

Company: Noble Energy, Inc.

Well: Nugent LD06-665

Field: Wildcat

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wildcat				
Location:	SENE Sec 5, T9N, R58W				
Well:	Nugent LD06-665				
Company:	Noble Energy, Inc.				
		SENE Sec 5, T9N, R58W	Elev.:	K.B.	4791.00 ft
		SHL: 2310' FNL X 330' FEL		G.L.	4761.00 ft
		Lat/Long: 40.78129/-103.88033		D.F.	4790.00 ft
		Permanent Datum:	Ground Level	Elev.:	4761.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-40808-0000	5	9N	58W
Logging Date	12-Aug-2016				

Run Number	One	
Depth Driller	16170.00 ft	
Schlumberger Depth	16170.00 ft	
Bottom Log Interval	6000.00 ft	
Top Log Interval	60.00 ft	
Casing Fluid Type	Brine	
Salinity		
Density	9.2 lbm/gal	
Fluid Level	8.00 ft	
BIT/CASING/TUBING STRING		
Bit Size	8.50 in	
From	1940.00 ft	
To	16170.00 ft	
Casing/Tubing Size	5.5 in	
Weight	20 lbm/ft	
Grade	P110	
From	0.00 ft	
To	16160.00 ft	
Max Recorded Temperatures	209 degF	
Logger on Bottom	13-Aug-2016	14:15:00
Unit Number	9115	Fort Morgan
Recorded By	Avery Becker	
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.

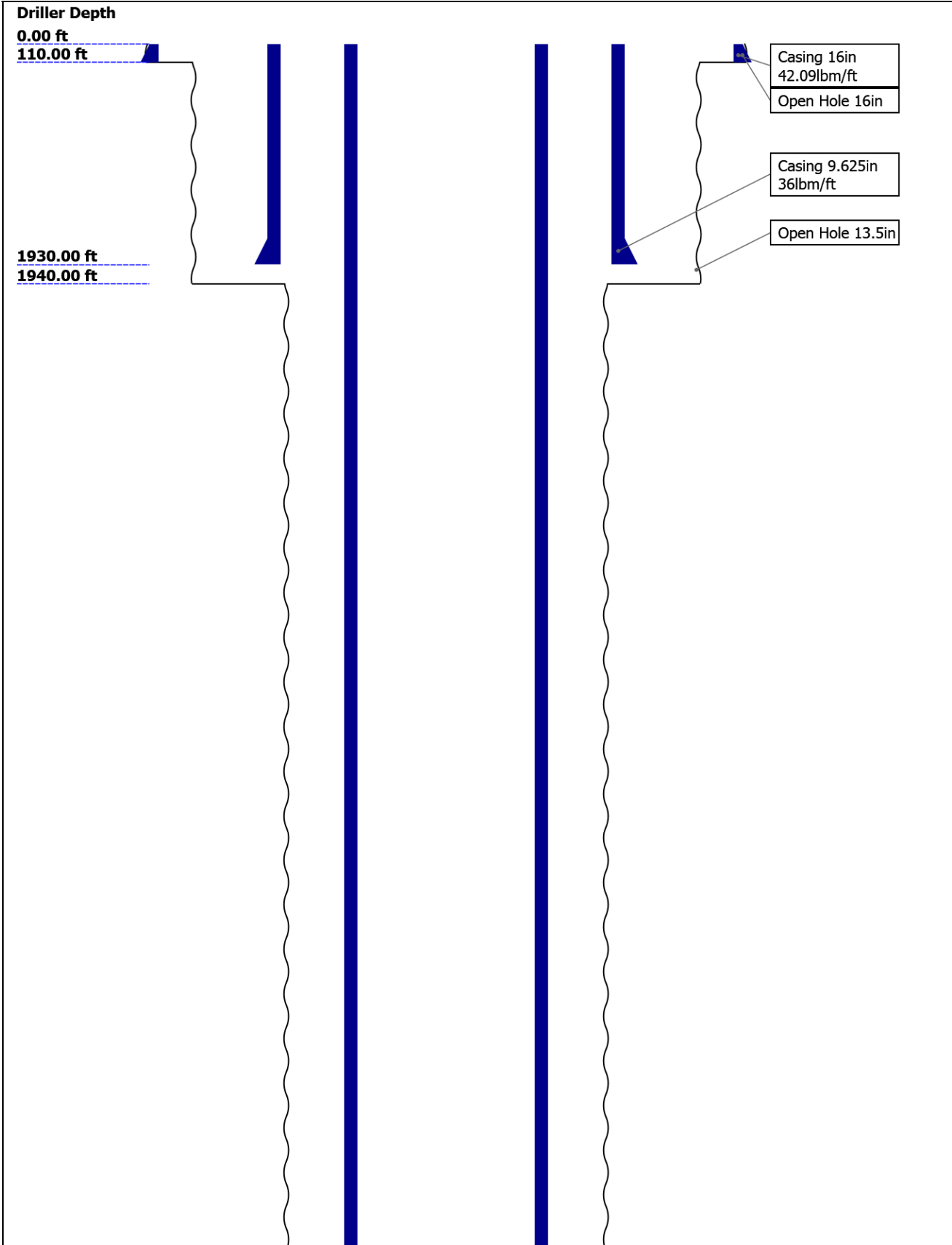
Contents

- Header
- Disclaimer
- Contents
- Well Sketch
- Borehole Size/Casing/Tubing Record
- Remarks and Equipment Summary
- Depth Summary
- USI Fluid Properties Measurement\_1
- One 2500 PSI Main Pass
  - Integration Summary
  - Software Version
  - Composite Summary
  - Log ( DJ Basin Ultrasonic Cement Summary Report )
  - Parameter Listing
- One 0 PSI Repeat Pass
  - Integration Summary

- in )
- Tail

- 10.2 Software Version
- 10.3 Composite Summary
- 10.4 Log ( DJ Basin Ultrasonic Cement Summary Report )
- 10.5 Parameter Listing
- 11. XYZ ( USI Fluid Acoustic Slowness vs Depth 3.0 in )
- 12. XYZ ( USI Acoustic Impedance of Mud vs Depth 3.0

Well Sketch



16160.00 ft

16170.00 ft

Casing 5.5in  
20lbm/ft

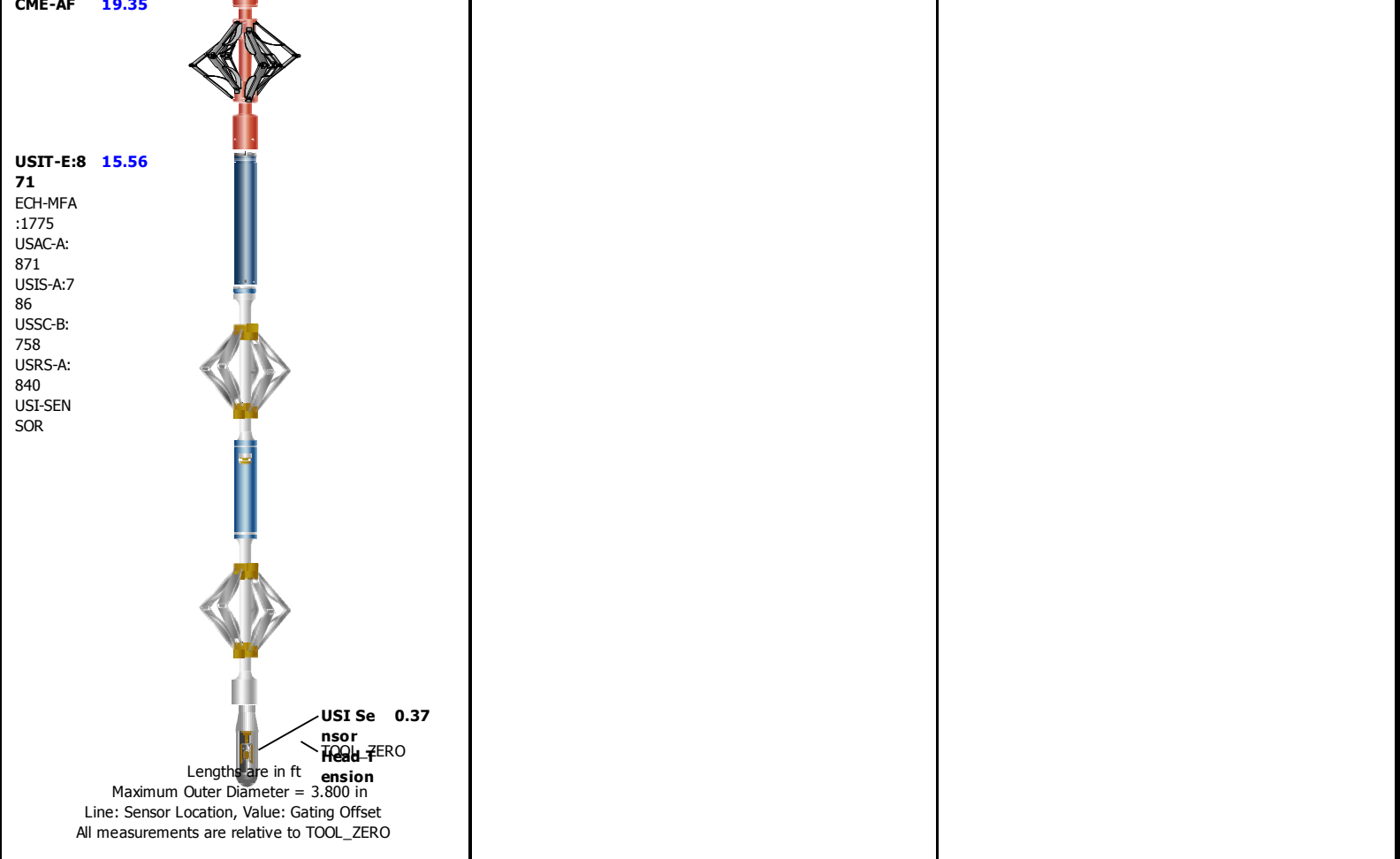
Open Hole 8.5in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	16	13.5	8.5			
Top Driller ( ft )	0	110	1940			
Top Logger ( ft )	0	110	1940			
Bottom Driller ( ft )	110	1940	16170			
Bottom Logger ( ft )	110	1940	16170			
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	P110			
Top Driller ( ft )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	110	1930	16160			
Bottom Logger ( ft )	110	1930	16160			

Remarks and Equipment Summary

One: Toolstring			One: Remarks		
<div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT34.77LEH-QT</div><div>DTC-H:831.85794ECH-KC:9373DTC-H:8794SGT-N:128.850249SGH-K:3039SGC-TB:10249SGD-TAA:21700</div><div>AH-18423.35[2]</div><div>AH-18421.35[1]</div><div>SGT-N:128.85</div></div><div></div></div>	Toolstring run as per tool sketch				
	Main pass=2500 psi, repeat=0 psi				
	Annular fluid=10 ppg OBM				
	Crew: Troy Ocanas & Gary Lapp				
	Thank you for choosing Schlumberger				



Depth Summary			
	One		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6568		
Calibration Date	23-Dec-2015		
Calibrator Serial Number			
Calibration Cable Type	7-46A-XS		
Wheel Correction 1	-1		
Wheel Correction 2	0		
Tension Device			
Type	CMTD-B/A		
Serial Number	147		
Calibration Date	16-Jul-2016		
Calibrator Serial Number	441435A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	12		
Calibration Peak Error	20		
Logging Cable			
Type	7-46A-XS		
Serial Number			
Length	23000.00 ft		
Conveyance Type	Wireline		

Rig Type	Crane	
One:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	First run in well depth control procedures followed
Rig Up Length At Surface		IDW used as primary depth device, z--chart used for secondary
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[3]:Up	6004.27	63.99

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 : 20.76m(68.09ft) to 25.10m(82.35ft)  
MUD\_N\_FRP = 1.08  
DFD = 1.10g/cm3(9.20lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.81 MRayl

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

One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

## Pass Summary

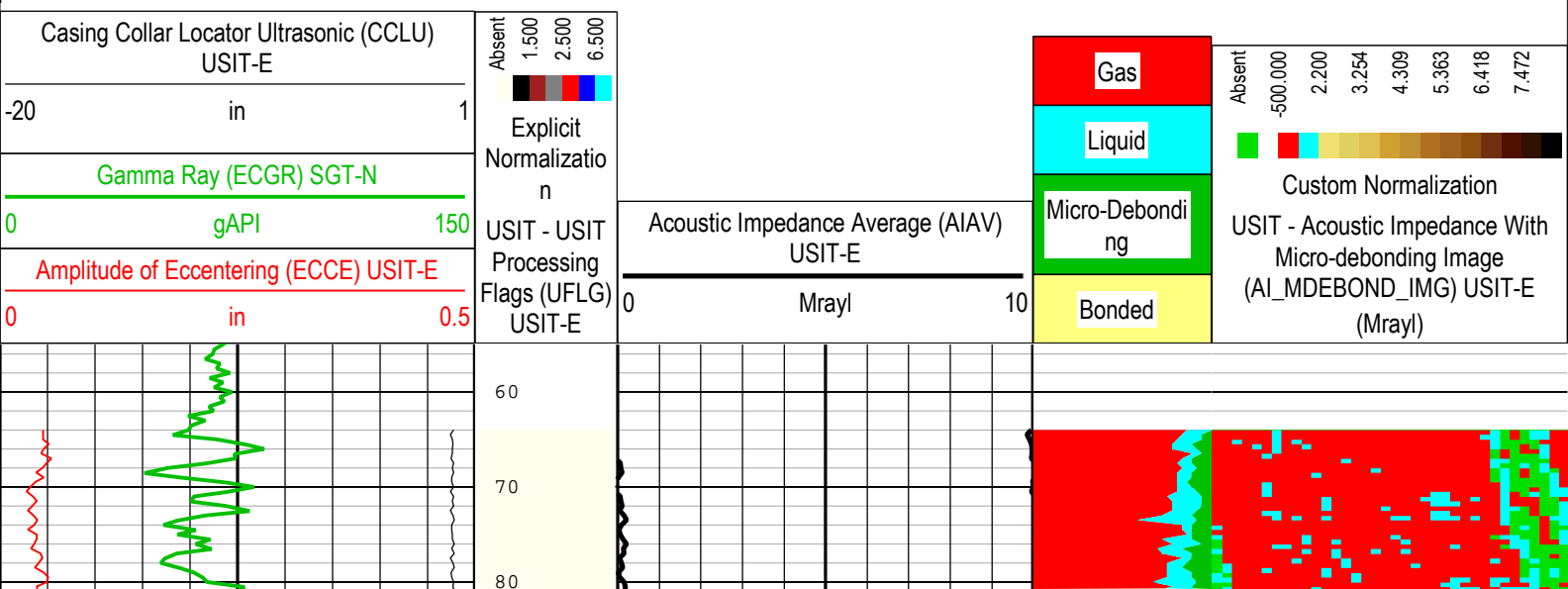
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	63.99 ft	6004.27 ft	13-Aug-2016 3:15:23 PM	13-Aug-2016 3:47:59 PM	ON	5.21 ft	Yes

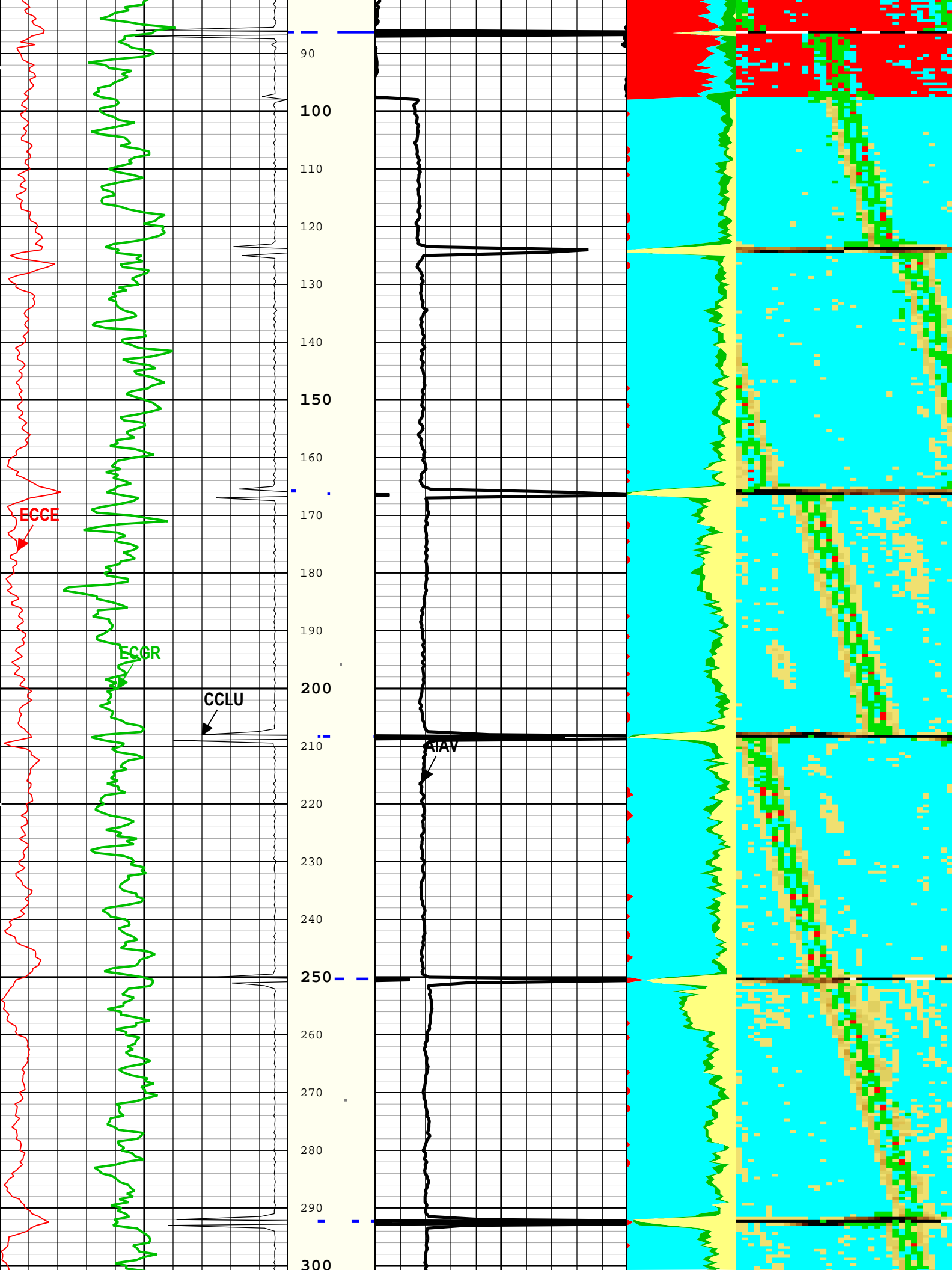
All depths are referenced to toolstring zero

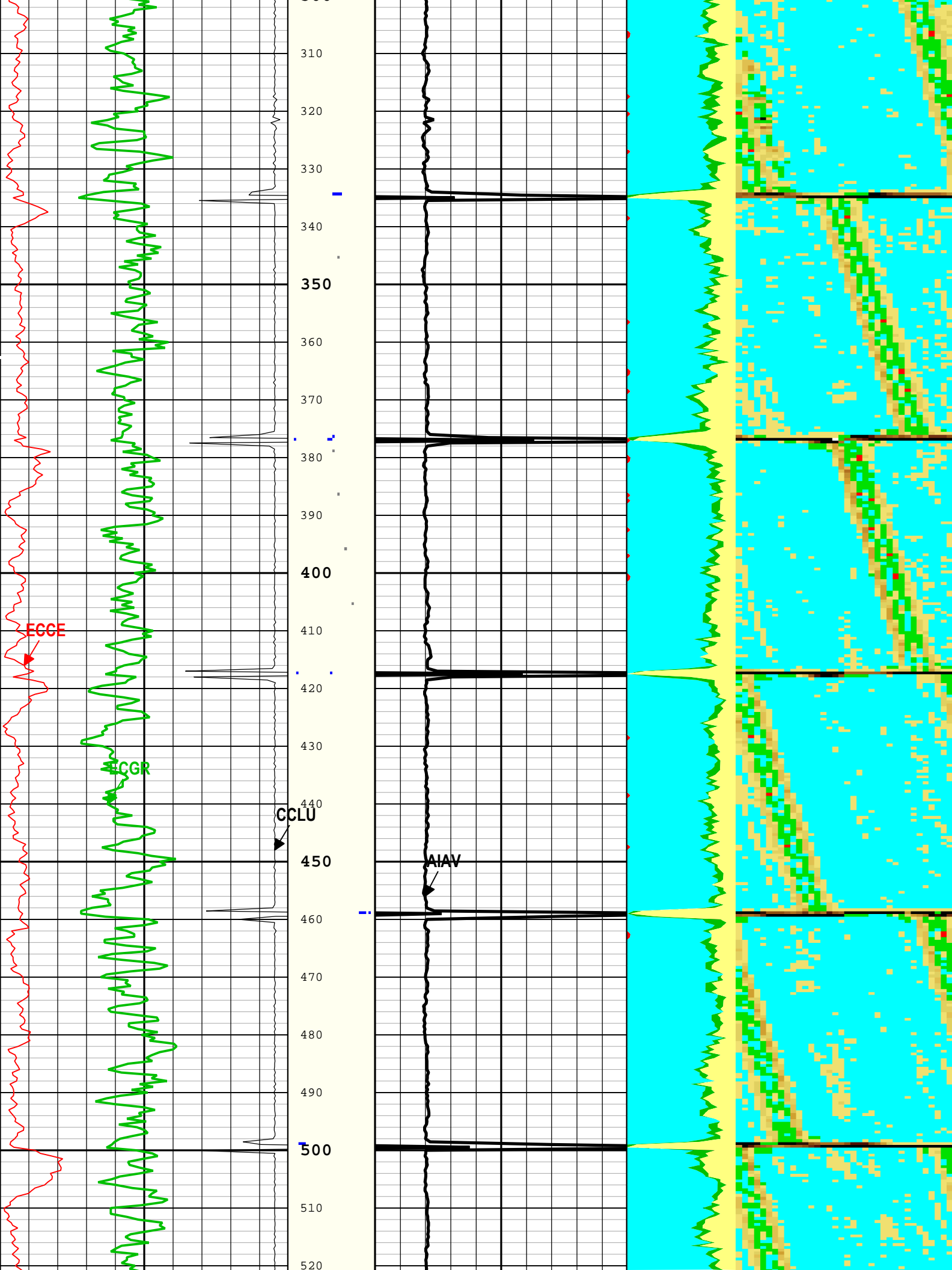
Log	Company:Noble Energy, Inc. Well:Nugent LD06-665 One: Log[3]:Up:S007
-----	--

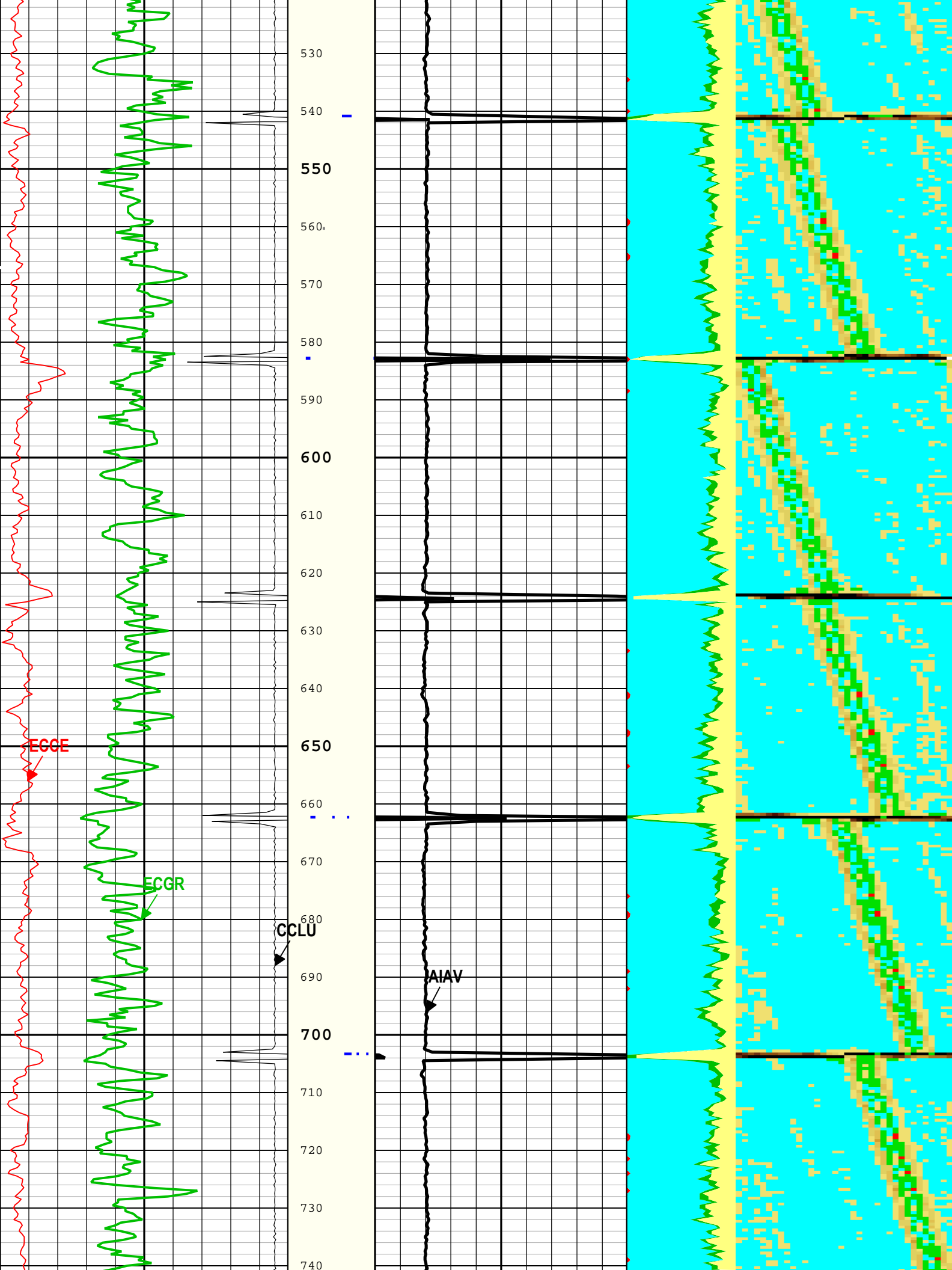
Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth  
Creation Date: 13-Aug-2016 16:17:05

TIME\_1900 - Time Marked every 60.00 (s)

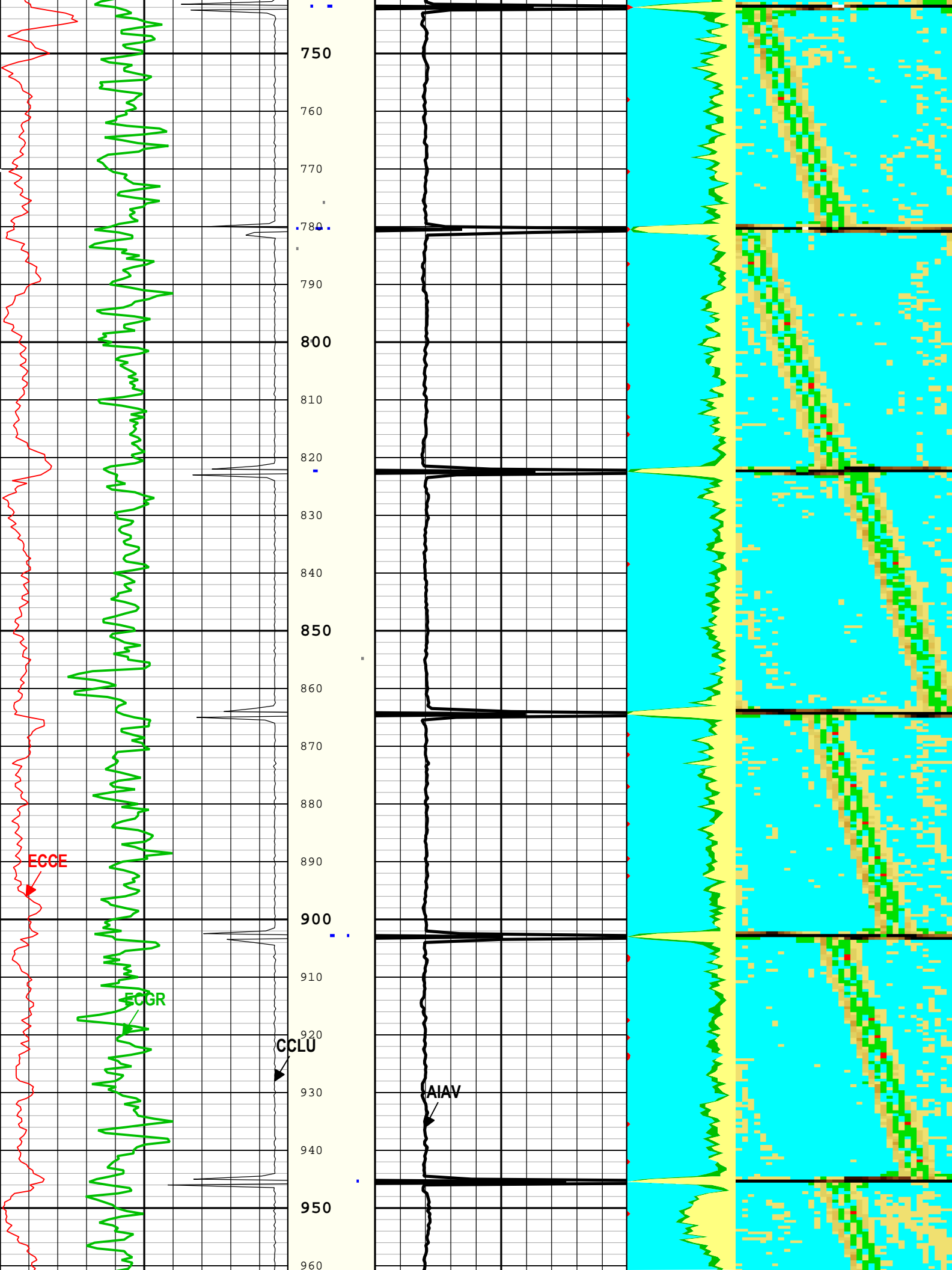


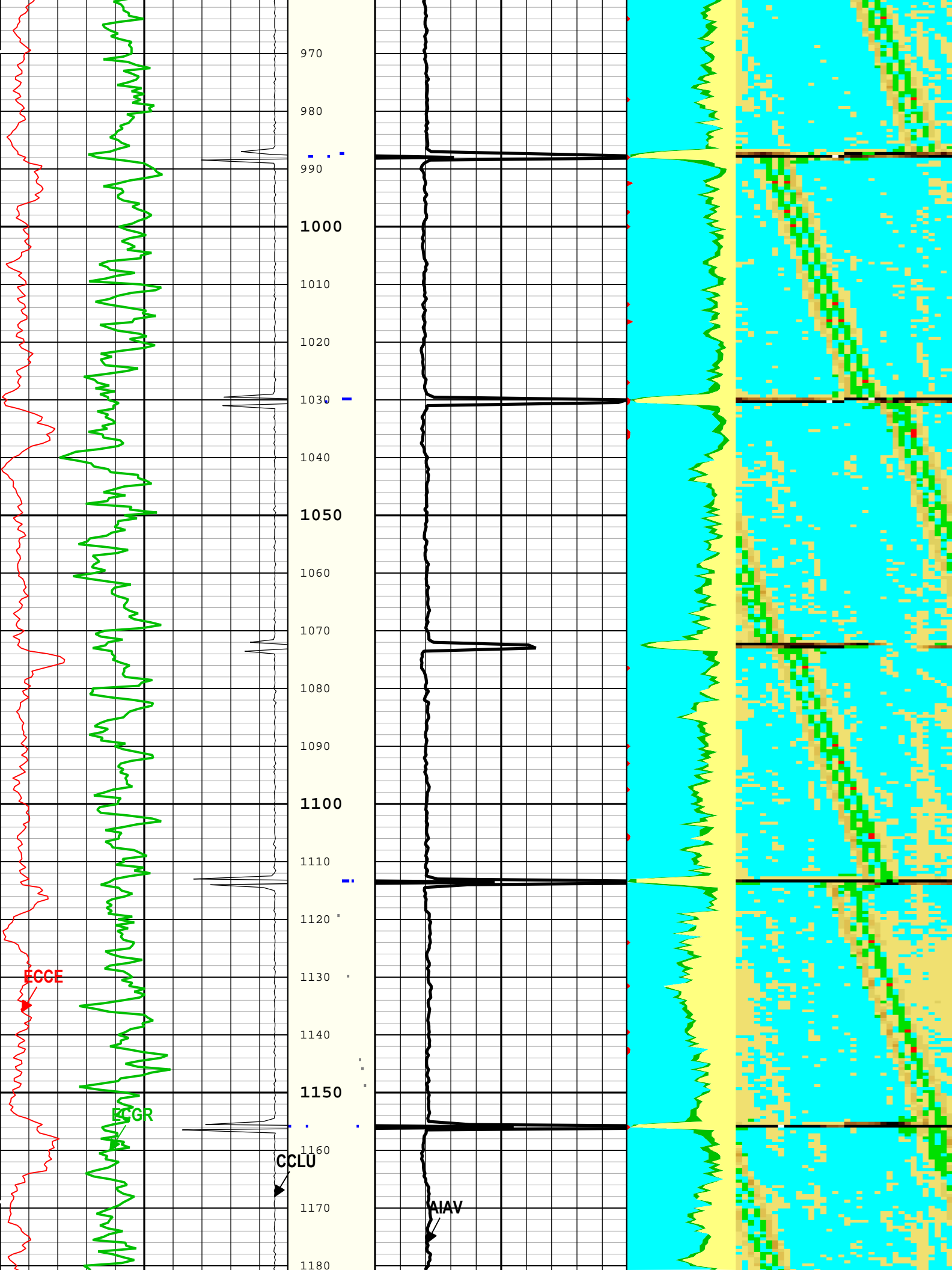


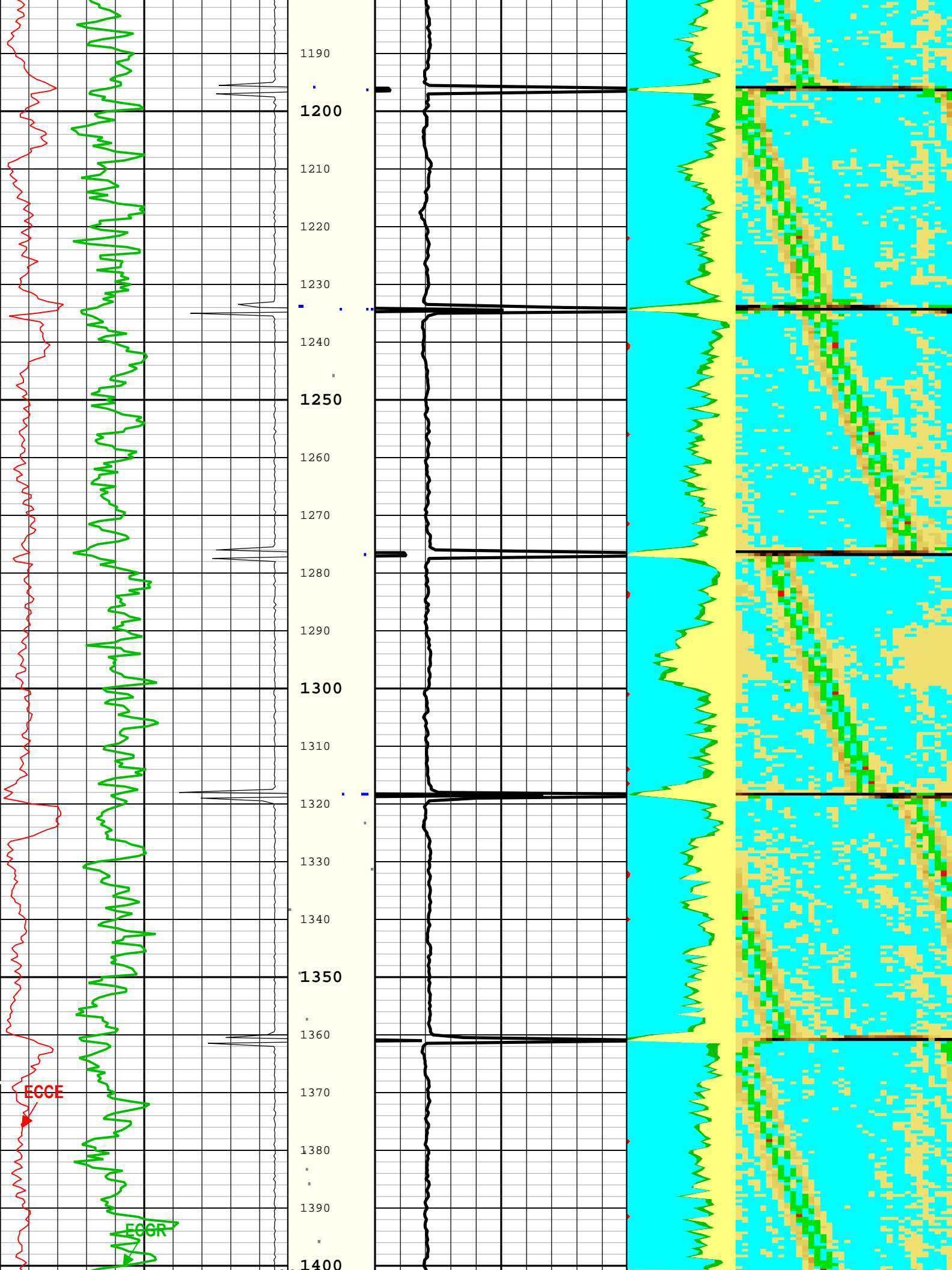


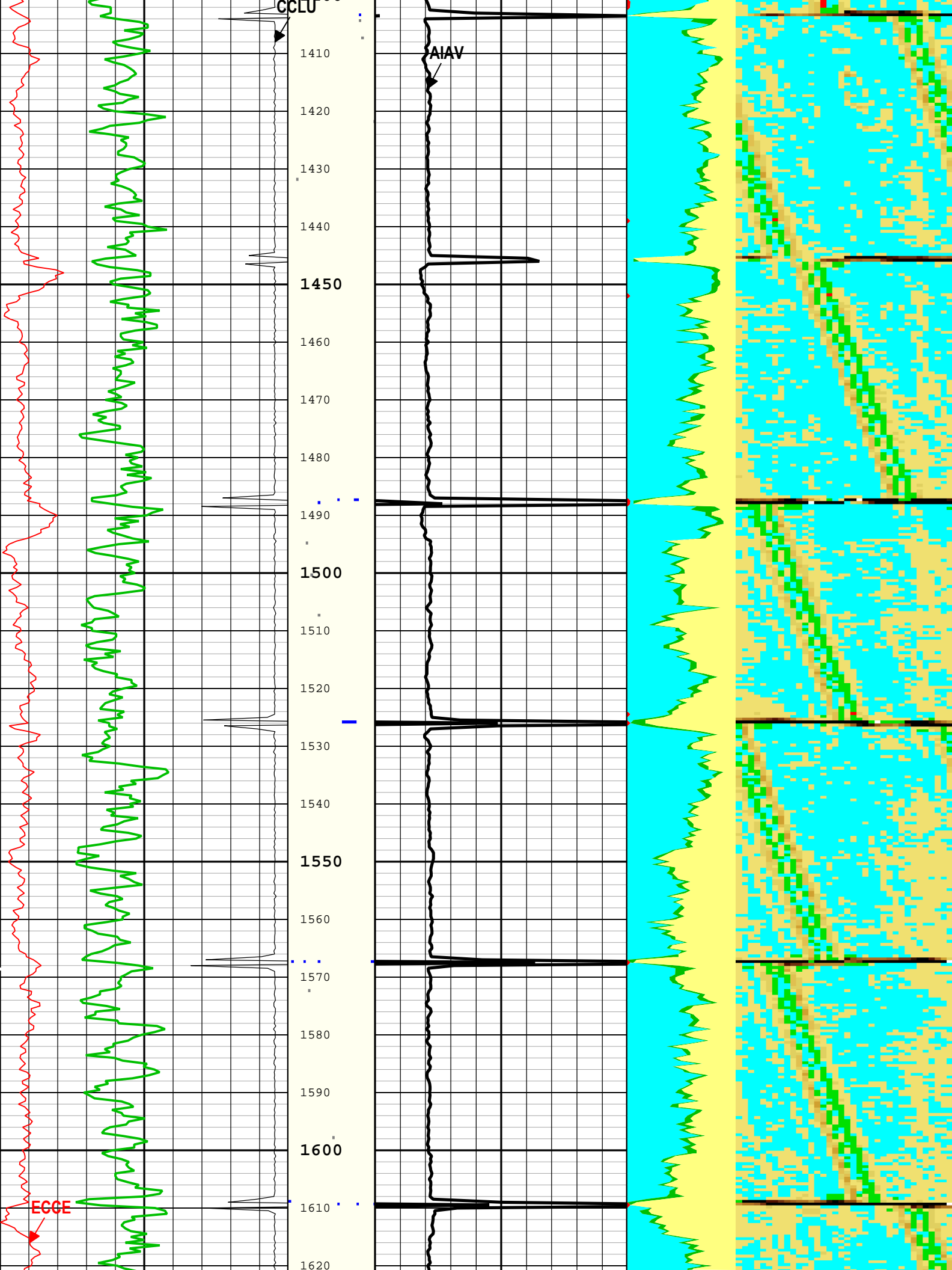


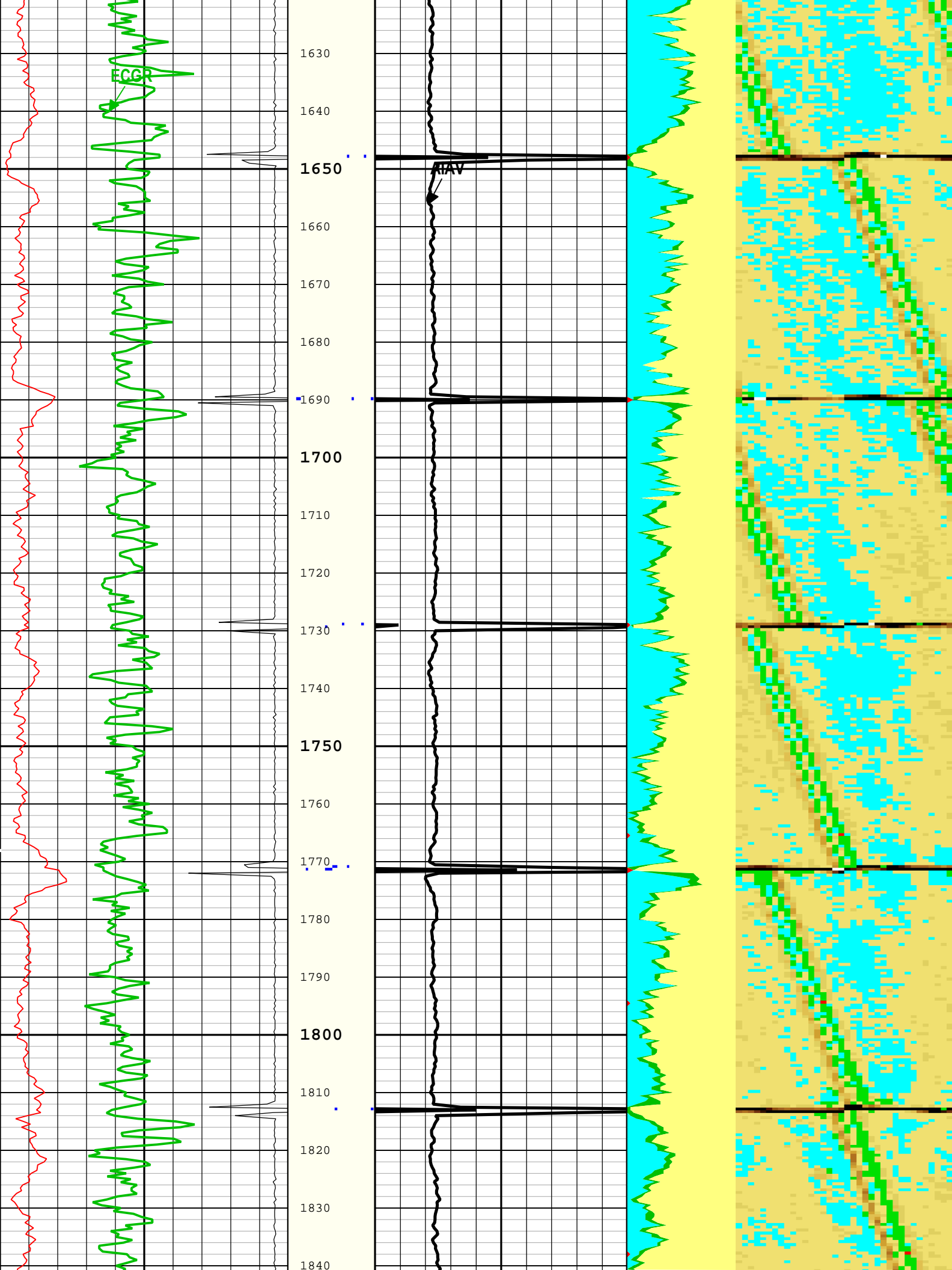


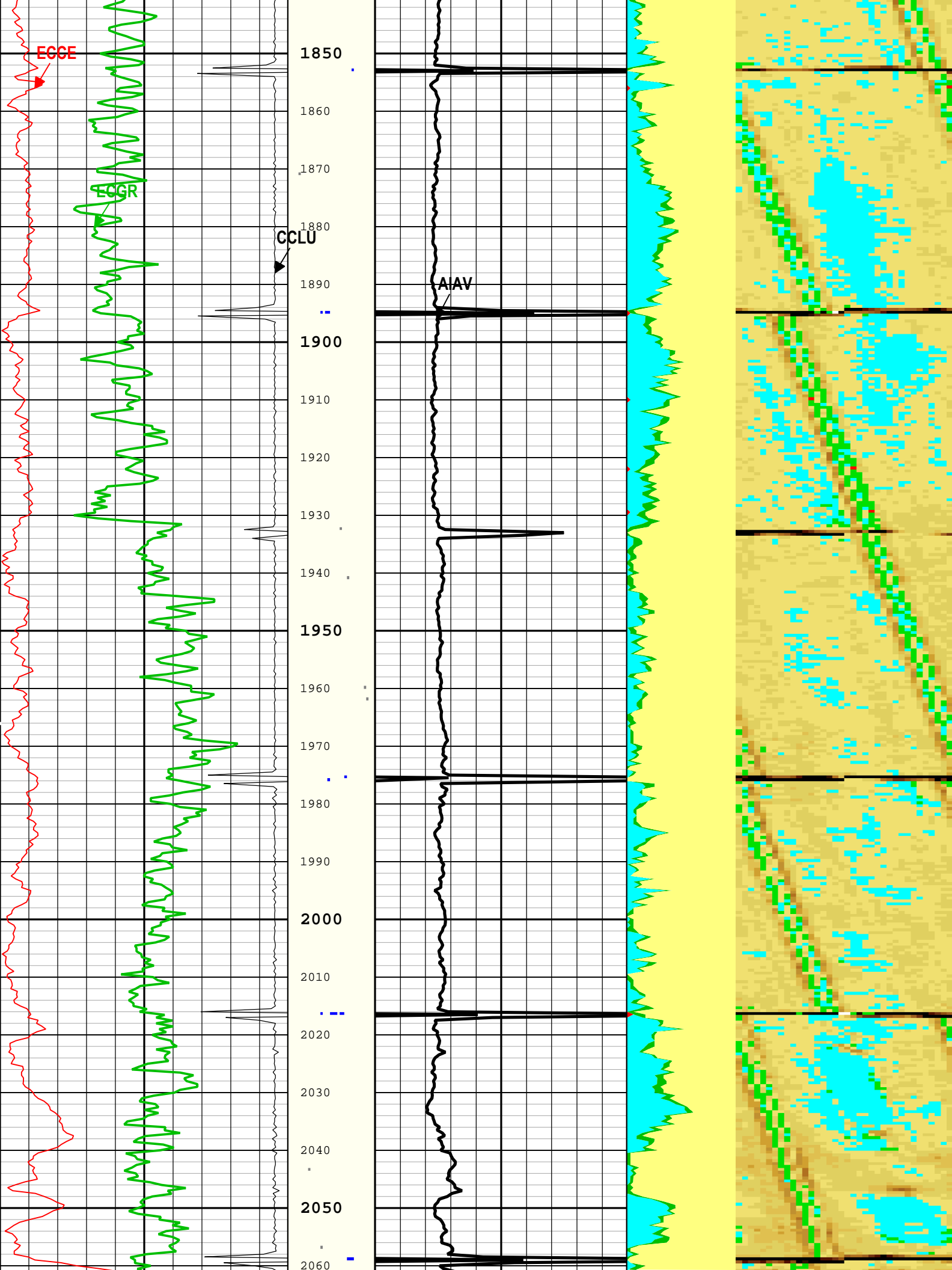


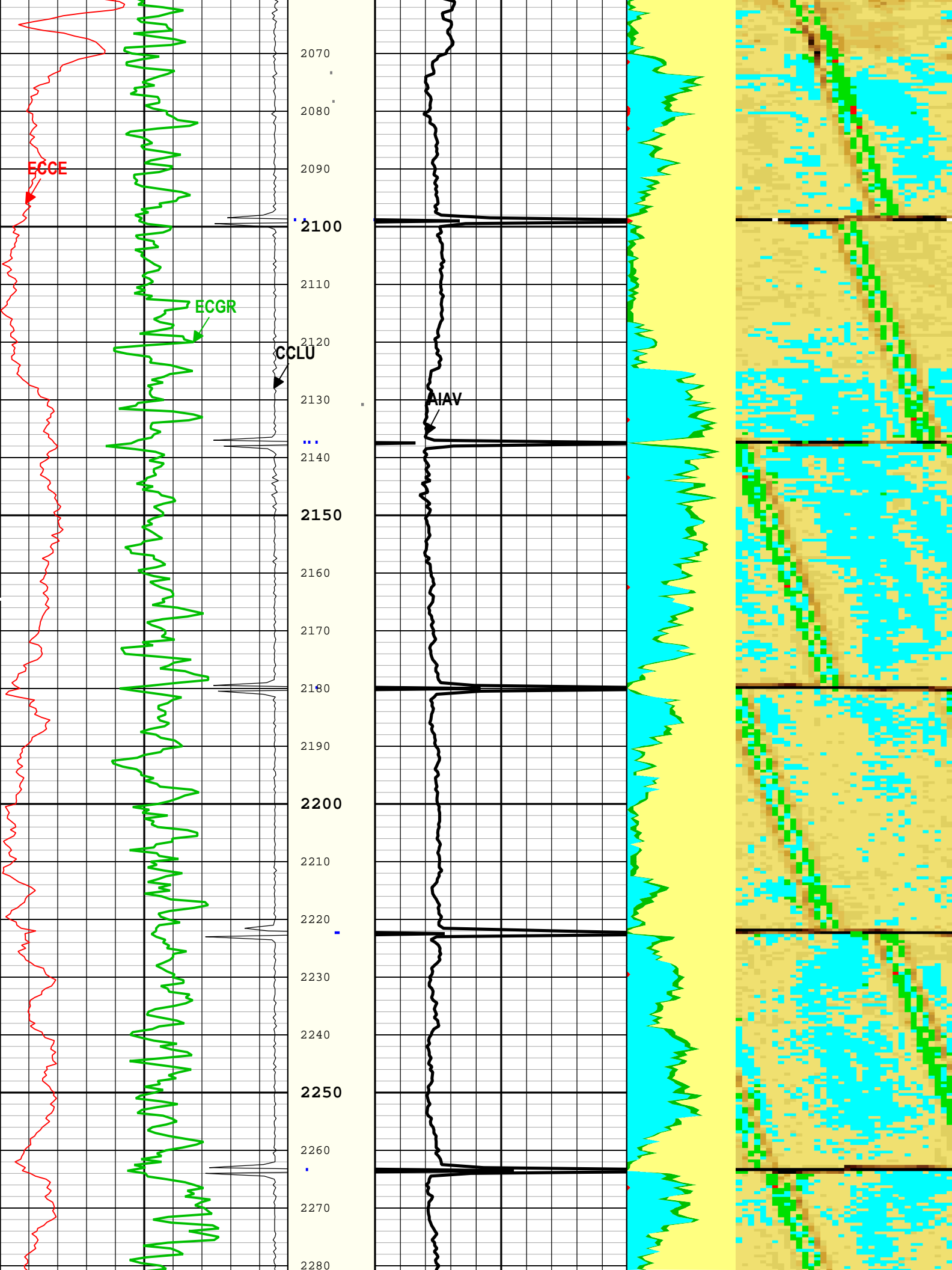


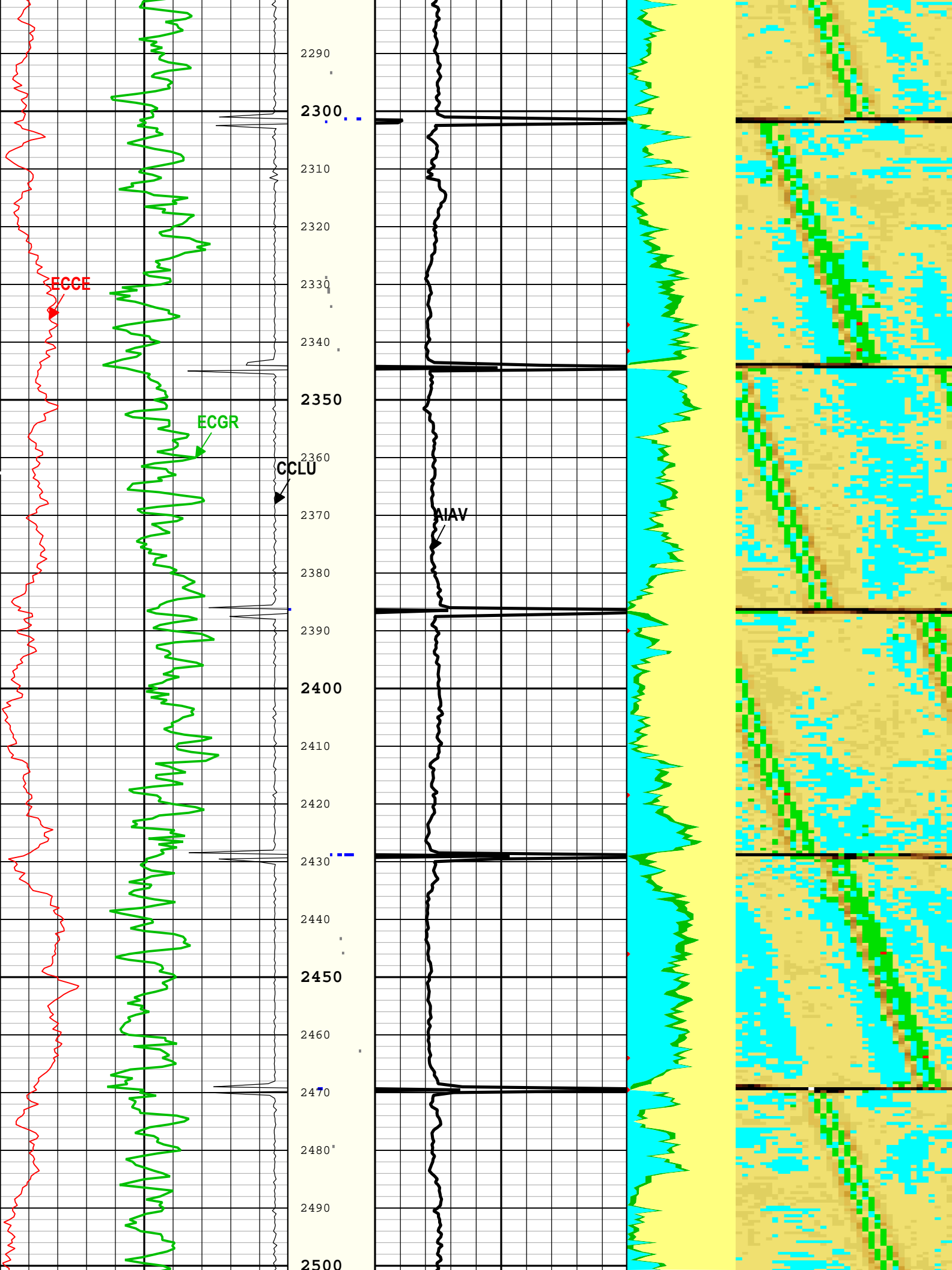




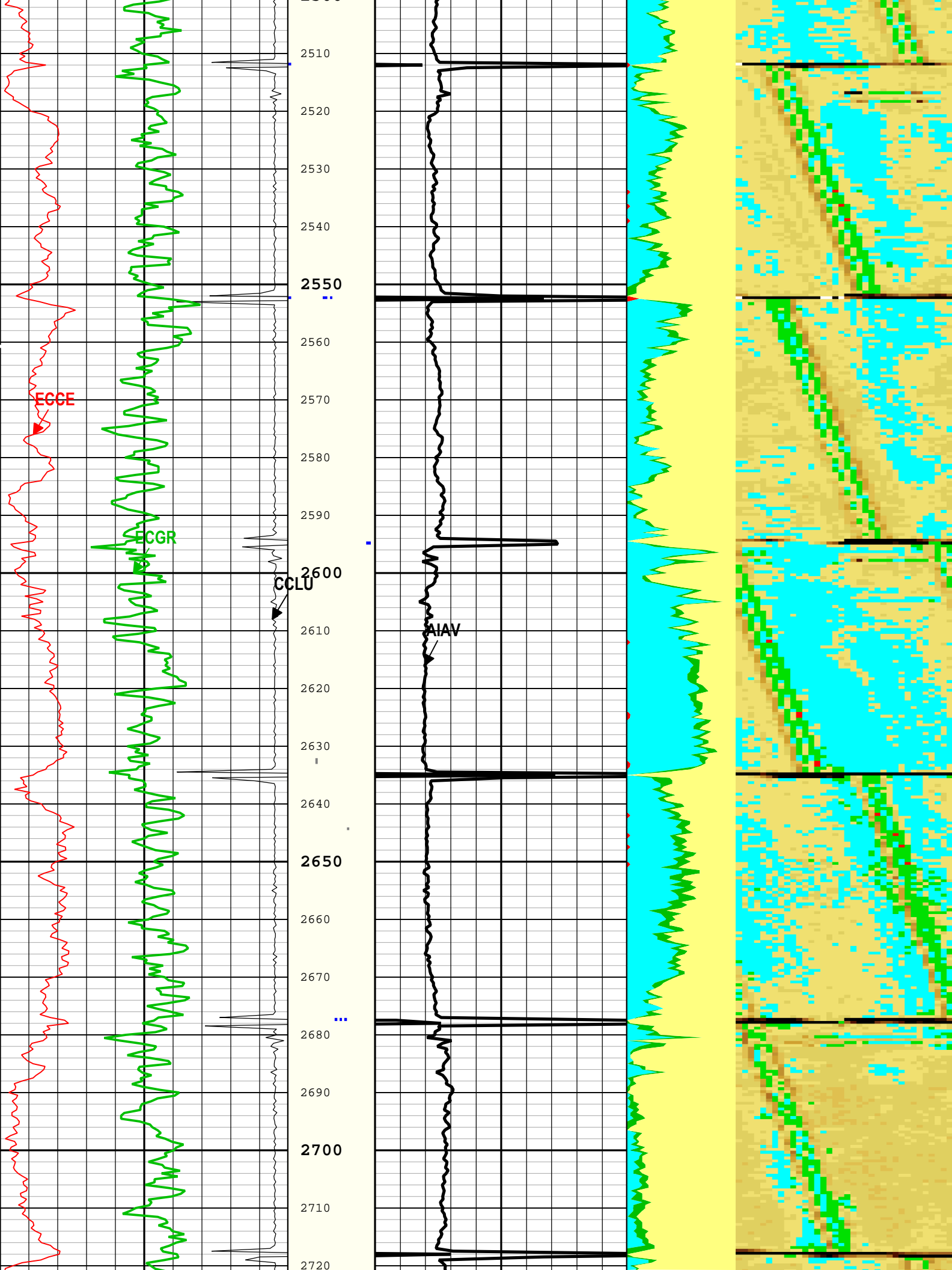


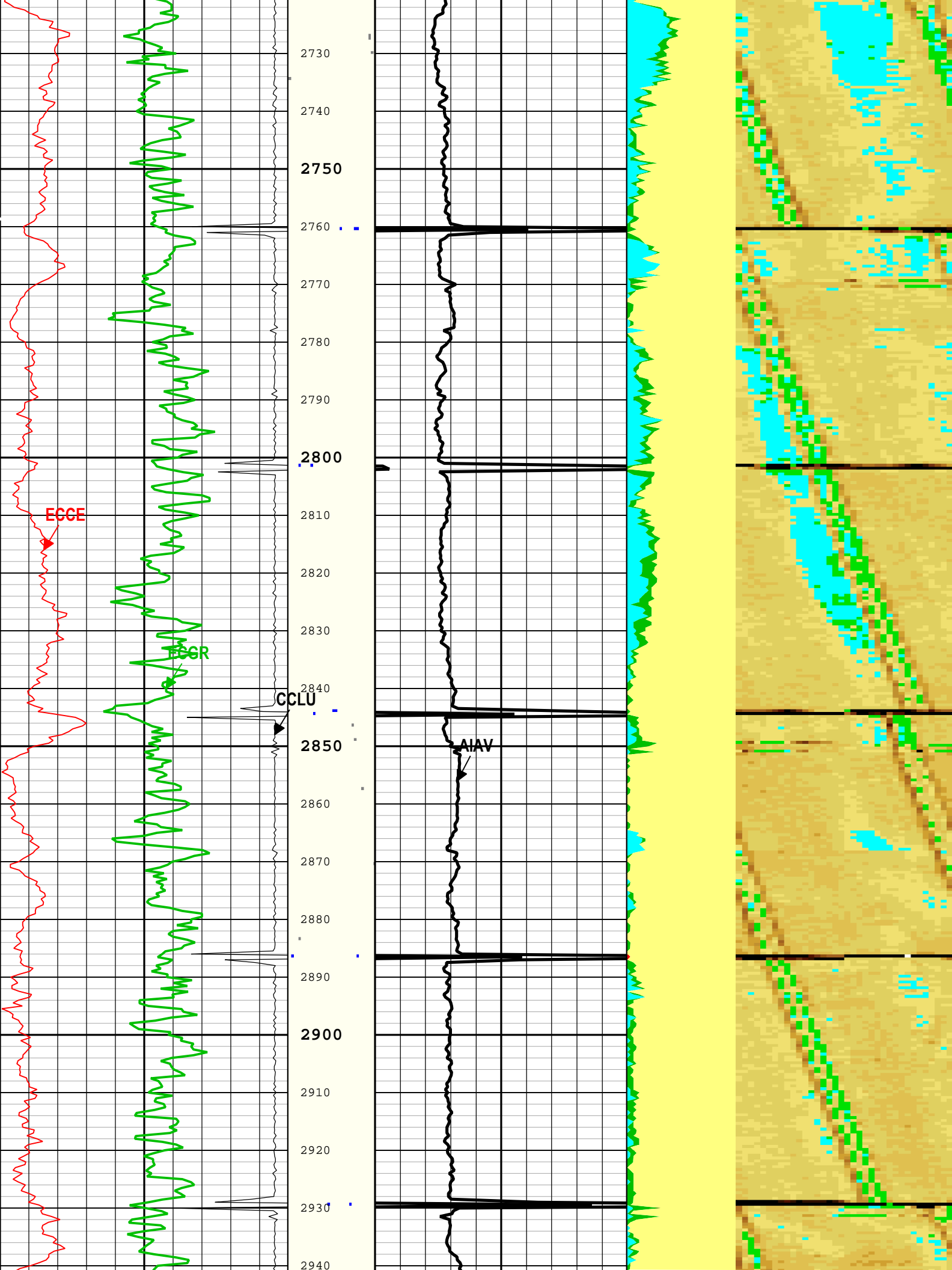


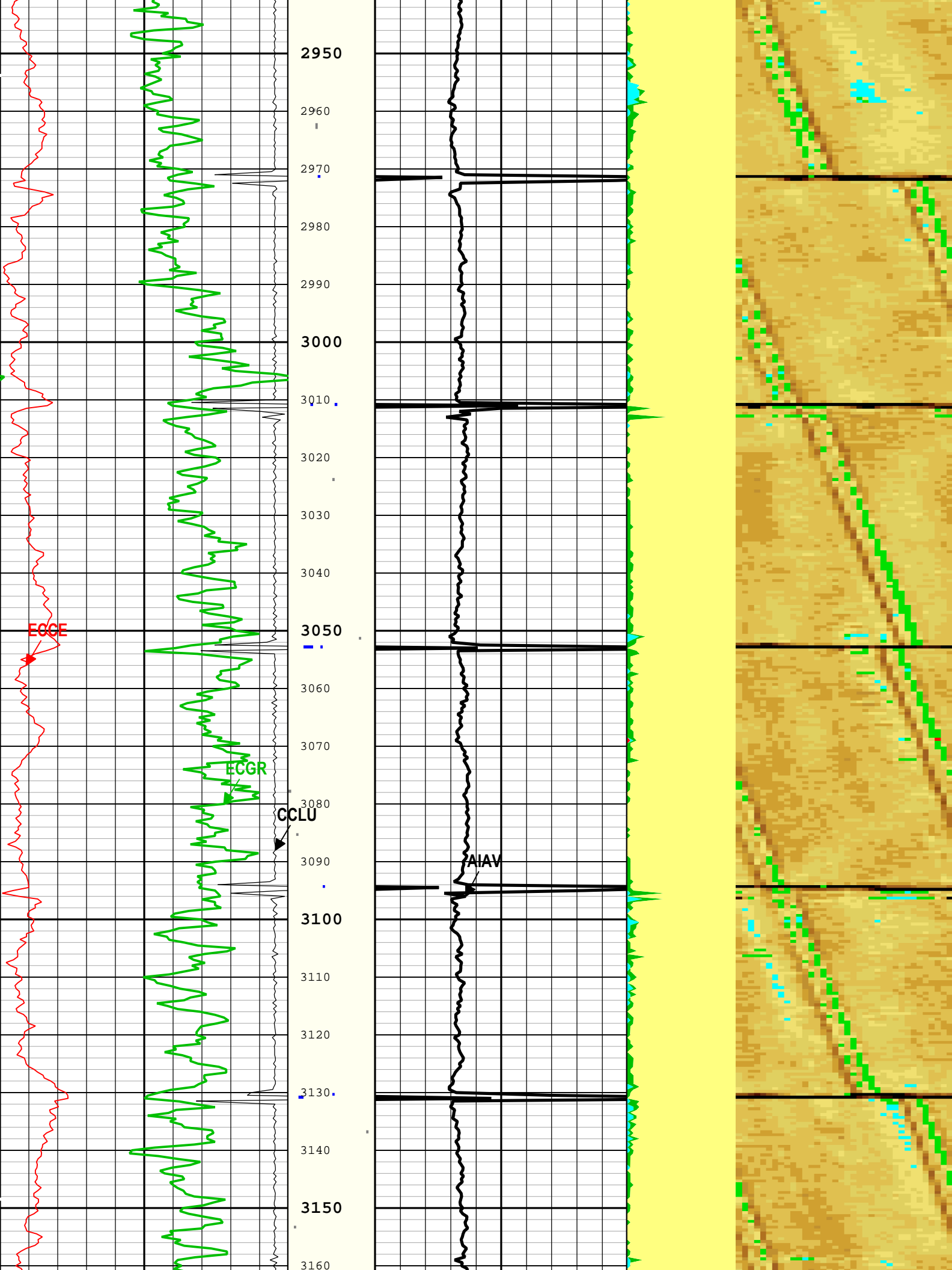


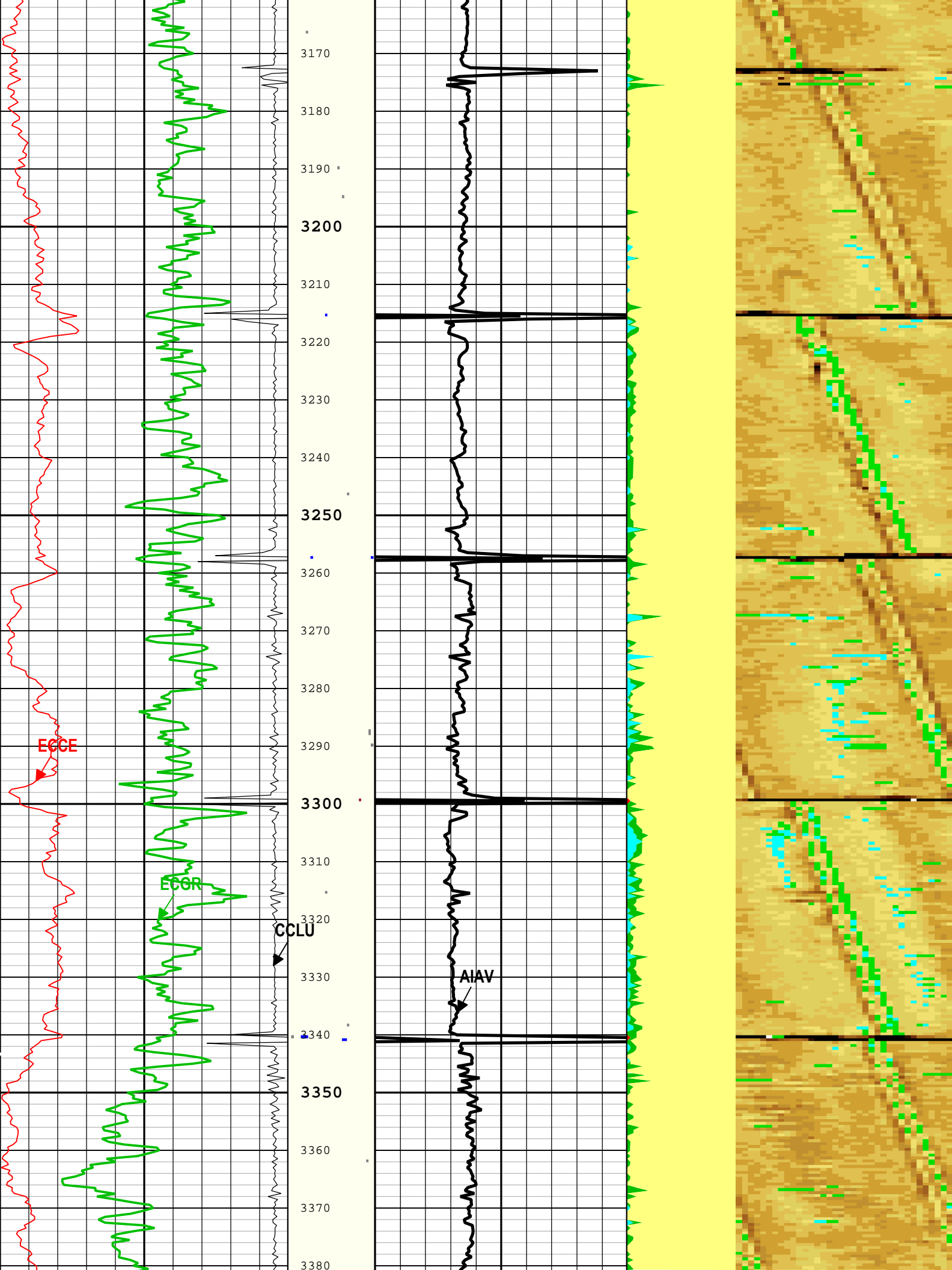


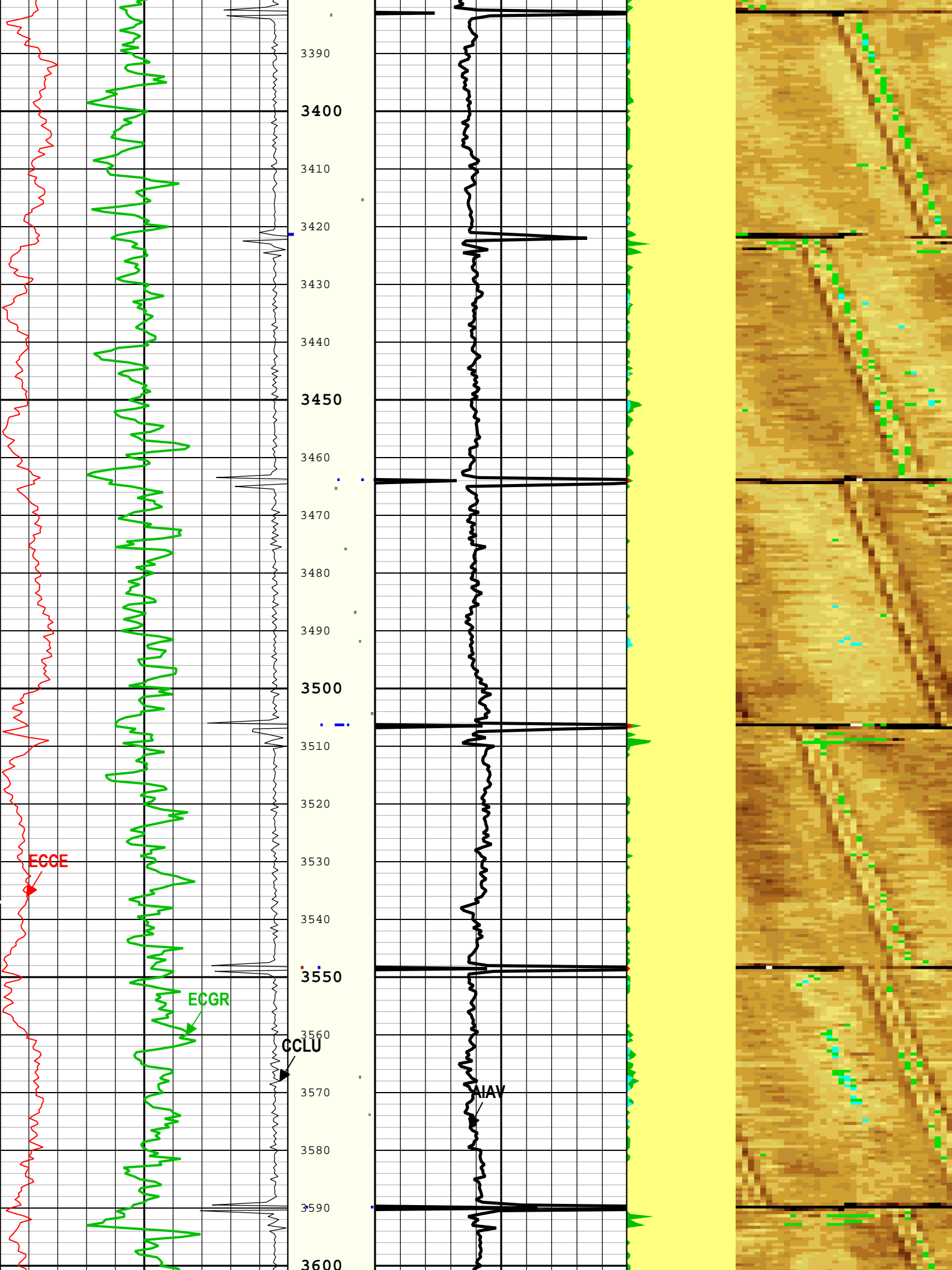


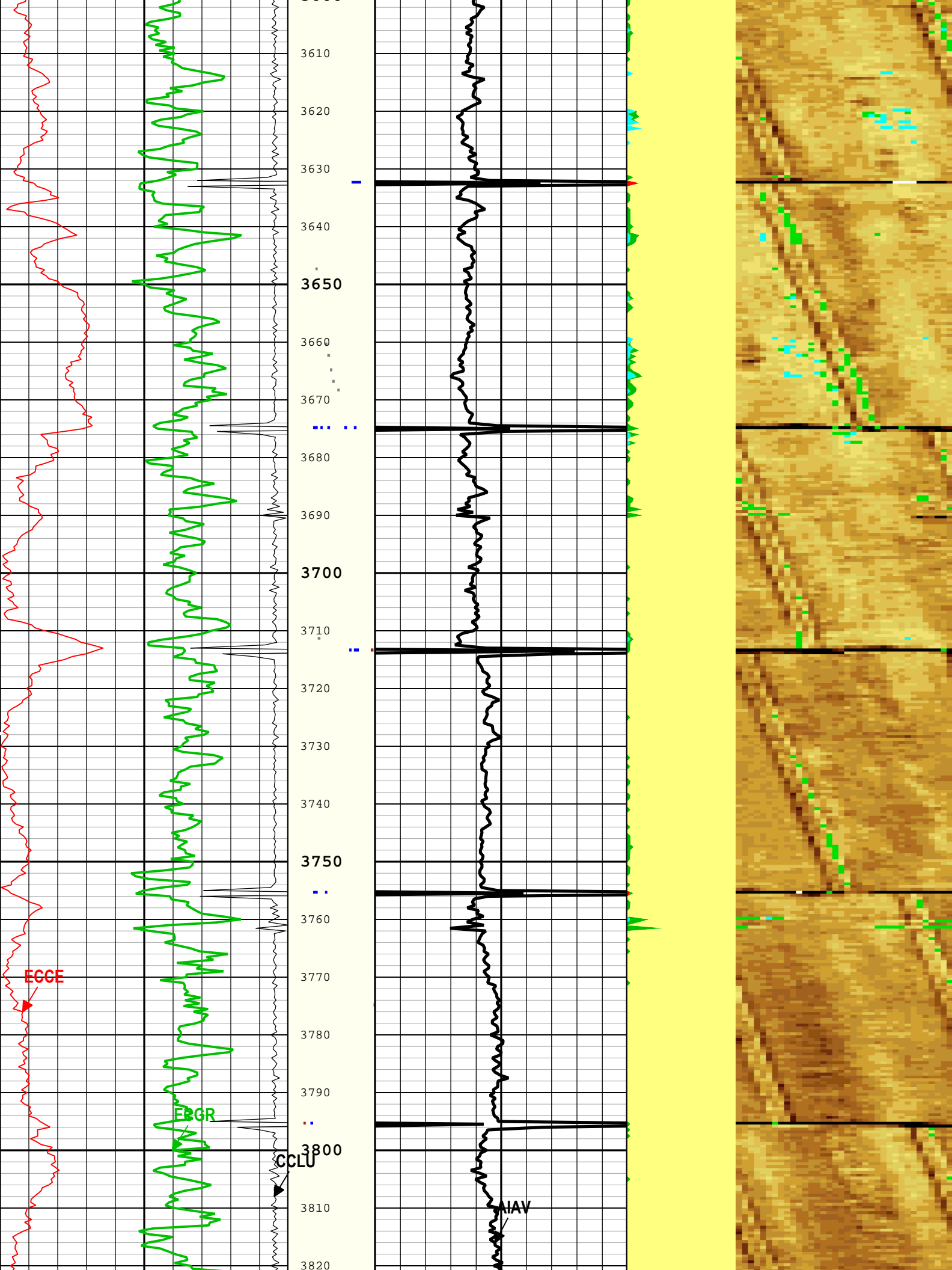


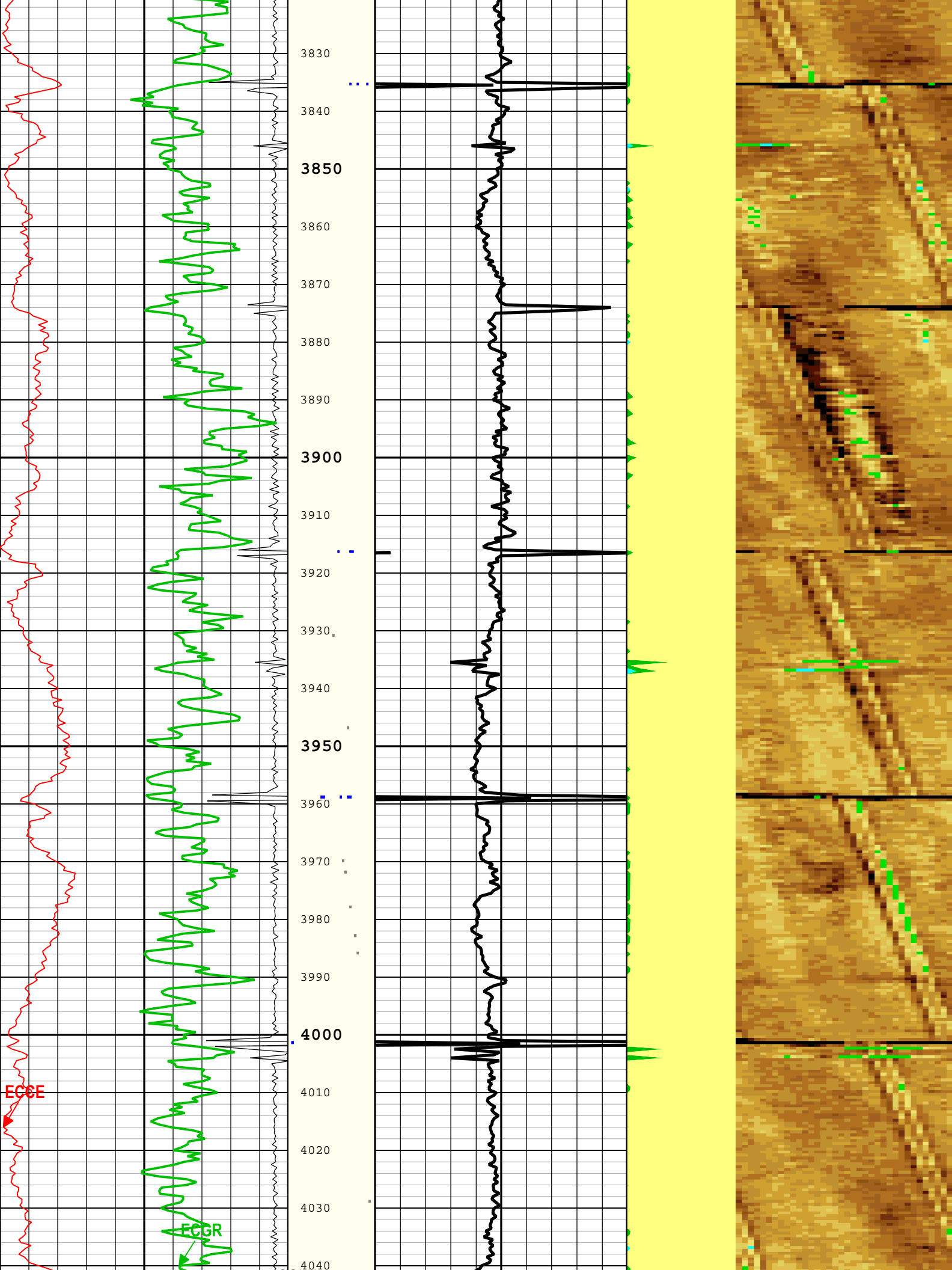


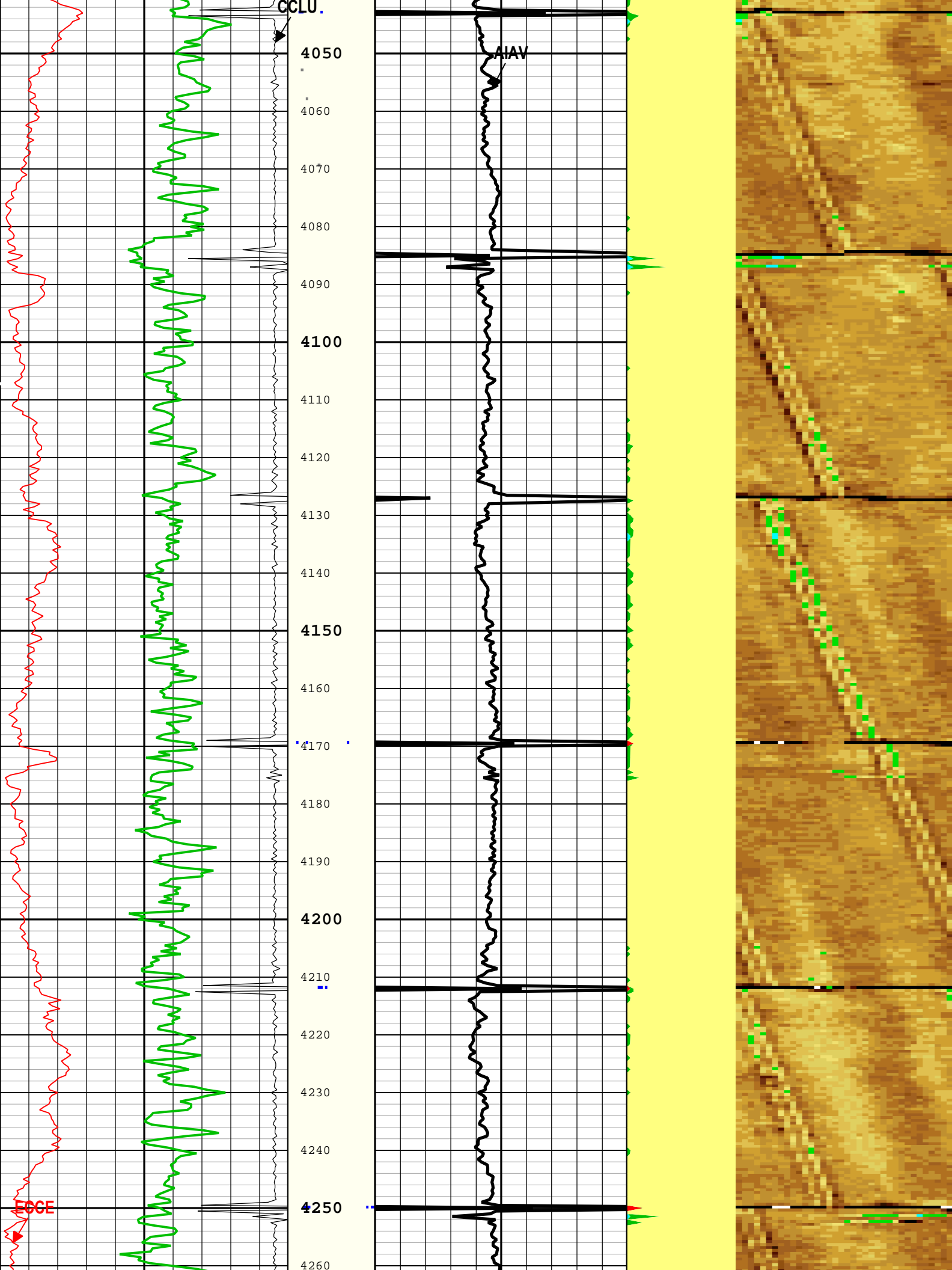




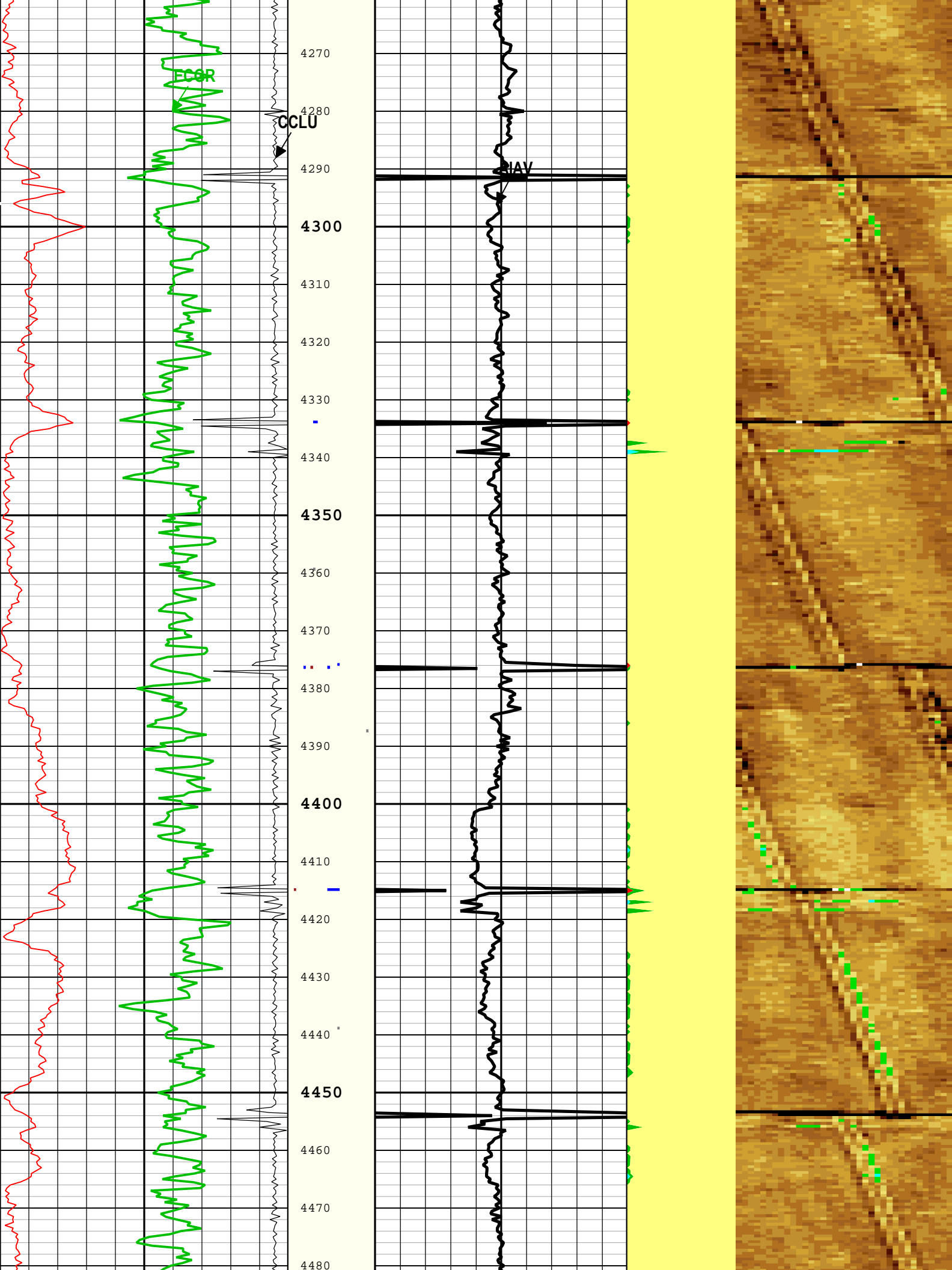


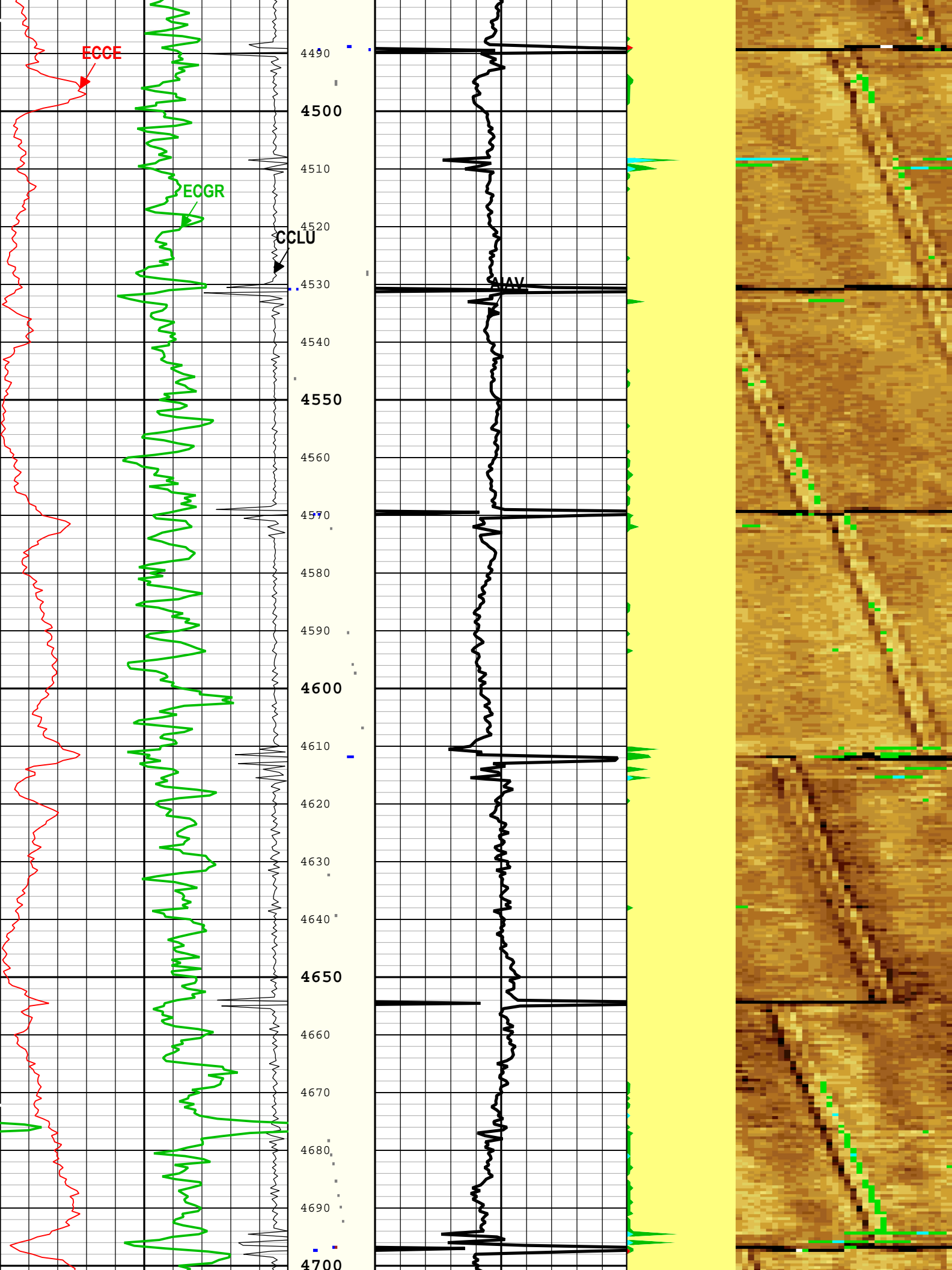


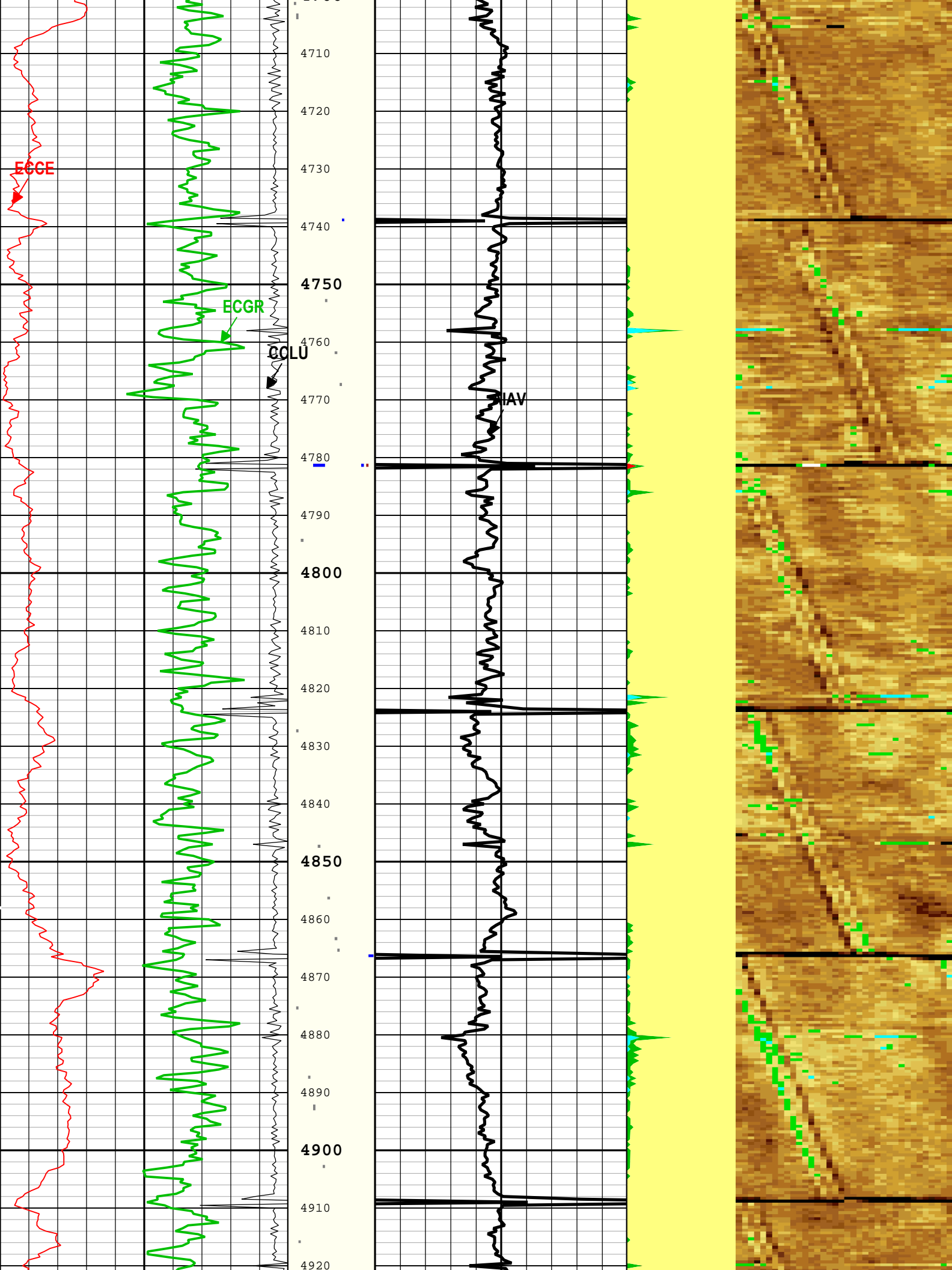


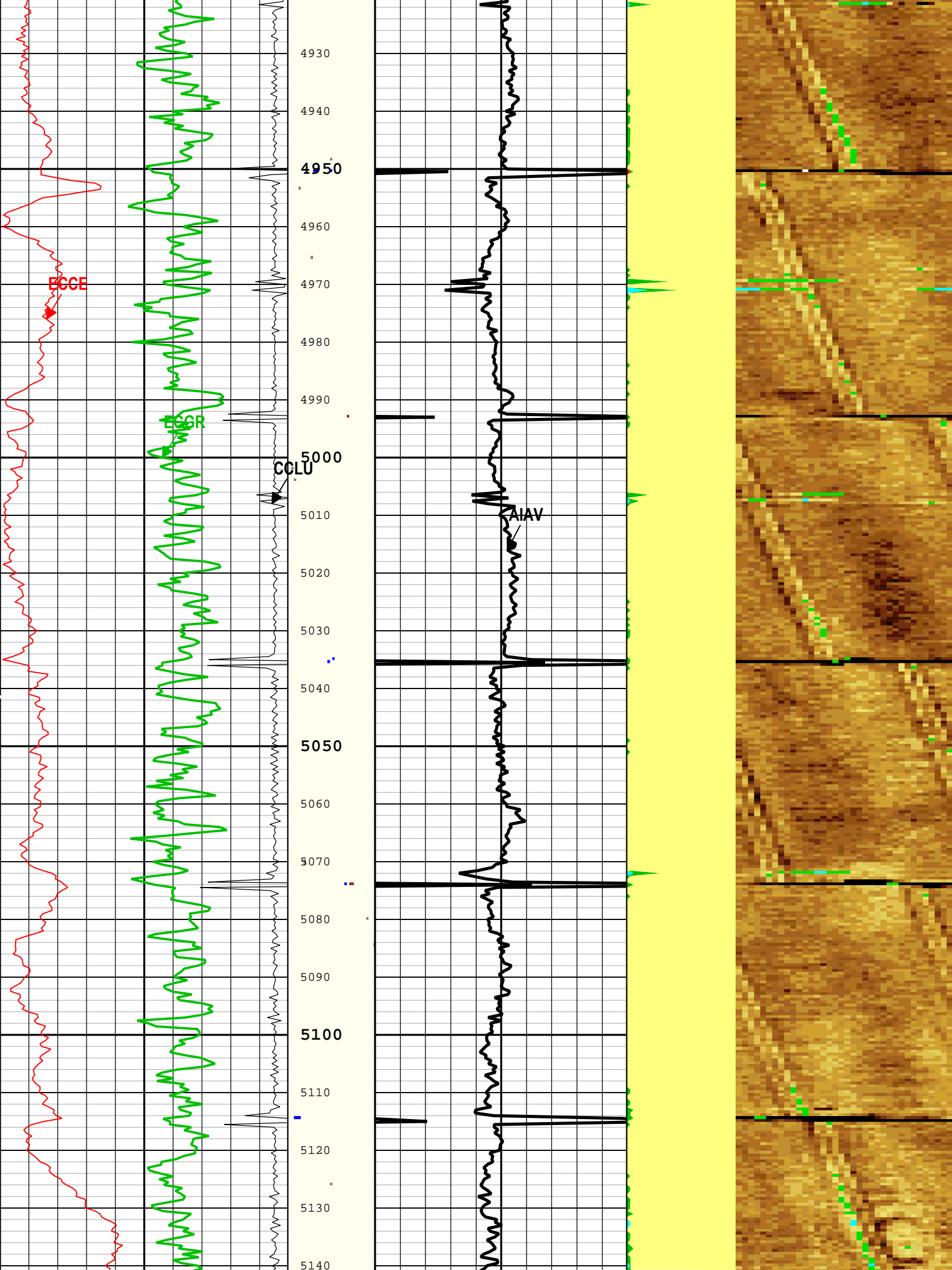


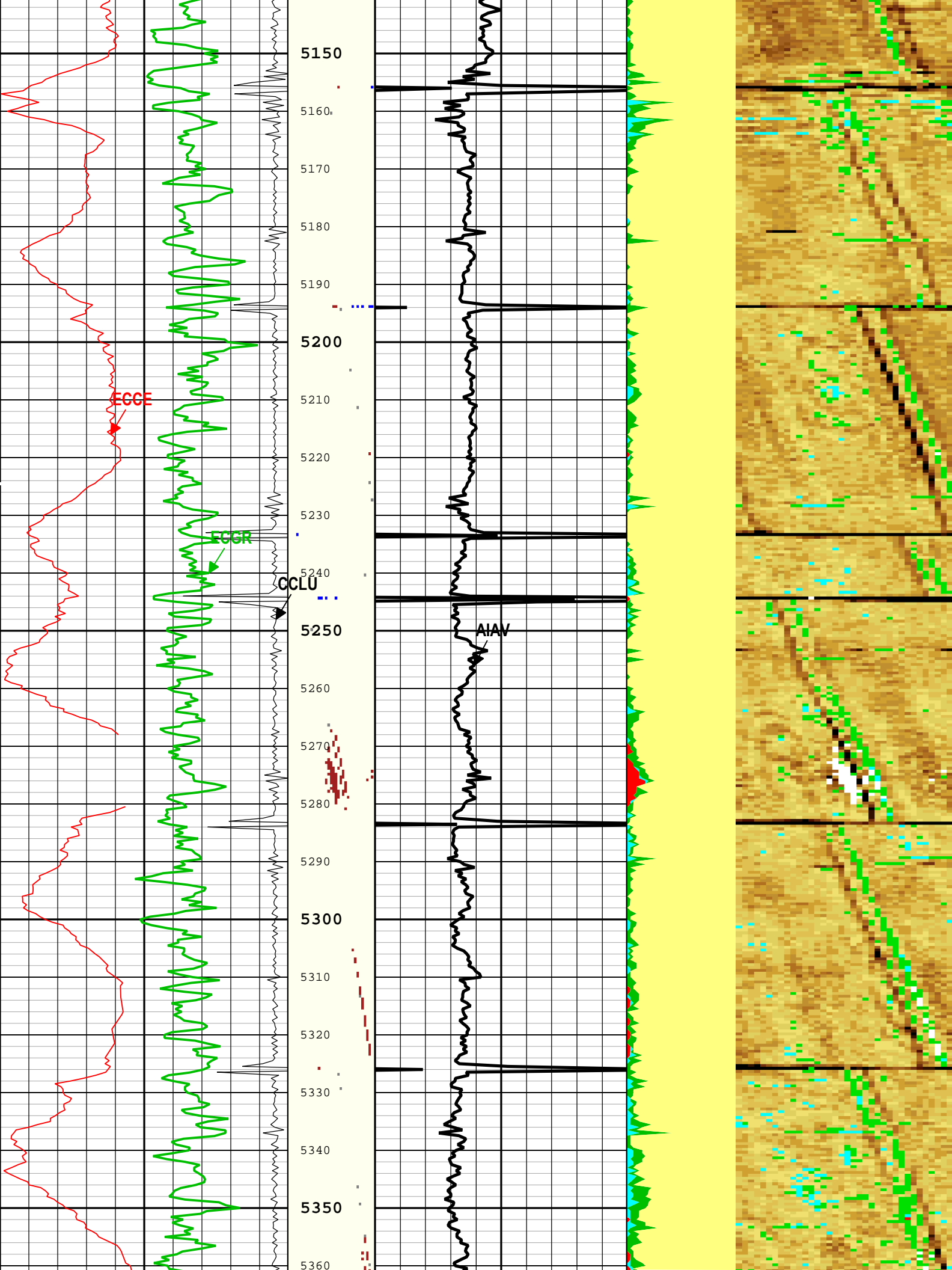


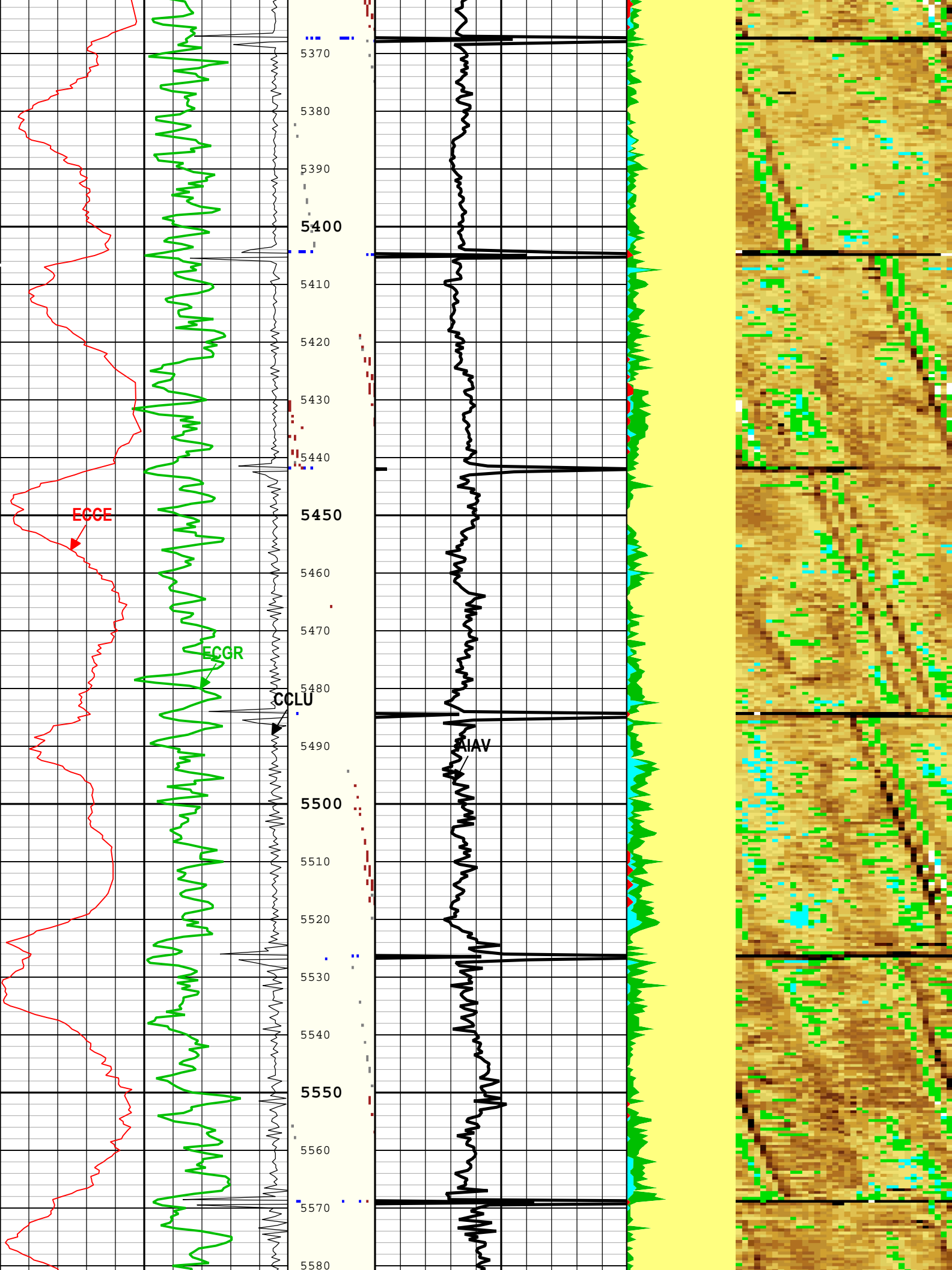


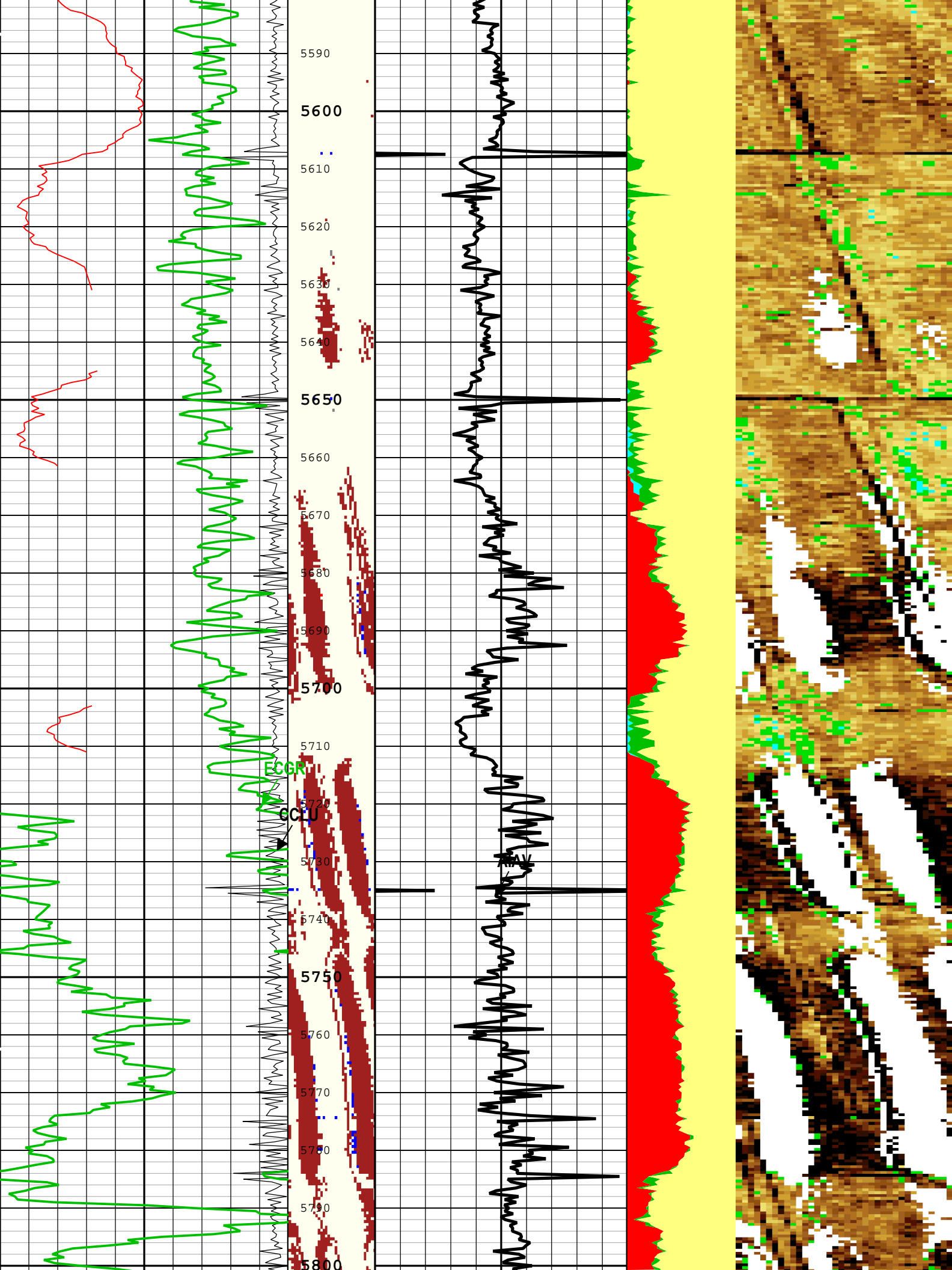


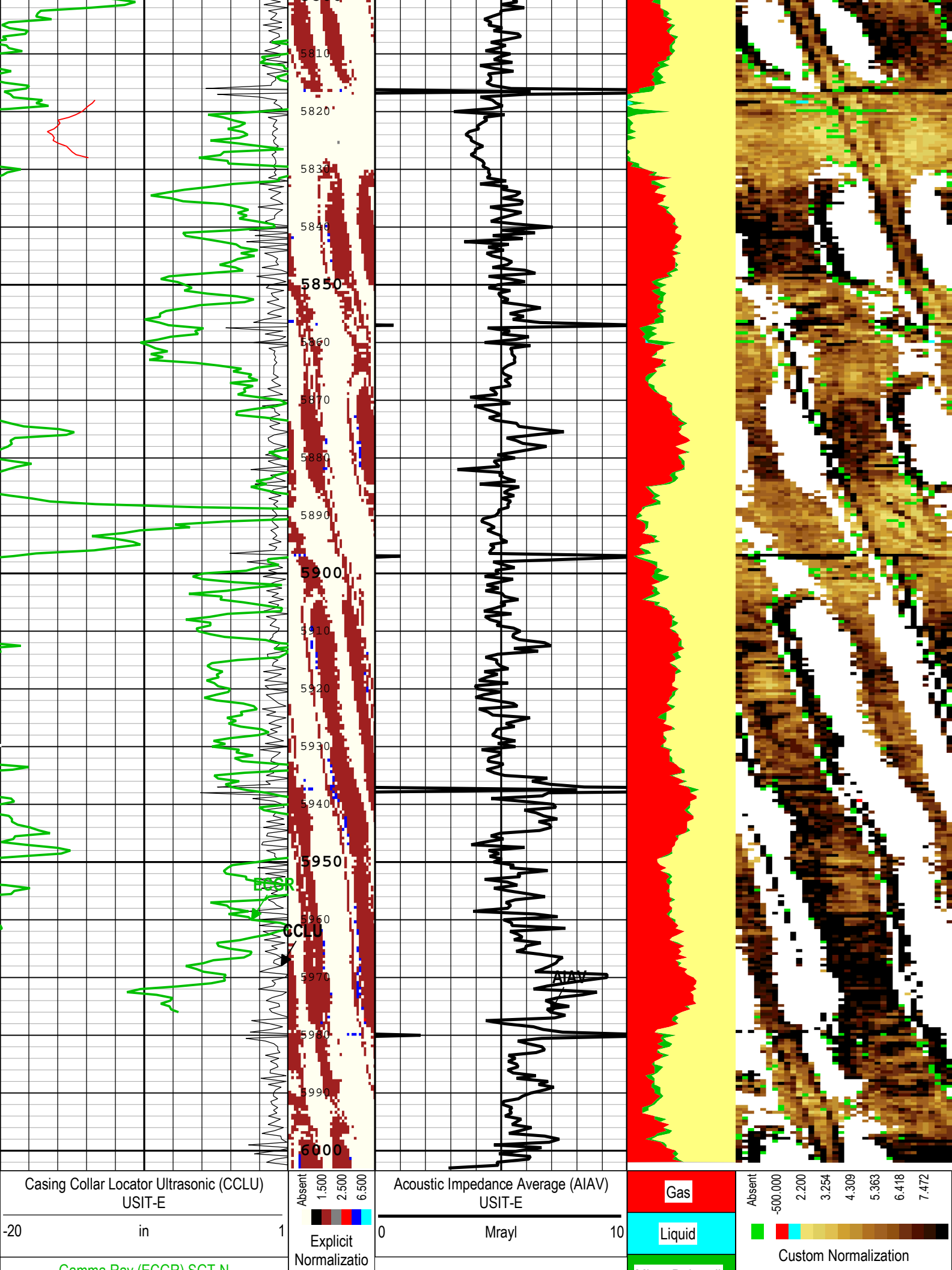












Casing Collar Locator Ultrasonic (CCLU)  
USIT-E

Acoustic Impedance Average (AIAV)  
USIT-E

Gas

Liquid

Absent  
-500,000  
2,200  
3,254  
4,309  
5,363  
6,418  
7,472

Custom Normalization

Explicit  
Normalization

0 Mrayl 10



Gamma Ray (ECGR) SGT-N		n	USIT - USIT Processing Flags (UFLG) USIT-E	Micro-Debonding	USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
0	gAPI	150			
Amplitude of Eccentering (ECCE) USIT-E				Bonded	
0	in	0.5			
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: 13-Aug-2016 16:17:05					

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	16160	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	9.2	lbm/gal
DFT	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	1.08	
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	1.75	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	16	55	110
BS	13.5	110	1940
BS	8.5	1940	6003.5

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	54	dB

U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	125	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	5000	ft
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	74	us

## Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
WINB	29	13-Aug-2016 15:15:23	13-Aug-2016 15:17:50	6004.27	5614.62
WINE	31	13-Aug-2016 15:17:50	13-Aug-2016 15:47:59	5614.62	63.99

All depth are at tool zero.

## One

## 0 PSI Repeat Pass

## Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

## Pass Summary

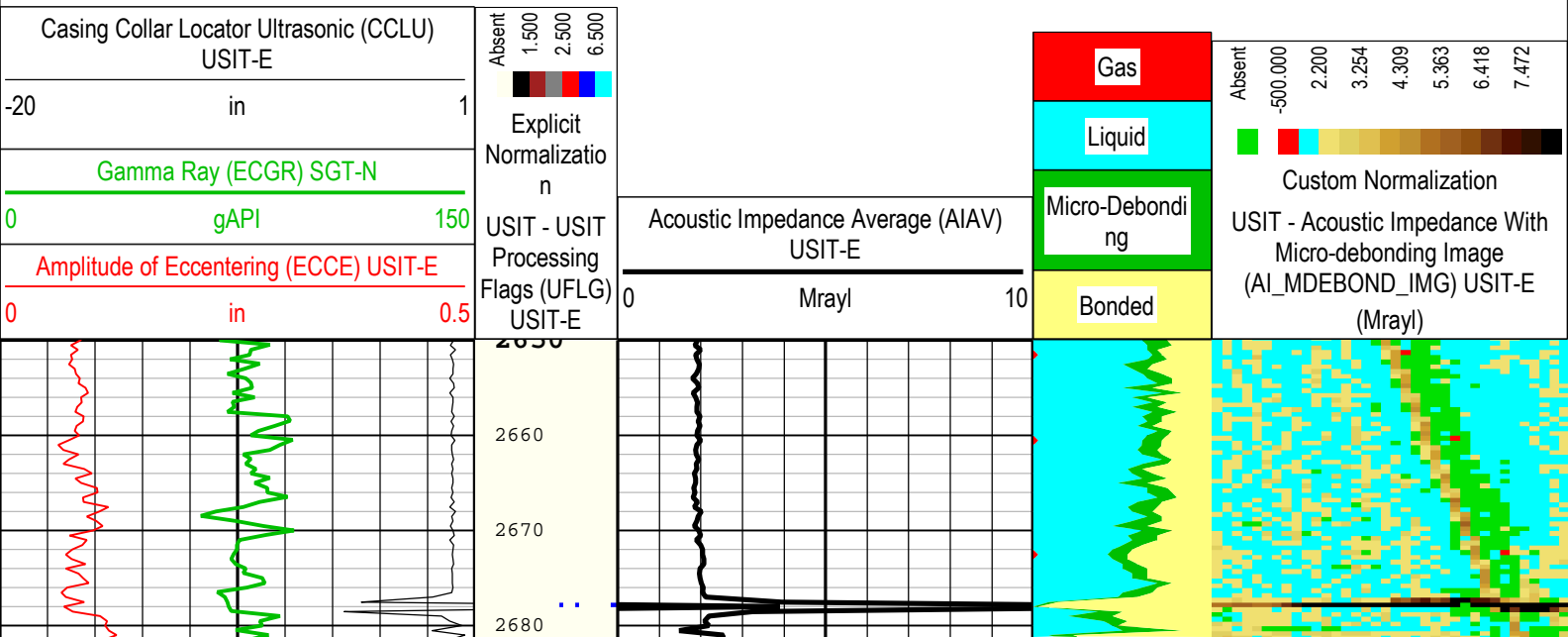
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	2643.88 ft	3415.13 ft	13-Aug-2016 4:00:00 PM	13-Aug-2016 4:04:40 PM	ON	0.00 ft	Yes

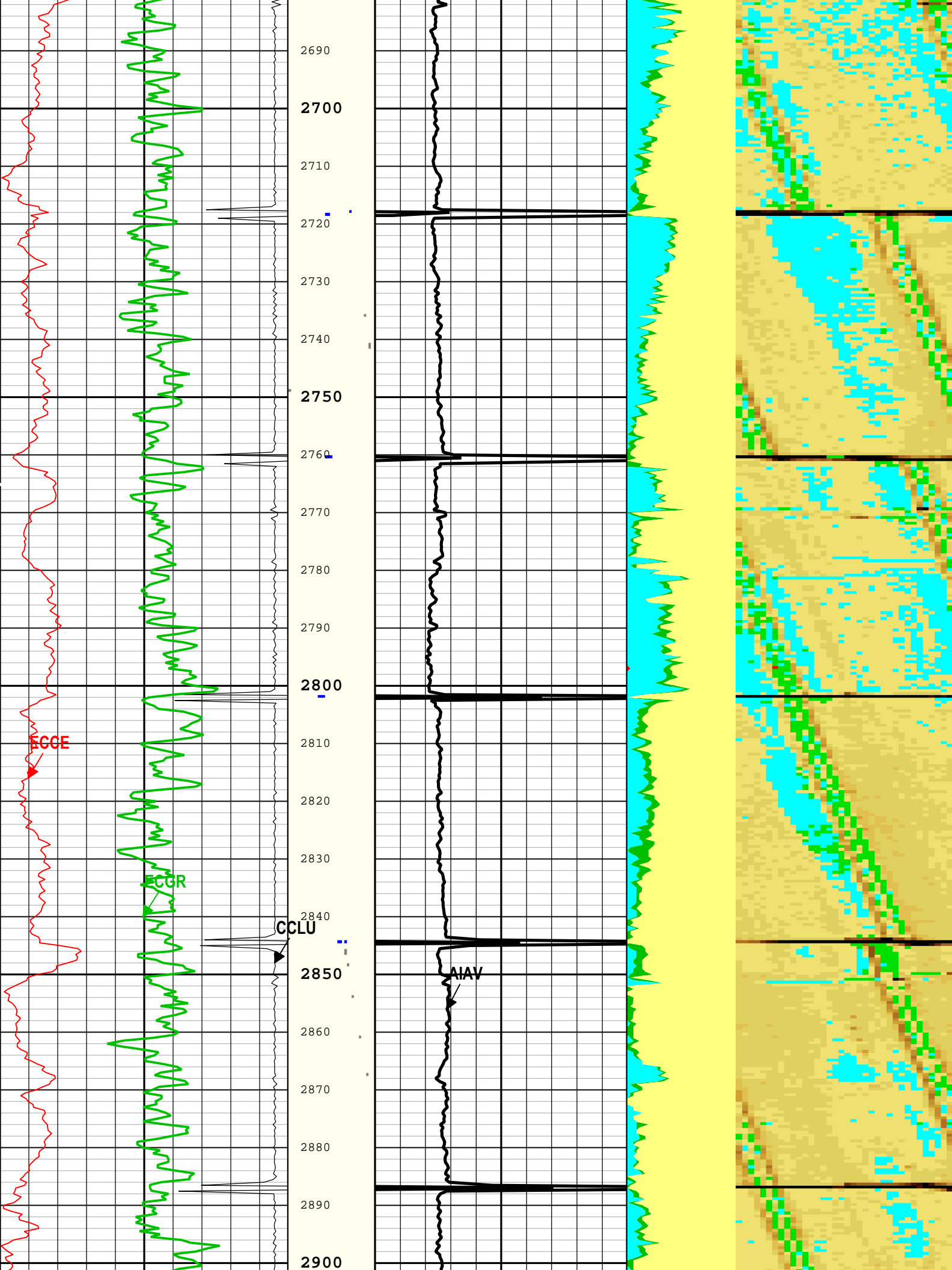
All depths are referenced to toolstring zero

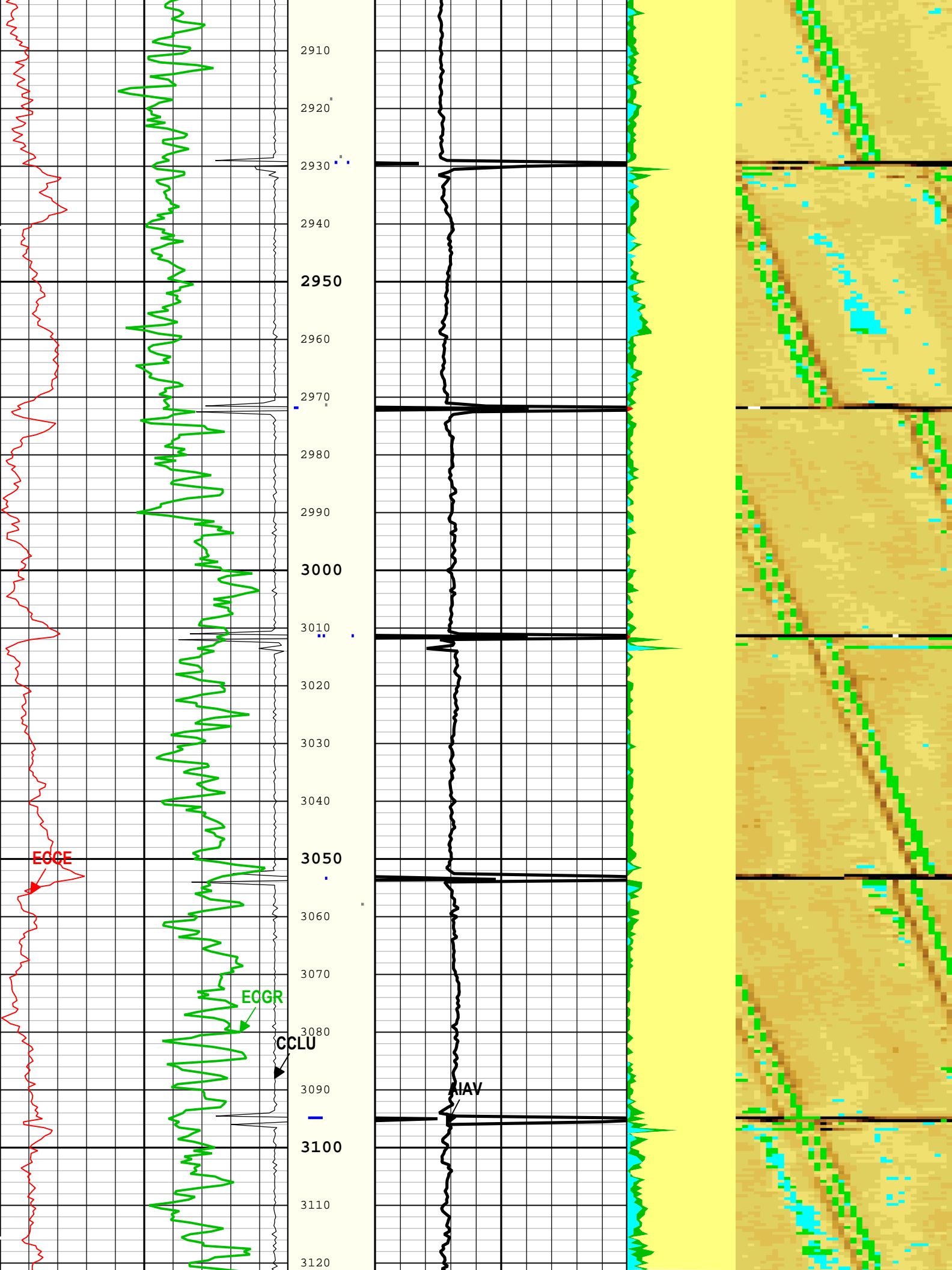
Log	Company:Noble Energy, Inc.      Well:Nugent LD06-665 One: Log[4]:Up:S007
-----	---

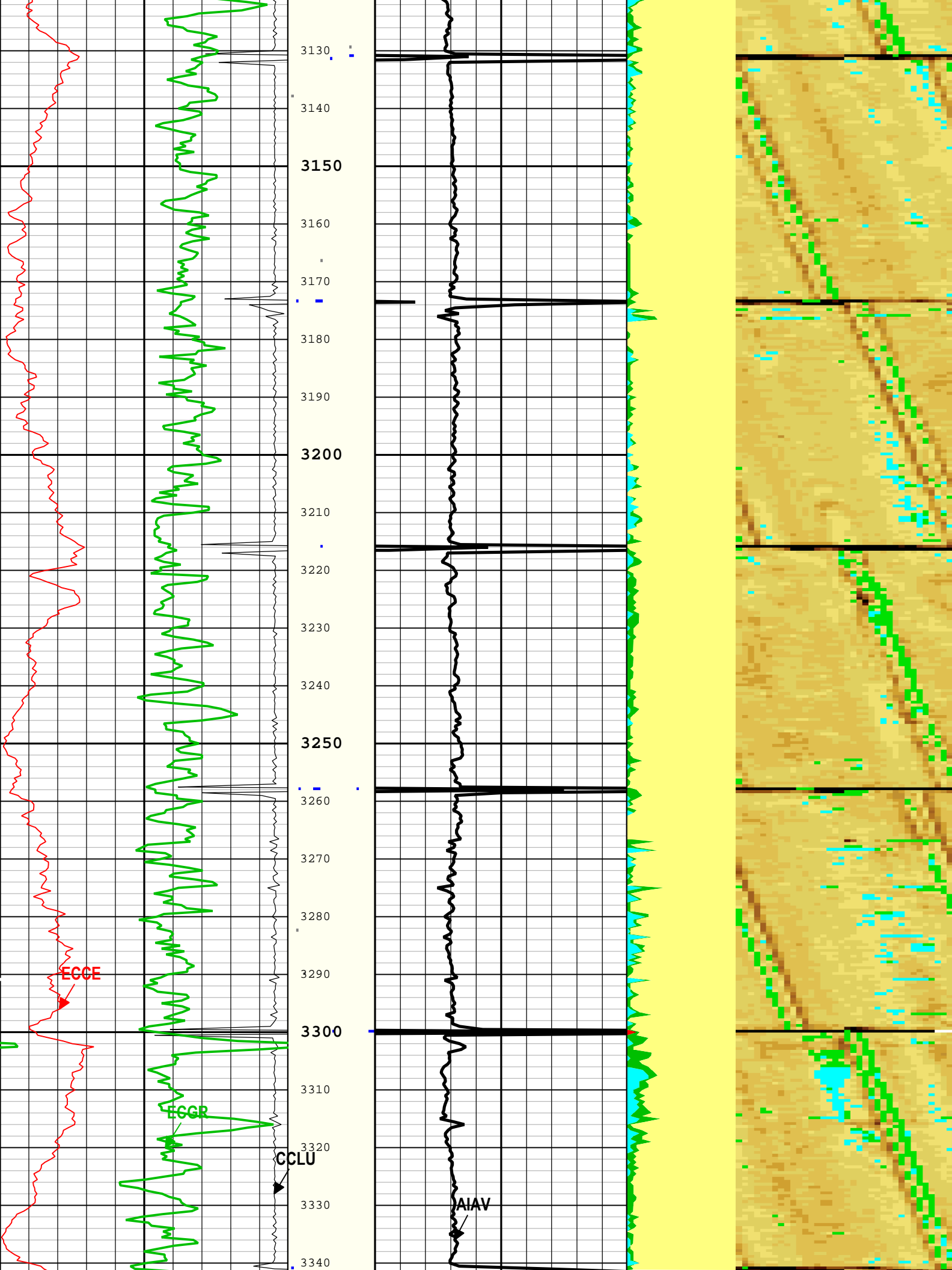
Description:    Format: Log ( DJ Basin Ultrasonic Cement Summary Report )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth  
Creation Date: 13-Aug-2016 16:17:11

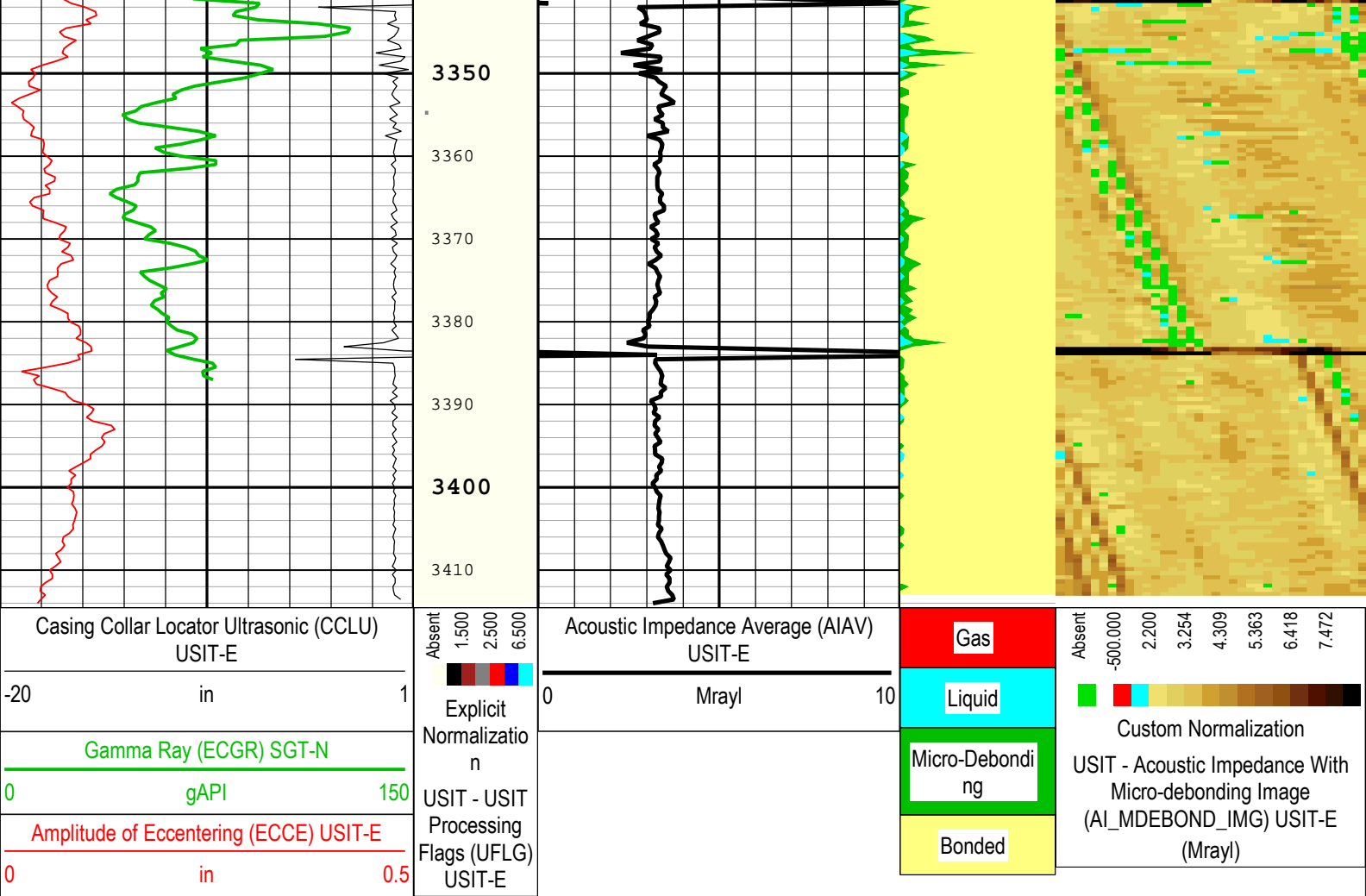
TIME\_1900 - Time Marked every 60.00 (s)











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: 13-Aug-2016 16:17:11

## 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	16160	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	9.2	lbm/gal
DFT	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	1.08	
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	1.75	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	54	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	125	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	5000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

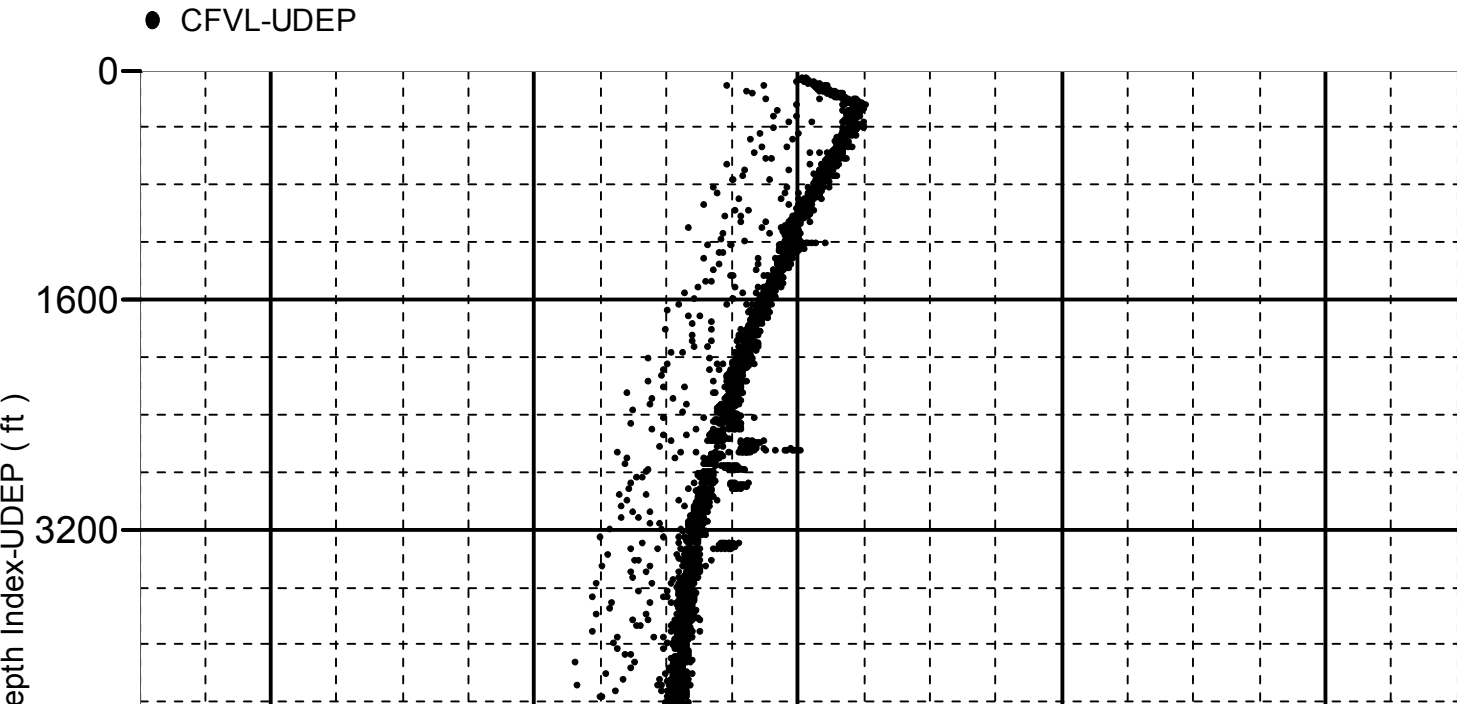
XYZ

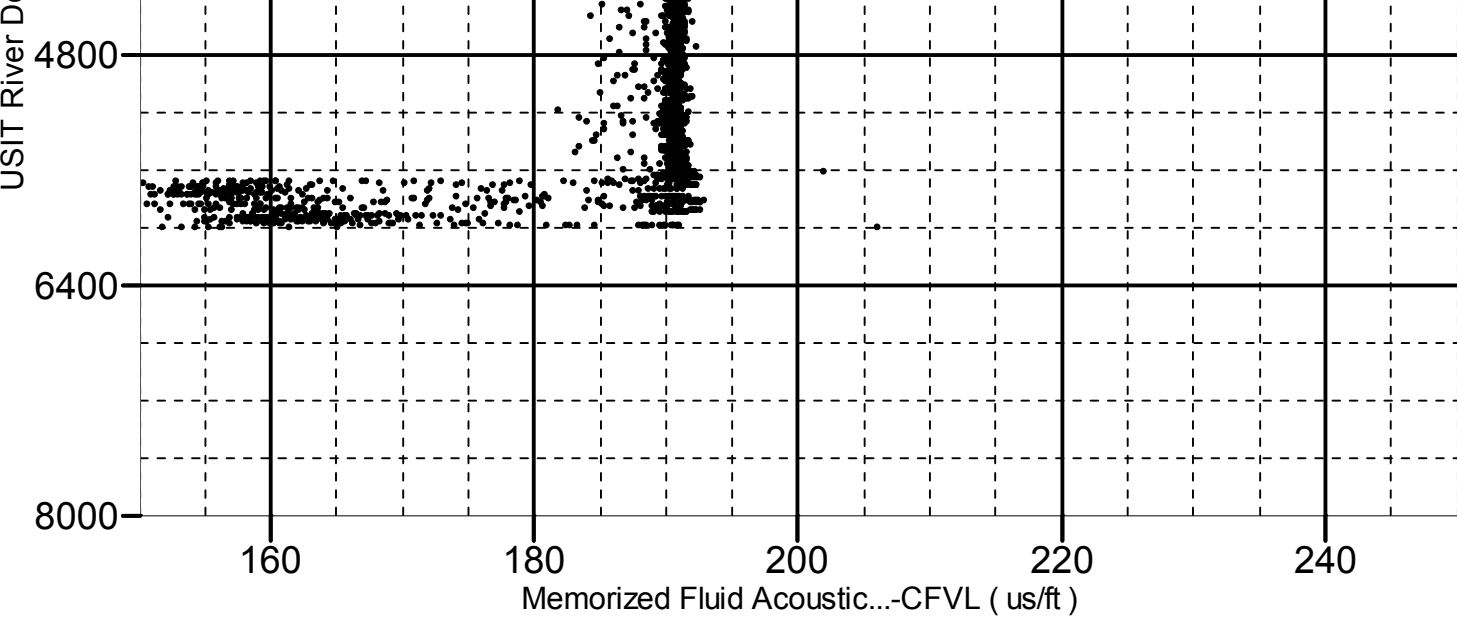
Company:Noble Energy, Inc. Well:Nugent LD06-665  
One: Log[3]:Up:S007

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6004.00 to 64.00 ft

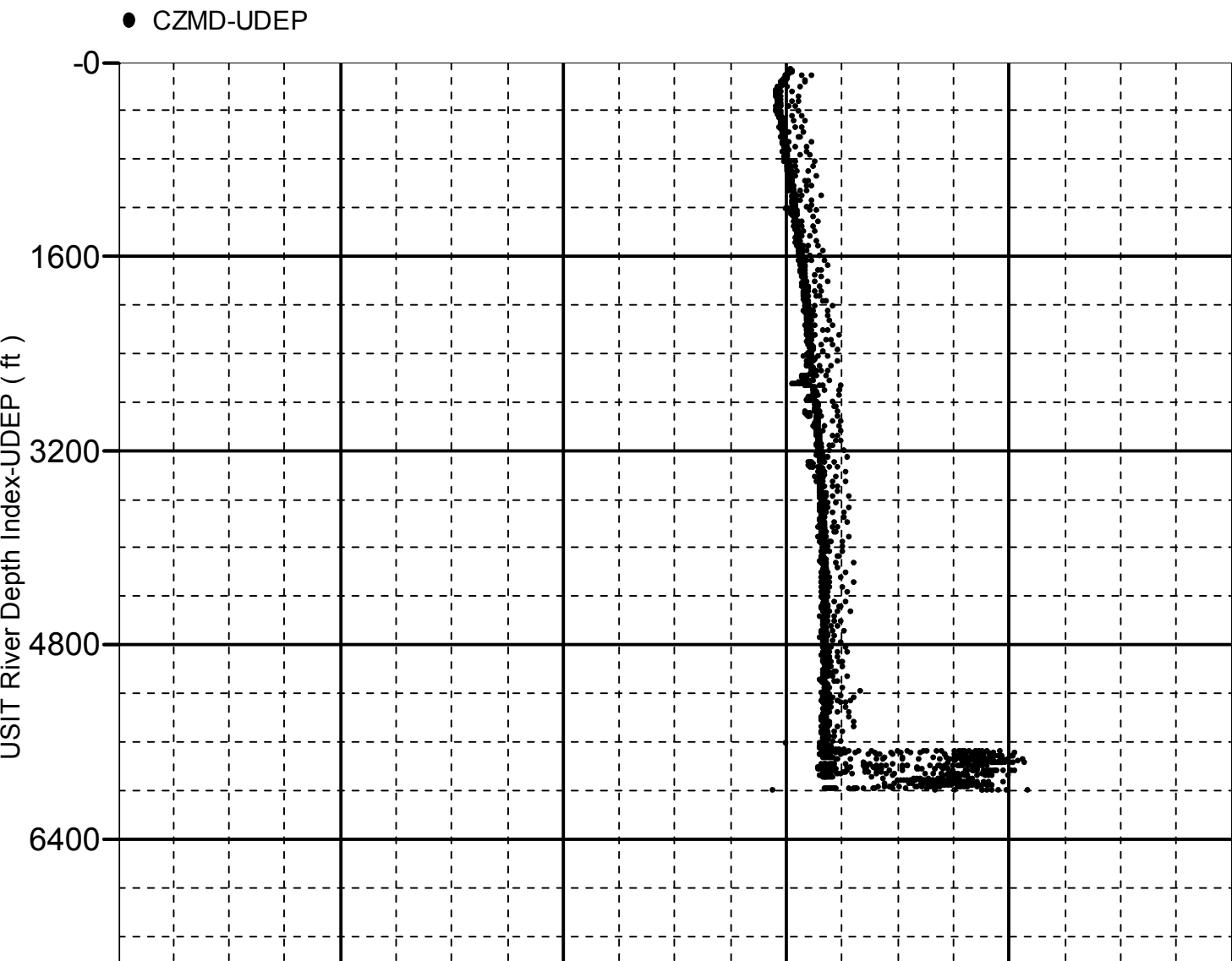




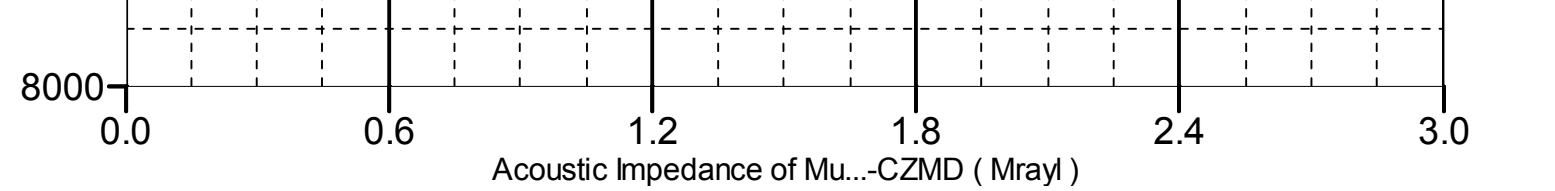
## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6004.00 to 64.00 ft







Company:	Noble Energy, Inc.	Schlumberger
Well:	Nugent LD06-665	
Field:	Wildcat	
County:	Weld	
State:	Colorado	
UltraSonic Summary Print		