Schlumberger

Company: Noble Energy, Inc.

Well: Benelli Federal LC22-765

Field: Wildcat

County: Weld State: Colorado

UltraSonic Summary Print

County: Weld
Field: Wildcat
Location: NENW Sec 22 T9N R59W
Well: Benelli Federal LC22-765
Company: Noble Energy, Inc.

Location:			
NENW Sec 22 T9N R59W		Elev.: K.B.	4946.00 ft
SHL: 400 FNL 1612 FWL		G.L.	4916.00 ft
Latitude: 40.74234 Longitude: -103.96782		D.F.	4945.00 ft
Permanent Datum:	Ground Level	Elev.:	4916.00 f
Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum
Drilling Measured From:	Kelly Bushing		

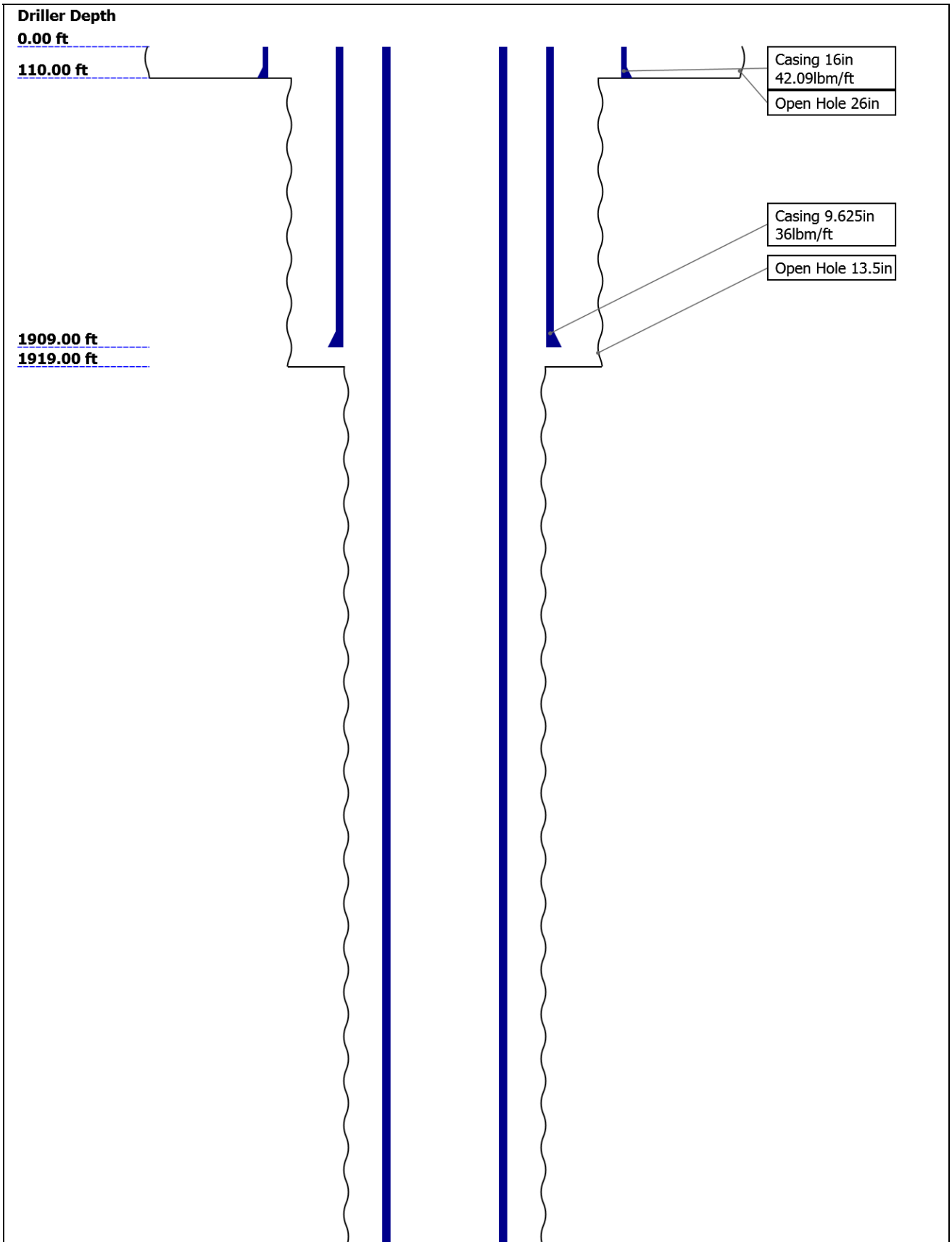
API Serial No.	Section:	Township:	Range:
05-123-42975	22	9N	59W

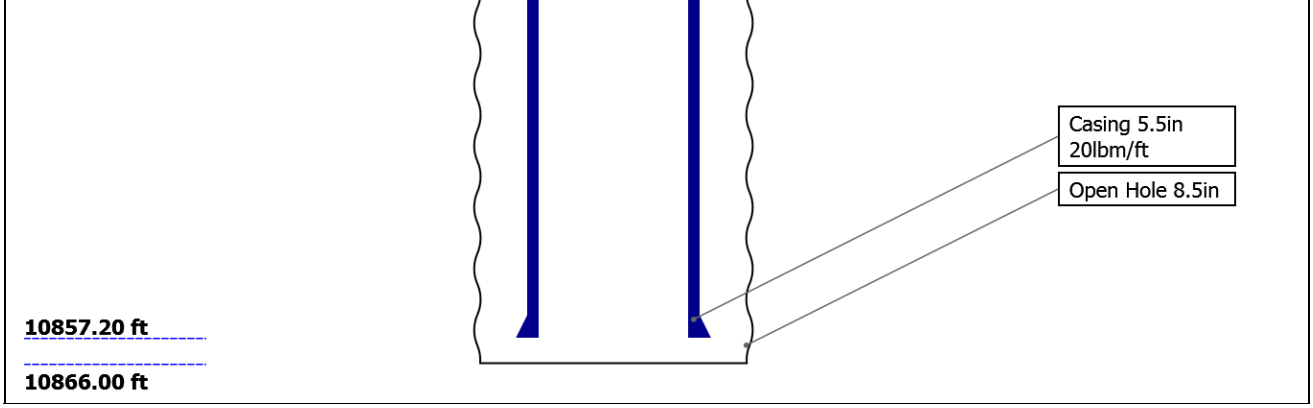
Logging Date	30-Mar-2017		
Run Number	One		
Depth Driller	10866.00 ft		
Schlumberger Depth	10866.00 ft		
Bottom Log Interval	6325.00 ft		
Top Log Interval	0.00 ft		
Casing Fluid Type	Brine		
Salinity			
Density	9.4 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	1919.00 ft		
To	10866.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	10857.20 ft		
Max Recorded Temperatures	227 degF		
Logger on Bottom Time	30-Mar-2017	09:32:00	
Unit Number Location:	9115	Fort Morgan	
Recorded By	Stephen Tang		
Witnessed By	Bill Mansfield		

Disclaimer

Contents

Well Sketch



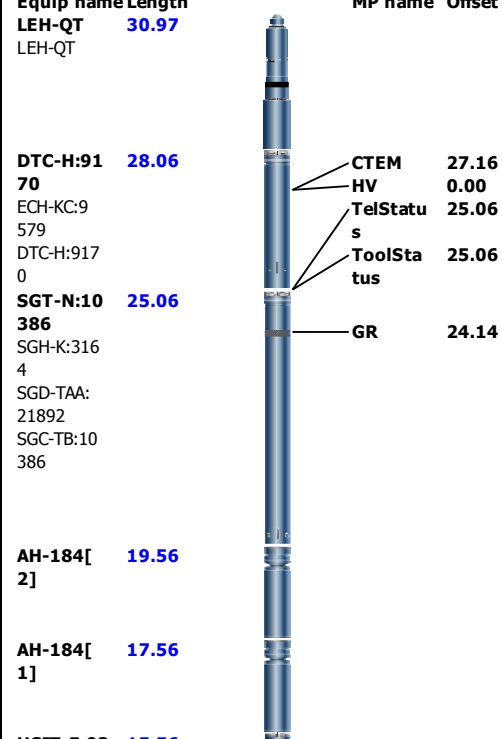


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	1919			
Top Logger (ft)	0	110	1919			
Bottom Driller (ft)	110	1919	10866			
Bottom Logger (ft)	110	1919	10866			
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	N/A	N/A			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	1909	10857.2			
Bottom Logger (ft)	110	1909	10857.2			

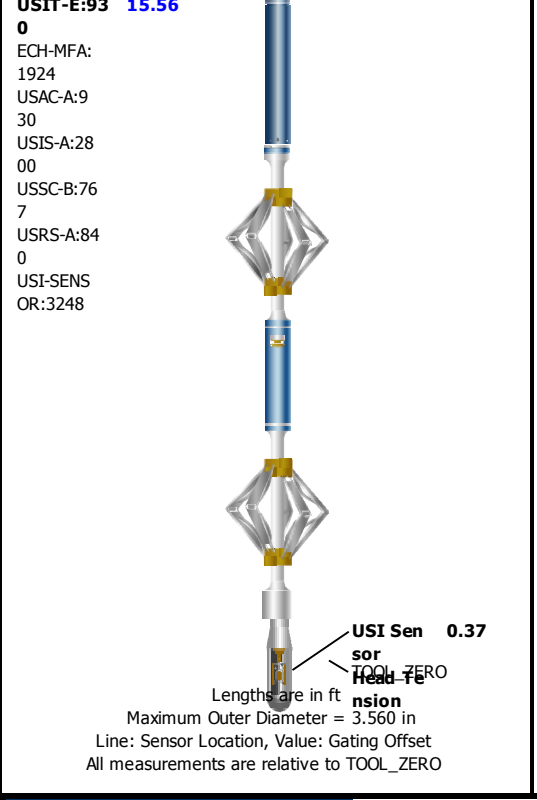
Remarks and Equipment Summary

One: Toolstring



One: Remarks

Toolstring ran as per tool sketch.
Well logged at 10 degree 6 inch.
Main pass logged with 2500 psi.
Repeat pass logged with 0 psi.
Crew: Gary Lapp
Thank you for choosing Schlumberger!



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			

One:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth procedures followed.
Rig Up Length At Surface		IDW used as primary depth device.
Rig Up Length At Bottom		Z-Chart used as secondary depth device.
Rig Up Length Correction		

Stretch Correction

Tool Zero Check At Surface

One

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	67.36 ft	6336.33 ft	30-Mar-2017 9:31:59 AM	30-Mar-2017 10:26:52 AM	ON	7.29 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy, Inc. Well:Benelli Federal LC22-765

One: Log[4]:Up:S003

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: 30-Mar-2017 11:07:08

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

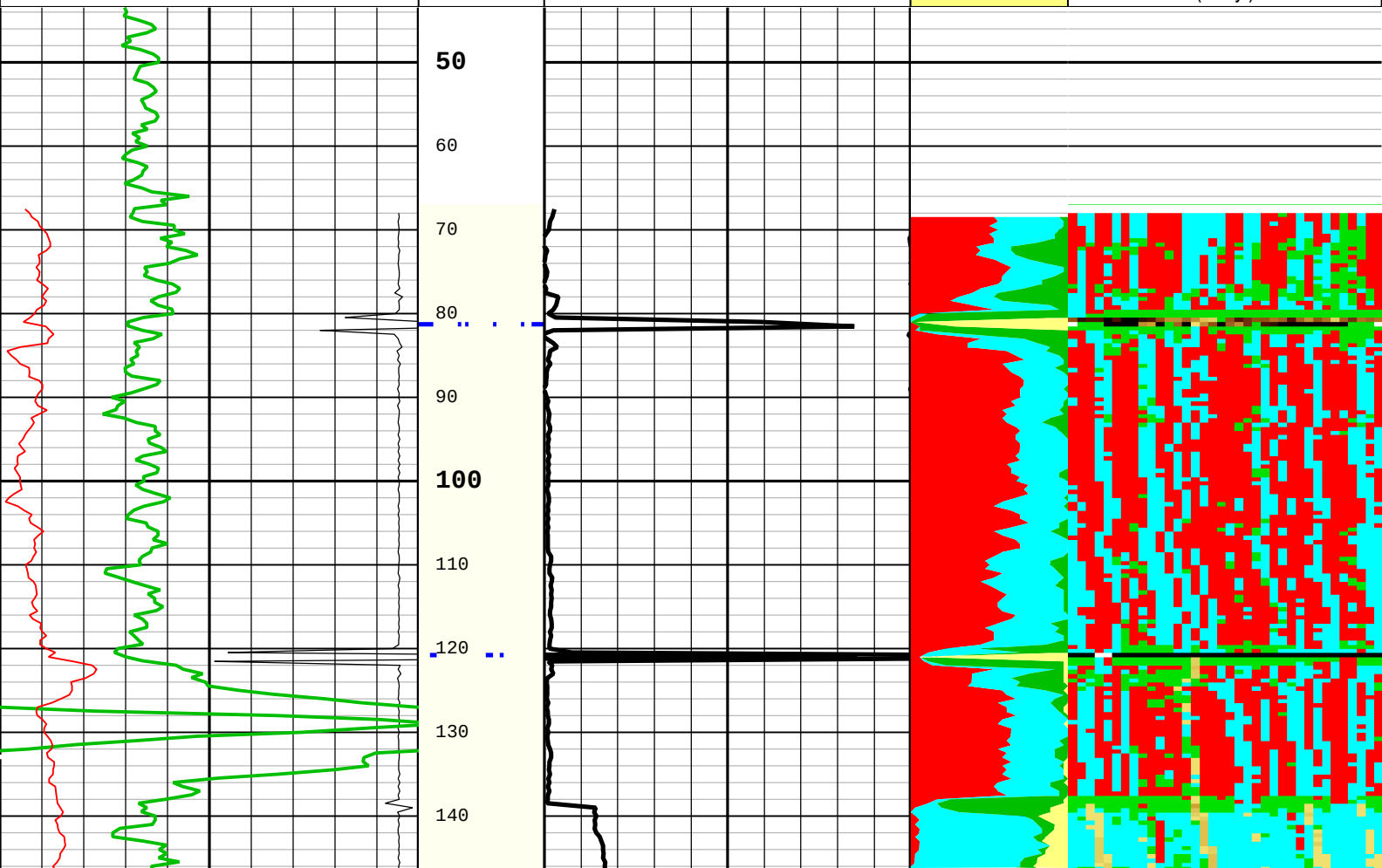
Micro-Debonding

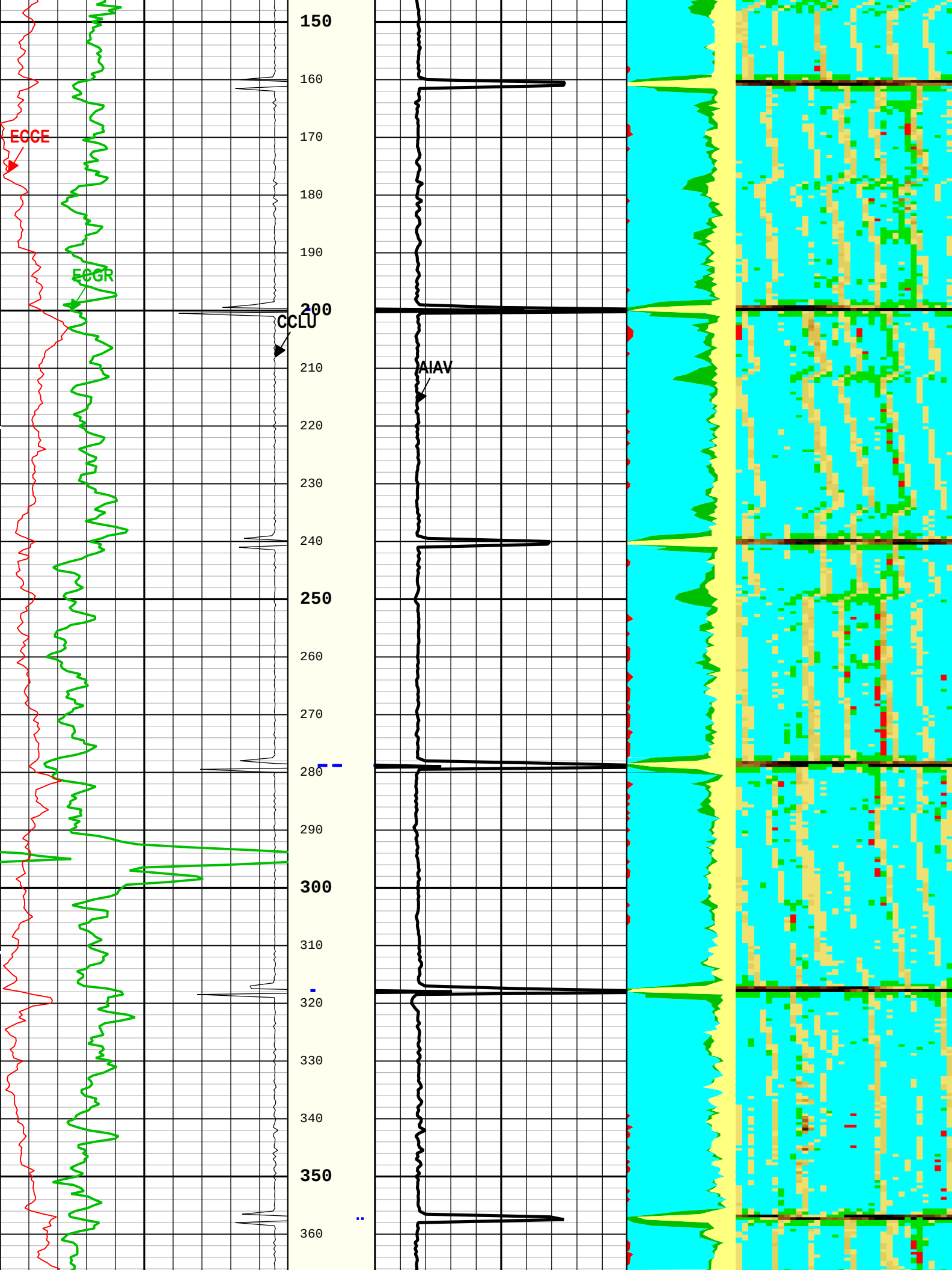
Bonded

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)

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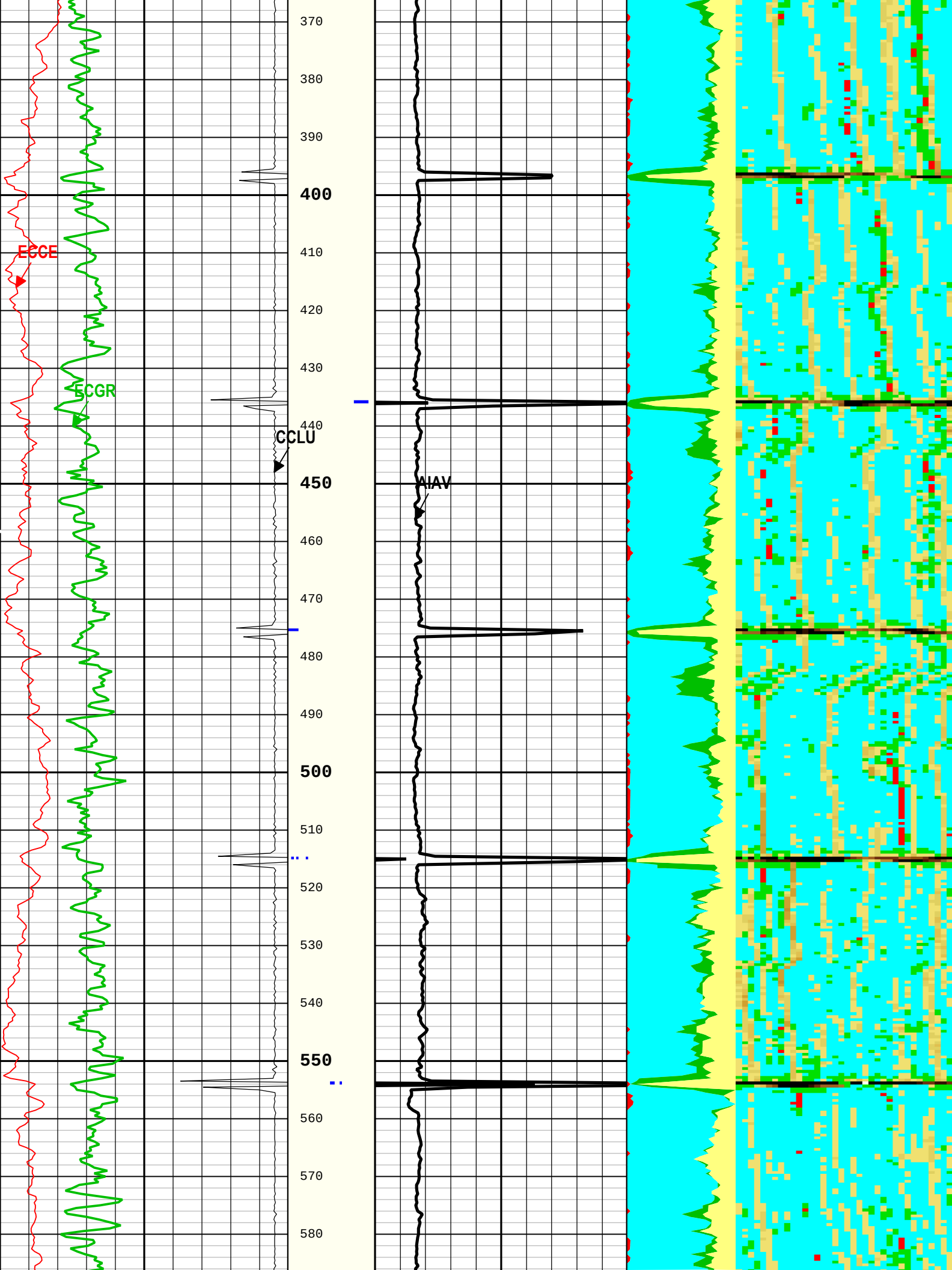
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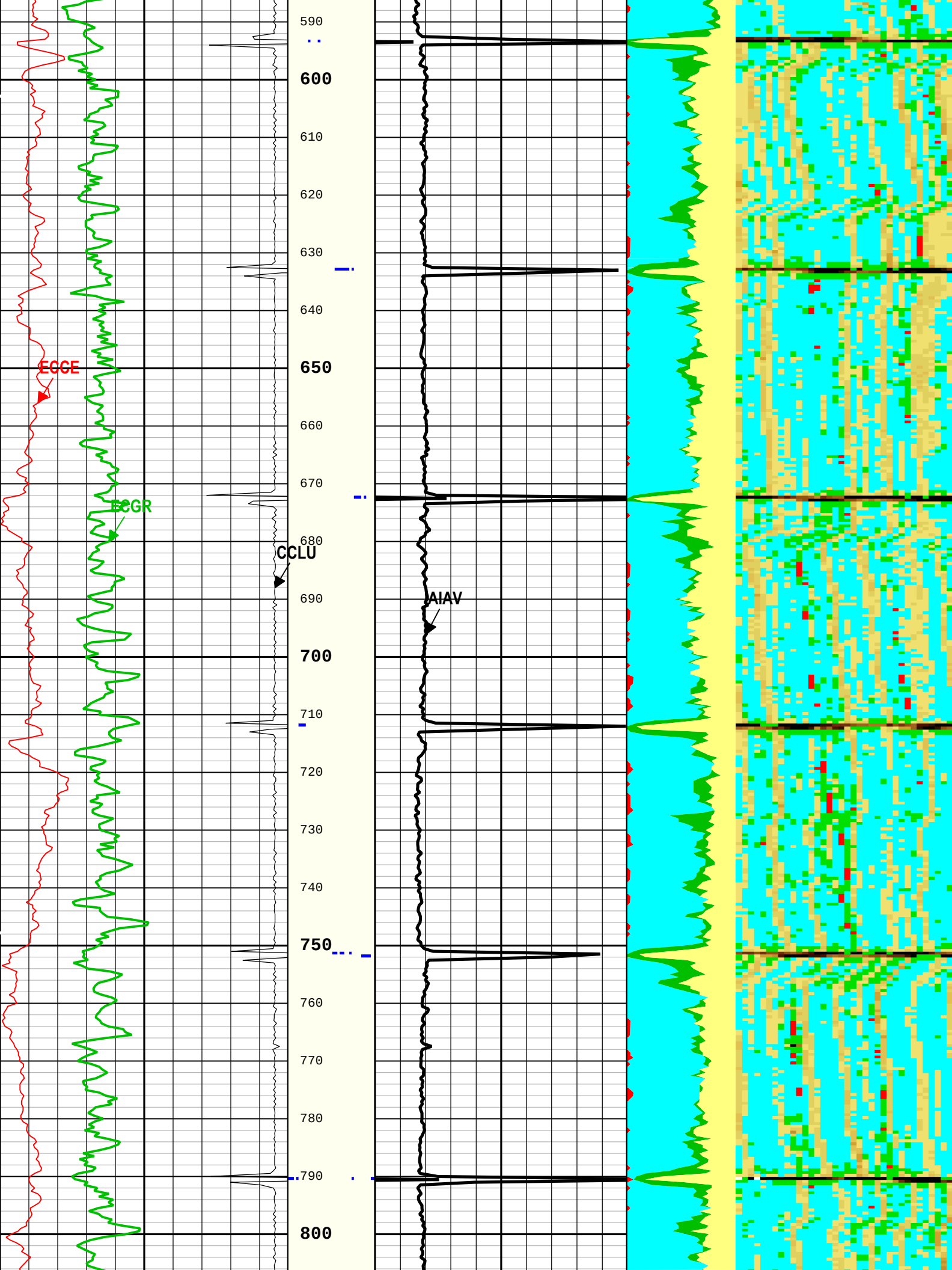
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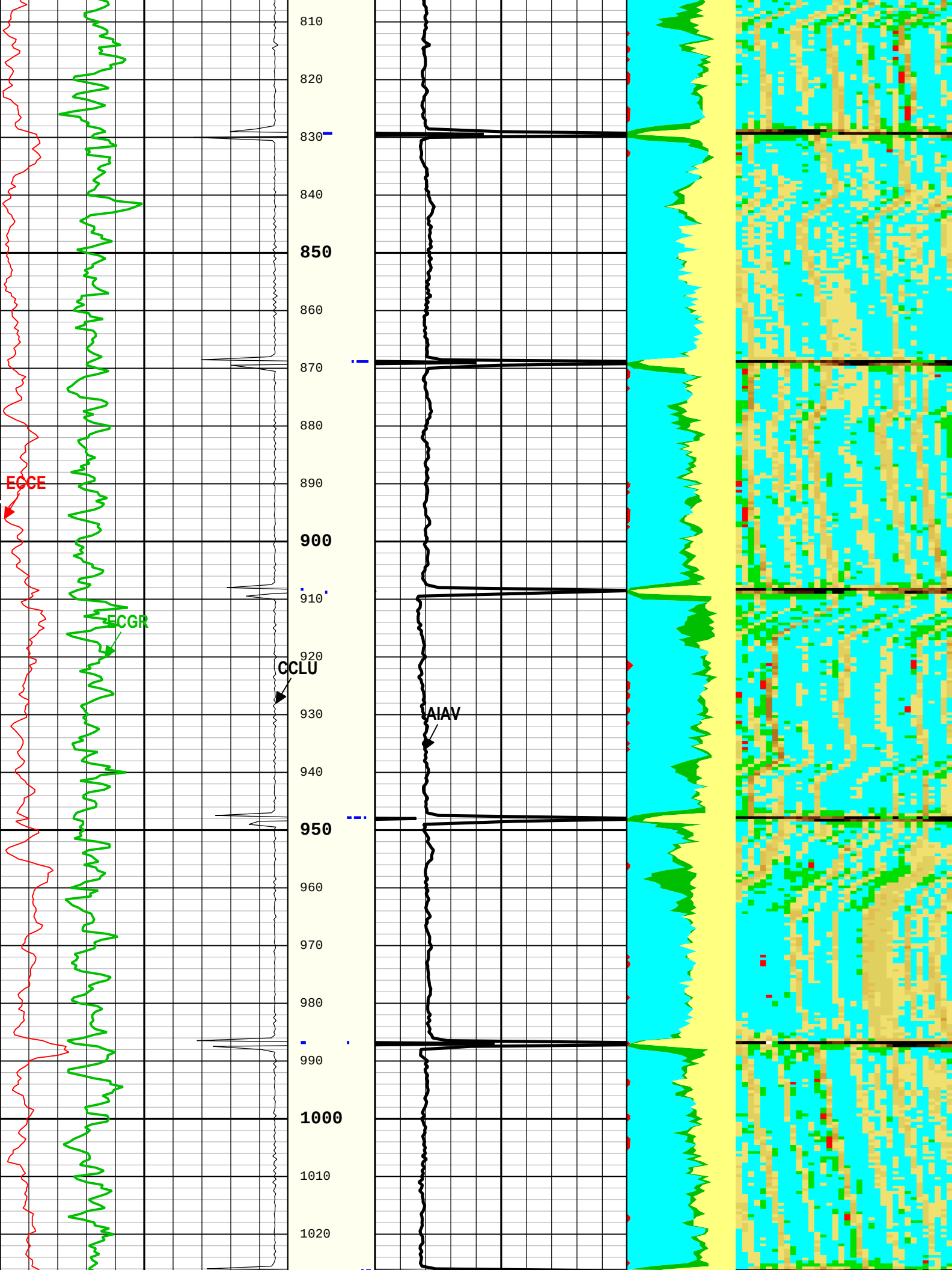
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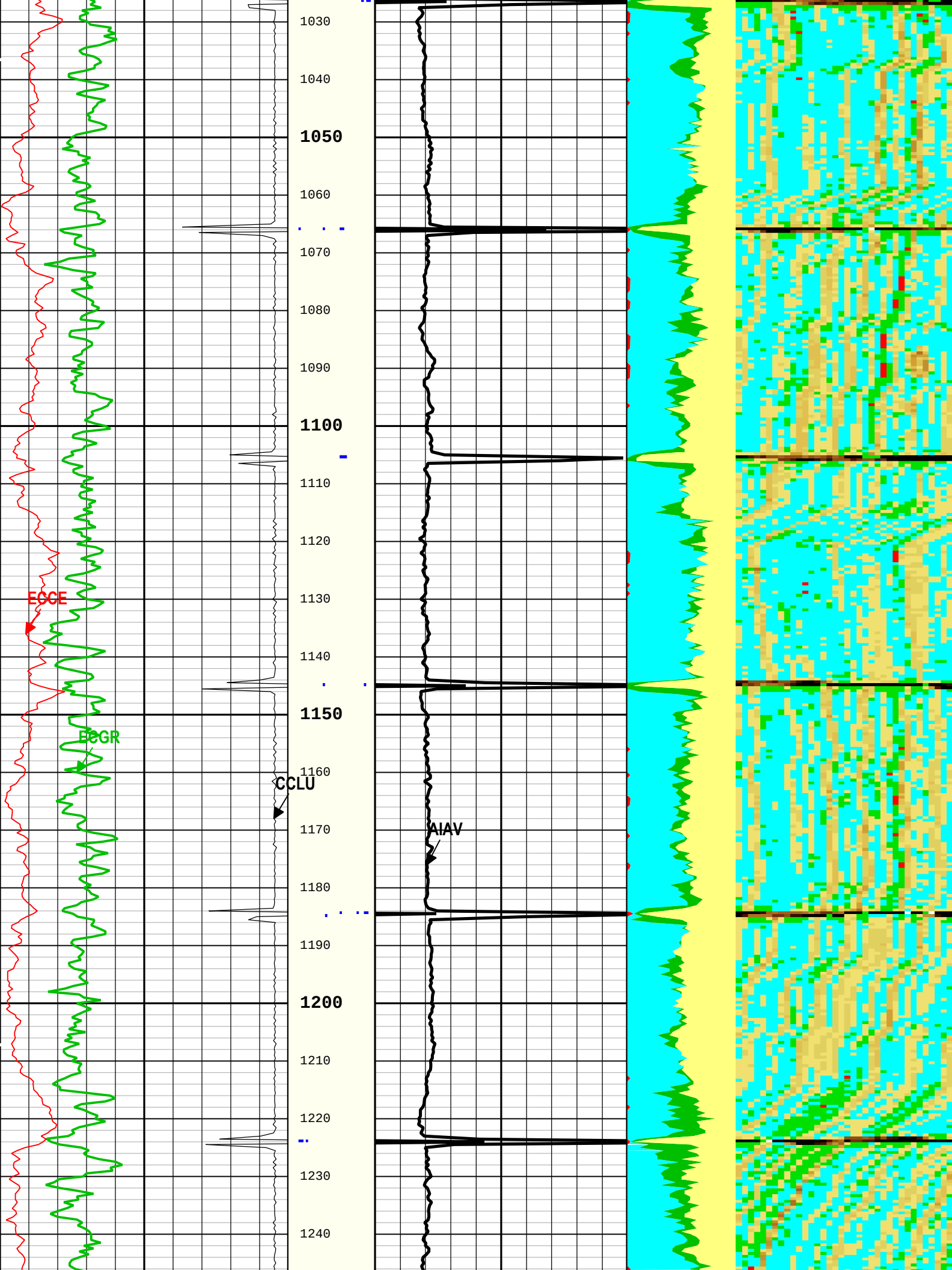
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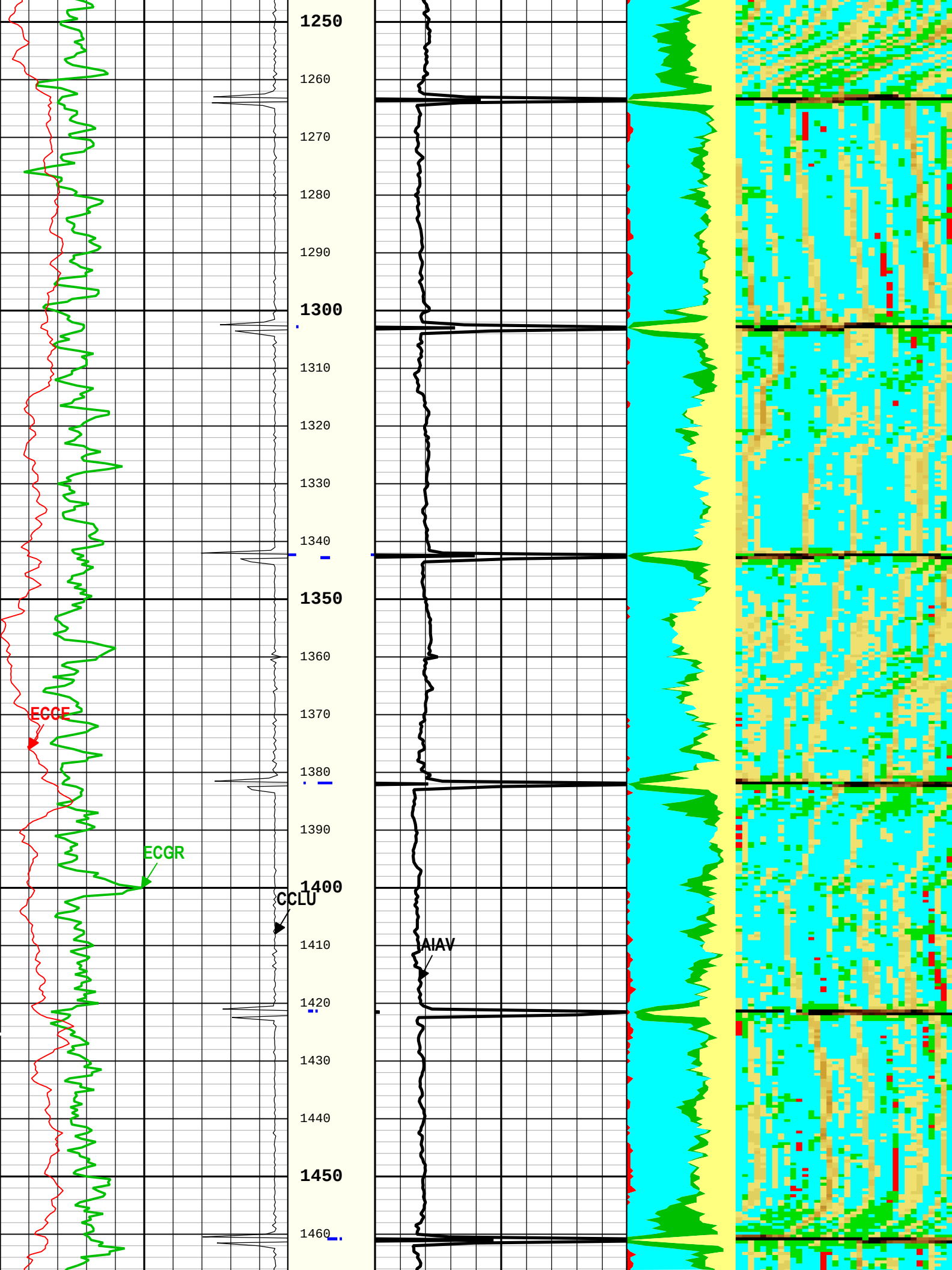
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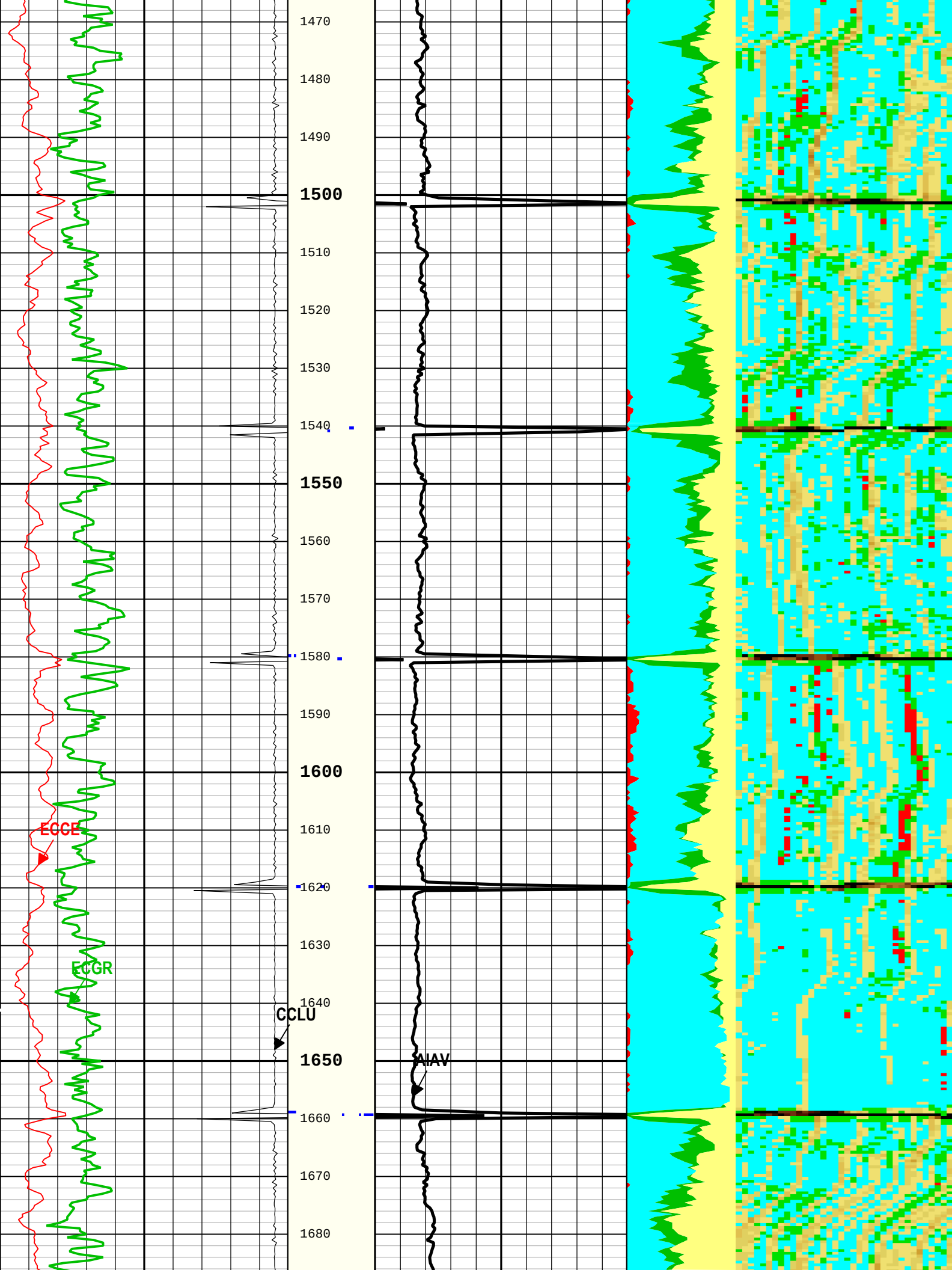
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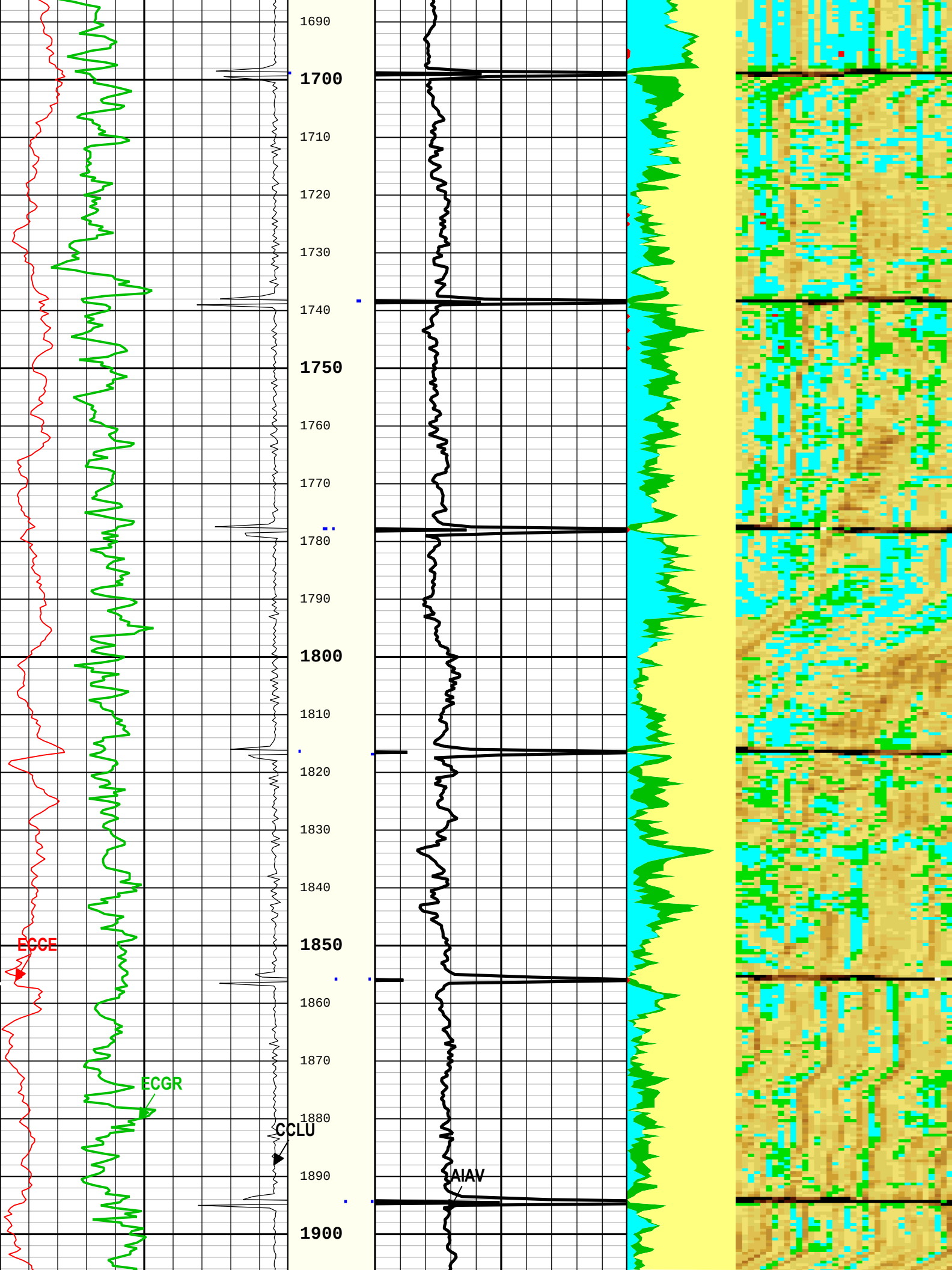
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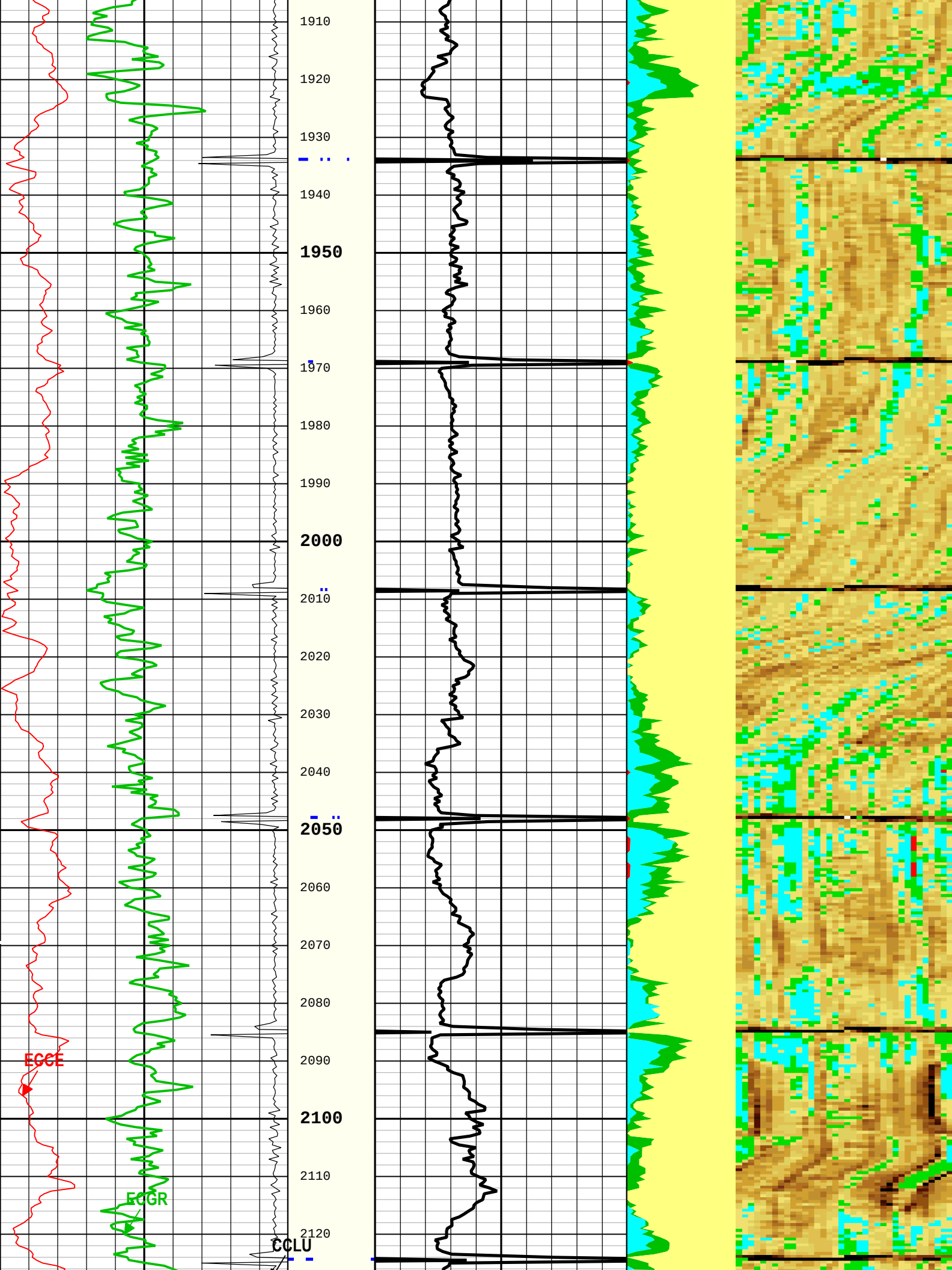
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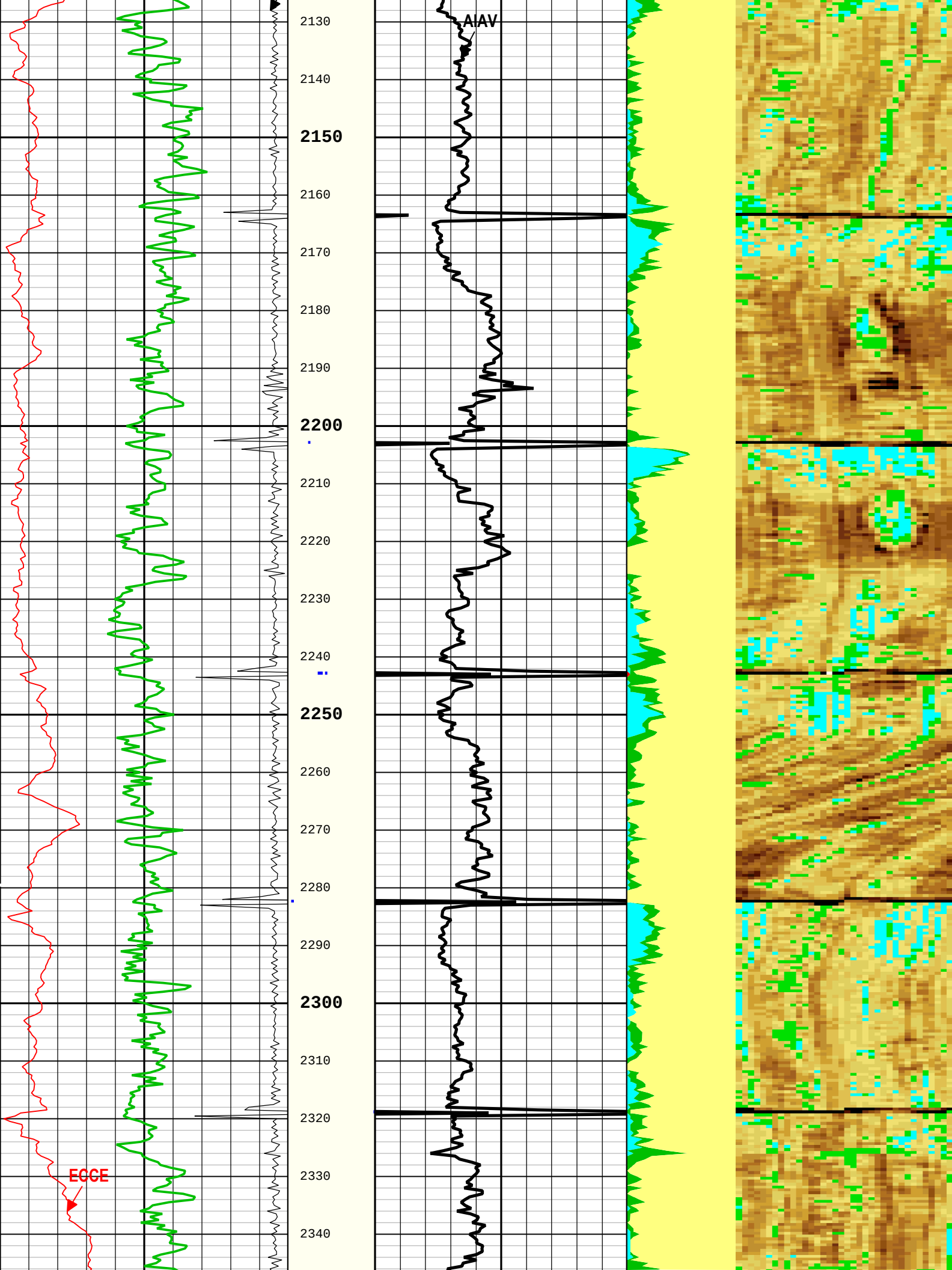
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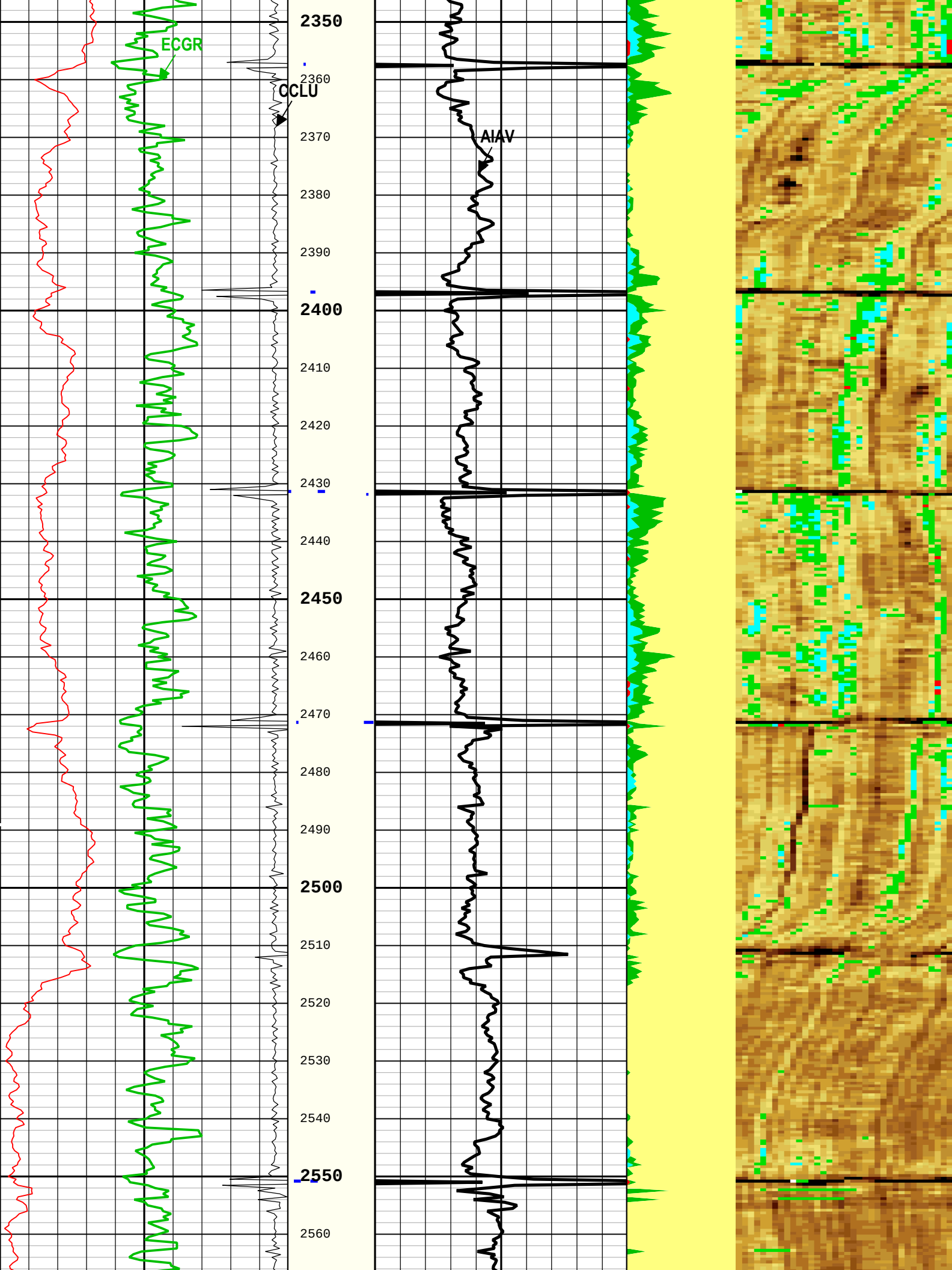
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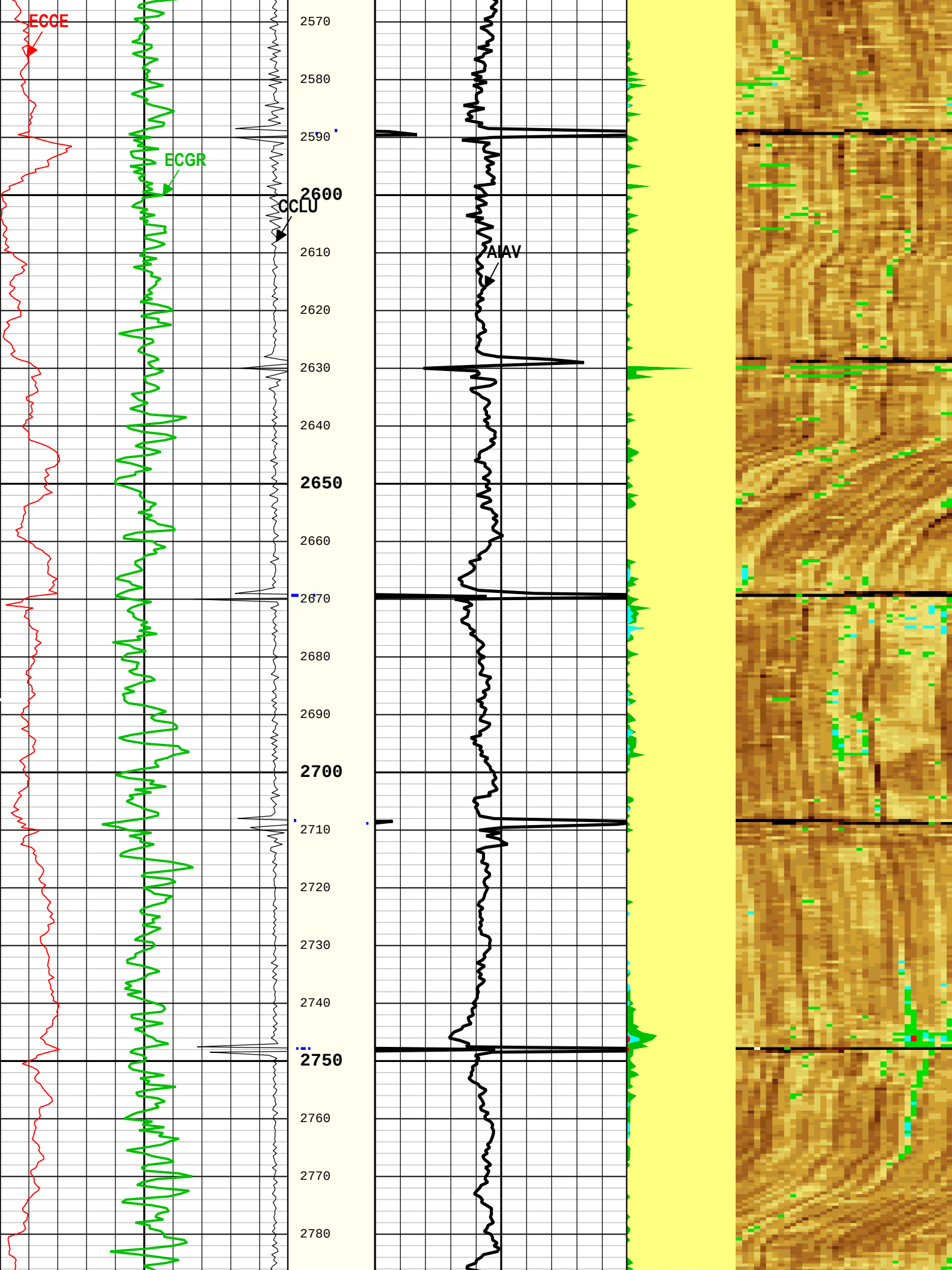
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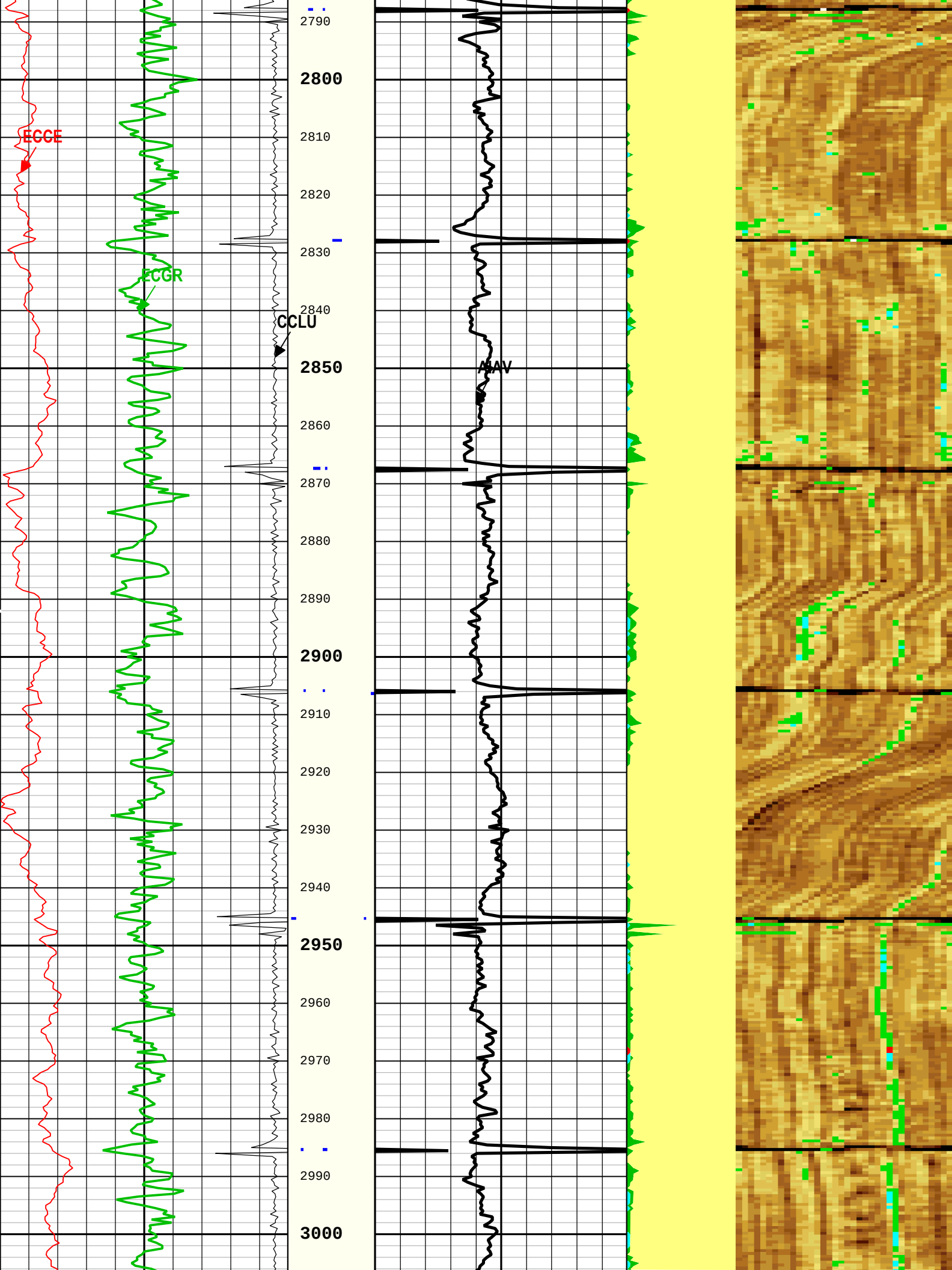
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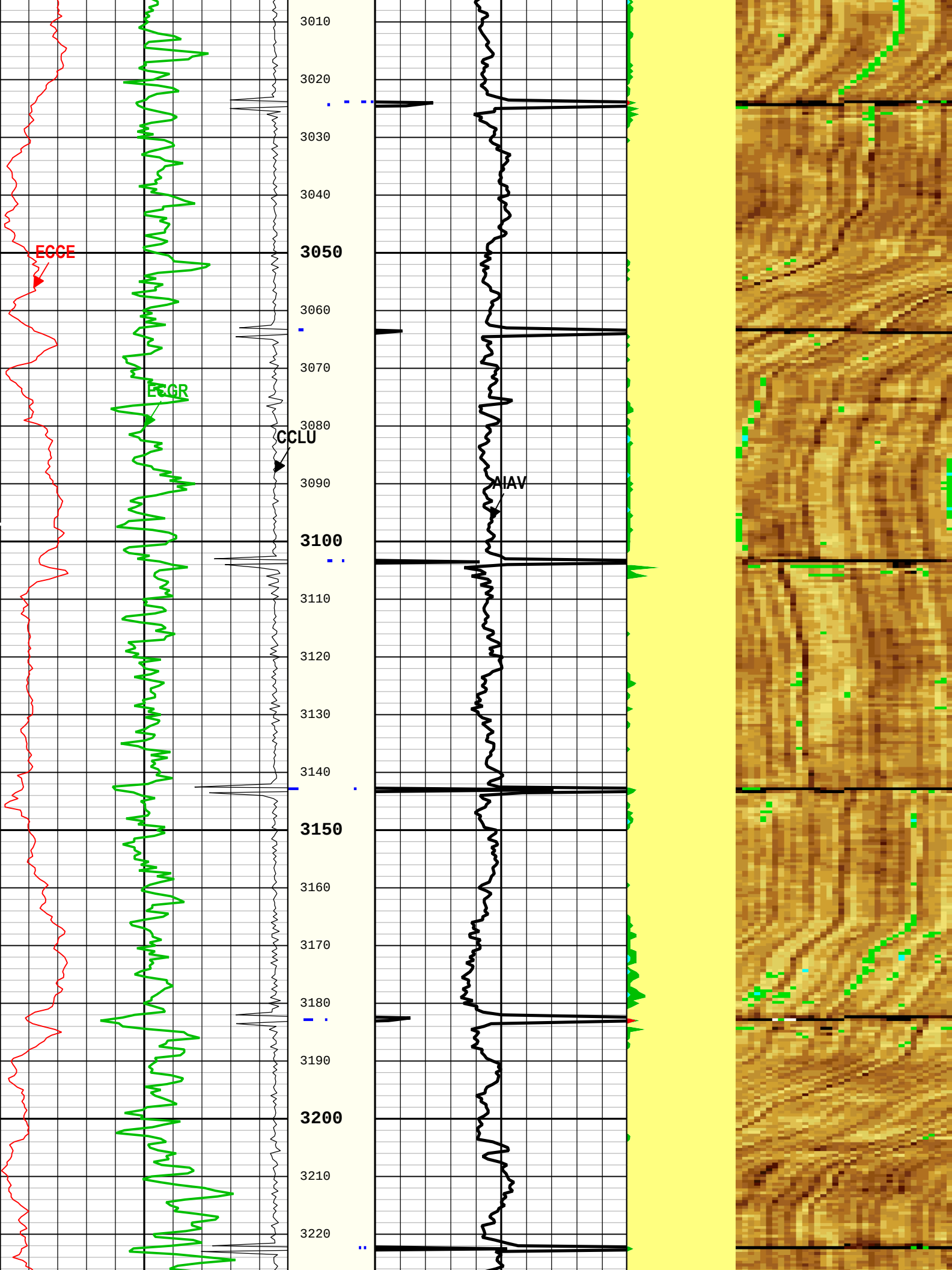
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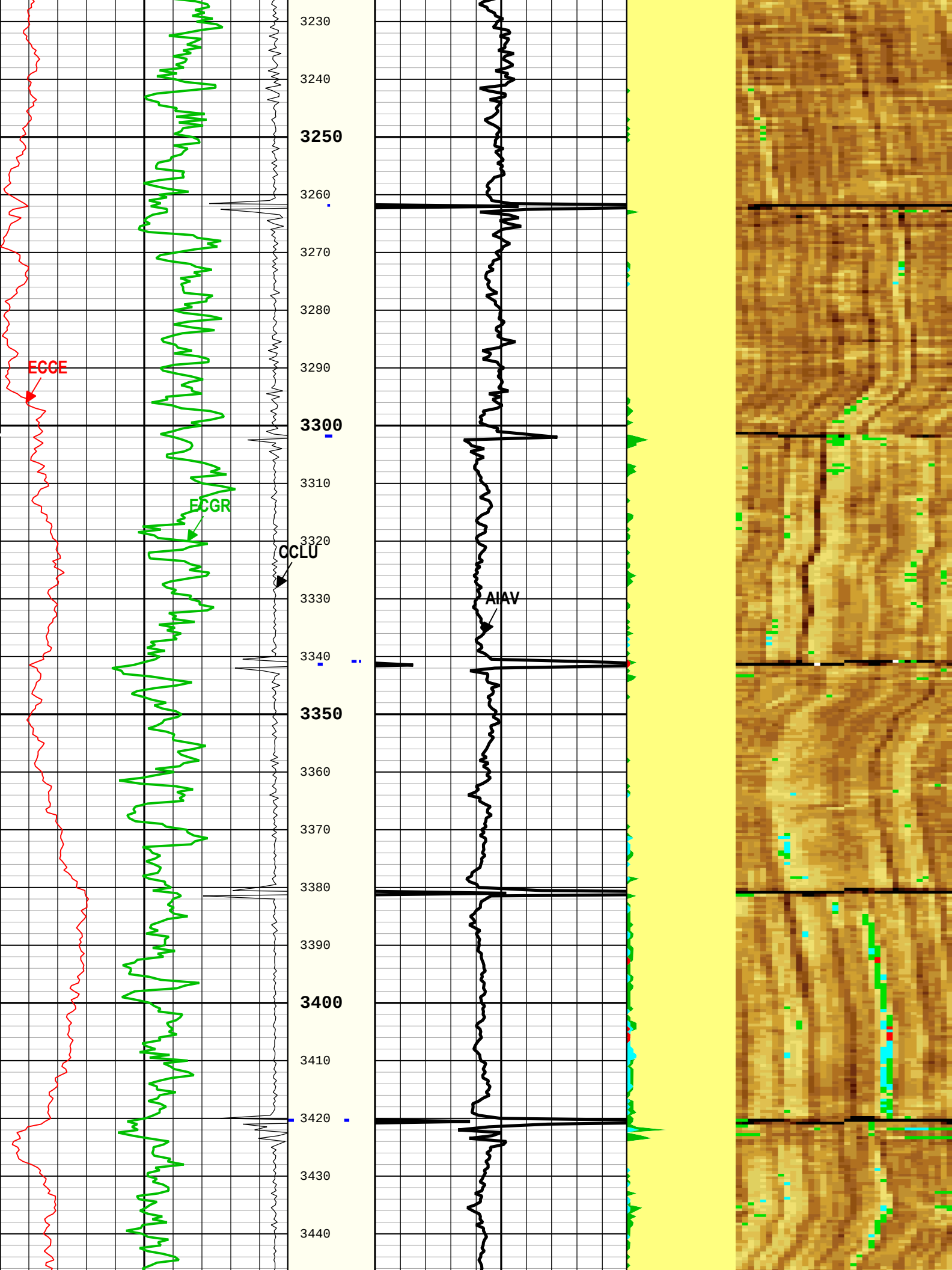
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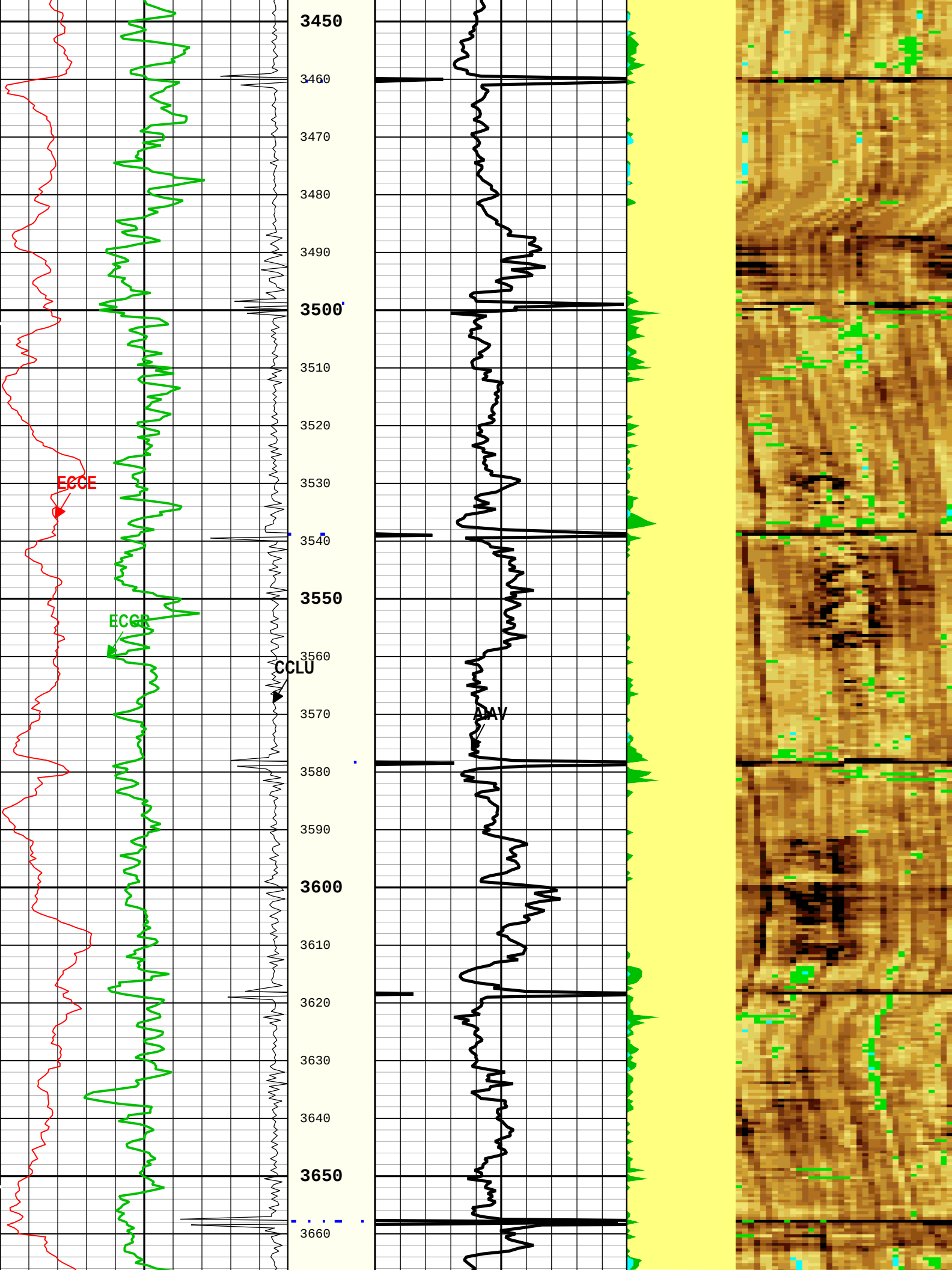
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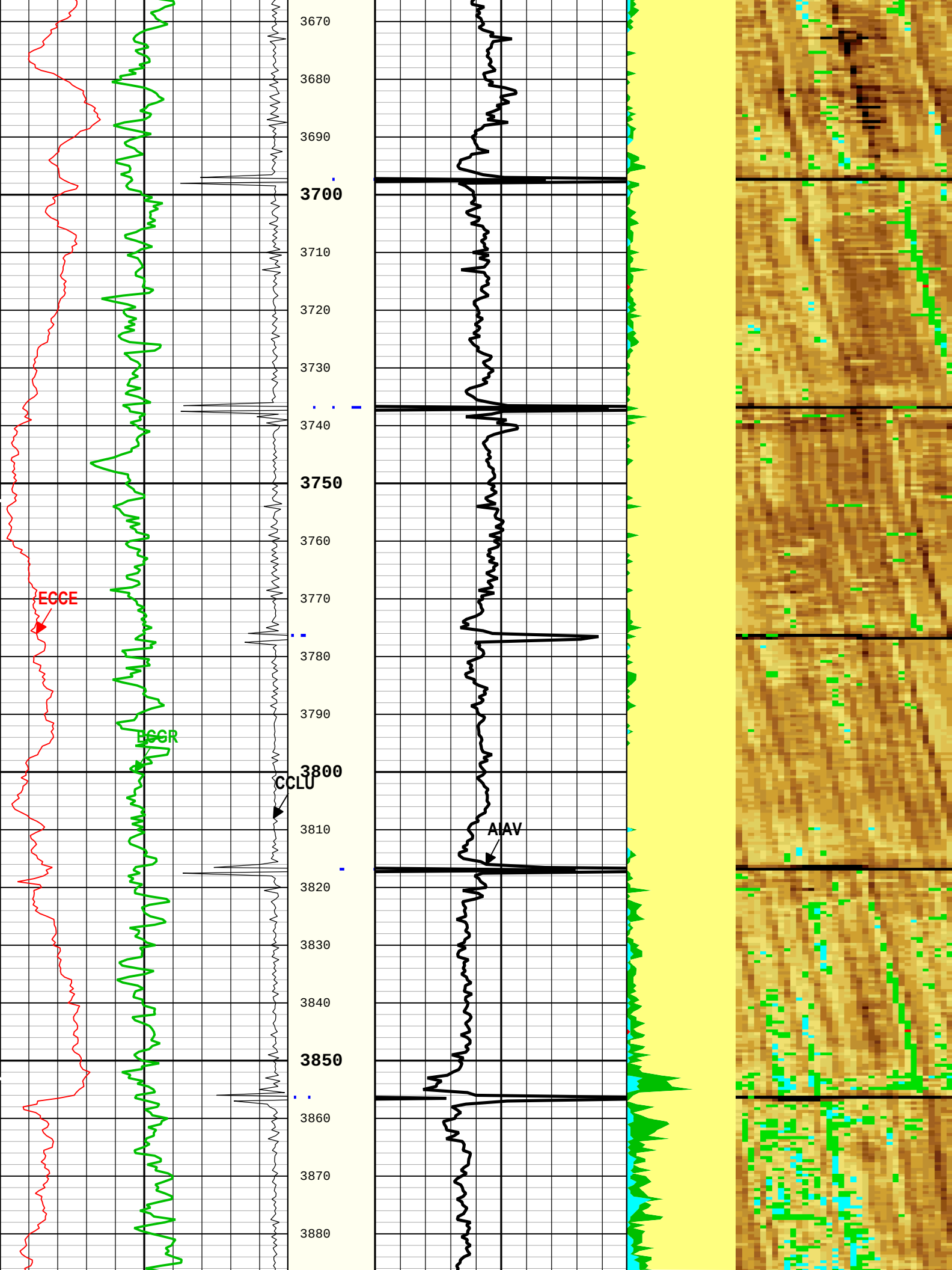
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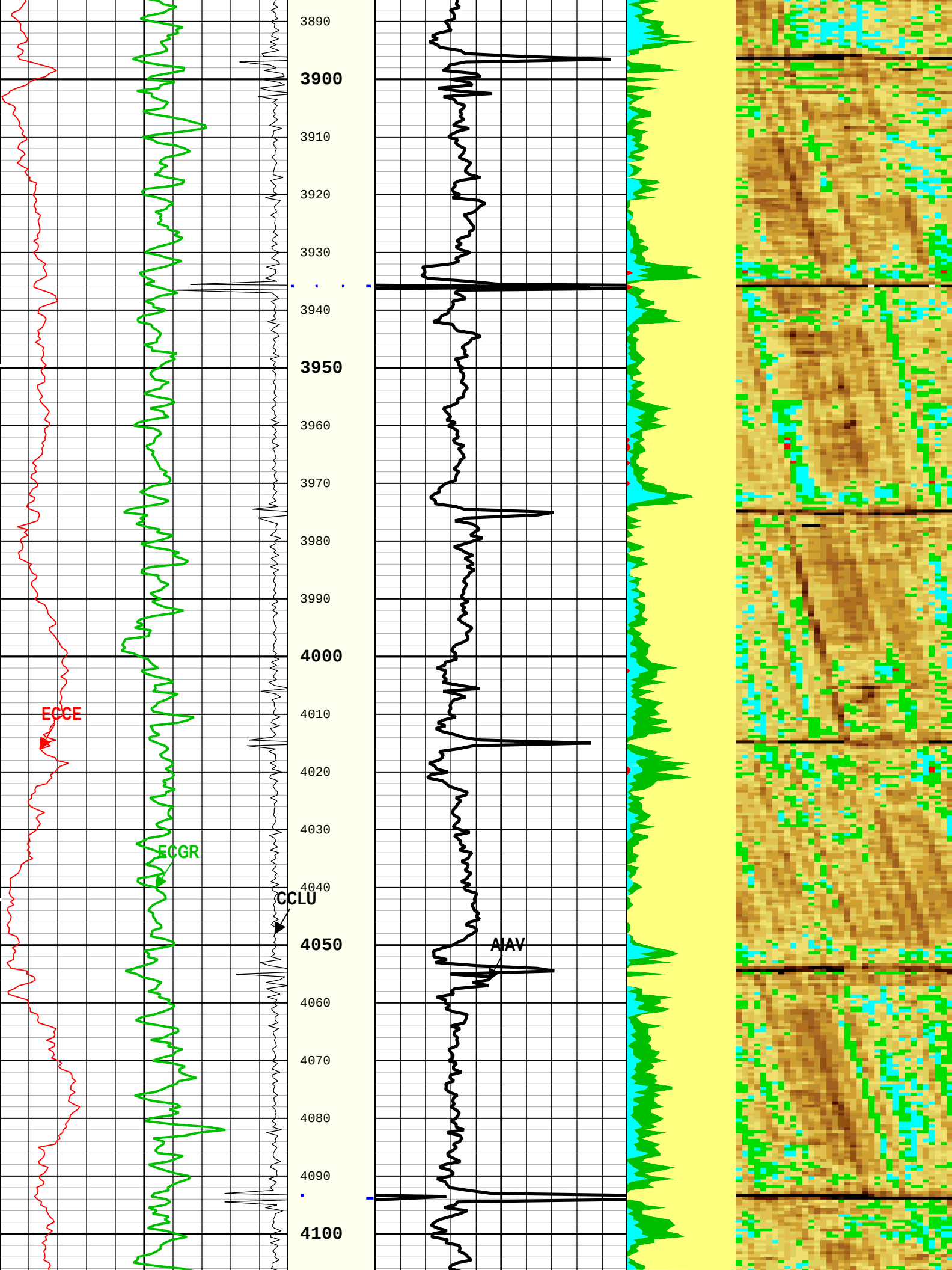
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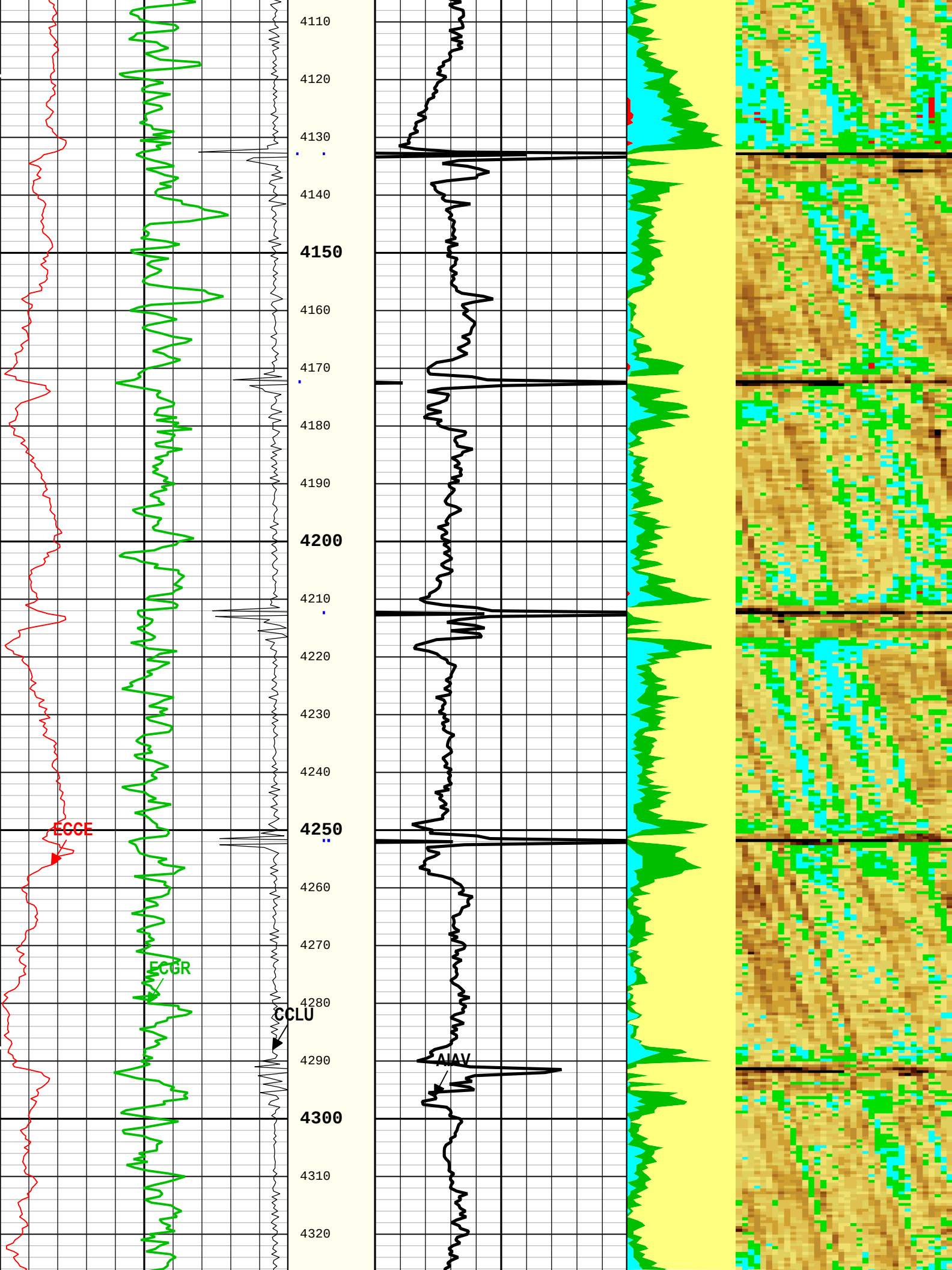
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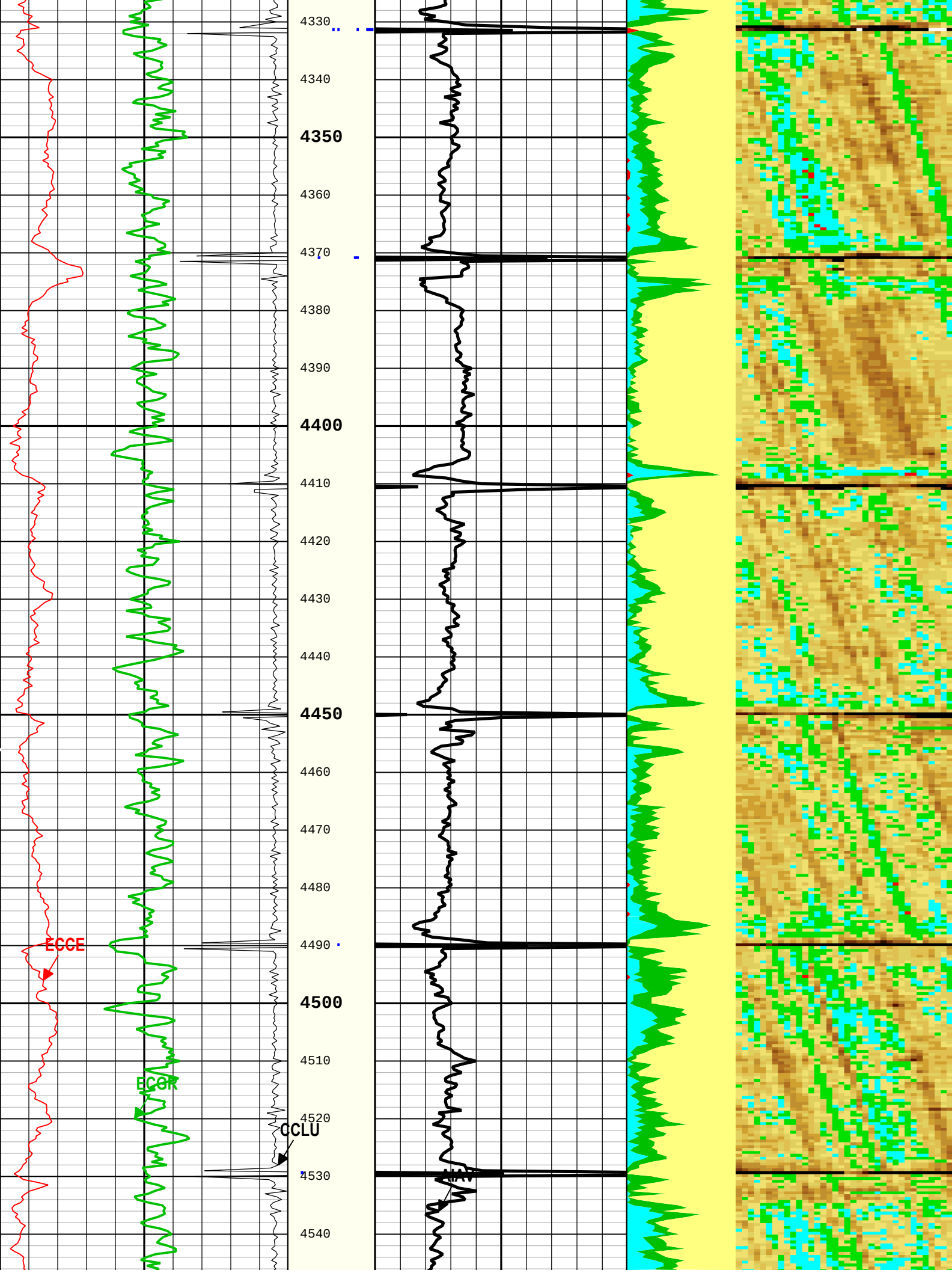
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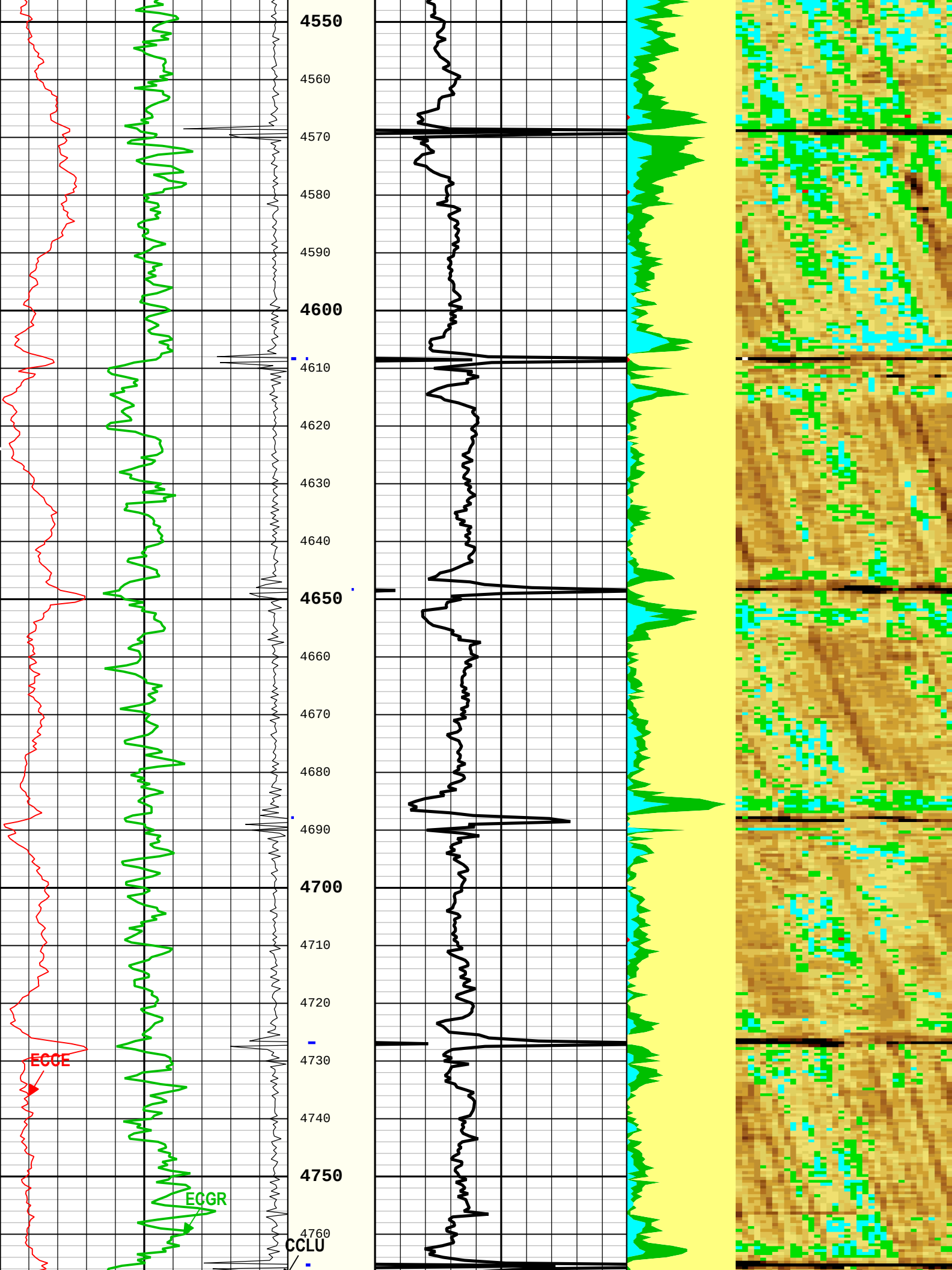
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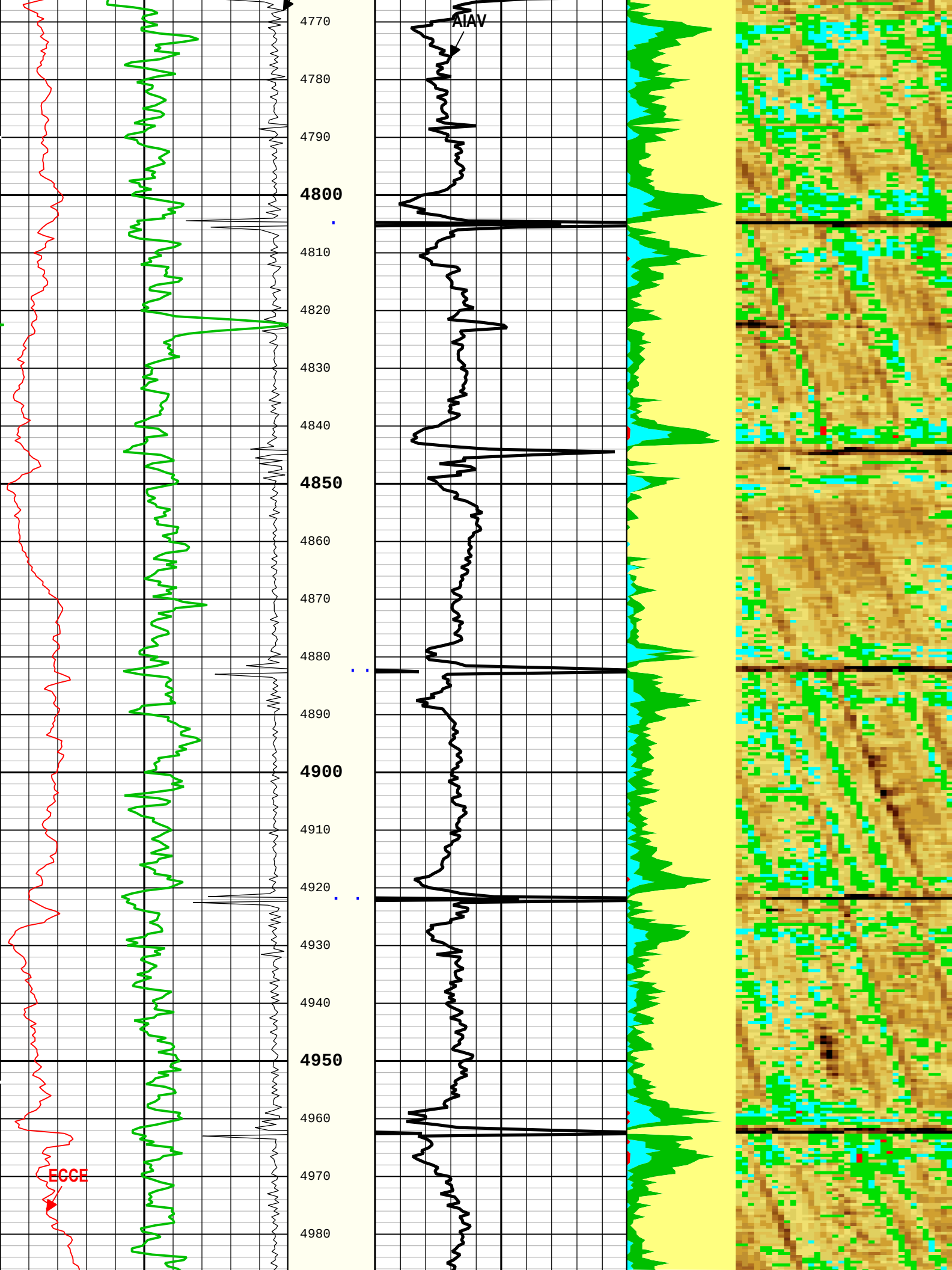
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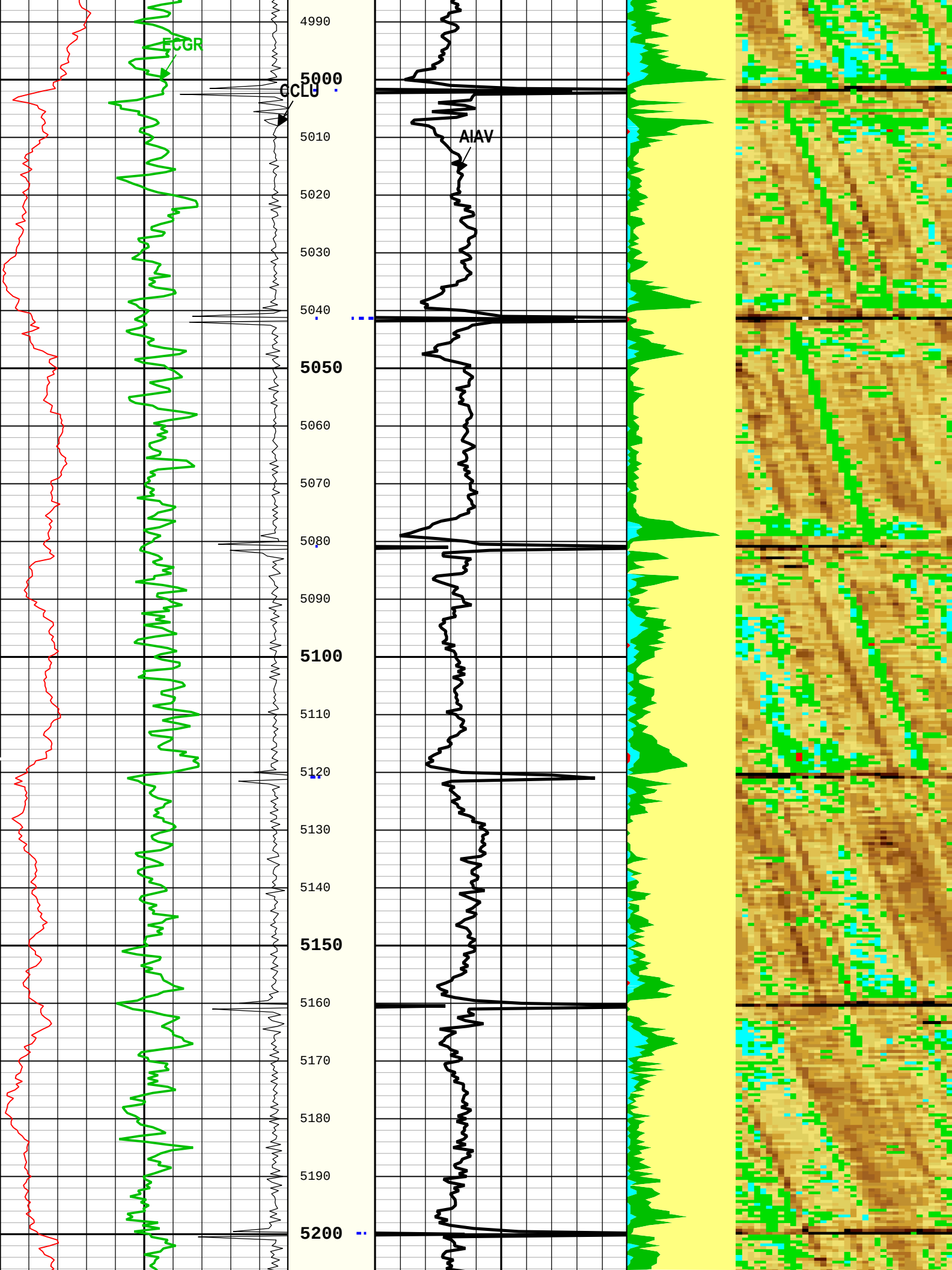
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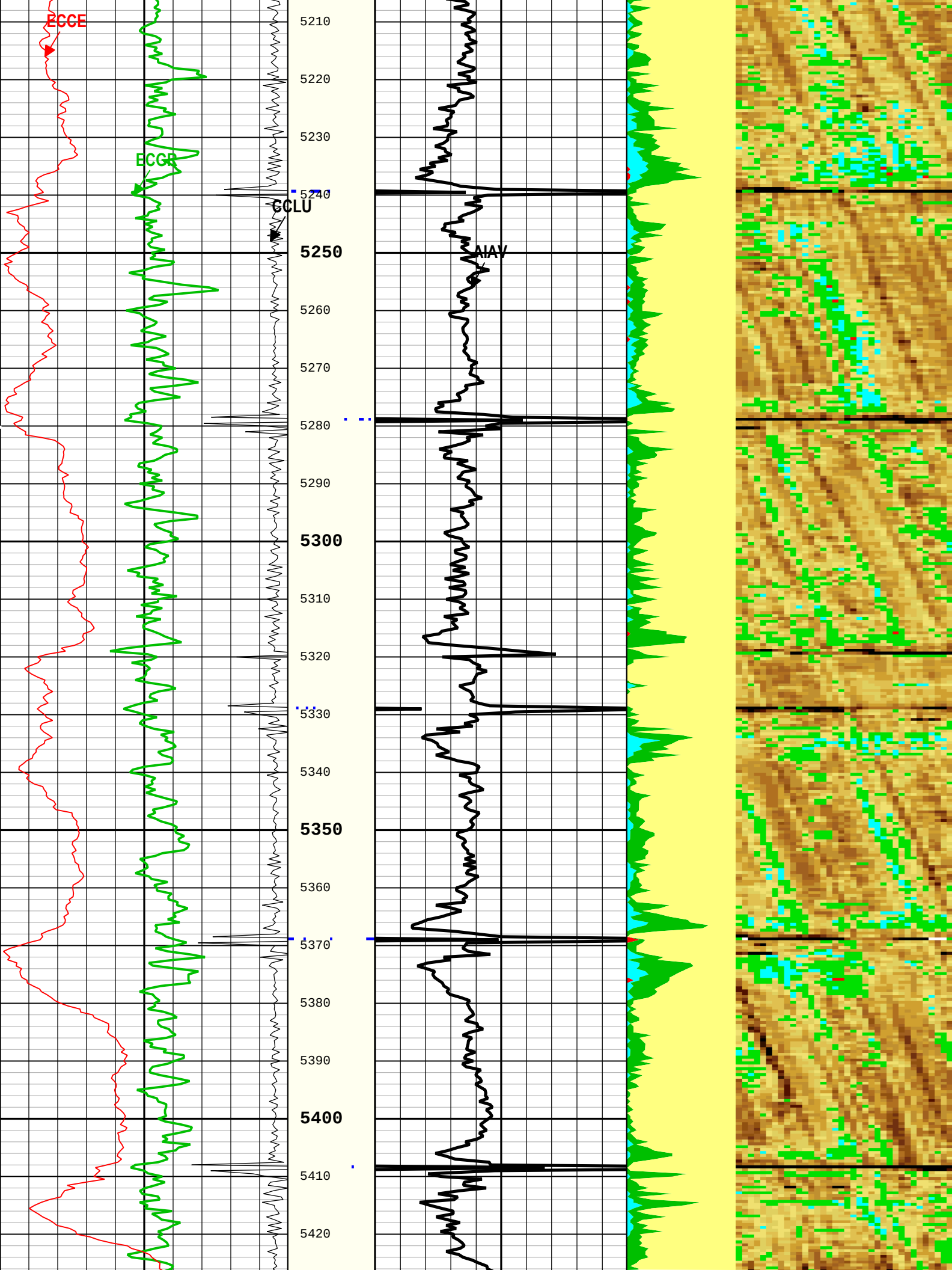
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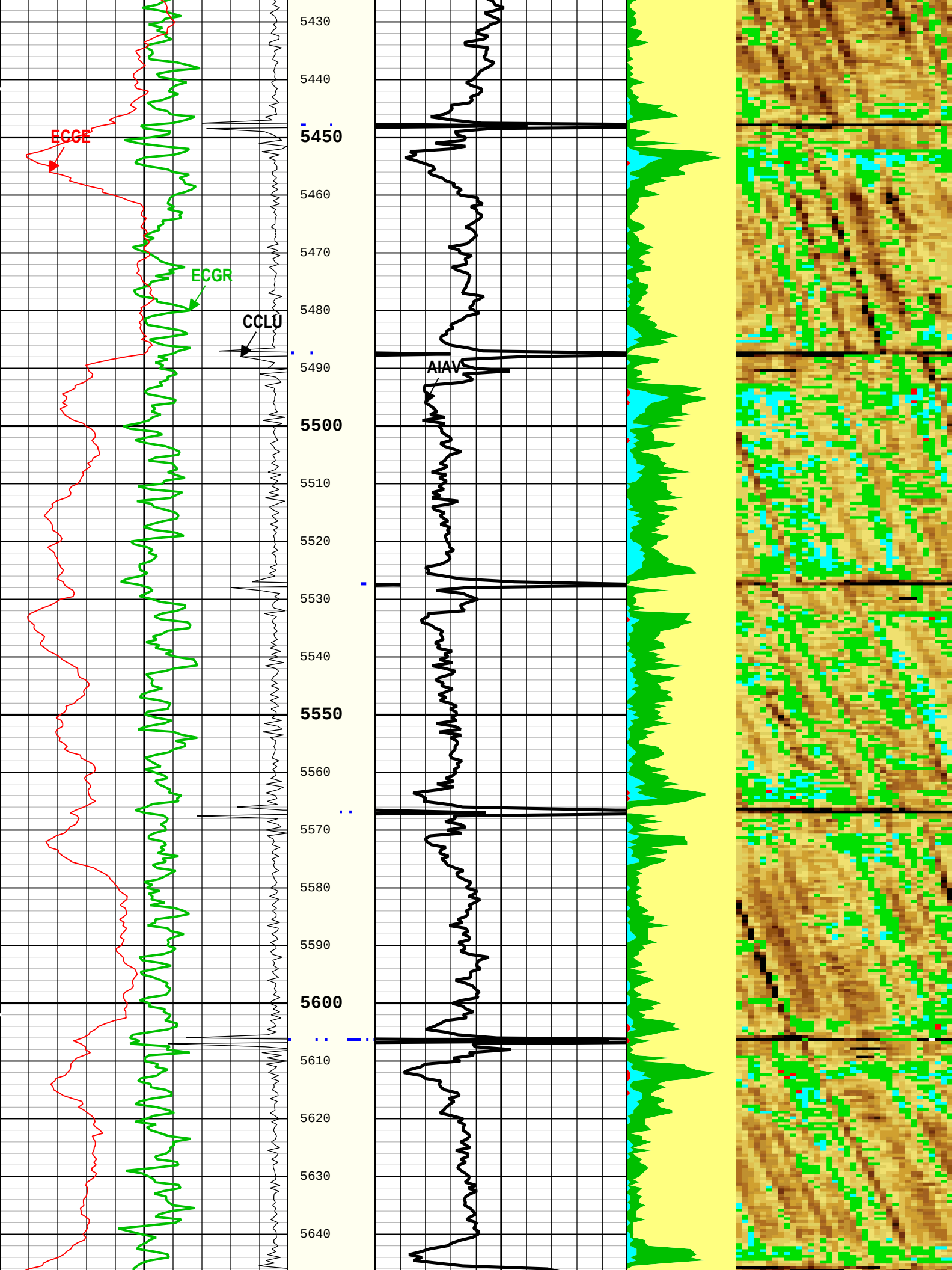
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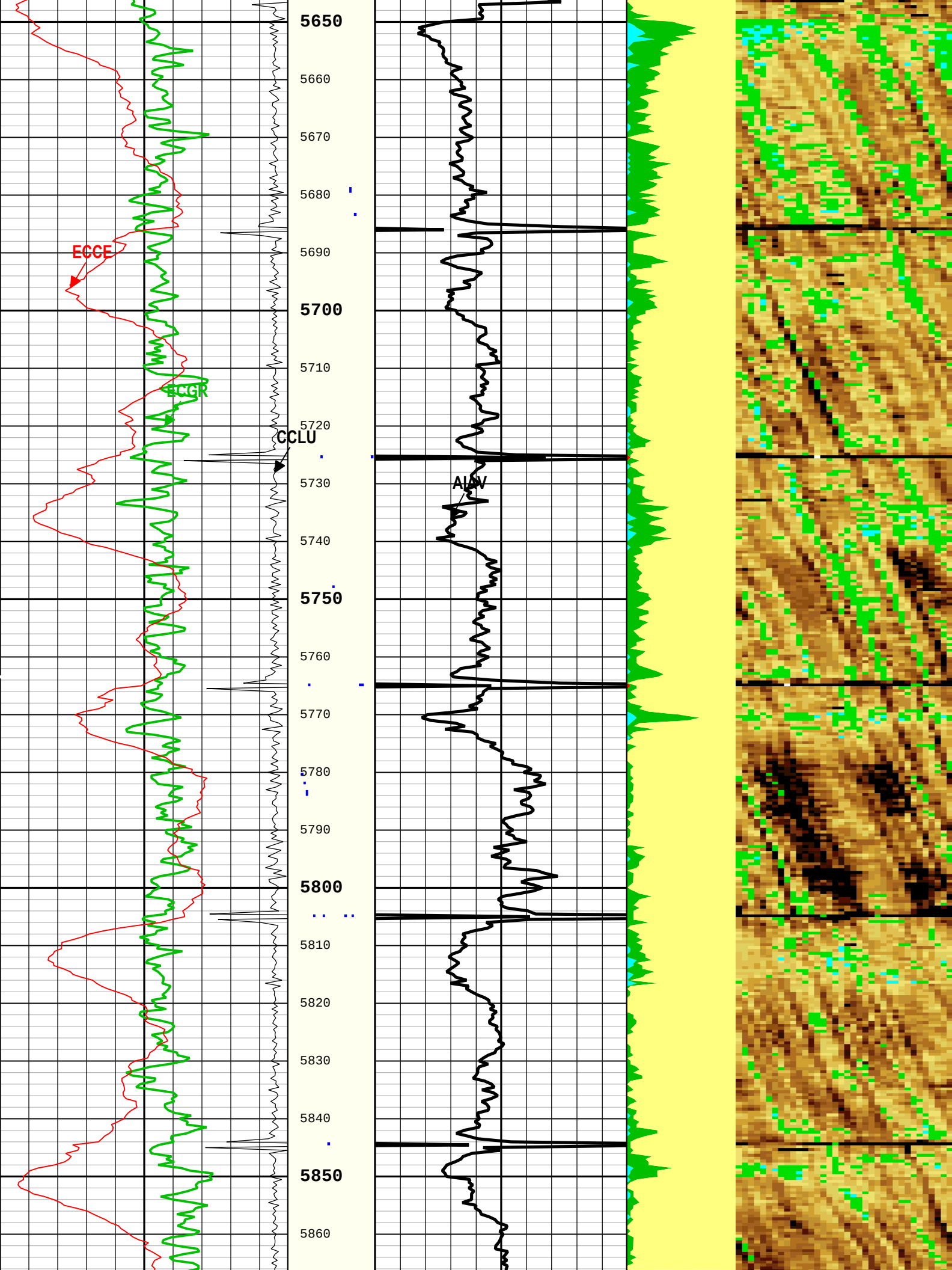
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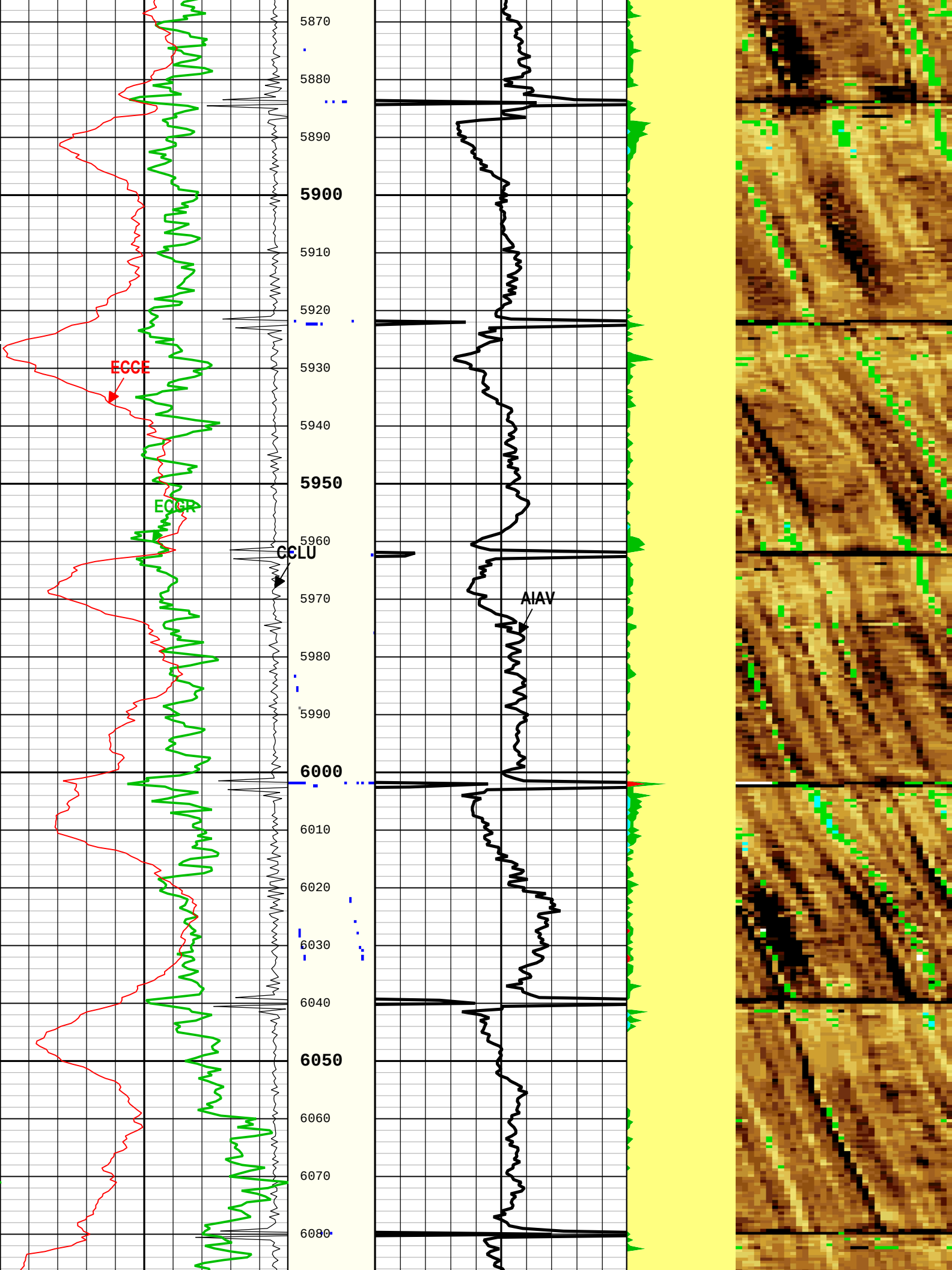
ALDV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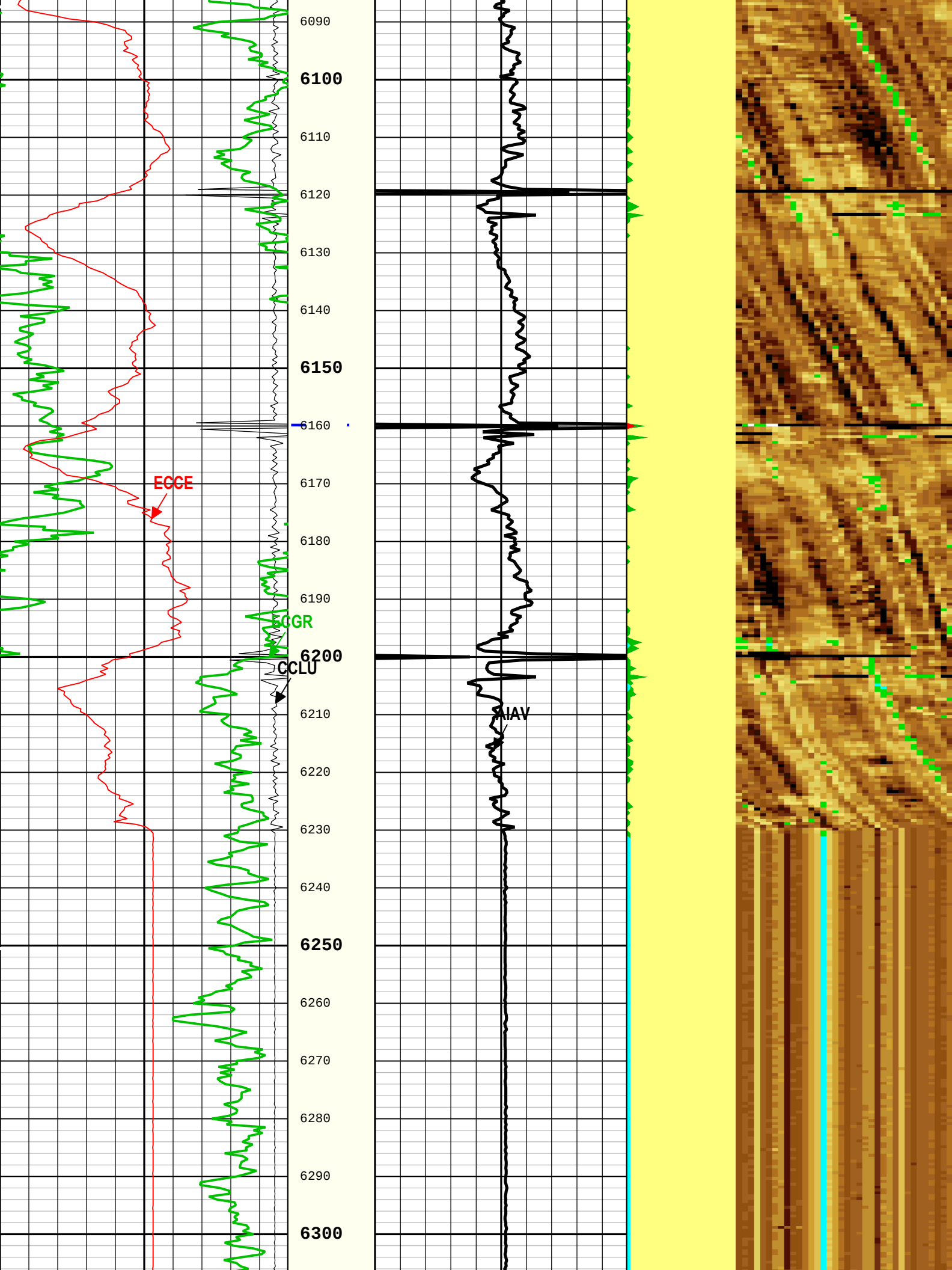
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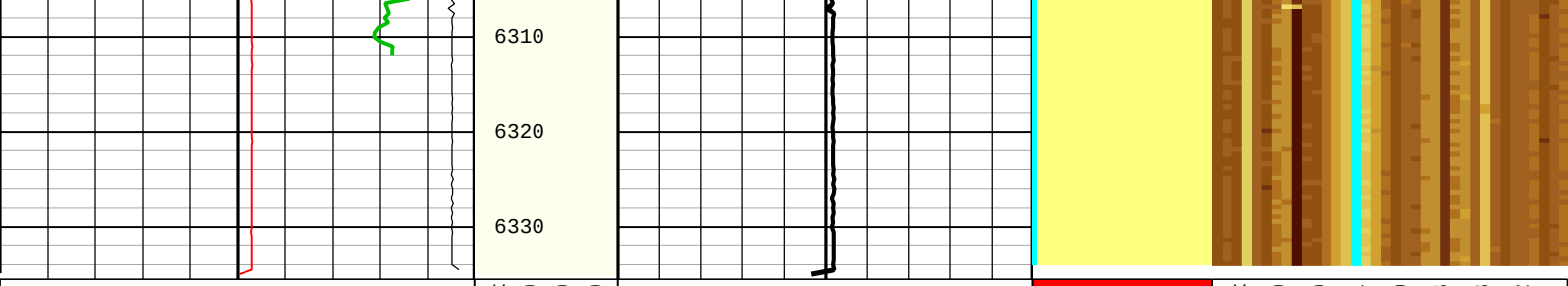

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 30-Mar-2017 11:07:08

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	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	10857.2	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	9.4	lbm/gal
DFT	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	Depth Zoned	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.03	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	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)

Parameter	Value	Start (ft)	Stop (ft)
BS	26	43.5	110
BS	13.5	110	1919
BS	8.5	1919	6335.5
MEAS_WLEN	20	43.5	1909
MEAS_WLEN	22.44	1909	6335.5

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	6329.1	ft
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	71.88	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	55	30-Mar-2017 09:31:59	30-Mar-2017 10:00:37	6336.32	4183.11
EMXV	50	30-Mar-2017 10:00:37	30-Mar-2017 10:26:52	4183.11	67.36
WINB	31.88	30-Mar-2017 09:31:59	30-Mar-2017 09:48:40	6336.32	6139.72
WINB	28	30-Mar-2017 09:48:40	30-Mar-2017 09:49:29	6139.72	6006.62
WINB	27	30-Mar-2017 09:49:29	30-Mar-2017 10:26:52	6006.62	67.36

All depth are at tool zero.

One

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2016 SP2	6.2.68624.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	3060.85 ft	3506.43 ft	30-Mar-2017 9:08:47 AM	30-Mar-2017 9:11:51 AM	ON	5.47 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy, Inc. Well:Benelli Federal LC22-765

One: Log[2]:Up:S003

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: 30-Mar-2017 11:07:16

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 Normalizatio n

USIT - USIT Processing Flags (UFLG) USIT-E

Acoustic Impedance Average (AIAV) USIT-E

0 Mrayl 10

Gas

Liquid

Micro-Debondi ng

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)

3040

3050

3060

3070

3080

3090

3100

3110

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3170

3180

3190

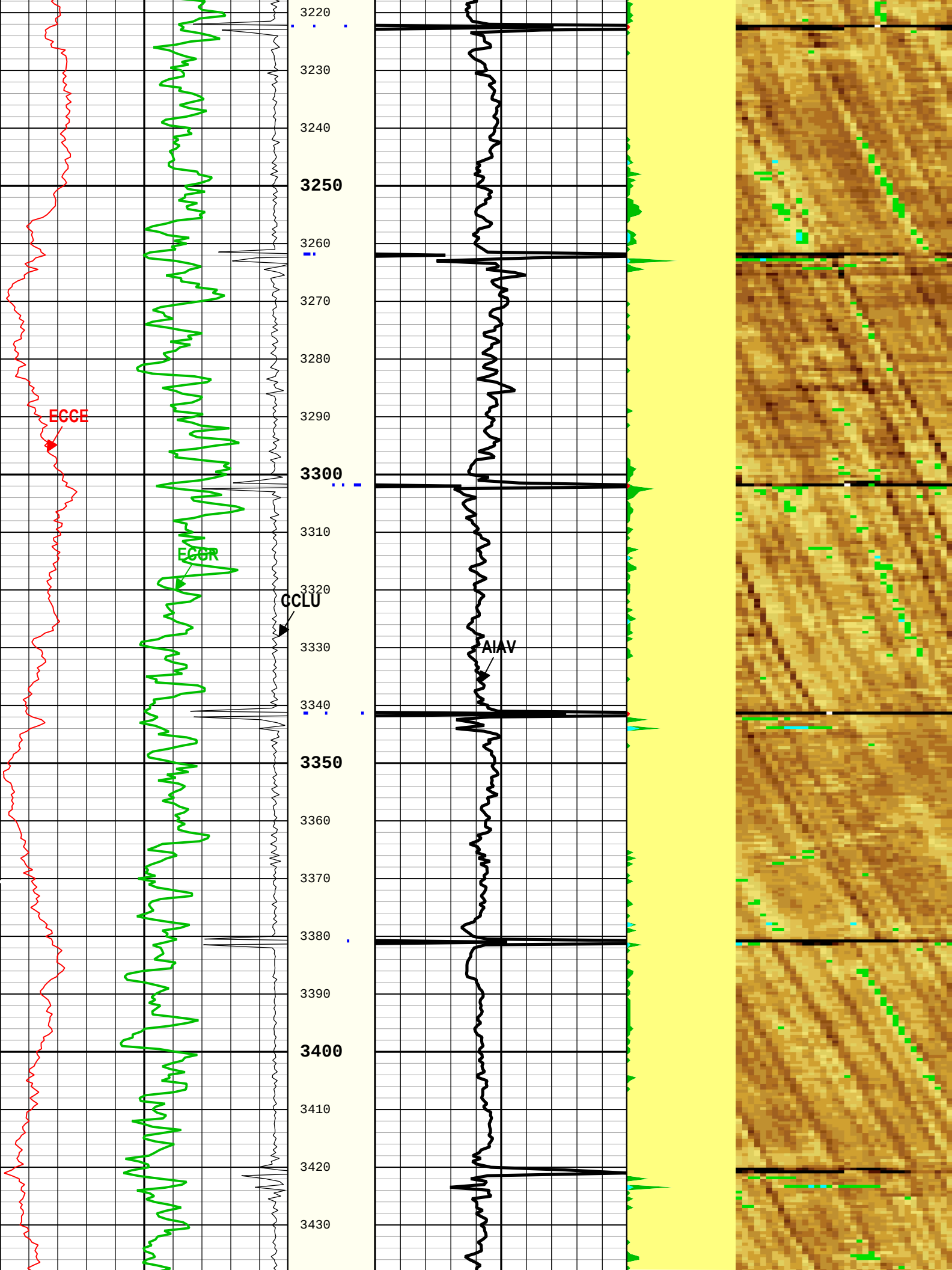
3200

3210

ECGR

CCLU

AIAV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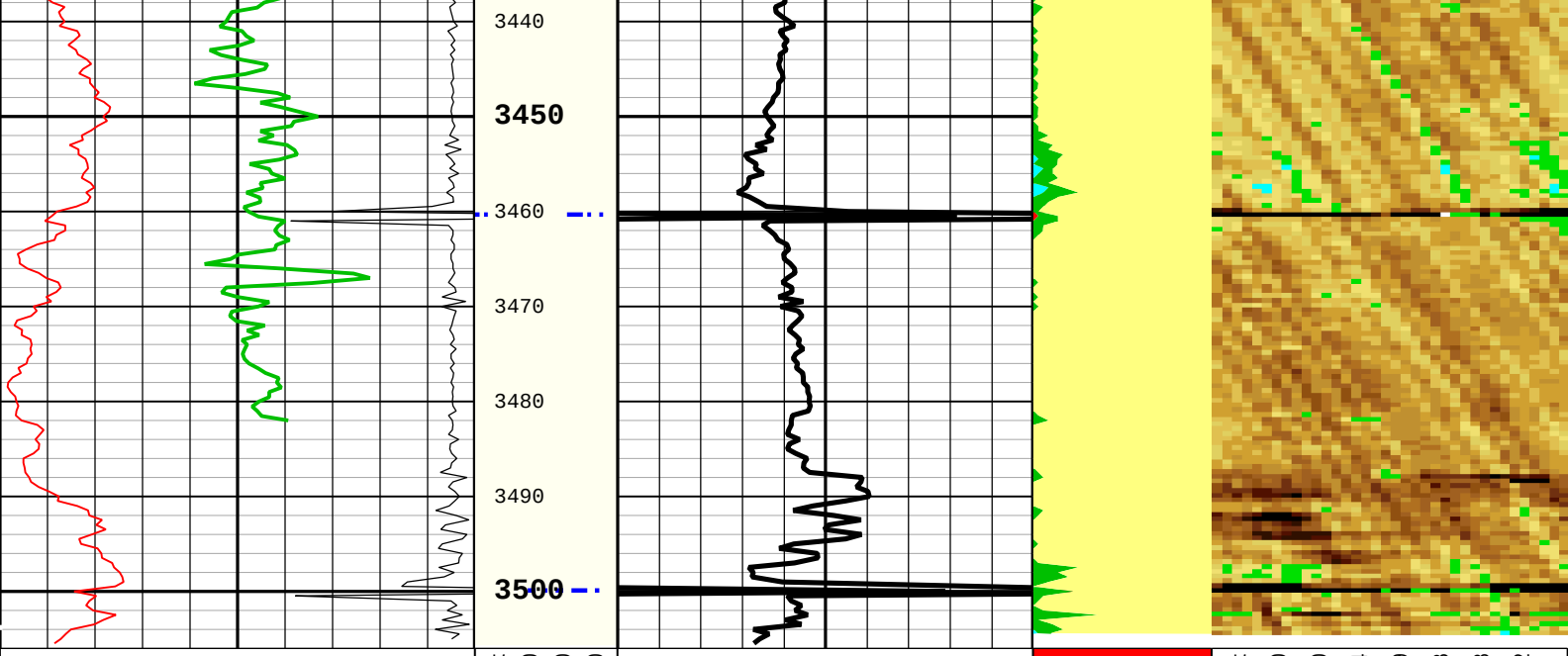
AIAV



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: 30-Mar-2017 11:07:16

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	Open	
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DFT	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	1.03	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	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

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One: Parameters

Parameter	Description	Tool	Value	Unit
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U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	40	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	3526	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

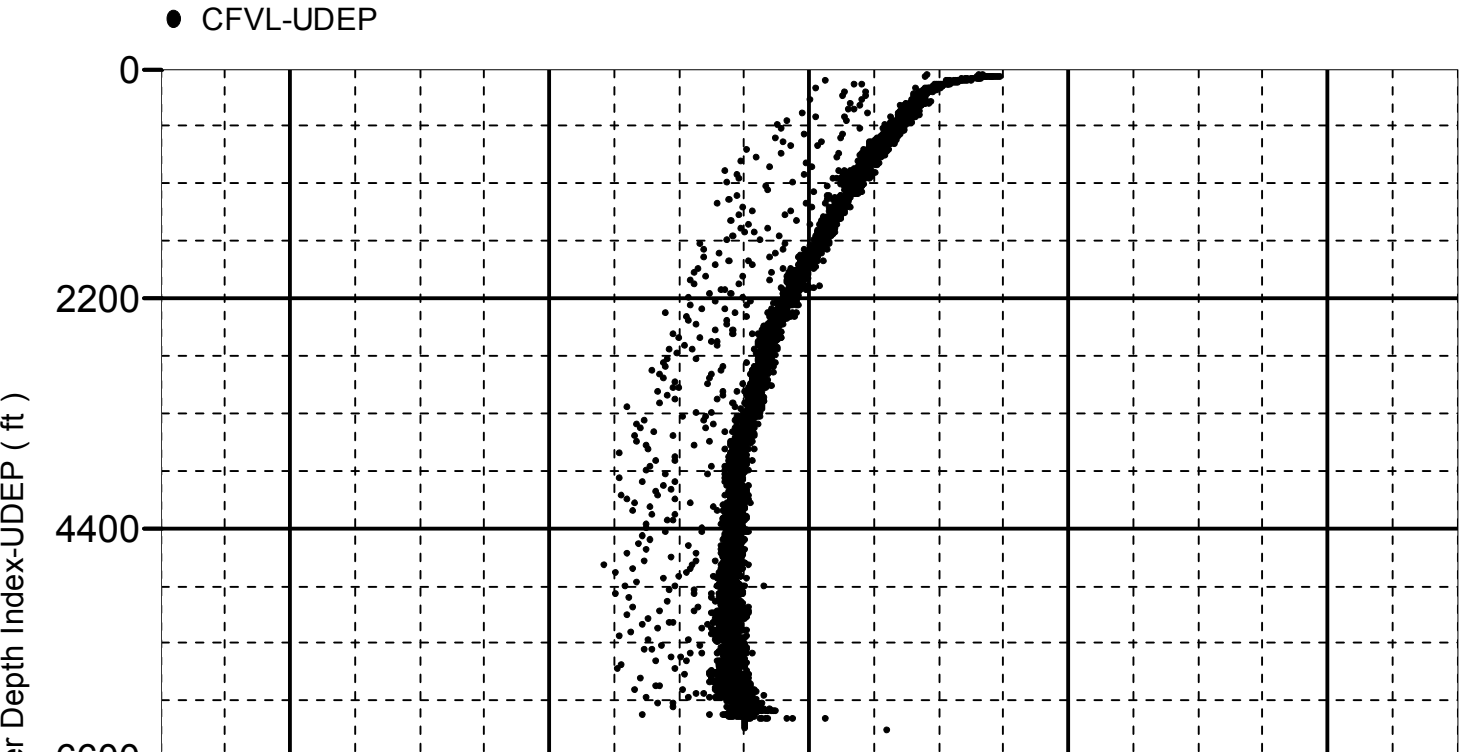
XYZ

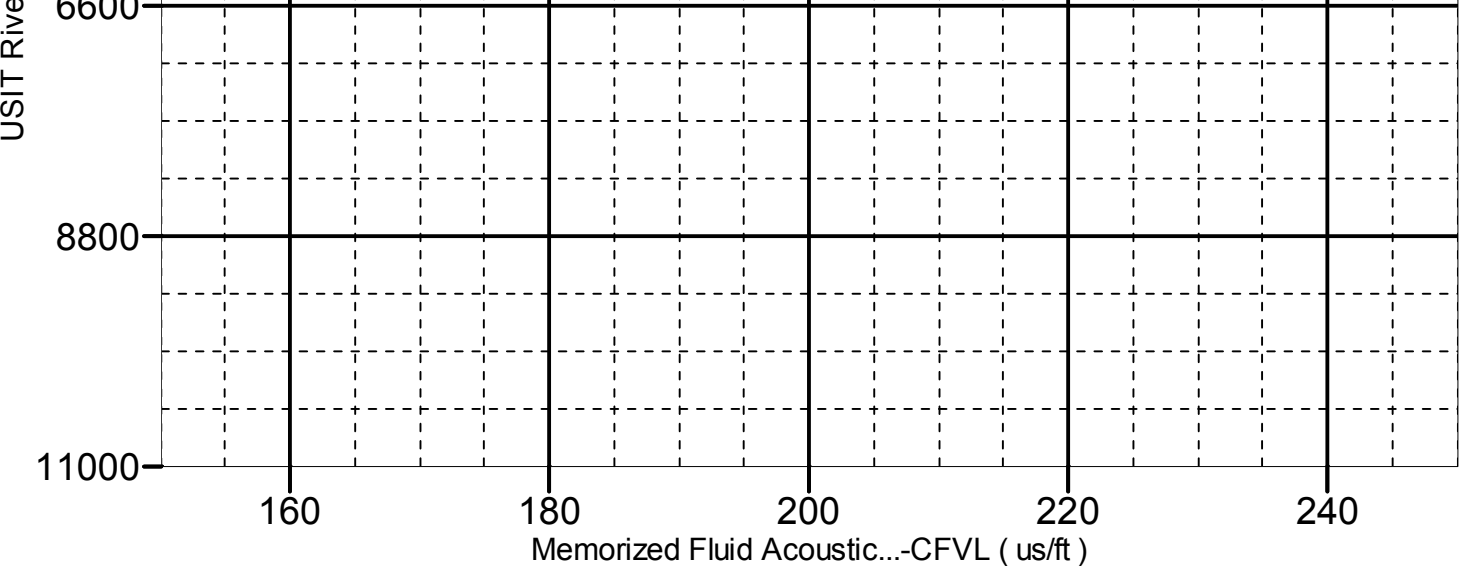
Company:Noble Energy, Inc. Well:Benelli Federal LC22-765
One: Log[4]:Up:S003

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6336.00 to 67.00 ft





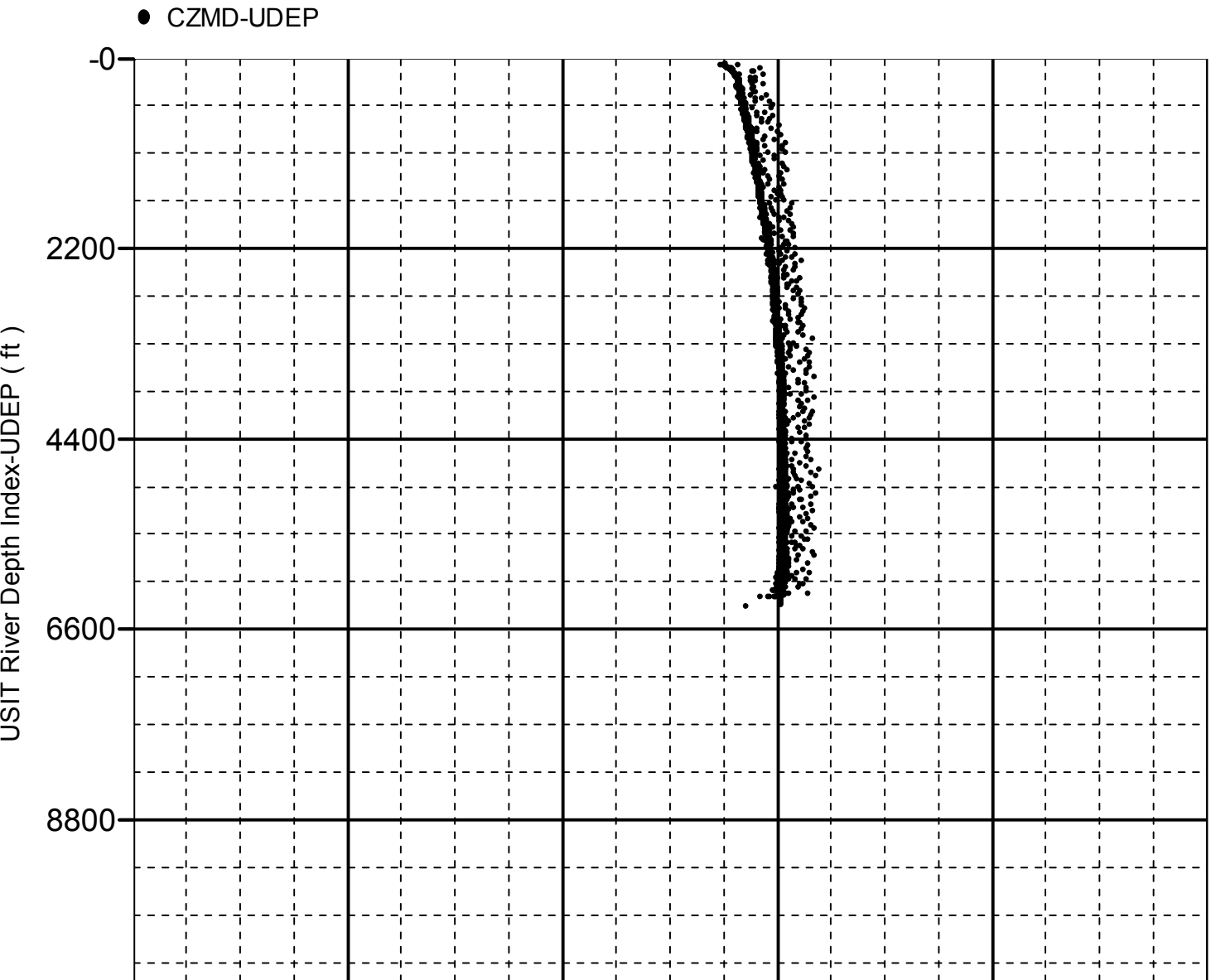
XYZ

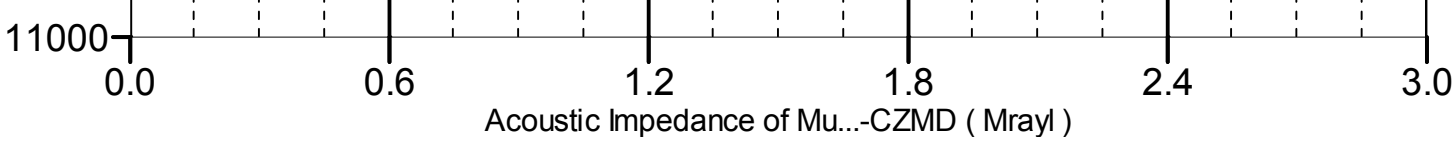
Company:Noble Energy, Inc. Well:Benelli Federal LC22-765
One: Log[4]:Up:S003

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6336.00 to 67.00 ft





Company:	Noble Energy, Inc.
Well:	Benelli Federal LC22-765
Field:	Wildcat
County:	Weld
State:	Colorado

Schlumberger

UltraSonic Summary Print