

Company: Noble Energy Inc

Well: Larson AA19-630

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld
Field:	Wattenberg
Location:	SESE 24-6N-64W
Well:	Larson AA19-630
Company:	Noble Energy Inc
Location:	
SESE 24-6N-64W	Elev.: K.B. 4676.00 ft G.L. 4646.00 ft D.F. 4676.00 ft
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No. 05-123-45553	Section: 24
	Township: 6N
	Range: 64W

Logging Date	20-Jun-2018
Run Number	UltraSonic
Depth Driller	17834.00 ft
Schlumberger Depth	17834.00 ft
Bottom Log Interval	6000.00 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	1956.00 ft
To	17834.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	N/A
From	0.00 ft
To	17819.30 ft
Max Recorded Temperatures	173 degF
Logger on Bottom	20-Jun-2018 09:45:00
Unit Number	Location: OSLC-EA 2377
Recorded By	L. Awalt
Witnessed By	B. 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.

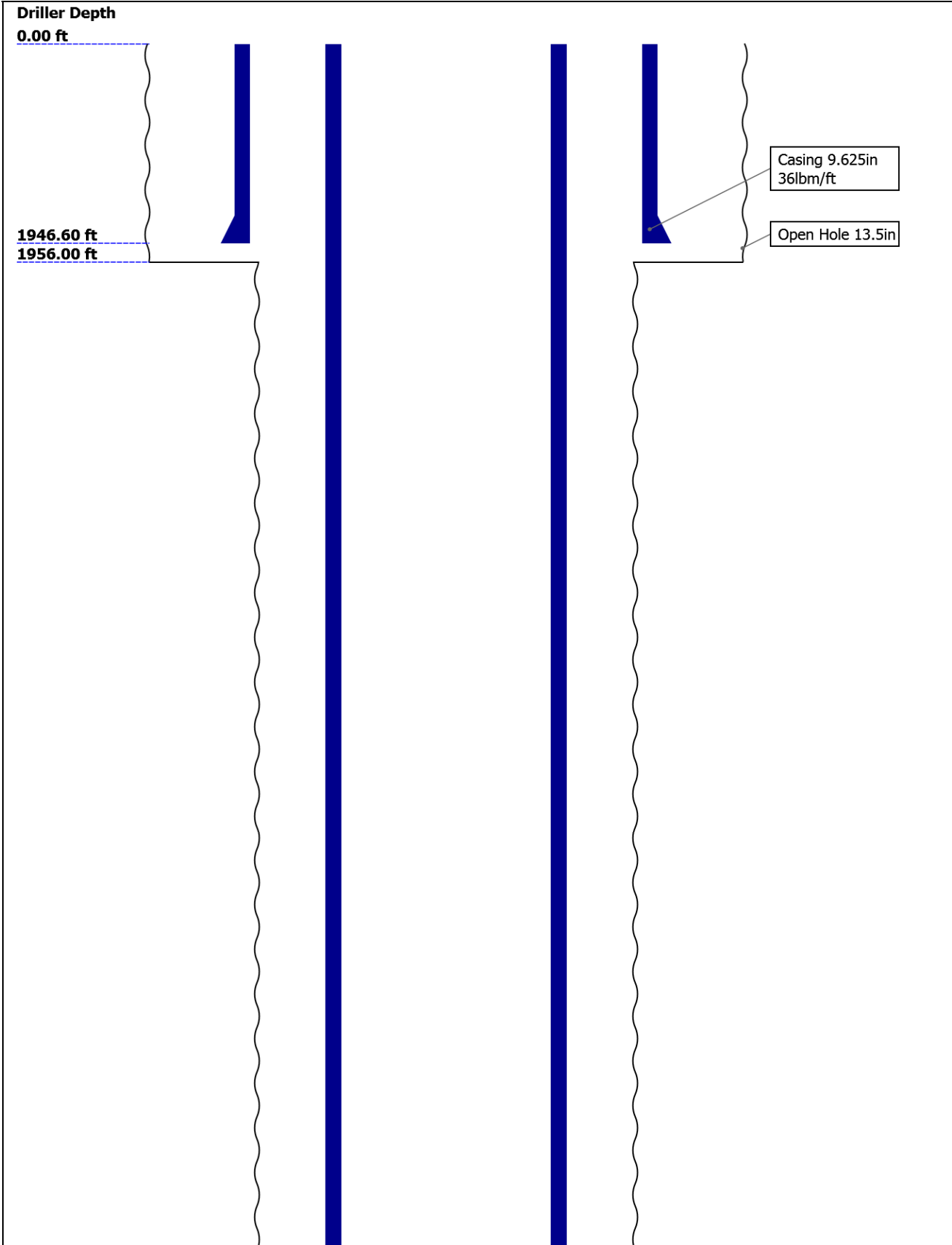
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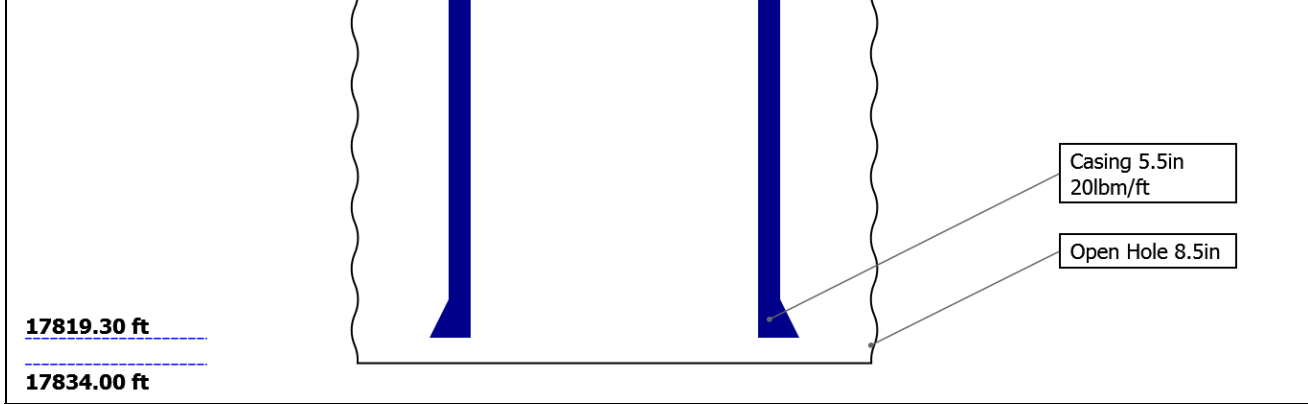
- 1. Header
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- 12. XYZ (USI Acoustic Impedance of Mud vs Depth 3.0

Well Sketch



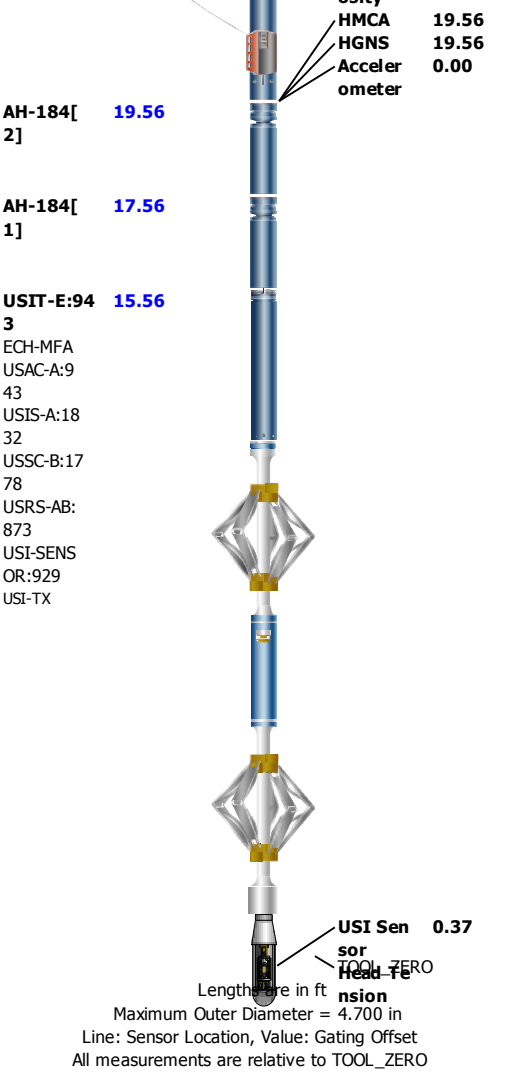


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.5				
Top Driller (ft)	0	1956				
Top Logger (ft)	0	1956				
Bottom Driller (ft)	1956	17834				
Bottom Logger (ft)	1956	17834				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	36	20				
Inner Diameter (in)	8.921	4.778				
Grade	N/A	N/A				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	1946.6	17819.3				
Bottom Logger (ft)	1946.6	17819.3				

Remarks and Equipment Summary

UltraSonic: Toolstring				UltraSonic: Remarks	
<div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT38.95LEH-QT</div><div>EDTC-B:835.47478EDTH-BEDTG-AEDTC-B:8478</div><div>HGNS-H28.97HGNHNPV-NSR-F:5203HACCZ-H:4168HMCA-HHGNS-H</div></div> <div><div>CTEM31.97ACCZ0.00HV0.00Gamma30.1RayTelStatu28.97sTemper28.94atureGR28.23</div><div>CNL Por21.89osity</div></div>	Thank you for choosing Schlumberger!				
	Log run for cement evaluation				
	Tool run centralized as per tool sketch				
	USRS-AB sub run with USI-TX transducer				
	Crew: Gary Lapp, Diego Saldana				



Depth Summary

	UltraSonic		
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Depth Measuring Device


Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		

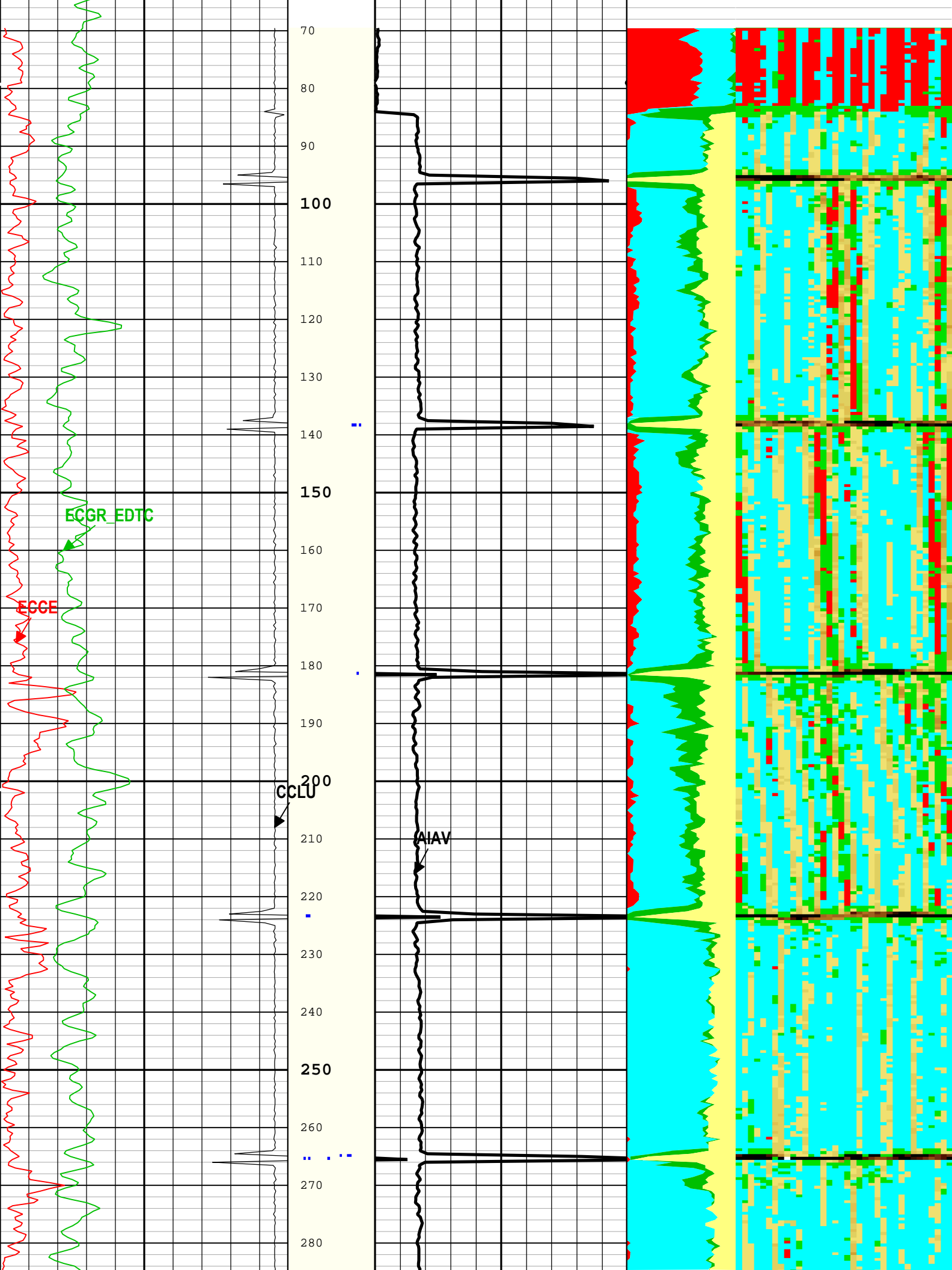
Tension Device

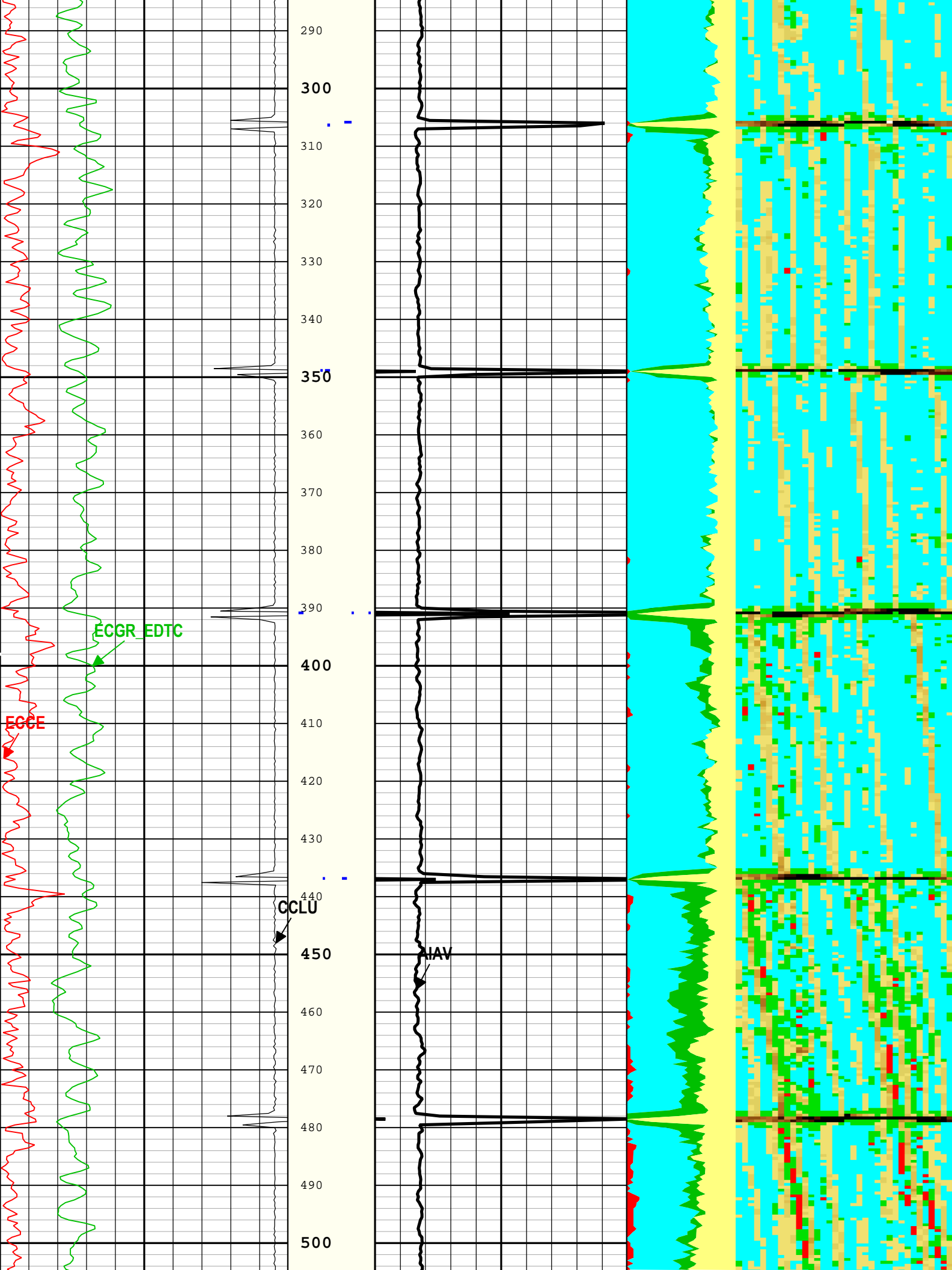
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		

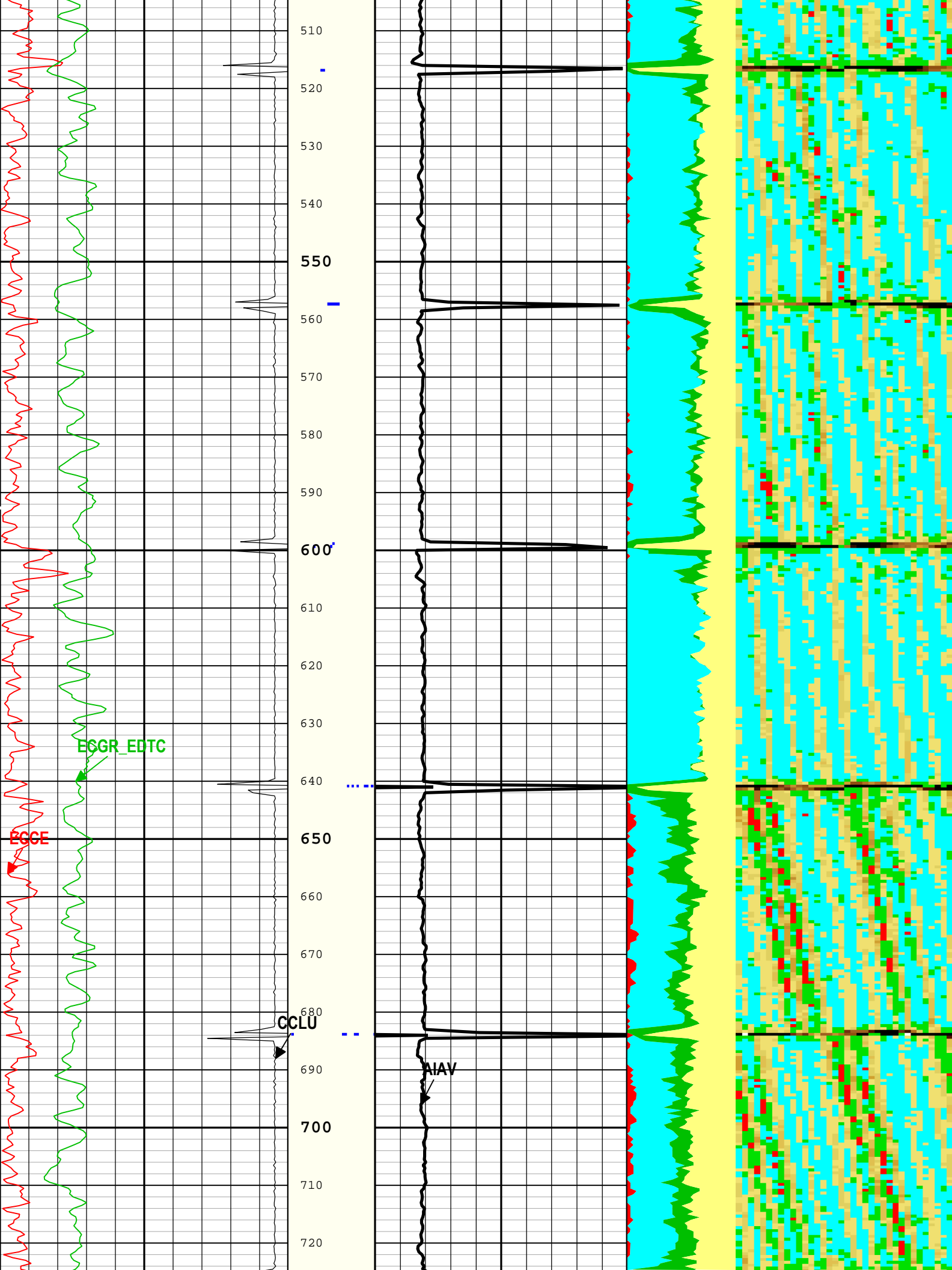
Logging Cable

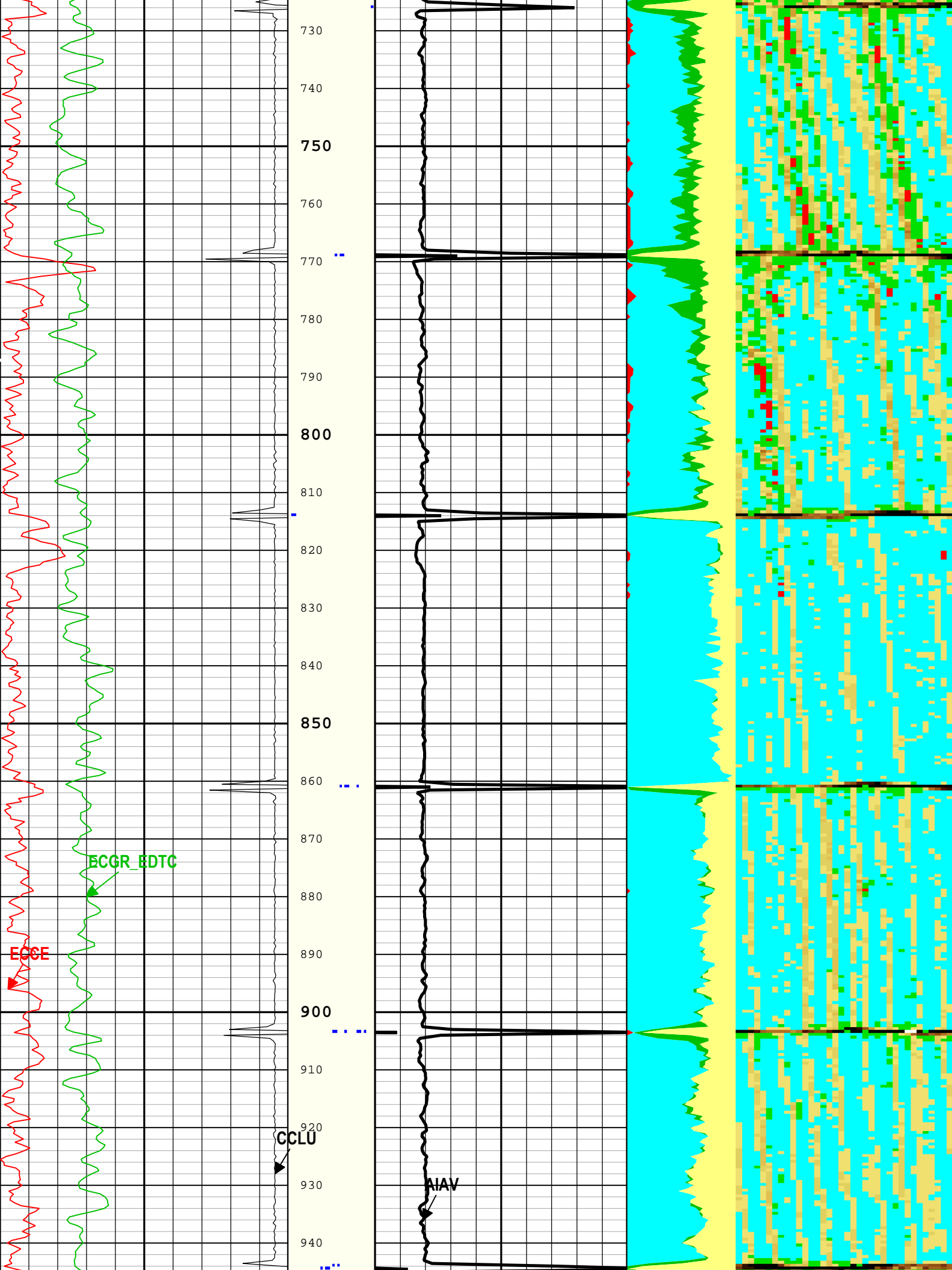
Type	7-46NT-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		

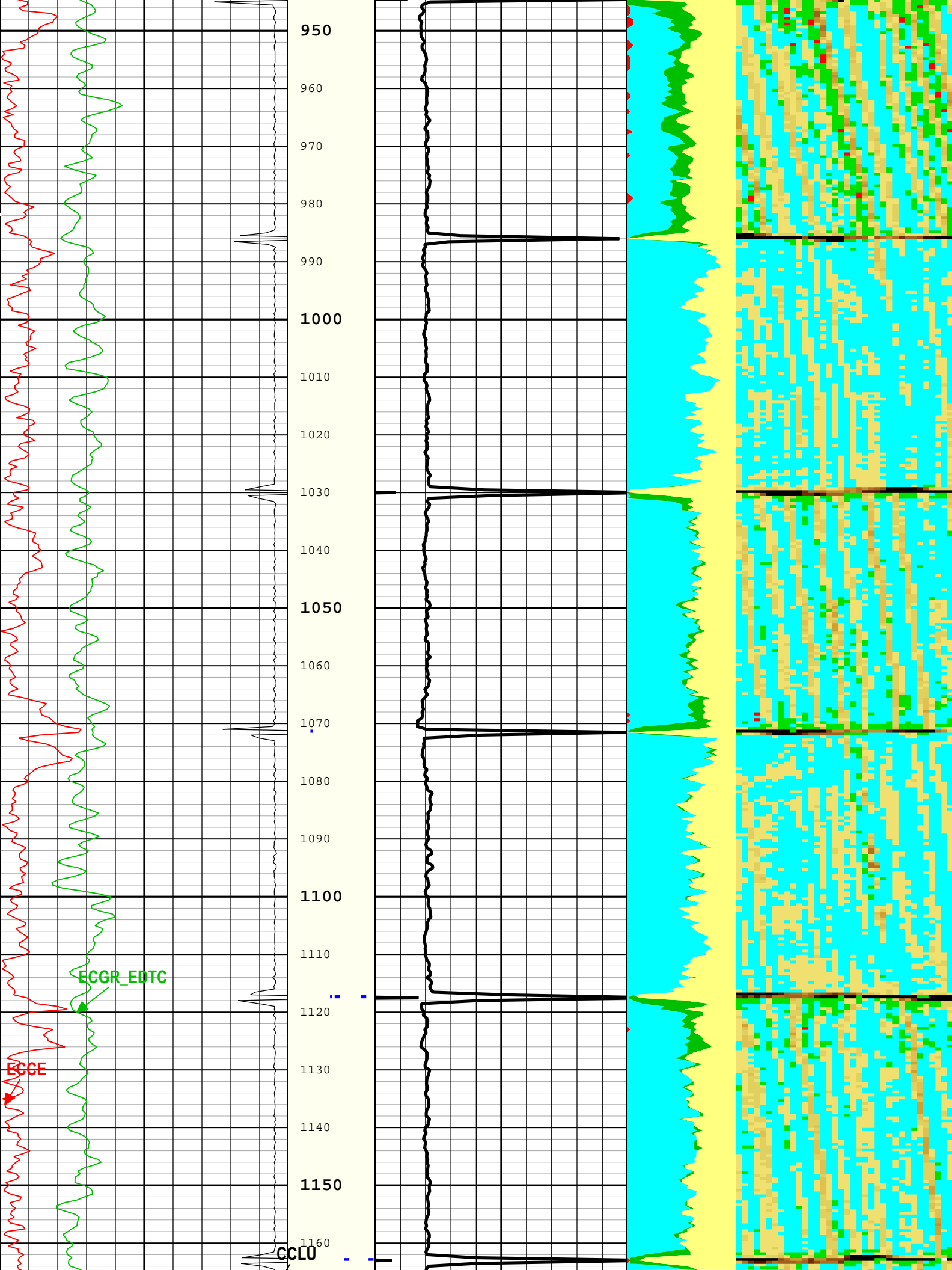
Rig Type									
UltraSonic:Depth Control Parameters					Depth Control Remarks				
Log Sequence		First Log In the Well							
Rig Up Length At Surface									
Rig Up Length At Bottom									
Rig Up Length Correction									
Stretch Correction									
Tool Zero Check At Surface									
USIT - Fluid Properties Measurement									
Run Name		Pass Name		Start Depth(ft)		Stop Depth(ft)			
Run 1		Log[3]:Up		6100.72		69.52			
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 : 20.58m(67.50ft) to 23.81m(78.13ft) MUD_N_FRP = 1.16 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.65 MRayl									
Start Depth(ft)		Stop Depth(ft)		Start Value(Mrayl)		End Value(Mrayl)			
UltraSonic									
2500 PSI Main Pass									
Software Version									
Acquisition System				Version					
Maxwell 2018 SP1				8.1.99839.3100					
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
UltraSonic	Log[3]:Up	Up	69.52 ft	6100.73 ft	20-Jun-2018 9:46:56 AM	20-Jun-2018 10:23:29 AM	ON	3.38 ft	Yes
All depths are referenced to toolstring zero									
Log	Company:Noble Energy Inc Well:Larson AA19-630 UltraSonic: Log[3]: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: 20-Jun-2018 10:45:46									
TIME_1900 - Time Marked every 60.00 (s)									
Casing Collar Locator Ultrasonic (CCLU) USIT-E			Absent 1,500 2,500 6,500				Gas		
-20 in 1			Explicit Normalization				Liquid		
Amplitude of Eccentering (ECCE) USIT-E			USIT - USIT Processing Flags (UFLG) USIT-E		Acoustic Impedance Average (AIAV) USIT-E		Micro-Debonding		
0 in 0.5					0 Mrayl 10		Bonded		
Gamma Ray (ECGR_EDTC) EDTC-B									
0 gAPI 150									
									
			40						
			50						
			60						

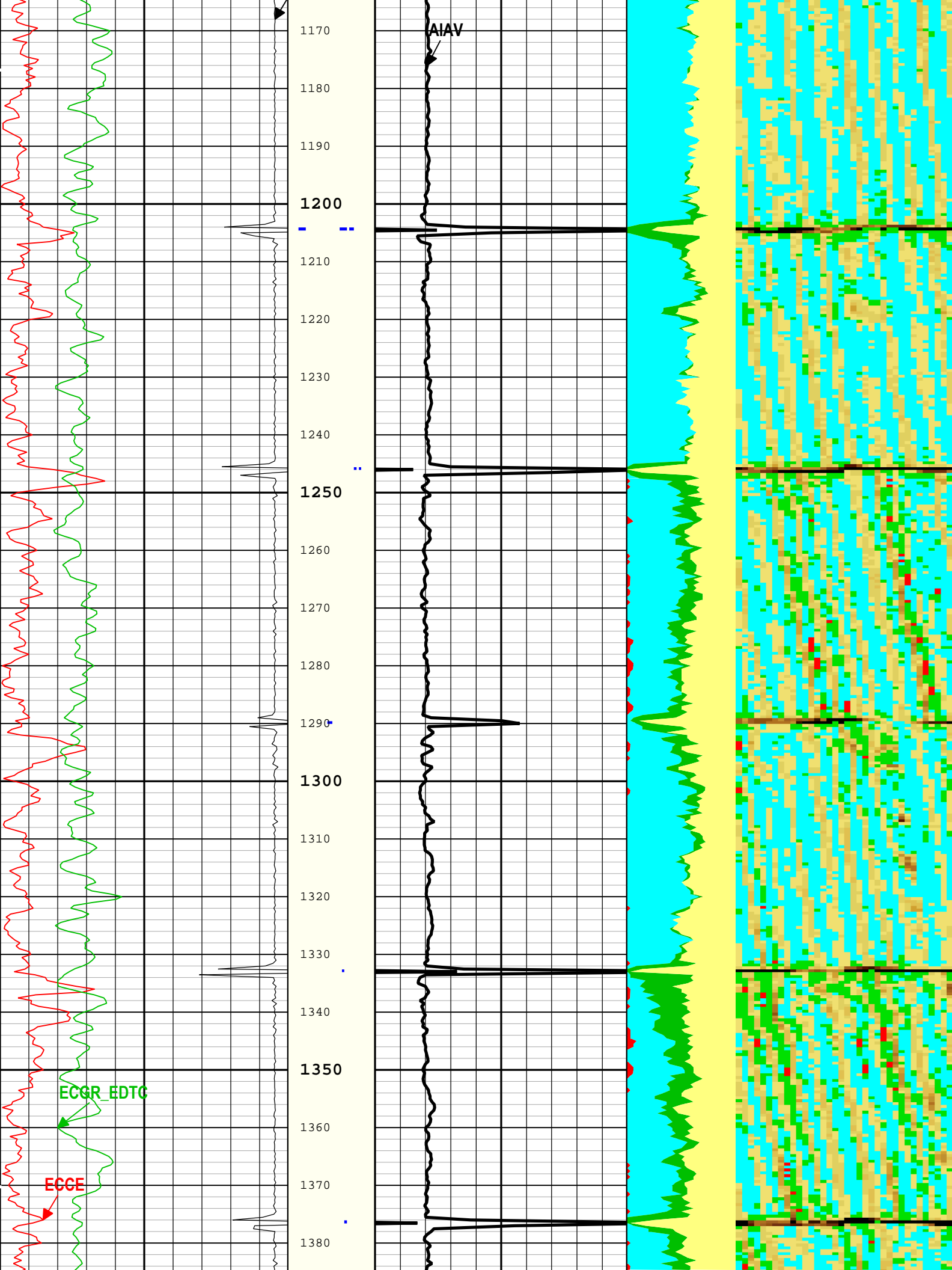


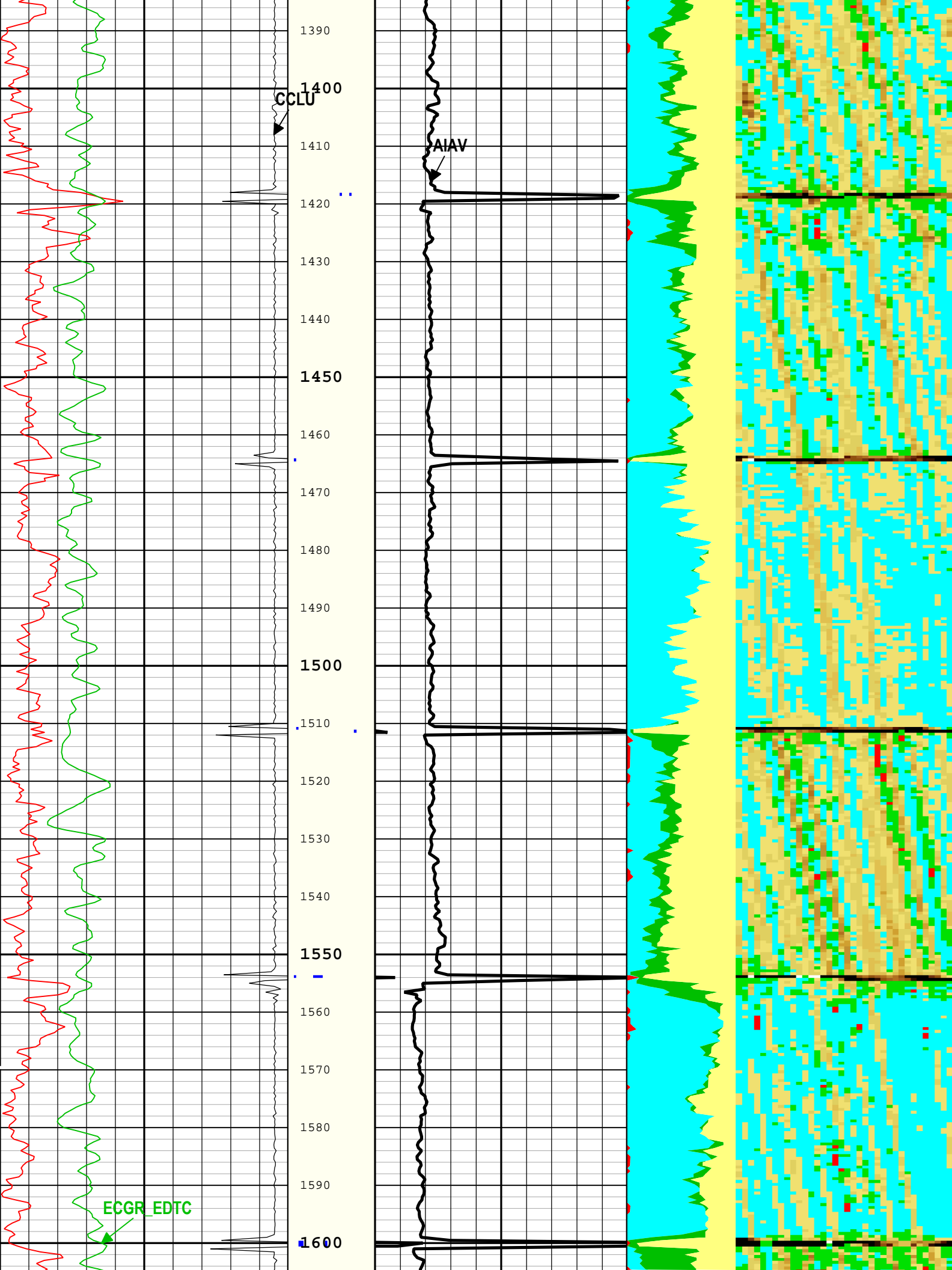


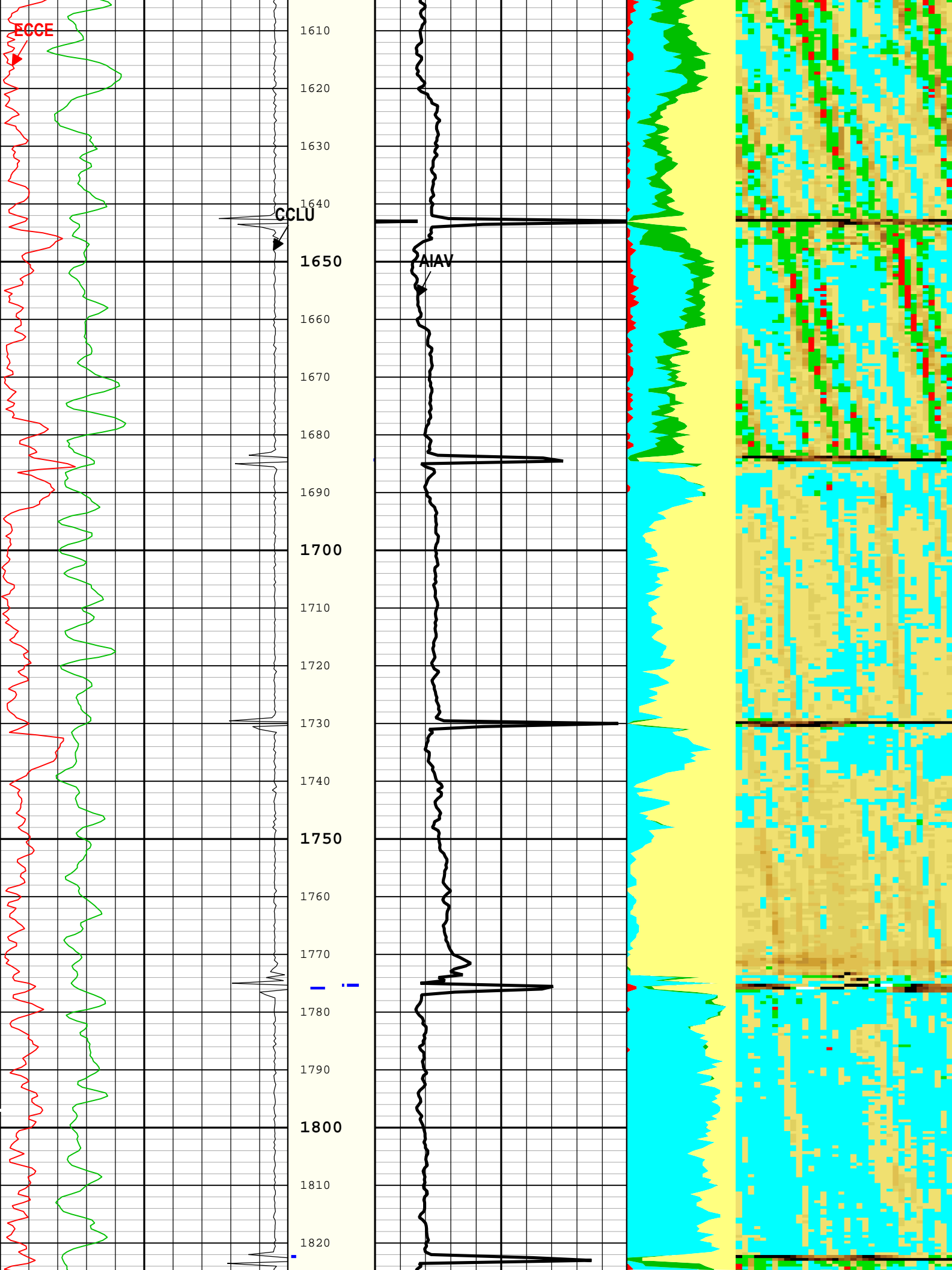


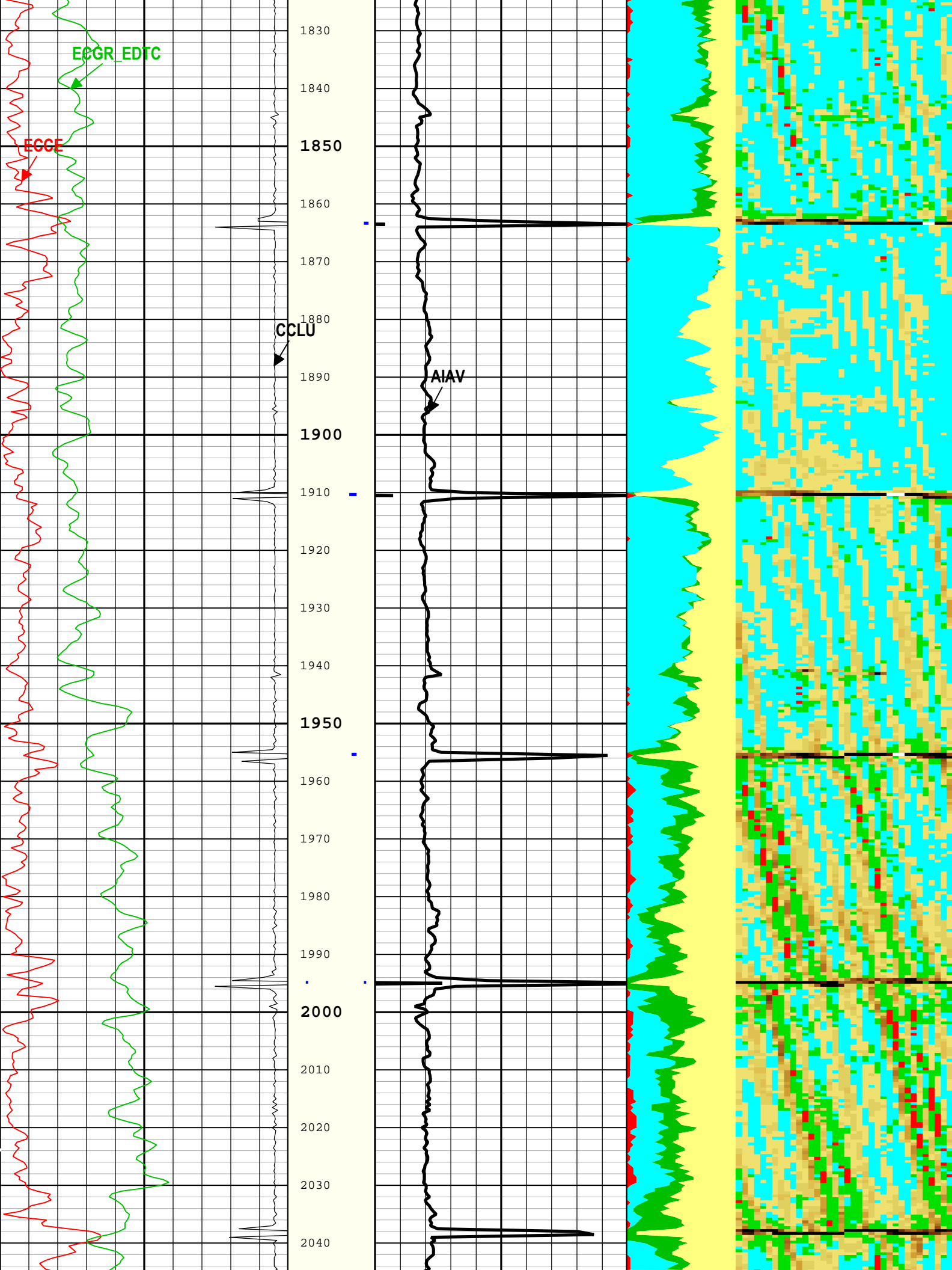


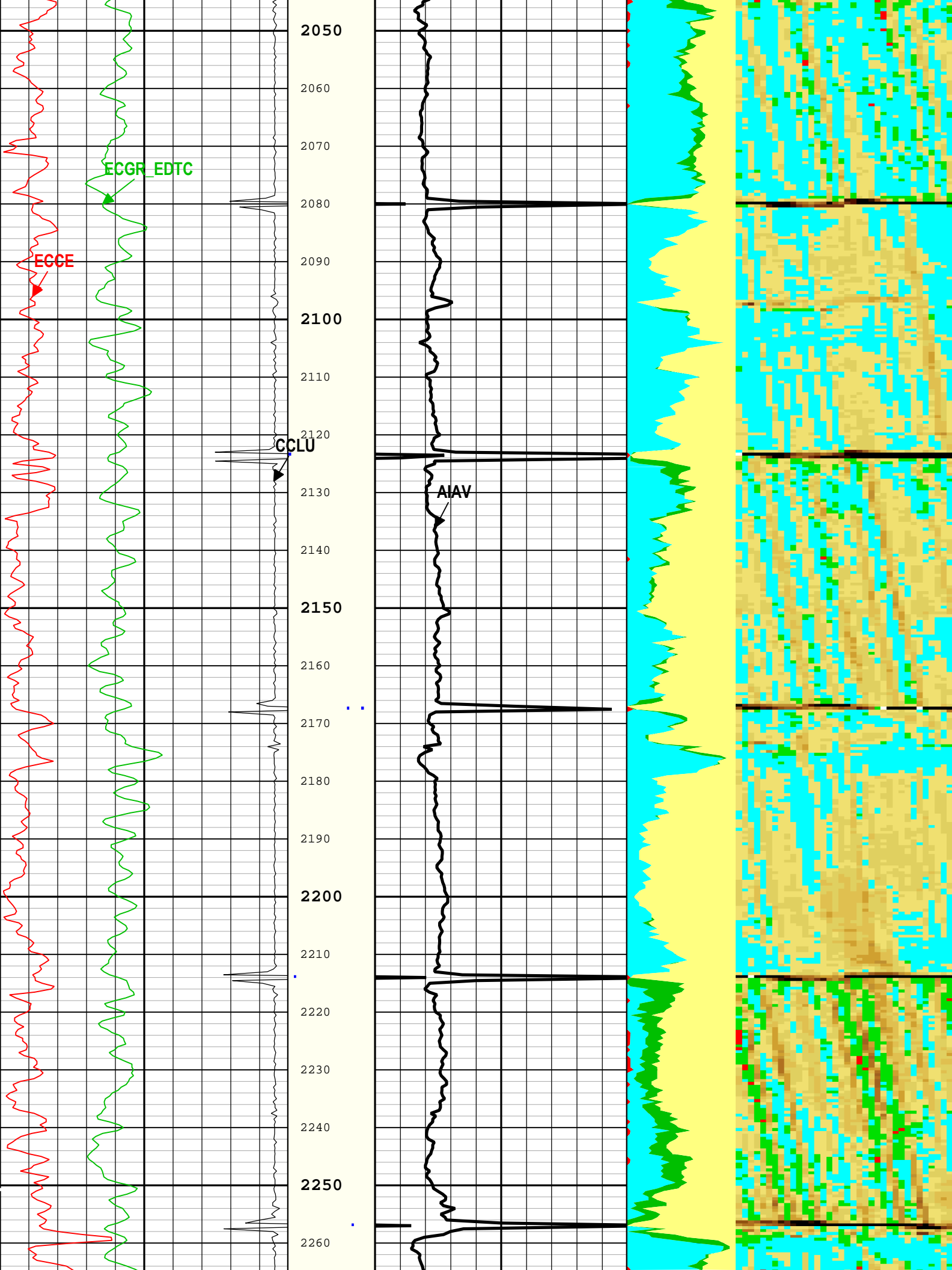


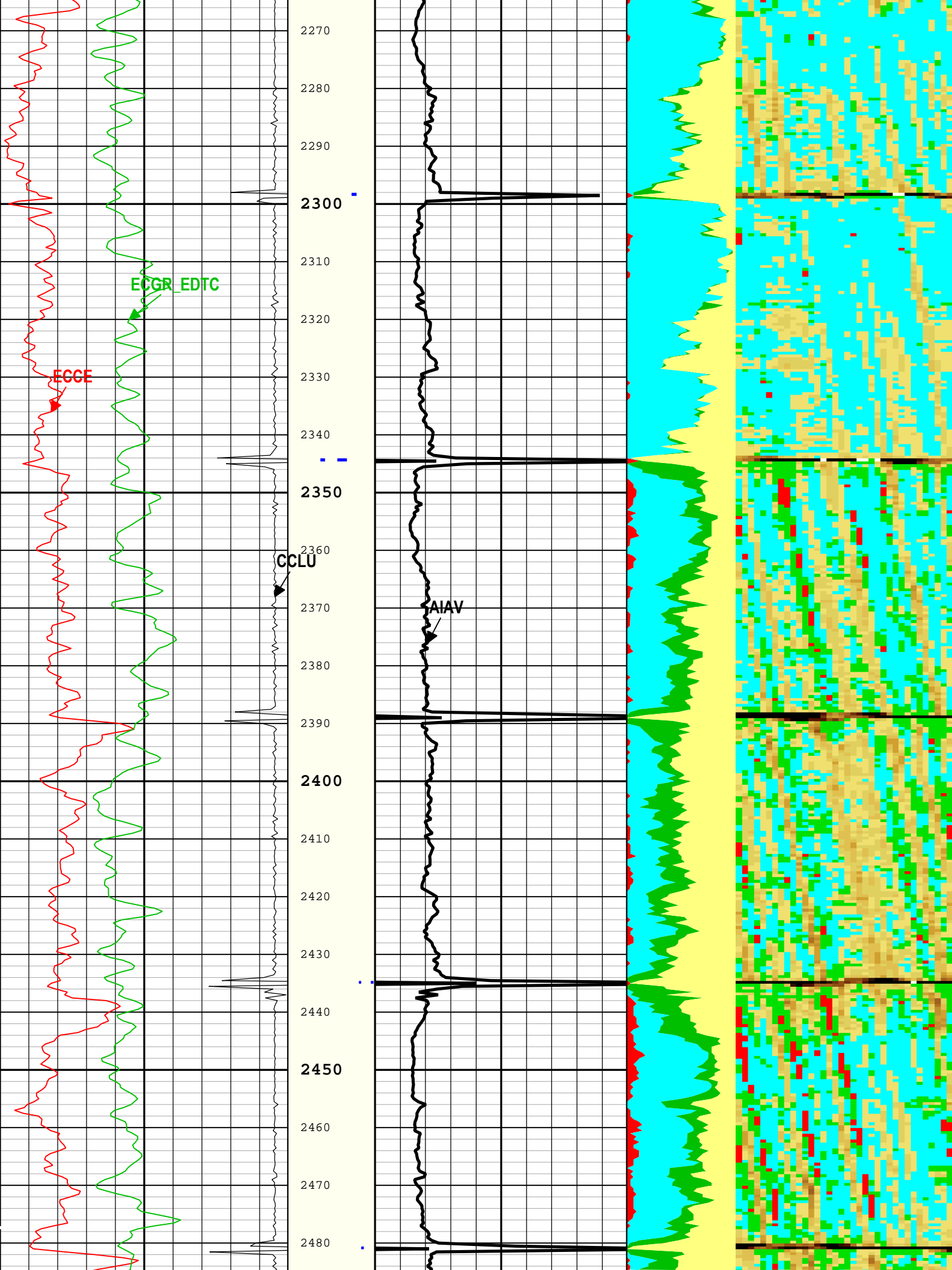


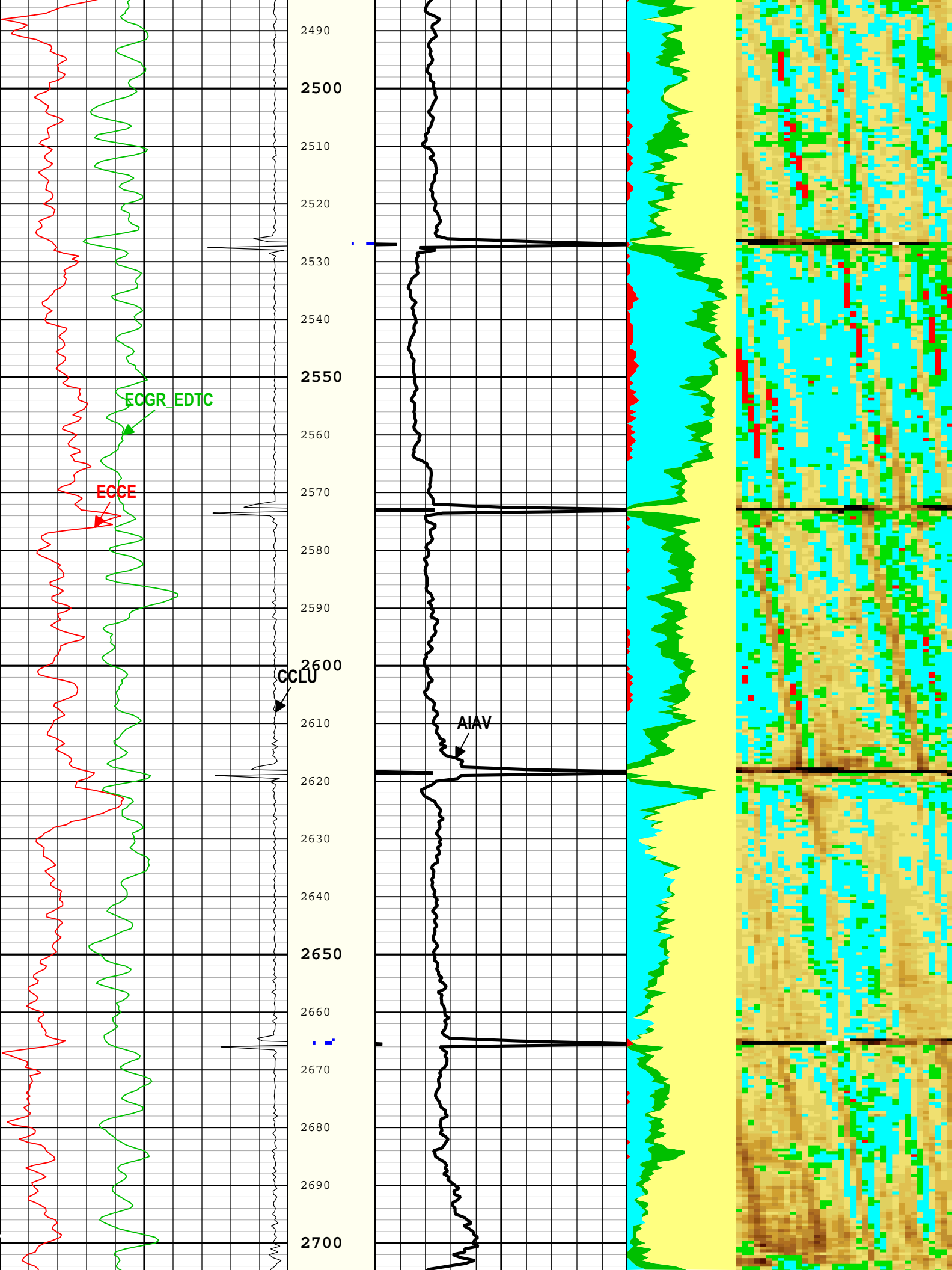


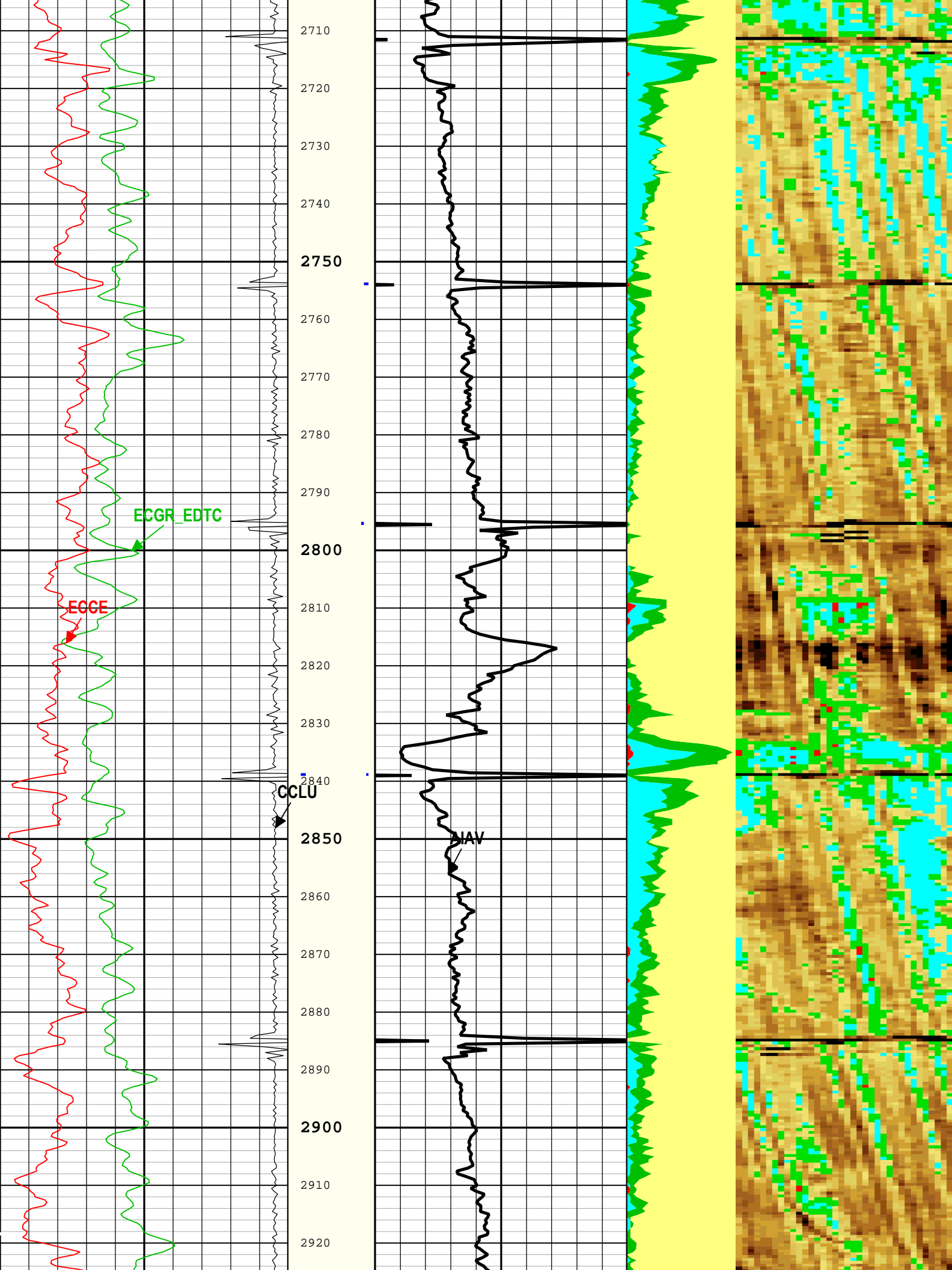


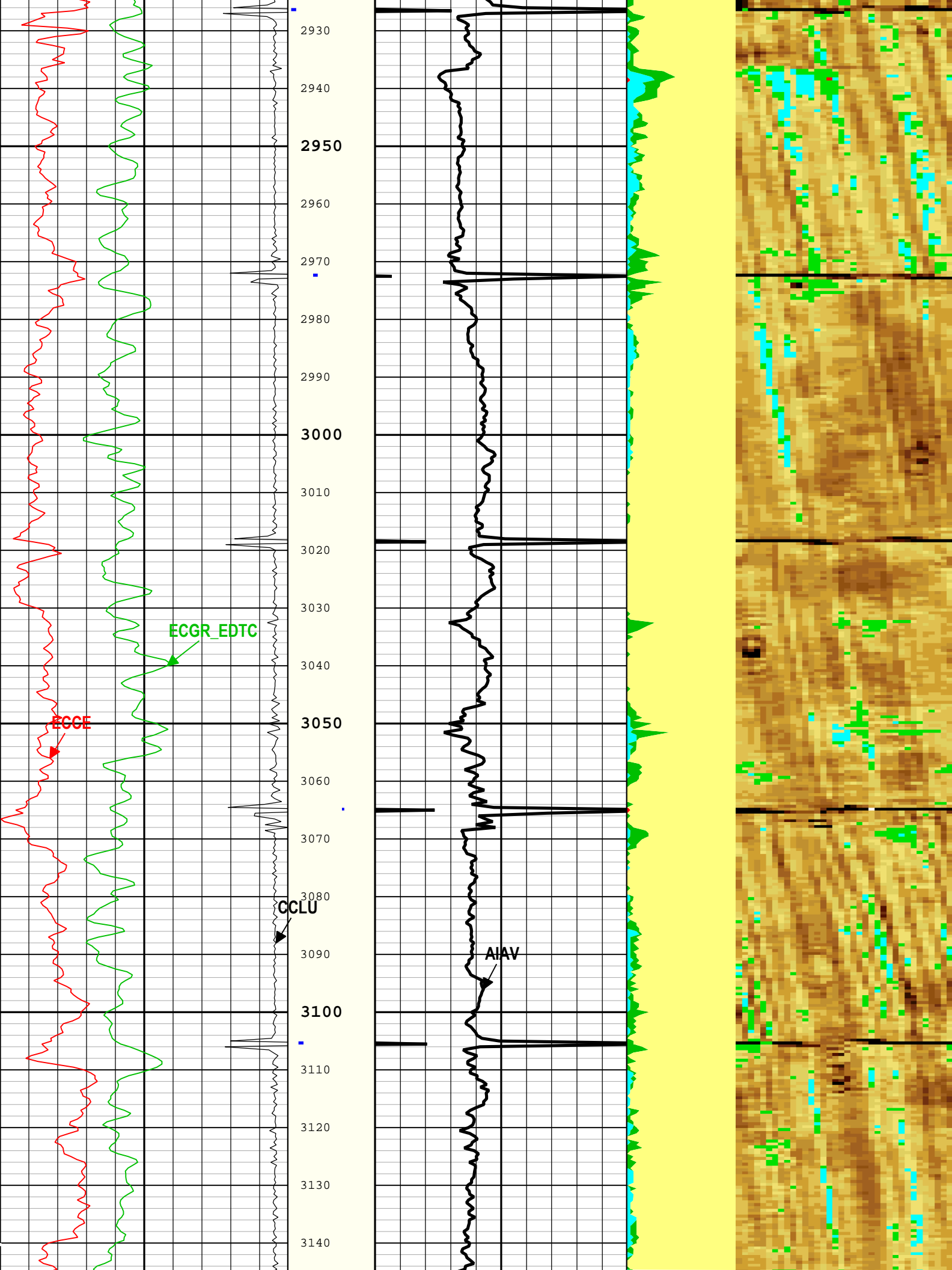


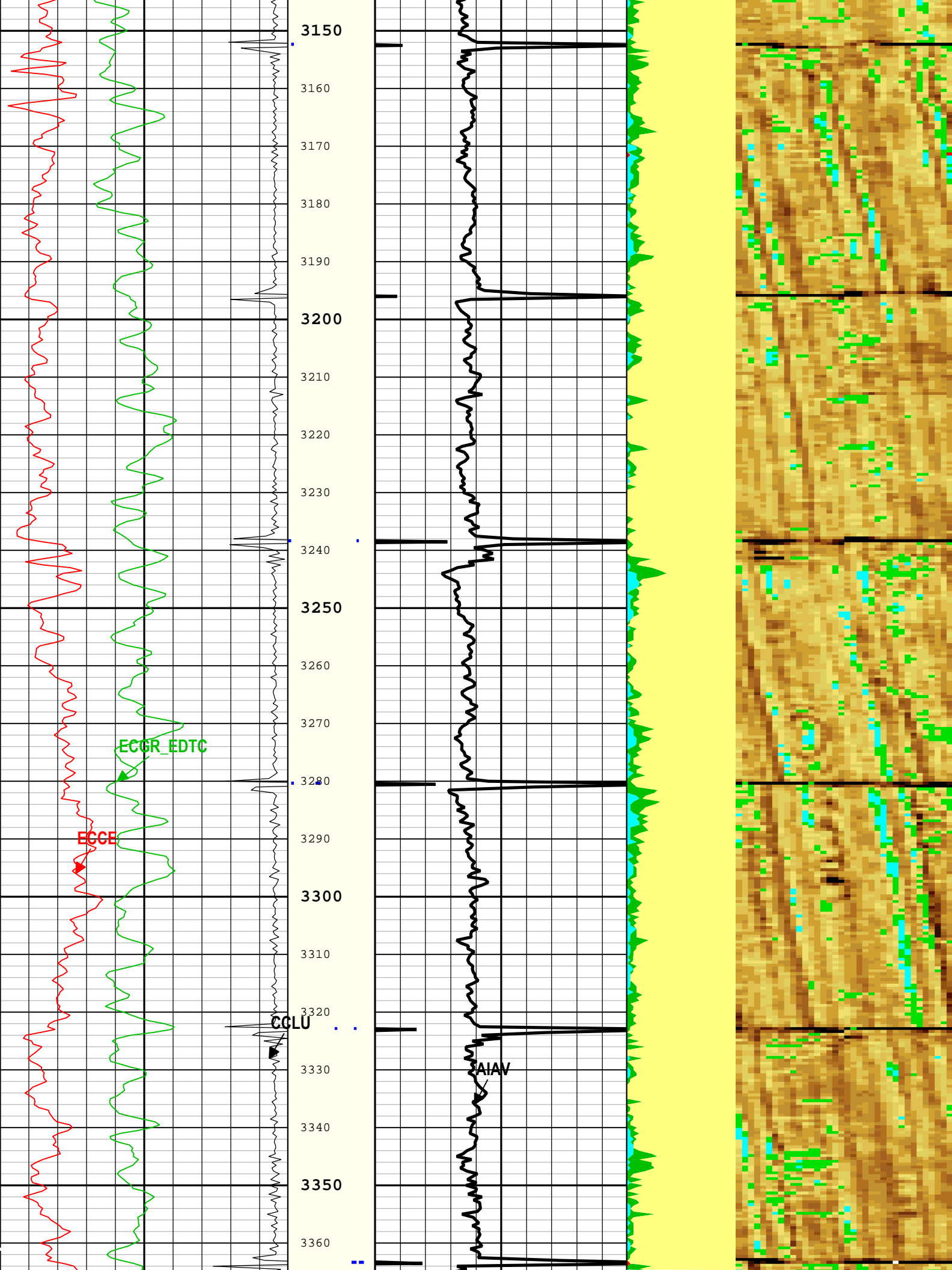


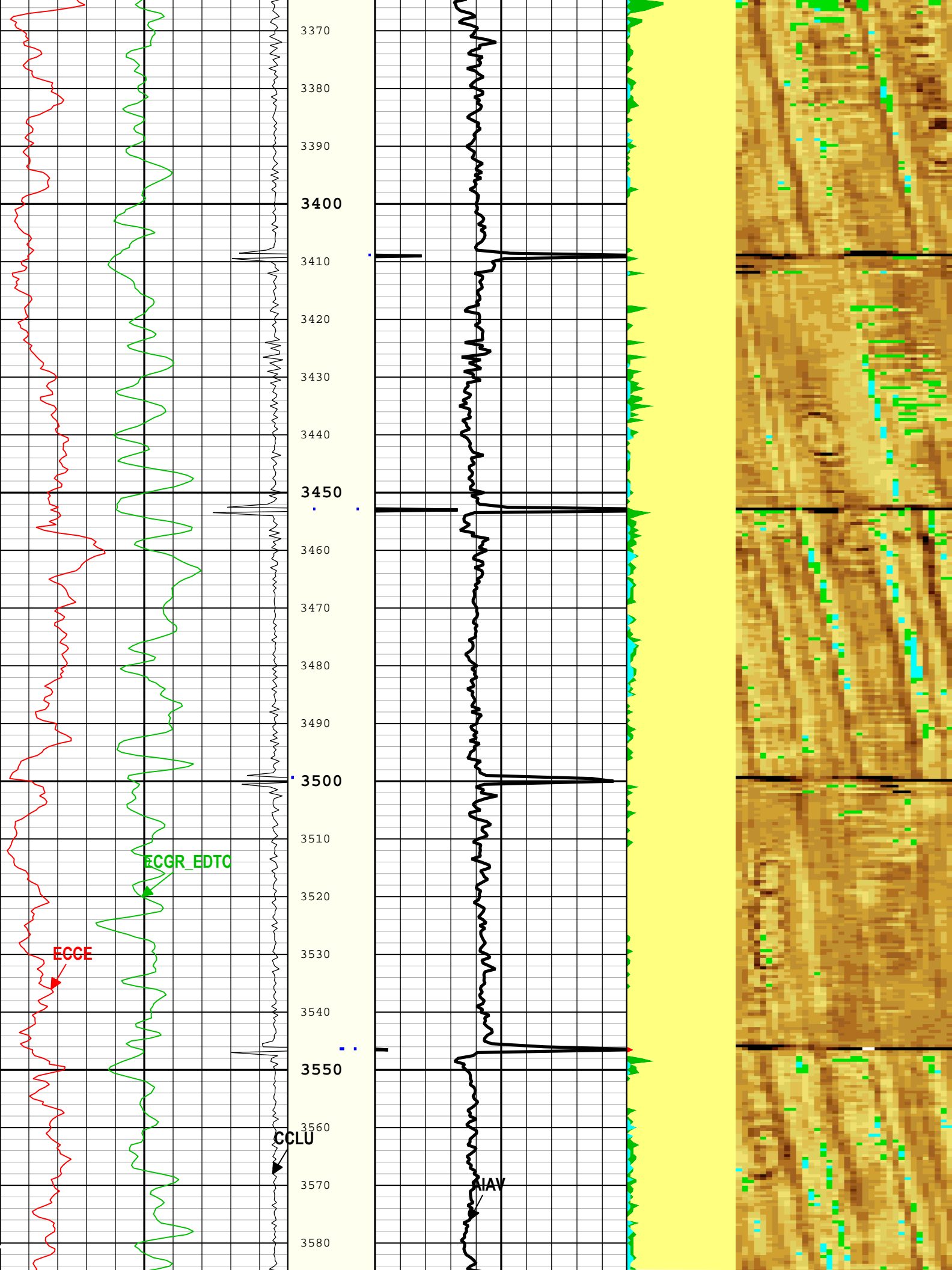


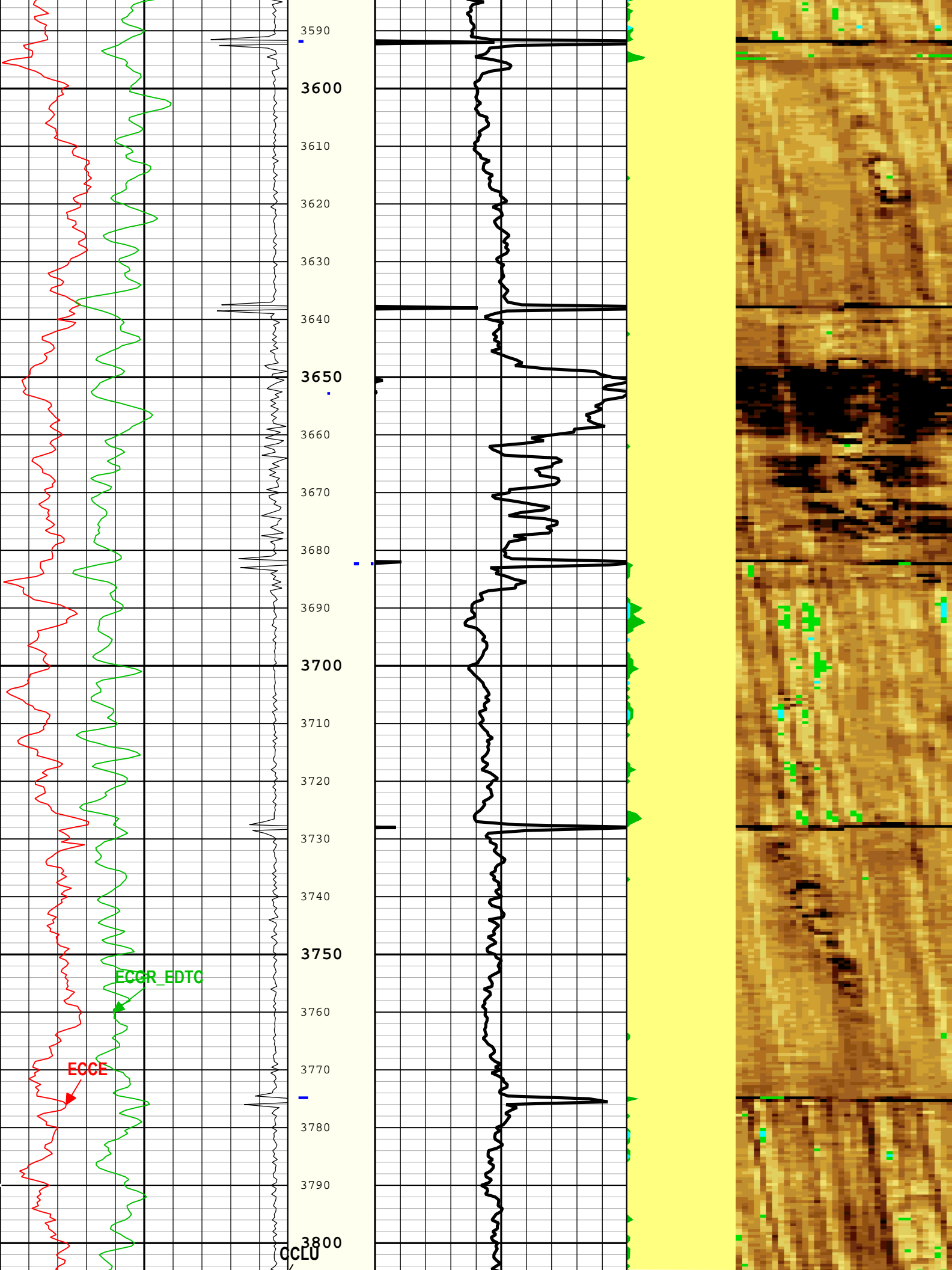


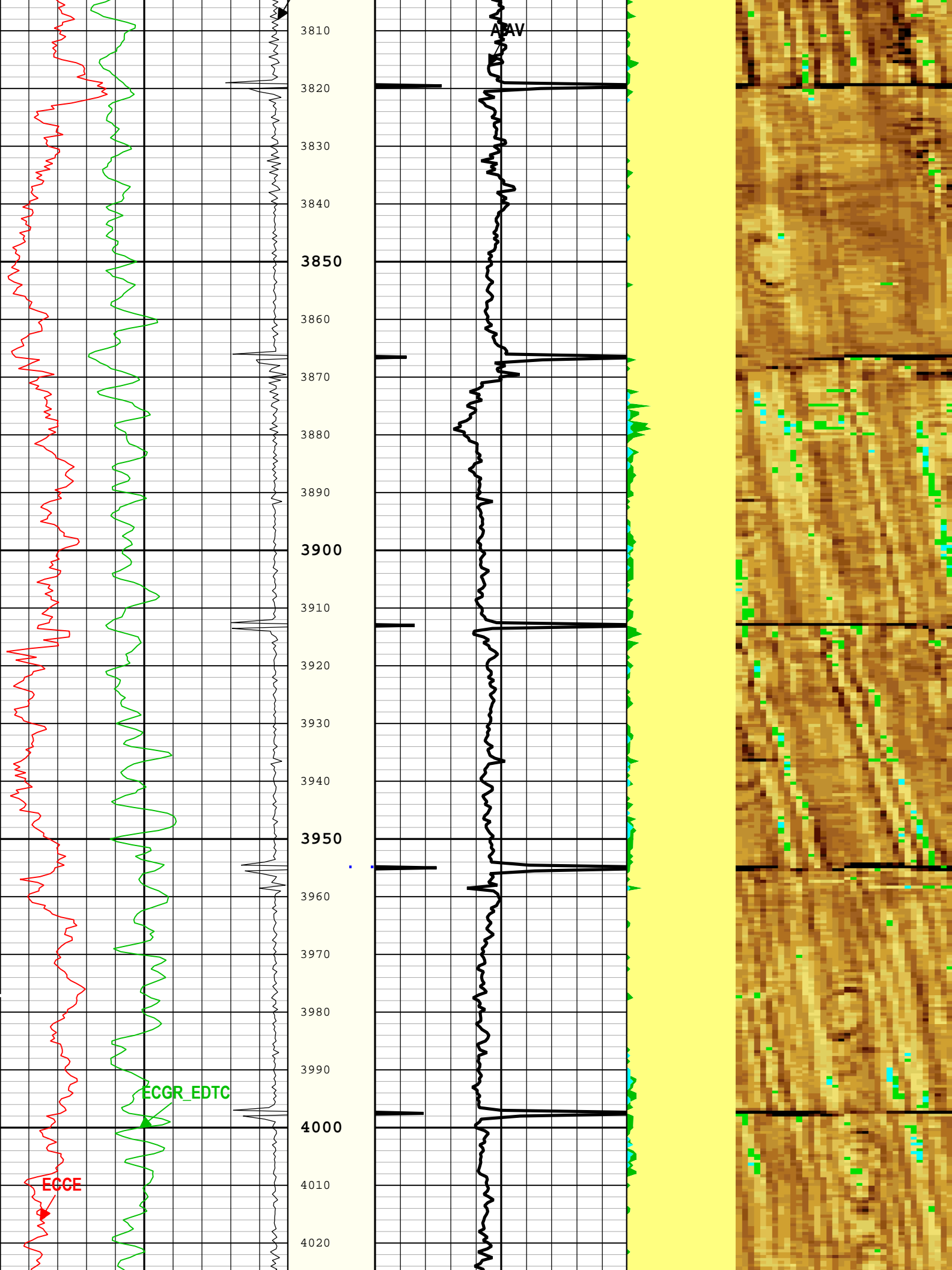


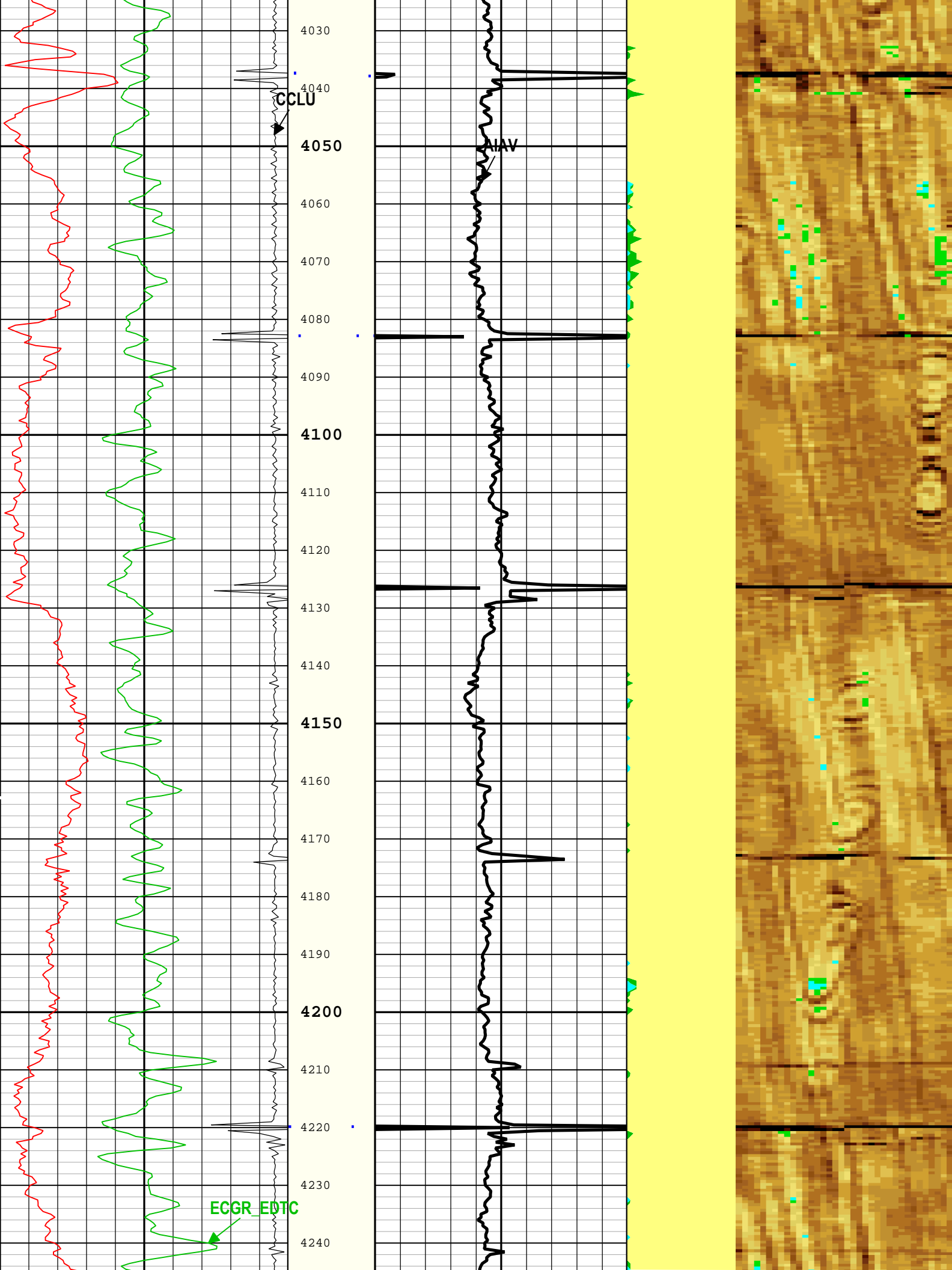


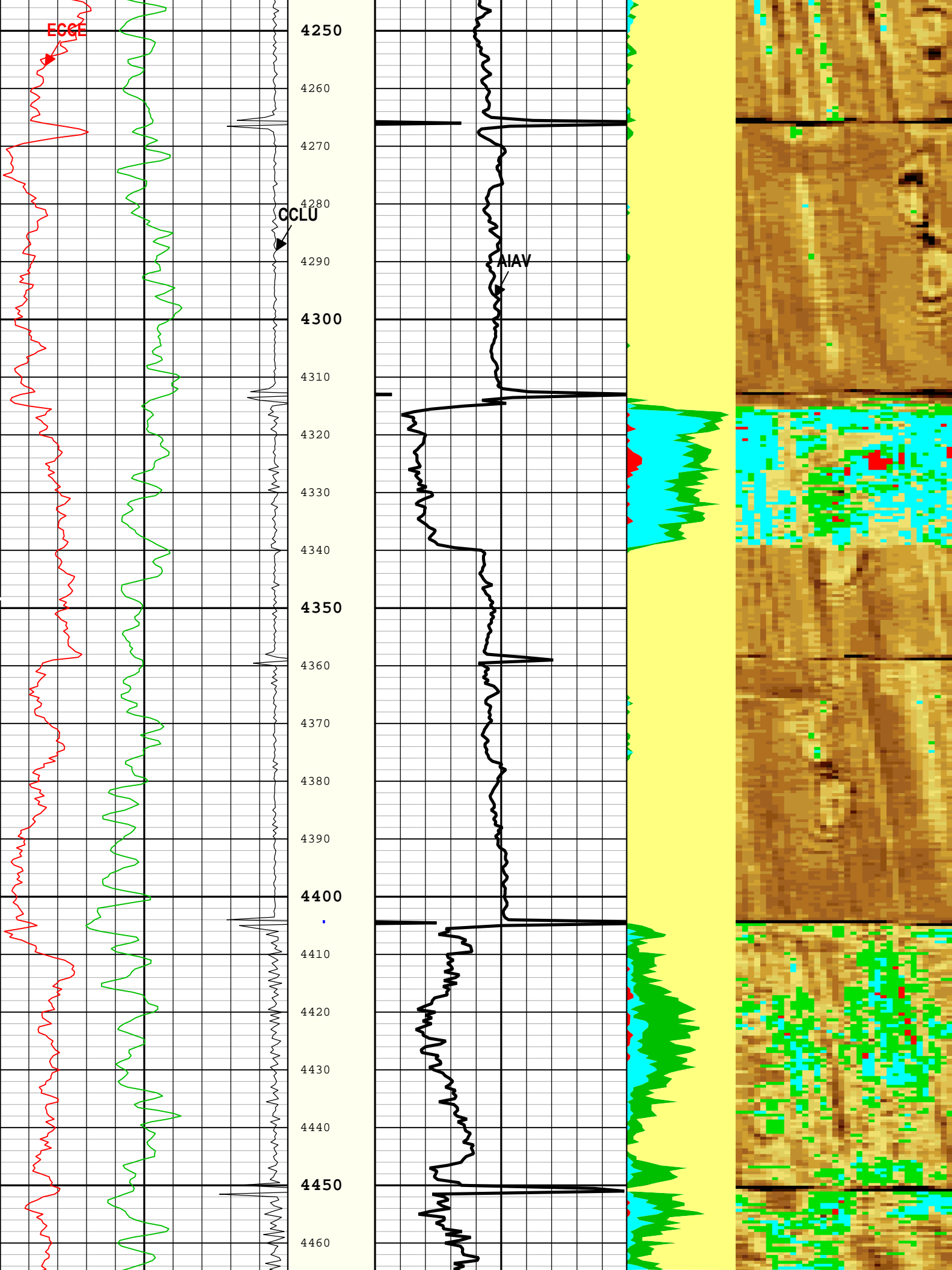


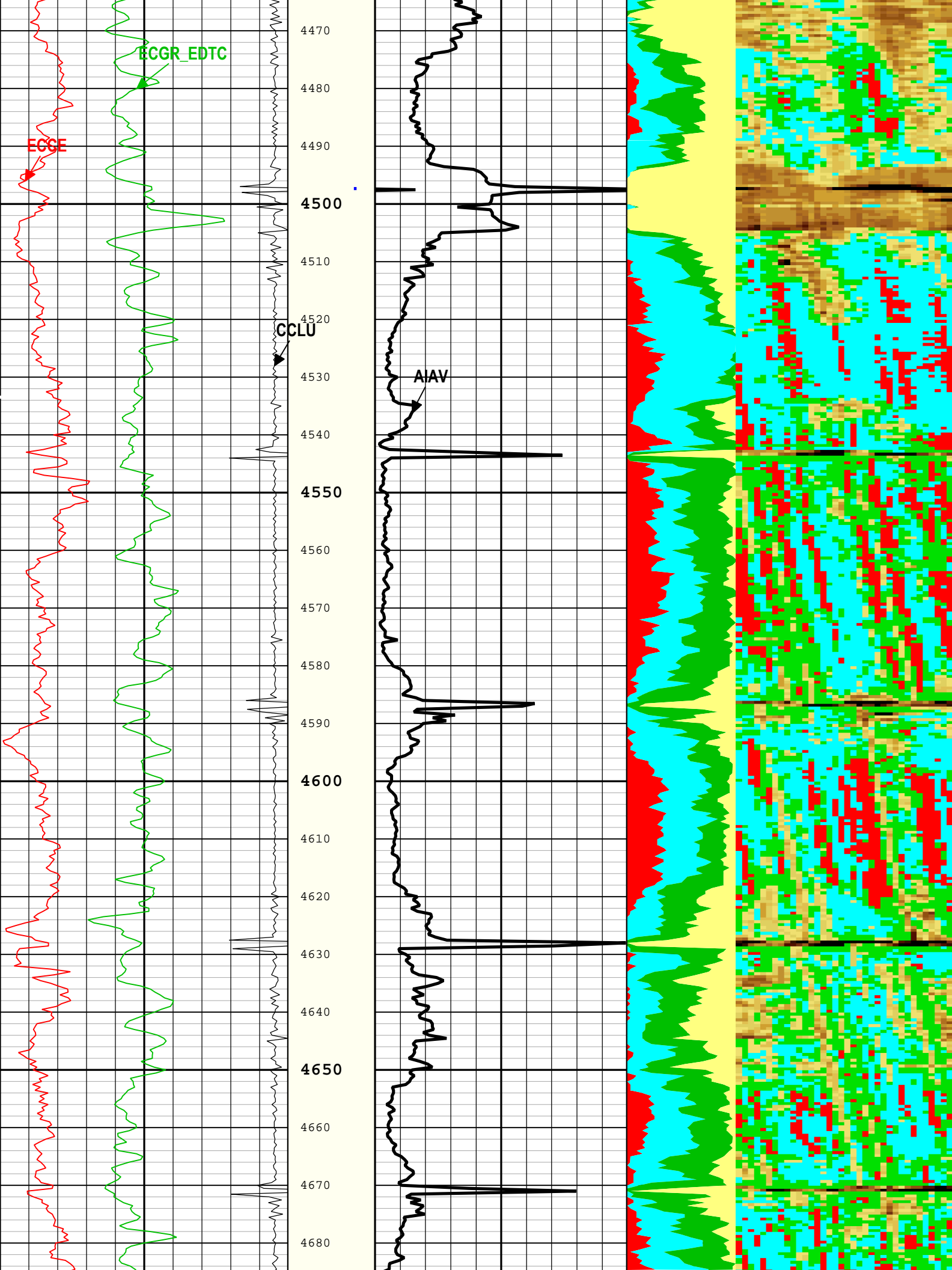


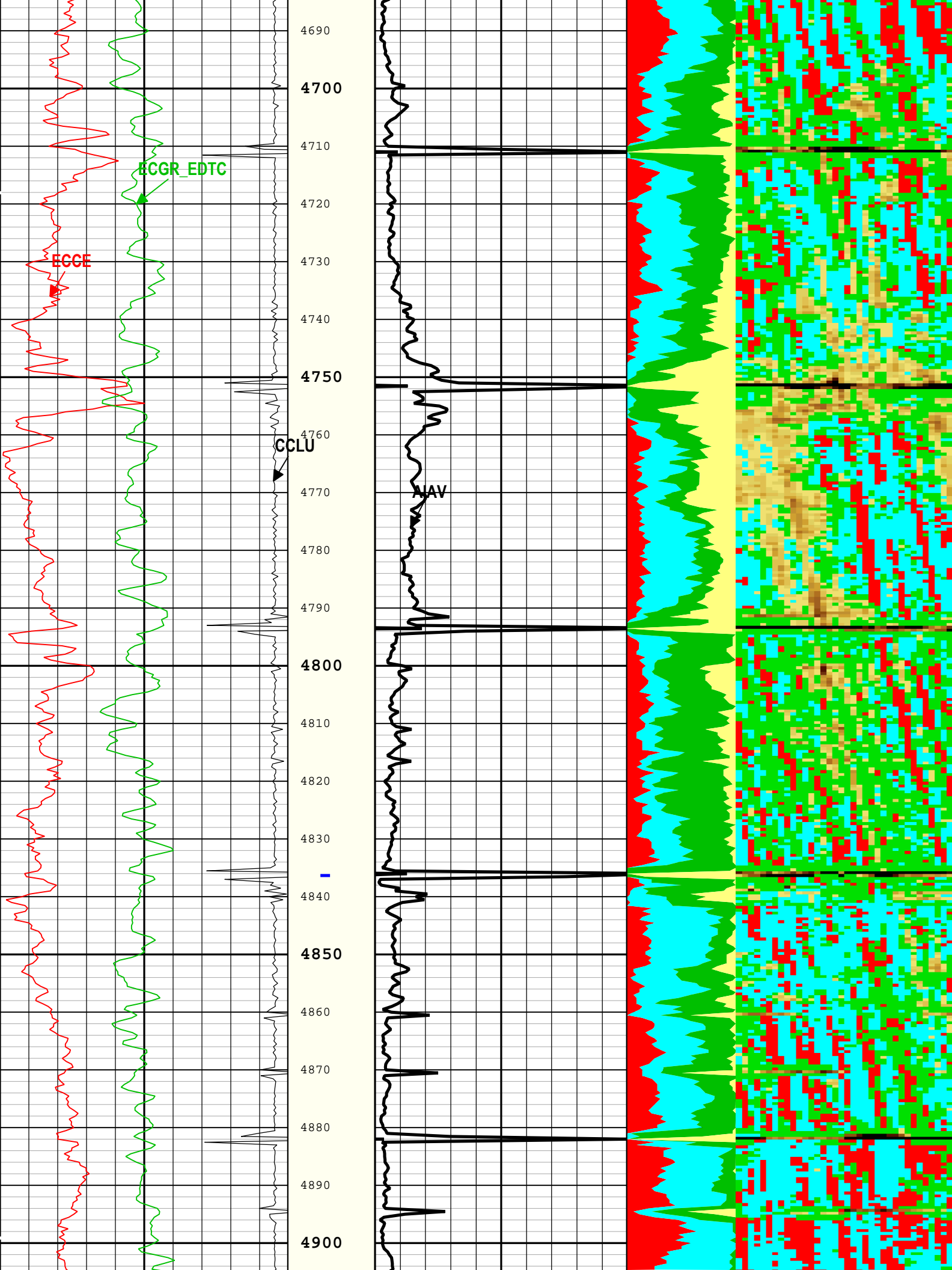


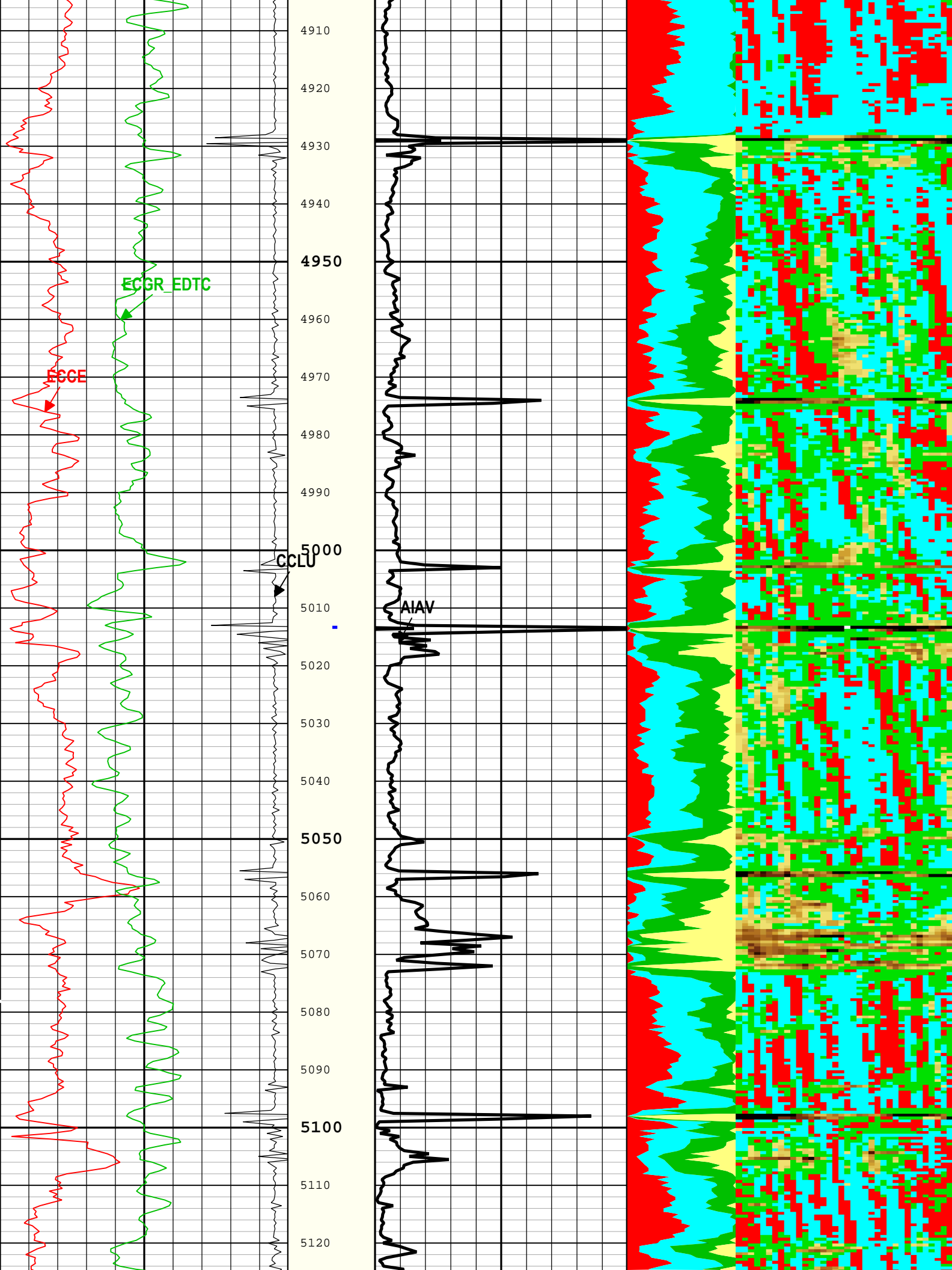


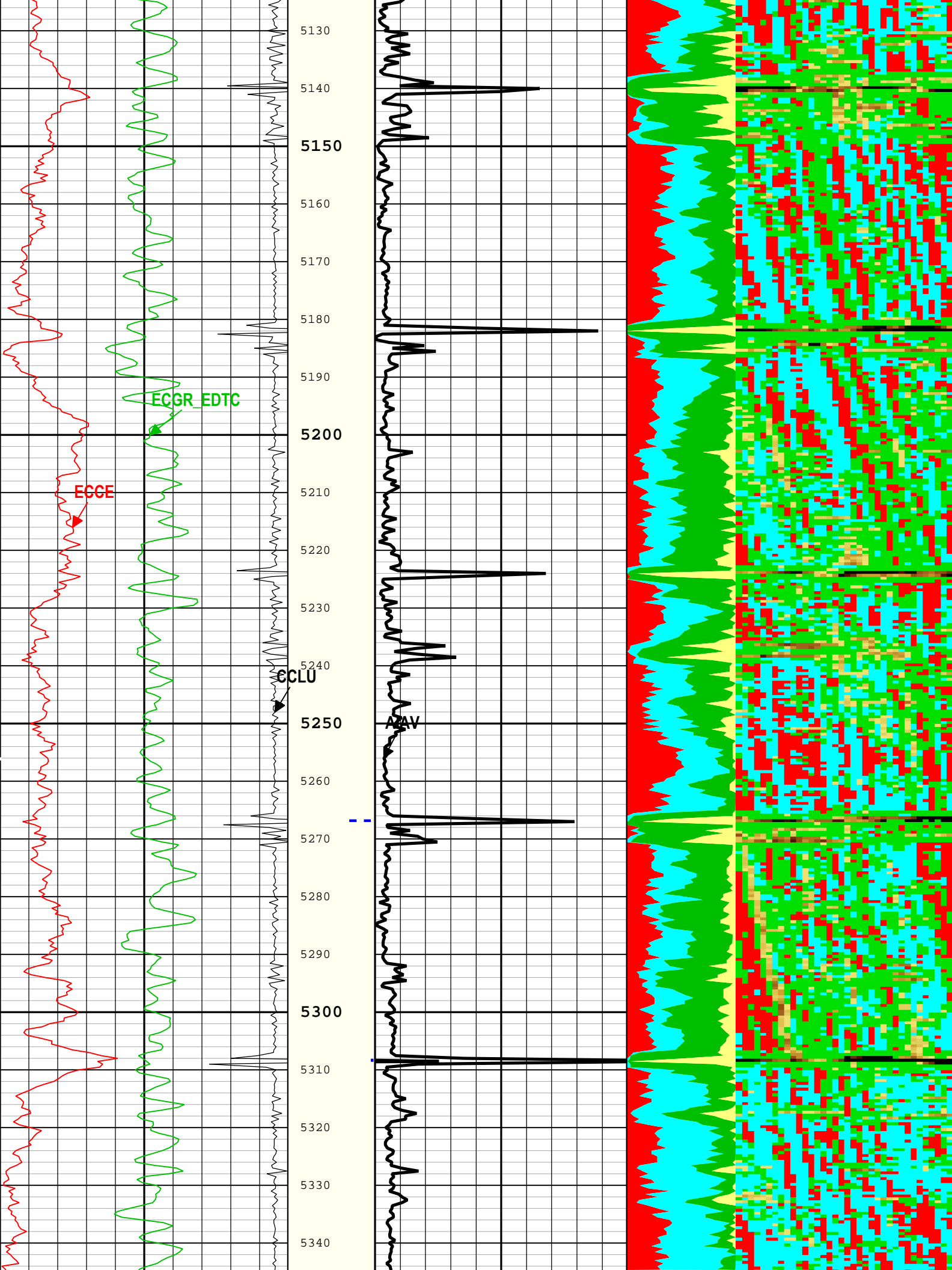


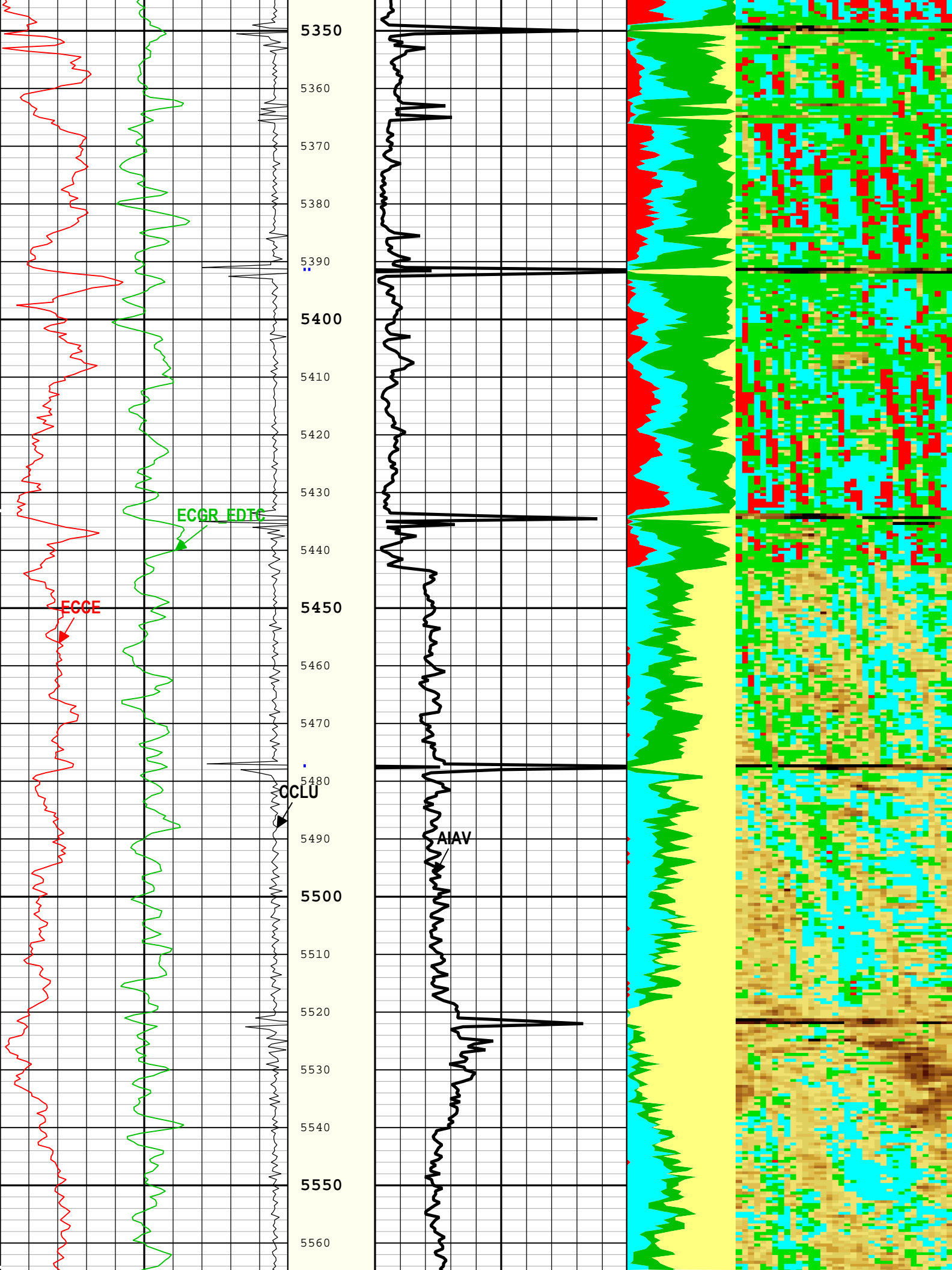


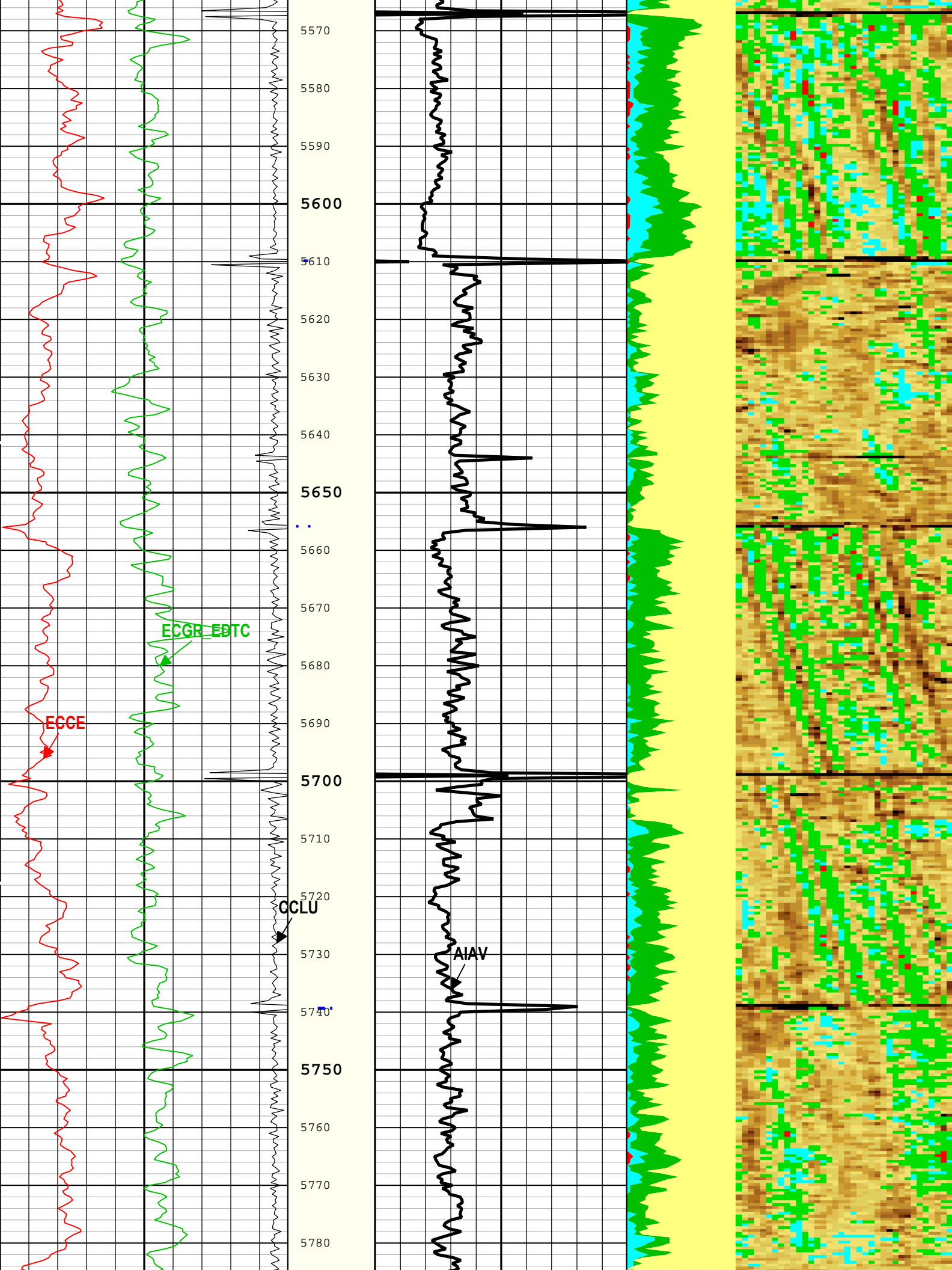


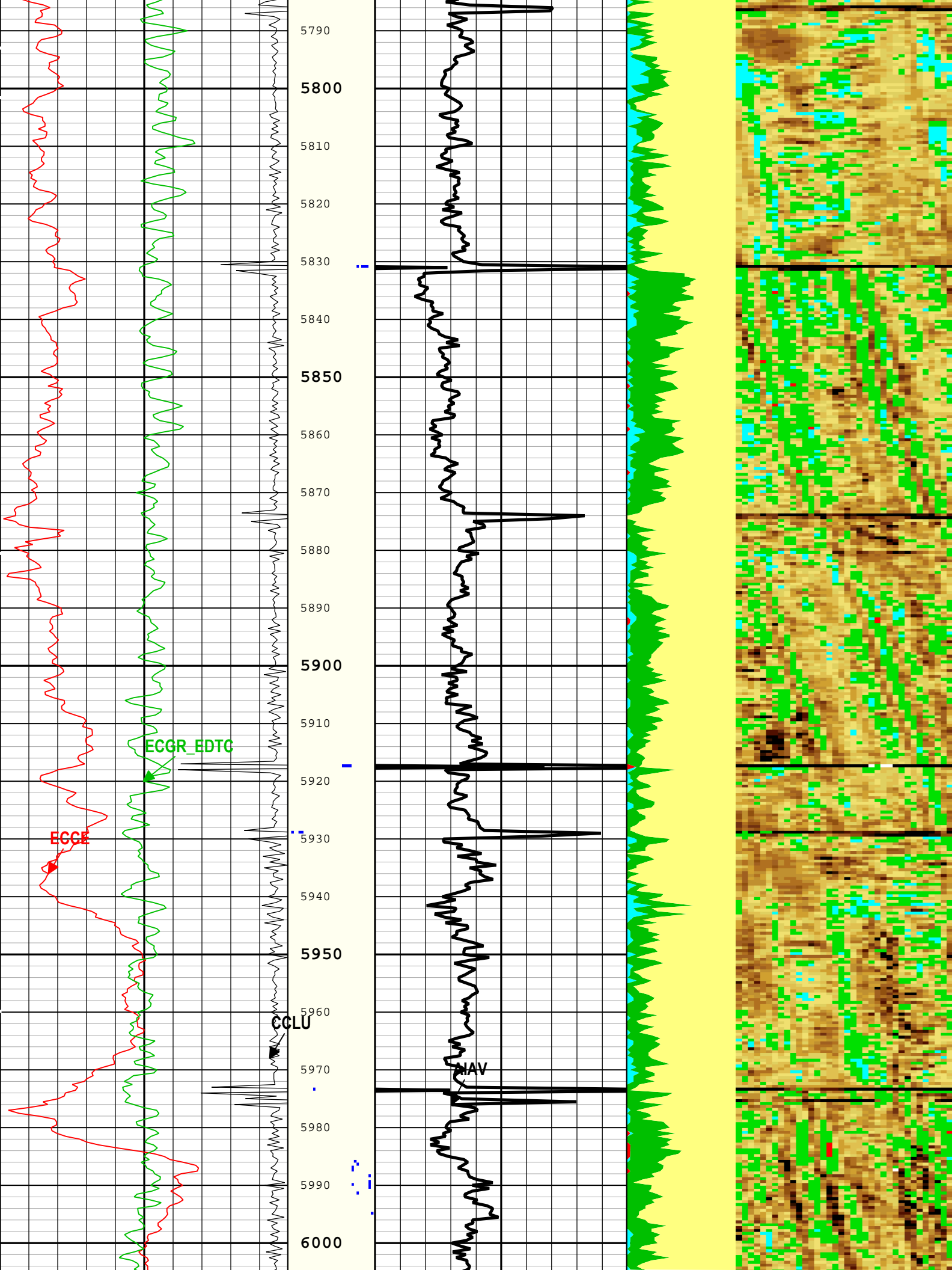


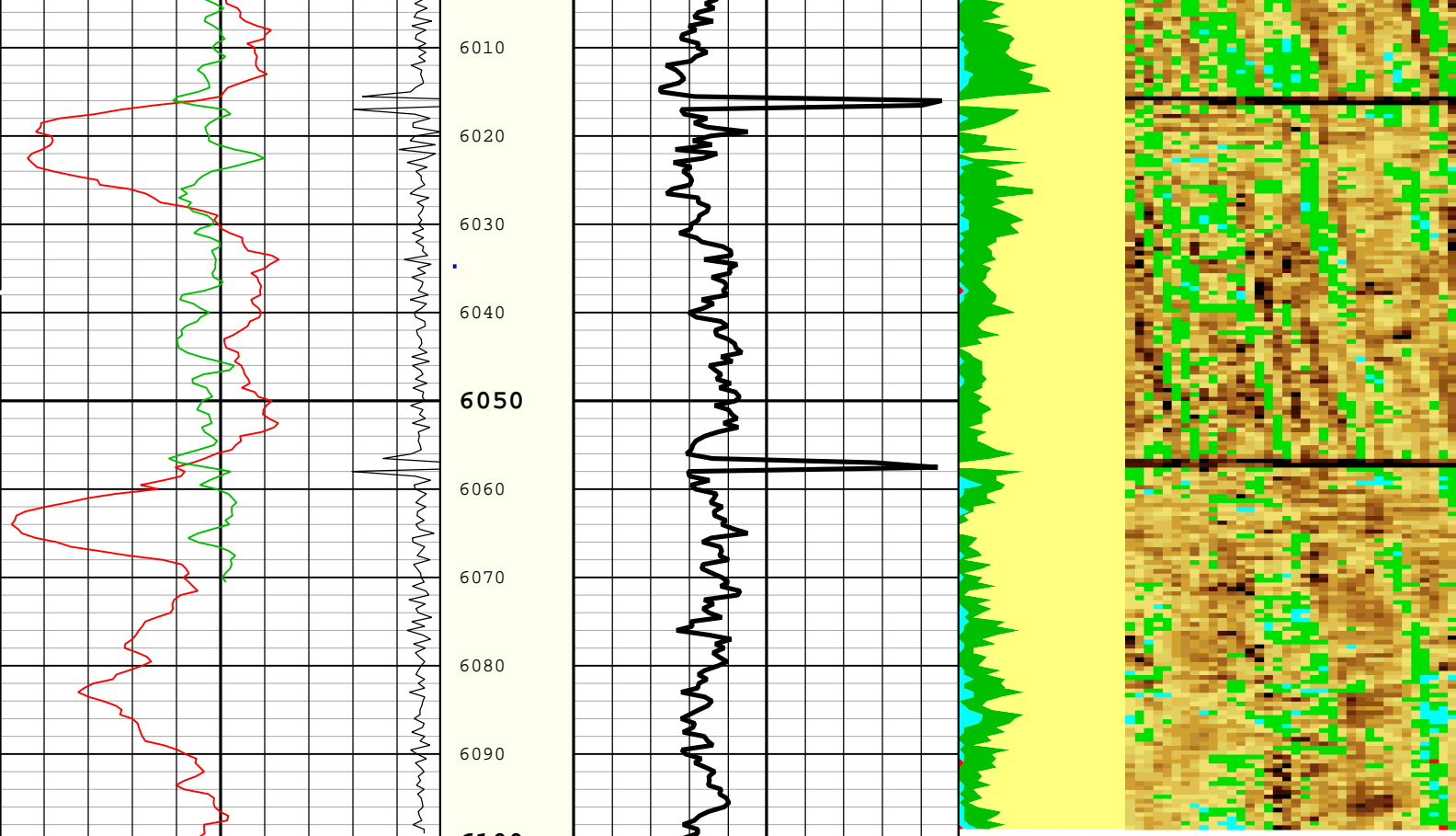












Casing Collar Locator Ultrasonic (CCLU) USIT-E			<div><div>Absent1.5002.5006.500</div><div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div>Explicit Normalization</div> <div>USIT - USIT Processing Flags (UFLG)</div>	Acoustic Impedance Average (AIAV) USIT-E		<div>Gas</div> <div>Liquid</div> <div>Micro-Debonding</div> <div>Bonded</div>	<div><div>Absent-500.0002.2003.2544.3095.3636.4187.472</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)</div>	
-20	in	1		0	Mrayl			10
Amplitude of Eccentering (ECCE) USIT-E								
0	in	0.5						
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: 20-Jun-2018 10:45:46

Channel Processing Parameters

UltraSonic: Parameters

Parameter	Description	Tool	Value	Unit
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	17819.3	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	1.16	
MUD_N_THE	Theoretical 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	1.48	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	39.5	1956
BS	8.5	1956	6100
All depth are actual.			

Tool Control Parameters

UltraSonic: 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	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	No	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
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	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

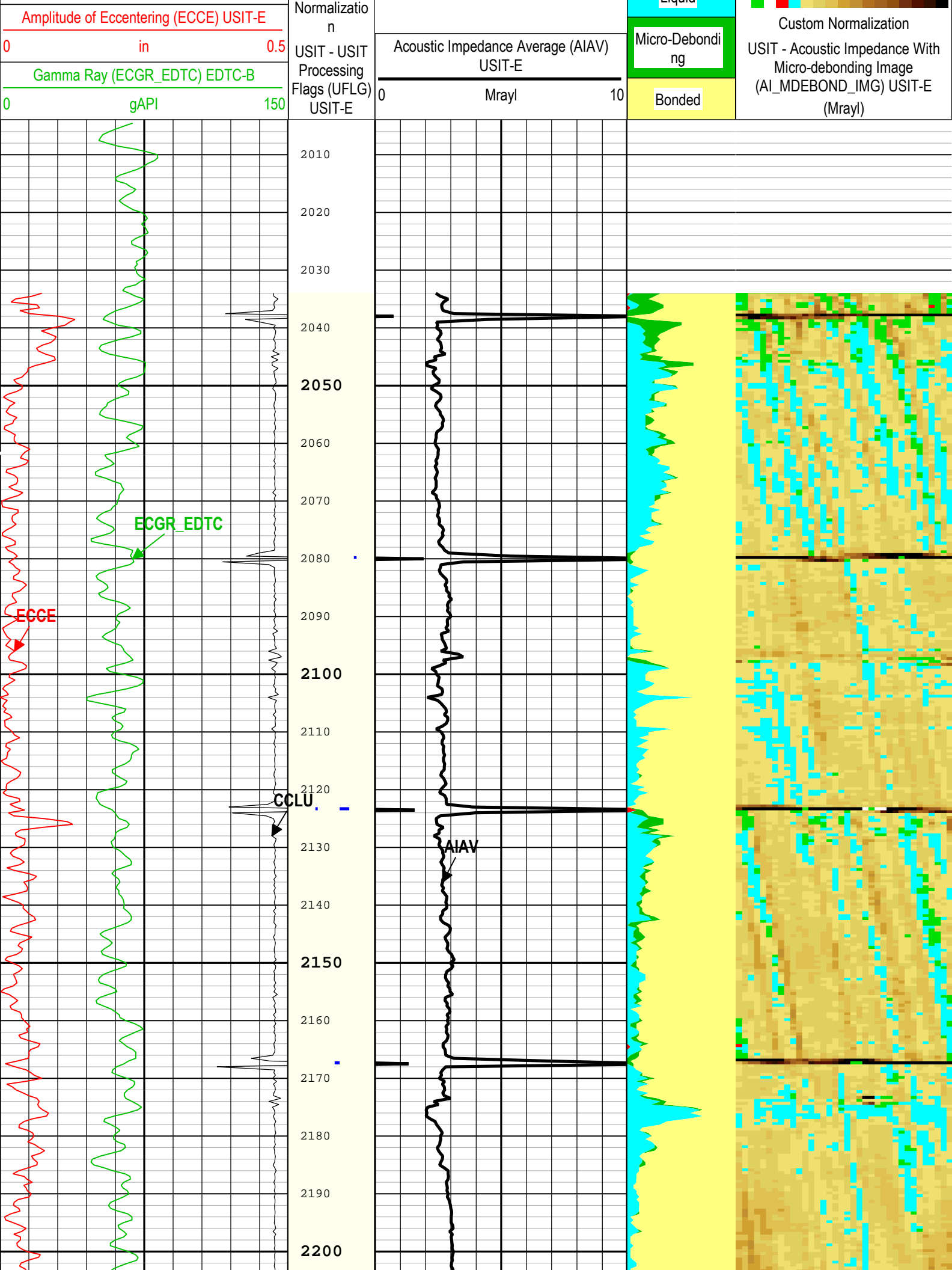
UltraSonic									
0 PSI Repeat Pass									

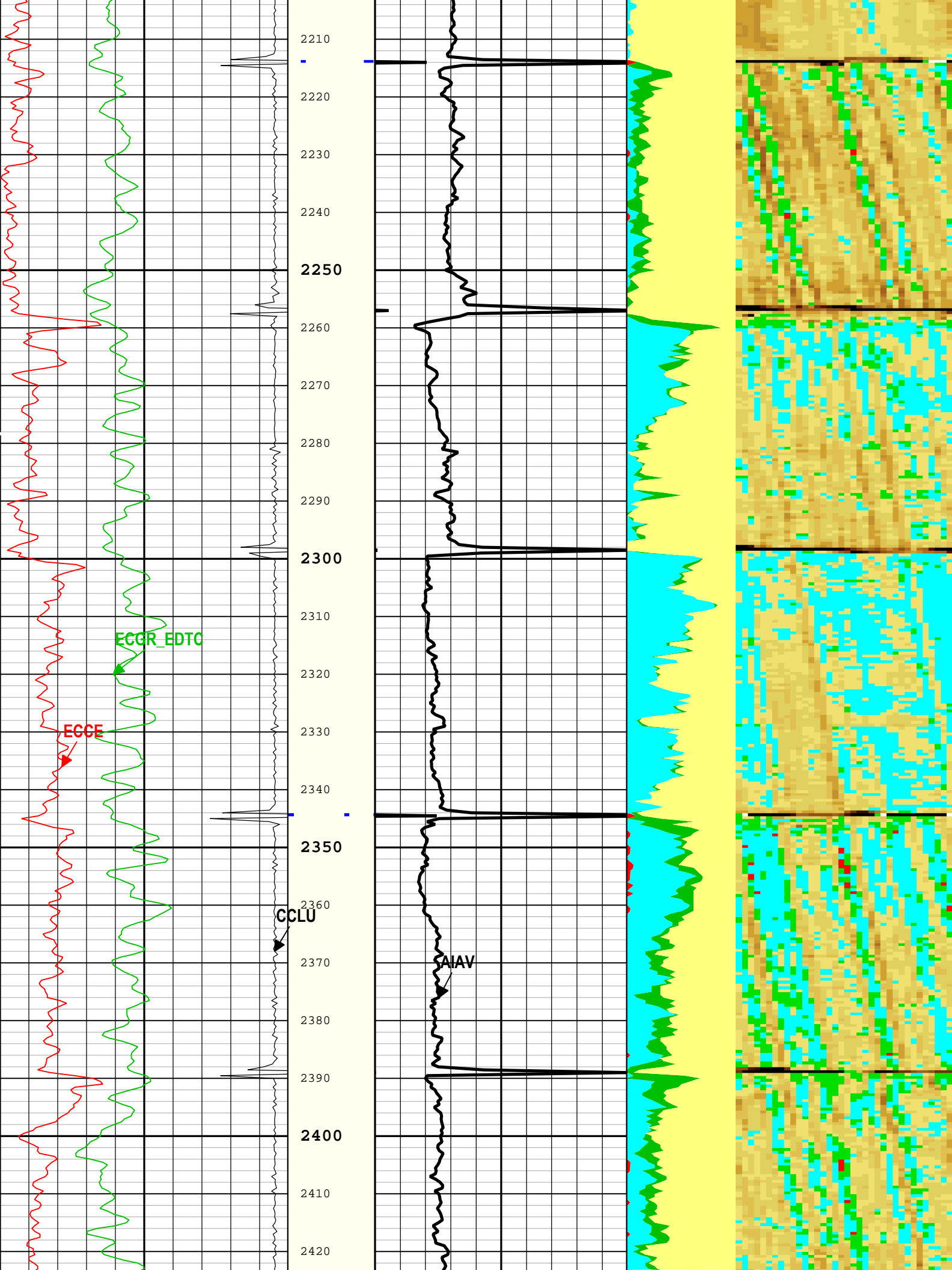
Software Version									
Acquisition System						Version			
Maxwell 2018 SP1						8.1.99839.3100			

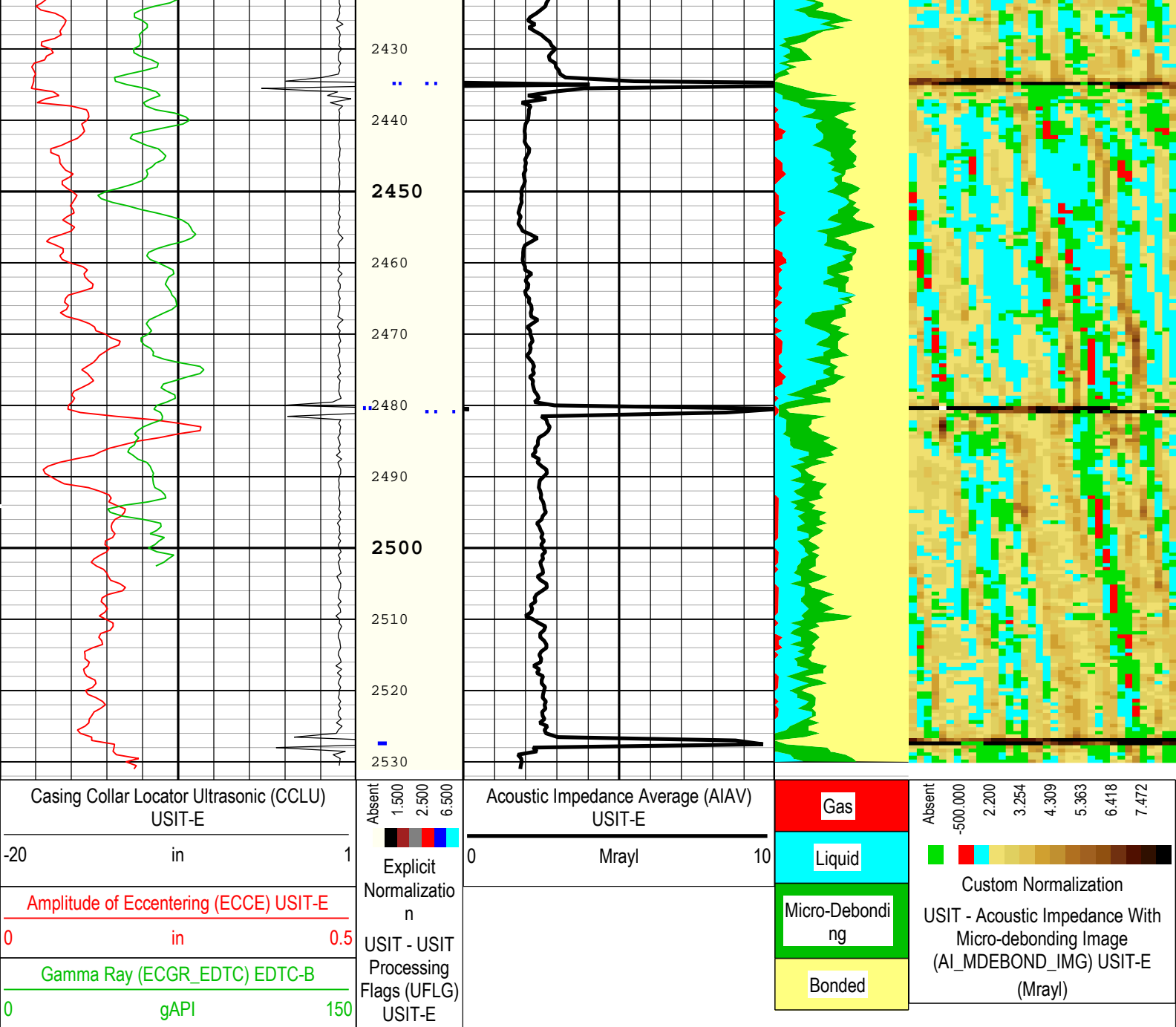
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
UltraSonic	Log[1]:Up	Up	2033.93 ft	2532.94 ft	20-Jun-2018 9:31:43 AM	20-Jun-2018 9:34:21 AM	ON	2.73 ft	Yes
All depths are referenced to toolstring zero									

All depths are referenced to toolstring zero			
Log	Company:Noble Energy Inc Well:Larson AA19-630		
	UltraSonic: Log[1]: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: 20-Jun-2018 10:46:01			

TIME_1900 - Time Marked every 60.00 (s)									
Casing Collar Locator Ultrasonic (CCLU) USIT-E			Absent 1.500 2.500 6.500 Explicit			Gas Liquid			
-20	in	1							







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: 20-Jun-2018 10:46:01

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UltraSonic: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.5	in
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DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
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GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	

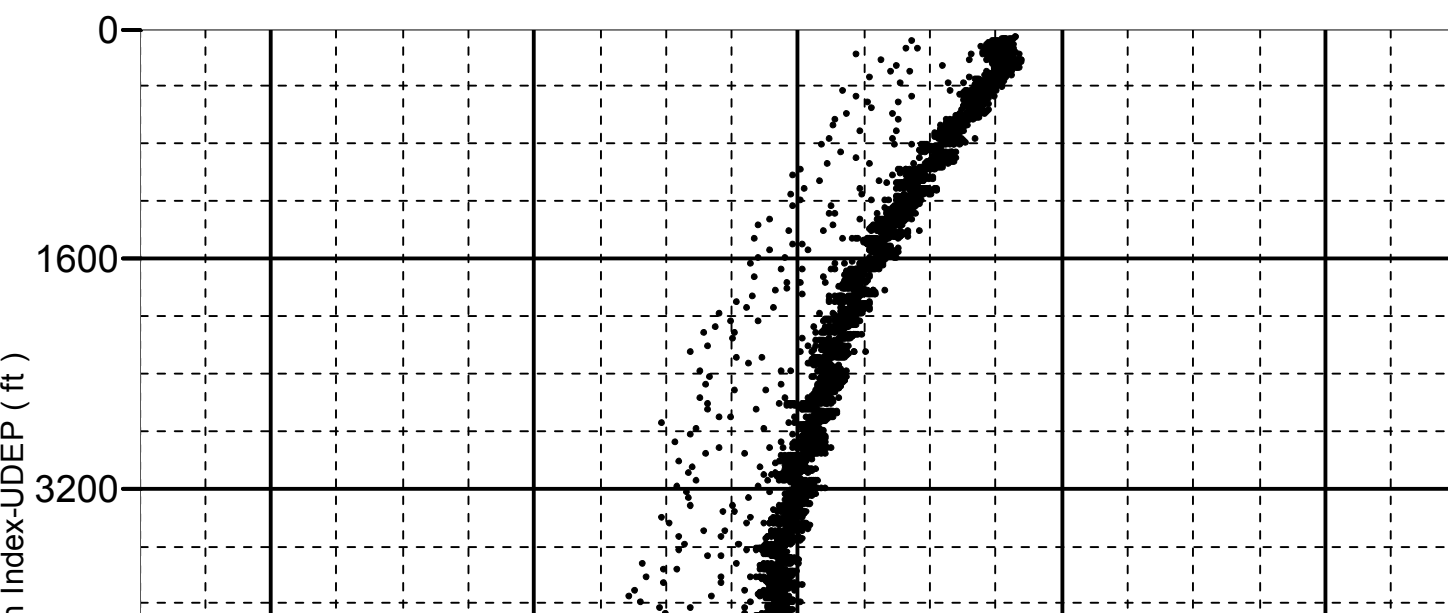
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.16	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	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	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

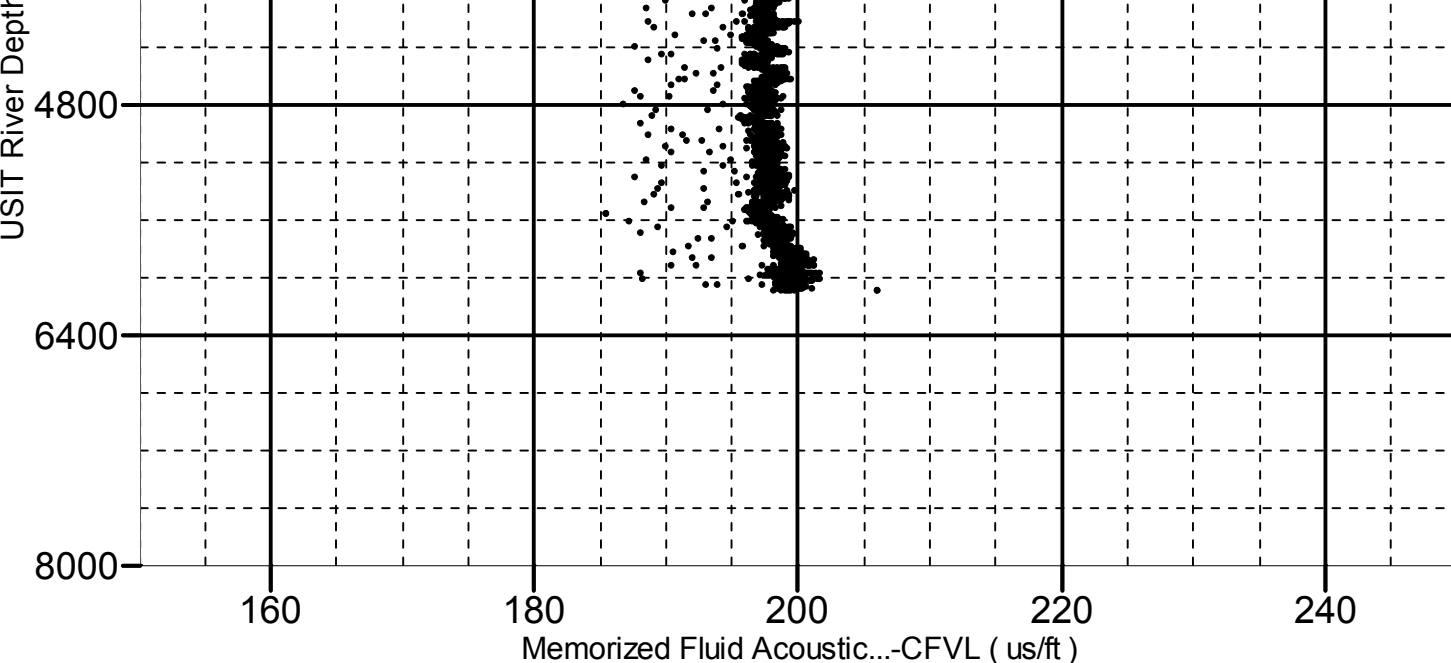
UltraSonic: Parameters

XYZ

Fluid Acoustic Slowness vs Depth

Index Range: From 6100.50 to 69.50 ft

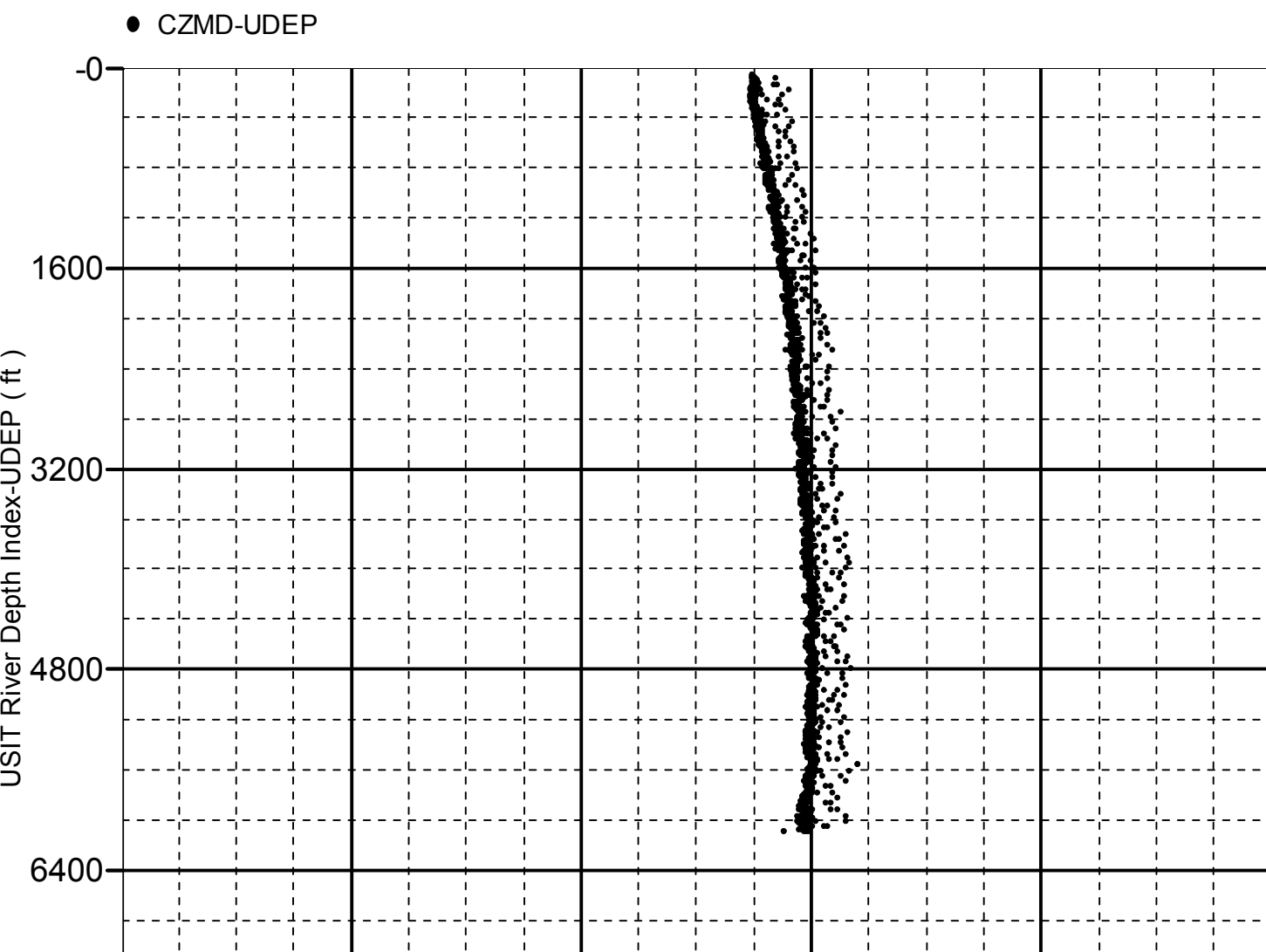


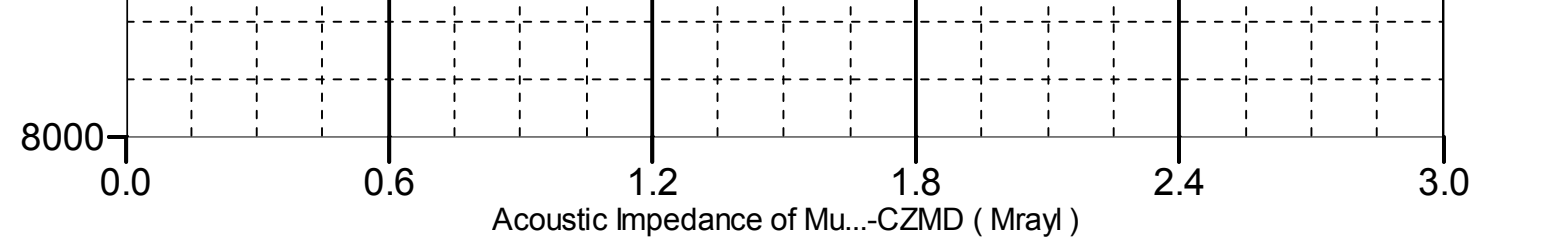


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6100.50 to 69.50 ft





Company:	Noble Energy Inc	Schlumberger
Well:	Larson AA19-630	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	

UltraSonic Summary Print