

Company: Noble Energy Inc

Well: Vogler State D21-750

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County: Weld  
Field: Wattenberg  
Location: SWSE  
Well: Vogler State D21-750  
Company: Noble Energy Inc

Location:	SWSE	Elev.:	K.B.	4854.00 ft
	SHL: 930' FSL & 2519' FEL		G.L.	4824.00 ft
	Lat/Long: 40.20623/-104.55592		D.F.	4854.00 ft
	Permanent Datum:	Ground Level	Elev.:	4824.00 f
Log Measured From:		Kelly Bushing	30.00 ft	above Perm.Datum
Drilling Measured From:		Kelly Bushing		
API Serial No.	Section:	Township:	Range:	
05-123-48562	21	3N	64W	

Logging Date 27-Apr-2019

Run Number ONE

Depth Driller 17630.00 ft

Schlumberger Depth 17630.00 ft

Bottom Log Interval 6350.00 ft

Top Log Interval 150.00 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 1940.00 ft

To 17630.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade P110

From 0.00 ft

To 17618.50 ft

Max Recorded Temperatures 205.7 degF

Logger on Bottom 27-Apr-2019

Unit Number 9108

Recorded By A. Voyage

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.

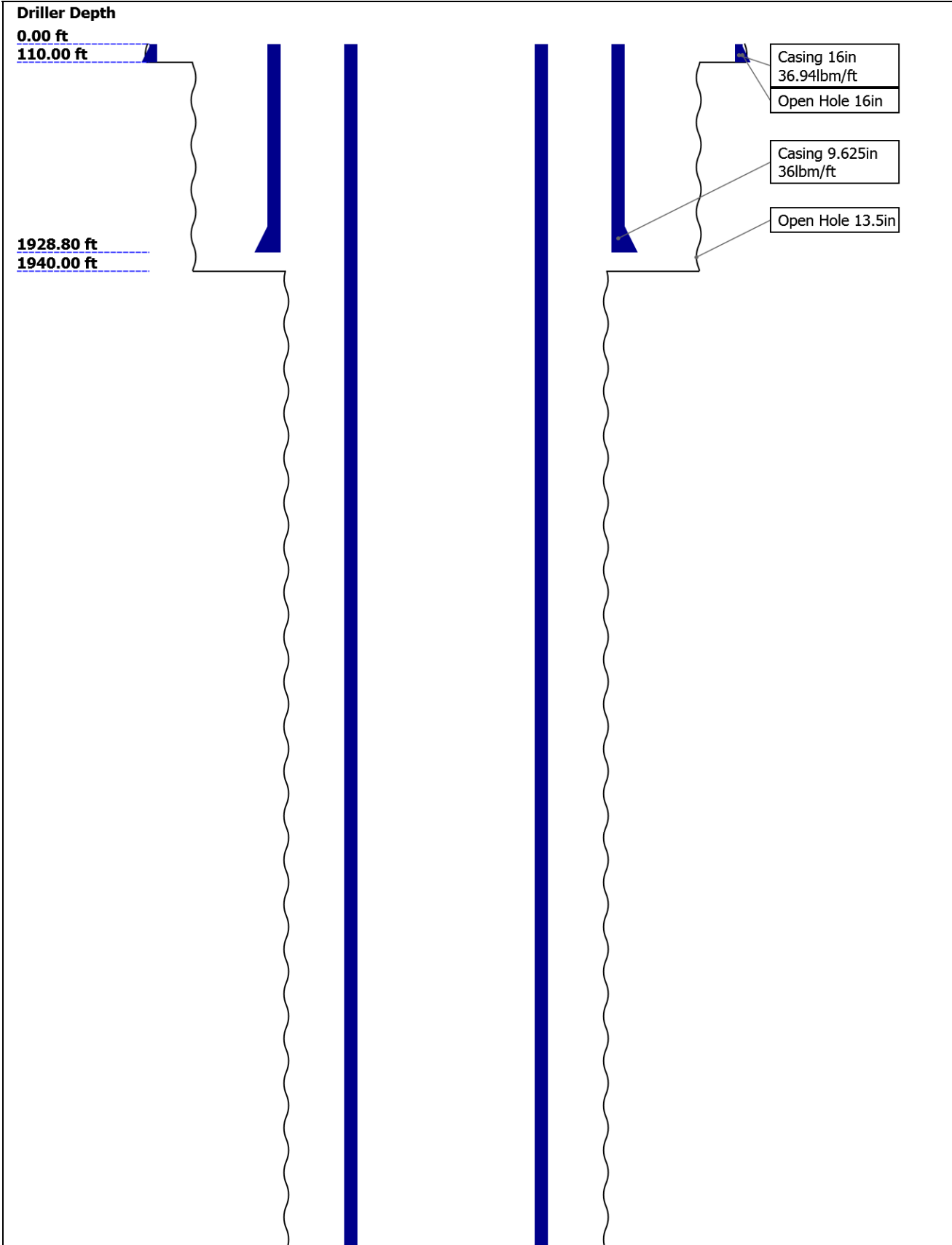
Contents

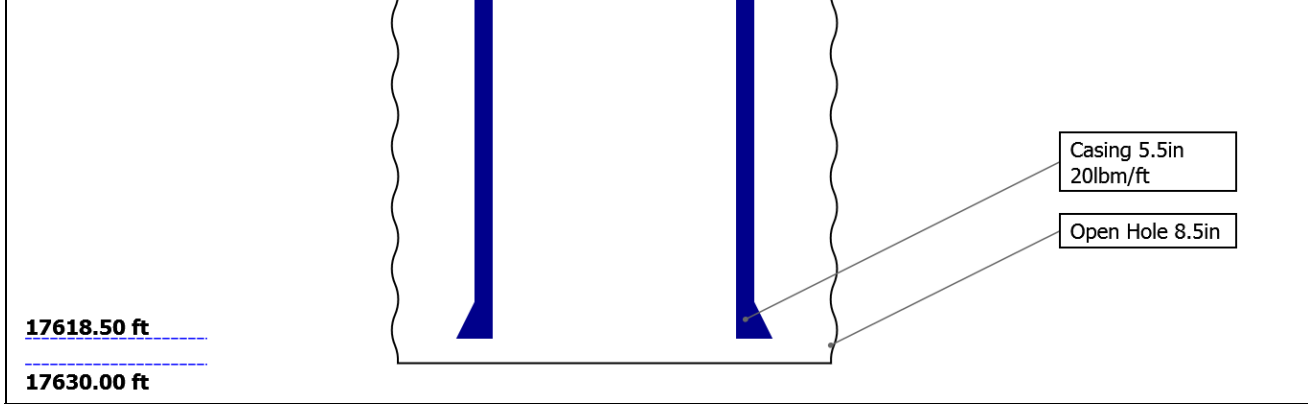
- Header
- Disclaimer
- Contents
- Well Sketch
- Borehole Size/Casing/Tubing Record
- Remarks and Equipment Summary
- Depth Summary
- USI Fluid Properties Measurement\_1
- ONE 2500 PSI Main Pass
  - Integration Summary
  - Software Version
  - Composite Summary
  - Log ( DJ Basin Ultrasonic Cement Summary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

- in )  
13. 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





17618.50 ft

17630.00 ft

Casing 5.5in  
20lbm/ft

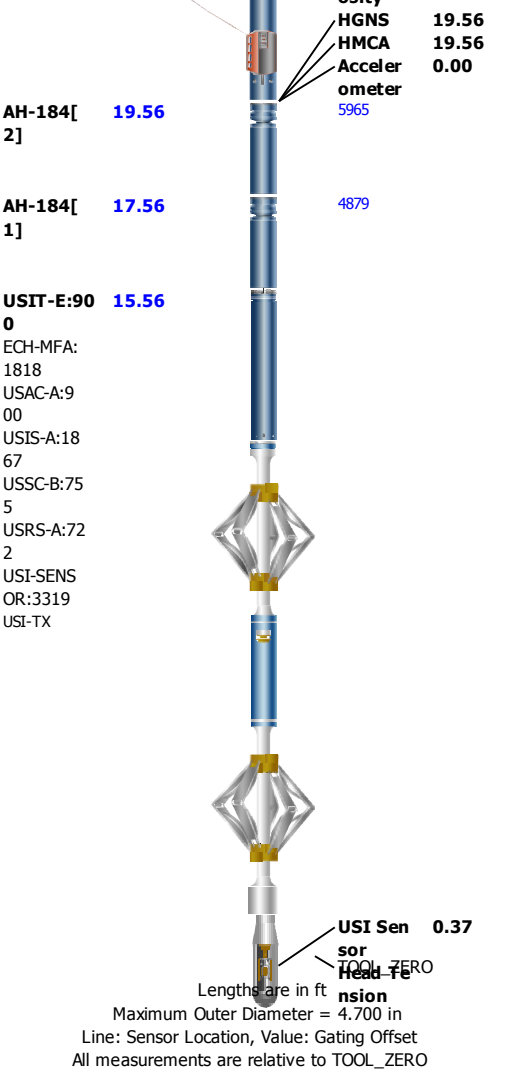
Open Hole 8.5in

## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	16	13.5	8.5			
Top Driller ( ft )	0	110	1940			
Top Logger ( ft )	0	110	1940			
Bottom Driller ( ft )	110	1940	17630			
Bottom Logger ( ft )	110	1940	17630			
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	1928.8	17618.5			
Bottom Logger ( ft )	110	1928.8	17618.5			

## Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
<div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT38.95LEH-QT</div><div>EDTC-B:935.47038EDTH-B:9046EDTG-B:79215EDTC-B:9038</div><div>HGNS-B:128.97855HGNH:1870NSR-F:5070NPV-NHMCA-BHGNS-B:1855HACCZ-B:659</div></div><div><div>CTEM31.97ACCZ0.00HV0.00Gamma30.1RayTelStatu28.97sTemper28.94atureGR28.23</div><div>CNL Por21.89osity</div></div></div>				Thank you for choosing Schlumberger Wireline!	
				Log objective: cement evaluation.	
				Toolstring ran as per tool sketch.	
				Small hole kit, booster kit and GEMCO on USAC used to centralize tool in well.	
				USRS-A sub run with USI-TX transducer.	
				Main pass logged @ 2500psi surface induced pressure. Repeat pass logged at 0 psi surface-induced pressure..	
				Slurry: 13.2ppg Spacer: 11.5ppg	



## Depth Summary

	ONE		
--	-----	--	--

### Depth Measuring Device

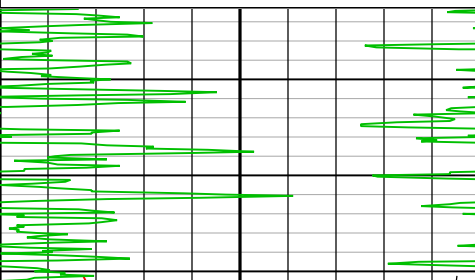
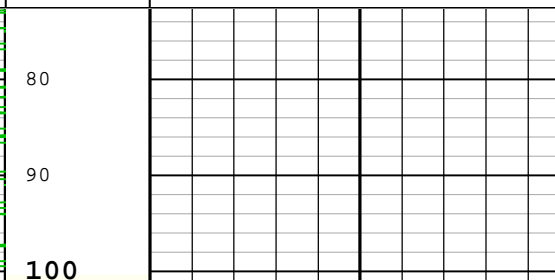
Type	IDW-JA		
Serial Number	6455		
Calibration Date	26-JUL-2018		
Calibrator Serial Number	57		
Calibration Cable Type	7-32AS-XS		
Wheel Correction 1	-1		
Wheel Correction 2	1		

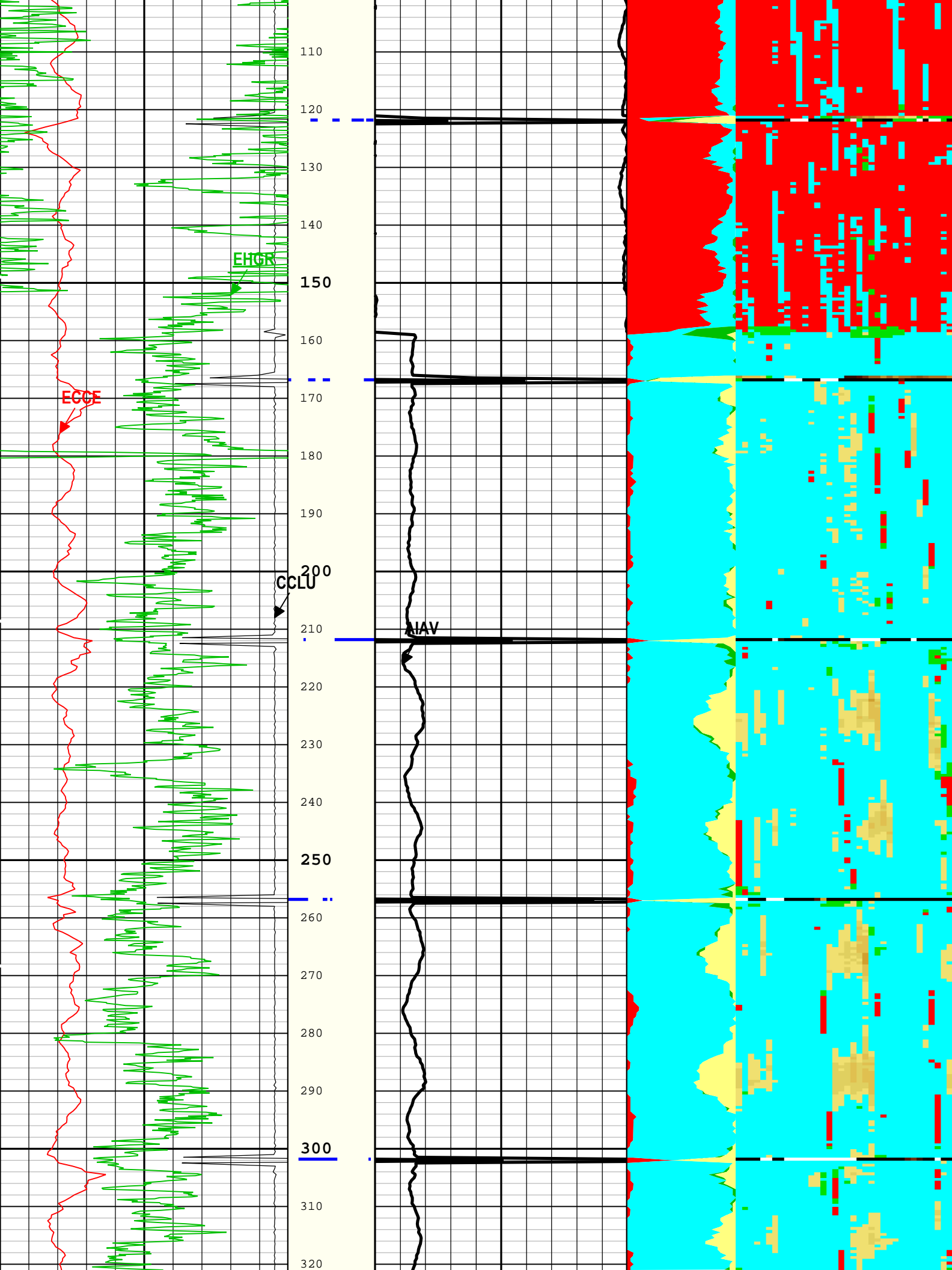
### Tension Device

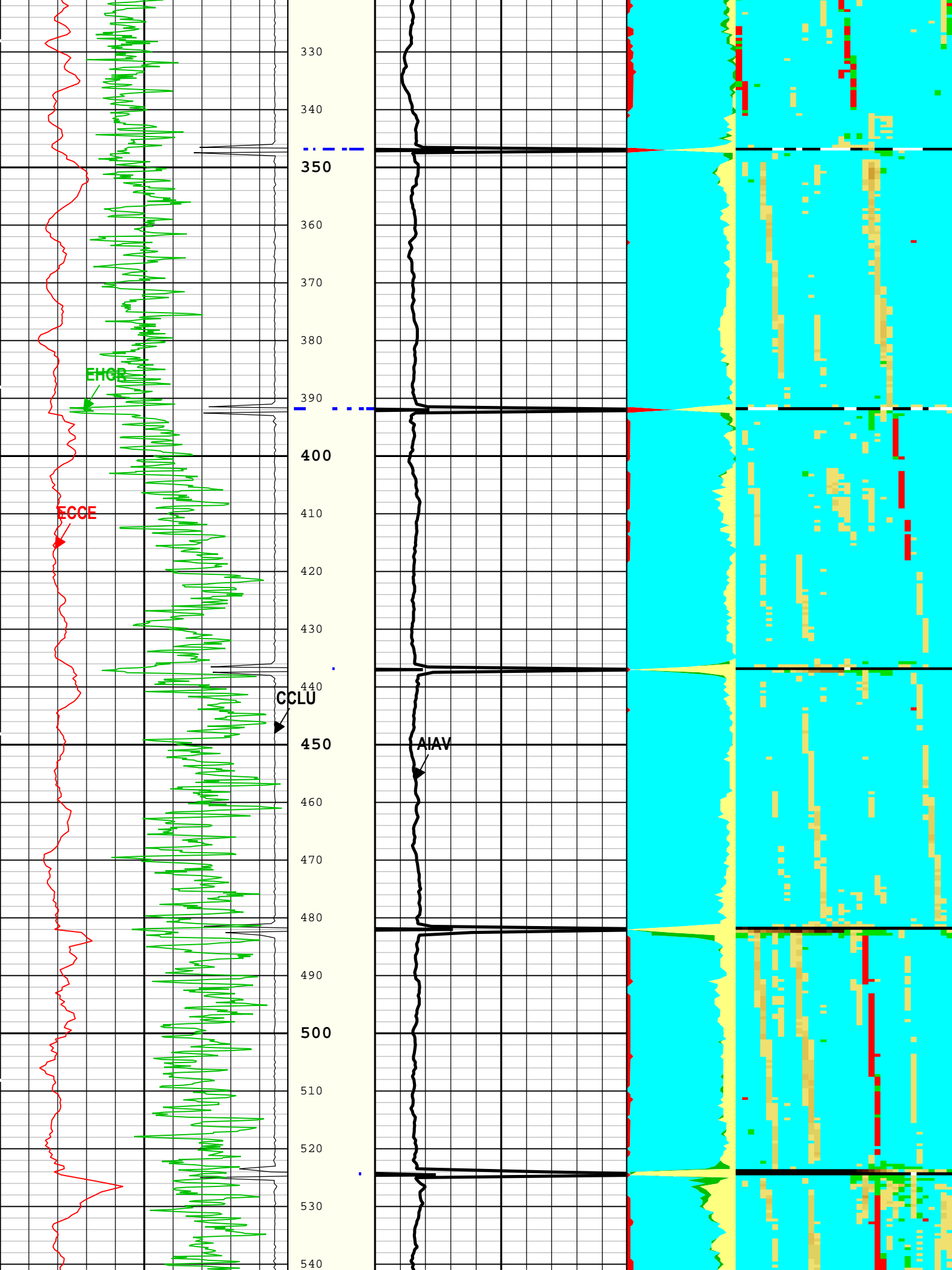
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		

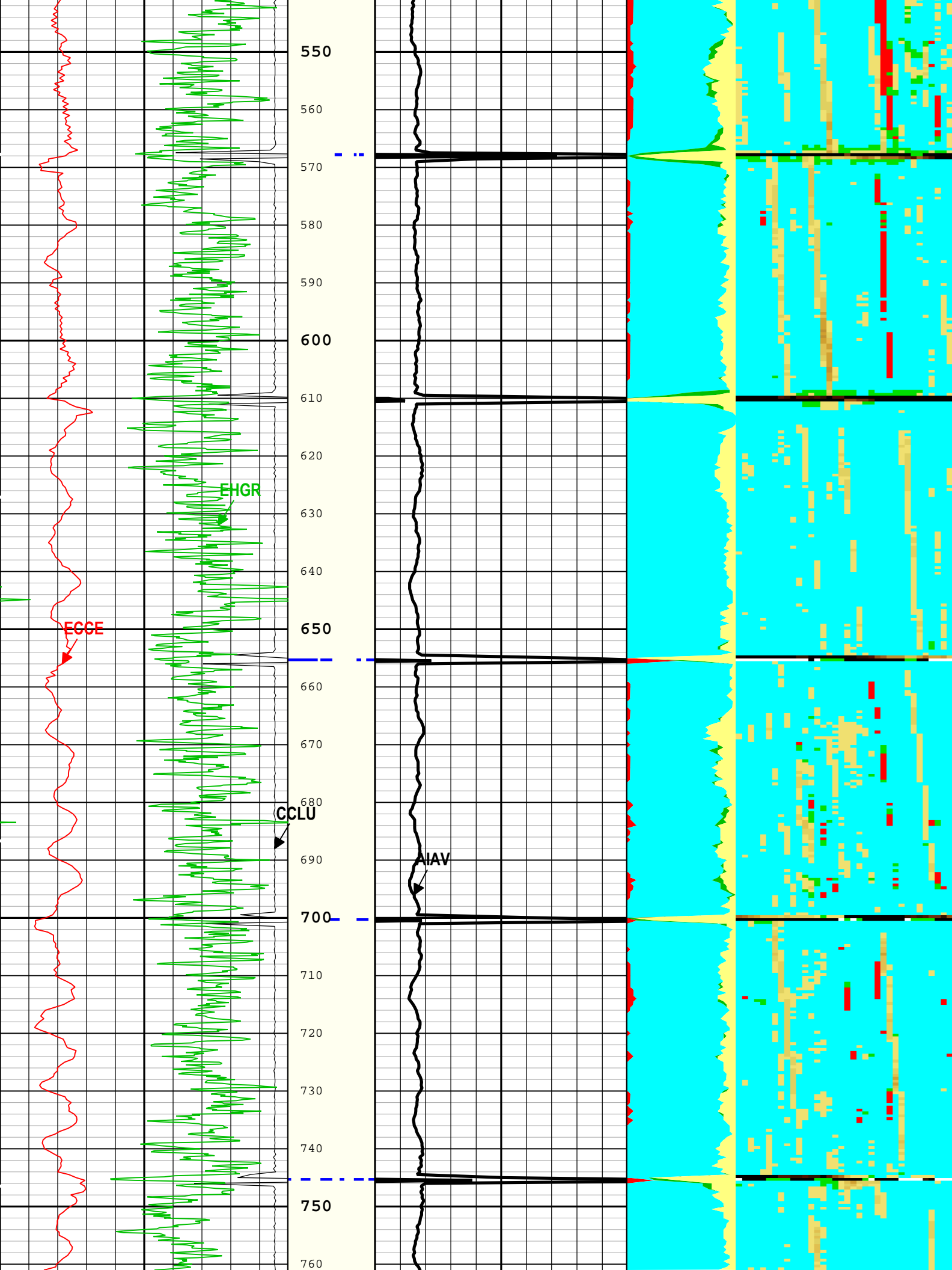
### Logging Cable

Type	7-32AS-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		

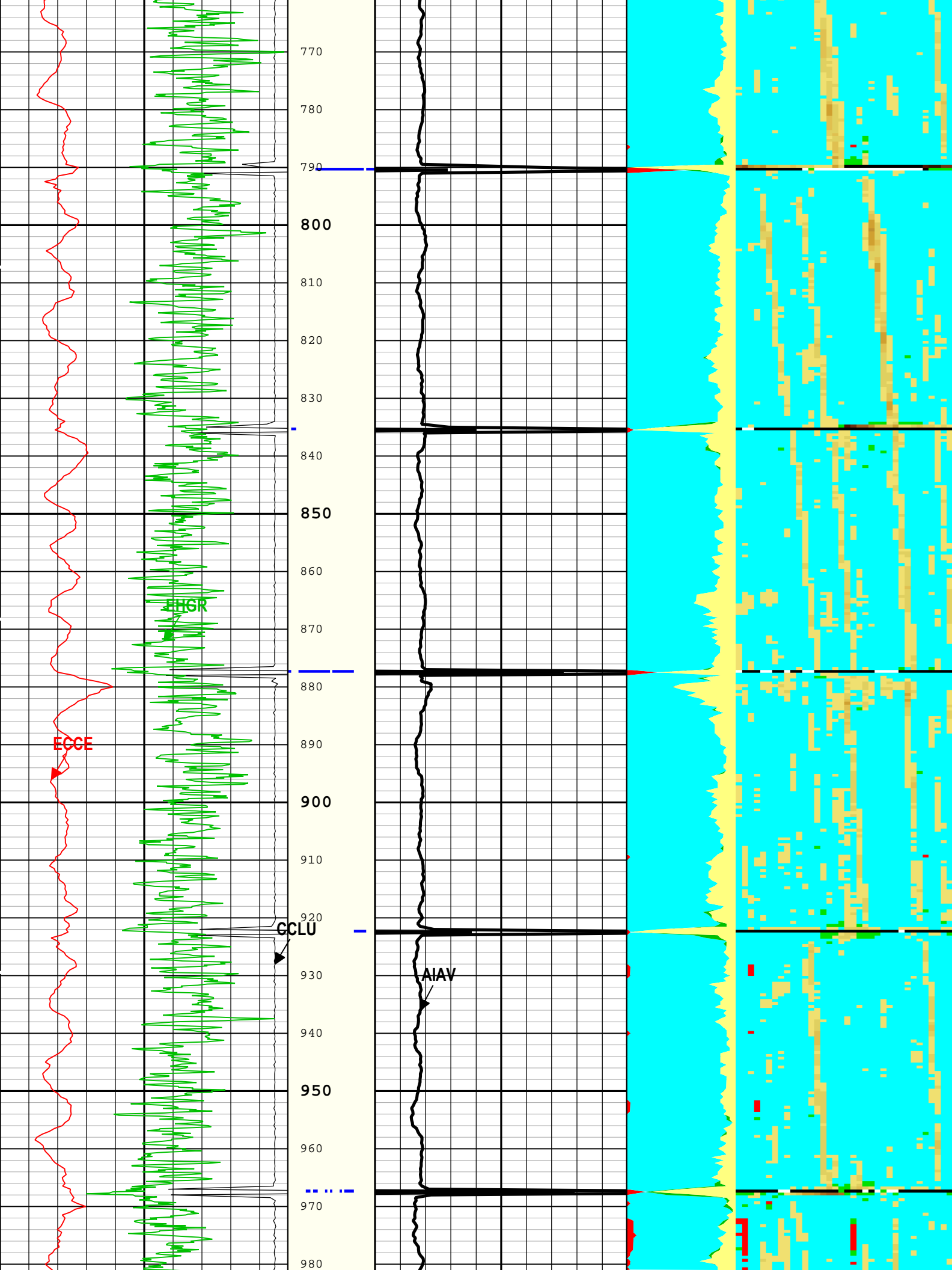
Rig Type		MAST							
ONE:Depth Control Parameters				Depth Control Remarks					
Log Sequence		First Log In the Well		All Schlumberger Depth control standards and guidelines followed.					
Rig Up Length At Surface				IDW used as primary depth control device.					
Rig Up Length At Bottom				Z-chart used as secondary depth control device.					
Rig Up Length Correction				All logs correlated to down pass.					
Stretch Correction		5.43 ft							
Tool Zero Check At Surface									
USIT - Fluid Properties Measurement									
Run Name		Pass Name		Start Depth(ft)		Stop Depth(ft)			
Run 1		Log[2]:Down		242.6		2503.31			
Fluid Velocity = "Automatic". CFVL equals DFSL channel									
Start Depth(ft)		Stop Depth(ft)		Start Value(us/ft)		End Value(us/ft)			
Mud Impedance = "Theoretical". CZMD uses theoretical results. MUD_N_THE=1.11 DFD=1.01g/cm3(8.40lbm/gal)									
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	Log[5]:Up	Up	100.80 ft	6374.54 ft	27-Apr-2019 11:02:29 AM	27-Apr-2019 12:56:52 PM	ON	5.43 ft	Yes
All depths are referenced to toolstring zero									
Log					Company:Noble Energy Inc		Well:Vogler State D21-750		
ONE: Log[5]:Up:S011									
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: 29-Apr-2019 09:35:48									
TIME_1900 - Time Marked every 60.00 (s)									
Casing Collar Locator Ultrasonic (CCLU) USIT-E			Explicit Normalization		Acoustic Impedance Average (AIAV) USIT-E		Gas		
-20 in 1			USIT - USIT Processing Flags (UFLG) USIT-E		0 Mrayl 10		Liquid		
Amplitude of Eccentering (ECCE) USIT-E							Micro-Debonding		
0 in 0.5							Bonded		
Gamma Ray (EHGR) HGNS-B							Custom Normalization		
0 gAPI 150							USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)		
									

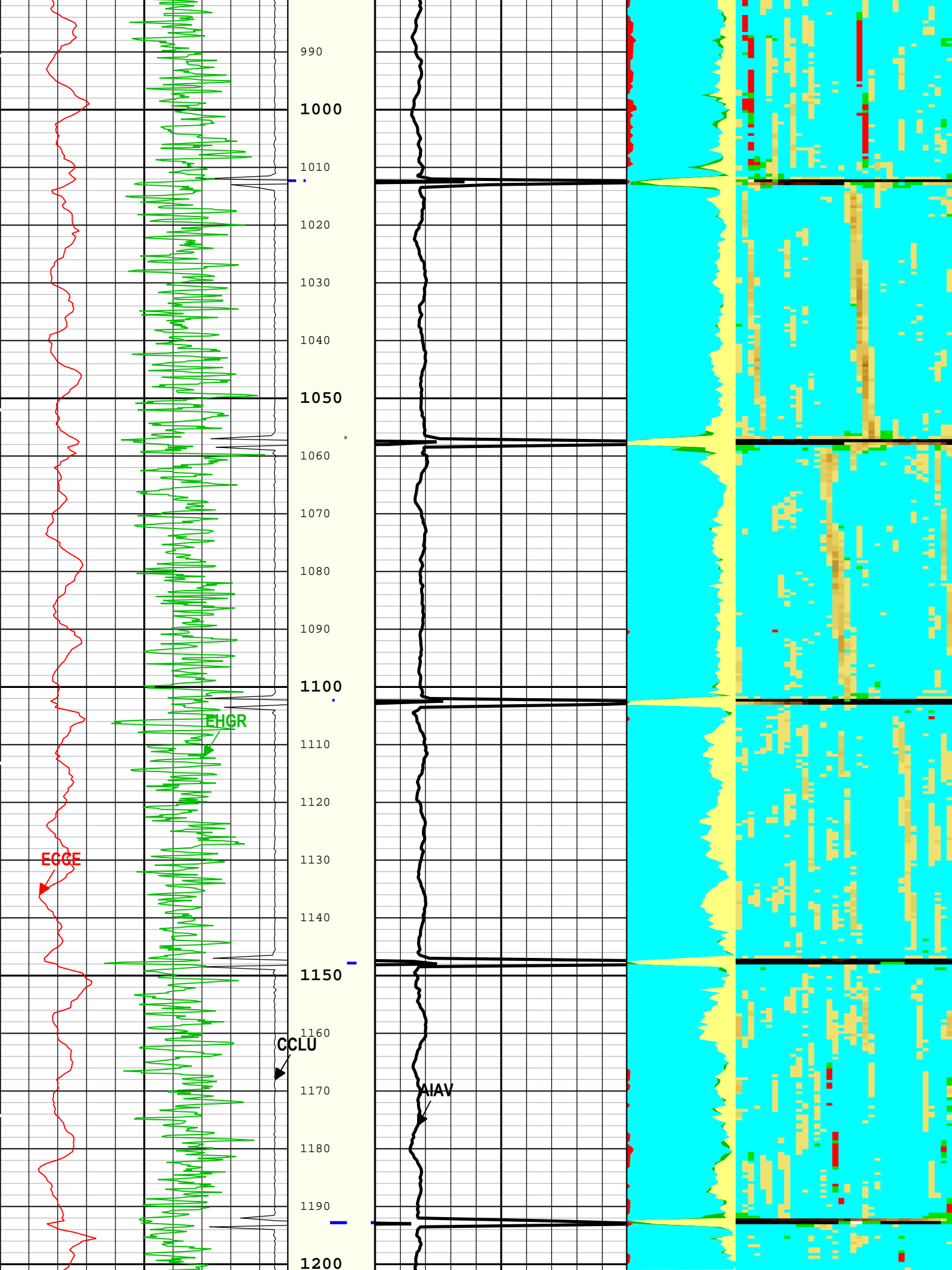


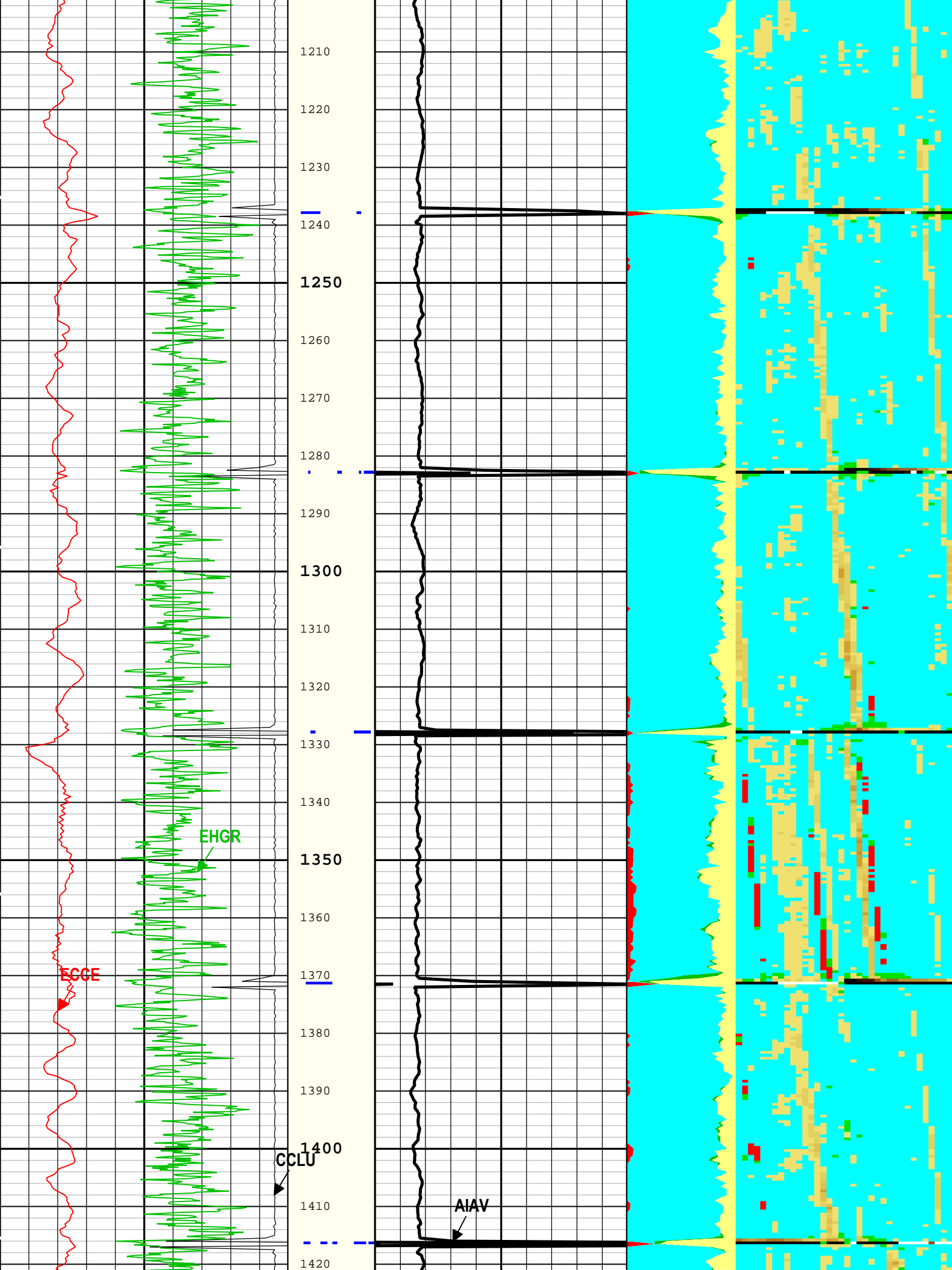


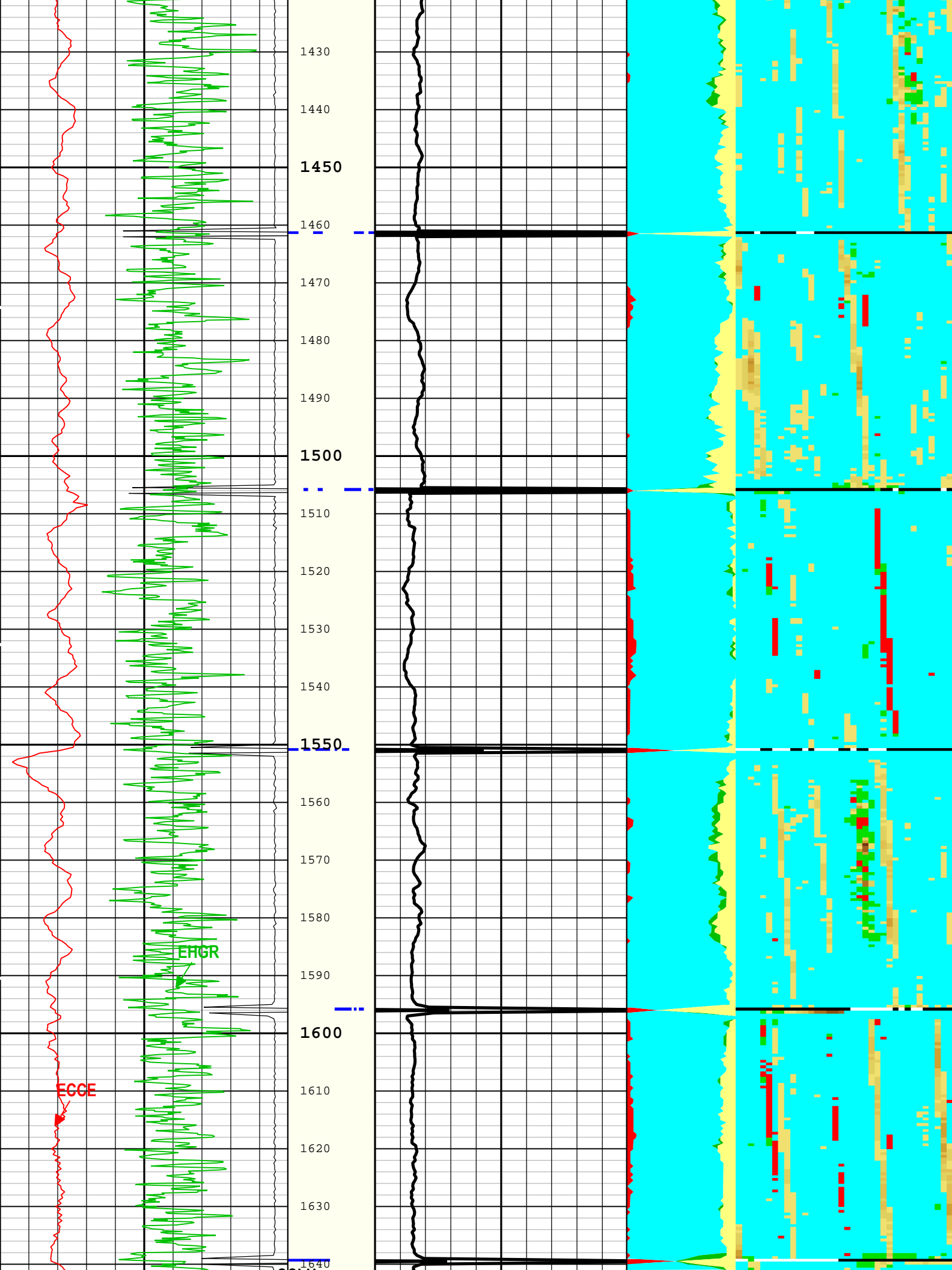


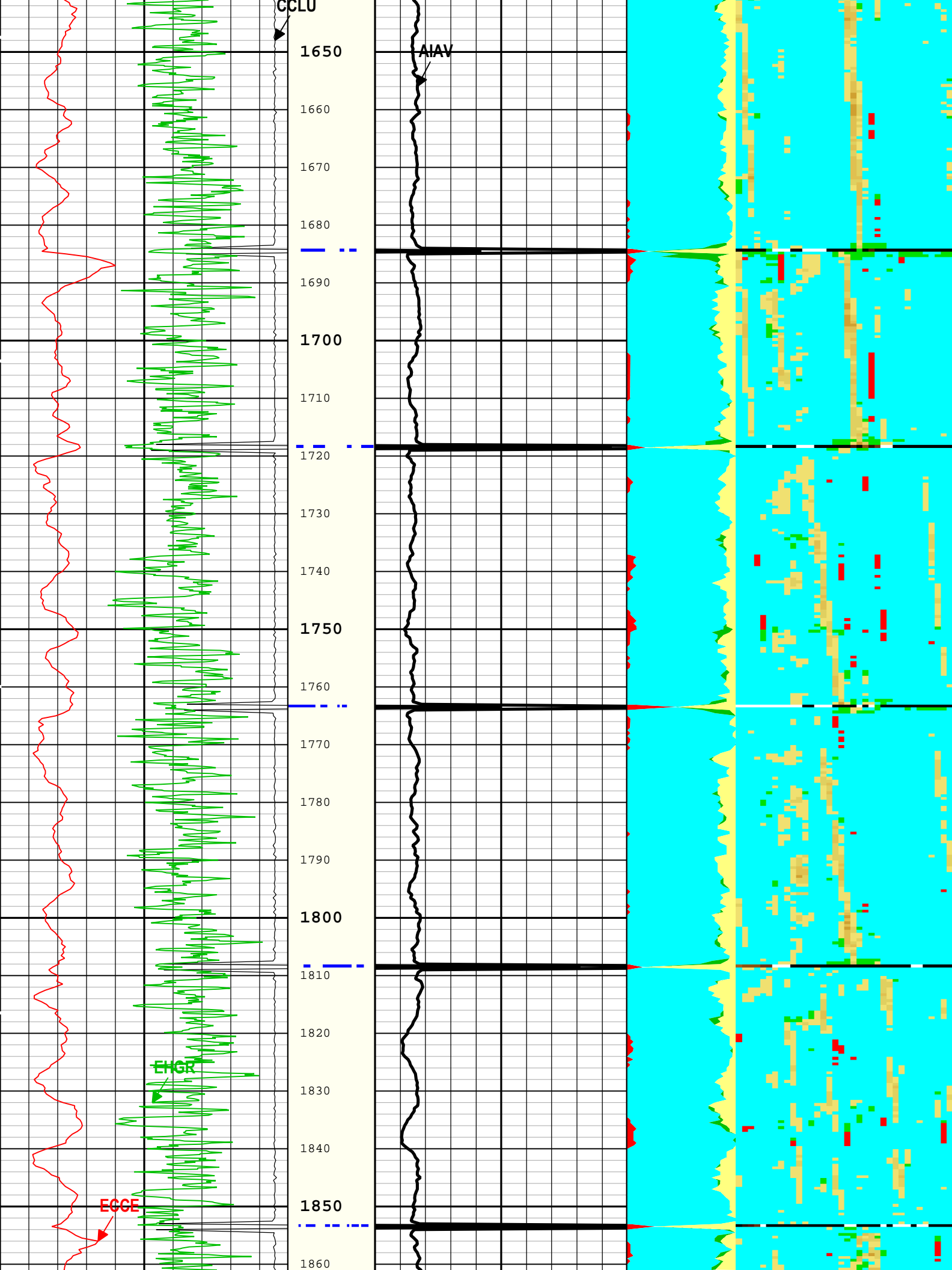


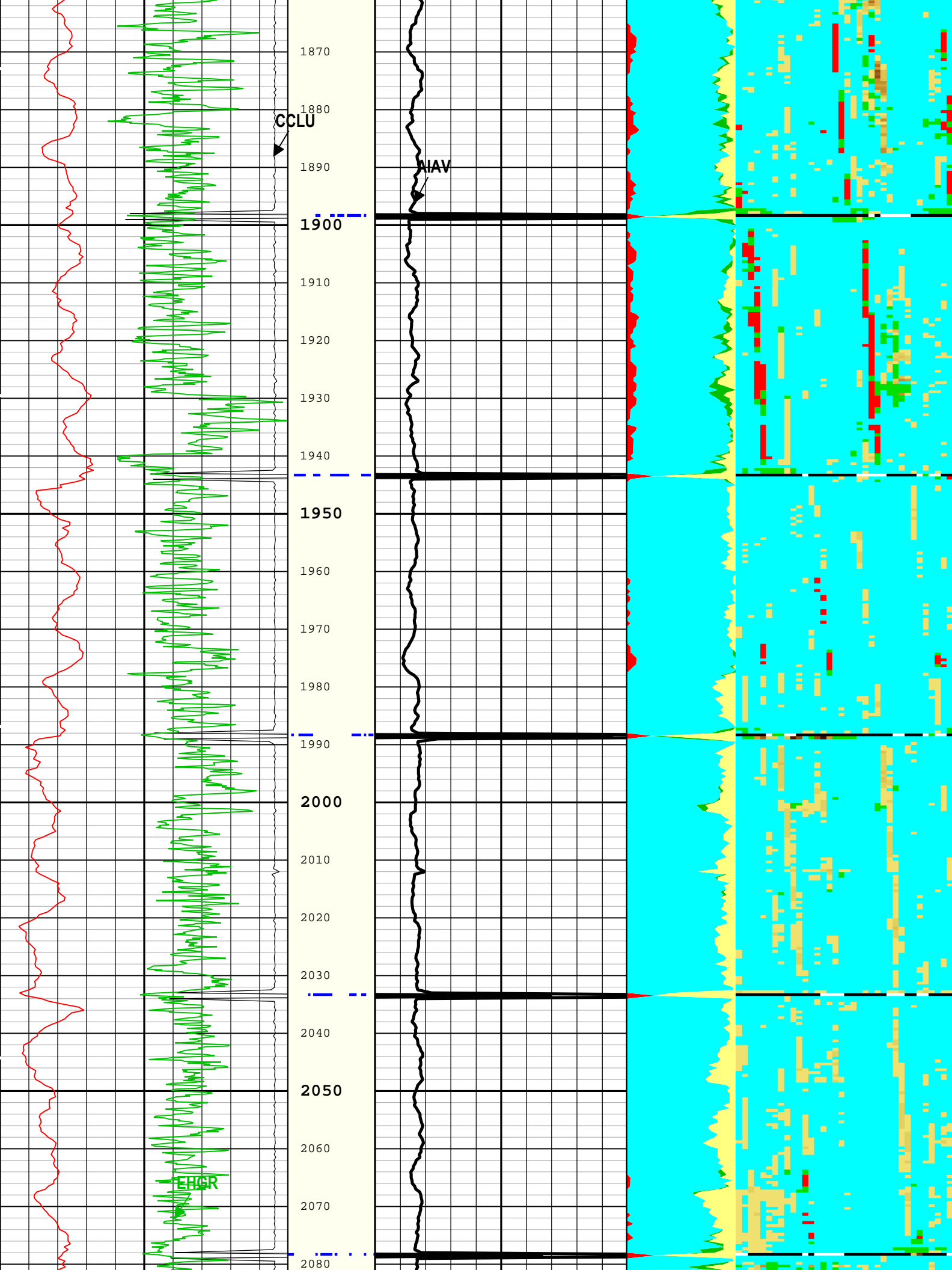


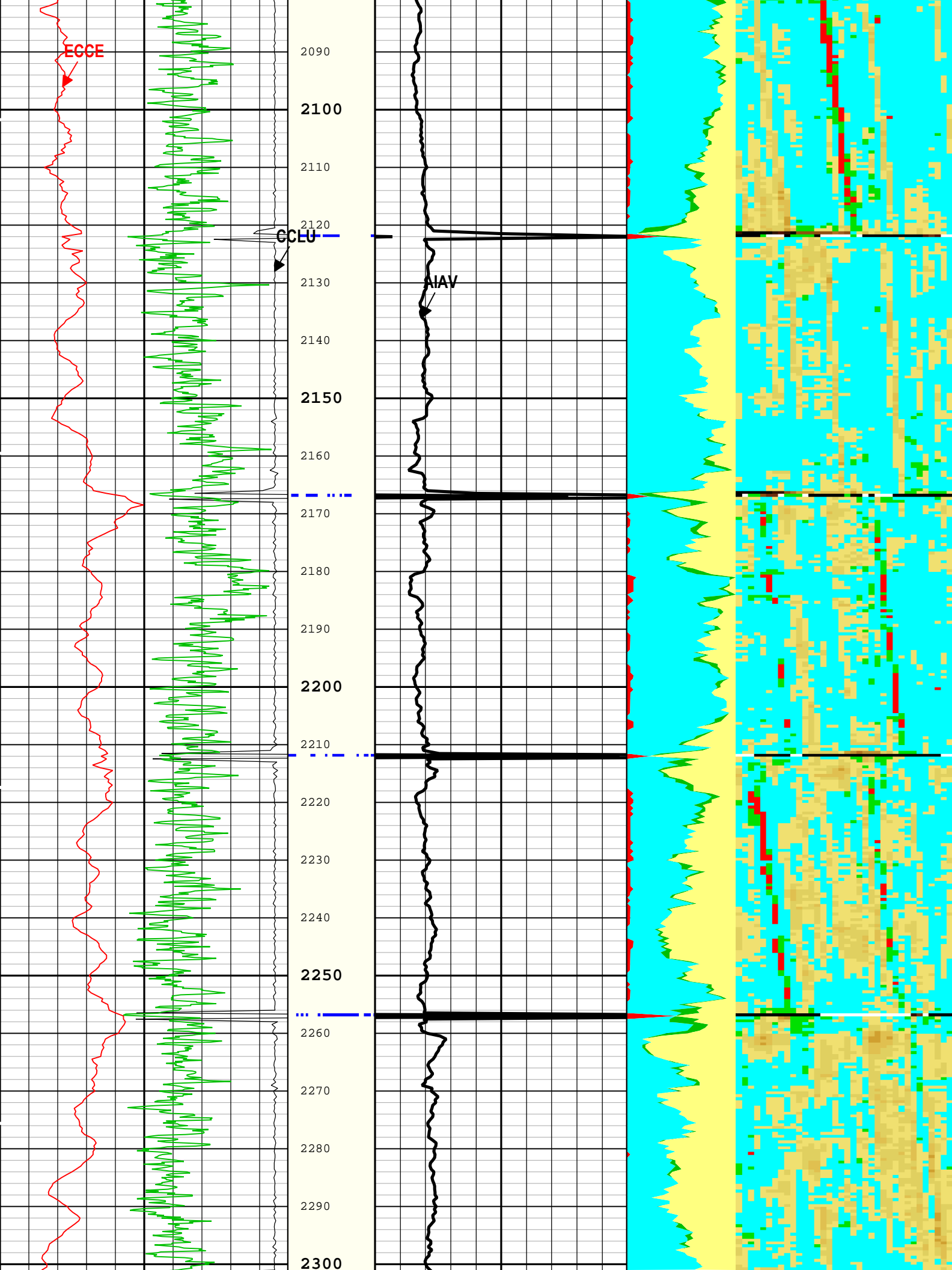


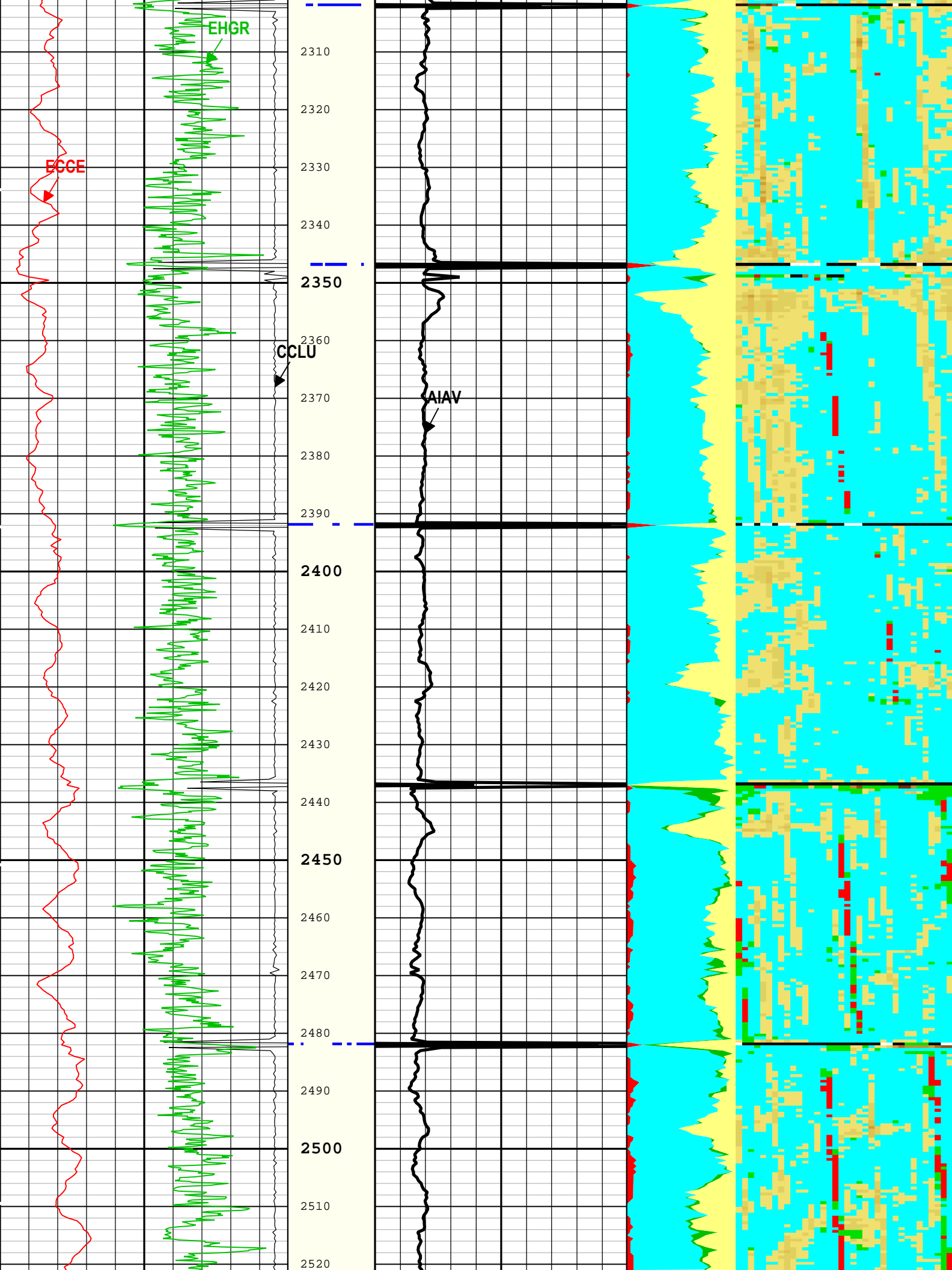




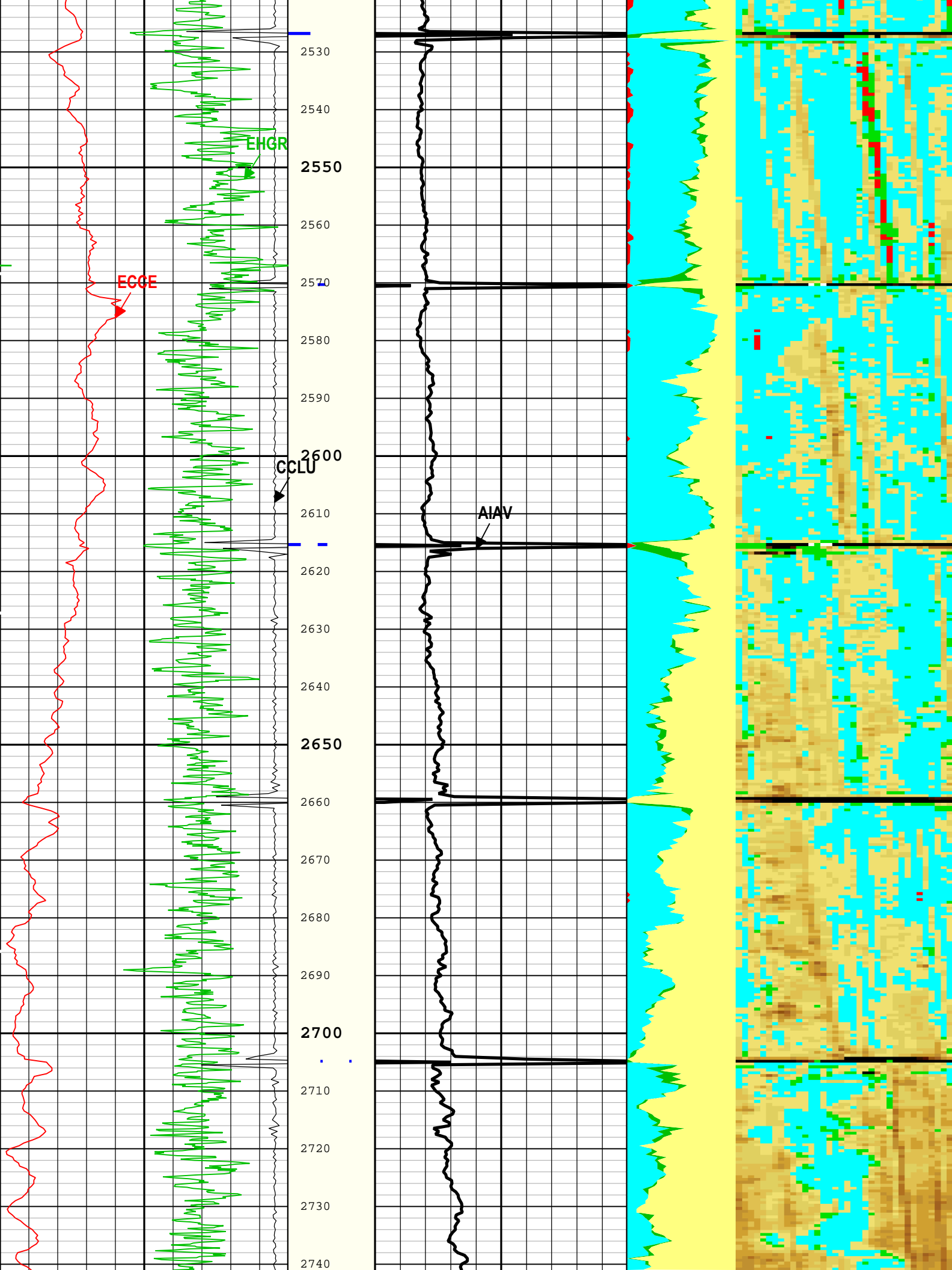


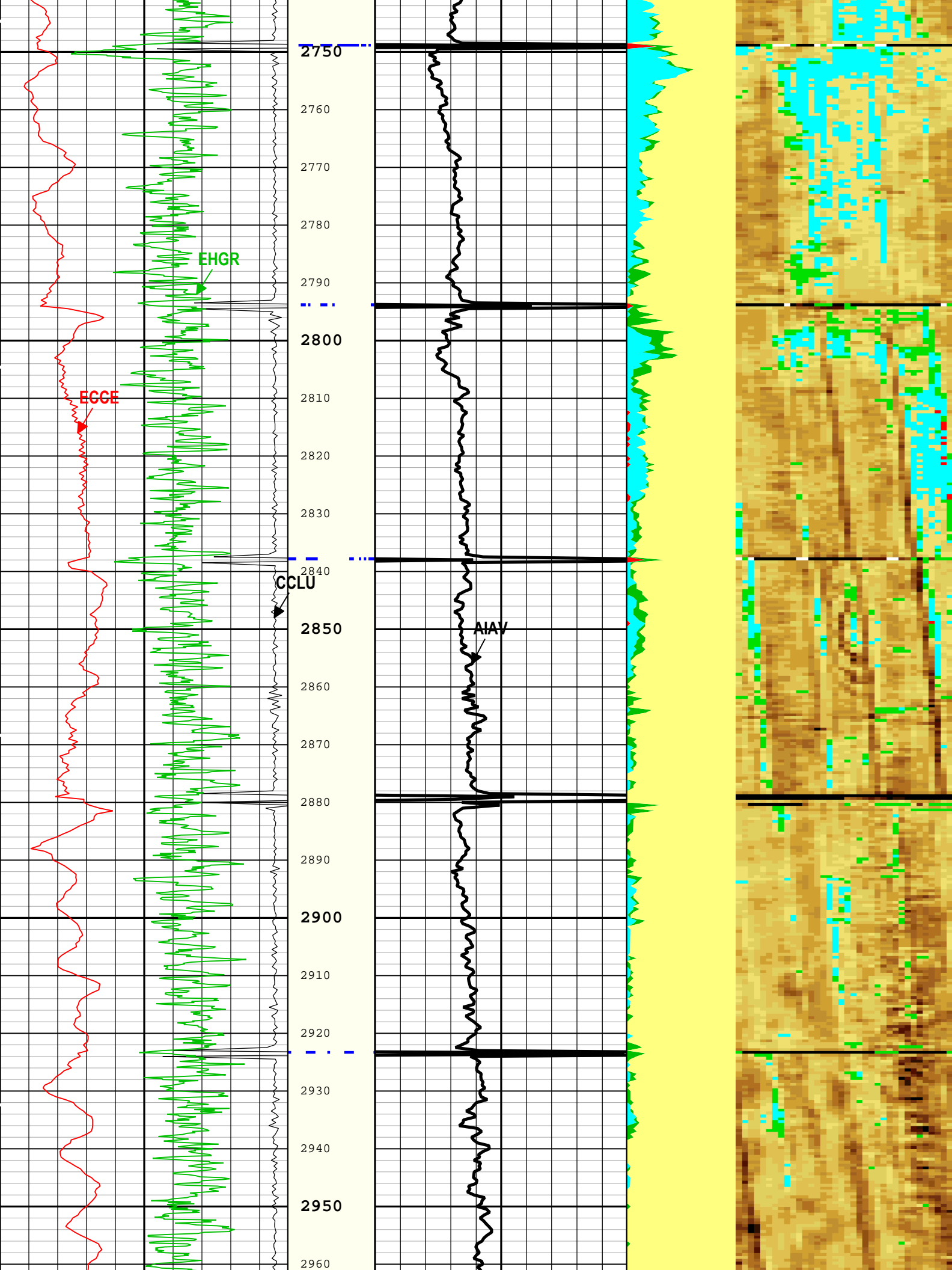


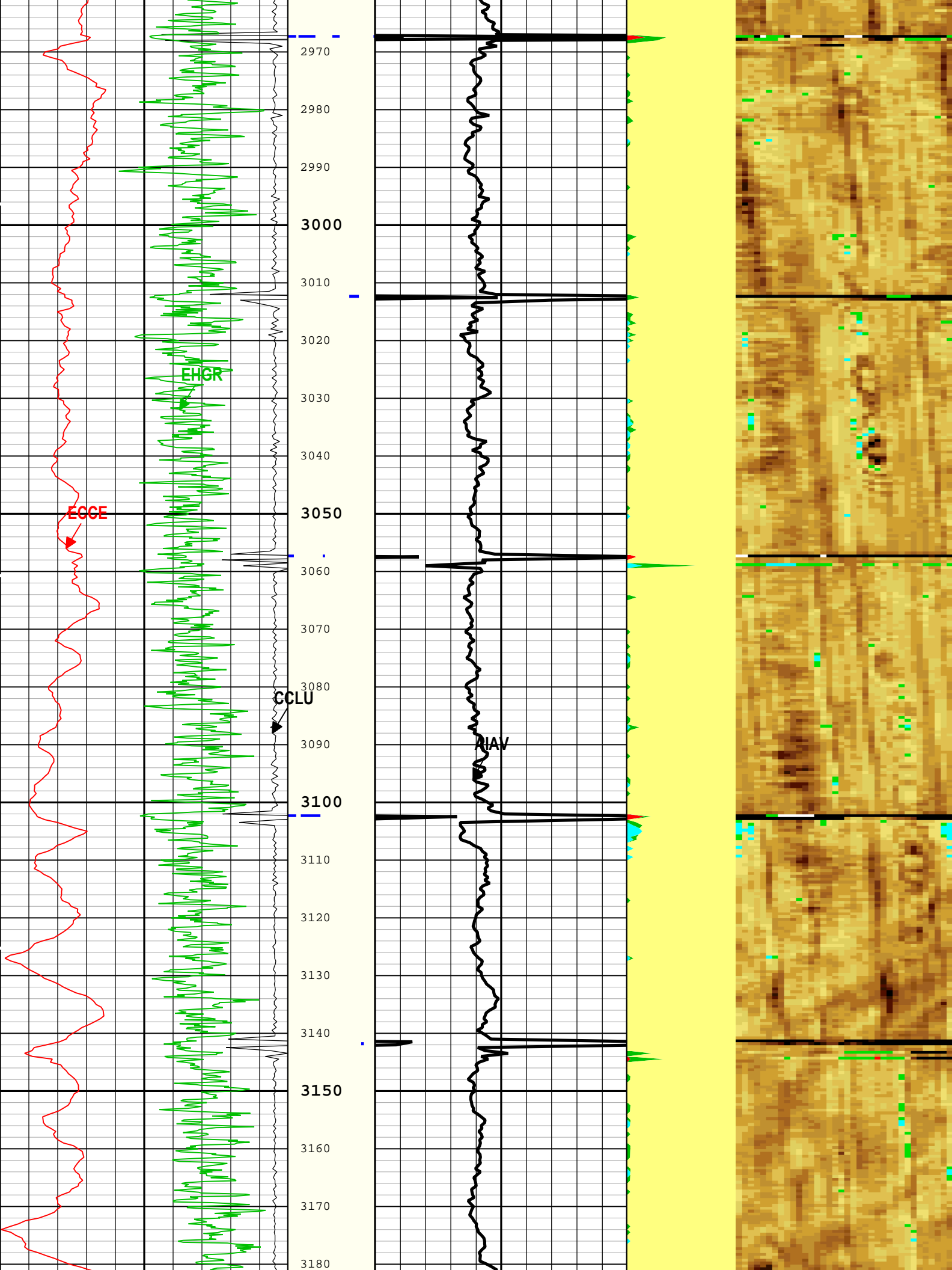


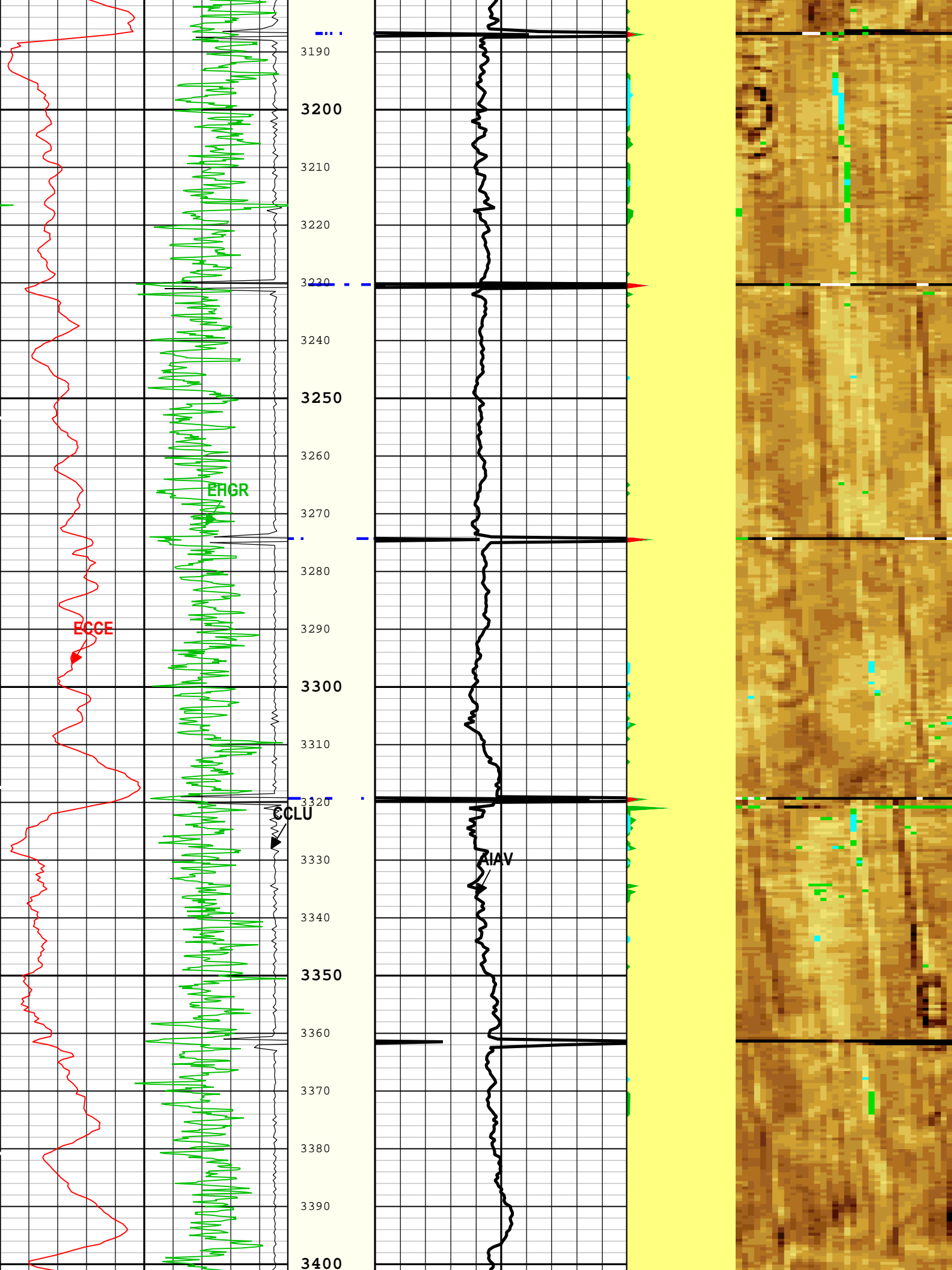


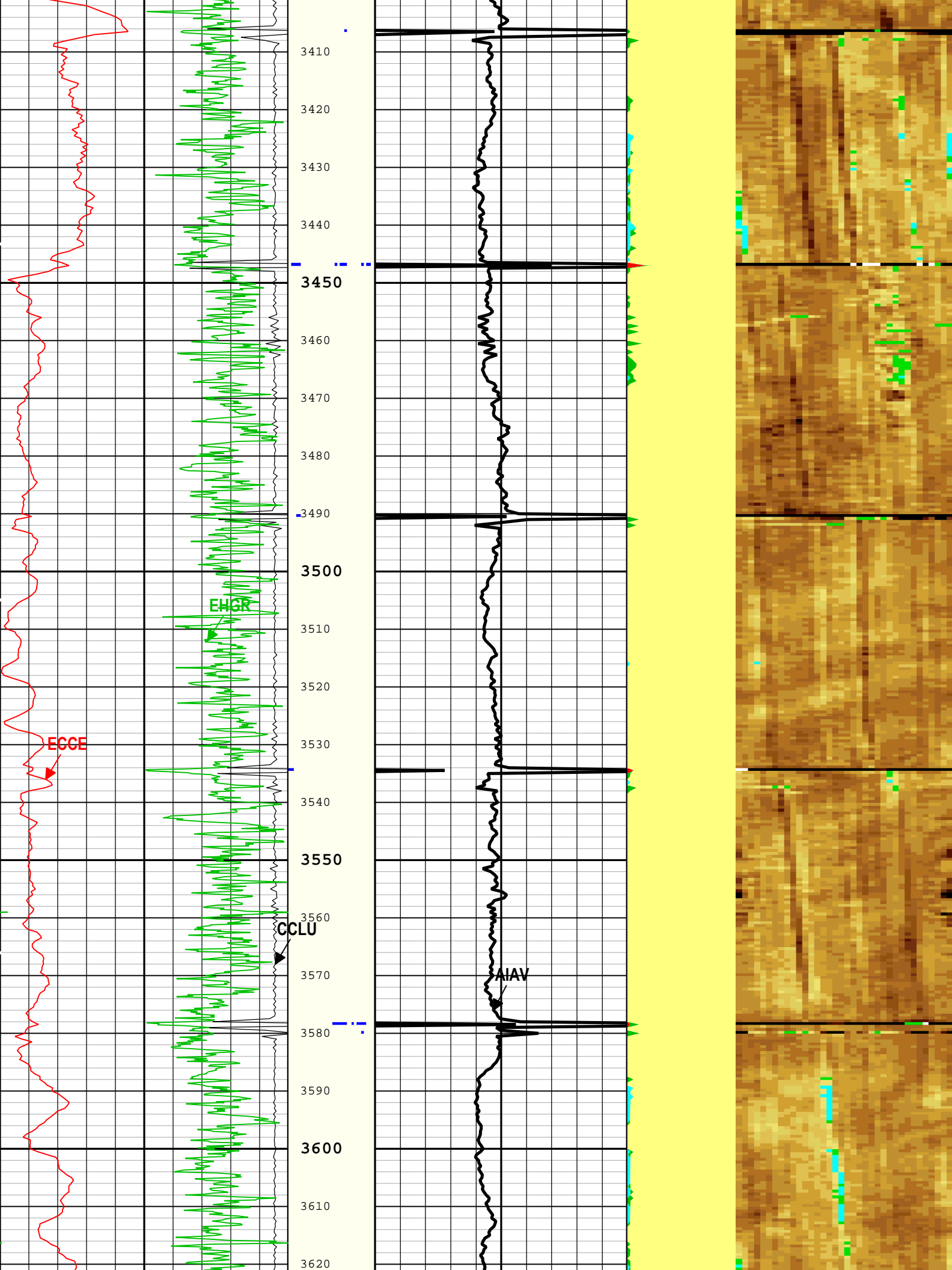


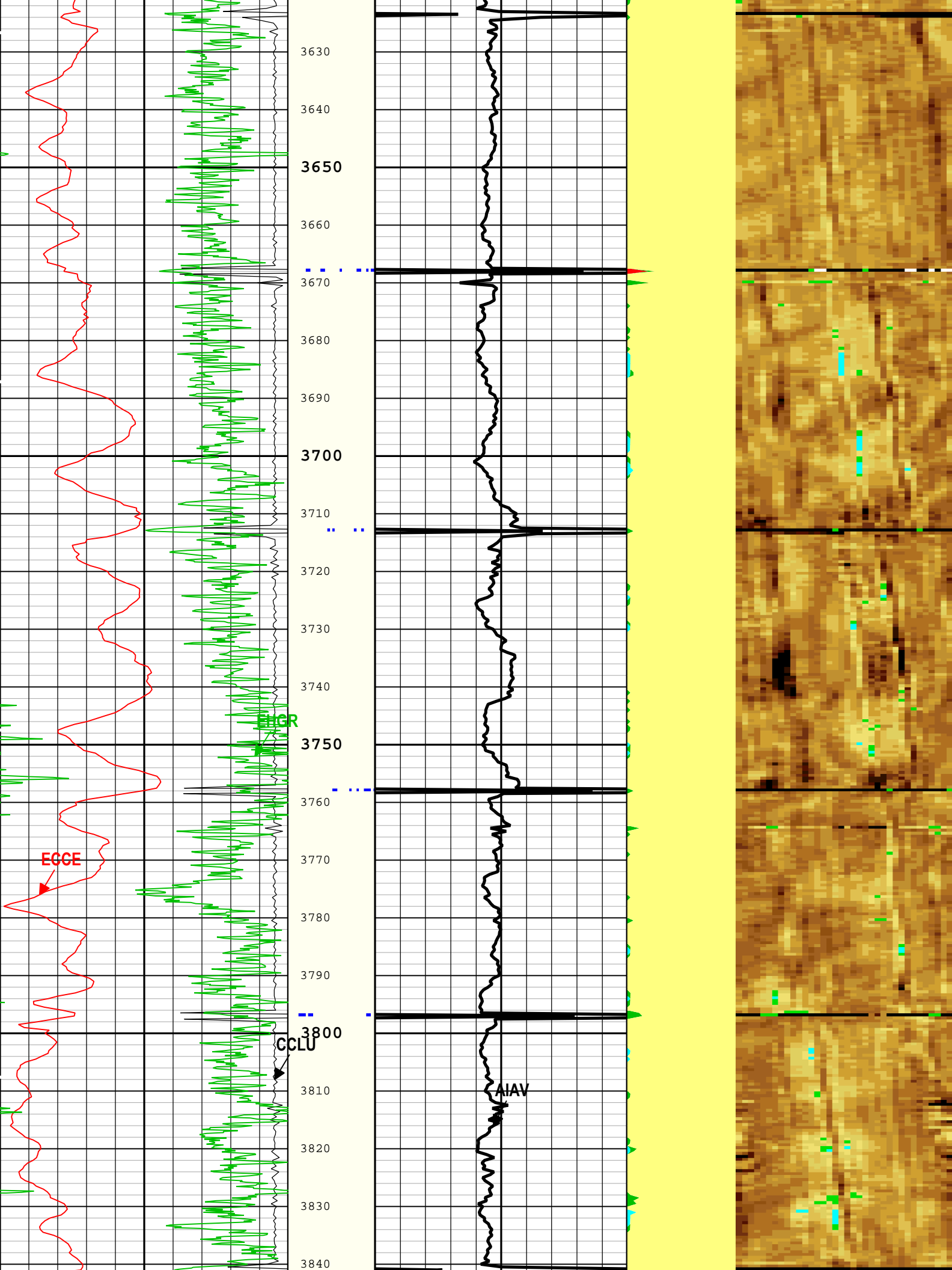


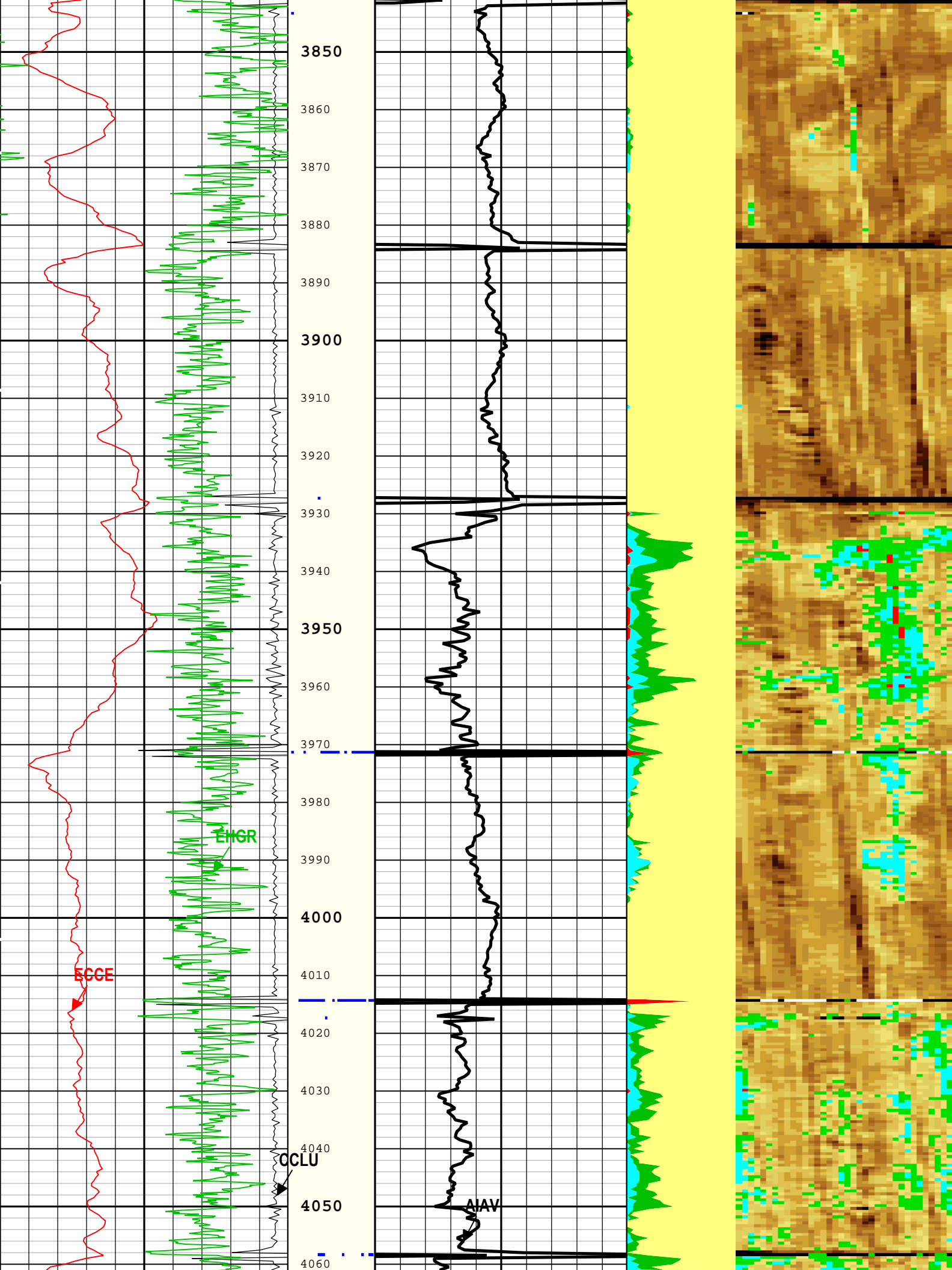


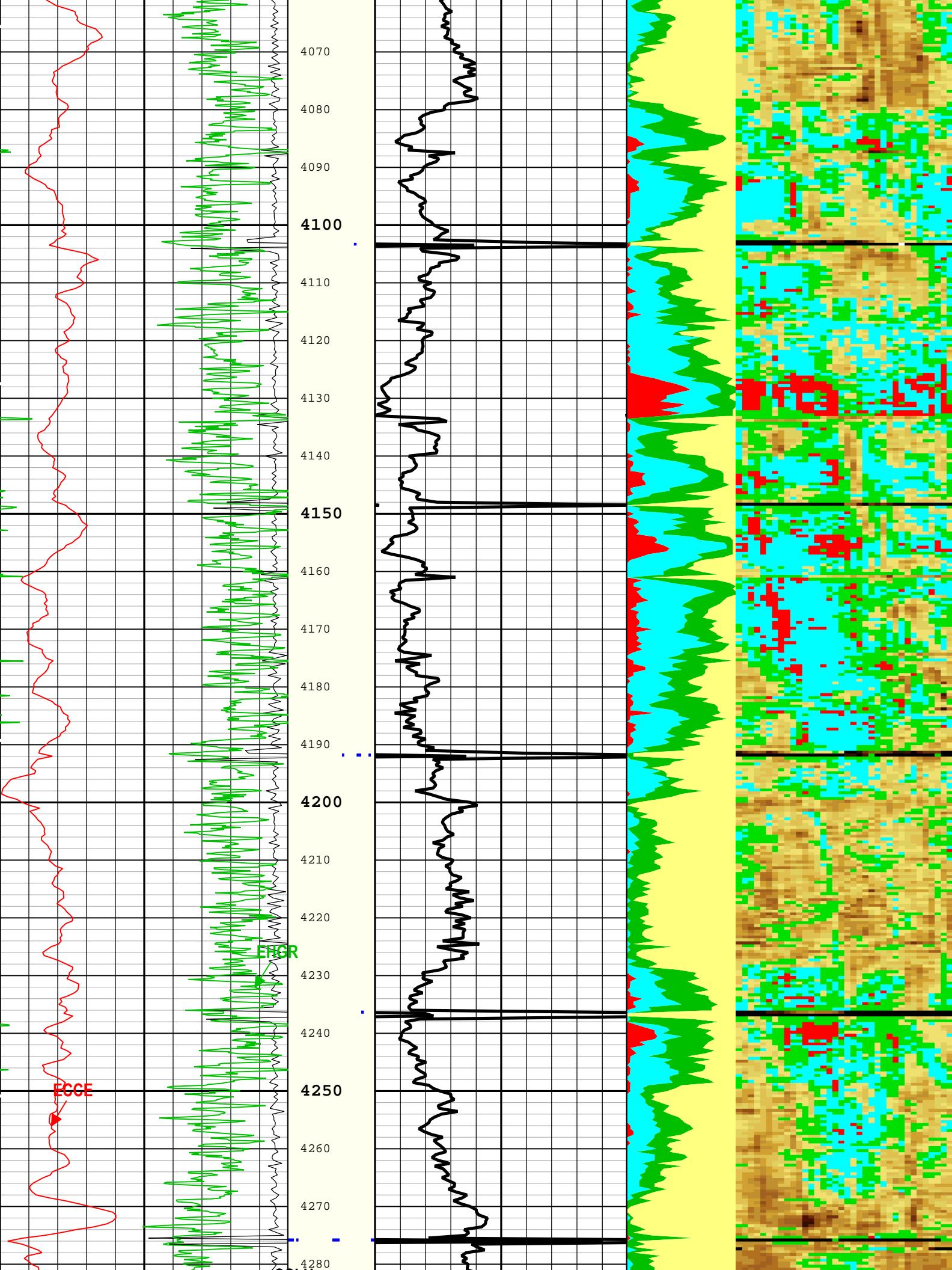




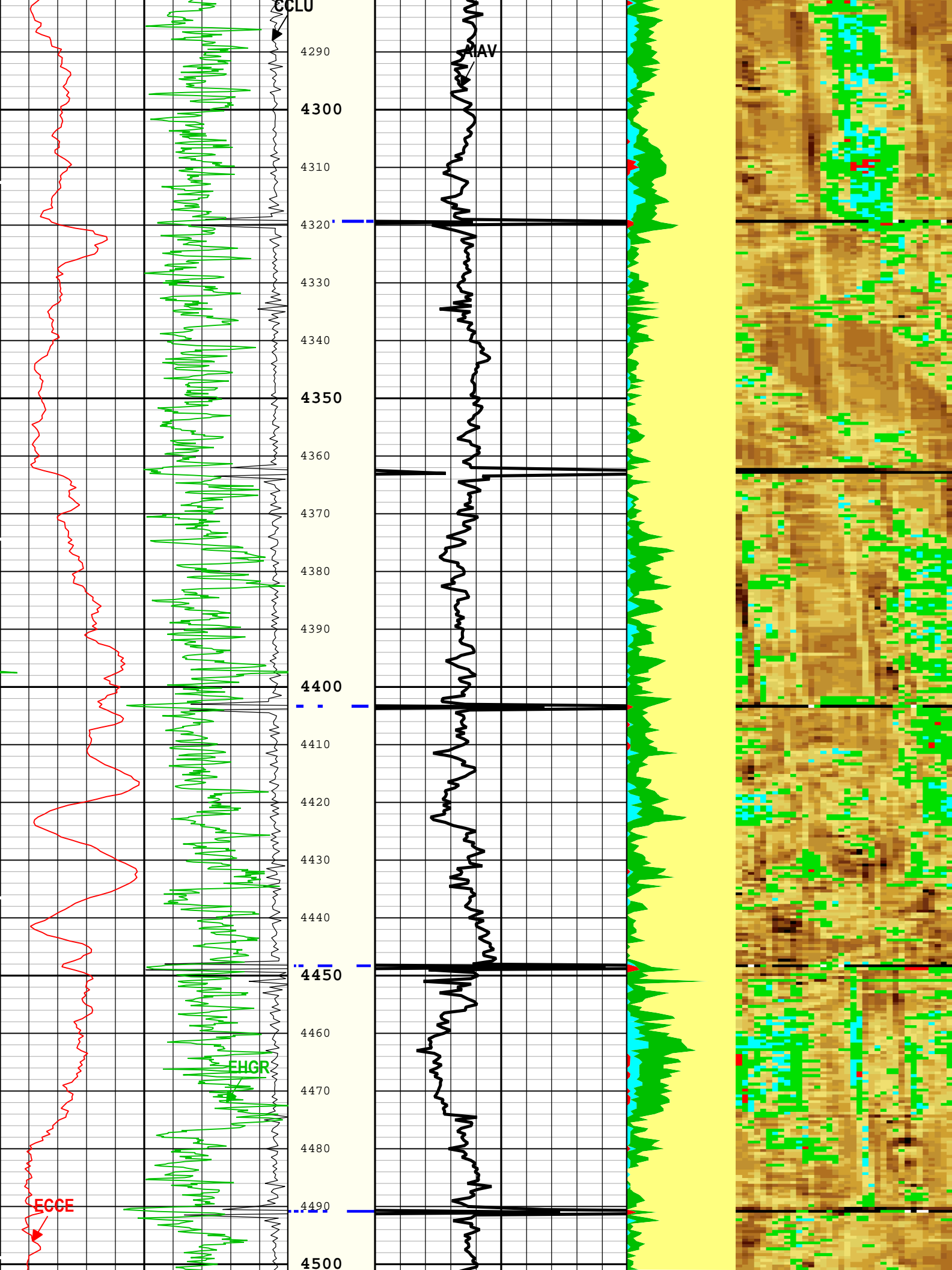


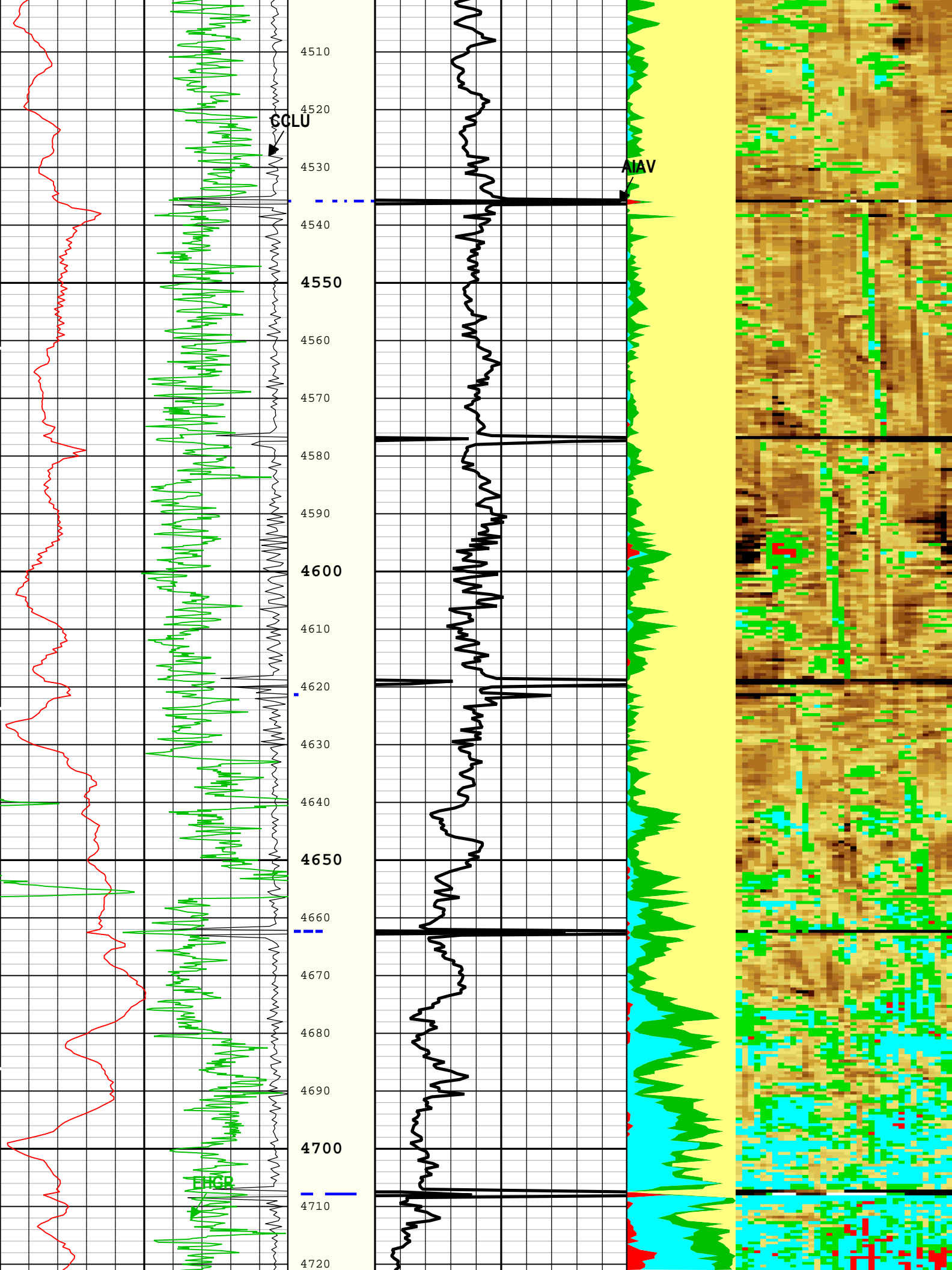


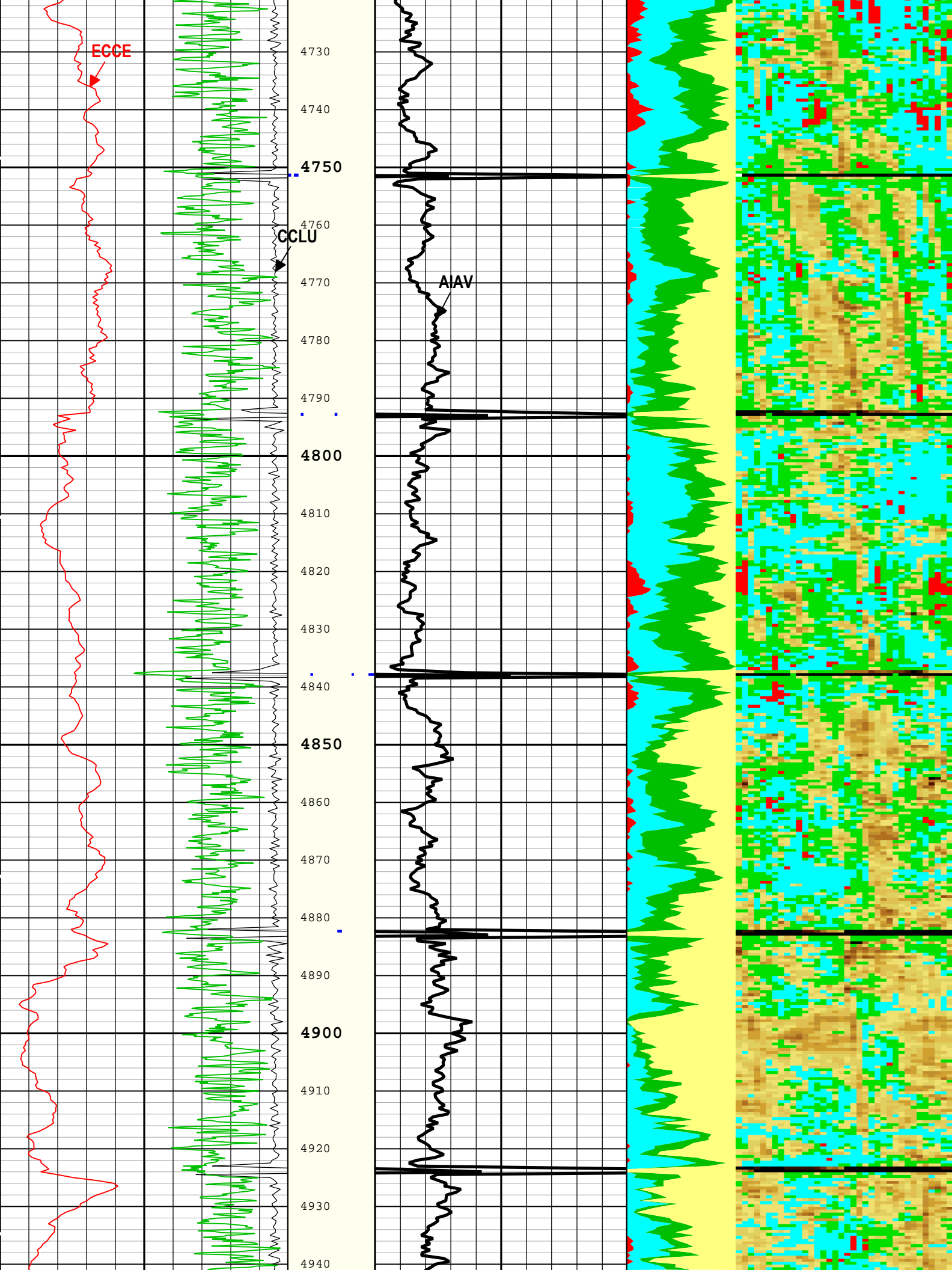


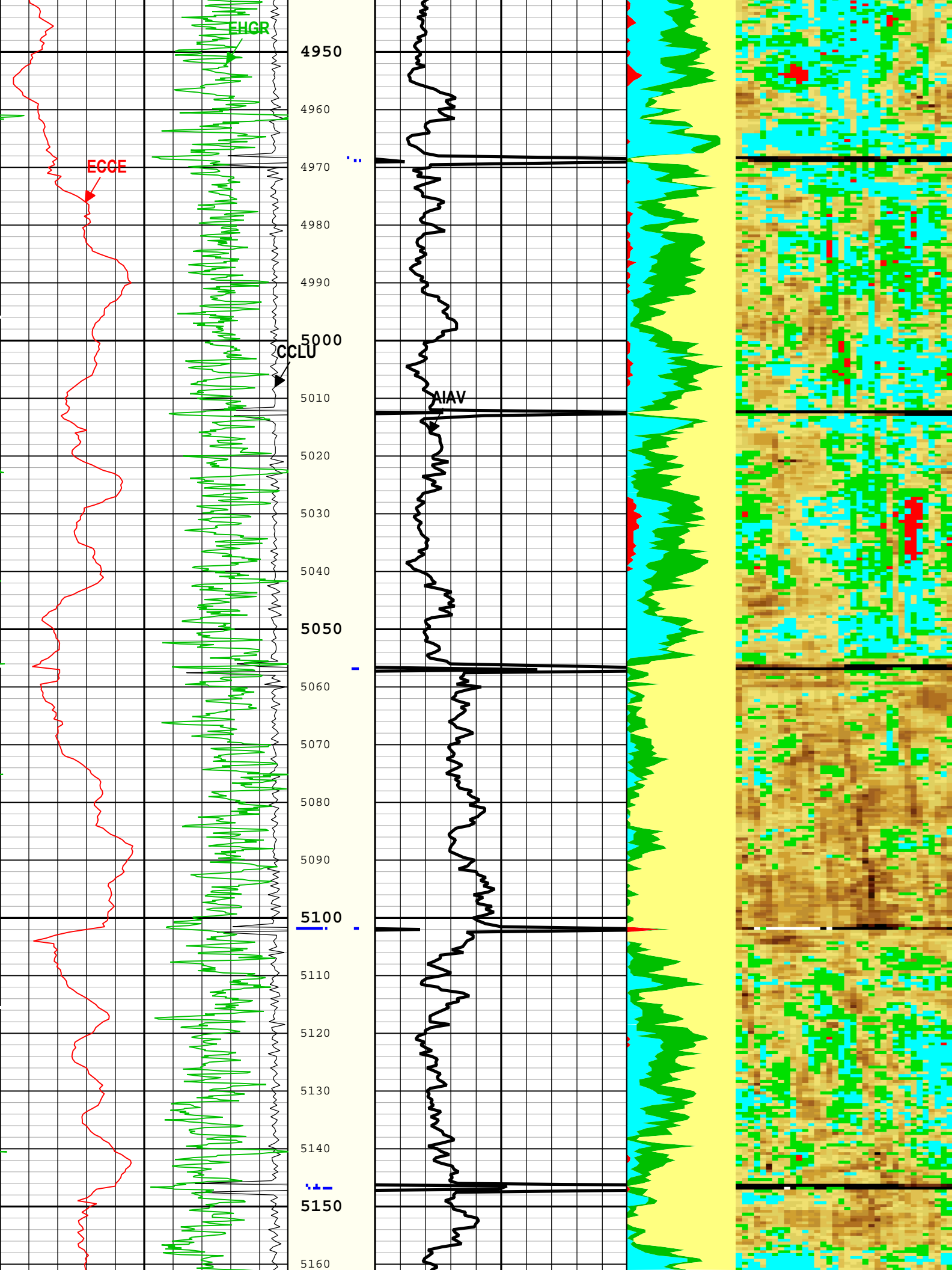


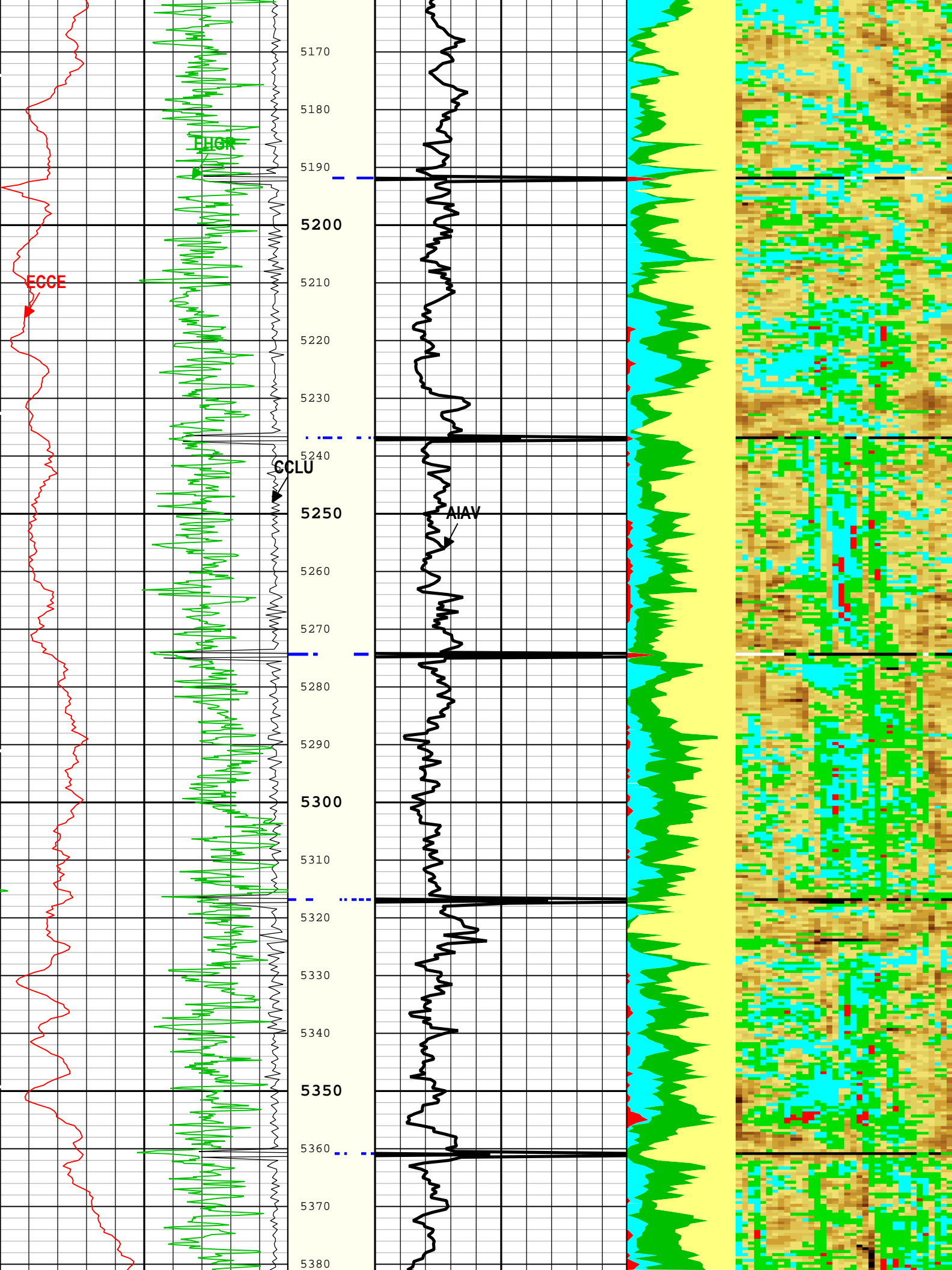


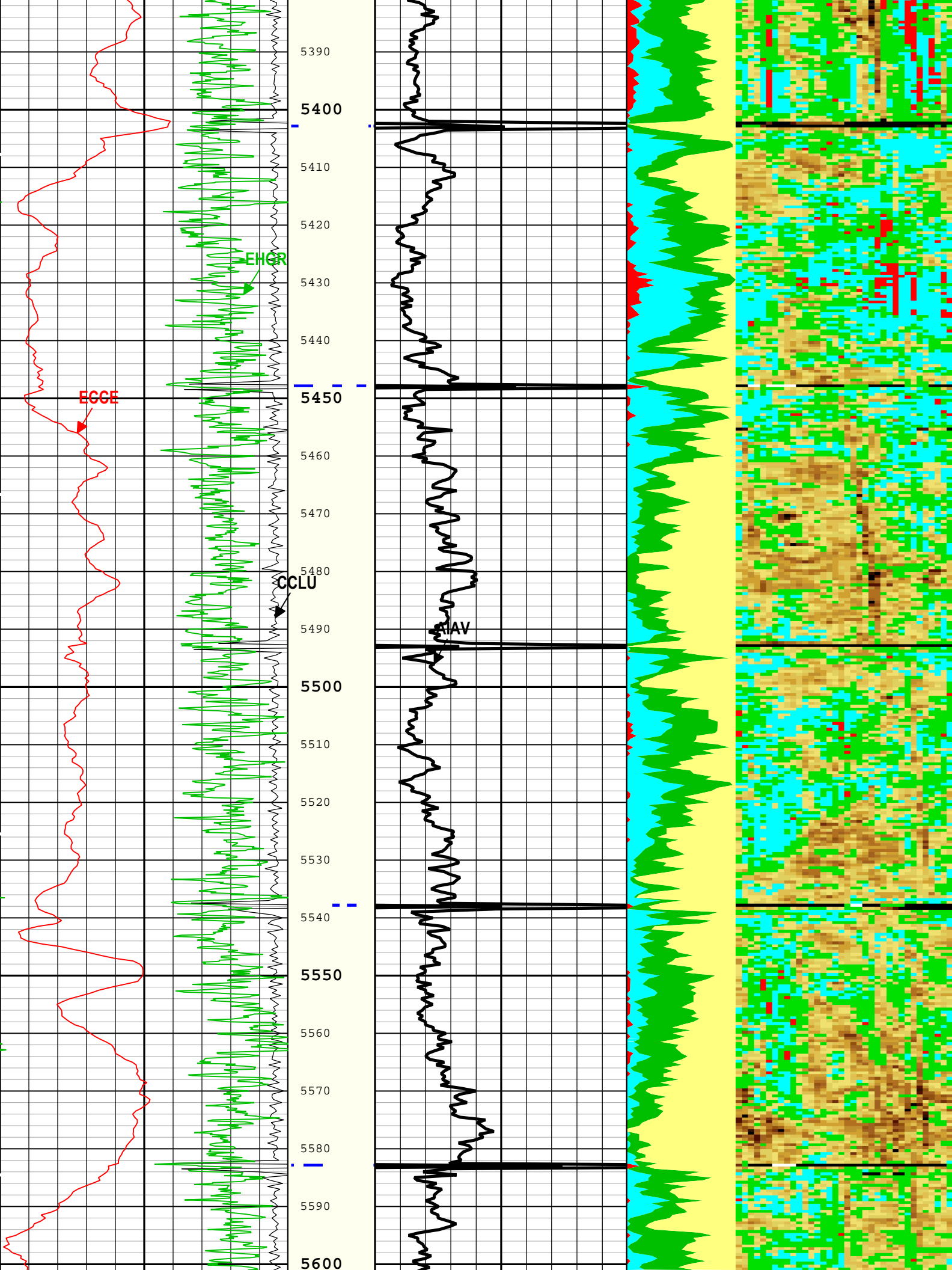


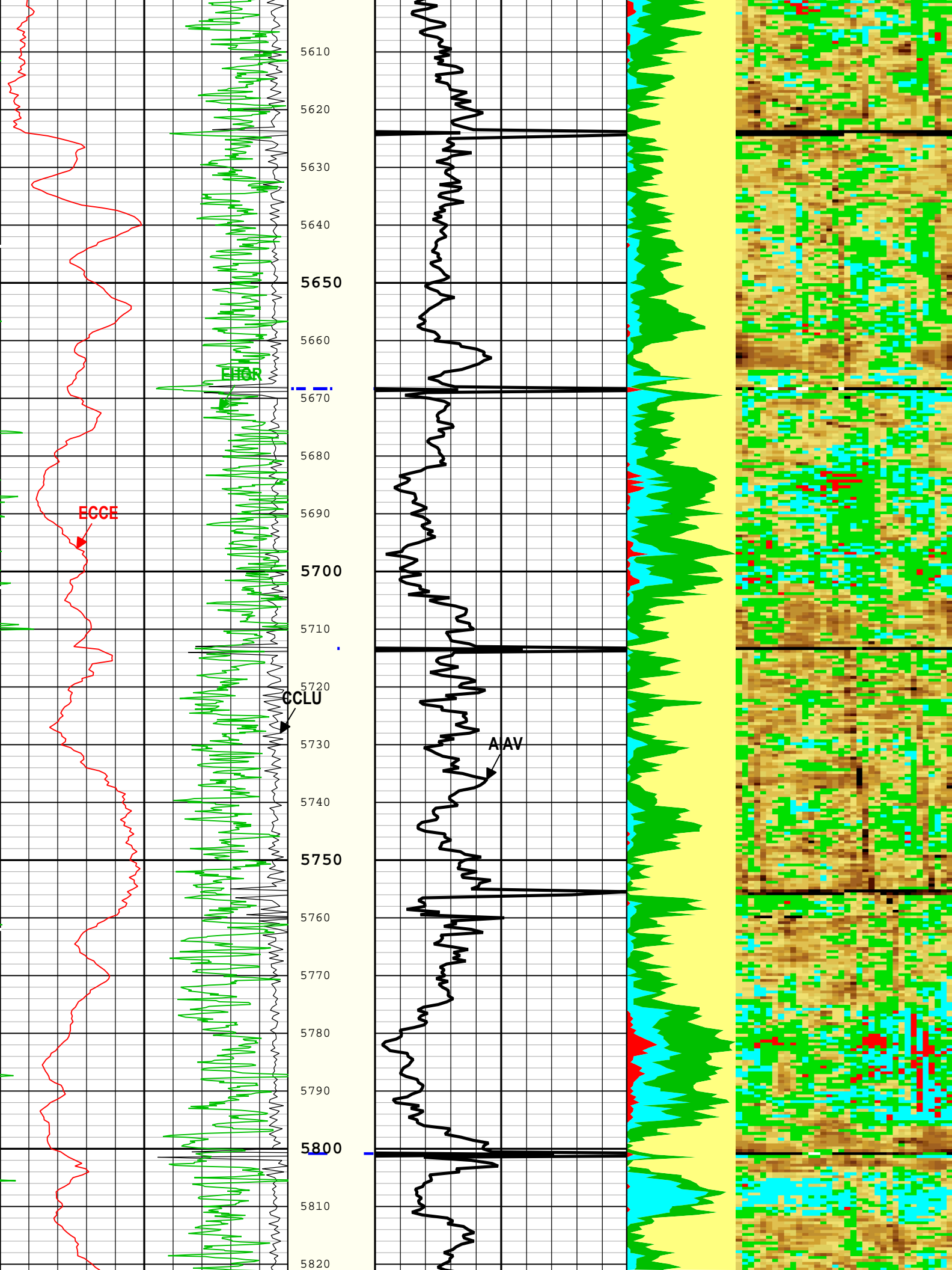




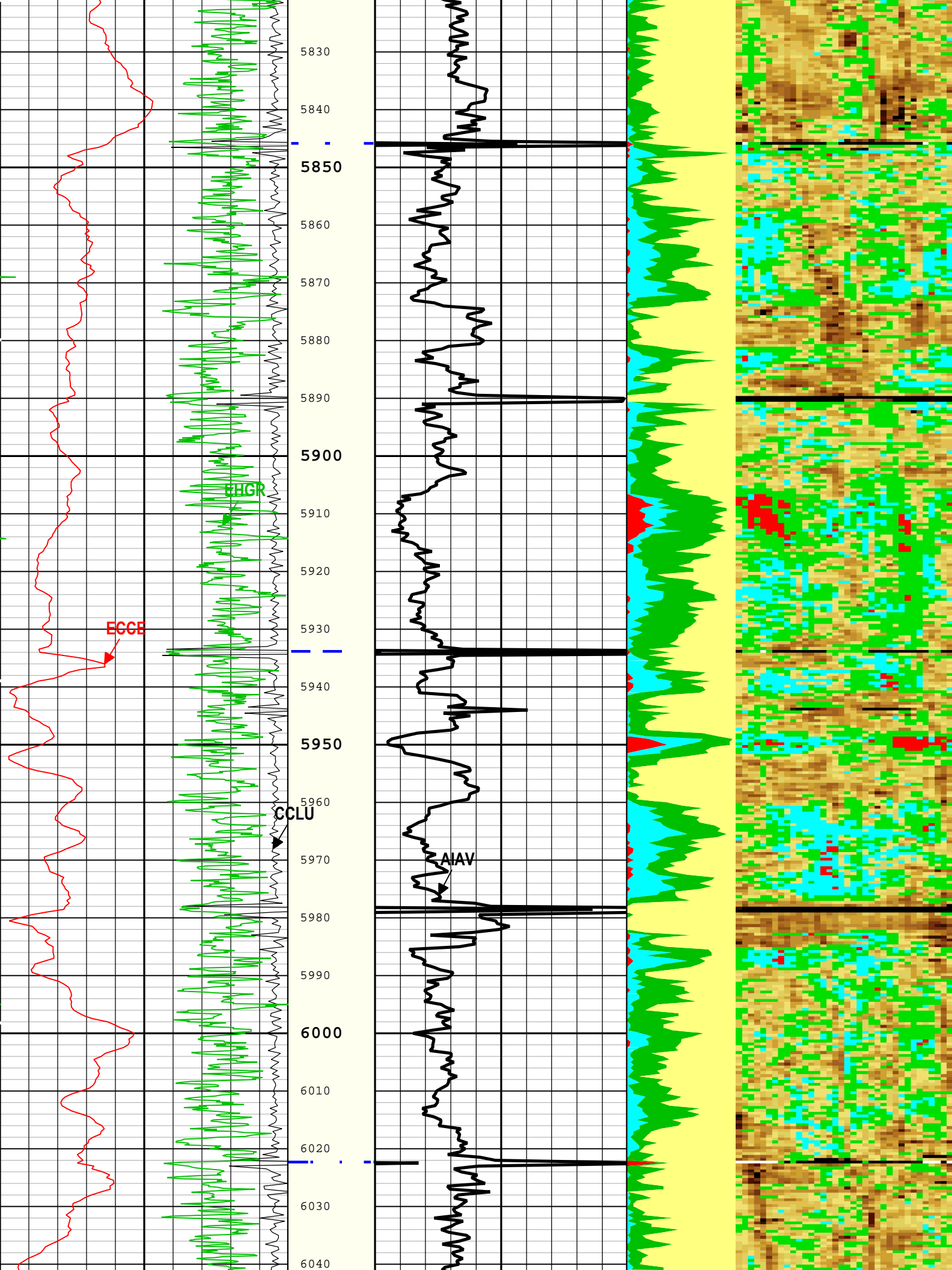




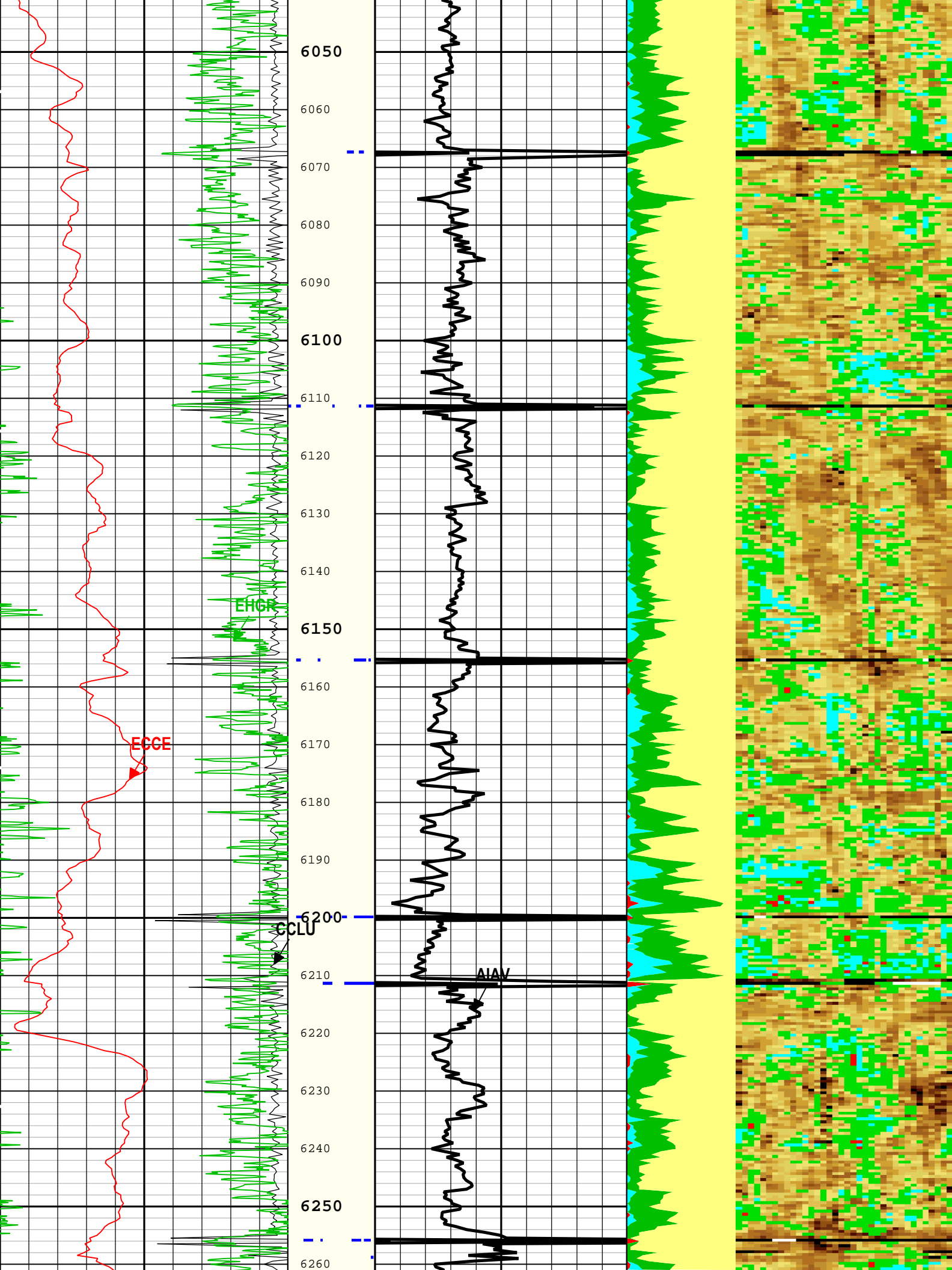


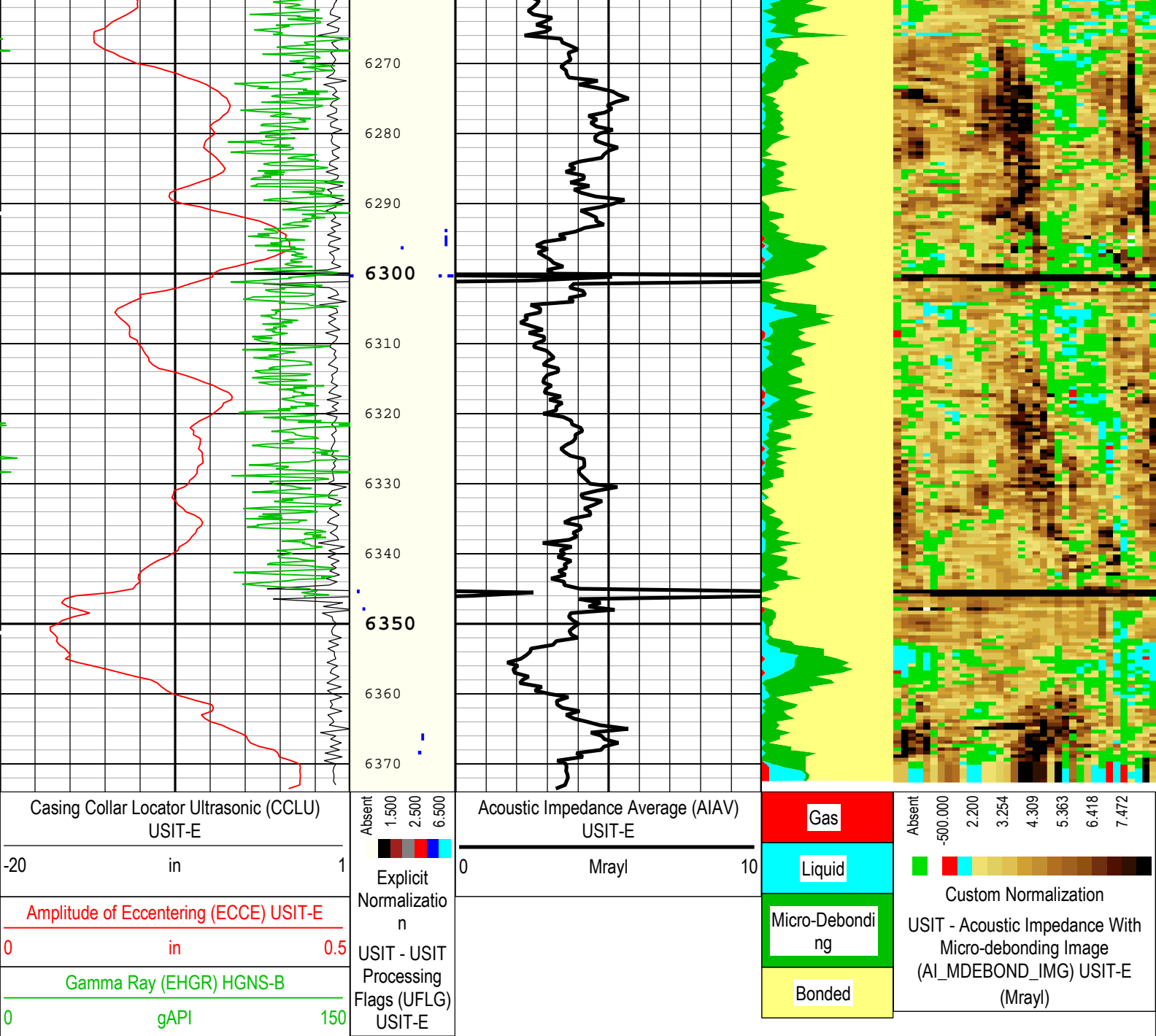












TIME\_1900 - Time Marked every 60.00 (s)

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: 29-Apr-2019 09:35:48

## 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	17618.5	ft
CDEN	Cement Density	HGNS-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	201	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	1.32	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.11	
SOCO	Standoff Correction Option	HGNS-B	Yes	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.54	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	Theoretical	
ZMUD	Acoustic Impedance of Mud	Borehole	1.52	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	72.67	110
BS	13.5	110	1940
BS	8.5	1940	6374
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	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	30.62	us
WINE	Window End Time	USIT-E	70.62	us

## Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	40	27-Apr-2019 11:02:29	27-Apr-2019 11:15:14	6374.54	6160.12
EMXV	50	27-Apr-2019 11:15:14	27-Apr-2019 11:27:58	6160.12	5409.16
EMXV	40	27-Apr-2019 11:27:58	27-Apr-2019 12:56:52	5409.16	100.8
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:

# Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	1994.25 ft	2503.40 ft	27-Apr-2019 10:26:48 AM	27-Apr-2019 10:35:31 AM	ON	0.12 ft	Yes

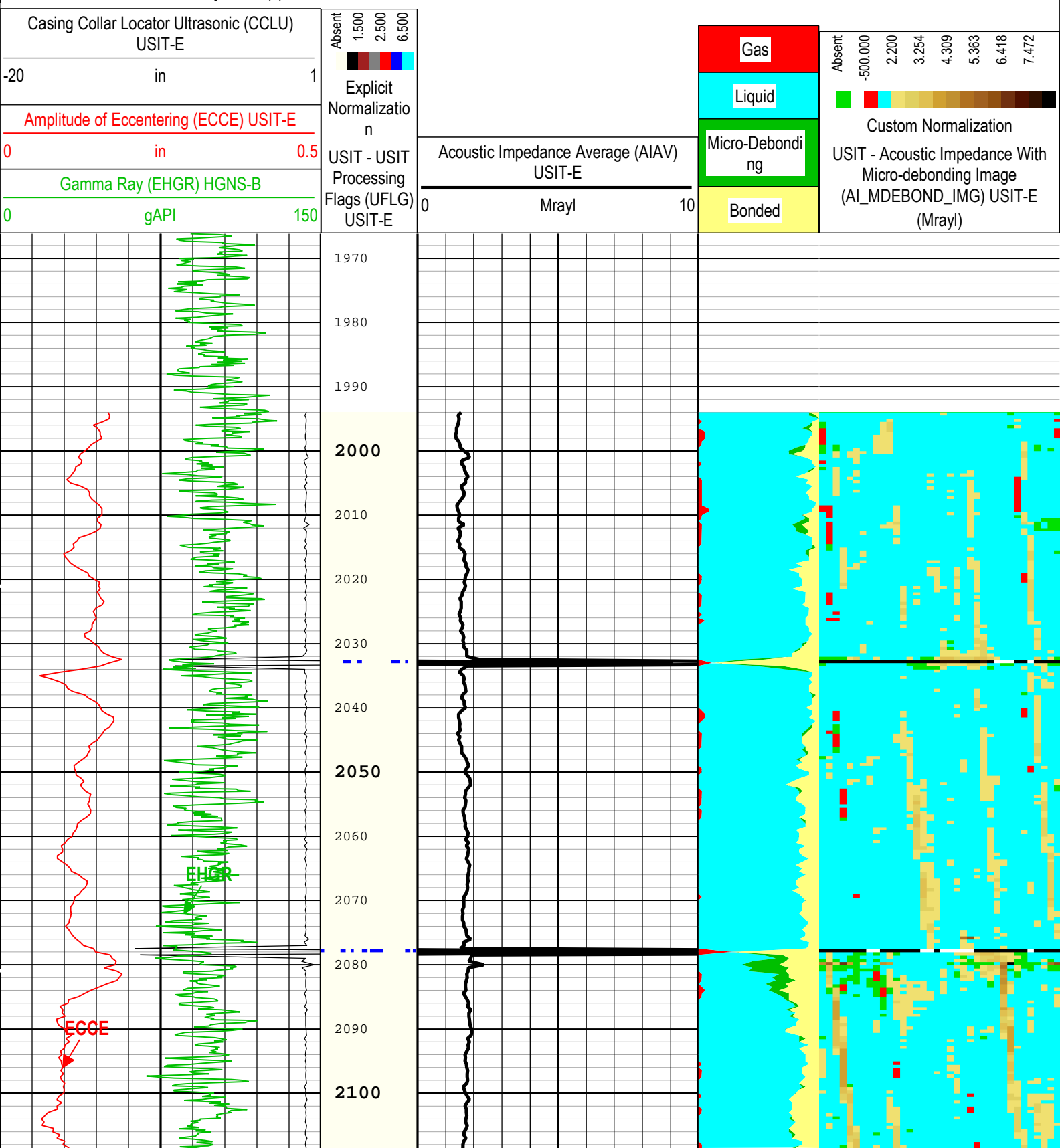
All depths are referenced to toolstring zero

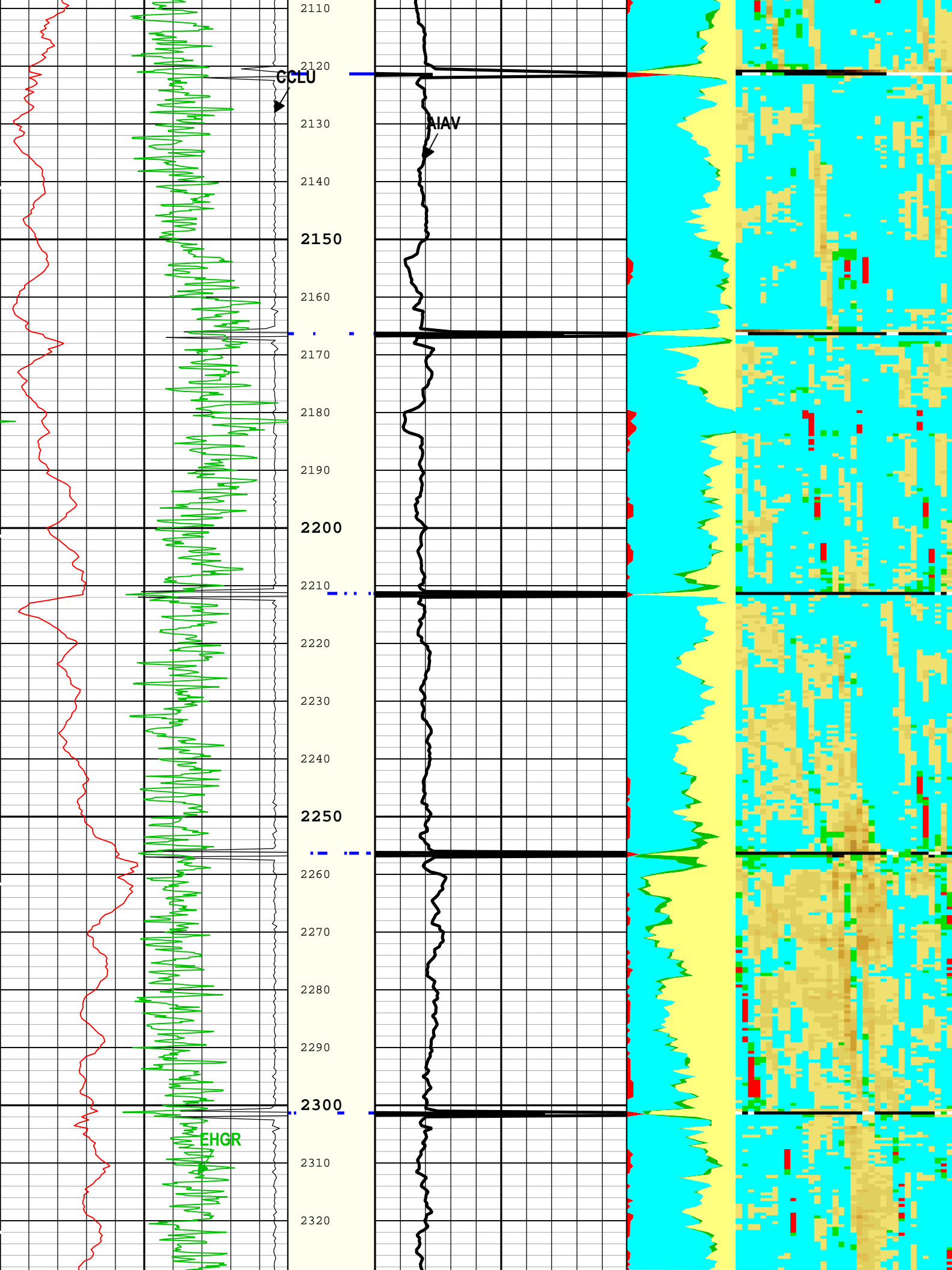
<b>Log</b>	Company:Noble Energy Inc	Well:Vogler State D21-750
		ONE: Log[3]:Up:S011

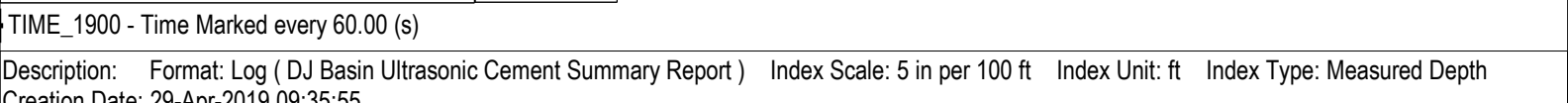
Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 29-Apr-2019 09:35:55

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	17618.5	ft
CDEN	Cement Density	HGNS-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	201	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	1.32	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.11	
SOCO	Standoff Correction Option	HGNS-B	Yes	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.54	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	Theoretical	
ZMUD	Acoustic Impedance of Mud	Borehole	1.52	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	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	30.62	us
WINE	Window End Time	USIT-E	70.62	us

### Time Zone Parameters

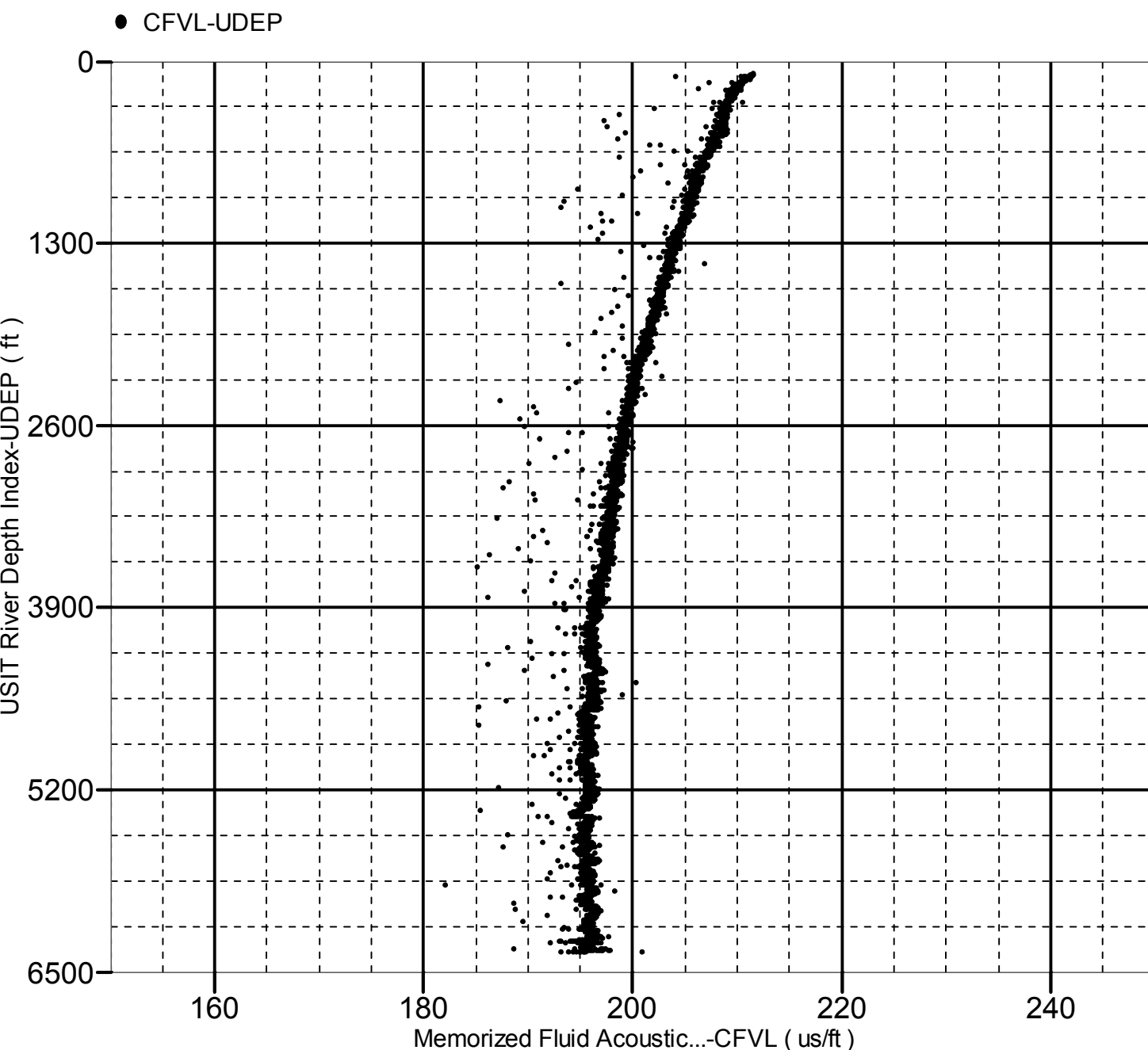
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	50	27-Apr-2019 10:26:48	27-Apr-2019 10:33:56	2503.4	2084.78
EMXV	40	27-Apr-2019 10:33:56	27-Apr-2019 10:35:31	2084.78	1994.25

All depth are at tool zero.

# Fluid Acoustic Slowness vs Depth

2D Cross Plot

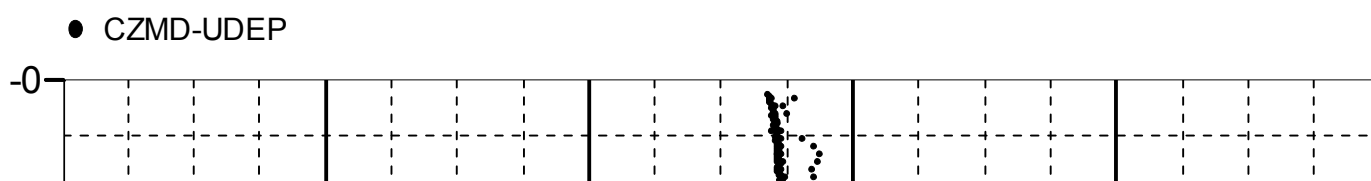
Index Range: From 6374.00 to 100.50 ft



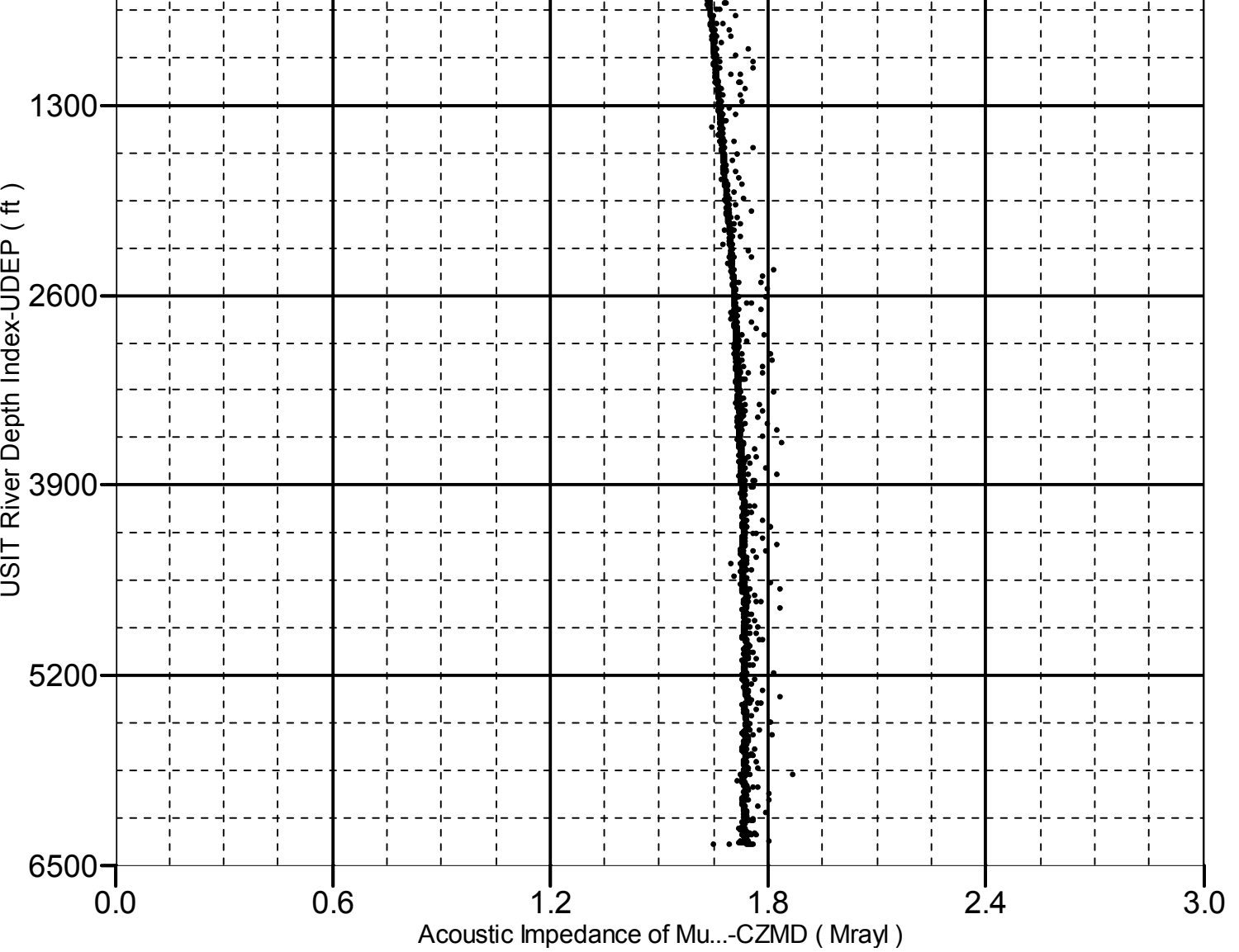
# Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6374.00 to 100.50 ft







Company: Noble Energy Inc

**Schlumberger**

Well: Vogler State D21-750

Field: Wattenberg

County: Weld

State: Colorado

UltraSonic Summary Print