

Company: Noble Energy Inc

Well: Constitution Federal LC21-655

Field: Wildcat

County: Weld

State: Colorado

County: Weld

Field: Wildcat

Location: SWNW Sec. 22, T9N, R59W

Well: Constitution Federal LC21-655

Company: Noble Energy Inc

UltraSonic Summary Print

SWNW Sec. 22, T9N, R59W		Elev.:	K.B.	4967.00 ft
SHL: 2175' FNL & 401' FWL			G.L.	4937.00 ft
Lat/Long: 40.73745/-103.97212			D.F.	4967.00 ft
Permanent Datum:		Ground Level	Elev.:	4937.00 f
Log Measured From:		Kelly Bushing	30.00 ft	above Perm.Datum
Drilling Measured From:		Kelly Bushing		
API Serial No.	Section:	Township:	Range:	
05-123-42632	22	9N	59W	

Logging Date	10-Jul-2017
Run Number	ONE
Depth Driller	11121.00 ft
Schlumberger Depth	11121.00 ft
Bottom Log Interval	6005.00 ft
Top Log Interval	60.00 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	1941.00 ft
To	11121.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	N/A
From	0.00 ft
To	11111.00 ft
Max Recorded Temperatures	213 degF
Logger on Bottom	10-Jul-2017
Unit Number	3046
Recorded By	Evan Meadows
Witnessed By	

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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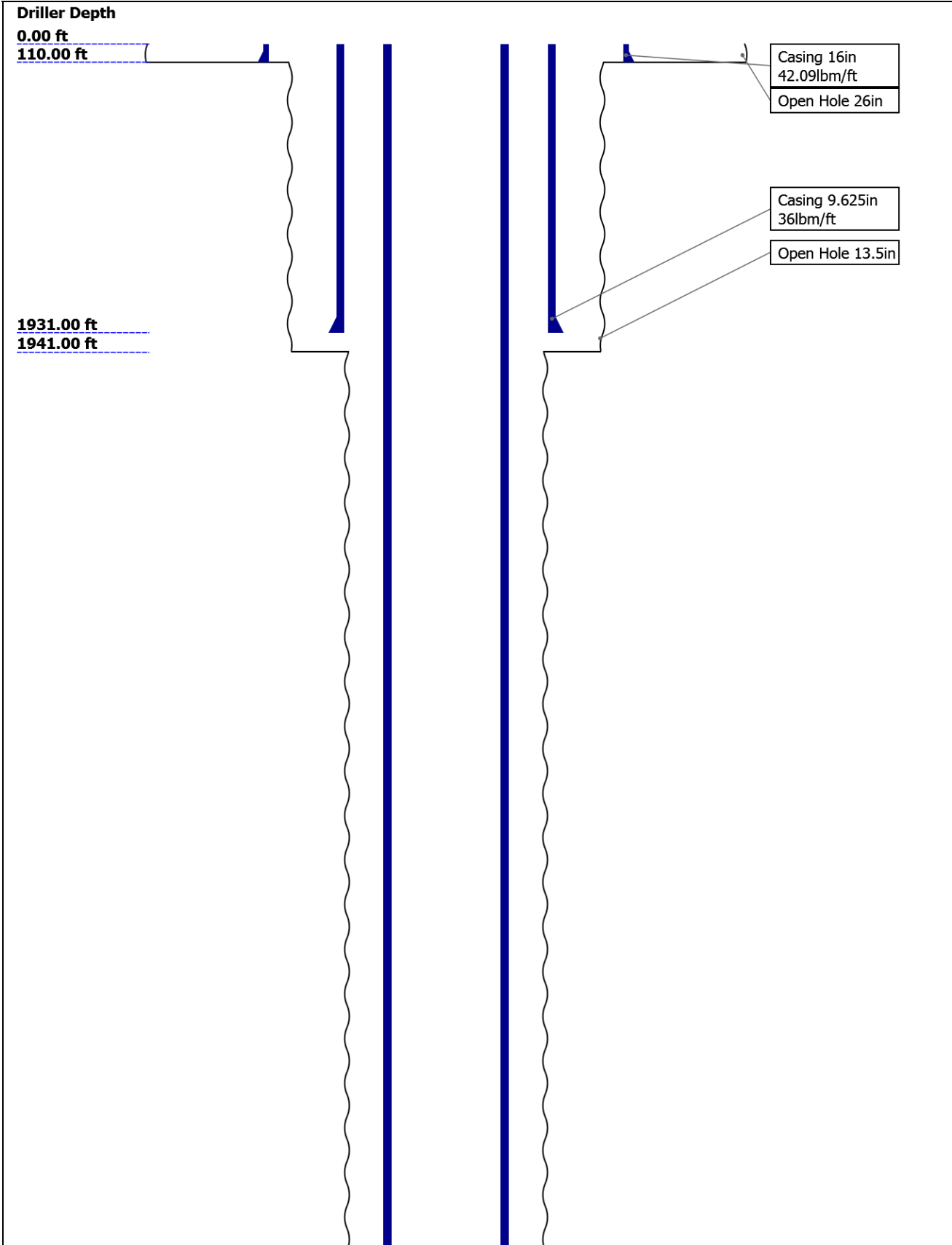
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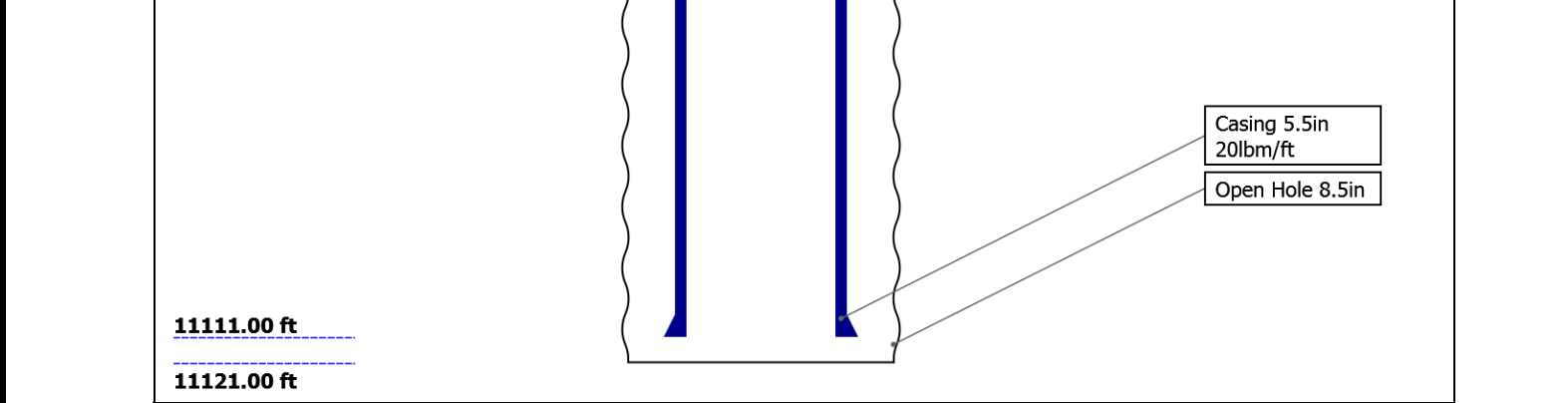
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Well Sketch





## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.5			
Top Driller ( ft )	0	110	1941			
Top Logger ( ft )	0	110	1941			
Bottom Driller ( ft )	110	1941	11121			
Bottom Logger ( ft )	110	1941	11121			
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	1931	11111			
Bottom Logger ( ft )	110	1931	11111			

## Operational Run Summary

Parameter ( unit )	ONE					
Date Log Started	10-Jul-2017					
Time Log Started	09:55:20					
Date Log Finished	10-Jul-2017					
Time Log Finished	11:14:25					
Top Log Interval ( ft )						
Bottom Log Interval ( ft )						
Total Depth ( ft )						
Max Hole Deviation ( deg )						
Azimuth of Max Deviation ( deg )						
Bit Size ( in )	8.500					
Logging Unit Number	3046					
Logging Unit Location	Fort Morgan, CO					
Recorded By	Evan Meadows					

Calibrator Serial Number	57	
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Calibrator Serial Number	57		
Calibration Cable Type	7-39 PLXS		
Wheel Correction 1	-4		
Wheel Correction 2	-1		

Tension Device			
Type	CMTD-B/A		
Serial Number	1398		
Calibration Date	05-Jul-2017		
Calibrator Serial Number	207746A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	16		
Calibration Peak Error	33		

Logging Cable			
Type	7-39P-LXS		
Serial Number	F713178		
Length	18000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	1. ALL SCHLUMBERGER DEPTH CONTROL PROCEDURES WERE FOLLOWED DURING LOGGING OPERATIONS 2. IDW USED AS PRIMARY DEPTH CONTROL MEASURE 3. Z CHART USED AS SECONDARY DEPTH CONTROL MEASURE 4. STRETCH CORRECTION: 3.9'	
Rig Up Length At Surface			
Rig Up Length At Bottom			
Rig Up Length Correction			
Stretch Correction	3.90 ft		
Tool Zero Check At Surface			

## USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[3]:Up	6006.22	57.75

Fluid Velocity = "Automatic".  
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Mud Impedance = "FreePipe Norm."  
Free Pipe normalization zone is : 19.52m(64.04ft) to 25.36m(83.21ft)  
MUD\_N\_FRP = 1.19  
DFD = 1.01g/cm3(8.40lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.76 MRayl

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

2500 PSI Main Pass

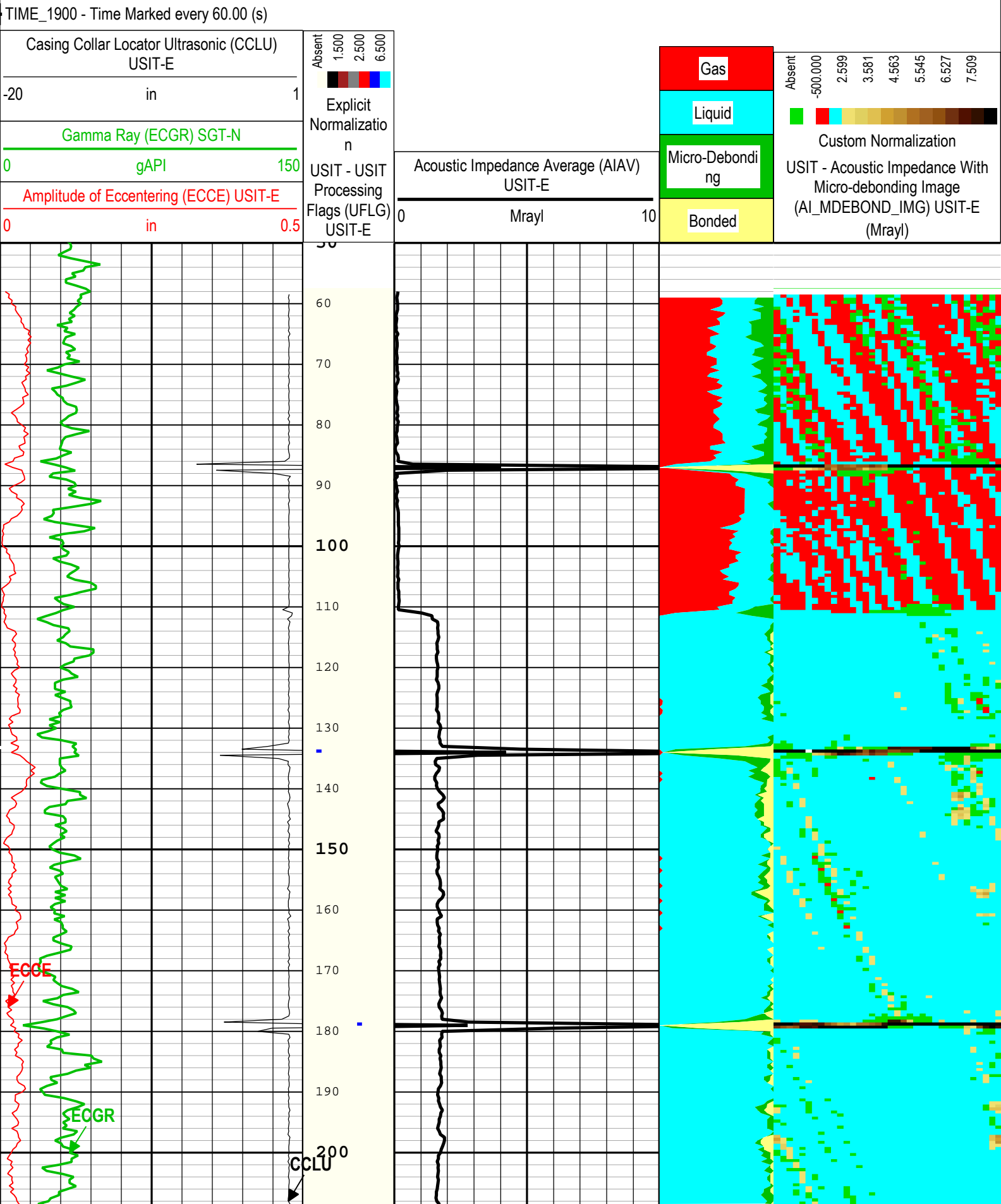
Software Version

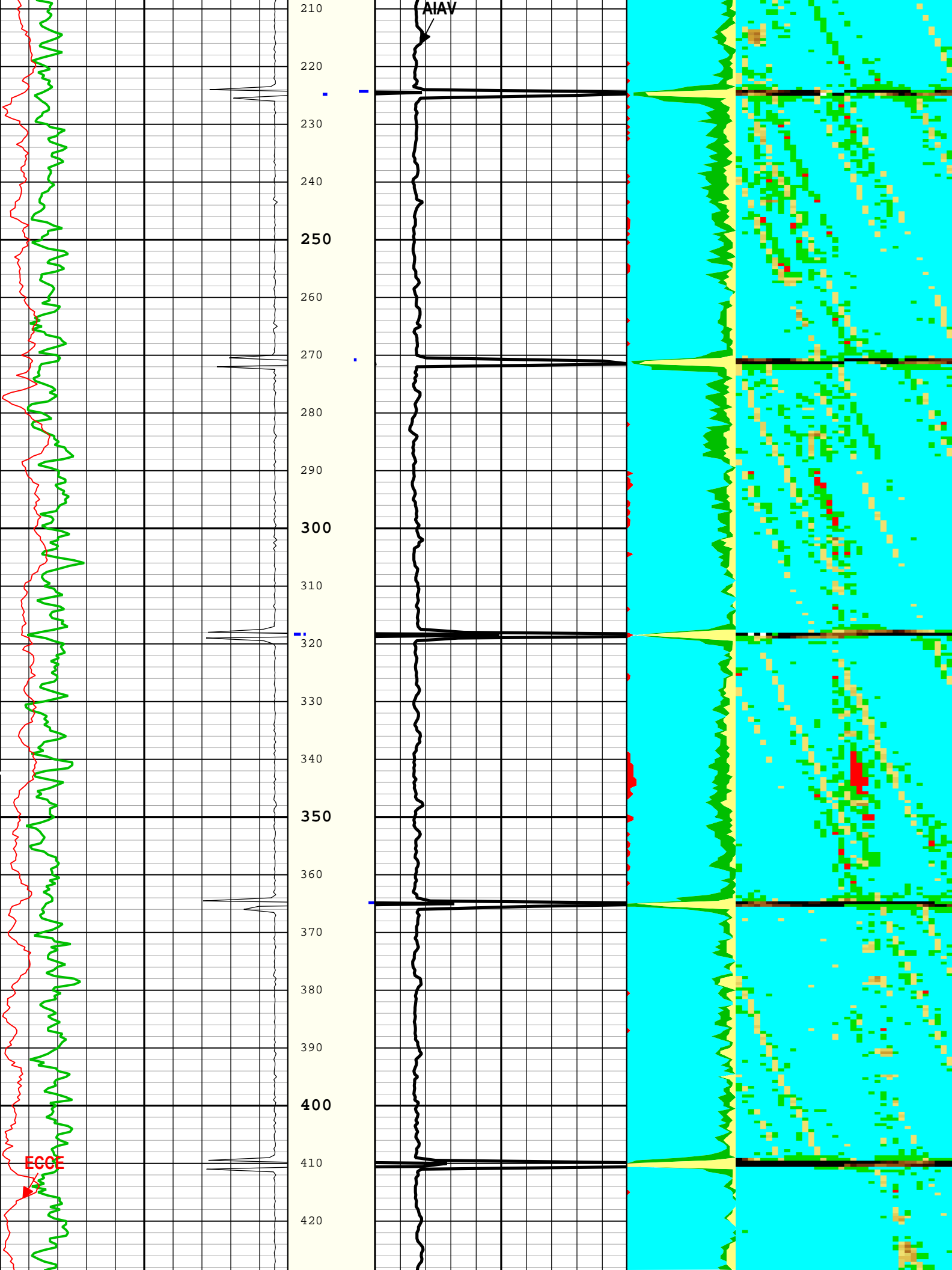
Acquisition System	Version
Maxwell 2017 SP2	7.2.87778.3100

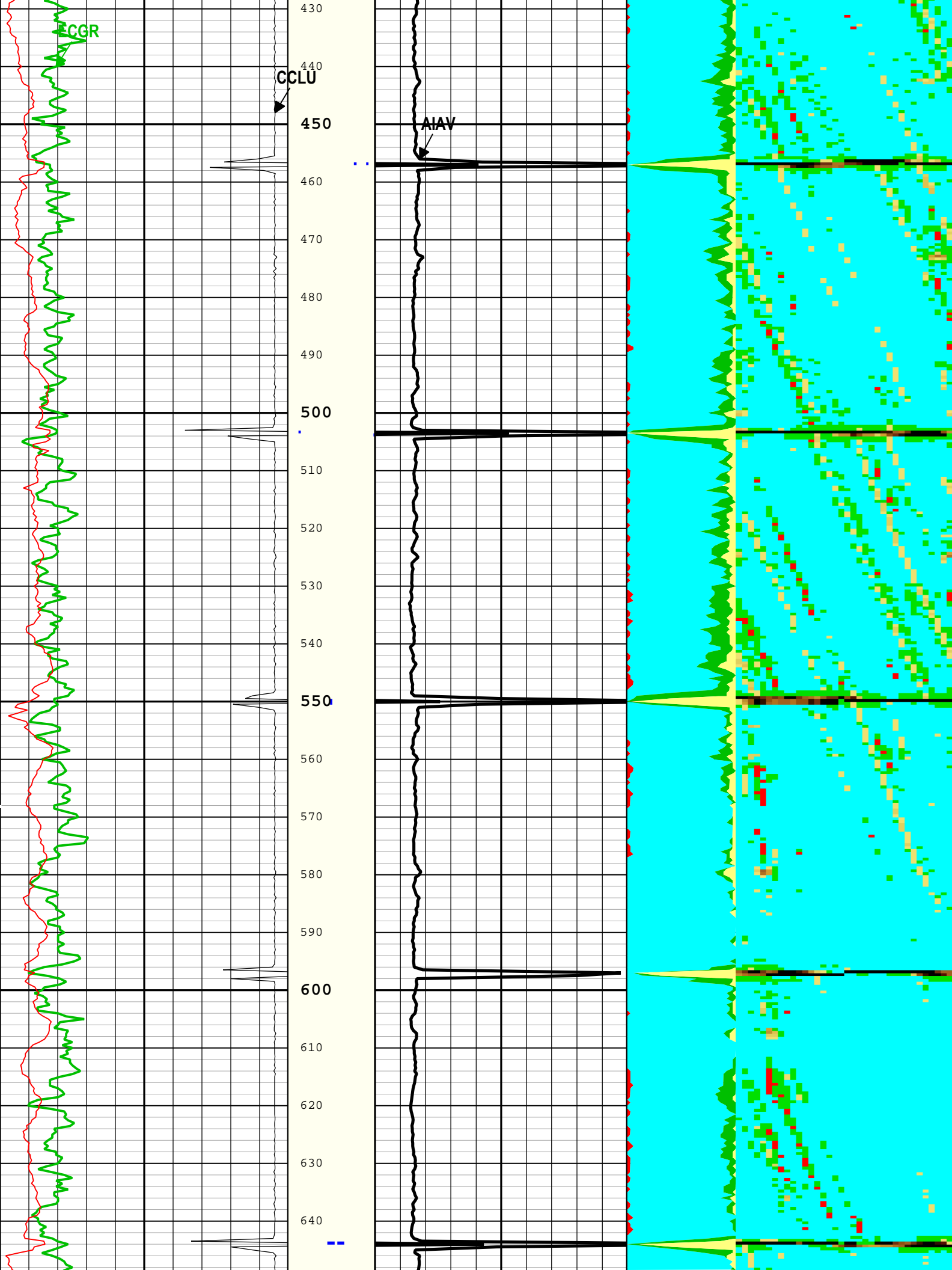
## Pass Summary

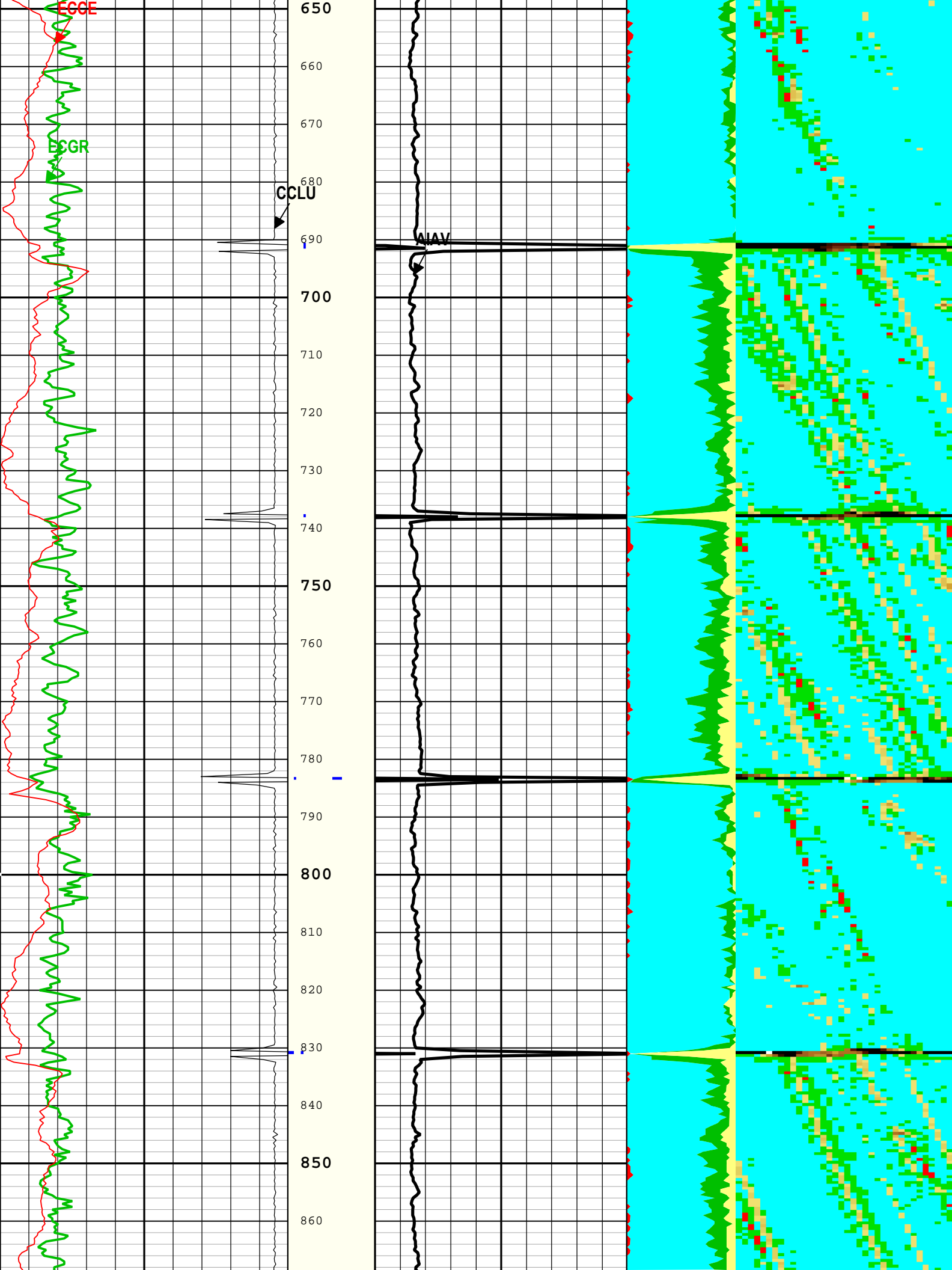
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Main[3]:Up	Up	57.75 ft	6006.22 ft	10-Jul-2017 10:20:14 AM	10-Jul-2017 10:56:56 AM	ON	3.91 ft	No

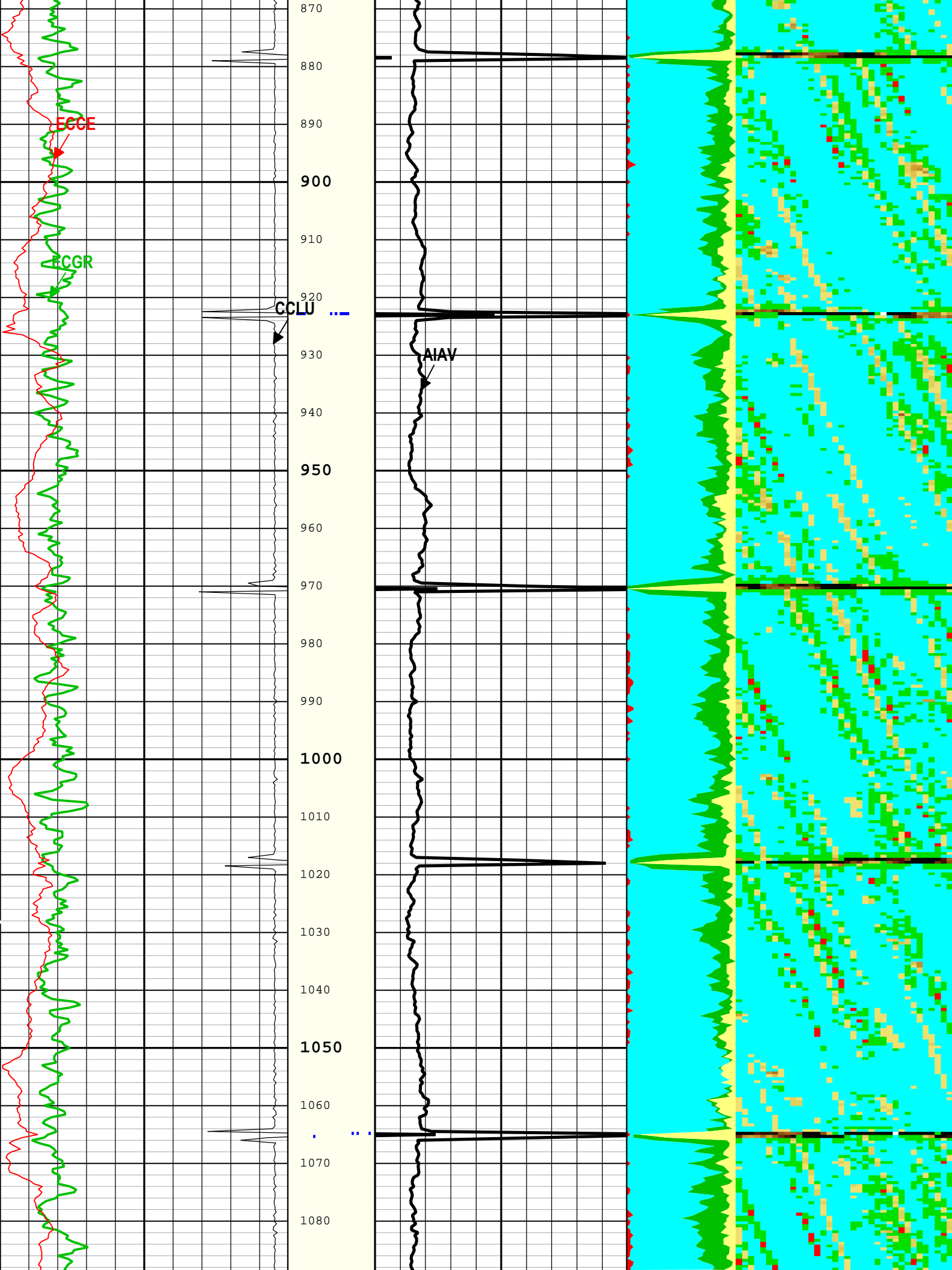
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Creation Date: 10-Jul-2017 11:45:23

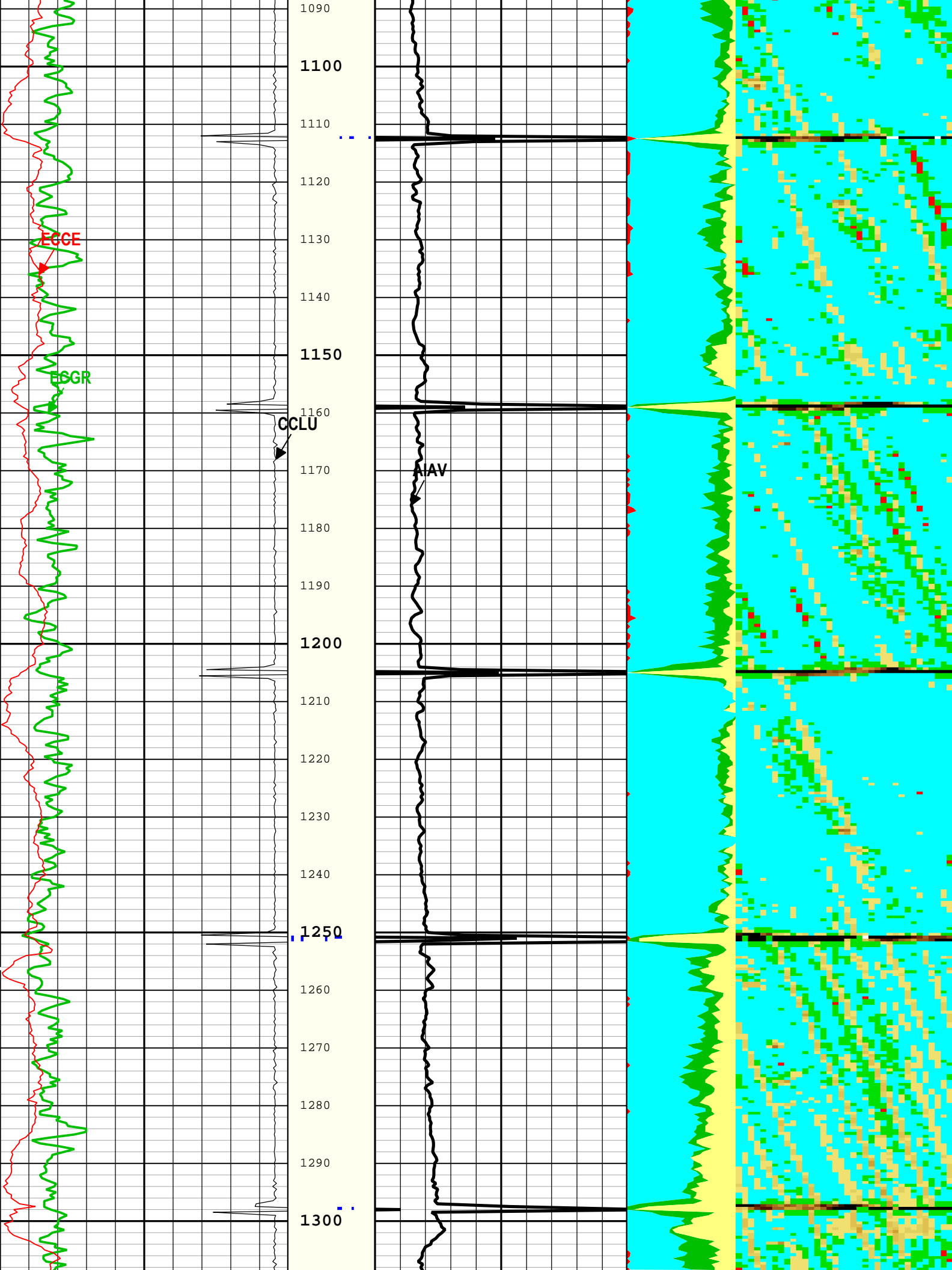


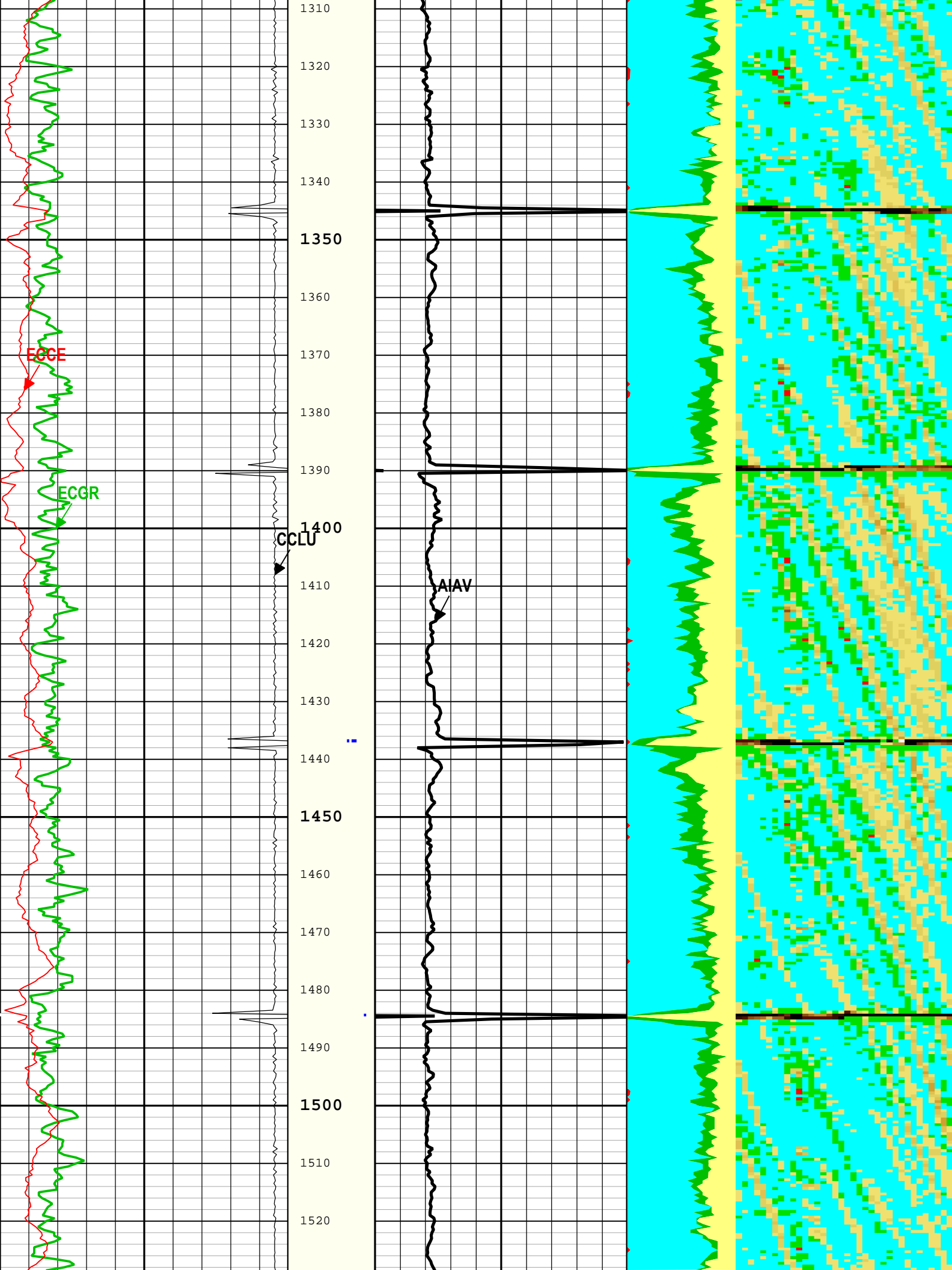


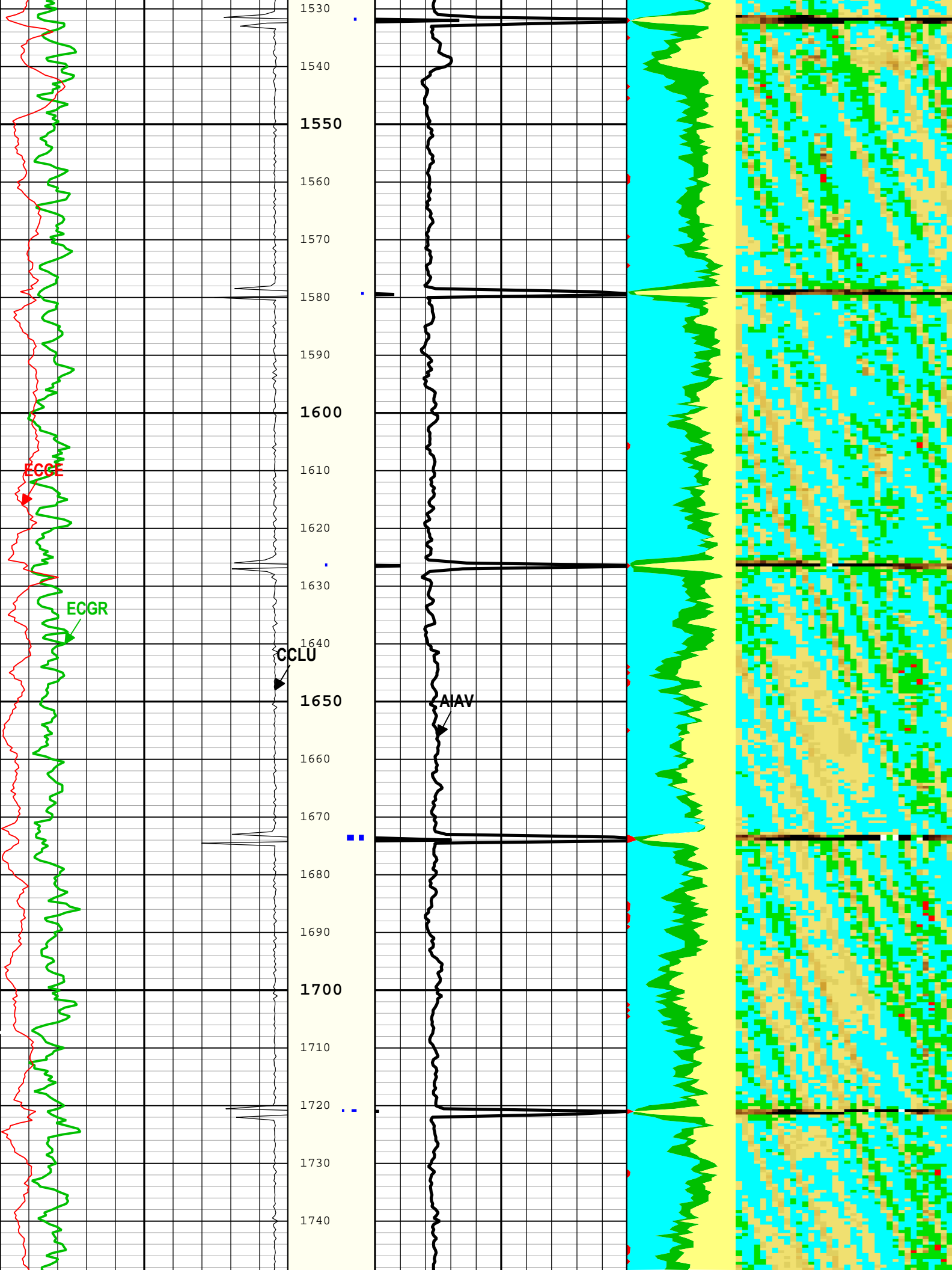


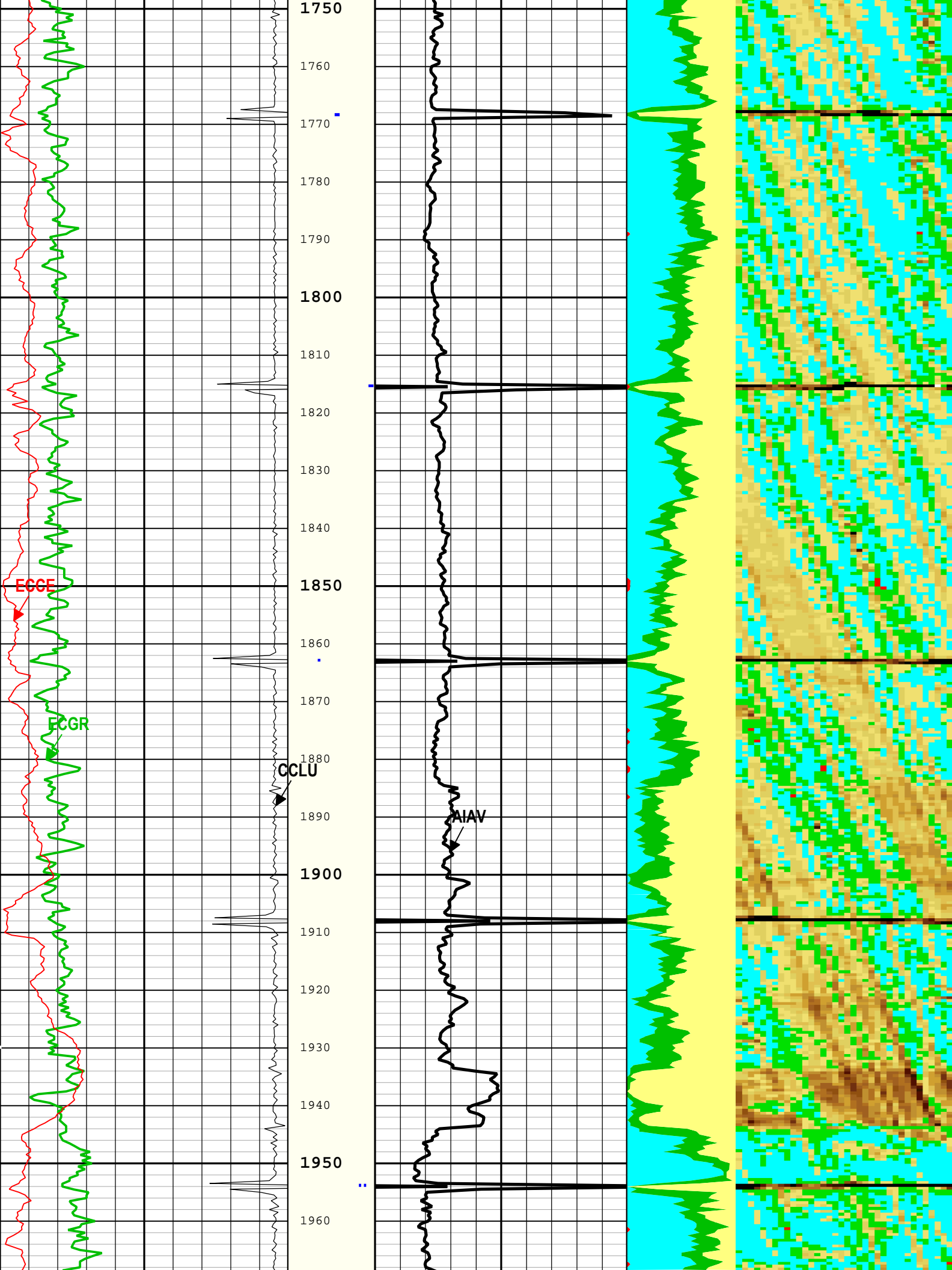


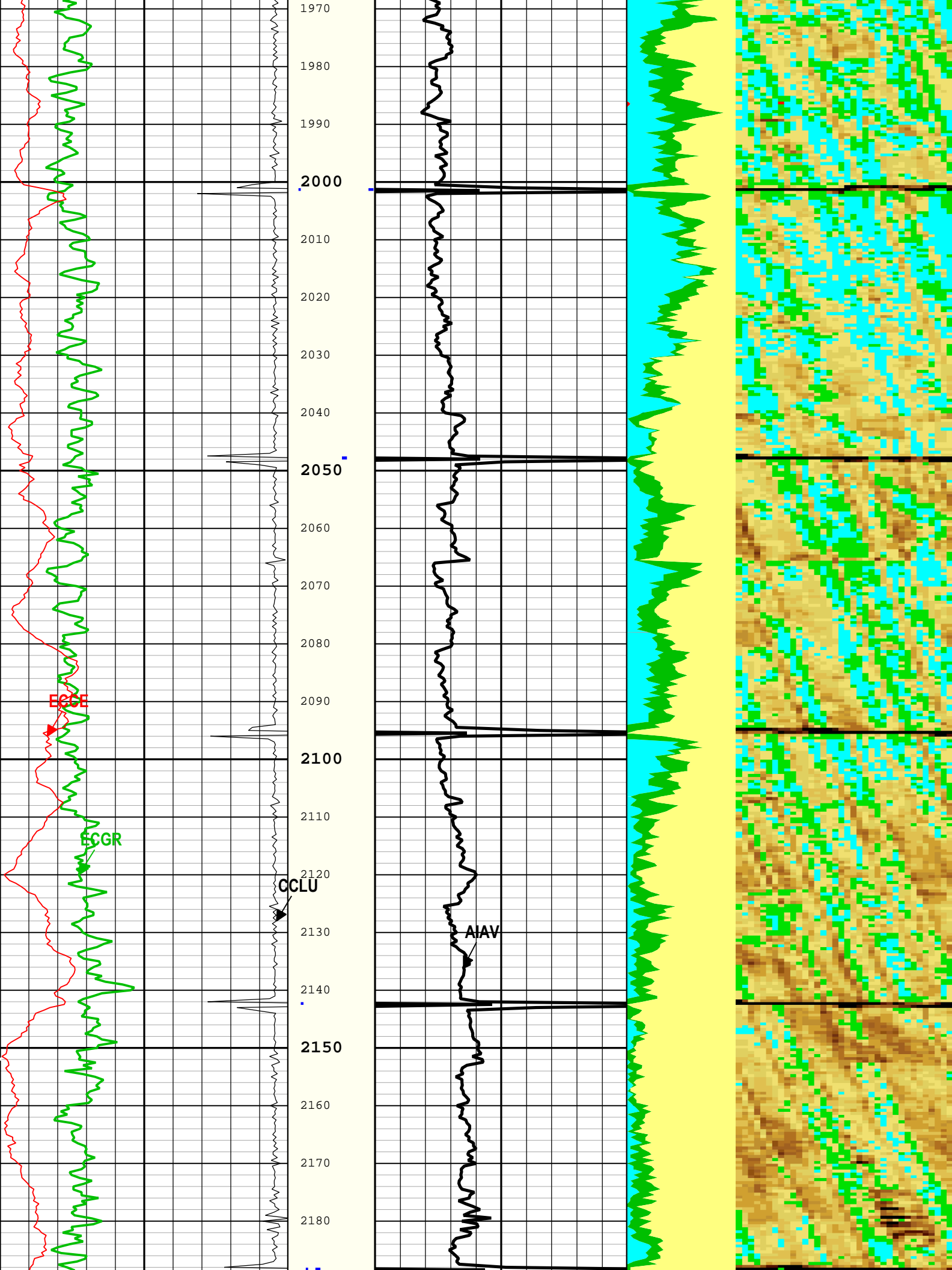


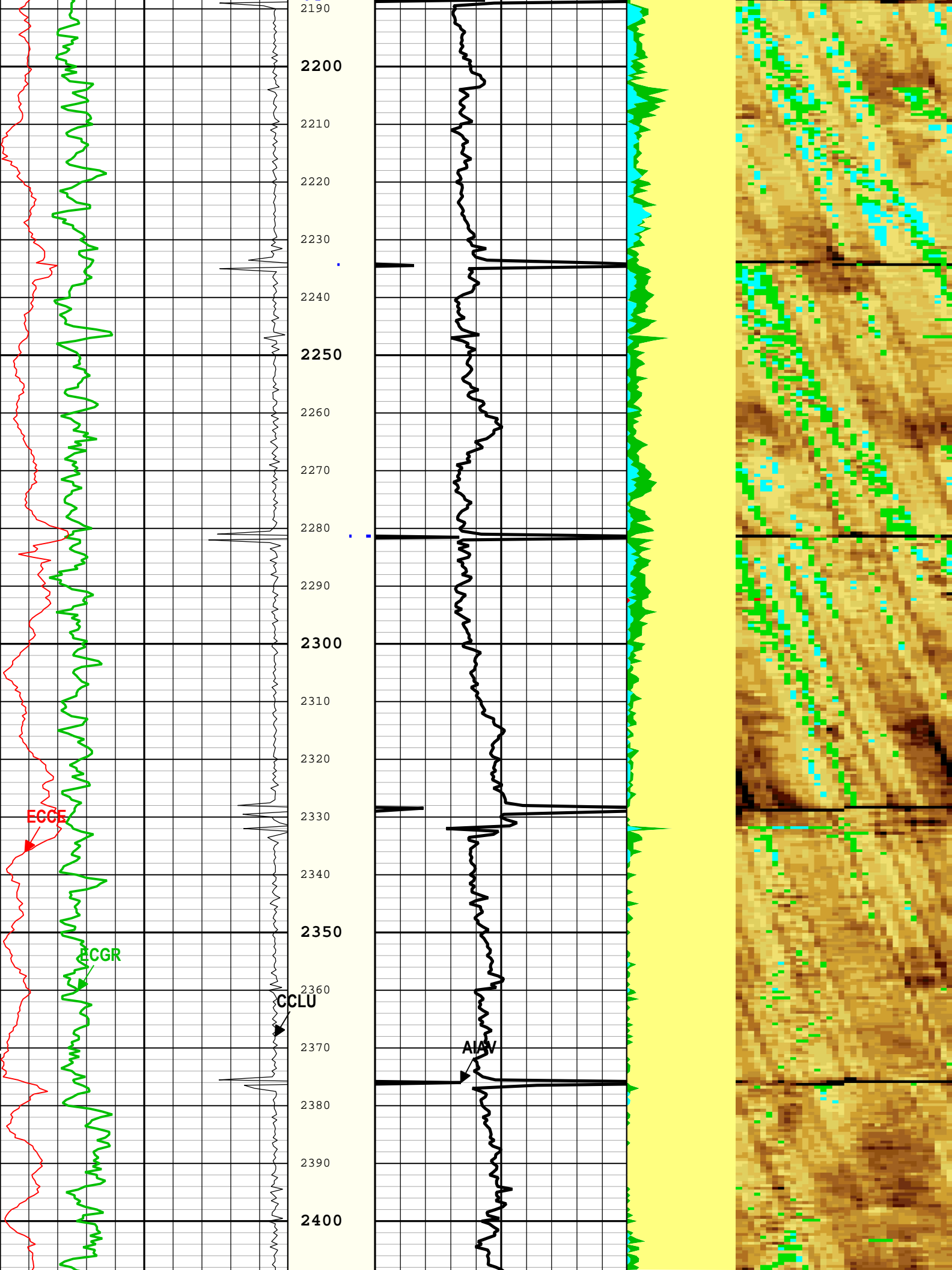


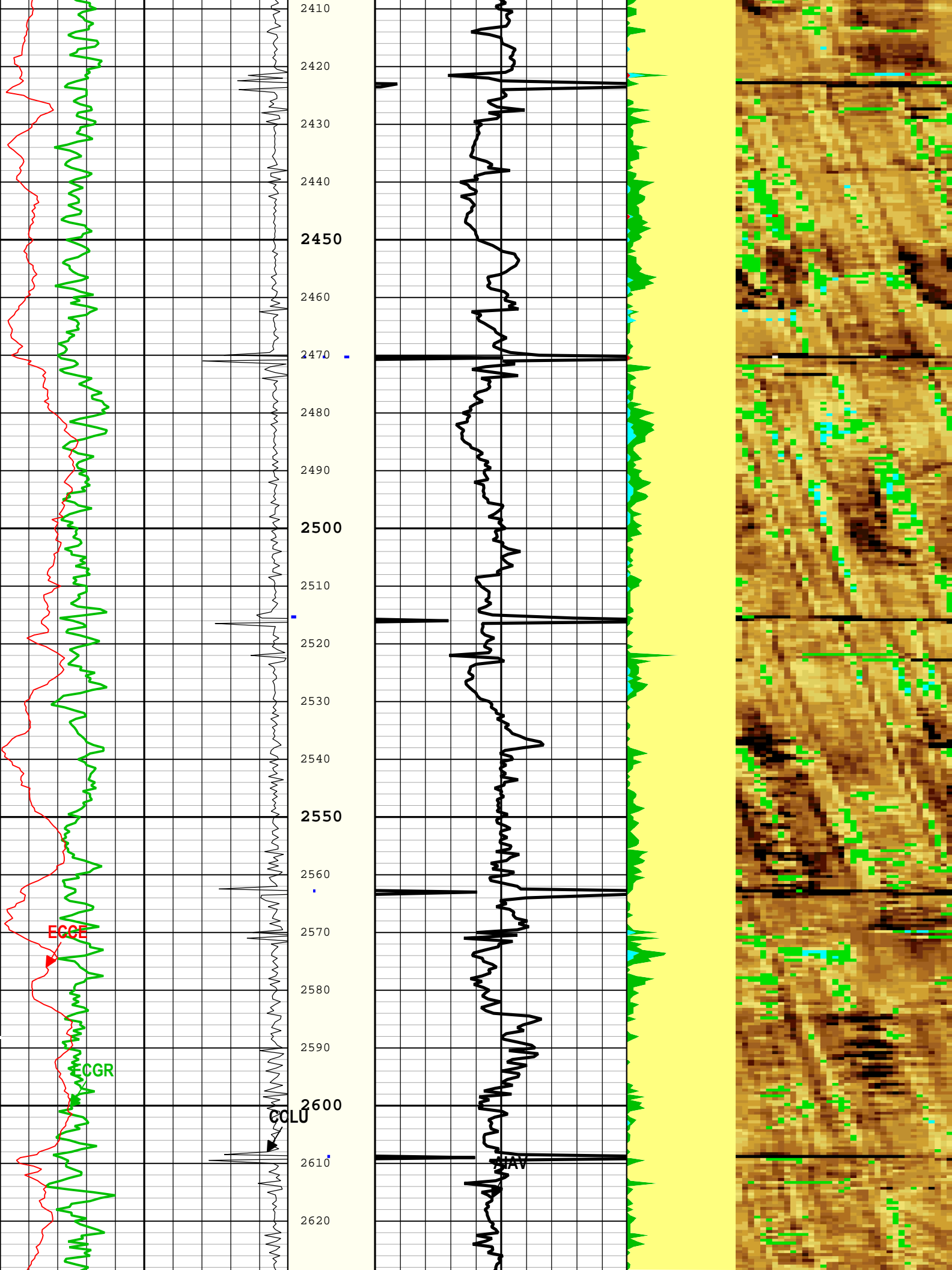


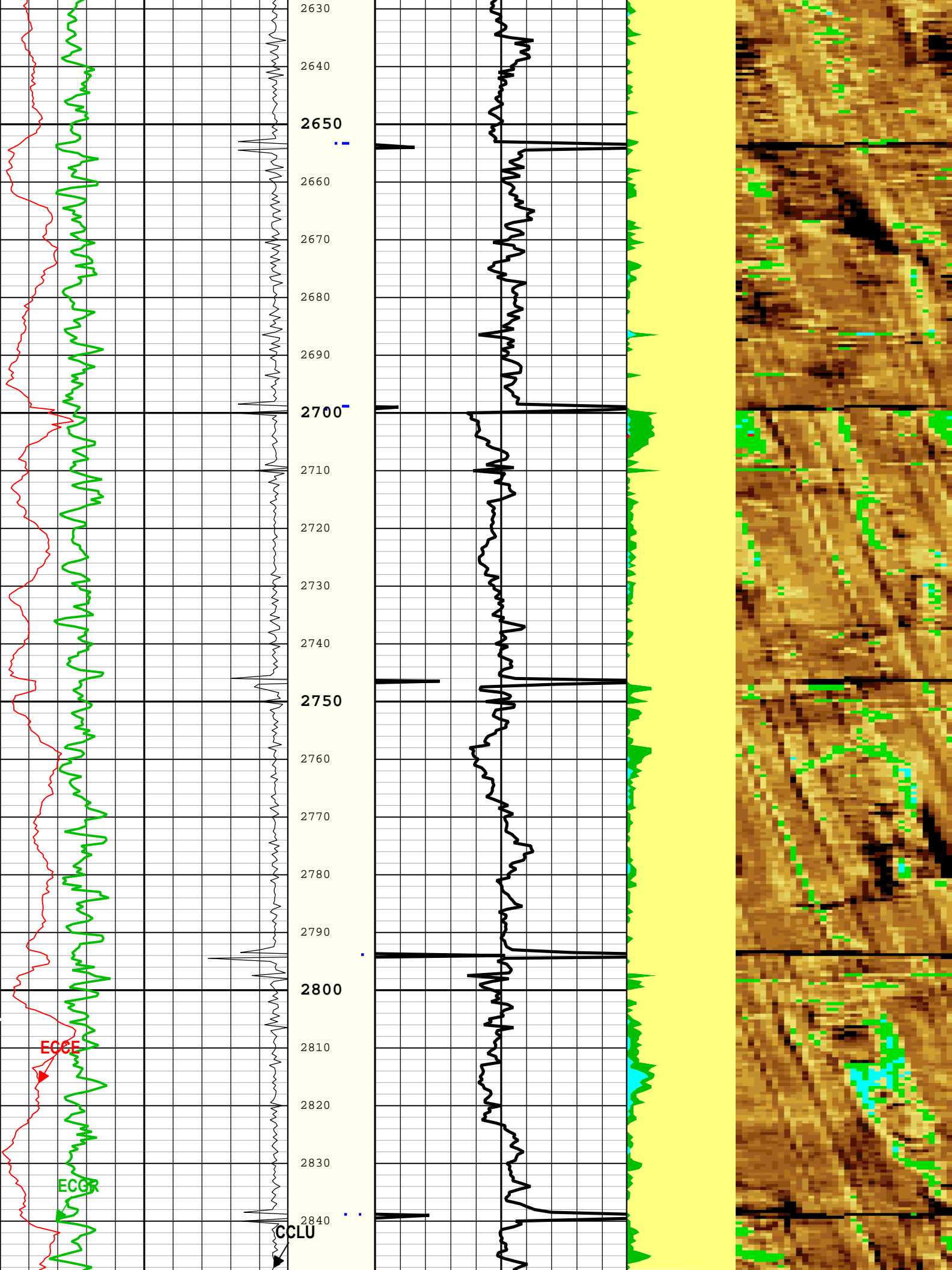


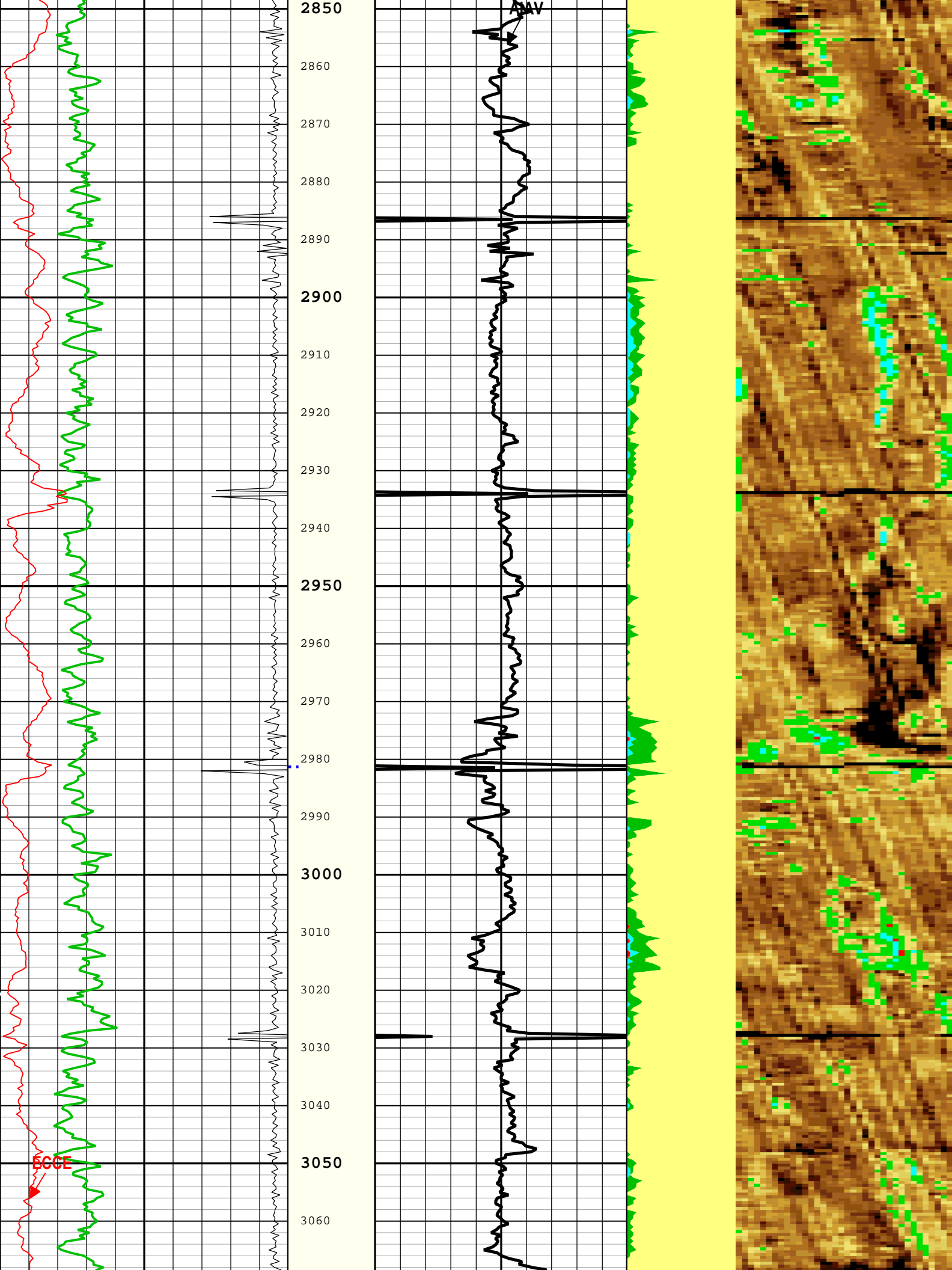


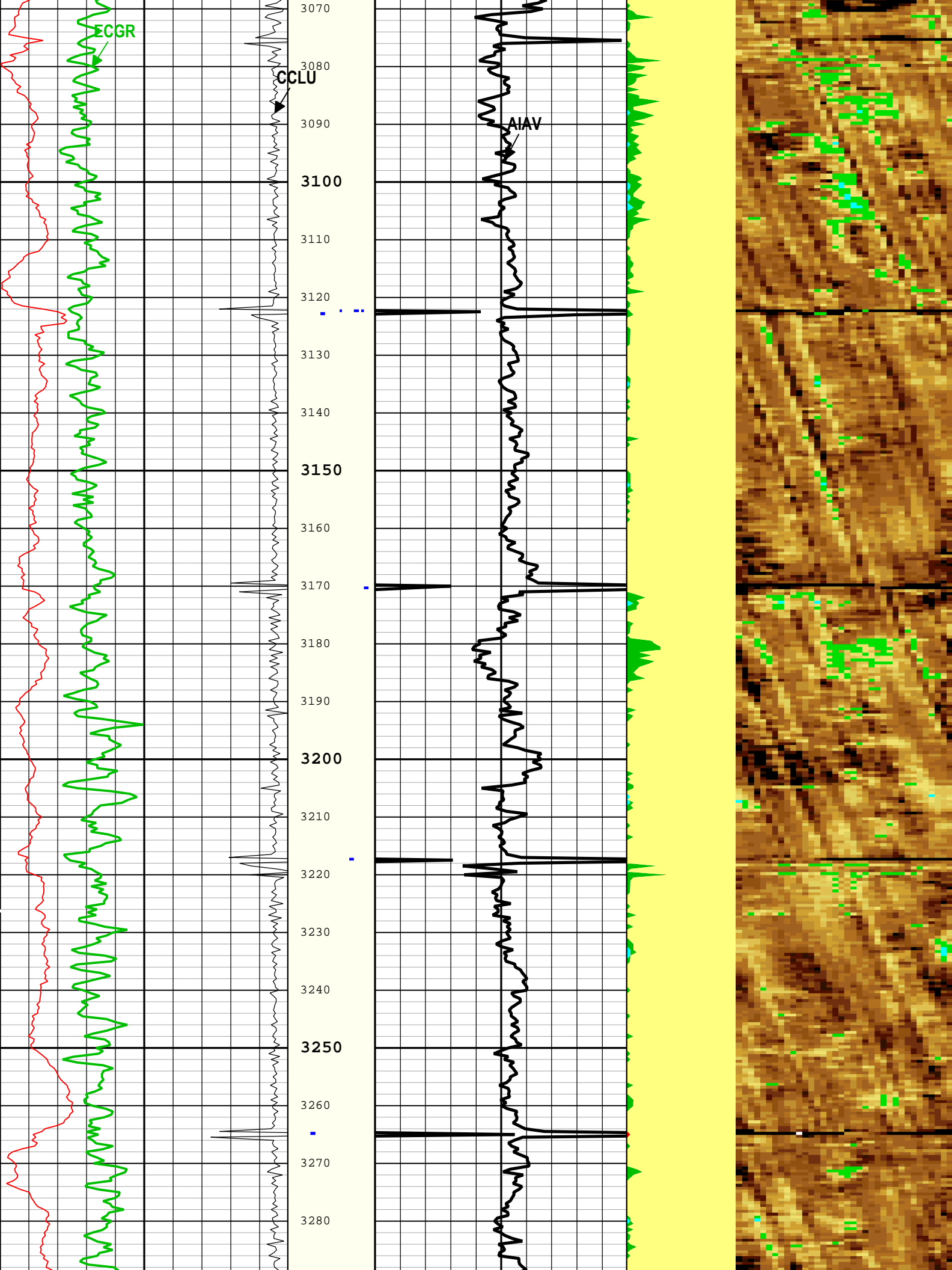


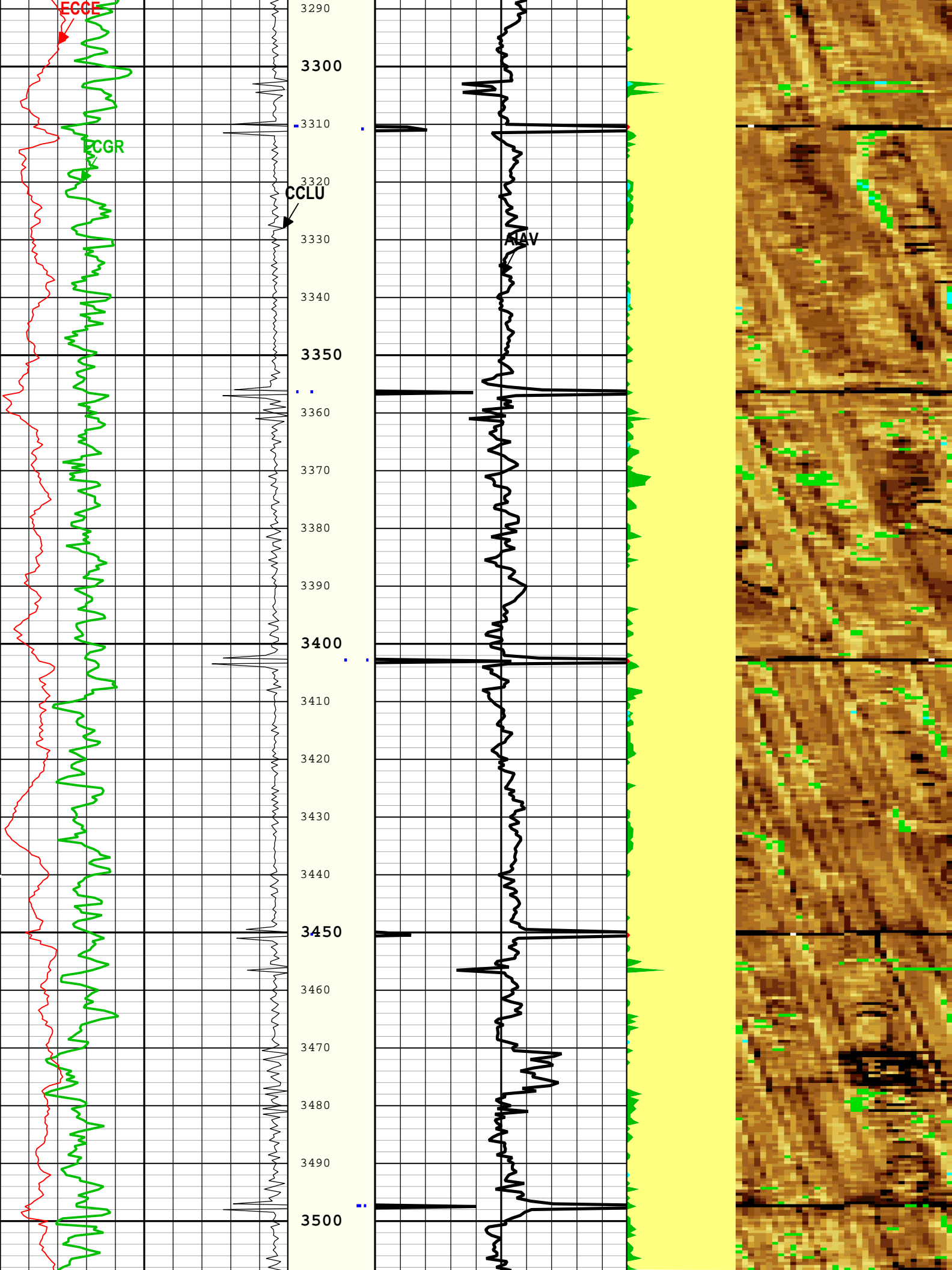


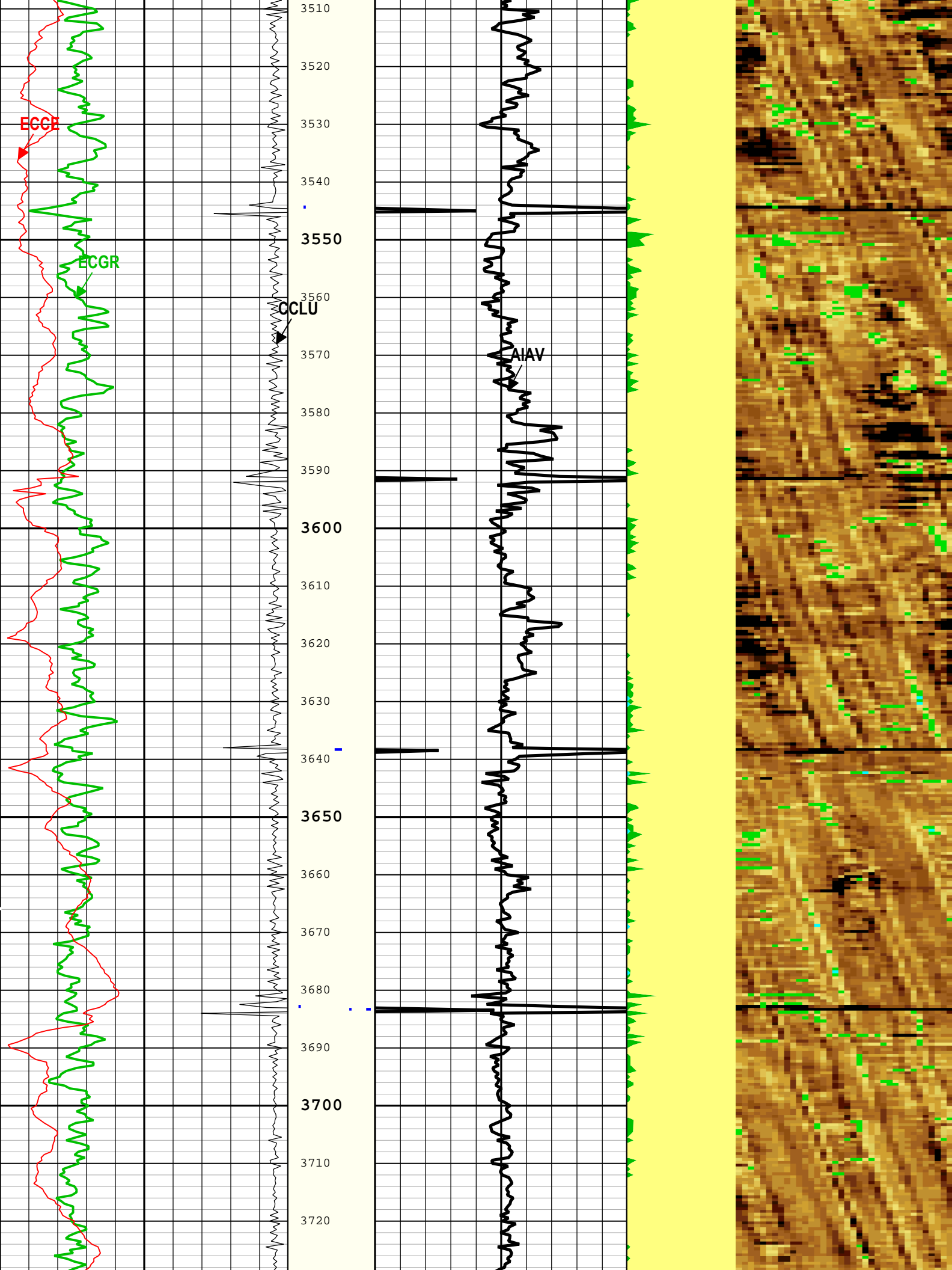


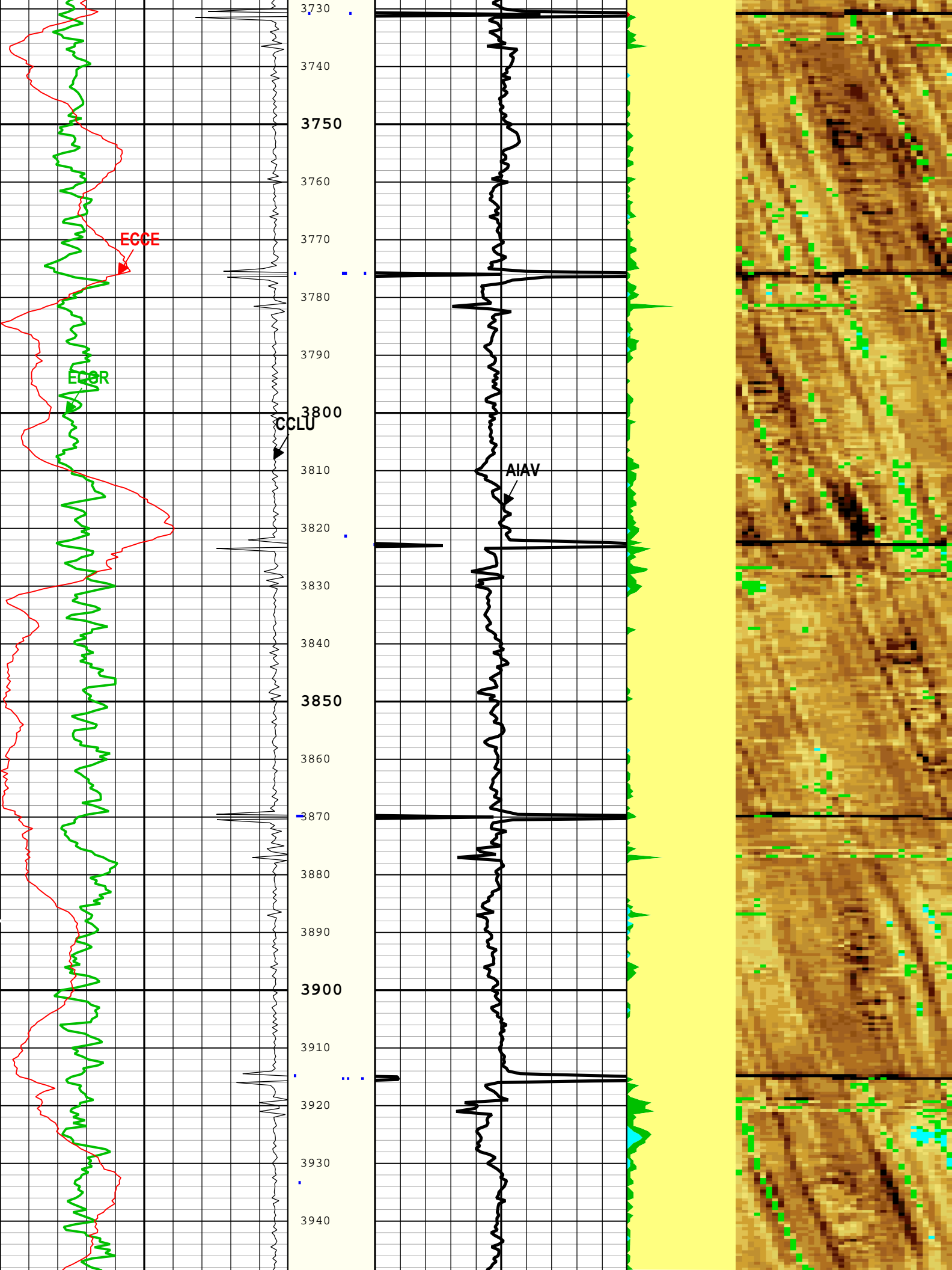


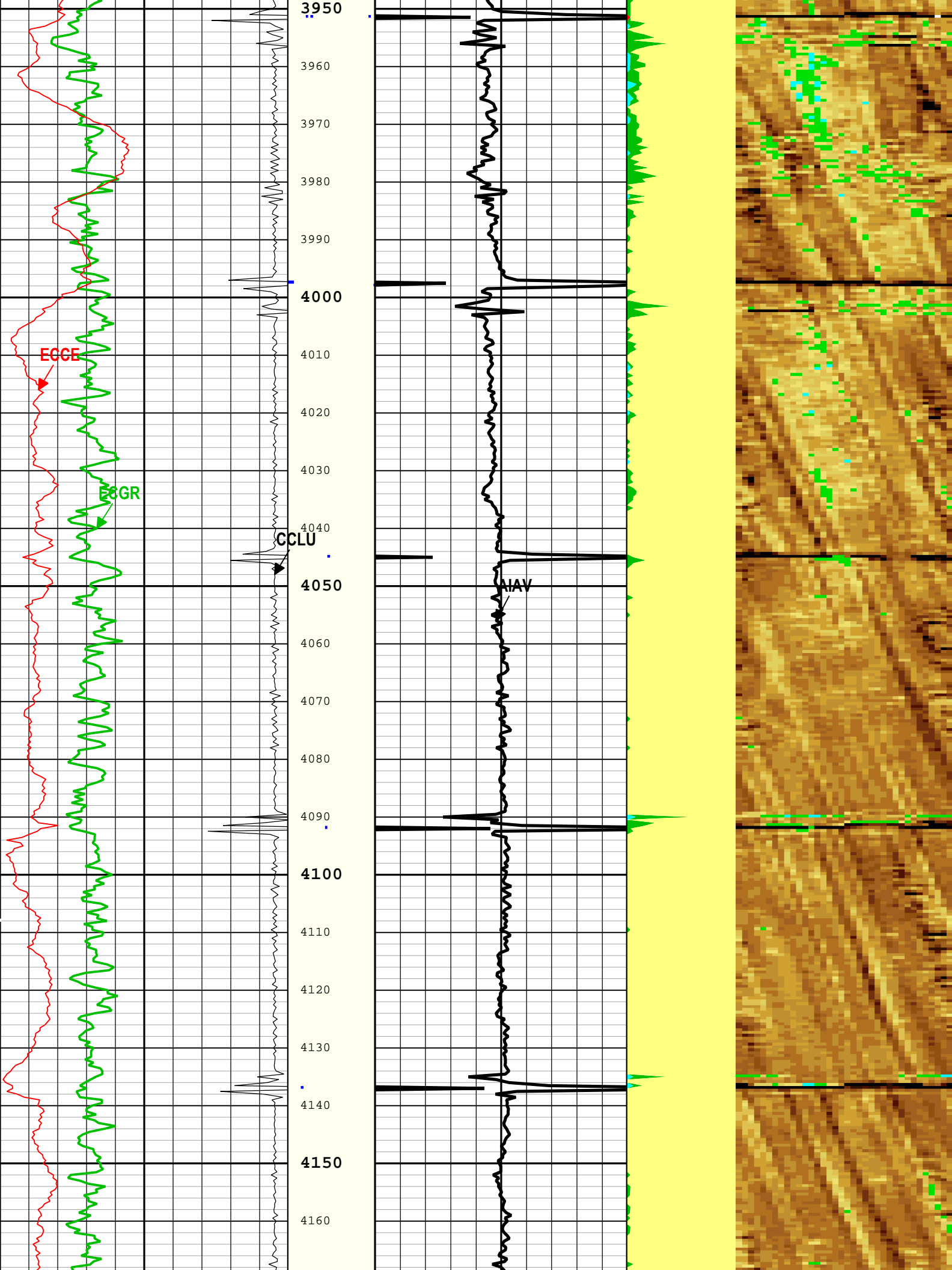


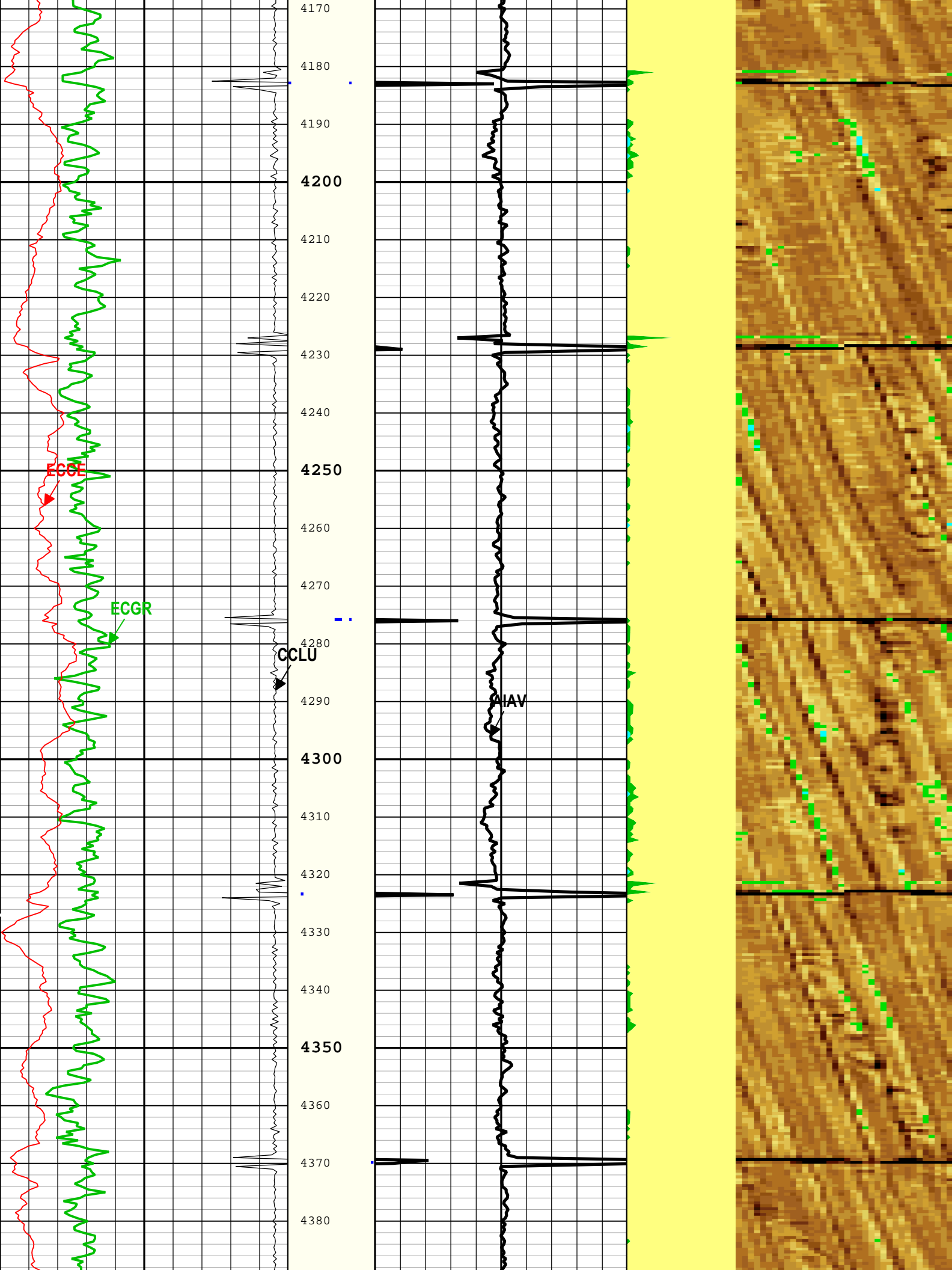


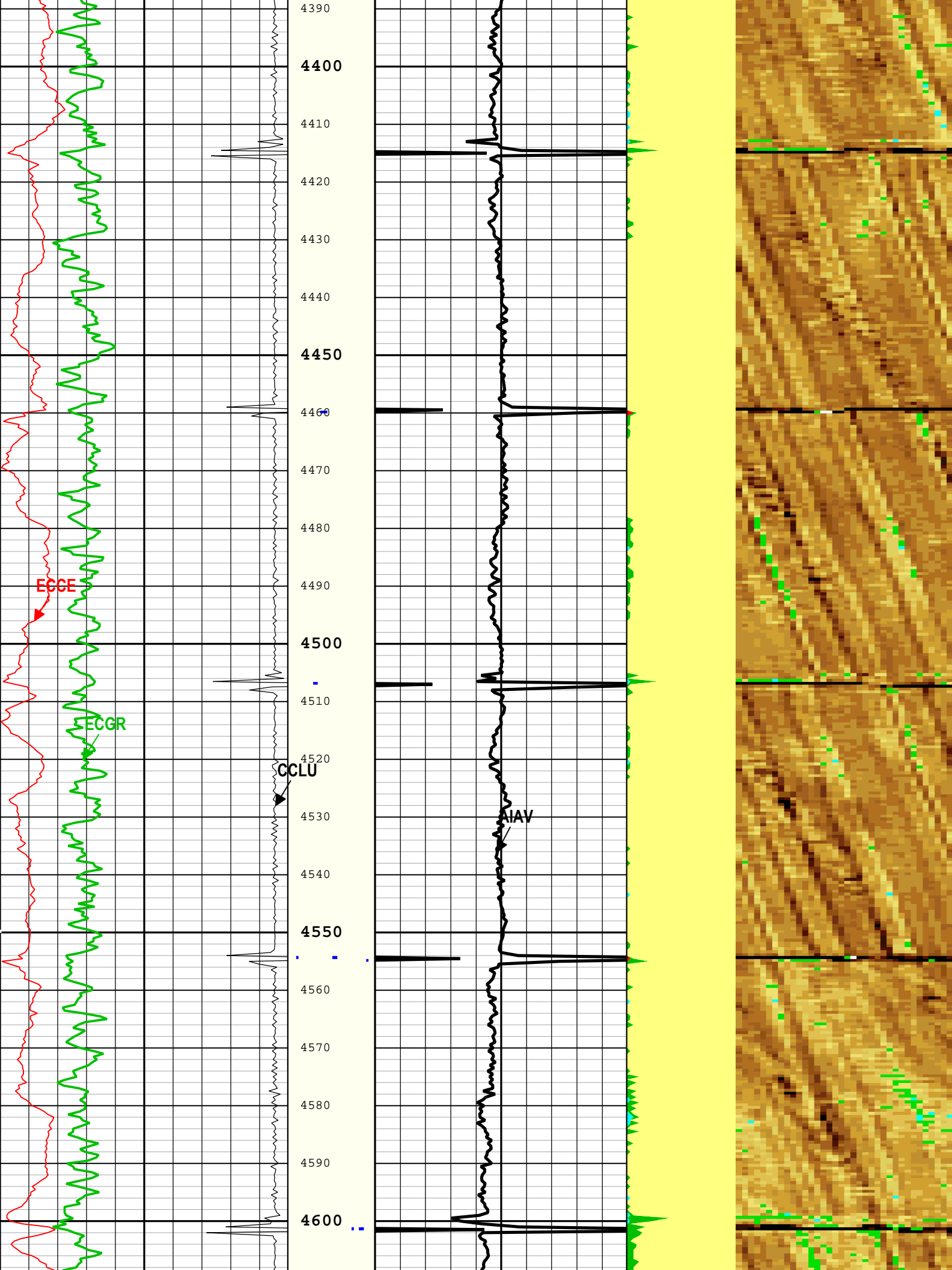


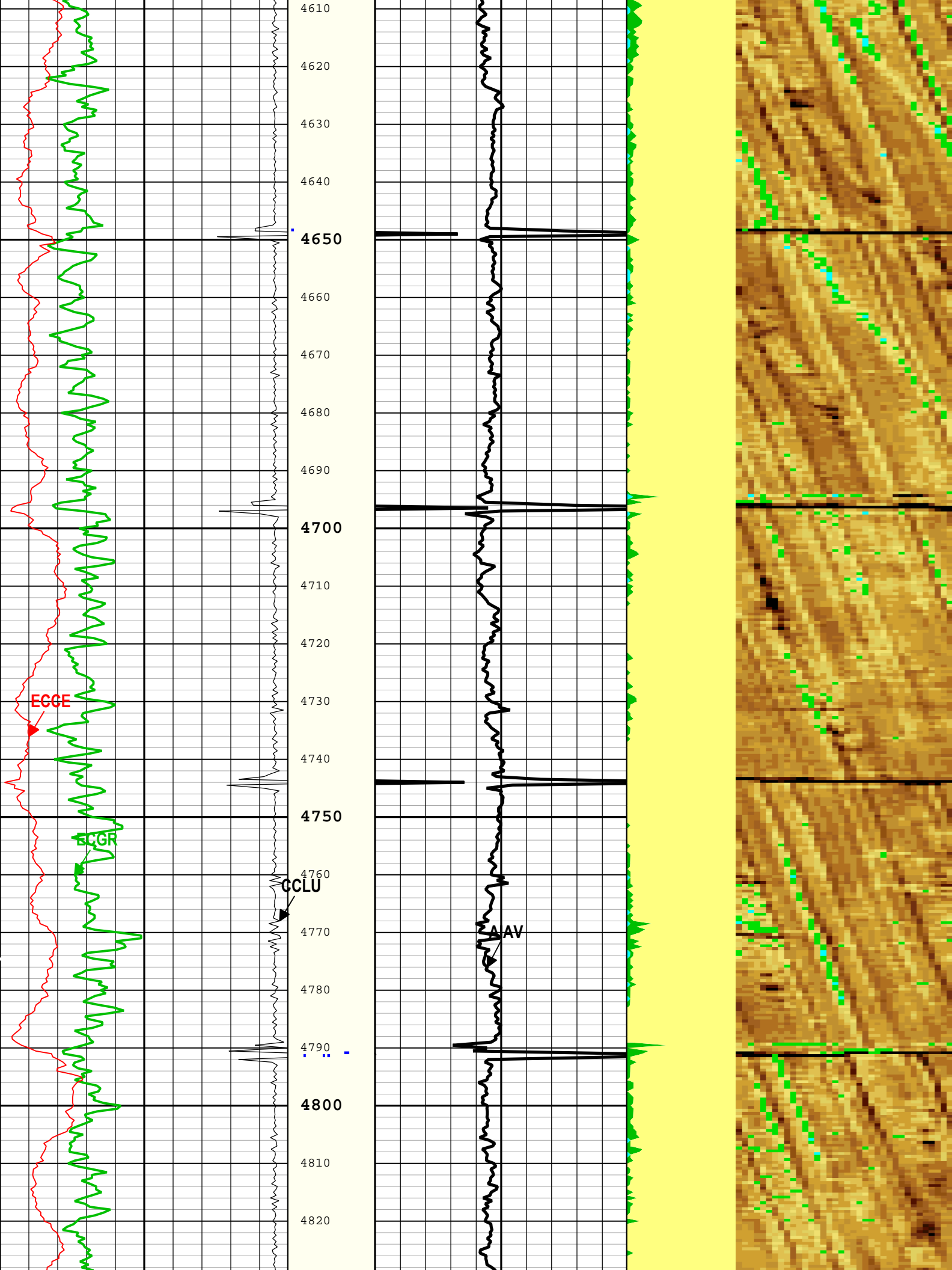


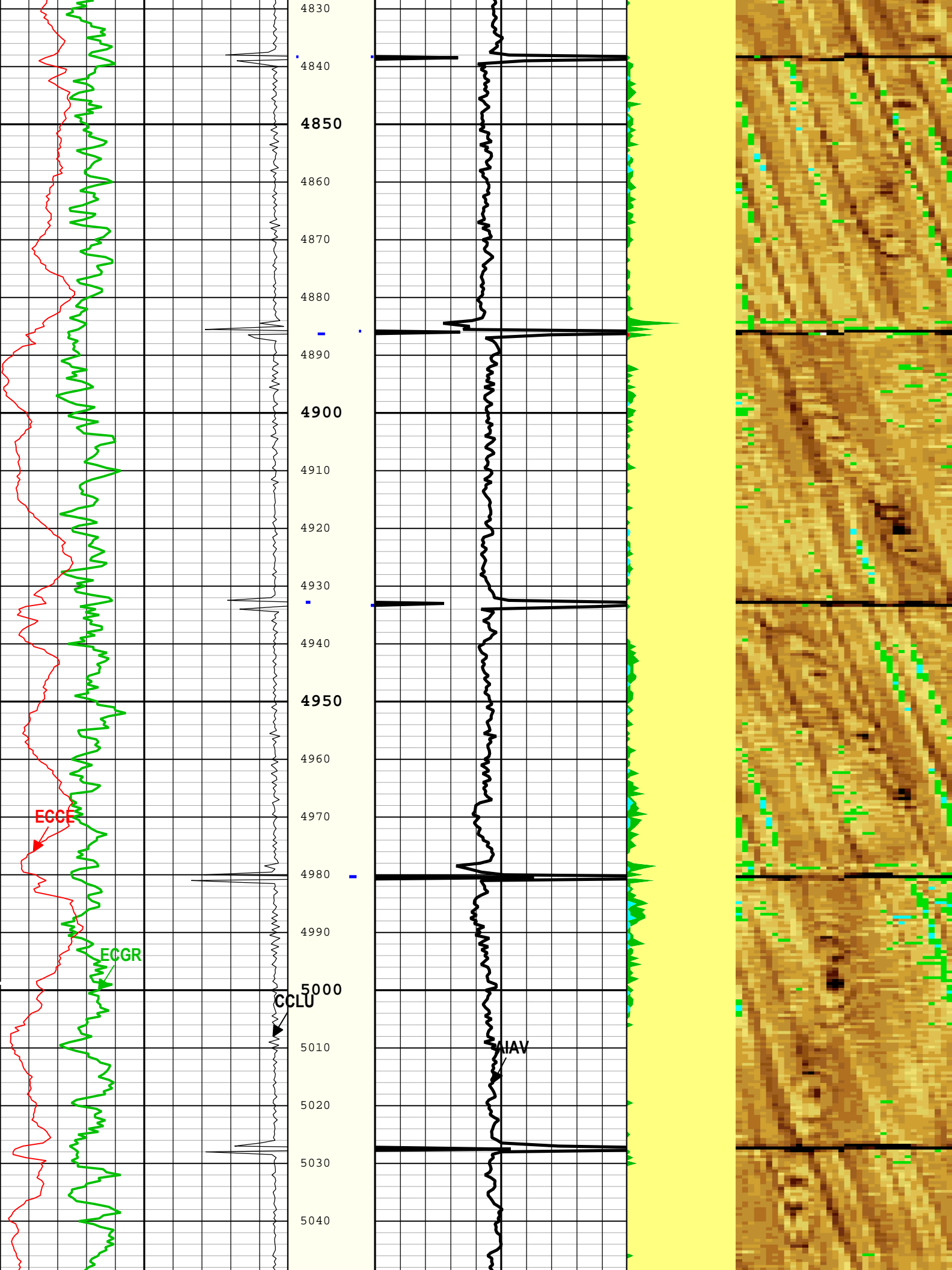


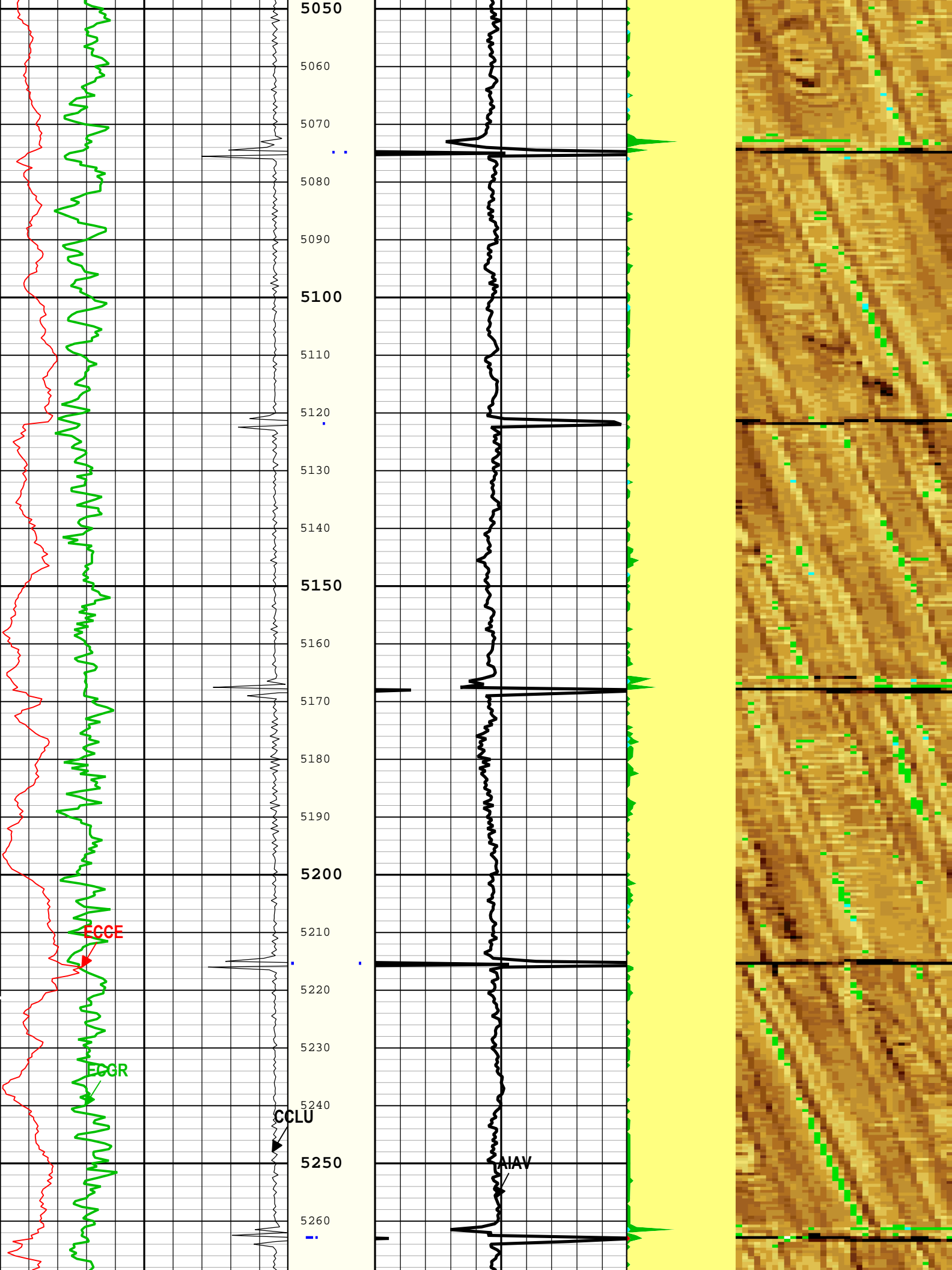


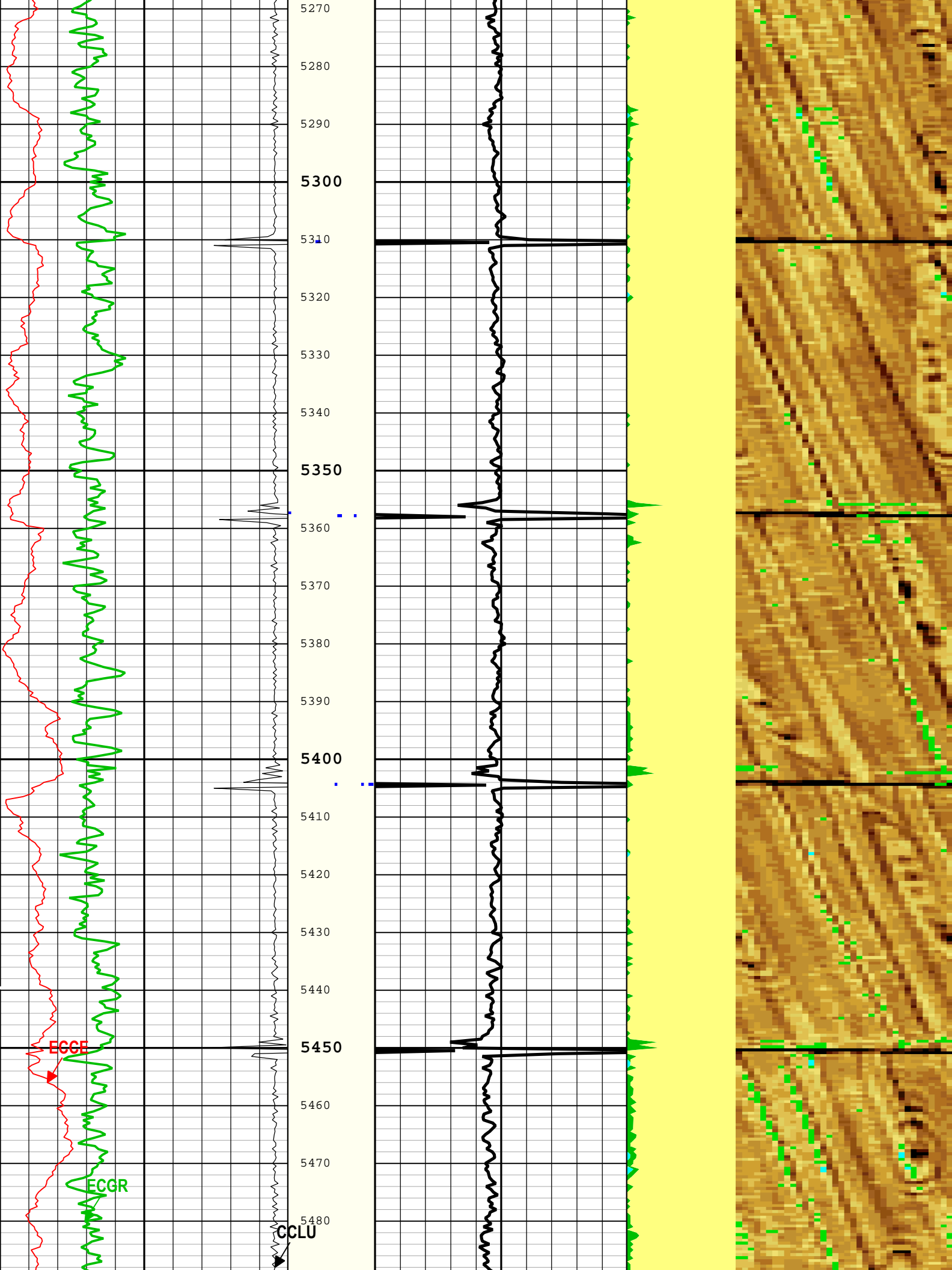


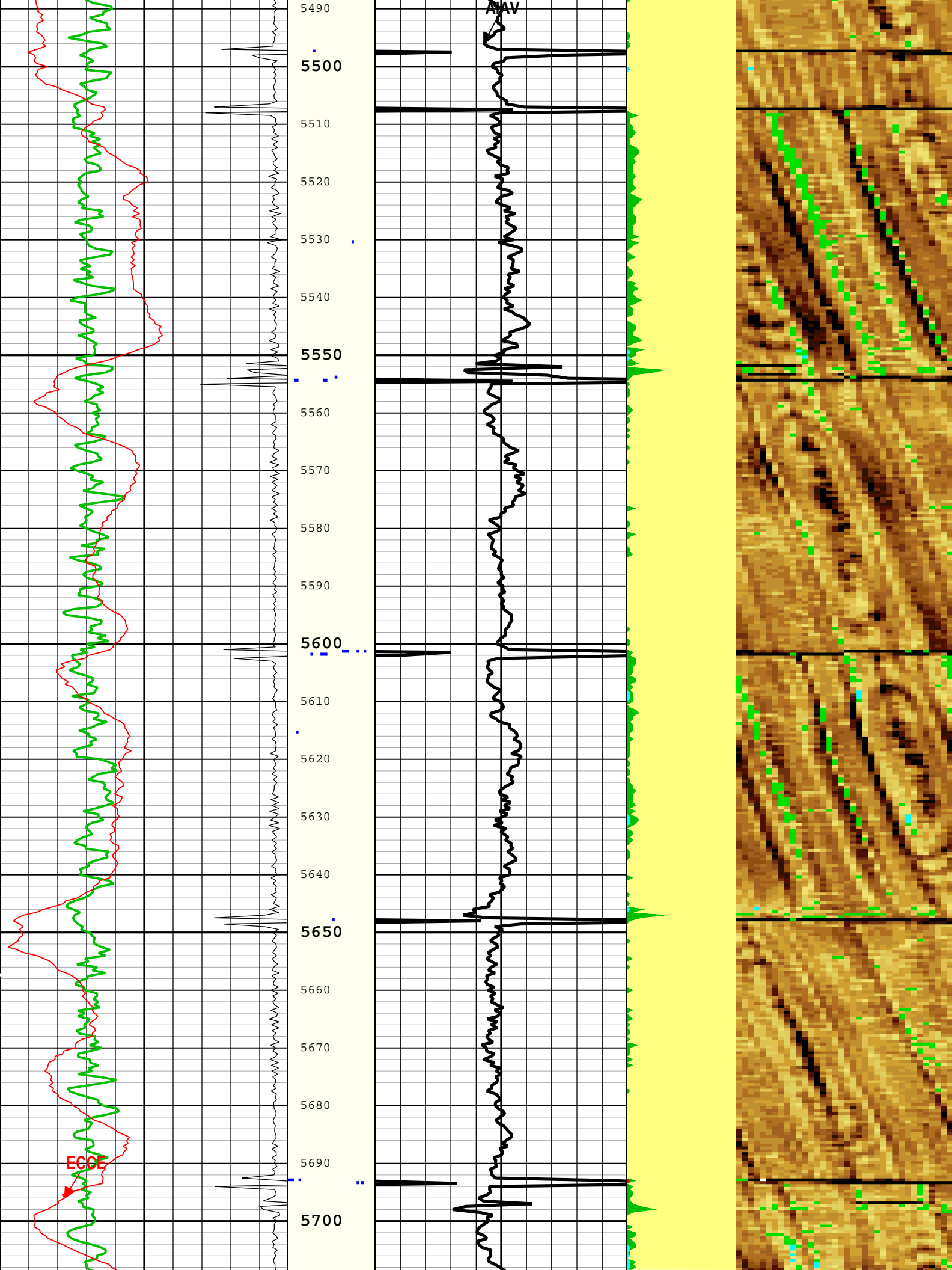


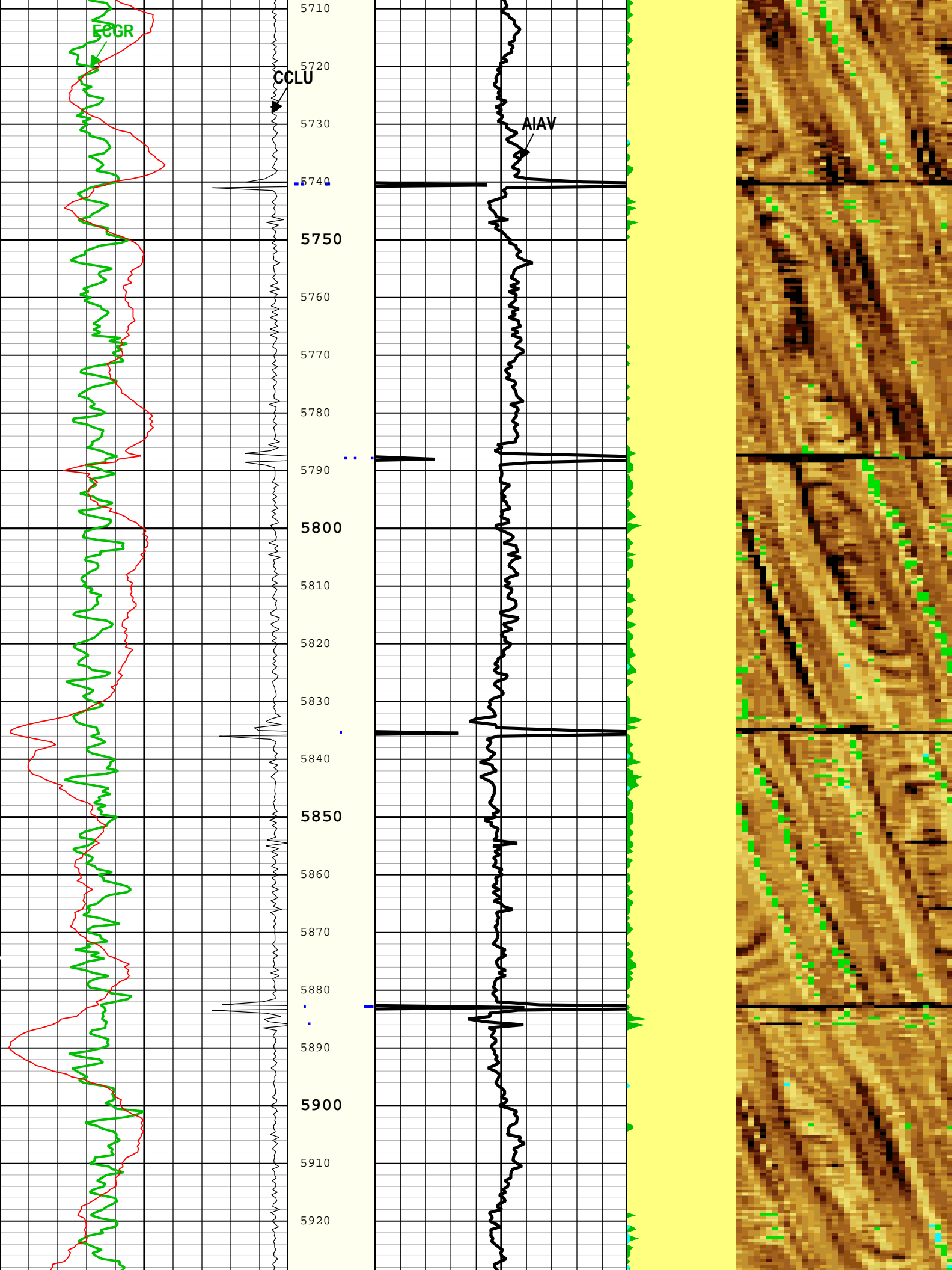


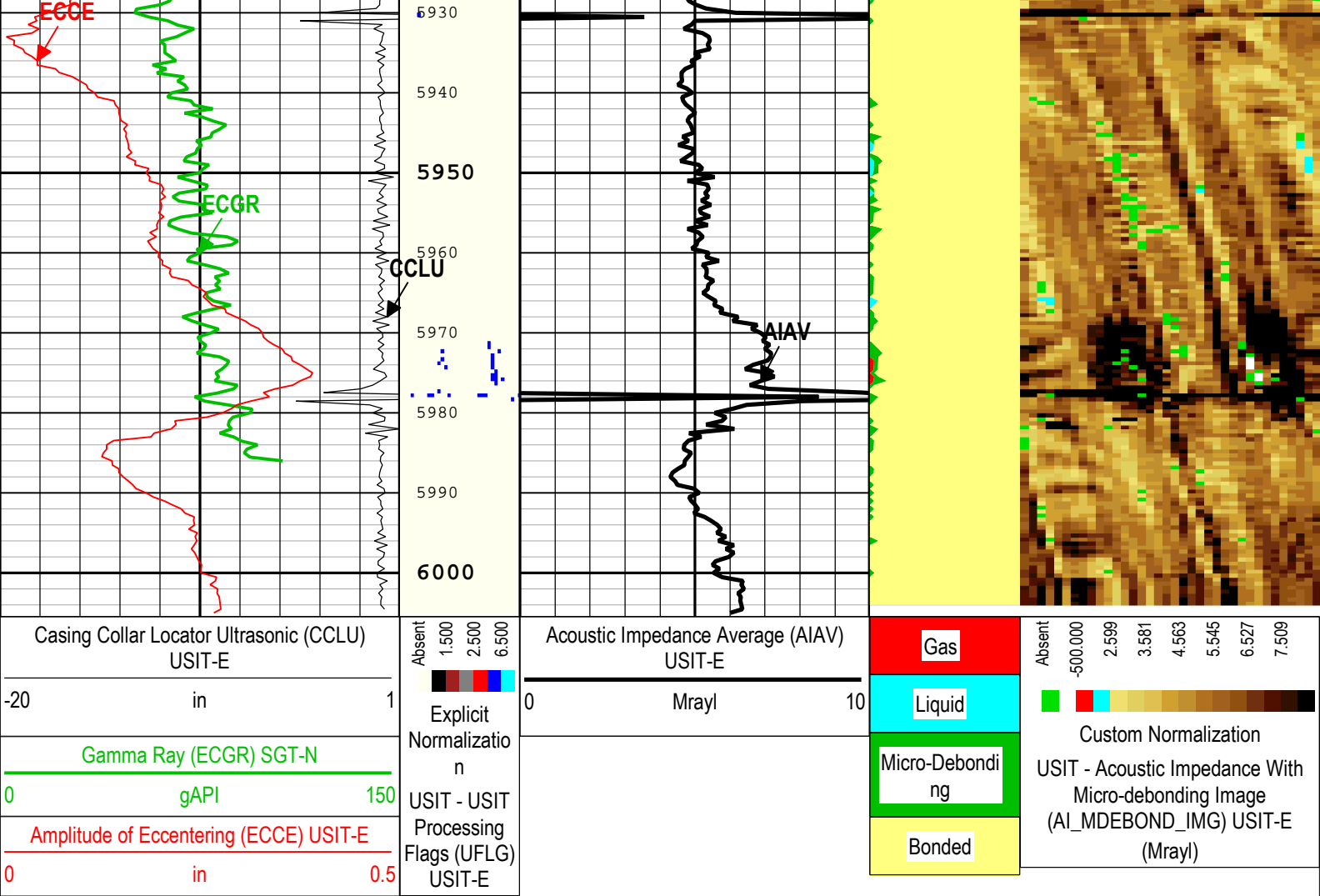












TIME\_1900 - Time Marked every 60.00 (s)

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: 10-Jul-2017 11:45:23

## 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	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	11111	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	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
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	1.19	
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	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters				
Parameter	Value	Start ( ft )	Stop ( ft )	
BS	26	50	110	
BS	13.5	110	1941	
BS	8.5	1941	6005.5	
All depth are actual.				

Tool Control Parameters	
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ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	36	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	50	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	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	6000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

ONE
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0 PSI Repeat Pass
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Software Version	
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Acquisition System	Version
Maxwell 2017 SP2	7.2.87778.3100

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Repeat[1]:Up	Up	1985.69 ft	2513.36 ft	10-Jul-2017 10:01:00 AM	10-Jul-2017 10:04:58 AM	ON	2.86 ft	No

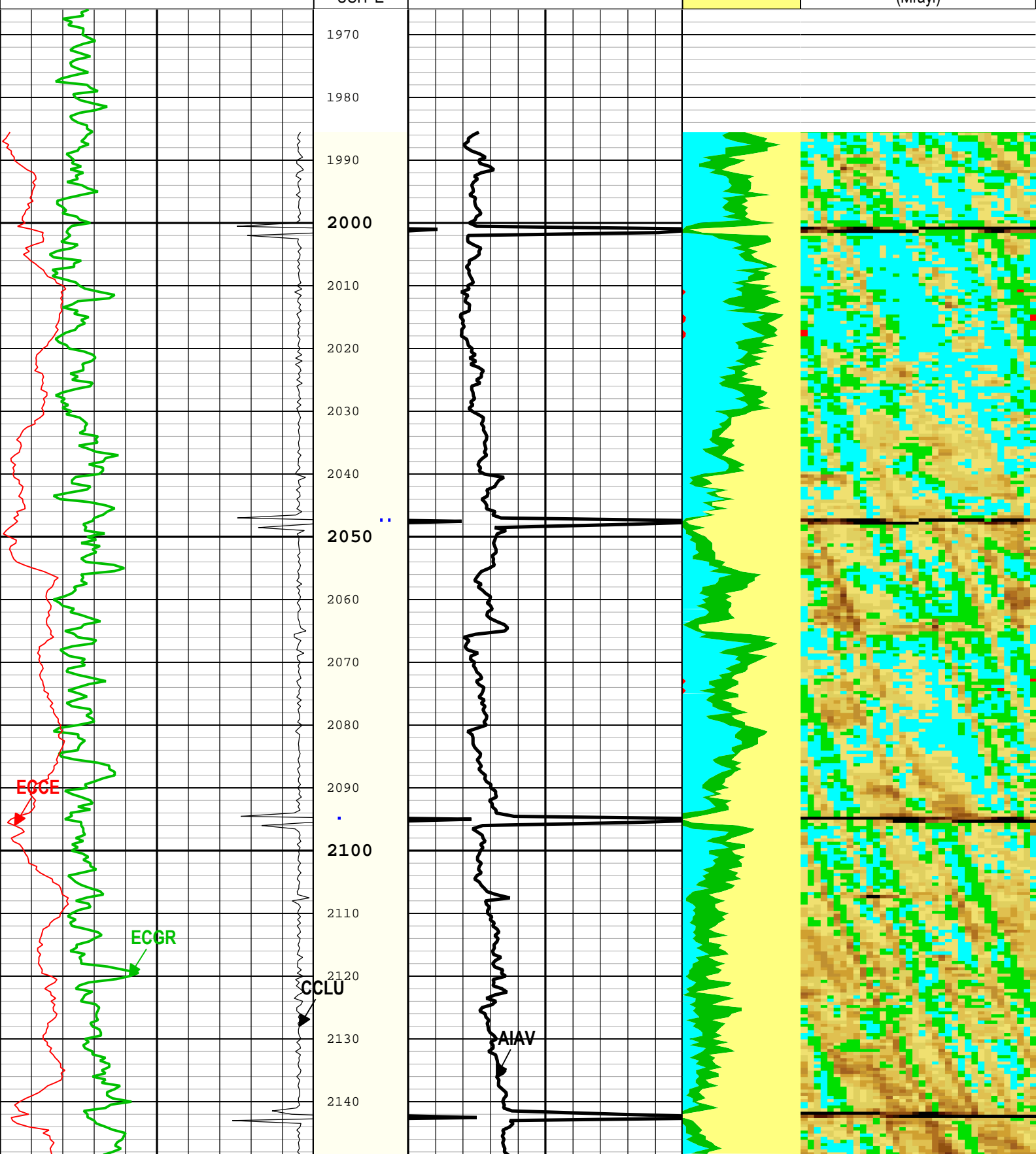
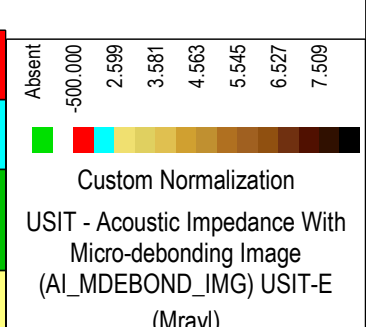
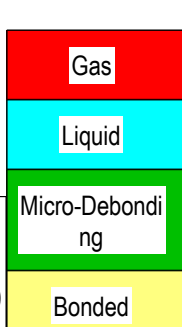
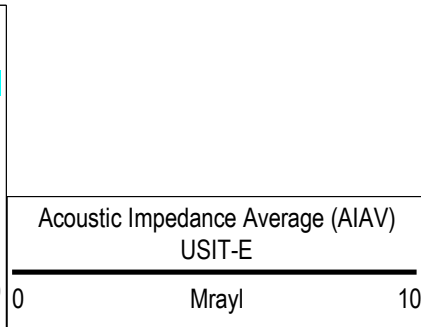
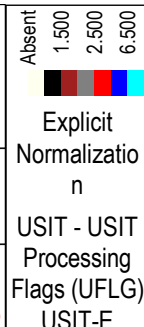
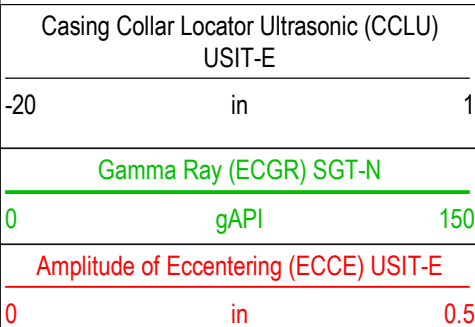
All depths are referenced to toolstring zero
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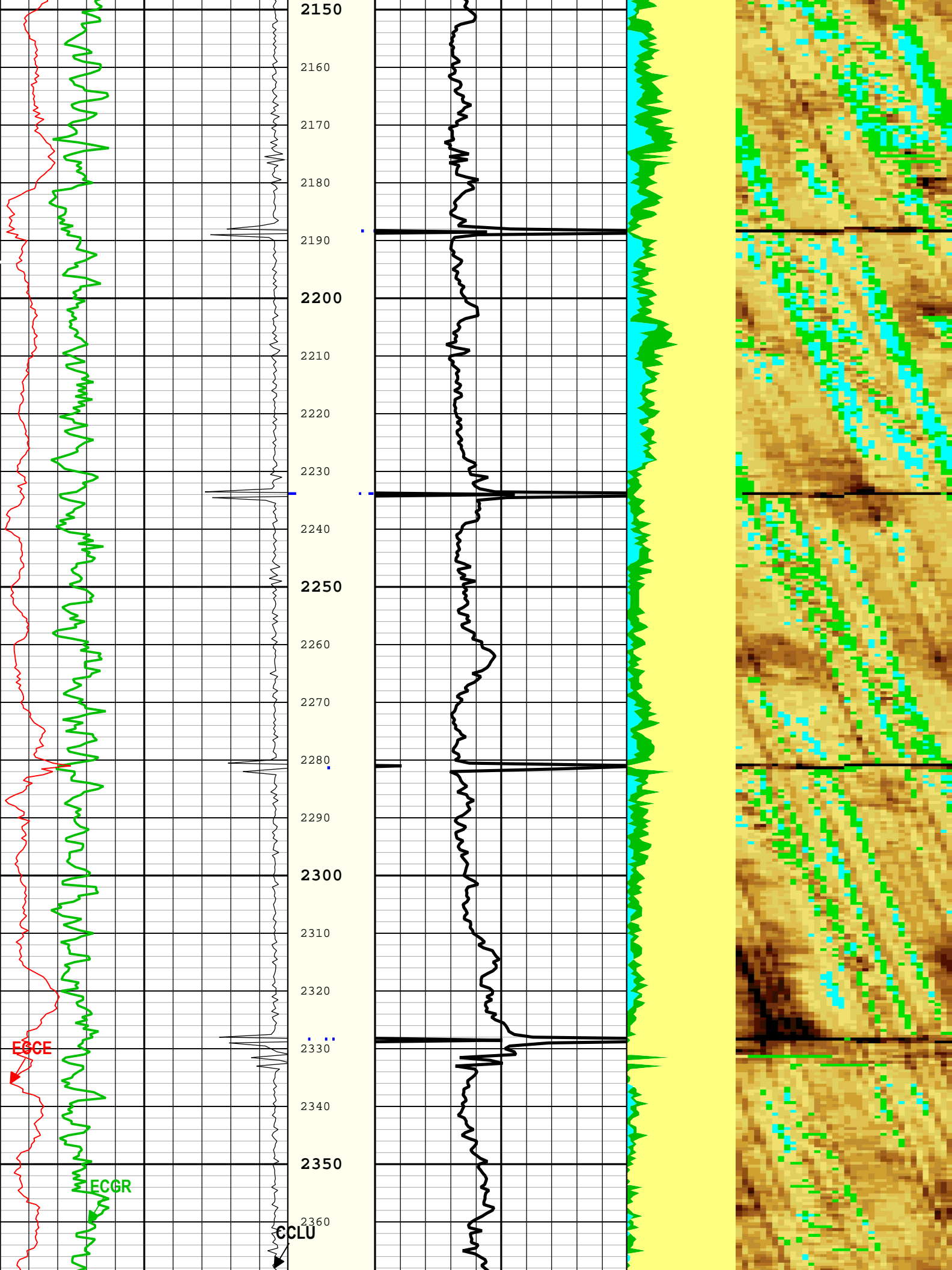
Log	Company:Noble Energy Inc      Well:Constitution Federal LC21-655 ONE: Repeat[1]:Up:S006
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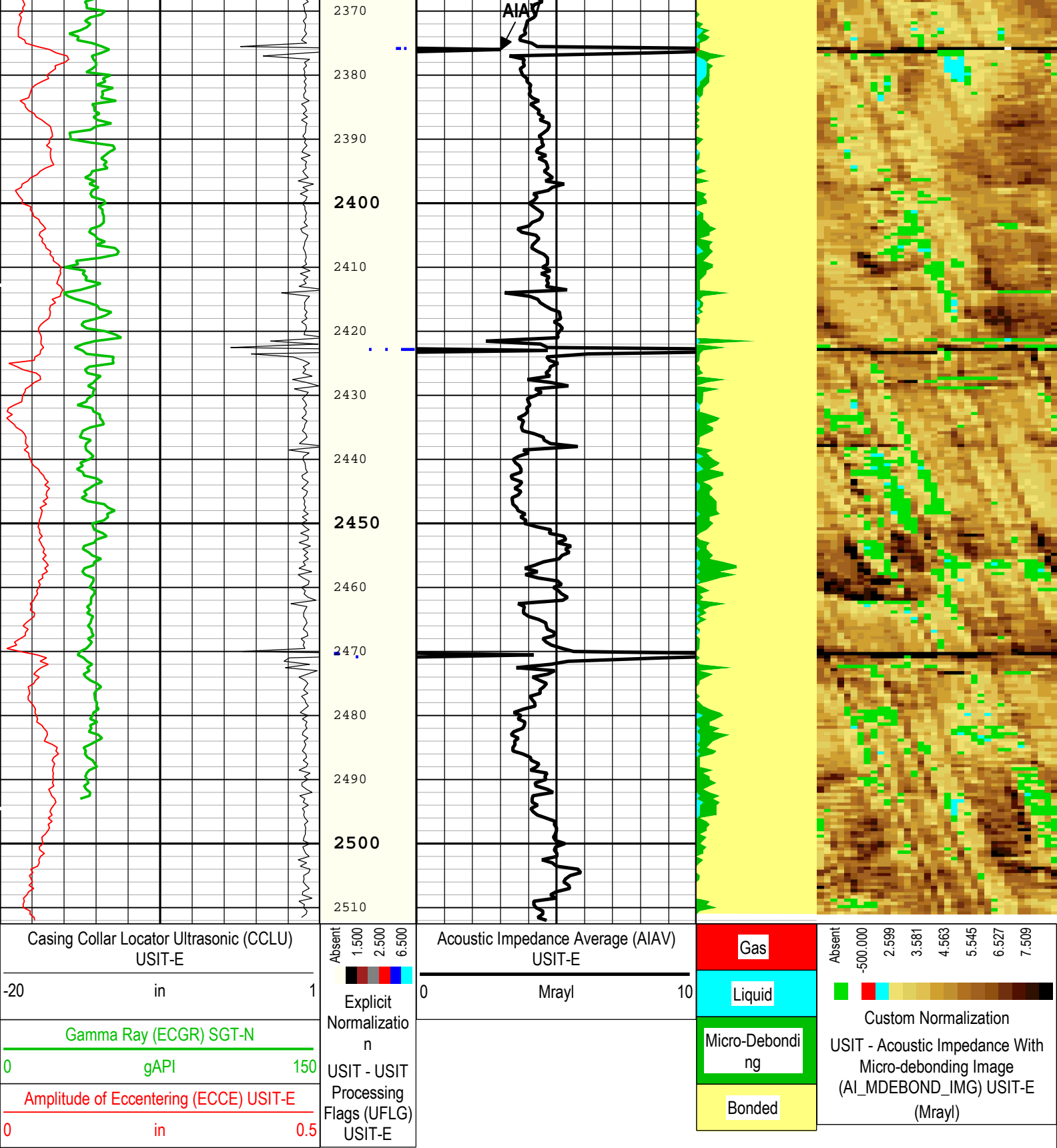
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TIME: 1900    Time Marked every 60.00 (s)
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TIME\_1900 - Time Marked every 00.00 (s)







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: 10-Jul-2017 11:45:34

## Channel Processing Parameters

### ONE: Parameters

Parameter	Description	Tool	Value	Unit
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BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	8.5	in

CBLO	Casing Bottom (Logger)	WLSESSION	11111	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	
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FDII	FPM Data Interpolation Interval	USIT-E	0	ft
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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	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.19	
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	2.6	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	36	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	50	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	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	2500	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:Constitution Federal LC21-655

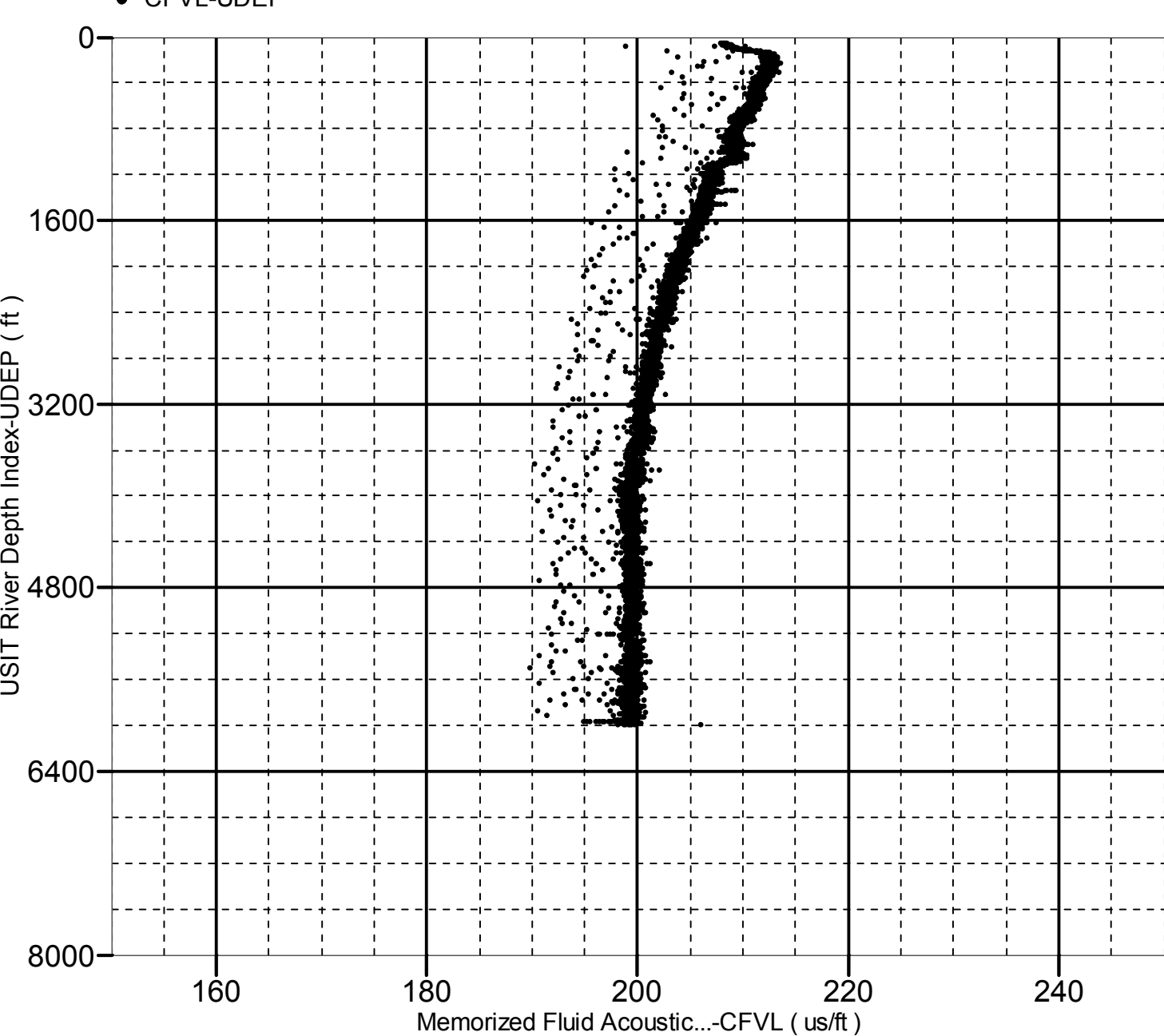
ONE: Main[3]:Up:S006

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6006.00 to 57.50 ft

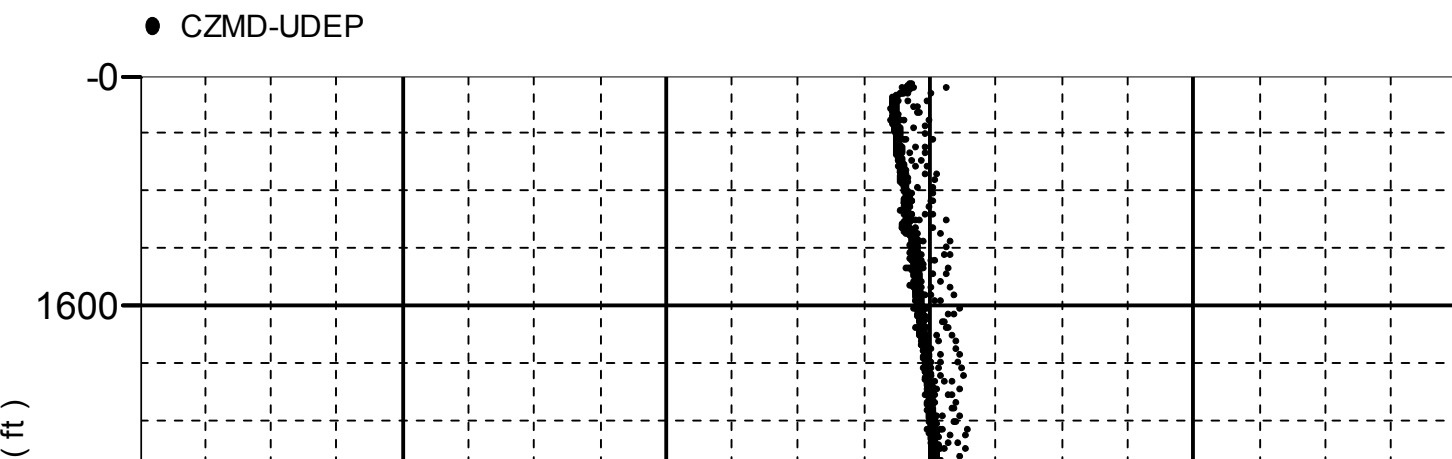
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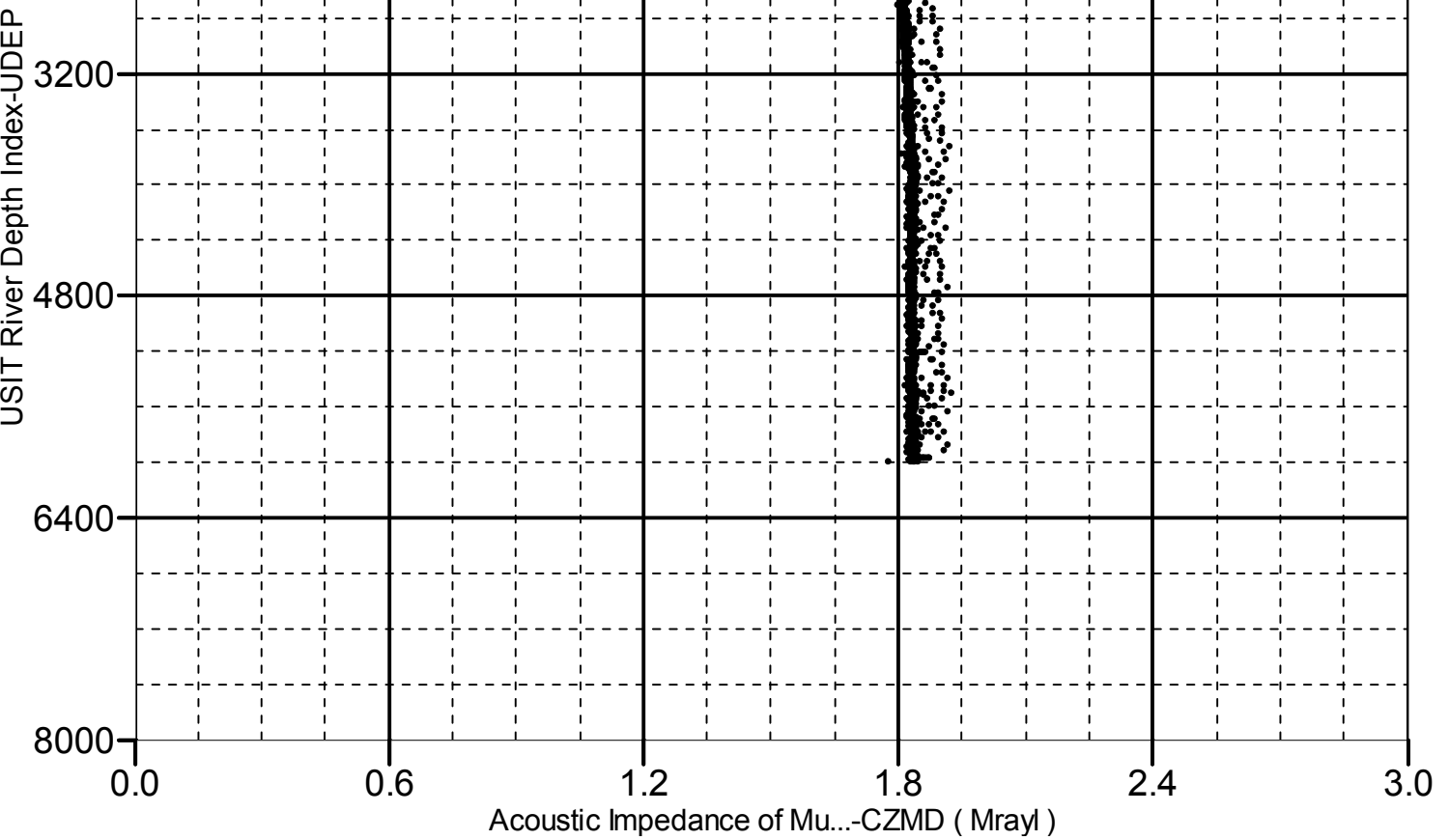


## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6006.00 to 57.50 ft





Company: Noble Energy Inc

**Schlumberger**

Well: Constitution Federal LC21-655

Field: Wildcat

County: Weld

State: Colorado

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