

Company: Noble Energy, Inc.
Well: Hullabaloo State Y21-756
Field: Wattenberg
County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld	
Field:	Wattenberg	
Location:	NENW Sec 16 T2N R64W	
Well:	Hullabaloo State Y21-756	
Company:	Noble Energy, Inc.	
API Serial No. 05-123-45240	Location:	
	NENW Sec 16 T2N R64W	
	SHL: 445 FNL 2617 FWL	
	Latitude: 40.14454 Longitude: -104.55665	
	Permanent Datum: Ground Level	
	Log Measured From: Kelly Bushing	
Drilling Measured From:	Kelly Bushing	
	Elev.: 30.00 ft	
Section:	Township:	Range:
16	2N	64W

Run Number	One
Depth Driller	17112.00 ft
Schlumberger Depth	17112.00 ft
Bottom Log Interval	6650.00 ft
Top Log Interval	
Casing Fluid Type	Brine
Salinity	
Density	9.3 lbm/gal
Fluid Level	8.00 ft
BIT/CASING/TUBING STRING	
Bit Size	8.50 in
From	1943.00 ft
To	17112.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	N/A
From	0.00 ft
To	17101.30 ft
Max Recorded Temperatures	219 degF
Logger on Bottom	01-Nov-2017 10:30:00
Unit Number	2161
Recorded By	Stephen Tang
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.

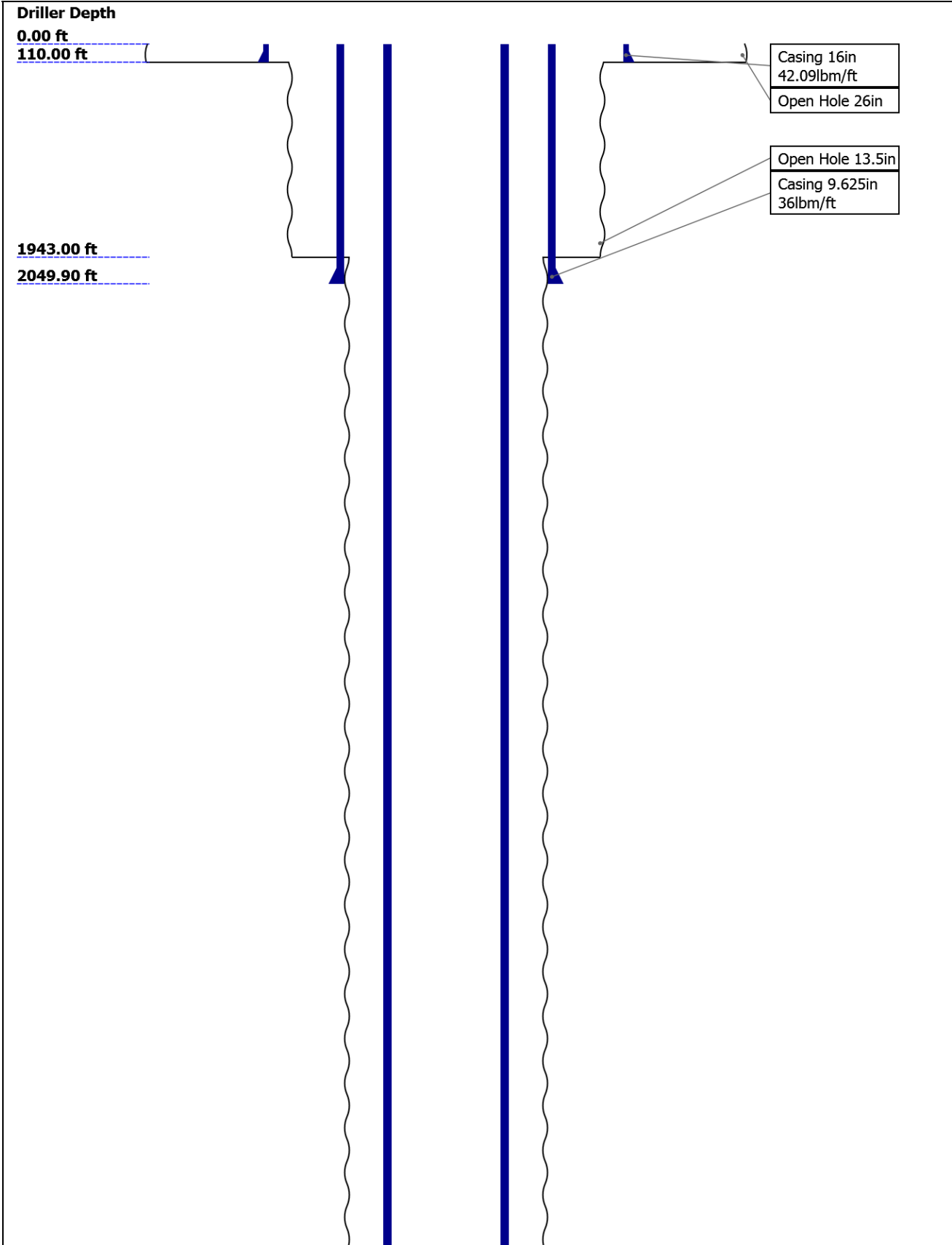
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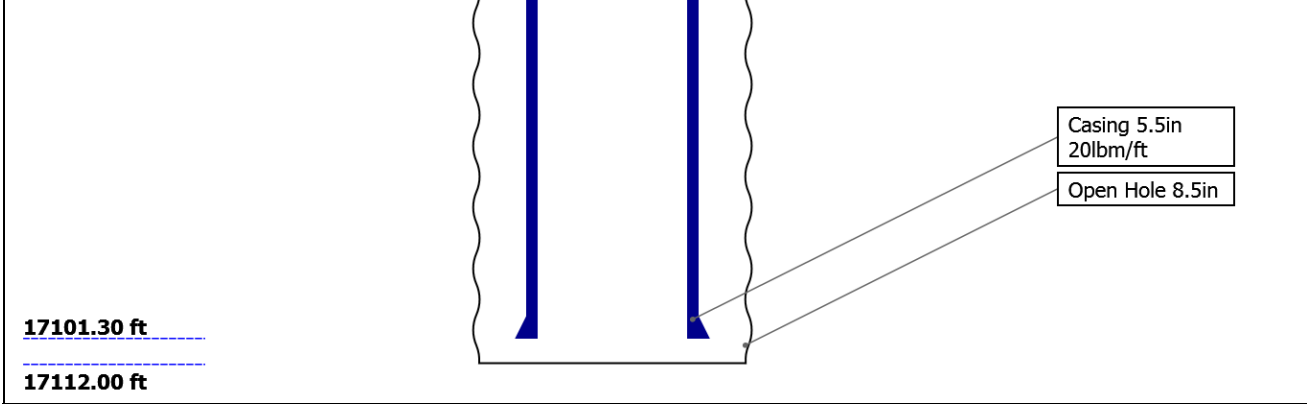
- 1. Header
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Well Sketch






17101.30 ft

17112.00 ft

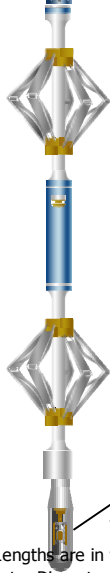
Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1943			
Top Logger (ft)	0	110	1943			
Bottom Driller (ft)	110	1943	17112			
Bottom Logger (ft)	110	1943	17112			
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)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	2049.9	17101.3			
Bottom Logger (ft)	110	2049.9	17101.3			

Remarks and Equipment Summary

One: Toolstring			One: Remarks	
<div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT28.97LEH-QT</div><div>EDTC-B:826.06102EDTH-B:9245EDTG-B:77004EDTC-B:8102</div><div>AH-184[2]:276519.56</div><div>AH-184[1]:594117.56</div><div>USIT-E:9415.563ECH-MFA:1928USAC-A:943USIT-A:99</div></div><div></div></div>	Toolstring ran as per tool sketch.		<div></div>	
	Well logged at 10 degree 6 inch.			
	Main pass logged with 2500 psi.			
	Repeat pass logged with 0 psi.			
	Thank you for choosing Schlumberger!			

USIS-A:90
2
USSC-B:17
30
USRS-A:84
0
USI-SENS
OR:3306
USI-TX



USI Sen 0.37
sor
TOOL_ZERO
Head Fe nsion

Lengths are in ft
Maximum Outer Diameter = 3.625 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	4714071
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 Schlumberger depth procedures followed.
IDW used as primary depth device.
Z-Chart used as secondary depth device.

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 2	Log[3]:Up	6659.93	55.24

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 : 17.27m(56.65ft) to 18.17m(59.60ft)
MUD_N_FRP = 1.04
DFD = 1.11g/cm3(9.30lbm/gal)
CZMD median computed in free pipe normalization interval = 1.67 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_NPD-ICE2-2017SP3_7.3.93033

Pass Summary

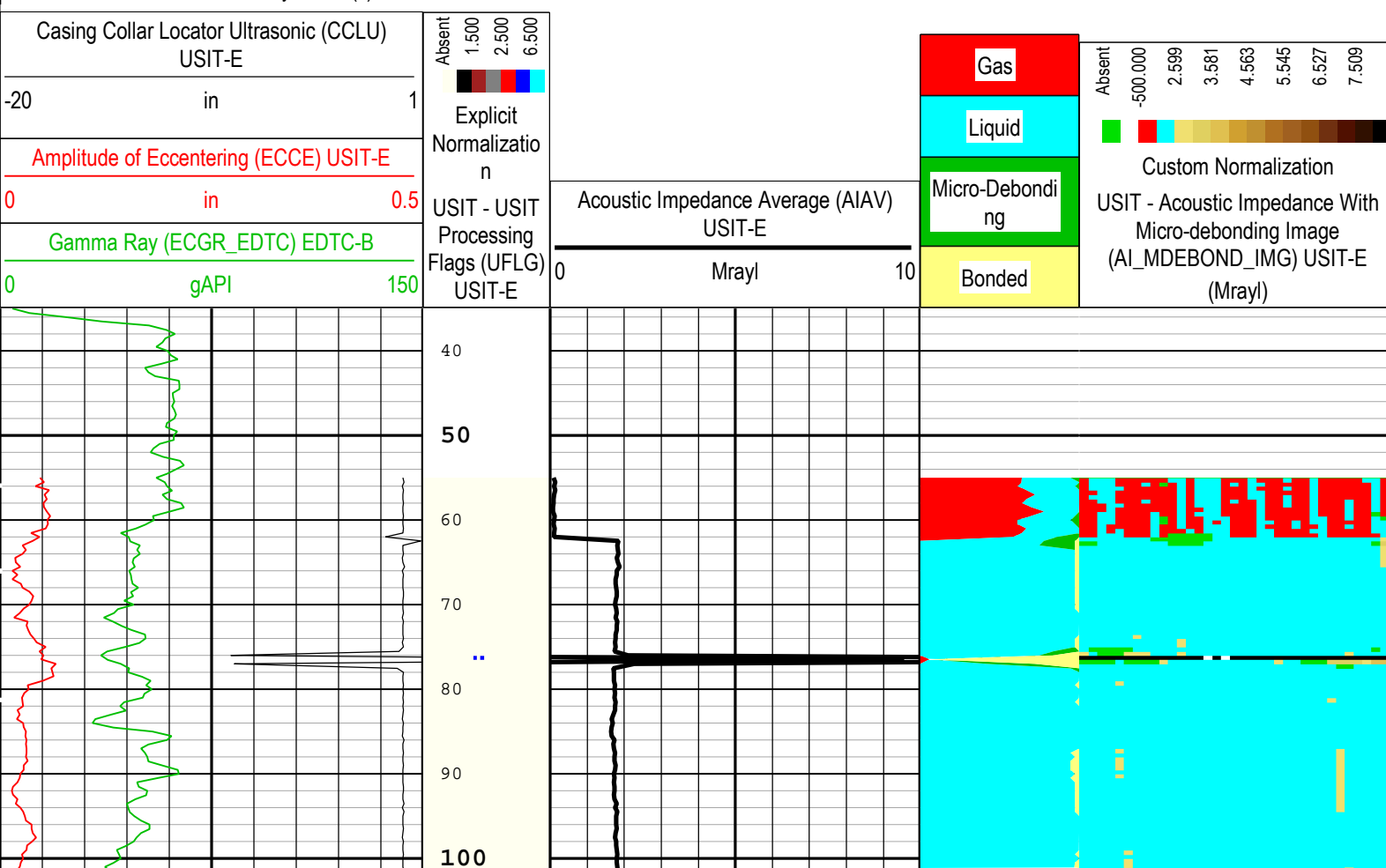
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	55.24 ft	6659.93 ft	01-Nov-2017 10:02:04 AM	01-Nov-2017 11:23:27 AM	ON	5.21 ft	Yes

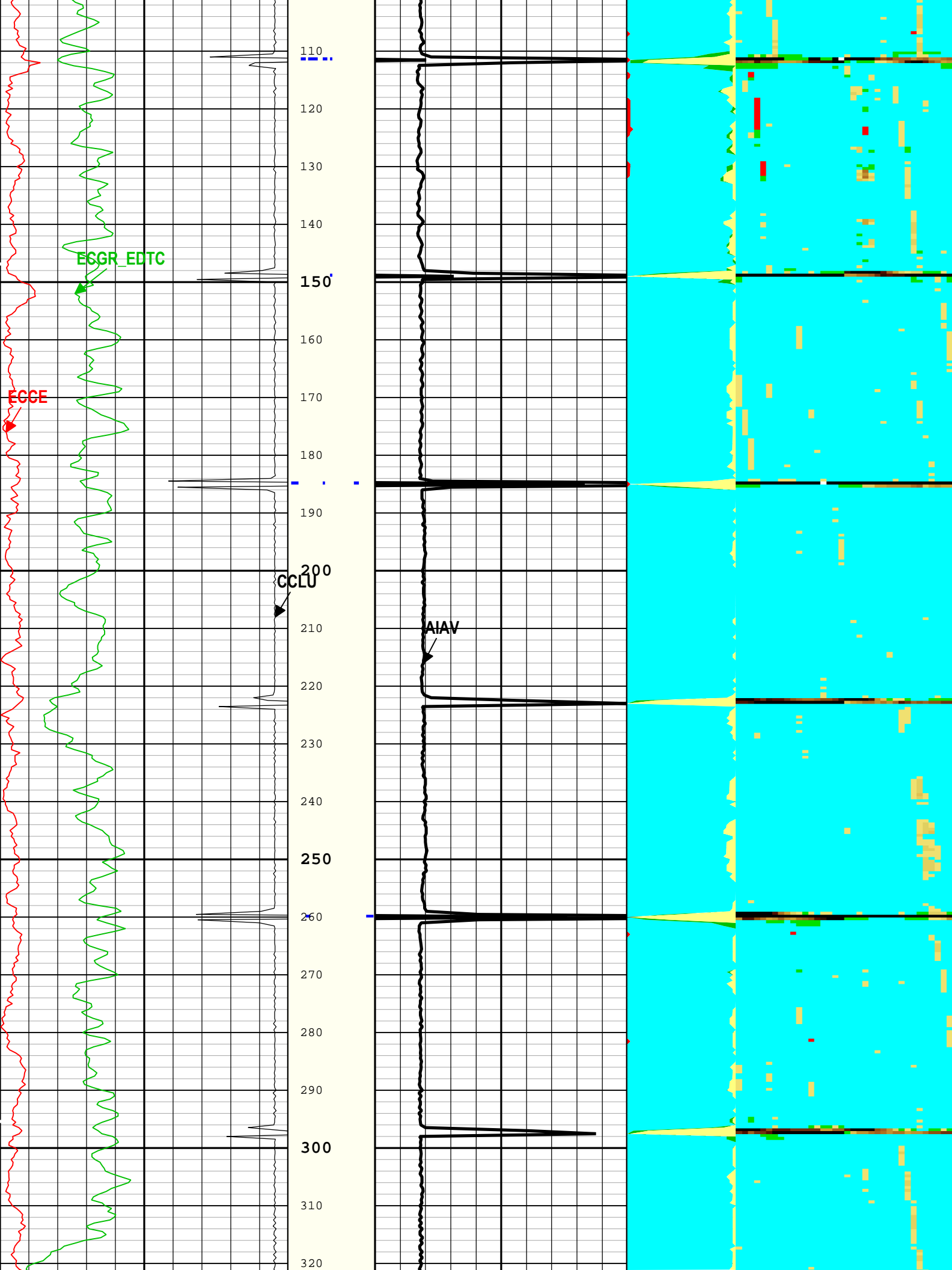
All depths are referenced to toolstring zero

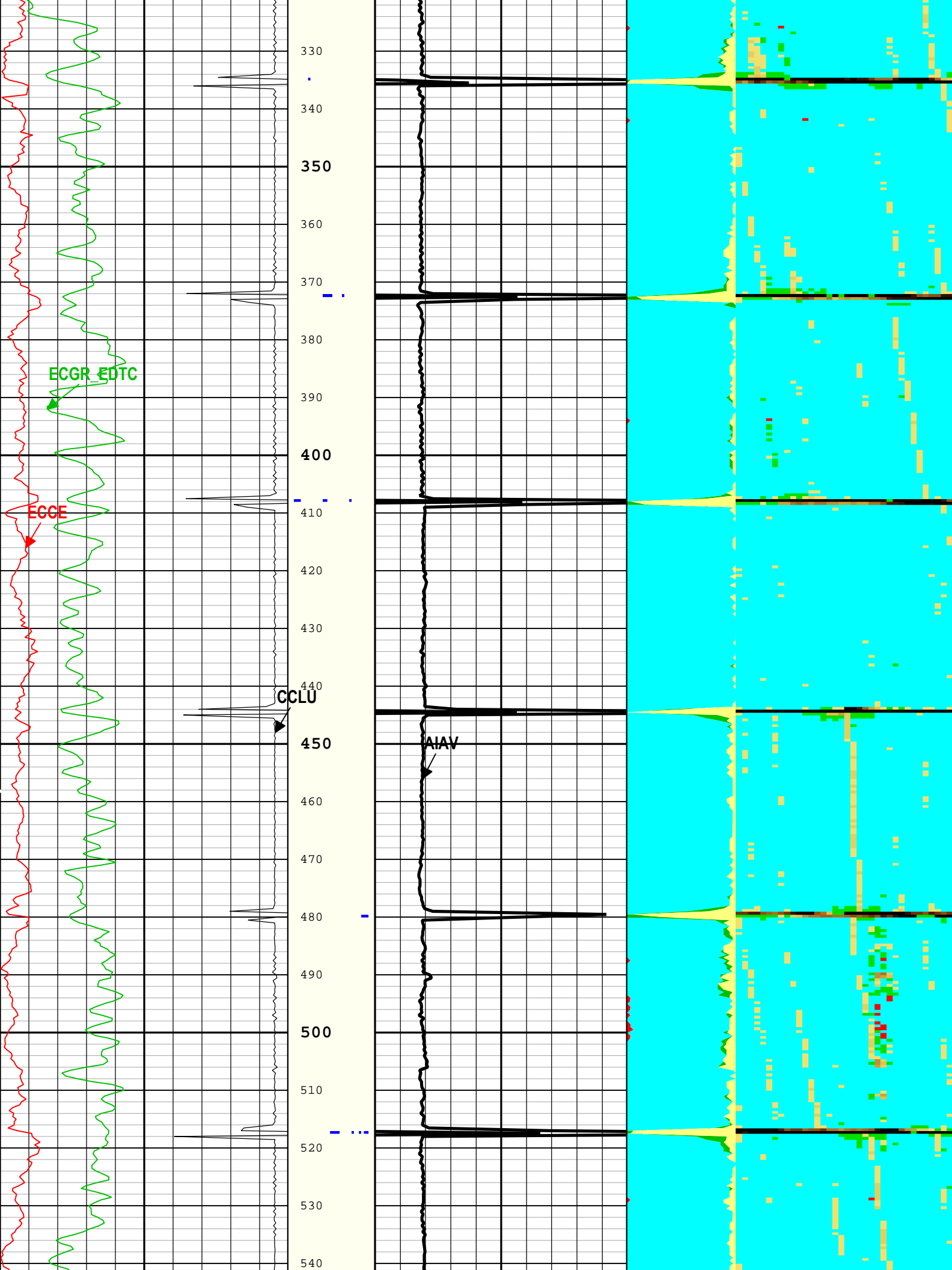
Log Company:Noble Energy, Inc. Well:Hullabaloo State Y21-756
One: Log[3]:Up:S009

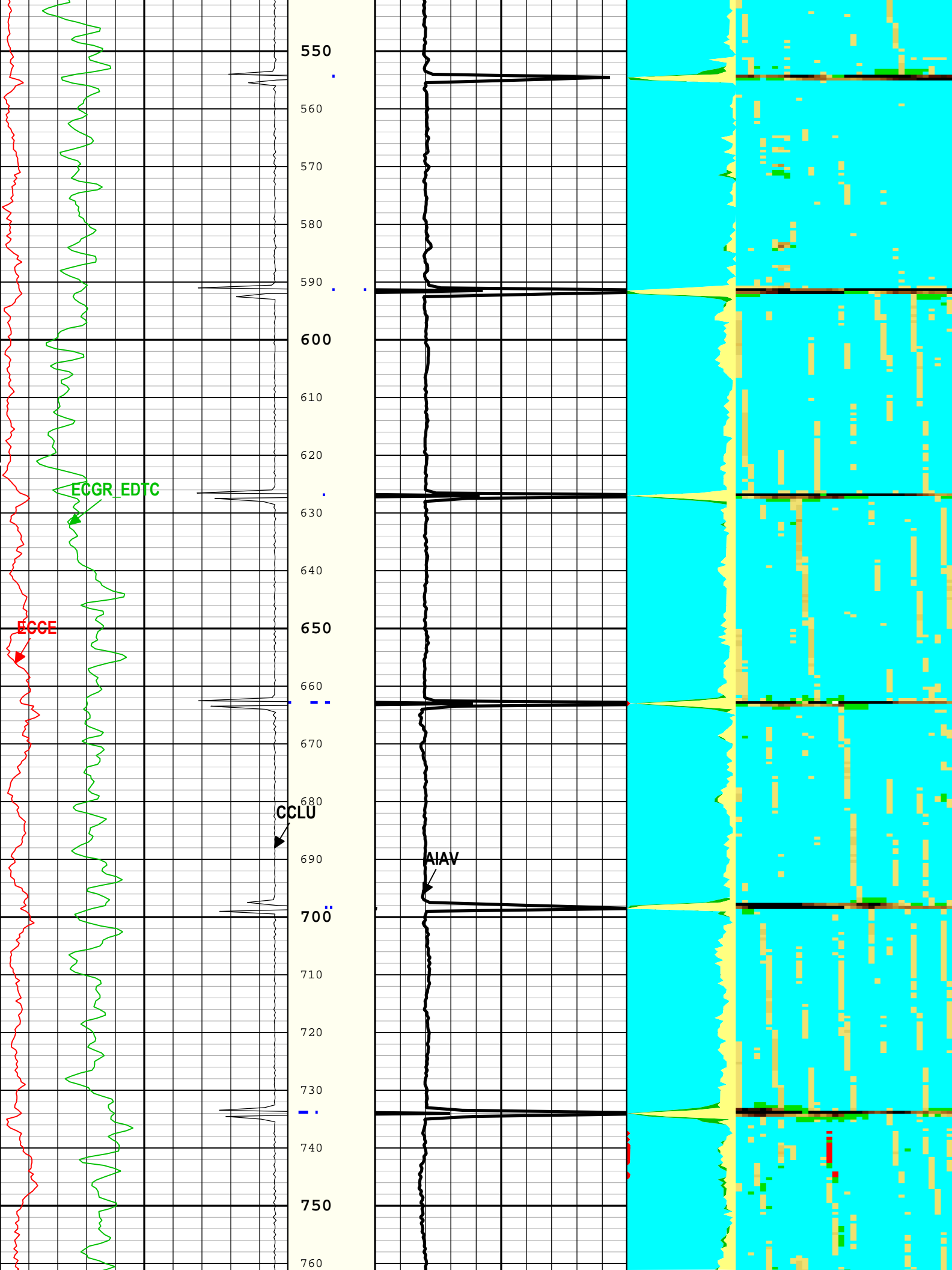
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Creation Date: 01-Nov-2017 13:19:54

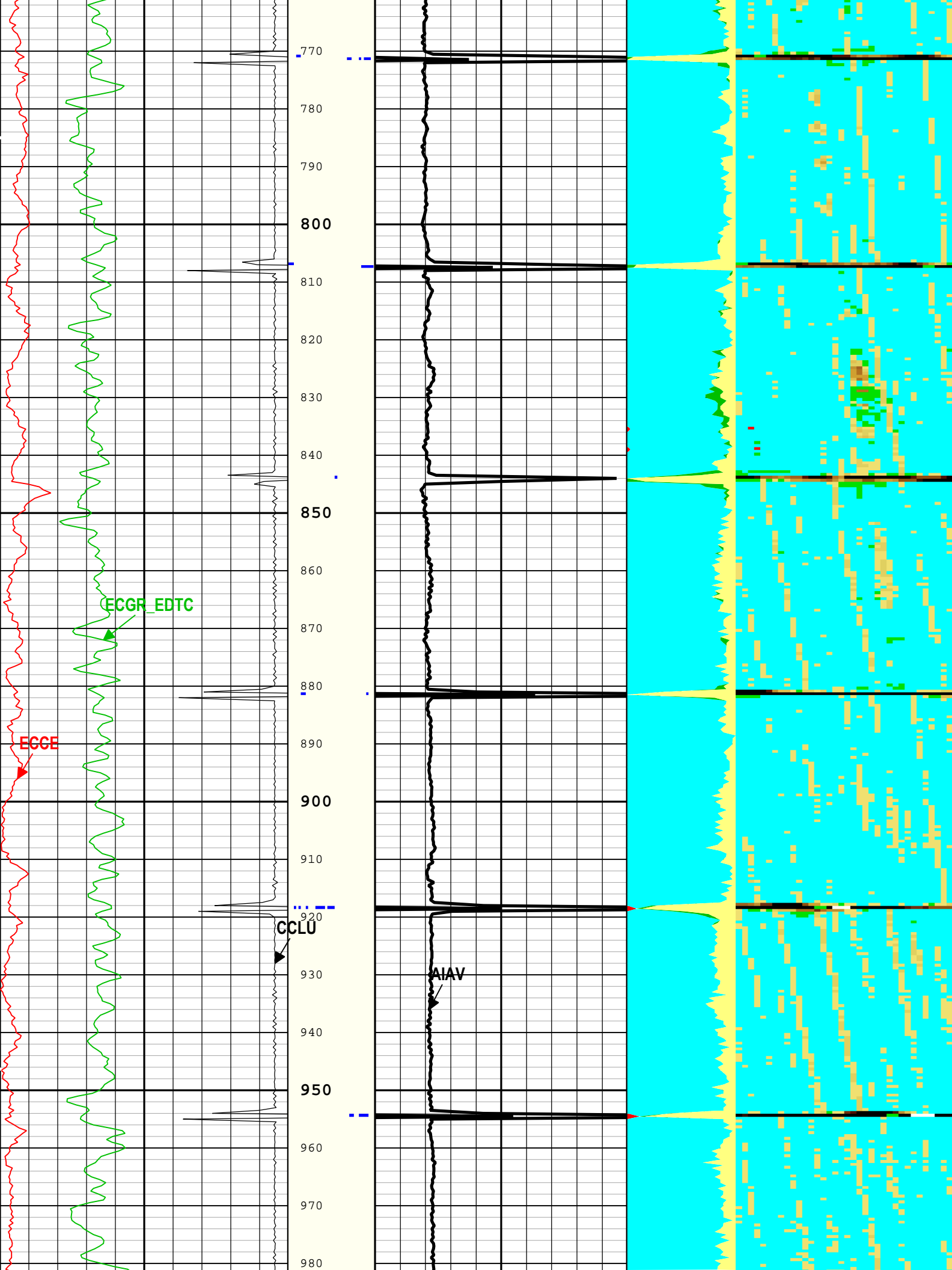
TIME_1900 - Time Marked every 60.00 (s)

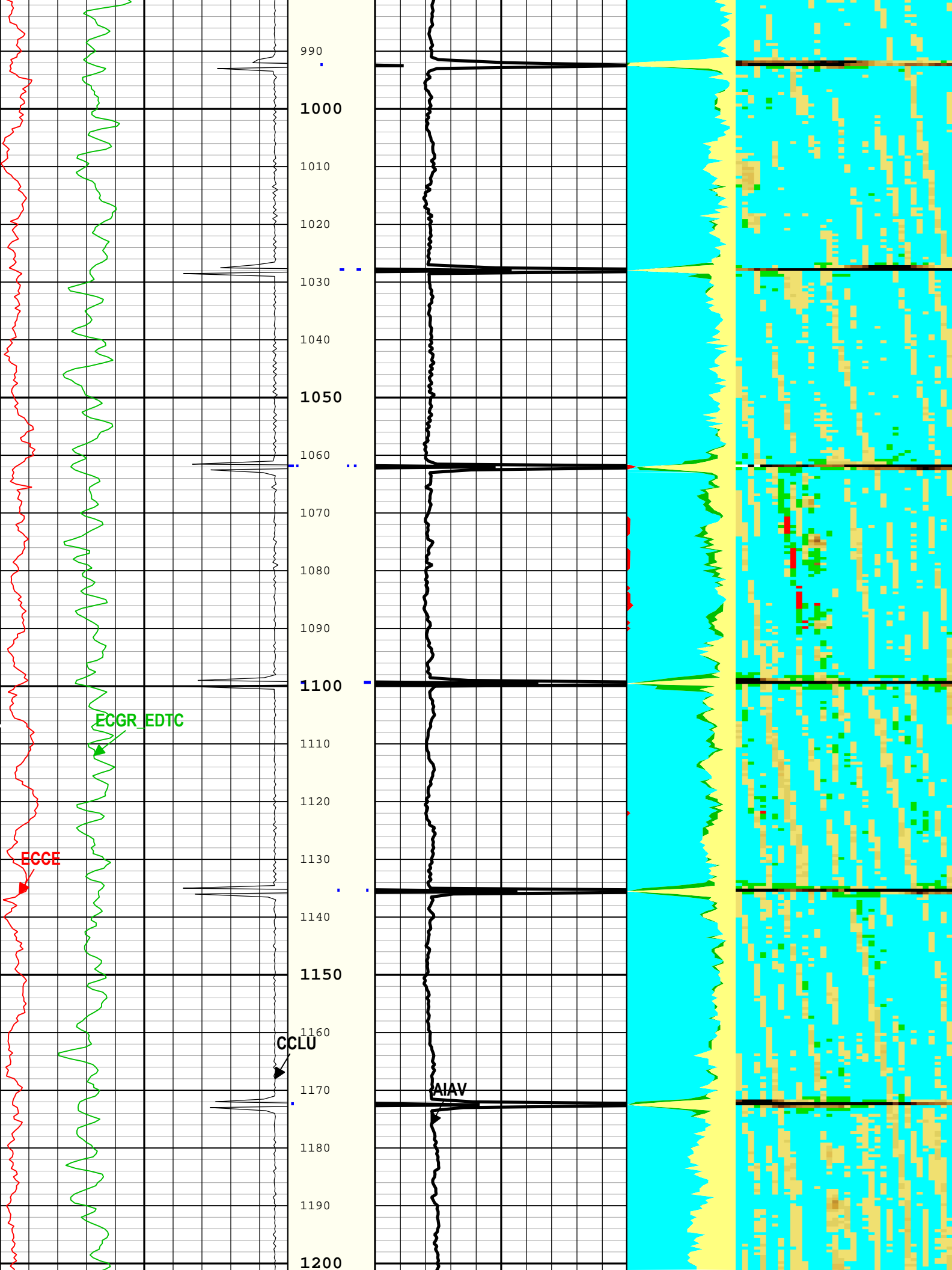


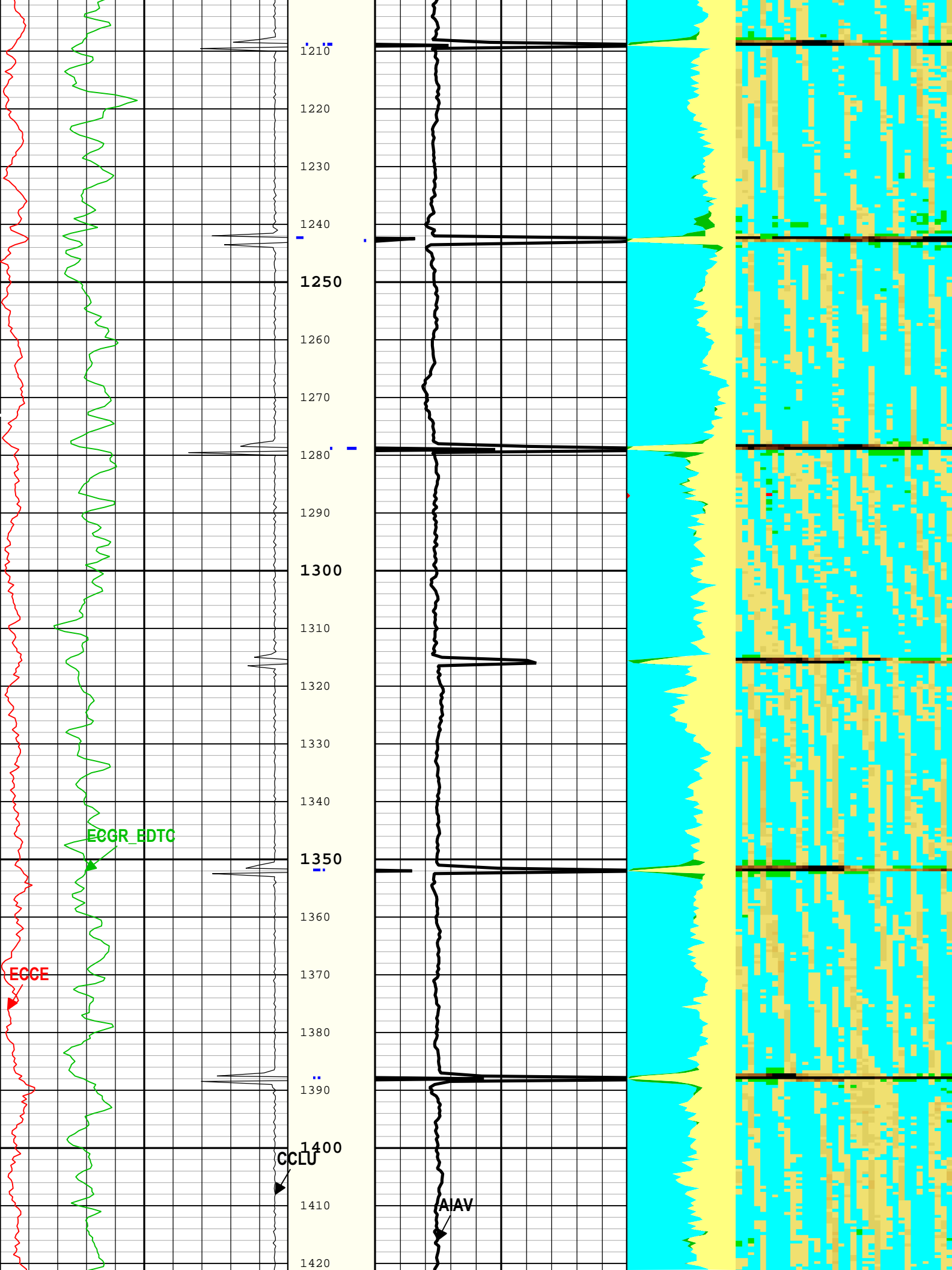


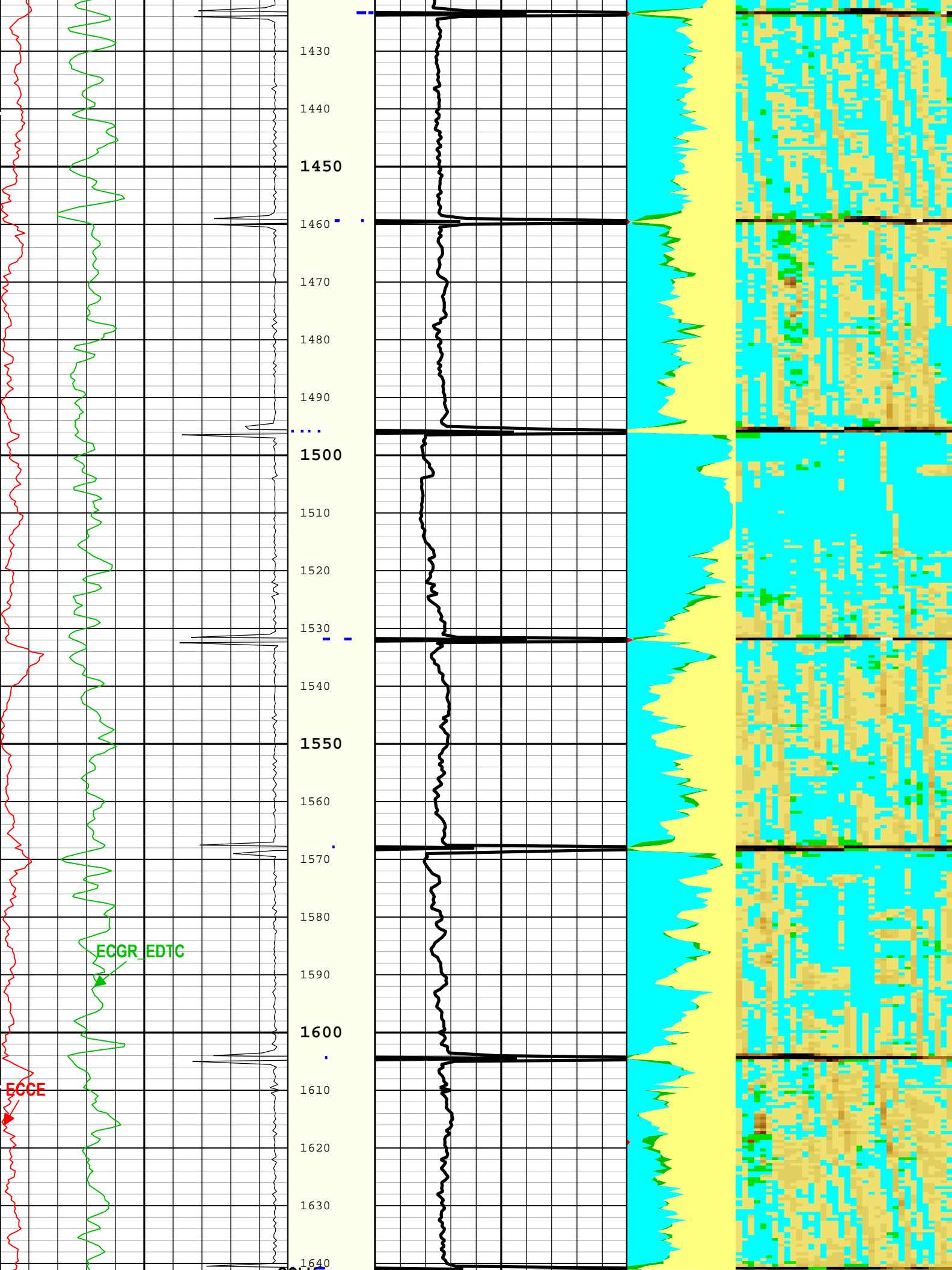


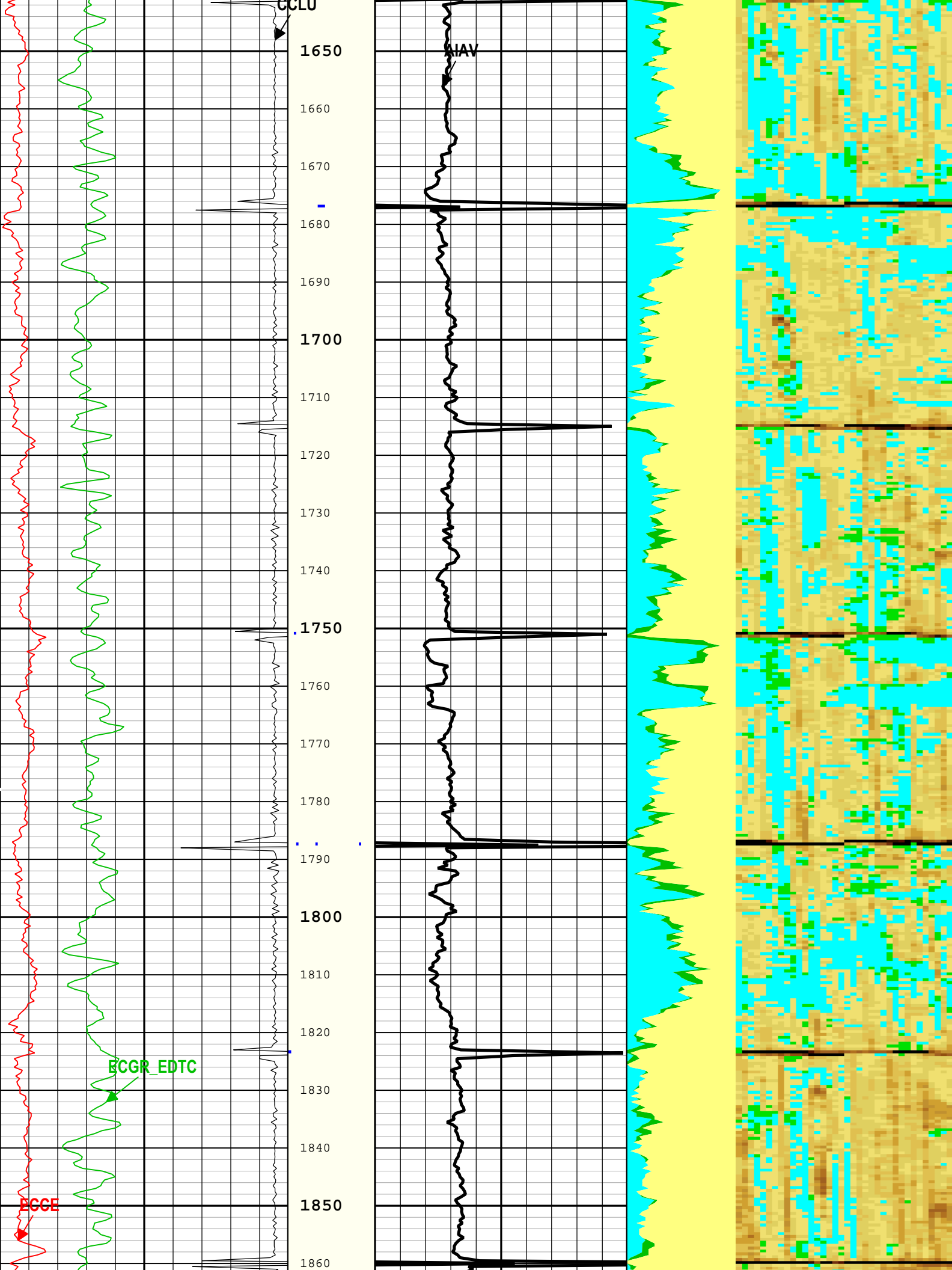


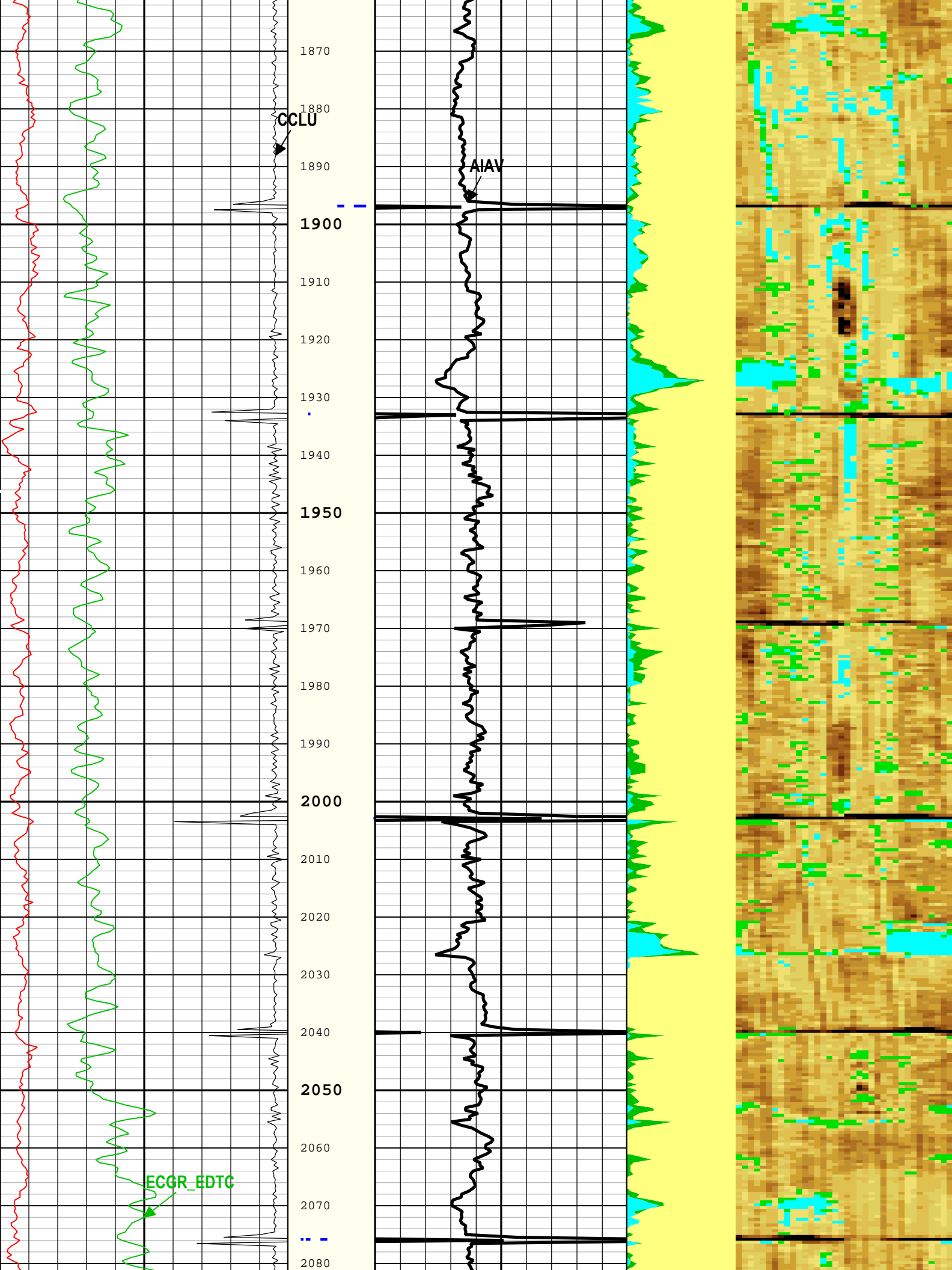


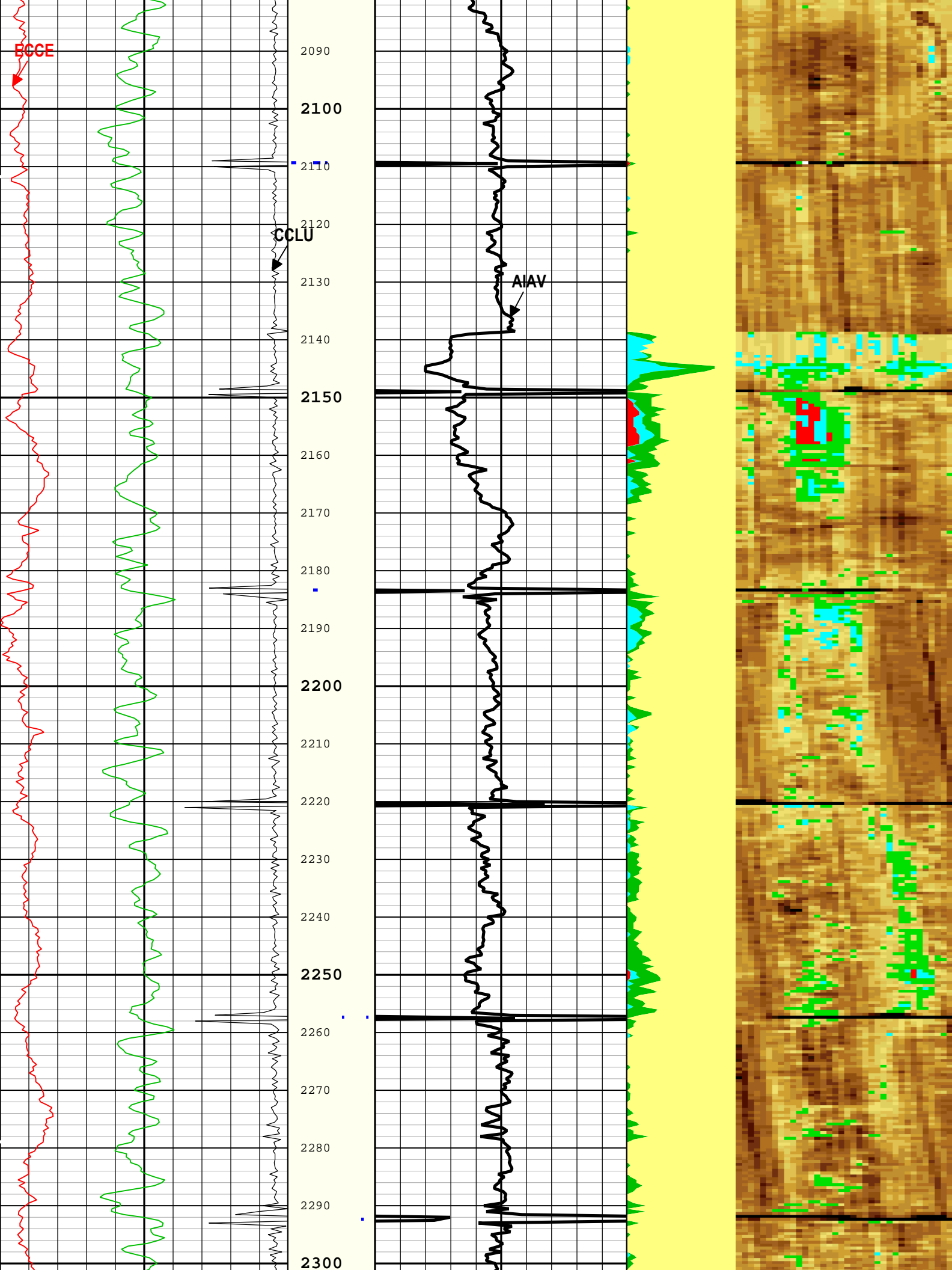


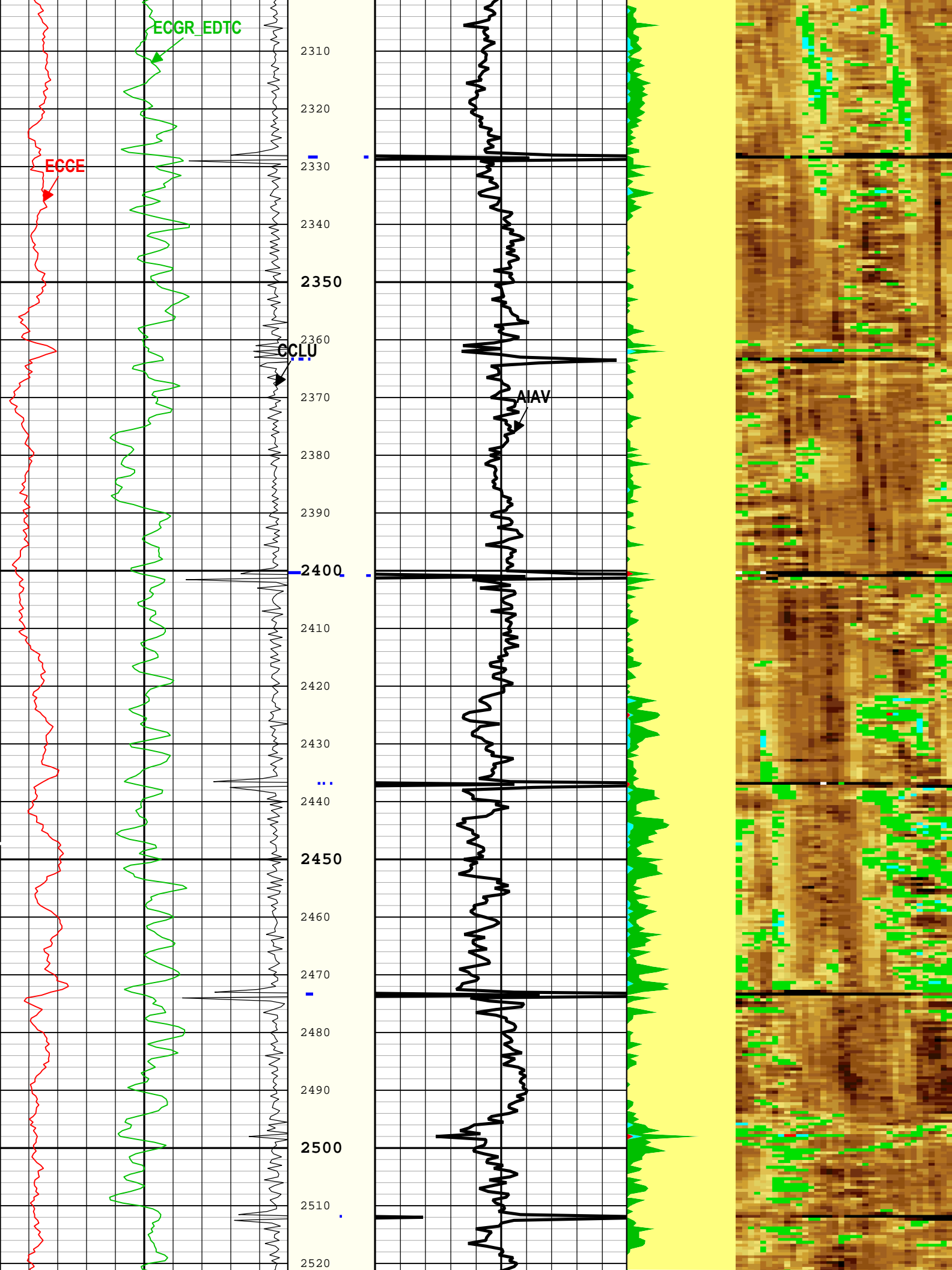


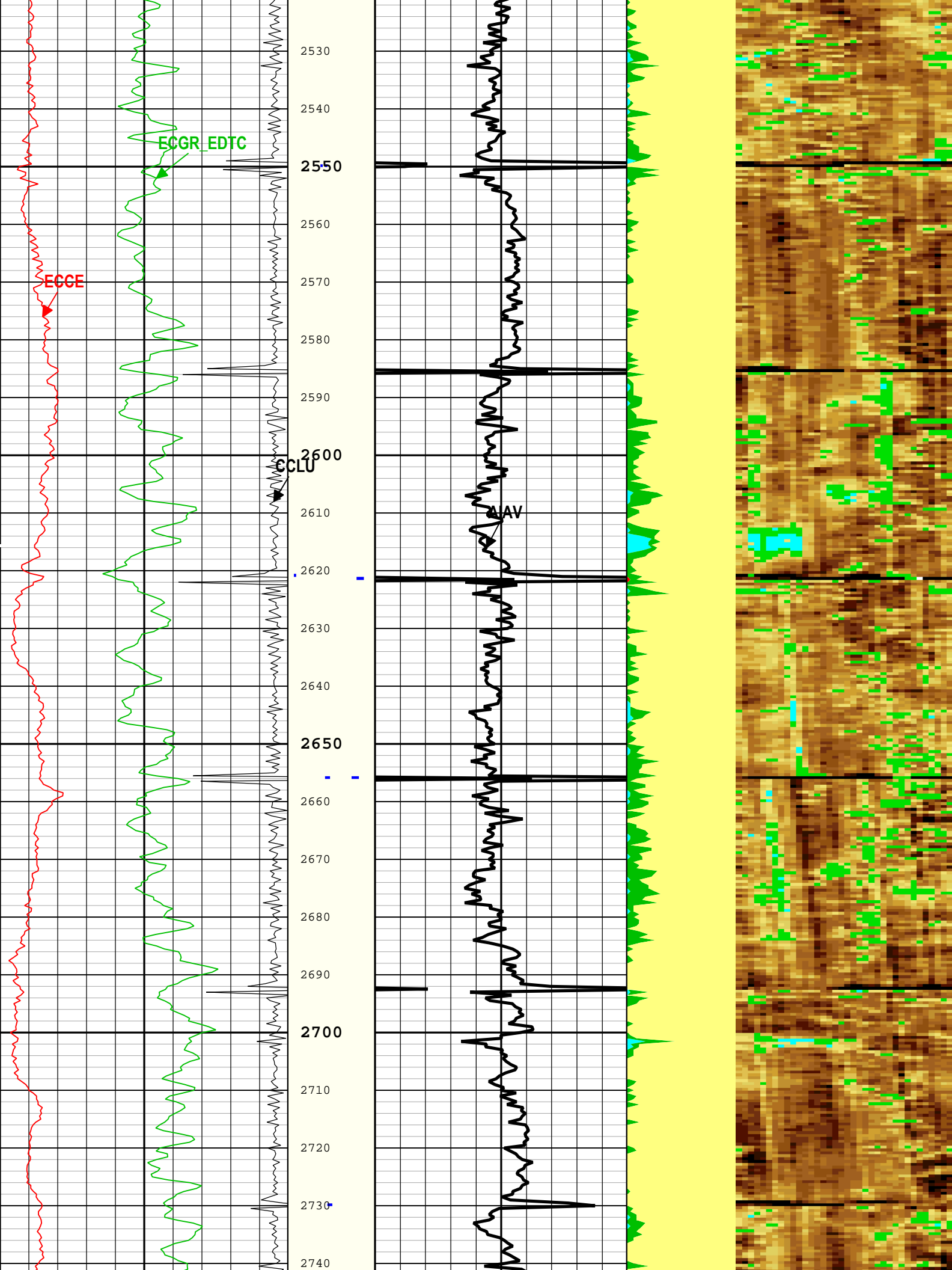


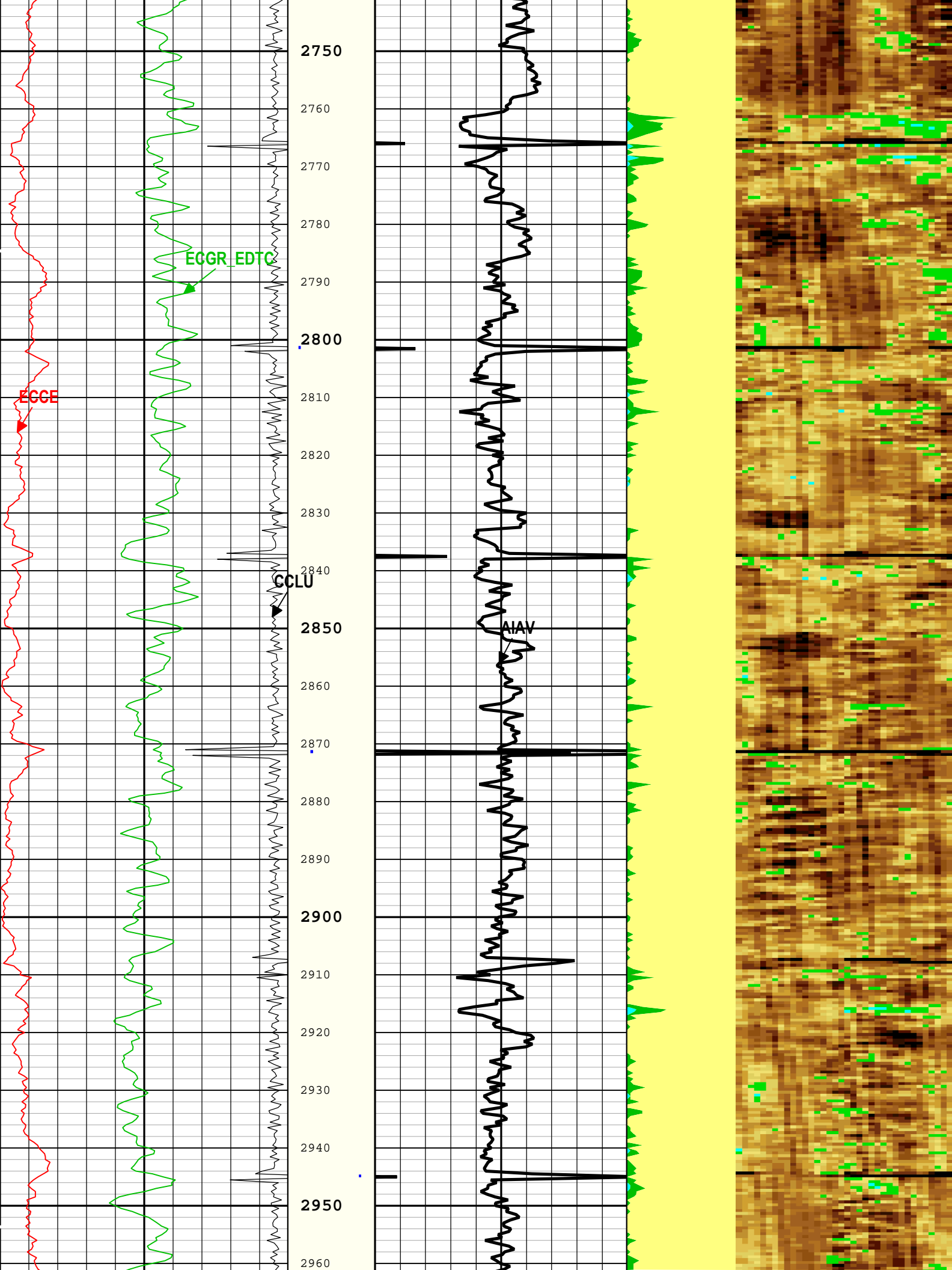


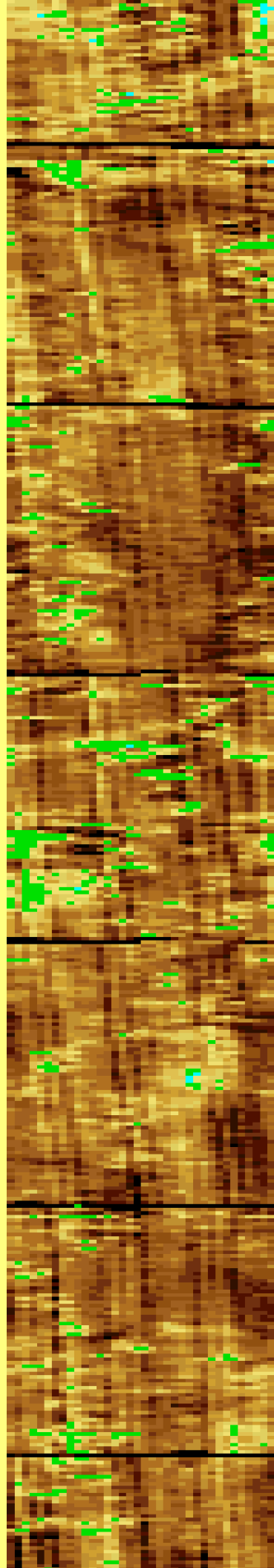
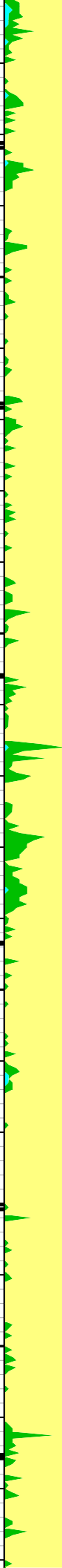
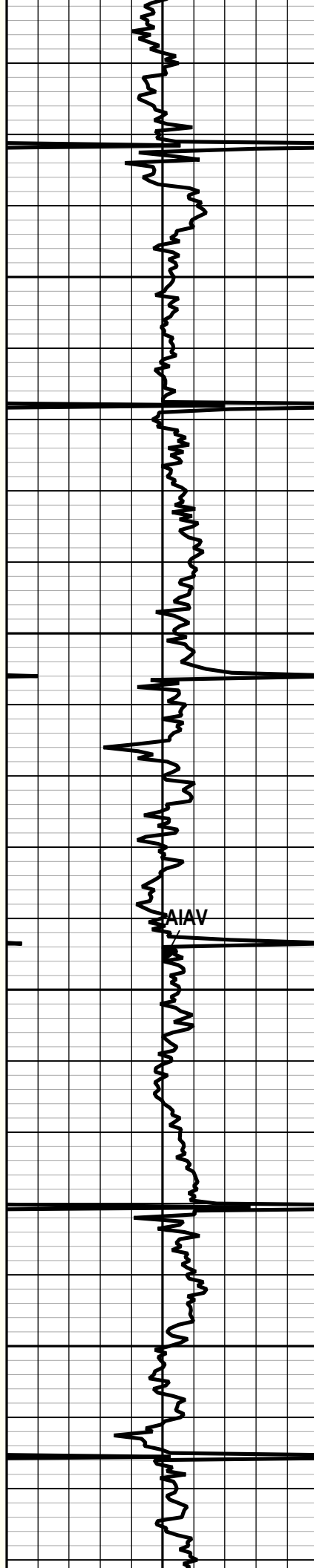
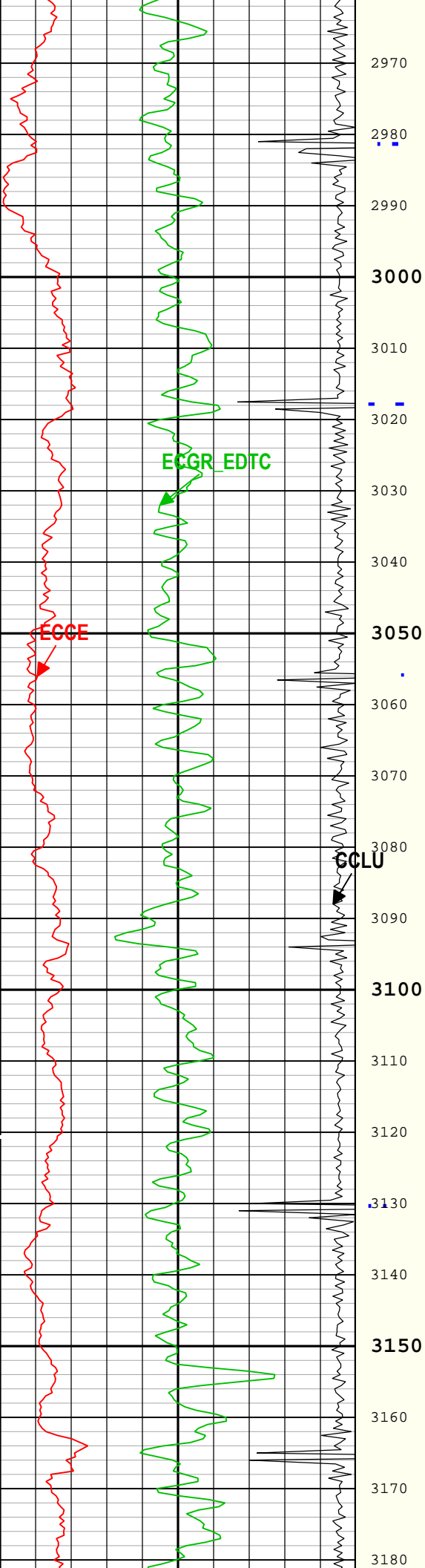


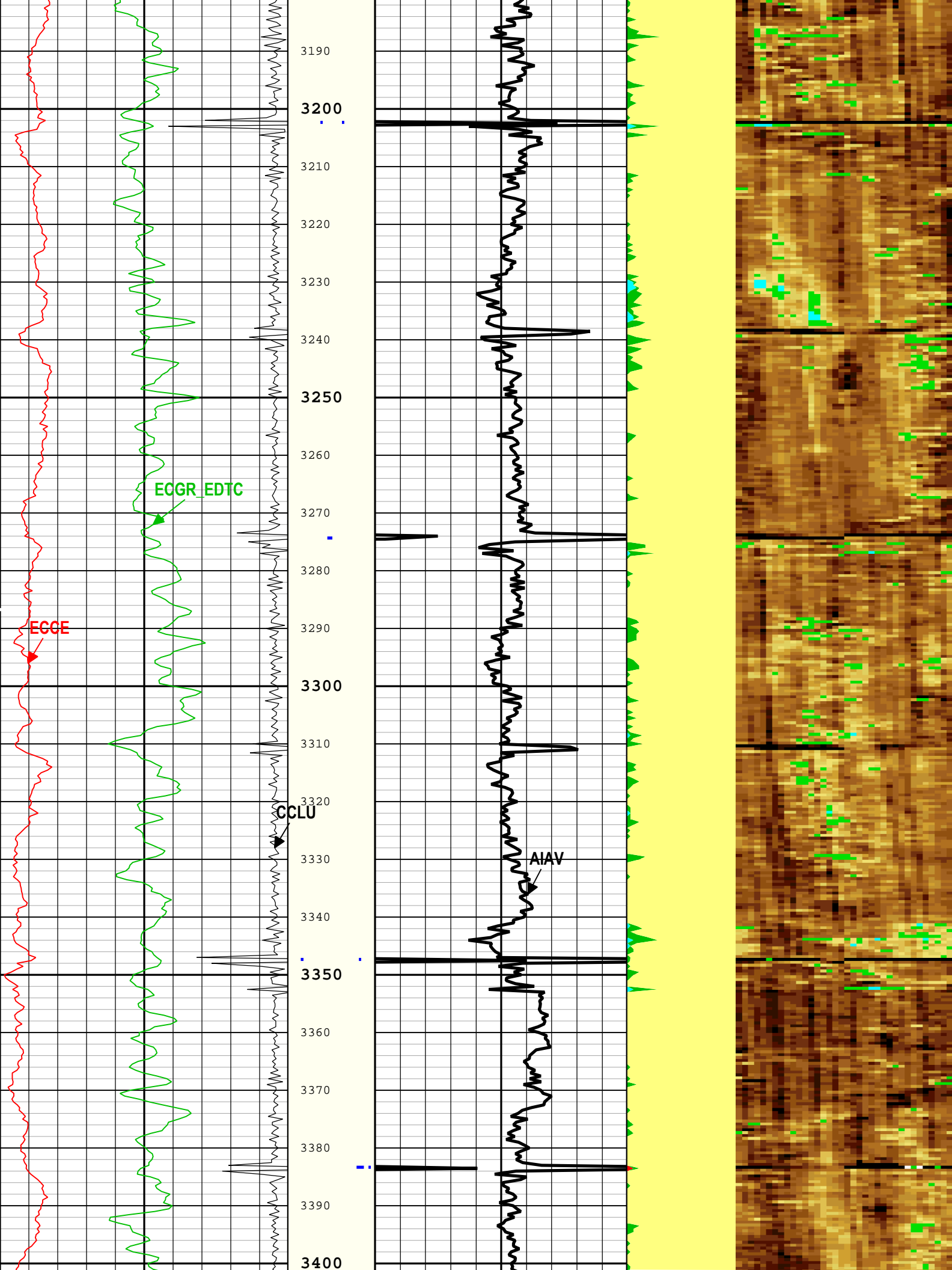


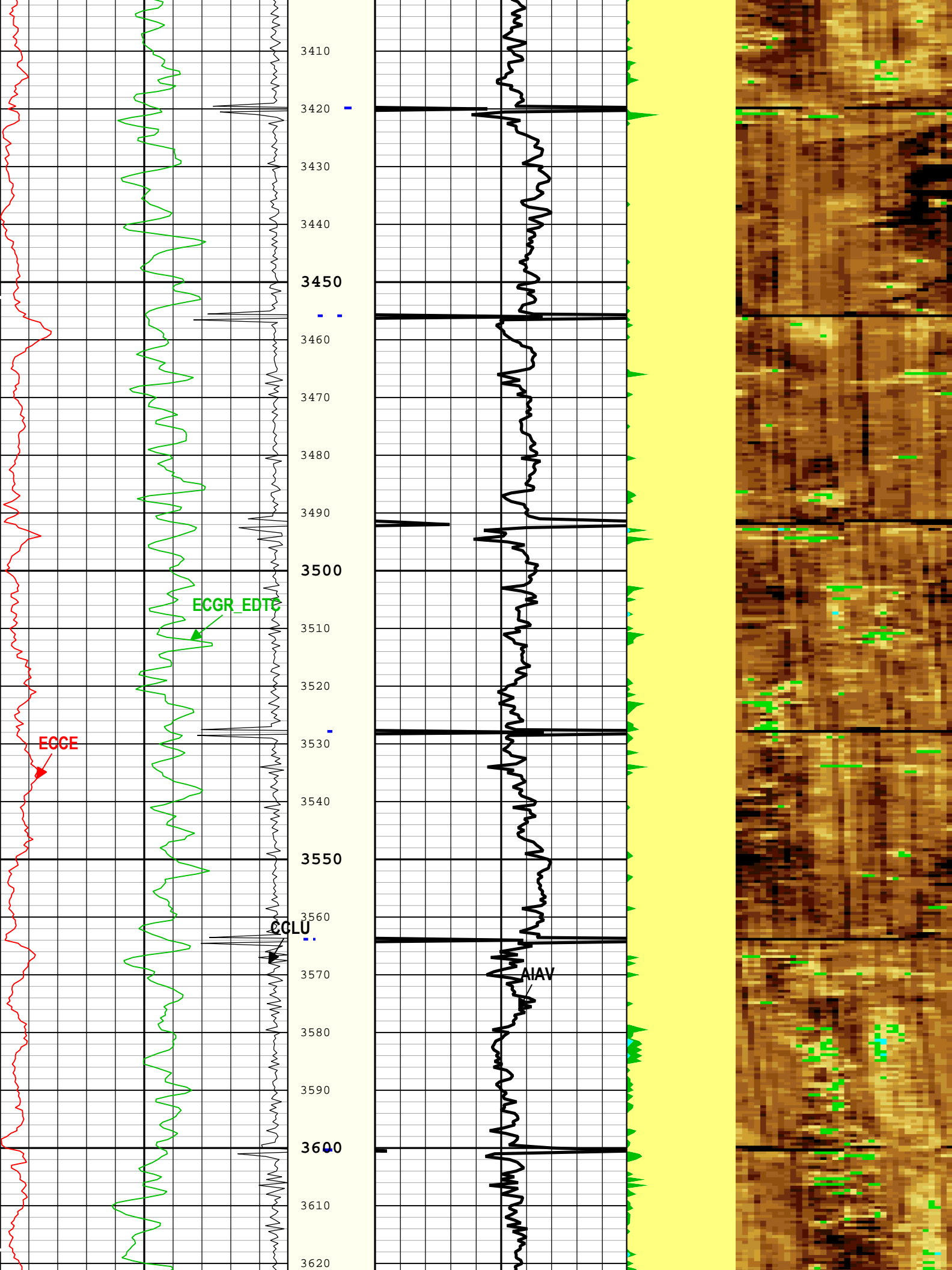


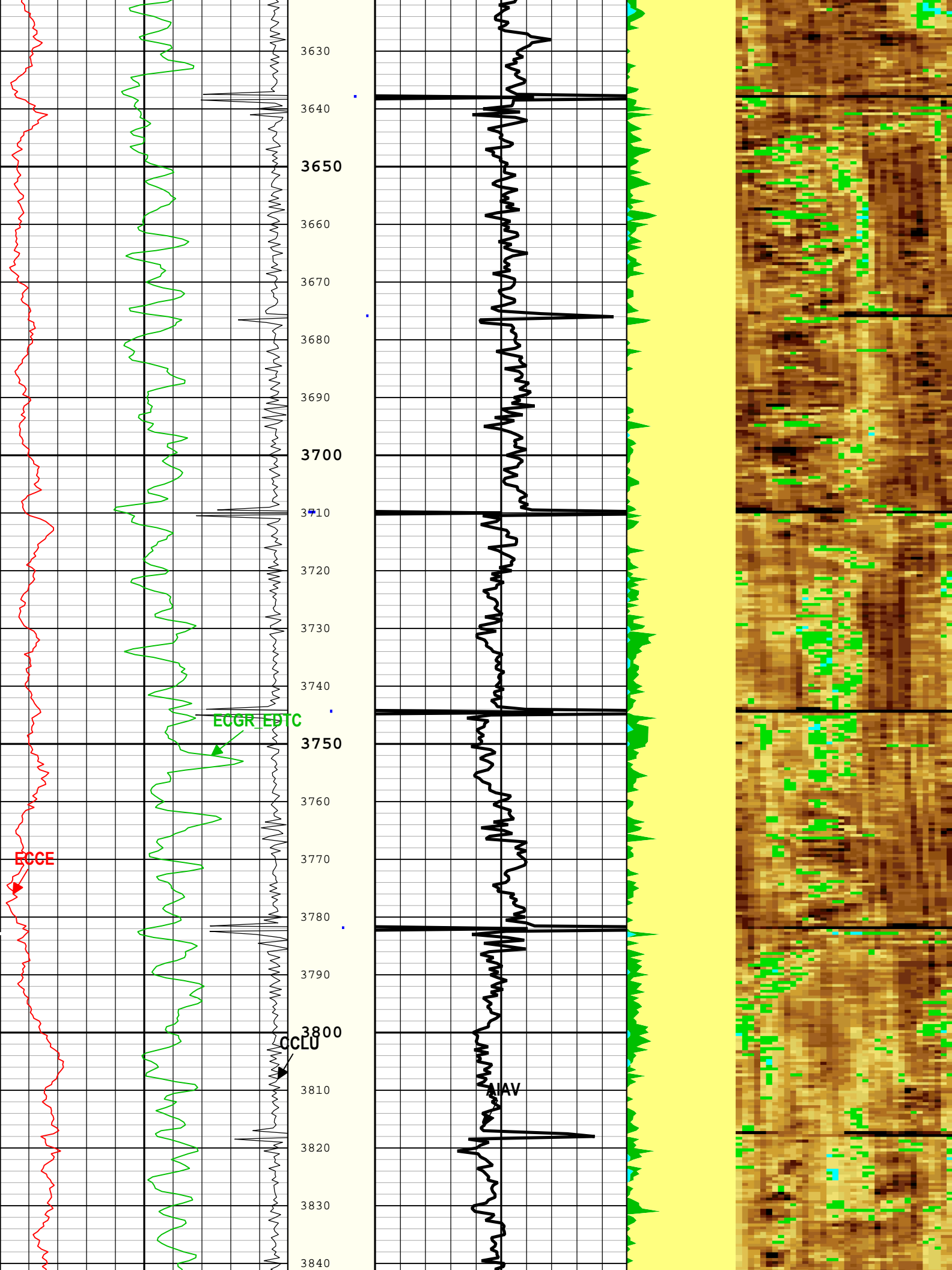


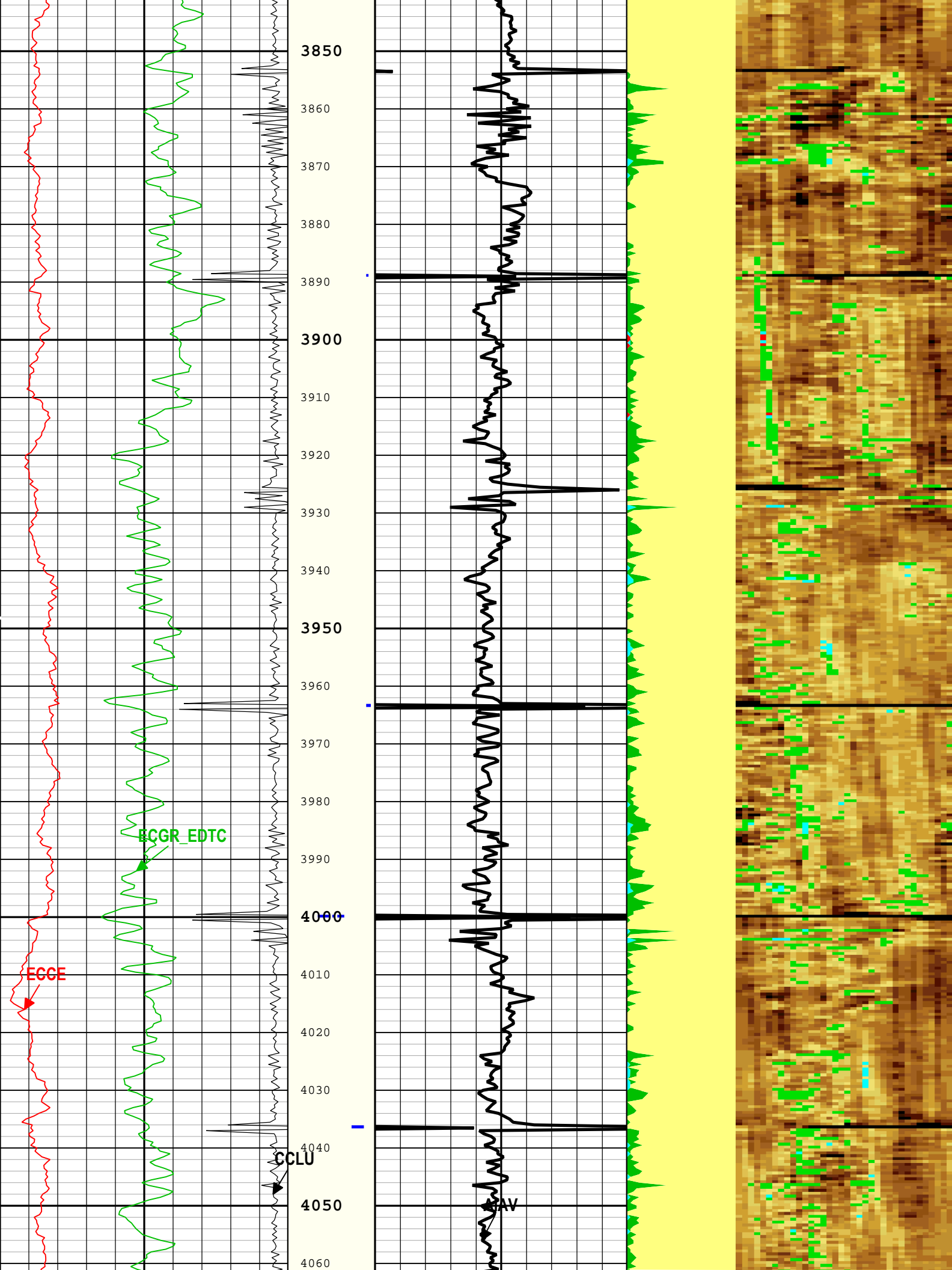


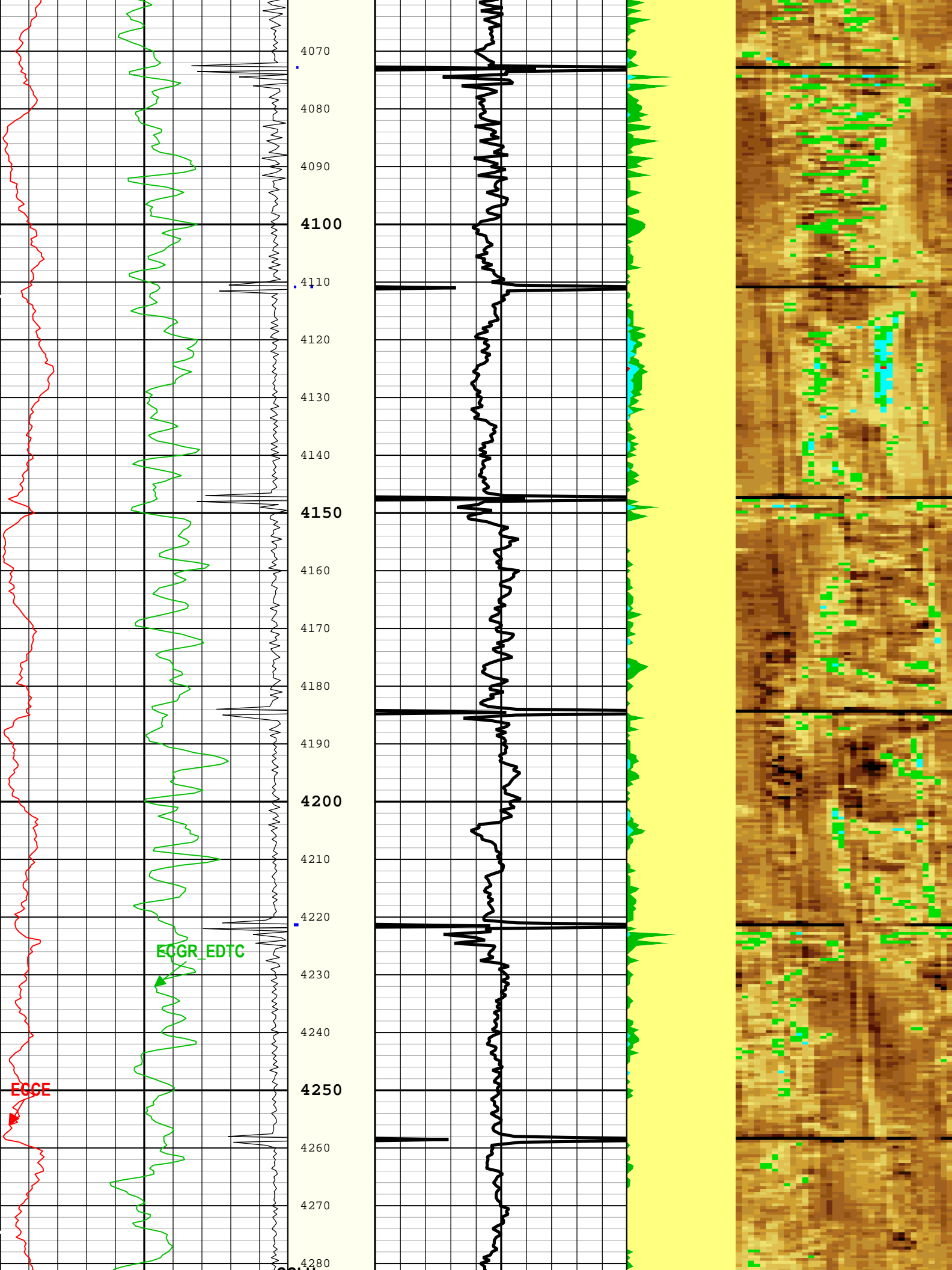


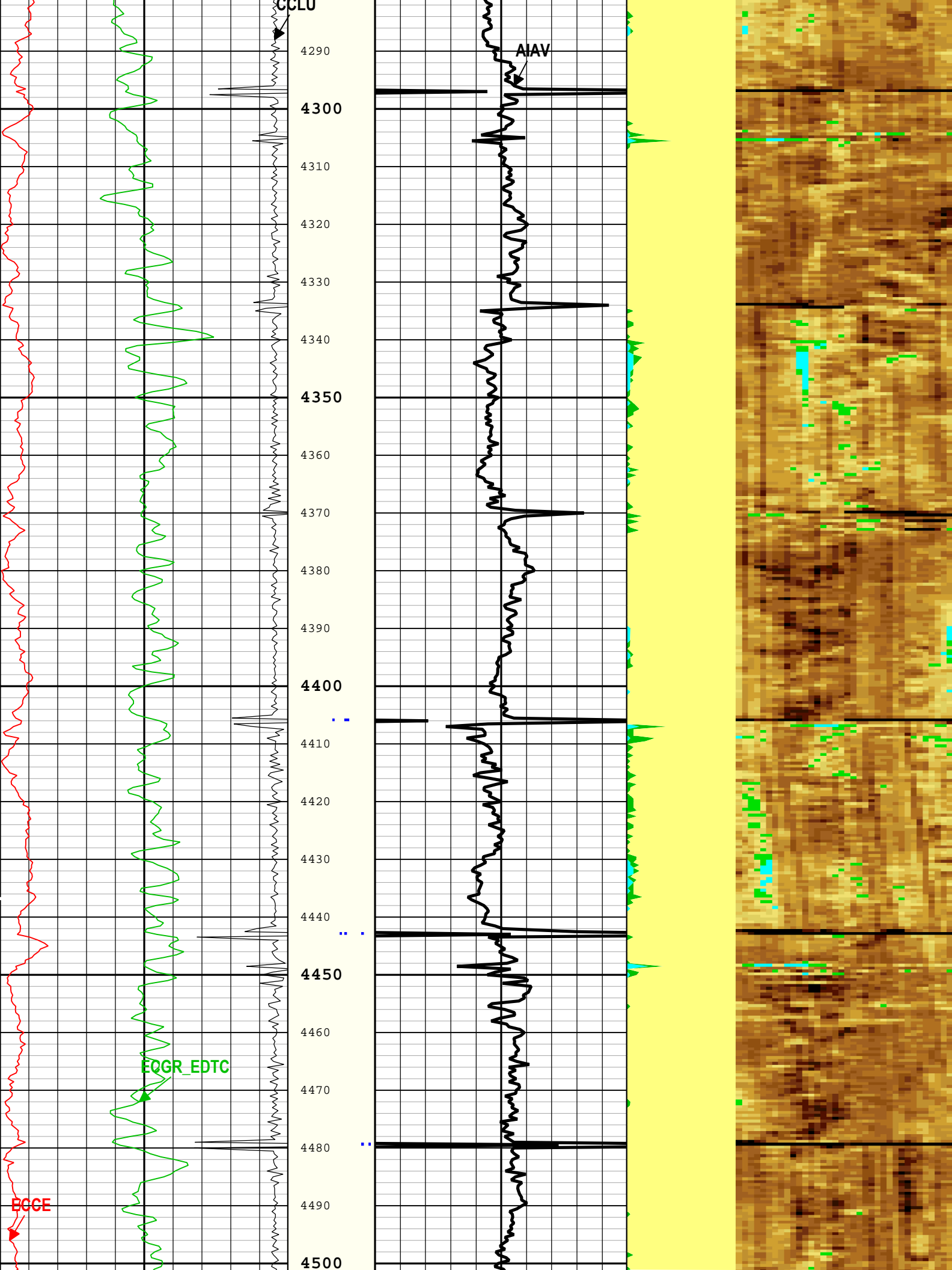


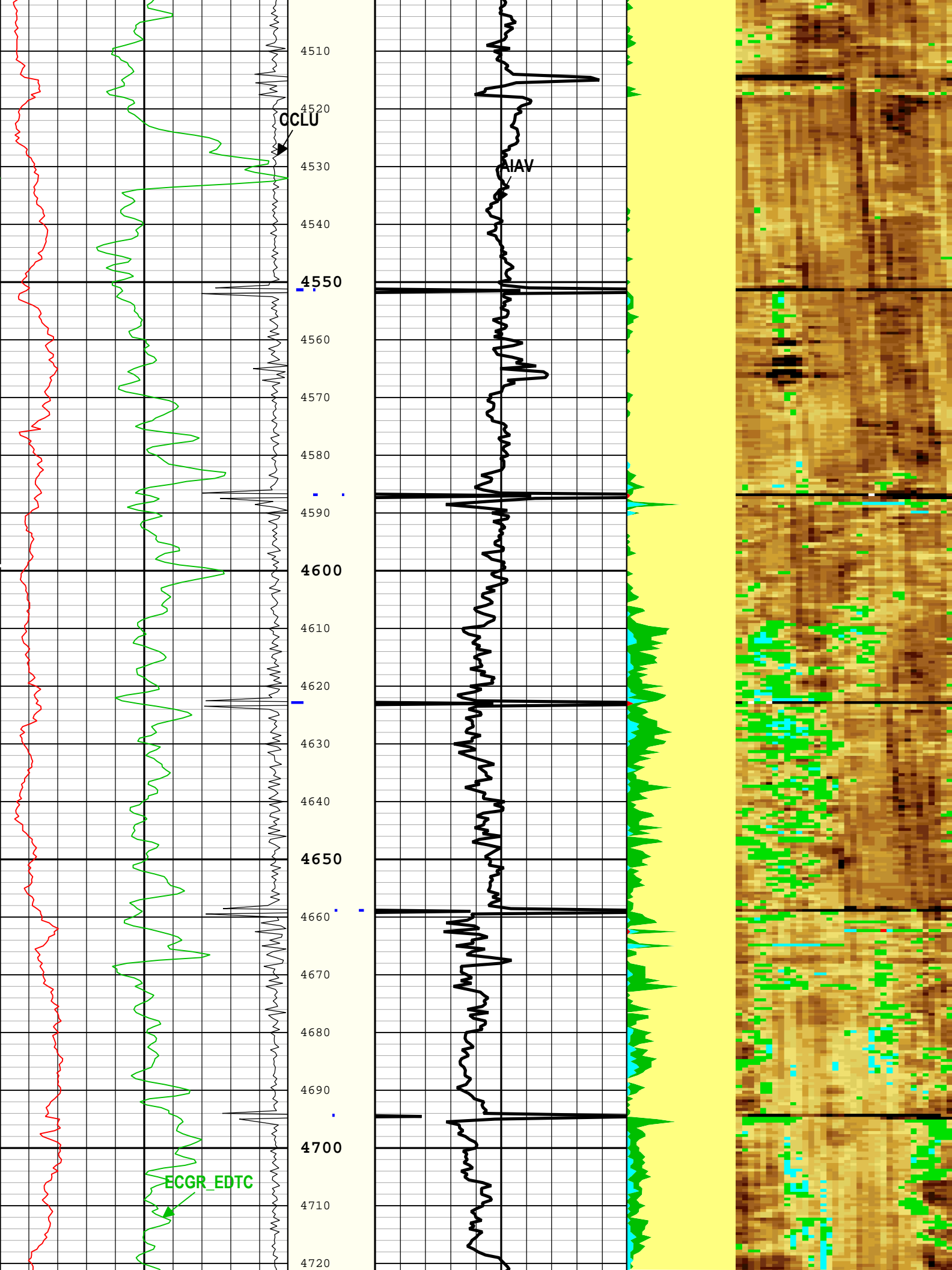


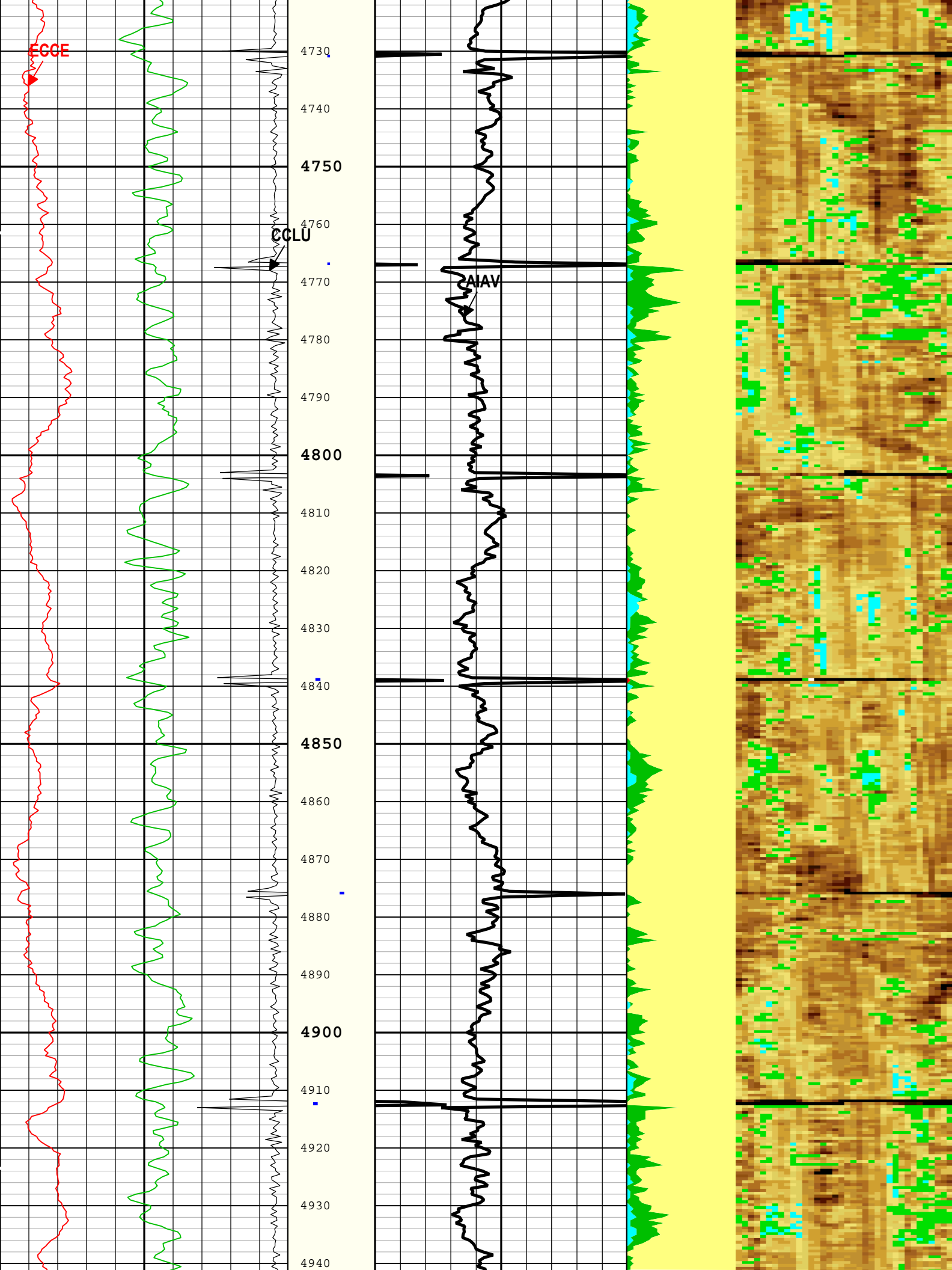


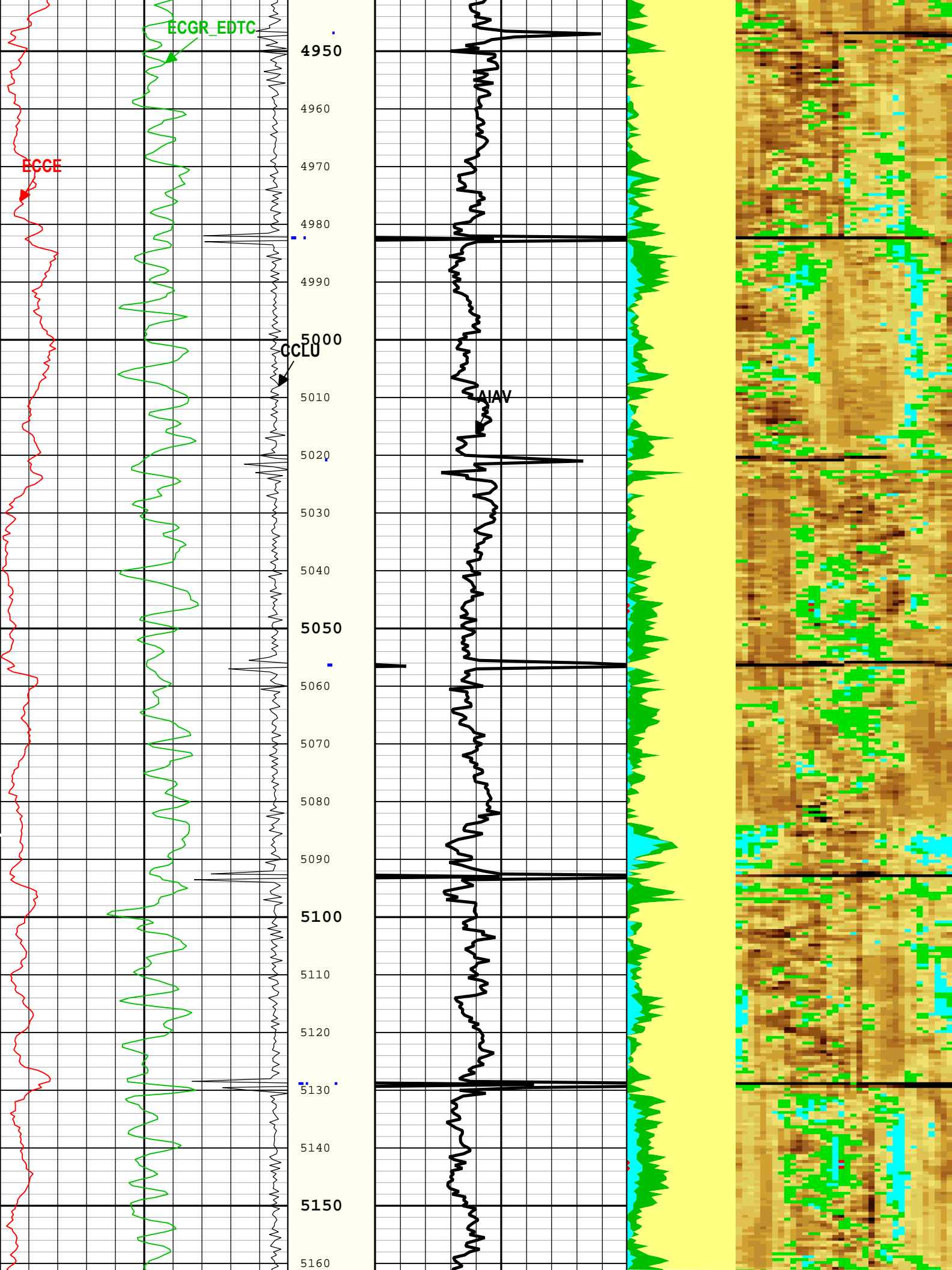


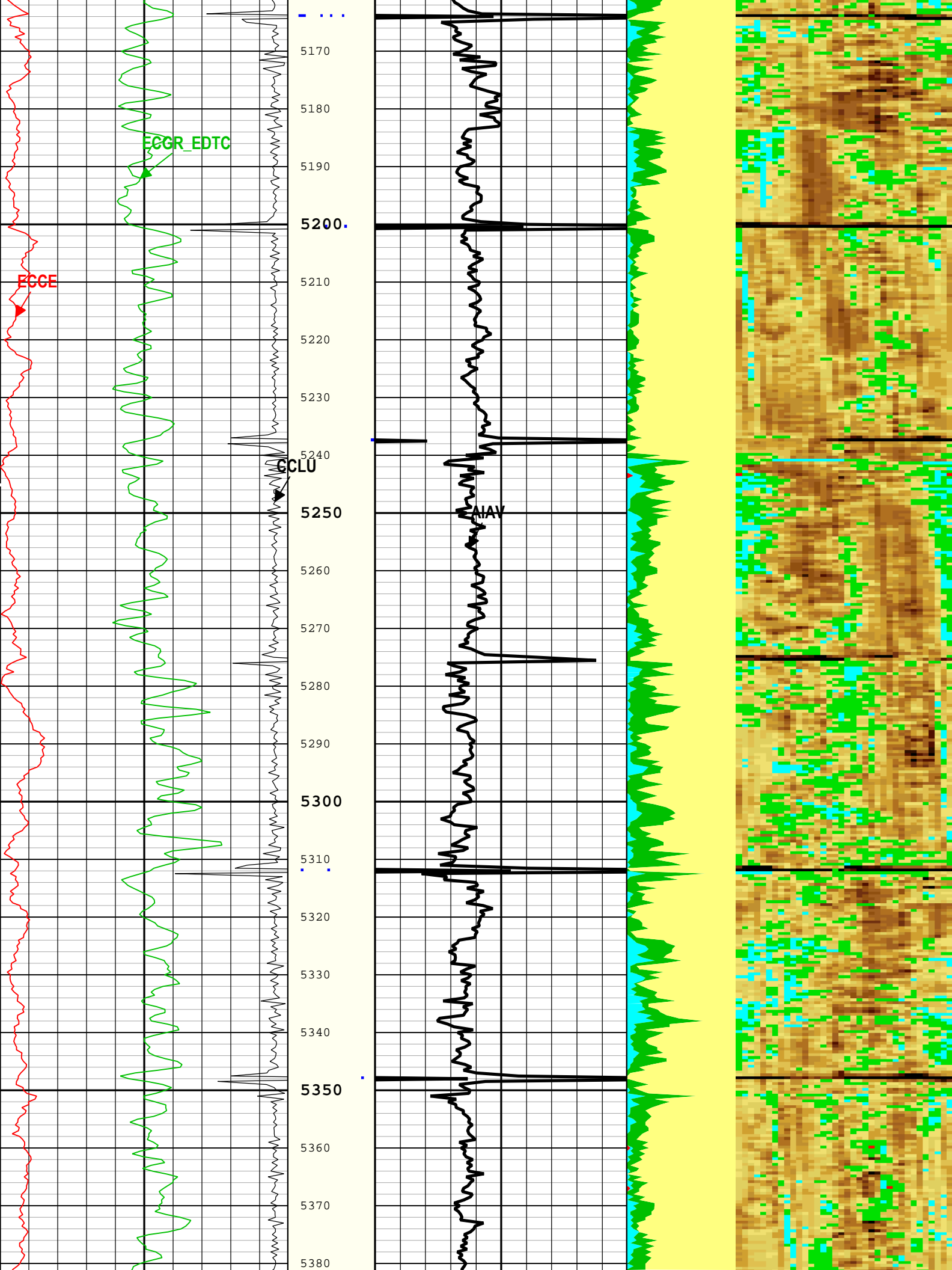


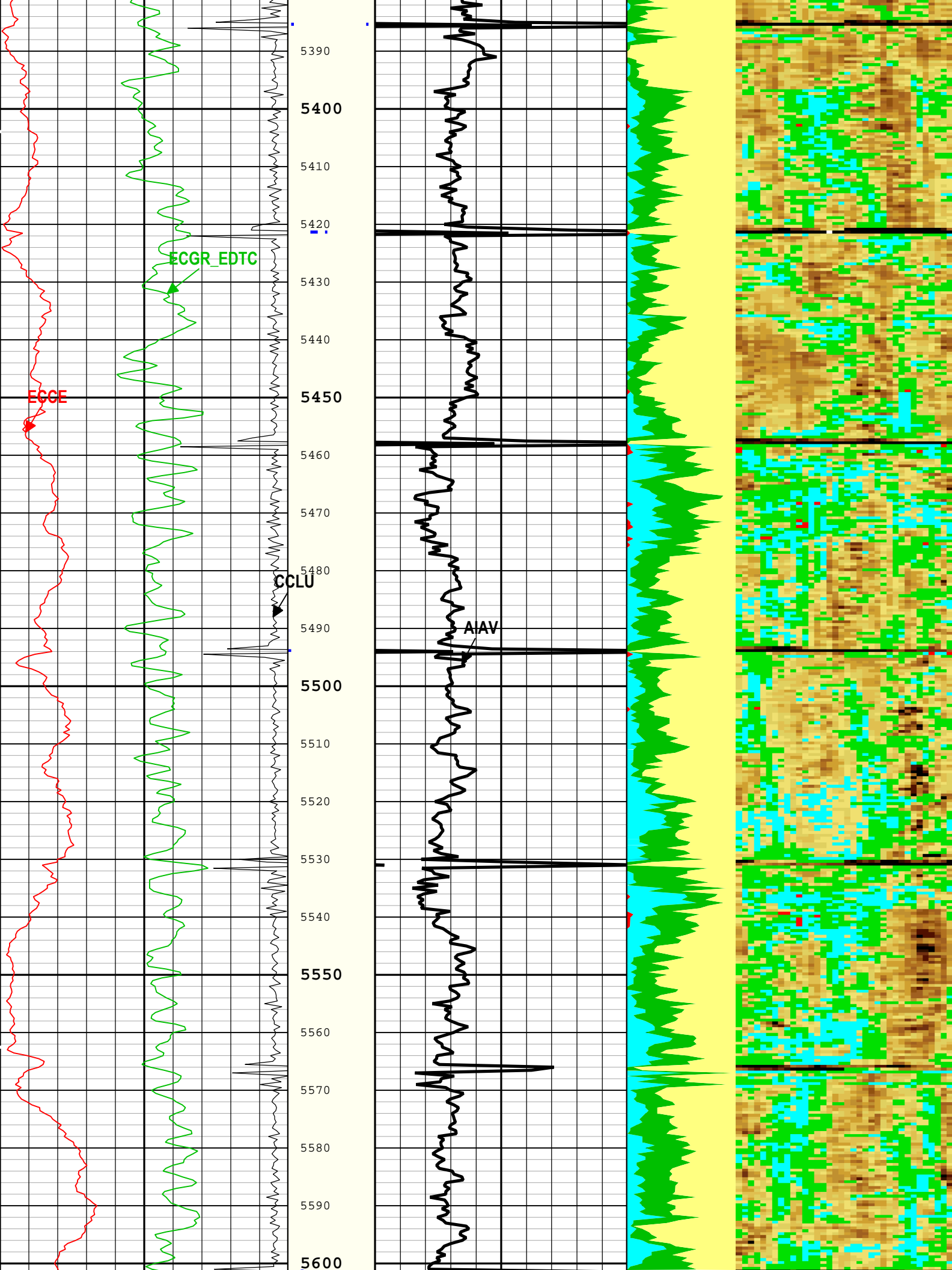


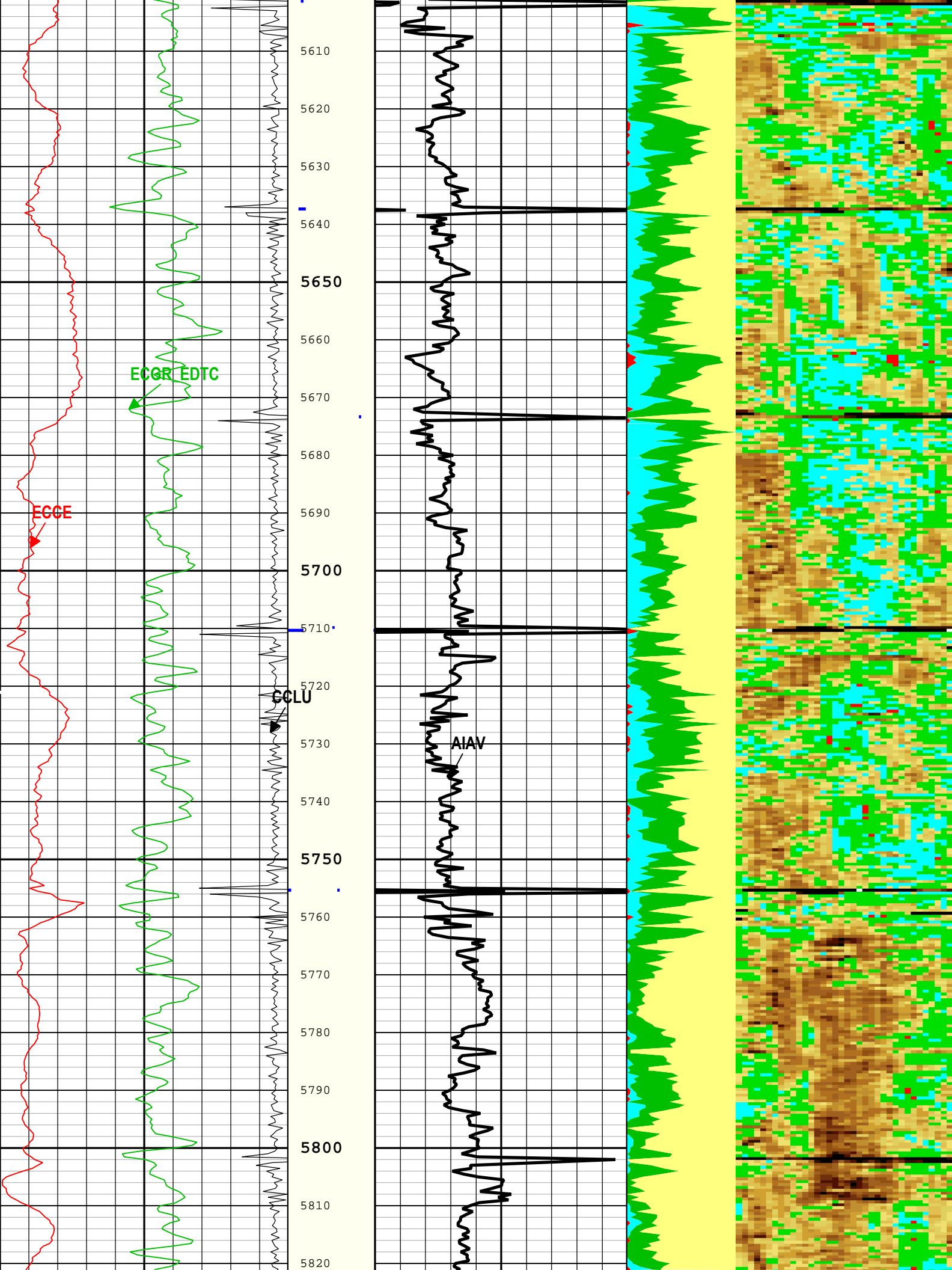


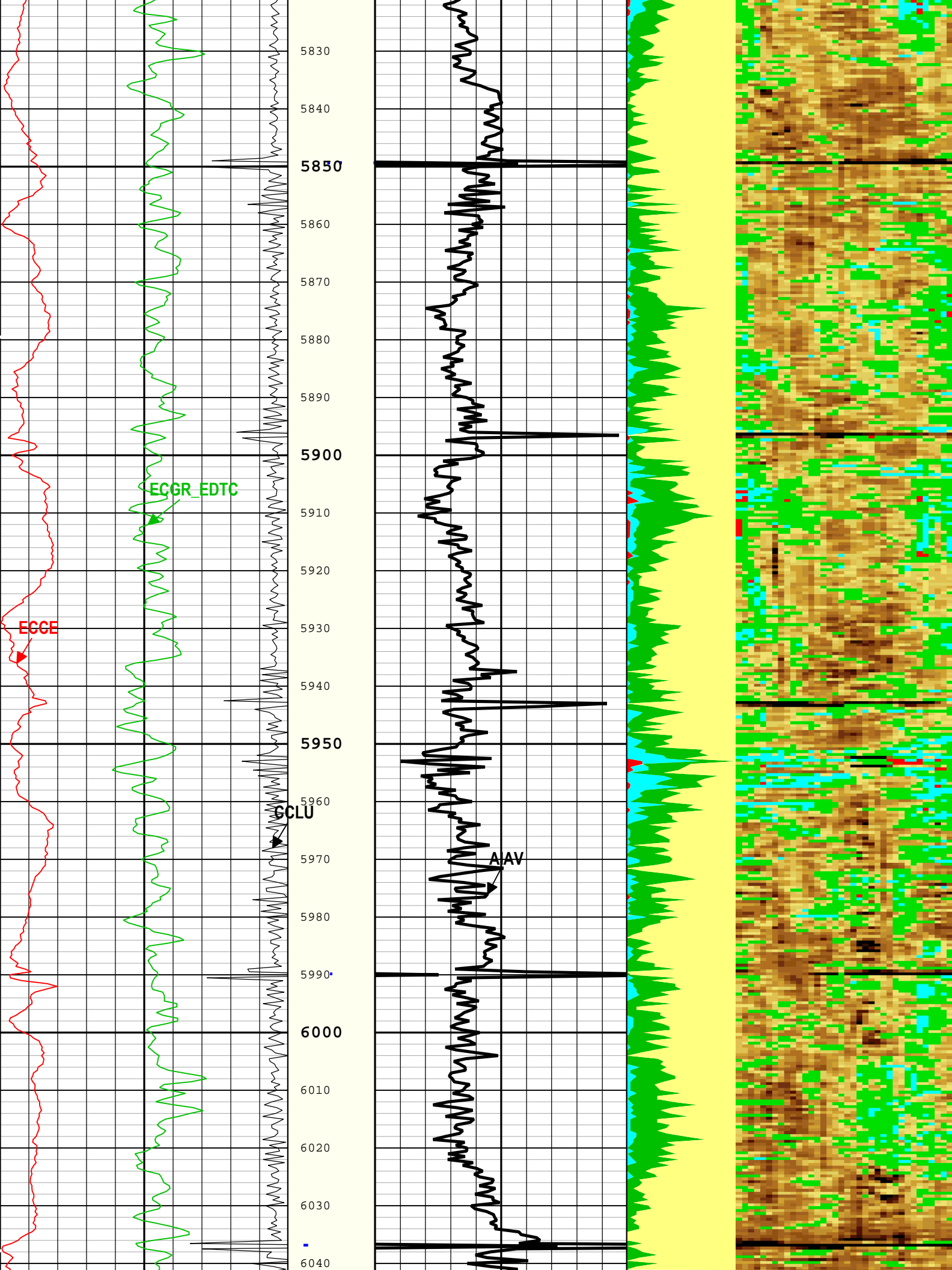


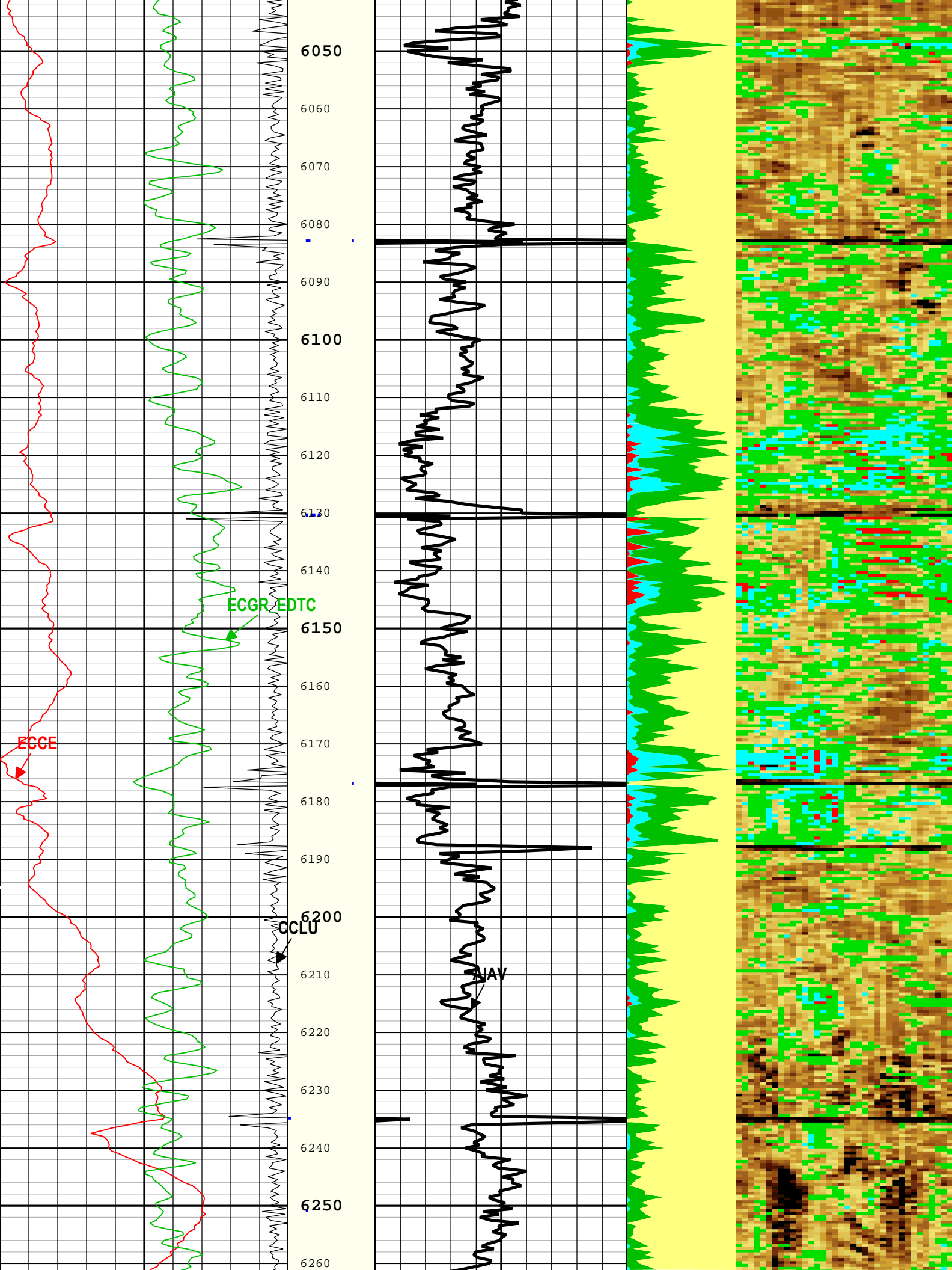


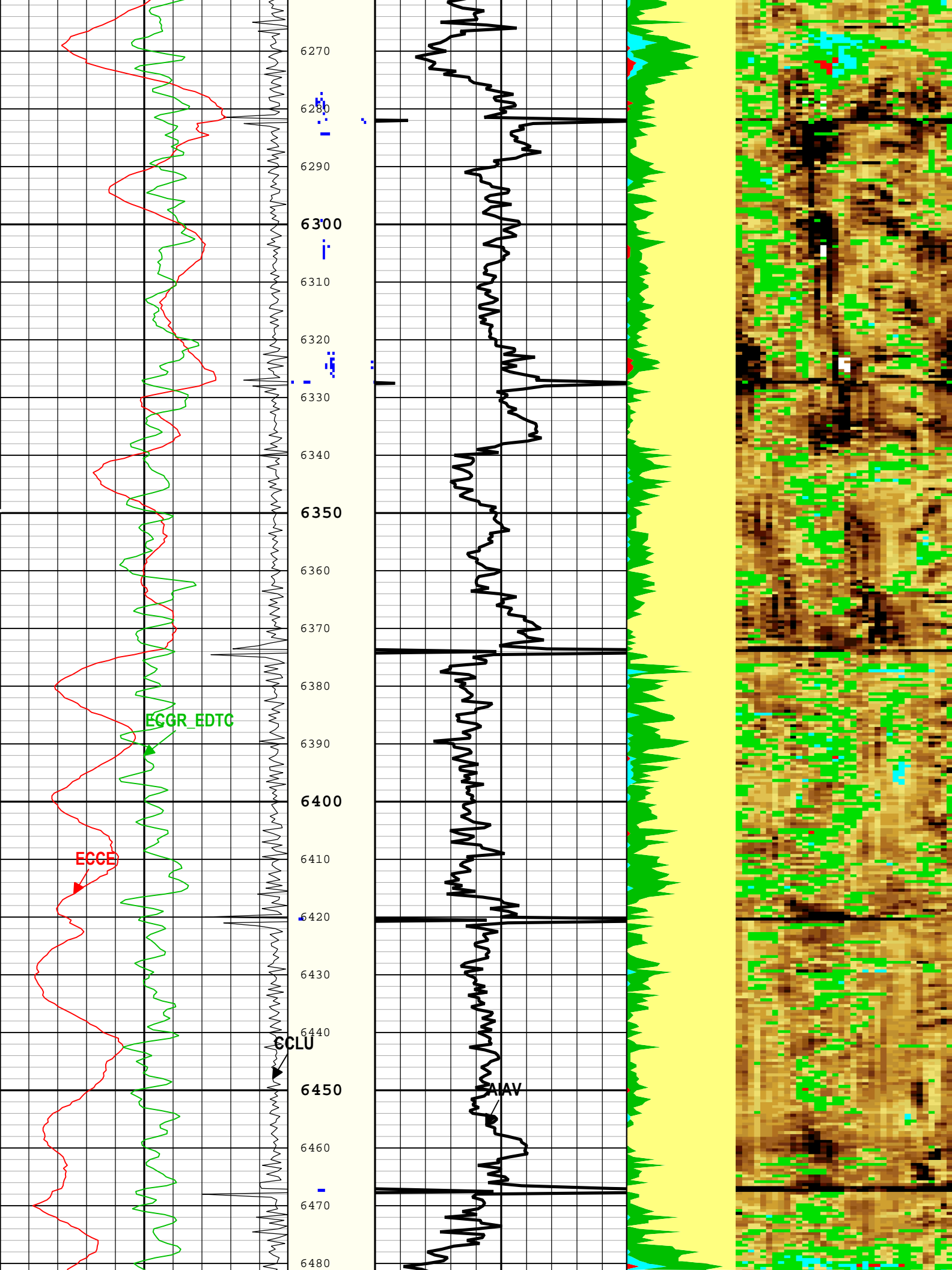


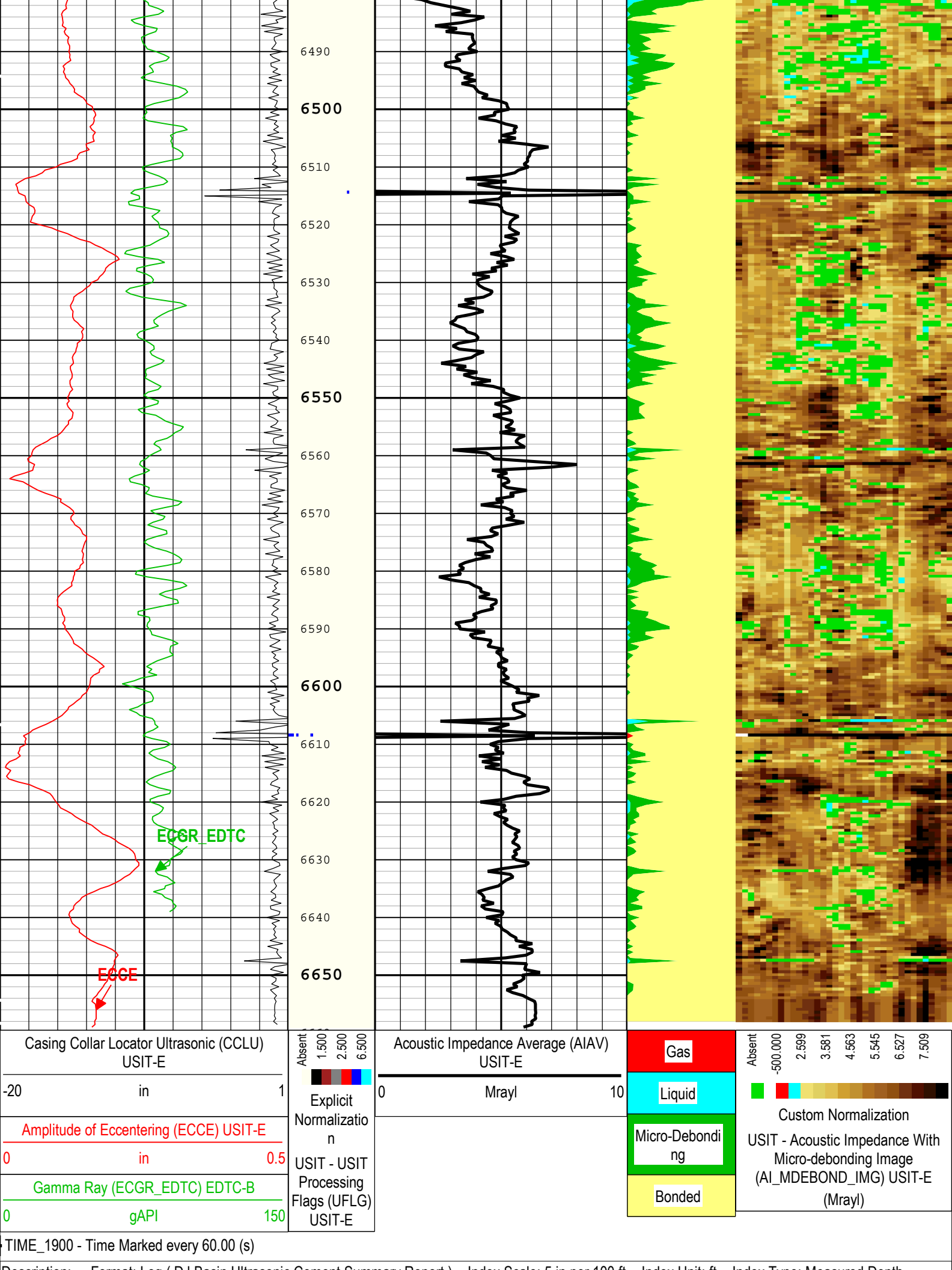












Channel Processing Parameters				
One: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	17101.3	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMENT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	9.3	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	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	
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	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	26	35	110
BS	13.5	110	1943
BS	8.5	1943	6659.5
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	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
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

Software Version

Acquisition System

Maxwell 2017 SP3

Application Patch

Version

7.3.92069.3100

Wireline_NPD-ICE2-2017SP3_7.3.93033

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[1]:Up	Up	2647.29 ft	3006.57 ft	01-Nov-2017 9:37:43 AM	01-Nov-2017 9:42:27 AM	ON	2.73 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy, Inc.

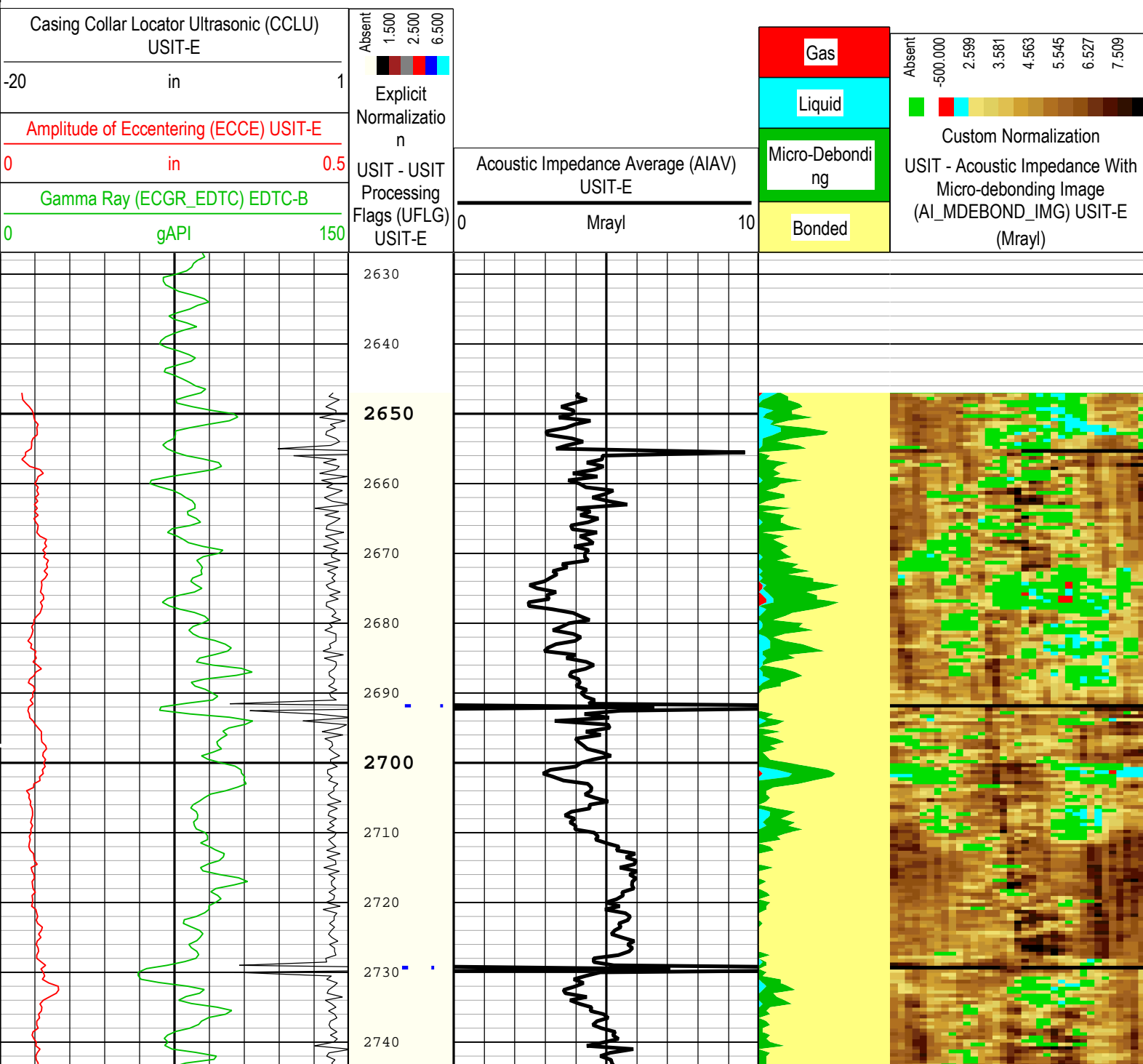
Well:Hullabaloo State Y21-756

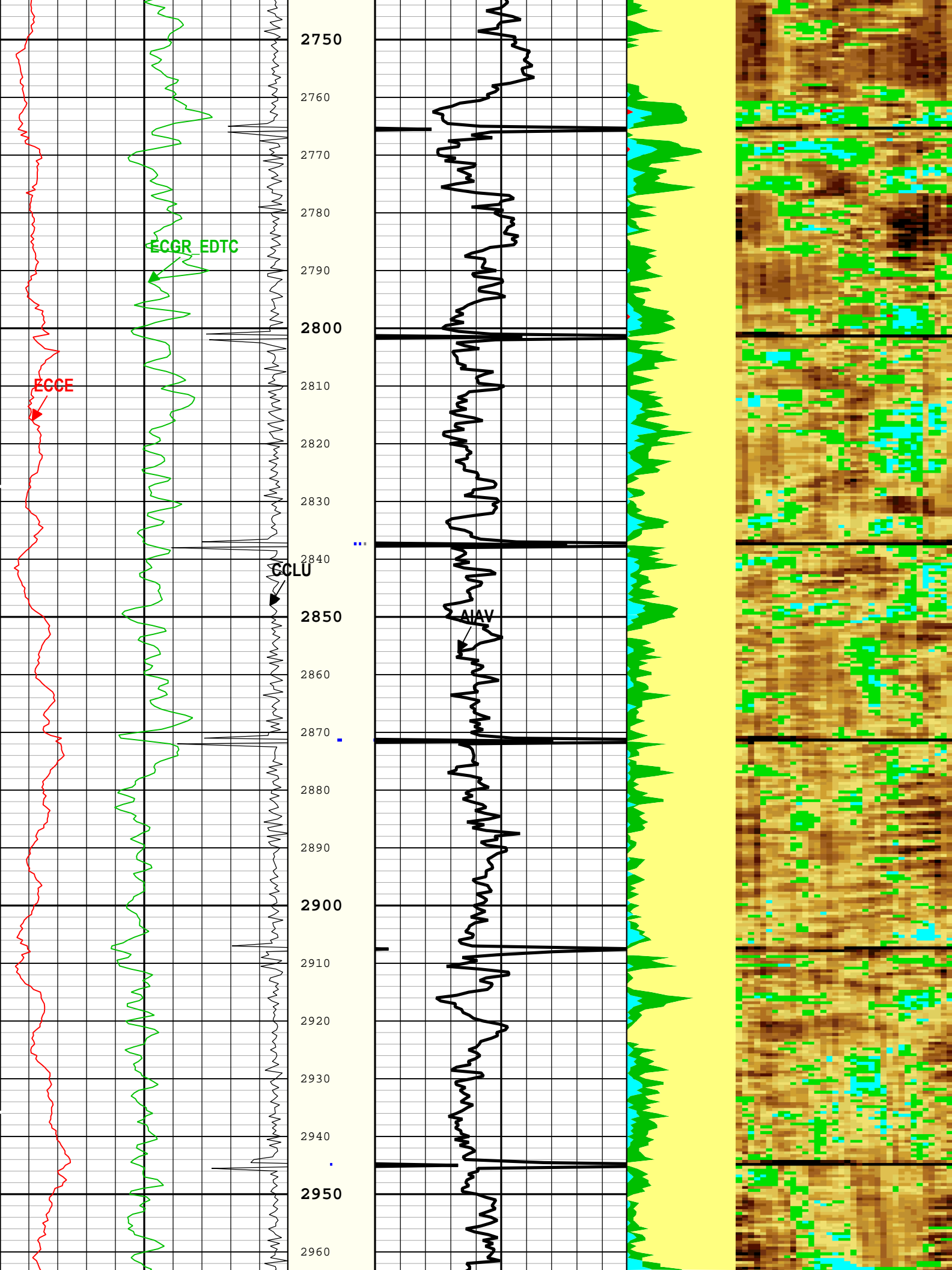
One: Log[1]:Up:S009

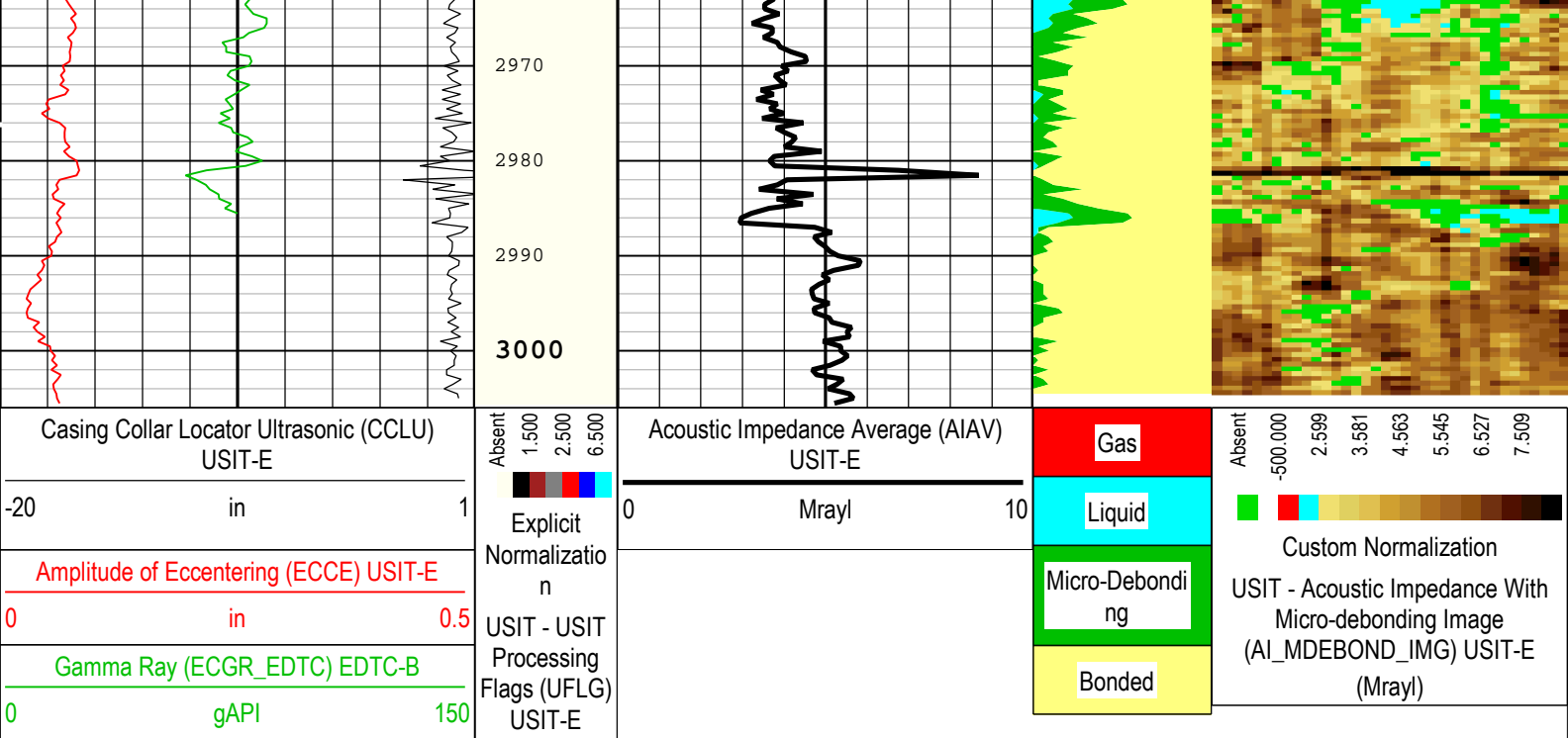
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

Creation Date: 01-Nov-2017 13:20:00

TIME_1900 - Time Marked every 60.00 (s)







TIME_1900 - Time Marked every 60.00 (s)

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Creation Date: 01-Nov-2017 13:20:00

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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

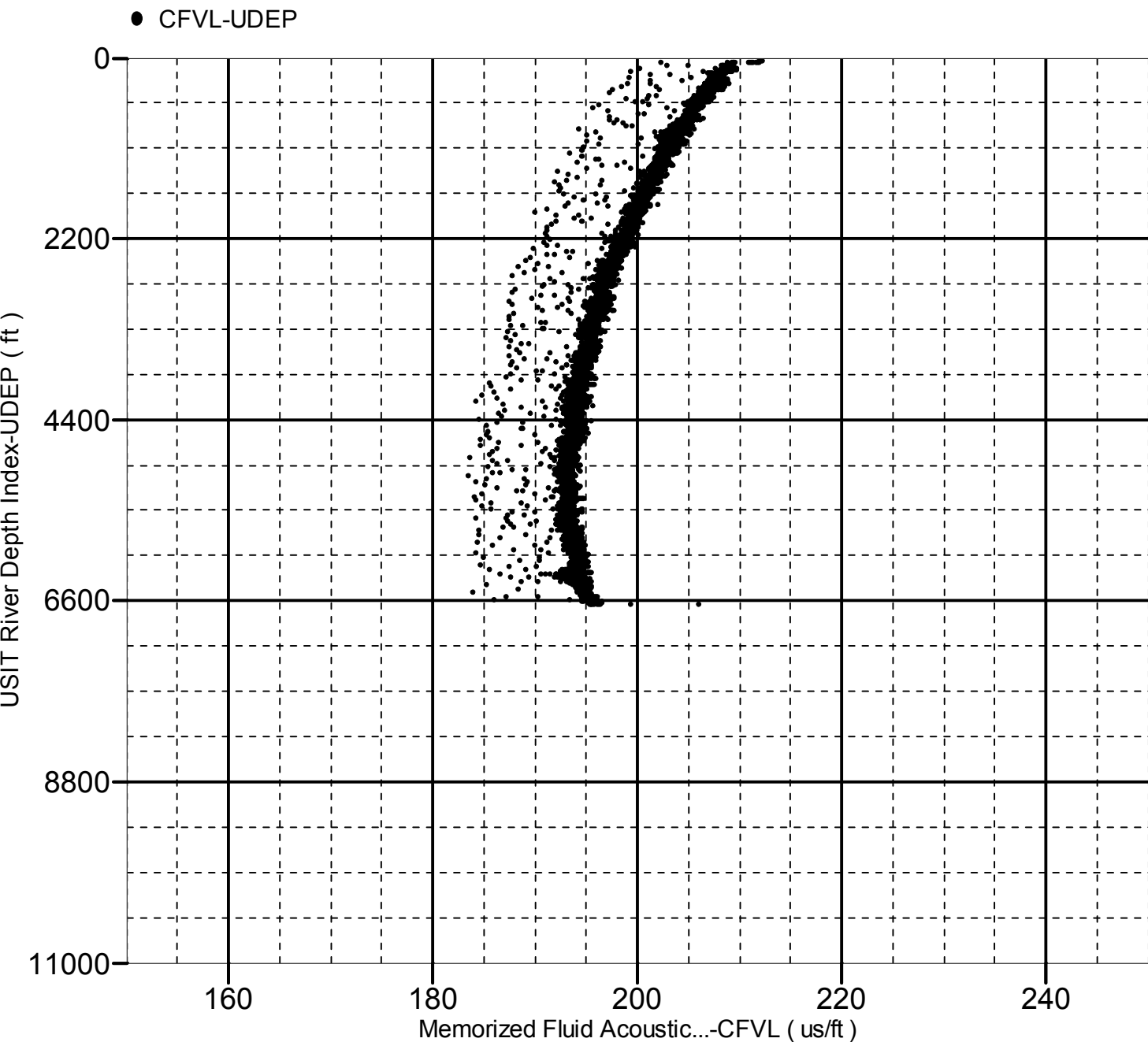
Company:Noble Energy, Inc. Well:Hullabaloo State Y21-756

One: Log[3]:Up:S009

Fluid Acoustic Slowness vs Depth

2D Cross Plot

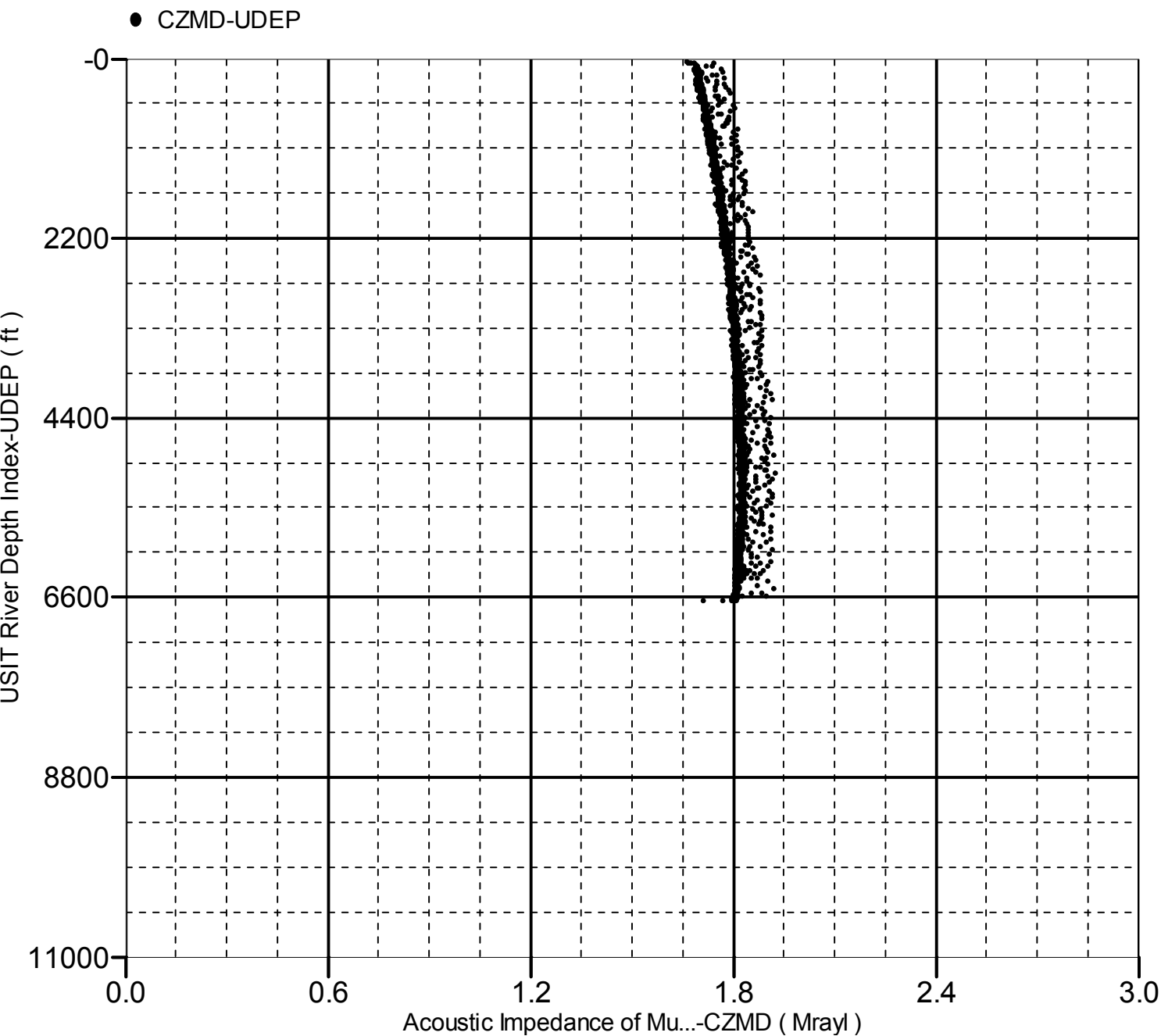
Index Range: From 6659.50 to 55.00 ft



Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6659.50 to 55.00 ft



Company:	Noble Energy, Inc.	Schlumberger
Well:	Hullabaloo State Y21-756	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	

UltraSonic Summary Print

