

Company: Noble Energy, Inc.

Well: Minutemen Federal #LC21-620

Field: Wildcat

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wildcat				
Location:	SWSW Sec 22 T9N R59W				
Well:	Minutemen Federal #LC21-620				
Company:	Noble Energy, Inc.				
Location:		SWSW Sec 22 T9N R59W	Elev.:	K.B.	4907.00 ft
		SHL: 862 FSL 400 FWL		G.L.	4877.00 ft
		Latitude: 40.73124 Longitude: -103.97204		D.F.	4906.00 ft
Permanent Datum:		Ground Level	Elev.:	4877.00 f	
Log Measured From:		Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From:		Kelly Bushing			
API Serial No.	Section:	Township:	Range:		
05-123-42789	22	9N	59W		

Logging Date	26-Aug-2017			
Run Number	One			
Depth Driller	11082.00 ft			
Schlumberger Depth	11082.00 ft			
Bottom Log Interval	6000.00 ft			
Top Log Interval	0.00 ft			
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	1940.00 ft			
To	11082.00 ft			
Casing/Tubing Size	5.5 in			
Weight	20 lbm/ft			
Grade	N/A			
From	0.00 ft			
To	11072.50 ft			
Max Recorded Temperatures				
Logger on Bottom			26-Aug-2017	14:07:00
Unit Number	Location:		9108	Fort Morgan
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.

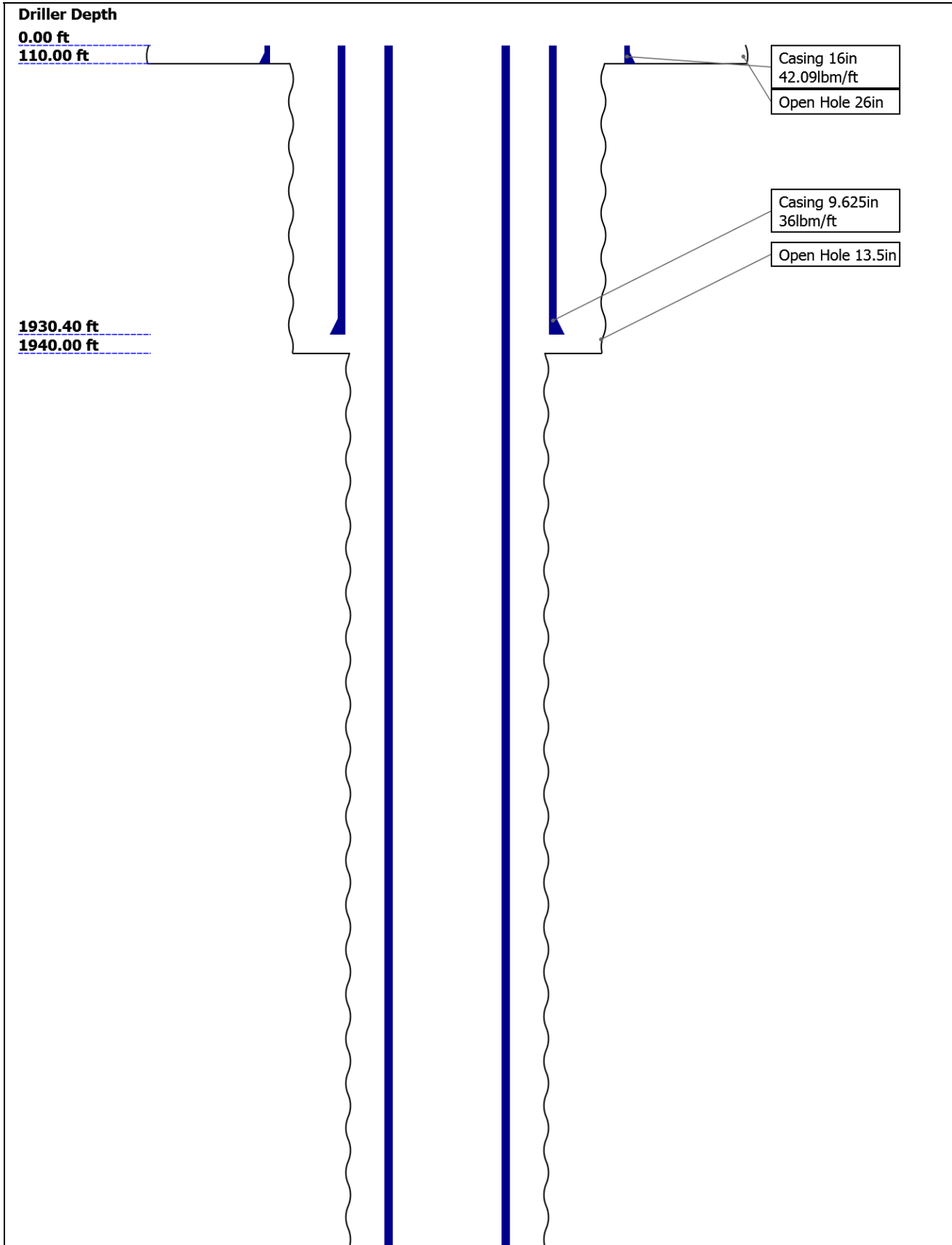
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- in)
- Tail

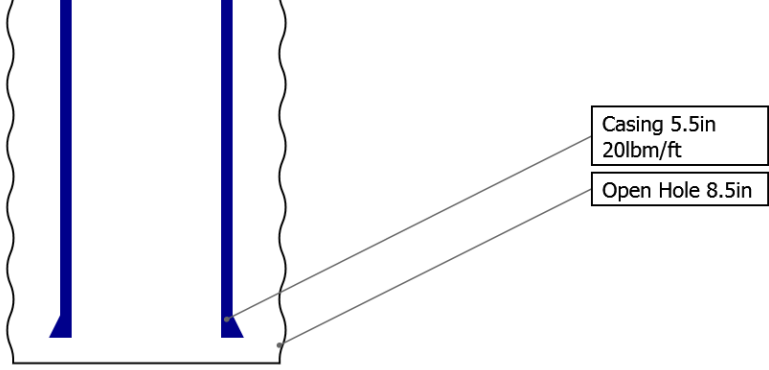
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Well Sketch



11072.50 ft

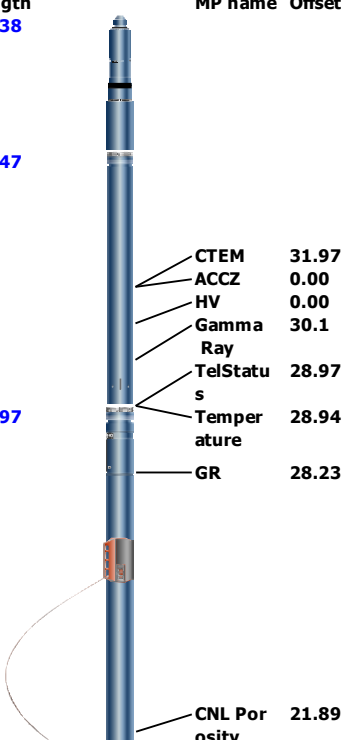
11082.00 ft



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1940			
Top Logger (ft)	0	110	1940			
Bottom Driller (ft)	110	1940	11082			
Bottom Logger (ft)	110	1940	11082			
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	1930.4	11072.5			
Bottom Logger (ft)	110	1930.4	11072.5			

Remarks and Equipment Summary

One: Toolstring				One: Remarks	
<div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT38.38LEH-QT</div><div>EDTC-B:835.47102</div><div>EDTH-B:9245</div><div>EDTG-B:77004</div><div>EDTC-B:8102</div><div>HGNS-H:428.97779</div><div>HGNH:3826</div><div>NSR-F:5068</div><div>NPV-N</div><div>HGNS-H:4779</div><div>HACCZ-H:6305</div><div>HMCA-H</div></div><div></div></div>	Toolstring ran as per tool sketch.				
	Well logged at 10 degree 6 inch.				
	Main pass logged with 2500 psi.				
	Repeat pass logged with 0 psi.				
	Thank you for choosing Schlumberger!				

AH-107

19.56

AH-184

17.56

1951

USIT-E:92

15.56

1

ECH-MFA

USAC-A:9

21

USIS-A:98

8

USSC-B:17

27

USRS-A:84

0

USI-SENS

OR:3306

USI-TX

HMCA

19.56

HGNS

19.56

Accelerometer

0.00

14

USI Sen

0.37

sensor

TOOL_ZERO

Head Fe

nsion

Lengths are in ft

Maximum Outer Diameter = 4.700 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		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth procedures followed.
Rig Up Length At Surface		IDW used as primary depth device.
Rig Up Length At Bottom		Z-Chart used as secondary depth device.
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

One

2500 PSI Main Pass

Software Version	
Acquisition System	Version
Maxwell 2017 SP1	7.1.82245.3100
Application Patch	Wireline_NPD-ICE2-2017SP1_7.1.87324

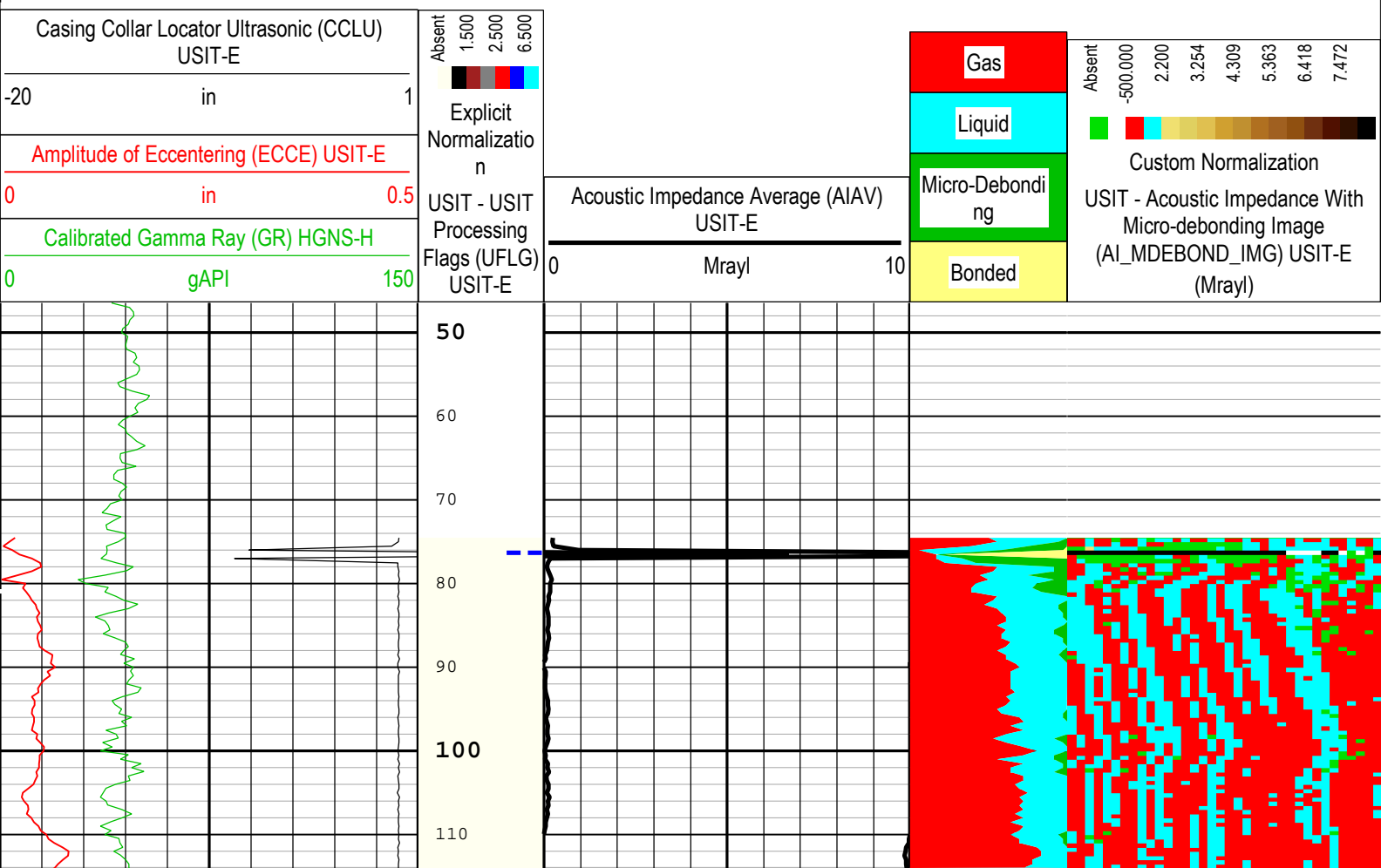
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	74.51 ft	6004.77 ft	26-Aug-2017 1:09:08 PM	26-Aug-2017 1:46:18 PM	ON	3.91 ft	Yes

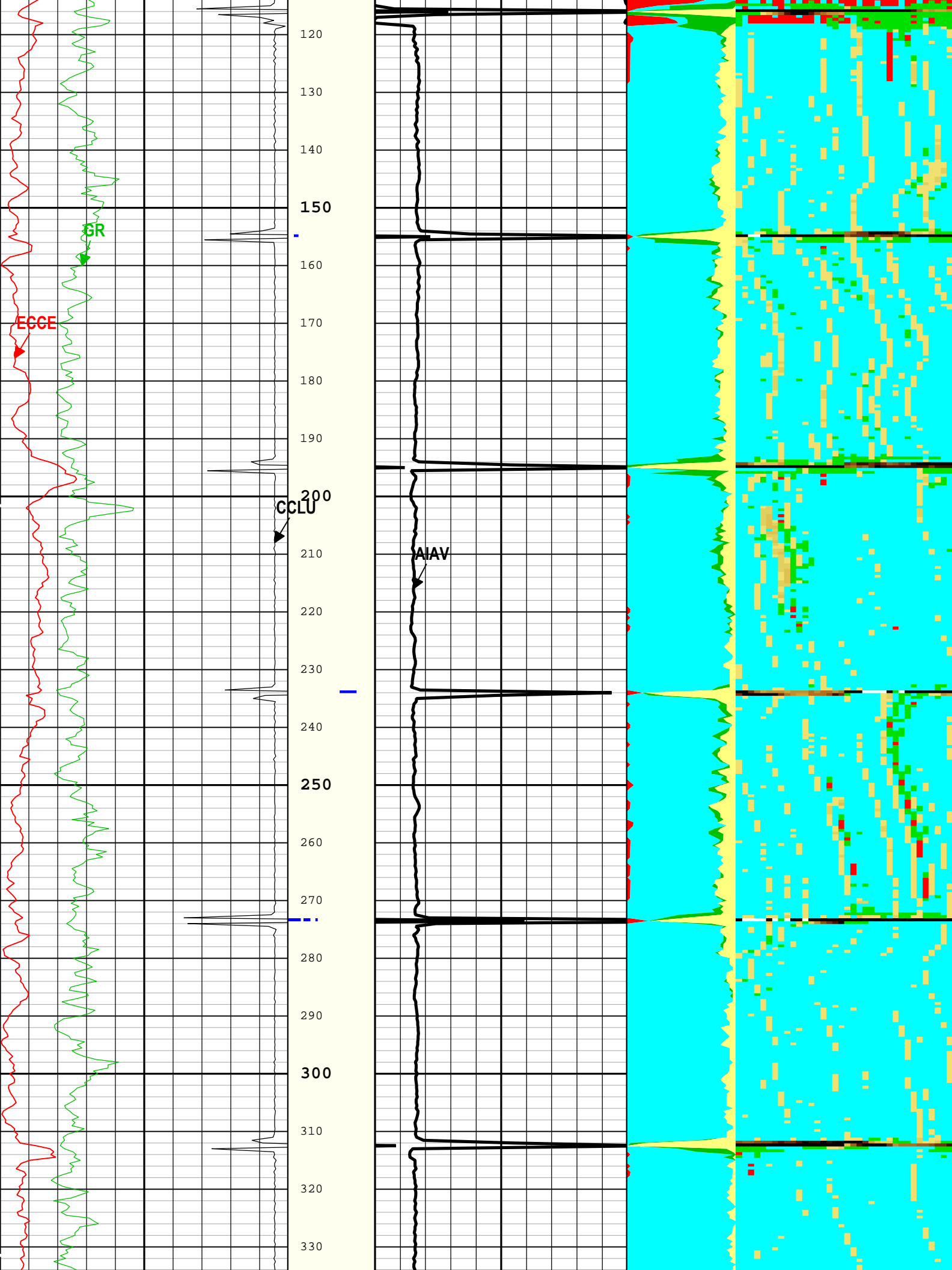
All depths are referenced to toolstring zero

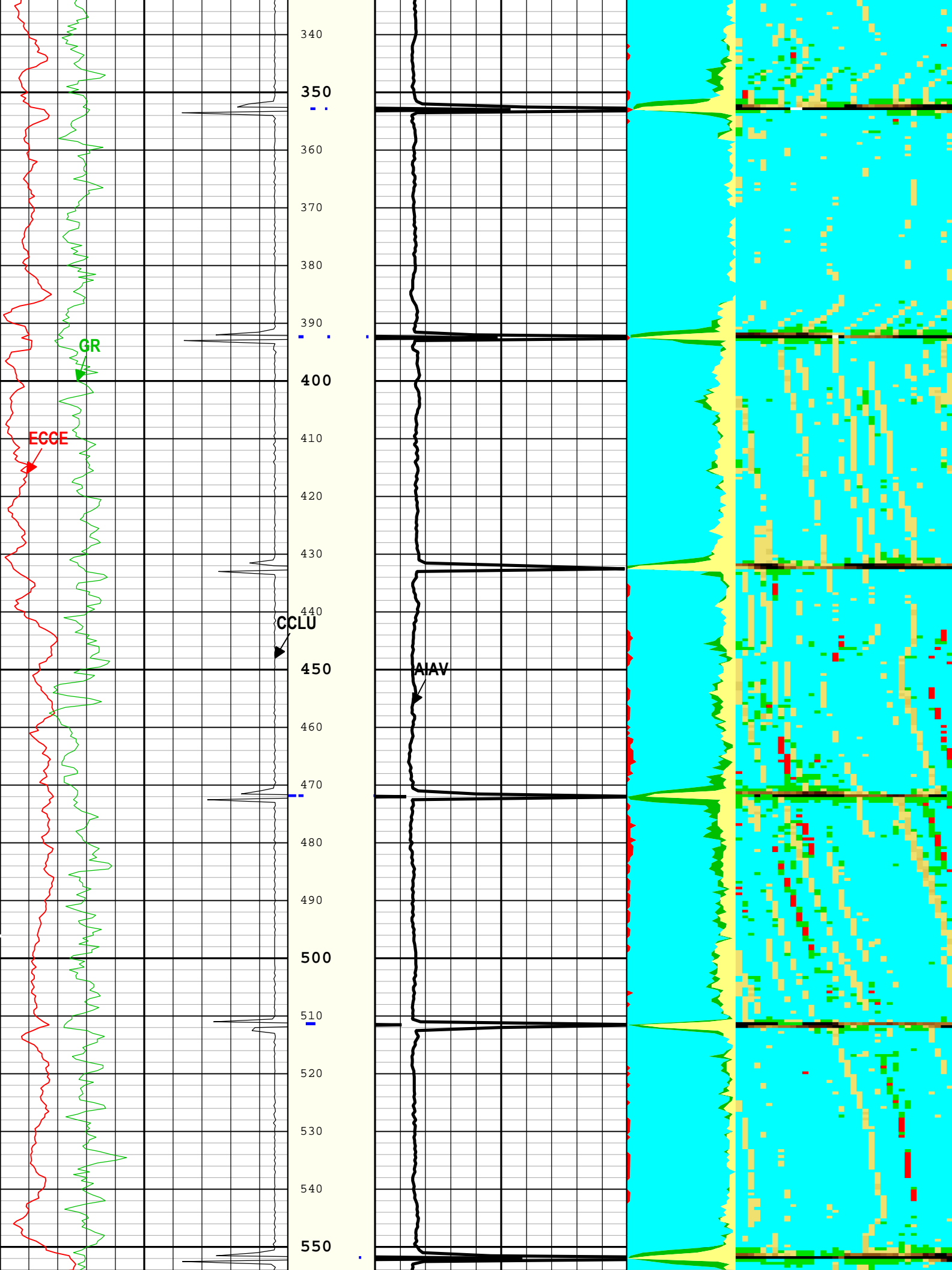
Log	Company:Noble Energy, Inc. Well:Minutemen Federal #LC21-620
	One: Log[3]:Up:S004

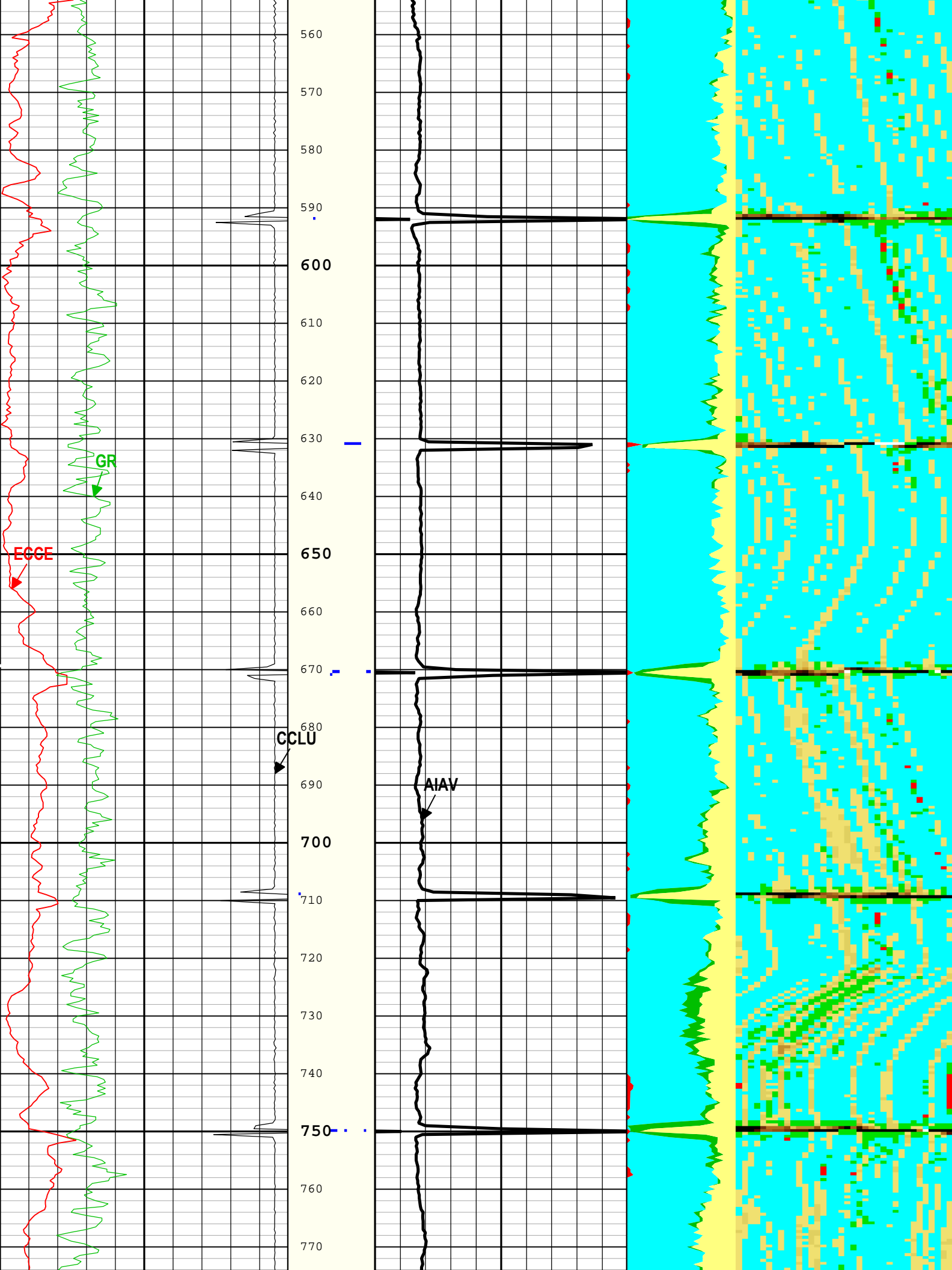
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Creation Date: 26-Aug-2017 13:56:18

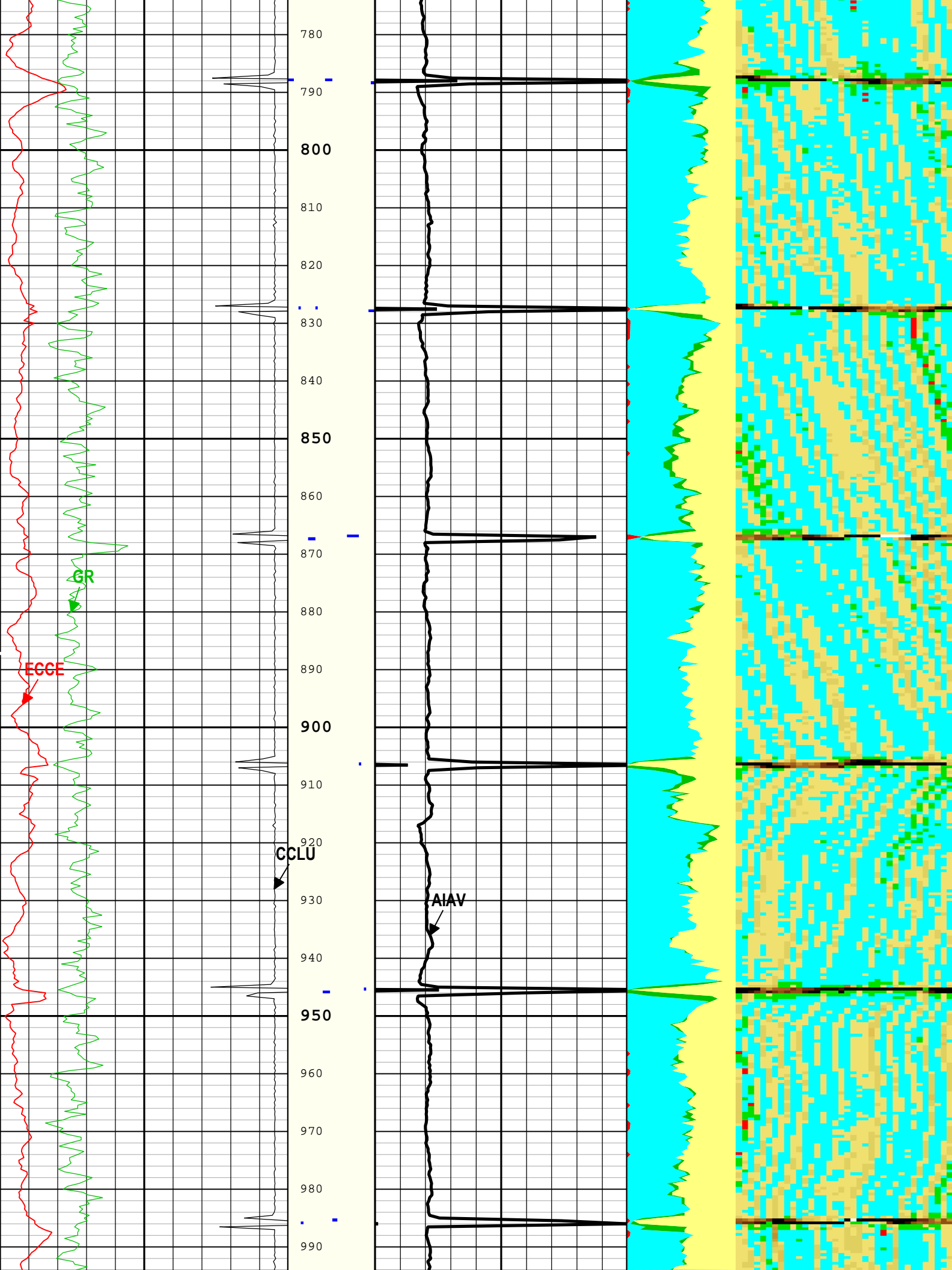
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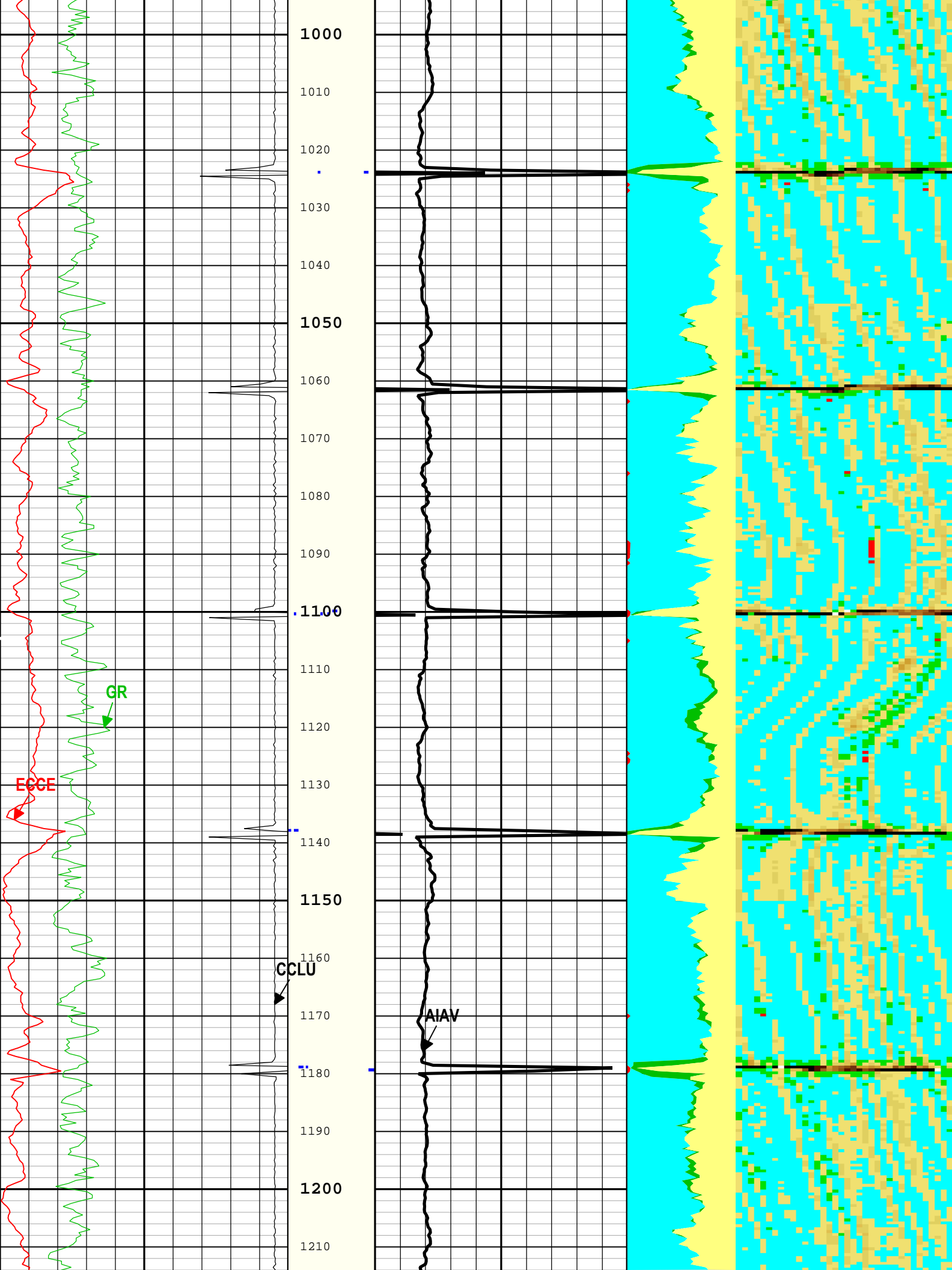


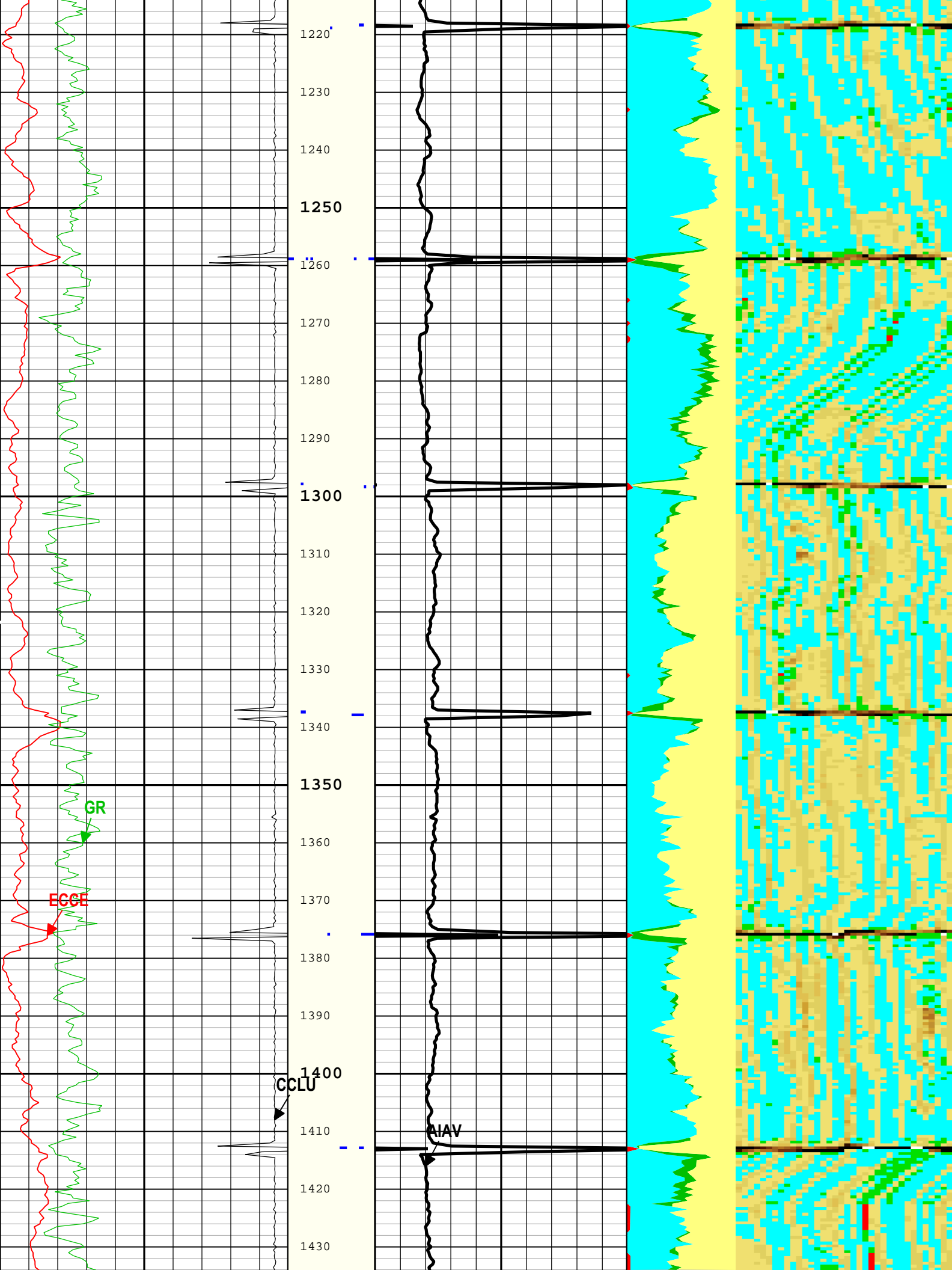


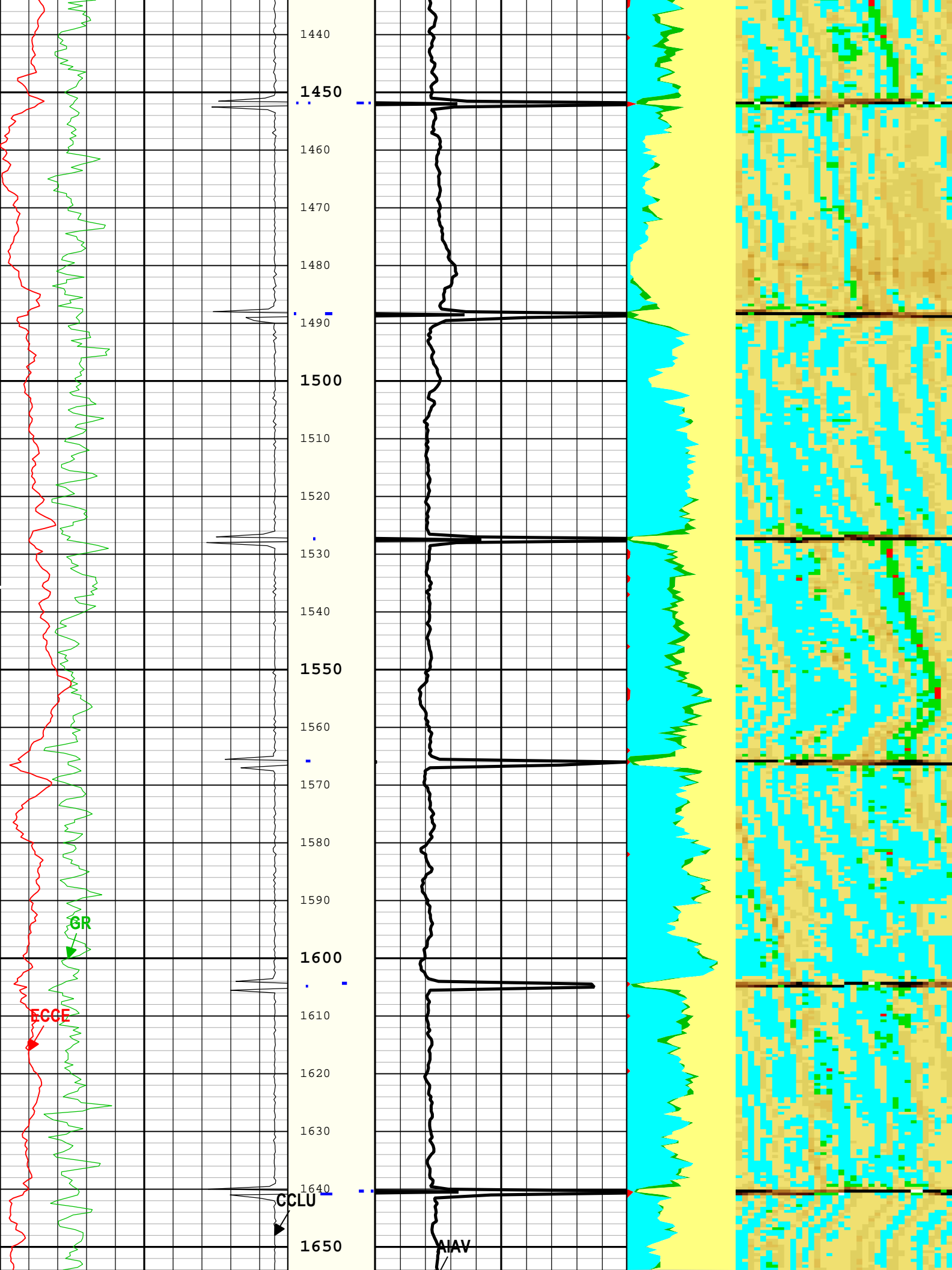


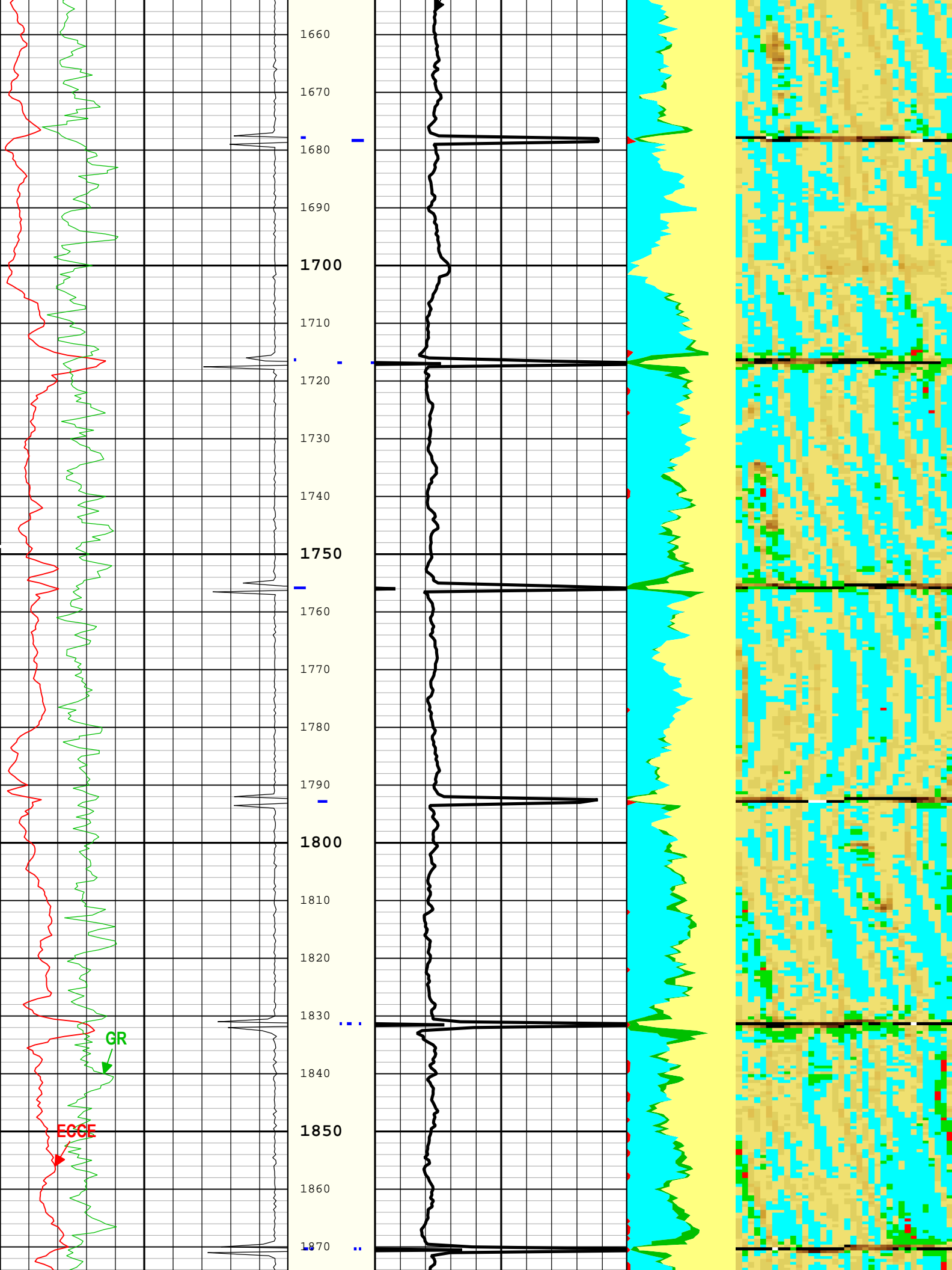


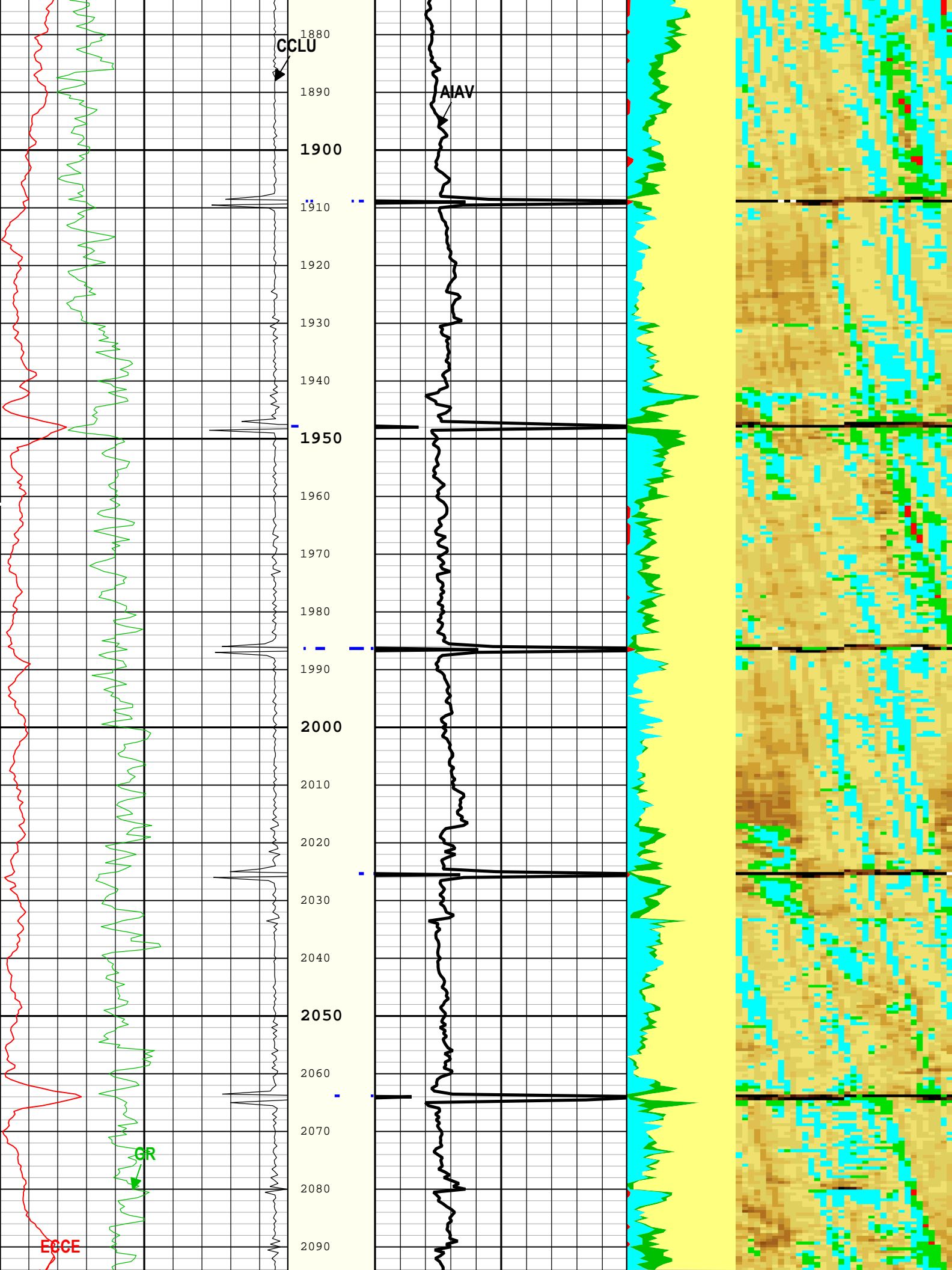


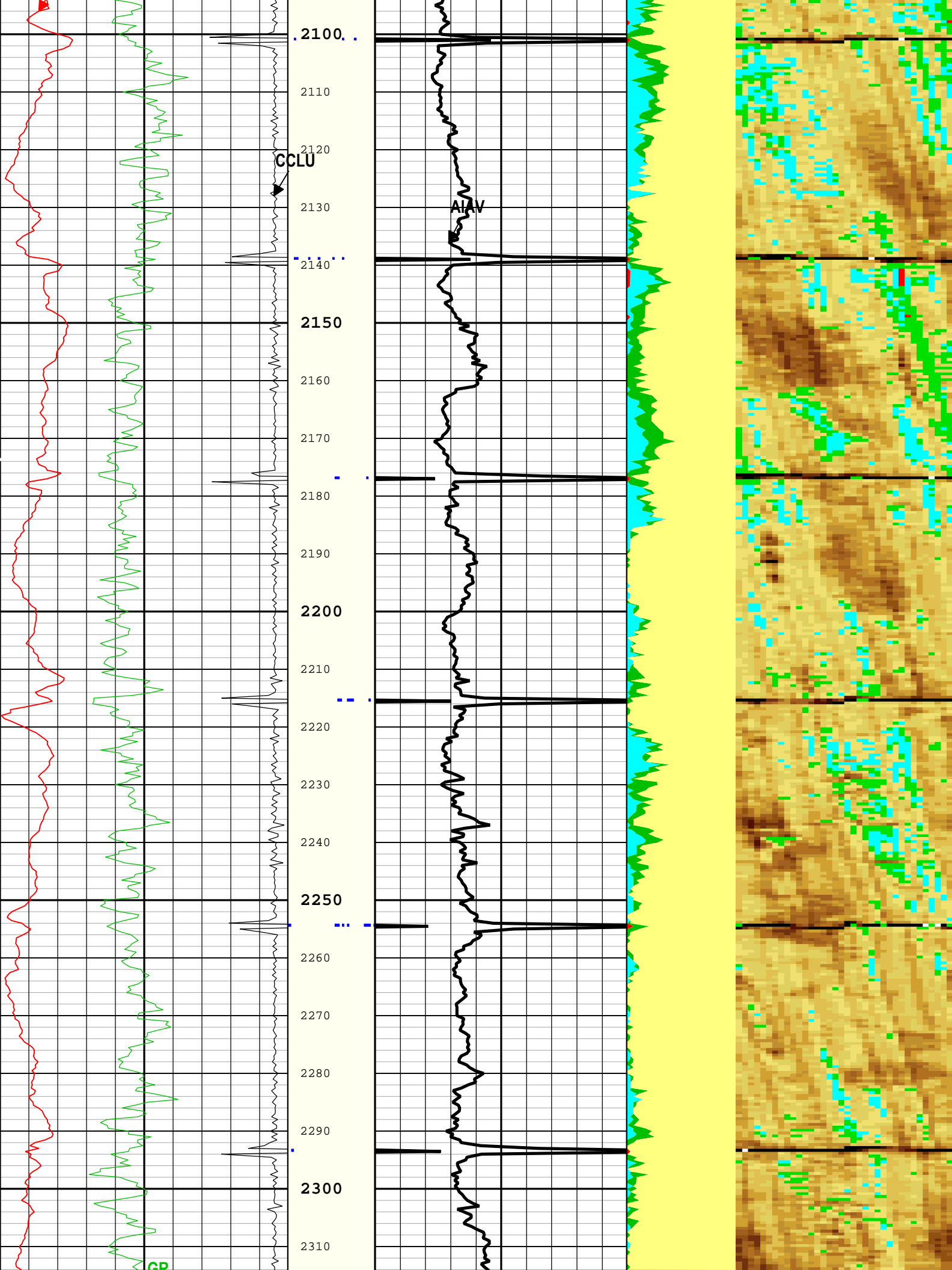


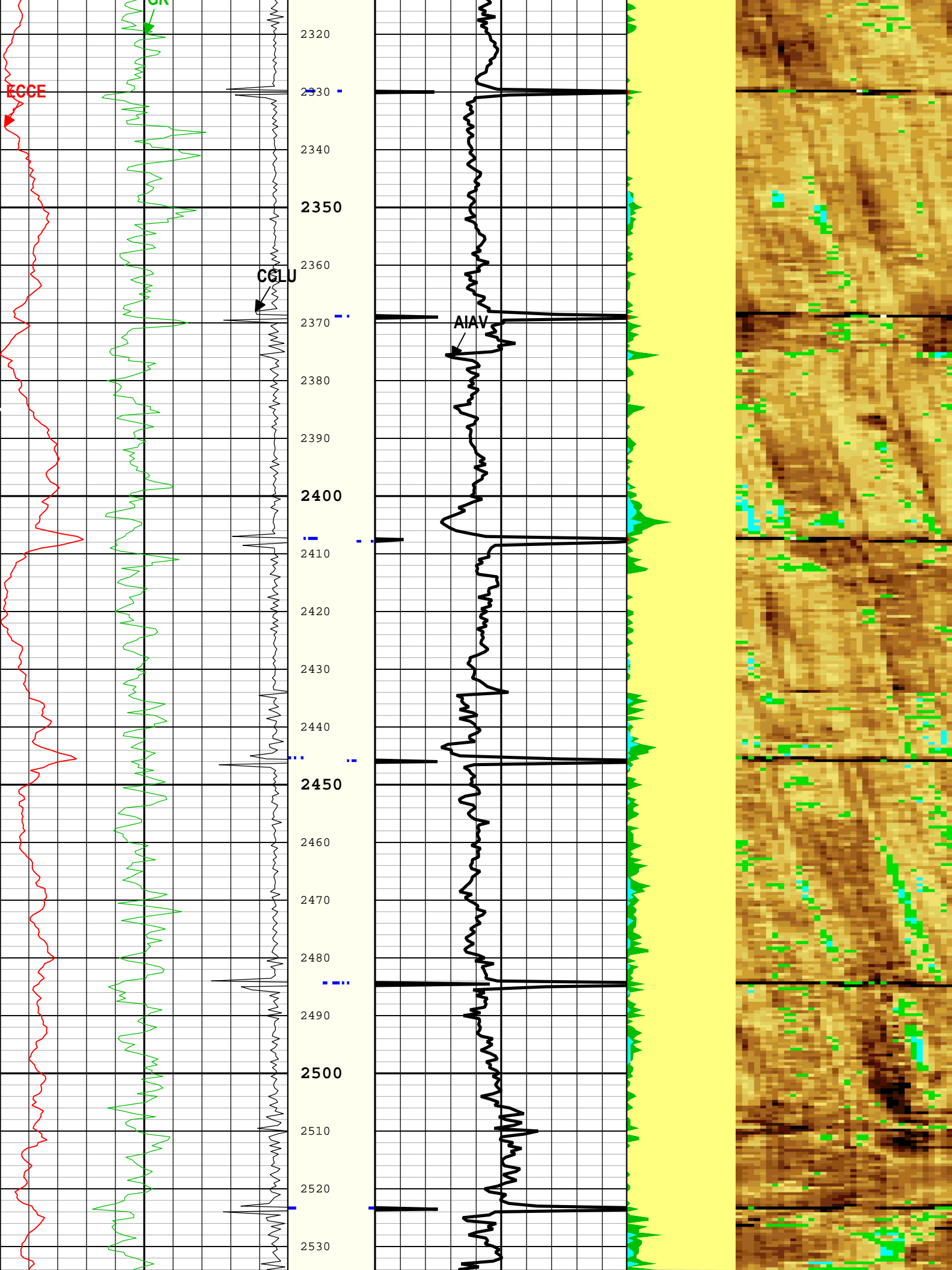


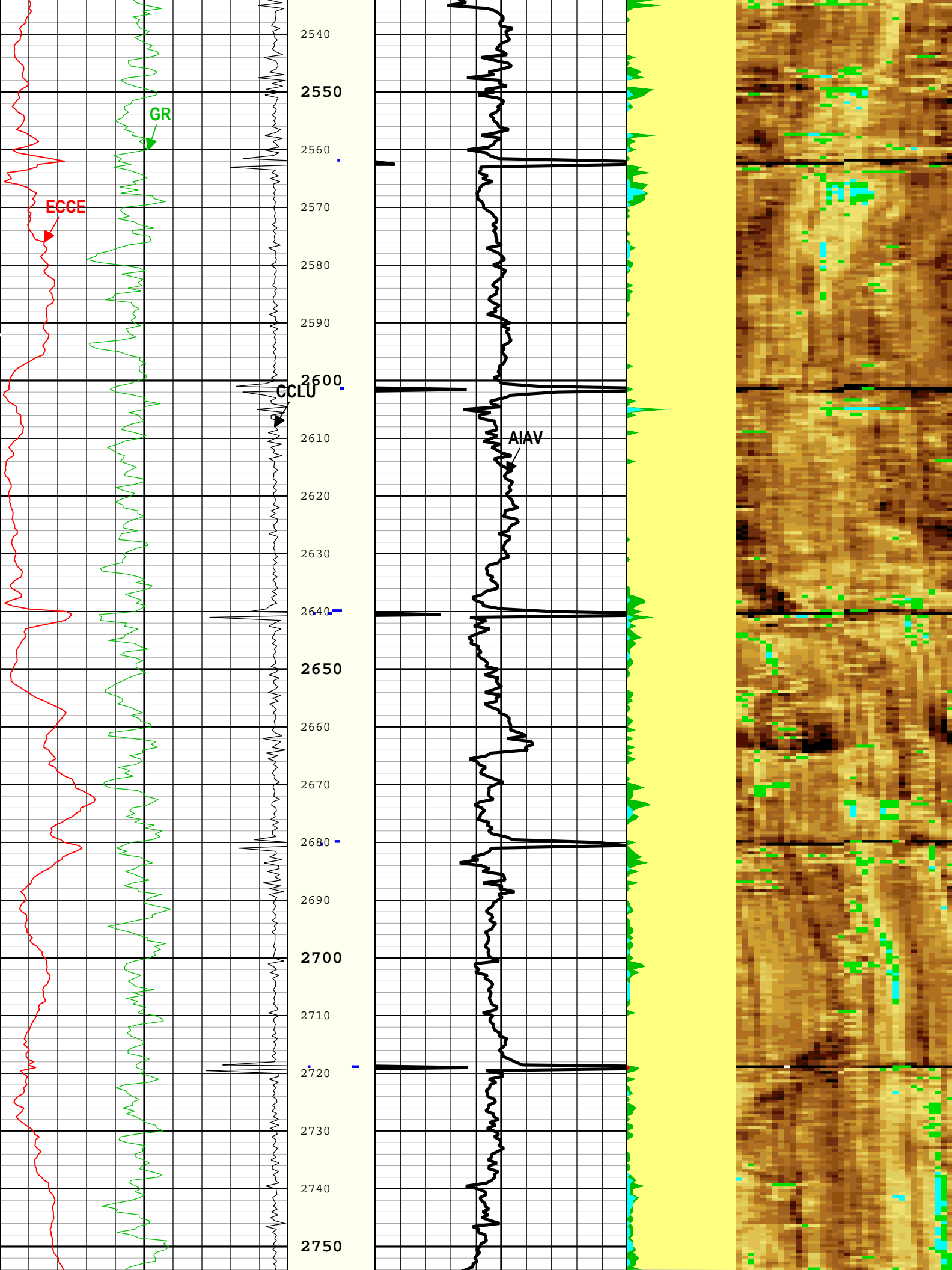


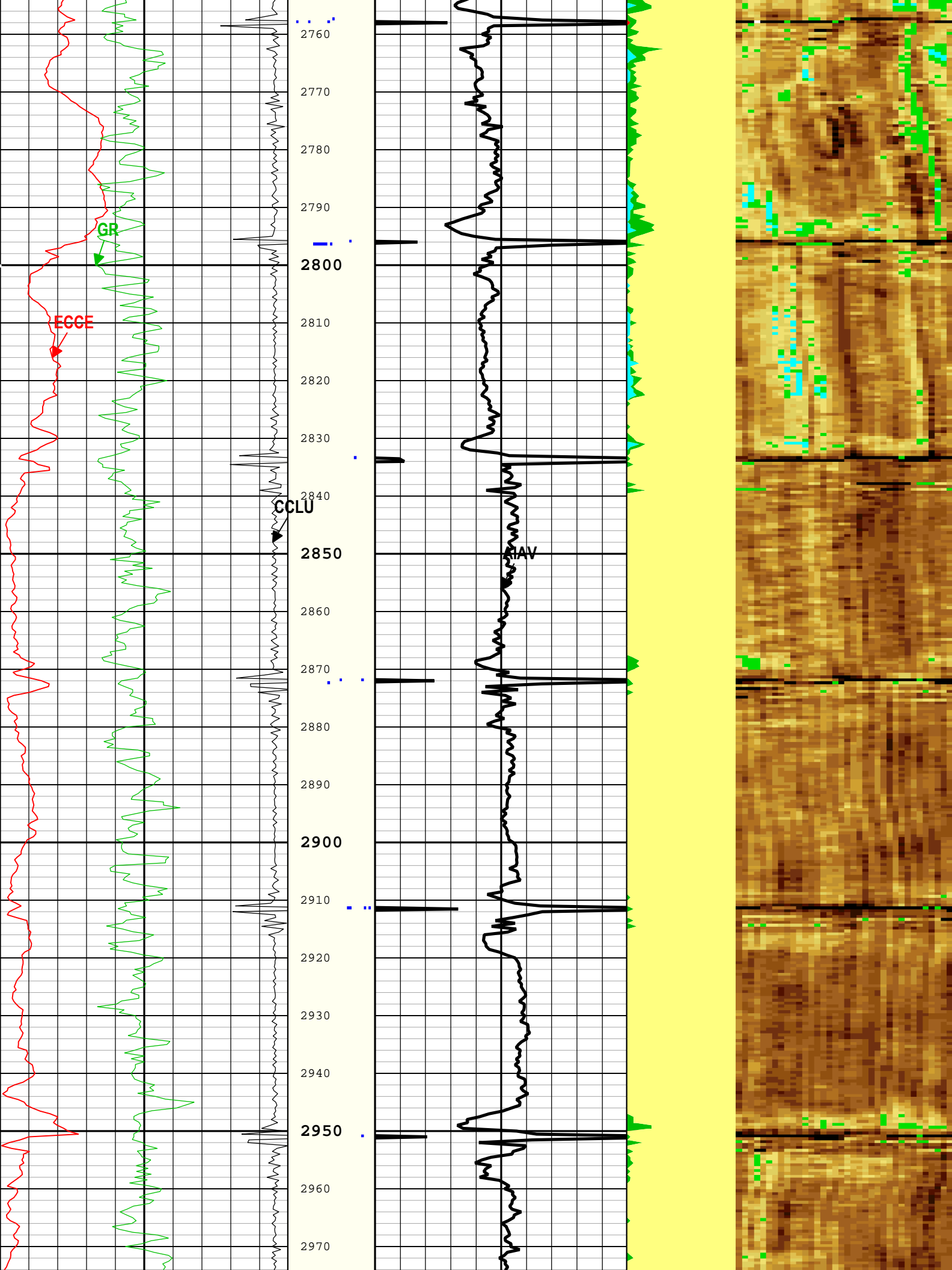


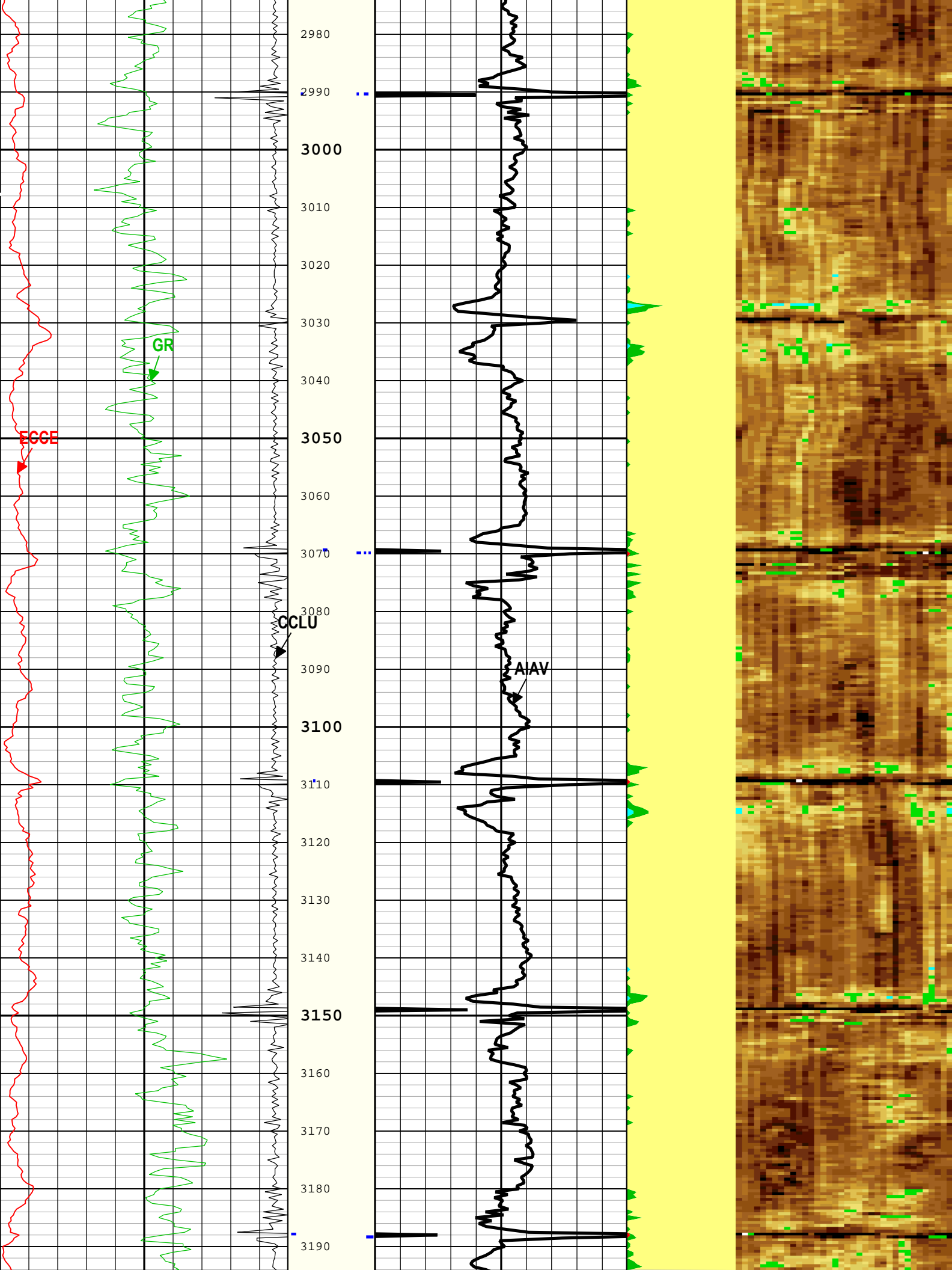


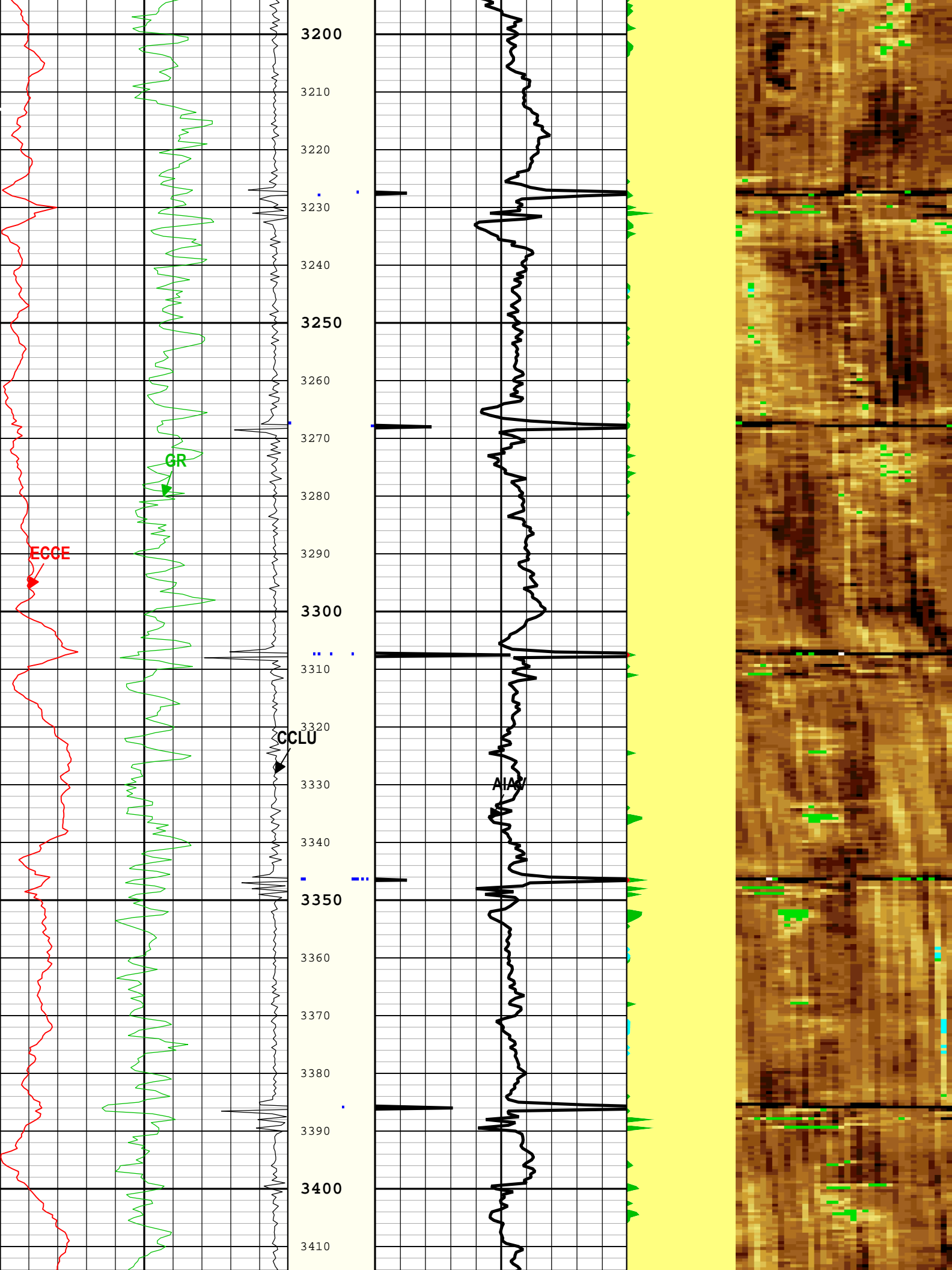


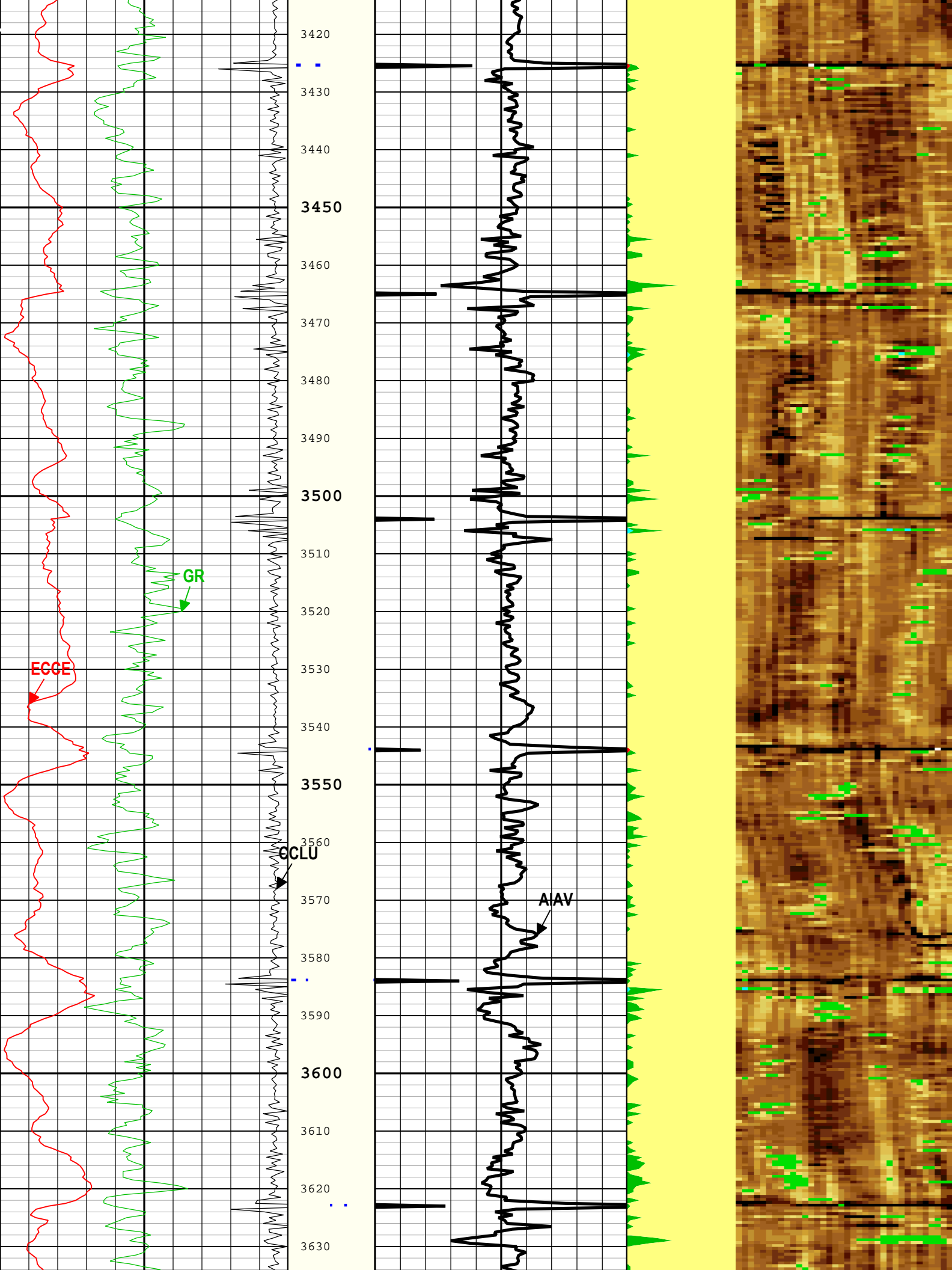


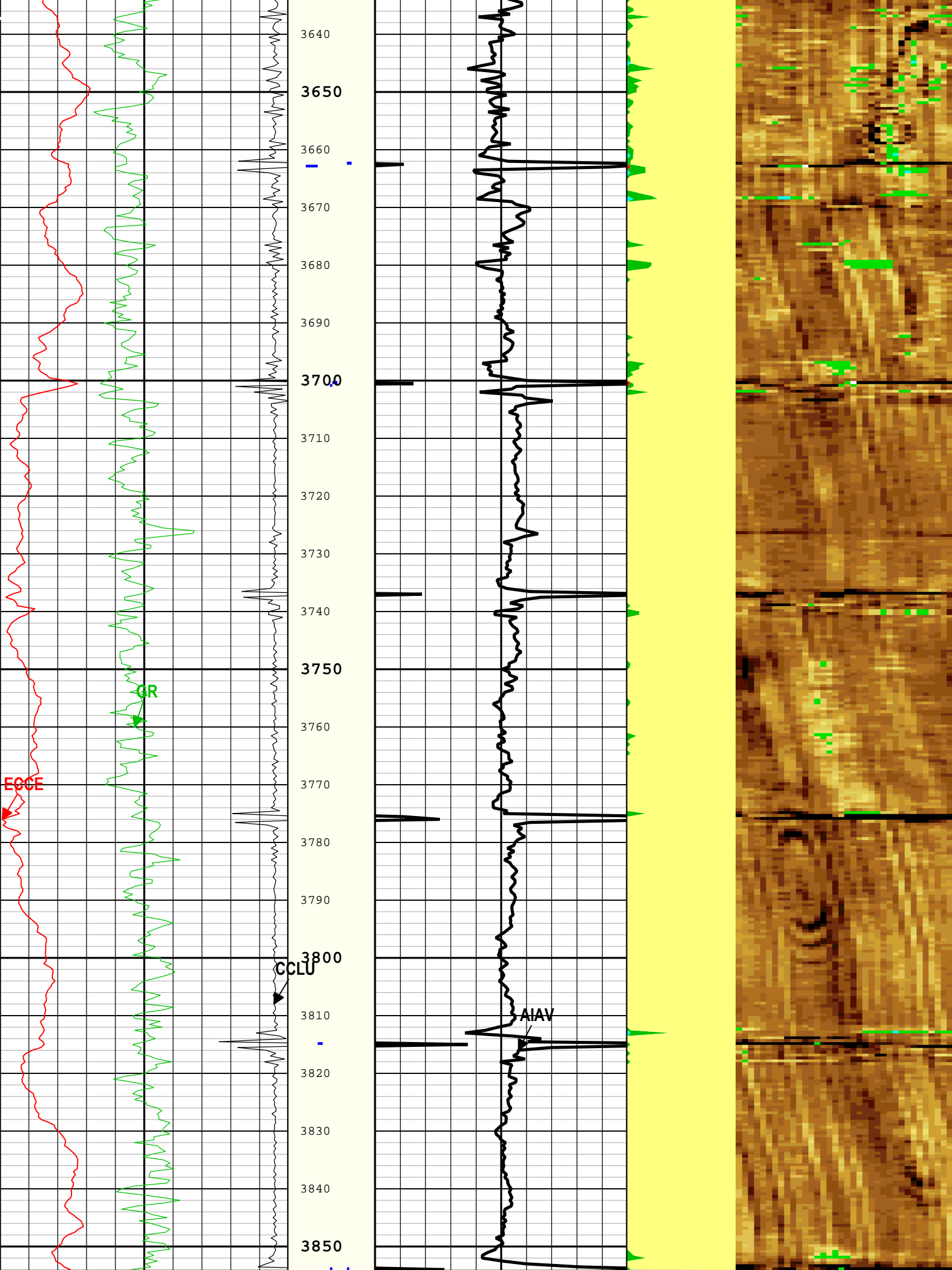


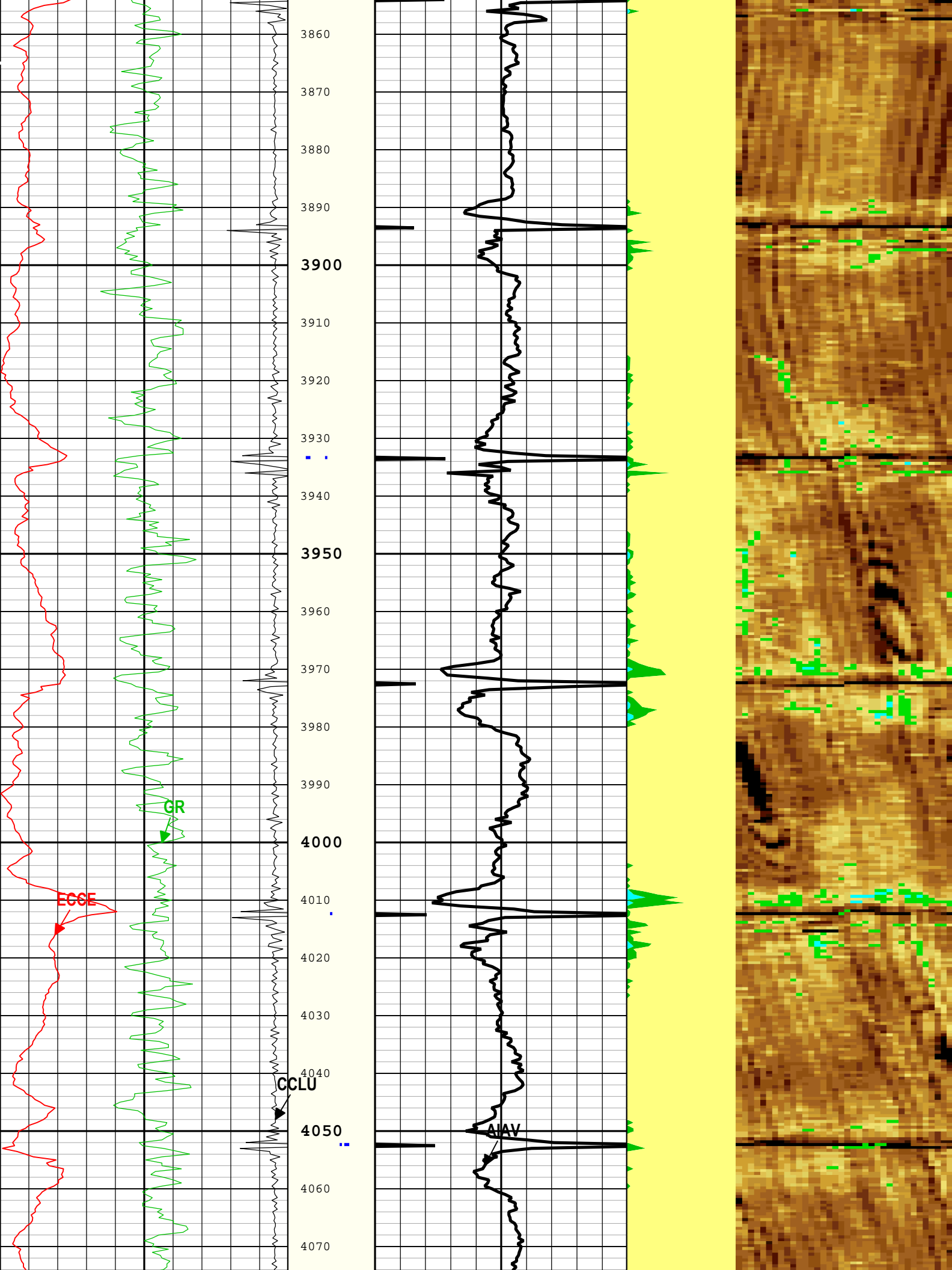


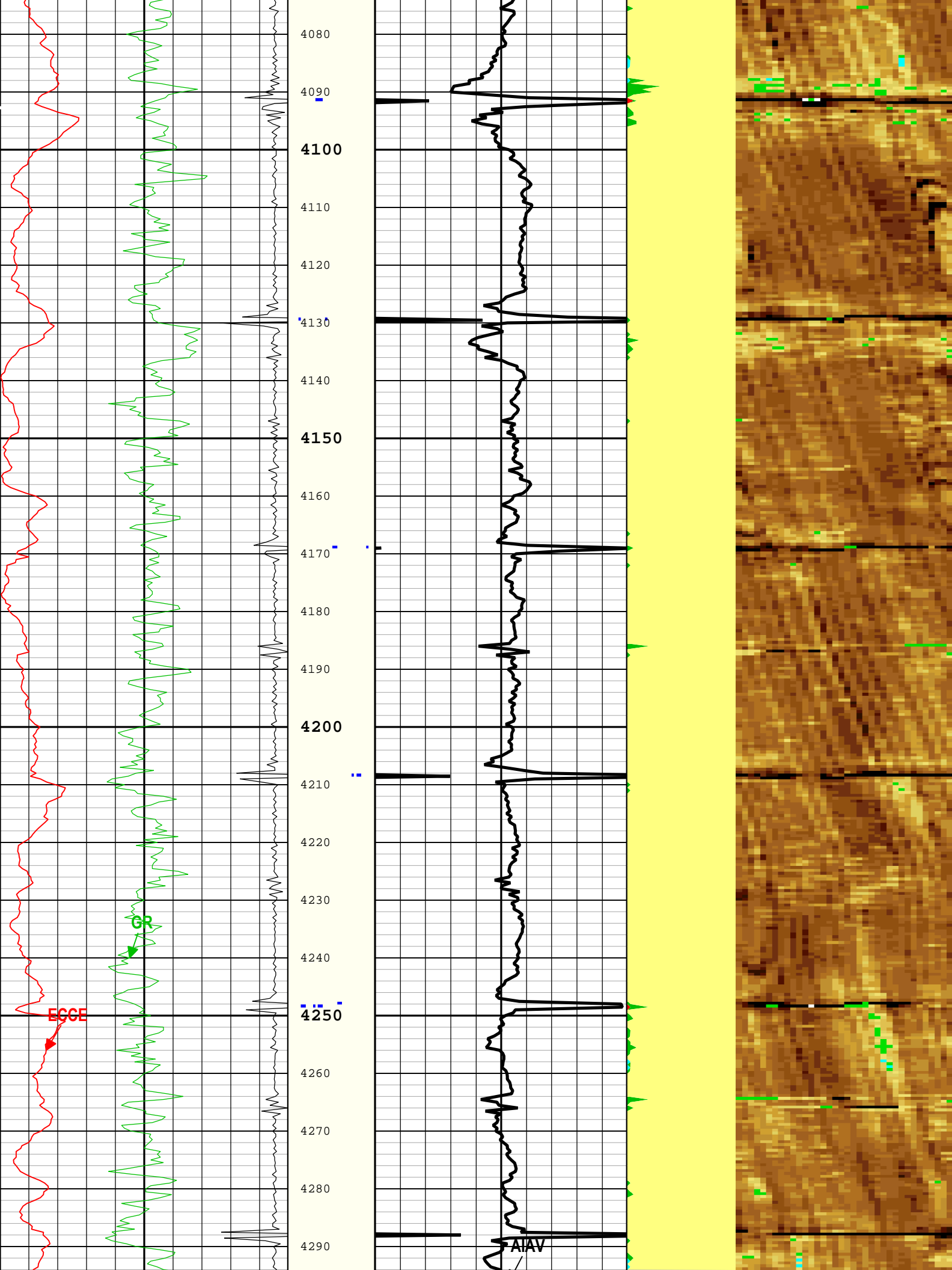


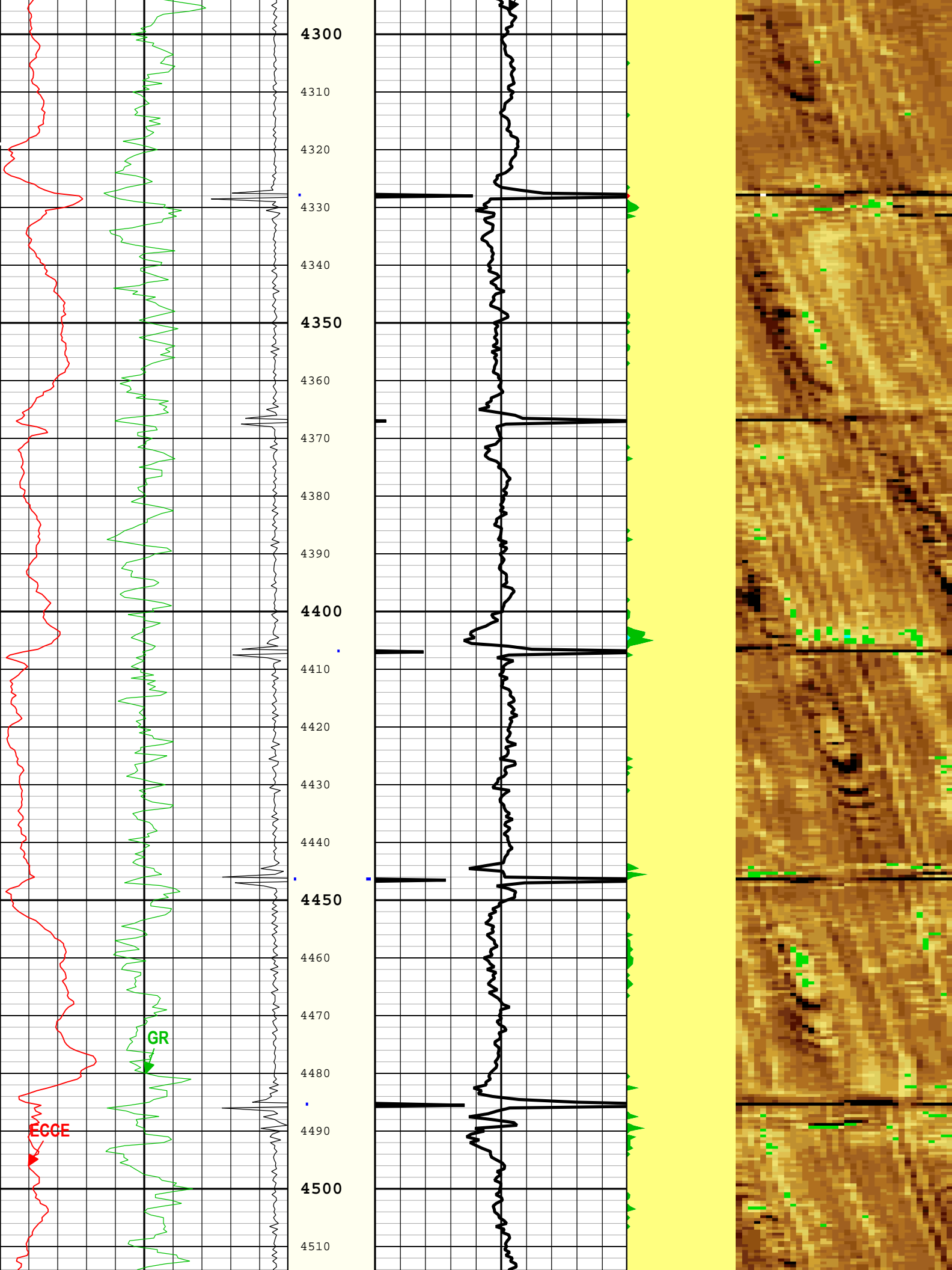


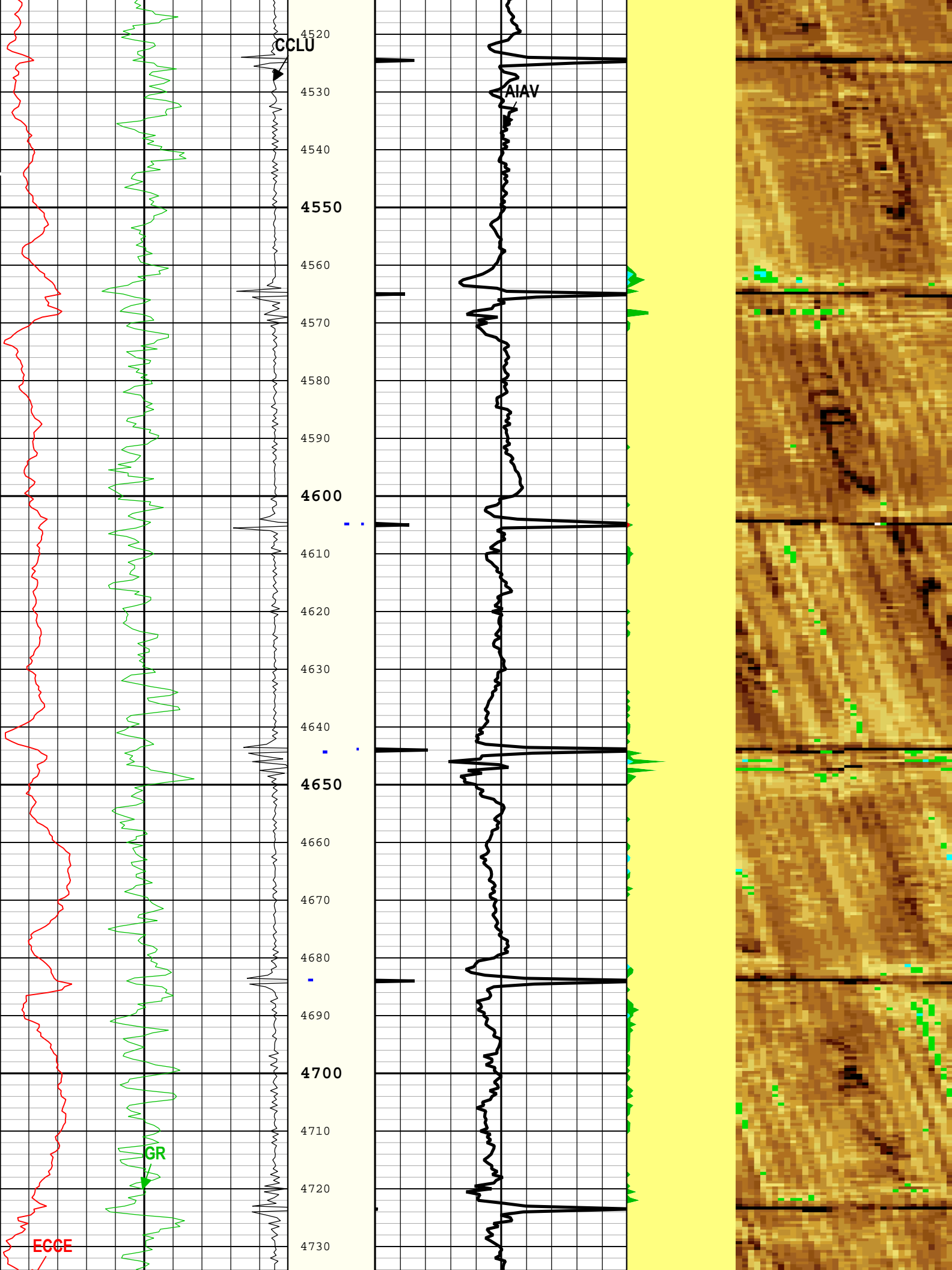


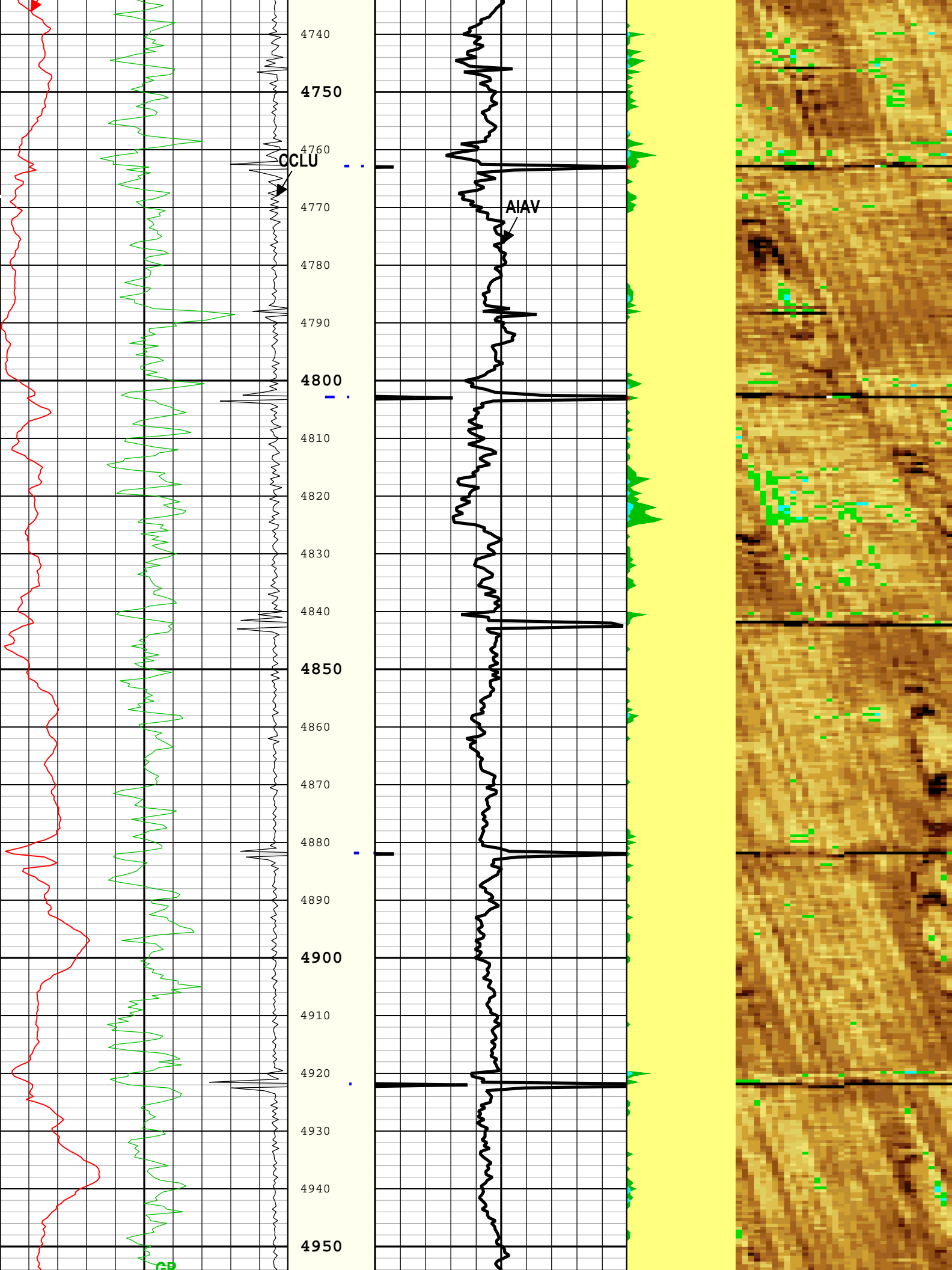


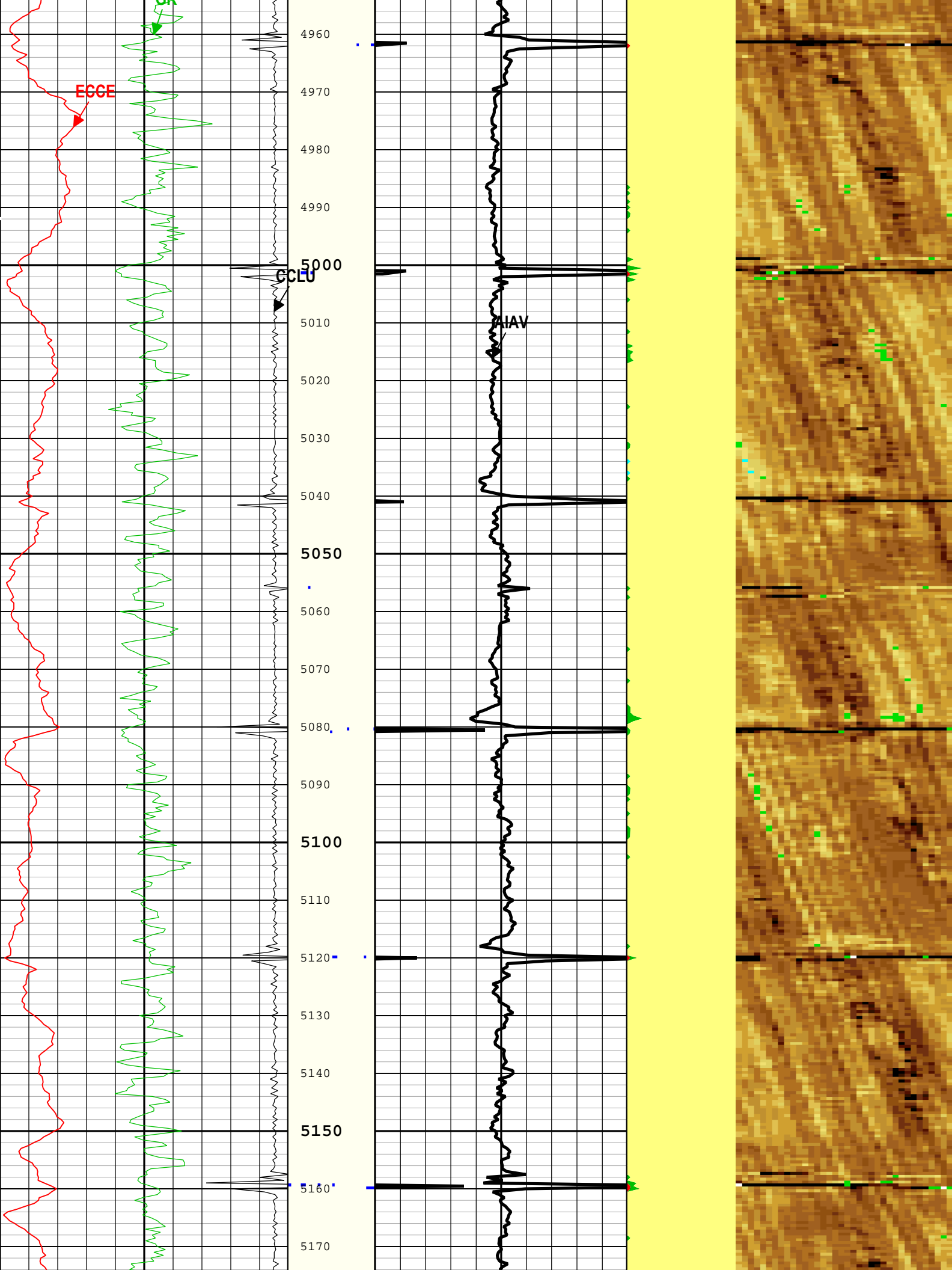


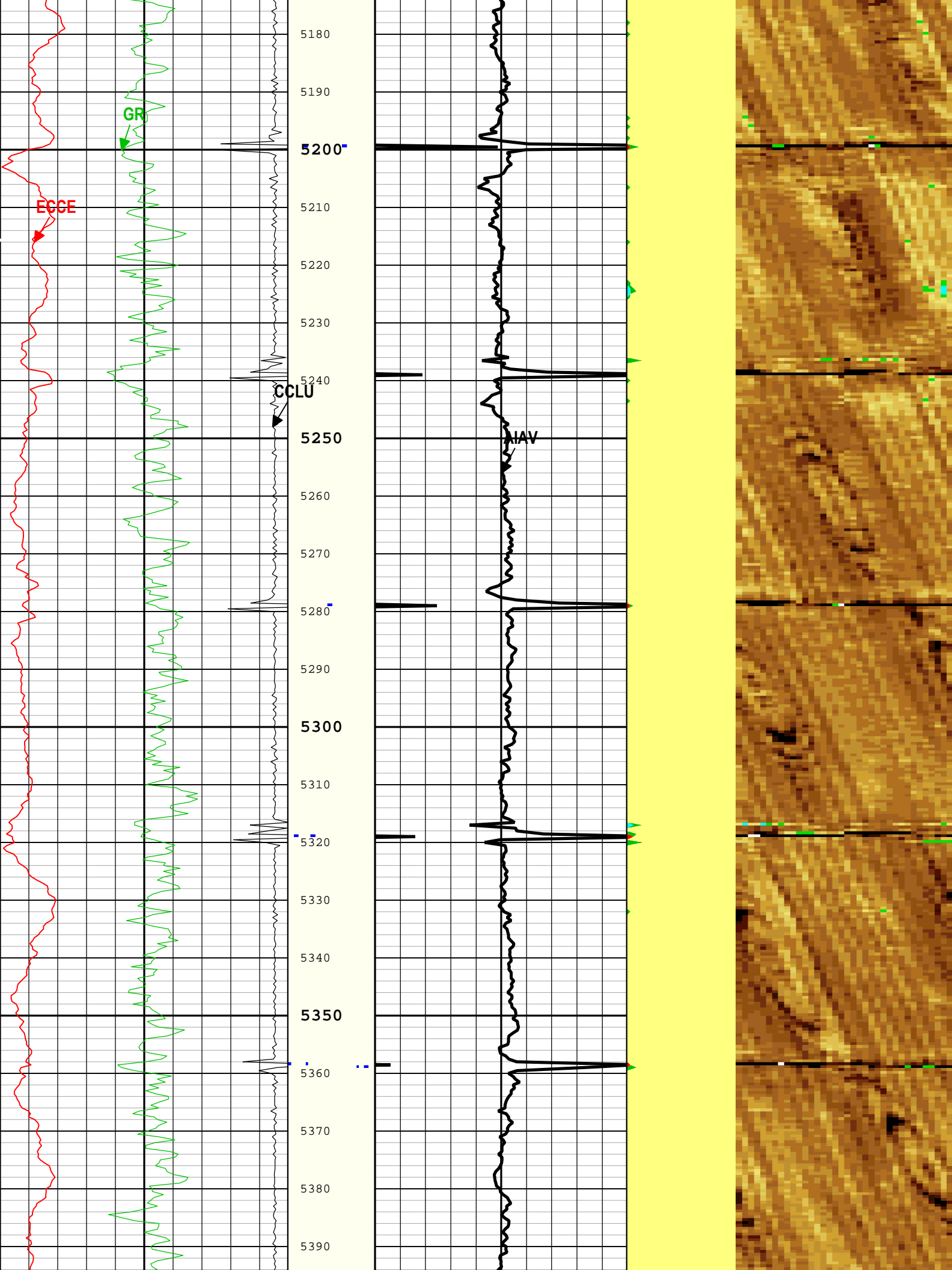


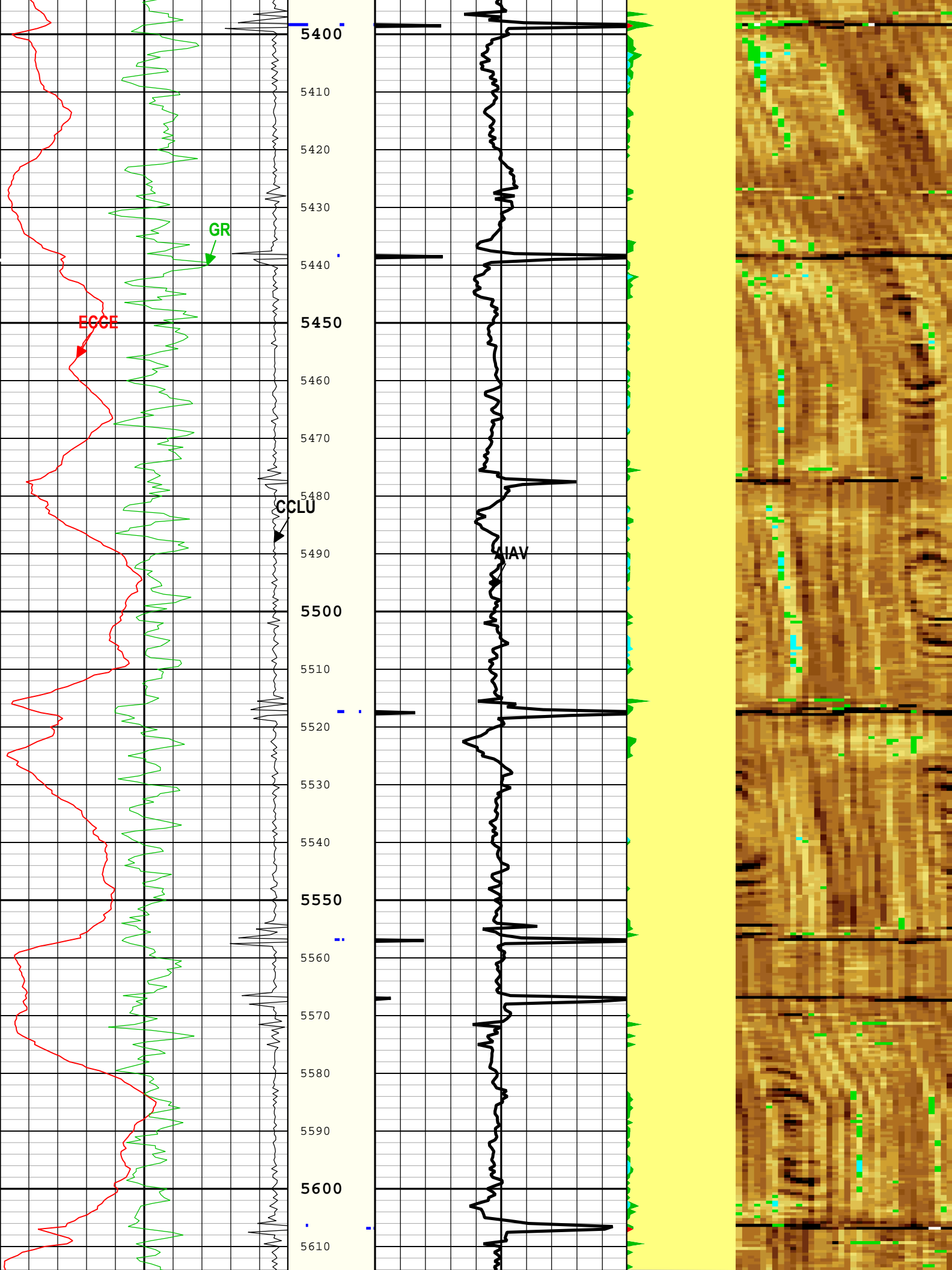


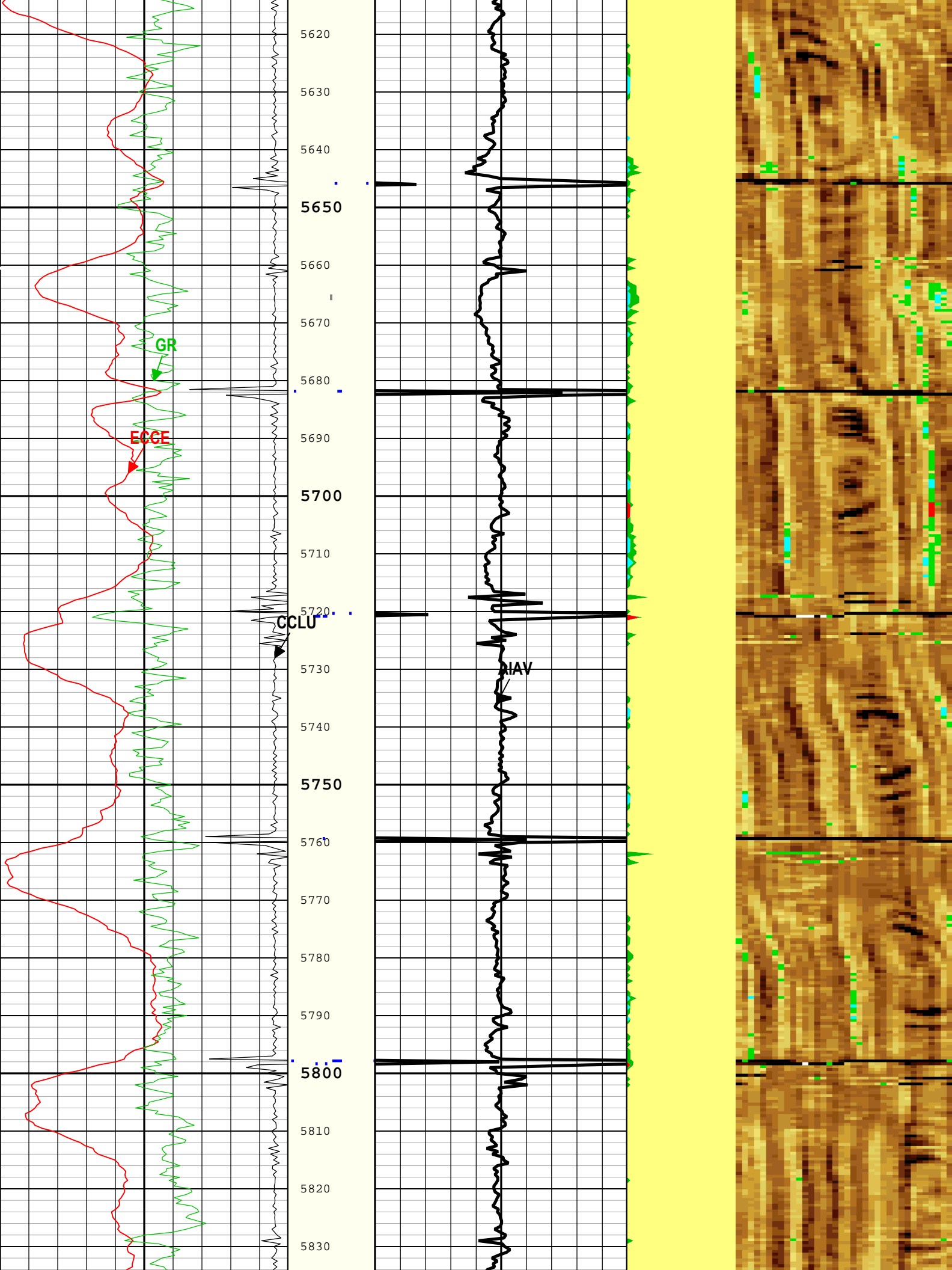


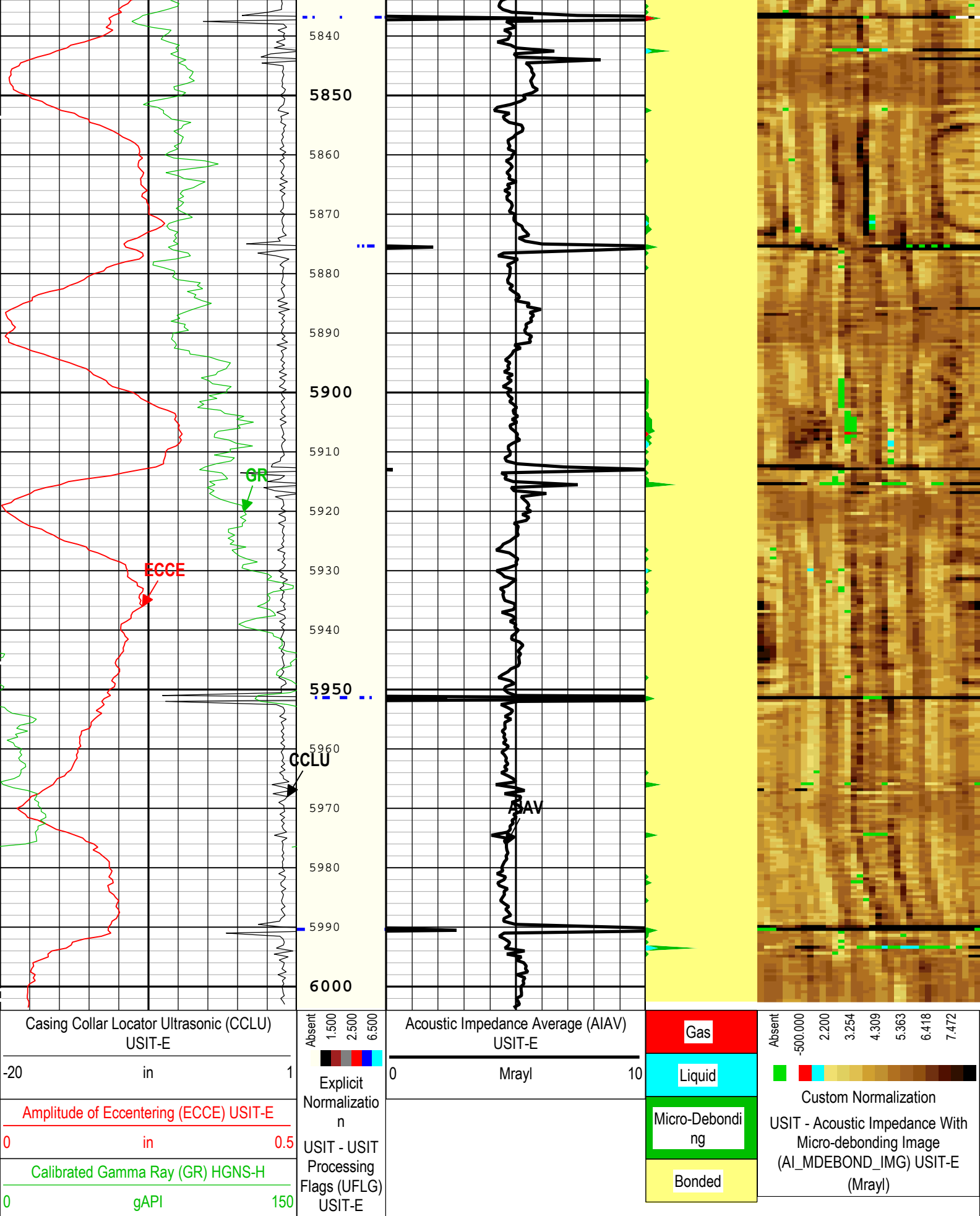












One: Parameters

Parameter	Description	Tool	Value	Unit
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	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
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
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.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	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	46.5	110
BS	13.5	110	1940
BS	8.5	1940	6004

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
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UPLIHT	Ultrasonic Pulse Echo Large Inhibit Time	USIT-E	Off	
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	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3500	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP1	7.1.82245.3100
Application Patch	Wireline_NPD-ICE2-2017SP1_7.1.87324

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[1]:Up	Up	3147.76 ft	3490.59 ft	26-Aug-2017 12:44:45 PM	26-Aug-2017 12:46:52 PM	ON	1.69 ft	Yes

All depths are referenced to toolstring zero

Log

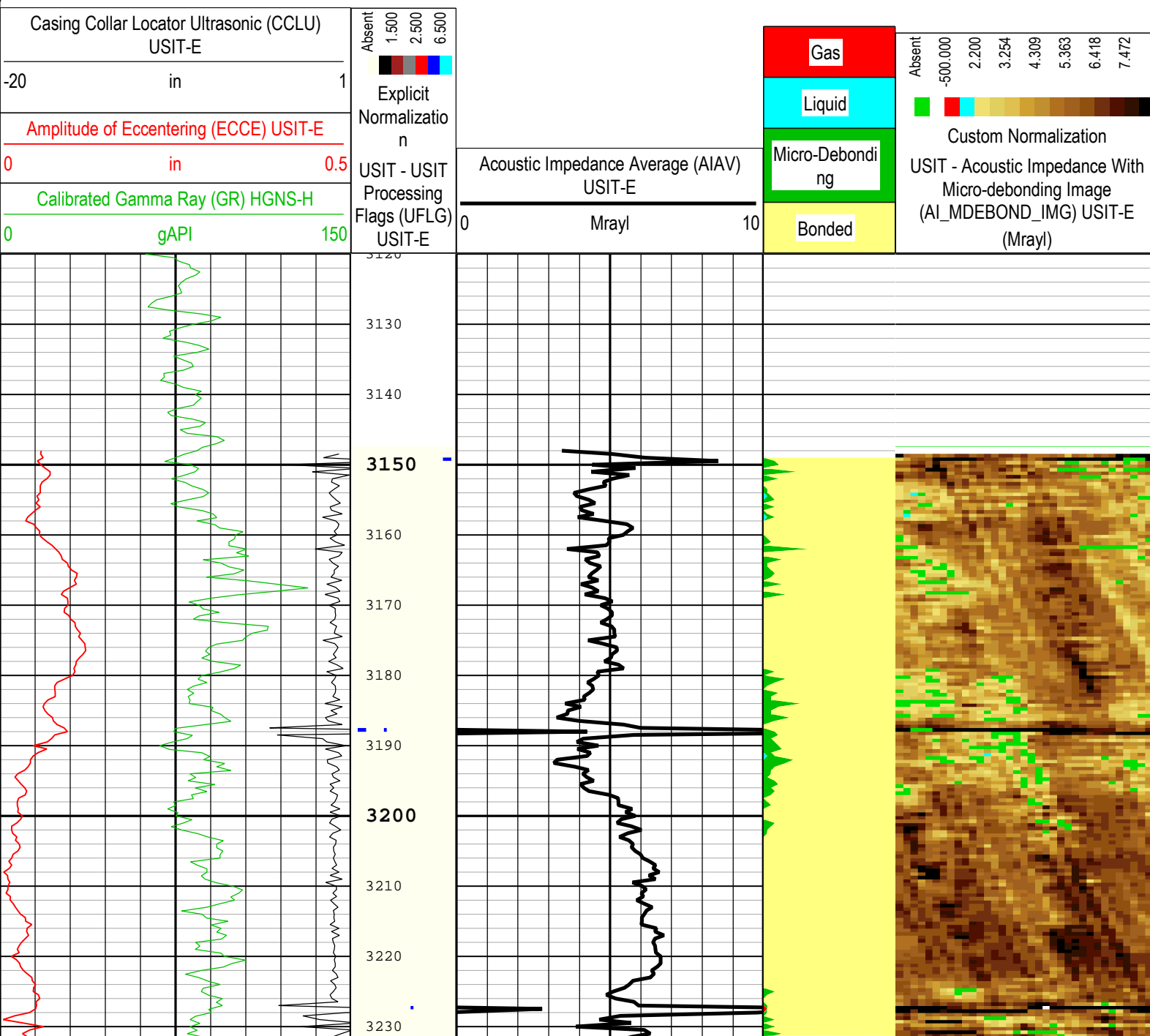
Company:Noble Energy, Inc.

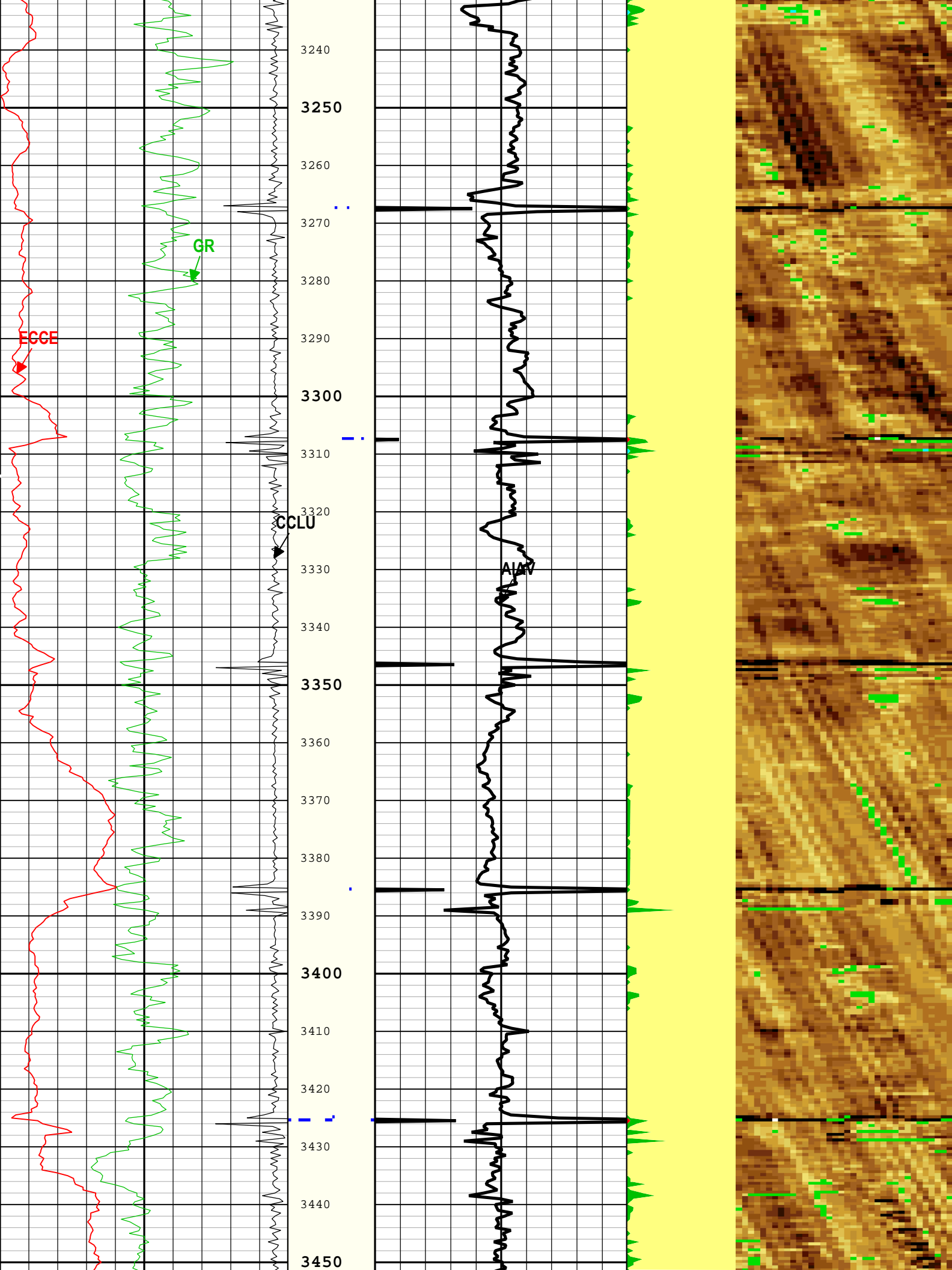
Well:Minutemen Federal #LC21-620

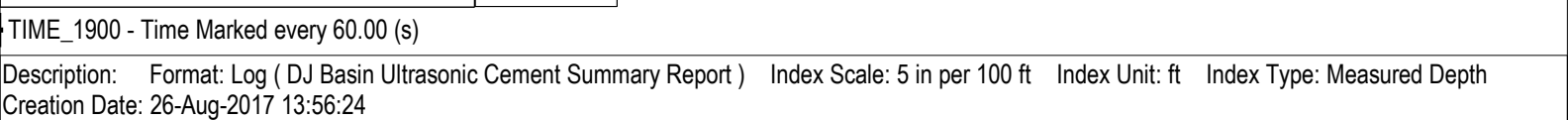
One: Log[1]:Up:S004

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: 26-Aug-2017 13:56:24

TIME_1900 - Time Marked every 60.00 (s)







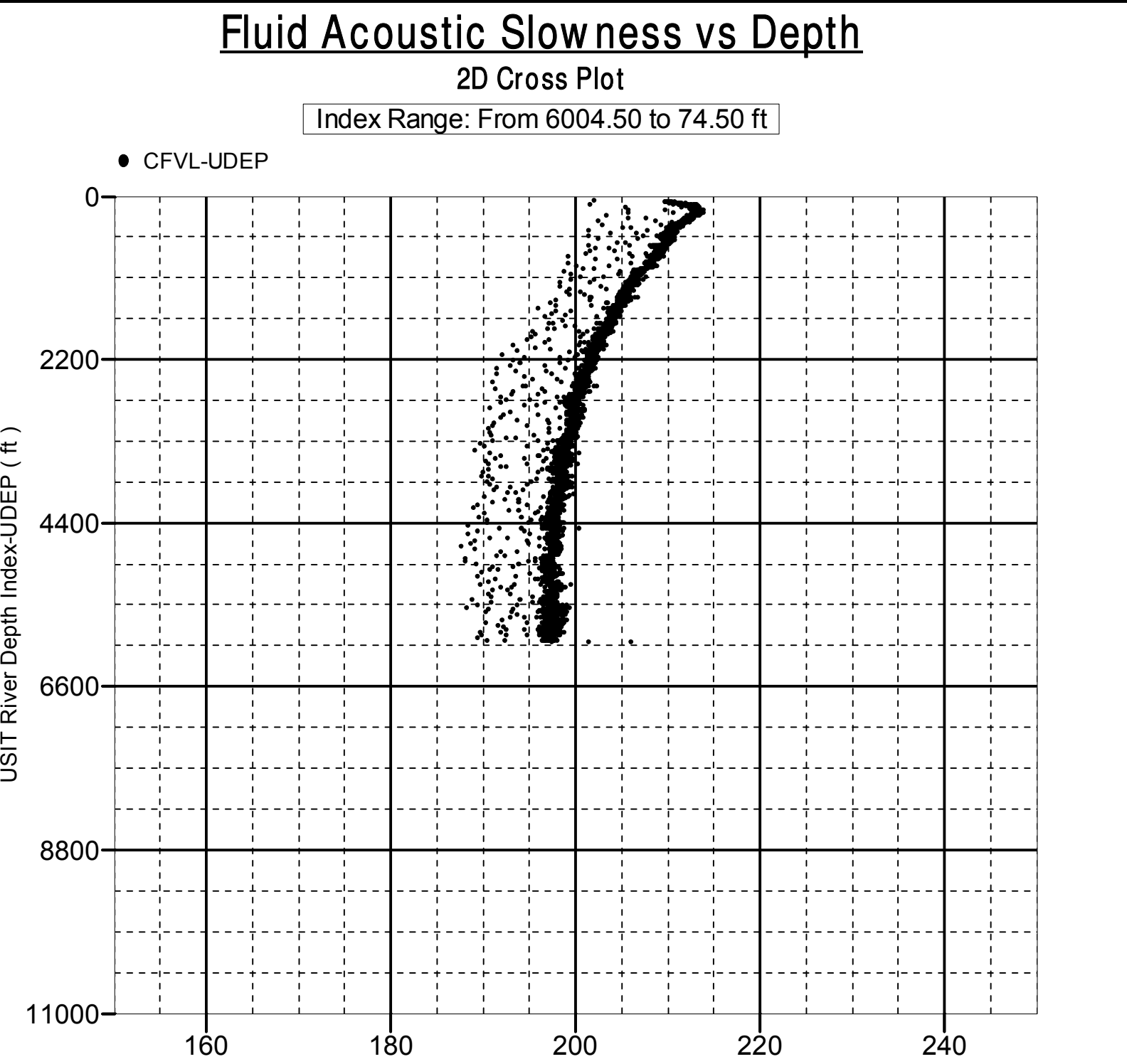
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BS	Bit Size	WLSESSION	8.5	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	9.3	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
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
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.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

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

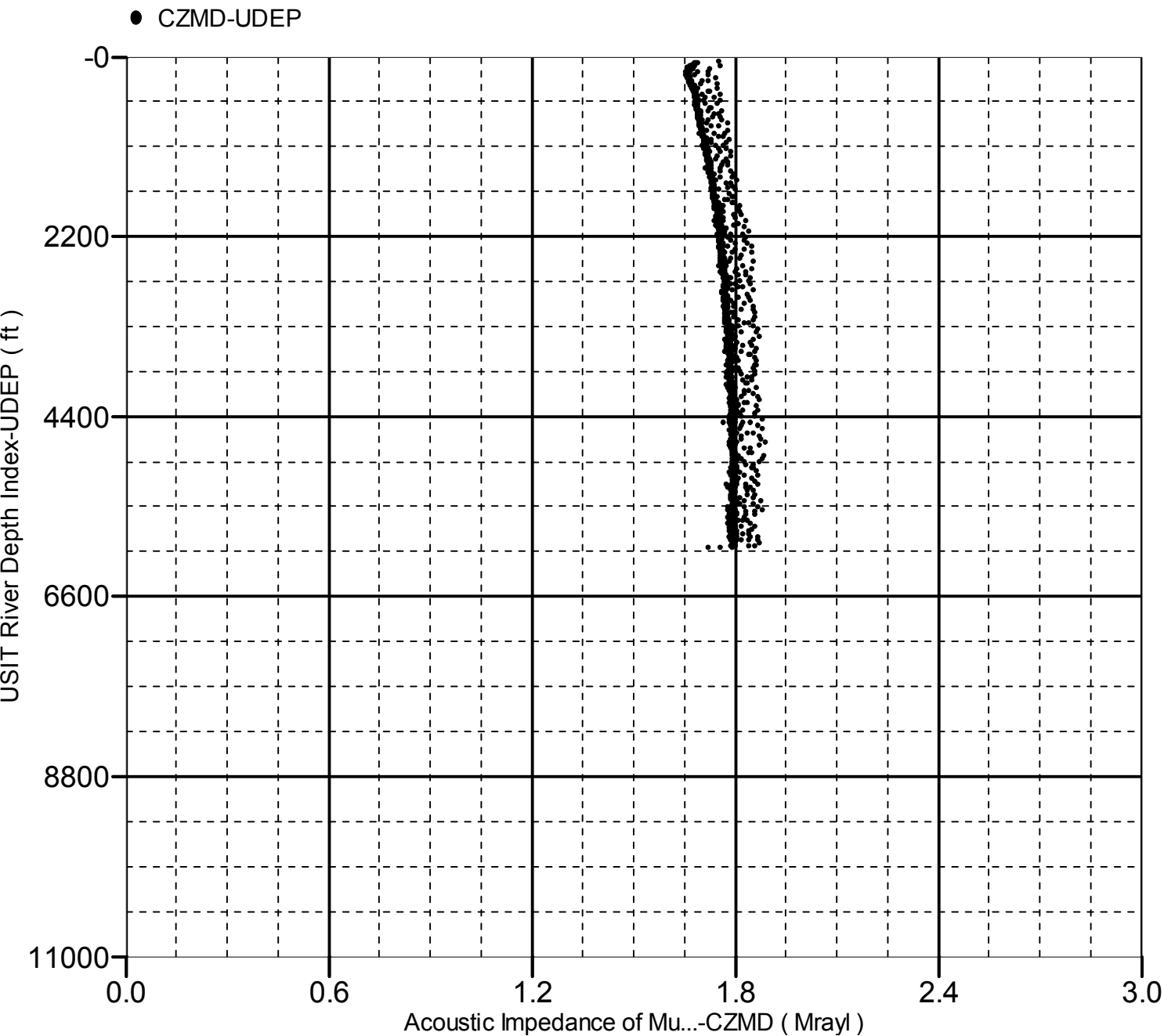
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UPLIHT	Ultrasonic Pulse Echo Large Inhibit Time	USIT-E	Off	
USFR	Ultrasonic Sampling Frequency	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	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3500	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us



Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6004.50 to 74.50 ft



Company:	Noble Energy, Inc.	Schlumberger
Well:	Minutemen Federal #LC21-620	
Field:	Wildcat	
County:	Weld	
State:	Colorado	

UltraSonic Summary Print