Schlumberger

Company: Noble Energy Inc

Well: Hazzard Federal LC22-735

Field: Wildcat

County: Weld Country: USA

UltraSonic Summary Print

County: Weld
Field: Wildcat
Location: NWNE Sec. 22, T9N, R59W
Well: Hazzard Federal LC22-735
Company: Noble Energy Inc

Location:				
NWNE Sec. 22, T9N, R59W			Elev.: K.B.	4926.00 ft
400' FNL, 1889' FEL			G.L.	4896.00 ft
Lat: 40.74237 / Long: -103.96147			D.F.	4925.00 ft
Permanent Datum:	Ground Level	Elev.:	4896.00 f	
Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

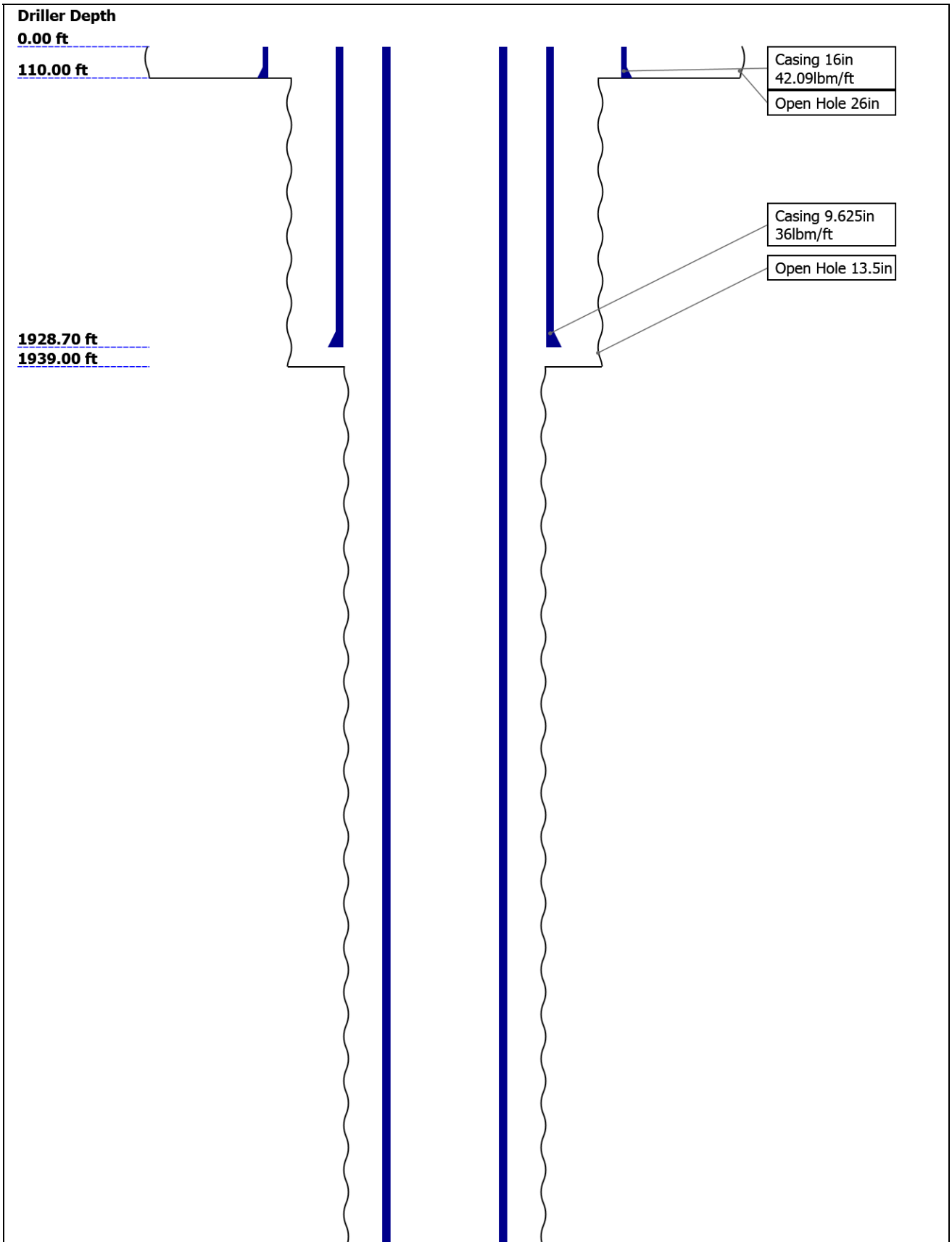
API Serial No.	Max.Hole Deviation	Longitude:	Latitude:
05-123-42980	0 deg	-103.96147 degrees	40.742370 degrees

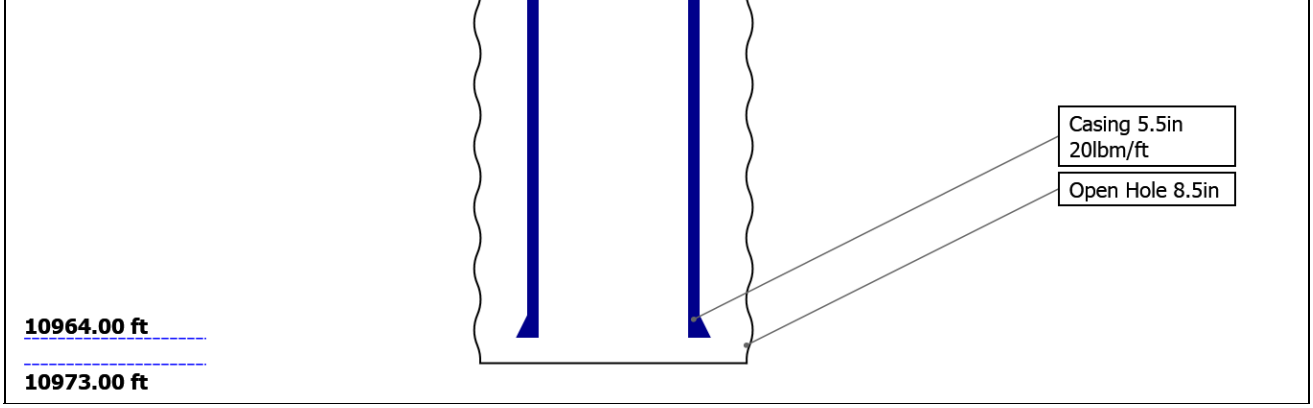
Logging Date		23-Mar-2017			
Run Number		One			
Depth Driller		10973.00 ft			
Schlumberger Depth		6104.00 ft			
Bottom Log Interval		6104.00 ft			
Top Log Interval		100.00 ft			
Casing Fluid Type		Salt Brine			
Salinity					
Density		8.4 lbm/gal			
Fluid Level		0.00 ft			
BIT/CASING/TUBING STRING					
Bit Size		8.50 in			
From		1939.00 ft			
To		10973.00 ft			
Casing/Tubing Size		5.5 in			
Weight		20 lbm/ft			
Grade		P110			
From		0.00 ft			
To		10964.00 ft			
Max Recorded Temperatures		214 degF			
Logger on Bottom	Time	23-Mar-2017	15:26:00		
Unit Number	Location:	2161	Fort Morgan		
Recorded By		Brandon Makinson			
Witnessed By					

Disclaimer

Contents

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1939			
Top Logger (ft)	0	110	1939			
Bottom Driller (ft)	110	1939	10973			
Bottom Logger (ft)	110	1939	10973			
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	J55	P110			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	1928.7	10964			
Bottom Logger (ft)	110	1928.7	10964			

Operational Run Summary

Parameter (unit)	One					
Date Log Started	23-Mar-2017					
Time Log Started	20:49:32					
Date Log Finished	23-Mar-2017					
Time Log Finished	22:10:19					
Top Log Interval (ft)	100.00					
Bottom Log Interval (ft)	6104.00					
Total Depth (ft)	6104.00					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.500					
Logging Unit Number	2161					
Logging Unit Location	Fort Morgan					
Recorded By	Brandon Makinson					

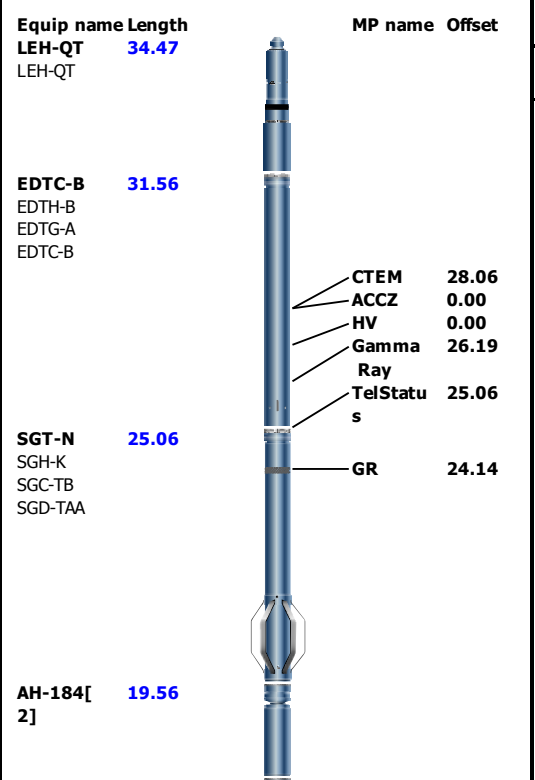
Witnessed By						
Service Order Number	DSBE-00009					

Borehole Fluids

Parameter(unit)	One					
Fluid Type	Water					
Fluid Name	Salt Brine					
Max Recorded Temperatures (degF)	214					
Source of Sample	Active Tank					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Funnel Viscosity (s)	26					
Fluid Loss (cm3)						
PH						
Date/Time Circulation Stopped	NaN					
Date Logger on Bottom	23-Mar-2017					
Time Logger on Bottom	15:26:00					
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)	0.07 @ 214					
RMF @ BHT (ohm.m@degF)	0.05 @ 214					
RMC @ BHT (ohm.m@degF)	NaN @ 214					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

One: Toolstring



One: Remarks

Tool string run as per tool sketch.

Repeat pass: 0 PSI, Main pass: 2500 PSI

Depth Summary

	One		
Depth Measuring Device			
Type	IDW-B		
Serial Number	5836		
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type	7-39 PLX		
Wheel Correction 1	0.74		
Wheel Correction 2	-1.62		
Tension Device			
Type	CMTD-B/A		
Serial Number	1109		
Calibration Date	20-Feb-2017		
Calibrator Serial Number			
Number of Calibration Points	10		
Calibration Root Mean Square Error	11		
Calibration Peak Error	32		
Logging Cable			
Type	7-39P-LXS		
Serial Number			
Length	13000.00 ft		
Conveyance Type	Wireline		
Rig Type			
One:Depth Control Parameters		**Depth Control Remarks**	

Log Sequence	First Log In the Well	All Schlumberger depth control procedures followed.
Rig Up Length At Surface		IDW used as primary depth control.
Rig Up Length At Bottom		Z-chart used as secondary depth control.
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	6113.51	81.13

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 : 27.72m(90.93ft) to 34.23m(112.29ft)
MUD_N_FRP = 1.11
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.61 MRayl

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

One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP1	7.1.82245.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	81.13 ft	6113.51 ft	23-Mar-2017 9:26:16 PM	23-Mar-2017 10:10:05 PM	ON	9.31 ft	Yes

All depths are referenced to toolstring zero

Log

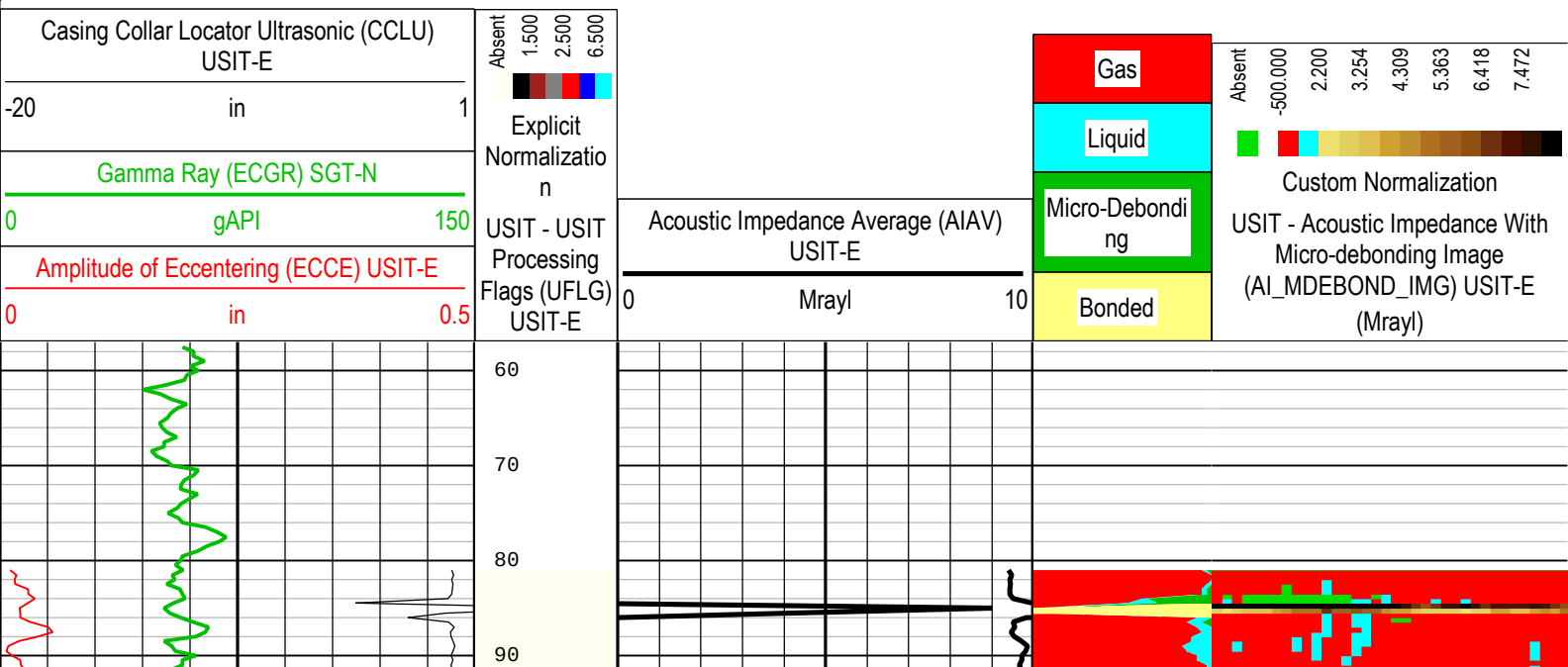
Company:Noble Energy Inc Well:Hazzard Federal LC22-735

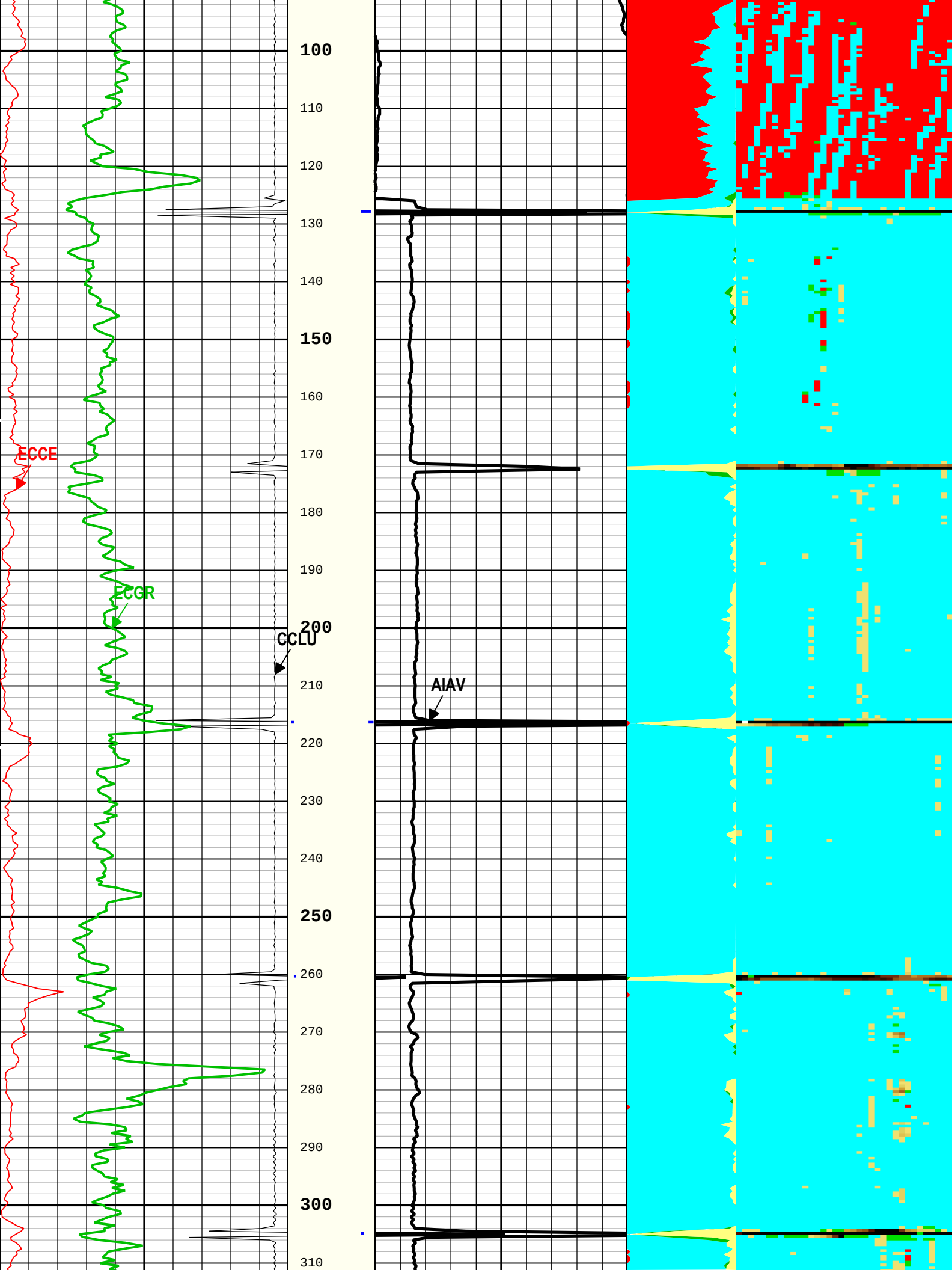
One: Log[4]:Up:S005

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: 23-Mar-2017 22:24:49

TIME_1900 - Time Marked every 60.00 (s)

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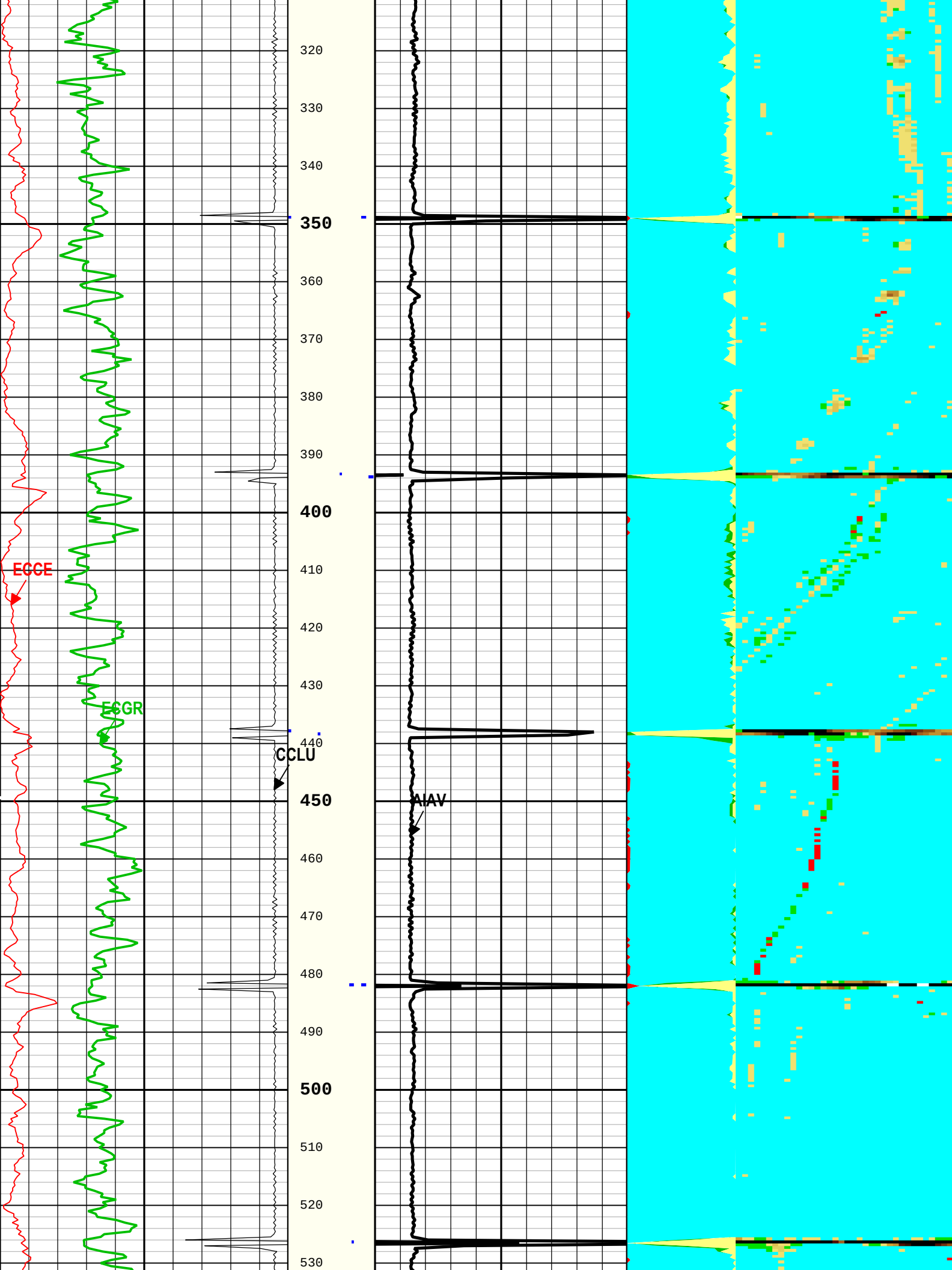
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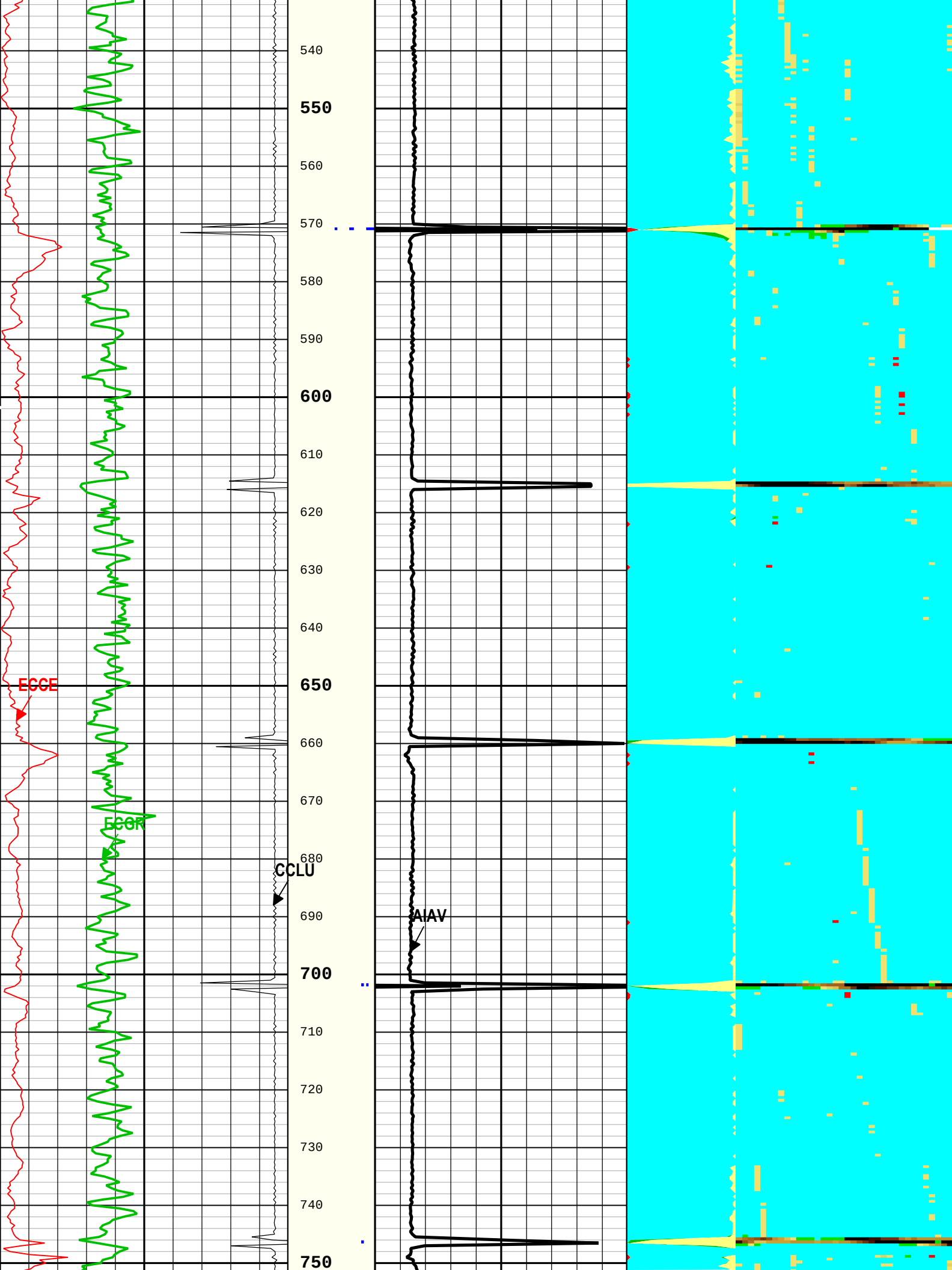
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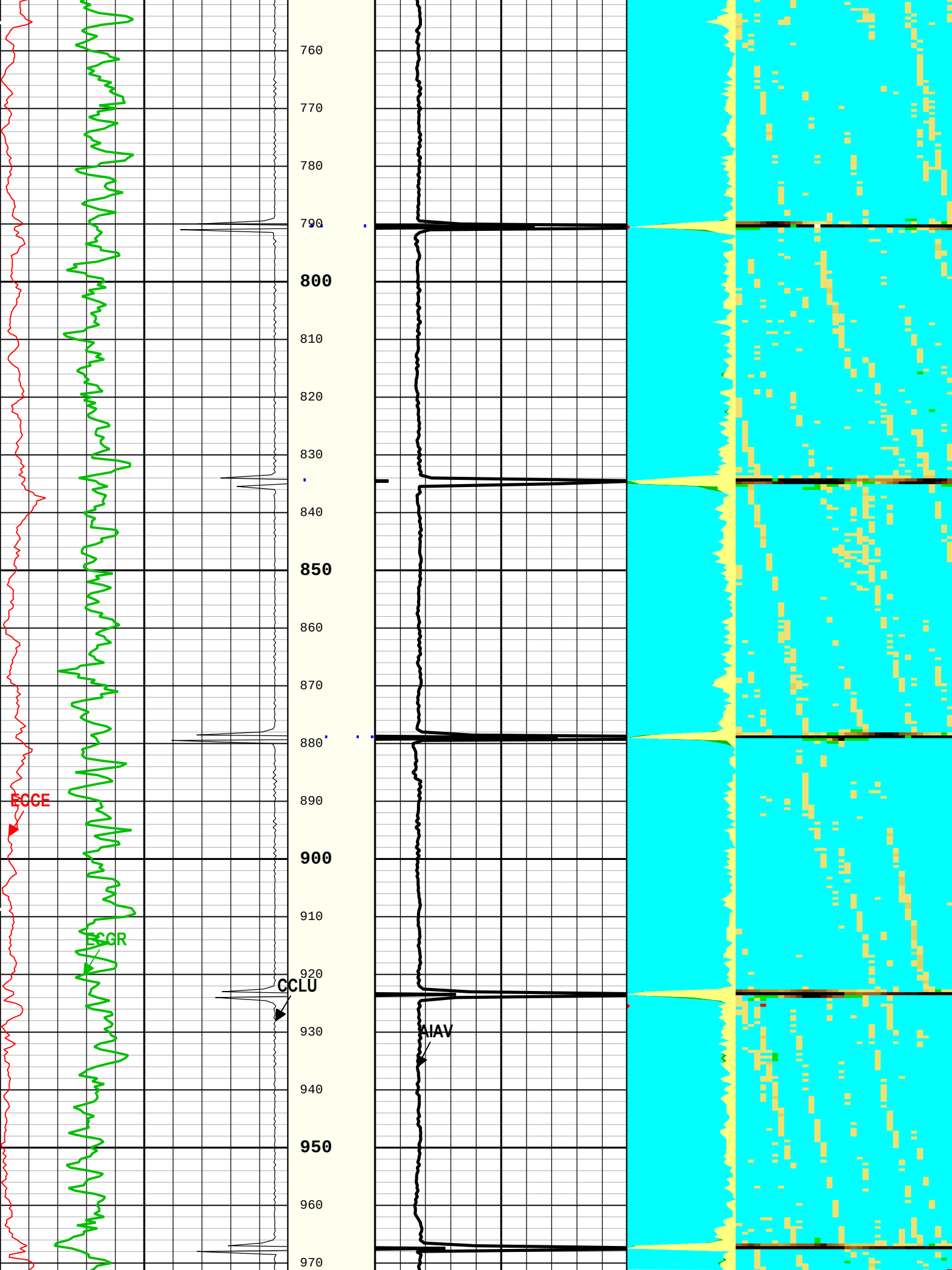
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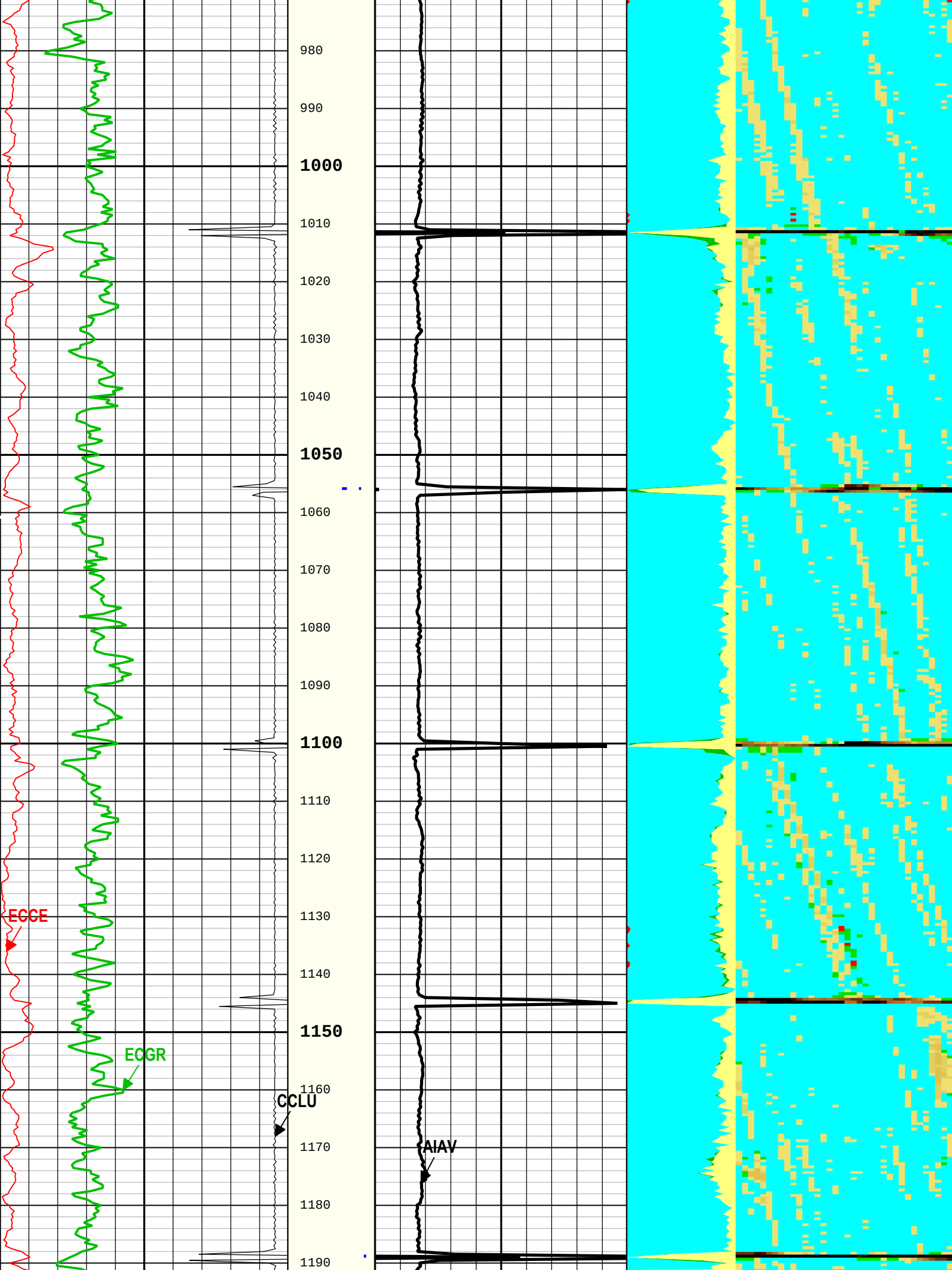
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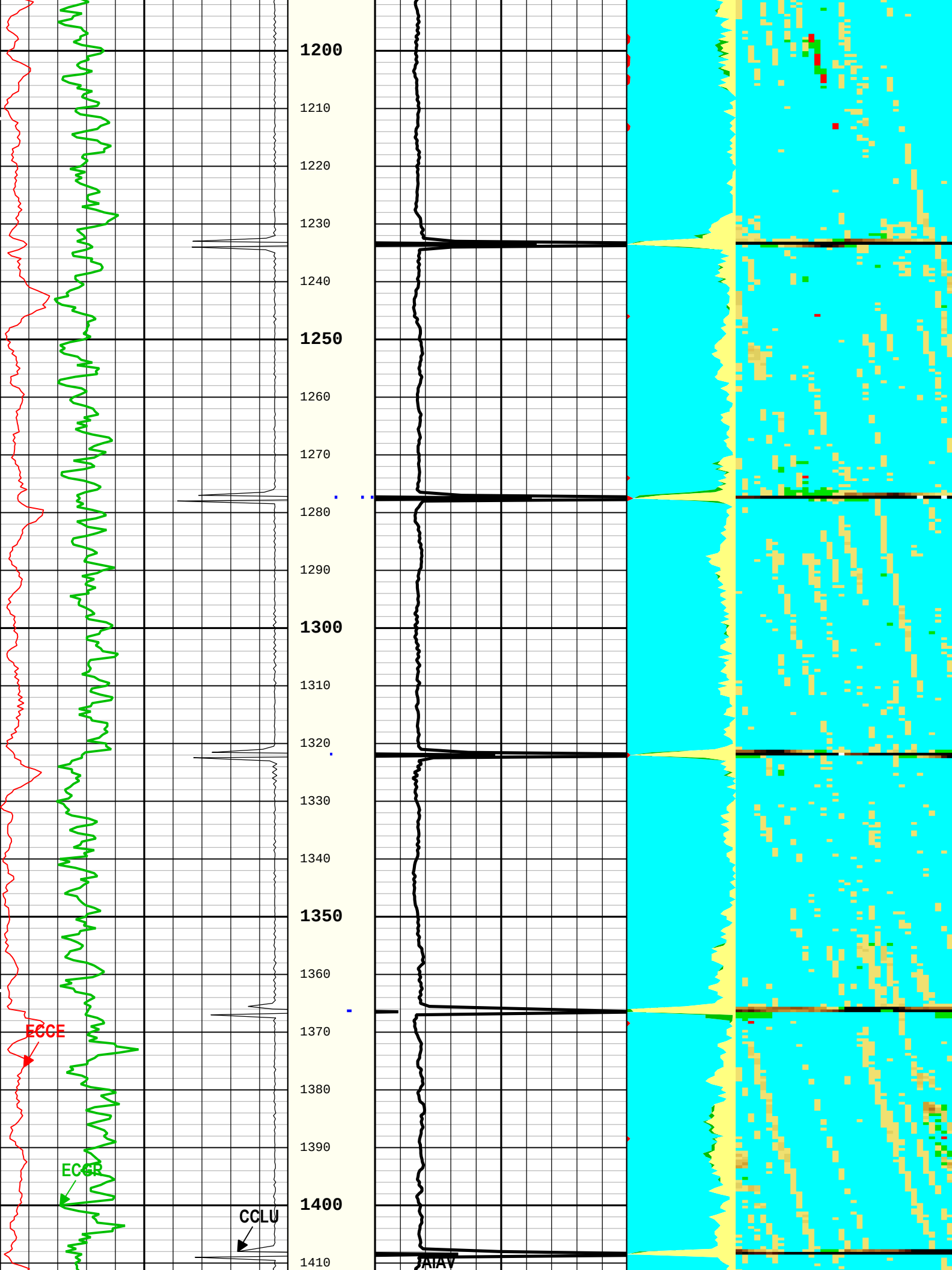
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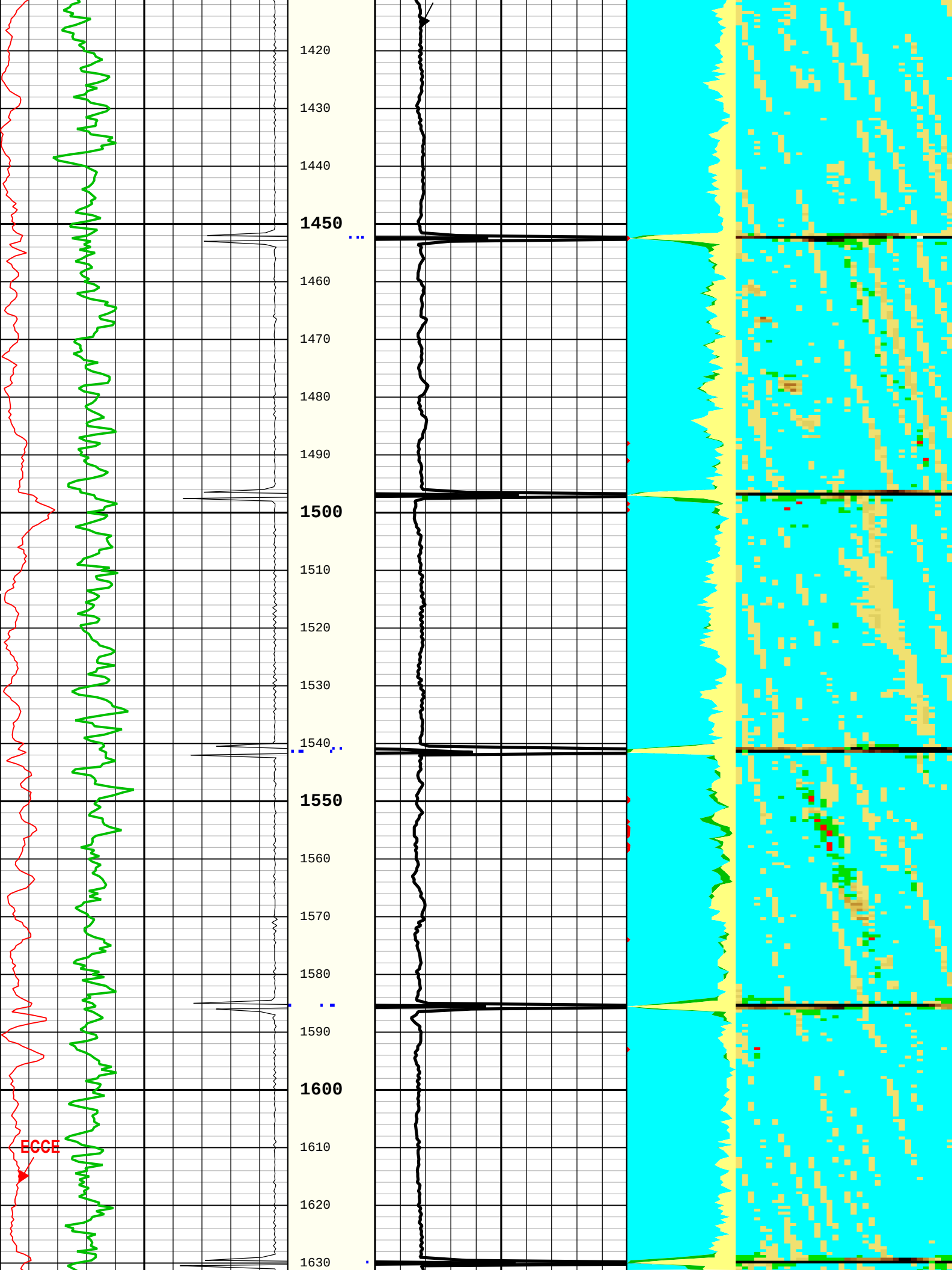
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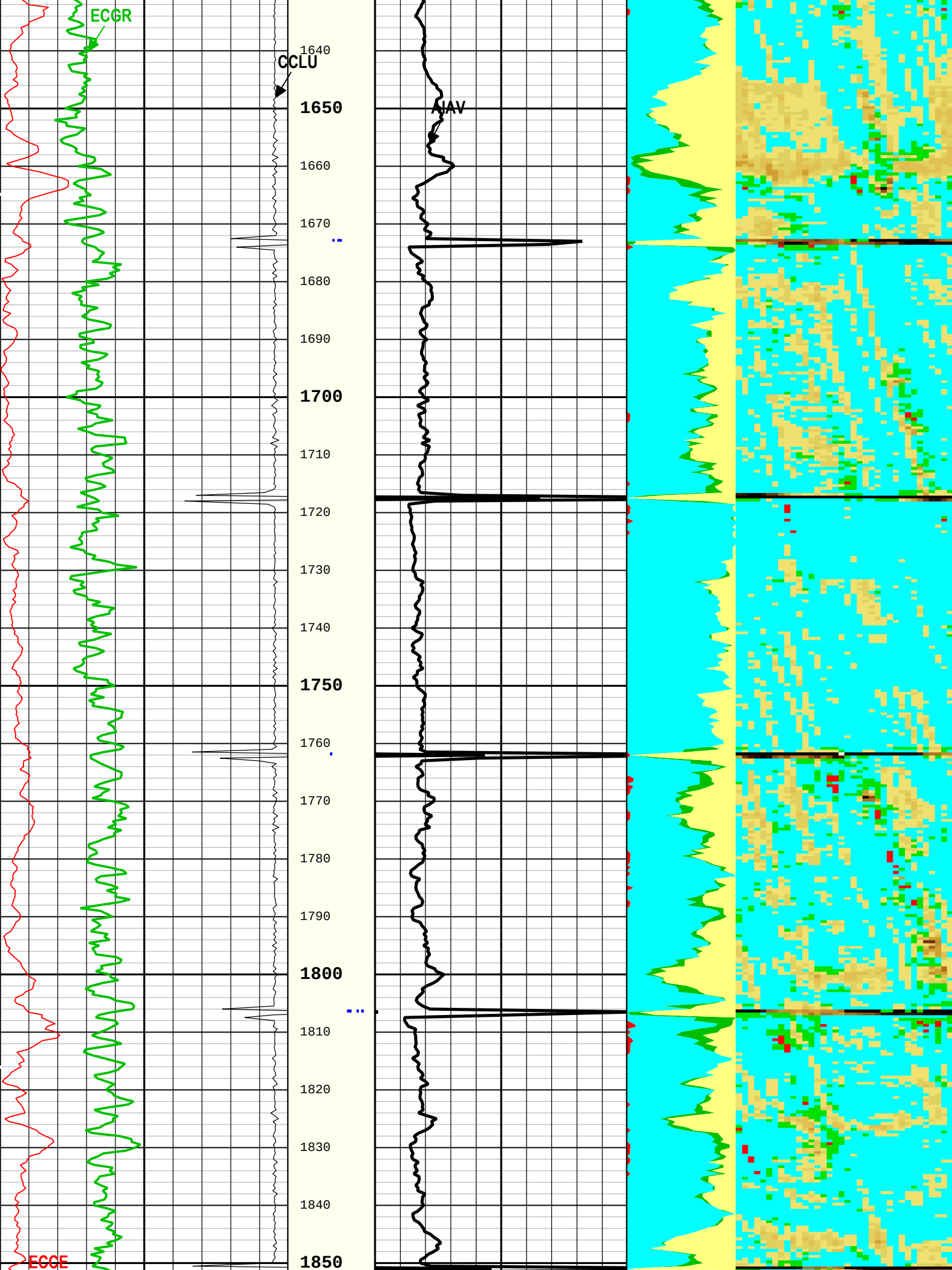
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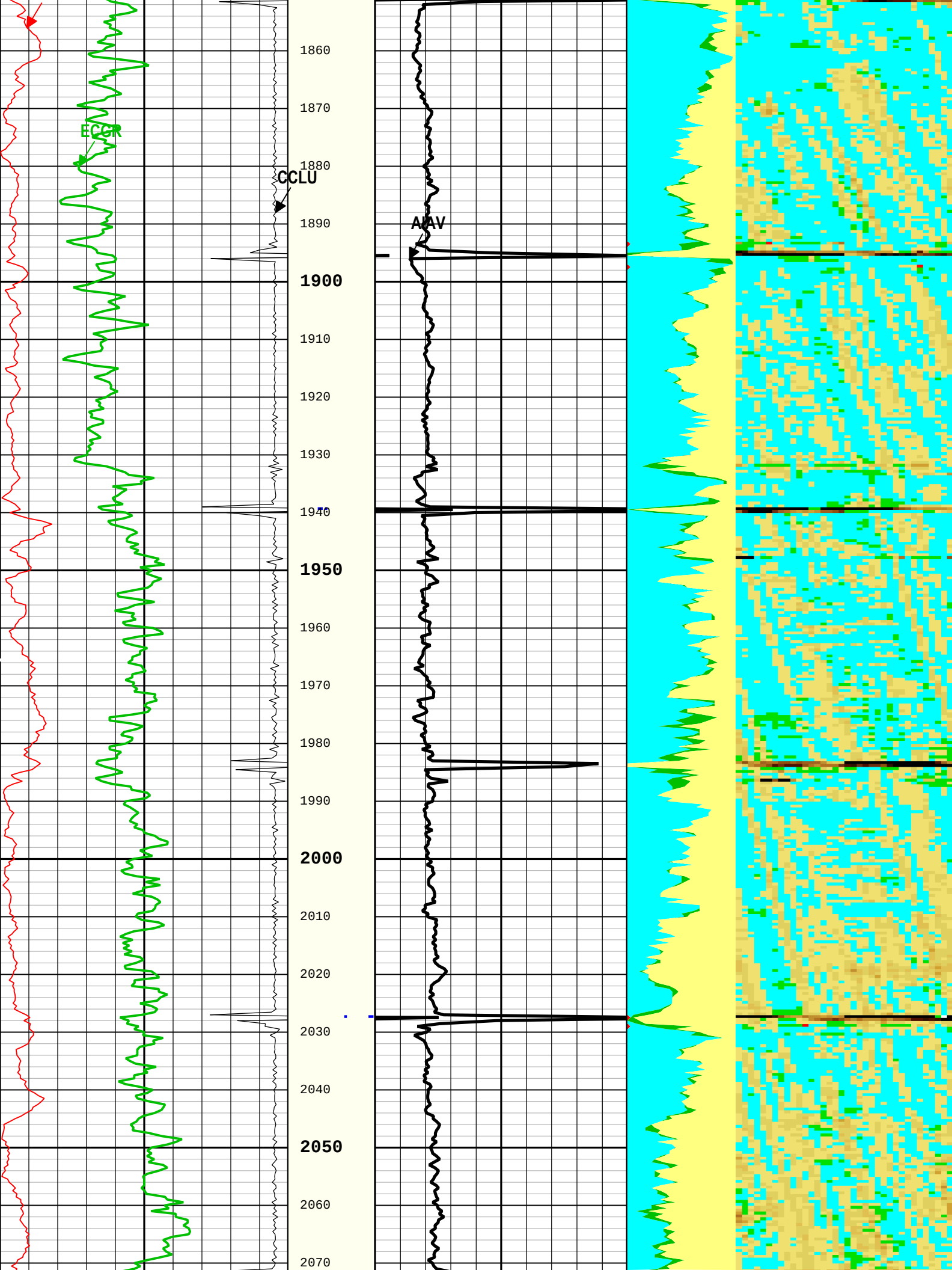
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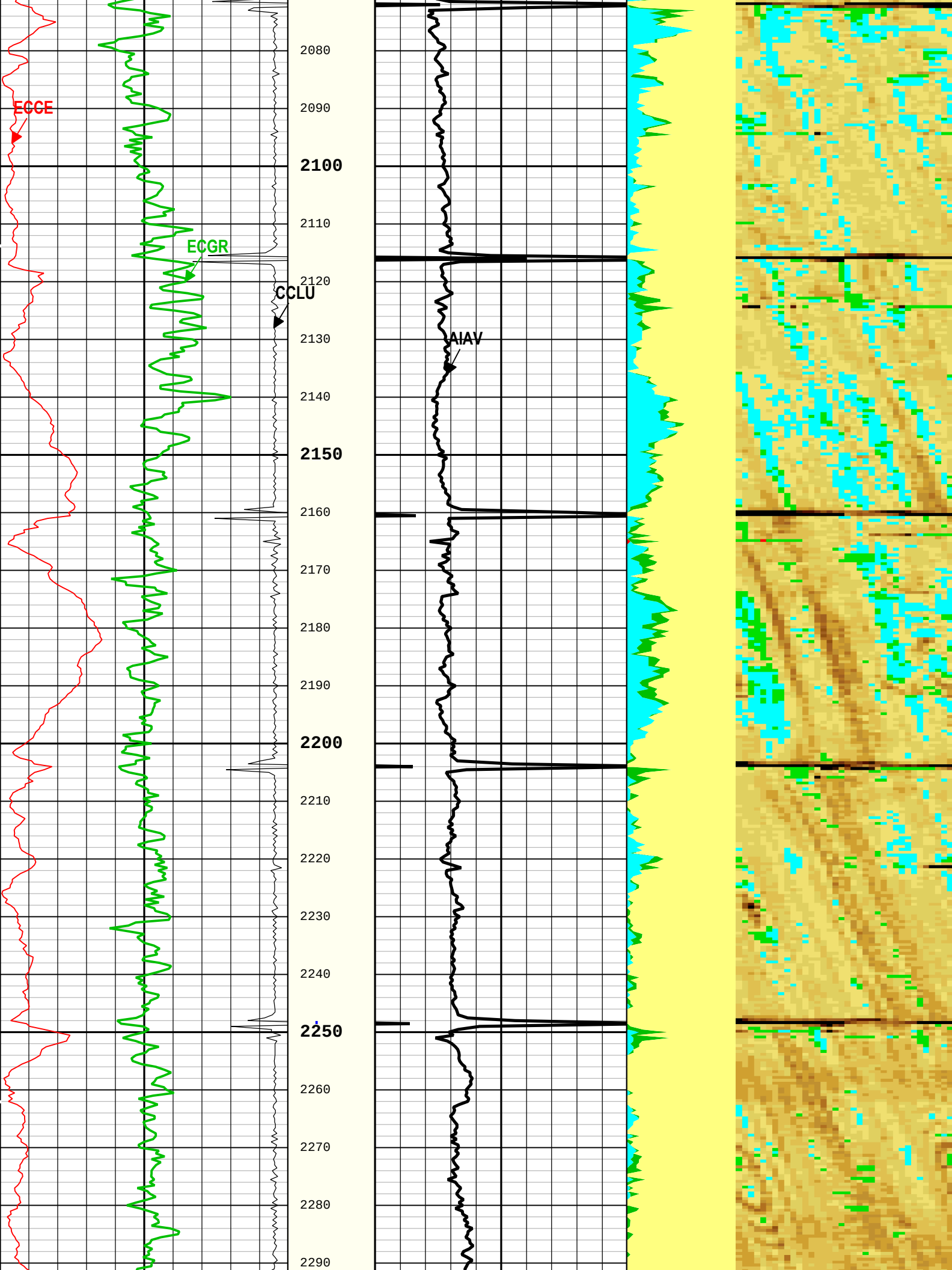
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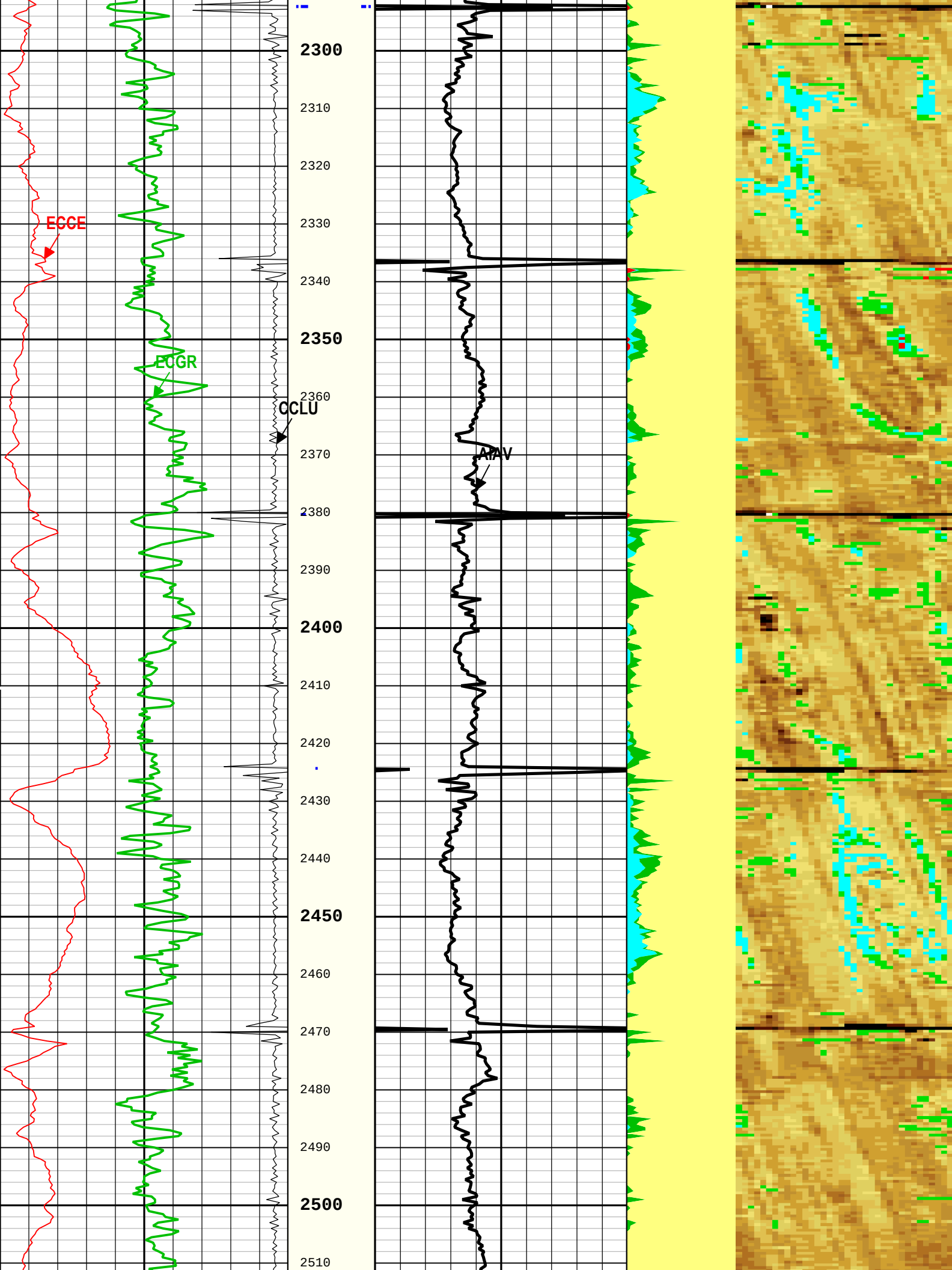
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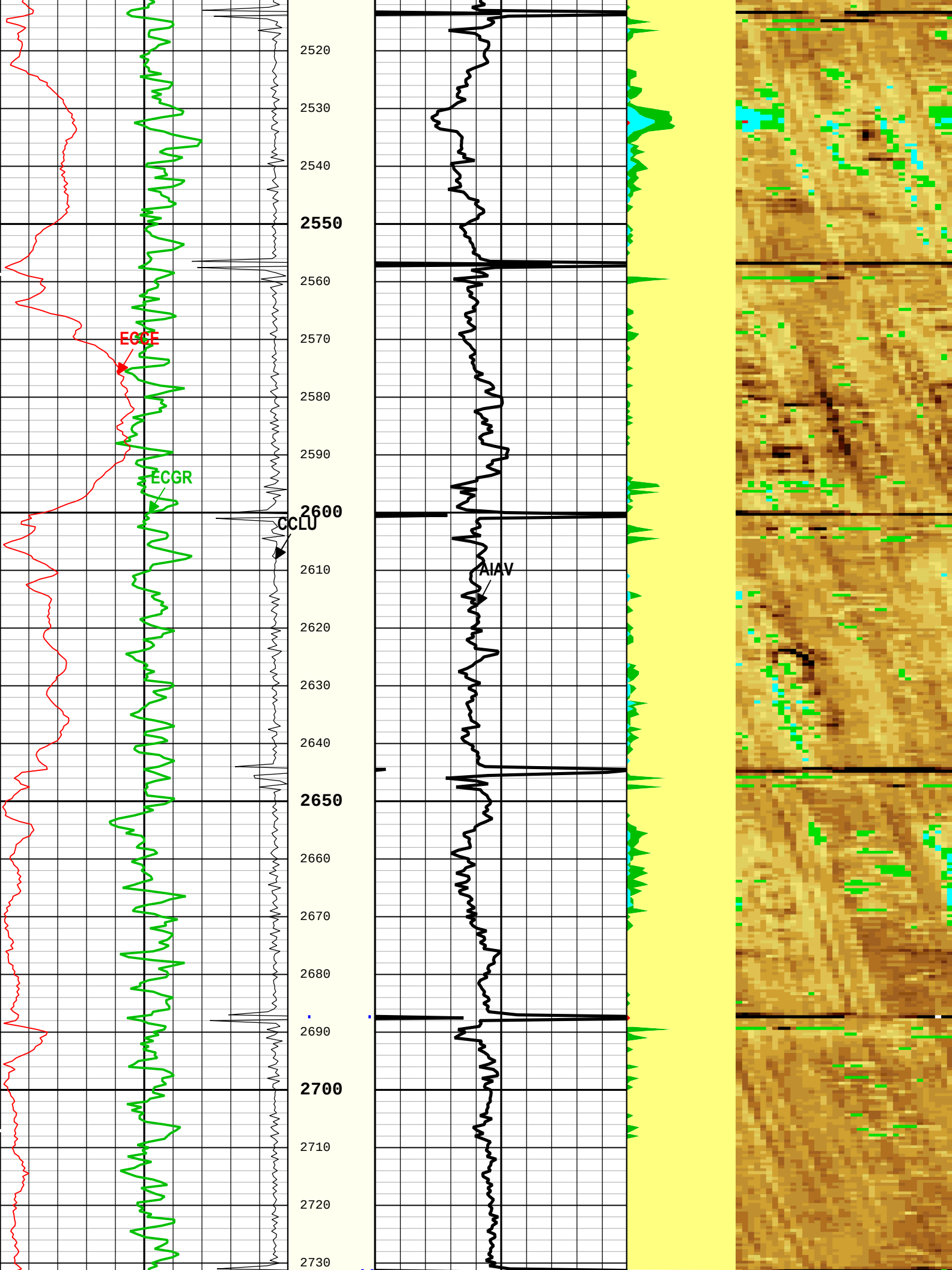
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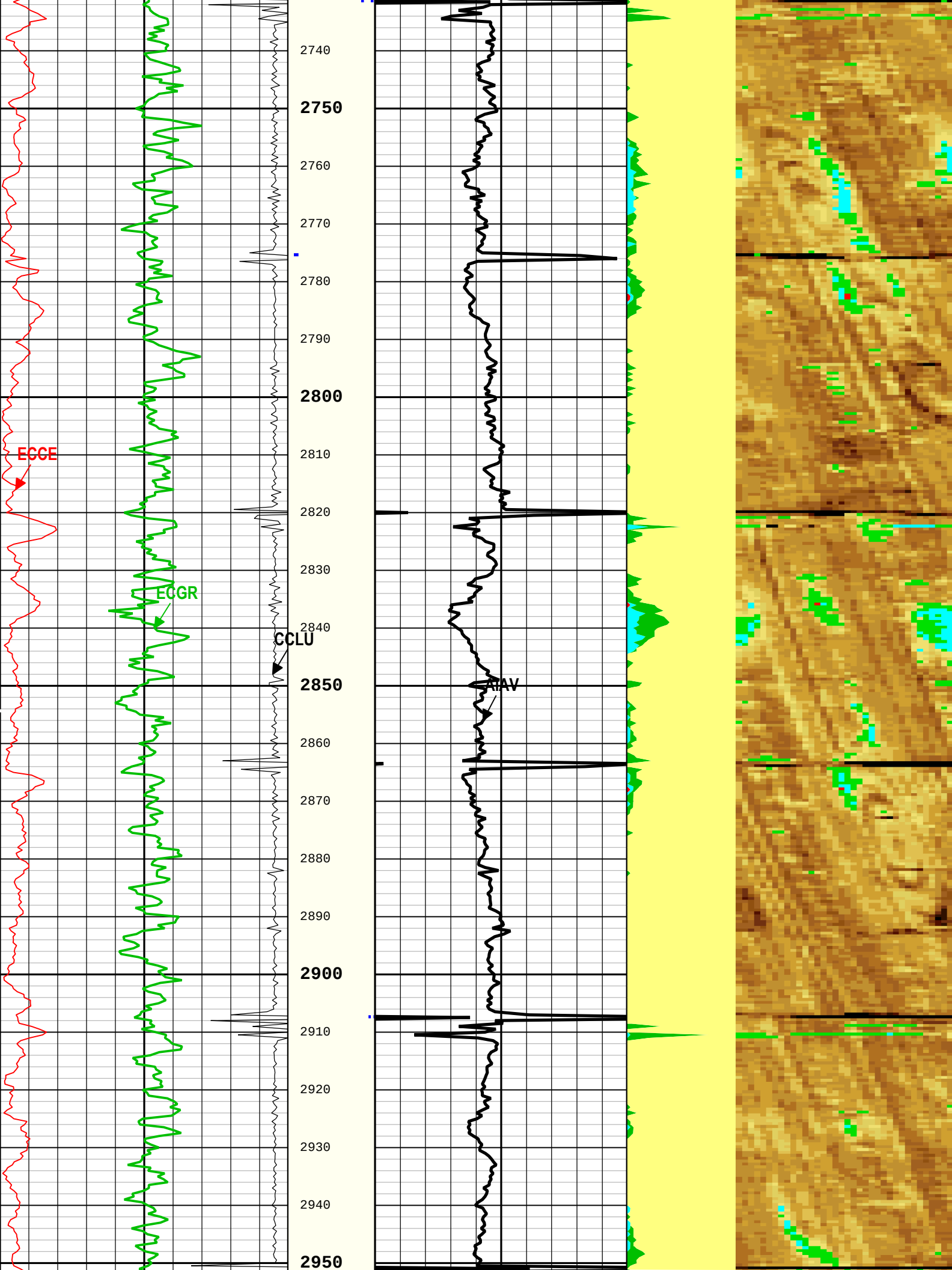
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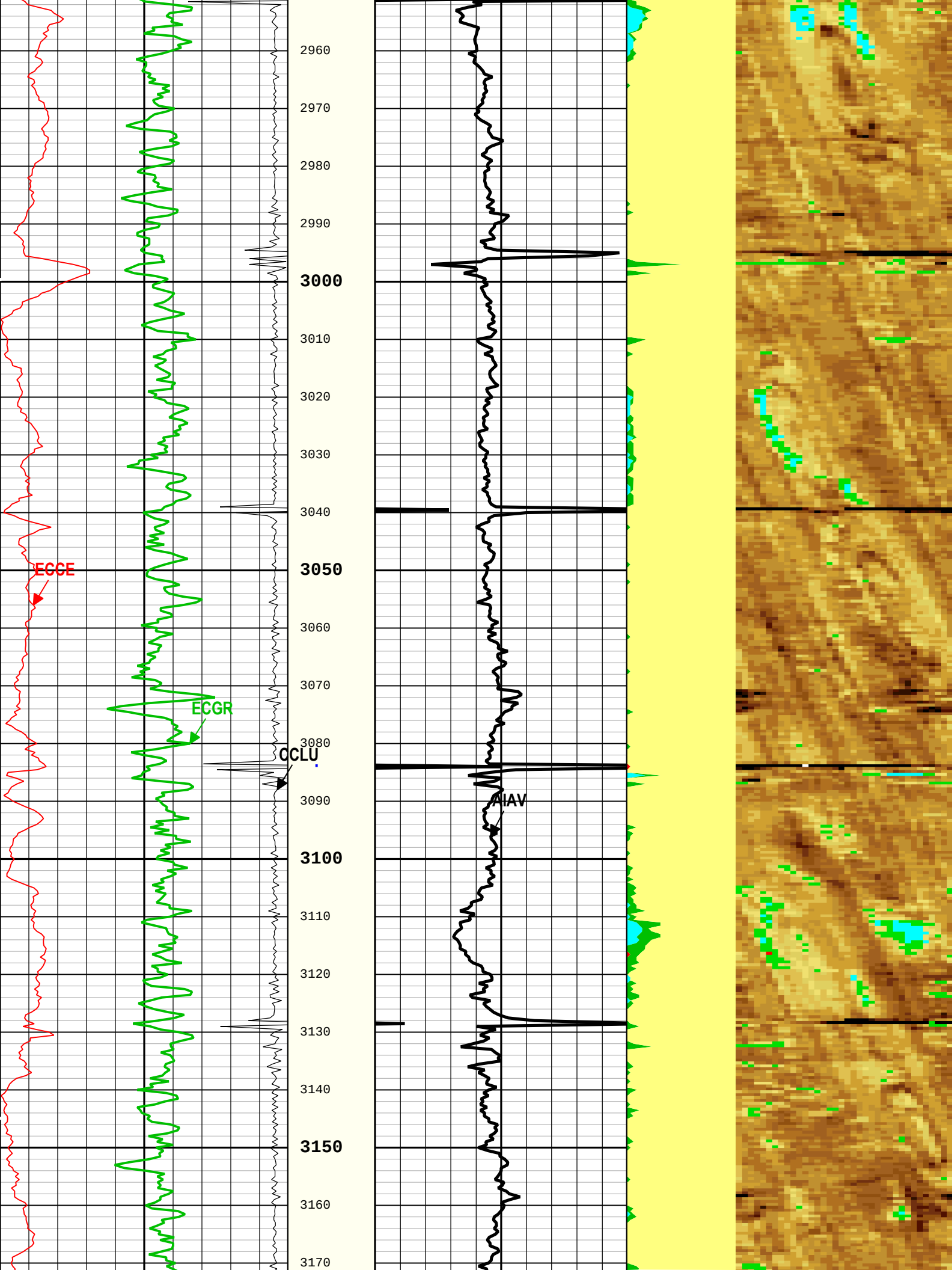
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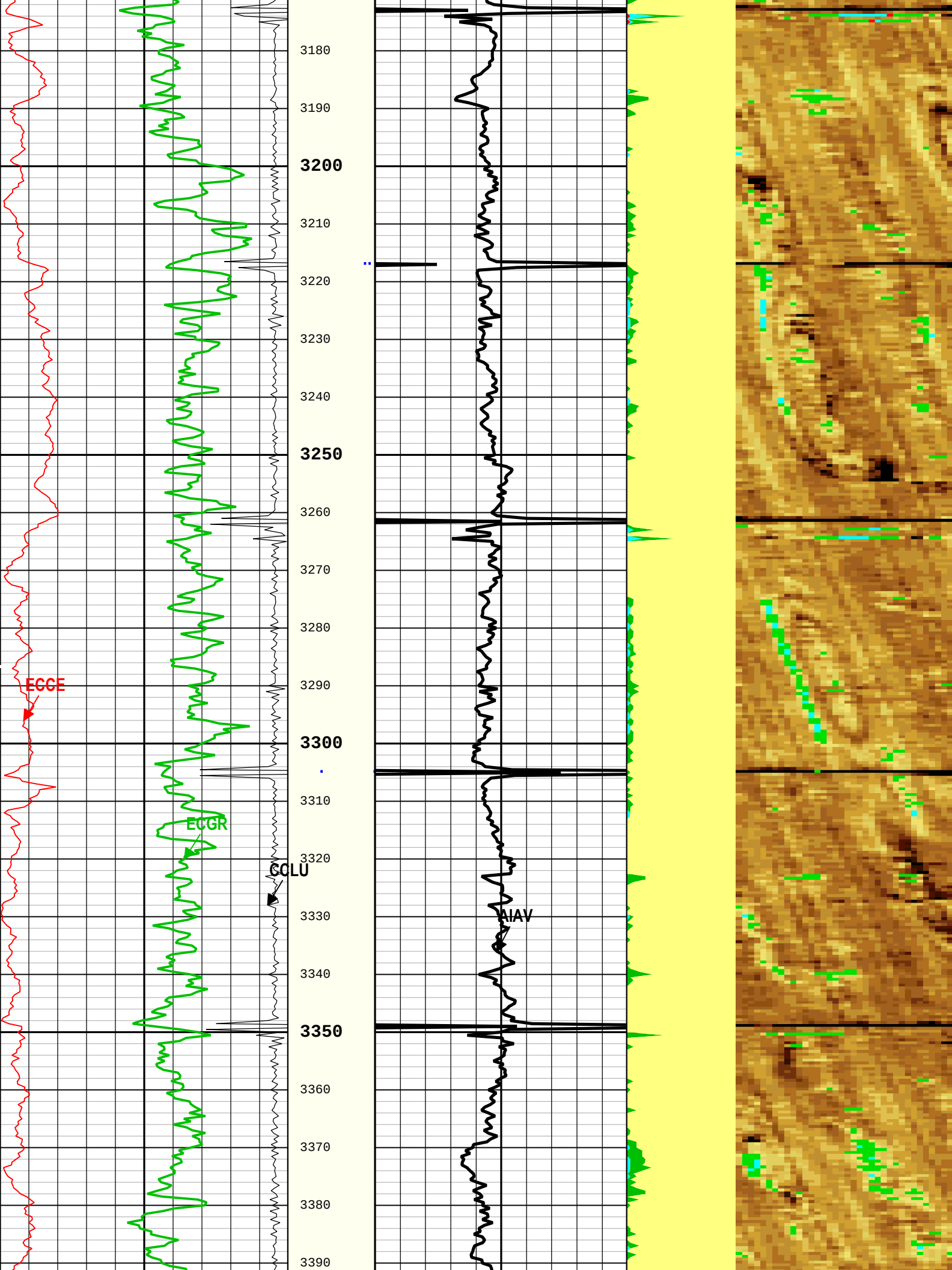
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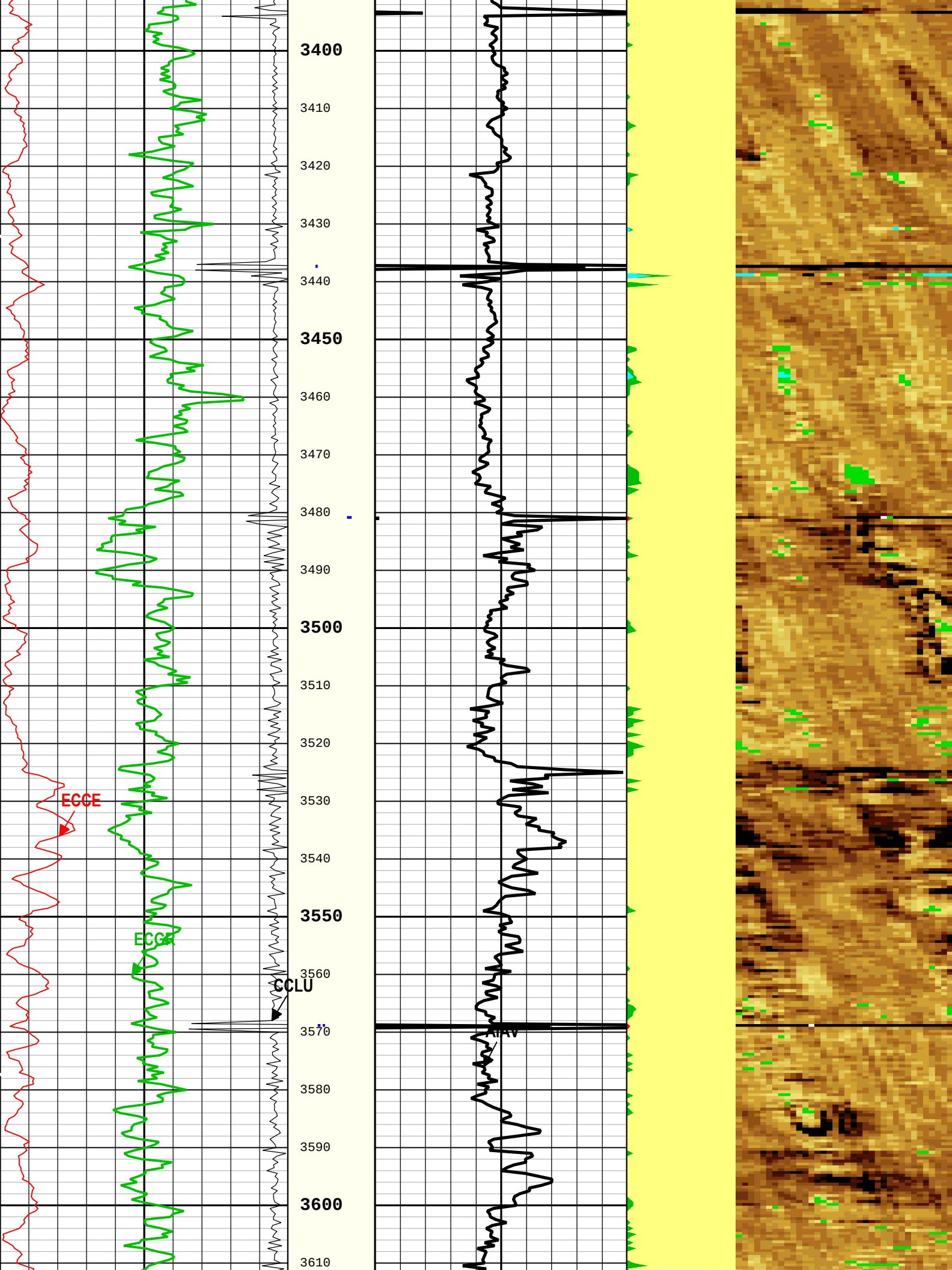
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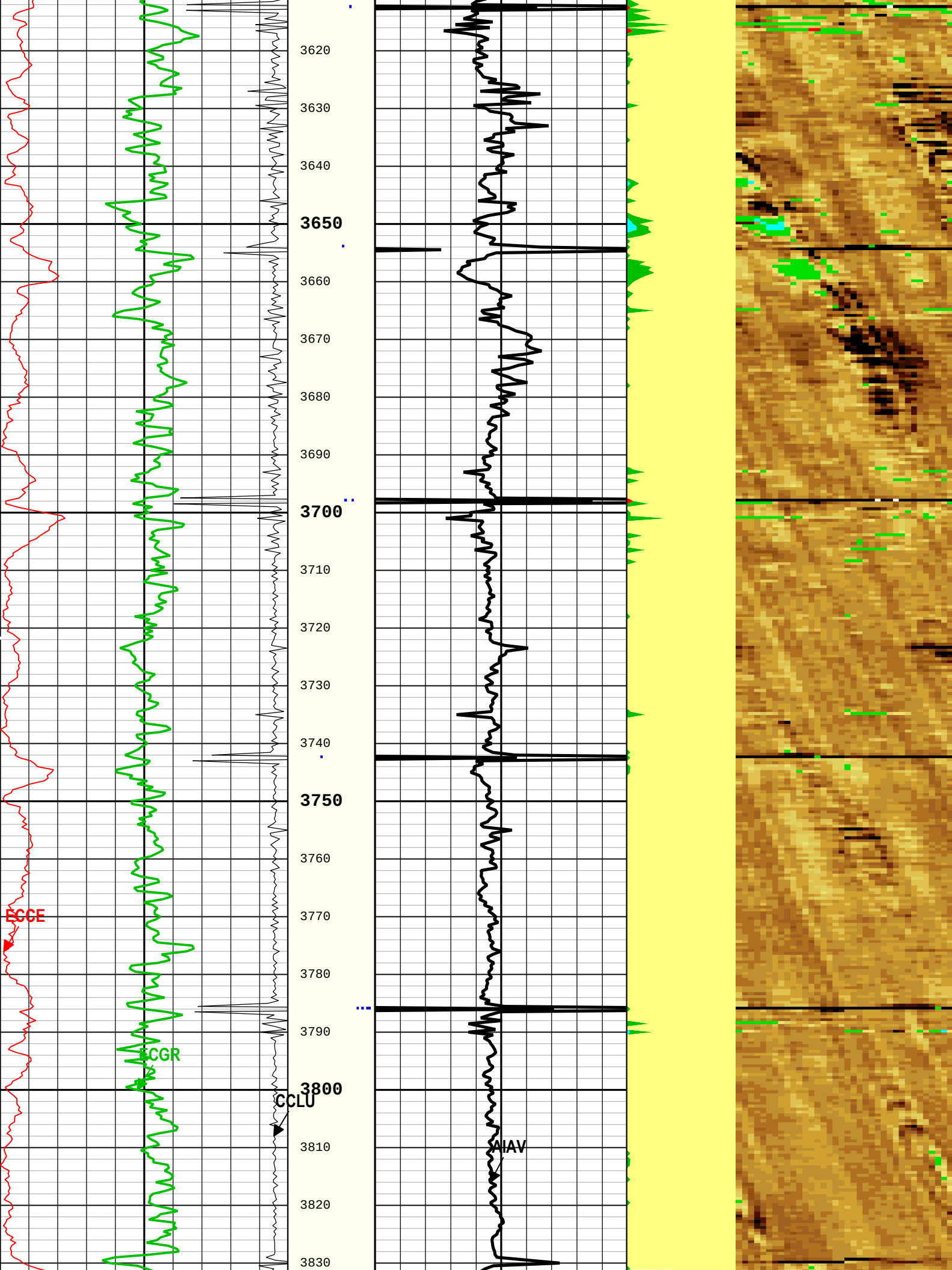
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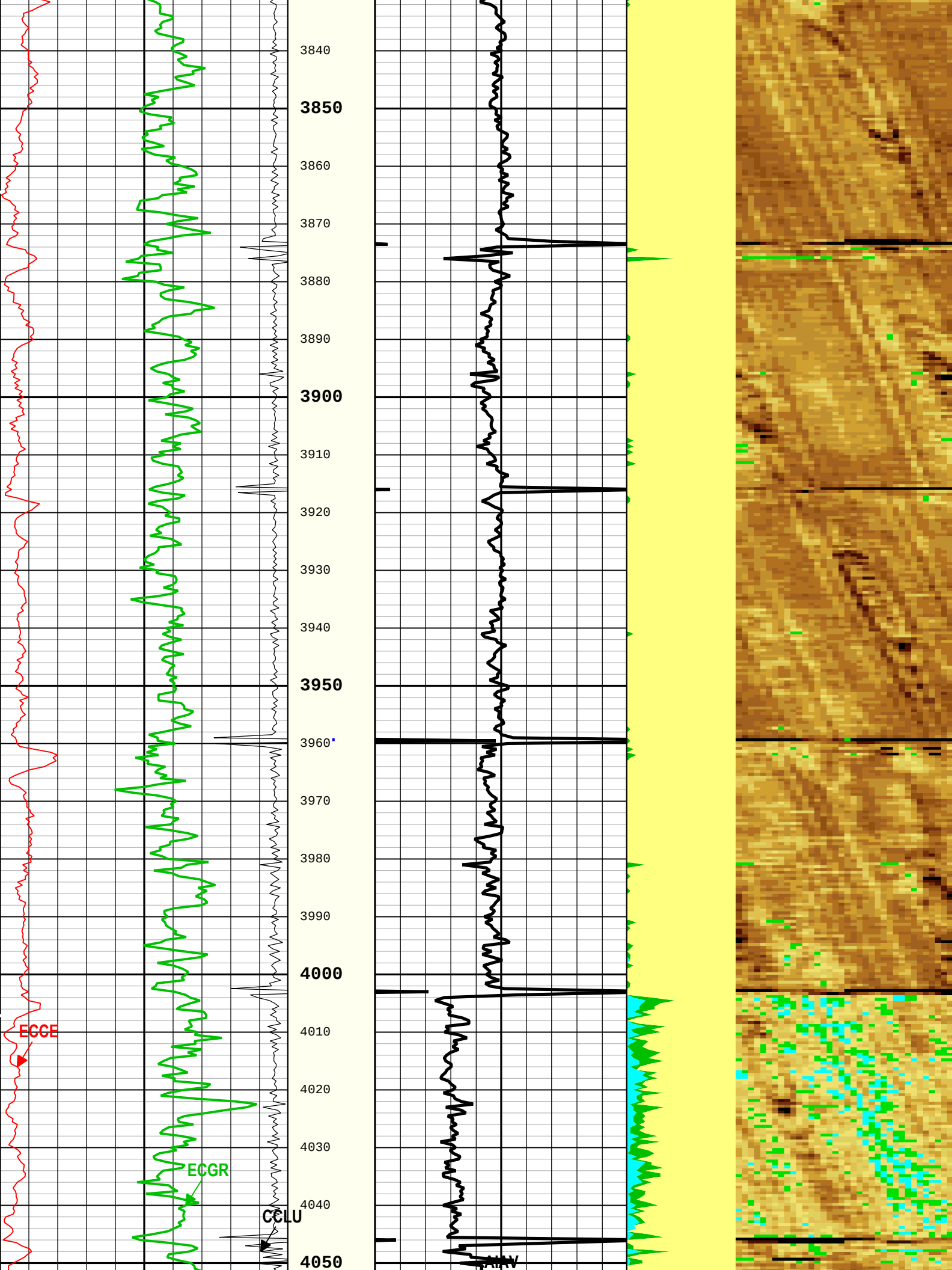
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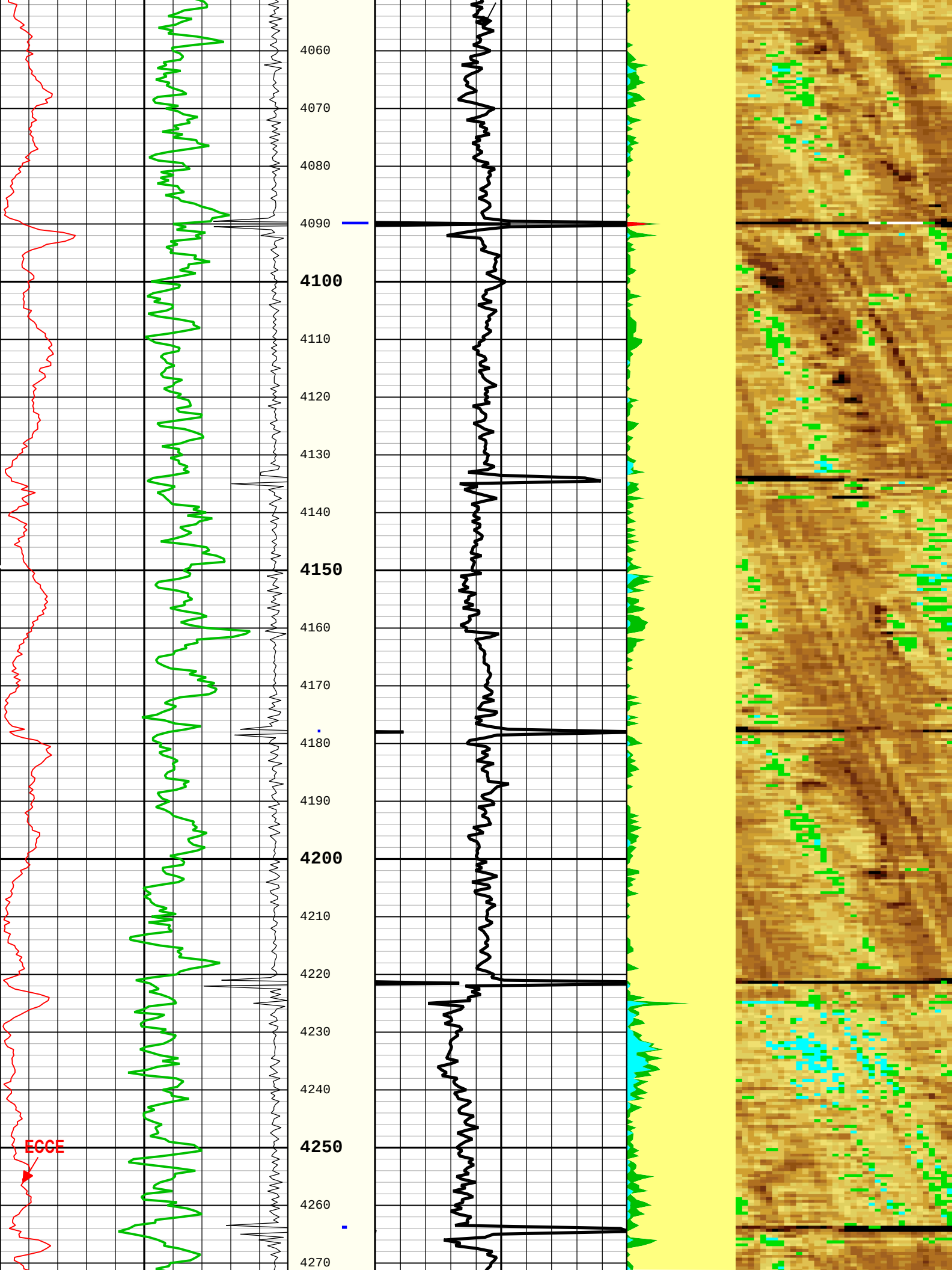
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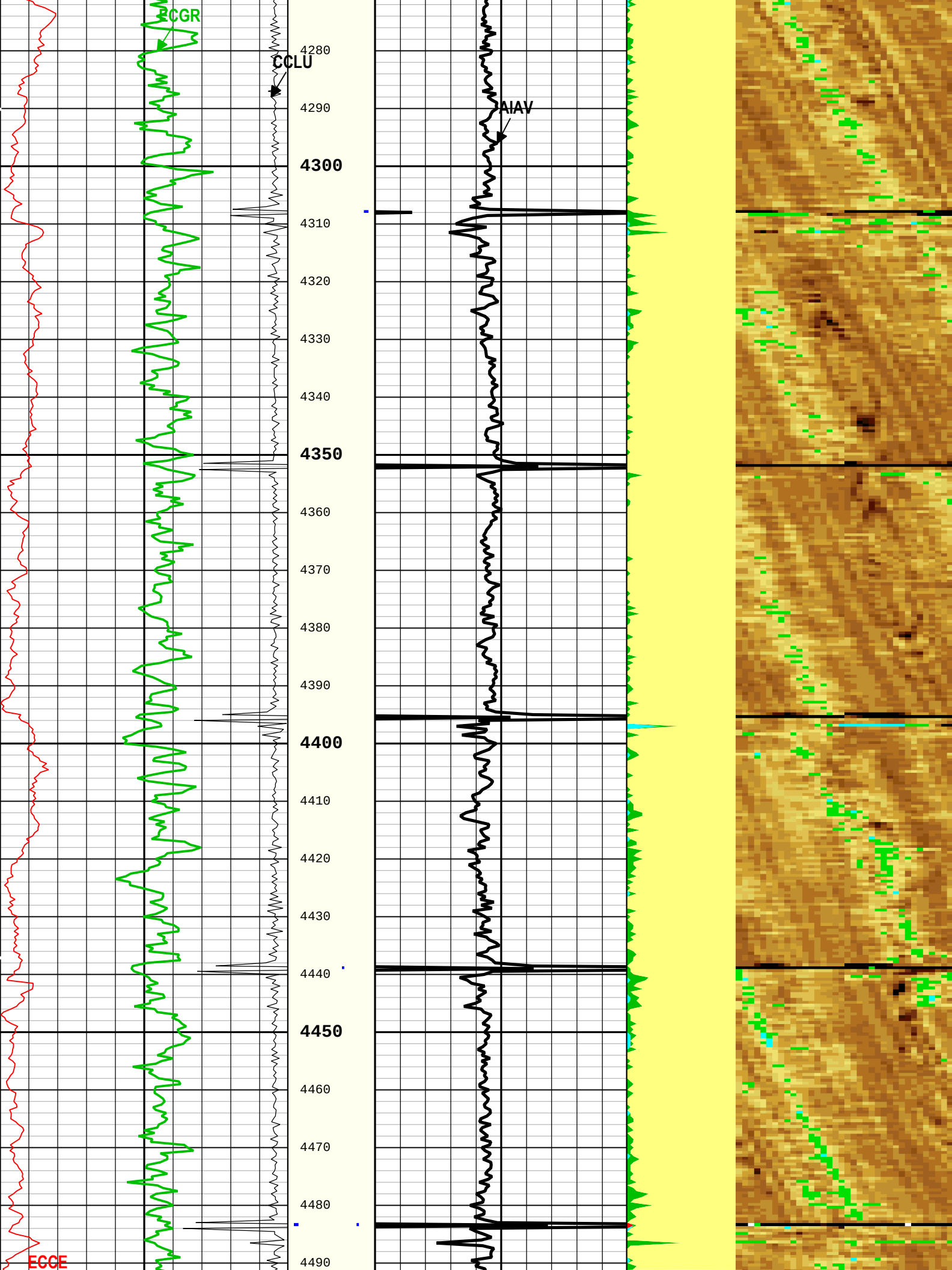
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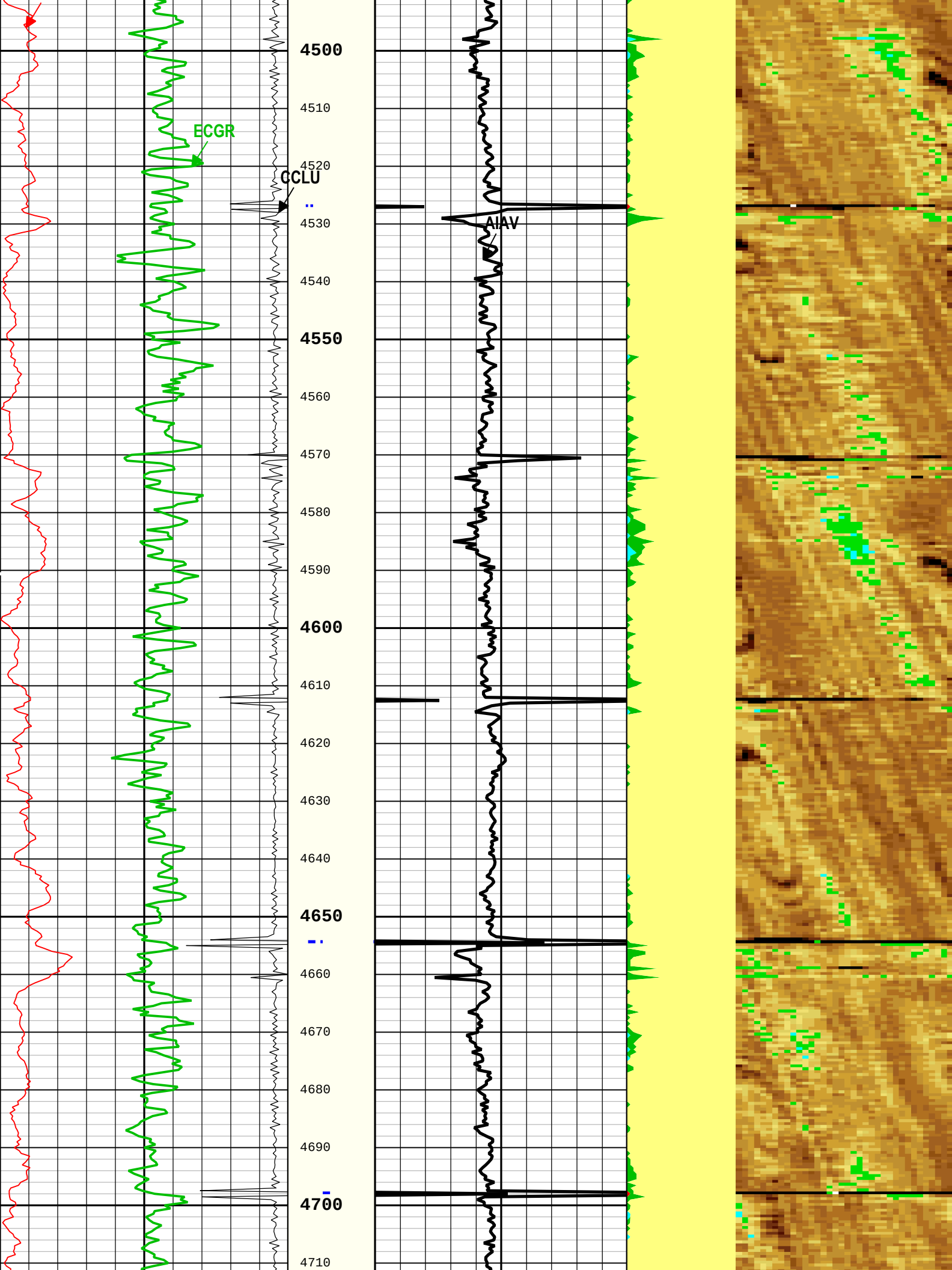
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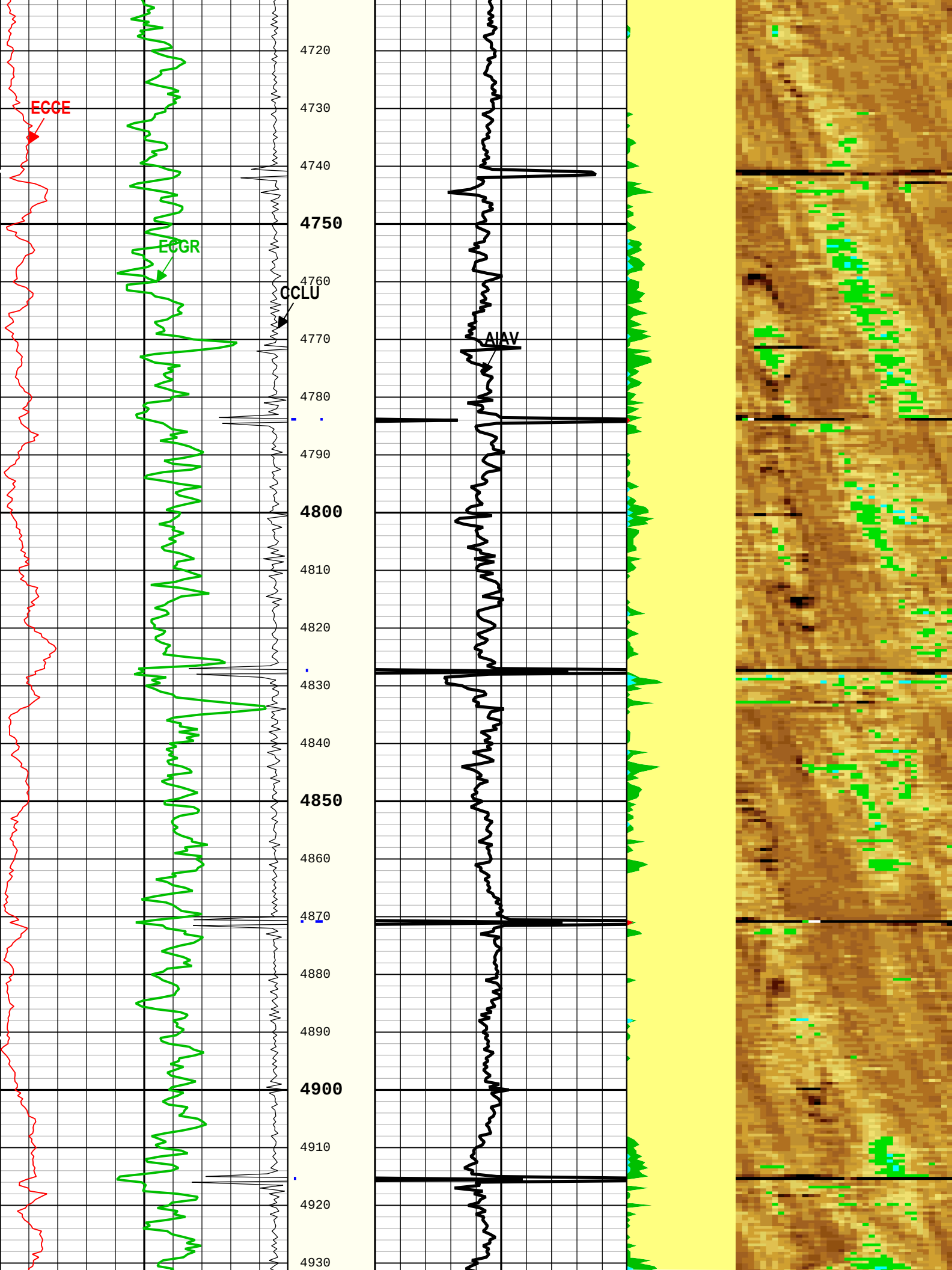
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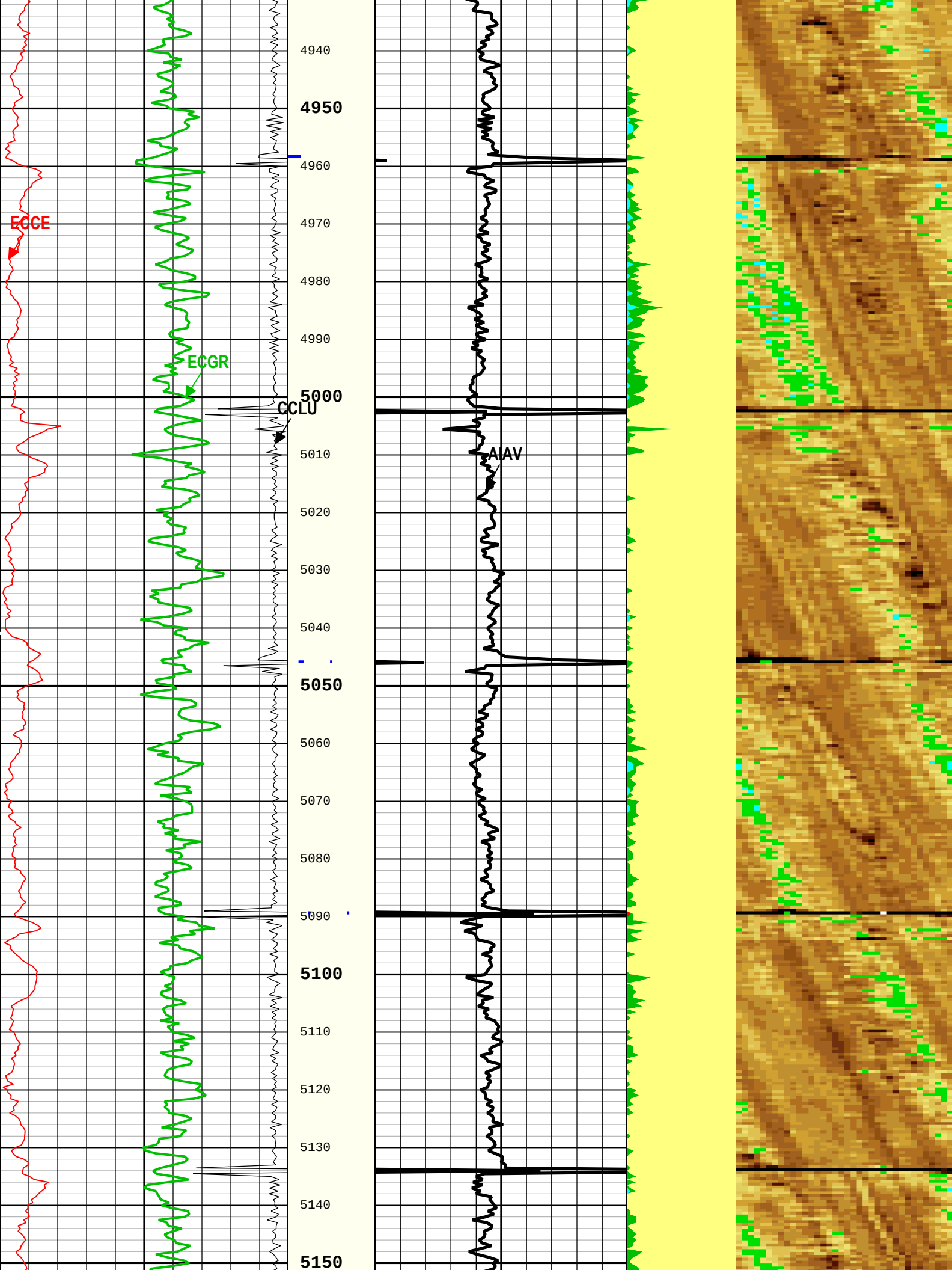
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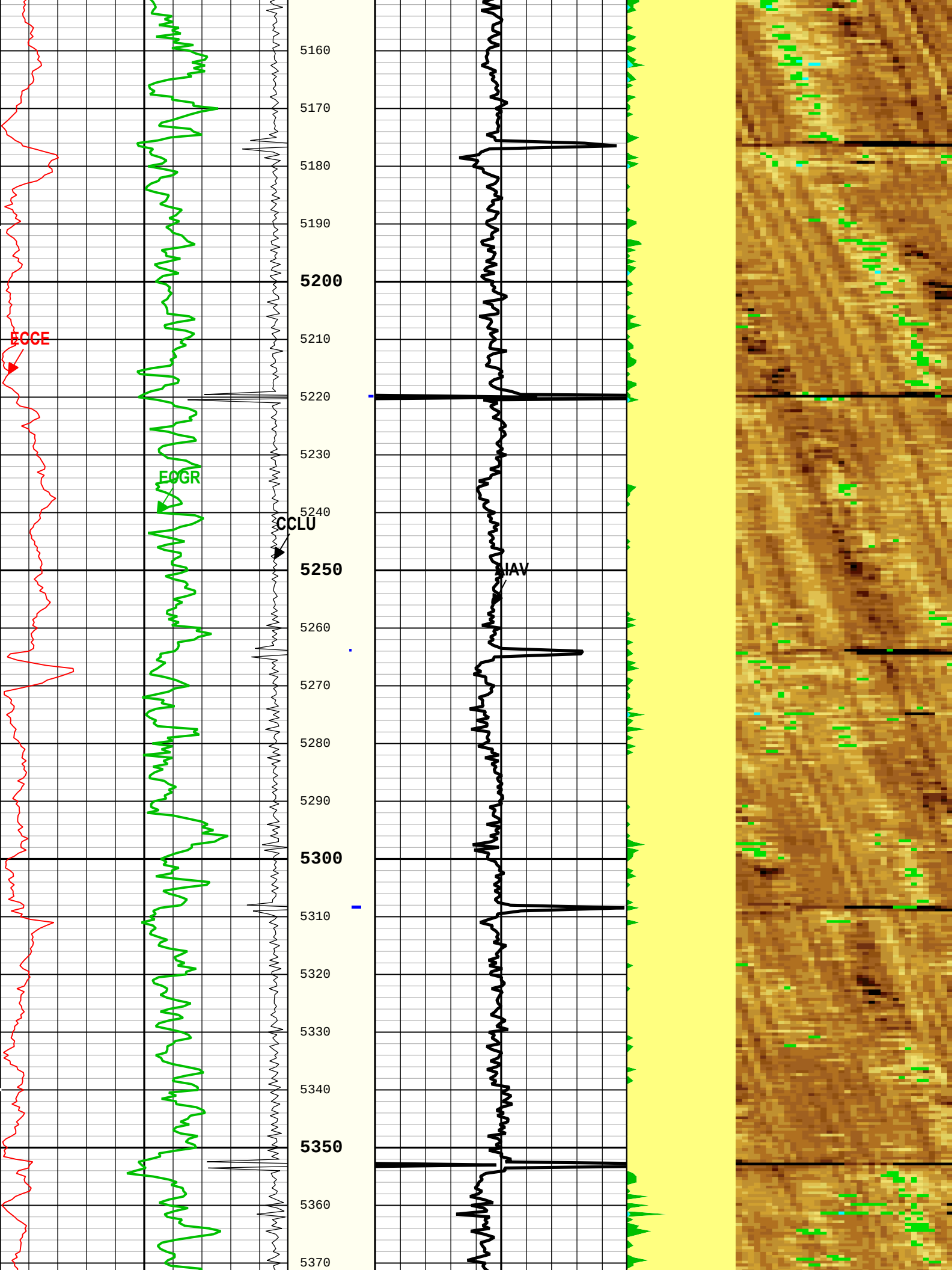
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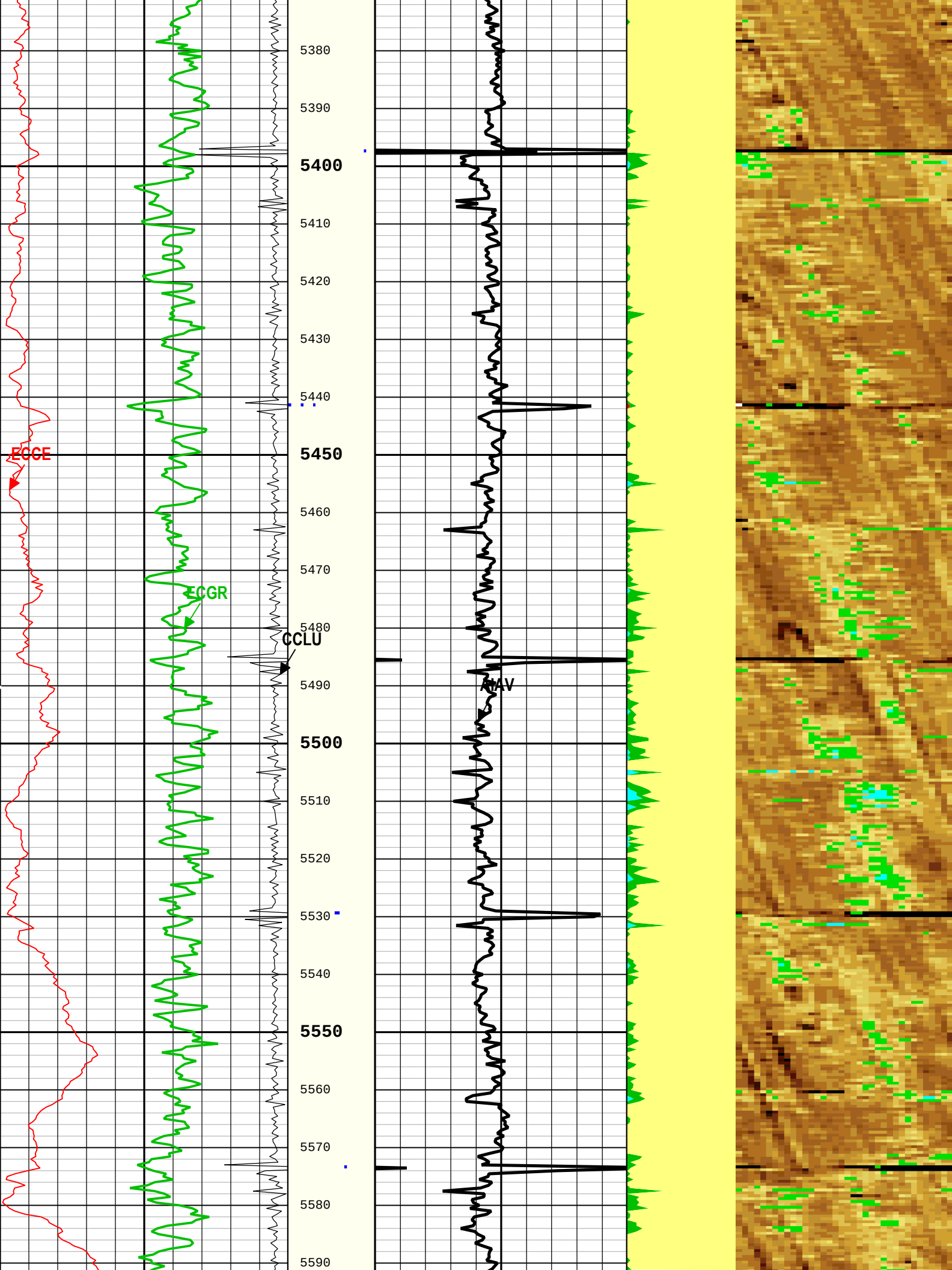
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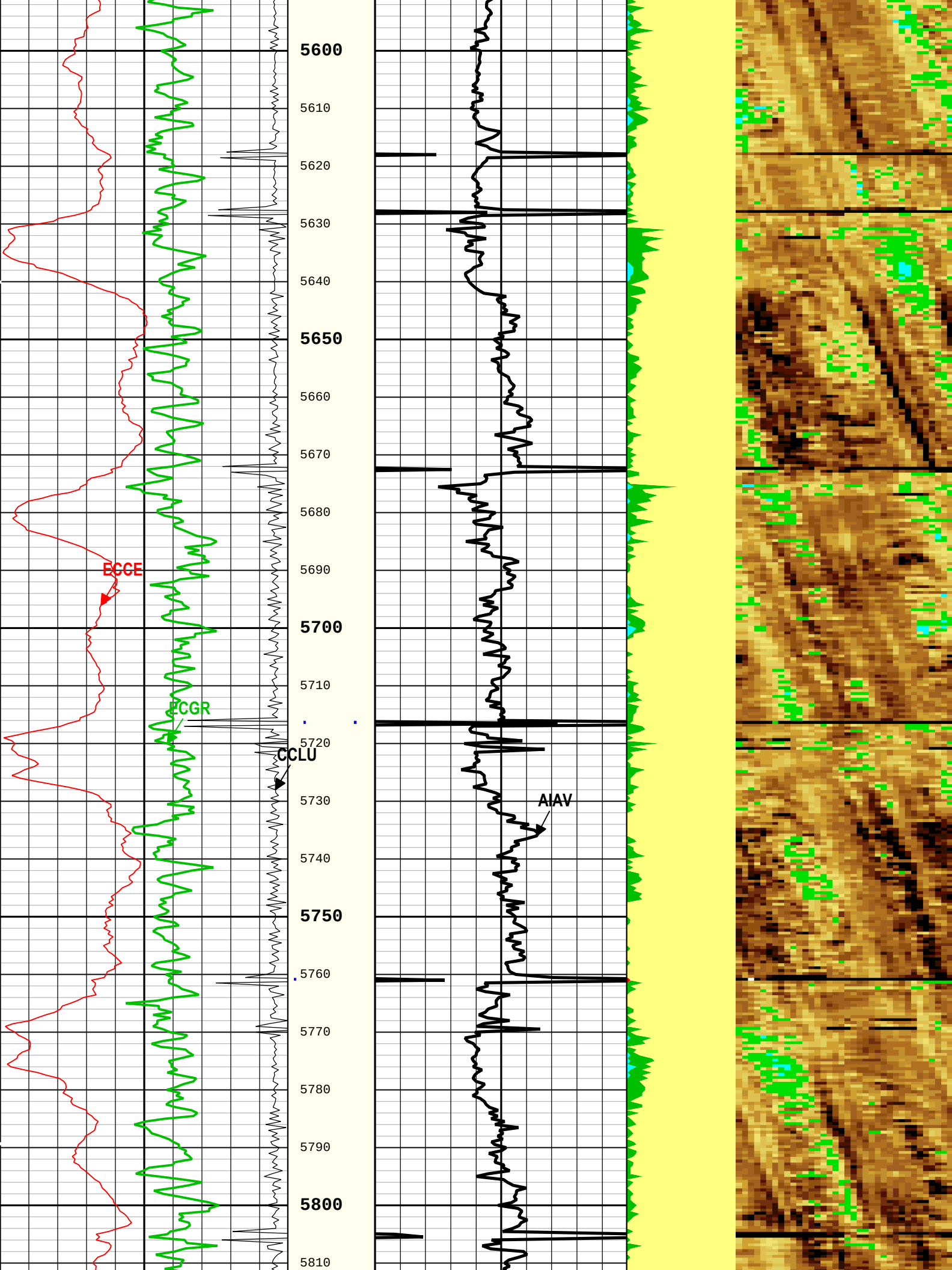
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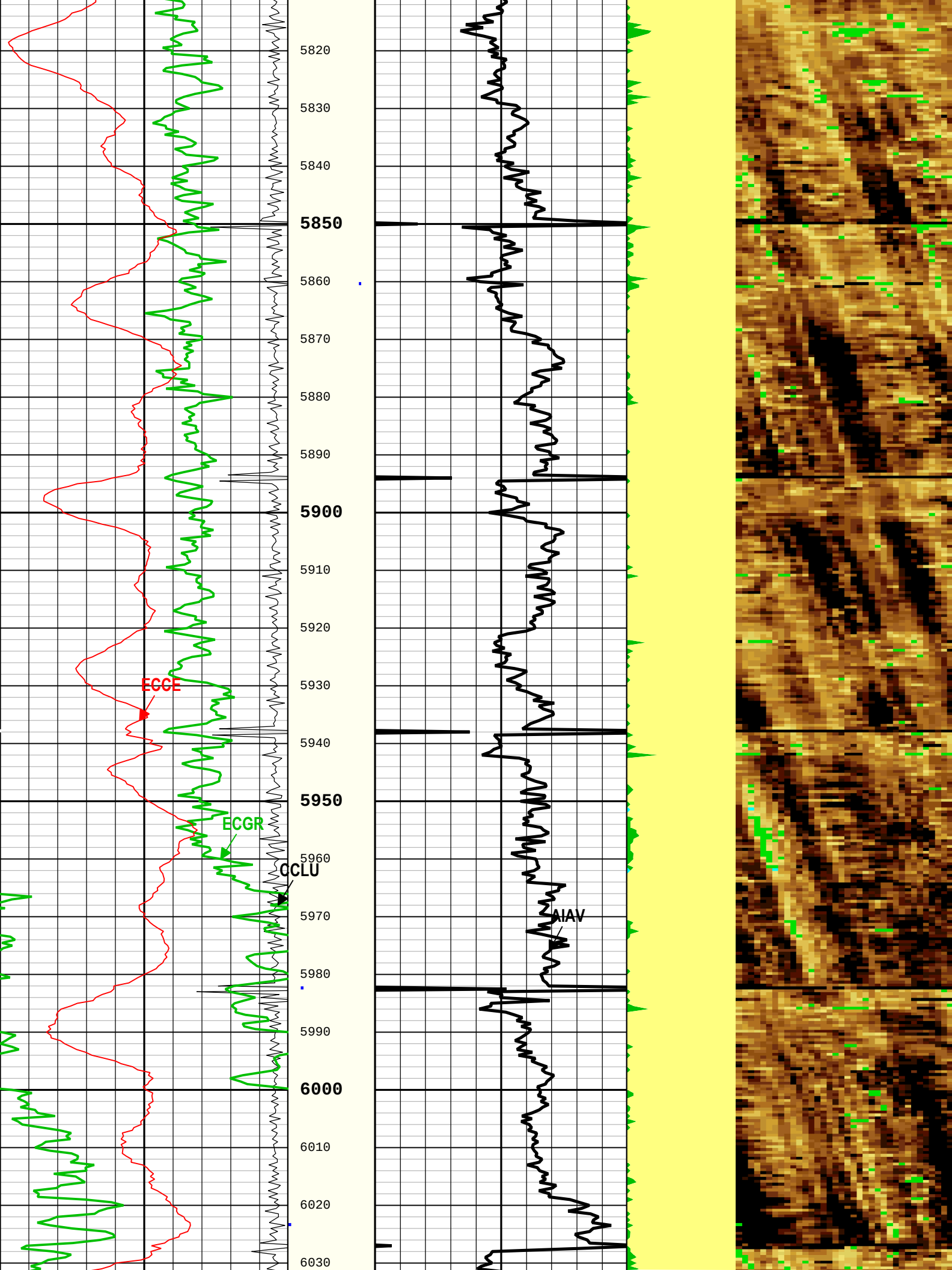
CCLU
AIAV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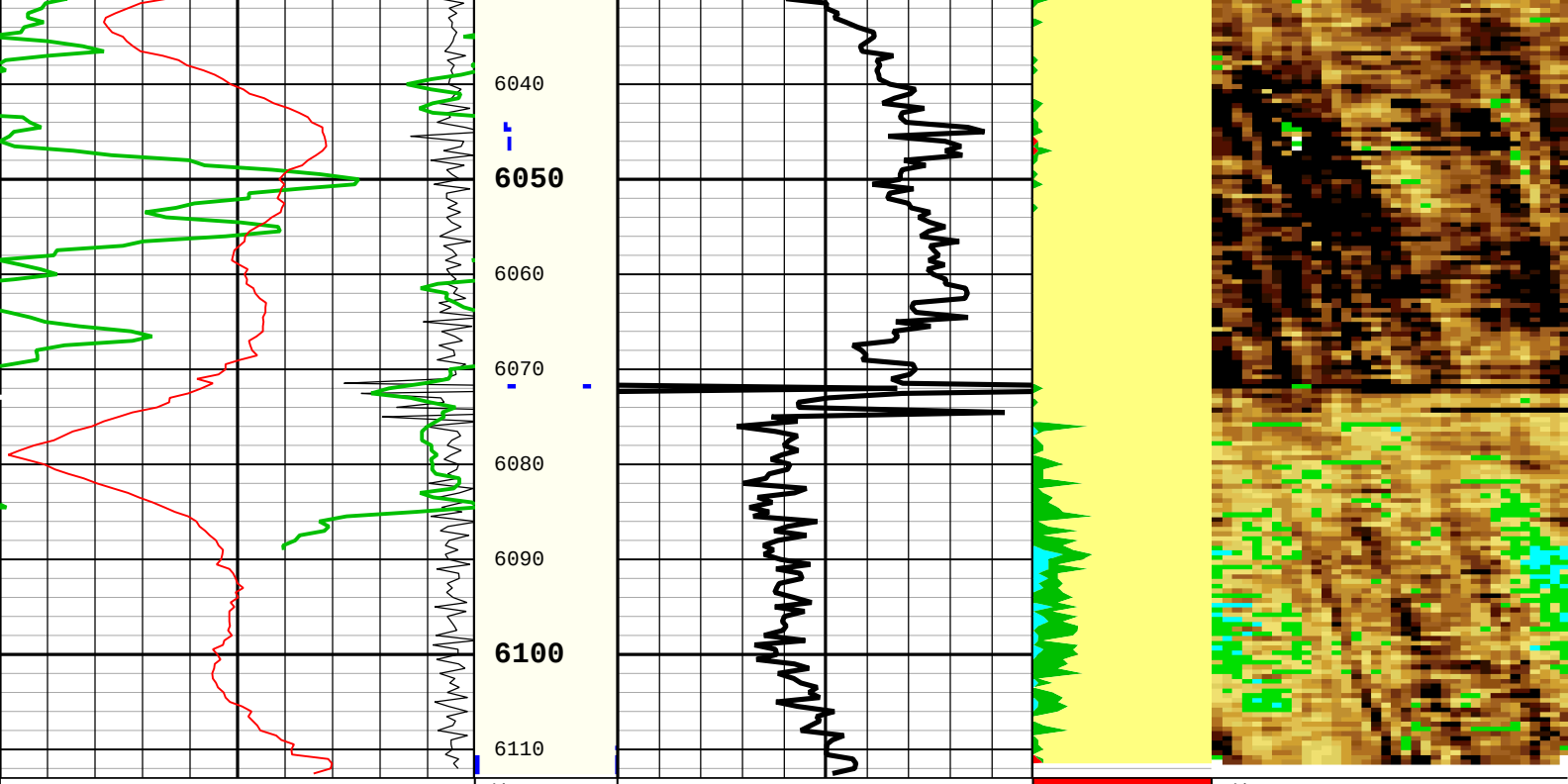
ECGR
CCLU
AIAV



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: 23-Mar-2017 22:24:49

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	10964	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	1.11	

U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	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	57	110
BS	13.5	110	1939
BS	8.5	1939	6113

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	6000	ft
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 2017 SP1	7.1.82245.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	2158.94 ft	2516.81 ft	23-Mar-2017 8:58:47 PM	23-Mar-2017 9:02:17 PM	ON	5.95 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Hazzard Federal LC22-735

One: Log[2]:Up:S005

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: 23-Mar-2017 22:24:56

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

0 in 0.5

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)

2140

2150

2160

2170

2180

2190

2200

2210

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2250

2260

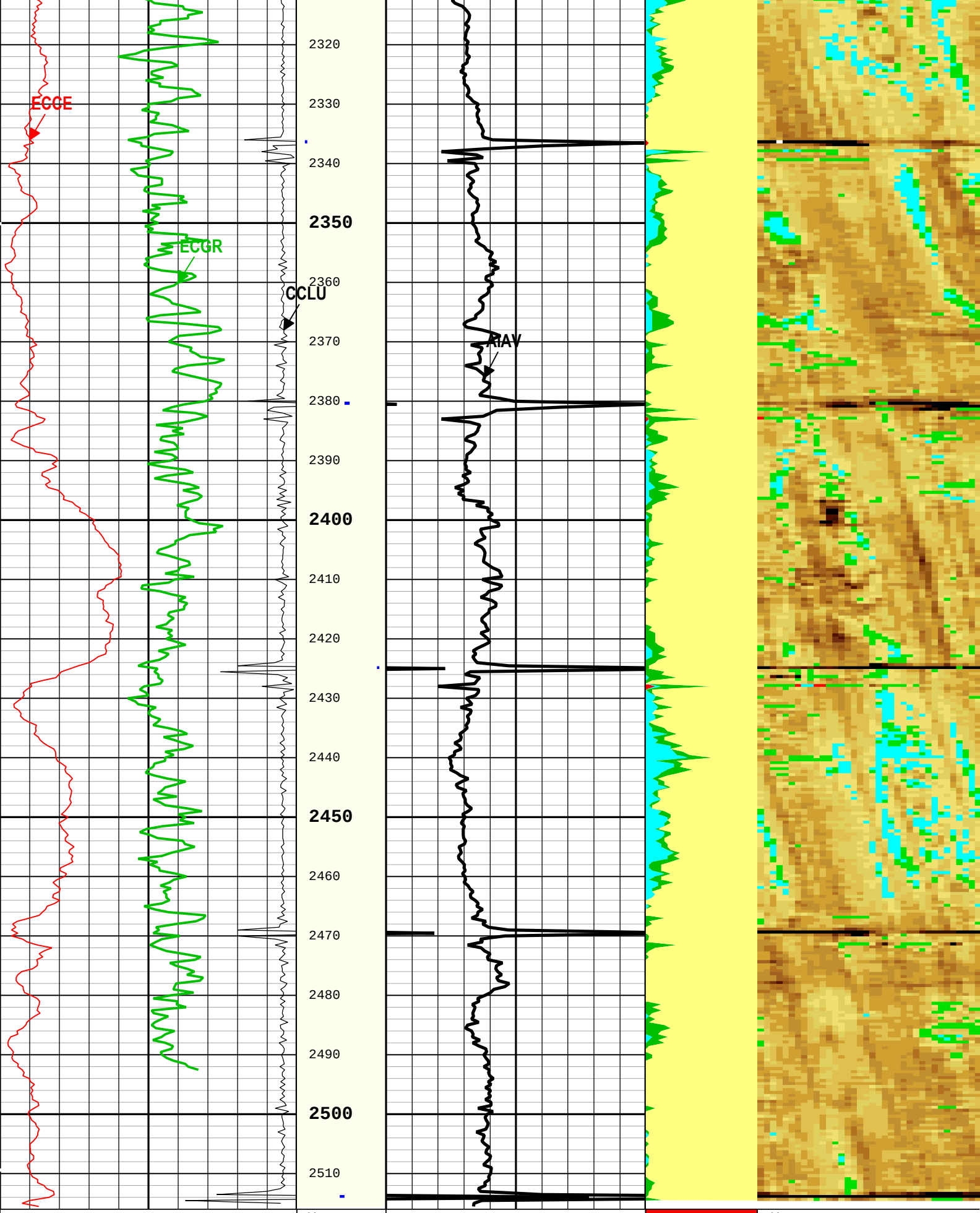
2270

2280

2290

2300

2310



Casing Collar Locator Ultrasonic (CCLU)
USIT-E

-20 in 1

Absent 1.500 2.500 6.500

Explicit Normalizatio

Acoustic Impedance Average (AIAV)
USIT-E

0 Mrayl 10

Gas

Liquid

Absent -500.000 2.200 3.254 4.309 5.363 6.418 7.472

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Gamma Ray (ECGR) SGT-N

0 gAPI 150

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

n

USIT - USIT Processing Flags (UFLG) USIT-E

Micro-Debondi ng

Bonded

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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: 23-Mar-2017 22:24:56

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GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
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IMAR	Image Rotation	USIT-E	Off	
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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.	
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ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

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TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
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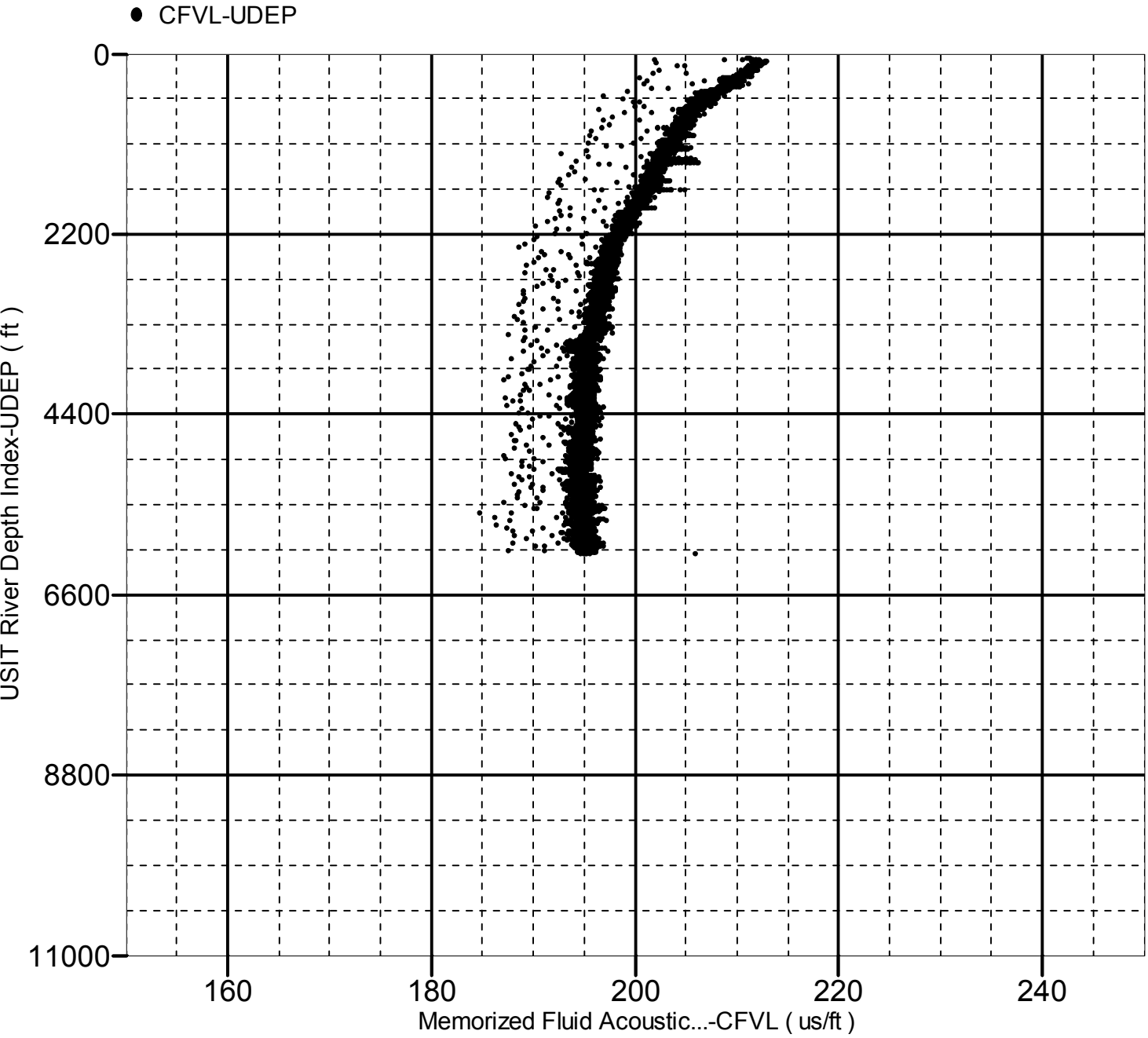
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz

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	2500	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6113.00 to 81.00 ft

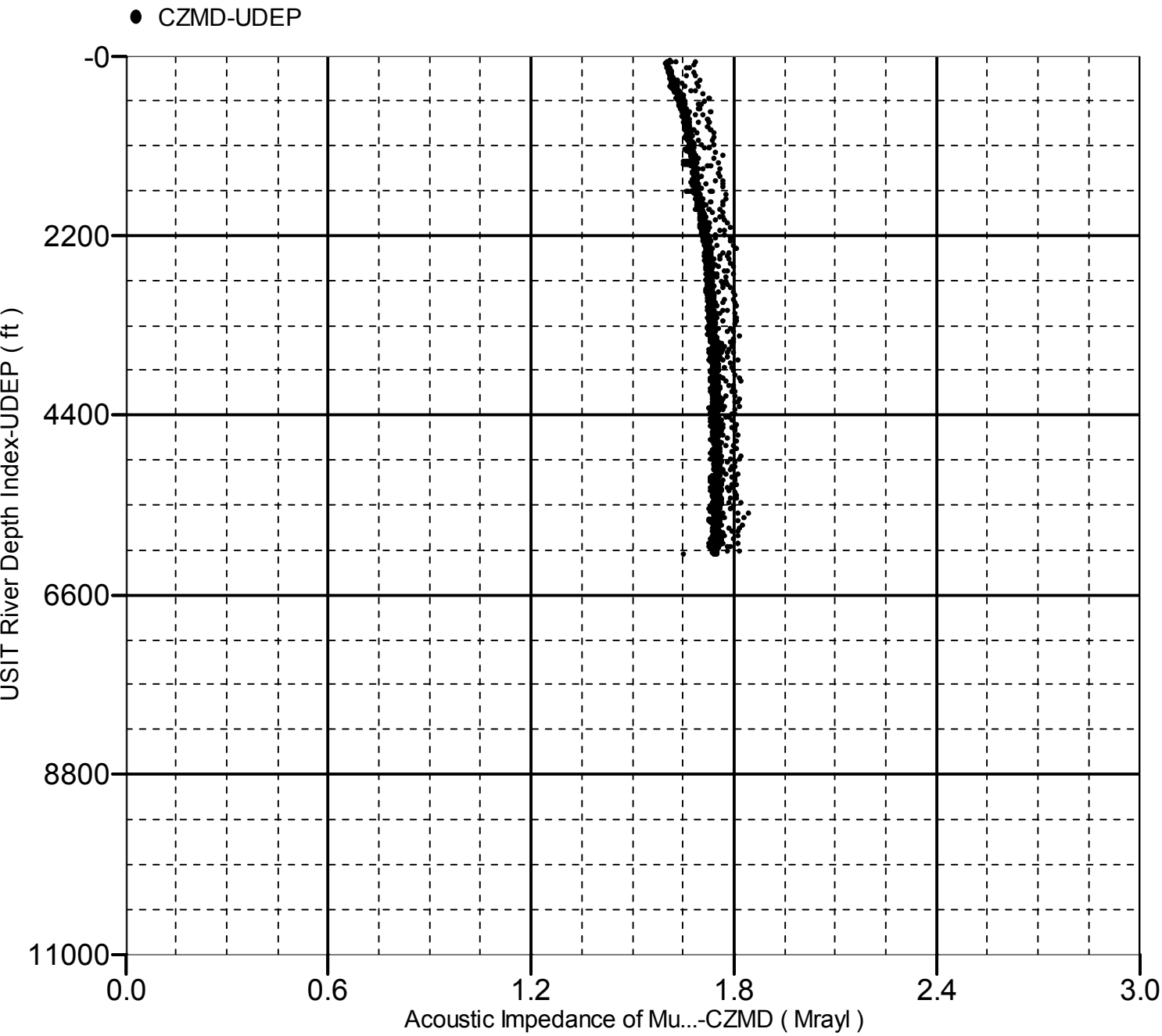


XYZ
Company:Noble Energy Inc Well:Hazzard Federal LC22-735
One: Log[4]:Up:S005

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6113.00 to 81.00 ft



Company:	Noble Energy Inc
Well:	Hazzard Federal LC22-735
Field:	Wildcat
County:	Weld
Country:	USA

Schlumberger

UltraSonic Summary Print