

Company: Noble Energy INC

Well: Wells Ranch BB11-643

Field: Wattenberg

County: WELD State: Colorado

UltraSonic Summary Print

County: WELD  
Field: Wattenberg  
Location: NWSW Sec. 11, T5N, R63W  
Well: Wells Ranch BB11-643  
Company: Noble Energy INC

Location:		NWSW Sec. 11, T5N, R63W		Elev.:		K.B.		4698.00 ft	
		SHL: 2120' FSL & 300' FWL		G.L.				4668.00 ft	
		Lat/Long: 40.41258, -104.41263		D.F.				4698.00 ft	
Permanent Datum:		Ground Level		Elev.:				4668.00 f	
Log Measured From:		Kelly Bushing		30.00 ft				above Perm.Datum	
Drilling Measured From:		Kelly Bushing							
API Serial No.		Section:		Township:				Range:	
05-123-44962		11		5N				63W	

Logging Date	18-Sep-2017			
Run Number	One			
Depth Driller	13990.00 ft			
Schlumberger Depth	5800.00 ft			
Bottom Log Interval	58000.00 ft			
Top Log Interval	88.00 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	1920.20 ft			
To	5800.00 ft			
Casing/Tubing Size	5.5 in			
Weight	20 lbm/ft			
Grade	N/A			
From	30.00 ft			
To	5800.00 ft			
Max Recorded Temperatures	220.89 degF			
Logger on Bottom	Time	17:34:00		
Unit Number	Location:			
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.

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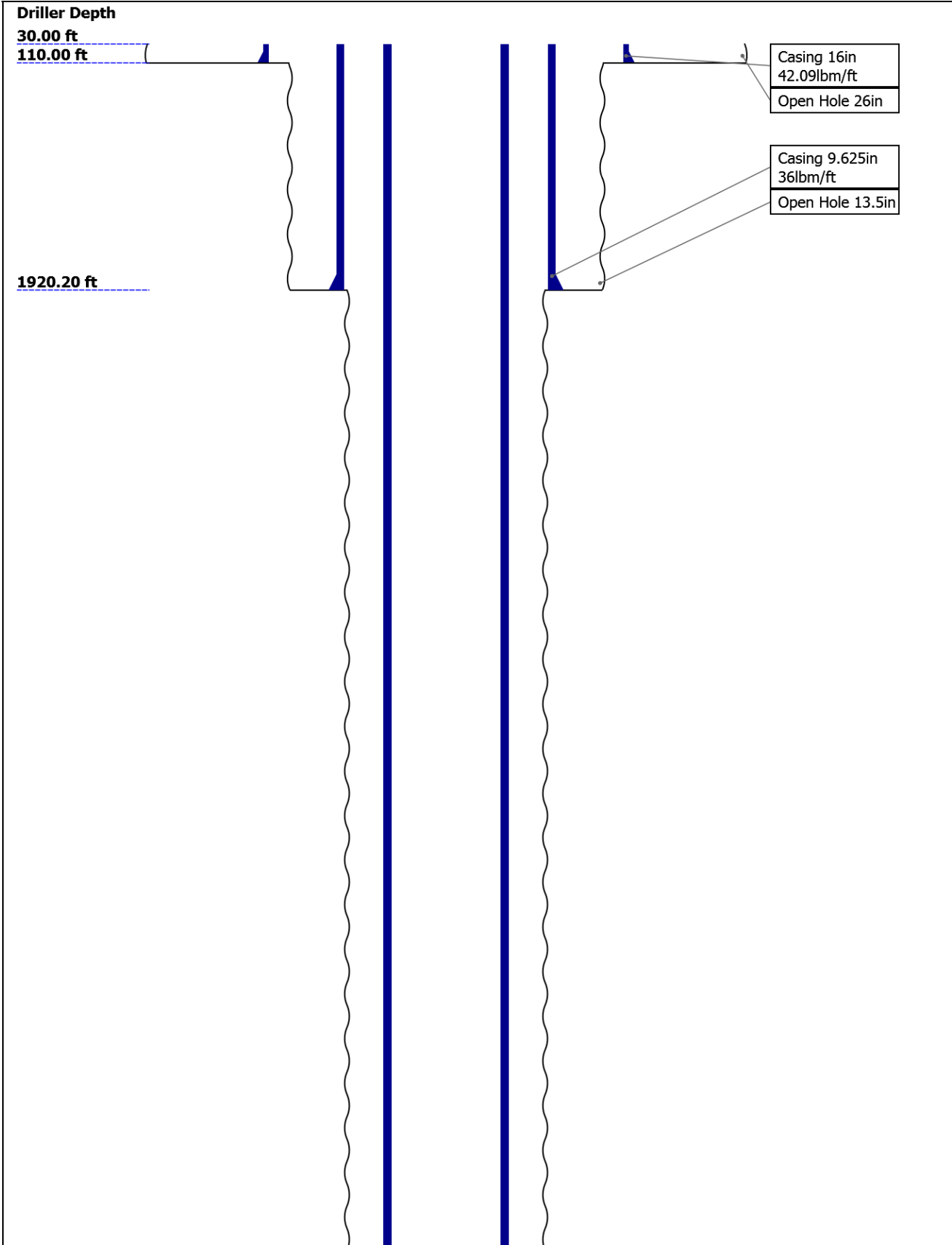
12.2 Software Version

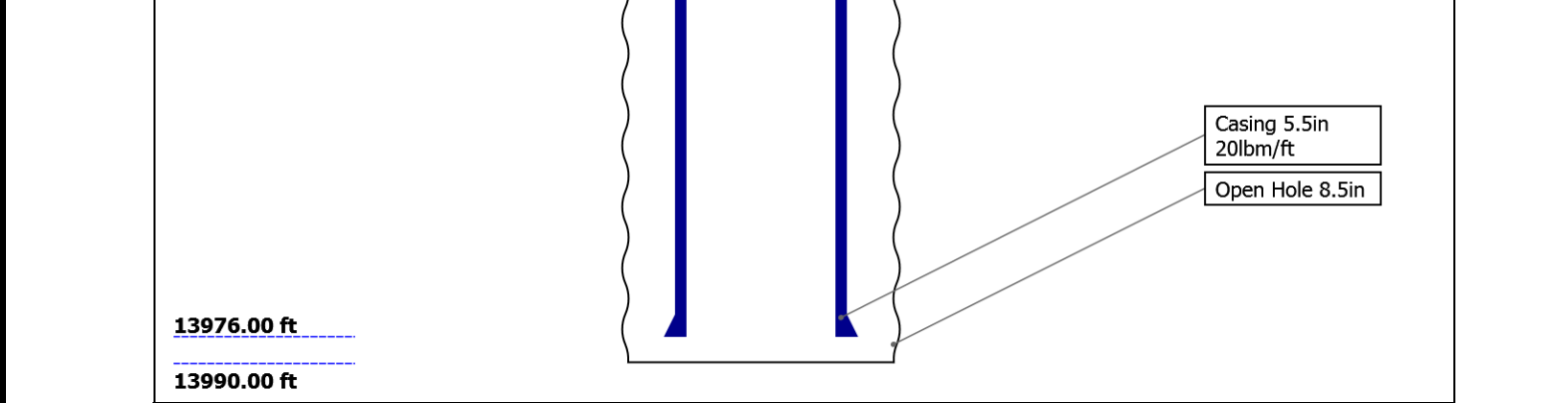
12.3 Composite Summary

12.4 Log ( DJ Basin Ultrasonic Cement Summary Report )

12.5 Parameter Listing

Well Sketch





## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in ) ( in )	26	13.5	8.5			
Top Driller ( ft )	30	110	1920.2			
Top Logger ( ft )	30	110	1920.2			
Bottom Driller ( ft )	110	1920.2	13990			
Bottom Logger ( ft )	110	1920.2	5800			
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 )	30	30	30			
Bottom Driller ( ft )	110	1920.2	13976			
Bottom Logger ( ft )	110	1920.2	5800			

## Operational Run Summary

Parameter ( unit )	One					
Date Log Started	18-Sep-2017					
Time Log Started	17:34:54					
Date Log Finished	18-Sep-2017					
Time Log Finished	19:22:11					
Top Log Interval ( ft )	88.00					
Bottom Log Interval ( ft )	58000.00					
Total Depth ( ft )	5800.00					
Max Hole Deviation ( deg )	0.00					
Azimuth of Max Deviation ( deg )	0.00					
Bit Size ( in )	8.500					
Logging Unit Number	2161					
Logging Unit Location	Fort Morgan					
Recorded By	Camila Lang					

Witnessed By	Bill Mansfield					
Service Order Number						

## Borehole Fluids

Parameter( unit )	One					
Fluid Type	Water					
Fluid Name	Brine					
Max Recorded Temperatures ( degF )	220.89					
Salinity ( ppm )	0					
Density ( lbm/gal )	8.4					
Date Logger on Bottom	18-Sep-2017					
Time Logger on Bottom	17:34:00					
Total Solid ( % )						
High Gravity Solids ( % )						

## Remarks and Equipment Summary

One: Toolstring	One: Remarks
<div> <div> <b>Equip name Length</b>  <b>LEH-QT:3 28.97</b>  <b>123</b>            LEH-QT:31            23         </div> <div> <b>MP name Offset</b>  <b>CTEM 25.16</b>  <b>HV 0.00</b>  <b>TelStatu 23.06</b>  <b>s</b>  <b>ToolSta 23.06</b>  <b>tus</b>  <b>GR 22.14</b>    <b>AH-184 17.56</b>    <b>USIT-E:93 15.56</b>  <b>0</b>            ECH-MFA:            1924            USAC-A:9            30            USIS-A:18            26            USSC-B            USRS-AB            USI-SENS            OR:1383            USI-TX         </div> <div> </div> </div>	Tool run as per tool sketch. This is the first log in well. CSG: 9.625" 36lb/ft @1920.2' 5.5" 20lb/ft @ 13976.0 Fluid: Fresh Water 8.4lb/gal Main pass recorded under 2500 PSI, and repeat pass recorded under 0 PSI. BHT: 220.89 degF

Lengths are in ft  
 Maximum Outer Diameter = 3.410 in  
 Line: Sensor Location Value: Casing Offset  
 USI Sen 0.37  
 sor  
 TOOL ZERO  
 Head Fe  
 nsion

Line: Sensor Location, Value: Gating Onset 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	7-39P-LXS		
Serial Number			
Length	10000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane USA		
One:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	ALI Schlumberger depth control policies were followed.	
Rig Up Length At Surface		IDW used as a primary depth reference.	
Rig Up Length At Bottom		Z-chart used as a secondary depth reference.	
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[4]:Up	6403.46	70.75
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 : 22.62m(74.21ft) to 24.14m(79.21ft) MUD_N_FRP = 1.15 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.66 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
One			
2500 PSI Main Pass			
Software Version			
Acquisition System		Version	

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

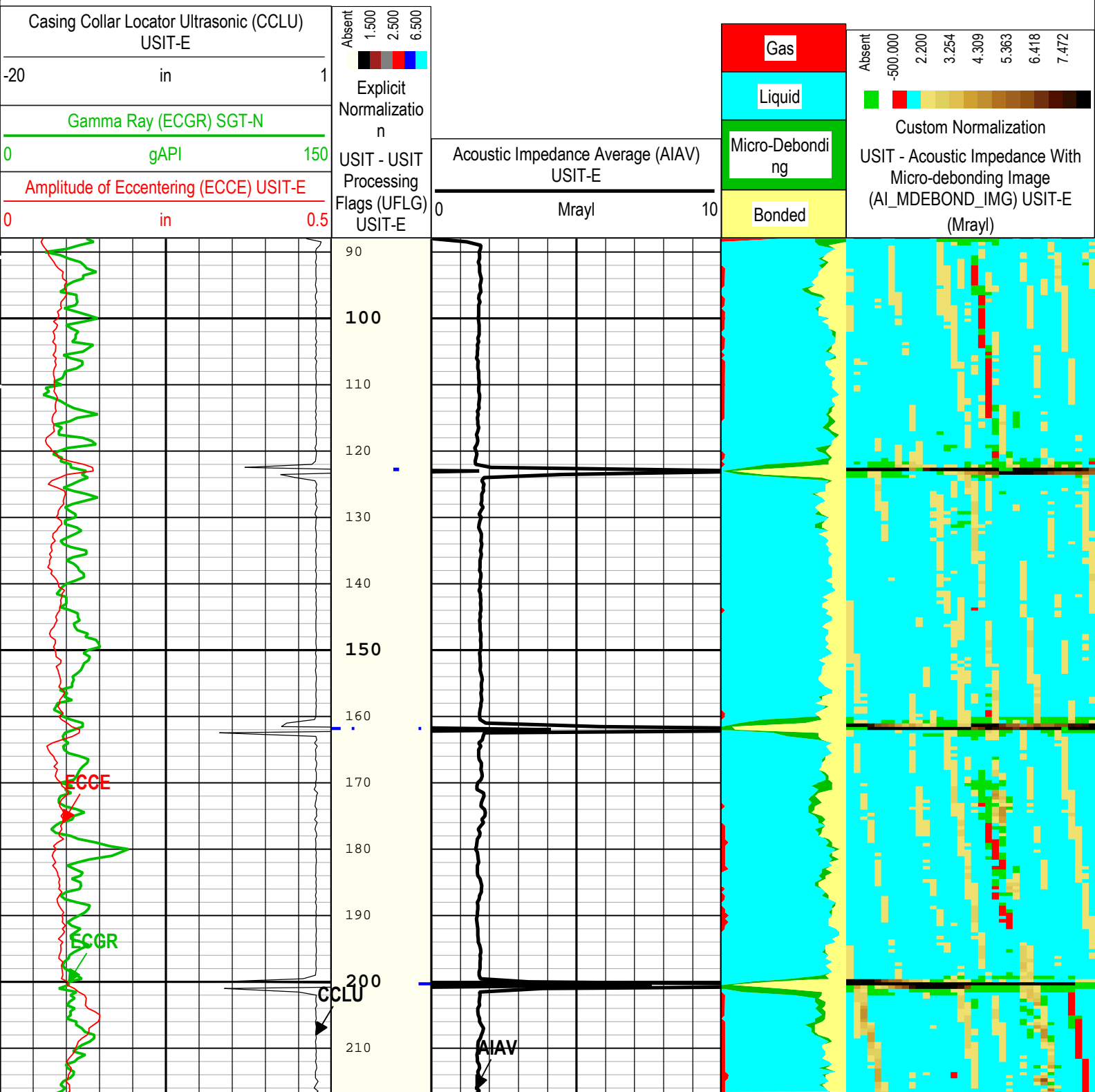
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	70.75 ft	6403.46 ft	18-Sep-2017 6:30:26 PM	18-Sep-2017 7:18:38 PM	ON	2.95 ft	Yes

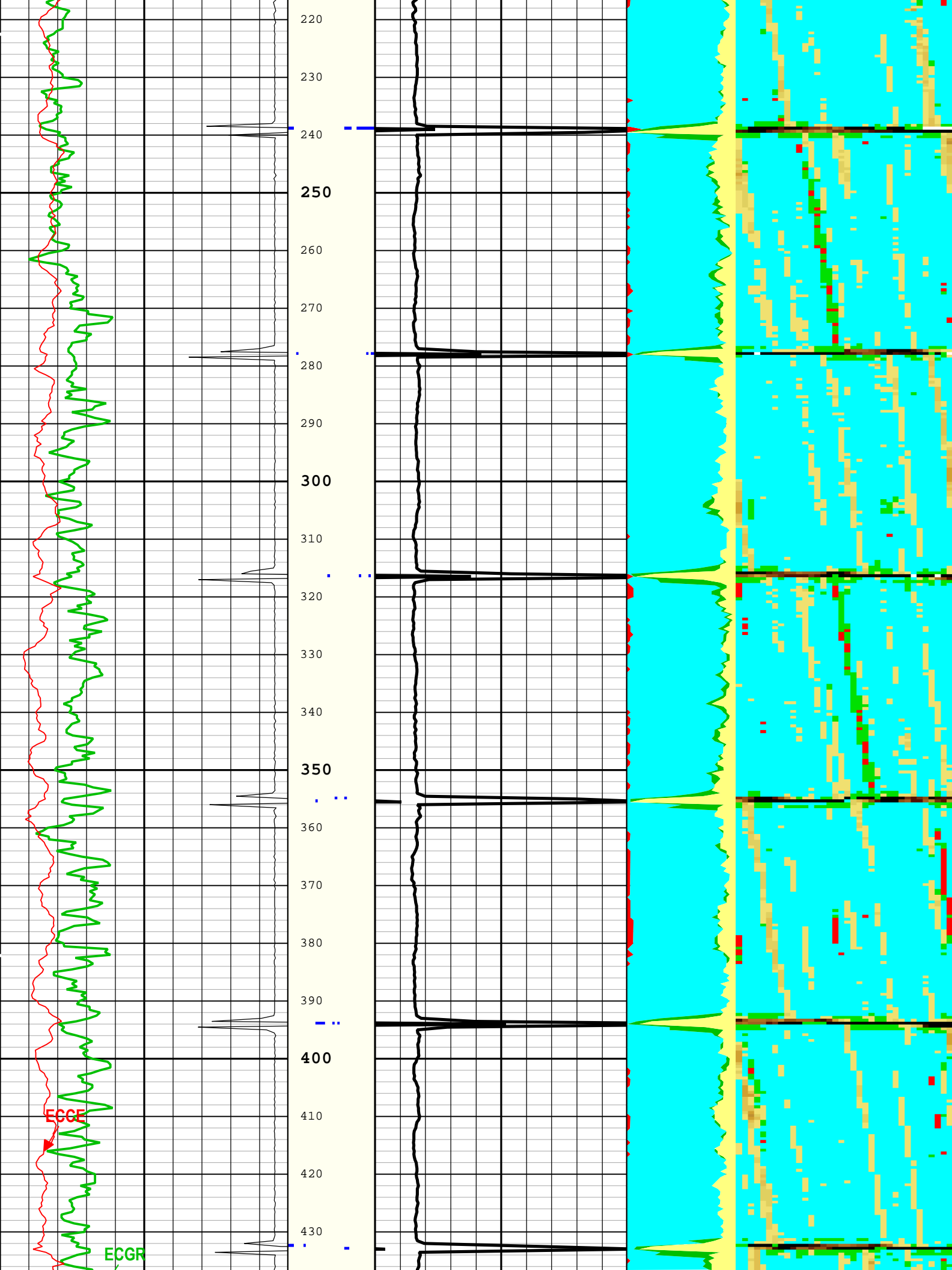
All depths are referenced to toolstring zero

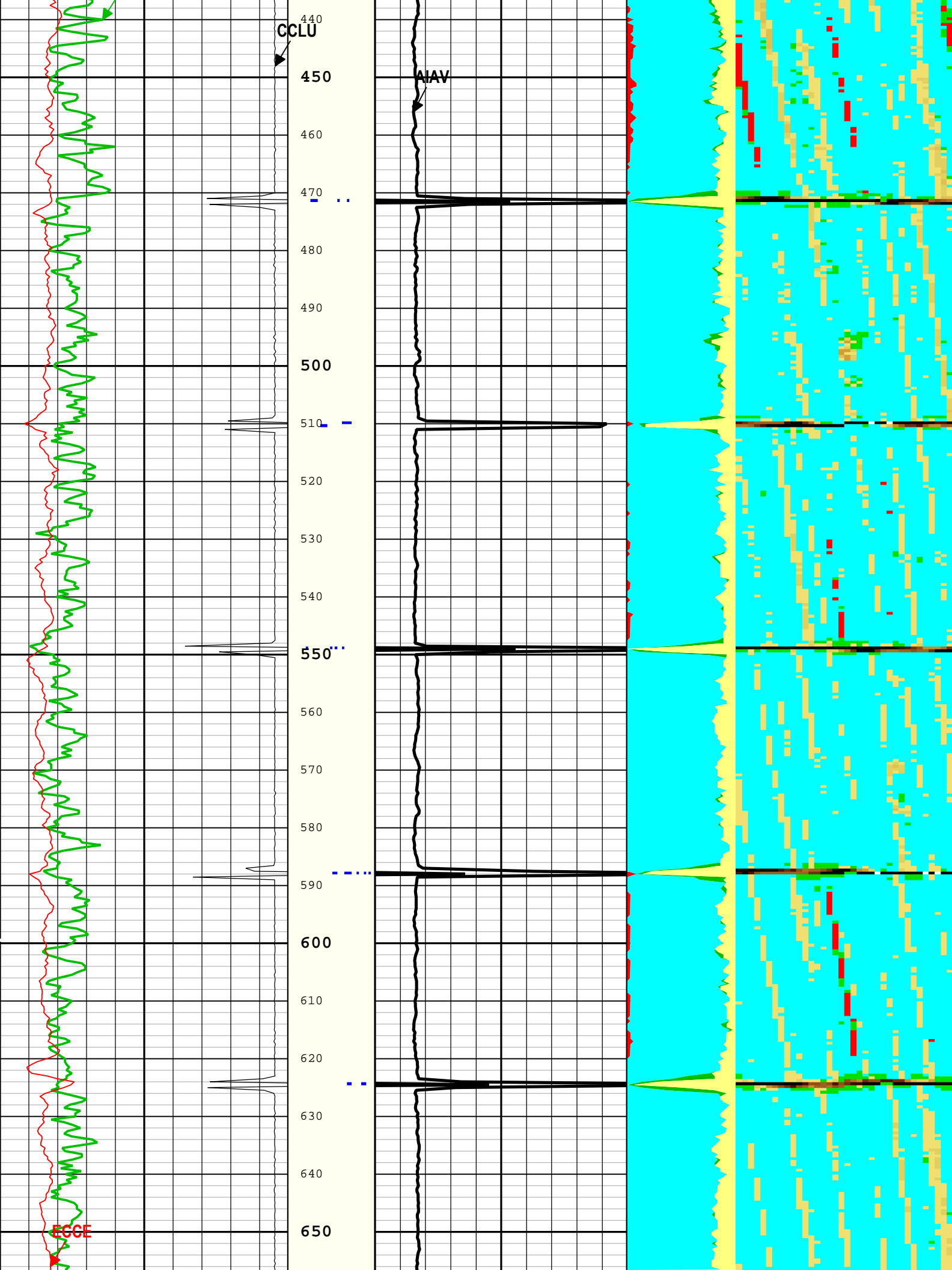
Log	Company:Noble Energy INC	Well:Wells Ranch BB11-643
	One: Log[4]:Up:S007	

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: 18-Sep-2017 20:04:57

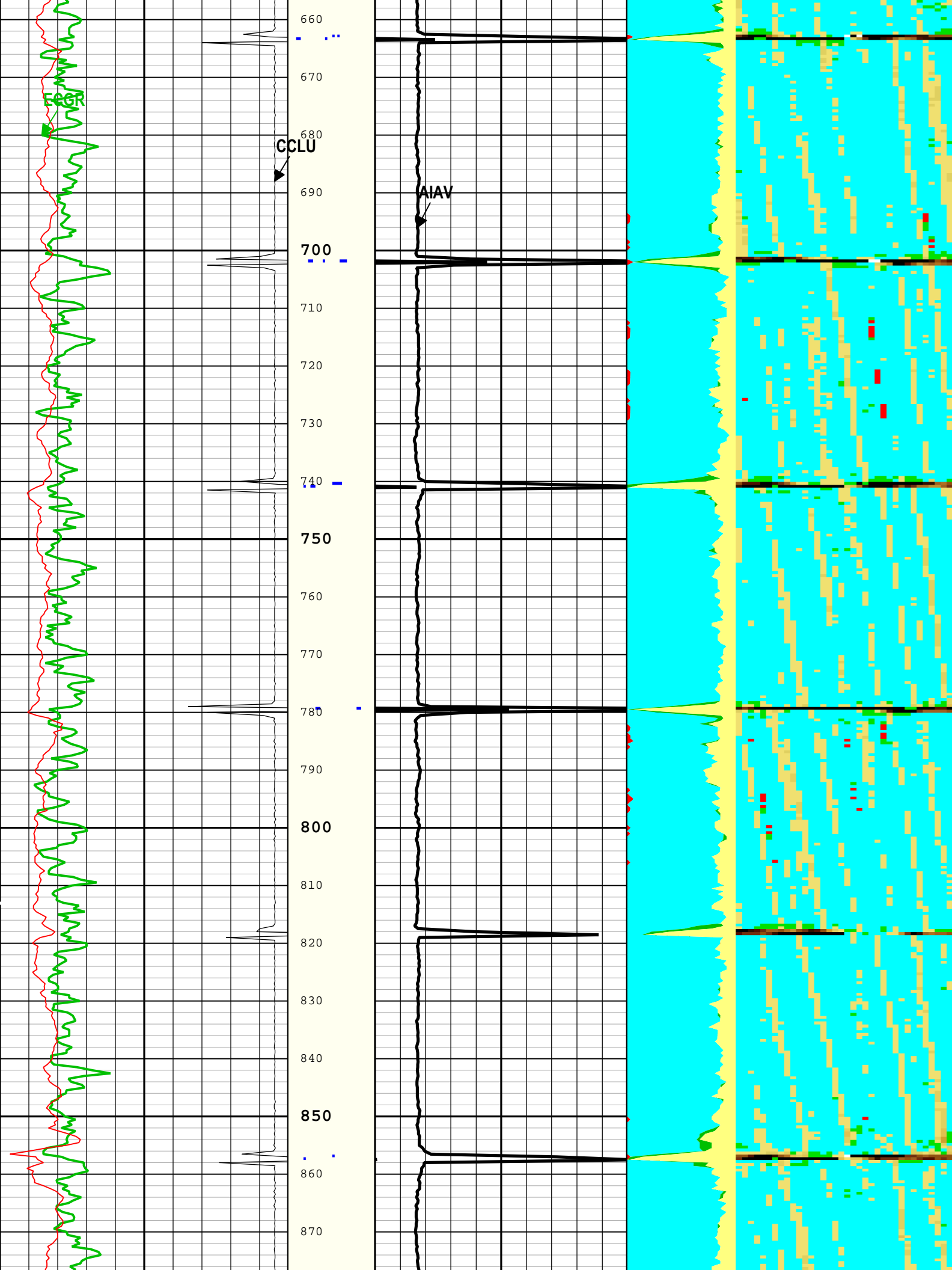
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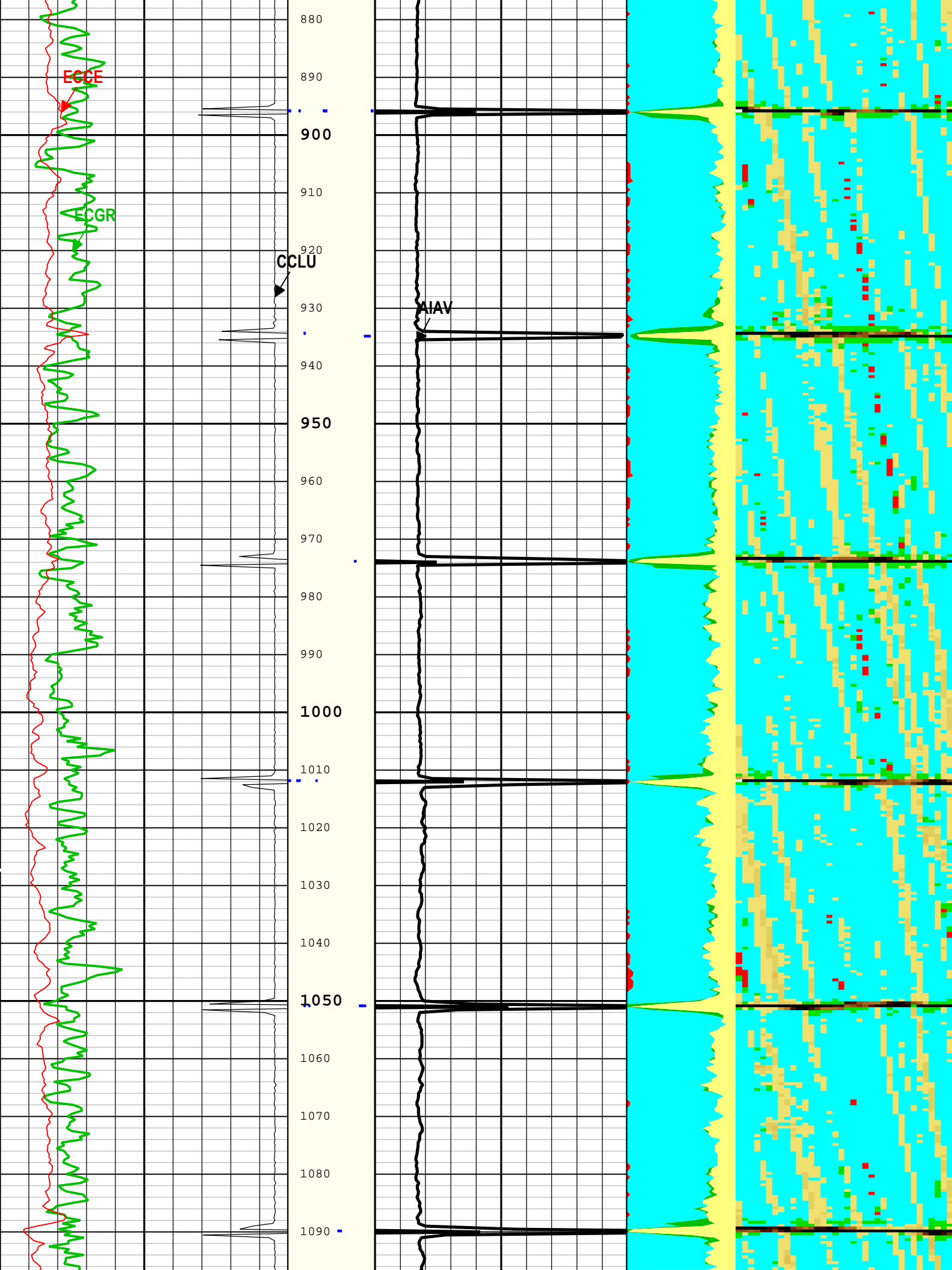


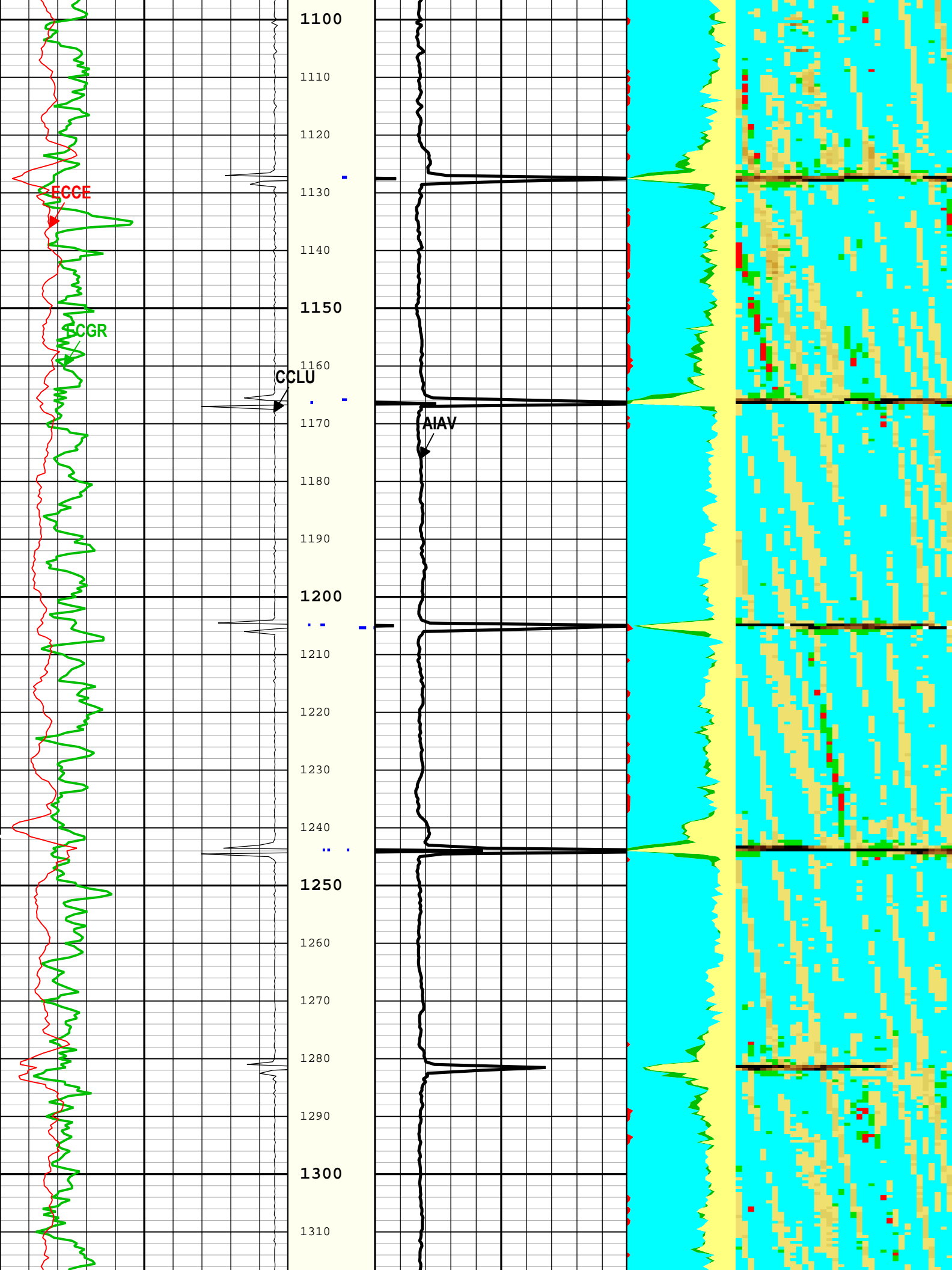


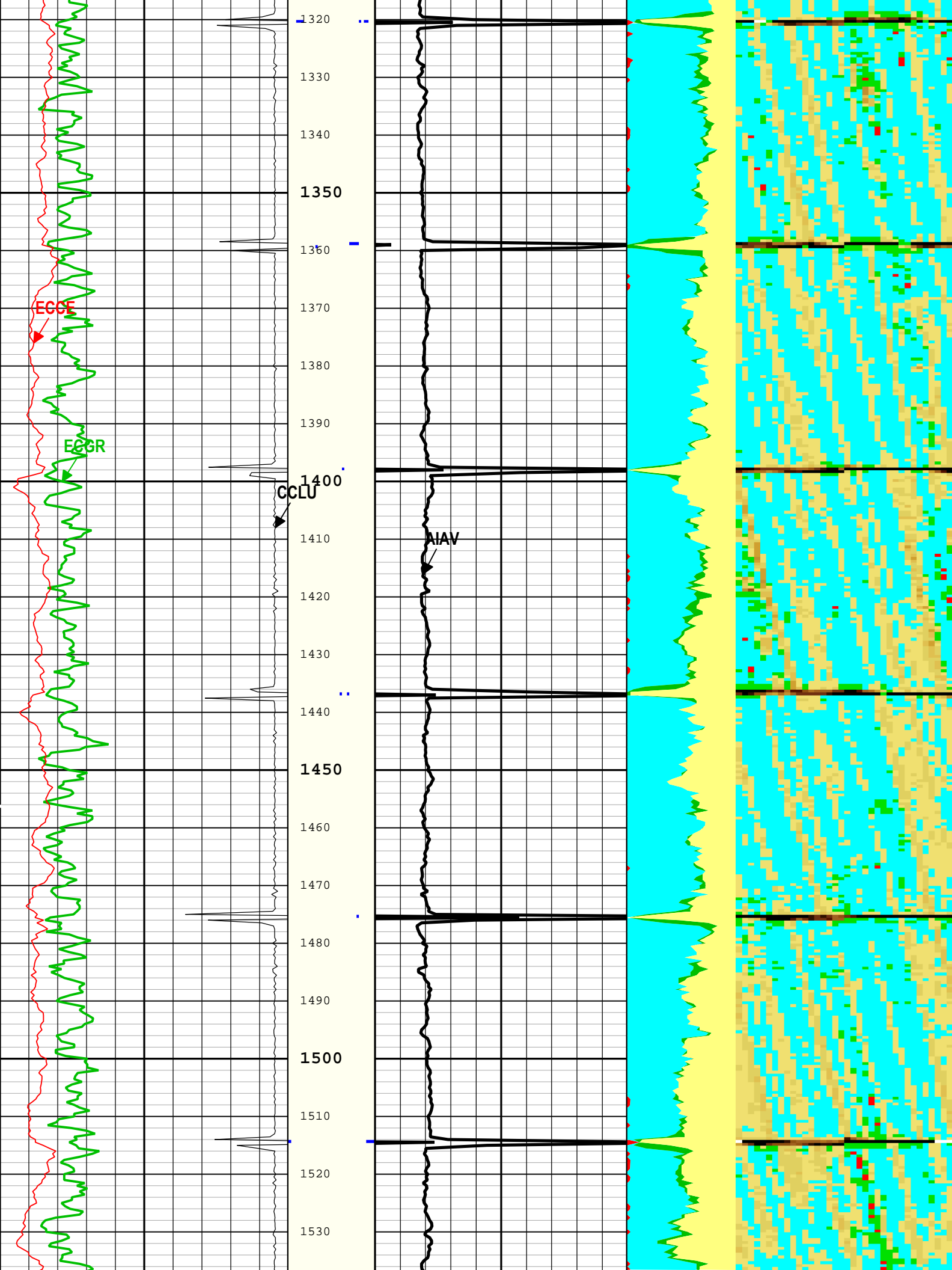


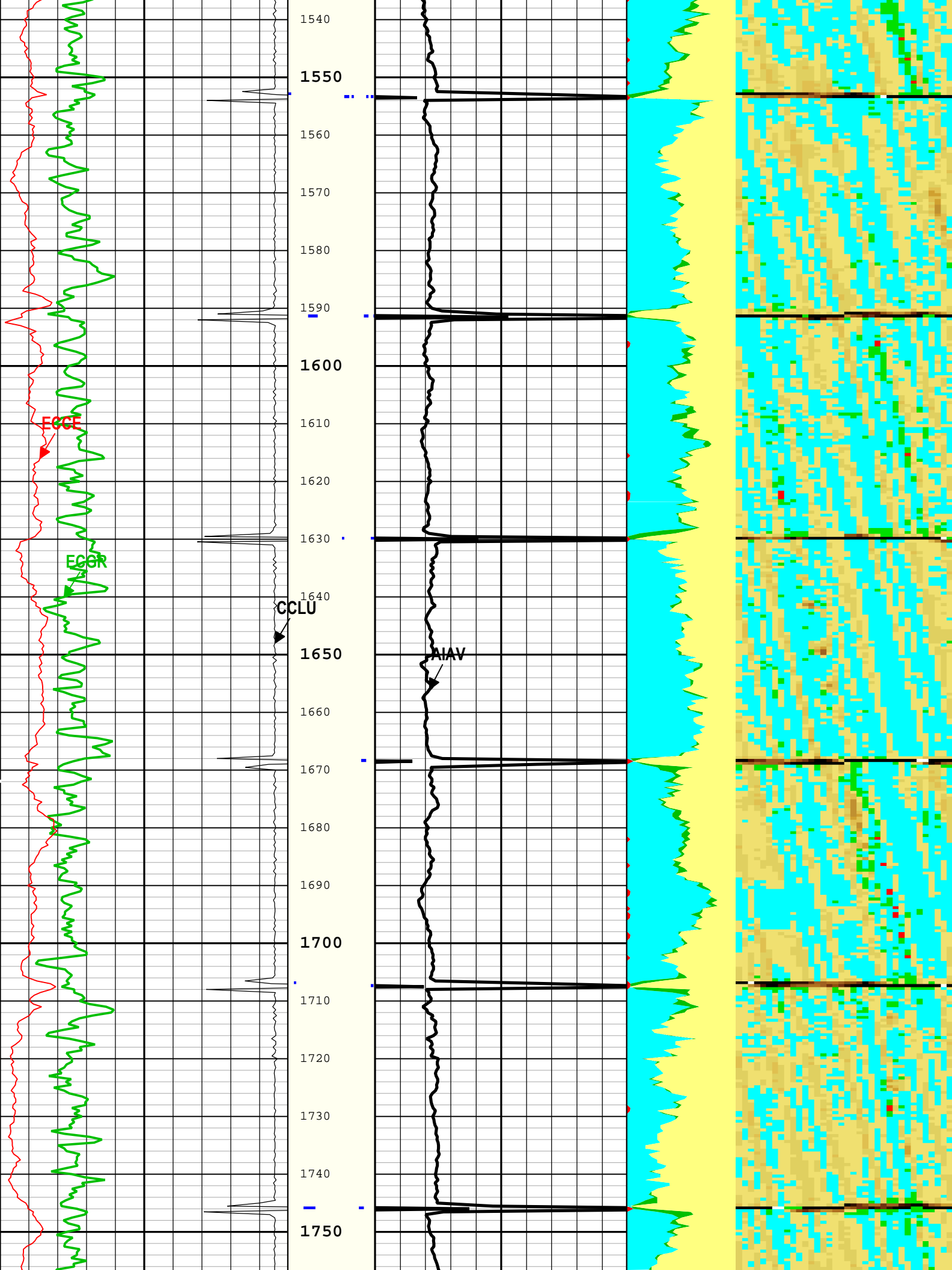


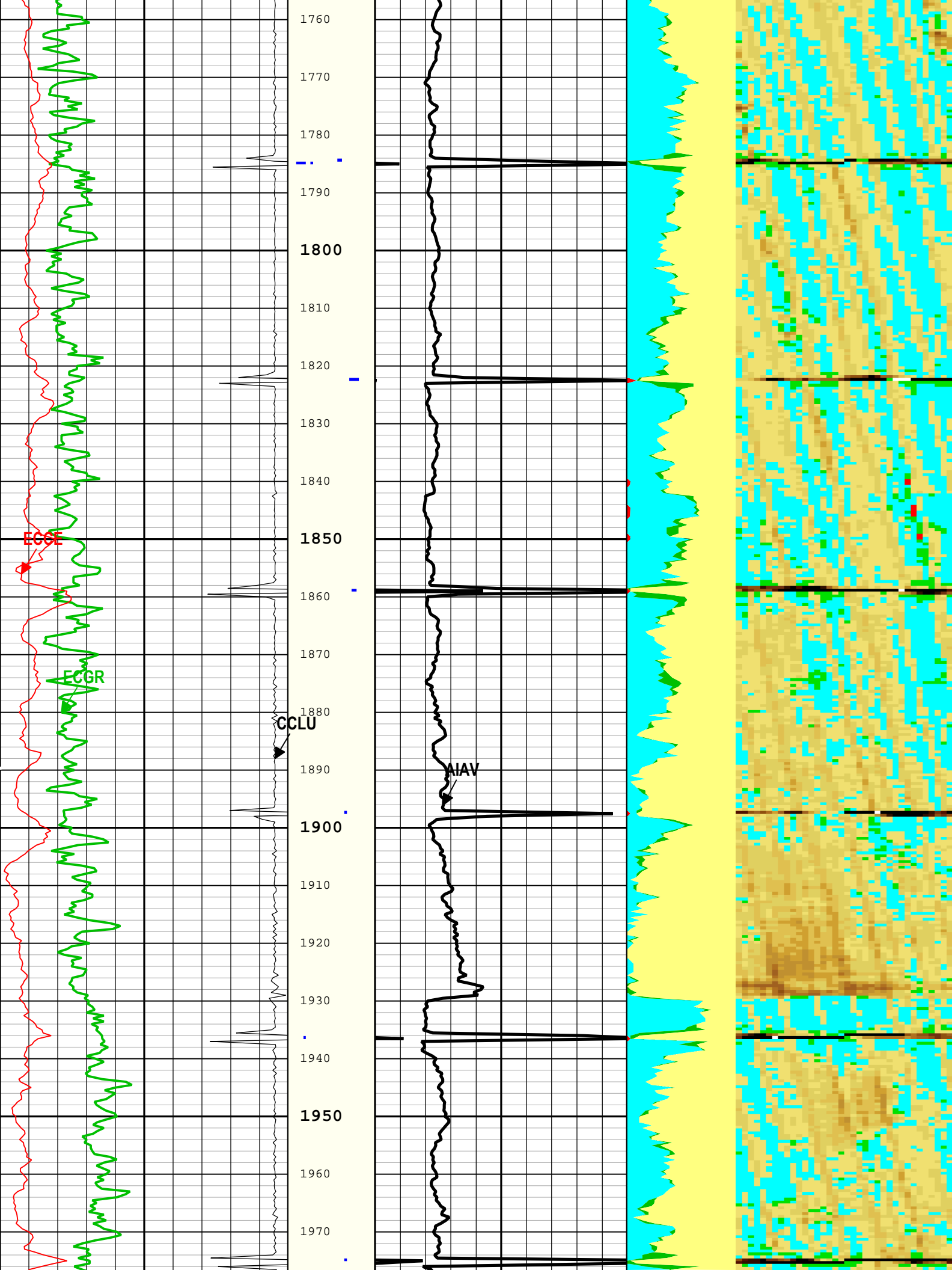


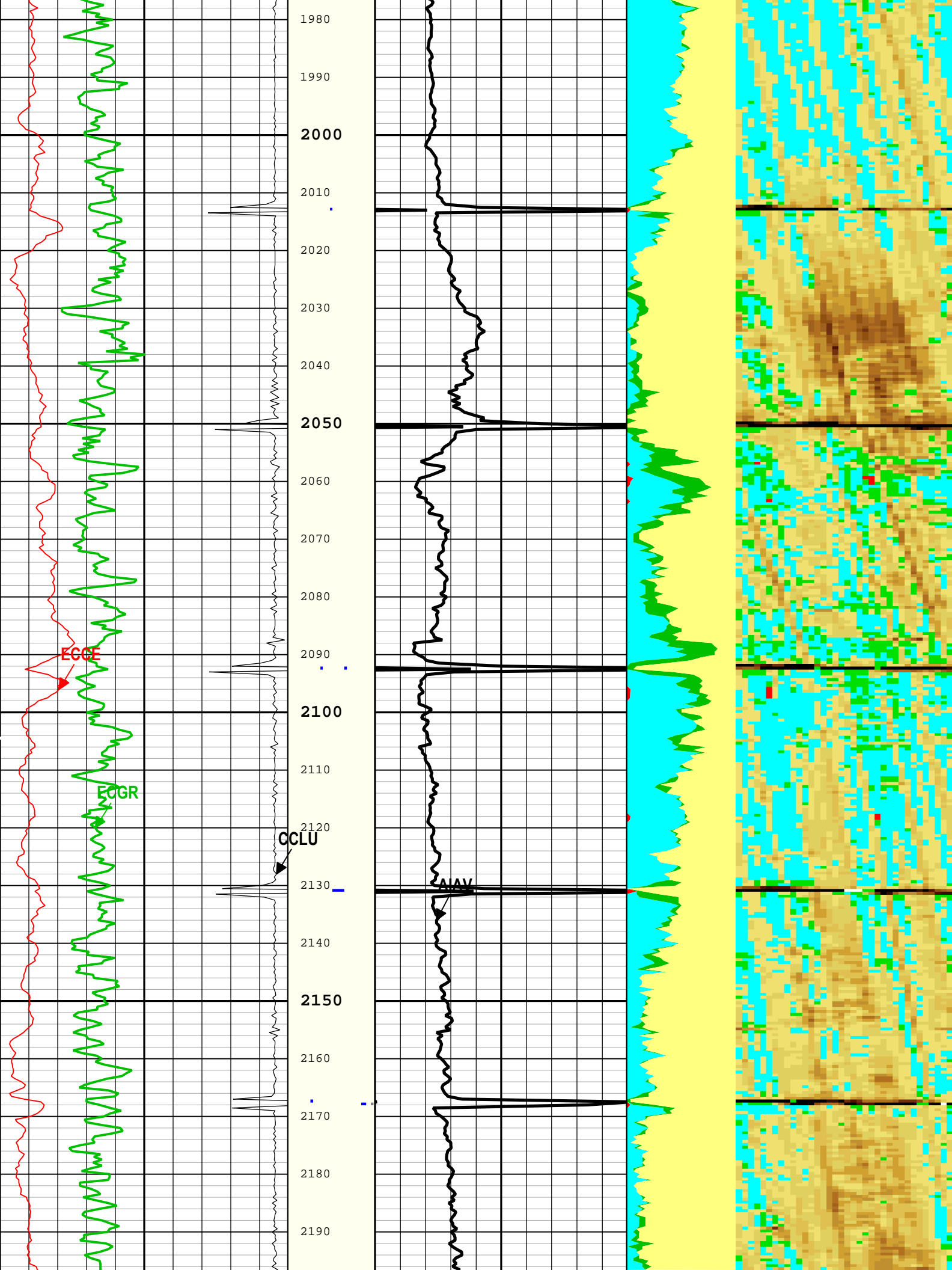


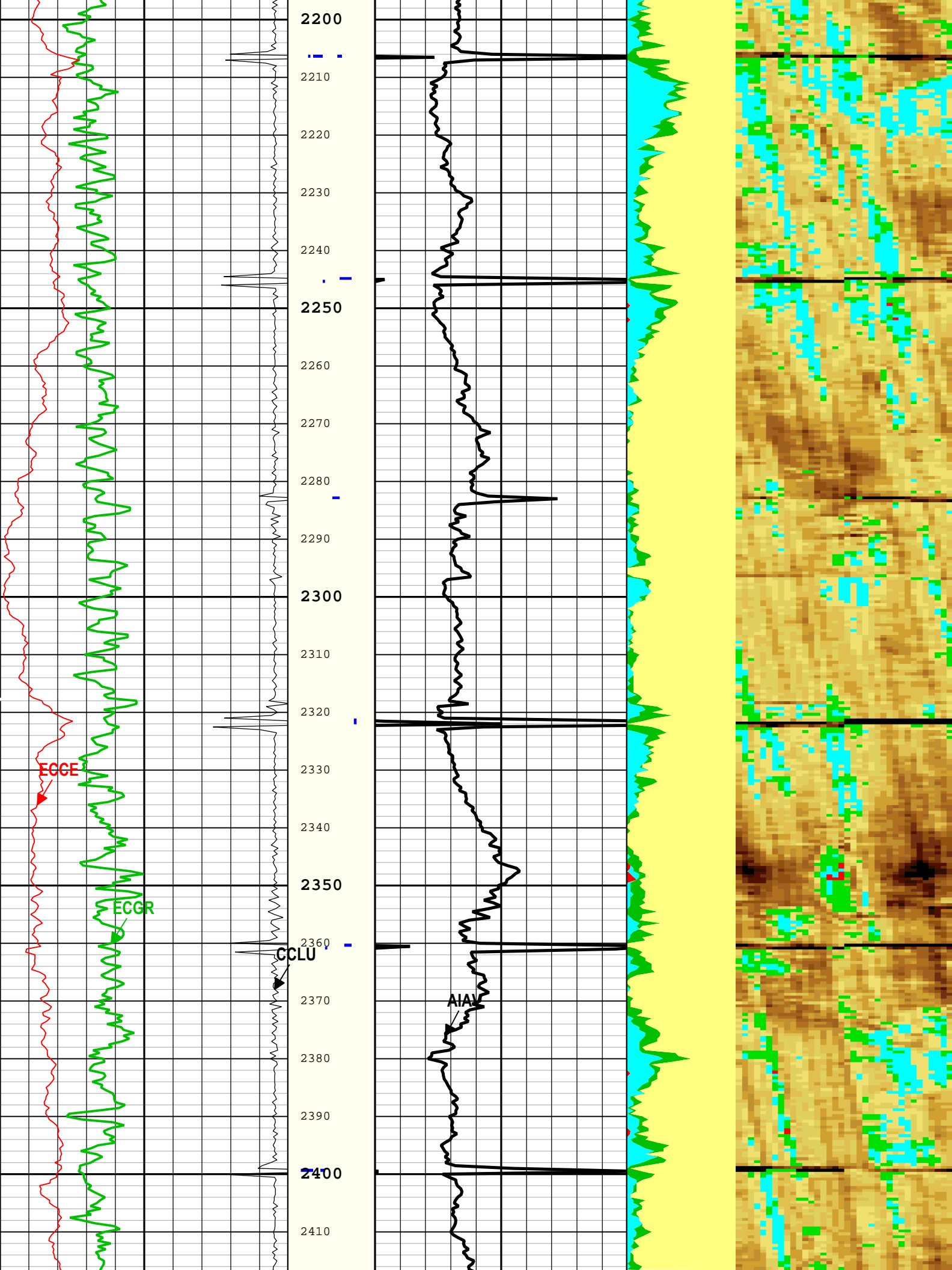




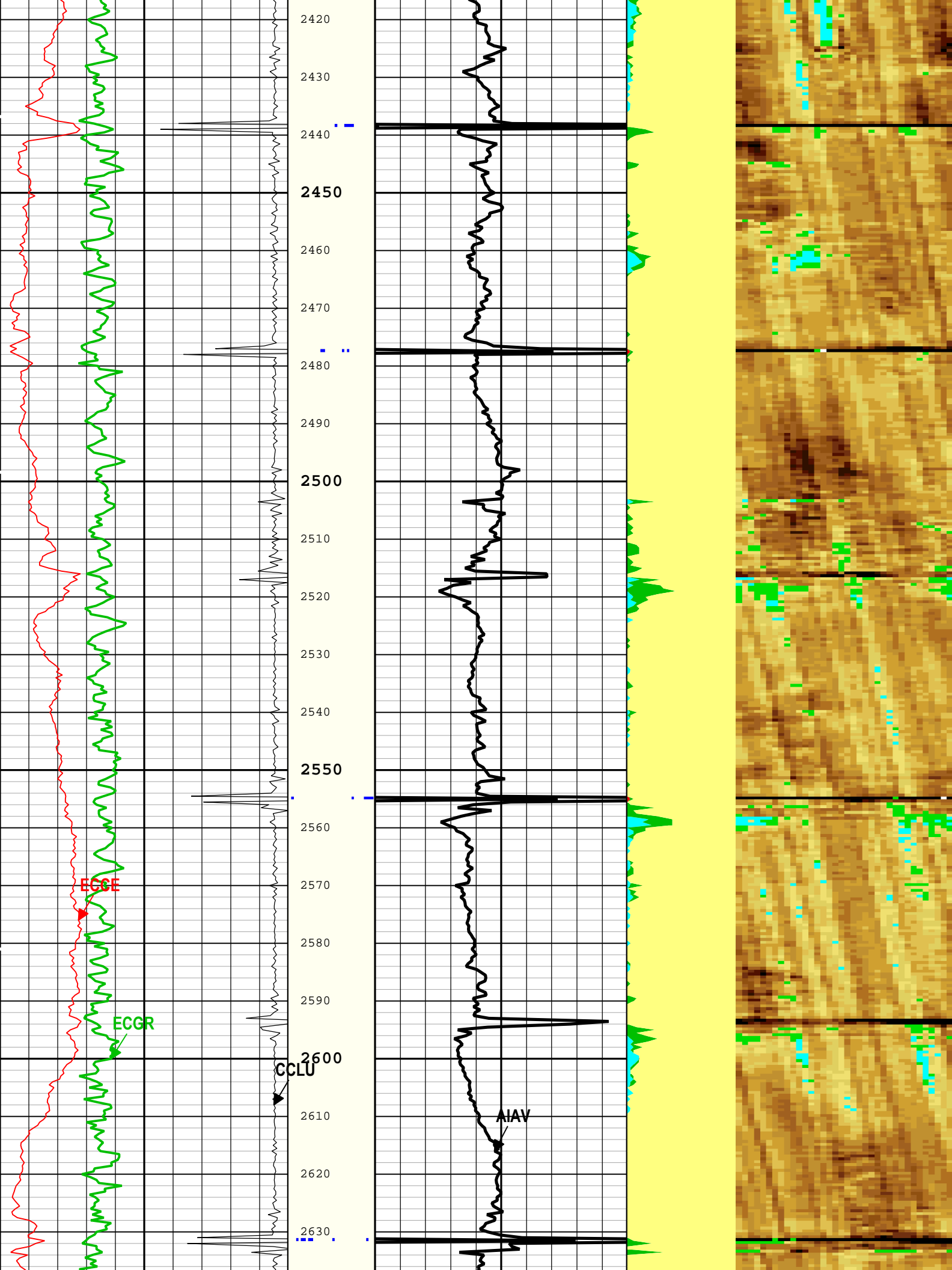


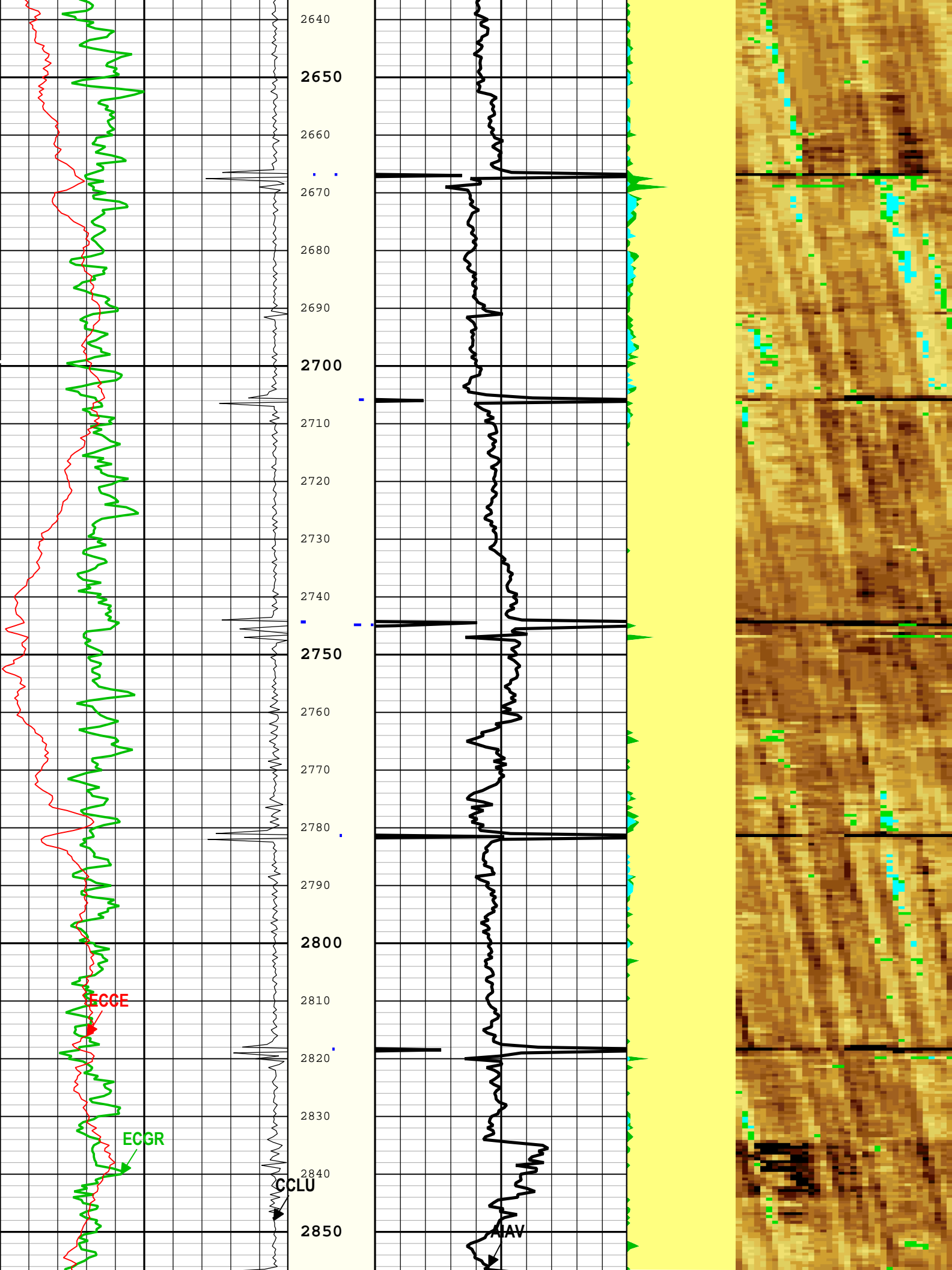


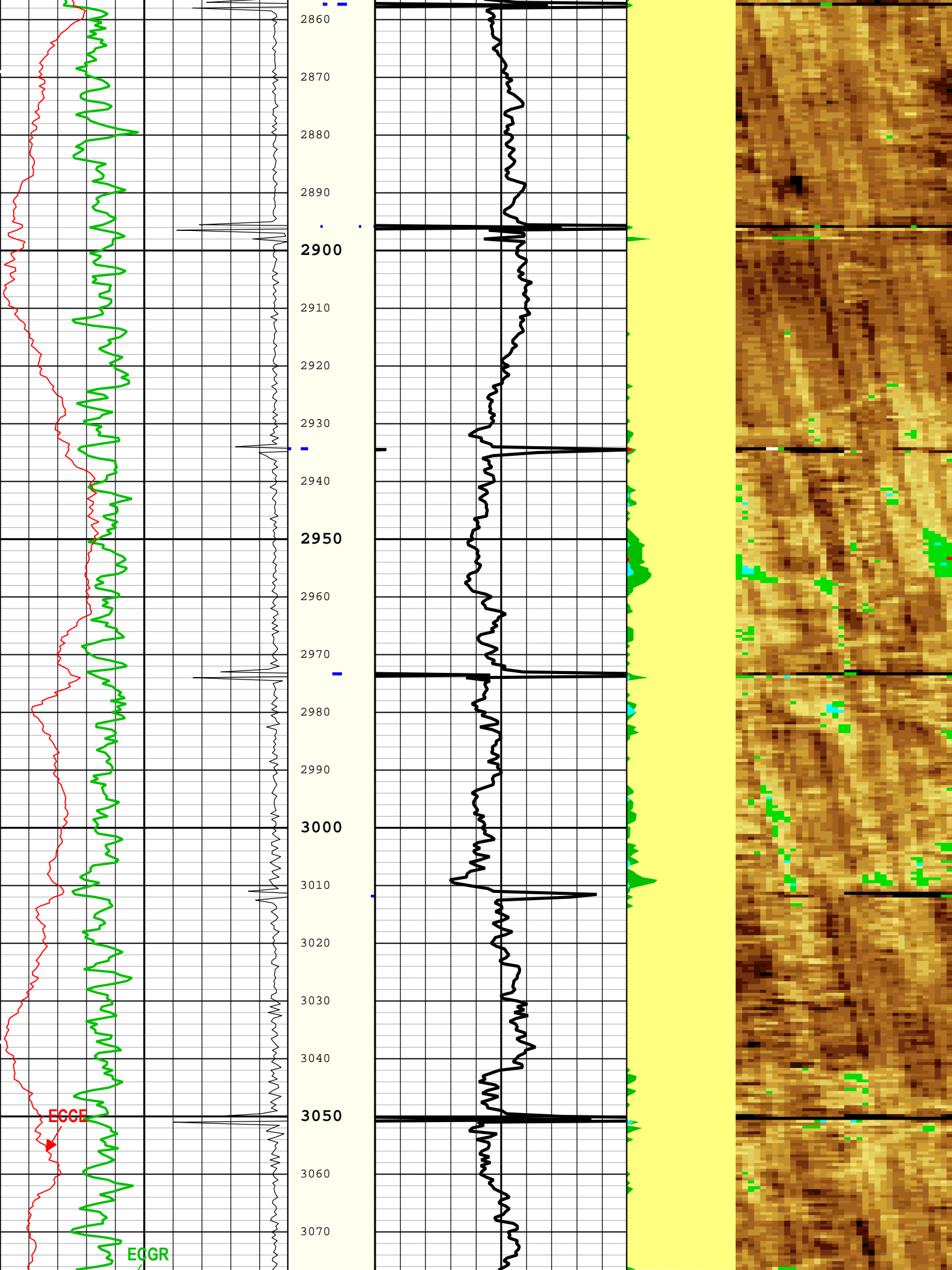


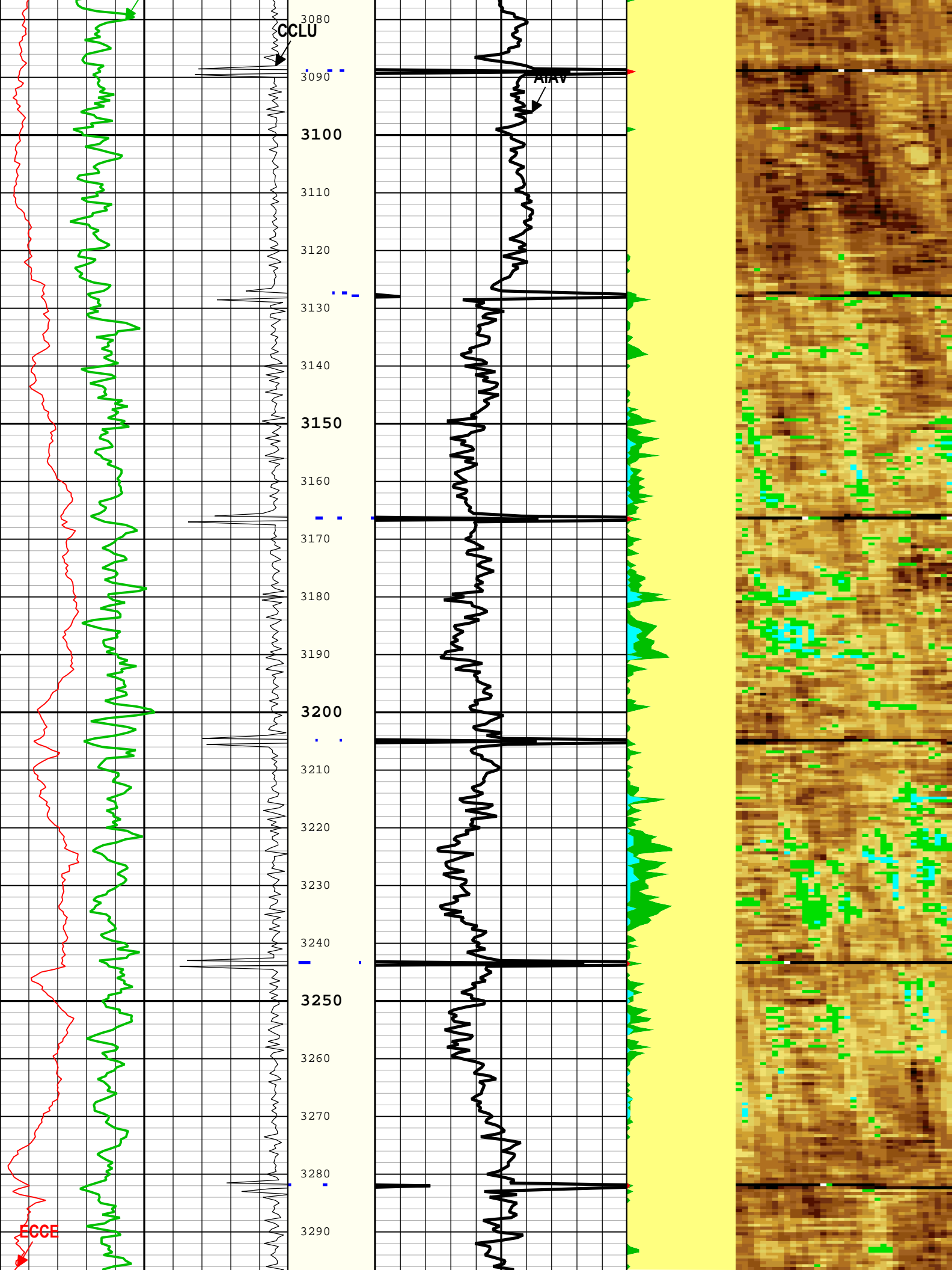


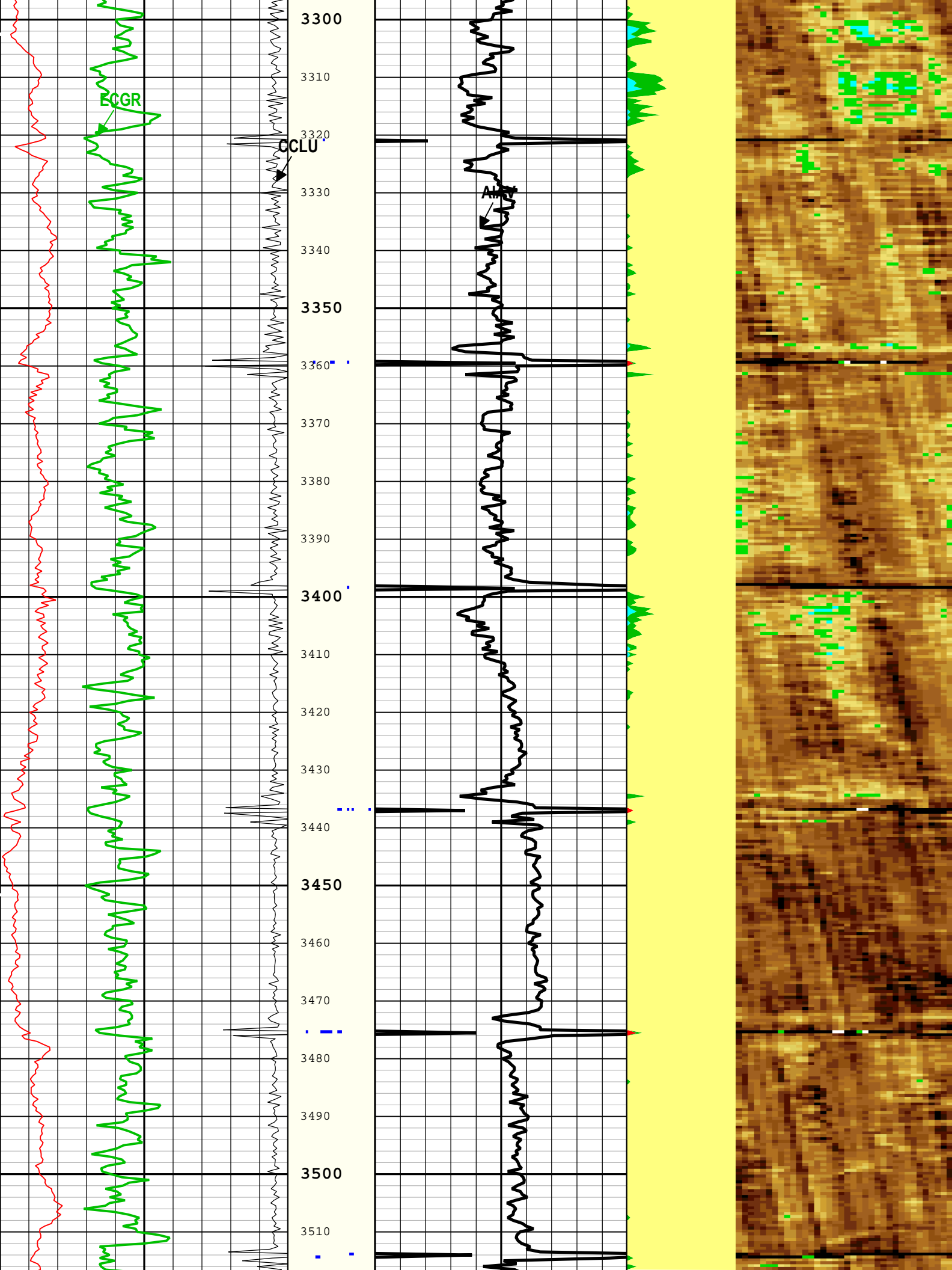


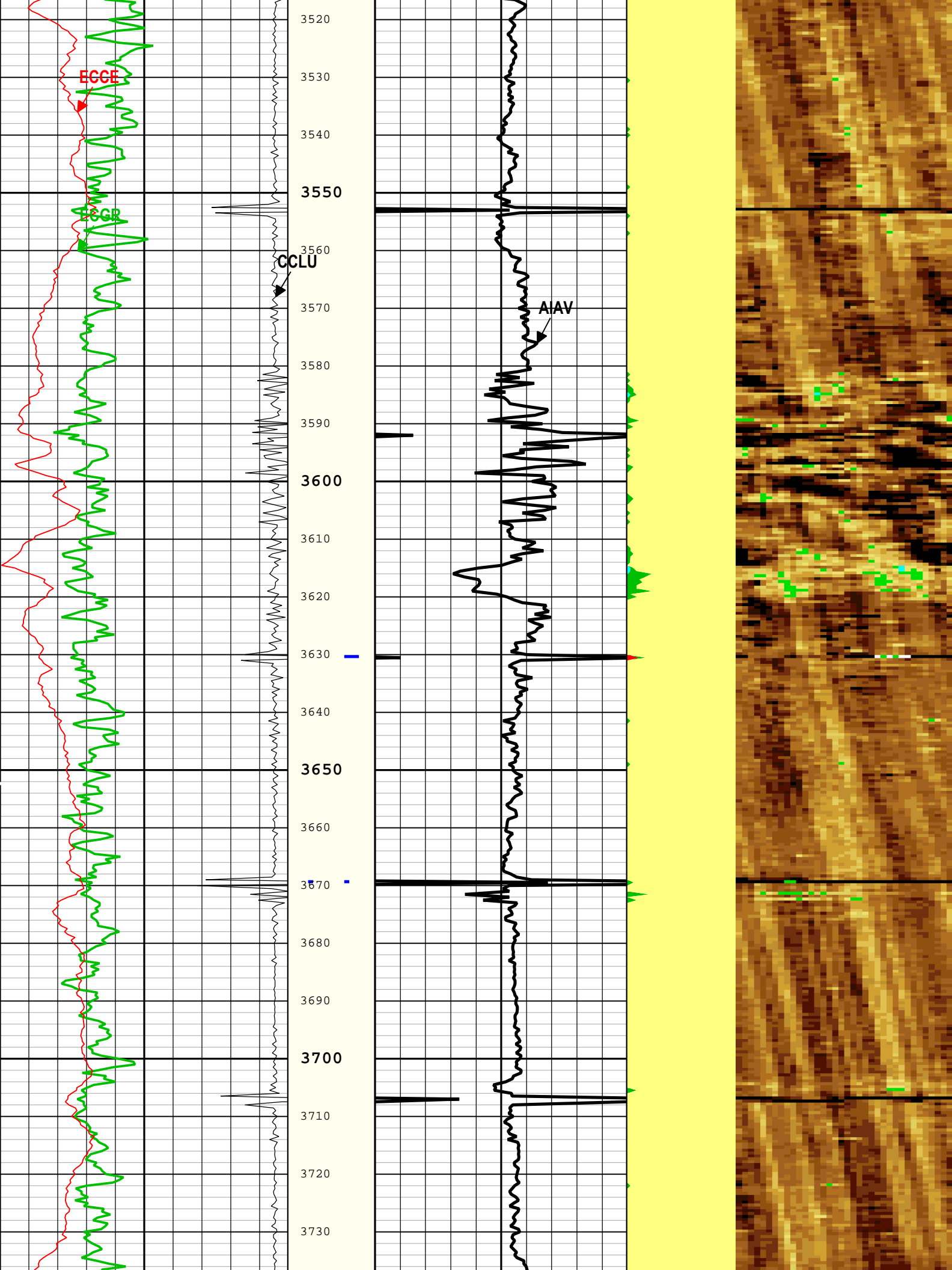


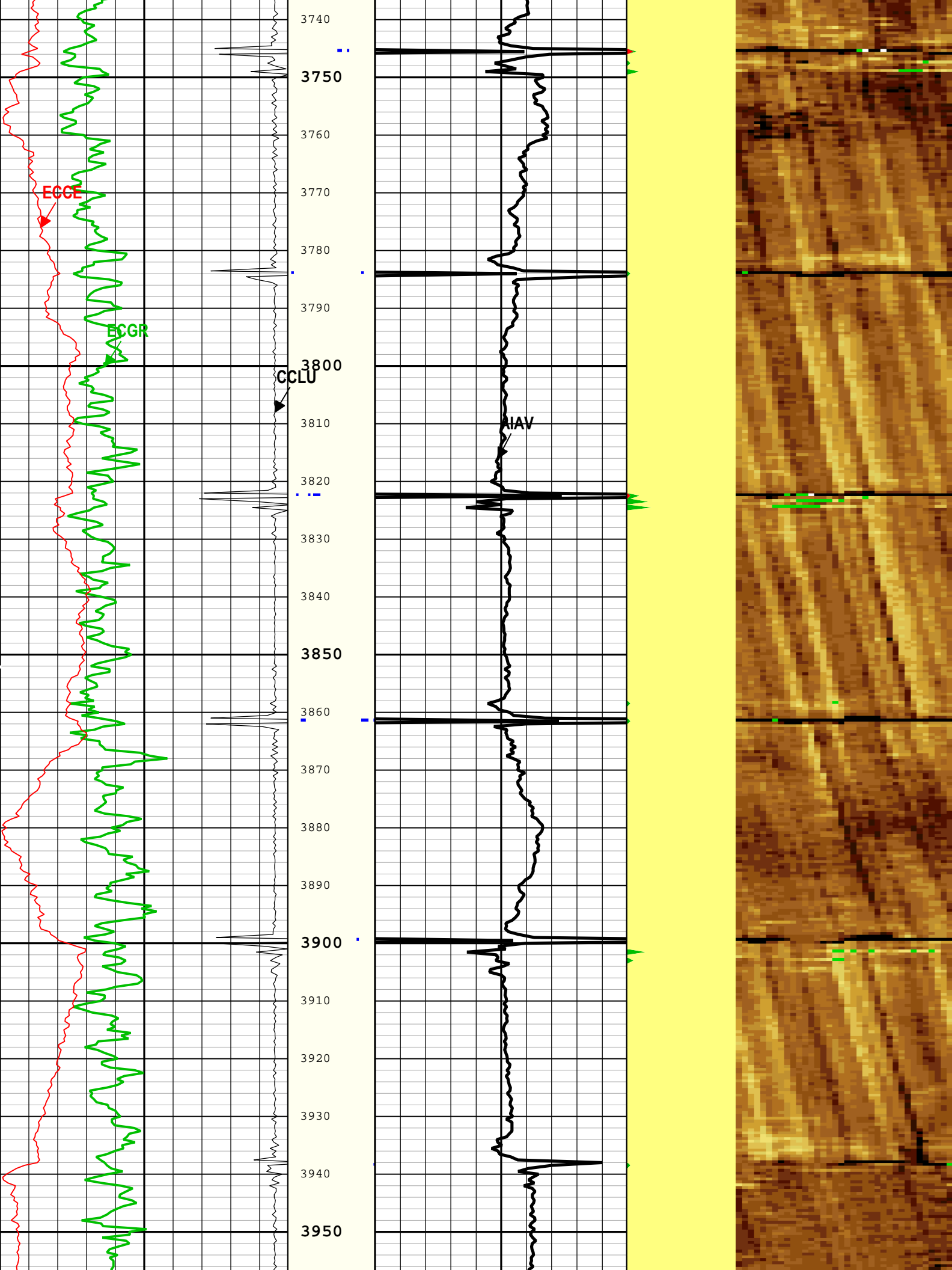


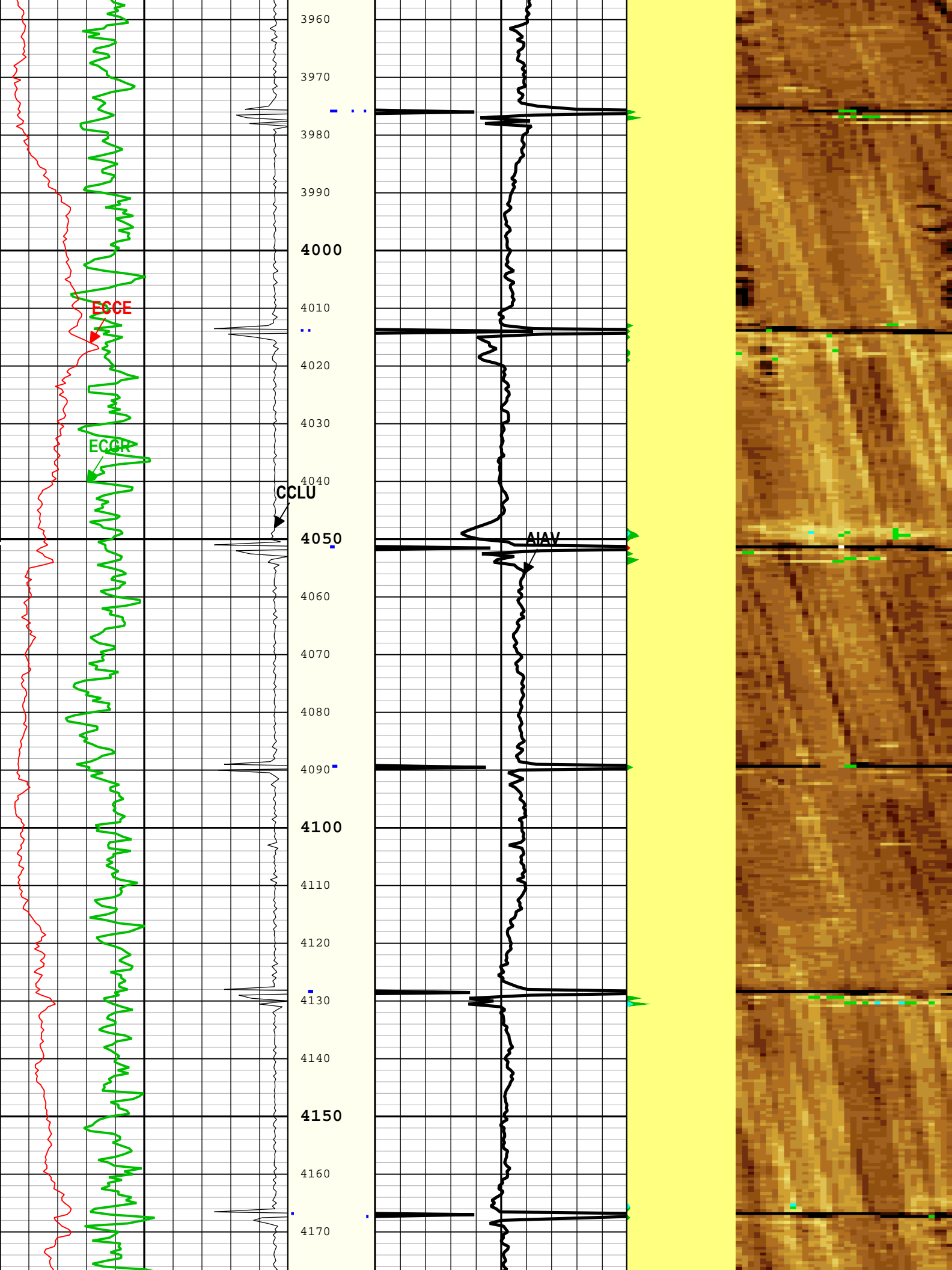




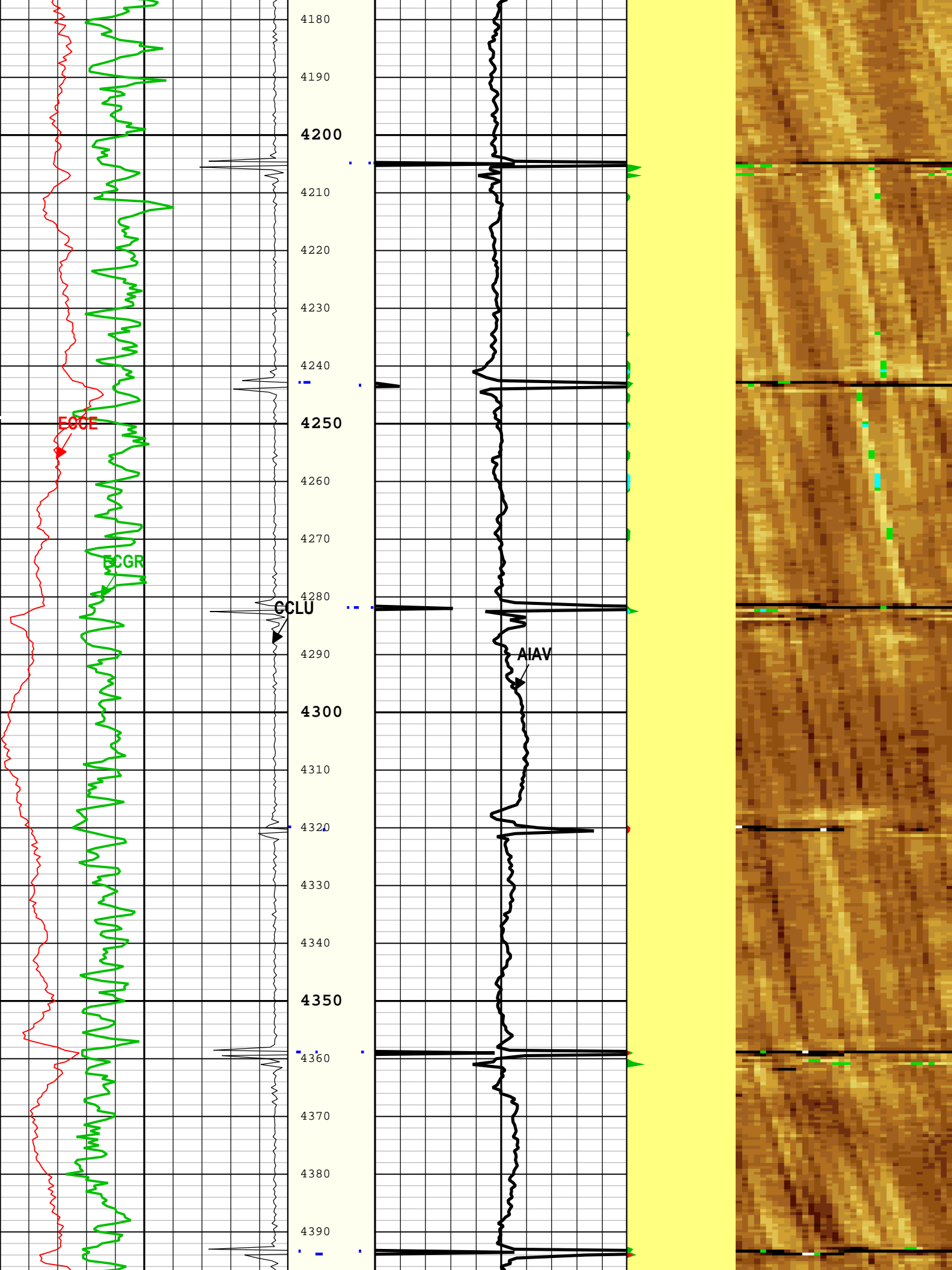


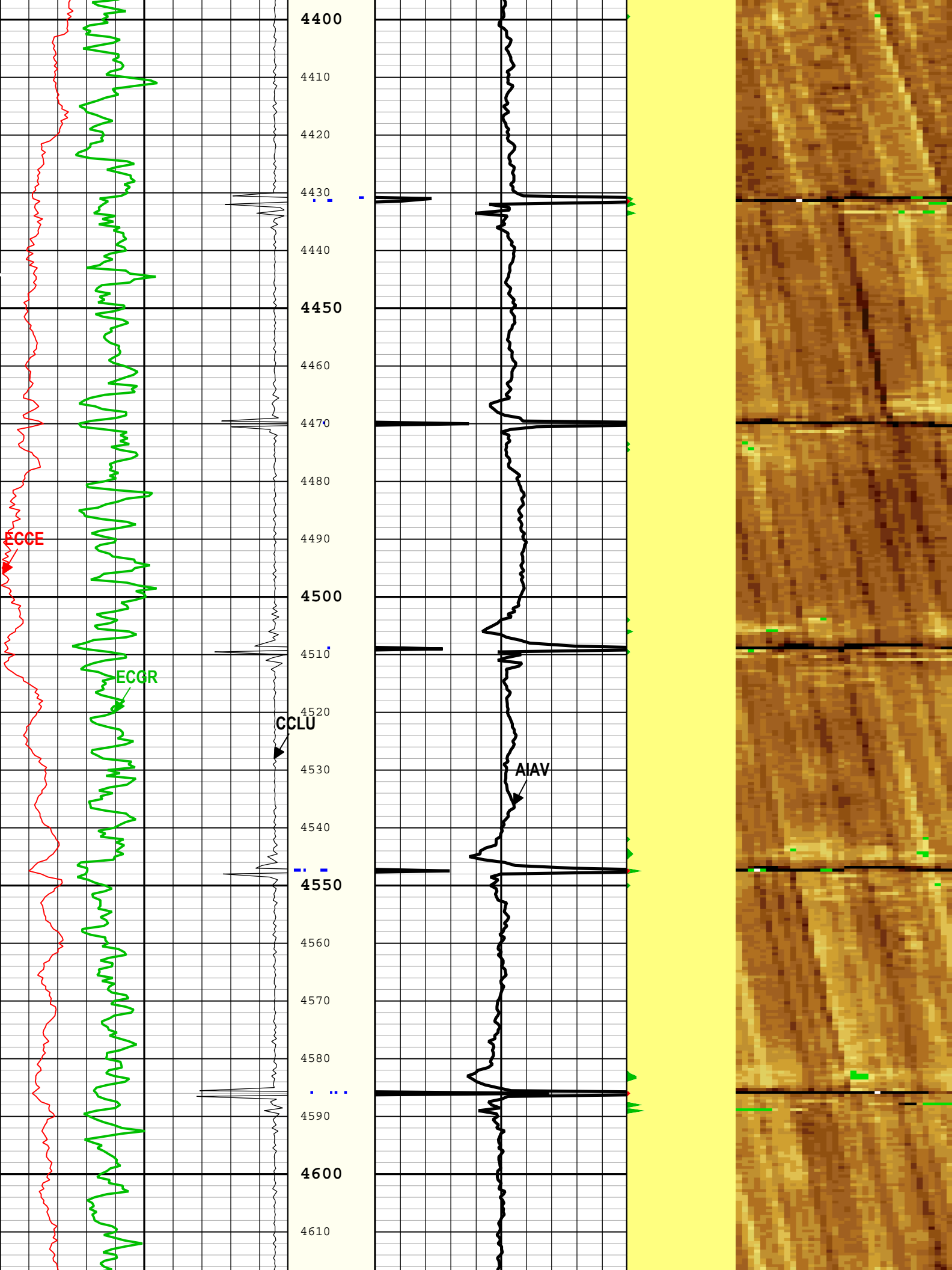


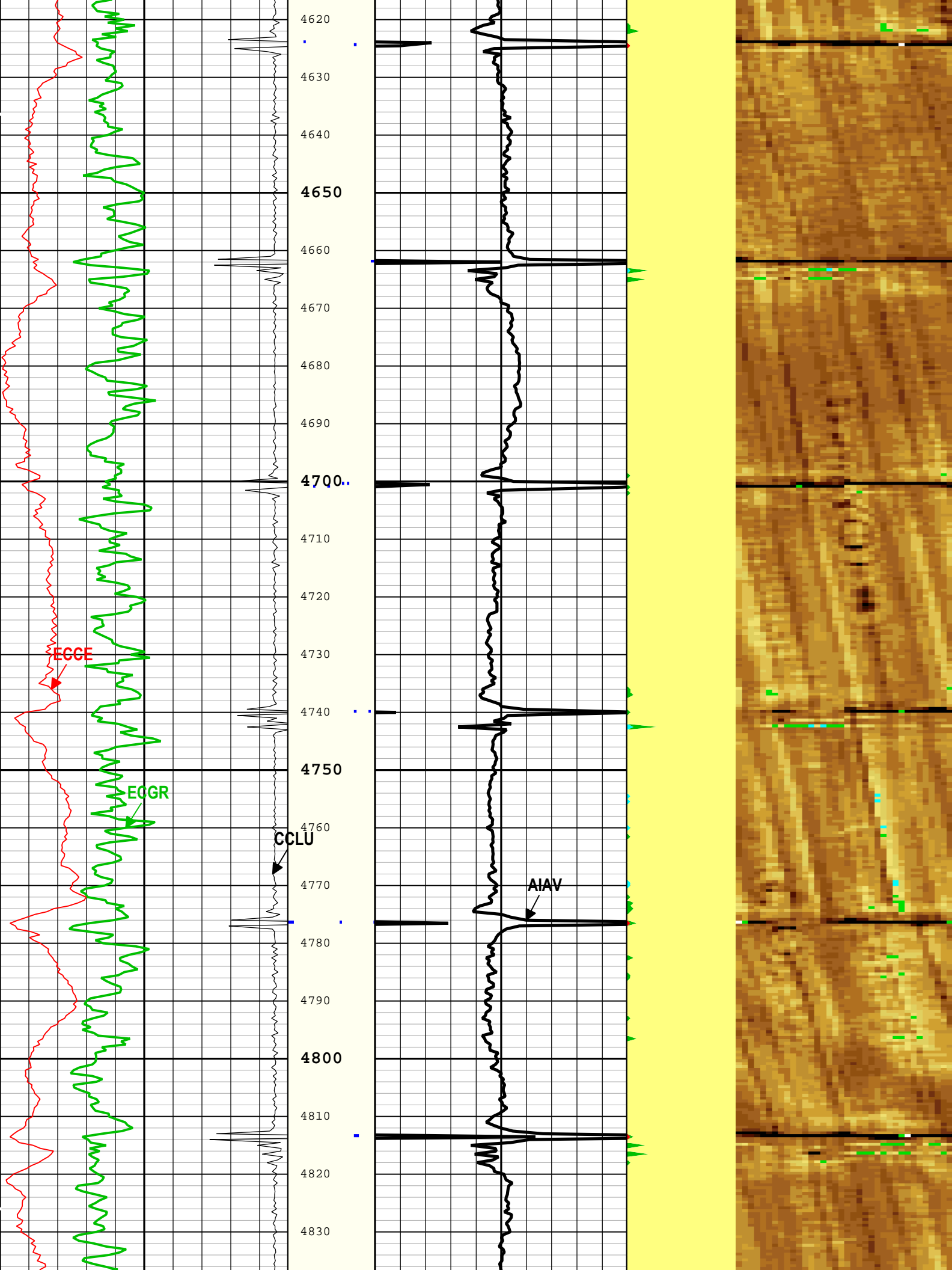


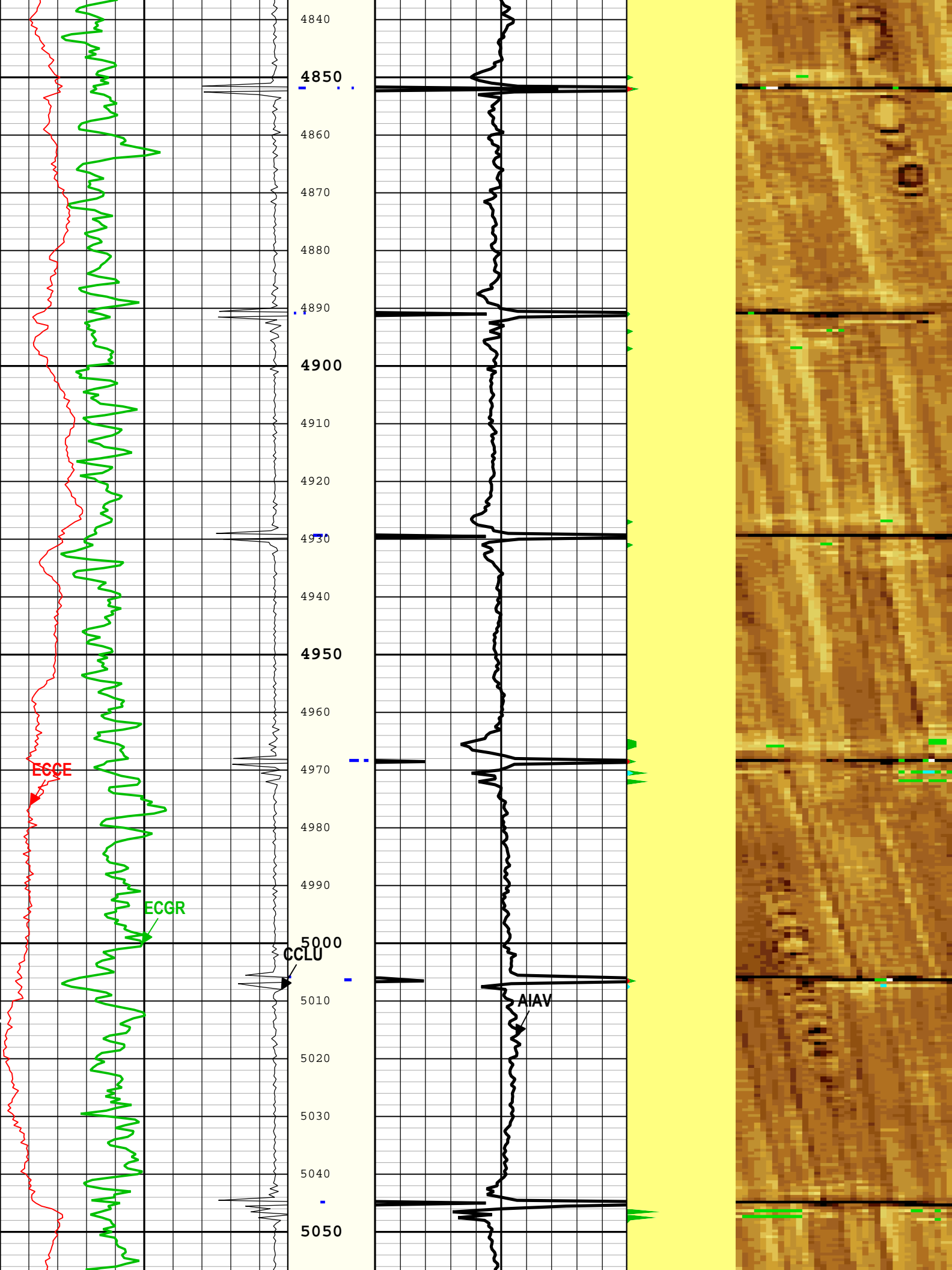


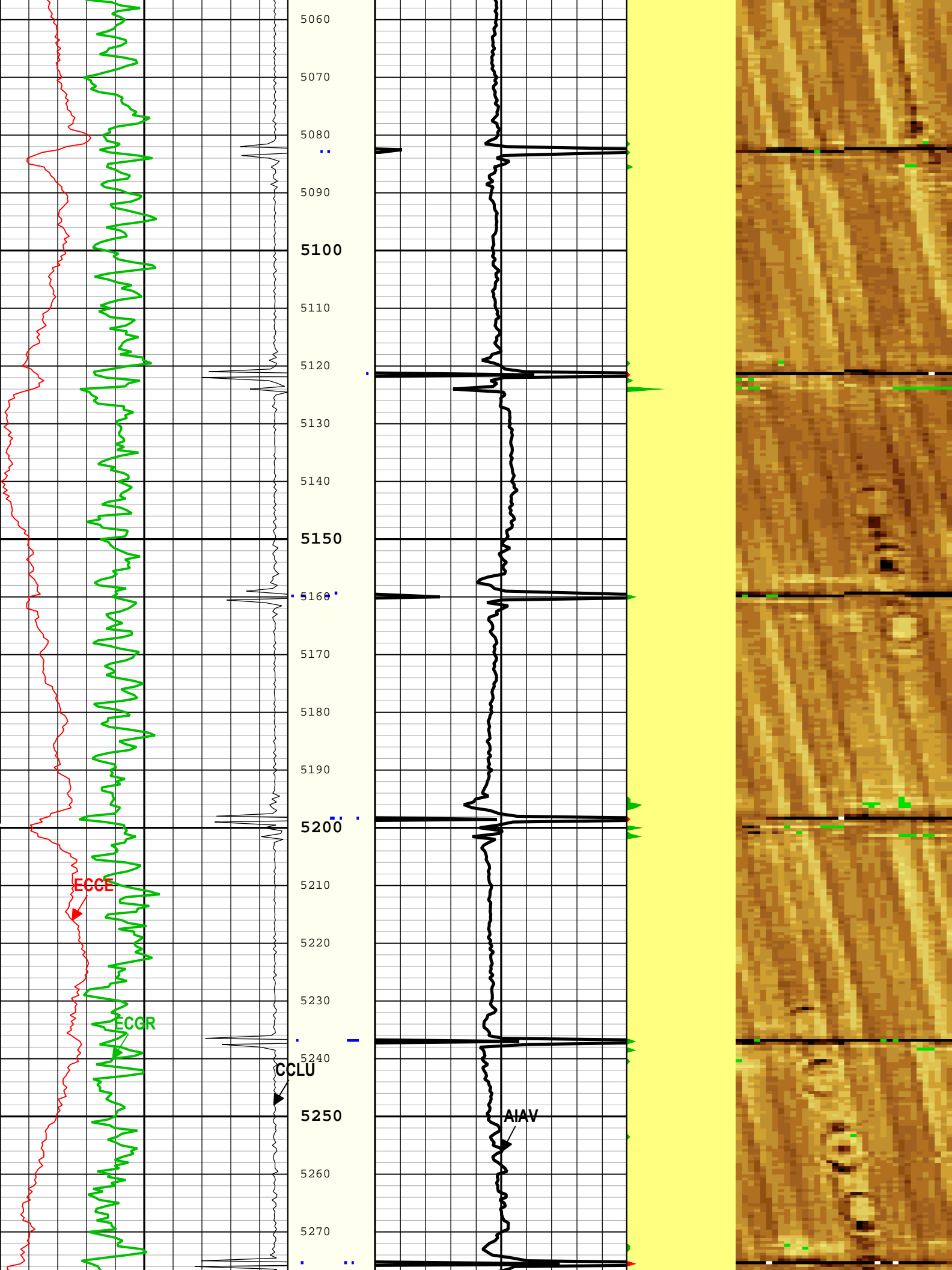


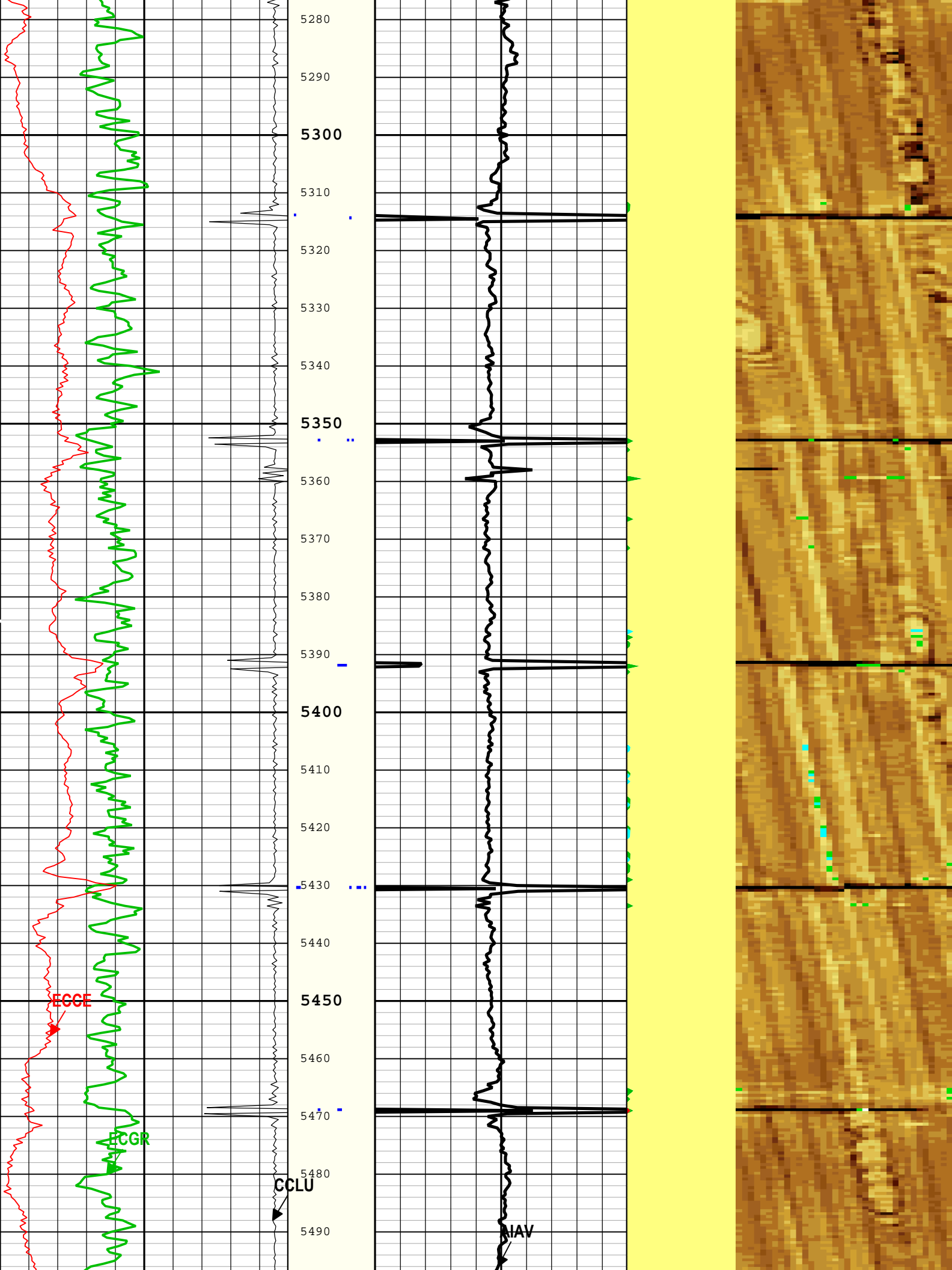


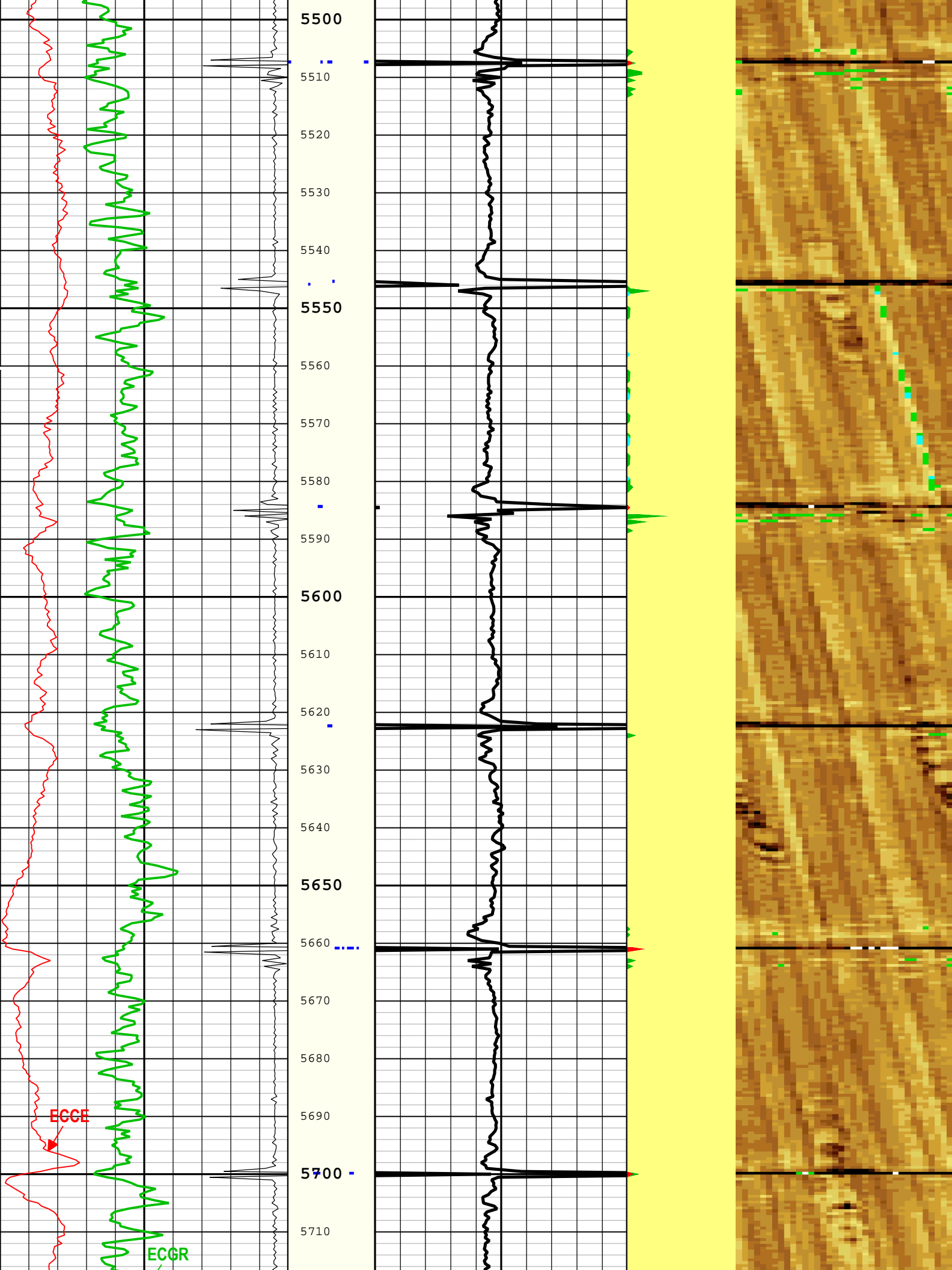


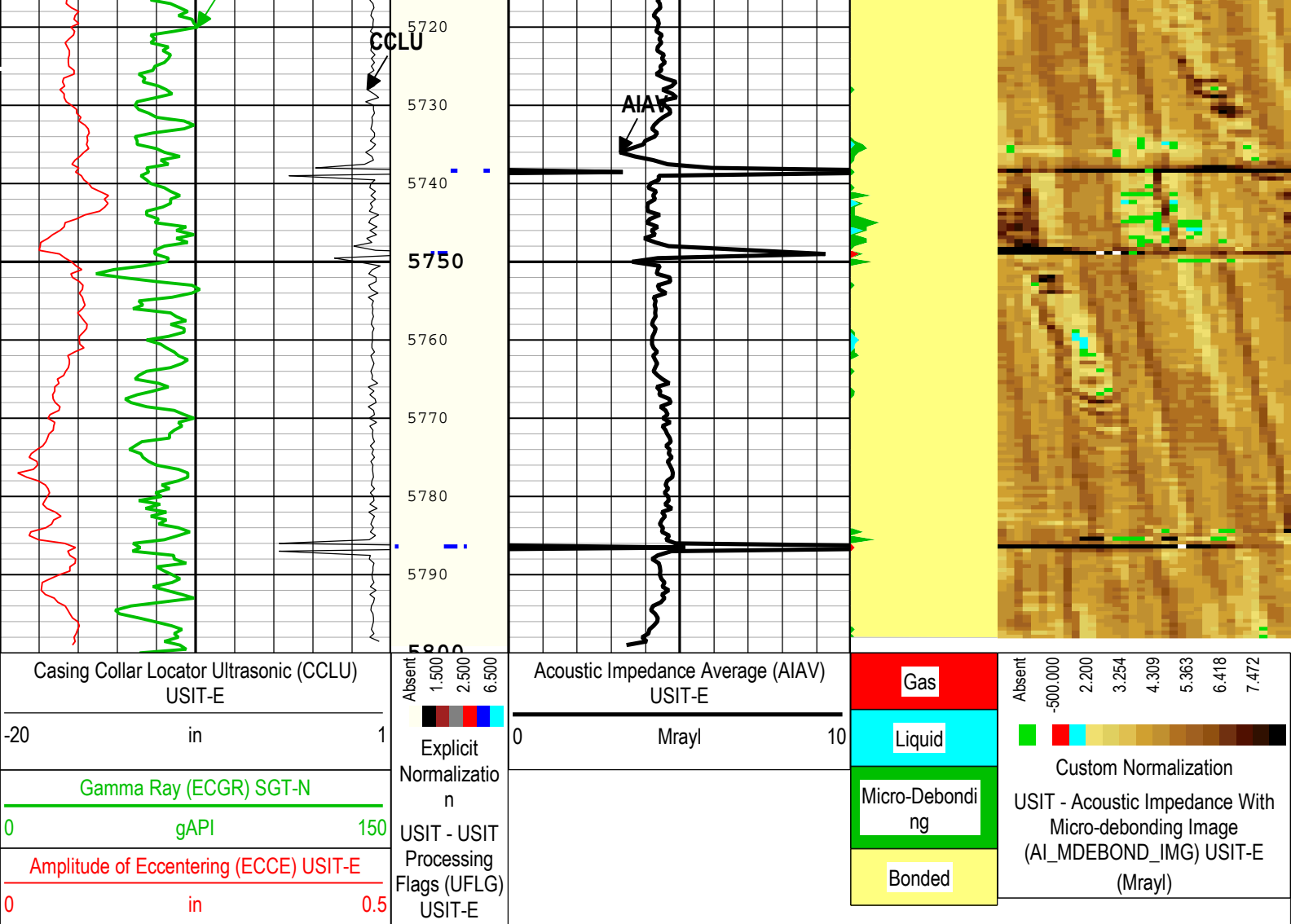












TIME\_1900 - Time Marked every 60.00 (s)

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: 18-Sep-2017 20:04:57

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	5800	ft
CDEN	Cement Density	SGT-N	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
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	1.15	
U-USIT_DESZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl



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	88	110
BS	13.5	110	1920.2
BS	8.5	1920.2	5800

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	Time Zoned	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	7000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

## Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	60	18-Sep-2017 18:30:26	18-Sep-2017 18:32:33	6403.46	6401.54
EMXV	70	18-Sep-2017 18:32:33	18-Sep-2017 19:18:38	6401.54	70.75

All depth are at tool zero.

## One

## 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
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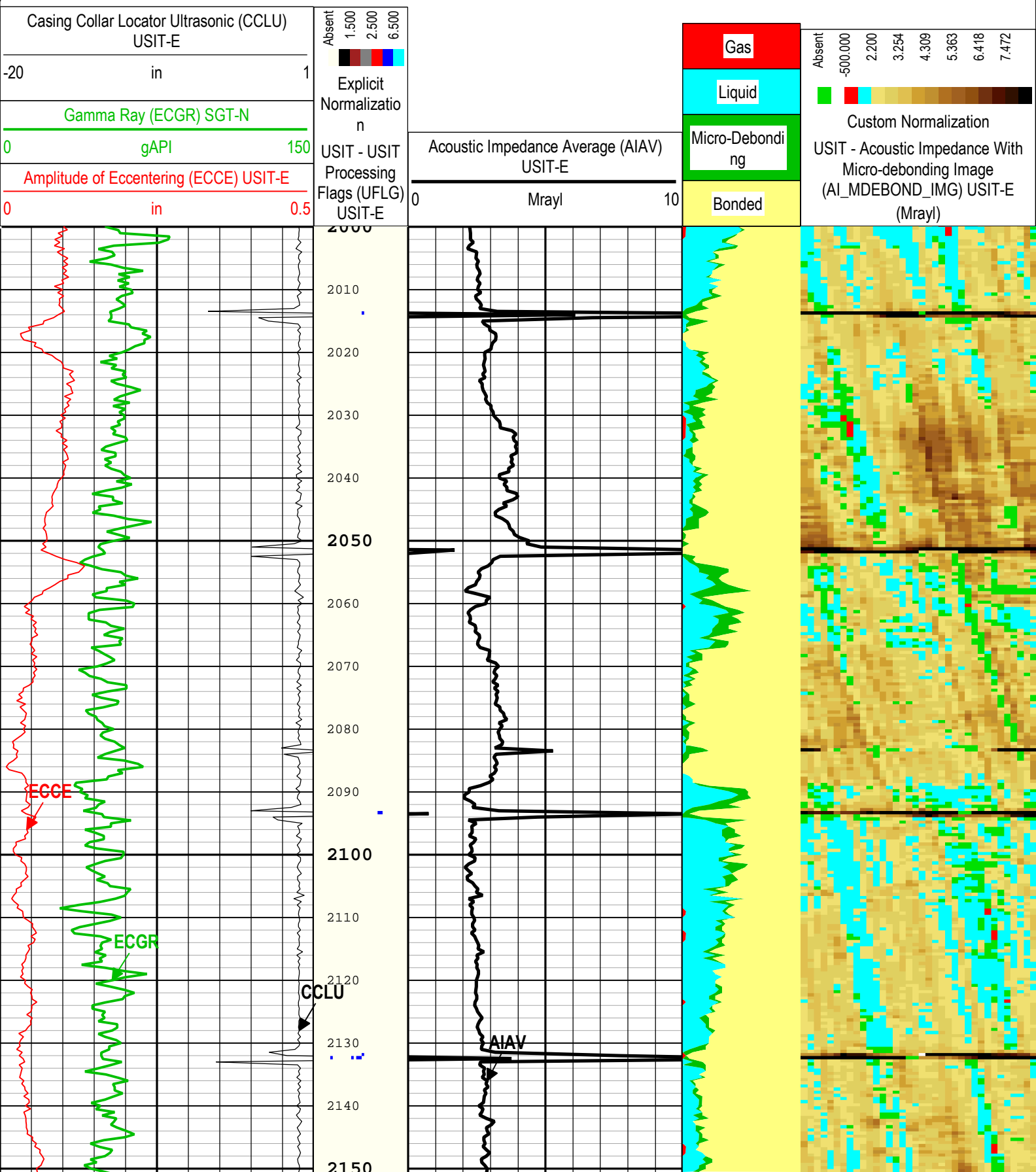
One	Log[2]:Up	Up	1961.25 ft	2548.74 ft	18-Sep-2017 5:53:09 PM	18-Sep-2017 5:57:14 PM	ON	1.74 ft	Yes
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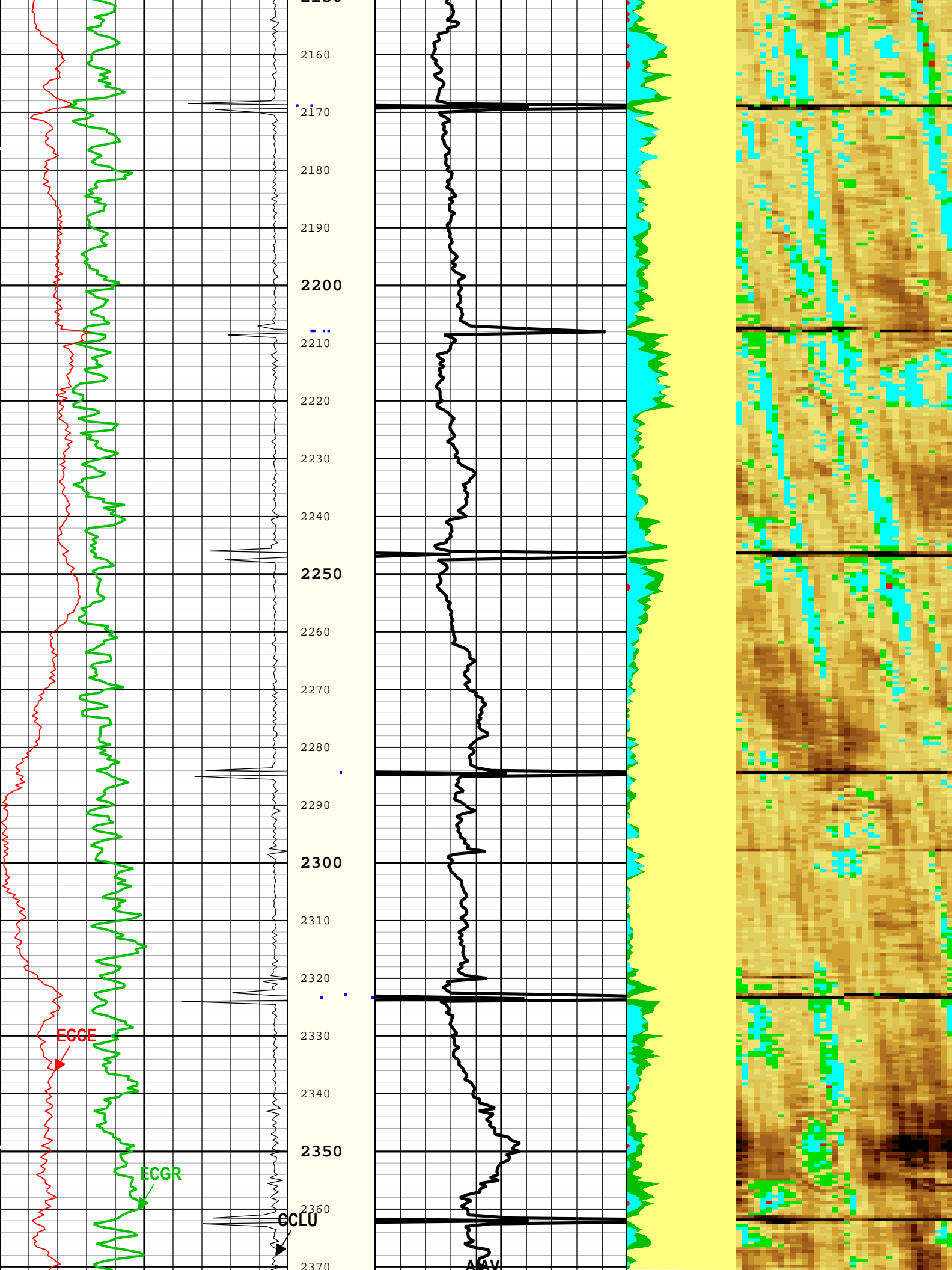
All depths are referenced to toolstring zero

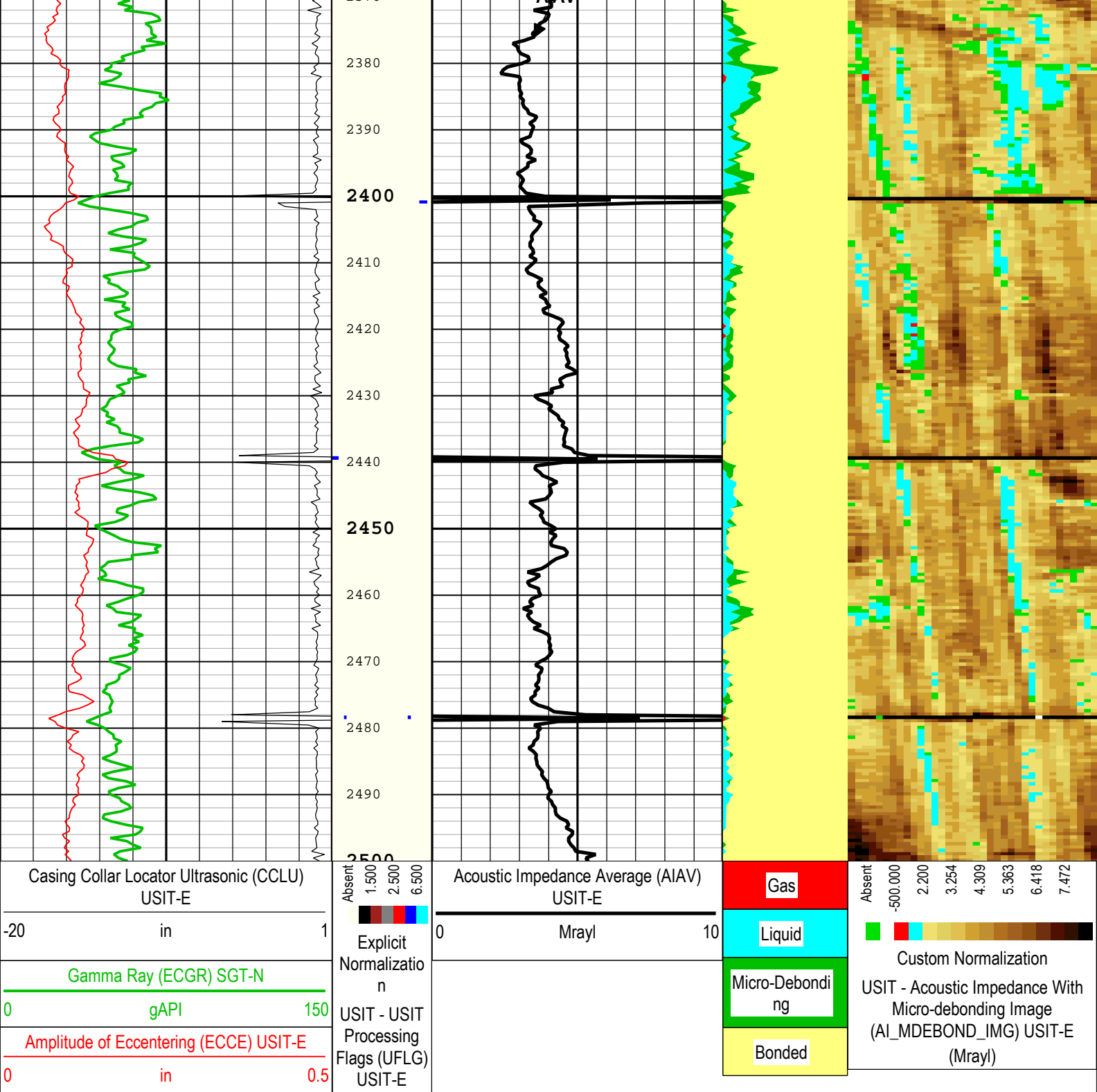
Log	Company:Noble Energy INC	Well:Wells Ranch BB11-643
	One: Log[2]:Up:S007	

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: 18-Sep-2017 20:05:03

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: 18-Sep-2017 20:05:03

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	8.5	in
CBLO	Casing Bottom (Logger)	WLSESSION	5800	ft
CDEN	Cement Density	SGT-N	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
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	1.15	
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

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	60	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	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 BB11-643

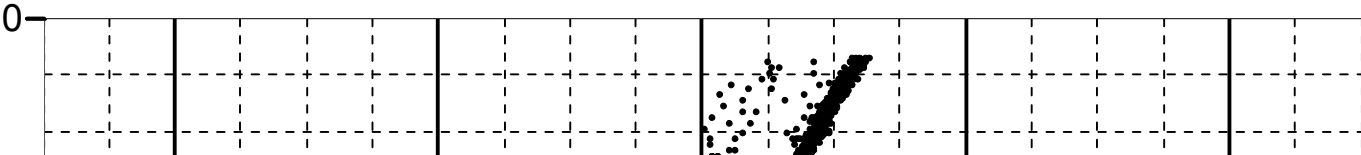
One: Log[4]:Up:S007

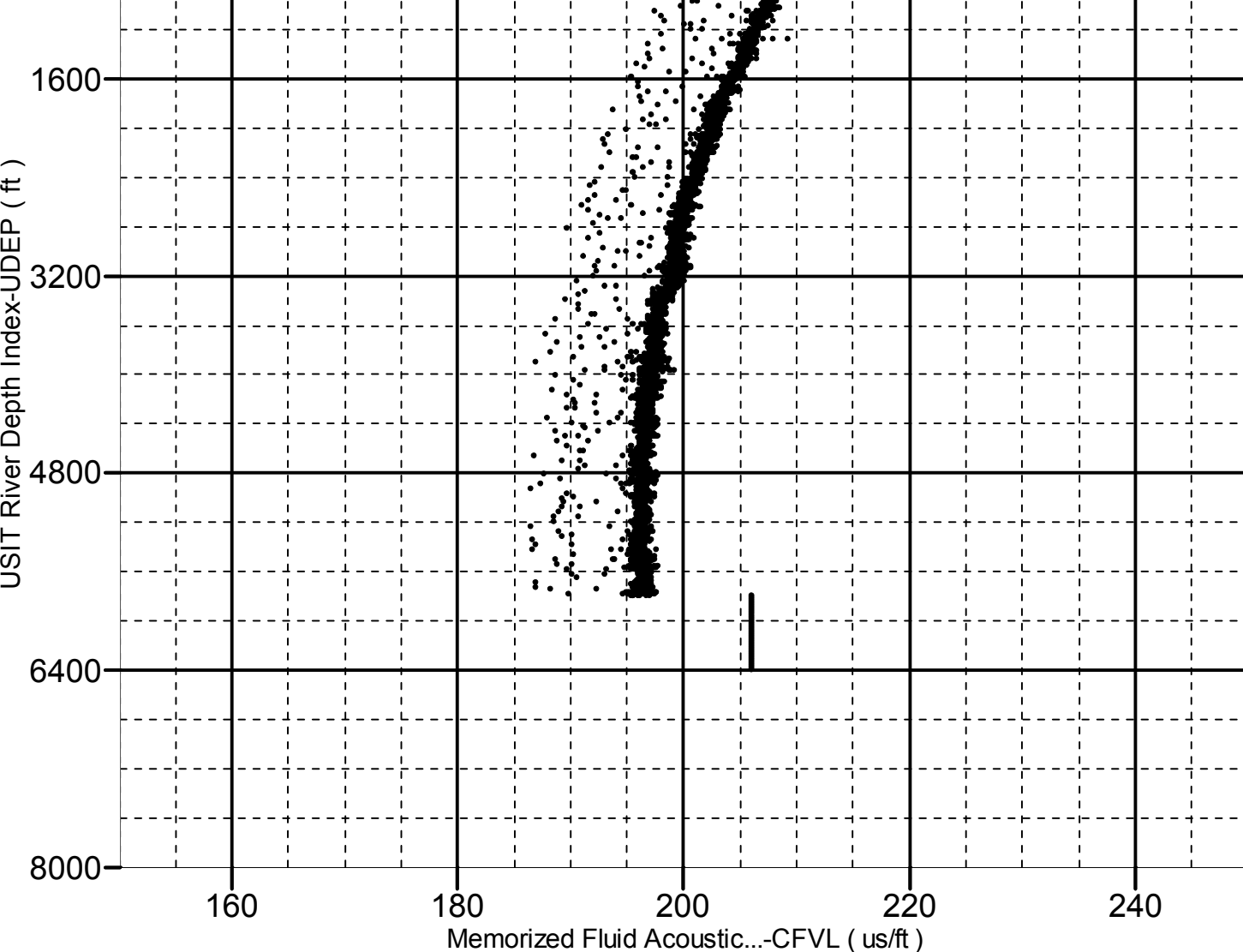
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 5800.00 to 88.00 ft

● CFVL-UDEP





XYZ

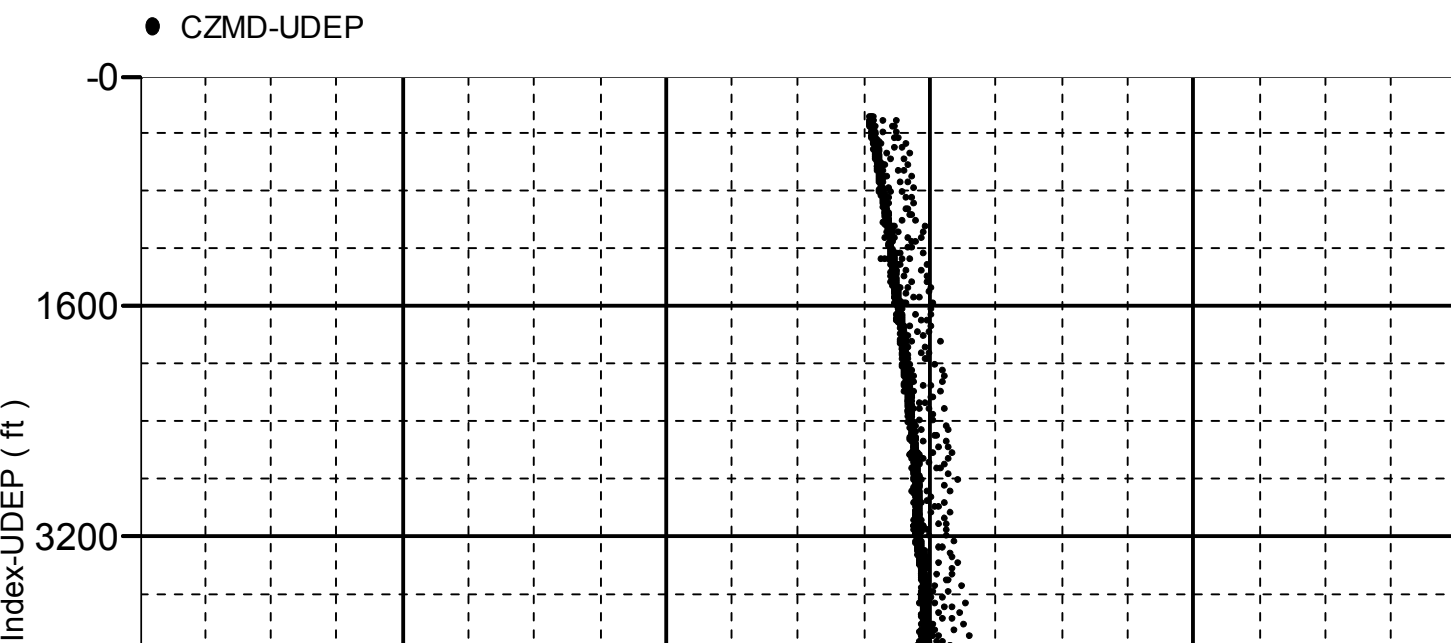
Company:Noble Energy INC Well:Wells Ranch BB11-643

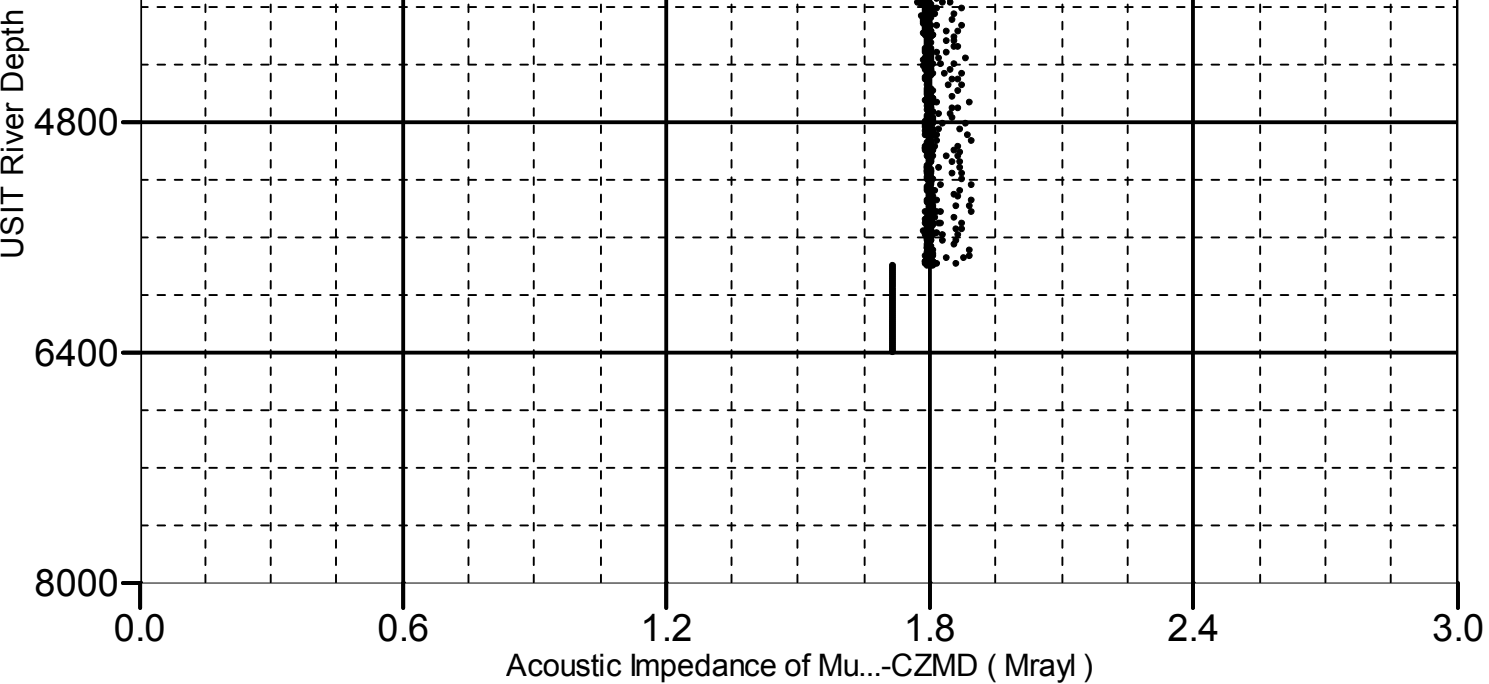
One: Log[4]:Up:S007

## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 5800.00 to 88.00 ft





Company:	Noble Energy INC	Schlumberger
Well:	Wells Ranch BB11-643	
Field:	Wattenberg	
County:	WELD	
State:	Colorado	

UltraSonic Summary Print