

Company: Noble Energy Inc

Well: Larson A23-656

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wattenberg				
Location:	SWNW 19-6N-63W				
Well:	Larson A23-656				
Company:	Noble Energy Inc				
Location:		SWNW 19-6N-63W	Elev.:	K.B.	4679.00 ft
		2255 FNL & 0 FWL		G.L.	4649.00 ft
		Permanent Datum:	Ground Level	Elev.:	4649.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-45516	19	6N	63W

Logging Date	16-Jun-2018		
Run Number	UltraSonic		
Depth Driller	18030.00 ft		
Schlumberger Depth	18030.00 ft		
Bottom Log Interval	5900.00 ft		
Top Log Interval	90.00 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	1961.00 ft		
To	18030.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	18015.30 ft		
Max Recorded Temperatures			
Logger on Bottom	185 degF		
Unit Number	Time		
	Location:		
Recorded By			
Witnessed By			

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.

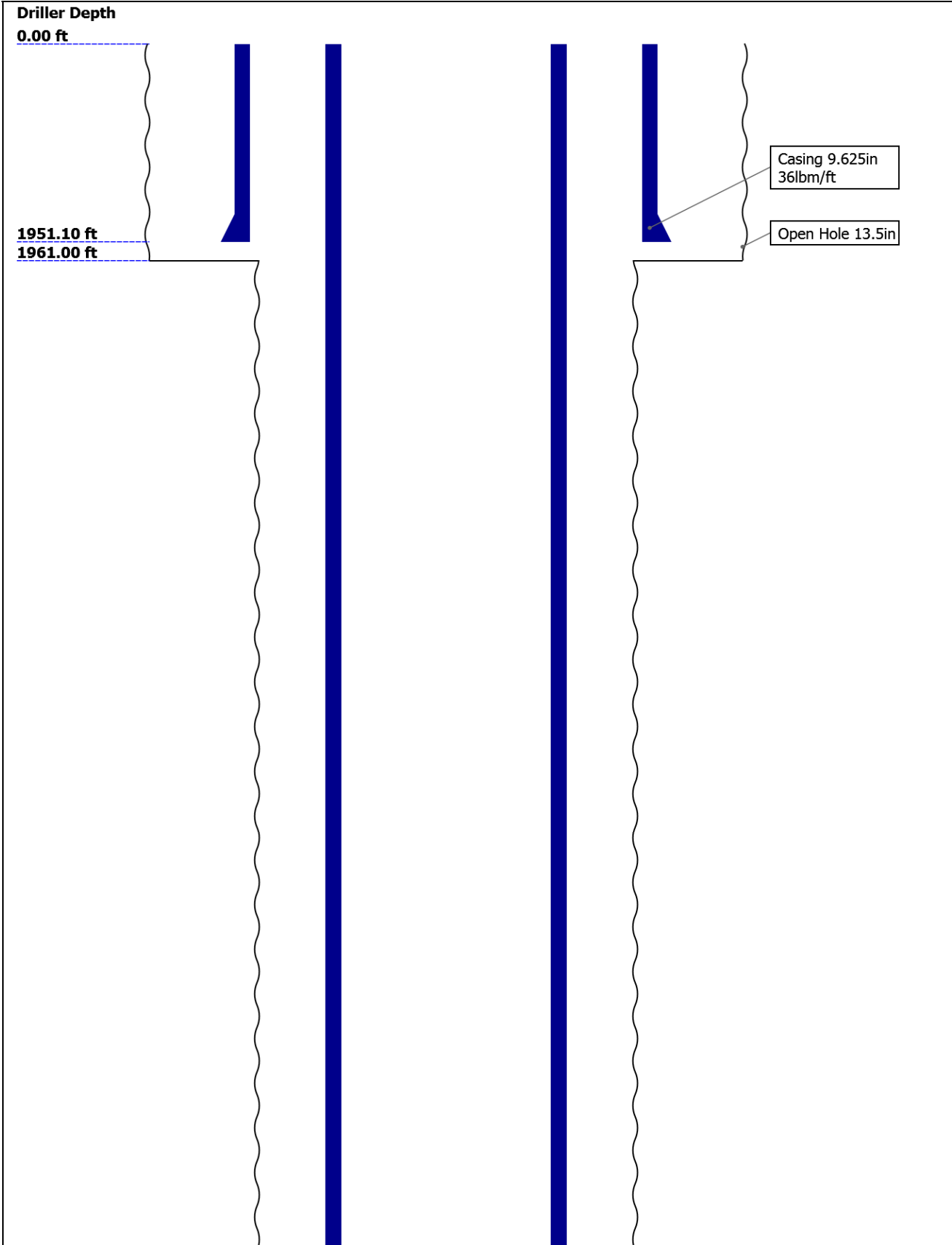
Contents

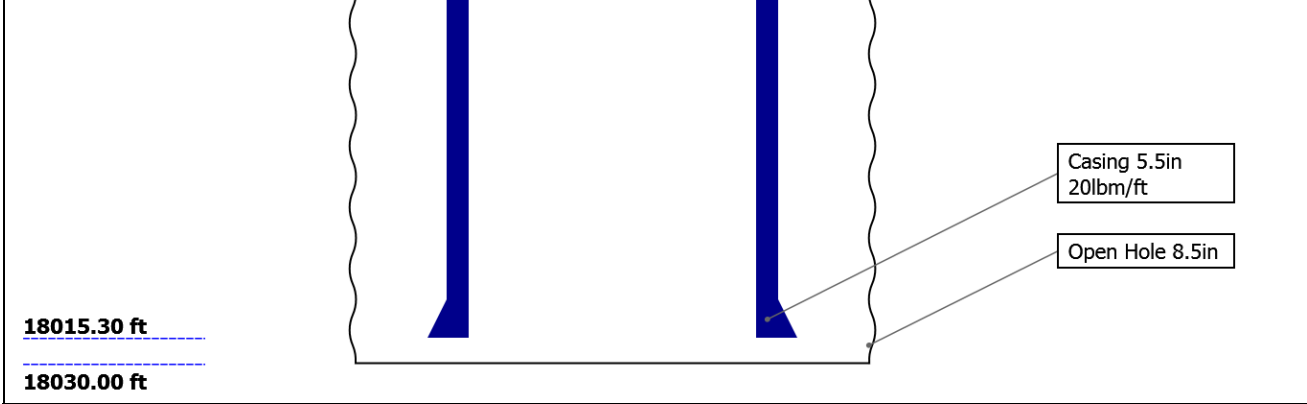
- 1. Header
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Well Sketch






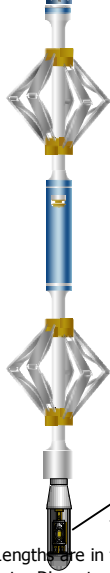
Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.5				
Top Driller (ft)	0	1961				
Top Logger (ft)	0	1961				
Bottom Driller (ft)	1961	18030				
Bottom Logger (ft)	1961	18030				
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)	1951.1	18015.3				
Bottom Logger (ft)	1951.1	18015.3				

Remarks and Equipment Summary

UltraSonic: Toolstring			UltraSonic: Remarks	
<div><div><div>Equip nameLength</div><div>LEH-QT28.97</div><div>LEH-QT</div></div><div><div>EDTC-B:8478</div><div>EDTH-B</div><div>EDTG-A</div><div>EDTC-B:8478</div></div><div><div>AH-184[2]</div><div>AH-184[1]</div><div>USIT-E:943</div><div>ECH-MFA</div><div>USAC-A:943</div><div>USIS-A:1822</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>s</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: Doug Robinson, Gary Lapp			

USSC-B:17
78
USRS-AB:
873
USI-SENS
OR:929
USI-TX



Depth Summary

UltraSonic

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

Pressure	Pressure	Temperature	Temperature
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Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[3]:Up	6508.62	81.13

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 : 34.80m(114.18ft) to 39.57m(129.81ft)
MUD_N_FRP = 1.16
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.68 MRayl

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

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_NPD-ICE2-2017SP3_7.3.93033
	Wireline_Hotfix-RTDLIS-2017SP3_7.3.92363
	Wireline_Hotfix-SML-2017SP3_7.3.101161
	Wireline_TestKit-CMR-NG-2017SP3_7.3.96073

Pass Summary

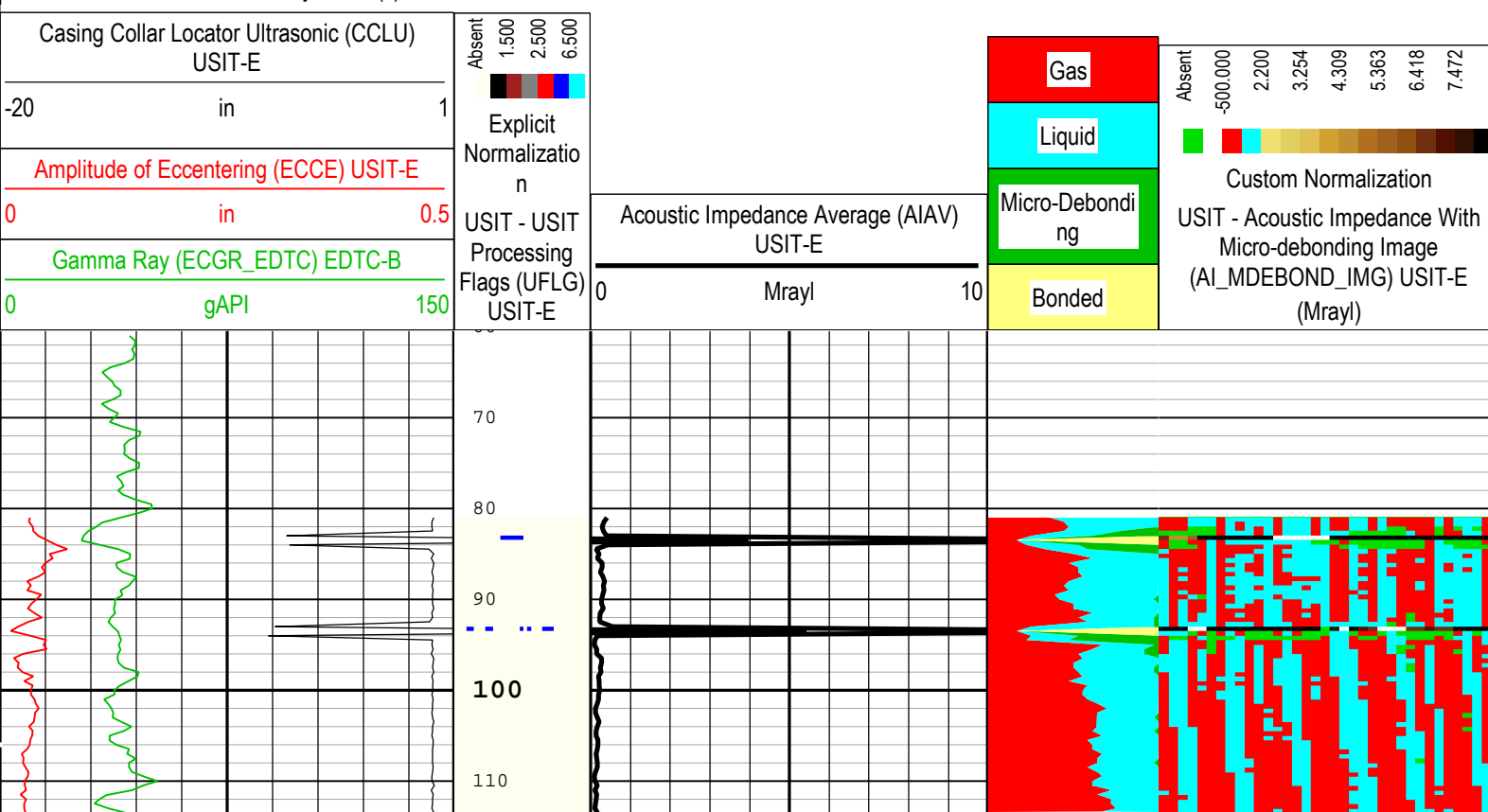
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
UltraSonic	Log[3]:Up	Up	81.13 ft	6508.63 ft	16-Jun-2018 1:43:28 PM	16-Jun-2018 2:54:41 PM	ON	3.39 ft	Yes

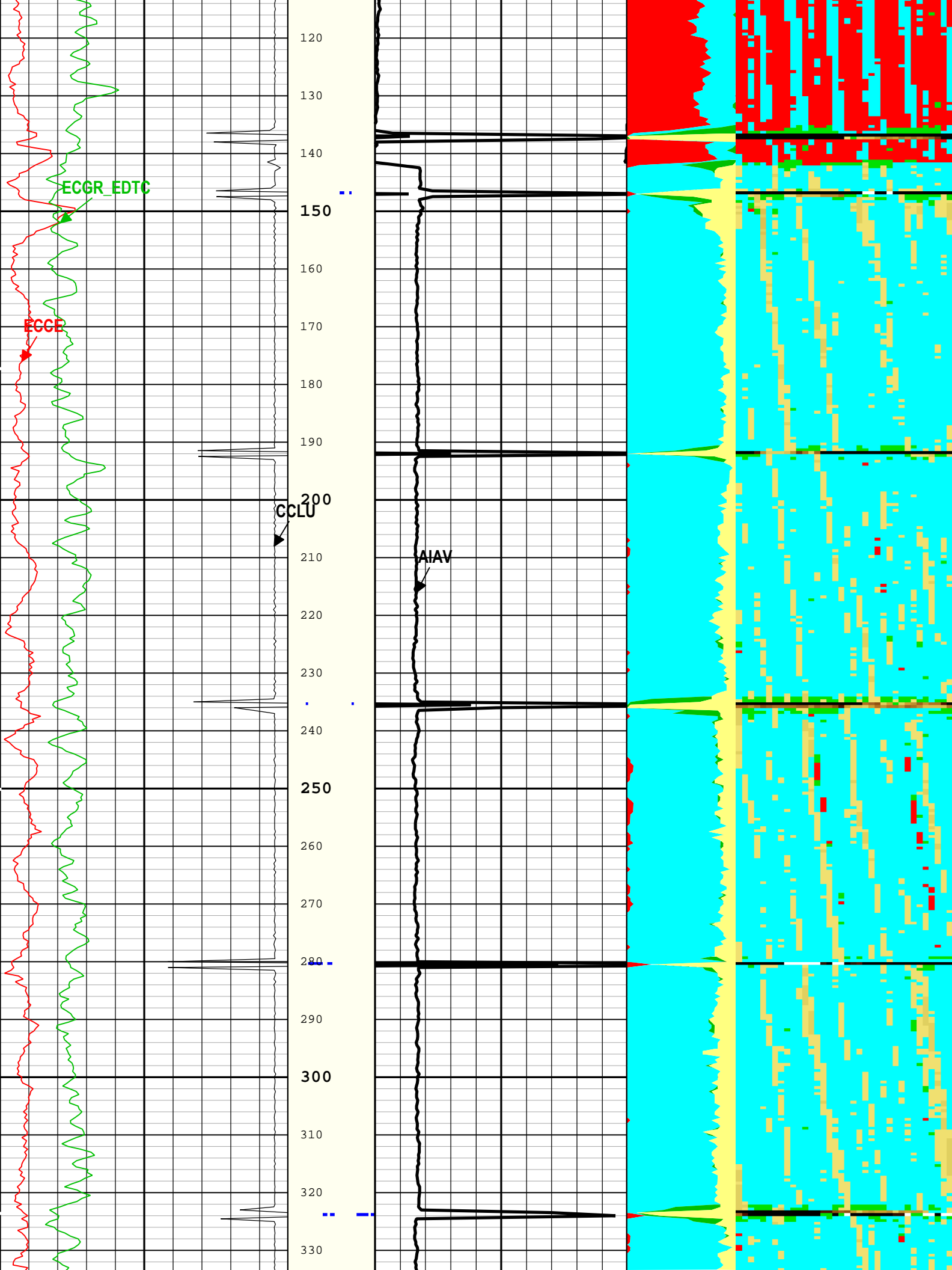
All depths are referenced to toolstring zero

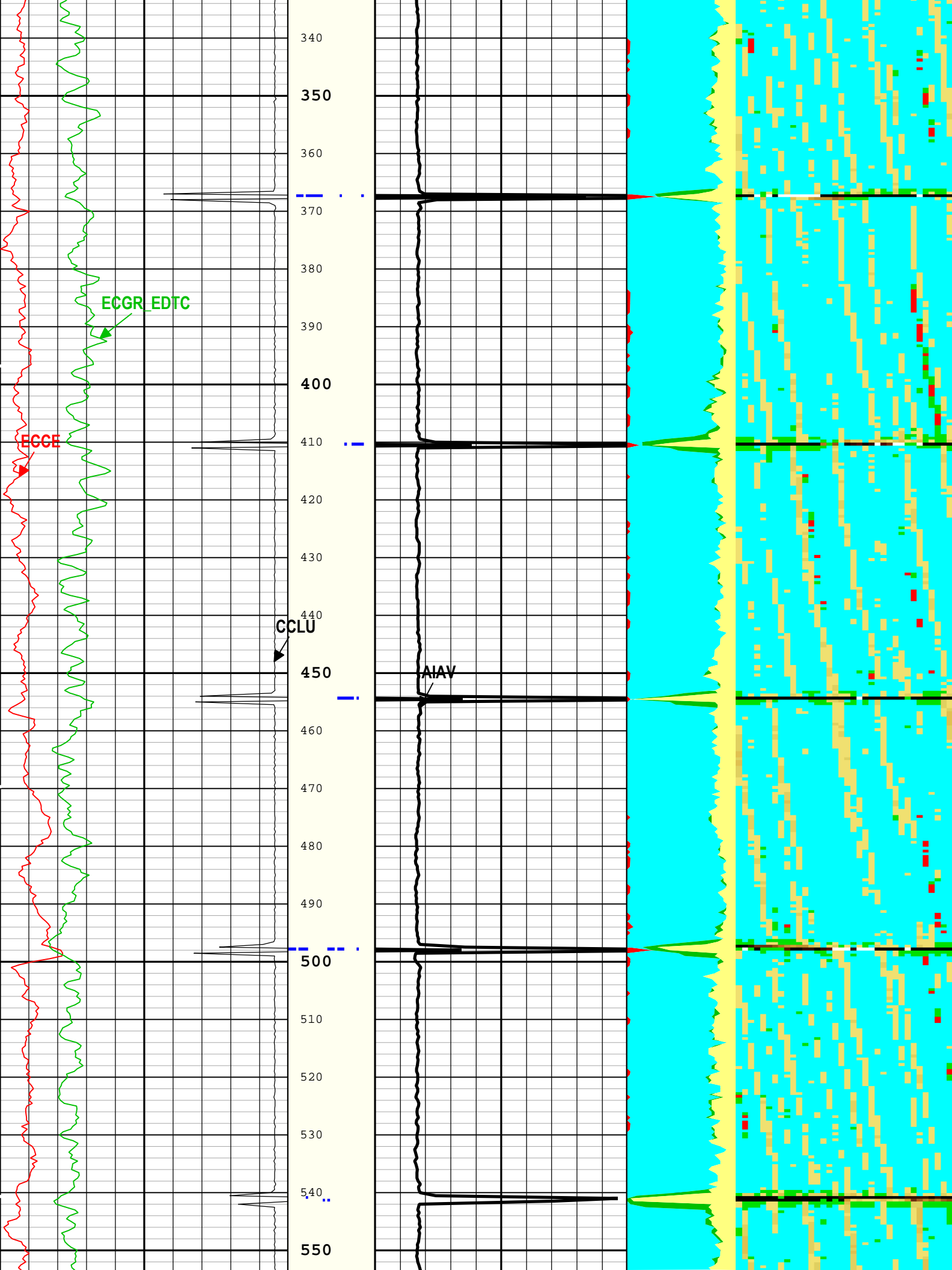
Log	Company:Noble Energy Inc	Well:Larson A23-656
		UltraSonic: Log[3]:Up:S003

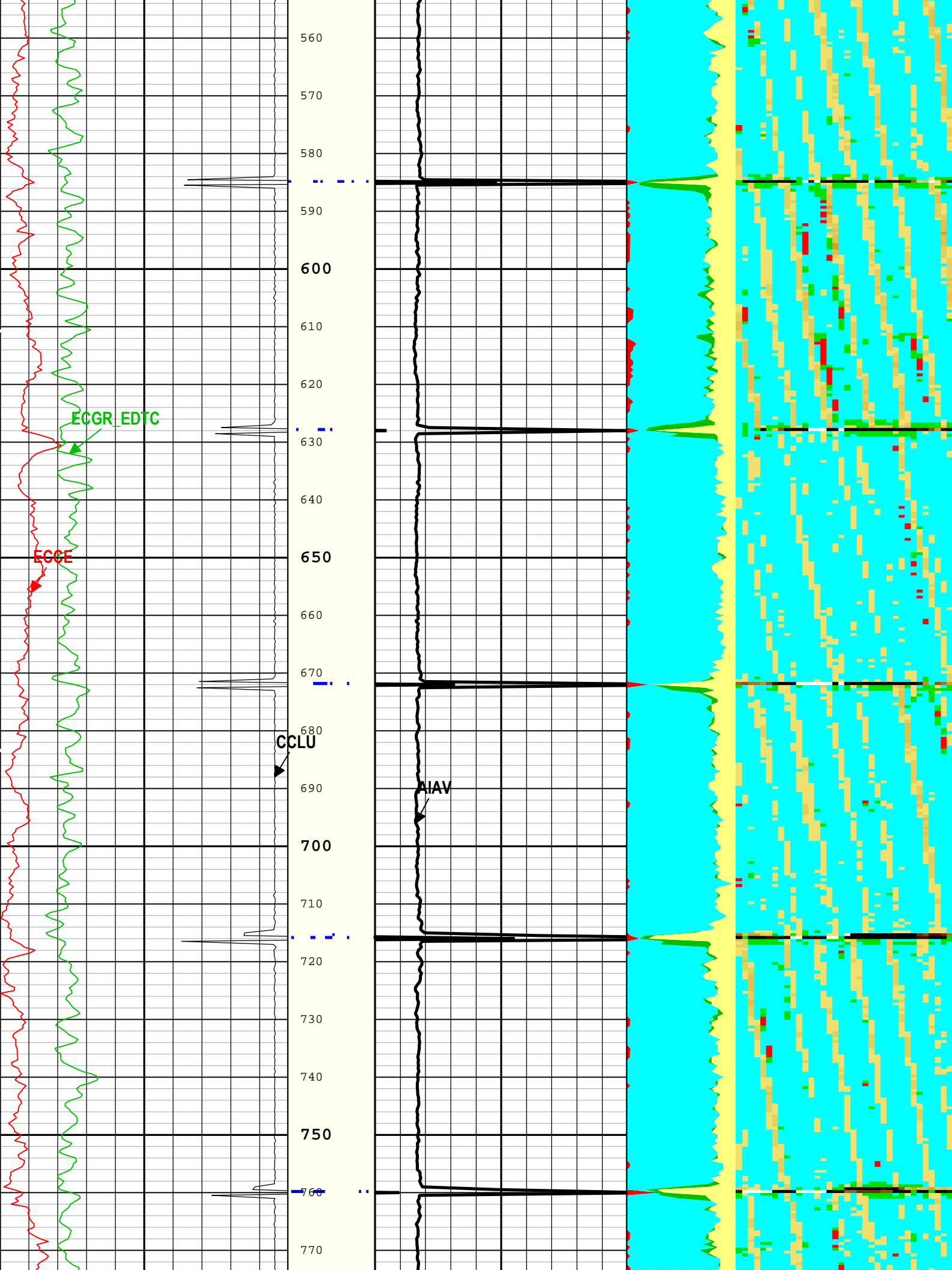
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Creation Date: 16-Jun-2018 15:31:35

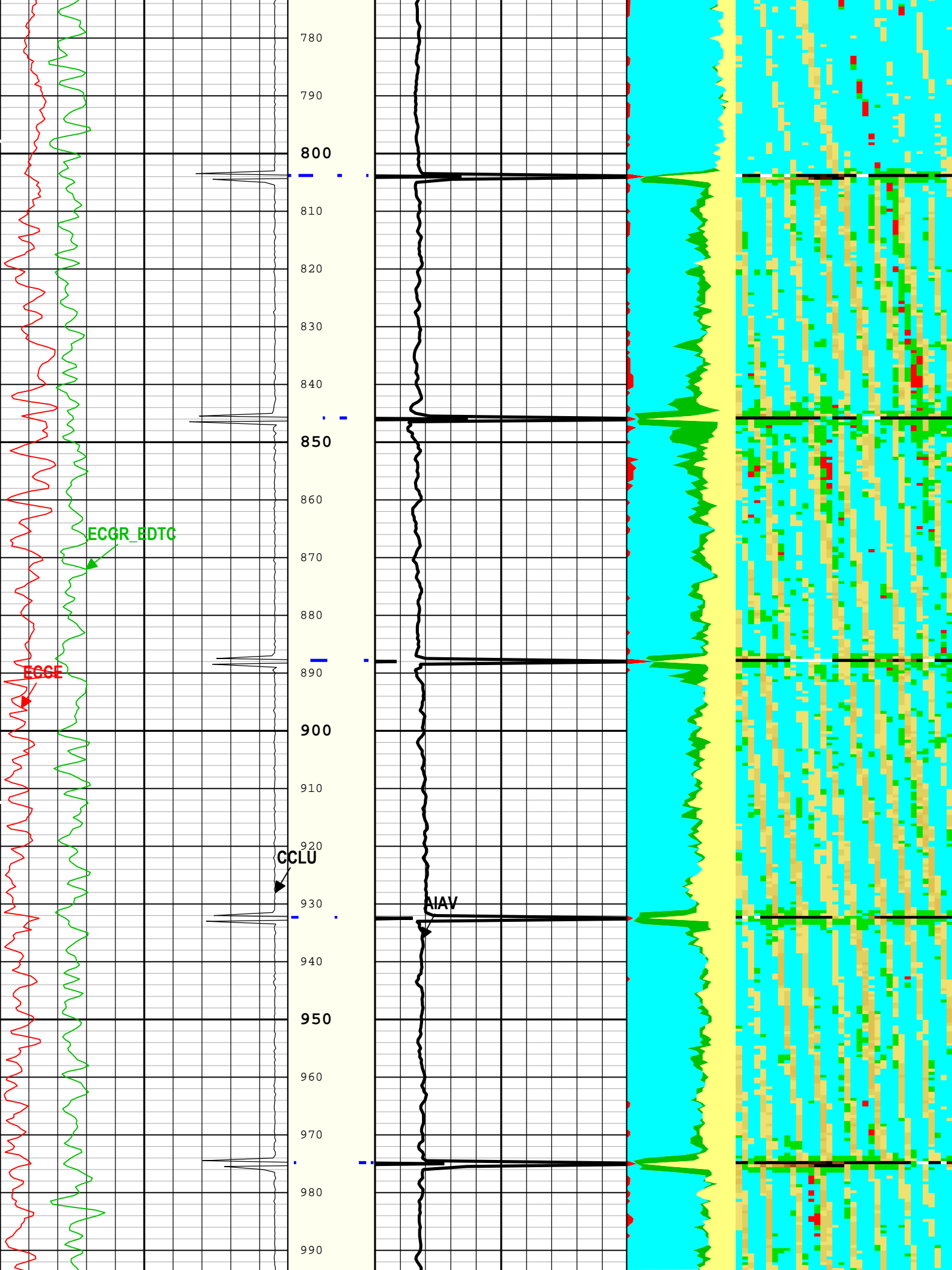
TIME_1900 - Time Marked every 60.00 (s)

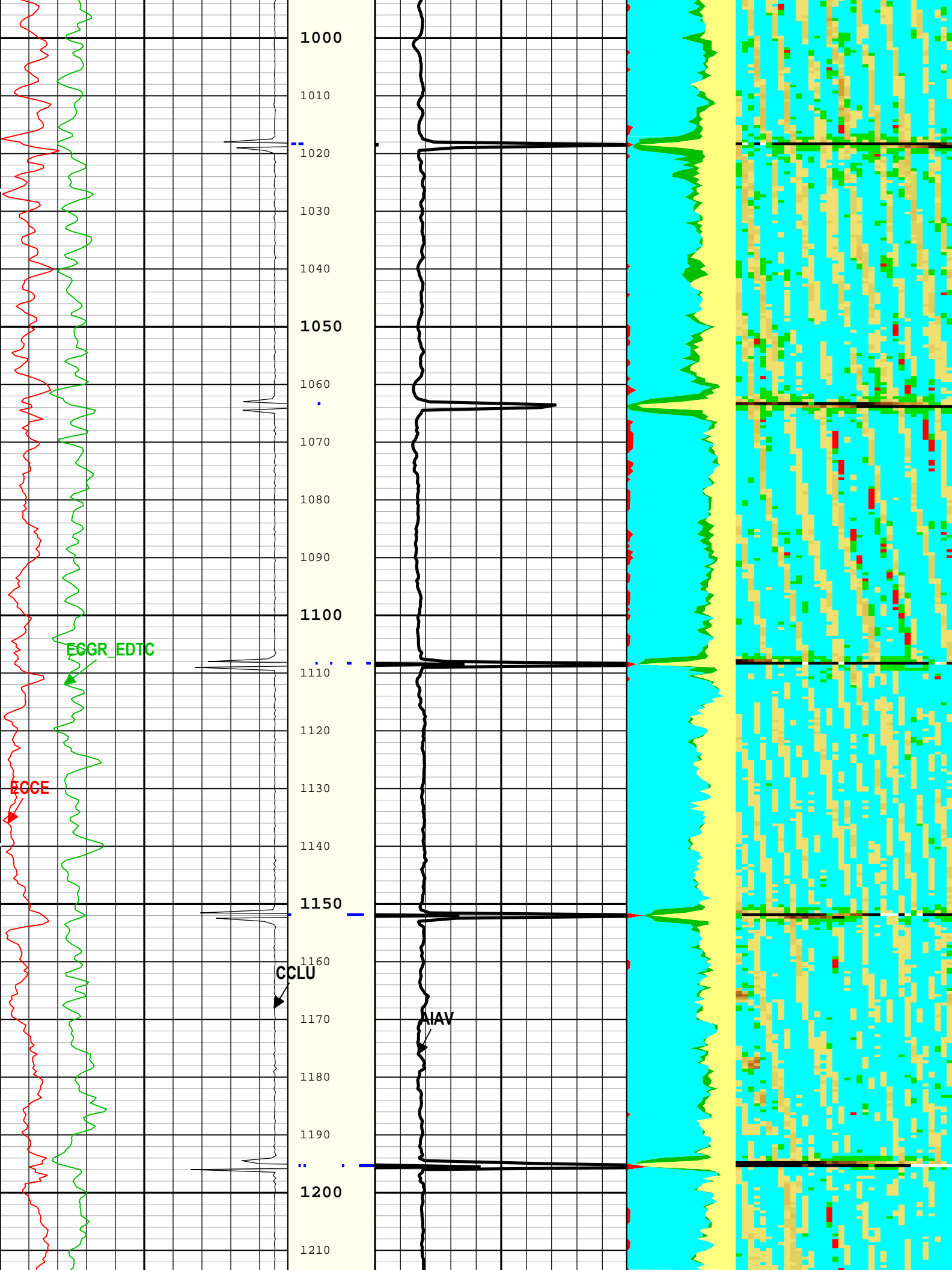


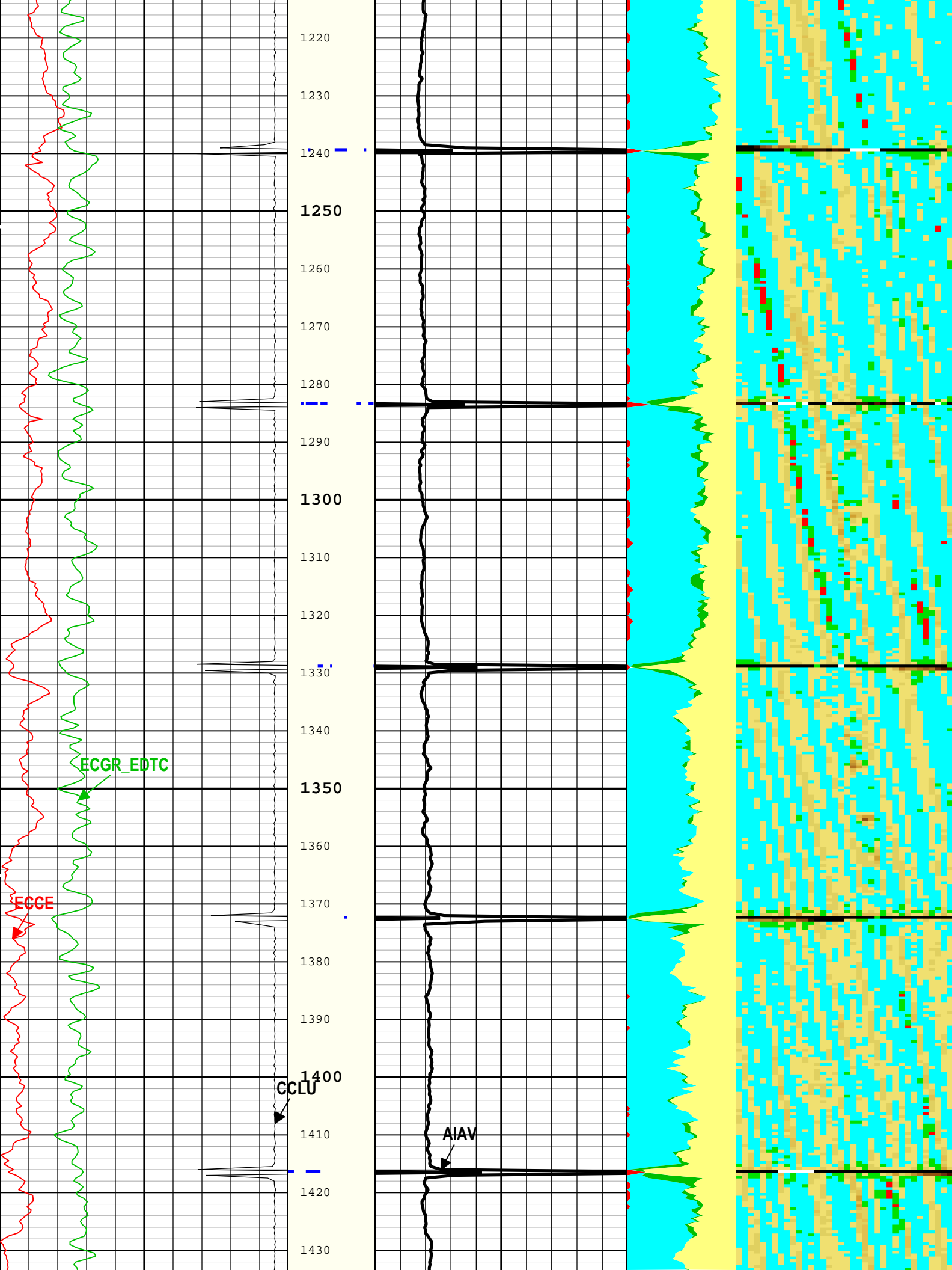


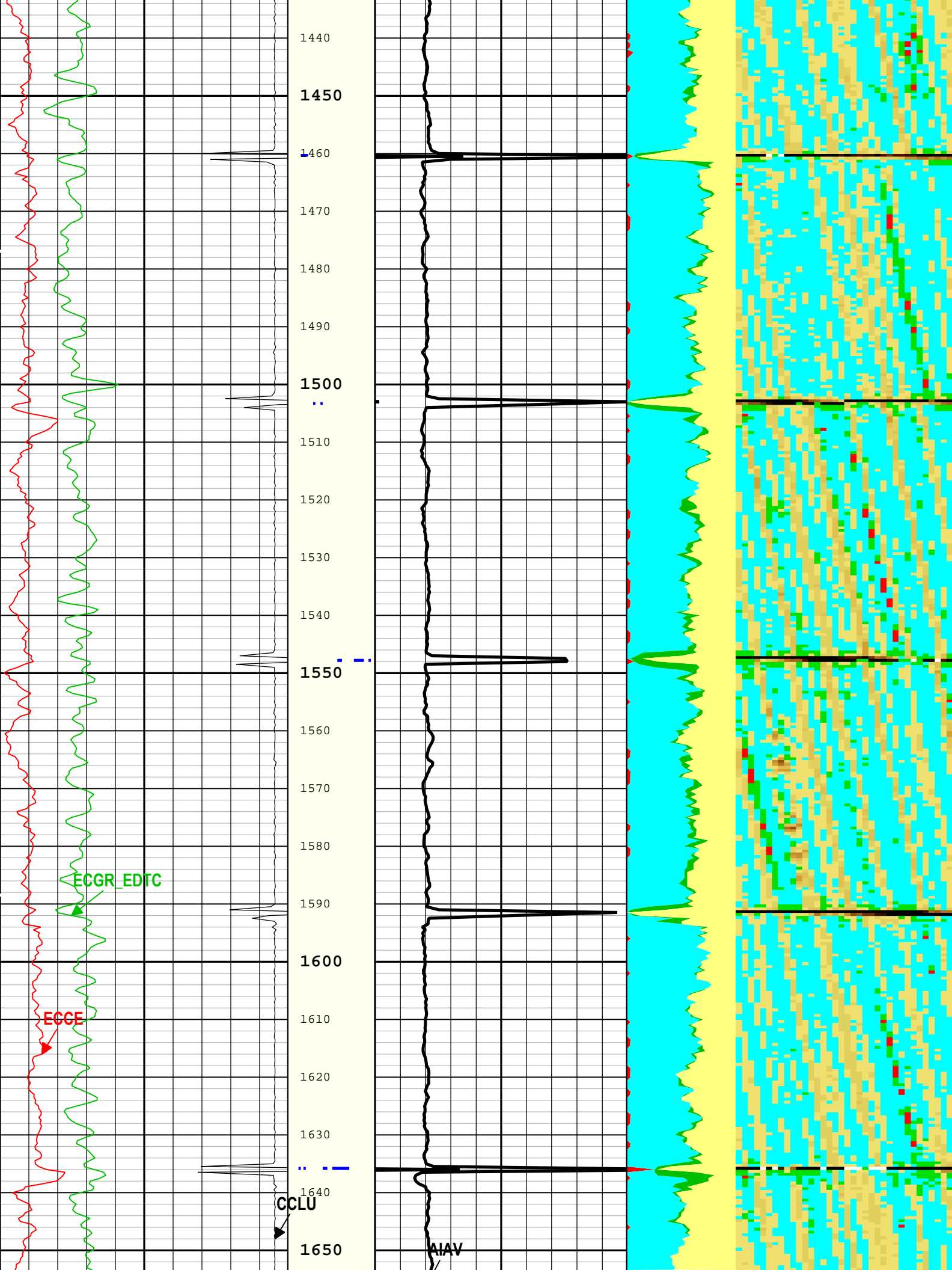


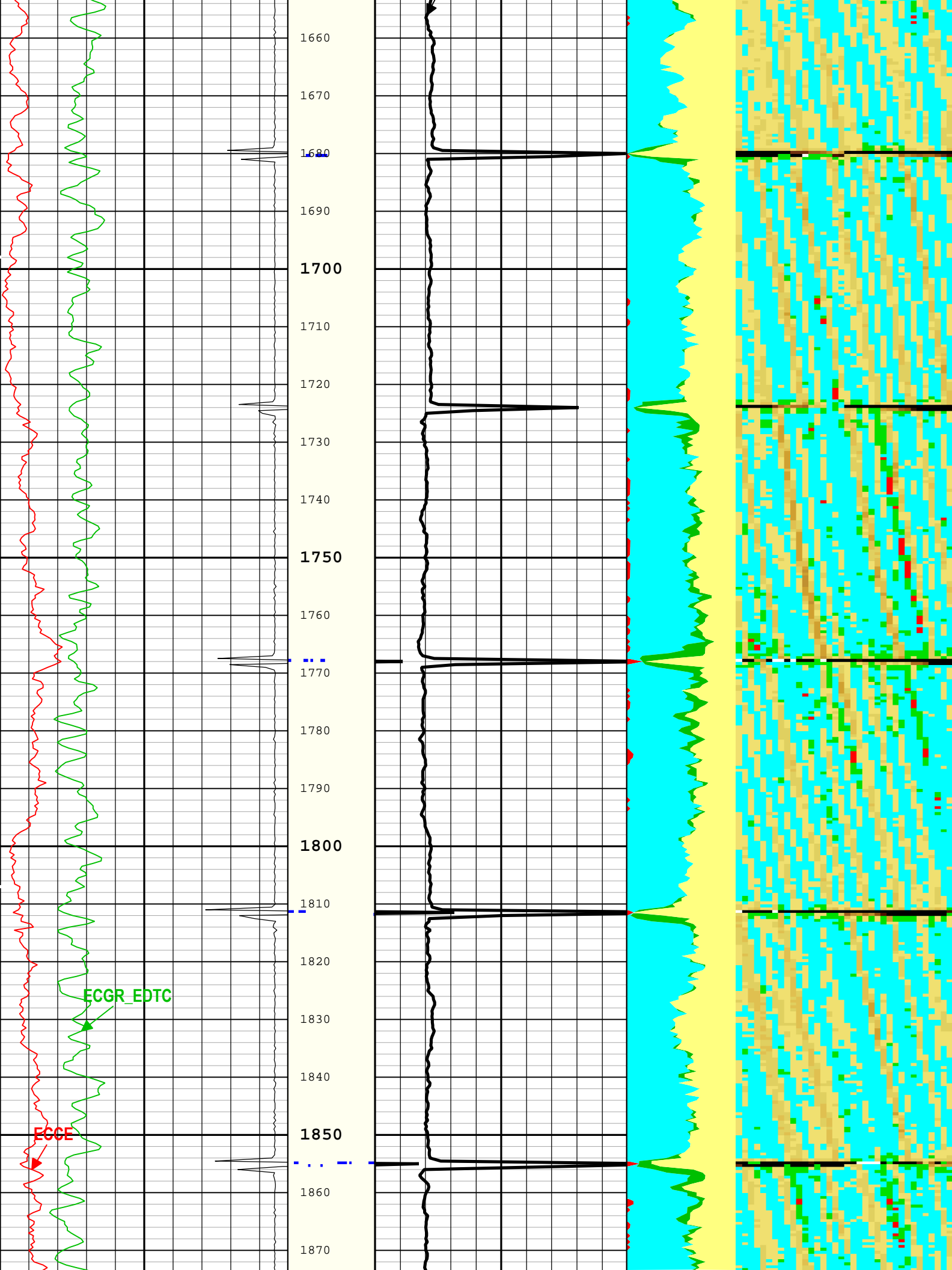


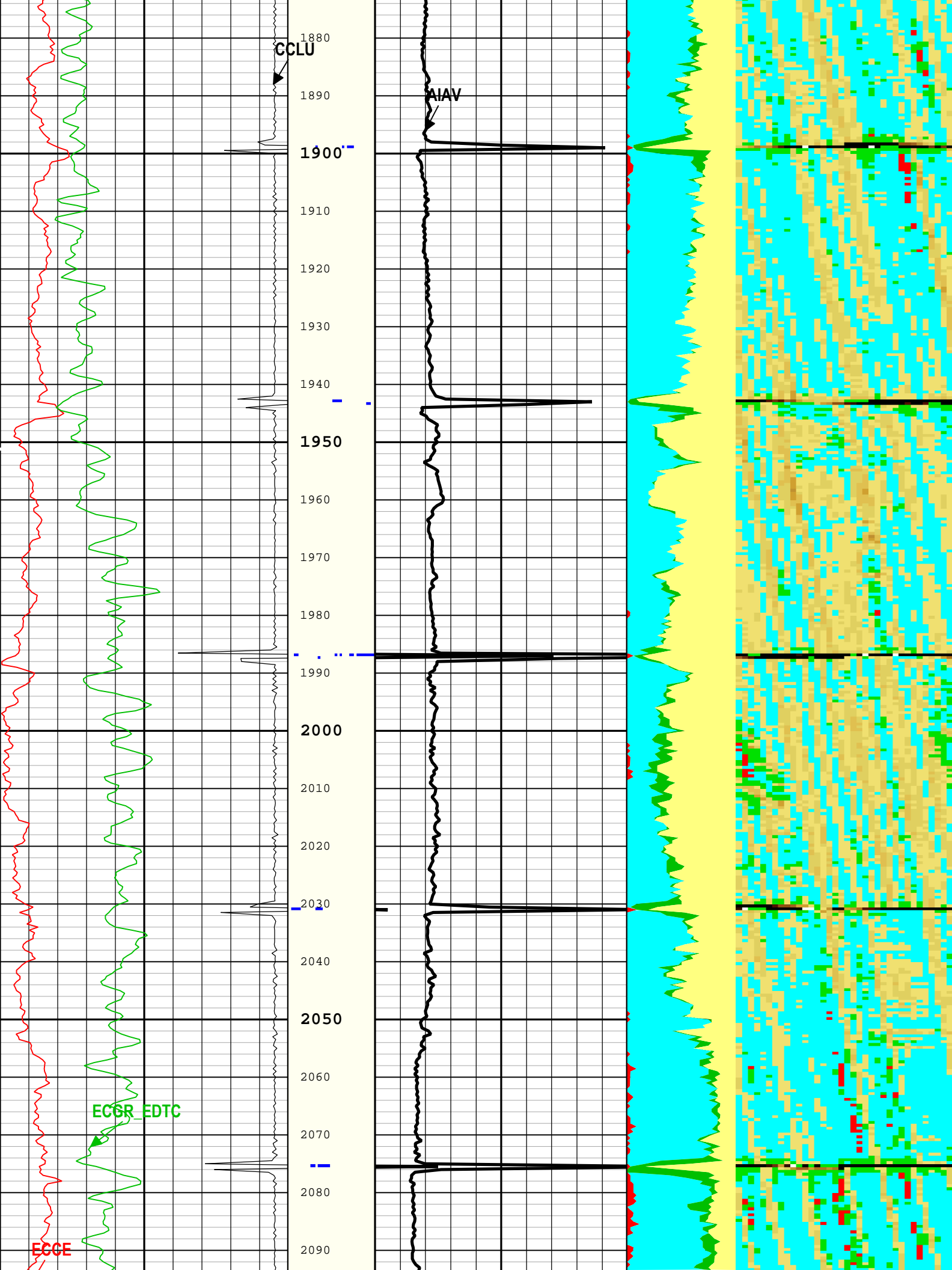


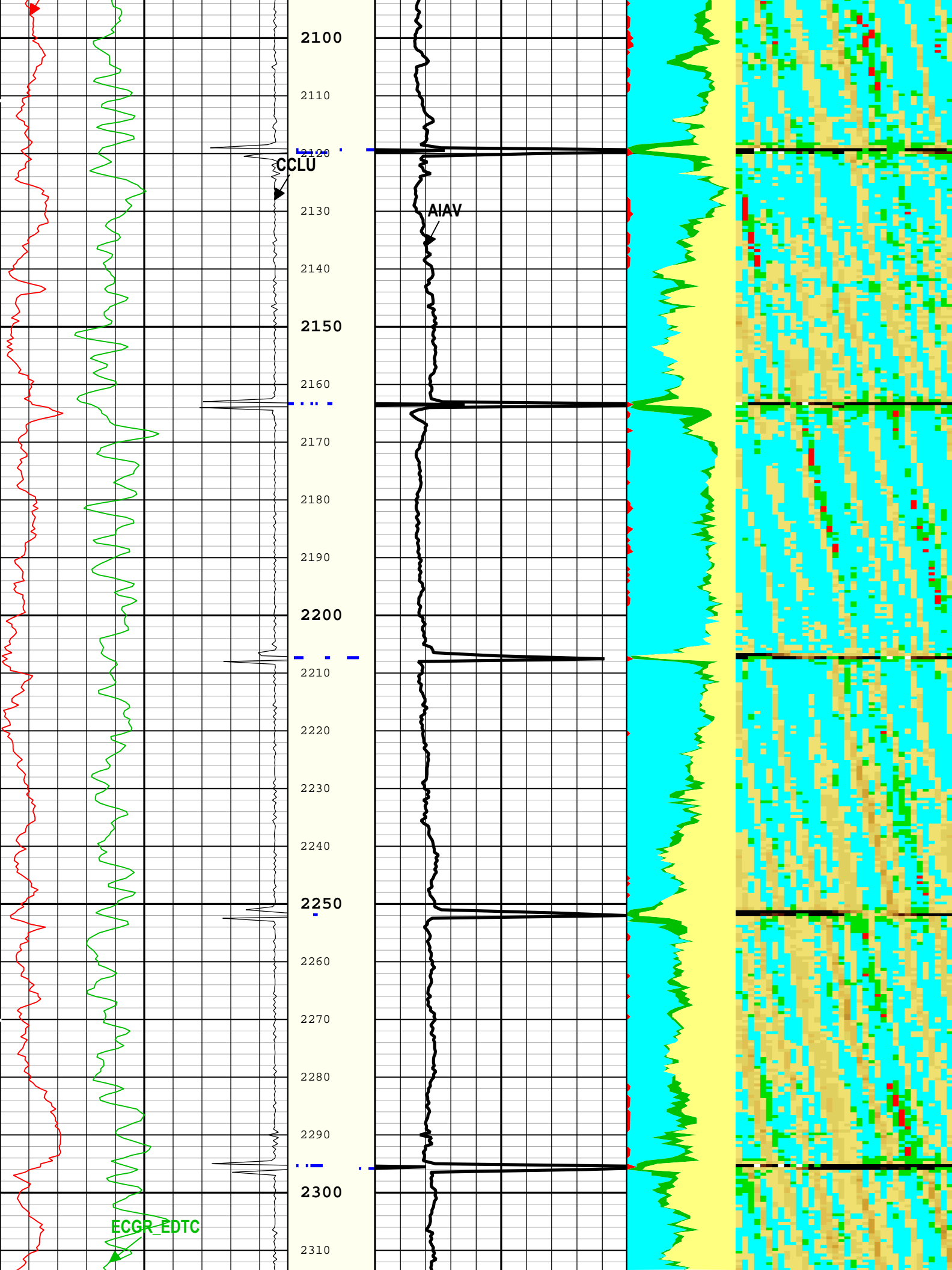


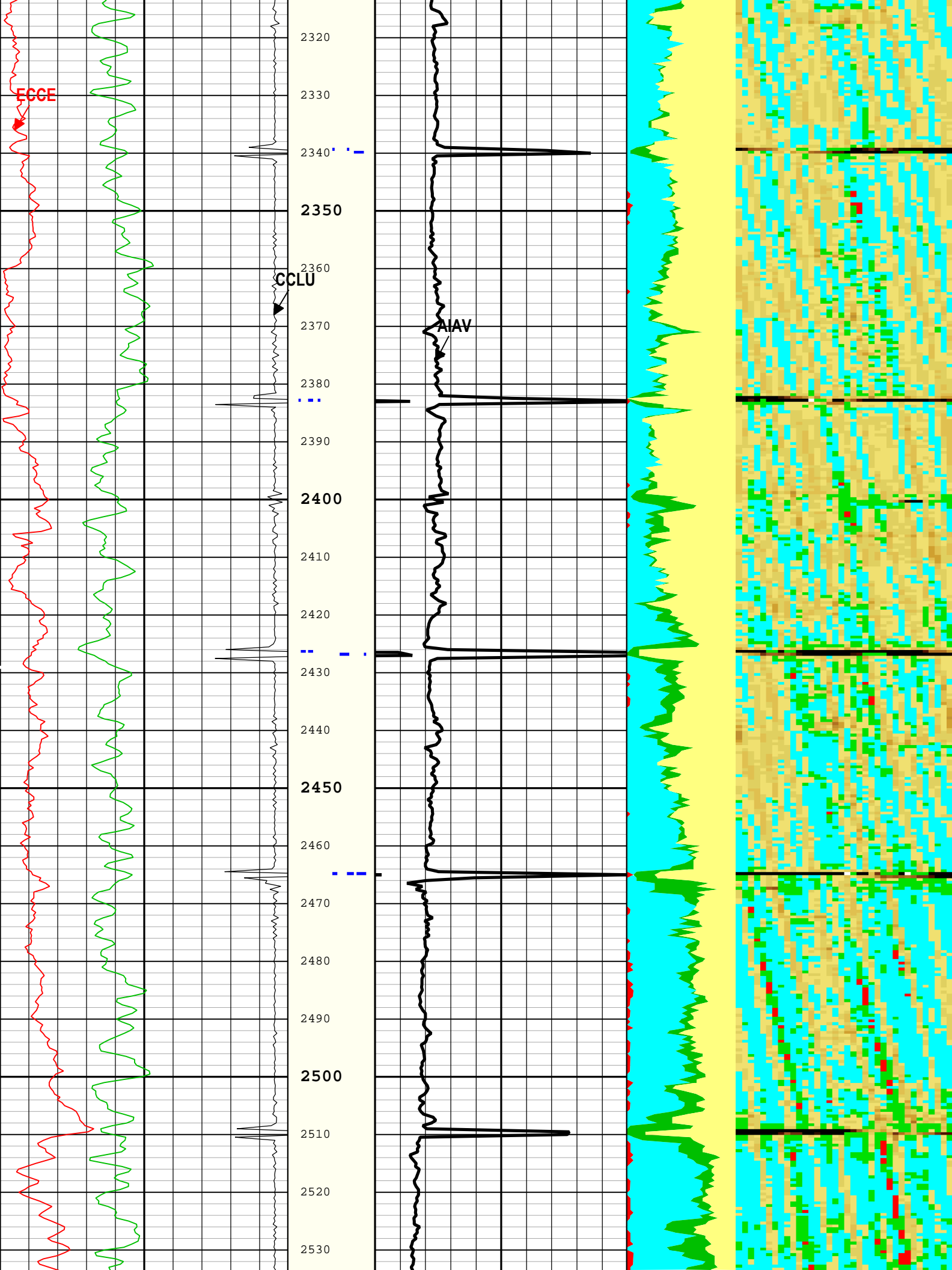


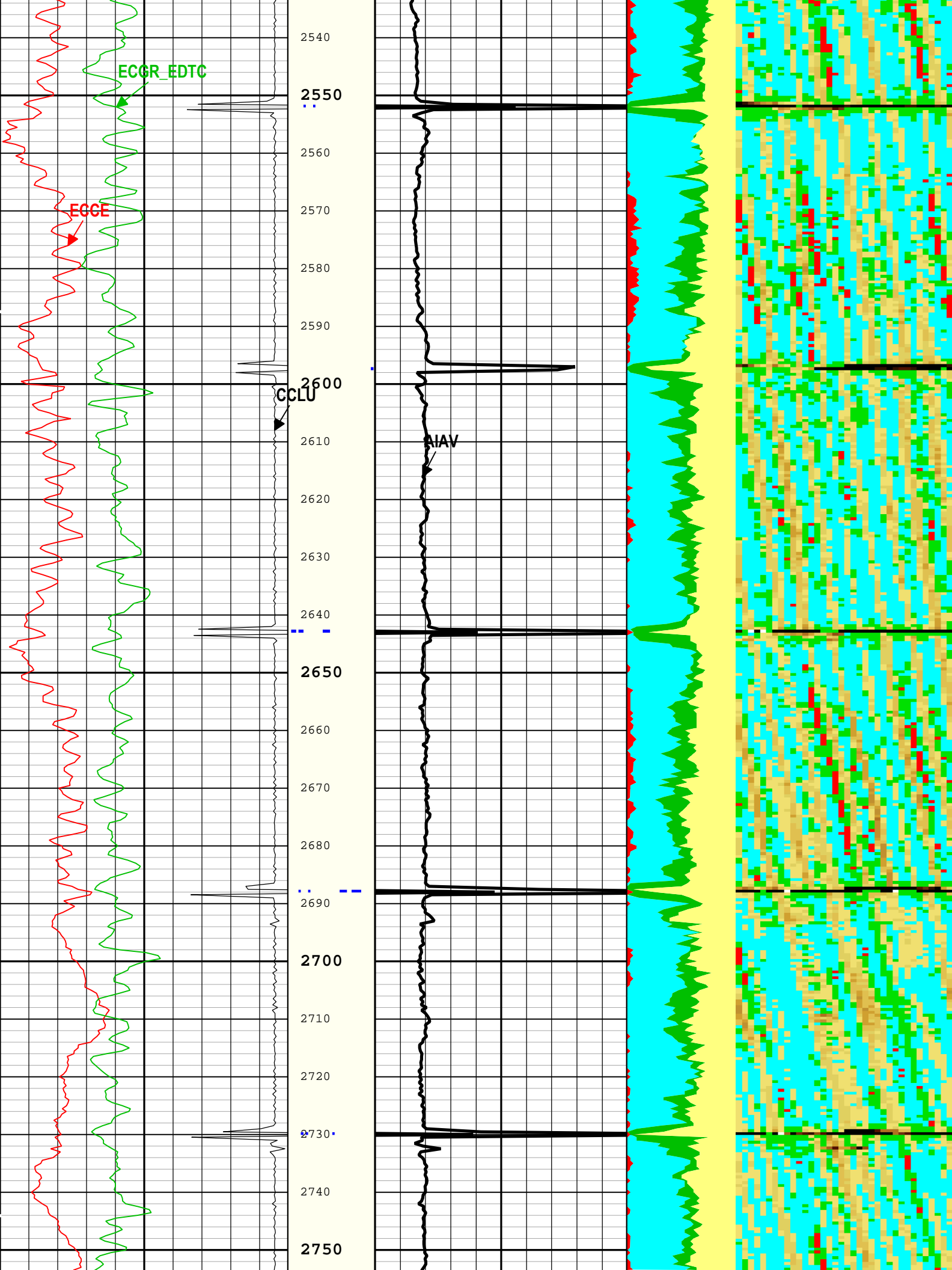


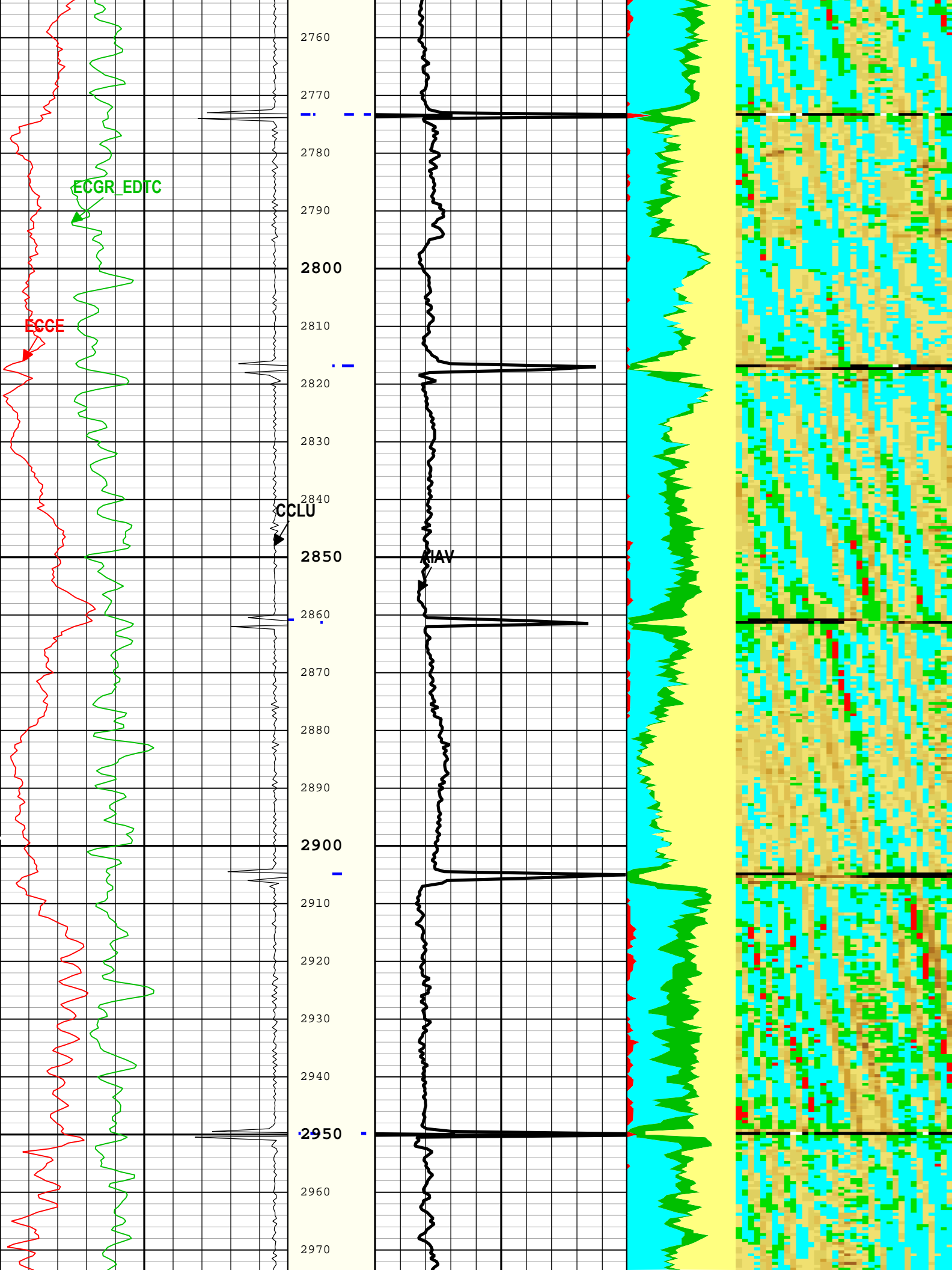


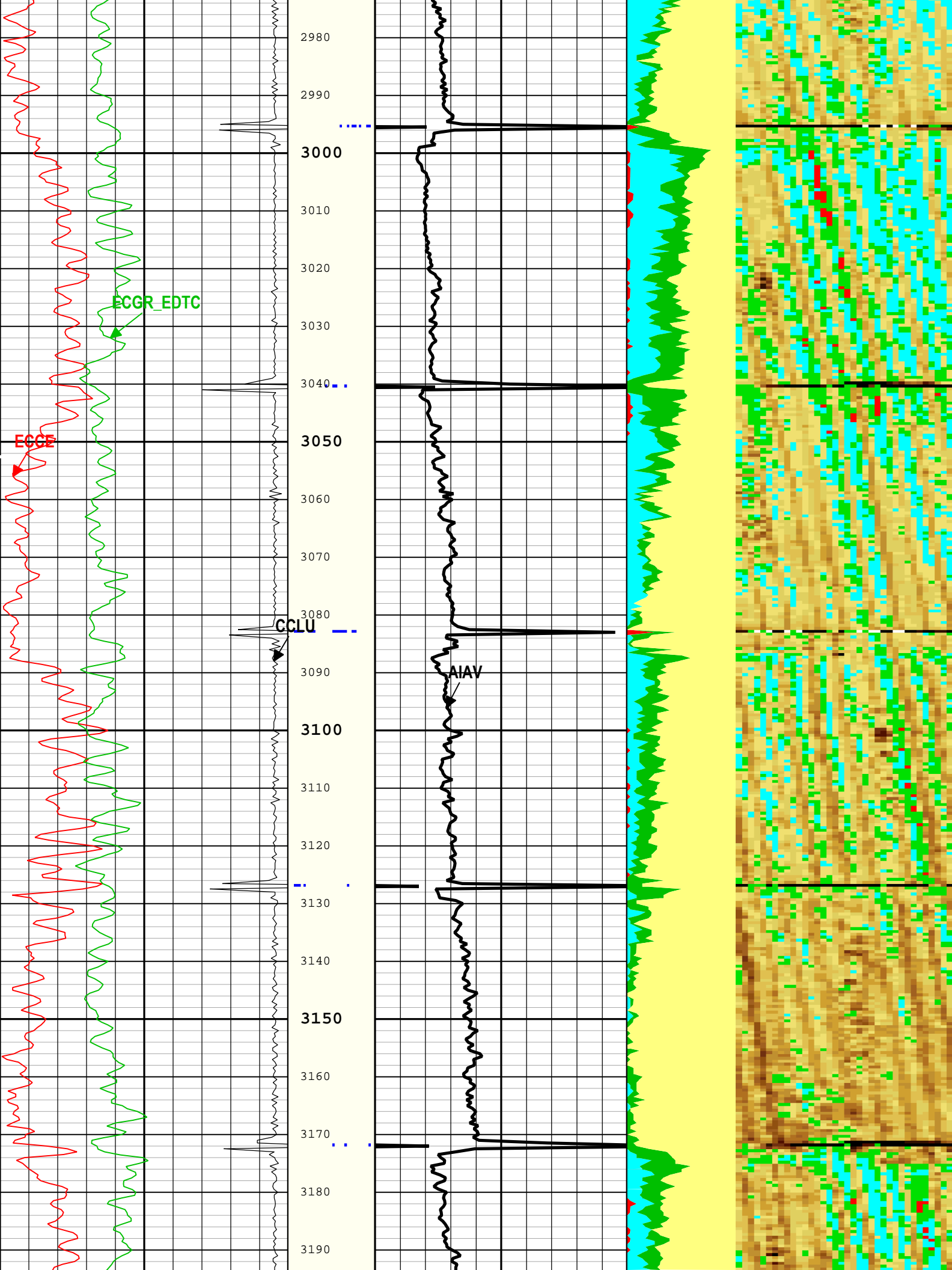


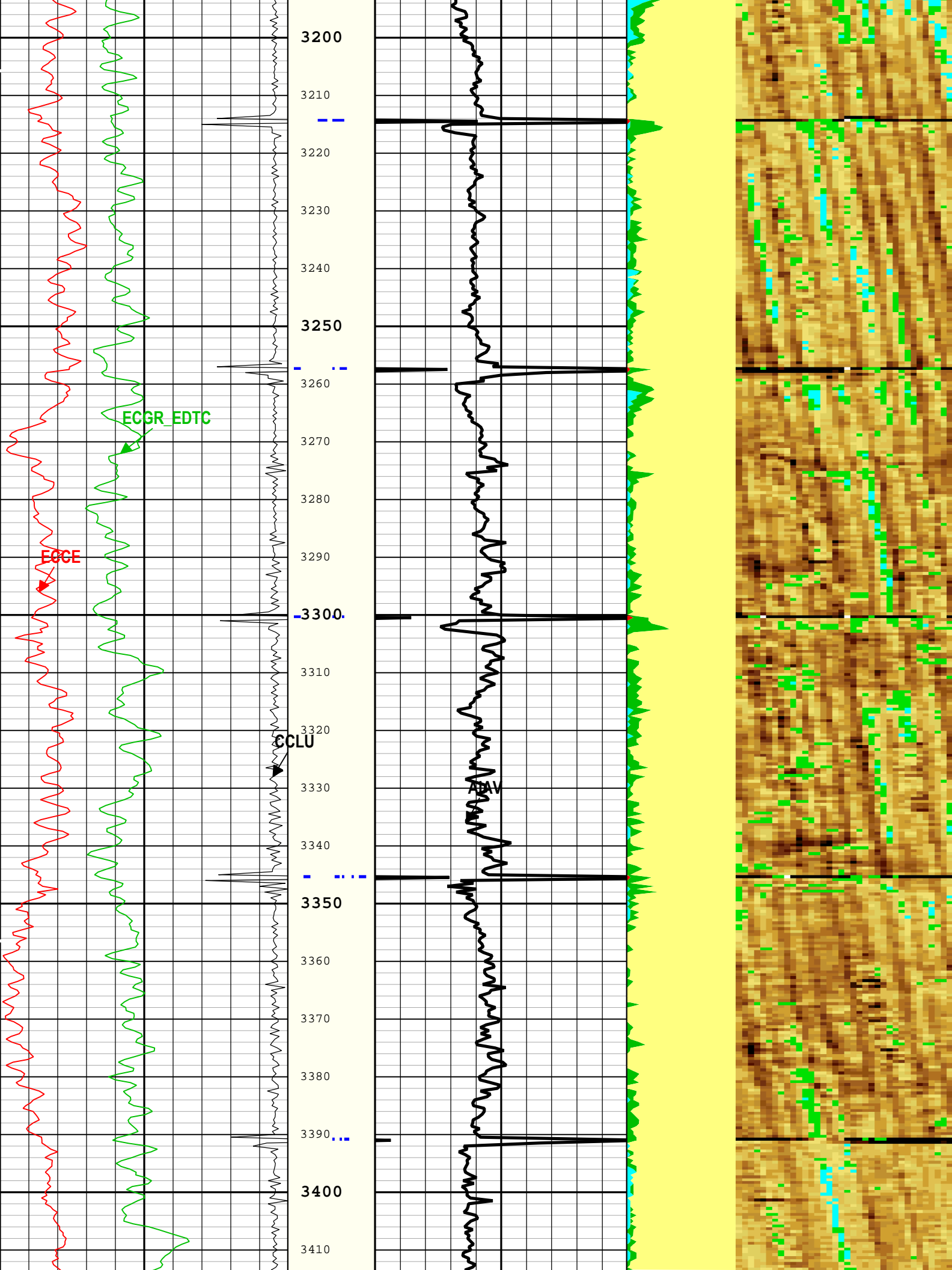


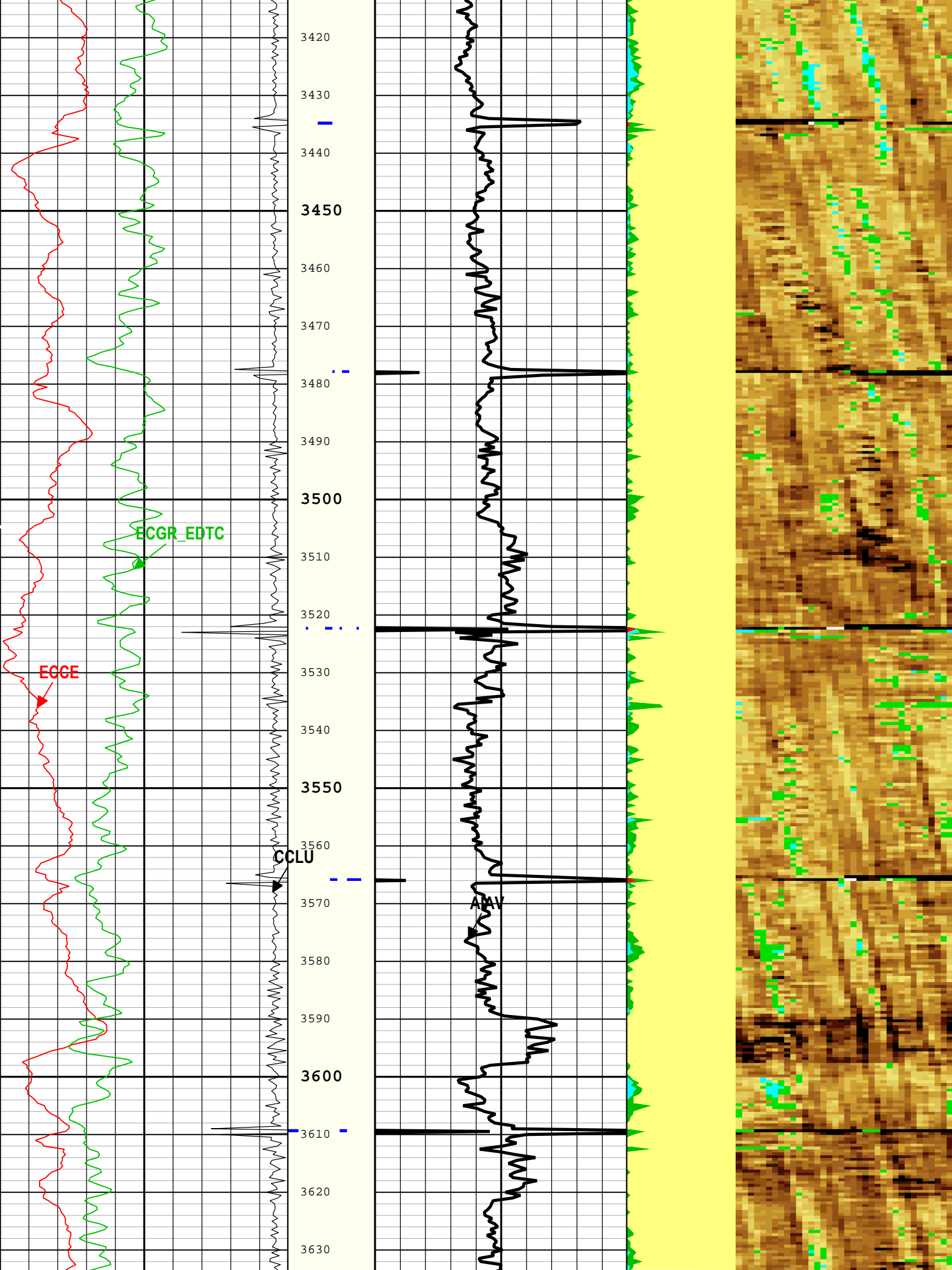


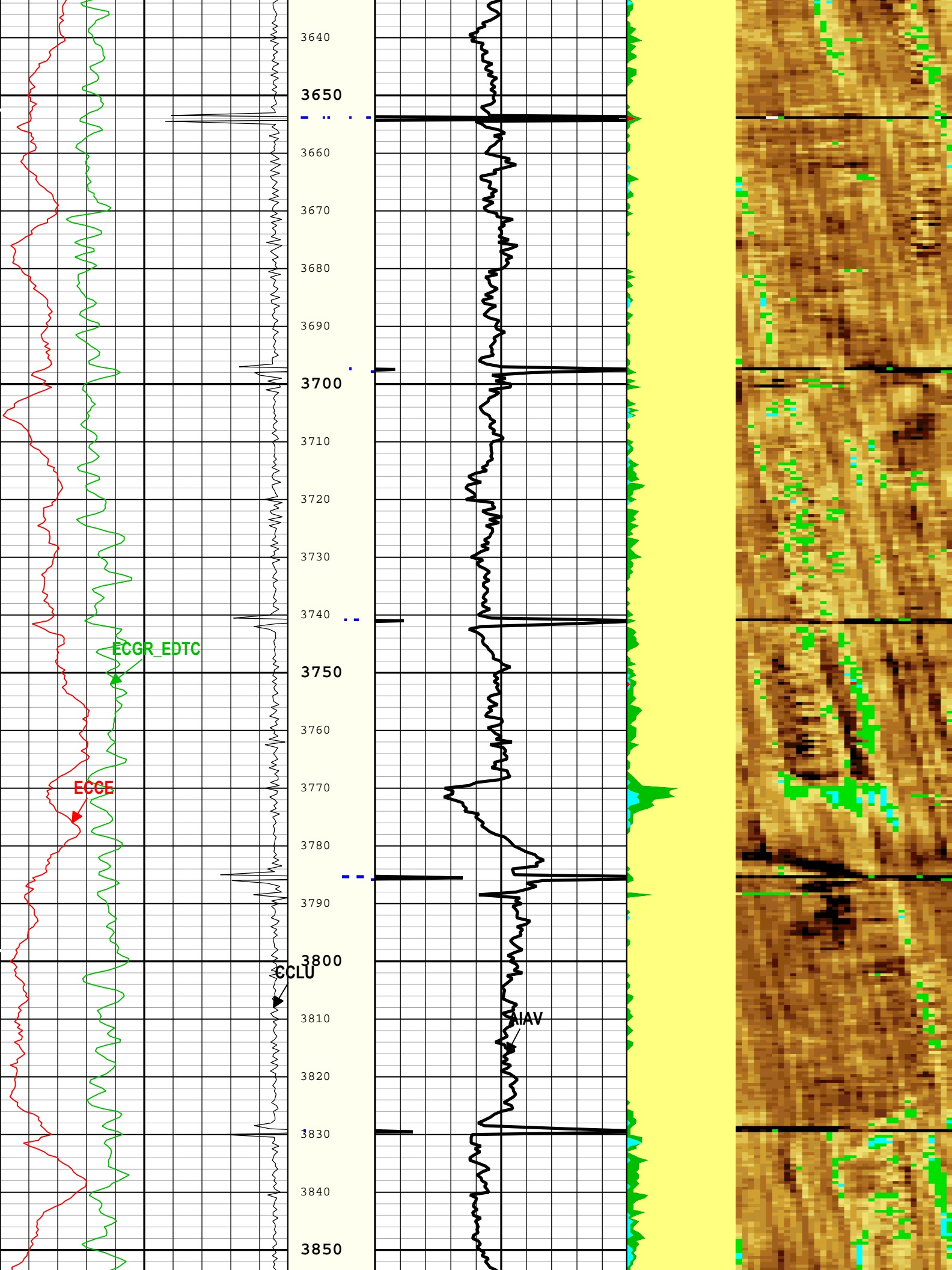


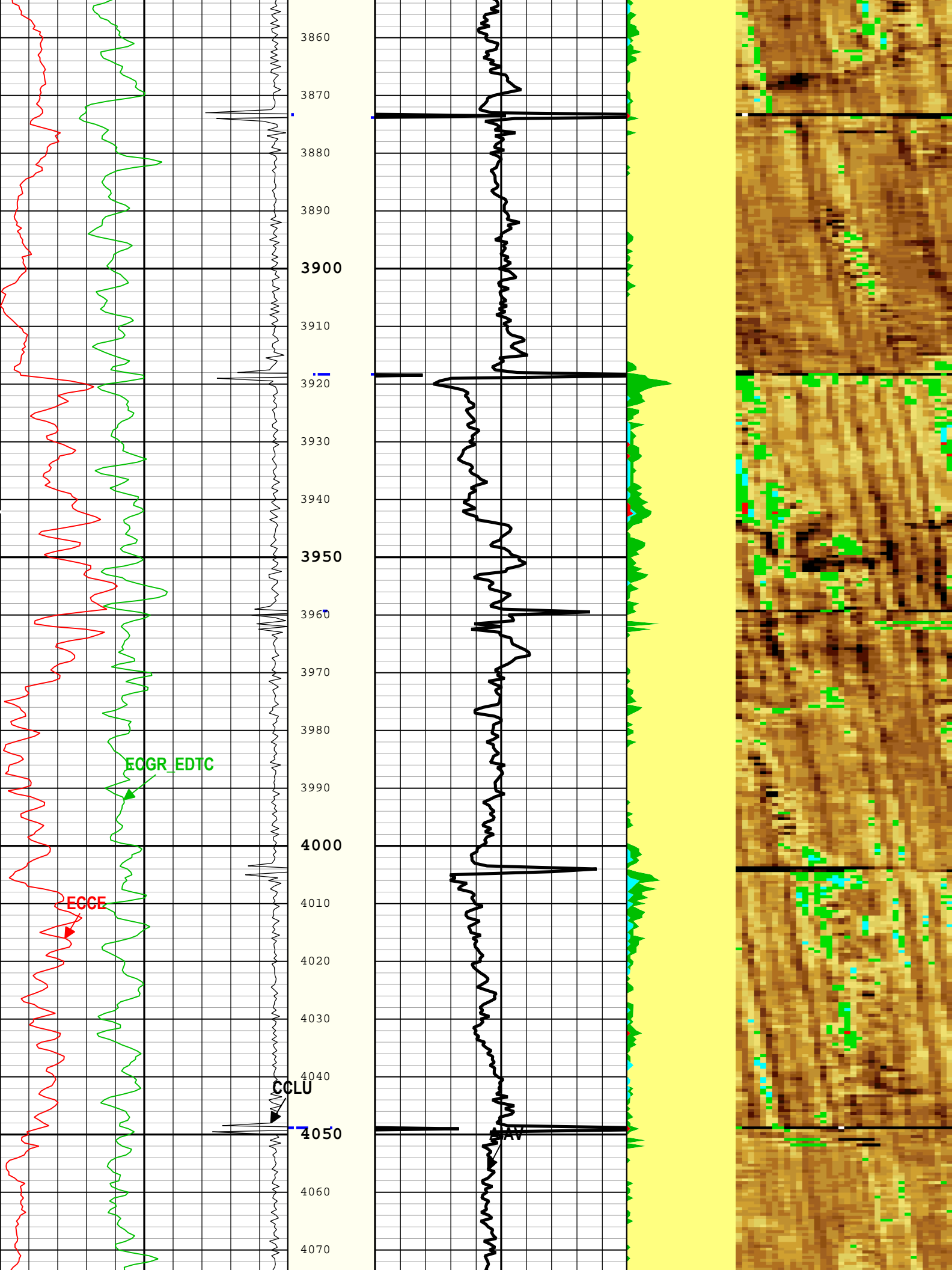


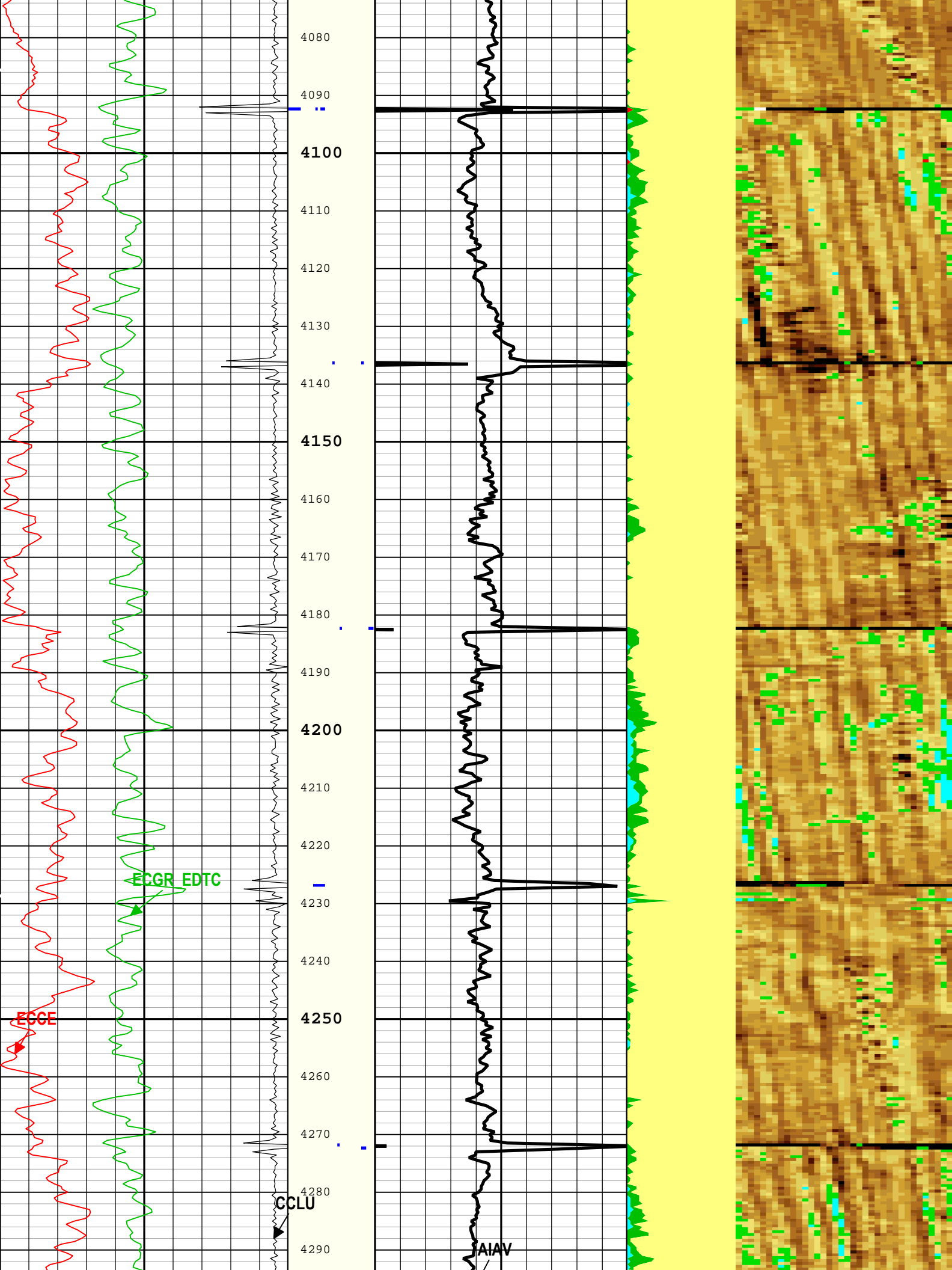


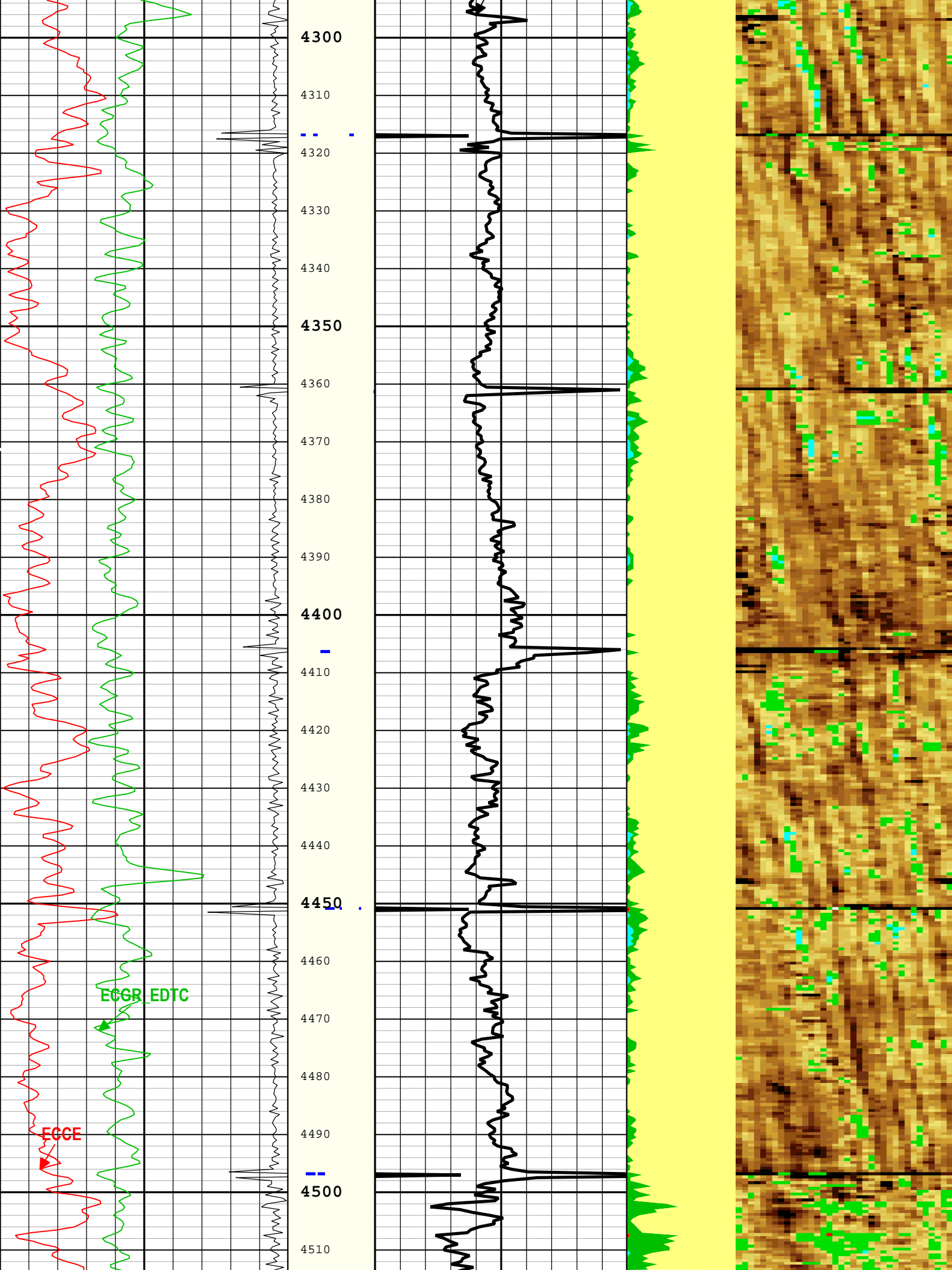


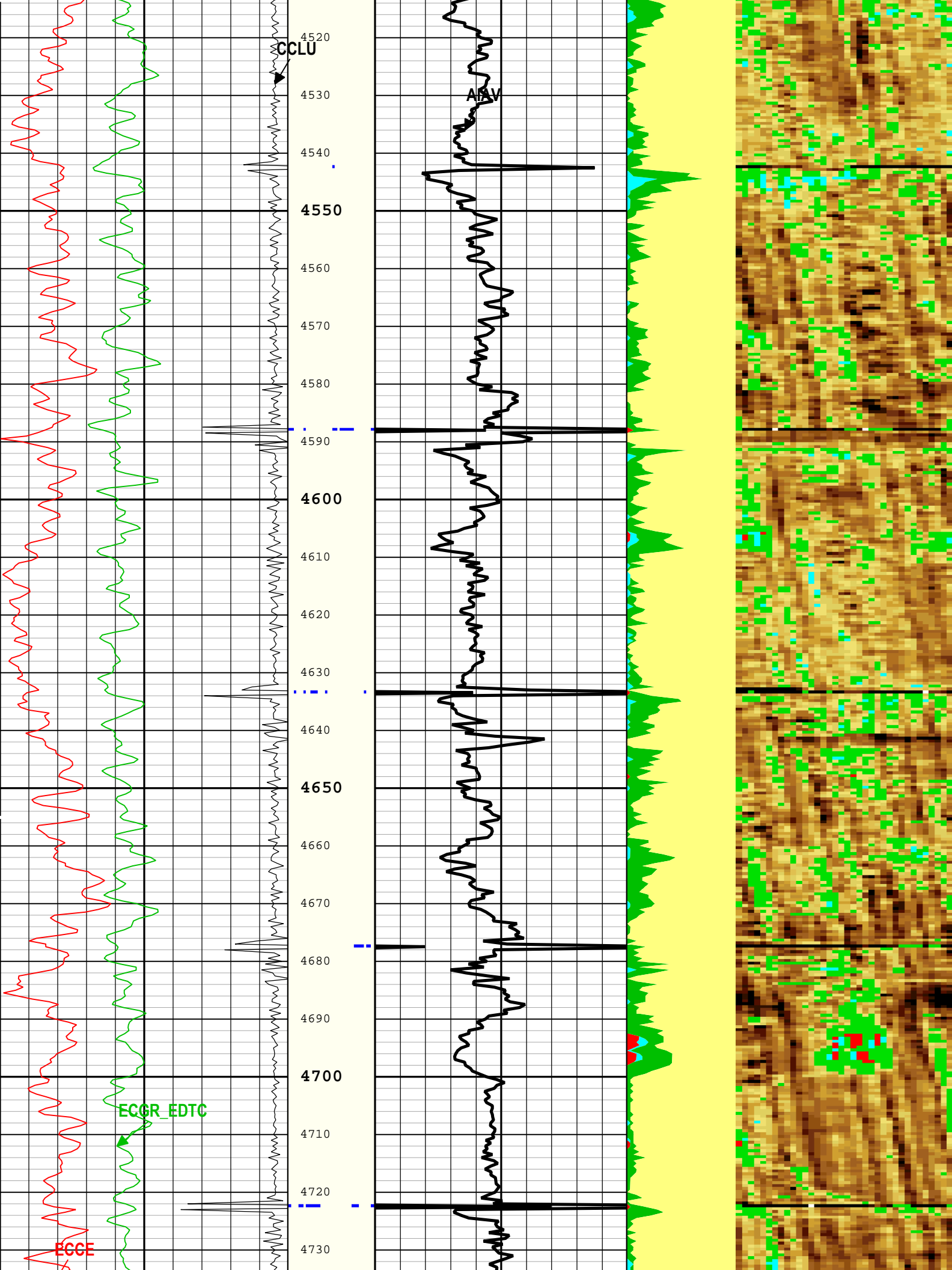


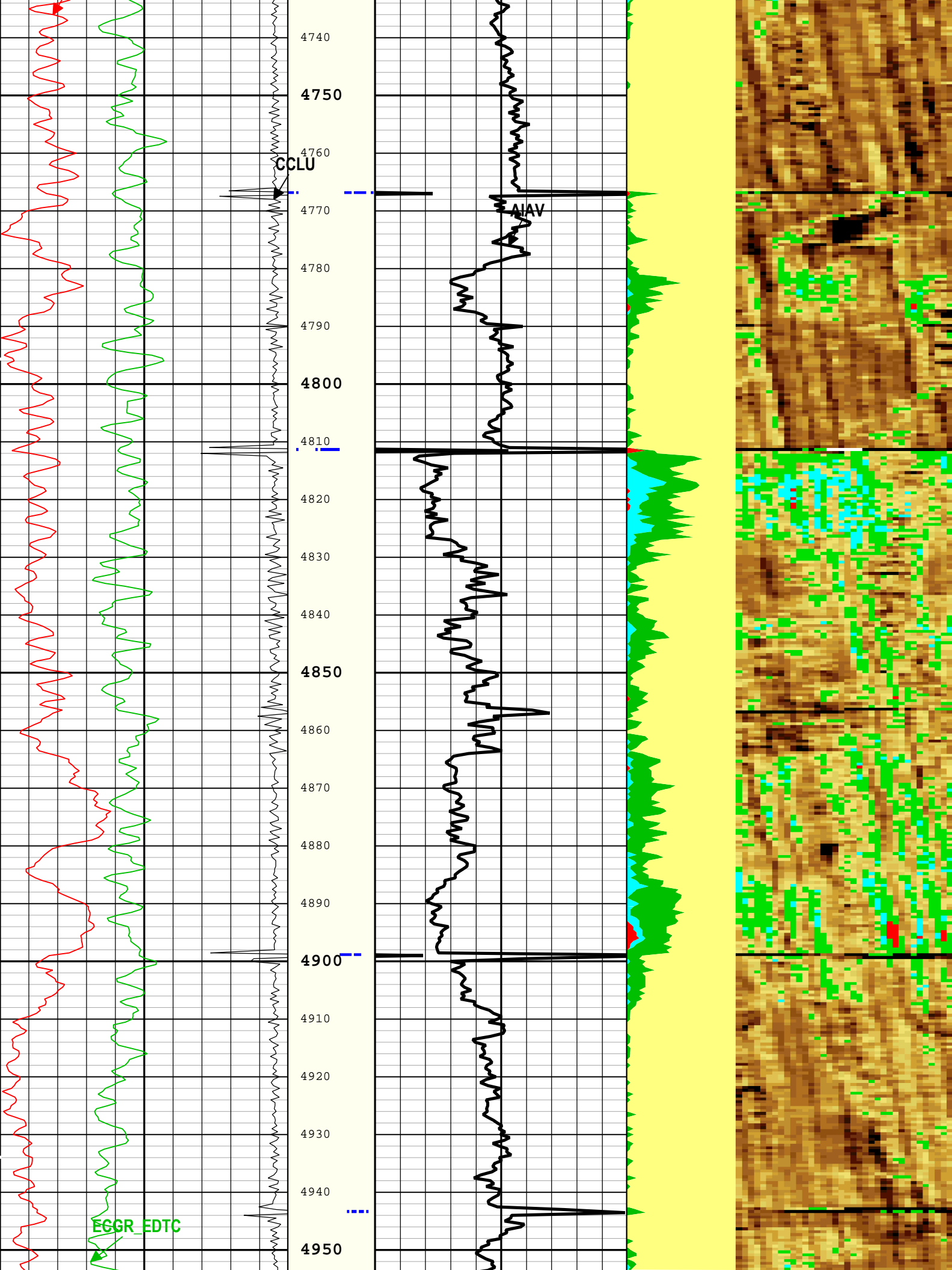


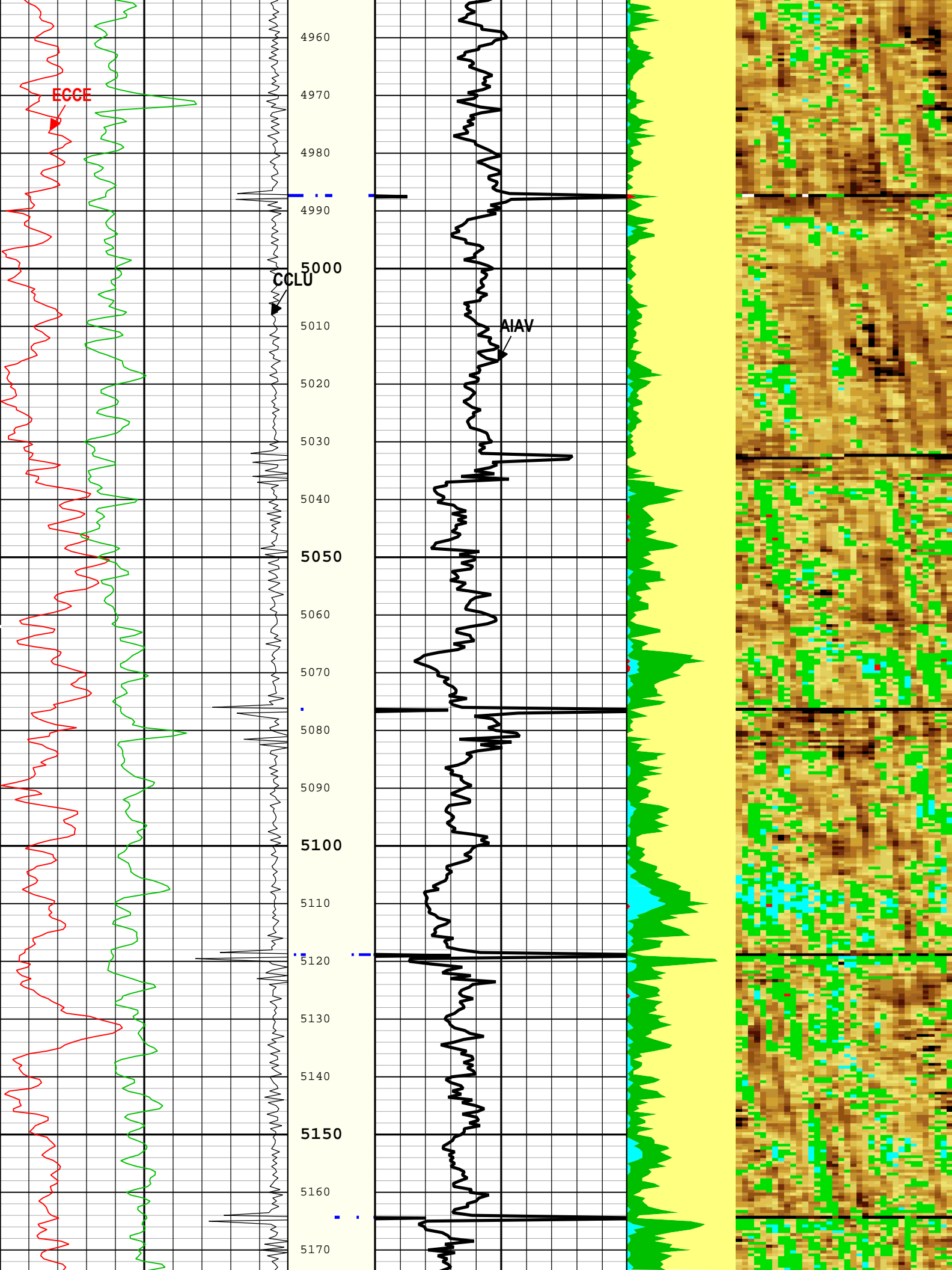


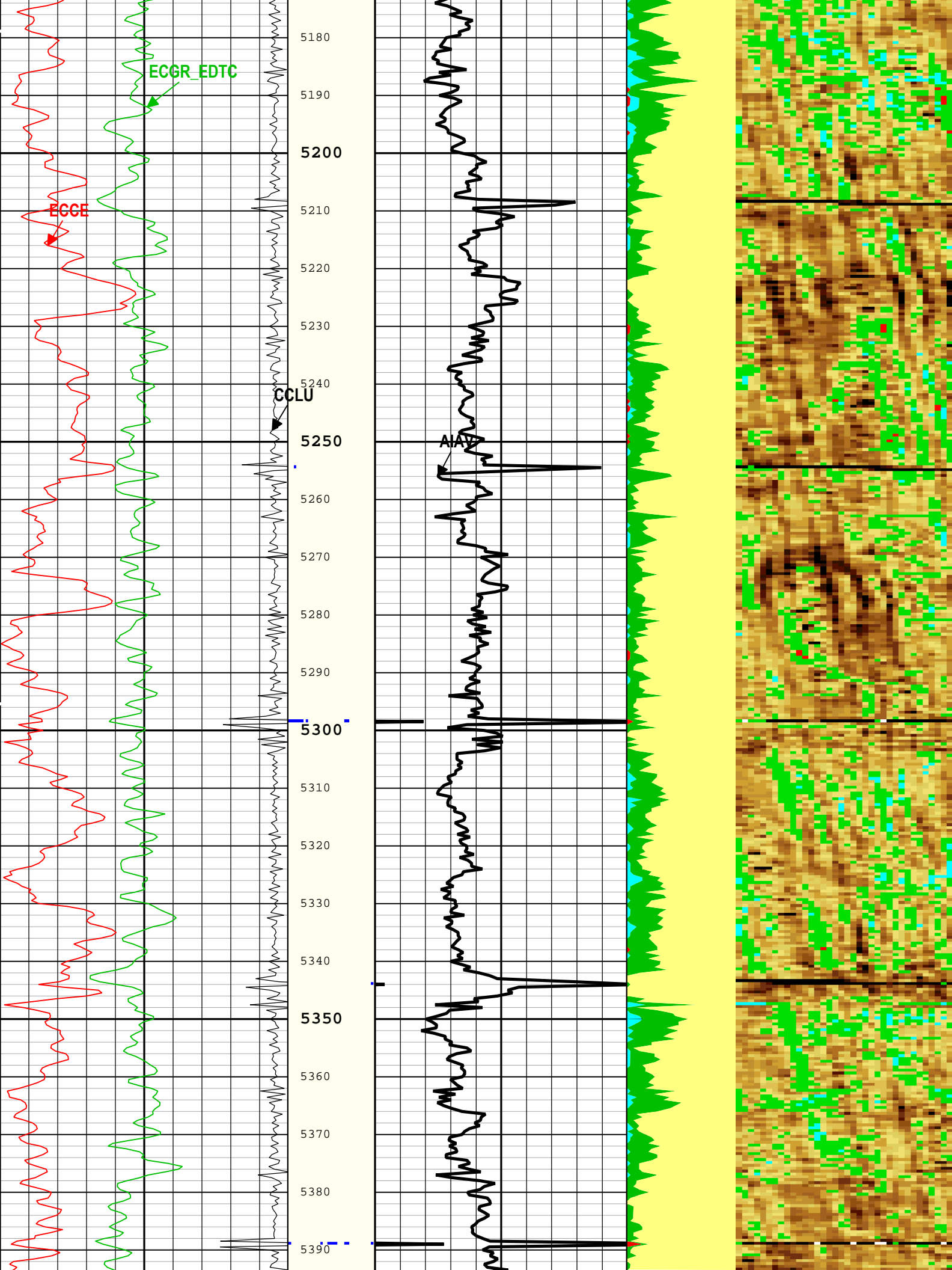


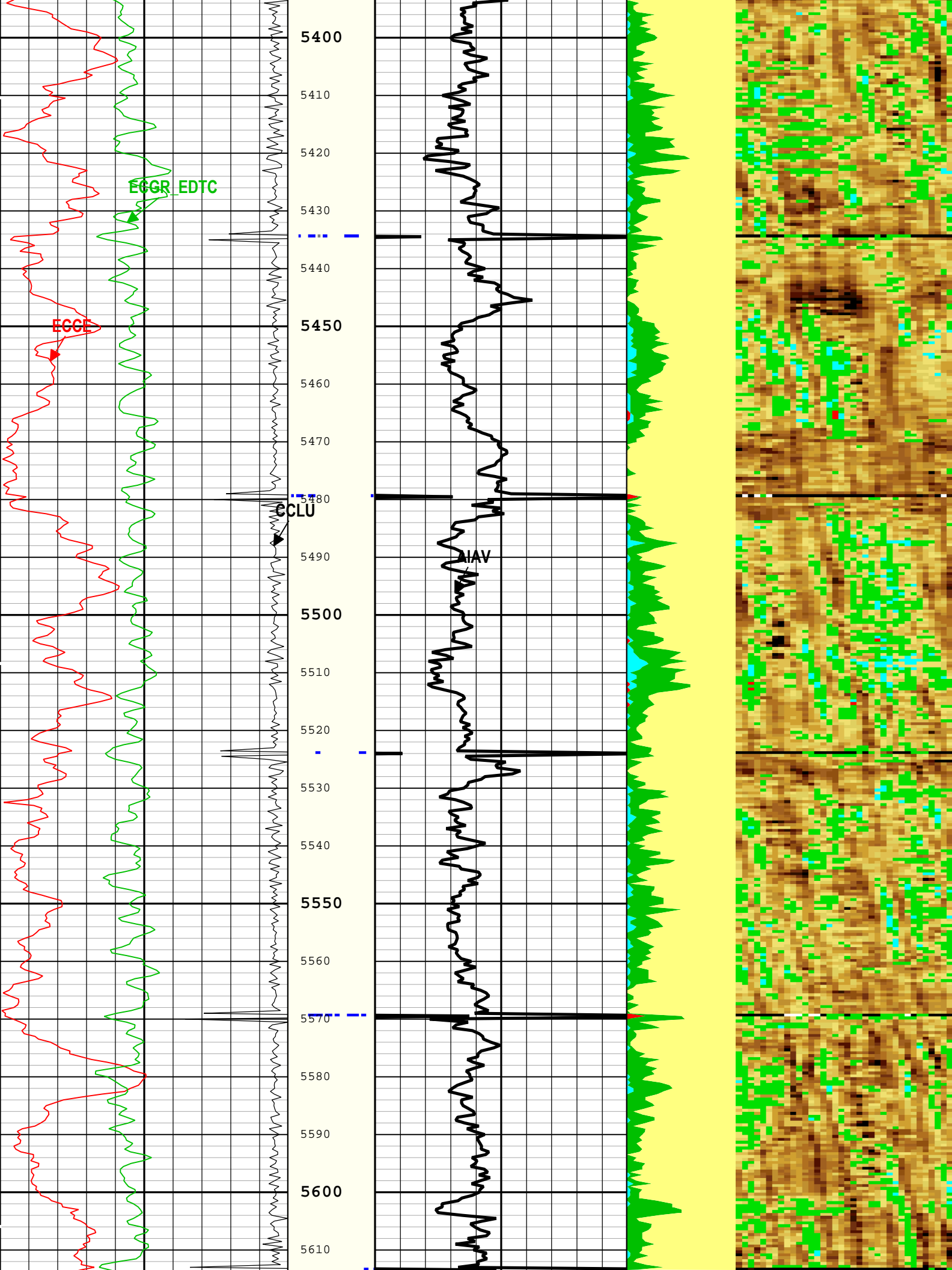


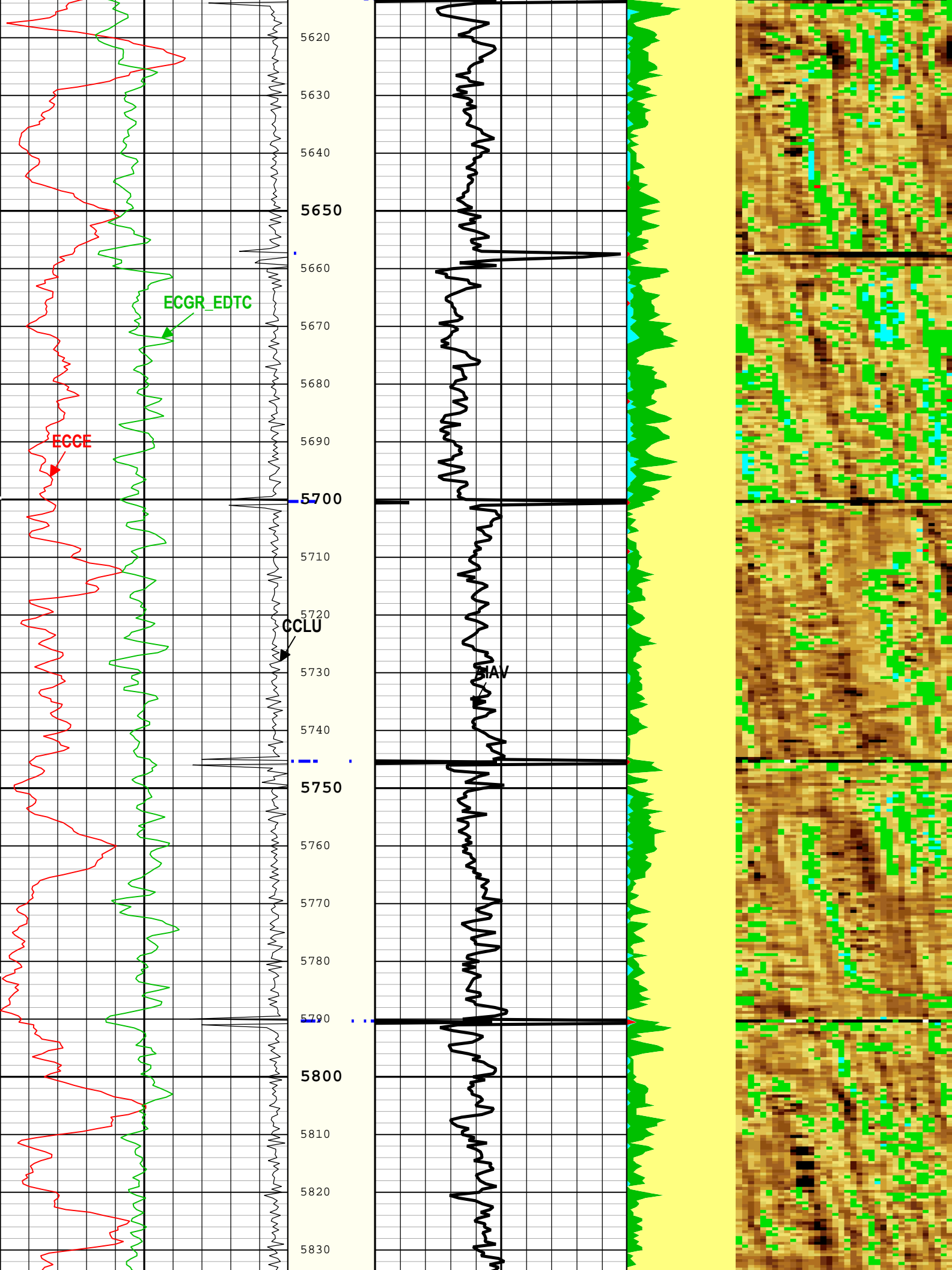


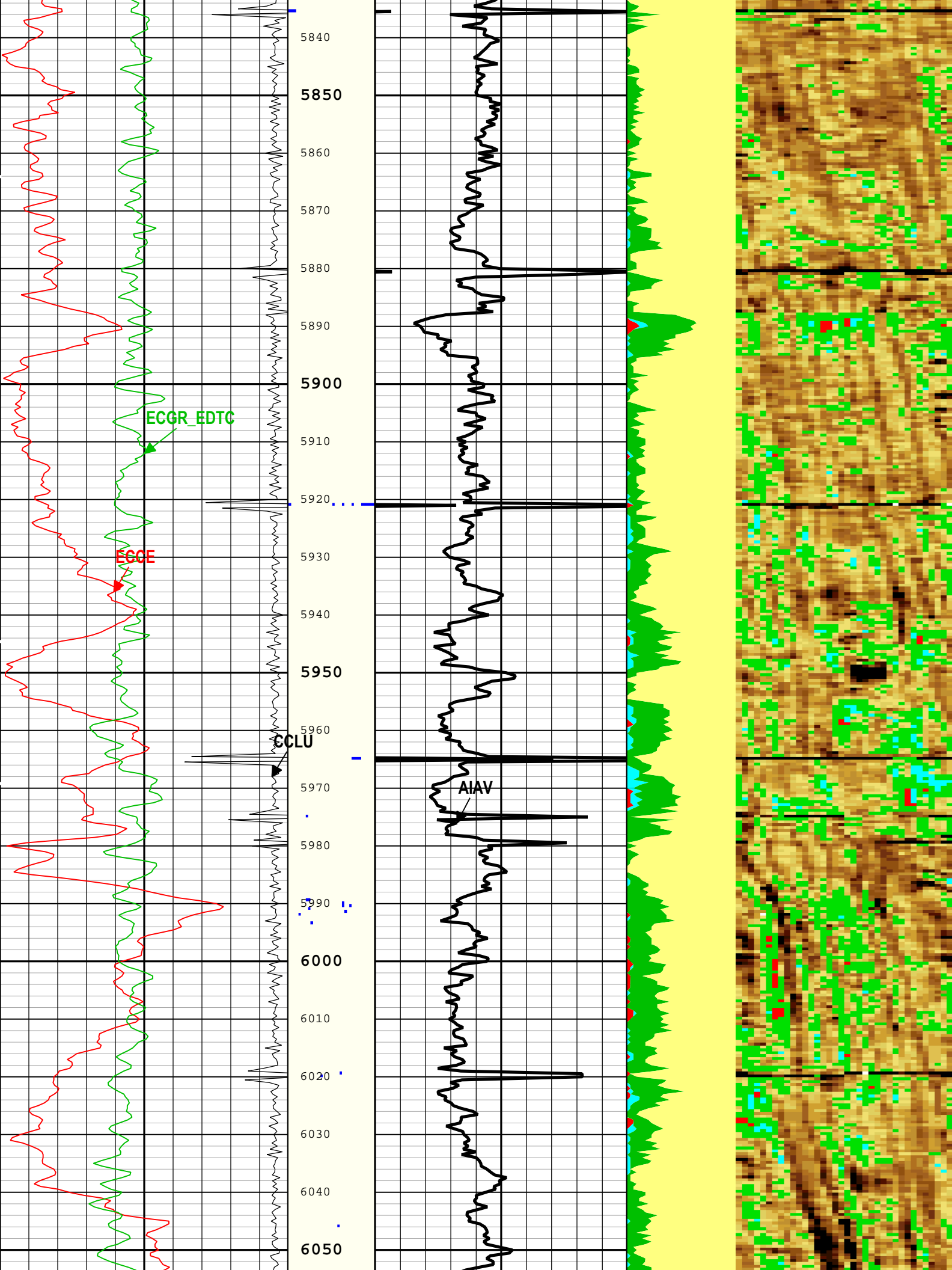


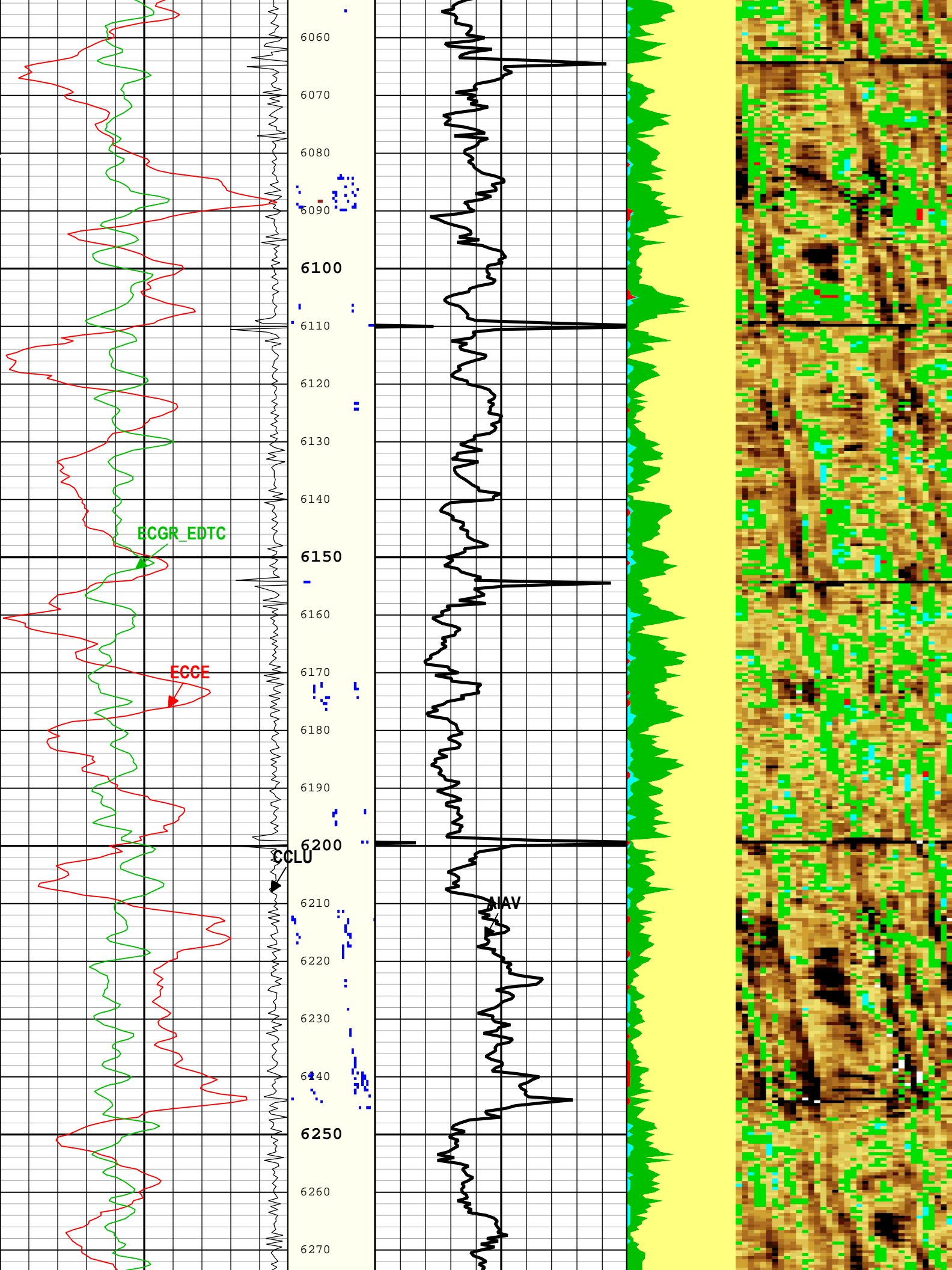


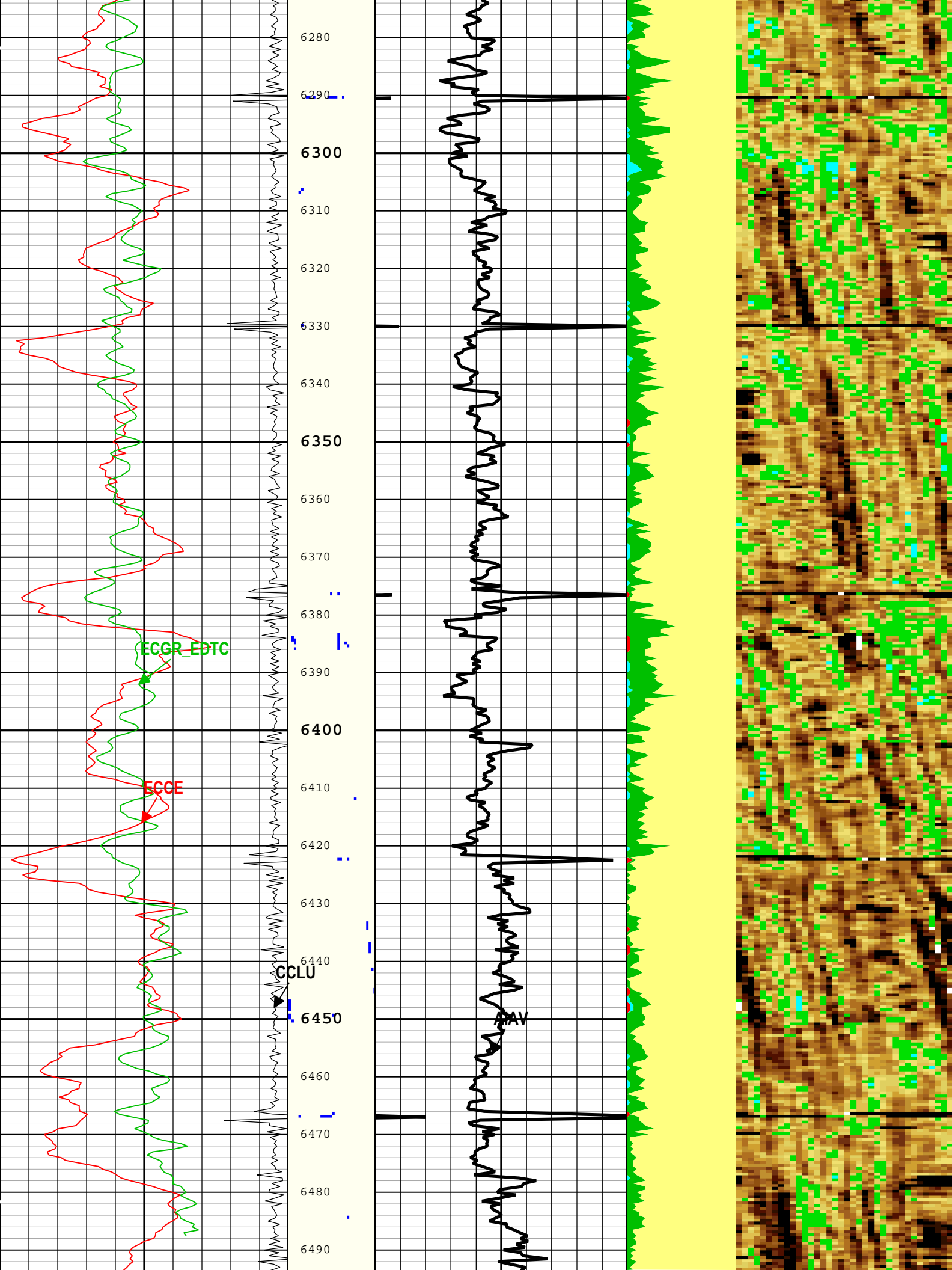












AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
EMXV	EMEX Voltage	USIT-E	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

UltraSonic

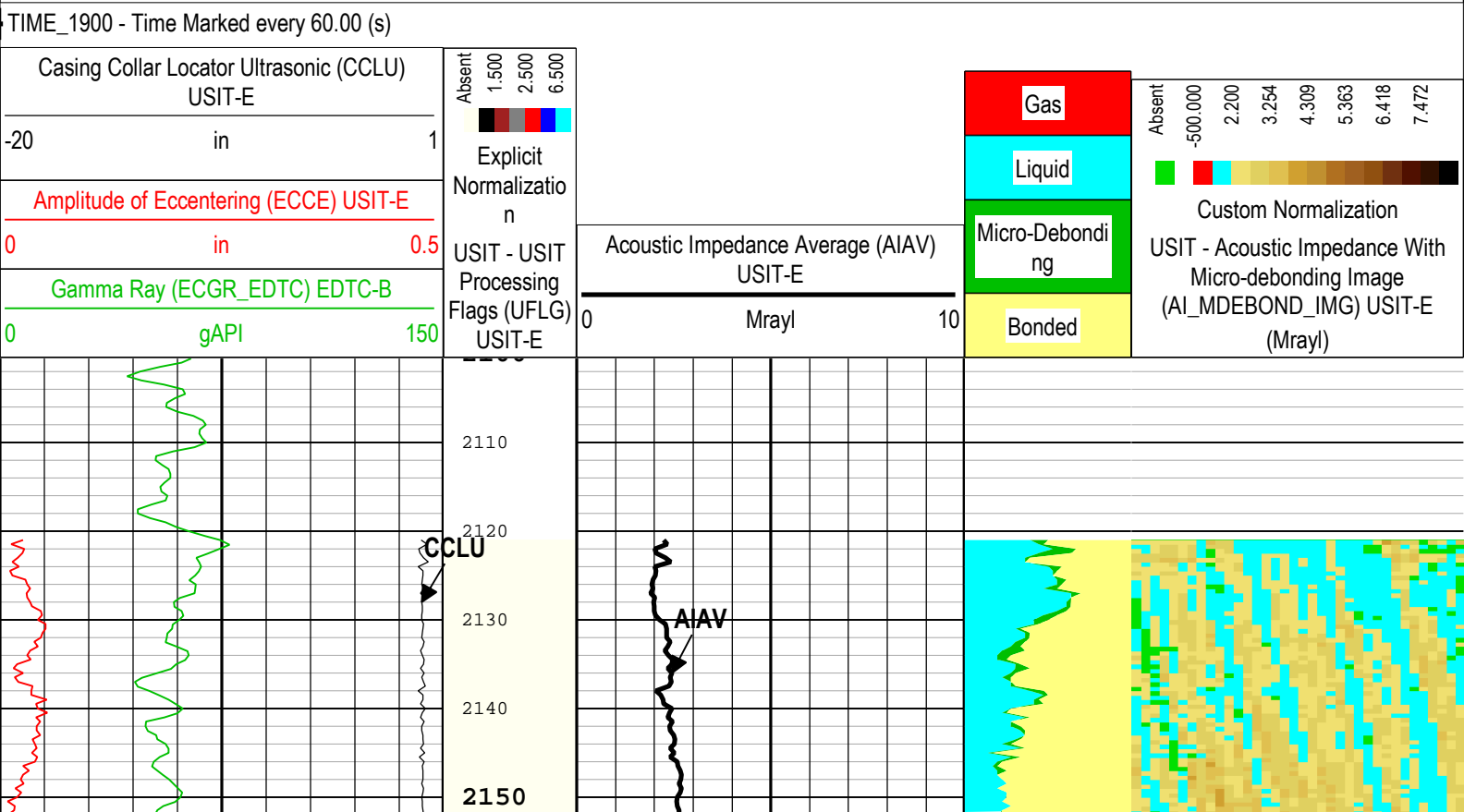
0 PSI Repeat Pass

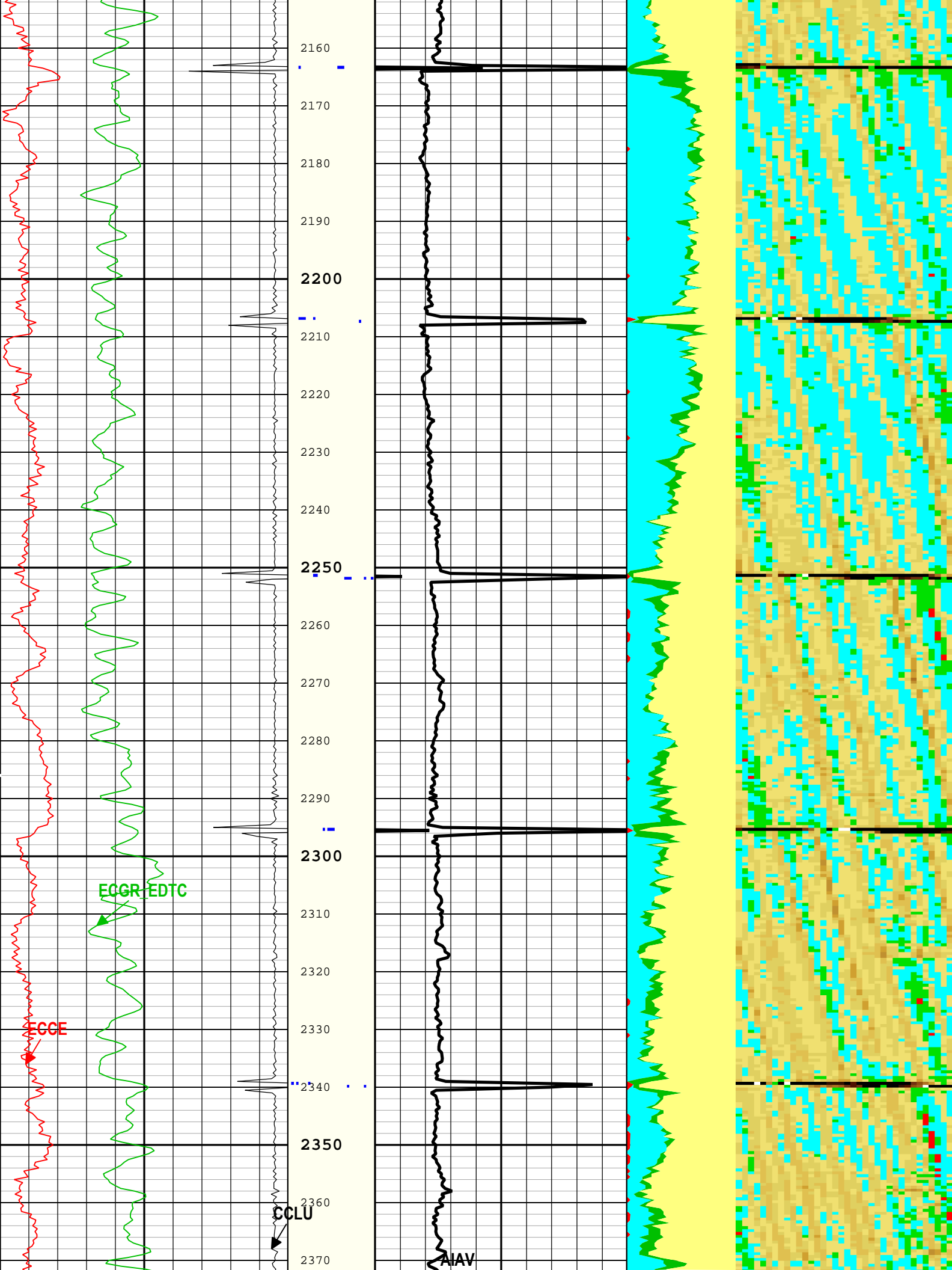
Software Version	
Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	<div>Wireline_NPD-ICE2-2017SP3_7.3.93033</div> <div>Wireline_Hotfix-RTDLIS-2017SP3_7.3.92363</div> <div>Wireline_Hotfix-SML-2017SP3_7.3.101161</div> <div>Wireline_TestKit-CMR-NG-2017SP3_7.3.96073</div>

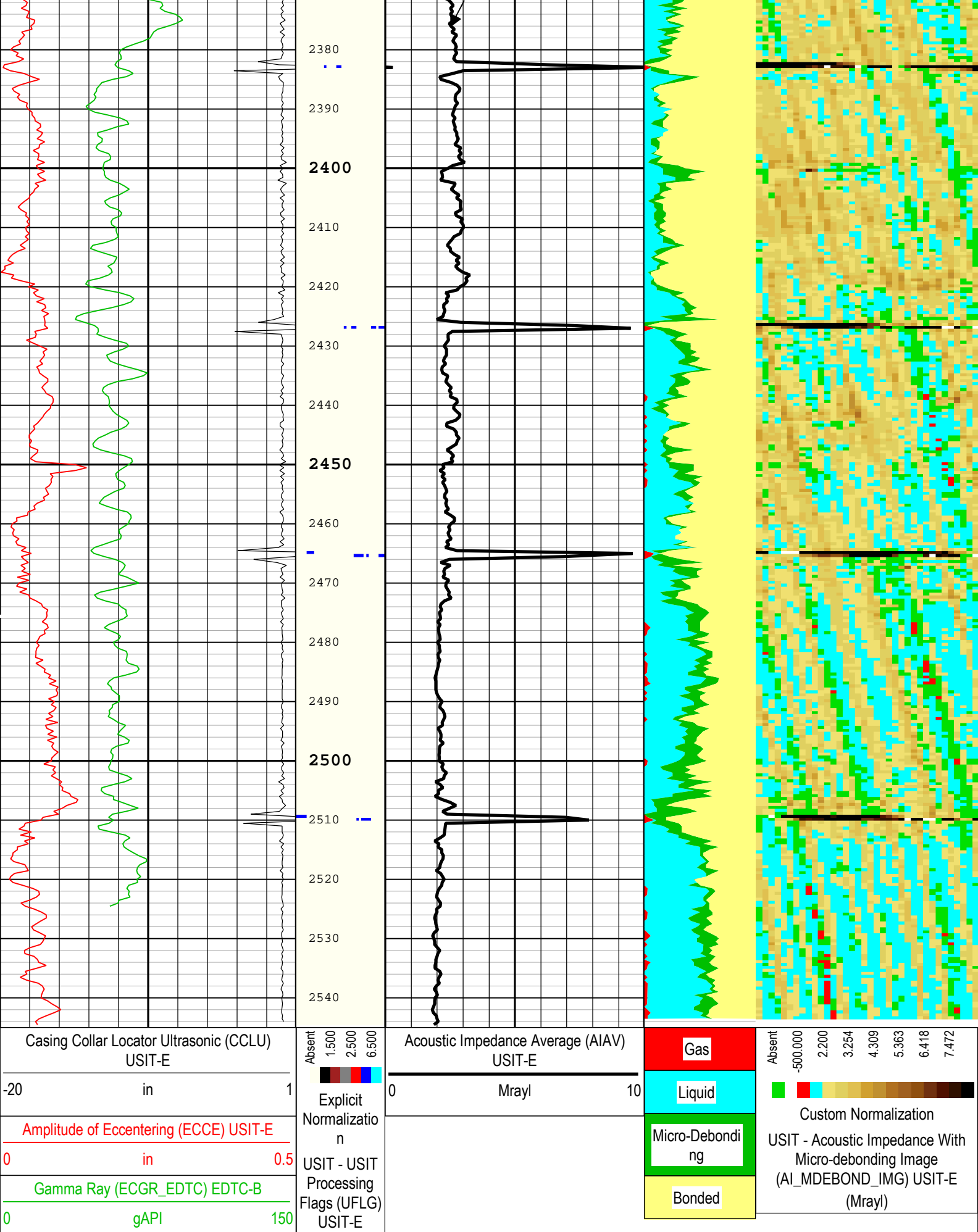
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
UltraSonic	Log[1]:Up	Up	2121.13 ft	2545.63 ft	16-Jun-2018 1:25:22 PM	16-Jun-2018 1:27:51 PM	ON	2.60 ft	Yes

All depths are referenced to toolstring zero									
Log	<div>Company:Noble Energy Inc Well:Larson A23-656</div> <div>UltraSonic: Log[1]:Up:S003</div>								

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: 16-Jun-2018 15:31:58





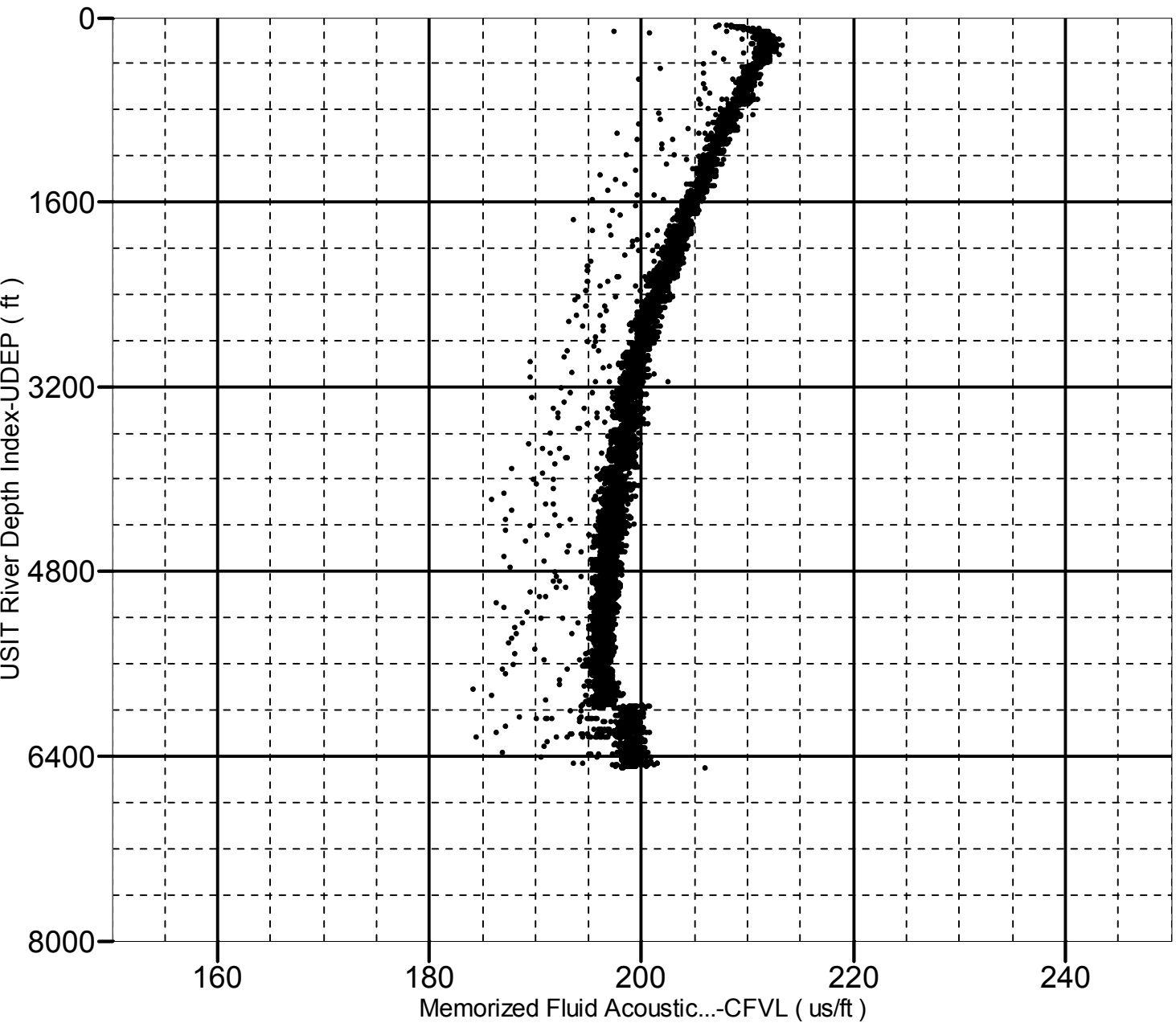


Channel Processing Parameters					
UltraSonic: Parameters					
Parameter	Description	Tool	Value	Unit	
ISSBAR	Barite Mud Presence Flag	Borehole	No		
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased		
BS	Bit Size	WLSESSION	8.5	in	
CBLO	Casing Bottom (Logger)	WLSESSION	18015.3	ft	
CDEN	Cement Density	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	
FDII	FPM Data Interpolation Interval	USIT-E	0	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		
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		
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	
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	Time Zoned	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	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)
AGMX	18	16-Jun-2018 13:25:22	16-Jun-2018 13:26:56	2545.62	2297.63
AGMX	48	16-Jun-2018 13:26:56	16-Jun-2018 13:27:51	2297.63	2121.13
All depth are at tool zero.					
XYZ		Company:Noble Energy Inc Well:Larson A23-656 UltraSonic: Log[3]:Up:S003			

2D Cross Plot

Index Range: From 6508.50 to 81.00 ft

● CFVL-UDEP



XYZ

Company:Noble Energy Inc Well:Larson A23-656

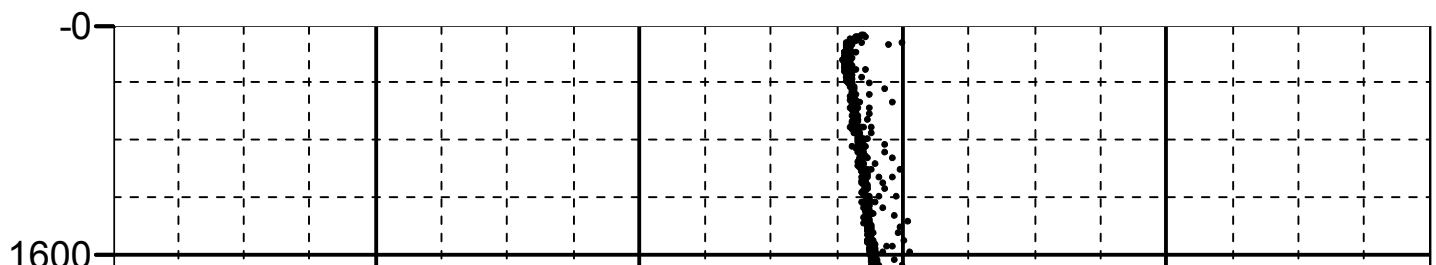
UltraSonic: Log[3]:Up:S003

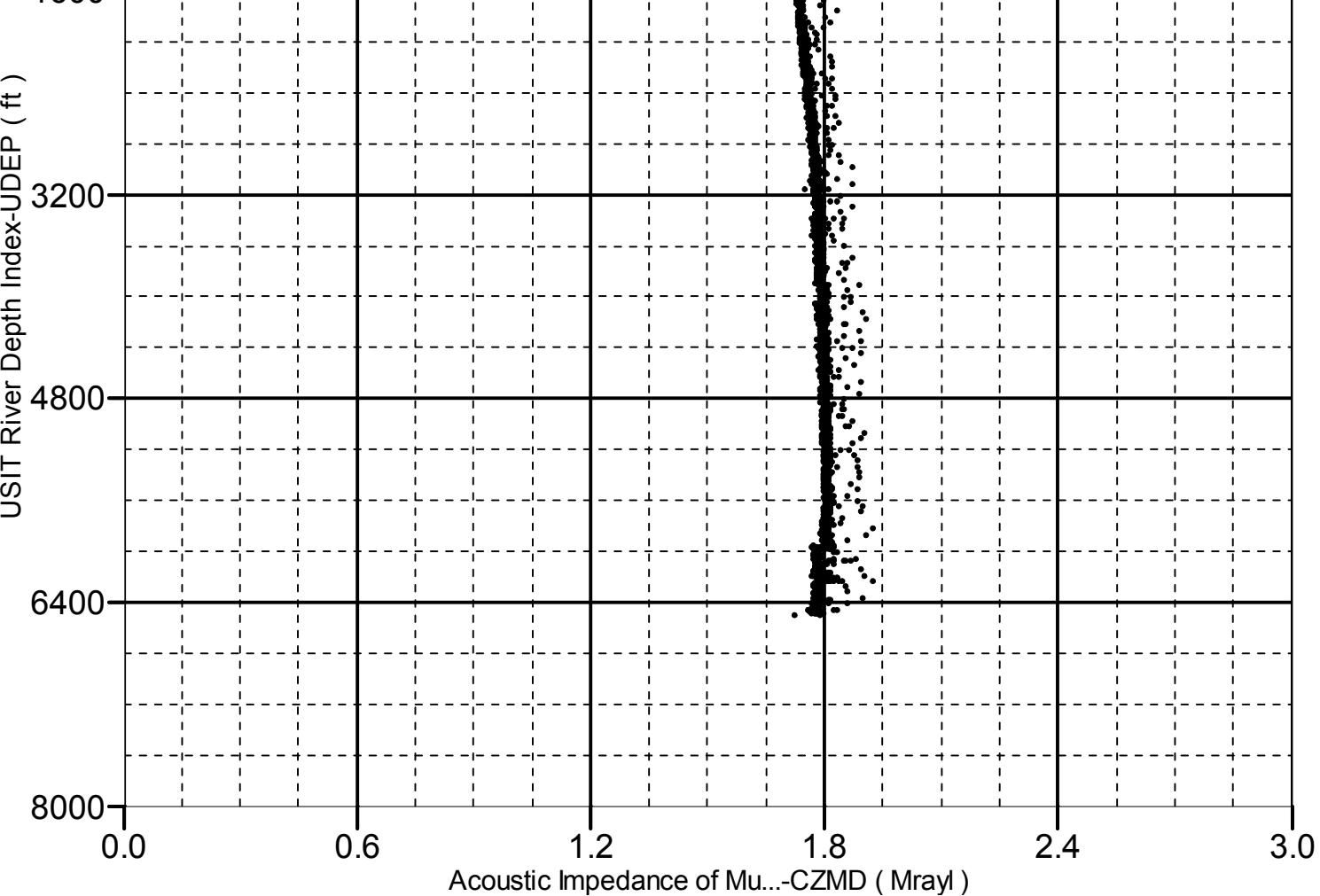
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6508.50 to 81.00 ft

● CZMD-UDEP





Company: Noble Energy Inc

Schlumberger

Well: Larson A23-656

Field: Wattenberg

County: Weld

State: Colorado

UltraSonic Summary Print