

Company: Noble Energy Inc

Well: Wells Ranch BB09-649

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld		
Field:	Wattenberg		
Location:	NWSW		
Well:	Wells Ranch BB09-649		
Company:	Noble Energy Inc		
Location:	NWSW	Elev.: K.B. 4700.00 ft	
	2297 FSL & 285 FWL	G.L. 4670.00 ft	
	Lat/Long: 40.41293/-104.41246	D.F. 4700.00 ft	
	Permanent Datum:	Ground Level	Elev.: 4670.00 f
Log Measured From:		Kelly Bushing	30.00 ft above Perm.Datum
Drilling Measured From:		Kelly Bushing	
API Serial No.	Section:	Township:	Range:
05-123-44958	11	5N	63W

Logging Date	04-Mar-2019	04-Mar-2019
Run Number	1A	1B
Depth Driller	16987.00 ft	16987.00 ft
Schlumberger Depth	6025.00 ft	6025.00 ft
Bottom Log Interval	6025.00 ft	6025.00 ft
Top Log Interval	100.00 ft	100.00 ft
Casing Fluid Type	Calcium Chloride Brine	Calcium Chloride Brine
Salinity		
Density	8.4 lbm/gal	8.4 lbm/gal
Fluid Level	0.00 ft	0.00 ft
BIT/CASING/TUBING STRING		
Bit Size	8.50 in	8.50 in
From	1948.00 ft	1948.00 ft
To	6025.00 ft	6025.00 ft
Casing/Tubing Size	5.5 in	5.5 in
Weight	20 lbm/ft	20 lbm/ft
Grade	N/A	N/A
From	0.00 ft	0.00 ft
To	6025.00 ft	6025.00 ft
Max Recorded Temperatures	220 degF	220 degF
Logger on Bottom	04-Mar-2019 12:30:00	04-Mar-2019 16:07:00
Unit Number	Location: Time	
Recorded By	2143	2143
	Evan Grzecki	Evan Grzecki
	Bill Mansfield	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.

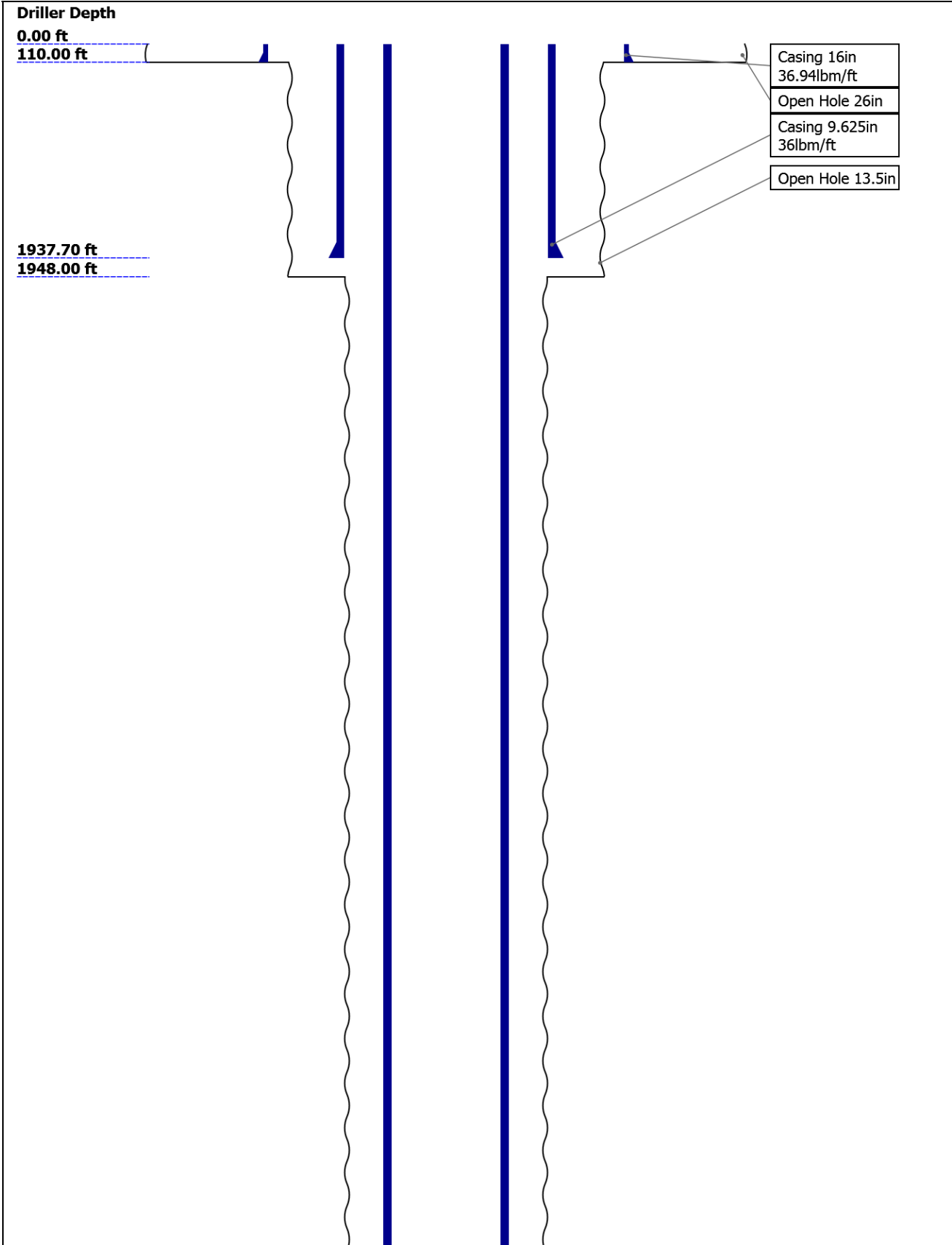
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Well Sketch



16972.40 ft

16987.00 ft

Casing 5.5in
20lbm/ft

Open Hole 8.5in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1948			
Top Logger (ft)	0	110	1948			
Bottom Driller (ft)	110	1948	16987			
Bottom Logger (ft)	110	1948	6025			
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	N/A	N/A			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	1937.7	16972.4			
Bottom Logger (ft)	110	1937.7	6025			

Remarks and Equipment Summary

Thank you for choosing Schlumberger!	
Log run for cement evaluation	
Toolstring run centralized using USIS centralizers and knuckles	
USRS-A sub run with USI-TX transducer	
Main pass logged @ 2500psi; Repeat pass logged @ 0psi	
Log correlated to downlog	
Crew: Tim Ludgate, Claude Walz	
1A: Remarks	1B: Remarks
Production Casing Cement: Halliburton 13.2ppg slurry and 11.5ppg spacer	
BHT: 220	
TOC: ~3100'	

1A: Toolstring

Equip name	Length	MP name	Offset
LEH-QT	40.47		
LEH-QT			
DTC-H	36.98		
ECH-KC			
DTC-H			
CTEM	36.08		
HV	0.00		
TelStatu	33.98		
s			
ToolSta	33.98		

1B: Toolstring

Equip name	Length	MP name	Offset
LEH-QT	36.56		
LEH-QT			

HGNS-B 33.98
HGNS
NSR-F:507
0
NPV-N
HMCA-B
HGNS-B
HACCZ-B:
5118

CNL Porosity 26.91
HGNS 24.57
HMCA 24.57
Accelerometer 0.00

AH-107 24.57

AH-184 22.57

USIT-D 20.57

ECH-MRA
USIC-D
USIS-A
USSC-B
USRS-A
USI-SENS
OR
USI-TX

USI Sensor Head-Fe 0.37
TOOL_ZERO
Lengths are in ft
Maximum Outer Diameter = 3.560 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

DTC-H 33.07
ECH-KC
DTC-H

SGT-N 30.07
SGH-K
SGD-TAA
SGC-TB

AH-107 24.57

AH-184 22.57

USIT-D 20.57

ECH-MRA
USIC-D
USIS-A
USSC-B
USRS-A
USI-SENS
OR
USI-TX

USI Sensor Head-Fe 0.37
TOOL_ZERO
Lengths are in ft
Maximum Outer Diameter = 3.560 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

CTEM 32.17
HV 0.00
TelStatus 30.07
ToolStatus 30.07
GR 29.16

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 2	Log[2]:Up	6028.58	108.76

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 : 39.77m(130.48ft) to 45.23m(148.39ft)

MUD_N_FRP = 1.13
DFP = 1.01 g/cm³ (9.8 lbm/gal)

DPD = 1.01g/cm3(8.40lbm/gal)

CZMD median computed in free pipe normalization interval = 1.69 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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1B

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1B	Log[2]:Up	Up	108.76 ft	6028.58 ft	04-Mar-2019 4:07:08 PM	04-Mar-2019 4:47:35 PM	ON	5.47 ft	Yes

All depths are referenced to toolstring zero

Log

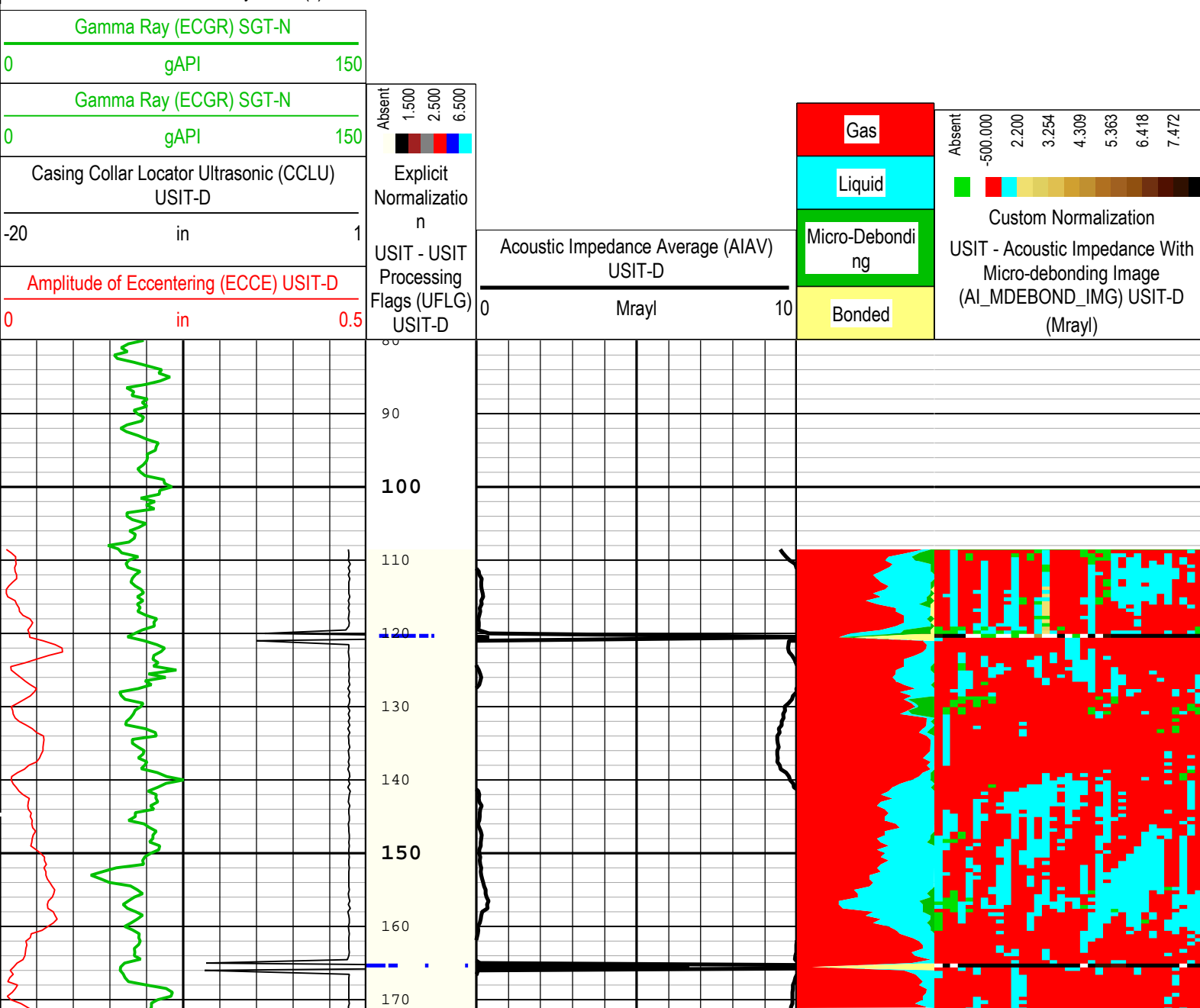
Company:Noble Energy Inc Well:Wells Ranch BB09-649

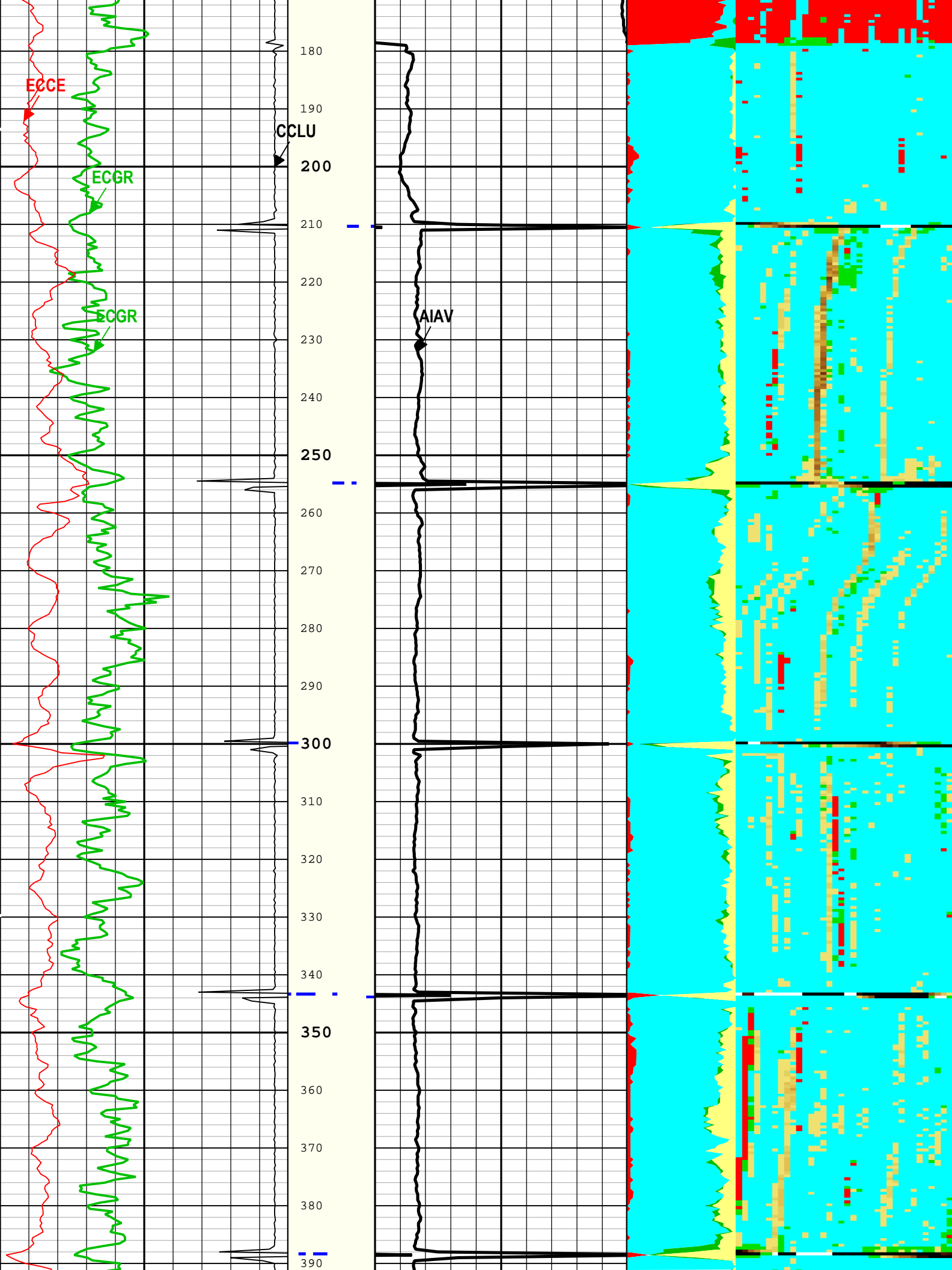
1B: Log[2]:Up:S003

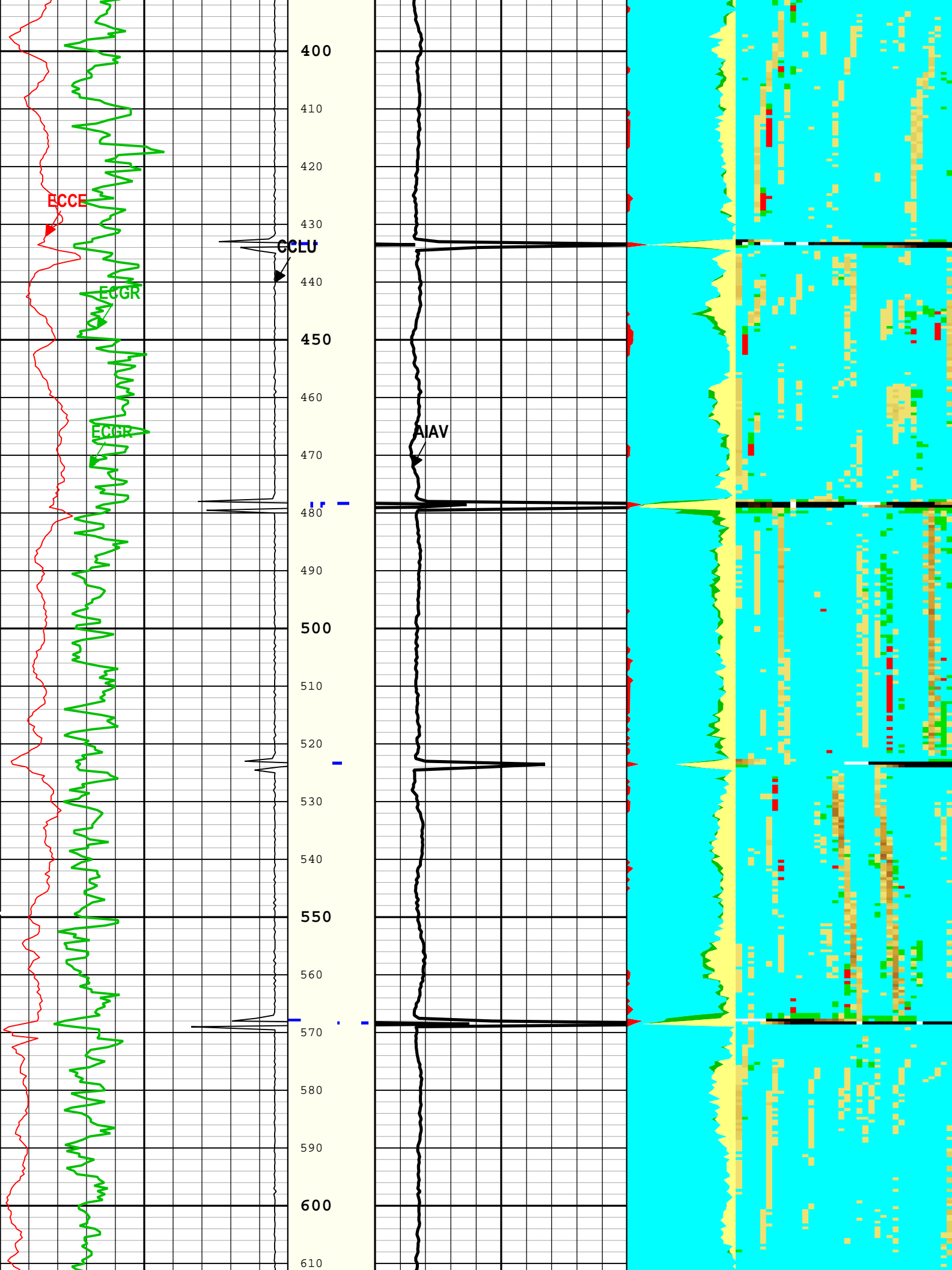
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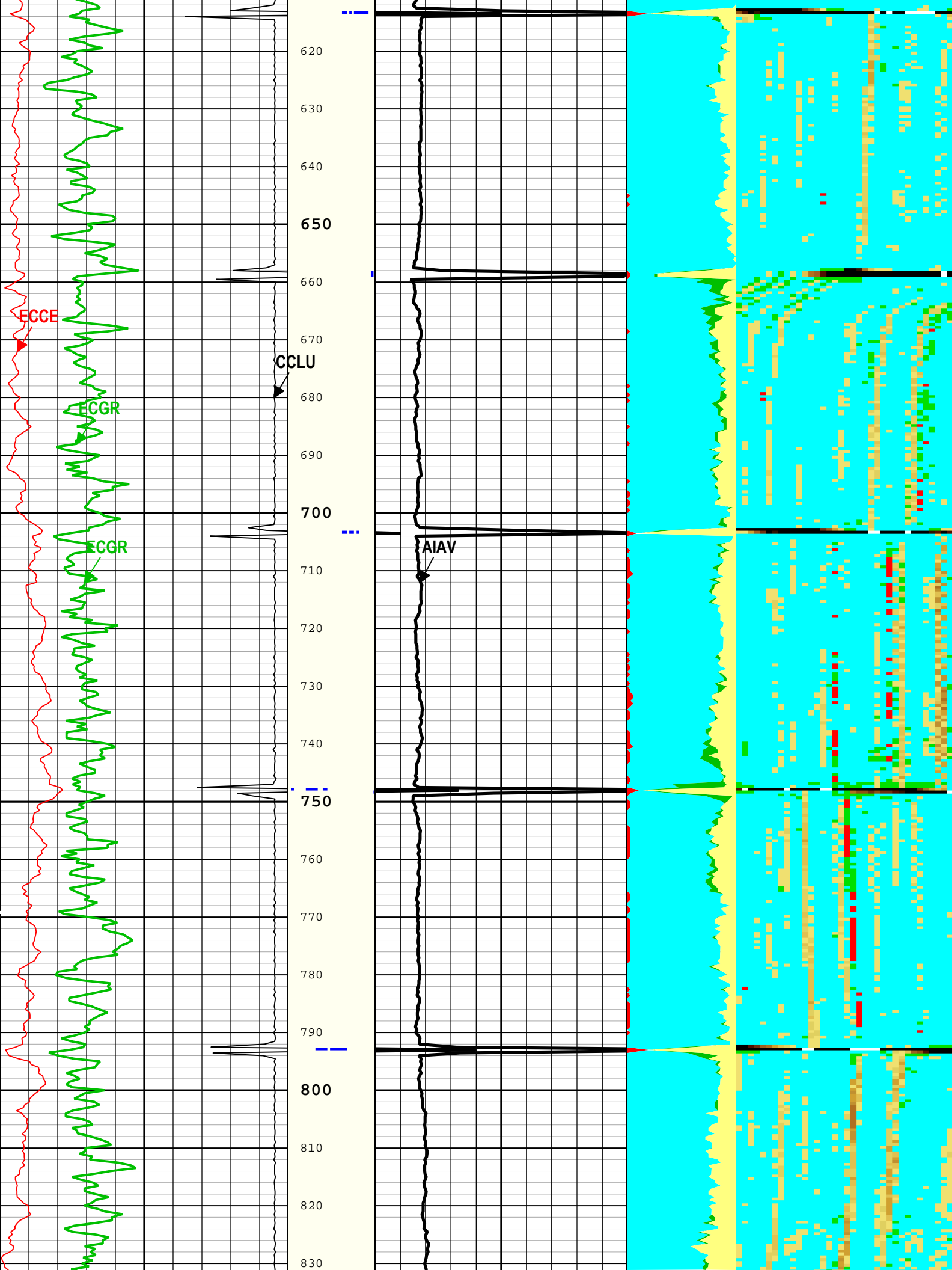
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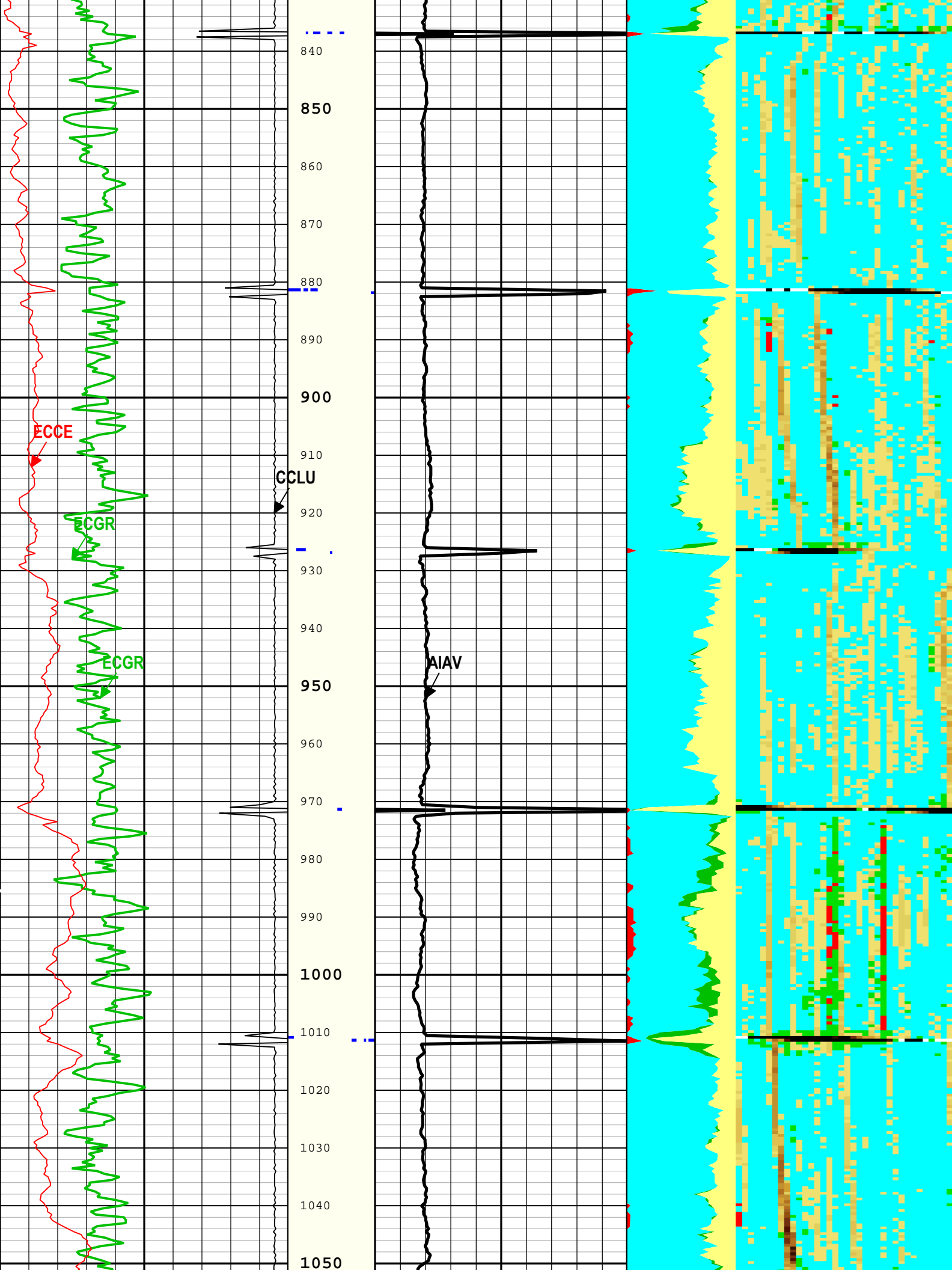
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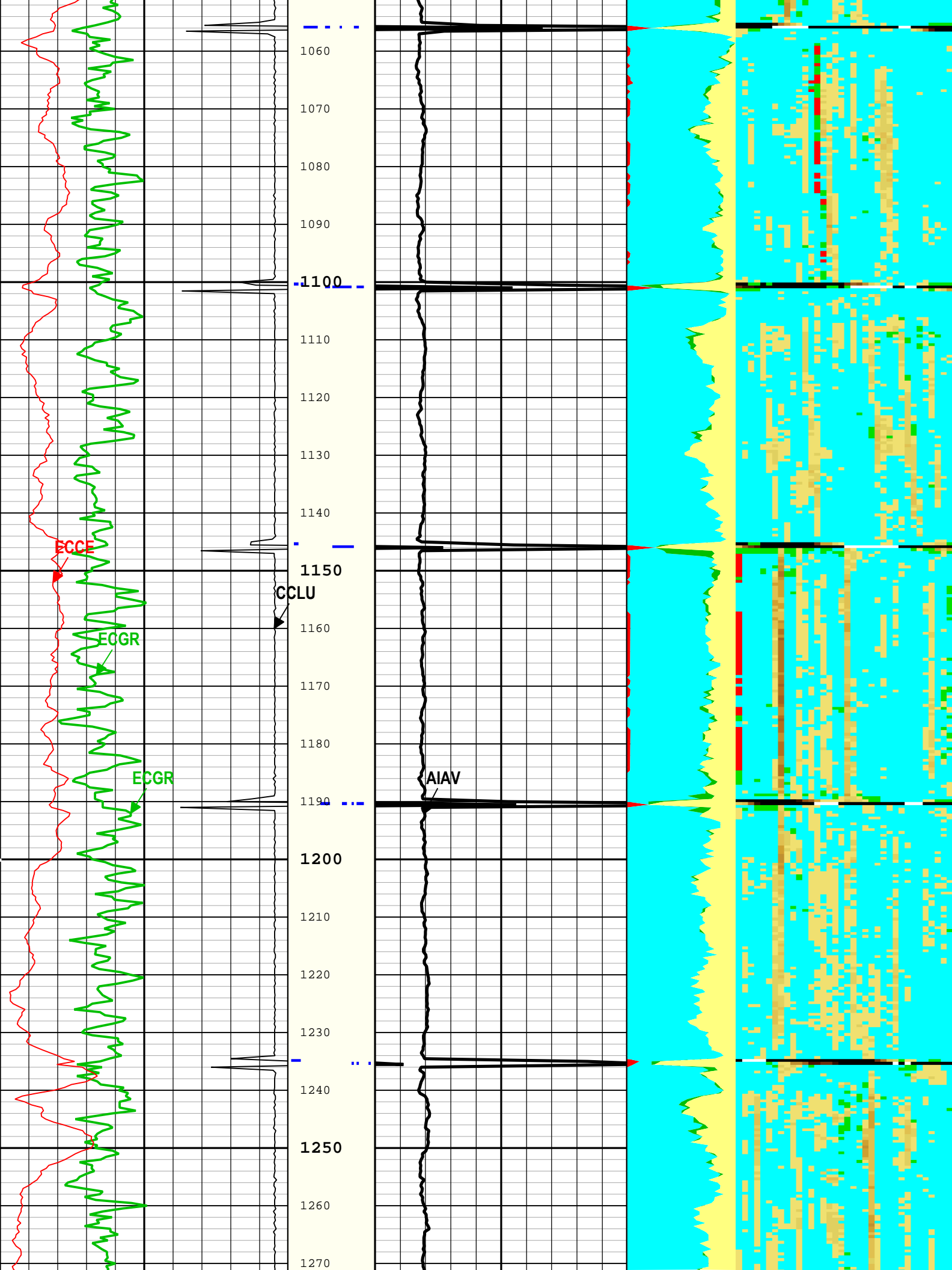


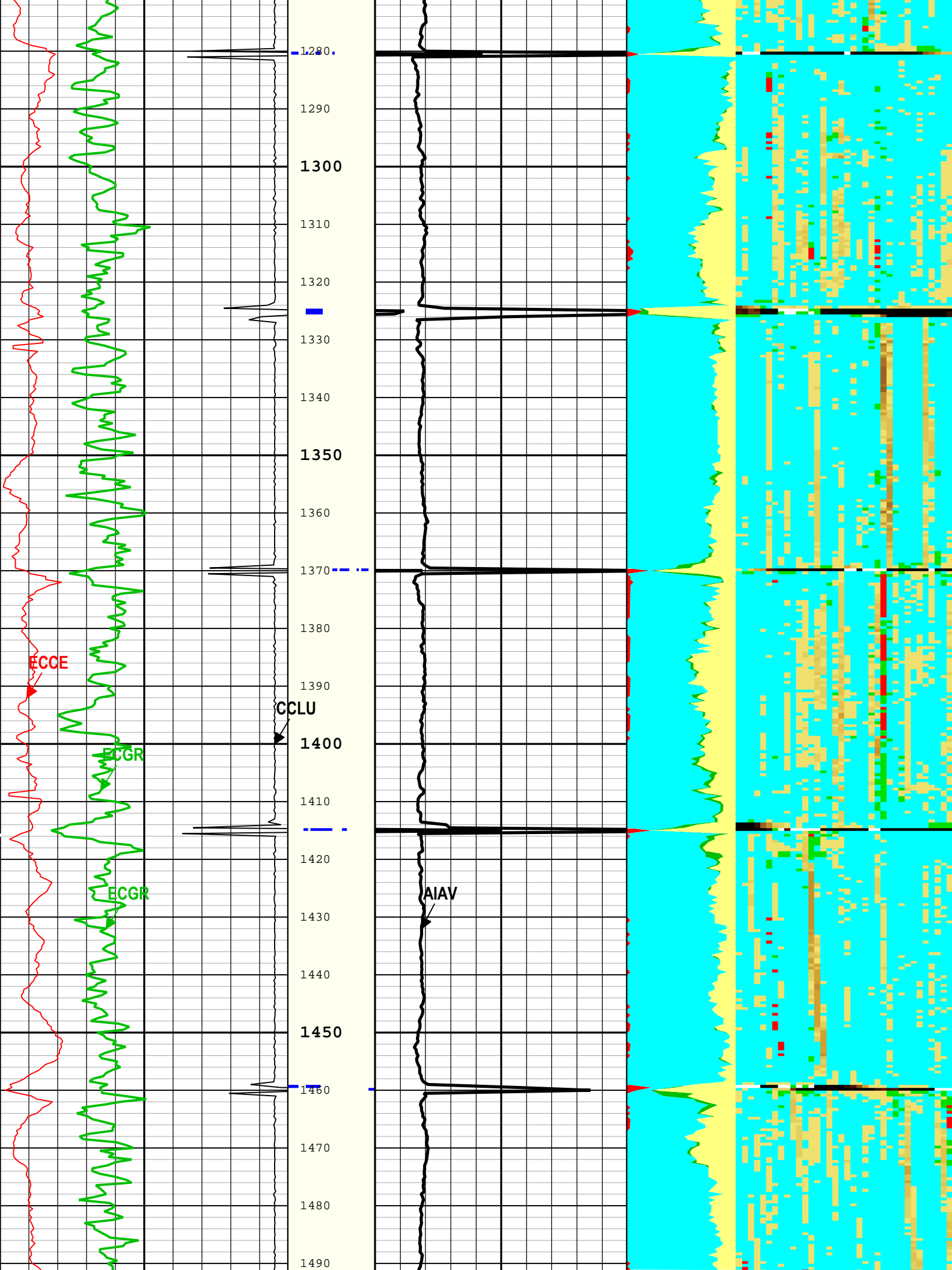


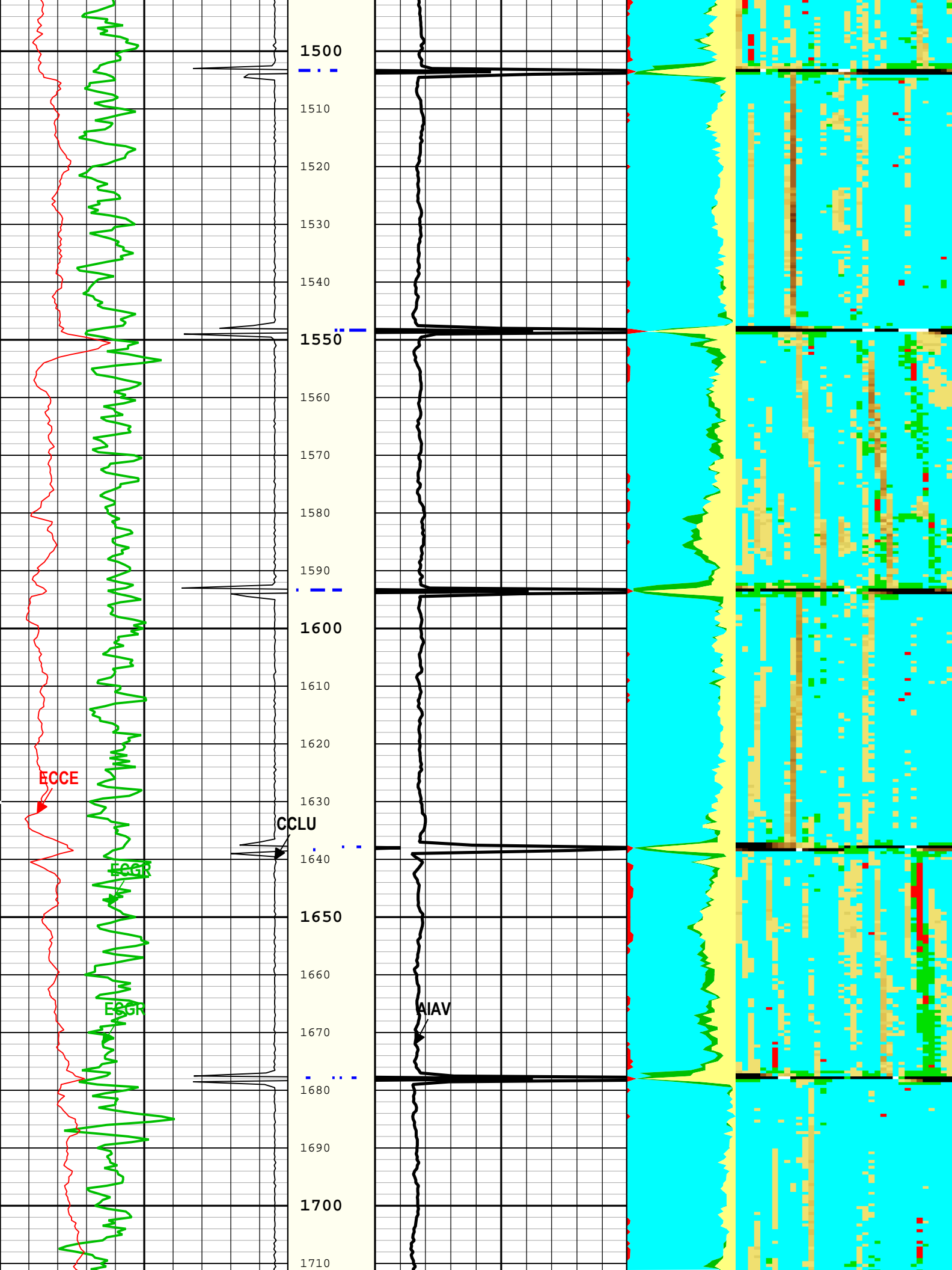


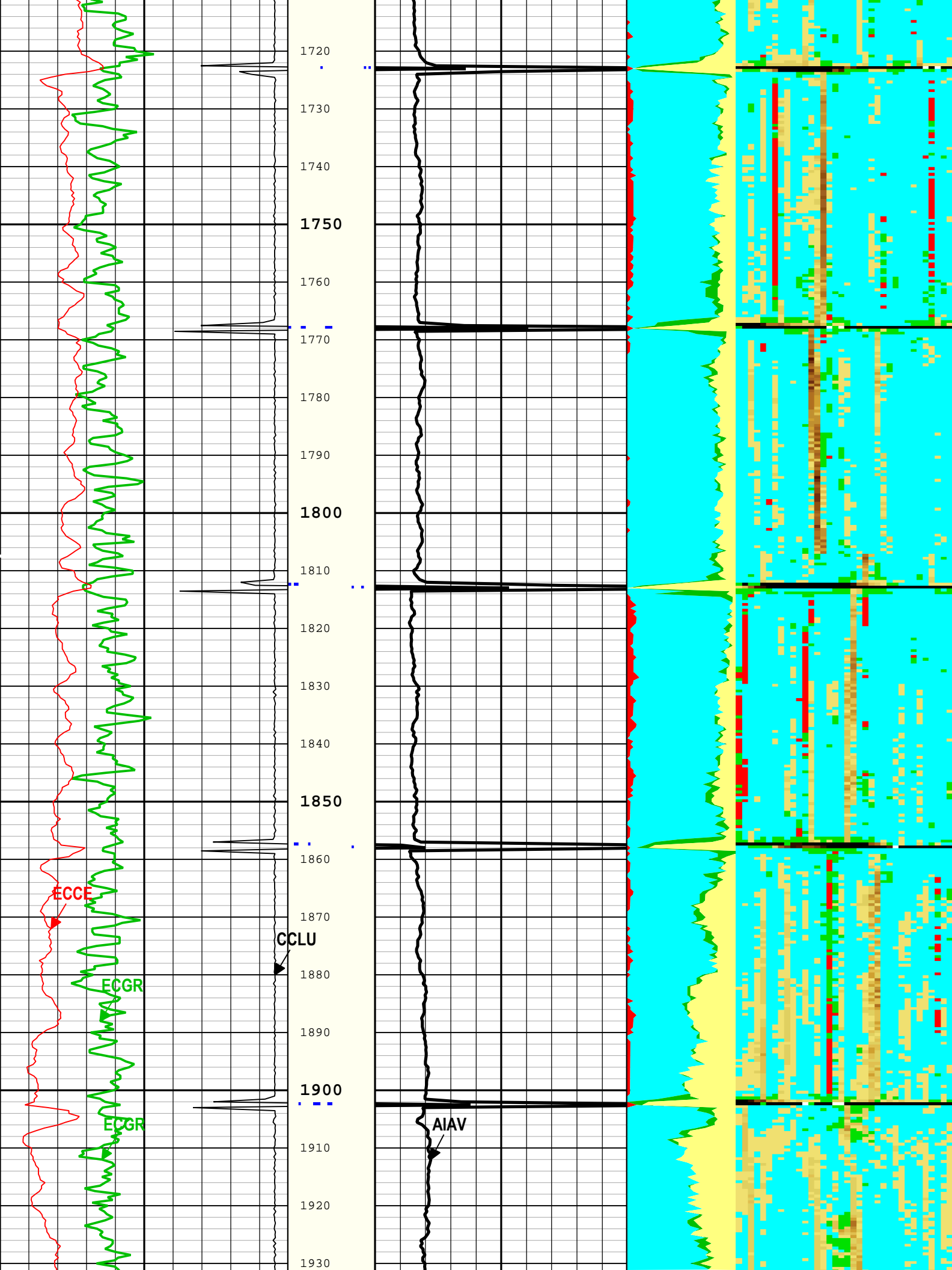


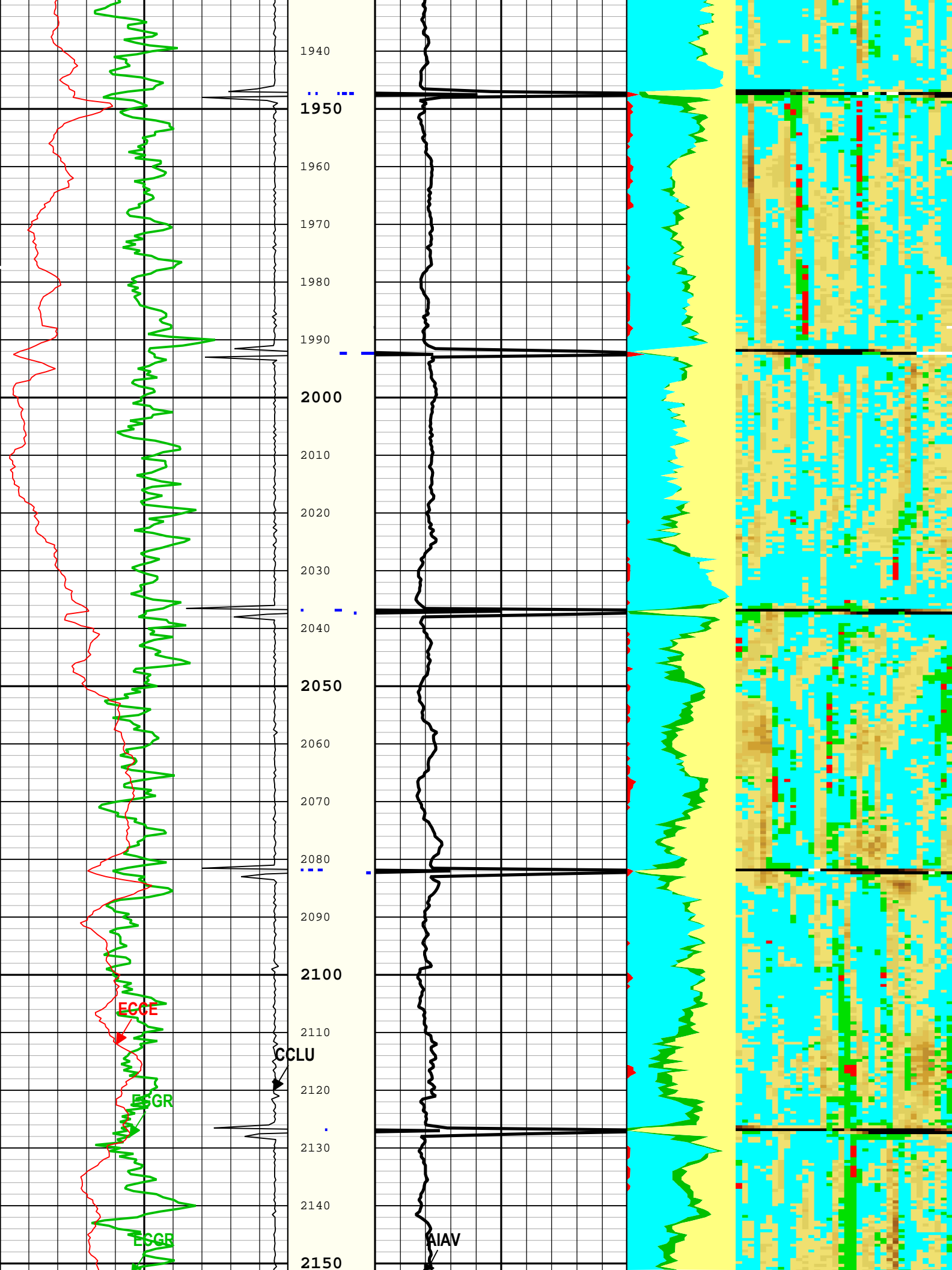


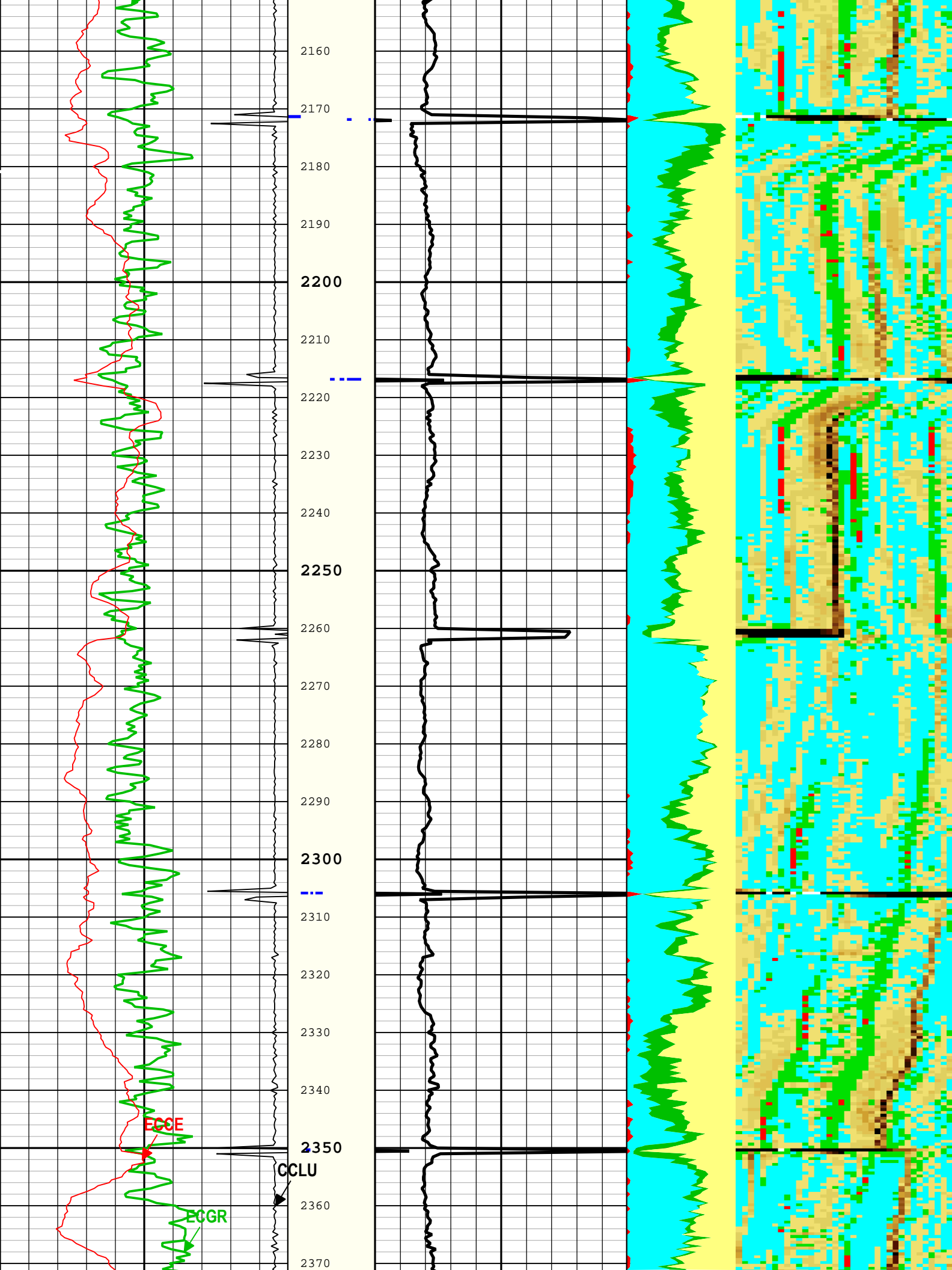


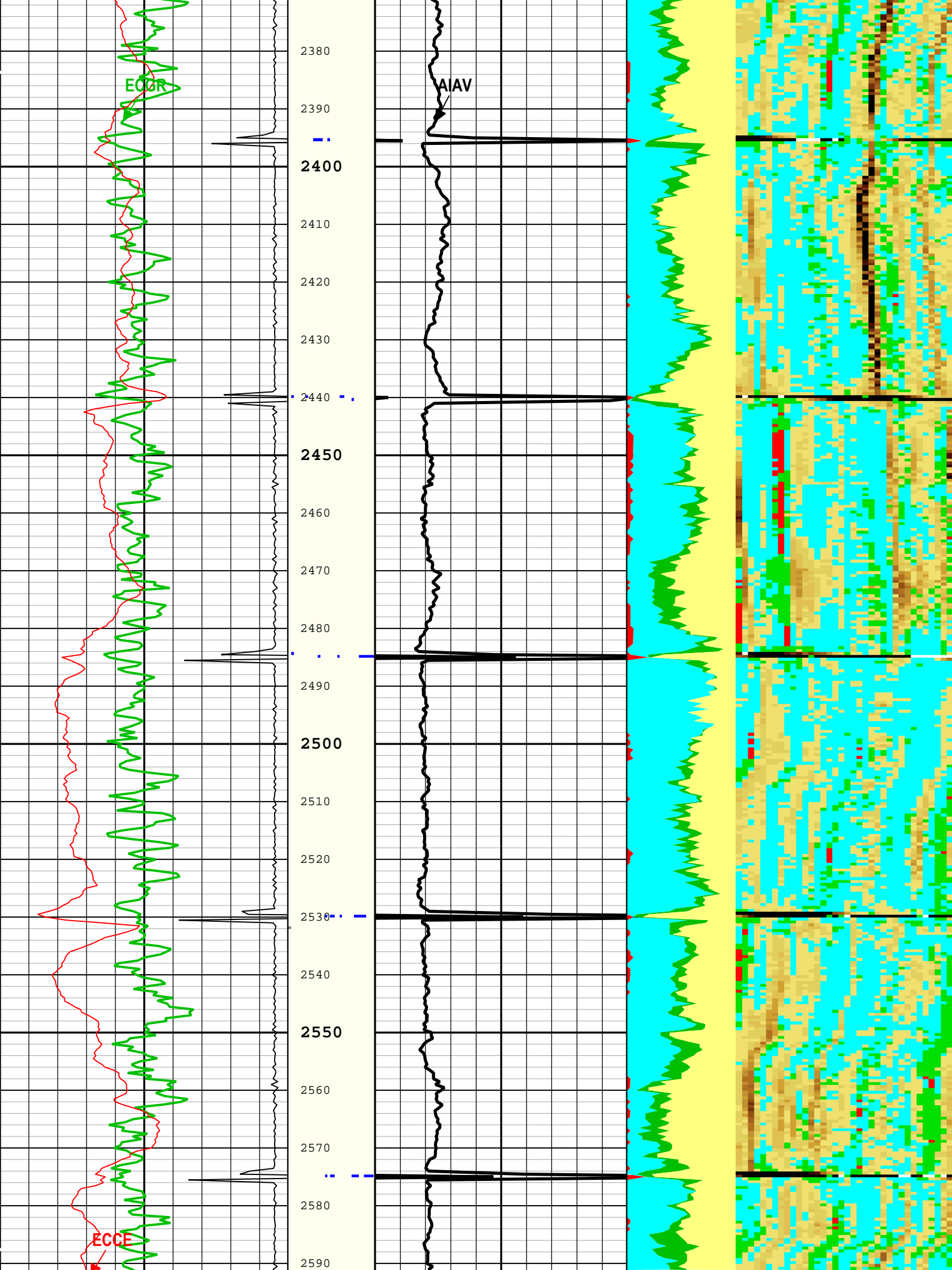


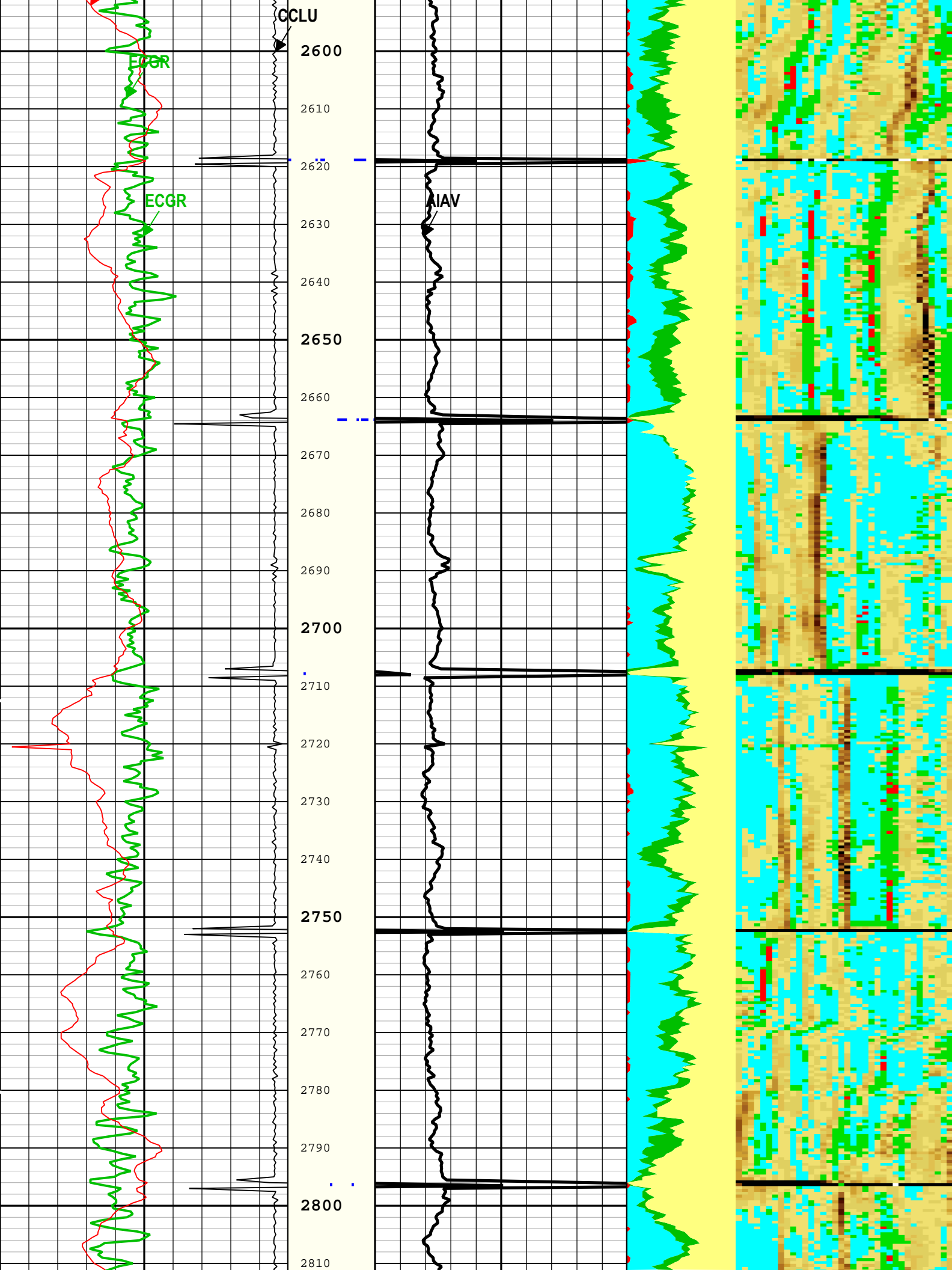


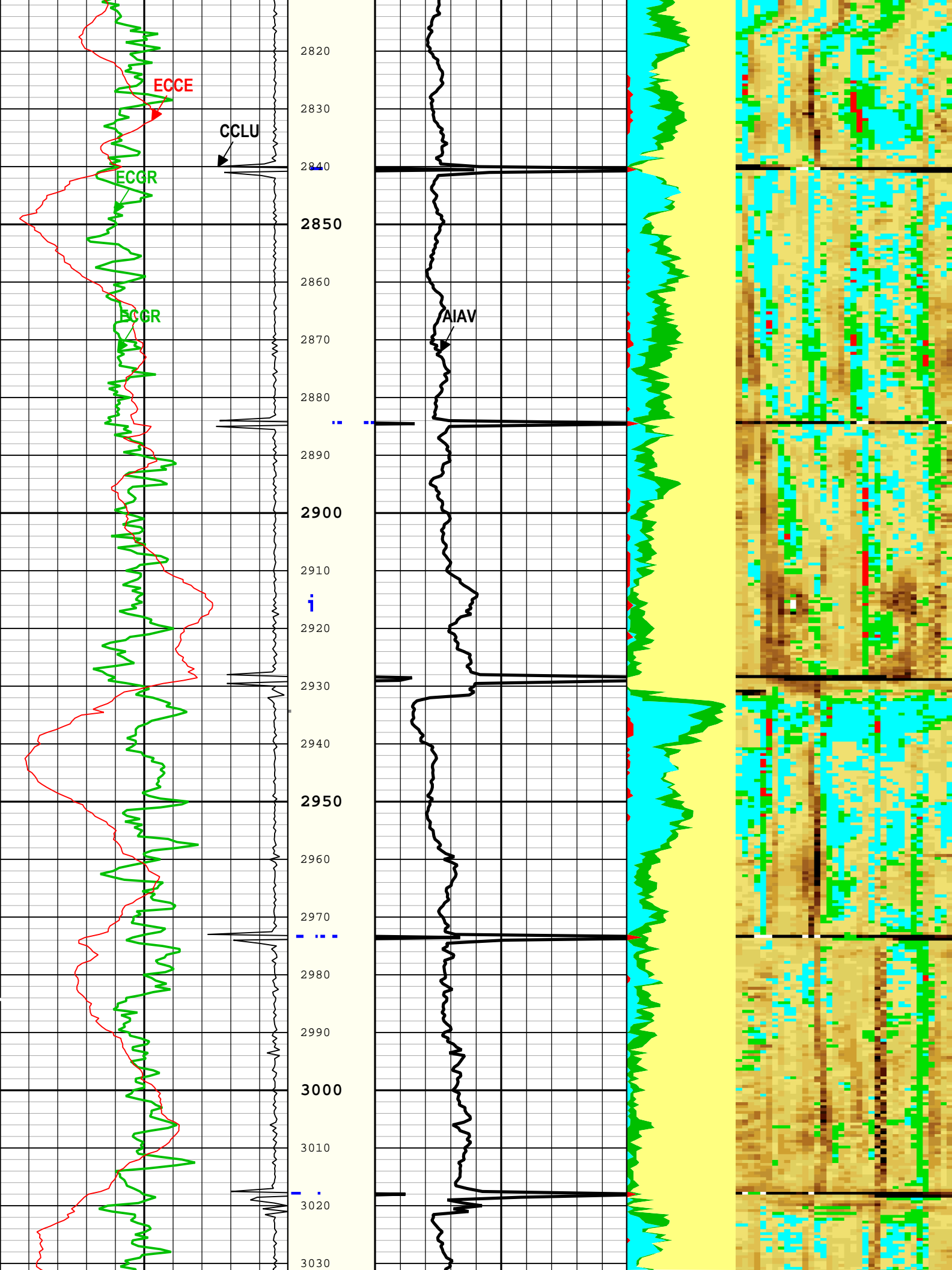


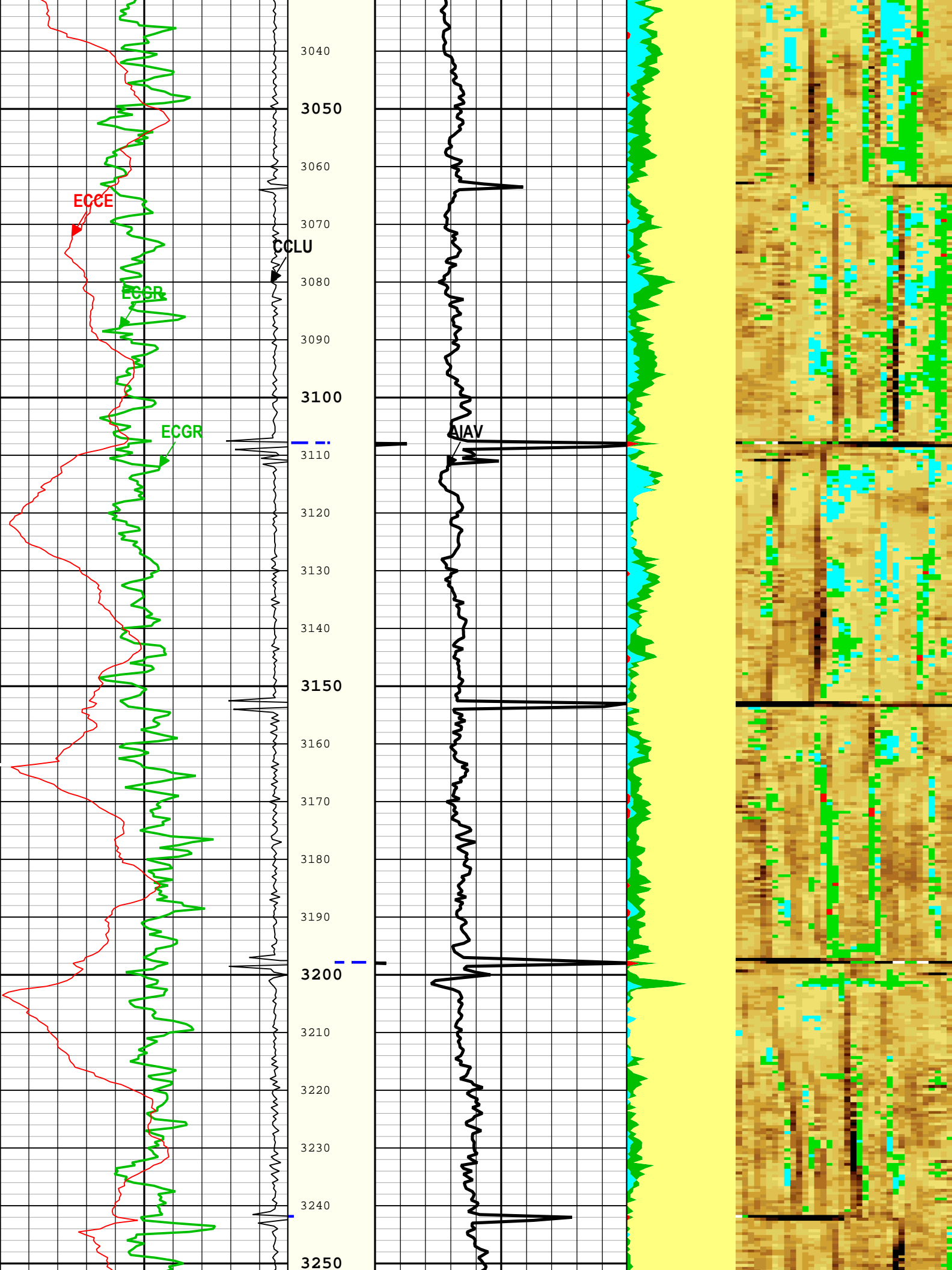


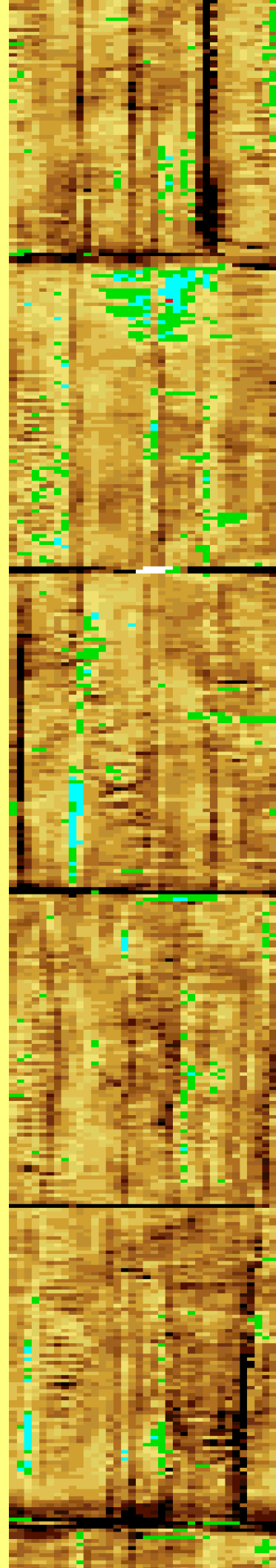
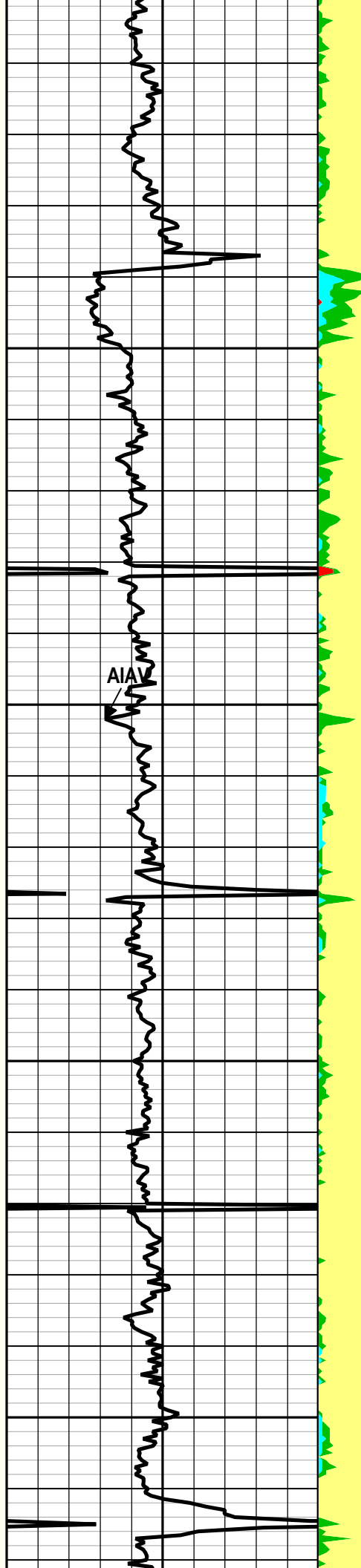
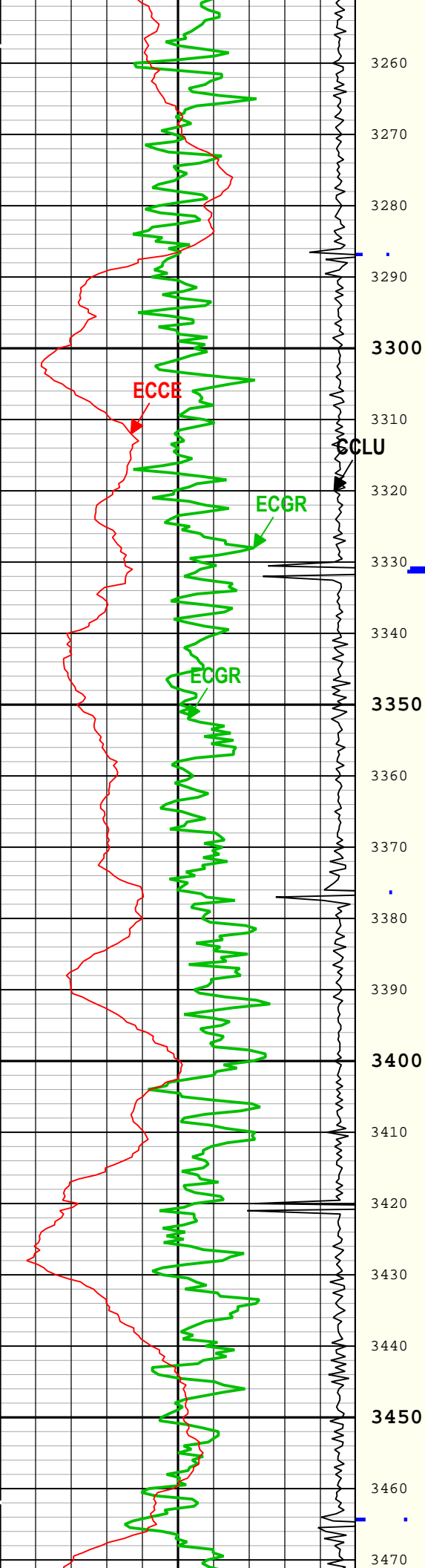


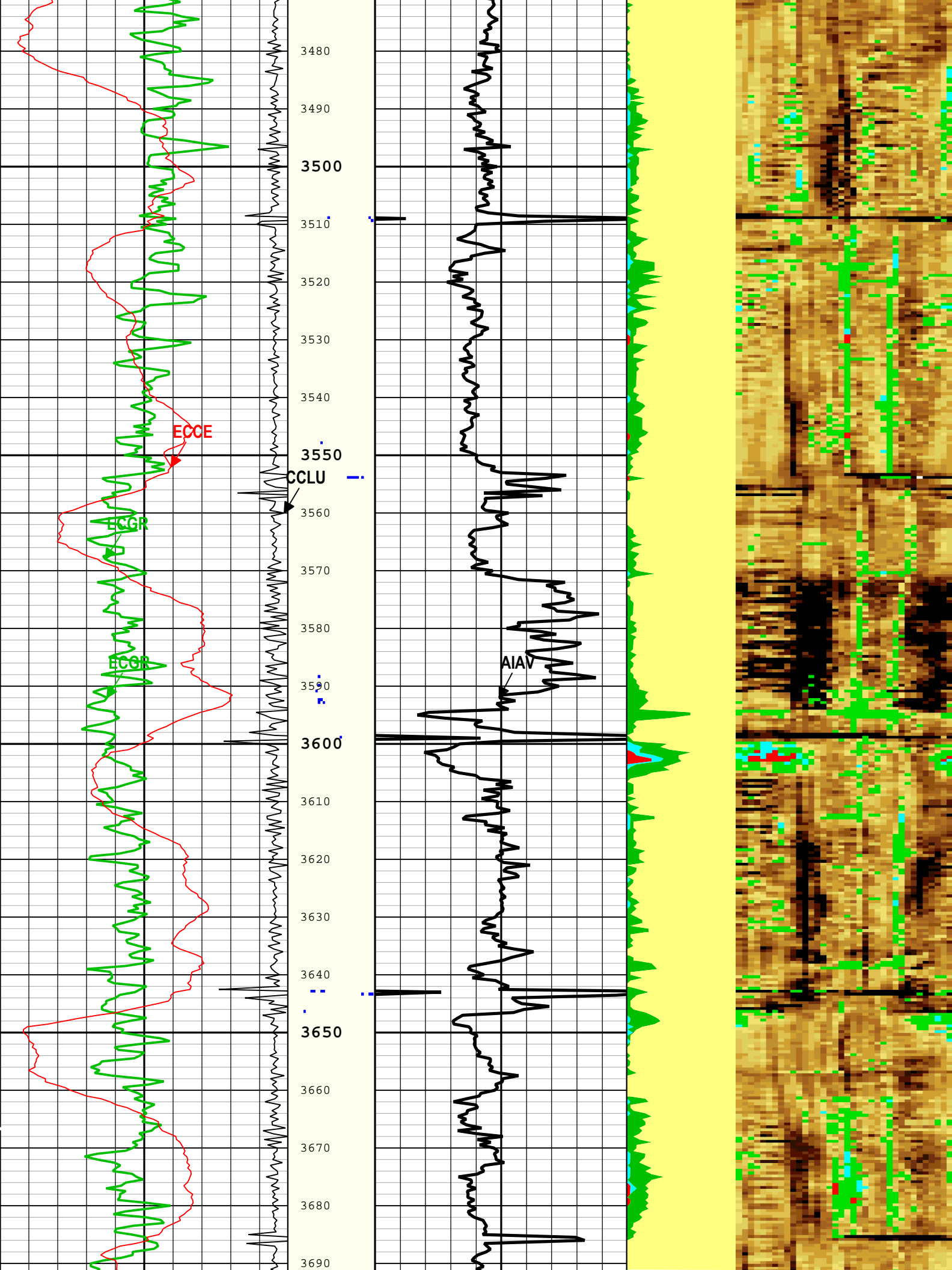


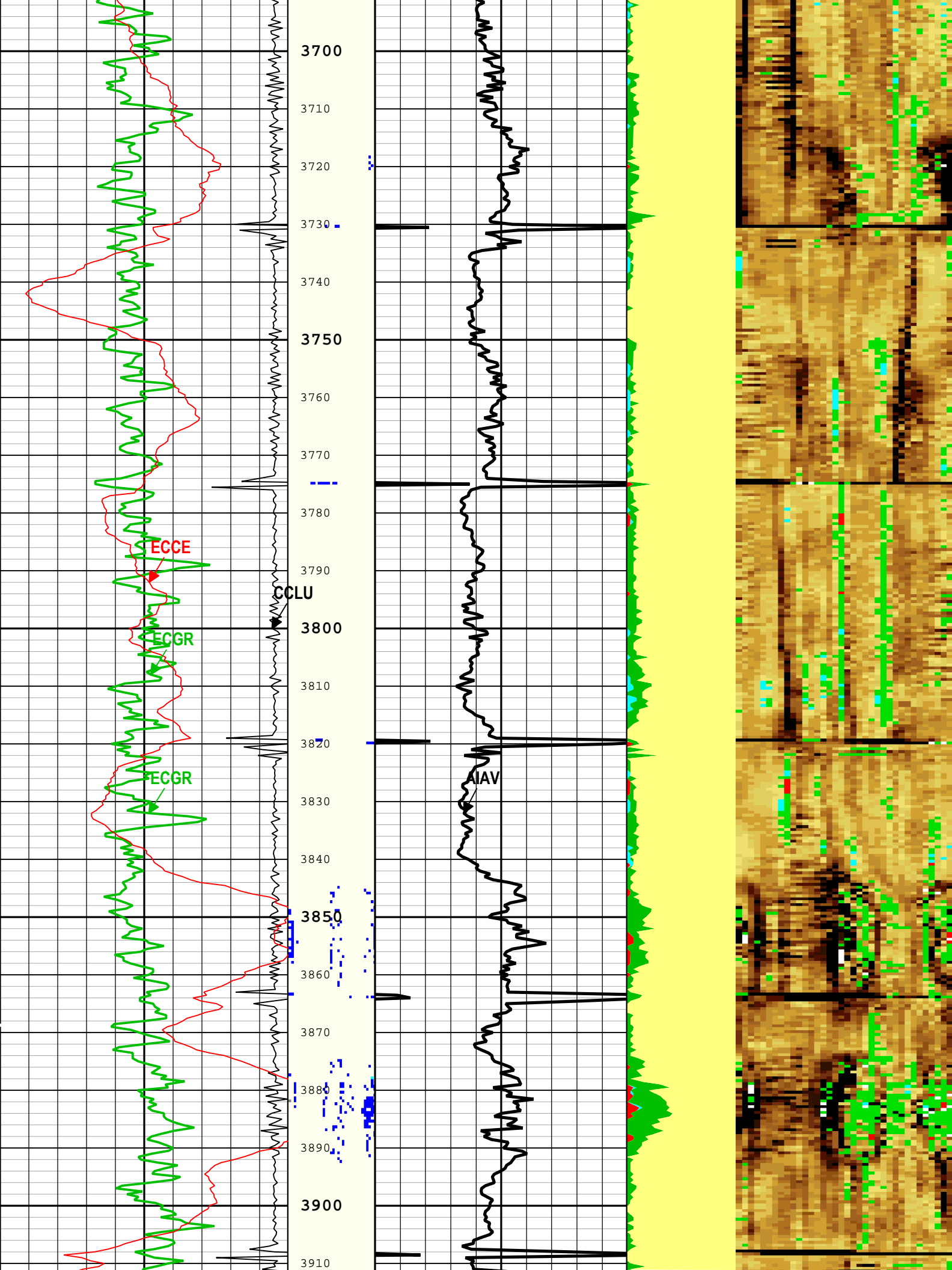


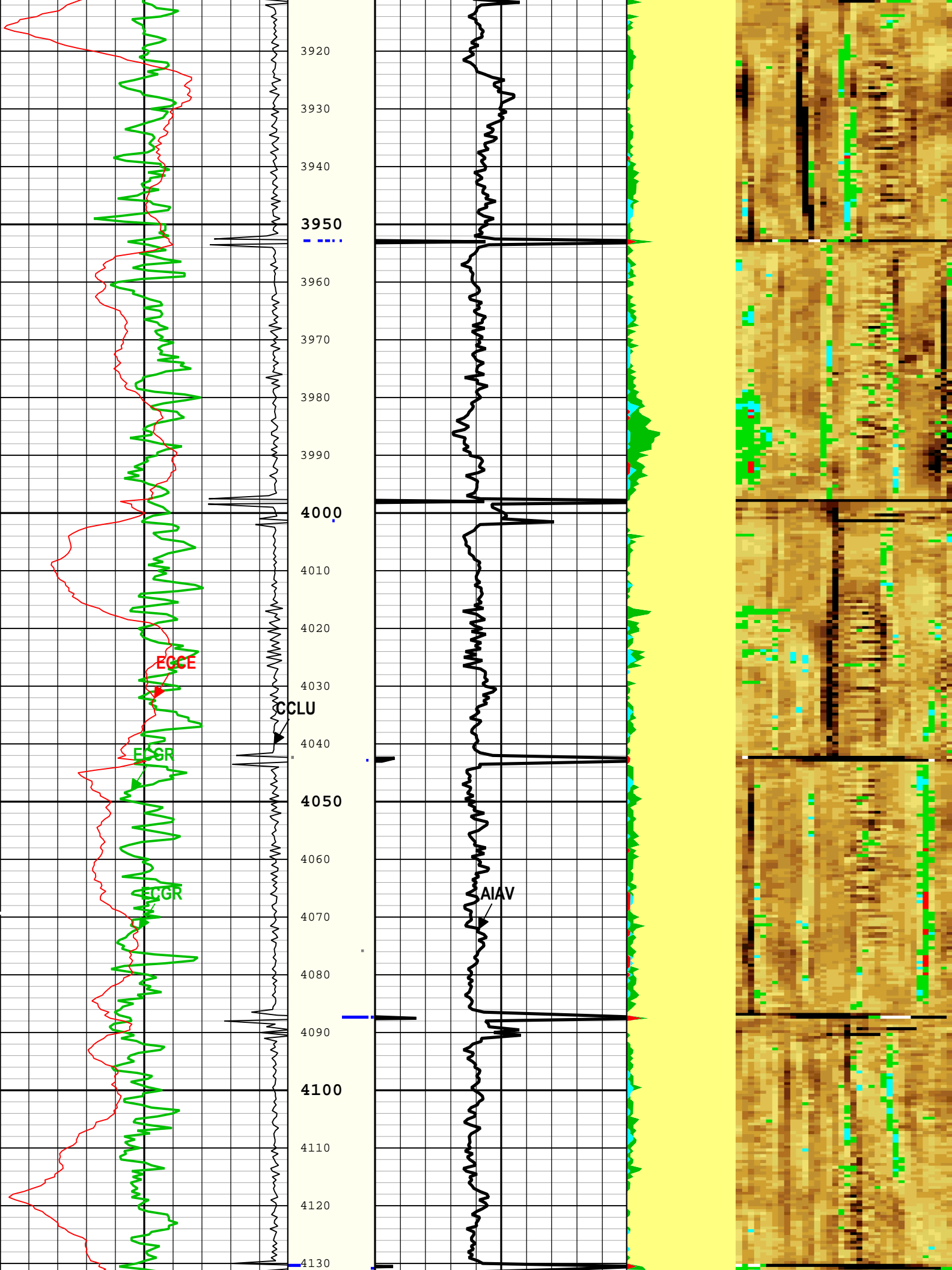


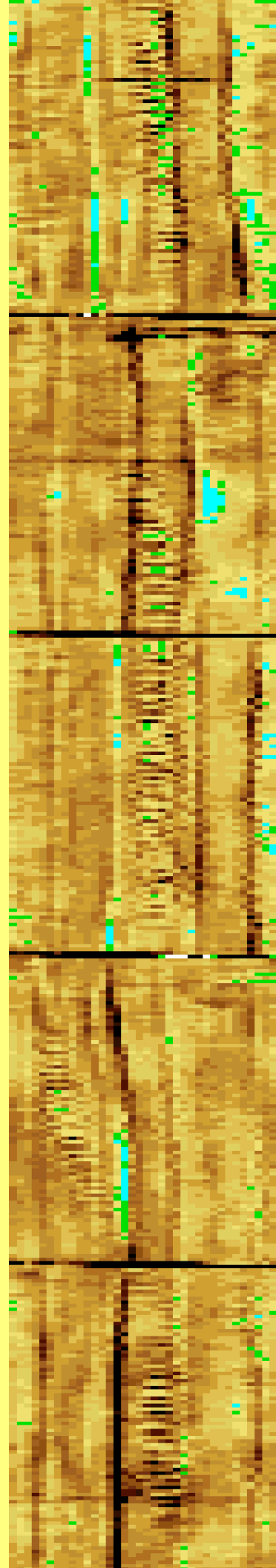
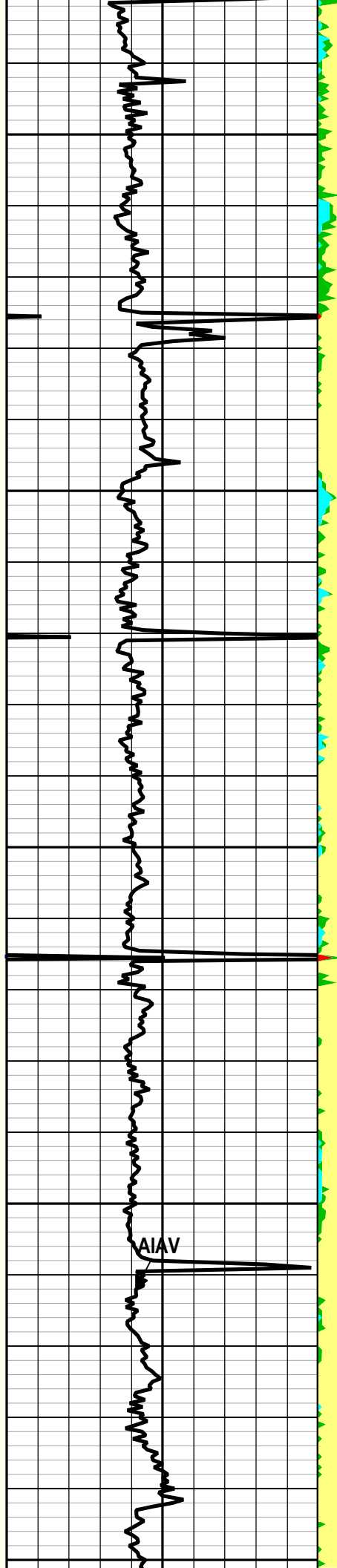
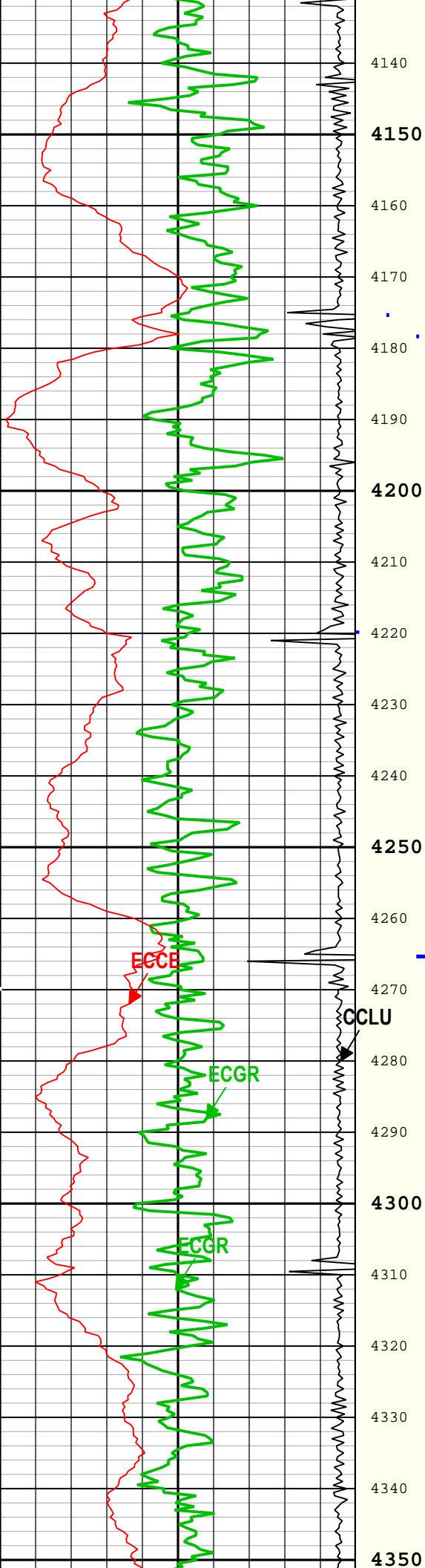


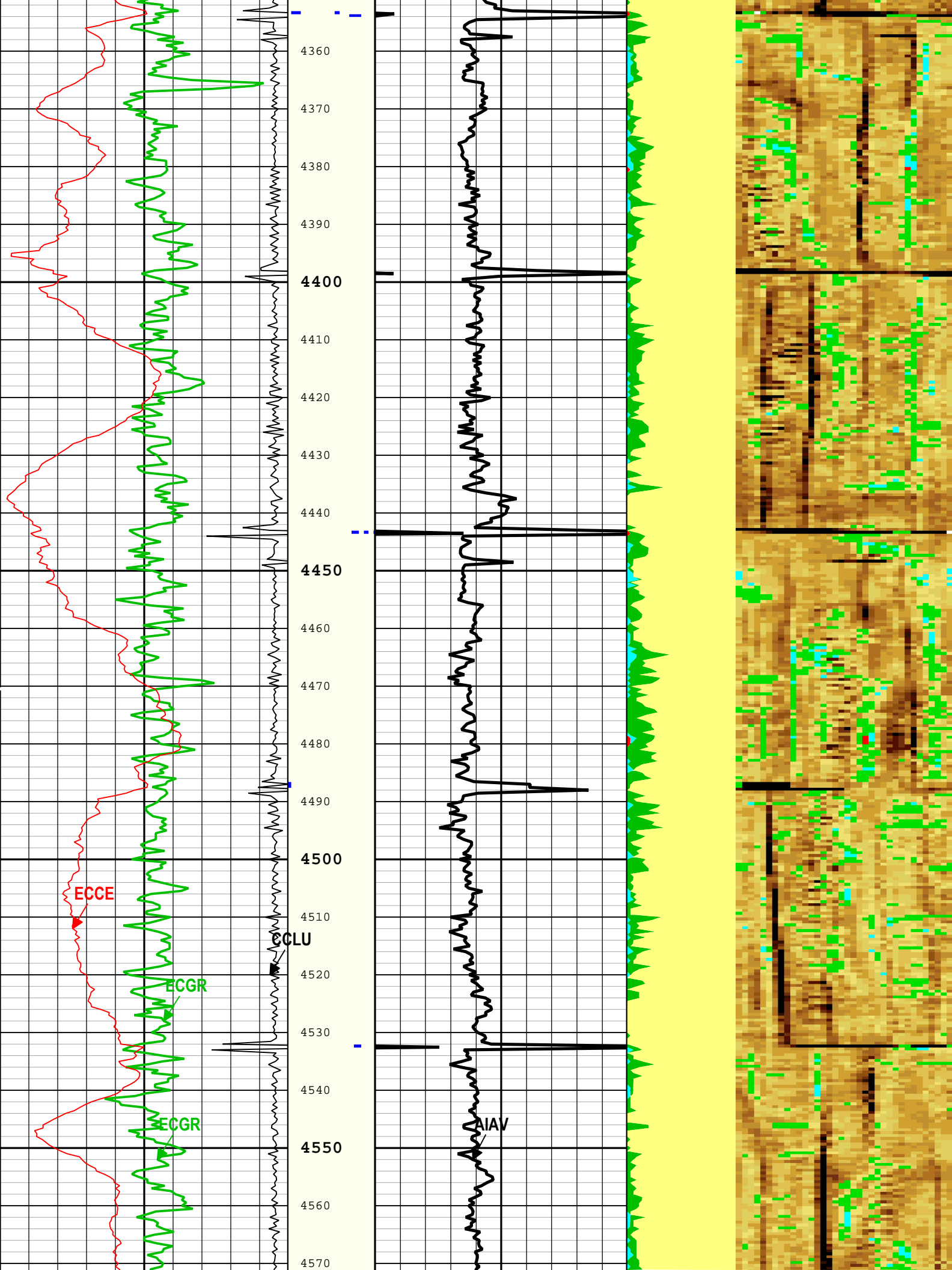


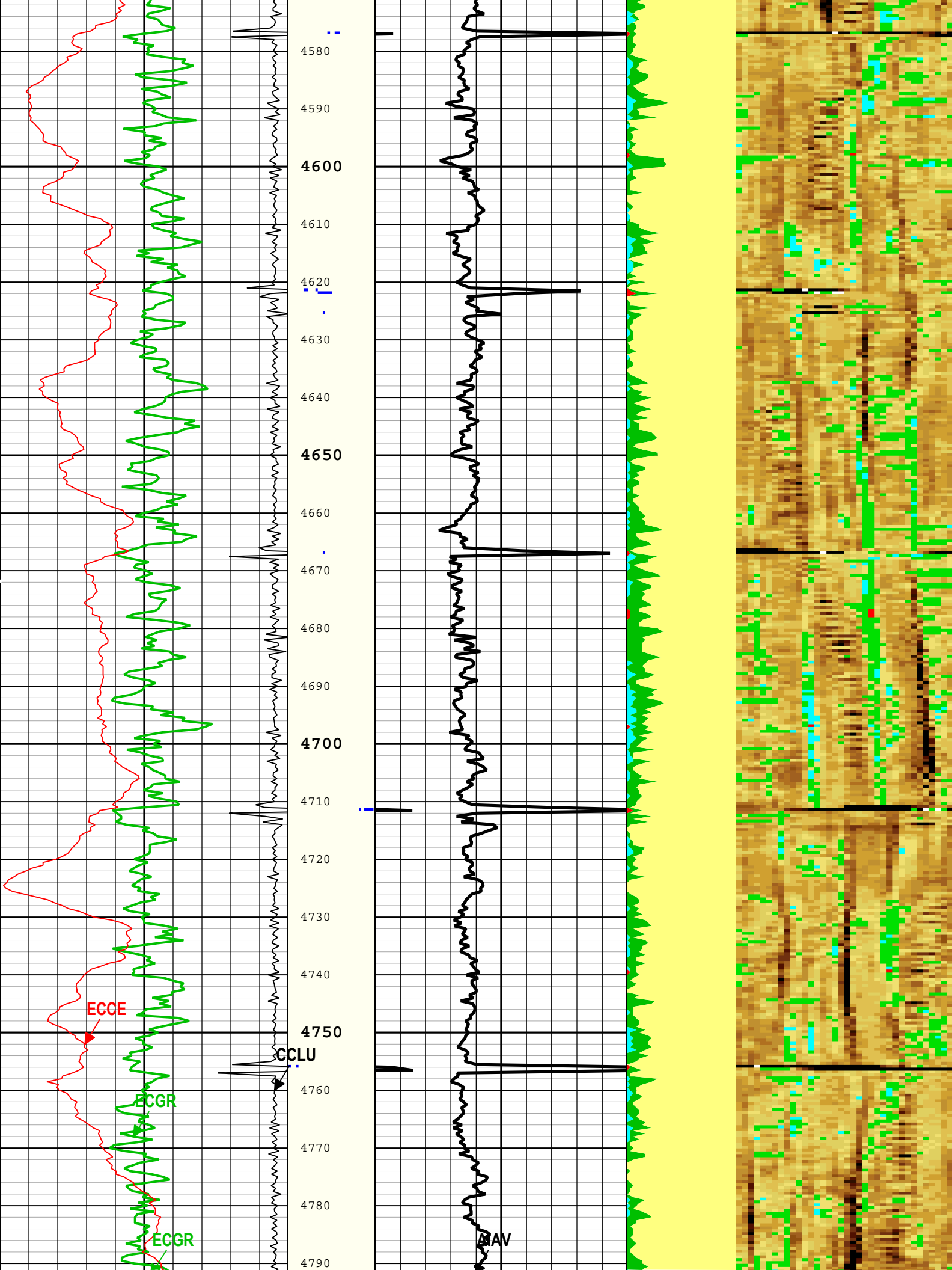


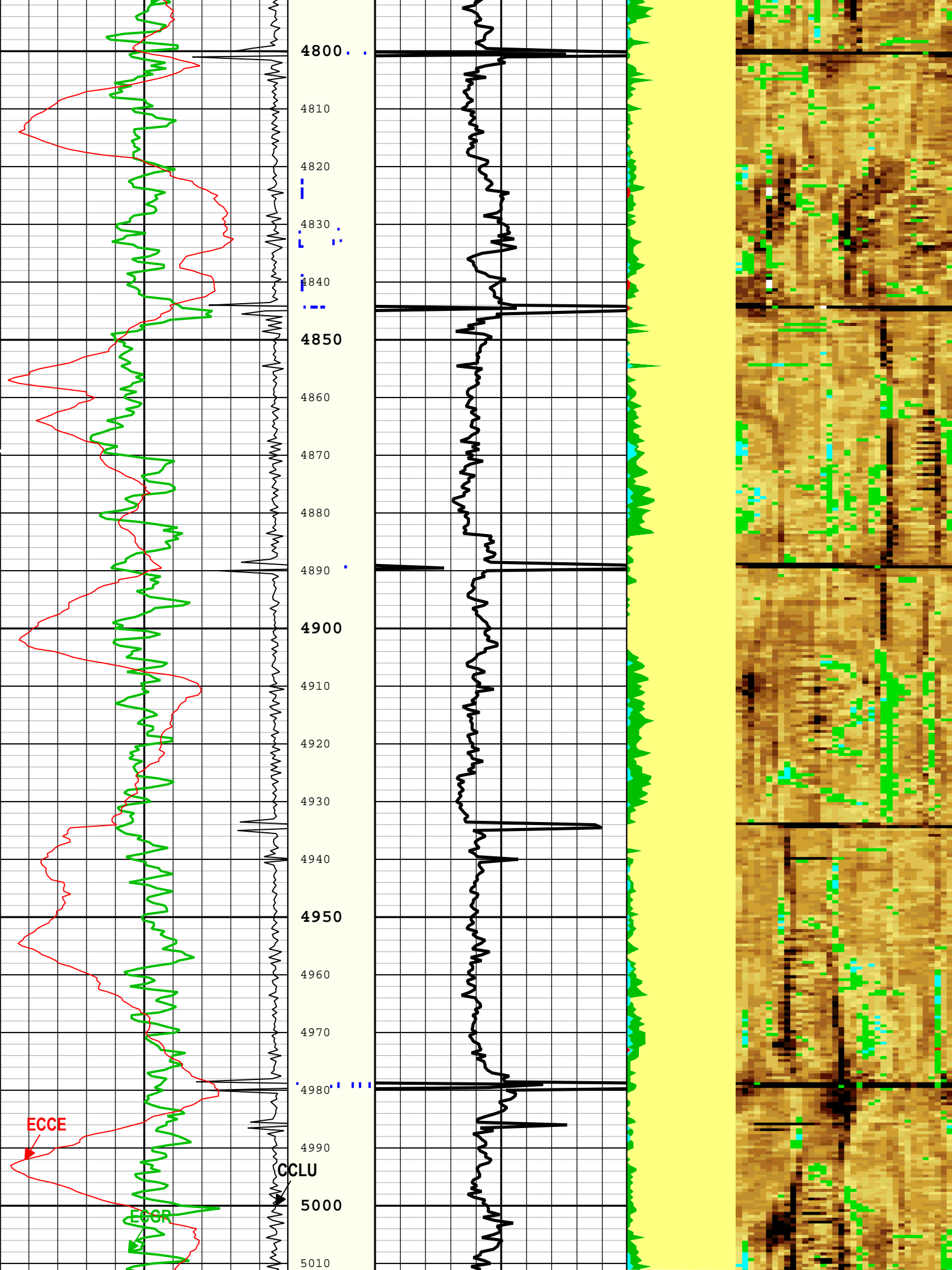


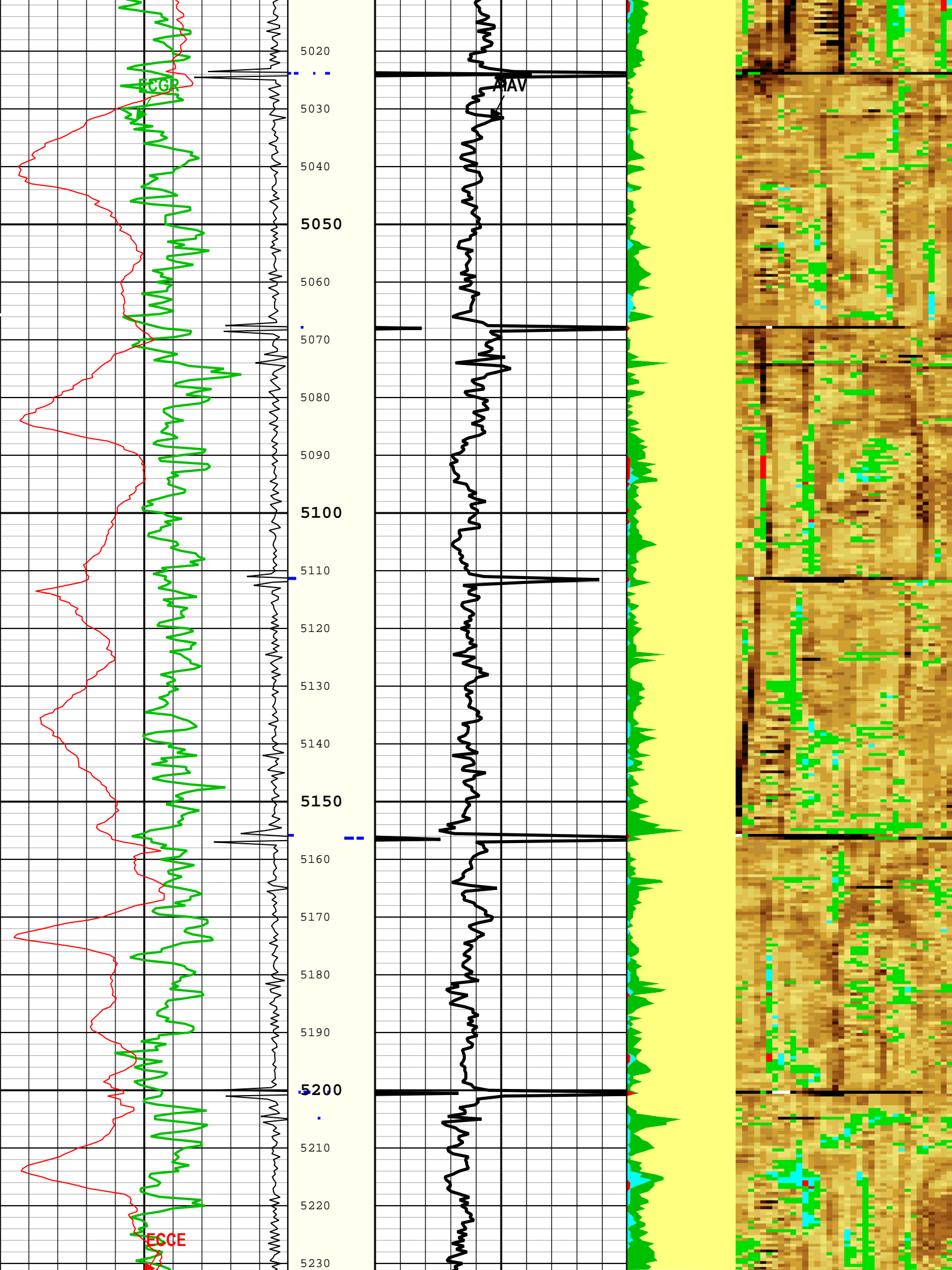


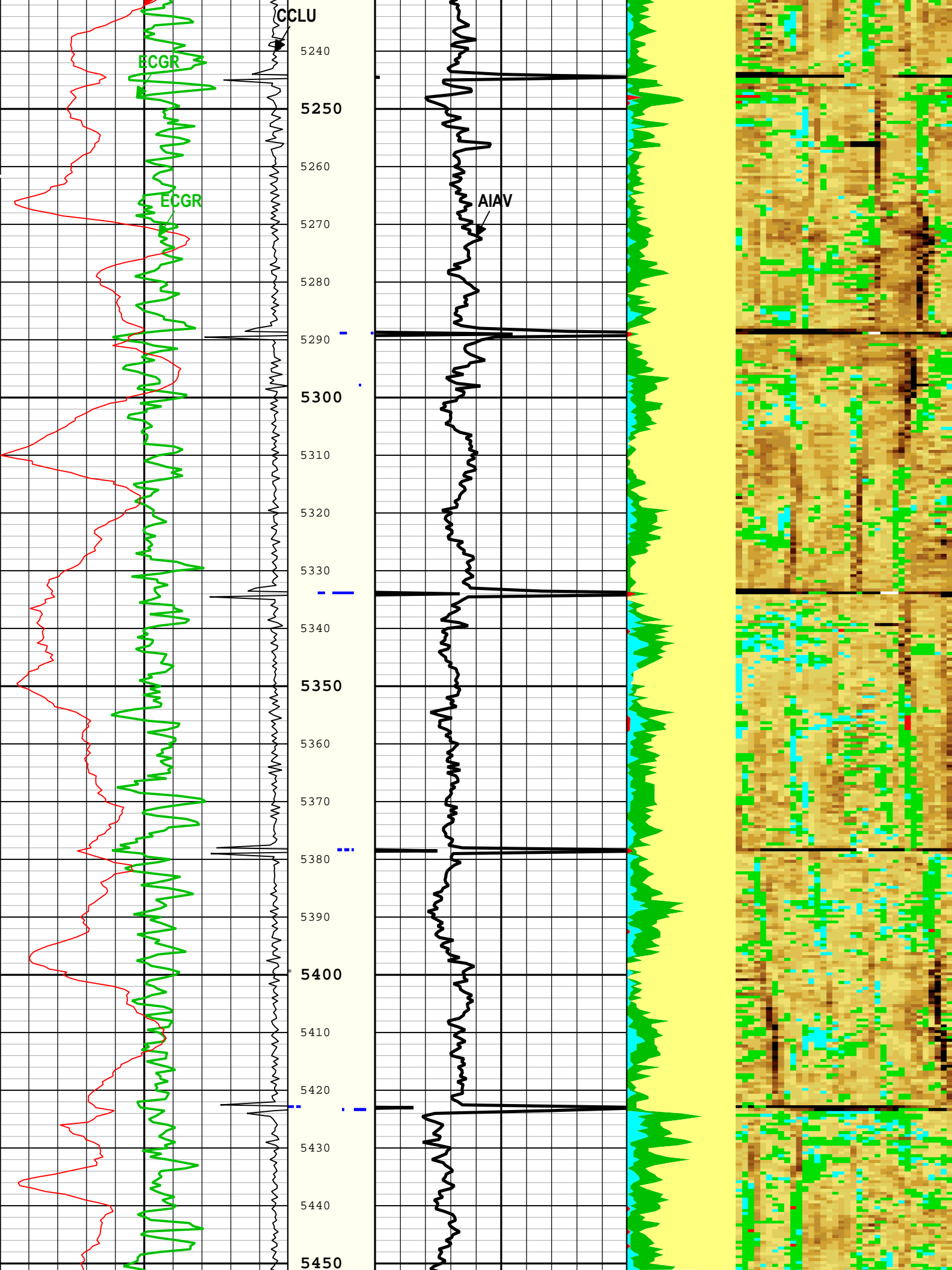


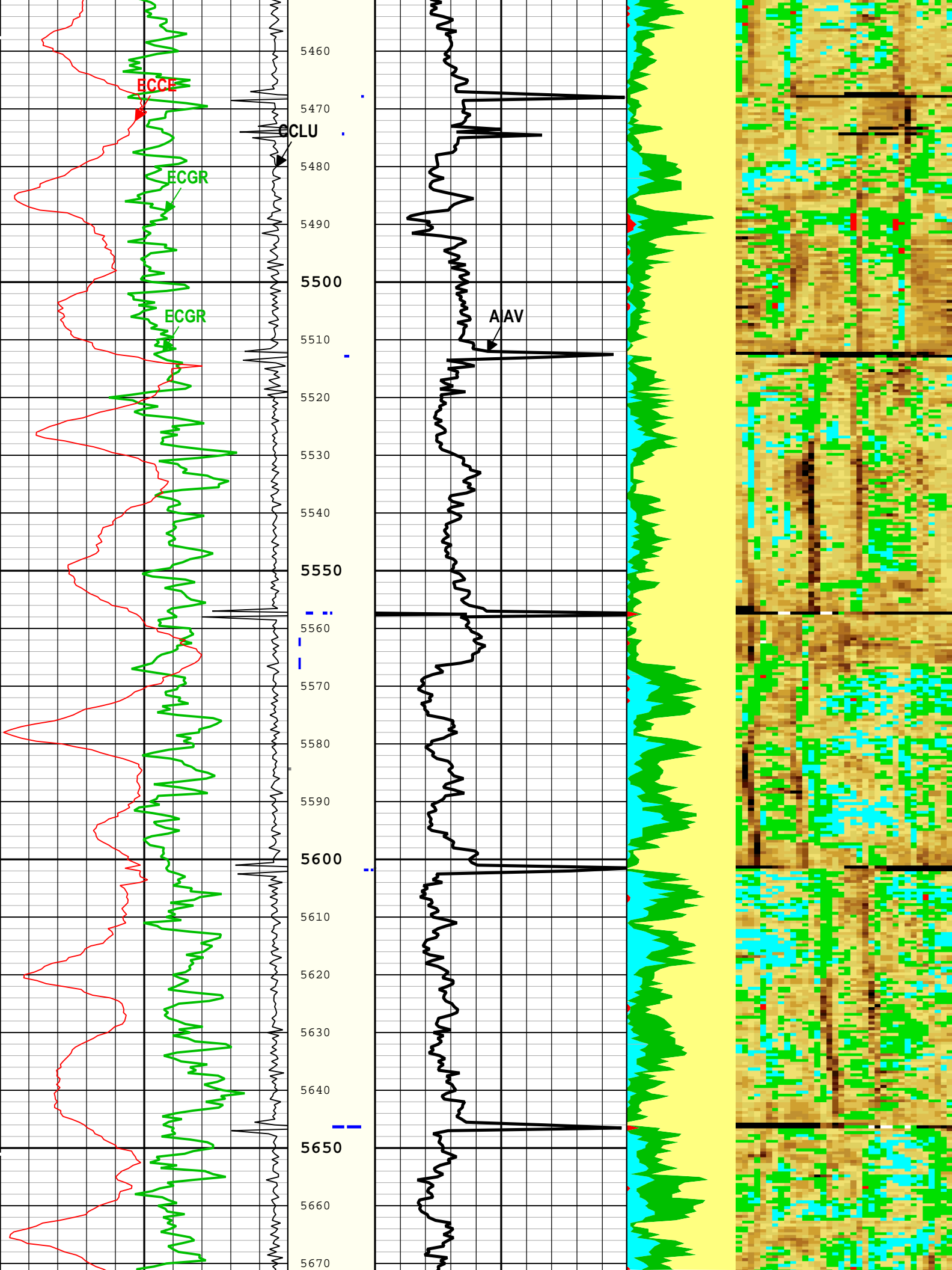


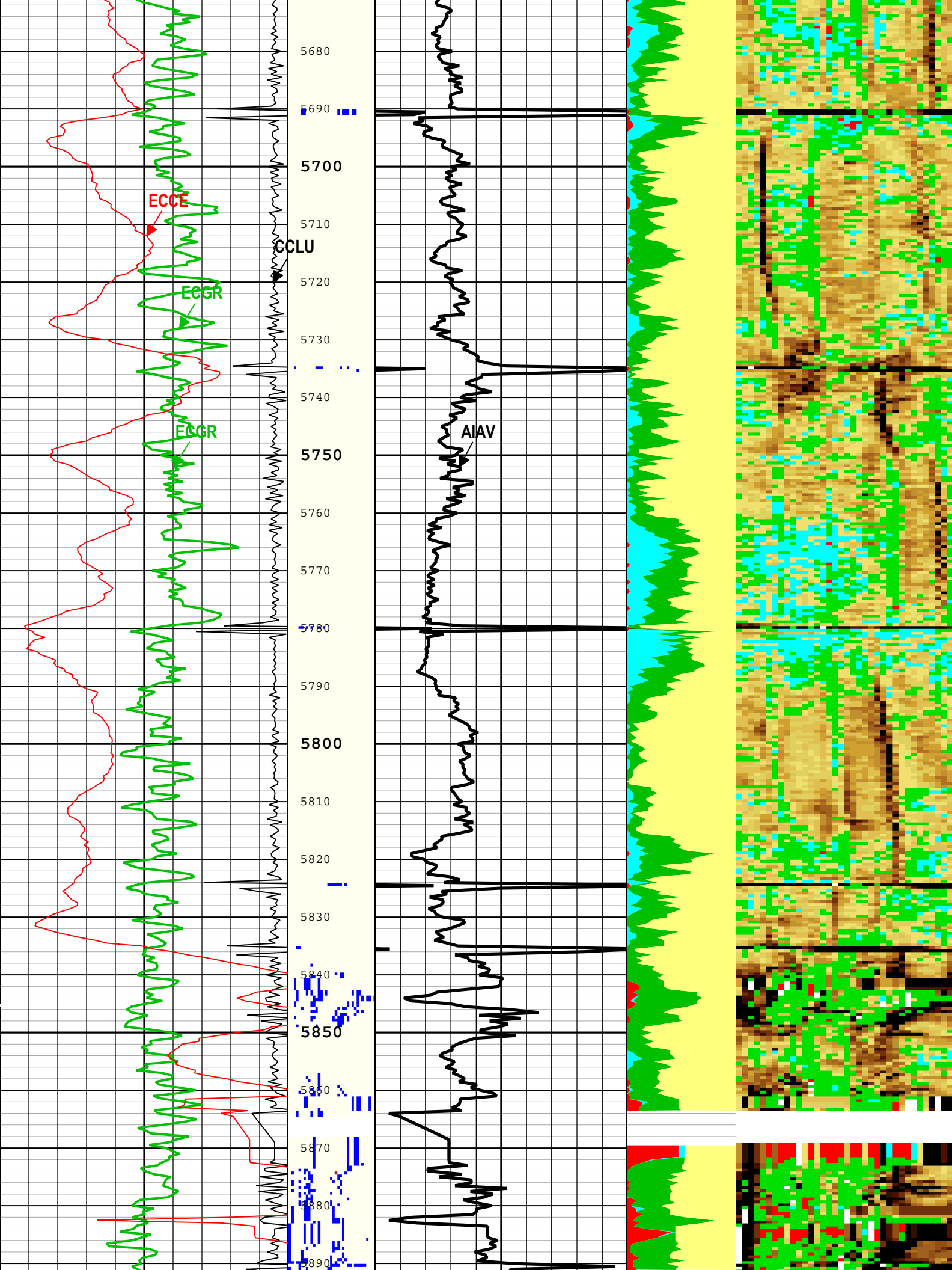


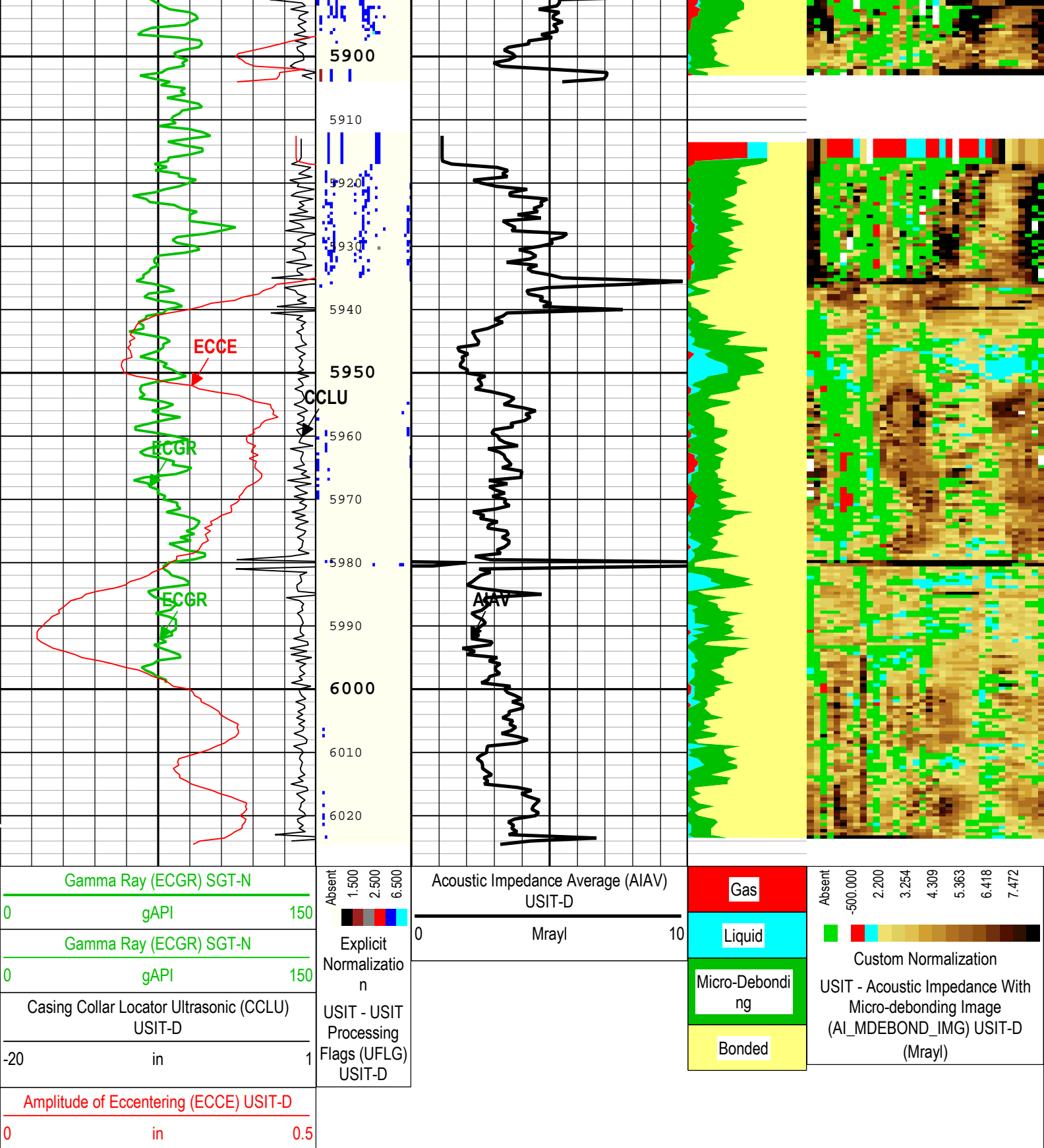












Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Mar-2019 17:26:30

Channel Processing Parameters				
1B: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(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	6025	ft
CDEN	Cement Density	SGT-N	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-D	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
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-D	Yes	
IMAR	Image Rotation	USIT-D	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-D	Depth Zoned	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-D	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-D	0.1	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-D	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-D	FreePipe Norm.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-D	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-D	0.3	Mrayl

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	26	80	110
BS	13.5	110	1948
BS	8.5	1948	6025
MEAS_WLEN	22.44	80	6025
MEAS_WLEN	20	6025	6028
All depth are actual.			

Tool Control Parameters	
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1B: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-D	-4	dB
AGMX	Maximum Gain of Cartridge	USIT-D	20	dB
EMXV	EMEX Voltage	USIT-D	50	V
HRES	Horizontal Resolution	USIT-D	10 deg	
ULOG	Logging Objective	USIT-D	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-D	500000	Hz
UPAT	USIT Emission Pattern	USIT-D	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-D	Uncompressed 10 deg at 6.0 in LF	
WINB	Window Begin Time	USIT-D	Time Zoned	us
WINE	Window End Time	USIT-D	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINB	31.88	04-Mar-2019 16:07:08	04-Mar-2019 16:14:05	6028.58	6011.36
WINB	23.53	04-Mar-2019 16:14:05	04-Mar-2019 16:31:16	6011.36	2927.08
WINB	25.83	04-Mar-2019 16:31:16	04-Mar-2019 16:36:55	2927.08	1992.15
WINB	31.2	04-Mar-2019 16:36:55	04-Mar-2019 16:47:35	1992.15	108.76
WINE	71.88	04-Mar-2019 16:07:08	04-Mar-2019 16:31:19	6028.58	2919.18

WINE	71.00	04-Mar-2019 10:07:00	04-Mar-2019 10:07:15	0020.00	2919.18	2919.18
WINE	68.04	04-Mar-2019 16:31:19	04-Mar-2019 16:47:35	2919.18	108.76	108.76

All depth are at tool zero.

1A

0 PSI Repeat Pass

Software Version	
Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

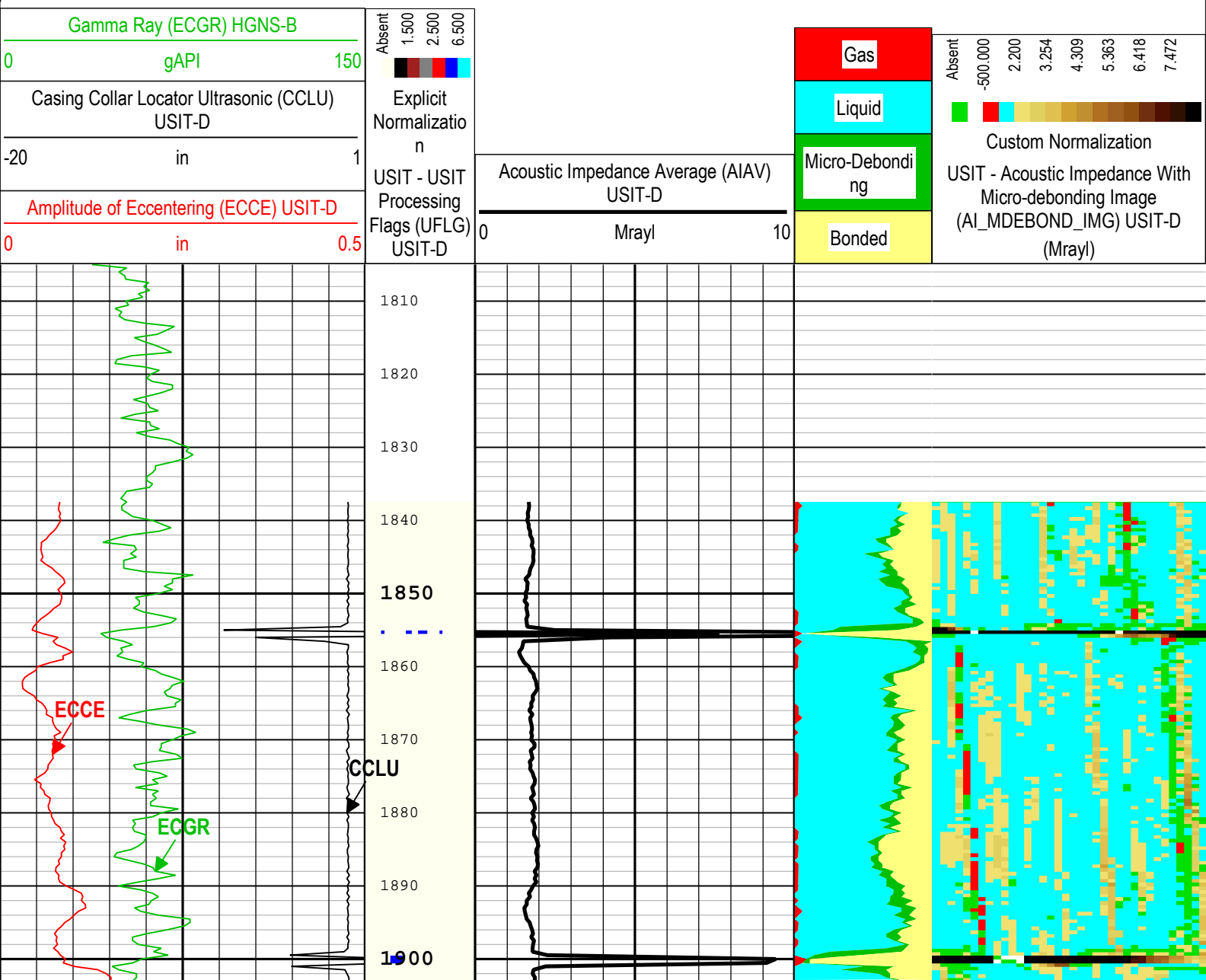
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[2]:Up	Up	1837.81 ft	2539.68 ft	04-Mar-2019 10:54:01 AM	04-Mar-2019 10:58:33 AM	ON	1.95 ft	Yes

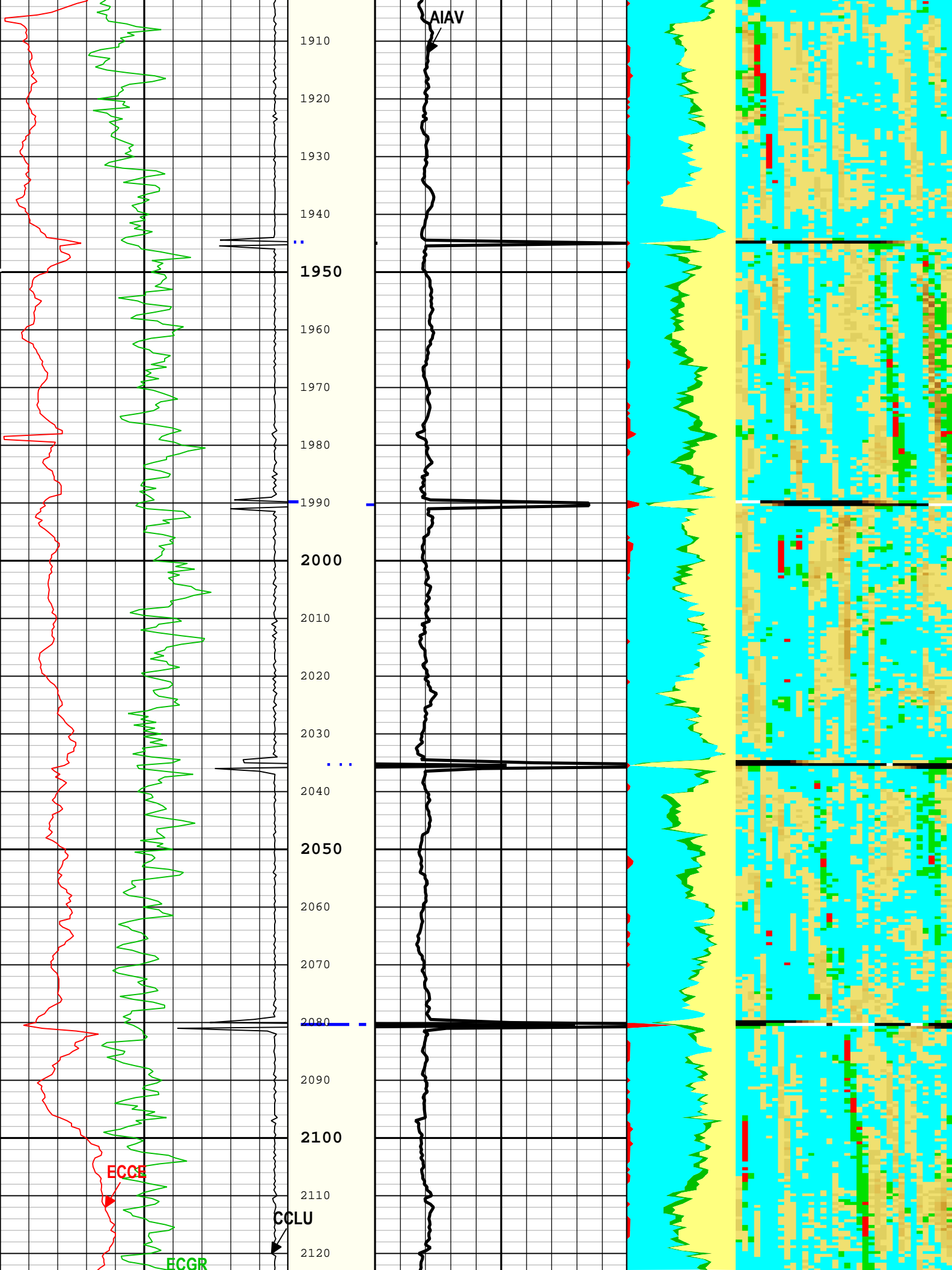
All depths are referenced to toolstring zero

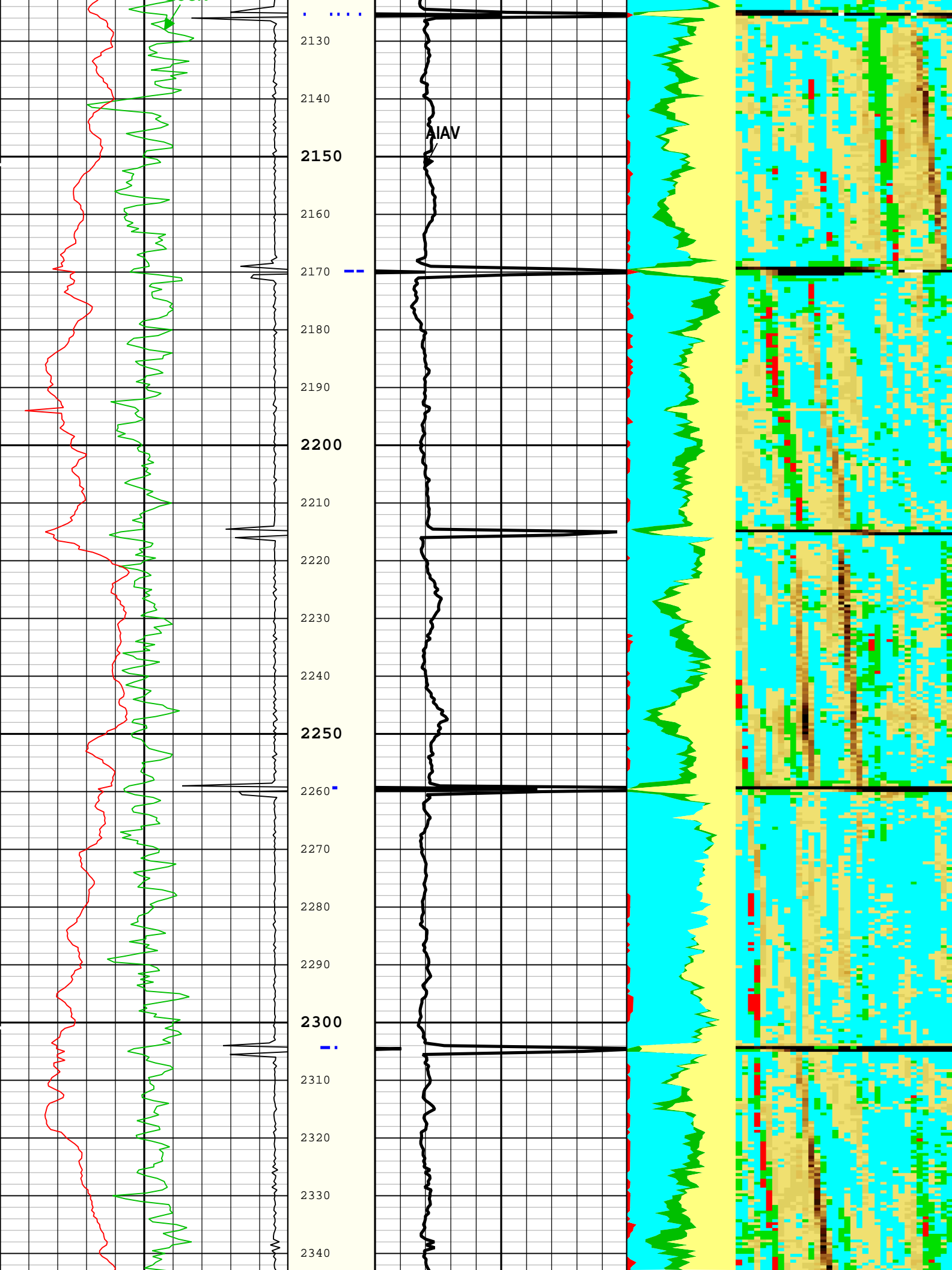
Log	Company:Noble Energy Inc Well:Wells Ranch BB09-649 1A: Log[2]:Up:S003
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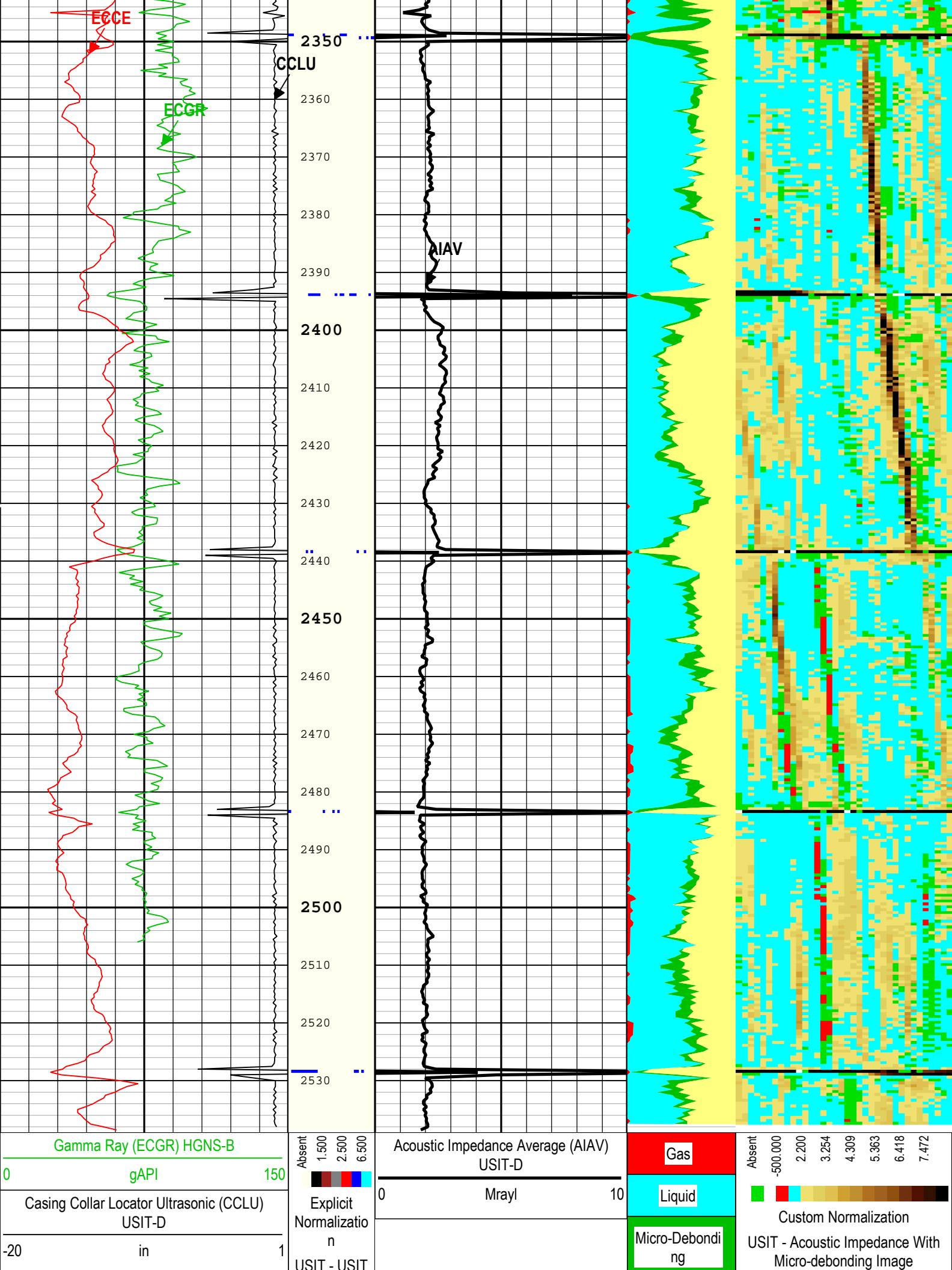
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Creation Date: 04-Mar-2019 17:26:54

TIME_1900 - Time Marked every 60.00 (s)







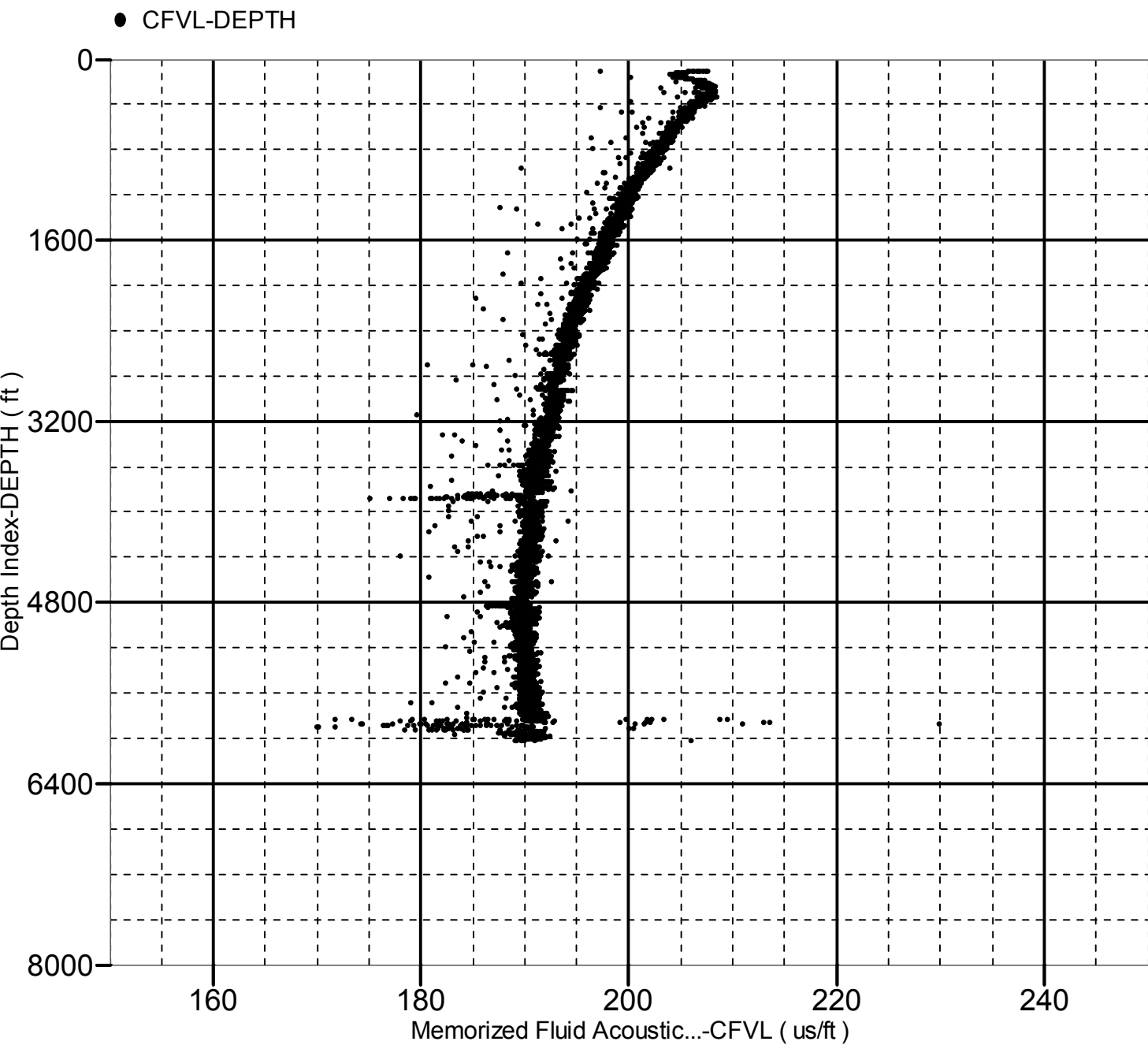


Amplitude of Eccentering (ECCE) USIT-D		Processing Flags (UFLG) USIT-D	Bonded	(AI_MDEBOND_IMG) USIT-D (Mrayl)			
0	in			0.5			
TIME_1900 - Time Marked every 60.00 (s)							
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 04-Mar-2019 17:26:54							
Channel Processing Parameters							
1A: Parameters							
Parameter	Description	Tool	Value	Unit			
BAR(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	6025	ft			
CDEN	Cement Density	HGNS-B	16.69	lbm/gal			
CMTY(U-USIT_CEMT)	Cement Type	USIT-D	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			
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-D	Yes				
IMAR	Image Rotation	USIT-D	Off				
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-D	22.44	us			
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-D	1.13				
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-D	1.6	Mrayl			
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-D	Automatic				
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-D	Theoretical				
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	Mrayl			
ZTCM	Acoustic Impedance Threshold for Cement	USIT-D	2.2	Mrayl			
ZTGS	Acoustic Impedance Threshold for Gas	USIT-D	0.3	Mrayl			
Depth Zone Parameters							
Parameter	Value	Start (ft)		Stop (ft)			
BS	13.5	1805		1948			
BS	8.5	1948		2539			
All depth are actual.							
Tool Control Parameters							
1A: Parameters							
Parameter	Description	Tool	Value	Unit			
AGMN	Minimum Gain of Cartridge	USIT-D	-4	dB			
AGMX	Maximum Gain of Cartridge	USIT-D	20	dB			
EMXV	EMEX Voltage	USIT-D	50	V			
HRES	Horizontal Resolution	USIT-D	10 deg				
ULOG	Logging Objective	USIT-D	MEASUREMENT				
USFR	Ultrasonic Sampling Frequency	USIT-D	500000	Hz			
UPAT	USIT Emission Pattern	USIT-D	Pattern 375 KHz				
UWKM	USIT Working Mode	USIT-D	Uncompressed 10 deg at 6.0 in LF				
WINB	Window Begin Time	USIT-D	31.88	us			
WINF	Window End Time	USIT-D	71.00				

Fluid Acoustic Slowness vs Depth

2D Cross Plot

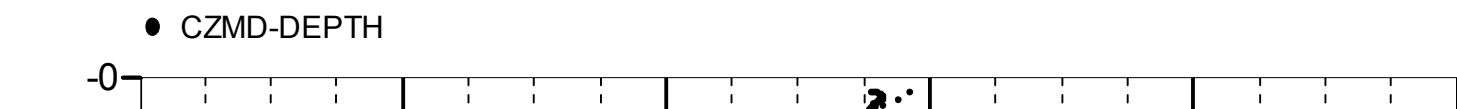
Index Range: From 6028.50 to 108.50 ft

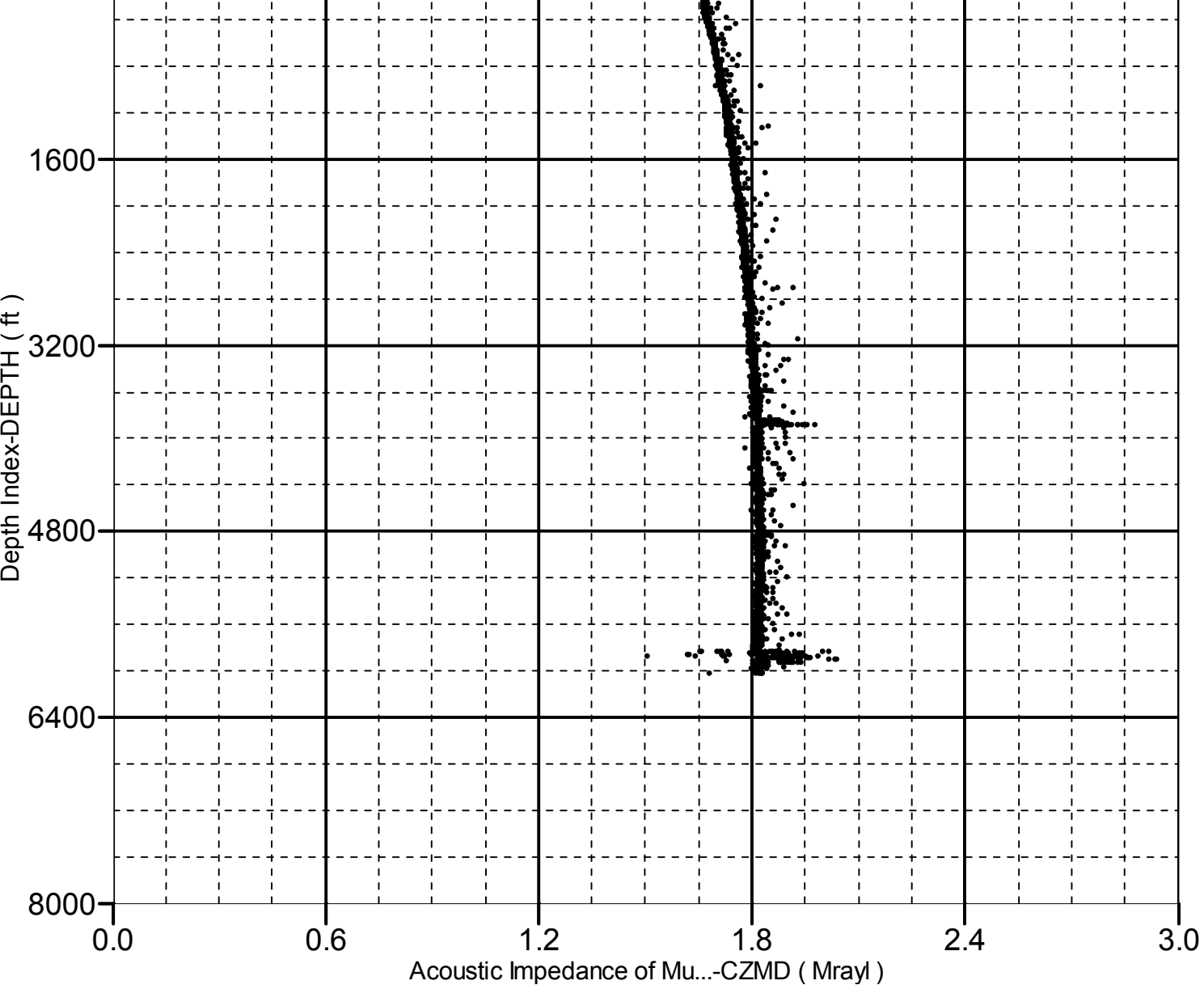


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6028.50 to 108.50 ft





Company:	Noble Energy Inc	Schlumberger
Well:	Wells Ranch BB09-649	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	
UltraSonic Summary Print		