

Company: Noble Energy INC

Well: Wells Ranch State AA36-633

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld
Field:	Wattenberg
Location:	SHL: 2046' FSL X 817' FWL
Well:	Wells Ranch State AA36-633
Company:	Noble Energy INC
Location:	
Permanent Datum:	SHL: 2046' FSL X 817' FWL
Log Measured From:	Elev.: K.B. 4756.00 ft
Drilling Measured From:	G.L. 4726.00 ft
API Serial No.	D.F. 4756.00 ft
05-123-48164	Ground Level
Section:	Kelly Bushing
32	Kelly Bushing
Township:	30.00 ft
6N	above Perm.Datum
Range:	4726.00 f
62W	

Logging Date	06-Jun-2019
Run Number	One
Depth Driller	16912.00 ft
Schlumberger Depth	16912.00 ft
Bottom Log Interval	6350.00 ft
Top Log Interval	100.00 ft
Casing Fluid Type	Water
Salinity	
Density	8.4 lbm/gal
Fluid Level	8.00 ft
BIT/CASING/TUBING STRING	
Bit Size	8.50 in
From	1960.00 ft
To	16912.00 ft
Casing/Tubing Size	5.5 in
Weight	17 lbm/ft
Grade	P110
From	0.00 ft
To	16892.00 ft
Max Recorded Temperatures	200 degF
Logger on Bottom	06-Jun-2019
Unit Number	9108
Recorded By	Avery Becker
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.

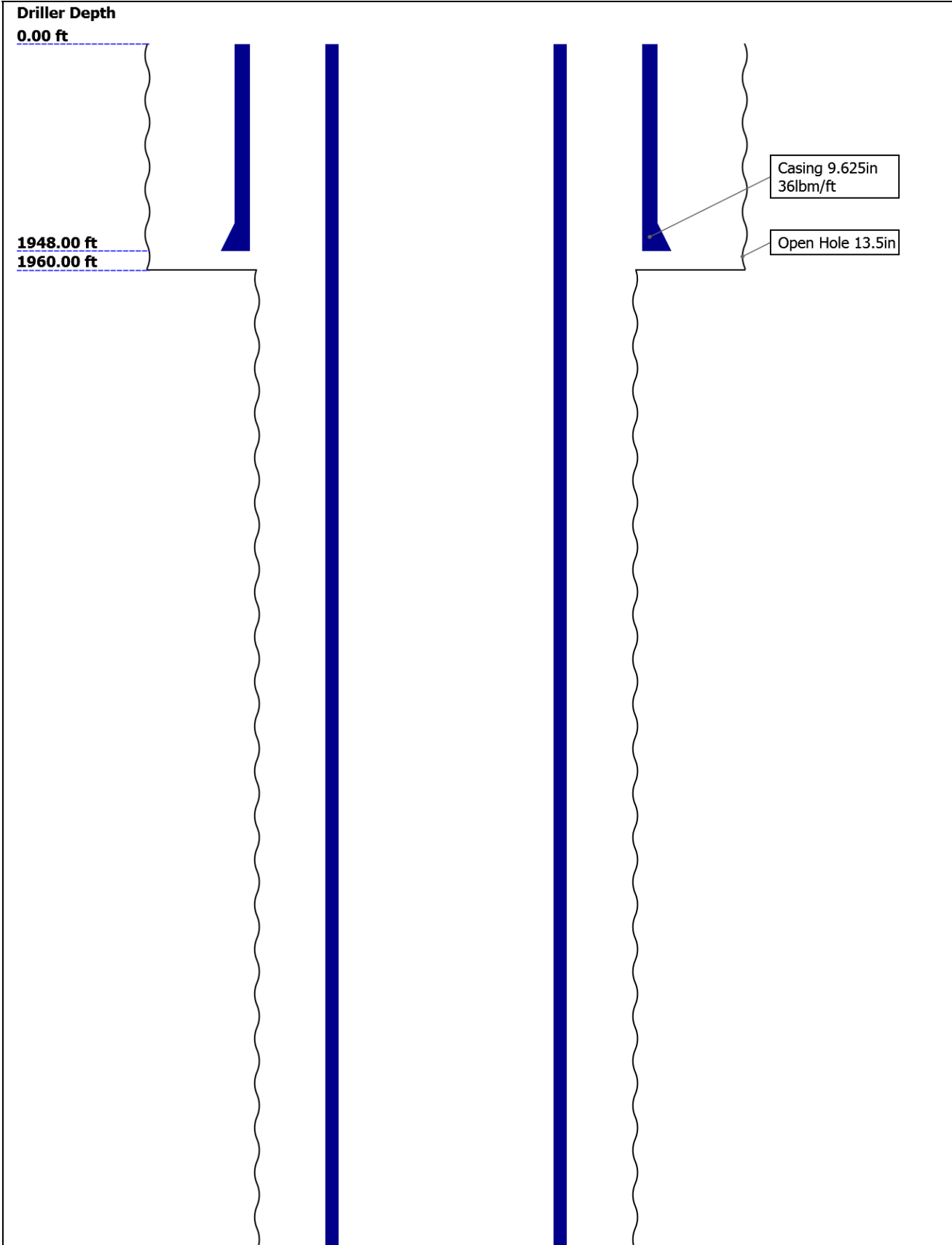
Contents

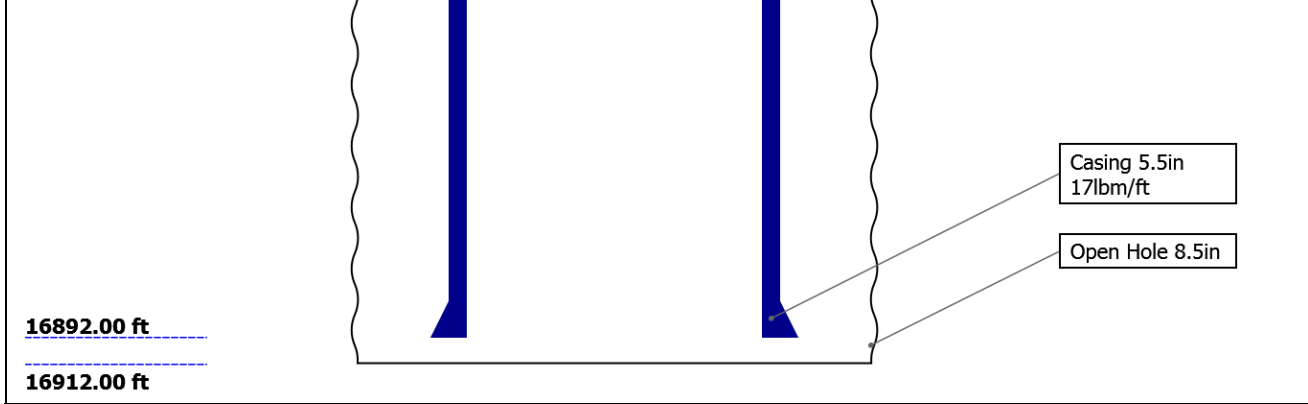
- Header
- Disclaimer
- Contents
- Well Sketch
- Borehole Size/Casing/Tubing Record
- Remarks and Equipment Summary
- Depth Summary
- USI Fluid Properties Measurement\_1
- One 2500 PSI Main Pass
  - Integration Summary
  - Software Version
  - Composite Summary
  - Log ( DJ Basin Ultrasonic Cement Summary Report )
  - Parameter Listing
- One 0 PSI Repeat Pass
  - Integration Summary

- in )
- Tail

- 10.2 Software Version
- 10.3 Composite Summary
- 10.4 Log ( DJ Basin Ultrasonic Cement Summary Report )
- 10.5 Parameter Listing
- 11. XYZ ( USI Fluid Acoustic Slowness vs Depth 3.0 in )
- 12. XYZ ( USI Acoustic Impedance of Mud vs Depth 3.0

Well Sketch





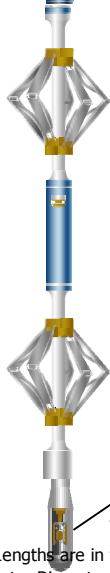
Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	13.5	8.5				
Top Driller ( ft )	0	1960				
Top Logger ( ft )	0	1960				
Bottom Driller ( ft )	1960	16912				
Bottom Logger ( ft )	1960	16912				
Casing						
Size ( in )	9.625	5.5				
Weight ( lbm/ft )	36	17				
Inner Diameter ( in )	8.921	4.892				
Grade	J55	P110				
Top Driller ( ft )	0	0				
Top Logger ( ft )	0	0				
Bottom Driller ( ft )	1948	16892				
Bottom Logger ( ft )	1948	16892				

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-B26.06</div><div>EDTH-B</div><div>EDTG-A</div><div>EDTC-B</div></div><div><div>AH-107[2]19.56</div><div>AH-107[1]17.56</div><div>USIT-E15.56</div><div>ECH-MFA</div><div>USAC-A</div><div>USIS-A</div><div>USSC-B</div><div>USRS-A:72</div></div></div> <div></div>	MP nameOffset			Toolstring run as per tool sketch	
				USIT resolution: 10 deg, 6inch	
				Main pass recorded under 2500 PSI surface induced	
				Repeat pass recorded under 0 psi surface induced	

USI-SENS  
OR  
USI-TX



USI Sensor 0.37  
TOOL\_ZERO  
Head Tension

Lengths are in ft  
Maximum Outer Diameter = 6.250 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			

One:Depth Control Parameters

Depth Control Remarks

Log Sequence	First Log In the Well	First run in well depth control procedures followed
Rig Up Length At Surface		IDW used as primary depth device, z-chart for secondary
Rig Up Length At Bottom		Uplug correlated to downlog
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

USIT - Fluid Properties Measurement

Pressure	Pressure	Slurry Density (lb/gal)	Slurry Density (lb/gal)
----------	----------	-------------------------	-------------------------

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[5]:Up	6350.32	51.74

Fluid Velocity = "Automatic".  
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
-----------------	----------------	--------------------	------------------

Mud Impedance = "FreePipe Norm."  
Free Pipe normalization zone is : 68.70m(225.40ft) to 75.05m(246.24ft)  
MUD\_N\_FRP = 1.10  
DFD = 1.01g/cm3(8.40lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.63 MRayl

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

One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

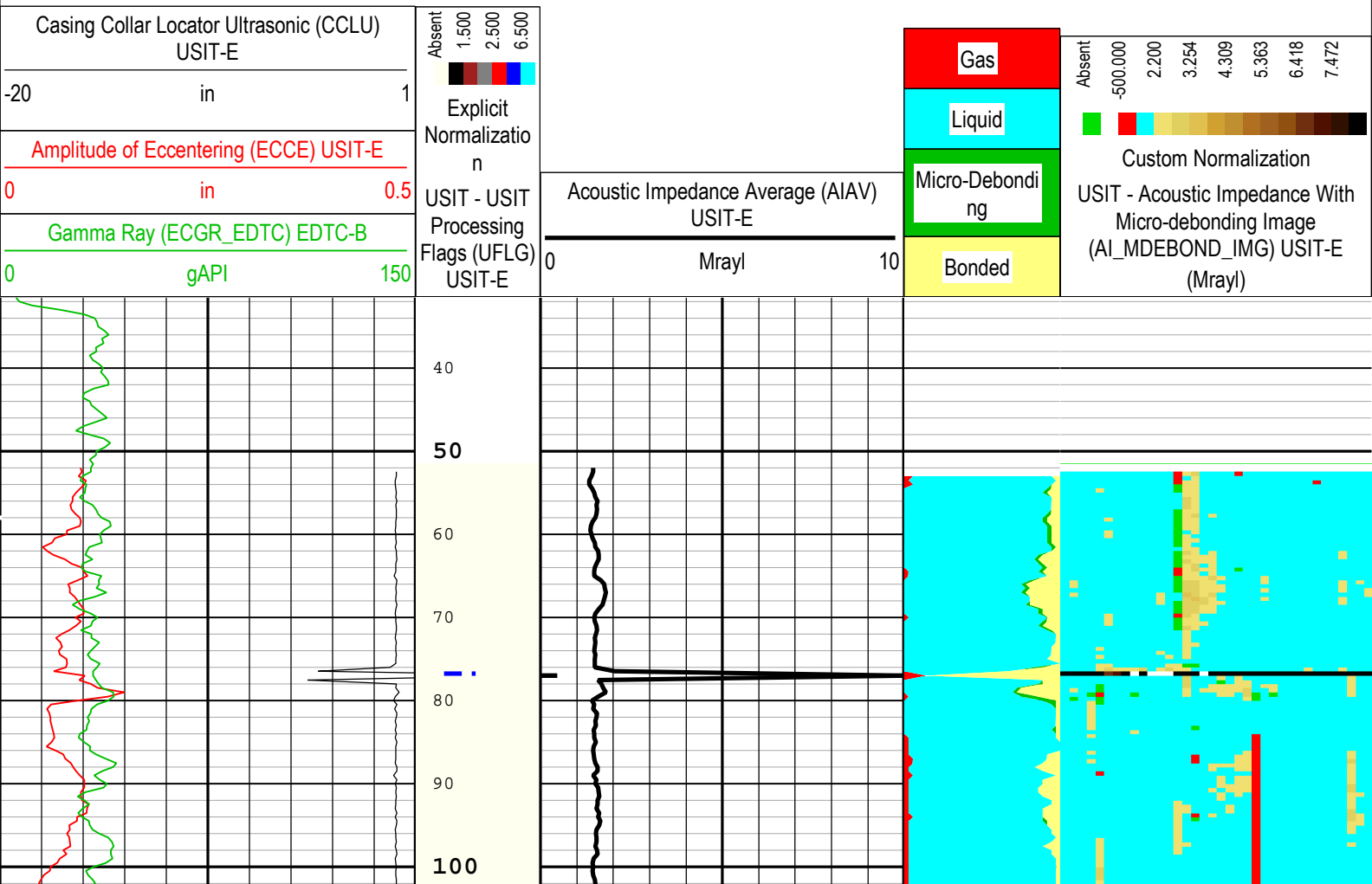
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Main[5]:Up	Up	51.74 ft	6350.33 ft	06-Jun-2019 12:08:04 PM	06-Jun-2019 12:42:21 PM	ON	0.00 ft	Yes

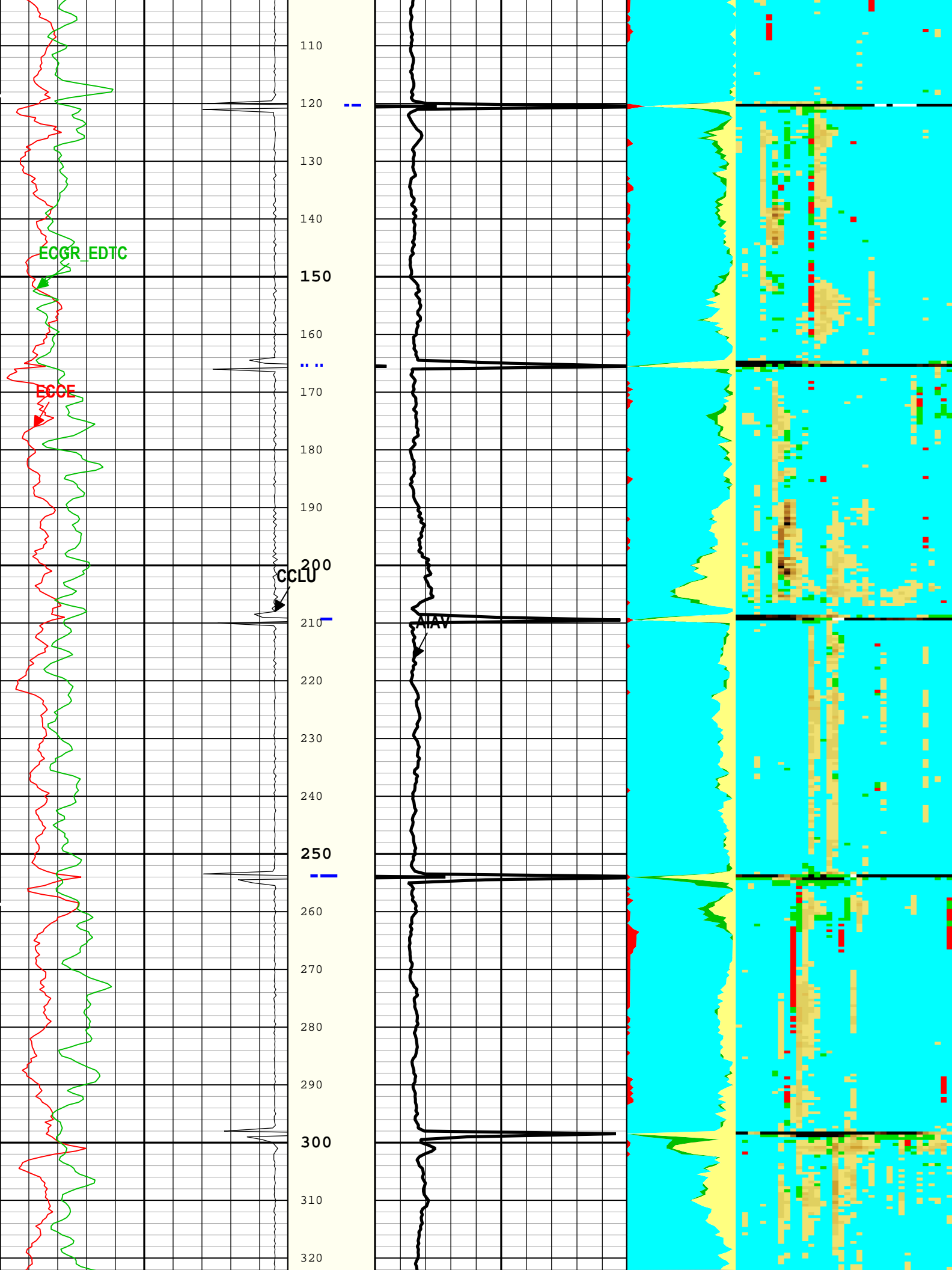
All depths are referenced to toolstring zero

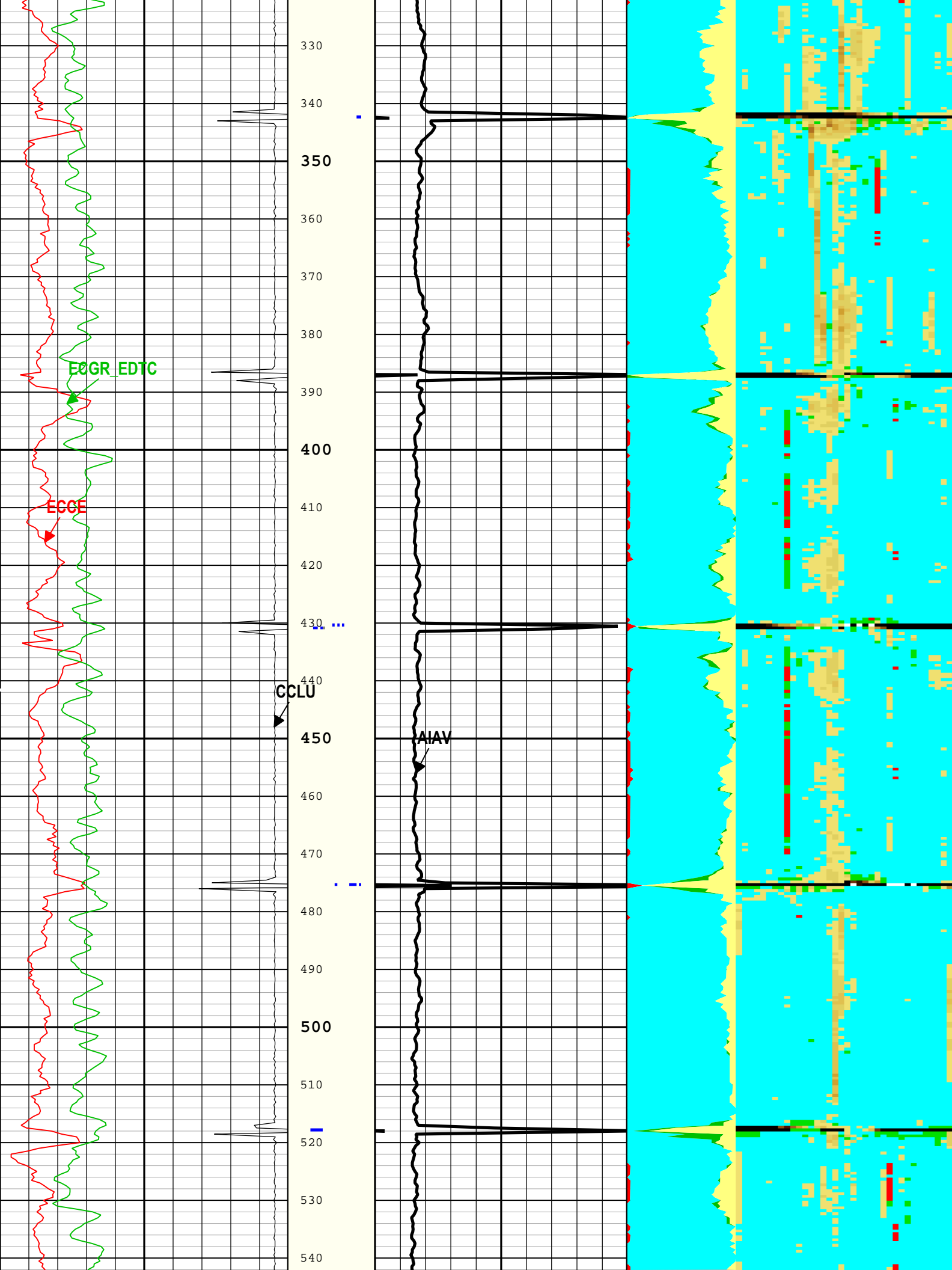
Log	Company:Noble Energy INC	Well:Wells Ranch State AA36-633
		One: Main[5]:Up:S004

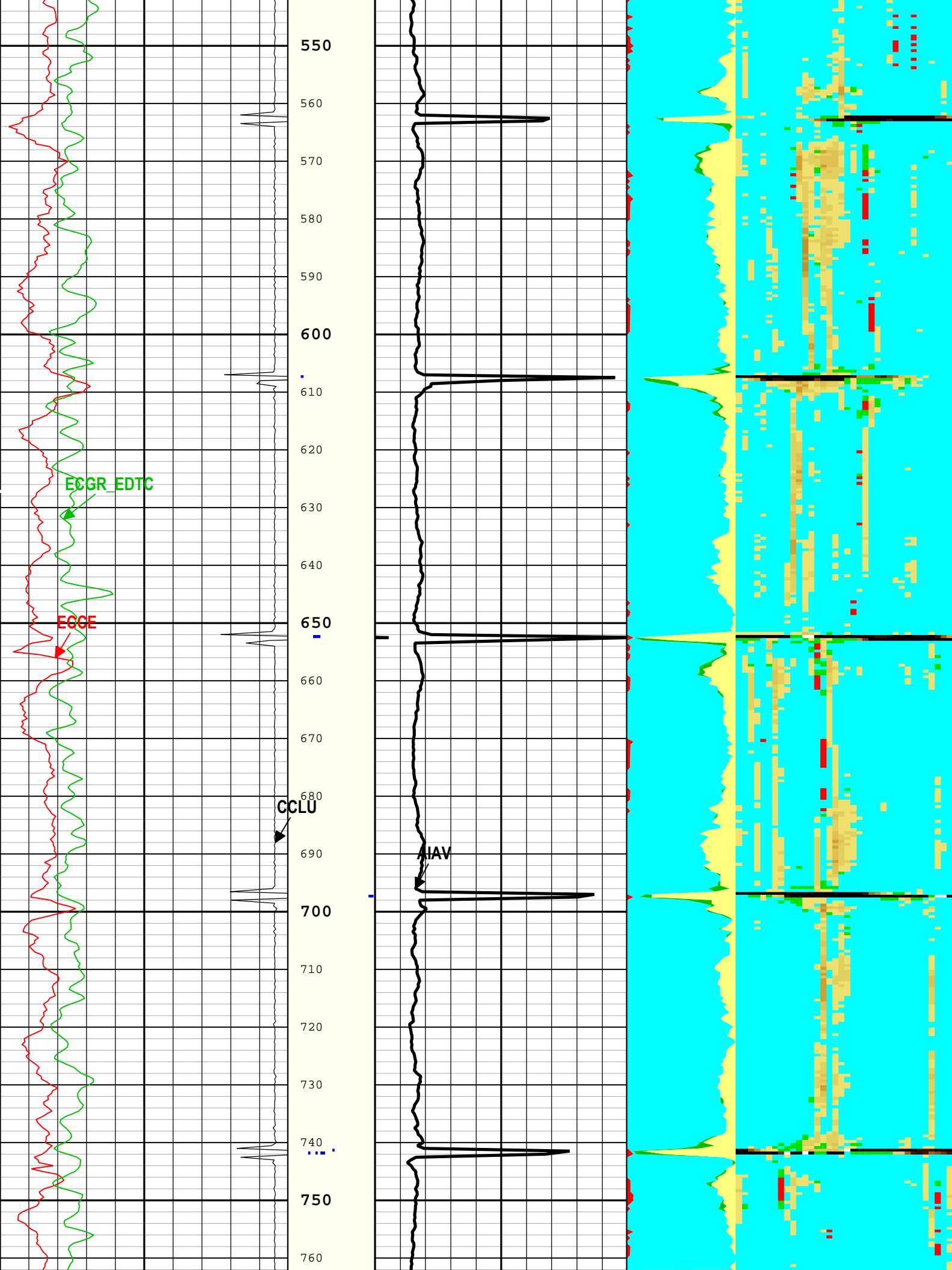
Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth  
Creation Date: 06-Jun-2019 12:48:17

TIME\_1900 - Time Marked every 60.00 (s)

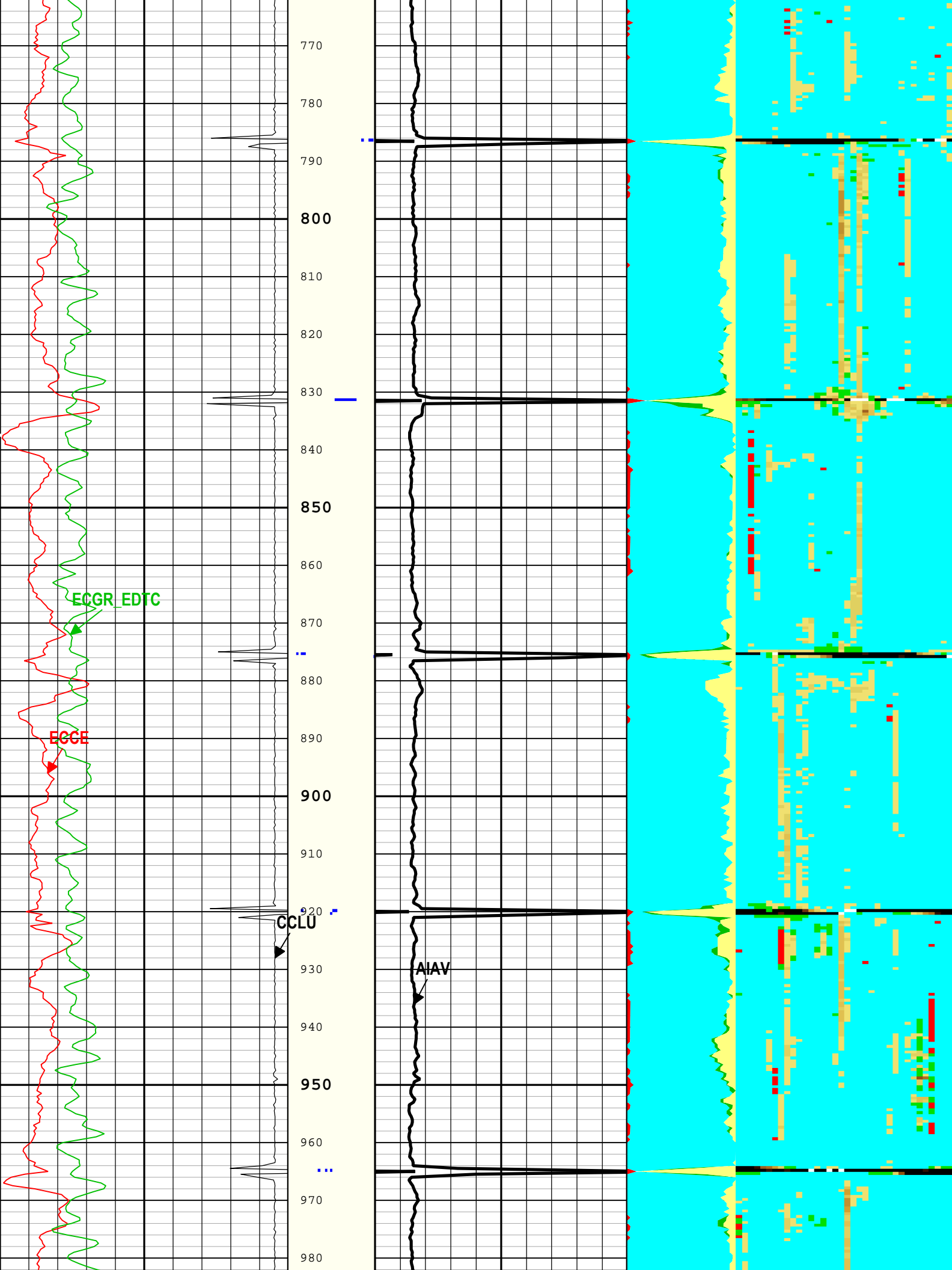


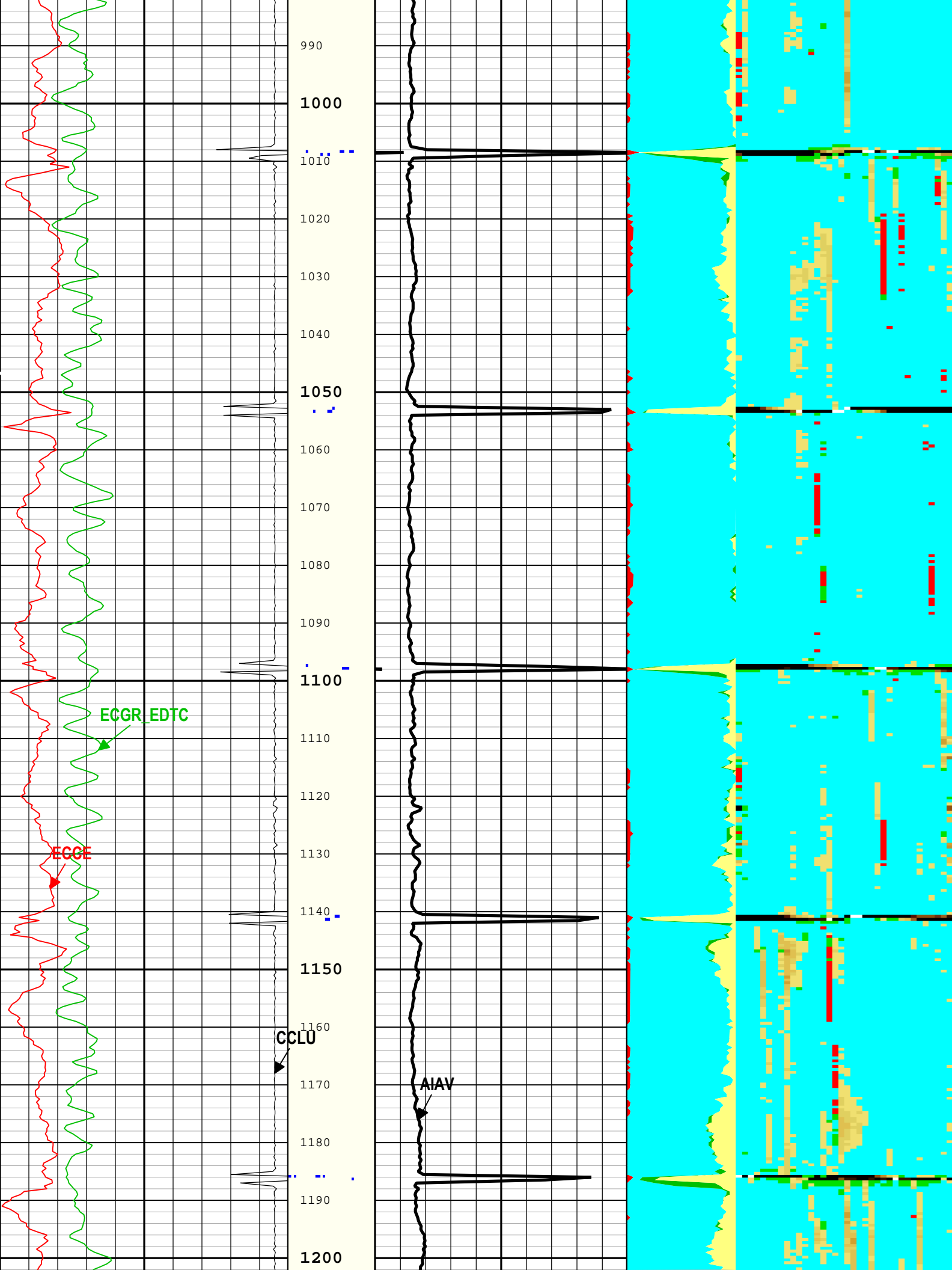


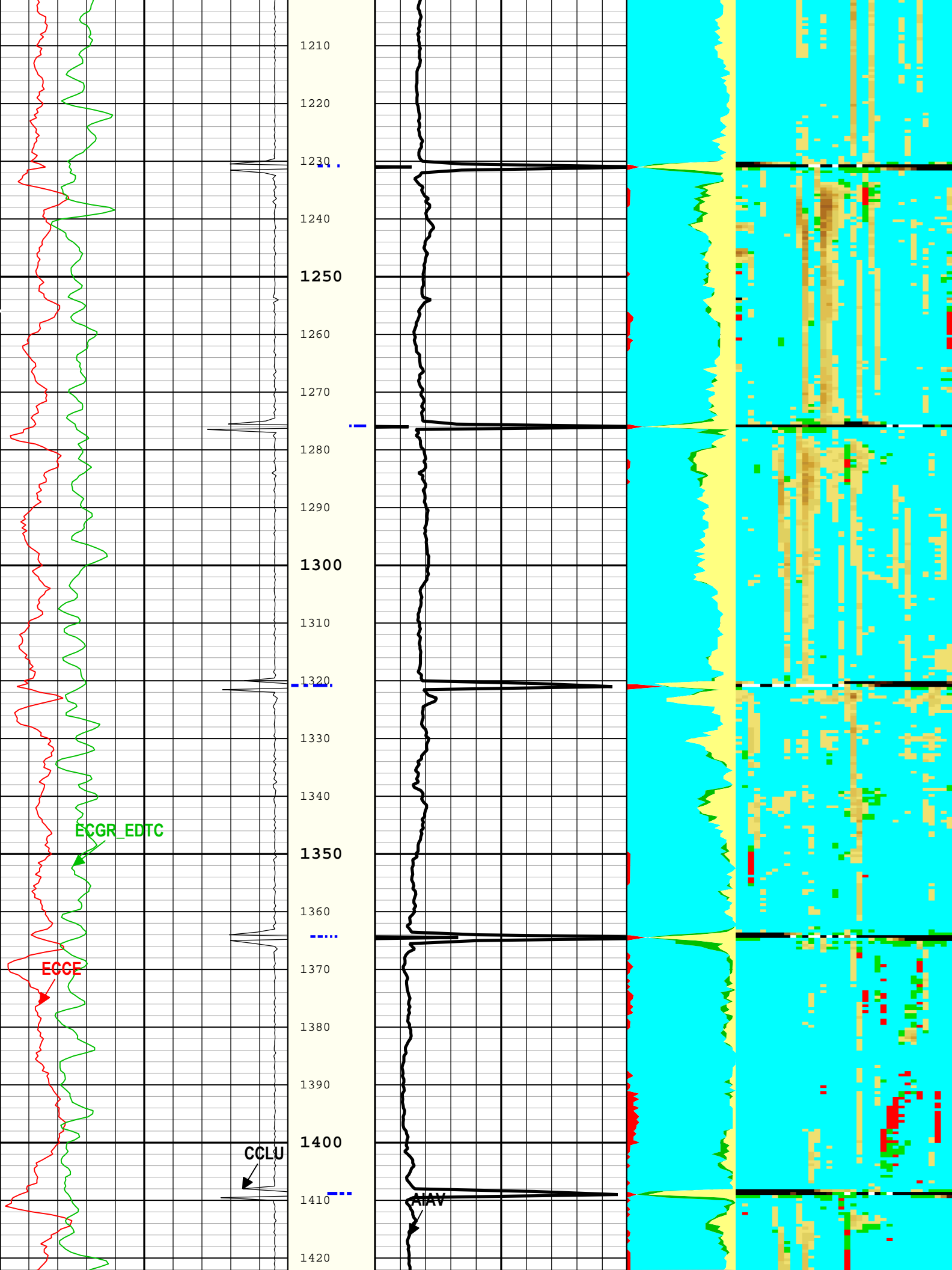


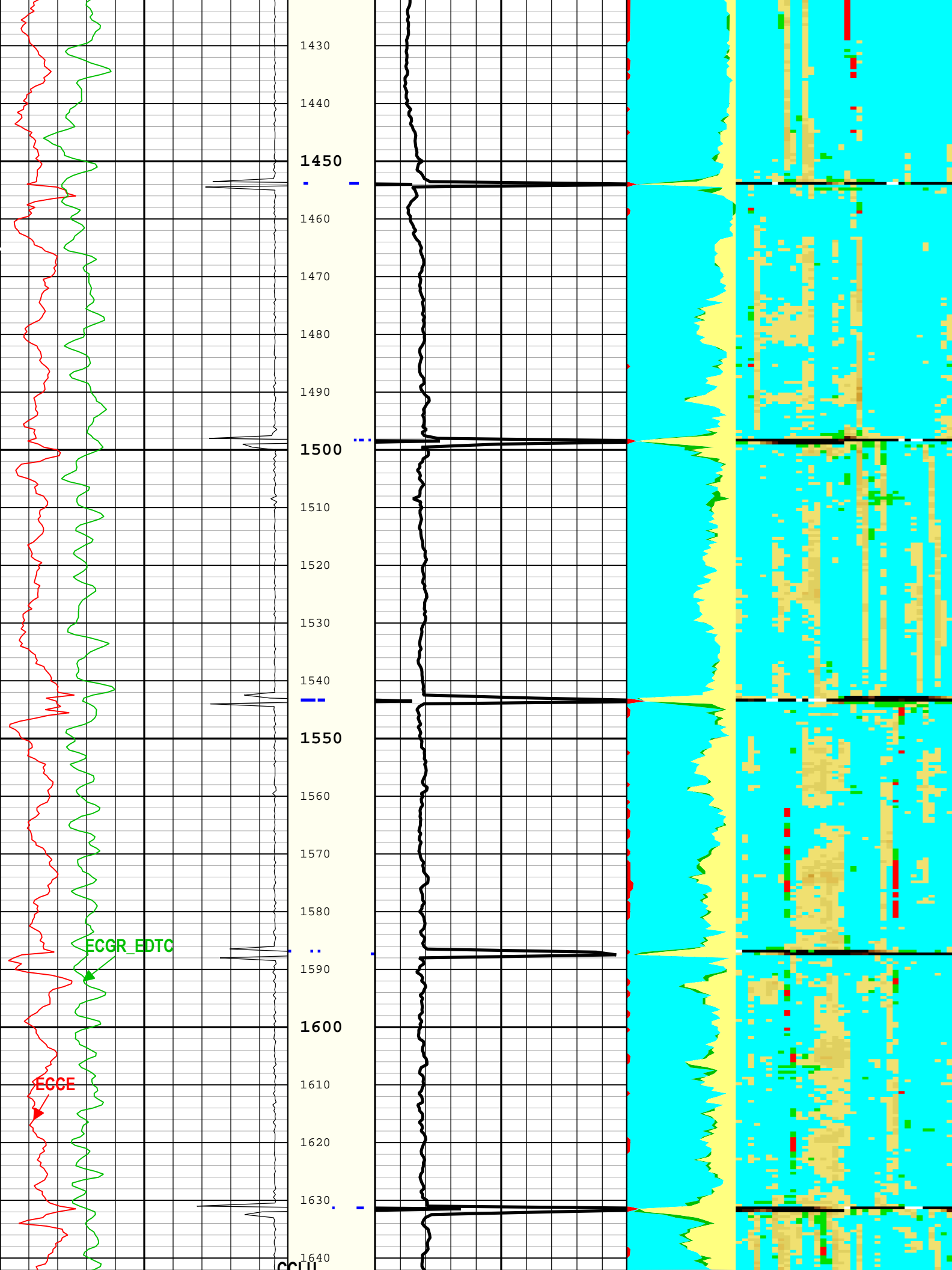


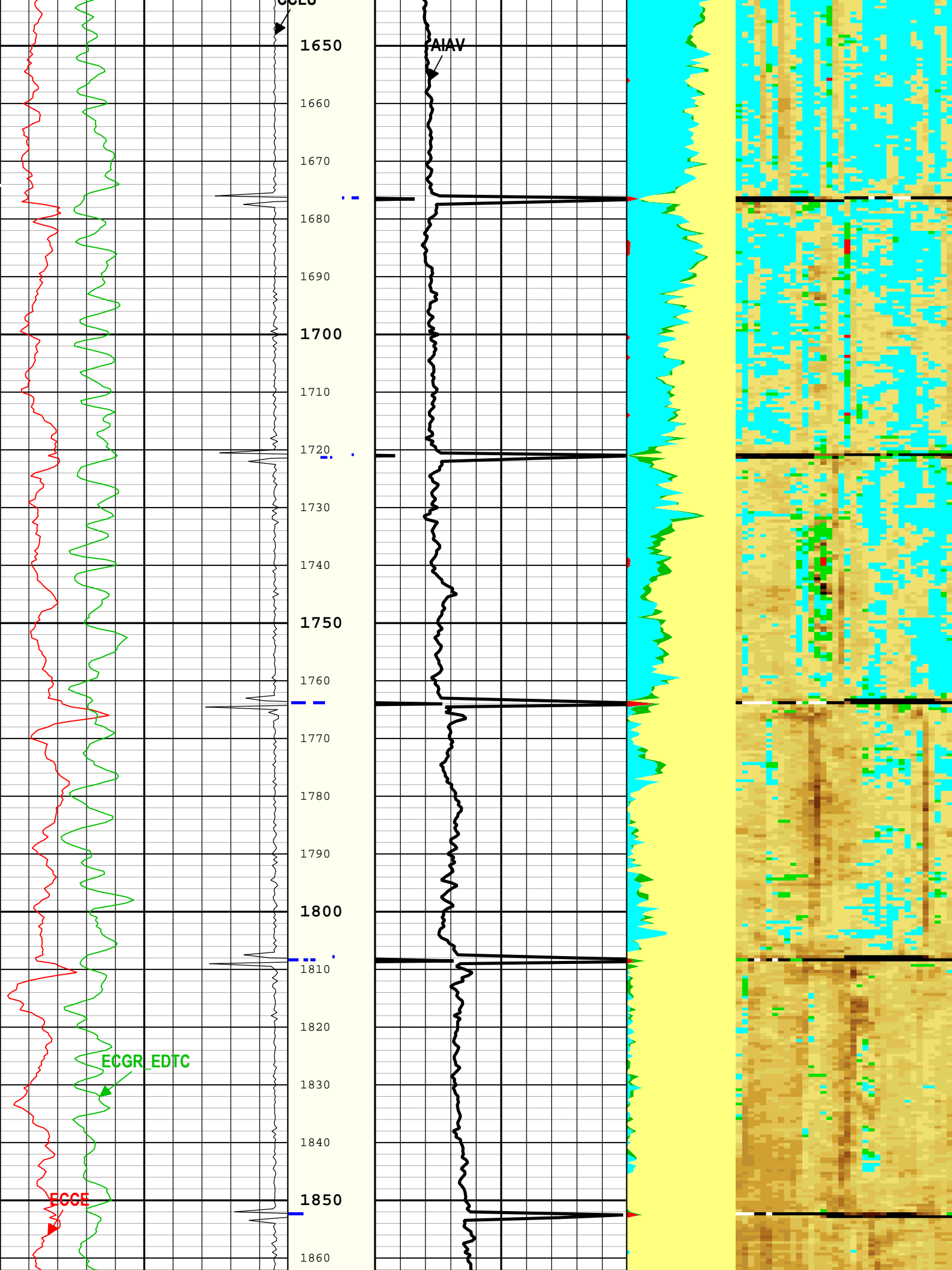


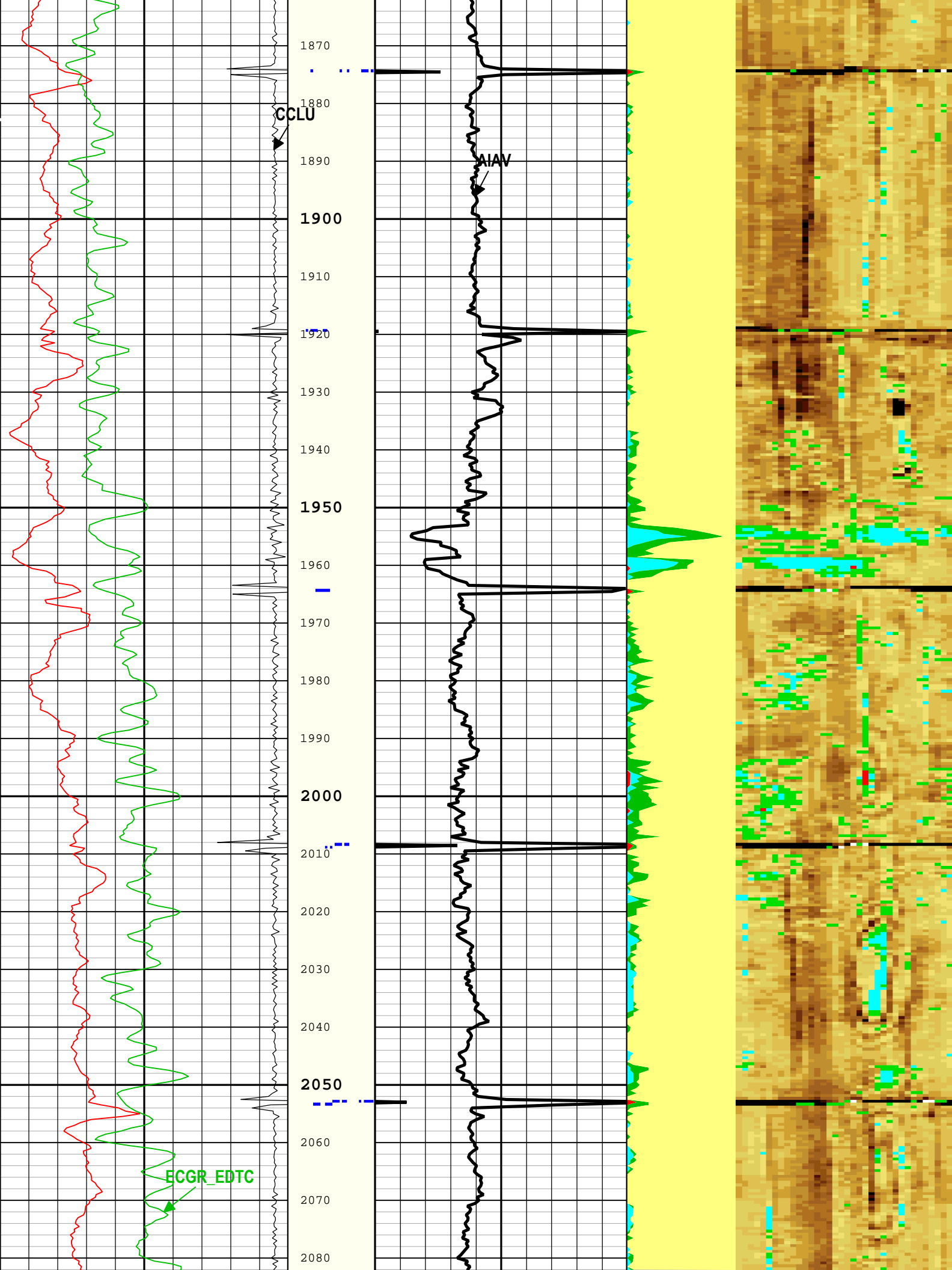


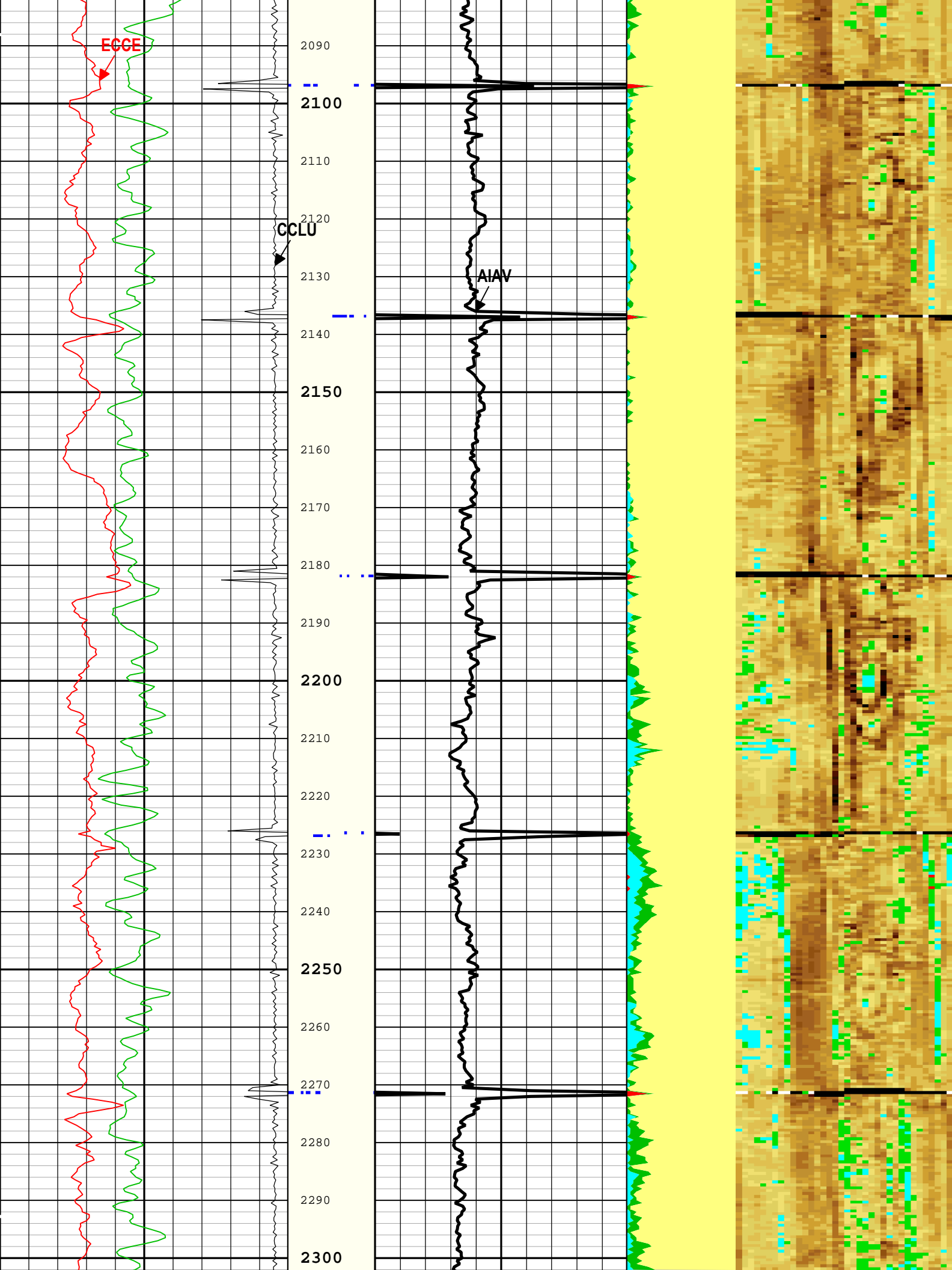


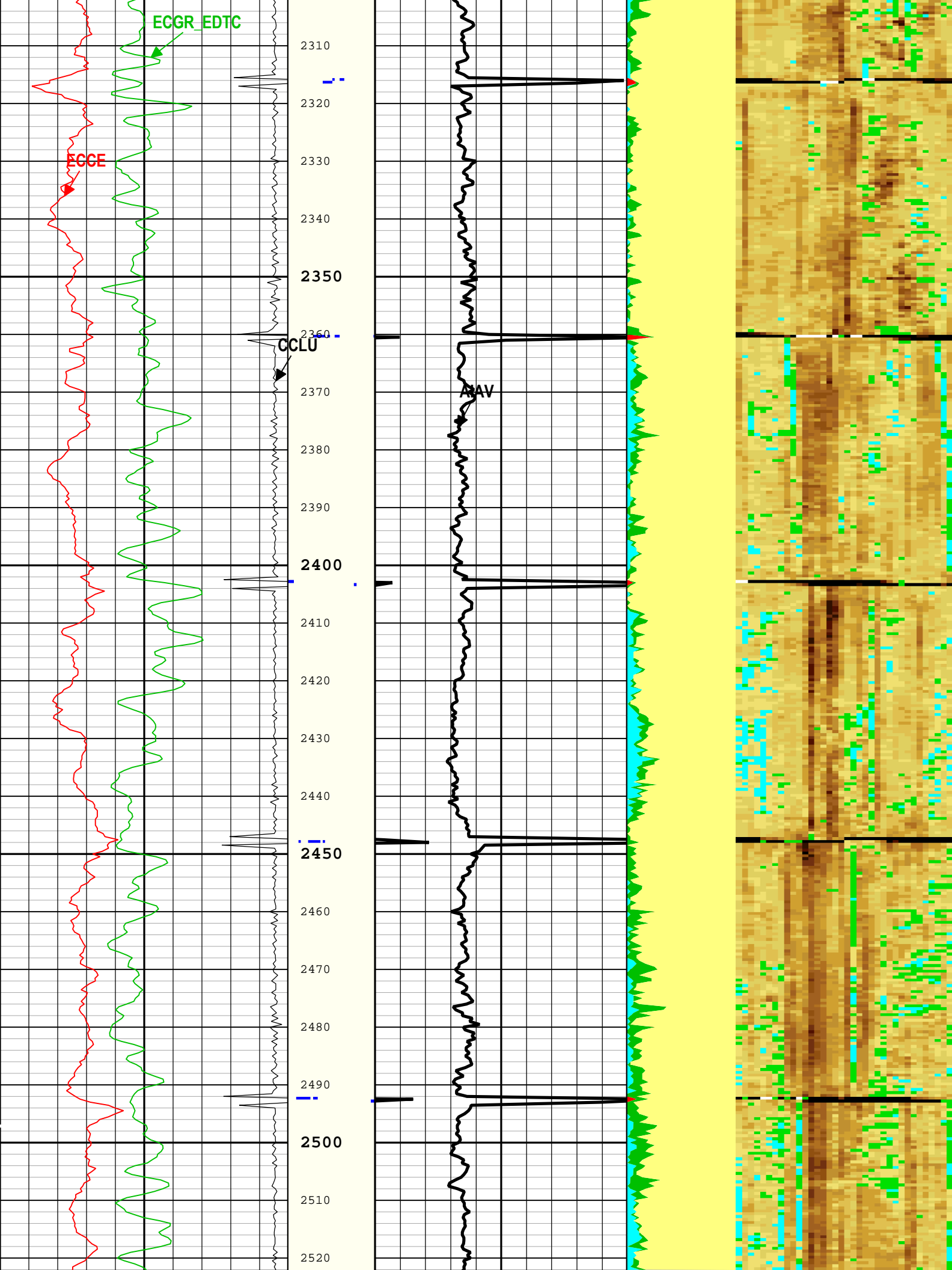




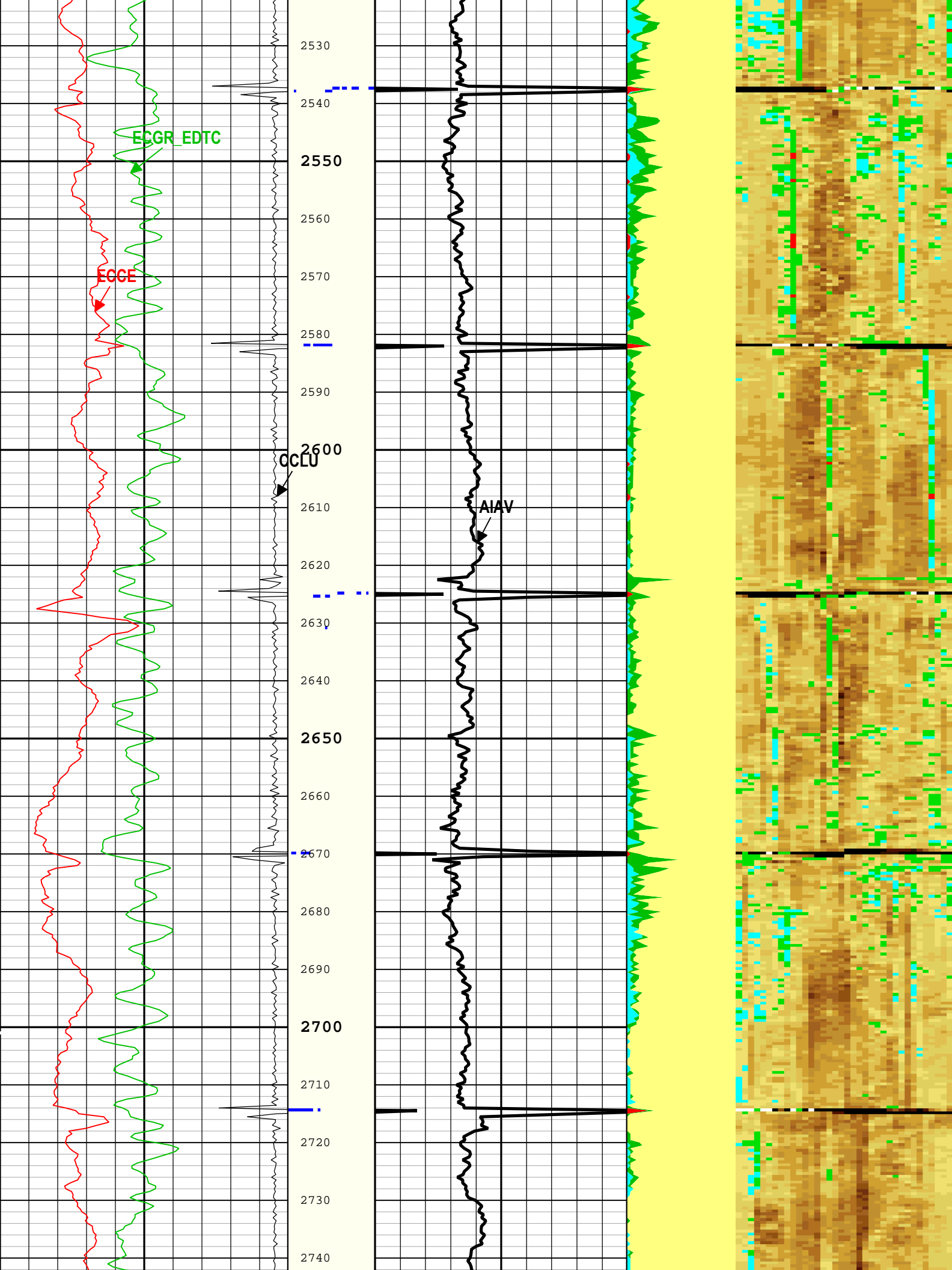


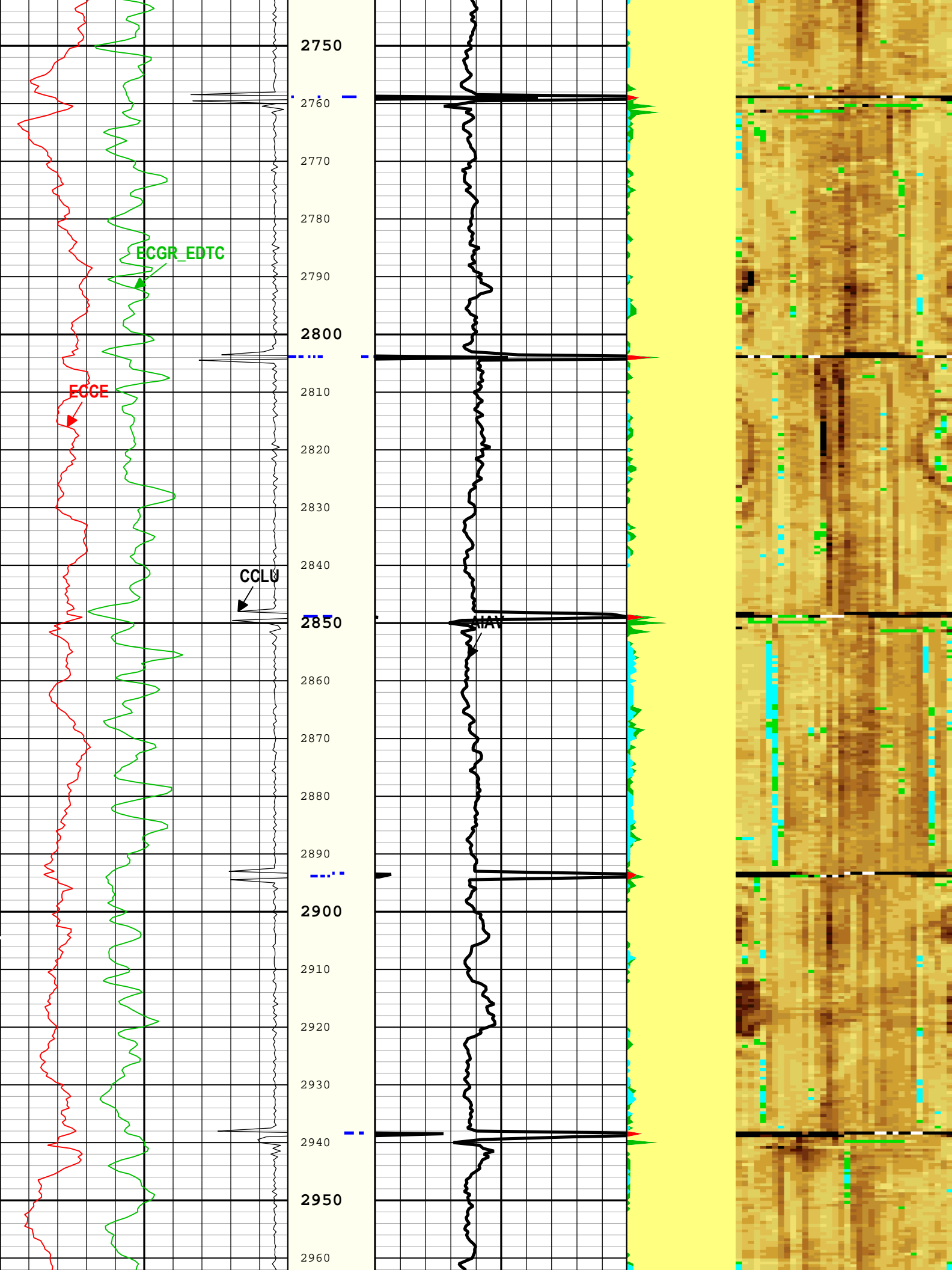


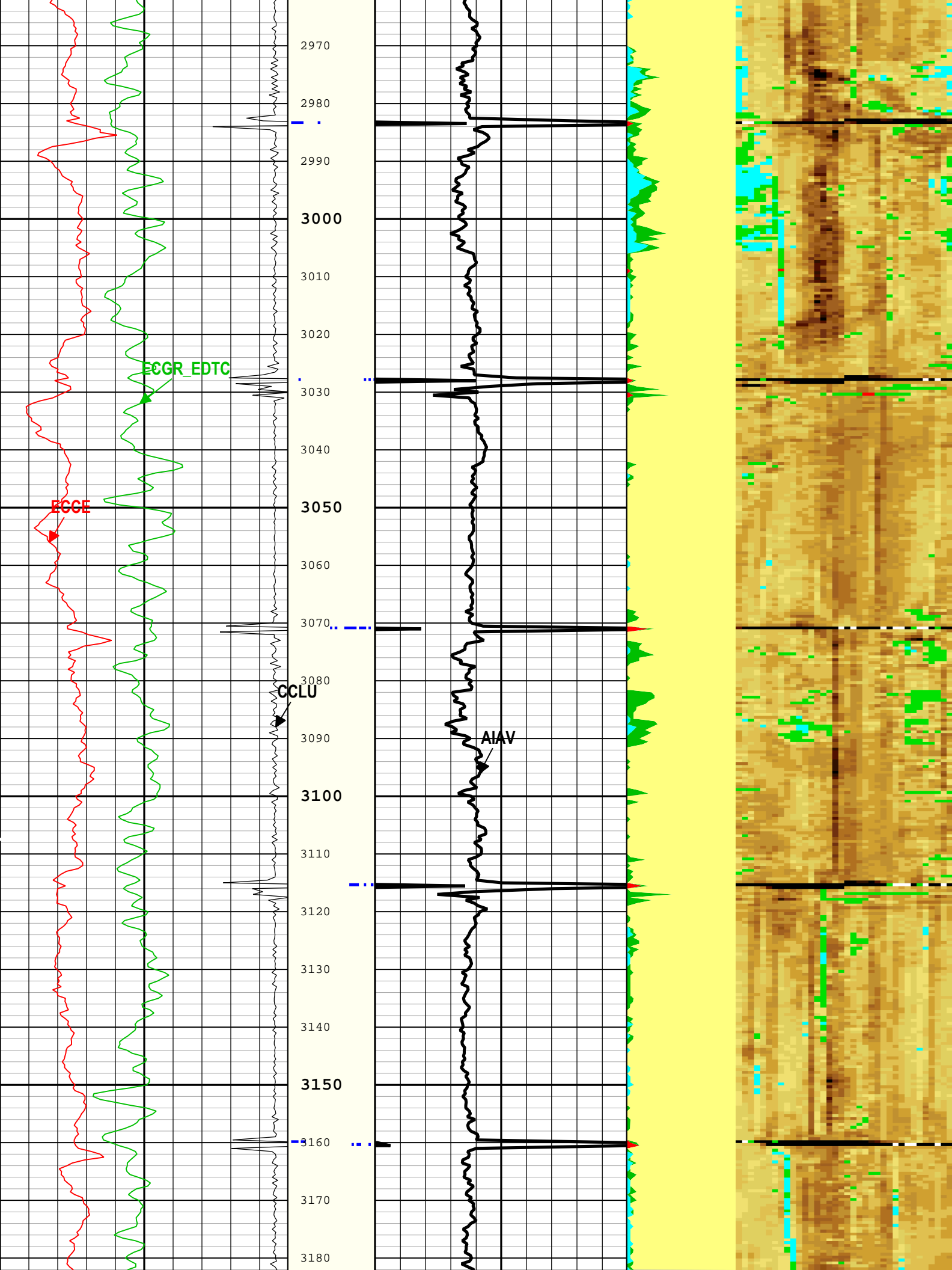


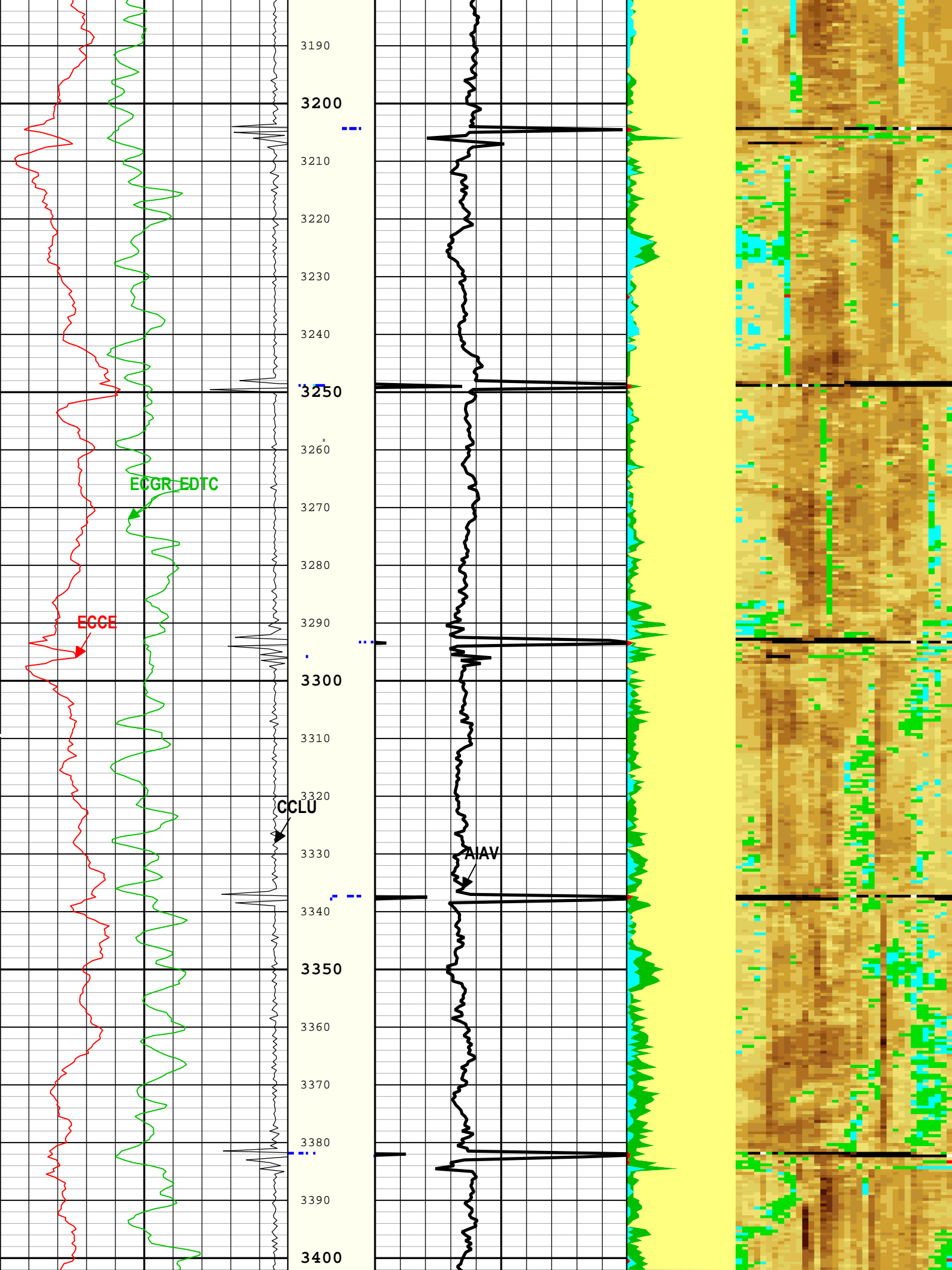


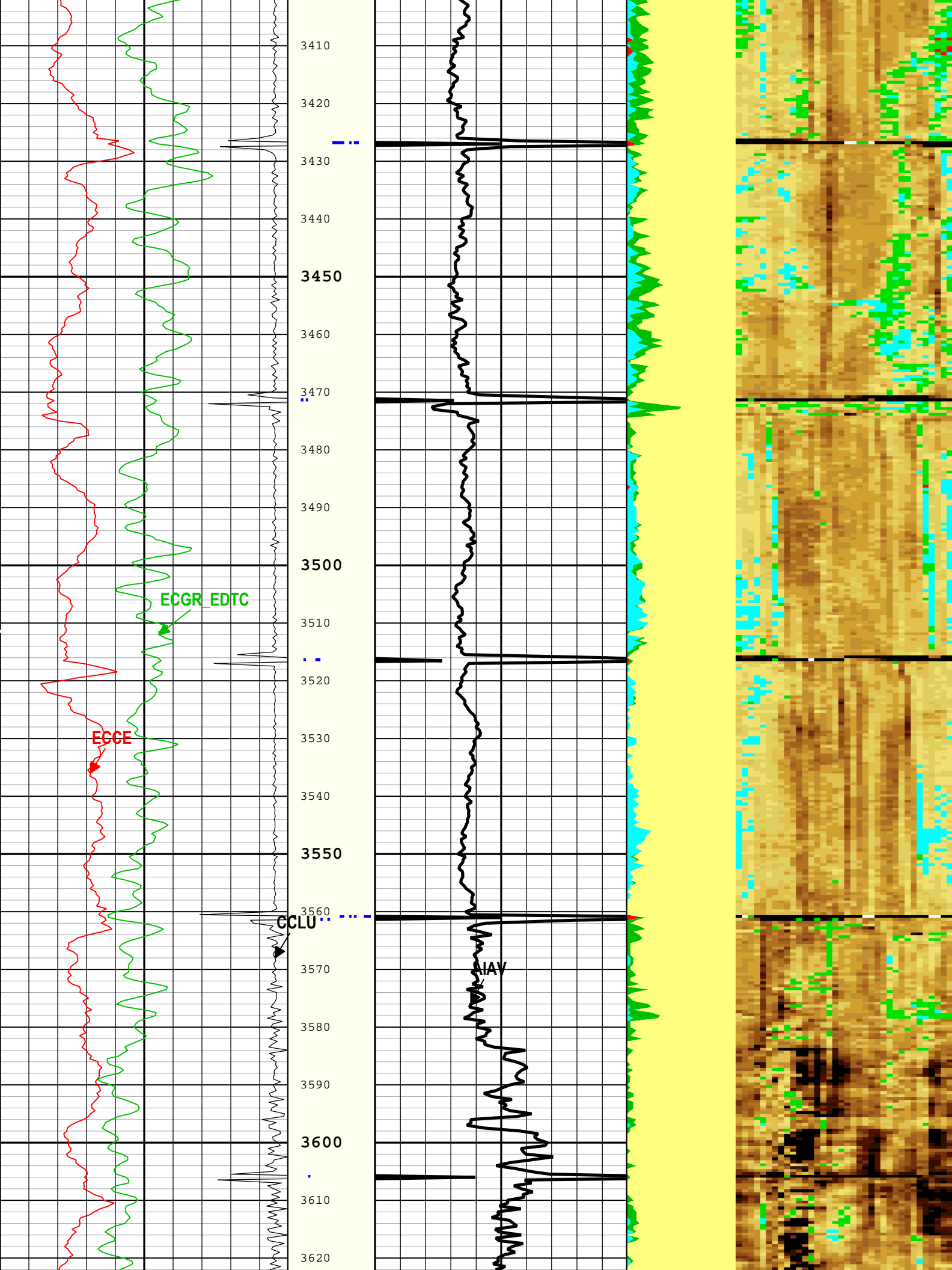


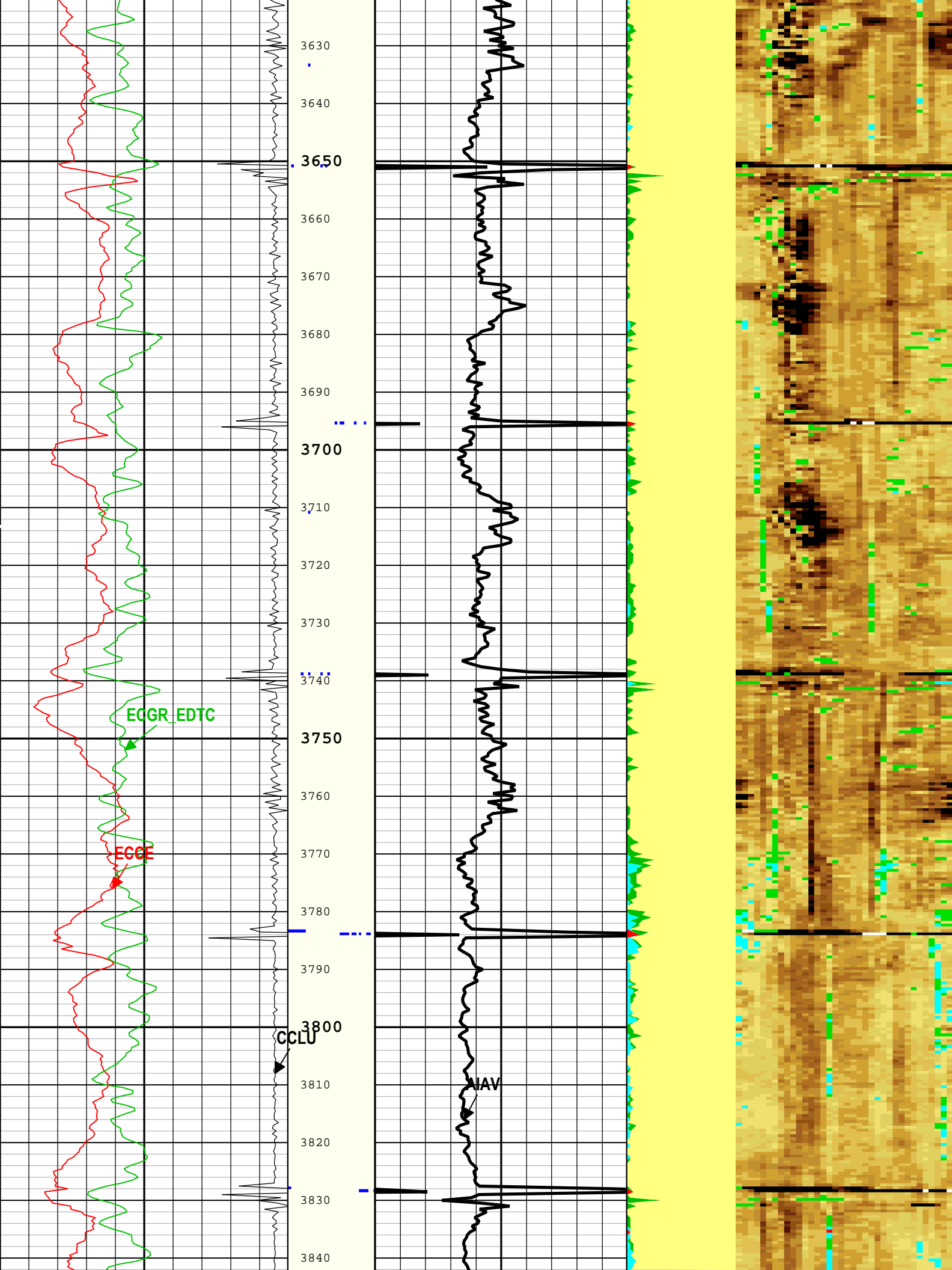


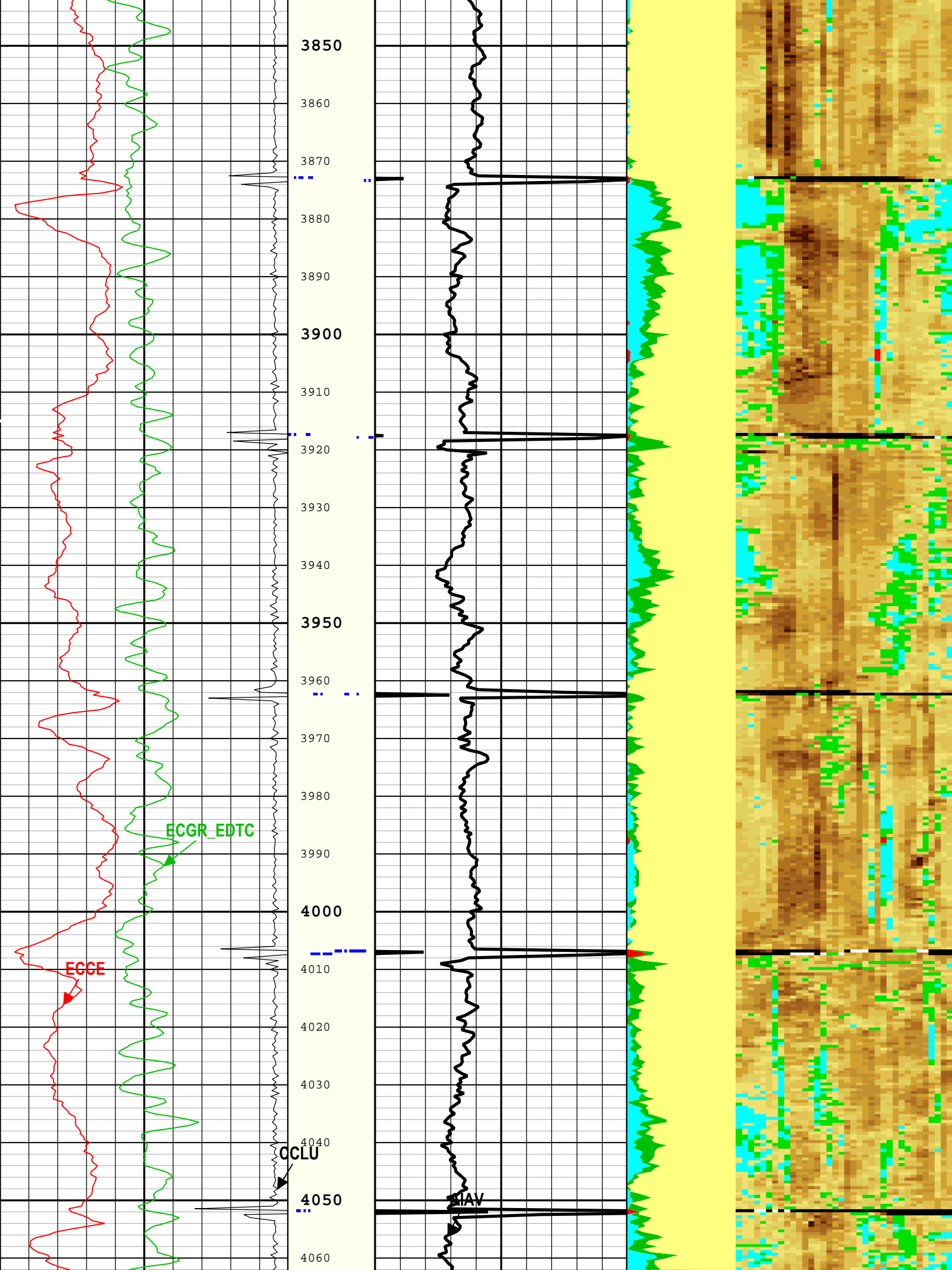


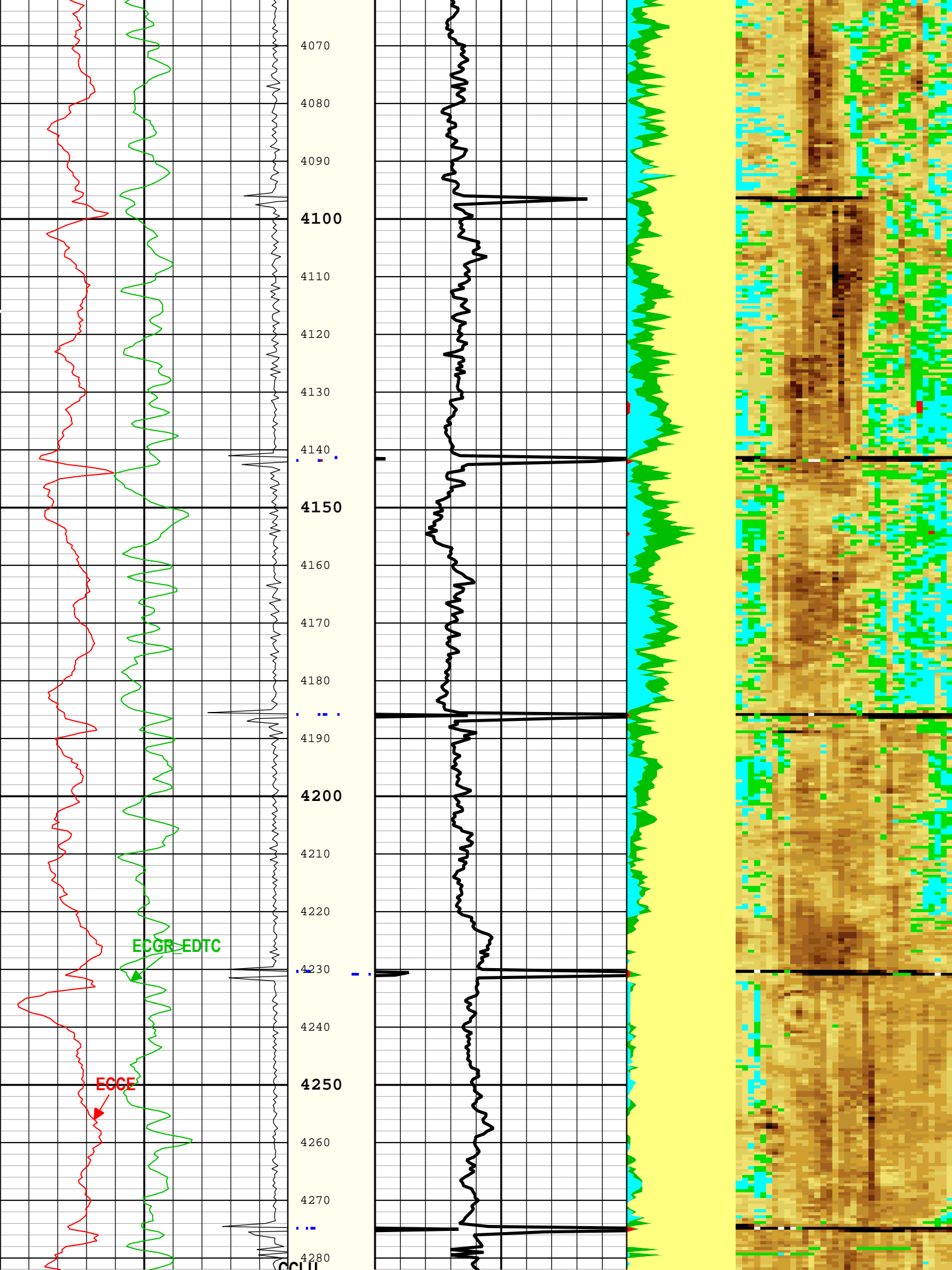




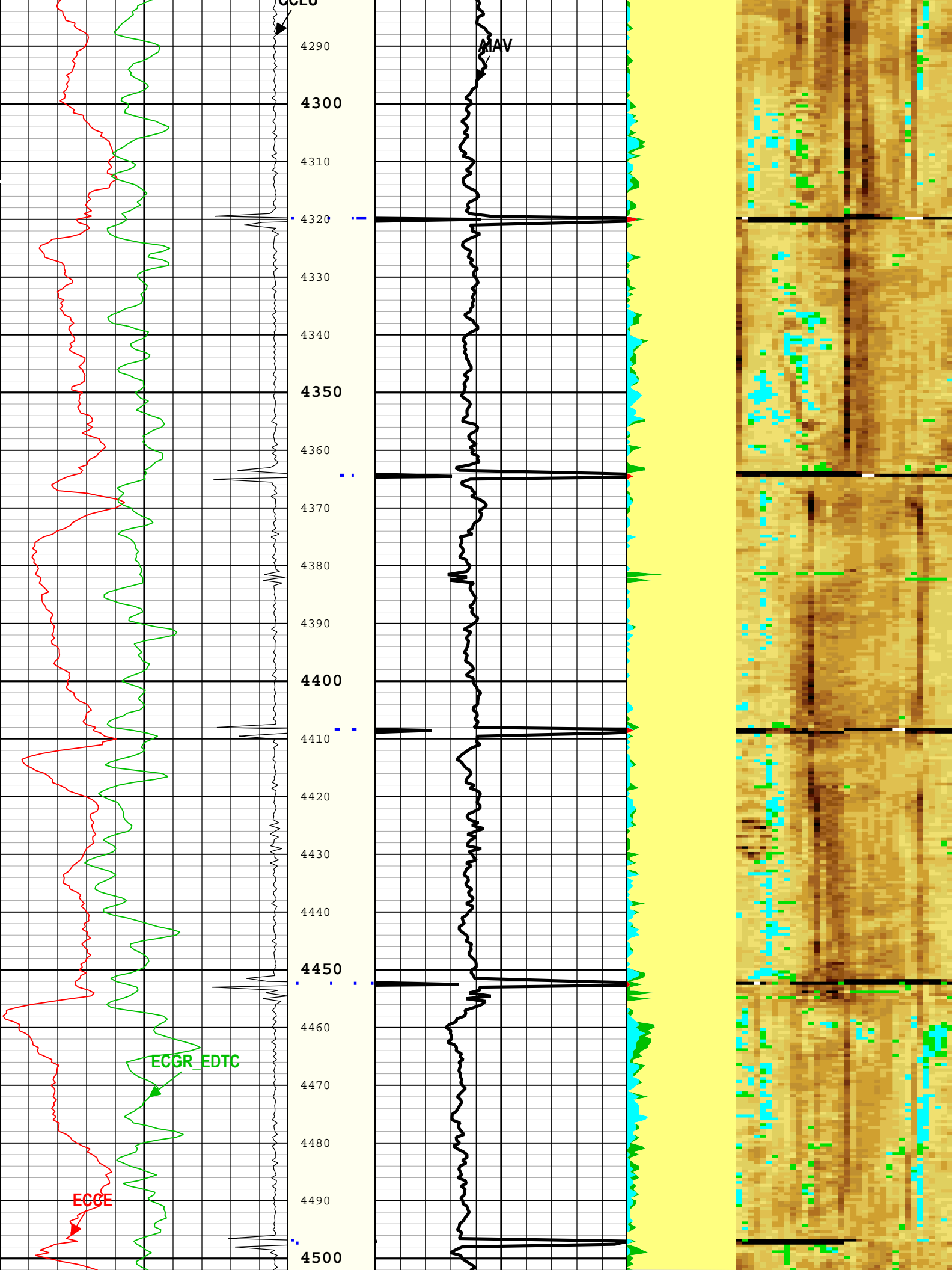


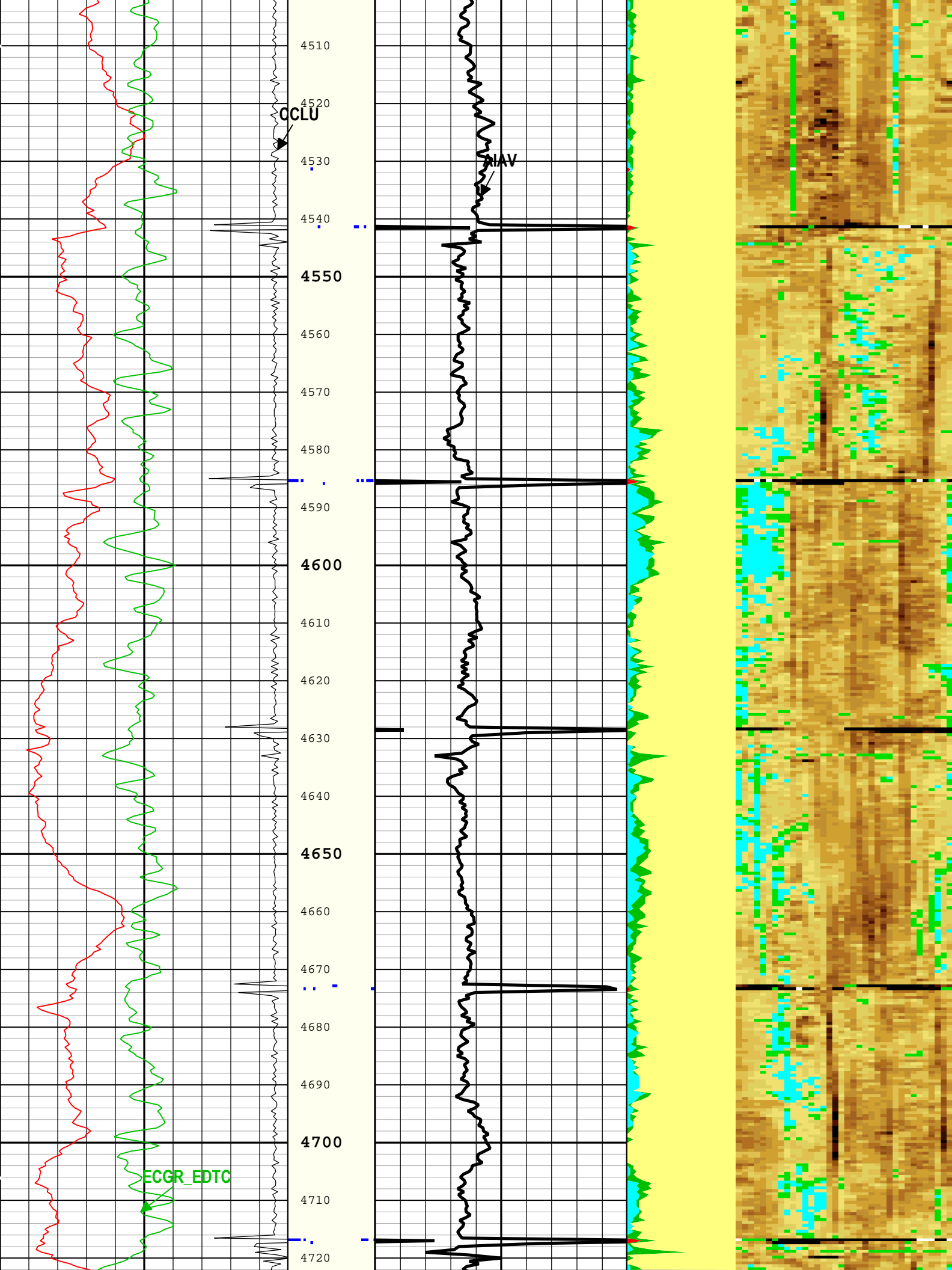


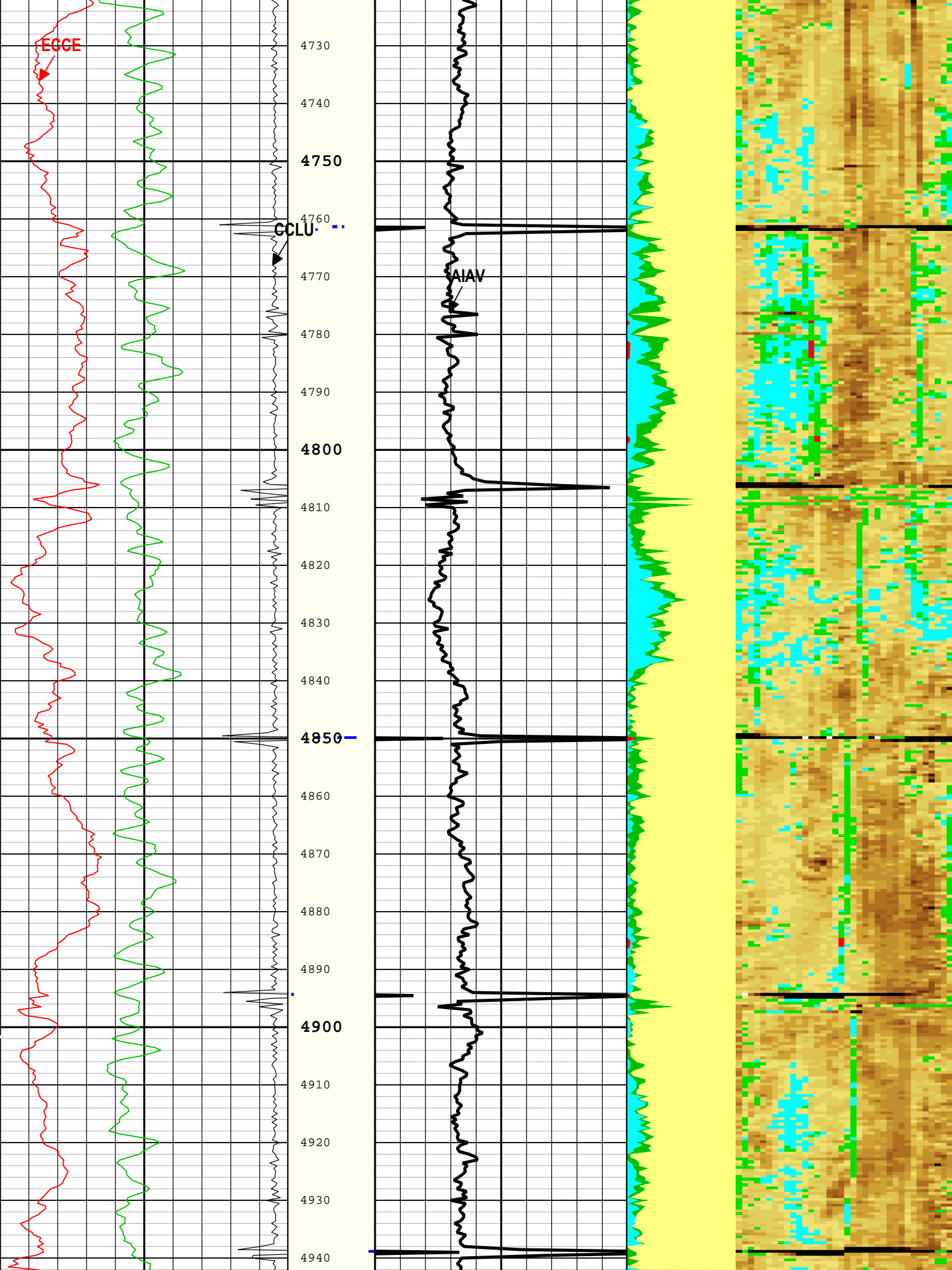


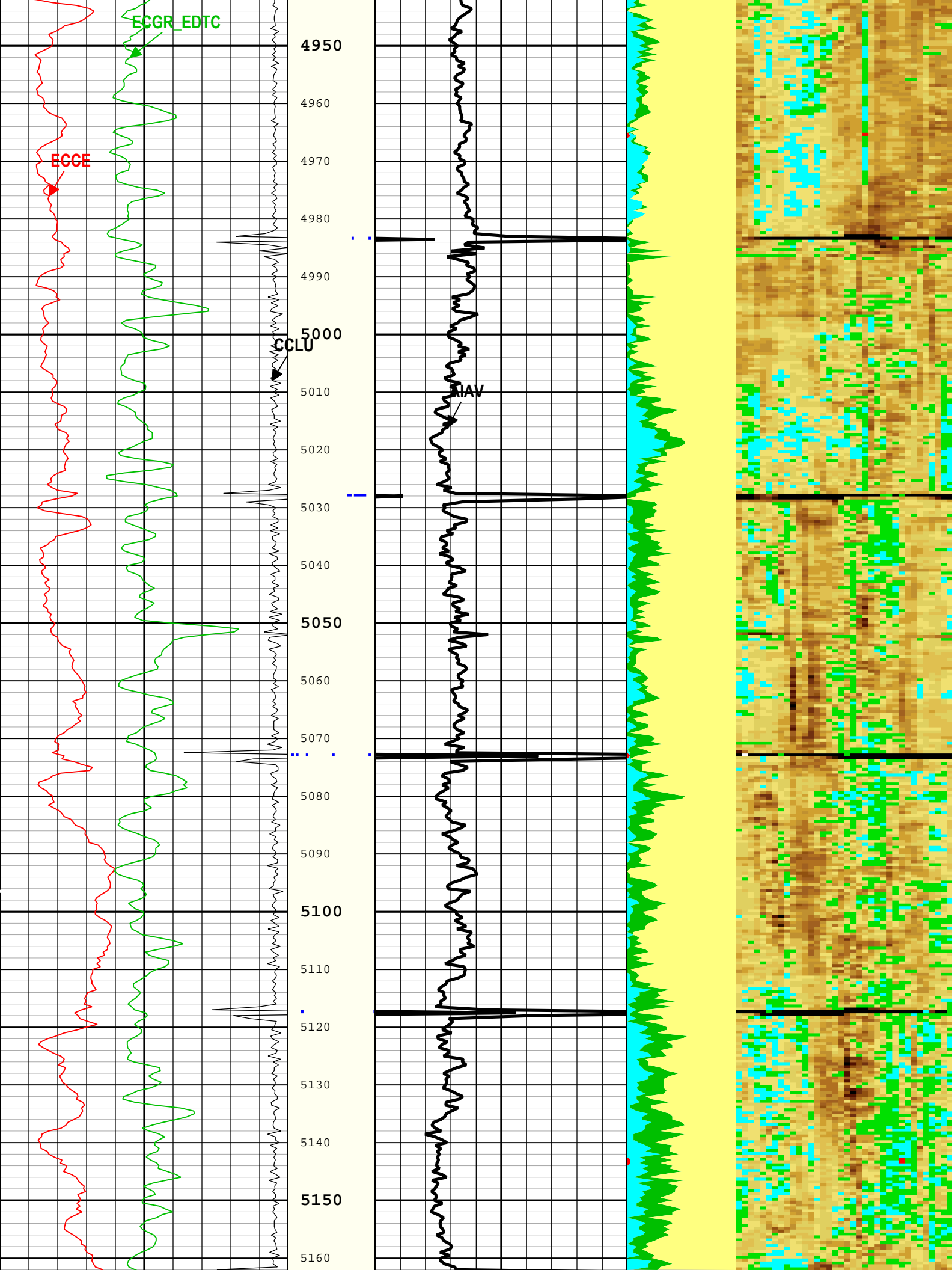


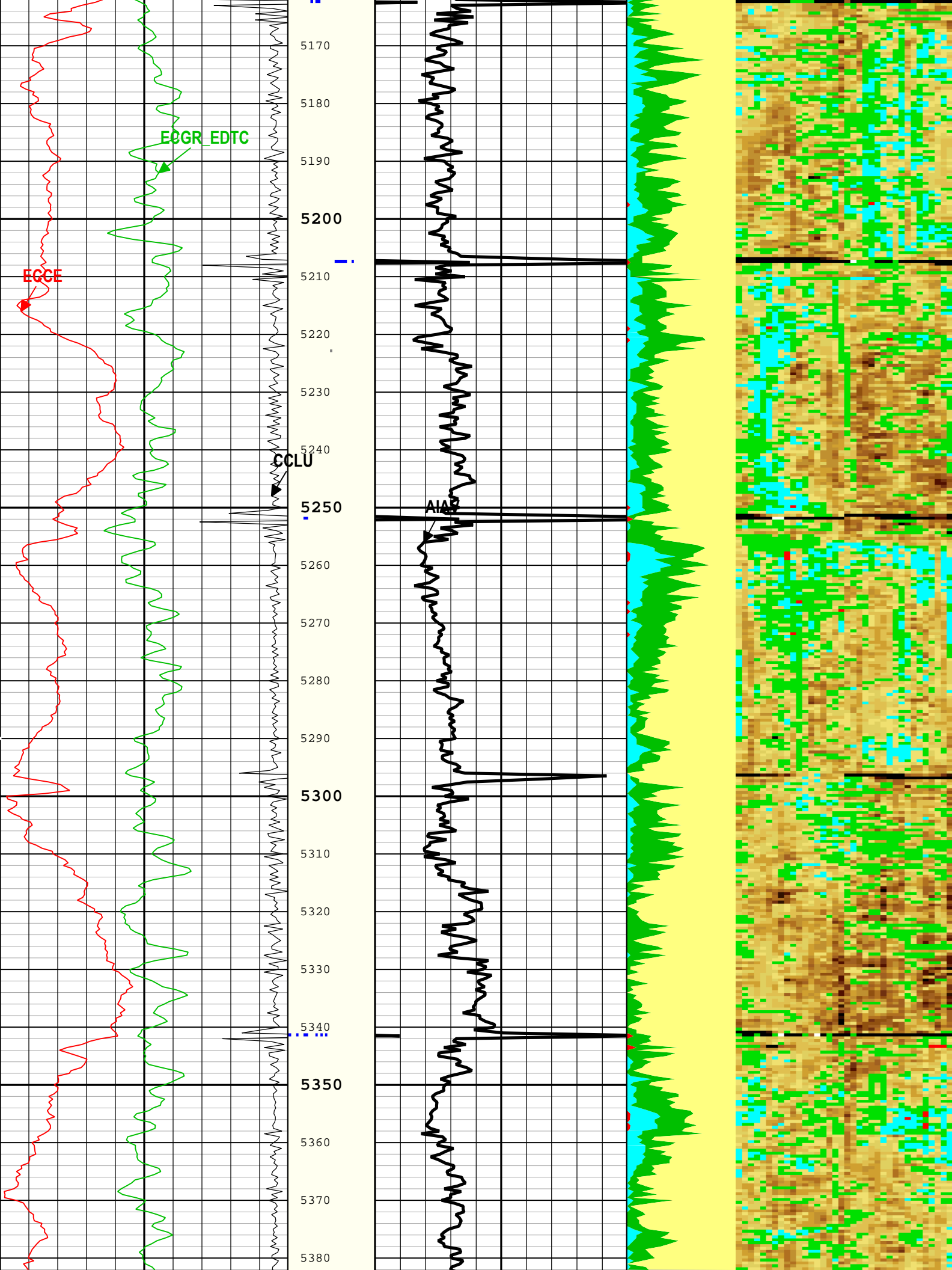


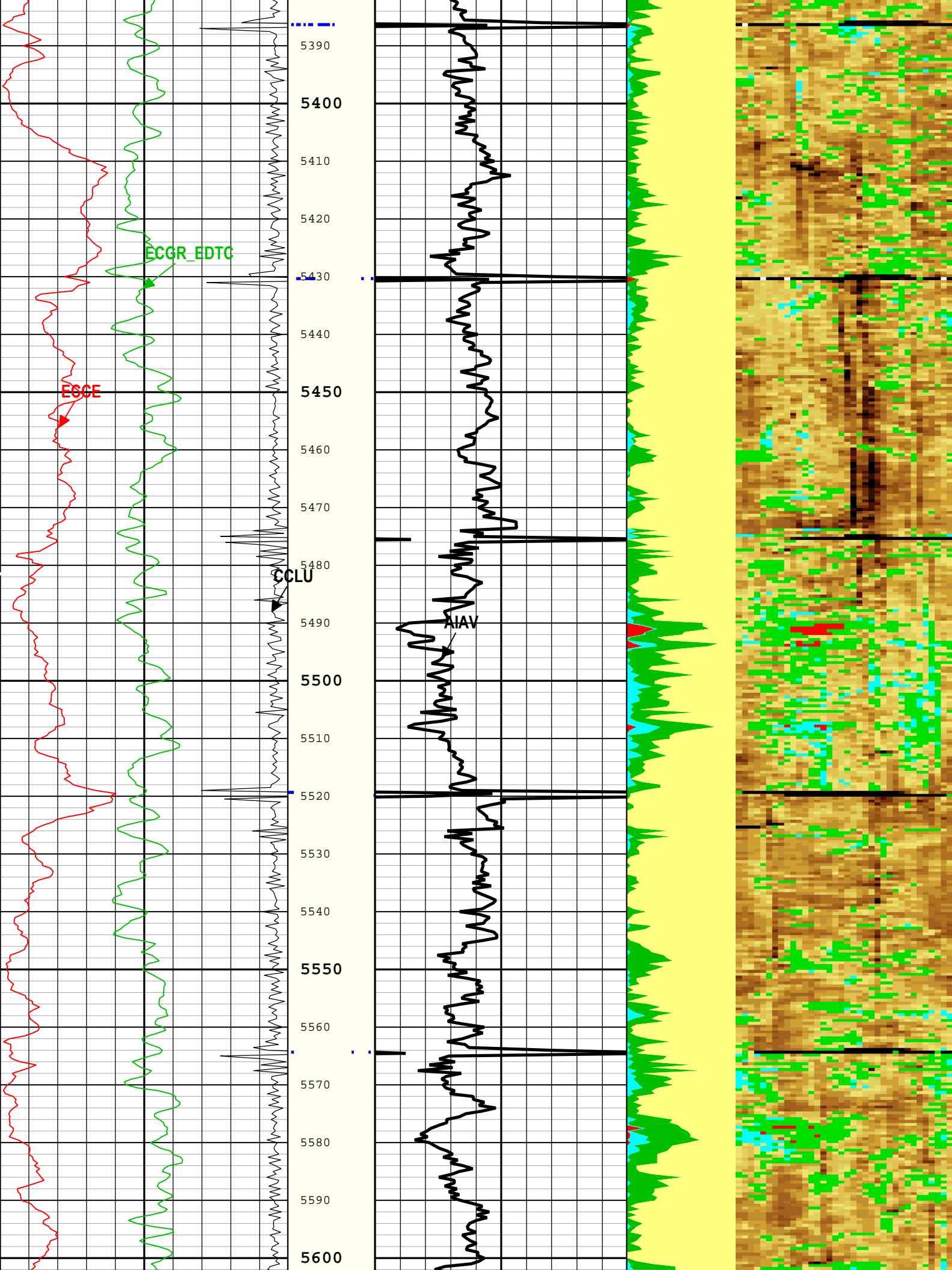


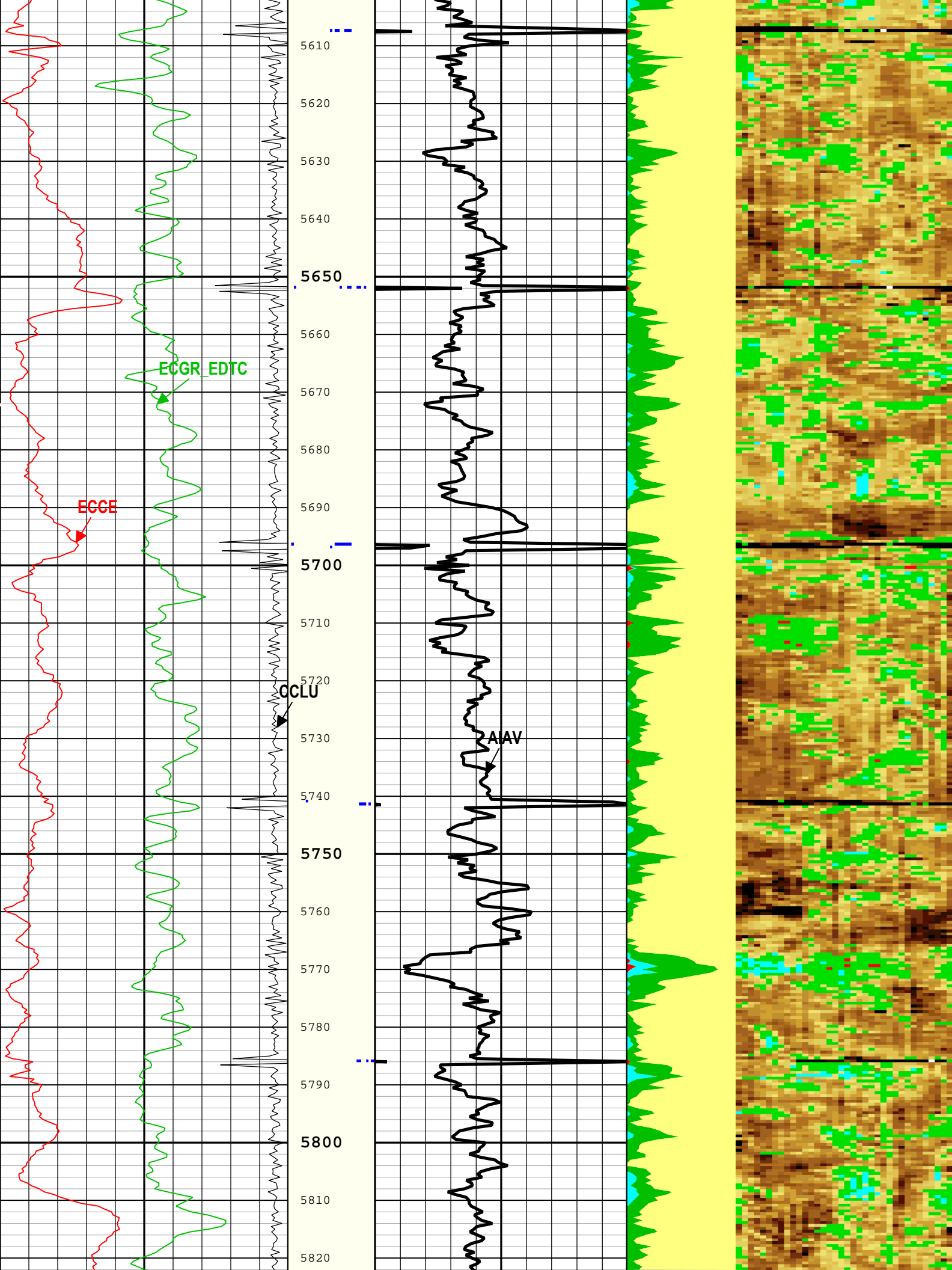


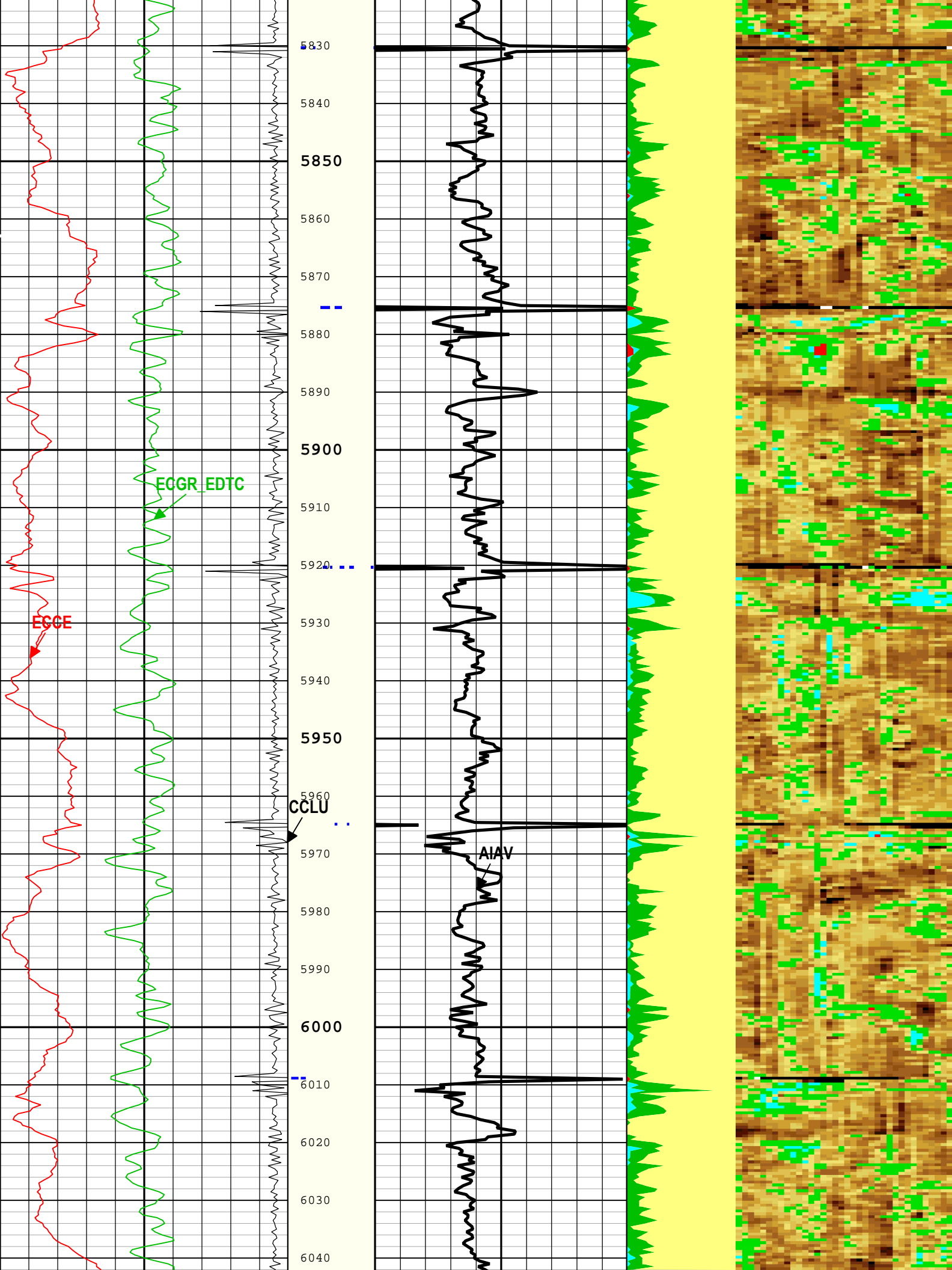




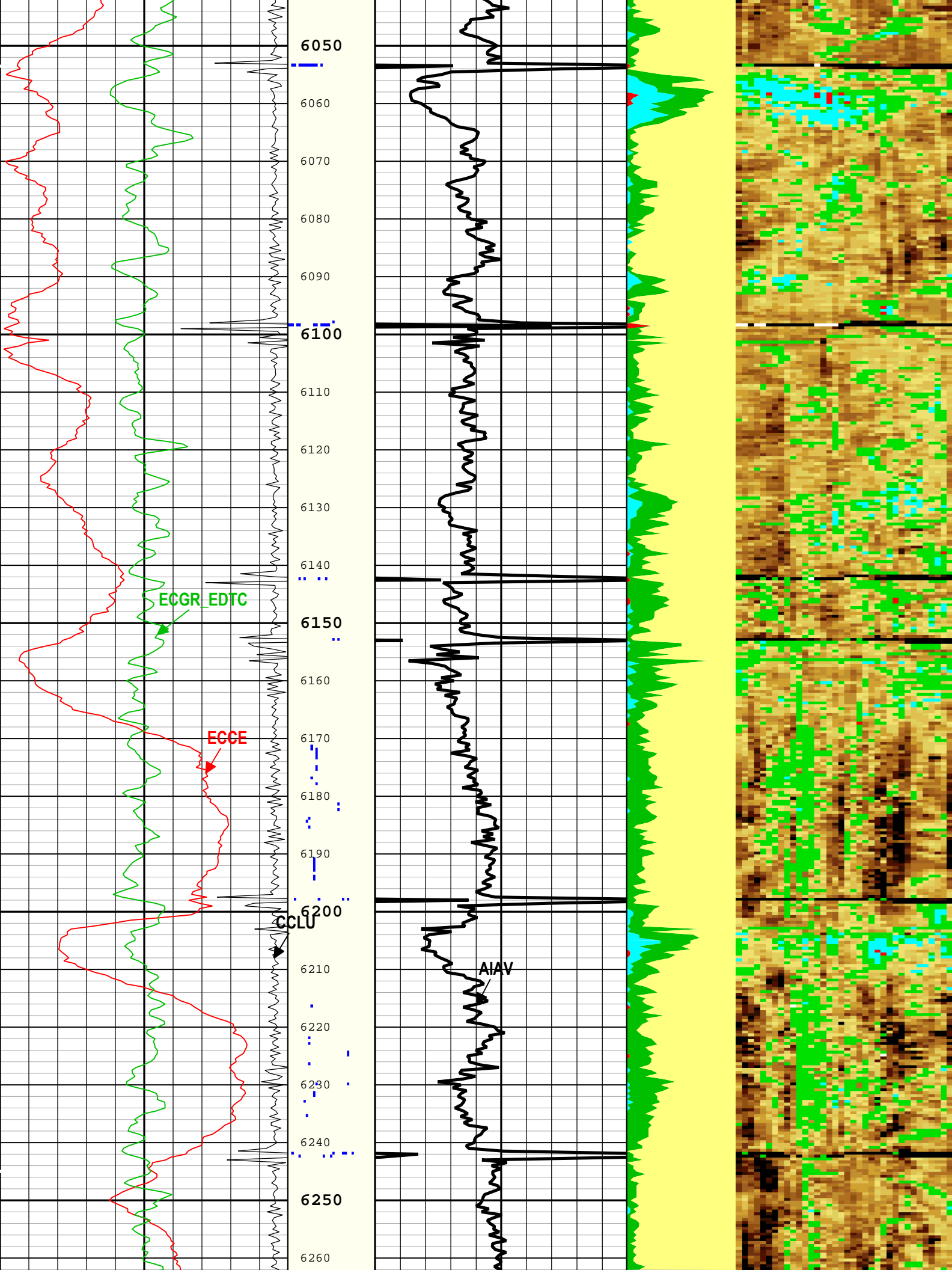


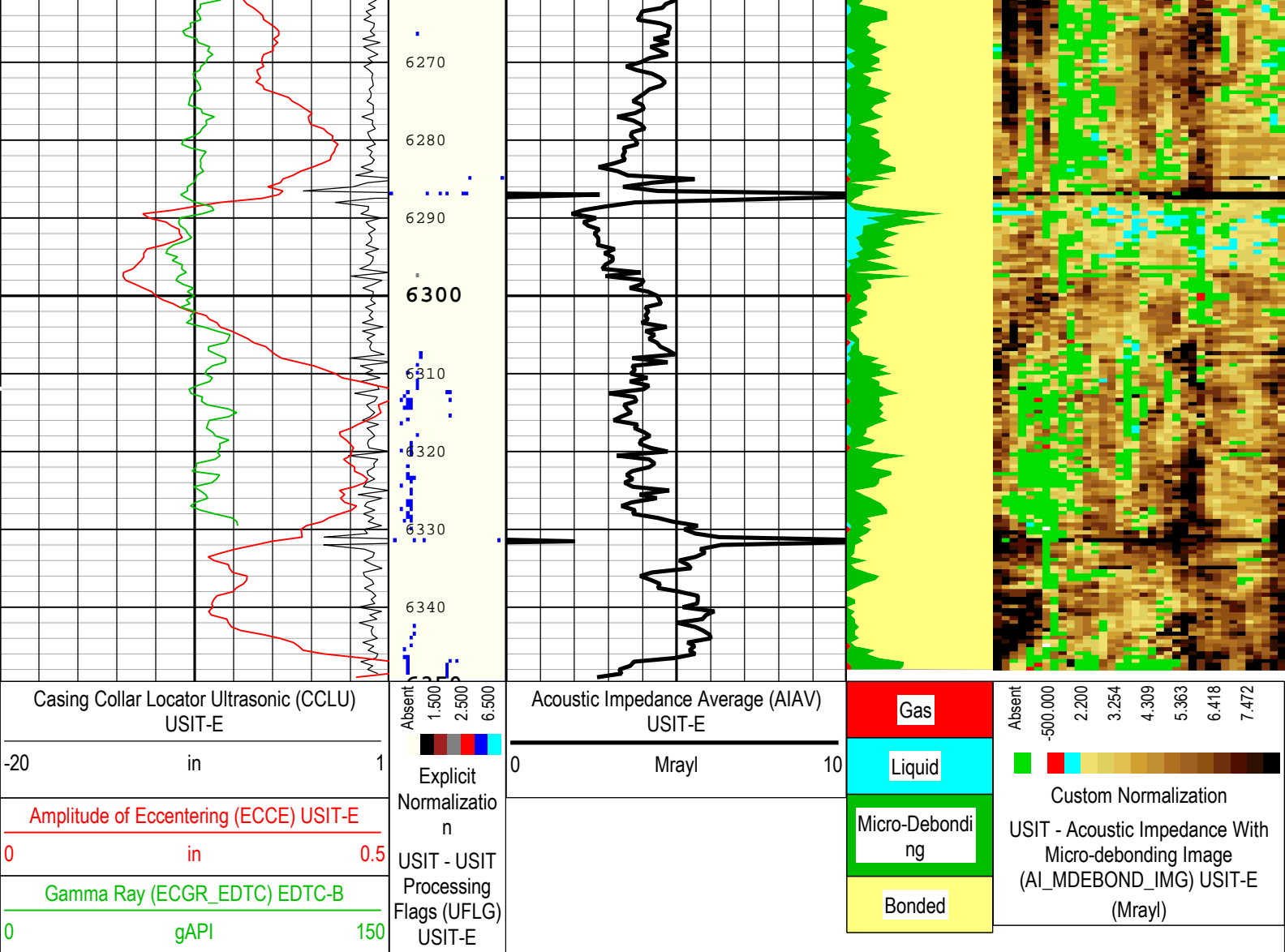












TIME\_1900 - Time Marked every 60.00 (s)

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: 06-Jun-2019 12:48:17

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	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	16892	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	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.1	

MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.62	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	1.62	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	31.5	1960
BS	8.5	1960	6349.5

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	48	dB
EMXV	EMEX Voltage	USIT-E	55	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 500 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 )
WINB	29.63	06-Jun-2019 12:08:04	06-Jun-2019 12:08:58	6350.32	6312.85
WINB	28	06-Jun-2019 12:08:58	06-Jun-2019 12:42:21	6312.85	51.74
WINE	73.83	06-Jun-2019 12:08:04	06-Jun-2019 12:08:23	6350.32	6337.63
WINE	75.34	06-Jun-2019 12:08:23	06-Jun-2019 12:08:32	6337.63	6331.64
WINE	74.61	06-Jun-2019 12:08:32	06-Jun-2019 12:09:15	6331.64	6301.02
WINE	75	06-Jun-2019 12:09:15	06-Jun-2019 12:42:21	6301.02	51.74

All depth are at tool zero.

# One

## 0 PSI Repeat Pass

## Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

## Pass Summary

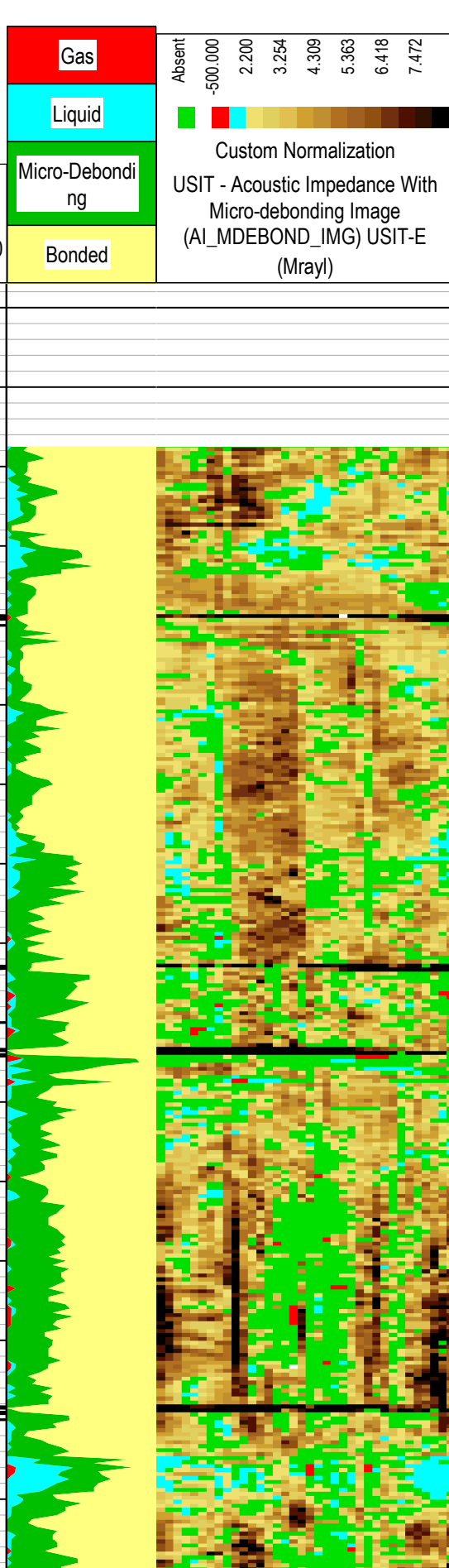
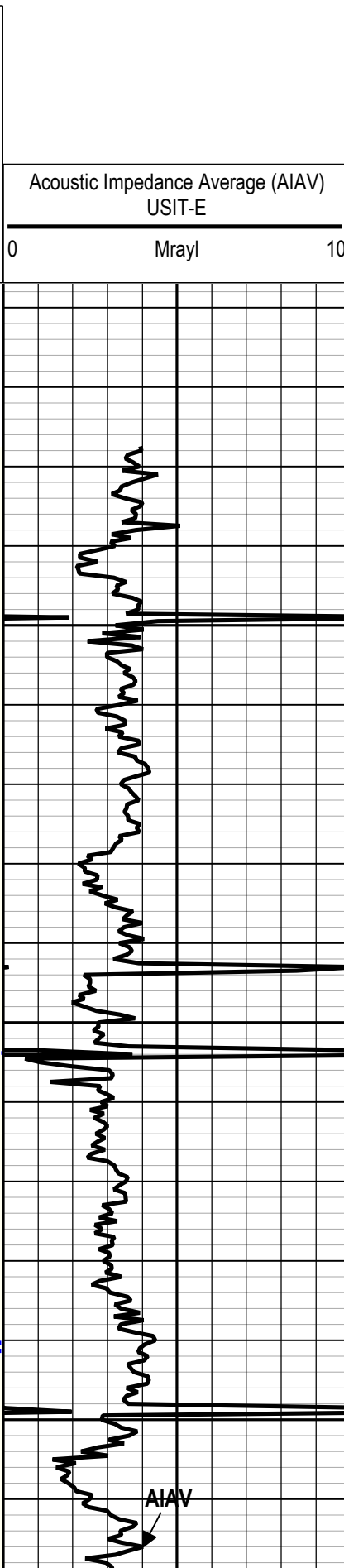
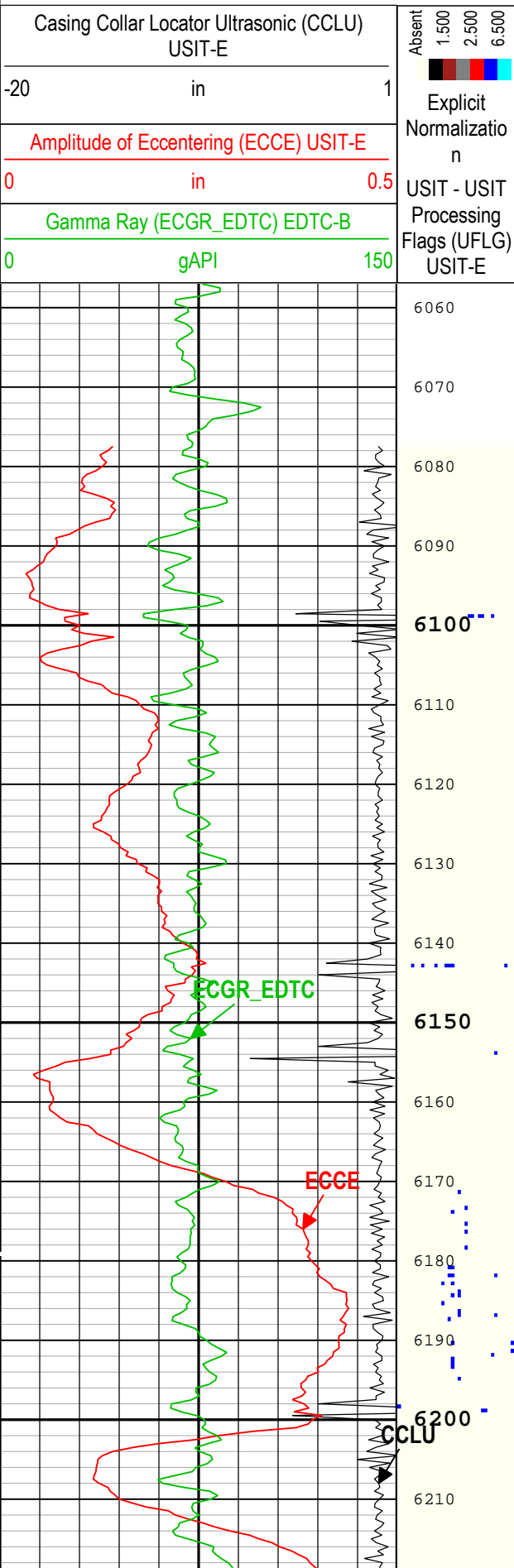
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	6077.68 ft	6355.47 ft	06-Jun-2019 11:22:04 AM	06-Jun-2019 11:24:59 AM	ON	2.99 ft	Yes

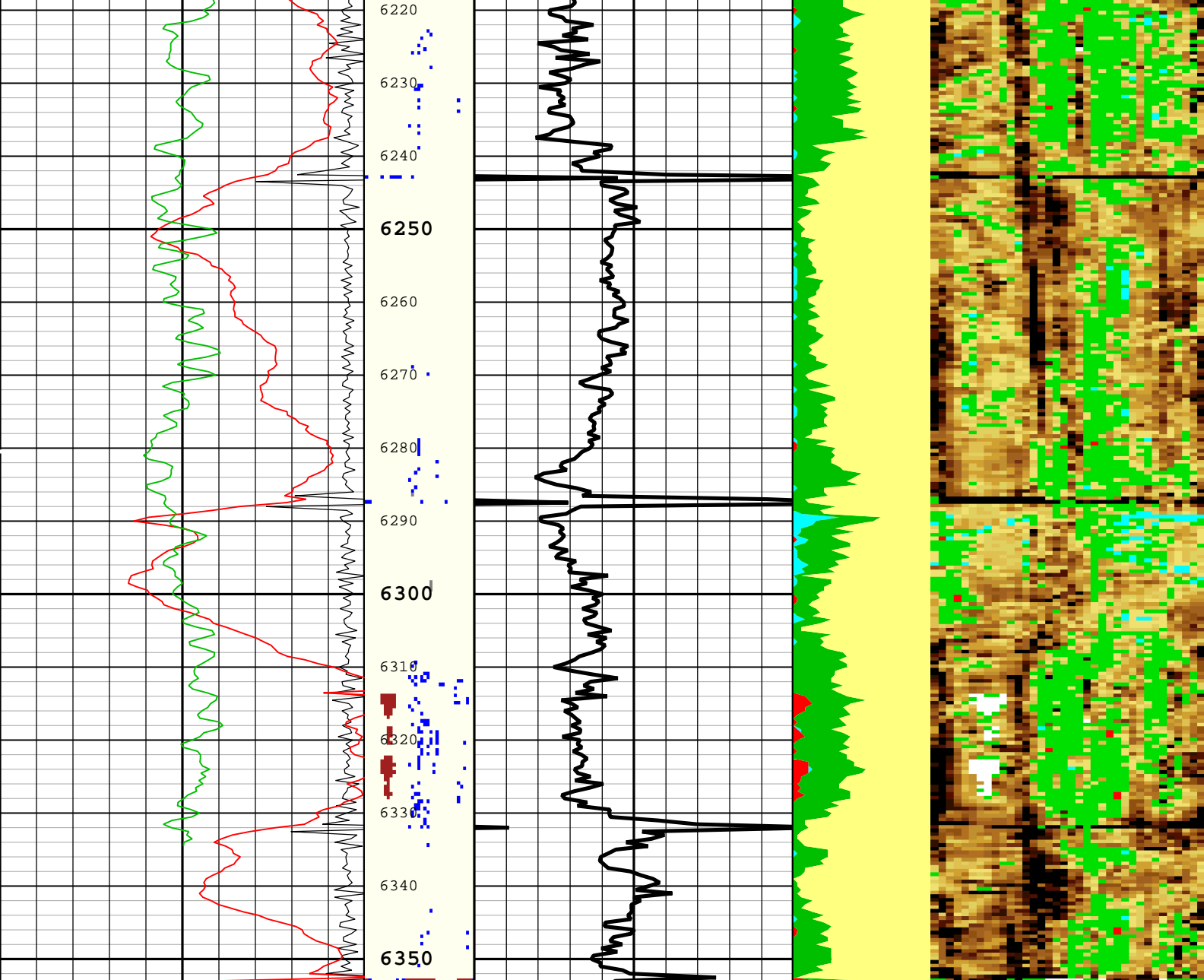
All depths are referenced to toolstring zero

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: 06-Jun-2019 12:48:25

TIME\_1900 - Time Marked every 60.00 (s)





Casing Collar Locator Ultrasonic (CCLU) USIT-E			Acoustic Impedance Average (AIAV) USIT-E			Gas			Absent			
-20 in 1			0 Mrayl 10			Liquid			-500.000 2.200 3.254 4.309 5.363 6.418 7.472			
Amplitude of Eccentering (ECCE) USIT-E			Explicit Normalization USIT - USIT Processing Flags (UFLG) USIT-E				Micro-Debonding			Custom Normalization		
0 in 0.5							Bonded			USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)		
Gamma Ray (ECGR_EDTC) EDTC-B												
0 gAPI 150												

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: 06-Jun-2019 12:48:25

## 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	16892	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	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.1	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.62	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	1.62	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
EMXV	EMEX Voltage	USIT-E	55	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 500 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	73.83	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
WINB	33.83	06-Jun-2019 11:22:04	06-Jun-2019 11:22:39	6355.47	6314.22
WINB	29.63	06-Jun-2019 11:22:39	06-Jun-2019 11:24:59	6314.22	6077.68

All depth are at tool zero.

XYZ

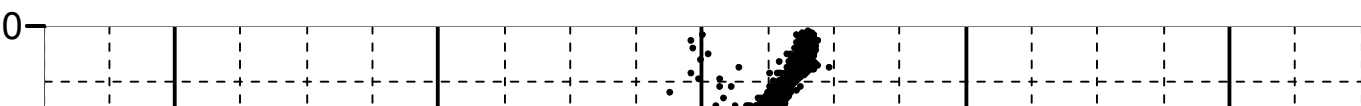
Company:Noble Energy INC Well:Wells Ranch State AA36-633  
One: Main[5]:Up:S004

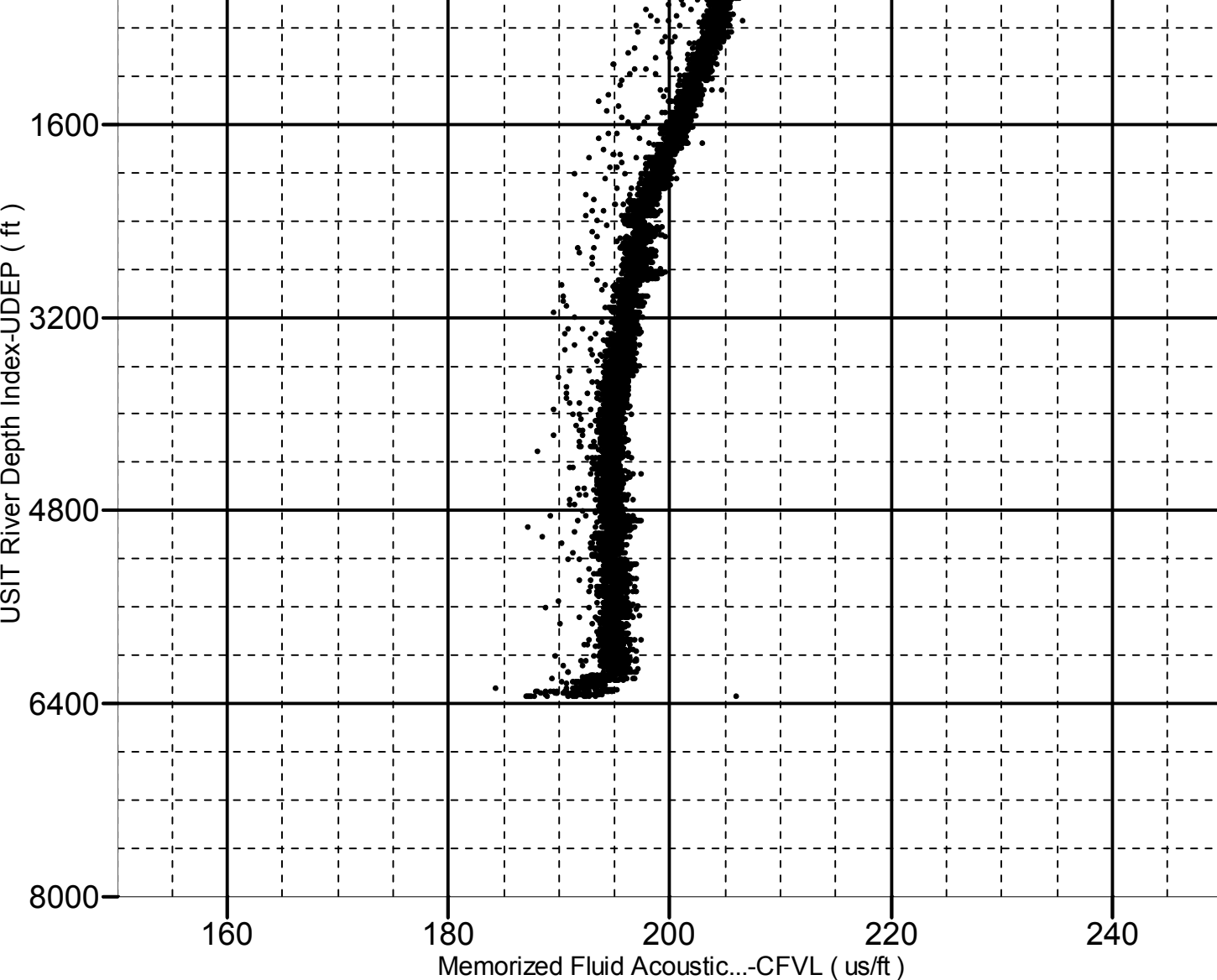
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6350.00 to 51.50 ft

● CFVL-UDEP





XYZ

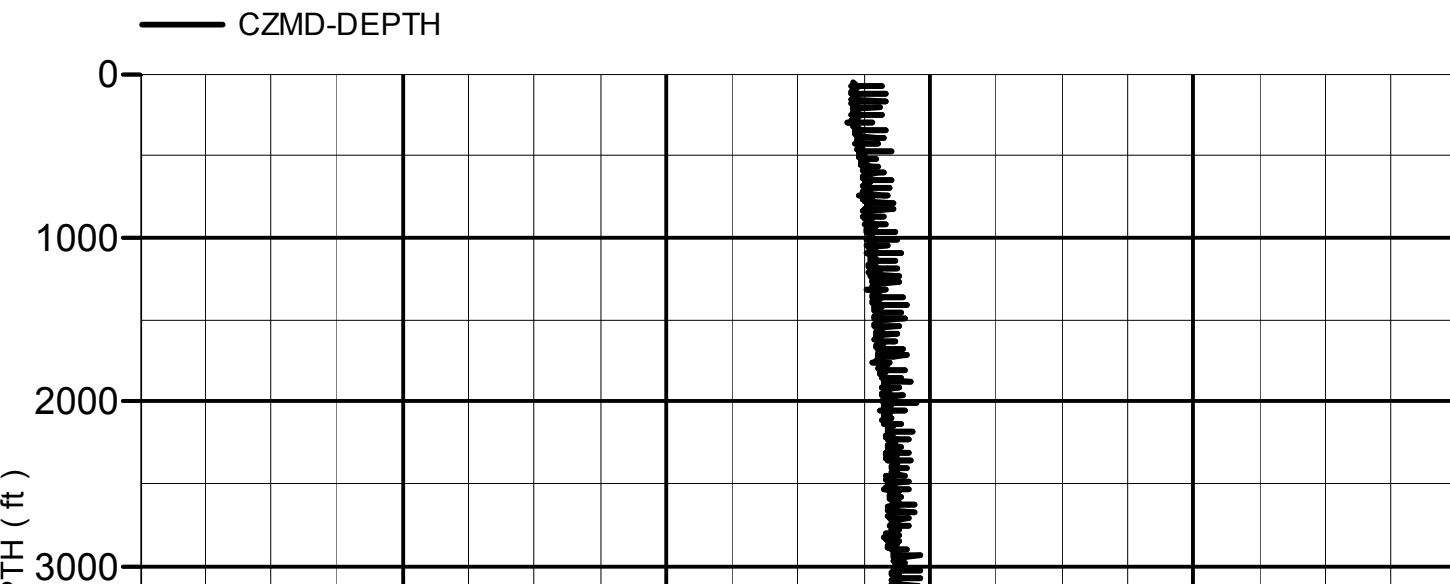
Company:Noble Energy INC Well:Wells Ranch State AA36-633

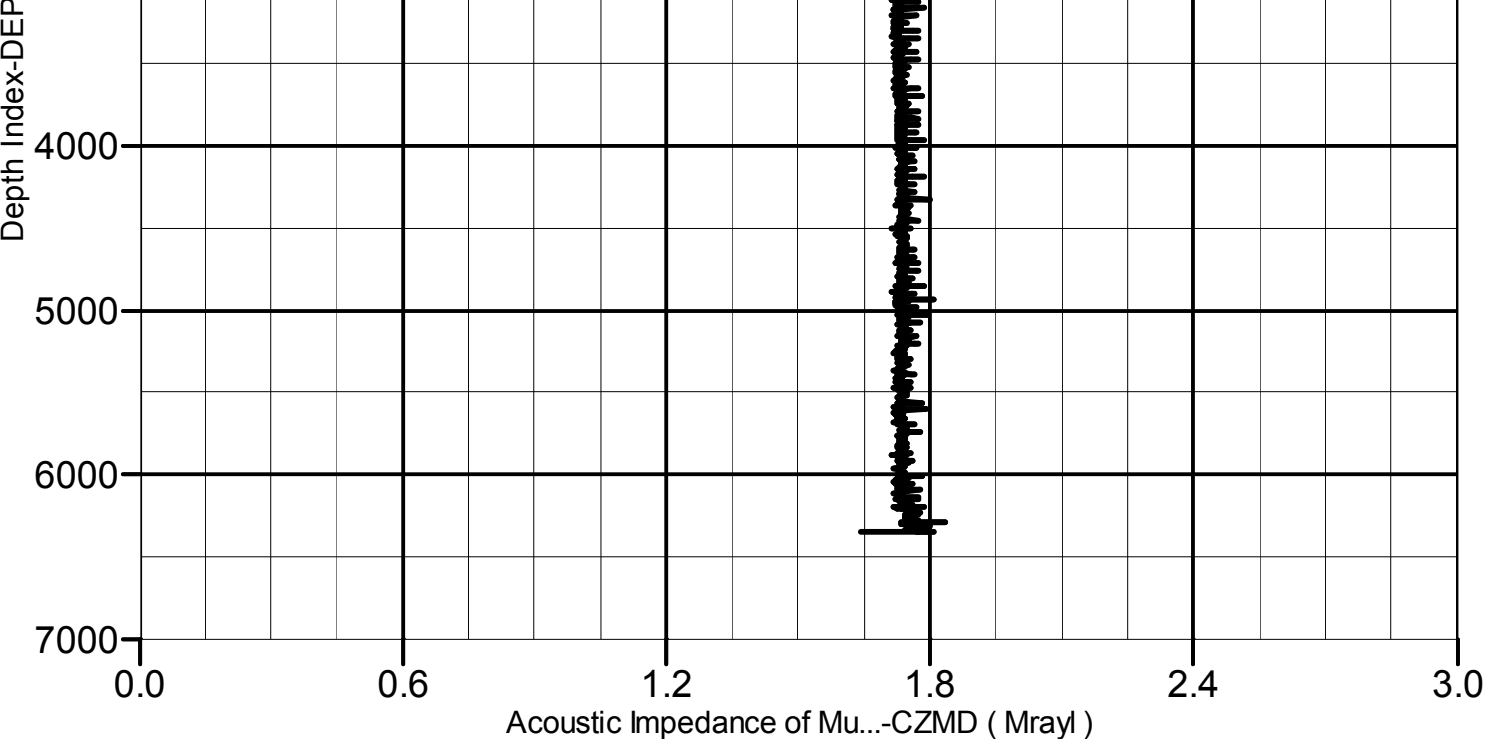
One: Main[5]:Up:S004

## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6350.50 to 51.50 ft





Company: Noble Energy INC

**Schlumberger**

Well: Wells Ranch State AA36-633

Field: Wattenberg

County: Weld

State: Colorado

UltraSonic Summary Print