

Company: Noble Energy Inc

Well: Stars Federal LD17-770

Field: DJ Horizontal Niobrara

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	DJ Horizontal Niobrara				
Location:	SHL: 285' FSL & 1128' FWL				
Well:	Stars Federal LD17-770				
Company:	Noble Energy Inc				
		Location:			
		SHL: 285' FSL & 1128' FWL	Elev.:	K.B.	4864.00 ft
		Lat: 40.77381 Long: -103.89375		G.L.	4834.00 ft
				D.F.	
		Permanent Datum:	Ground Level	Elev.:	4834.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-49610	5	9N	58W
Logging Date	25-Jul-2019				

Run Number	ONE	
Depth Driller	16619.00 ft	
Schlumberger Depth	16619.00 ft	
Bottom Log Interval	5890.00 ft	
Top Log Interval	100.00 ft	
Casing Fluid Type	Fresh Water Brine	
Salinity		
Density	8.4 lbm/gal	
Fluid Level	8.00 ft	
BIT/CASING/TUBING STRING		
Bit Size	8.50 in	
From	1929.00 ft	
To	16619.00 ft	
Casing/Tubing Size	5.5 in	
Weight	17 lbm/ft	
Grade	N/A	
From	30.00 ft	
To	16602.00 ft	
Max Recorded Temperatures	200 degF	
Logger on Bottom	25-Jul-2019	16:15:00
Unit Number	9108	Ft. Morgan, CO
Recorded By	Mark Butler	
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.

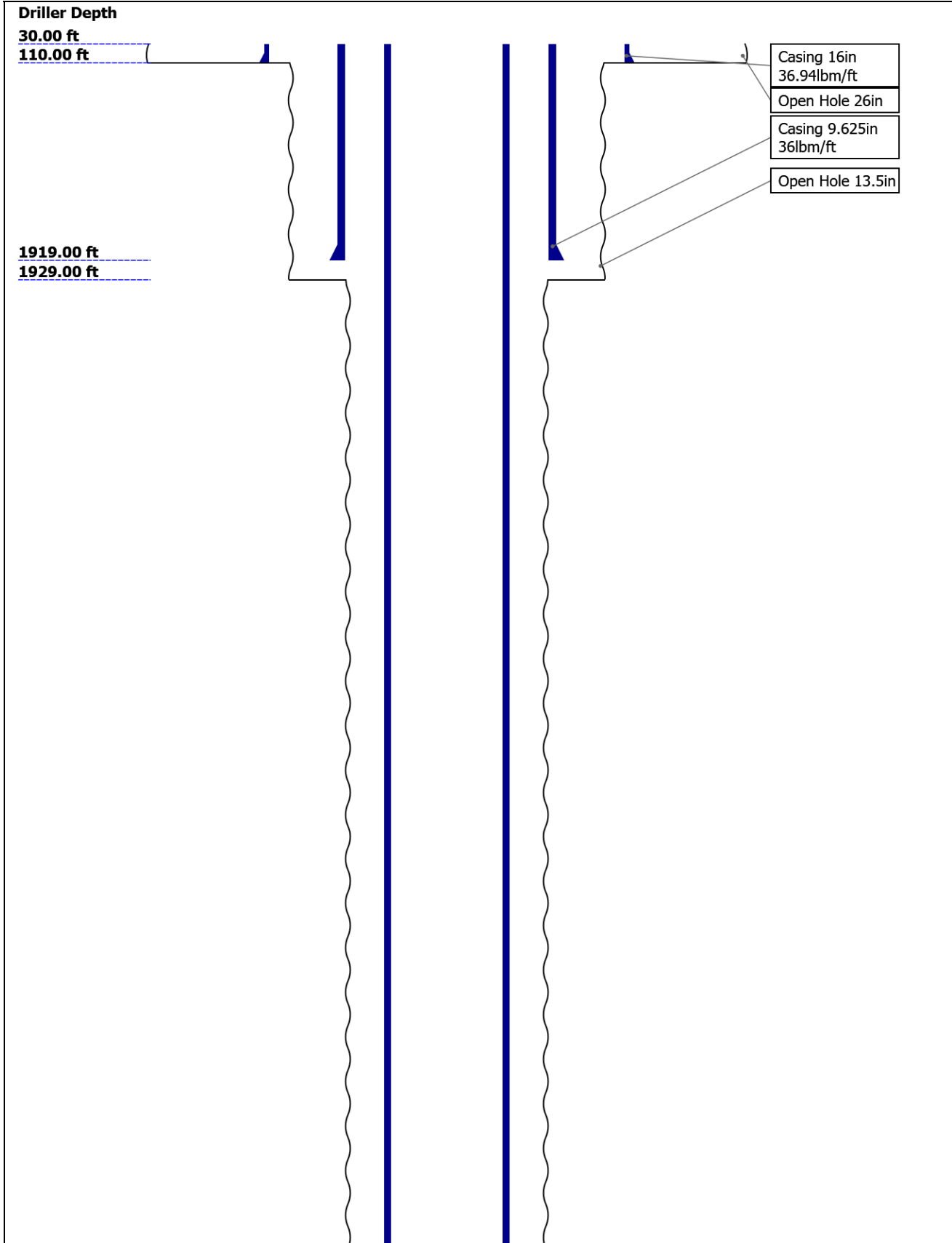
Contents

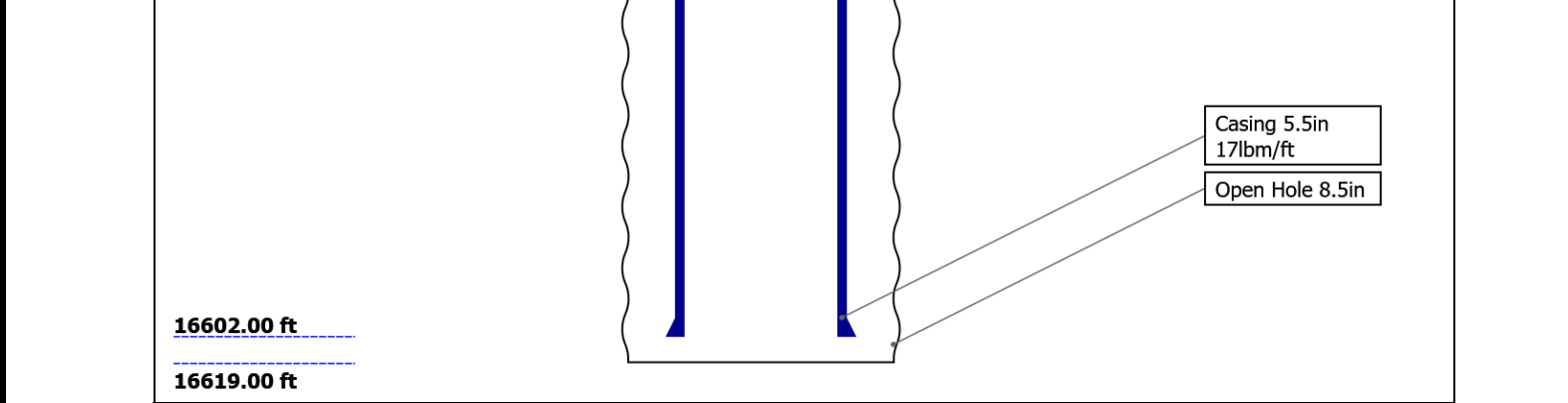
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Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	1929			
Top Logger (ft)	30	110	1929			
Bottom Driller (ft)	110	1929	16619			
Bottom Logger (ft)	110	1929	16619			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	36.94	36	17			
Inner Diameter (in)	15.572	8.921	4.892			
Grade	N/A	N/A	N/A			
Top Driller (ft)	30	30	30			
Top Logger (ft)	30	30	30			
Bottom Driller (ft)	110	1919	16602			
Bottom Logger (ft)	110	1919	16602			

Operational Run Summary

Parameter (unit)	ONE					
Date Log Started	25-Jul-2019					
Time Log Started	15:05:37					
Date Log Finished	25-Jul-2019					
Time Log Finished	17:08:41					
Top Log Interval (ft)	100.00					
Bottom Log Interval (ft)	5890.00					
Total Depth (ft)						
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.500					
Logging Unit Number	9108					
Logging Unit Location	Ft. Morgan, CO					
Recorded By	Mark Butler					

Witnessed By	Bill Mansfield					
Service Order Number	EDNS-00004					

ONE: Toolstring				ONE: Remarks	
<div><div><div><div><div>Equip name</div><div>Length</div></div><div>LEH-QT</div><div>29.44</div></div><div>LEH-QT</div></div><div><div><div><div>EDTC-B</div><div>25.96</div></div><div>EDTH-B</div><div>EDTG-A</div><div>EDTC-B</div></div></div><div><div><div><div>AH-184[2]</div><div>19.46</div></div></div><div><div><div><div>AH-184[1]</div><div>17.46</div></div></div><div><div><div><div>USIT-E:1846</div><div>15.46</div></div><div>ECH-MFA</div><div>USAC-A:1846</div><div>USIS-A:1789</div><div>USSC-B:1803</div><div>USRS-AB:784</div><div>USI-SENSOR</div><div>USI-TX</div></div></div></div><div><div><div><div>CTEM</div><div>22.46</div></div><div><div>ACCZ</div><div>0.00</div></div><div><div>HV</div><div>0.00</div></div><div><div>Gamma</div><div>20.59</div></div><div><div>Ray</div><div></div></div><div><div>TelStatu</div><div>19.46</div></div><div><div>s</div><div></div></div></div><div><div><div><div>USI Sen</div><div>0.37</div></div><div>sor</div><div>TOOL_ZERO</div><div>Head Fe</div><div>nsion</div></div><div><div>Length are in ft</div><div>Maximum Outer Diameter = 3.625 in</div><div>Line: Sensor Location, Value: Gating Offset</div><div>All measurements are relative to TOOL_ZERO</div></div></div></div></div></div>	<div><div>Thank you for choosing Schlumberger!</div><div>Tools run as per tool sketch.</div><div>SLB Crew: Claude Walz, Gary Lapp, Michael Yost</div><div>USIT resolution = 10deg 6in</div><div>Repeat pass logged at 0 psi surface induced pressure</div><div>Main pass logged at 2500 psi surface induced pressure</div></div>				

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		

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

Type	7-32AS-XS		
Serial Number	U718001		
Length	17000.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

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		

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[4]:Up	5891.93	101.97

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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Acquisition System	Version
Maxwell 2019.1	9.1.110979.3100

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Main[4]:Up	Up	101.97 ft	5891.93 ft	25-Jul-2019 4:22:03 PM	25-Jul-2019 5:08:08 PM	ON	4.88 ft	Yes

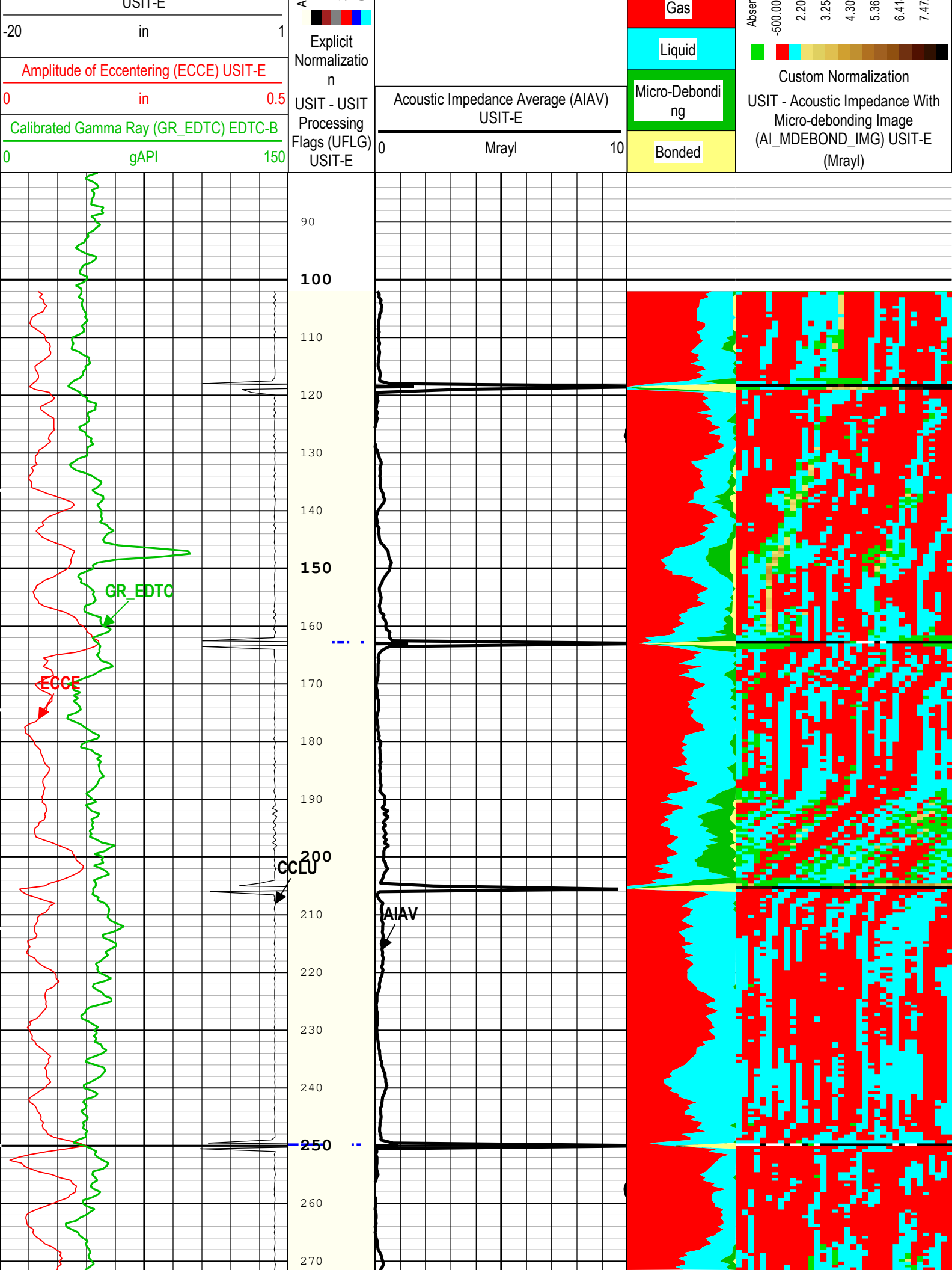
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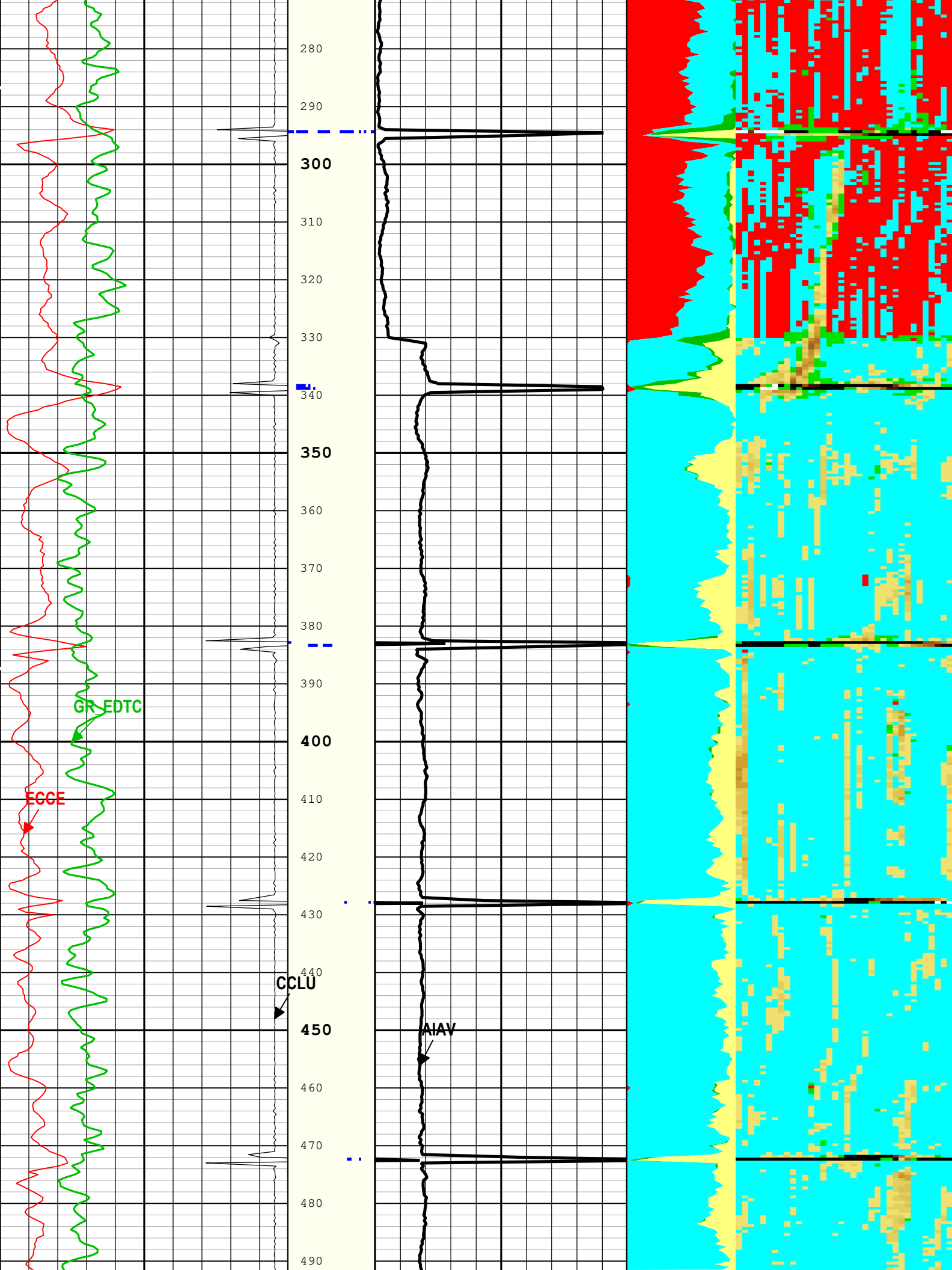
ONE: Main[4]:Up:S003

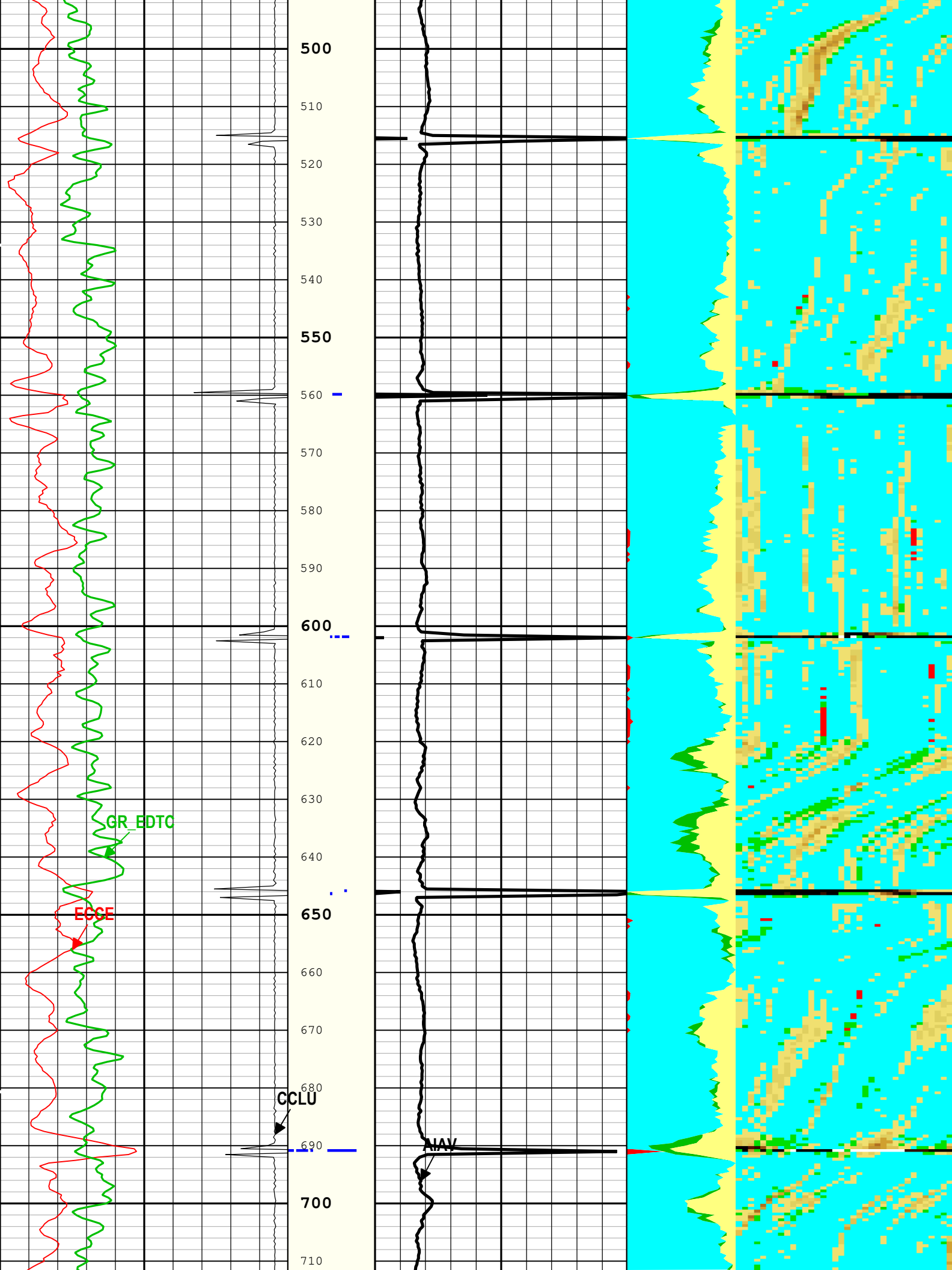
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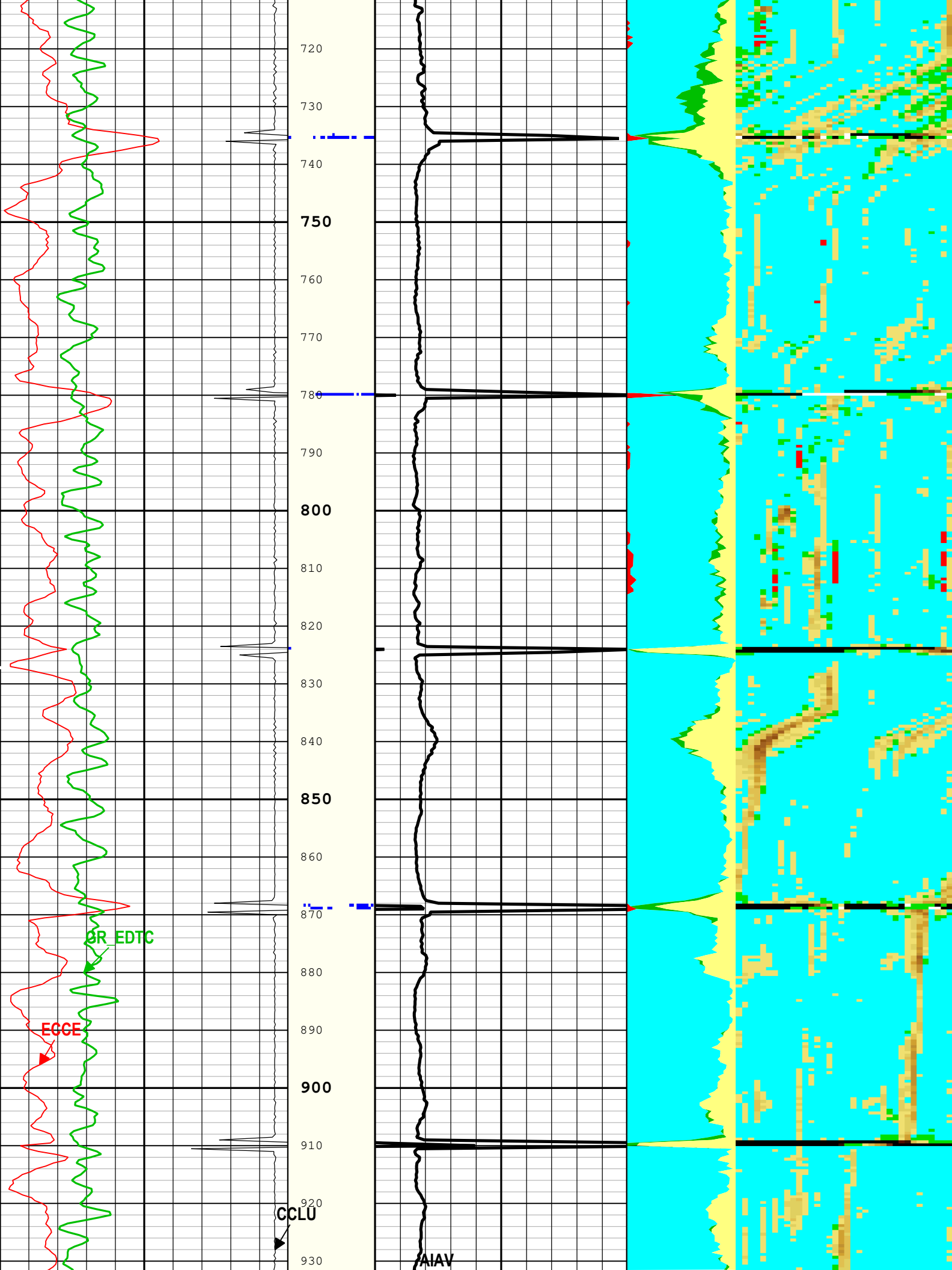
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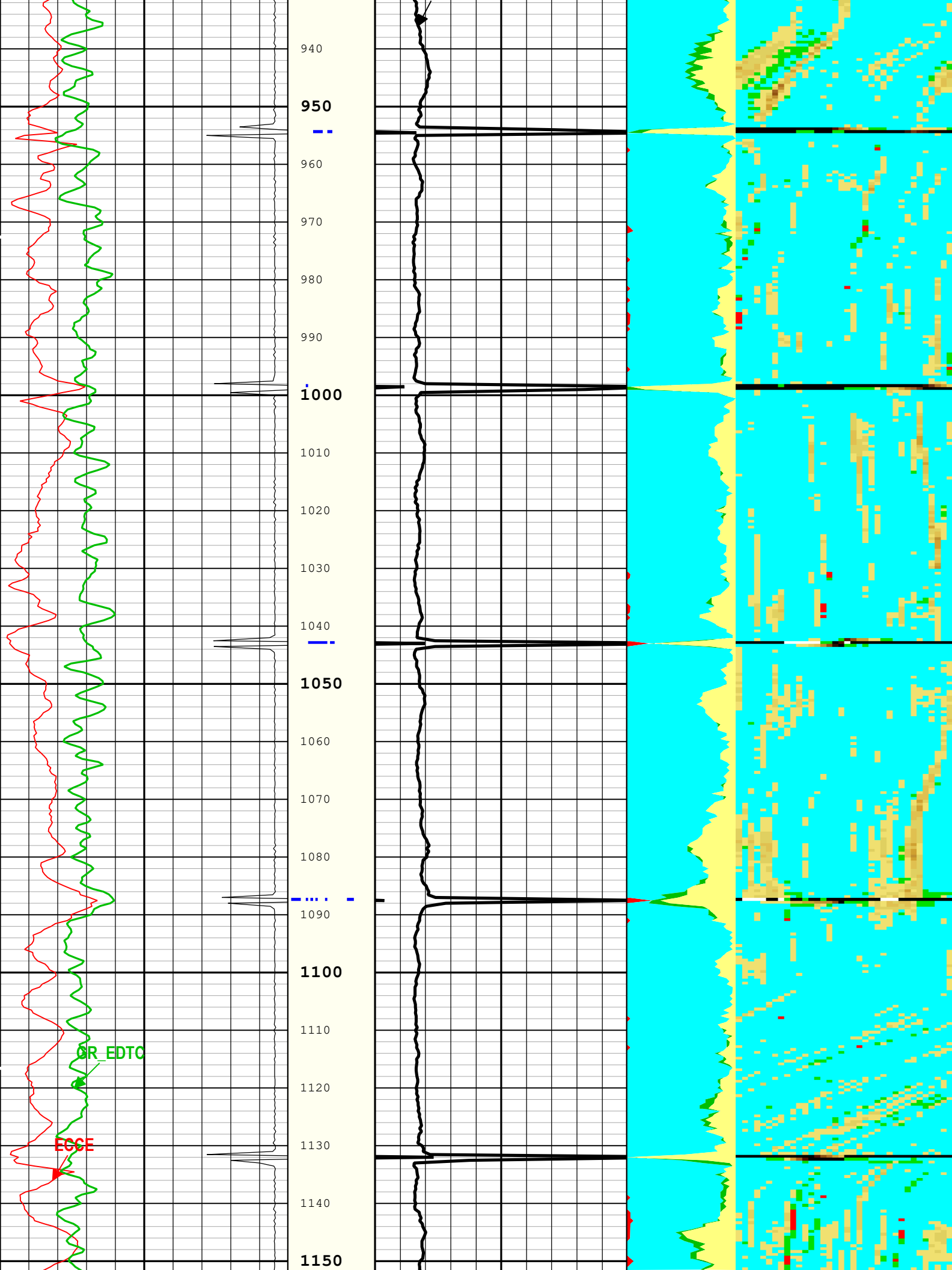
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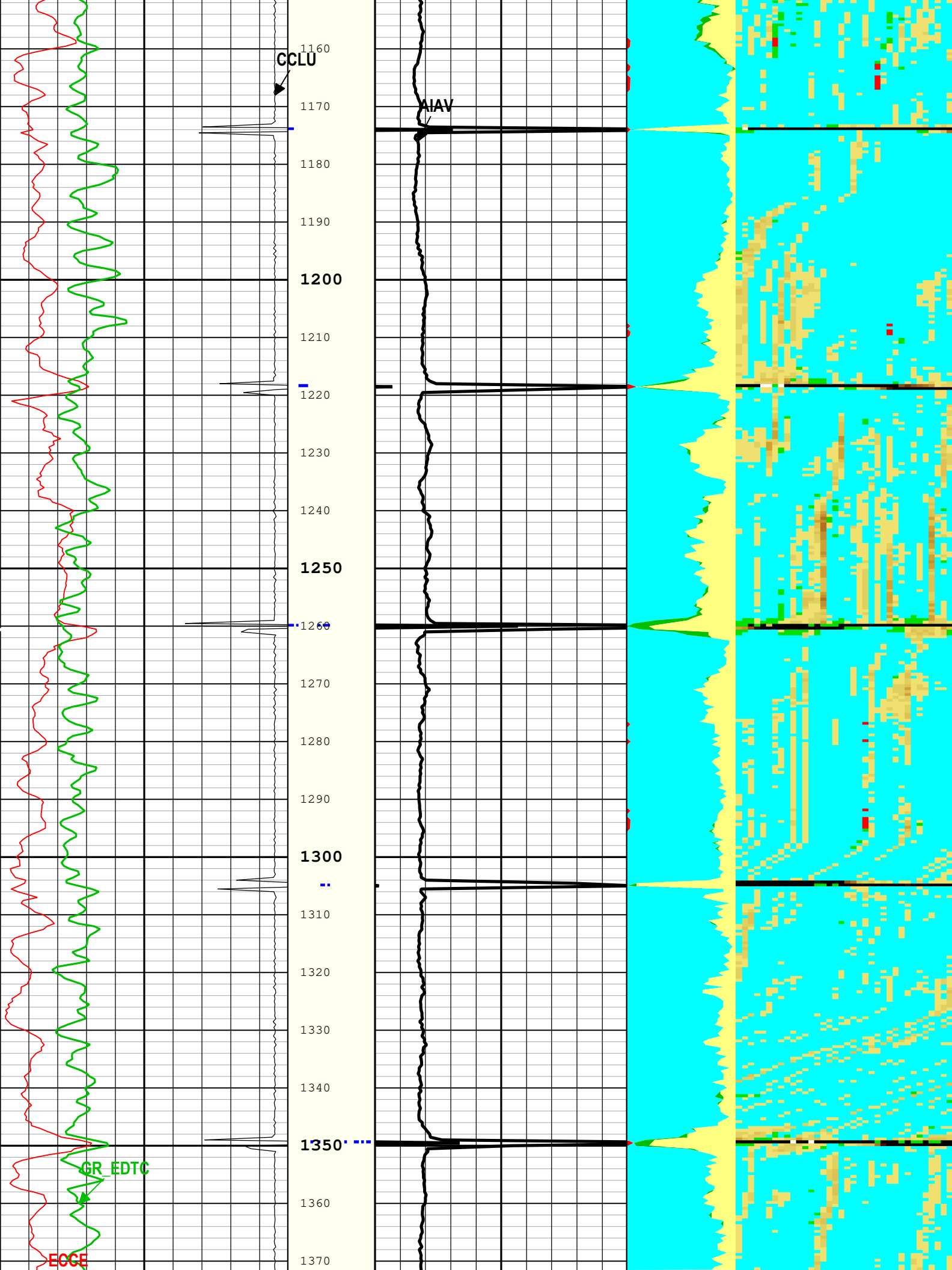


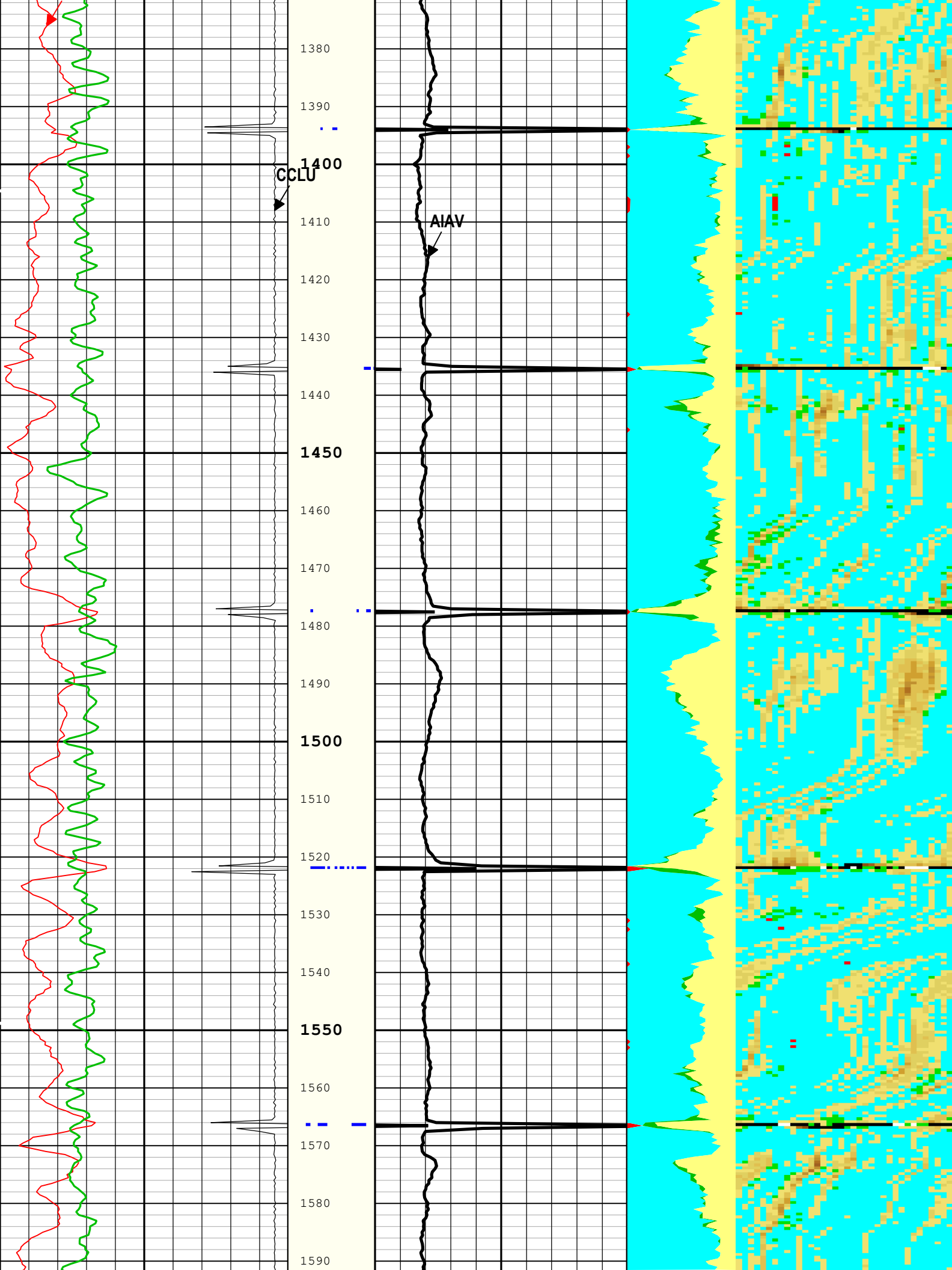


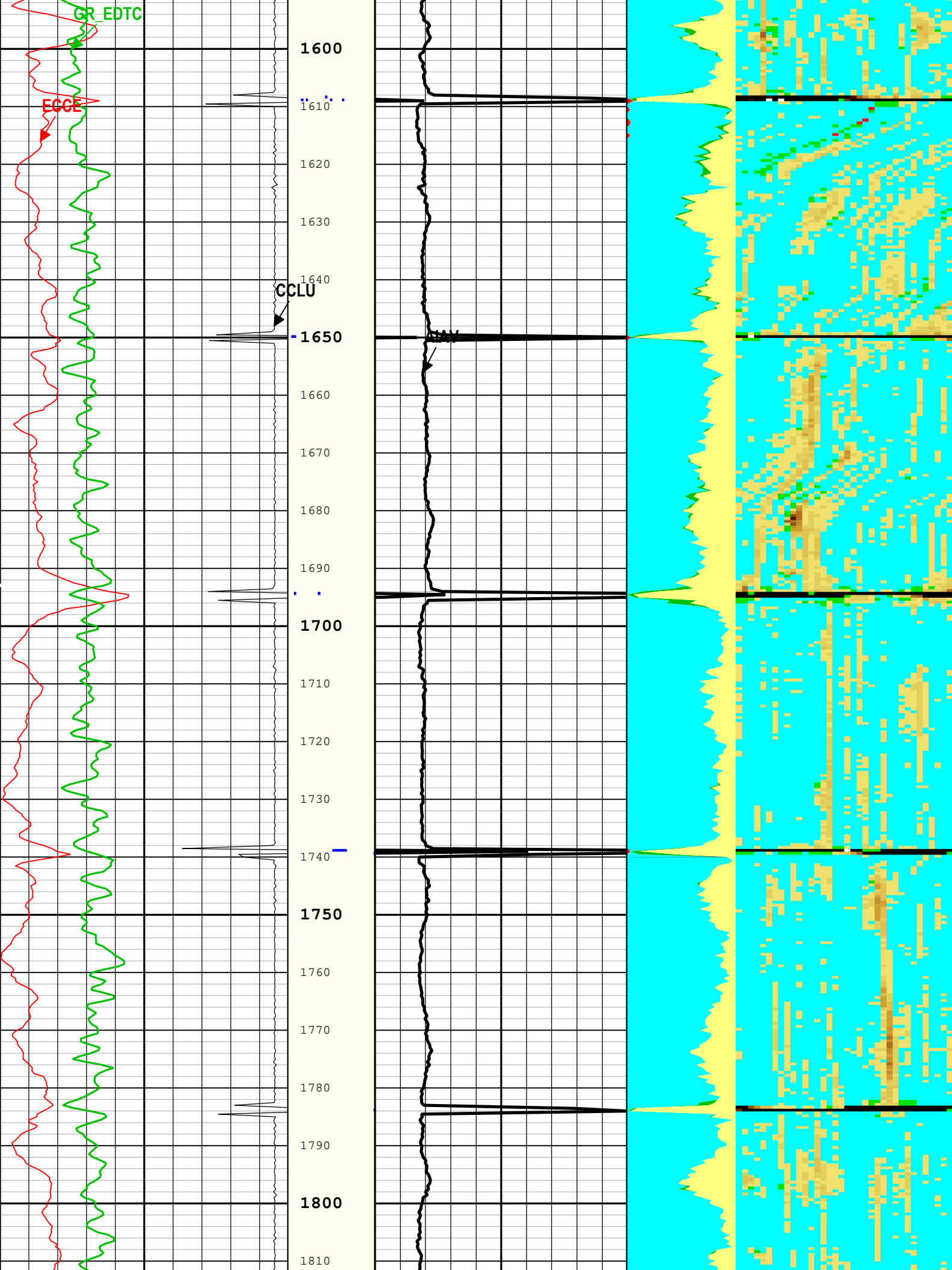


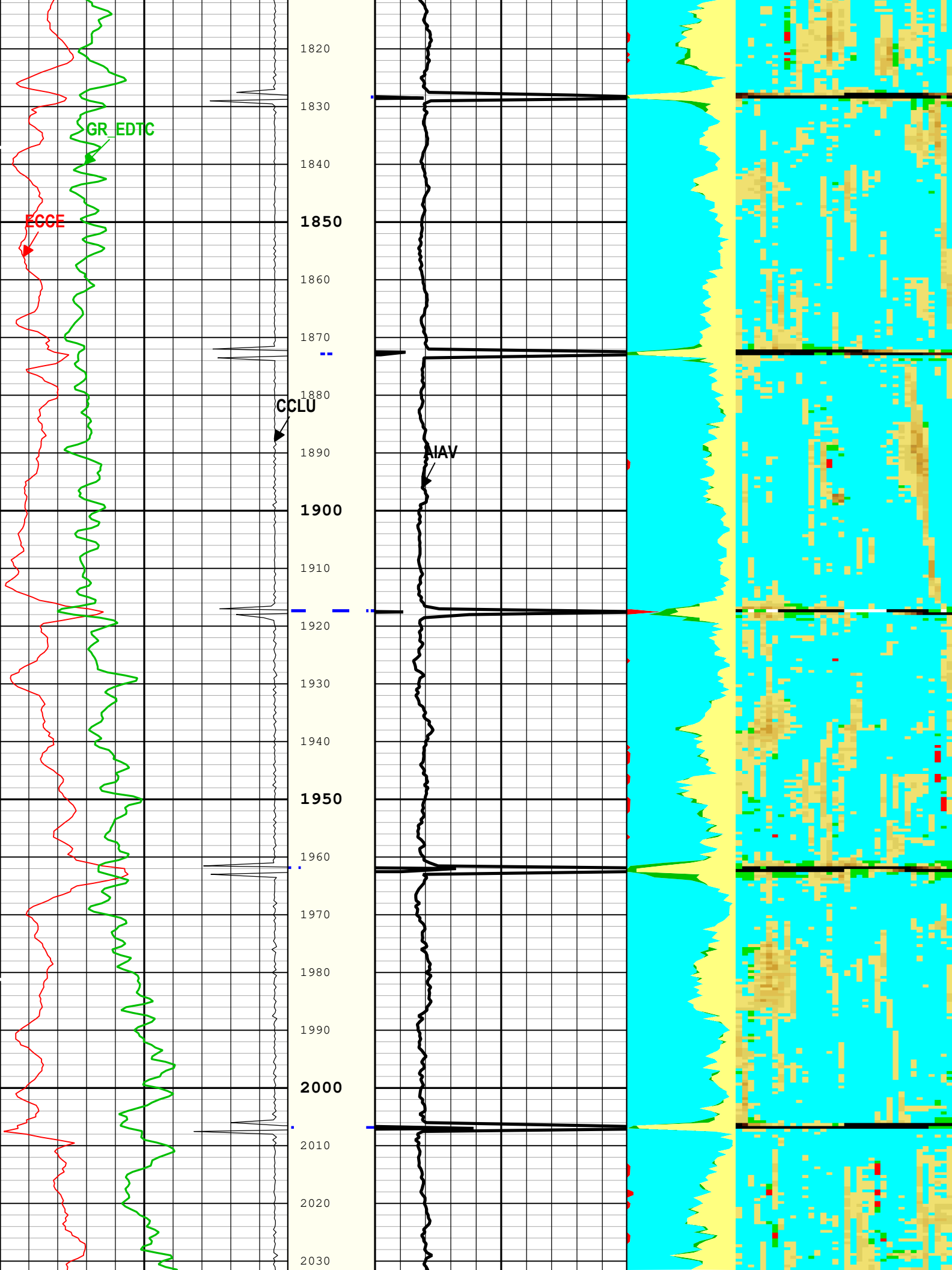


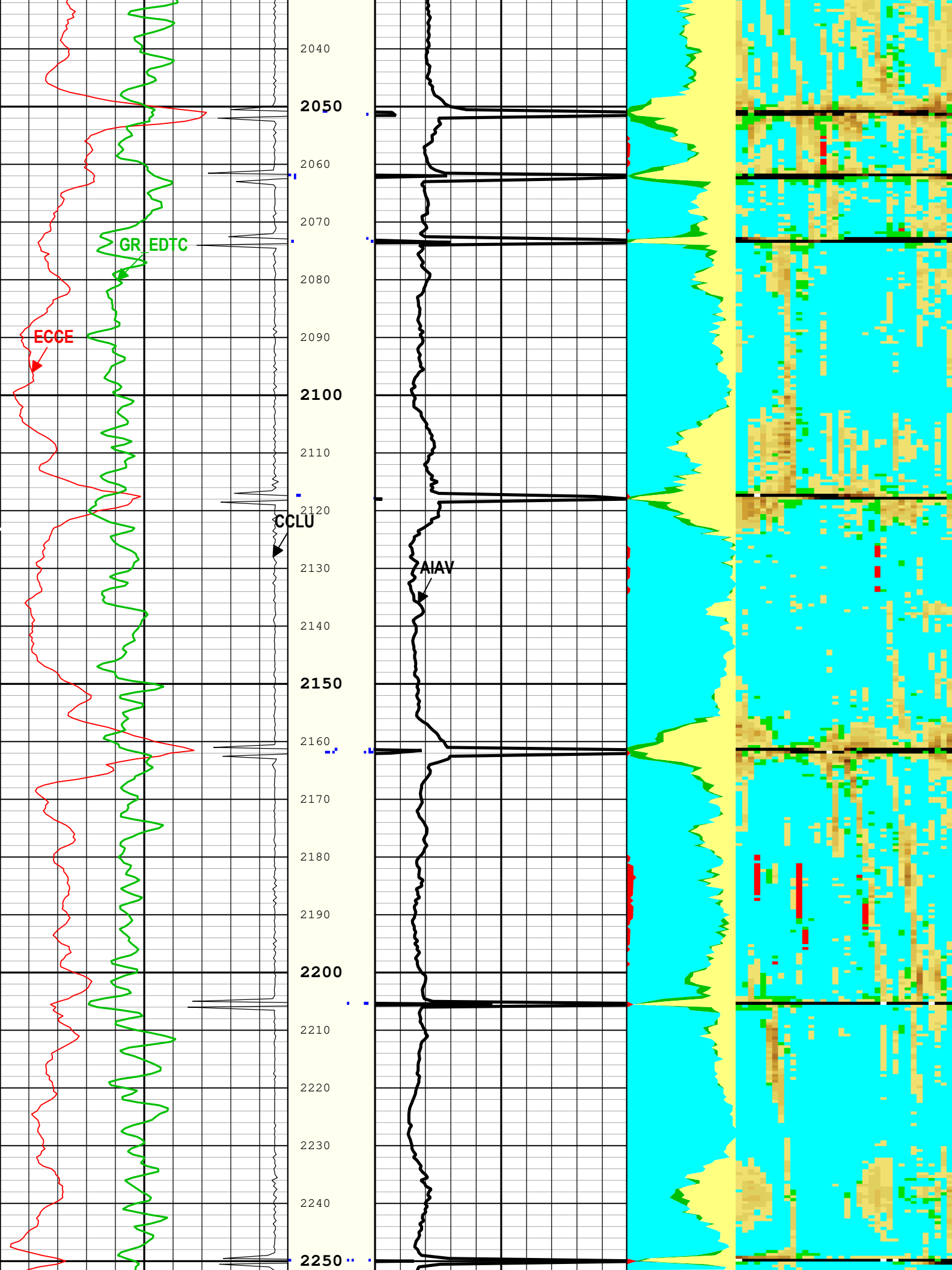


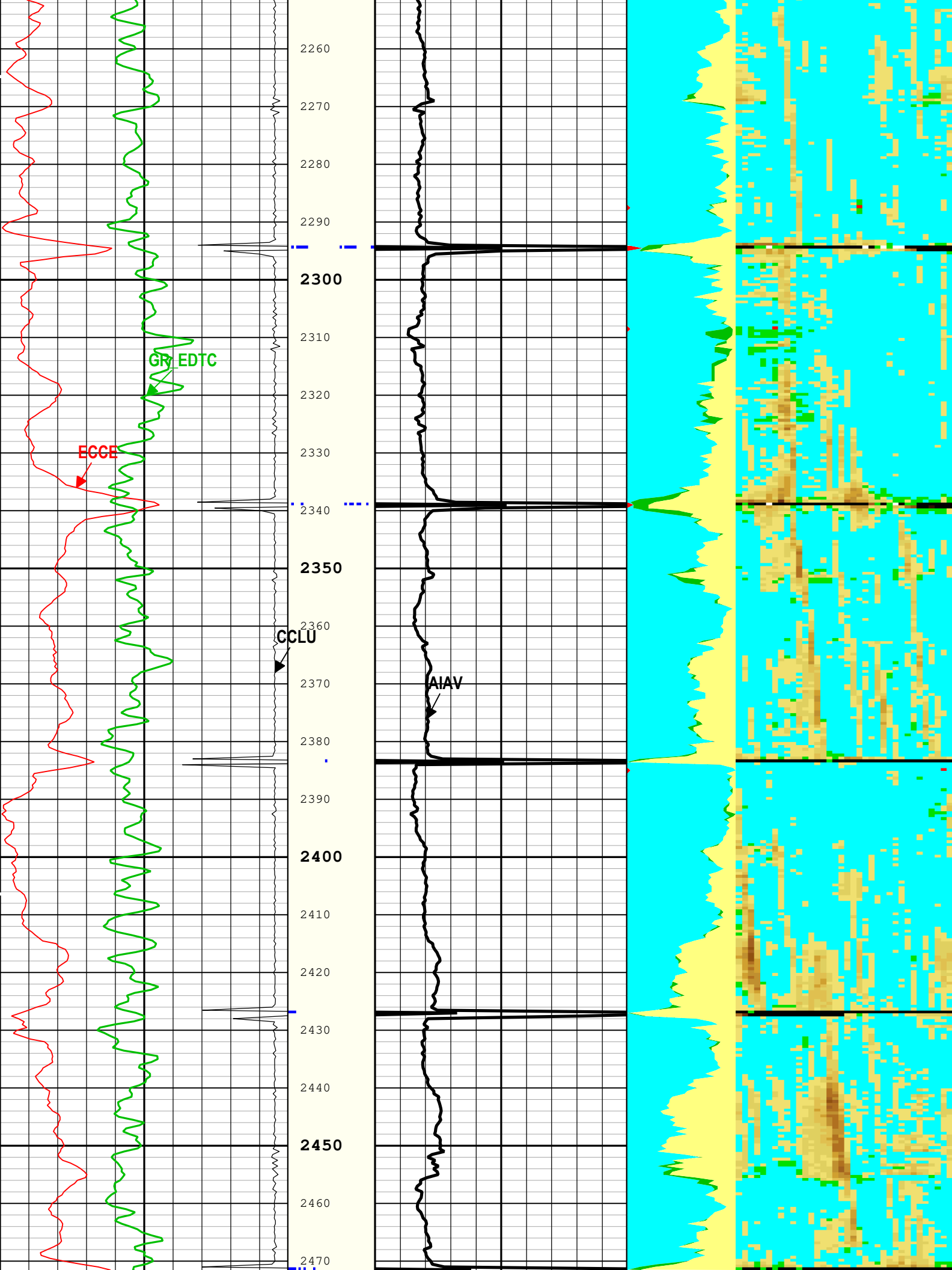


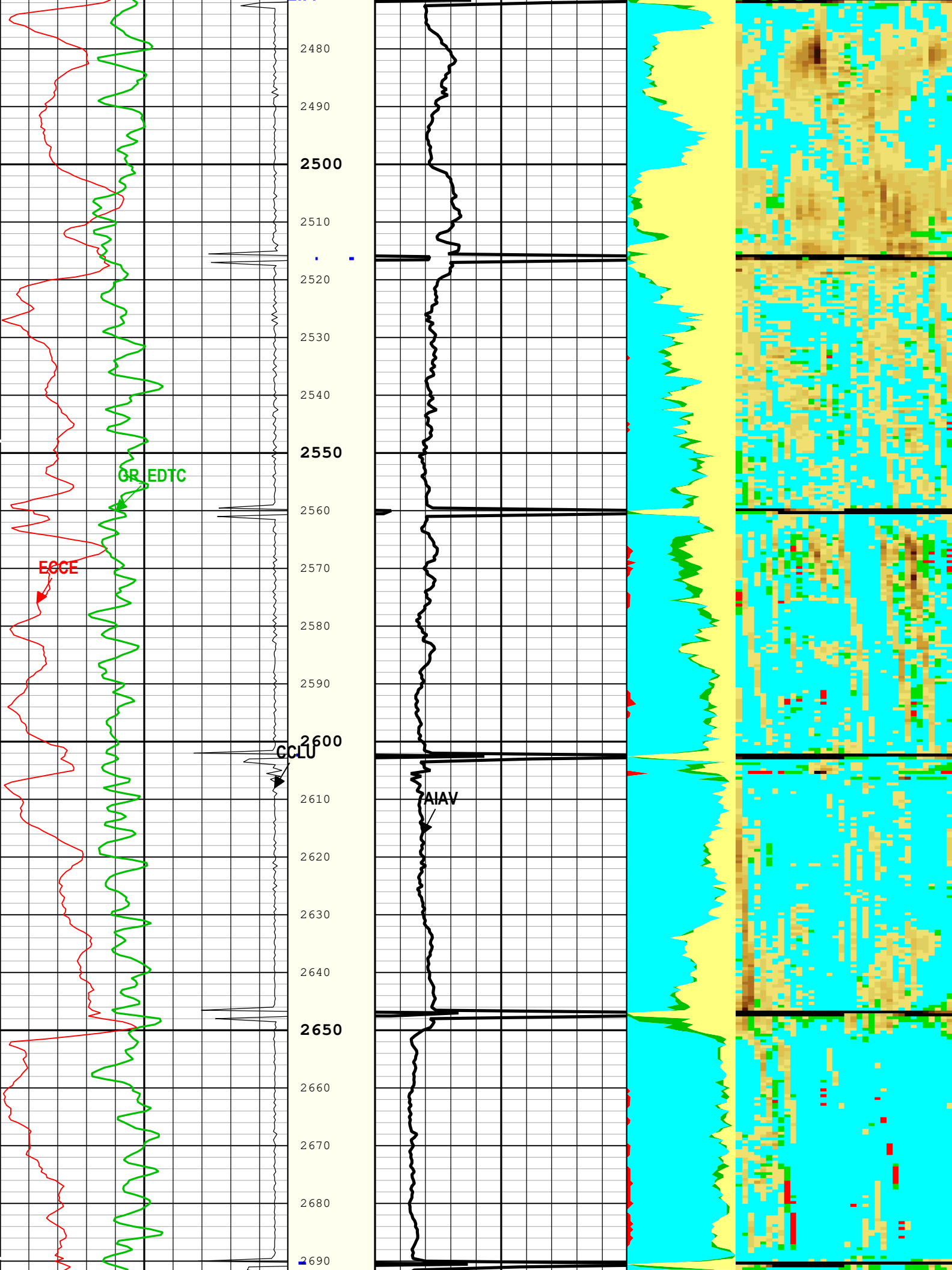


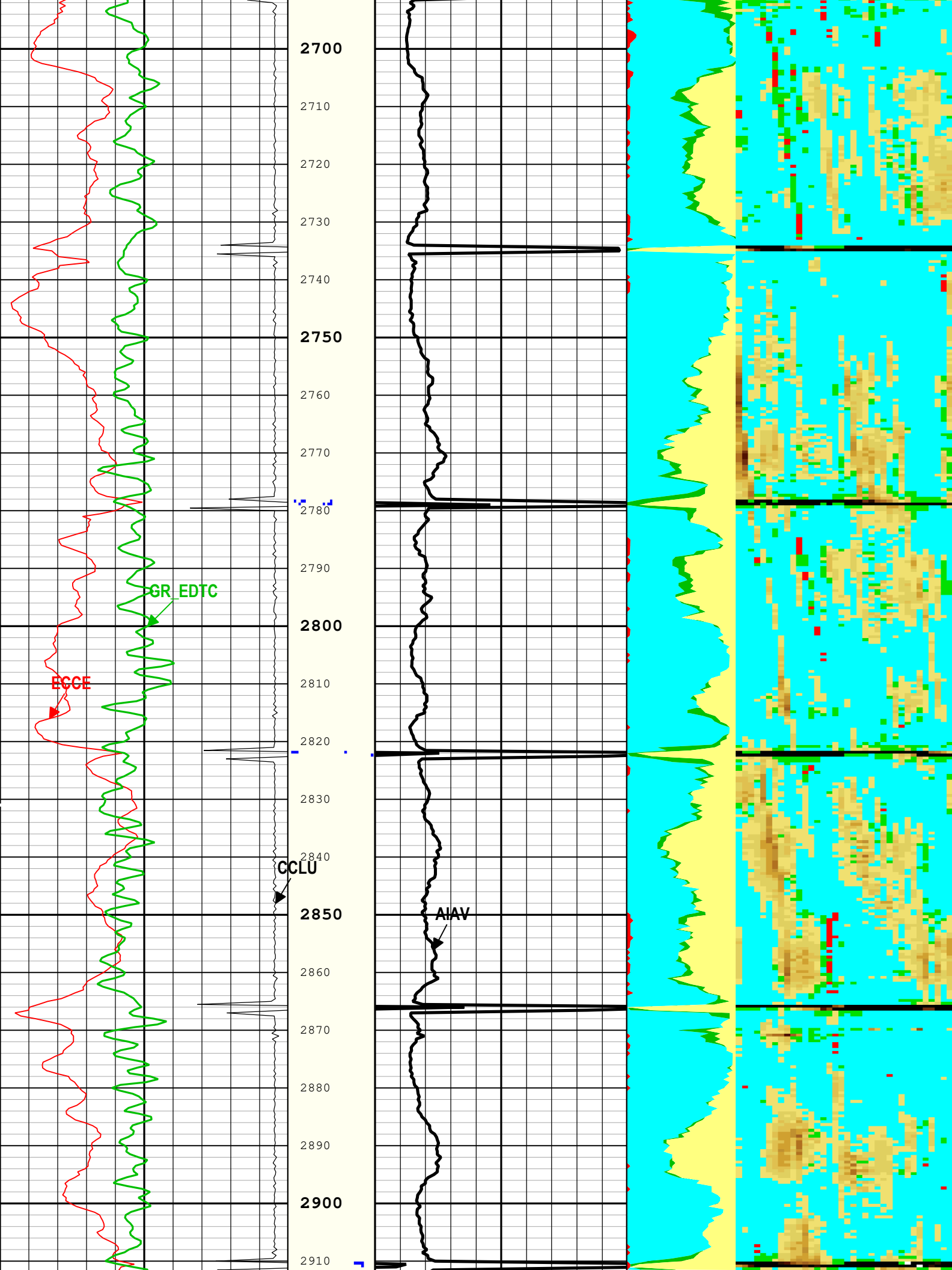


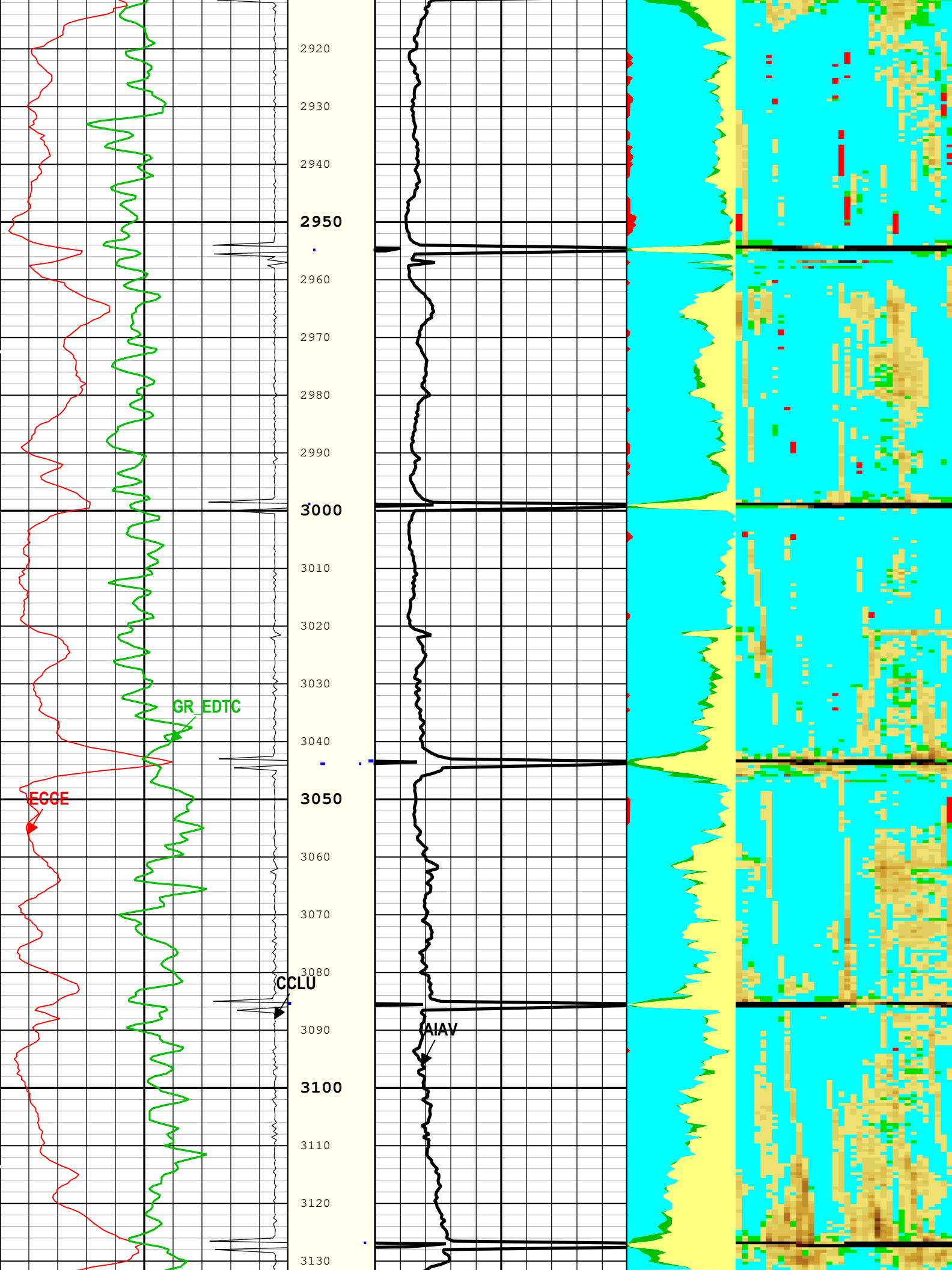


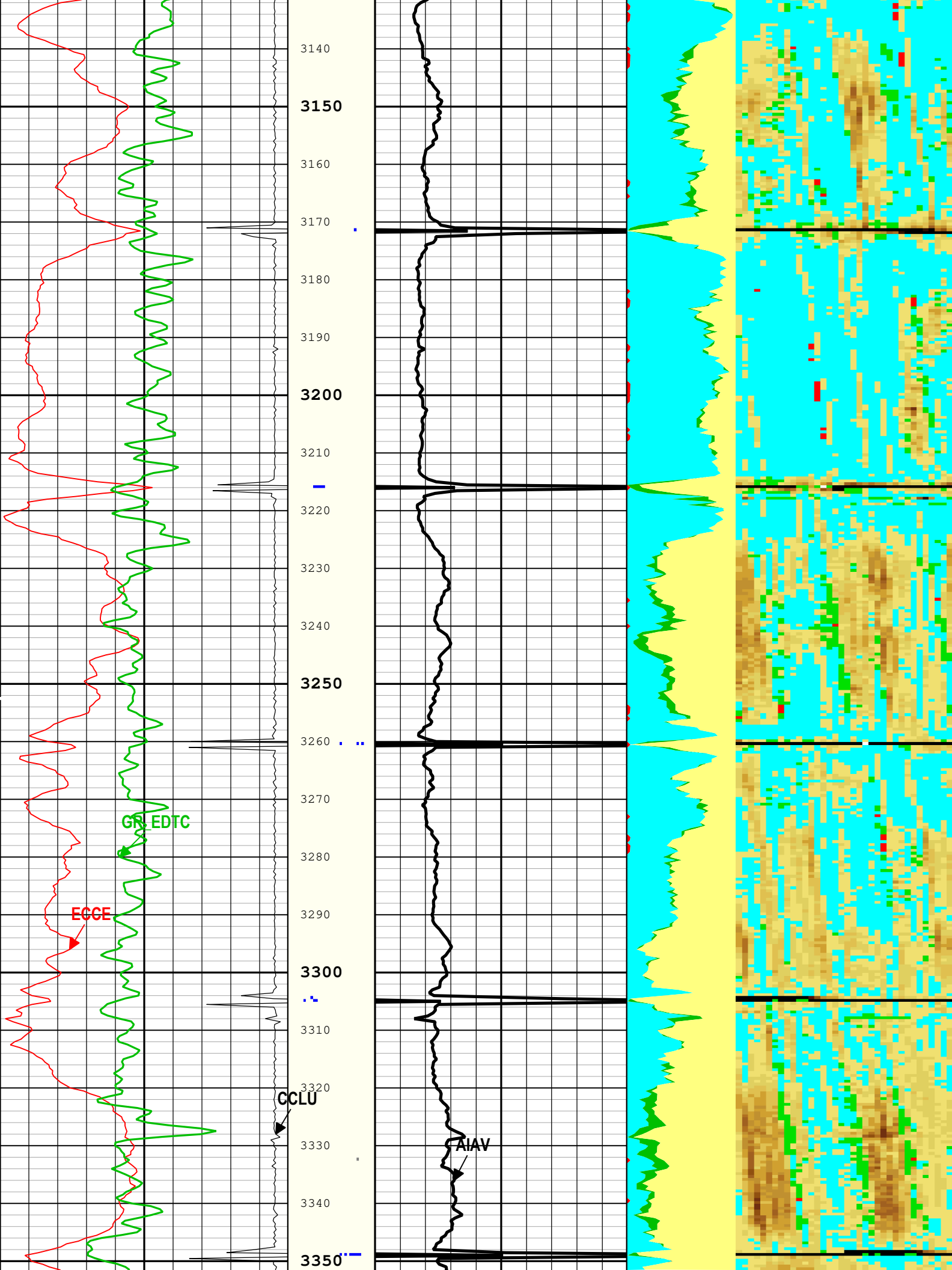


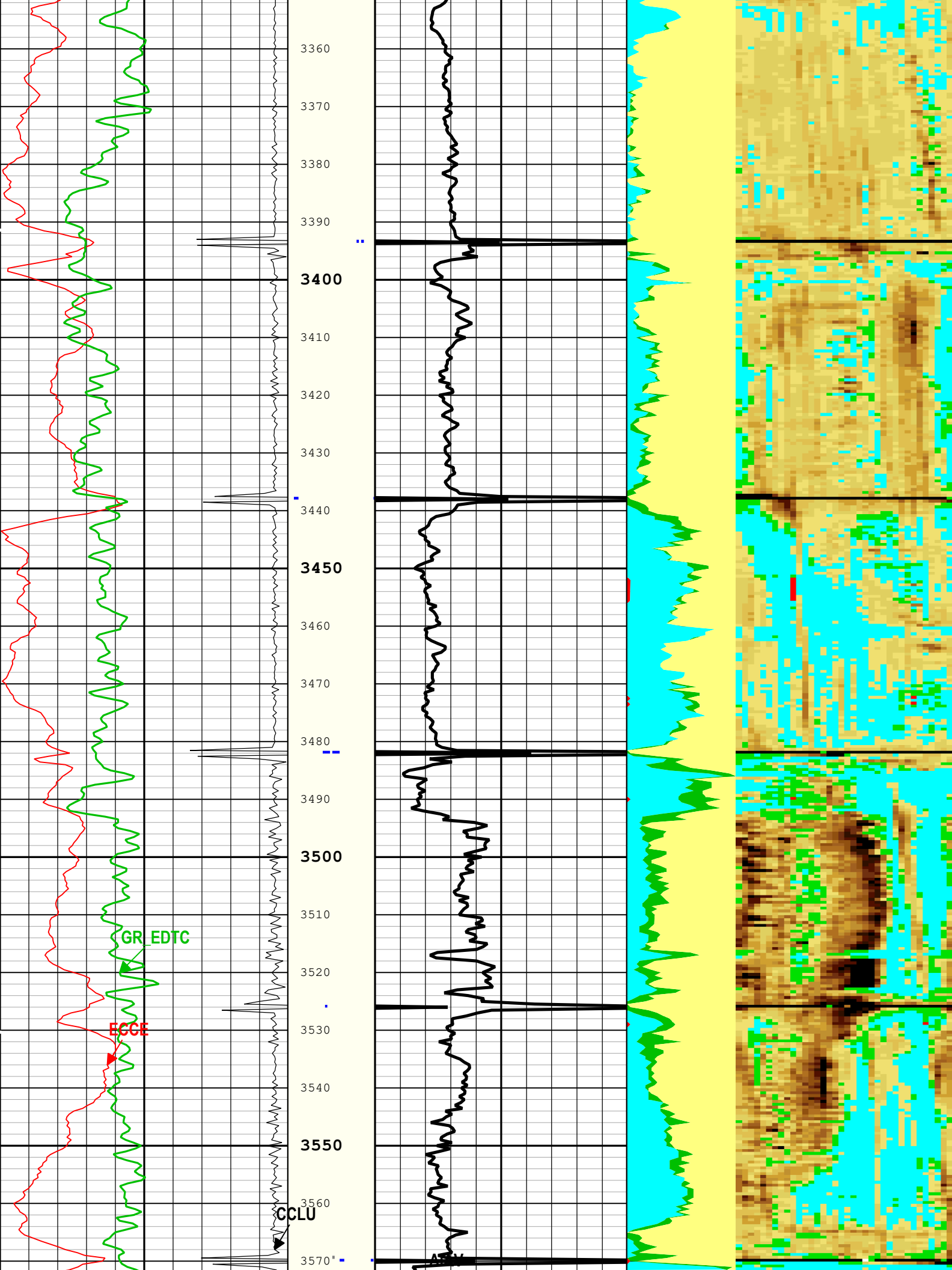


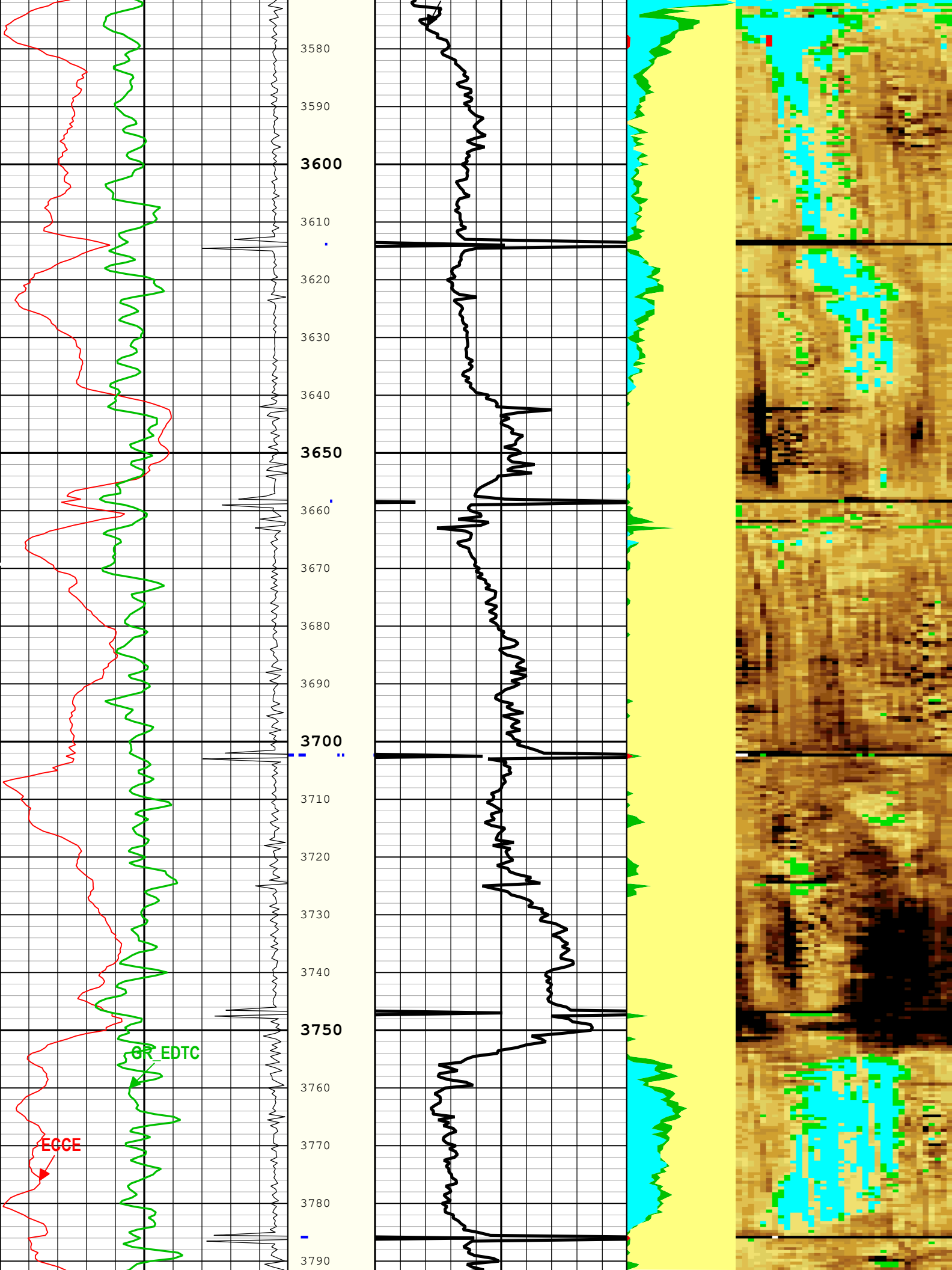


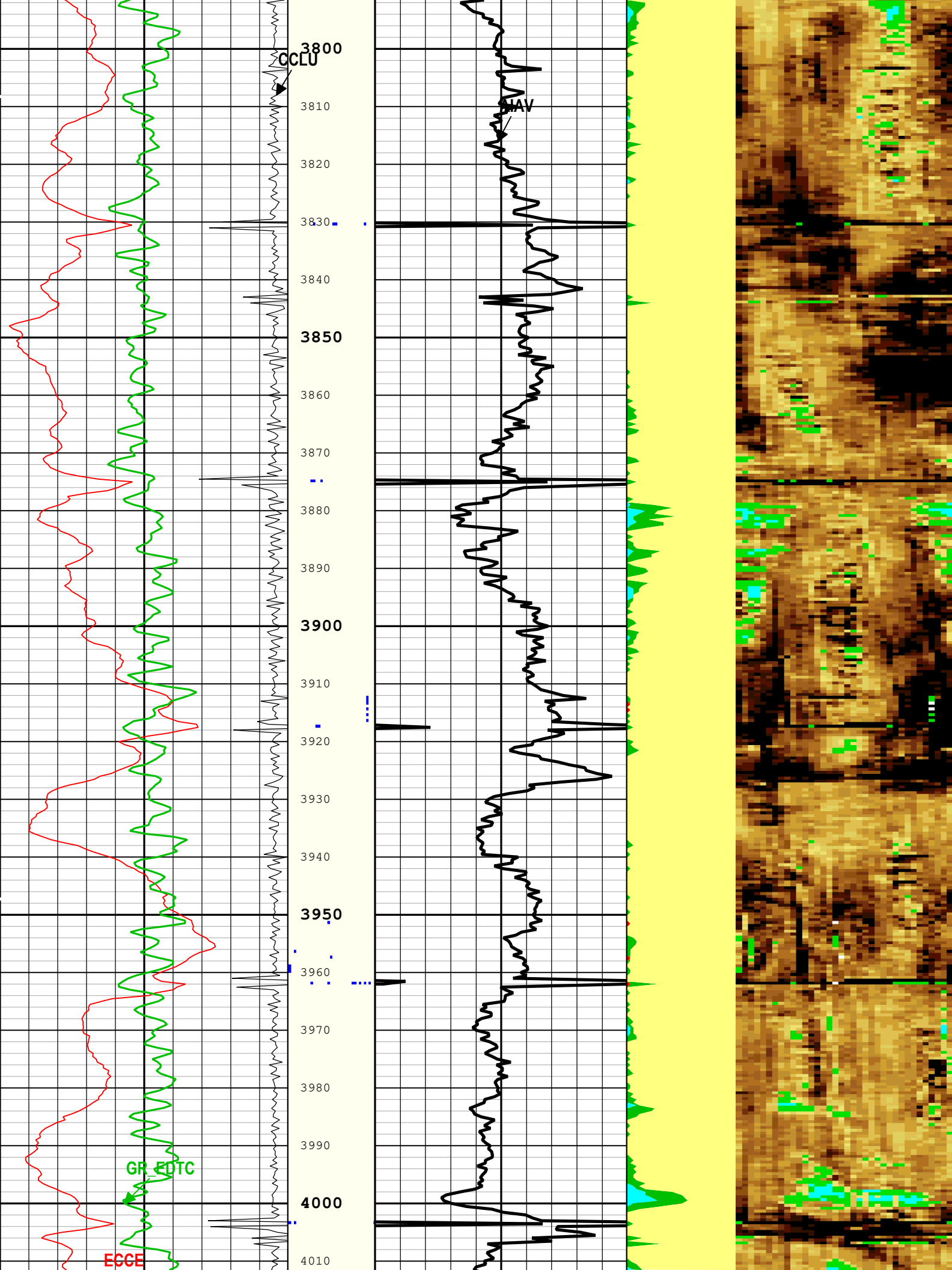


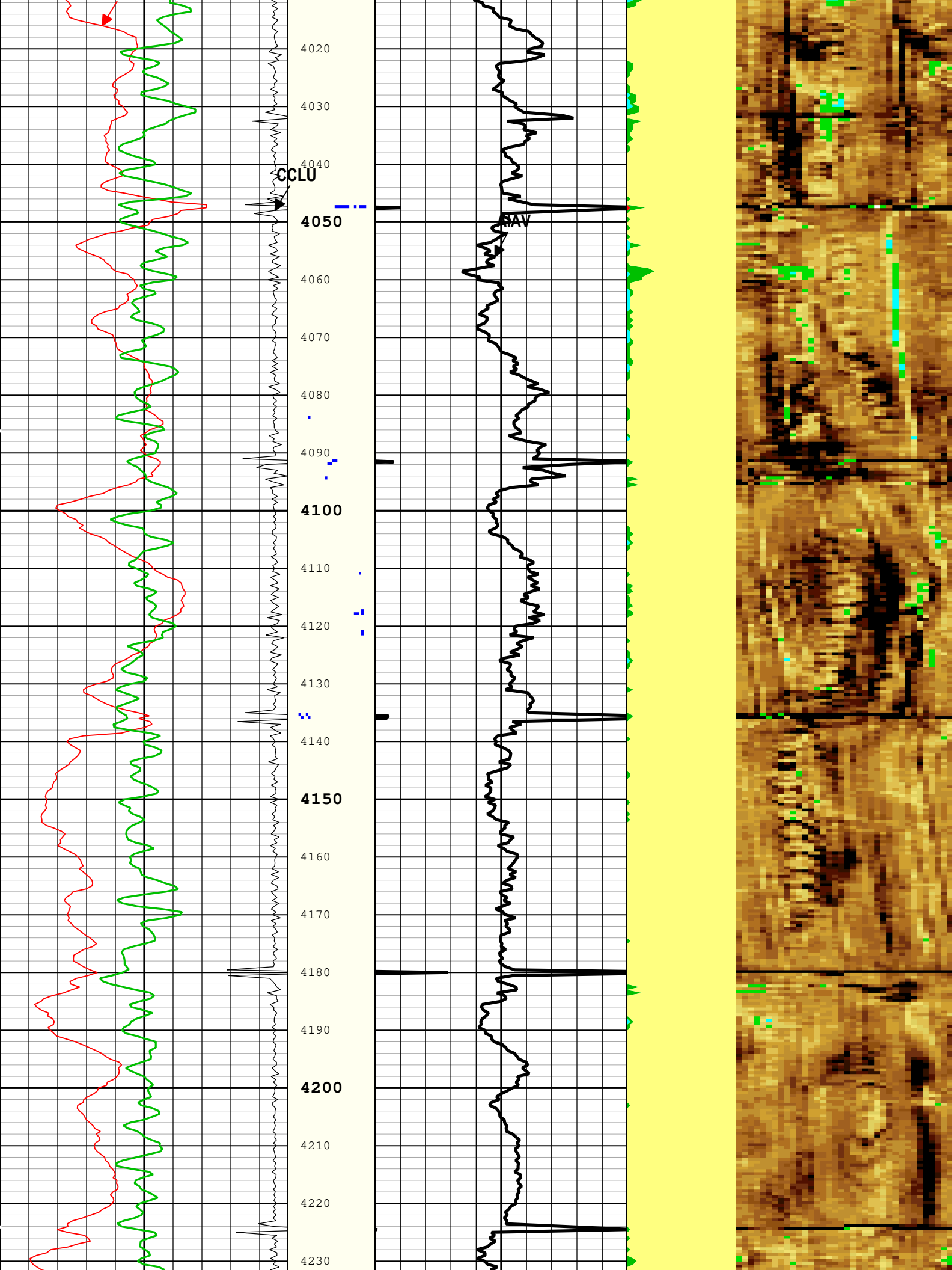


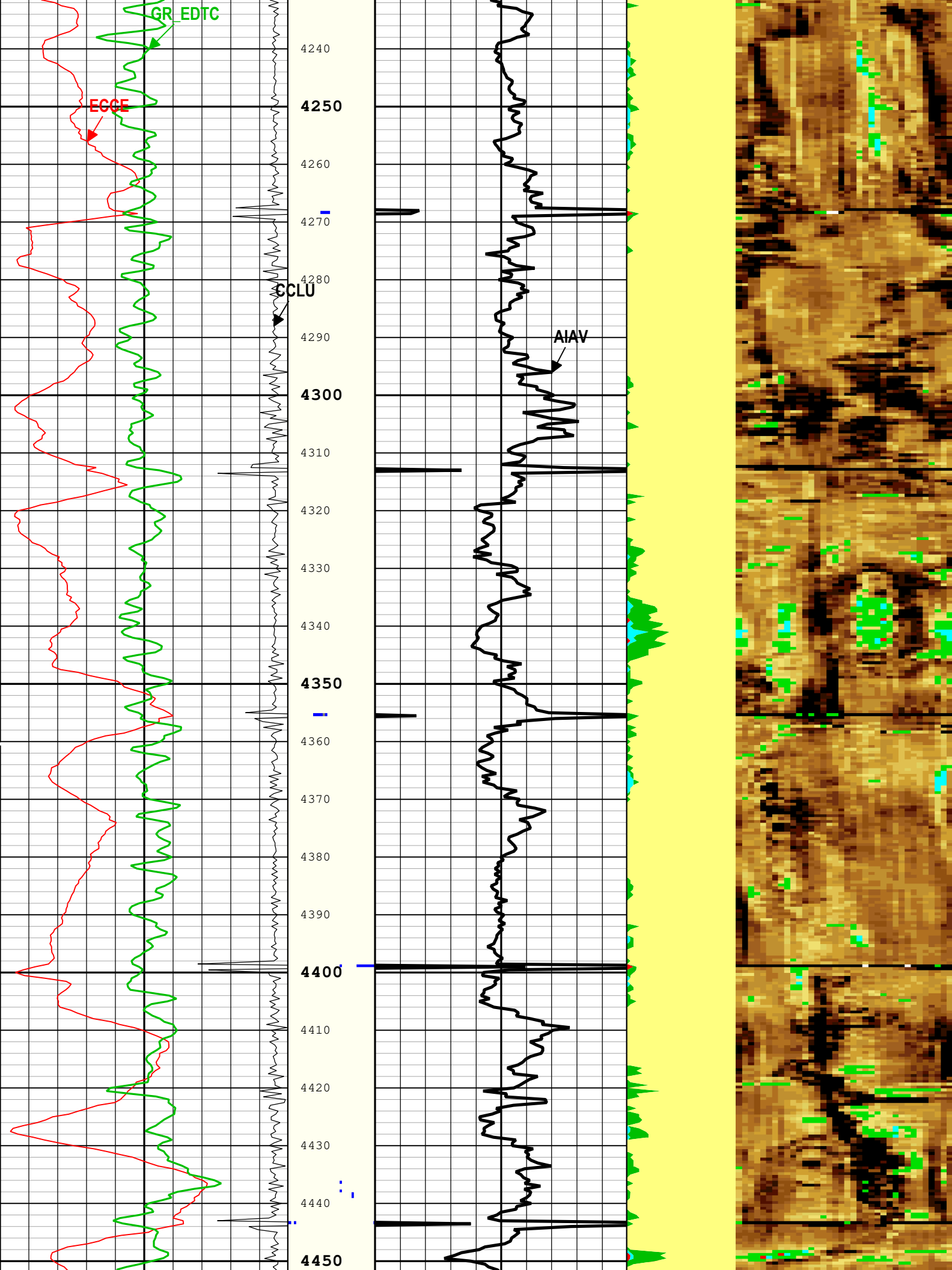


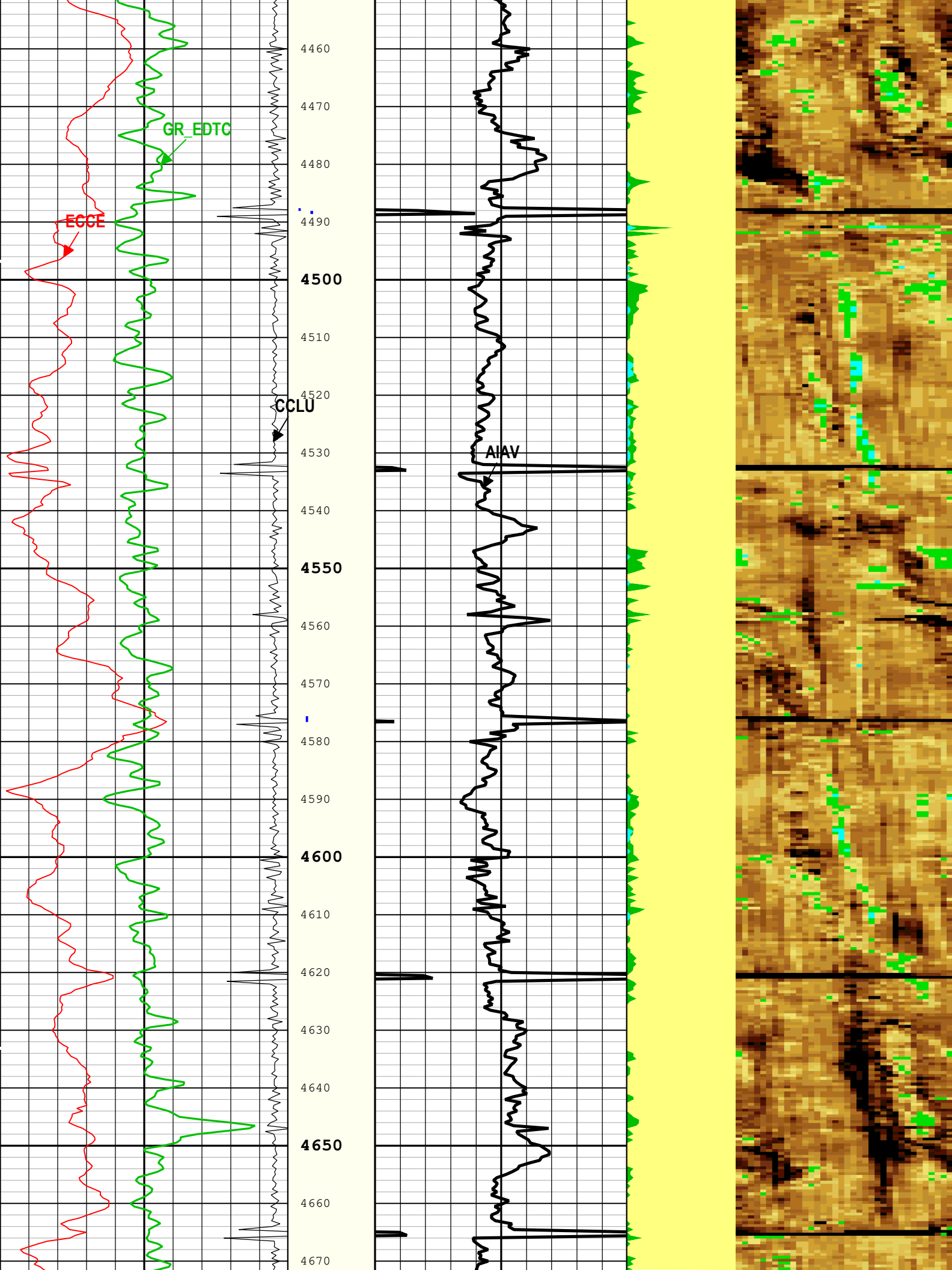


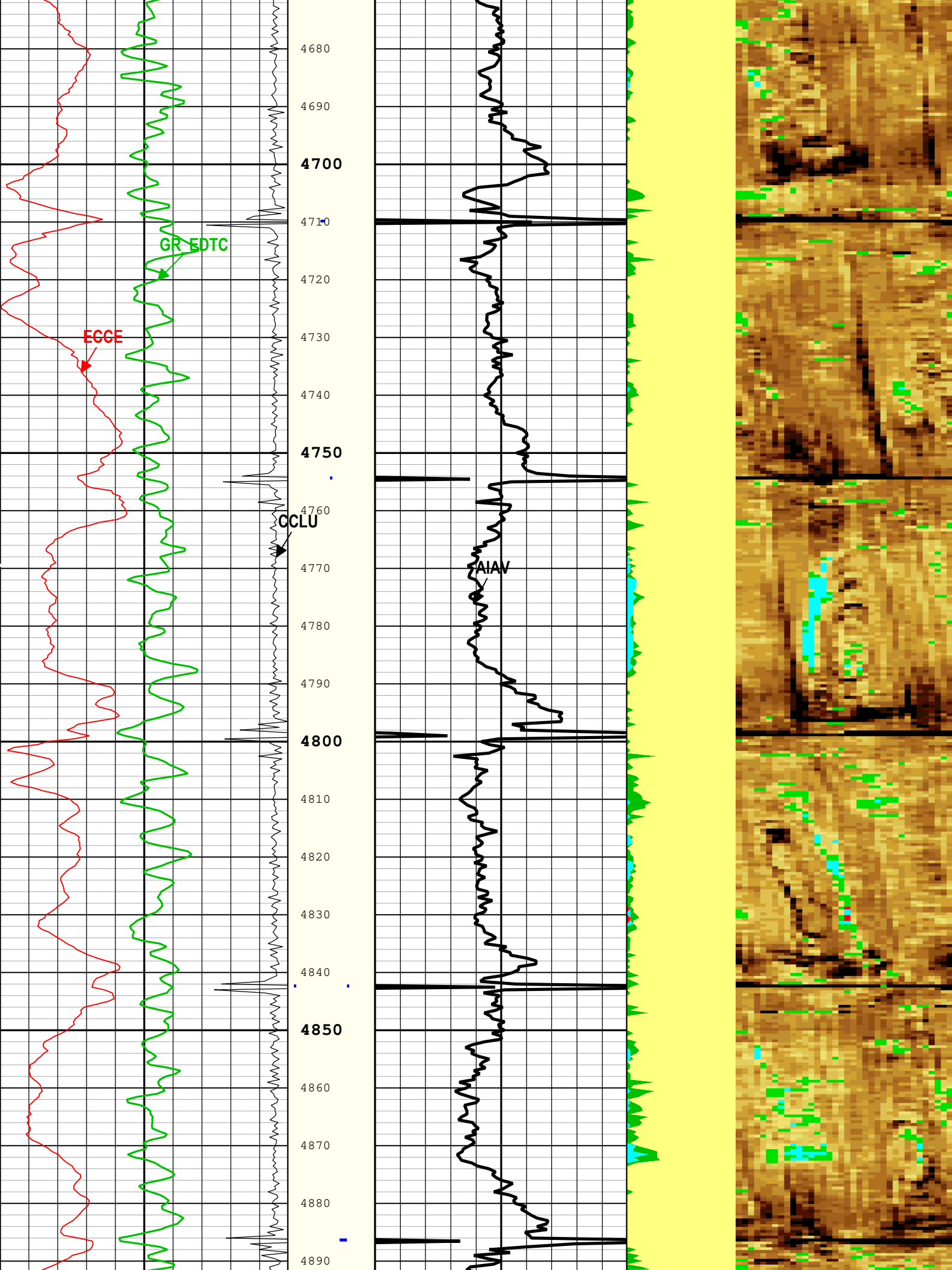


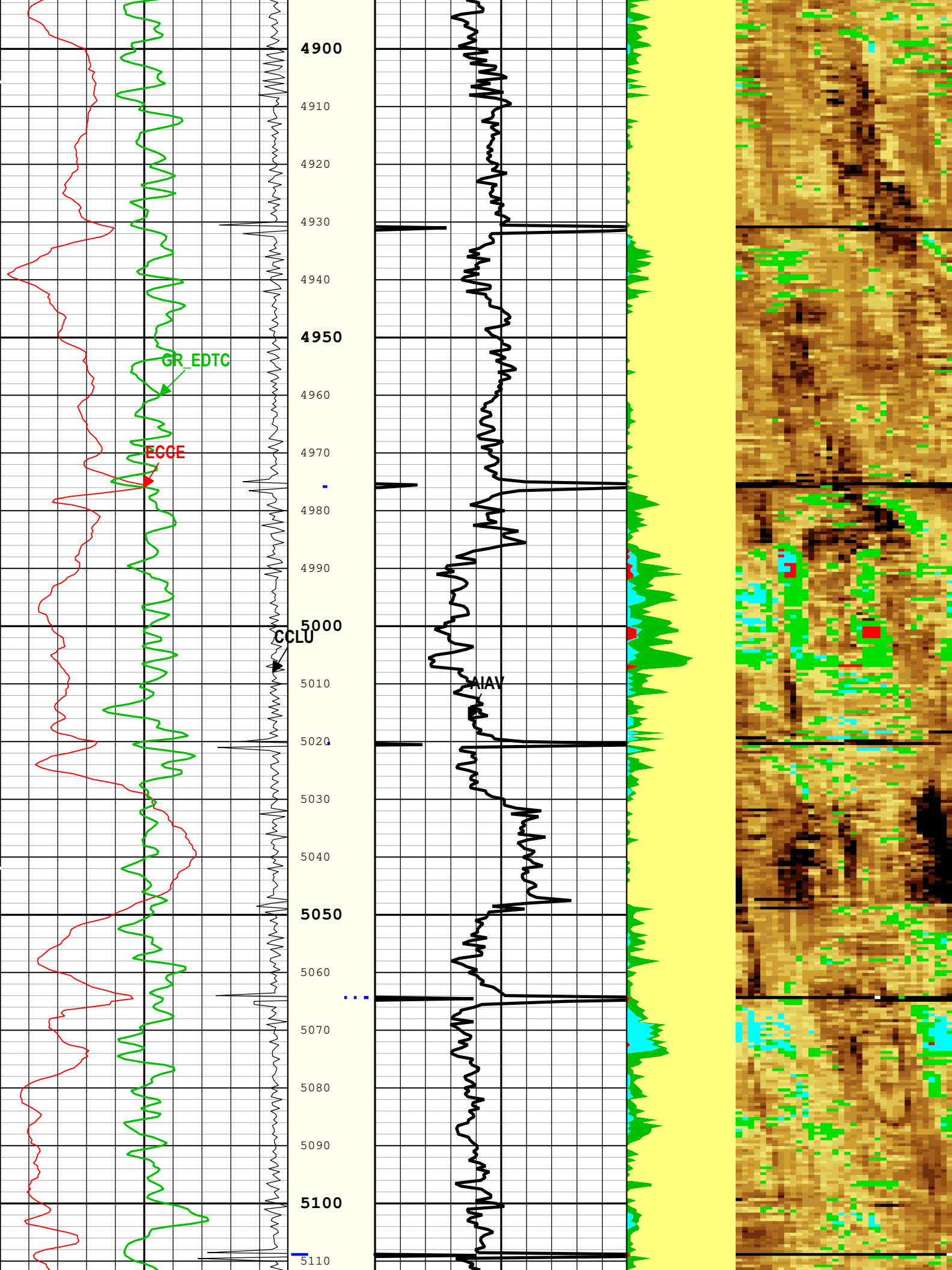


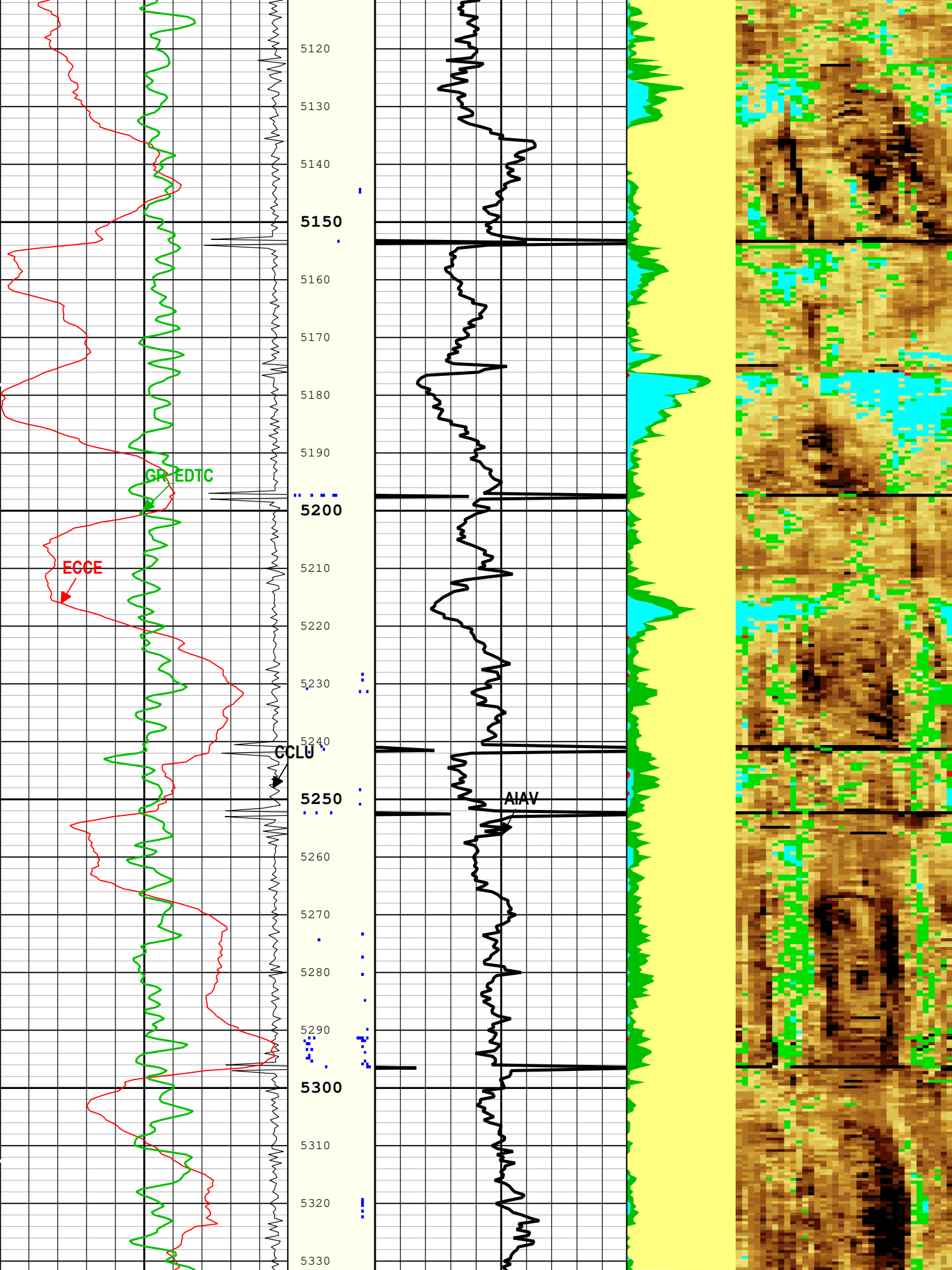


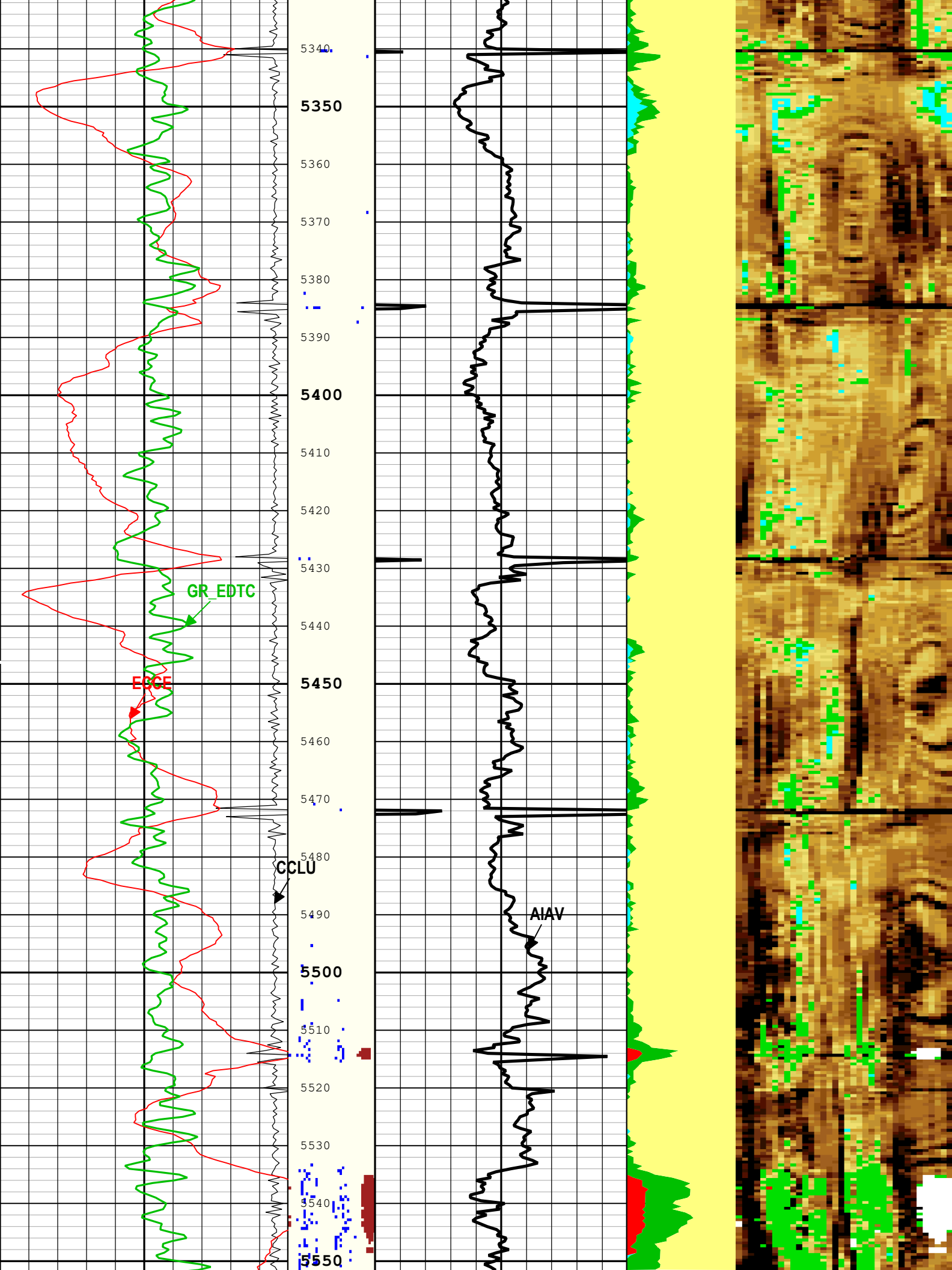


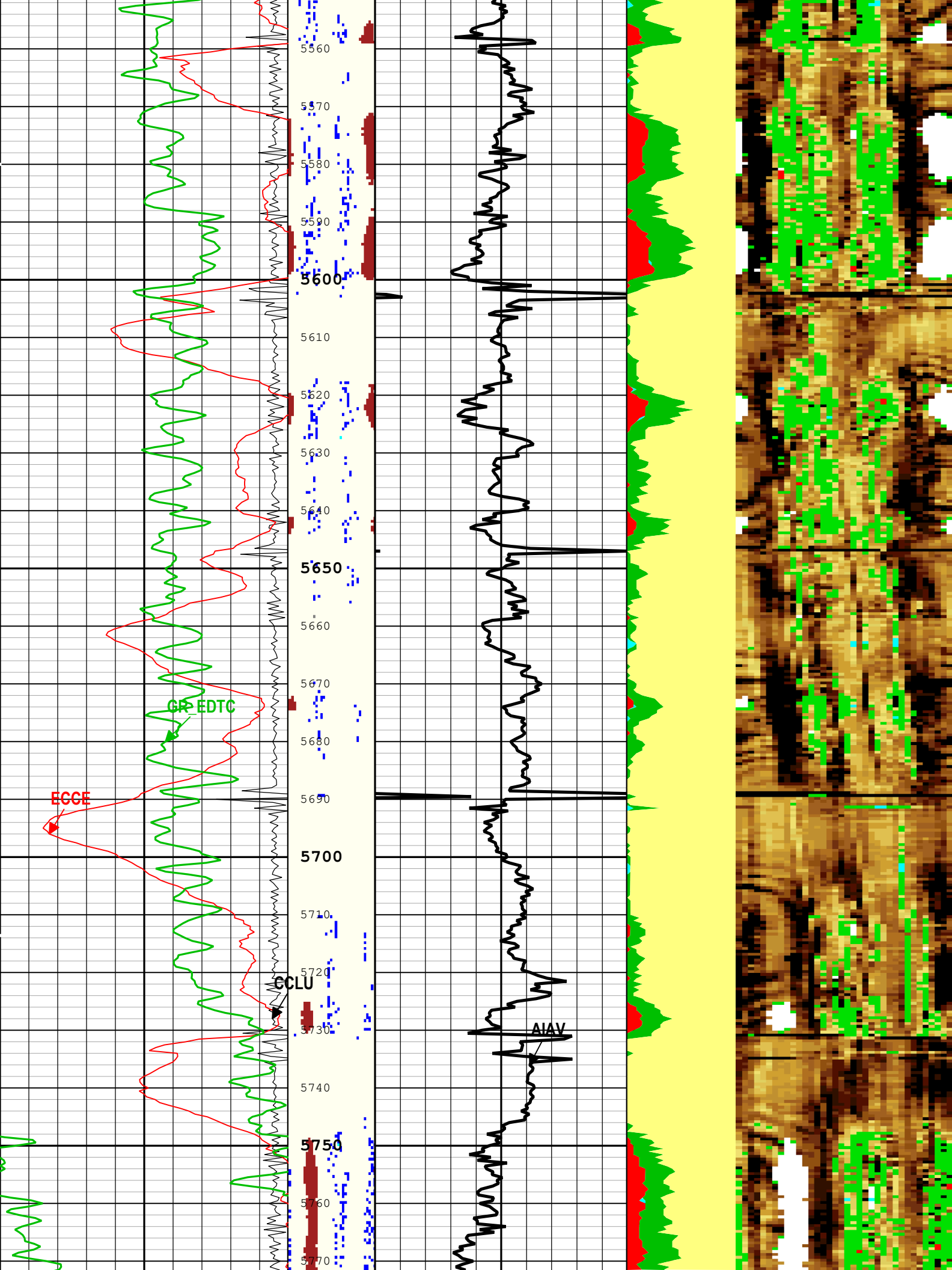


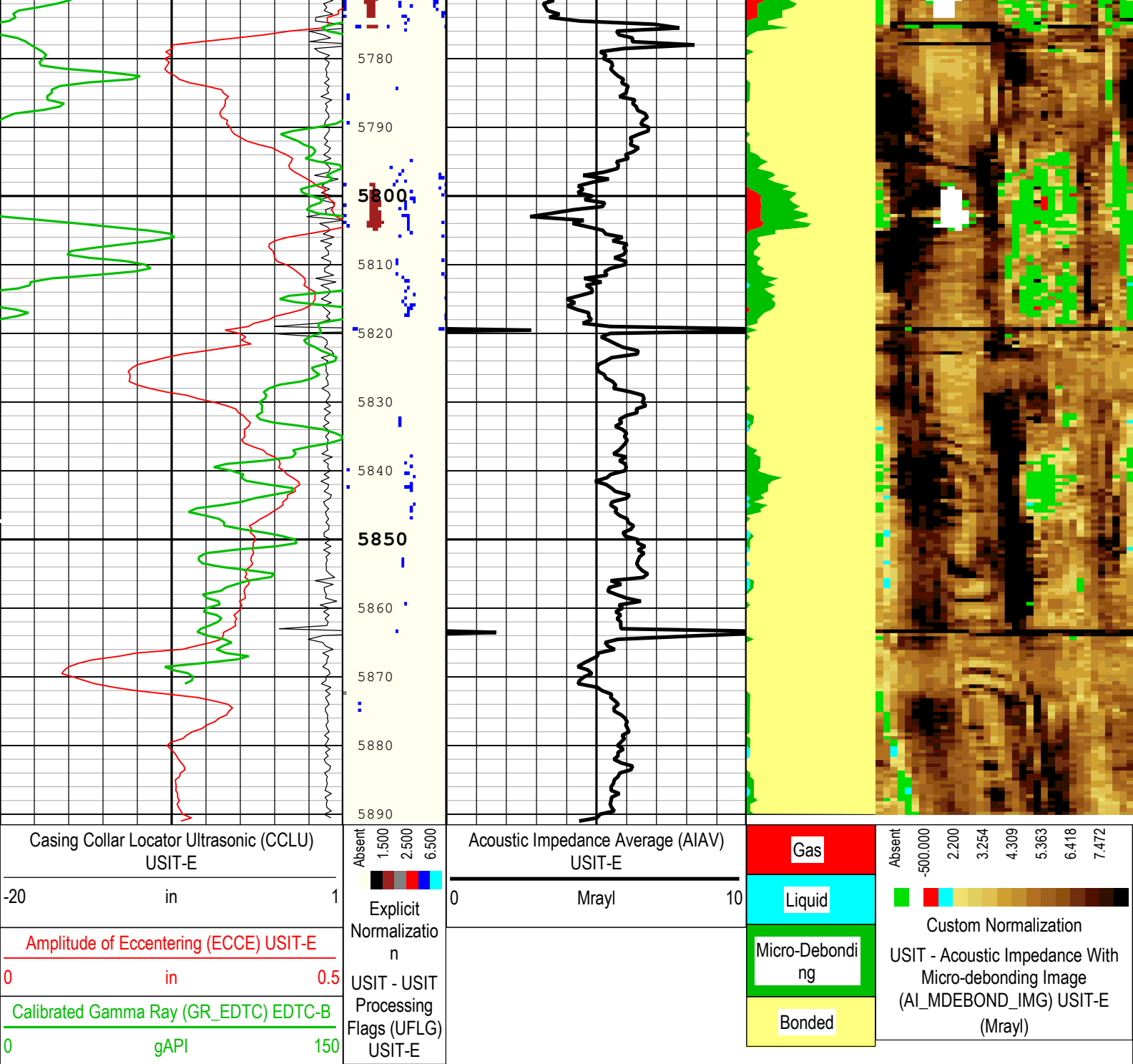












TIME_1900 - Time Marked every 60.00 (s)

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: 25-Jul-2019 17:54:43

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
CMTY(U-USIT_CENT)	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
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	1.14	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.6	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	26	81.5	110
BS	13.5	110	1929
BS	8.5	1929	5891.5

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	50	dB
EMXV	EMEX Voltage	USIT-E	65	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	33.83	25-Jul-2019 16:22:03	25-Jul-2019 16:26:54	5891.93	5324.78
WINB	28.9	25-Jul-2019 16:26:54	25-Jul-2019 17:08:08	5324.78	101.97
WINE	73.83	25-Jul-2019 16:22:03	25-Jul-2019 16:27:01	5891.93	5310.22
WINE	77.25	25-Jul-2019 16:27:01	25-Jul-2019 17:08:08	5310.22	101.97

All depth are at tool zero.

ONE

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2019.1	9.1.110979.3100

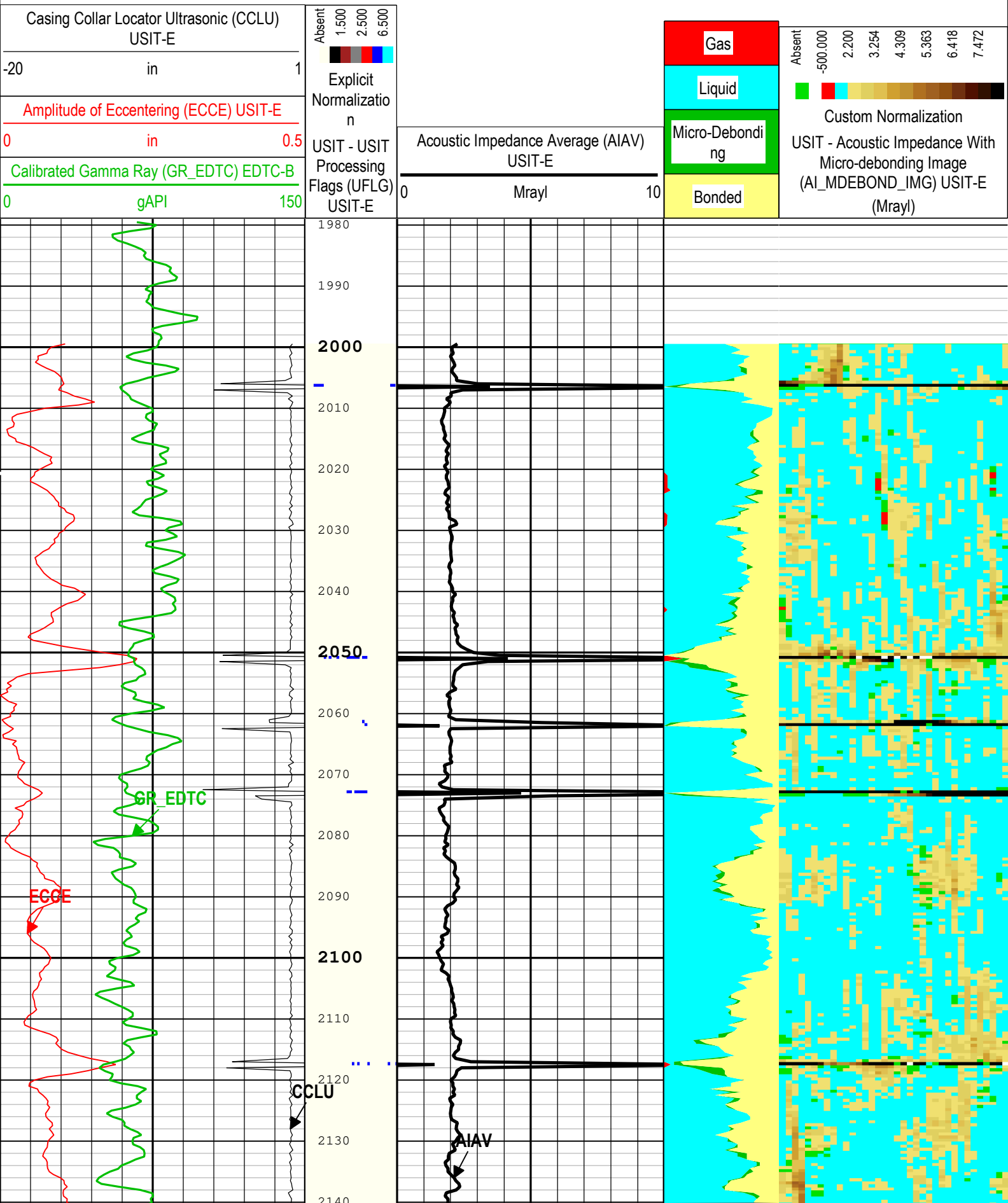
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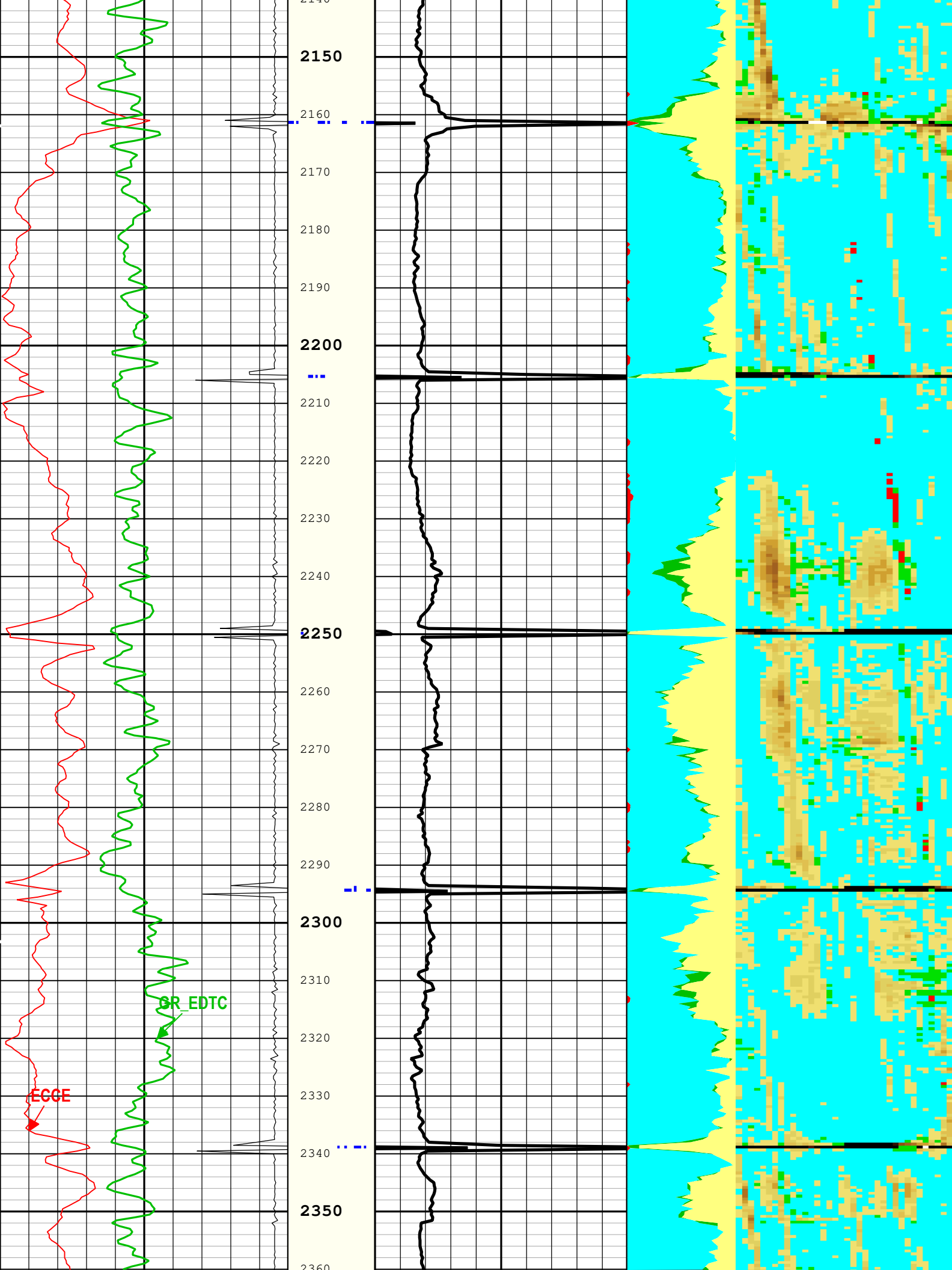
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Repeat[2]:Up	Up	1999.50 ft	2515.51 ft	25-Jul-2019 3:34:53 PM	25-Jul-2019 3:39:14 PM	ON	5.05 ft	Yes

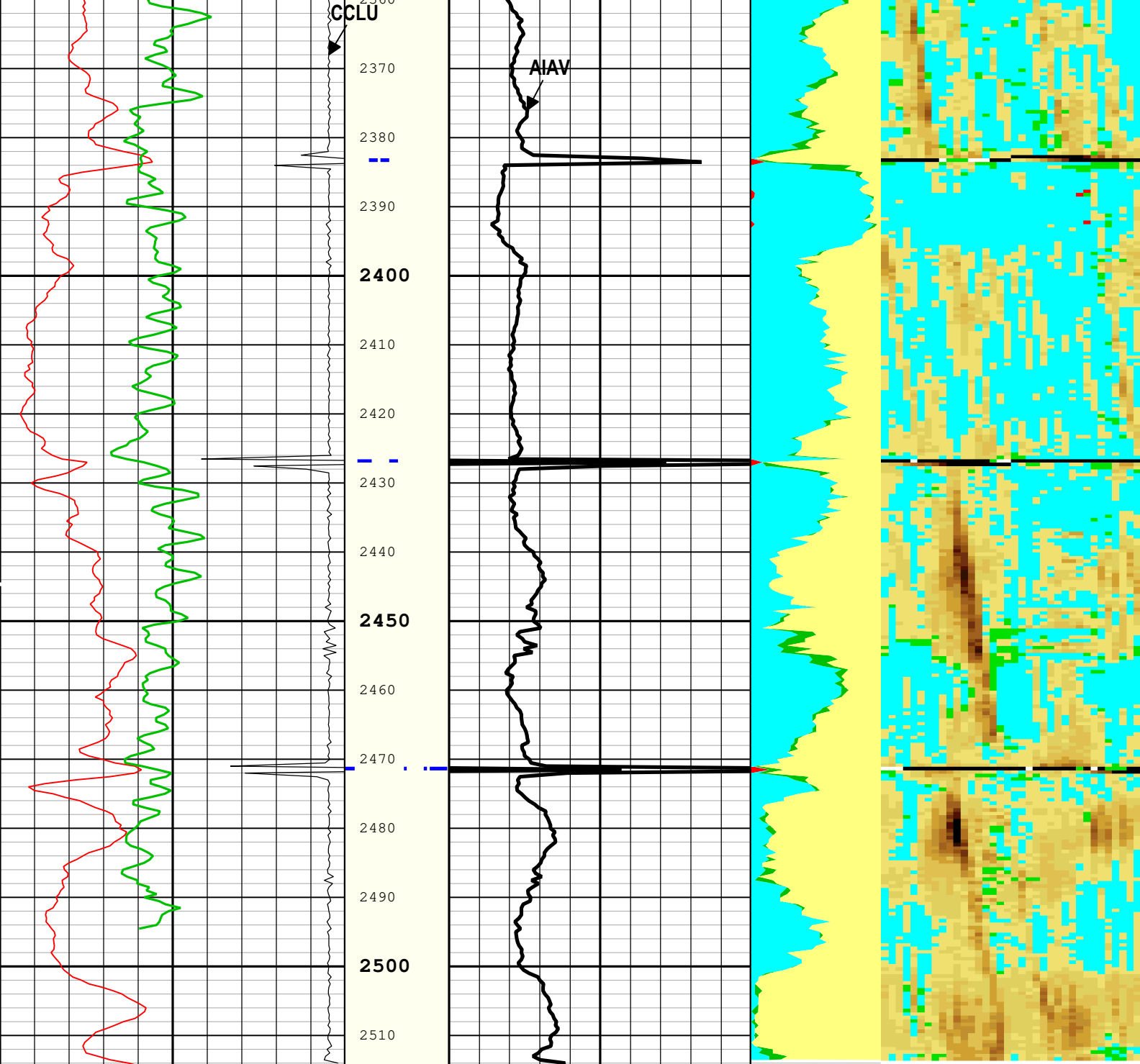
All depths are of measured true distance.

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: 25-Jul-2019 17:55:05

TIME_1900 - Time Marked every 60.00 (s)







Casing Collar Locator Ultrasonic (CCLU)
USIT-E

Amplitude of Eccentering (ECCE) USIT-E

Calibrated Gamma Ray (GR_EDTC) EDTC-B

USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV)
USIT-E

Gas

Liquid

Micro-Debonding

Bonded

Custom Normalization
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: 25-Jul-2019 17:55:05

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit

BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	8.5	in
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
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	1.14	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.6	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

ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	50	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 500 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
WINB	Window Begin Time	USIT-E	33.83	us
WINE	Window End Time	USIT-E	73.83	us

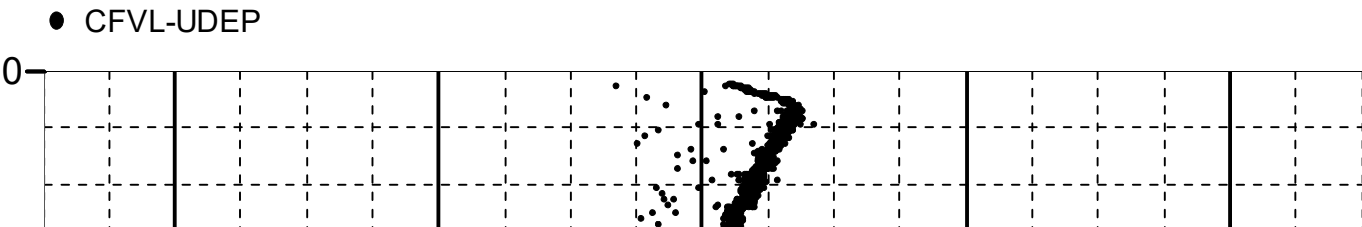
Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	40	25-Jul-2019 15:34:53	25-Jul-2019 15:38:54	2515.51	2033.46
EMXV	60	25-Jul-2019 15:38:54	25-Jul-2019 15:39:14	2033.46	1999.5
All depth are at tool zero.					

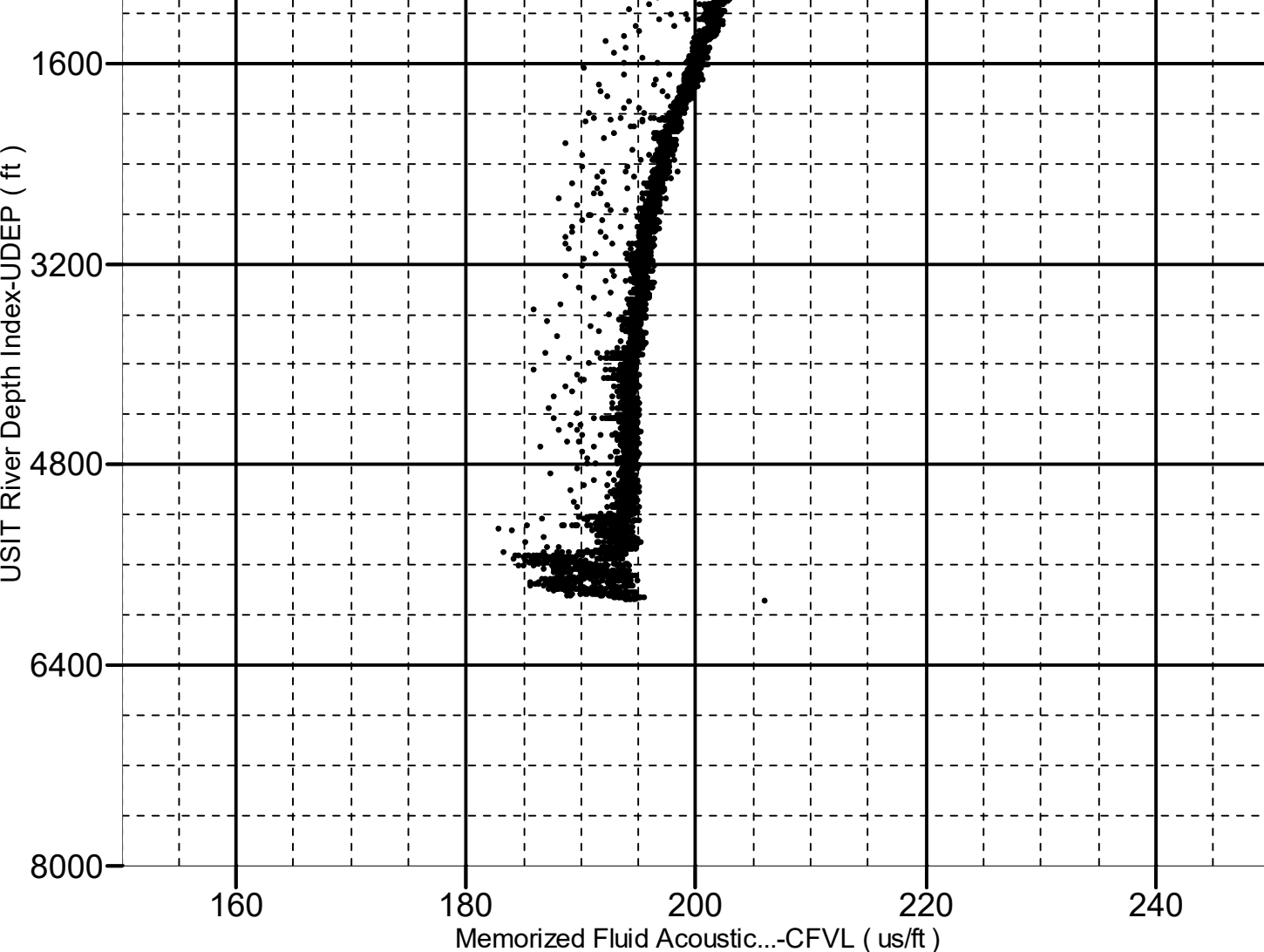
XYZ	Company:Noble Energy Inc Well:Stars Federal LD17-770 ONE: Main[4]:Up:S003
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Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 5891.50 to 102.00 ft

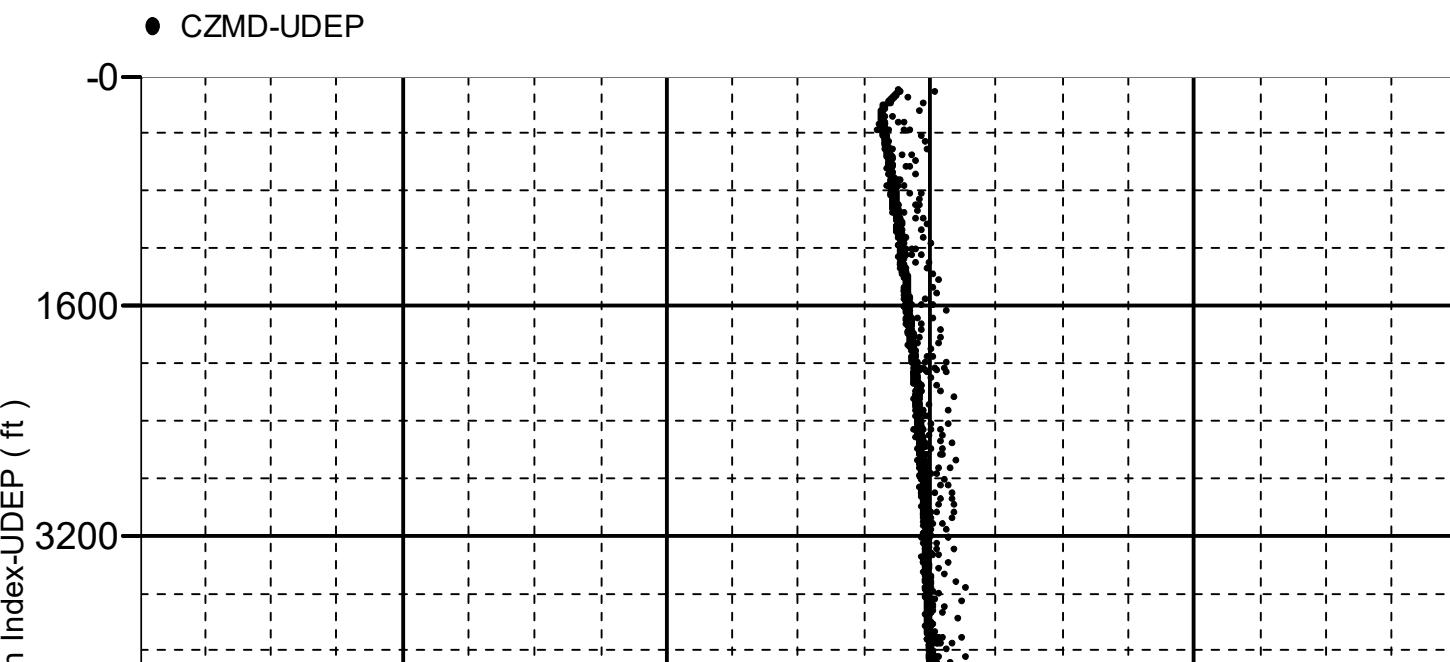


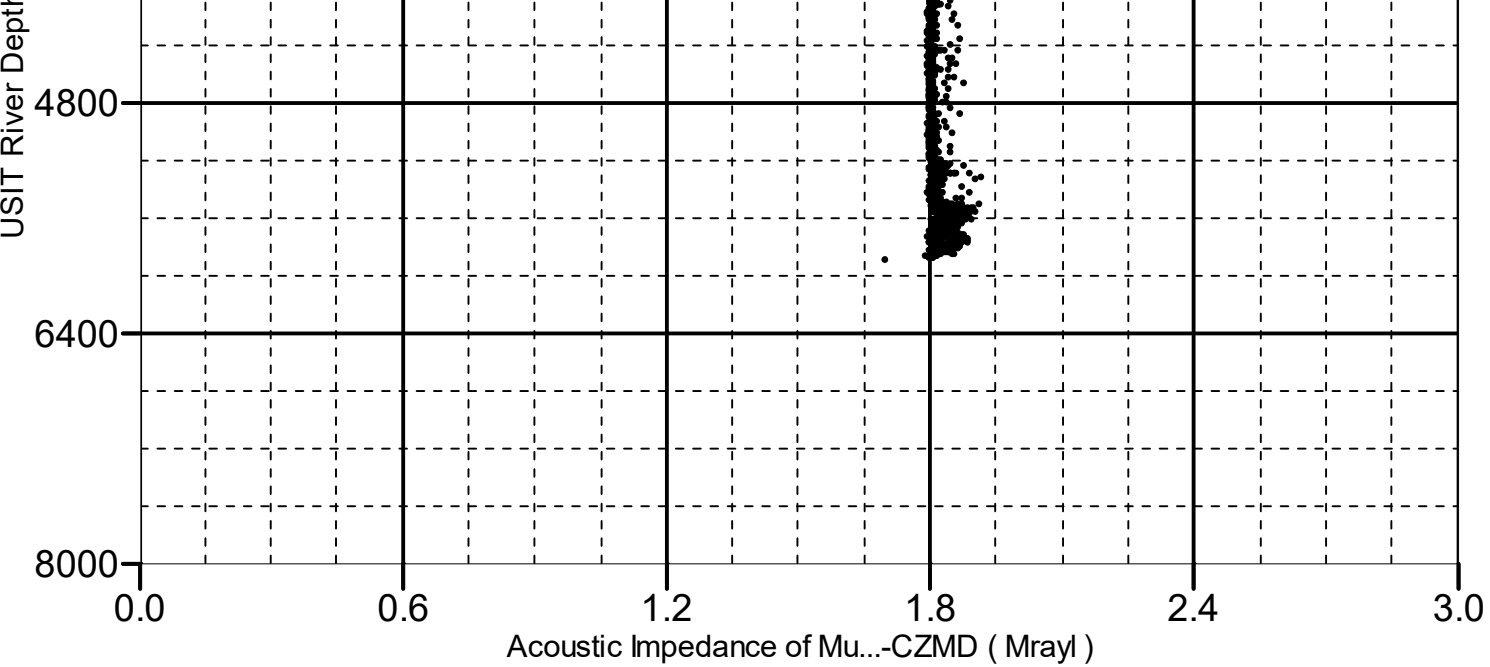


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 5891.50 to 102.00 ft





Company:	Noble Energy Inc	Schlumberger
Well:	Stars Federal LD17-770	
Field:	DJ Horizontal Niobrara	
County:	Weld	
State:	Colorado	

UltraSonic Summary Print