Schlumberger

Company: Noble Energy Inc

Well: Hurley H26-768

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County: Weld
Field: Wattenberg
Location: SWNW
Well: Hurley H26-768
Company: Noble Energy Inc

Location:				
SWNW		Elev.:	K.B.	4852.00 ft
2366' FNL & 1319 FWL			G.L.	4822.00 ft
Lat/Long: 40.1971/-104.63549			D.F.	4852.00 ft
Permanent Datum:	Ground Level	Elev.:	4822.00 f	
Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

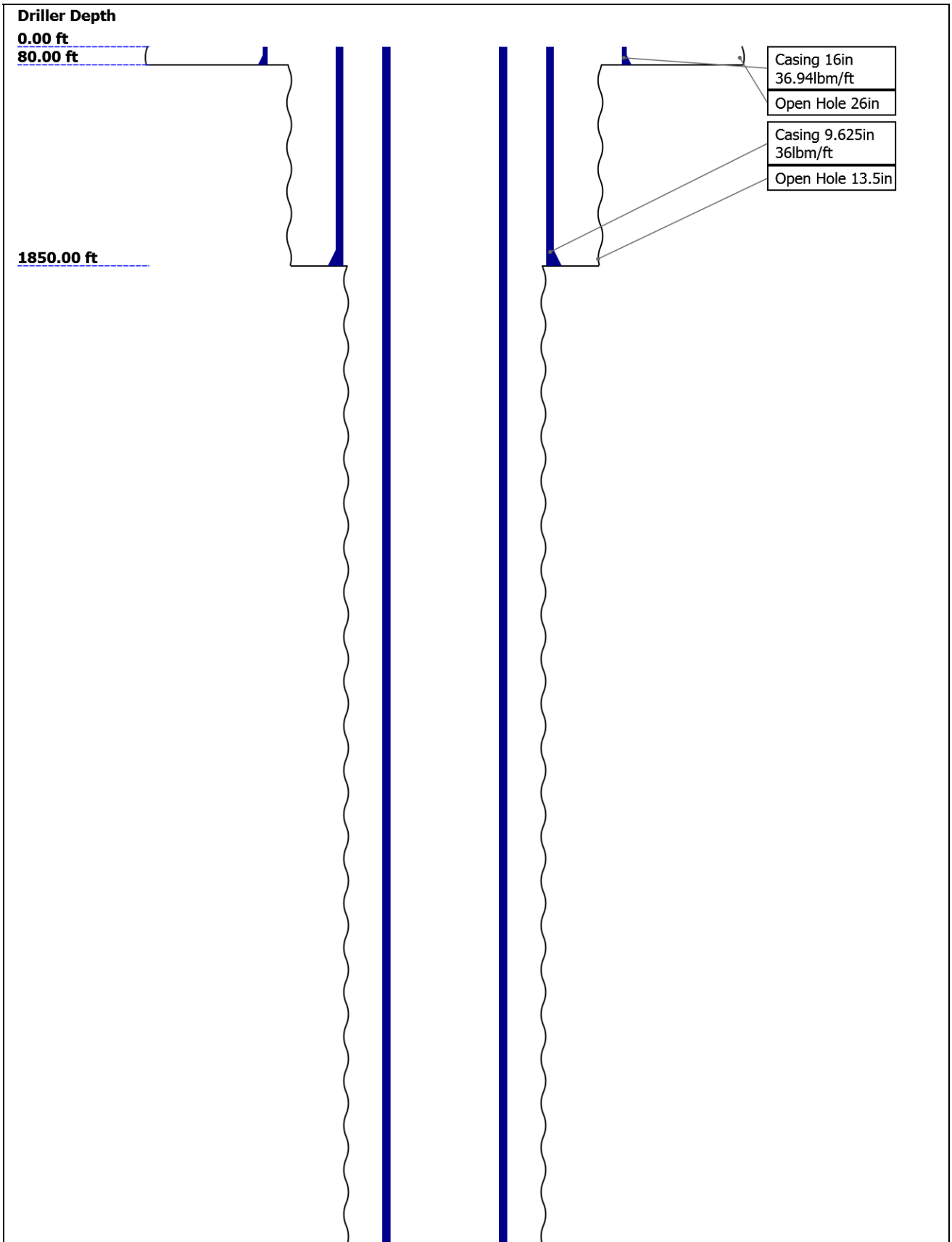
API Serial No.	Section:	Township:	Range:
05-123-46766	26	3N	65W

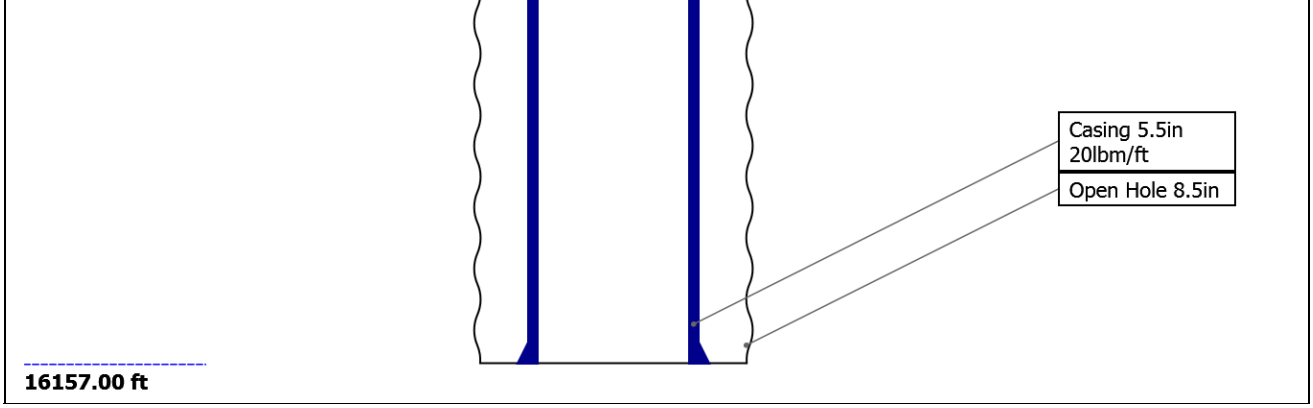
Logging Date	24-Aug-2018		
Run Number	ONE		
Depth Driller	16157.00 ft		
Schlumberger Depth	6710.00 ft		
Bottom Log Interval	8000.00 ft		
Top Log Interval	0.00 ft		
Casing Fluid Type	Salt Brine		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	0.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	1850.00 ft		
To	6710.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	6710.00 ft		
Max Recorded Temperatures	234 degF		
Logger on Bottom Time	24-Aug-2018	09:34:00	
Unit Number Location:	2377	Fort Morgan	
Recorded By	Evan Grzecki		
Witnessed By	Bill Mansfield		

Disclaimer

Contents

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	80	1850			
Top Logger (ft)	0	80	1850			
Bottom Driller (ft)	80	1850	16157			
Bottom Logger (ft)	80	1850	6710			
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)	80	1850	16157			
Bottom Logger (ft)	80	1850	6710			

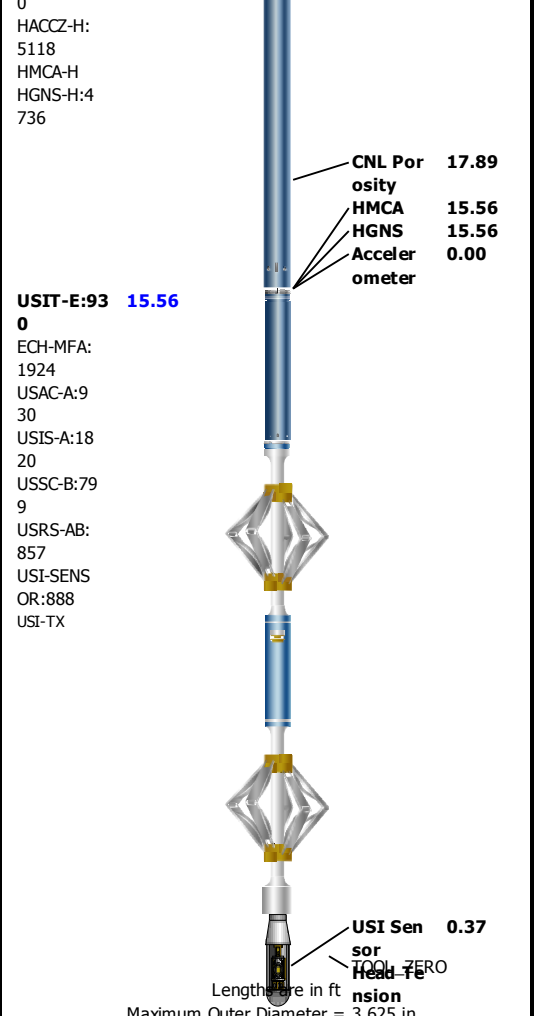
Remarks and Equipment Summary

ONE: Toolstring

Equip name	Length	MP name	Offset
LEH-QT LEH-QT	38.95		
EDTC-B:9247 EDTH-B:9309 EDTG-B:79445 EDTC-B:9247	35.47		
		CTEM	**31.97**
		ACCZ	**0.00**
		HV	**0.00**
		Gamma Ray	**30.1**
		TelStatus GP14	**28.97**
AH-184[2]	28.97		
AH-184[1]	26.97	4900	
HGNS-H:4736 HGNH:2987 NPV-N NSR-F:507	24.97	**Temperature**	**24.94**
		GR	**24.23**

ONE: Remarks

Thank you for choosing Schlumberger!
Log run for cement evaluation
Toolstring run centralized using knuckles and houma kit as per toolsketch
USRS-AB sub run with USI-TX transducer
Log correlated to downlog
Crew: Rob Selter, Kyle Howington
BHT: 234 Deg F
TOC: ~2500ft
Cement: Halliburton 13.2ppg slurry with 11.5ppg spacer
Main Pass logged @ 2500psi
Repeat Pass logged @ 0psi



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	7-46NT-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		

Rig Type	Crane USA		

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		

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[3]:Up	6711.39	81.04

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 : 44.66m(146.53ft) to 53.17m(174.44ft)
MUD_N_FRP = 1.12
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.63 MRayl

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

ONE

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
ONE	Log[3]:Up	Up	81.04 ft	6711.39 ft	24-Aug-2018 10:34:06 AM	24-Aug-2018 11:36:01 AM	ON	5.99 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Hurley H26-768

ONE: Log[3]:Up:S002

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: 24-Aug-2018 12:05:55

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E
-20 in 1

Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5

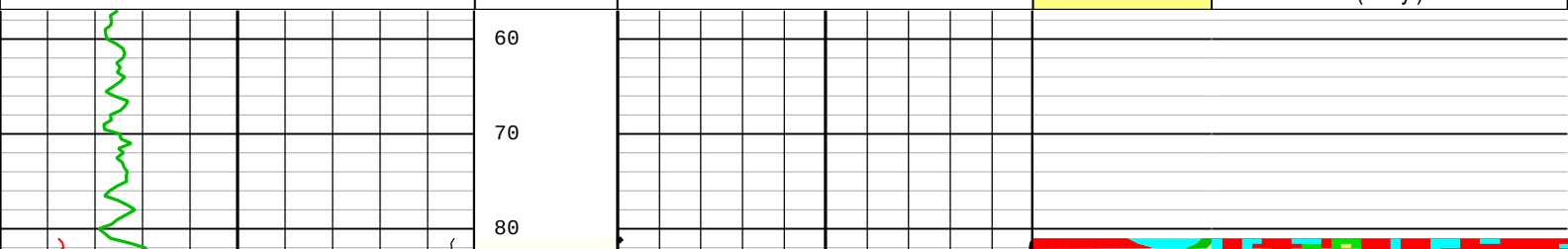
Calibrated Gamma Ray (GR) HGNS-H
0 gAPI 150

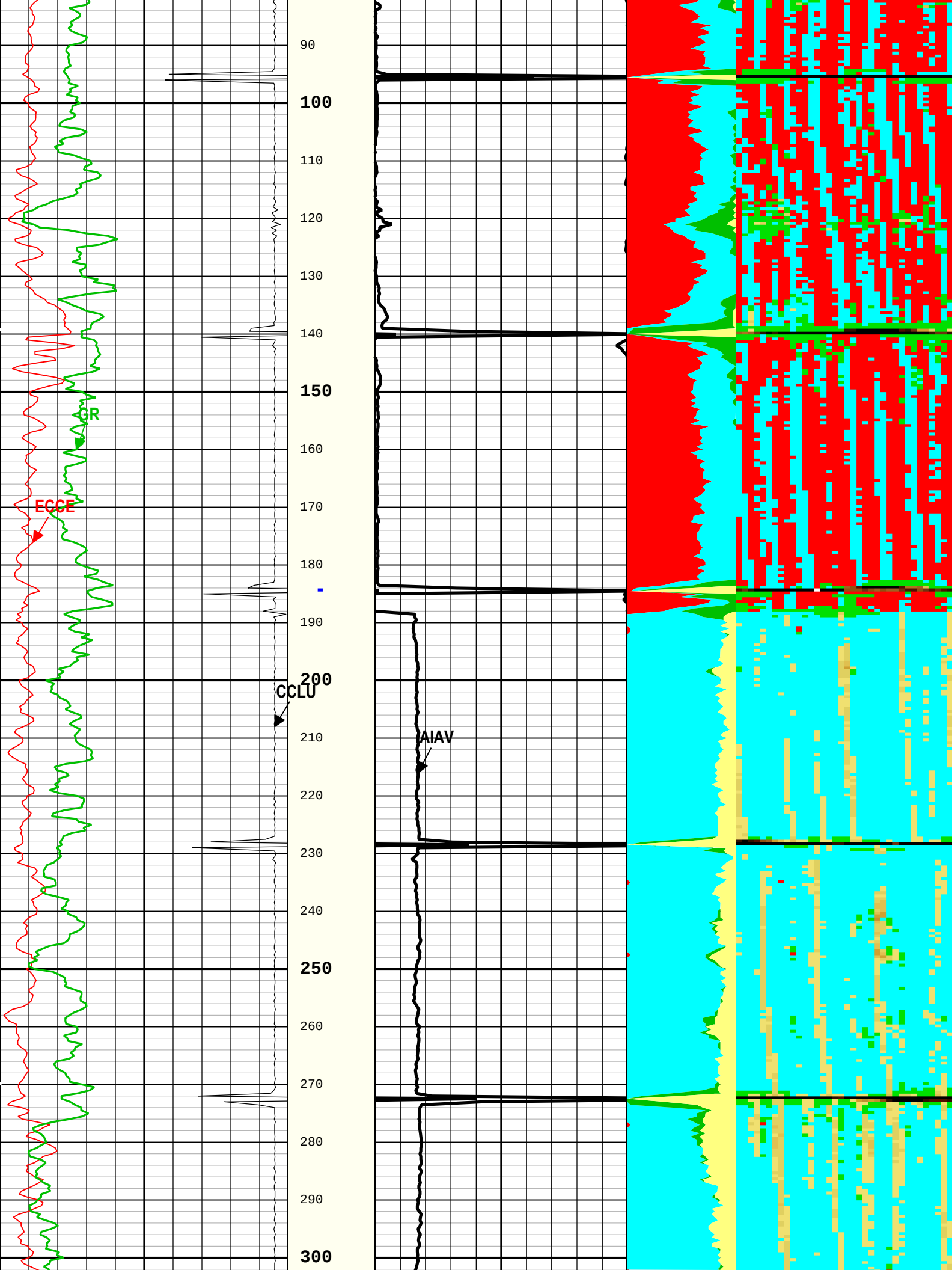
Absent 1.500 2.500 6.500
Explicit Normalization
USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV) USIT-E
0 Mrayl 10

Gas
Liquid
Micro-Debonding
Bonded

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_MDEBOND_IMG) USIT-E (Mrayl)

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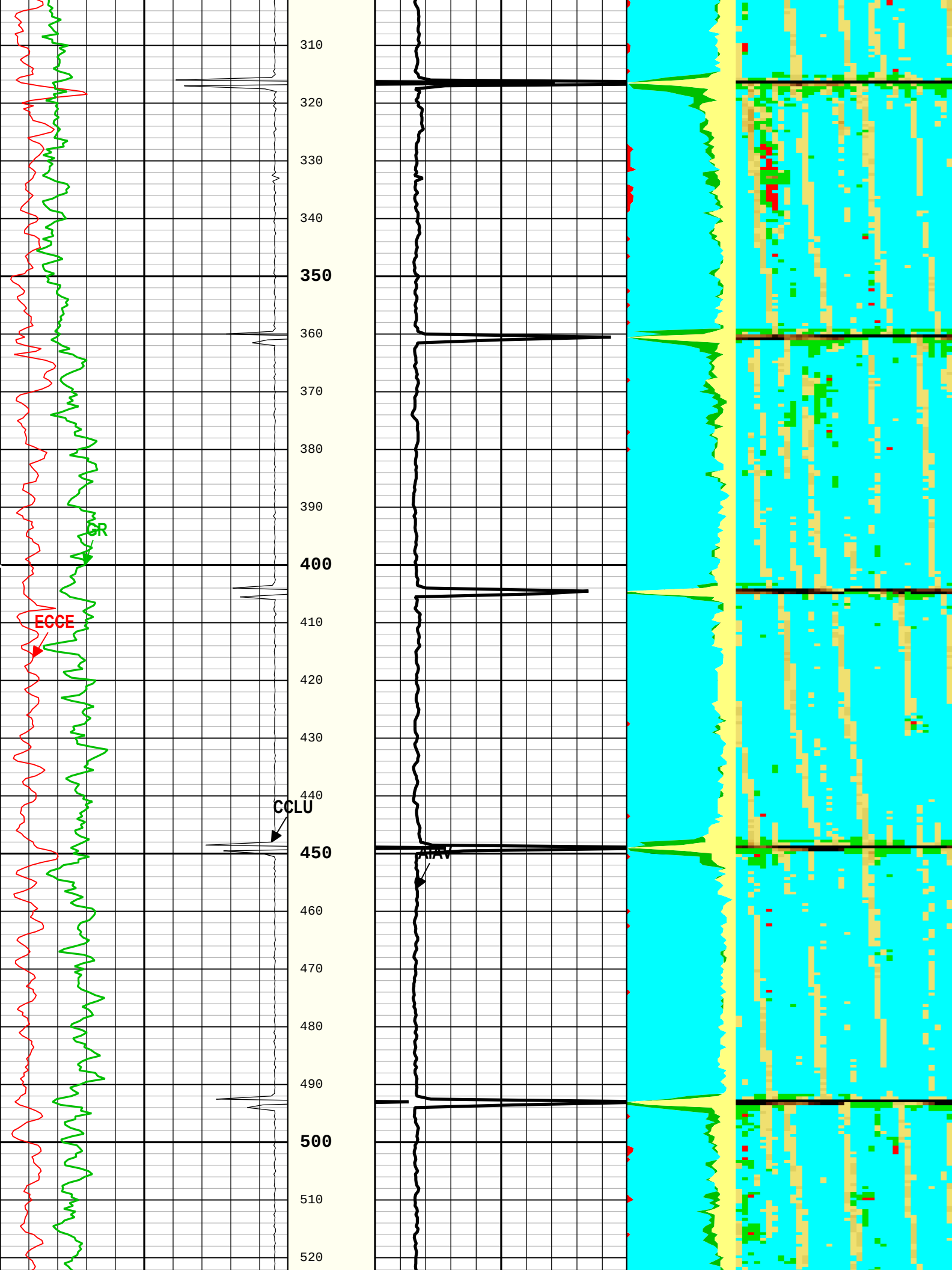
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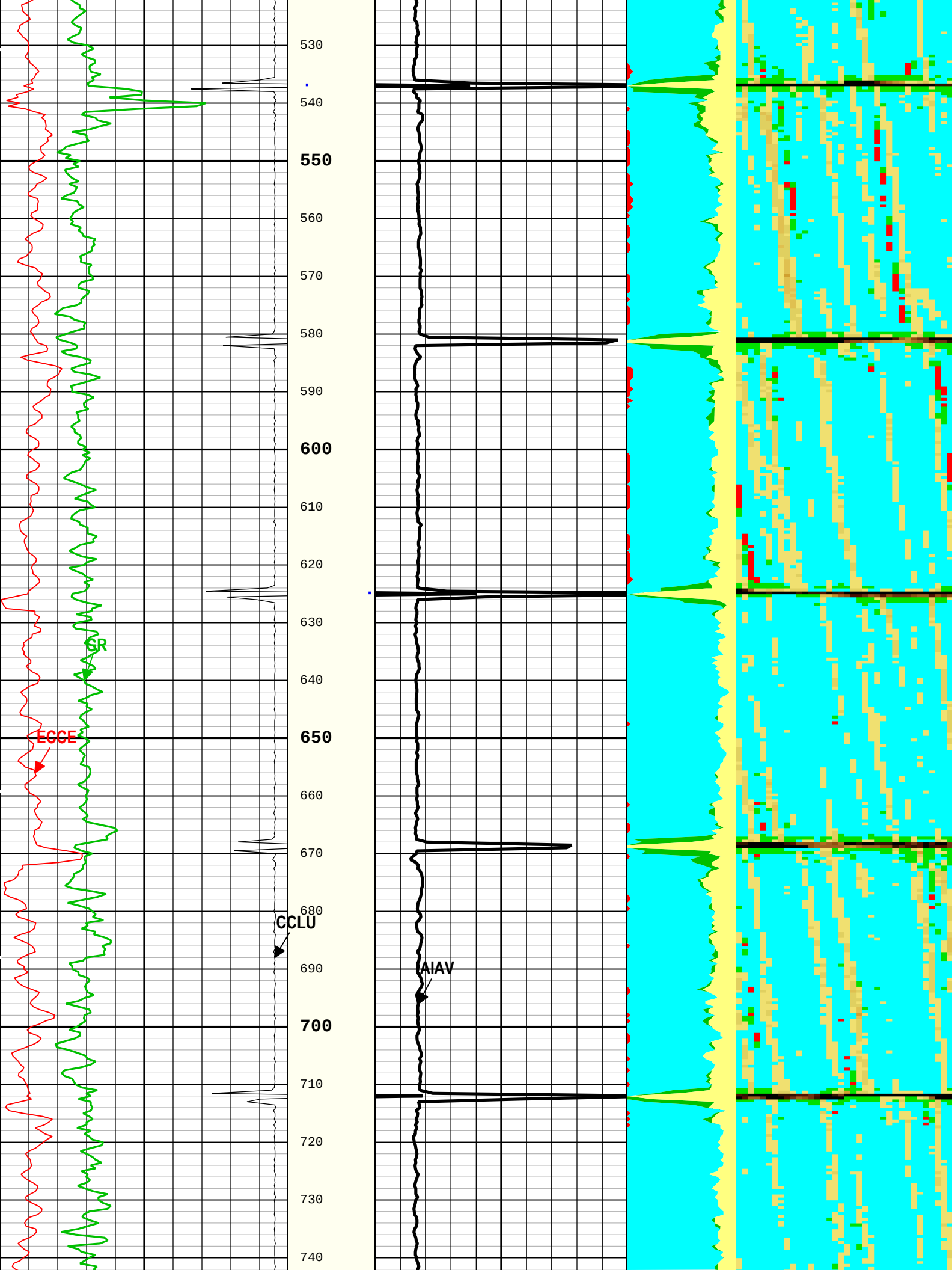
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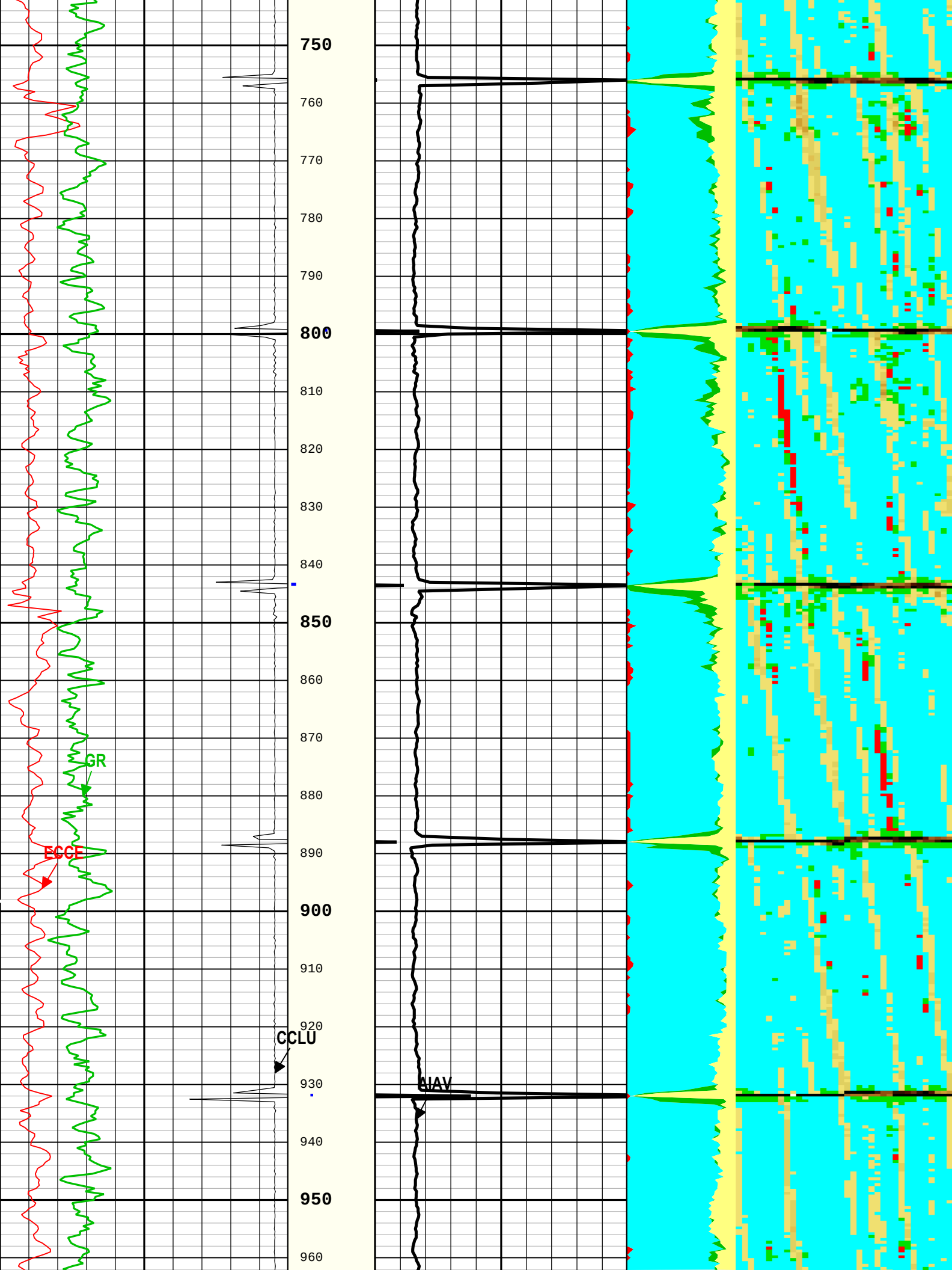
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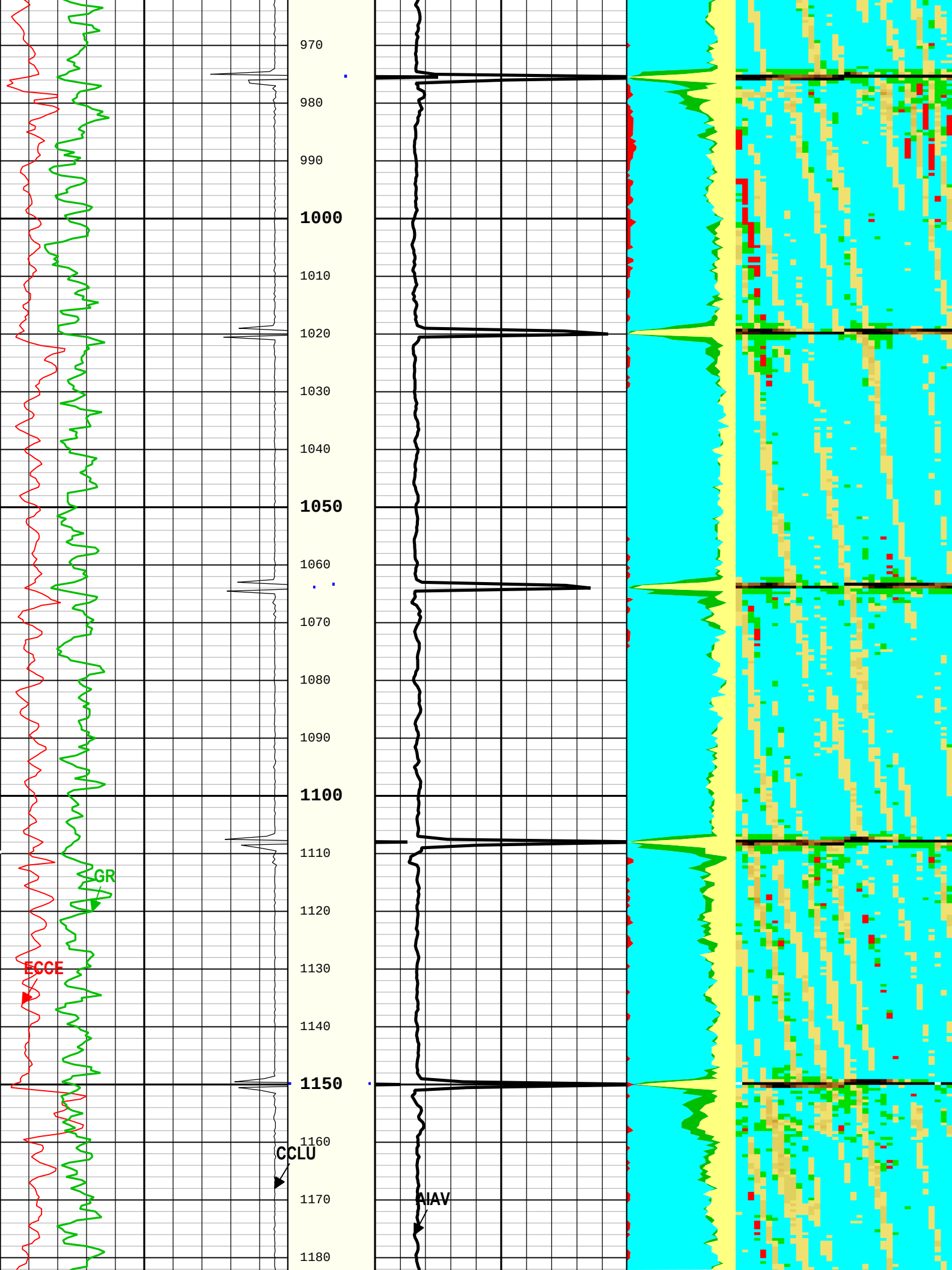
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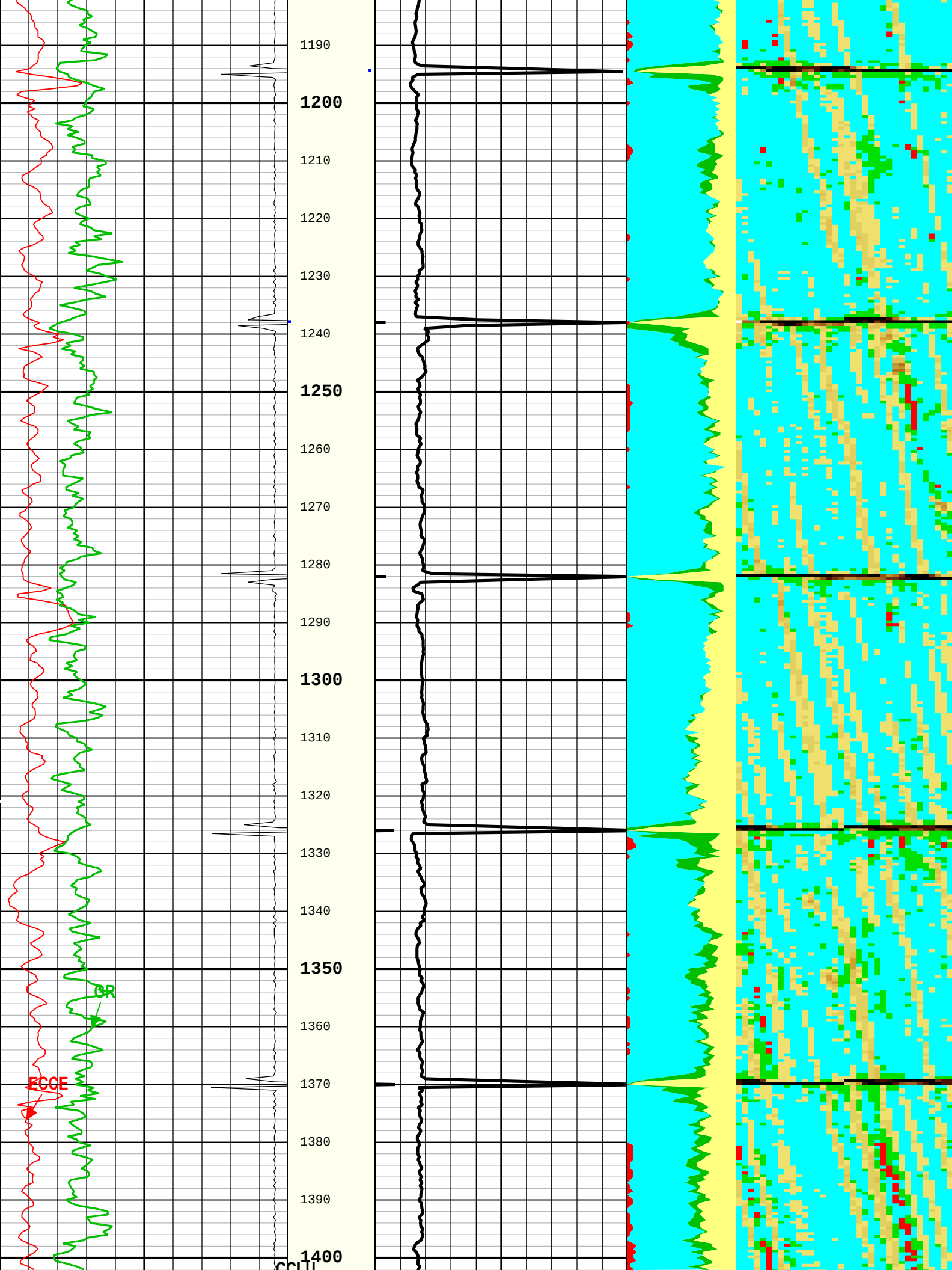
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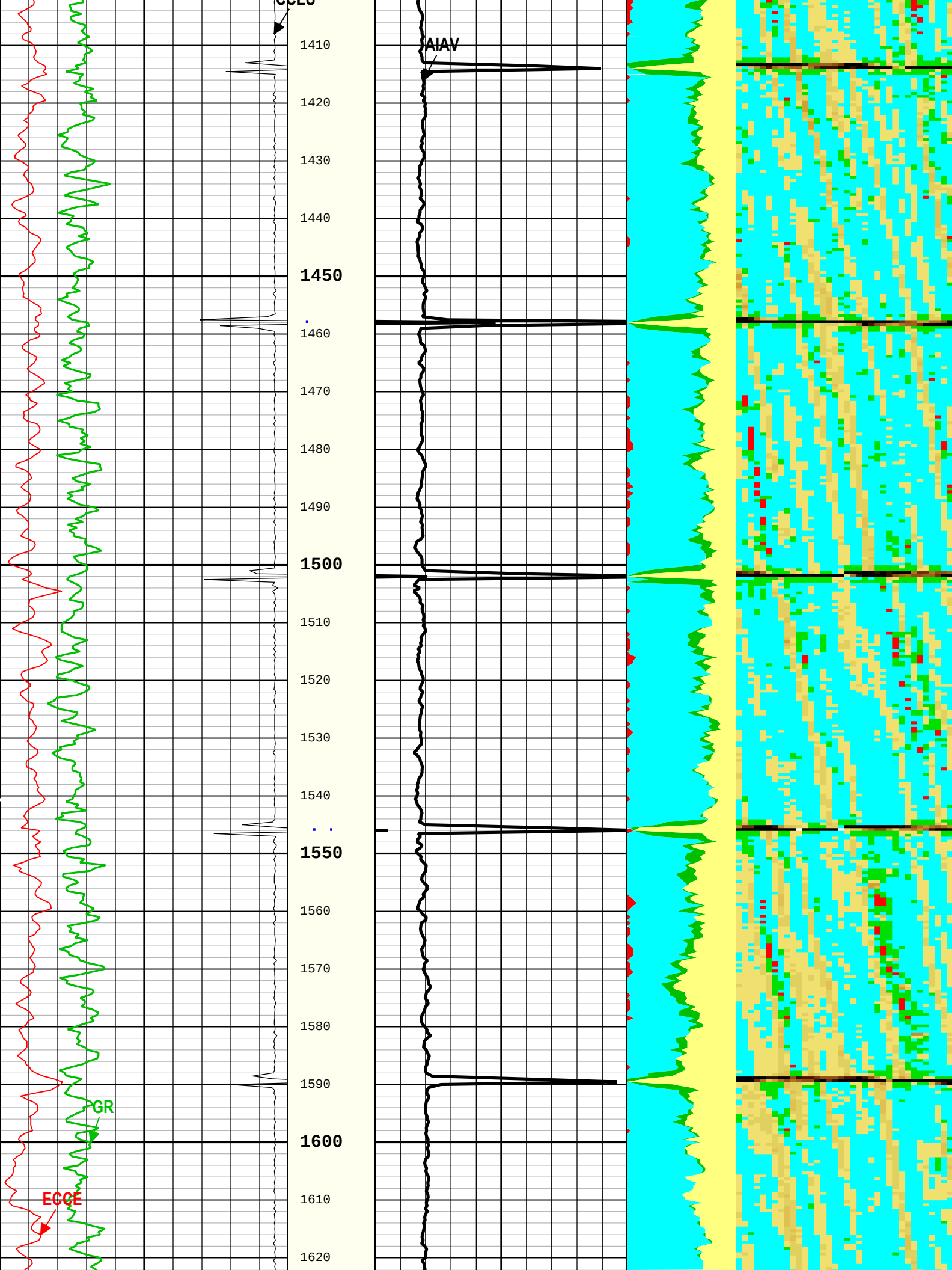
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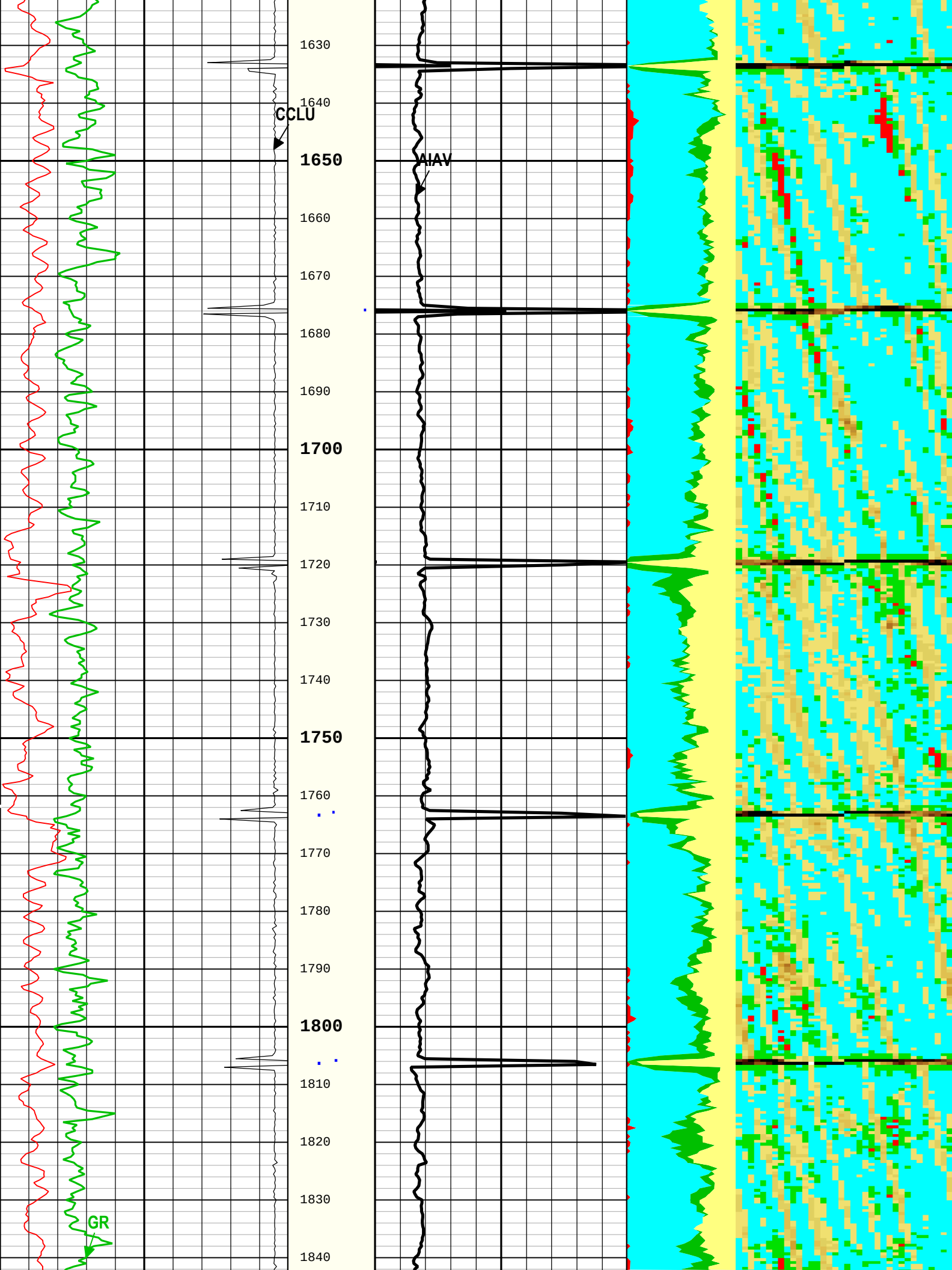
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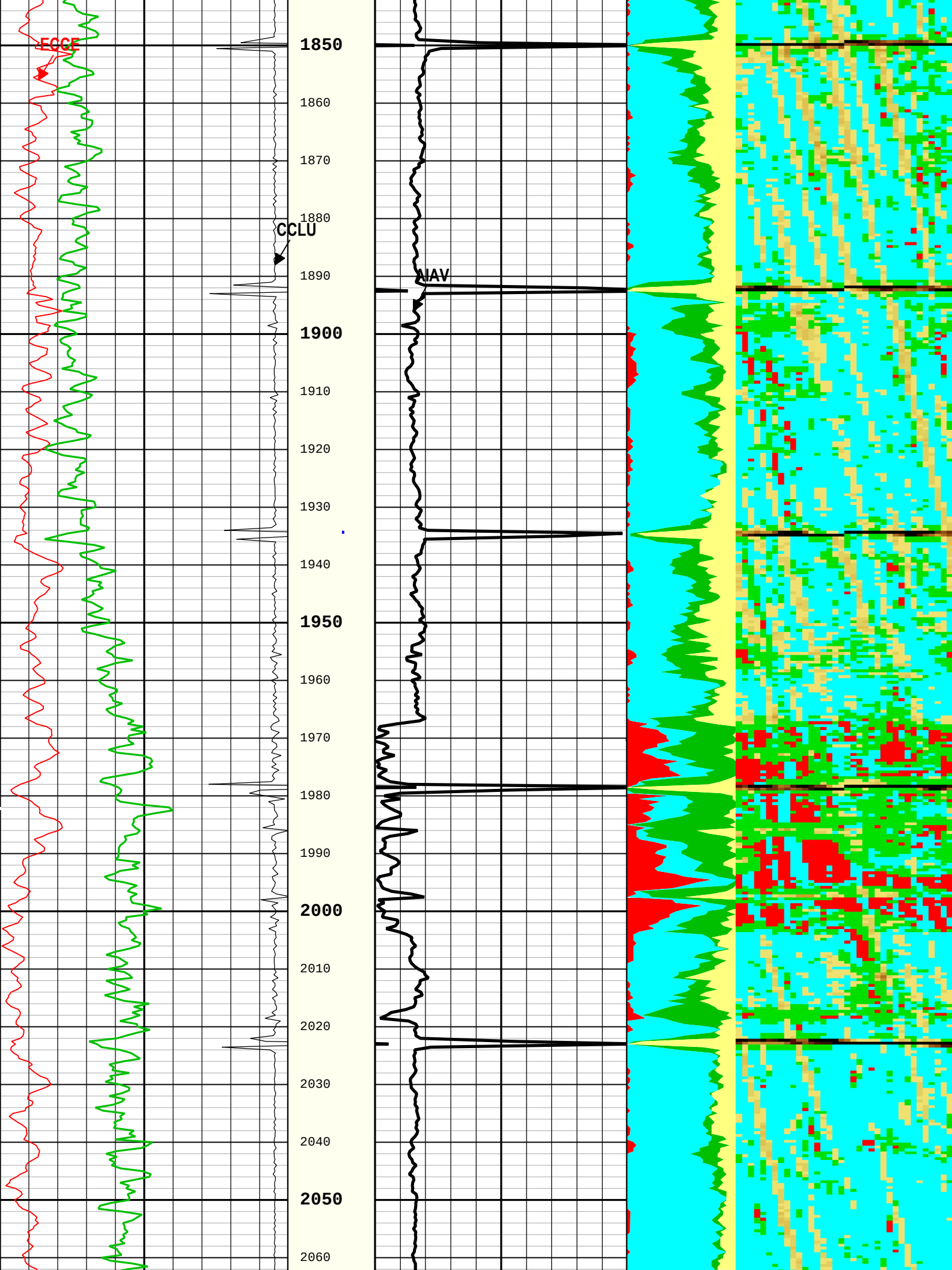
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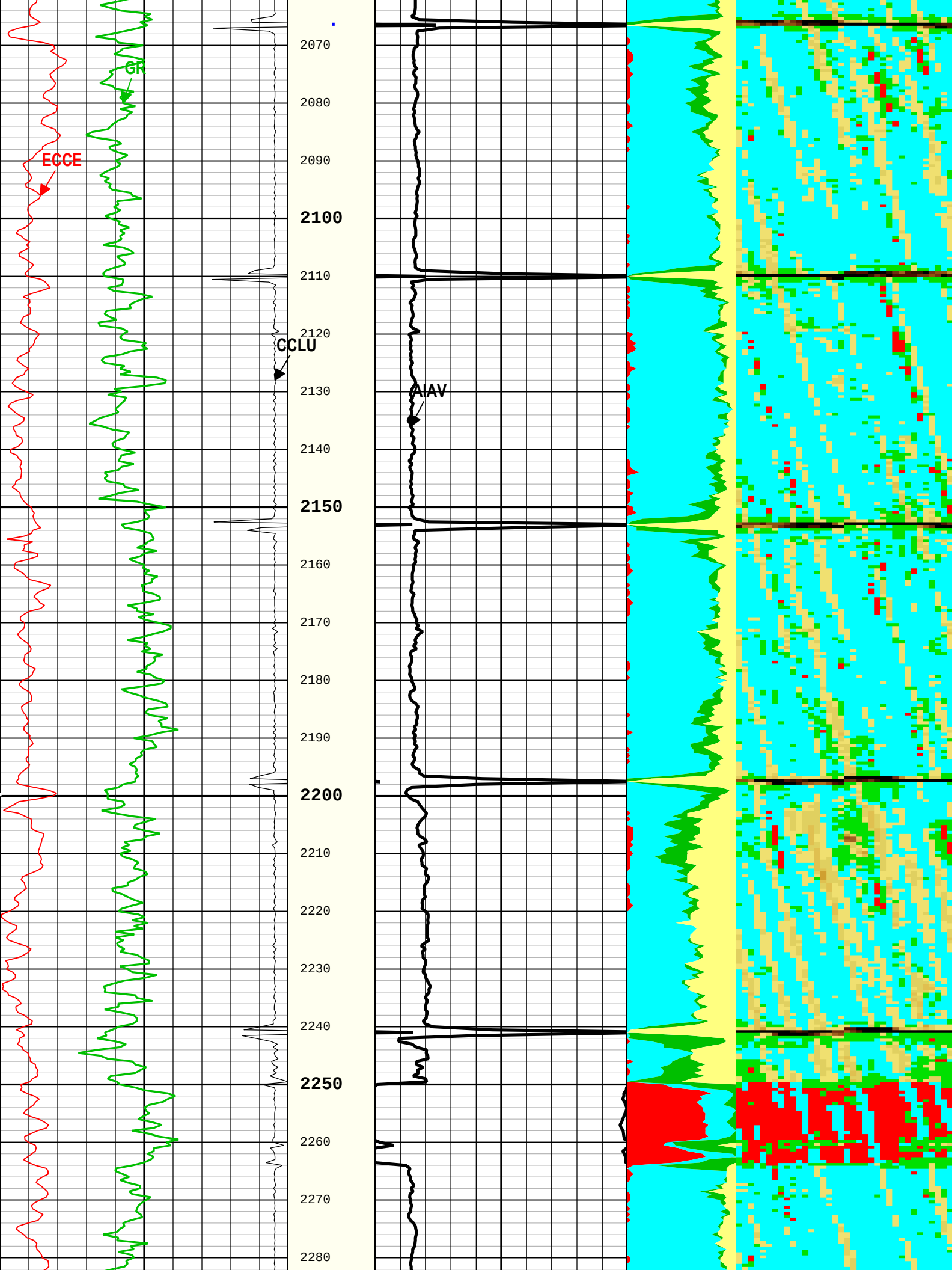
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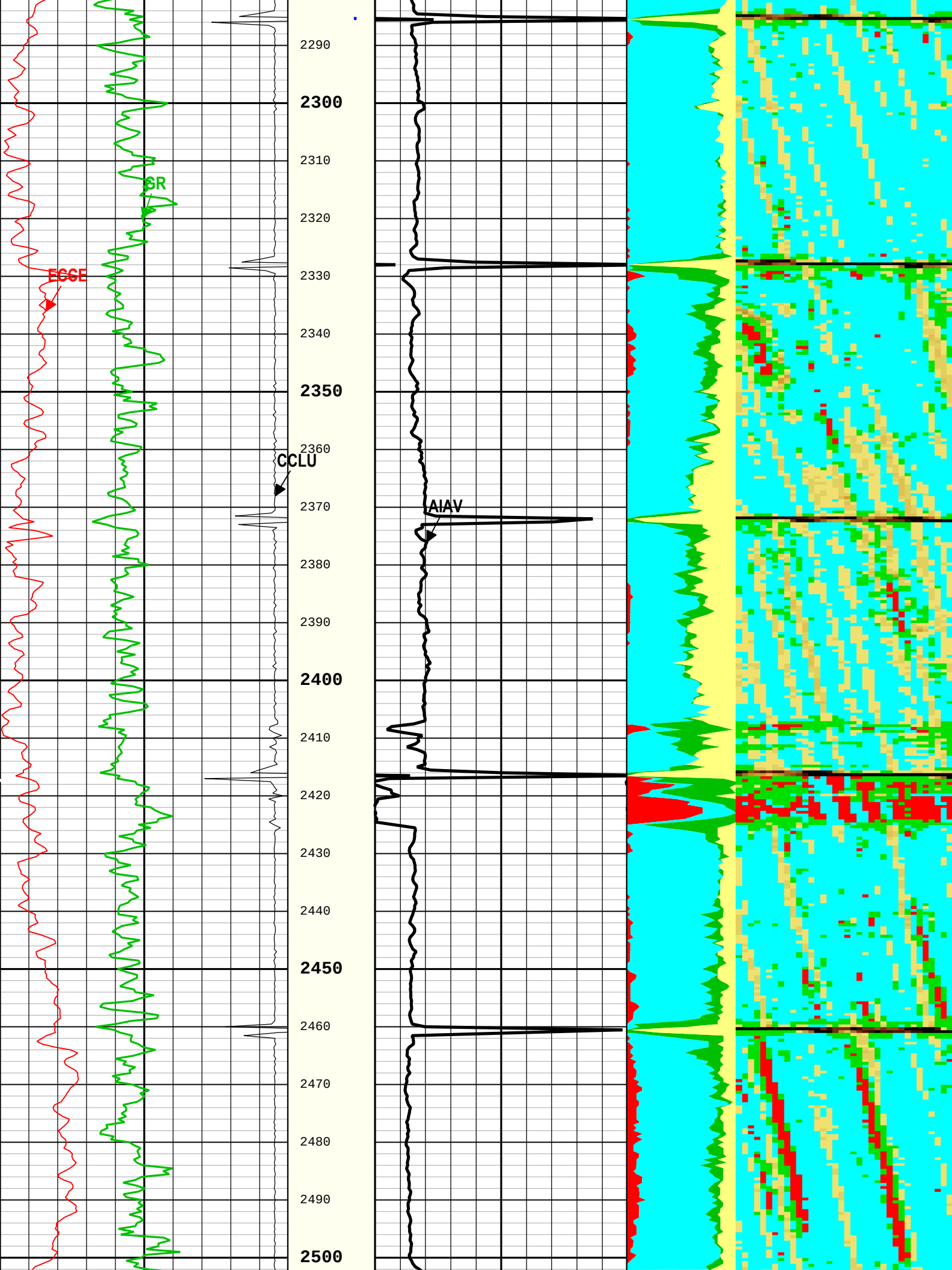
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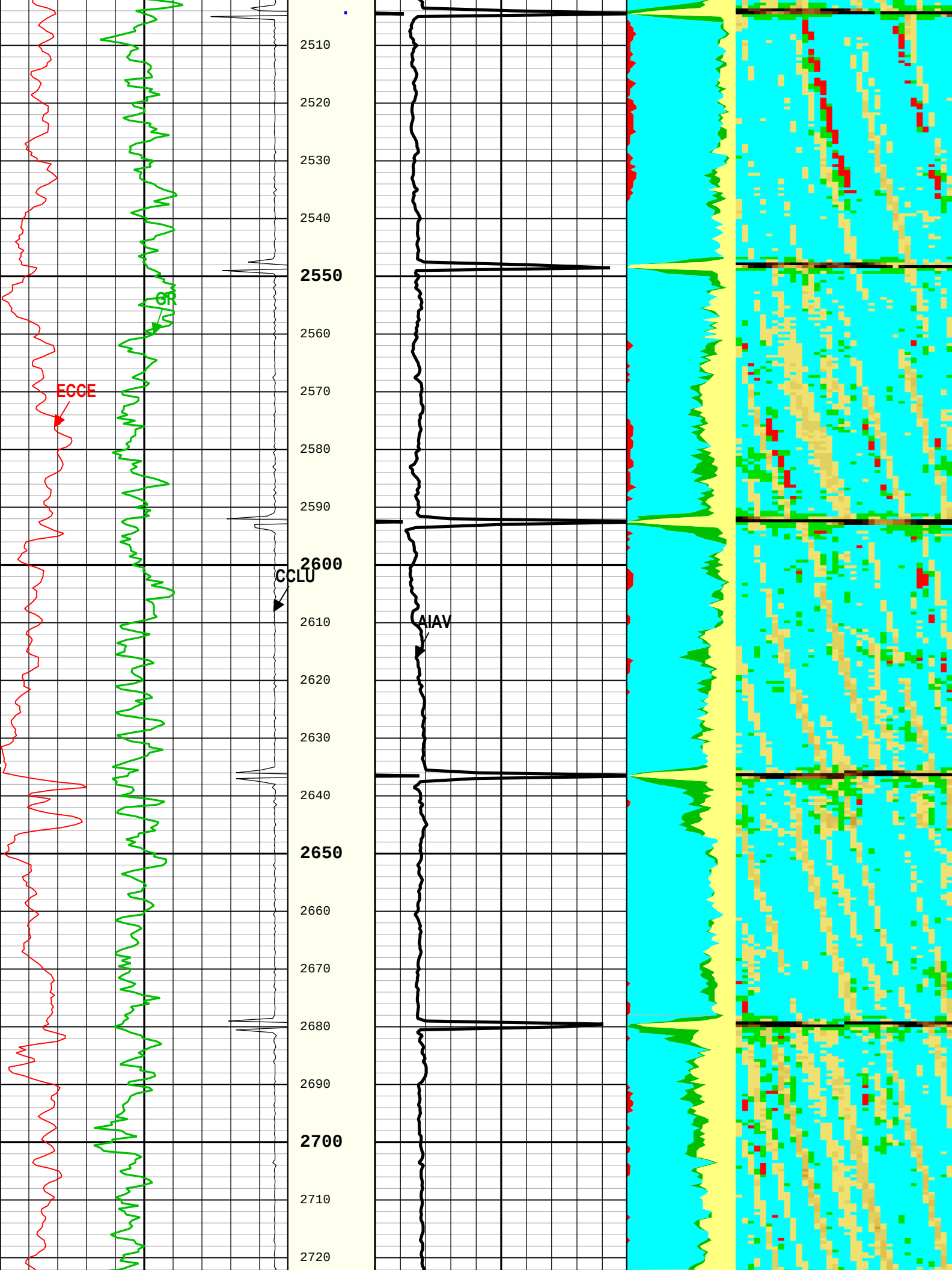
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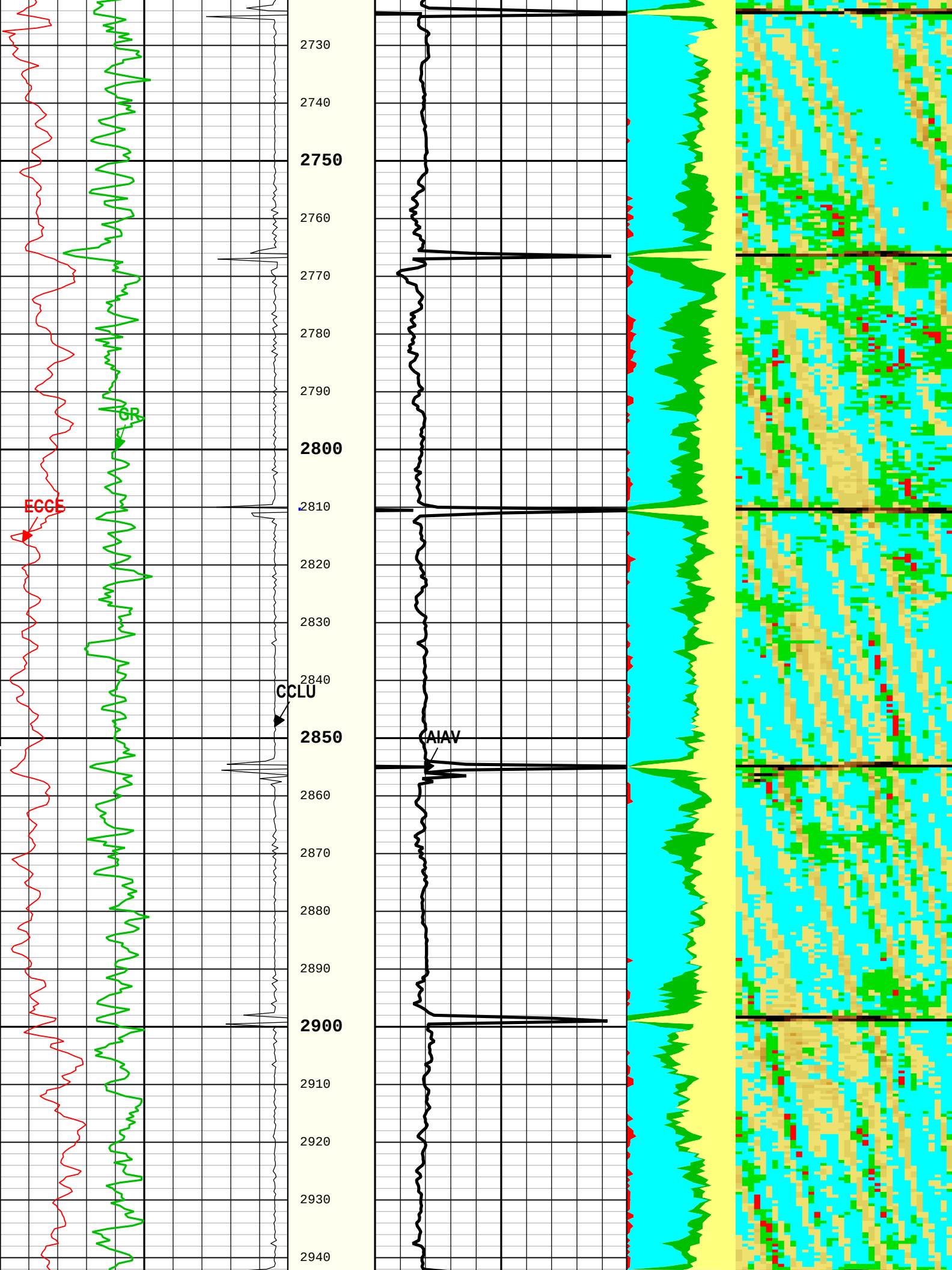
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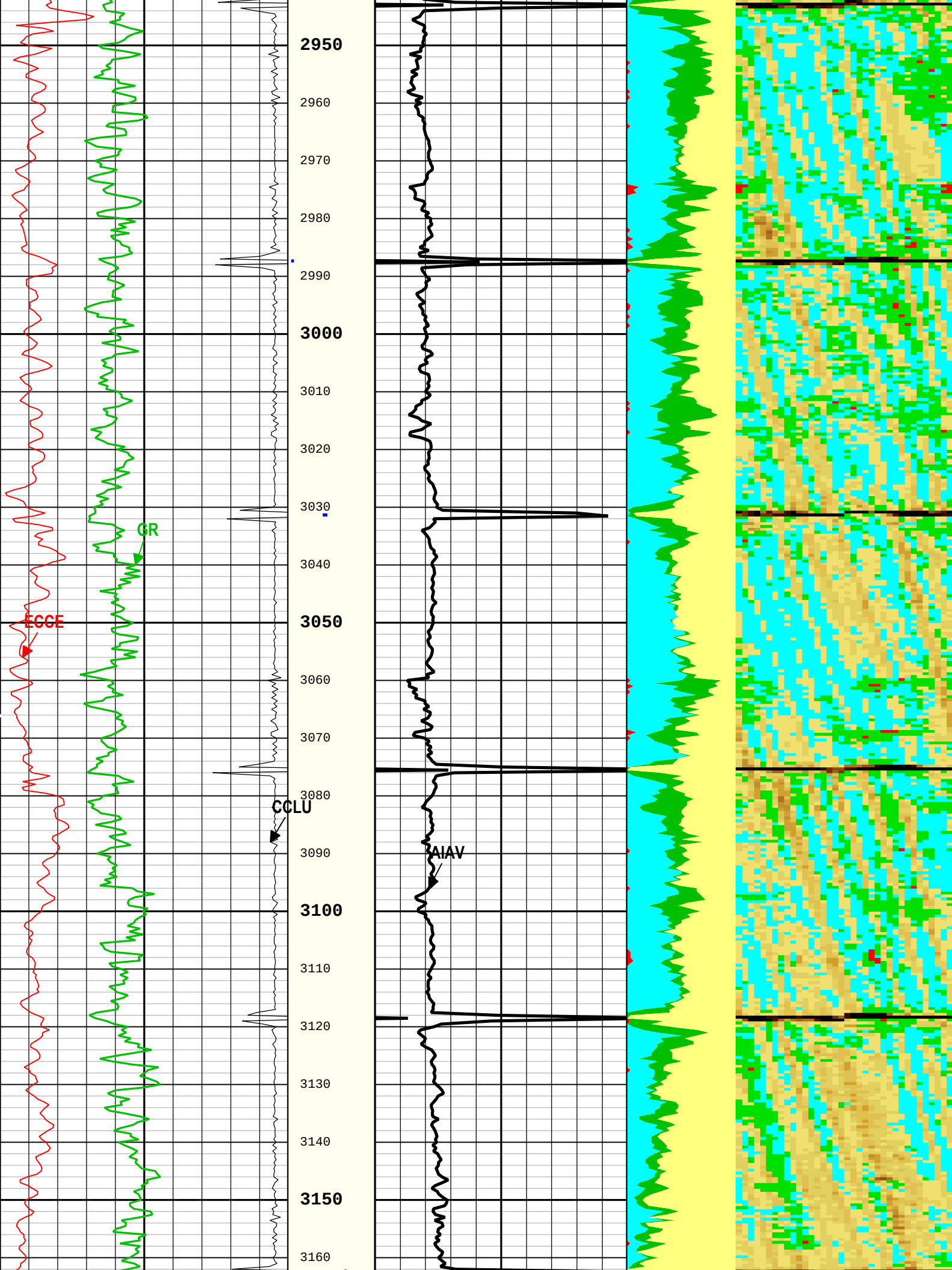
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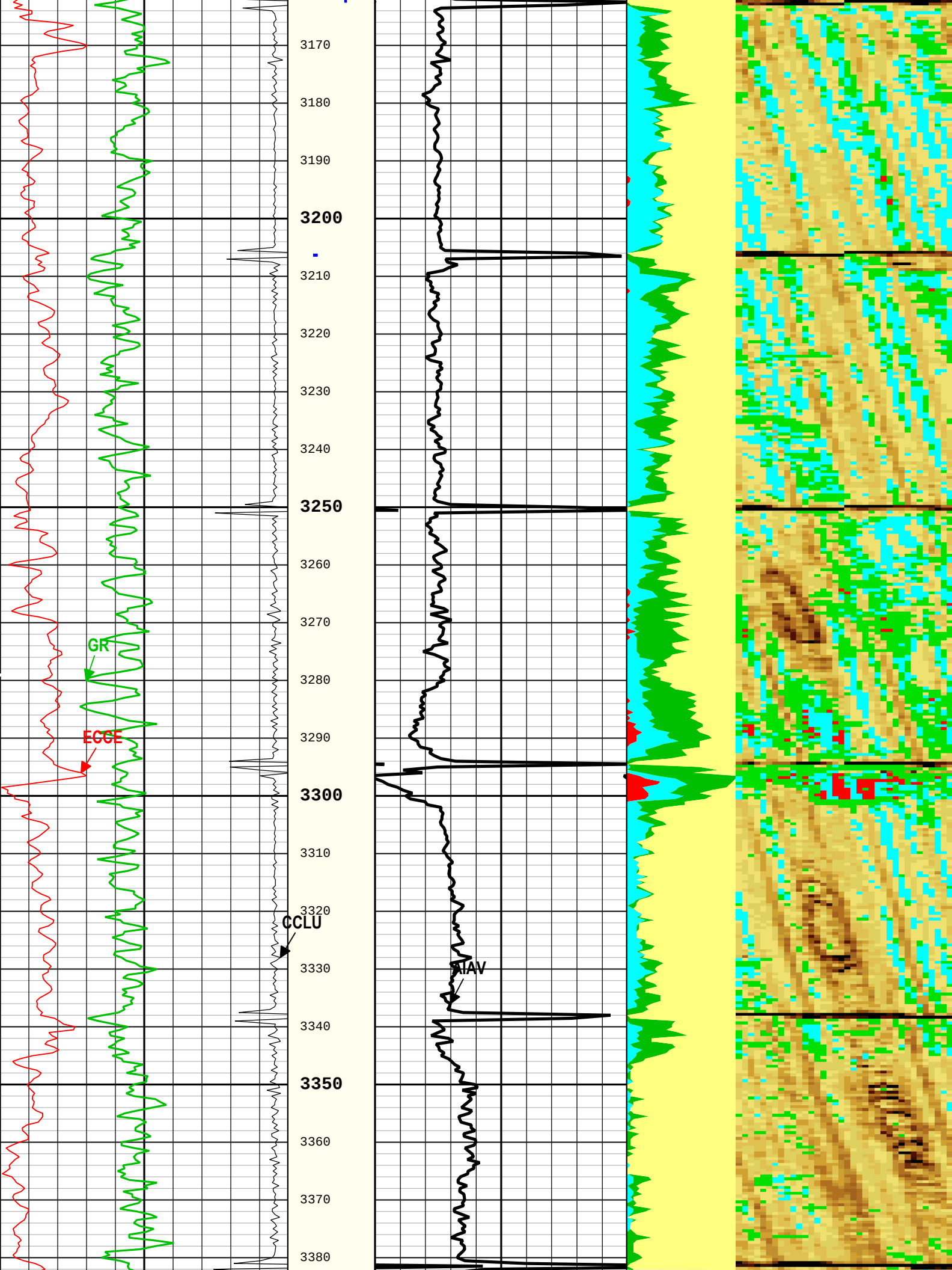
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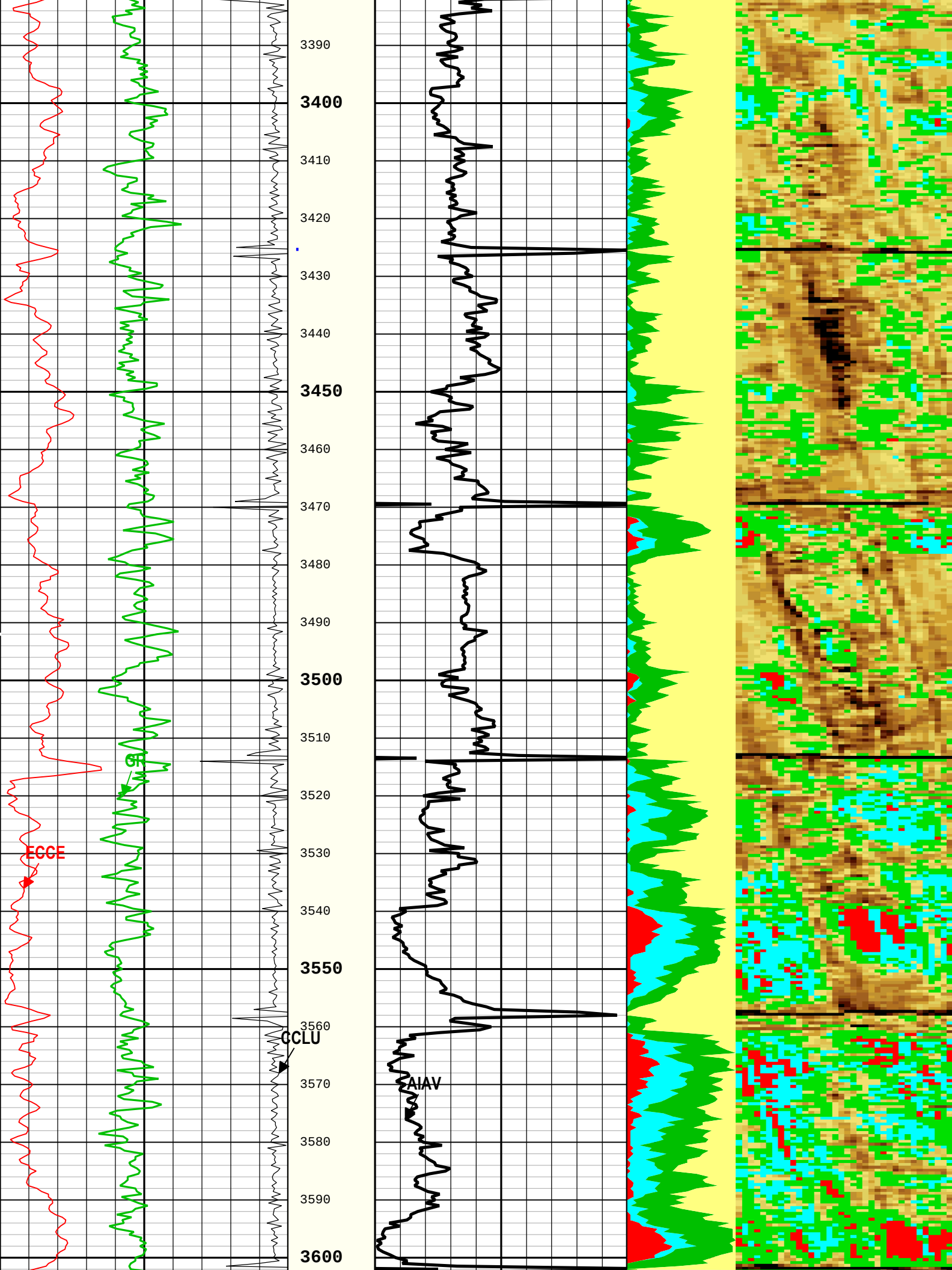
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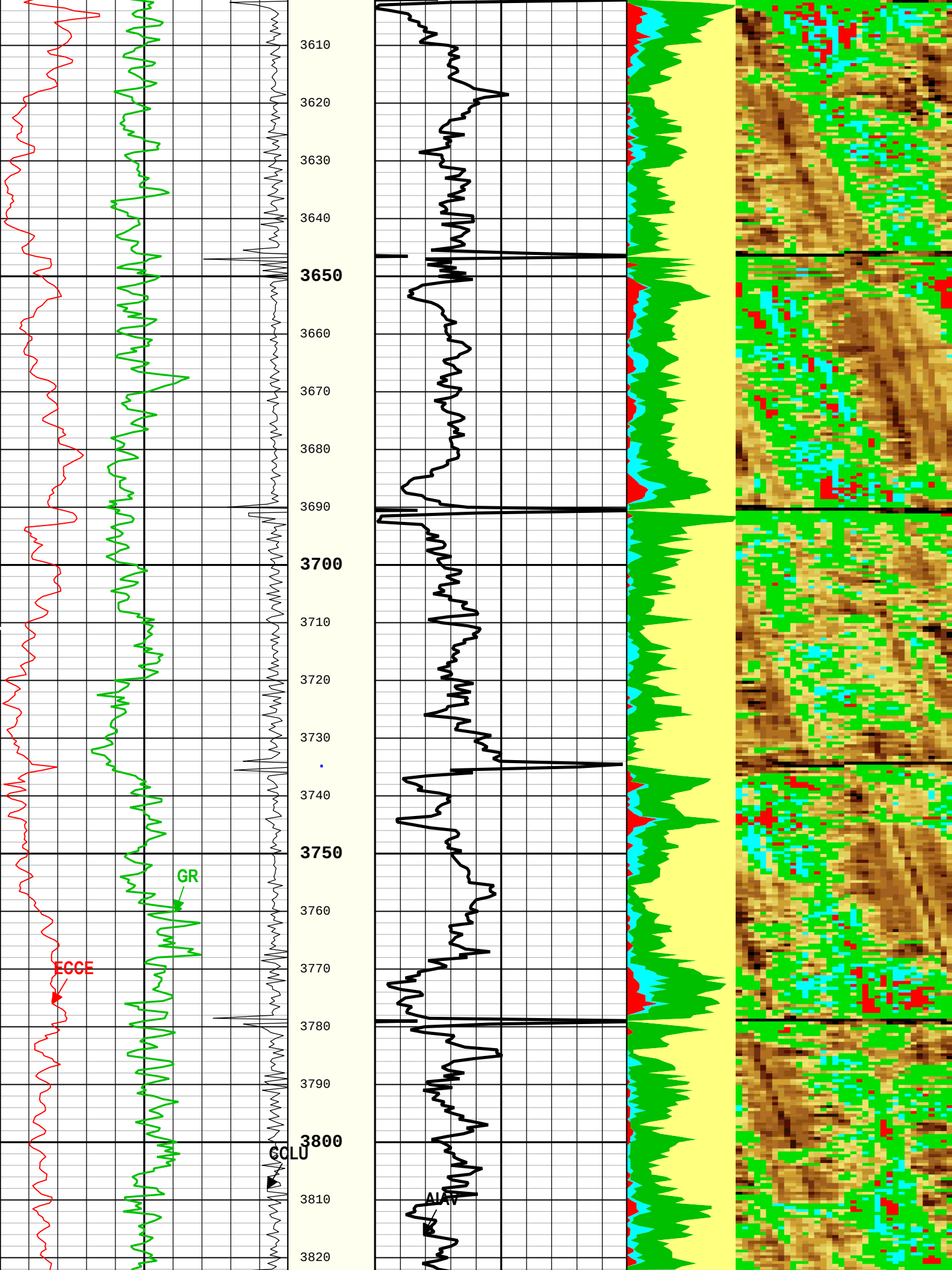
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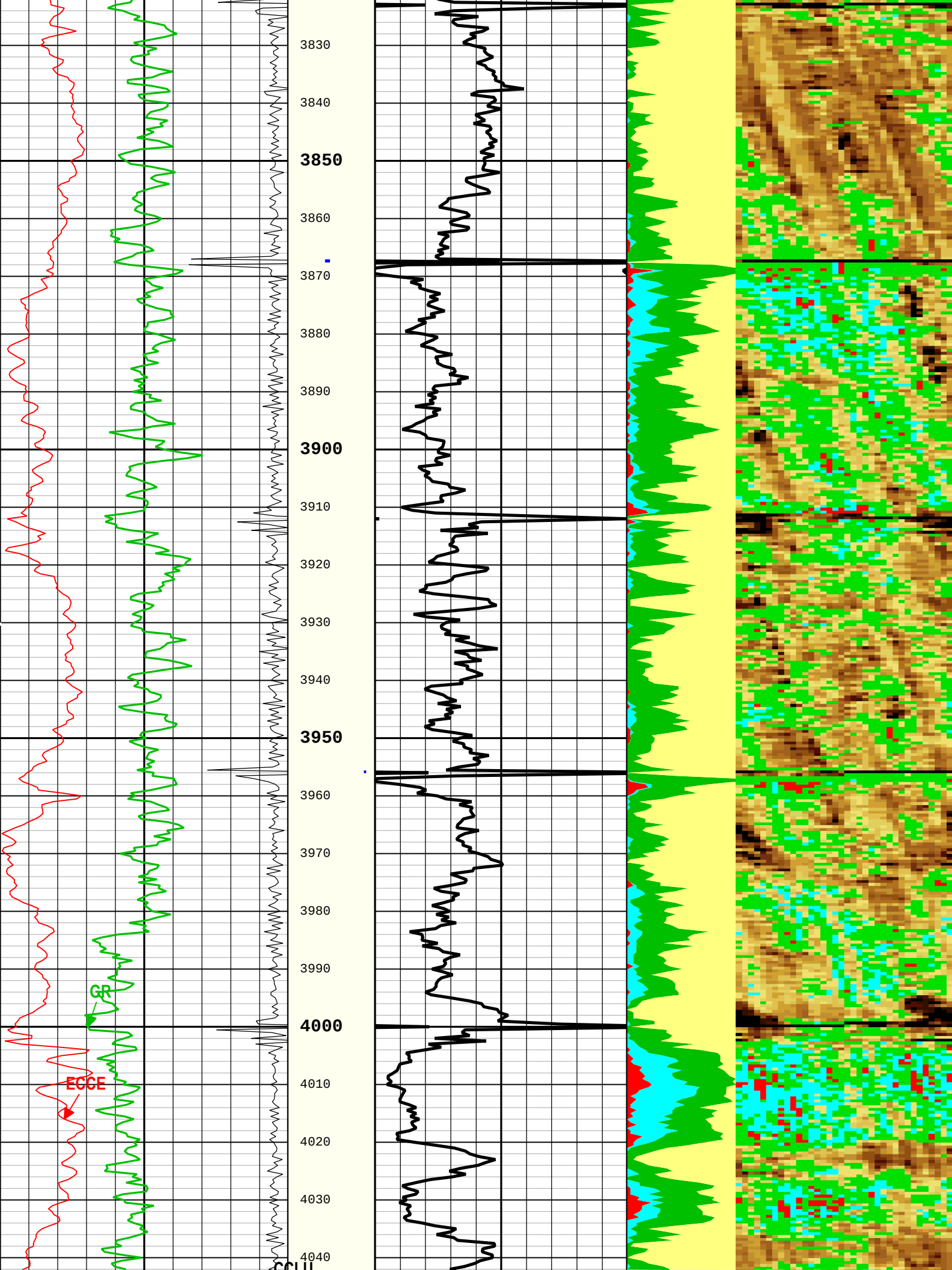
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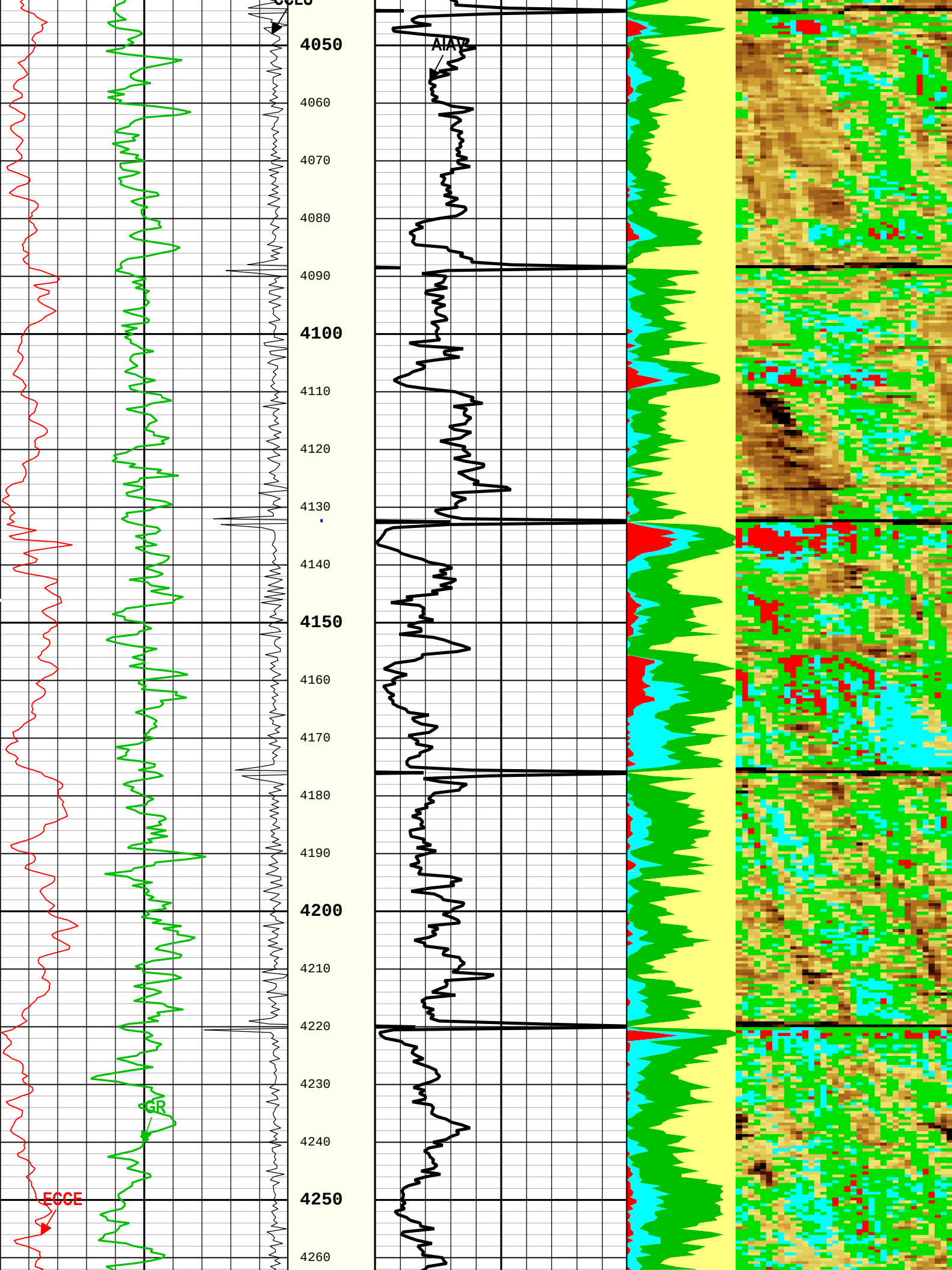
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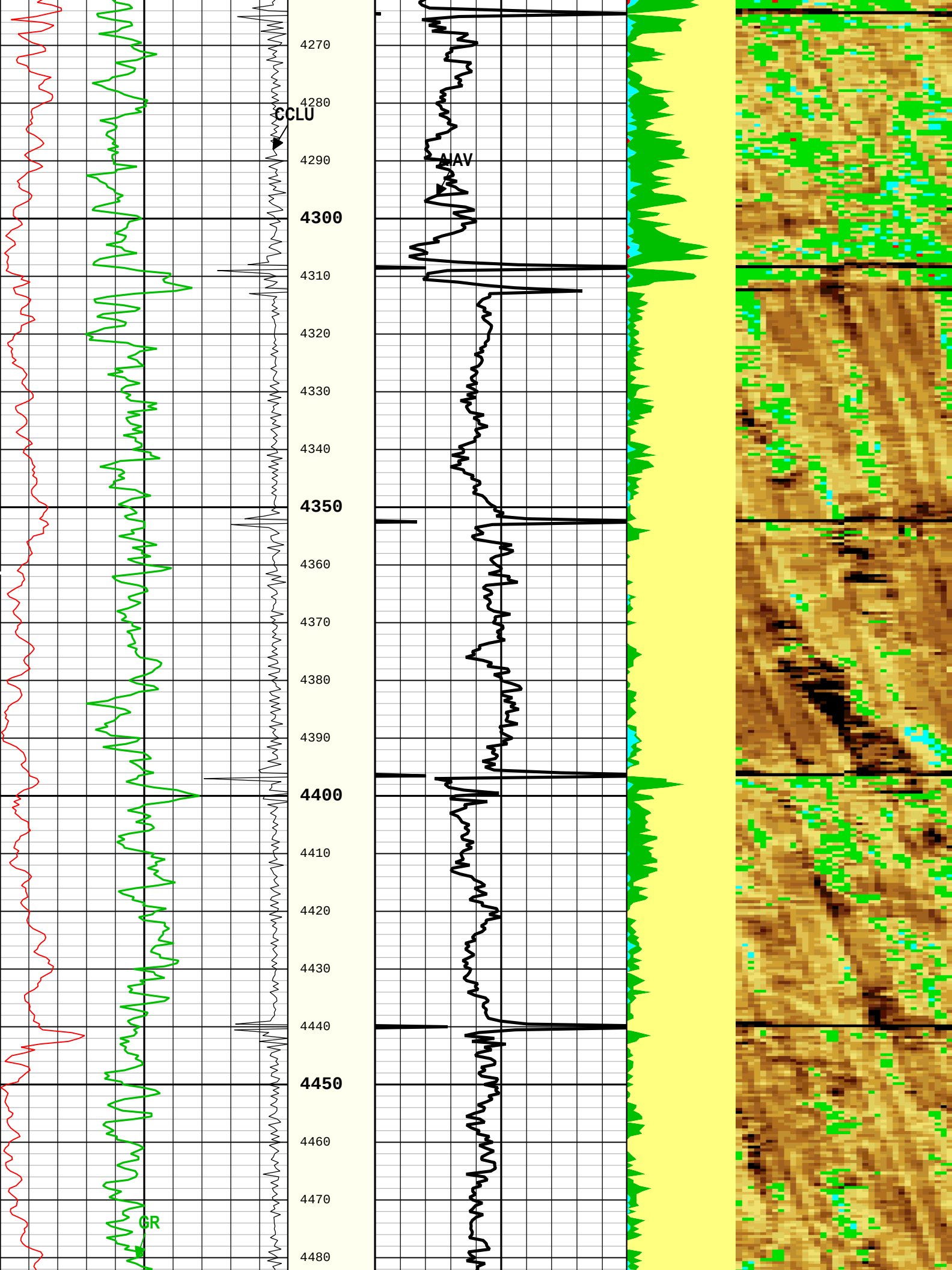
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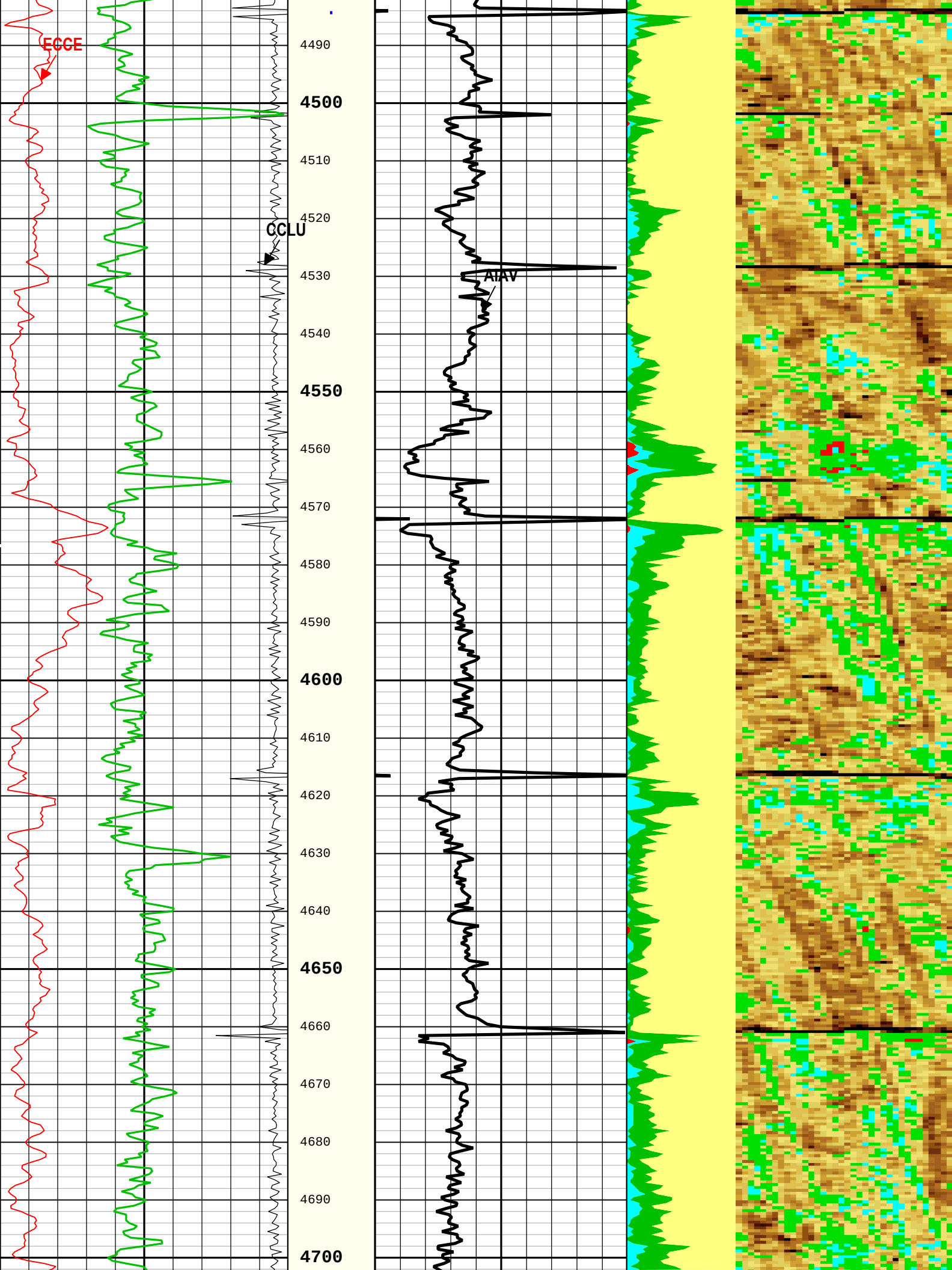
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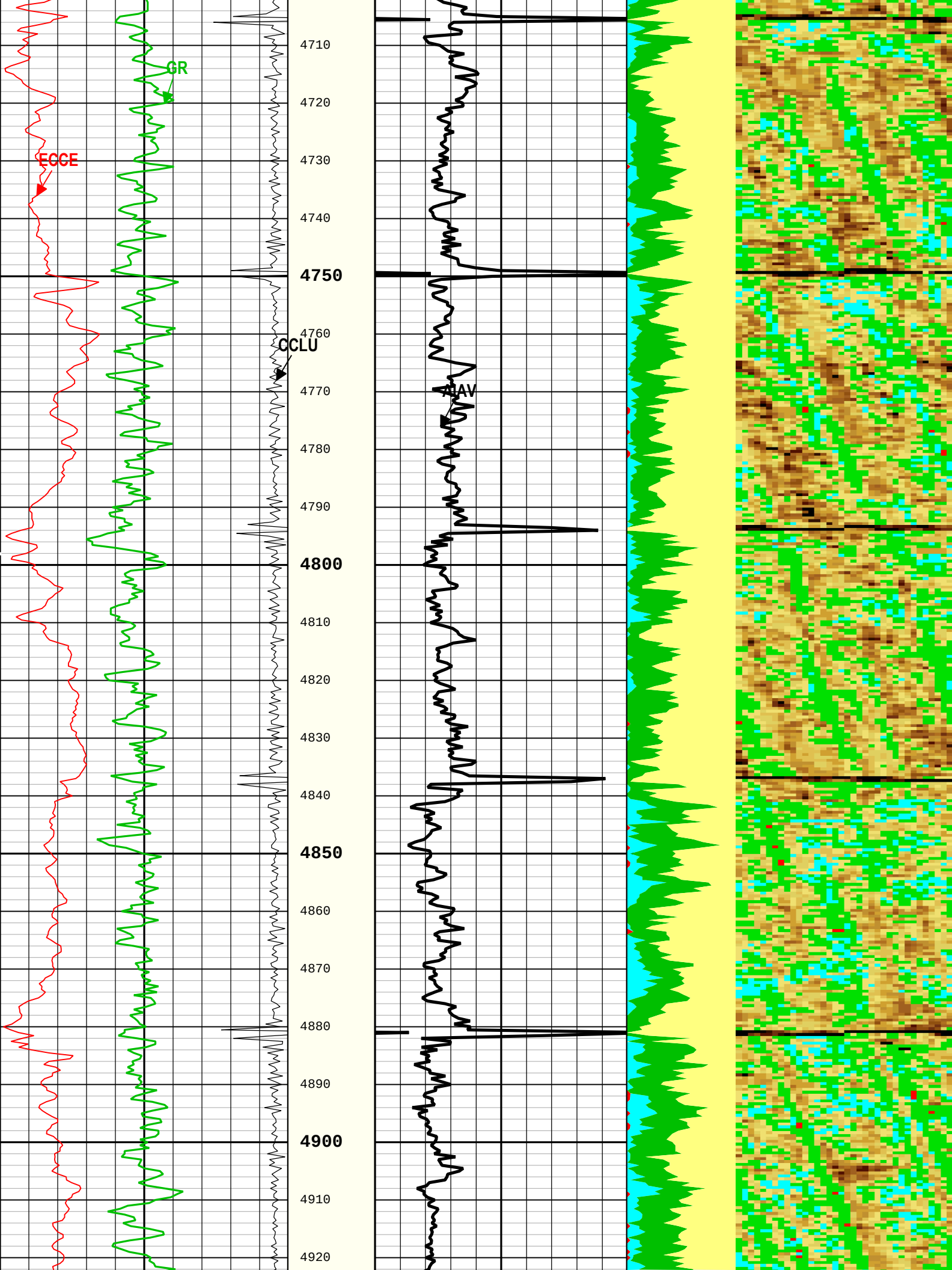
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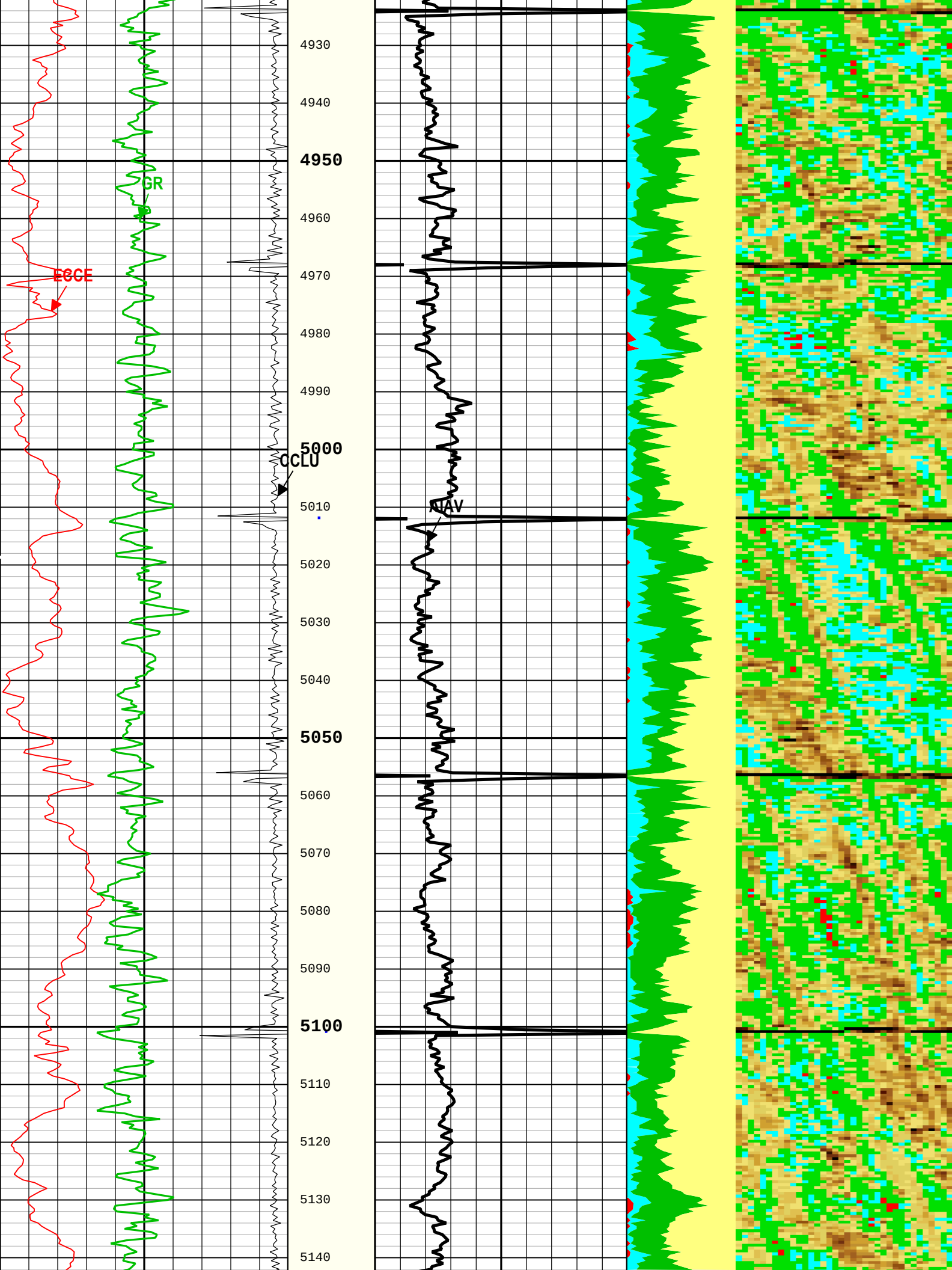
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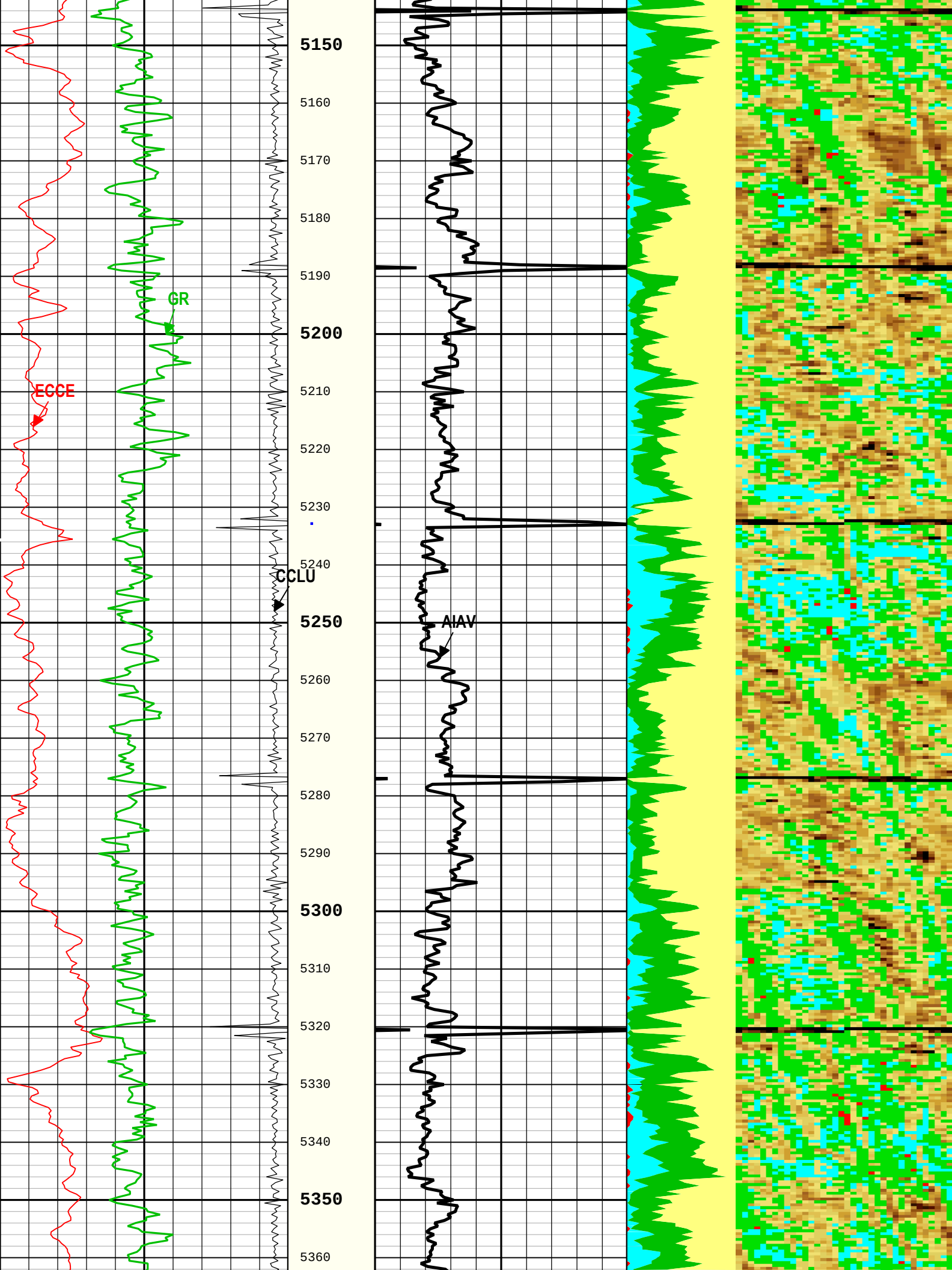
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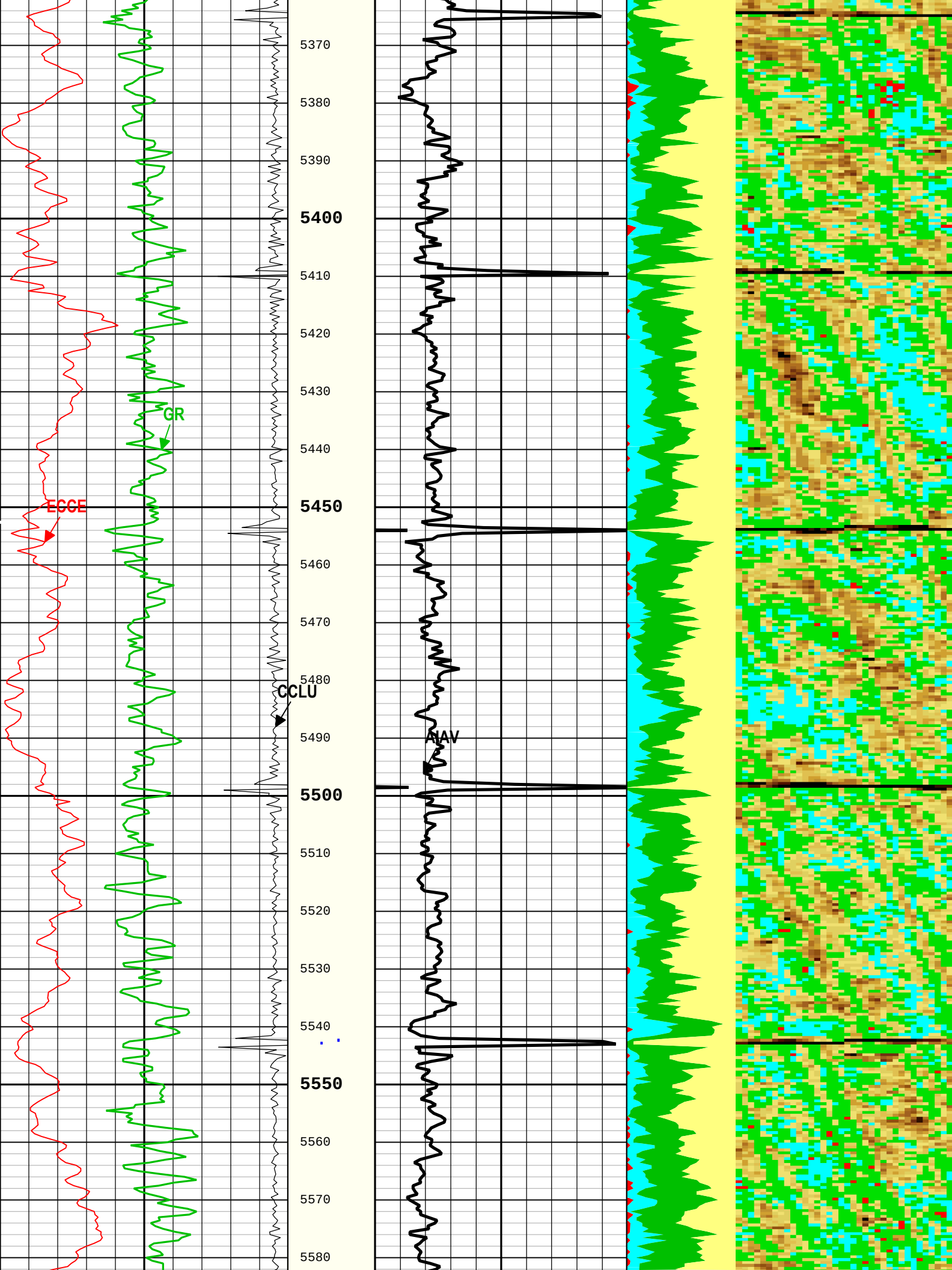
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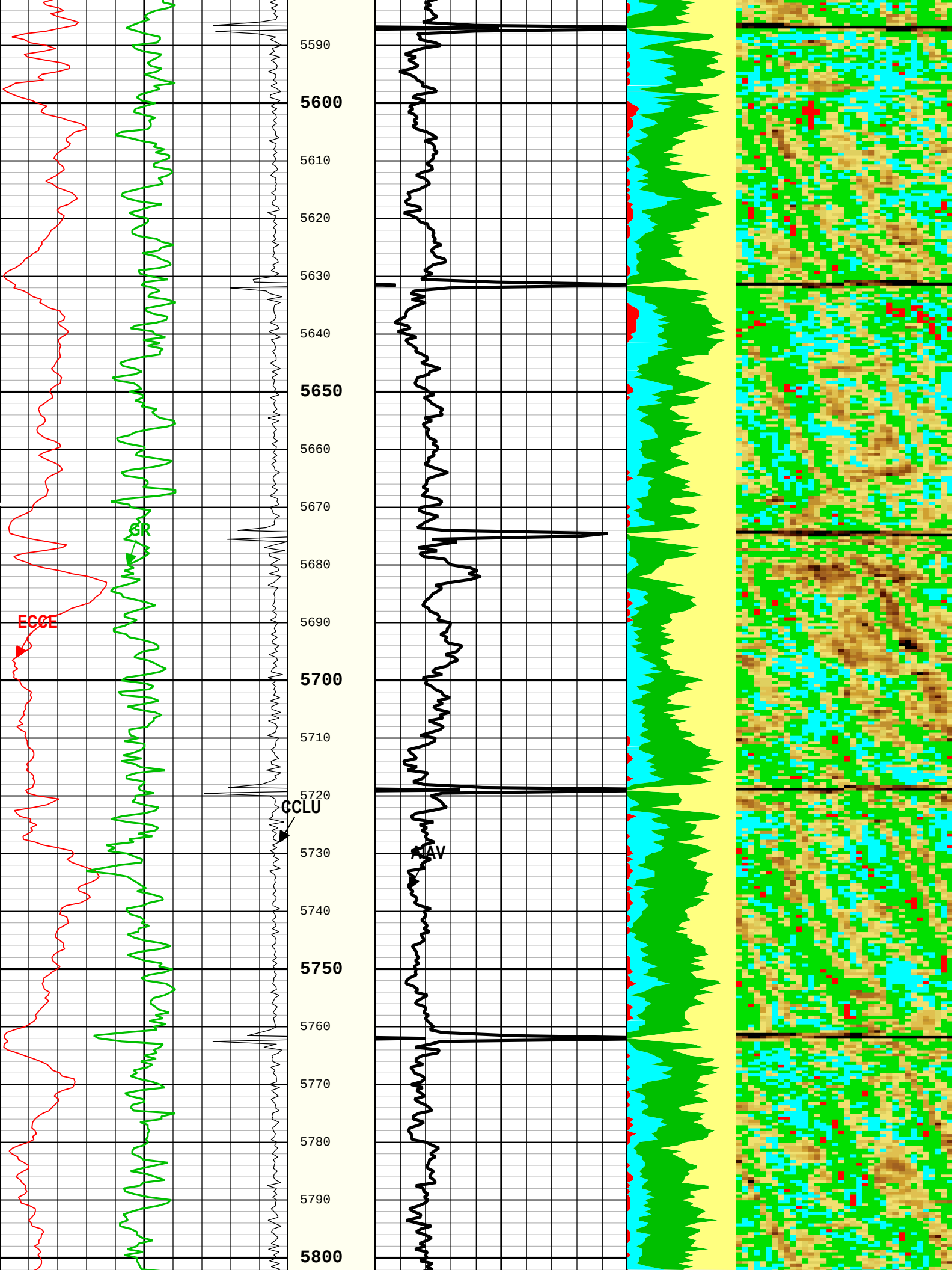
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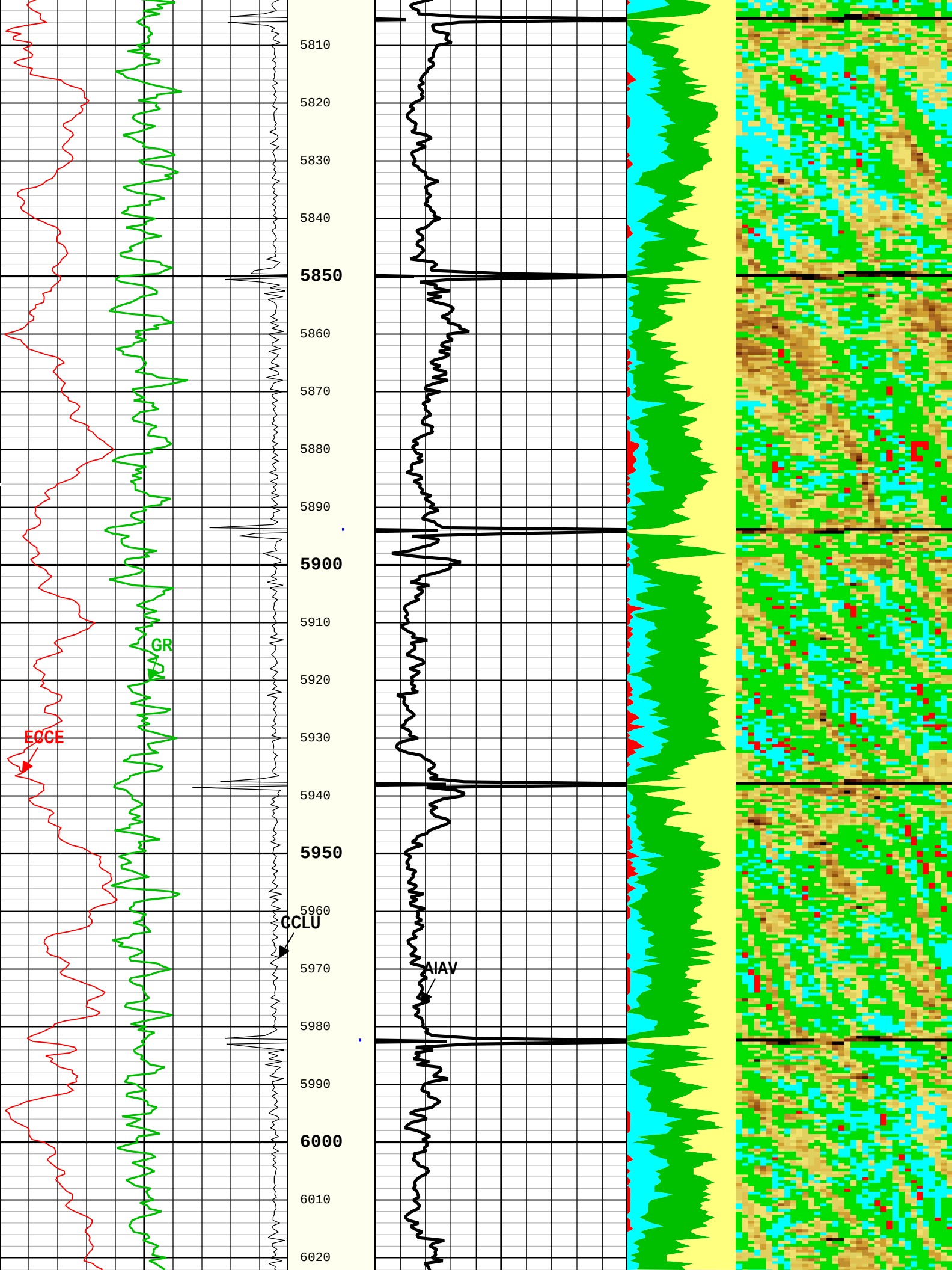
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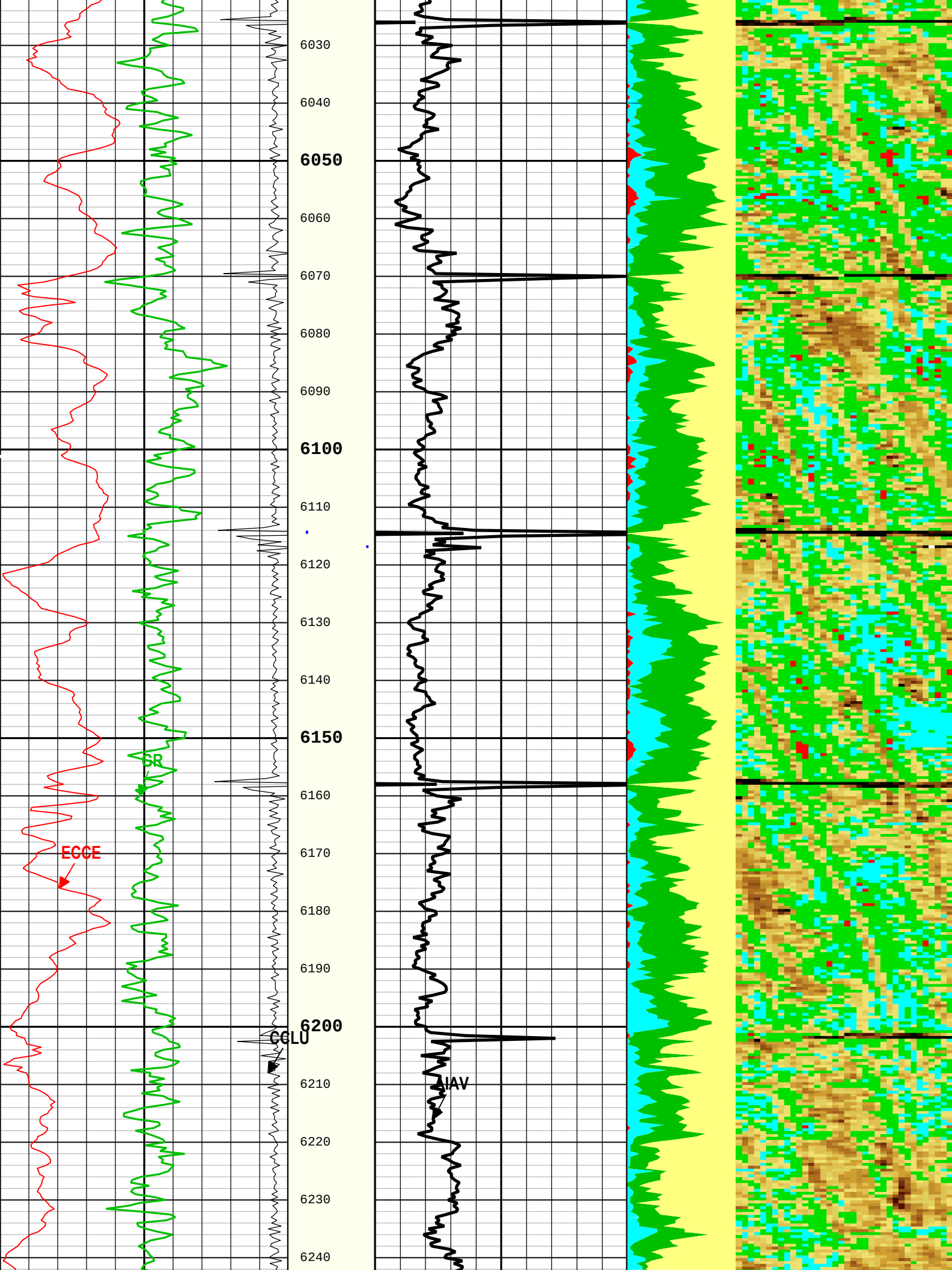
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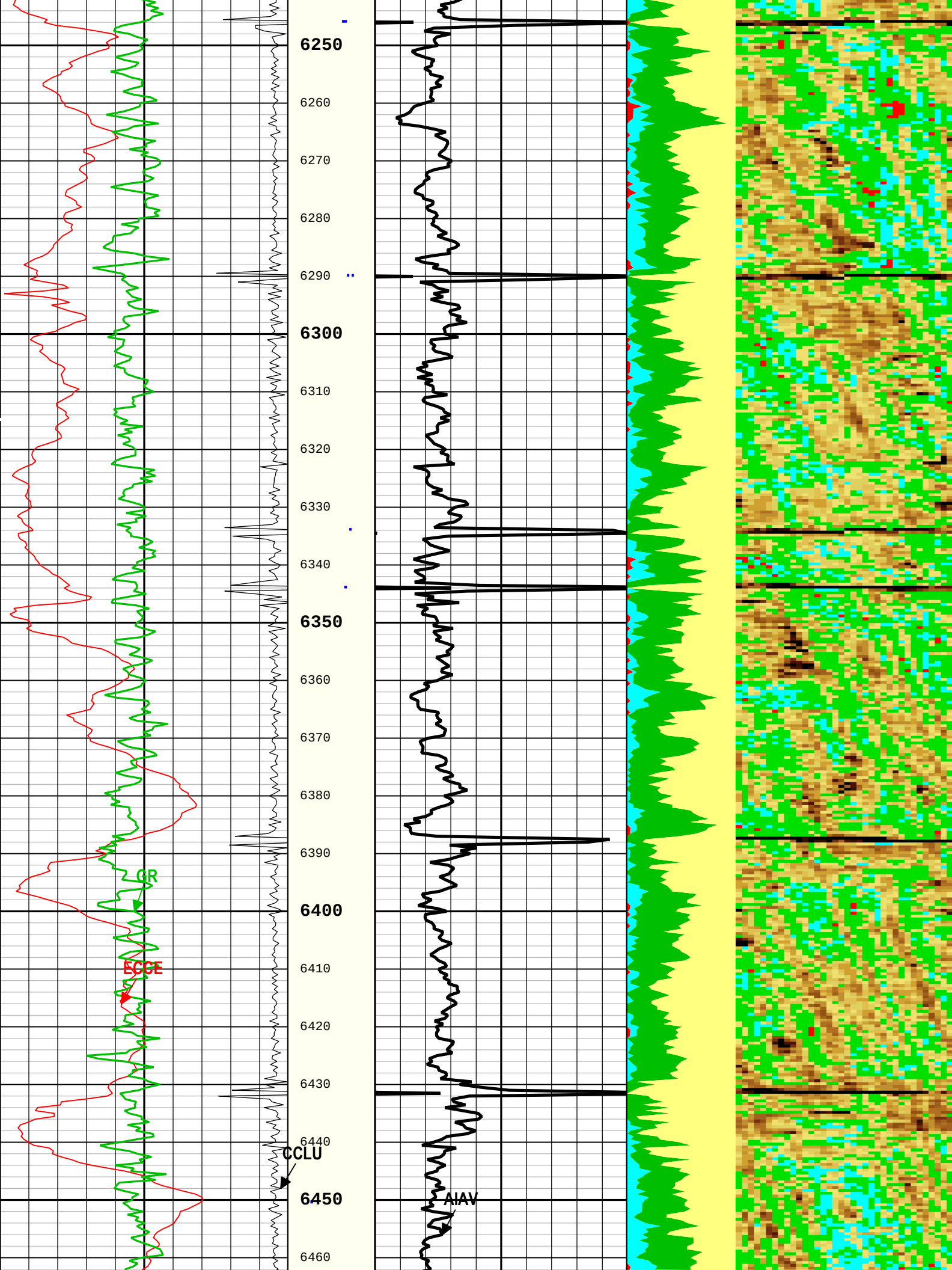
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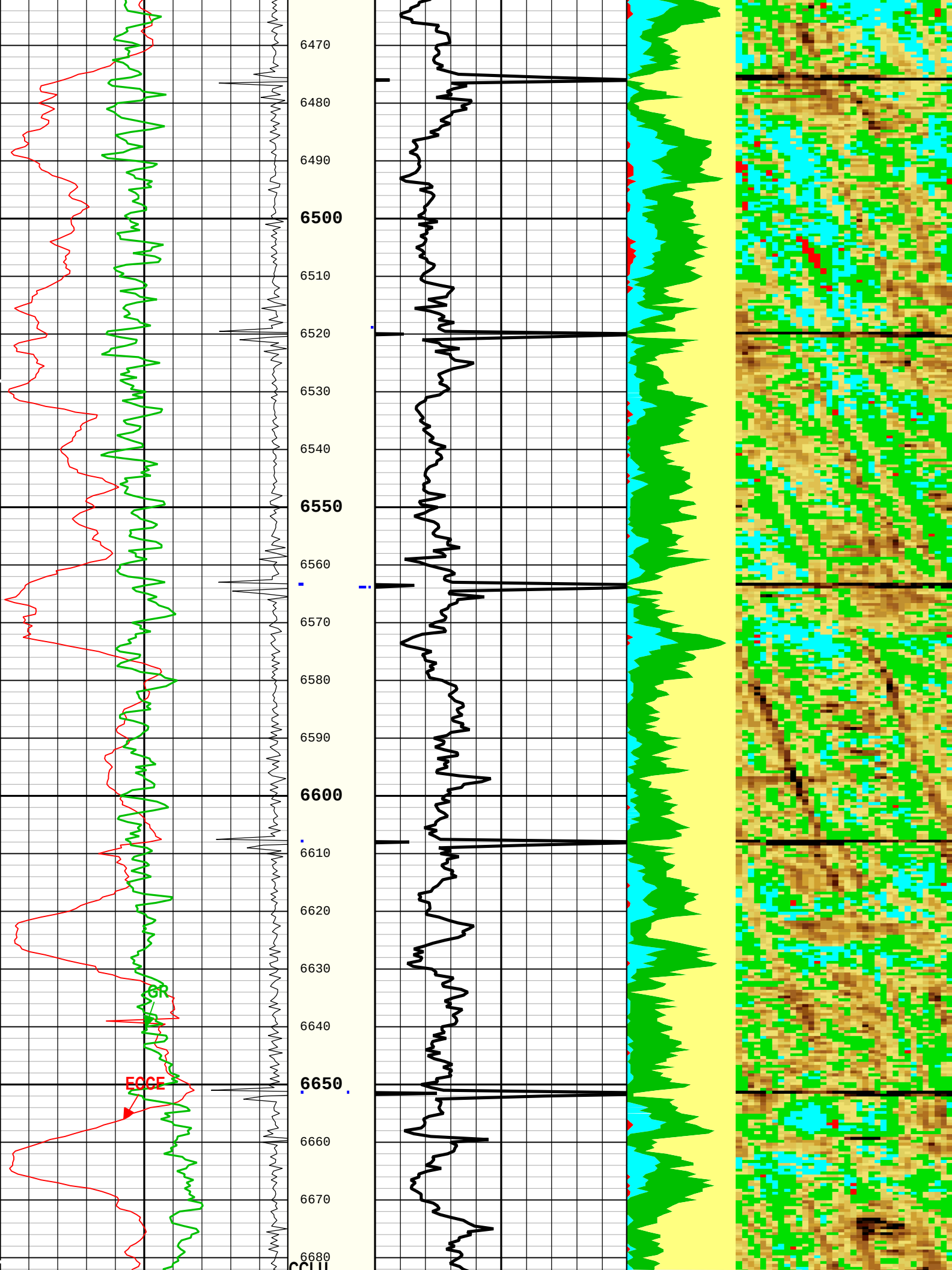
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ECCE
CCLU

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 1

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Calibrated Gamma Ray (GR) HGNS-H

0 gAPI 150

Absent 1.500 2.500 6.500

Explicit Normalization

USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV) USIT-E

0 Mrayl 10

Gas

Liquid

Micro-Debonding

Bonded

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_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: 24-Aug-2018 12:05:55

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
BARI(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
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	Depth Zoned	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.12	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
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	57	80
BS	13.5	80	1850
BS	8.5	1850	6710
MEAS_WLEN	22.44	57	6710
MEAS_WLEN	20	6710	6711

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	48	dB
EMXV	EMEX Voltage	USIT-E	40	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	Yes	
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	Time Zoned	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINB	31.88	24-Aug-2018 10:34:06	24-Aug-2018 11:02:19	6711.39	6639.73
WINB	28.13	24-Aug-2018 11:02:19	24-Aug-2018 11:33:26	6639.73	341.87
WINB	30.44	24-Aug-2018 11:33:26	24-Aug-2018 11:36:01	341.87	81.04
WINE	71.88	24-Aug-2018 10:34:06	24-Aug-2018 11:02:24	6711.39	6627.92
WINE	70.34	24-Aug-2018 11:02:24	24-Aug-2018 11:33:20	6627.92	356.08
WINE	73.41	24-Aug-2018 11:33:20	24-Aug-2018 11:36:01	356.08	81.04

All depth are at tool zero.

ONE

0 PSI Repeat 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
ONE	Log[1]:Up	Up	1984.16 ft	2516.63 ft	24-Aug-2018 10:05:08 AM	24-Aug-2018 10:08:33 AM	ON	5.47 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Hurley H26-768

ONE: Log[1]:Up:S002

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: 24-Aug-2018 12:06:17

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 1

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Calibrated Gamma Ray (GR) HGNS-H

0 gAPI 150

Absent 1.500 2.500 6.500

Explicit Normalization

USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV) USIT-E

0 Mrayl 10

Gas

Liquid

Micro-Debonding

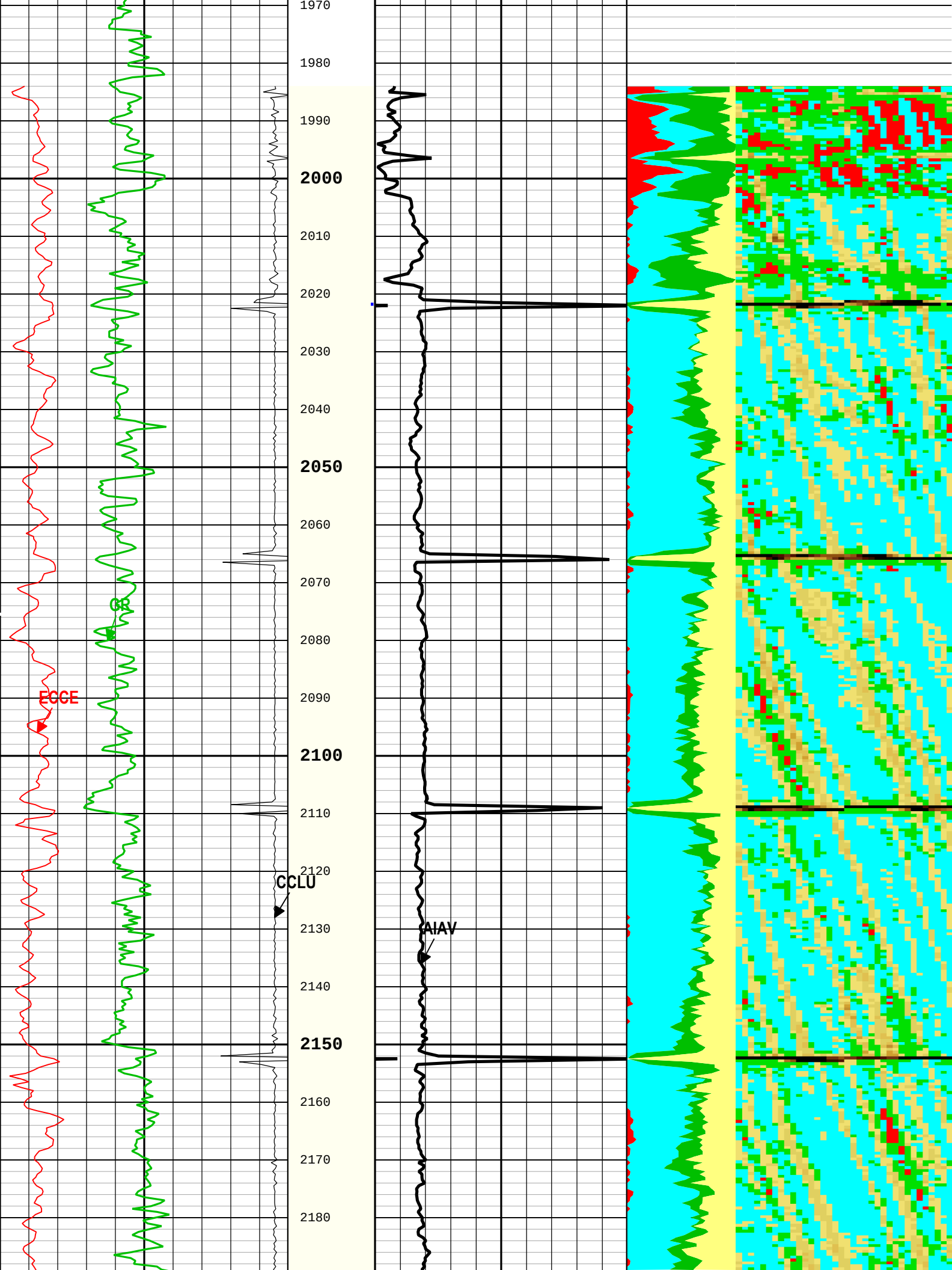
Bonded

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_MDEBOND_IMG) USIT-E (Mrayl)

1900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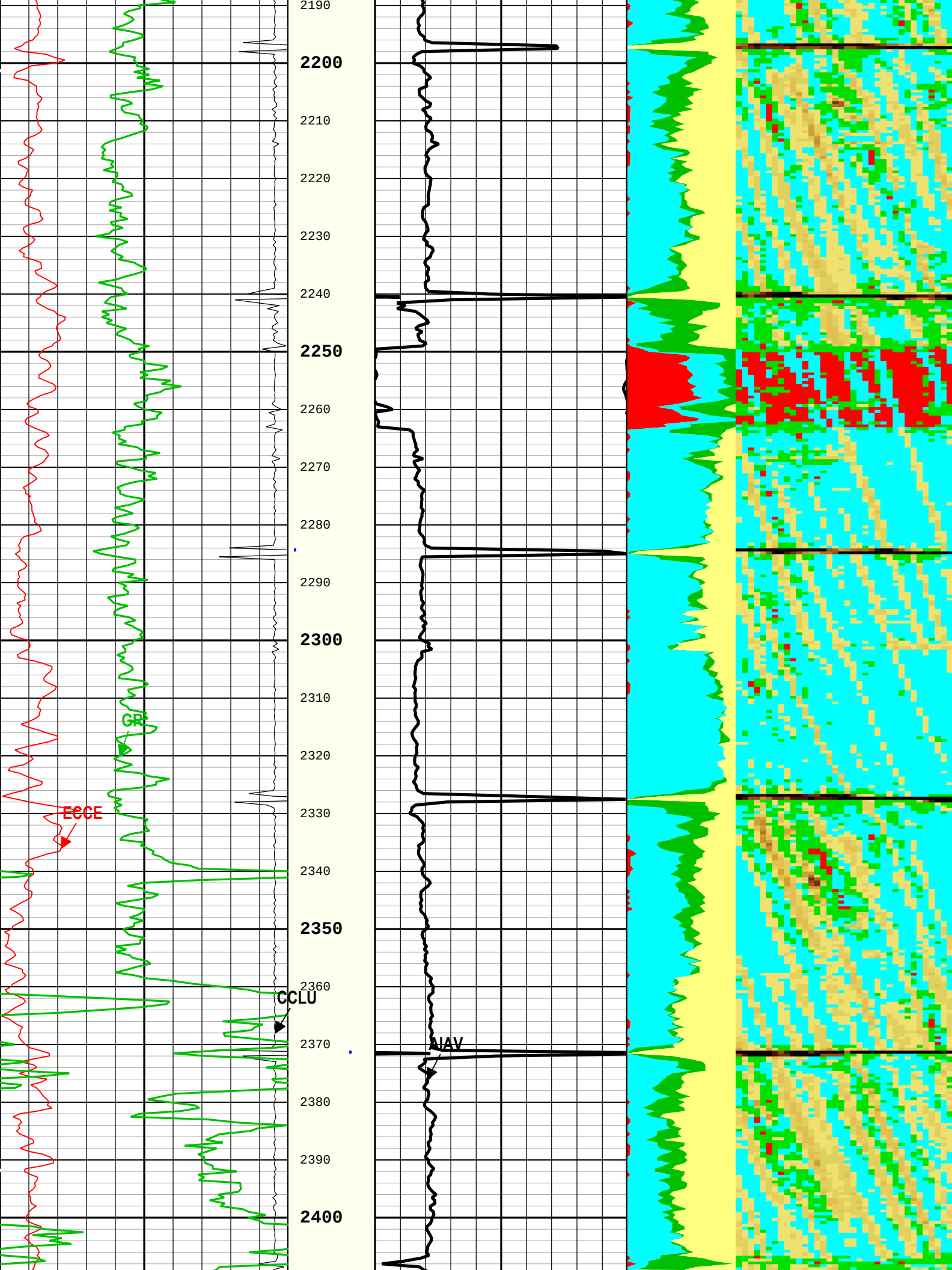
CCLU
AIAV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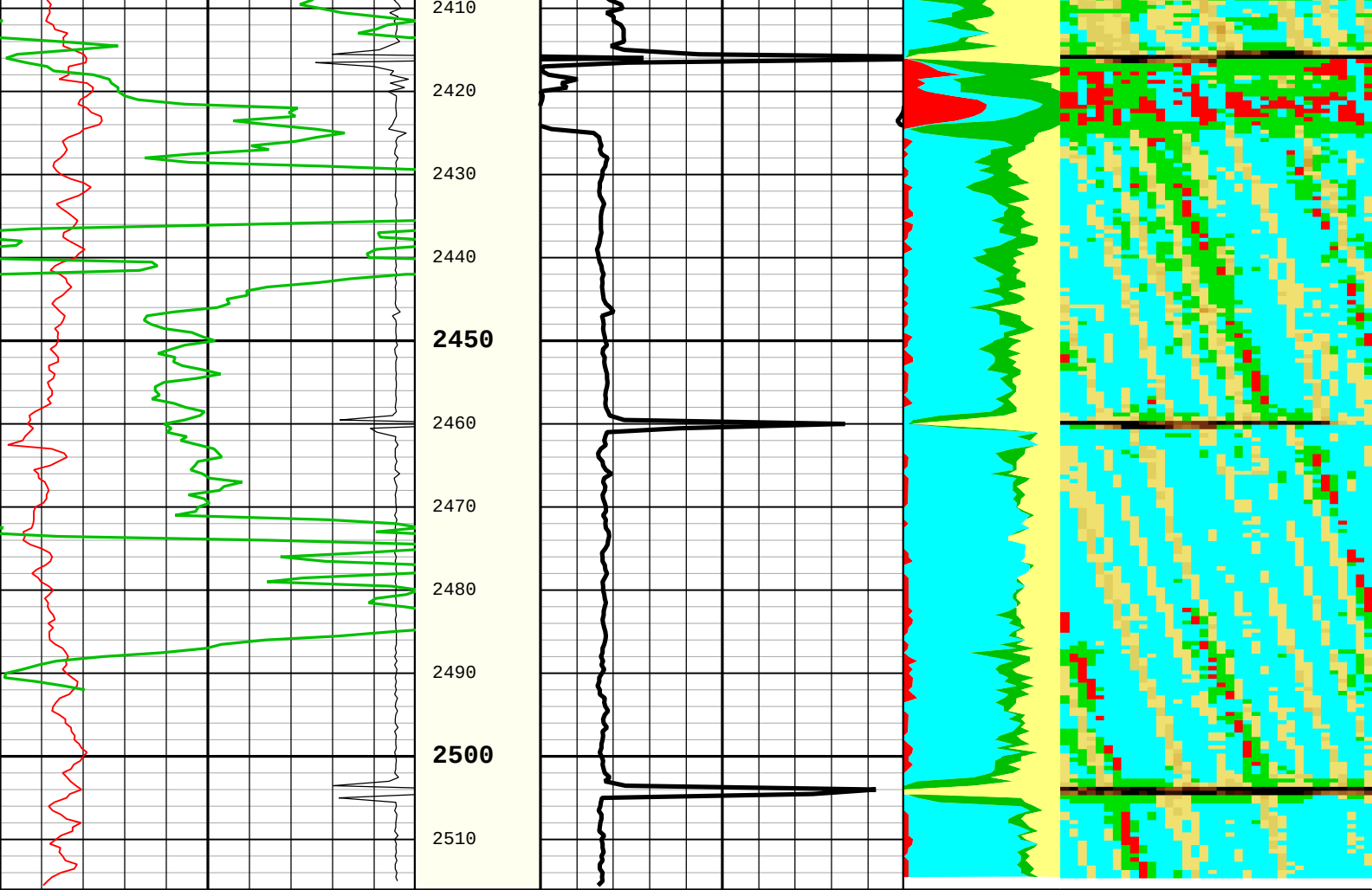

TIME_1900 - Time Marked every 60.00 (s)

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: 24-Aug-2018 12:06:17

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ONE: Parameters

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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
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MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
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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

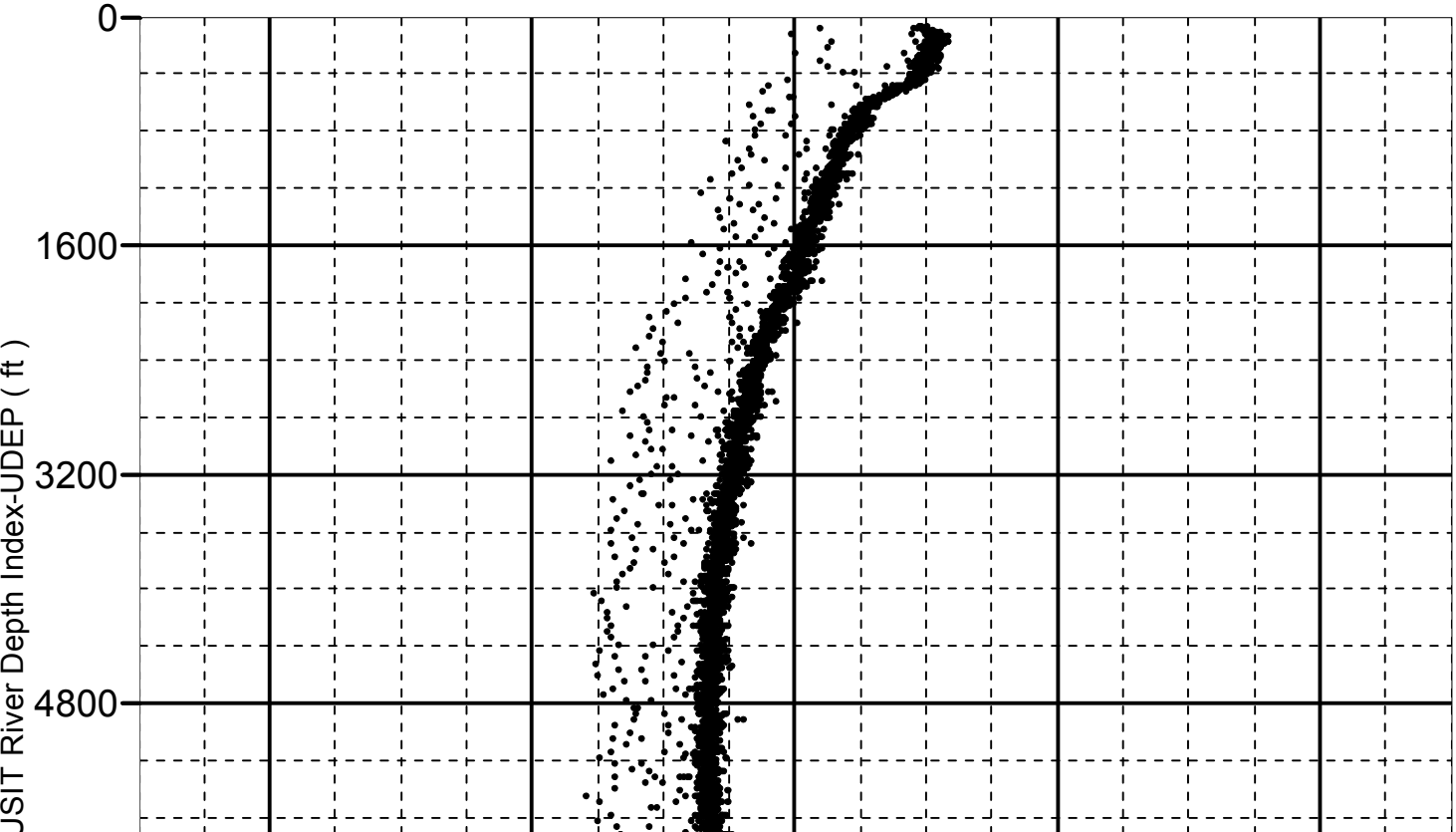
Company:Noble Energy Inc Well:Hurley H26-768
ONE: Log[3]:Up:S002

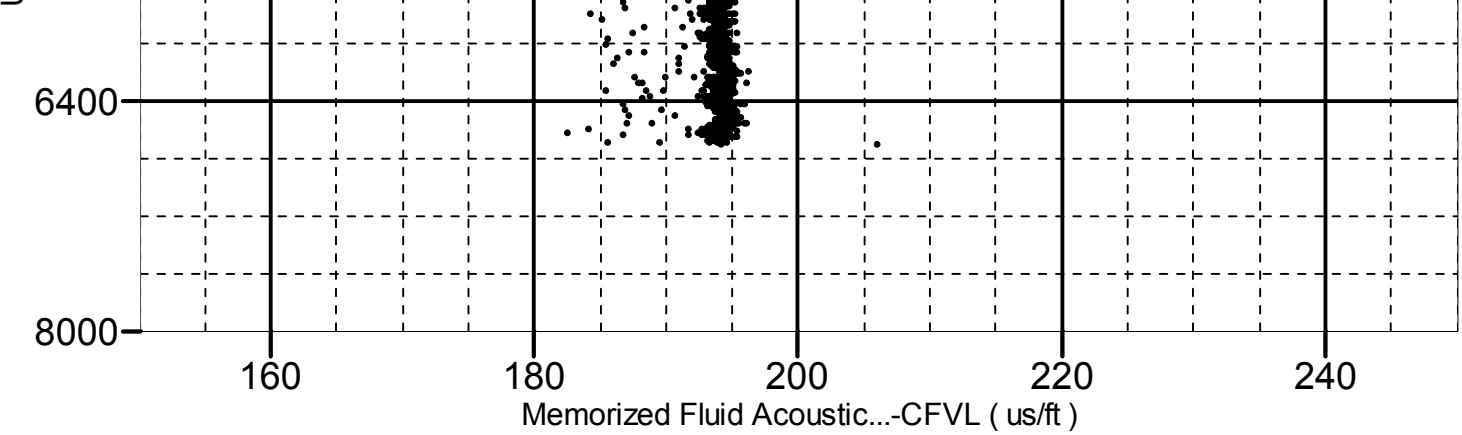
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6711.00 to 81.00 ft

● CFVL-UDEP





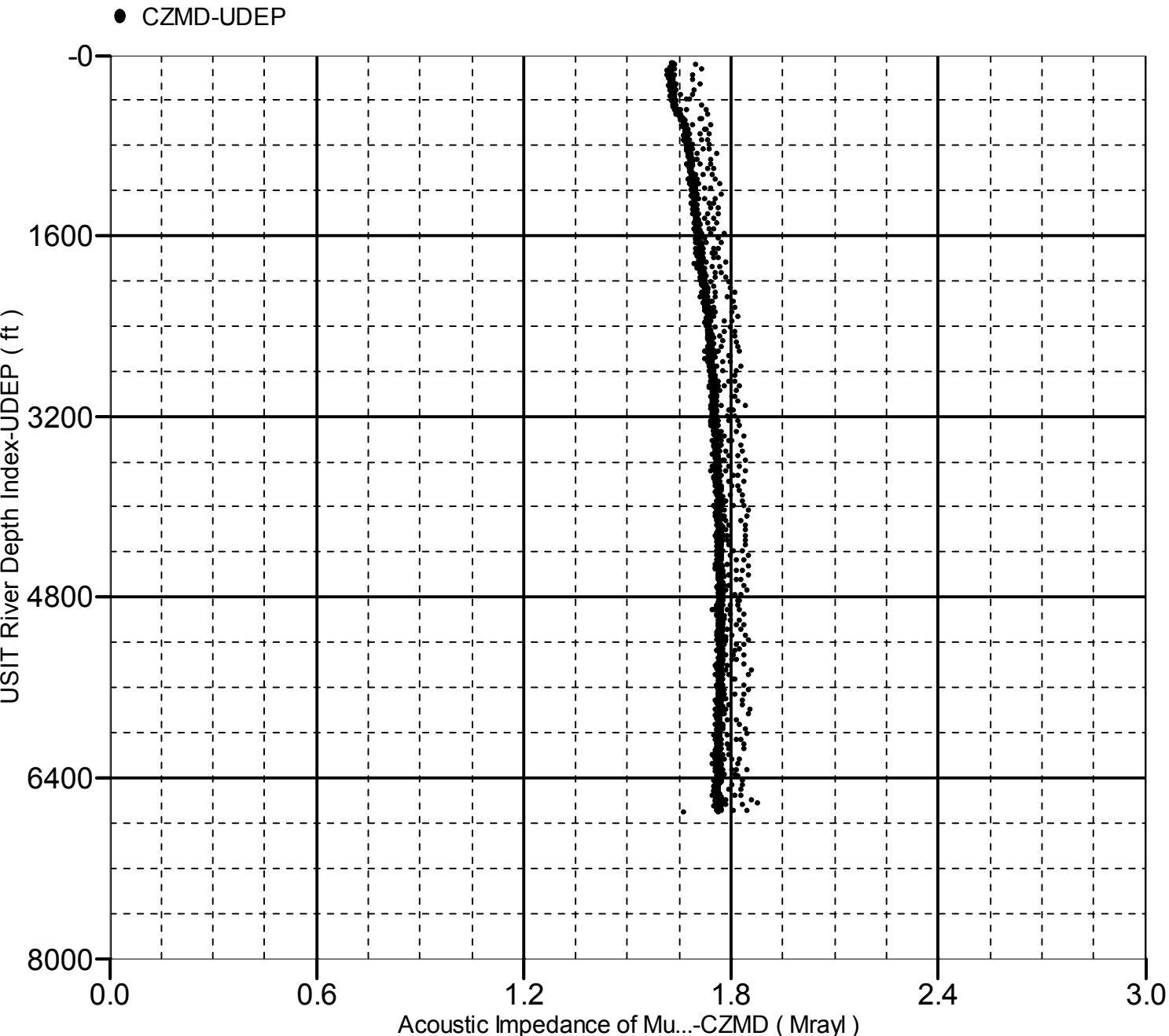
XYZ

Company:Noble Energy Inc Well:Hurley H26-768
ONE: Log[3]:Up:S002

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6711.00 to 81.00 ft



Company:	Noble Energy Inc
Well:	Hurley H26-768
Field:	Wattenberg

Schlumberger

County: Weld

State: Colorado

UltraSonic Summary Print