

Company: Noble Energy Inc.

Well: EMMY H25-744

Field: DJ BASIN

County: Weld State: Colorado

UltraSonic Summary Print

Weld
DJ BASIN
SW SE SEC:25 TWN:3N RNG: 65W
EMMY H25-744
Noble Energy Inc.

Location:		SW SE SEC:25 TWN:3N RNG: 65W	Elev.:	K.B.	4835.00 ft
Permanent Datum:				G.L.	4805.00 ft
Log Measured From:				D.F.	4835.00 ft
Drilling Measured From:					
API Serial No.	Section:	Township:	Range:		
05-123-46970	25	3N	65W		

Logging Date 04-Nov-2018

Run Number ONE

Depth Driller 17254.00 ft

Schlumberger Depth 6645.00 ft

Bottom Log Interval 6645.00 ft

Top Log Interval 45.00 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 1955.00 ft

To 17254.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade P110

From 0.00 ft

To 17237.70 ft

Max Recorded Temperatures 219 degF

Logger on Bottom 04-Nov-2018 15:35:00

Unit Number 2377

Recorded By Justin Ray

Fort Morgan, CO

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.

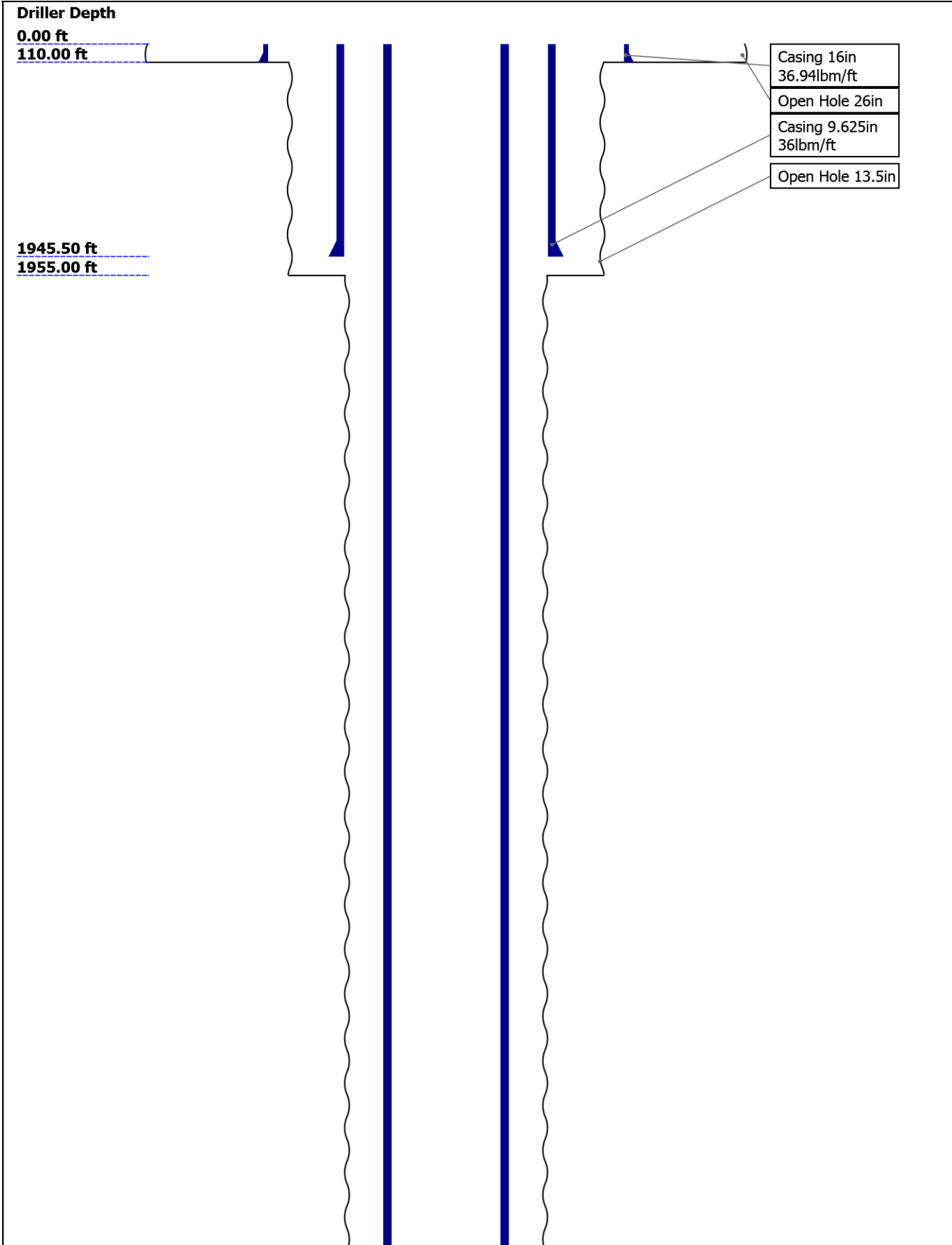
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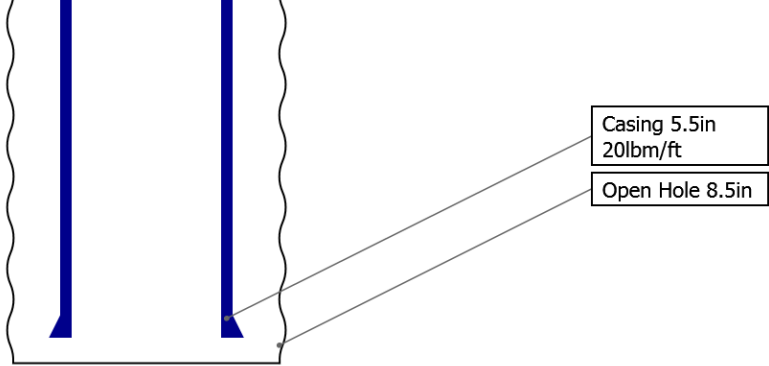
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Well Sketch



17237.70 ft
17254.00 ft



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1955			
Top Logger (ft)	0	110	1955			
Bottom Driller (ft)	110	1955	17254			
Bottom Logger (ft)	110	1955	17254			
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	1945.5	17237.7			
Bottom Logger (ft)	110	1945.5	17237.7			

Remarks and Equipment Summary

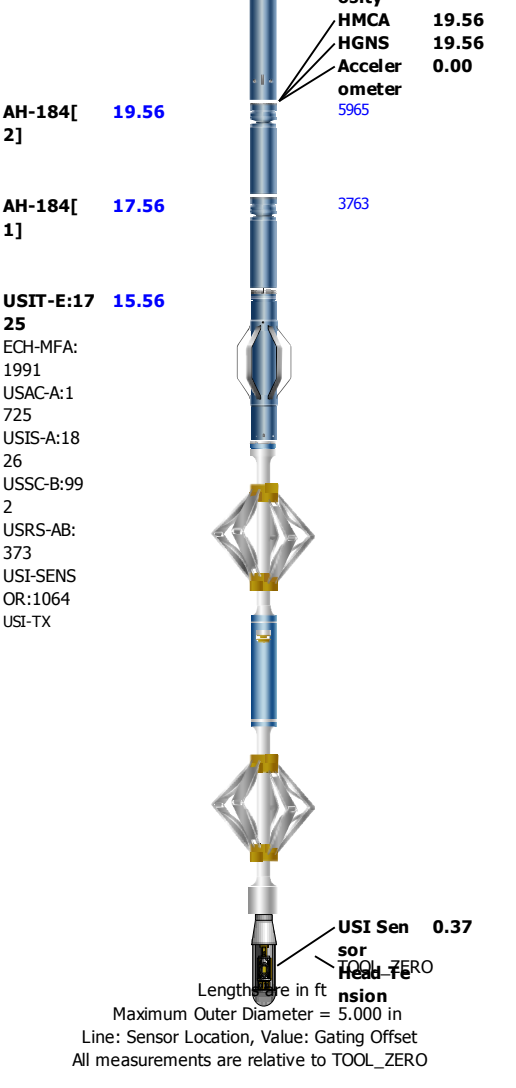
ONE: Toolstring			ONE: Remarks
<div><div><div>Equip nameLength</div><div>LEH-QT38.95</div><div>LEH-QT</div></div><div><div>EDTC-B:9316</div><div>EDTH-B:9373</div><div>EDTG-A:79527</div><div>EDTC-B:9316</div></div><div><div>HGNS-H:4736</div><div>HGNH:2987</div><div>NSR-F:5070</div><div>NPV-N</div><div>HACCZ-H:5118</div><div>HMCA-H</div><div>HGNS-H:4736</div></div></div> <div></div> <div><div>MP nameOffset</div><div>CTEM31.97</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamma30.1</div><div>Ray</div><div>TelStatu28.97</div><div>s</div><div>Temper28.94</div><div>ature</div><div>GR28.23</div><div>CNL Por21.89</div><div>osity</div></div>	Toolstring ran as per tool sketch		
	Gemcos, booster, and two knuckles ran for tool centralization		
	Main pass ran with 2500 PSI. Repeat pass ran with 0 PSI		
	Thank you for choosing Schlumberger		

Toolstring ran as per tool sketch

Gemcos, booster, and two knuckles ran for tool centralization

Main pass ran with 2500 PSI. Repeat pass ran with 0 PSI

Thank you for choosing Schlumberger



Depth Summary

	ONE		
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Depth Measuring Device

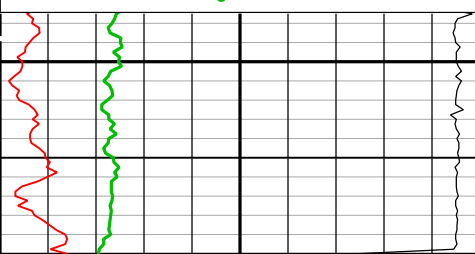

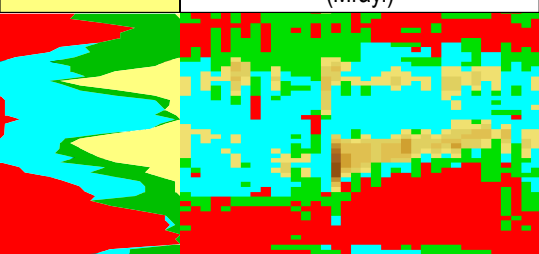
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		

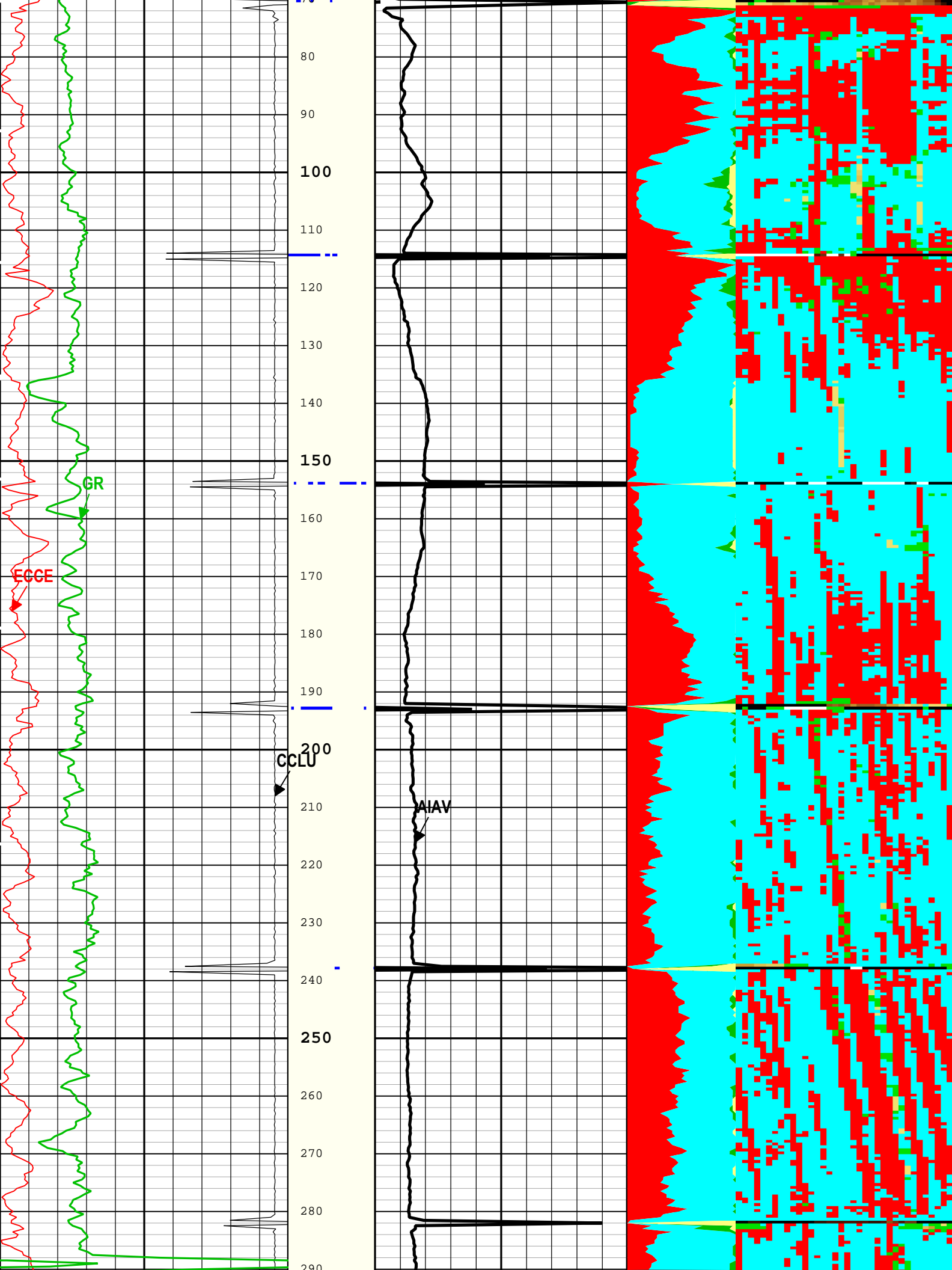
Tension Device

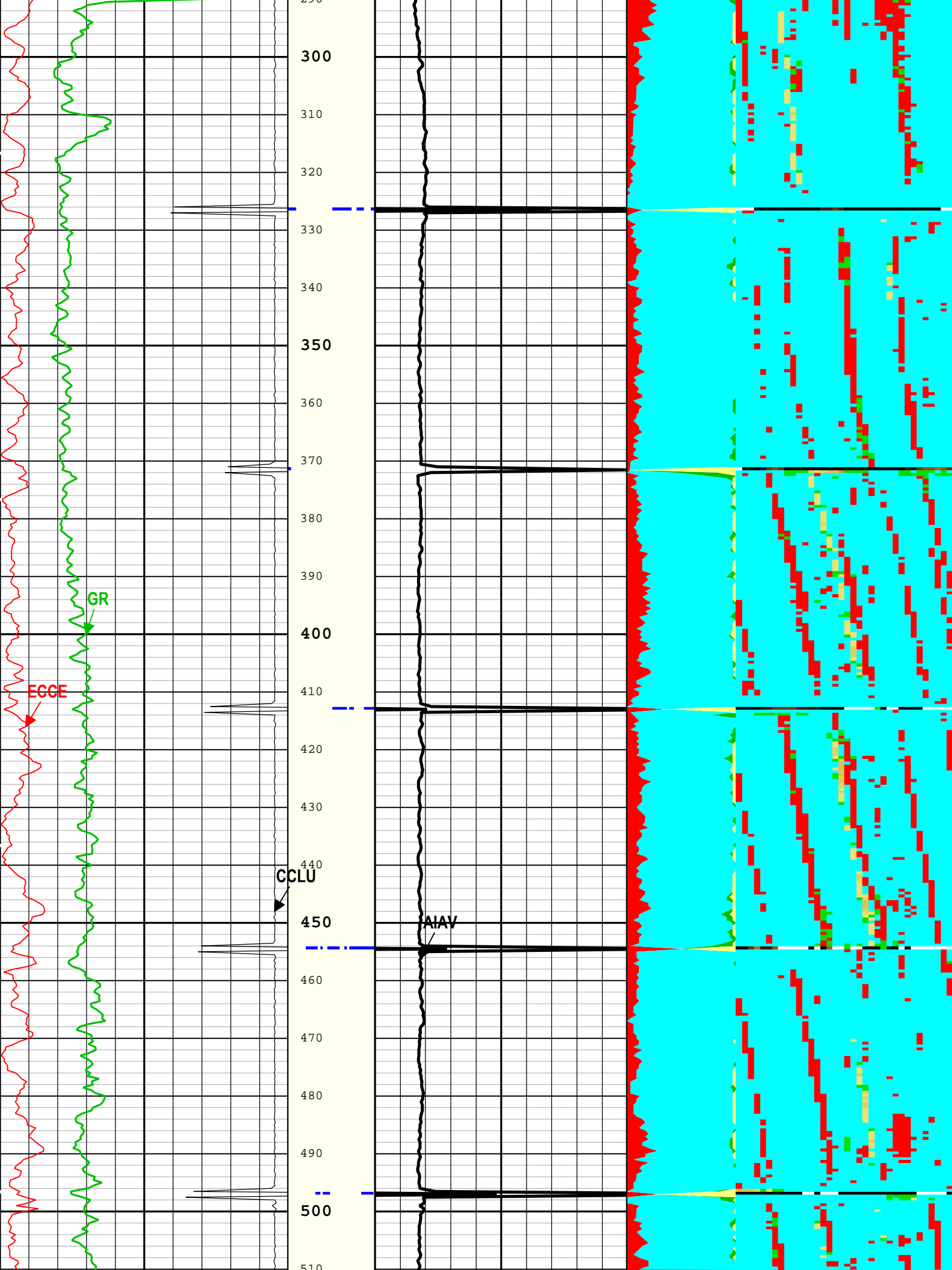
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		

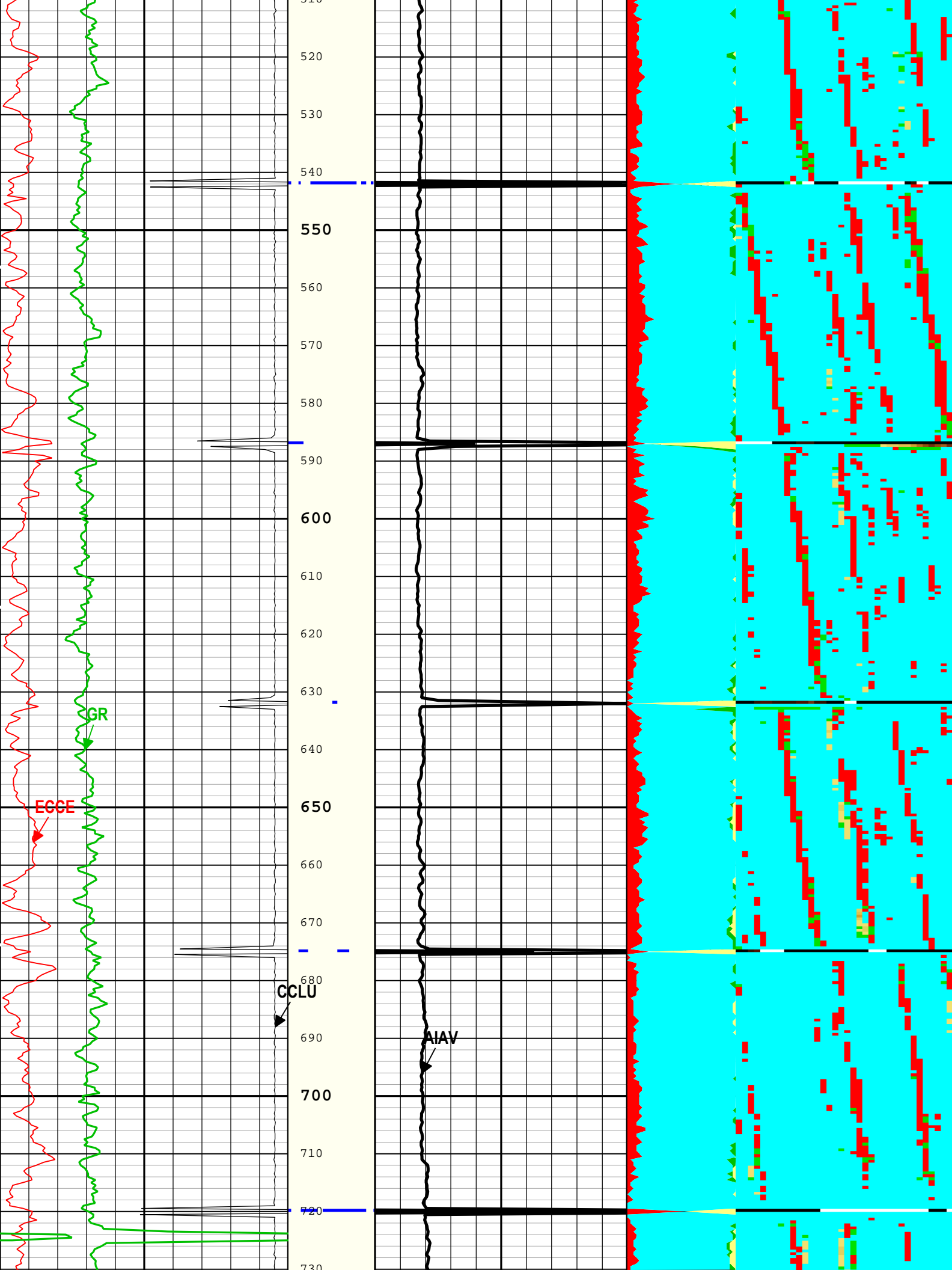
Logging Cable

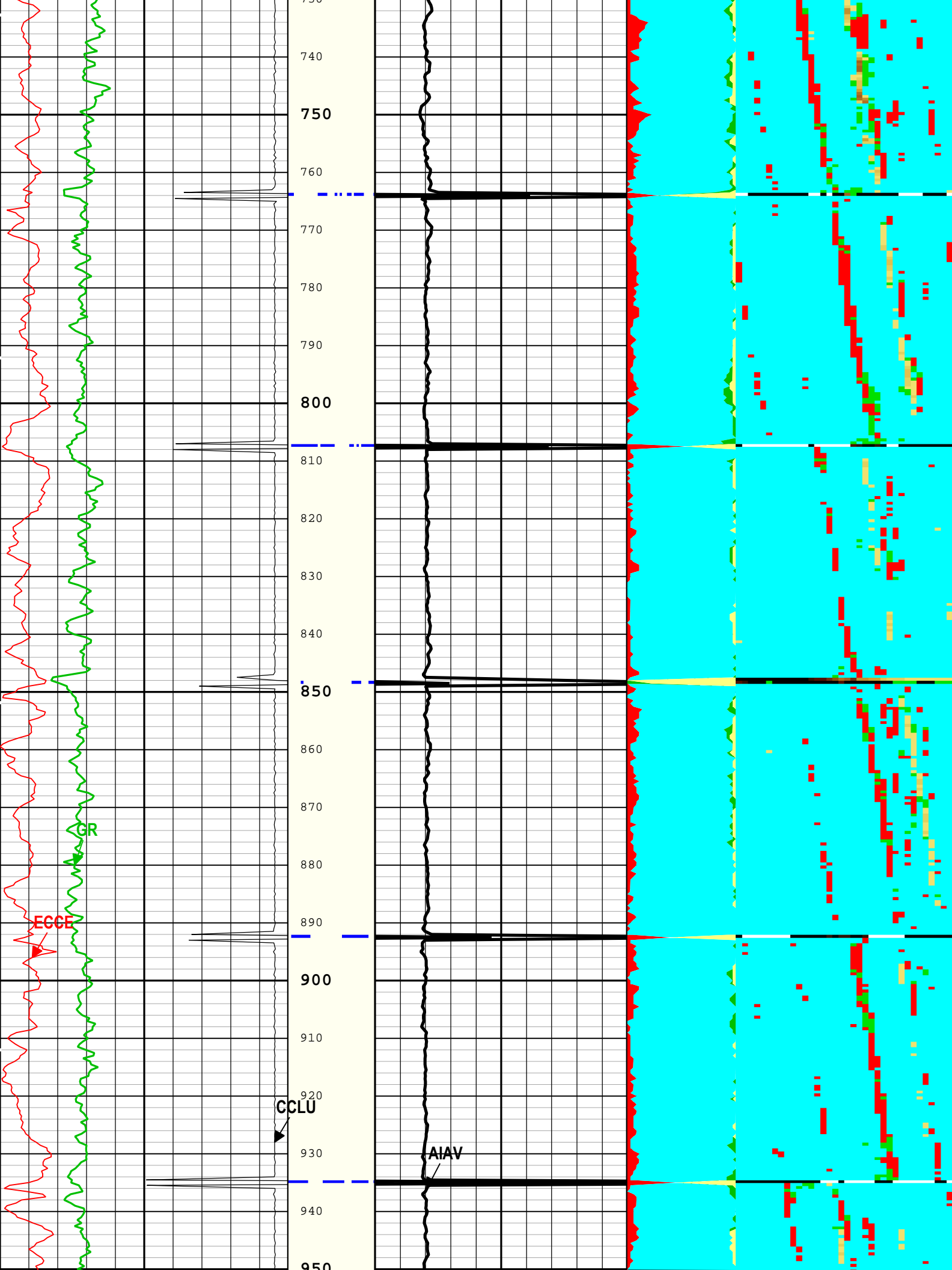
Type	7-46NT-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		

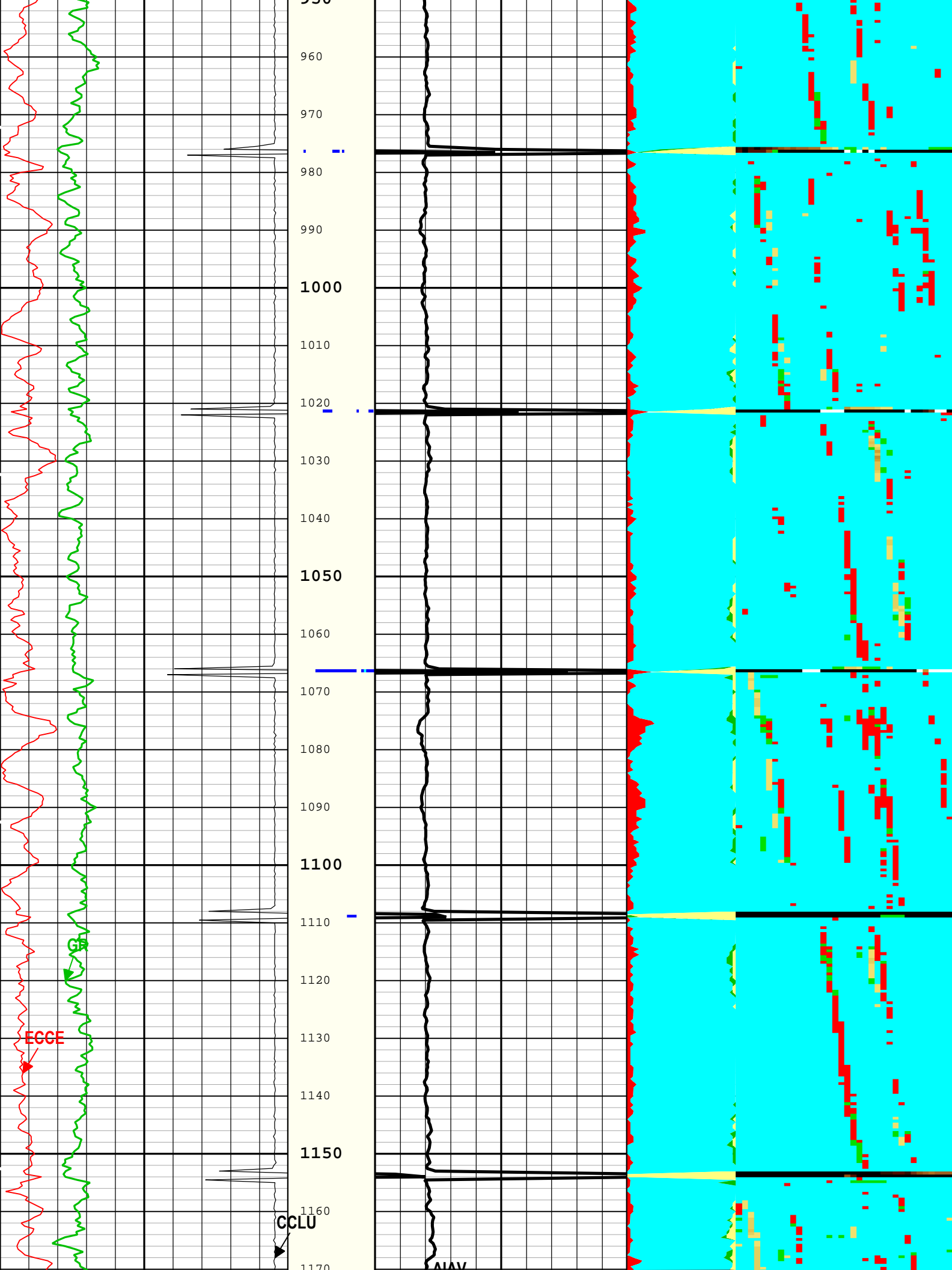
Rig Type		CRANE								
ONE:Depth Control Parameters				Depth Control Remarks						
Log Sequence		First Log In the Well		All Schlumberger depth control procedures followed						
Rig Up Length At Surface				IDW used as primary depth control device						
Rig Up Length At Bottom				Z-Chart used as secondary depth control device						
Rig Up Length Correction				Log correlated to marker joint at 6331.8-6342.7 FT						
Stretch Correction										
Tool Zero Check At Surface										
USIT - Fluid Properties Measurement										
Run Name		Pass Name		Start Depth(ft)		Stop Depth(ft)				
Run 1		Main[4]:Up		6650.02		41.98				
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 : 24.69m(80.99ft) to 28.81m(94.53ft) MUD_N_FRP = 1.04 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.48 MRayl										
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	Main[4]:Up	Up	41.98 ft	6650.03 ft	04-Nov-2018 5:17:09 PM	04-Nov-2018 7:13:29 PM	ON	62.74 ft	Yes	
All depths are referenced to toolstring zero										
Log		Company:Noble Energy Inc. Well:EMMY H25-744 ONE: Main[4]:Up:S015								
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: 05-Nov-2018 00:20:31										
TIME_1900 - Time Marked every 60.00 (s)										
Casing Collar Locator Ultrasonic (CCLU) USIT-E			Absent 1,500 2,500 6,500				Gas			Absent -500,000 2,200 3,254 4,309 5,363 6,418 7,472
-20 in 1			Explicit Normalization				Liquid			Custom Normalization
Amplitude of Eccentering (ECCE) USIT-E			USIT - USIT Processing Flags (UFLG) USIT-E				Micro-Debonding			USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
0 in 0.5			Acoustic Impedance Average (AIAV) USIT-E				Bonded			
Calibrated Gamma Ray (GR) HGNS-H			-1 Mrayl 9							
0 gAPI 150										
										

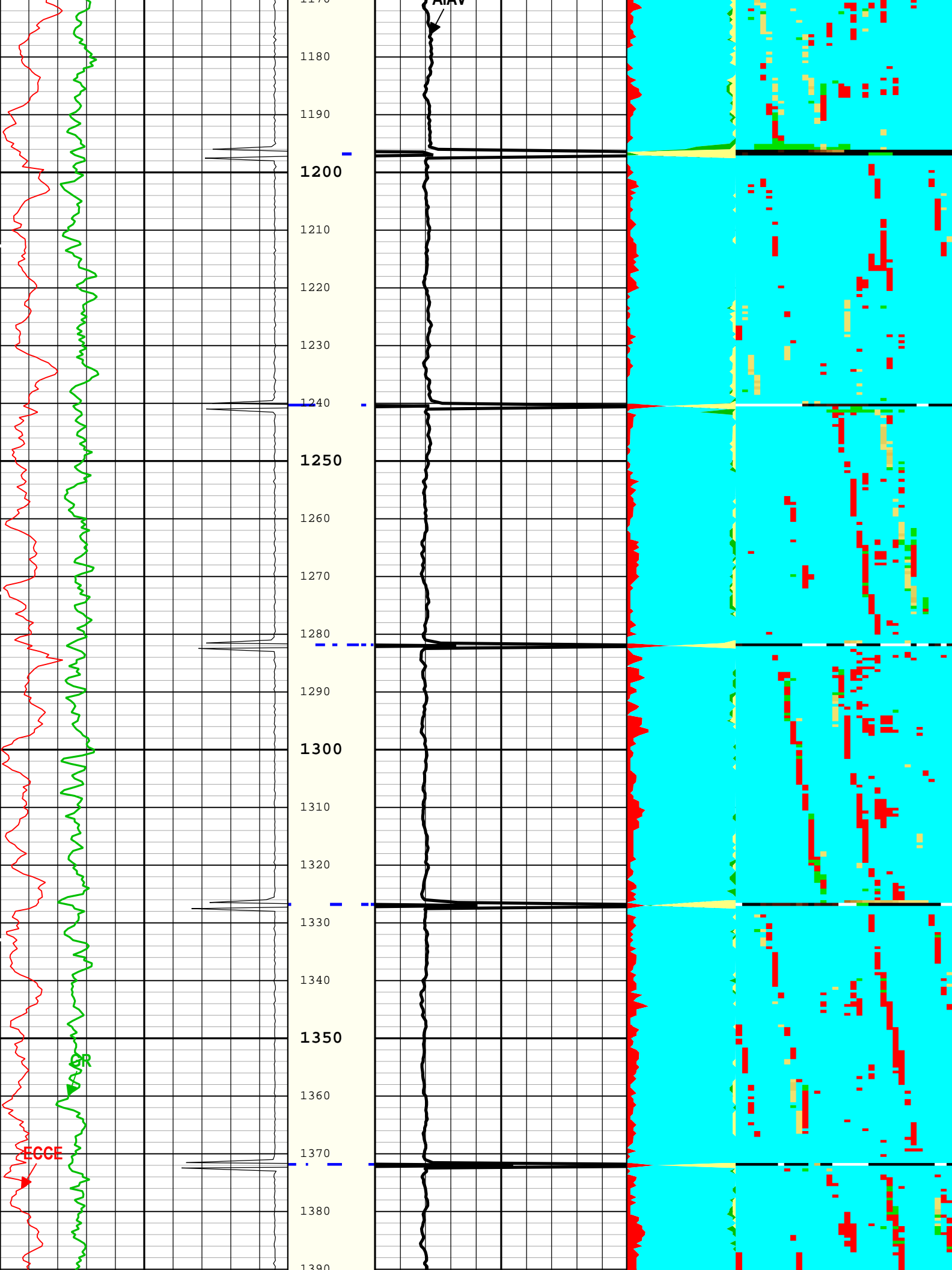


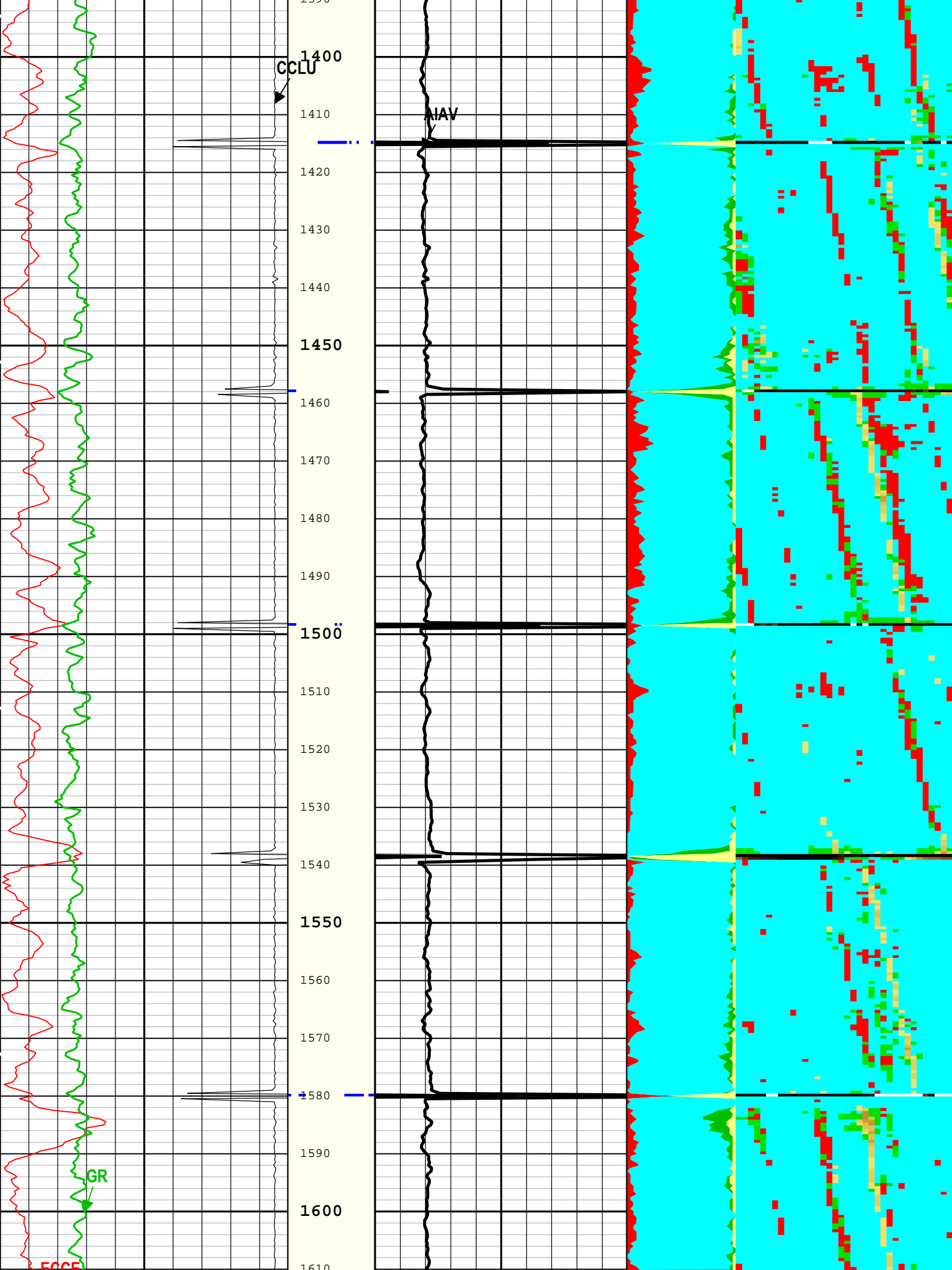


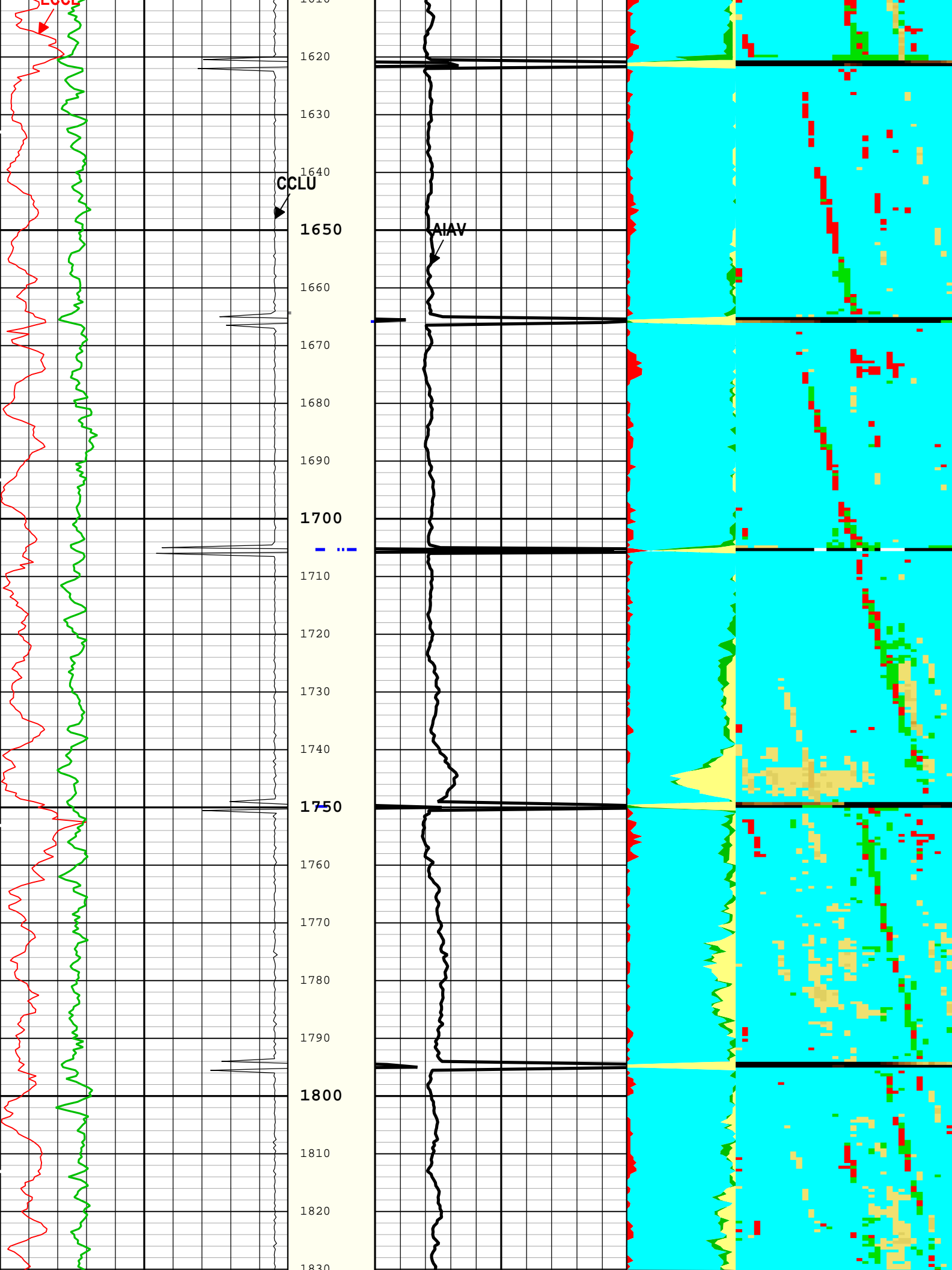


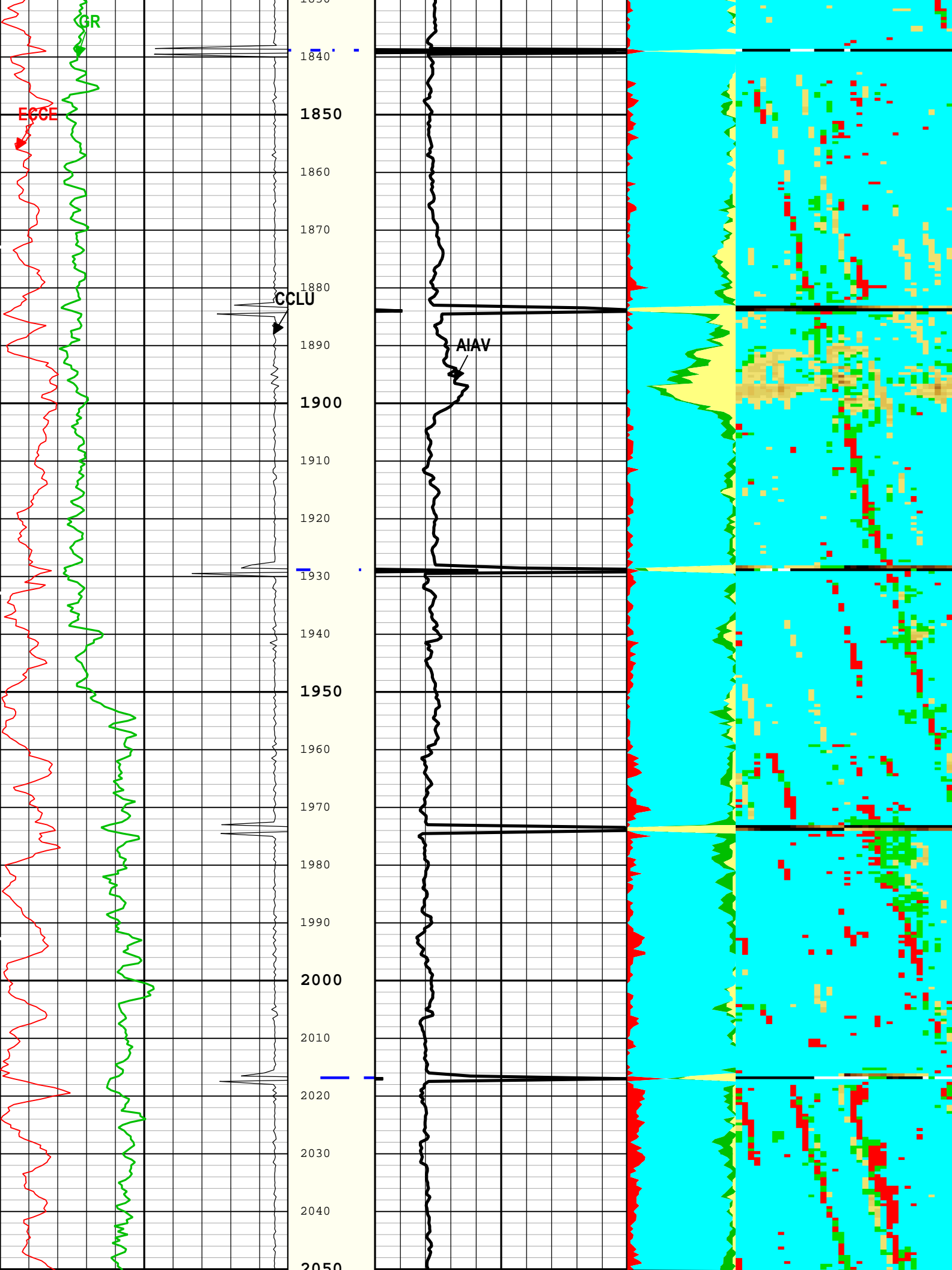


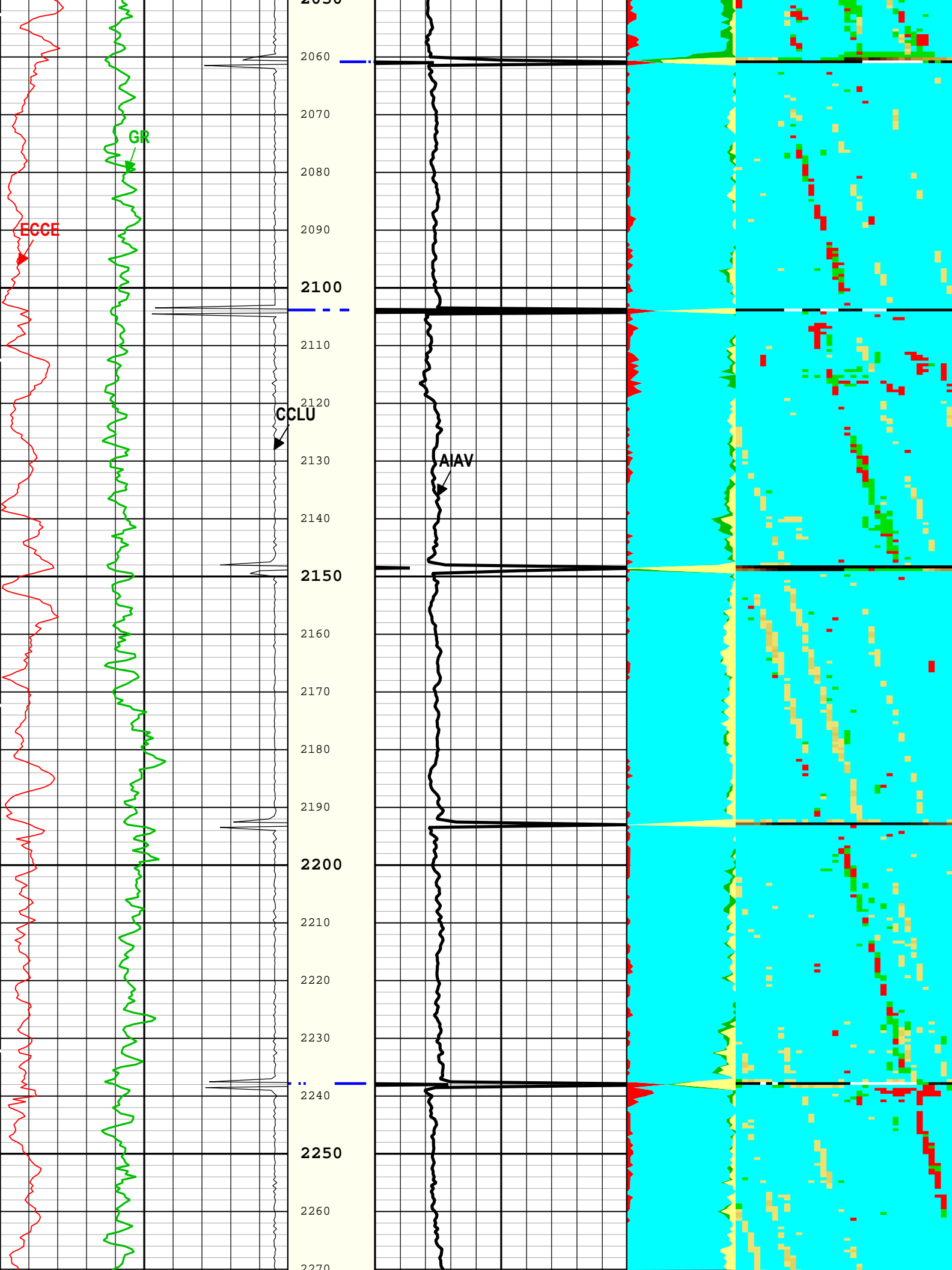


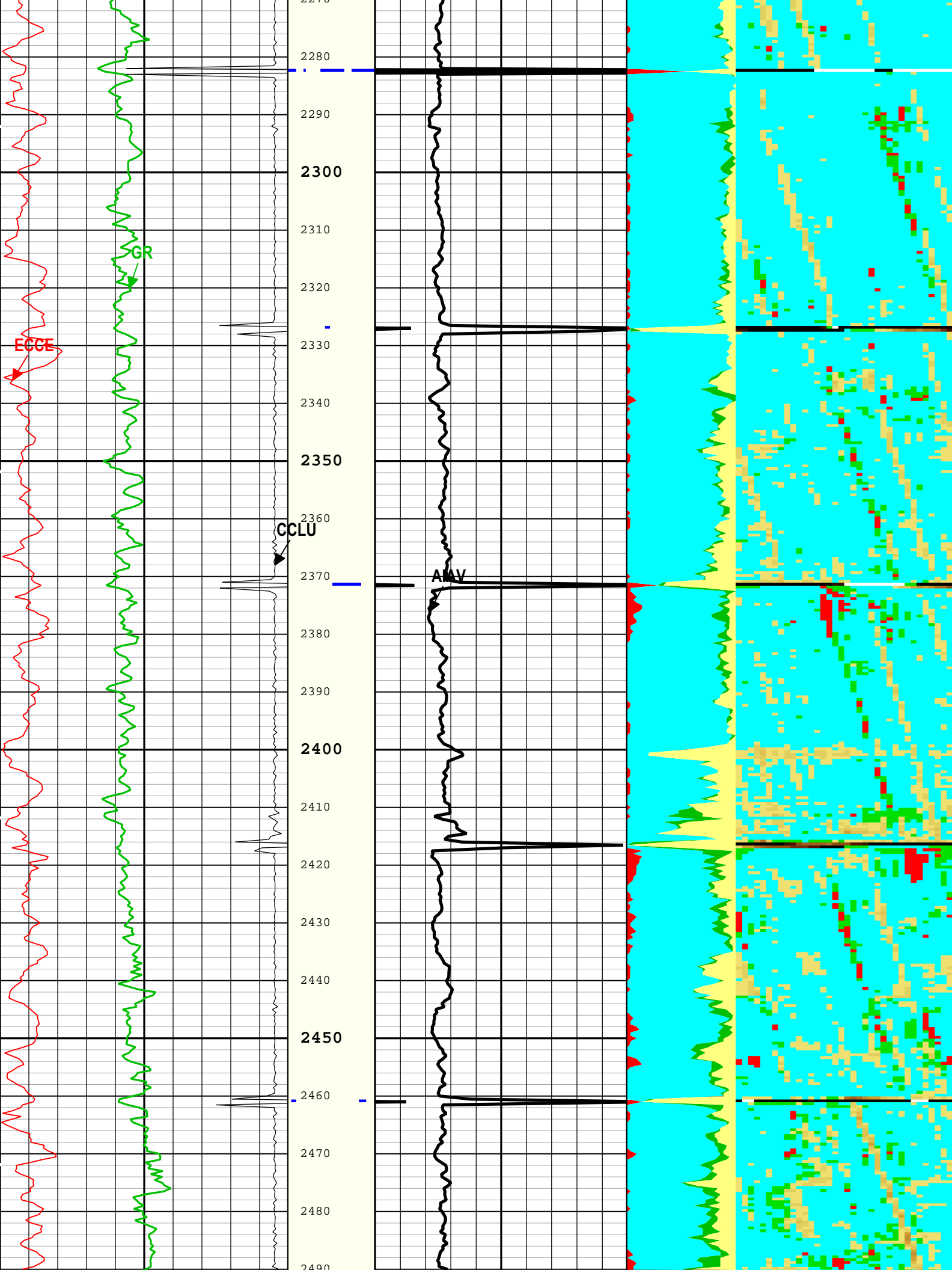


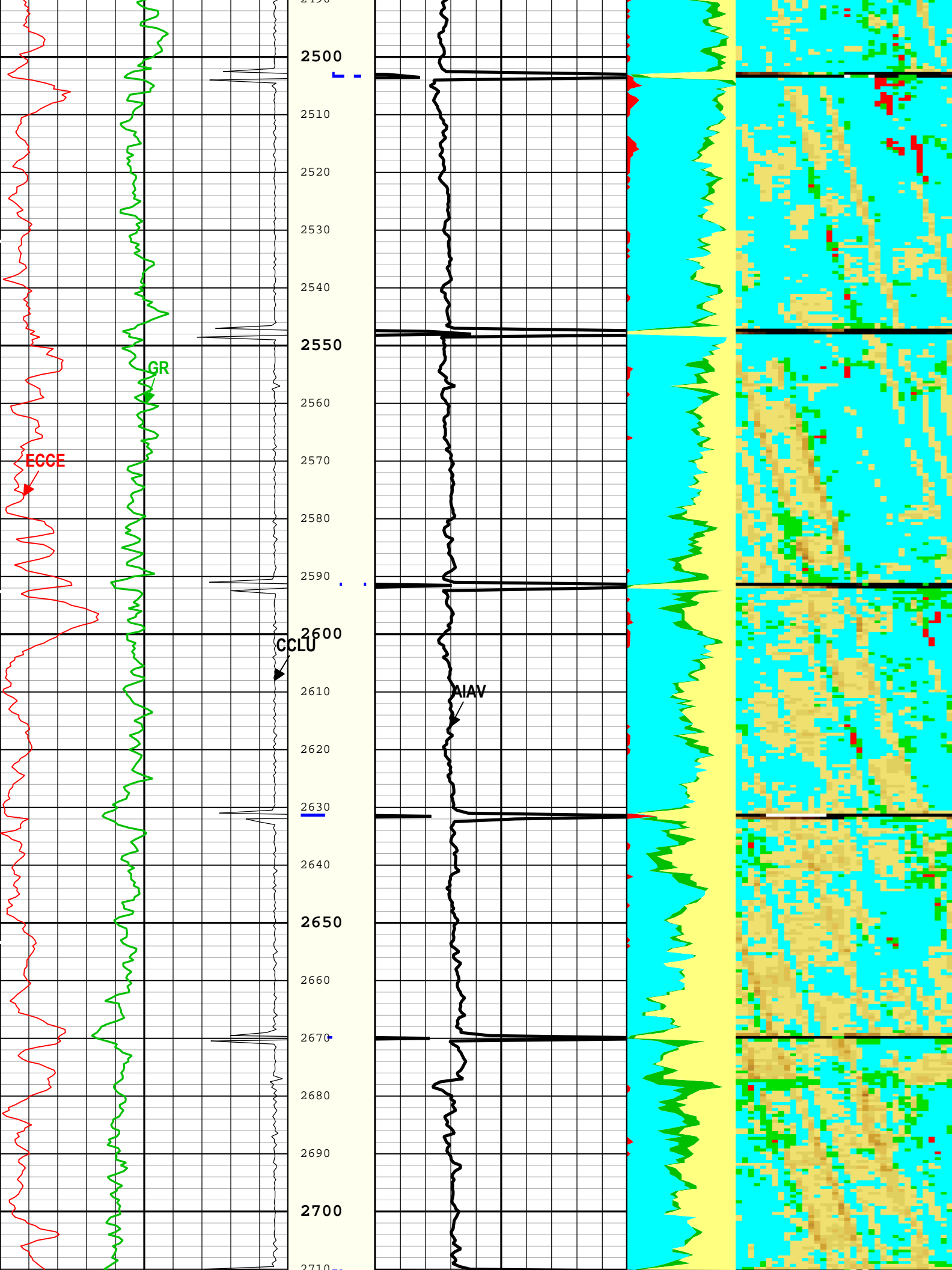


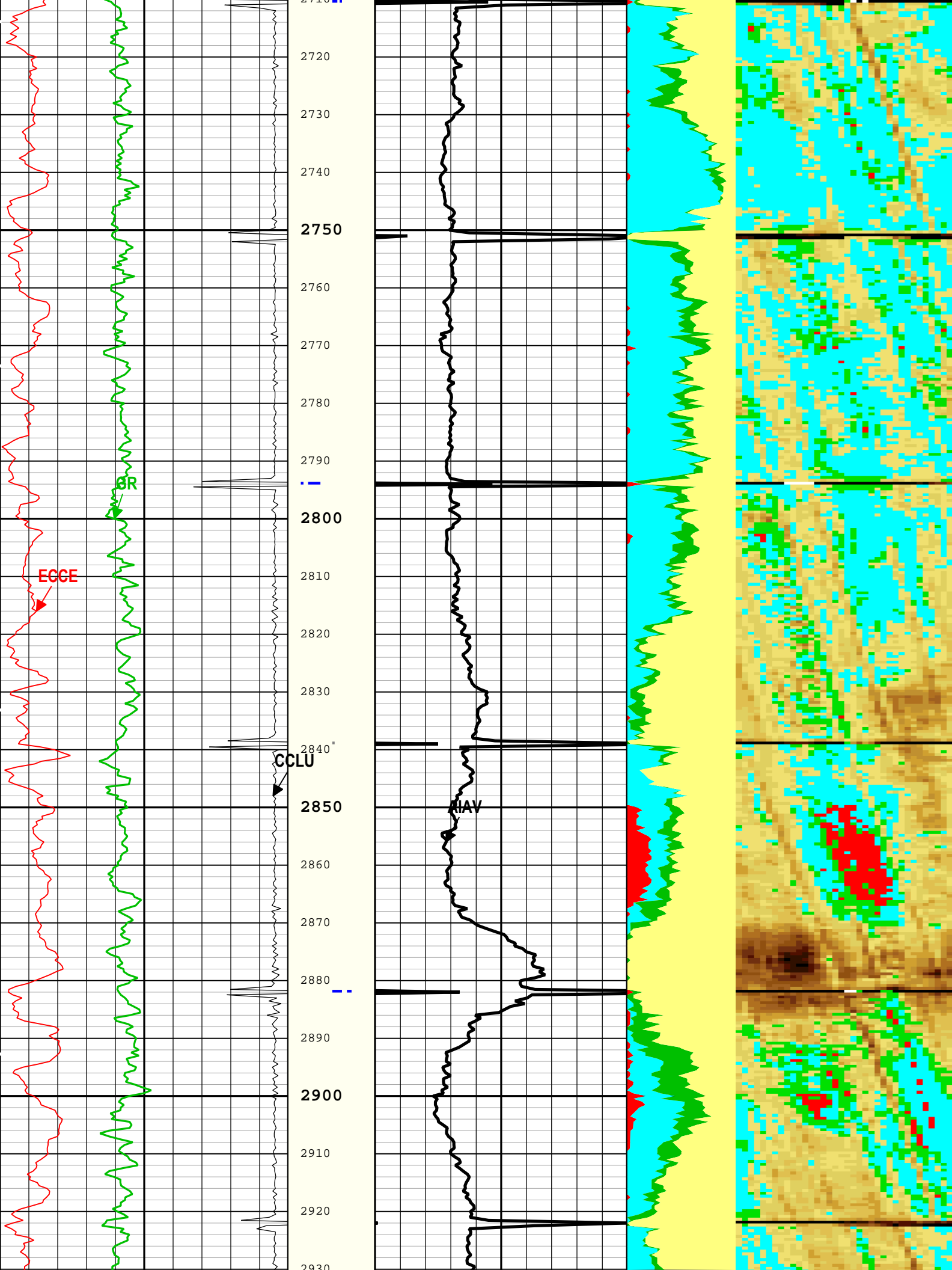


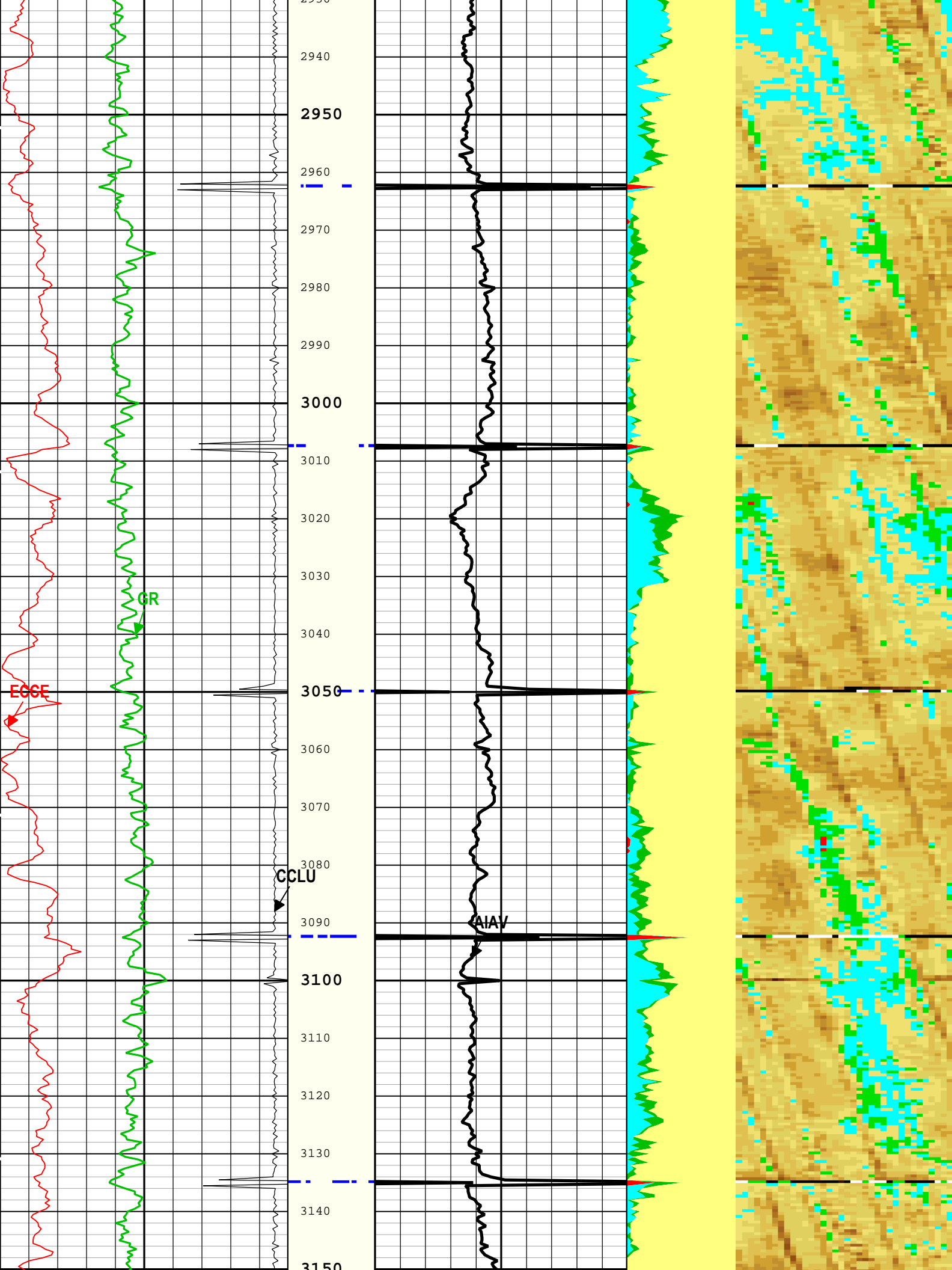


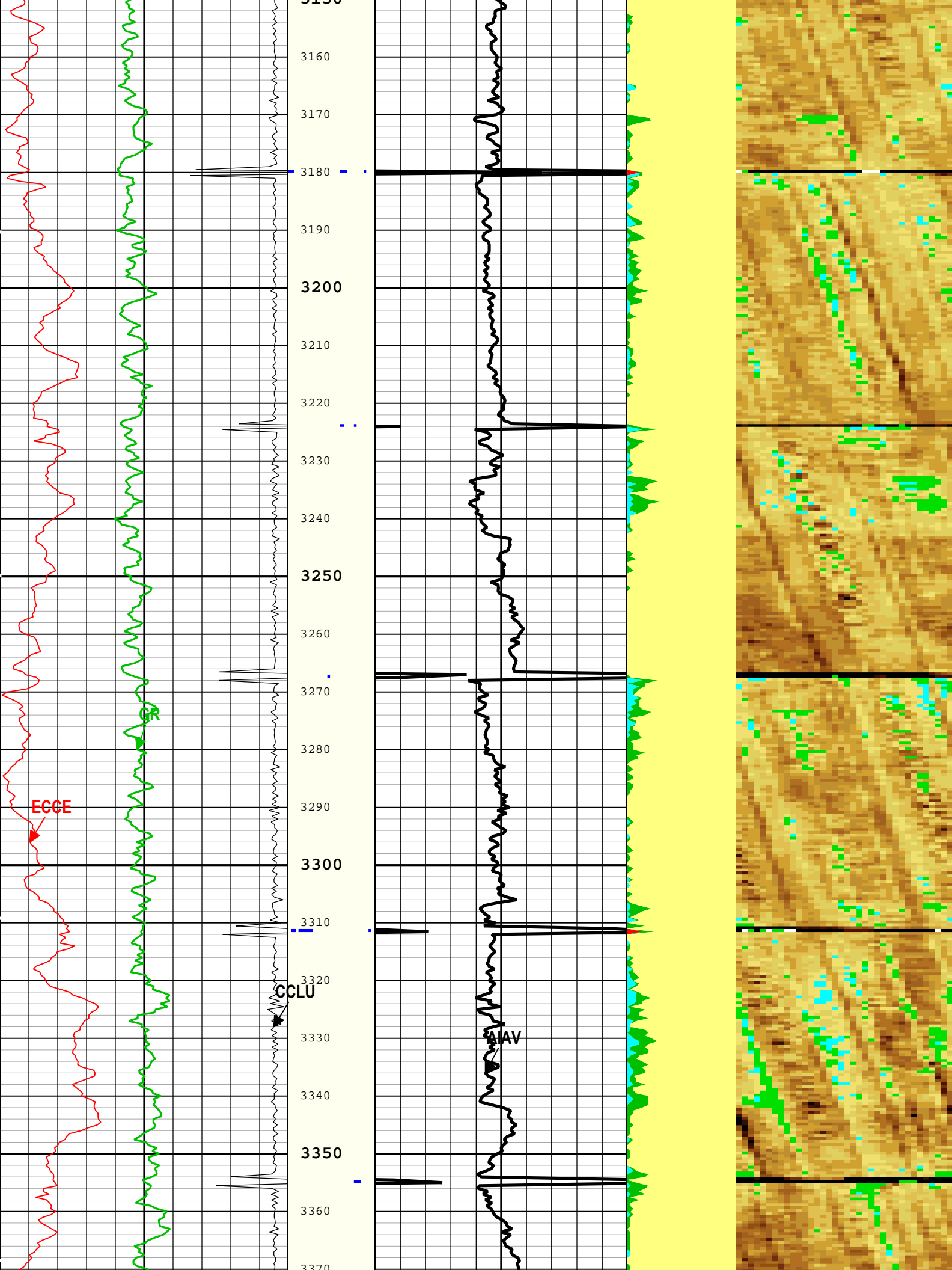


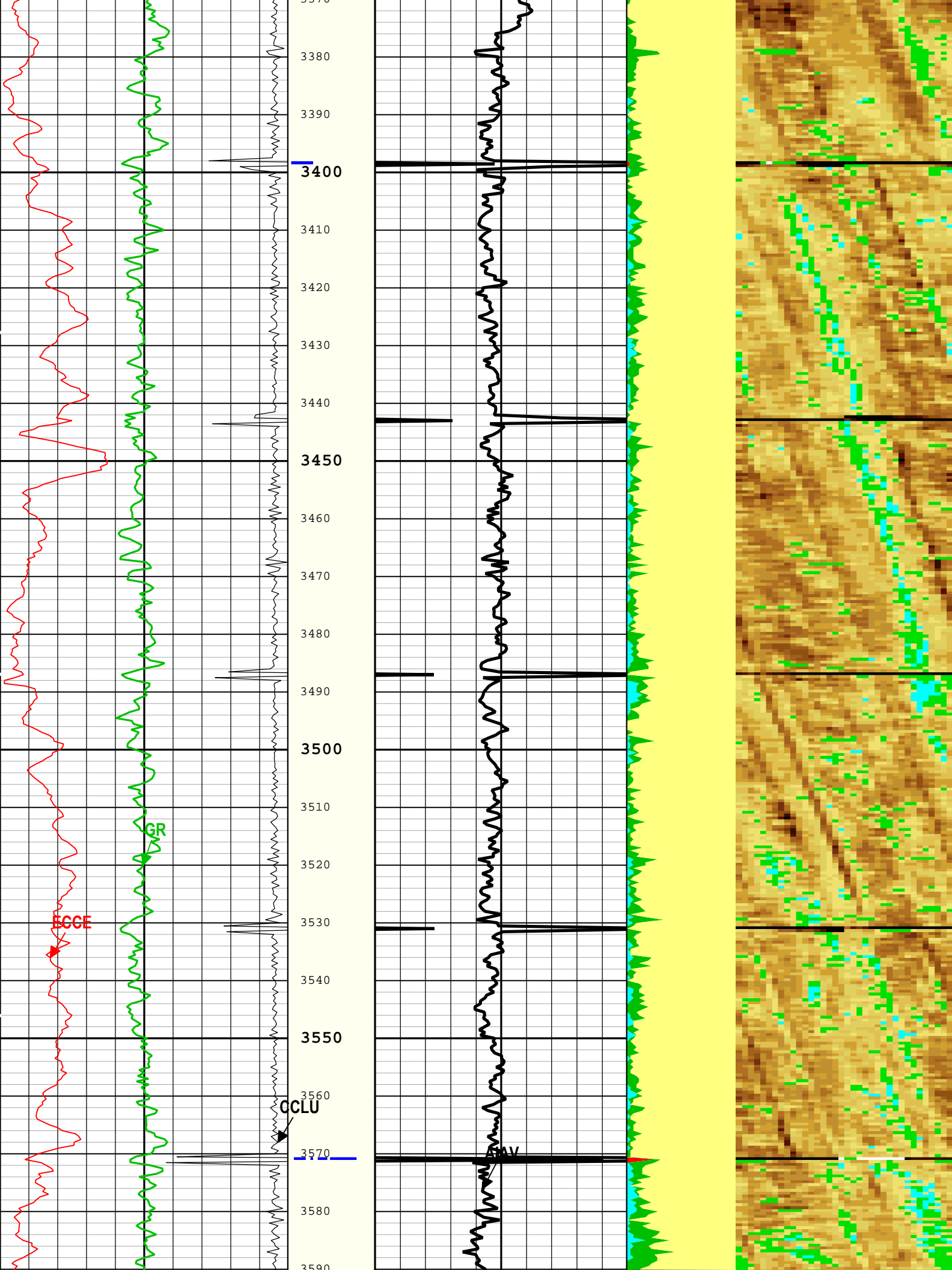


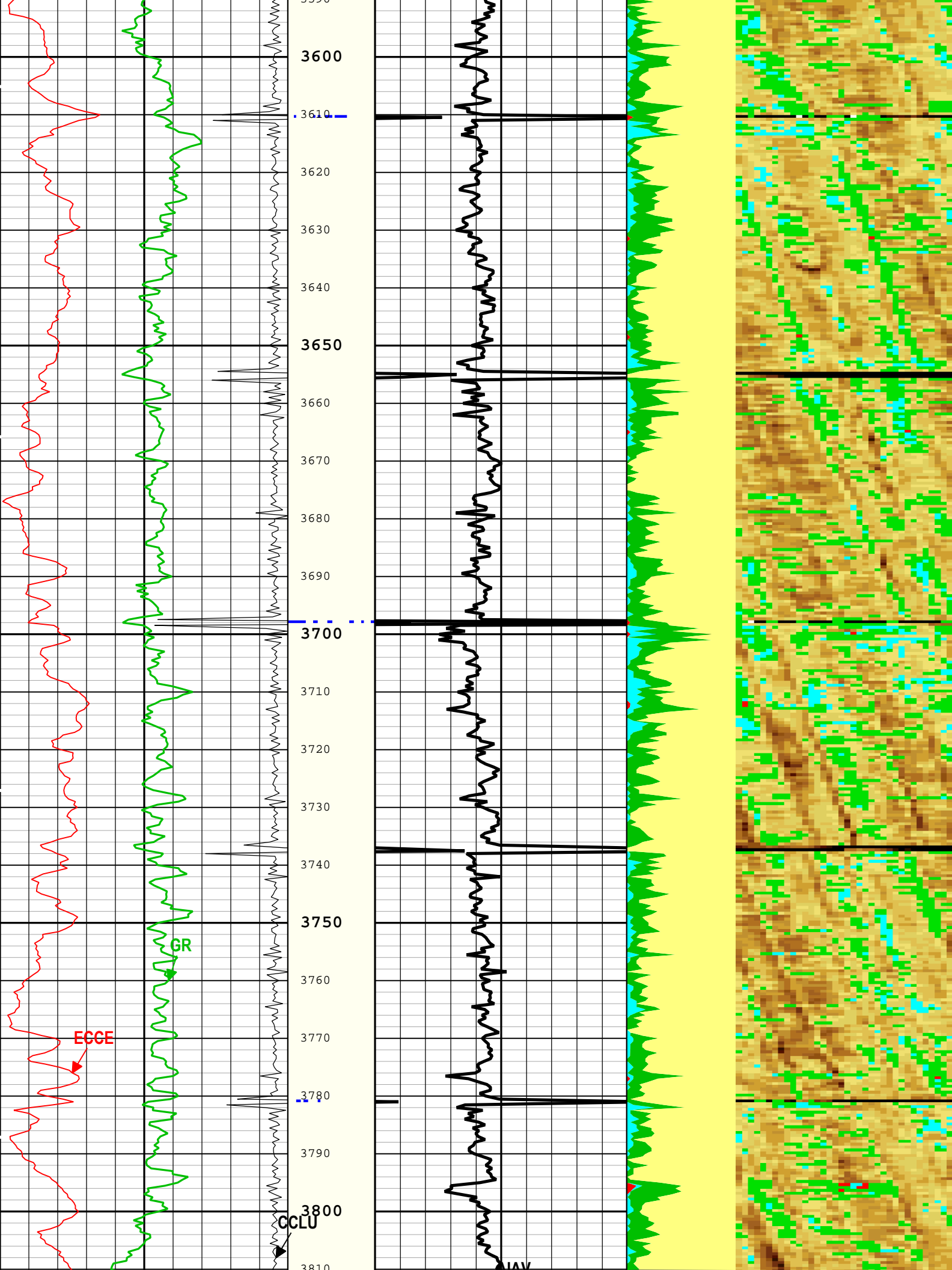


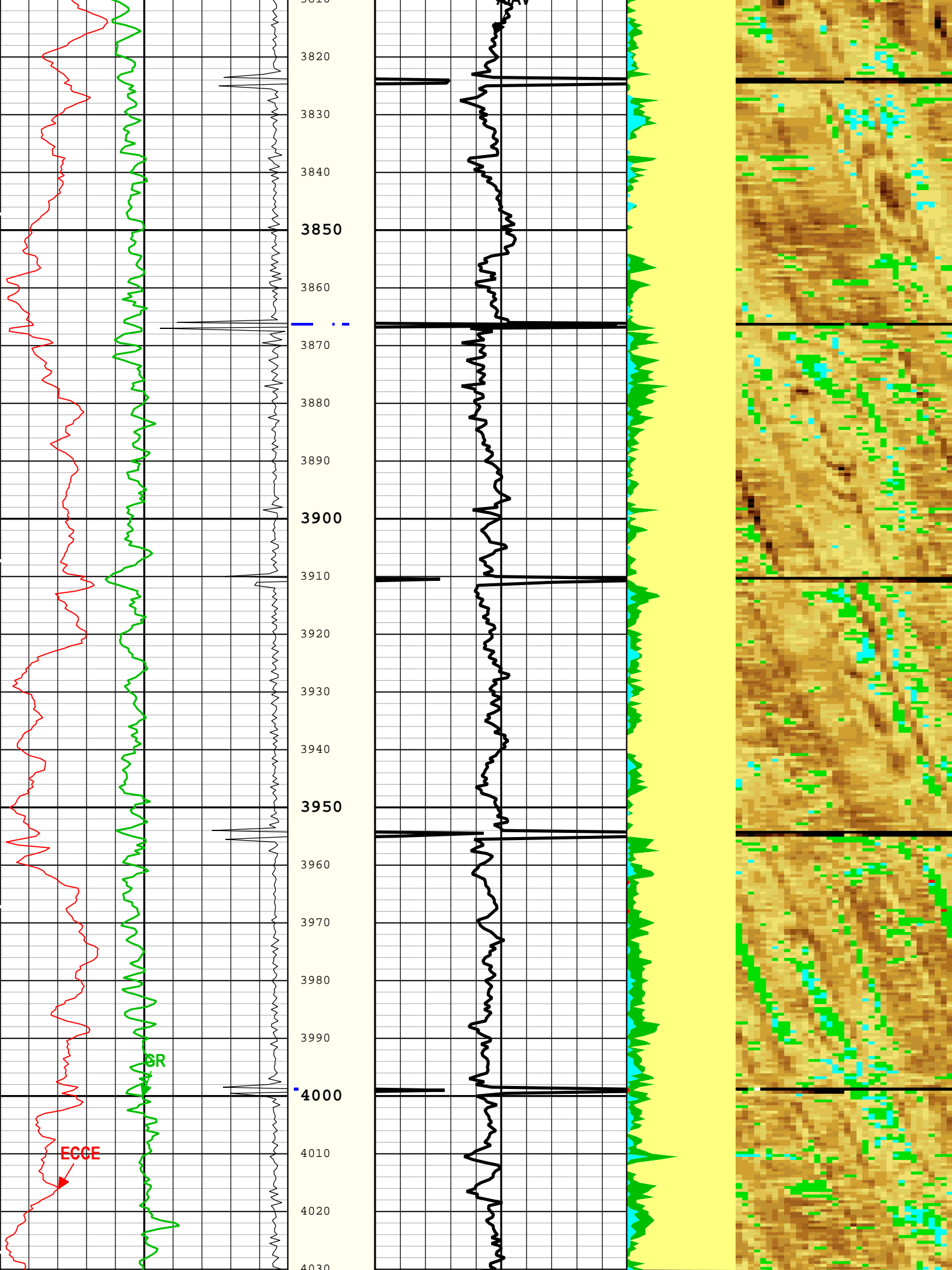


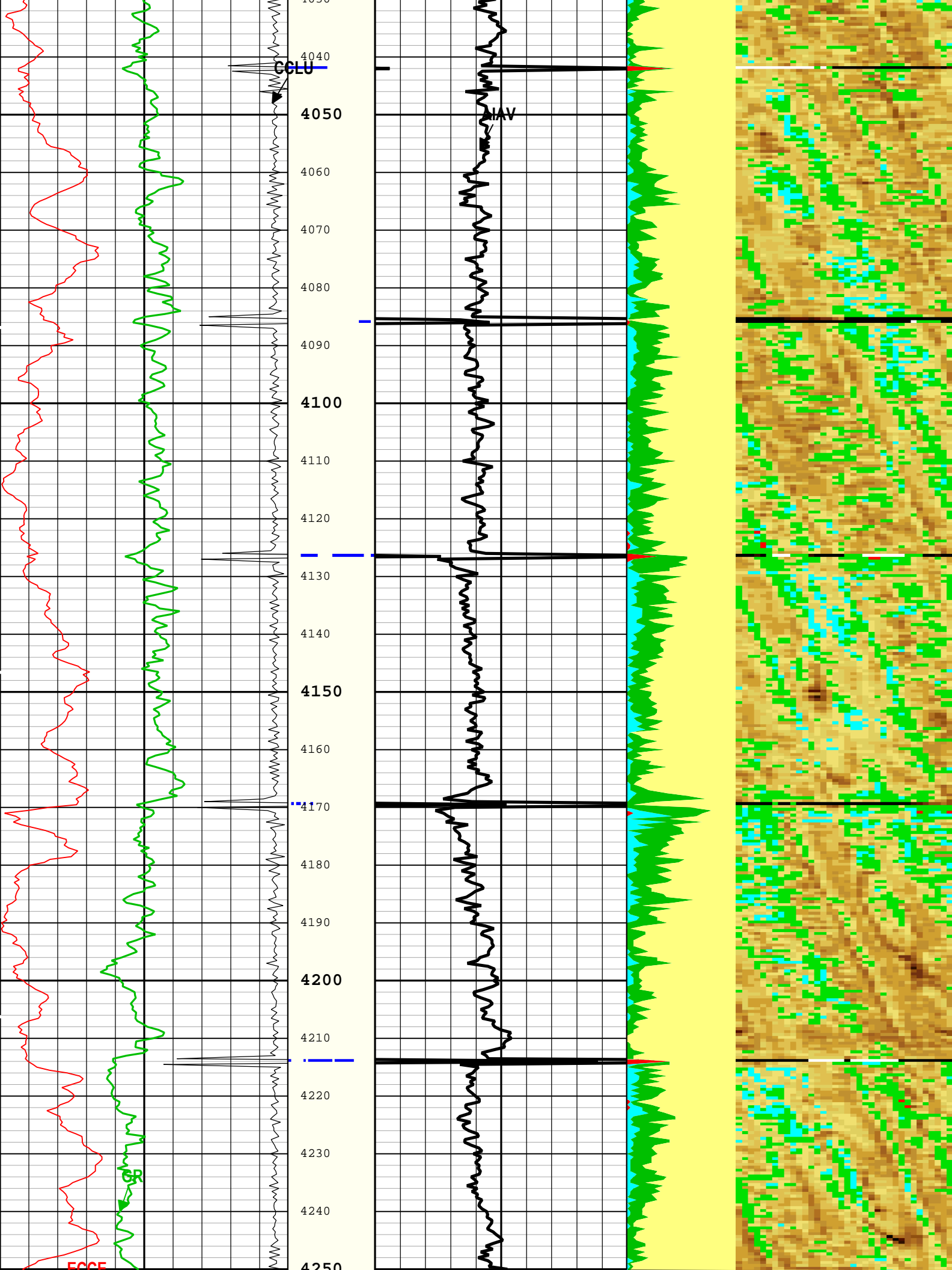


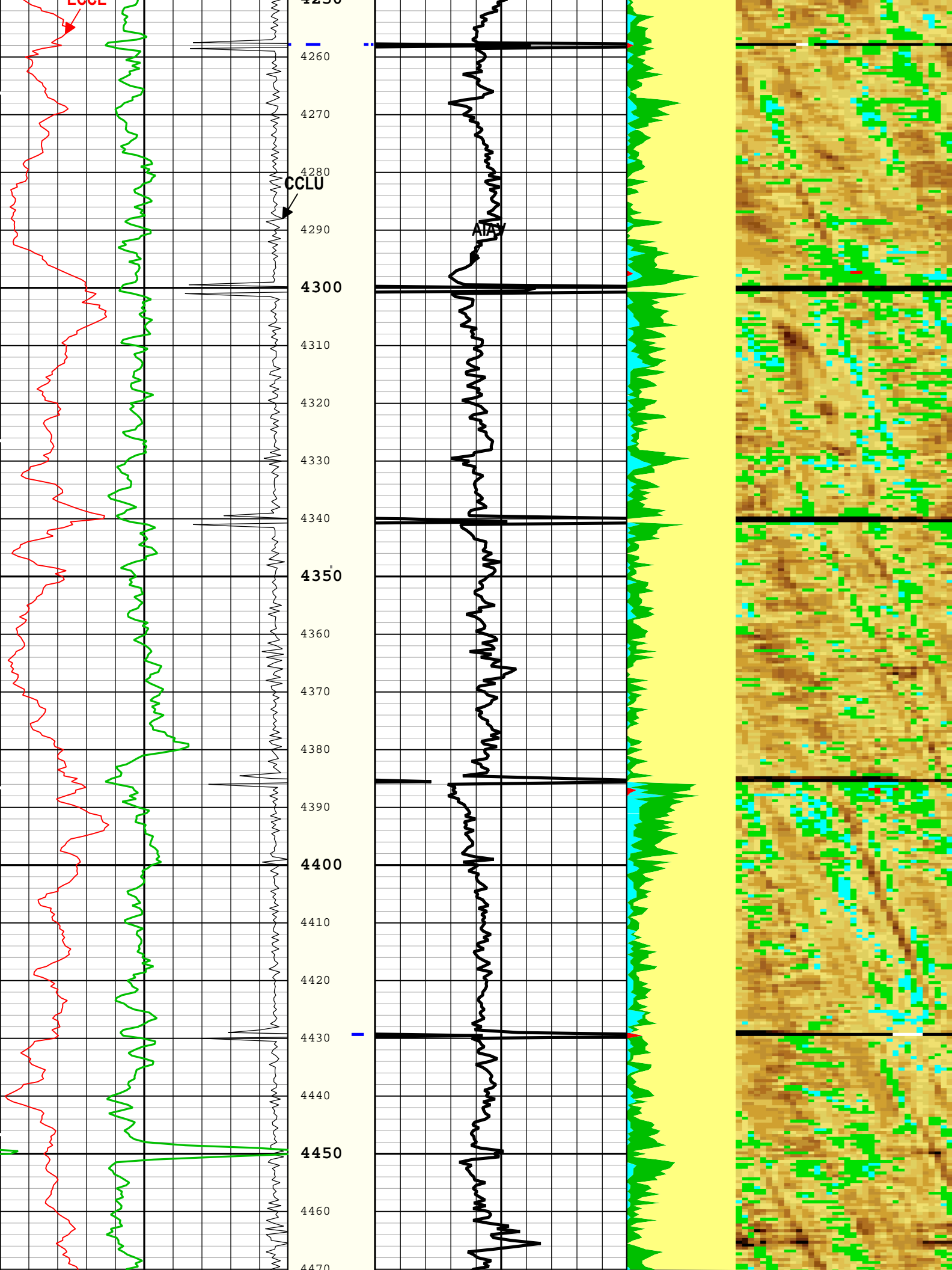


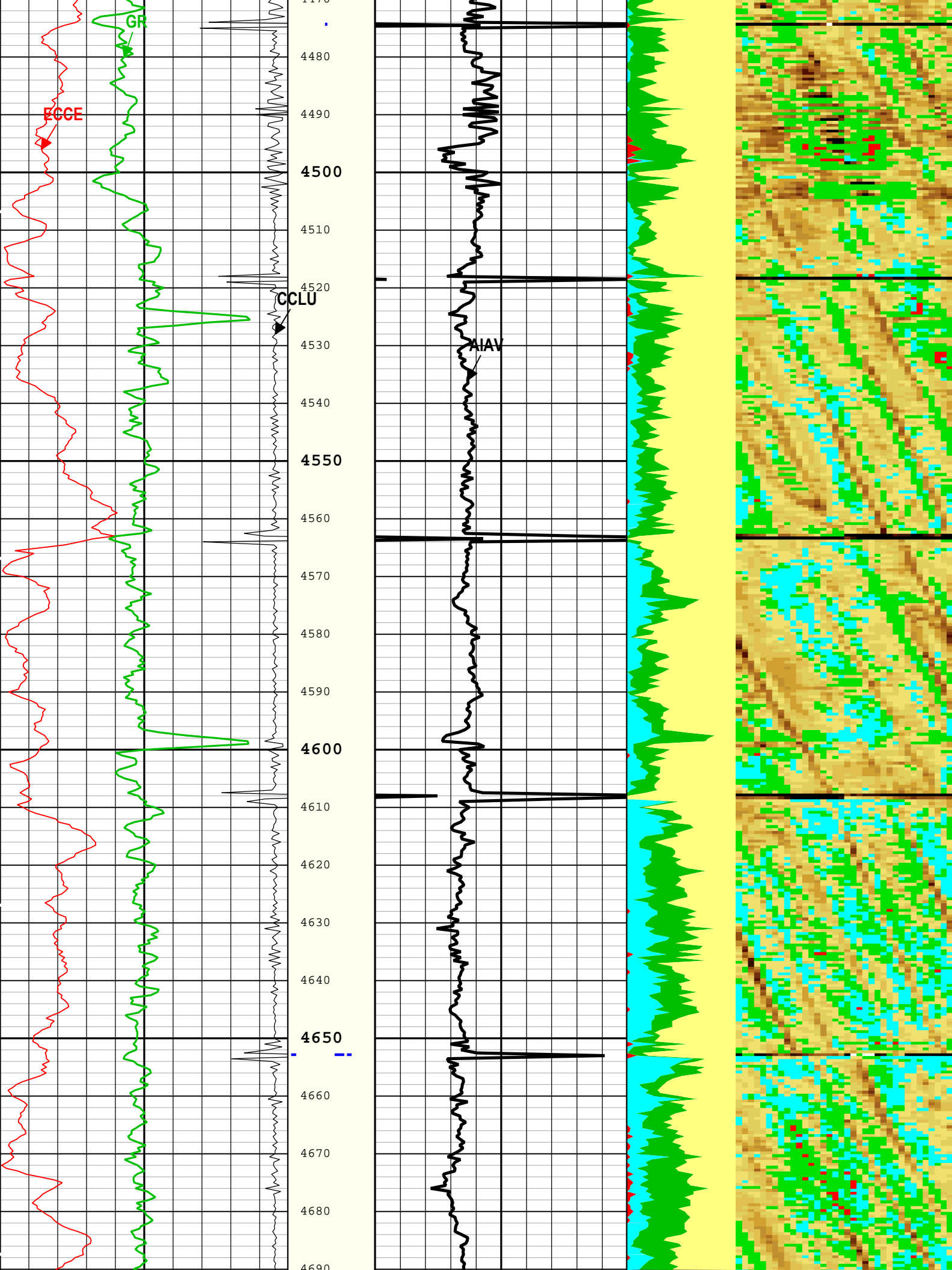


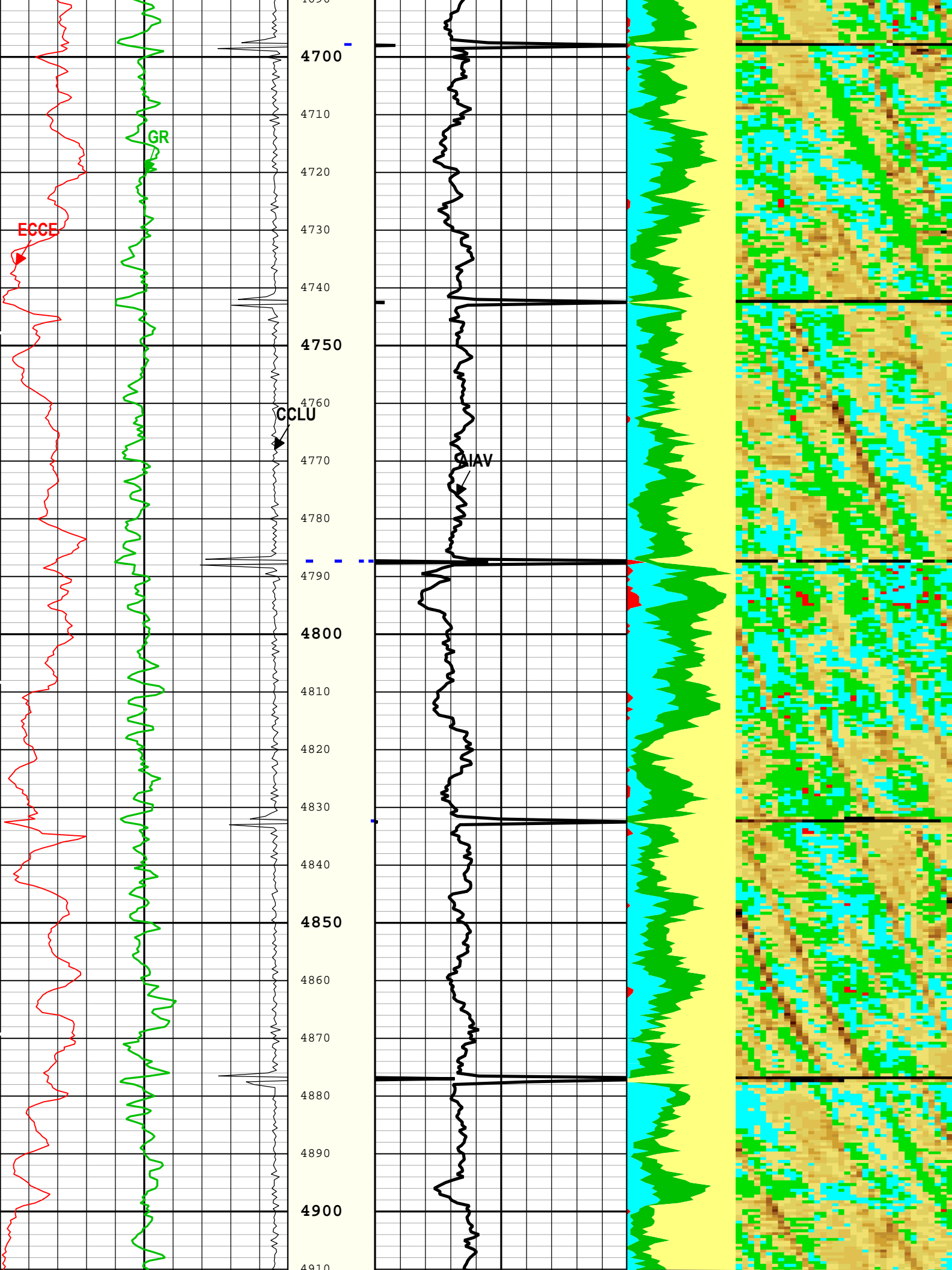


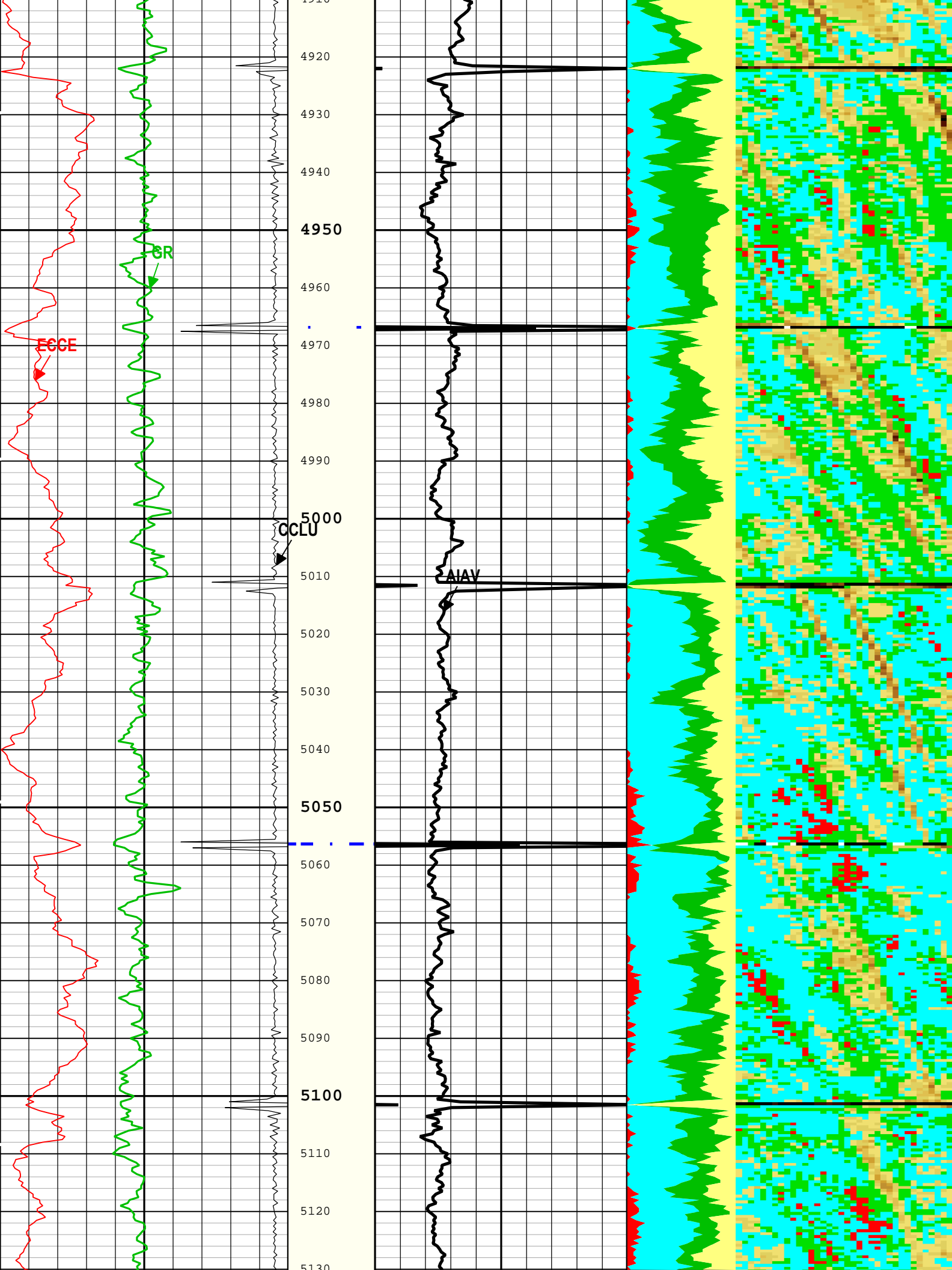


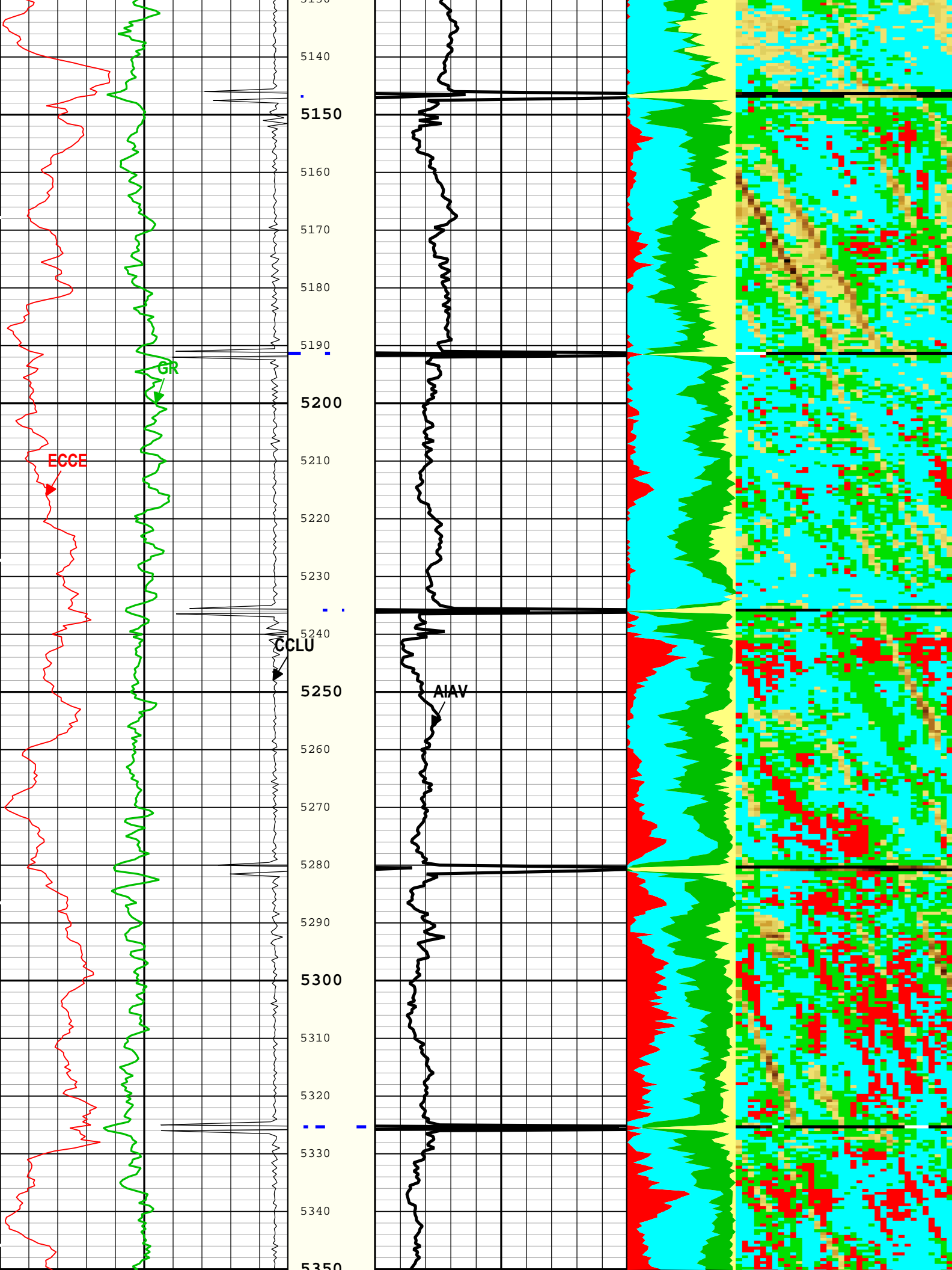


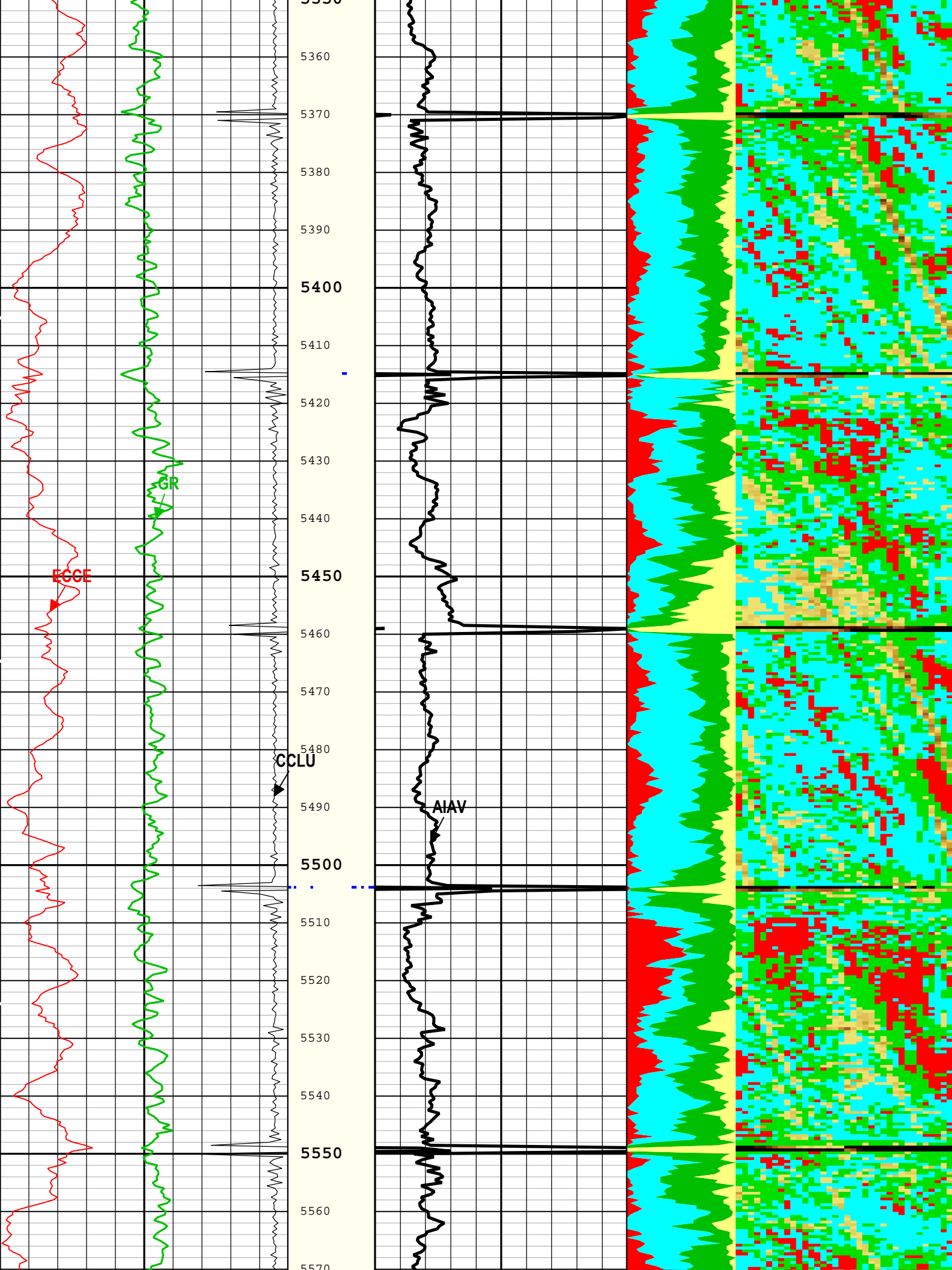


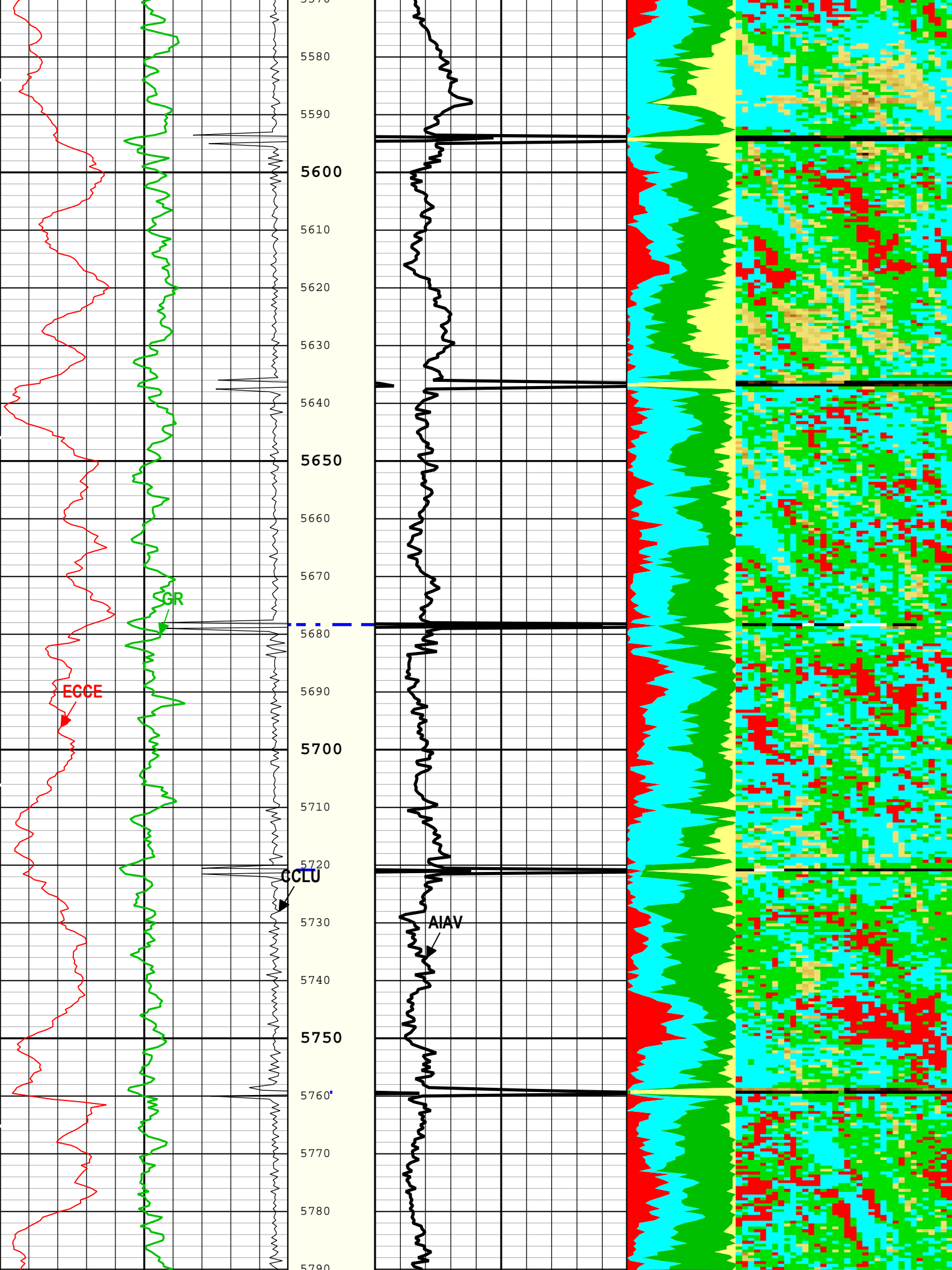


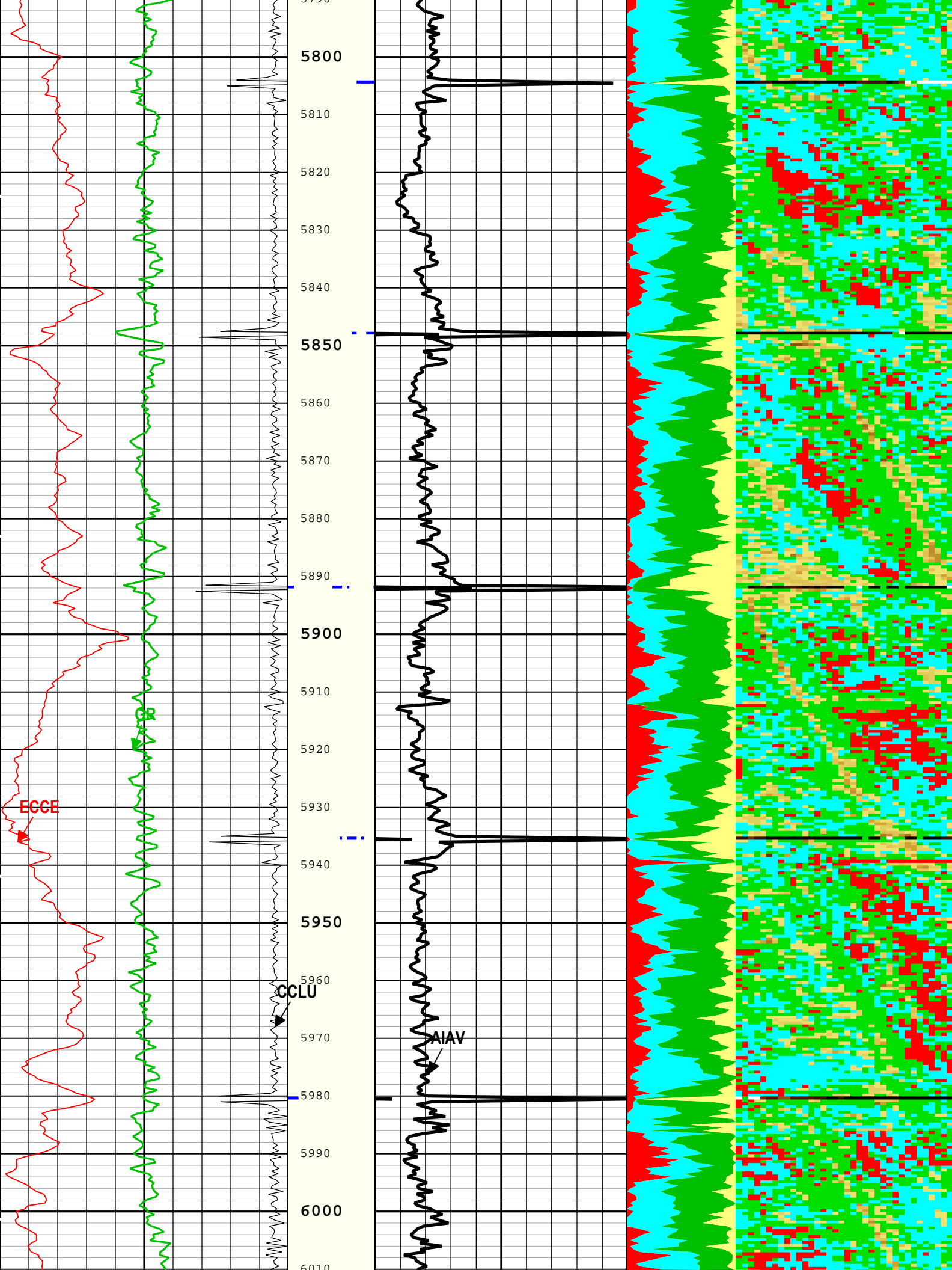


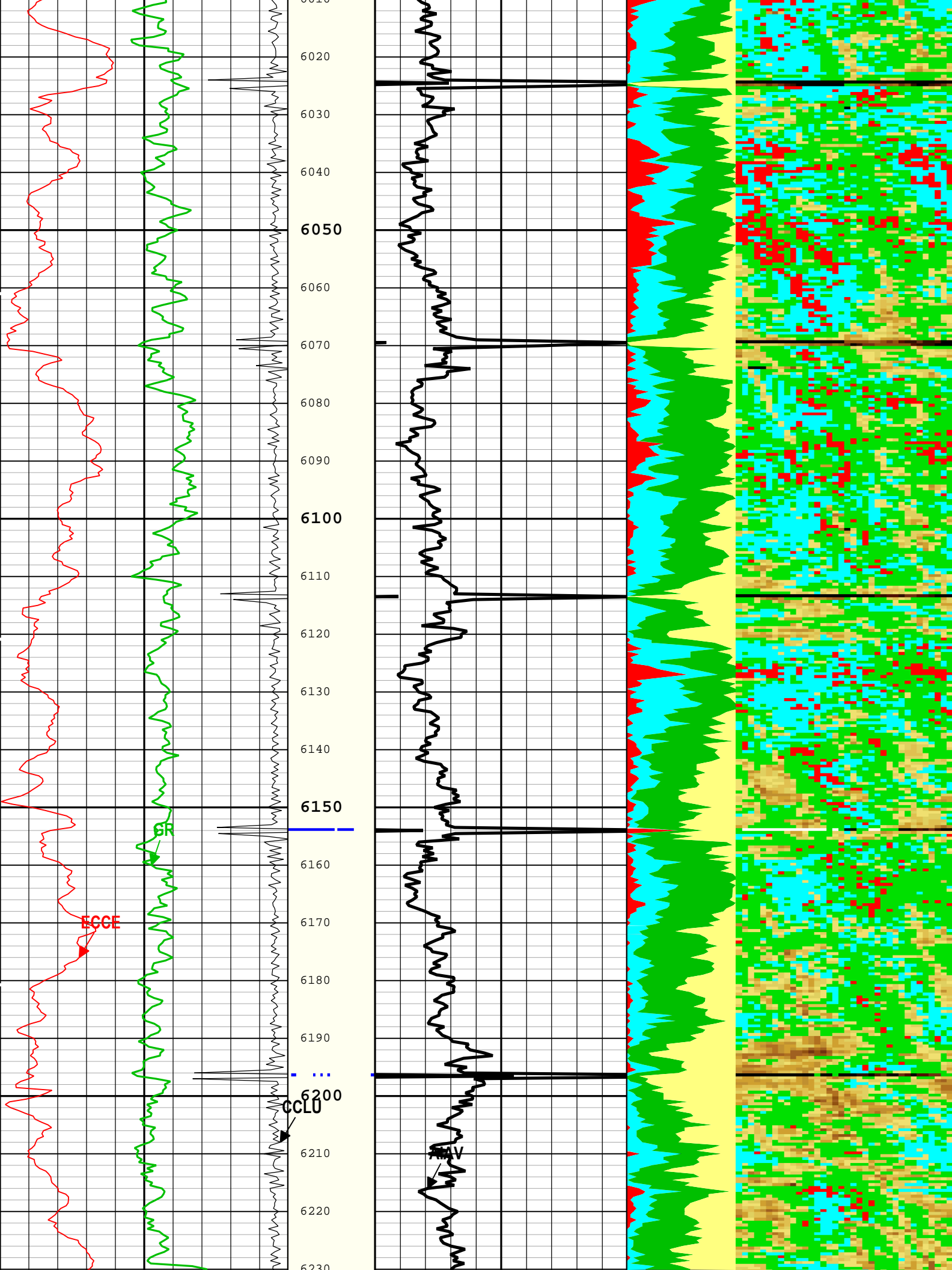


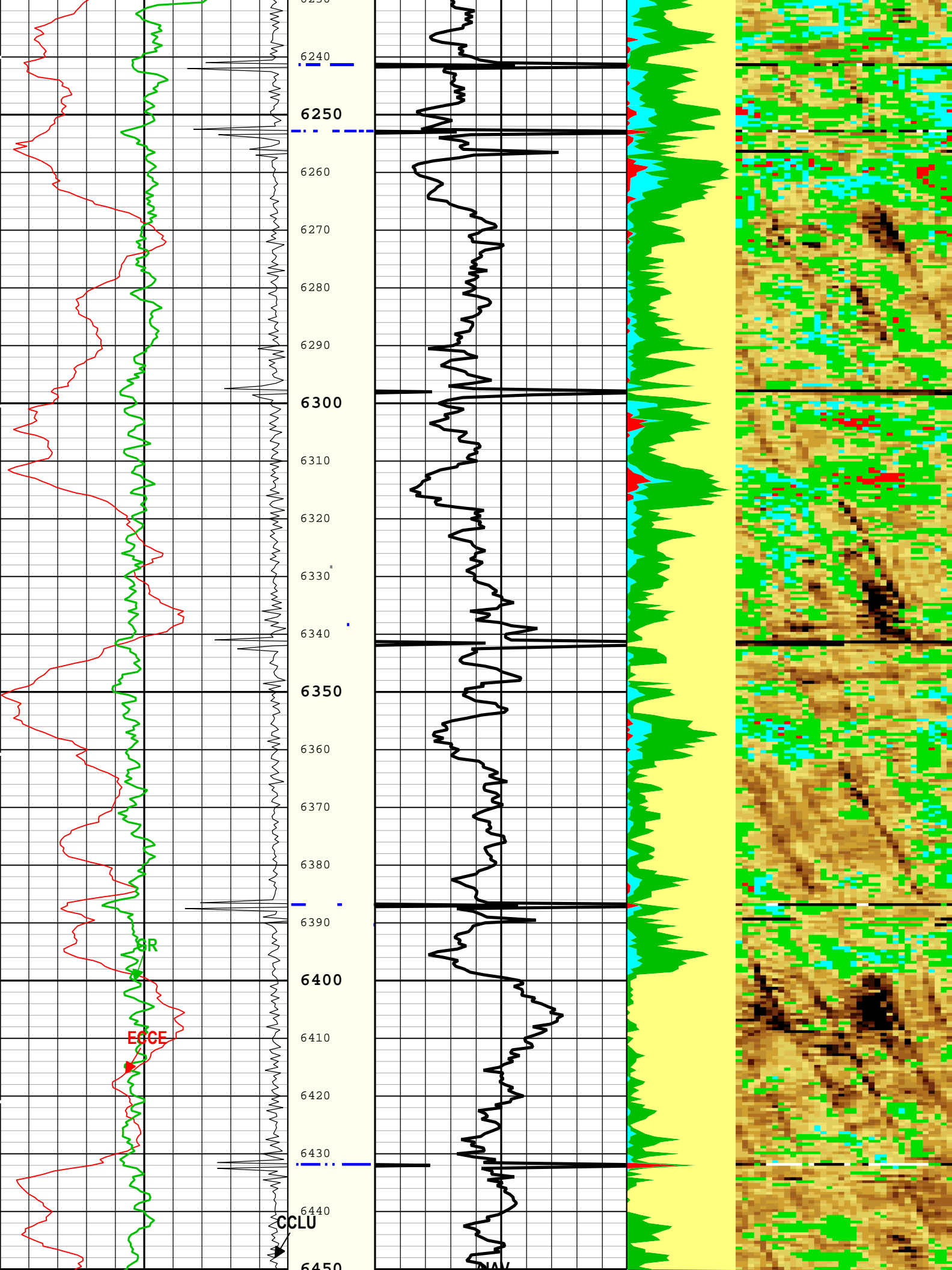


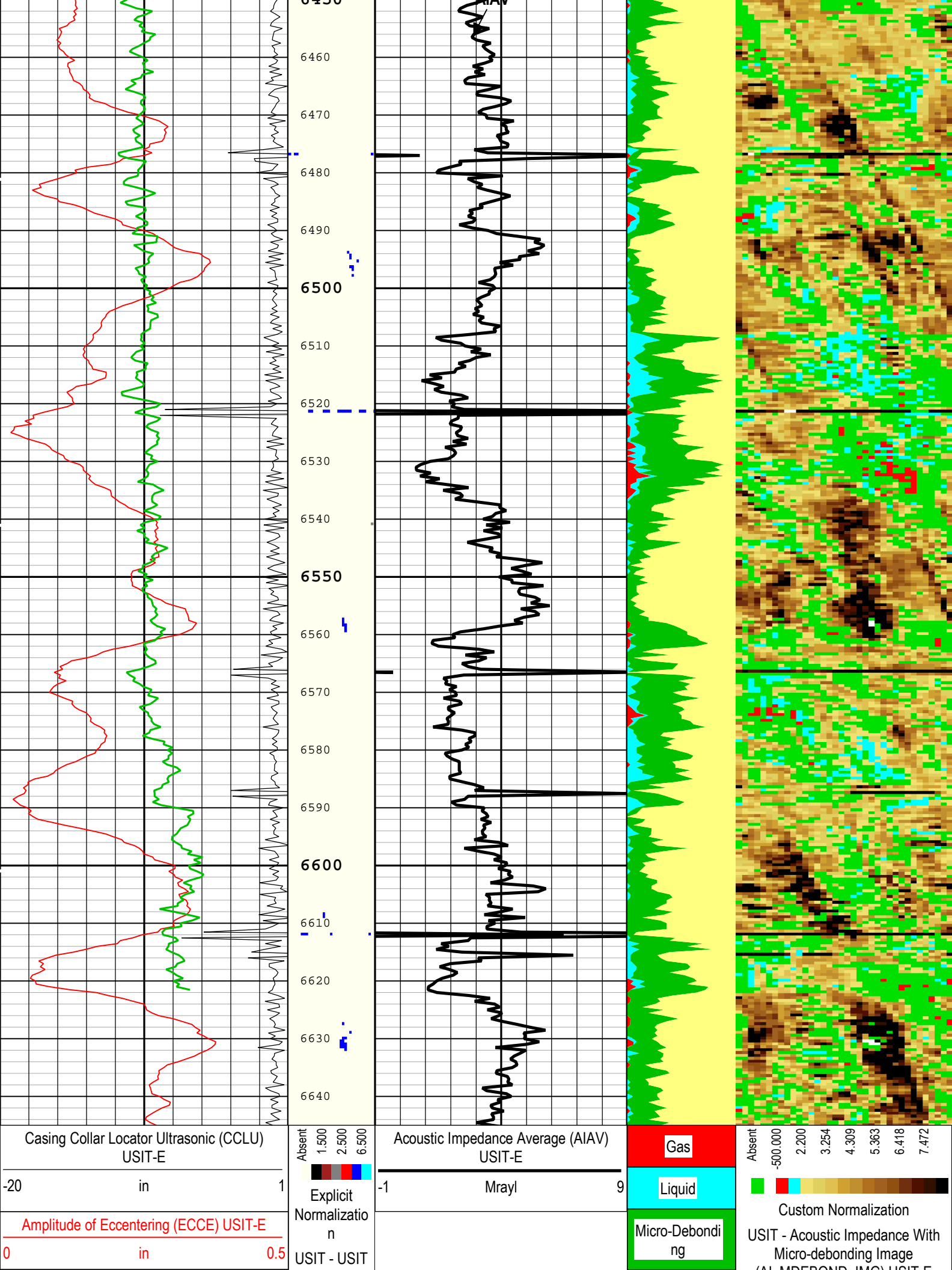












TIME_1900 - Time Marked every 60.00 (s)

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: 05-Nov-2018 00:20:31

Channel Processing Parameters	
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ONE: Parameters

Parameter	Description	Tool	Value	Unit
BAR1(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	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	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.04	
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	1.6	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	45	110
BS	13.5	110	1955
BS	8.5	1955	6645

All depth are actual.

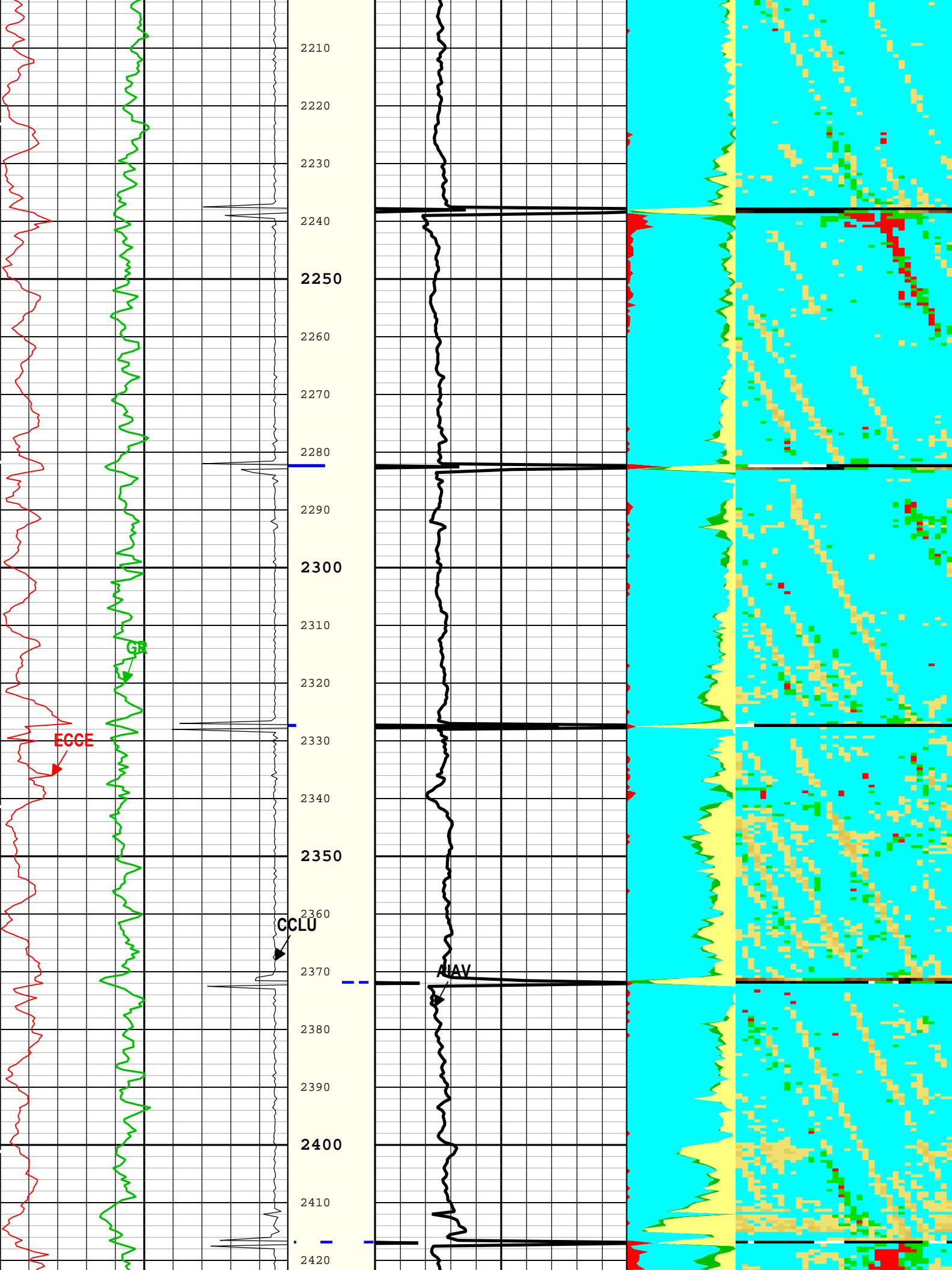
Tool Control Parameters	
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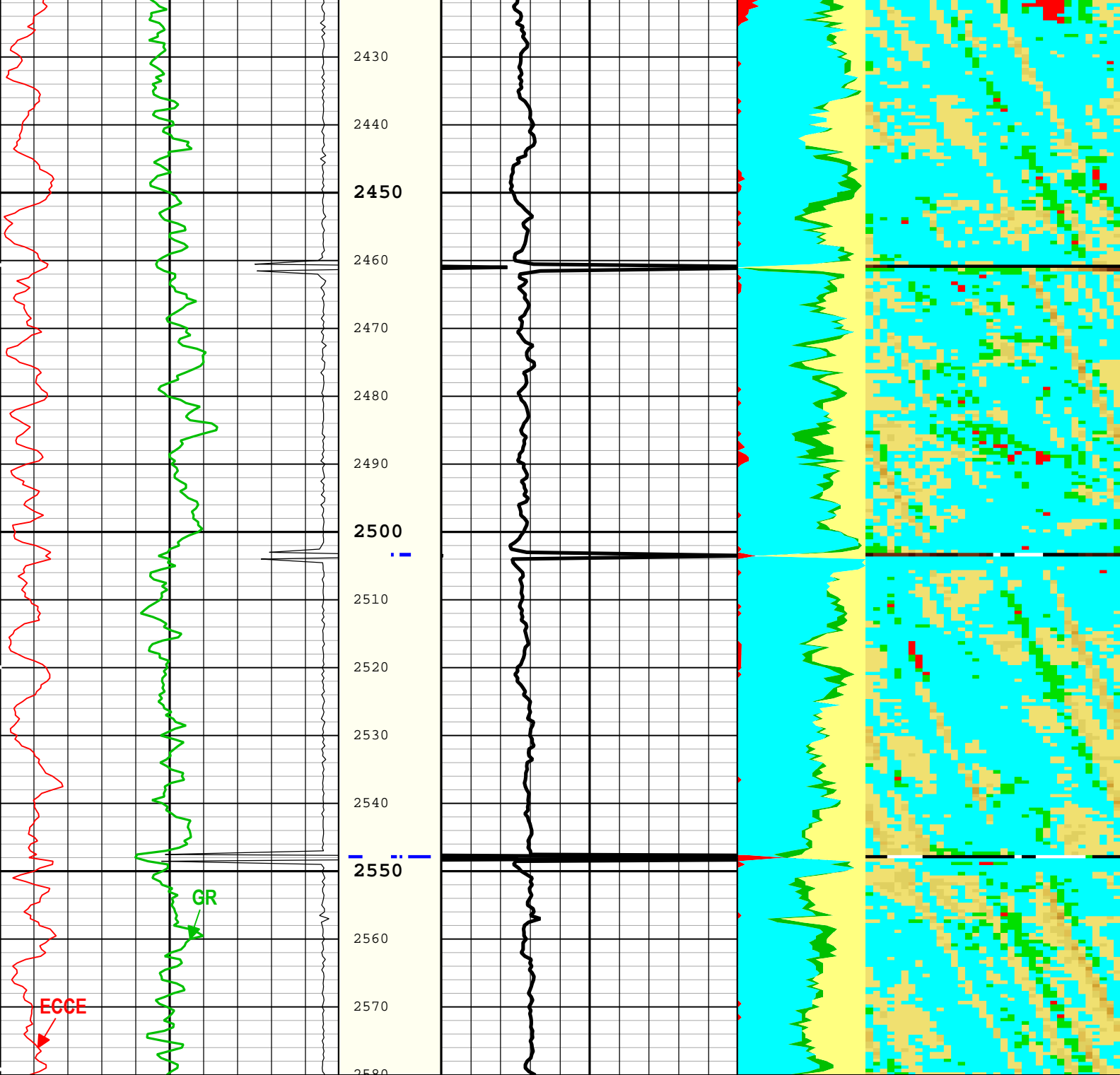
ONE: Parameters


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	20	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	31.88	us
WINE	Window End Time	USIT-E	71.88	us

ONE

0 PSI Repeat Pass





Casing Collar Locator Ultrasonic (CCLU) USIT-E			<div>Absent 1.500 2.500 6.500</div> <div></div> <div>Explicit Normalization</div> <div>USIT - USIT Processing Flags (UFLG) USIT-E</div>	Acoustic Impedance Average (AIAV) USIT-E			<div>Gas</div> <div>Liquid</div> <div>Micro-Debonding</div> <div>Bonded</div> <div>Absent -500.000 2.200 3.254 4.309 5.363 6.418 7.472</div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)</div>
-20	in	1		-1	Mrayl	9	
Amplitude of Eccentering (ECCE) USIT-E							
0	in	0.5					
Calibrated Gamma Ray (GR) HGNS-H							
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: 05-Nov-2018 00:20:38

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	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.04	
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	1.6	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

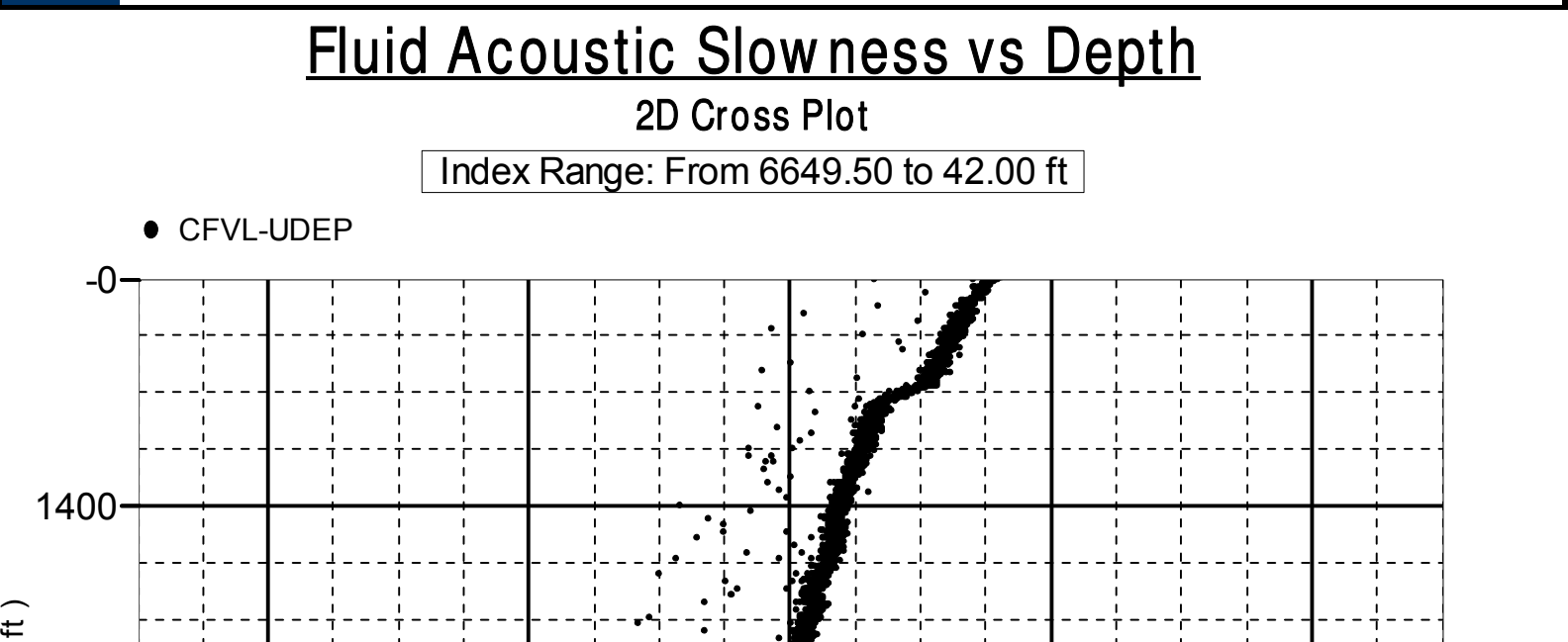
Tool Control Parameters

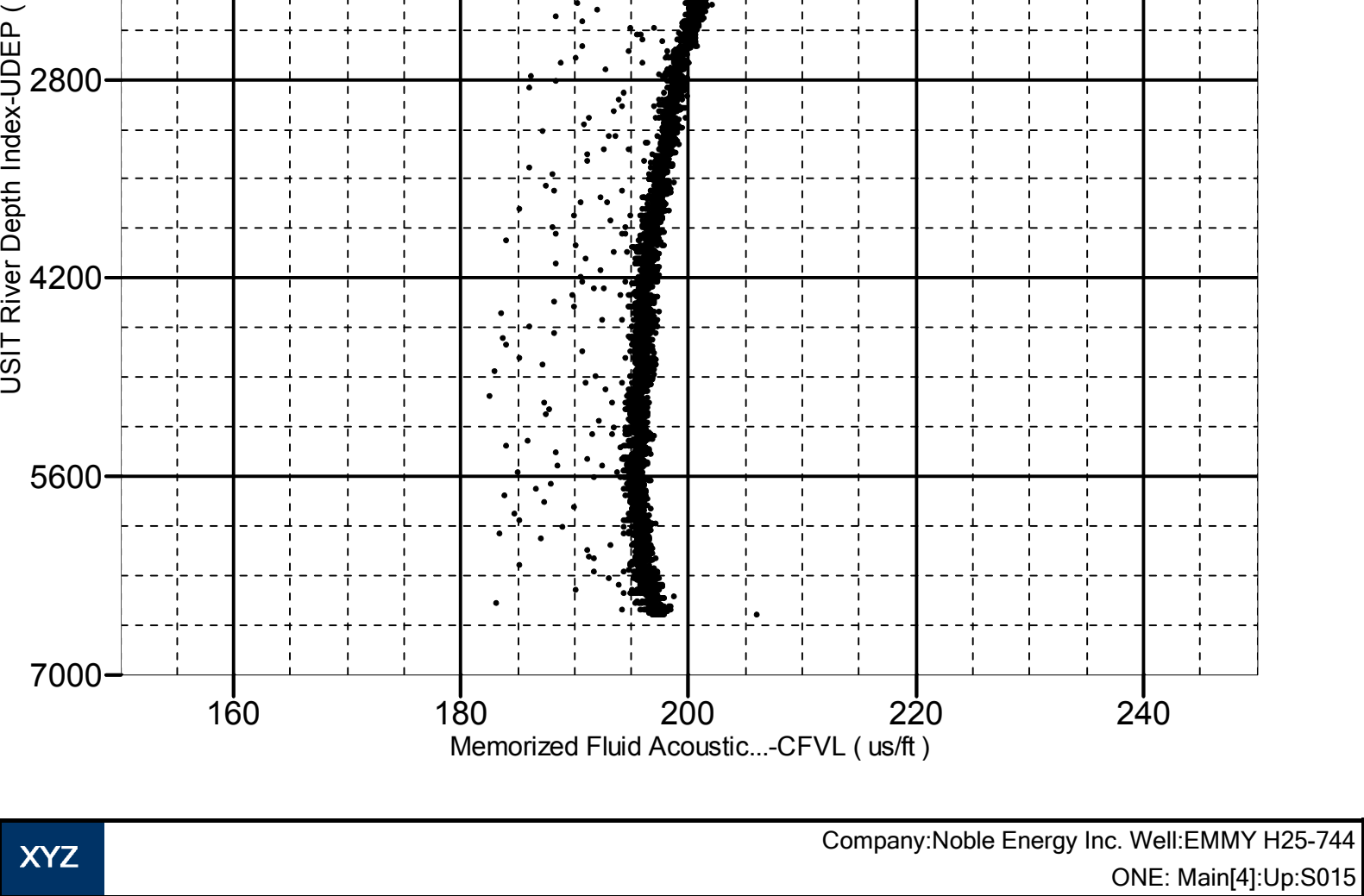
ONE: Parameters

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	20	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	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

Company:Noble Energy Inc. Well:EMMY H25-744
ONE: Main[4]:Up:S015

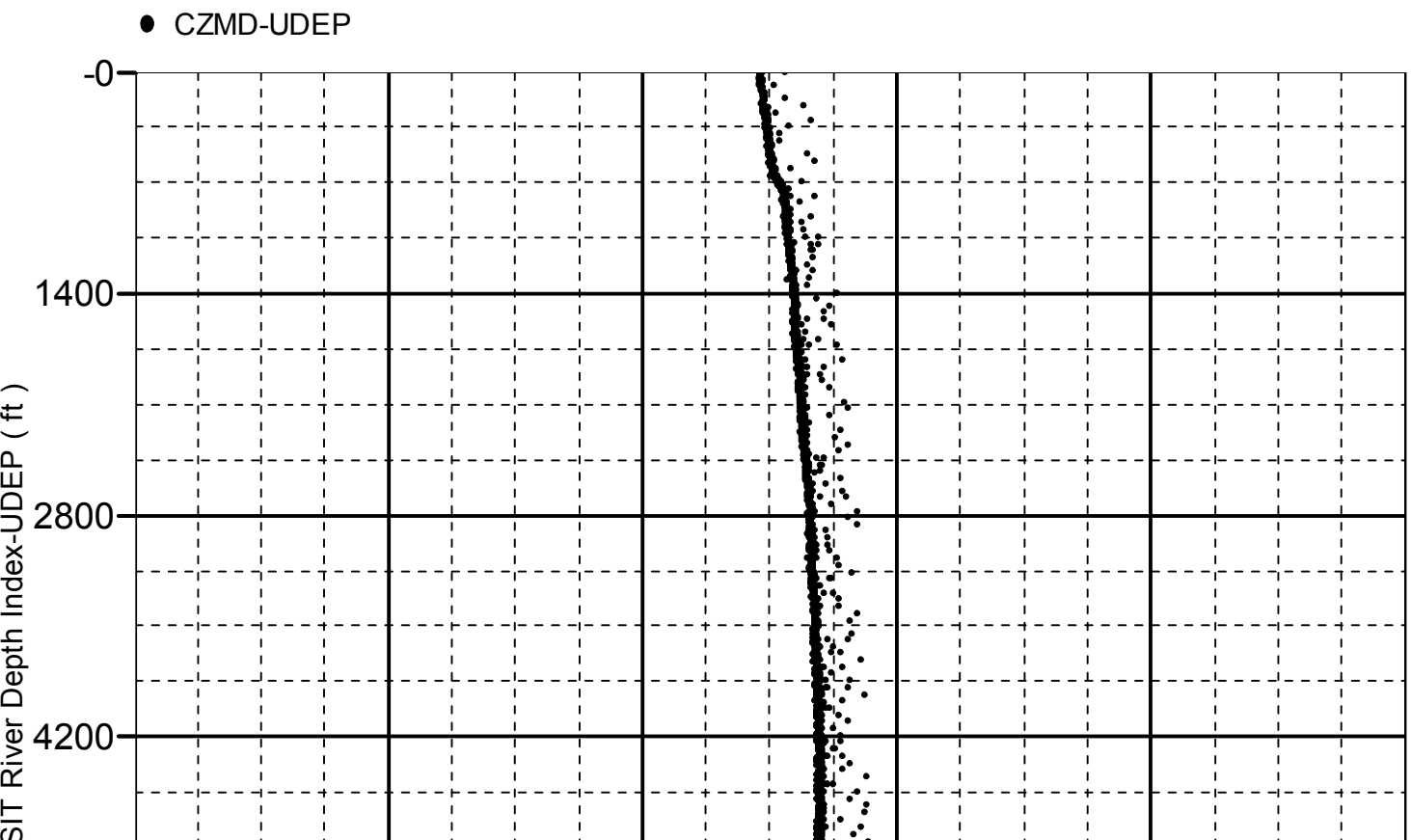


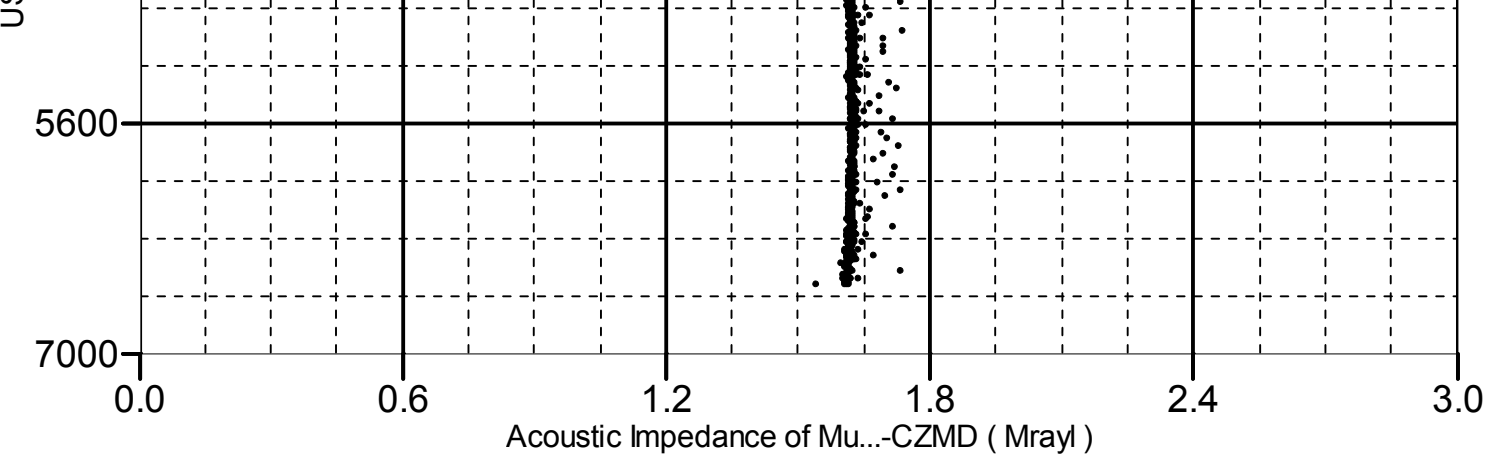


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6649.50 to 42.00 ft





Company:	Noble Energy Inc.	Schlumberger
Well:	EMMY H25-744	
Field:	DJ BASIN	
County:	Weld	
State:	Colorado	

UltraSonic Summary Print

