

Company: Noble Energy, Inc.

Well: Winchester Federal LC24-725

Field: Wildcat

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wildcat				
Location:	NENE Sec 24, T9N, R59W				
Well:	Winchester Federal LC24-725				
Company:	Noble Energy, Inc.				
		Location:			
		NENE Sec 24, T9N, R59W	Elev.:	K.B.	4881.00 ft
		SHL: 363' FNL X 541' FEL		G.L.	4851.00 ft
		Lat/Long: 40.74271/-103.91872		D.F.	4880.00 ft
		Permanent Datum:	Ground Level	Elev.:	4851.00 f
		Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
		Drilling Measured From:	Kelly Bushing		
		API Serial No.	Section:	Township:	Range:
		05-123-42959-0000	24	9N	59W
Logging Date	08-Dec-2016				

Run Number	One	
Depth Driller	10670.00 ft	
Schlumberger Depth	10670.00 ft	
Bottom Log Interval	6080.00 ft	
Top Log Interval	0.00 ft	
Casing Fluid Type	Water	
Salinity		
Density	9.4 lbm/gal	
Fluid Level	8.00 ft	
BIT/CASING/TUBING STRING		
Bit Size	8.50 in	
From	1912.00 ft	
To	10670.00 ft	
Casing/Tubing Size	5.5 in	
Weight	20 lbm/ft	
Grade	P110	
From	0.00 ft	
To	10655.00 ft	
Max Recorded Temperatures	209 degF	
Logger on Bottom	08-Dec-2016	09:15:00
Unit Number	2161	FtMorgan
Recorded By	A Becker	
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.

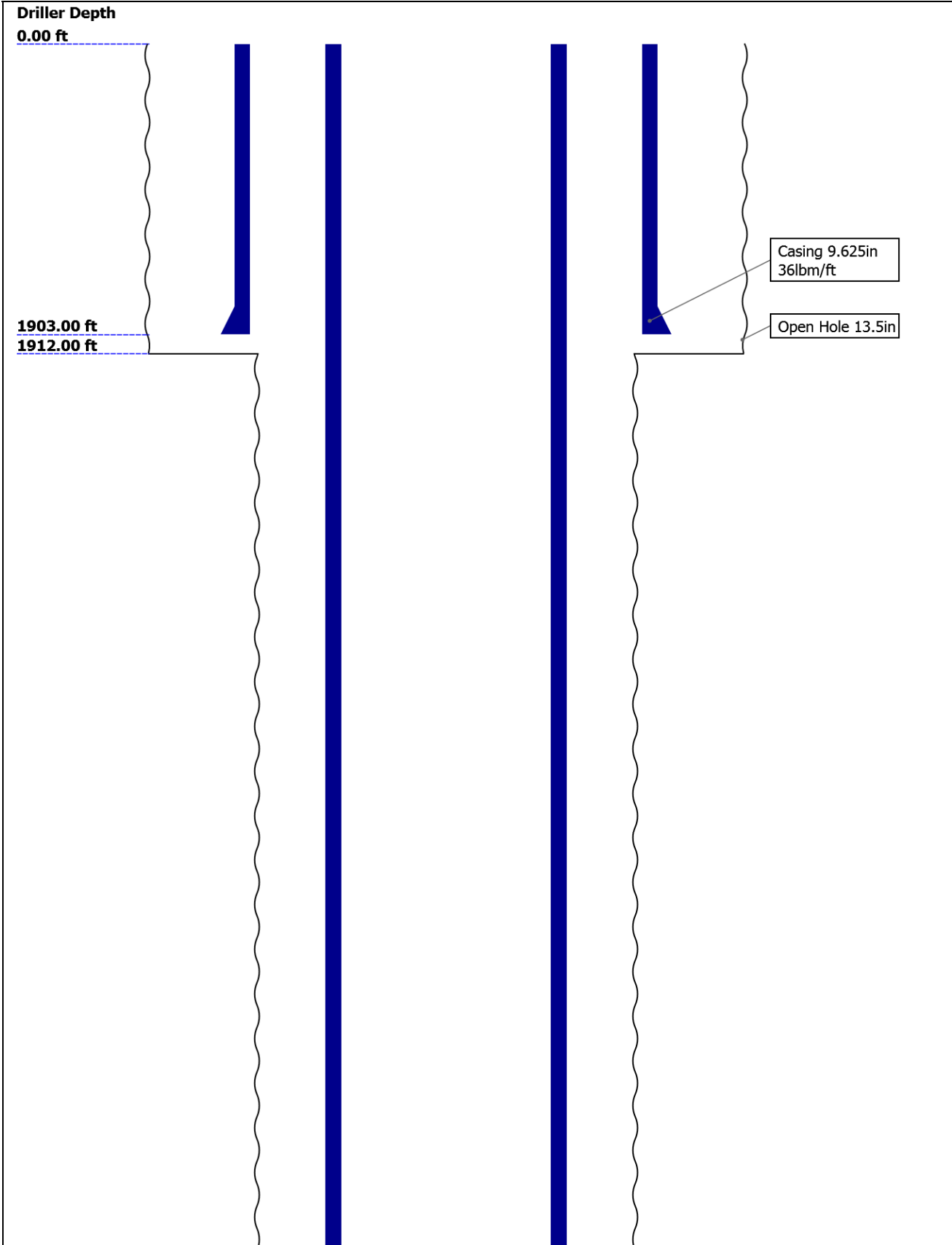
Contents

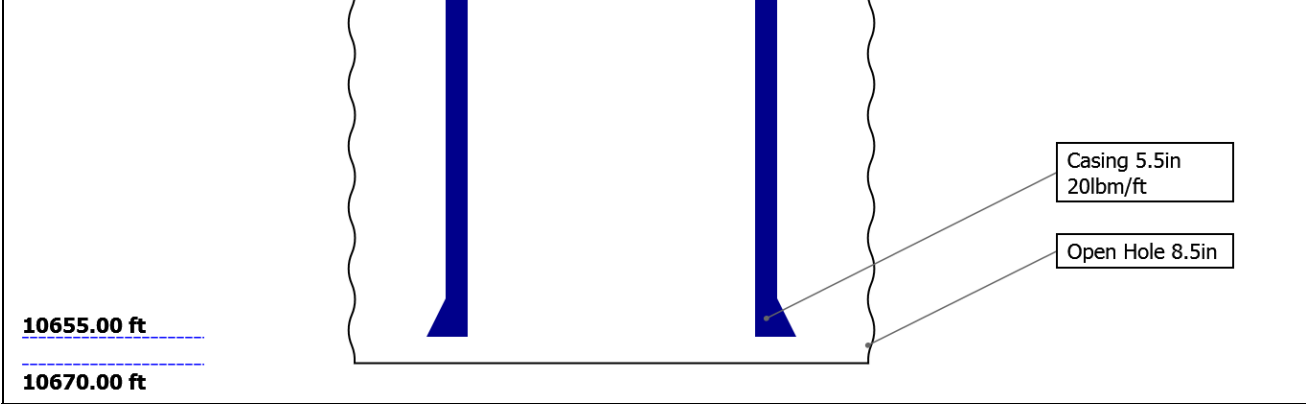
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Well Sketch






Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.5				
Top Driller (ft)	0	1912				
Top Logger (ft)	0	1912				
Bottom Driller (ft)	1912	10670				
Bottom Logger (ft)	1912	10670				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	36	20				
Inner Diameter (in)	8.921	4.778				
Grade	N/A	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	1903	10655				
Bottom Logger (ft)	1903	10655				

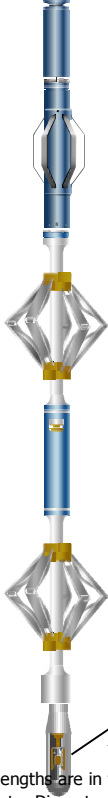
Remarks and Equipment Summary

One: Toolstring			One: Remarks	
<div><div><div>Equip nameLength</div><div>LEH-QT33.83</div><div>LEH-QT</div></div><div><div>SAH-F:9930.91</div><div>2</div></div><div><div>EDTC-B:926.06</div><div>100</div><div>EDTH-B:9339</div><div>EDTG-A</div><div>EDTC-B:9100</div></div><div><div>AH-184[2]:196219.56</div></div><div><div>AH-184[2]:196217.56</div></div></div> <div></div> <div><div>CTEM22.56</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamma20.69</div><div>Ray</div><div>TelStatu19.56</div><div>s</div></div>	Toolstring run as per tool sketch			
	Main pass recorded under 2500 psi, repeat under 0 psi			
	Main pass recorded with 10 deg, 6 in resolution			
	Crew: Fernando Nava & Kris Davis			
	Thank you for choosing Schlumberger			

1J:2749

USIT-E:92 15.56

1
ECH-MFA:
1908
USAC-A:9
21
USIS-A:27
75
USSC-B:98
5
USRS-A:93
2
USI-SENS
OR



Lengths are in ft

Maximum Outer Diameter = 4.800 in

Line: Sensor Location, Value: Gating Offset

All measurements are relative to TOOL_ZERO

Depth Summary

One

Depth Measuring Device

Type IDW-JA
Serial Number 5836
Calibration Date 17-Sep-2016
Calibrator Serial Number
Calibration Cable Type 7-39P-LXS
Wheel Correction 1 1
Wheel Correction 2 -2

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 13000.00 ft
Conveyance Type Wireline
Rig Type

One:Depth Control Parameters

Log Sequence First Log In the Well
Rig Up Length At Surface
Rig Up Length At Bottom

Depth Control Remarks

First run in well depth control procedures followed
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[4]:Up	6115.78	4769.76

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 : 48.83m(160.22ft) to 55.50m(182.09ft)
MUD_N_FRP = 1.05
DFD = 1.13g/cm3(9.40lbm/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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Composite 1

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

Composite Summary

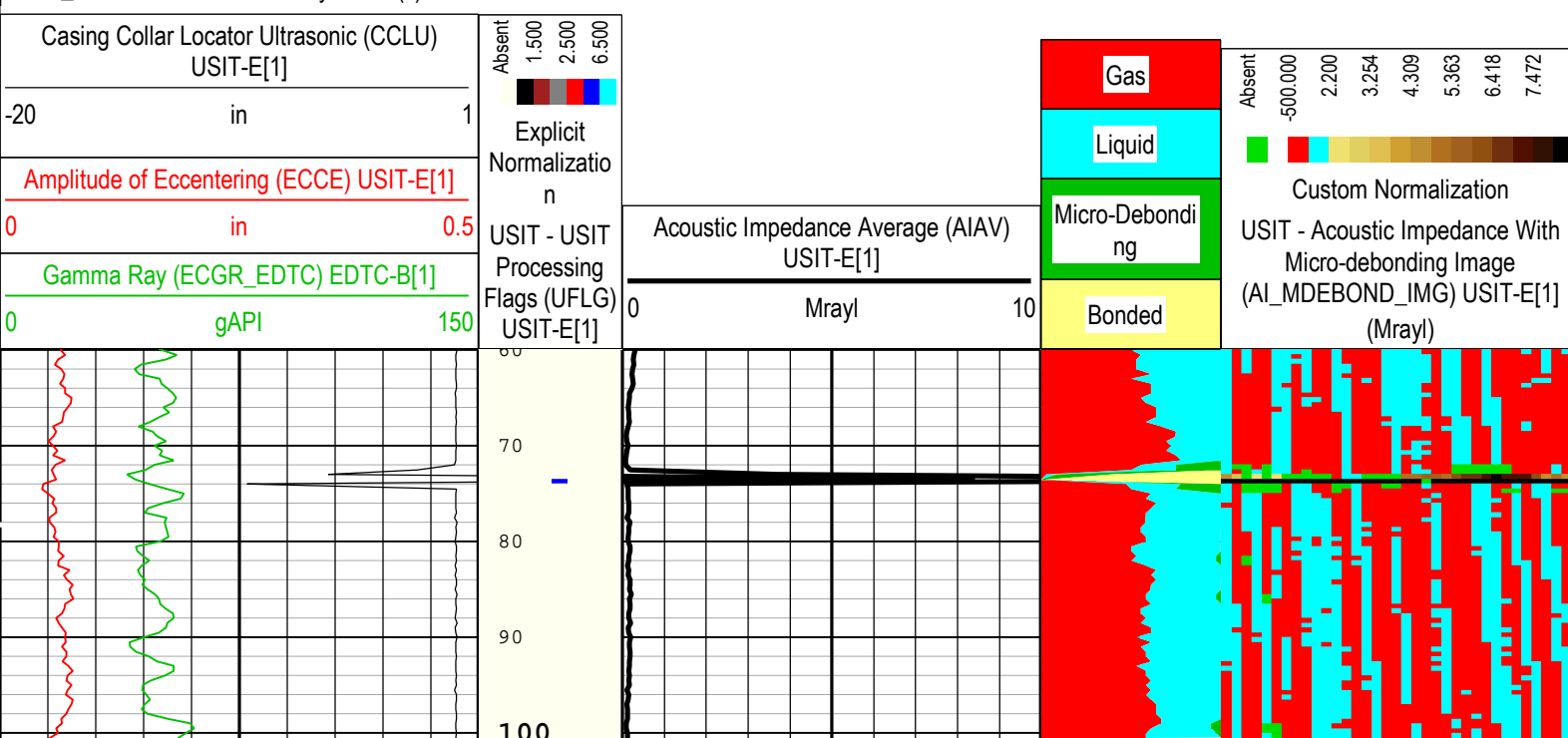
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	4769.76 ft	6115.78 ft	08-Dec-2016 9:25:08 AM	08-Dec-2016 9:48:35 AM	OFF	5.50 ft	Yes
One	Log[5]:Up	Up	53.94 ft	4821.77 ft	08-Dec-2016 9:50:37 AM	08-Dec-2016 10:16:34 AM	OFF	5.73 ft	Yes

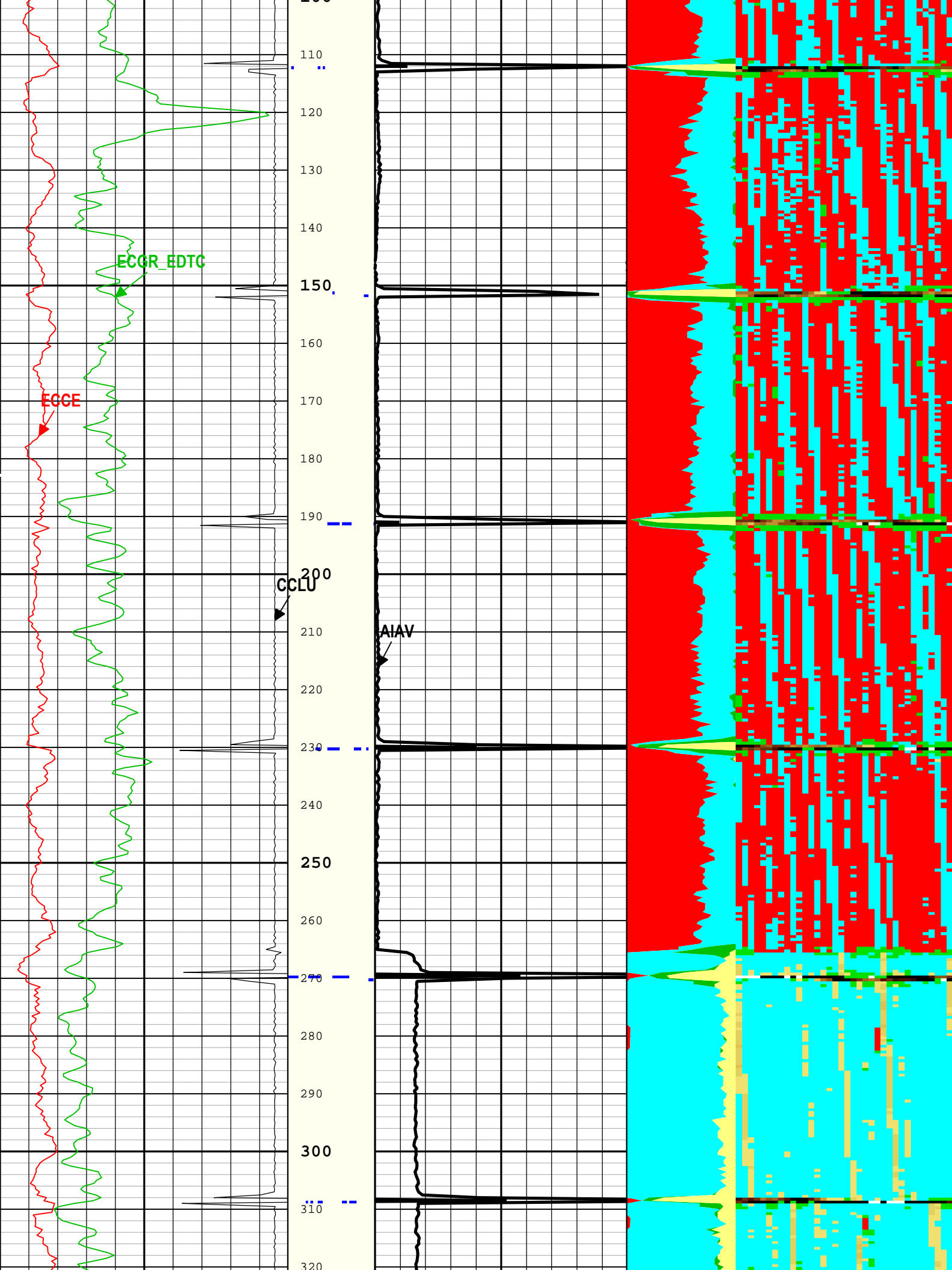
All depths are referenced to toolstring zero

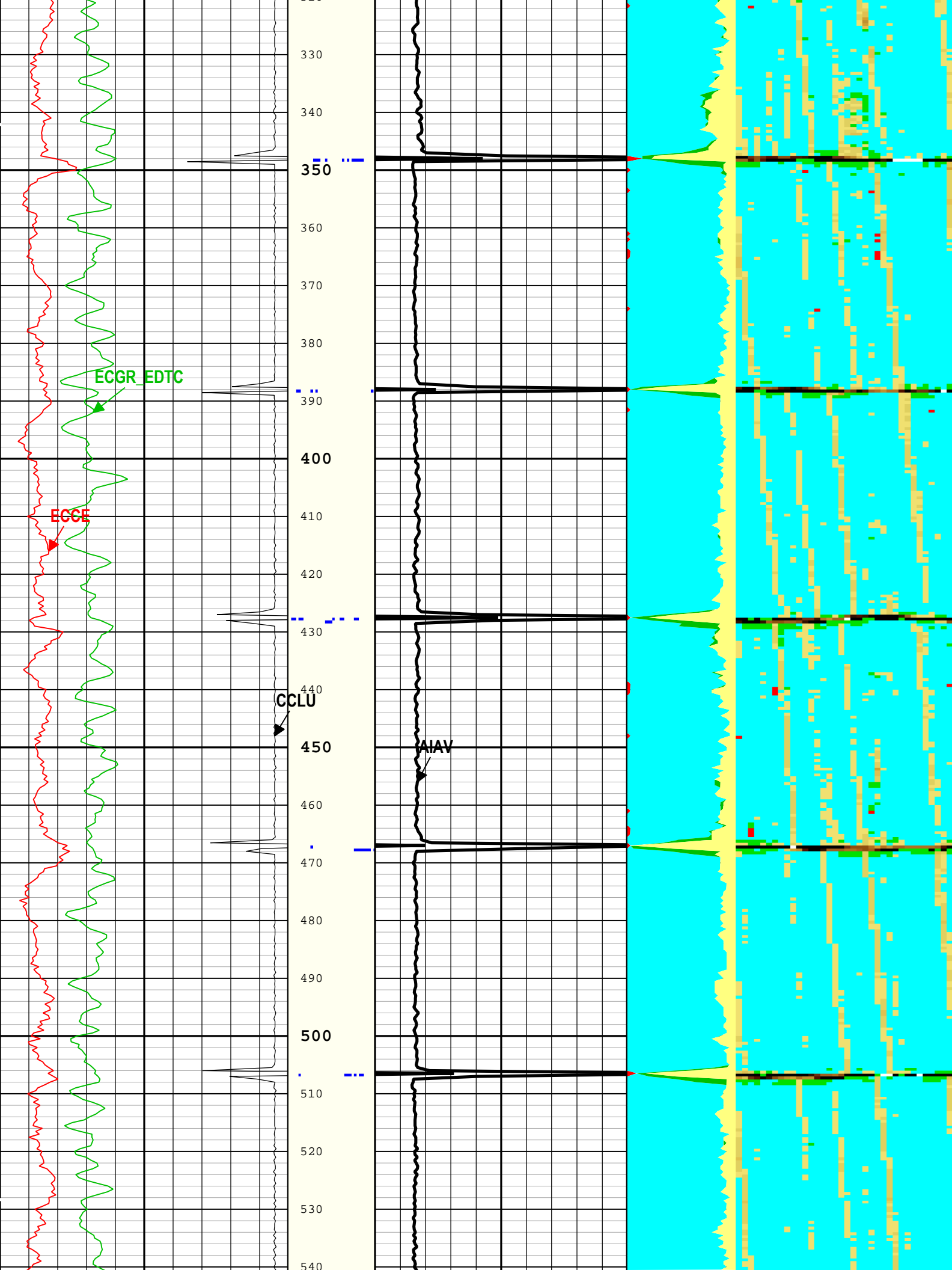
Log	Company:Noble Energy, Inc.	Well:Winchester Federal LC24-725
		Composite 1:S006

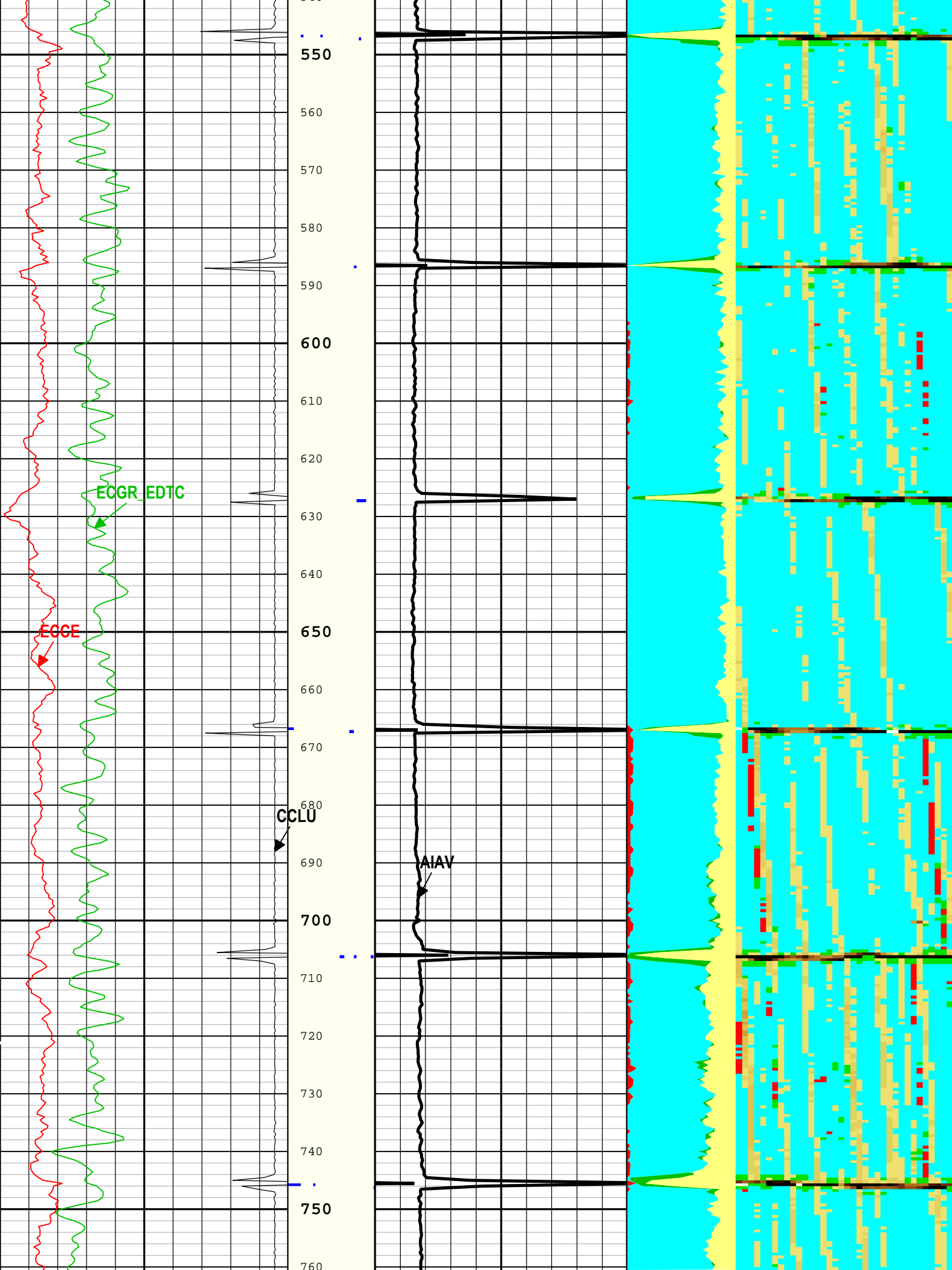
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Creation Date: 08-Dec-2016 10:28:15

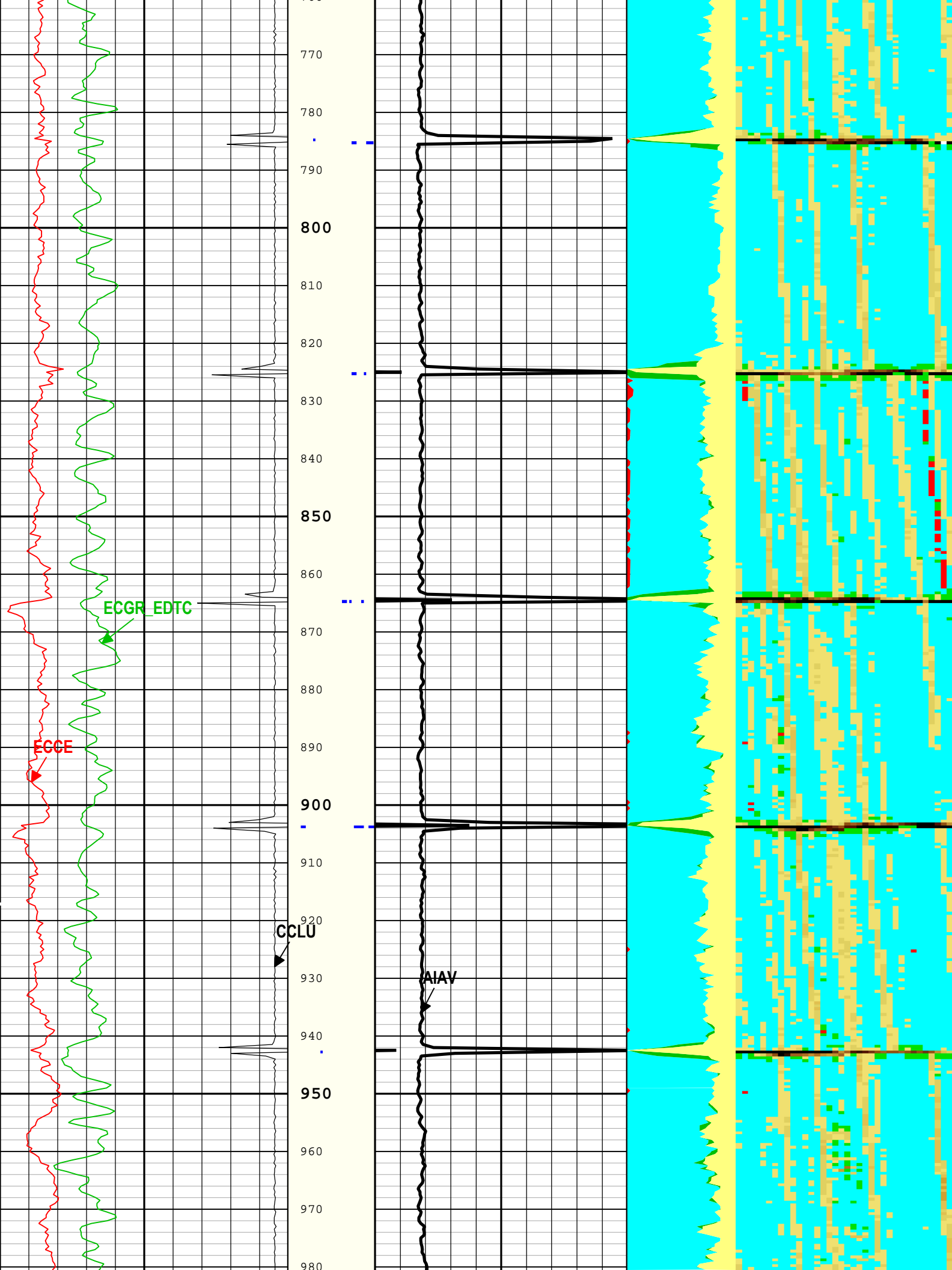
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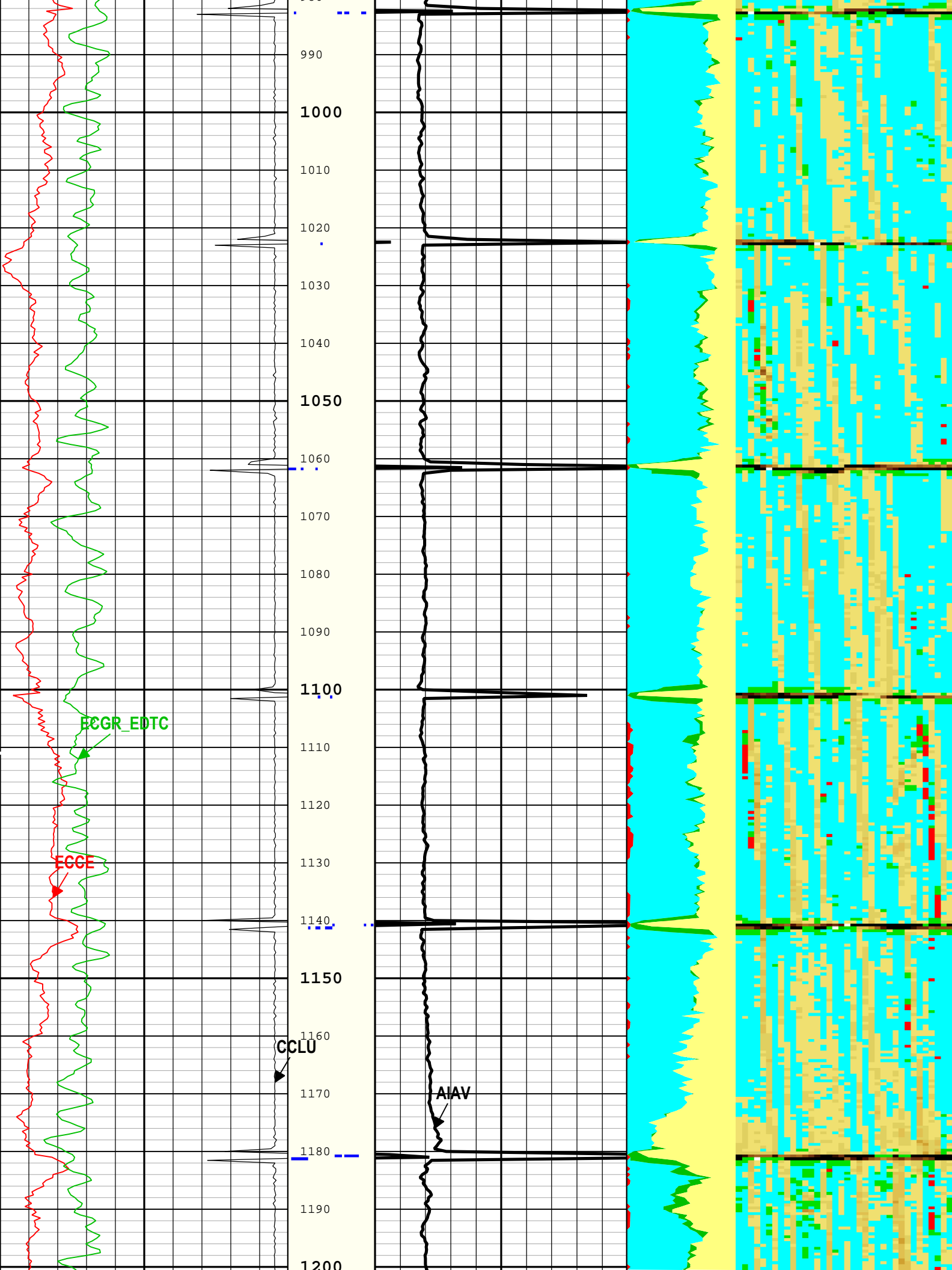


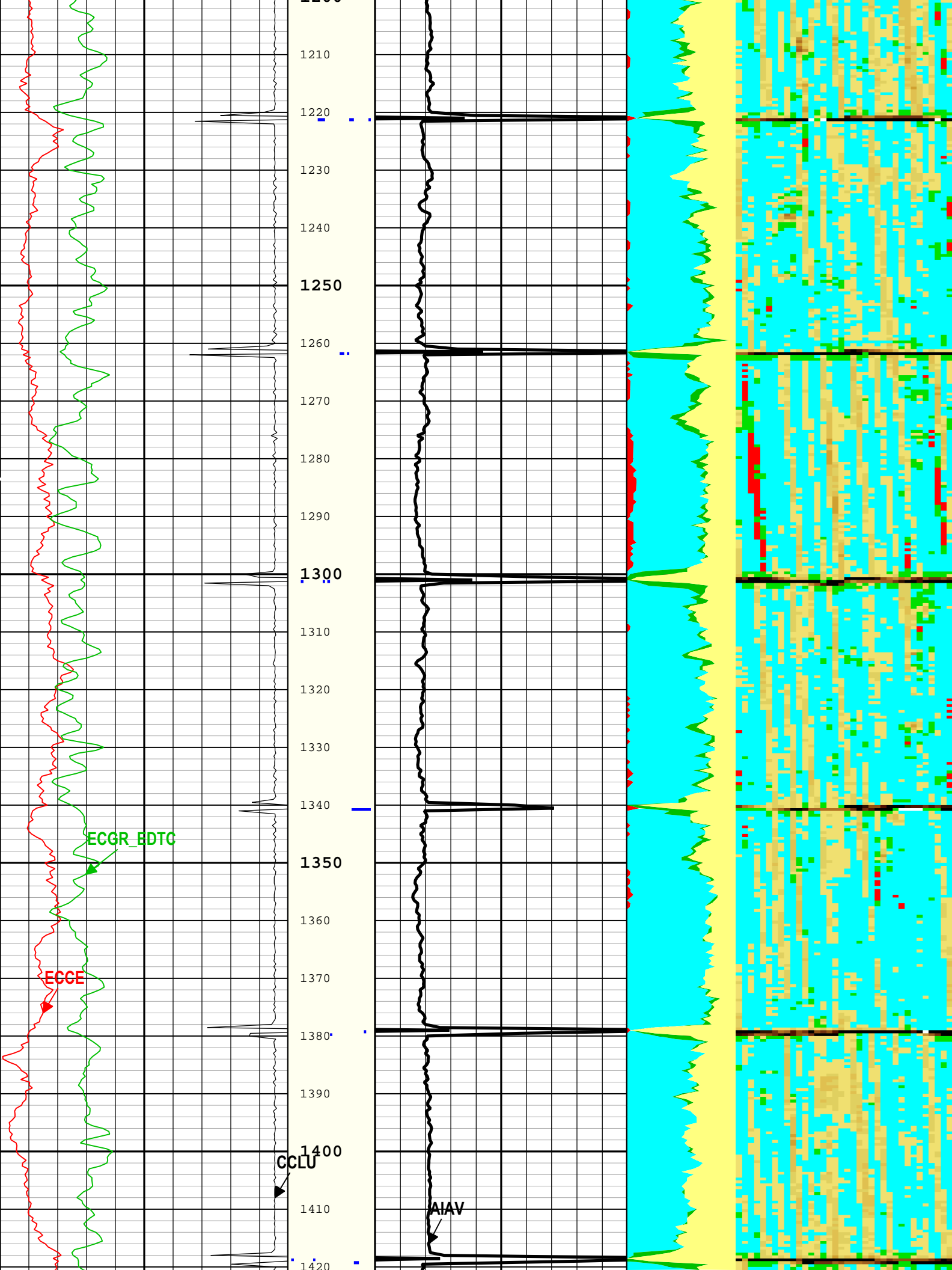


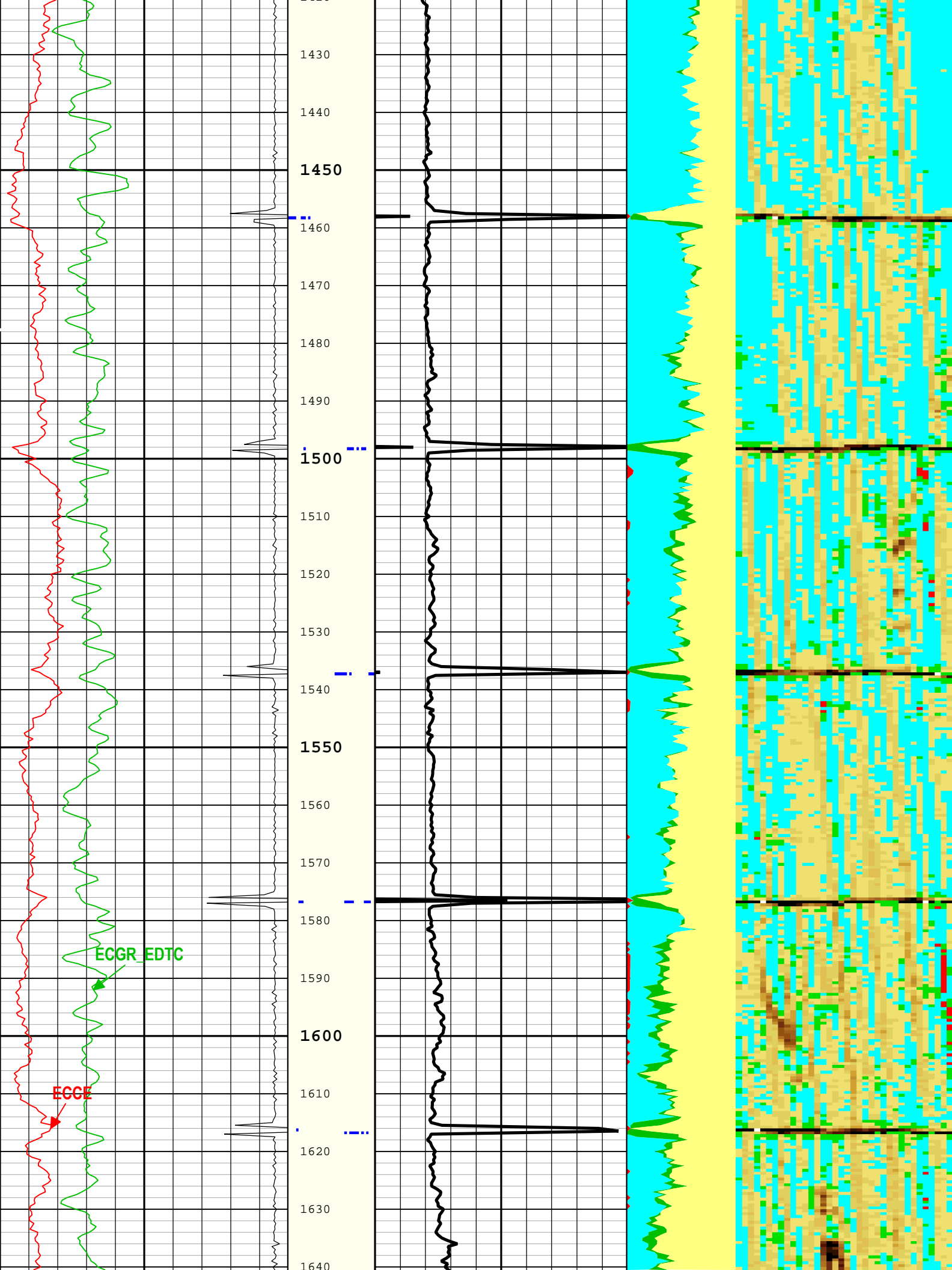


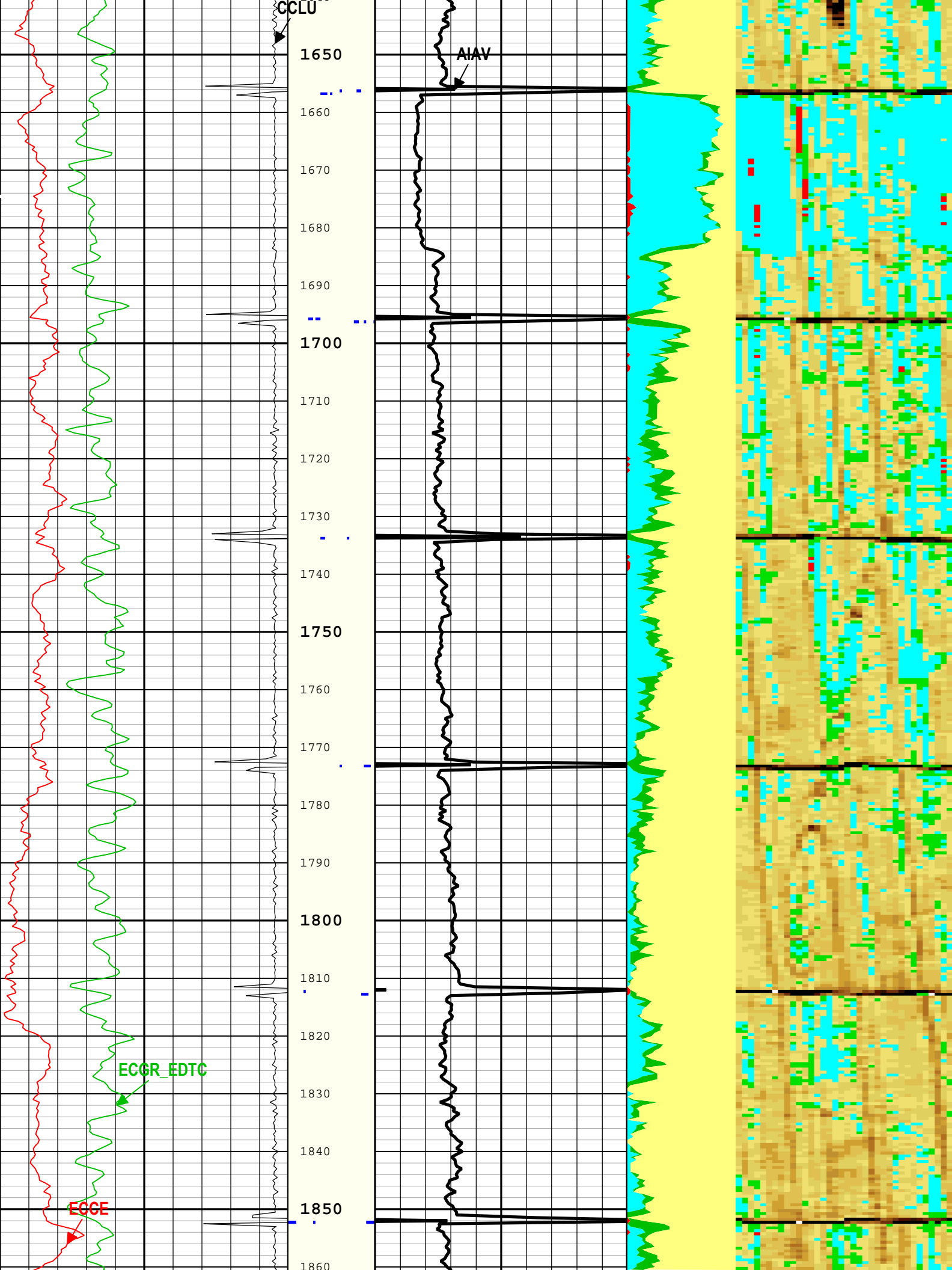


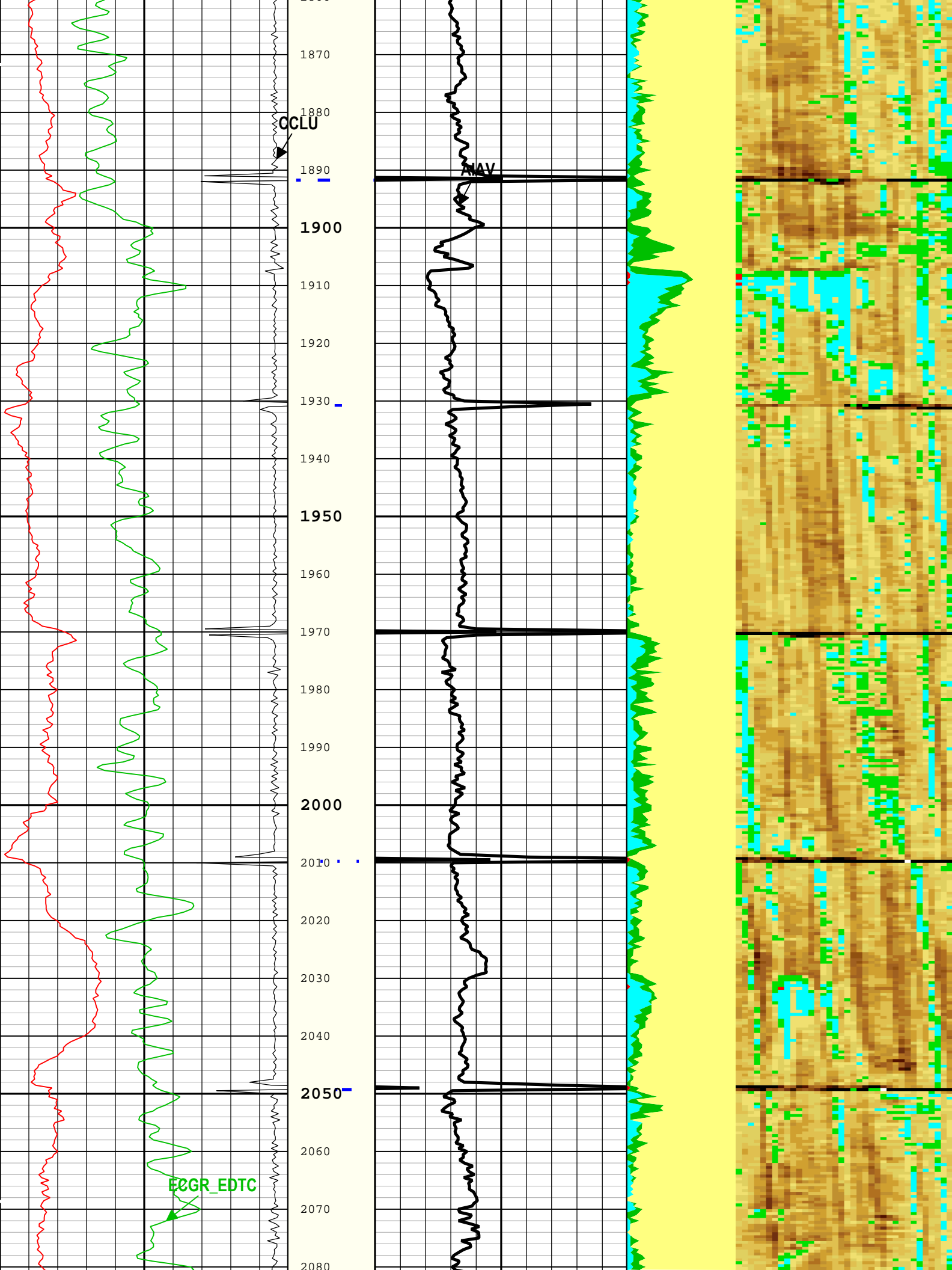


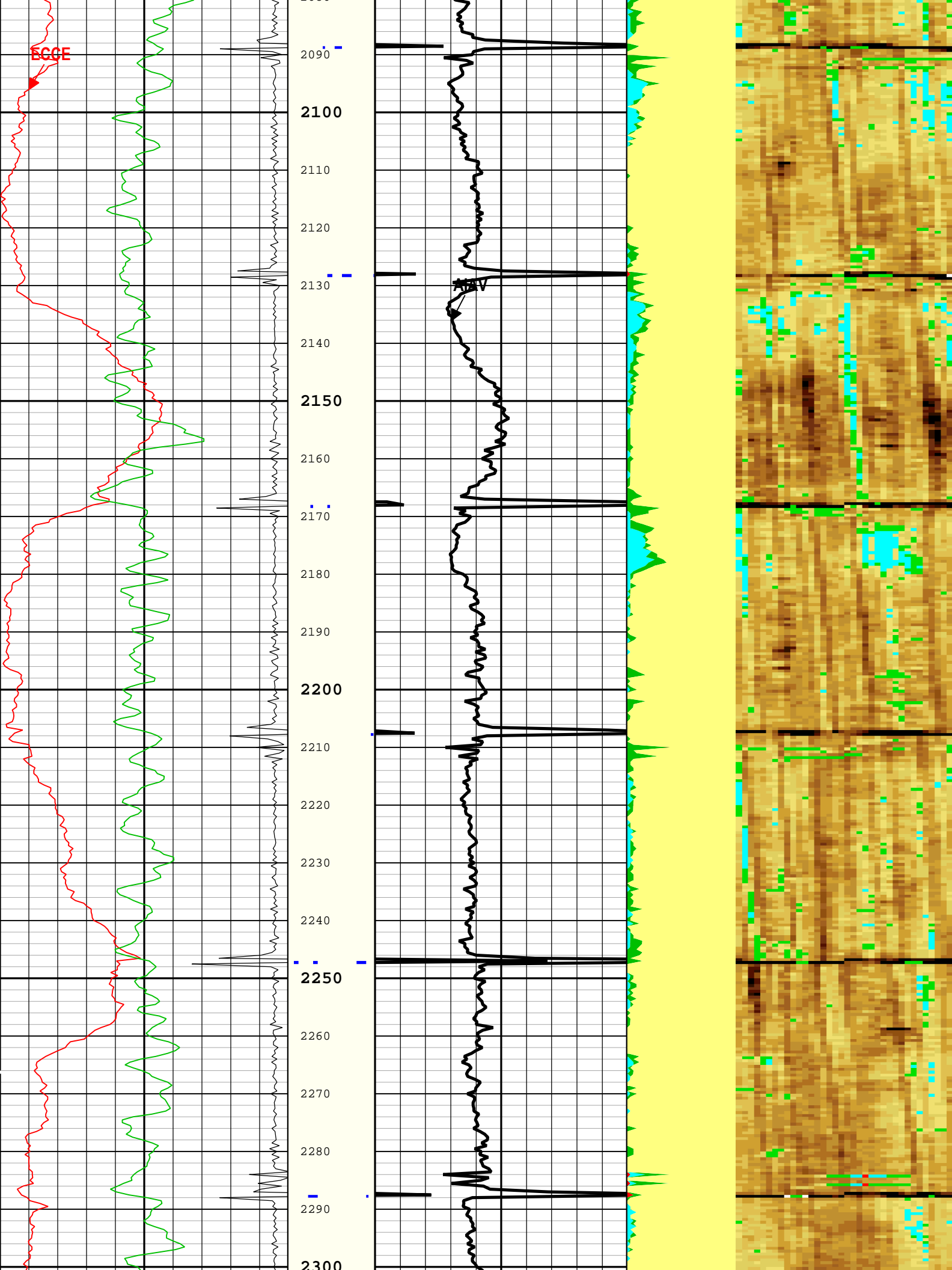


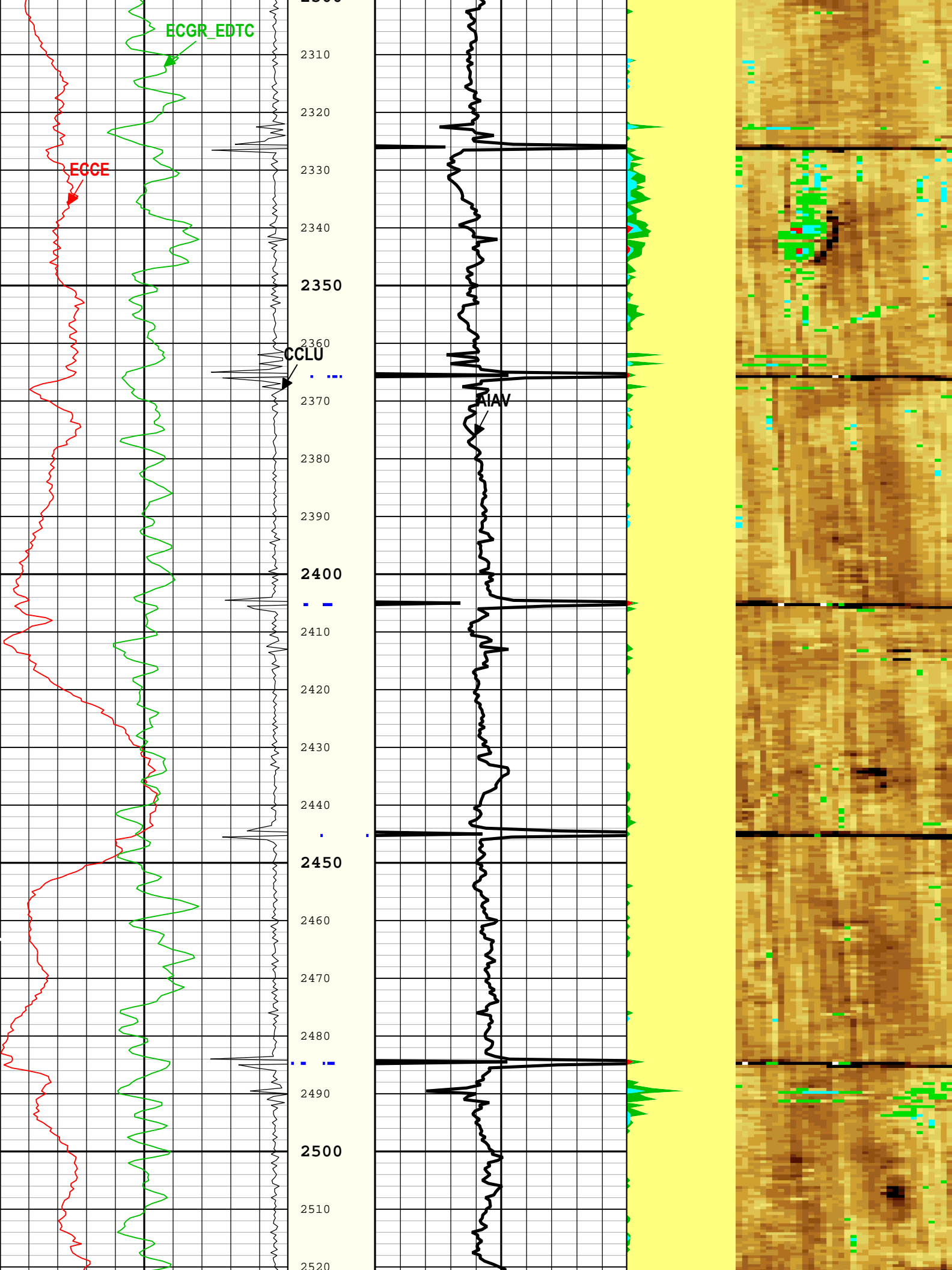


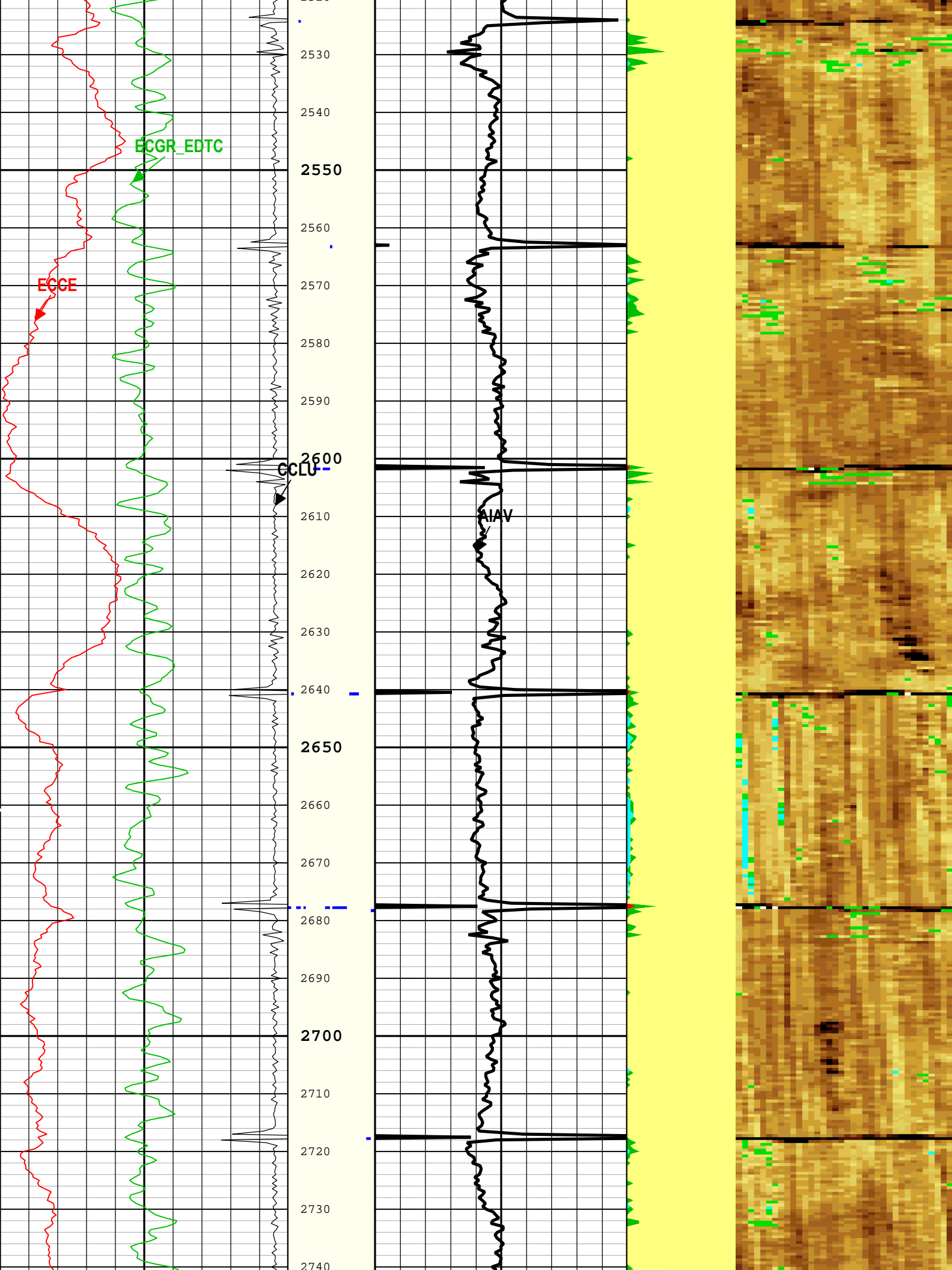


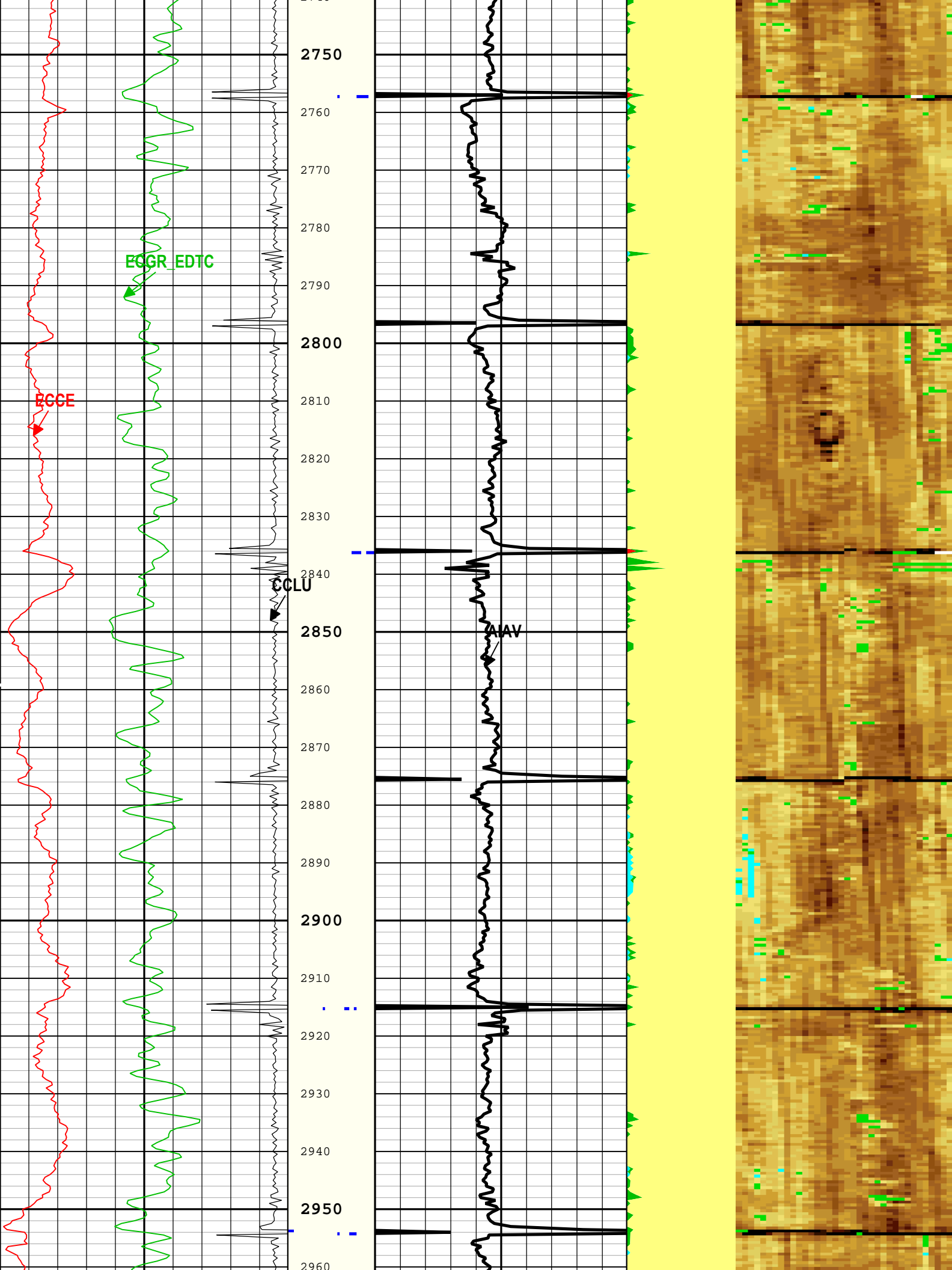


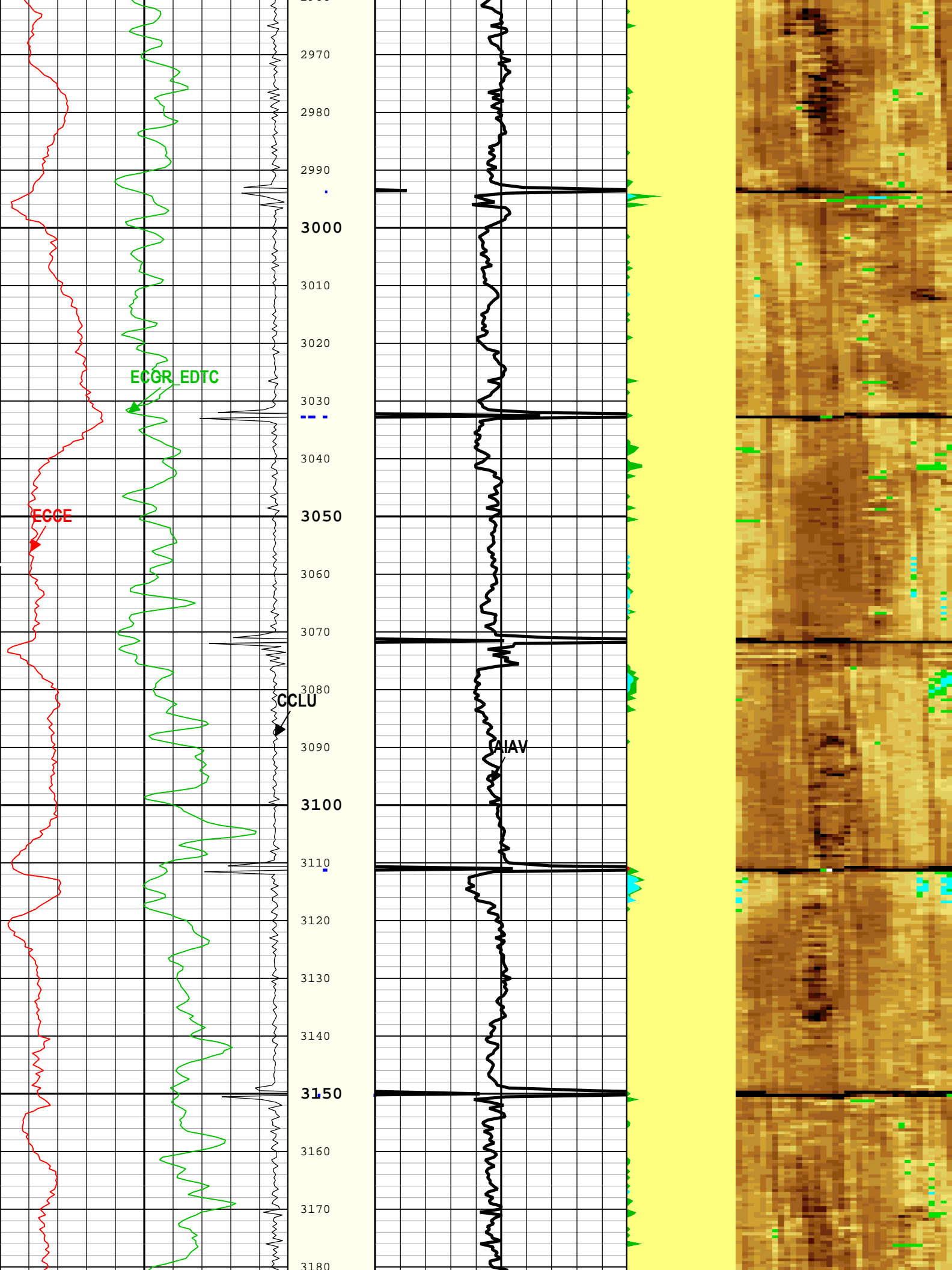


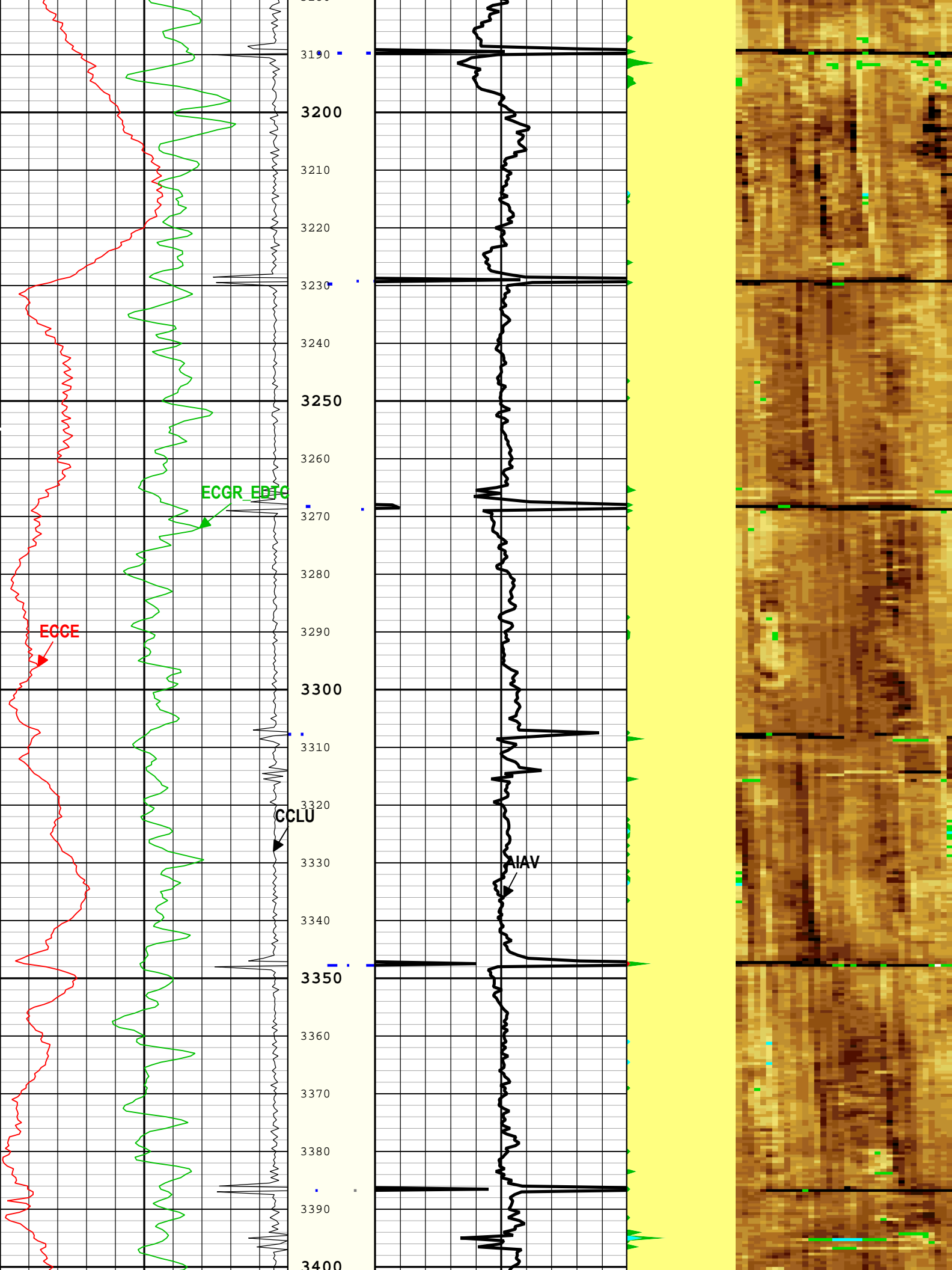


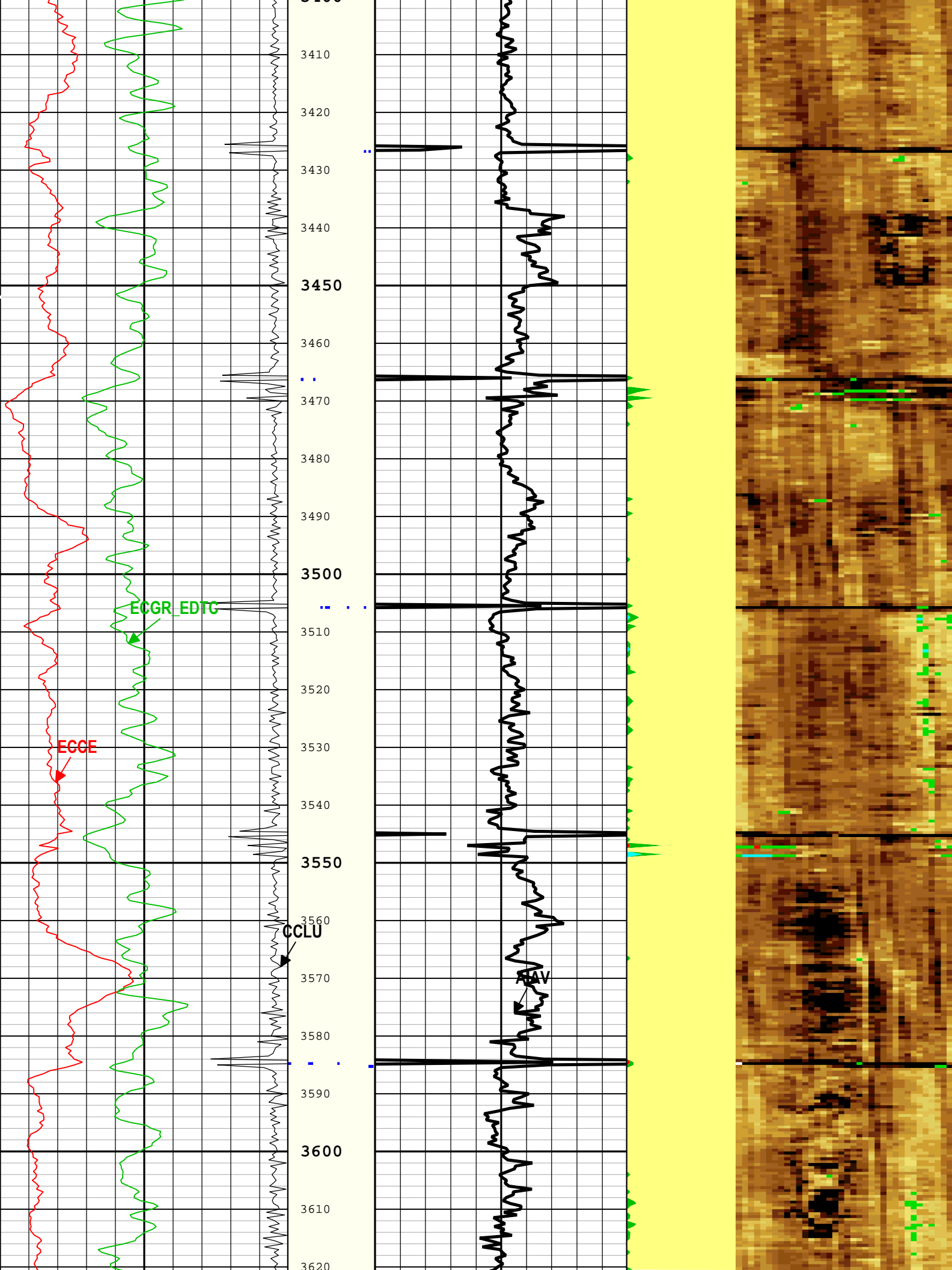


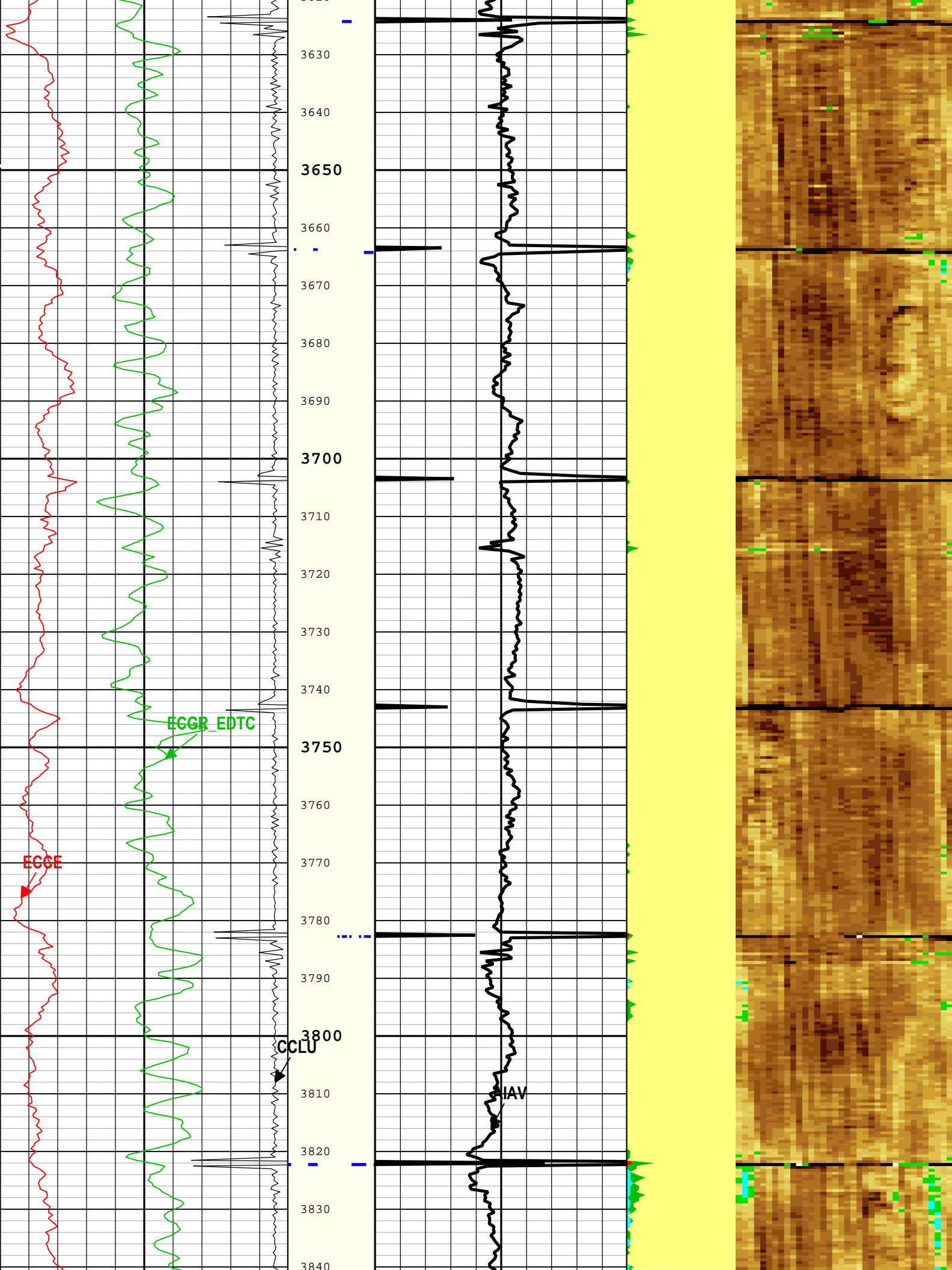


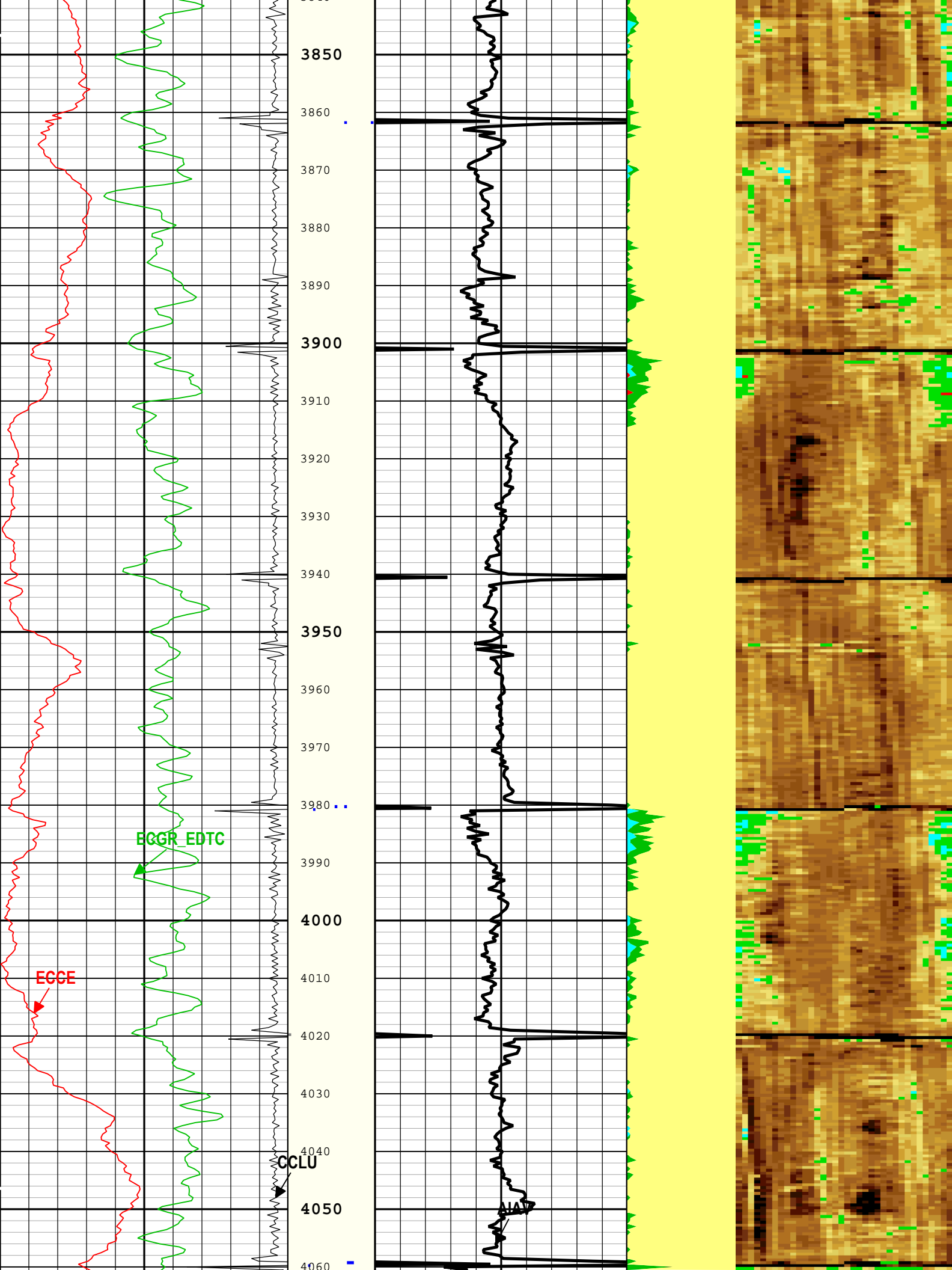


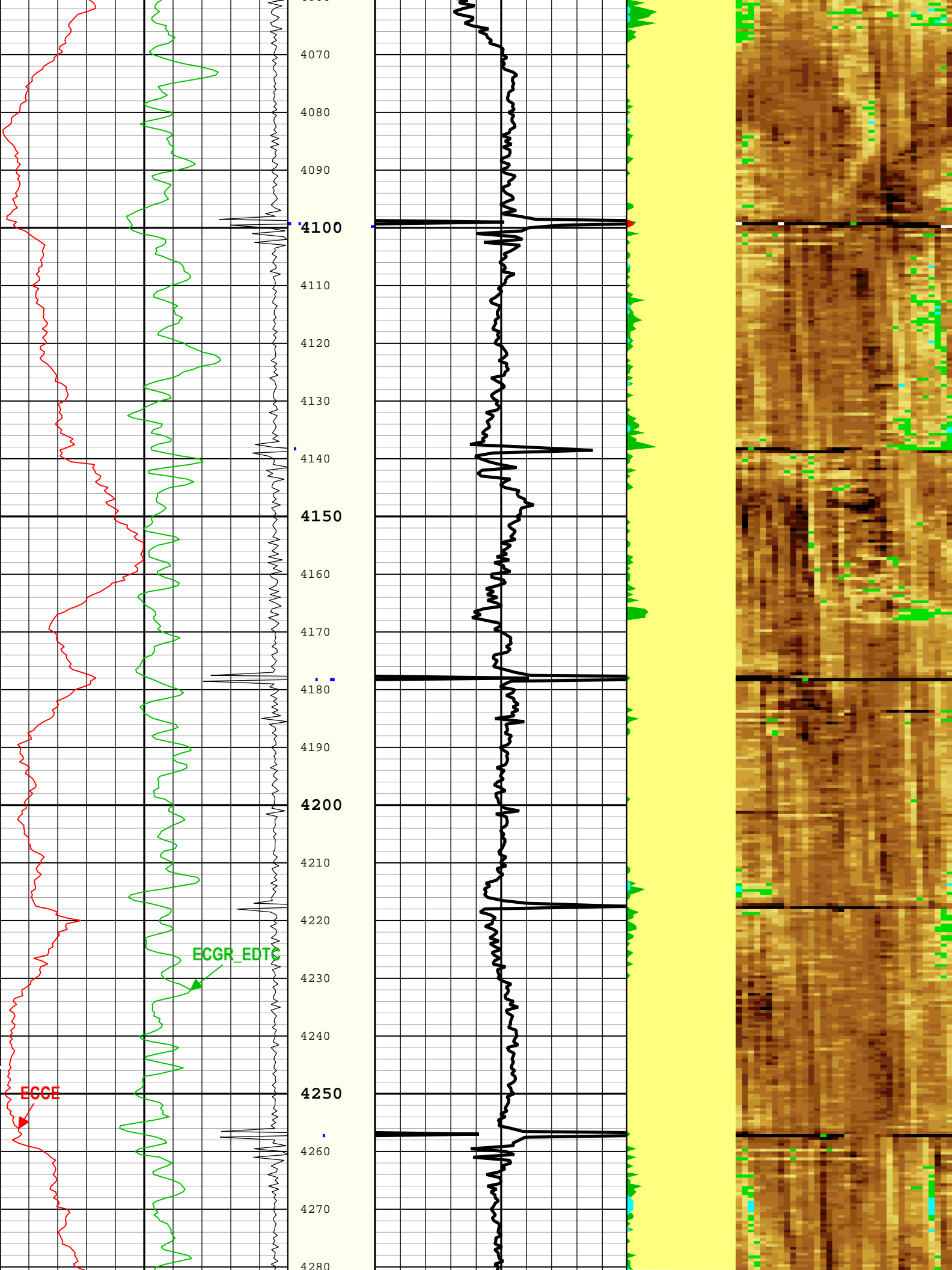


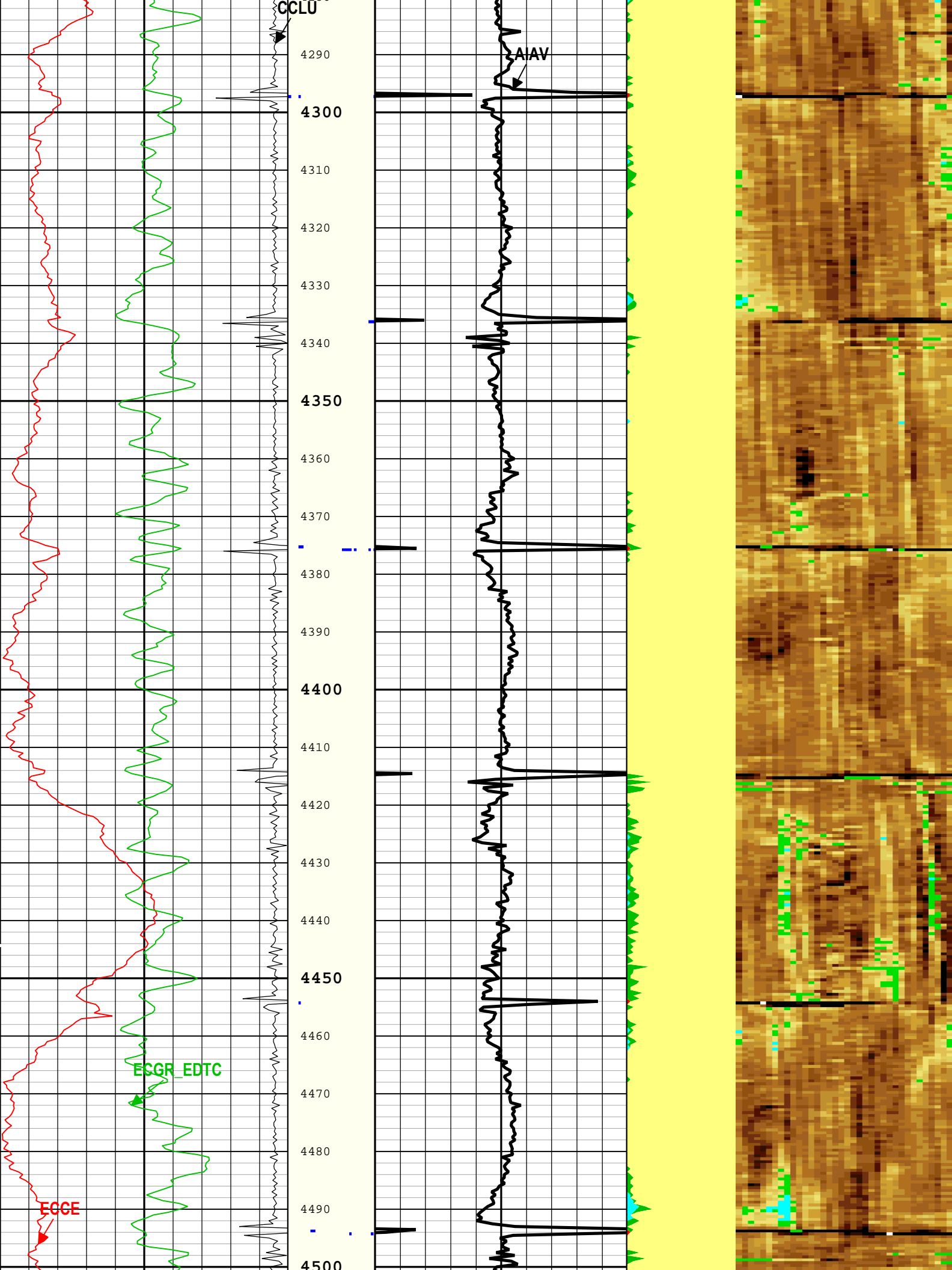


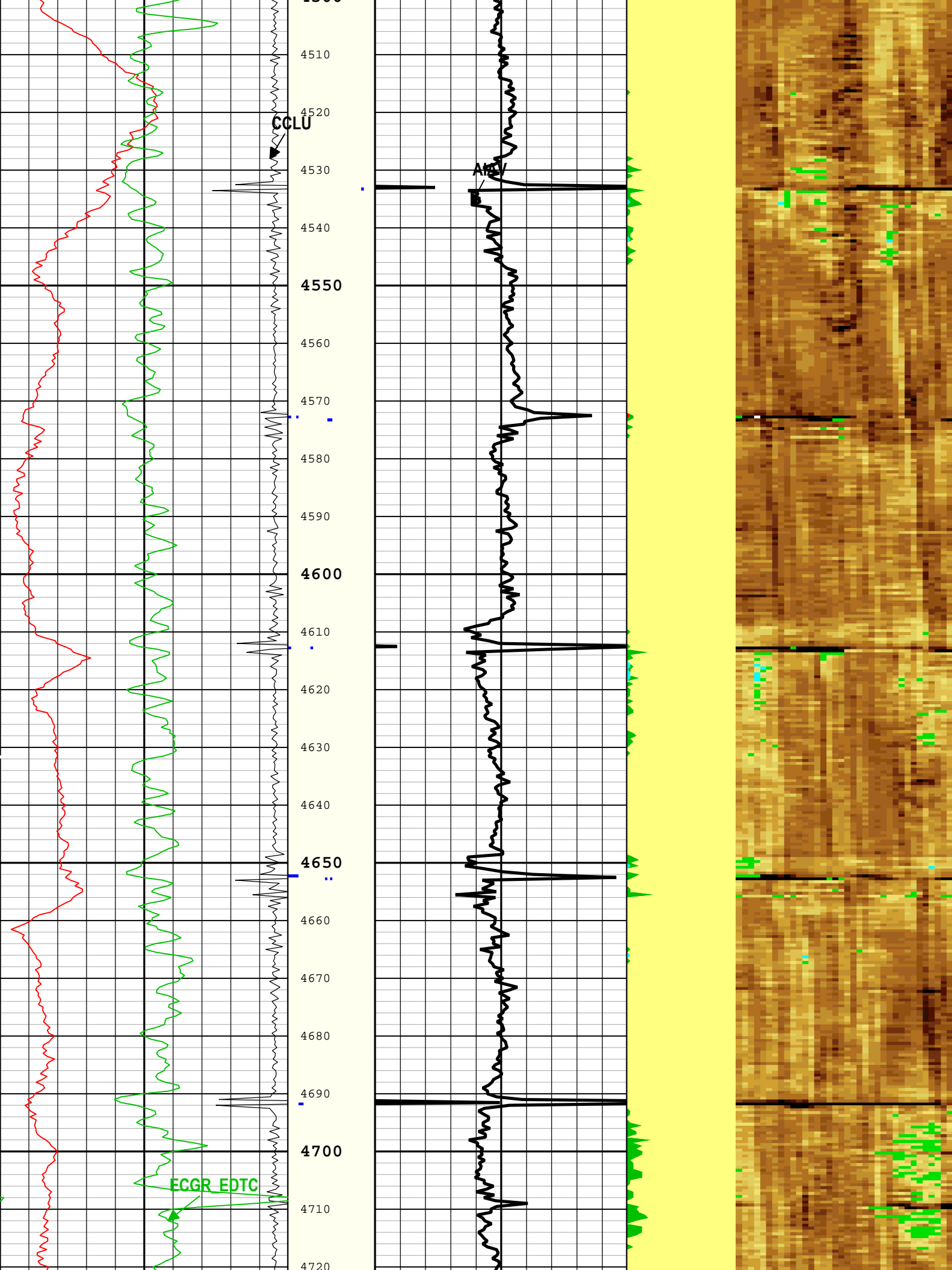


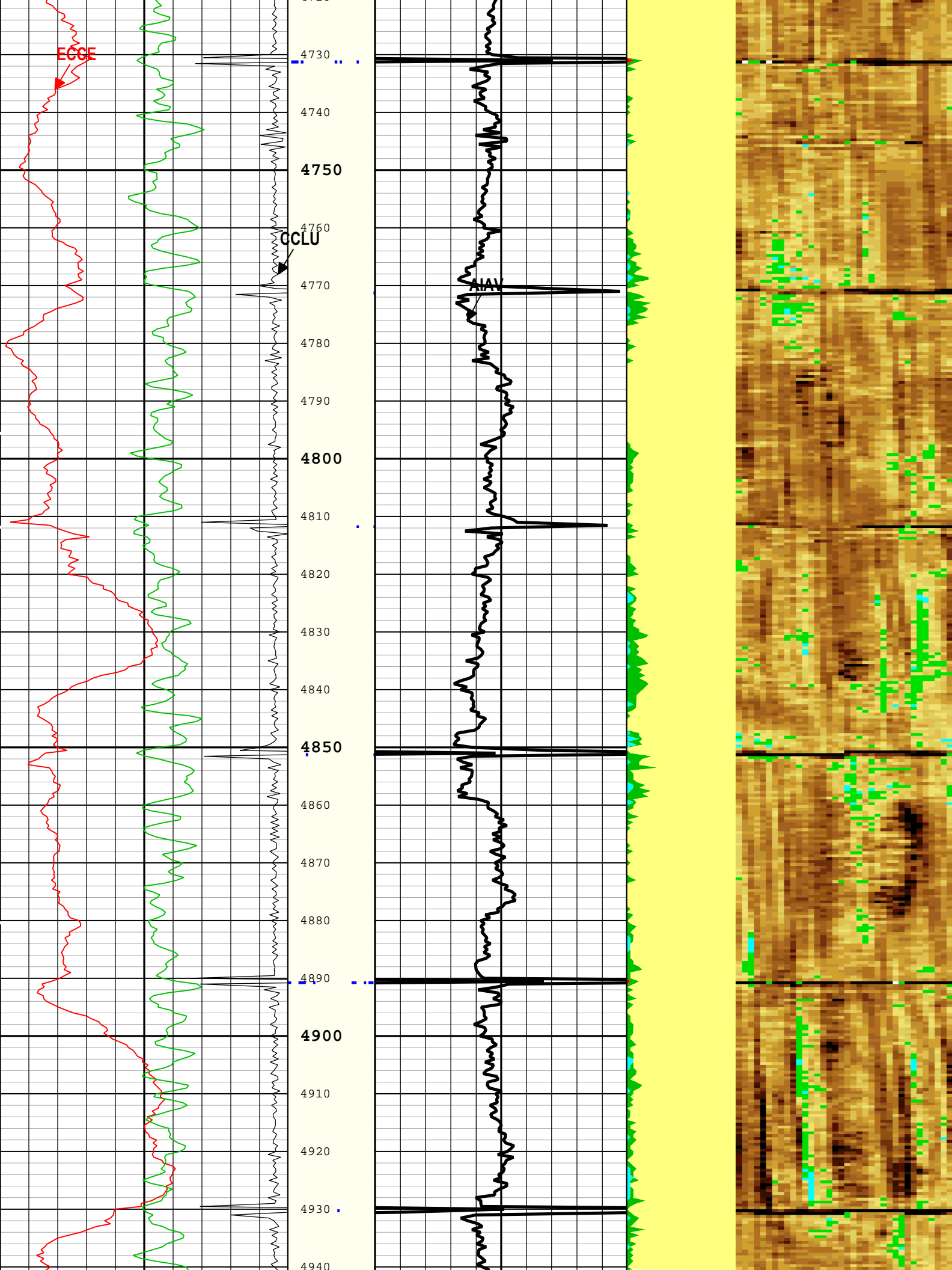


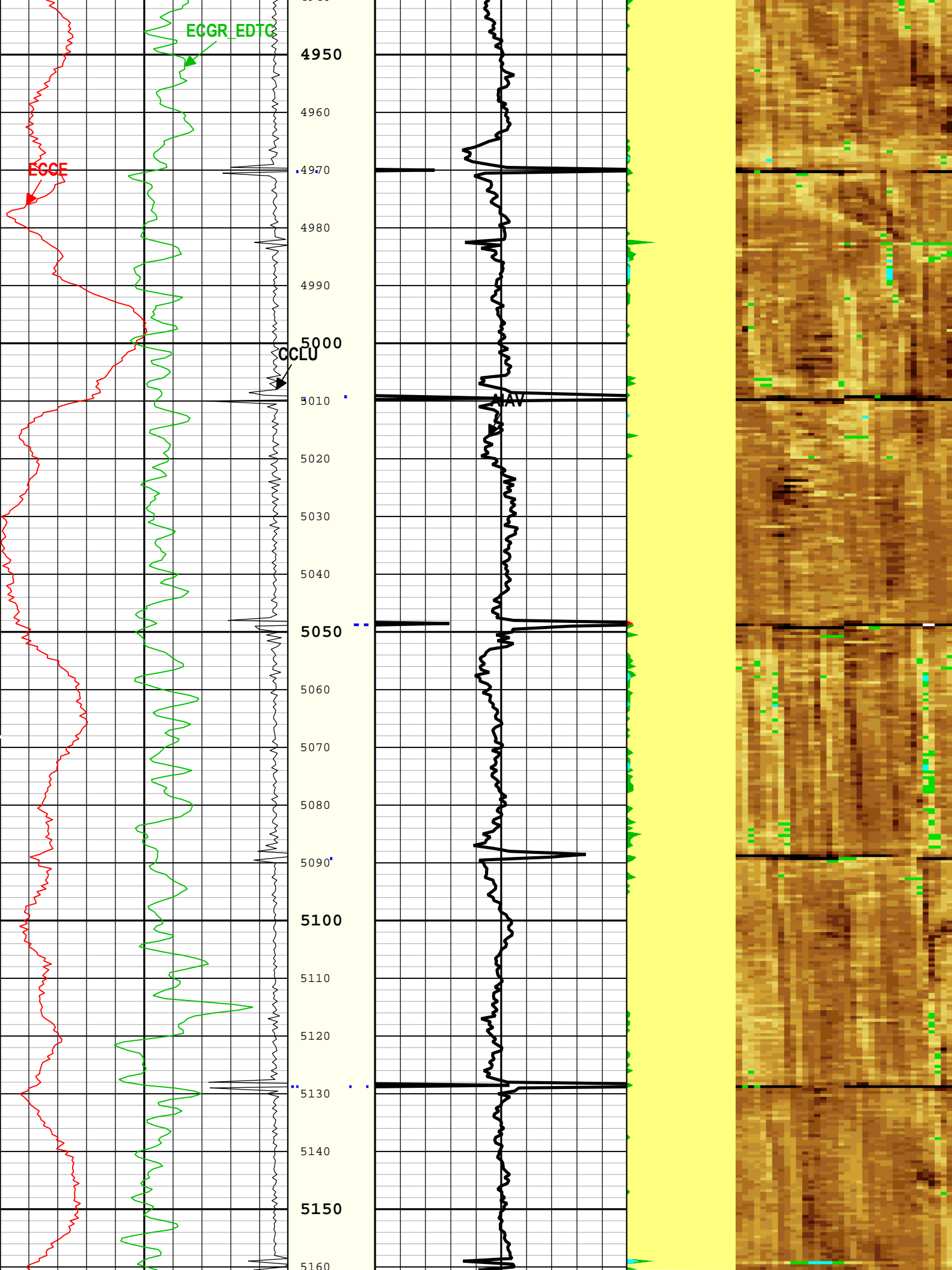


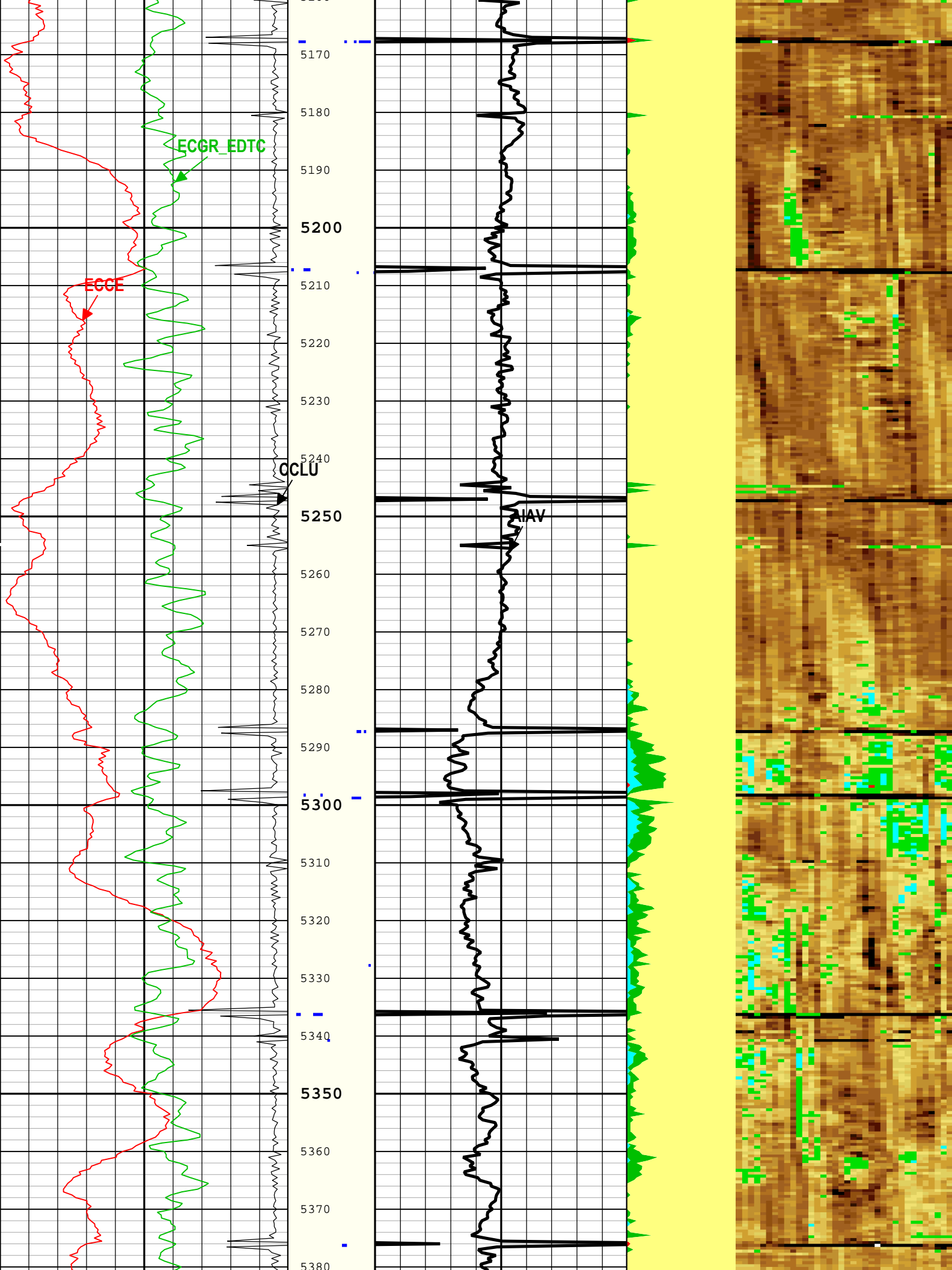


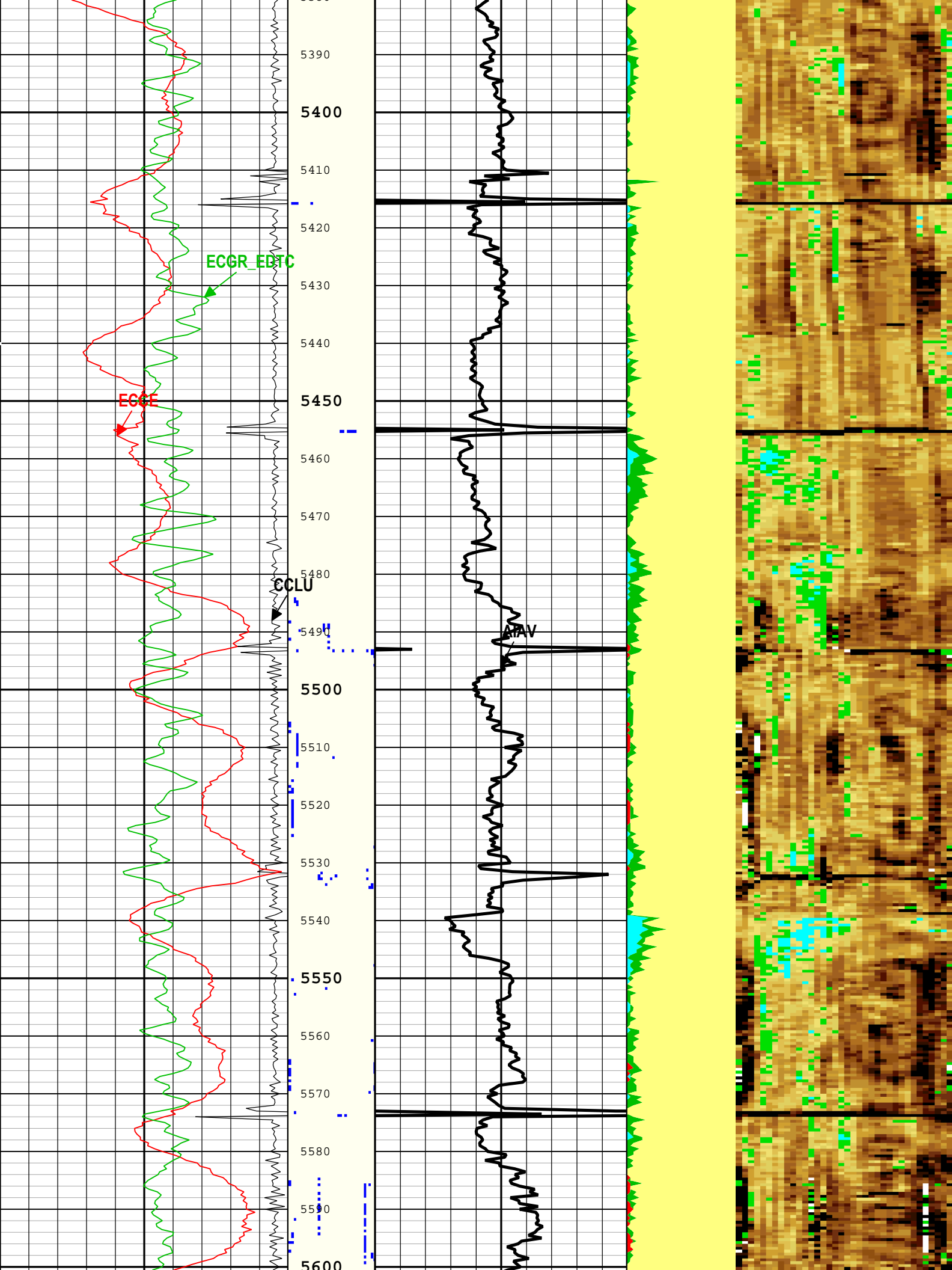


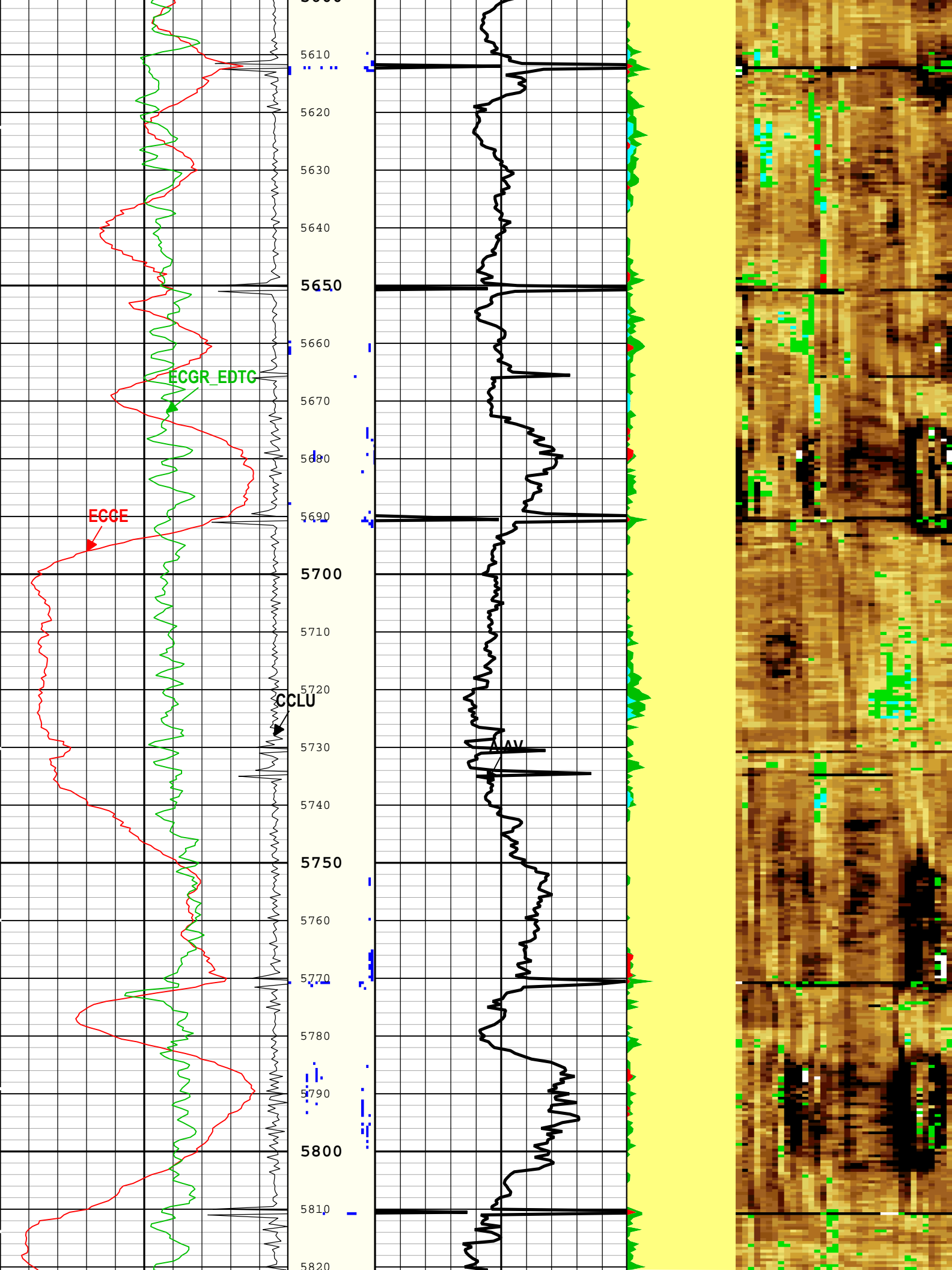


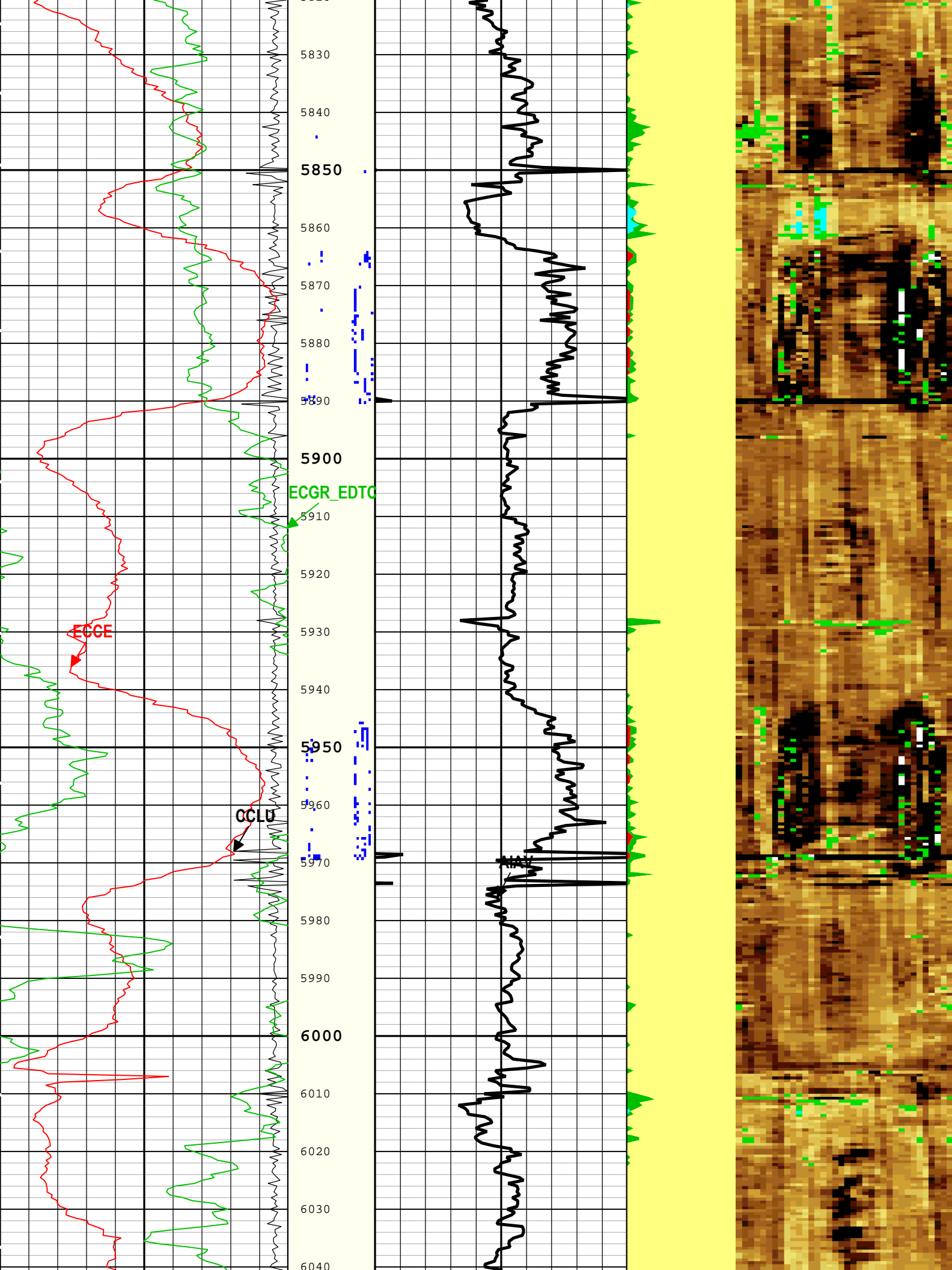


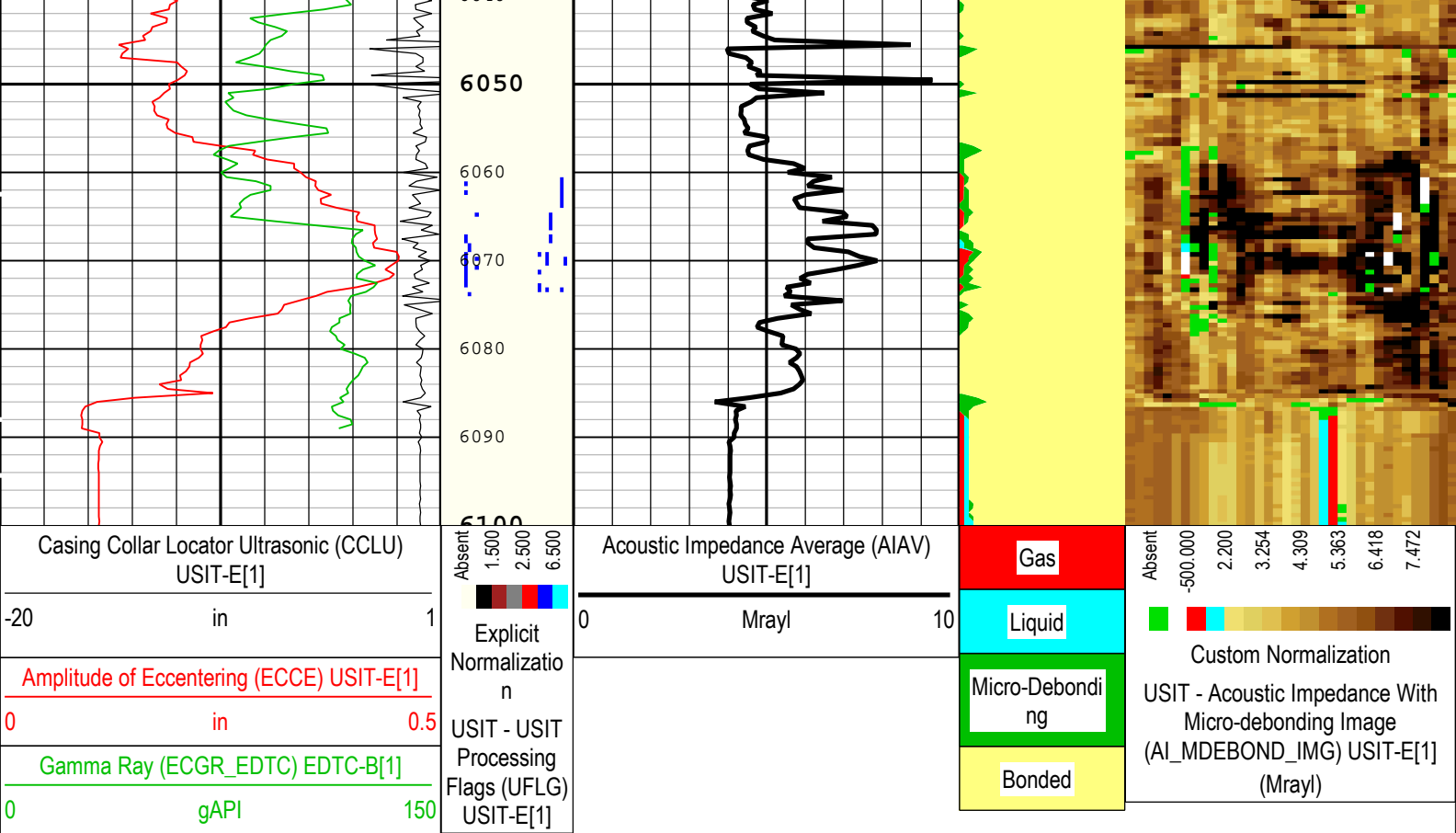












TIME_1900 - Time Marked every 60.00 (s)

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: 08-Dec-2016 10:28:15

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	10655	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	9.4	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	1.05	
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	1.7	Mrayl	
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl	
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl	
OneDepth Zoned Parameters					
Parameter	Value	Start (ft)	Stop (ft)		
BS	13.5	60	1912		
BS	8.5	1912	6100		
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		
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	71.88	us	
OneTime Zoned Parameters					
Pass Log[4]:Up					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	60	08-Dec-2016 09:25:08	08-Dec-2016 09:25:48	6109.87	6099.39
EMXV	65	08-Dec-2016 09:25:48	08-Dec-2016 09:25:54	6099.39	6096.96
EMXV	70	08-Dec-2016 09:25:54	08-Dec-2016 09:42:38	6096.96	5740.83
EMXV	75	08-Dec-2016 09:42:38	08-Dec-2016 09:48:35	5740.83	4811.84
WINB	31.88	08-Dec-2016 09:25:08	08-Dec-2016 09:27:47	6109.87	6067.83
WINB	30	08-Dec-2016 09:27:47	08-Dec-2016 09:36:34	6067.83	5856.58
WINB	28	08-Dec-2016 09:36:34	08-Dec-2016 09:48:35	5856.58	4811.84
Pass Log[5]:Up					
EMXV	75	08-Dec-2016 09:50:37	08-Dec-2016 09:56:01	4821.77	3841.18
EMXV	70	08-Dec-2016 09:56:01	08-Dec-2016 10:16:34	3841.18	53.94
WINB	28	08-Dec-2016 09:50:44	08-Dec-2016 10:16:34	4821.77	53.94
All depth are at tool zero.					
One					
0 PSI Repeat Pass					
One					

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

Pass Summary

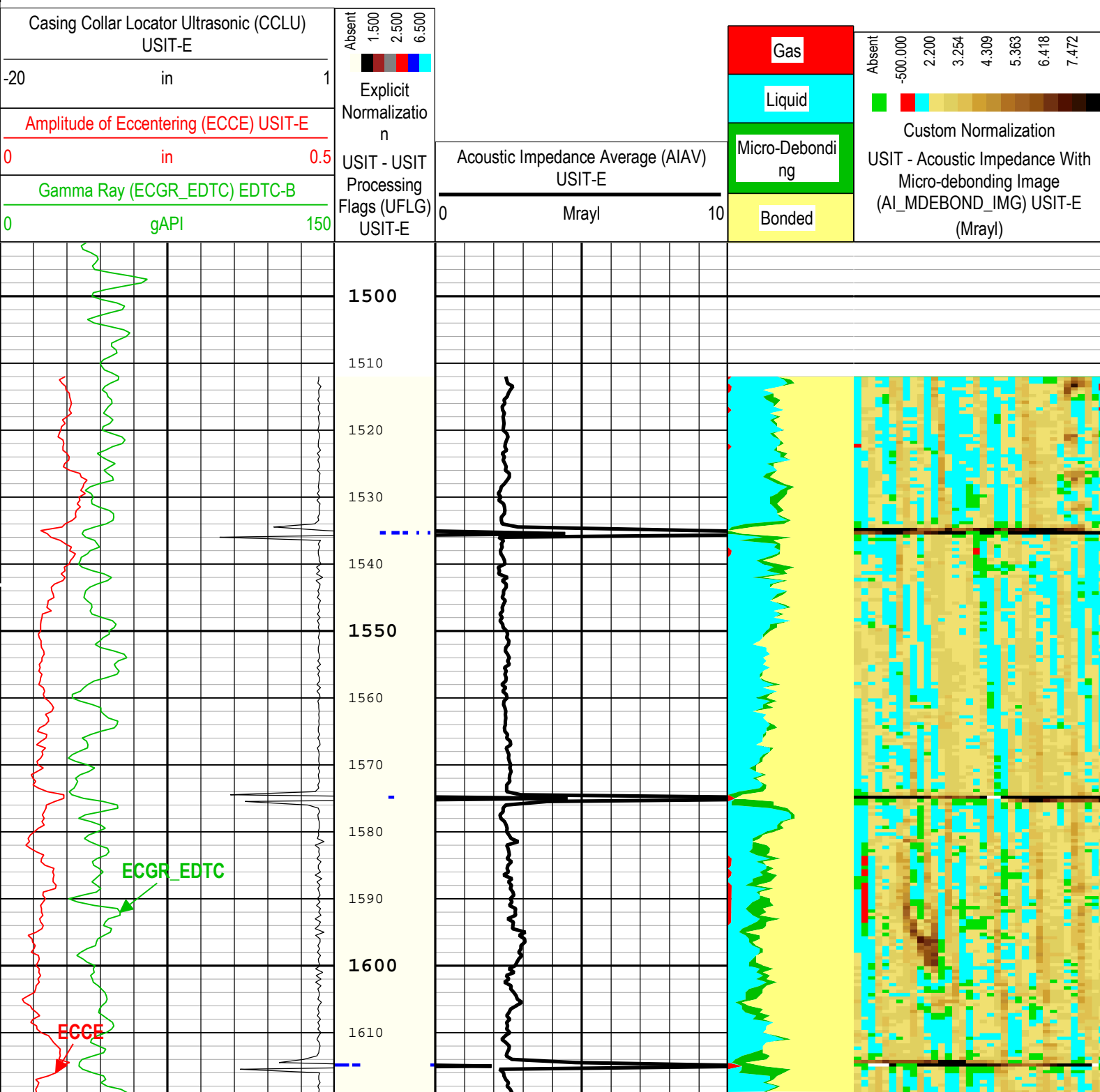
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	1512.33 ft	2517.69 ft	08-Dec-2016 8:58:42 AM	08-Dec-2016 9:05:11 AM	ON	0.00 ft	Yes

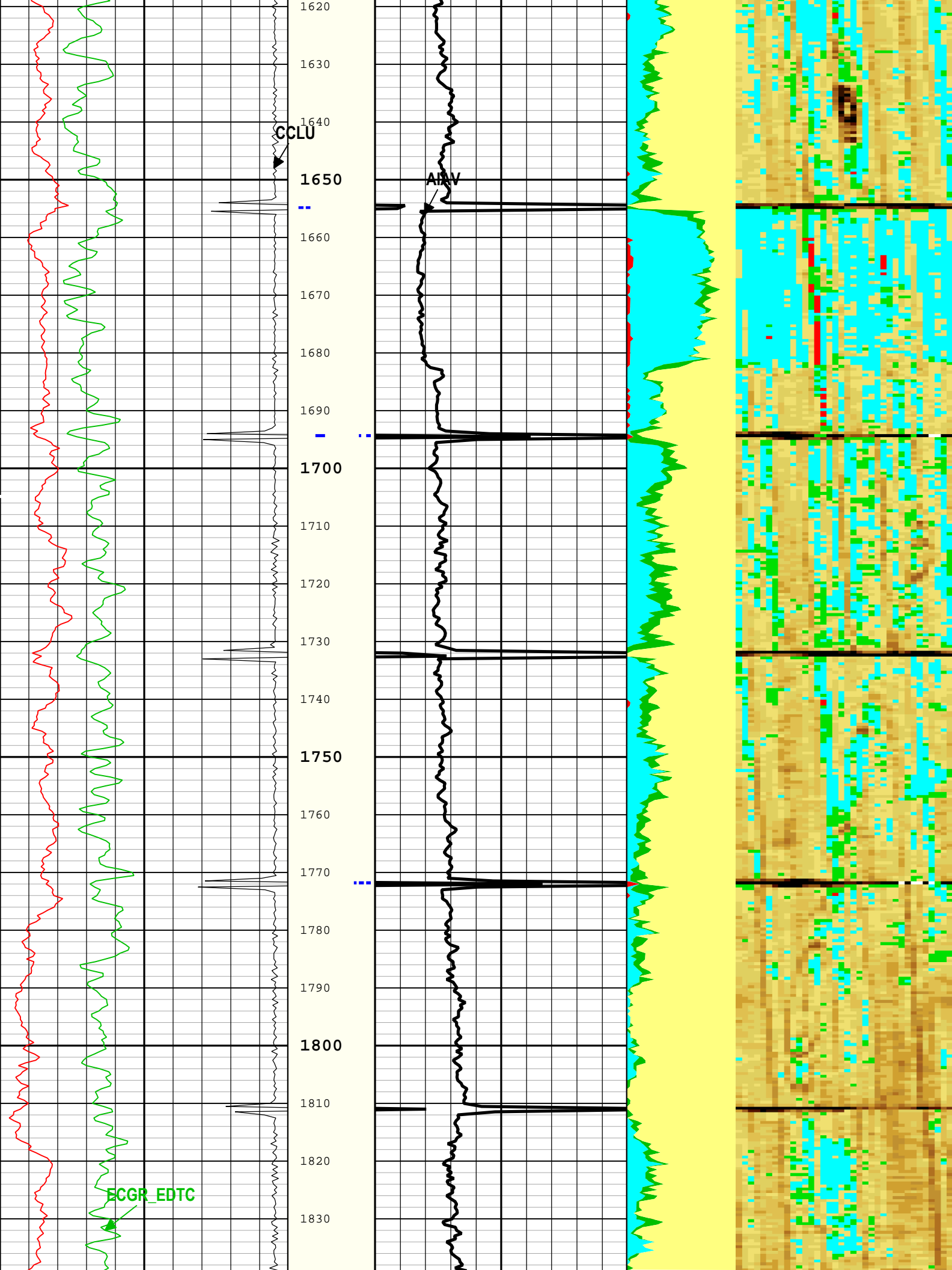
All depths are referenced to toolstring zero

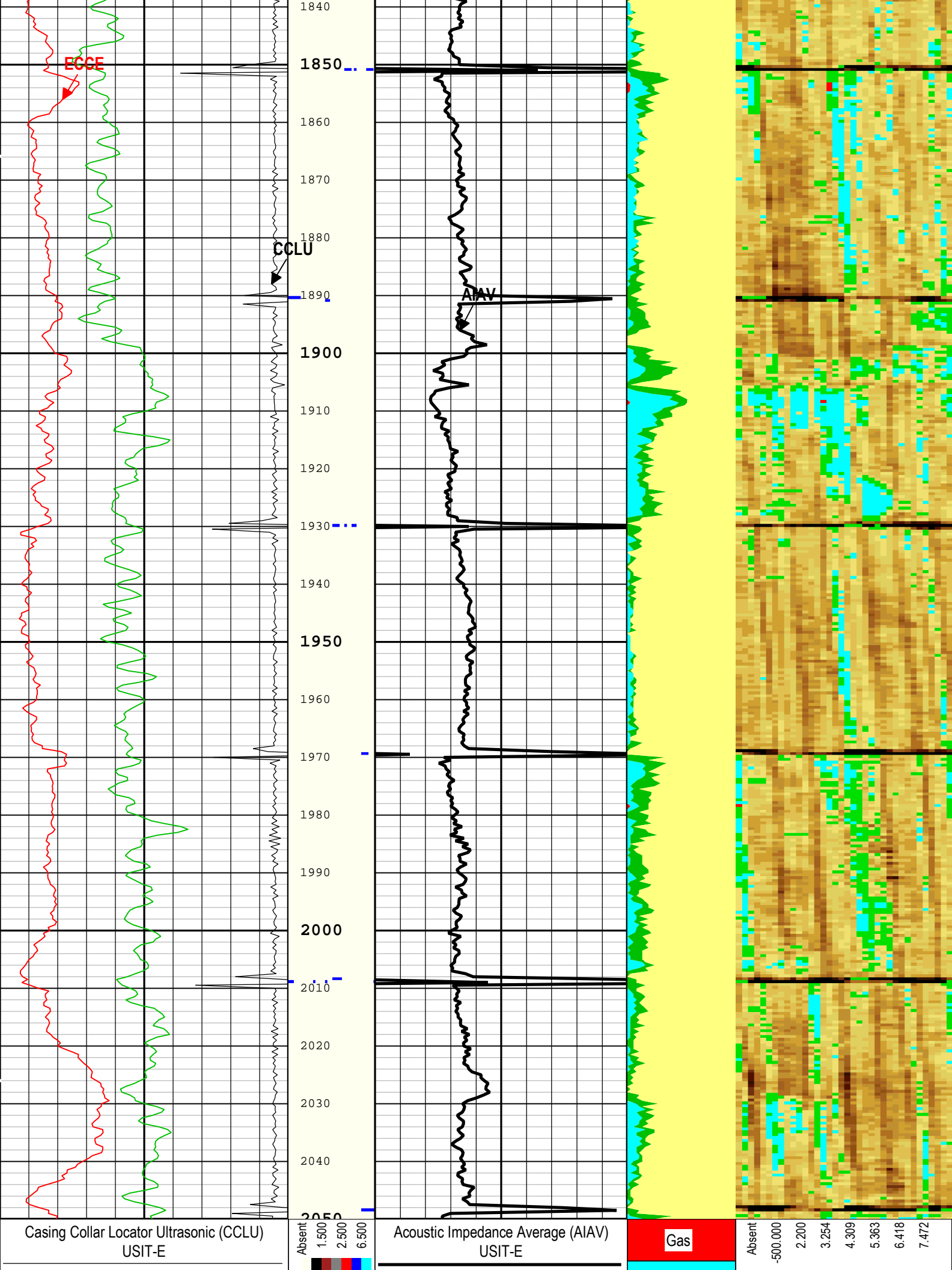
Log	Company:Noble Energy, Inc.	Well:Winchester Federal LC24-725
		One: Log[2]:Up:S006

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: 08-Dec-2016 10:28:22

TIME_1900 - Time Marked every 60.00 (s)







-20 in 1		Explicit Normalization USIT - USIT Processing Flags (UFLG) USIT-E	0 Mrayl 10		Liquid	<div>Custom Normalization</div> <div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)</div>	
Amplitude of Eccentering (ECCE) USIT-E					Micro-Debonding		
0 in 0.5					Bonded		
Gamma Ray (ECGR_EDTC) EDTC-B							
0 gAPI 150							
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: 08-Dec-2016 10:28:22							
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	10655	ft		
CDEN	Cement Density		EDTC-B	16.69	lbm/gal		
CMTY(U-USIT_CEMT)	Cement Type		USIT-E	Regular Cement			
DFD	Drilling Fluid Density		Borehole	9.4	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	1.05			
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	1.7	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	13.5	1492		1912			
BS	8.5	1912		2050			
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	60	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

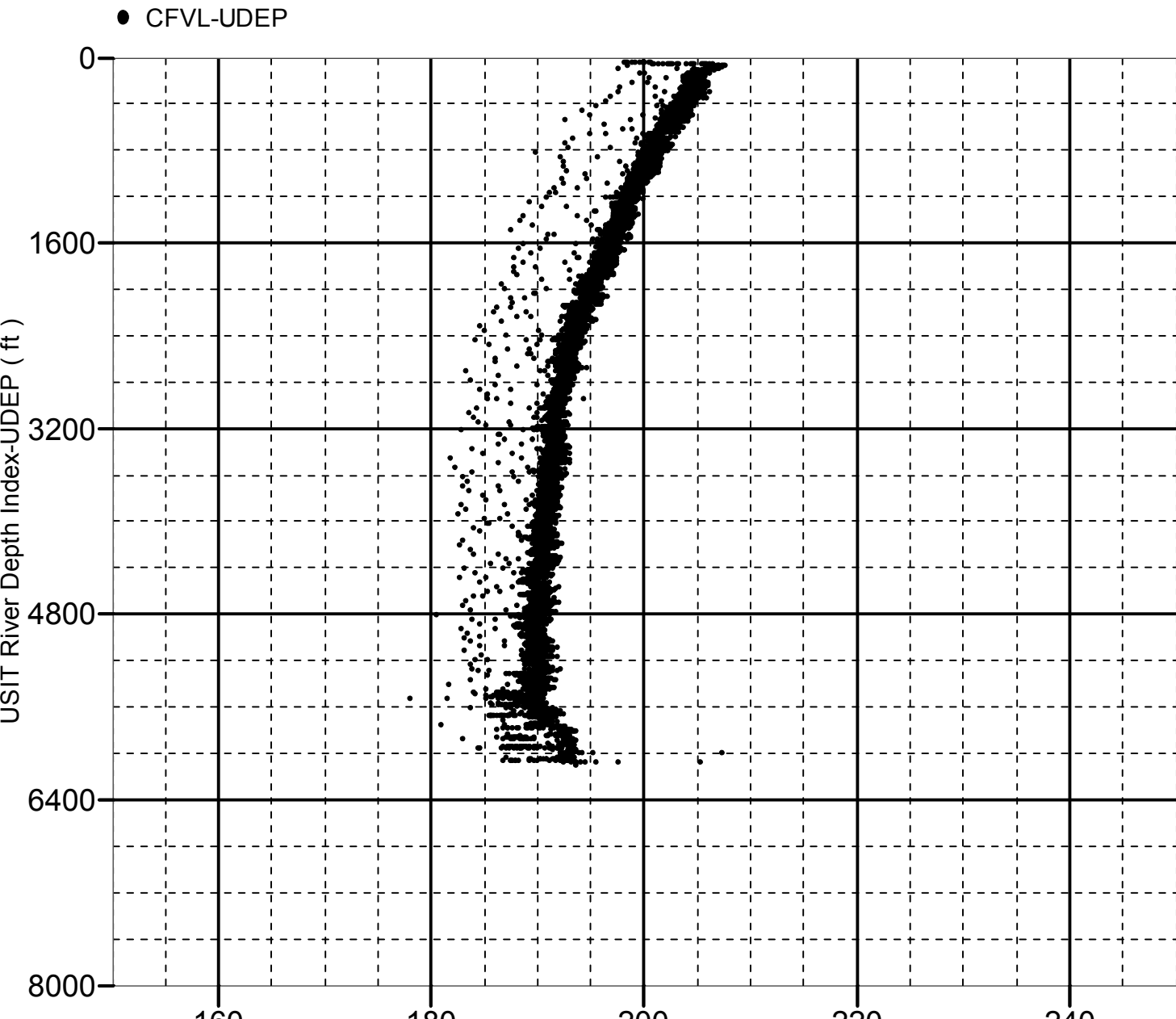
Company:Noble Energy, Inc. Well:Winchester Federal LC24-725

Composite 1:S006

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 53.50 to 6109.50 ft



160

180

200

220

240

Memorized Fluid Acoustic...-CFVL (us/ft)

XYZ

Company:Noble Energy, Inc. Well:Winchester Federal LC24-725

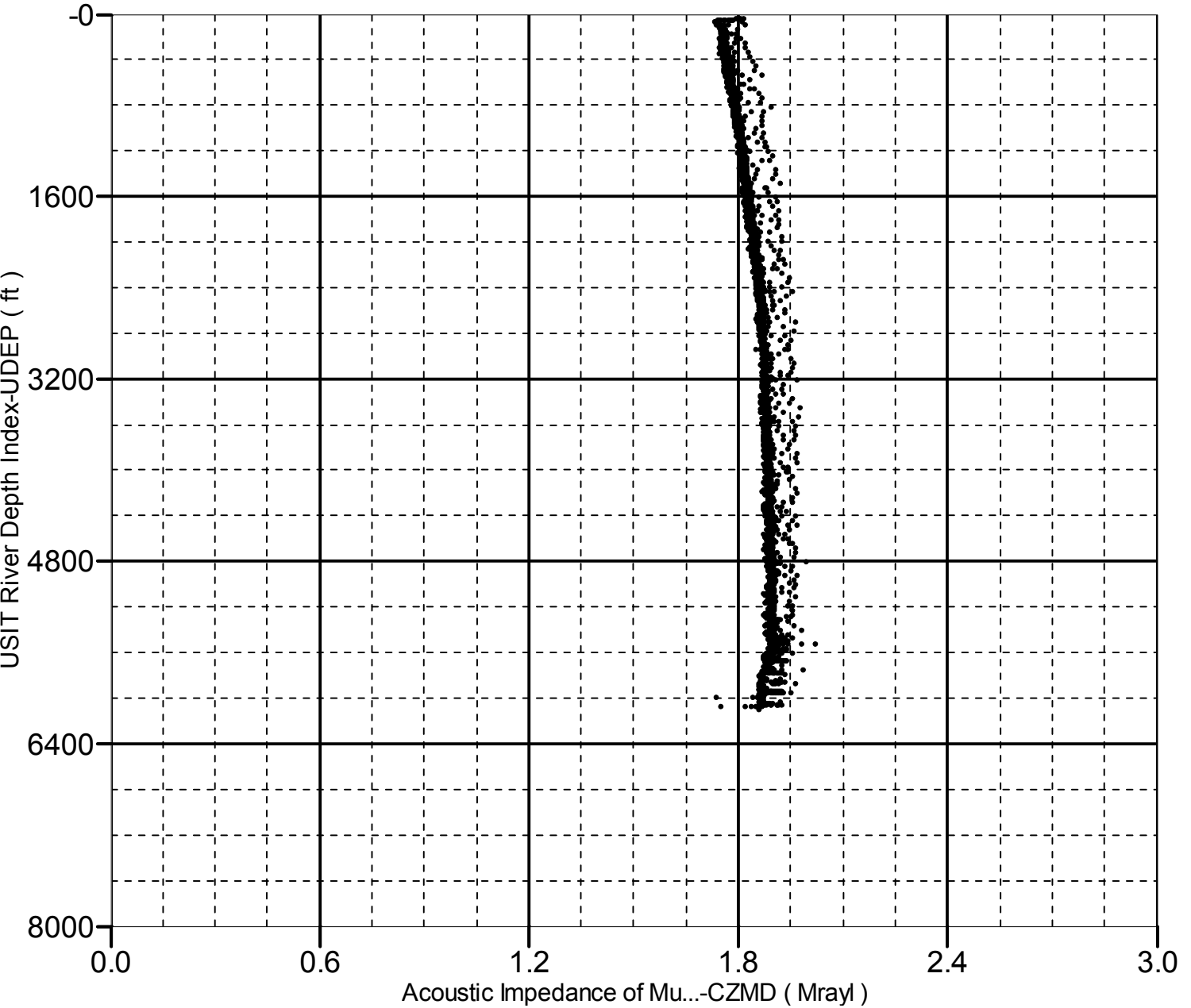
Composite 1:S006

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 53.50 to 6109.50 ft

● CZMD-UDEP



Company:	Noble Energy, Inc.	Schlumberger
Well:	Winchester Federal LC24-725	
Field:	Wildcat	
County:	Weld	
State:	Colorado	
UltraSonic Summary Print		