Schlumberger

Company: Noble Energy Inc

Well: Centennial State G34-684

Field: Wattenberg

County: Weld State: Colorado

DJ BASIN UltraSonic Summary Print

Cement Evaluation

Gamma Ray - CCL Log

County: Weld
Field: Wattenberg
Location: NENE Sec. 35, T4N, R65W
Well: Centennial State G34-684
Company: Noble Energy Inc

Location:
NENE Sec. 35, T4N, R65W
SHL: 351' FNL & 190' FEL
Lat: 40.27454. Long: -104.62198

Elev.: K.B. 4801.00 ft
G.L. 4771.00 ft
D.F. 4801.00 ft

Permanent Datum: Ground Level Elev.: 4771.00 f
Log Measured From: Kelly Bushing 30.00 ft above Perm.Datum
Drilling Measured From: Kelly Bushing

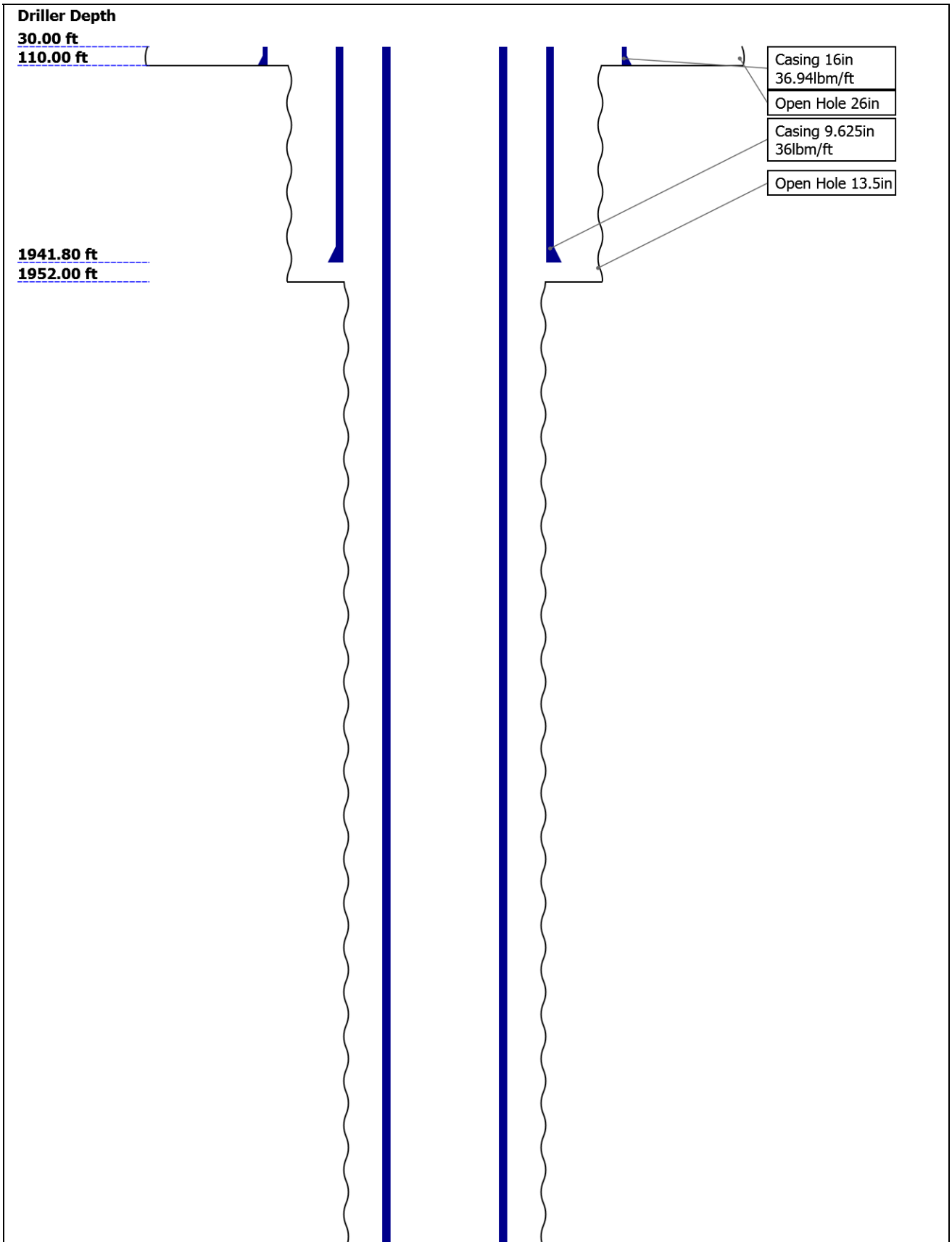
API Serial No.	Section:	Township:	Range:
05-123-44601	35	4N	65W

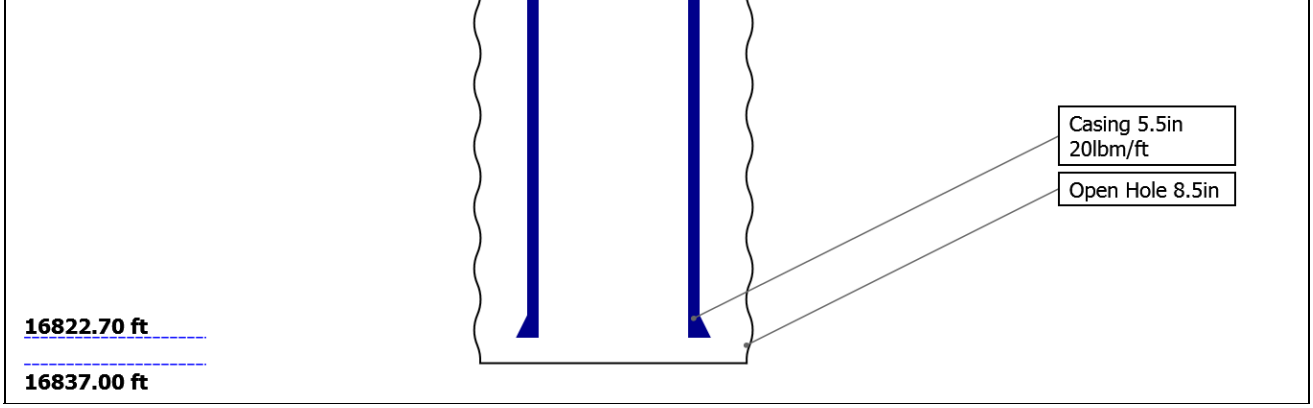
Logging Date		15-Mar-2018		
Run Number		ONE		
Depth Driller		16837.00 ft		
Schlumberger Depth		6700.00 ft		
Bottom Log Interval		6300.00 ft		
Top Log Interval		150.00 ft		
Casing Fluid Type		Brine		
Salinity				
Density		8.4 lbm/gal		
Fluid Level		8.00 ft		
BIT/CASING/TUBING STRING				
Bit Size		8.50 in		
From		1952.00 ft		
To		6700.00 ft		
Casing/Tubing Size		5.5 in		
Weight		20 lbm/ft		
Grade		N/A		
From		30.00 ft		
To		6700.00 ft		
Max Recorded Temperatures		236 degF		
Logger on Bottom	Time	15-Mar-2018	12:41:00	
Unit Number	Location:	9102	Fort Morgan	
Recorded By		Camila Lang		
Witnessed By		Mike Stenger		

Disclaimer

Contents

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	1952			
Top Logger (ft)	30	110	1952			
Bottom Driller (ft)	110	1952	16837			
Bottom Logger (ft)	110	1952	6700			
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)	30	30	30			
Top Logger (ft)	30	30	30			
Bottom Driller (ft)	110	1941.8	16822.7			
Bottom Logger (ft)	110	1941.8	6700			

Operational Run Summary

Parameter (unit)	ONE					
Date Log Started	15-Mar-2018					
Time Log Started	11:53:45					
Date Log Finished	15-Mar-2018					
Time Log Finished	13:41:12					
Top Log Interval (ft)	150.00					
Bottom Log Interval (ft)	6300.00					
Total Depth (ft)						
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.500					
Logging Unit Number	9102					
Logging Unit Location	Fort Morgan					
Recorded By	Camila Lang					

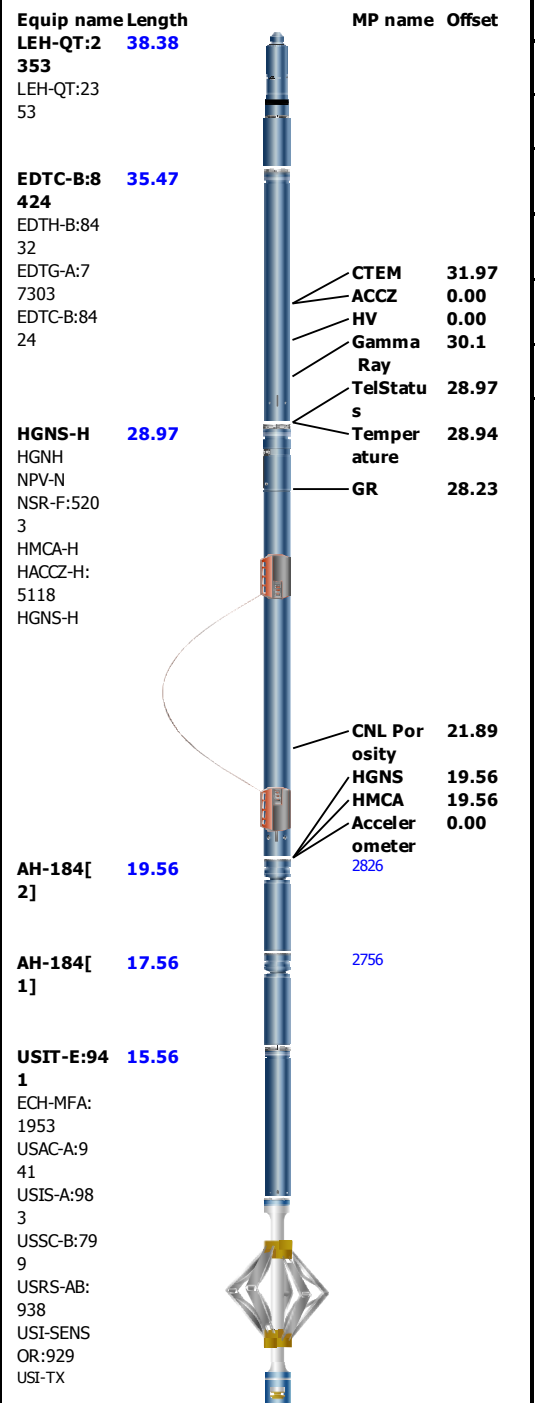
Witnessed By	Mike Stenger					
Service Order Number	E0QY-00007					

Borehole Fluids

Parameter(unit)	ONE					
Fluid Type	Water					
Fluid Name	Brine					
Max Recorded Temperatures (degF)	236					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Date Logger on Bottom	15-Mar-2018					
Time Logger on Bottom	12:41:00					
Total Solid (%)						
High Gravity Solids (%)						

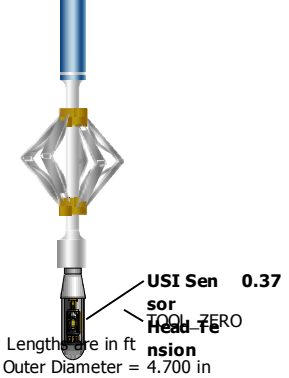
Remarks and Equipment Summary

ONE: Toolstring



ONE: Remarks

ONE: Remarks
This is the first log in the well.
Tool ran as per tool sketch.
Fluid: 8.4 lb/gal Brine
CS: 9.625" 36 lb/ft @ 1941.8' 5.5" 20lb/ft @ 16822.7
Two inlines and one gemco was used for centralization.
Main pass recorded 2500 PSI, and repeat pass recorded under 0 PSI.
BHT: 236 degF



Depth Summary

	ONE		
Depth Measuring Device			
Type	IDW-JA		
Serial Number	6174		
Calibration Date	18-OCT-2018		
Calibrator Serial Number	15		
Calibration Cable Type	7-46A-XS		
Wheel Correction 1	-2		
Wheel Correction 2	-3		
Tension Device			
Type	CMTD-B/A		
Serial Number	3872		
Calibration Date	24-FEB-2018		
Calibrator Serial Number	1014		
Number of Calibration Points	10		
Calibration Root Mean Square Error	19		
Calibration Peak Error	11		
Logging Cable			
Type	7-46A-XS		
Serial Number	U717022		
Length	20000.00 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 and standards are not followed.
Rig Up Length At Surface		IDW used as a primary depth reference.
Rig Up Length At Bottom		Z-Chart used as a 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[5]:Up	6730.88	83.84

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 : 24.63m(80.79ft) to 26.97m(88.50ft)
MUD_N_FRP = 1.18
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.71 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	8.0.95333.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[5]:Up	Up	83.84 ft	6730.88 ft	15-Mar-2018 12:36:31 PM	15-Mar-2018 1:40:12 PM	ON	4.11 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Centennial State G34-684

ONE: Log[5]: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: 15-Mar-2018 14:15:23

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

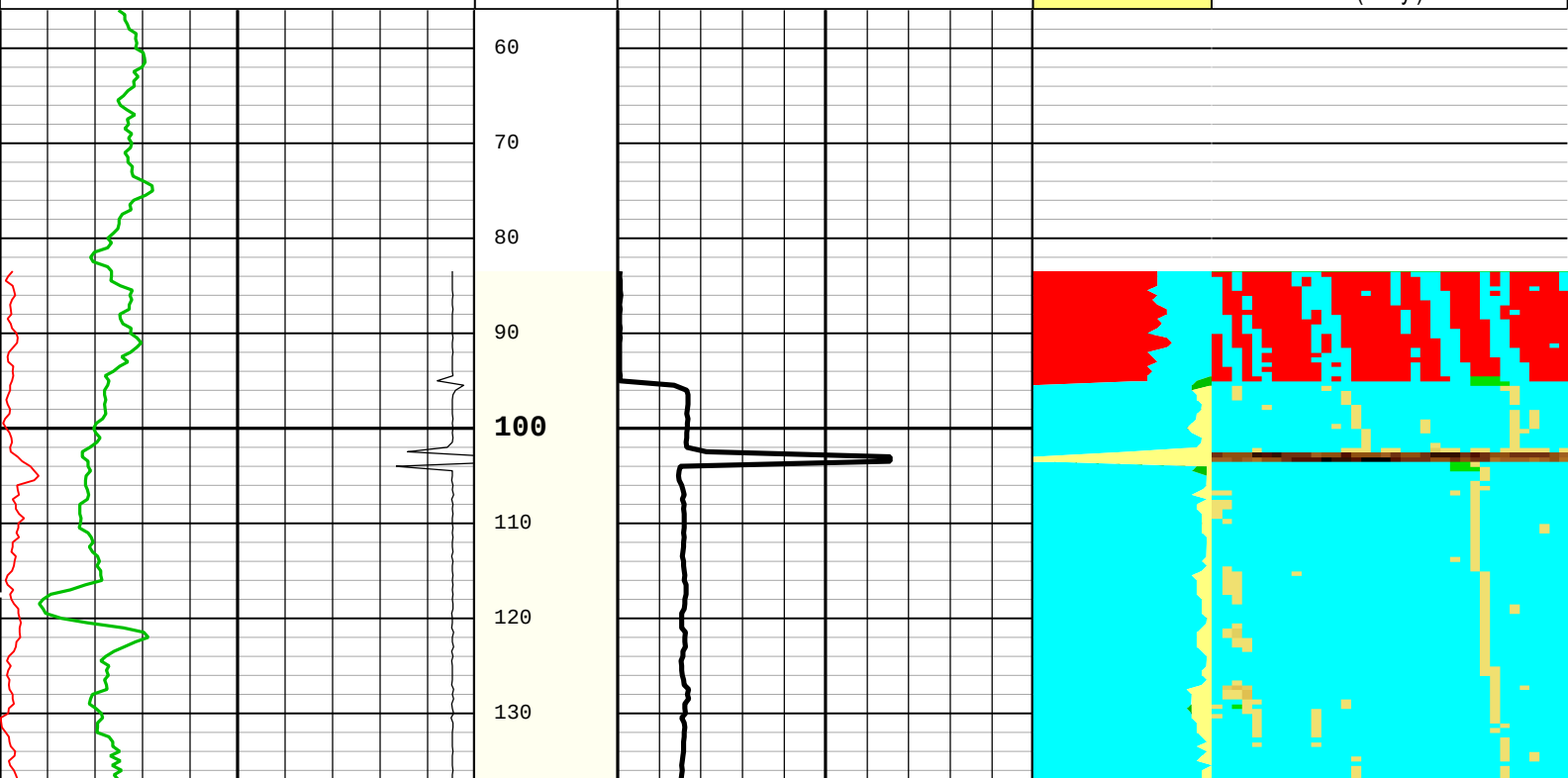
Calibrated Gamma Ray (GR) HGNS-H
0 gAPI 150

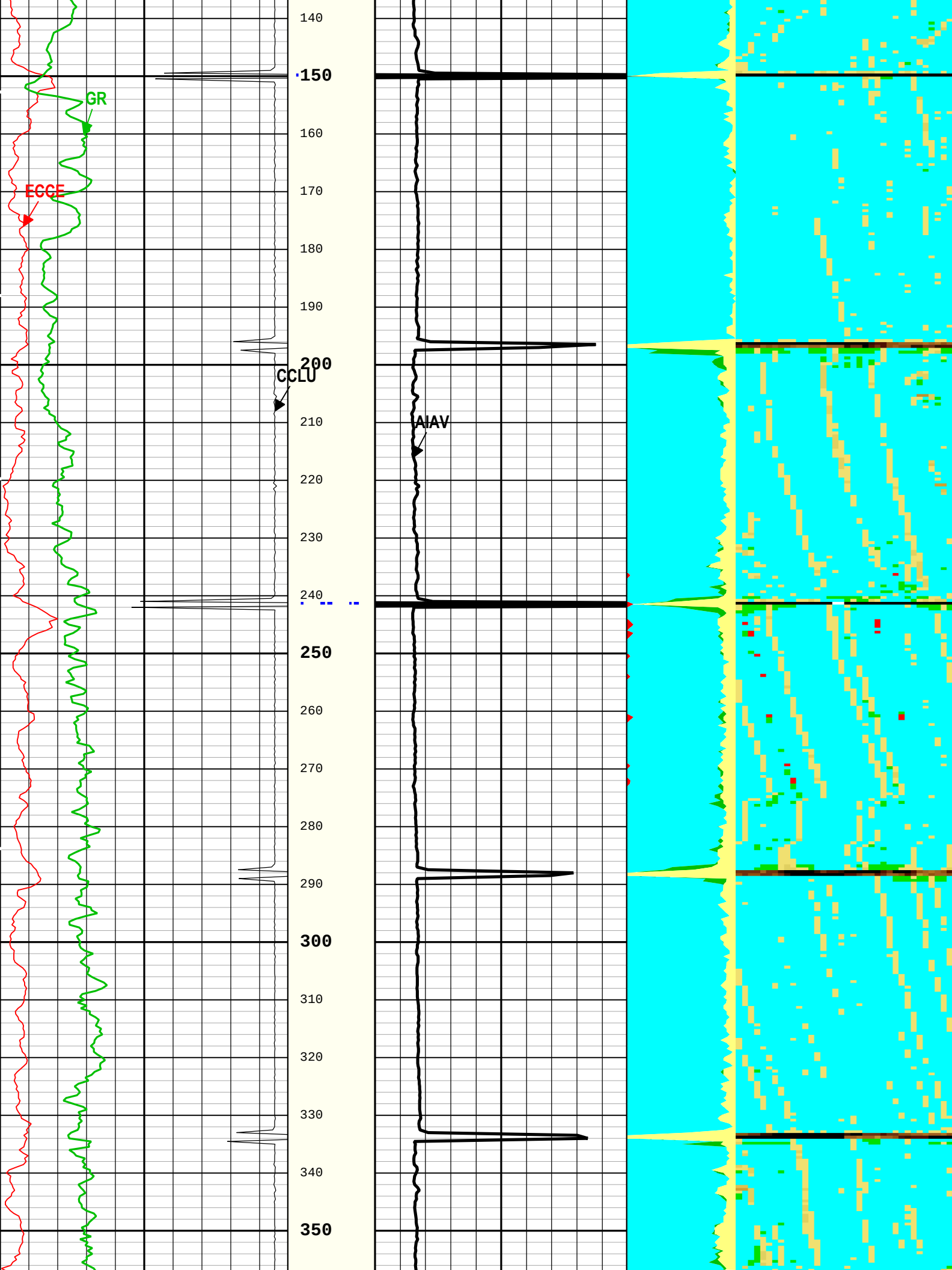
Absent 1.500 2.500 6.500
Explicit Normalization
USIT - USIT Processing Flags (UFLG) USIT-E

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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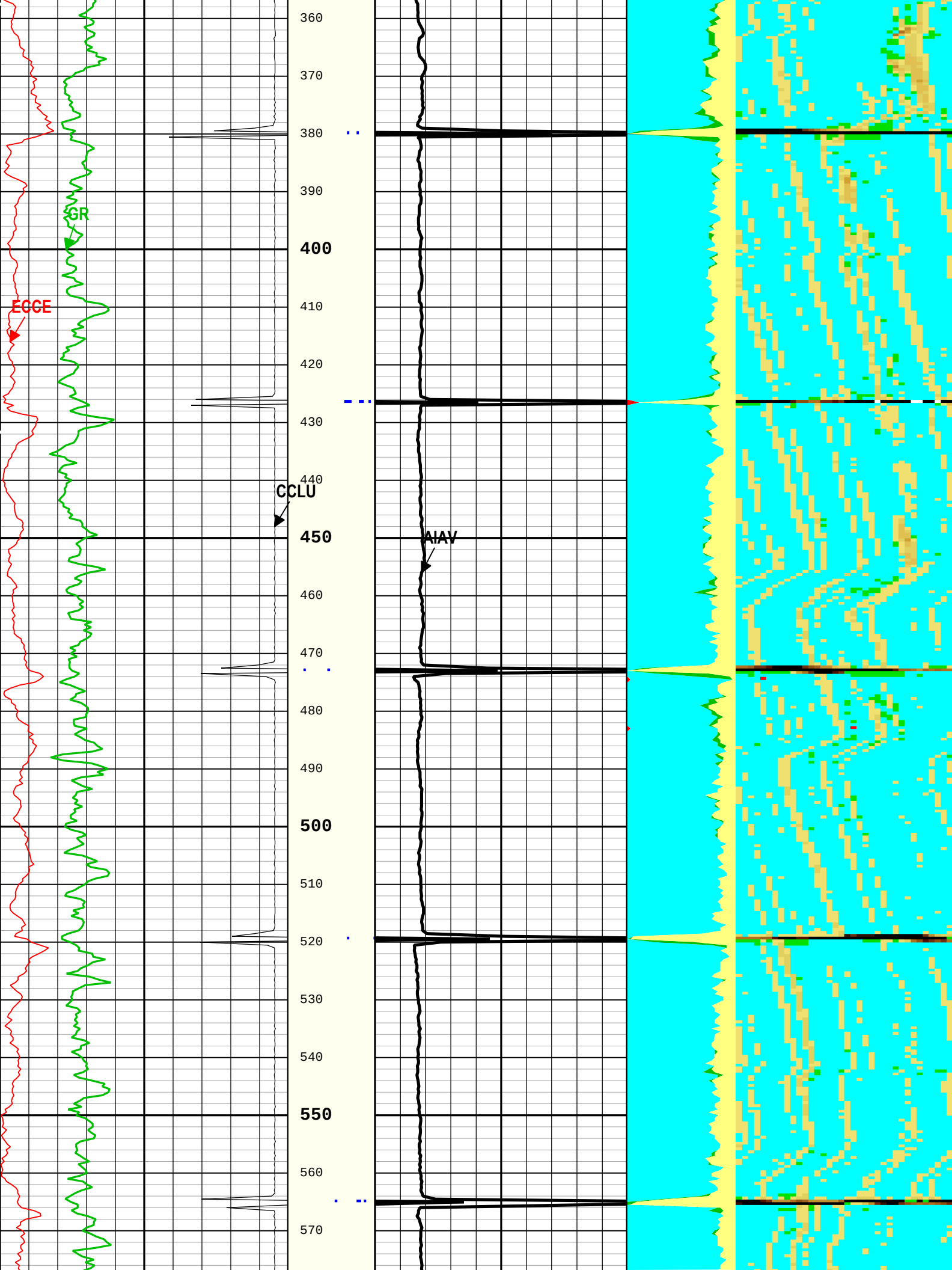
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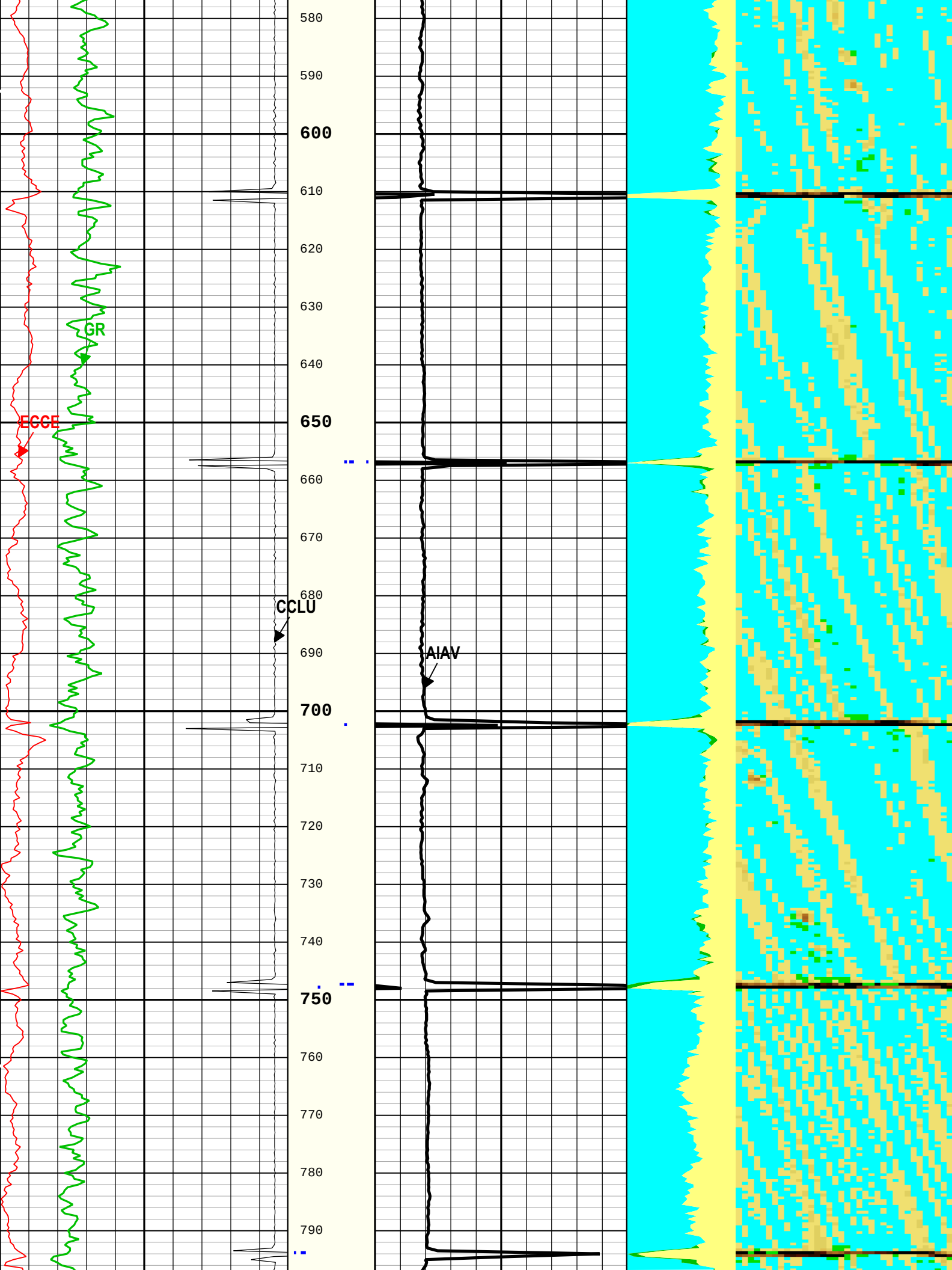
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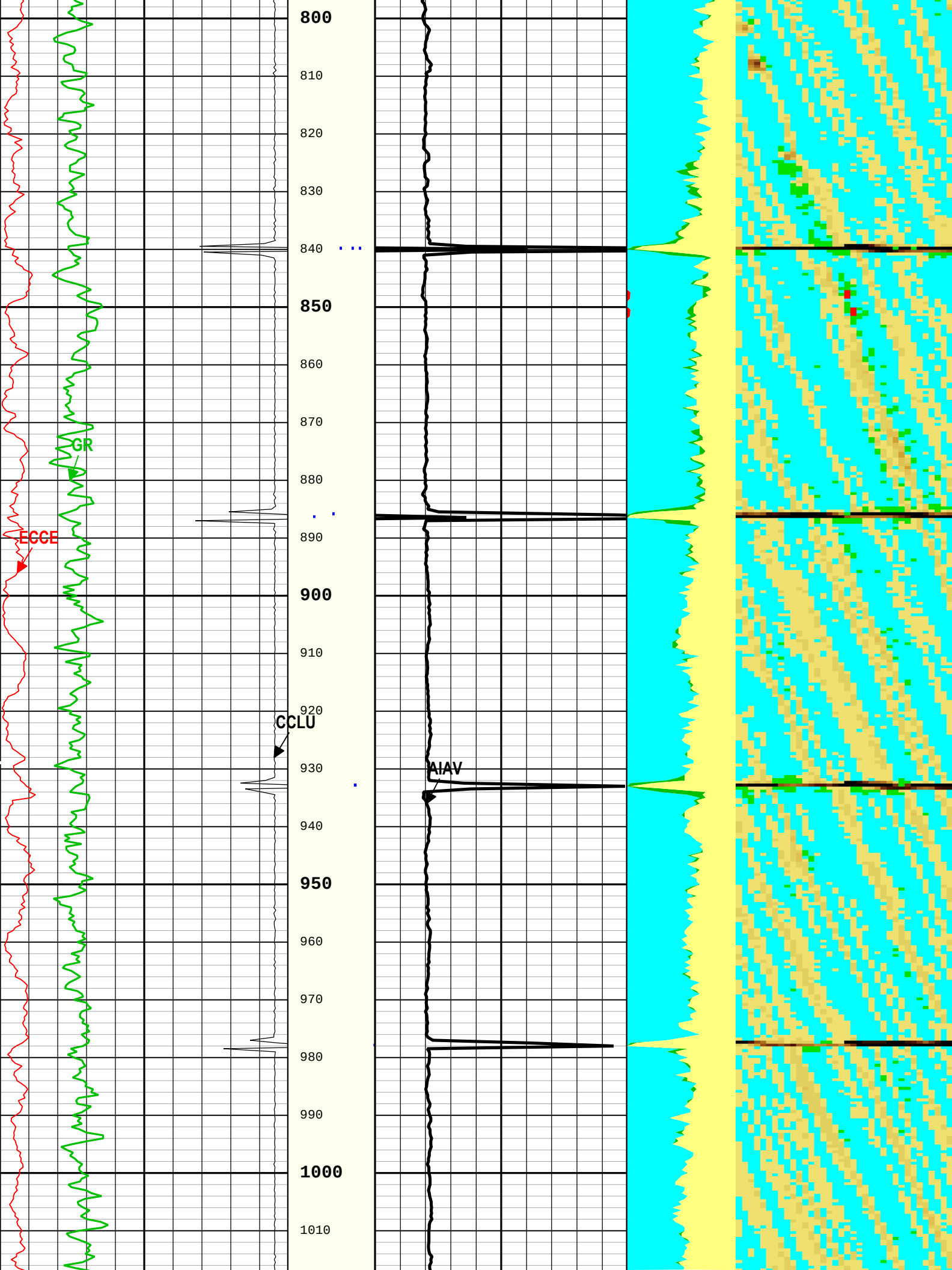
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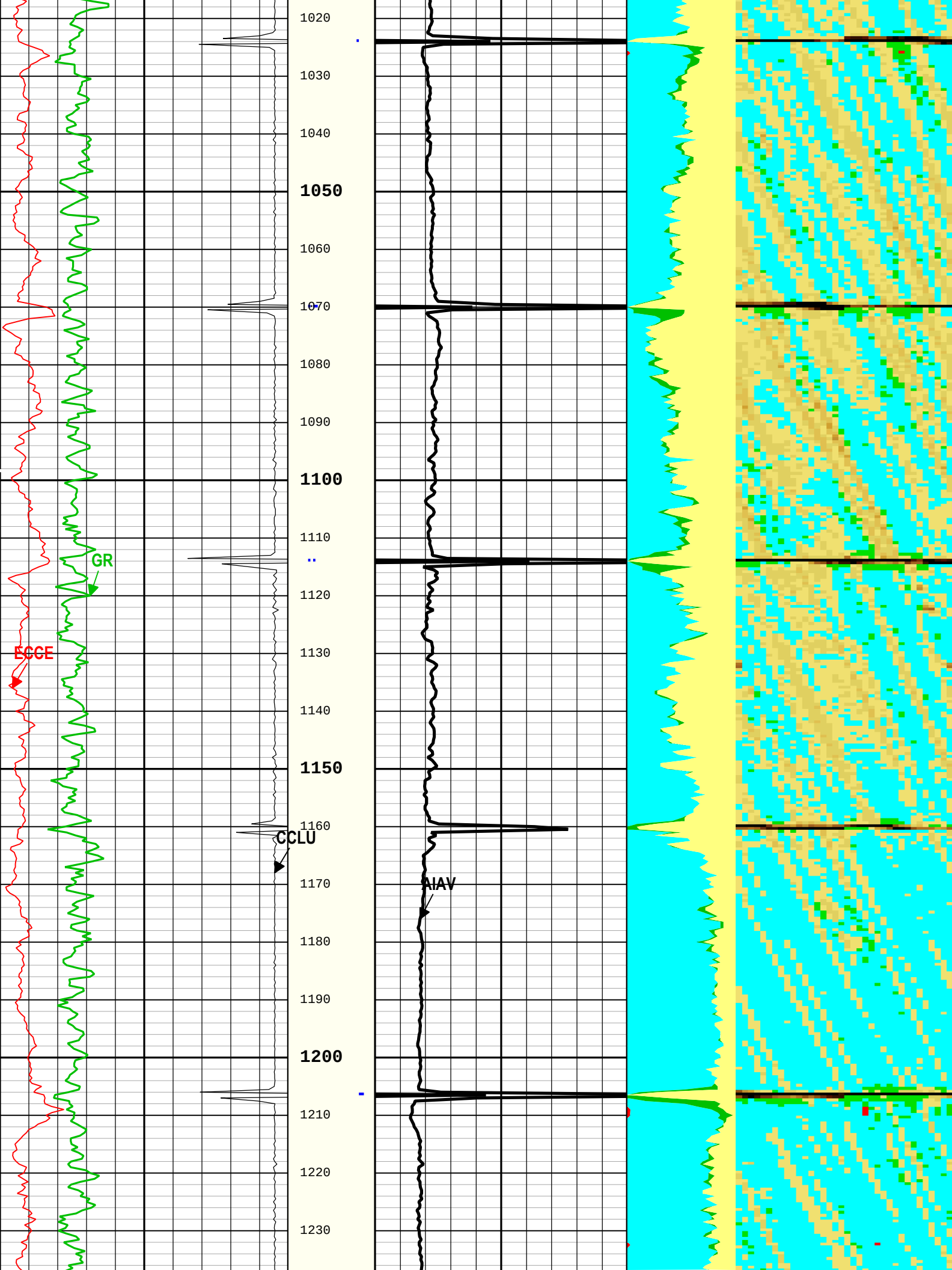
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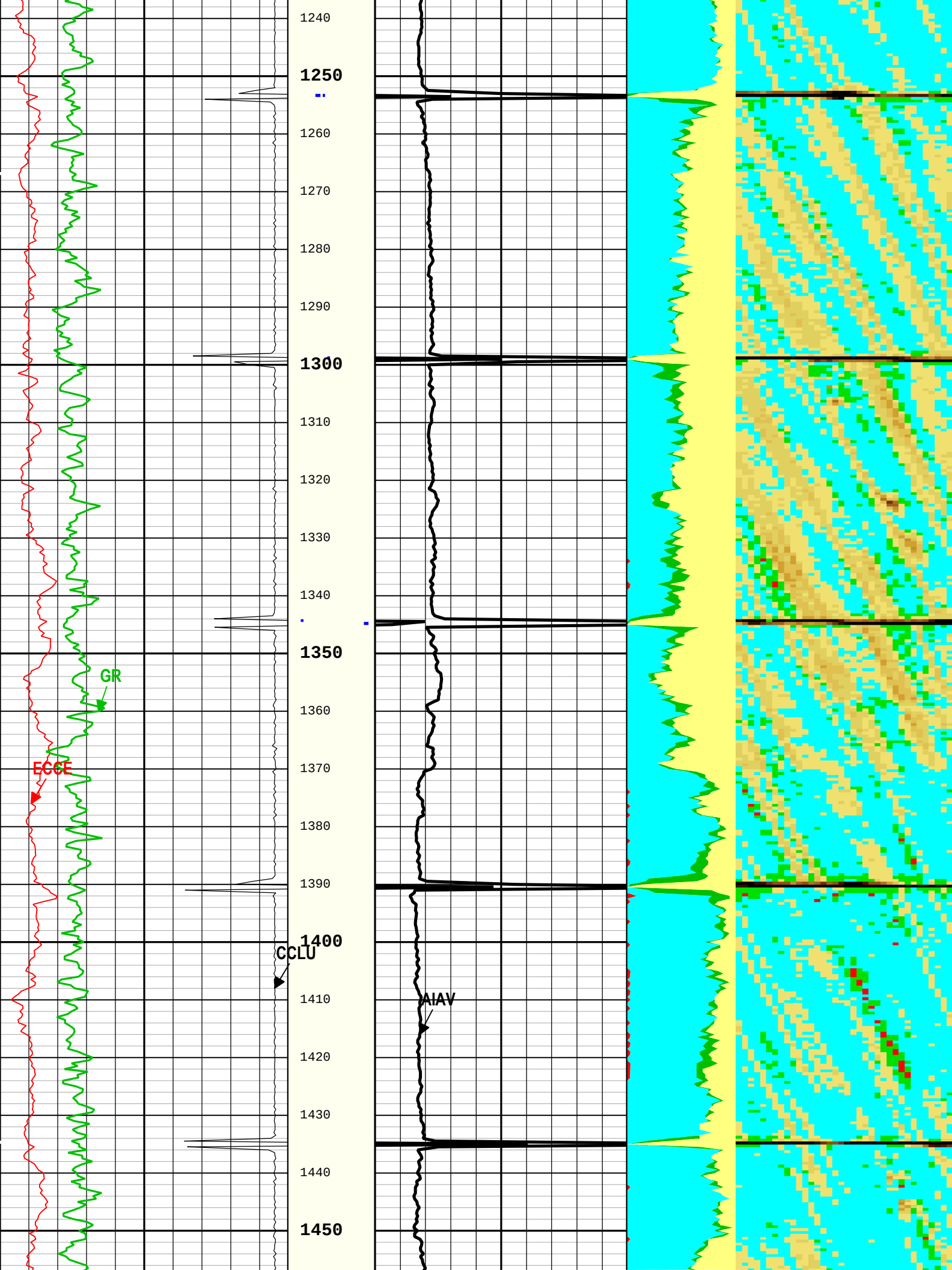
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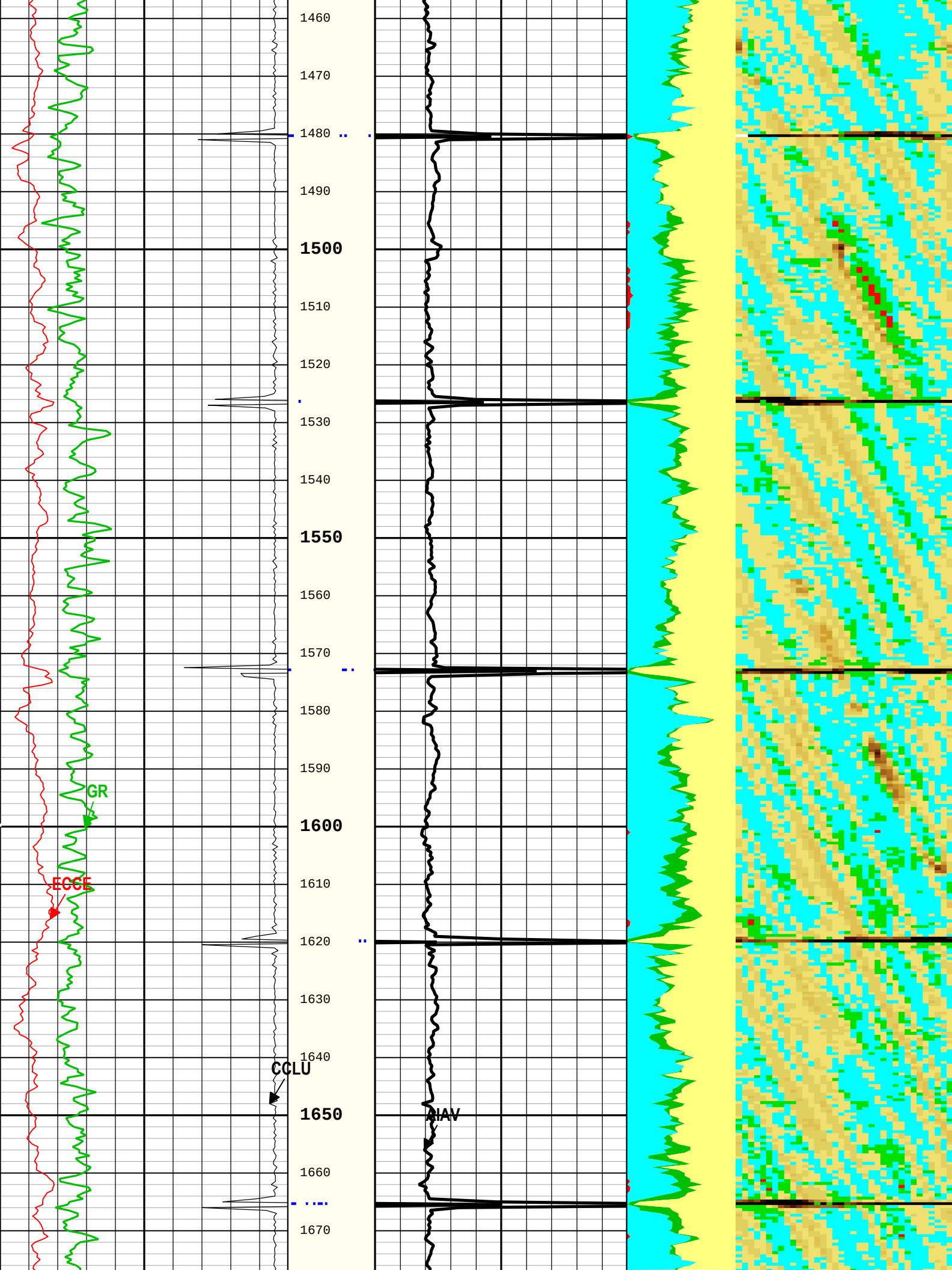
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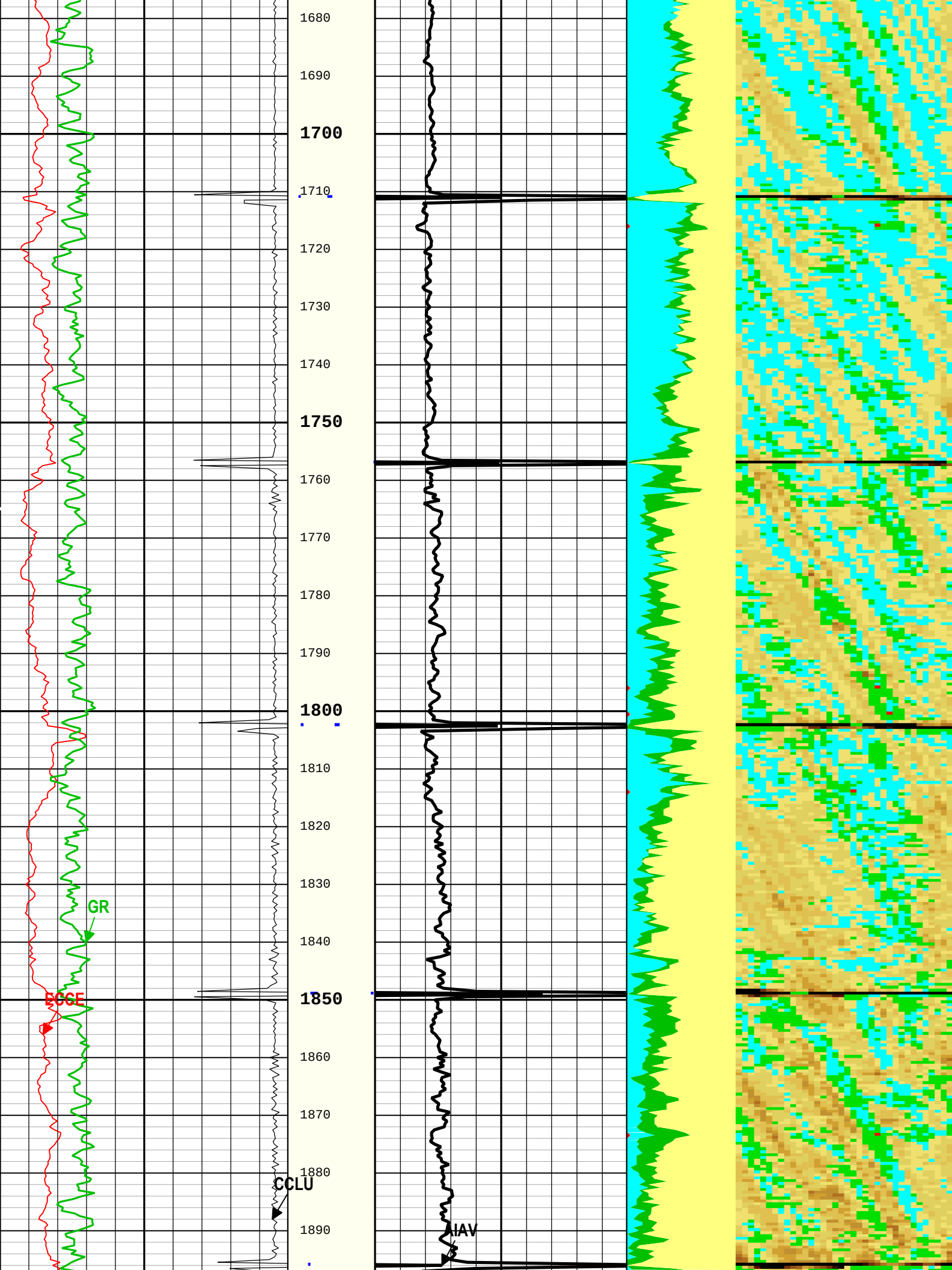
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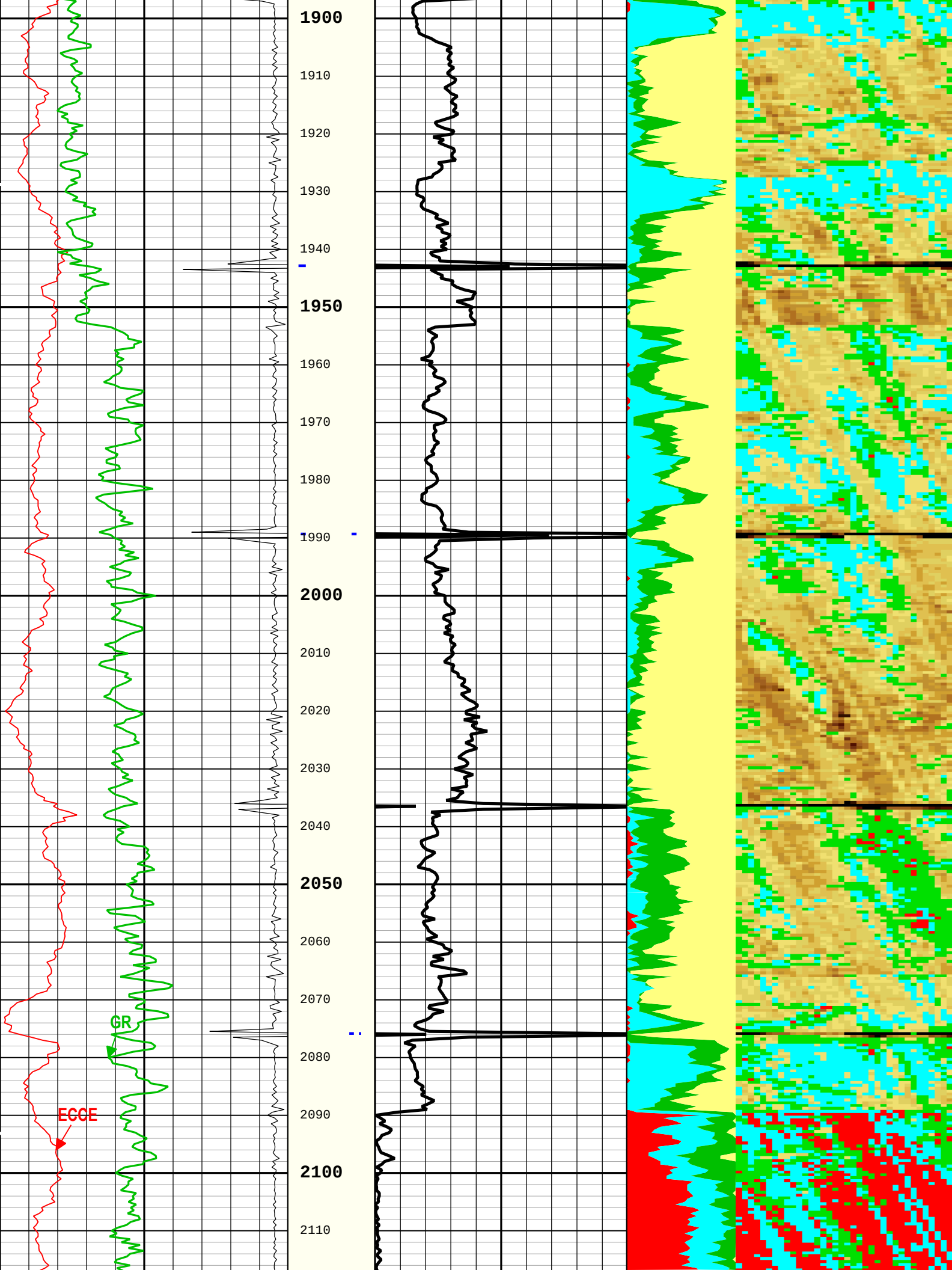
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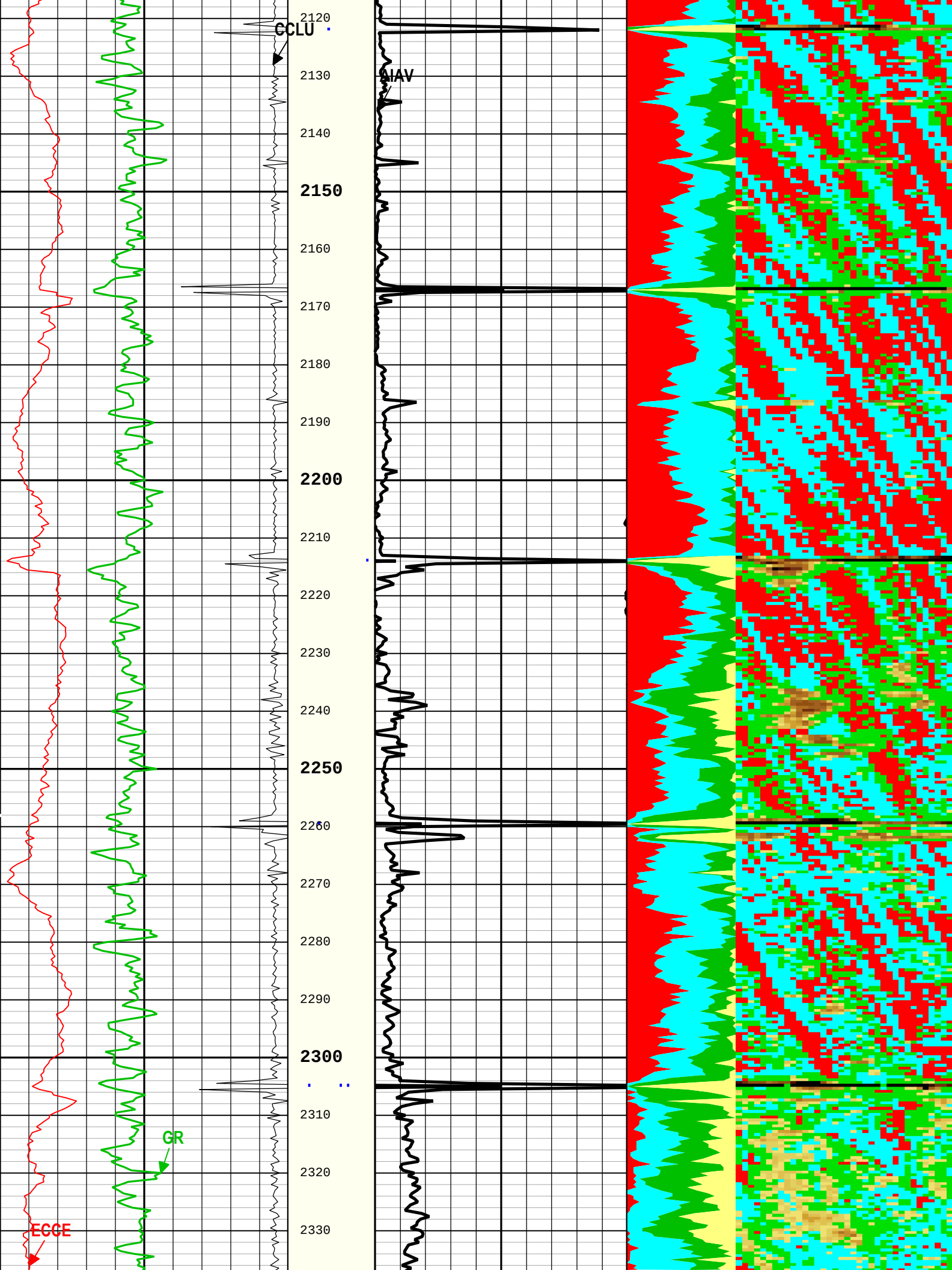
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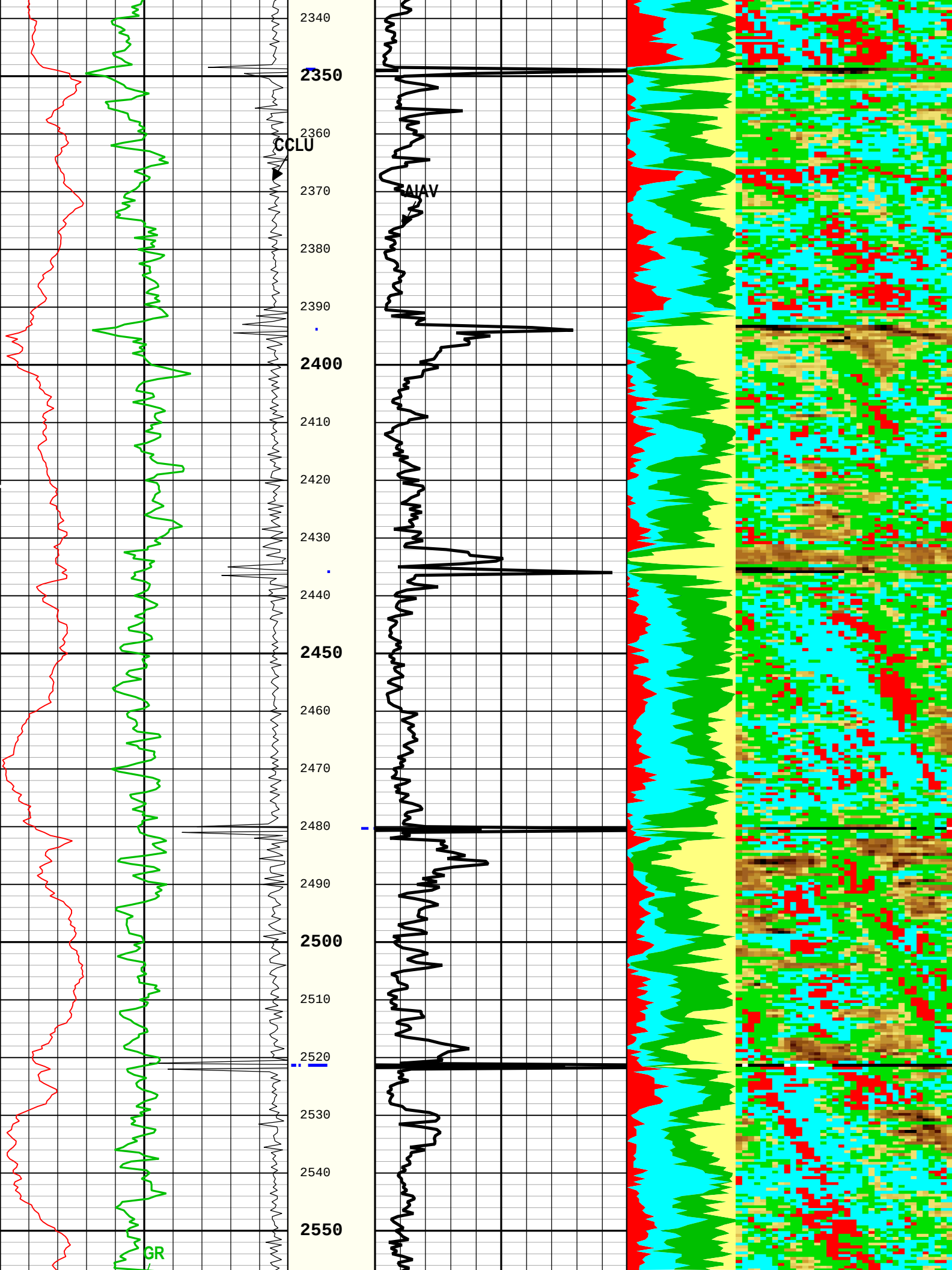
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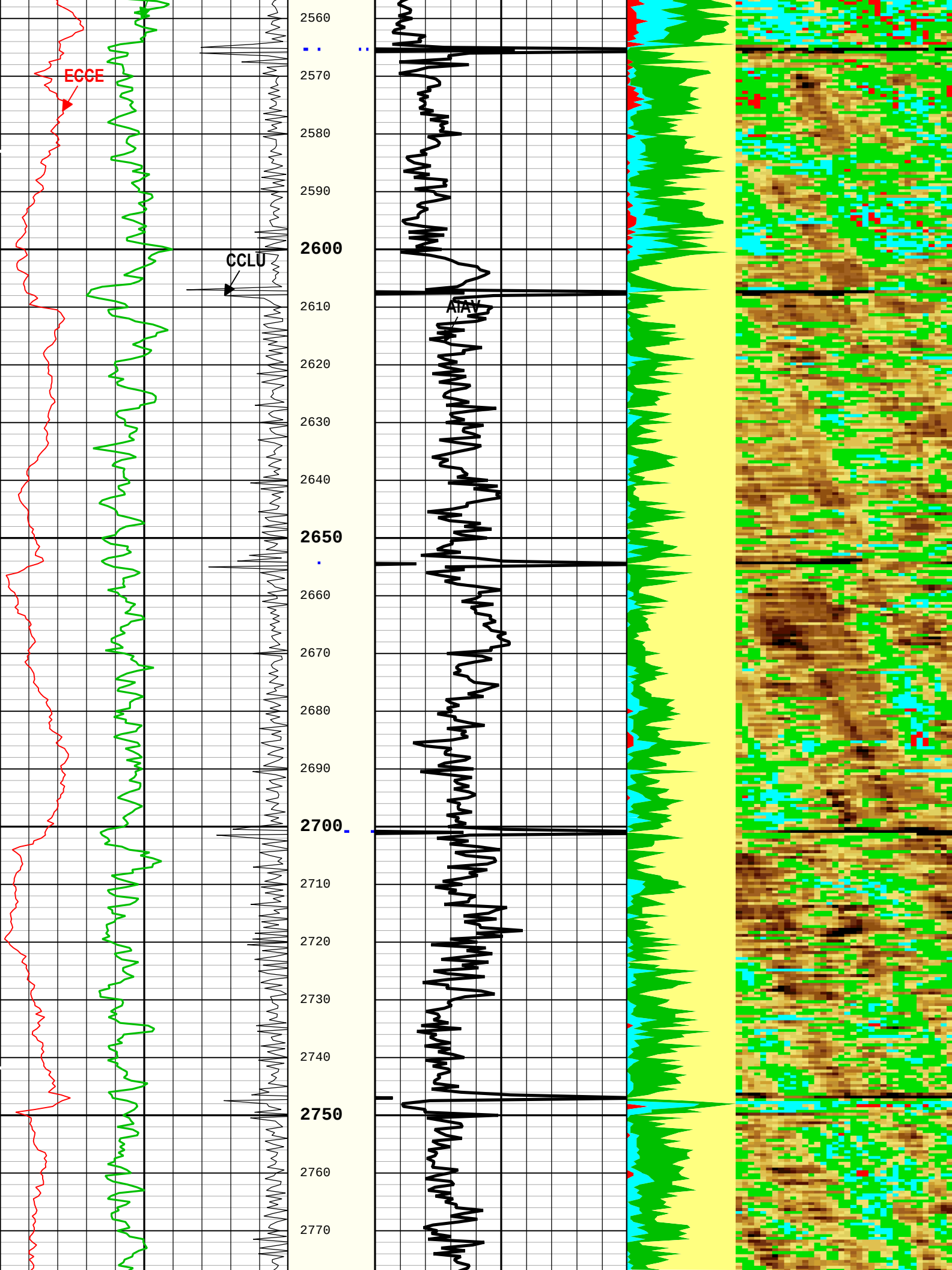
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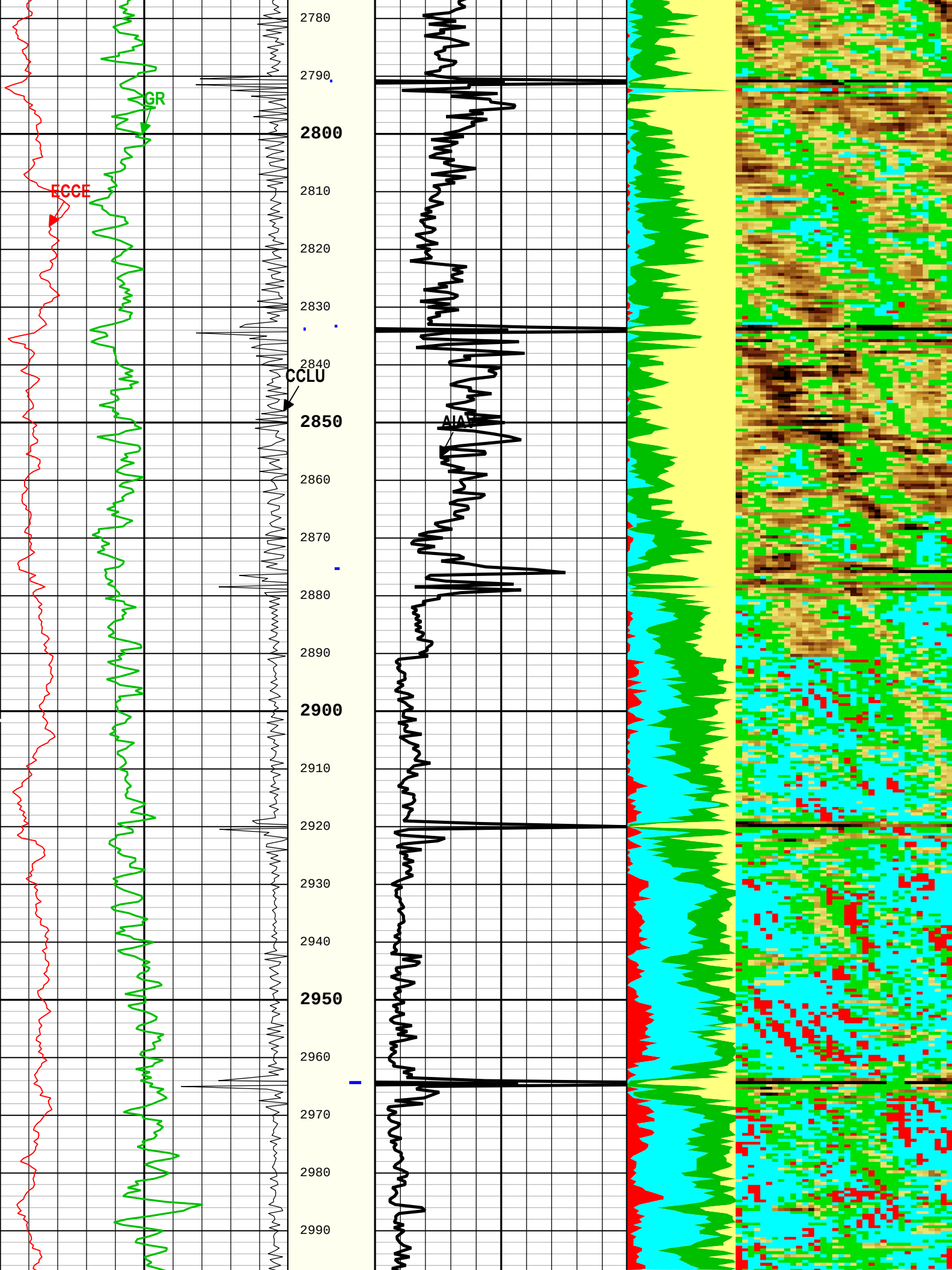
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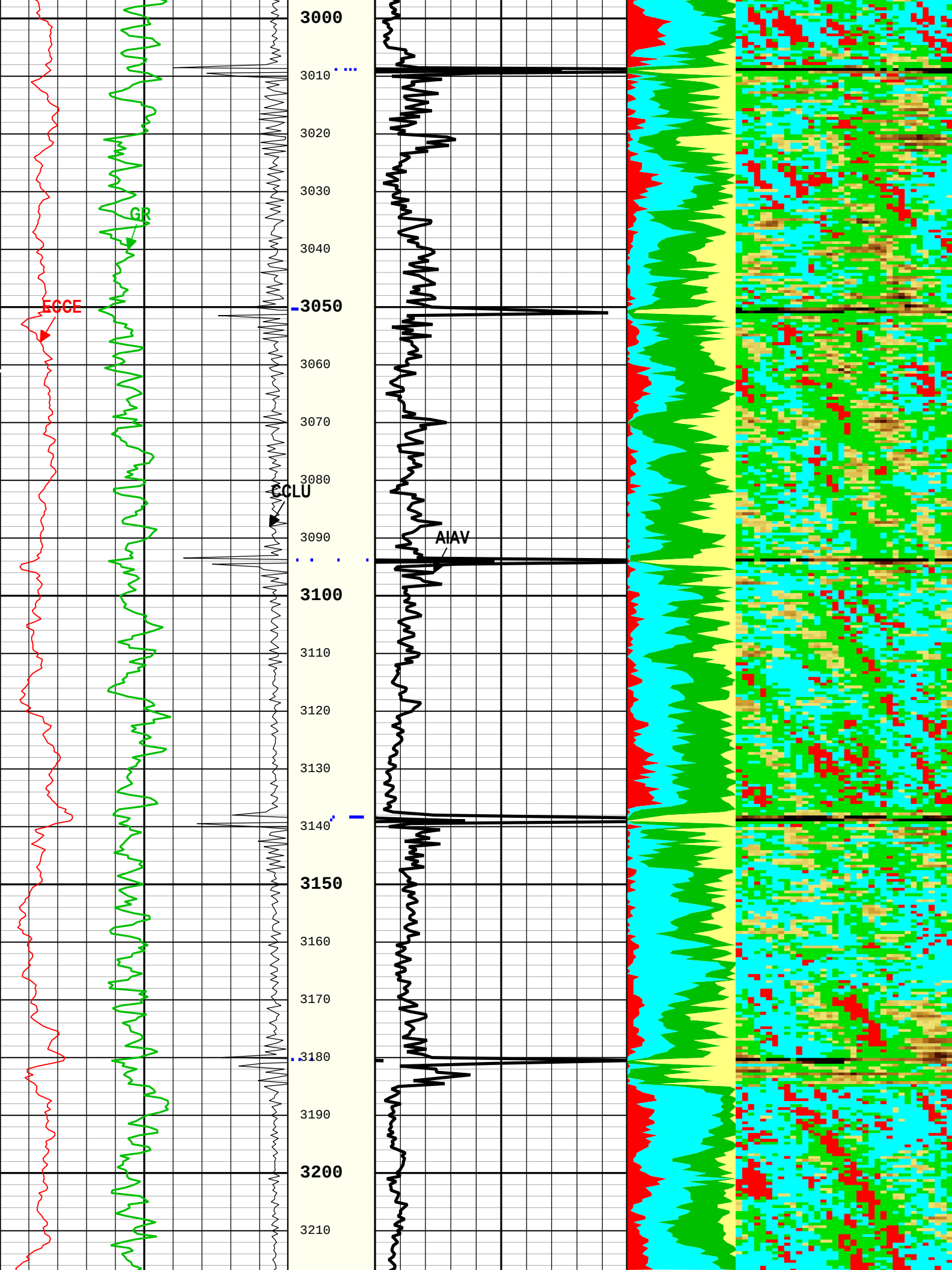
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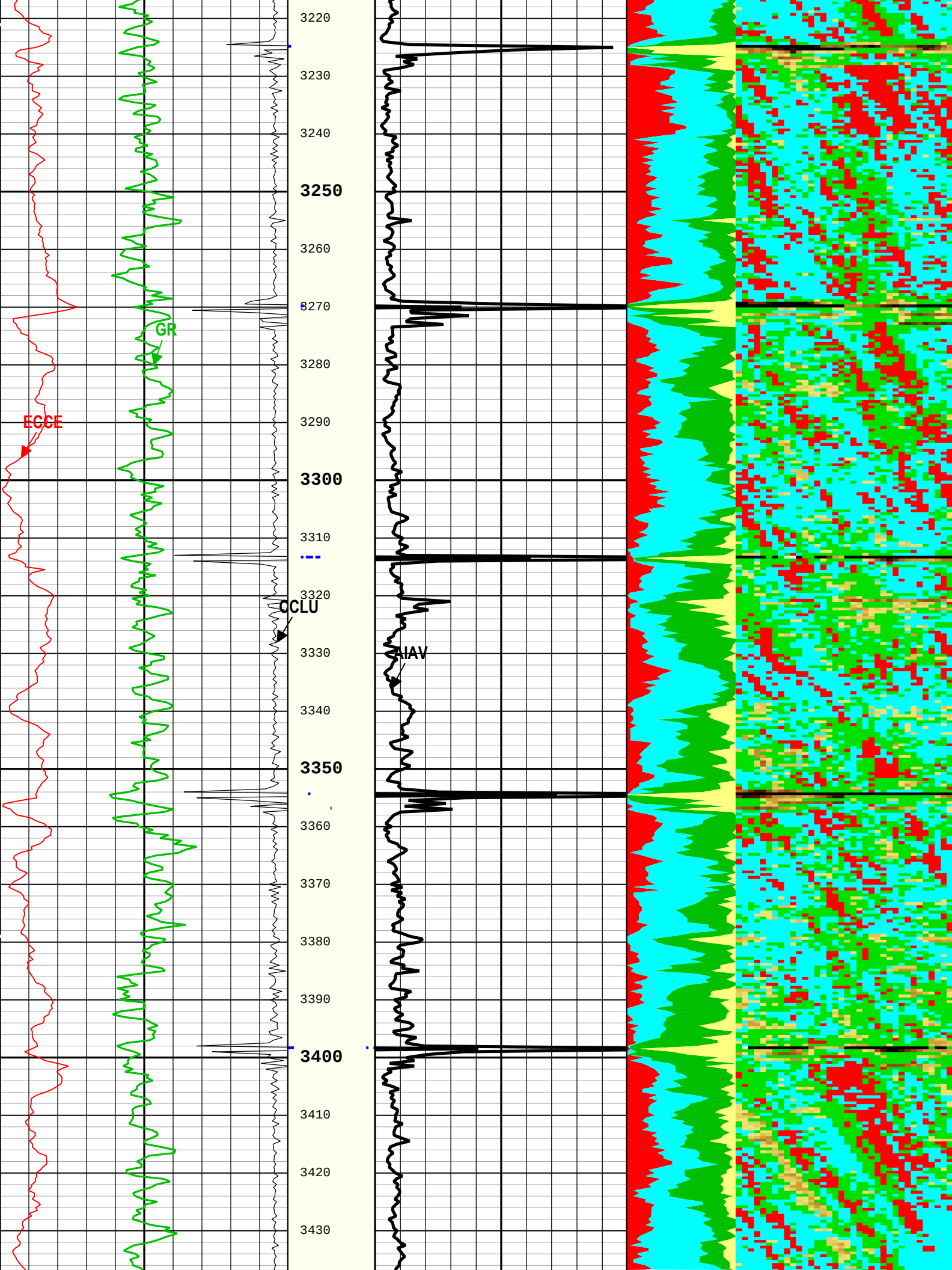
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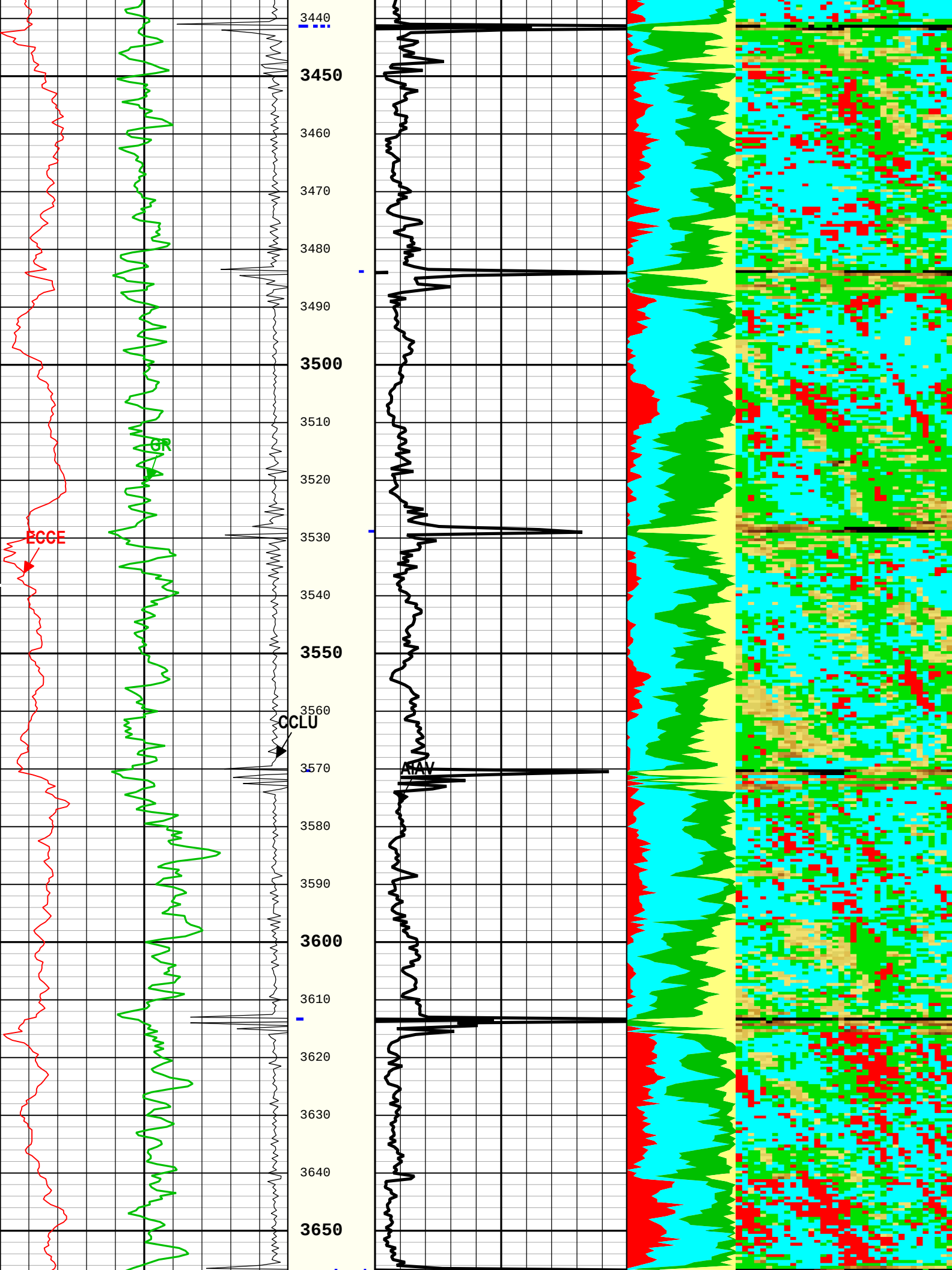
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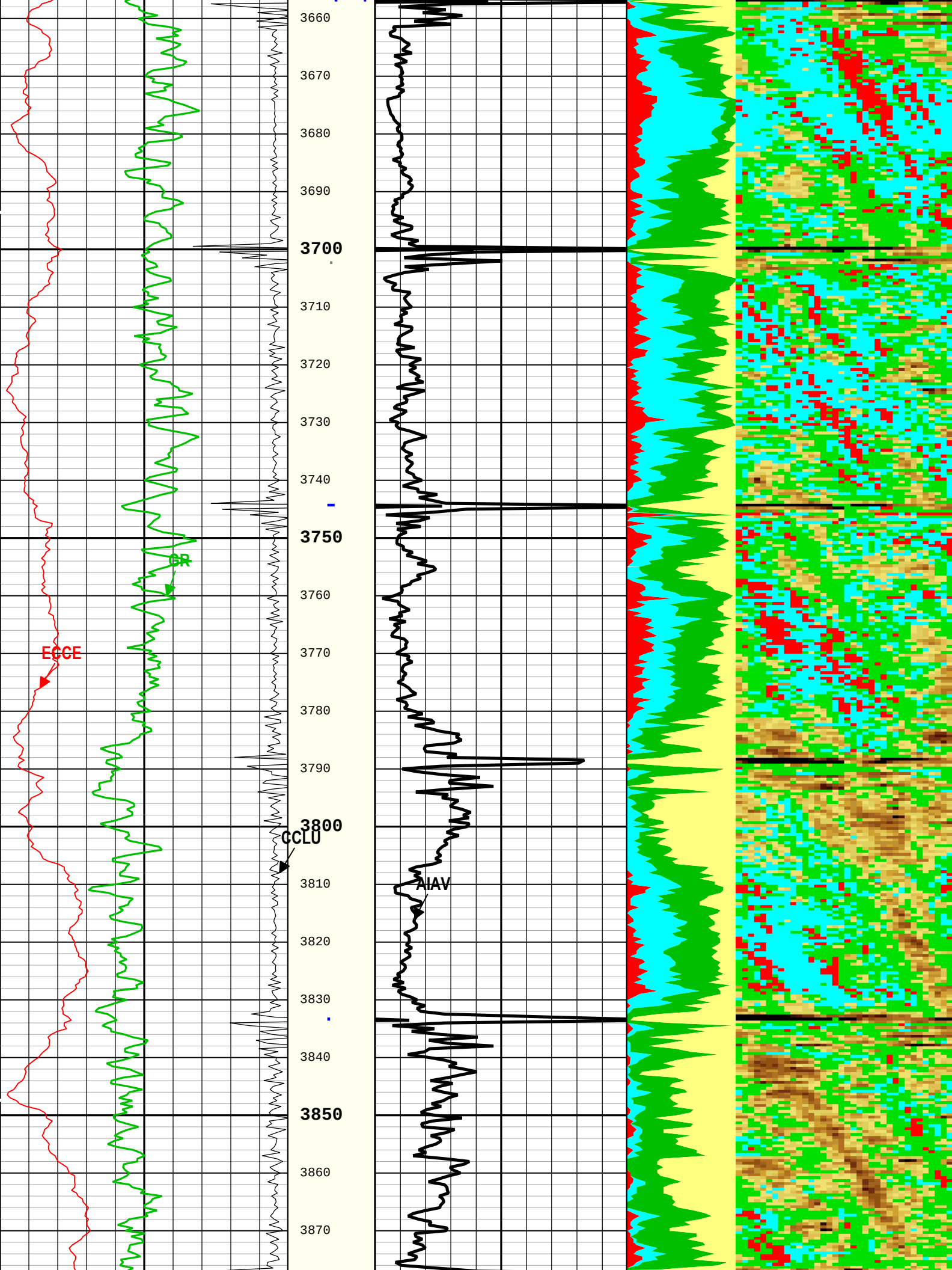
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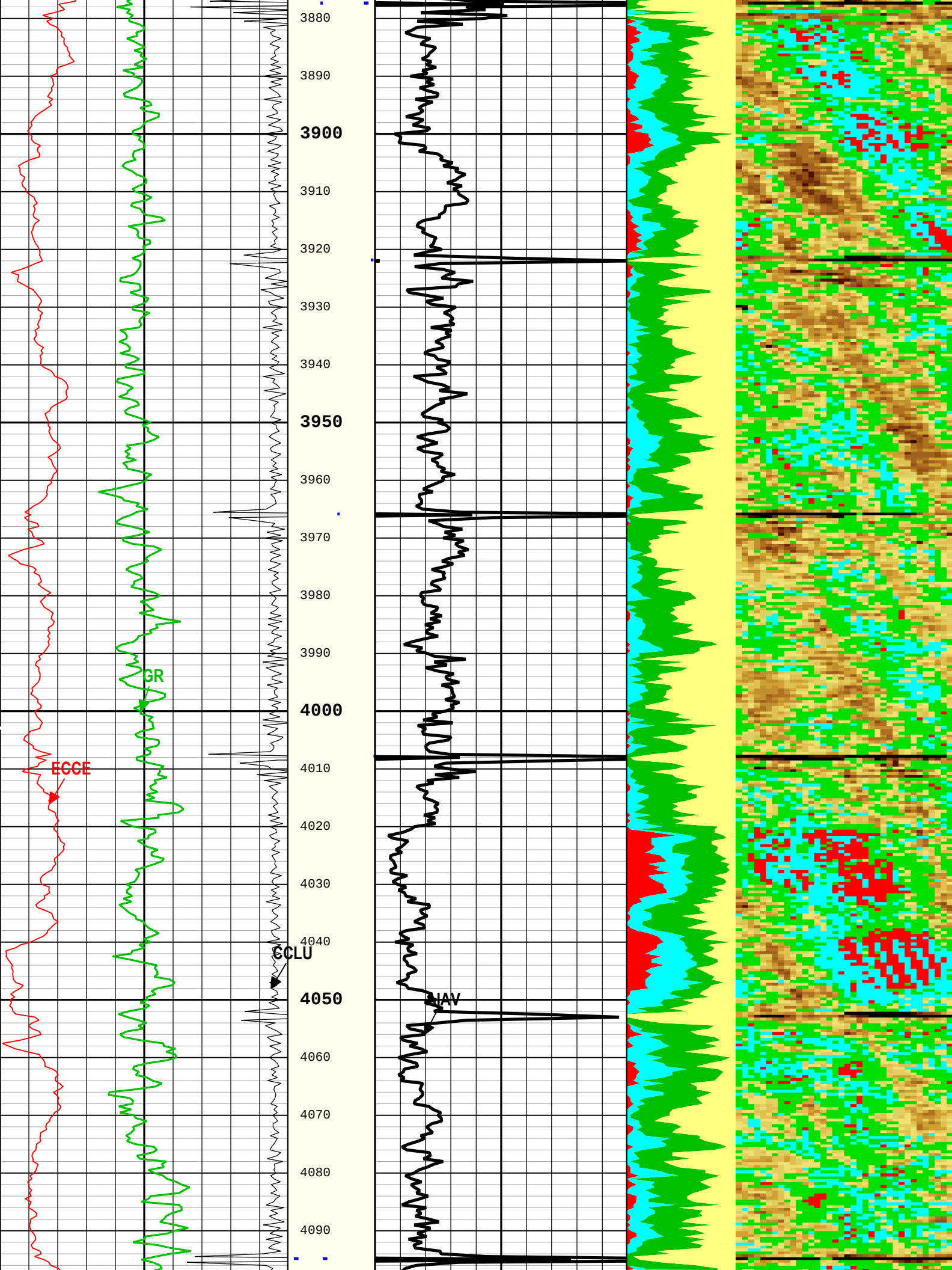
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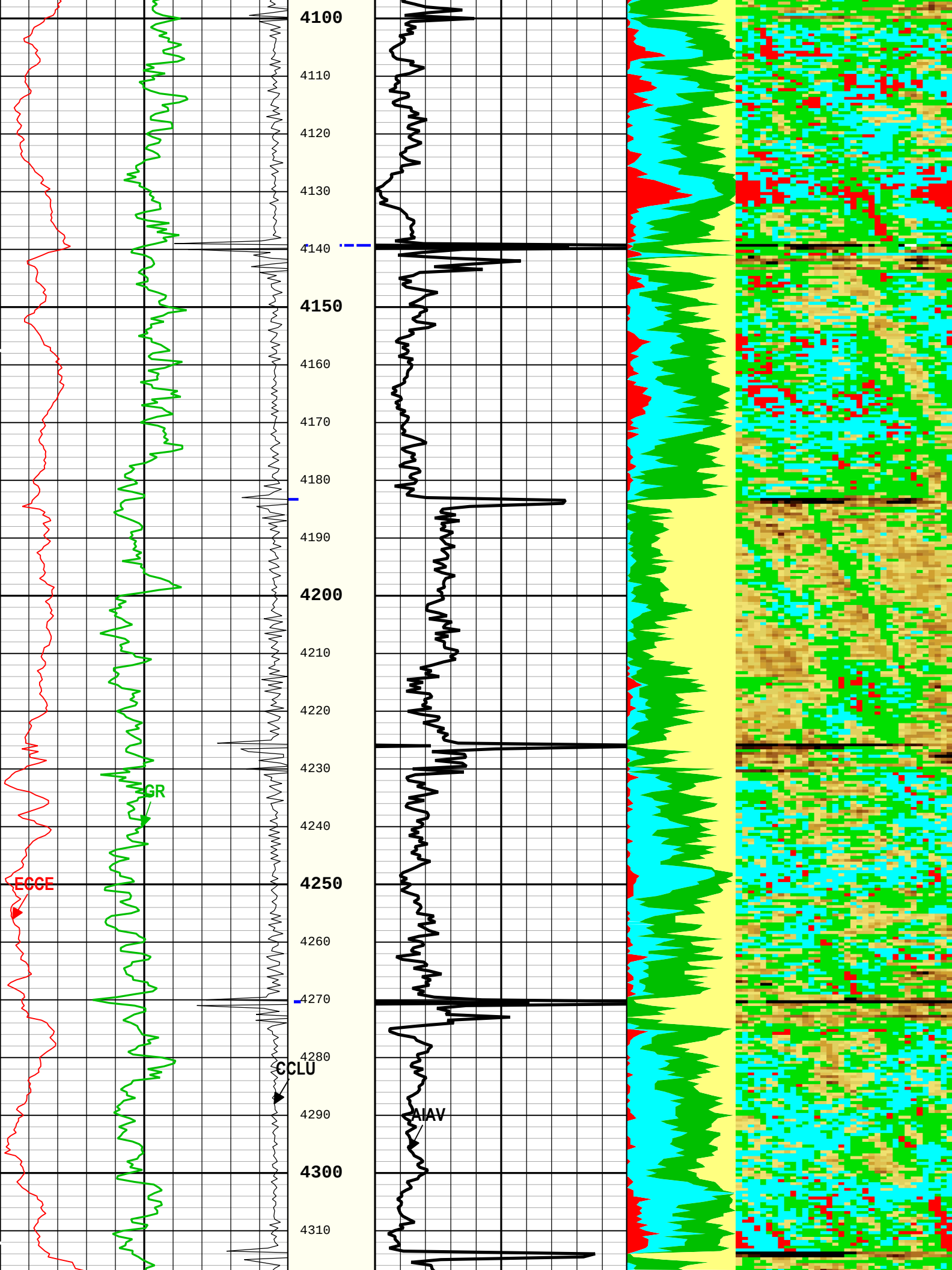
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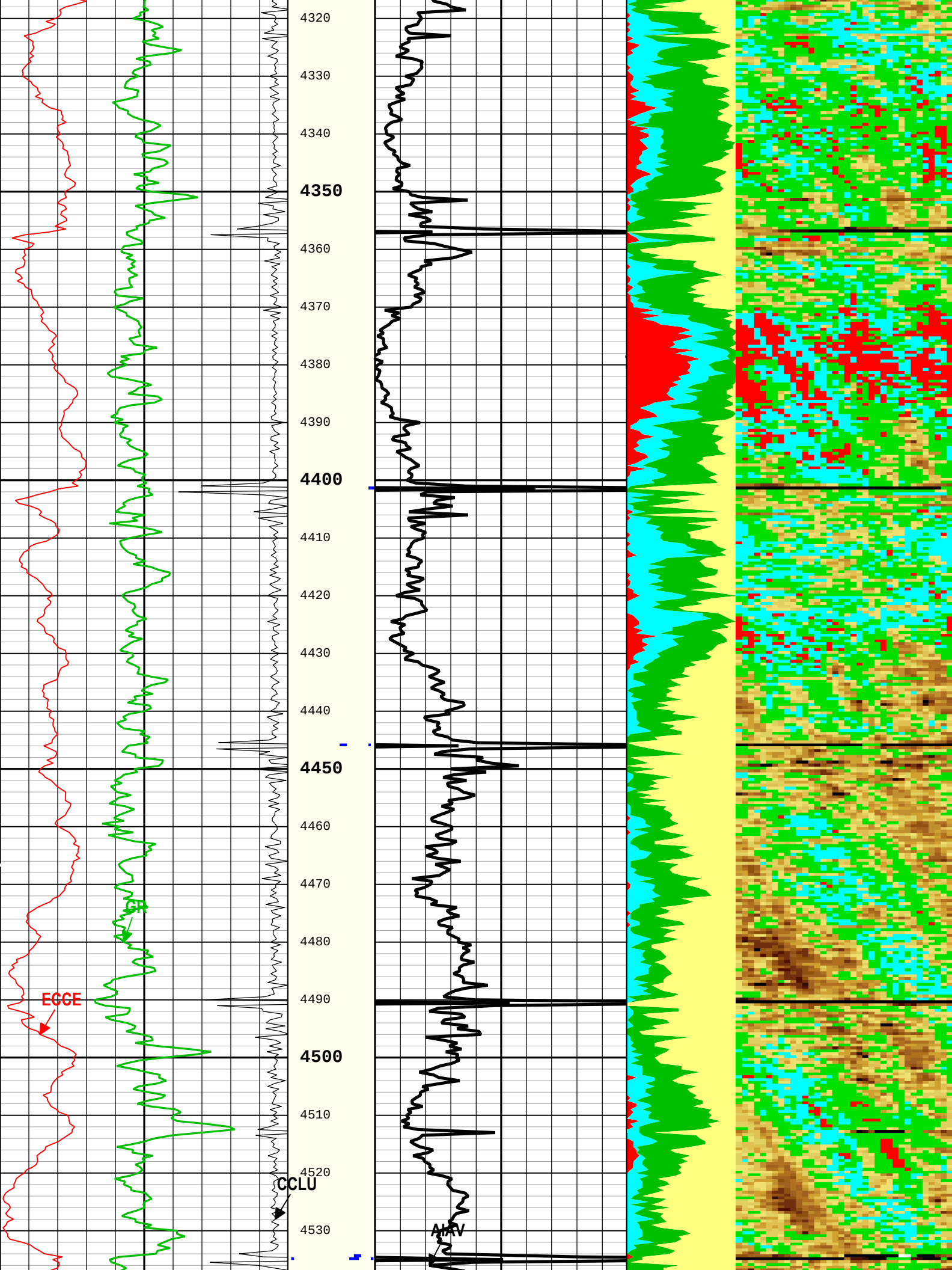
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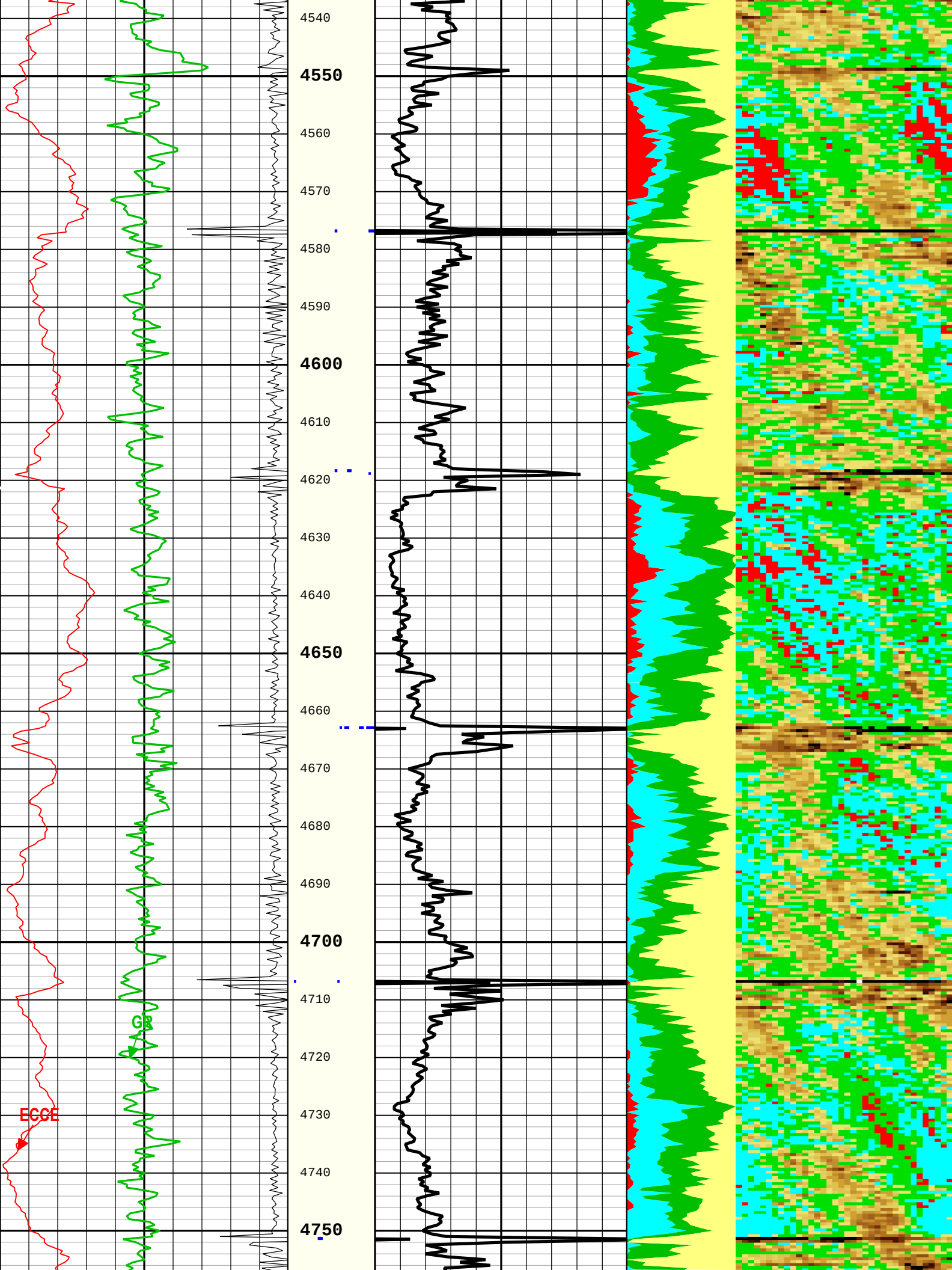
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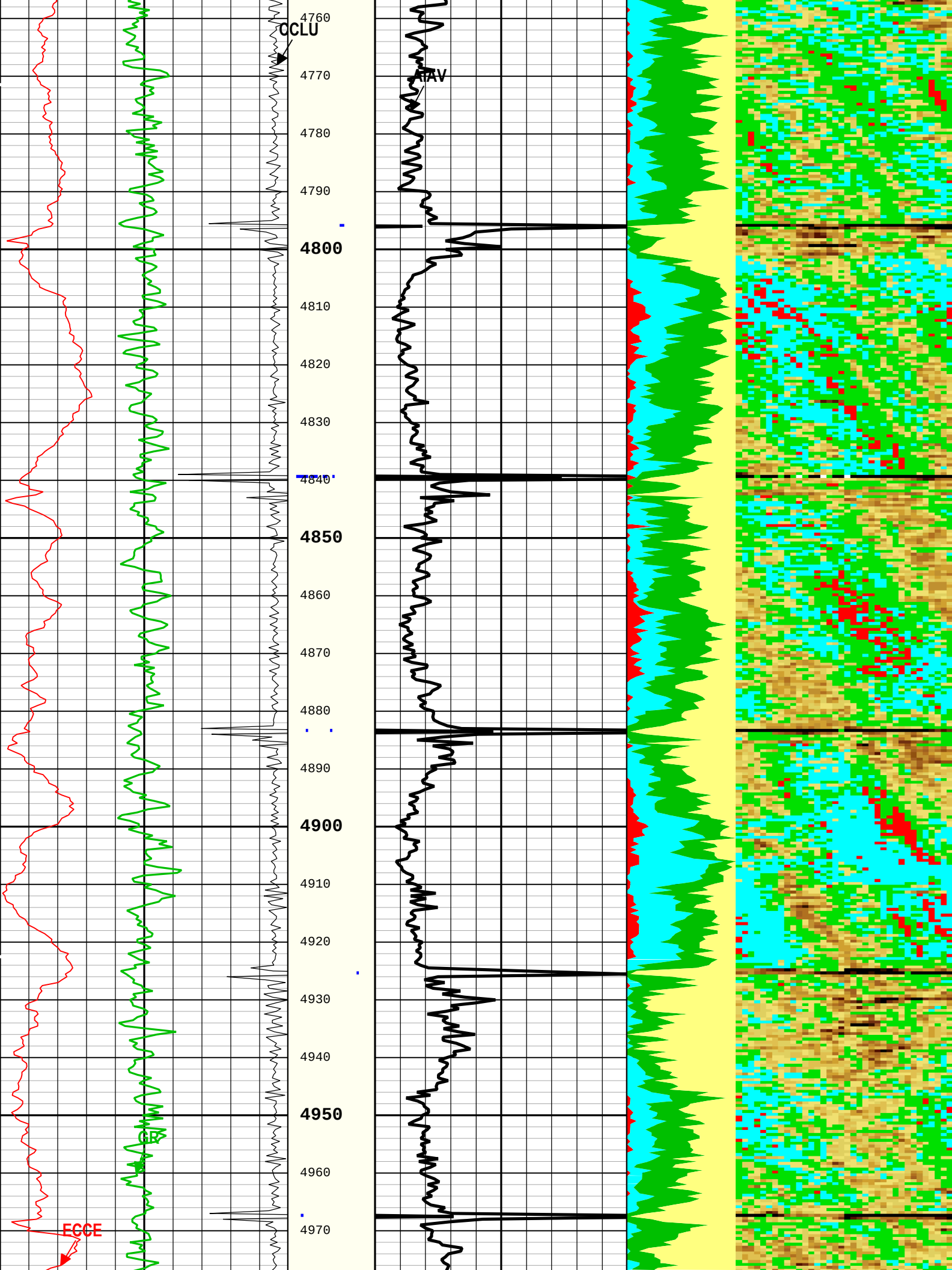
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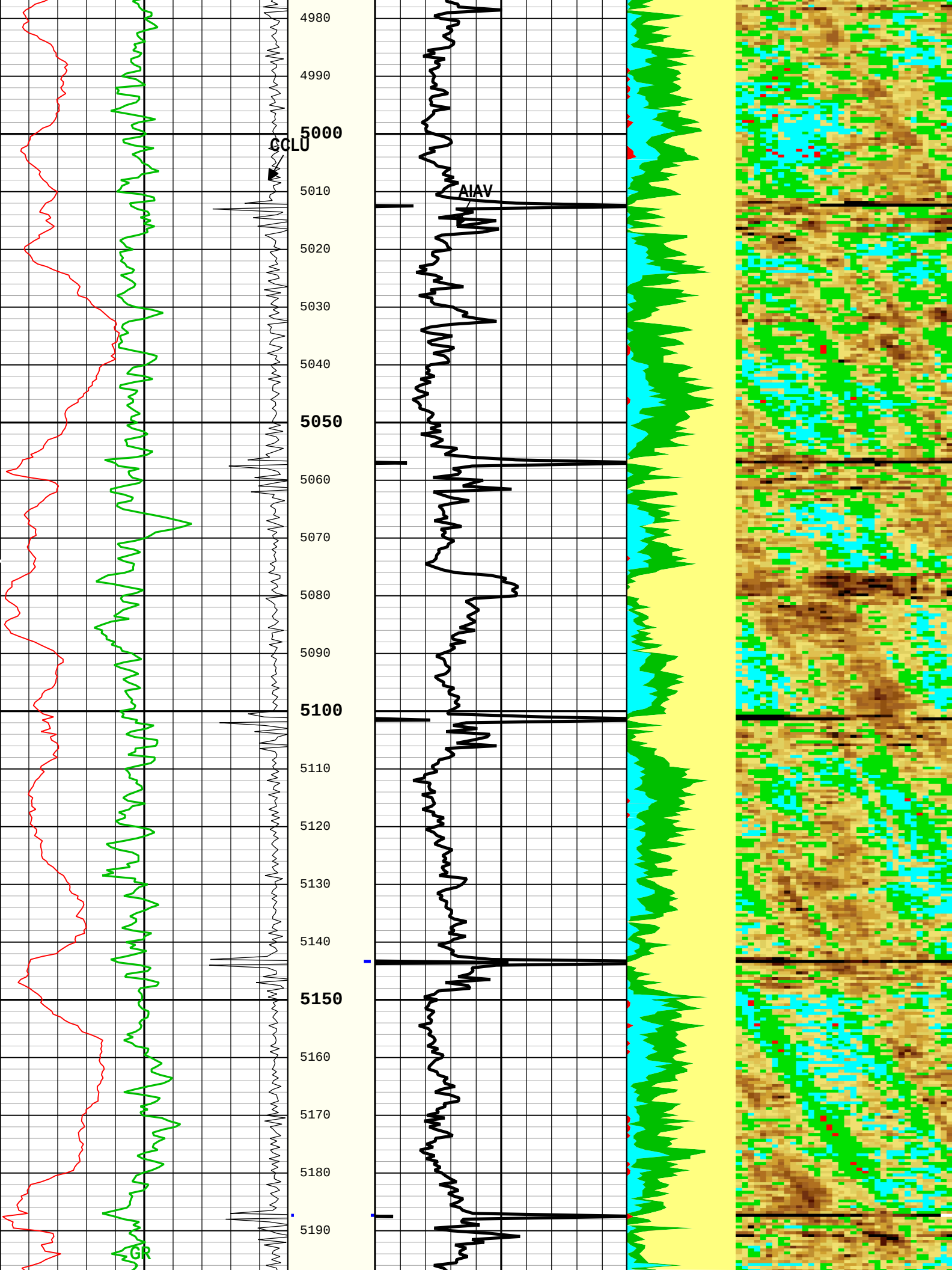
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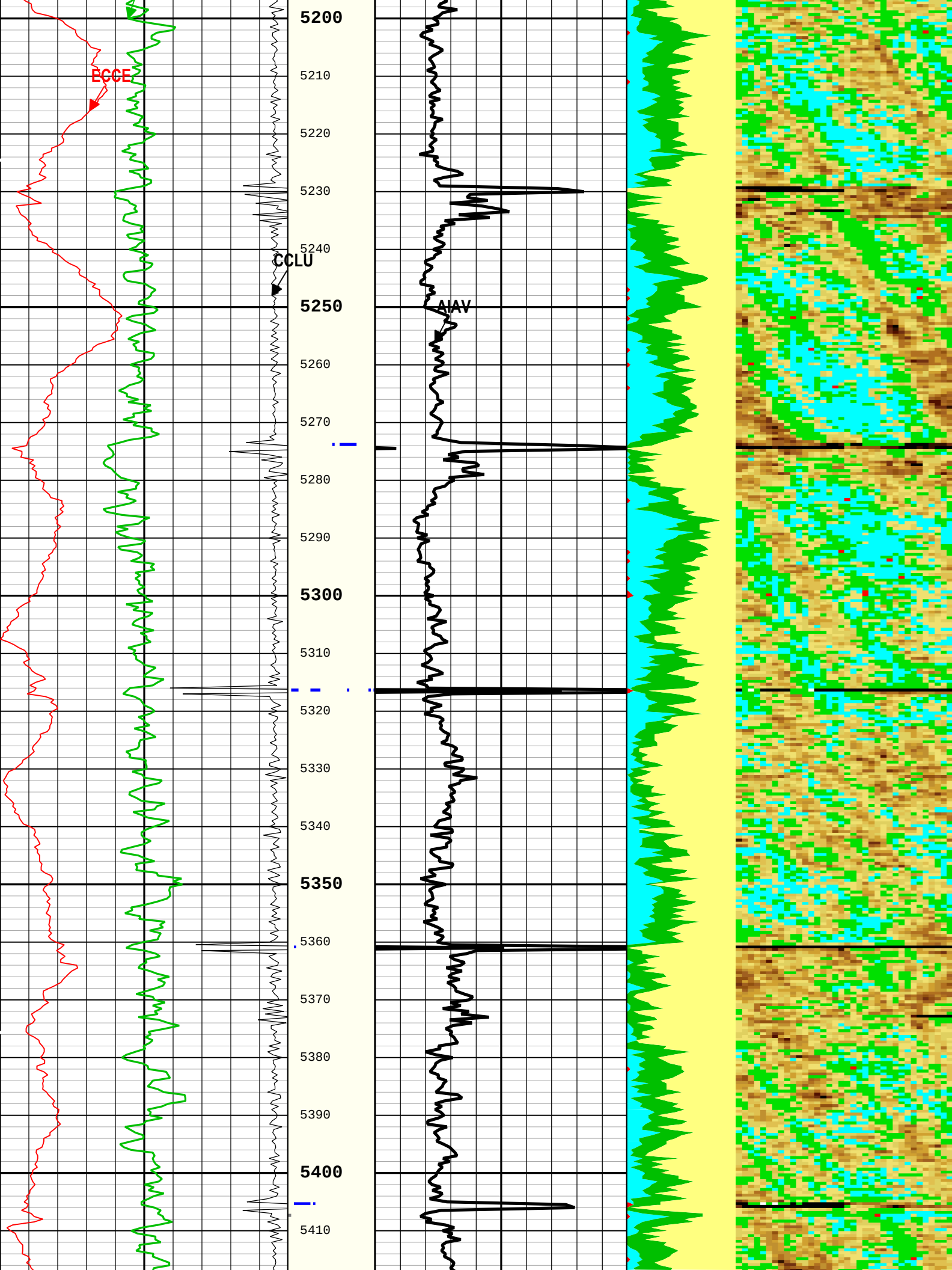
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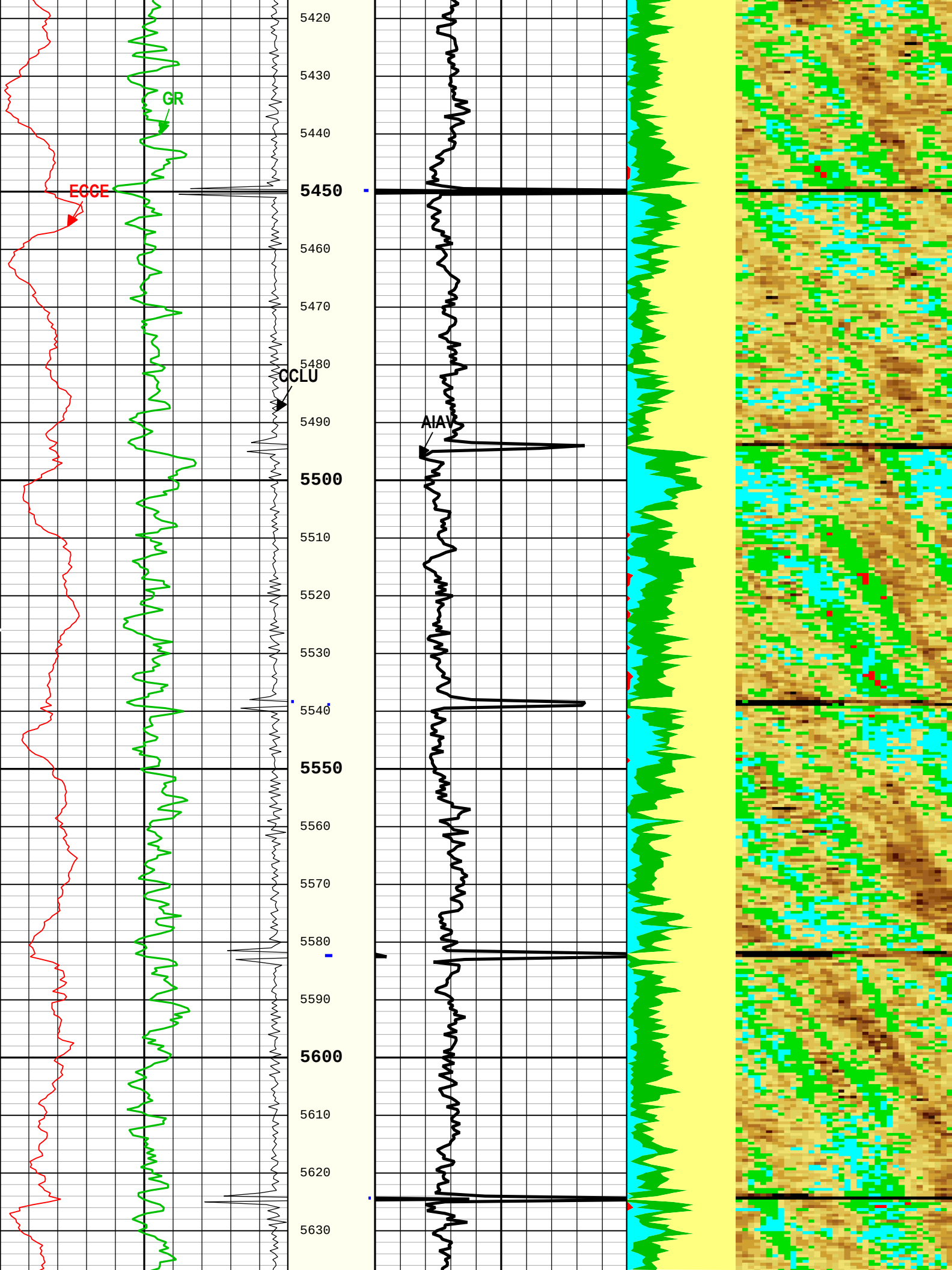
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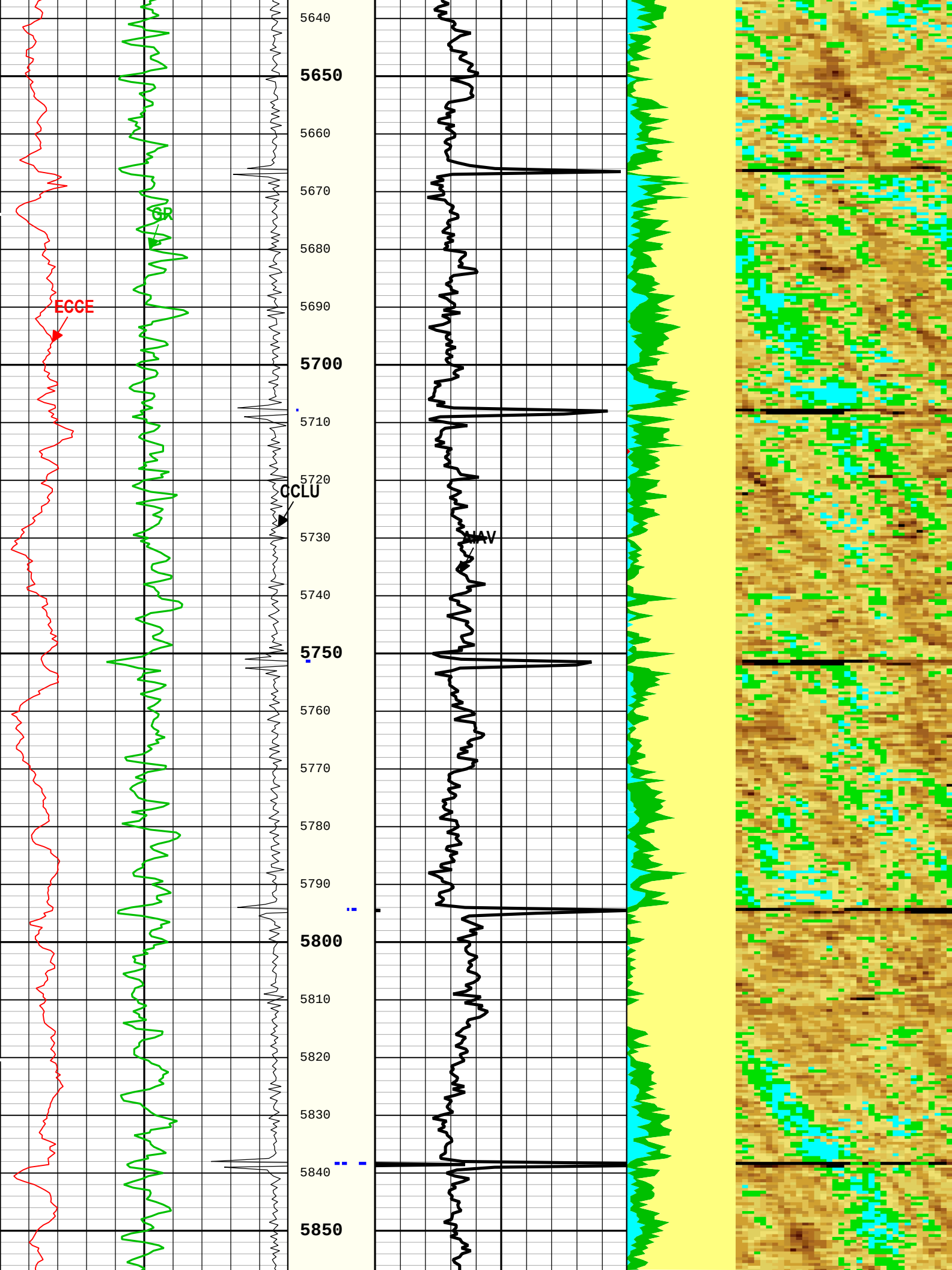
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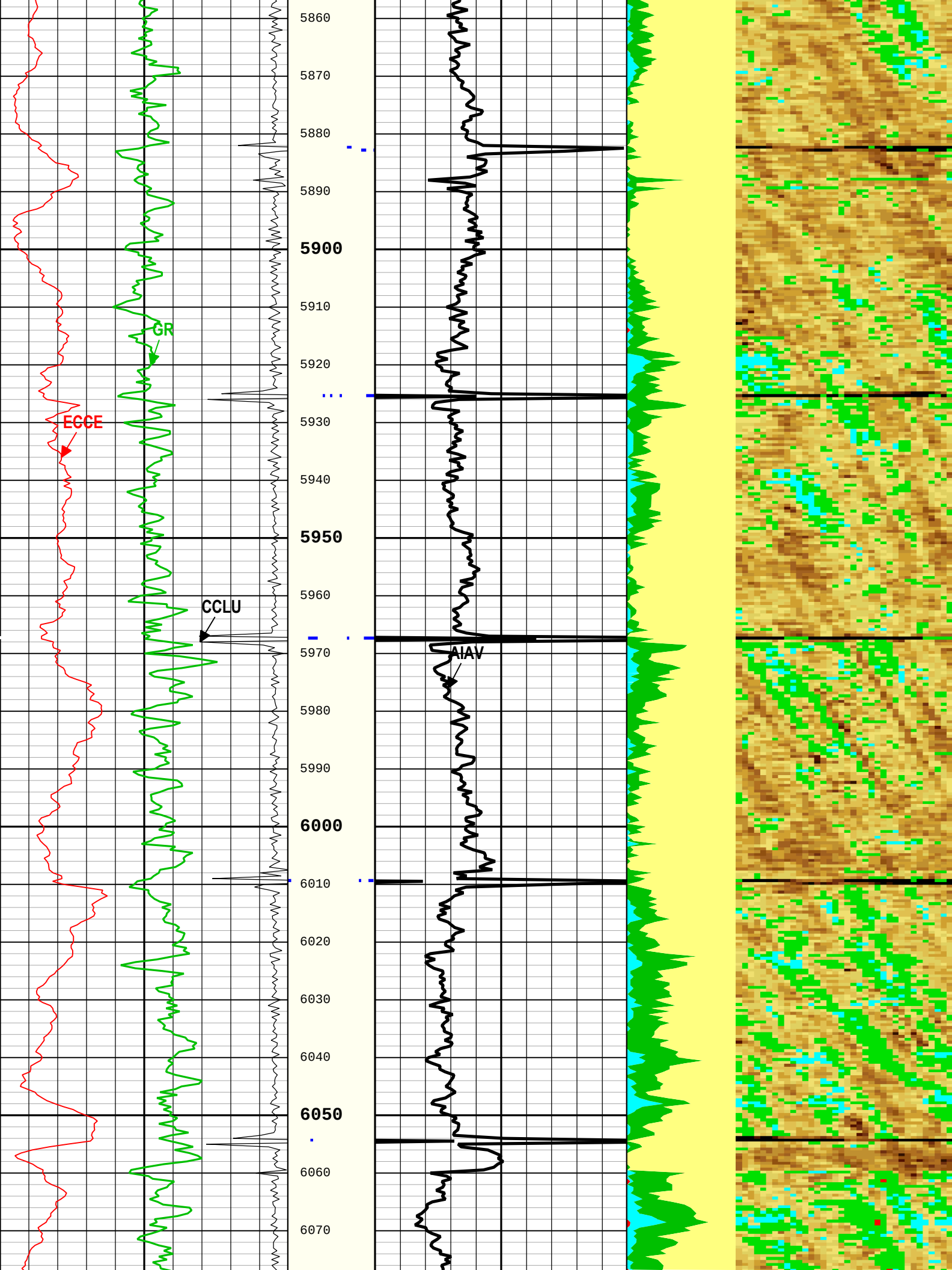
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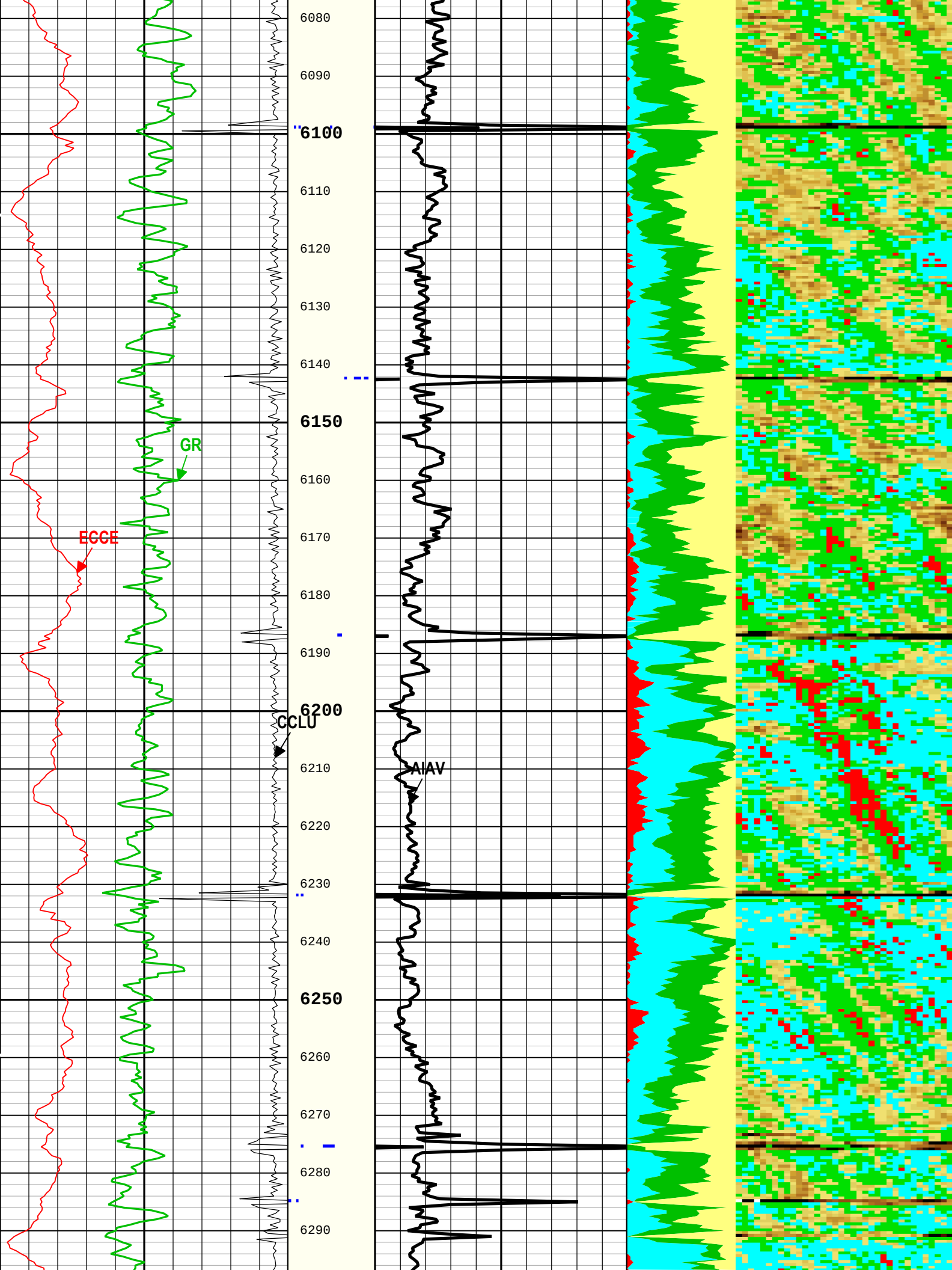
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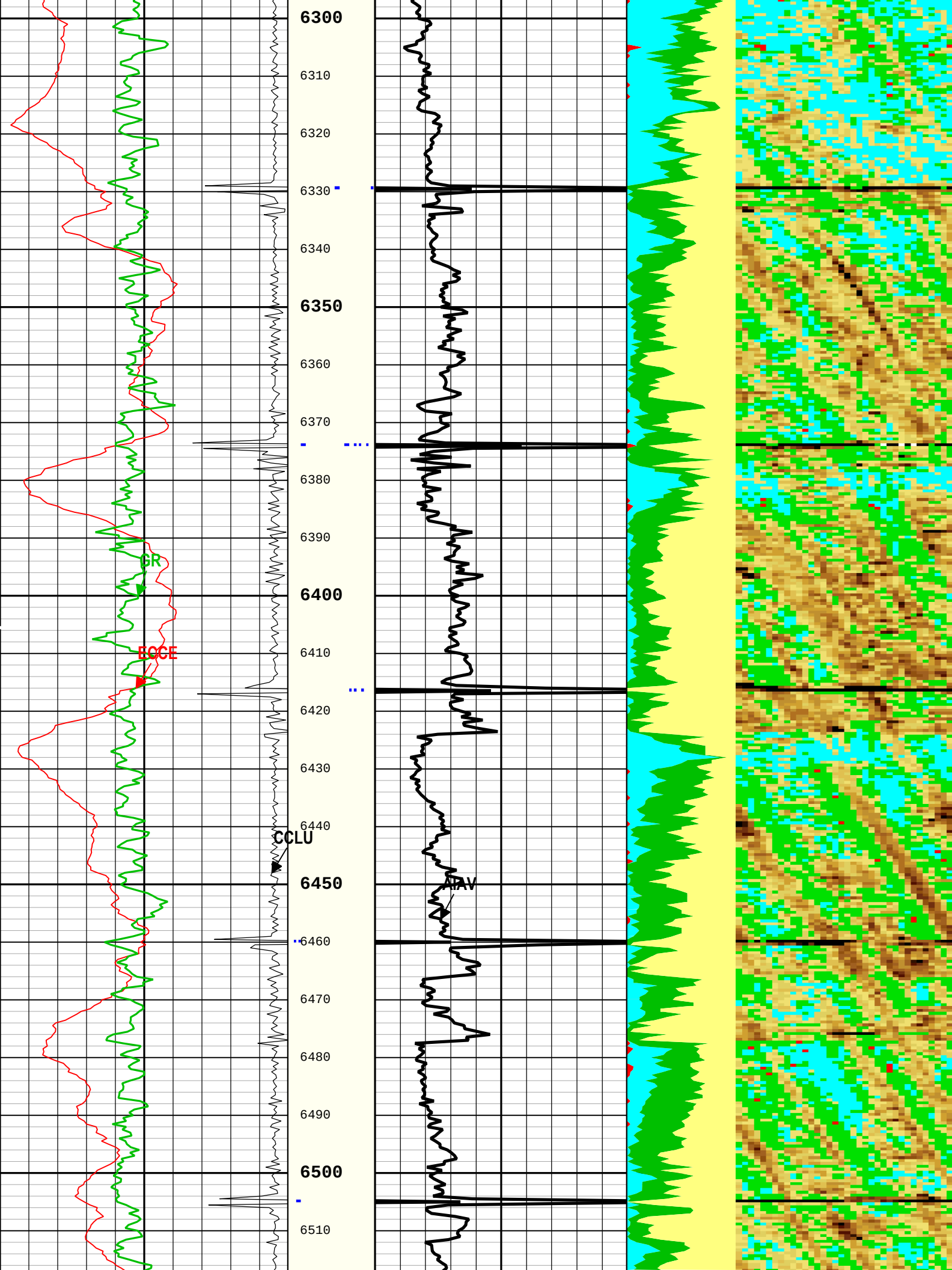
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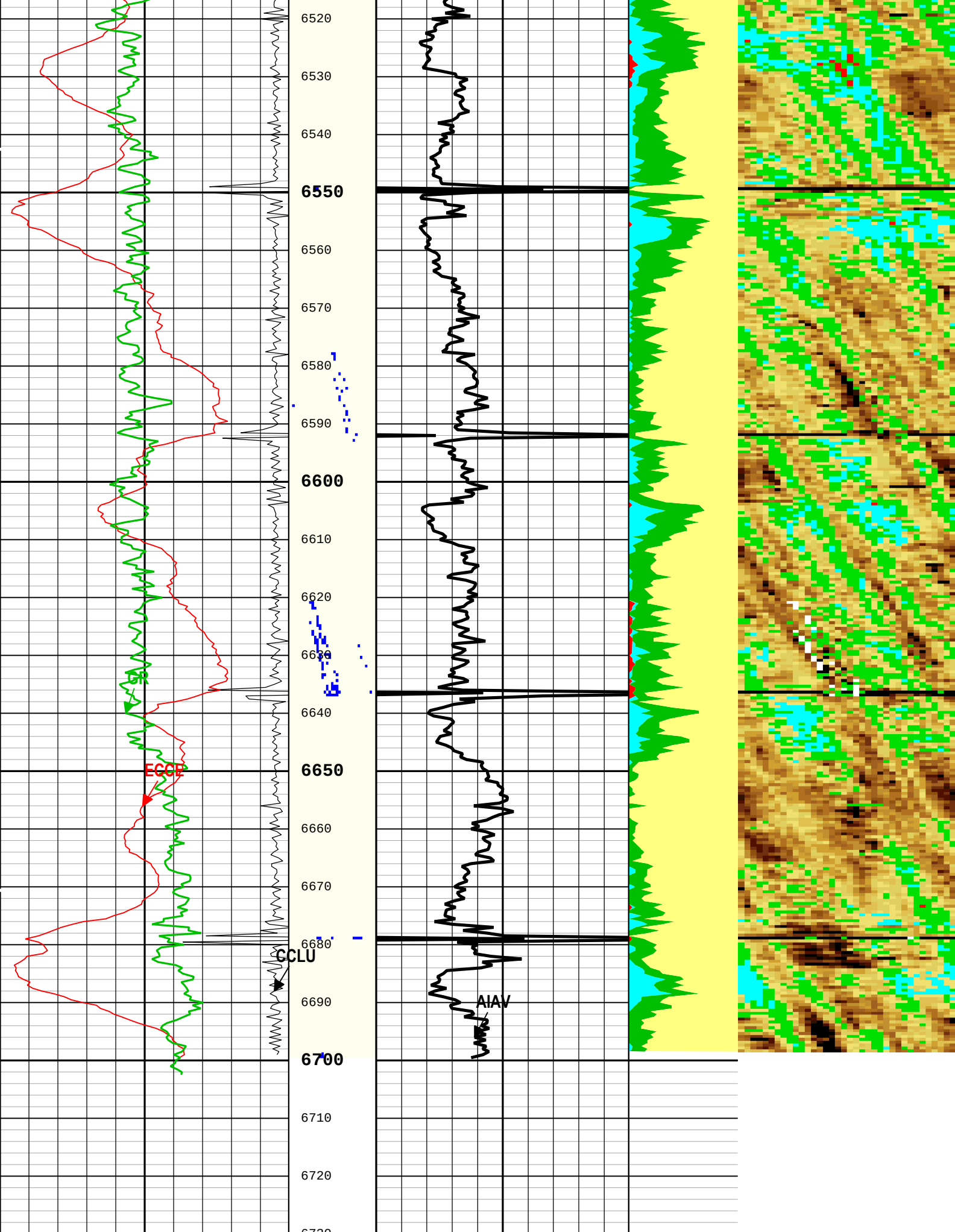


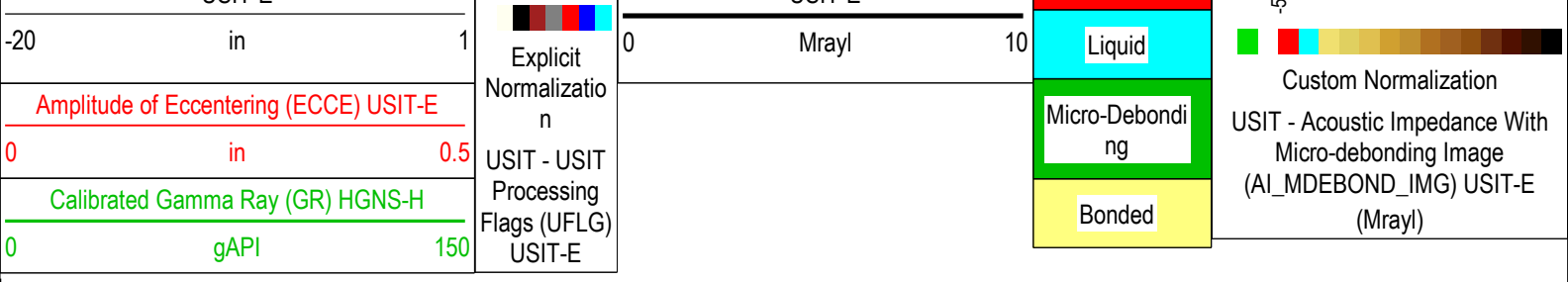
Casing Collar Locator Ultrasonic (CCLU)
USIT-E

Absent 1.500 2.500 6.500

Acoustic Impedance Average (AIAV)
USIT-E

Gas

Absent 00.000 2.200 3.254 4.309 5.363 6.418 7.472



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: 15-Mar-2018 14:15:23

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
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	1.18	
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	56	110
BS	13.5	110	1952
BS	8.5	1952	6700
MEAS_WLEN	22.44	56	6700
MEAS_WLEN	20	6700	6730.5

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	50	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	31.88	us
WINE	Window End Time	USIT-E	71.88	us

ONE

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2018	8.0.95333.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	1989.51 ft	2505.38 ft	15-Mar-2018 12:15:57 PM	15-Mar-2018 12:18:36 PM	ON	2.94 ft	Yes

All depths are referenced to toolstring zero

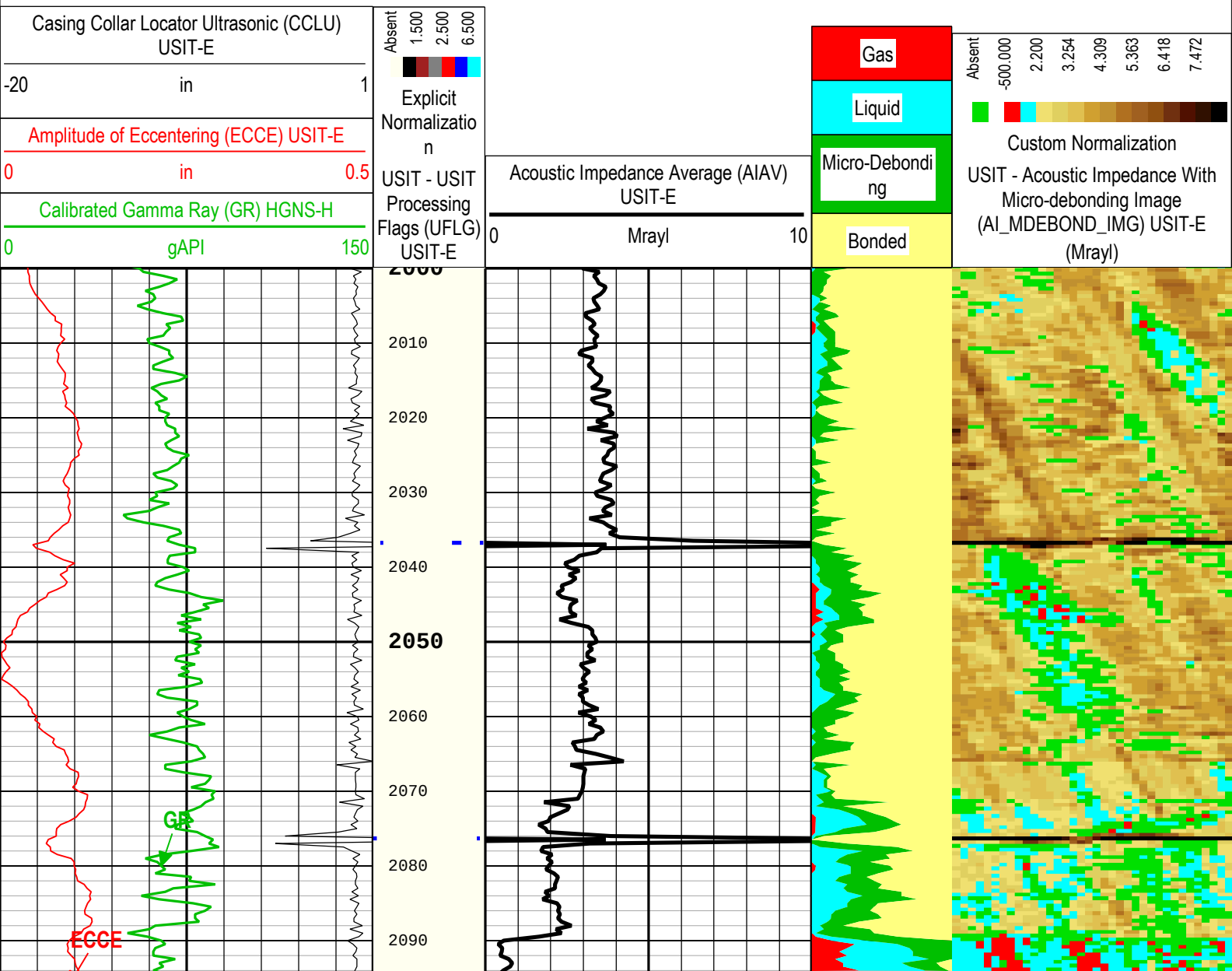
Log

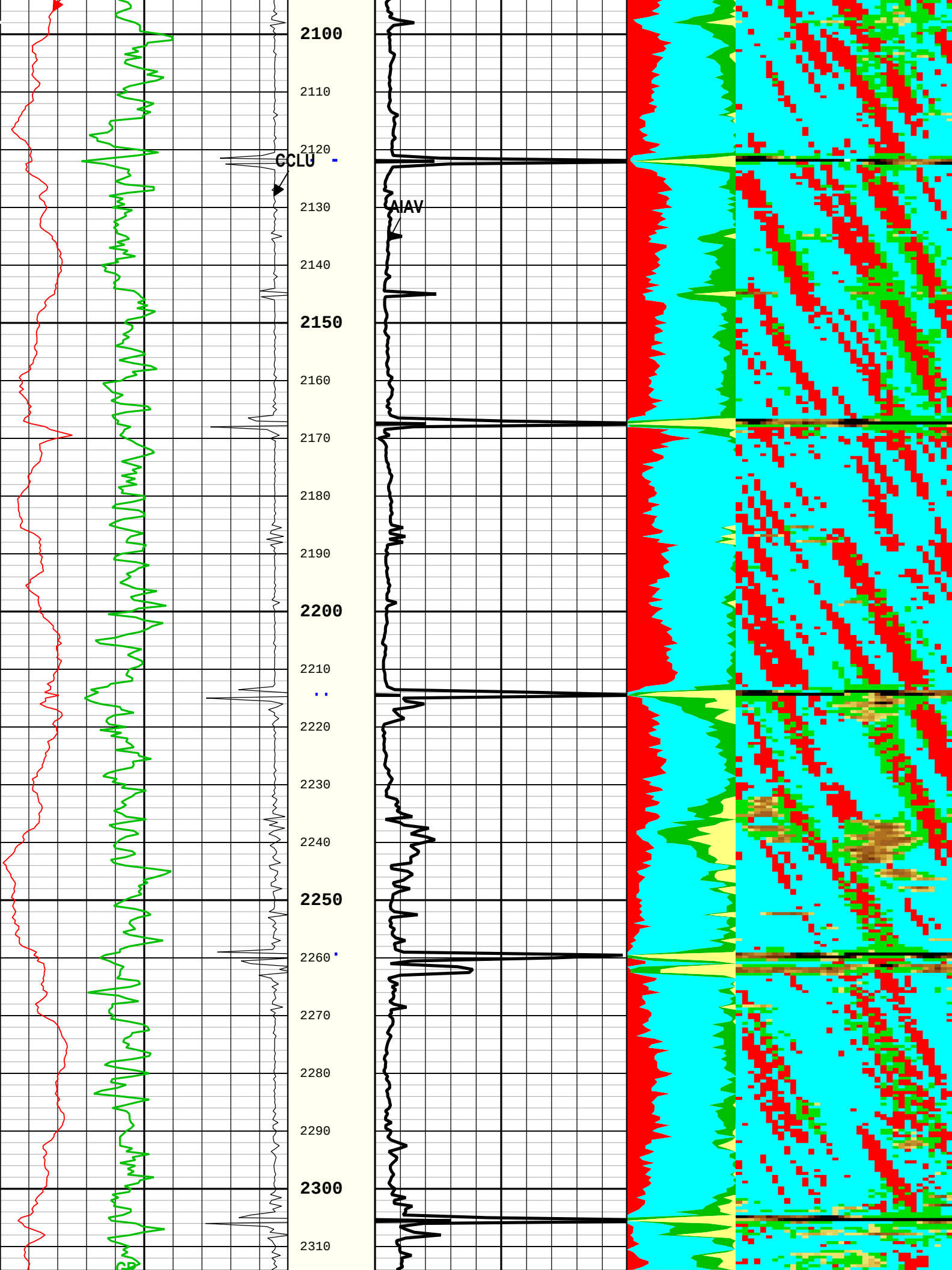
Company:Noble Energy Inc Well:Centennial State G34-684

ONE: Log[3]: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: 15-Mar-2018 14:15:44

TIME_1900 - Time Marked every 60.00 (s)

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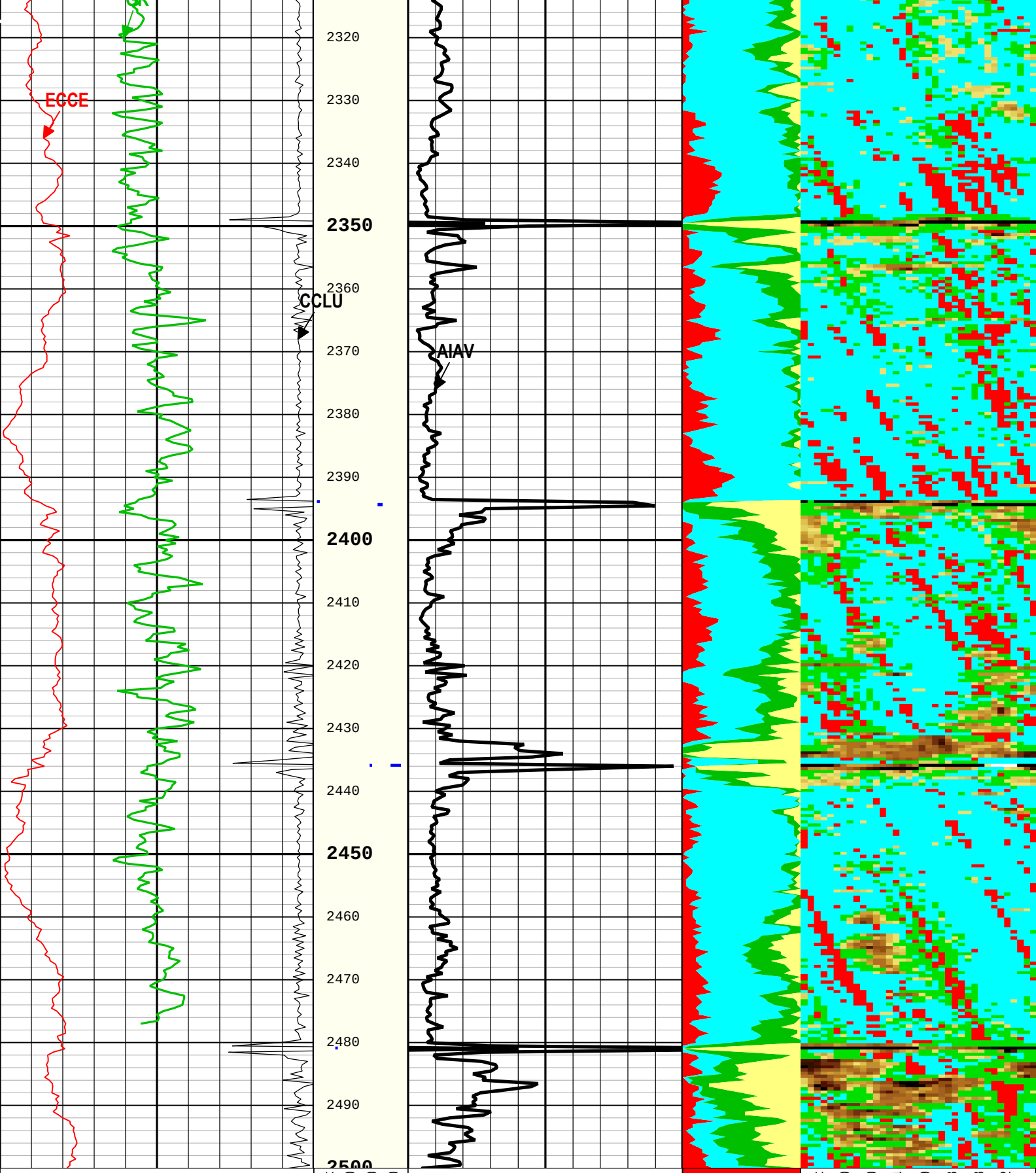

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-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: 15-Mar-2018 14:15:44

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
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BS	Bit Size	WLSESSION	8.5	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	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.18	
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

Tool Control Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
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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	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	15-Mar-2018 12:15:57	15-Mar-2018 12:16:08	2505.38	2494.57
WINE	74.18	15-Mar-2018 12:16:08	15-Mar-2018 12:18:36	2494.57	1989.51

All depth are at tool zero.

XYZ

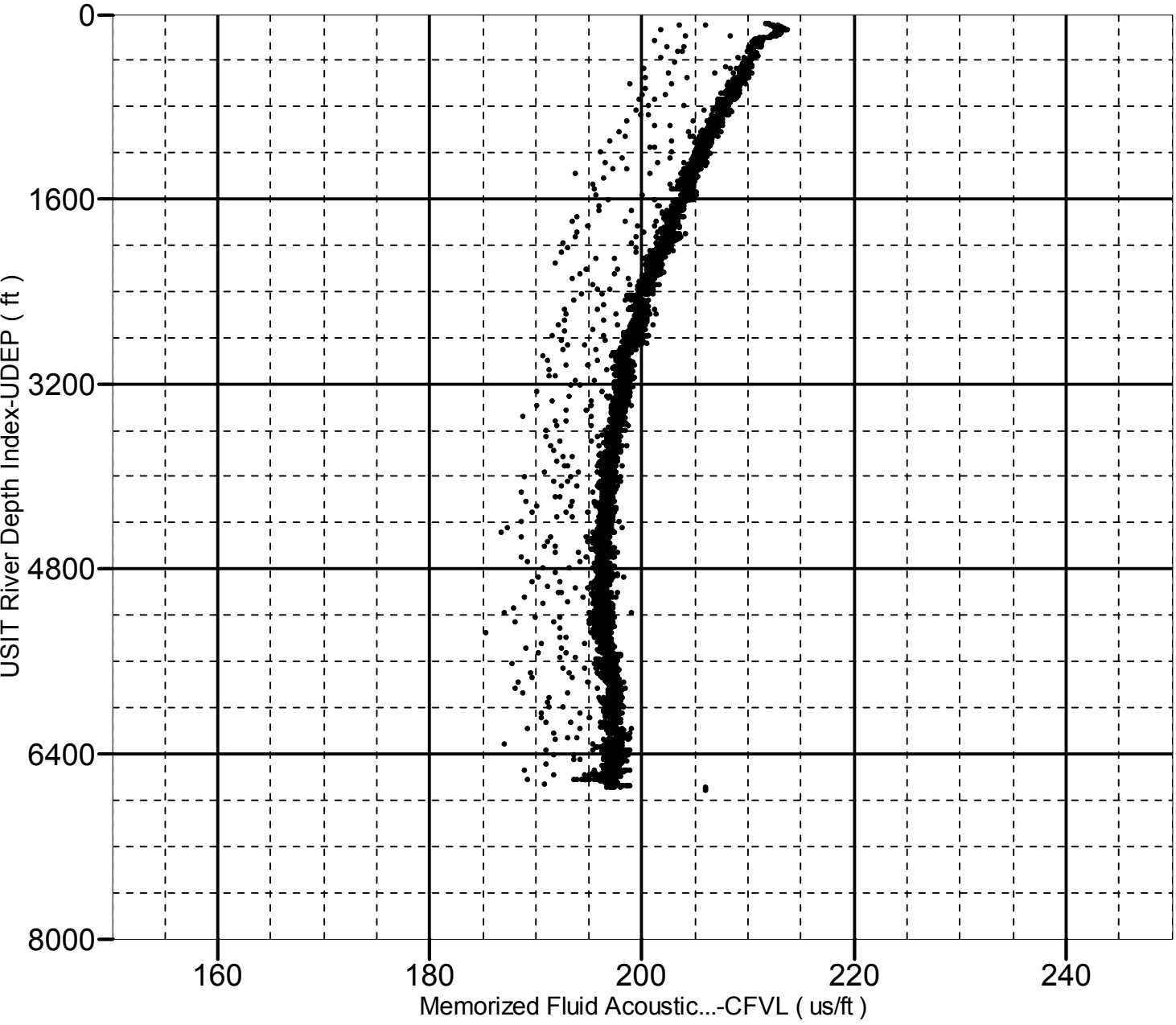
Company:Noble Energy Inc Well:Centennial State G34-684
ONE: Log[5]:Up:S006

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6730.50 to 83.50 ft

● CFVL-UDEP



XYZ

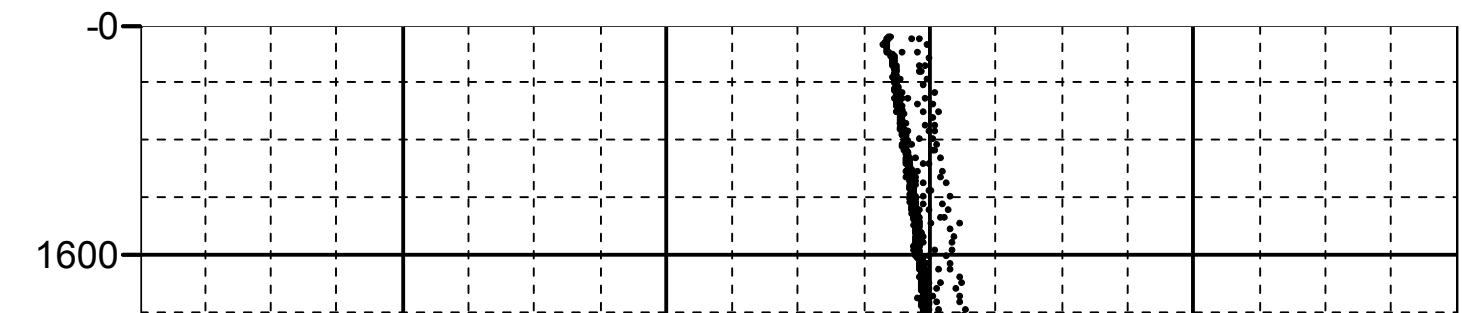
Company:Noble Energy Inc Well:Centennial State G34-684
ONE: Log[5]:Up:S006

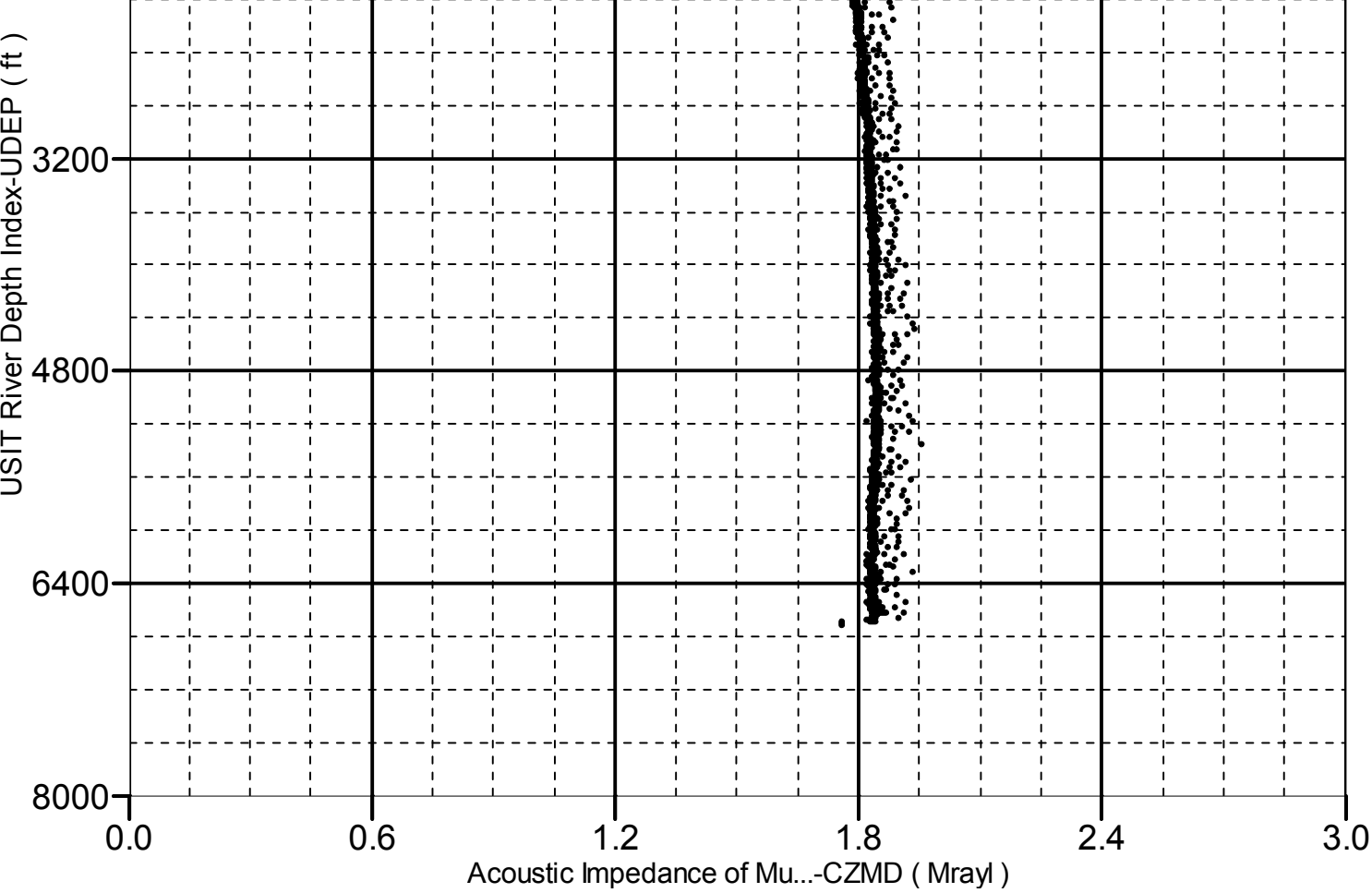
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6730.50 to 83.50 ft

● CZMD-UDEP





Company:	Noble Energy Inc
Well:	Centennial State G34-684
Field:	Wattenberg

Schlumberger

County:	Weld
State:	Colorado

DJ BASIN UltraSonic Summary Print

Cement Evaluation

Gamma Ray - CCL Log