Schlumberger

Company: Noble Energy Inc

Well: Shadow A26-622

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County: Weld
Field: Wattenberg
Location: SWSE Sec30, T6N, R63W
Well: Shadow A26-622
Company: Noble Energy Inc

Location:
SWSE Sec30, T6N, R63W
SHL: 500' FSL x 1553' FEL
Lat/Long: 40.451630/-104.475820

Elev.: K.B. 4662.00 ft
G.L. 4638.00 ft
D.F. 4661.00 ft

Permanent Datum: Ground Level Elev.: 4638.00 f
Log Measured From: Kelly Bushing 24.00 ft above Perm.Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section:	Township:	Range:
05-123-425919	30	6N	63W

Logging Date	24-Jun-2016		
Run Number	One		
Depth Driller	17520.00 ft		
Schlumberger Depth	17520.00 ft		
Bottom Log Interval	6700.00 ft		
Top Log Interval	95.00 ft		
Casing Fluid Type	BRINE		
Salinity			
Density	9.1 lbm/gal		
Fluid Level	0.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	1904.00 ft		
To	17520.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	24.00 ft		
To	17513.10 ft		
Max Recorded Temperatures	227 degF		
Logger on Bottom Time	24-Jun-2016	06:17:00	
Unit Number Location:	2161	Ft Morgan	
Recorded By	B Kesek & B Marmon		
Witnessed By	Bill Mansfield		

Disclaimer

Contents

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Borehole Fluids

Parameter(unit)	One					
Fluid Type	Water					
Fluid Name	BRINE					
Max Recorded Temperatures (degF)	227					
Source of Sample	Active Tank					
Salinity (ppm)	0					
Density (lbm/gal)	9.1					
Funnel Viscosity (s)	26					
Fluid Loss (cm3)						
PH						
Date/Time Circulation Stopped	NaN					
Date Logger on Bottom	24-Jun-2016					
Time Logger on Bottom	06:17:00					
Source RMF						
RMC	Pressed					
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68					
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68					
RMC @ Meas Temp (ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.06 @ 227					
RMF @ BHT (ohm.m@degF)	0.05 @ 227					
RMC @ BHT (ohm.m@degF)	NaN @ 227					
Total Solid (%)						
High Gravity Solids (%)						

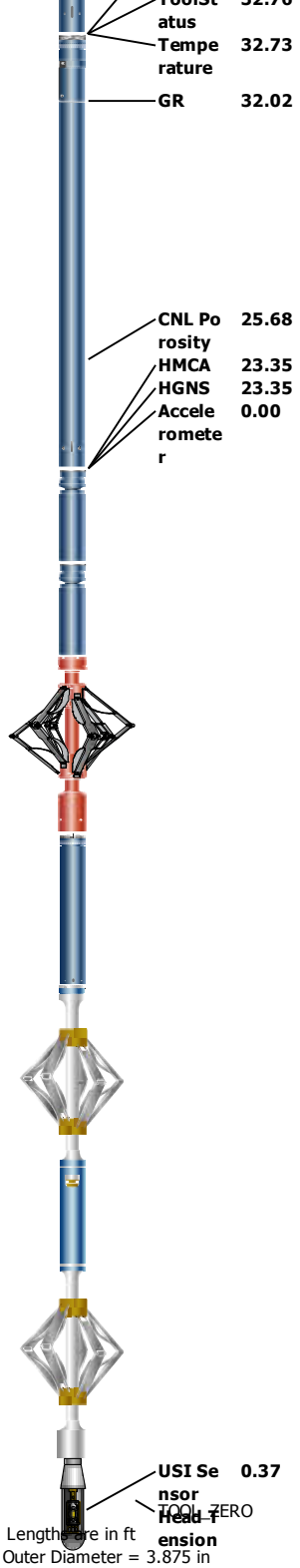
Remarks and Equipment Summary

One: Toolstring

Equip name	Length	MP name	Offset
LEH-QT LEH-QT	43.53		
SAH-F:1 817	40.61		
DTC-H:8 803 ECH-KC: 10354 DTC-H:8	35.76	CTEM HV TelStatus ToolSt	34.86 0.00 32.76 32.76

One: Remarks

This is the first run in the well.
Tool ran as per toolsketch.
CSG: 5.5" 20lb/ft.
Main pass recorded at 2500PSi, repeat pass at 0PSI.
Logs recorded for cement at 10deg 6".



Length are 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	5896		
Calibration Date			
Calibrator Serial Number	16		
Calibration Cable Type	7-46 PLX		
Wheel Correction 1	-1		
Wheel Correction 2	-3		

Tension Device

Type	CMTD-B/A		
Serial Number	1109		
Calibration Date	13-Apr-2016		
Calibrator Serial Number	441435A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	10		
Calibration Peak Error	17		

Logging Cable

Type	7-39P-LXS		
Serial Number			
Length	15000.00 ft		
Conveyance Type	Wireline		
Rig Type	Rigless		

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		

One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2016	6.0.53731.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	95.61 ft	6742.34 ft	24-Jun-2016 6:02:00 AM	24-Jun-2016 6:39:56 AM	ON	5.60 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Shadow A26-622

One: Log[2]:Up:S011

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: 25-Jun-2016 11:33:48

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E

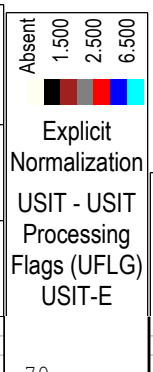
-20 in 1

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Calibrated Gamma Ray (GR) HGNS-H

0 gAPI 150

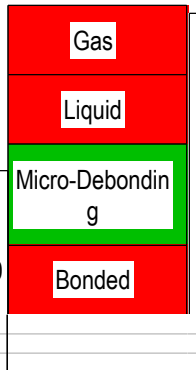


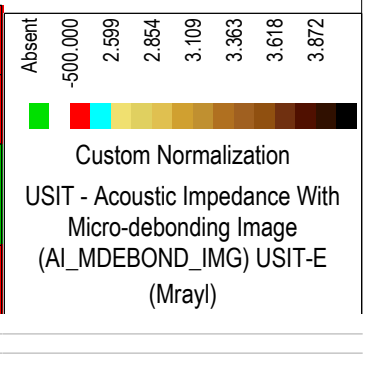
Explicit Normalization

USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV) USIT-E

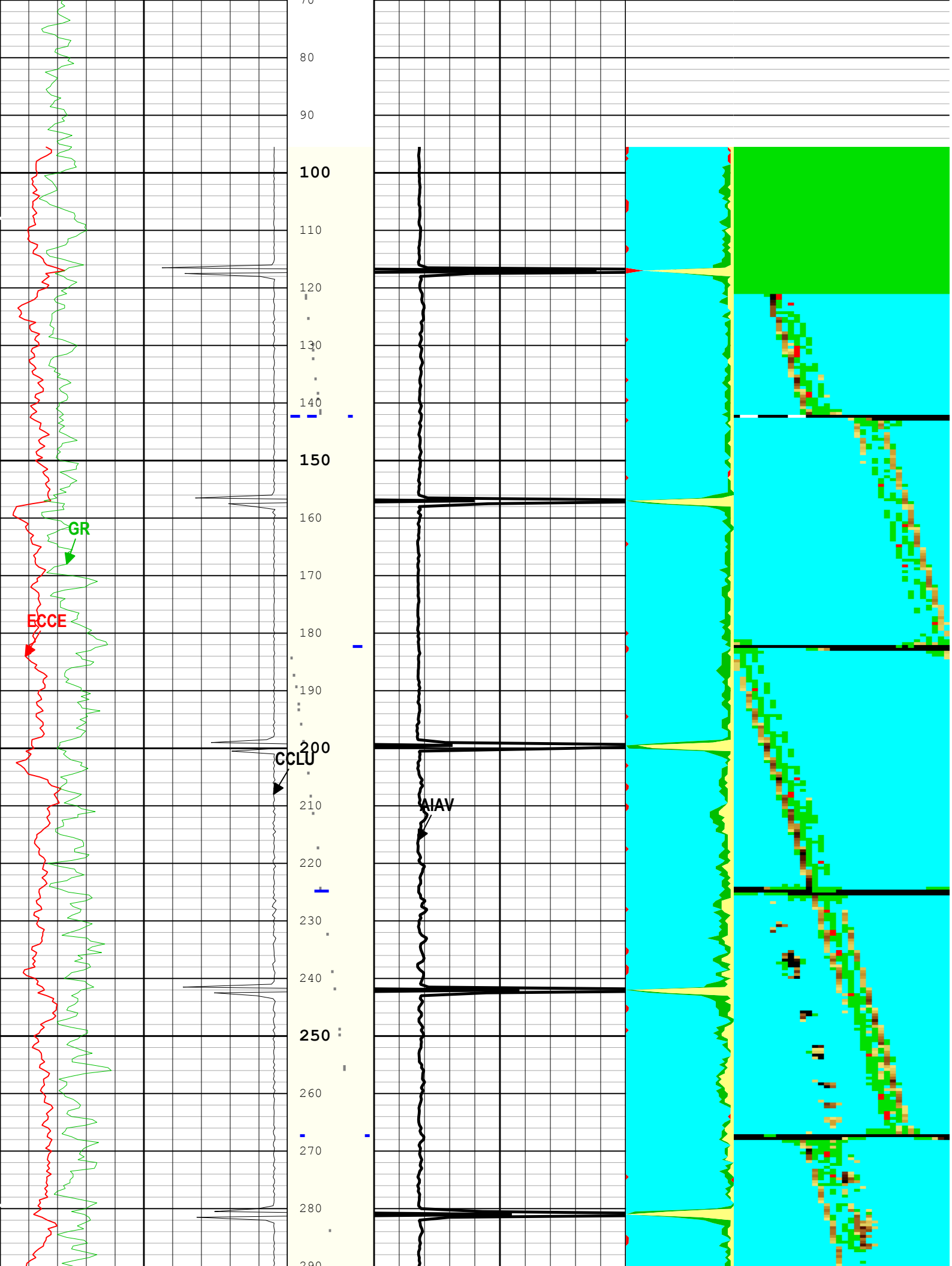
0 Mrayl 10





Custom Normalization

USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)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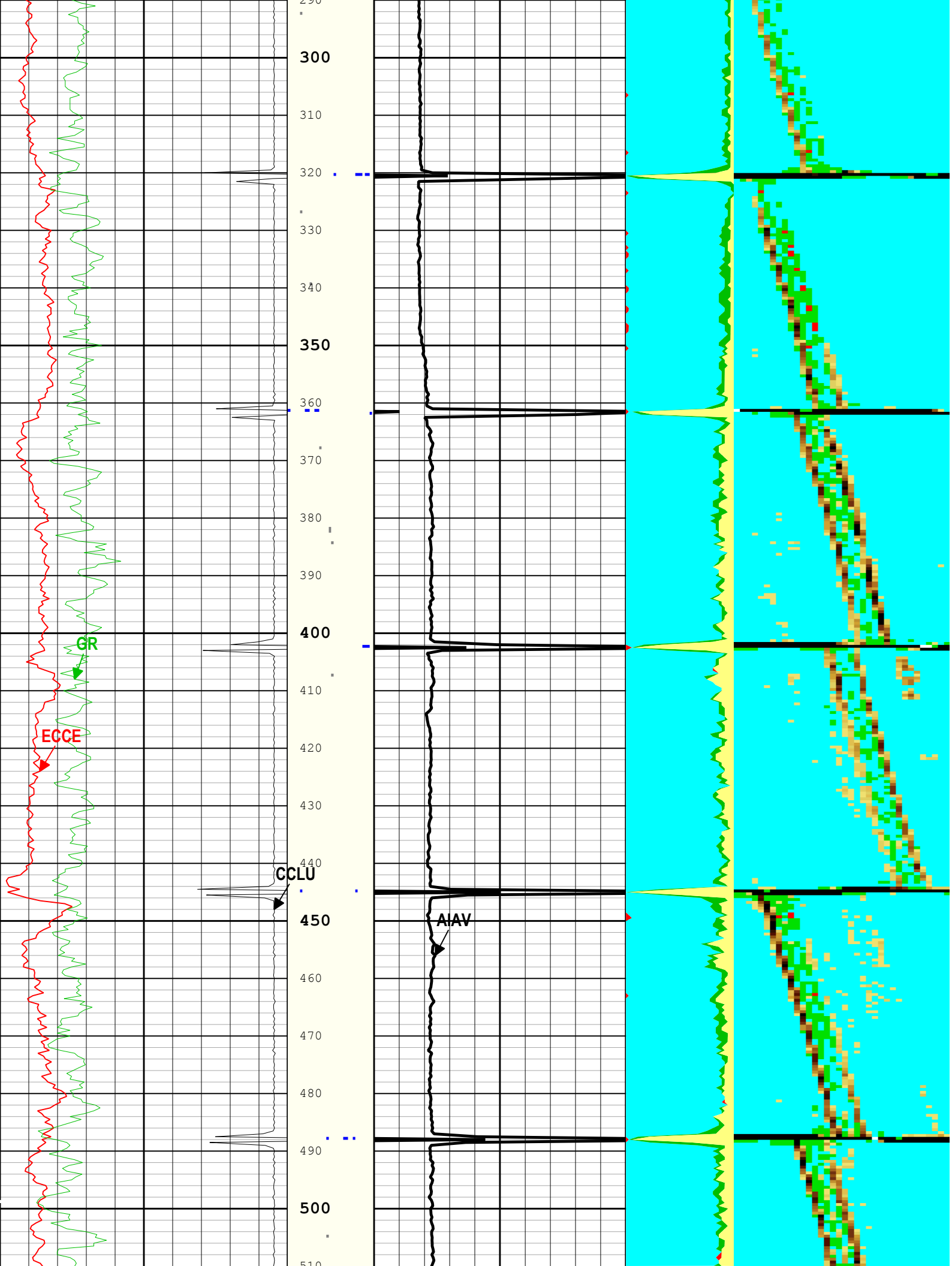
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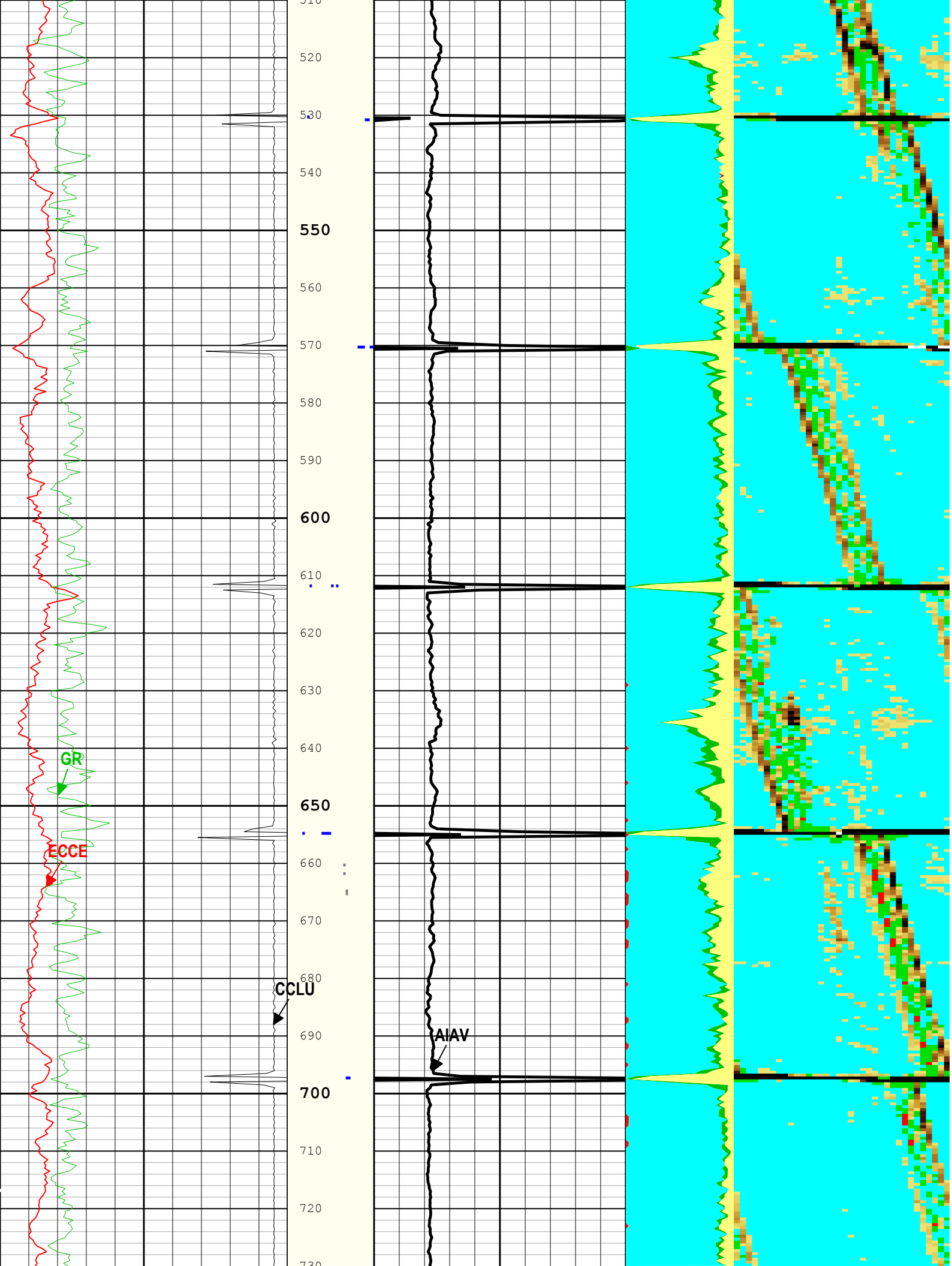
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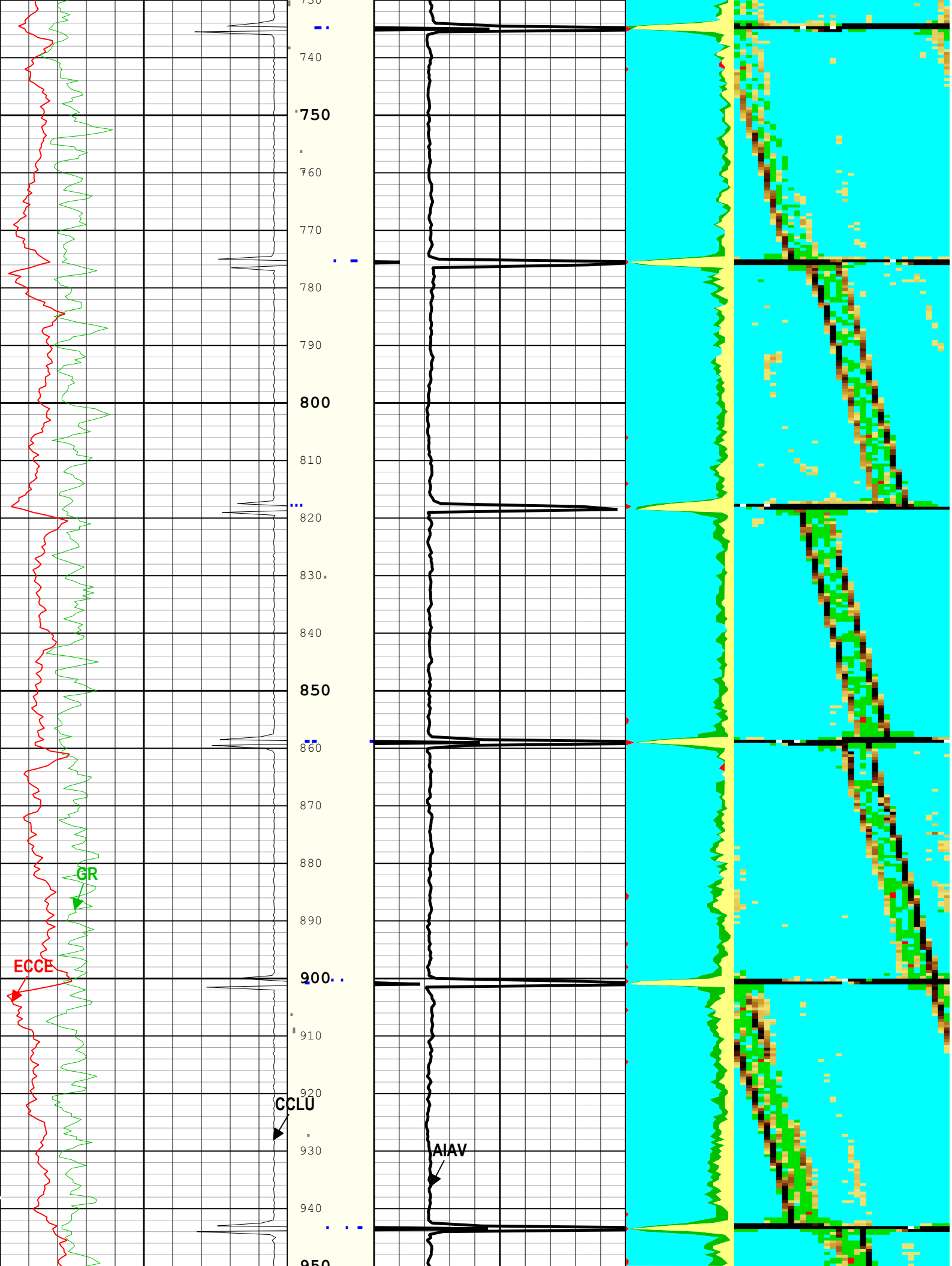
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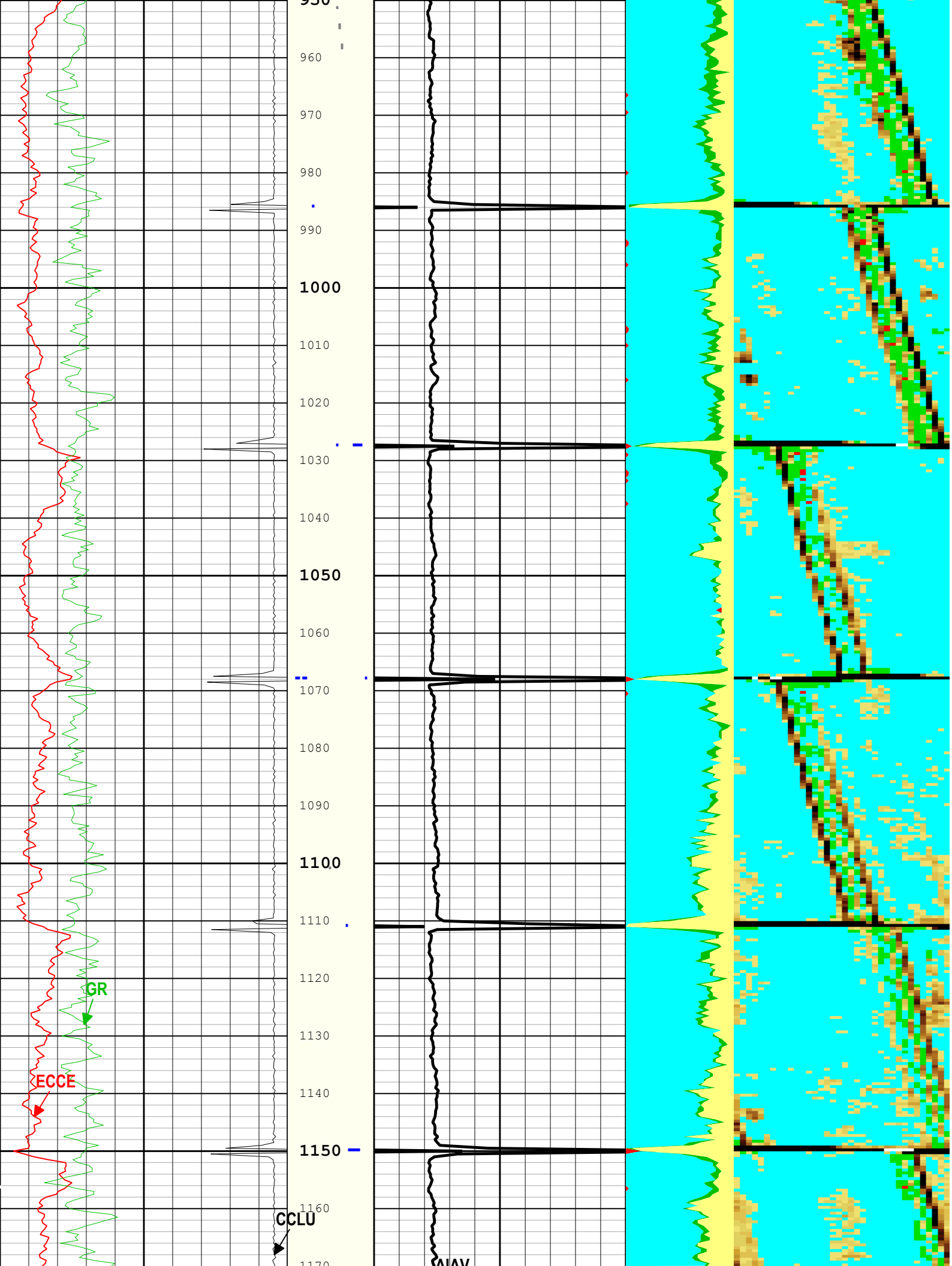
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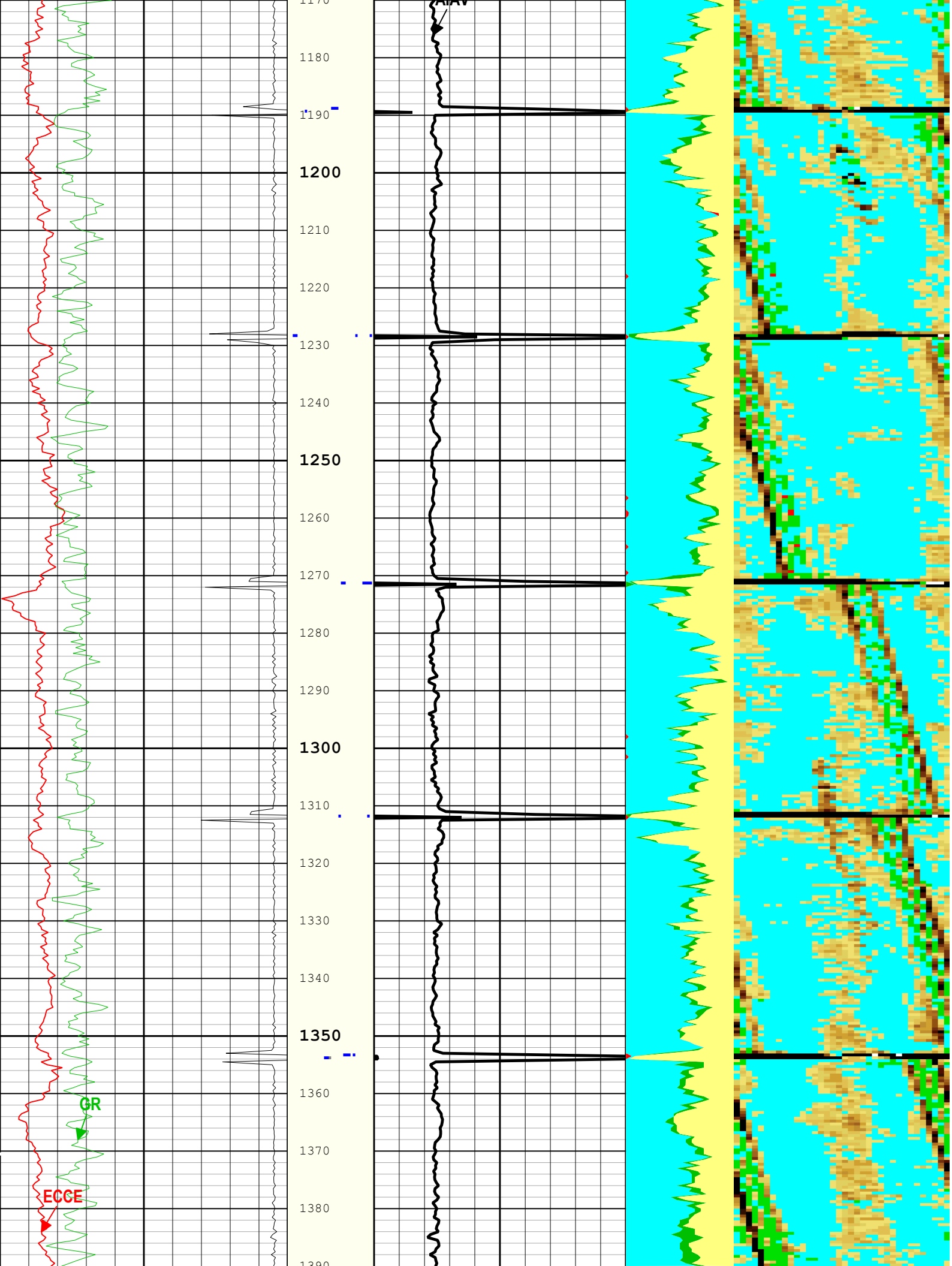
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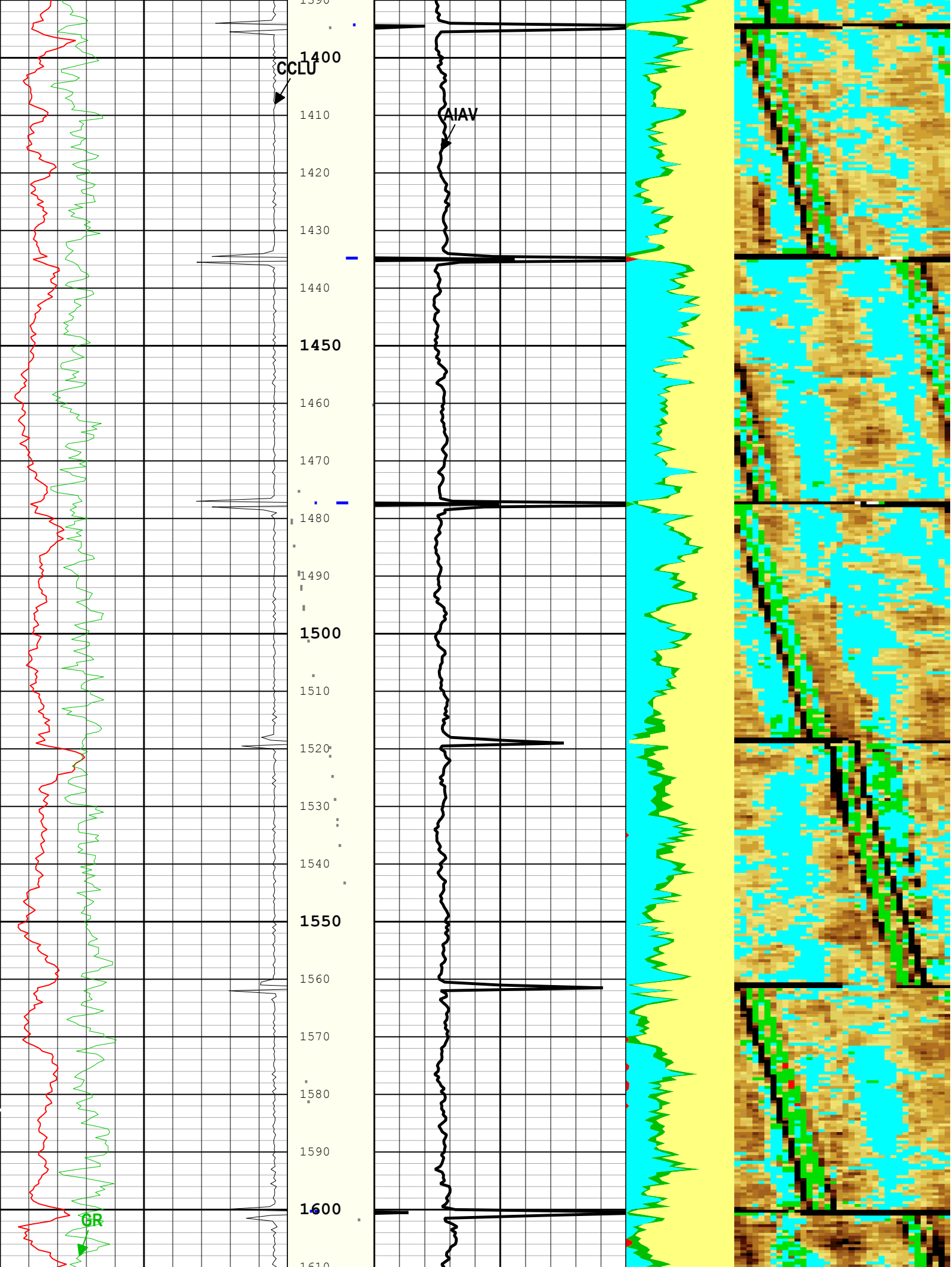
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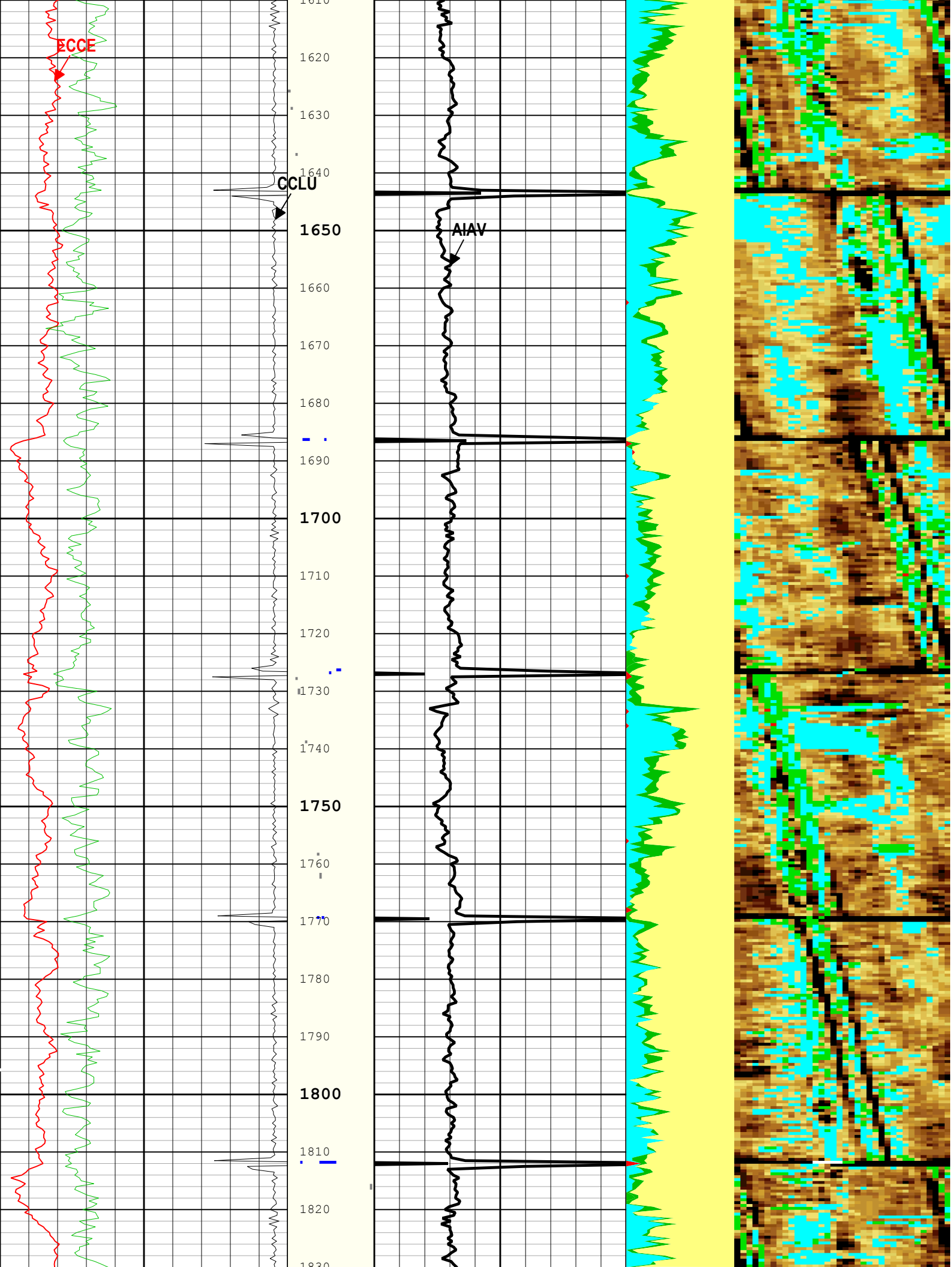
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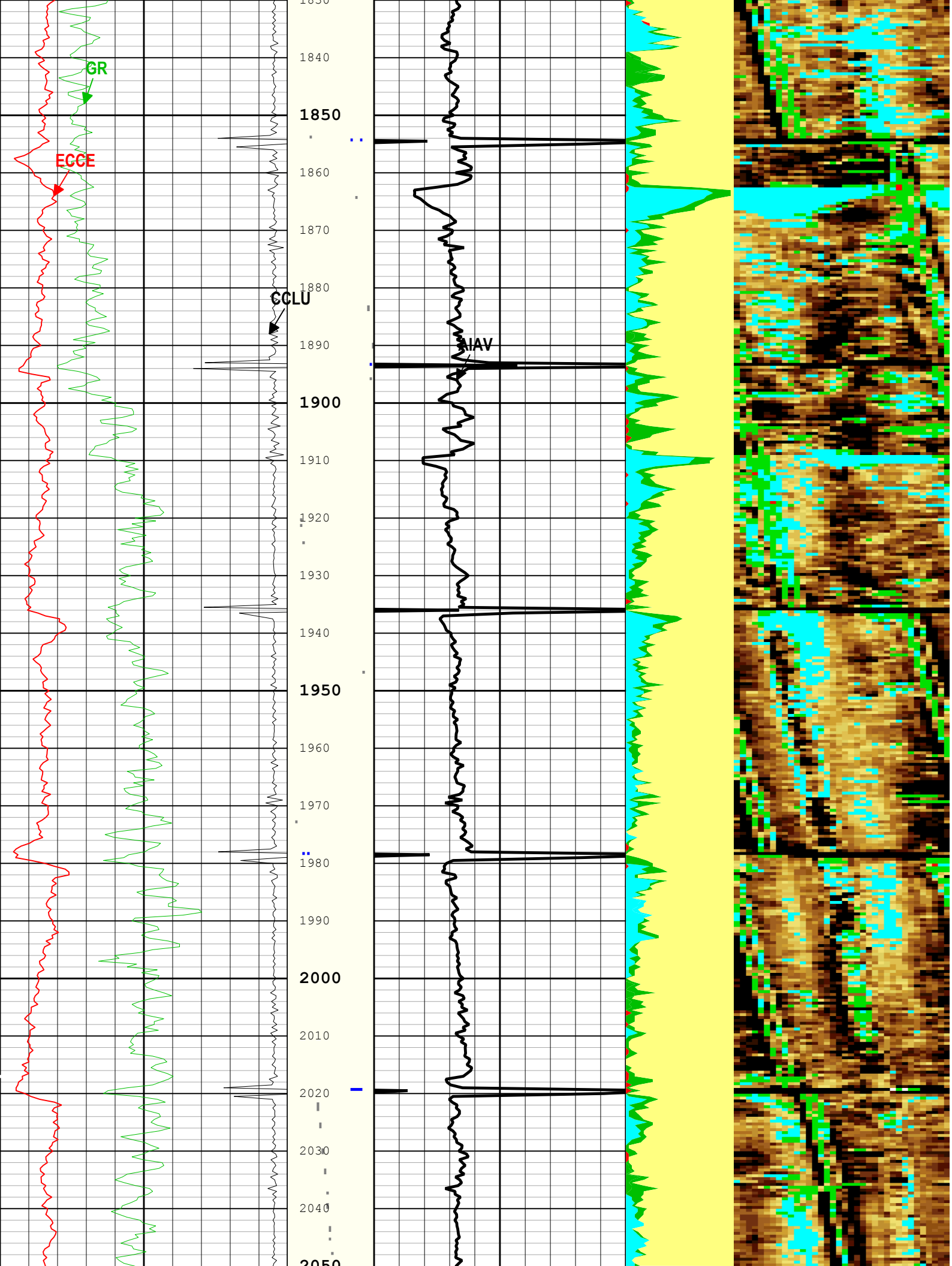
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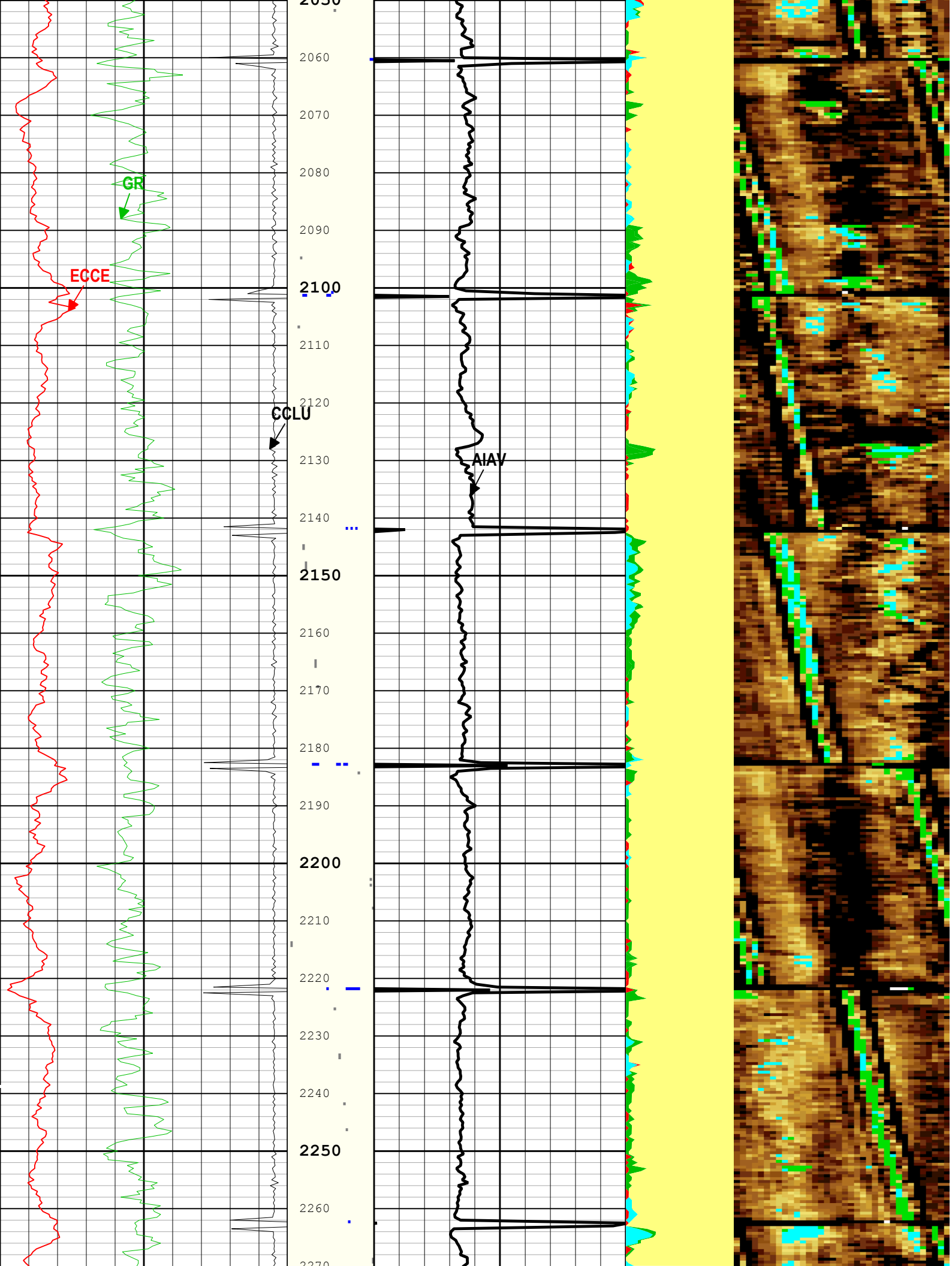
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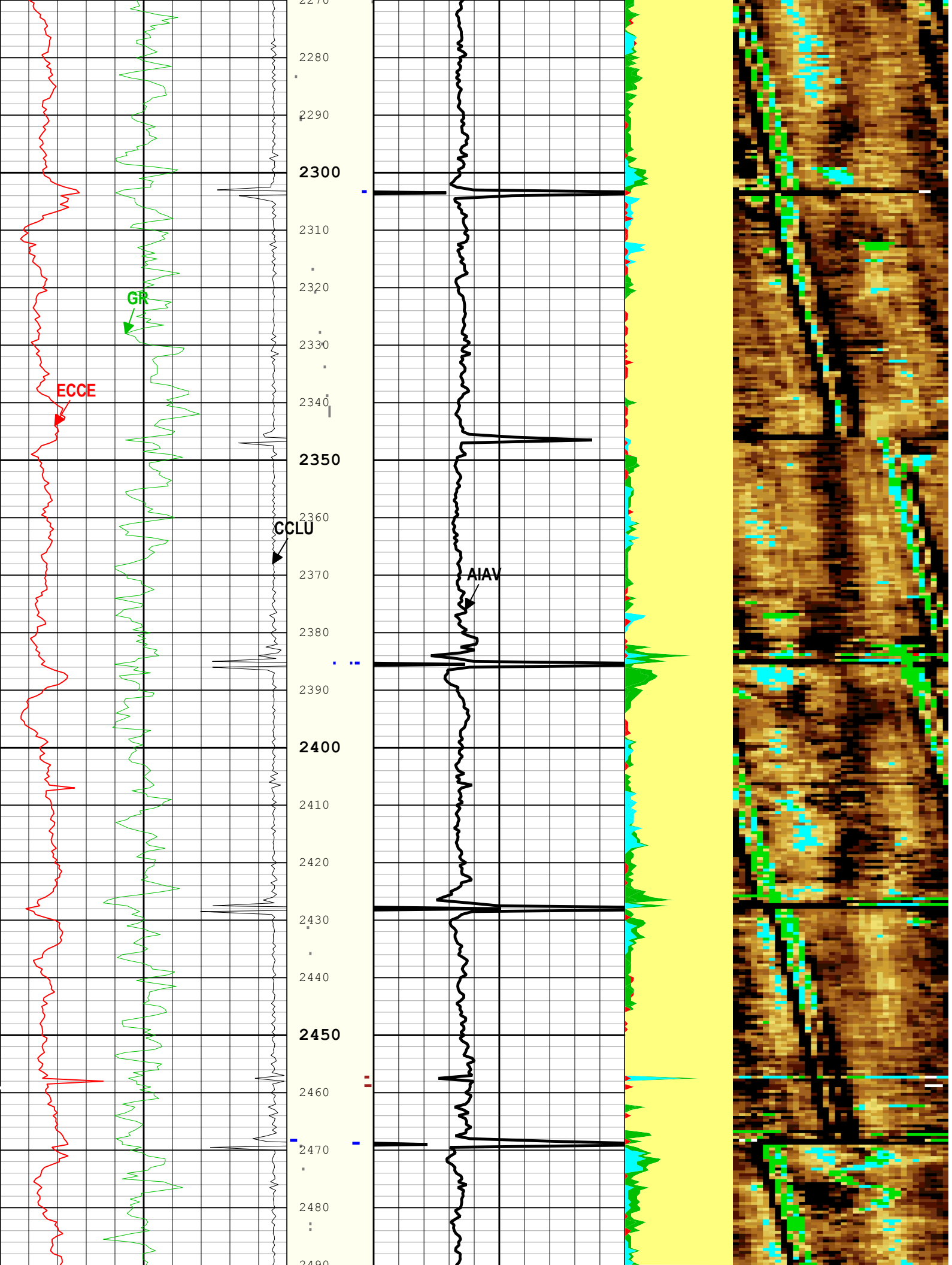
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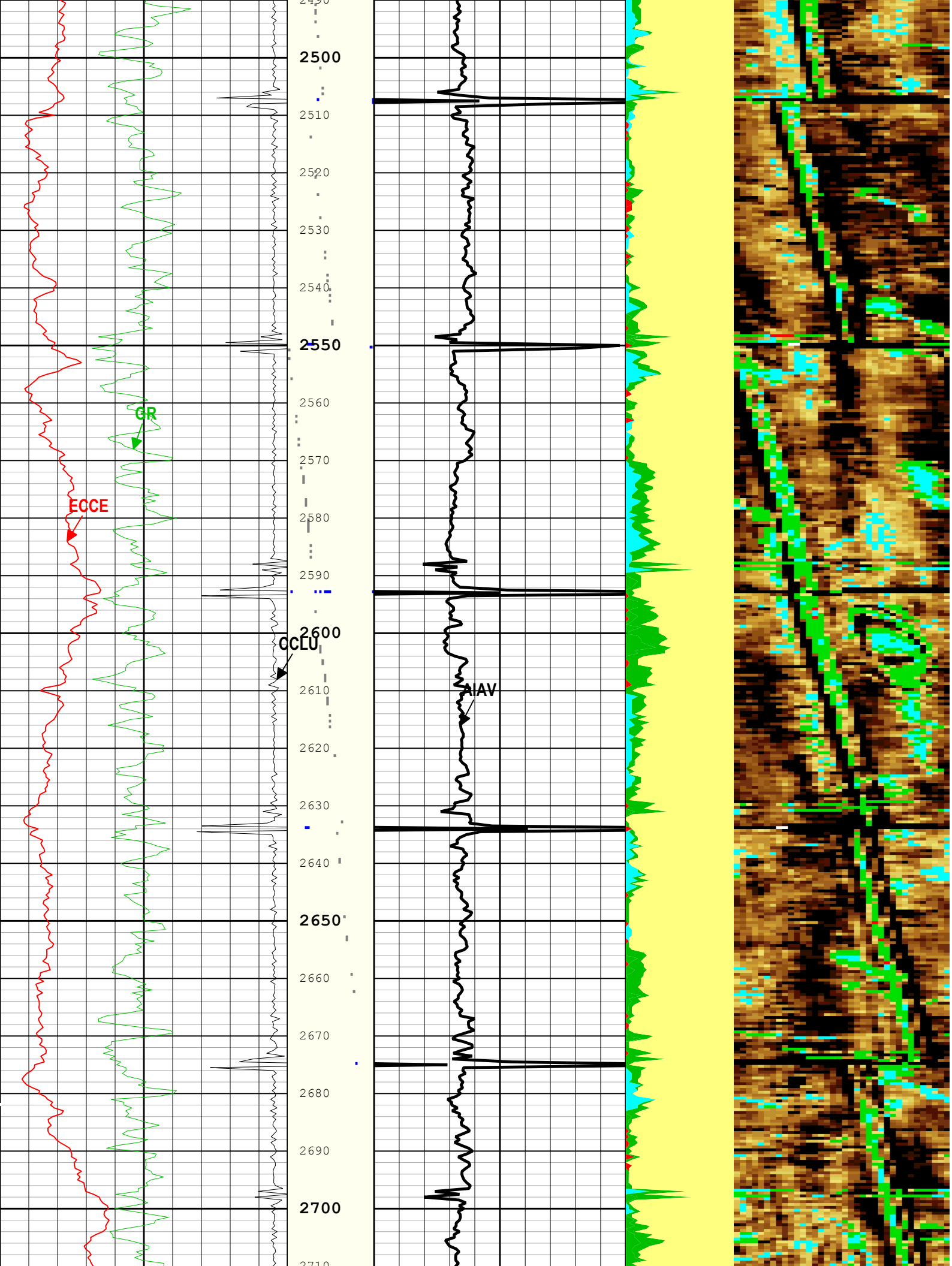
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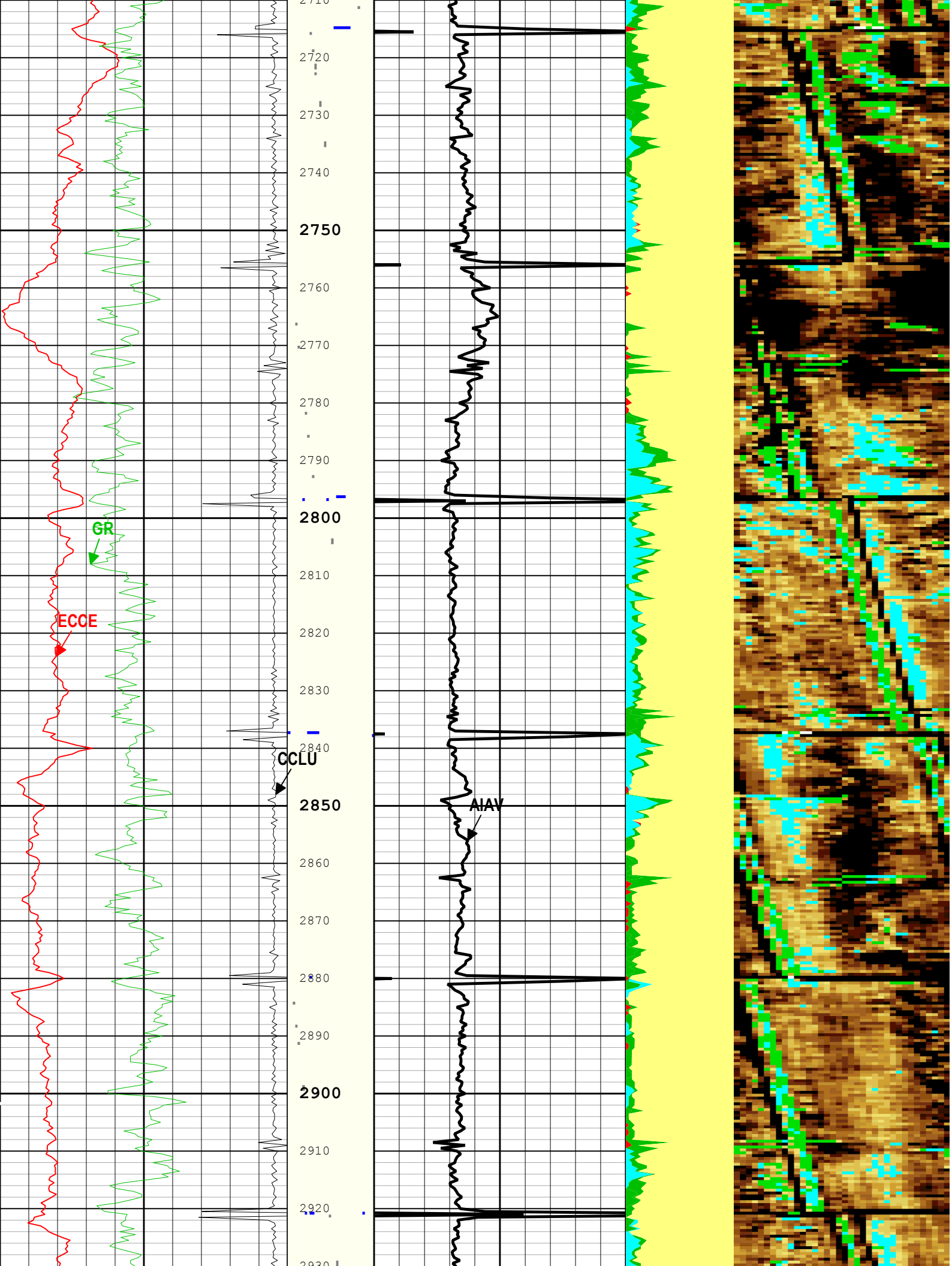
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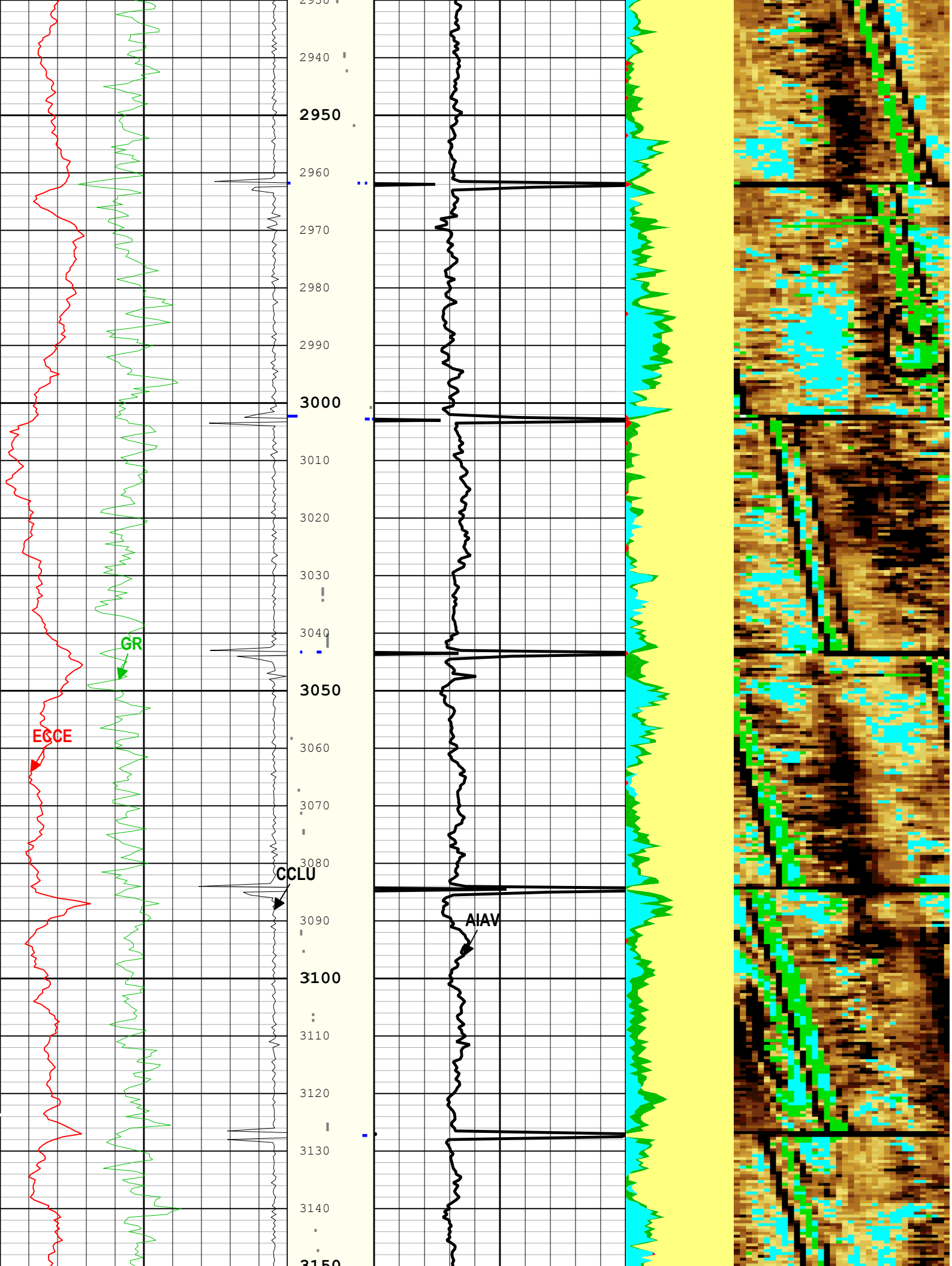
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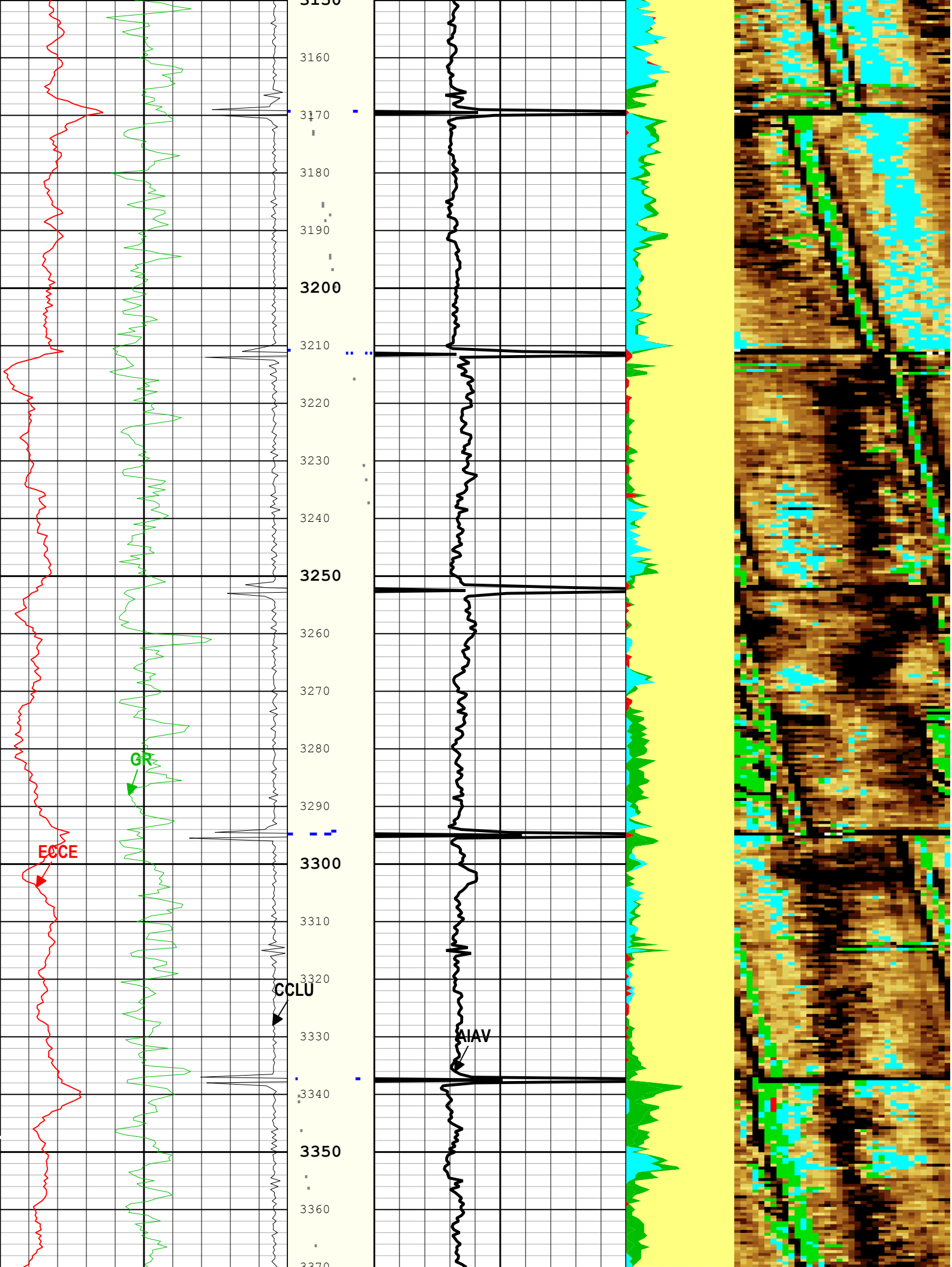
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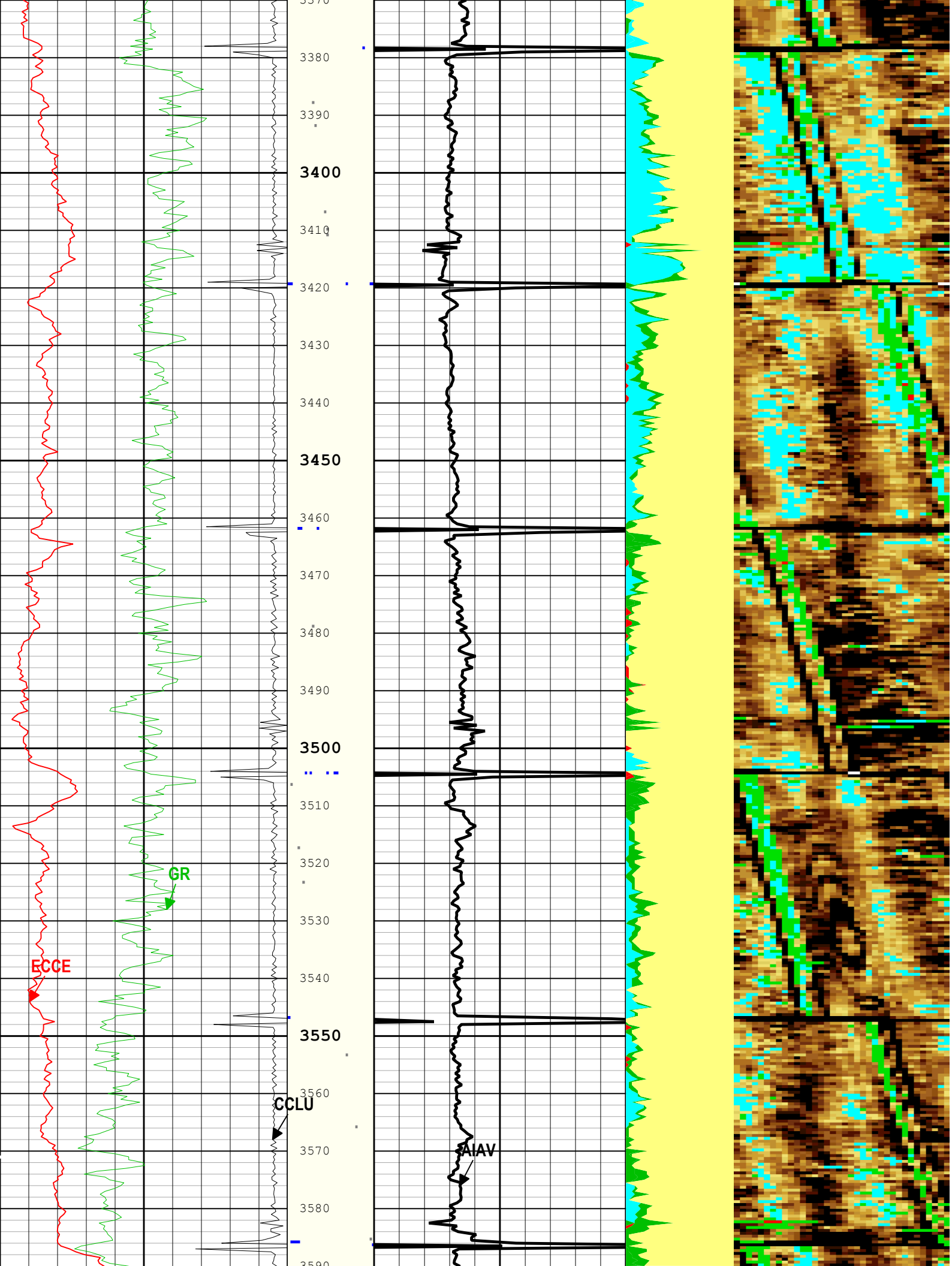
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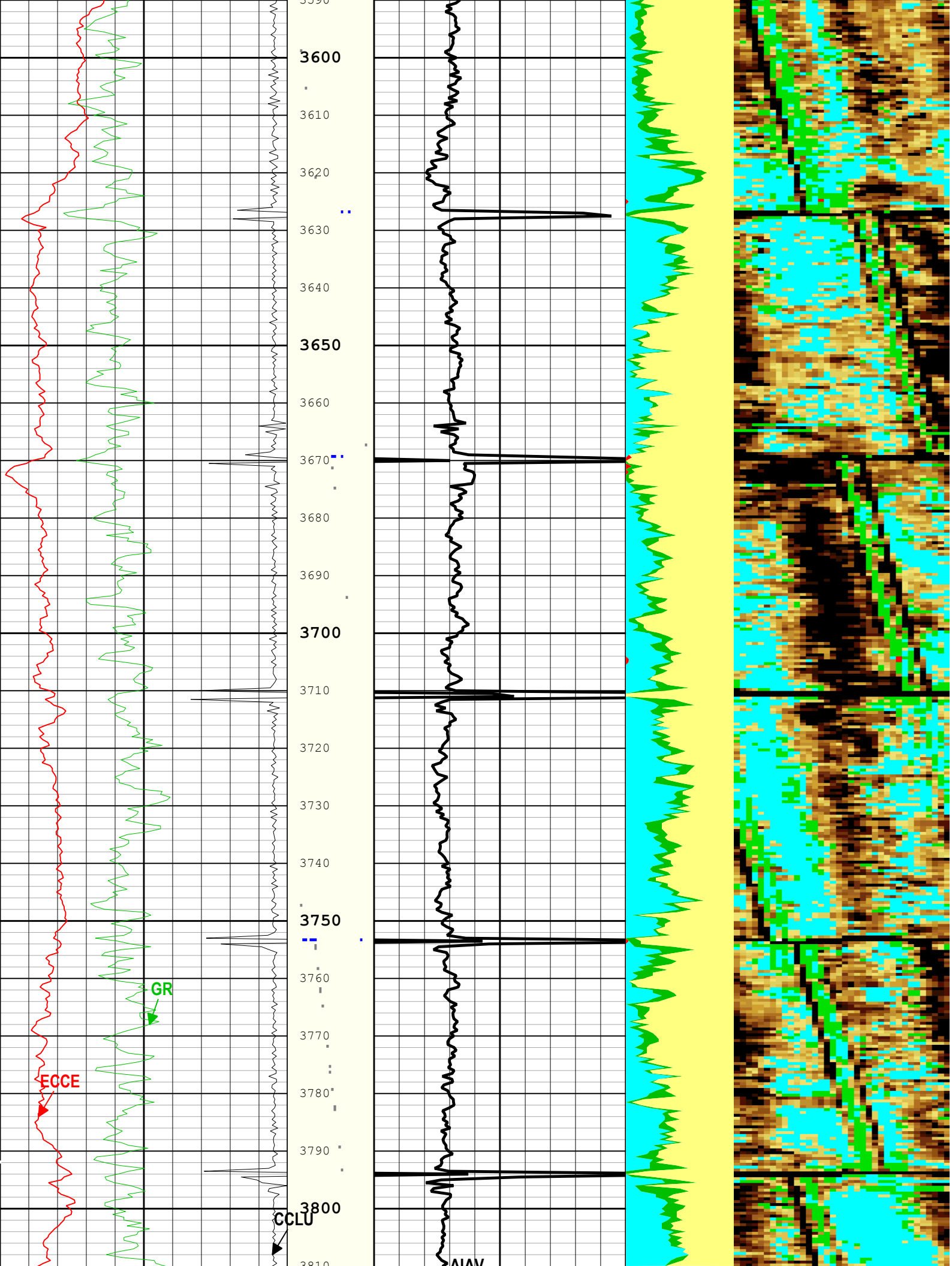
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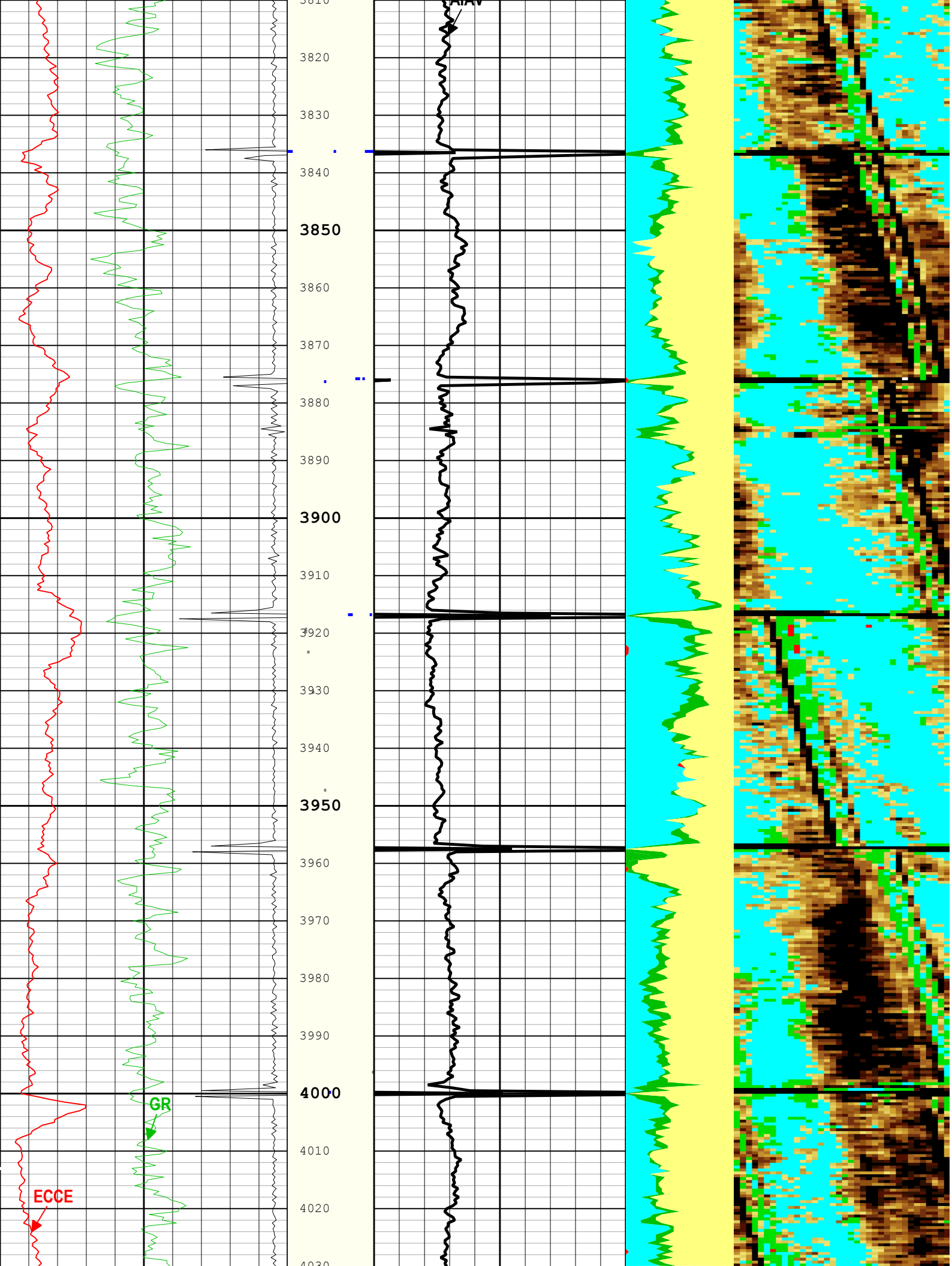
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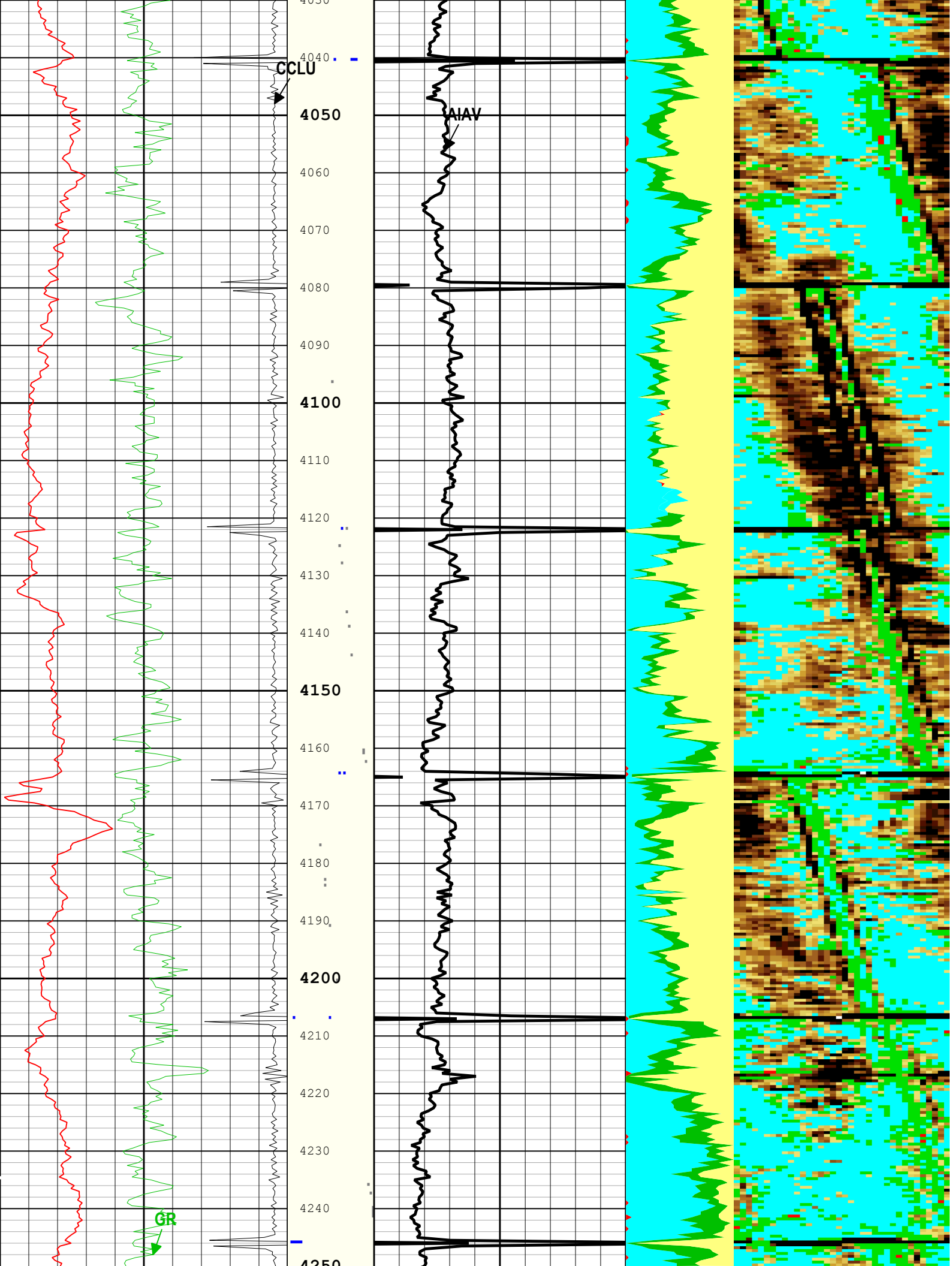
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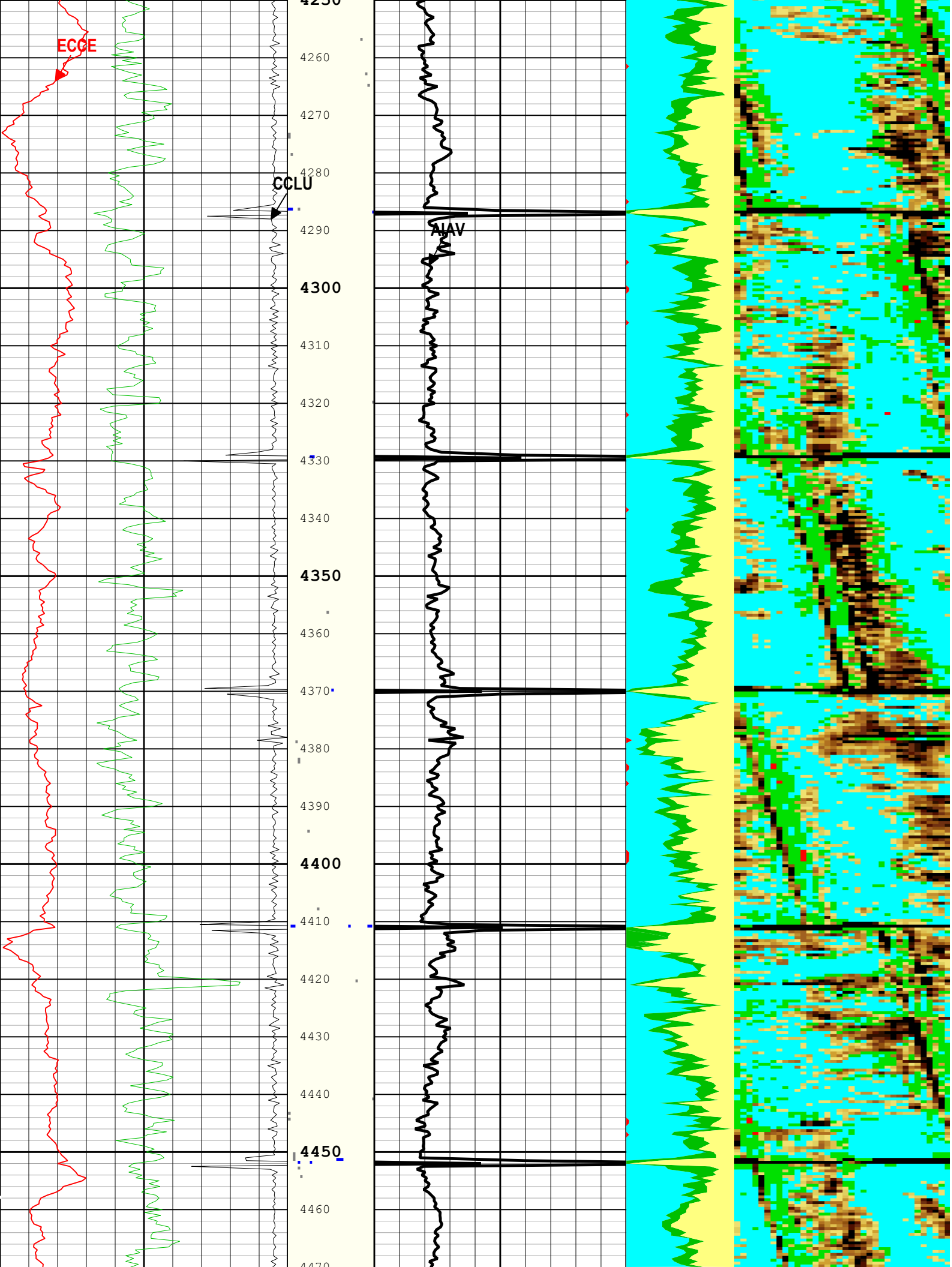
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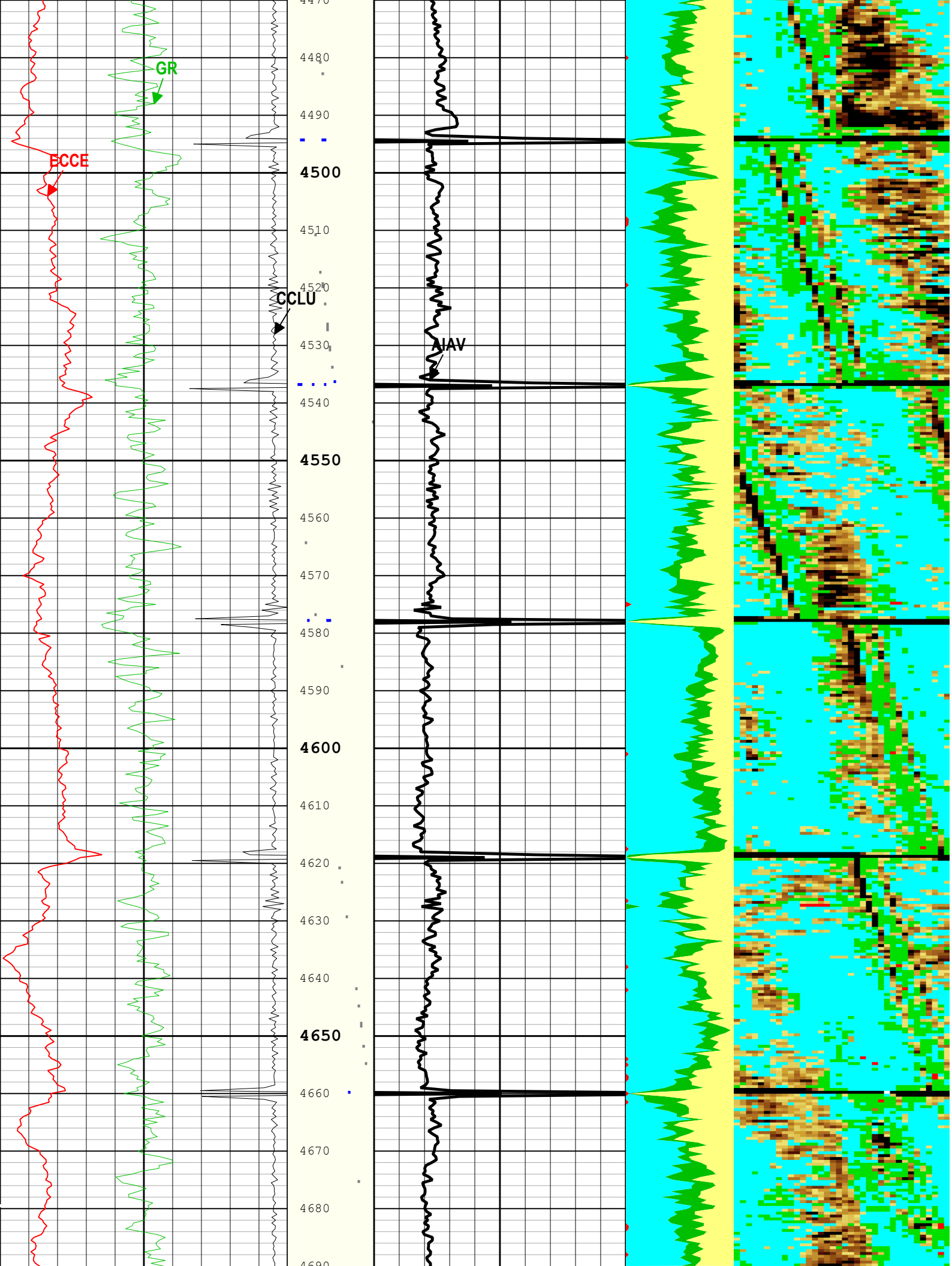
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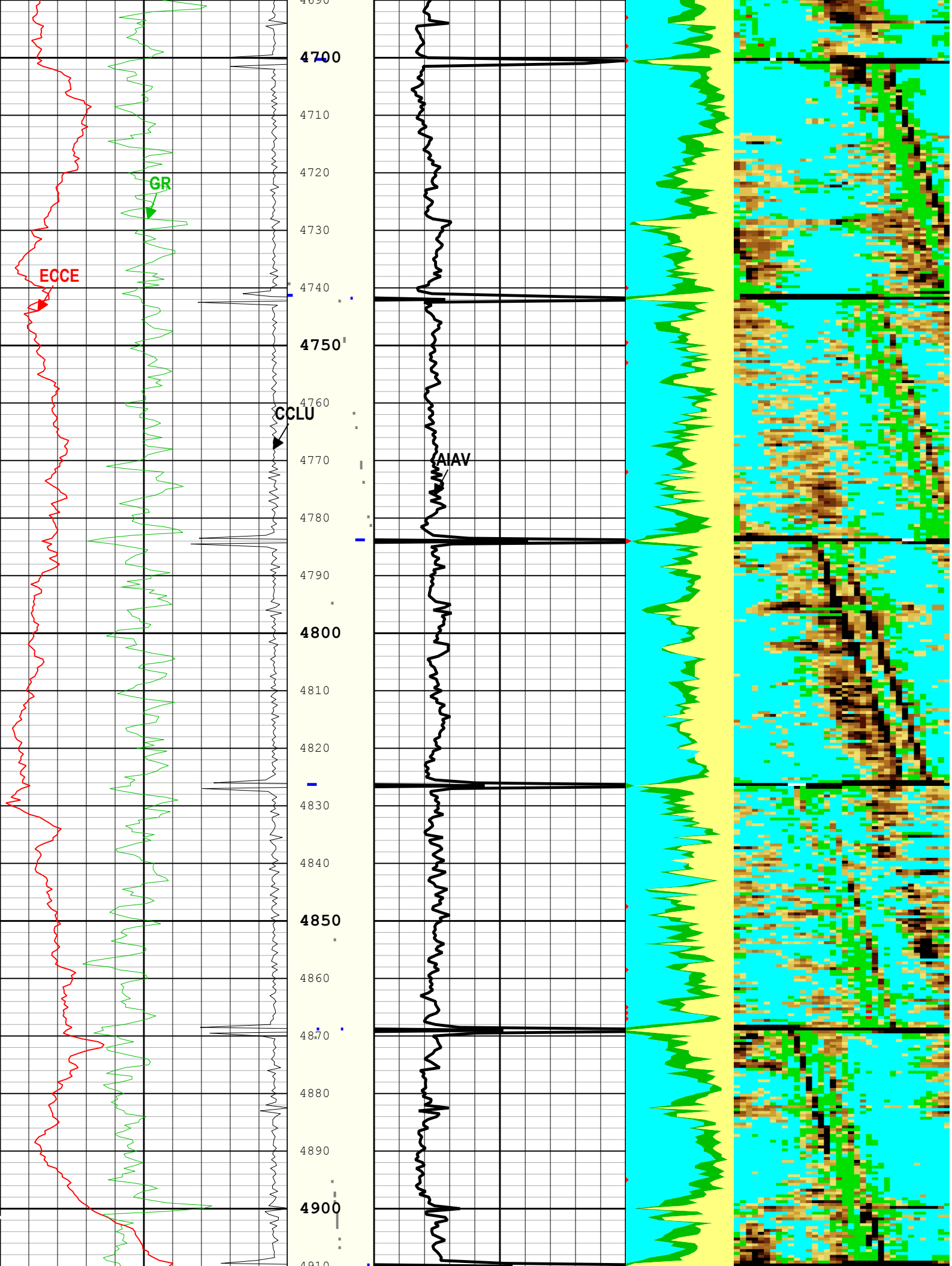
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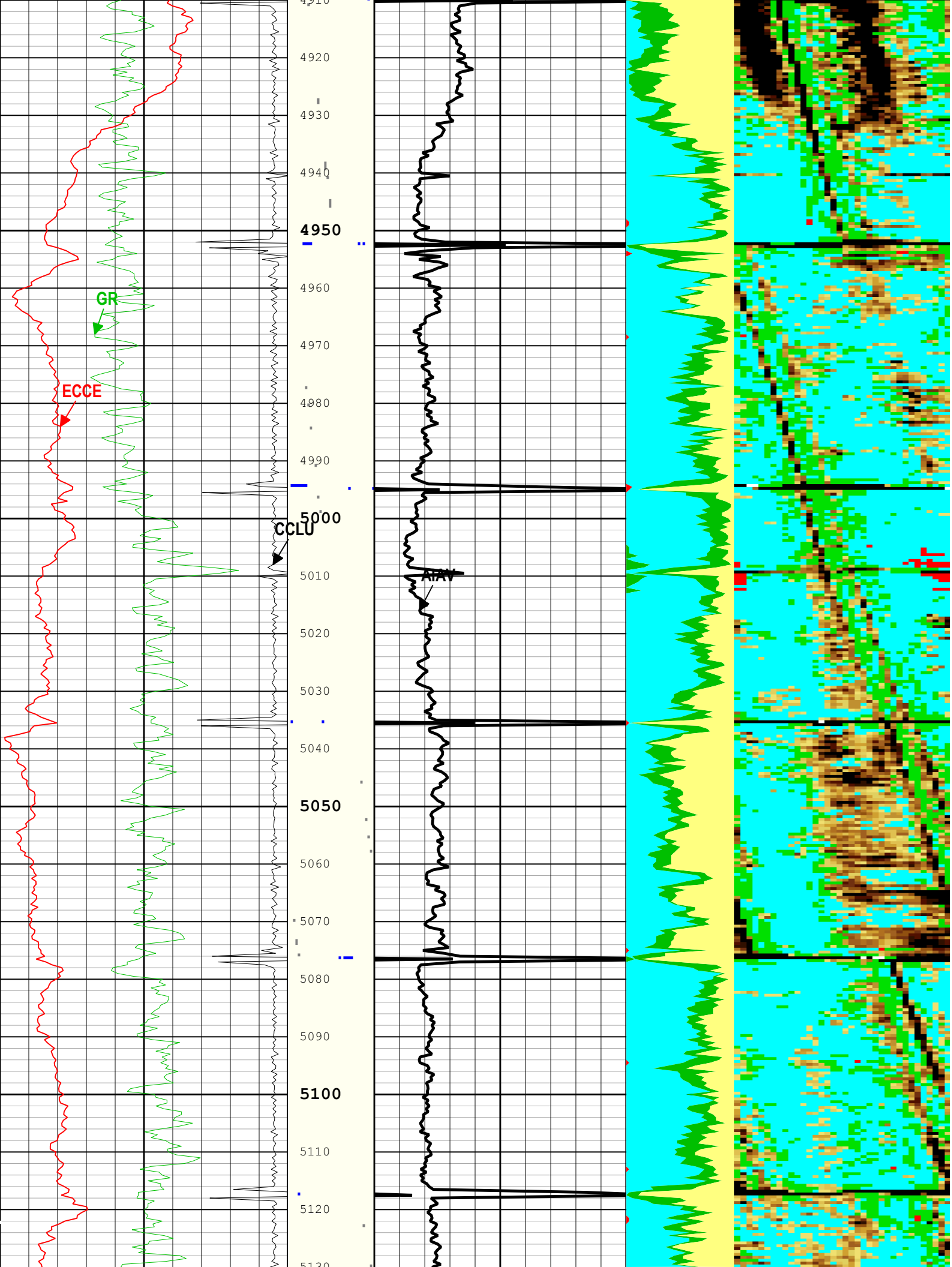
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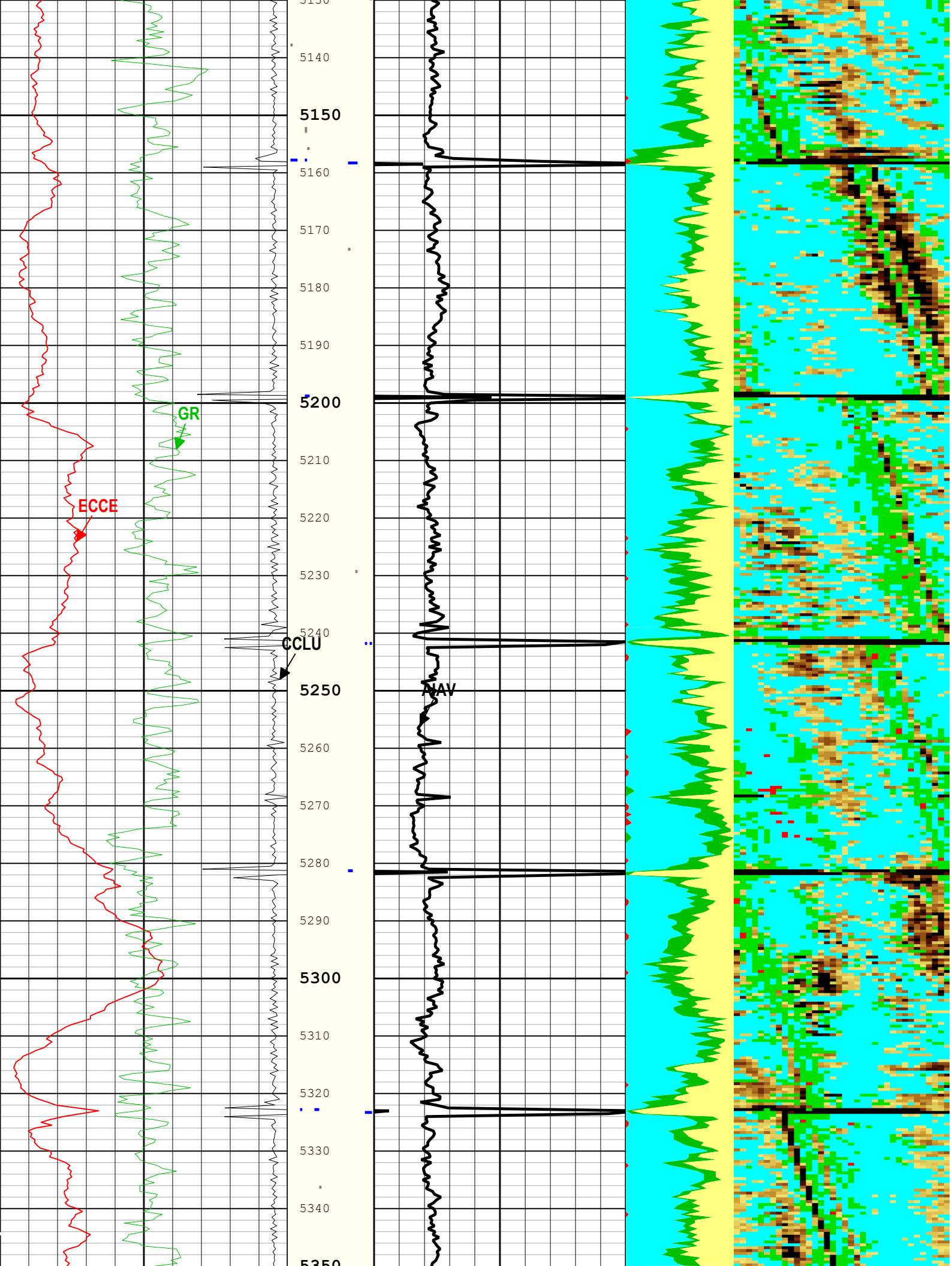
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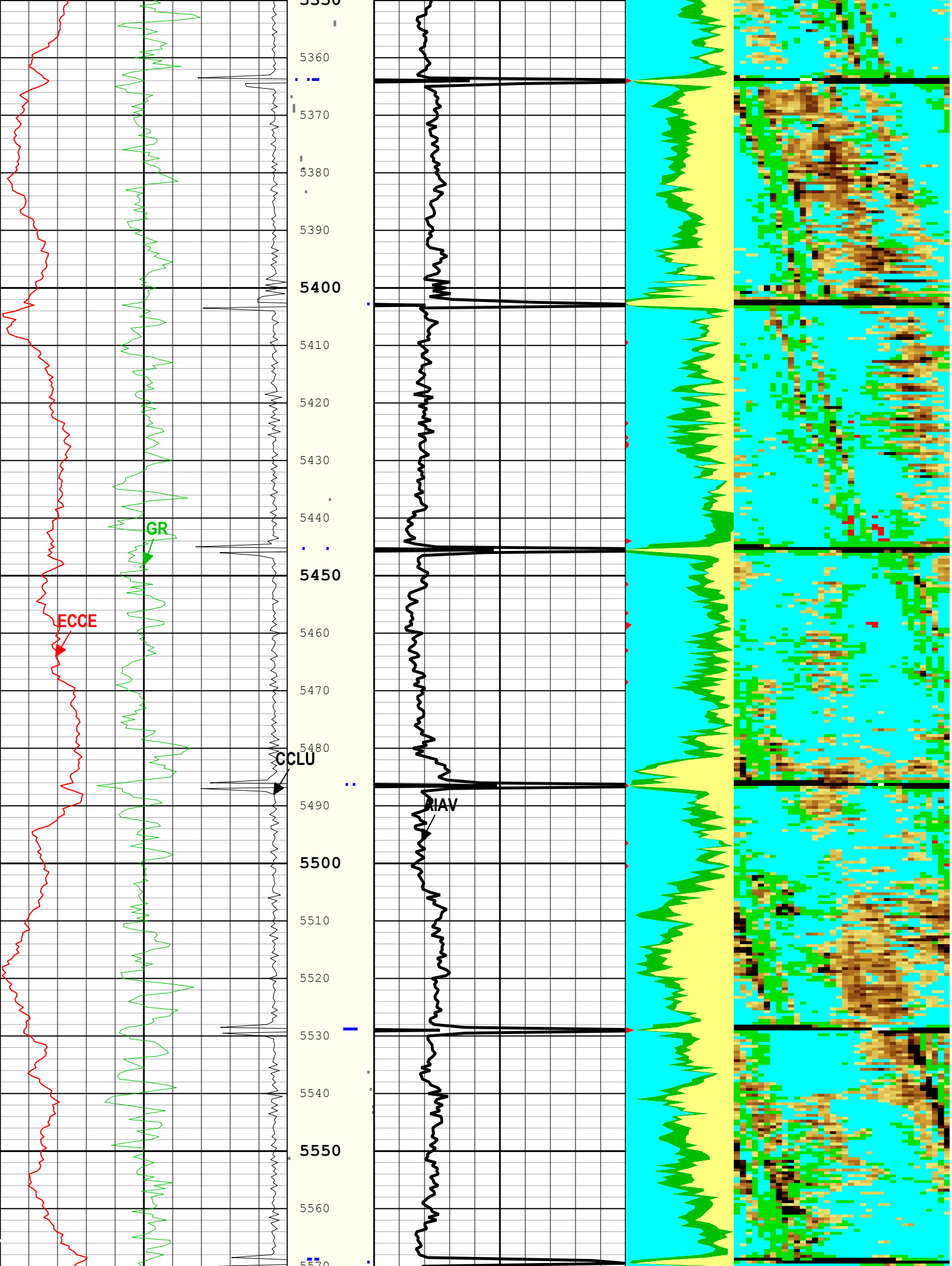
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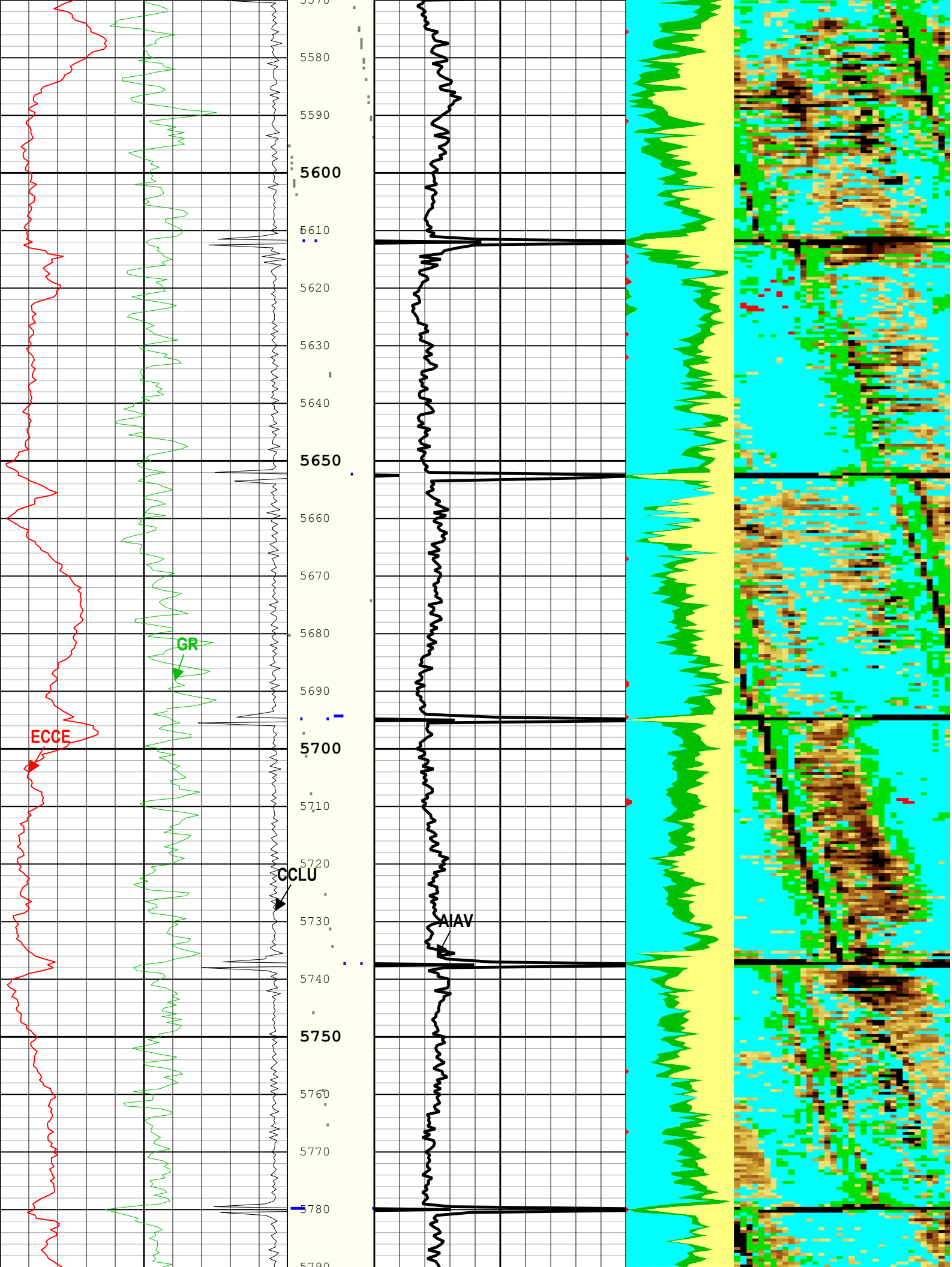
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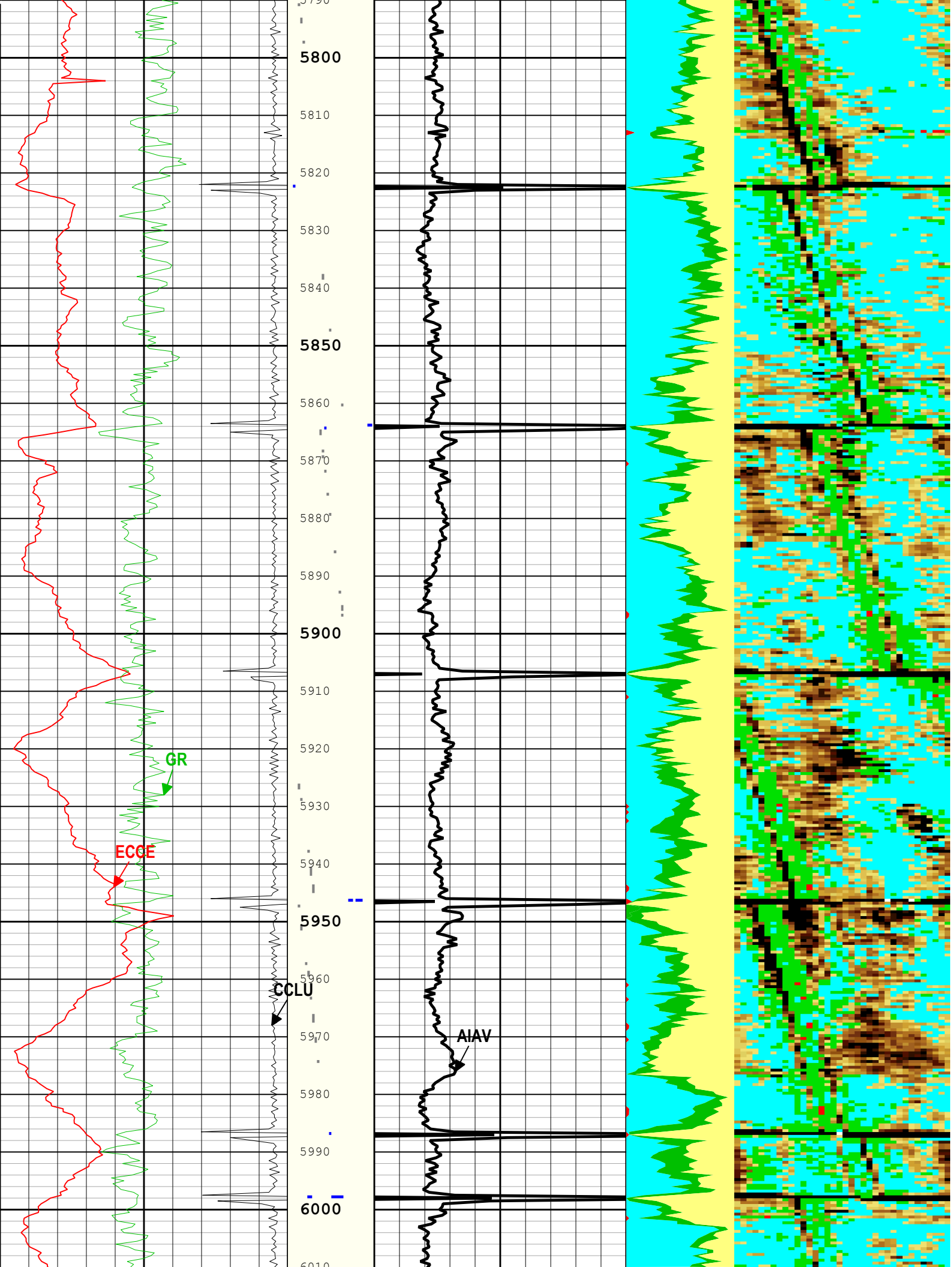
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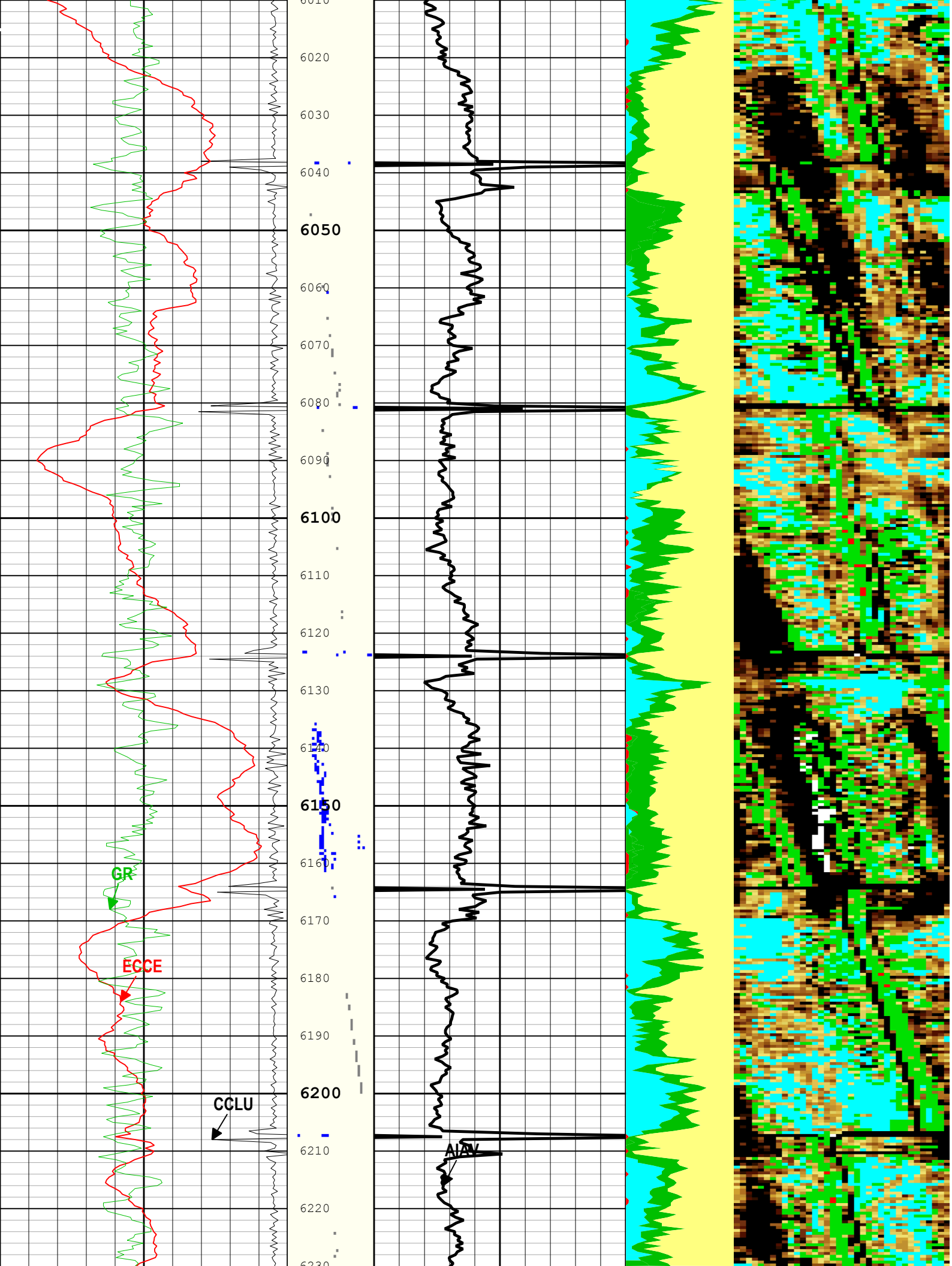
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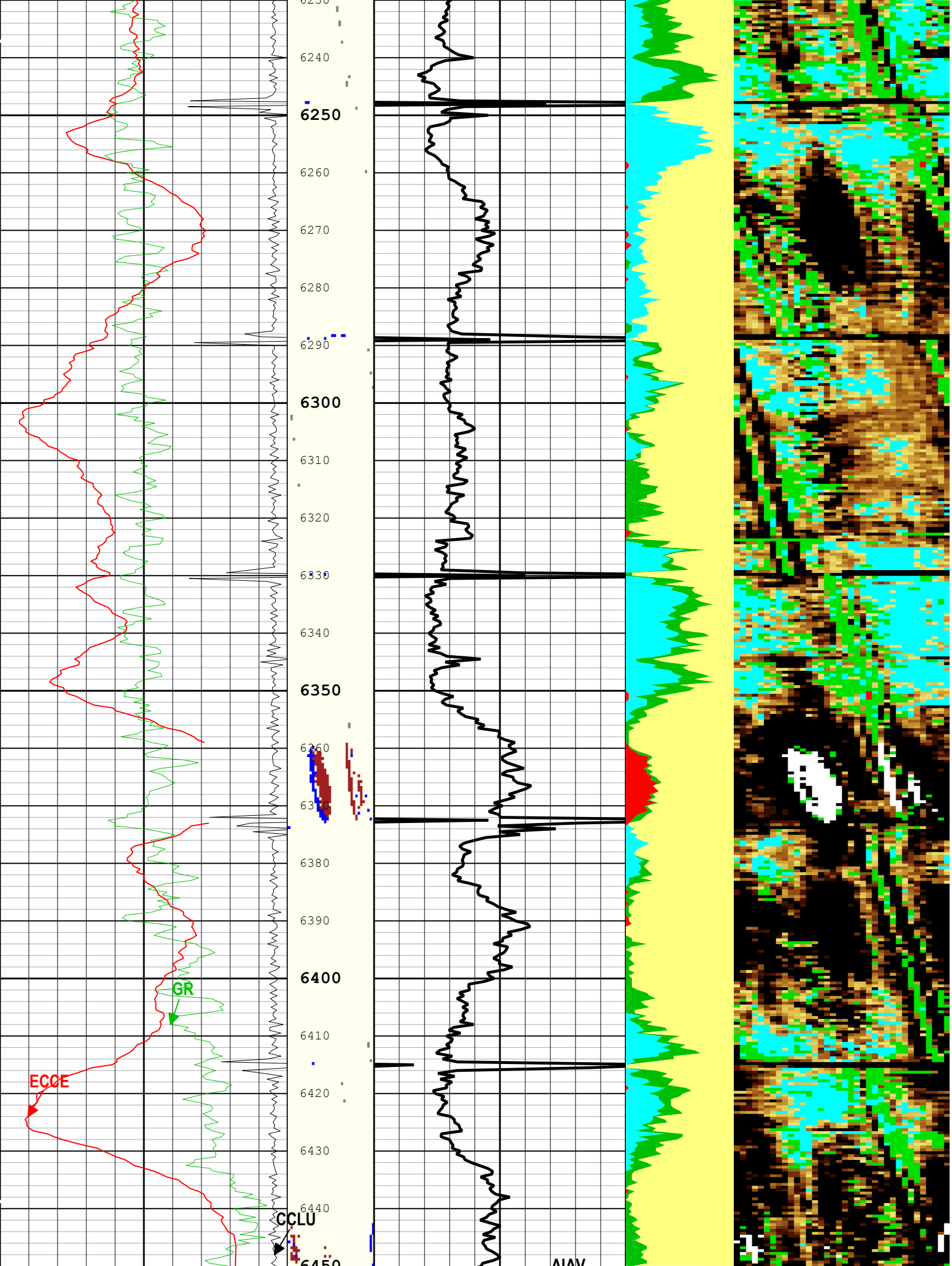
AIAV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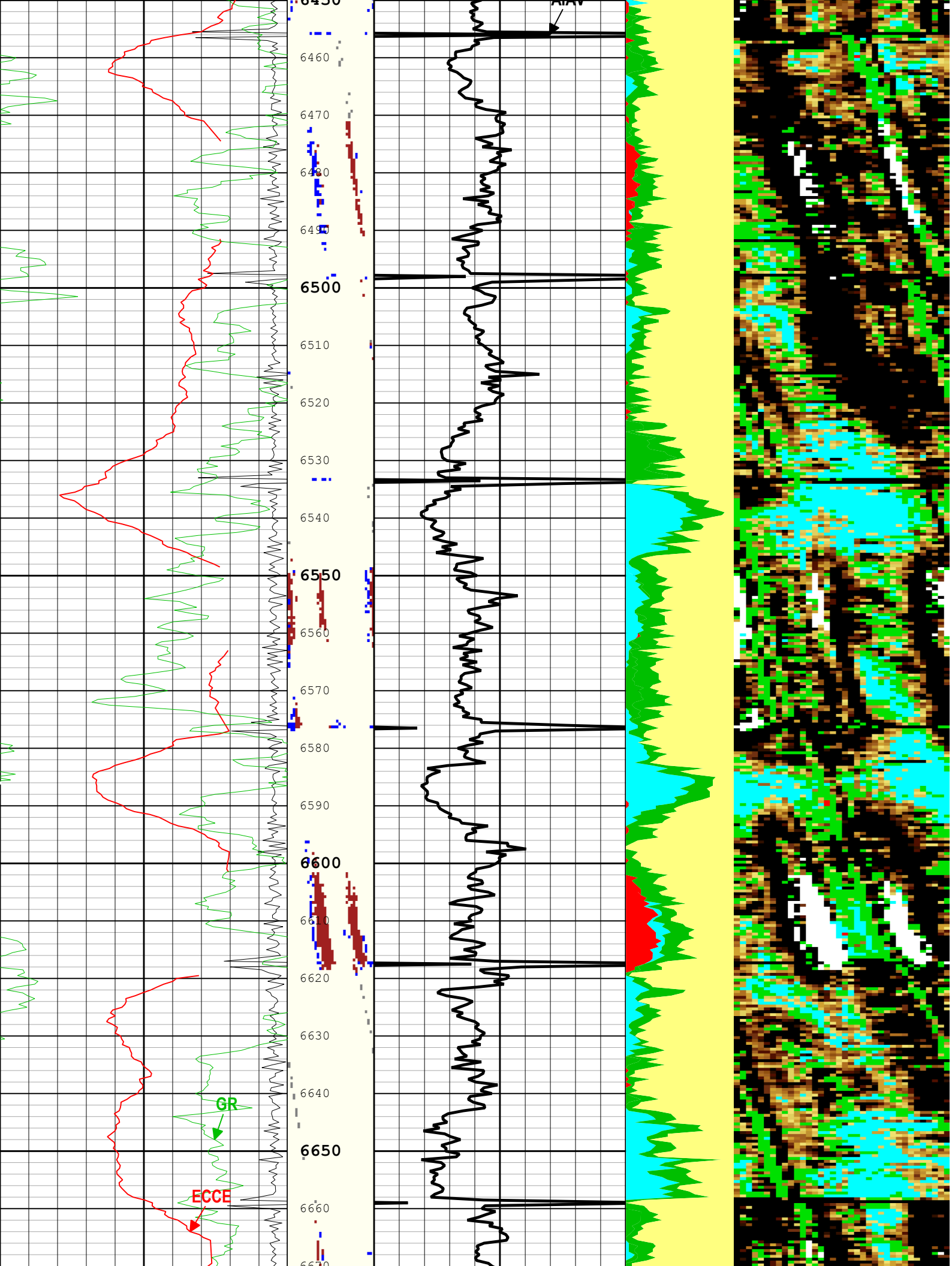
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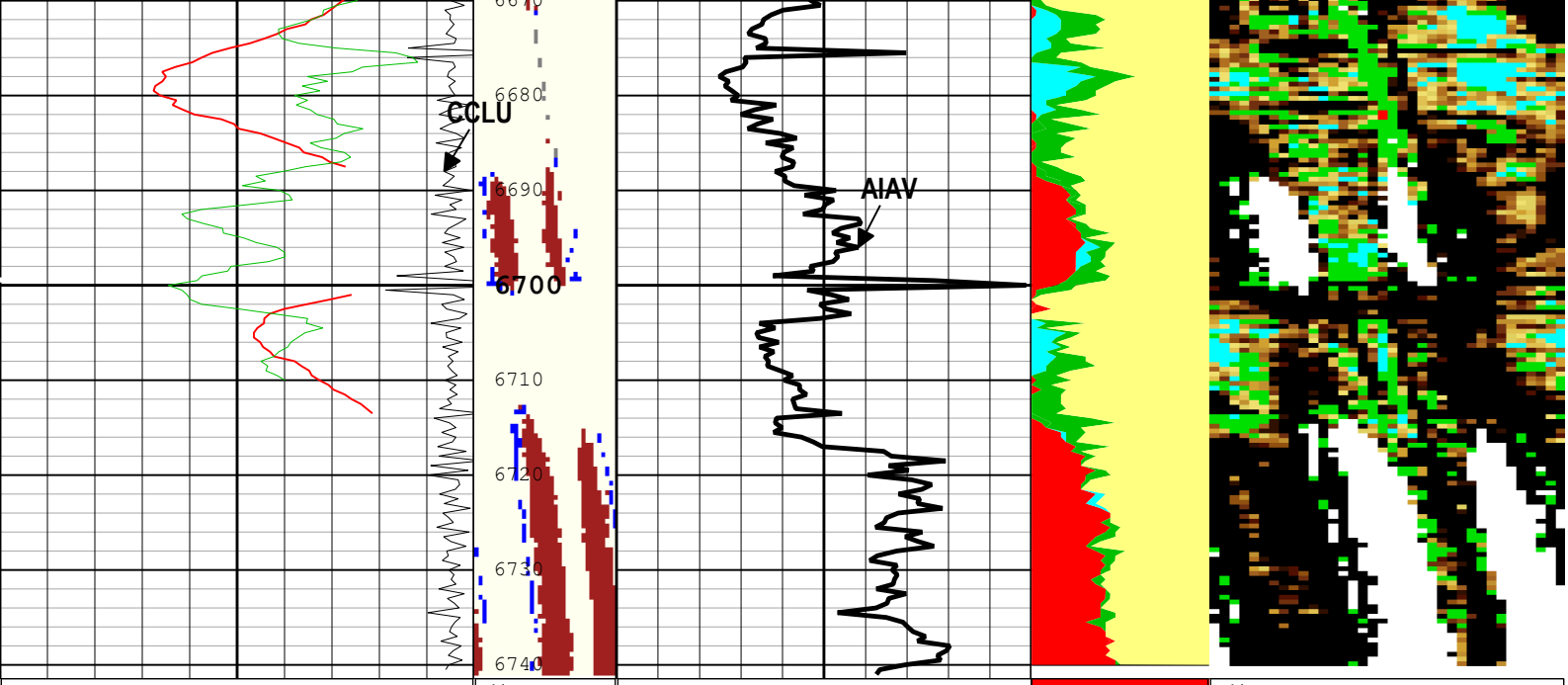


Casing Collar Locator Ultrasonic (CCLU) USIT-E

-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 2.599 2.854 3.109 3.363 3.618 3.872

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: 25-Jun-2016 11:33:48

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	Light Cement	
DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	190	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	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	1.08	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	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	1.78	Mrayl

ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	26	64	104
BS	13.5	104	1904
BS	8.5	1904	6741.5

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
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	Time Zoned	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	6800	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)
EMXV	50	24-Jun-2016 06:02:00	24-Jun-2016 06:06:01	6742.34	6230.04
EMXV	55	24-Jun-2016 06:06:01	24-Jun-2016 06:39:56	6230.04	95.61
WINB	15	24-Jun-2016 06:02:00	24-Jun-2016 06:06:04	6742.34	6219.27
WINB	22.27	24-Jun-2016 06:06:04	24-Jun-2016 06:07:56	6219.27	5805.24
WINB	30.45	24-Jun-2016 06:07:56	24-Jun-2016 06:08:44	5805.24	5624.01
WINB	34.54	24-Jun-2016 06:08:44	24-Jun-2016 06:22:59	5624.01	2459.62
WINB	44.41	24-Jun-2016 06:22:59	24-Jun-2016 06:23:02	2459.62	2449.15
WINB	42.09	24-Jun-2016 06:23:02	24-Jun-2016 06:23:13	2449.15	2408.69
WINB	39.01	24-Jun-2016 06:23:13	24-Jun-2016 06:39:56	2408.69	95.61
WINE	100	24-Jun-2016 06:02:00	24-Jun-2016 06:03:03	6742.34	6695.23
WINE	66.59	24-Jun-2016 06:03:03	24-Jun-2016 06:03:11	6695.23	6684.27
WINE	75.45	24-Jun-2016 06:03:11	24-Jun-2016 06:07:54	6684.27	5812.54
WINE	67.27	24-Jun-2016 06:07:54	24-Jun-2016 06:23:21	5812.54	2380.22
WINE	65.97	24-Jun-2016 06:23:21	24-Jun-2016 06:39:56	2380.22	95.61

All depth are at tool zero.

One

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2016	6.0.53731.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[3]:Up	Up	2282.78 ft	3045.52 ft	24-Jun-2016 6:46:18 AM	24-Jun-2016 6:49:39 AM	ON	6.01 ft	Yes

All depths are referenced to toolstring zero

Log

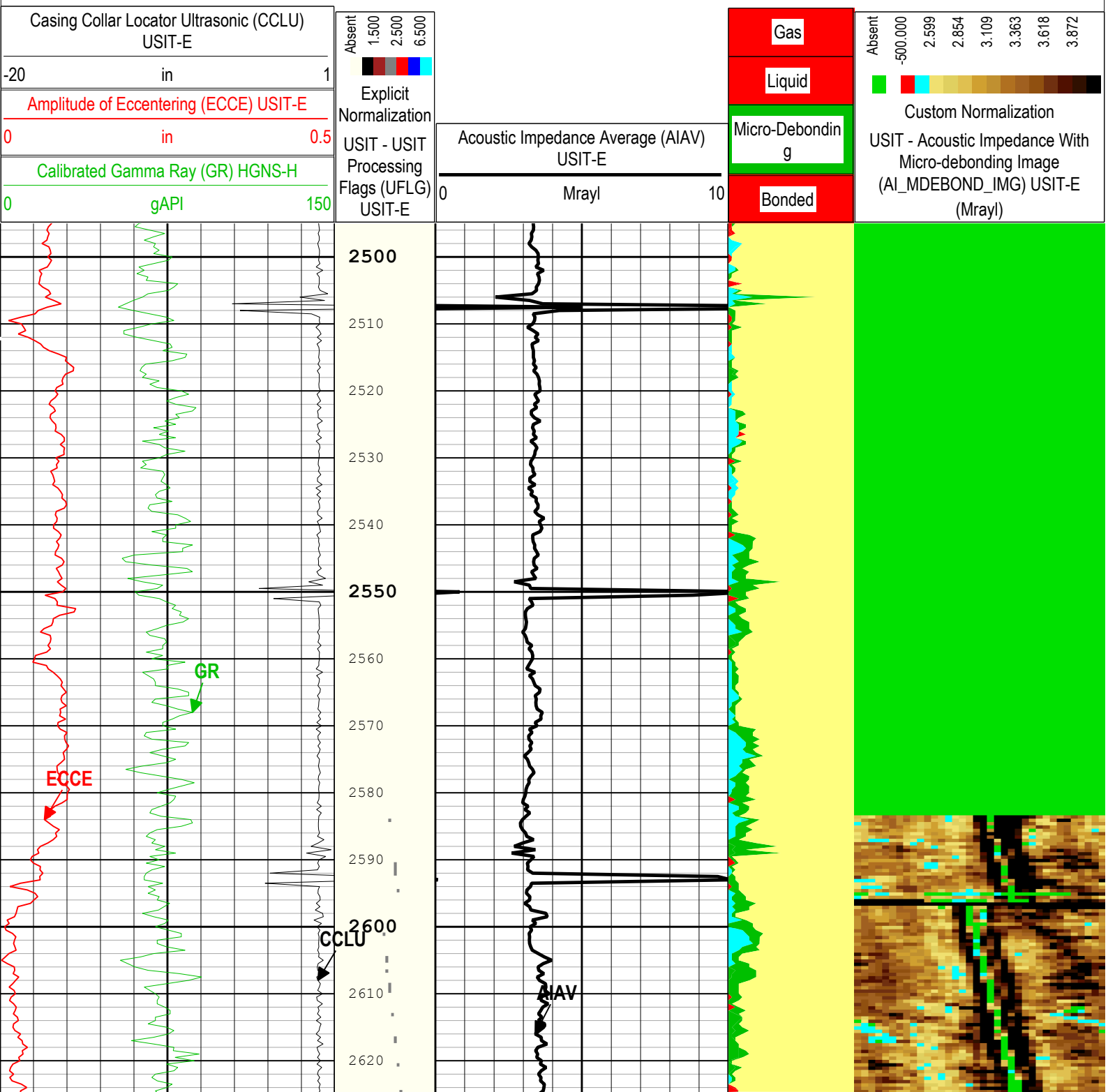
Company:Noble Energy Inc Well:Shadow A26-622

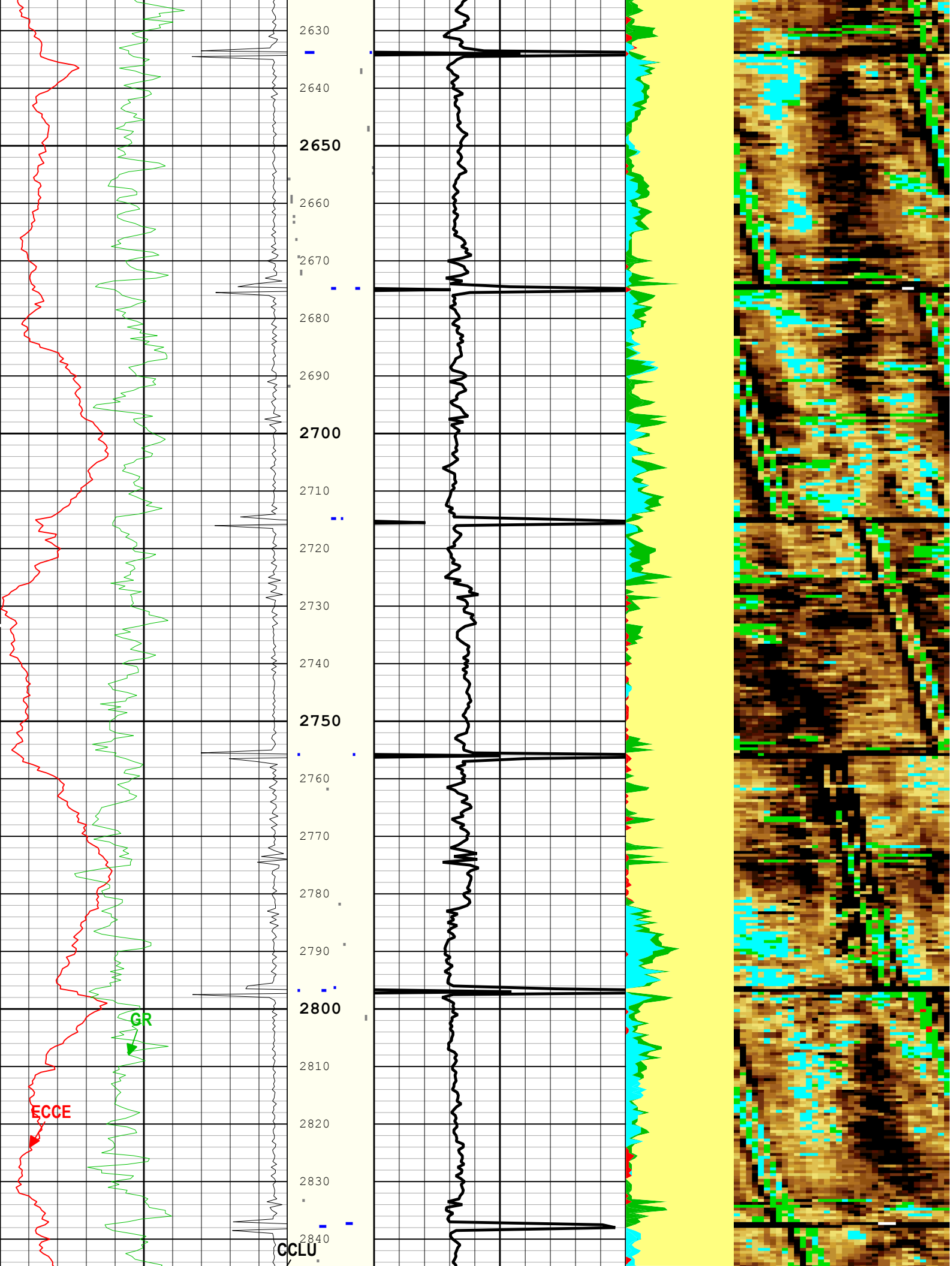
One: Log[3]:Up:S011

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: 25-Jun-2016 11:34:05

TIME_1900 - Time Marked every 60.00 (s)

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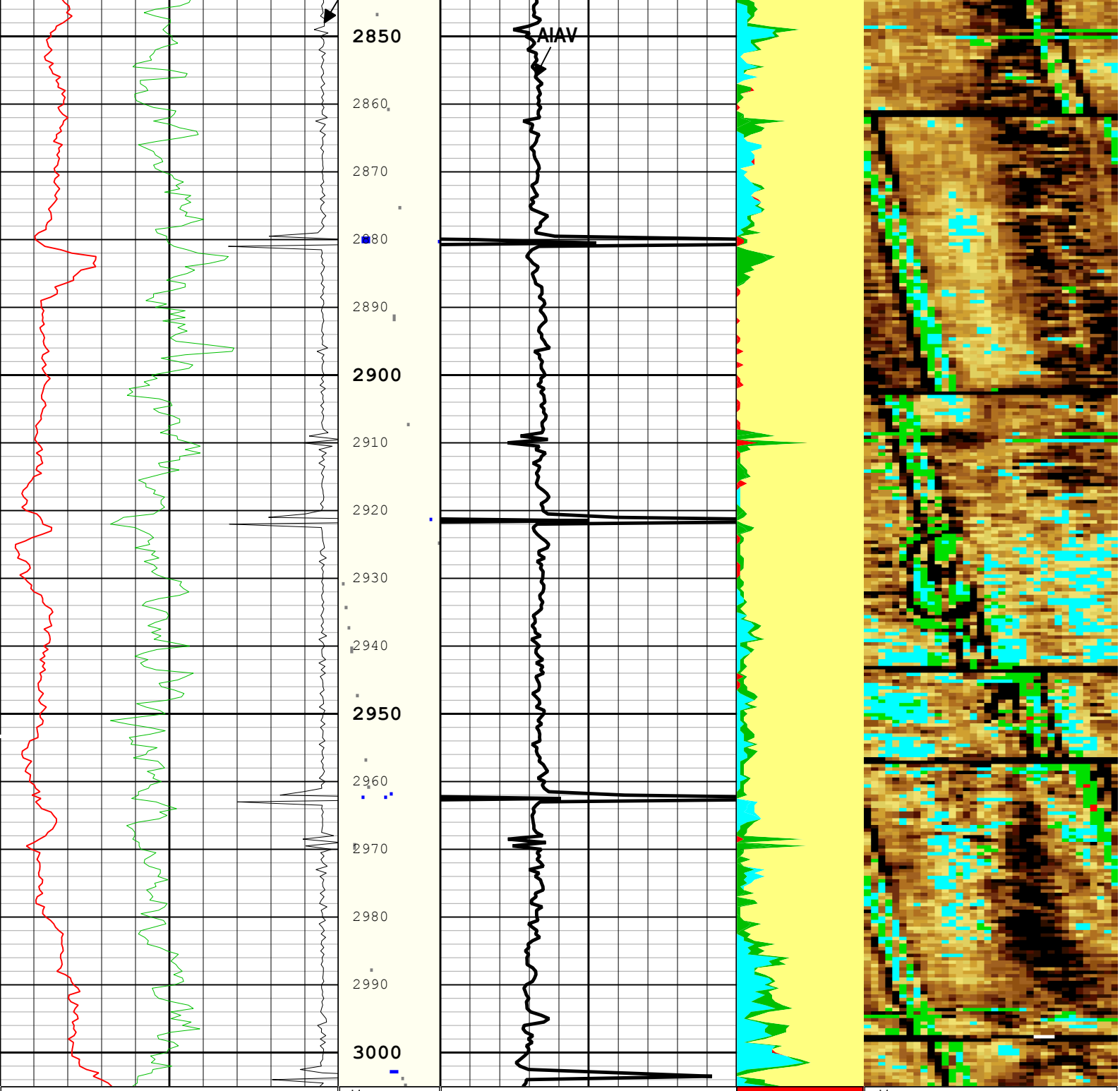

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-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-Debondin g

Bonded

Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872

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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: 25-Jun-2016 11:34:05

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BS	Bit Size	WLSESSION	8.5	in
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DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	190	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	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	1.08	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	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	1.78	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	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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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	55	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	6800	ft
WINB	Window Begin Time	USIT-E	39.01	us
WINE	Window End Time	USIT-E	65.97	us

XYZ

Company:Noble Energy Inc Well:Shadow A26-622

One: Log[2]:Up:S011

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6742.00 to 95.50 ft

- CFVL-UDEP

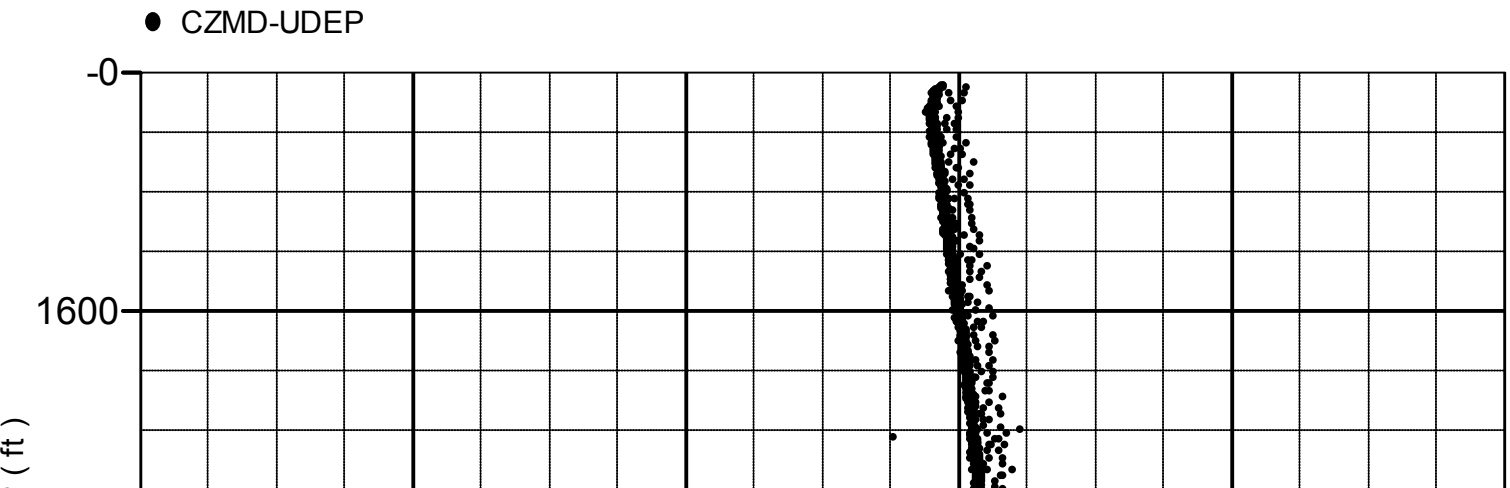
XYZ

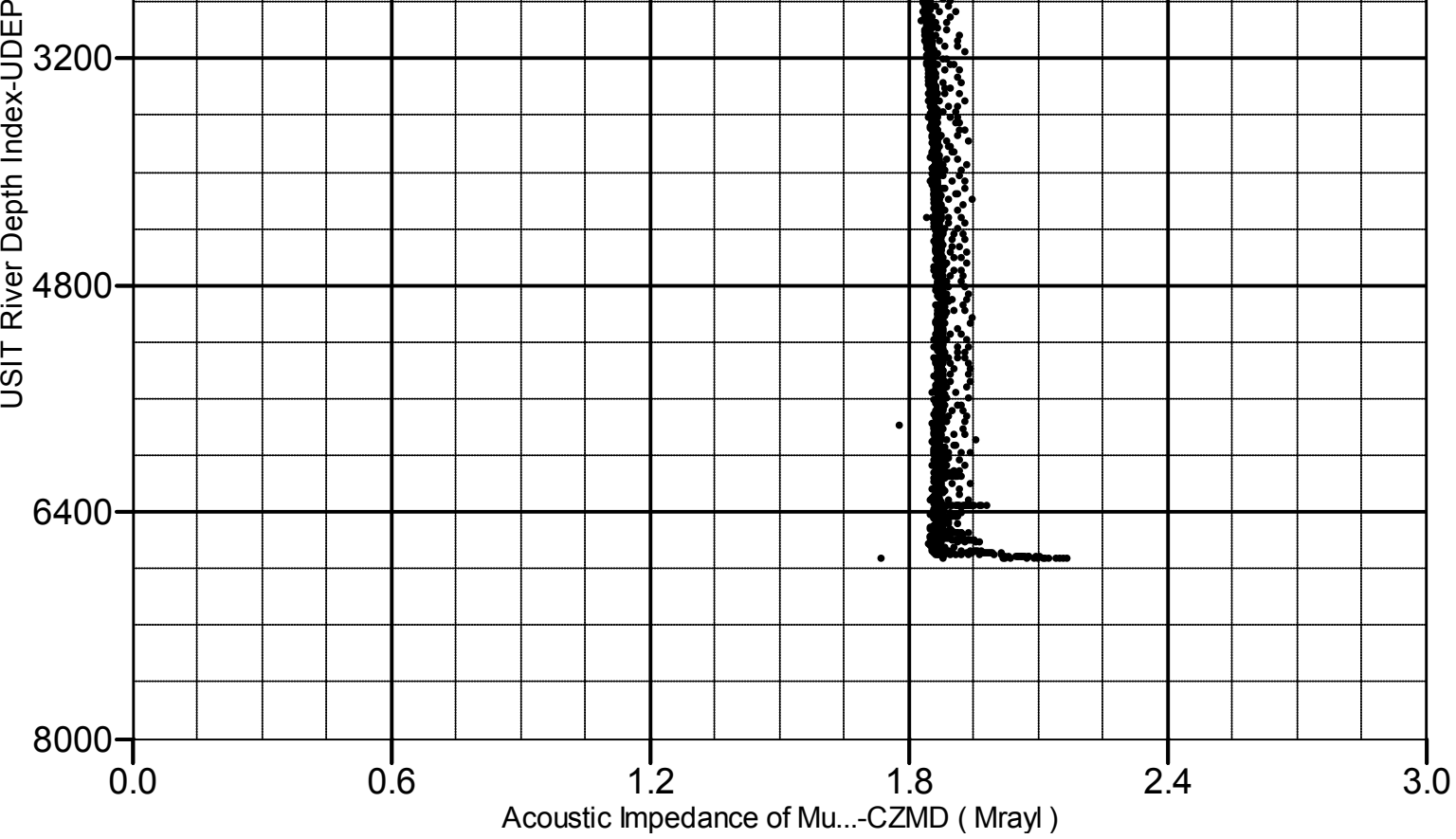
Company:Noble Energy Inc Well:Shadow A26-622
One: Log[2]:Up:S011

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6742.00 to 95.50 ft





Calibration Report

HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run One

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 150 degC	HGNS-H	2987

Auxiliary Equipment :

HGNS Accelerometer, 150 degC	HACCZ-H	5118
AmBe Neutron Logging Source	NSR-F	5069

Calibration Parameter :

Water Temperature	
Housing Size	
JIG-BKG (Jig minus background reference)	165

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before (Measured): 05:33:00 24-Jun-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
AZ Vertical Measurement	ft/s2	Before	32.2	31.5	31.6	32.8

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 18:00:00 14-May-2006

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master			QAT_160	
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	2900.000	-----
Accelerometer Coefficients - 1		Master	-----	-----	19.000	-----
Accelerometer Coefficients - 2		Master	-----	-----	0.002	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.747	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----

Accelerometer Coefficients - 8		Master	-----	-----	299.100	-----	
Accelerometer Coefficients - 9		Master	-----	-----	0.993	-----	

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 08:03:00 19-Apr-2016 Before (Measured): 08:15:53 23-Jun-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	28.0	40.0
		Before	0	5.0	28.0	40.0
		Before-Master	-----	-4.2	0.0	4.2
Far Zero Measurement	1/s	Master	0	5.0	28.0	40.0
		Before	0	5.0	27.4	40.0
		Before-Master	-----	-4.2	-0.6	4.2
Near Plus Measurement	1/s	Master	6031.0	4700.0	4916.0	6900.0
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Far Plus Measurement	1/s	Master	2793.0	1900.0	2019.0	2900.0
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Near Corrected Plus Measurement	1/s	Master		4700.0	5007.0	6900.0
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
Far Corrected Plus Measurement	1/s	Master		1900.0	2066.0	2900.0
		Before	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured): 08:18:06 23-Jun-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
RGR Zero Measurement	gAPI	Before	30.0	0	77.8	120.0
RGR Plus Measurement	gAPI	Before	185.4	157.1	178.8	206.3
GR Calibration Gain		Before	0.89	0.80	0.92	1.05

County: Weld

State: Colorado

UltraSonic Summary Print