

Company: NOBLE ENERGY INC

Well: WELLS RANCH STATE AA36-673

Field: WATTENBERG

County: WELD State: COLORADO

UltraSonic Summary Print

County:	WELD		
Field:	WATTENBERG		
Location:	SHL: NWNW SEC 32 TWN 6N RNG 62W		
Well:	WELLS RANCH STATE AA36-673		
Company:	NOBLE ENERGY INC		
	Location:		
	SHL: NWNW SEC 32 TWN 6N RNG 62W		Elev.:
	BHL 1150' FNL & 30' FWL		K.B. 4791.00 ft
			G.L. 4761.00 ft
			D.F.
Permanent Datum:	Ground Level	Elev.:	4761.00 f
	Kelly Bushing		
Log Measured From:		30.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		
API Serial No.	Section:	Township:	Range:
05-123-48159	32	6N	62W

Run Number	ONE	
Depth Driller	16982.00 ft	
Schlumberger Depth	16982.00 ft	
Bottom Log Interval	6342.00 ft	
Top Log Interval	35.00 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	1959.00 ft	
To	16982.00 ft	
Casing/Tubing Size	5.5 in	
Weight	17 lbm/ft	
Grade	N/A	
From	0.00 ft	
To	16961.00 ft	
Max Recorded Temperatures	215 degF	
Logger on Bottom	28-May-2019	15:02:00
Unit Number	9108	FORT MORGAN
Recorded By	Morris Moore	
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.

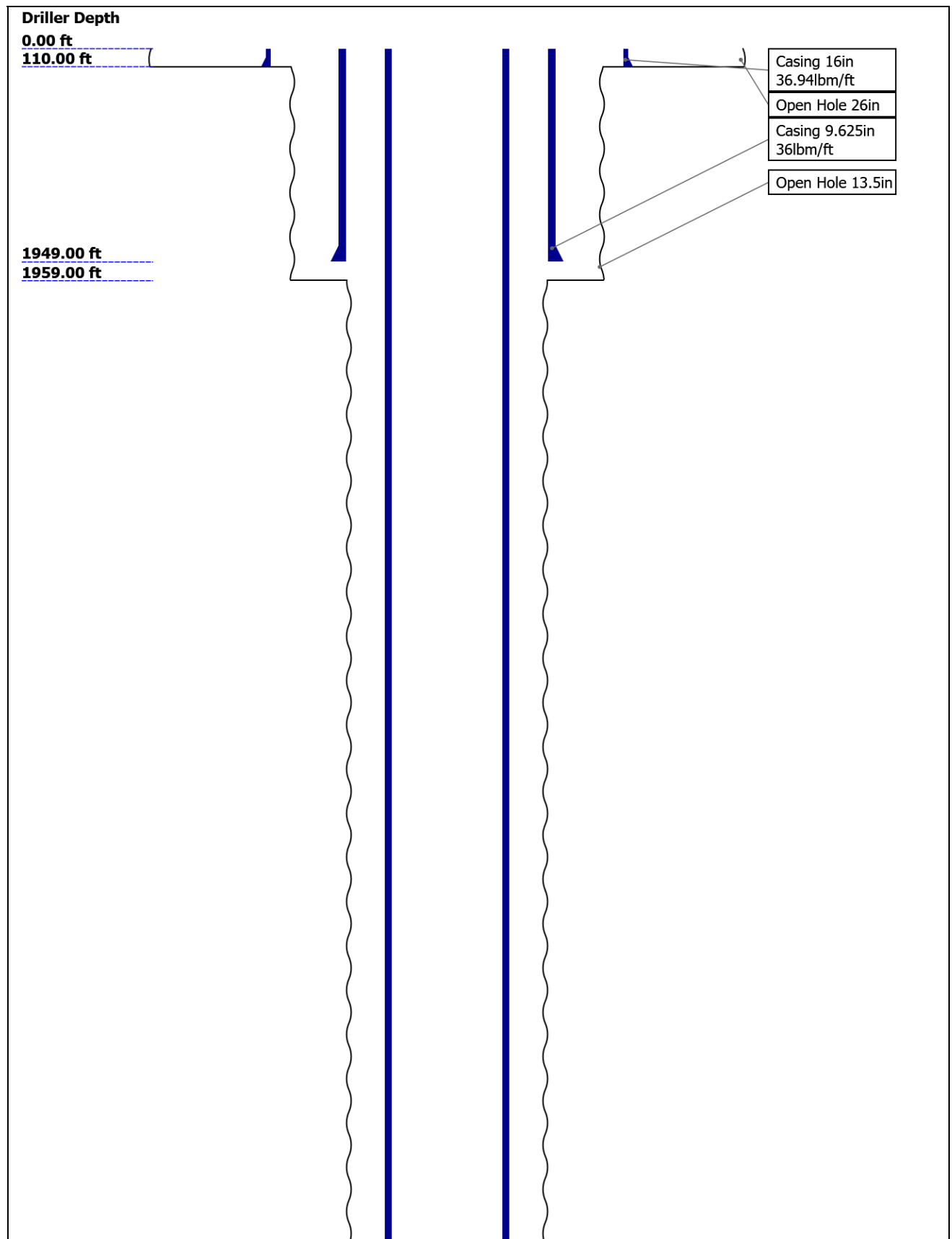
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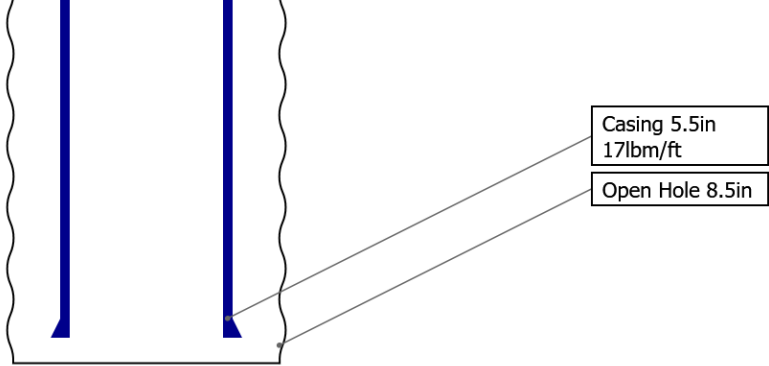
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## Well Sketch




16961.00 ft  
16982.00 ft



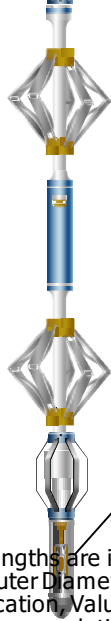
Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.5			
Top Driller ( ft )	0	110	1959			
Top Logger ( ft )	0	110	1959			
Bottom Driller ( ft )	110	1959	16982			
Bottom Logger ( ft )	110	1959	16982			
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 )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	110	1949	16961			
Bottom Logger ( ft )	110	1949	16961			

Remarks and Equipment Summary

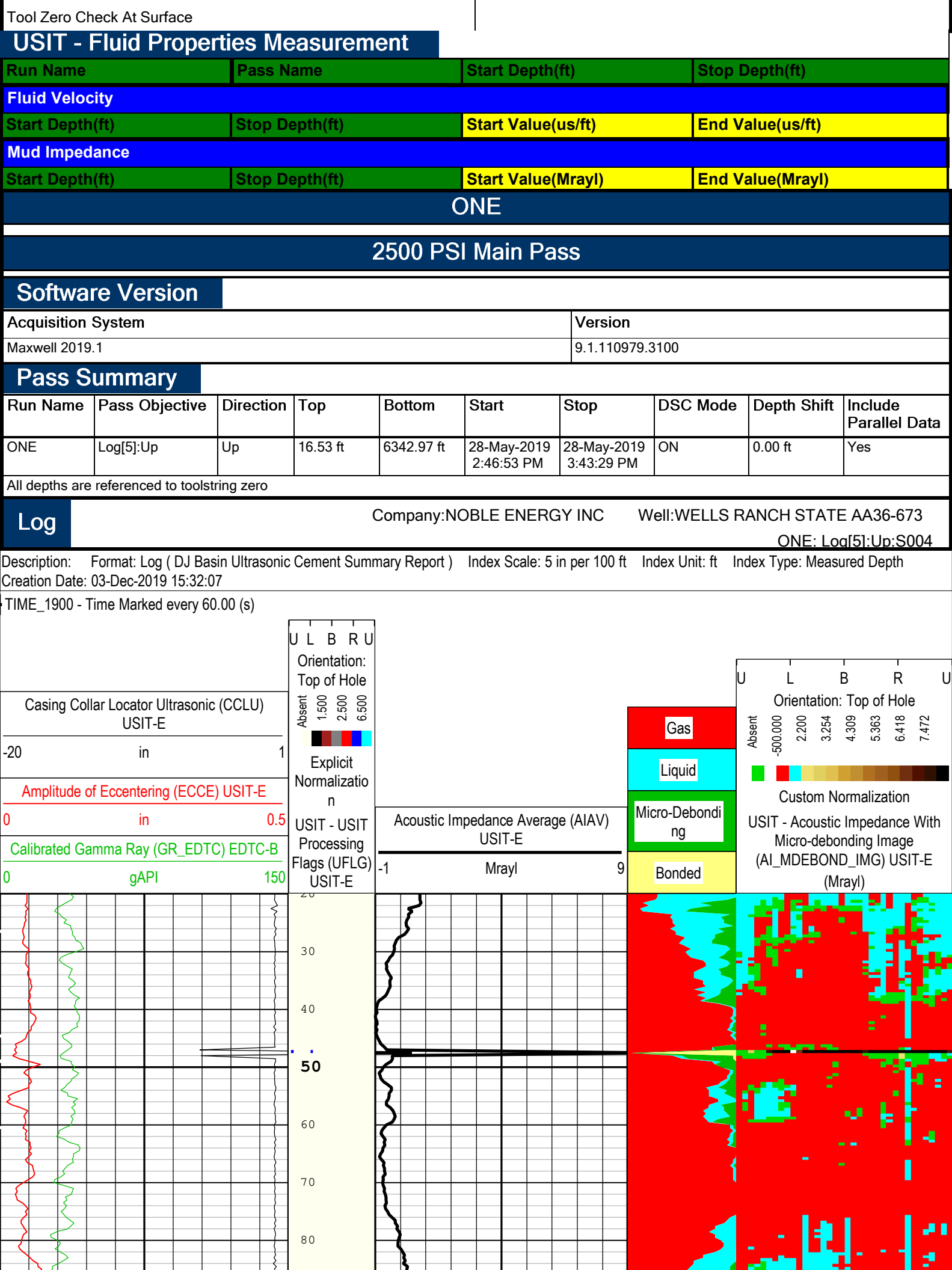
ONE: Toolstring			ONE: Remarks		
<div><div><div>Equip name</div><div>Length</div></div><div>LEH-Q 29.44</div><div>T</div><div>LEH-QT</div><div>EDTC- 25.96</div><div>B</div><div>EDTH-B</div><div>EDTG-A</div><div>EDTC-B</div><div>CTEM 22.46</div><div>ACCZ 0.00</div><div>HV 0.00</div><div>Gamm 20.59</div><div>a Ra</div><div>y</div><div>TelSt 19.46</div><div>atus</div><div>AH-10 19.46</div><div>7[2]</div><div>AH-10 17.46</div><div>7[1]</div><div>USIT-E 15.46</div><div>ECH-MF</div><div>A</div><div>USAC-A</div><div>USIS-A</div><div>USSC-B</div></div> <div></div>	Thank you for selecting Schlumberger Wireline.				
	Logging Objective: Casing and Cement evaluation				
	Toolstring ran as per toolsketch				
	Main Pass logged under 2500 psi				
	Repeat Pass logged under 0 psi.				
	Your crew: Robert Stelter, JuiceFlorress, & Chester Tanner				

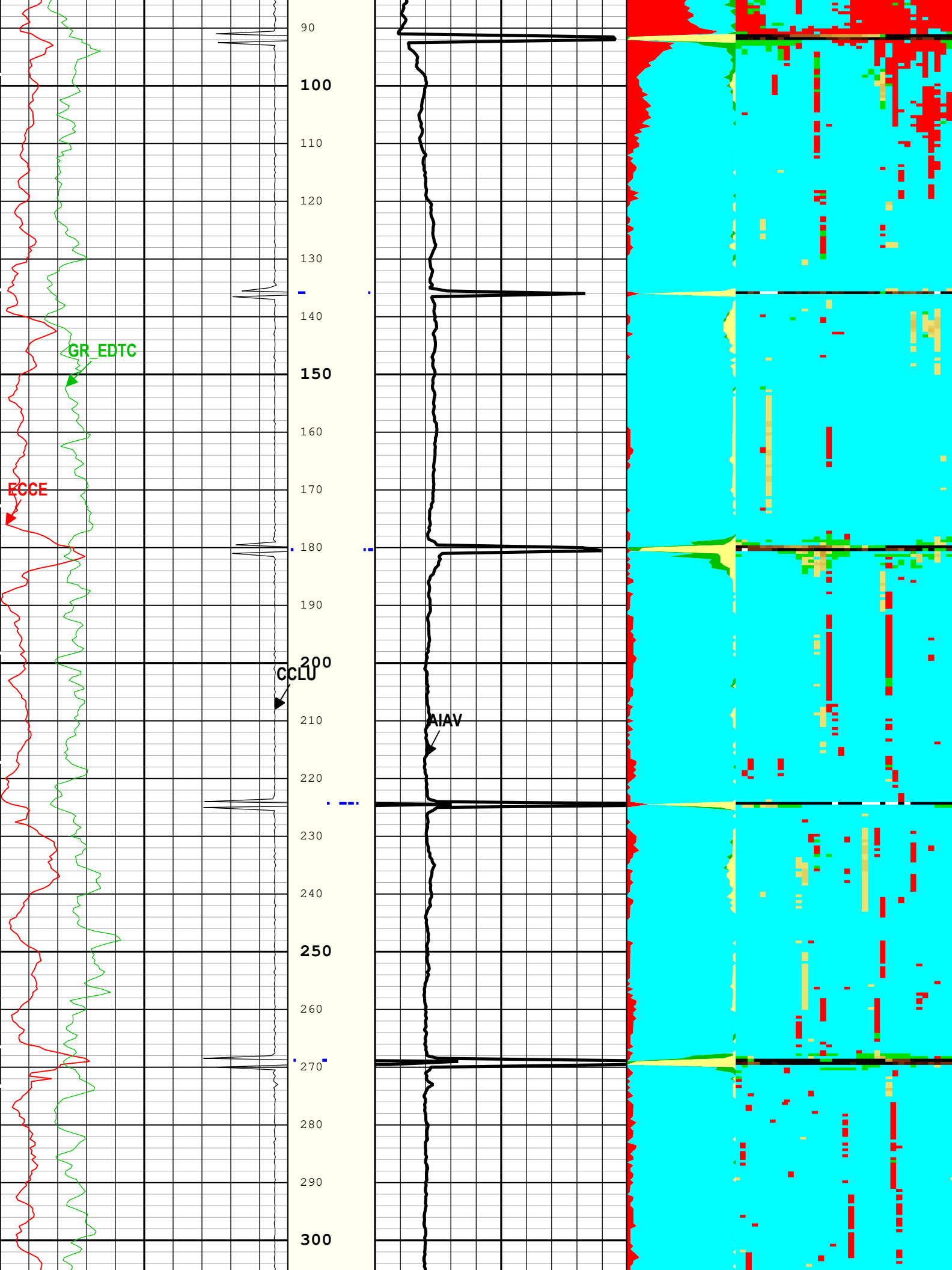
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USI-SE  
NSOR  
USI-TX

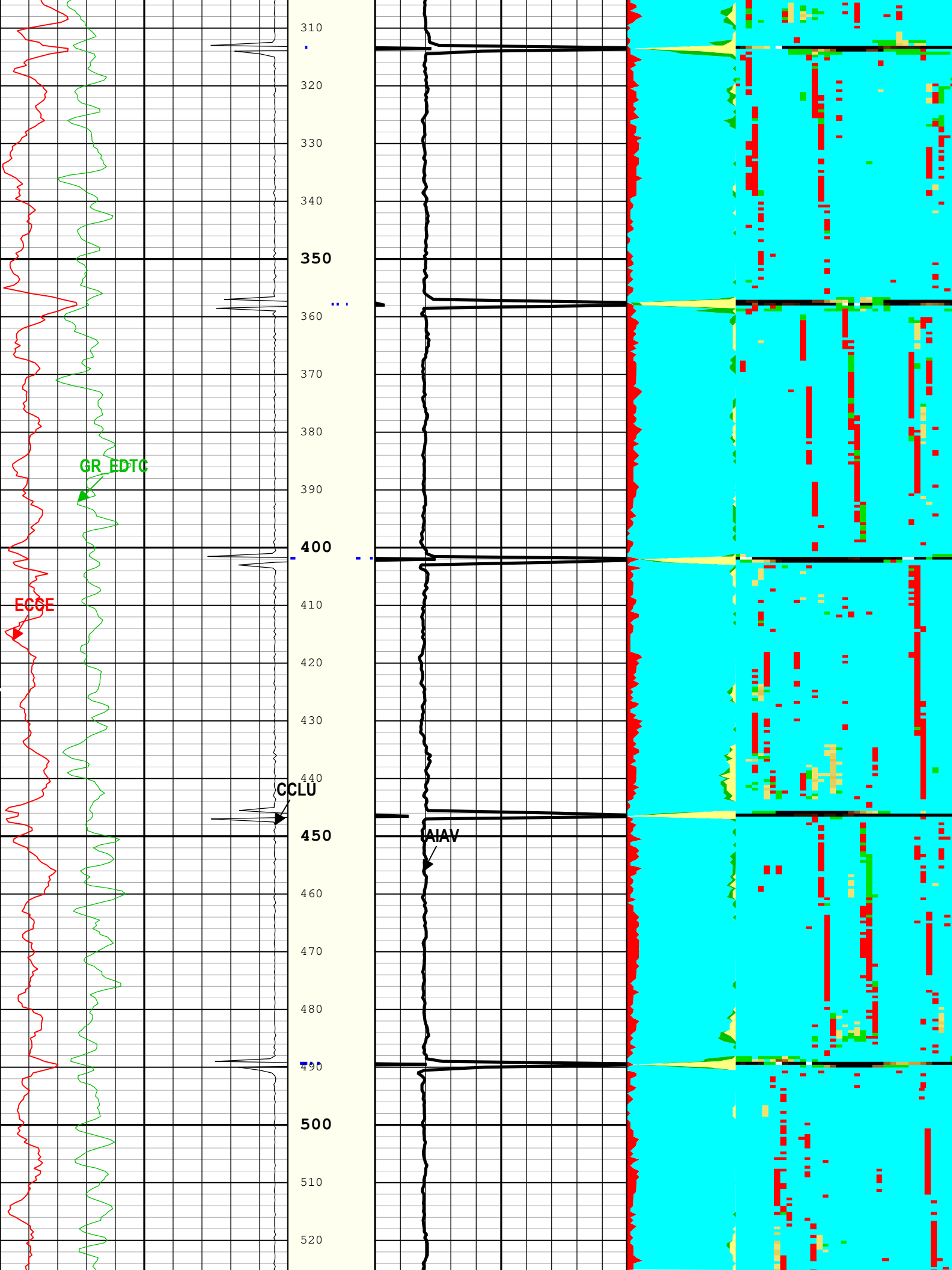


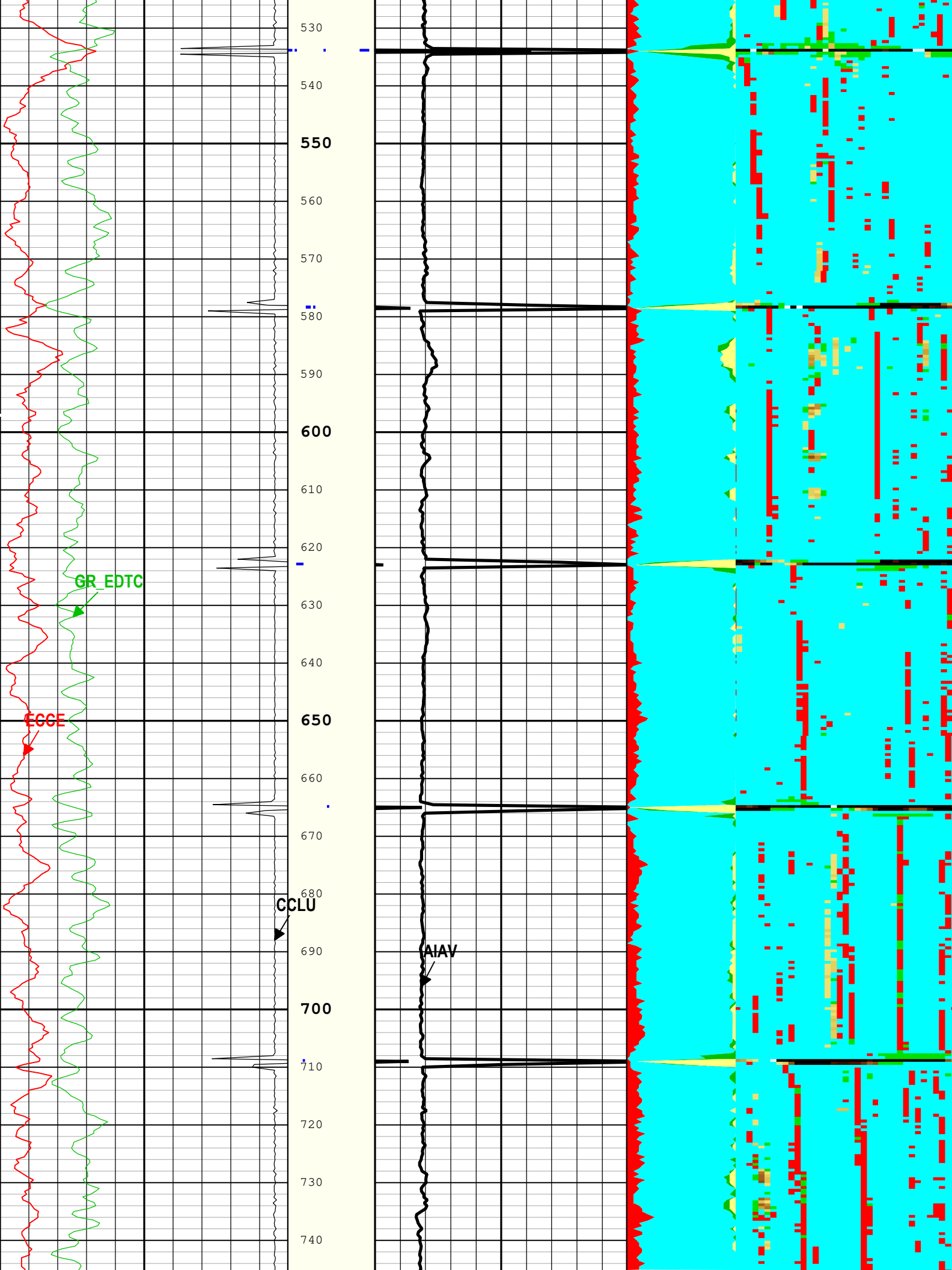
USI S 0.37  
enso  
TOOL\_ZERO  
Head  
Tension  
Lengths are in ft  
Maximum Outer Diameter = 6.250 in  
Line: Sensor Location Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

Depth Summary			
	ONE		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6455		
Calibration Date	26-Jul-2018		
Calibrator Serial Number	IDWC-C-57		
Calibration Cable Type	7-32 ASXS		
Wheel Correction 1	-1		
Wheel Correction 2	1		
Tension Device			
Type	CMTD-B/A		
Serial Number	946		
Calibration Date	08-Apr-2019		
Calibrator Serial Number	88310A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	14		
Calibration Peak Error	25		
Logging Cable			
Type	7-32AS-XS		
Serial Number	U718001		
Length	23000.00 ft		
Conveyance Type	Wireline		
Rig Type			
ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	Followed Schlumberger depth control procedures	
Rig Up Length At Surface		Used IDW as primary depth control	
Rig Up Length At Bottom		Used Z-chart as secondary depth control	
Rig Up Length Correction			
Stretch Correction			

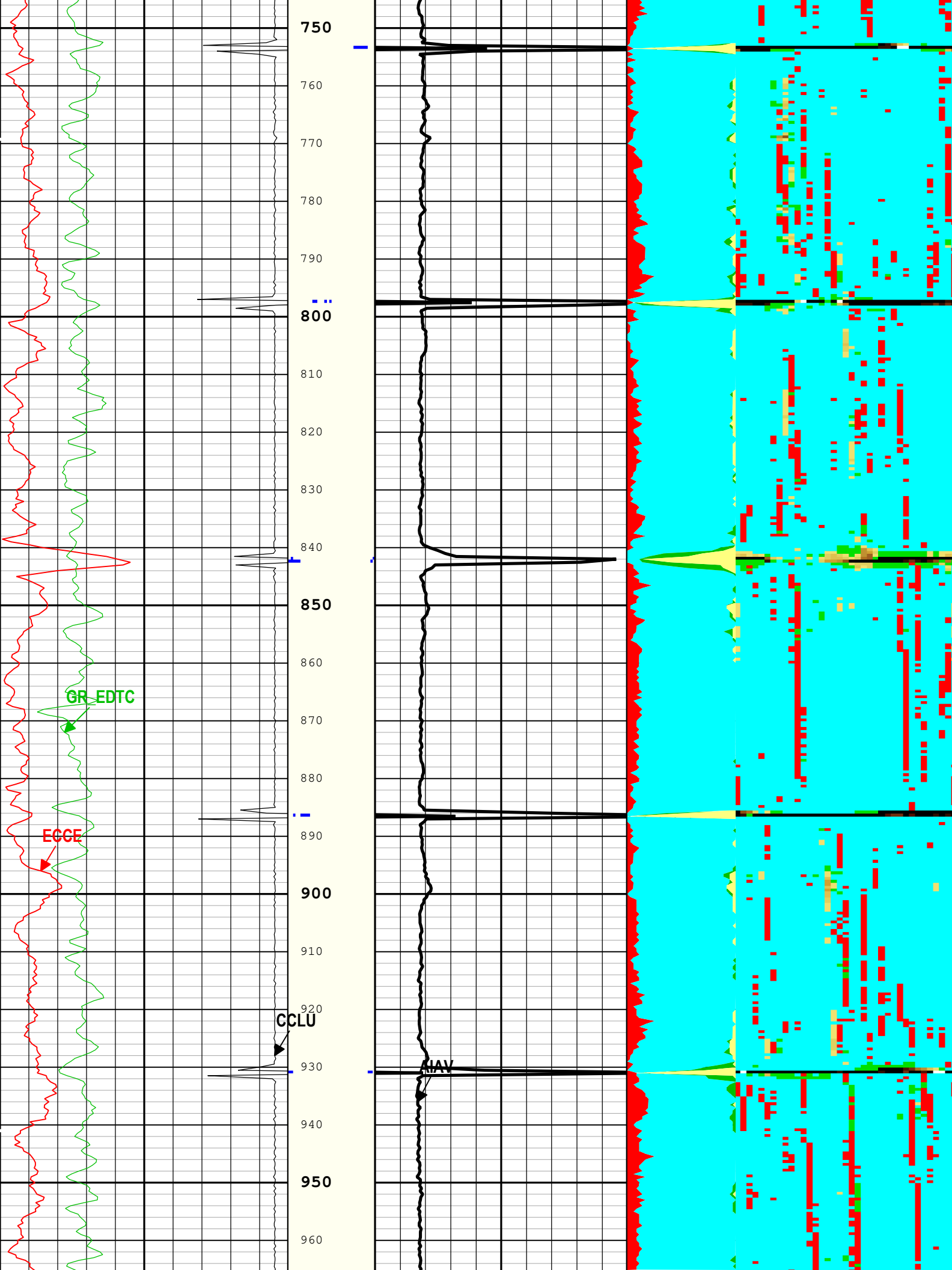


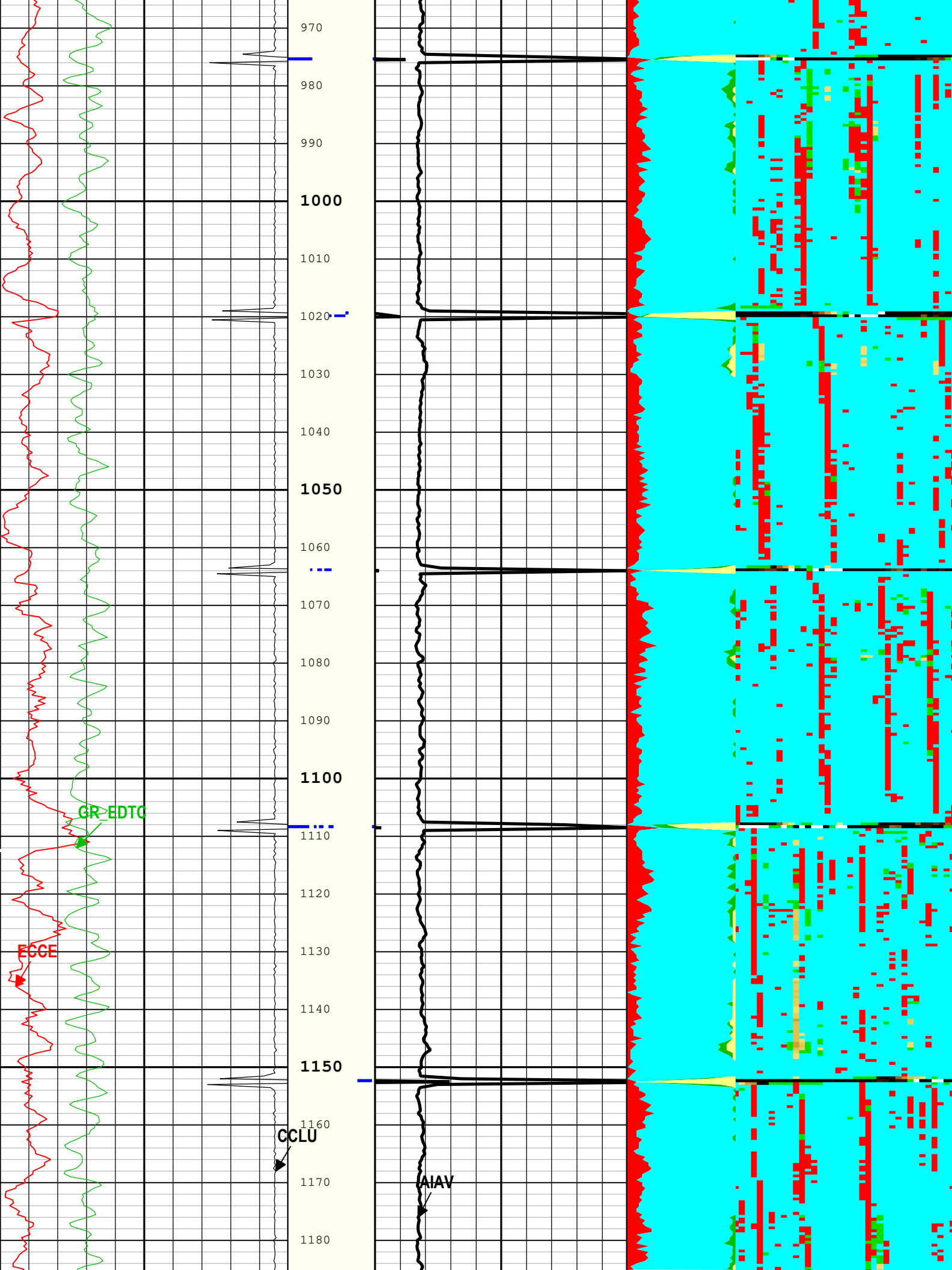


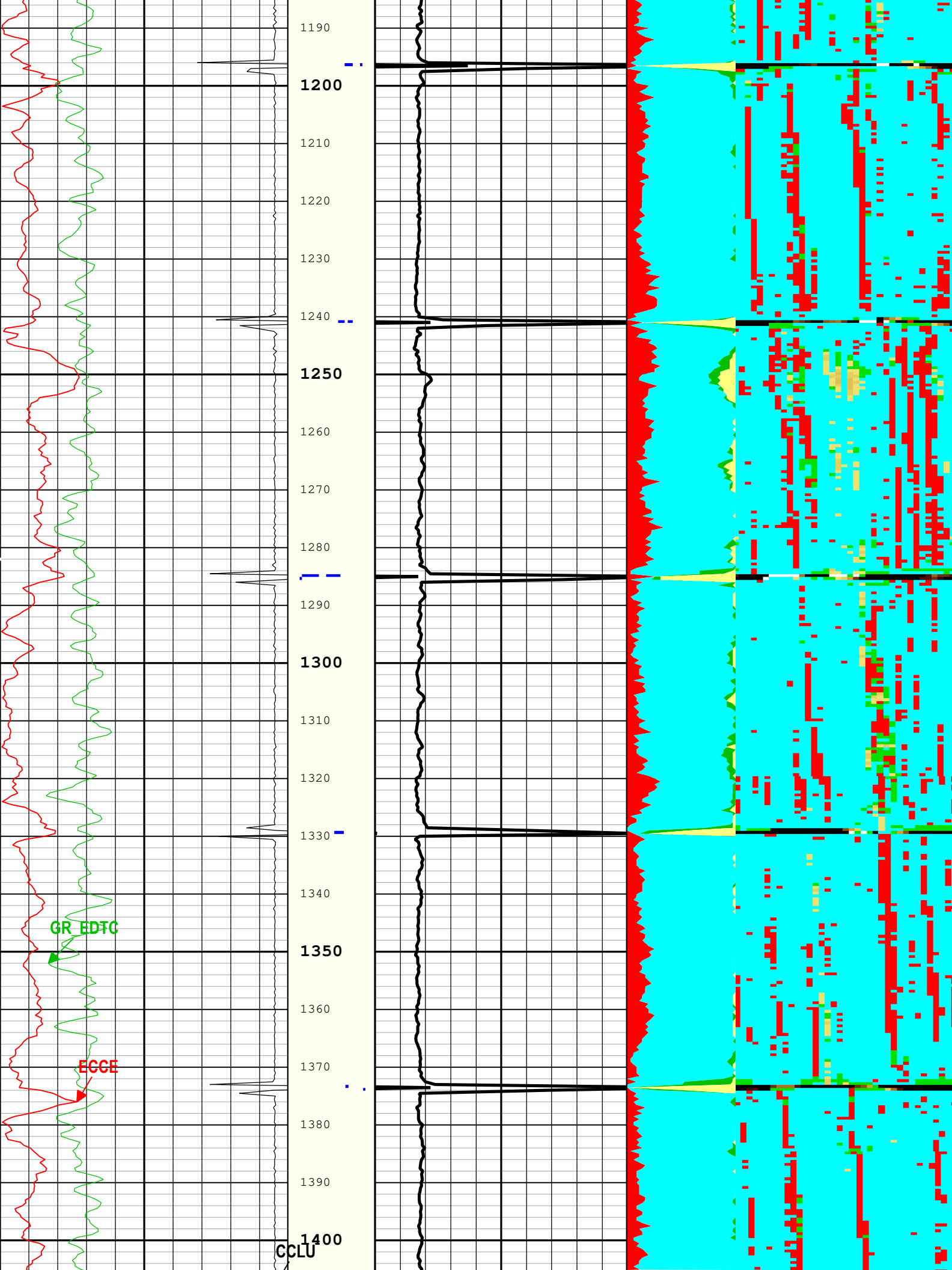


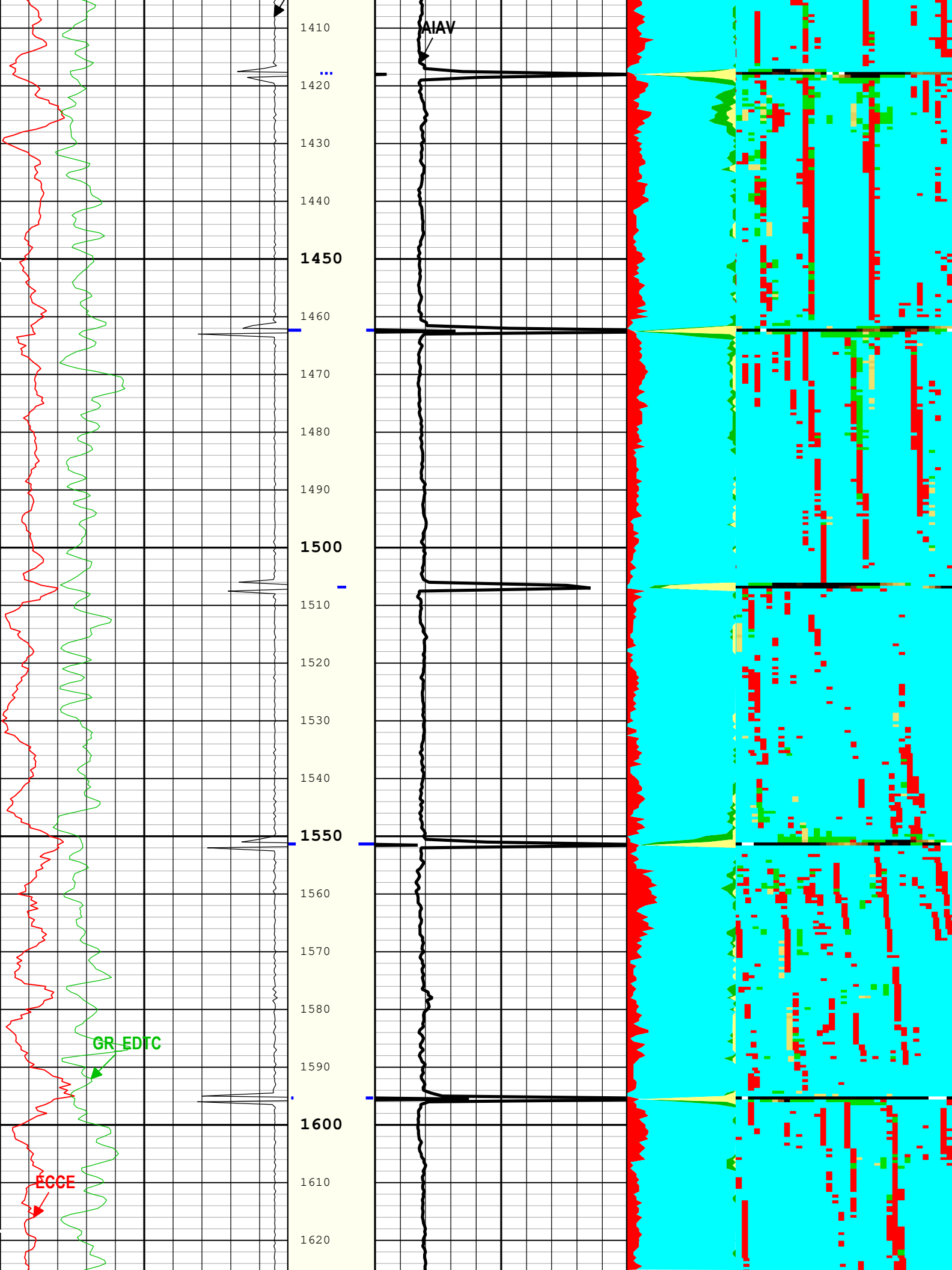


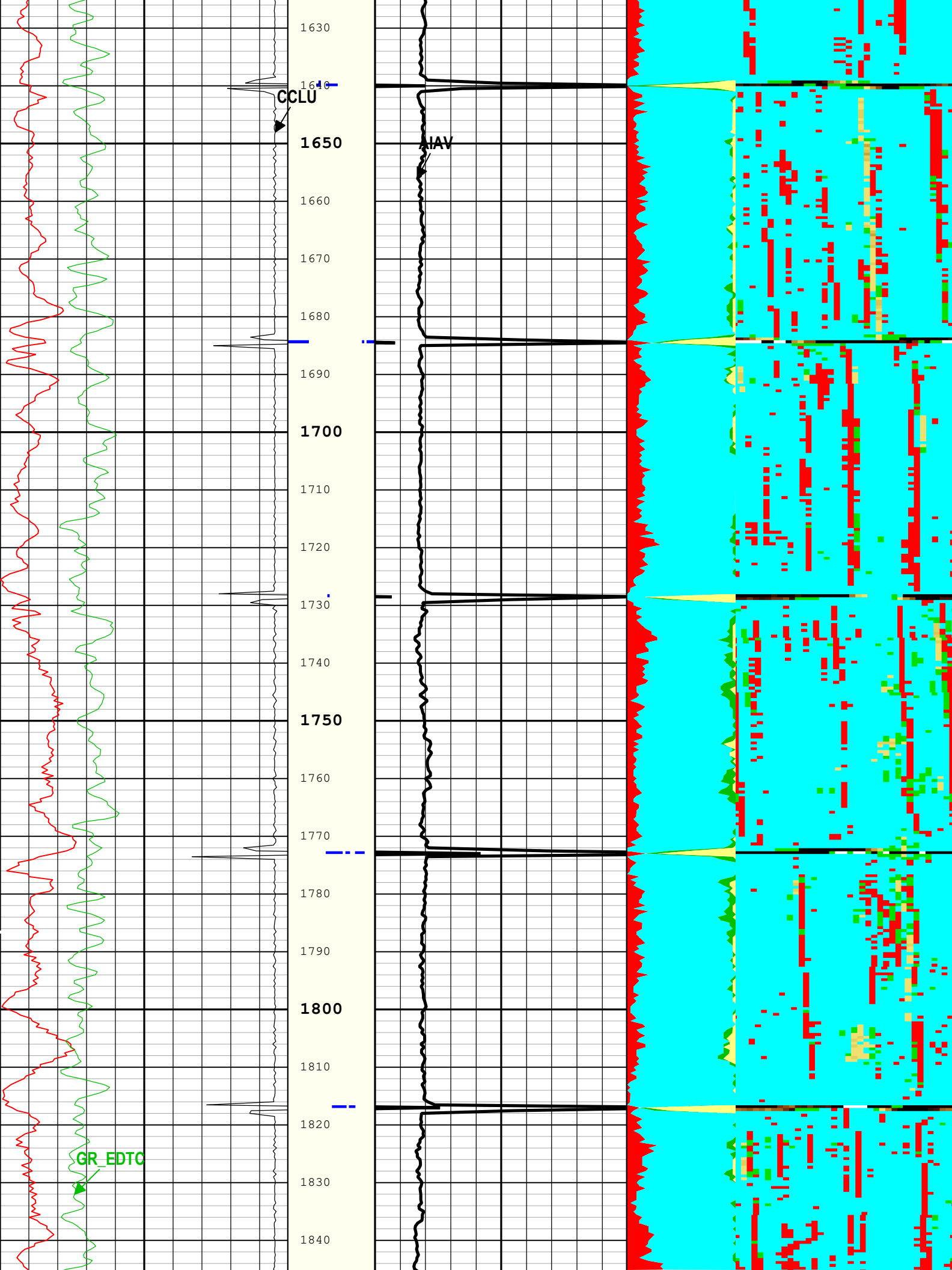


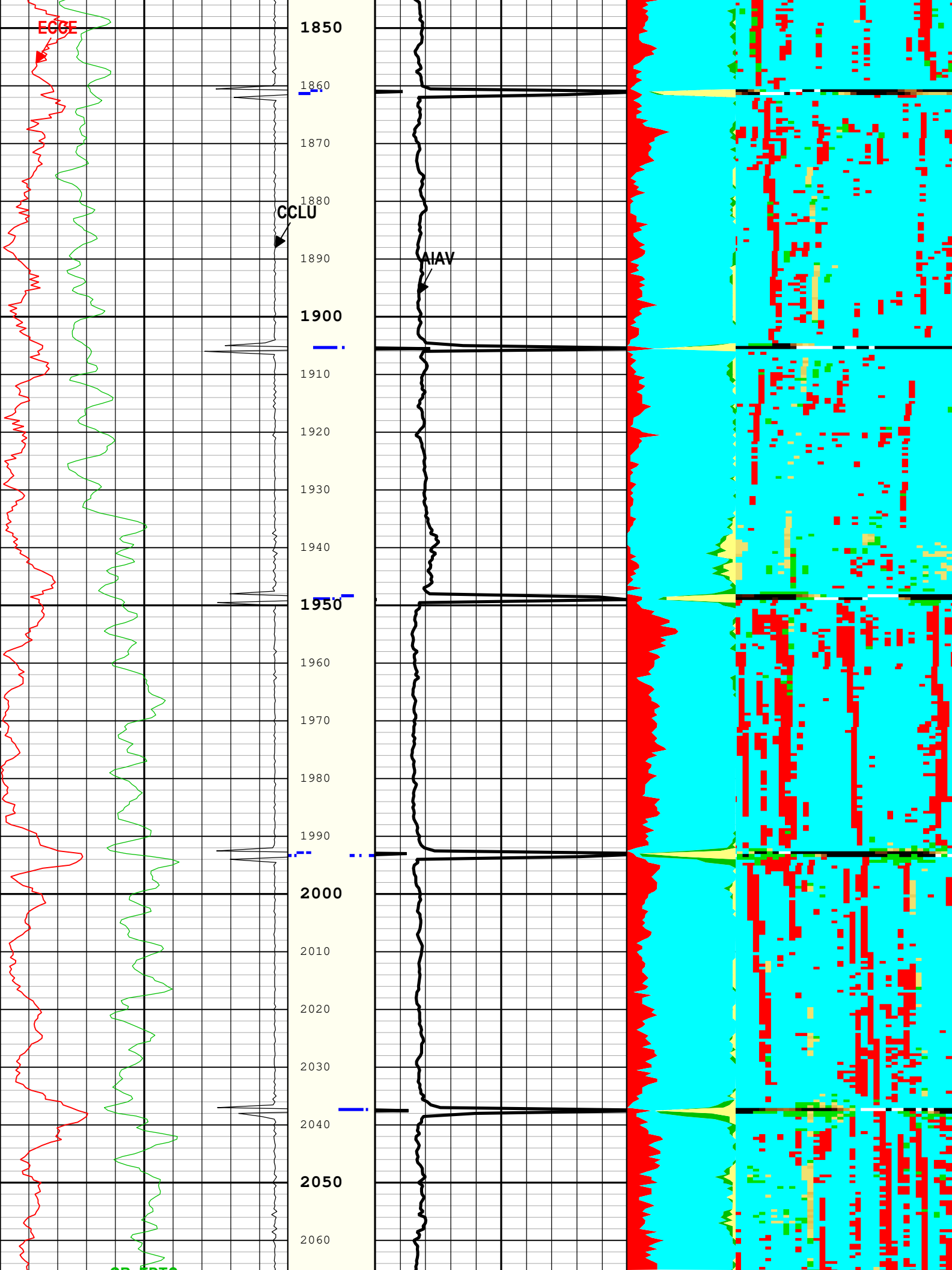


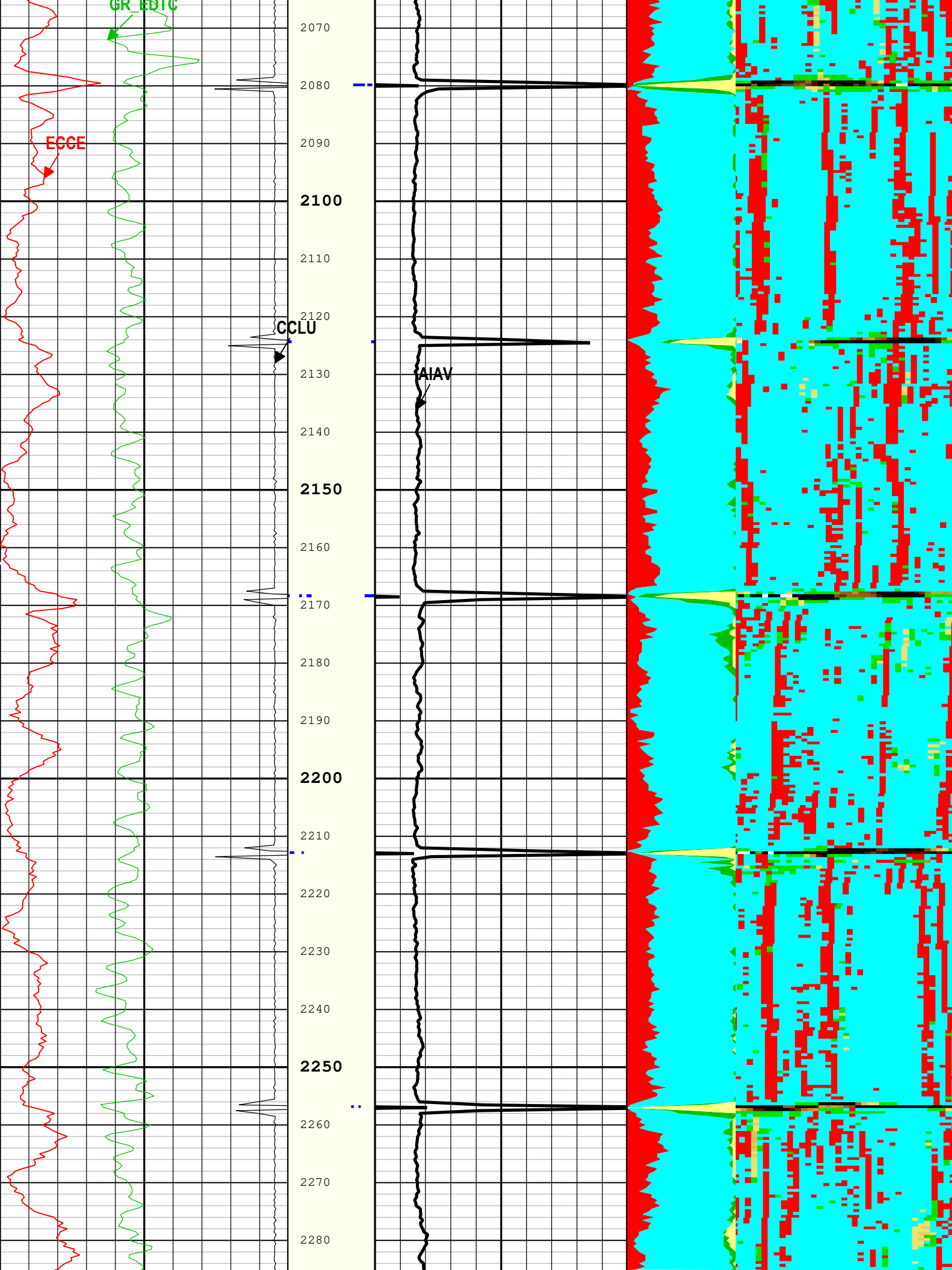


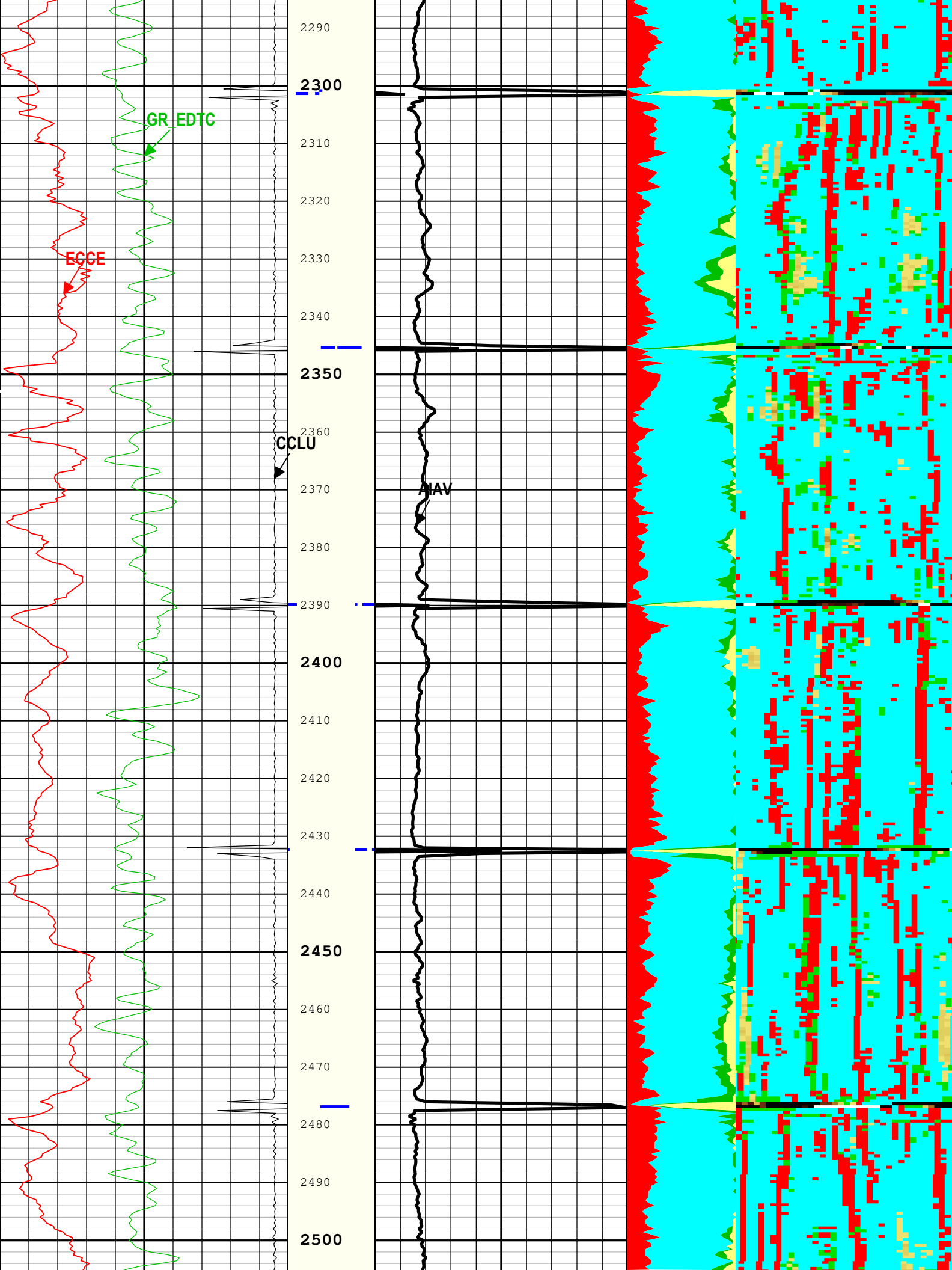




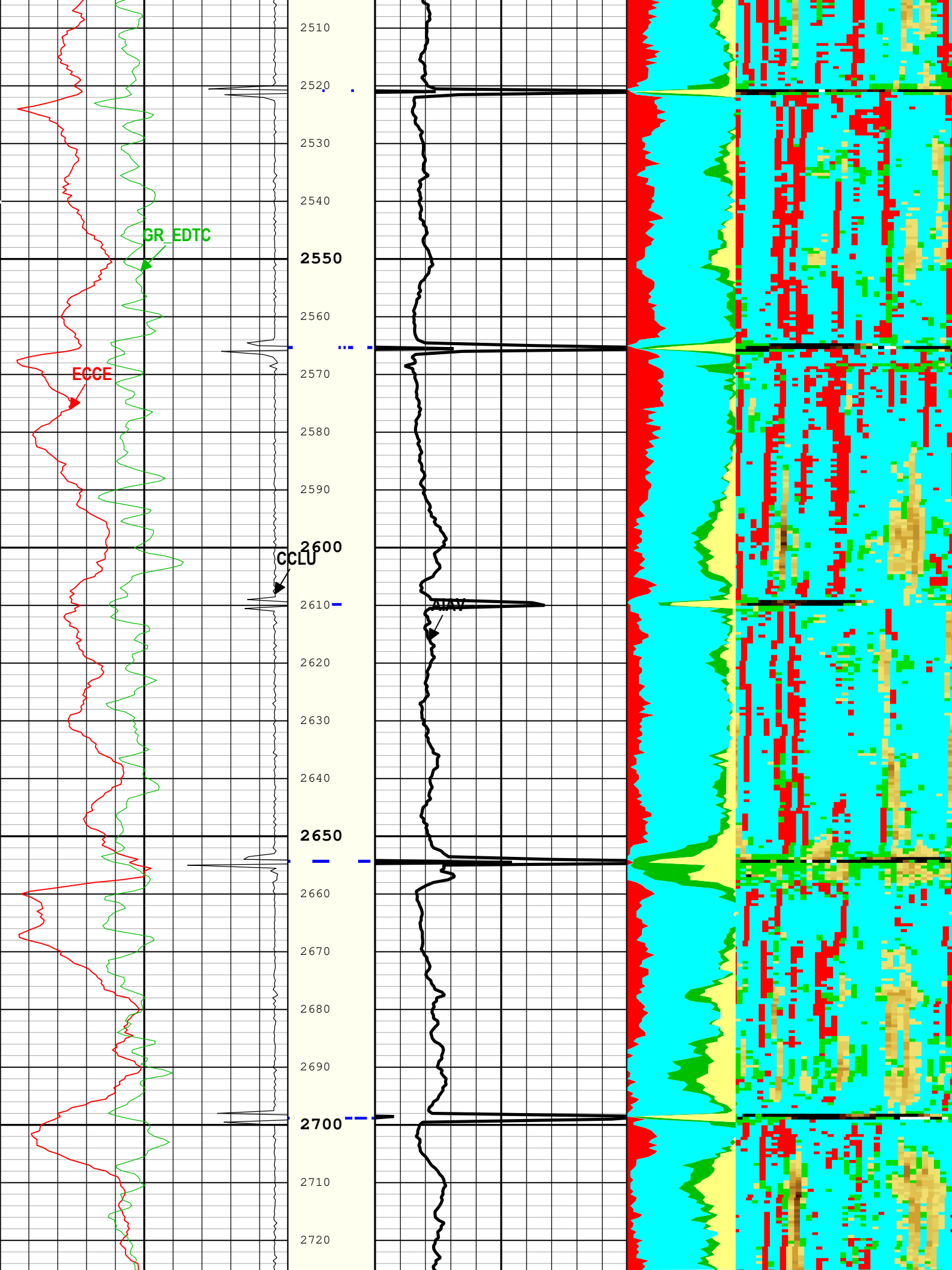


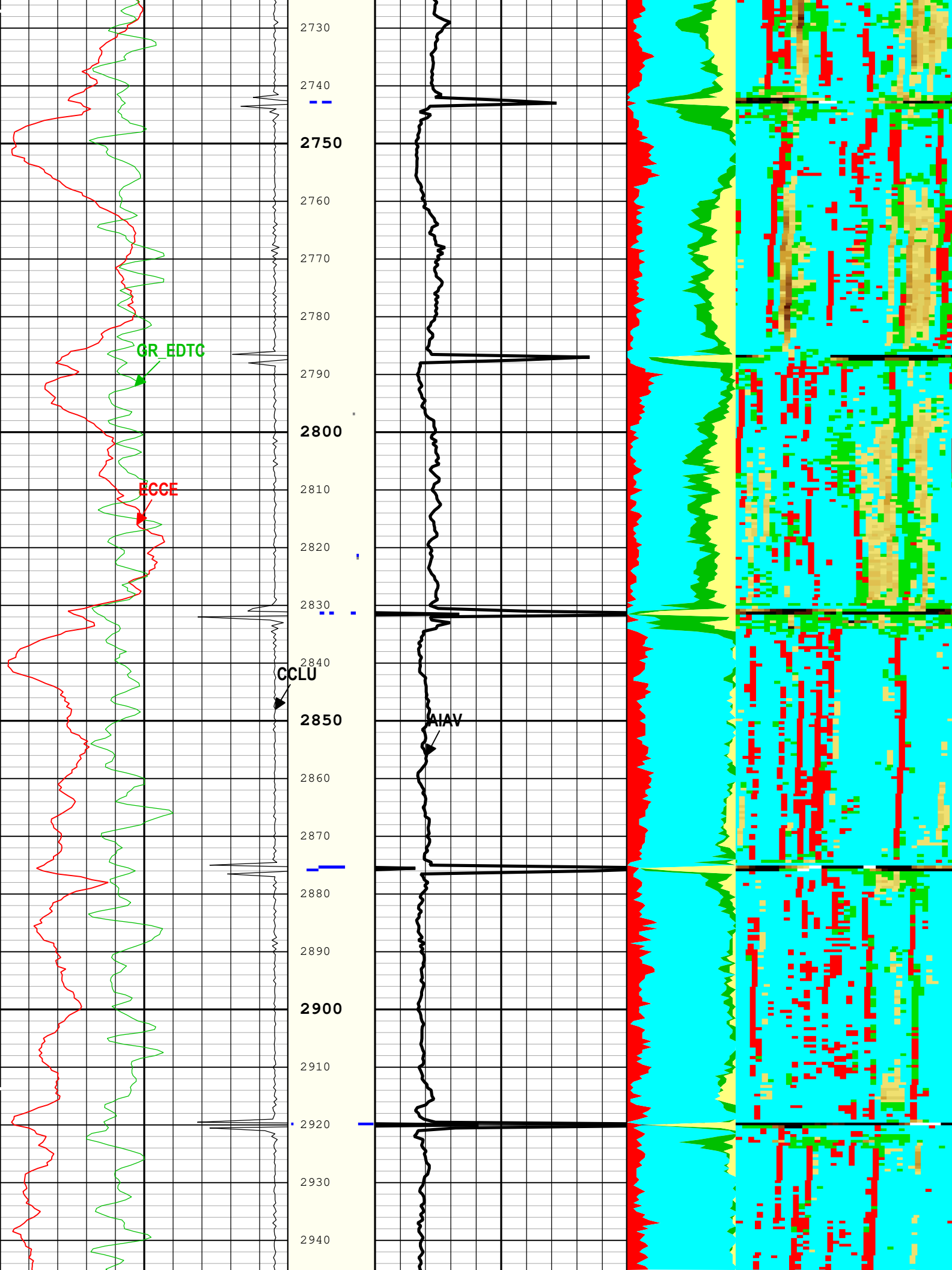


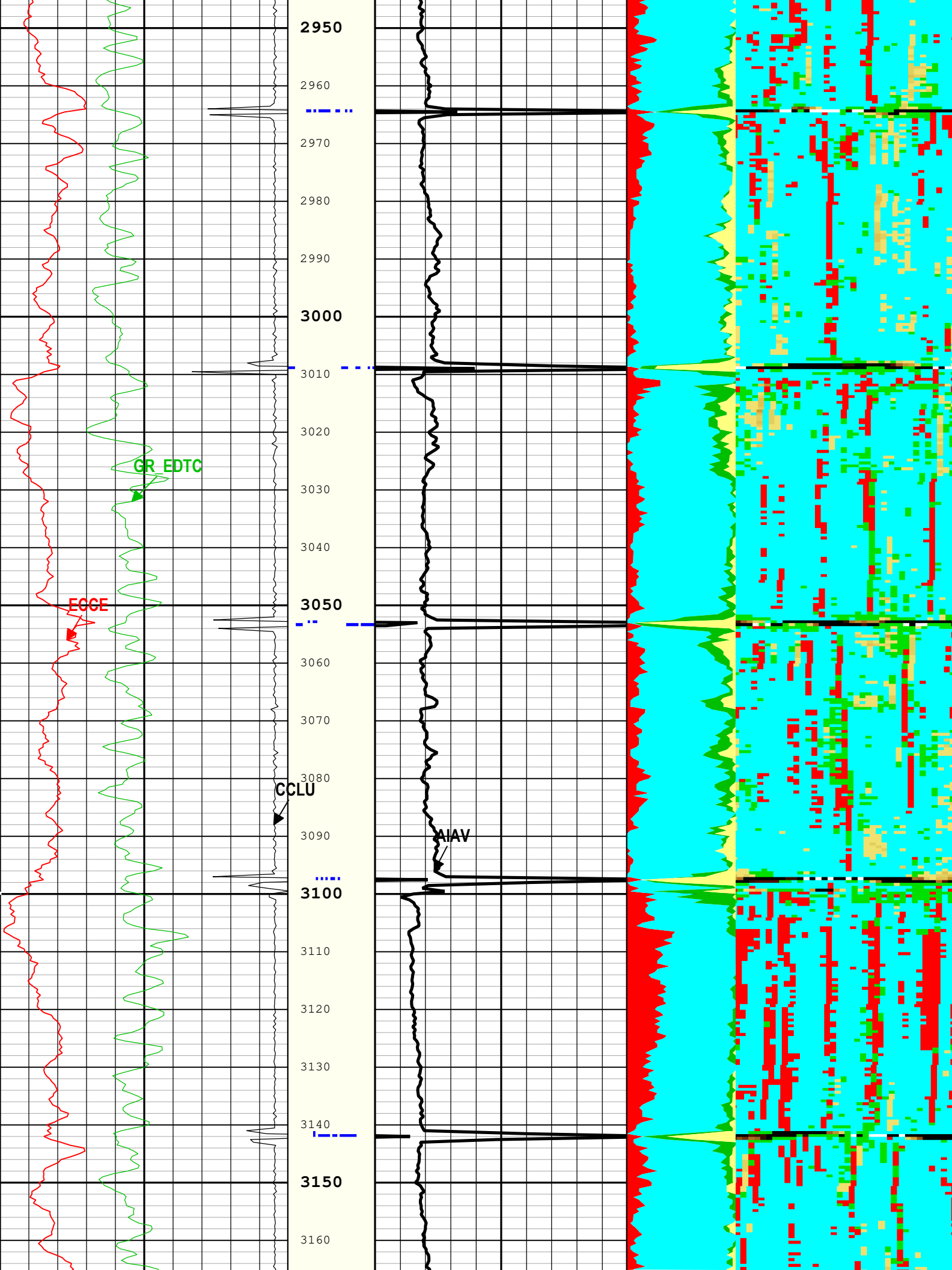


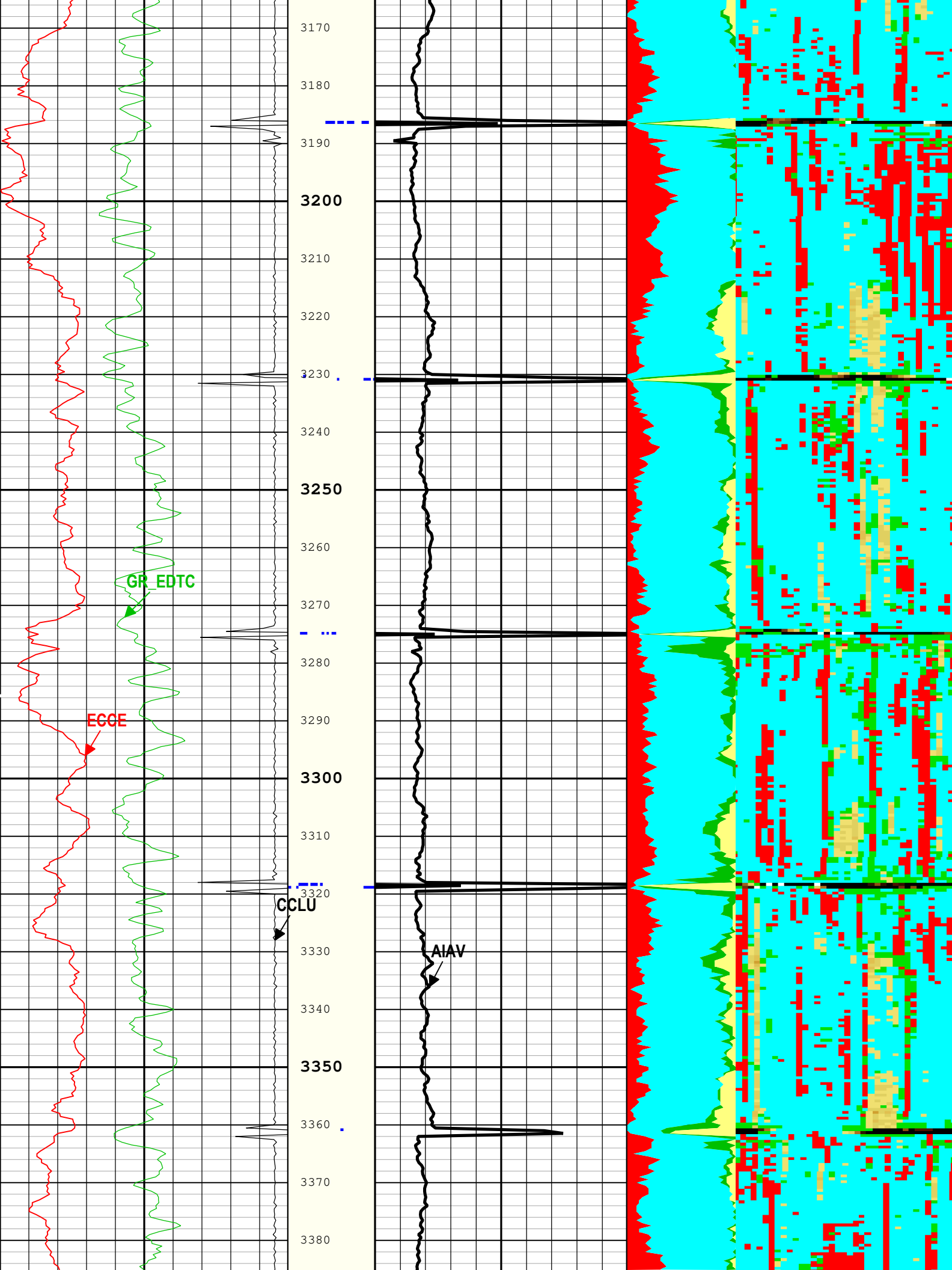


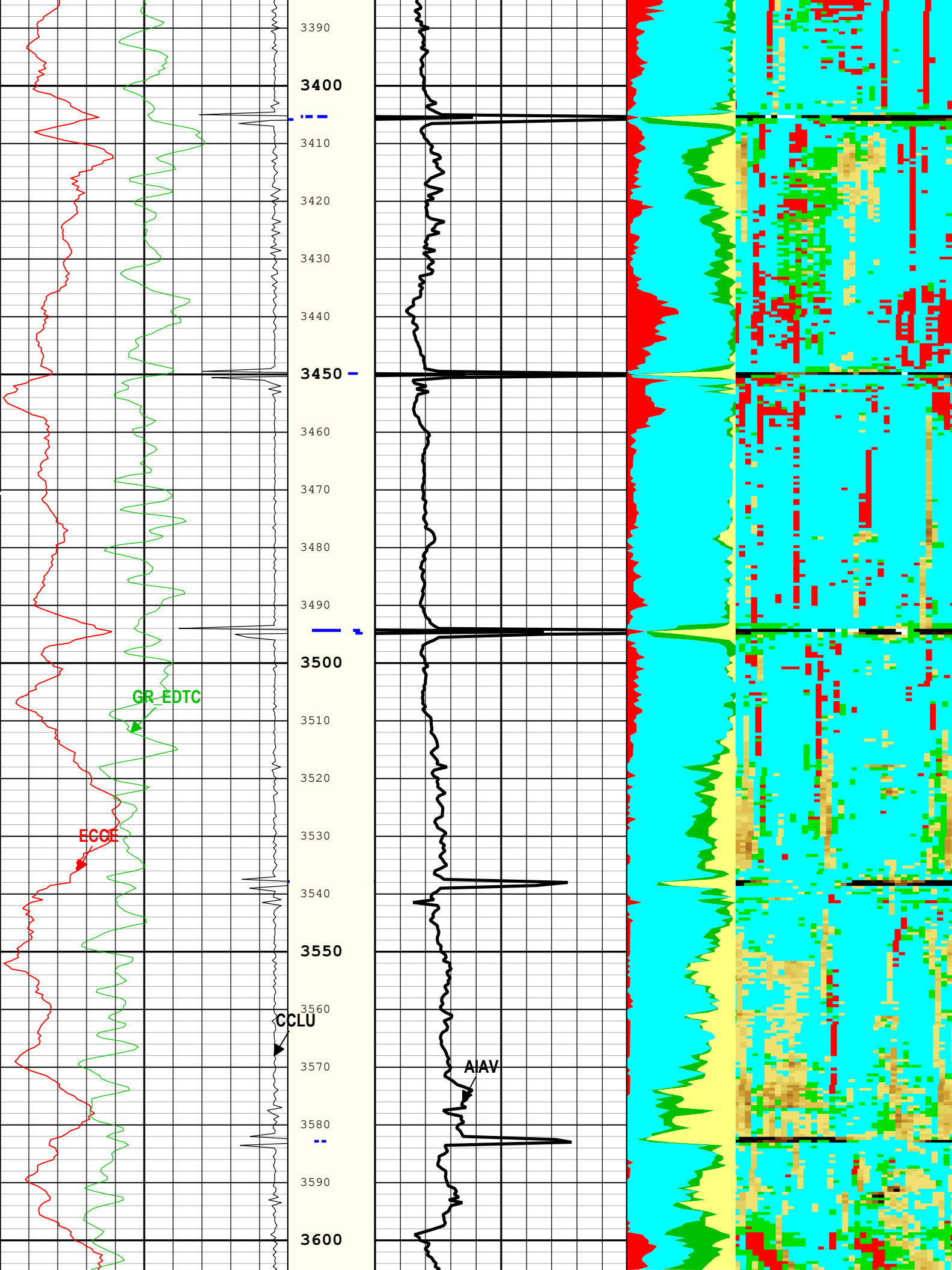


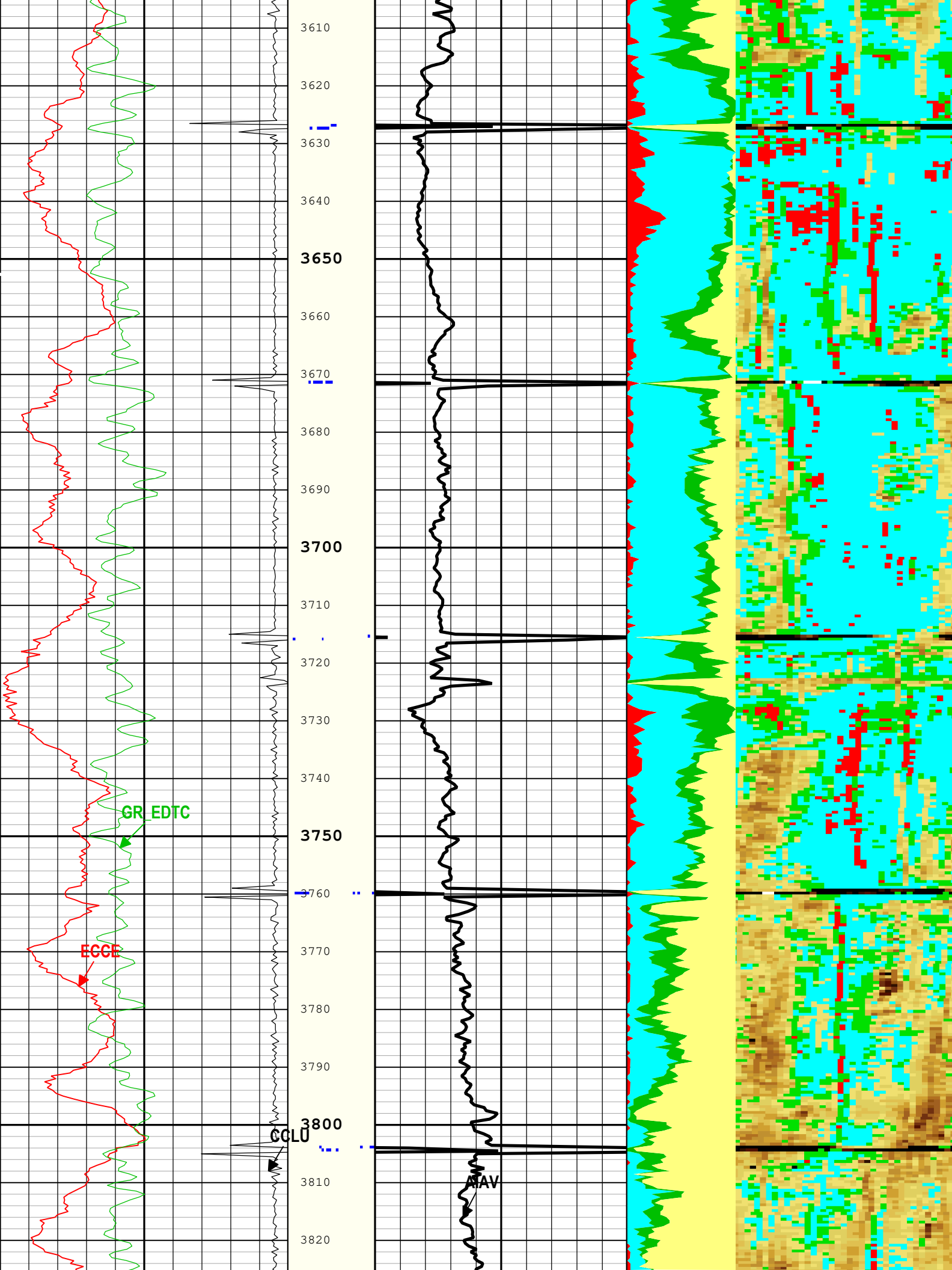


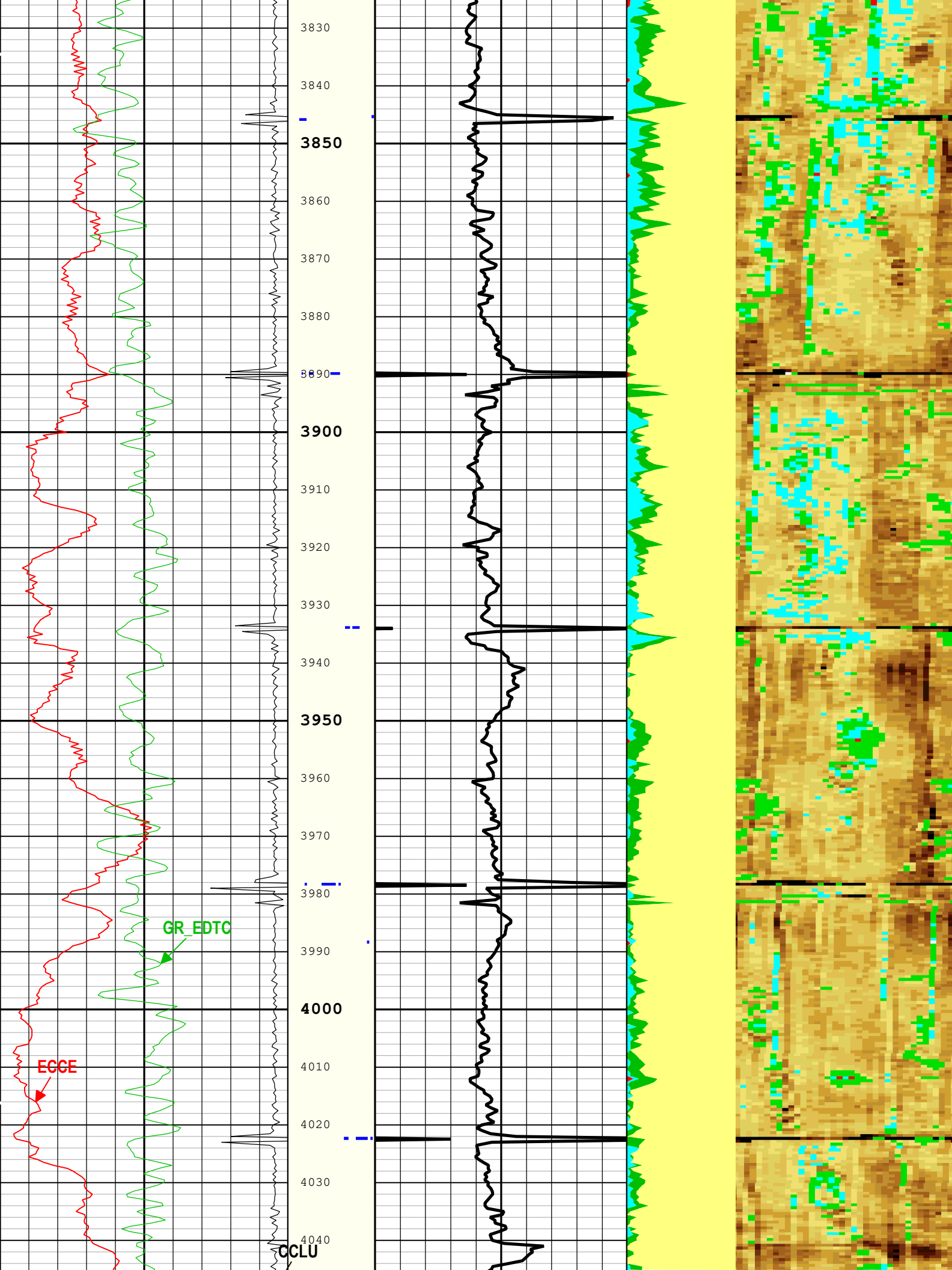


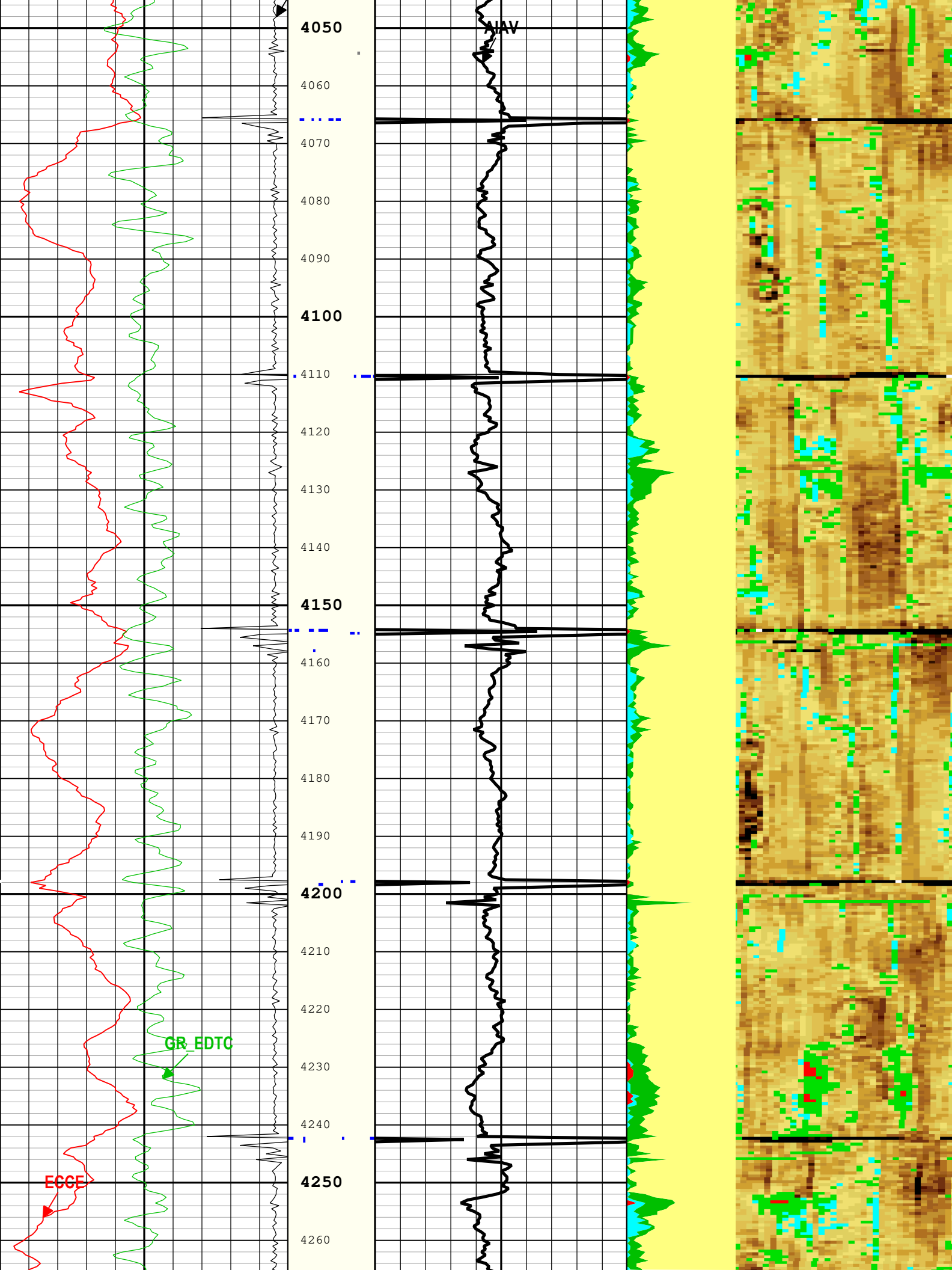




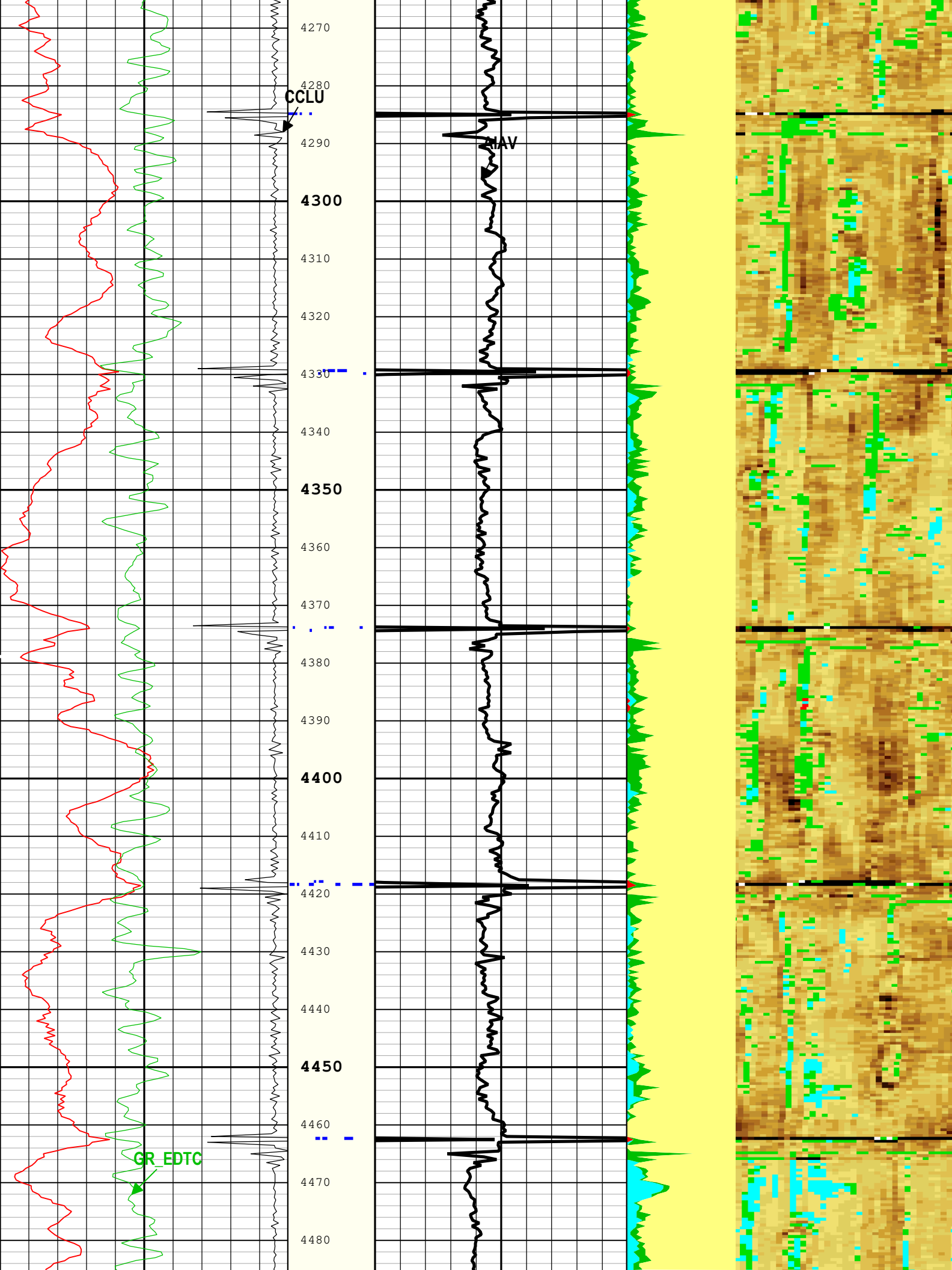


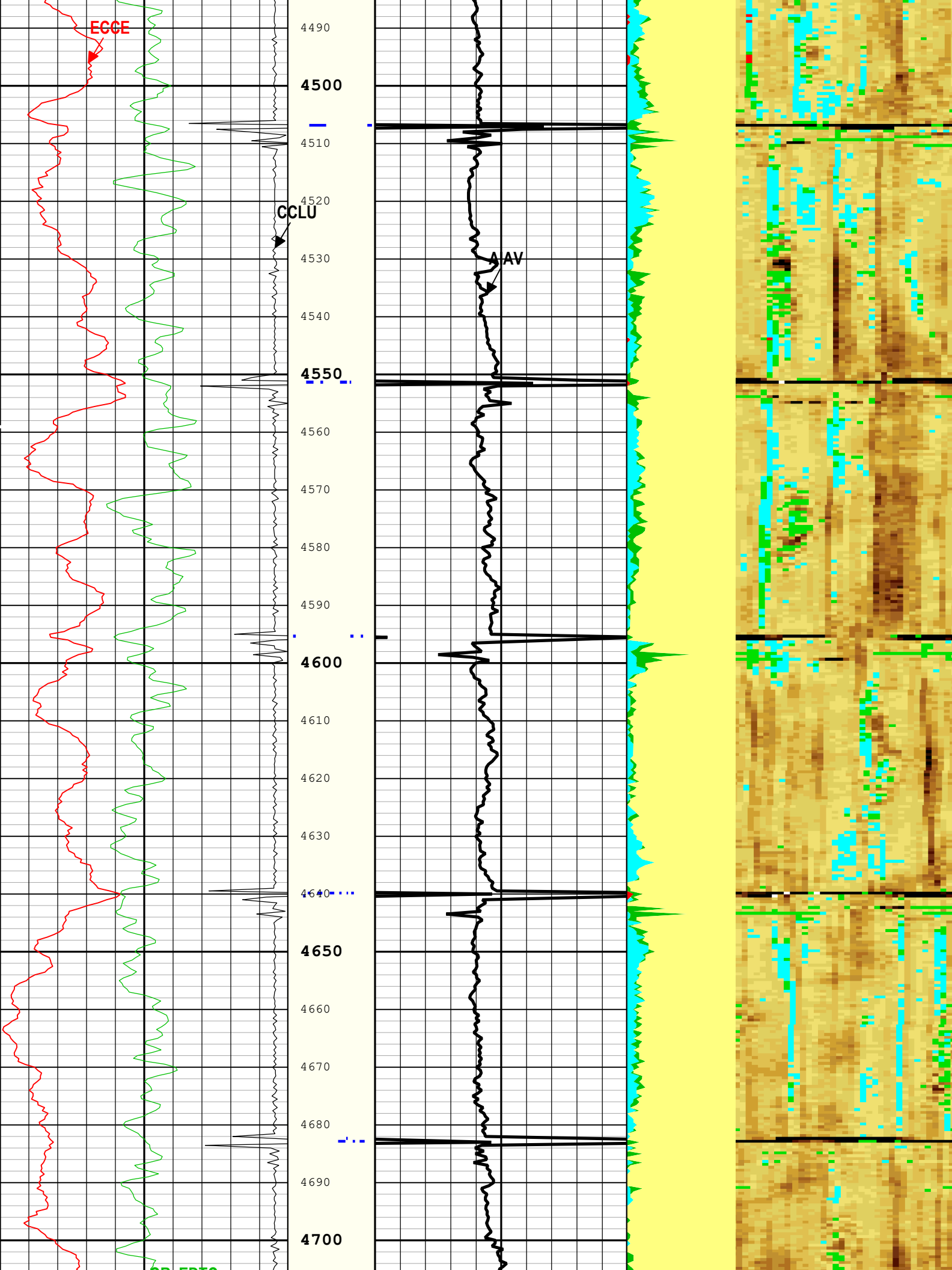


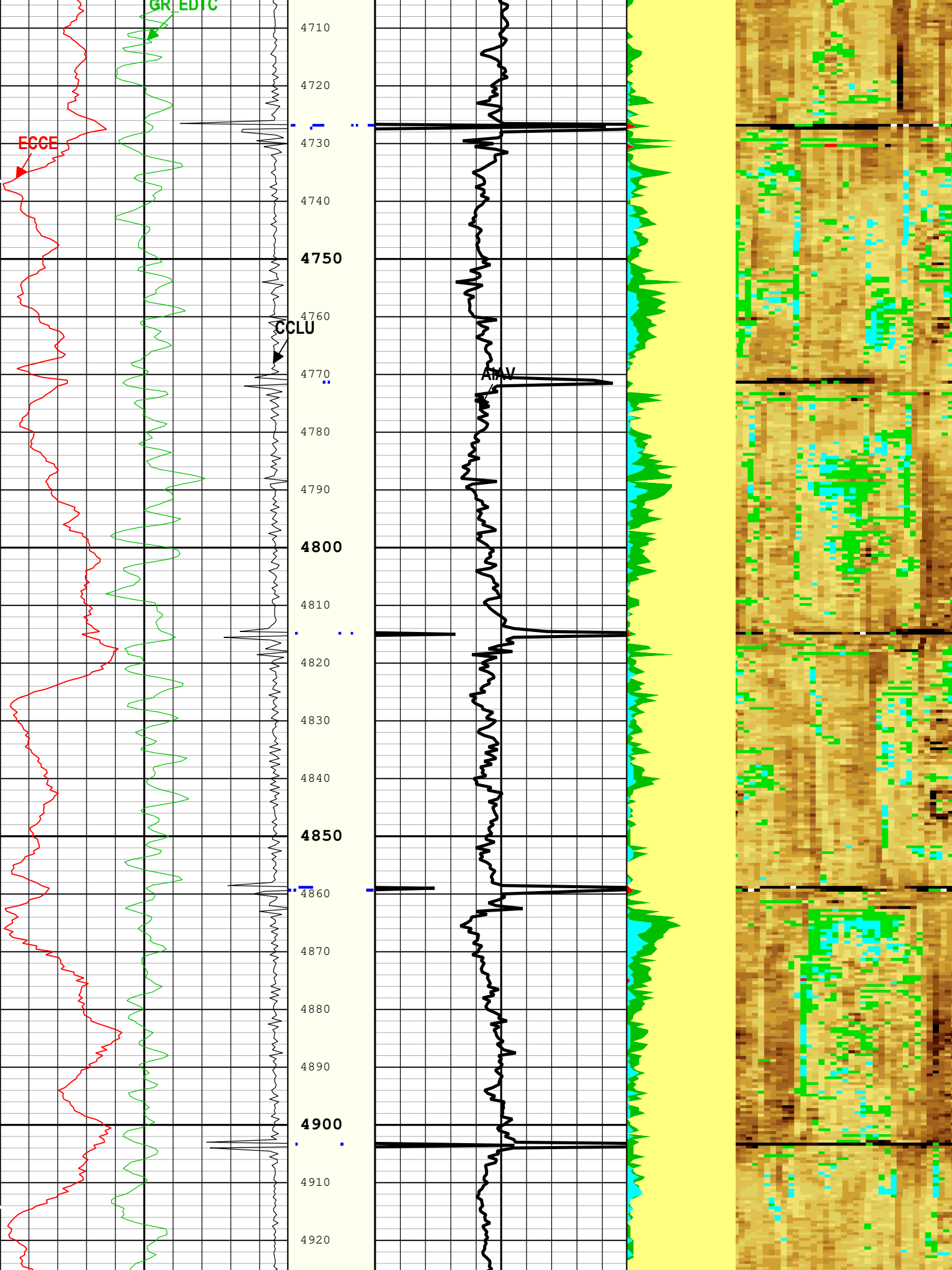


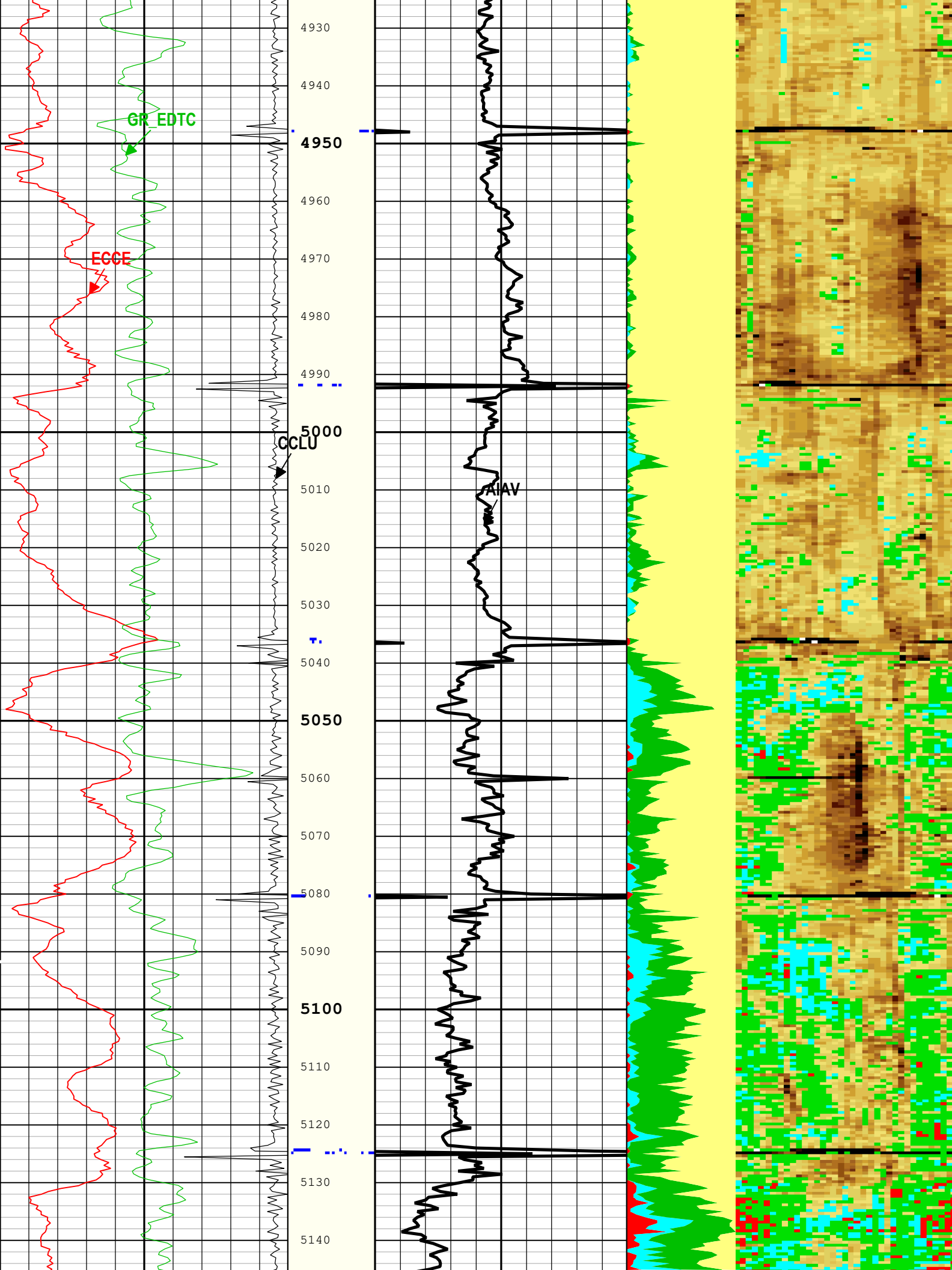


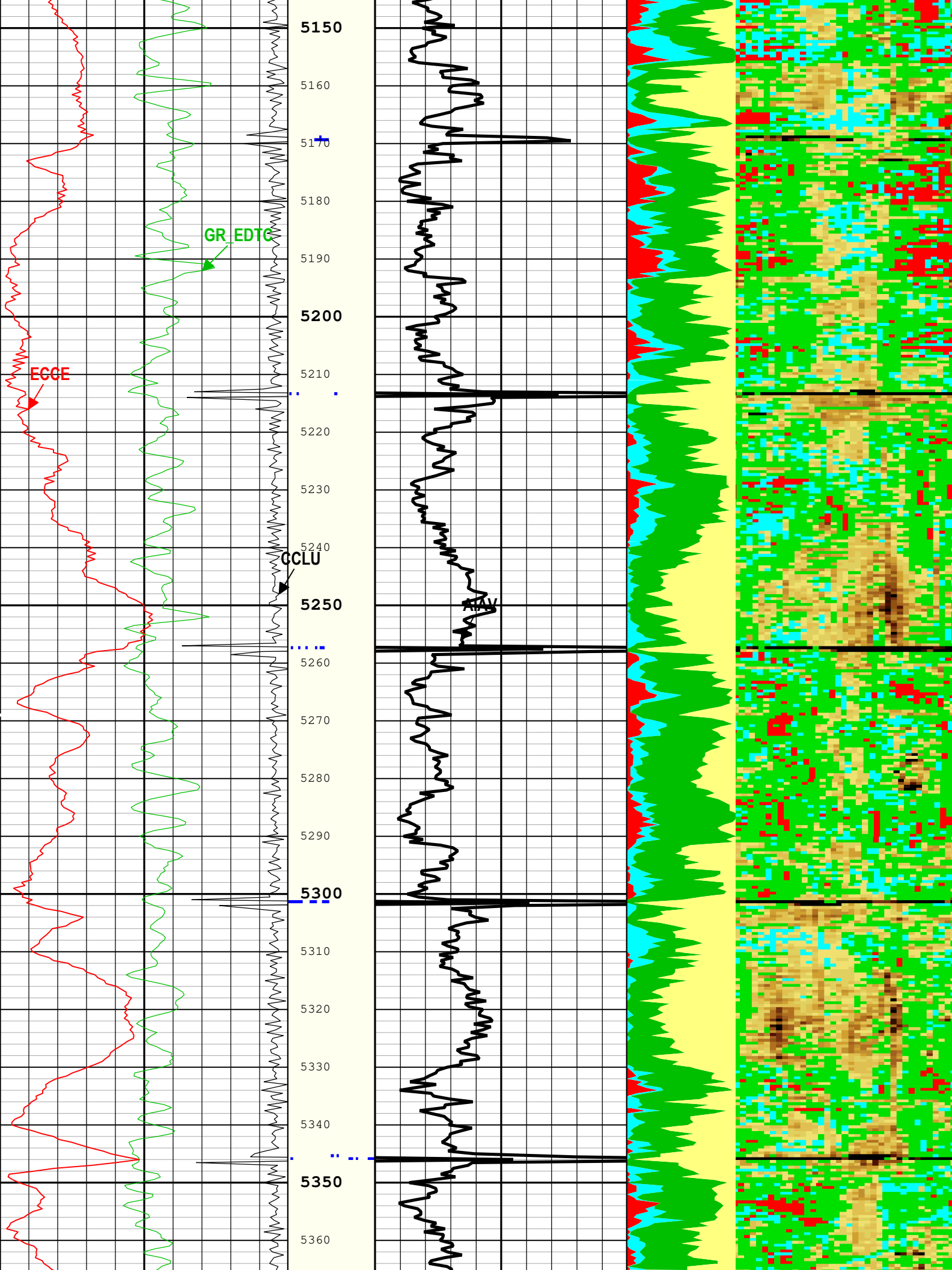


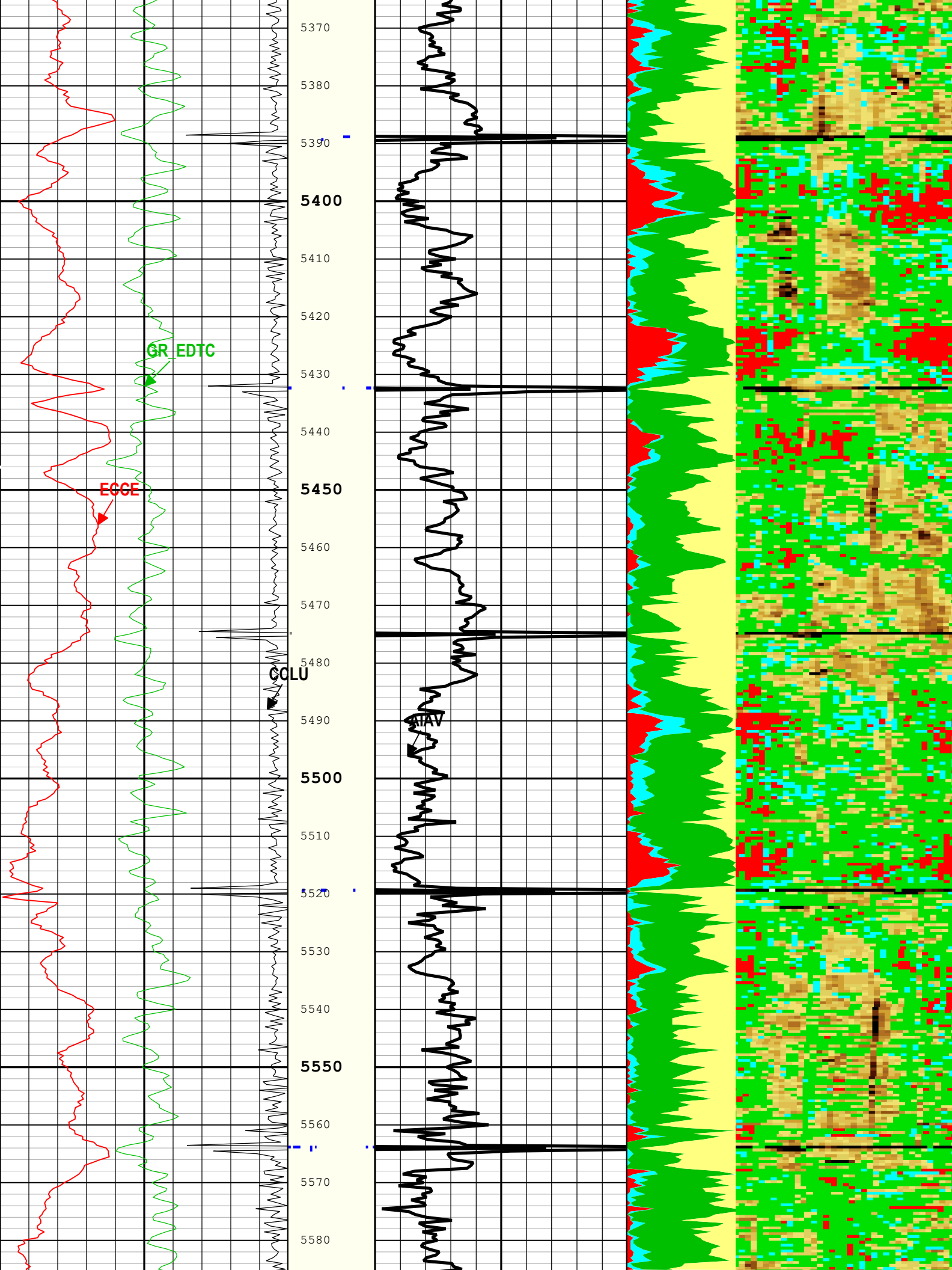


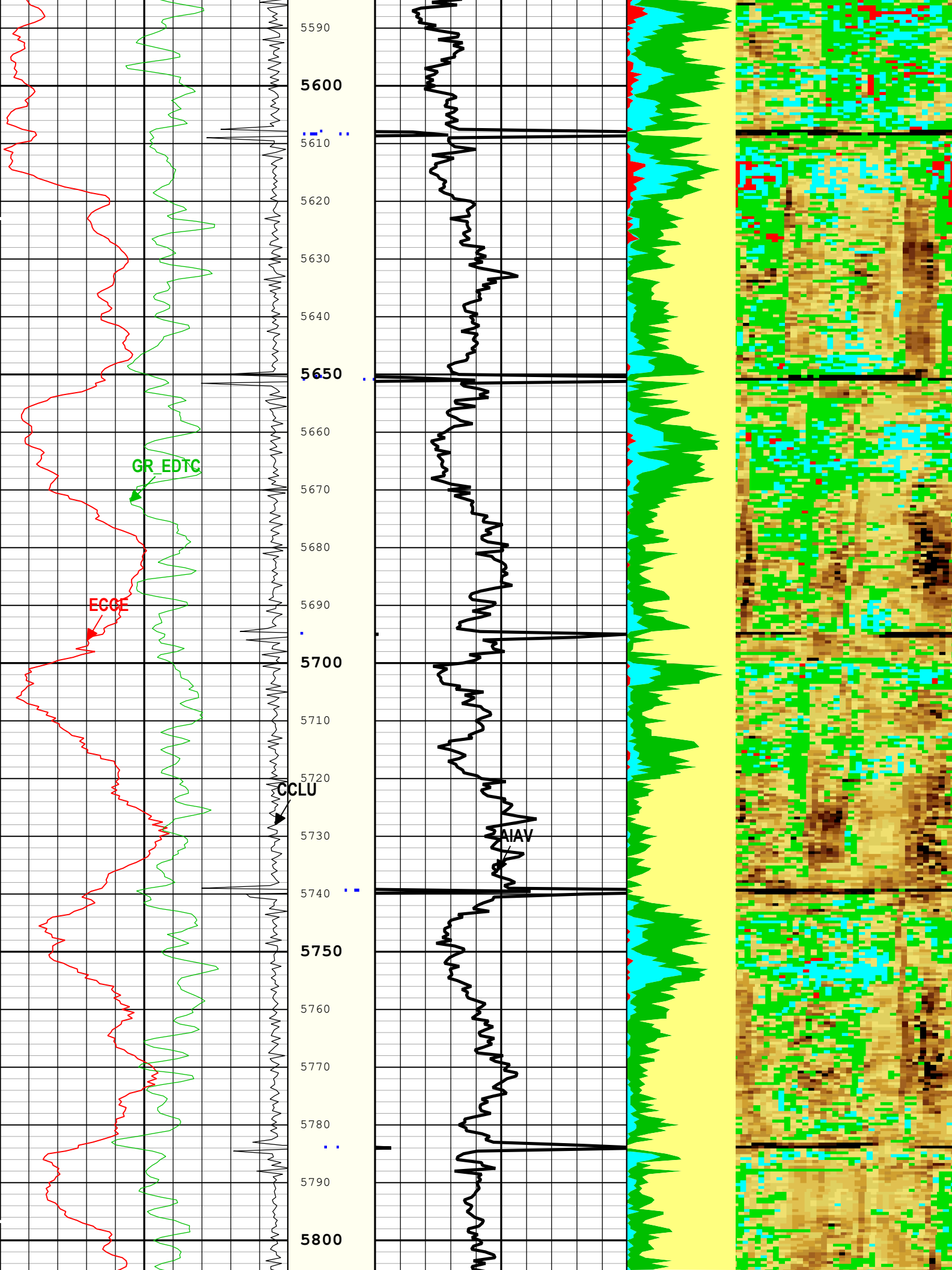


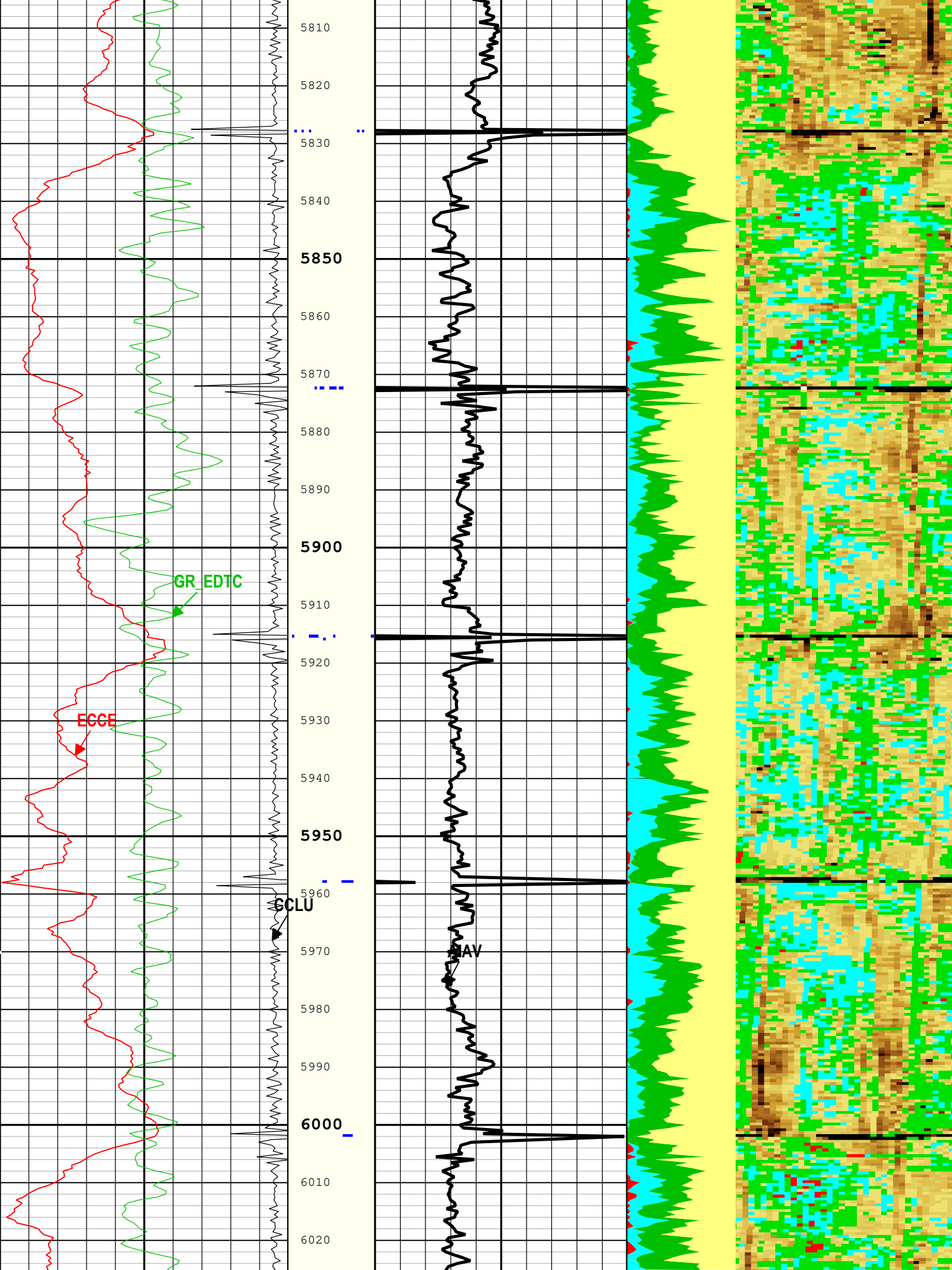




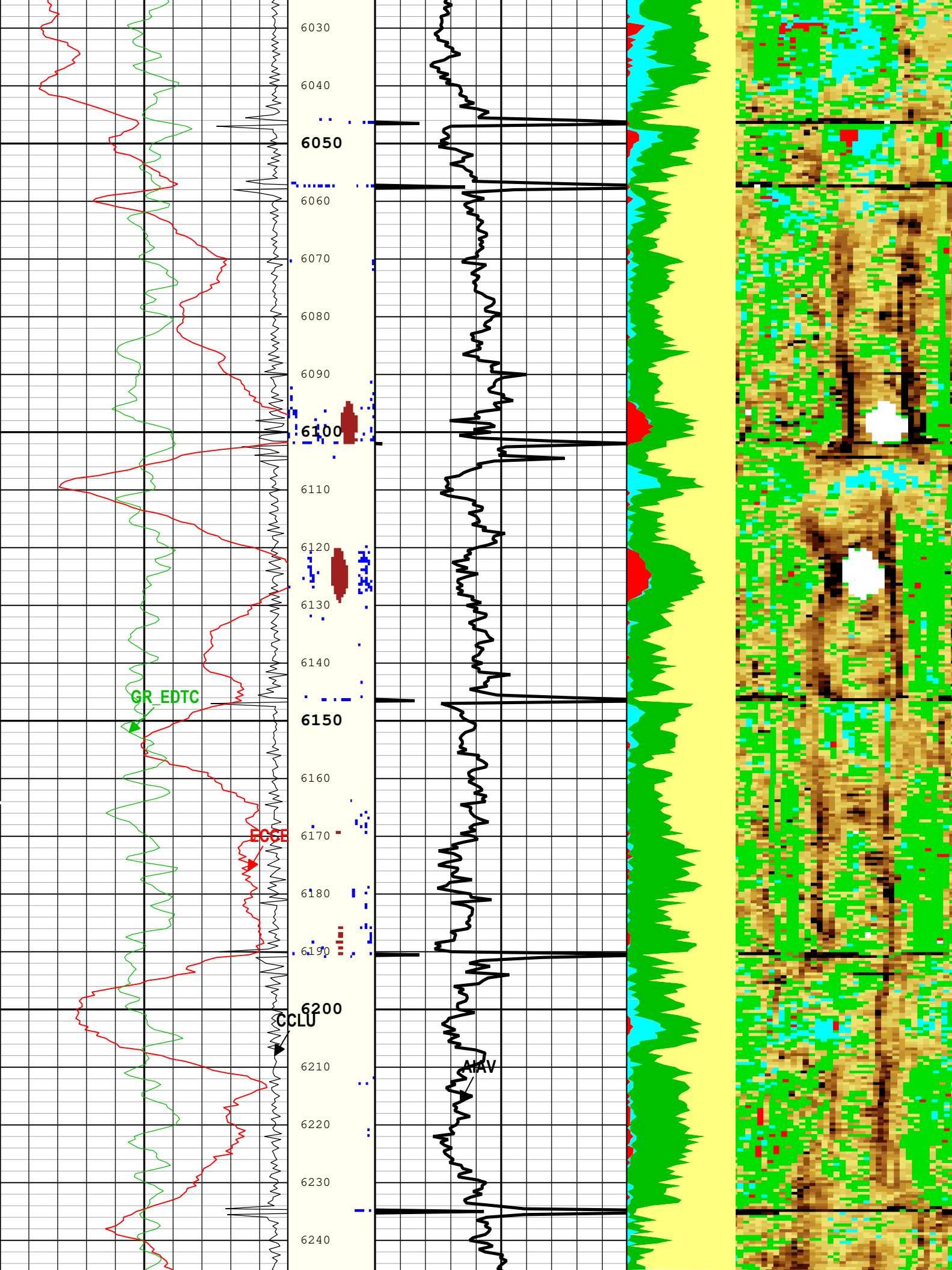


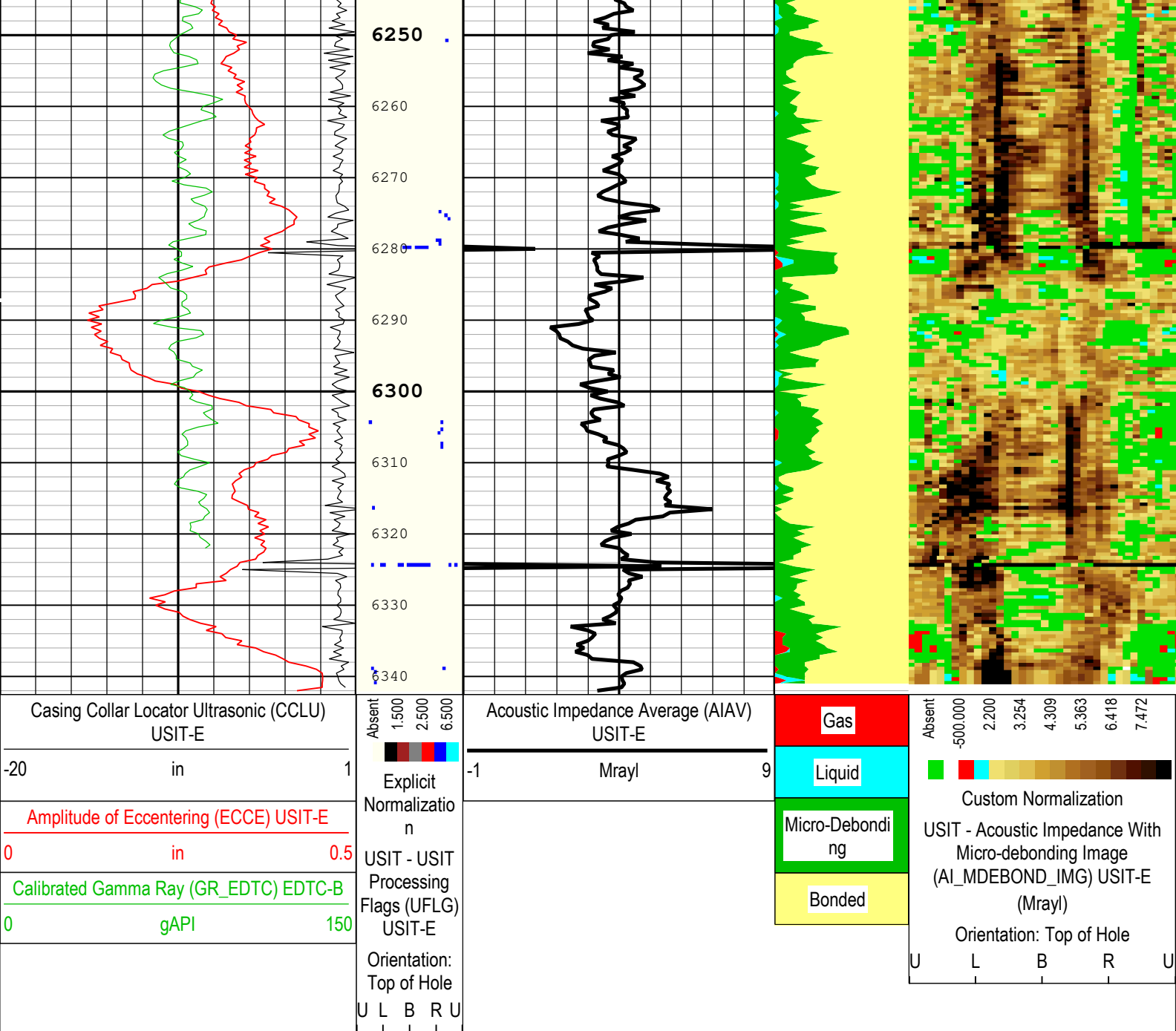












TIME\_1900 - Time Marked every 60.00 (s)

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: 03-Dec-2019 15:32:07

## 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	RB	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-F	1.13	

U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.55	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	1.5	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	20	110
BS	13.5	110	1959
BS	8.5	1959	6342.5

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	18	dB
EMXV	EMEX Voltage	USIT-E	40	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

ONE
0 PSI Repeat Pass

Software Version	
Acquisition System	Version
Maxwell 2019.1	9.1.110979.3100

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	1988.45 ft	2501.25 ft	28-May-2019 2:22:44 PM	28-May-2019 2:26:57 PM	ON	0.00 ft	Yes

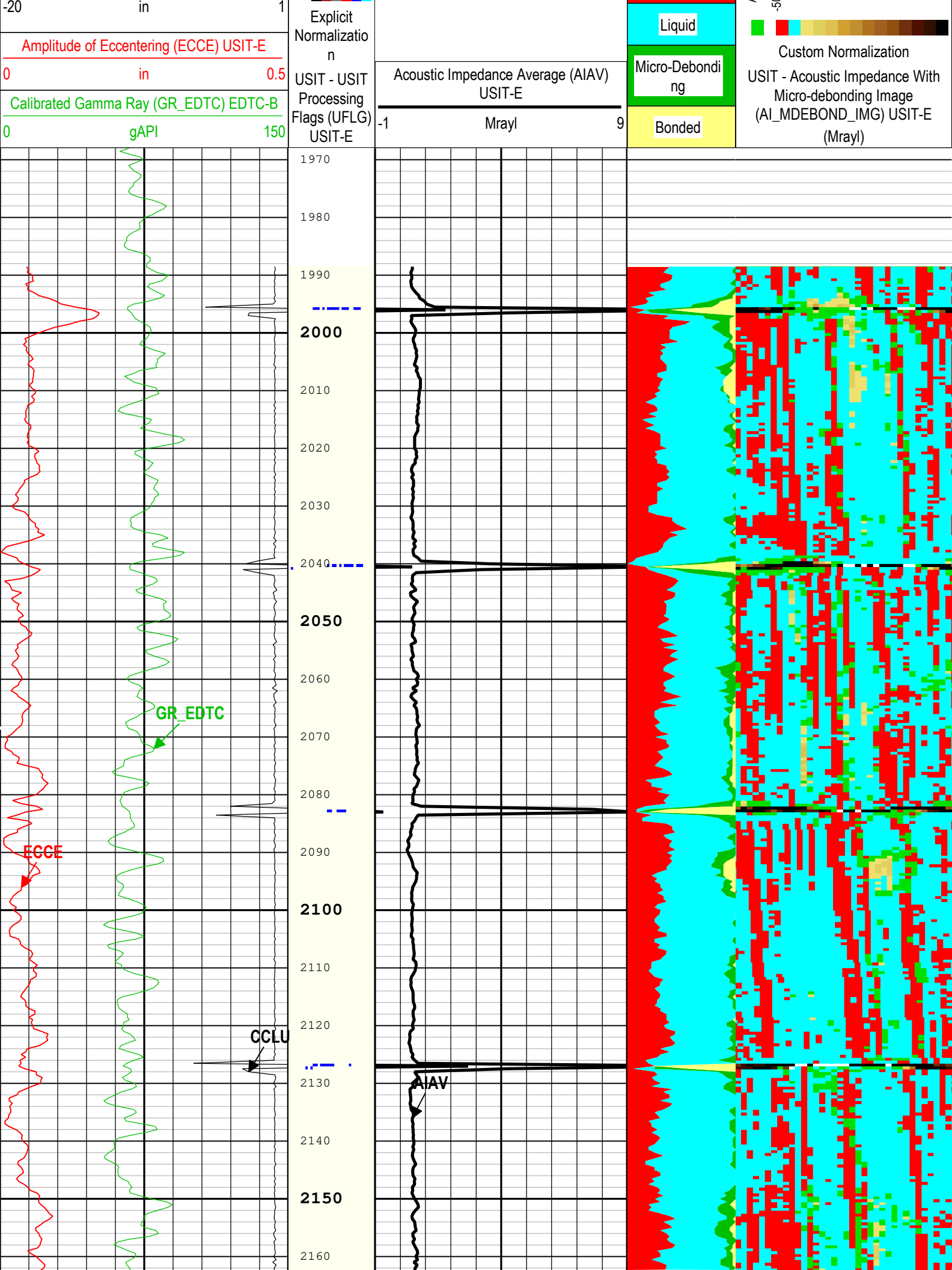
All depths are referenced to toolstring zero

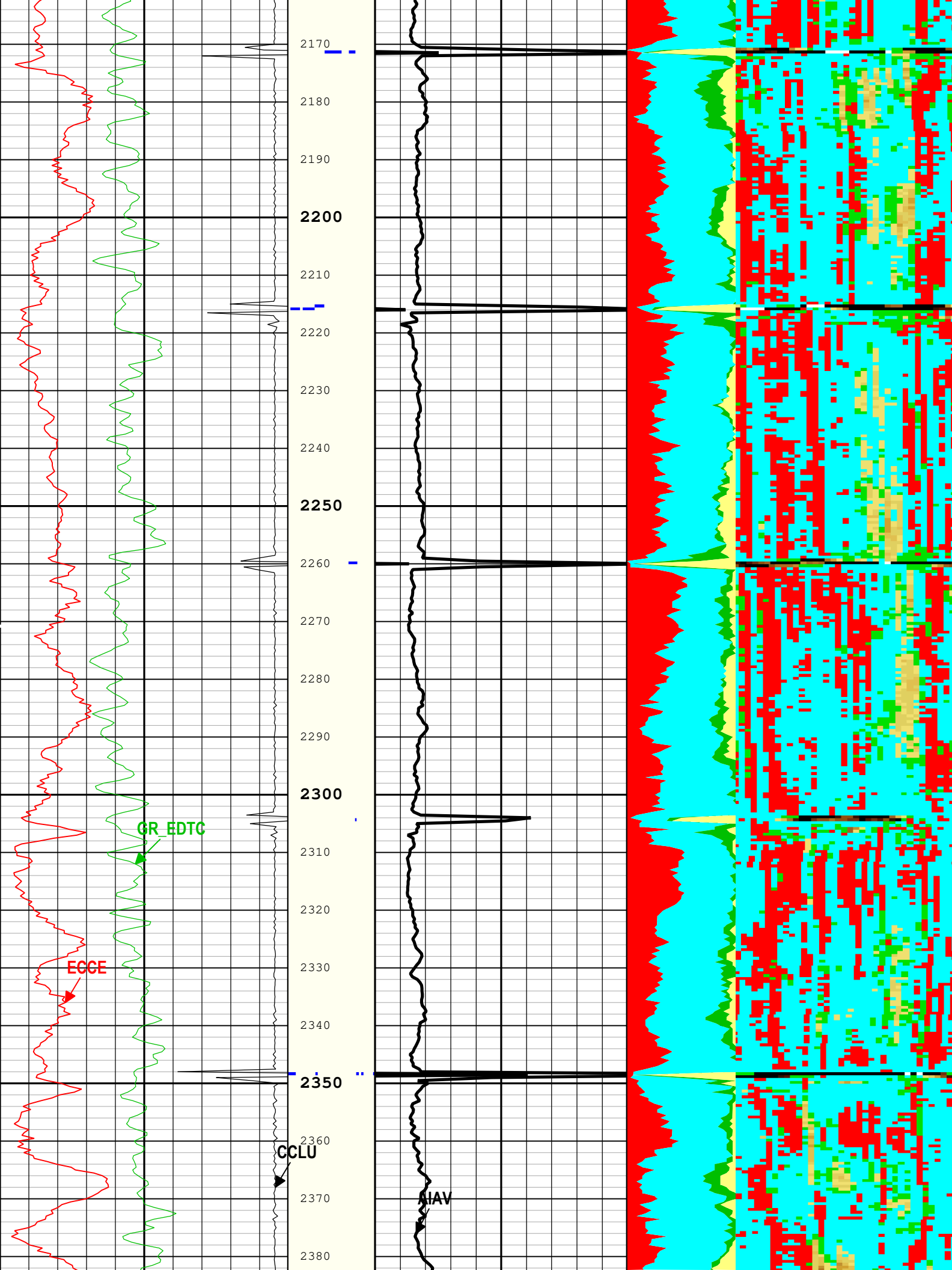
Log	Company:NOBLE ENERGY INC	Well:WELLS RANCH STATE AA36-673
	ONE: Log[3]:Up:S004	

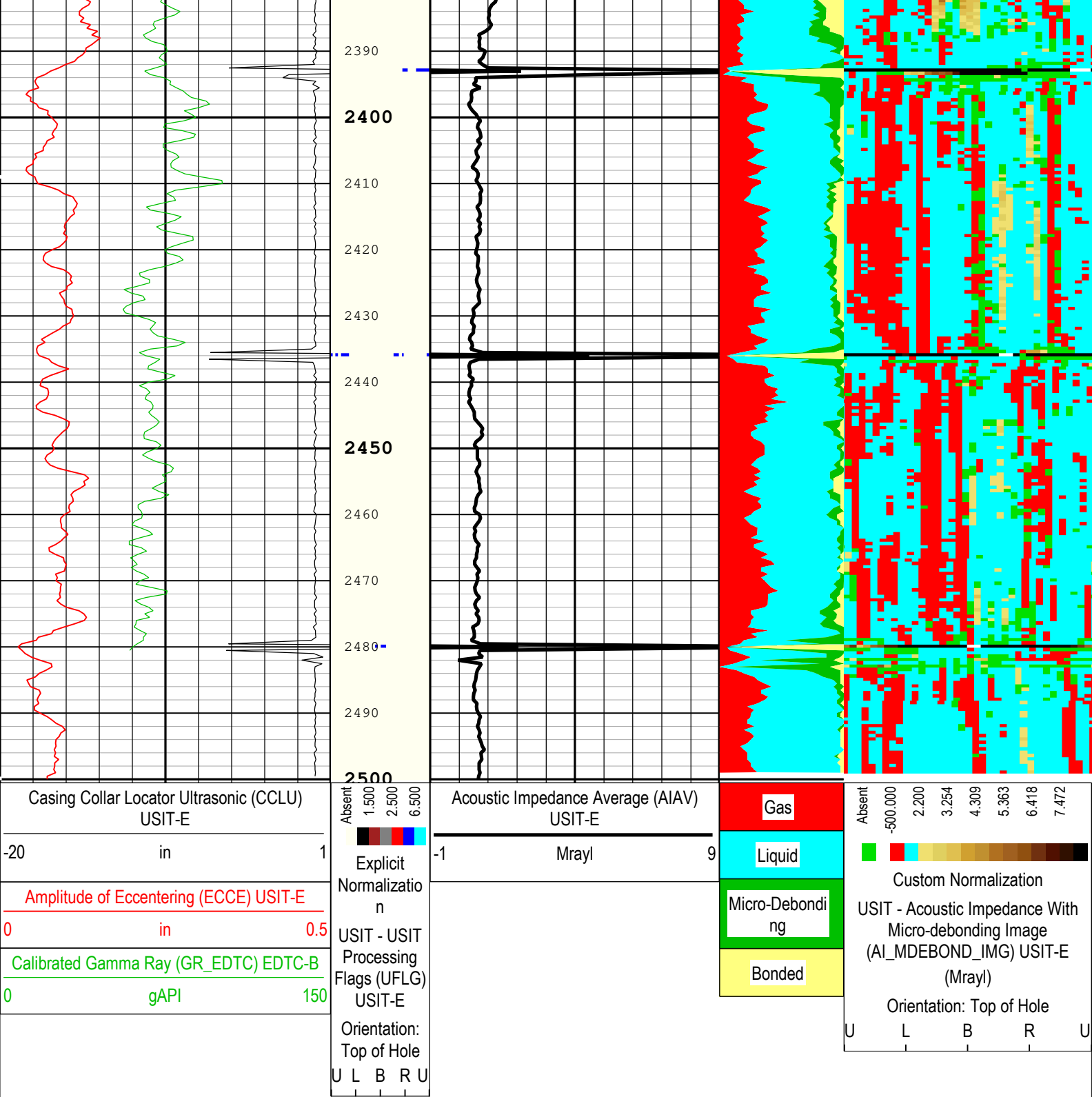
Description:    Format: Log ( DJ Basin Ultrasonic Cement Summary Report )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth  
Creation Date: 03-Dec-2019 15:32:15

TIME\_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E	<div><div>U L B R U</div><div>Orientation: Top of Hole</div><div><div>Absent</div><div>1.500</div><div>2.500</div><div>6.500</div></div></div>					<div><div>Gas</div></div>	<div><div>U L B R U</div><div>Orientation: Top of Hole</div><div><div>Absent</div><div>00.000</div><div>2.200</div><div>3.254</div><div>4.309</div><div>5.363</div><div>6.418</div><div>7.472</div></div></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: 03-Dec-2019 15:32:15

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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	RB	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.55	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	Theoretical	
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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
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AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
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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

XYZ

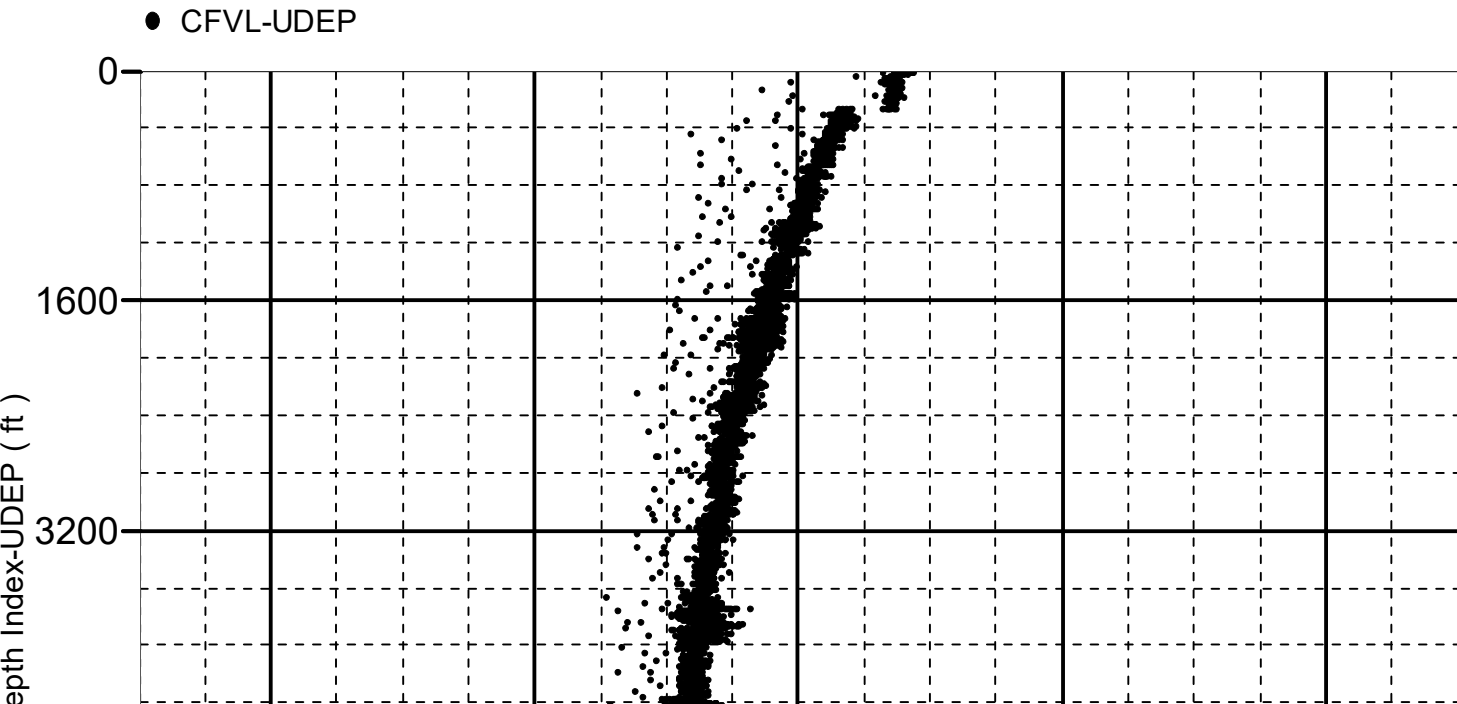
Company:NOBLE ENERGY INC Well:WELLS RANCH STATE AA36-673

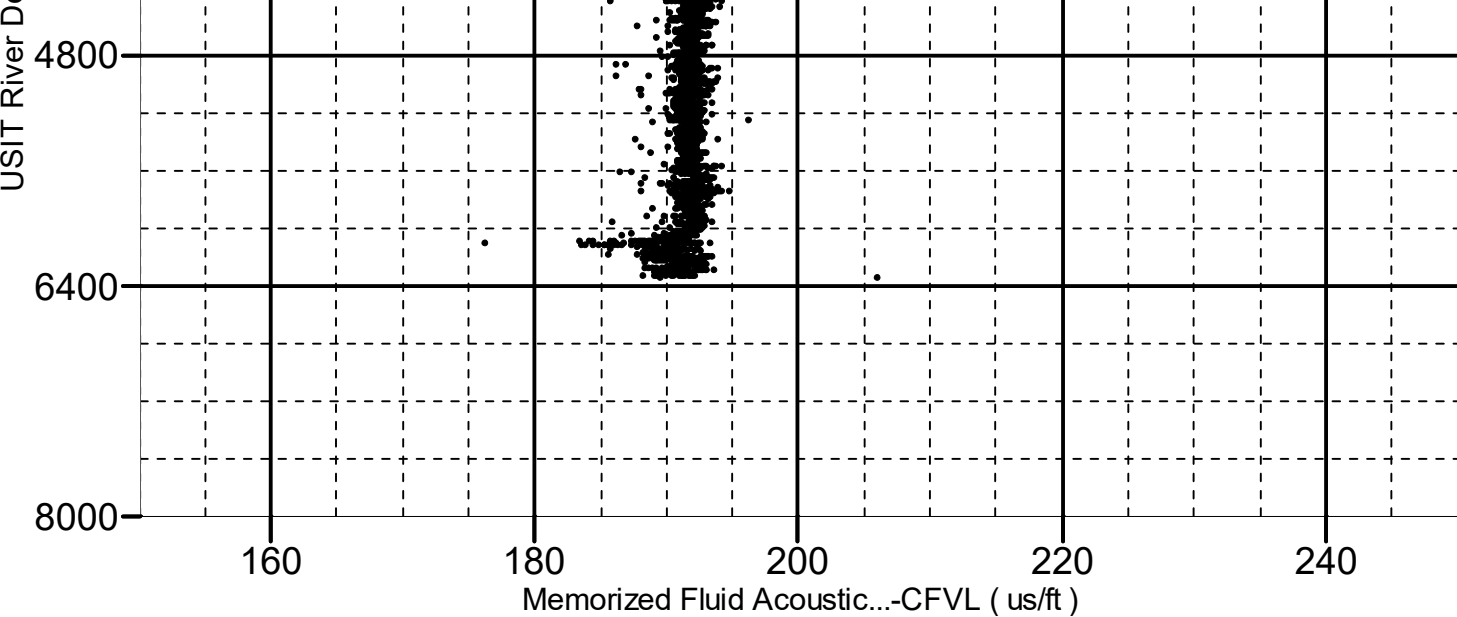
ONE: Log[5]:Up:S004

# Fluid Acoustic Slowness vs Depth

## 2D Cross Plot

Index Range: From 6342.50 to 16.50 ft



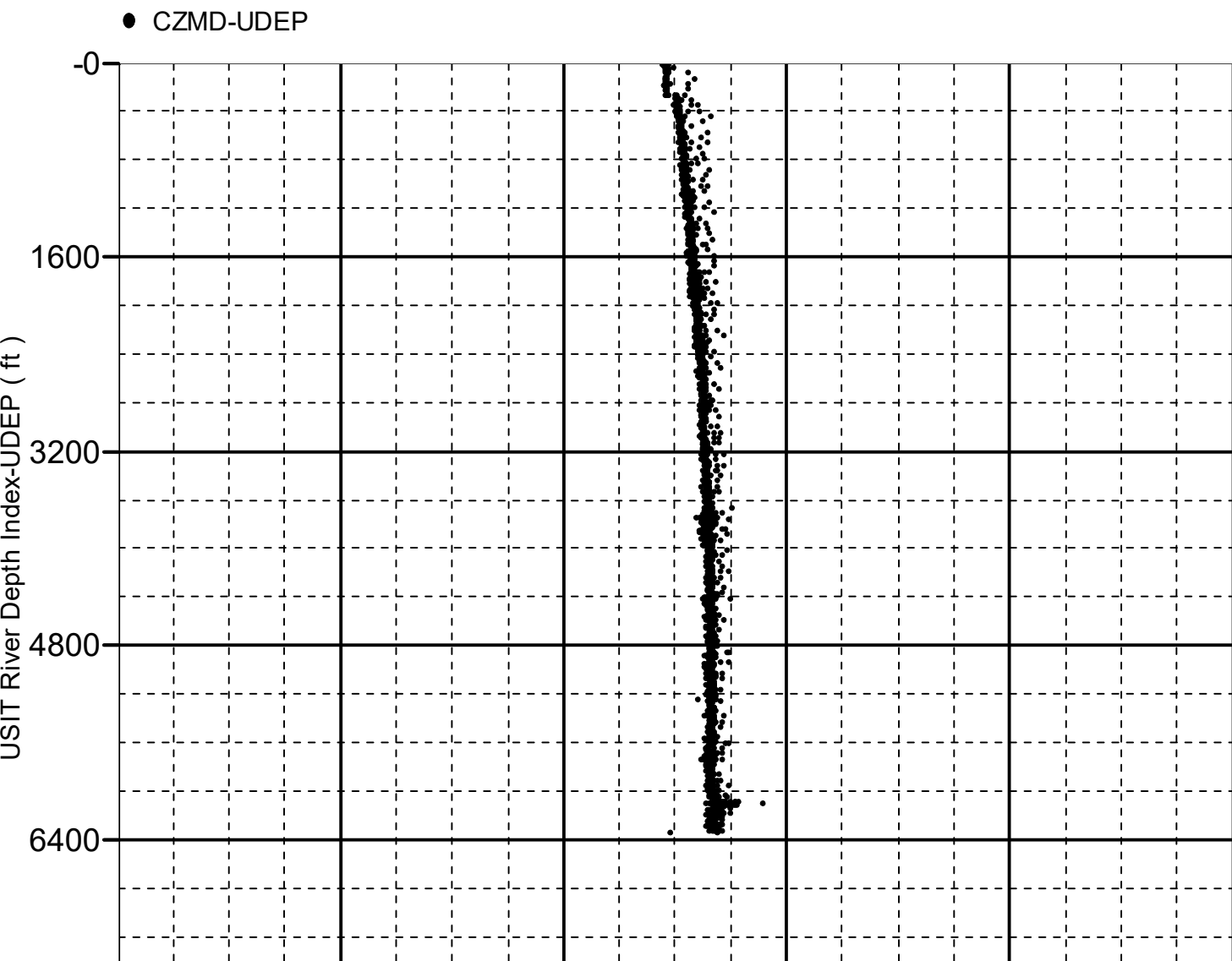


XYZ Company:NOBLE ENERGY INC Well:WELLS RANCH STATE AA36-673 ONE: Log[5]:Up:S004

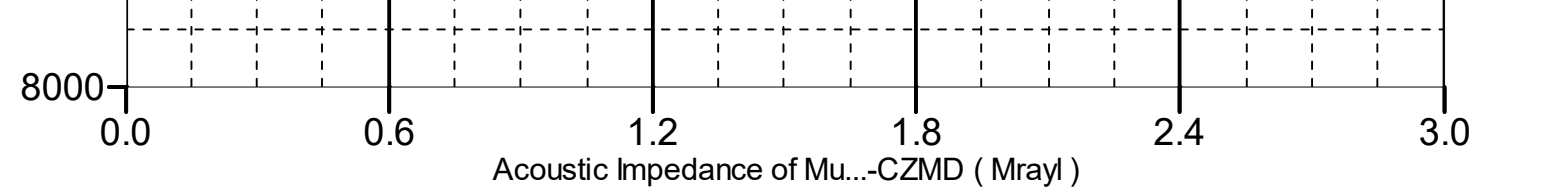
## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6342.50 to 16.50 ft







Company:	NOBLE ENERGY INC	Schlumberger
Well:	WELLS RANCH STATE AA36-673	
Field:	WATTENBERG	
County:	WELD	
State:	COLORADO	
UltraSonic Summary Print		