

Company: Noble Energy Inc.

Well: Wells Ranch AF07-659

Field: Wattenberg

County: Weld State: Colorado

DJ Basin UltraSonic Summary Print

County:	Weld				
Field:	Wattenberg				
Location:	SENE Sec. 8, T5N, R62W				
Well:	Wells Ranch AF07-659				
Company:	Noble Energy Inc.				
		SENE Sec. 8, T5N, R62W	Elev.:	K.B.	4735.00 ft
		SHL: 2313' FNL & 175' FEL		G.L.	4705.00 ft
		Lat: 40.41517, Long:-104.33836		D.F.	4735.00 ft
		Permanent Datum:	Ground Level	Elev.:	4705.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-44246	8	5N	62W
Logging Date	07-Aug-2017				

Run Number	ONE	
Depth Driller	16445.00 ft	
Schlumberger Depth	16445.00 ft	
Bottom Log Interval	6508.00 ft	
Top Log Interval	100.00 ft	
Casing Fluid Type	Brine	
Salinity		
Density	8.4 lbm/gal	
Fluid Level	0.00 ft	
BIT/CASING/TUBING STRING		
Bit Size	8.50 in	
From	1940.00 ft	
To	16445.00 ft	
Casing/Tubing Size	5.5 in	
Weight	20 lbm/ft	
Grade	N/A	
From	30.00 ft	
To	16435.30 ft	
Max Recorded Temperatures	192 degF	
Logger on Bottom	07-Aug-2017	15:45:00
Unit Number	Location:	Fort Morgan
Recorded By	Camila Lang	
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

2. Disclaimer

3. Contents

4. Well Sketch

5. Borehole Size/Casing/Tubing Record

6. Operational Run Summary

7. Borehole Fluids

8. Remarks and Equipment Summary

9. Depth Summary

10. USI Fluid Properties Measurement_1

11. ONE 2500 PSI Main Pass

11.1 Integration Summary

11.2 Software Version

11.3 Composite Summary

11.4 Log (DJ Basin Ultrasonic Cement Summary Report)

11.5 Parameter Listing
13. XYZ (USI Fluid Acoustic Slowness vs Depth 3.0 in)

14. XYZ (USI Acoustic Impedance of Mud vs Depth 3.0 in)

15. Calibration Report

16. Tail

12. ONE 0 PSI Repeat Pass

12.1 Integration Summary

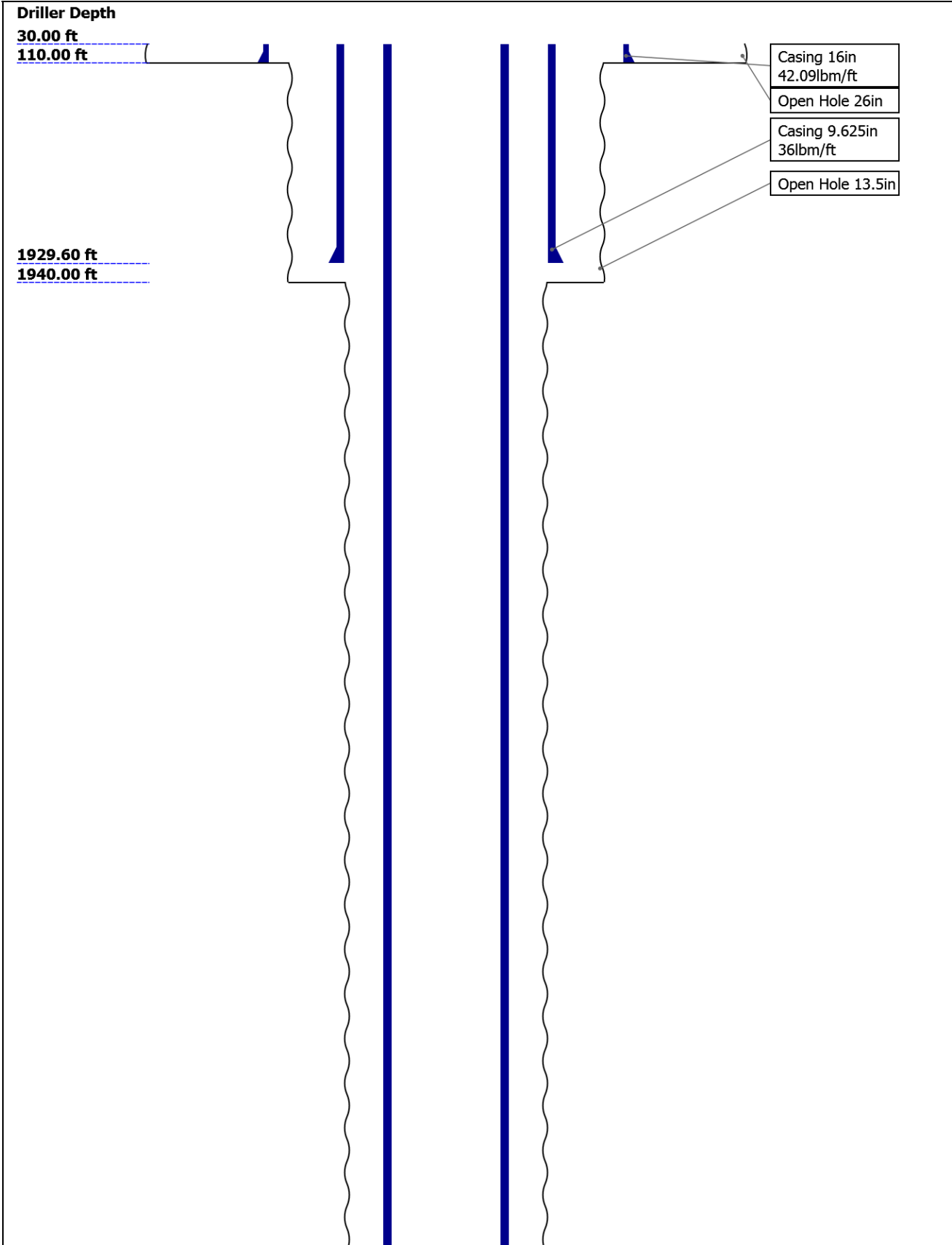
12.2 Software Version

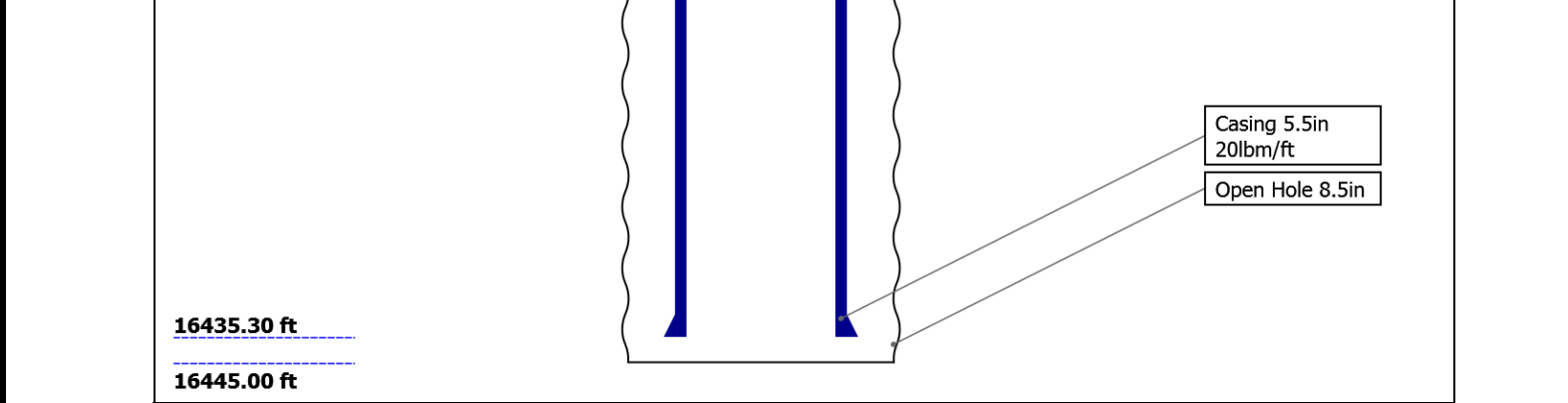
12.3 Composite Summary

12.4 Log (DJ Basin Ultrasonic Cement Summary Report)

12.5 Parameter Listing

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	1940			
Top Logger (ft)	30	110	1940			
Bottom Driller (ft)	110	1940	16445			
Bottom Logger (ft)	110	1940	16445			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	42.09	36	20			
Inner Diameter (in)	15.511	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller (ft)	30	30	30			
Top Logger (ft) (ft)	30	30	30			
Bottom Driller (ft)	110	1929.6	16435.3			
Bottom Logger (ft)	110	1929.6	16435.3			

Operational Run Summary


Parameter (unit)	ONE					
Date Log Started	07-Aug-2017					
Time Log Started	15:00:07					
Date Log Finished	07-Aug-2017					
Time Log Finished	16:28:35					
Top Log Interval (ft)	100.00					
Bottom Log Interval (ft)	6508.00					
Total Depth (ft)	6508.00					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.500					
Logging Unit Number	2377					
Logging Unit Location	Fort Morgan					
Recorded By	Camila Lang					

Witnessed By	Bill Mansfield					
Service Order Number	DVWV-00008					

Borehole Fluids

Parameter(unit)	ONE					
Fluid Type	Water					
Fluid Name	Brine					
Max Recorded Temperatures (degF)	192					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Date Logger on Bottom	07-Aug-2017					
Time Logger on Bottom	15:45:00					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

ONE: Toolstring			ONE: Remarks	
<div><div><div>Equip nameLength</div><div>LEH-QT33.83</div><div>LEH-QT</div></div><div><div>SAH-F:1830.91</div><div>17</div></div><div><div>EDTC-B:826.06</div><div>102</div><div>EDTH-B:9245</div><div>EDTG-A:77004</div><div>EDTC-B:8102</div></div><div><div>AH-184[2]:195119.56</div><div>AH-184[1]:282617.56</div><div>USIT-E:9215.56</div><div>1</div><div>ECH-MFA:1908</div><div>USAC-A:921</div><div>USIS-A:902</div><div>USSC-B:1730</div><div>USRS-A:786</div><div>USI-SENS</div><div>OR</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>	This was the first log in well.			
	Tool ran as per tool sketch.			
	CSG: 9.625" 36 lb/ft @ 1929.6'			
	5.5" 20lb/ft @ 16435.3'			
	Main pass recorded under 2500 psi, and repeat pass recorded under 0 psi.			
	BHT: 185 degF			
	Data below 5900' is due to the curve and eccentricization.			

CTEM

22.56

ACCZ

0.00

HV

0.00

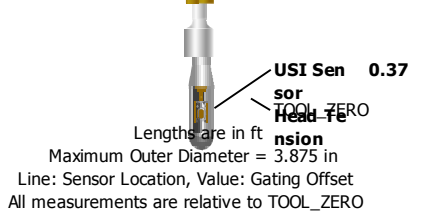
Gamma Ray

20.69

TelStatu

19.56

s

<div></div>			
Depth Summary			
ONE			
Depth Measuring Device			
Type	IDW-JA		
Serial Number	5845		
Calibration Date	07-Jul-2017		
Calibrator Serial Number	57		
Calibration Cable Type	7-46 PXS		
Wheel Correction 1	-4		
Wheel Correction 2	-5		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		
Logging Cable			
Type	7-46A-XS		
Serial Number	710146		
Length	23000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane USA		
ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All Schlumberger depth control policies and standards were followed. IDW used as primary depth reference. Z-chart used as seconardary depth reference.	
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			
Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[5]:Up	6511.38	58.48
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 : 36.27m(118.99ft) to 37.47m(122.94ft) MUD_N_FRP = 1.05 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.50 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
ONE			

2500 PSI Main Pass

Software Version

Acquisition System

Maxwell 2017 SP2

Version

7.2.87778.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[5]:Up	Up	58.48 ft	6511.38 ft	07-Aug-2017 3:43:58 PM	07-Aug-2017 4:27:38 PM	ON	5.55 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc.

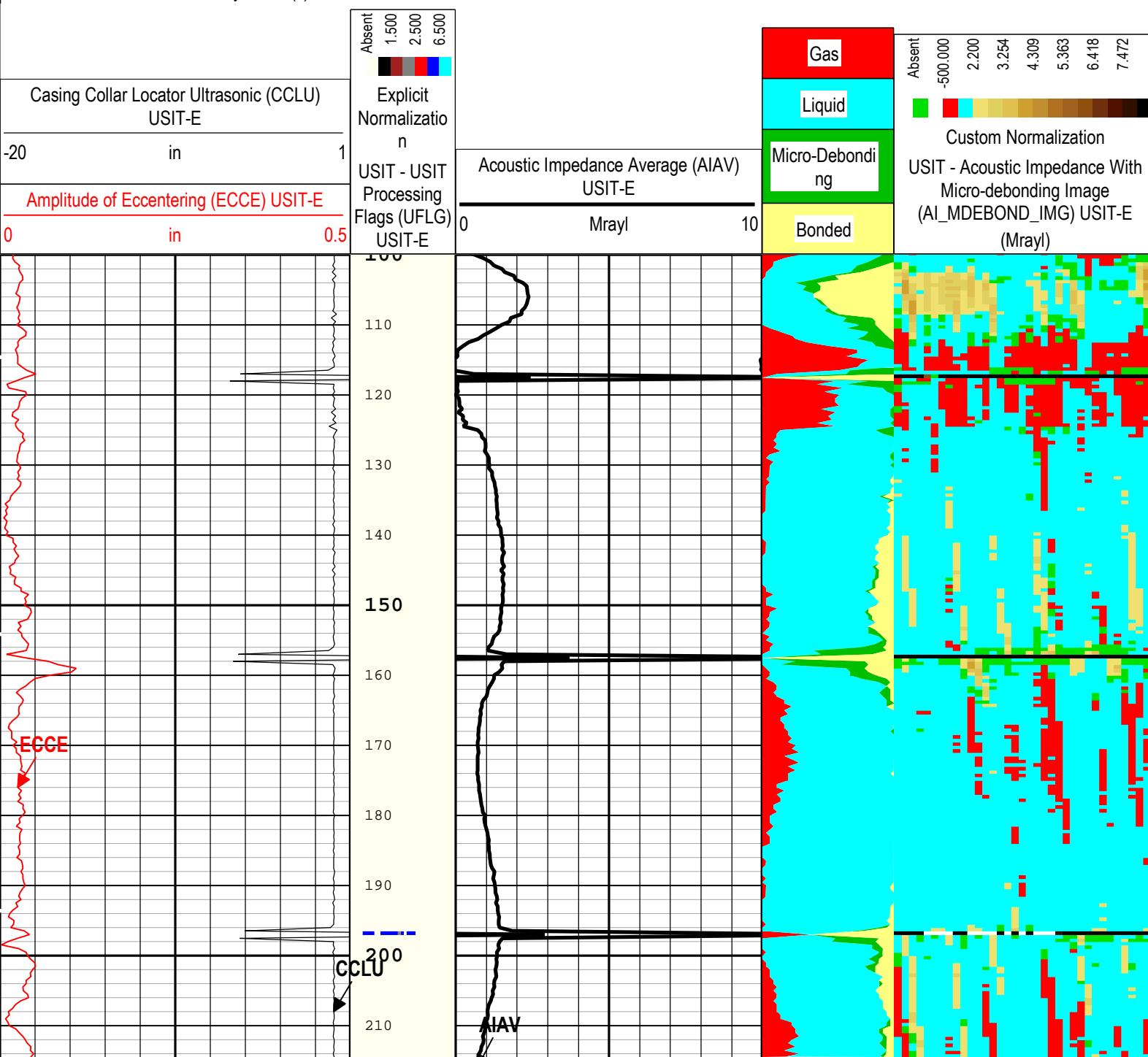
Well:Wells Ranch AF07-659

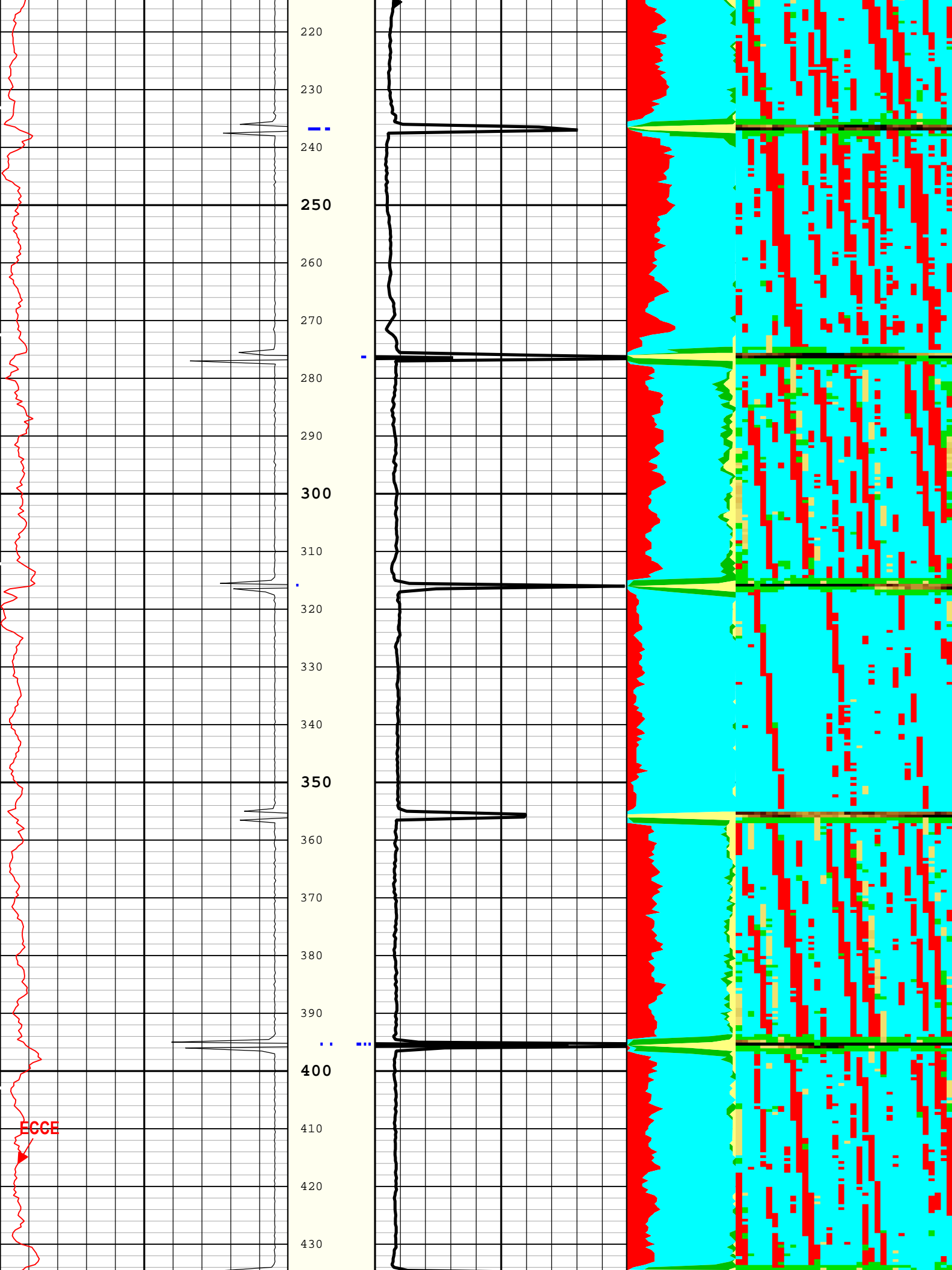
ONE: Log[5]:Up:S010

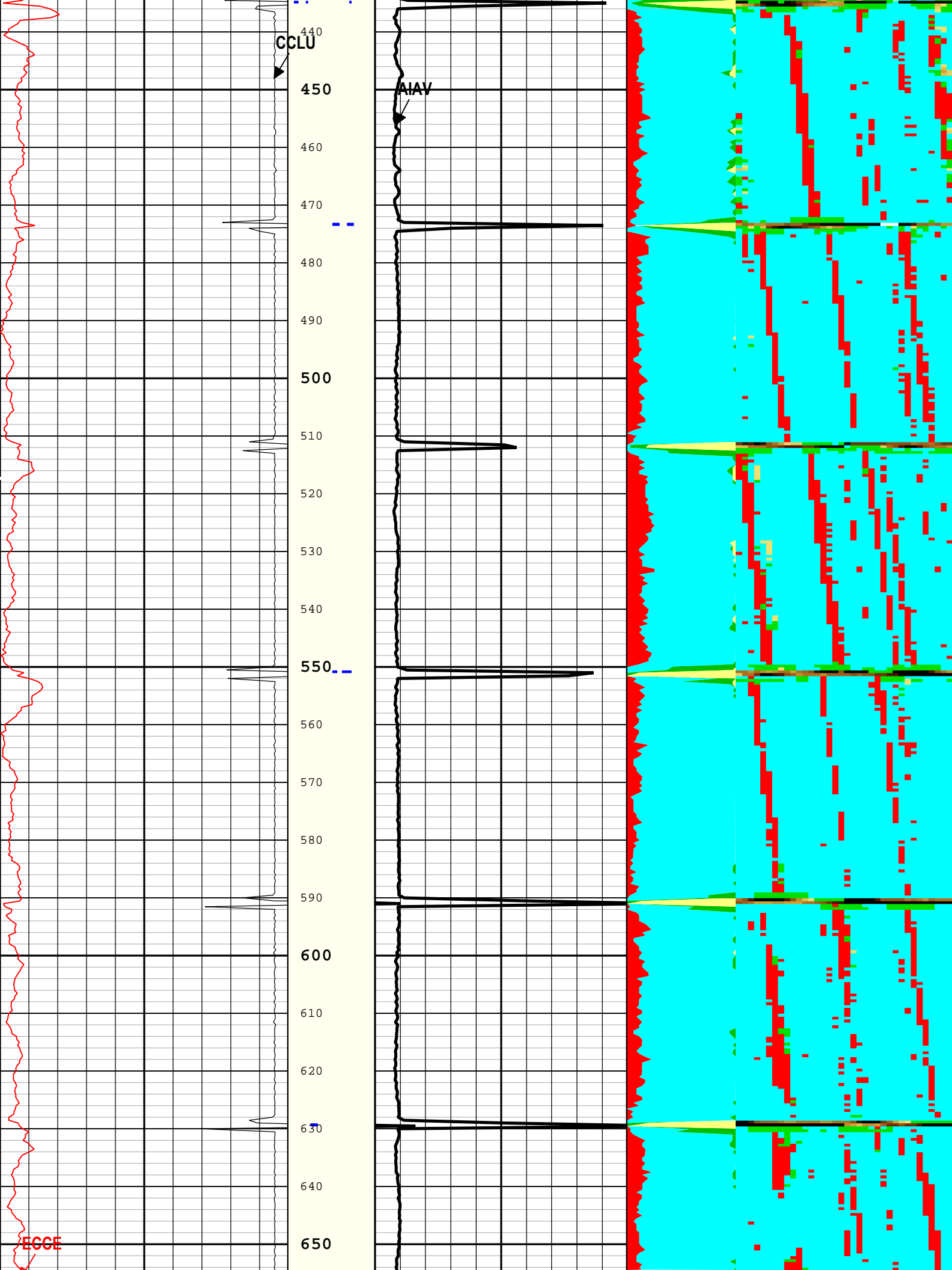
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

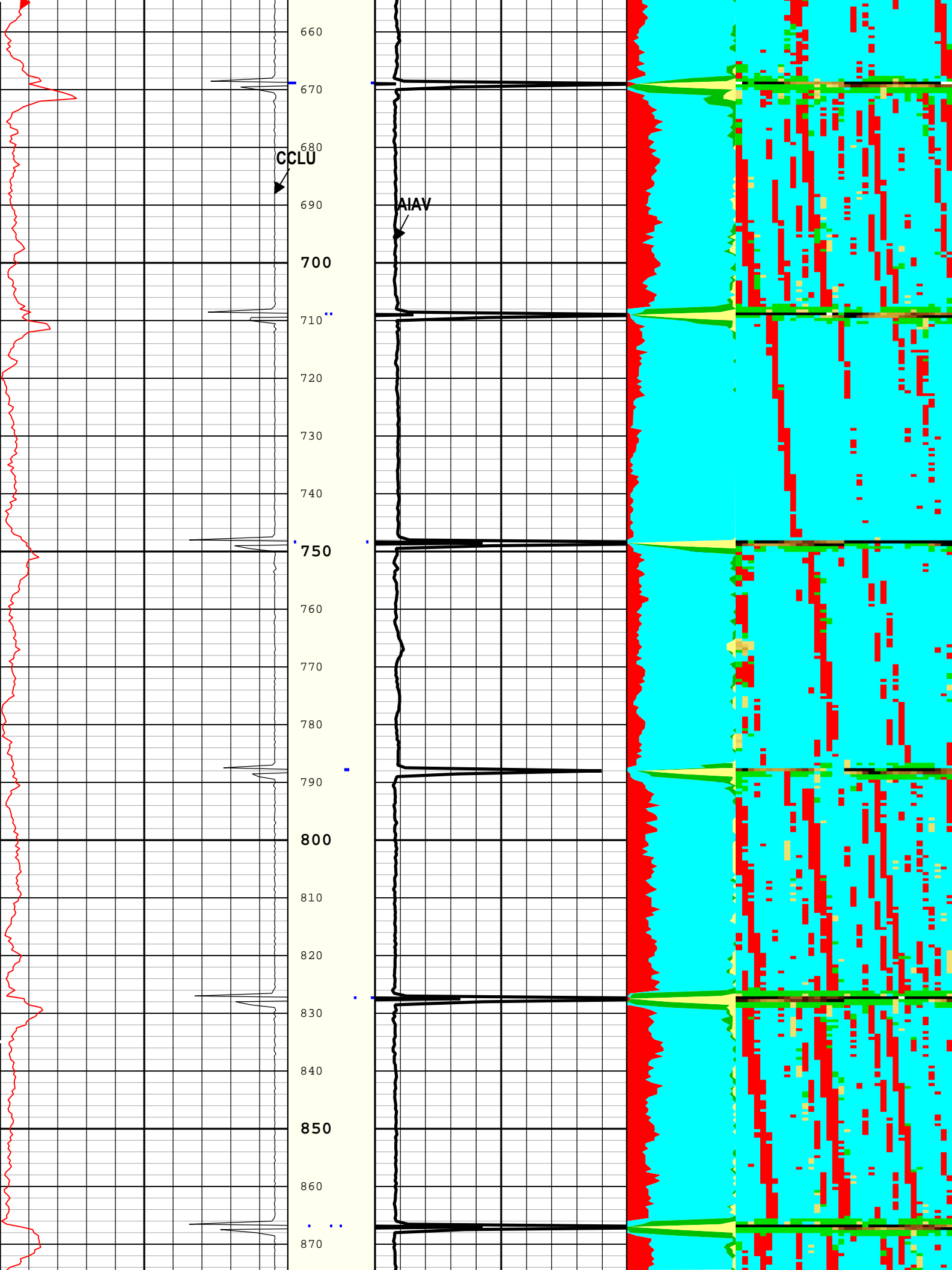
Creation Date: 08-Aug-2017 18:39:54

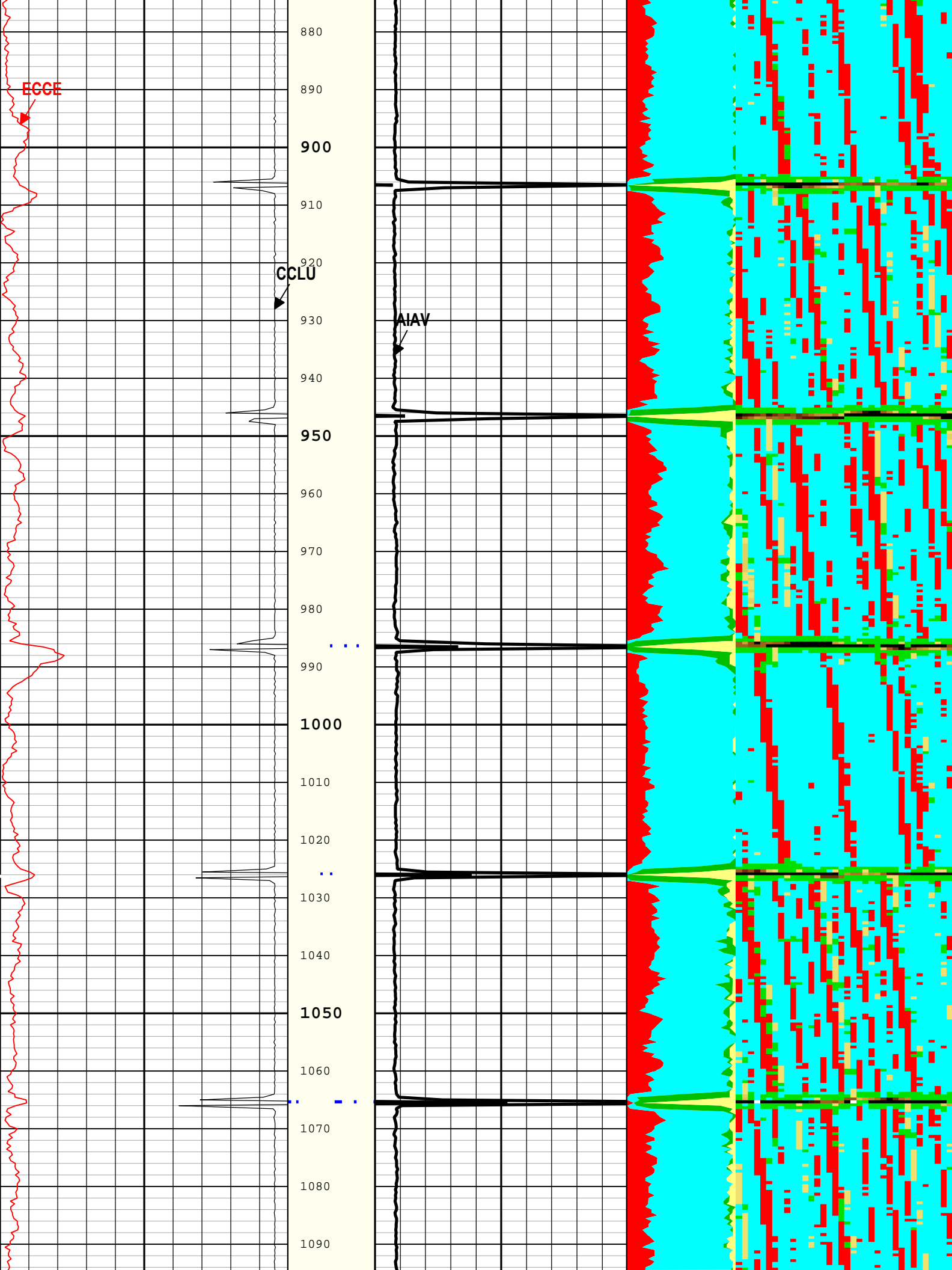
TIME_1900 - Time Marked every 60.00 (s)

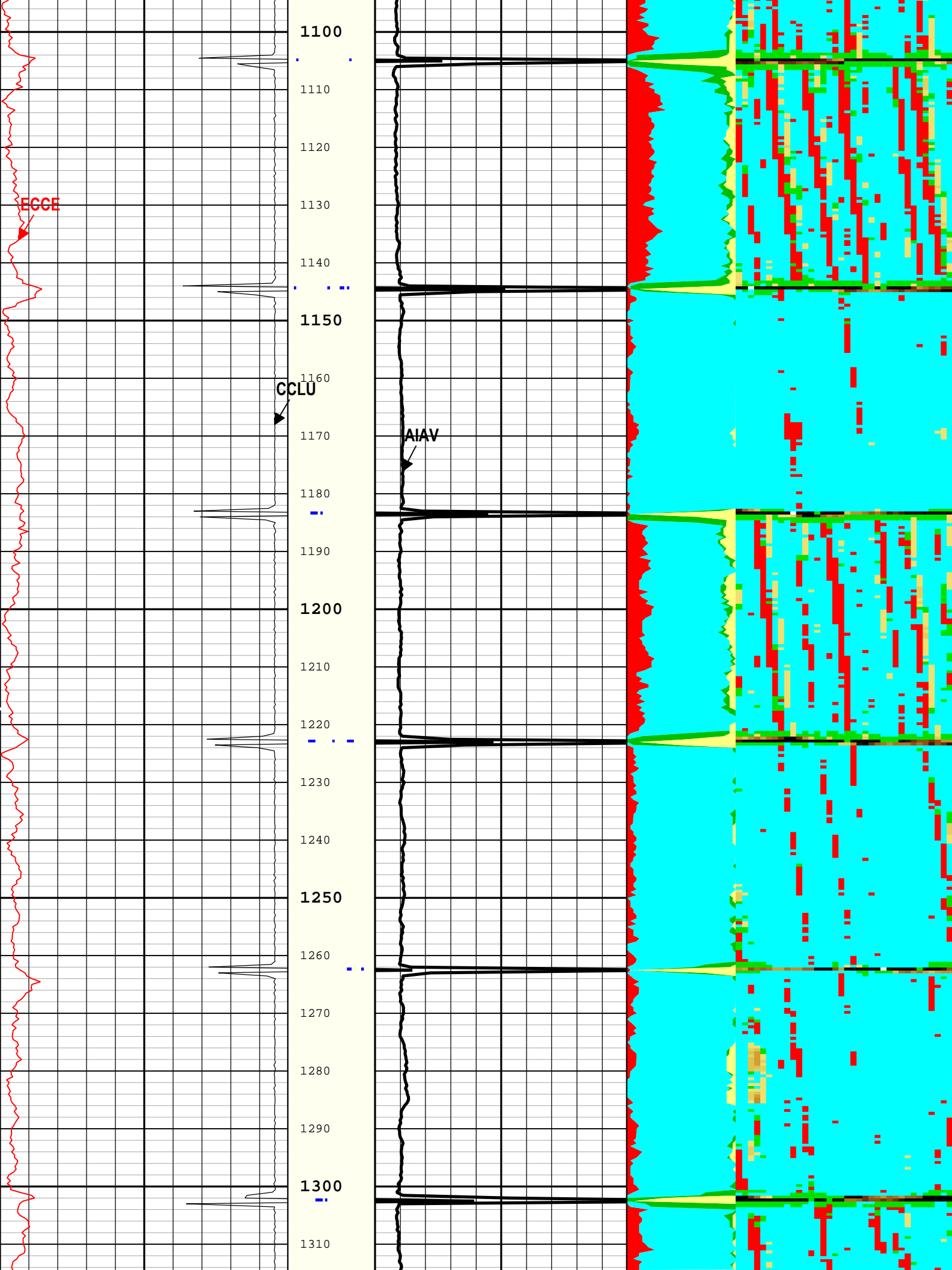


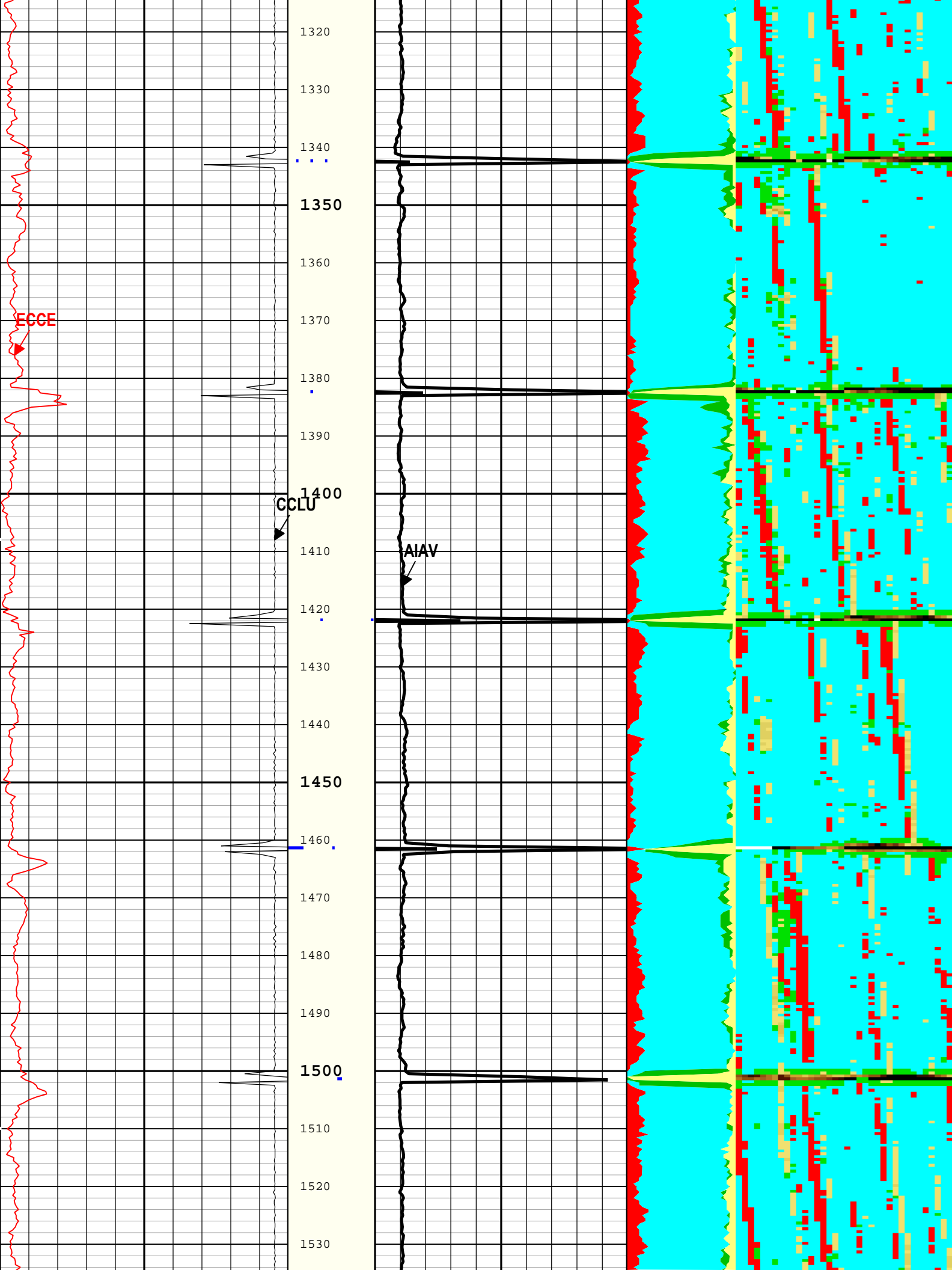


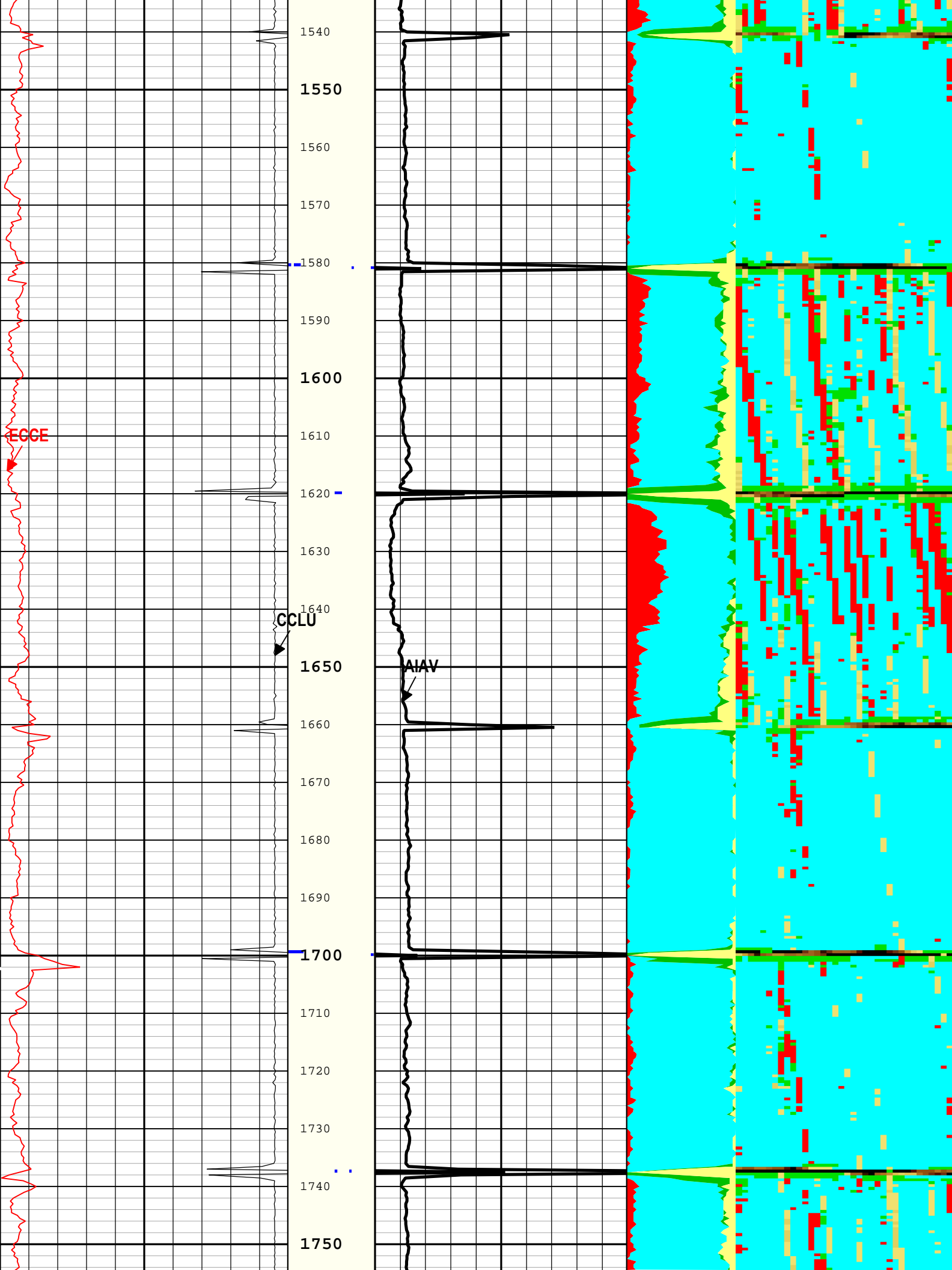


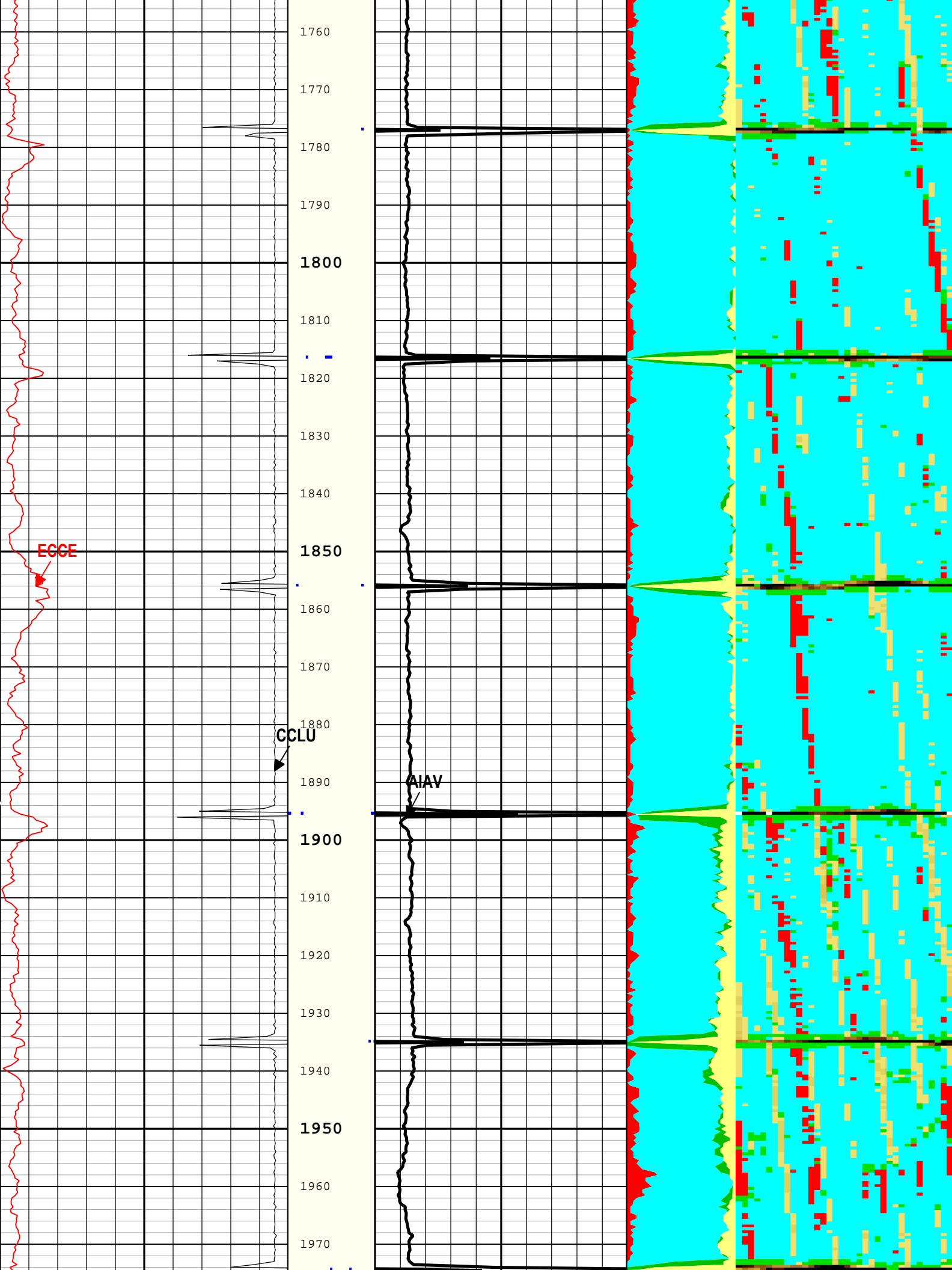


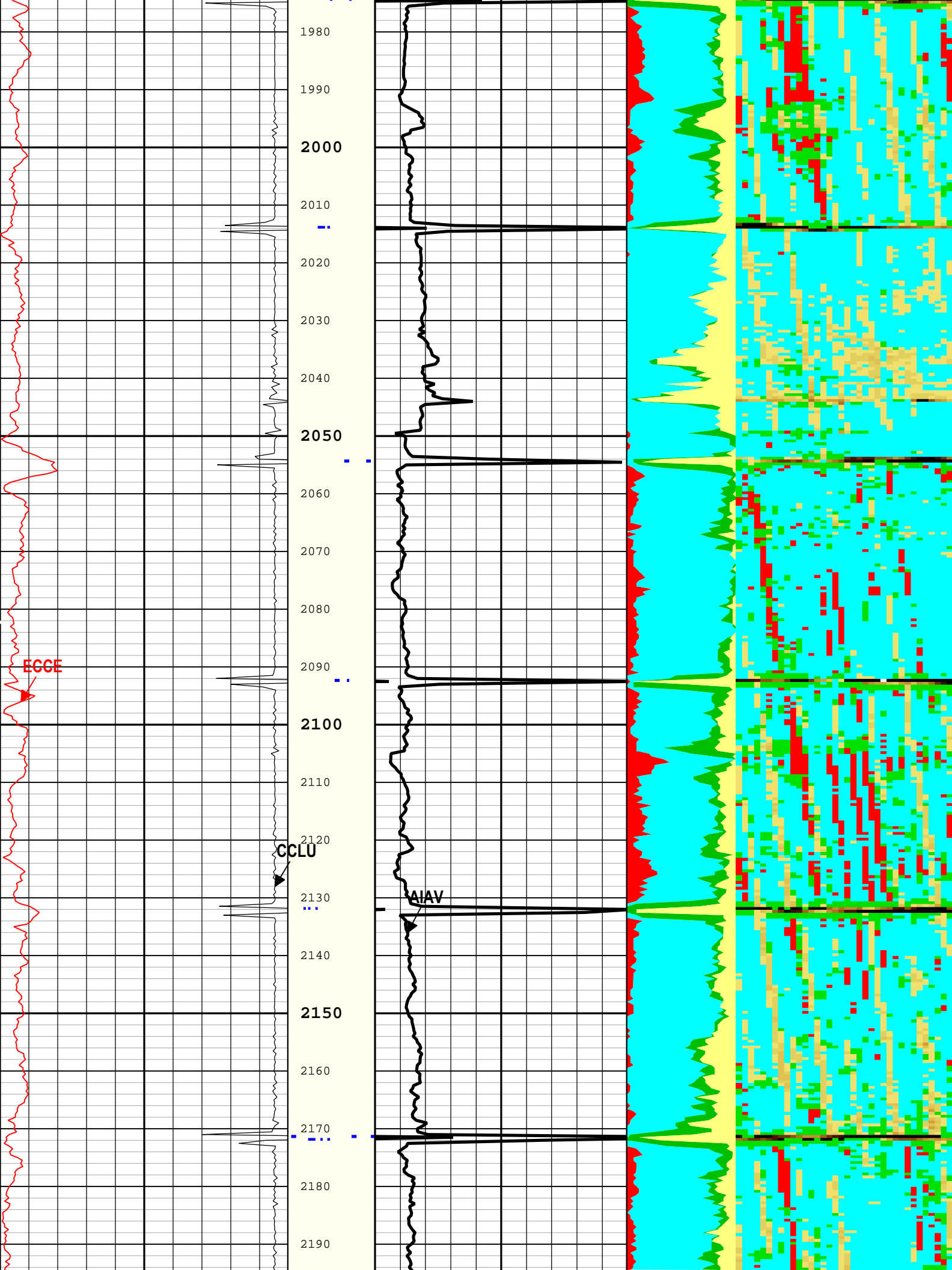


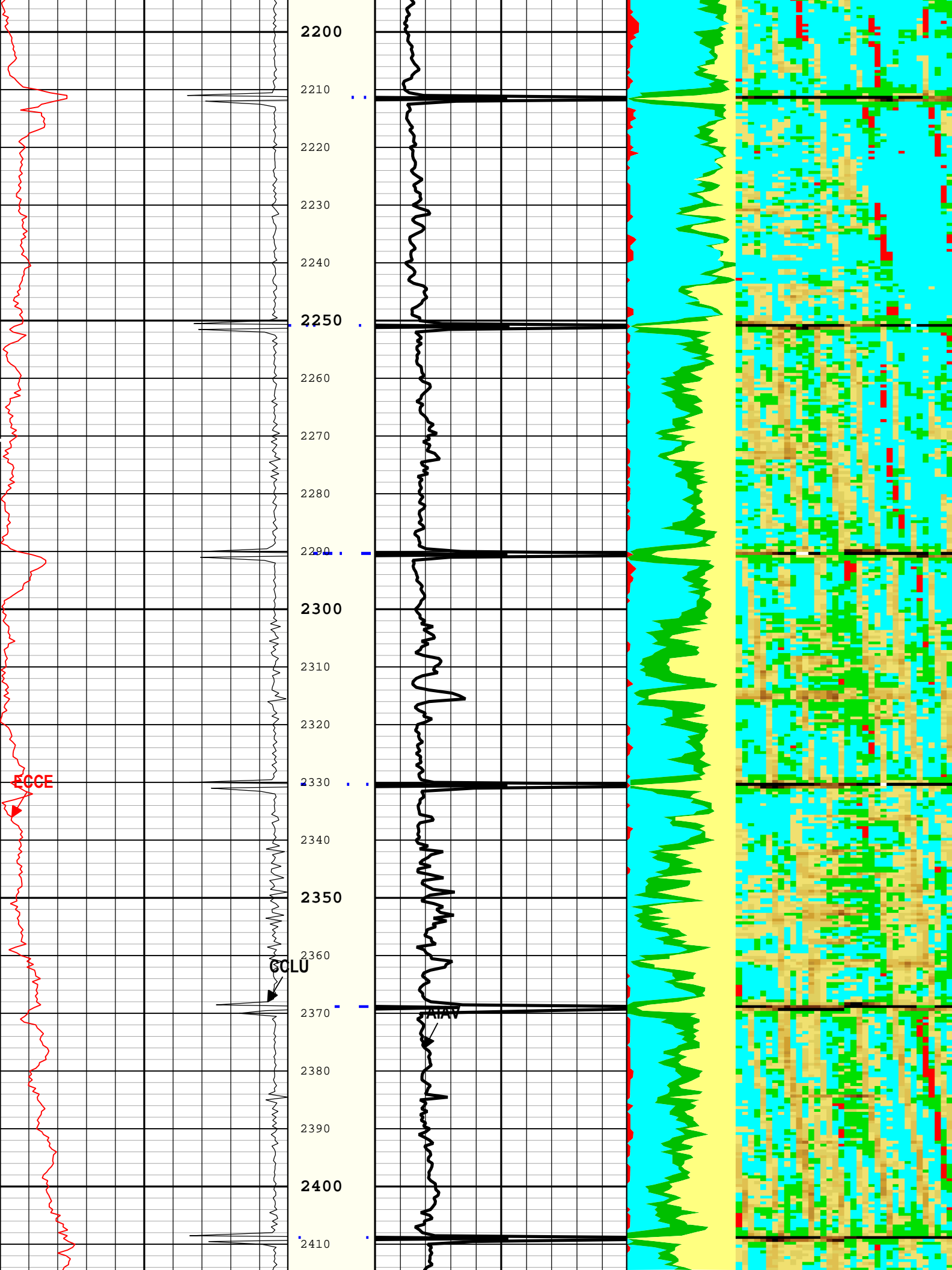


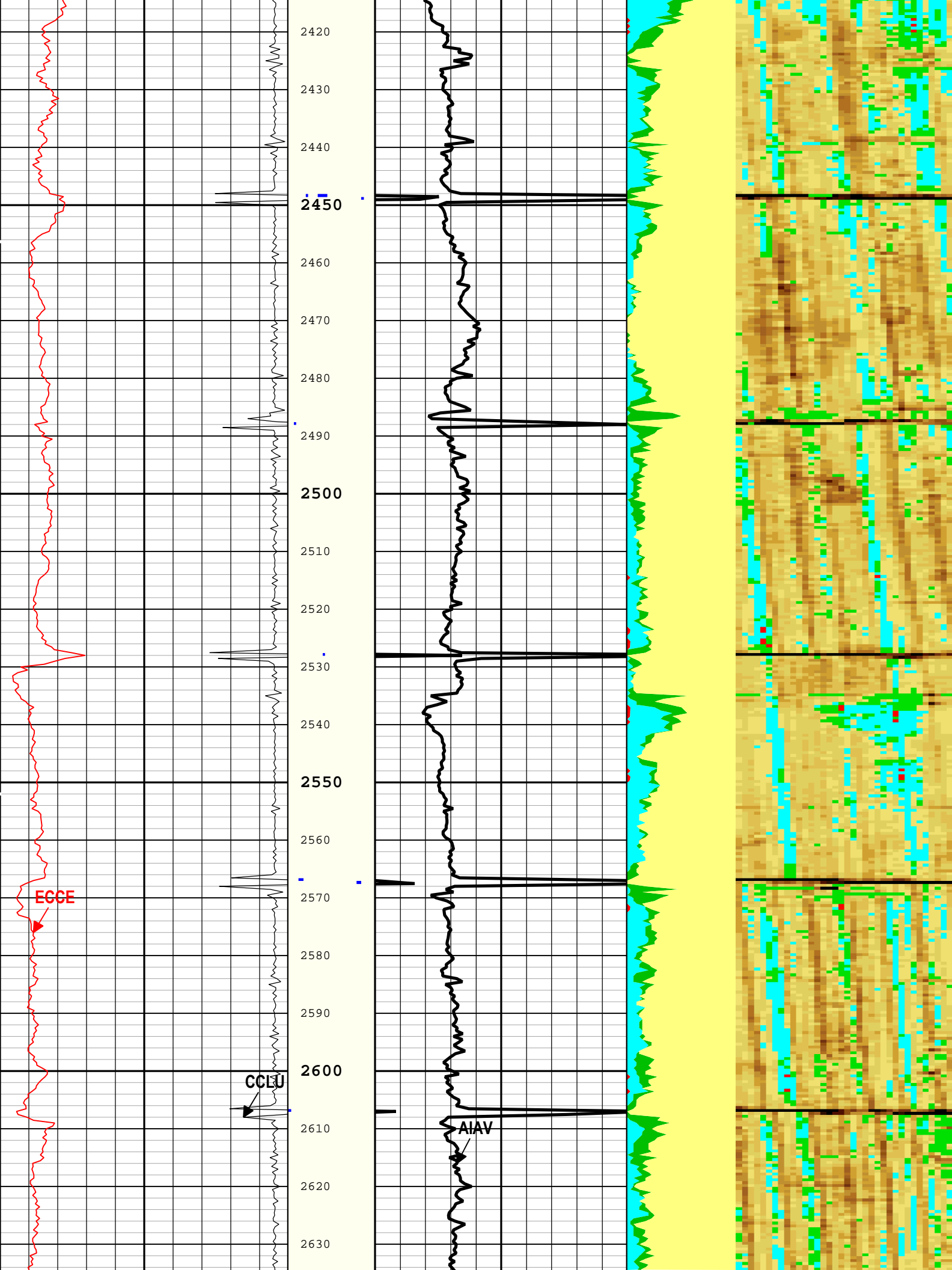


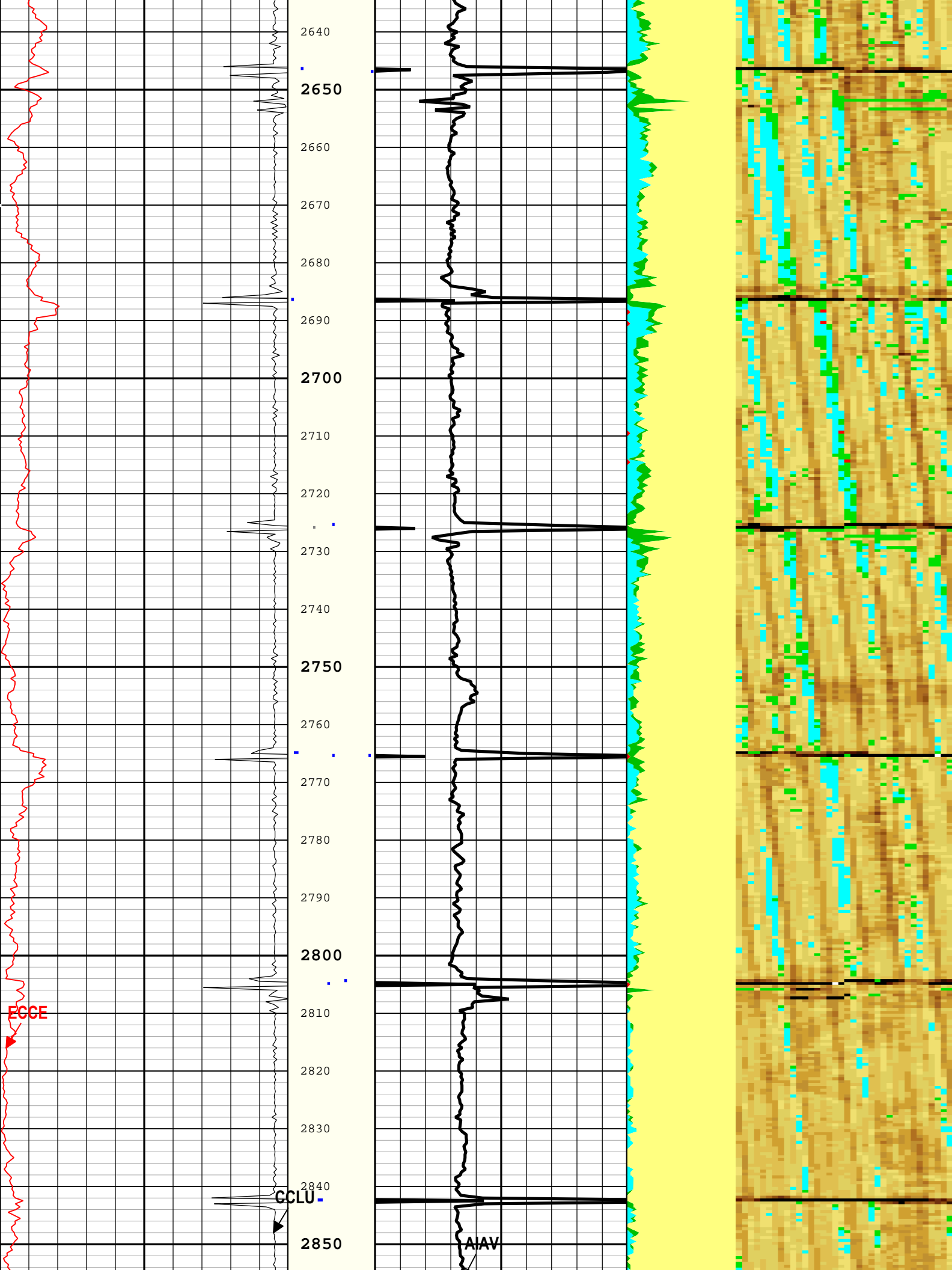


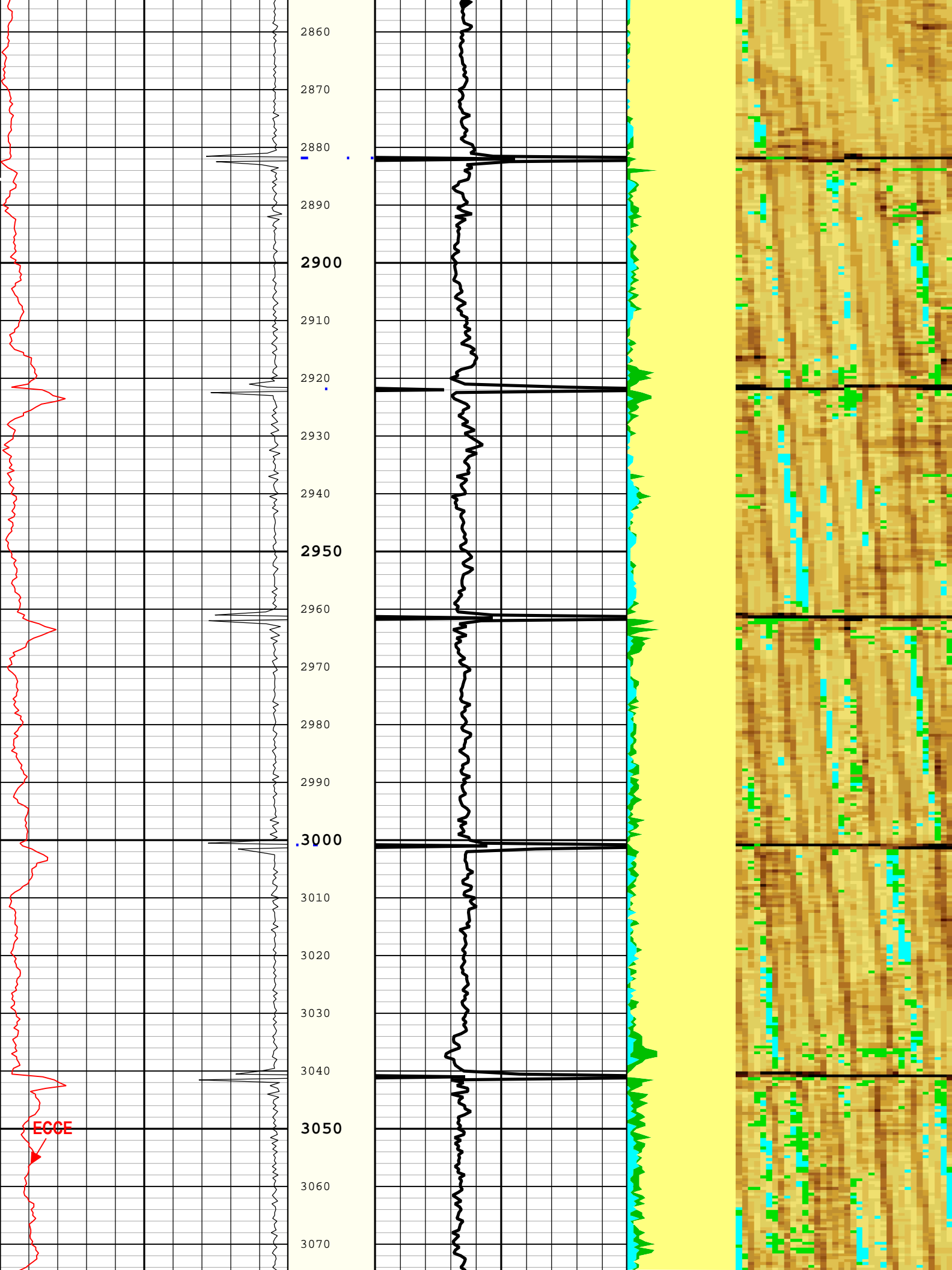


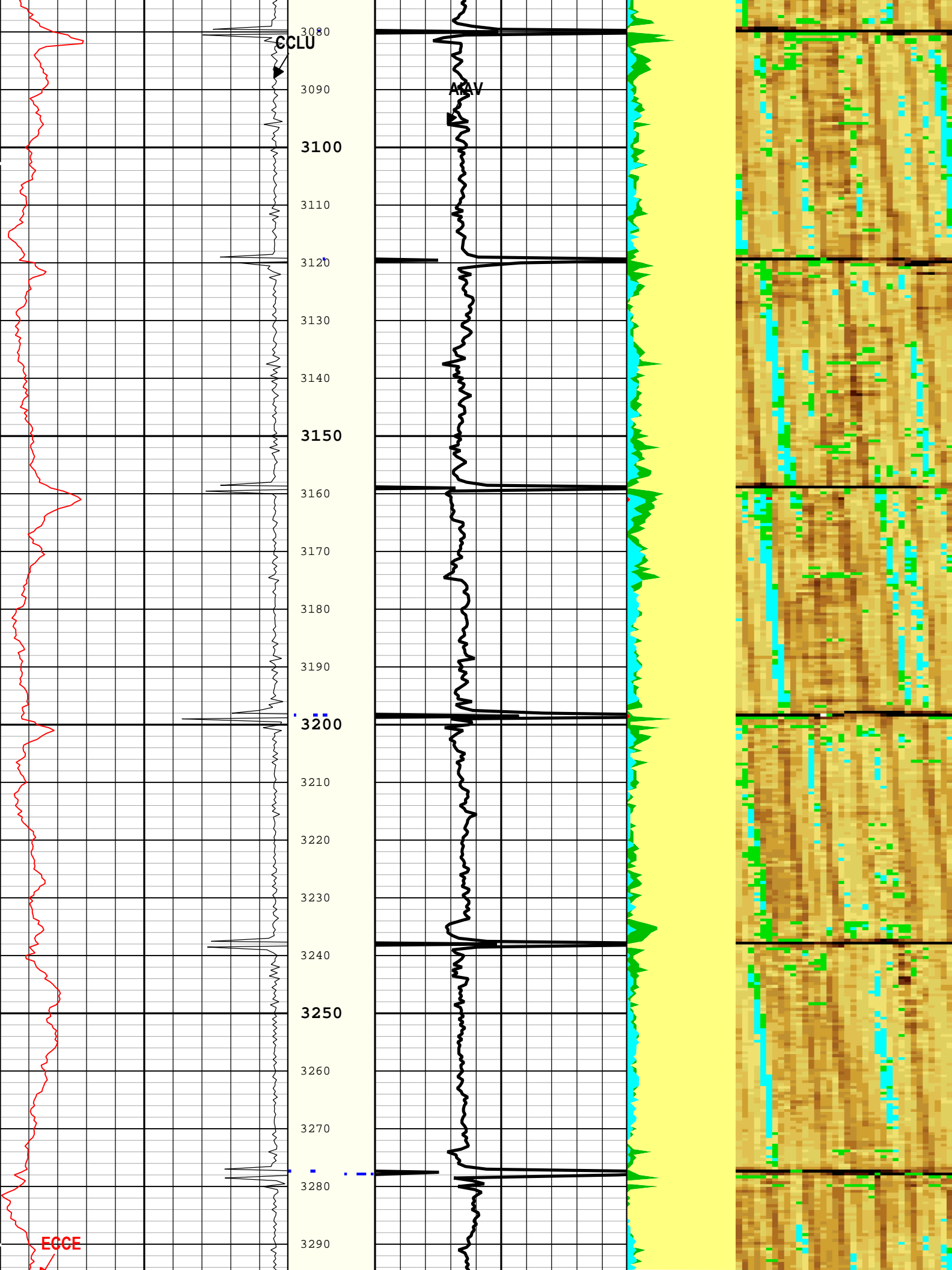


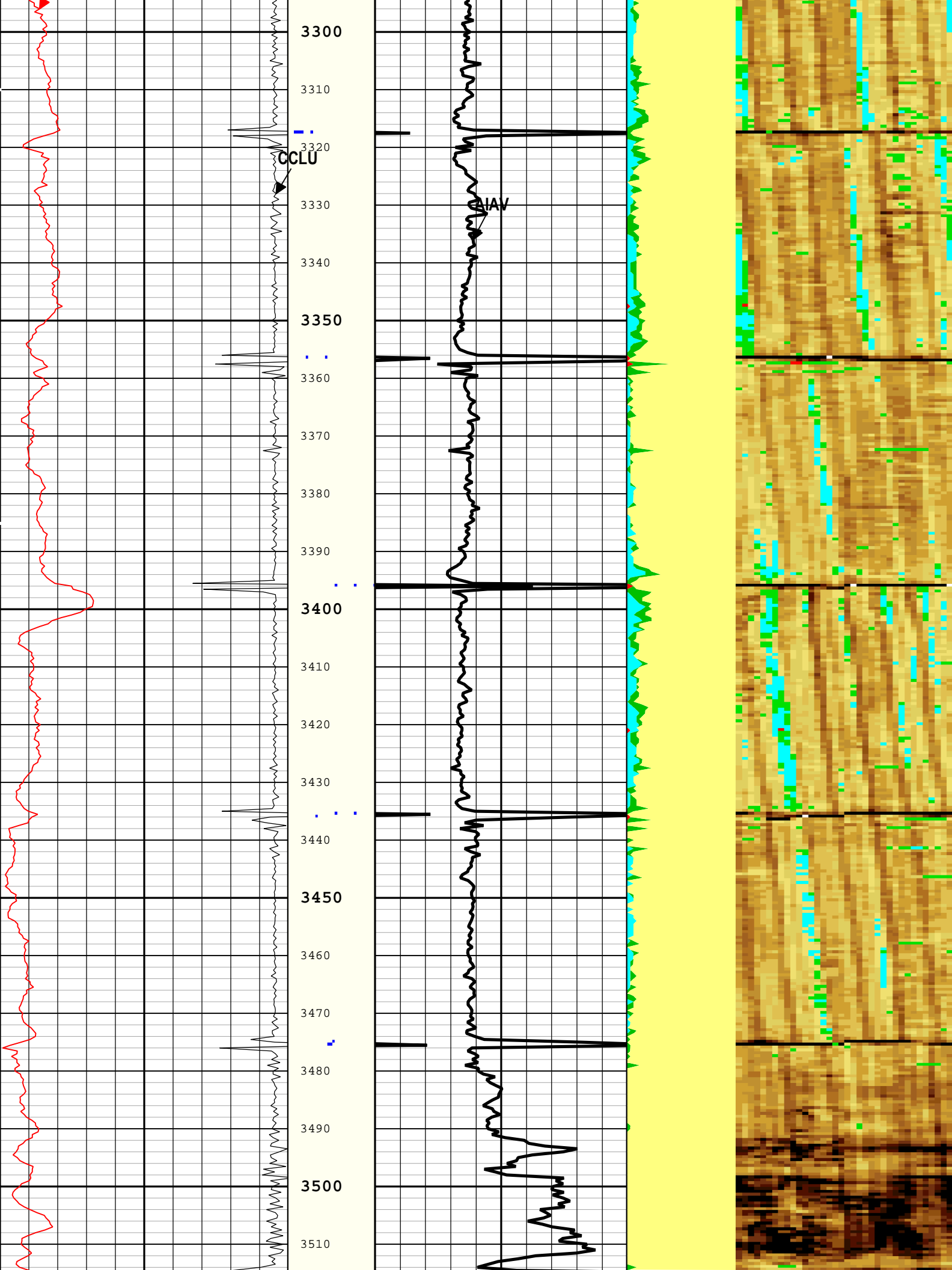


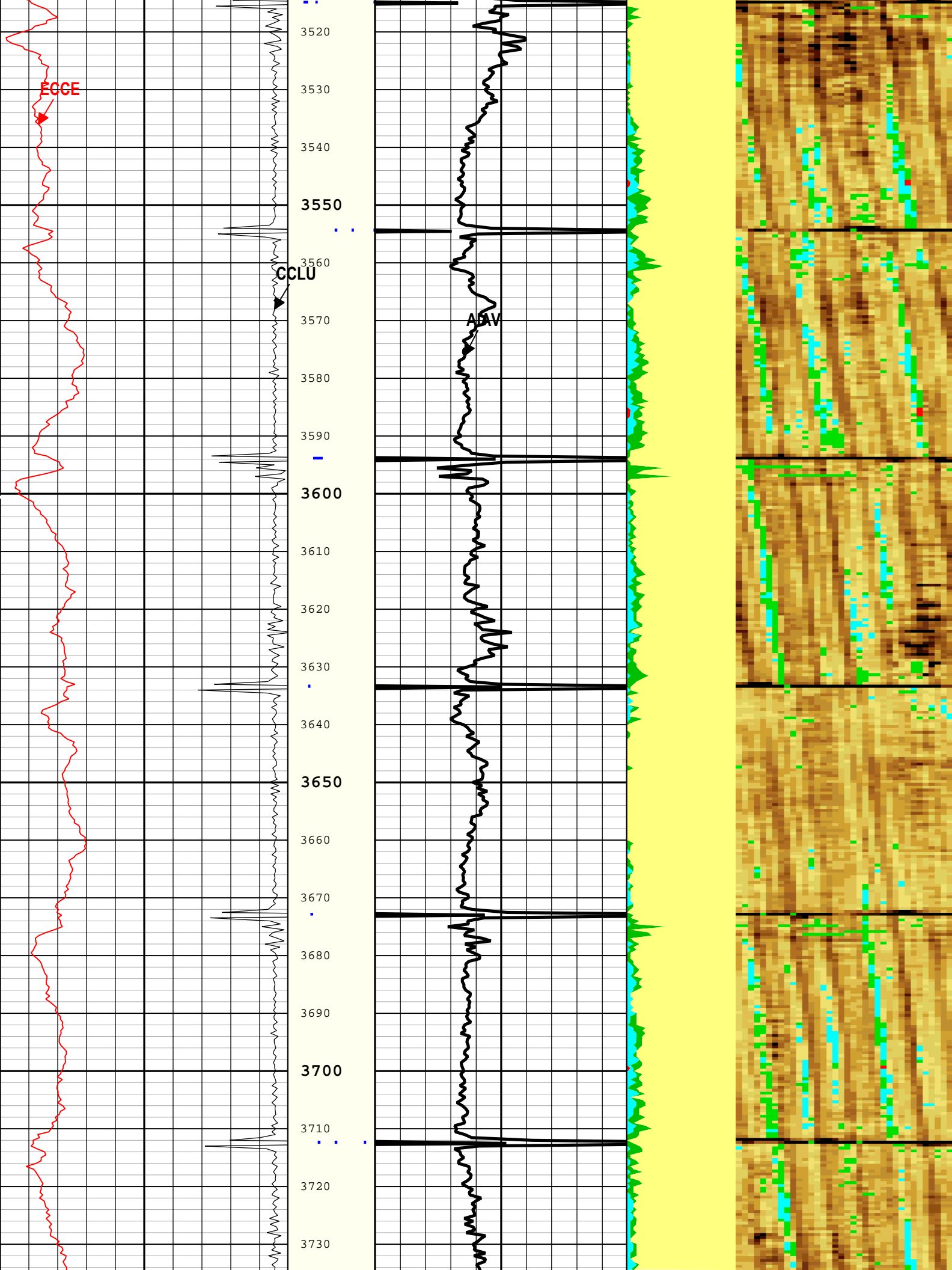


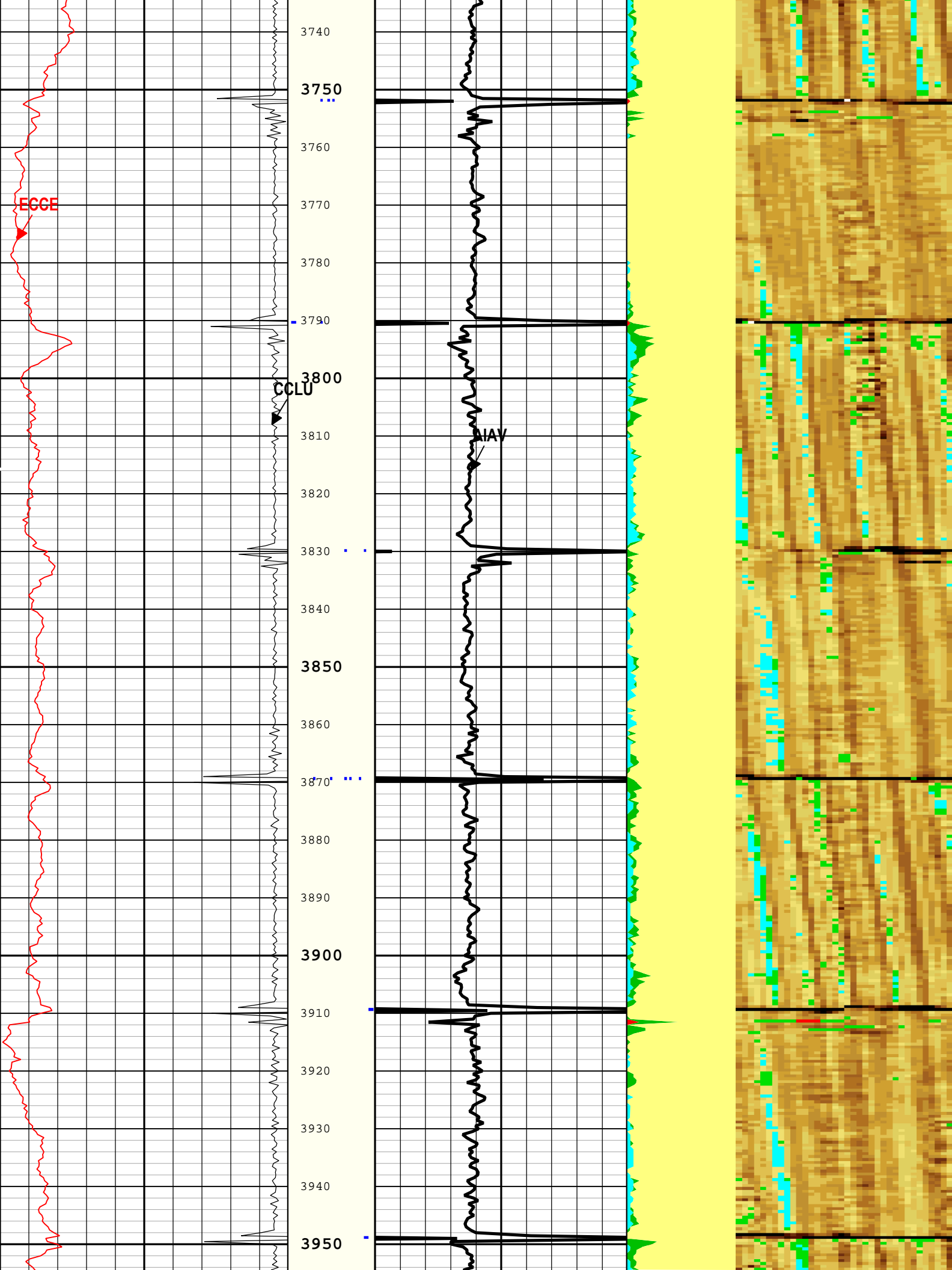


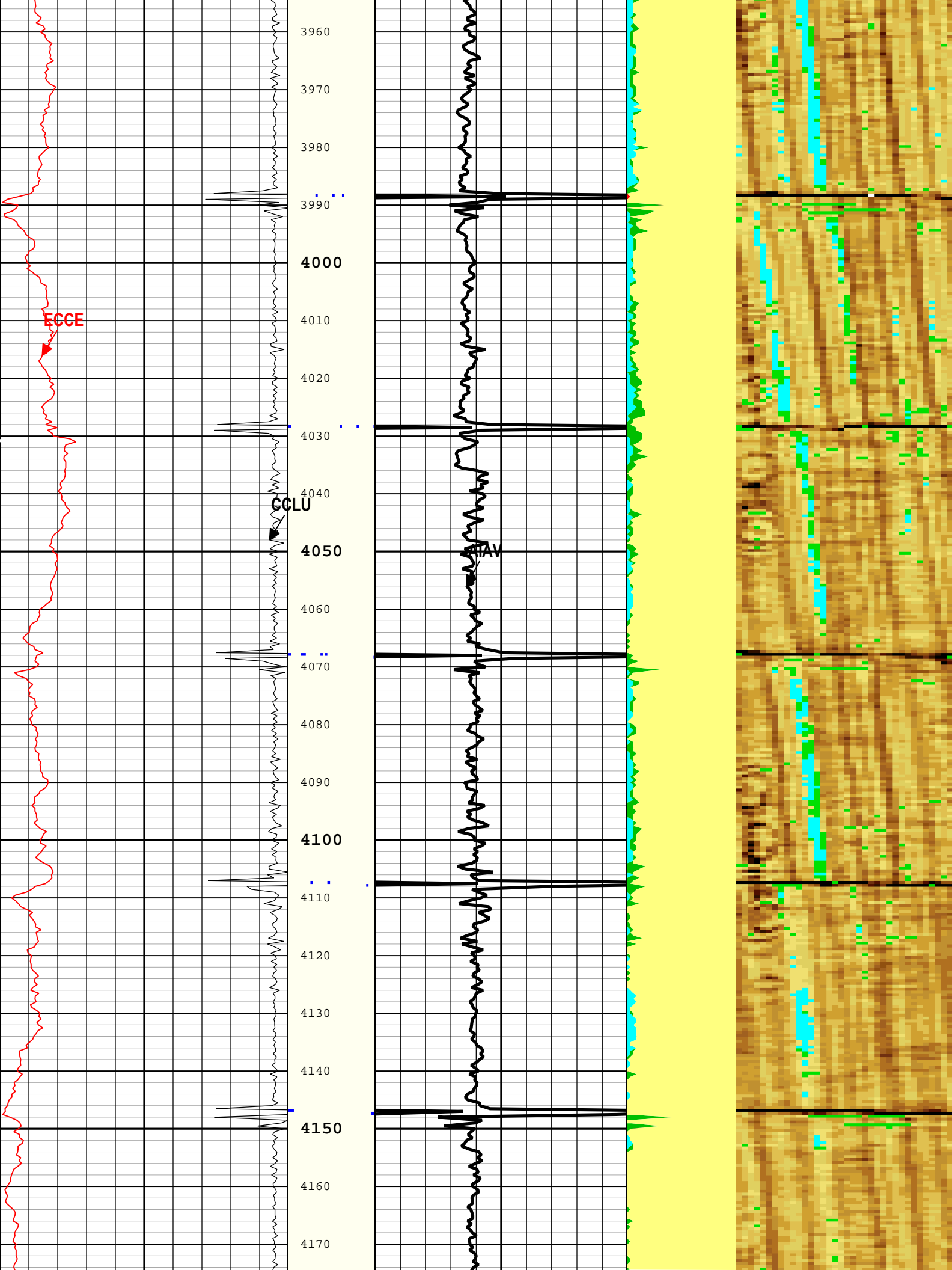


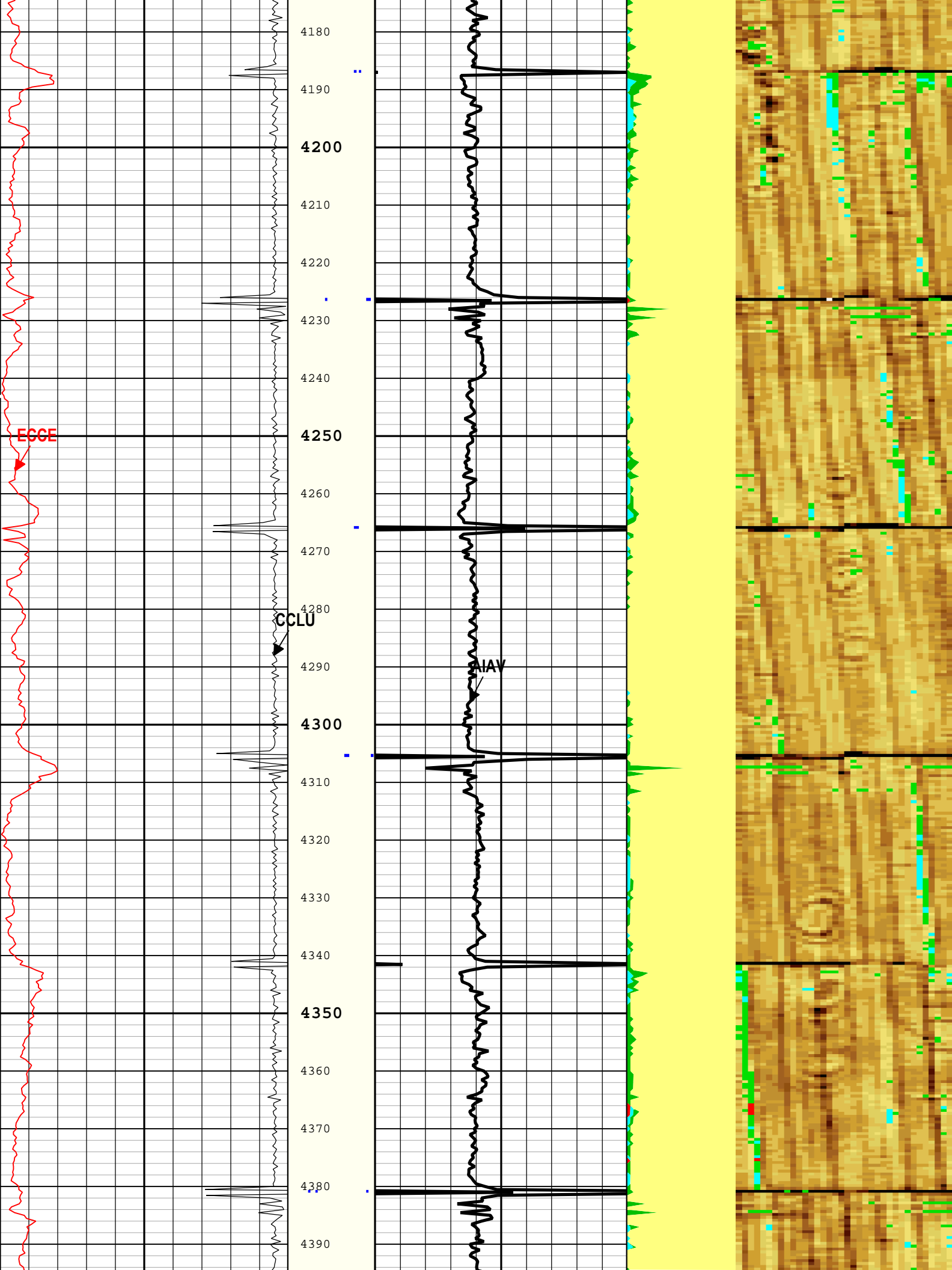


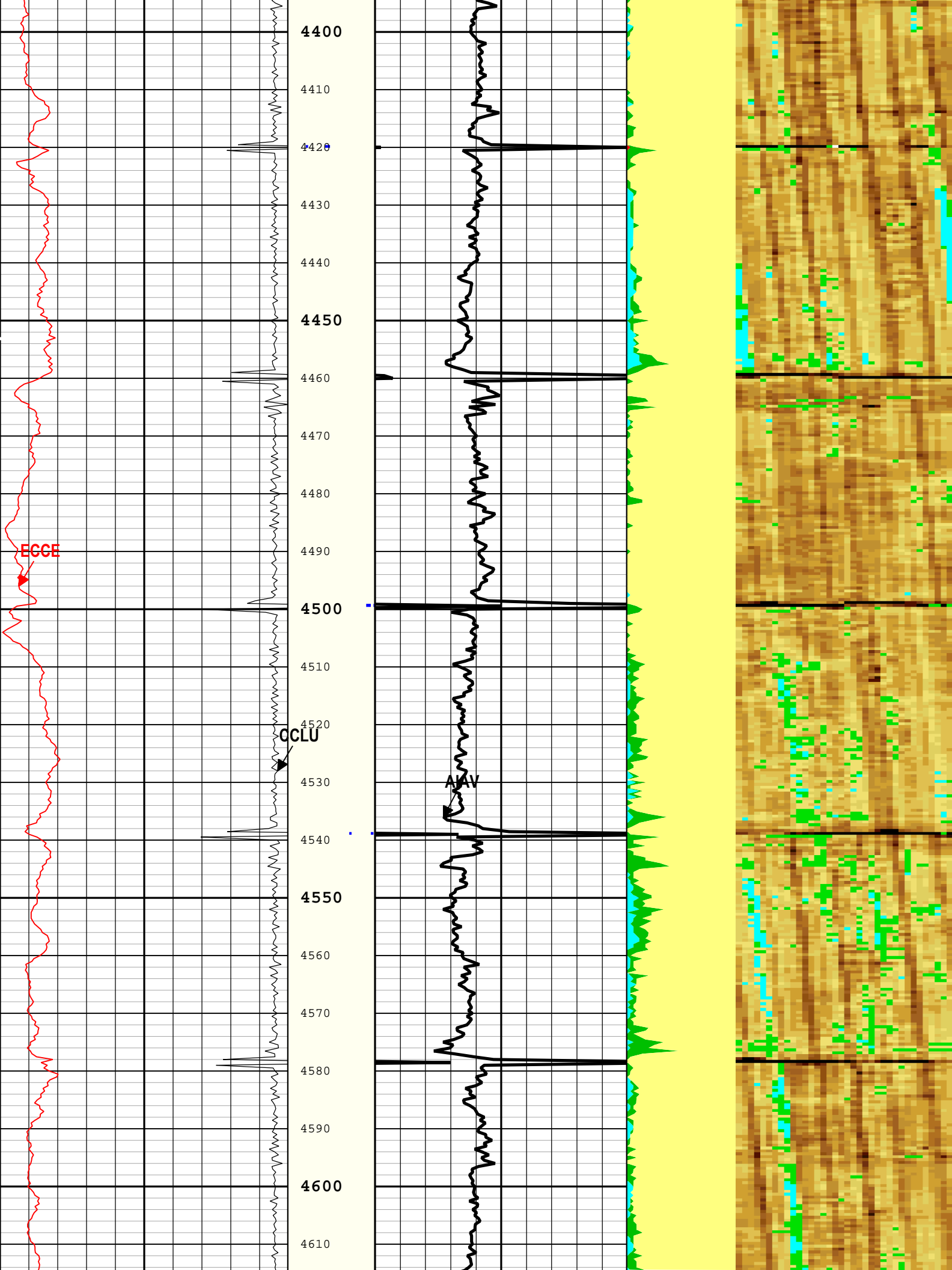


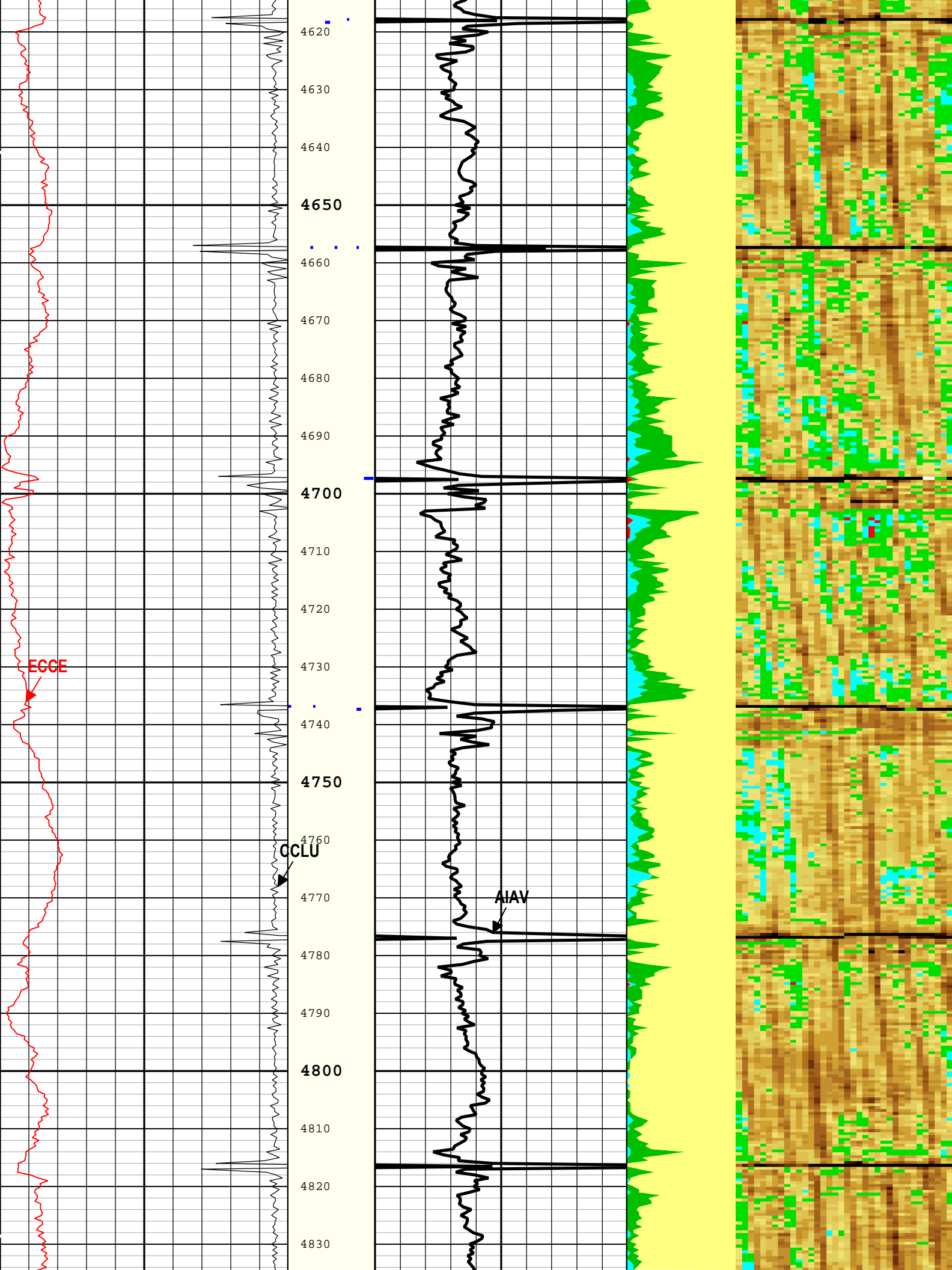


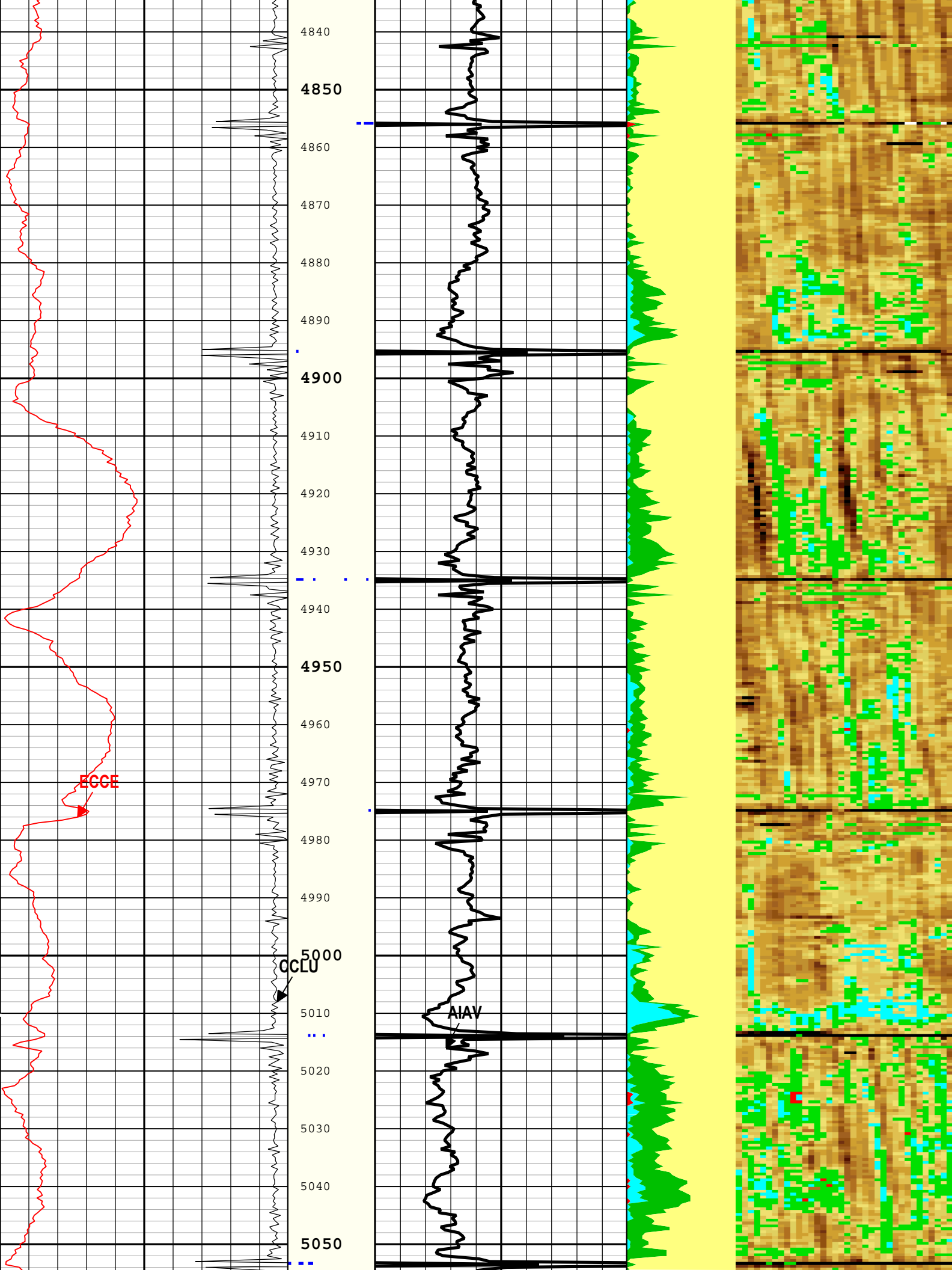


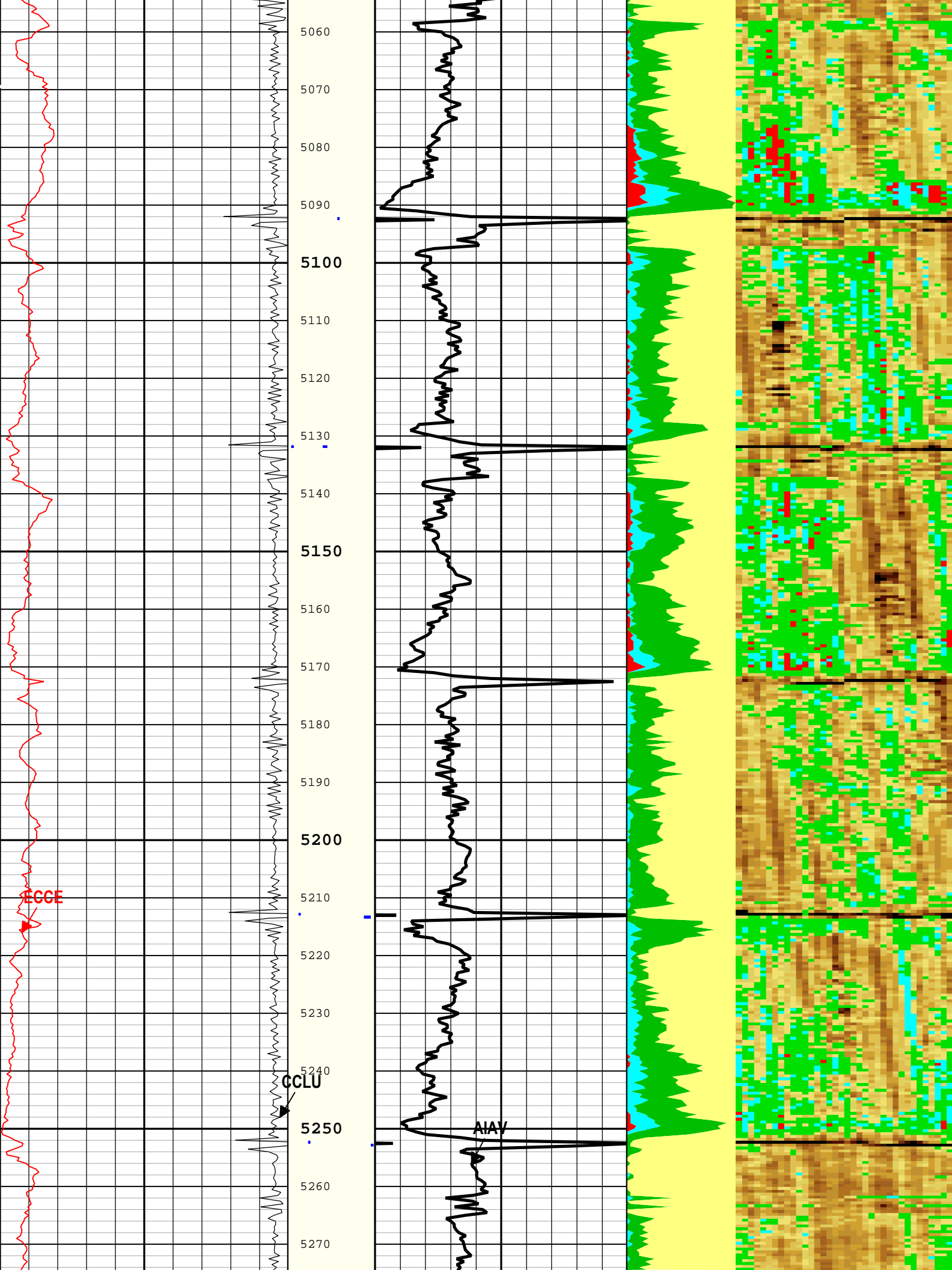


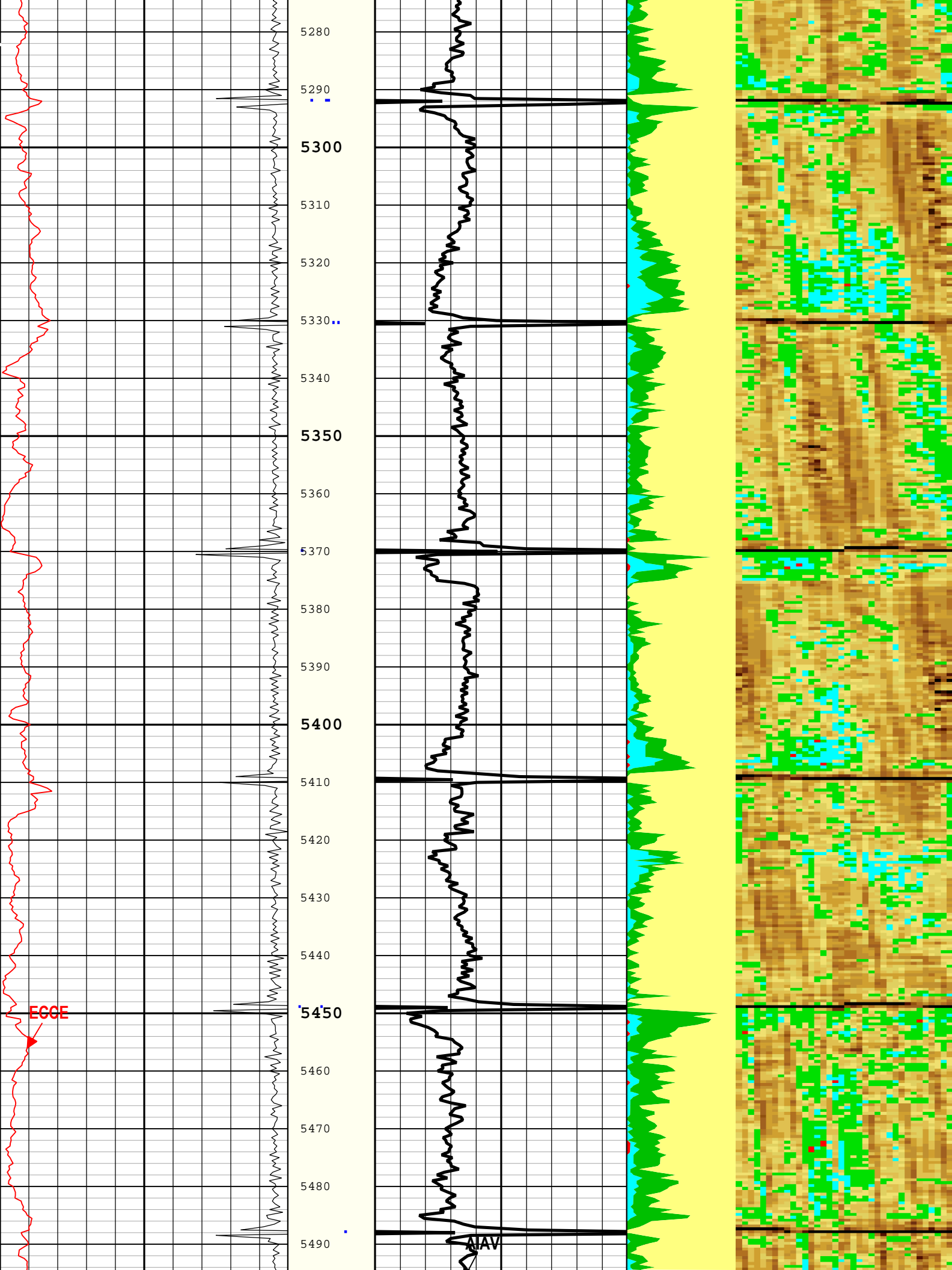


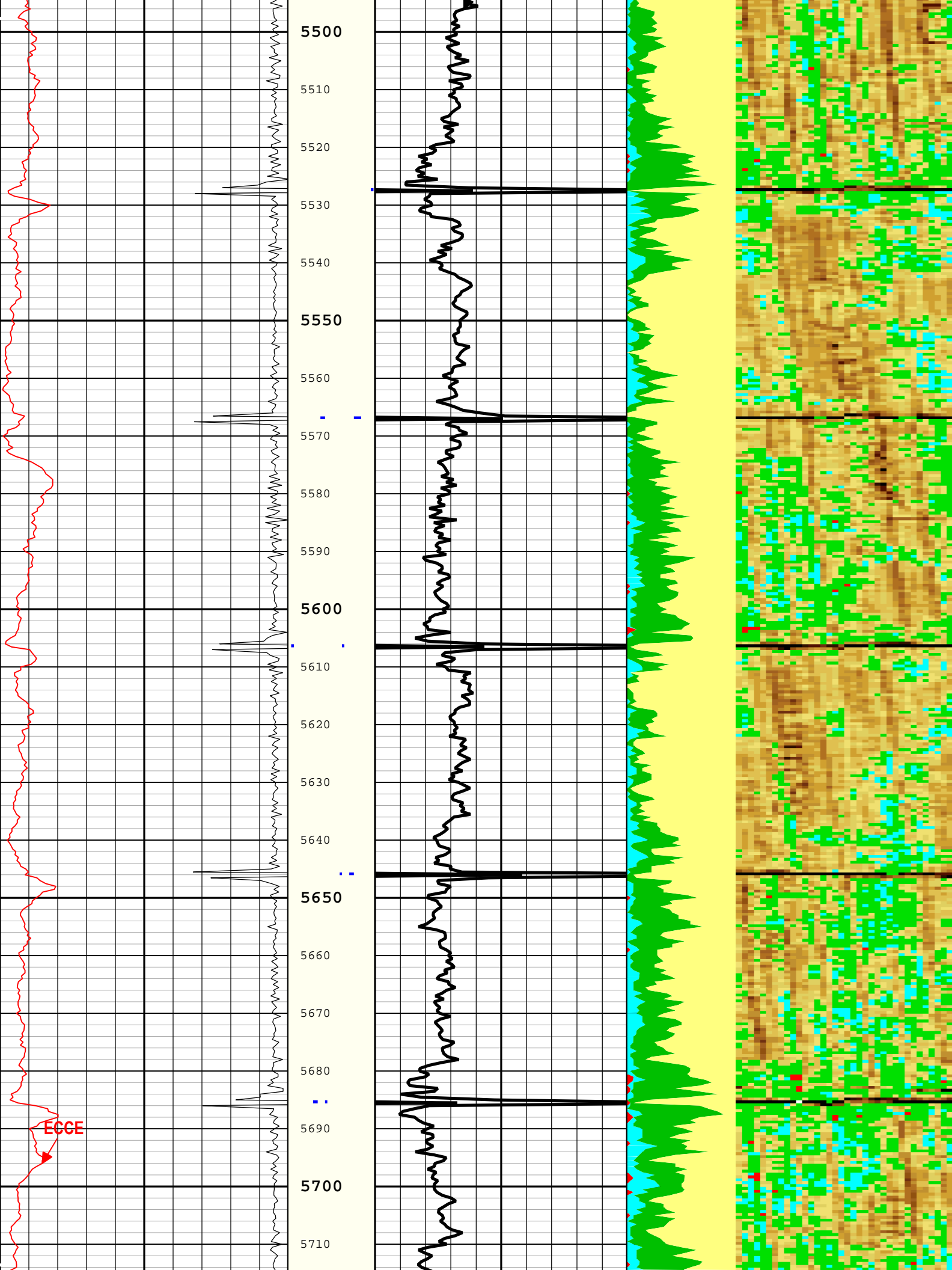


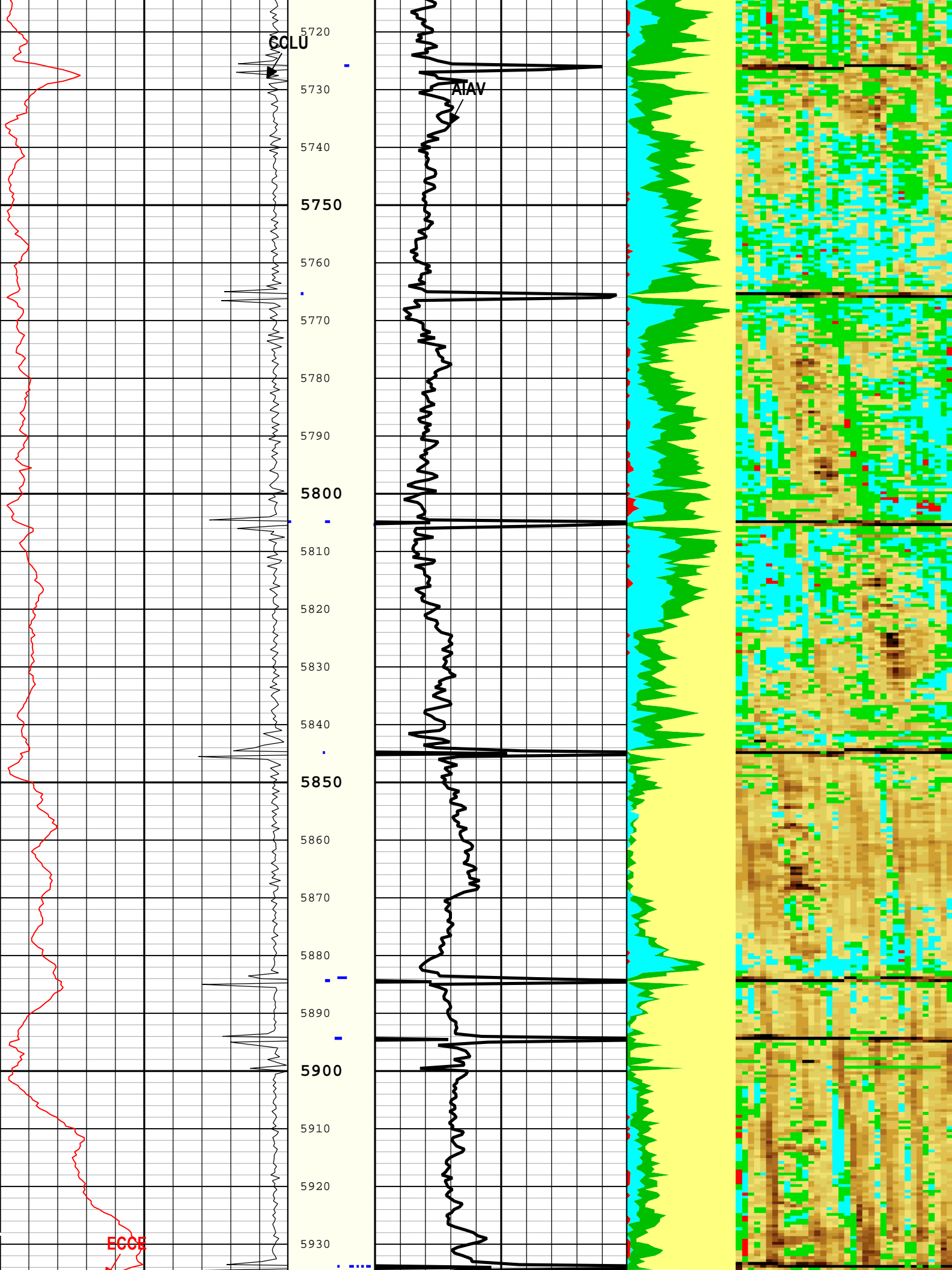


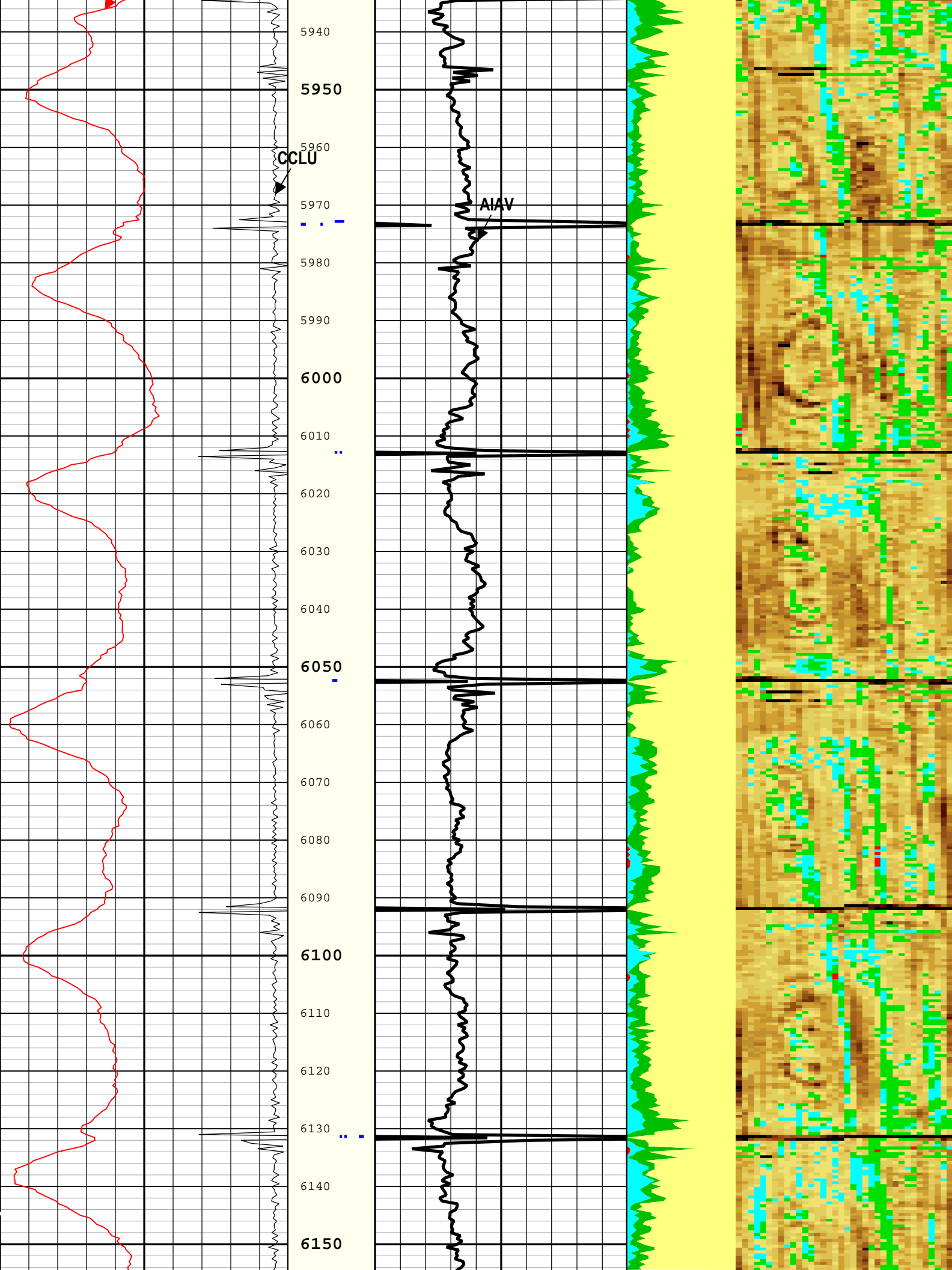


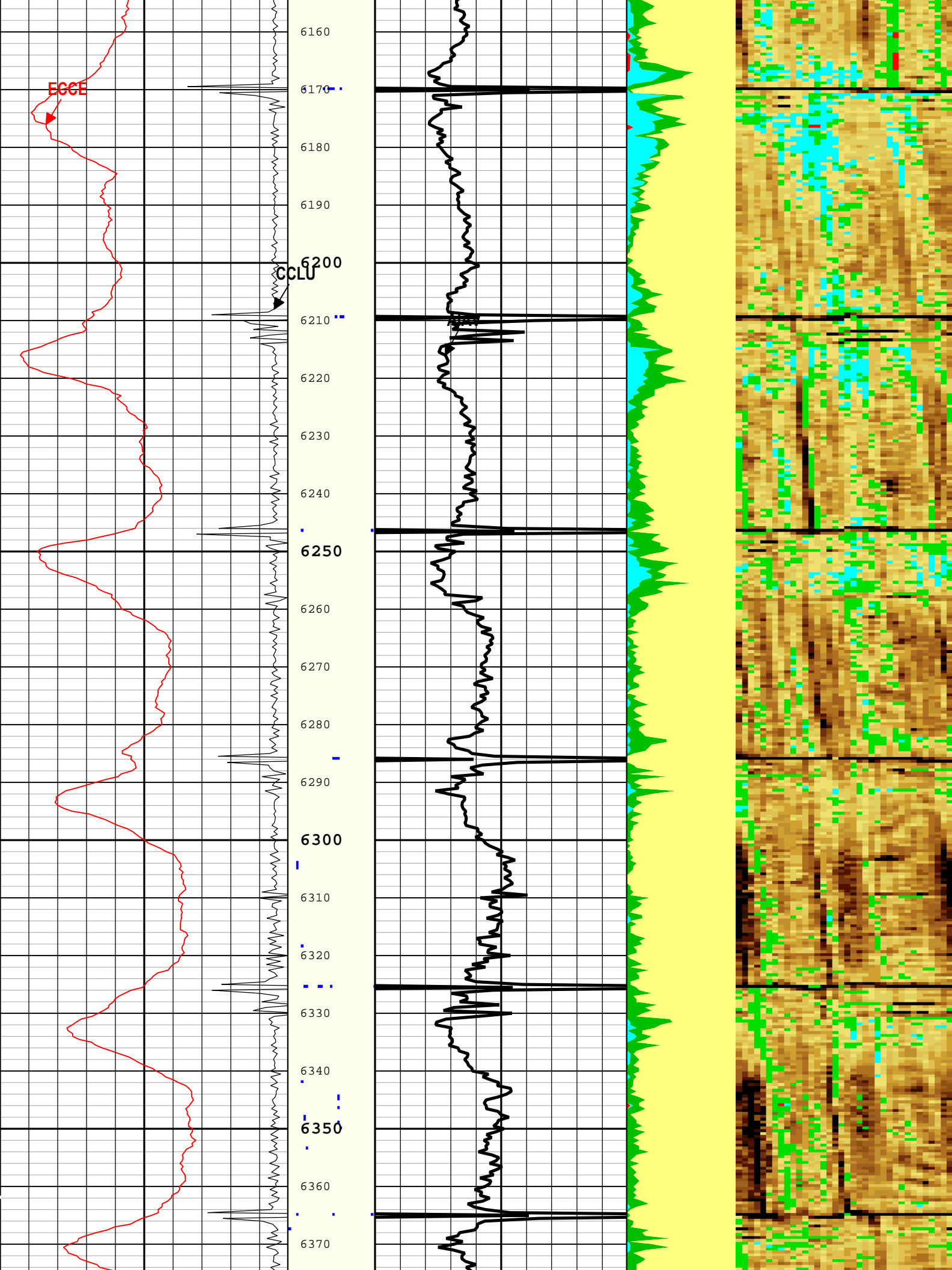


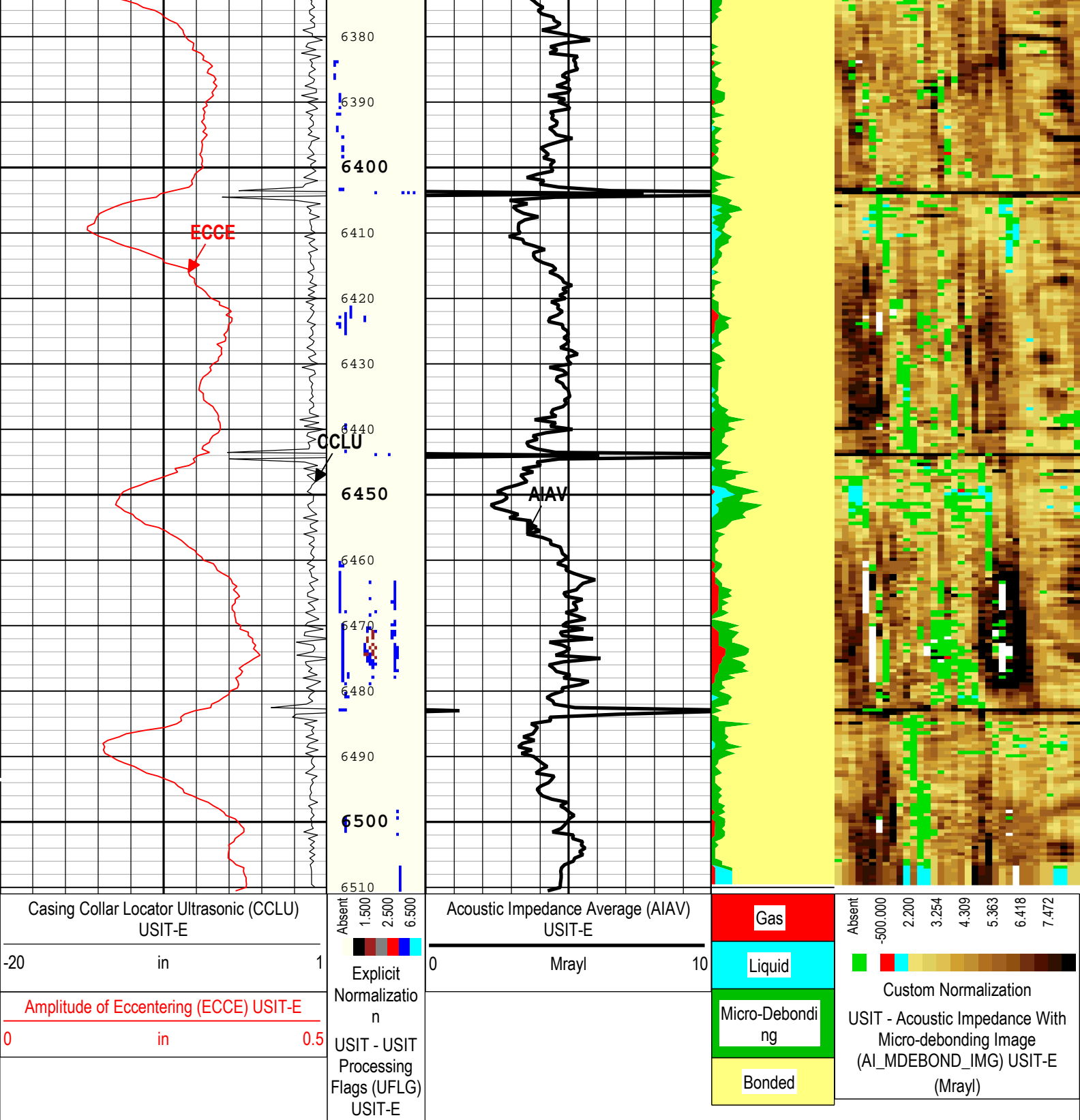








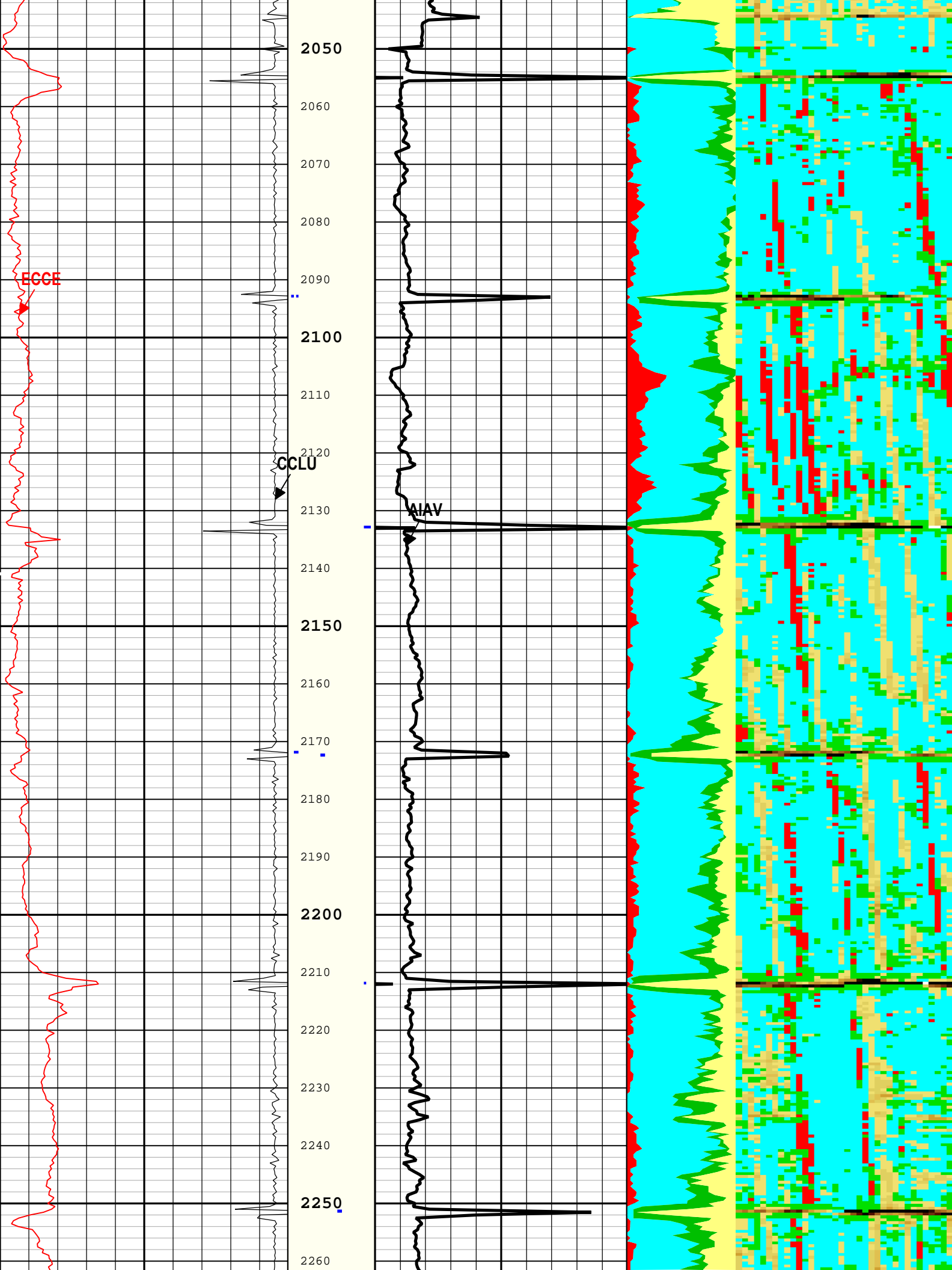


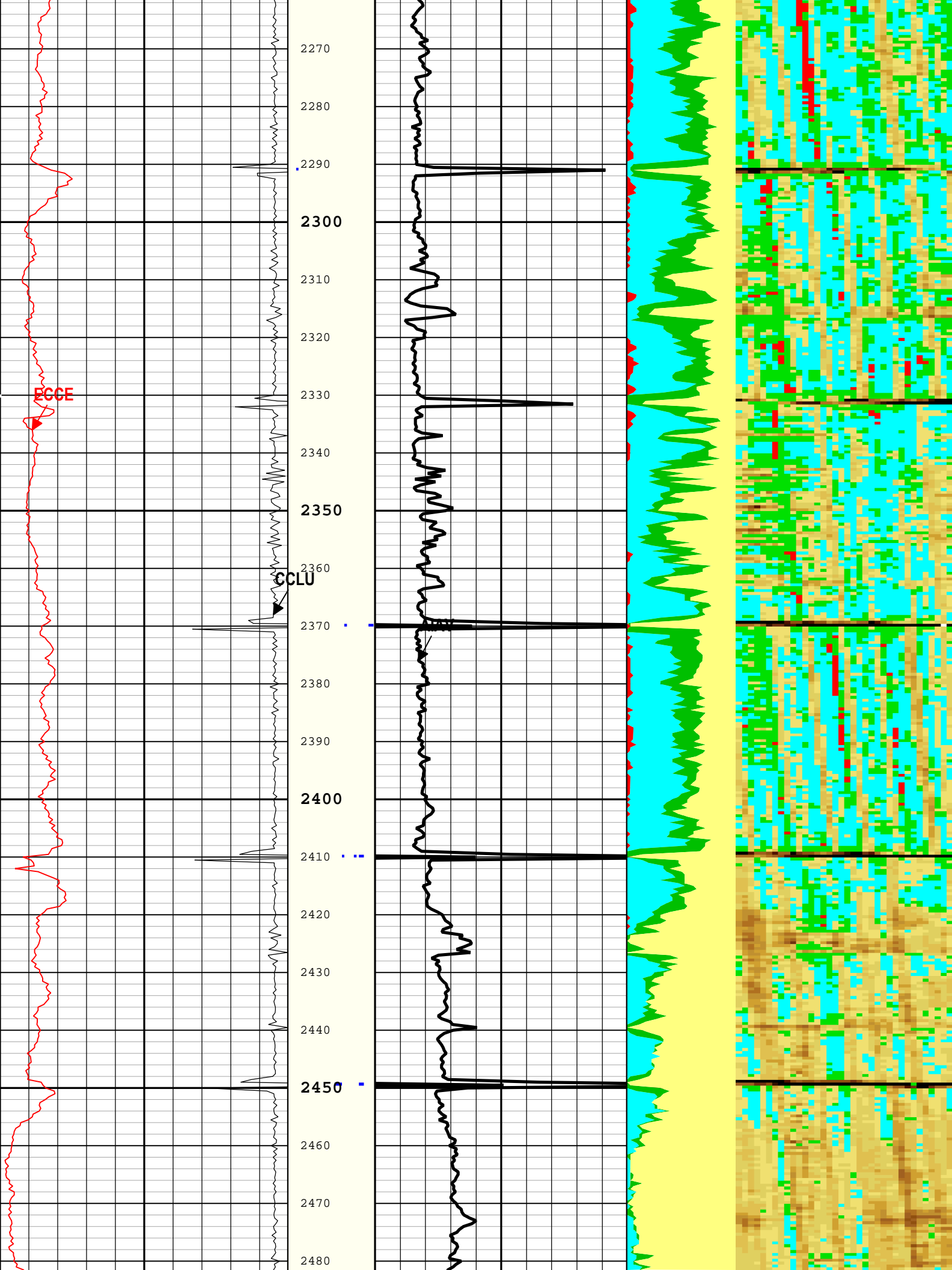


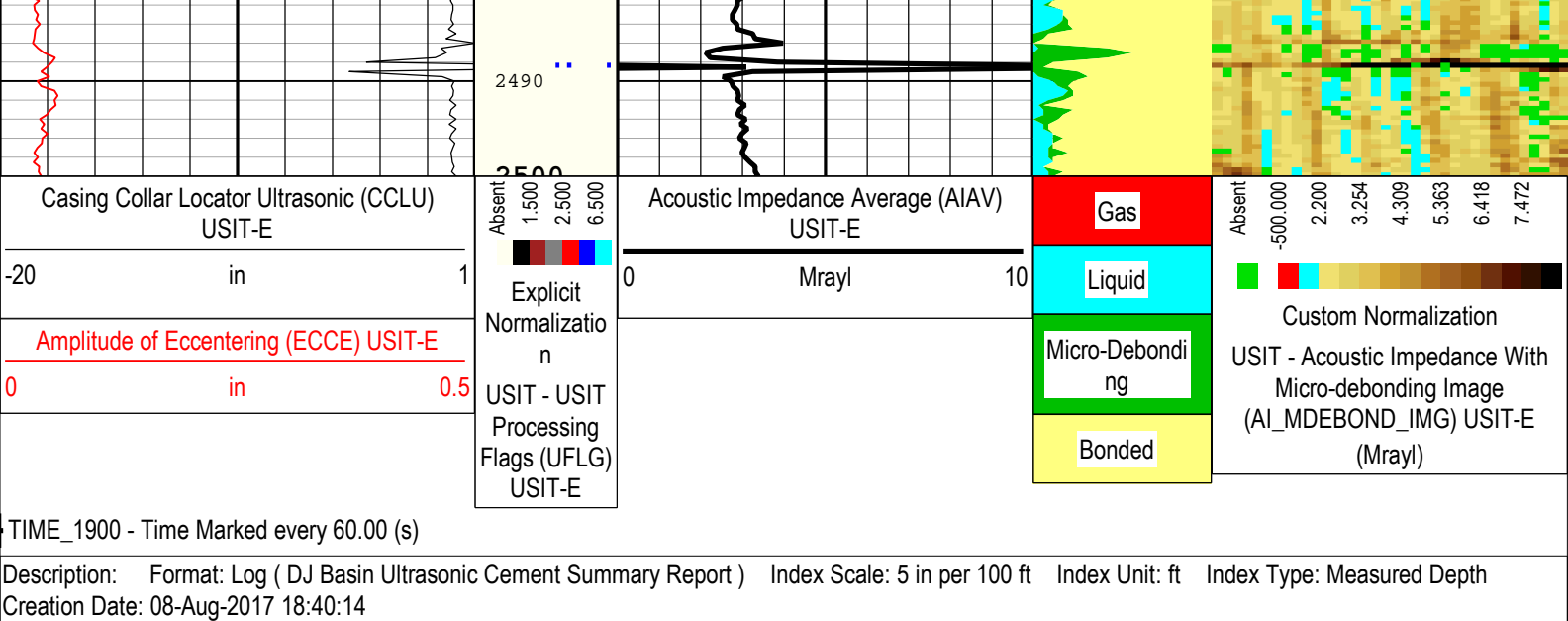
TIME_1900 - Time Marked every 60.00 (s)

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: 08-Aug-2017 18:39:54

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
IMAR	Image Rotation	USIT-E	Off	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UEGPS	Fiberglass Processing Selection	USIT-E	No	







Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
CMTY(U-USIT_CENT)	Cement Type	USIT-E	Regular Cement	
IMAR	Image Rotation	USIT-E	Off	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	

Tool Control Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

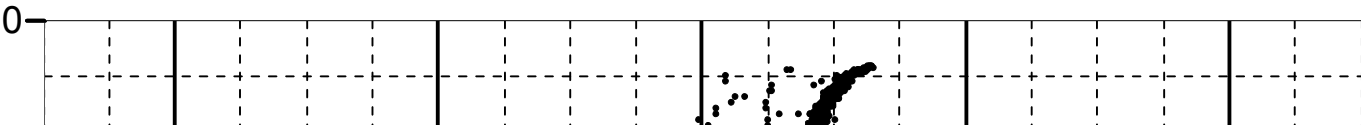
Company:Noble Energy Inc. Well:Wells Ranch AF07-659
ONE: Log[5]:Up:S010

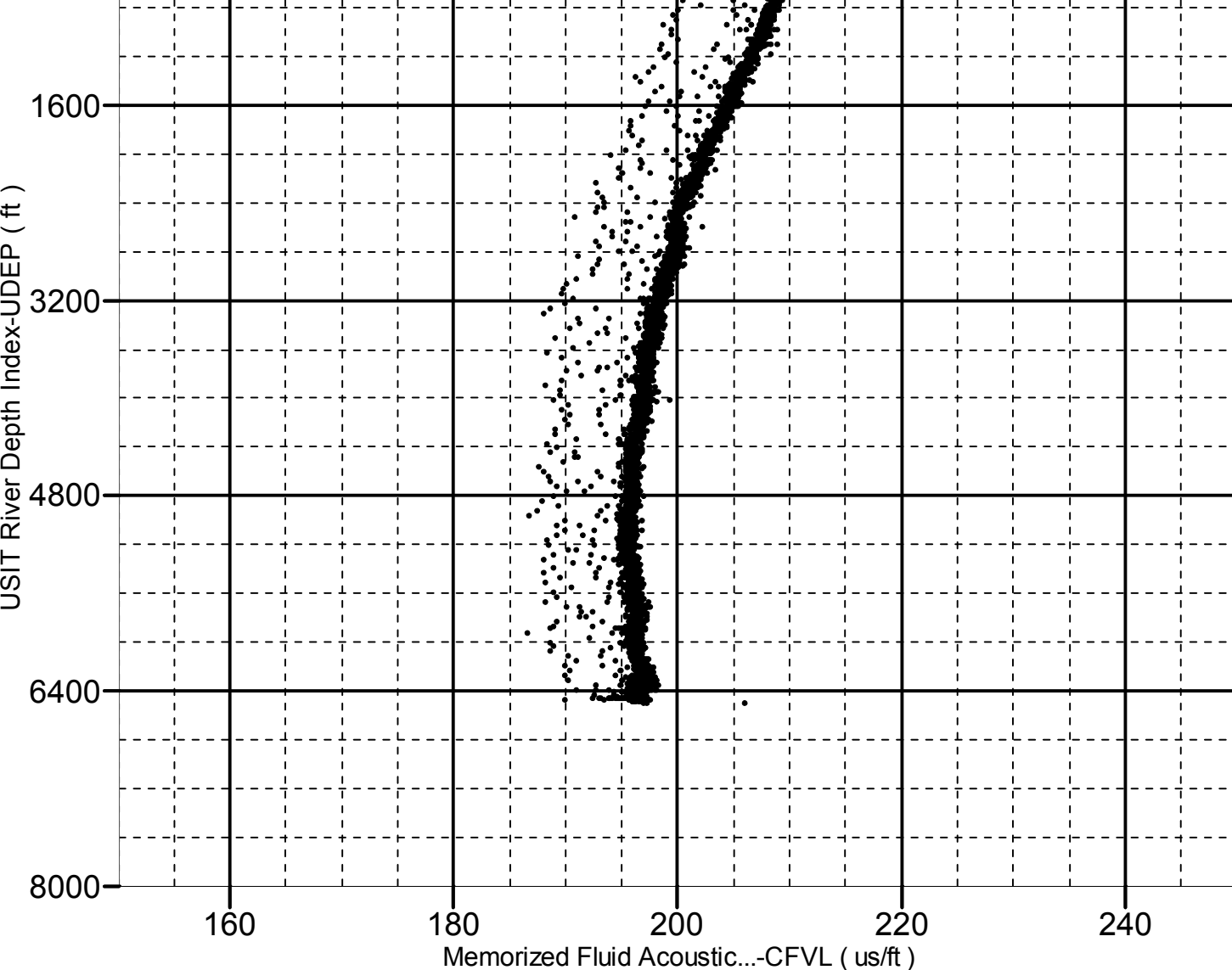
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6511.00 to 100.00 ft

● CFVL-UDEP





XYZ

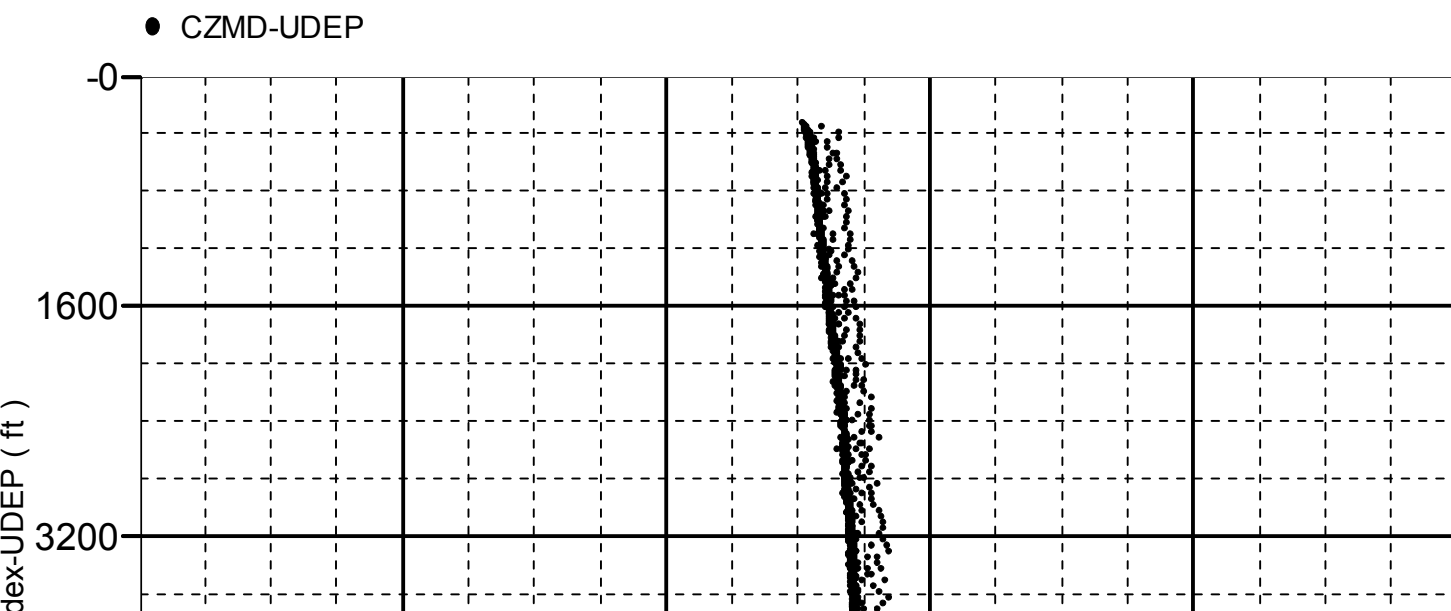
Company:Noble Energy Inc. Well:Wells Ranch AF07-659

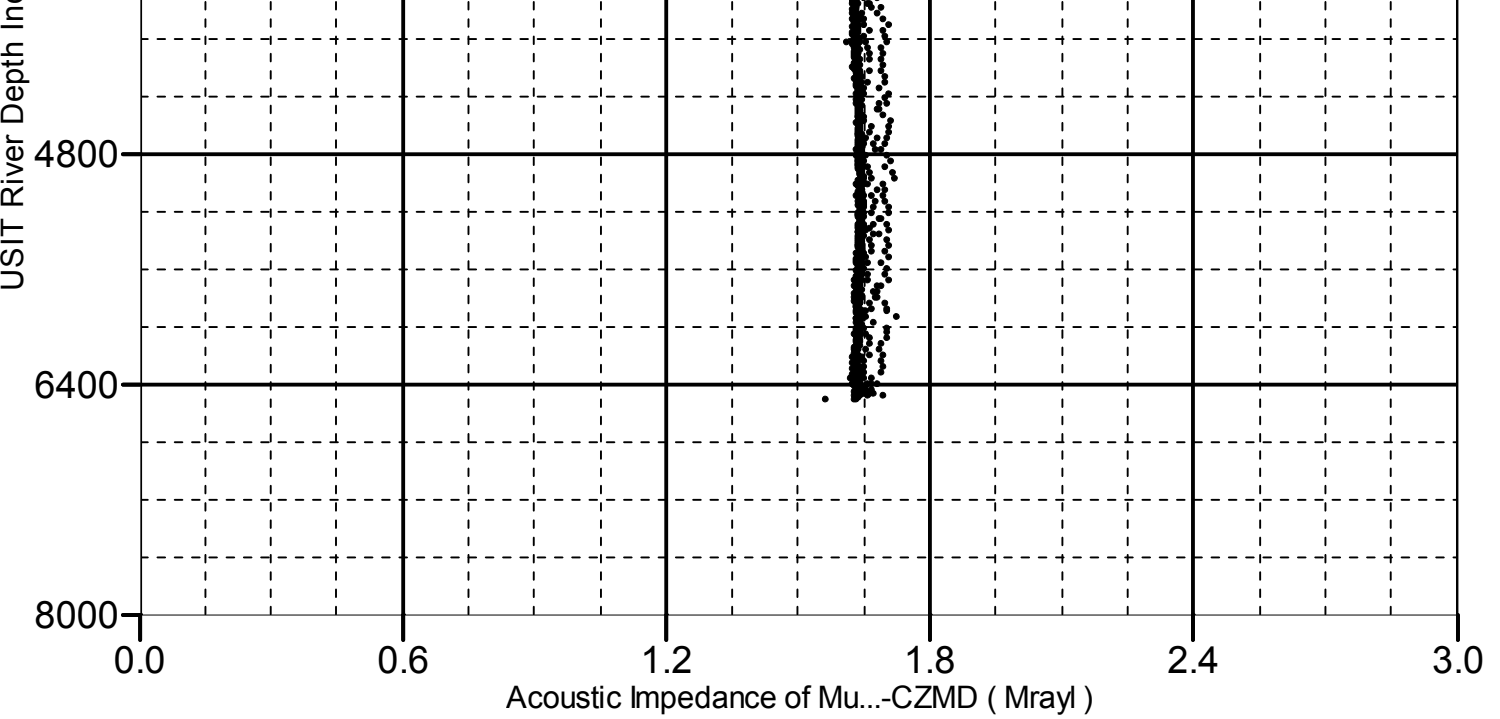
ONE: Log[5]:Up:S010

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6511.00 to 100.00 ft





Calibration Report

EDTC-B (Enhanced Digital Telemetry Cartridge - Version B) Calibration - Run ONE

Primary Equipment :

EDTC-B

EDTC-B

8102

Calibration Parameter :

Plus Reference (Jig minus background reference)

165

EDTC-B Accelerometer Calibration - EDTC-B Accelerometer Calibration

Before (Measured): 13:23:01 07-Aug-2017

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
AZ Vertical Measurement	ft/s2	Before	32.19	31.53	32.13	32.84	

EDTC-B Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured): 14:28:50 06-Aug-2017

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Gain		Before	1.000	0.900	1.065	1.100	

EDTC-B Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured): 14:28:50 06-Aug-2017

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before		0	74.927	120.000	
RGR Plus Measurement	gAPI	Before	165.000	150.000	154.970	180.000	

Company: Noble Energy Inc.

Schlumberger

Well: Wells Ranch AF07-659

Field: Wattenberg

County: Weld

State: Colorado

DJ Basin UltraSonic Summary Print

