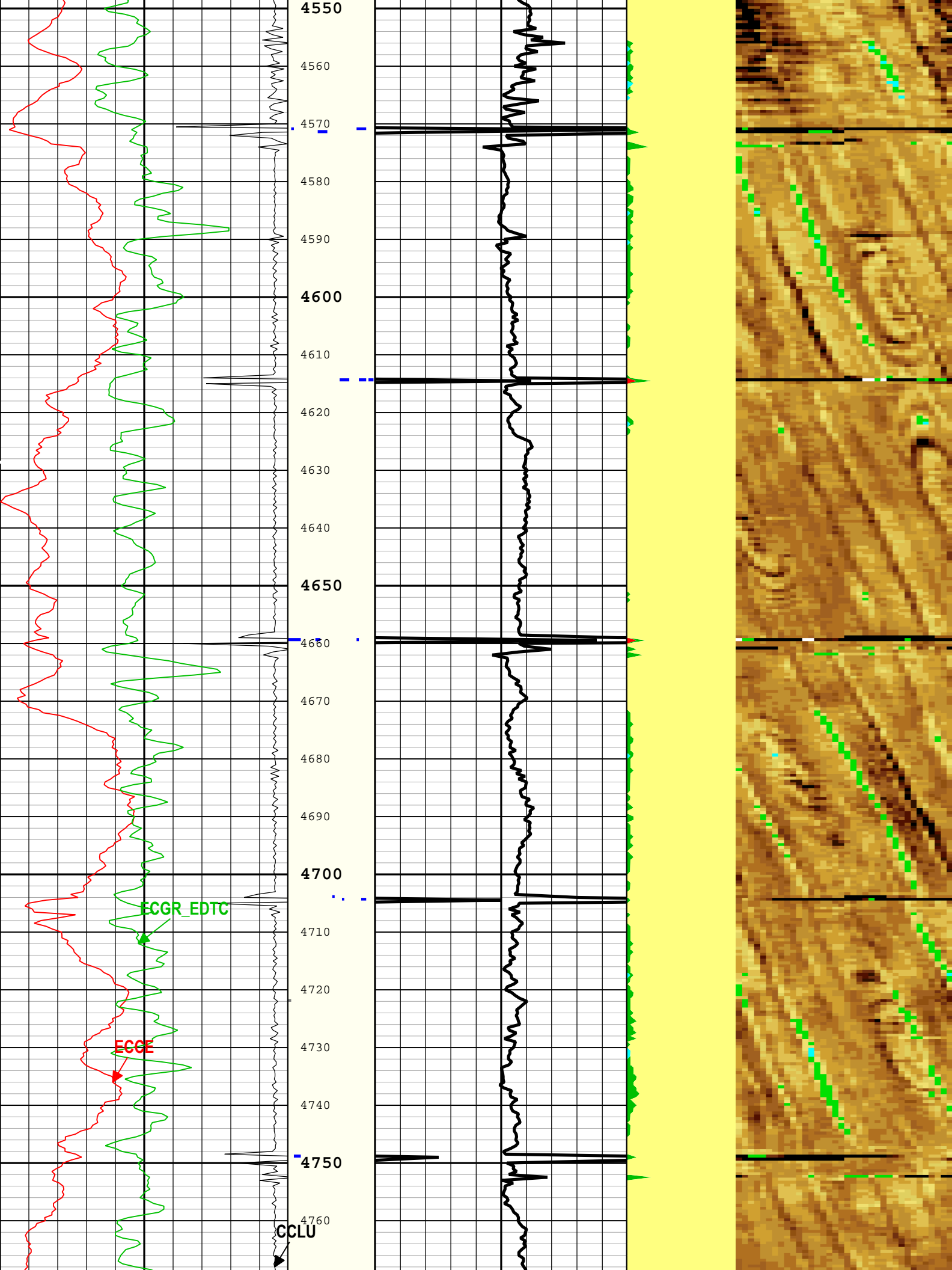


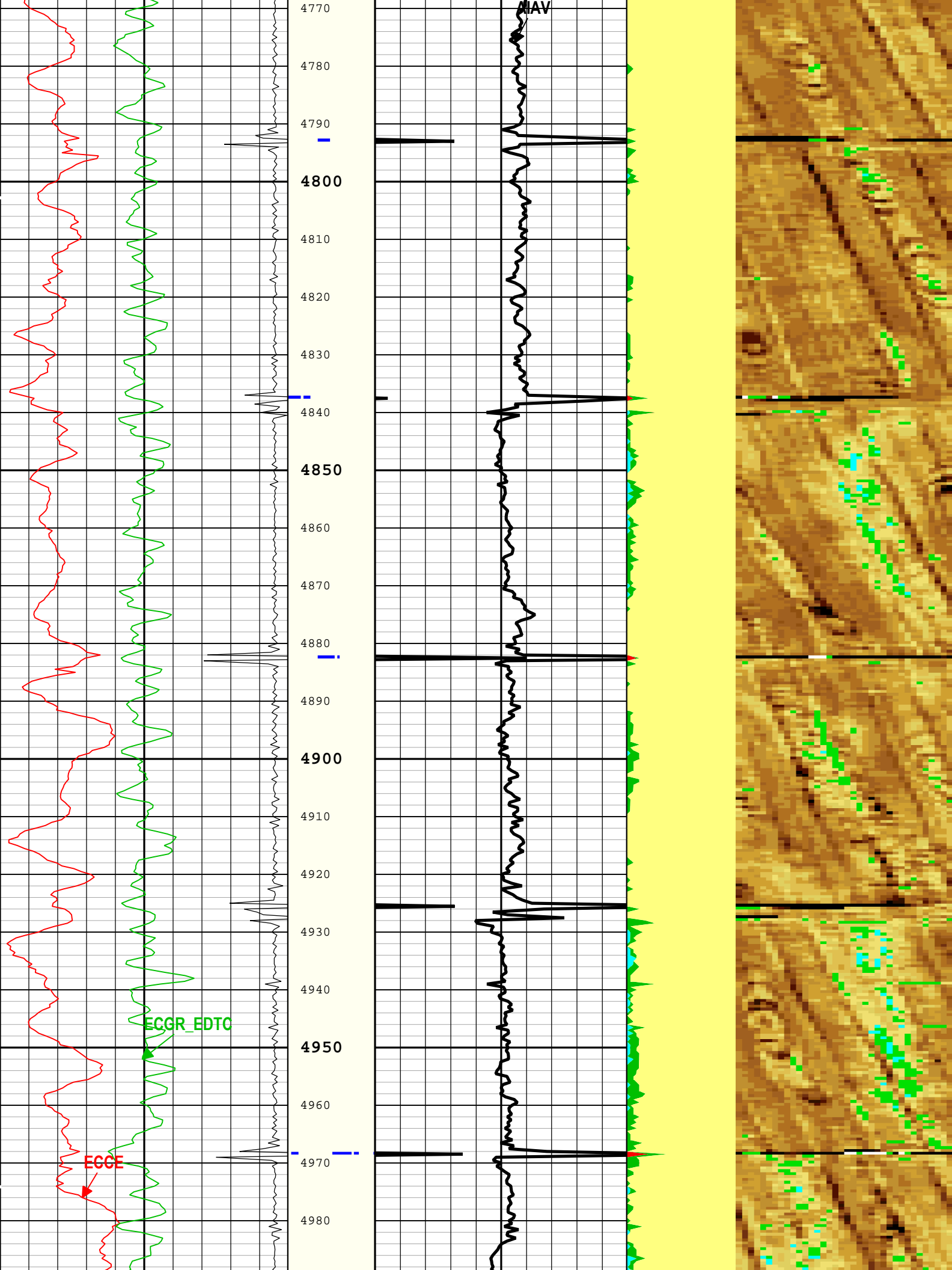


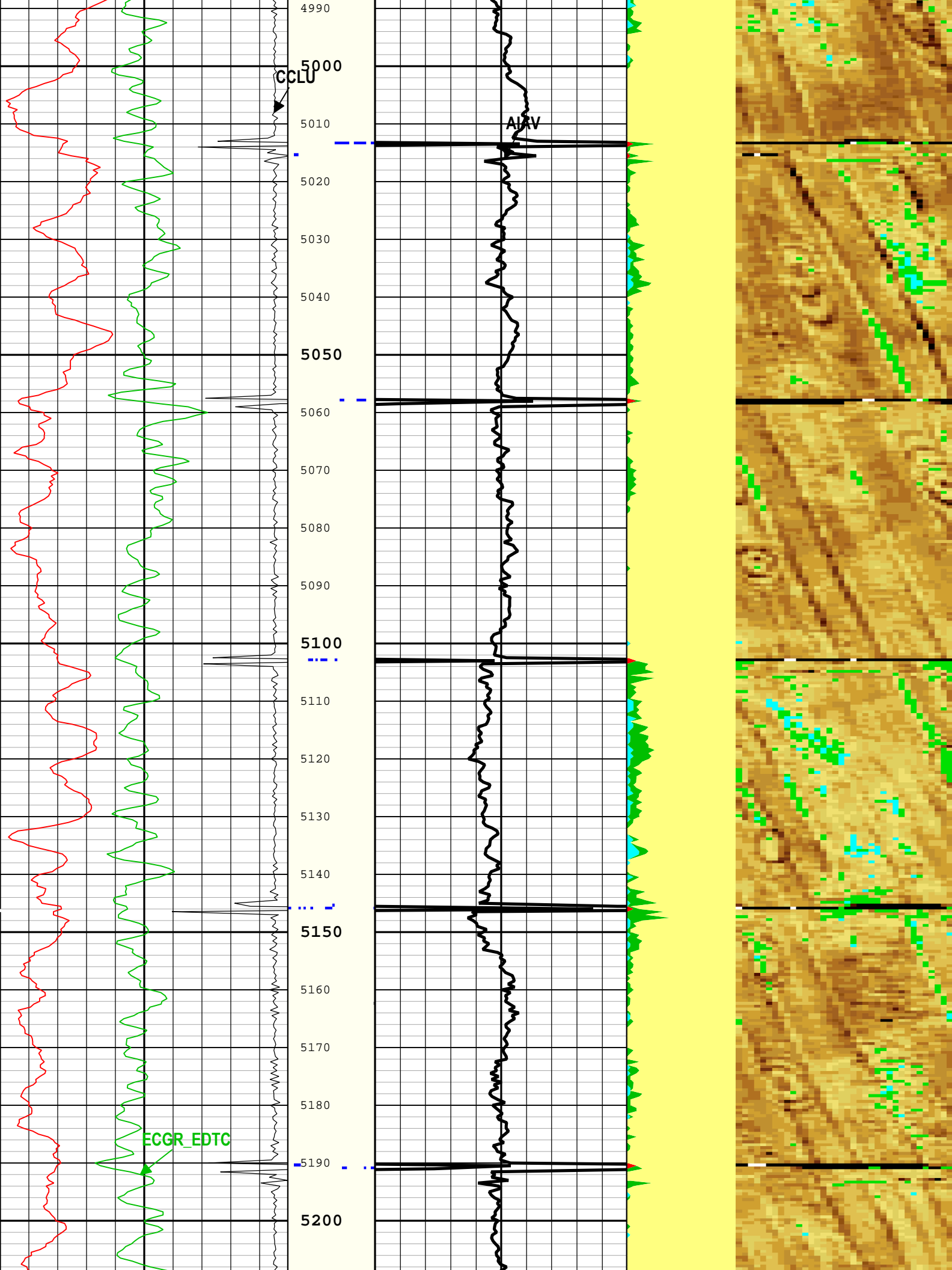


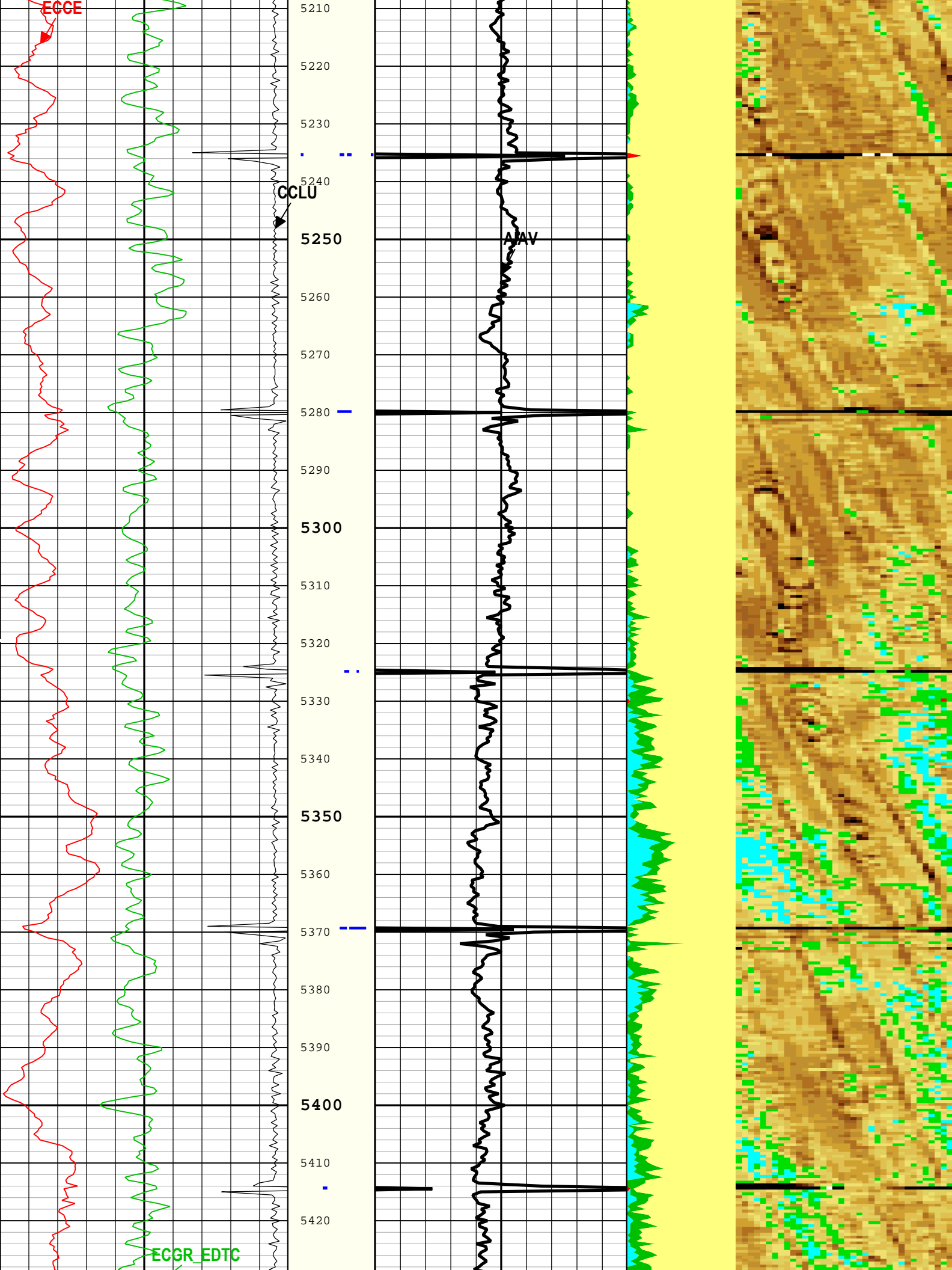


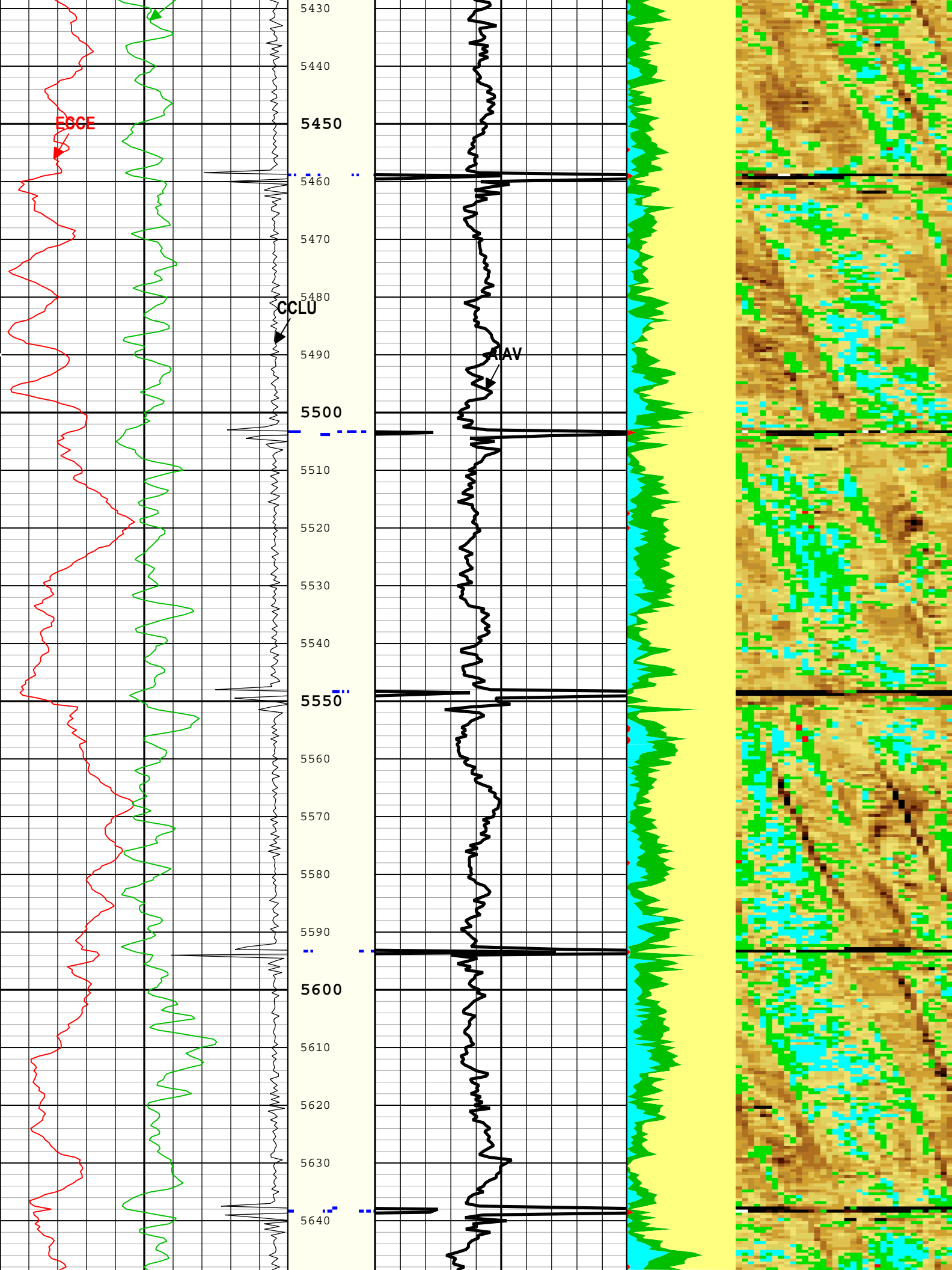


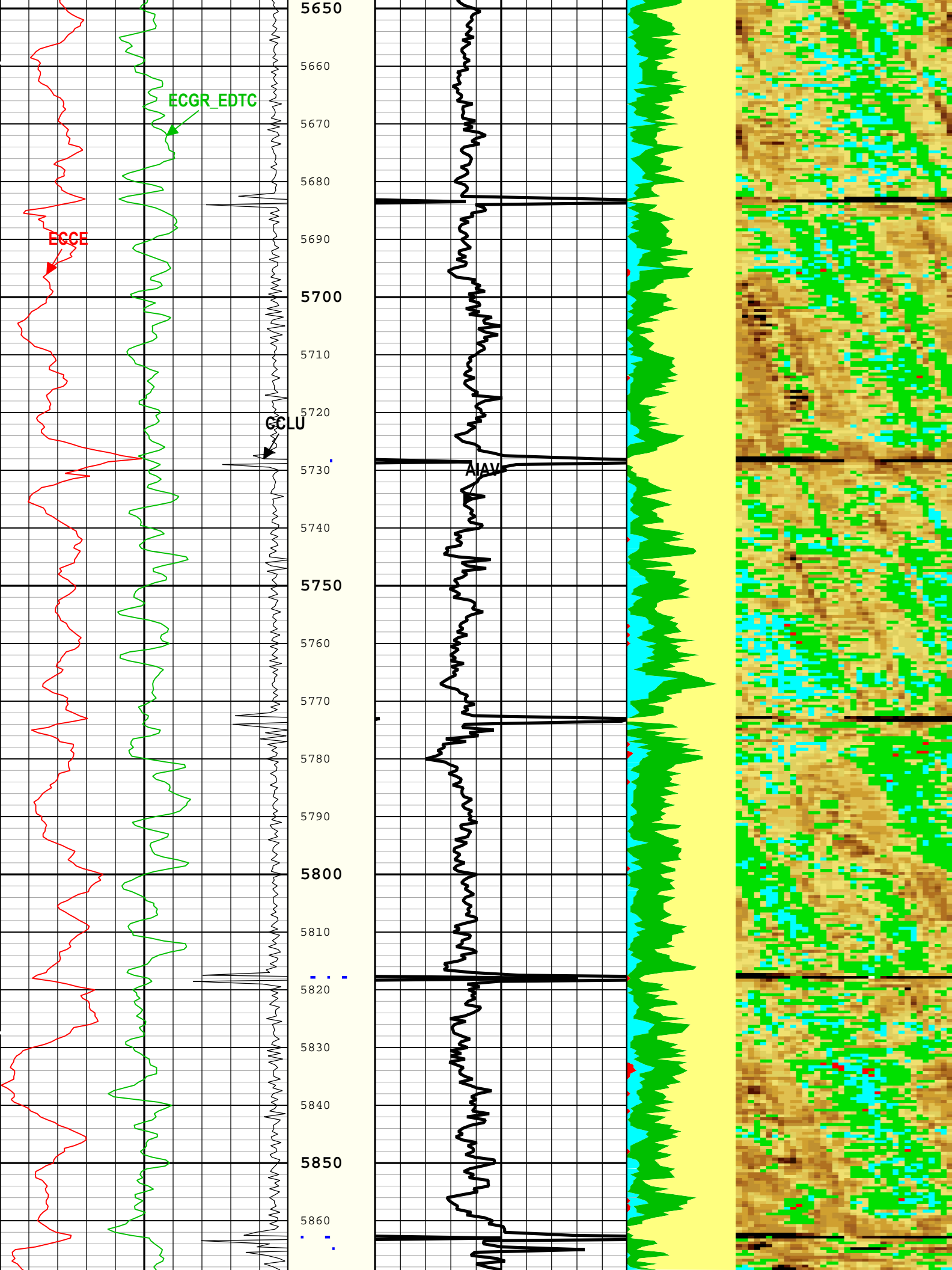


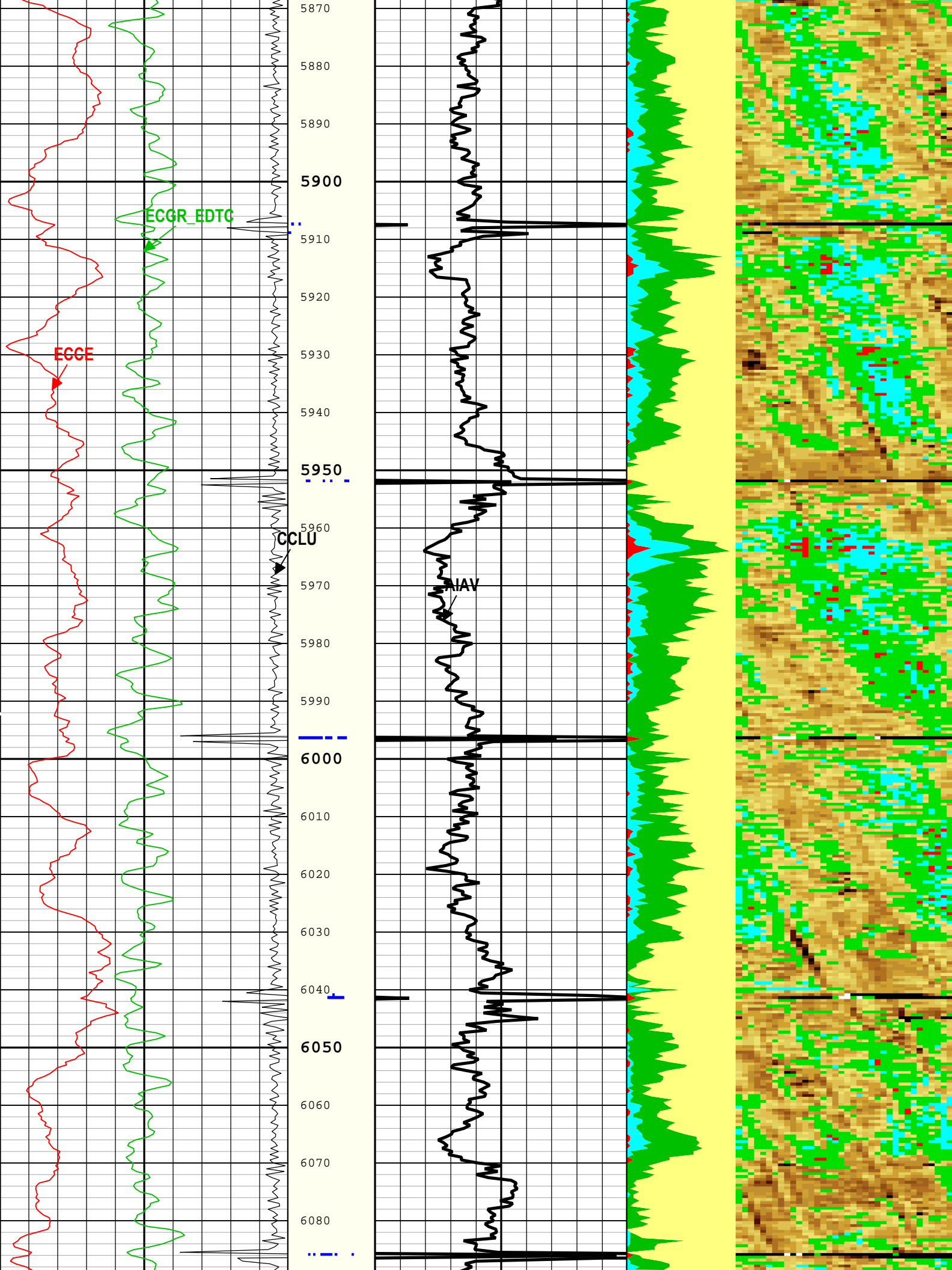




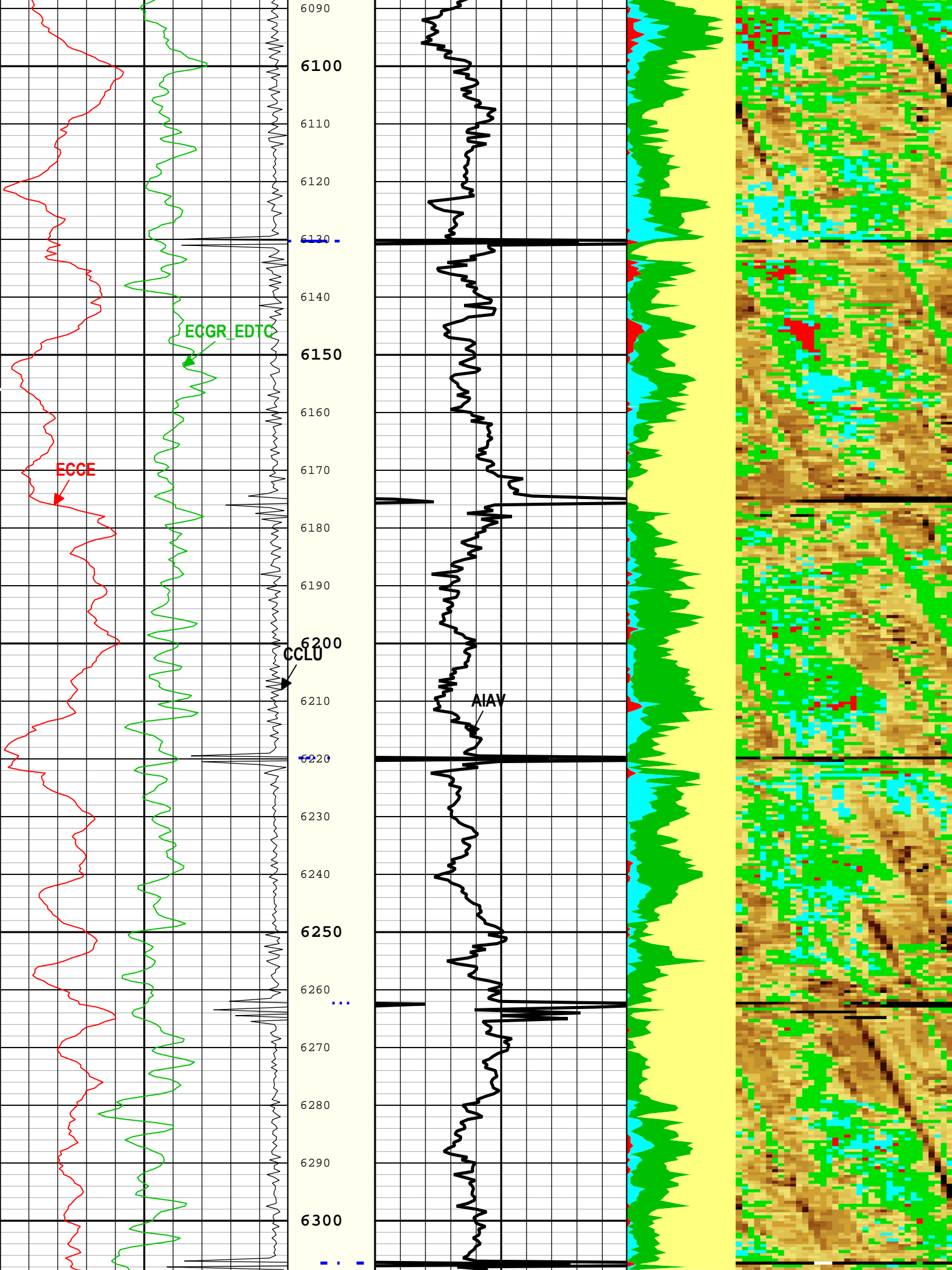


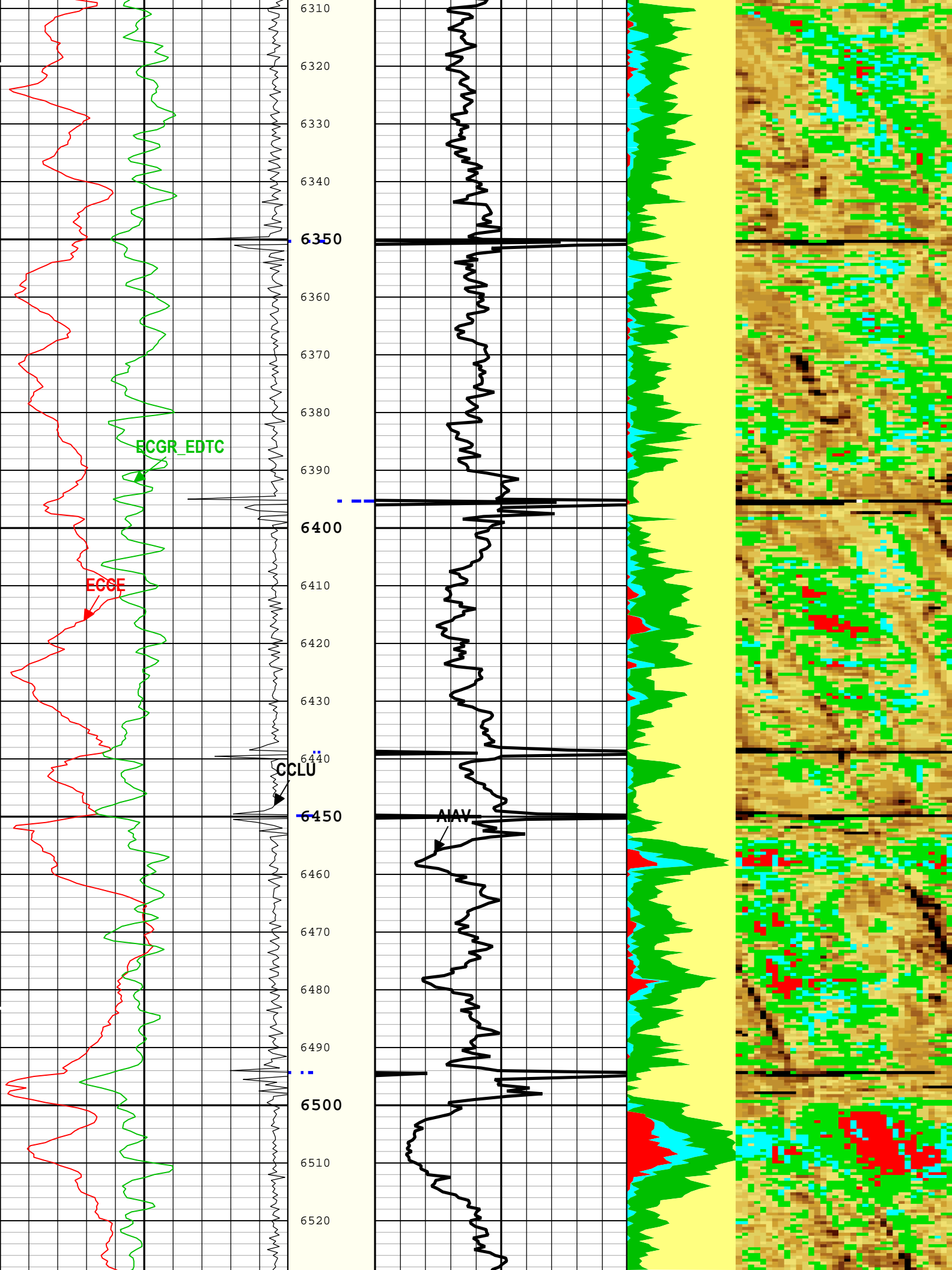


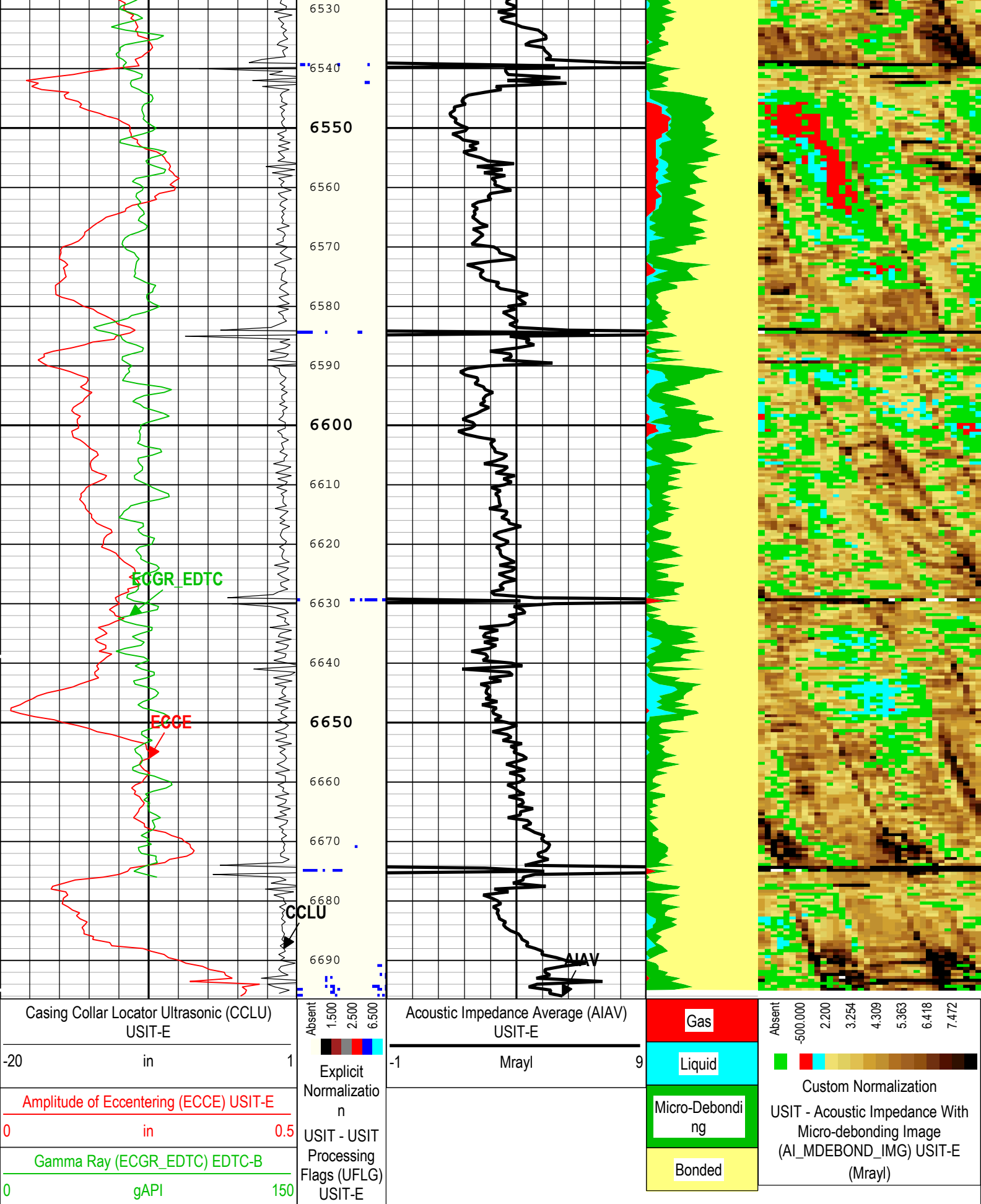












ONE: Parameters

Parameter	Description	Tool	Value	Unit
BAR(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	17336	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
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
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
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	1.15	
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	1.55	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	78	110
BS	13.5	110	1943
BS	8.5	1943	6696.5

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	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	Yes	
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	31.88	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 )
EMXV	35	02-Nov-2018 10:32:52	02-Nov-2018 10:34:42	6697.12	6531.77

All depth are at tool zero.

# ONE

## 0 PSI Repeat Pass

## Software Version

## Acquisition System

Version

Maxwell 2018 SP2

	8.2.104493.3100
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## Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Repeat[2]:Up	Up	1939.37 ft	2495.68 ft	02-Nov-2018 9:35:04 AM	02-Nov-2018 9:39:19 AM	ON	-3.57 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc.

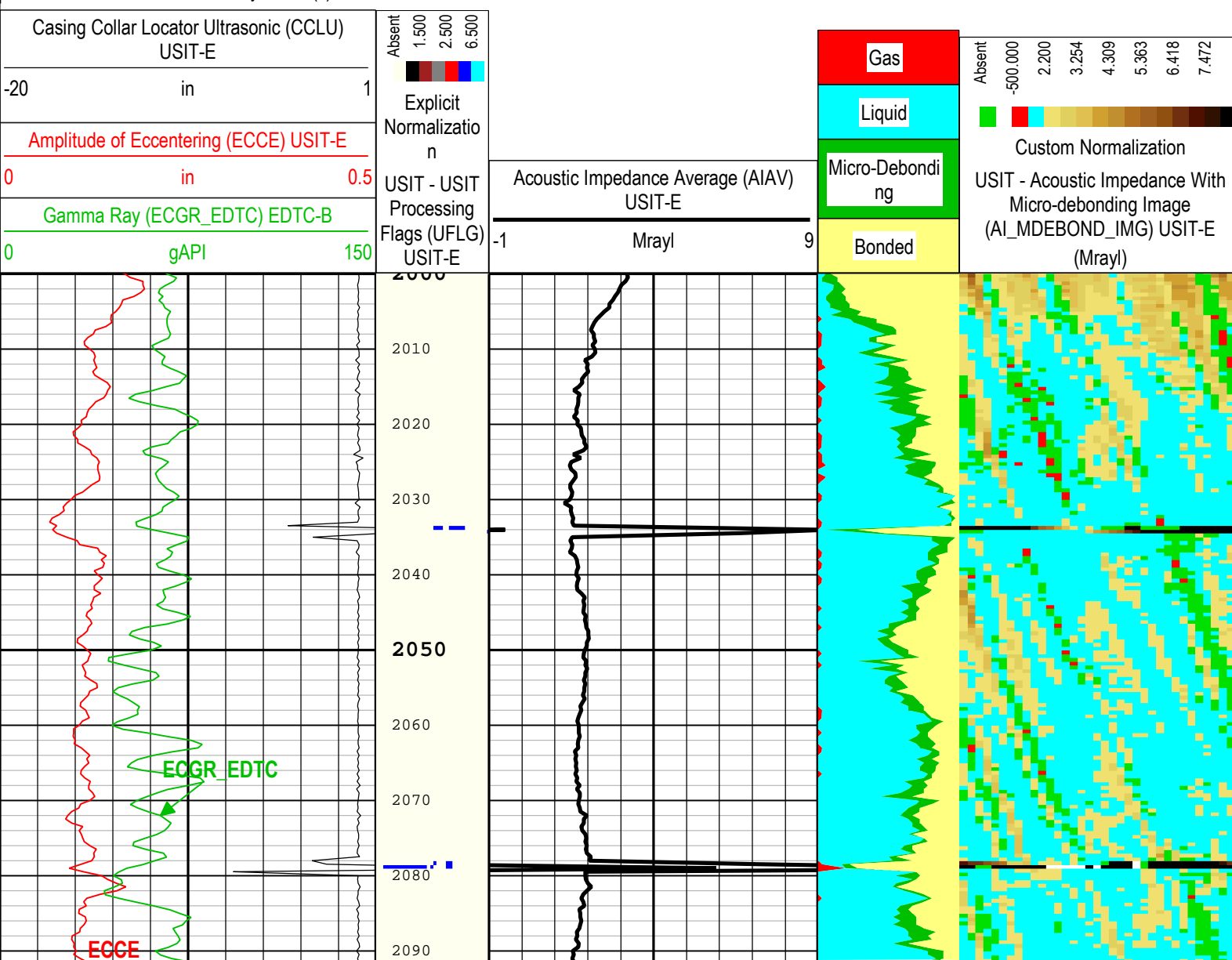
Well:EMMY H25-718

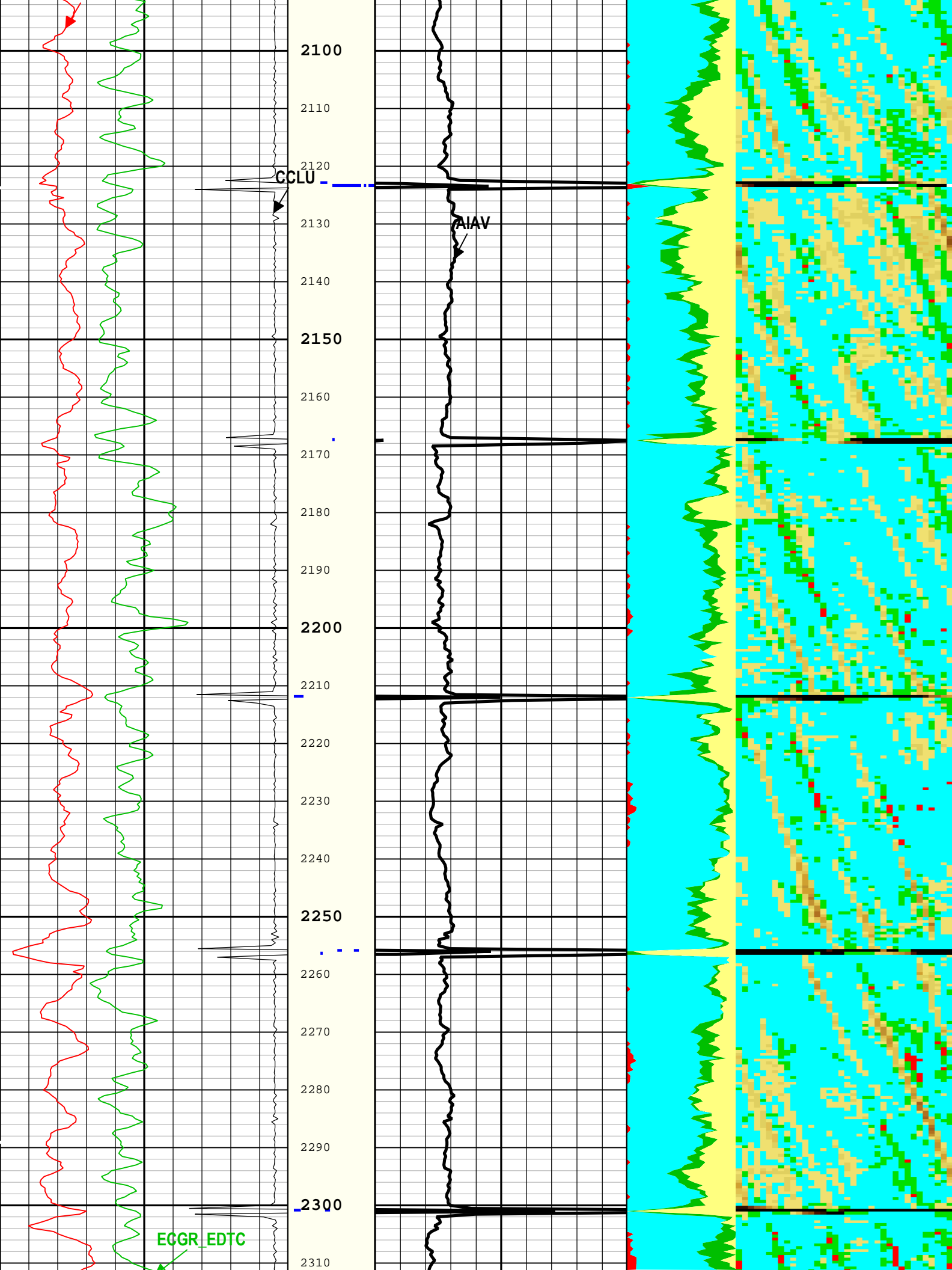
ONE: Repeat[2]:Up:S008

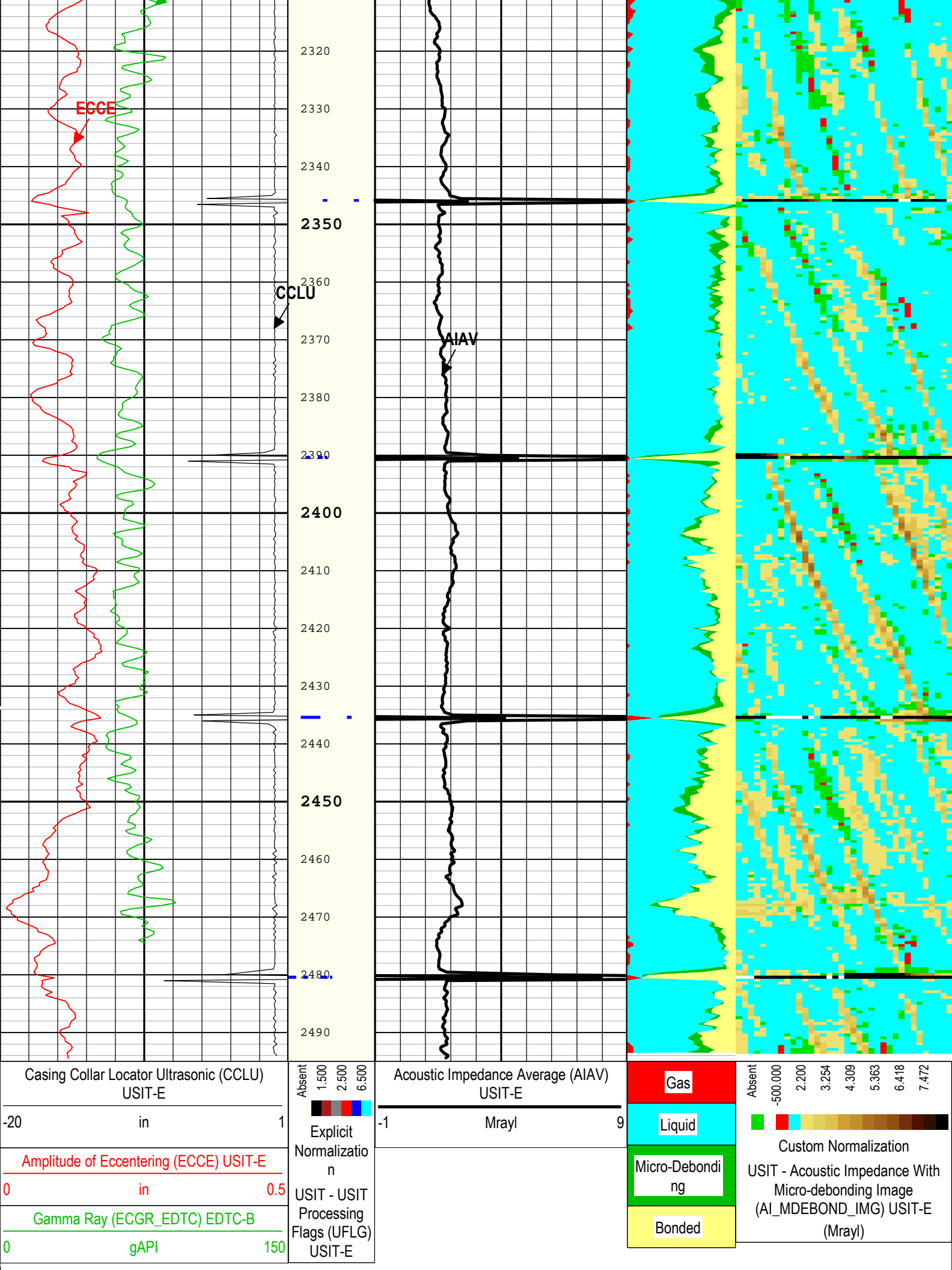
Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 03-Nov-2018 17:10:38

TIME 1900 - Time Marked every 60.00 (s)







## Channel Processing Parameters

### ONE: Parameters

Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.5	in
CBLO	Casing Bottom (Logger)	WLSESSION	17336	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
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
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
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	1.15	
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	1.55	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	18	dB
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	Yes	
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	31.88	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 )
EMXV	35	02-Nov-2018 09:35:04	02-Nov-2018 09:37:23	2495.68	2224.84
EMXV	3	02-Nov-2018 09:37:23	02-Nov-2018 09:37:25	2224.84	2219.5
EMXV	30	02-Nov-2018 09:37:25	02-Nov-2018 09:39:19	2219.5	1939.37

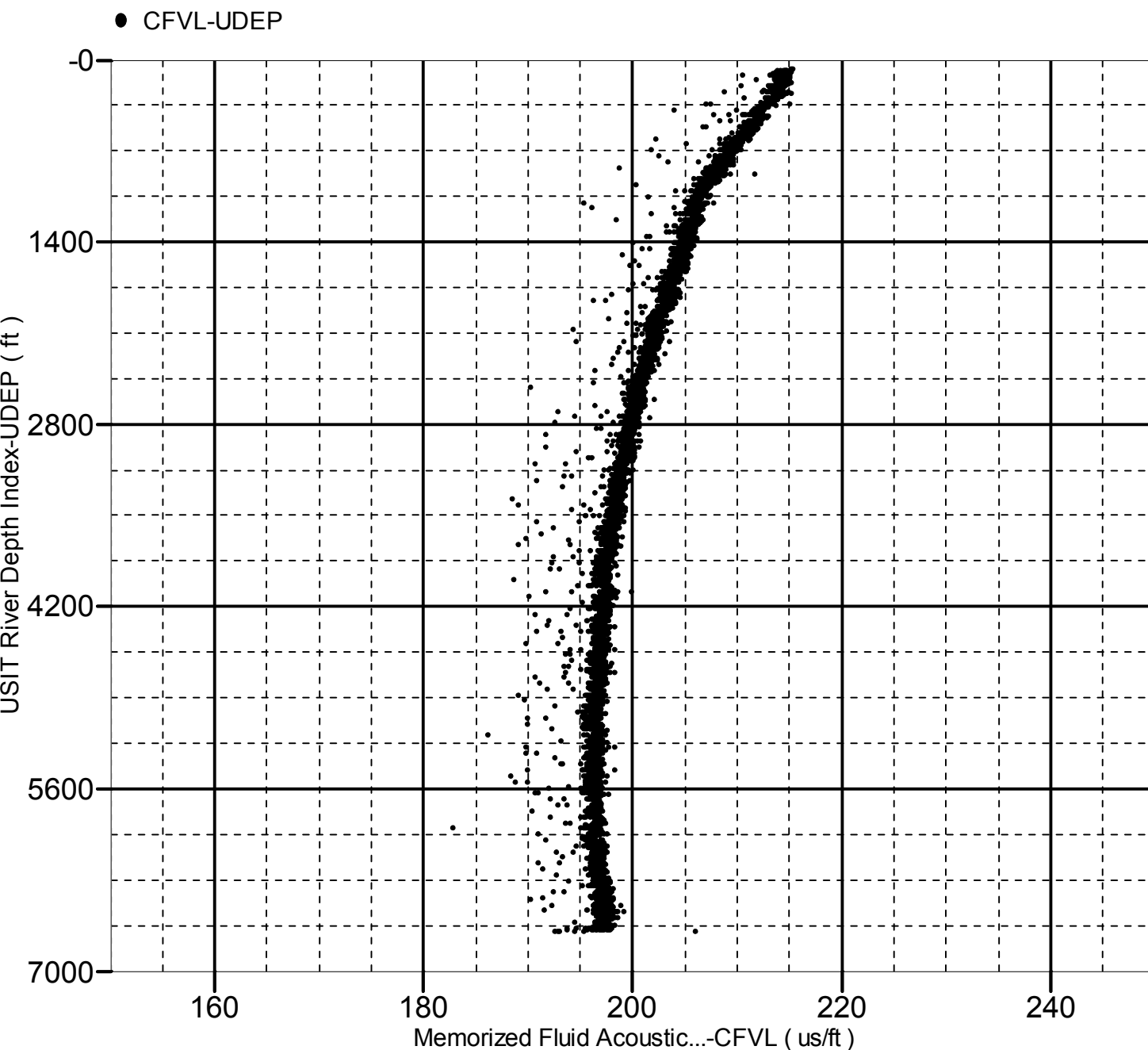
All depth are at tool zero.



# Fluid Acoustic Slowness vs Depth

2D Cross Plot

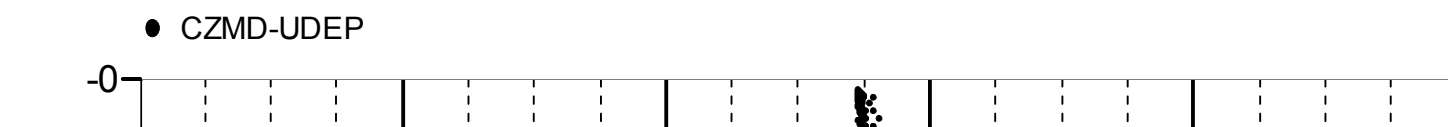
Index Range: From 6697.00 to 77.00 ft

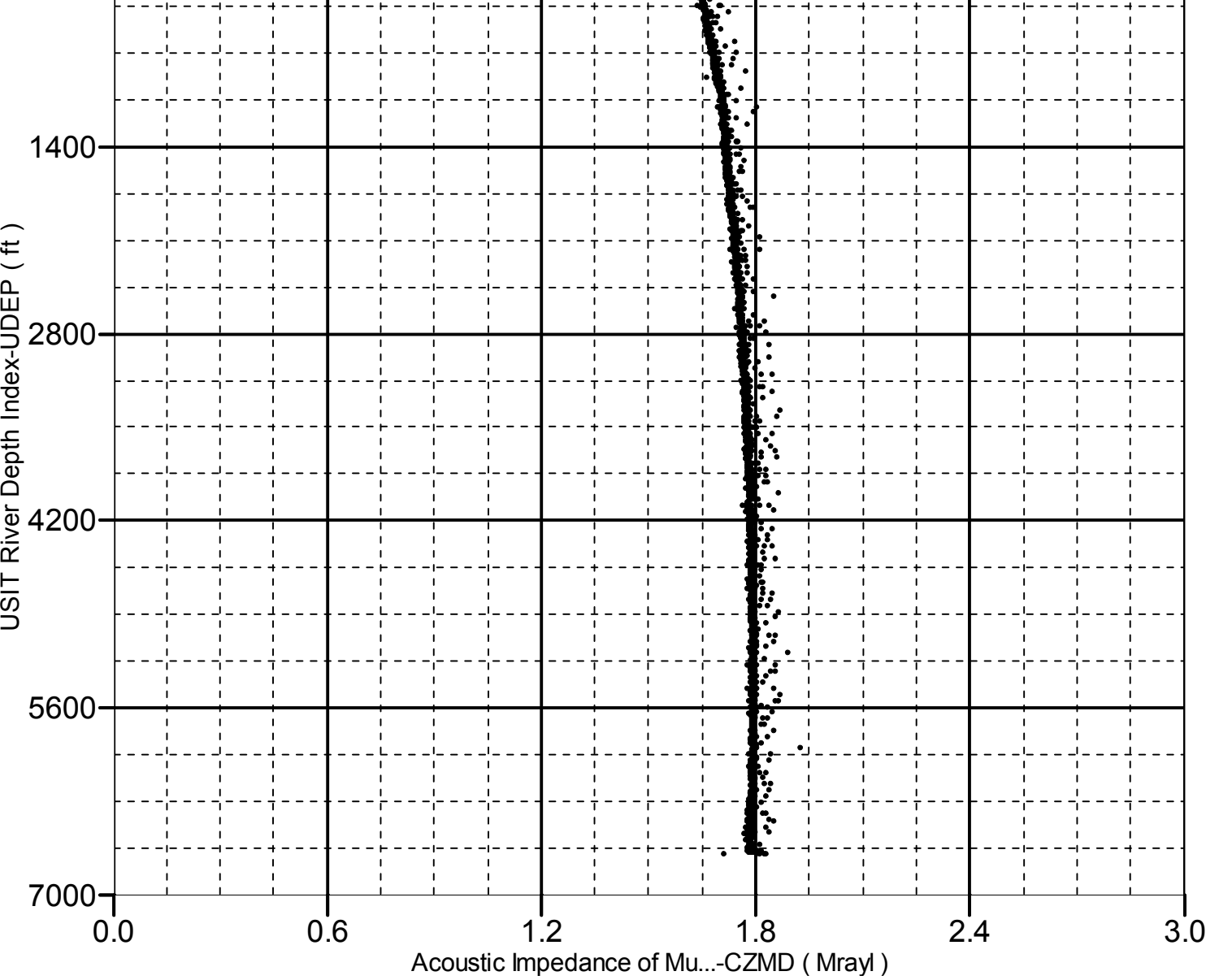


# Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6697.00 to 77.00 ft





Company: Noble Energy Inc.

**Schlumberger**

Well: EMMY H25-718

Field: DJ BASIN

County: Weld

State: Colorado

UltraSonic Summary Print

