

Company: Noble Energy INC

Well: Wells Ranch State AA36-643

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wattenberg				
Location:	SHL: 2084' FSL X 817' FWL				
Well:	Wells Ranch State AA36-643				
Company:	Noble Energy INC				
Location:		SHL: 2084' FSL X 817' FWL	Elev.:	K.B.	4756.00 ft
				G.L.	4726.00 ft
				D.F.	4756.00 ft
		Permanent Datum:	Ground Level	Elev.:	4726.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		49-123-48165	32	6N	62W
Logging Date	06-Jun-2019				

Run Number	One	
Depth Driller	16905.00 ft	
Schlumberger Depth	16905.00 ft	
Bottom Log Interval	6250.00 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	1950.00 ft	
To	16905.00 ft	
Casing/Tubing Size	5.5 in	
Weight	17 lbm/ft	
Grade	P110	
From	0.00 ft	
To	16893.00 ft	
Max Recorded Temperatures	205 degF	
Logger on Bottom	06-Jun-2019	13:55:00
Unit Number	9108	FtMorgan
Recorded By	Avery Becker	
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.

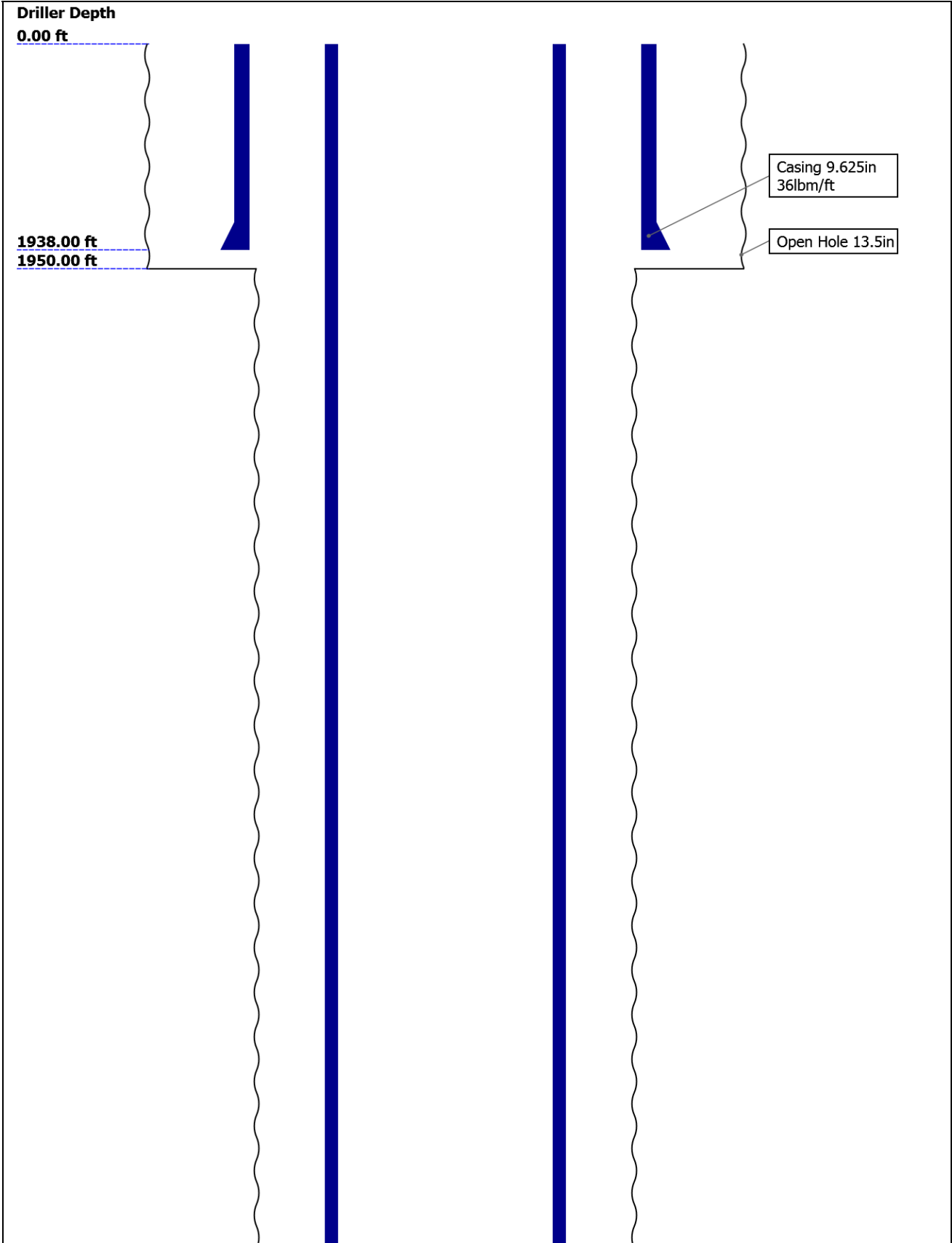
Contents

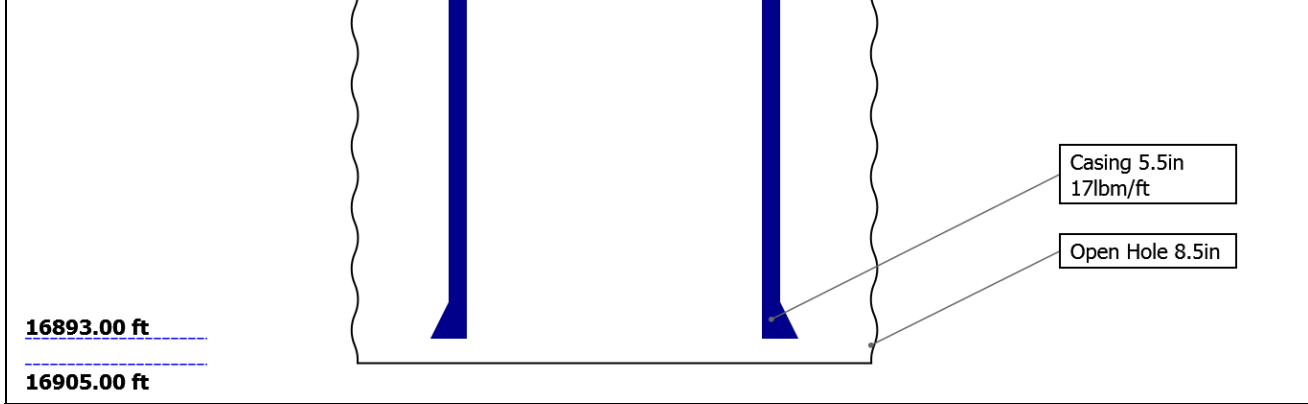
1. Header
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6. Remarks and Equipment Summary
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8. USI Fluid Properties Measurement_1
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13. Tail

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- 10.4 Log (DJ Basin Ultrasonic Cement Summary Report)
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Well Sketch





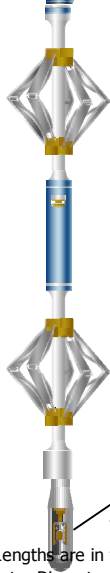
Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.5				
Top Driller (ft)	0	1950				
Top Logger (ft)	0	1950				
Bottom Driller (ft)	1950	16905				
Bottom Logger (ft)	1950	16905				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	36	17				
Inner Diameter (in)	8.921	4.892				
Grade	J55	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	1938	16893				
Bottom Logger (ft)	1938	16893				

Remarks and Equipment Summary

One: Toolstring				One: Remarks	
<div><div><div>Equip nameLength</div><div>LEH-QT29.54</div><div>LEH-QT</div></div><div><div>EDTC-B26.06</div><div>EDTH-B</div><div>EDTG-A</div><div>EDTC-B</div></div><div><div>AH-107[2]19.56</div><div>AH-107[1]17.56</div><div>USIT-E15.56</div><div>ECH-MFA</div><div>USAC-A</div><div>USIS-A</div><div>USSC-B</div><div>USRS-A:72</div></div></div> <div><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></div>				Toolstring run as per tool sketch	
				USIT run at 10 deg, 6 inch resolution	
				Main pass recorded under 2500 PSI surface induced	
				Repeat pass recorded under 0 PSI surface induced	

USI-SENS
OR
USI-TX



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-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	

One:Depth Control Parameters

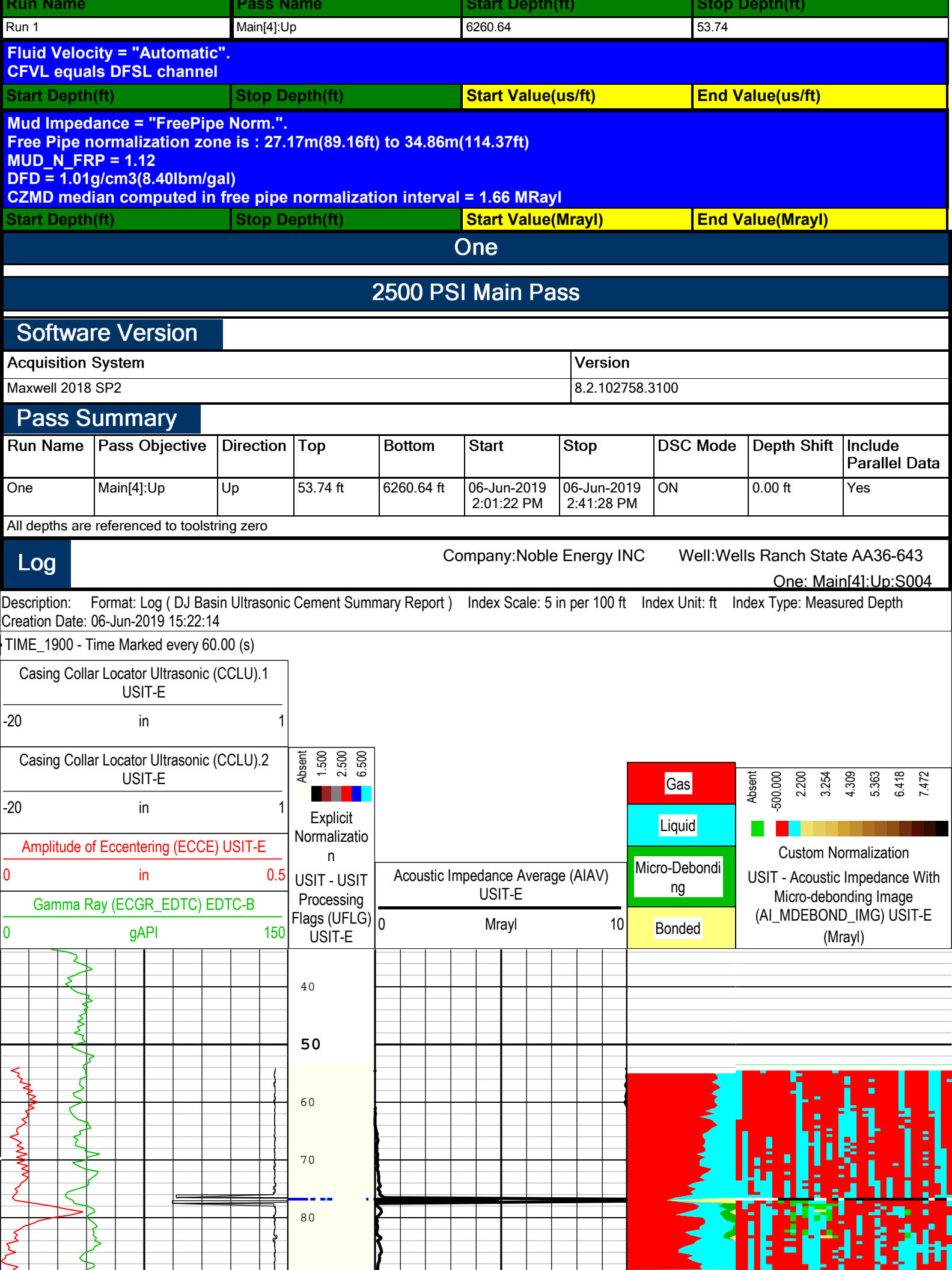
Log Sequence	First Log In the Well
Rig Up Length At Surface	
Rig Up Length At Bottom	
Rig Up Length Correction	
Stretch Correction	
Tool Zero Check At Surface	

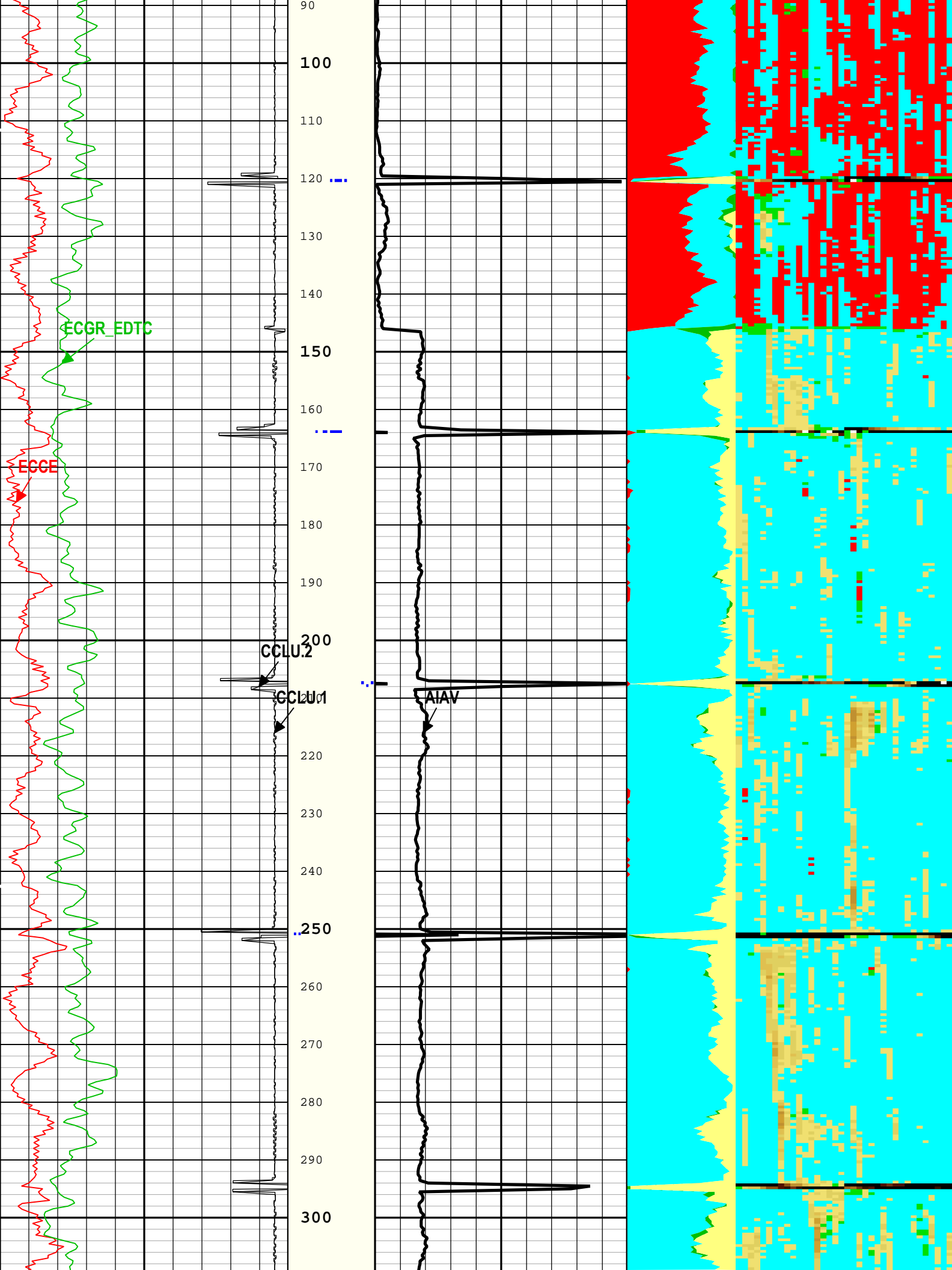
Depth Control Remarks

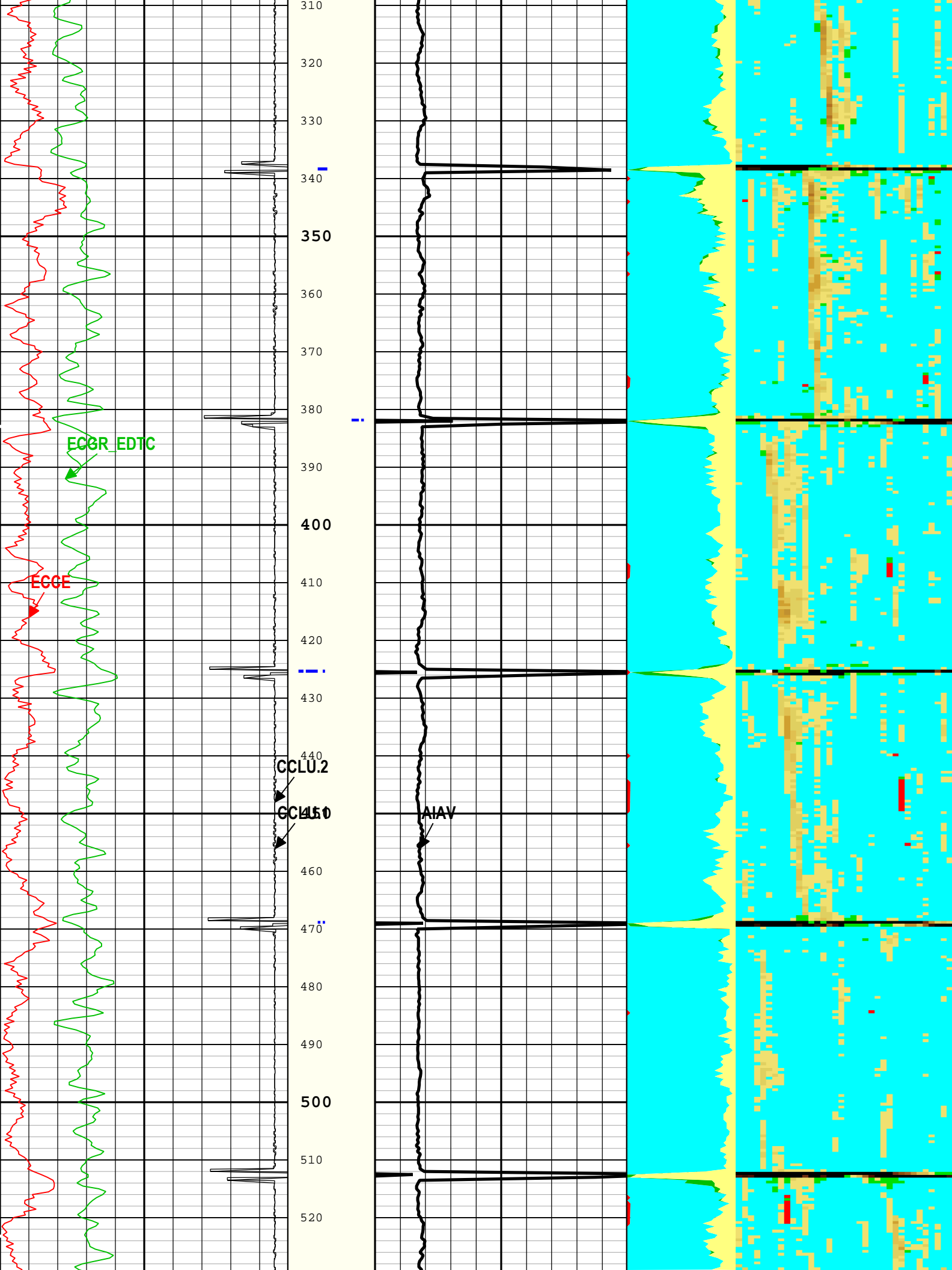
All depth control procedures followed
IDW used as primary depth device, z-chart used for secondary
Uplug correlated to downlog

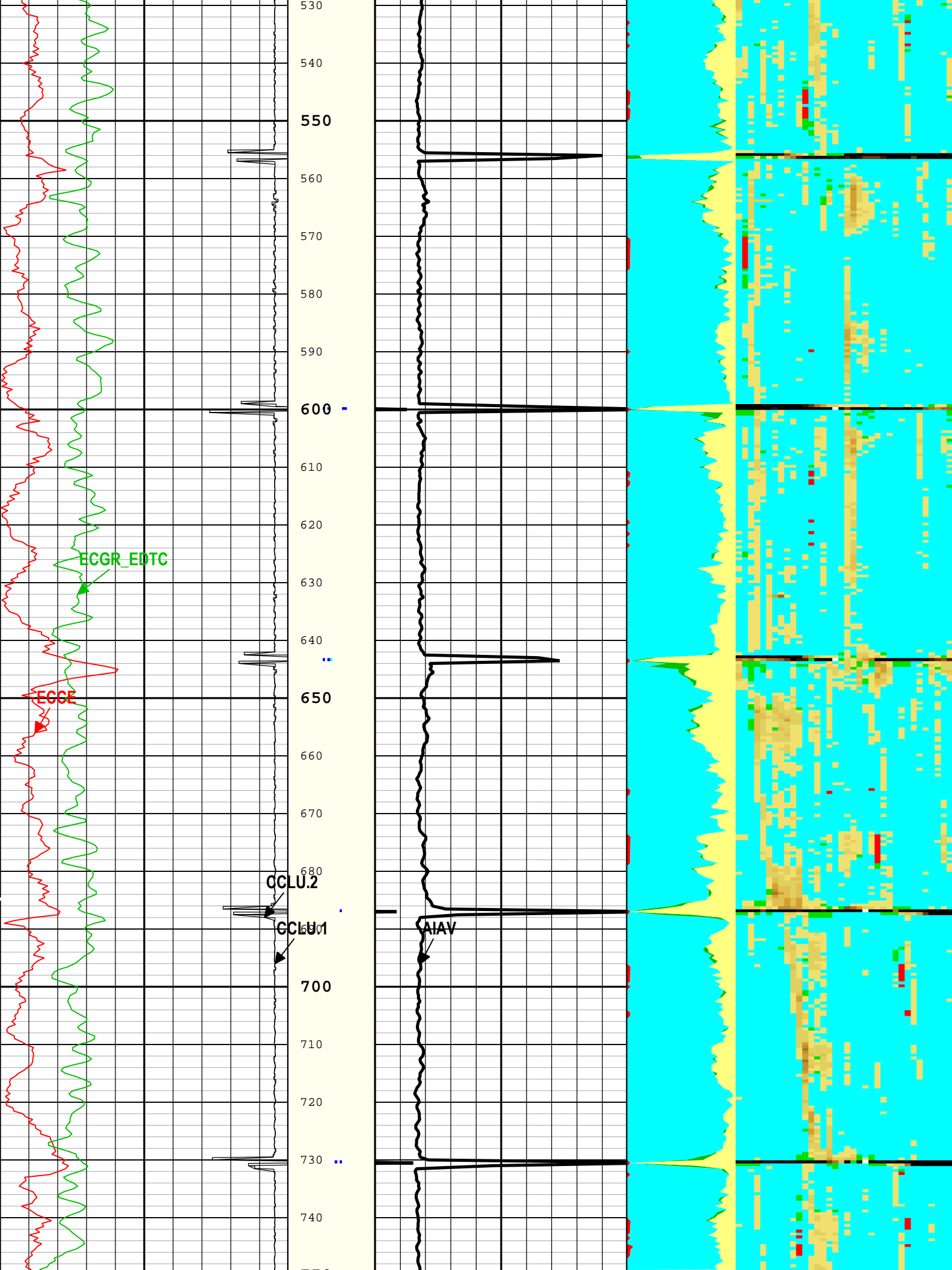
USIT - Fluid Properties Measurement

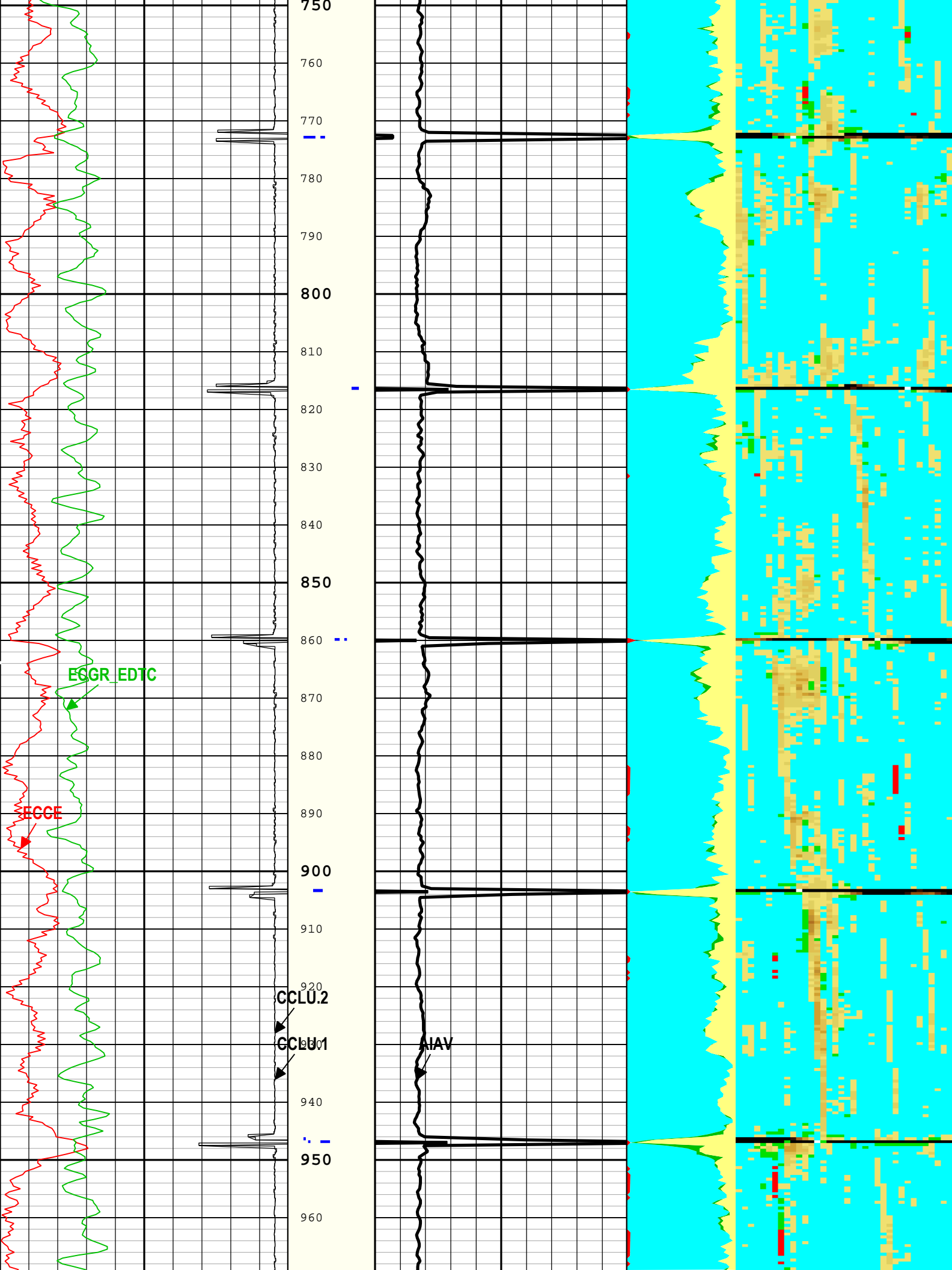
Pressure	Pressure	Temperature	Temperature
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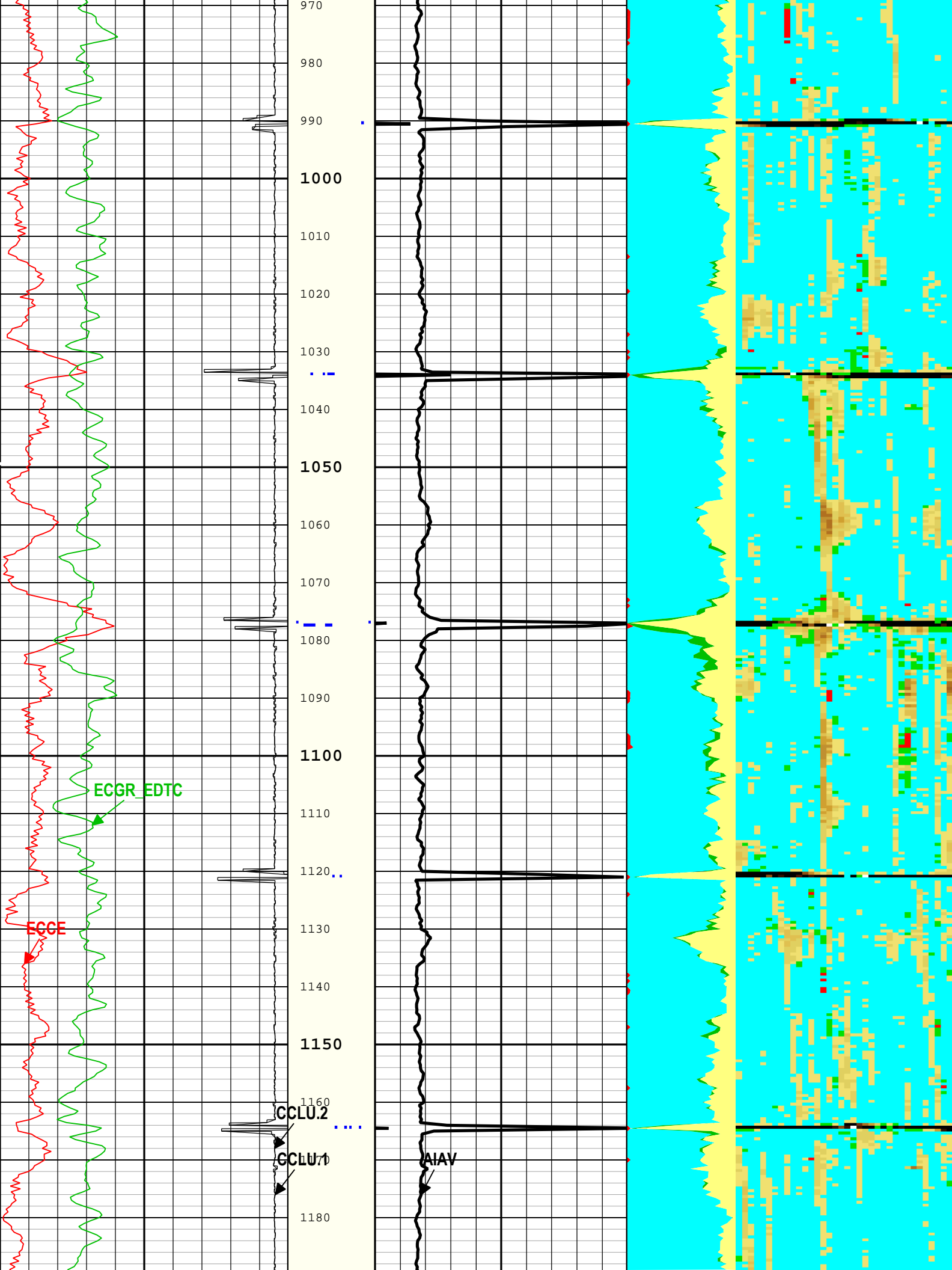


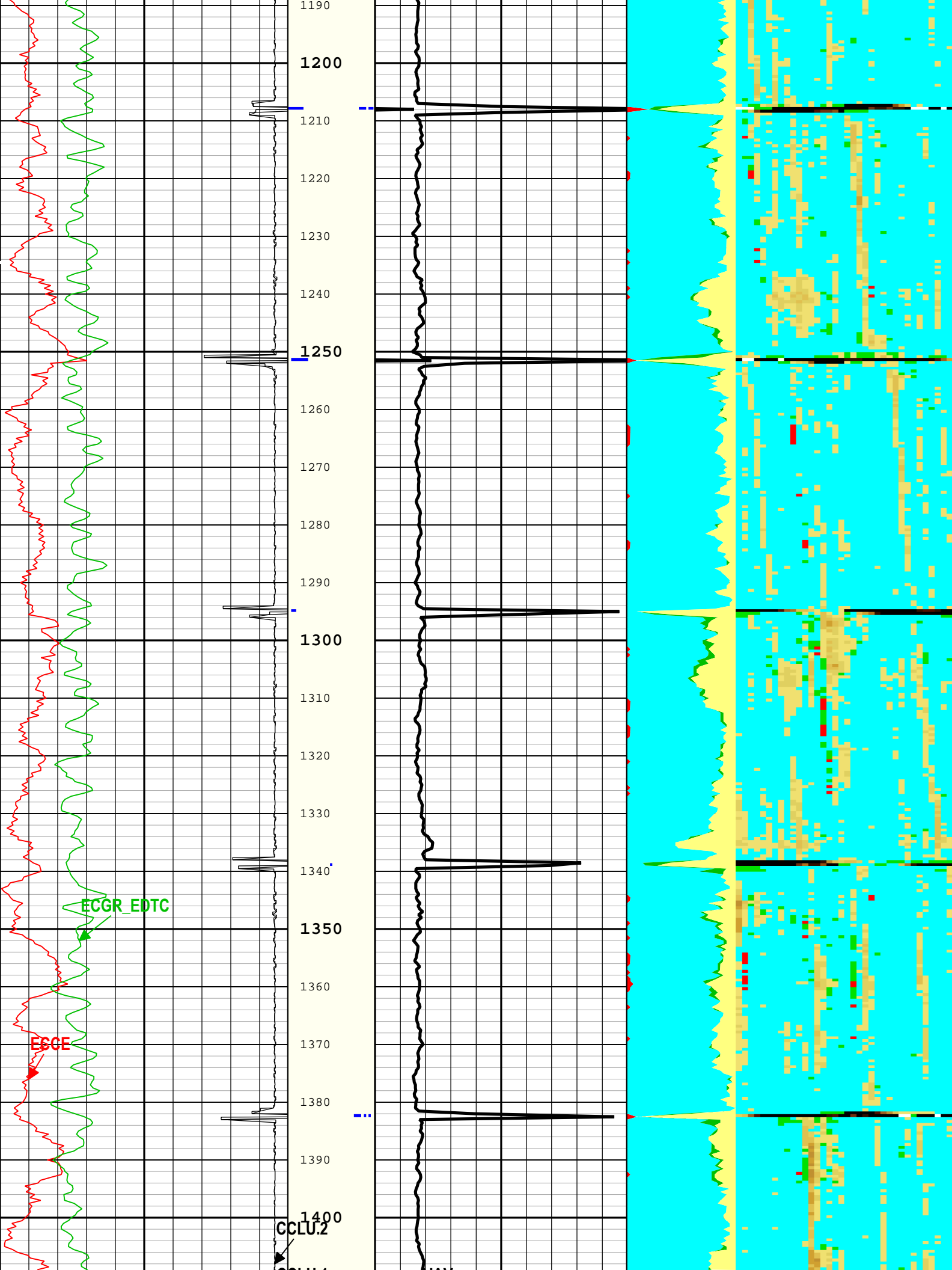


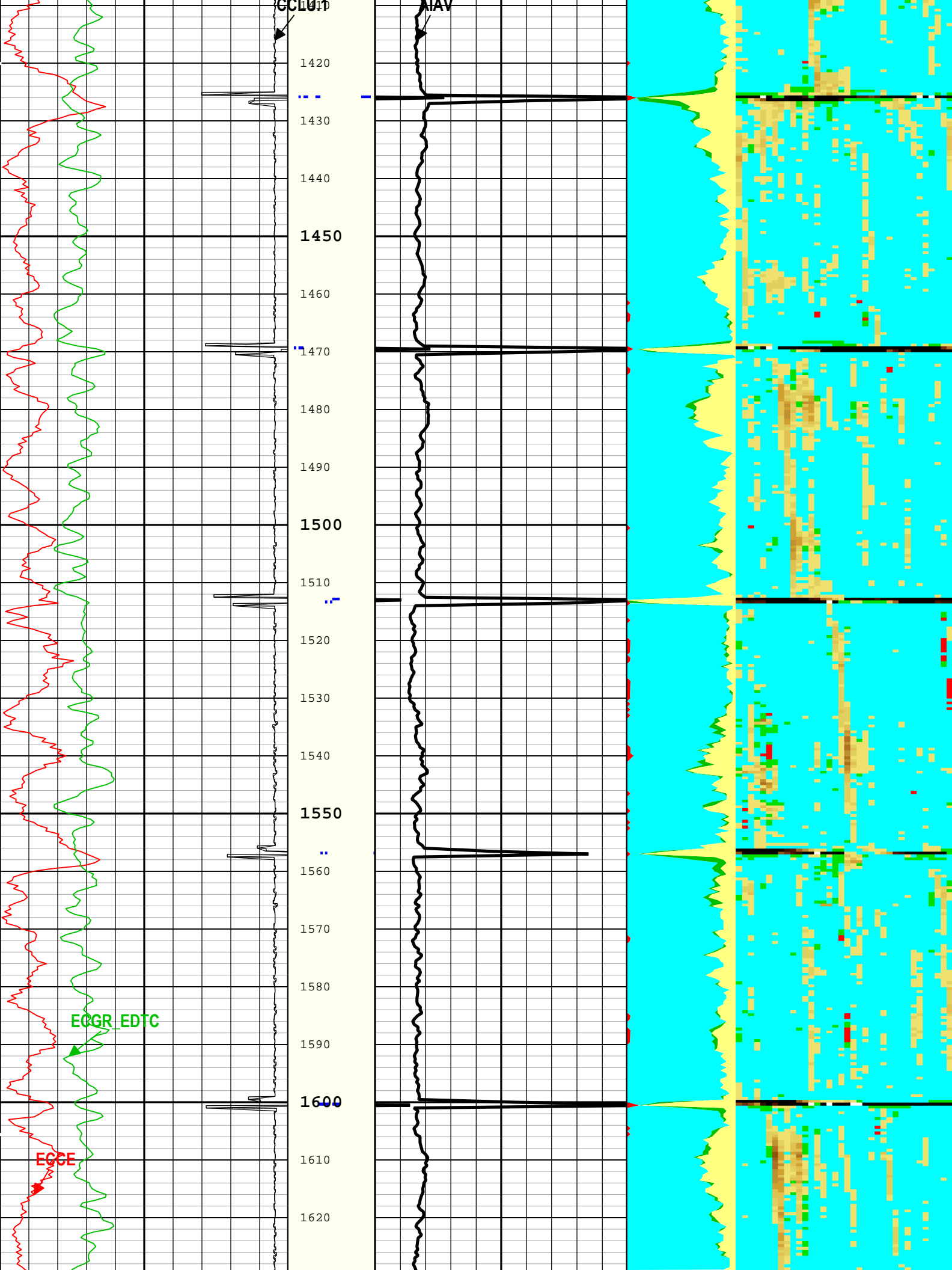


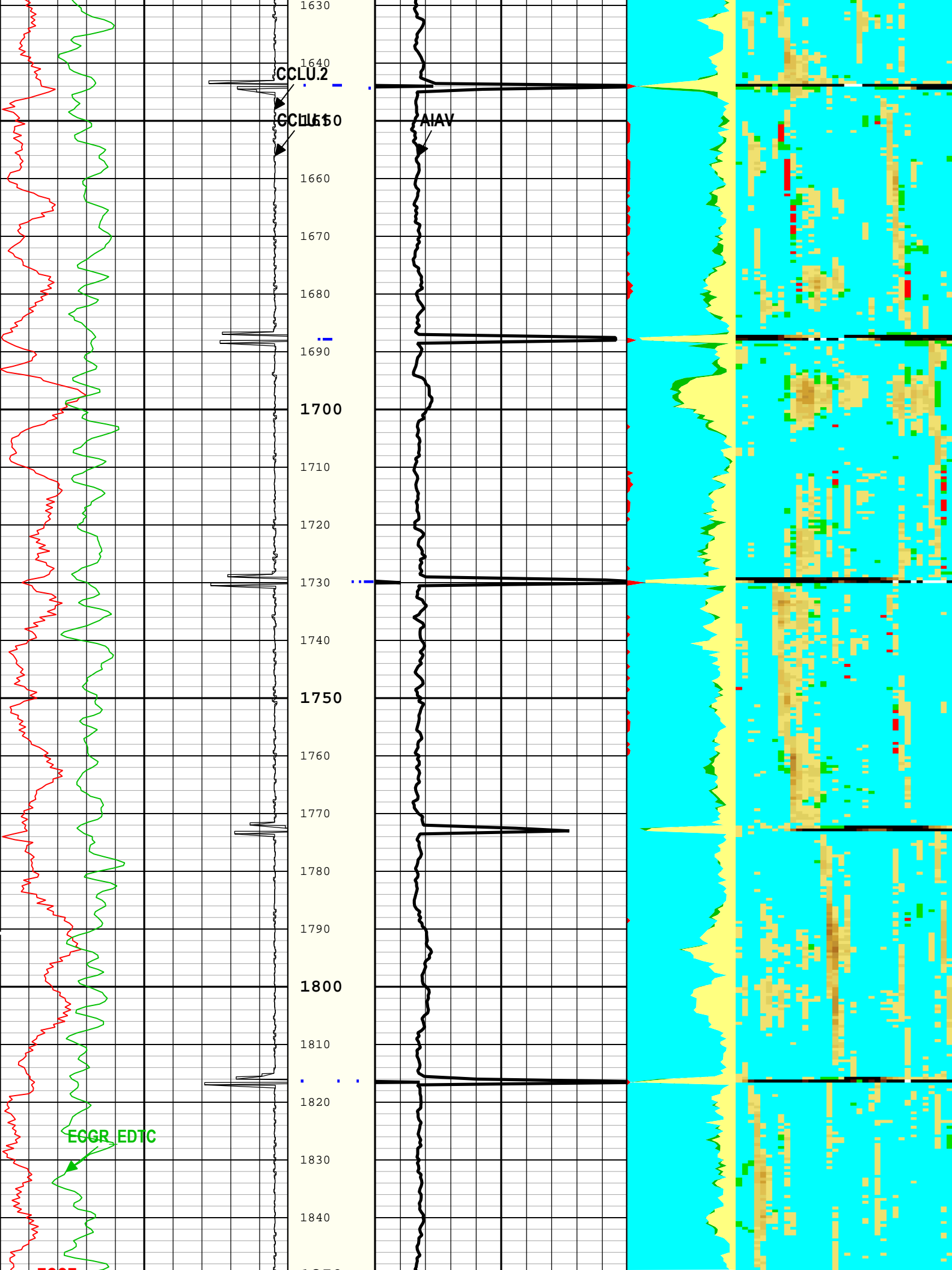


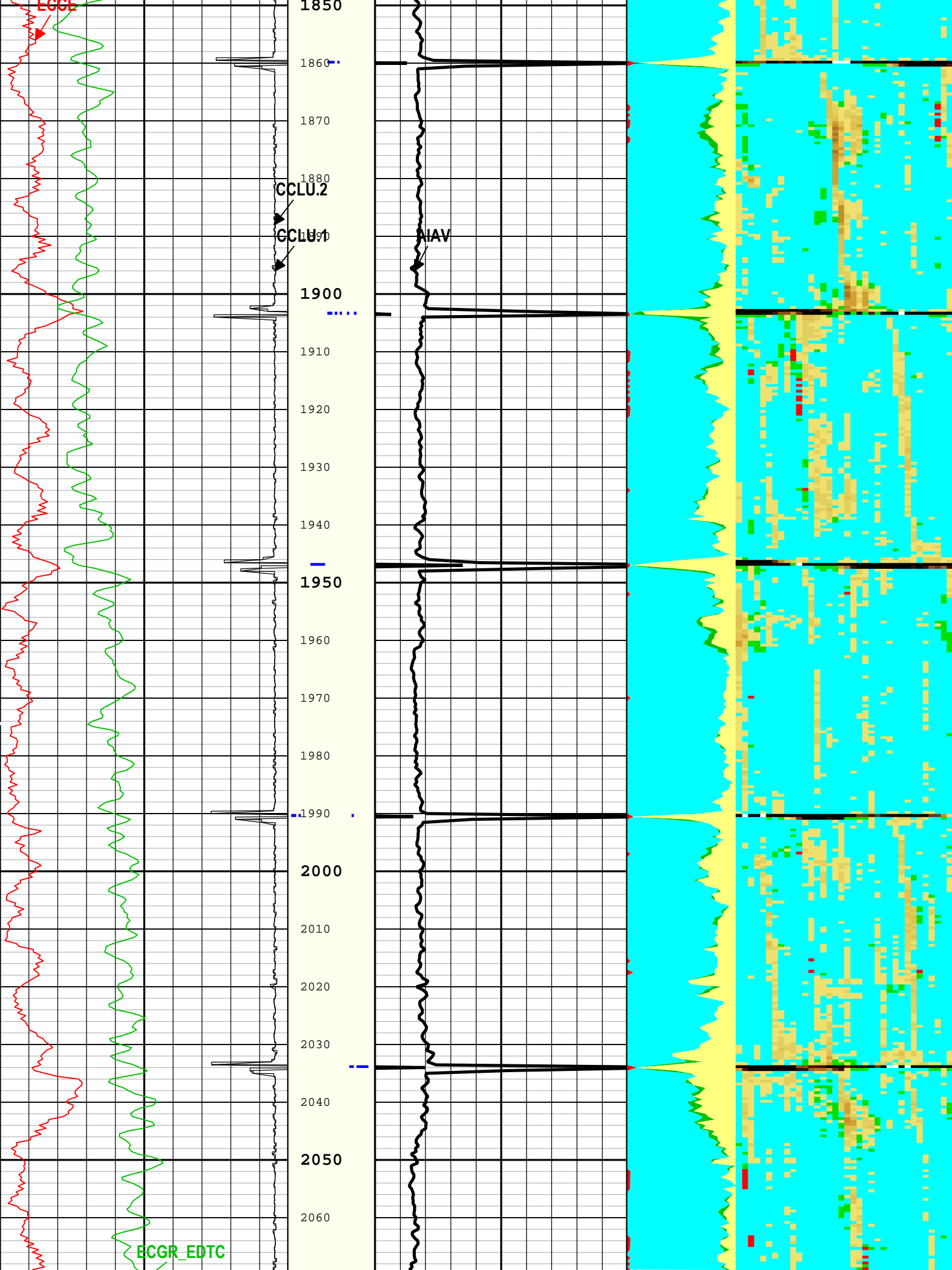


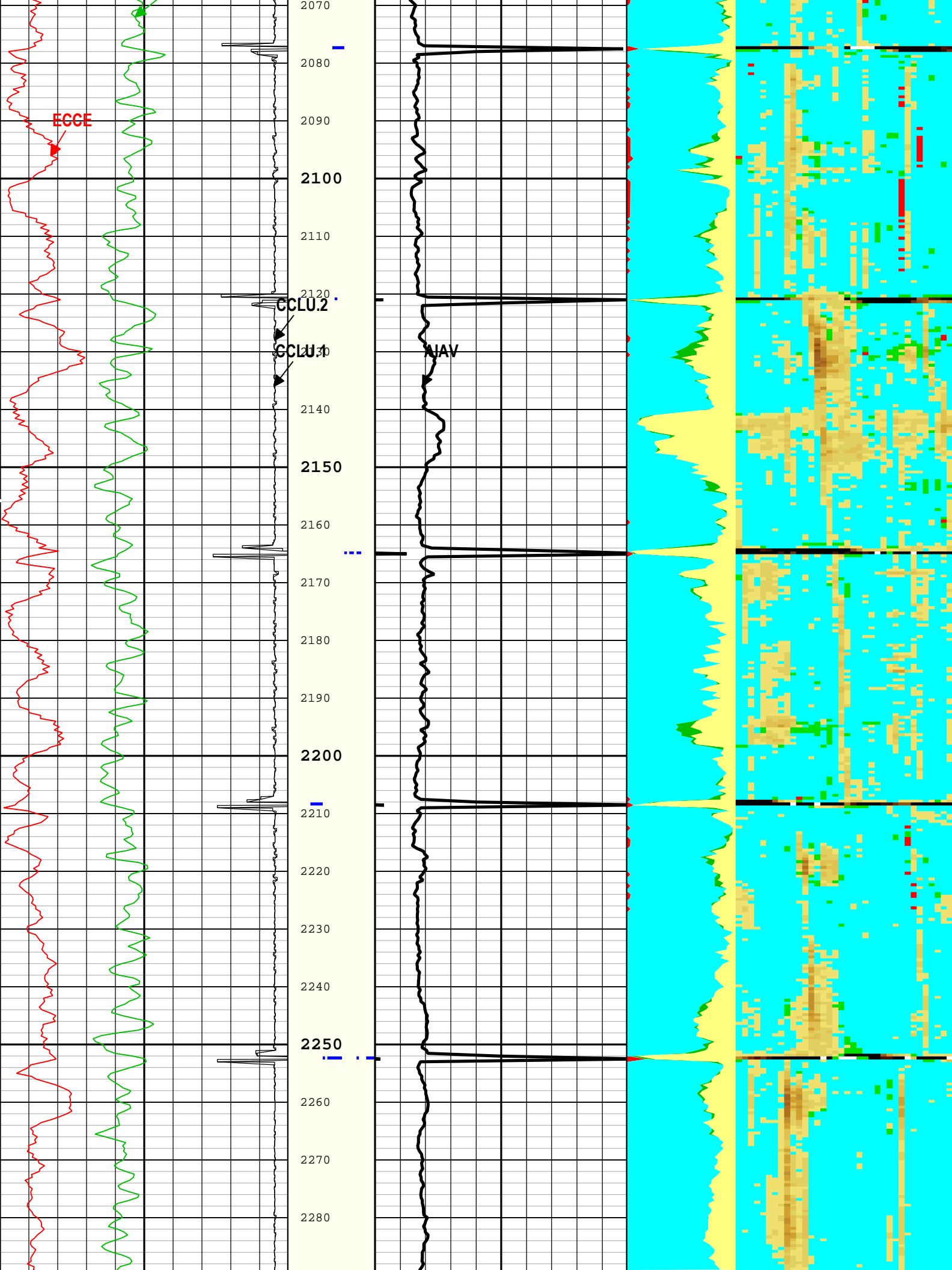


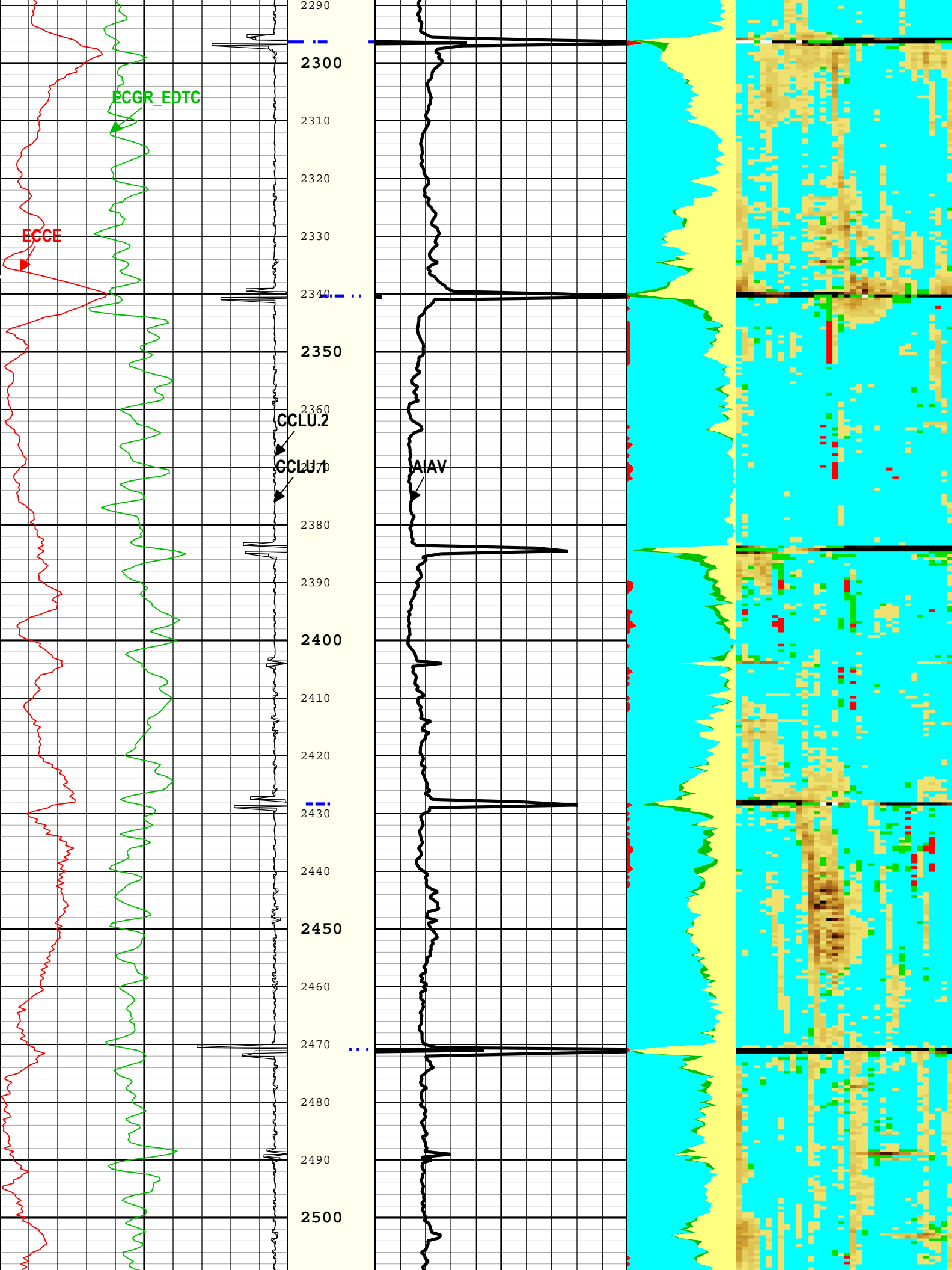


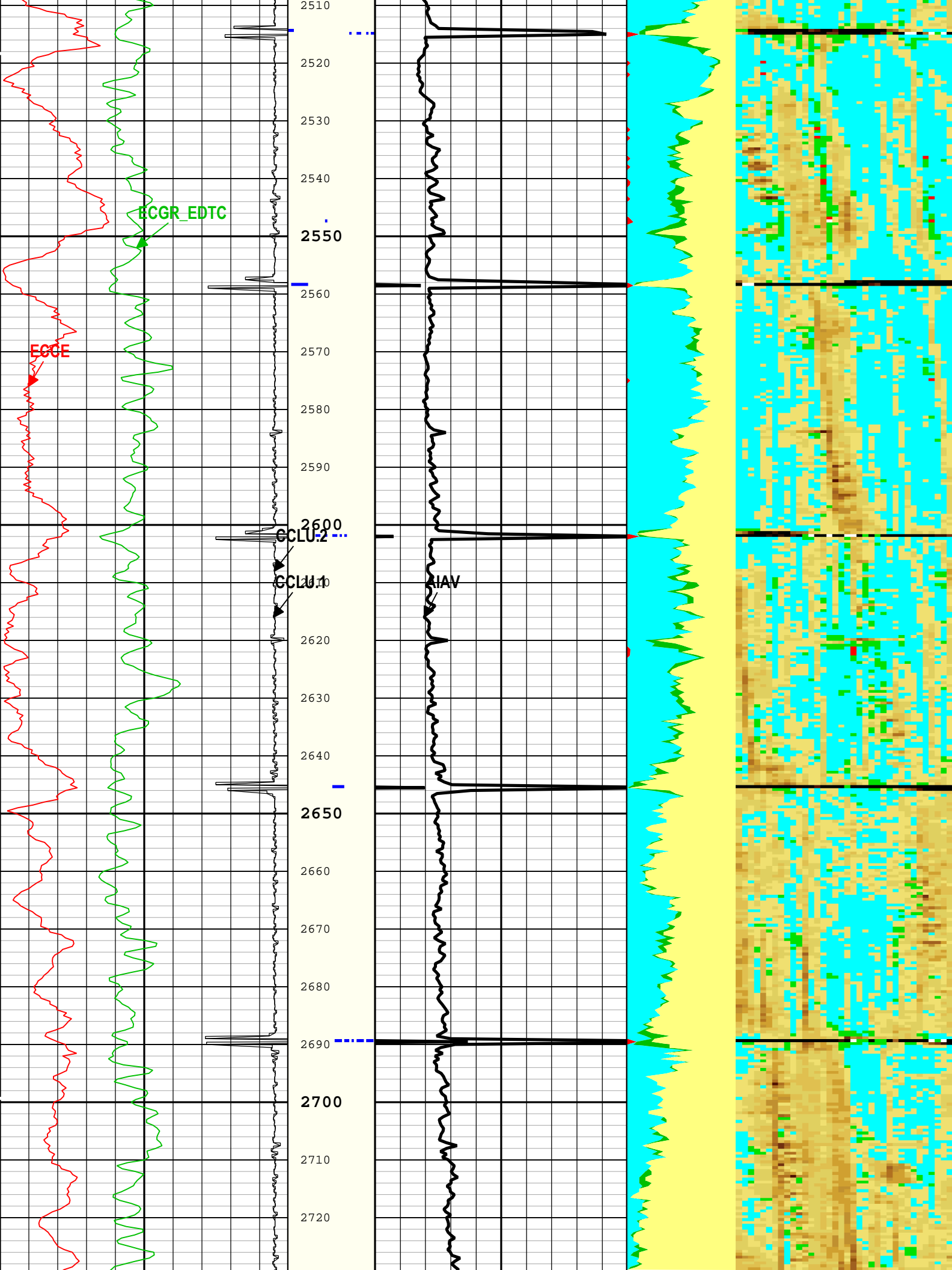


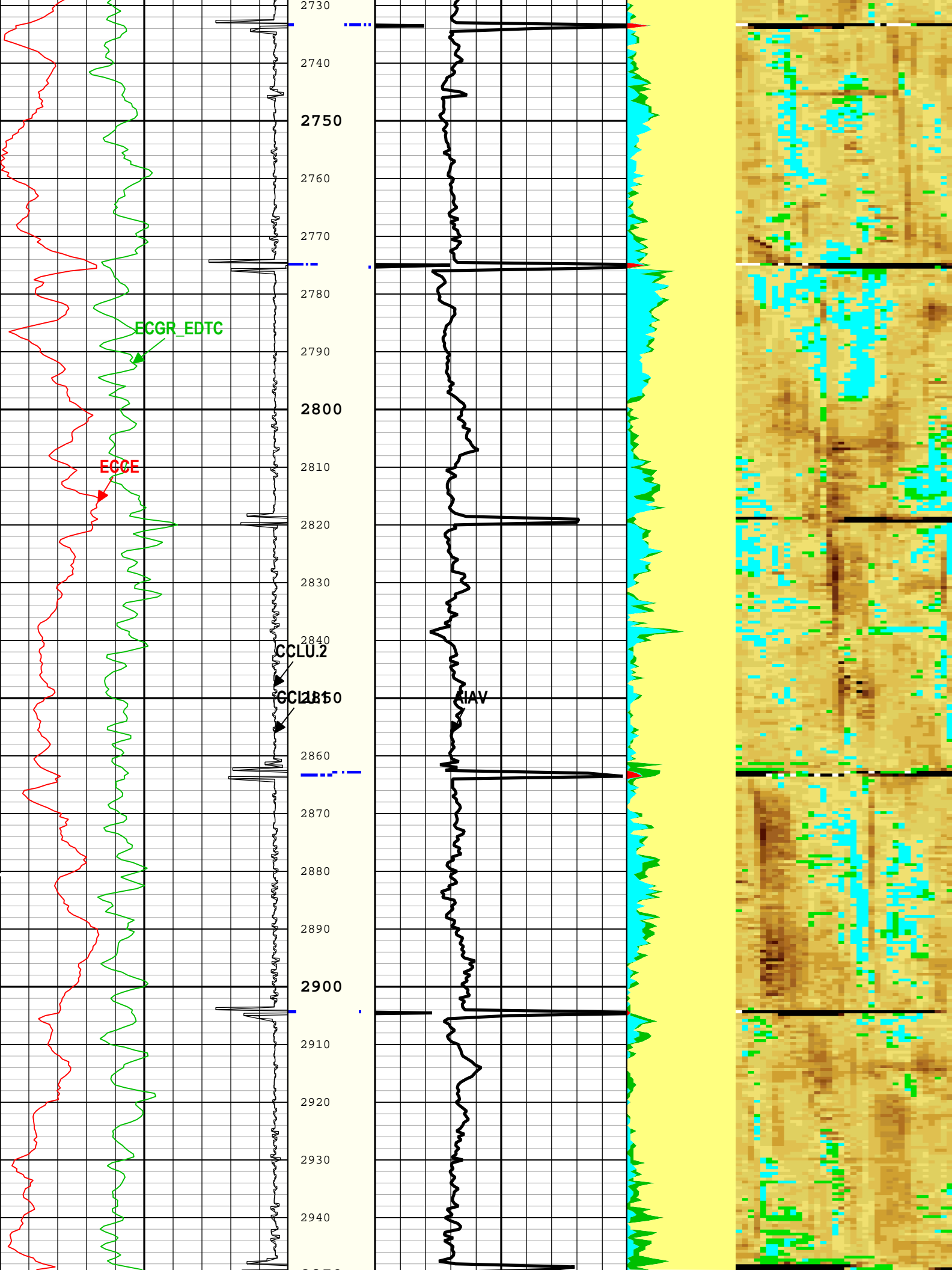


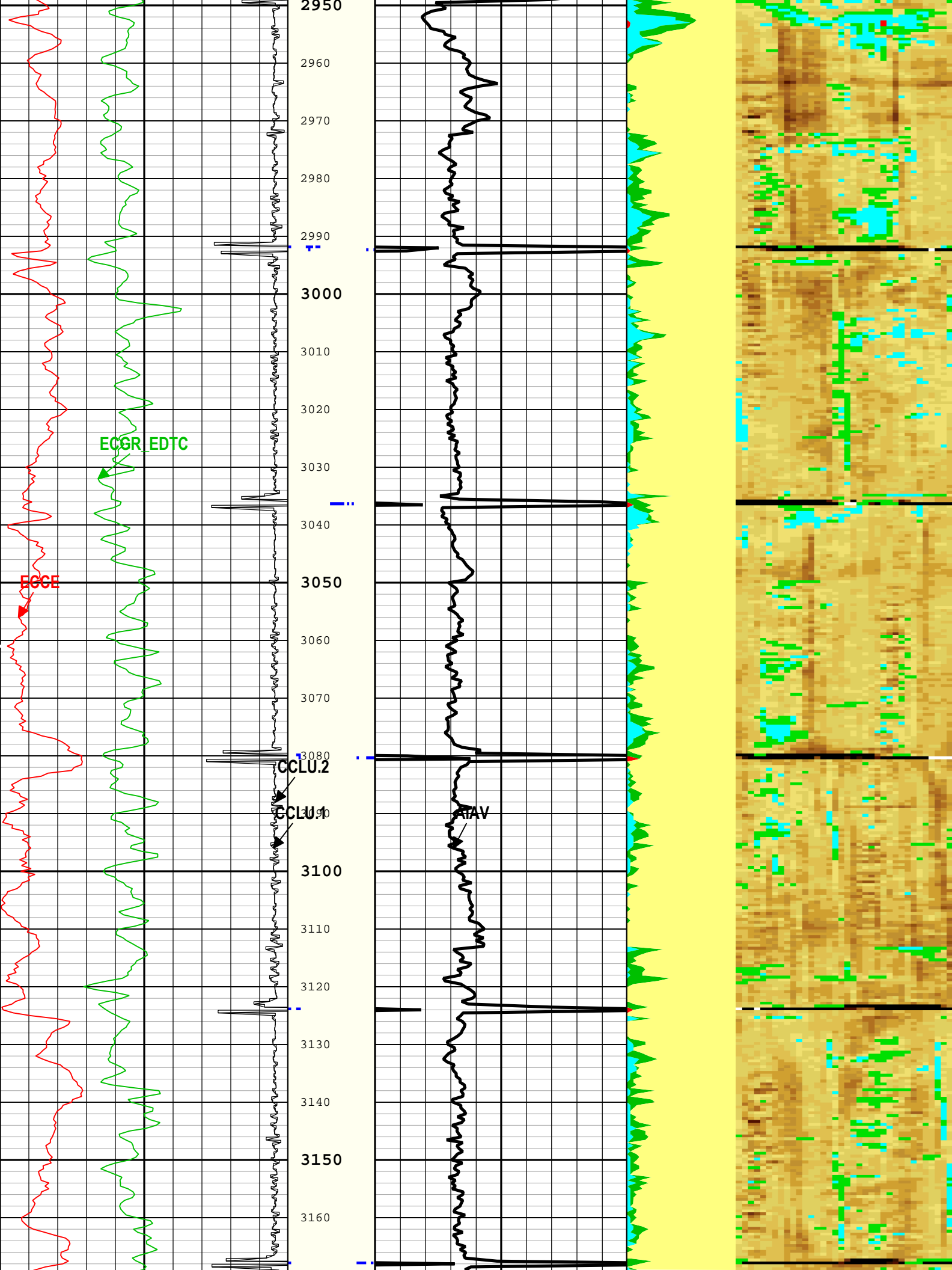


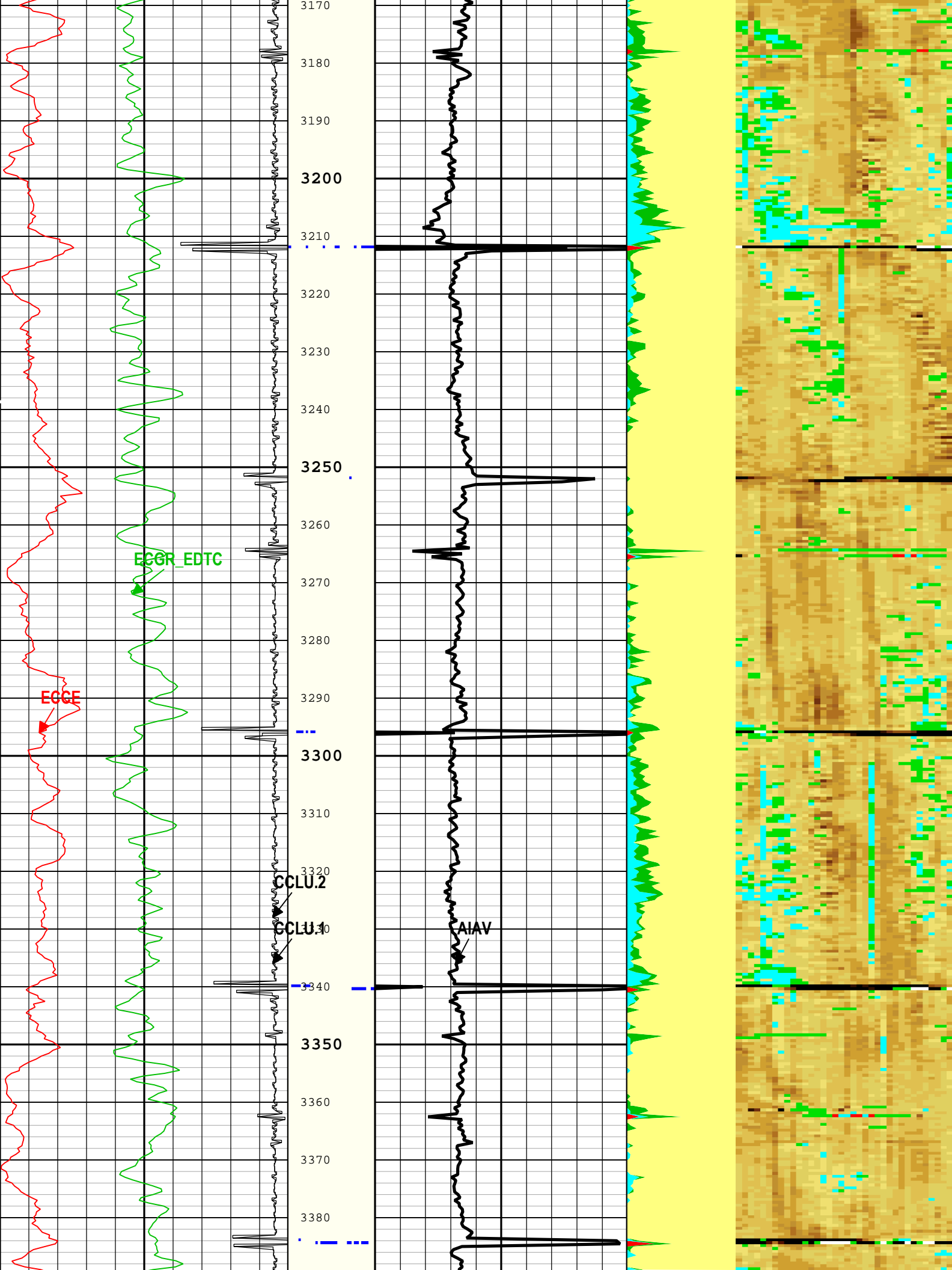


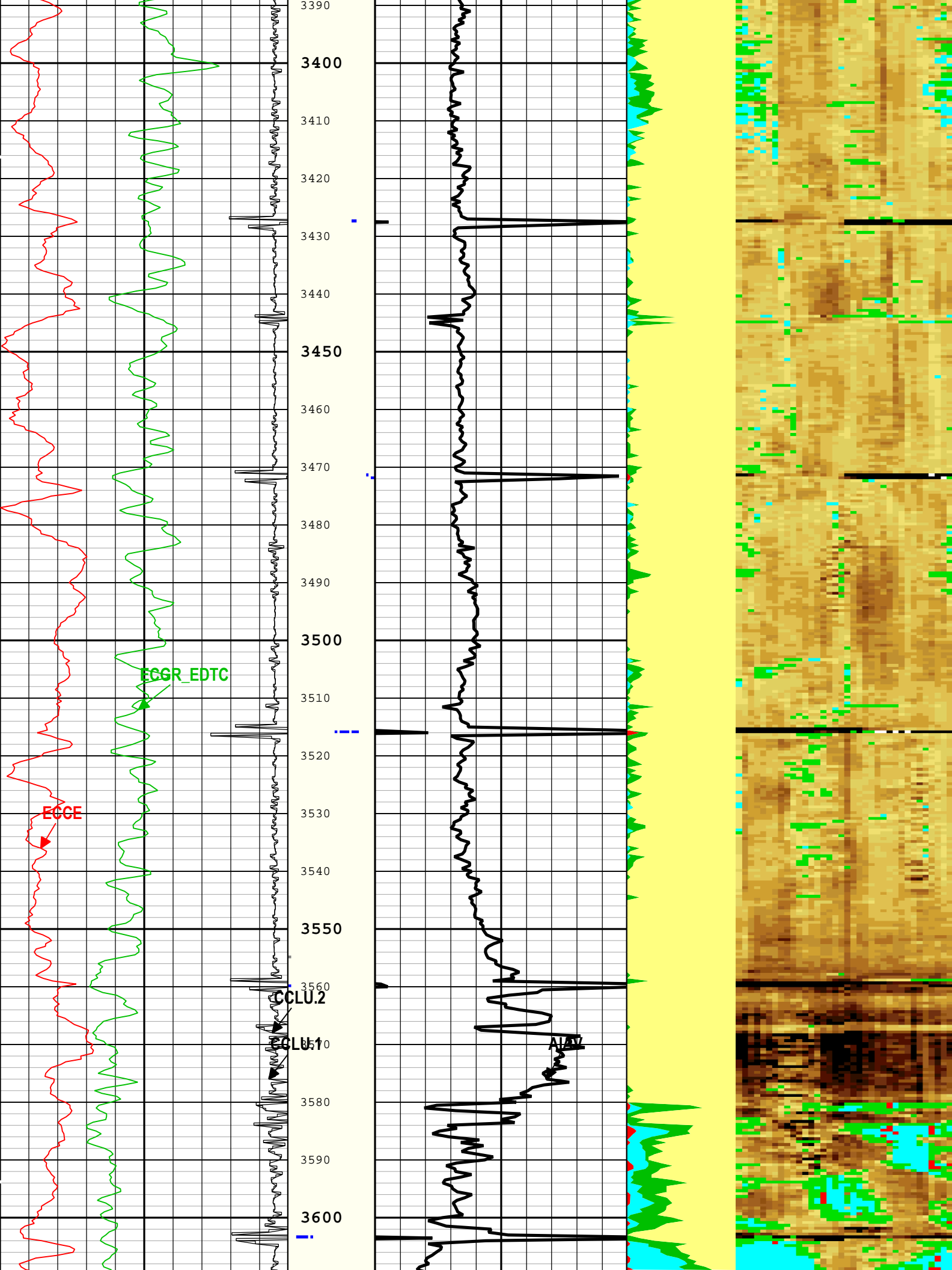


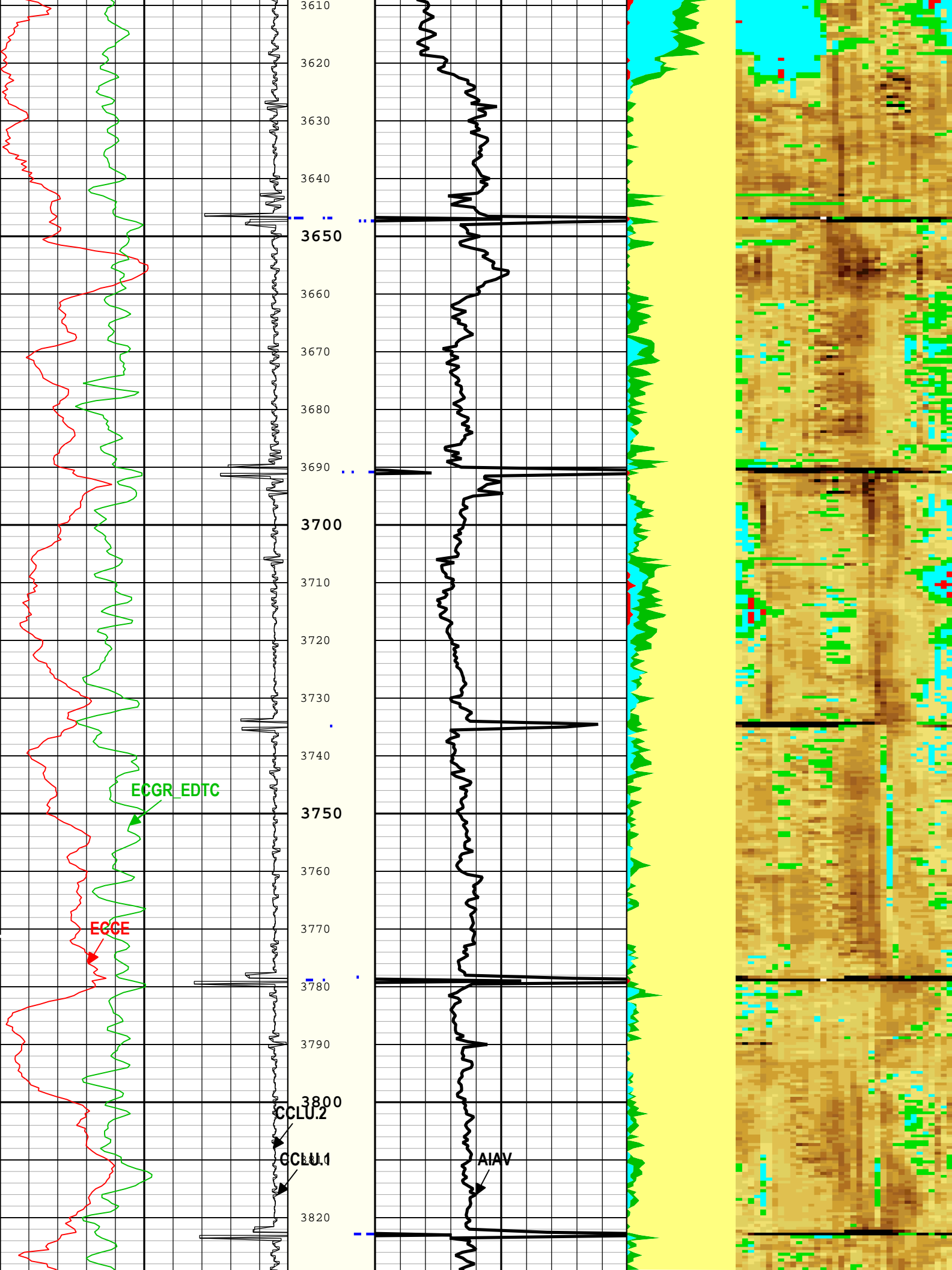


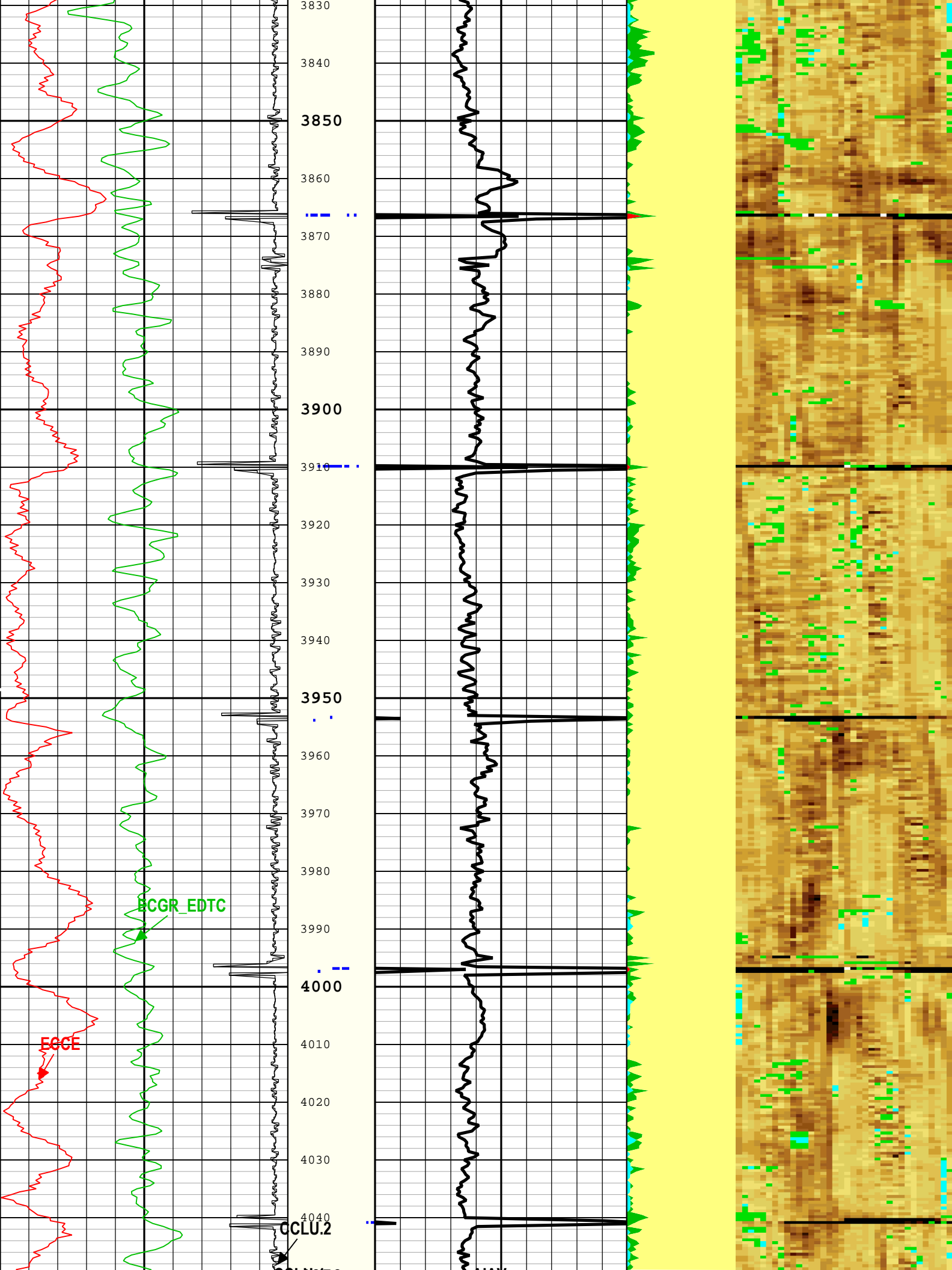


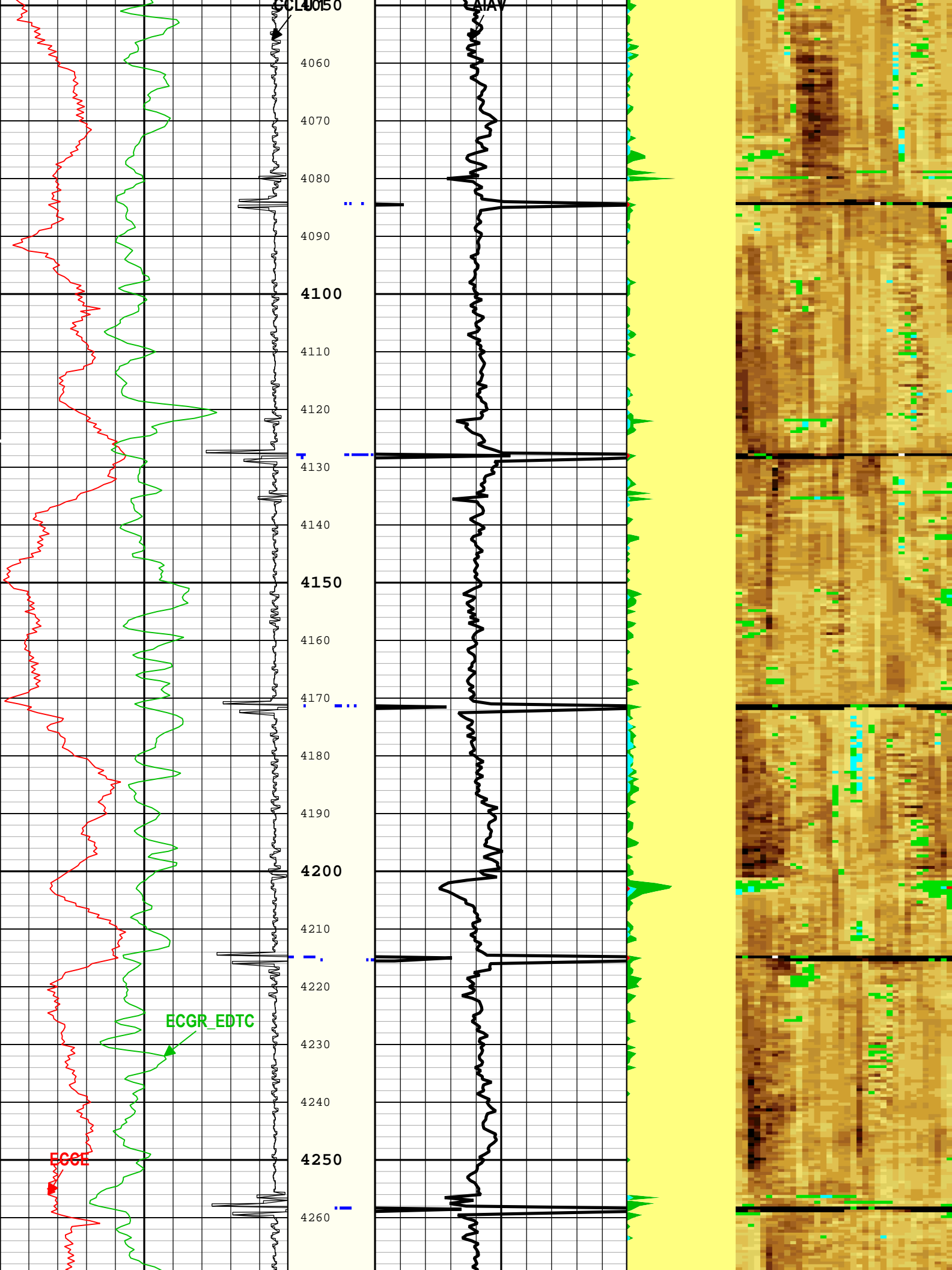


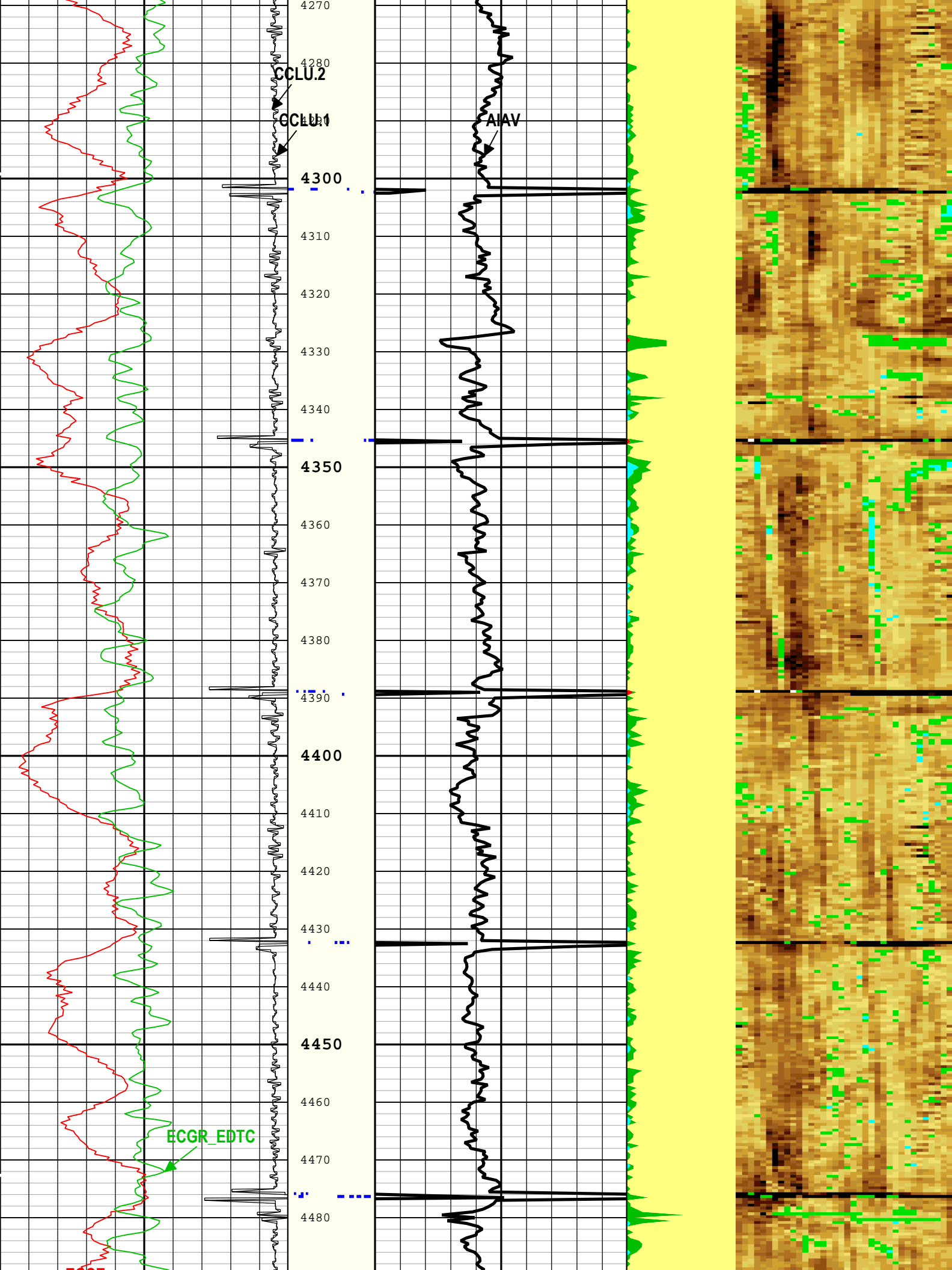


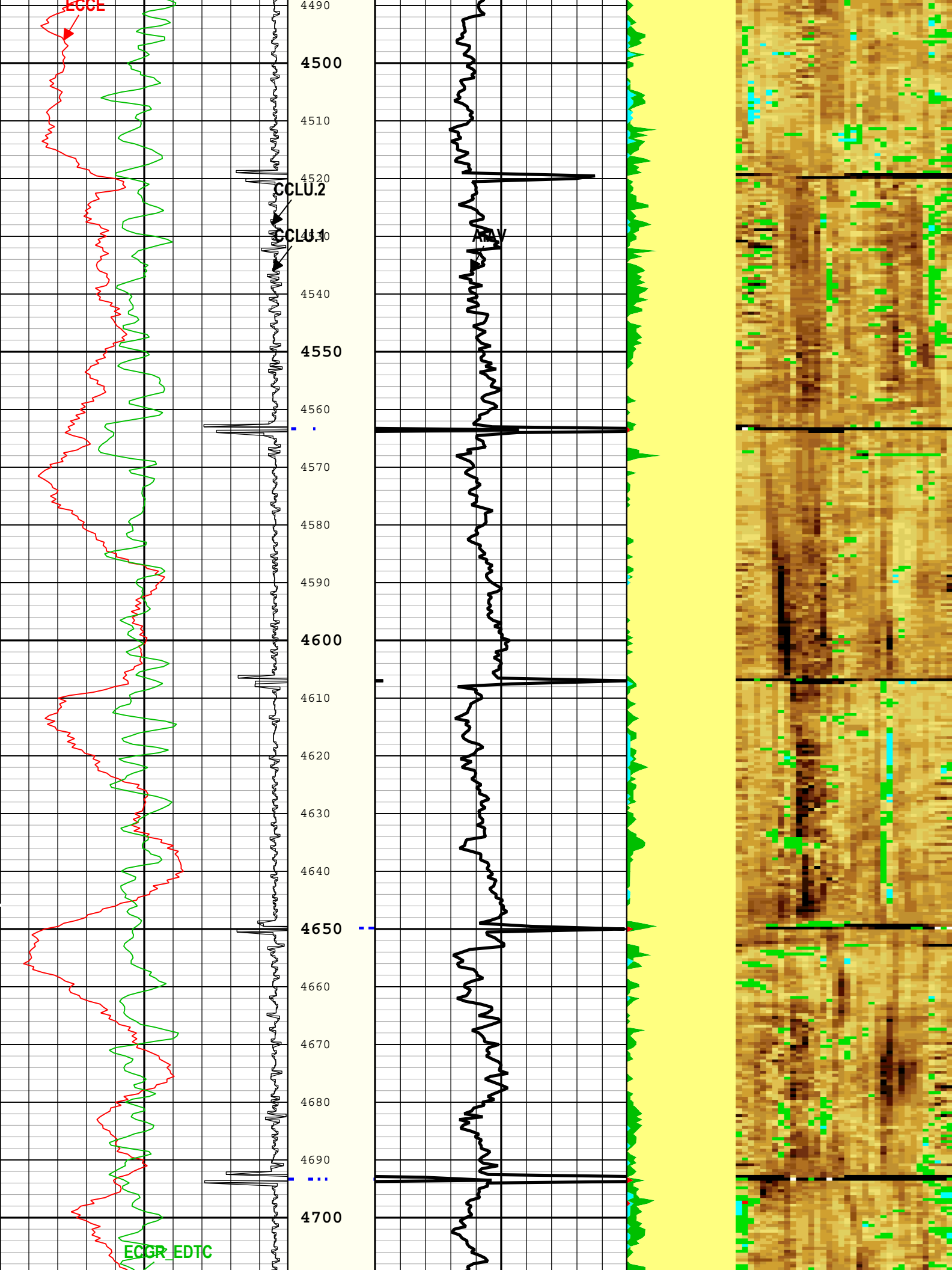


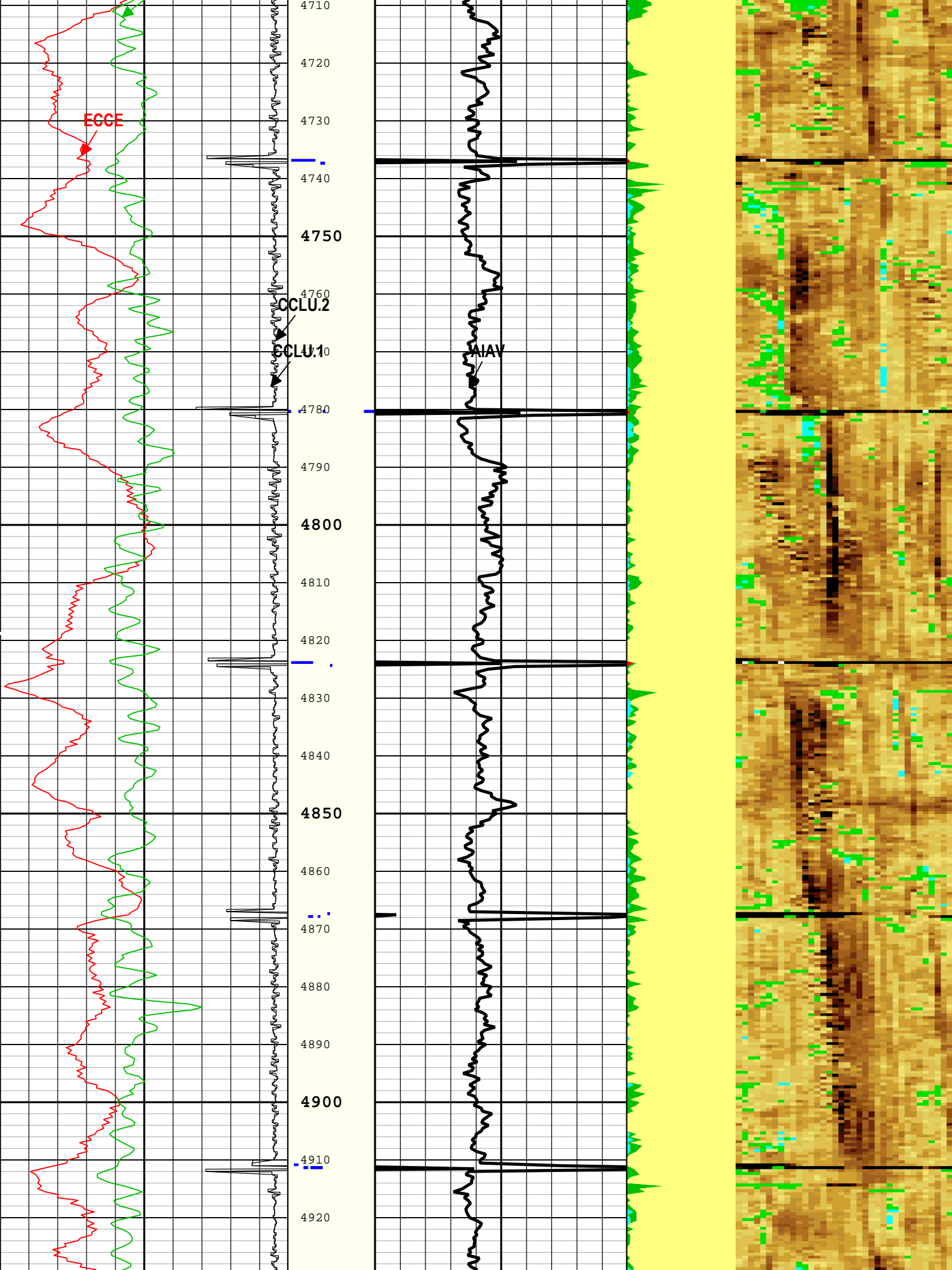


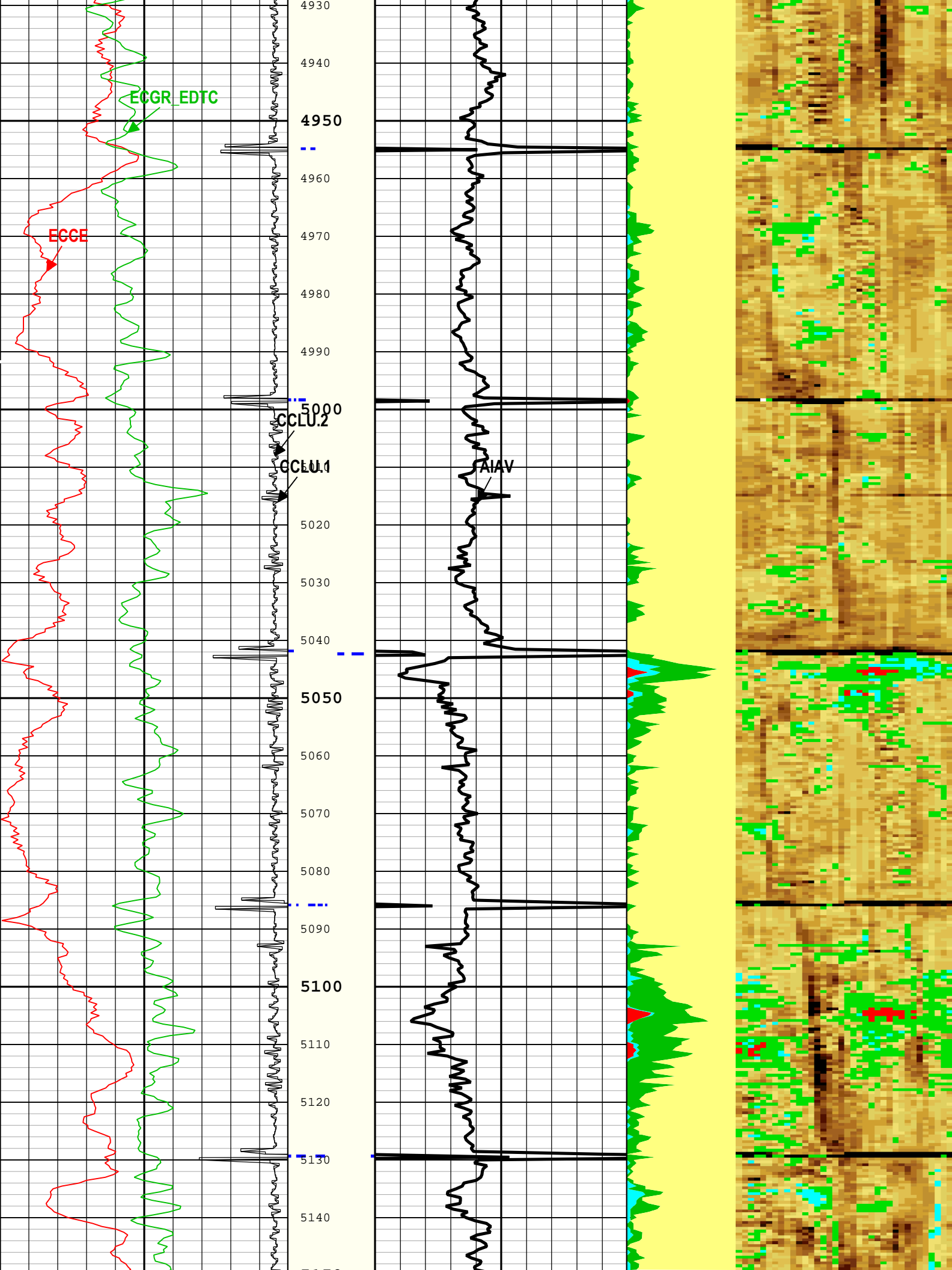


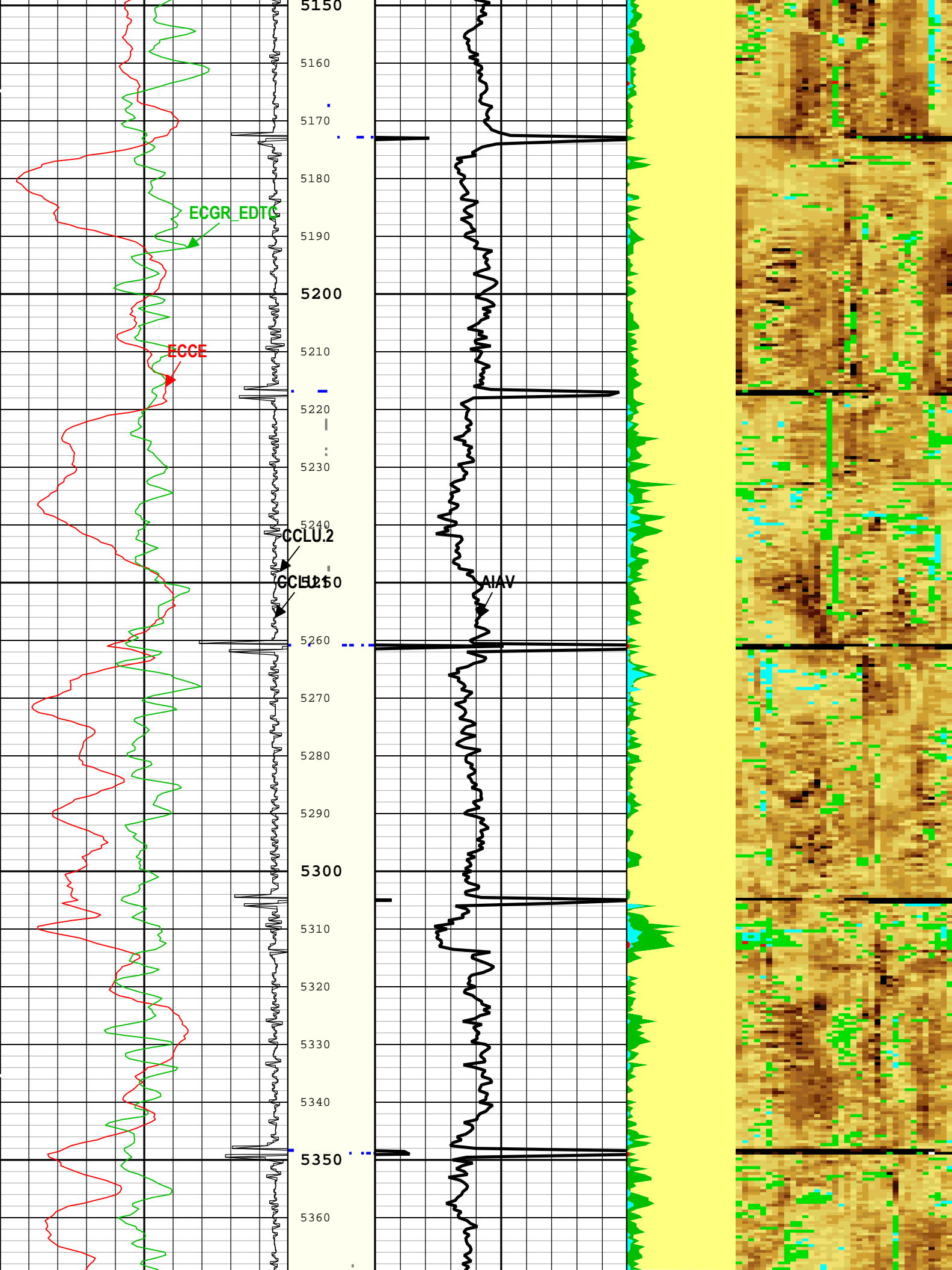


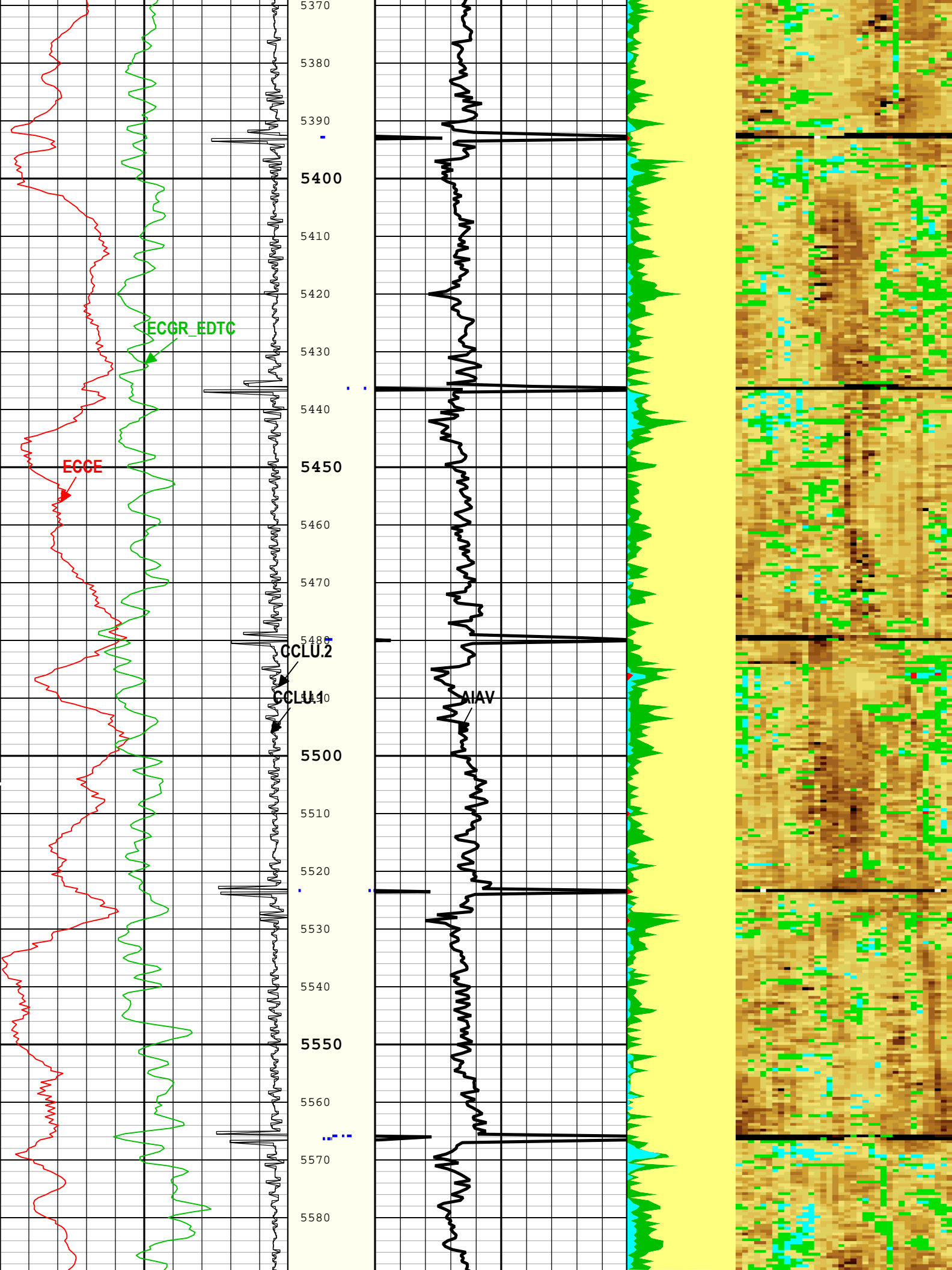


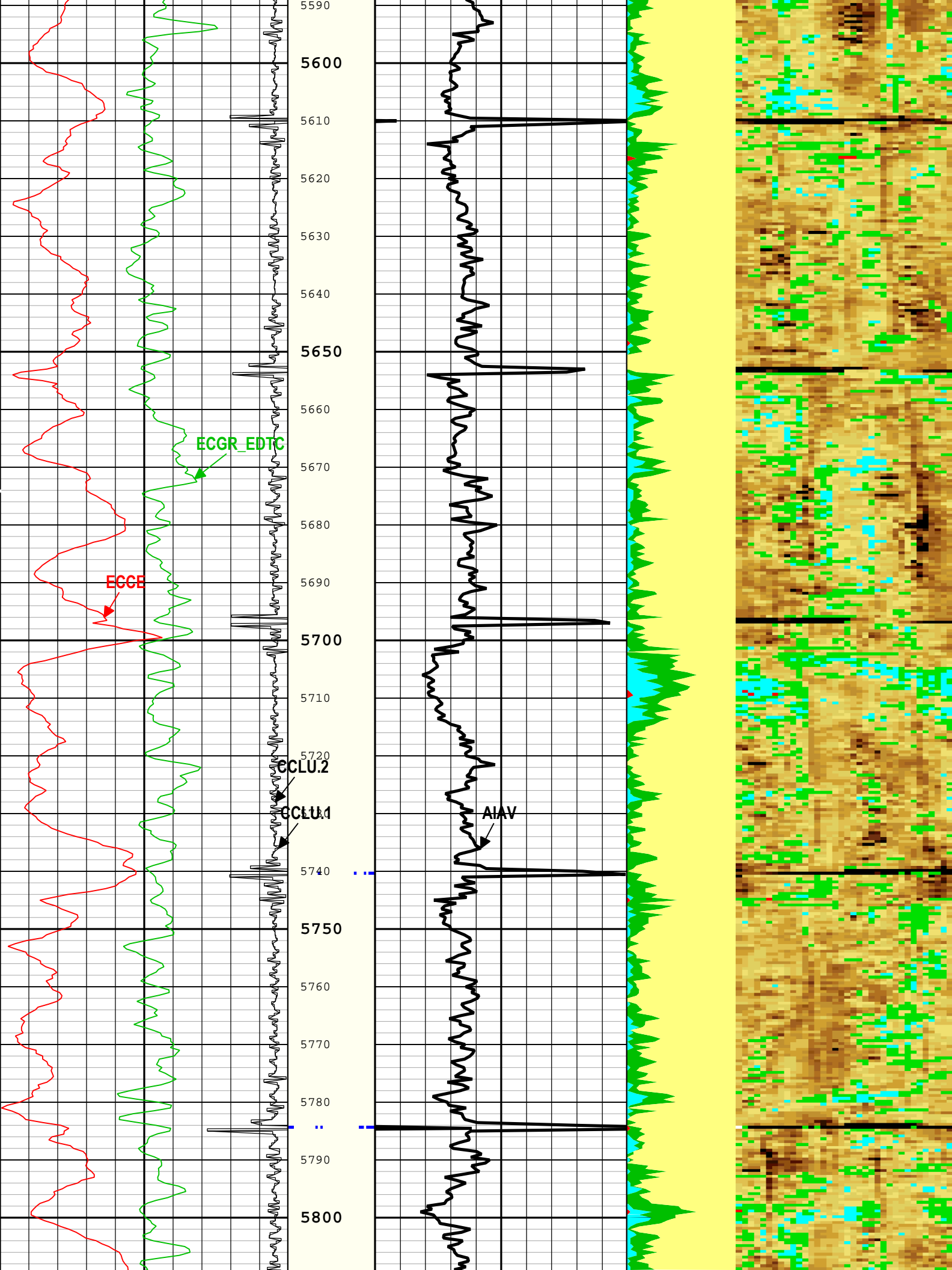


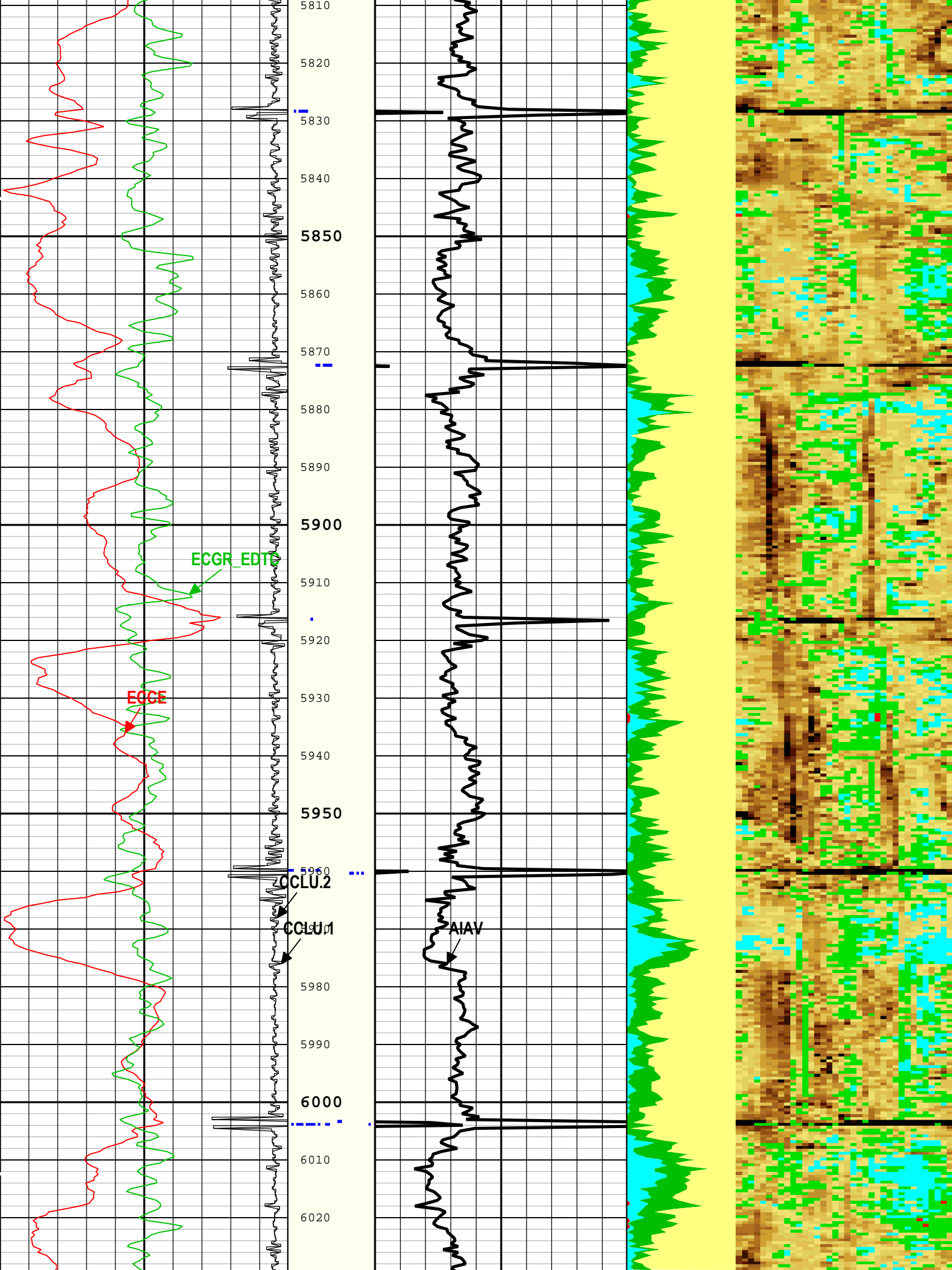


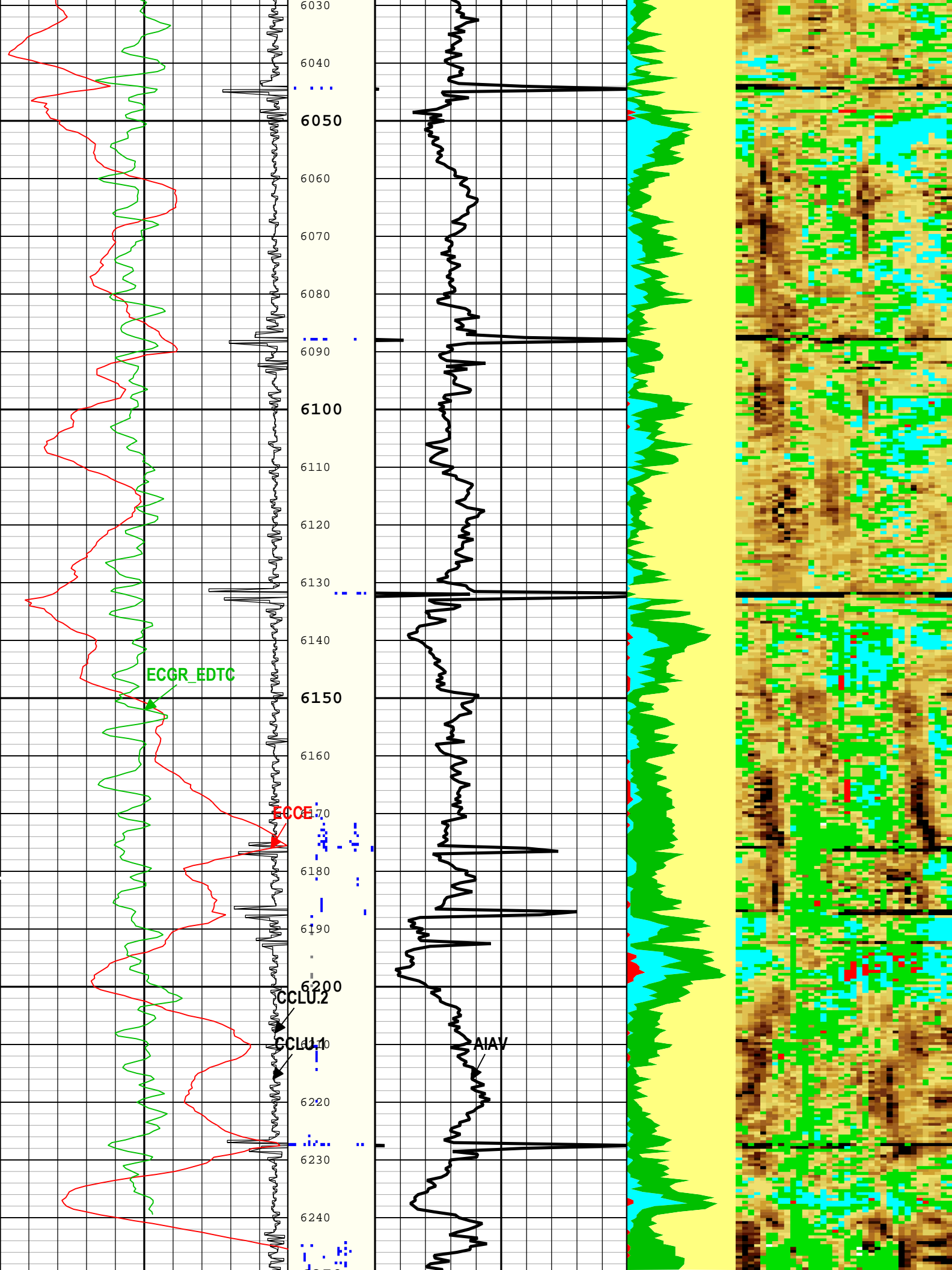


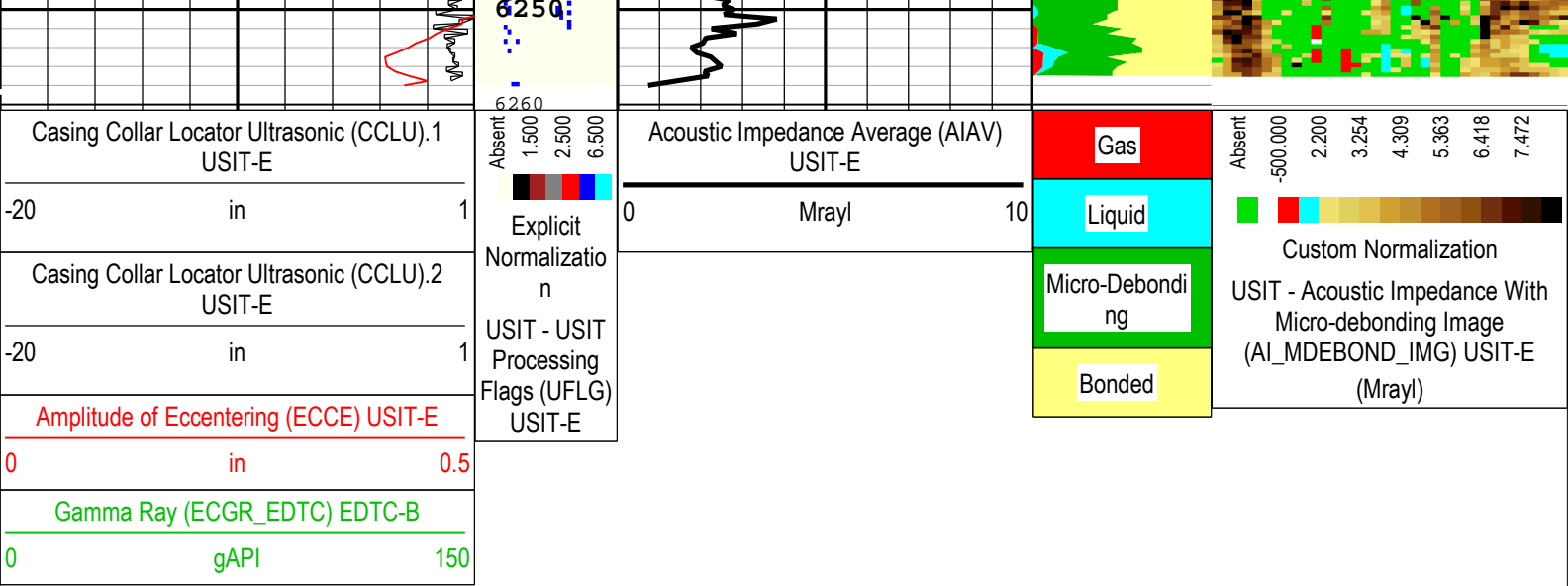












TIME_1900 - Time Marked every 60.00 (s)

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: 06-Jun-2019 15:22:14

Channel Processing Parameters

One: Parameters

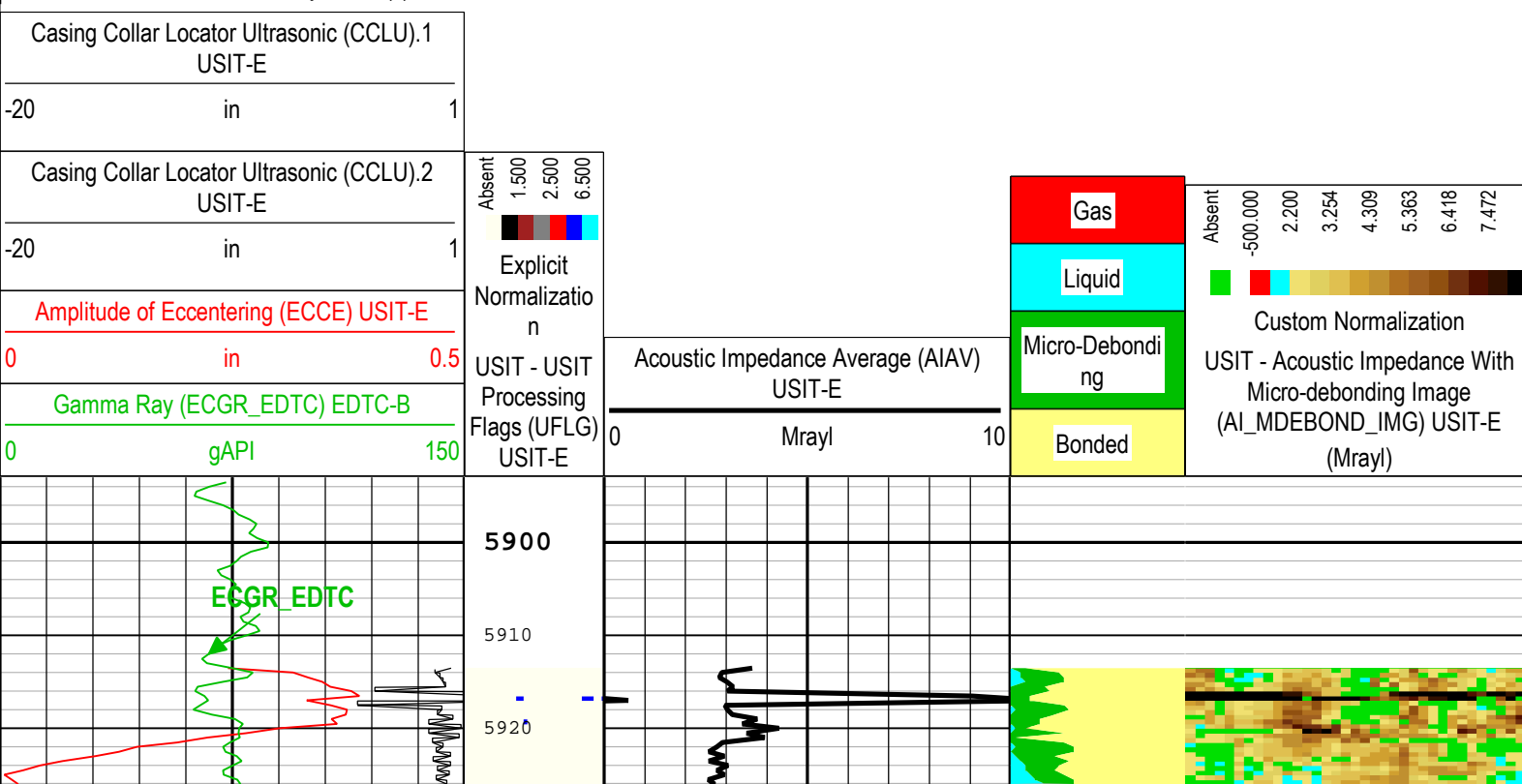
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	16893	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CENT)	Cement Type	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
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	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.12	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.62	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	1.62	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

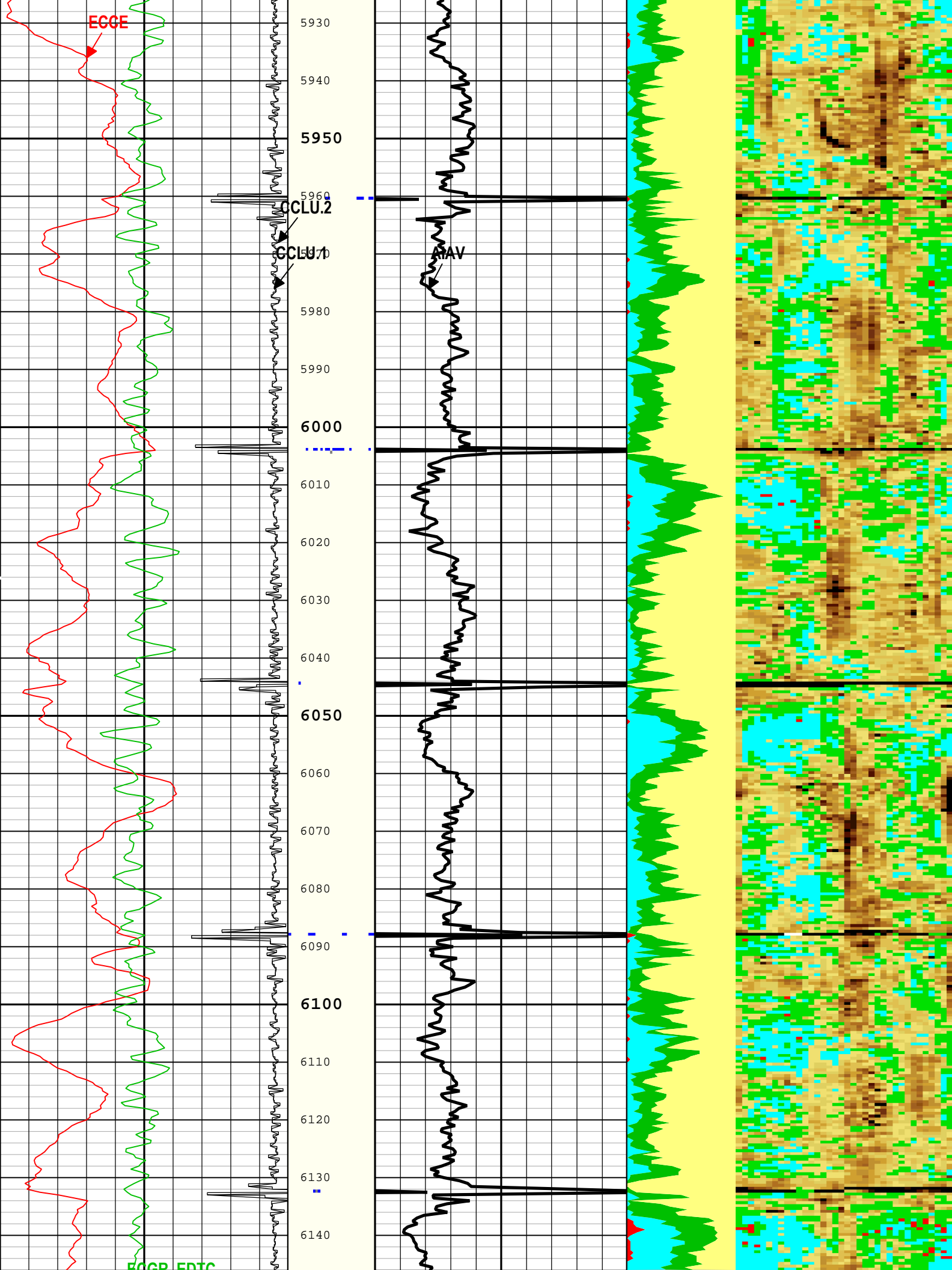
Depth Zone Parameters

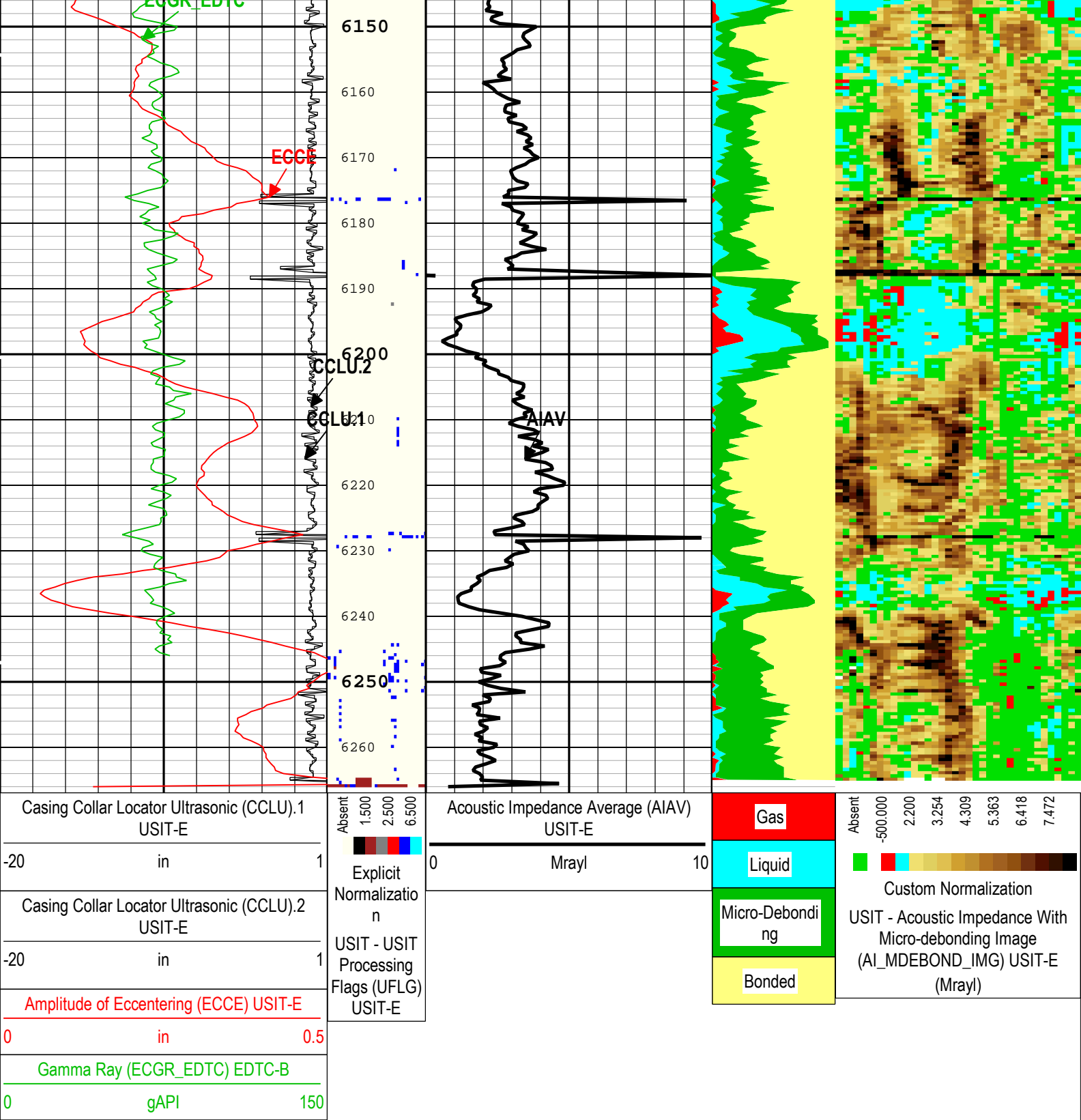
Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	33.5	1950
BS	8.5	1950	6260.58

All depth are actual.

Tool Control Parameters







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: 06-Jun-2019 15:22:32

Channel Processing Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
BARI(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	16893	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	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.12	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.62	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	1.62	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	60	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	06-Jun-2019 13:51:32	06-Jun-2019 13:51:53	6266.96	6252.16
WINB	28	06-Jun-2019 13:51:53	06-Jun-2019 13:52:11	6252.16	6237.99
WINB	27	06-Jun-2019 13:52:11	06-Jun-2019 13:55:50	6237.99	5913.64
WINE	73.83	06-Jun-2019 13:51:32	06-Jun-2019 13:52:17	6266.96	6232.93
WINE	75	06-Jun-2019 13:52:17	06-Jun-2019 13:55:50	6232.93	5913.64

All depth are at tool zero.

XYZ

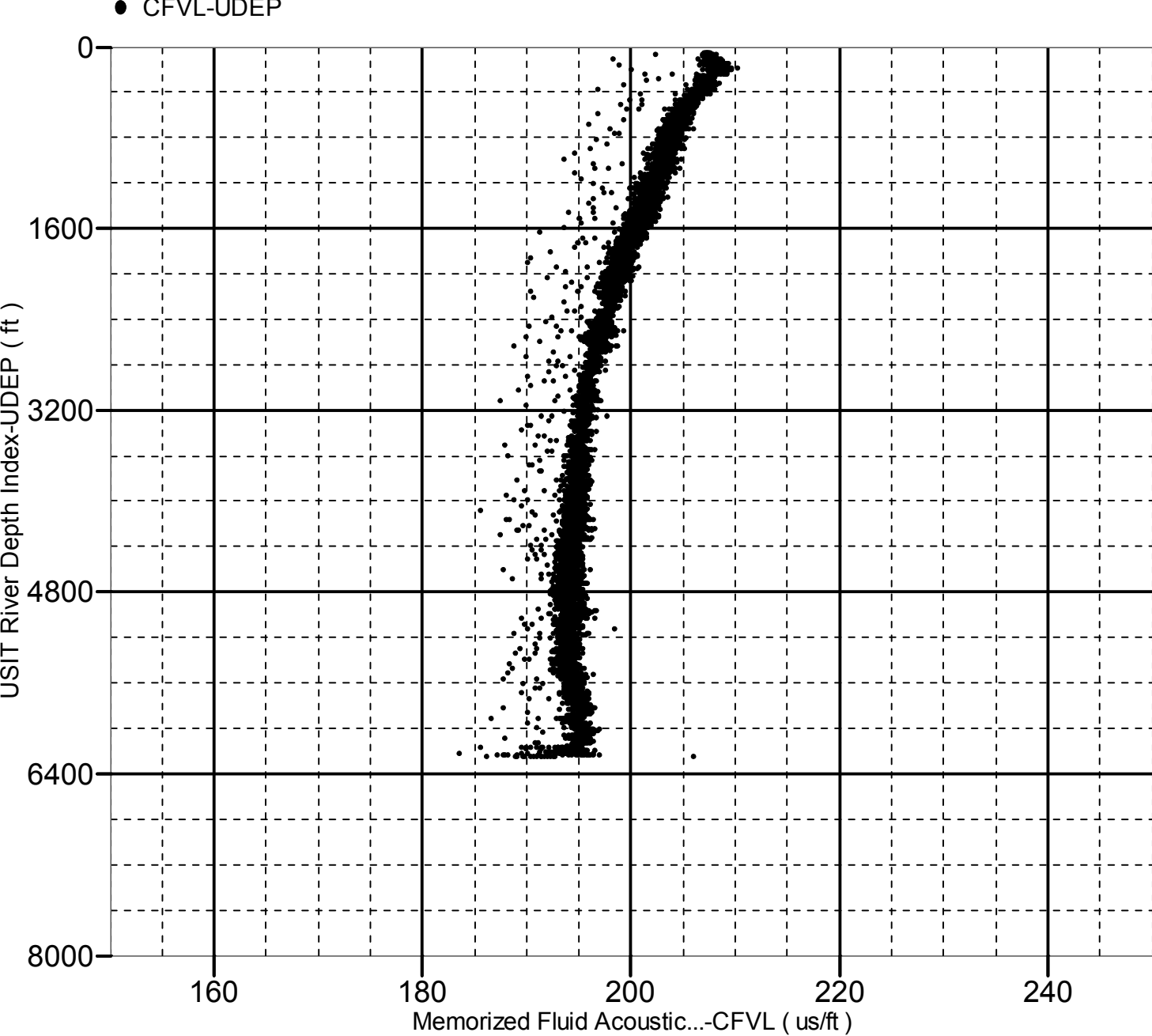
Company:Noble Energy INC Well:Wells Ranch State AA36-643

One: Main[4]:Up:S004

Fluid Acoustic Slowness vs Depth

2D Cross Plot

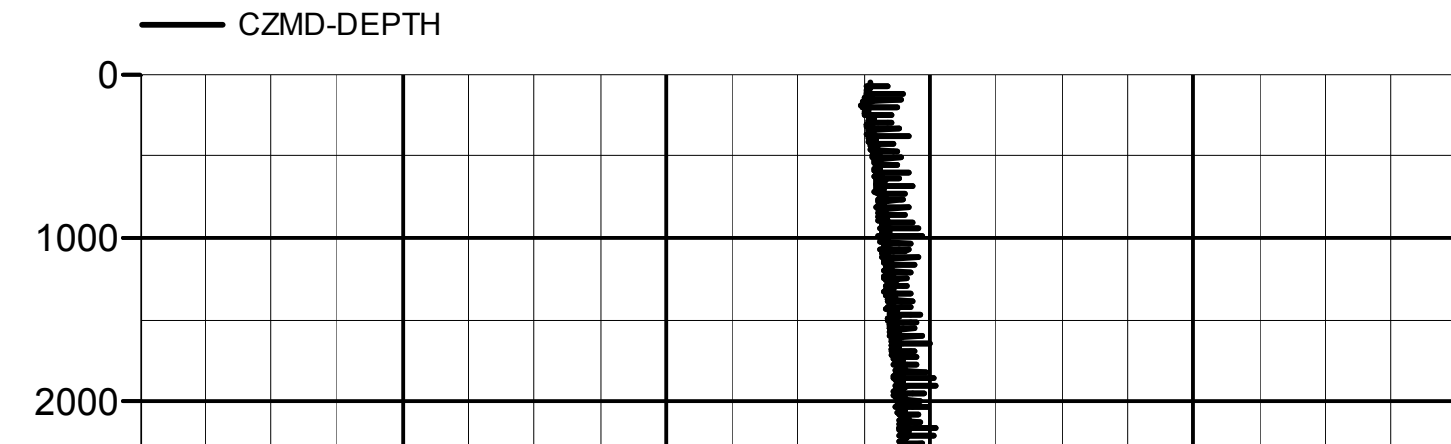
Index Range: From 6260.50 to 53.50 ft

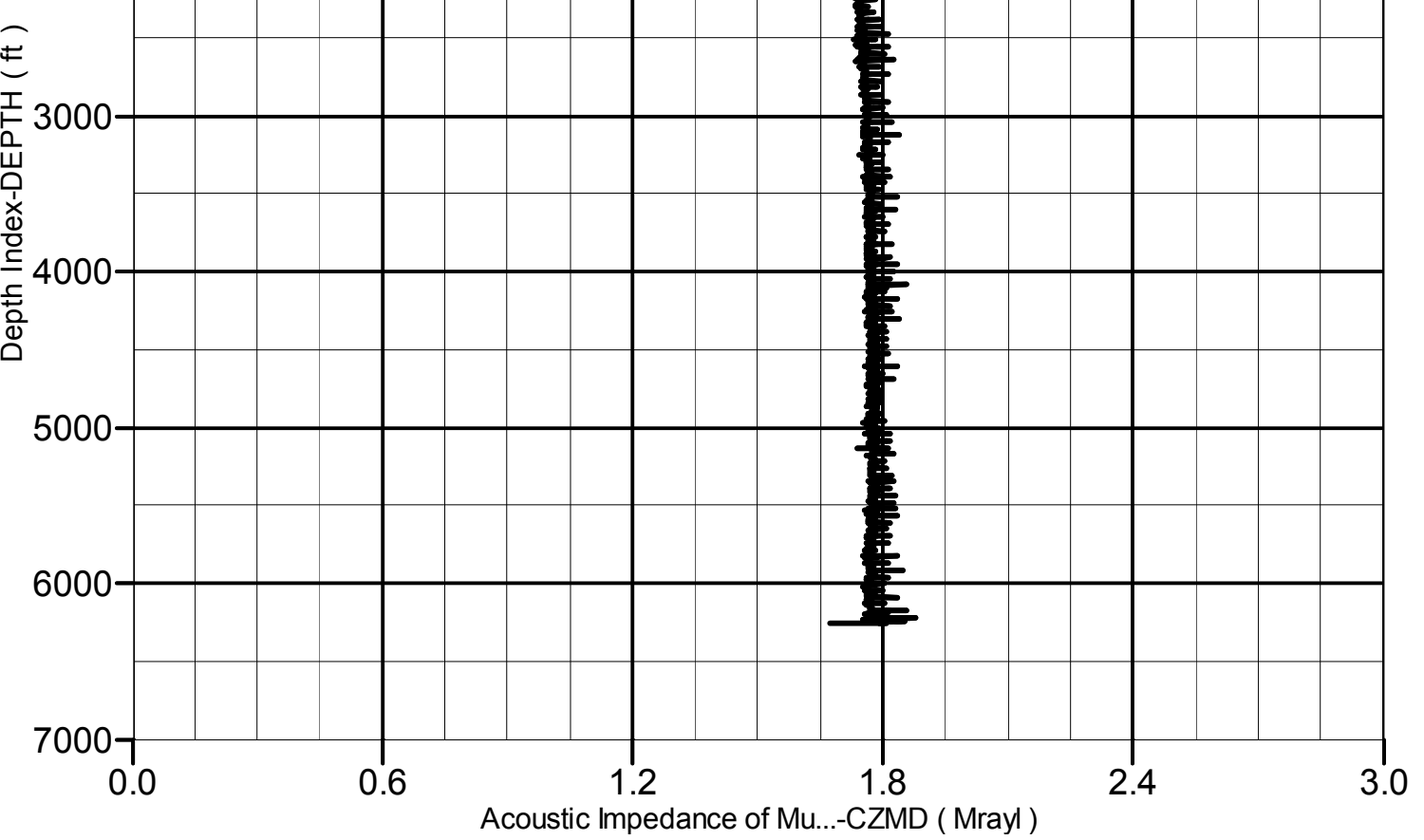


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6260.50 to 53.50 ft





Company: Noble Energy INC

Schlumberger

Well: Wells Ranch State AA36-643

Field: Wattenberg

County: Weld

State: Colorado

UltraSonic Summary Print