

Company: Noble Energy Inc

Well: Reagan LD06-685

Field: Wildcat

County: Weld

Country: US

UltraSonic Summary Print			
County: Weld			
Field: Wildcat			
Location: SHL: NENE S5, T9N, R58W			
Well: Reagan LD06-685			
Company: Noble Energy Inc			
Location:	SHL: NENE S5, T9N, R58W	Elev.: K.B. 4785.00 ft	
	330 FNL & 330 FWL	G.L. 4755.00 ft	
	Lat: 40.78581 / Long: -103.88041	D.F. 4785.00 ft	
	Permanent Datum:	Ground Level	Elev.: 4755.00 f
Log Measured From:	Kelly Bushing		30.00 ft
	Kelly Bushing		above Perm.Datum
Drilling Measured From:			
API Serial No. 05-123-40818	Max.Hole Deviation 0 deg	Longitude: -103.88041 degrees	Latitude: 40.785810 degrees

Logging Date	02-Sep-2016			
Run Number	One			
Depth Driller	16320.00 ft			
Schlumberger Depth	16320.00 ft			
Bottom Log Interval	5400.00 ft			
Top Log Interval	60.00 ft			
Casing Driller Size @ Depth	5.5 in @ 16309.50 ft			
Casing Schlumberger	16309.5 ft			
Bit Size	8.5 in			
Type Fluid In Hole	Water			
Density	Viscosity	26 s		
Fluid Loss	PH			
Source of Sample	Active Tank			
RM @ Meas Temp	0.2 ohm.m @ 68 degF			
RMF @ Meas Temp	0.15 ohm.m @ 68 degF			
RMC @ Meas Temp				
Source RMF	RMC	Pressed		
RM @ BHT	RMF @ BHT	0.08 @ 181 0.06 @ 181		
Max Recorded Temperatures				
Circulation Stopped		Time		
Logger on Bottom		Time		
Unit Number	Location:	2161		
Recorded By	Benjamin Marmon			
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.

1. Header	13. XYZ ( USI Fluid Acoustic Slowness vs Depth 3.0 in )
2. Disclaimer	14. XYZ ( USI Acoustic Impedance of Mud vs Depth 3.0 in )
3. Contents	15. Tail
4. Well Sketch	
5. Borehole Size/Casing/Tubing Record	
6. Operational Run Summary	
7. Borehole Fluids	
8. Remarks and Equipment Summary	
9. Depth Summary	
10. USI Fluid Properties Measurement_1	
11. One 2500 PSI Main Pass	
11.1 Integration Summary	
11.2 Software Version	
11.3 Composite Summary	
11.4 Log ( DJ Basin Ultrasonic Cement Summary Report )	
11.5 Parameter Listing	

12. One 0 PSI Repeat Pass

12.1 Integration Summary

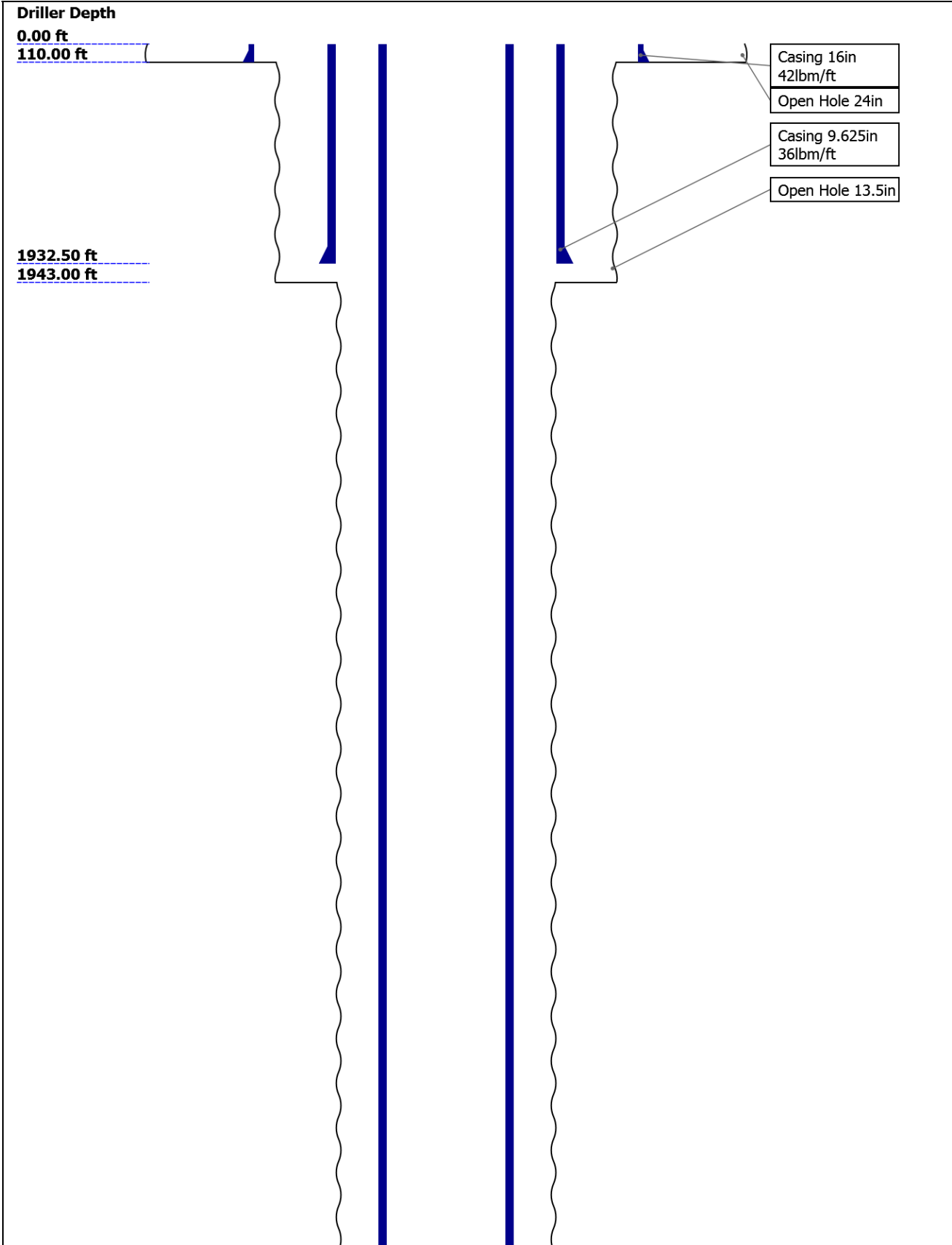
12.2 Software Version

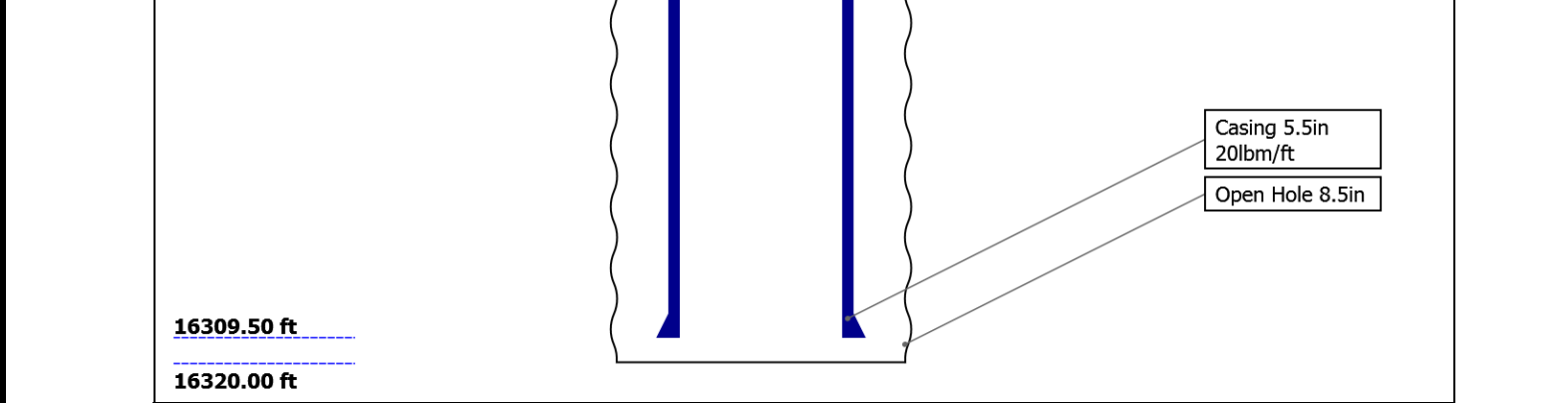
12.3 Composite Summary

12.4 Log ( DJ Basin Ultrasonic Cement Summary Report )

12.5 Parameter Listing

Well Sketch





## Borehole Size/Casing/Tubing Record

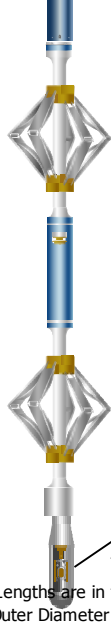
Bit						
Bit Size ( in )	24	13.5	8.5			
Top Driller ( ft )	0	110	1943			
Top Logger ( ft )	0	110	1943			
Bottom Driller ( ft )	110	1943	16320			
Bottom Logger ( ft )	110	1943	16320			
Casing						
Size ( in )	16	9.625	5.5			
Weight ( lbm/ft )	42	36	20			
Inner Diameter ( in )	15.512	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller ( ft )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	110	1932.5	16309.5			
Bottom Logger ( ft )	110	1932.5	16309.5			

## Operational Run Summary

Parameter ( unit )	One					
Date Log Started	02-Sep-2016					
Time Log Started	10:02:58					
Date Log Finished	02-Sep-2016					
Time Log Finished	11:04:29					
Top Log Interval ( ft )	60.00					
Bottom Log Interval ( ft )	5400.00					
Total Depth ( ft )						
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, CO					
Recorded By	Benjamin Marmon					



USIS-A:75  
8  
USSC-B  
USRS-A  
USI-SENS  
OR



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 7-39 PLXS  
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 14000.00 ft  
Conveyance Type Wireline  
Rig Type Crane

One:Depth Control Parameters

Depth Control Remarks

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

All Schlumberger depth control procedures followed during logging operations.  
IDW used as primary depth control device.  
Z-Chart used as secondary depth control device.

# USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Fluid Velocity			
Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
Mud Impedance			
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

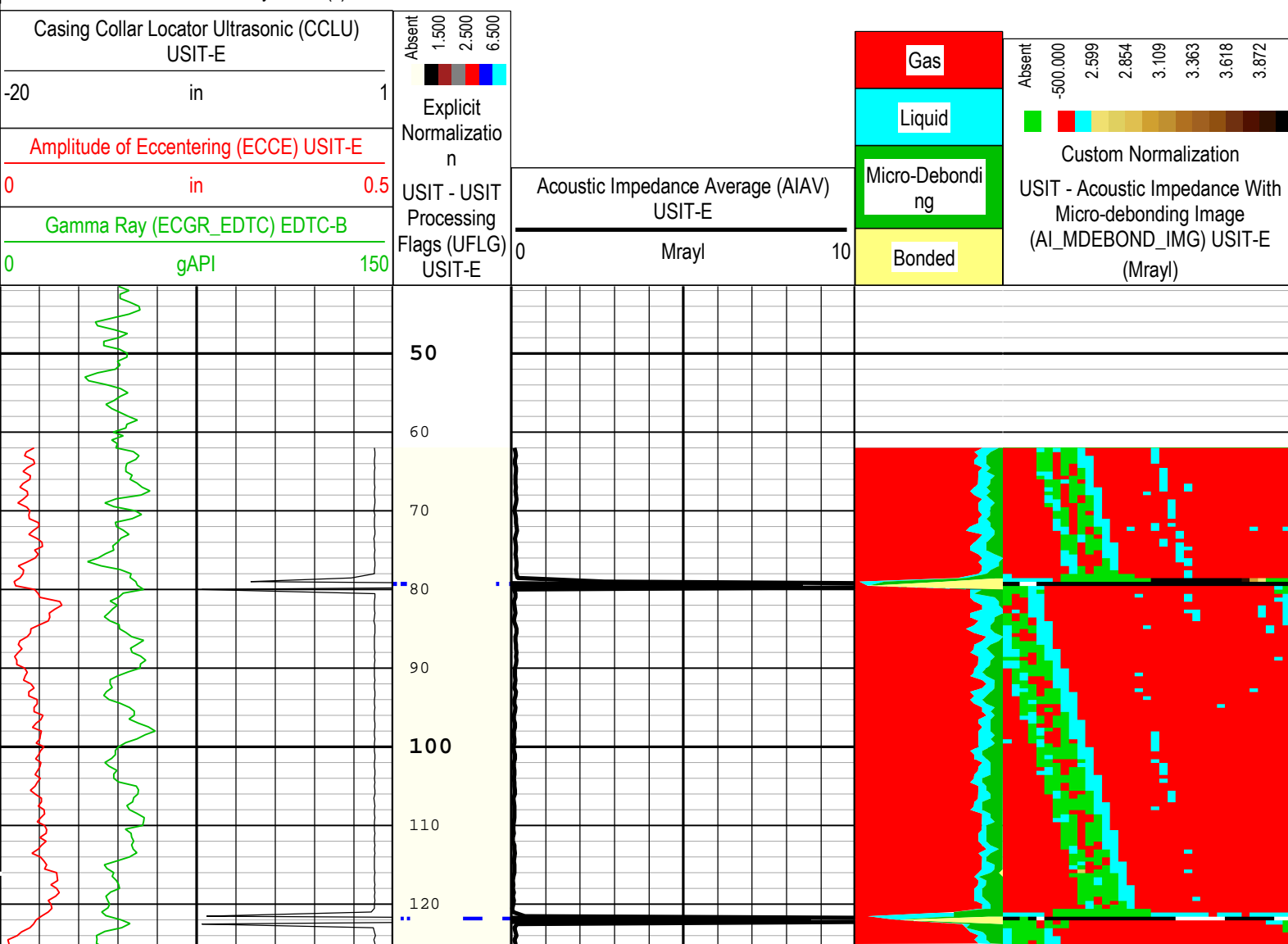
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	61.98 ft	5966.44 ft	02-Sep-2016 10:30:30 AM	02-Sep-2016 11:04:13 AM	ON	2.04 ft	Yes

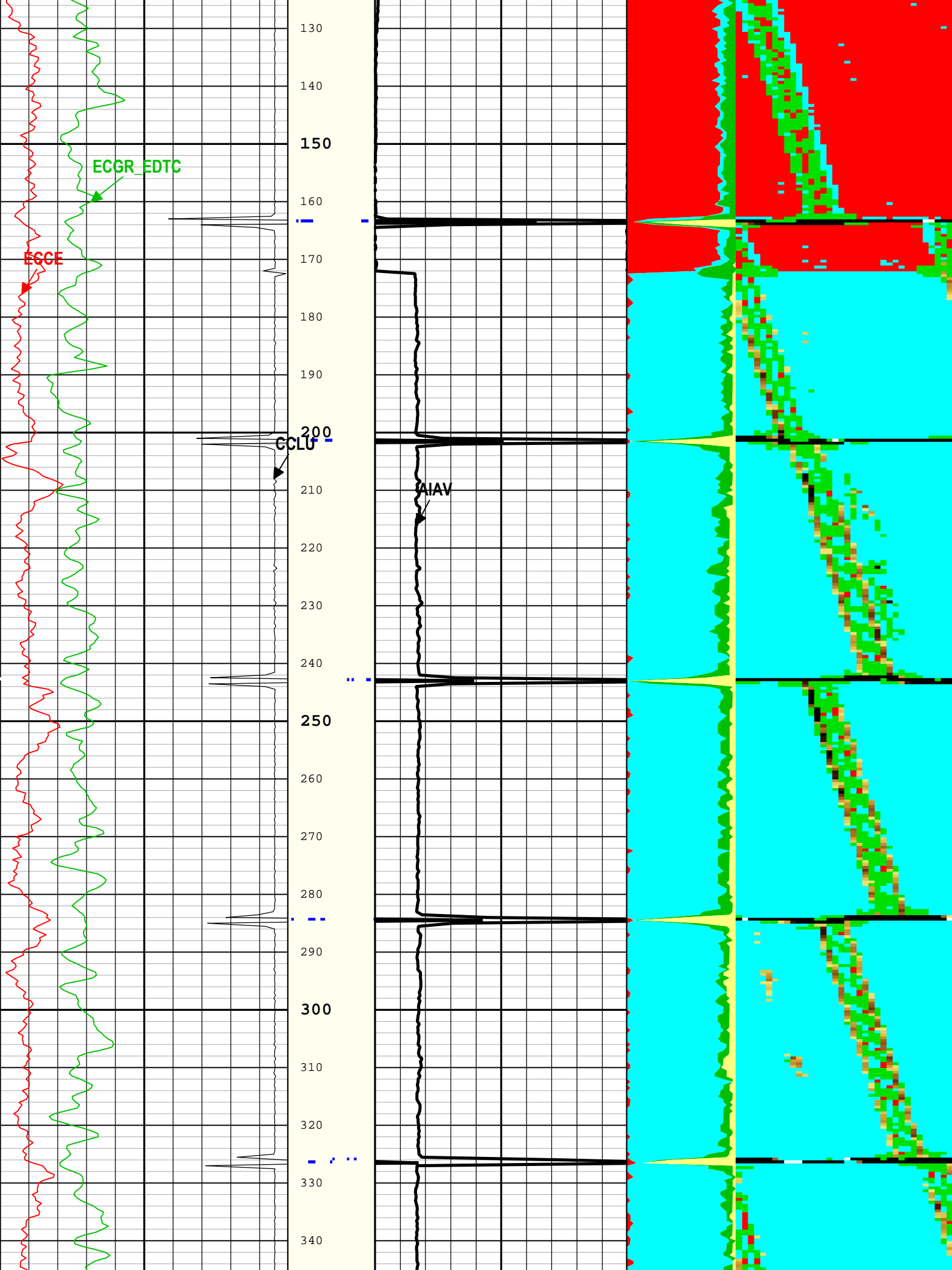
All depths are referenced to toolstring zero

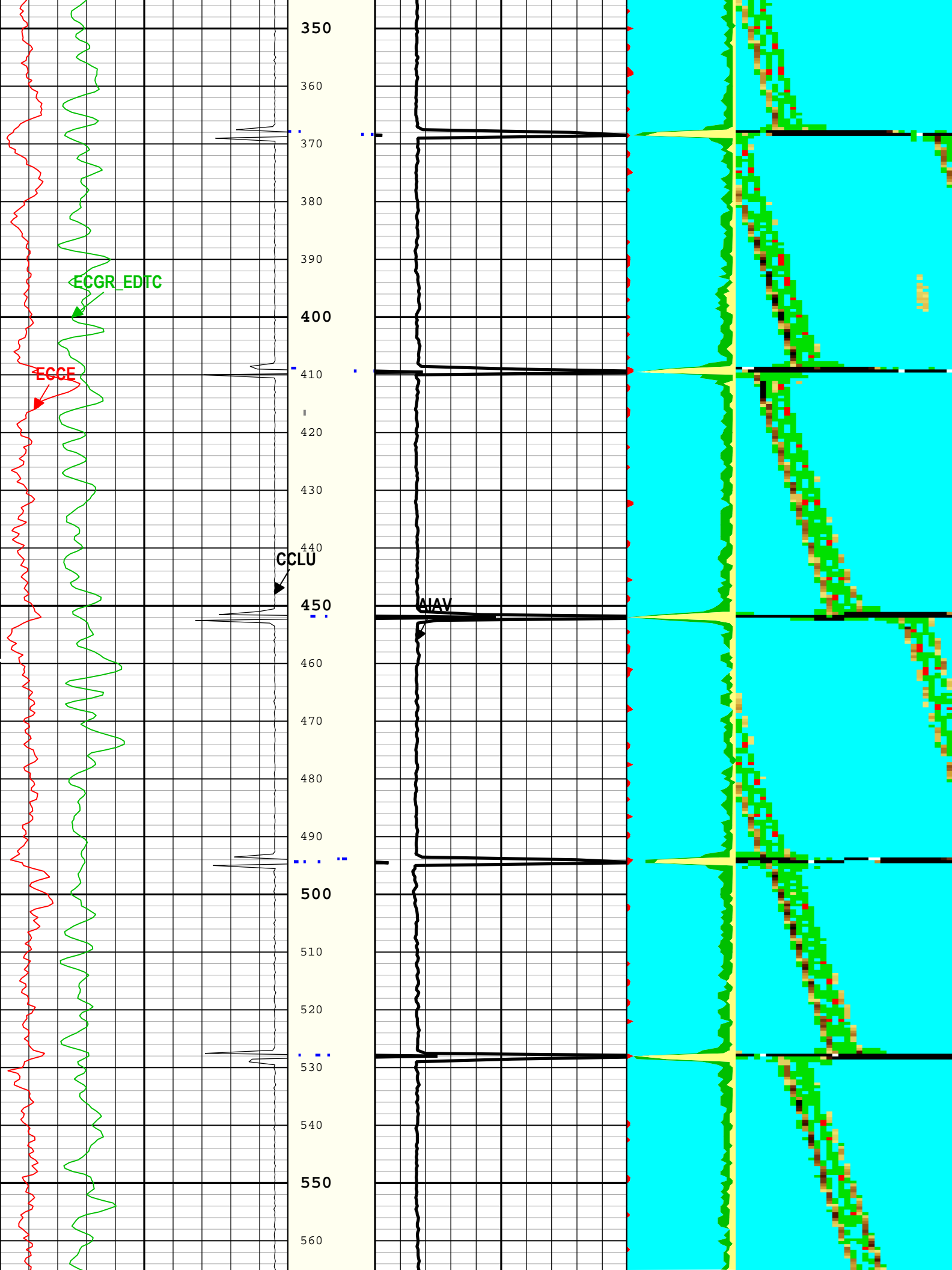
Log	Company:Noble Energy Inc Well:Reagan LD06-685 One: Log[4]:Up:S008
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Description: Format: Log ( DJ Basin Ultrasonic Cement Summary Report ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth  
Creation Date: 02-Sep-2016 11:29:30

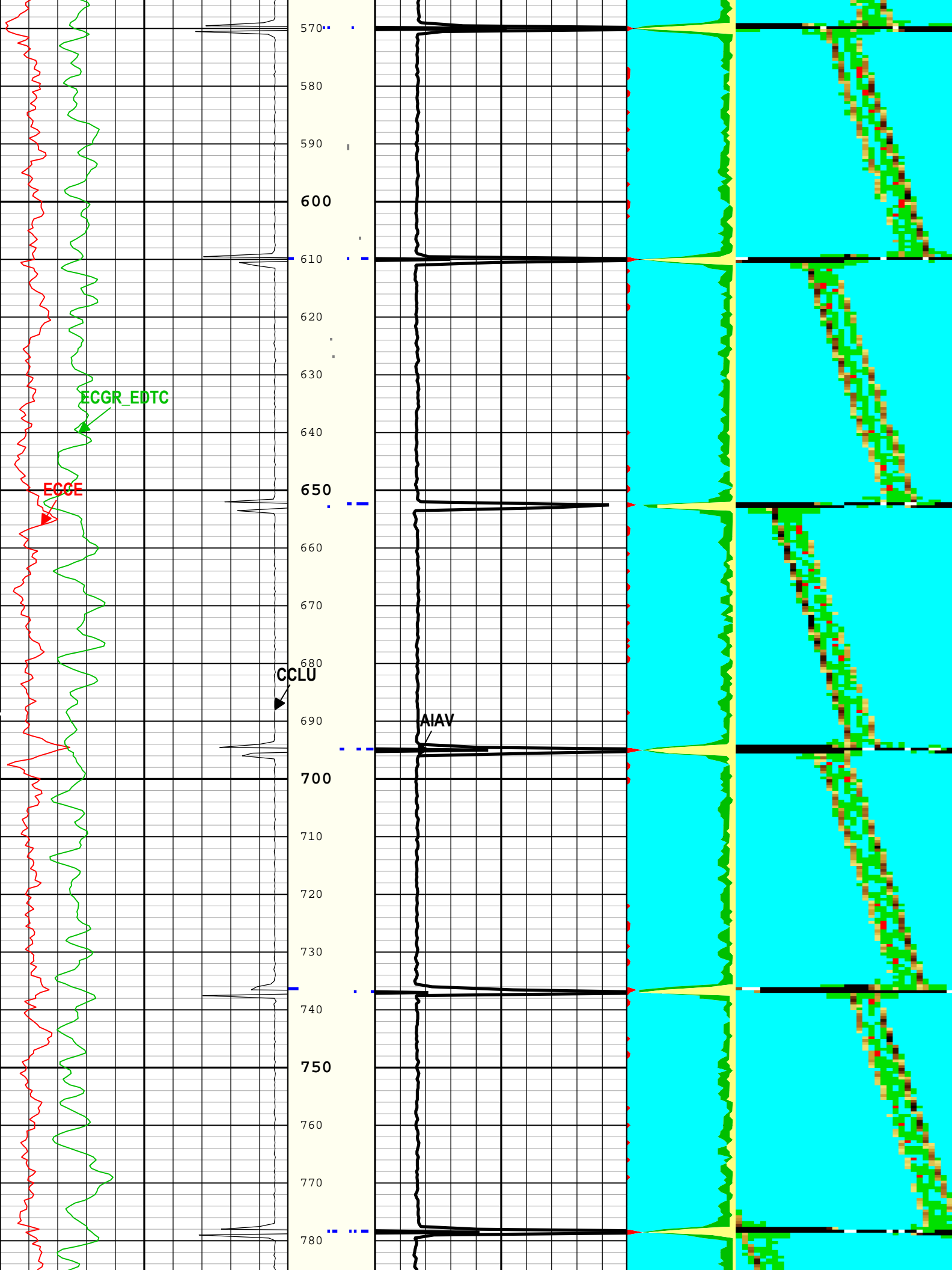
TIME\_1900 - Time Marked every 60.00 (s)

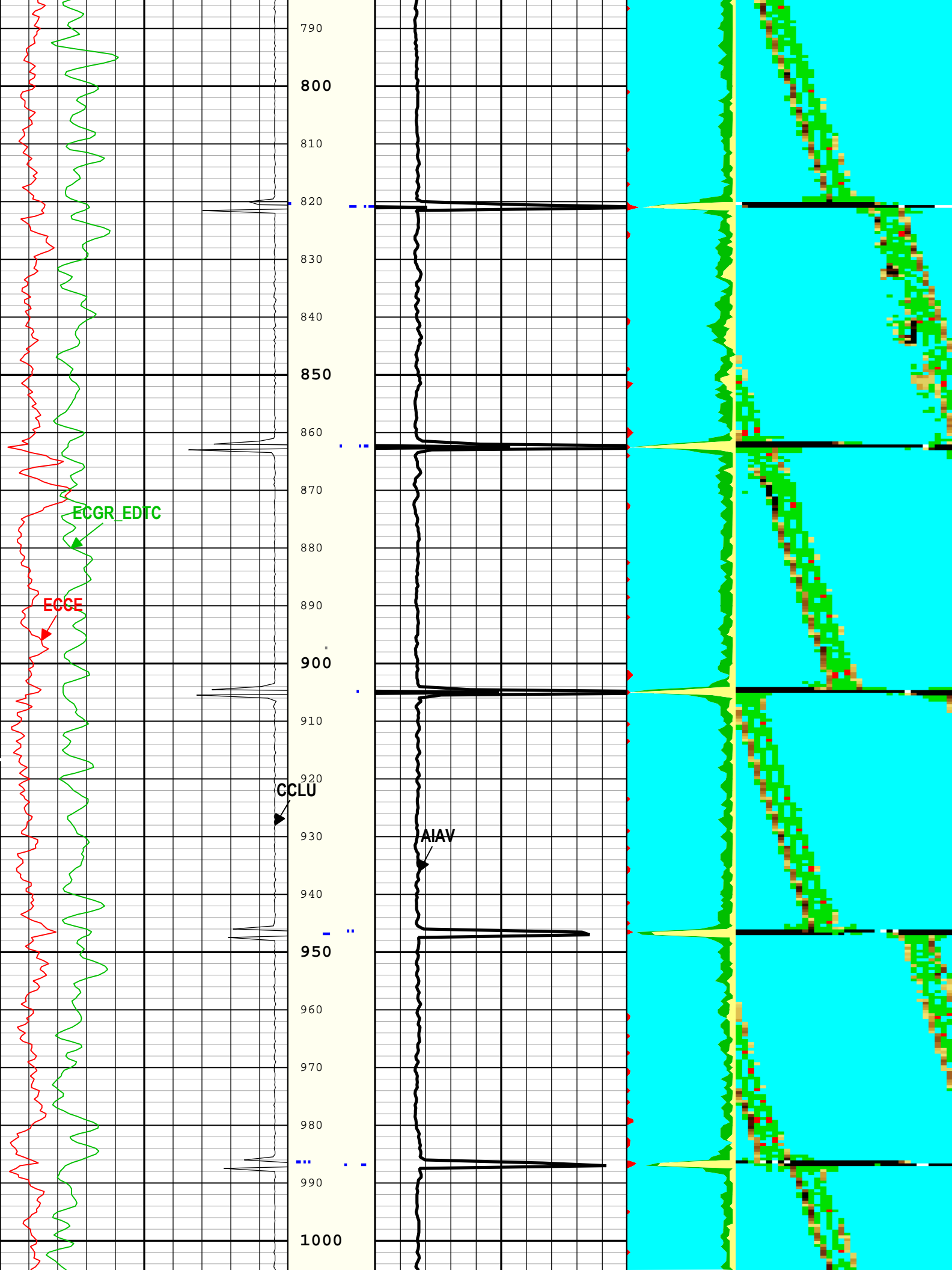


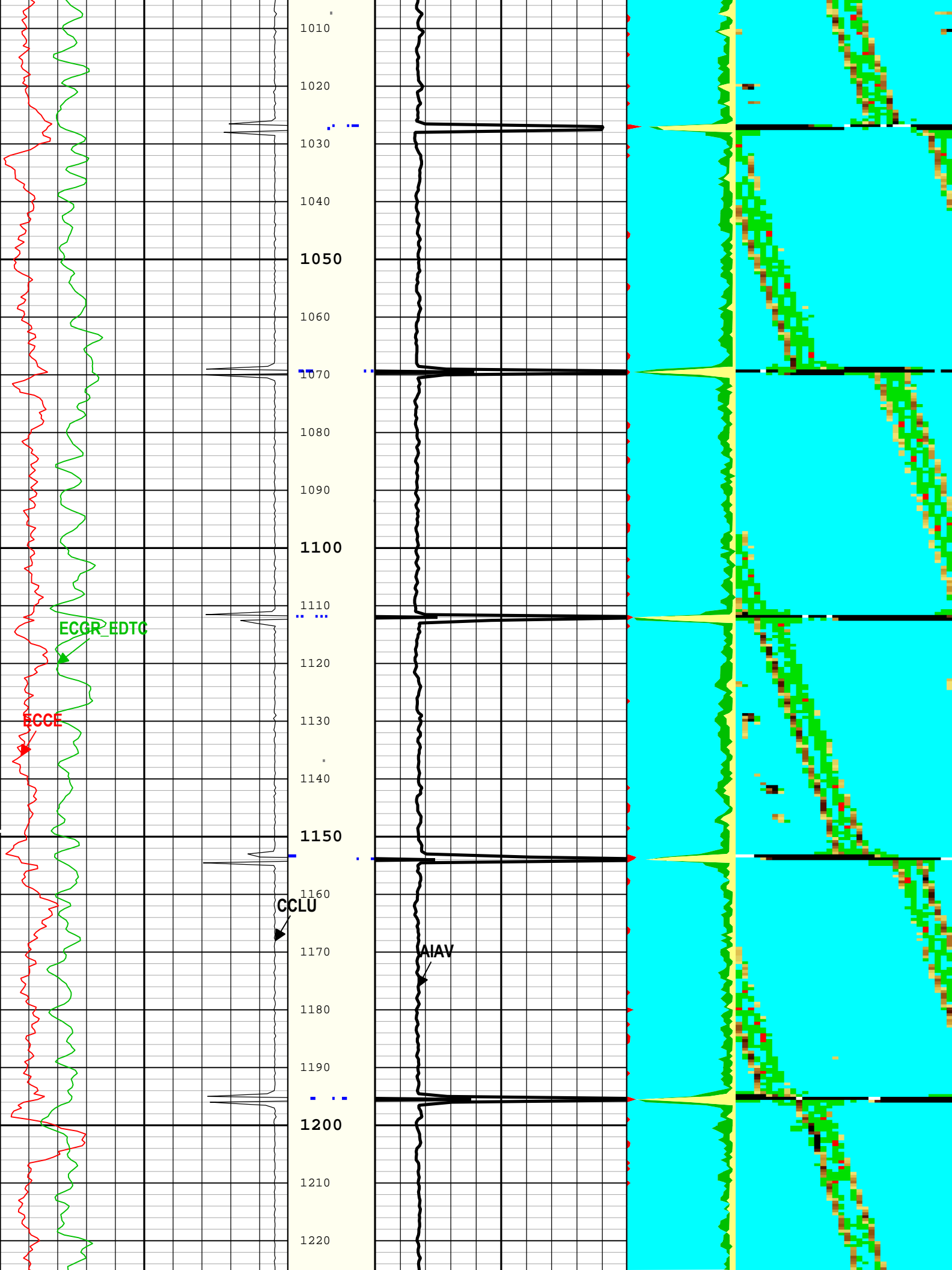


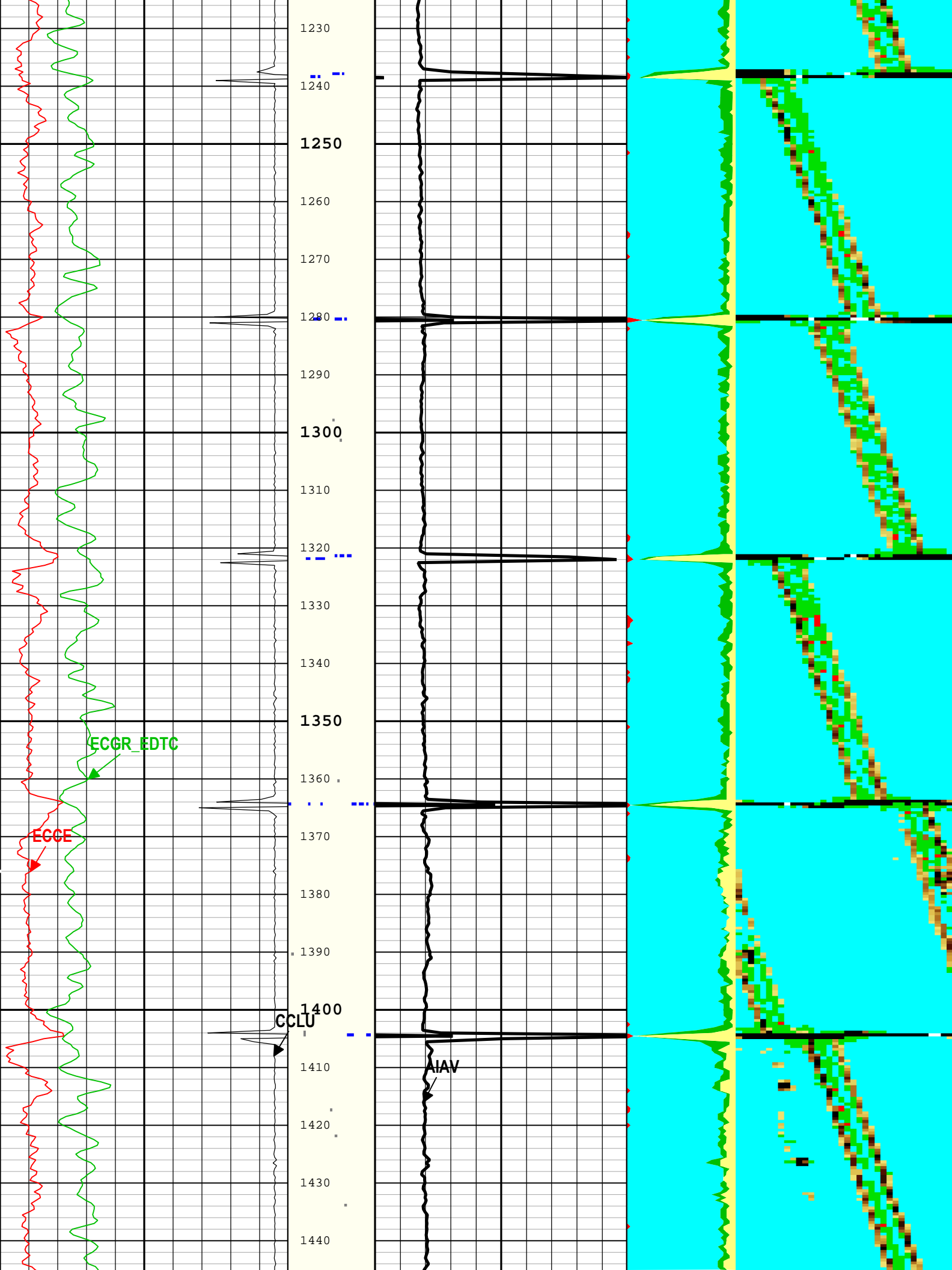


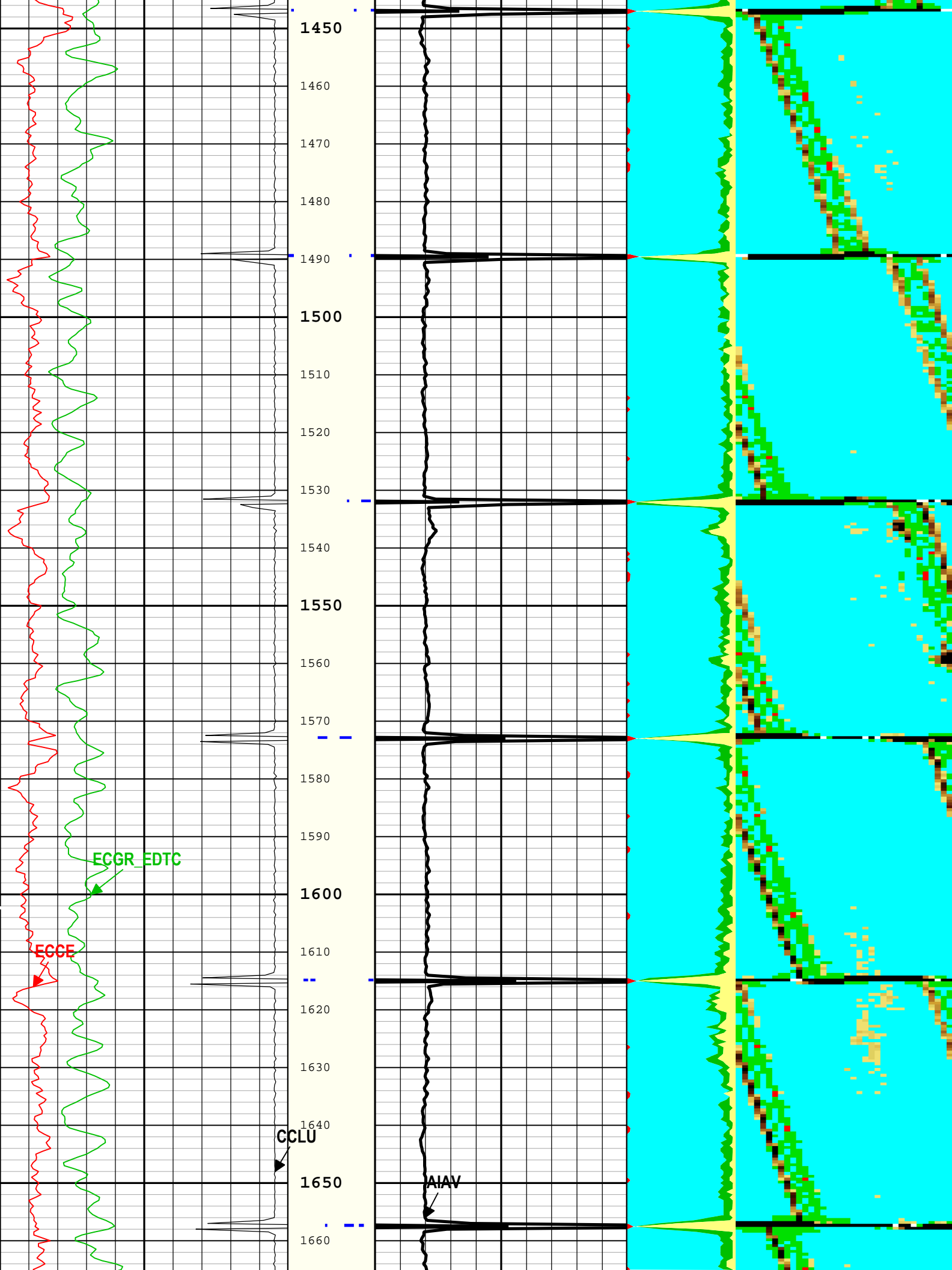


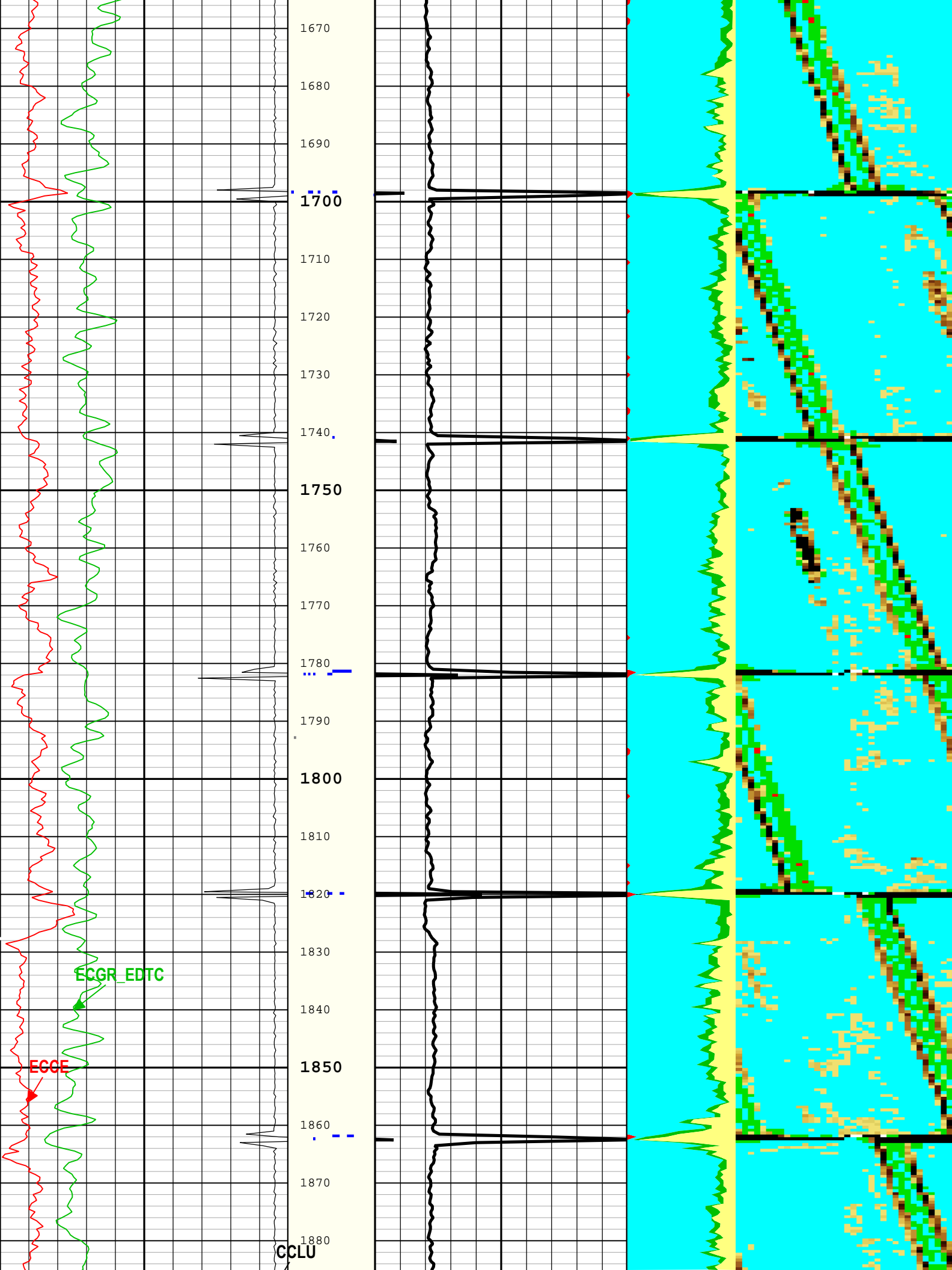


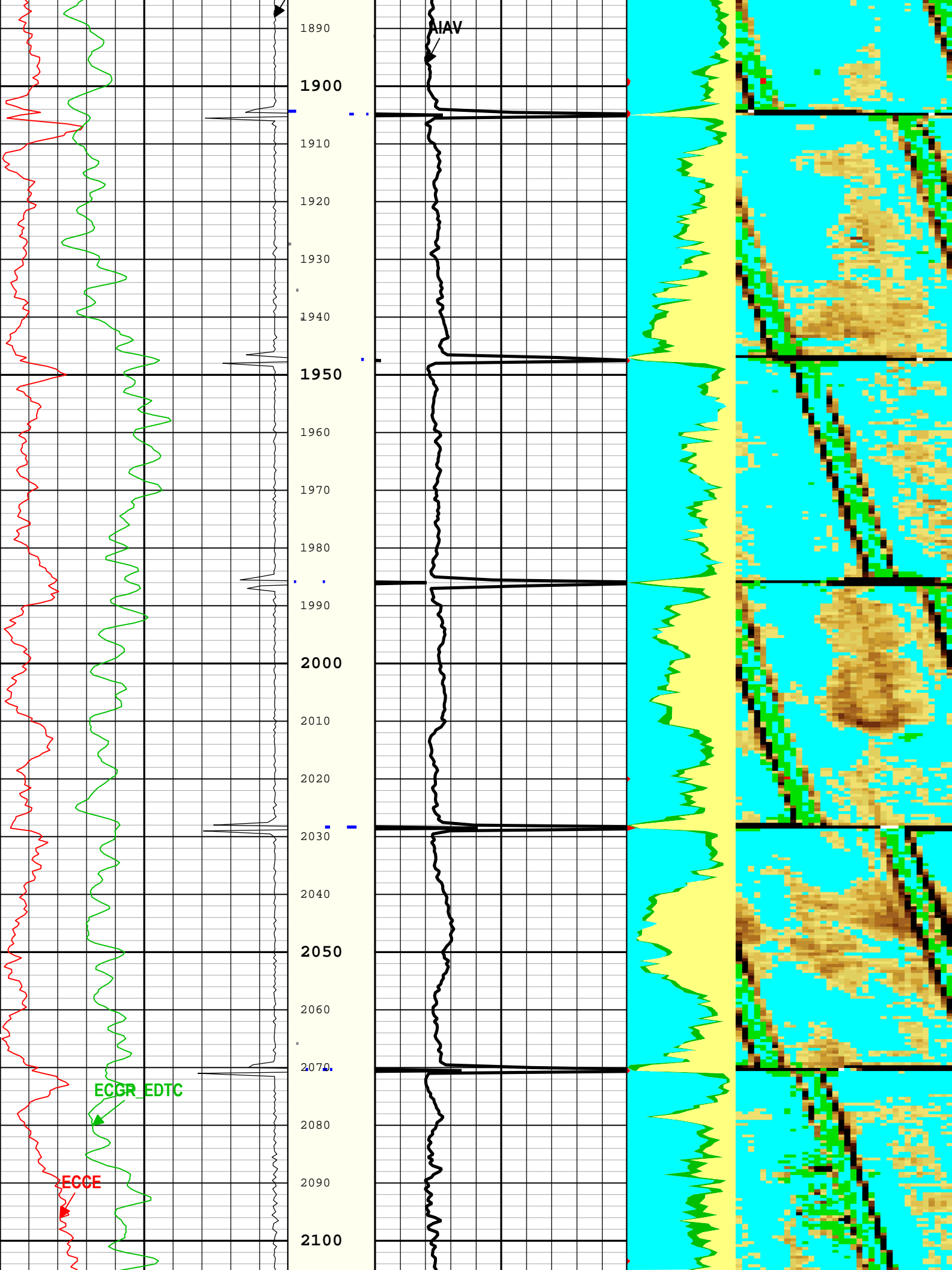


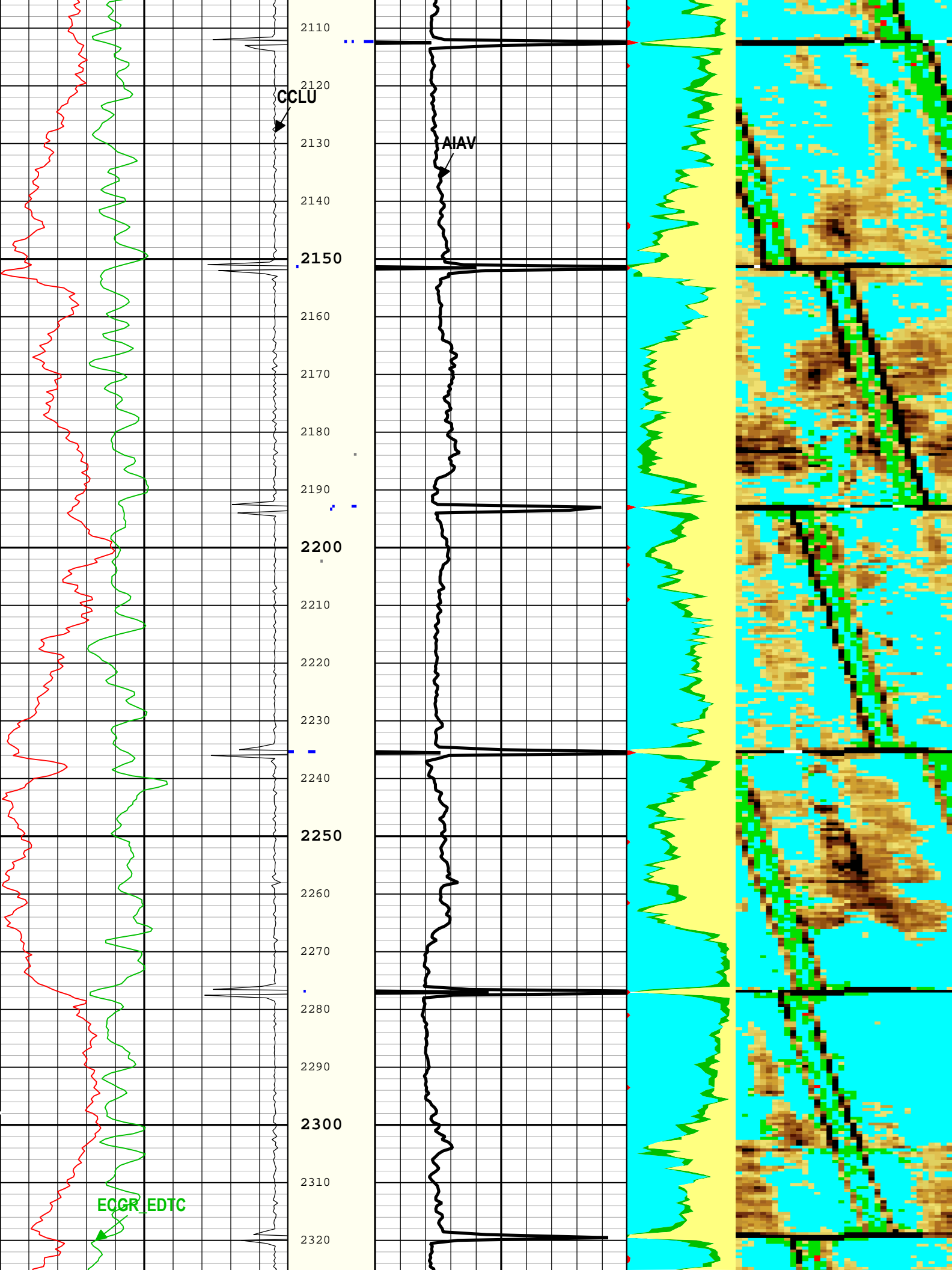




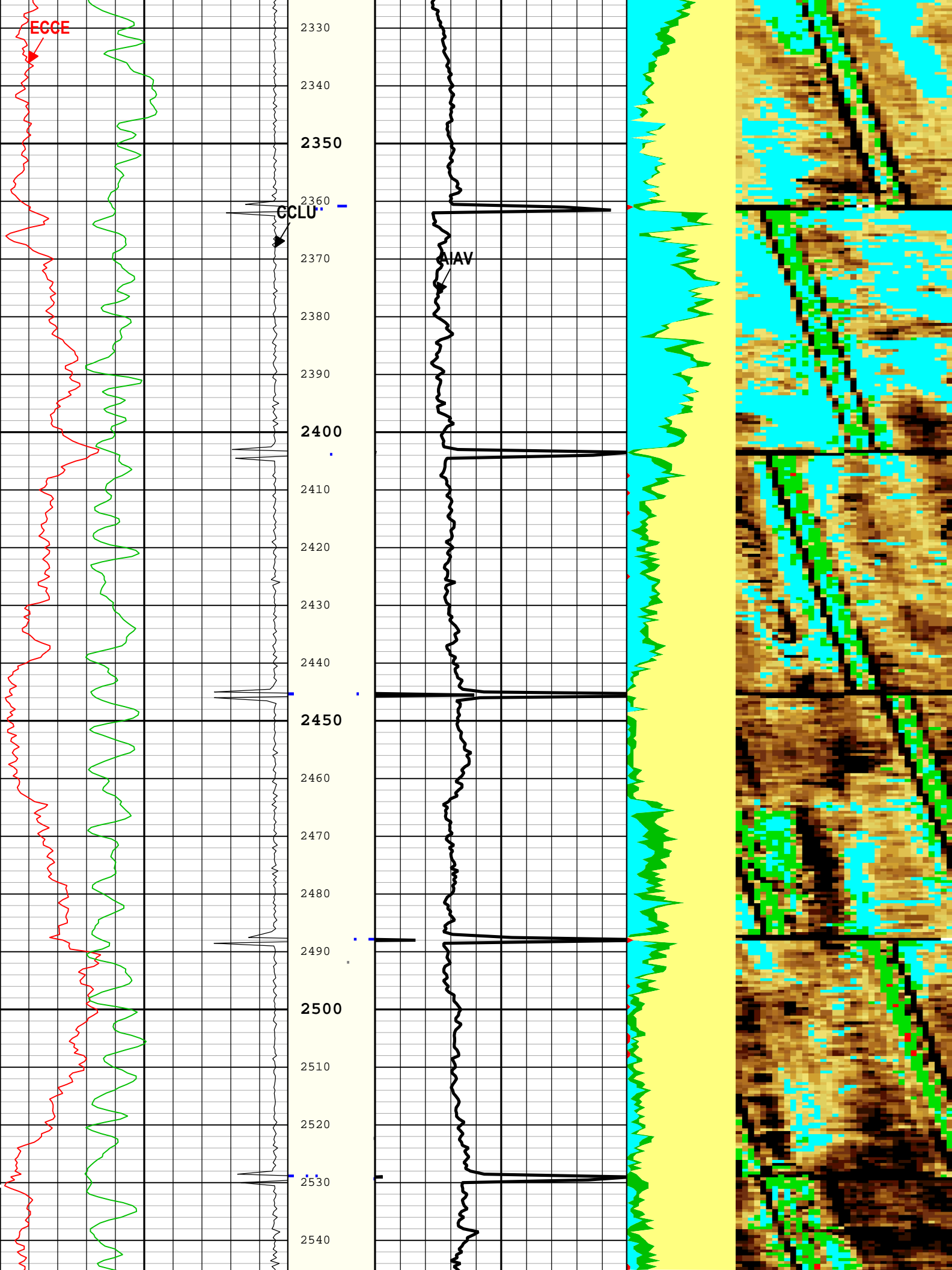


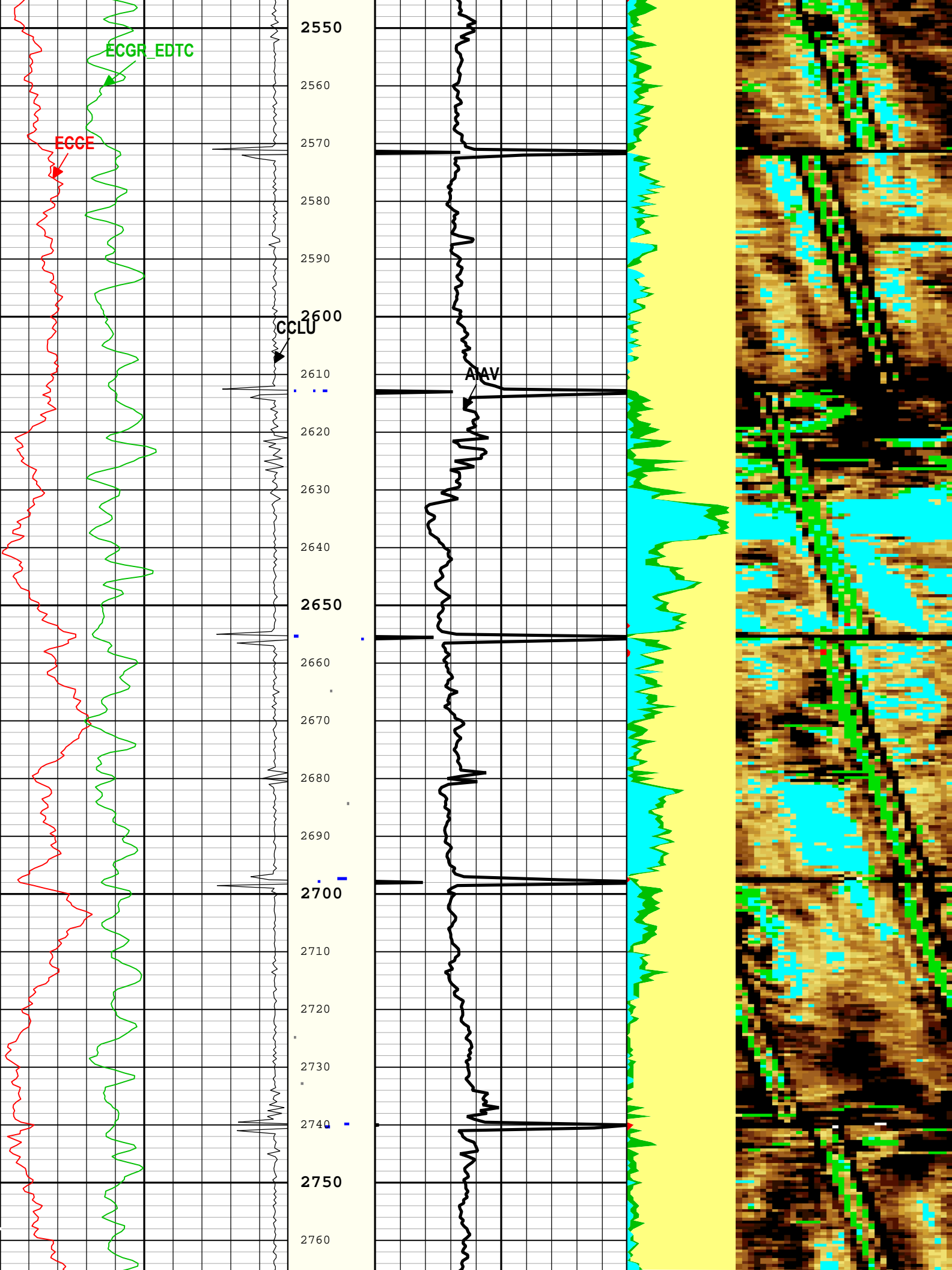


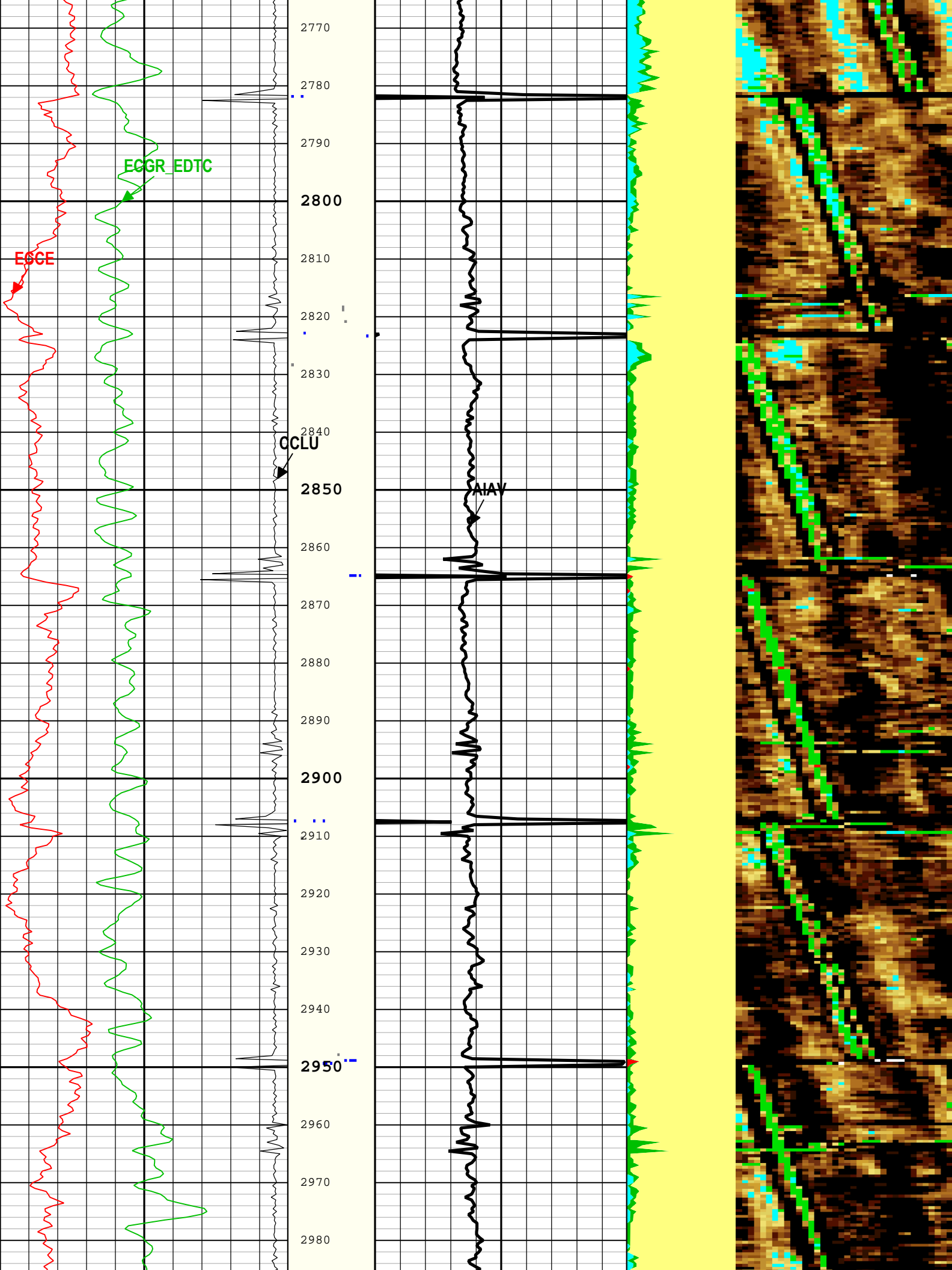


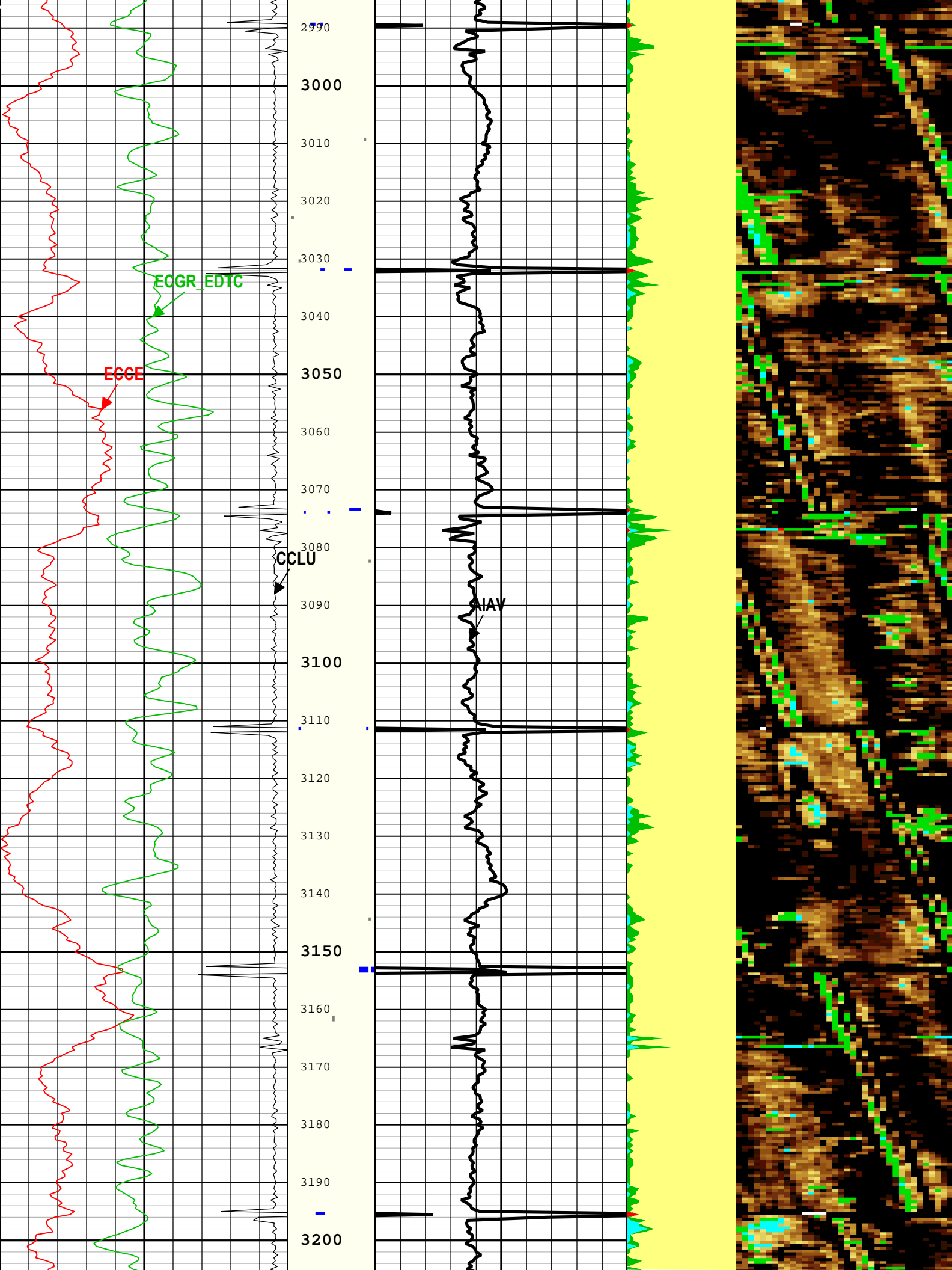


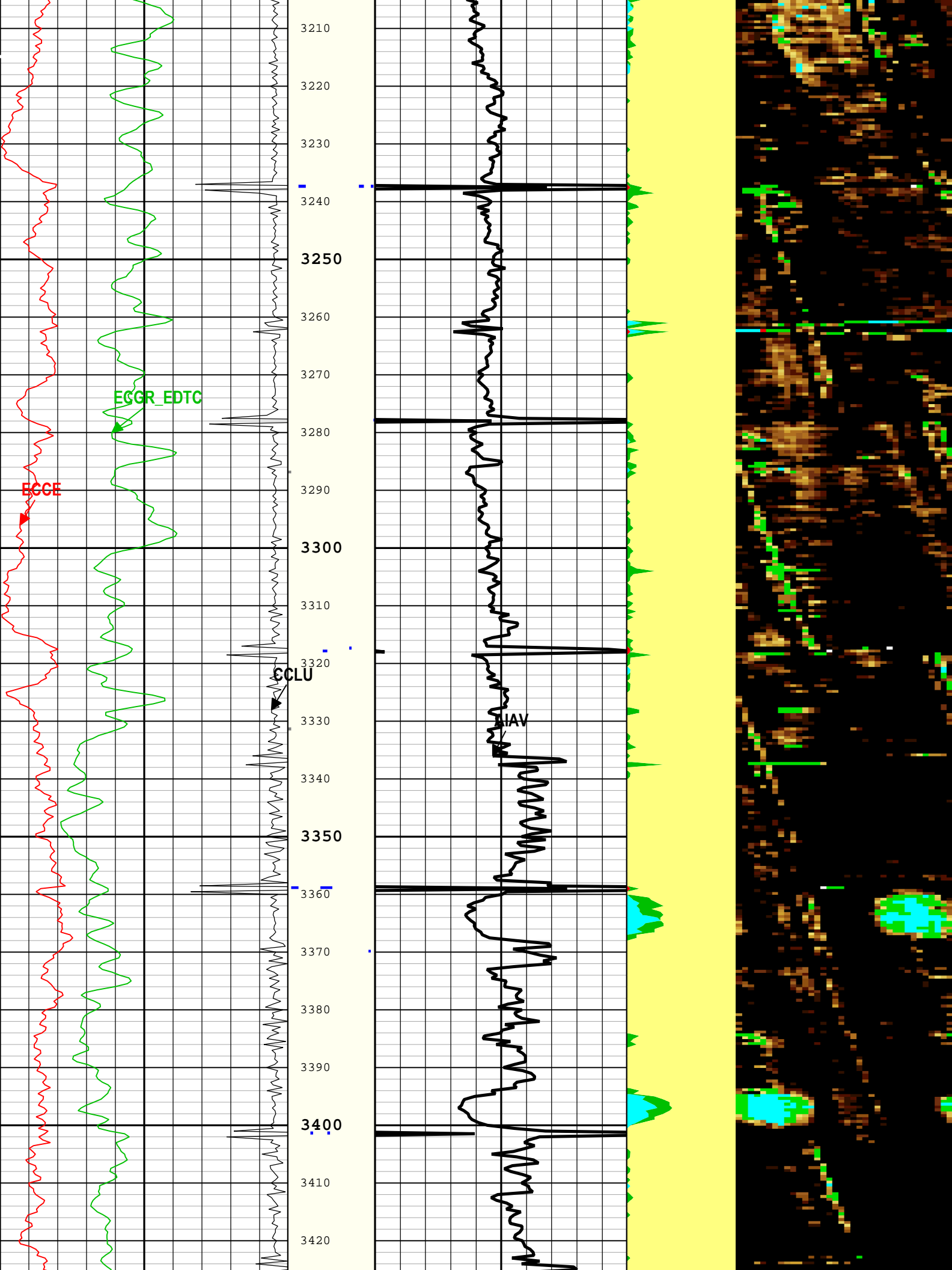


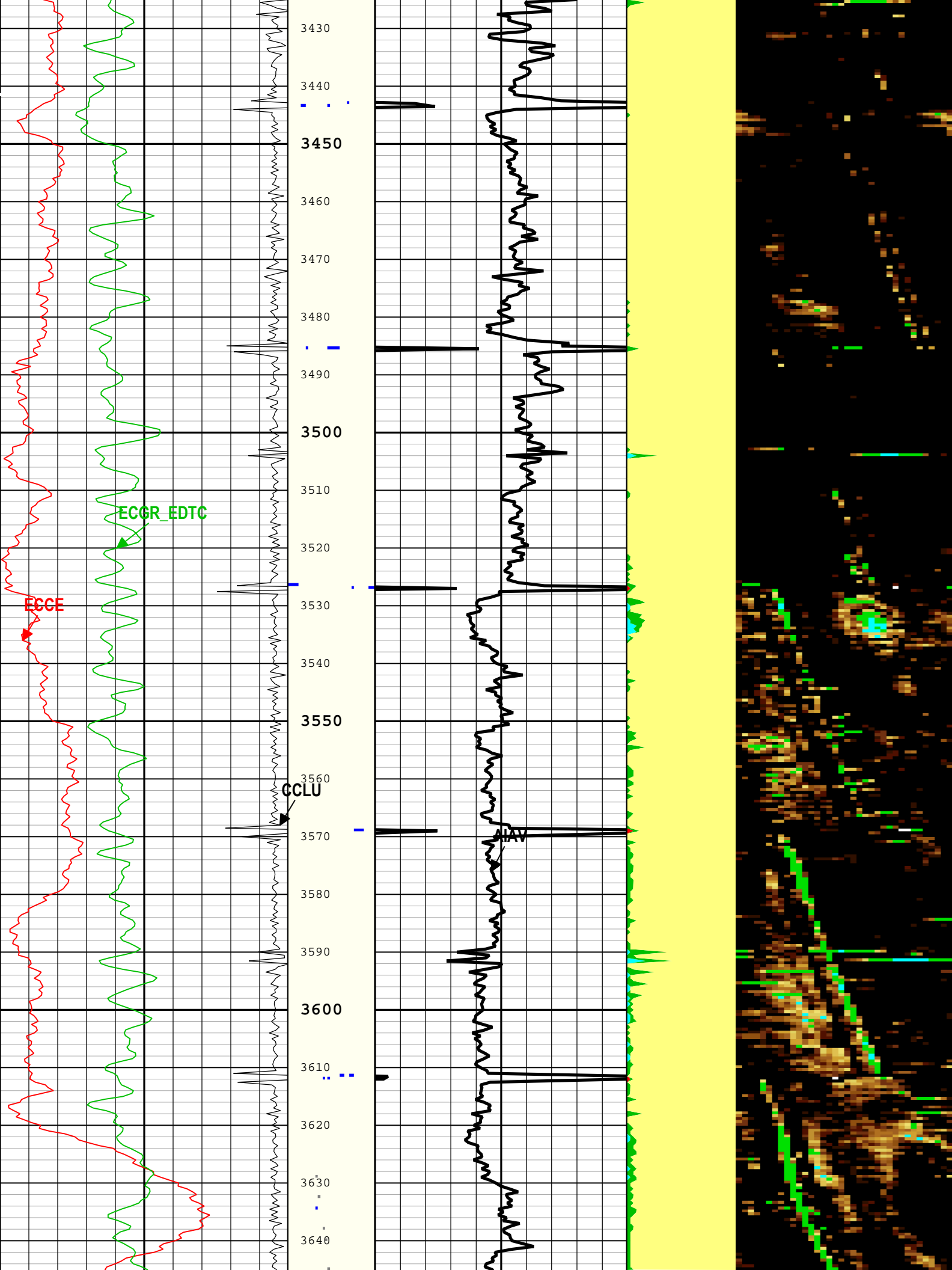


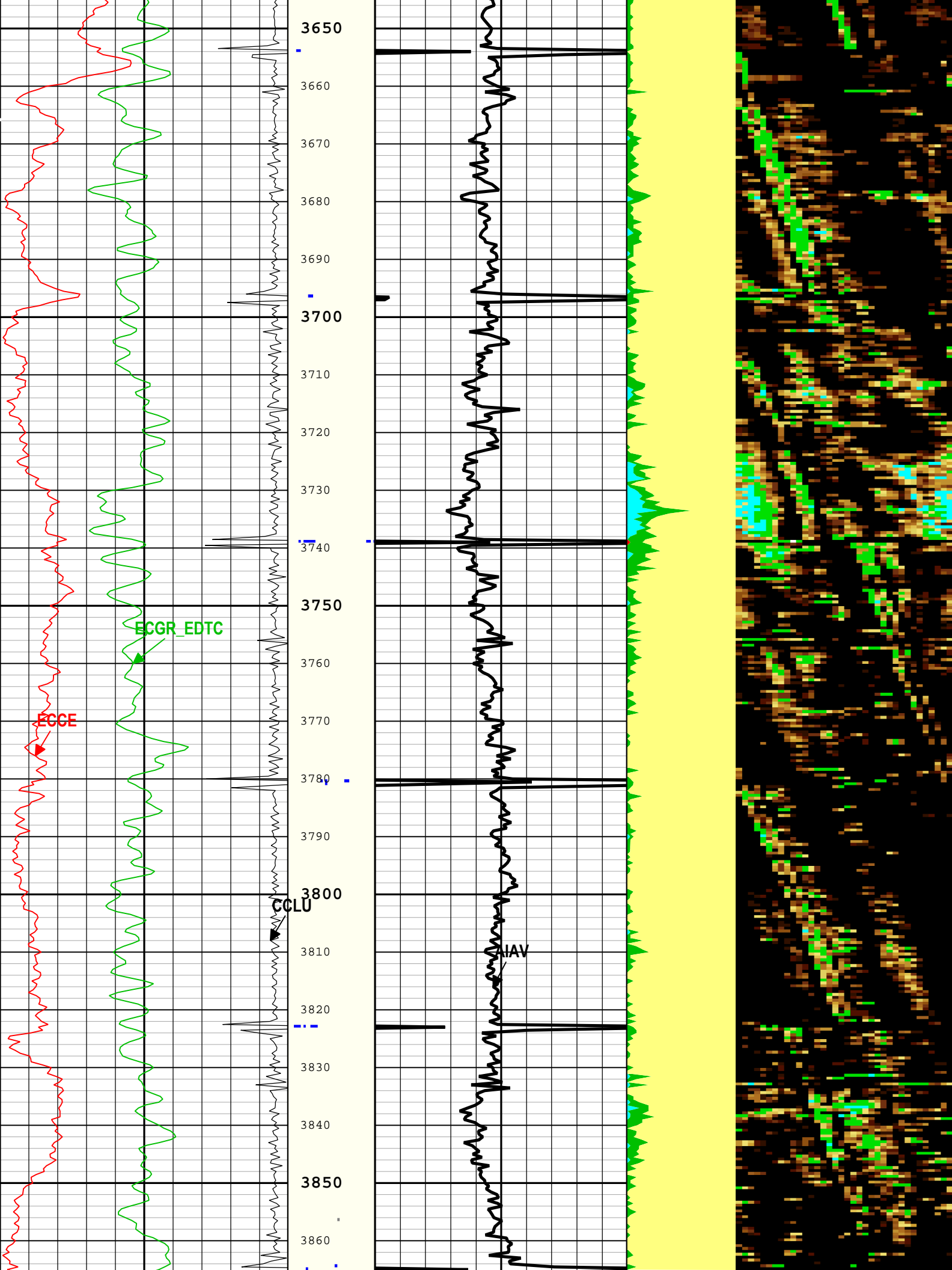


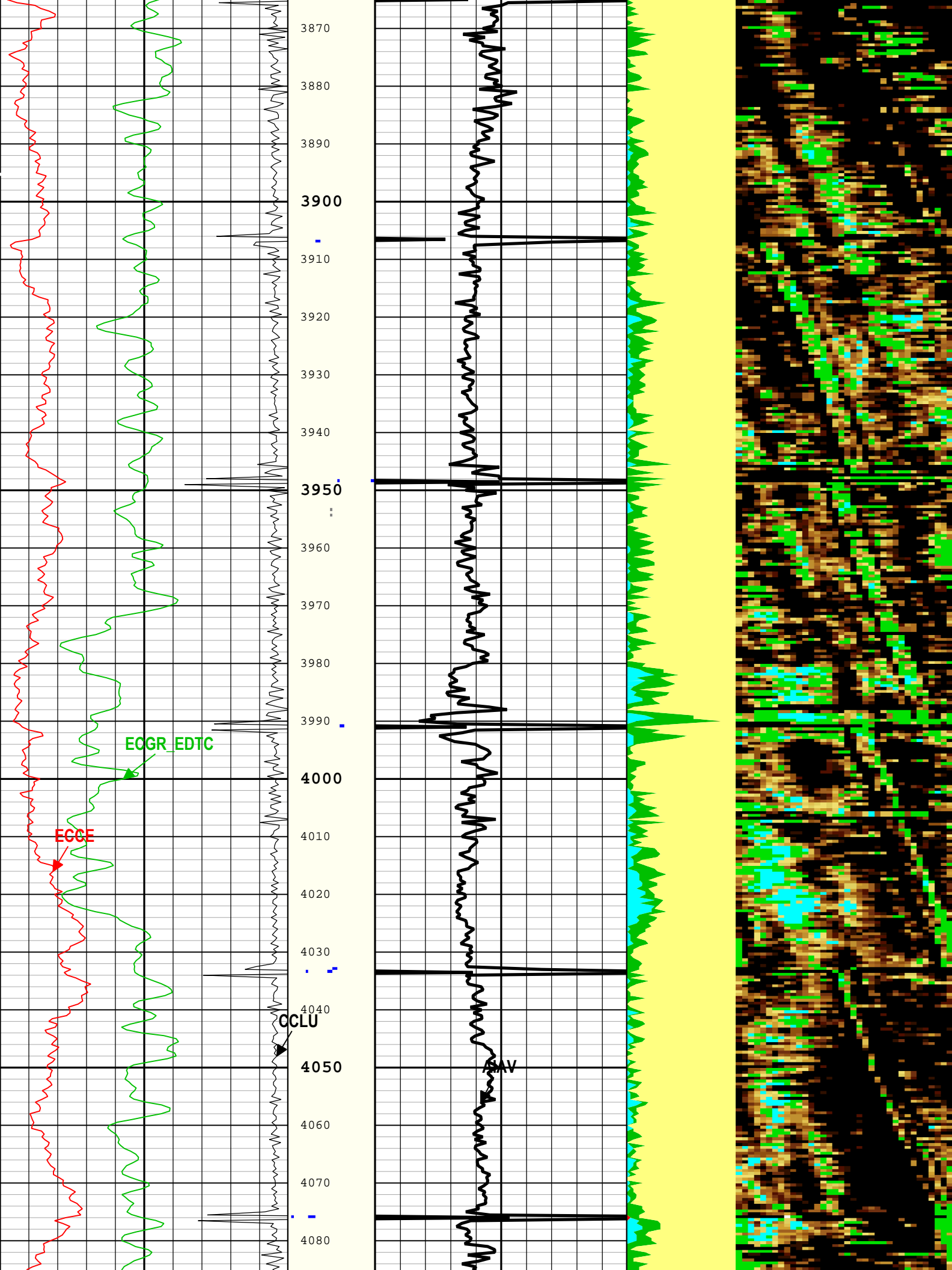




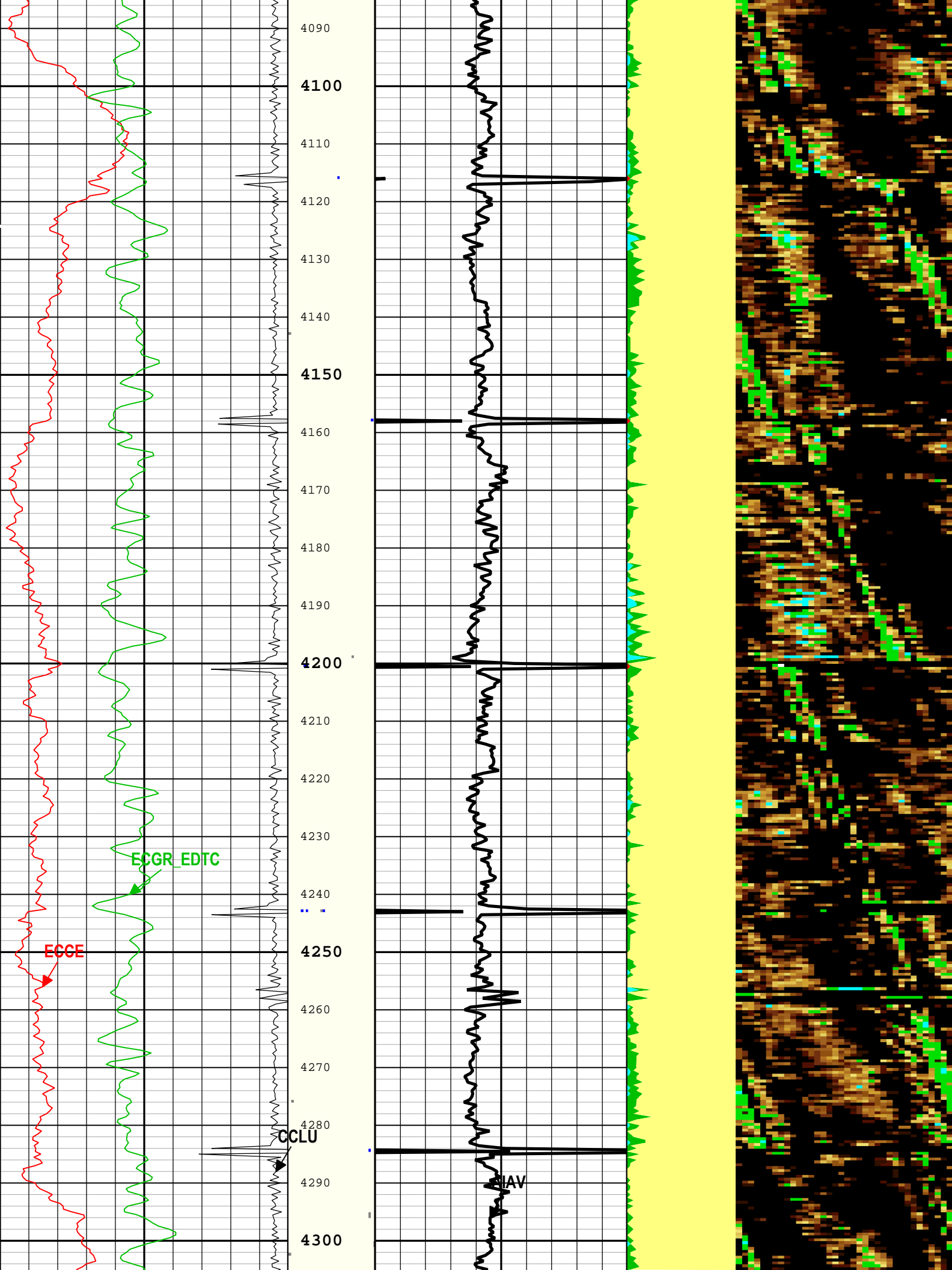


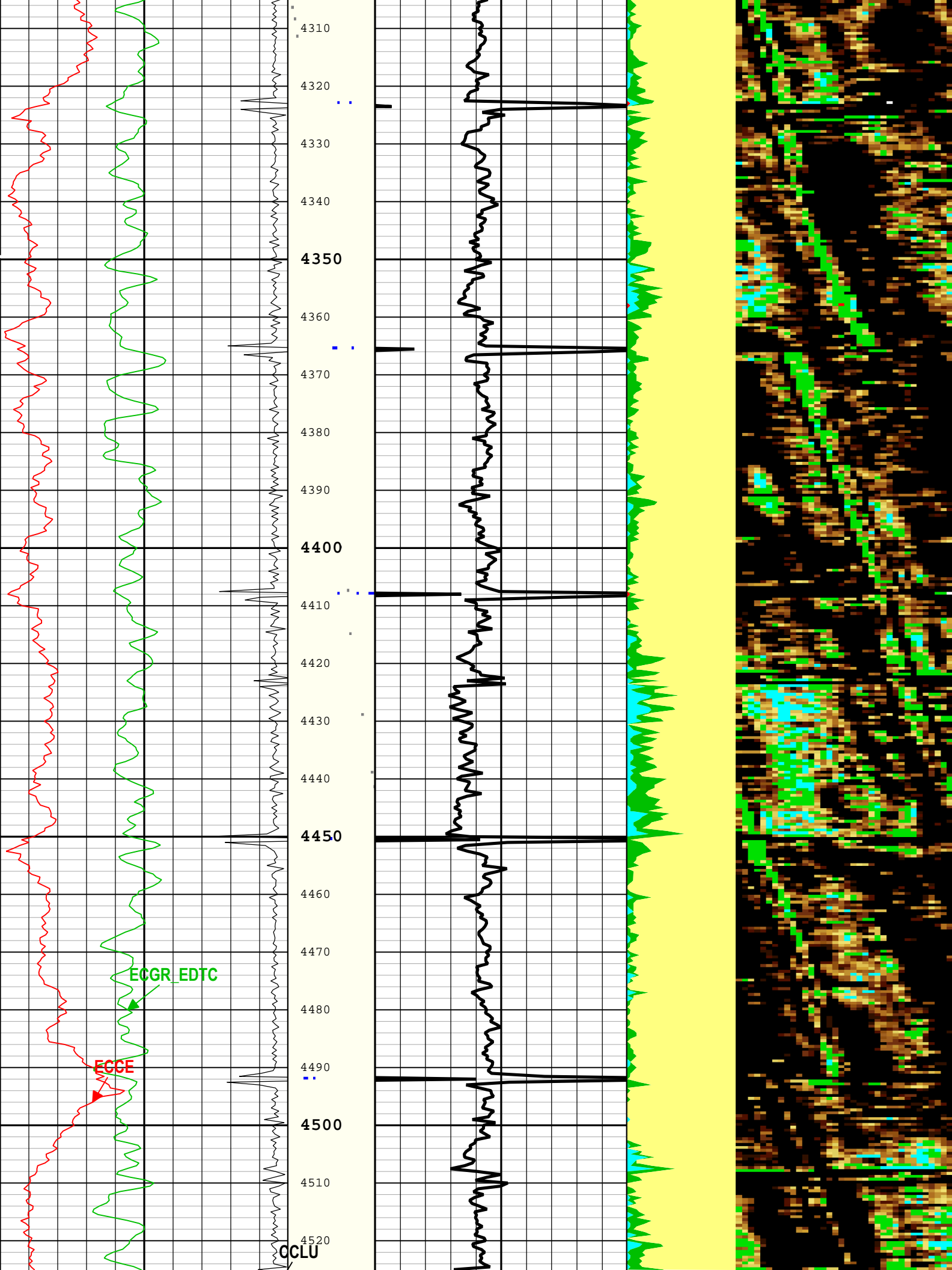


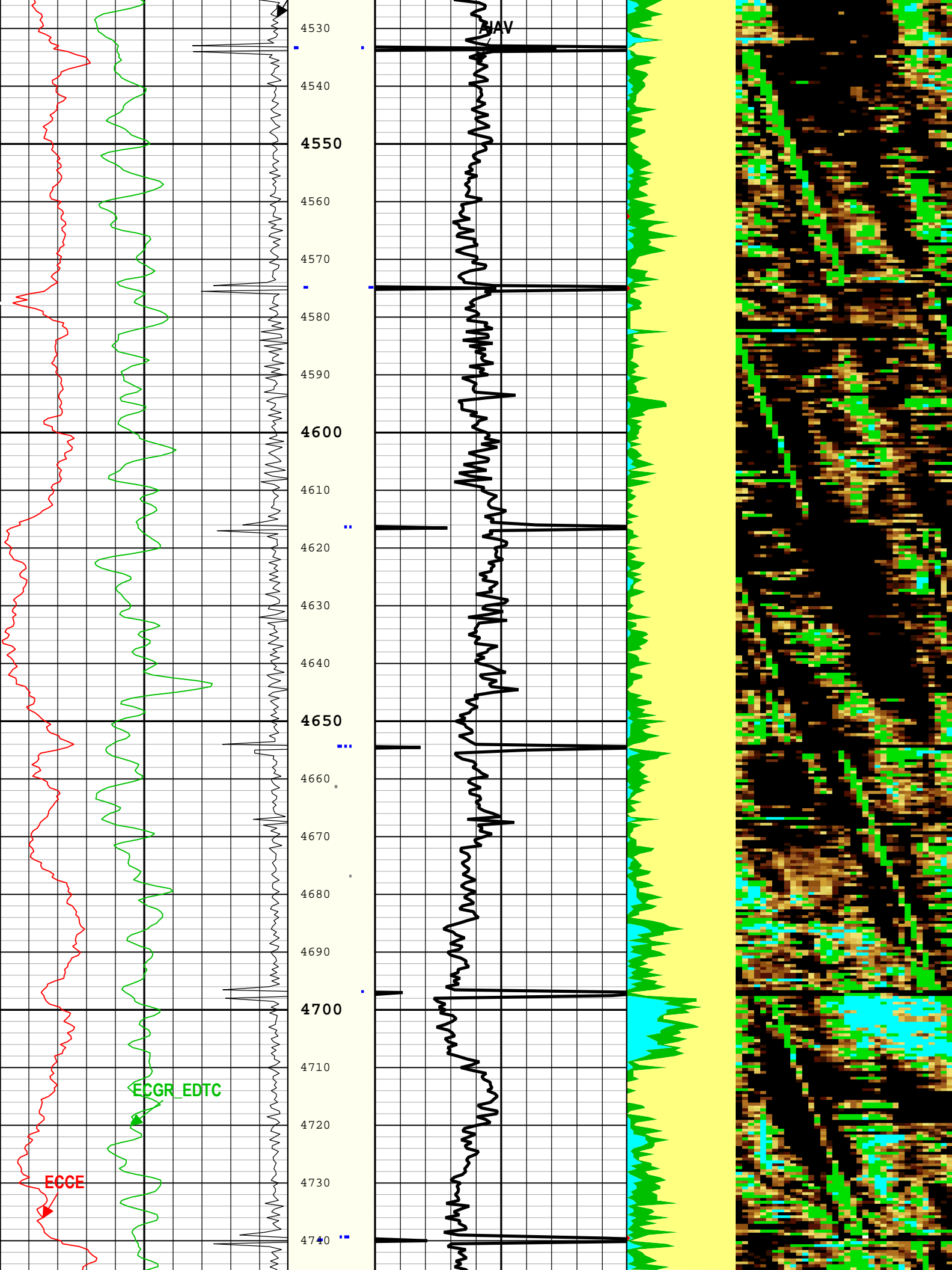


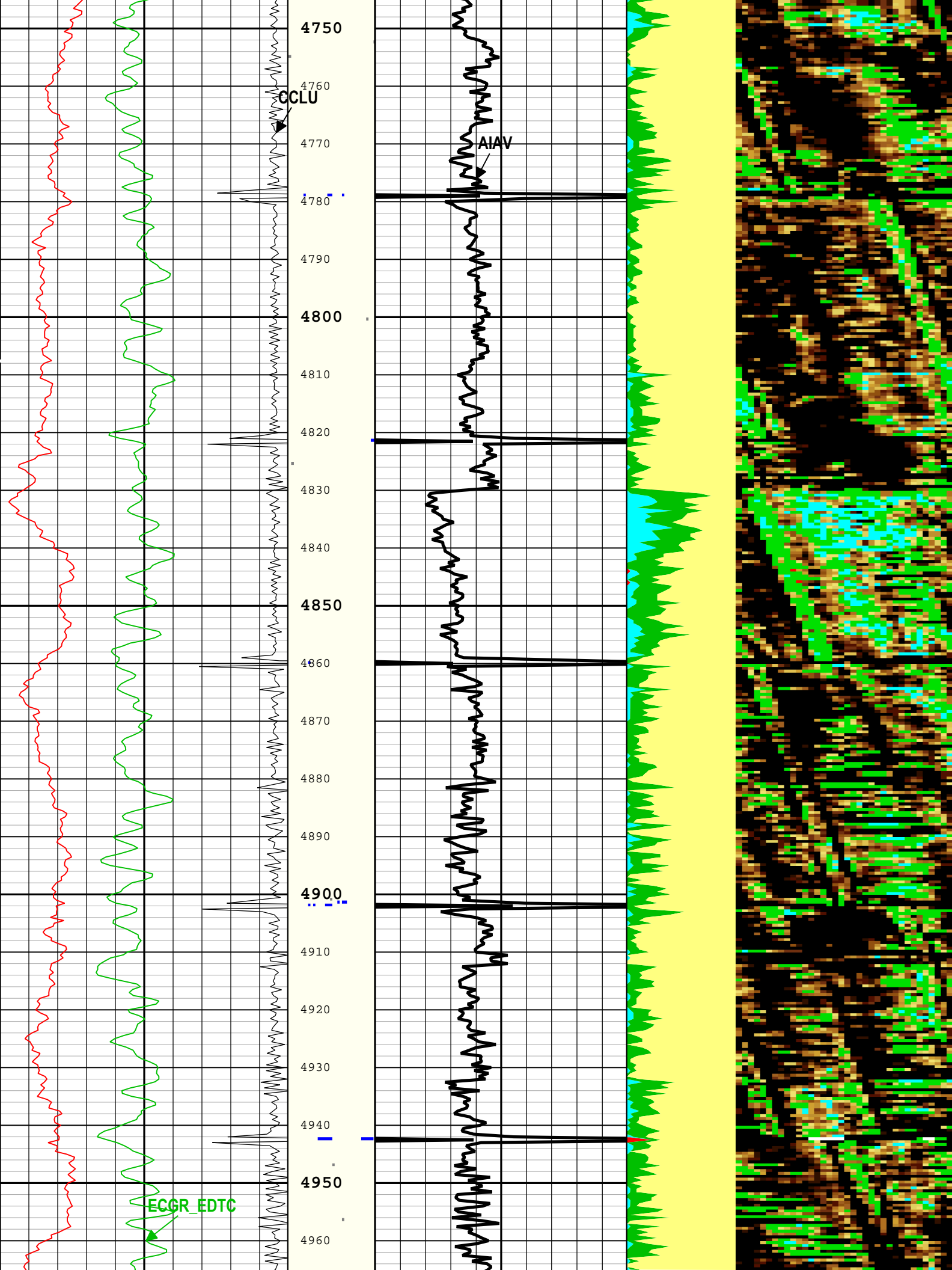


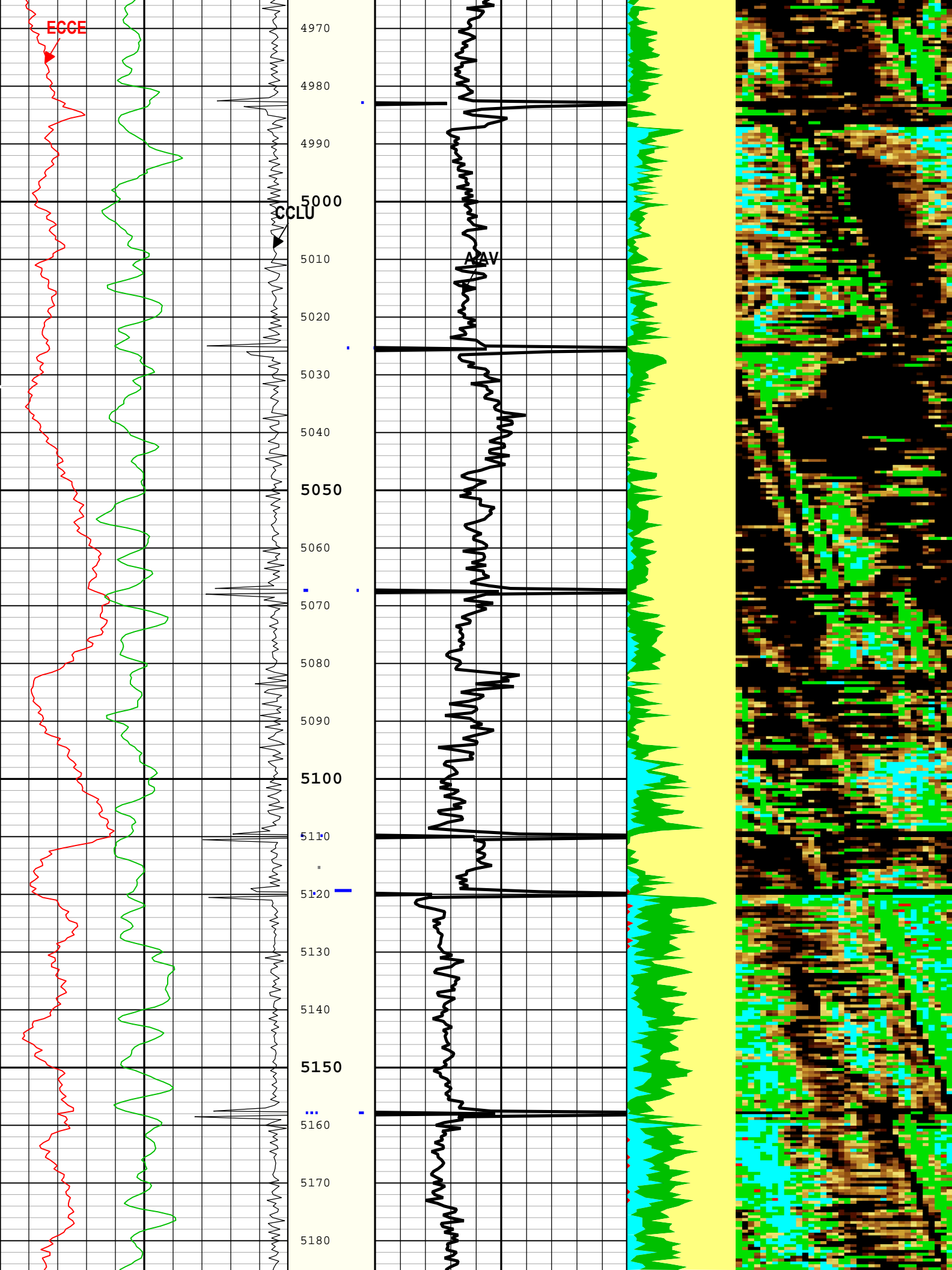


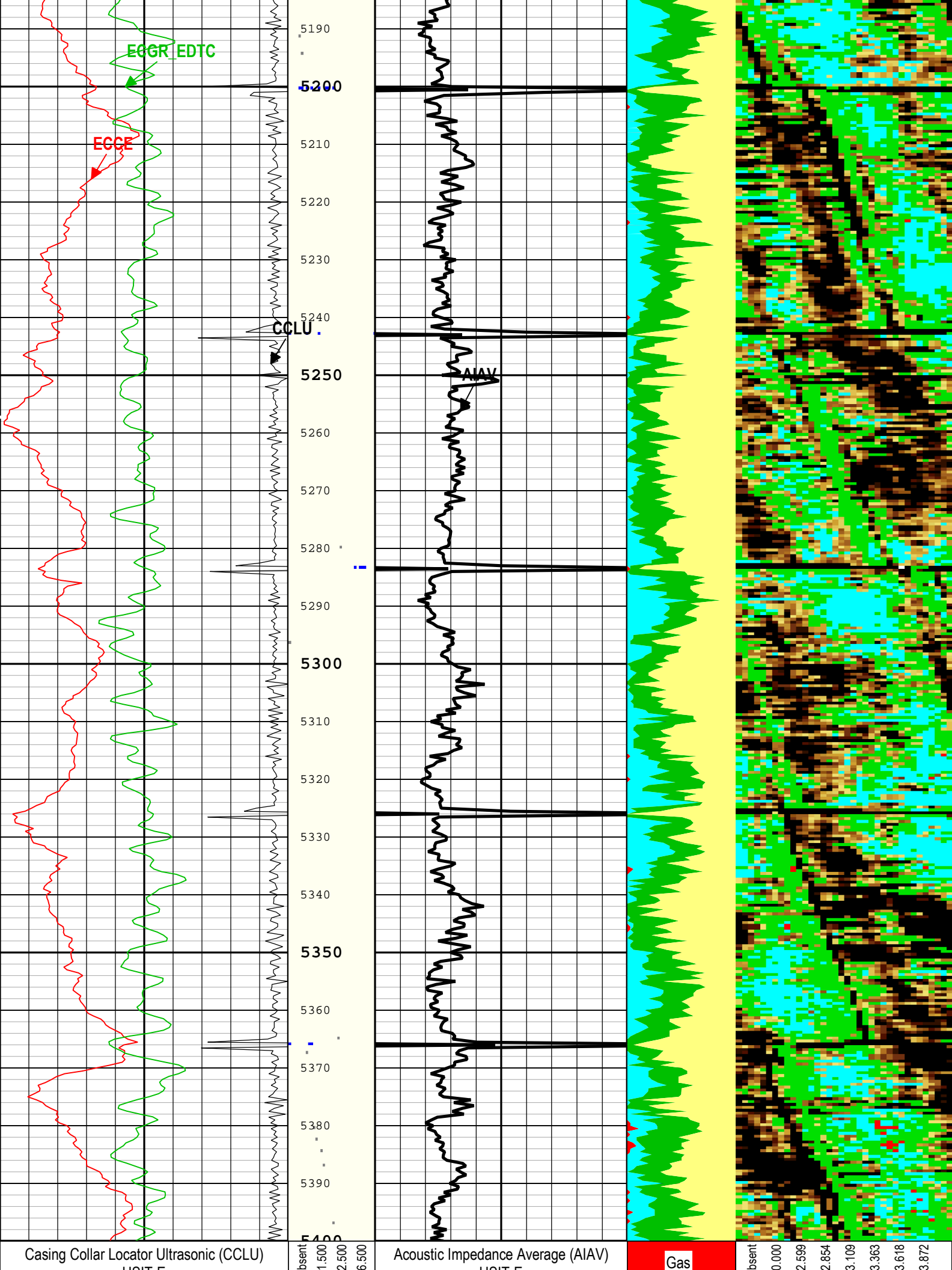












USIT-E

-20in1

Amplitude of Eccentering (ECCE) USIT-E

0in0.5

Gamma Ray (ECGR\_EDTC) EDTC-B

0gAPI150

USIT-E

0Mrayl10

Liquid

Micro-Debonding

Bonded

USIT-E

050

Custom Normalization

USIT - Acoustic Impedance With Micro-debonding Image (AI\_MDEBOND\_IMG) USIT-E (Mrayl)

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: 02-Sep-2016 11:29:30

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	16309.5	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light Cement	
DFD	Drilling Fluid Density	Borehole	8.8	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	190	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	1.14	
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	1.78	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	24	41.5	110
BS	13.5	110	1943
BS	8.5	1943	5400

All depth are actual.

Tool Control Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
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Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	25	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	
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	5970	ft
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
WINB	27.85	02-Sep-2016 10:30:30	02-Sep-2016 10:36:55	5966.44	5939.14
WINB	15	02-Sep-2016 10:36:55	02-Sep-2016 10:42:06	5939.14	4781.55
WINB	20	02-Sep-2016 10:42:06	02-Sep-2016 11:04:13	4781.55	61.98
WINE	67.85	02-Sep-2016 10:30:30	02-Sep-2016 10:36:53	5966.44	5946.84
WINE	85	02-Sep-2016 10:36:53	02-Sep-2016 10:42:04	5946.84	4790.75
WINE	75	02-Sep-2016 10:42:04	02-Sep-2016 11:04:13	4790.75	61.98
All depth are at tool zero.					

One					
0 PSI Repeat Pass					

Software Version					
Acquisition System					Version
Maxwell 2016 SP2					6.2.68624.3100

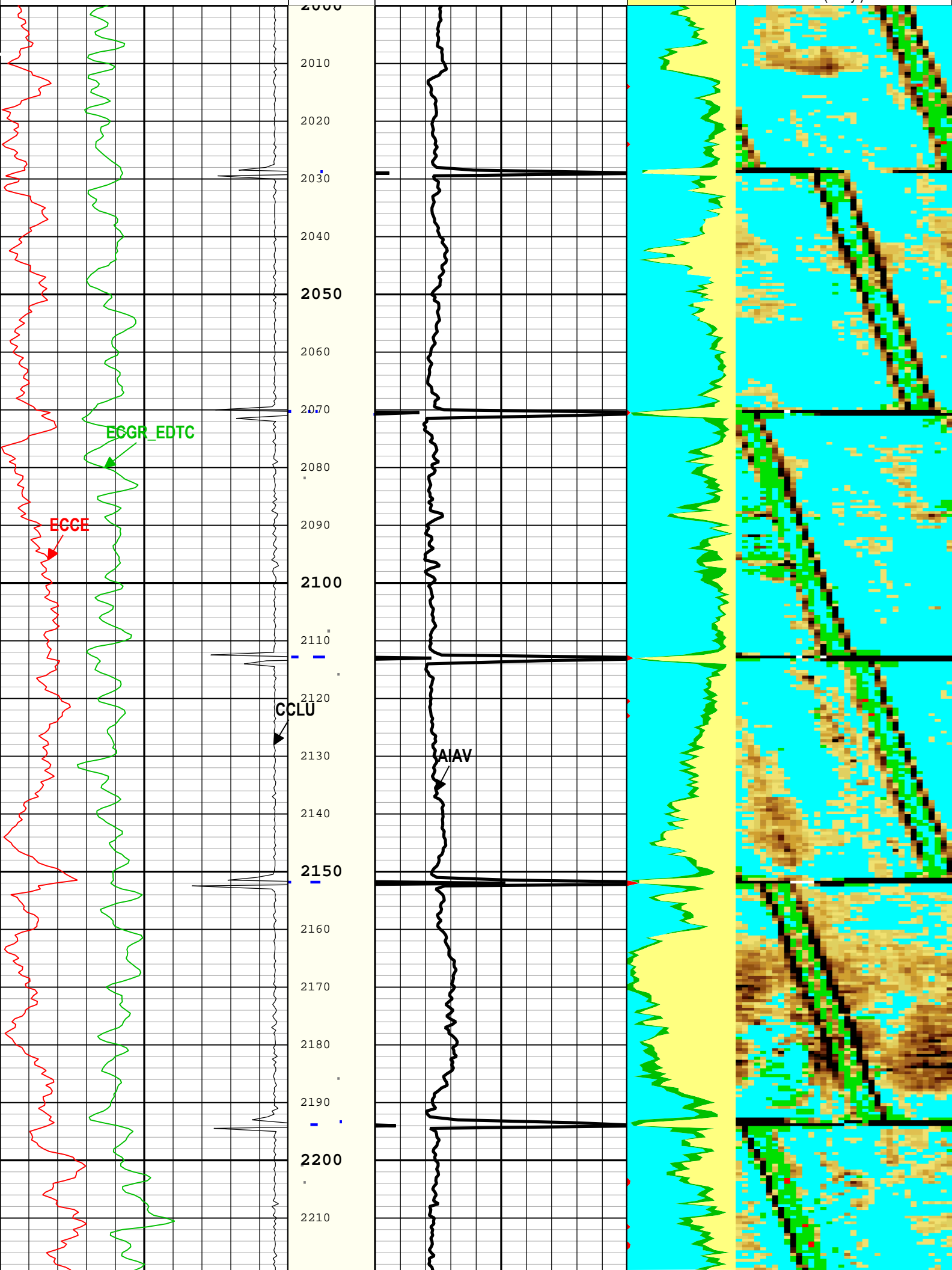
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	1896.89 ft	2525.39 ft	02-Sep-2016 10:15:41 AM	02-Sep-2016 10:18:36 AM	ON	0.59 ft	Yes
All depths are referenced to toolstring zero									

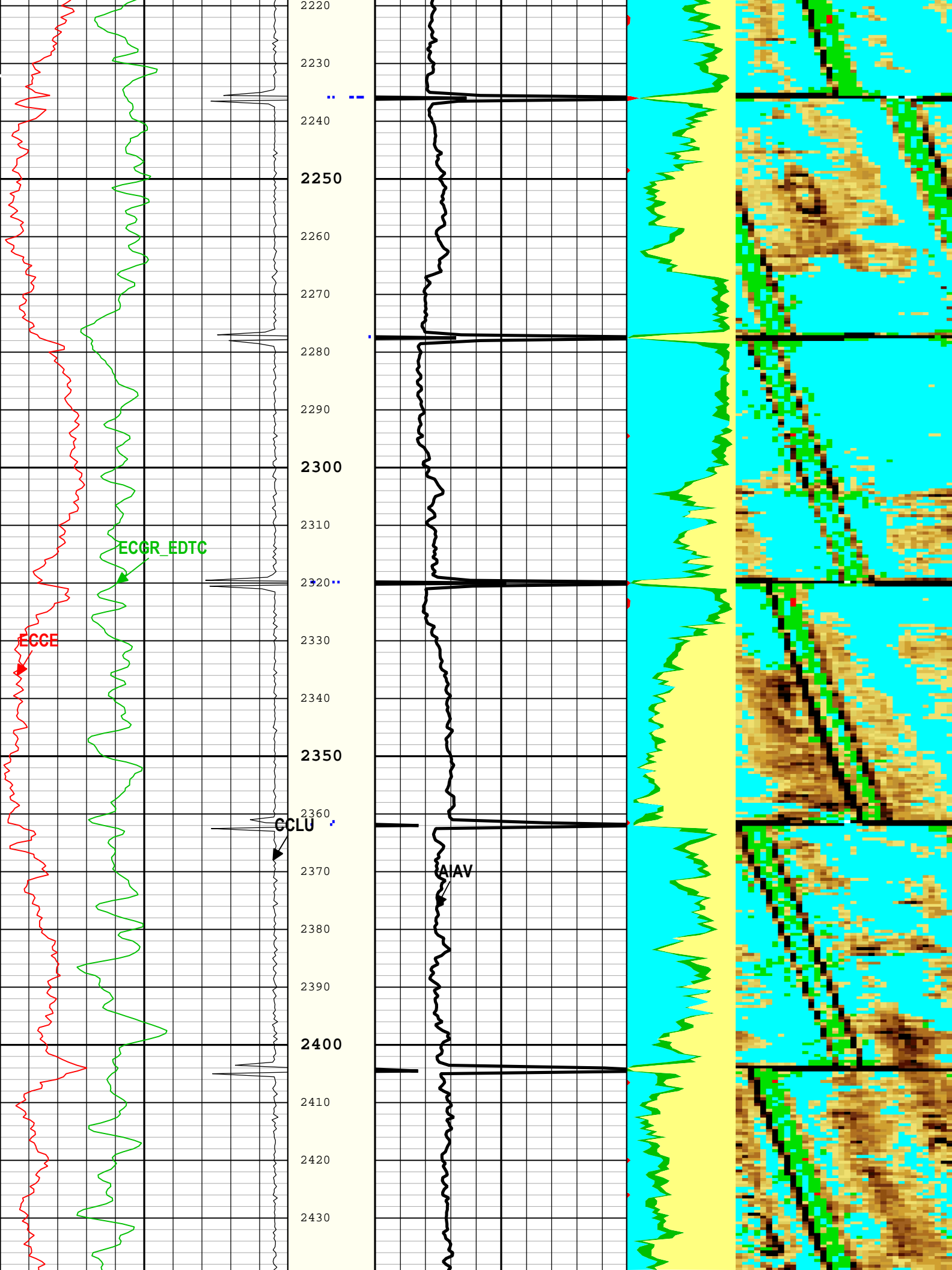
Log	Company:Noble Energy Inc	Well:Reagan LD06-685
	One: Log[2]:Up:S008	

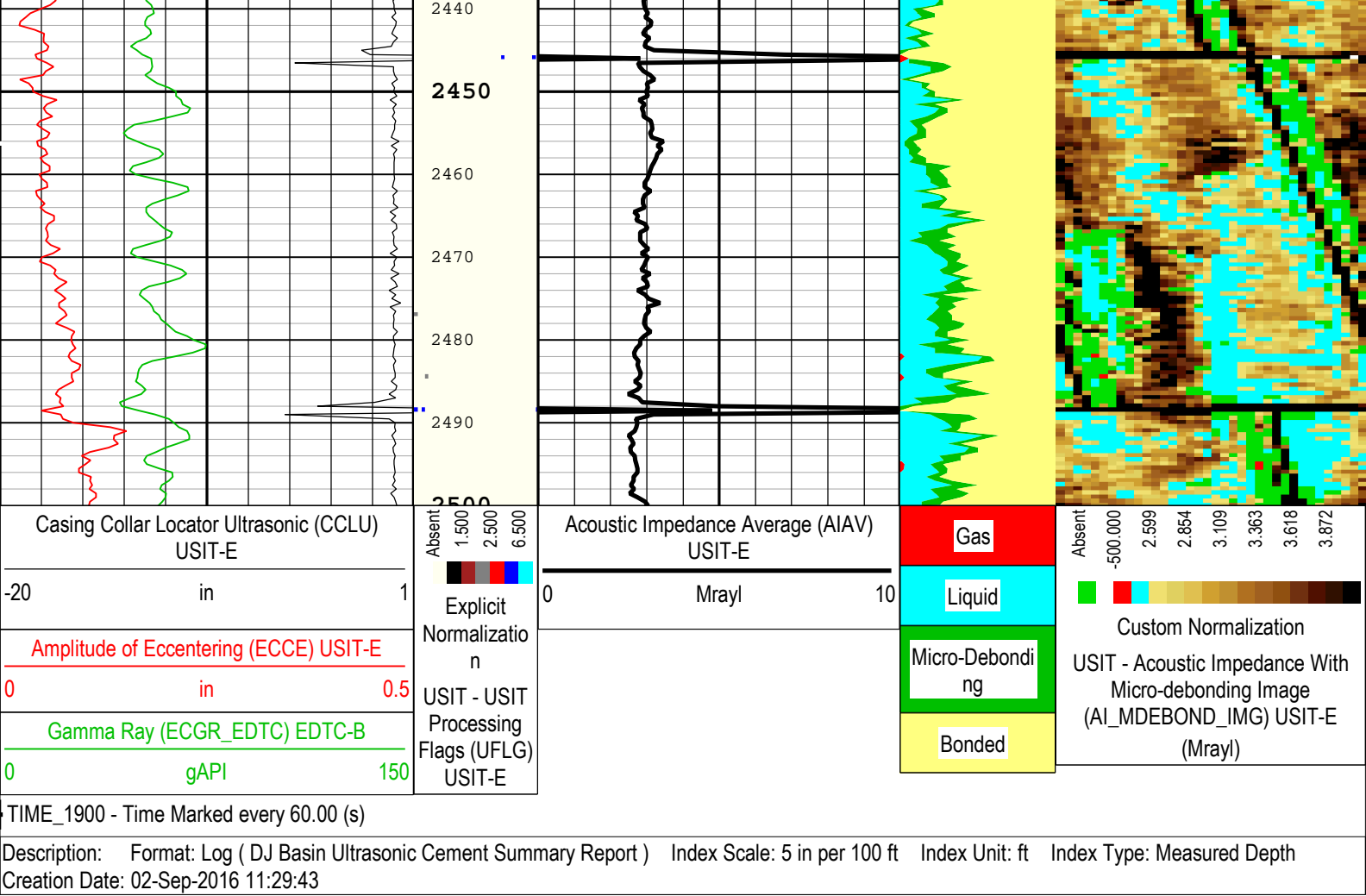
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Creation Date: 02-Sep-2016 11:29:43

TIME_1900 - Time Marked every 60.00 (s)										
Casing Collar Locator Ultrasonic (CCLU) USIT-E			<div>Absent</div> <div>1.500</div> <div>2.500</div> <div>6.500</div> <div></div> <div>Explicit</div> <div>Normalization</div> <div>n</div>							
-20	in	1								
Amplitude of Eccentering (ECCE) USIT-E										
0	in	0.5	USIT - USIT	Acoustic Impedance Average (AIAV) USIT-E		Gas		<div>Absent</div> <div>-500.000</div> <div>2.599</div> <div>2.854</div> <div>3.109</div> <div>3.363</div> <div>3.618</div> <div>3.872</div> <div></div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance With</div> <div>Micro-debonding Image</div> <div>(AI_MDEBOND_IMG) USIT-E</div> <div>(Mrayl)</div>		
Gamma Ray (ECGR_EDTC) EDTC-B					Liquid					
					Micro-Debonding					
0	gAPI	150	Flags (UFLG) USIT-E	0Mrayl10		Bonded				









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	16309.5	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light Cement	
DFD	Drilling Fluid Density	Borehole	8.8	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	190	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	1.14	
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	1.78	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	25	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	
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	27.85	us
WINE	Window End Time	USIT-E	67.85	us

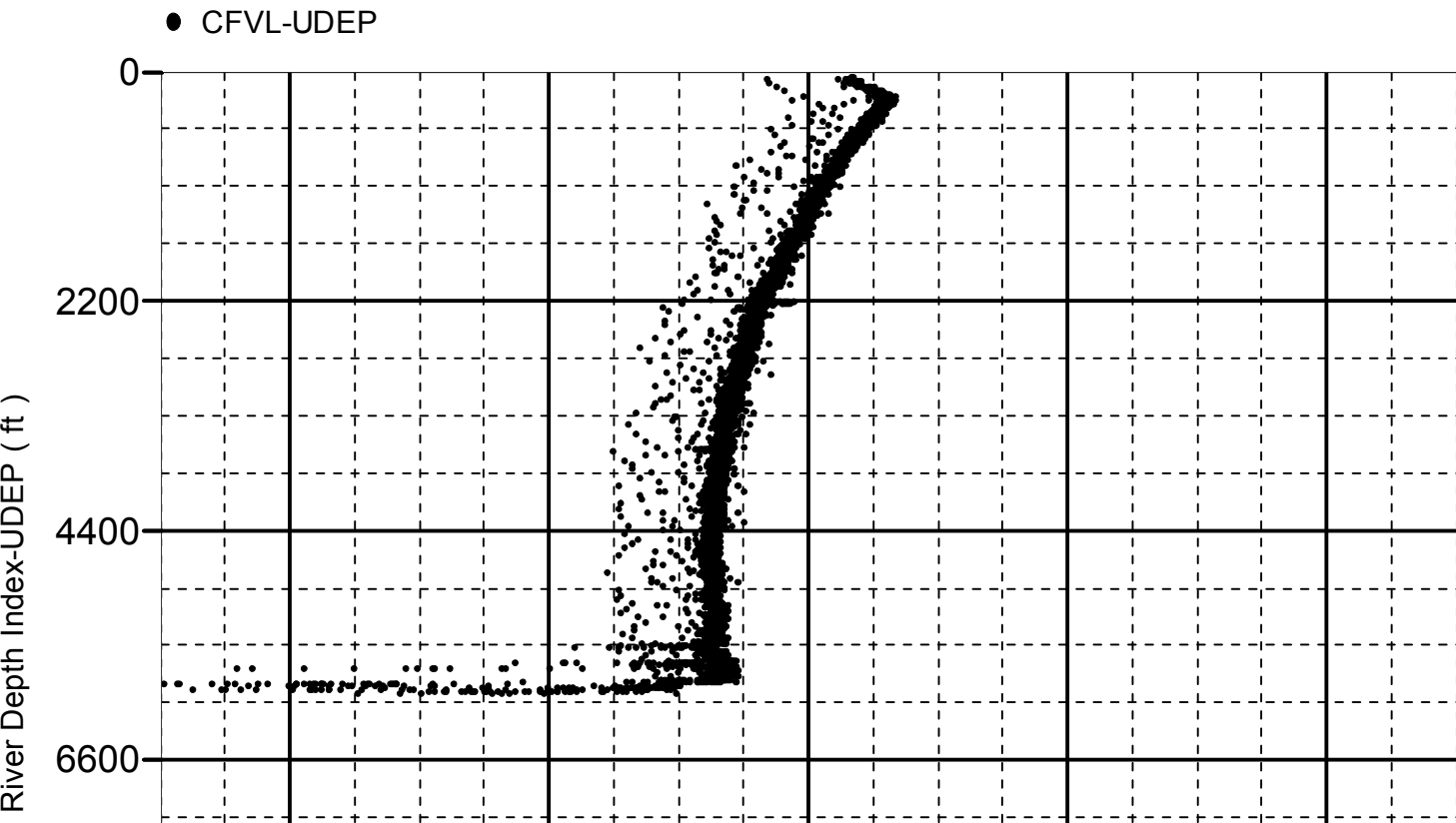
XYZ

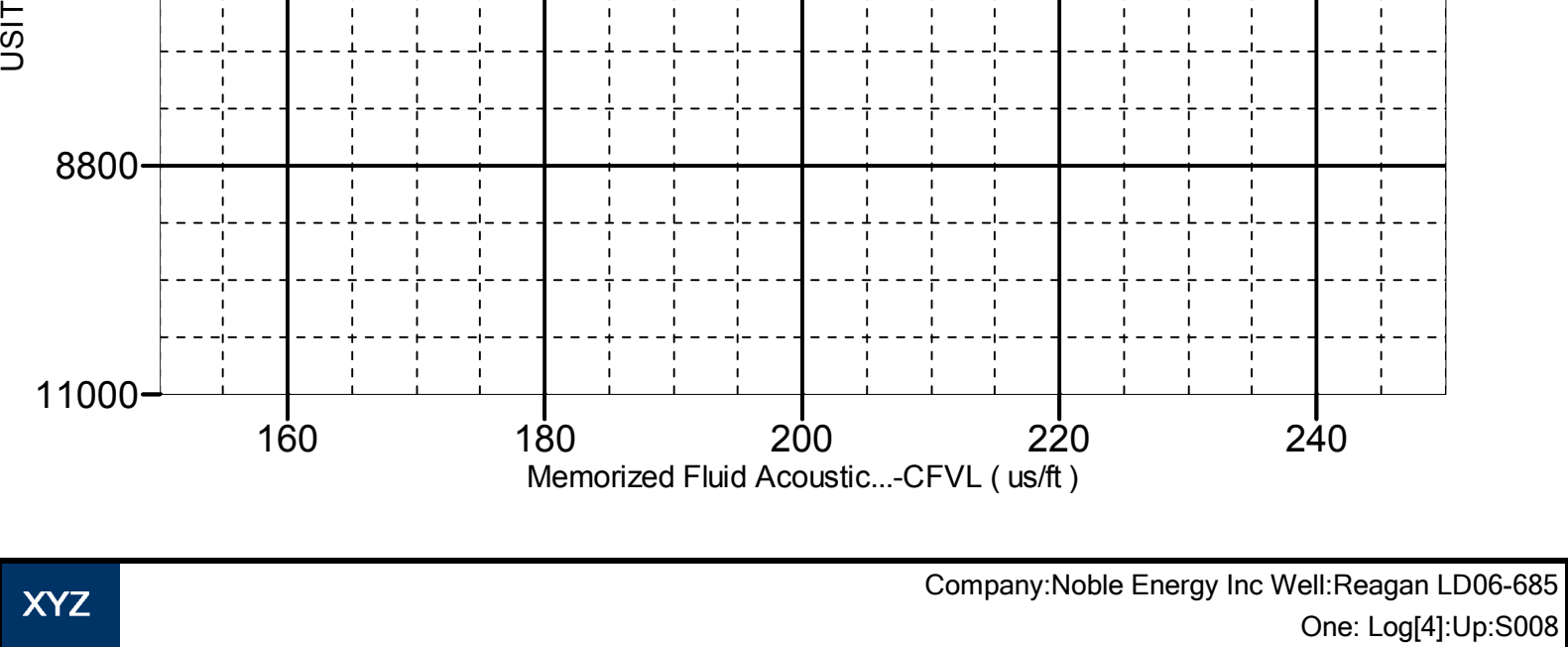
Company:Noble Energy Inc Well:Reagan LD06-685  
One: Log[4]:Up:S008

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 5966.00 to 62.00 ft

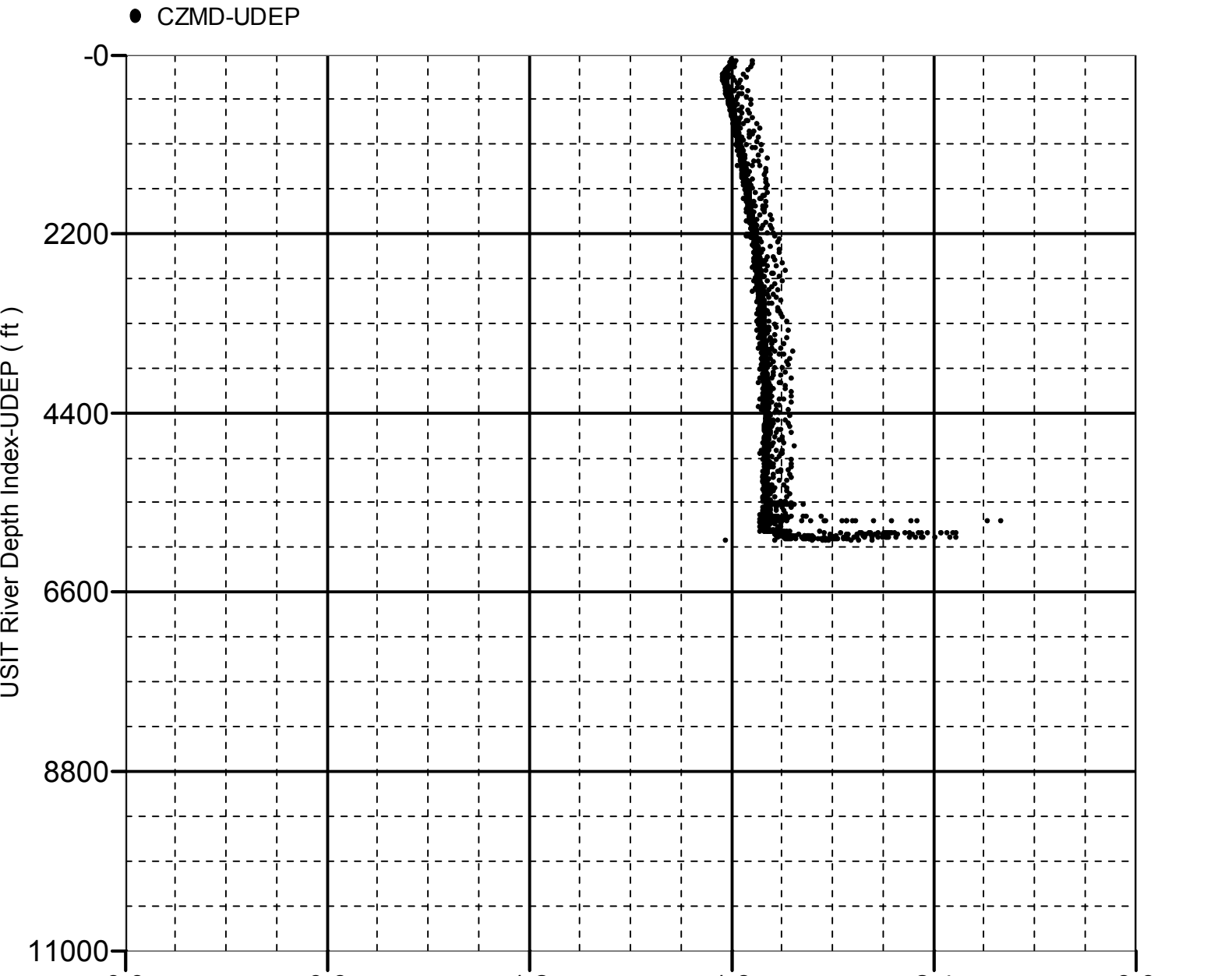




# Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 5966.00 to 62.00 ft



0.0

0.6

1.2

1.8

2.4

3.0

Acoustic Impedance of Mu...-CZMD ( Mrayl )

Company:	Noble Energy Inc	Schlumberger
Well:	Reagan LD06-685	
Field:	Wildcat	
County:	Weld	
Country:	US	

UltraSonic Summary Print