

Company: Noble Energy Inc

Well: Bison Ridge Y22-756

Field: Wattenberg

County: Weld State: CO

UltraSonic Summary Print

County:	Weld
Field:	Wattenberg
Location:	NESW Sec. 10, T2N, R64W
Well:	Bison Ridge Y22-756
Company:	Noble Energy Inc
Location:	
NESW Sec. 10, T2N, R64W	Elev.: K.B. 4961.00 ft
SHL: 2230' FSL & 2130' FEL	G.L. 4931.00 ft
Lat/Long: 40.151830/-104.539440	D.F. 4961.00 ft
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No.	Section: 10
05-123-45370	Township: 2N
	Range: 64W

Logging Date	02-Feb-2018
Run Number	ONE
Depth Driller	17337.00 ft
Schlumberger Depth	6810.00 ft
Bottom Log Interval	6810.00 ft
Top Log Interval	60.00 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	2065.00 ft
To	6810.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	P110
From	0.00 ft
To	16267.00 ft
Max Recorded Temperatures	203 degF
Logger on Bottom	02-Feb-2018
Unit Number	2161
Recorded By	A.Rosacker/T.Savoie
Witnessed By	Bill Mansfield

Disclaimer

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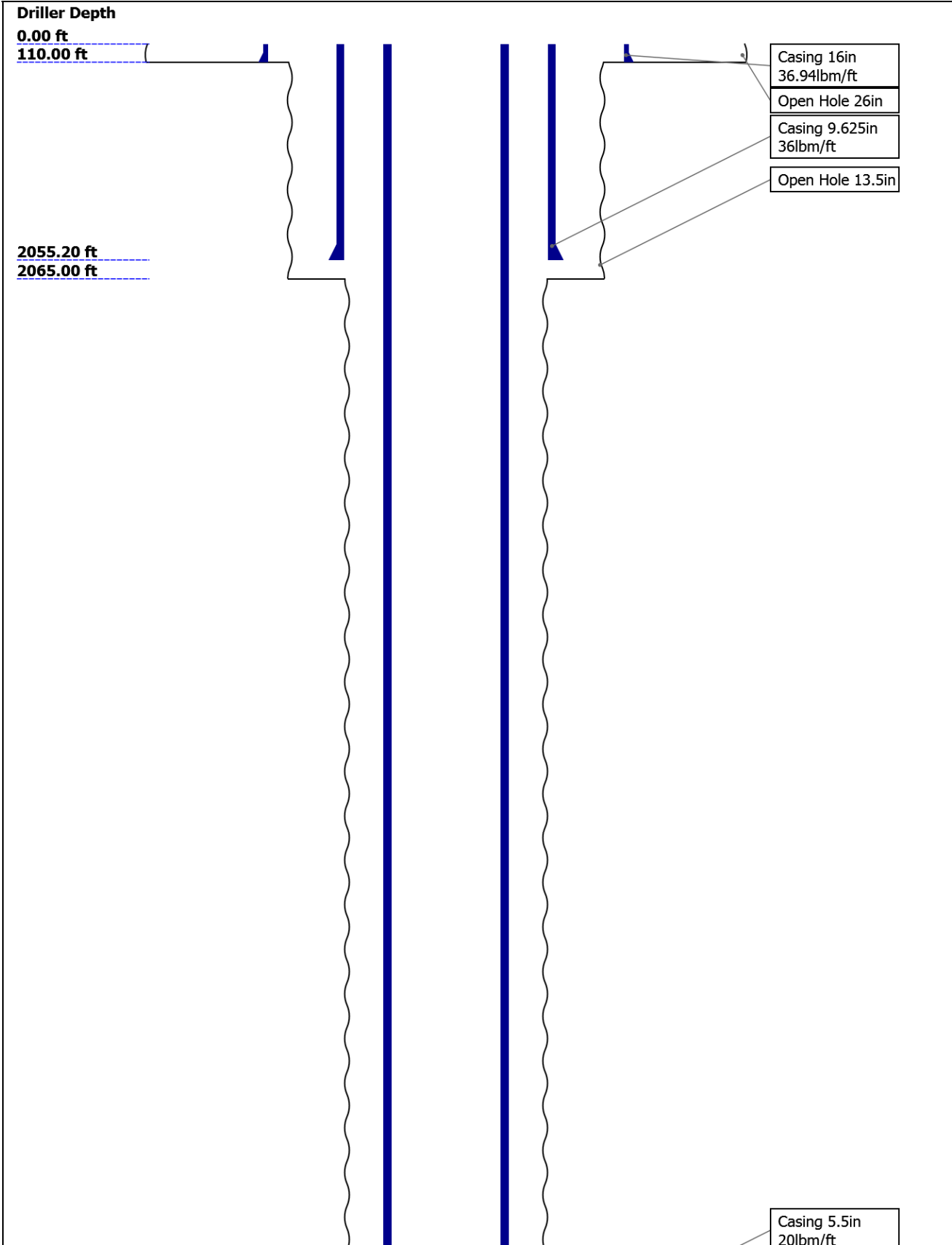
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Well Sketch



16267.00 ft


17337.00 ft

Open Hole 8.5in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	2065			
Top Logger (ft)	0	110	2065			
Bottom Driller (ft)	110	2065	17337			
Bottom Logger (ft)	110	2065	6810			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	36.94	36	20			
Inner Diameter (in)	15.572	8.921	4.778			
Grade	N/A	J55	P110			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	2055.2	16267			
Bottom Logger (ft)	110	2055.2	16267			

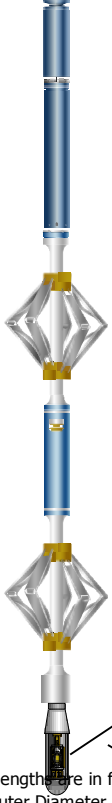
Remarks and Equipment Summary

ONE: Toolstring			ONE: Remarks
<div><div><div>Equip name</div><div>Length</div></div><div>LEH-QT:2</div><div>33.83</div><div>353</div><div>LEH-QT:23</div><div>53</div><div>SAH-F:18</div><div>30.91</div><div>17</div><div>EDTC-B:8</div><div>26.06</div><div>424</div><div>EDTH-B:84</div><div>32</div><div>EDTG-B</div><div>EDTC-B:84</div><div>24</div><div>AH-184[2]:2765</div><div>19.56</div><div>AH-184[</div><div>17.56</div></div> <div></div> <div><div><div>MP name</div><div>Offset</div></div><div>CTEM</div><div>22.56</div><div>ACCZ</div><div>0.00</div><div>HV</div><div>0.00</div><div>Gamma</div><div>20.69</div><div>Ray</div><div>TelStatu</div><div>19.56</div><div>s</div></div>	Thank you for choosing Schlumberger!		
	Tool string run as per tool sketch and client logging program.		
	This is the first log in well.		
	Main pass logged at 2500 PSI; Repeat pass logged at 0 PSI		
	4.75" gemcos ran on USAC and EDTC for centralization.		
	BHT: 199 degF		
	Estimated Top of Cement is 565 ft		

1J:2826

USIT-E:94 15.56
3

ECH-MFA:
1928
USAC-A:9
43
USIS-A:27
20
USSC-B:75
8
USRS-AB:
873
USI-SENS
OR
USI-TX



USI Sen 0.37
sor
TOOL_ZERO
Head Fe
nsion

Length in ft
Maximum Outer Diameter = 3.875 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	6483		
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type	7-46 PI-XXS		
Wheel Correction 1	-4		
Wheel Correction 2	-5		

Tension Device

Type	CMTD-B/A		
Serial Number	466		
Calibration Date	11-Jan-2018		
Calibrator Serial Number	84749A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	15		
Calibration Peak Error	24		

Logging Cable

Type	7-46PI-XXS		
Serial Number	F716045		
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

ONE:Depth Control Parameters

Depth Control Remarks

Log Sequence	First Log In the Well	All Schlumberger depth control policies followed.
Rig Up Length At Surface		IDW used as primary depth reference.
Rig Up Length At Bottom		Z-chart used as 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[10]:Up	6805.95	65.16

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 : 20.09m(65.92ft) to 22.31m(73.21ft)
MUD_N_FRP = 1.09
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.65 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 SP3	7.3.92069.3100
Application Patch	Wireline_NPD-ICE2-2017SP3_7.3.93033

Pass Summary

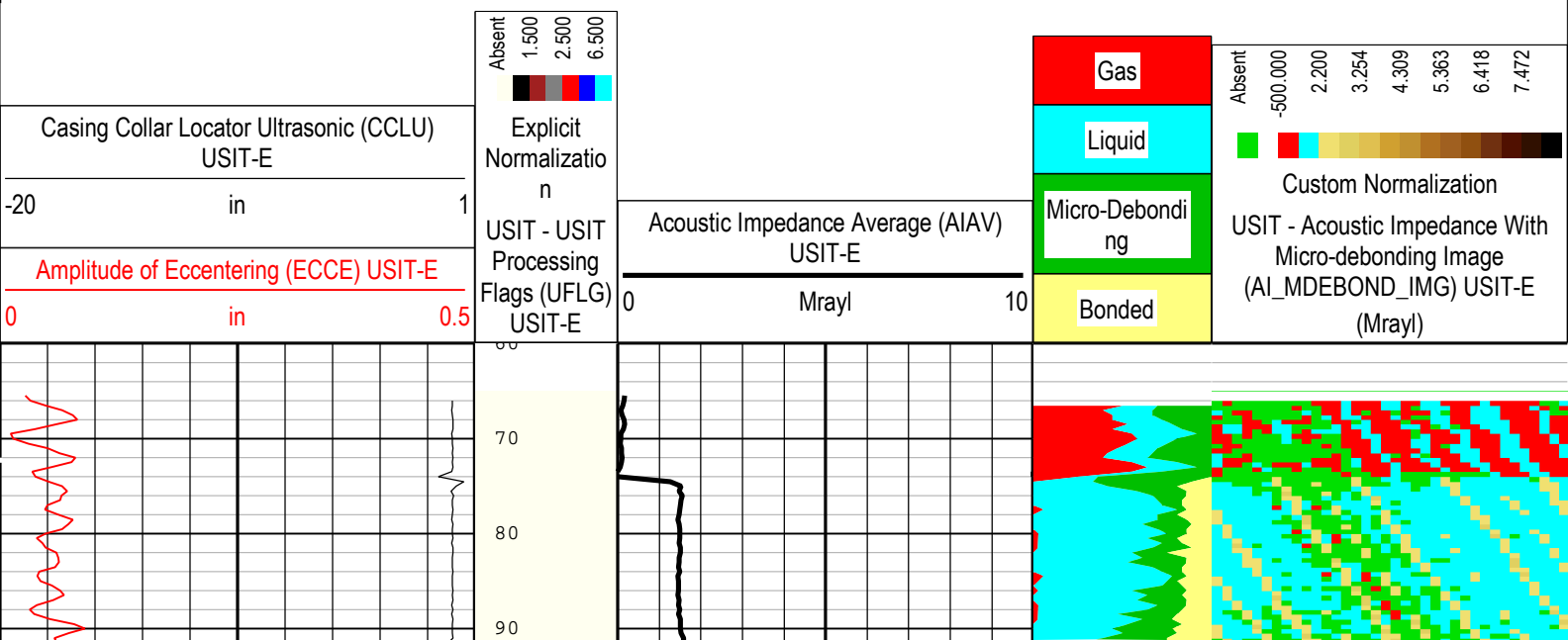
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[10]:Up	Up	65.16 ft	6805.95 ft	02-Feb-2018 1:56:55 PM	02-Feb-2018 2:58:49 PM	ON	6.64 ft	Yes

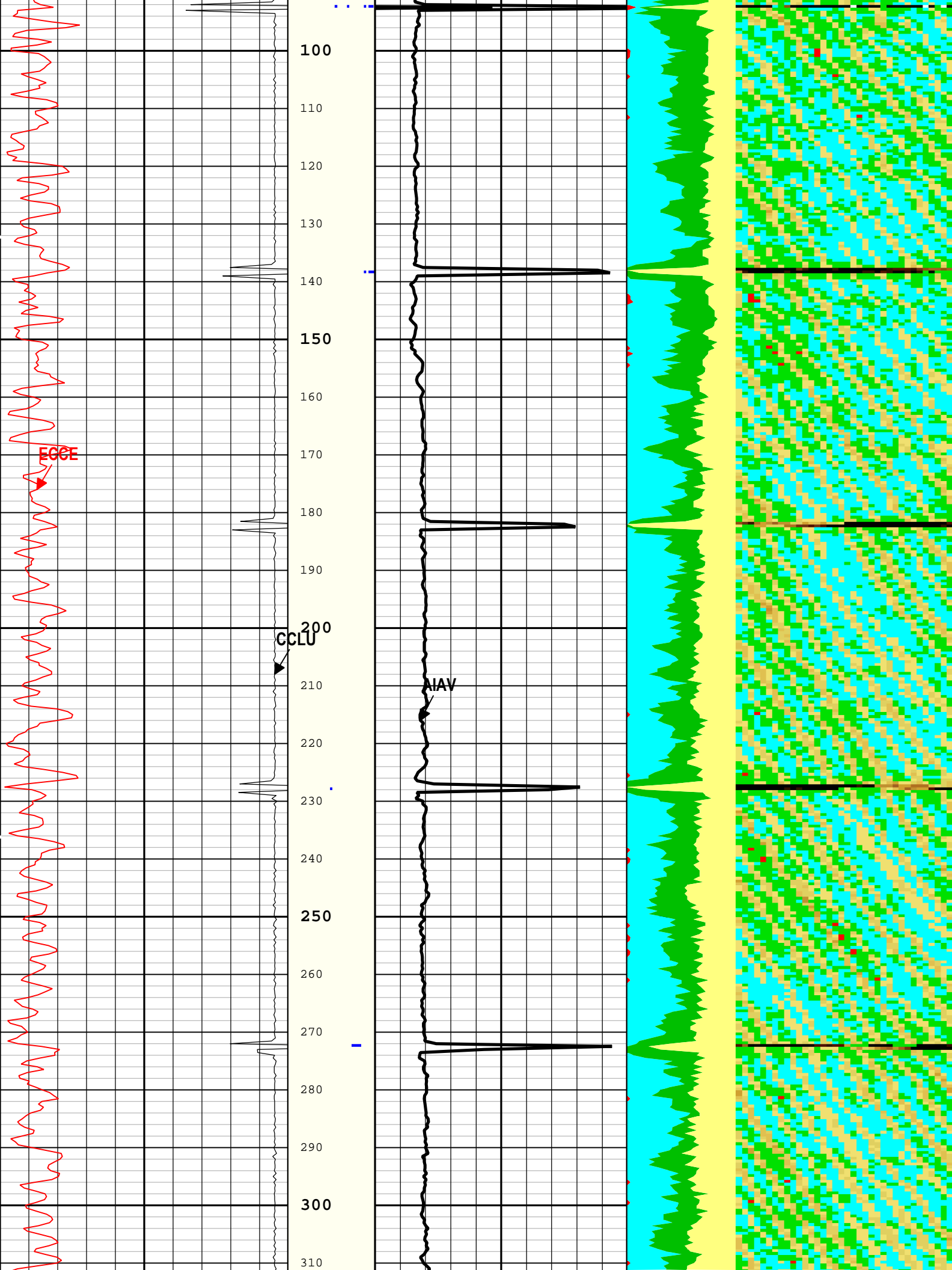
All depths are referenced to toolstring zero

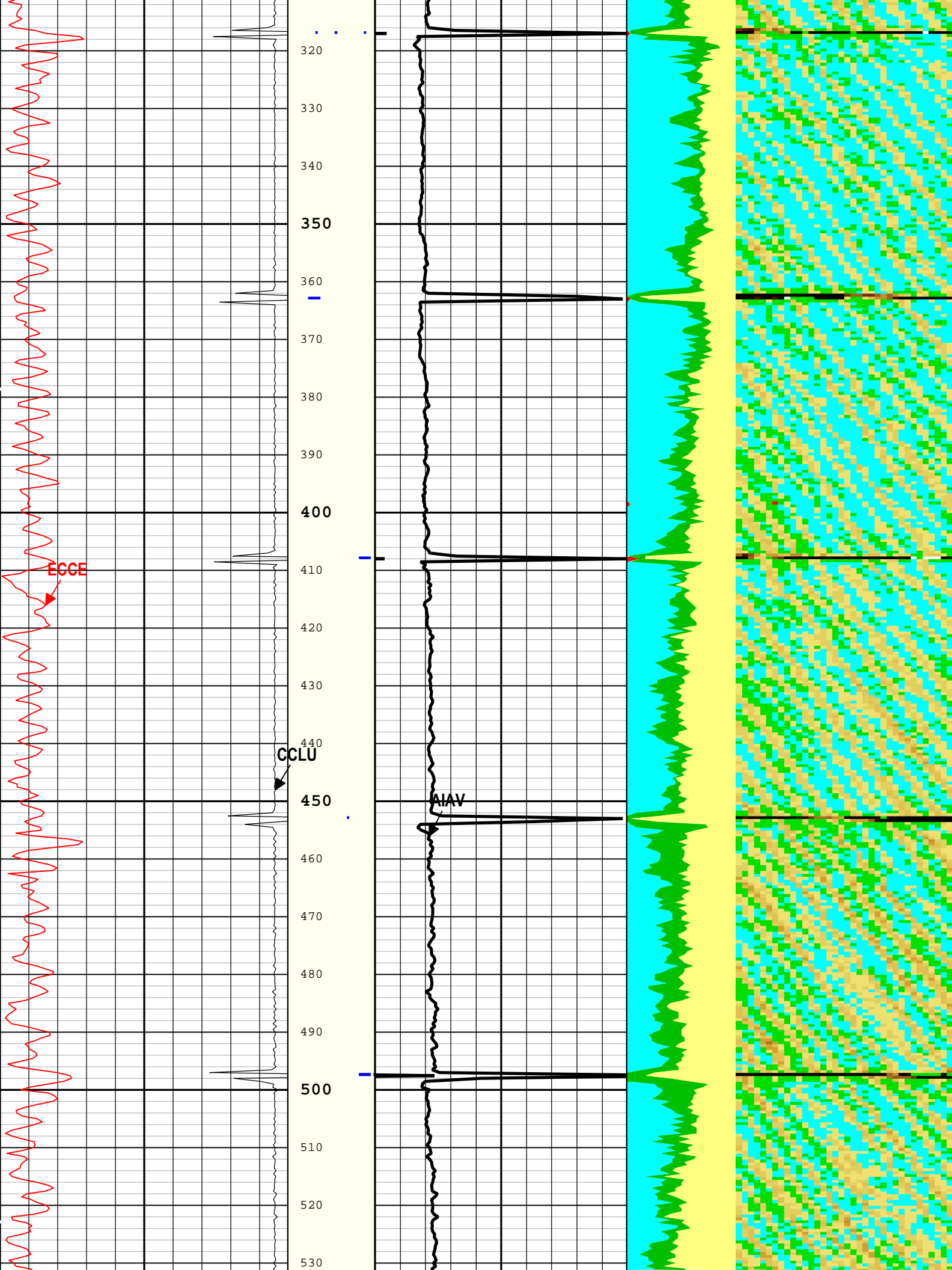
Log	Company:Noble Energy Inc Well:Bison Ridge Y22-756 ONE: Log[10]:Up:S005
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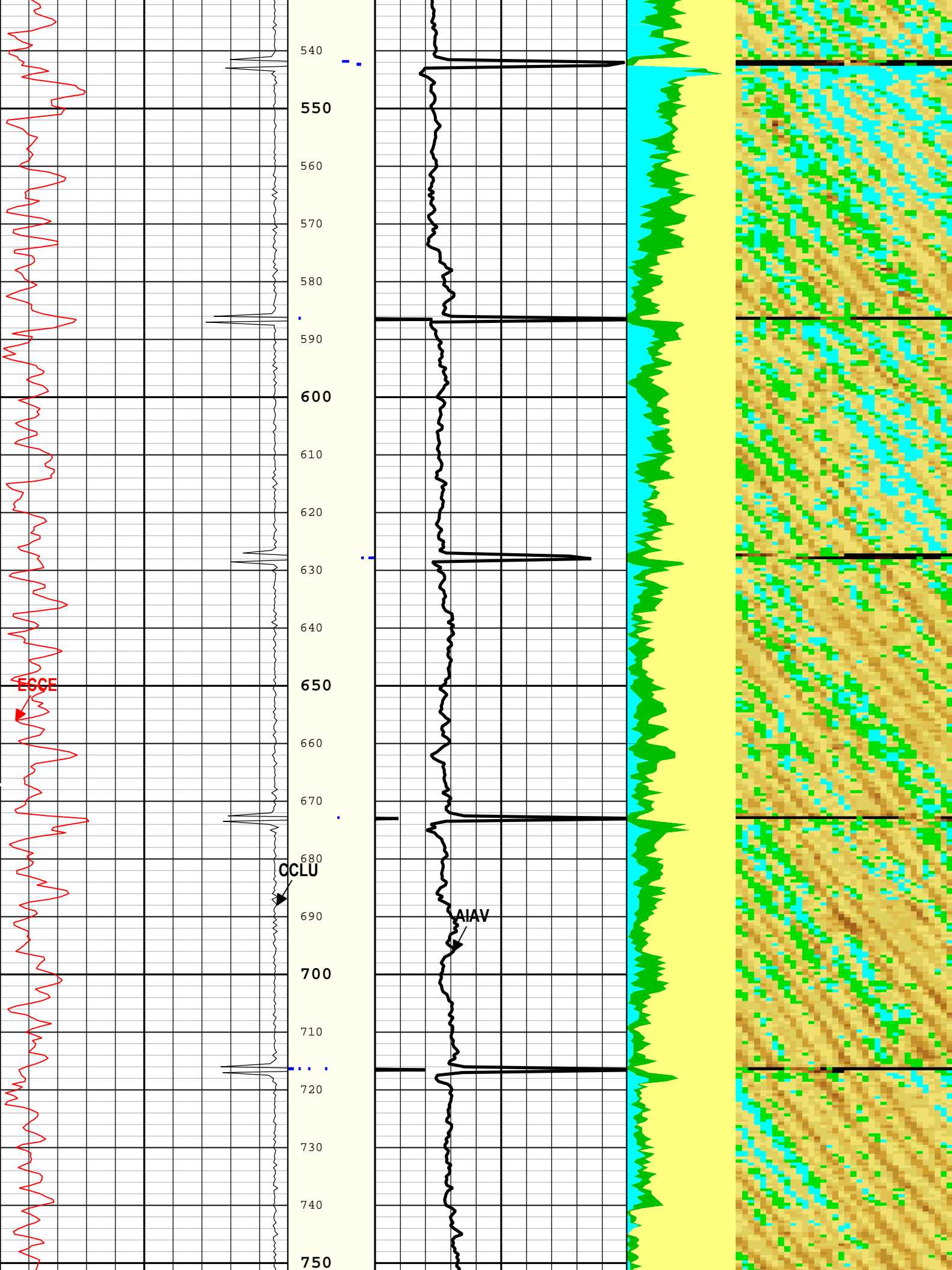
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Creation Date: 03-Feb-2018 12:49:52

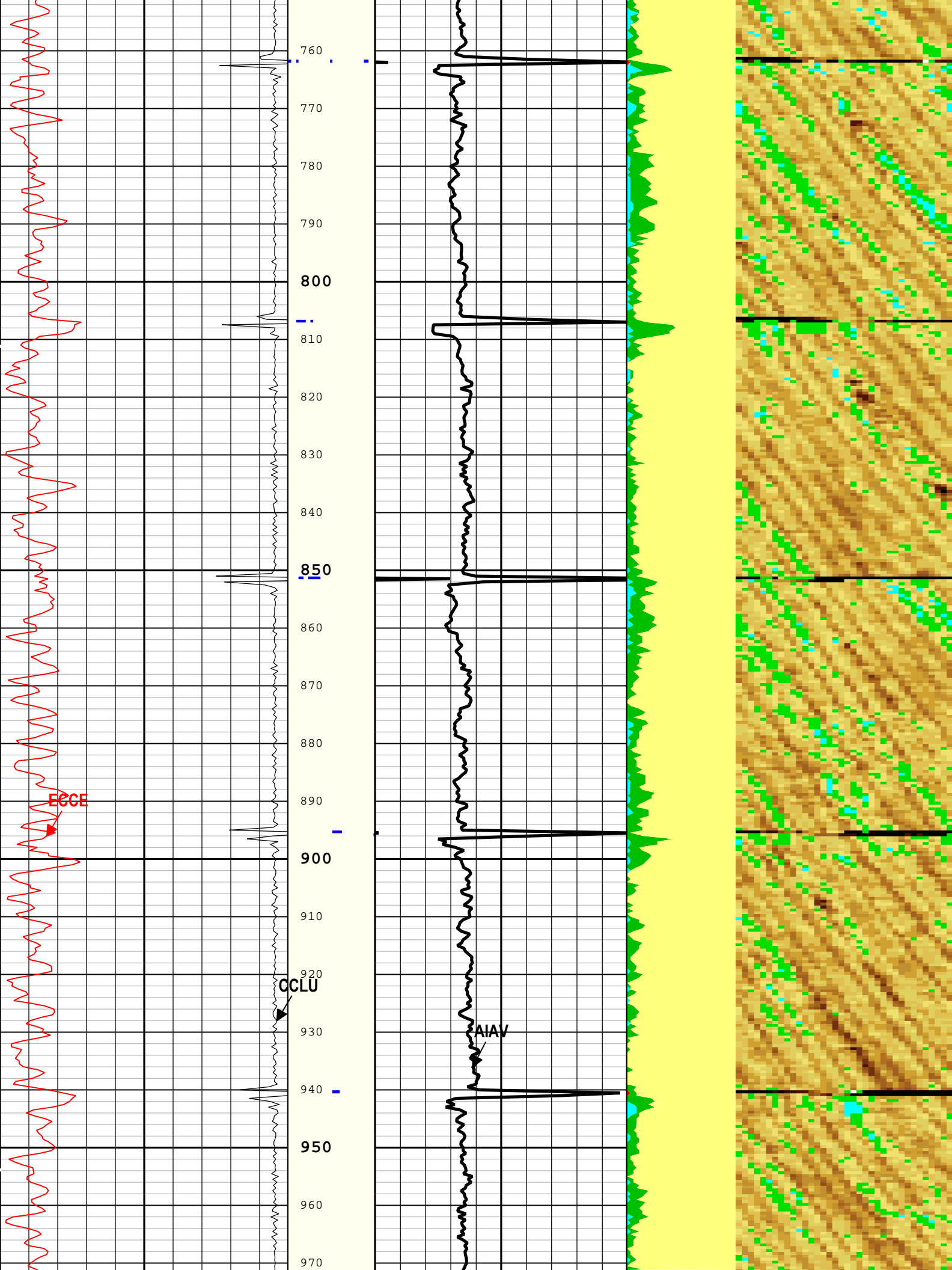
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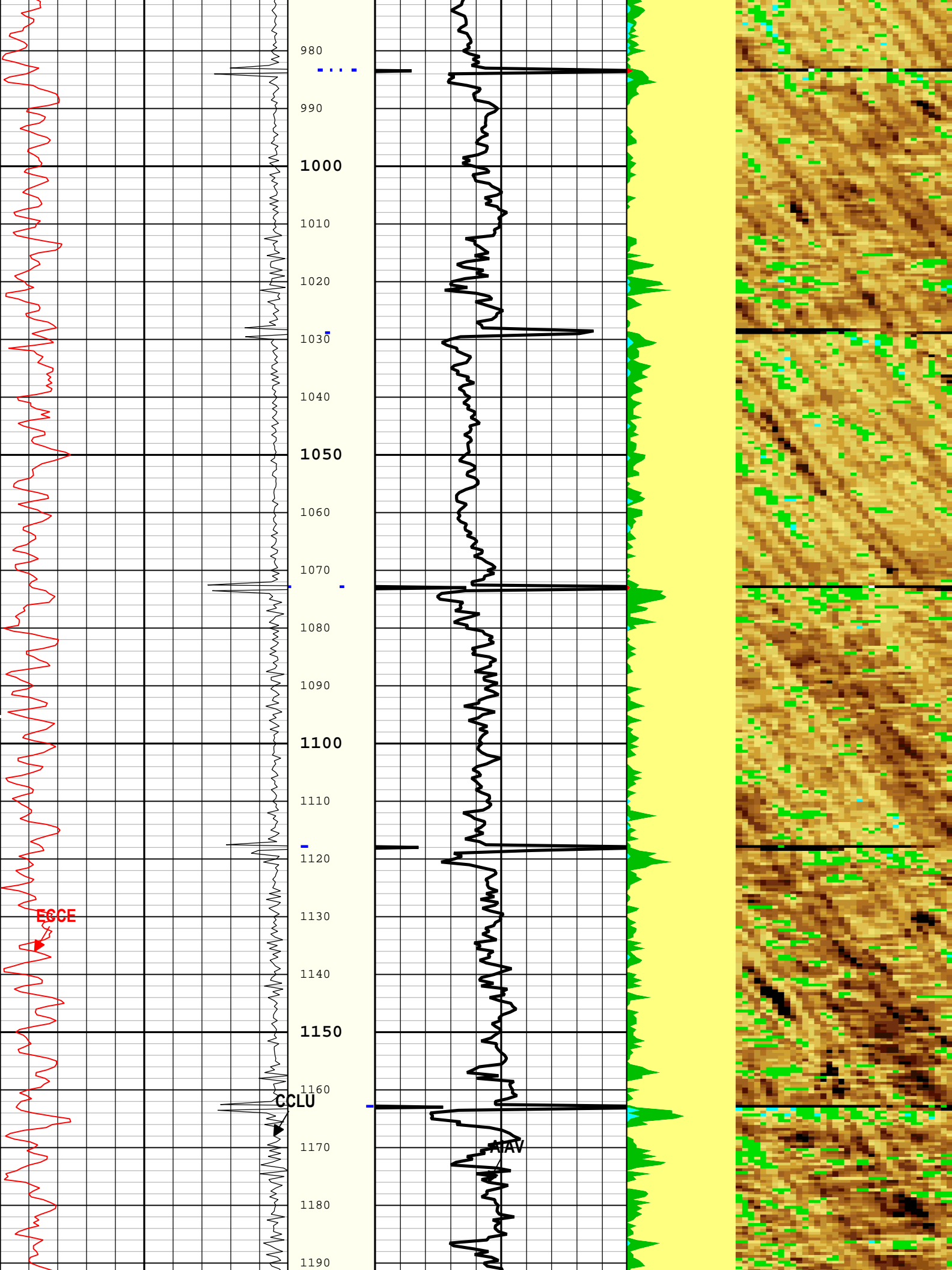


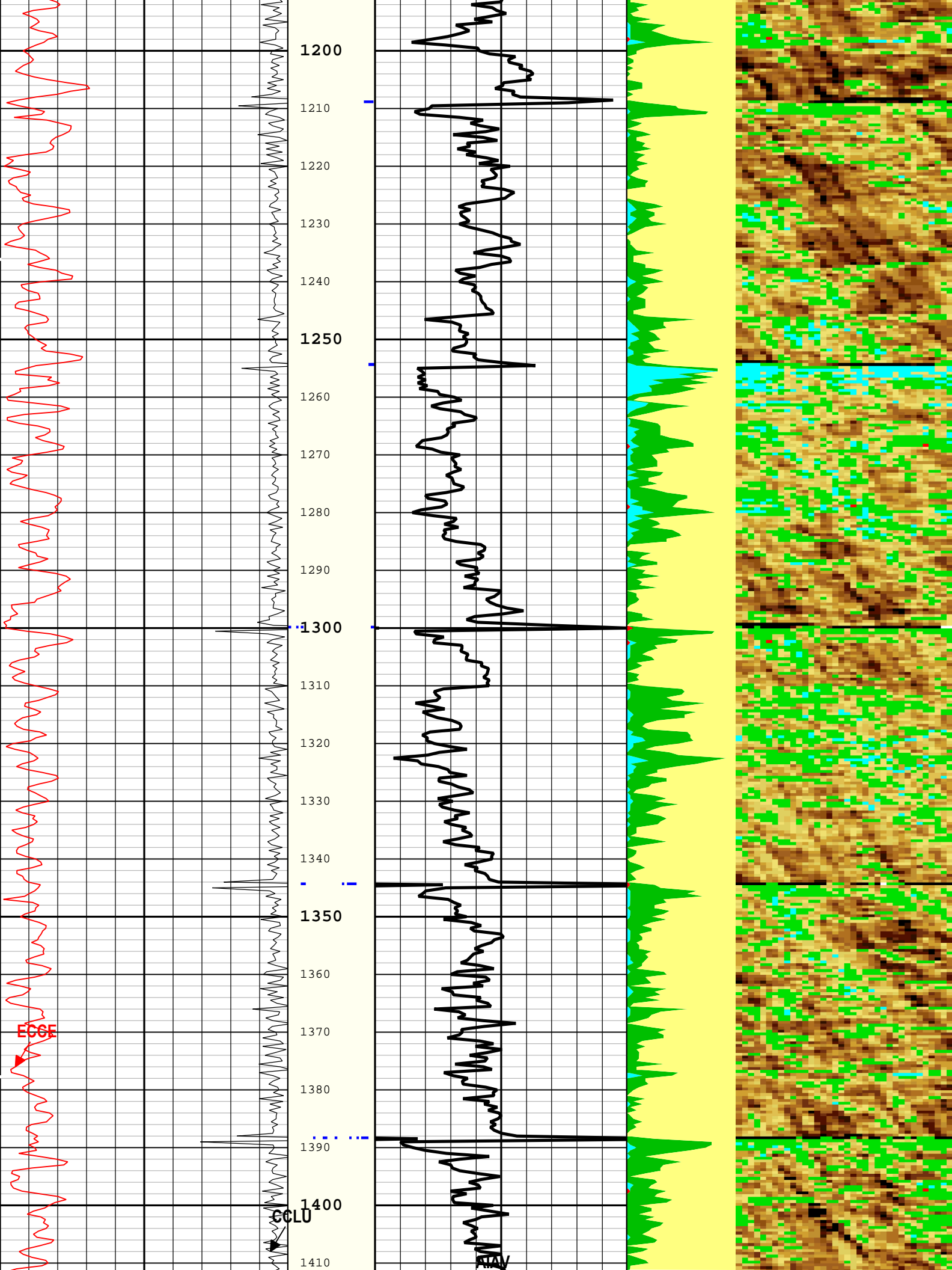


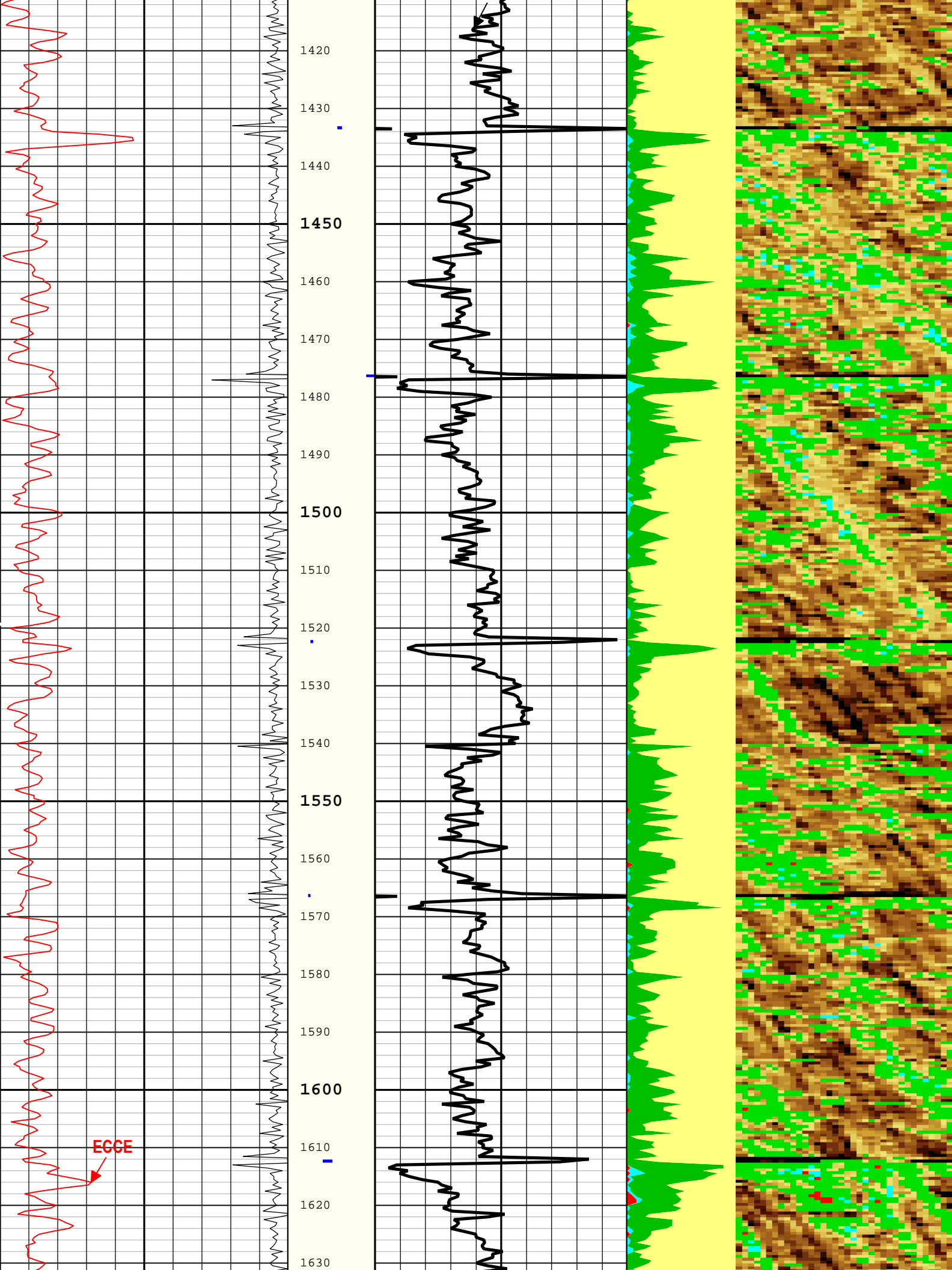


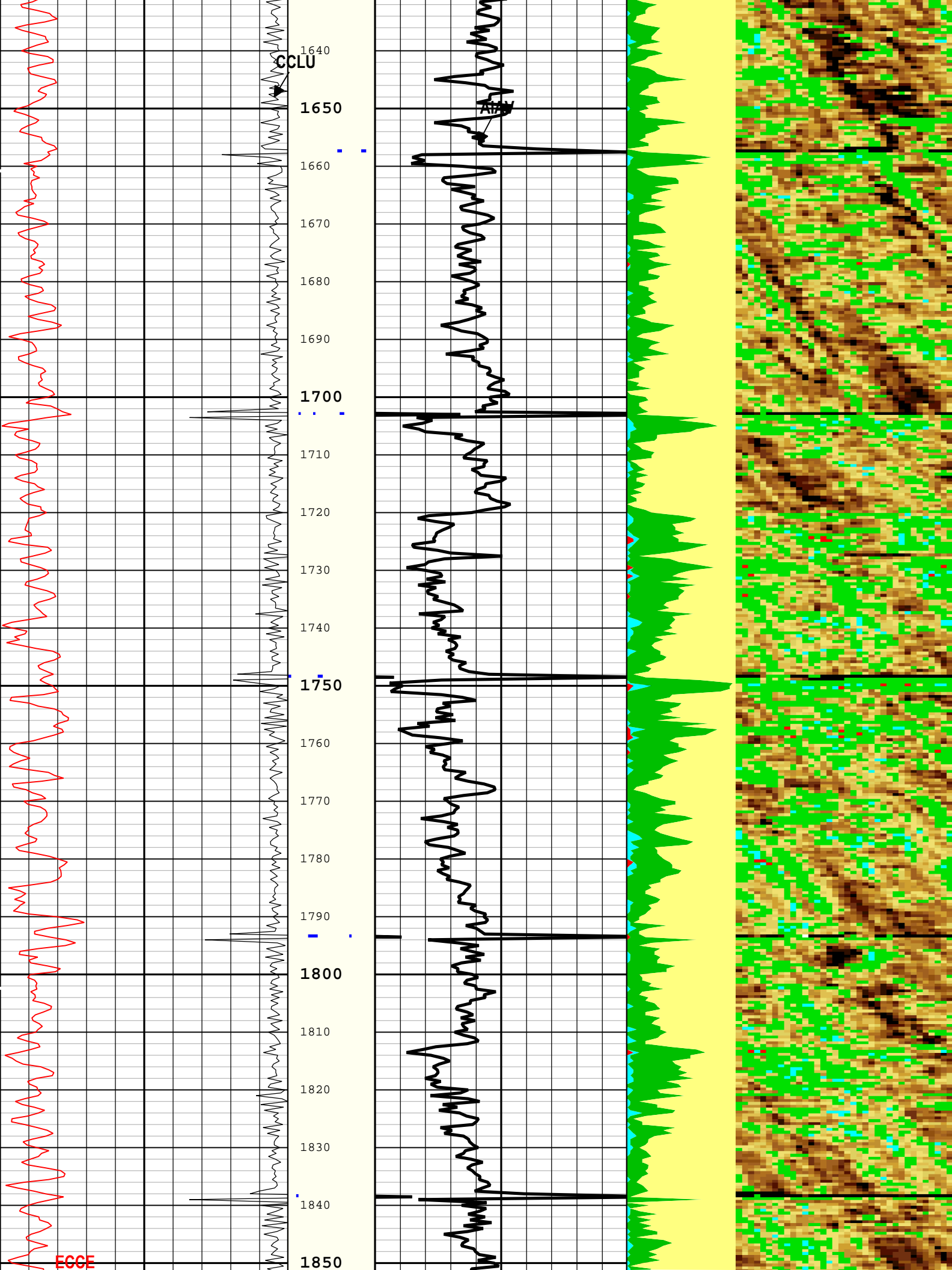


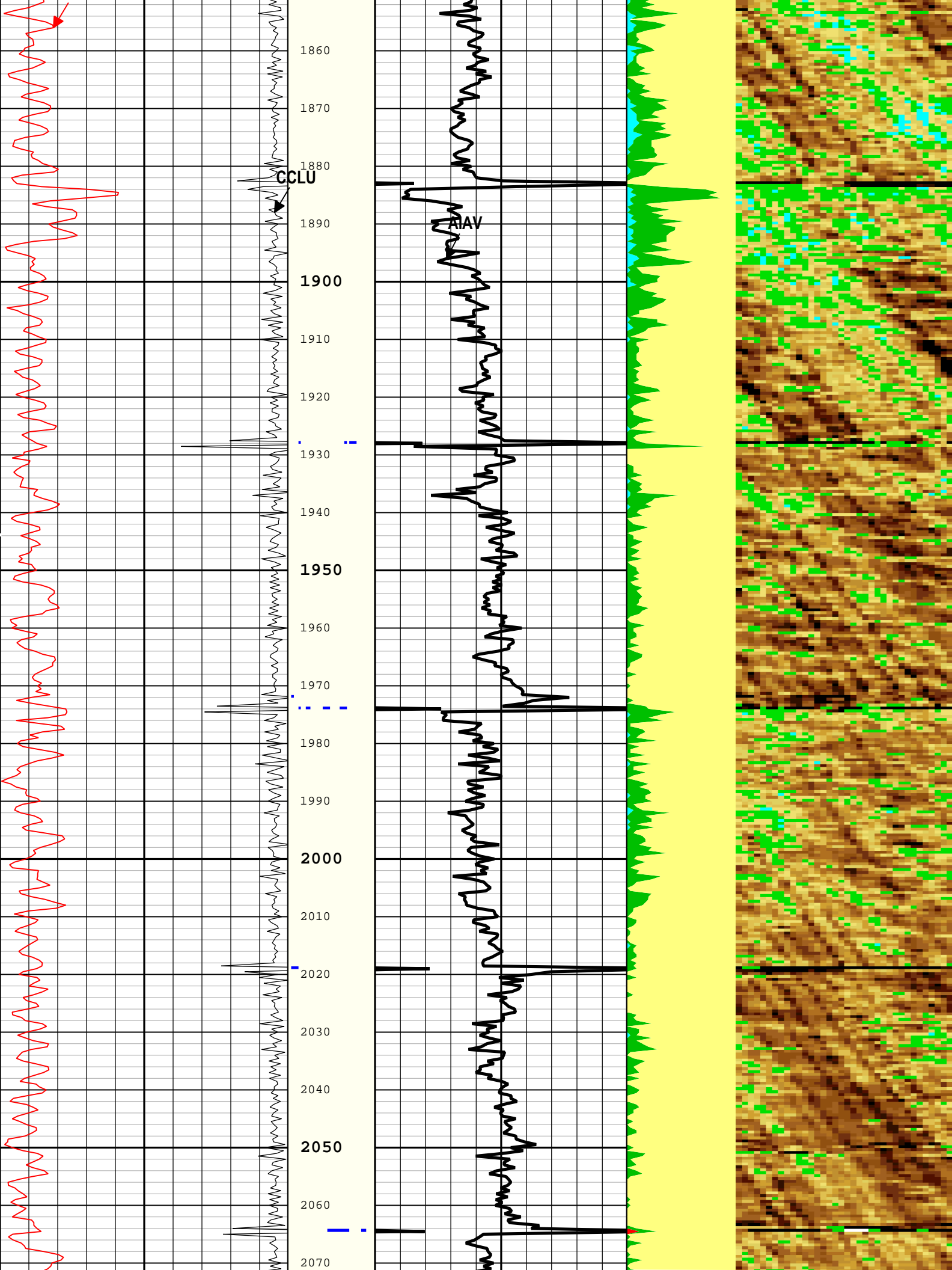


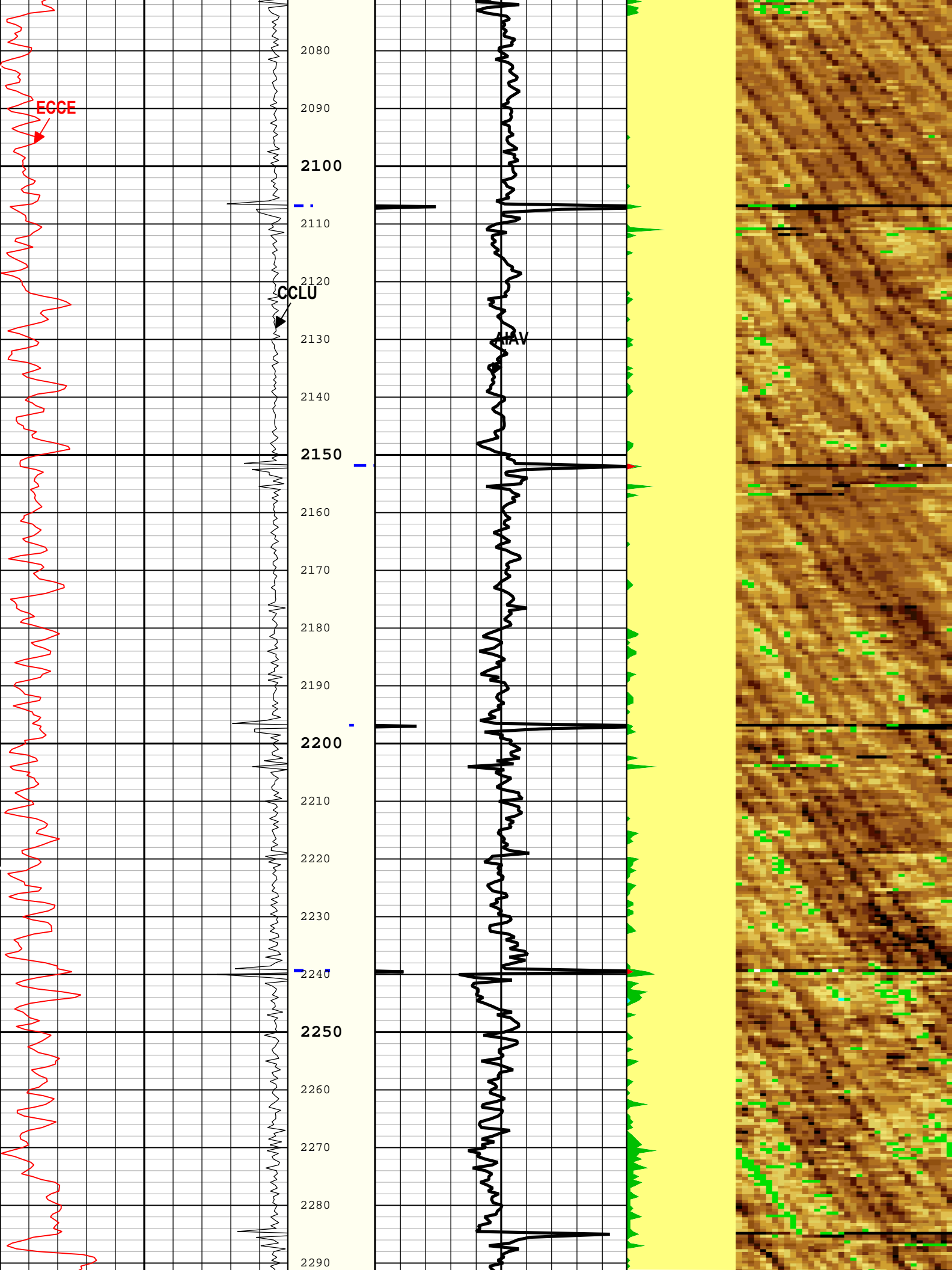


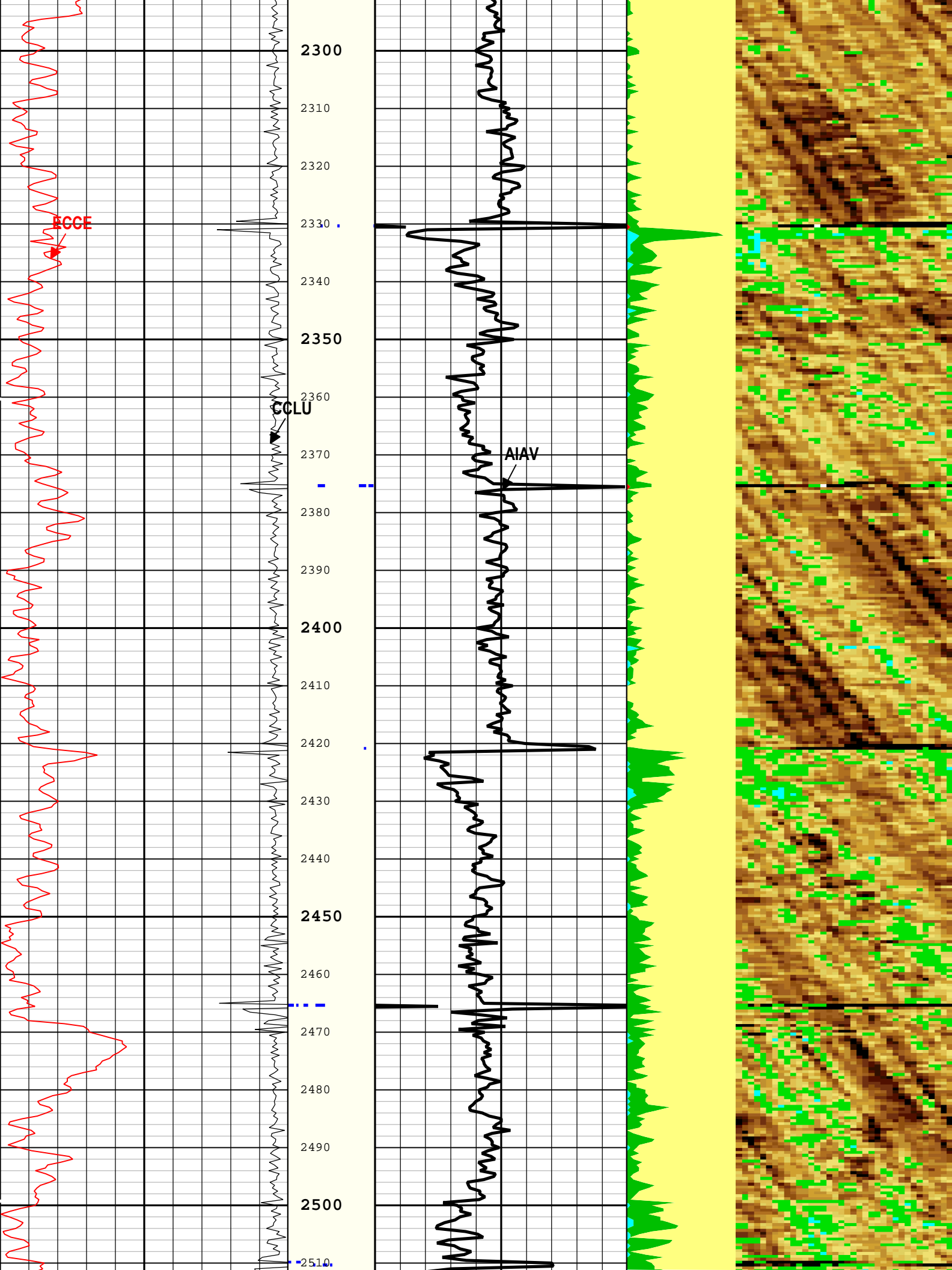


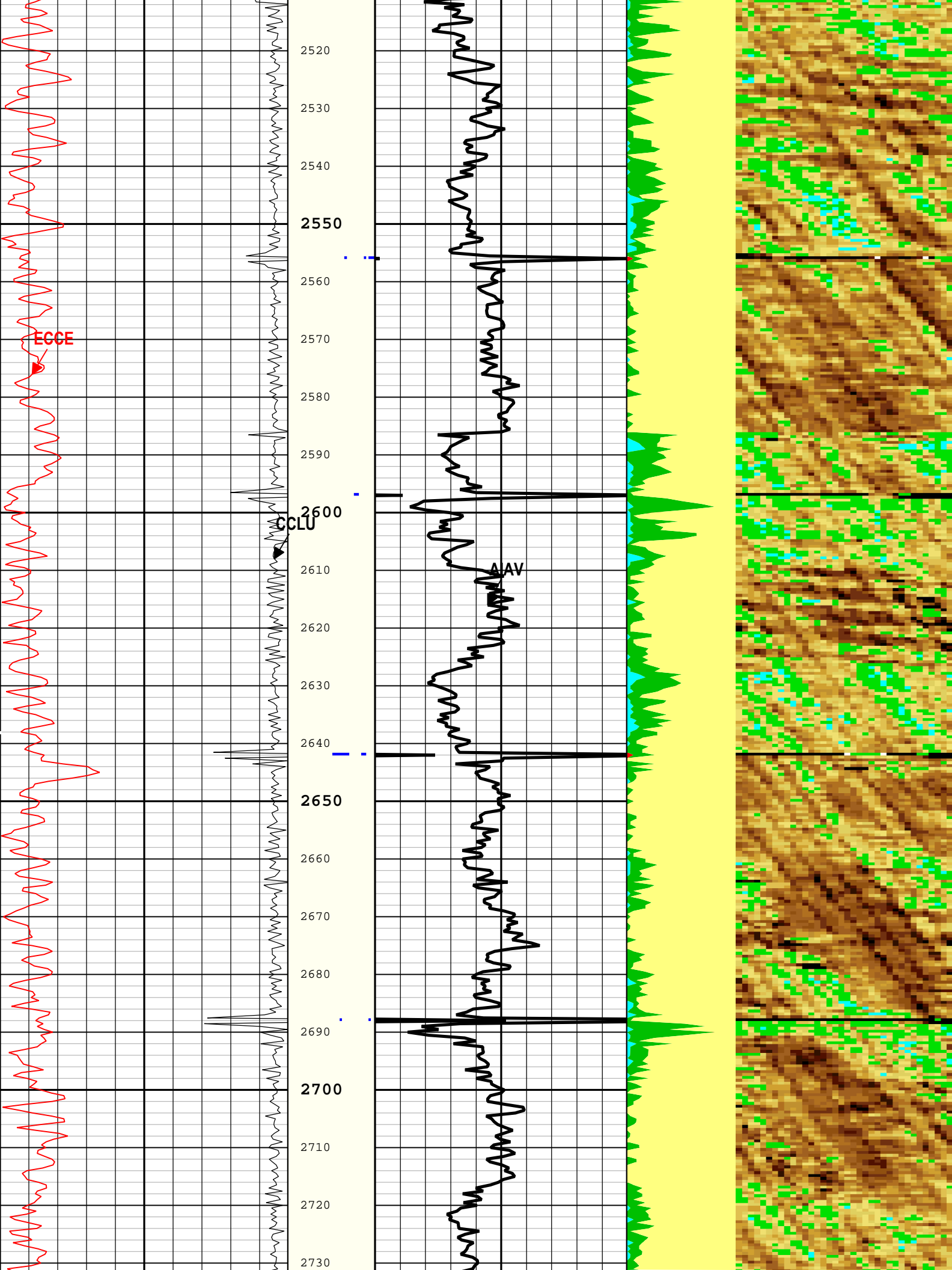


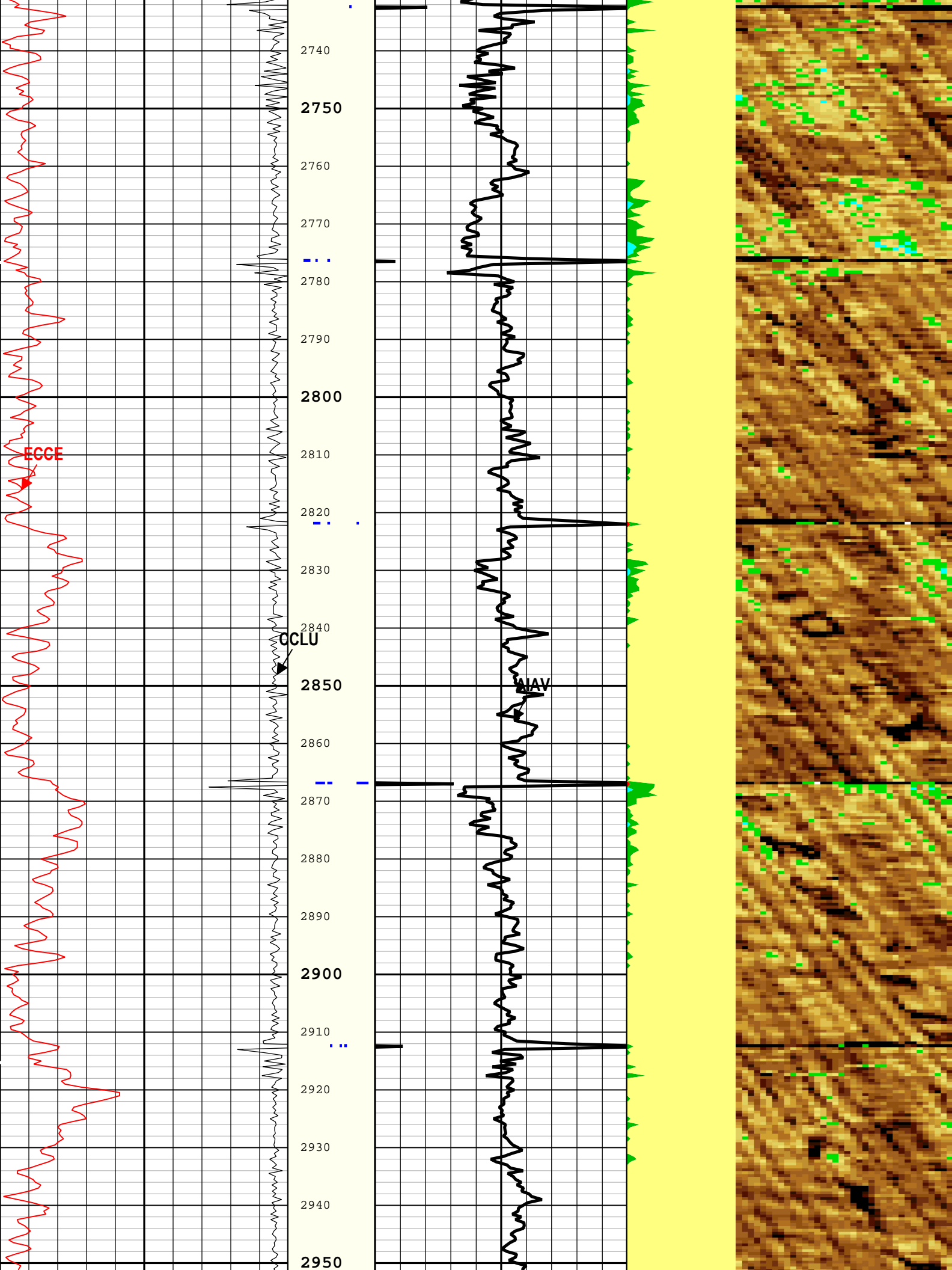


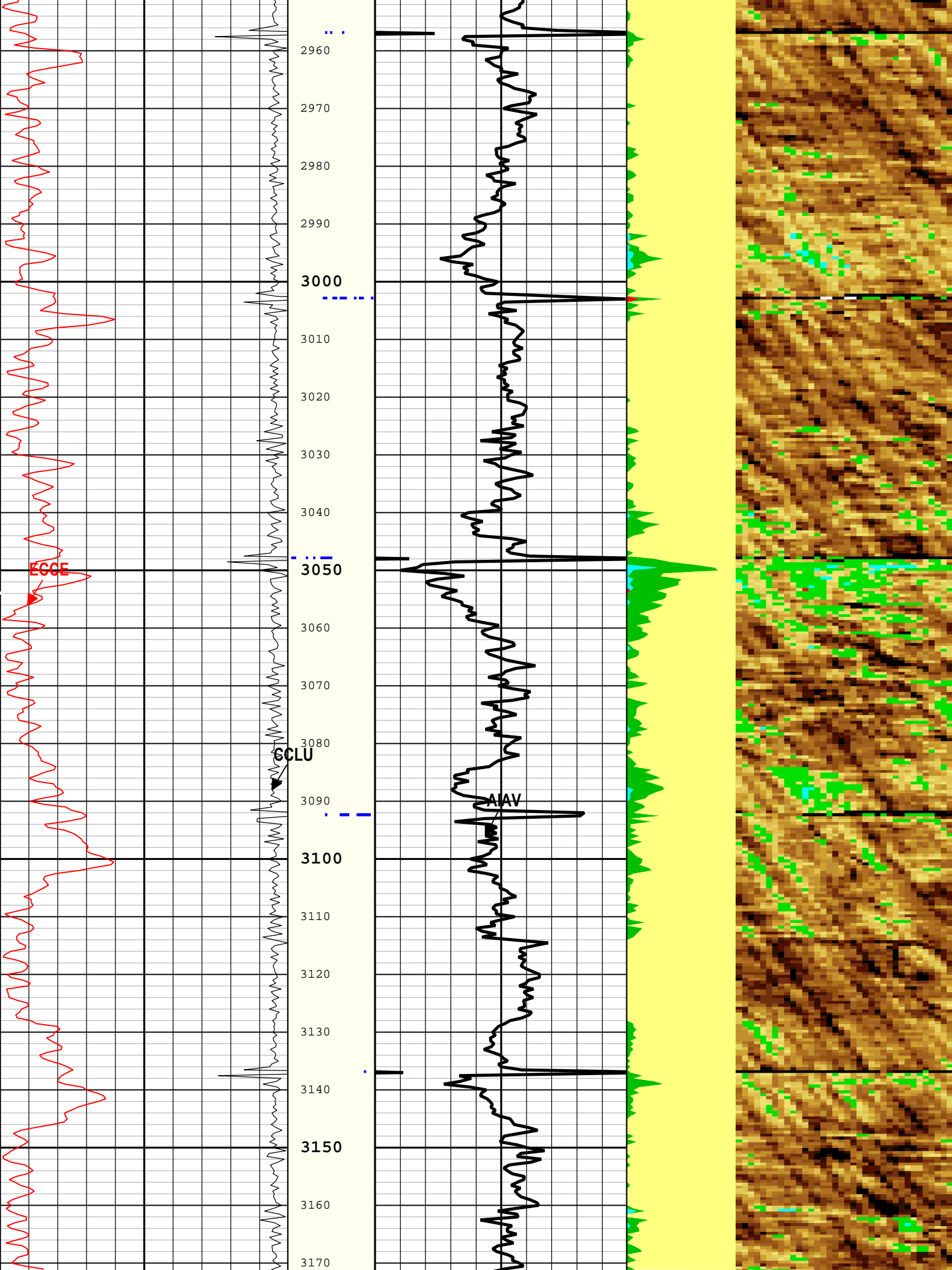


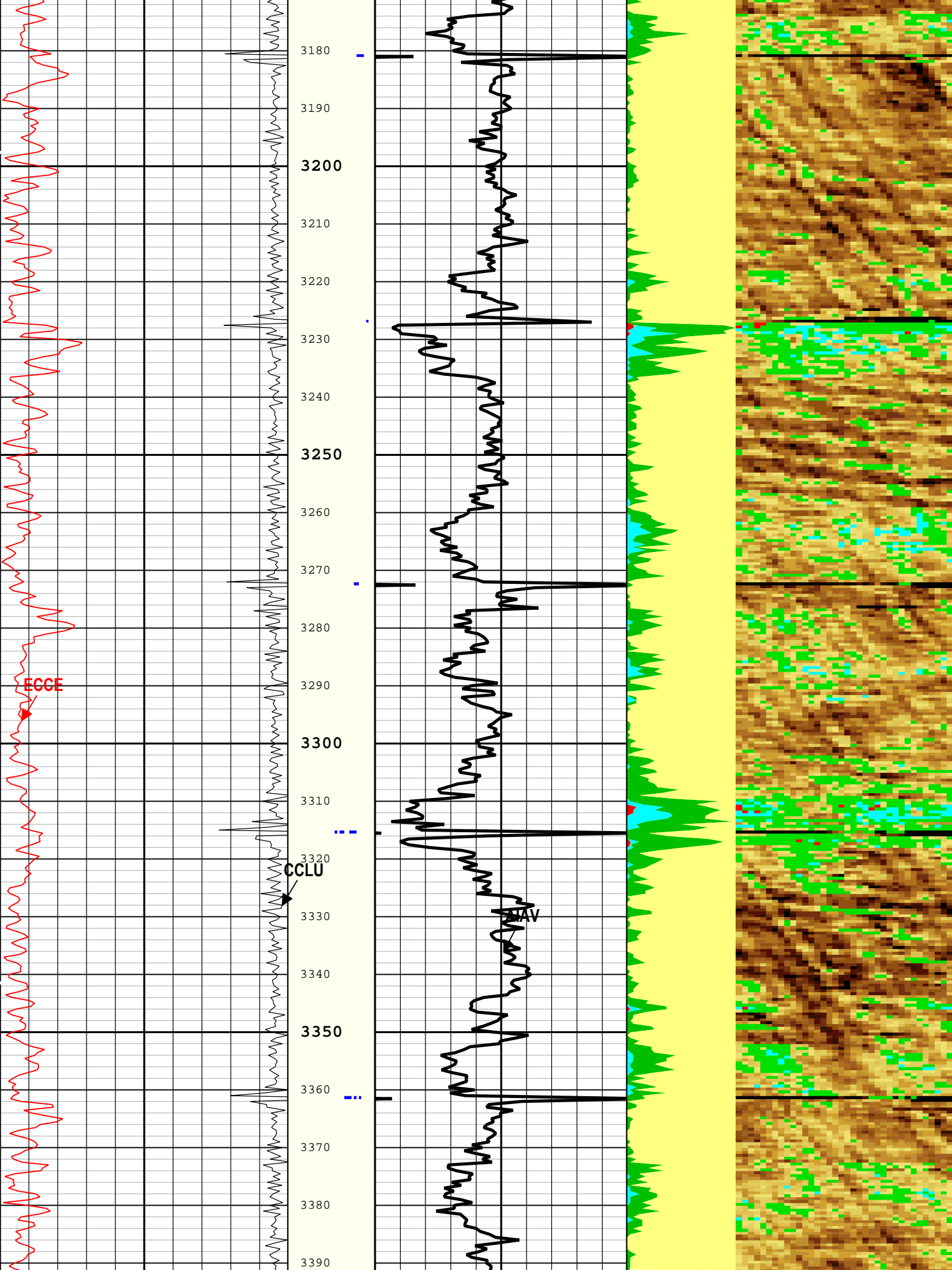


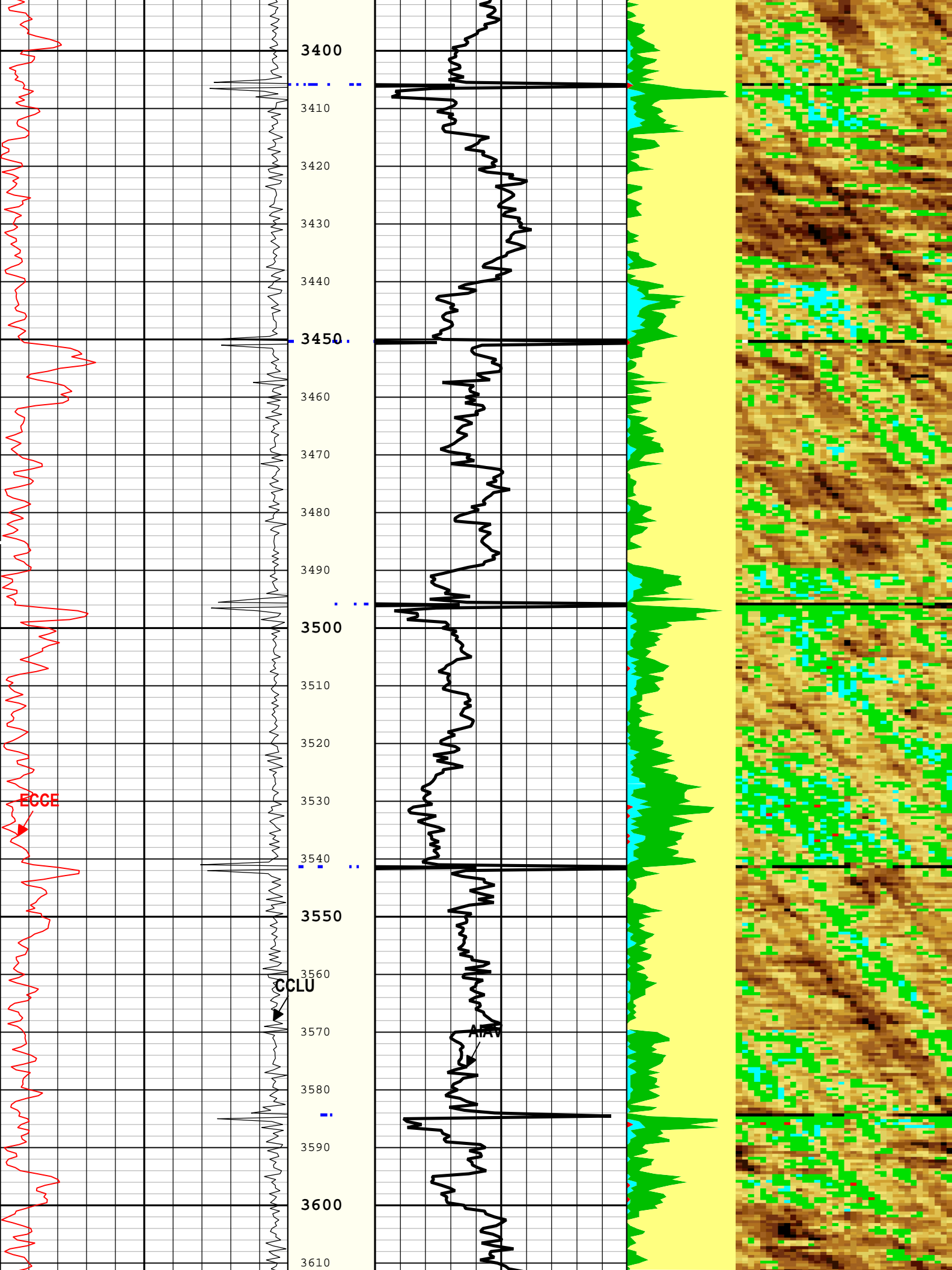


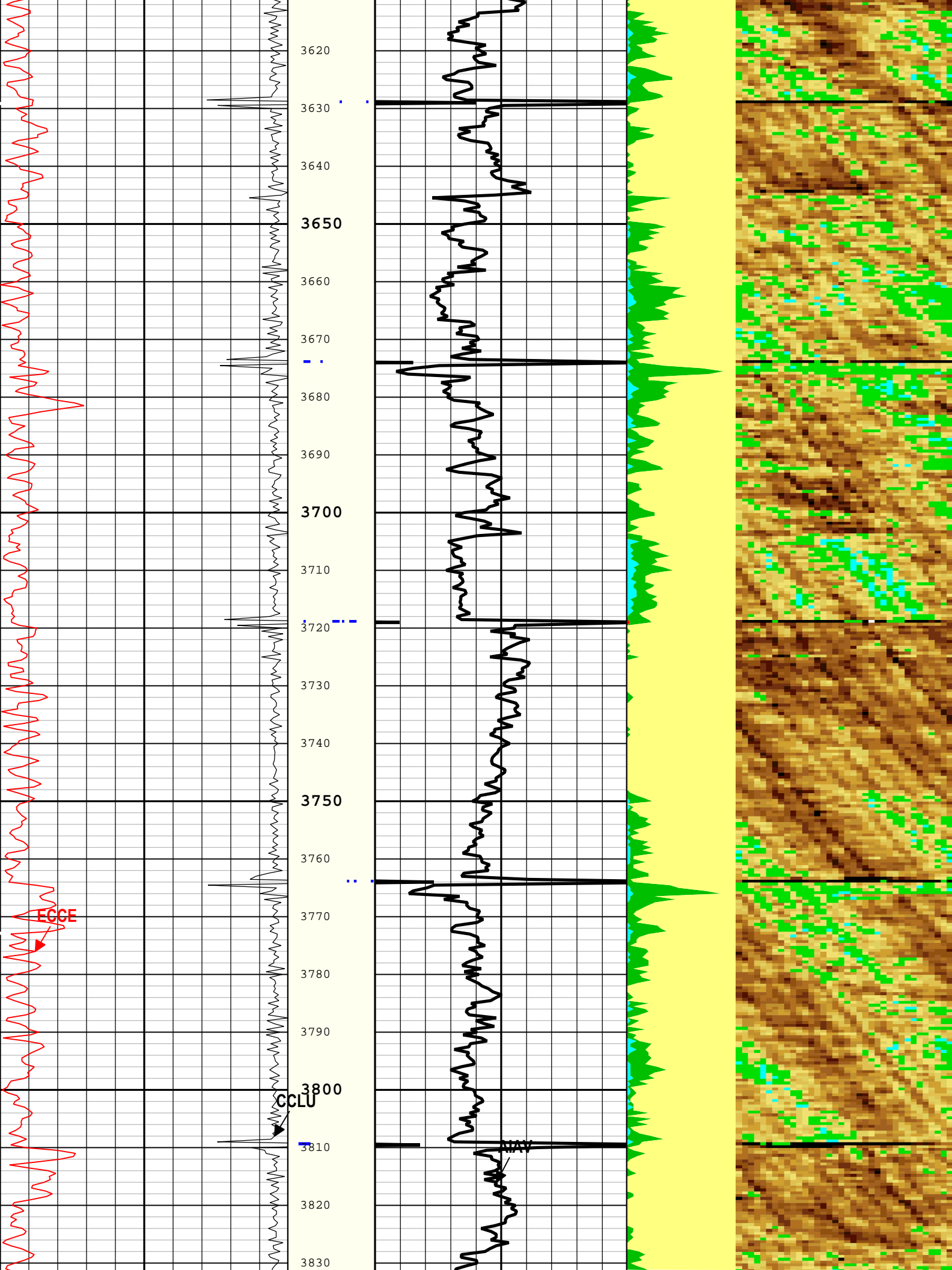


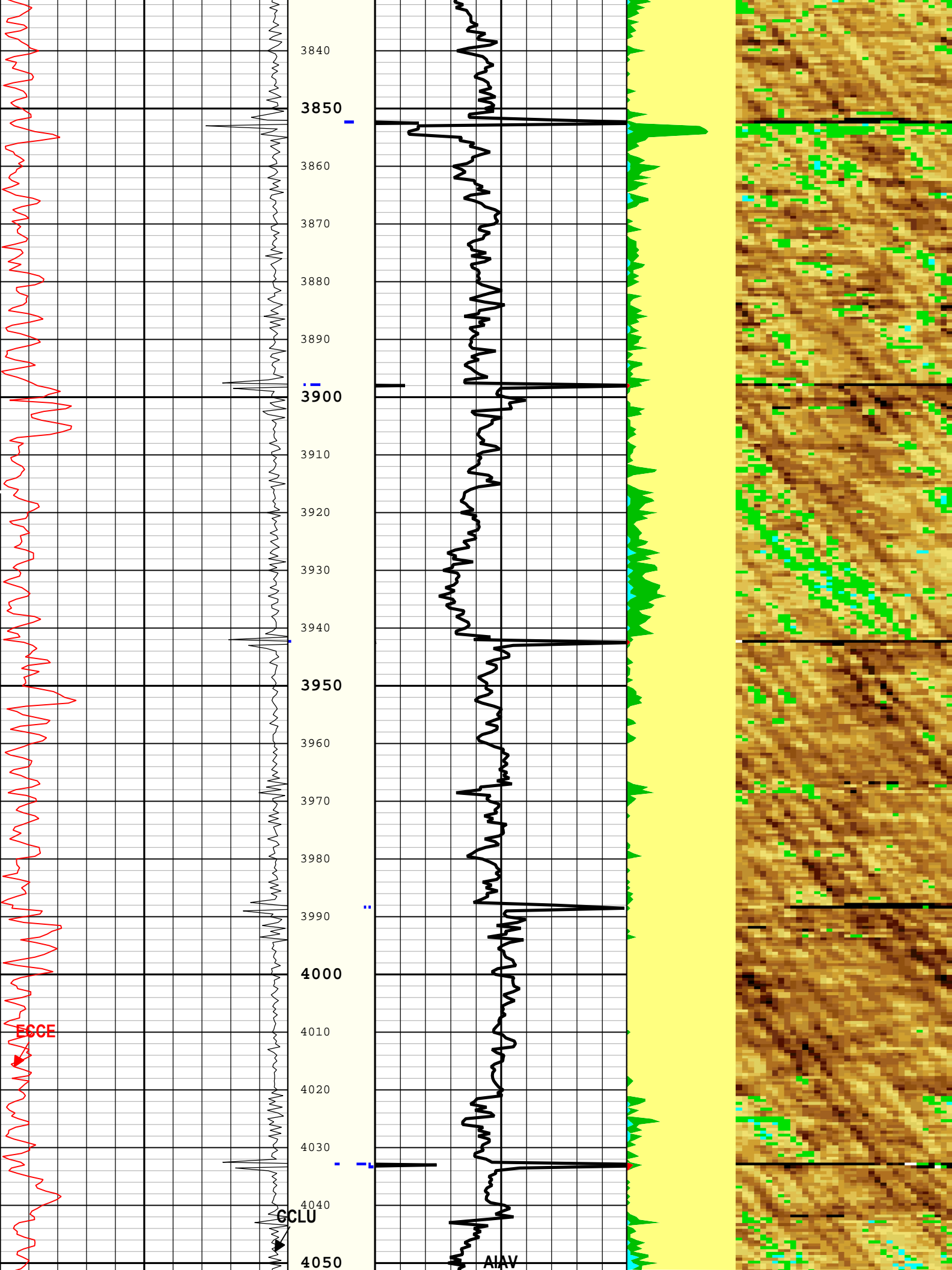


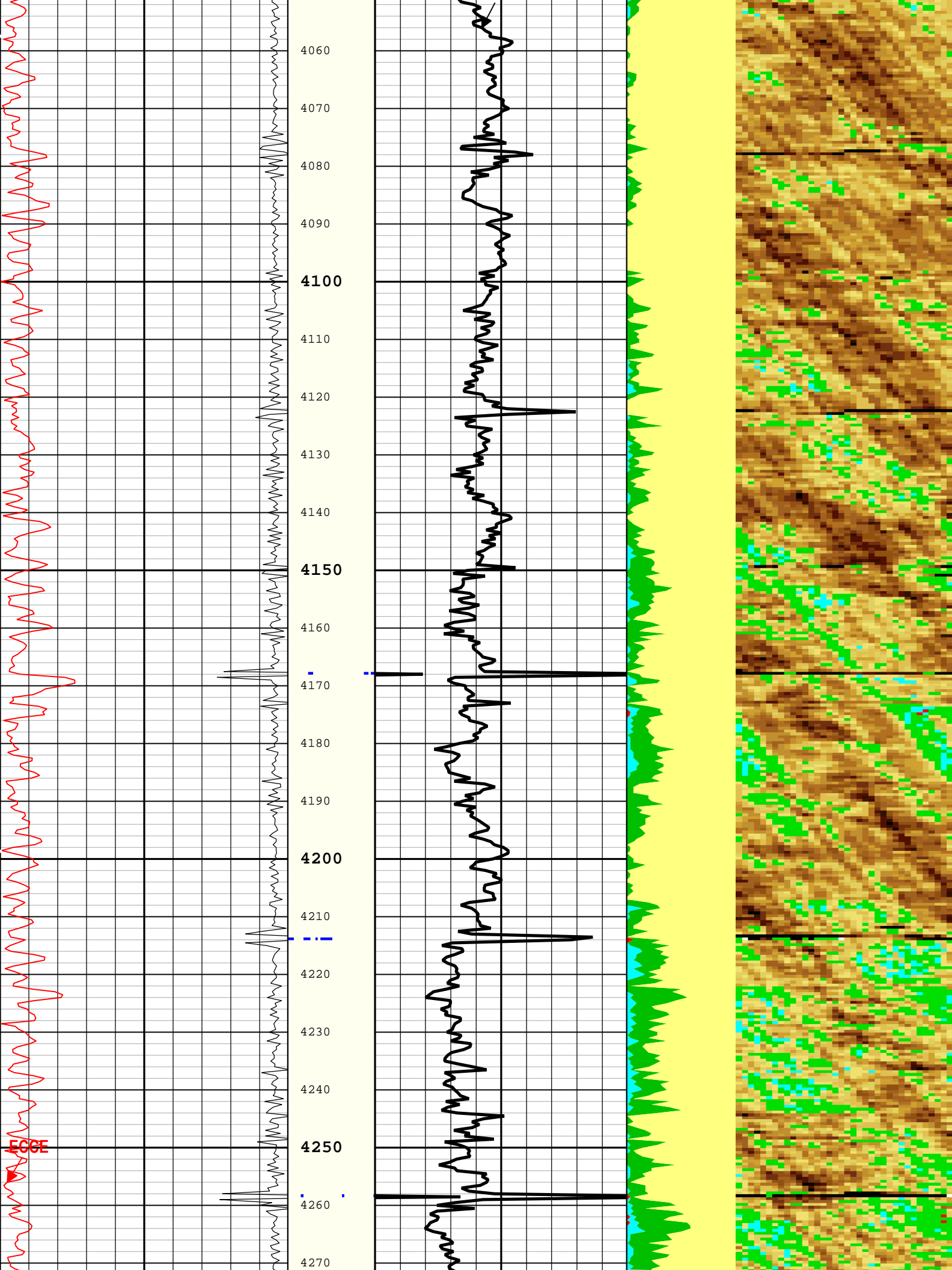


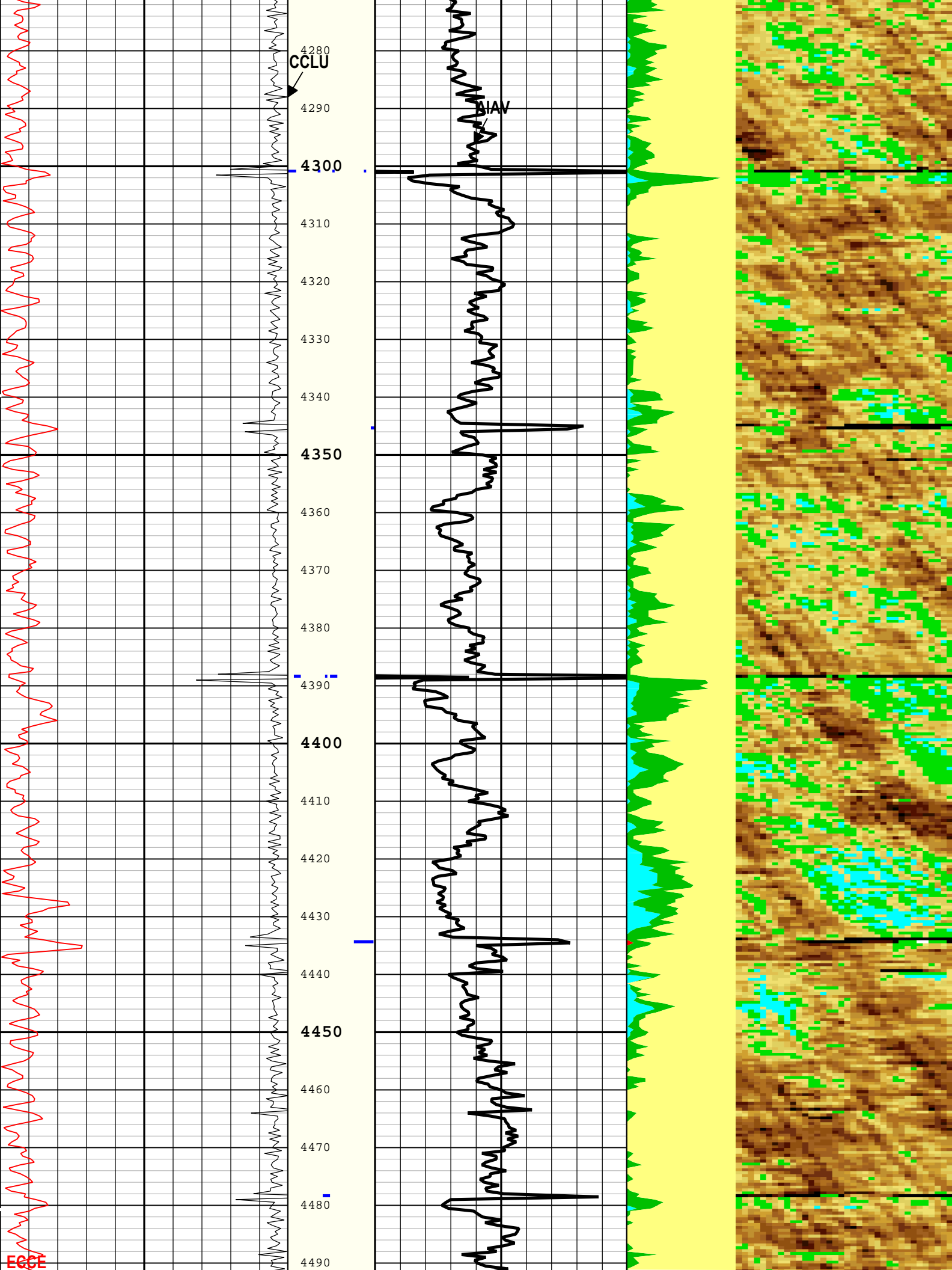


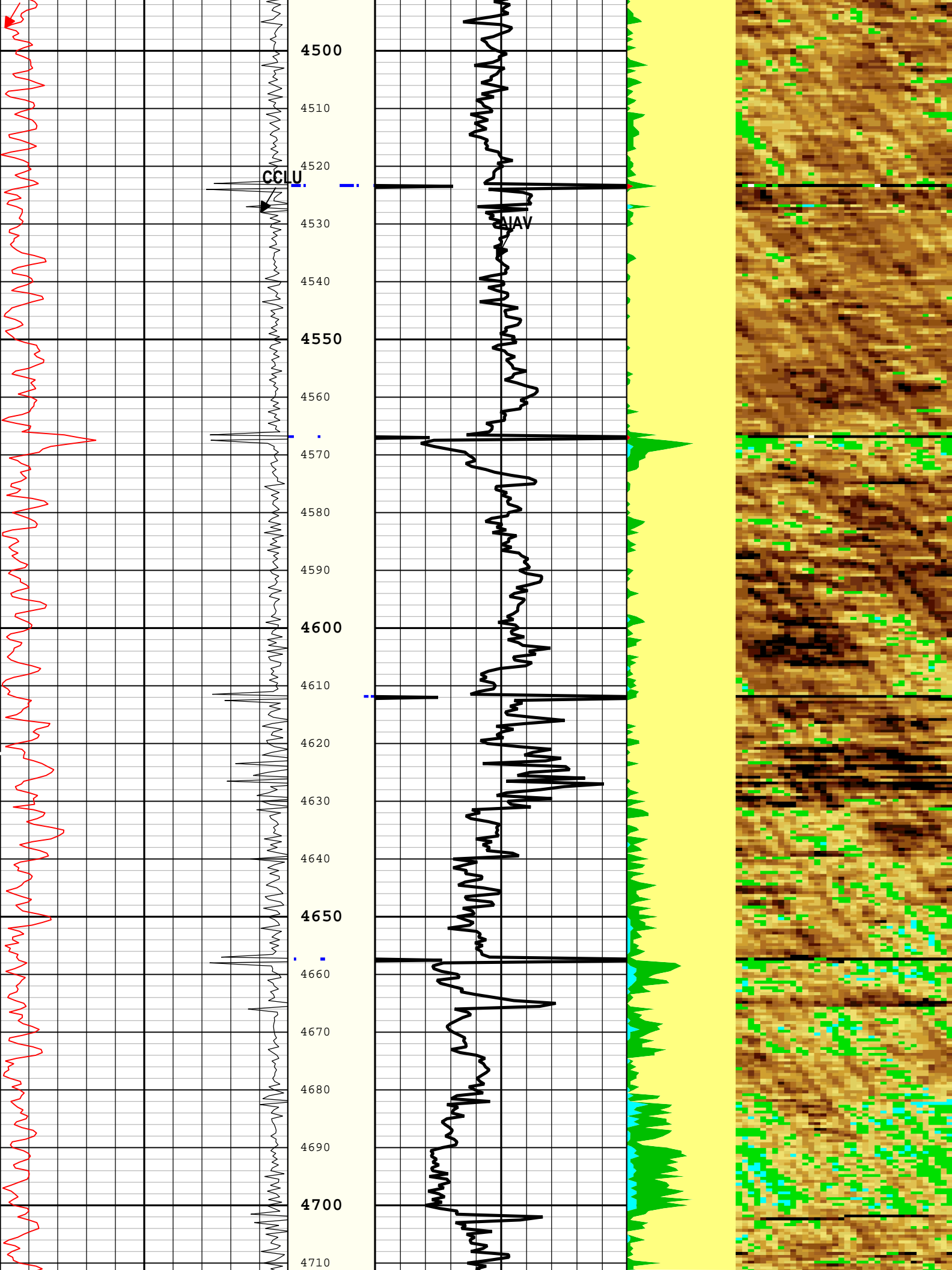


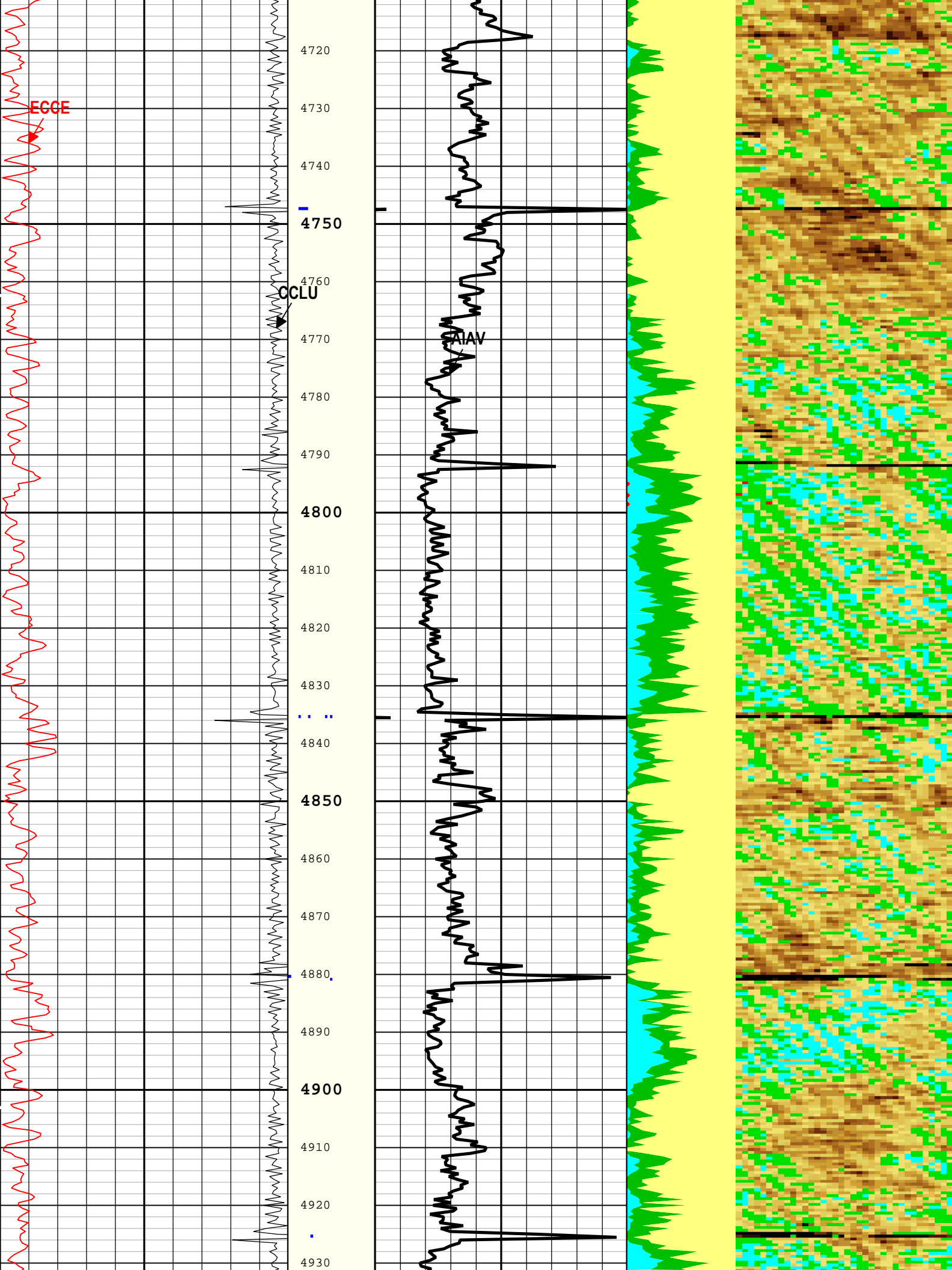


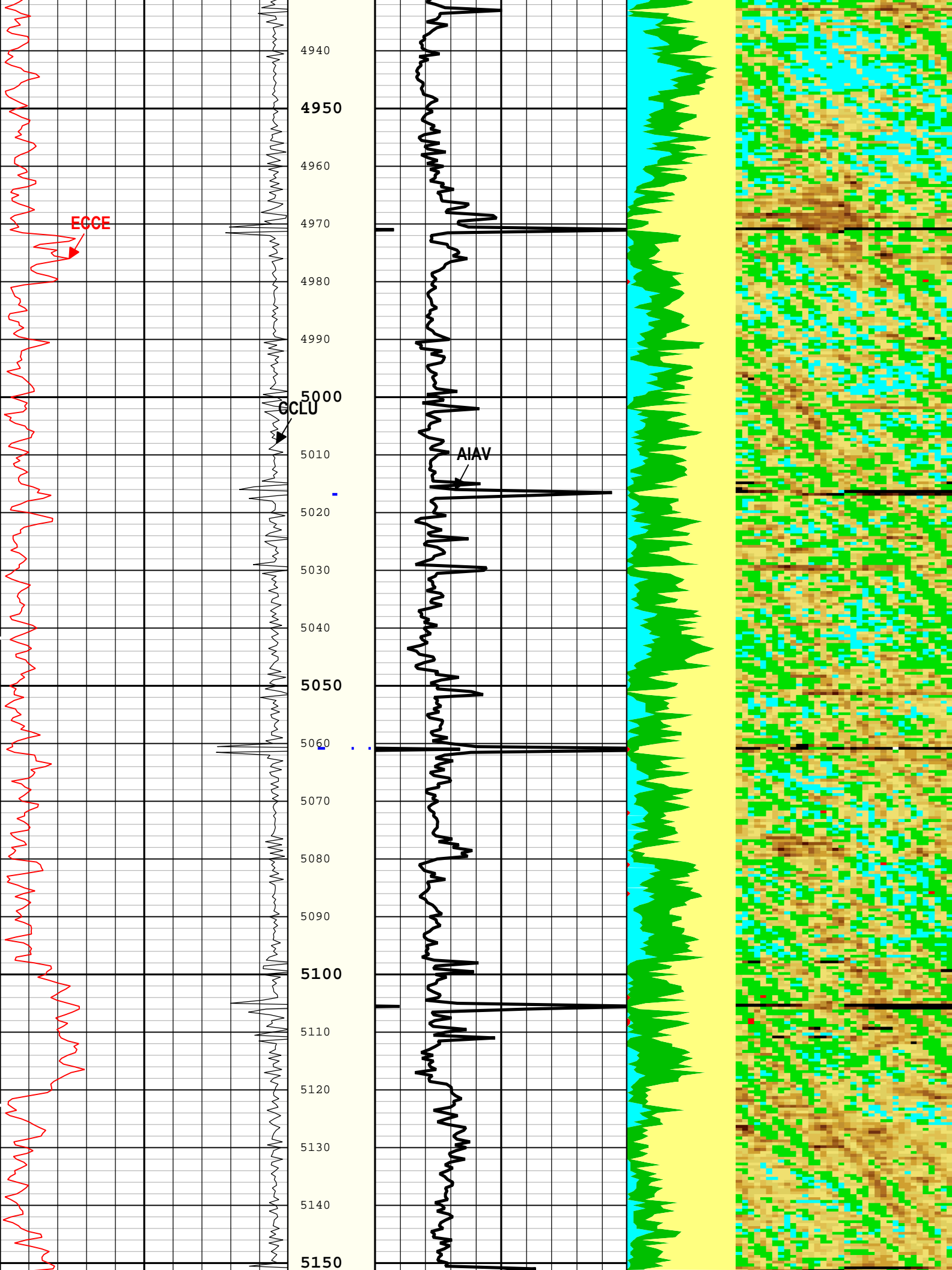


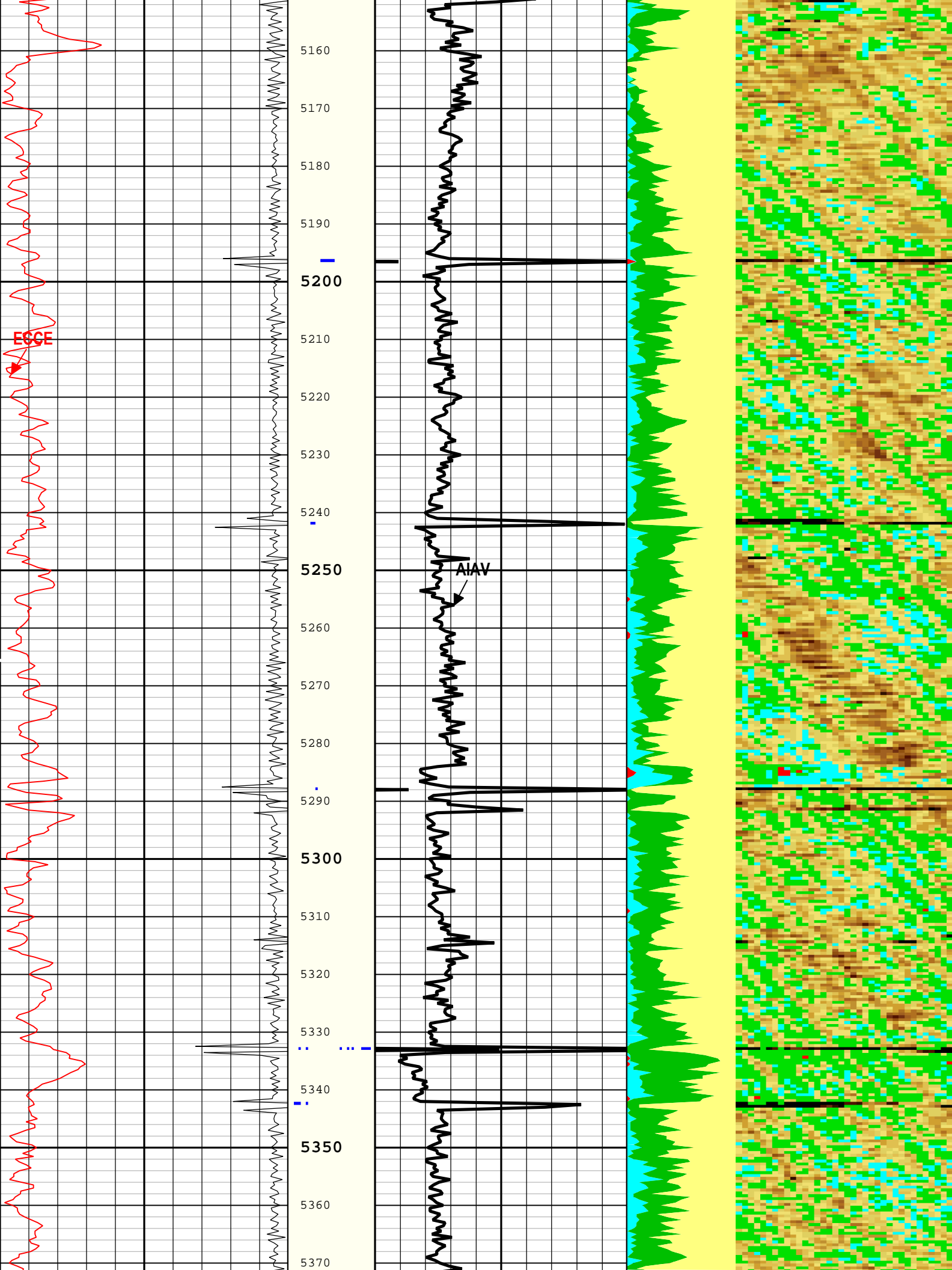


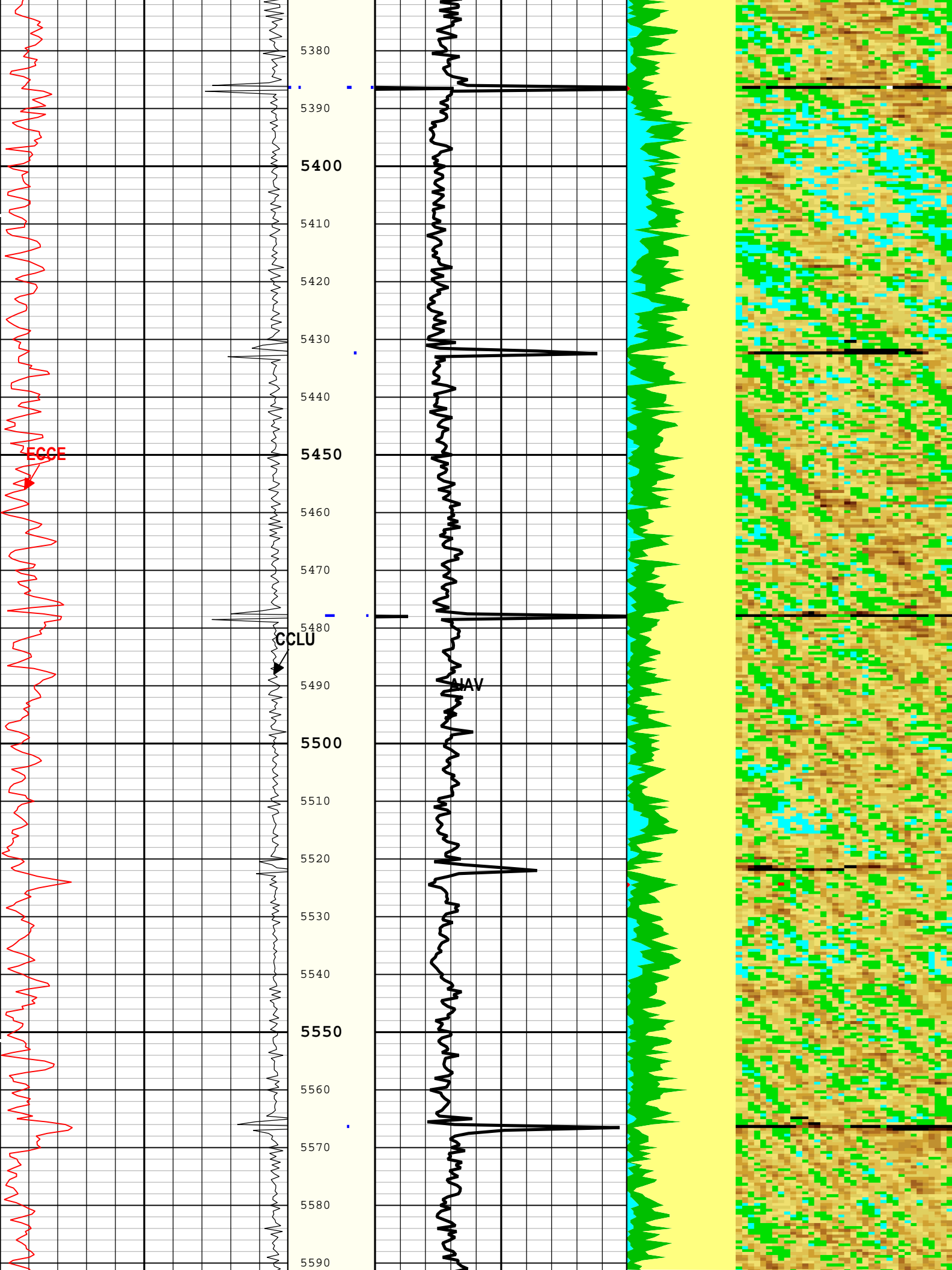


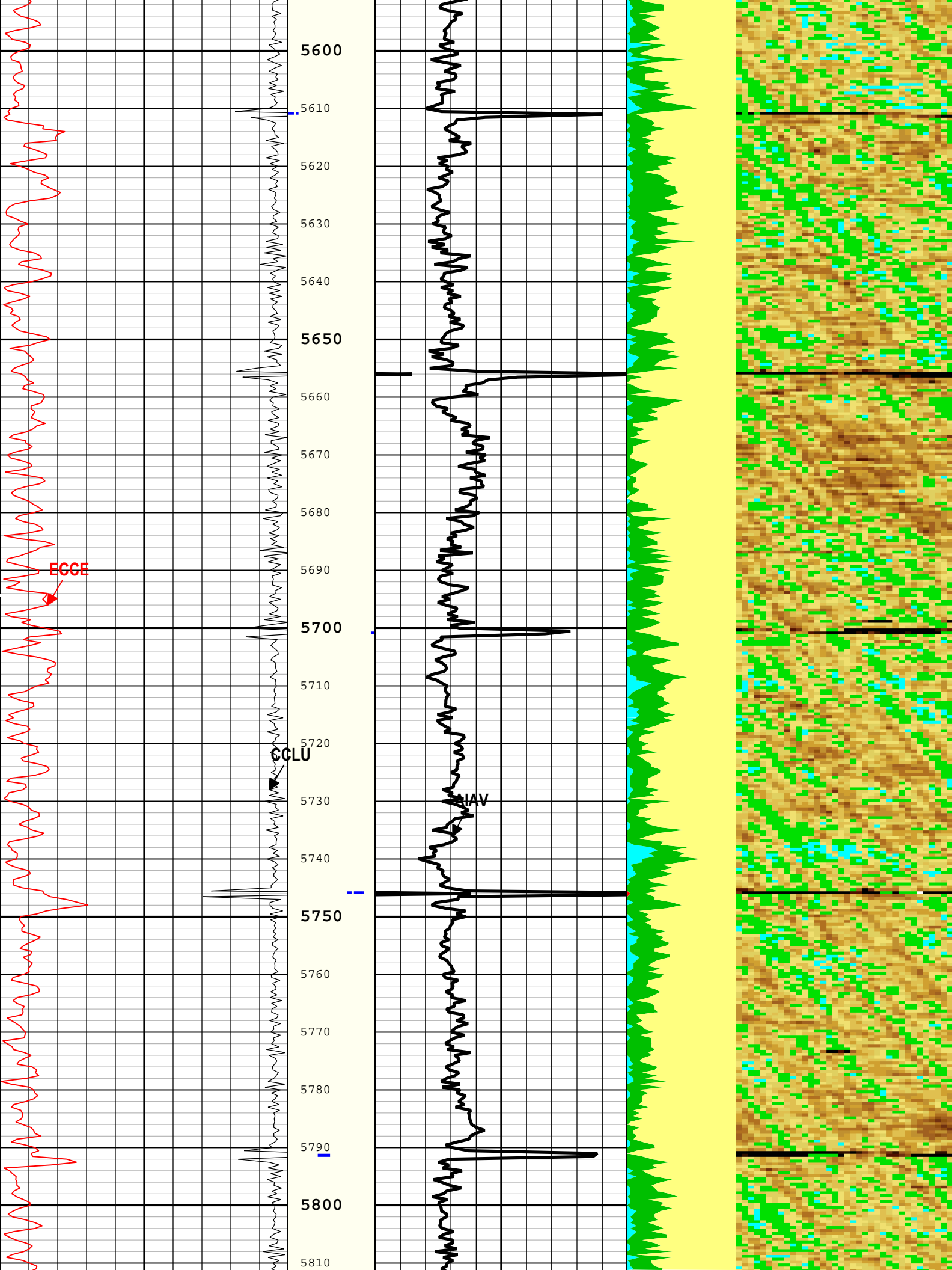


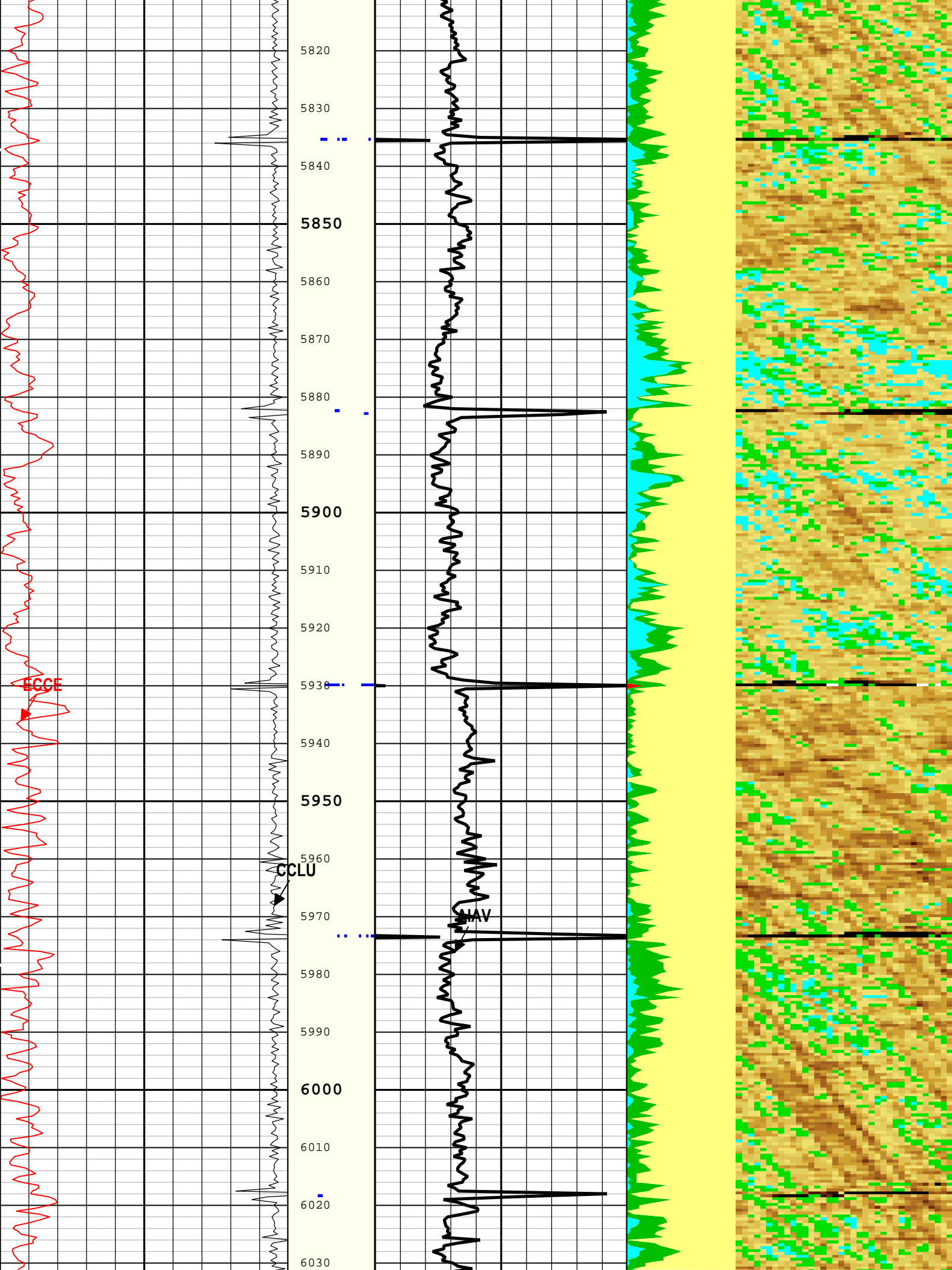


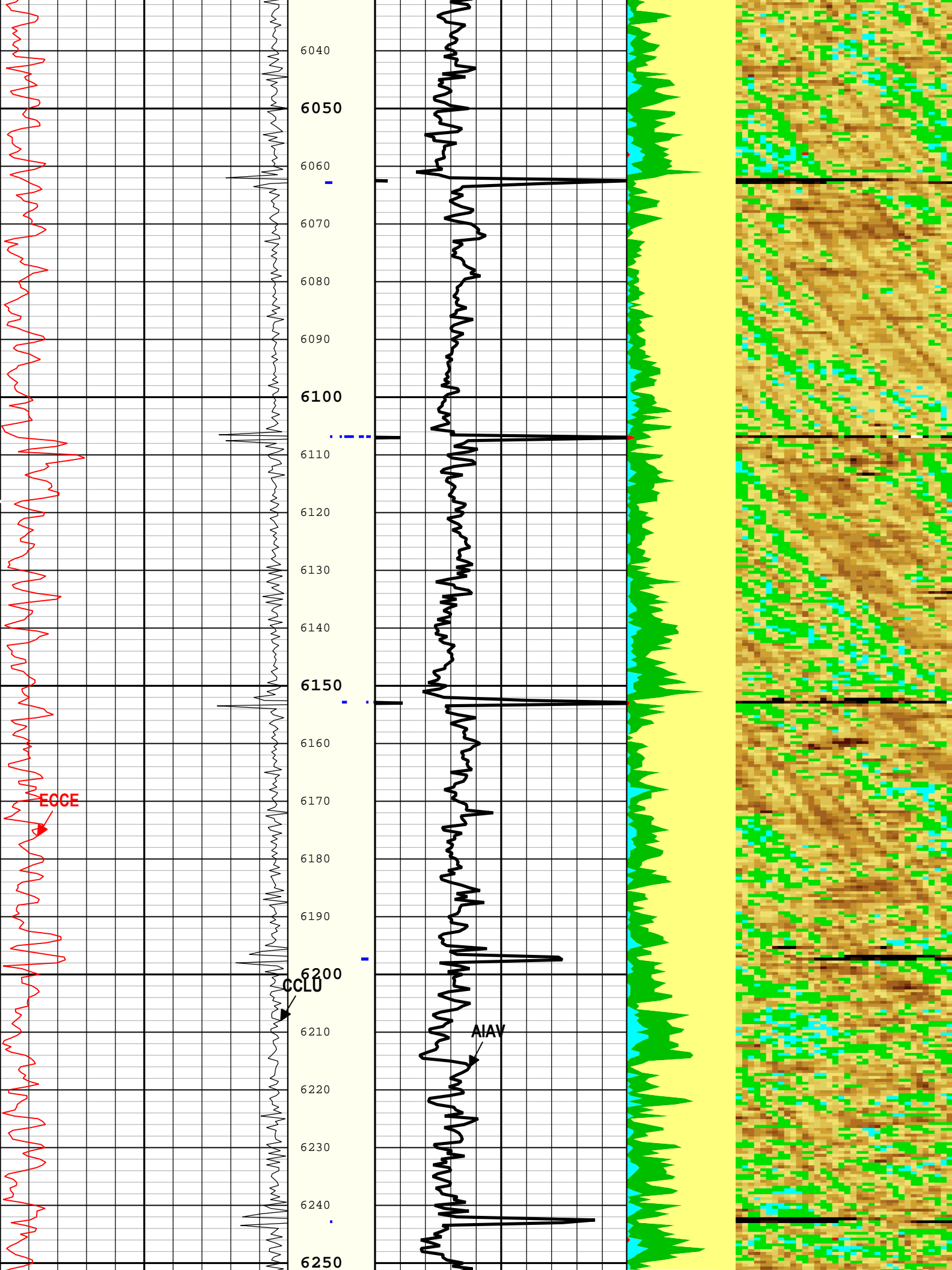


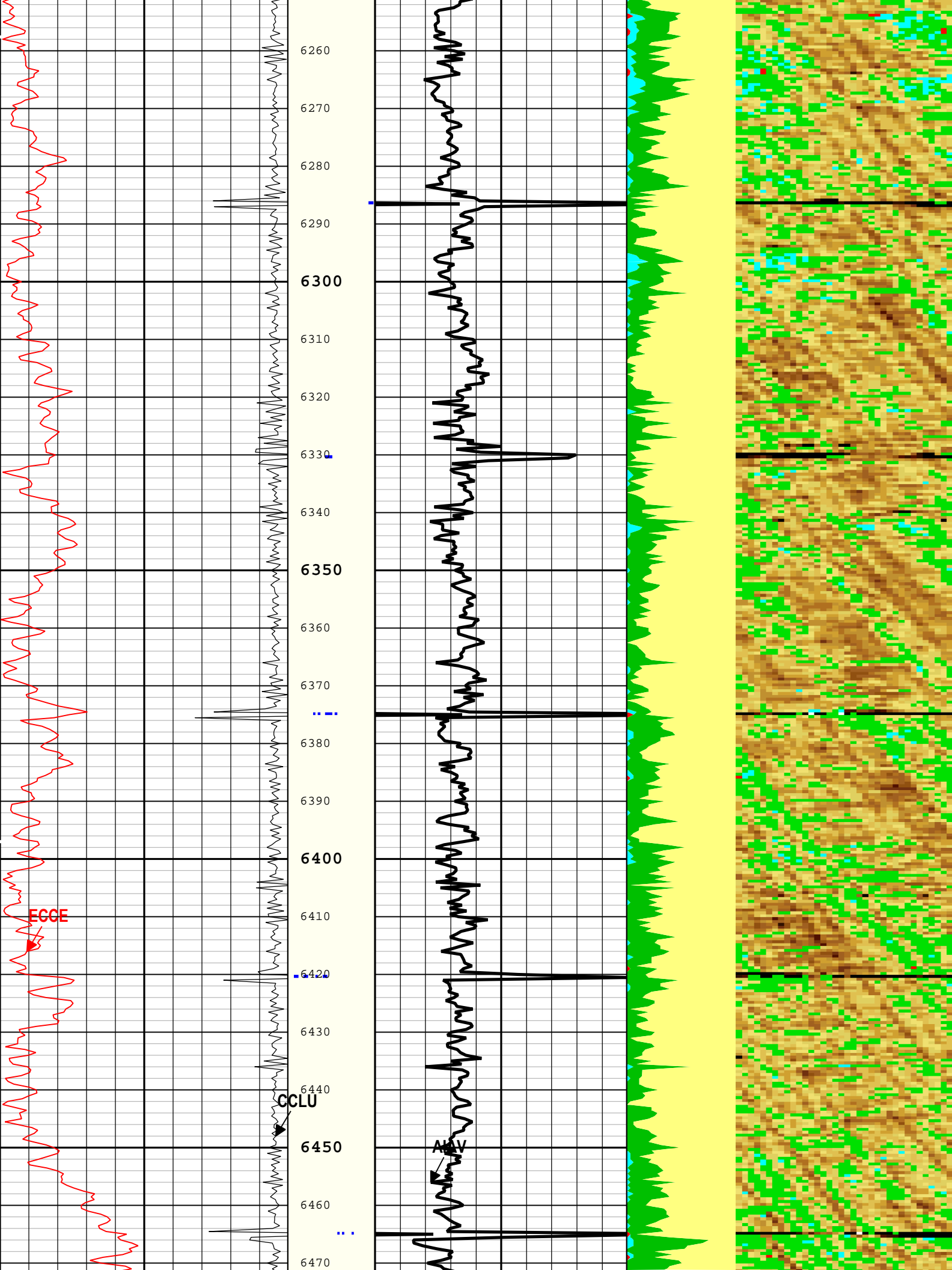


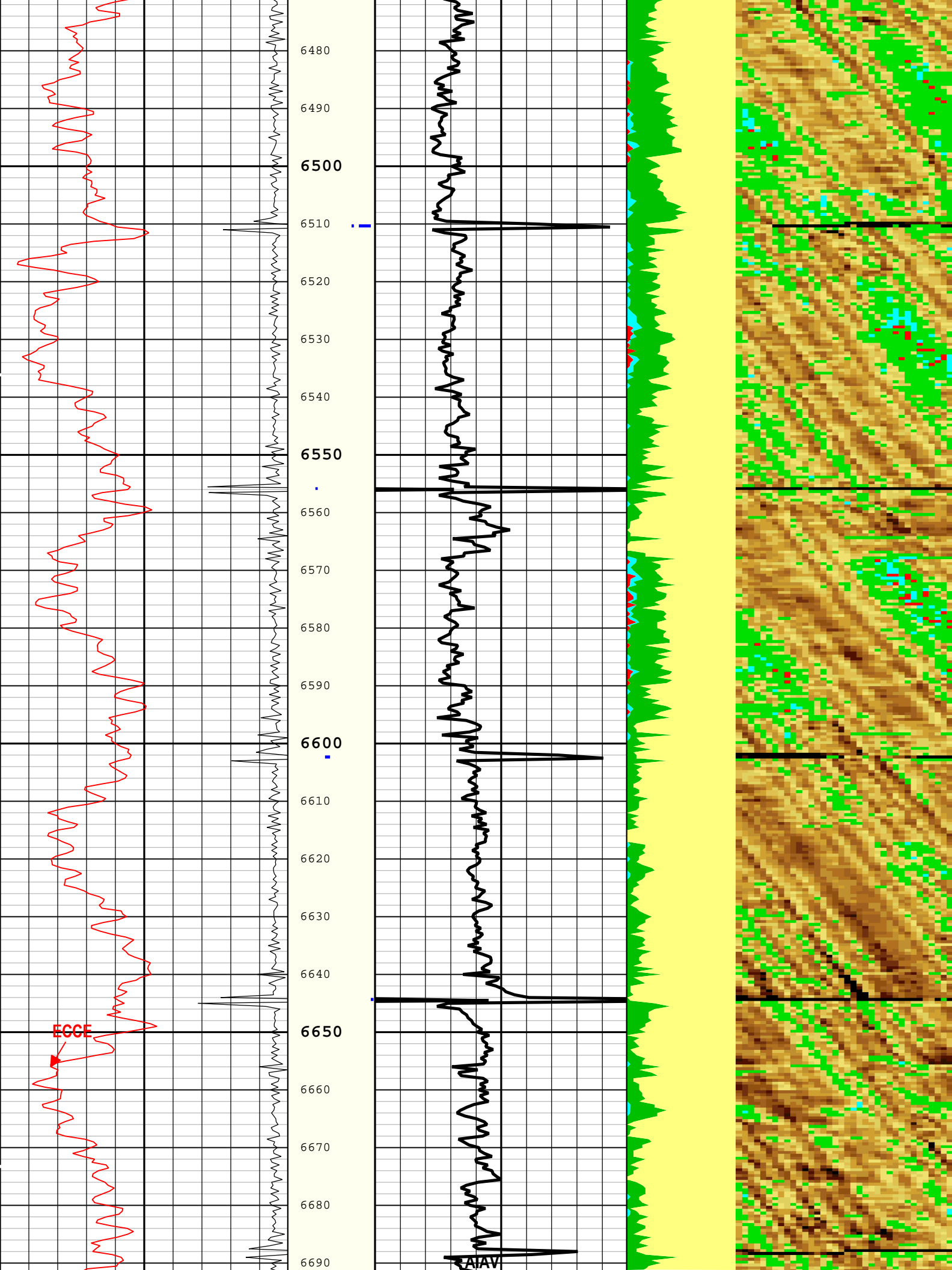


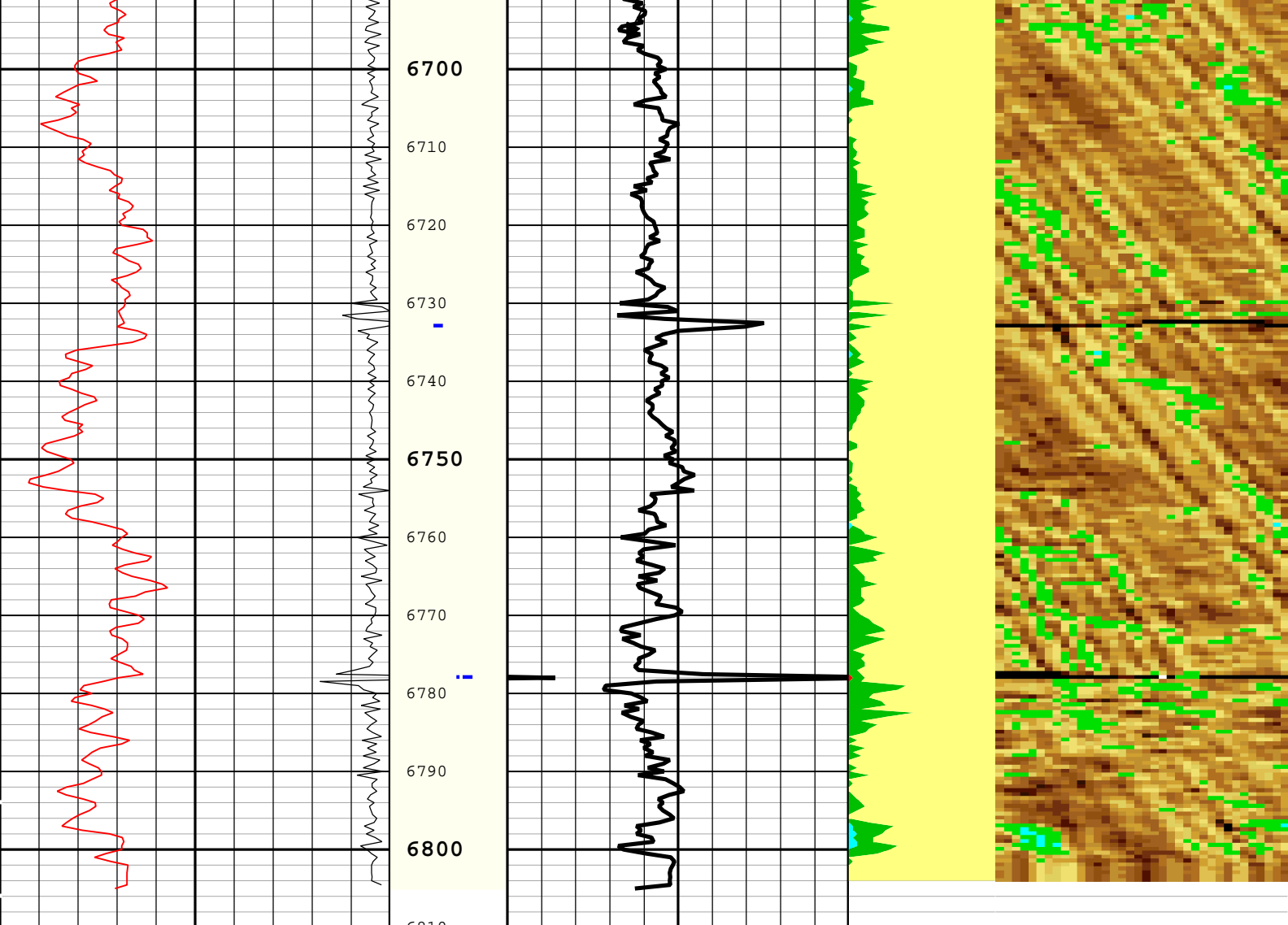












Casing Collar Locator Ultrasonic (CCLU) USIT-E			<div>Absent</div> <div>1.5002.5006.500</div> <div></div> <div>Explicit</div> <div>Normalization</div> <div>USIT - USIT Processing Flags (UFLG) USIT-E</div>	Acoustic Impedance Average (AIAV) USIT-E			<div>Gas</div> <div>Liquid</div> <div>Micro-Debonding</div> <div>Bonded</div>	<div>Absent</div> <div>-500.0002.2003.2544.3095.3636.4187.472</div> <div></div> <div>Custom Normalization</div> <div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)</div>
-20	in	1		0Mrayl10				
Amplitude of Eccentering (ECCE) USIT-E								
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: 03-Feb-2018 12:49:52

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
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
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	1.09	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
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	60	110
BS	13.5	110	2065
BS	8.5	2065	6810
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
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
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	
WINB	Window Begin Time	USIT-E	Time Zoned	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	50	02-Feb-2018 13:56:55	02-Feb-2018 14:10:38	6805.95	6585.06
EMXV	55	02-Feb-2018 14:10:38	02-Feb-2018 14:58:49	6585.06	65.16
WINB	31.88	02-Feb-2018 13:56:55	02-Feb-2018 14:09:43	6805.95	6710.33
WINB	31.17	02-Feb-2018 14:09:43	02-Feb-2018 14:58:49	6710.33	65.16
All depth are at tool zero.					

ONE									
0 PSI Repeat Pass									

Software Version									
Acquisition System						Version			
Maxwell 2017 SP3						7.3.92069.3100			
Application Patch						Wireline_NPD-ICE2-2017SP3_7.3.93033			

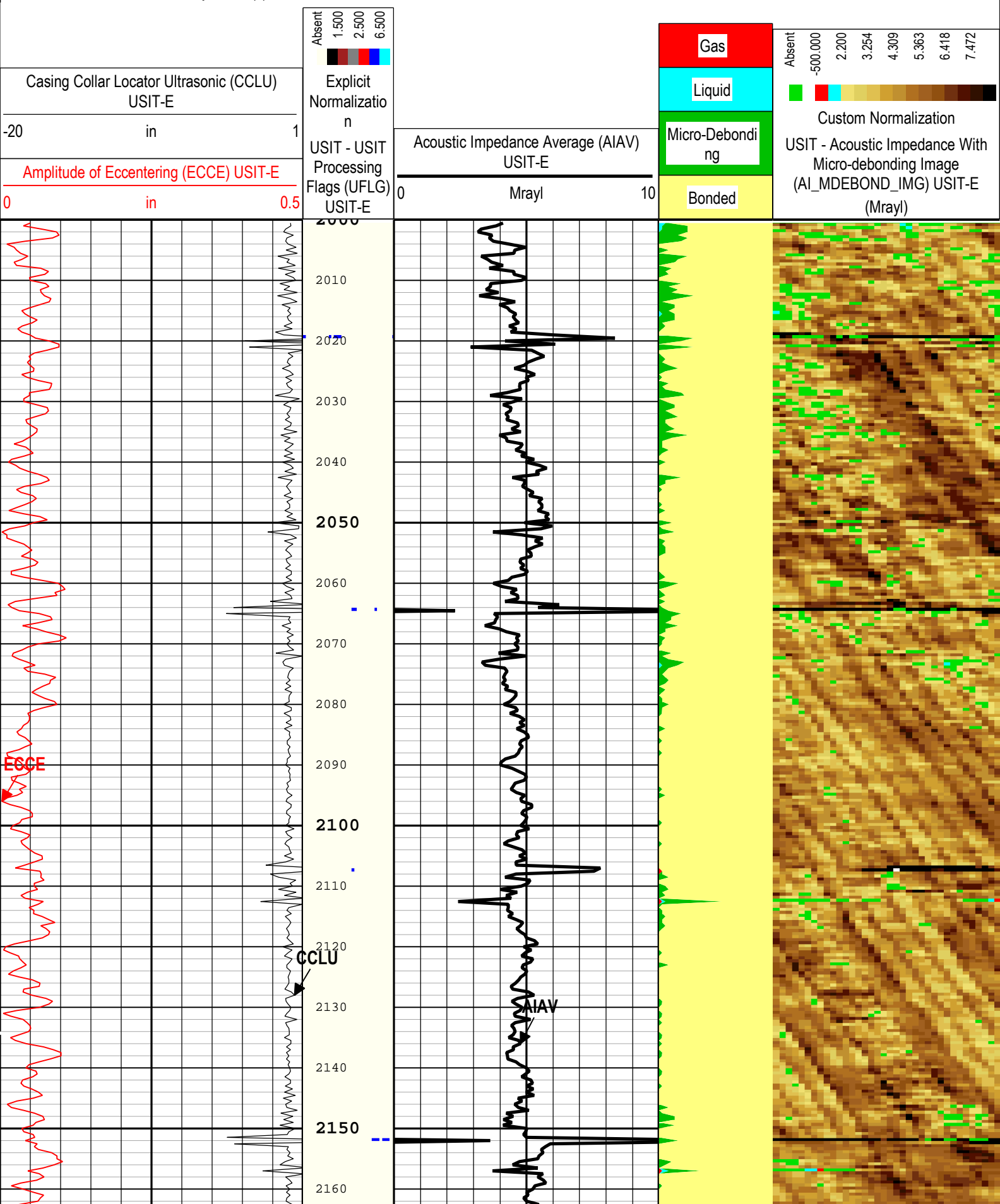
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[6]:Up	Up	2000.71 ft	2508.35 ft	02-Feb-2018 1:34:06 PM	02-Feb-2018 1:37:51 PM	ON	4.30 ft	Yes

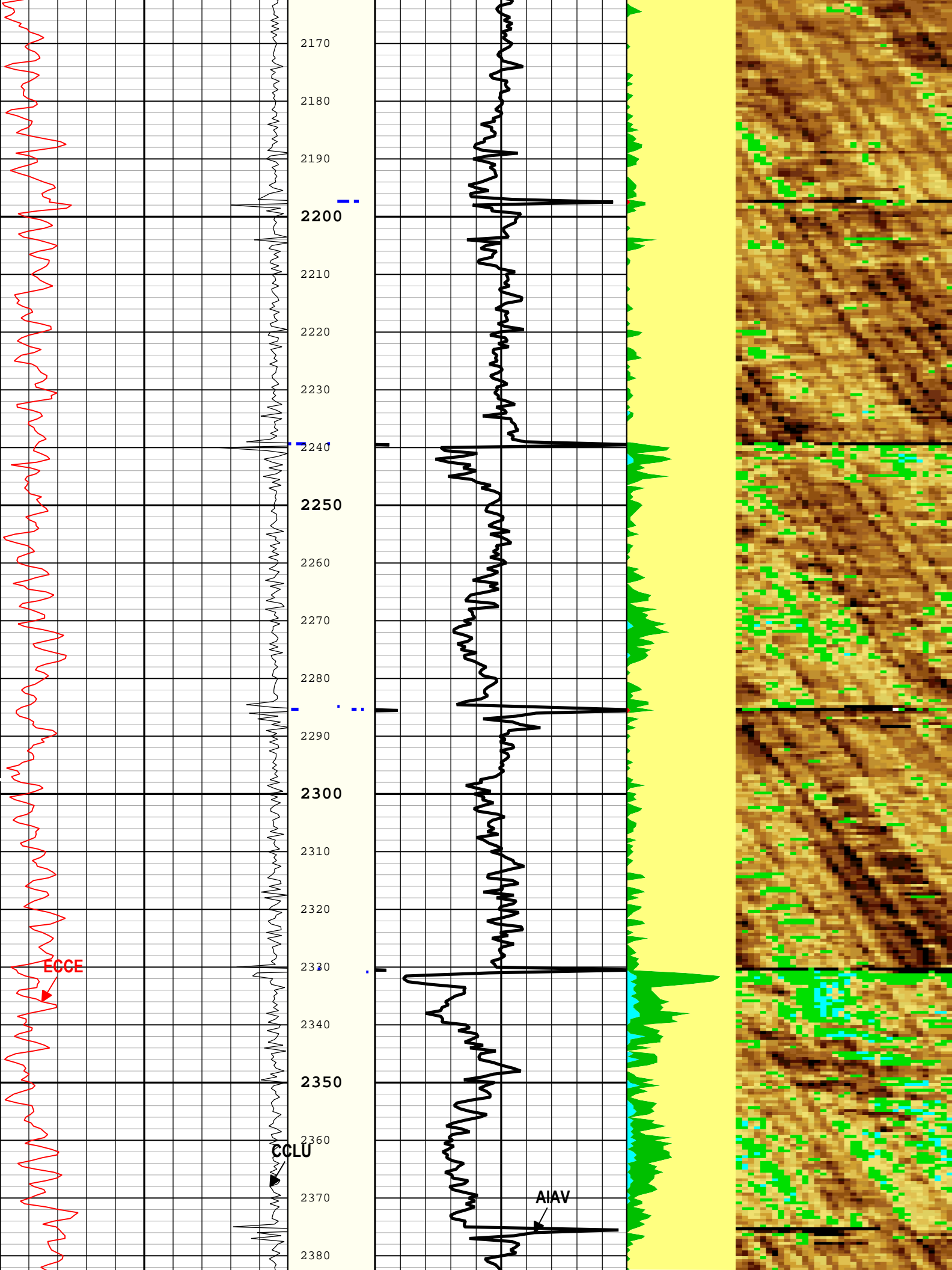
All depths are referenced to toolstringa zero

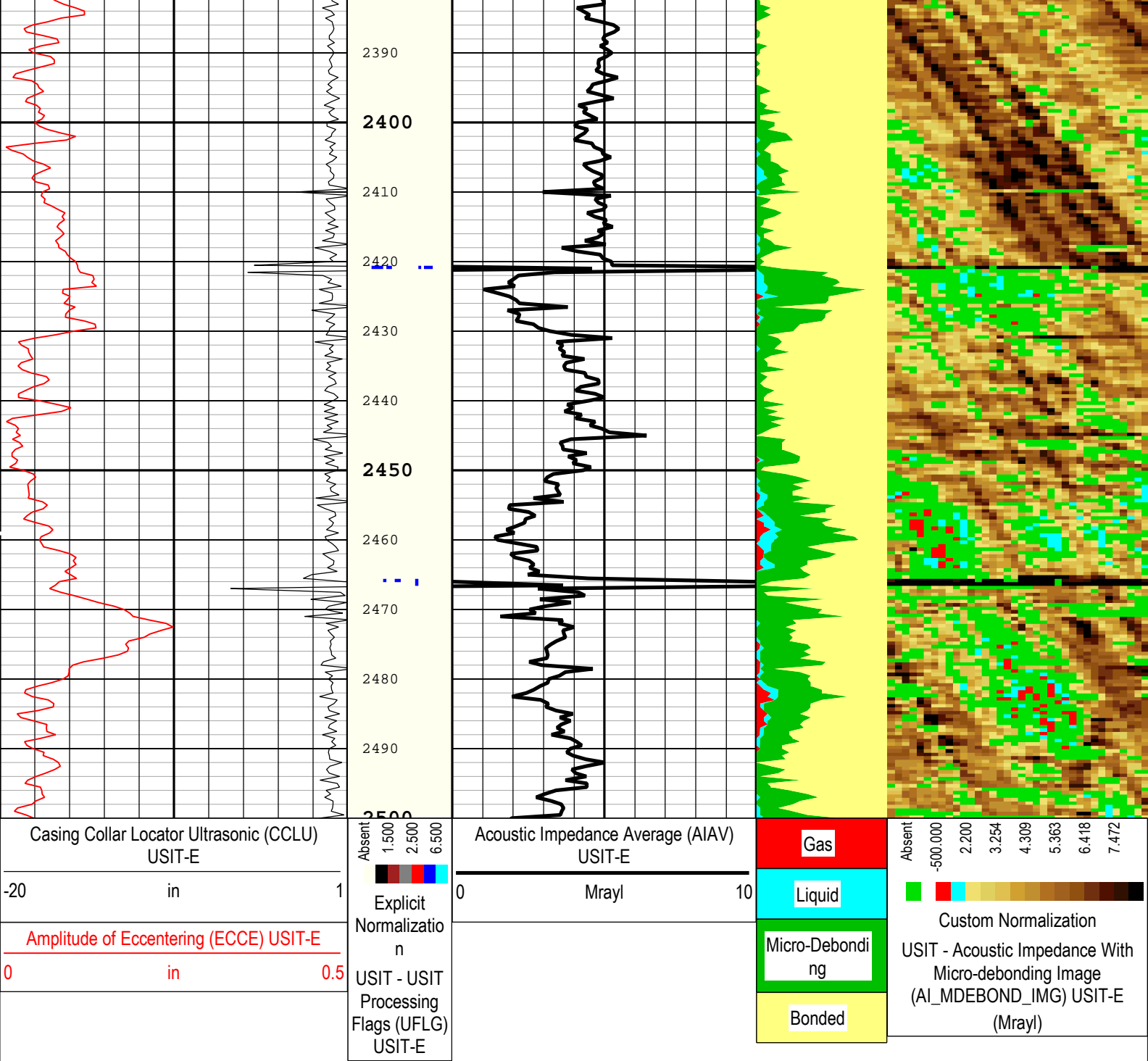
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Creation Date: 03-Feb-2018 12:49:59

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: 03-Feb-2018 12:49:59

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
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
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	1.09	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
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	13.5	2000	2065
BS	8.5	2065	2500

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
EMXV	EMEX Voltage	USIT-E	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
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	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

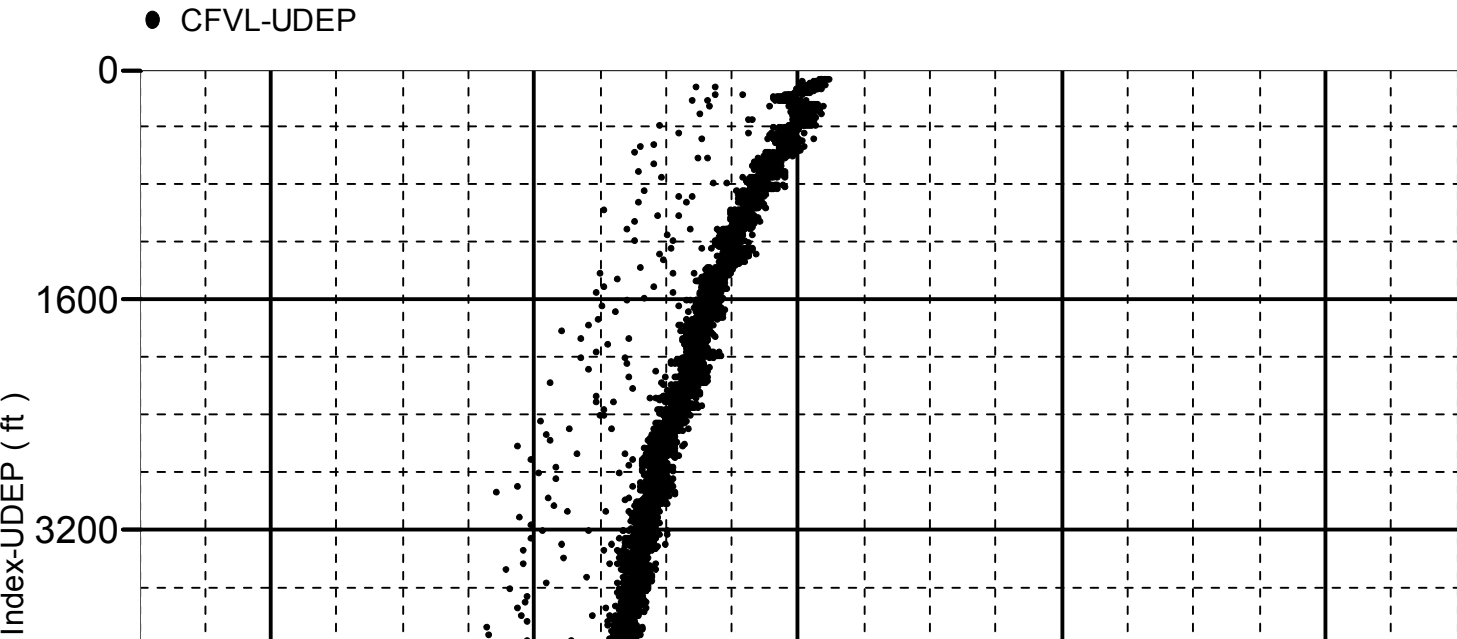
Company:Noble Energy Inc Well:Bison Ridge Y22-756

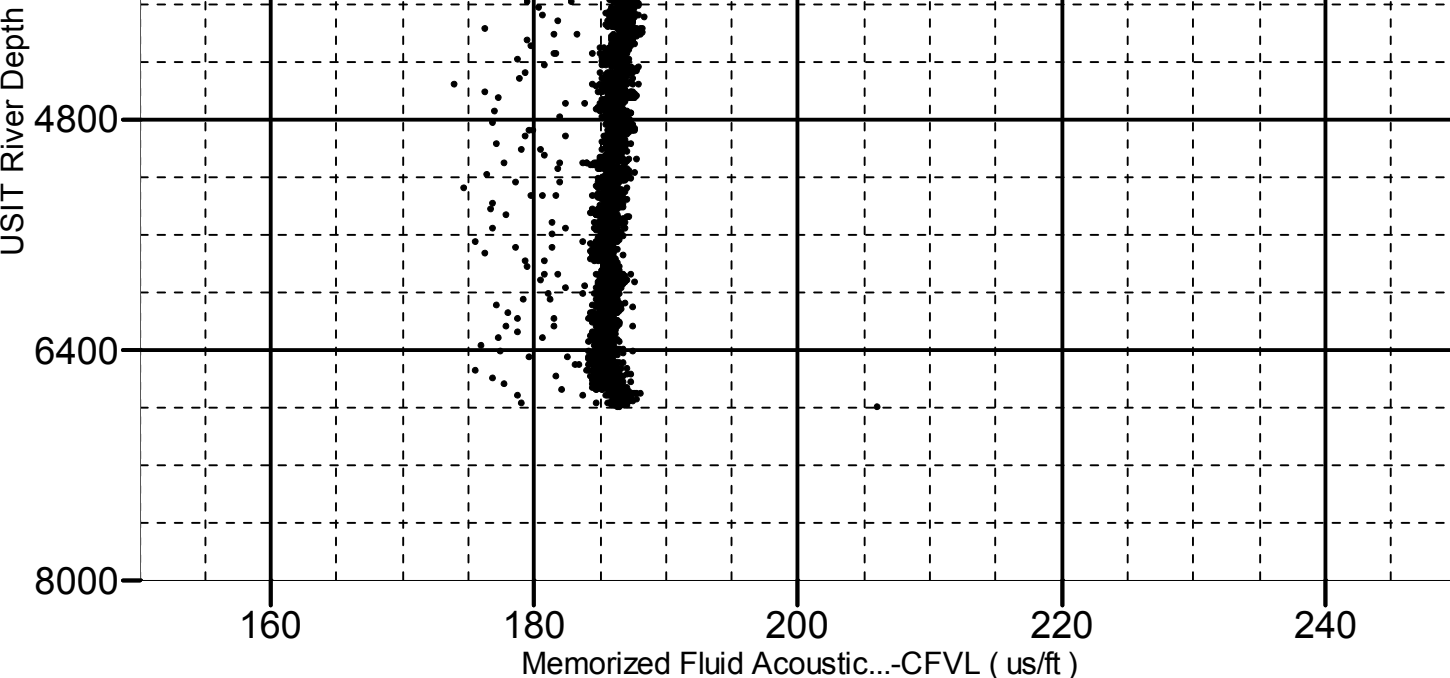
ONE: Log[10]:Up:S005

Fluid Acoustic Slow ness vs Depth

2D Cross Plot

Index Range: From 6805.50 to 65.00 ft





XYZ

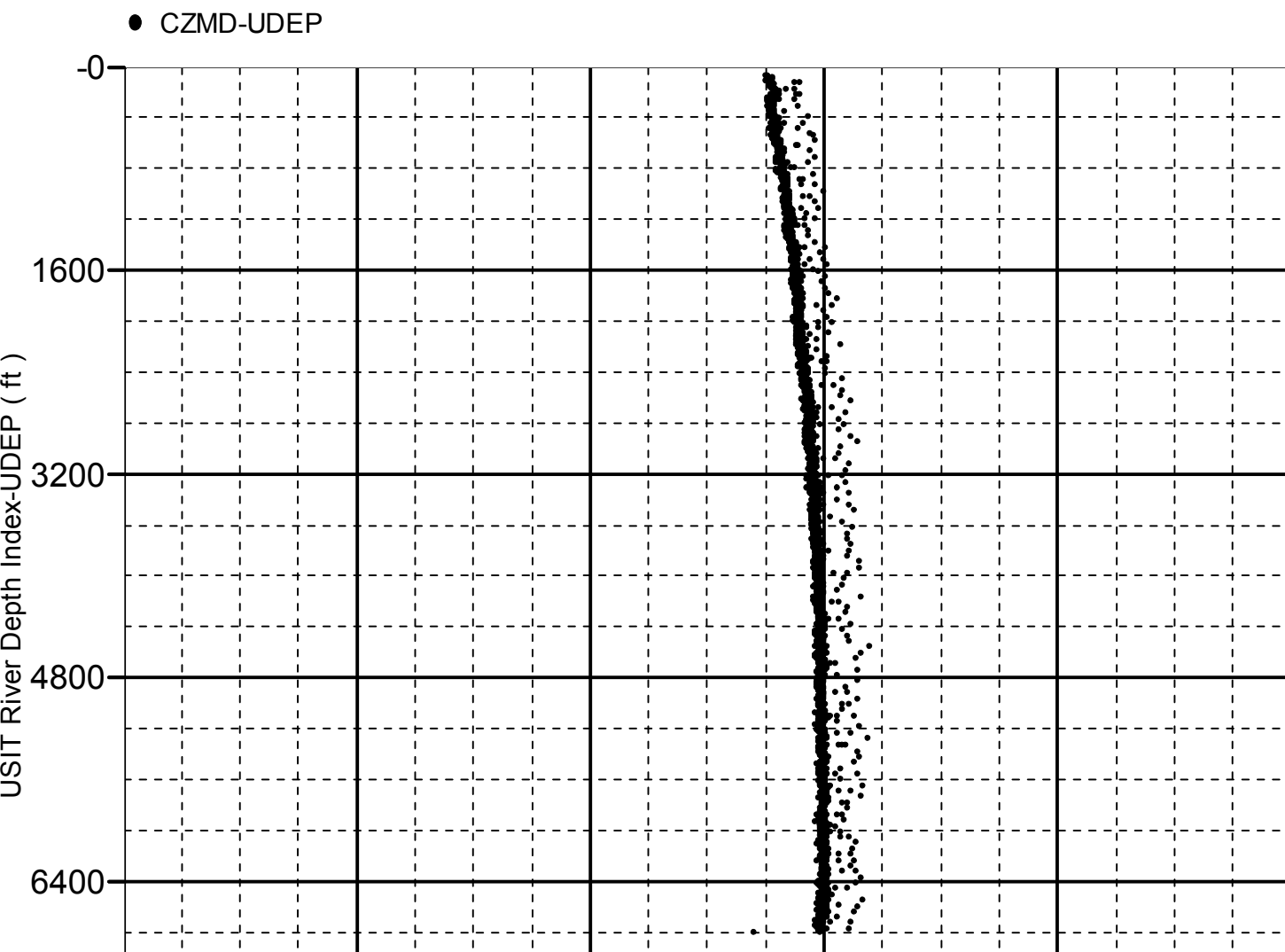
Company:Noble Energy Inc Well:Bison Ridge Y22-756

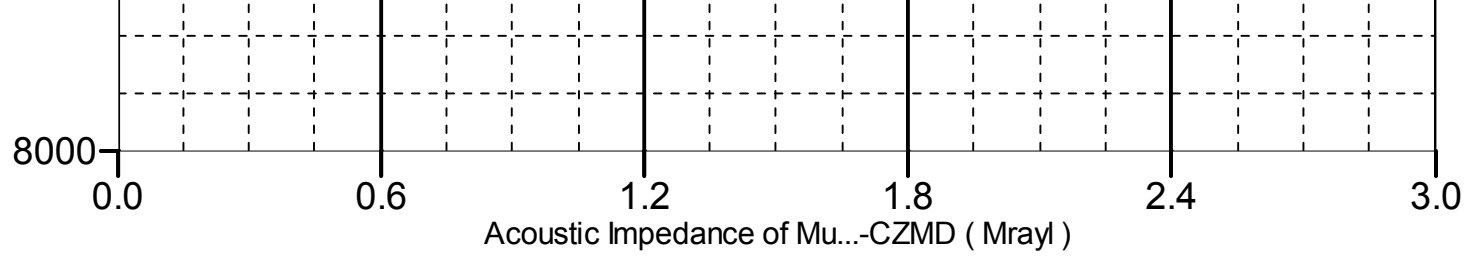
ONE: Log[10]:Up:S005

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6805.50 to 65.00 ft





Company: Noble Energy Inc

Schlumberger

Well: Bison Ridge Y22-756

Field: Wattenberg

County:	Weld
State:	CO
UltraSonic Summary Print	