

Company: Noble Energy INC

Well: Wells Ranch BB11-682

Field: Wattenberg

County: WELD State: Colorado

UltraSonic Summary Print

County: WELD
Field: Wattenberg
Location: NWNW Sec. 11, T5N, R63W
Well: Wells Ranch BB11-682
Company: Noble Energy INC

Location:		NWNW Sec. 11, T5N, R63W SHL: 550' FNL & 300' FWL Lat/Long: 40.41918, -104.41268	Elev.: K.B. 4715.00 ft G.L. 4685.00 ft D.F. 4715.00 ft
Permanent Datum:	Ground Level		Elev.: 4685.00 f
Log Measured From:	Kelly Bushing		30.00 ft above Perm.Datum
Drilling Measured From:	Kelly Bushing		
API Serial No. 05-123-44969	Section: 11	Township: 5N	Range: 63W

Logging Date 22-Sep-2017

Run Number ONE

Depth Driller 17237.00 ft

Schlumberger Depth 5900.00 ft

Bottom Log Interval 5900.00 ft

Top Log Interval 129.00 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 1953.00 ft

To 5900.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade N/A

From 30.00 ft

To 5900.00 ft

Max Recorded Temperatures 215 degF

Logger on Bottom 22-Sep-2017 03:00:00

Unit Number 2161 Location: Fort Morgan

Recorded By Camilla Lang

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
- Operational Run Summary
- Borehole Fluids
- 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
- XYZ (USI Fluid Acoustic Slowness vs Depth 3.0 in)
- XYZ (USI Acoustic Impedance of Mud vs Depth 3.0 in)
- Tail

12. ONE 0 PSI Repeat Pass

12.1 Integration Summary

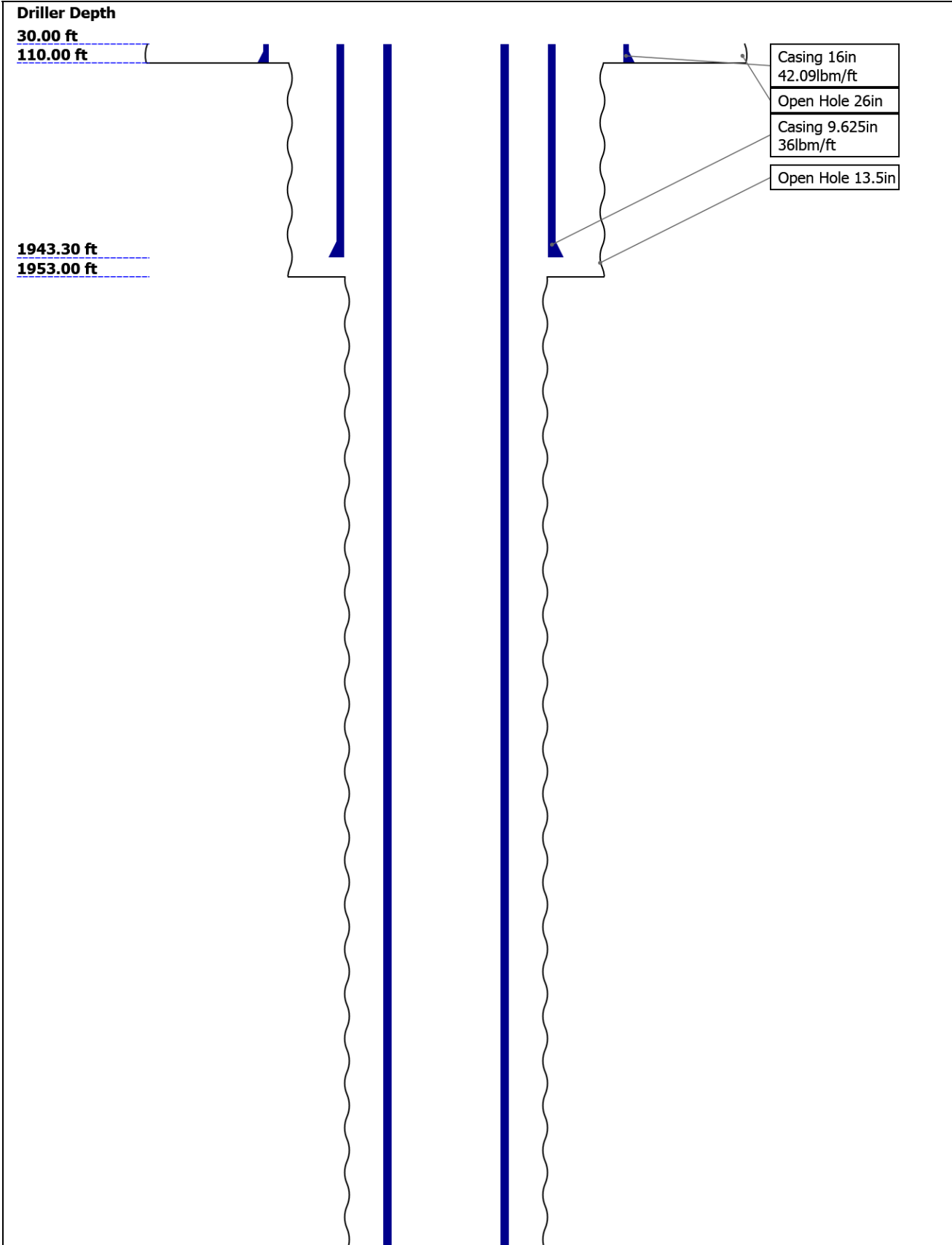
12.2 Software Version

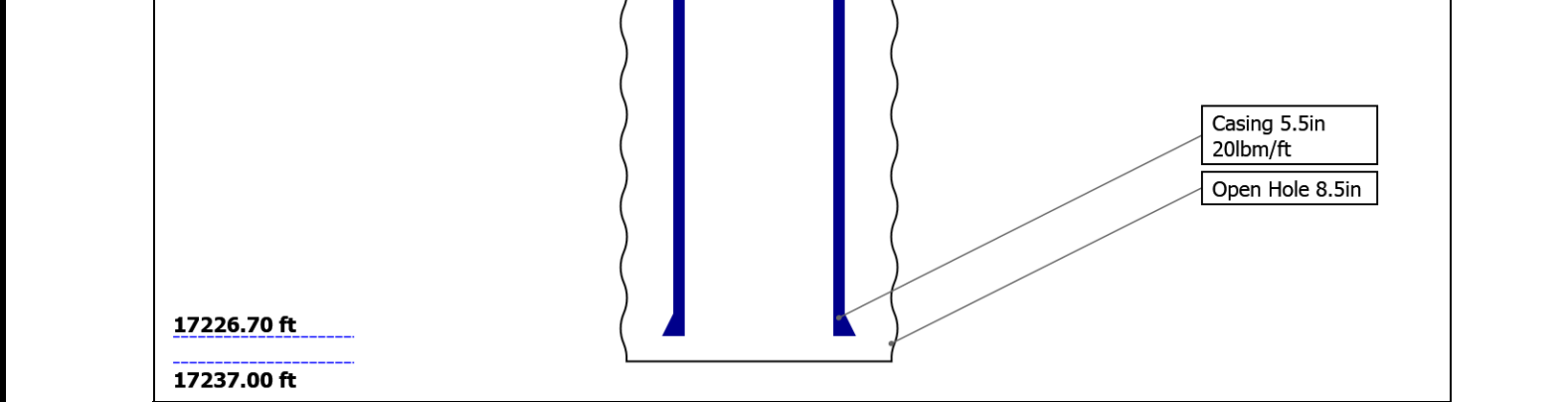
12.3 Composite Summary

12.4 Log (DJ Basin Ultrasonic Cement Summary Report)

12.5 Parameter Listing

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	1953			
Top Logger (ft)	30	110	1953			
Bottom Driller (ft)	110	1953	17237			
Bottom Logger (ft)	110	1953	5900			
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)	30	30	30			
Top Logger (ft)	30	30	30			
Bottom Driller (ft)	110	1943.3	17226.7			
Bottom Logger (ft)	110	1943.3	5900			

Operational Run Summary

Parameter (unit)	ONE					
Date Log Started	22-Sep-2017					
Time Log Started	02:29:18					
Date Log Finished	22-Sep-2017					
Time Log Finished	03:57:58					
Top Log Interval (ft)						
Bottom Log Interval (ft)						
Total Depth (ft)	5900.00					
Max Hole Deviation (deg)						
Azimuth of Max Deviation (deg)						
Bit Size (in)	8.500					
Logging Unit Number	2161					
Logging Unit Location	Fort Morgan					
Recorded By	Camila Lang					

Line: Sensor Location, Value: Gating Onset 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			
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	10000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane USA		
ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All Schlumberger depth control policies were followed.	
Rig Up Length At Surface		IDW used as primary depth referenece.	
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[4]:Up	6139.54	89.58
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 : 38.06m(124.88ft) to 39.72m(130.30ft) MUD_N_FRP = 1.13 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.64 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
ONE			
2500 PSI Main Pass			
Software Version			
Acquisition System		Version	

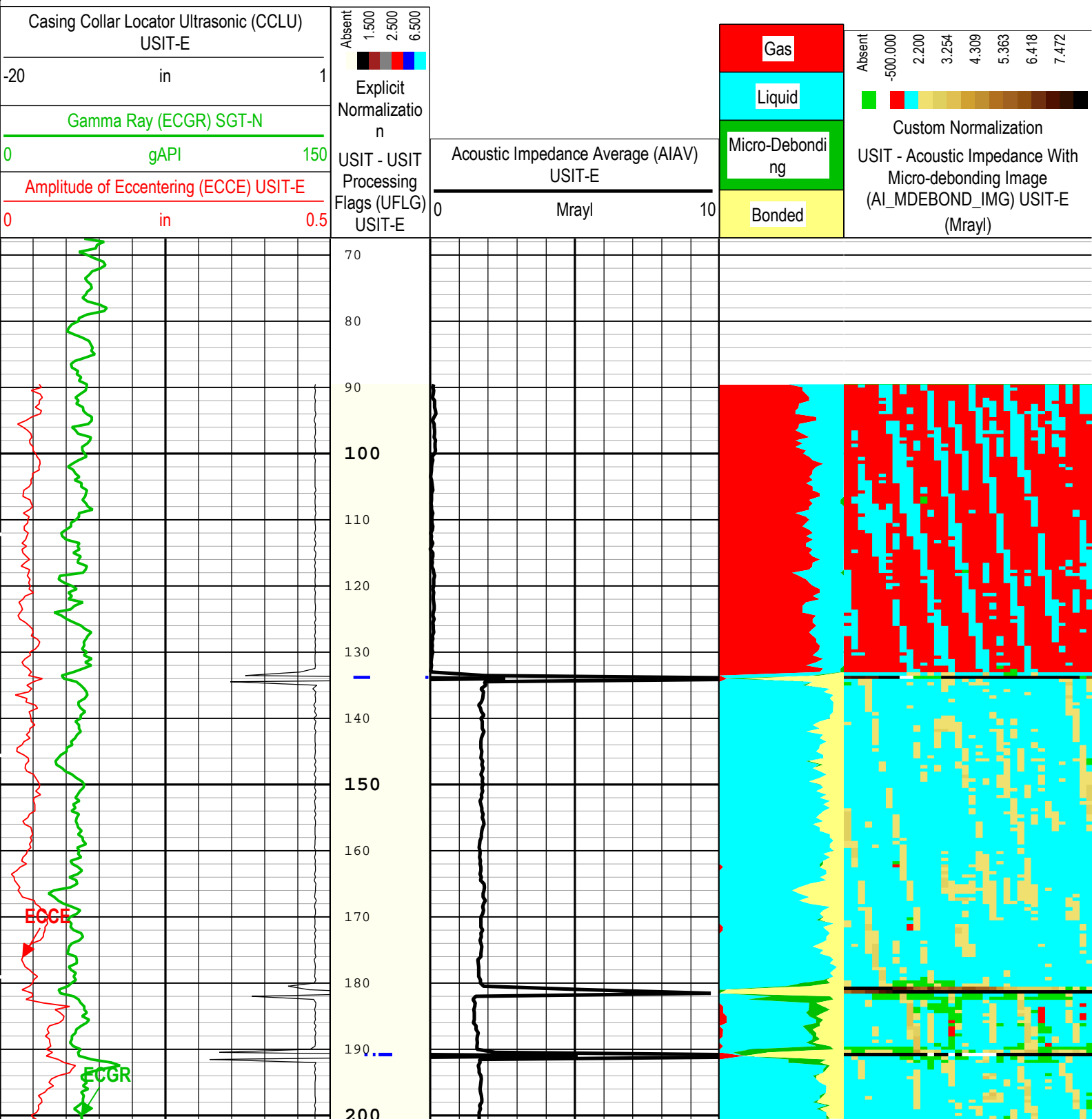
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[4]:Up	Up	89.58 ft	6139.54 ft	22-Sep-2017 3:24:45 AM	22-Sep-2017 3:57:40 AM	ON	3.81 ft	No

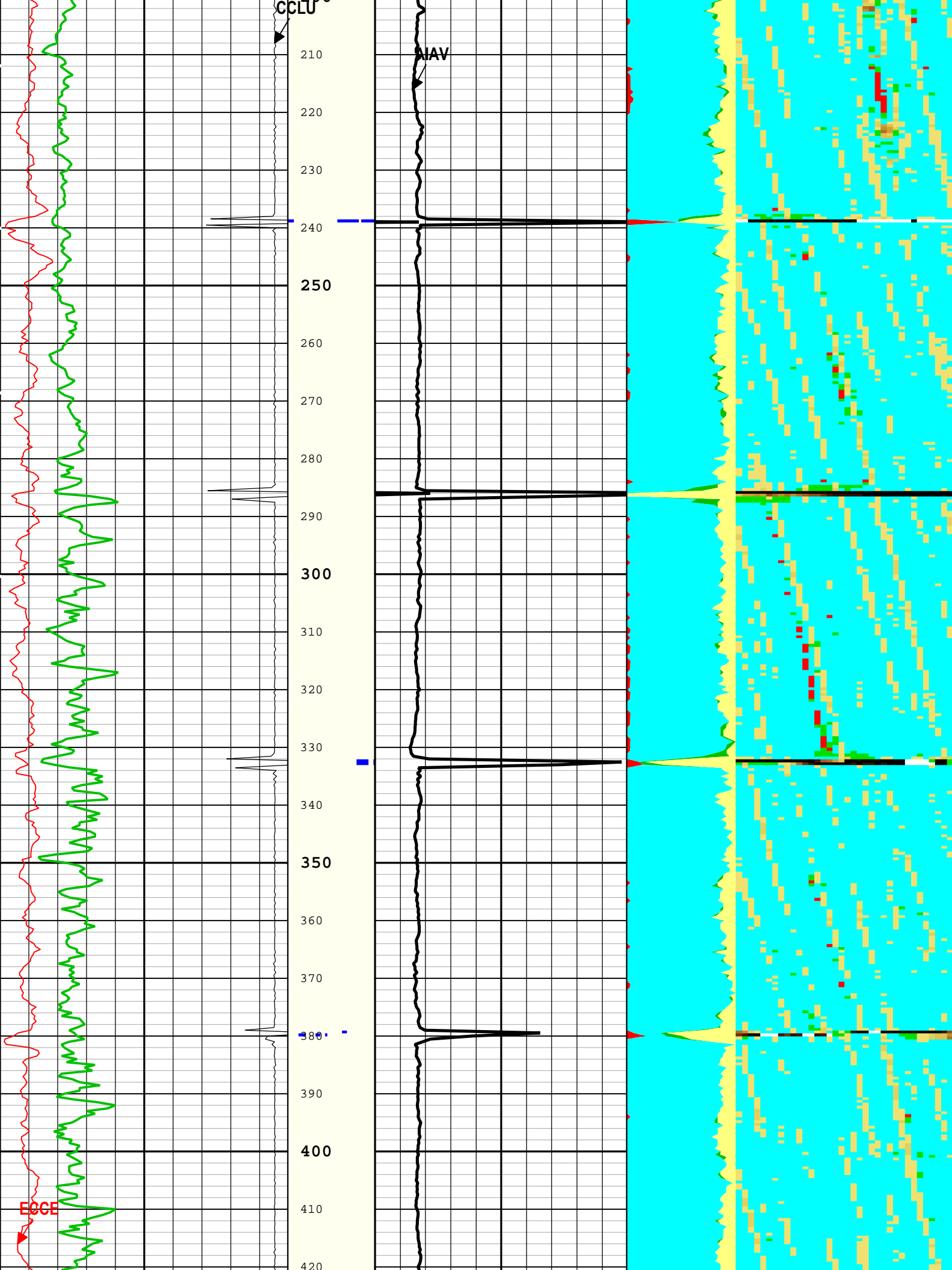
All depths are referenced to toolstring zero

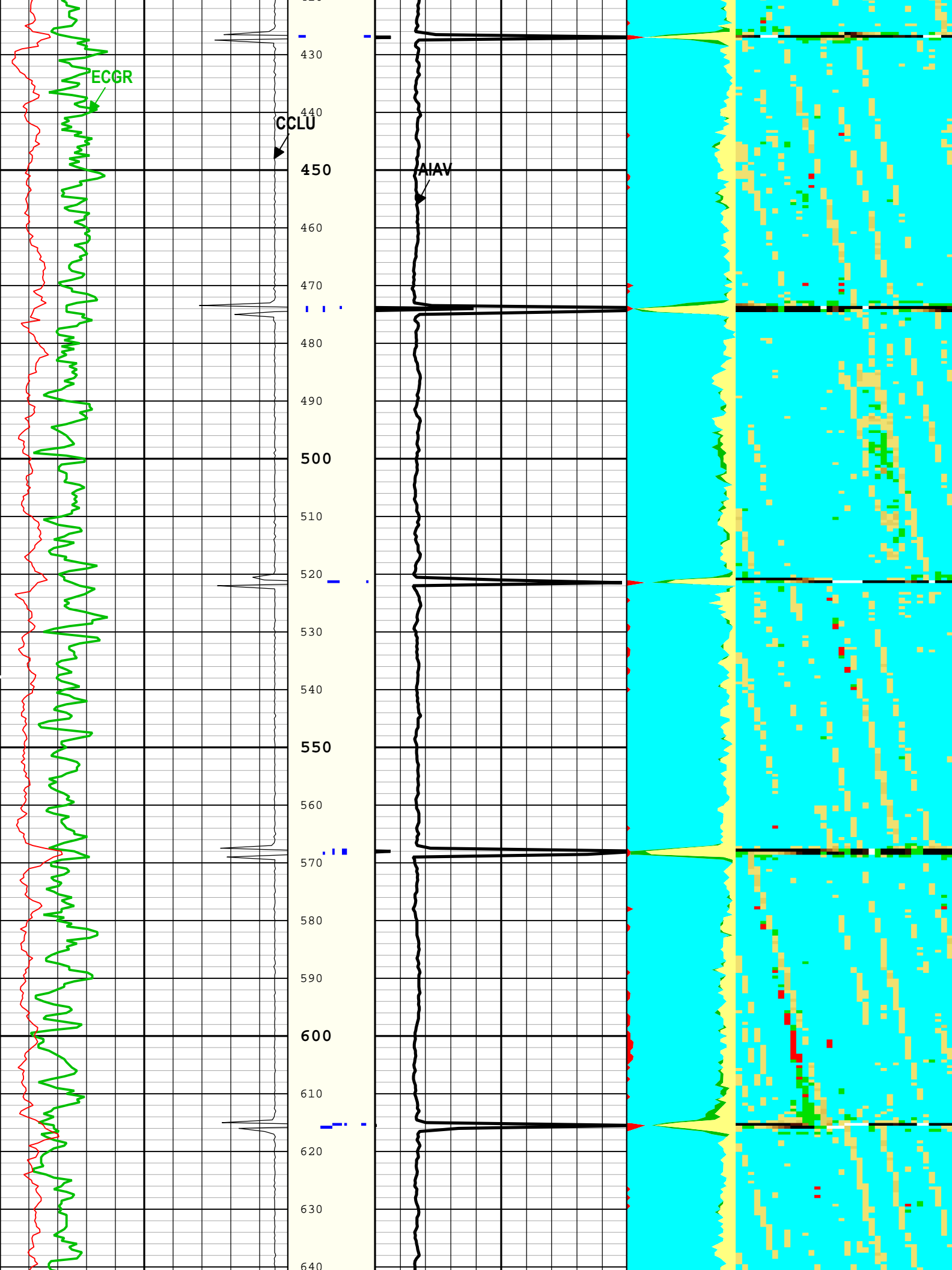
Log	Company:Noble Energy INC	Well:Wells Ranch BB11-682
	ONE: Log[4]:Up:S007	

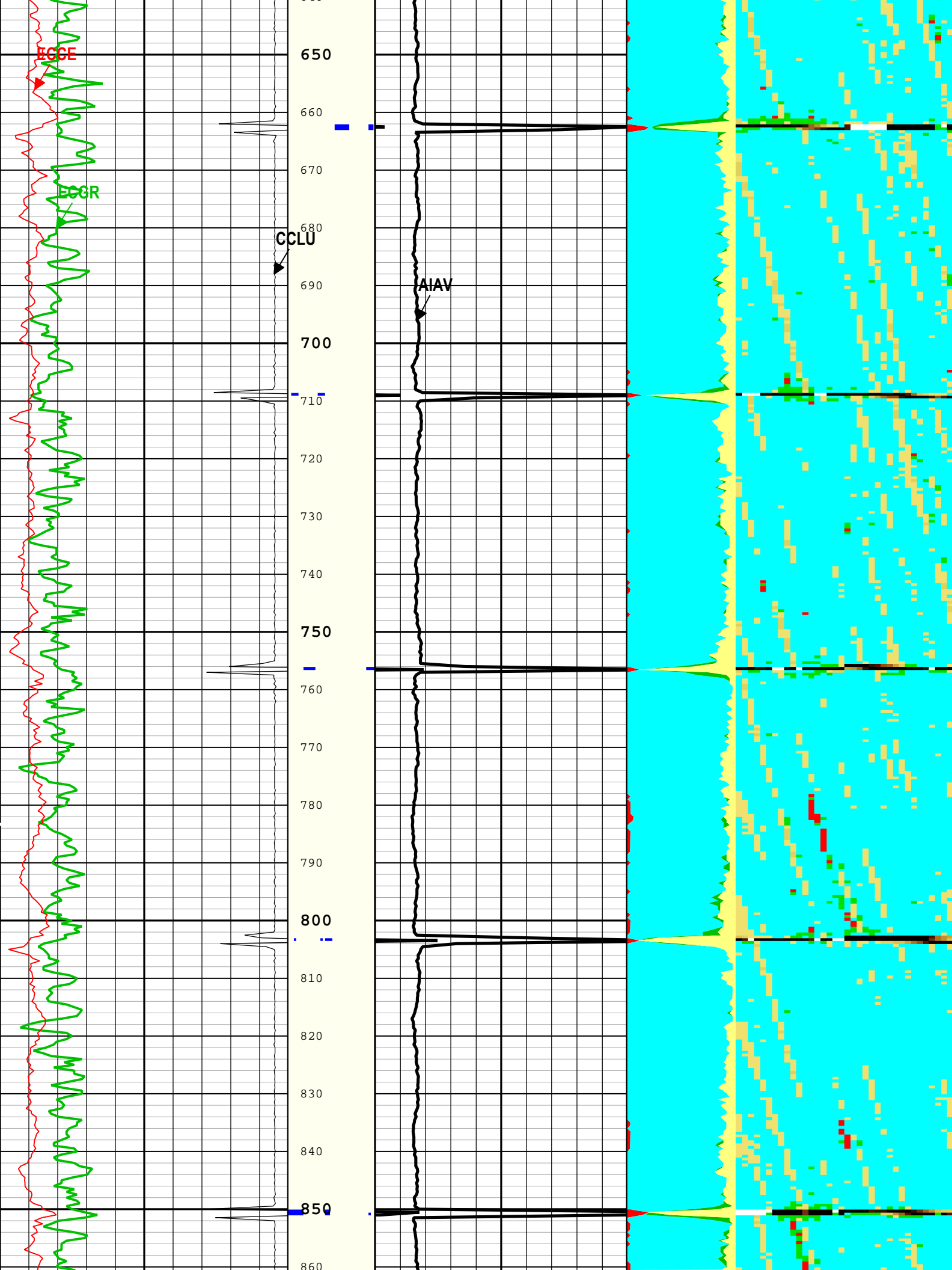
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Creation Date: 22-Sep-2017 04:47:55

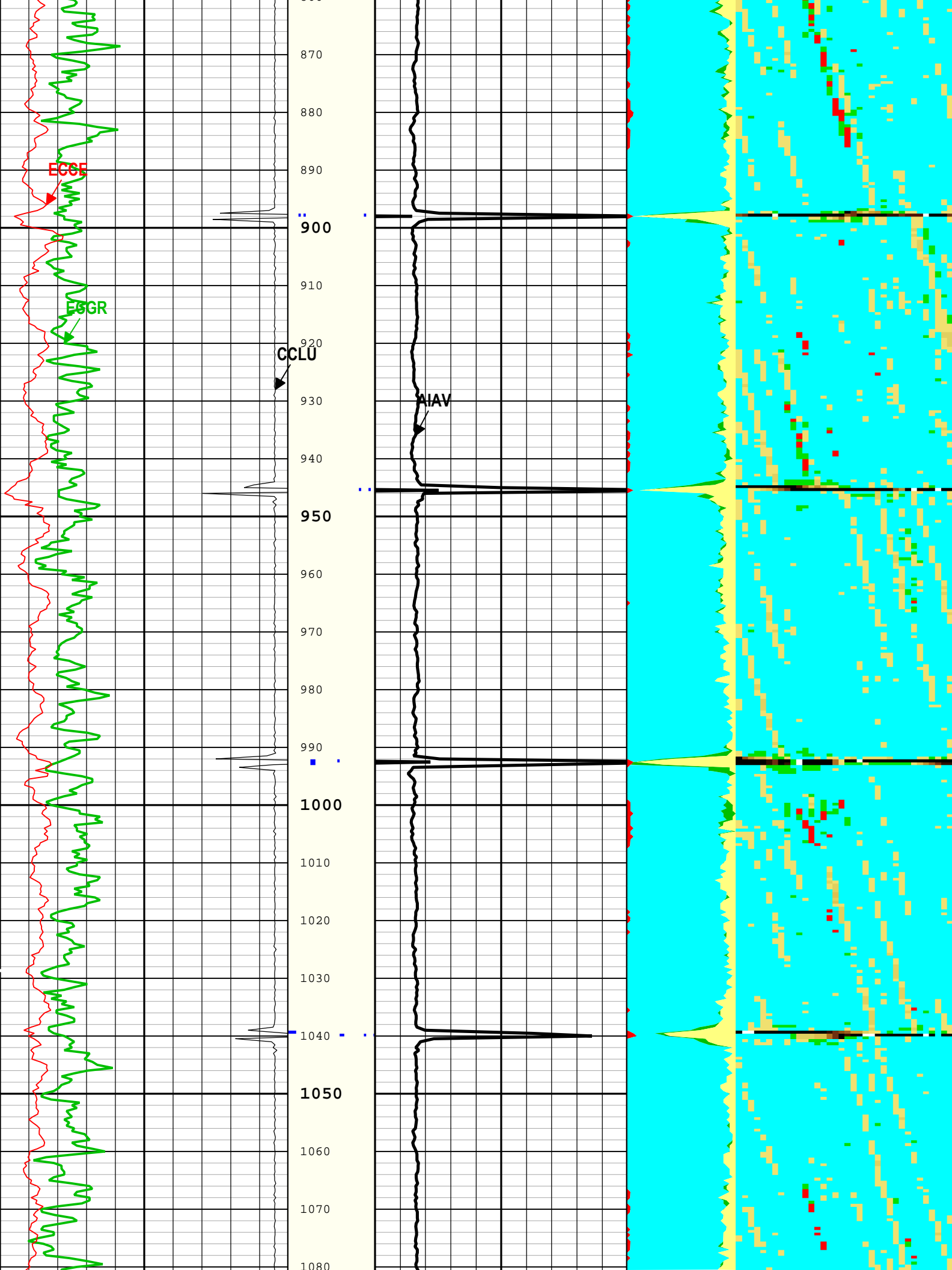
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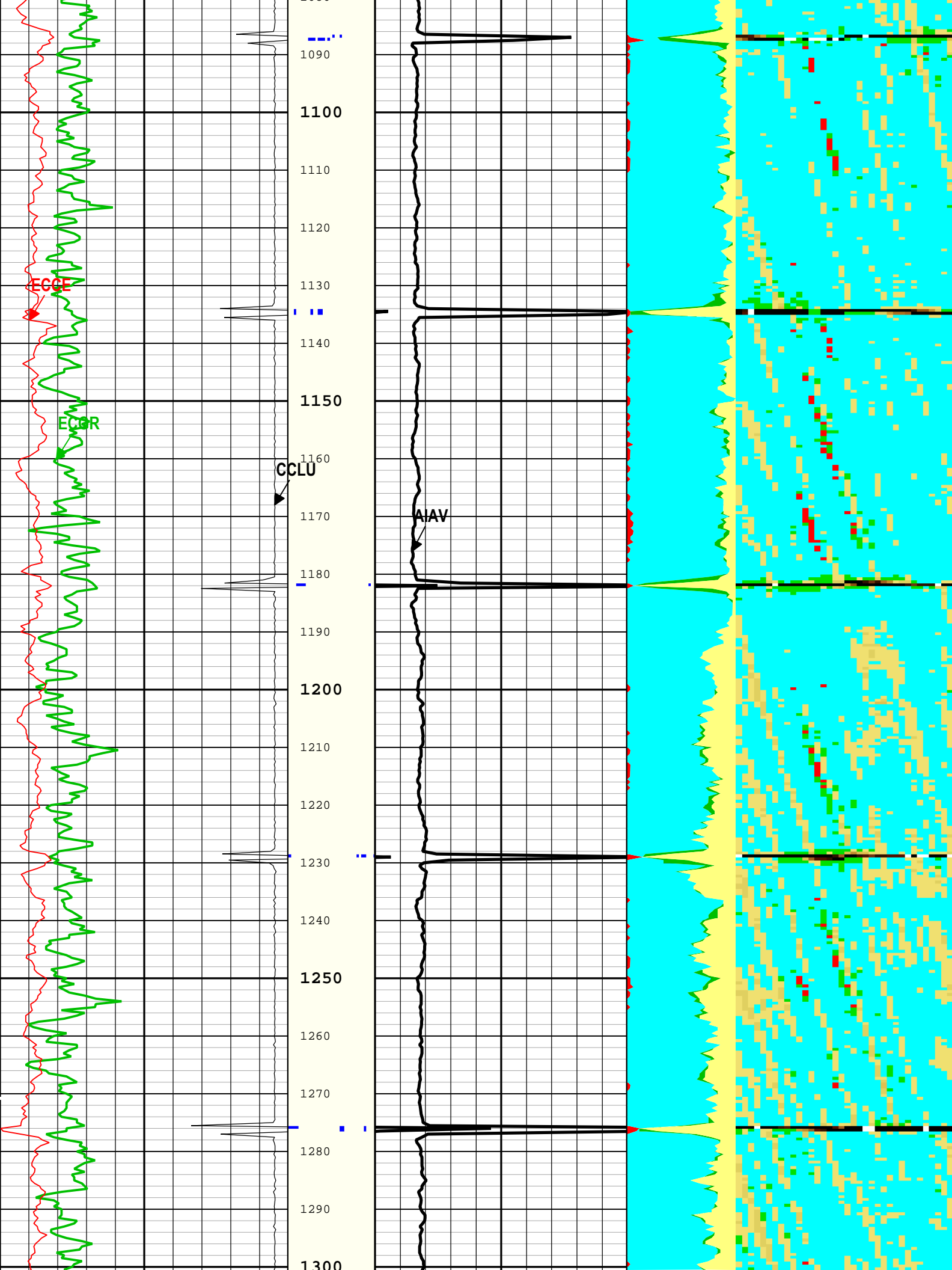


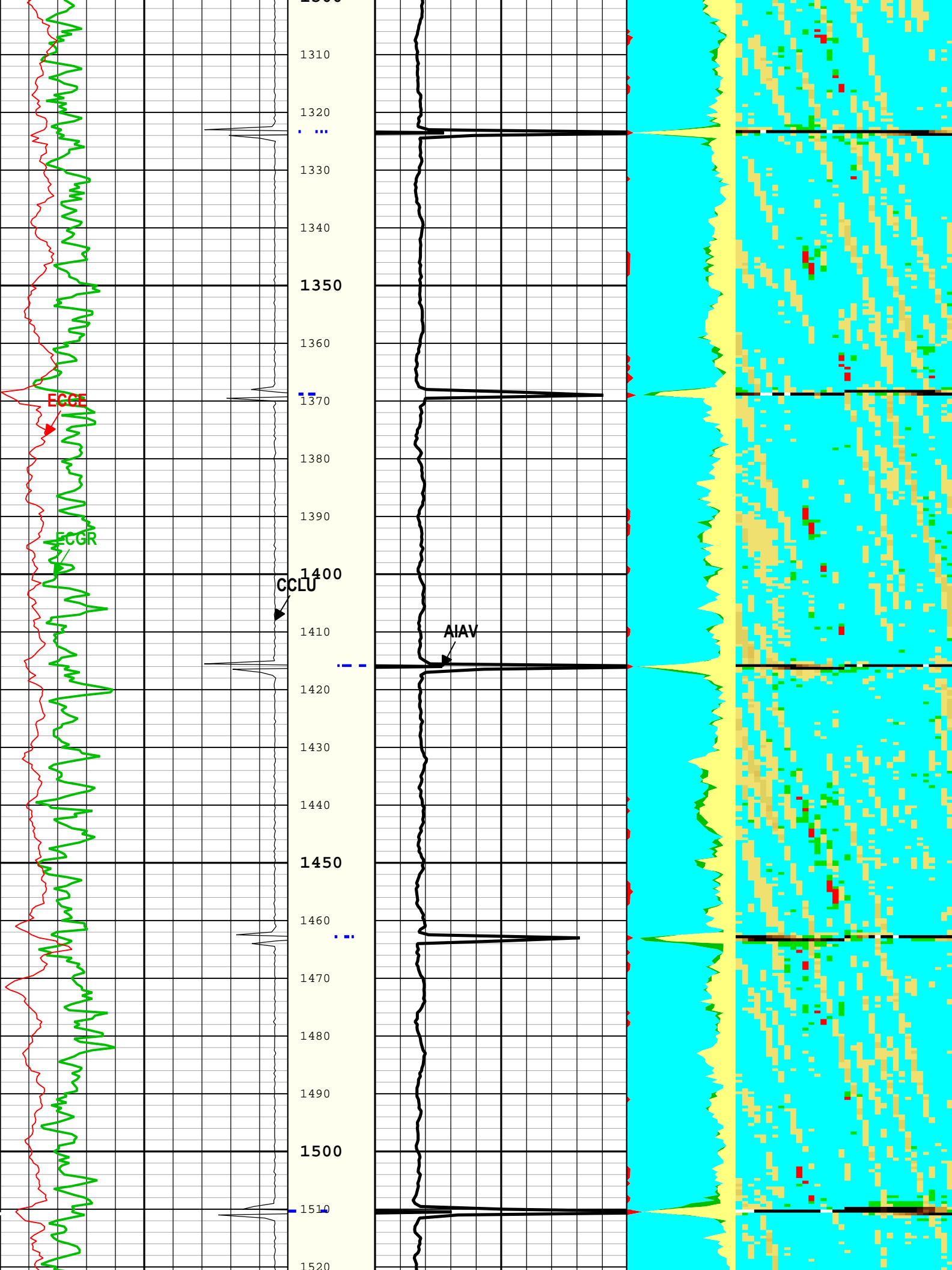


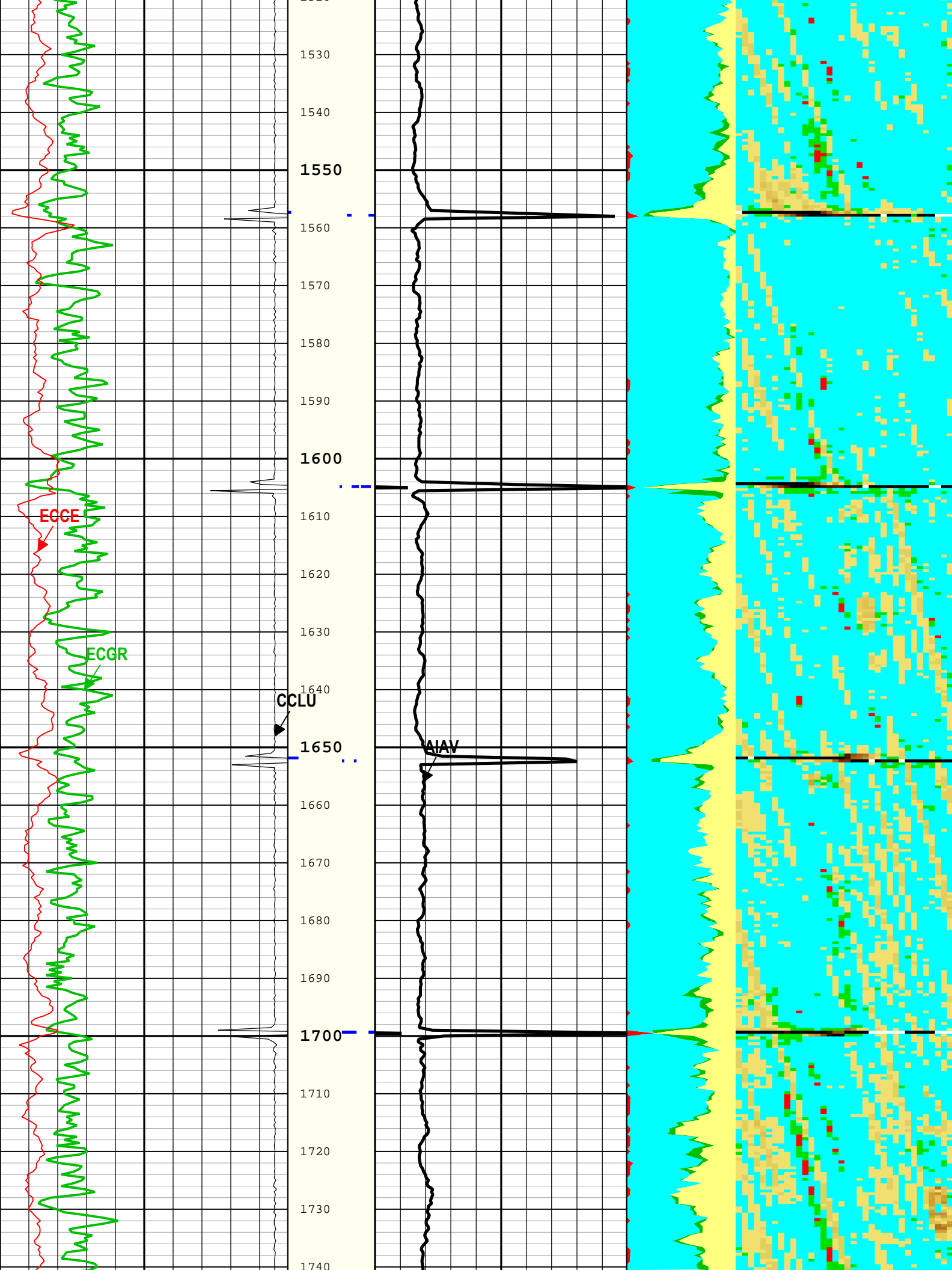


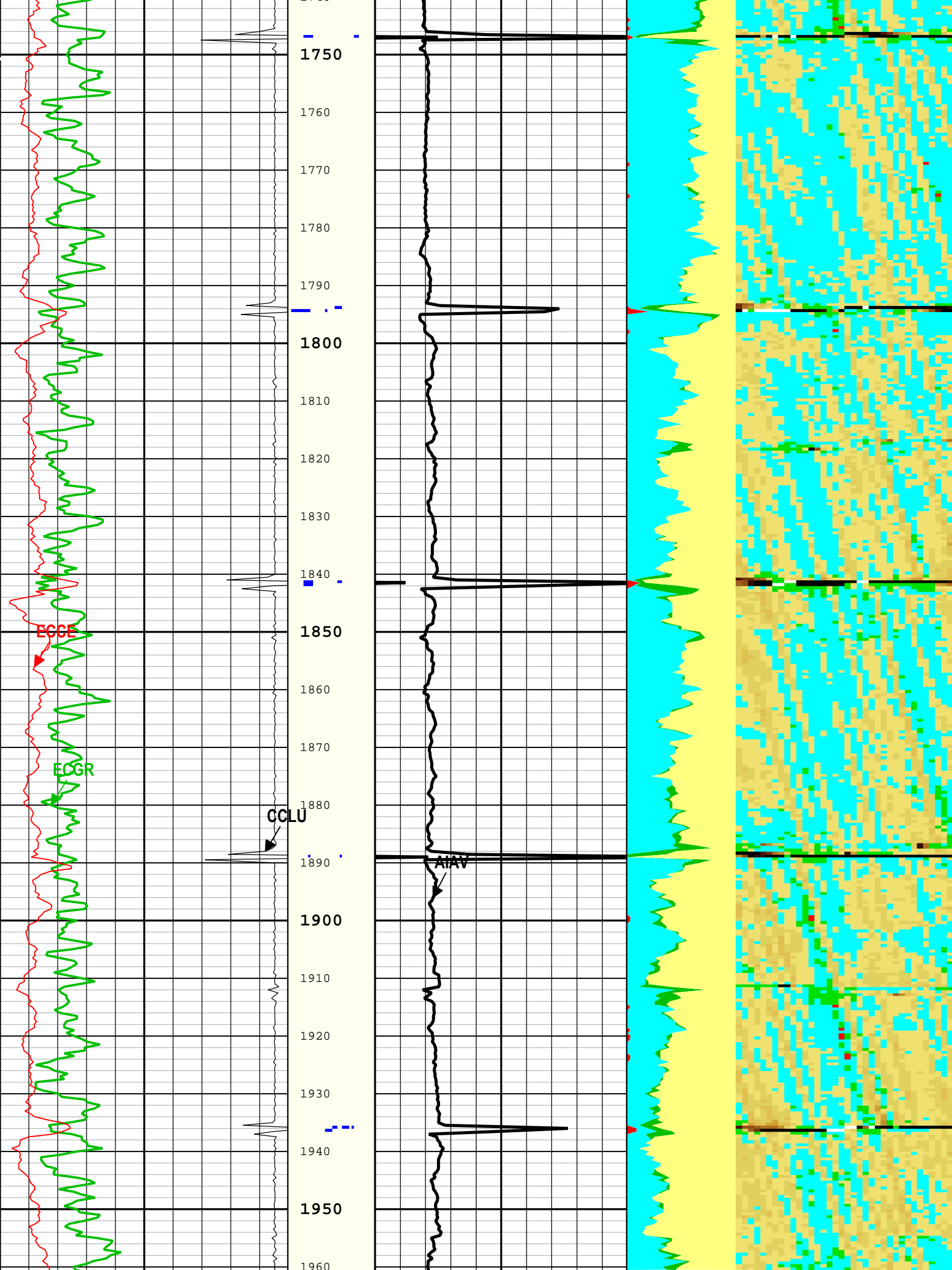


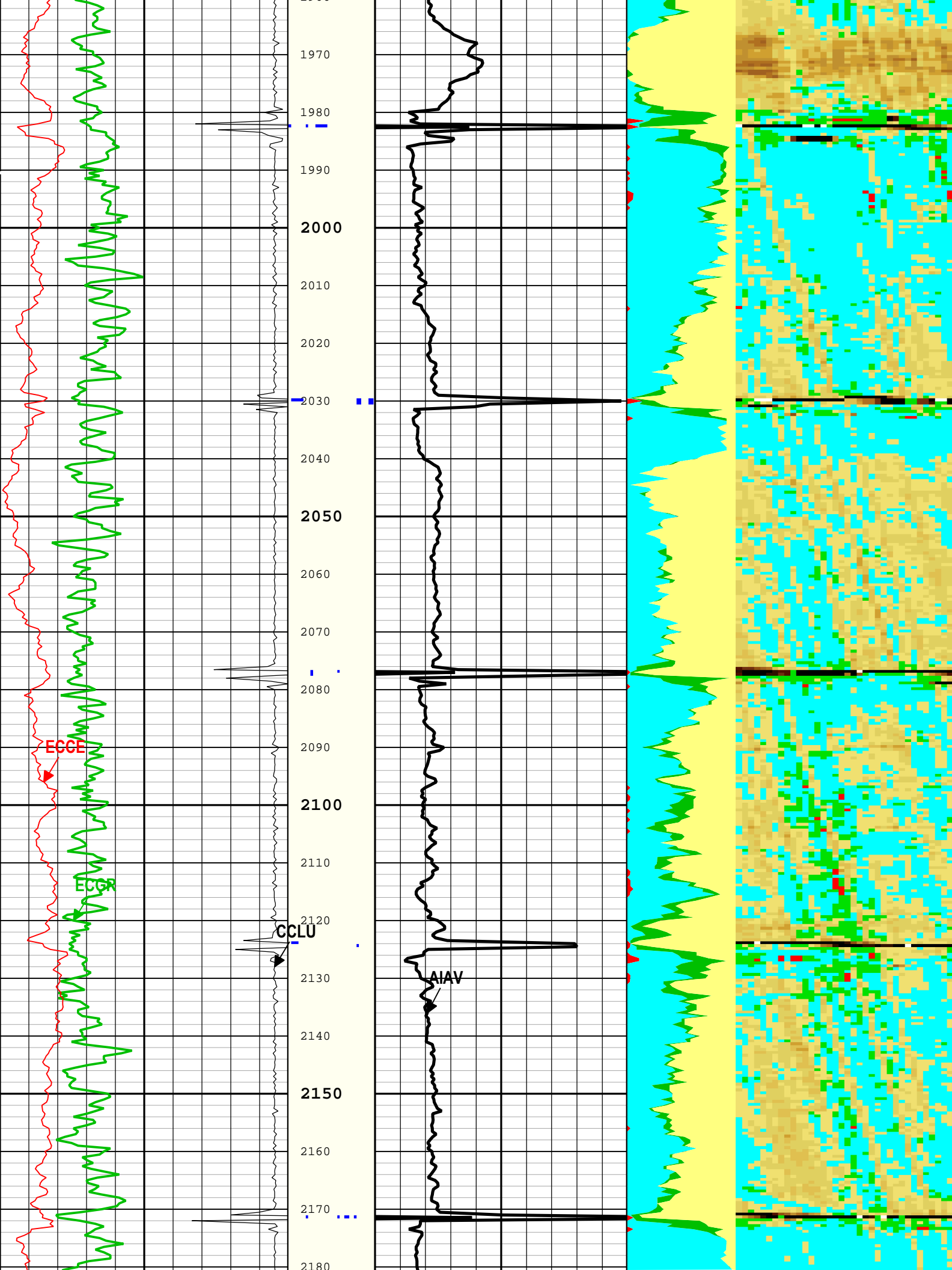


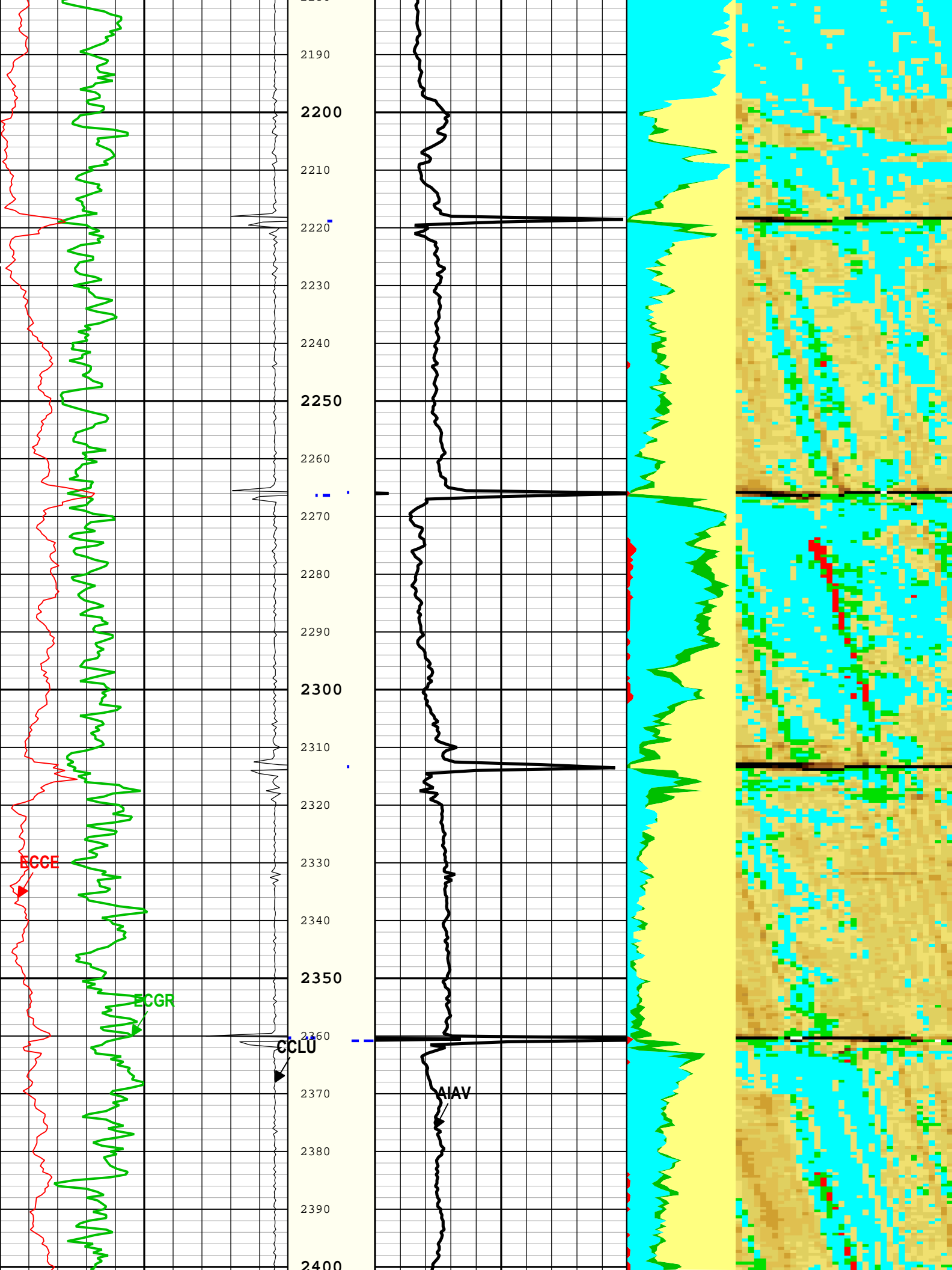


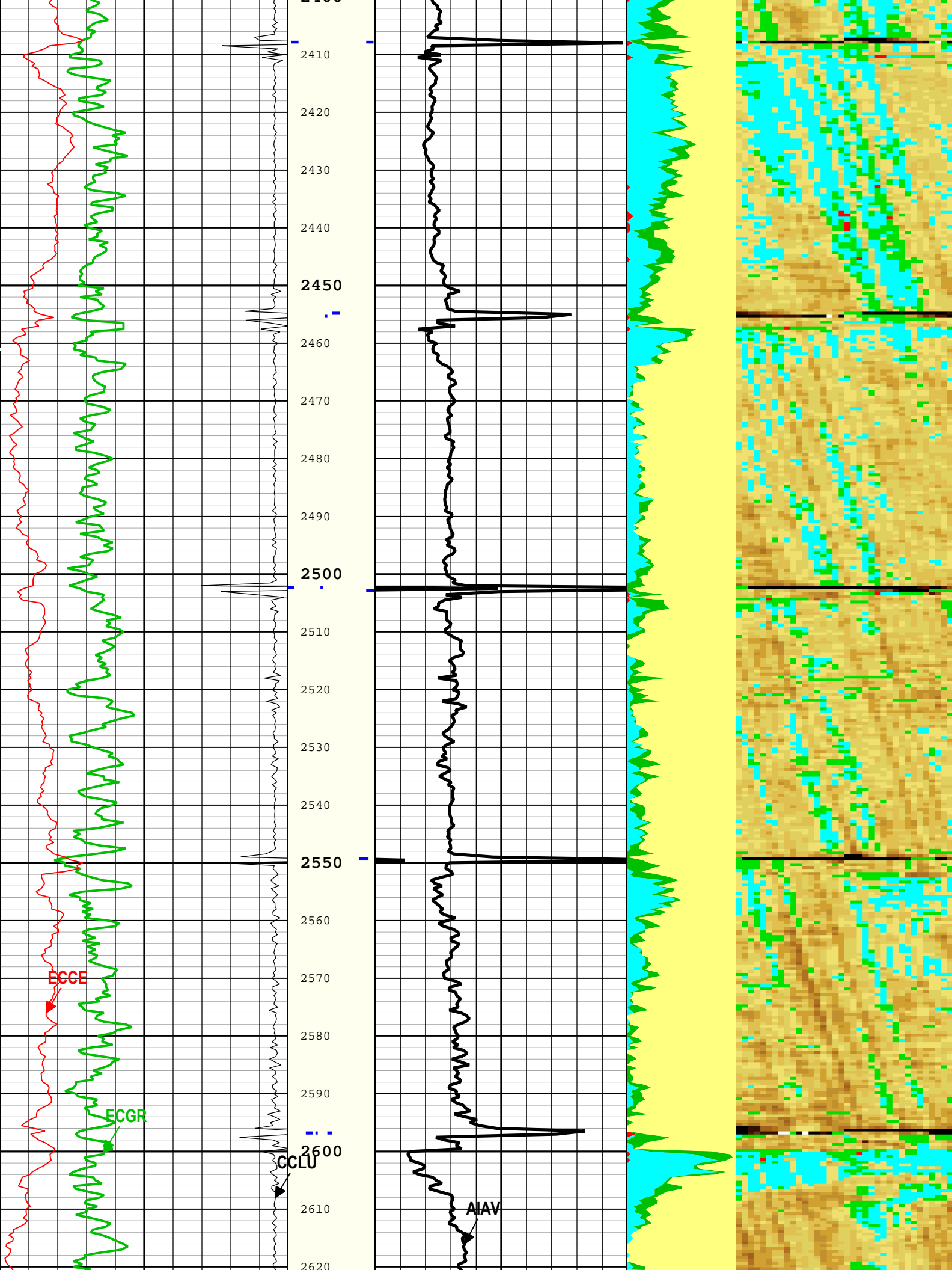


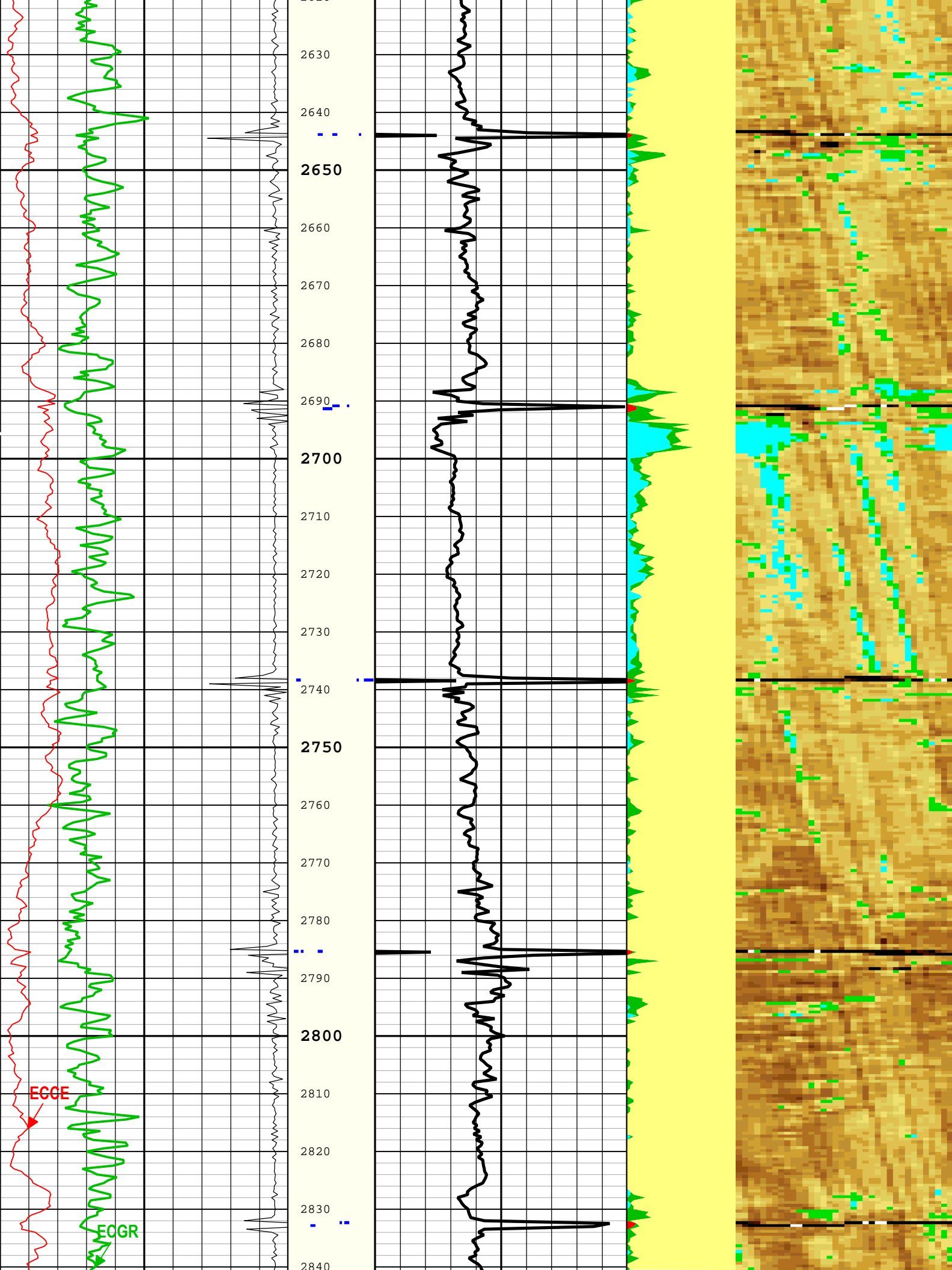


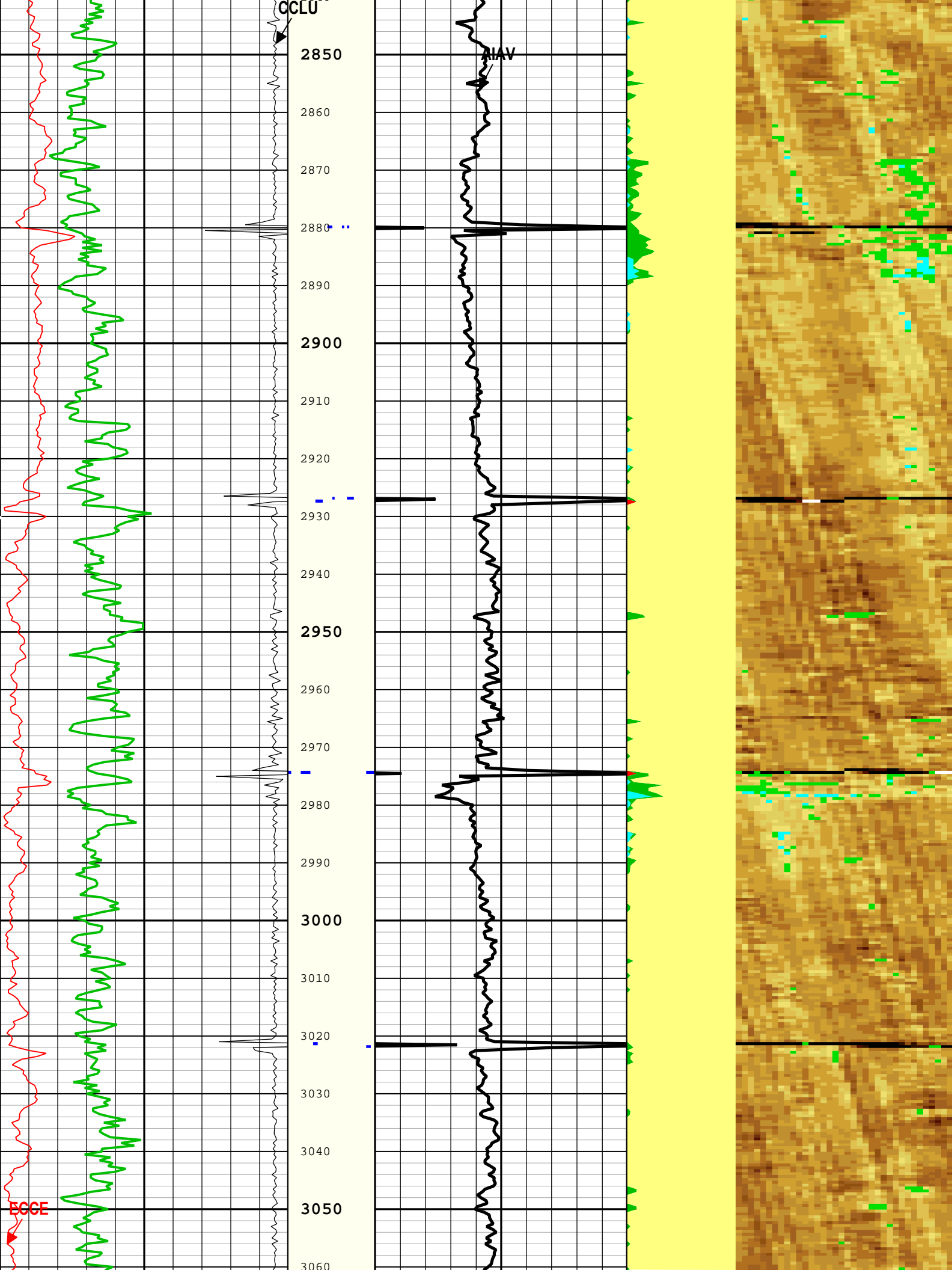


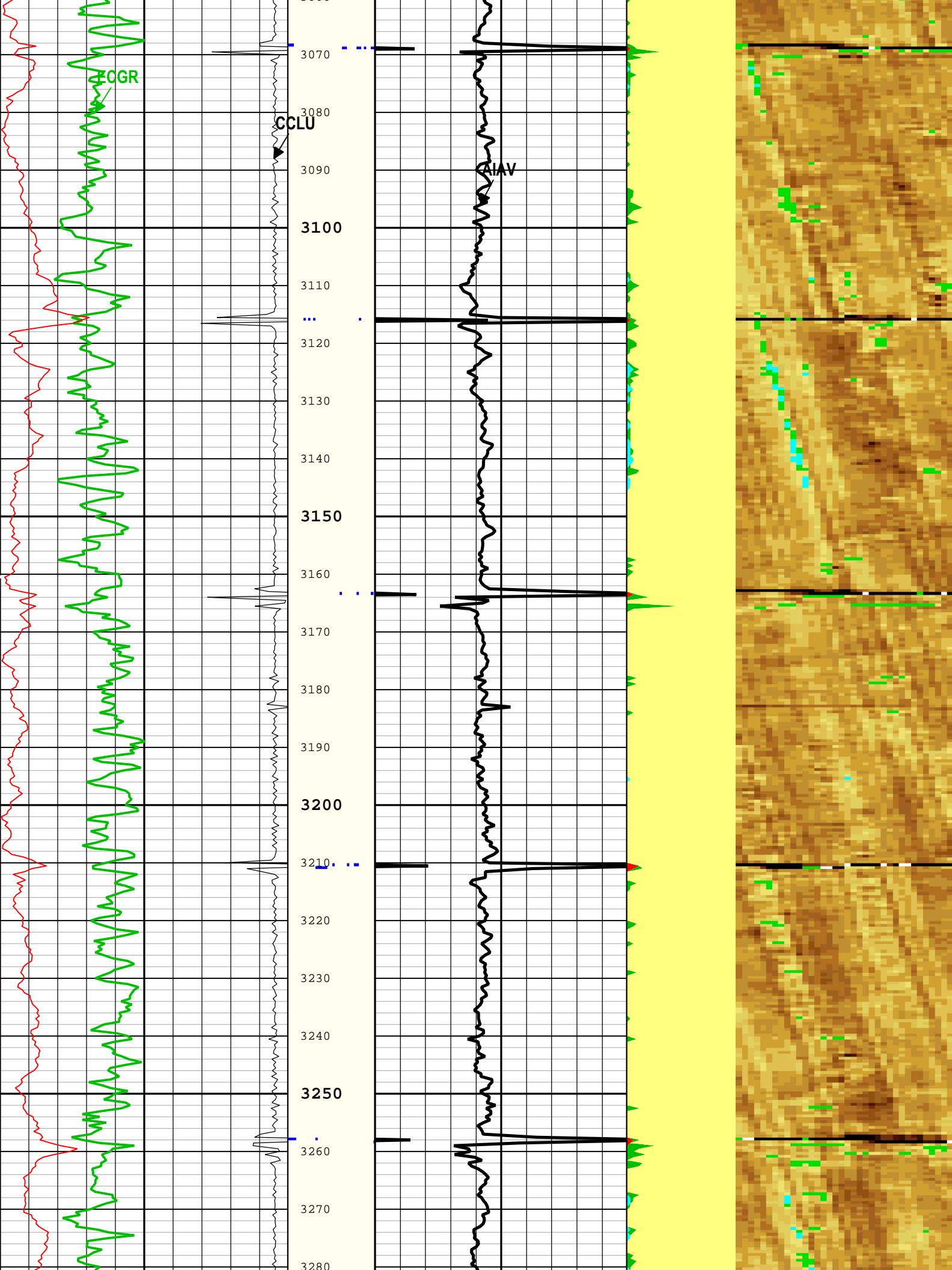


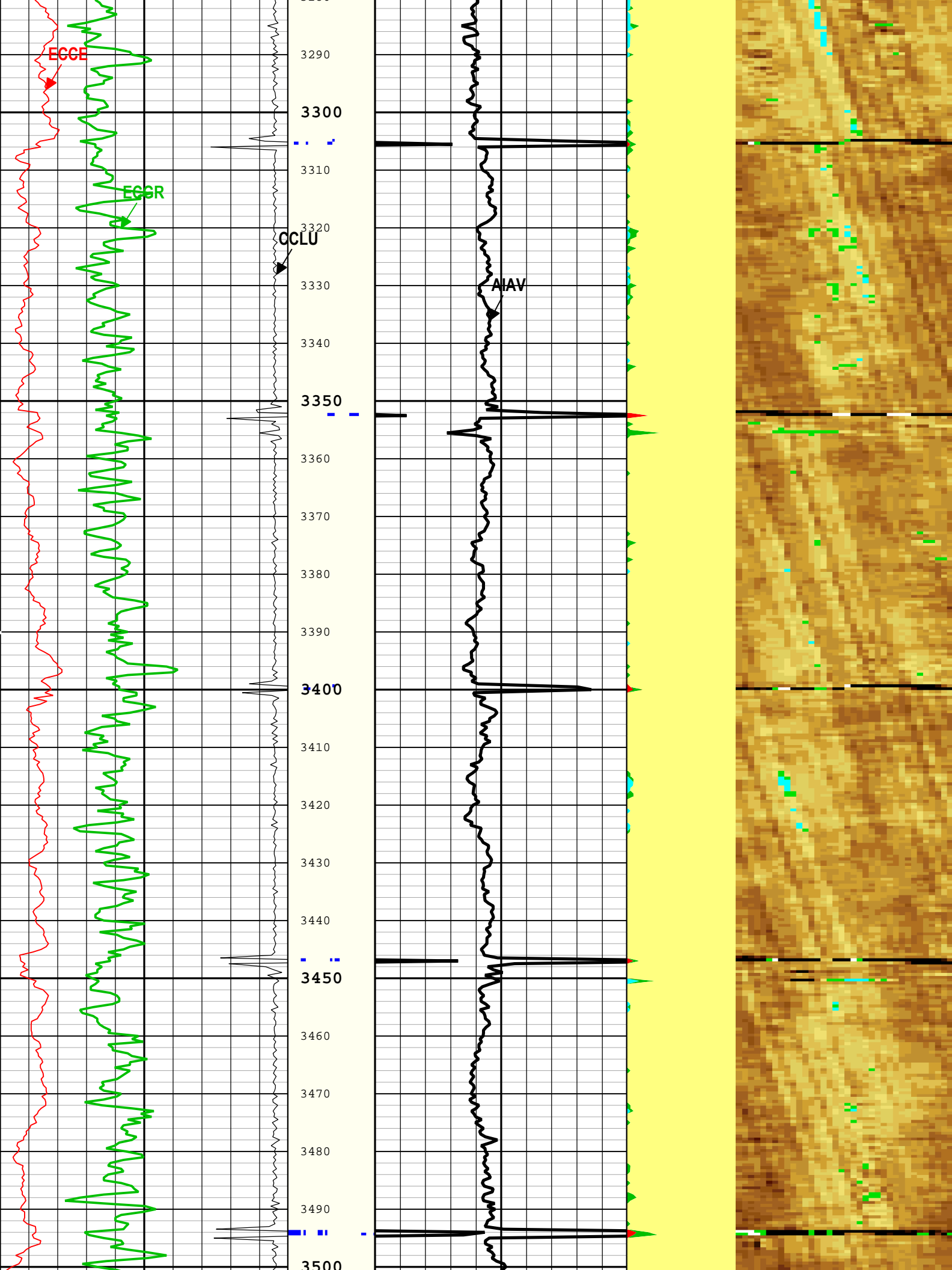


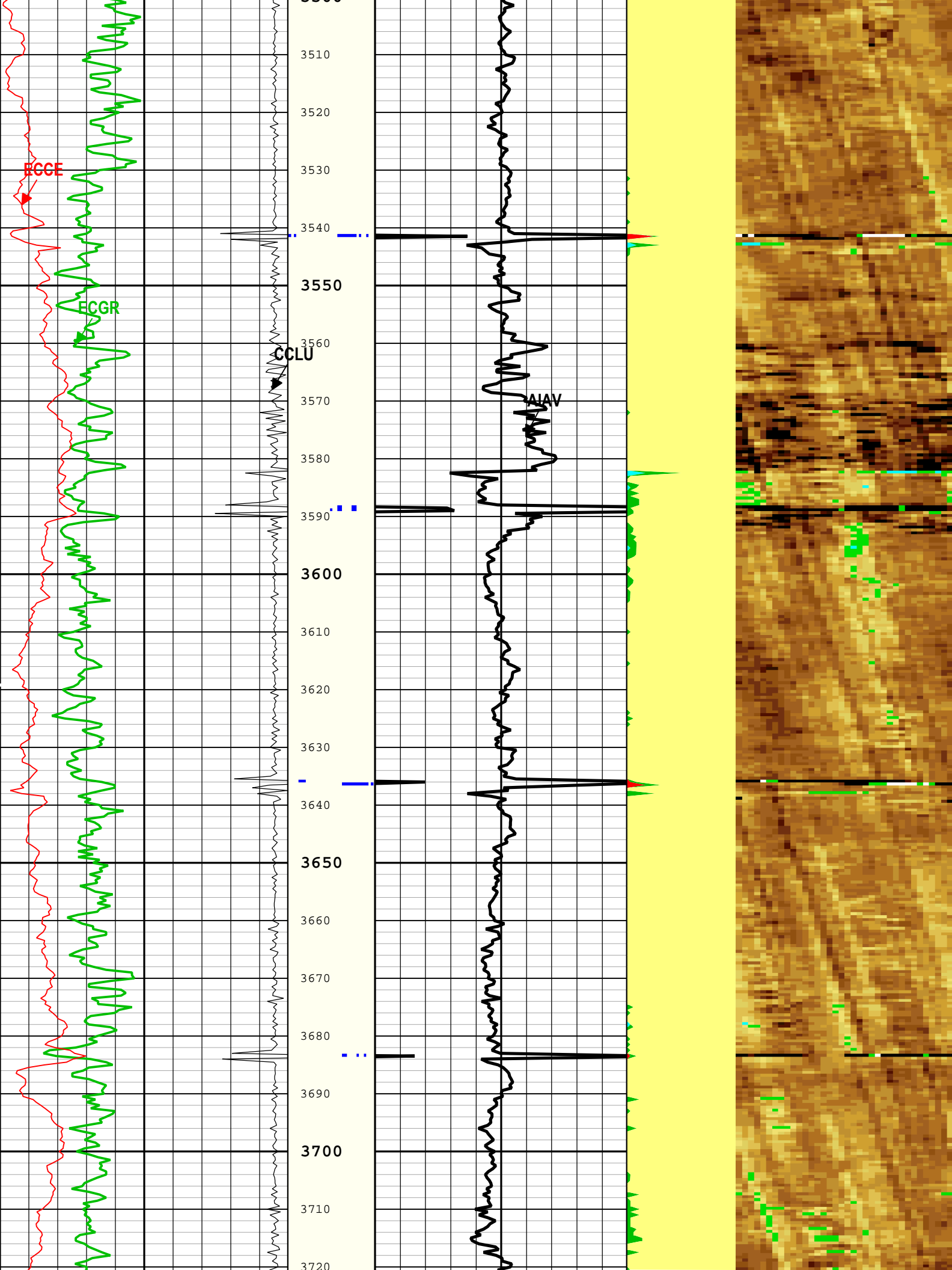


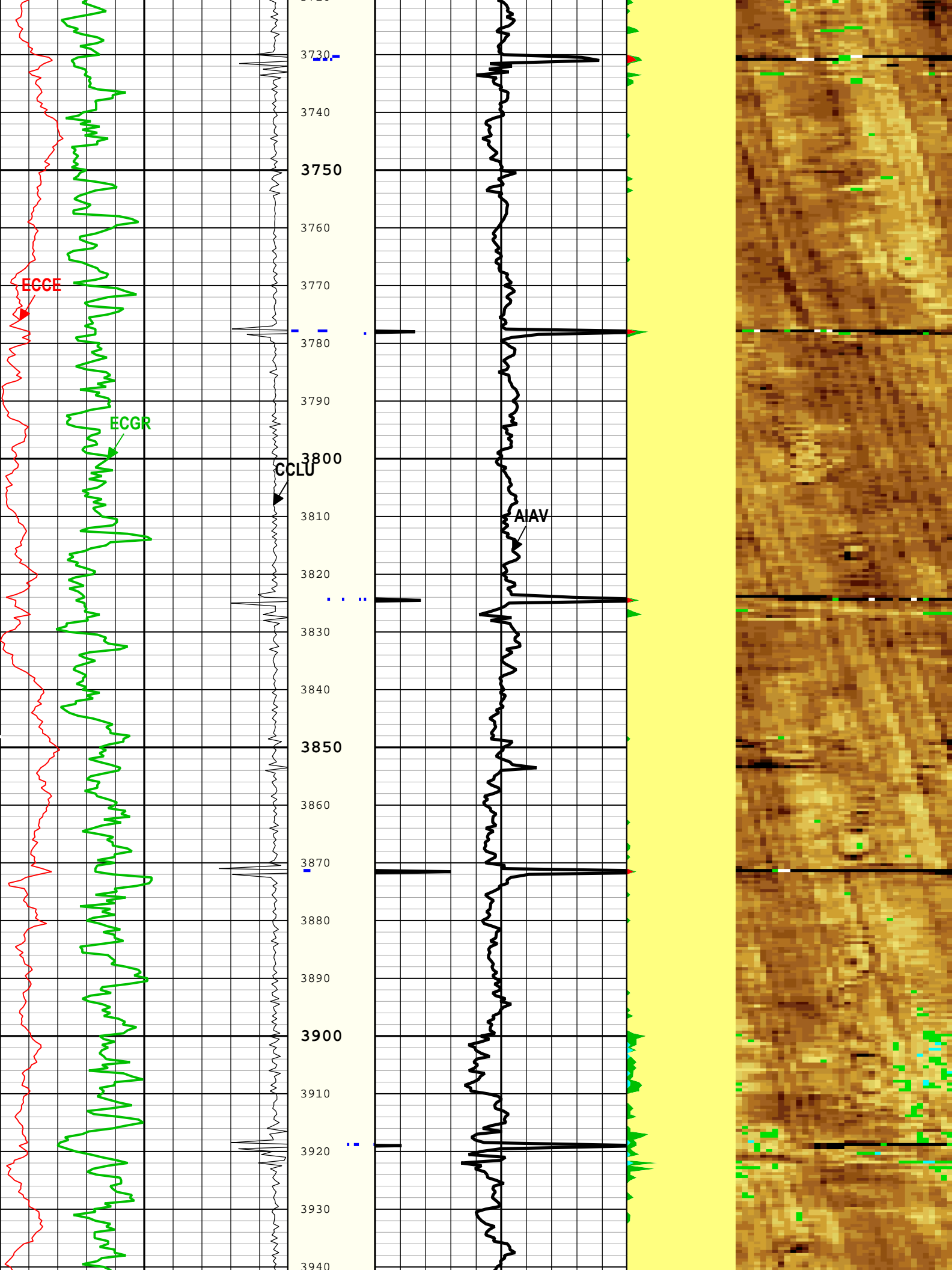


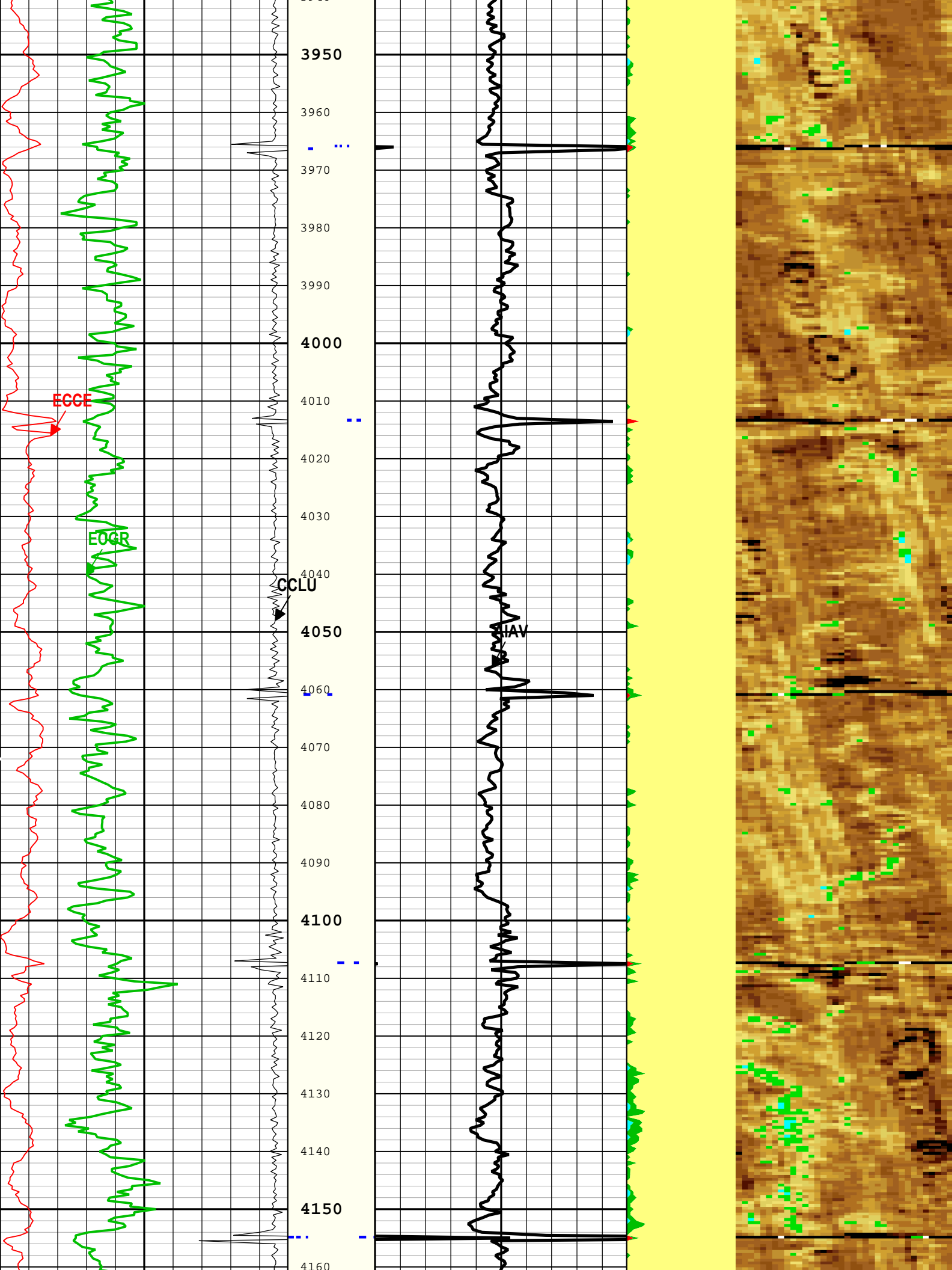


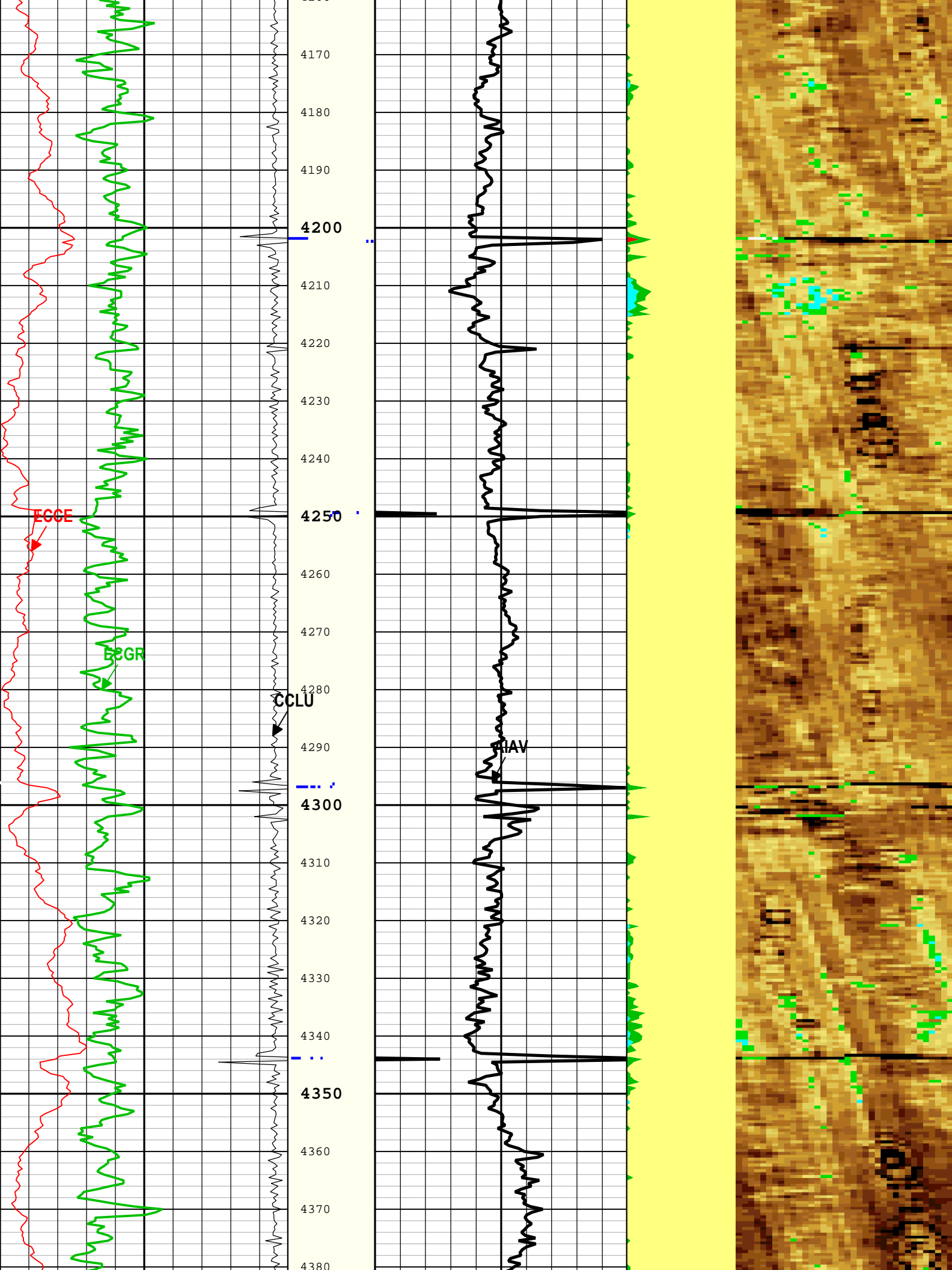


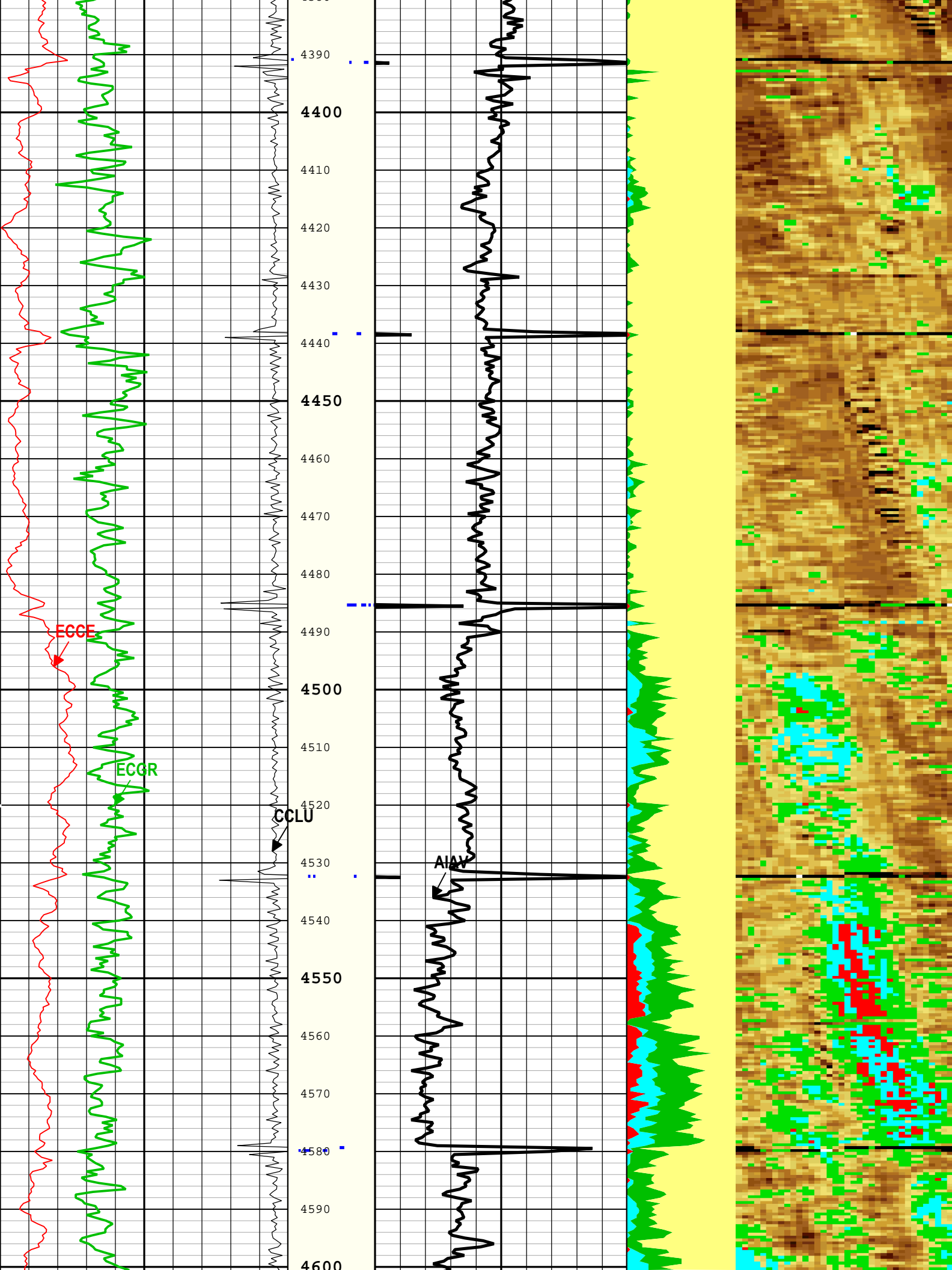


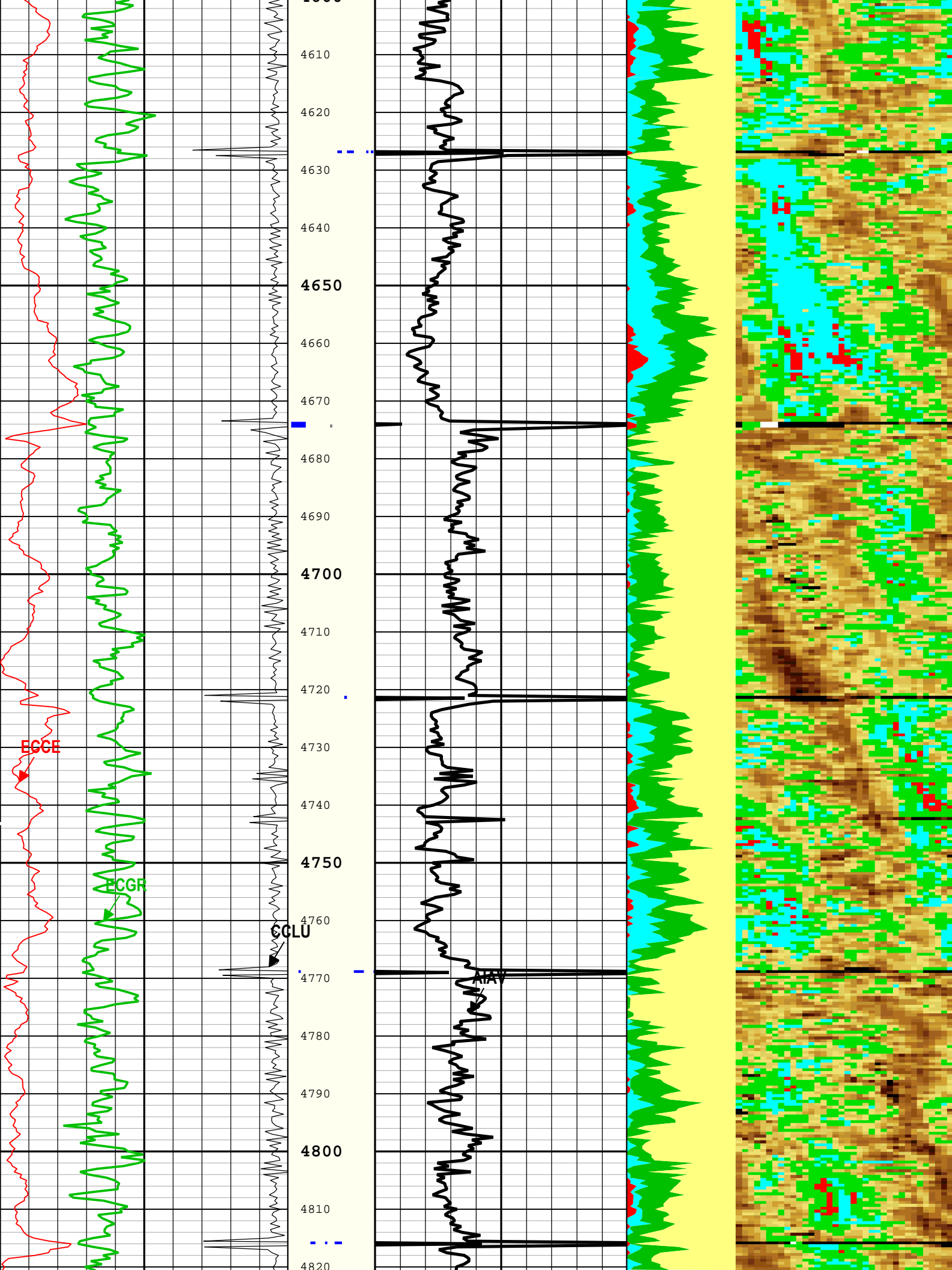


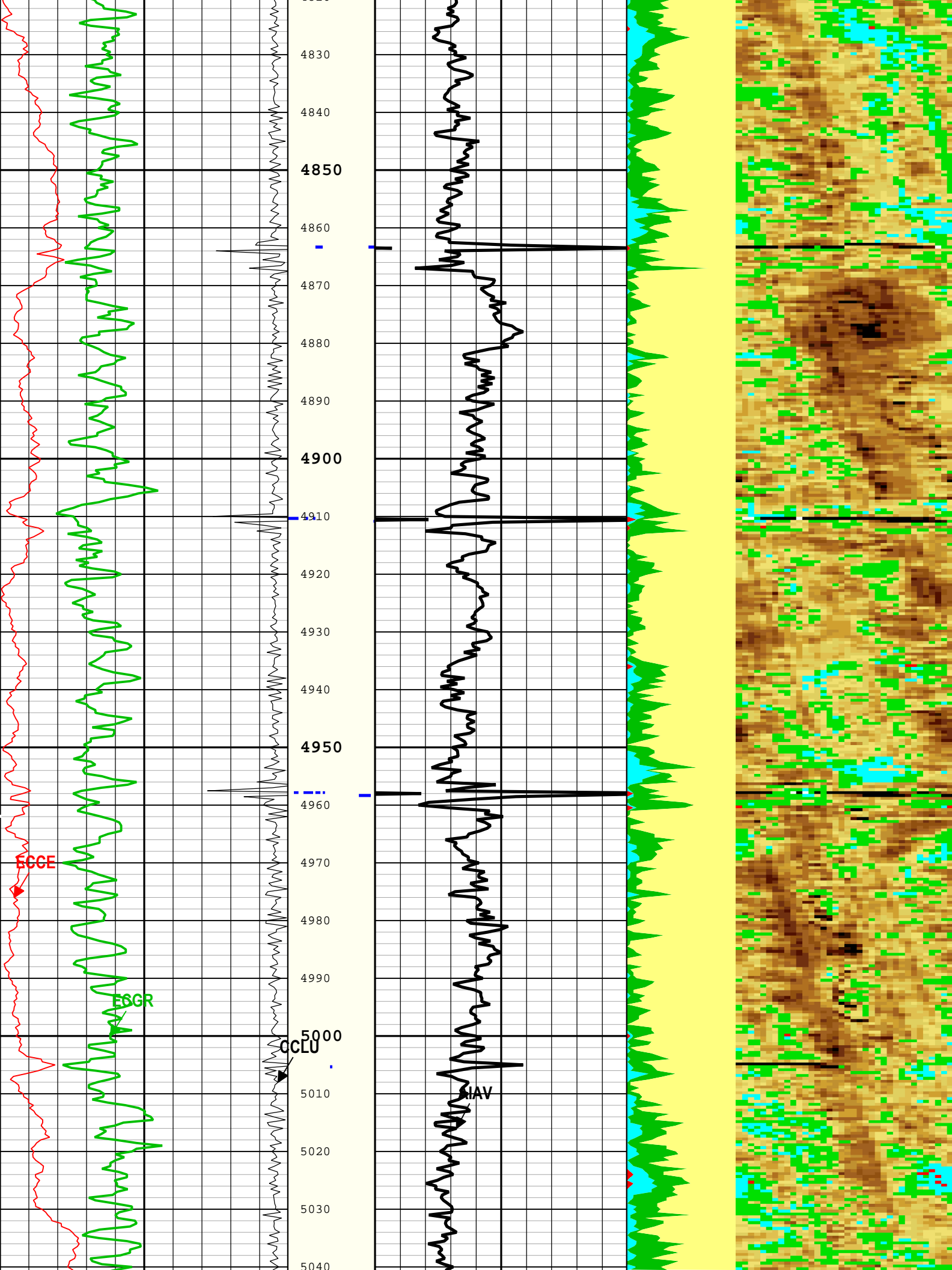


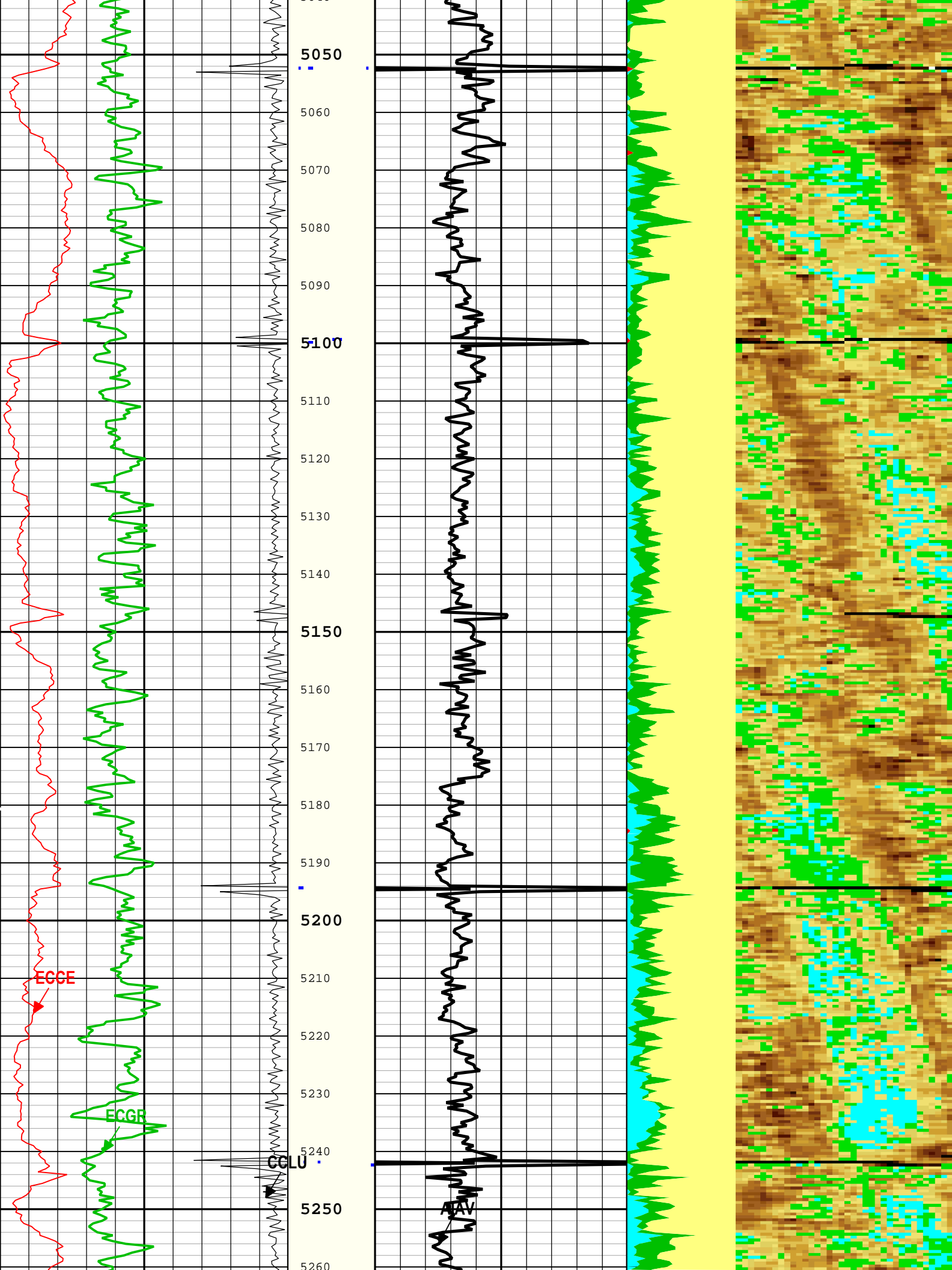


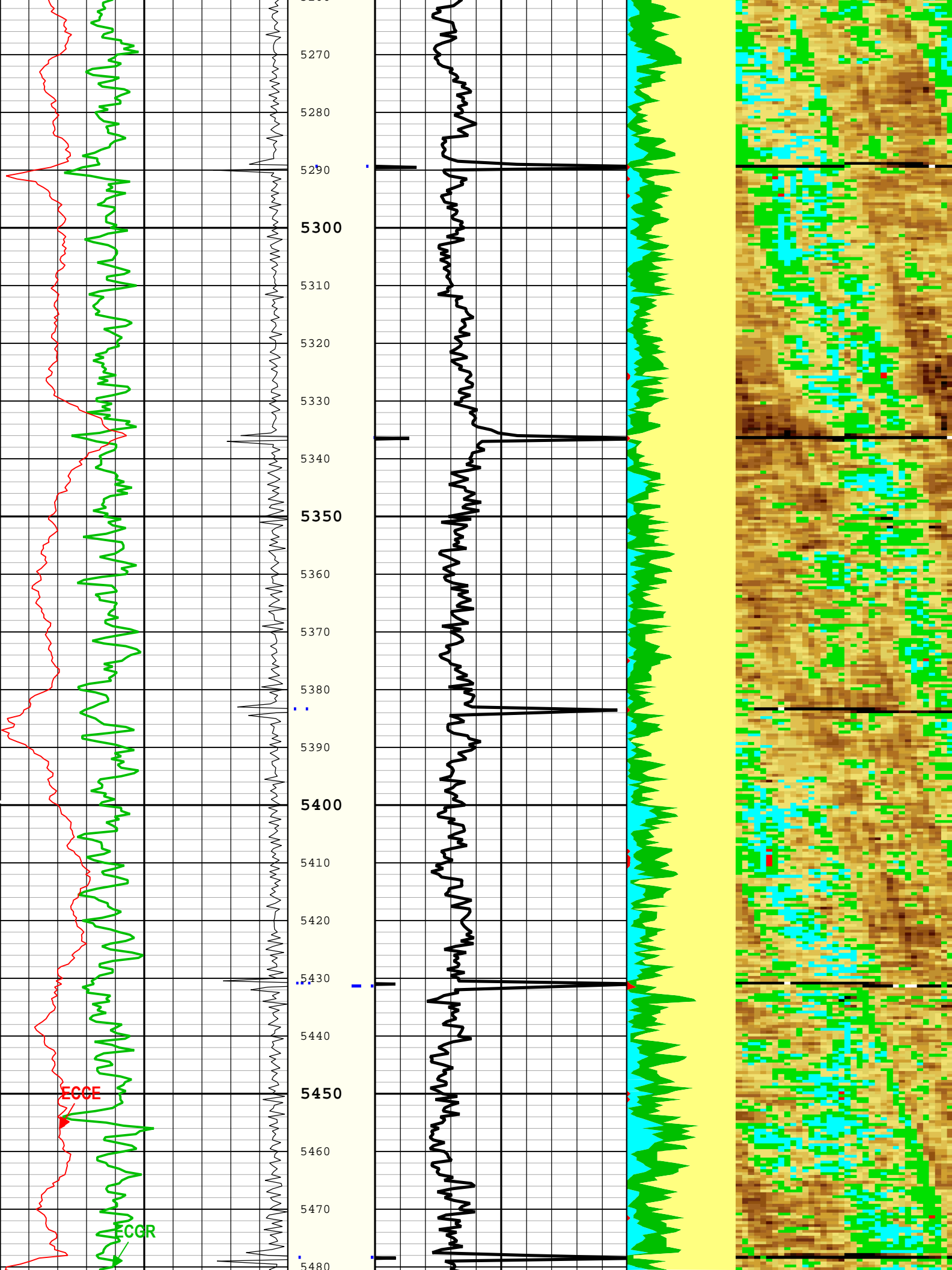


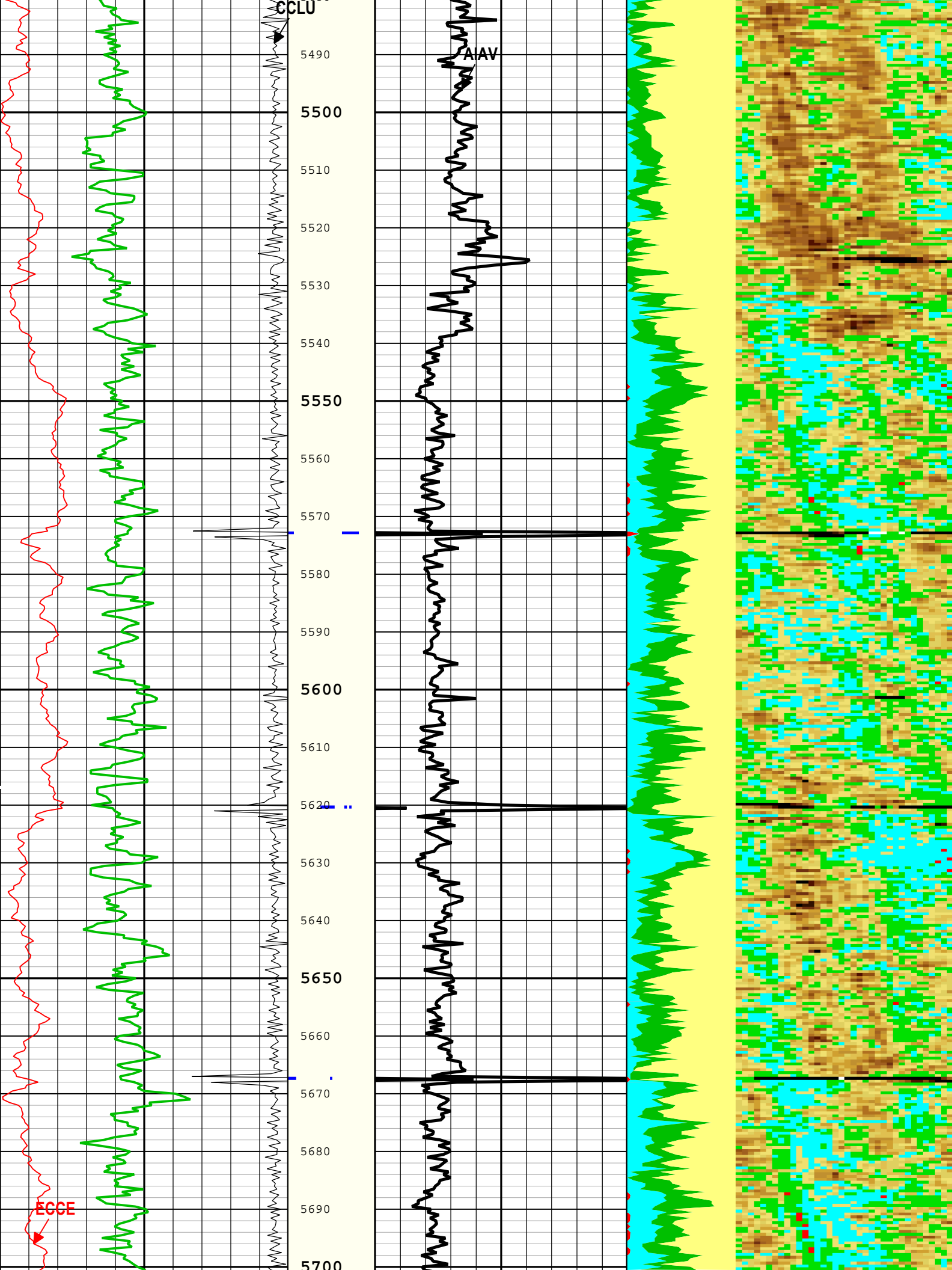


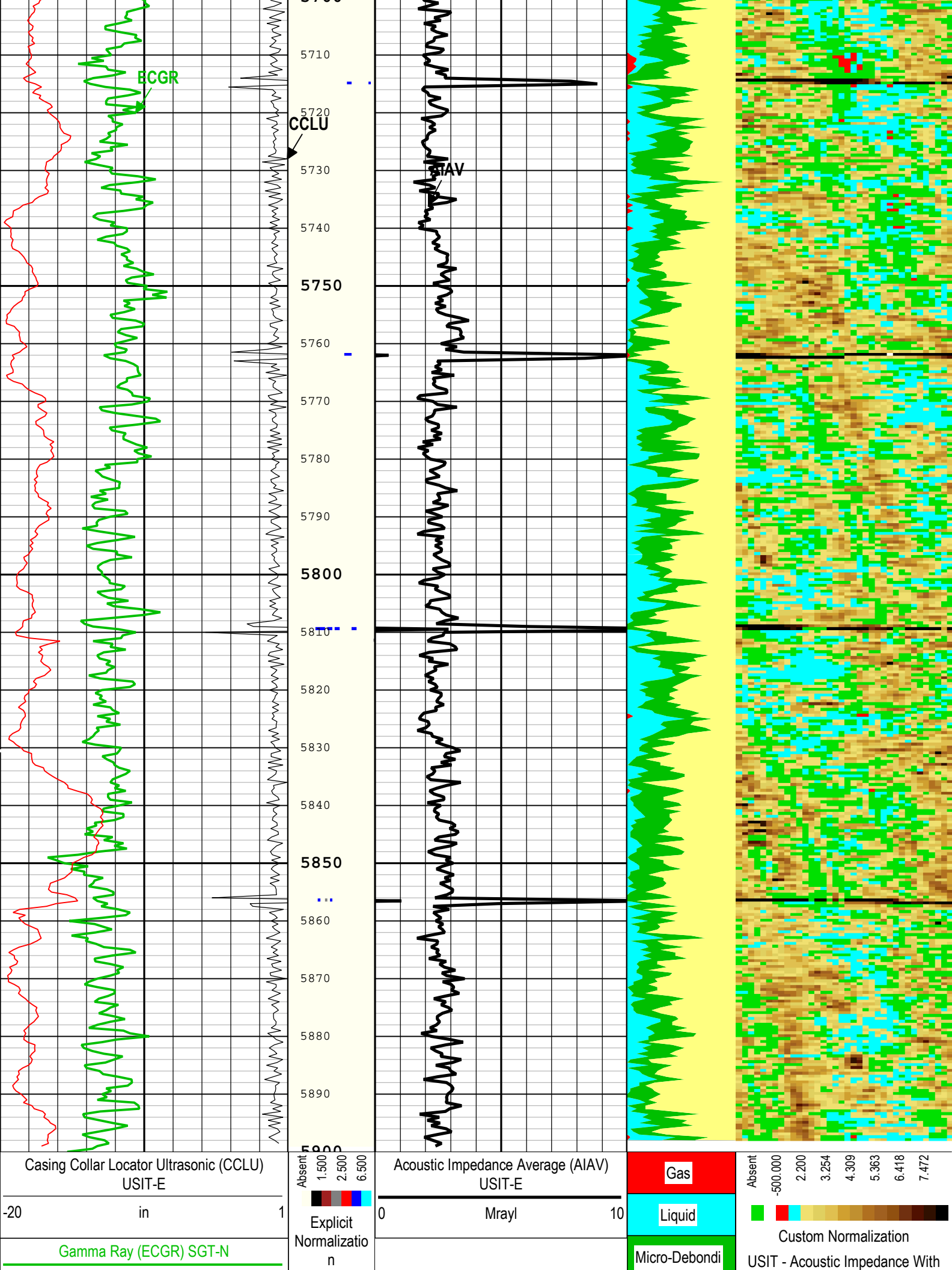












Channel Processing Parameters

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	5900	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	1.13	
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	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	26	67.5	110
BS	13.5	110	1953
BS	8.5	1953	5900

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	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	6300	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	31.88	22-Sep-2017 03:24:45	22-Sep-2017 03:26:18	6139.54	5979.42
WINB	22	22-Sep-2017 03:26:18	22-Sep-2017 03:26:37	5979.42	5911.87
WINB	26.6	22-Sep-2017 03:26:37	22-Sep-2017 03:57:40	5911.87	89.58
WINE	71.88	22-Sep-2017 03:24:45	22-Sep-2017 03:26:13	6139.54	5996.51
WINE	68.04	22-Sep-2017 03:26:13	22-Sep-2017 03:26:25	5996.51	5952.27
WINE	66.51	22-Sep-2017 03:26:25	22-Sep-2017 03:32:54	5952.27	4541.03
WINE	67.27	22-Sep-2017 03:32:54	22-Sep-2017 03:32:59	4541.03	4523.65
WINE	68.04	22-Sep-2017 03:32:59	22-Sep-2017 03:33:02	4523.65	4509.39
WINE	69.57	22-Sep-2017 03:33:02	22-Sep-2017 03:33:09	4509.39	4486.29
WINE	71.88	22-Sep-2017 03:33:09	22-Sep-2017 03:57:40	4486.29	89.58

All depth are at tool zero.

ONE

0 PSI Repeat 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	Log[2]:Up	Up	1945.22 ft	2521.55 ft	22-Sep-2017 2:50:07 AM	22-Sep-2017 2:52:49 AM	ON	2.99 ft	No

All depths are referenced to toolstring zero

Log	Company:Noble Energy INC Well:Wells Ranch BB11-682 ONE: Log[2]:Up:S007
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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: 22-Sep-2017 04:48:01

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU)
USIT-E

-20 in 1

Gamma Ray (ECGR) SGT-N

0 gAPI 150

Amplitude of Eccentering (ECCE) USIT-E

Absent 1.500 2.500 6.500

Explicit Normalization

USIT - USIT Processing Floor (ULF) C

Acoustic Impedance Average (AIAV)
USIT-E

Gas

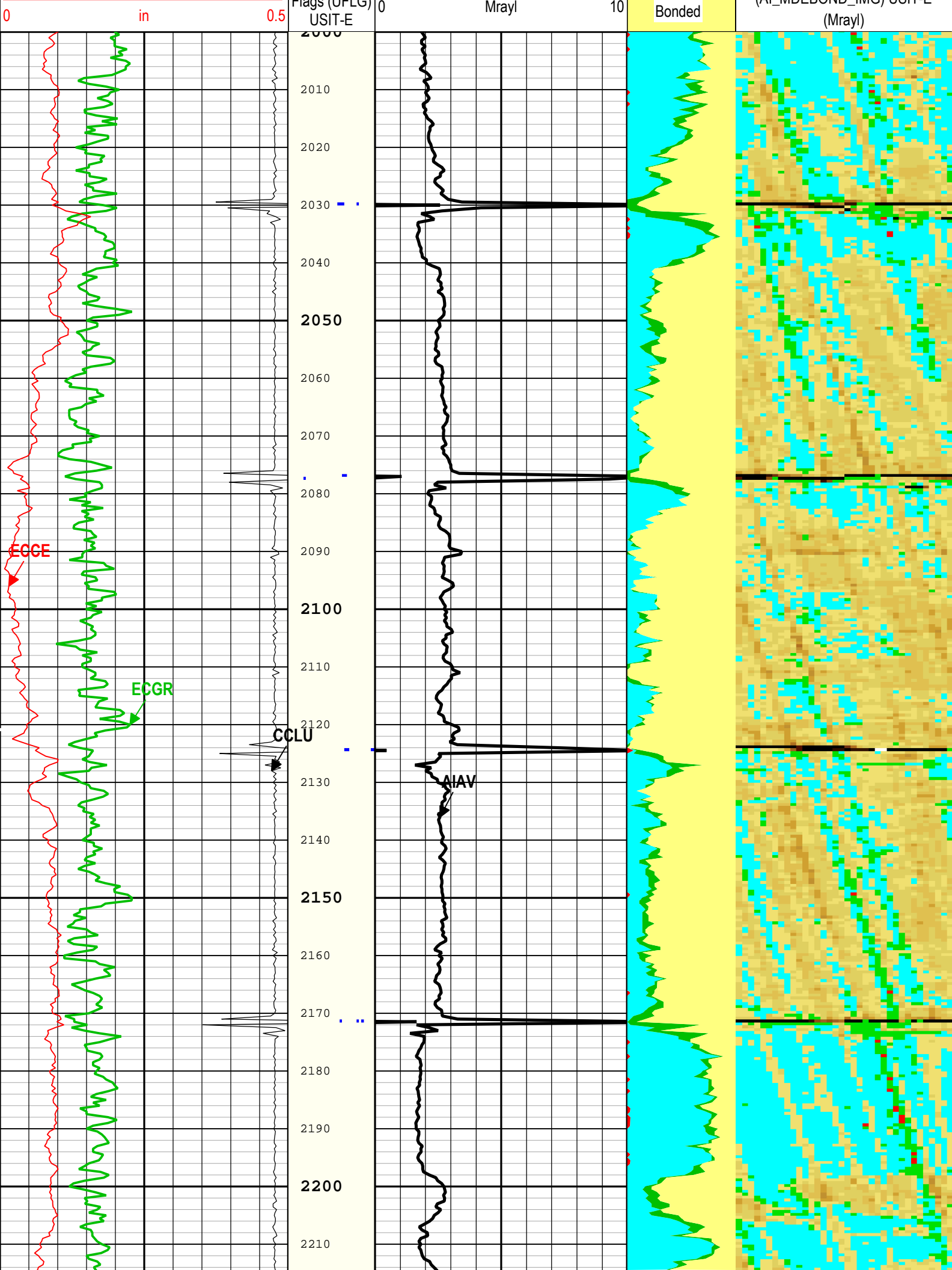
Liquid

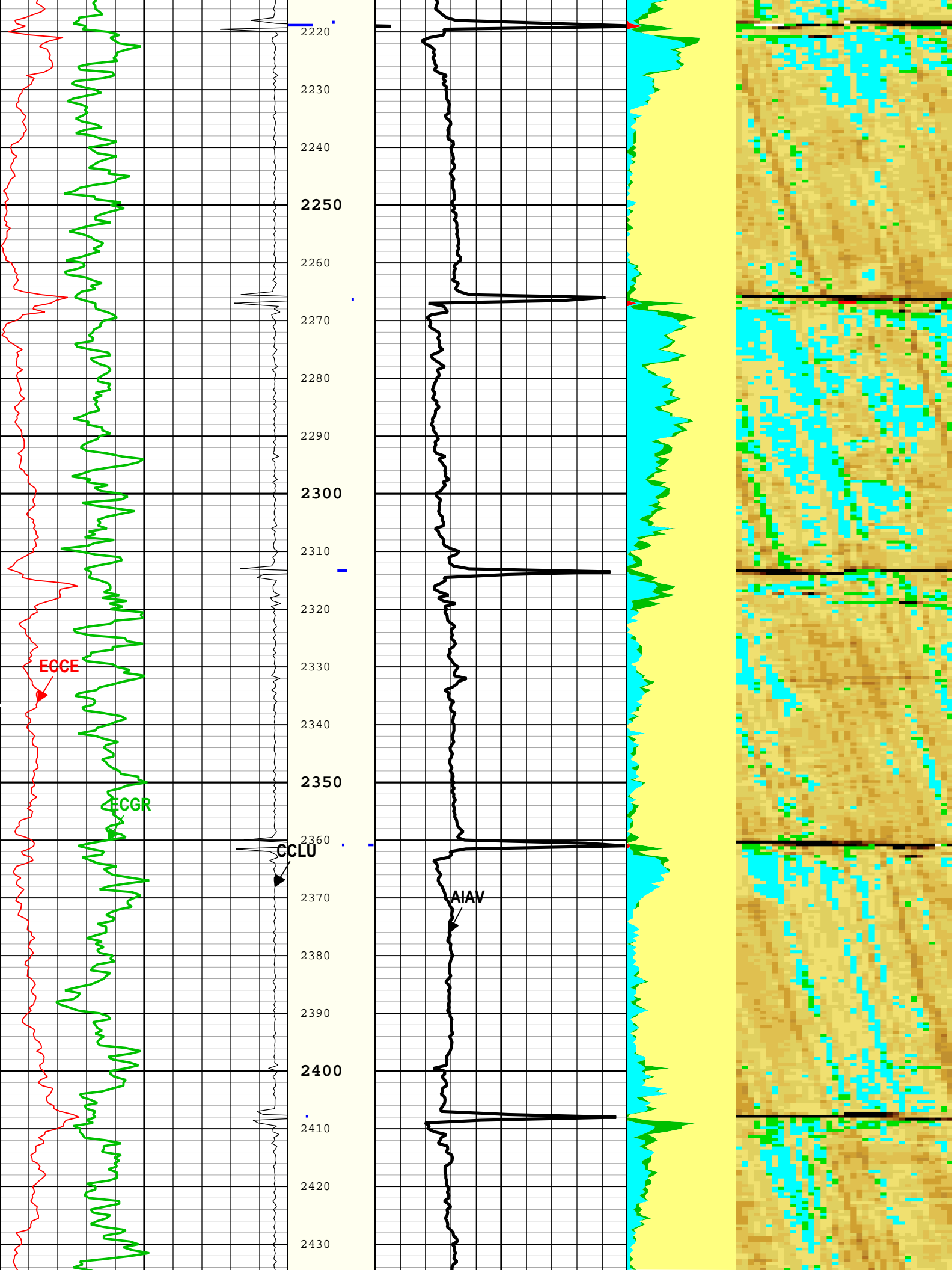
Micro-Debonding

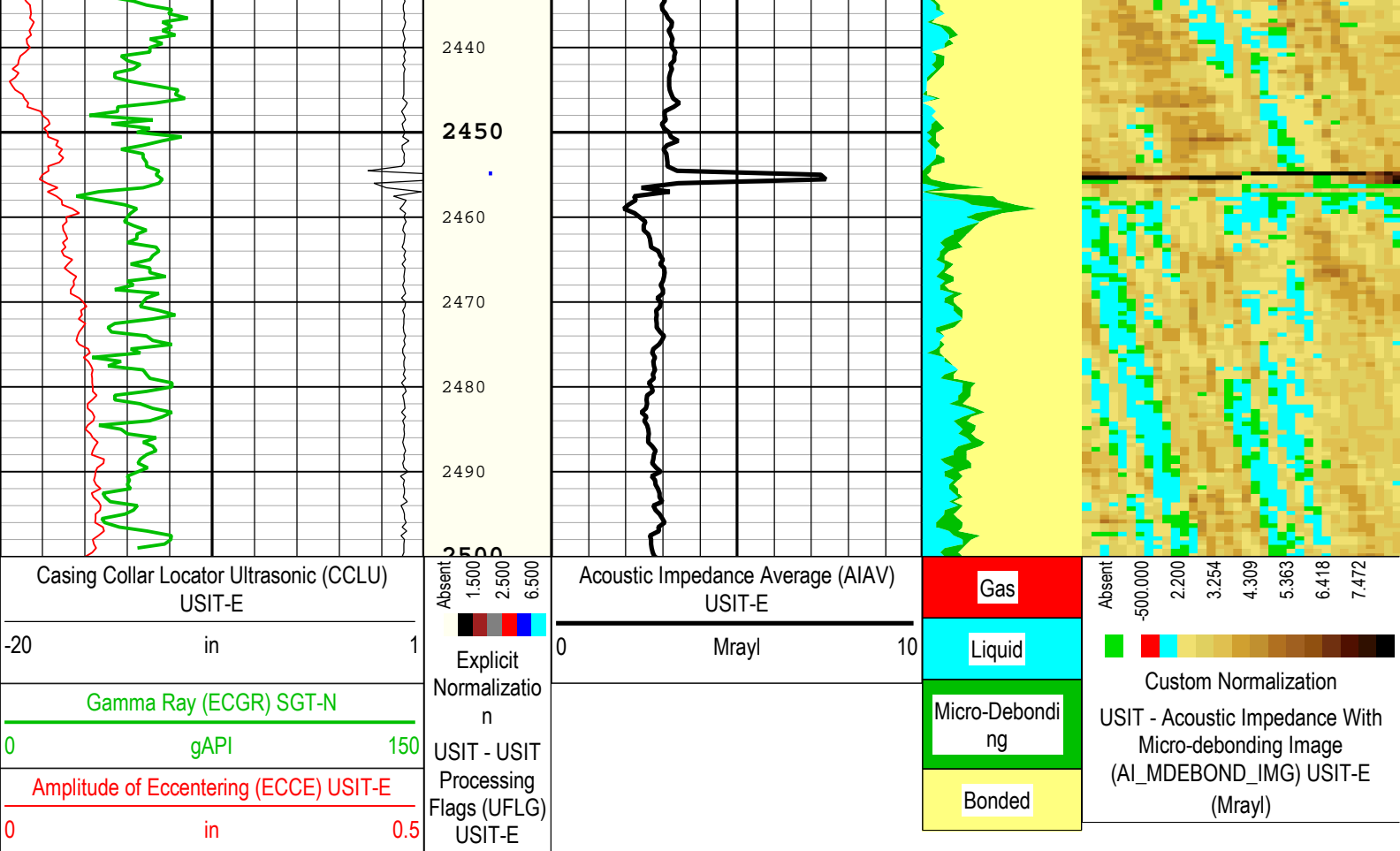
Absent -500.000 2.200 3.254 4.309 5.363 6.418 7.472

Custom Normalization

USIT - Acoustic Impedance With Micro-debonding Image (AI MDEROND IMG) USIT-E







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: 22-Sep-2017 04:48:01

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	5900	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	1.13	
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	2.2	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	18	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	3000	ft
WINB	Window Begin Time	USIT-E	31.88	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)
WINE	71.88	22-Sep-2017 02:50:07	22-Sep-2017 02:51:18	2521.55	2269.16
WINE	74.18	22-Sep-2017 02:51:18	22-Sep-2017 02:52:49	2269.16	1945.22

All depth are at tool zero.

XYZ

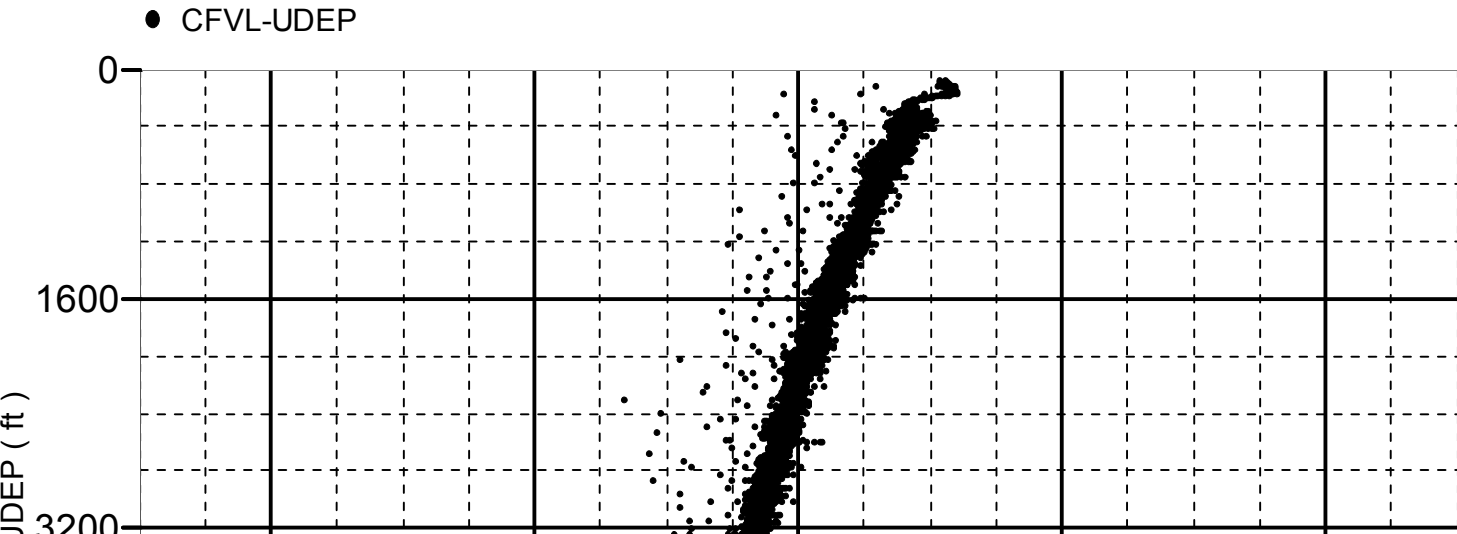
Company:Noble Energy INC Well:Wells Ranch BB11-682

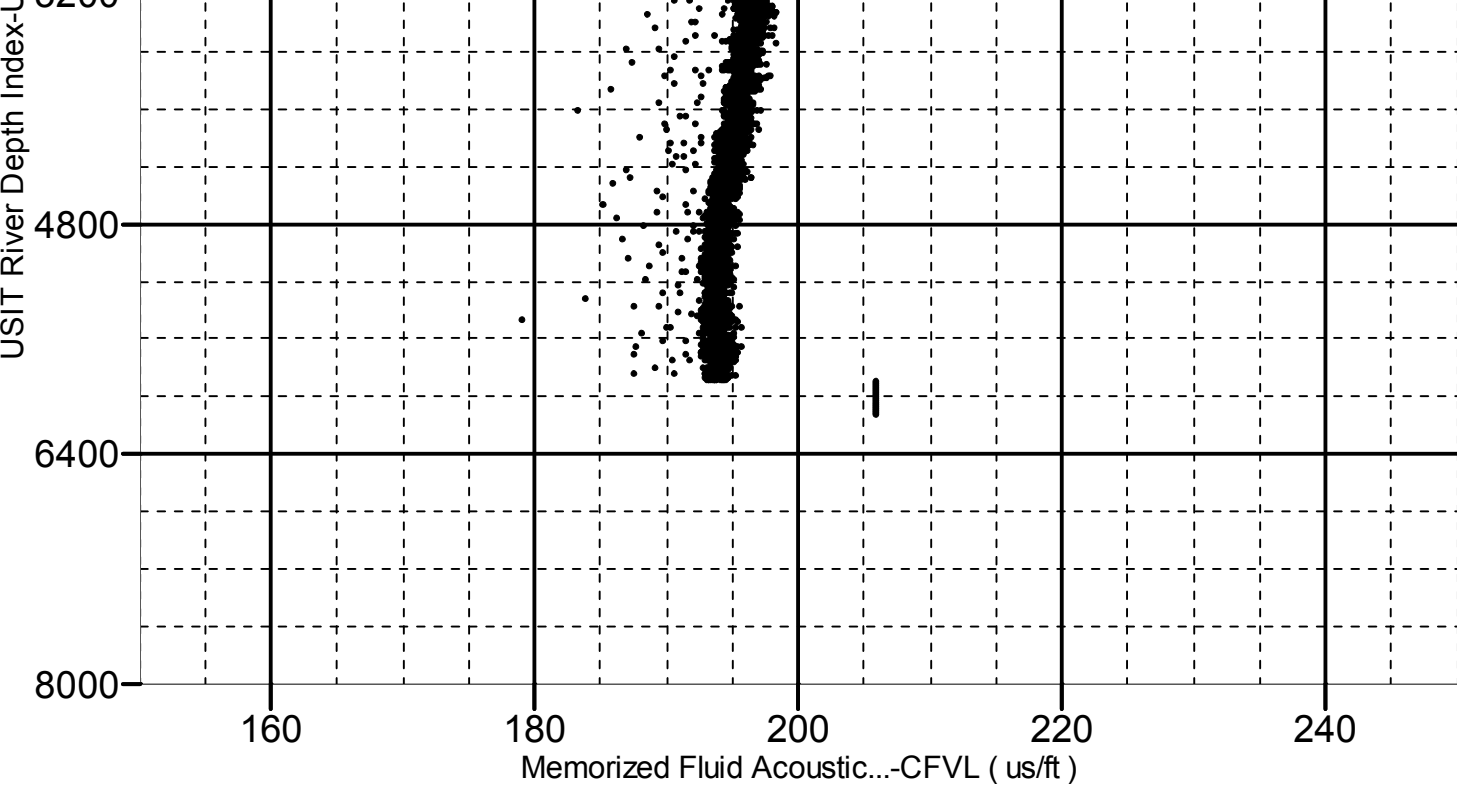
ONE: Log[4]:Up:S007

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 5900.00 to 89.50 ft

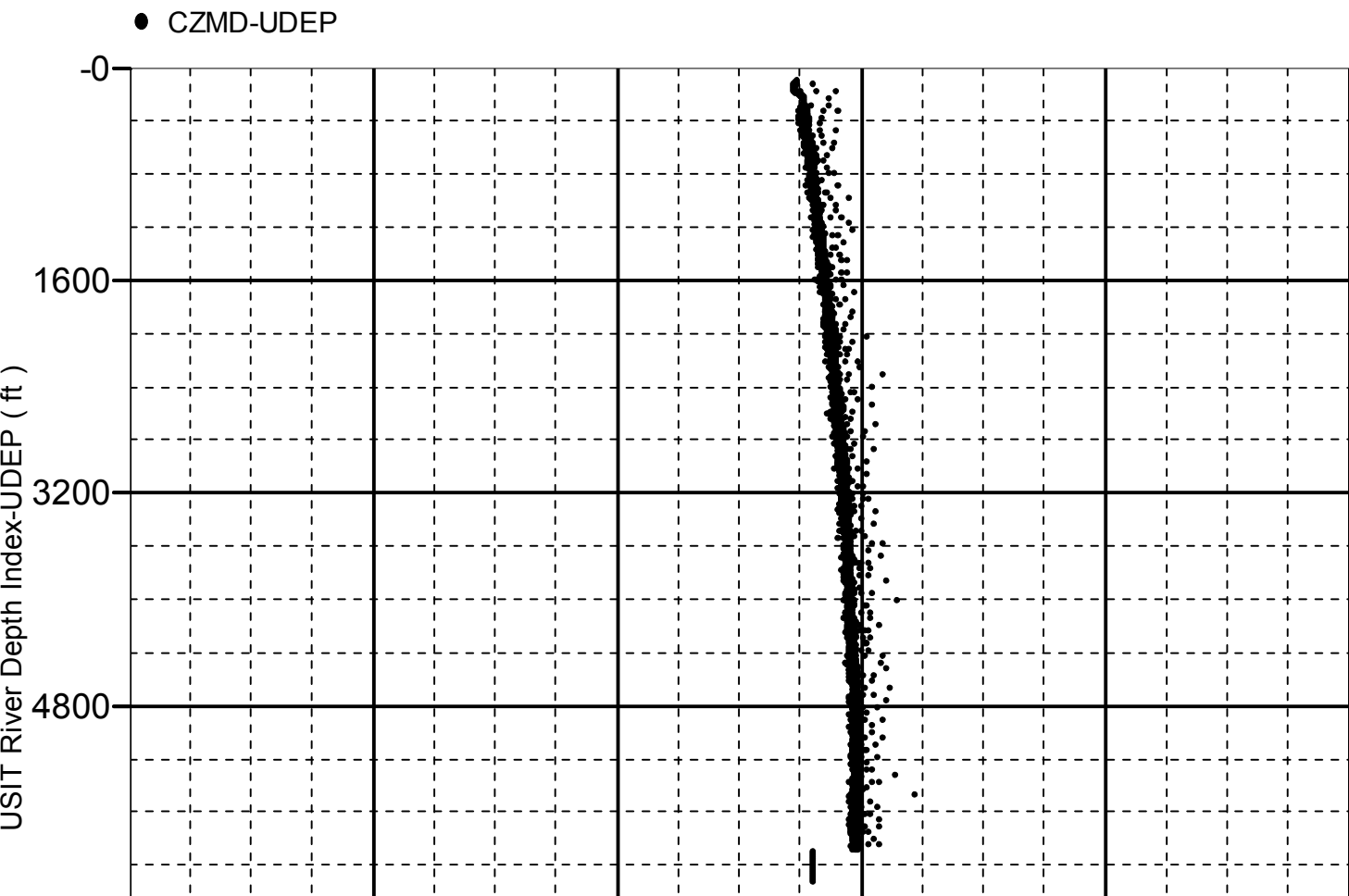


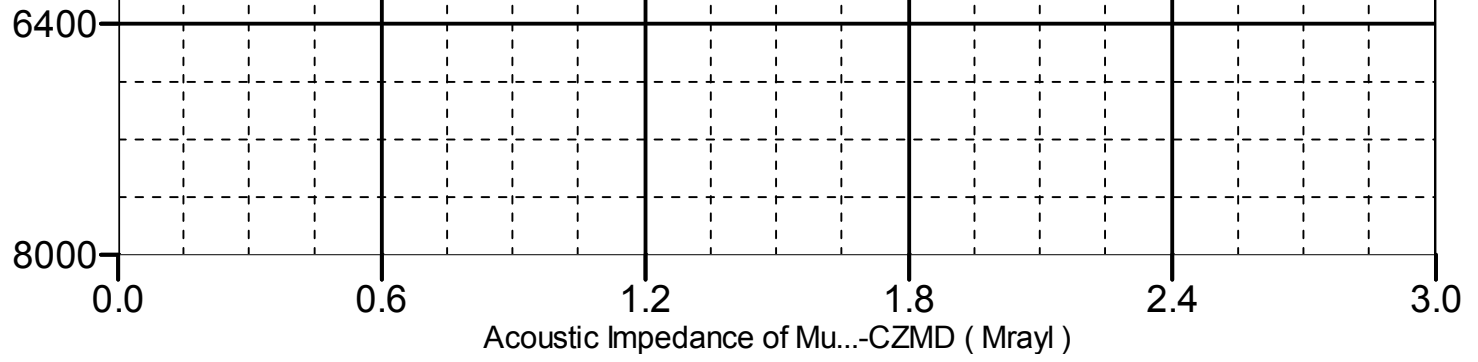


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 5900.00 to 89.50 ft





Company:	Noble Energy INC	Schlumberger
Well:	Wells Ranch BB11-682	
Field:	Wattenberg	
County:	WELD	
State:	Colorado	

UltraSonic Summary Print