Schlumberger

Company: Noble Energy Inc

Well: Earp Federal LC23-745

Field: Wildcat

County: WELD Country: US

UltraSonic Summary Print

County: WELD
Field: Wildcat
Location: SHL: SWSE Sec 11, T9N, R59W
Well: Earp Federal LC23-745
Company: Noble Energy Inc

Location:			
SHL: SWSE Sec 11, T9N, R59W 810' FSL & 2090' FEL Lat: 40.75992 / Long: -103.9444	Elev.: K.B. 5005.00 ft G.L. 4975.00 ft D.F. 5005.00 ft		
Permanent Datum: Ground Level	Elev.: 4975.00 f		
Log Measured From: Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From: Kelly Bushing			

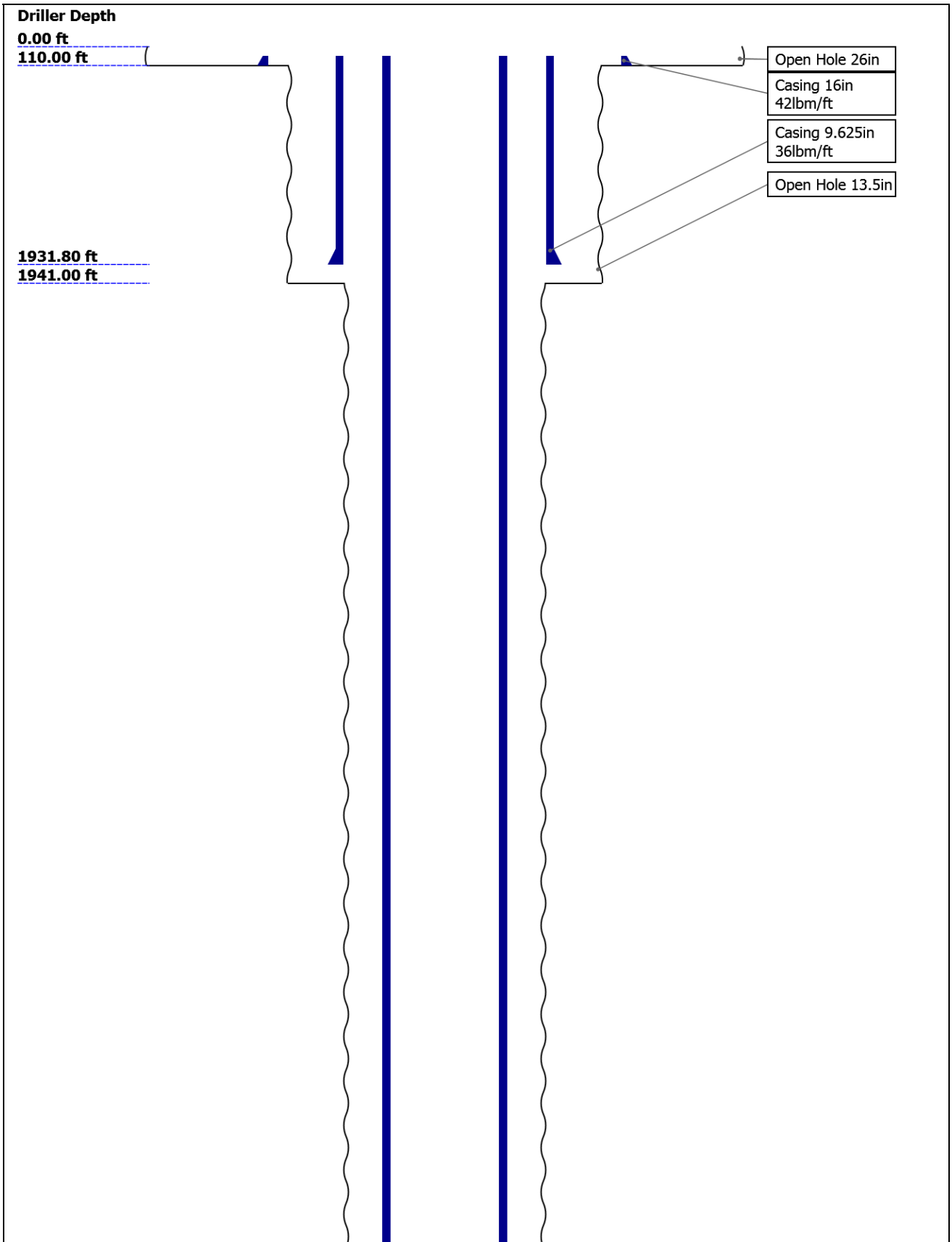
API Serial No.	Max.Hole Deviation	Longitude:	Latitude:
05-123-42940		-103.94400 degrees	40.759220 degrees

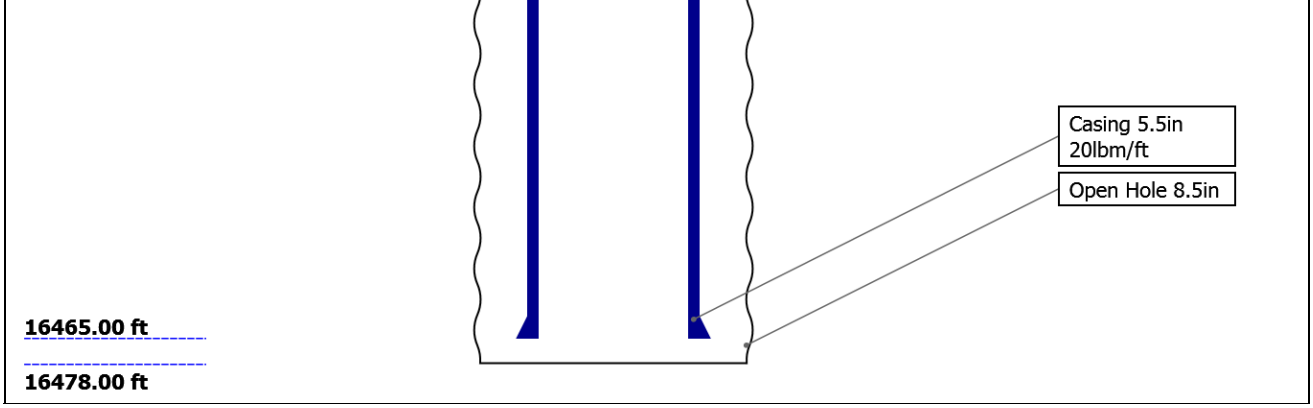
Logging Date			30-Jan-2017			
Run Number			One			
Depth Driller			16478.00 ft			
Schlumberger Depth			16478.00 ft			
Bottom Log Interval			6150.00 ft			
Top Log Interval			40.00 ft			
Casing Driller Size @ Depth			5.5 in @ 16465.00 ft			
Casing Schlumberger			16465 ft			
Bit Size			8.5 in			
Type Fluid In Hole			Water			
MUD	Density	Viscosity	8.9 lbm/gal	26 s		
	Fluid Loss	PH				
	Source of Sample		Active Tank			
RM @ Meas Temp			0.2 ohm.m @ 68 degF			
RMF @ Meas Temp			0.15 ohm.m @ 68 degF			
RMC @ Meas Temp						
Source RMF		RMC		Pressed		
RM @ BHT		RMF @ BHT	0.07 @ 212	0.05 @ 212		
Max Recorded Temperatures						
Circulation Stopped		Time				
Logger on Bottom		Time	30-Jan-2017	08:46:00		
Unit Number		Location:	9115	Fort Morgan, CO		
Recorded By			Benjamin Marmon			
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	1941			
Top Logger (ft)	0	110	1941			
Bottom Driller (ft)	110	1941	16478			
Bottom Logger (ft)	110	1941	16478			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	42	36	20			
Inner Diameter (in)	15.512	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	1931.8	16465			
Bottom Logger (ft)	110	1931.8	16465			

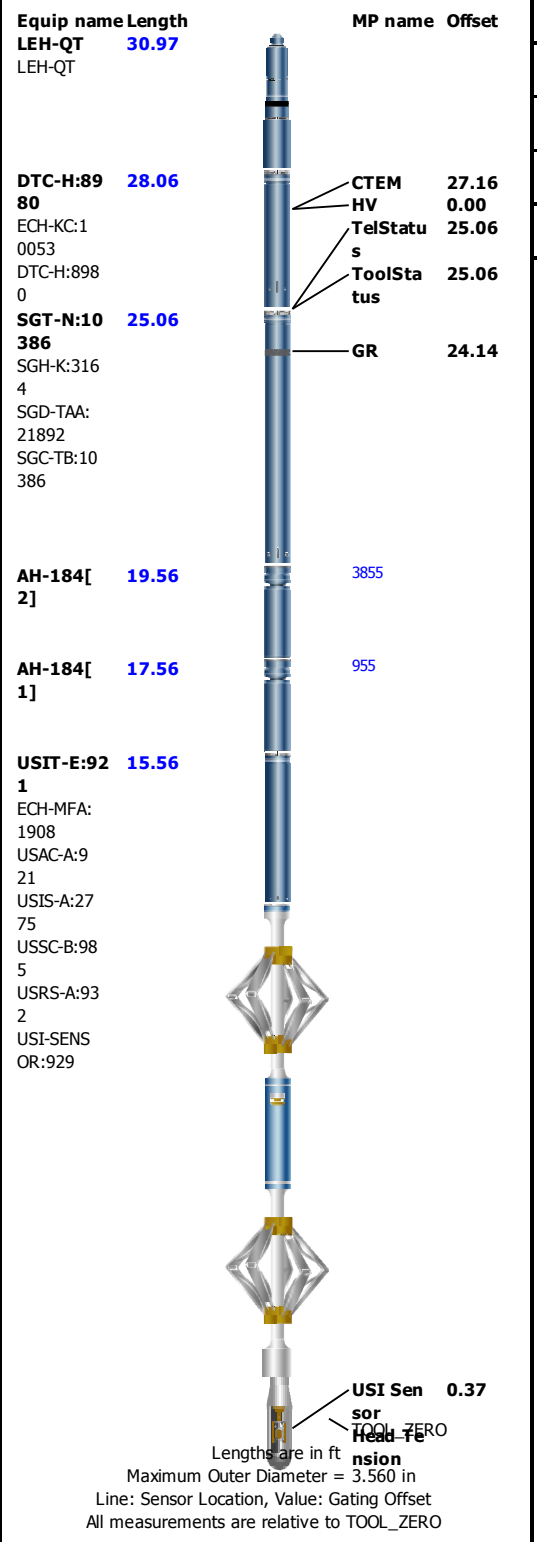
Operational Run Summary

Parameter (unit)	One					
Date Log Started	30-Jan-2017					
Time Log Started	08:09:46					
Date Log Finished	30-Jan-2017					
Time Log Finished	09:22:21					
Top Log Interval (ft)						
Bottom Log Interval (ft)						
Total Depth (ft)						
Max Hole Deviation (deg)						
Azimuth of Max Deviation (deg)						
Bit Size (in)	8.500					
Logging Unit Number	9115					
Logging Unit Location	Fort Morgan, CO					
Recorded By	Benjamin Marmon					

Witnessed By	Bill Mansfield					
Service Order Number	D5ND-00150					

Remarks and Equipment Summary

One: Toolstring



Lengths are in ft
Maximum Outer Diameter = 3.560 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

One: Remarks

This is the first log in the well.
Tool String ran as per toolsketch.
Main Pass logged with 2500 PSI
Repeat Pass Logged with 0 PSI
Expected TOC: 1119'

Depth Summary

	One		
Depth Measuring Device			
Type	IDW-JA		
Serial Number			
Calibration Date	23-Dec-2015		
Calibrator Serial Number			

Calibration Cable Type	7-46 AXS		
Wheel Correction 1	-5		
Wheel Correction 2	-3		

Tension Device

Type	CMTD-B/A		
Serial Number	146		
Calibration Date	02-Jan-2017		
Calibrator Serial Number			
Number of Calibration Points	10		
Calibration Root Mean Square Error	13		
Calibration Peak Error	23		

Logging Cable

Type	7-46A-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

One:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth control procedures followed during logging operations.
Rig Up Length At Surface		IDW used as primary depth control device.
Rig Up Length At Bottom		Z Chart used as secondary depth control device.
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	6170.51	52.30

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 : 20.69m(67.87ft) to 30.08m(98.70ft)
MUD_N_FRP = 1.07
DFD = 1.07g/cm3(8.90lbm/gal)
CZMD median computed in free pipe normalization interval = 1.65 MRayl

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

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[5]:Up	Up	52.30 ft	6170.51 ft	30-Jan-2017 8:47:31 AM	30-Jan-2017 9:21:26 AM	ON	4.21 ft	No

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc Well:Earp Federal LC23-745

One: Log[5]:Up:S007

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-Jan-2017 10:18:59

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

Calibrated Gamma Ray (GR) SGT-N

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

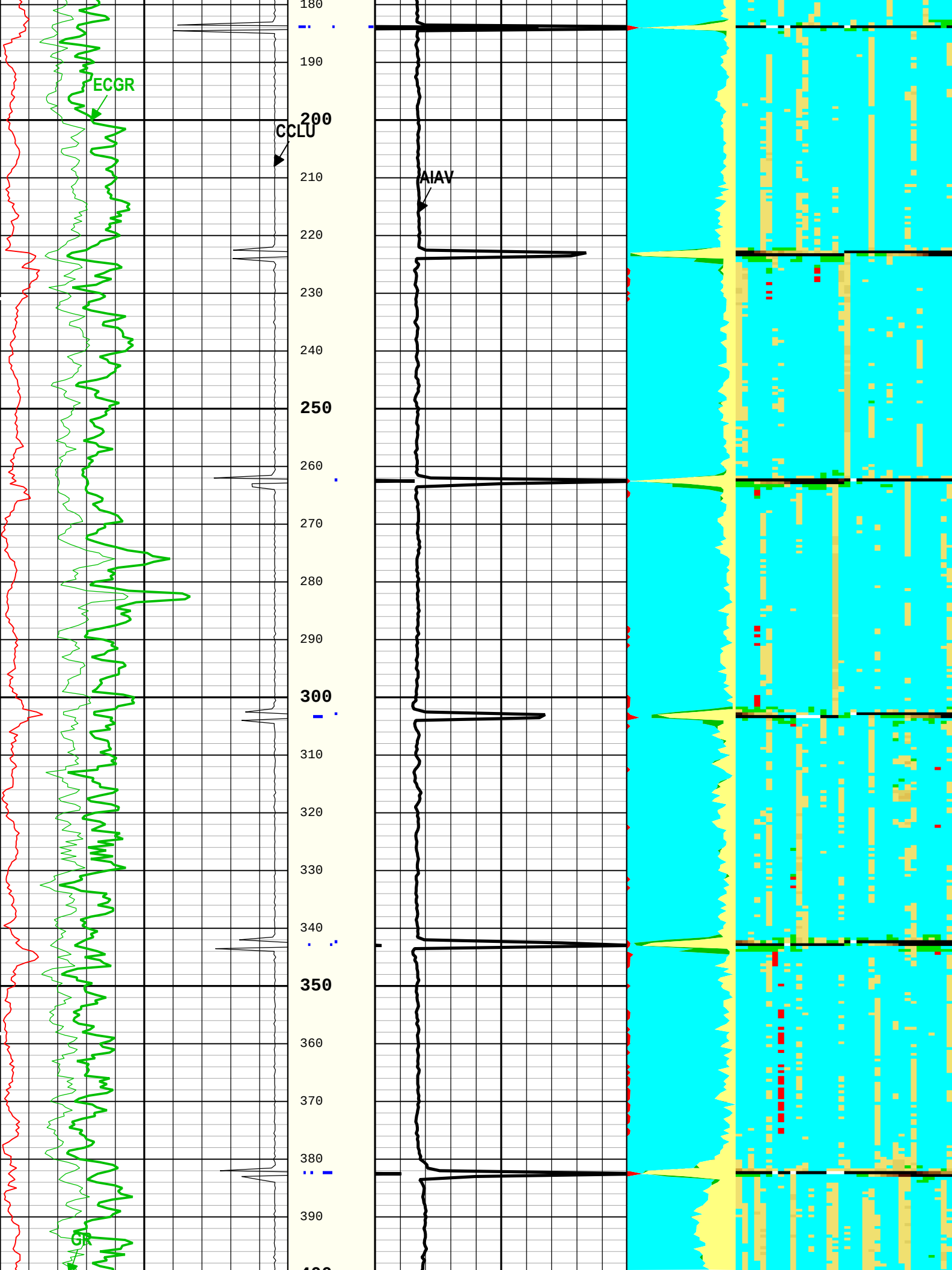
Custom Normalization

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

30 40 50 60 70 80 90 100 110 120 130 140 150 160 170

GR

ECCE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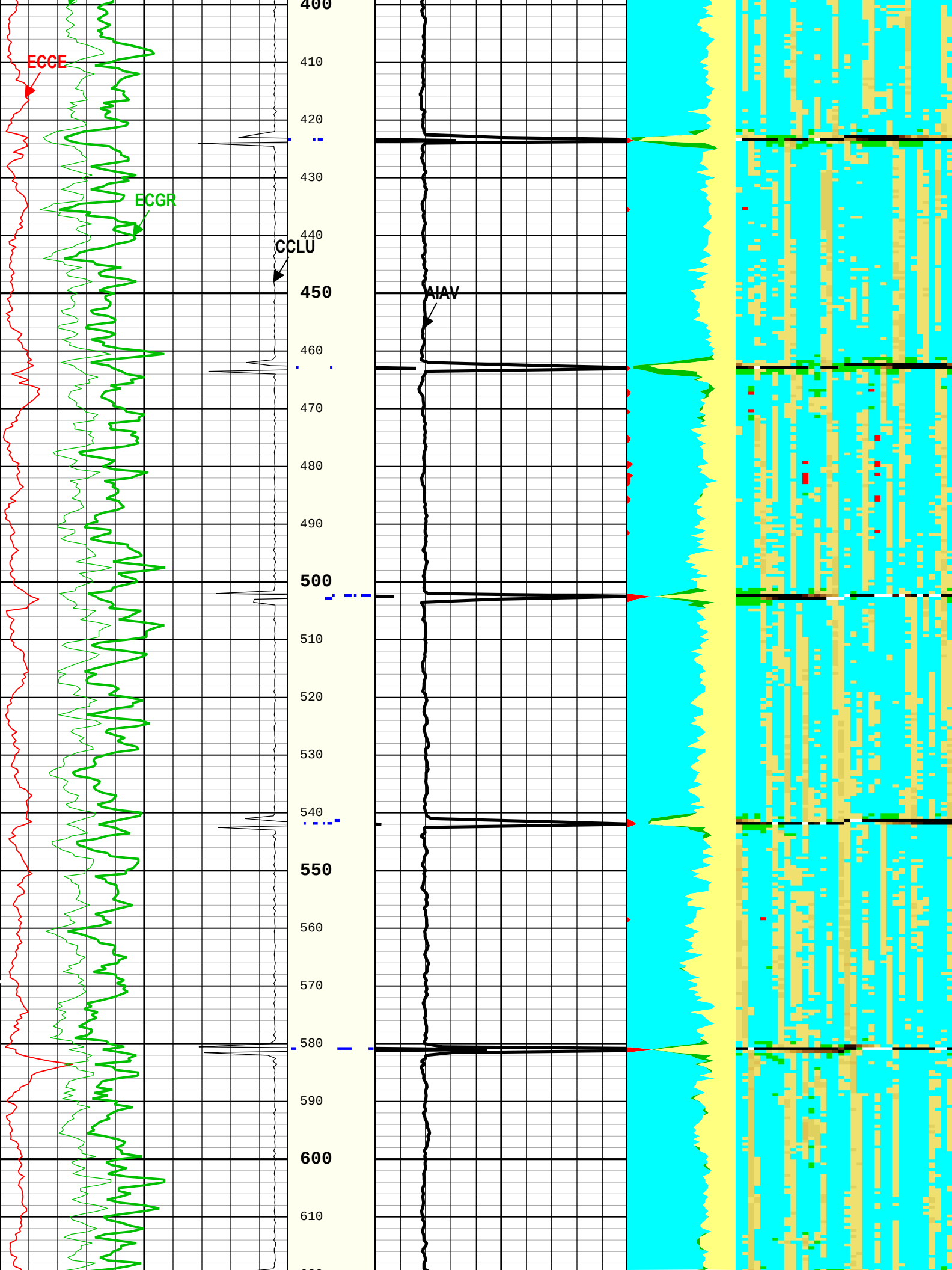
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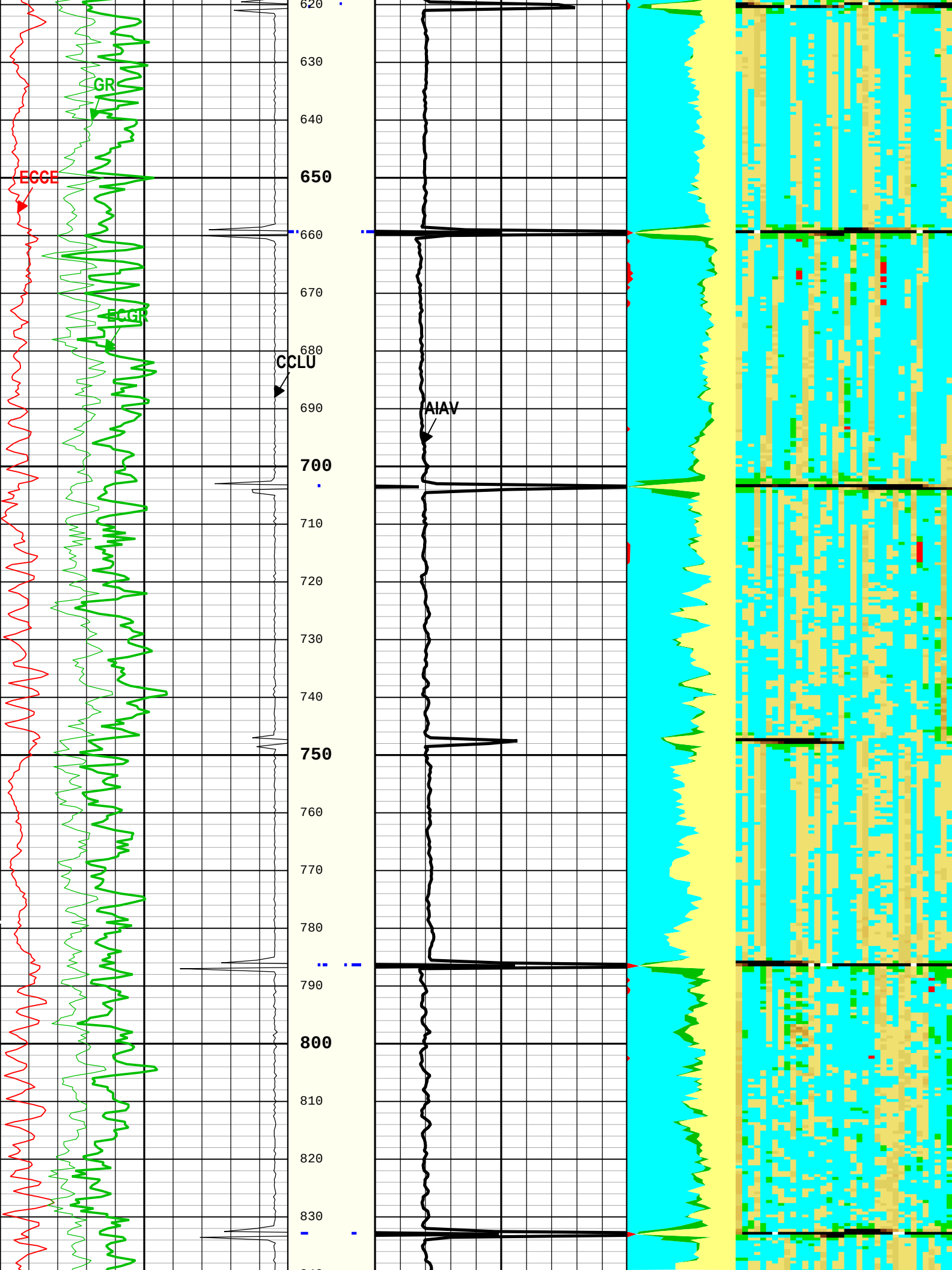
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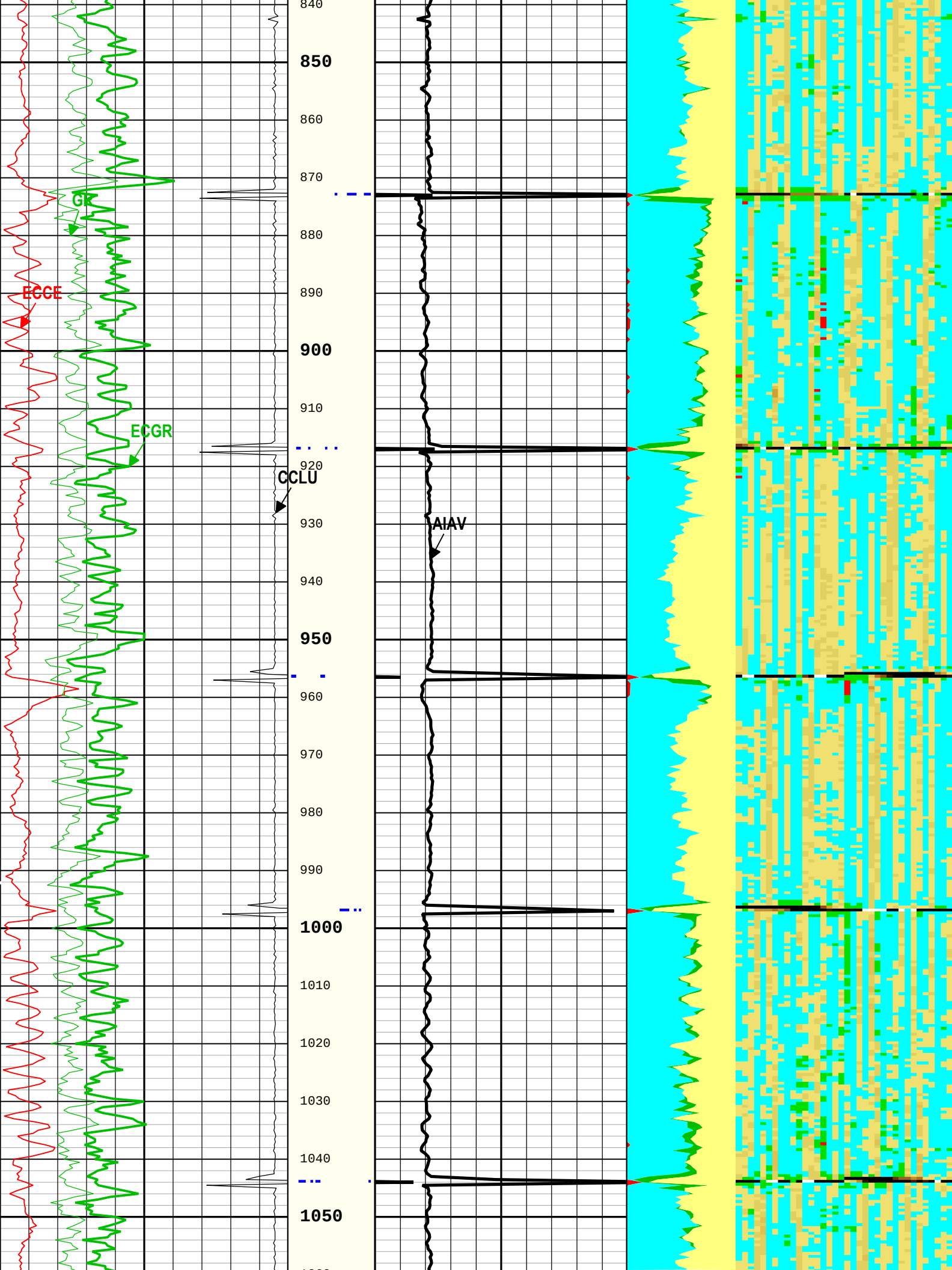
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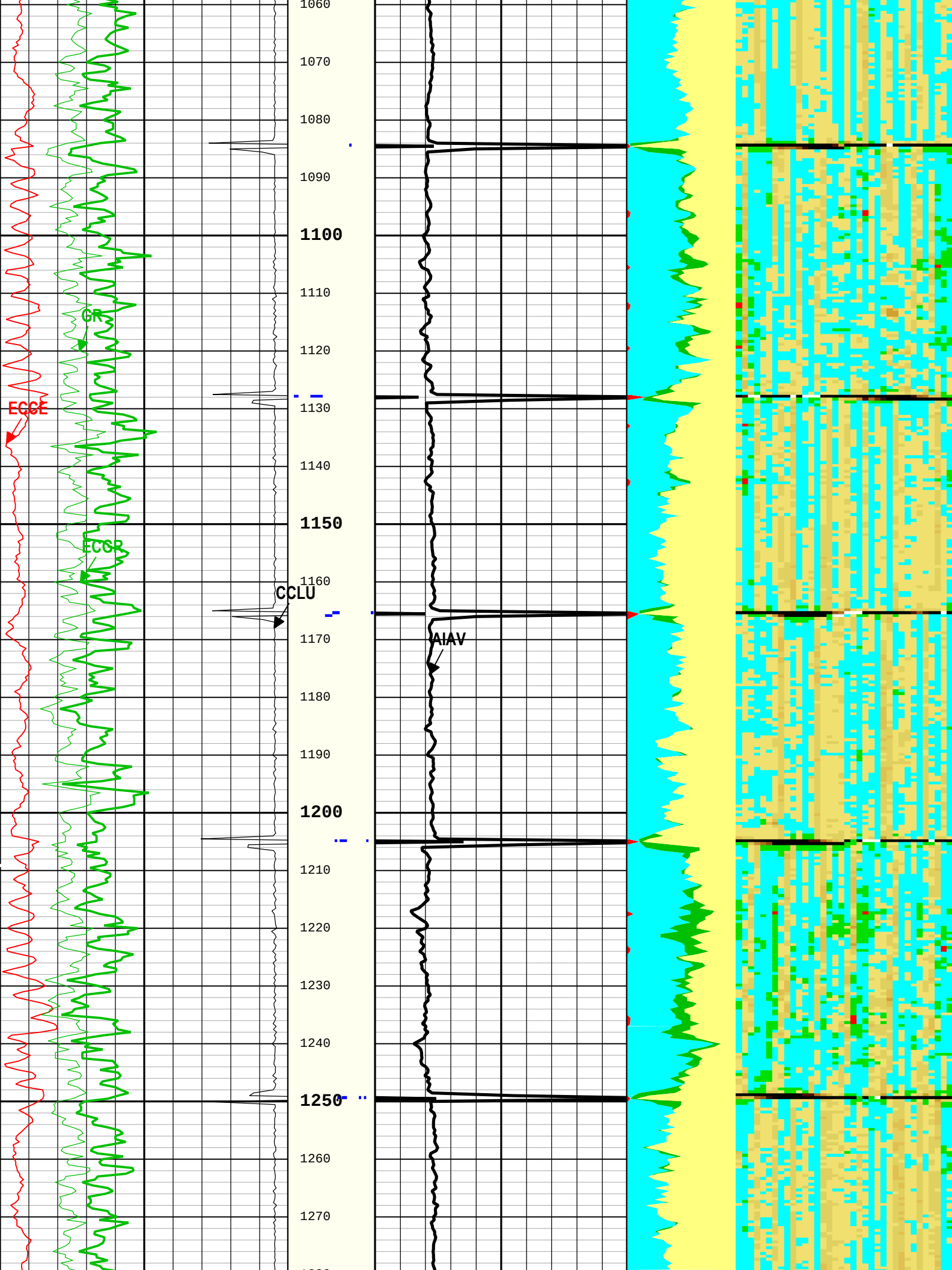
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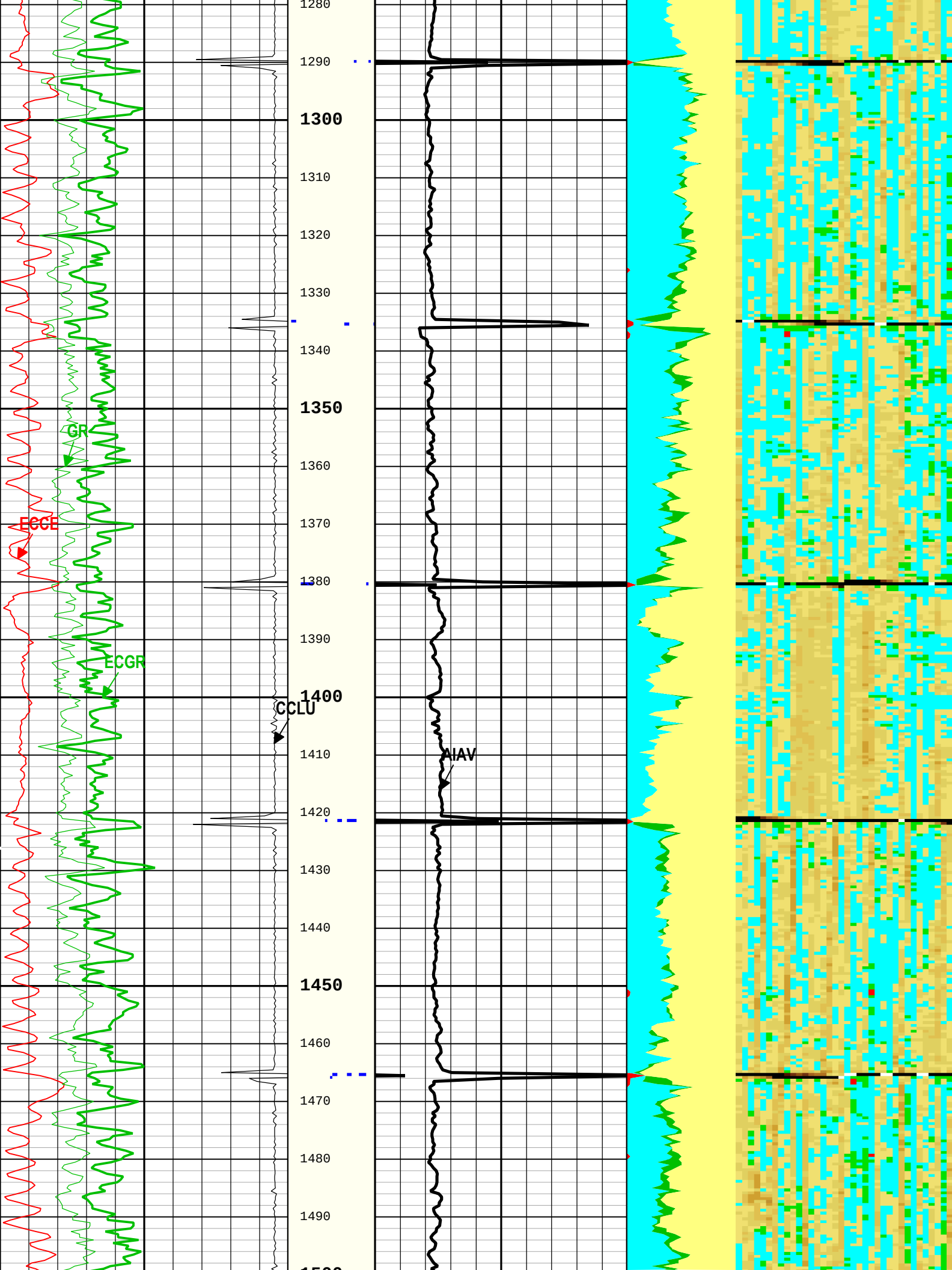
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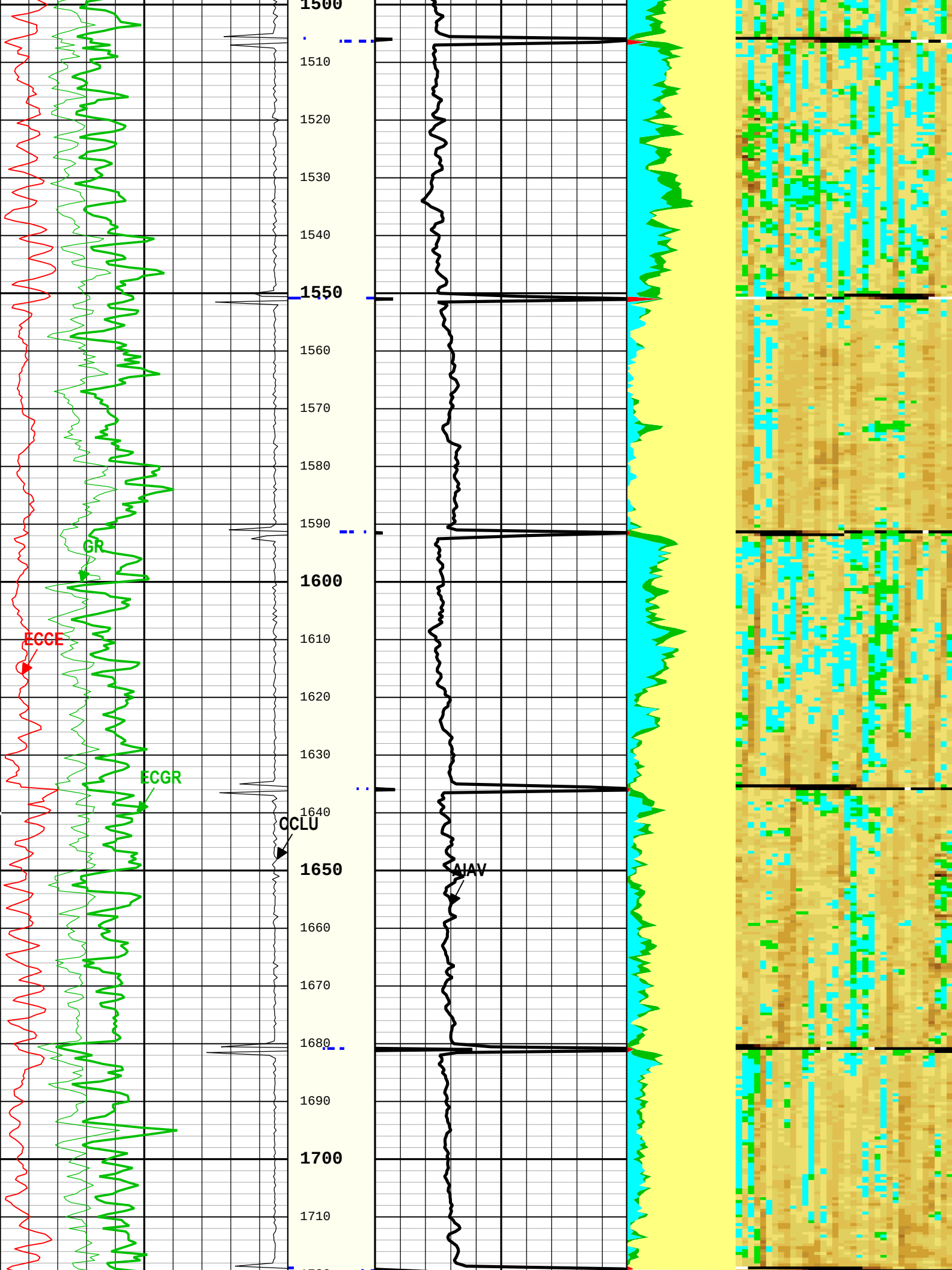
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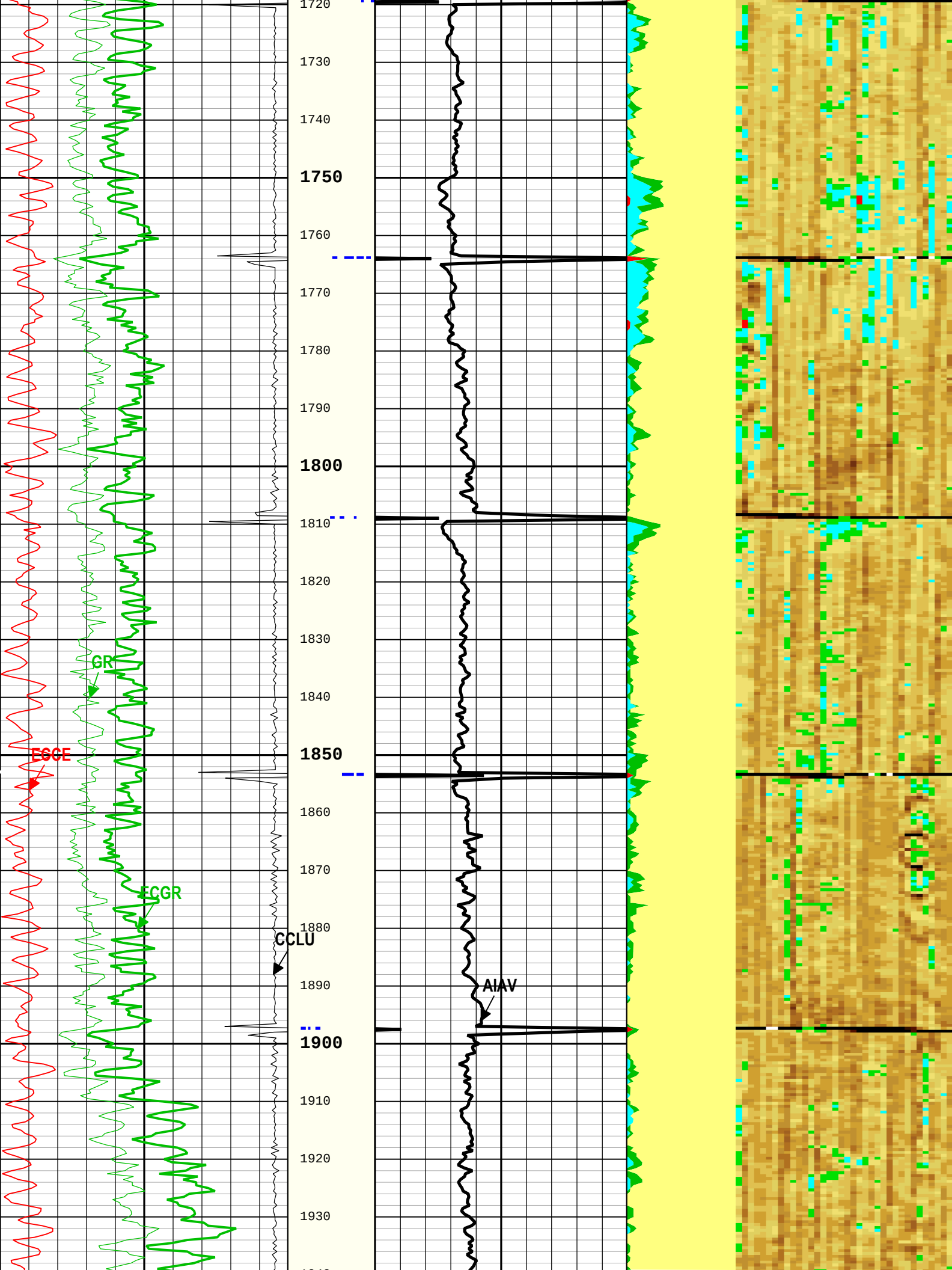
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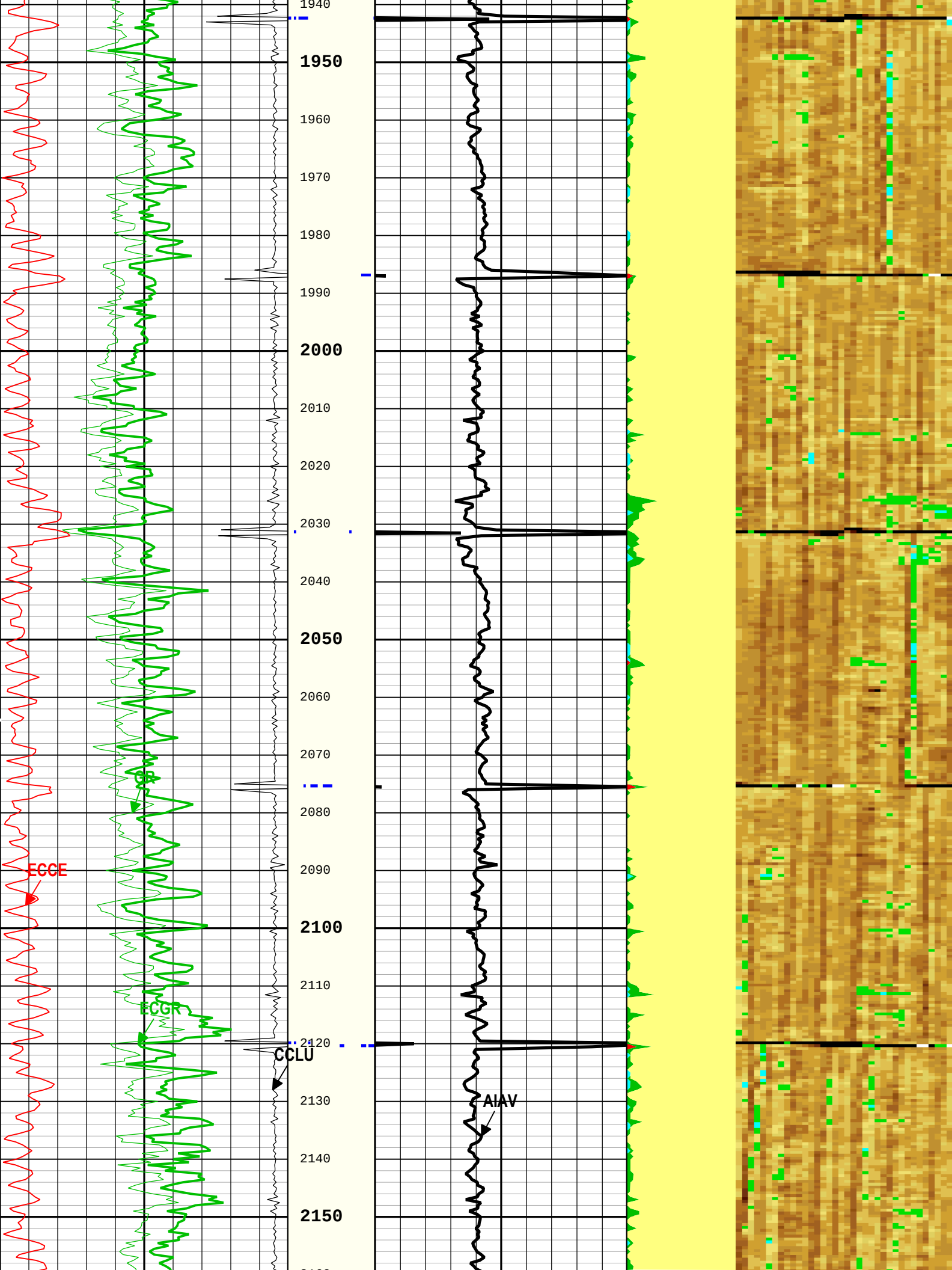
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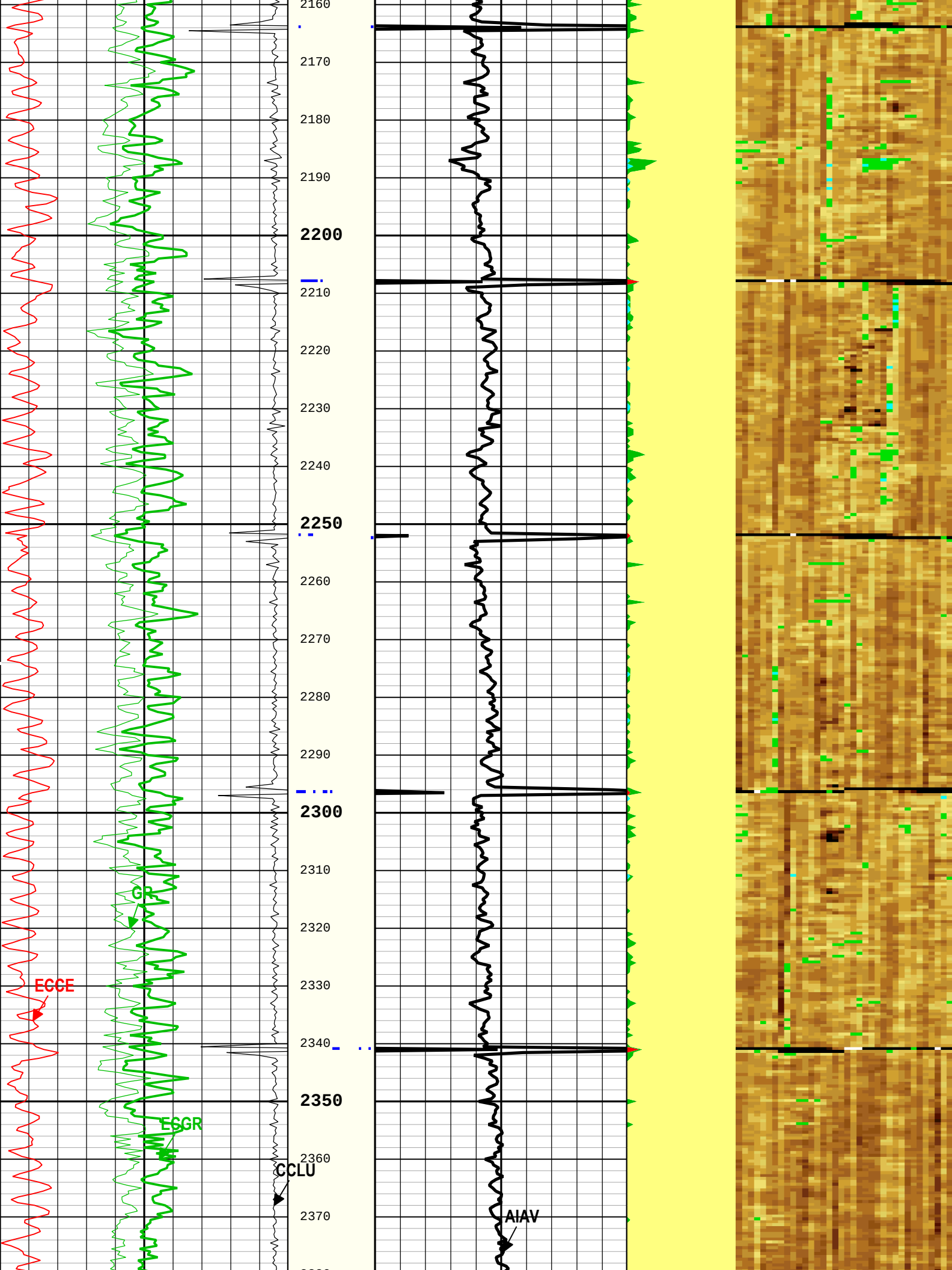
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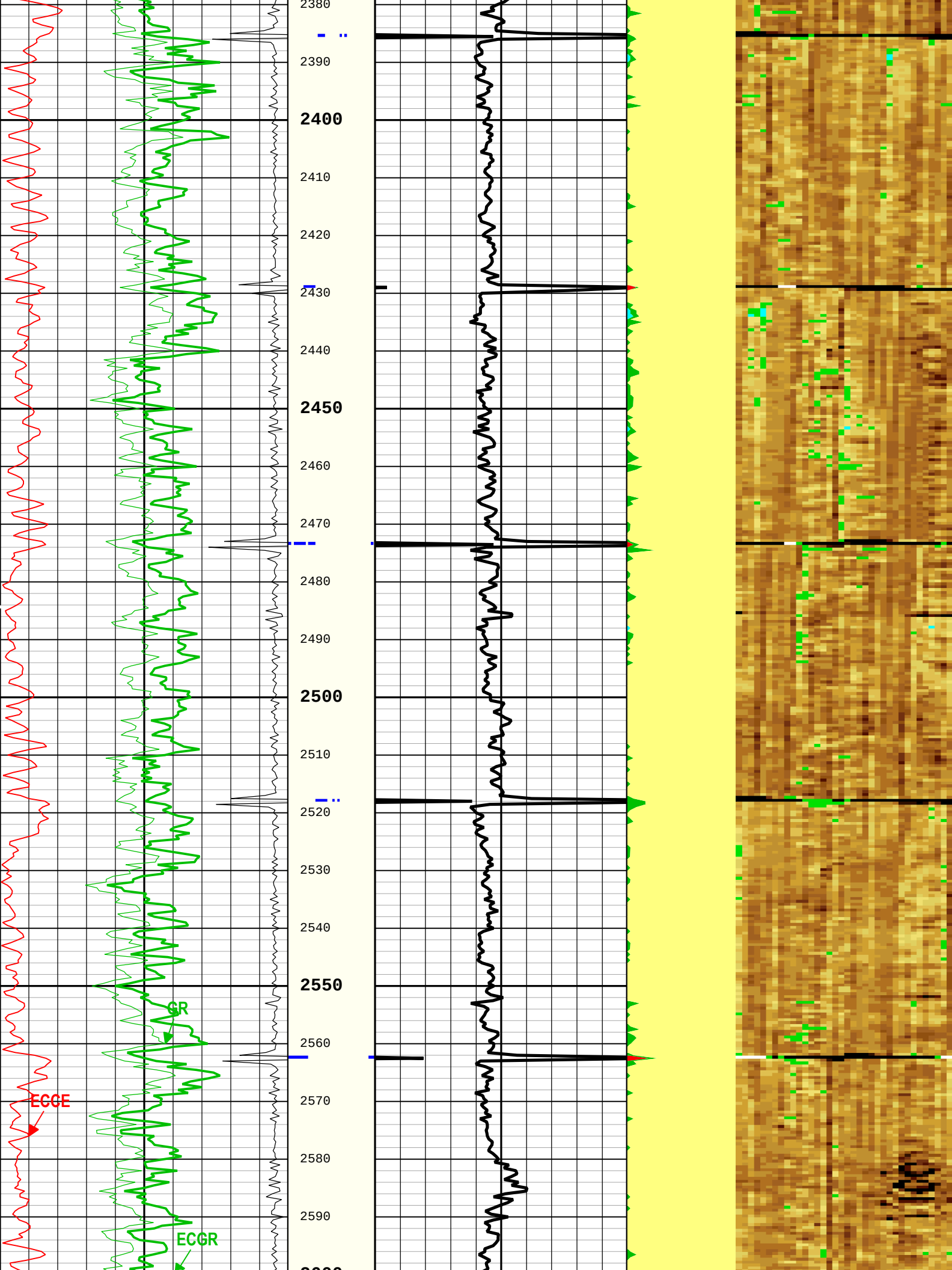
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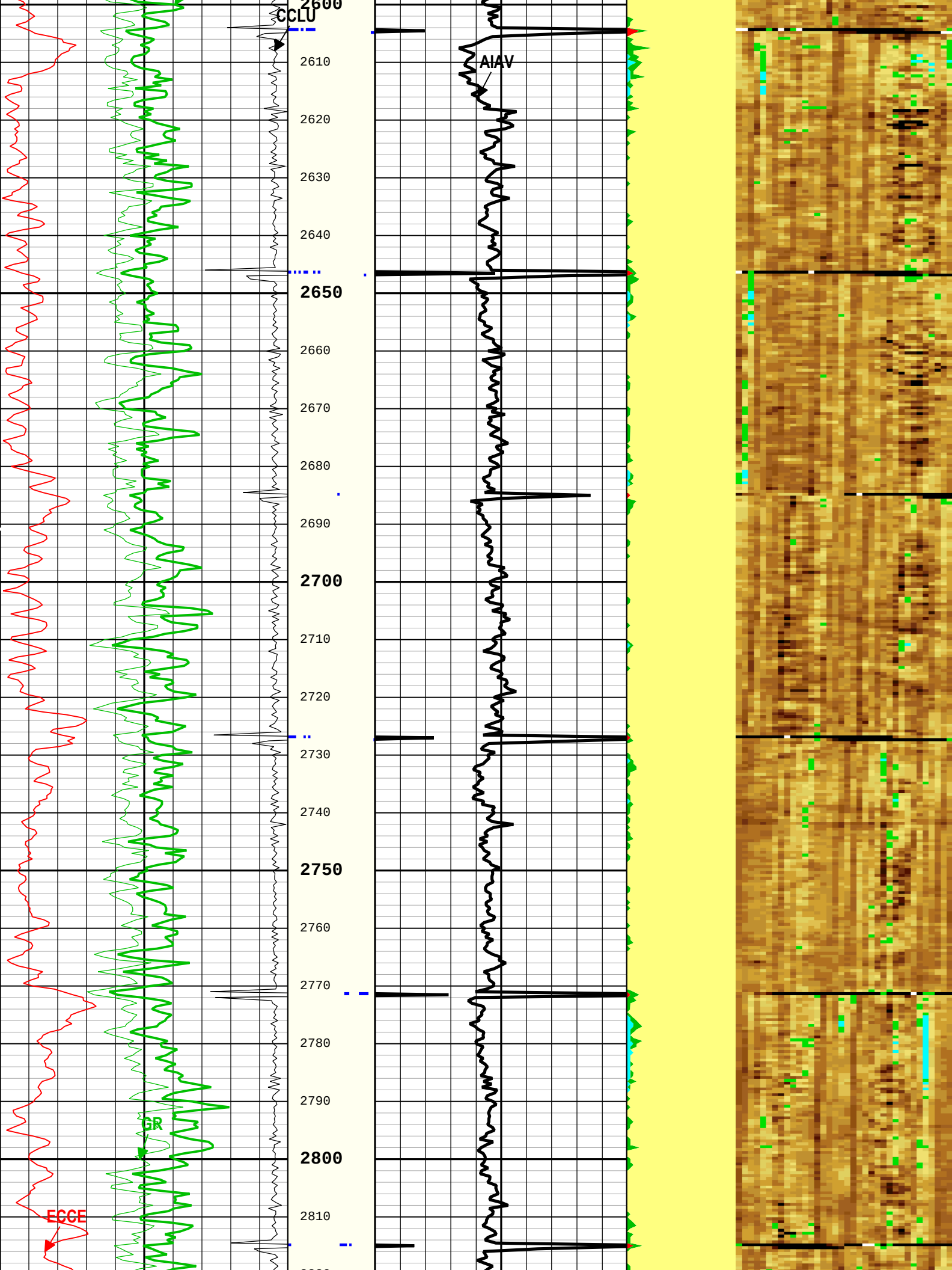
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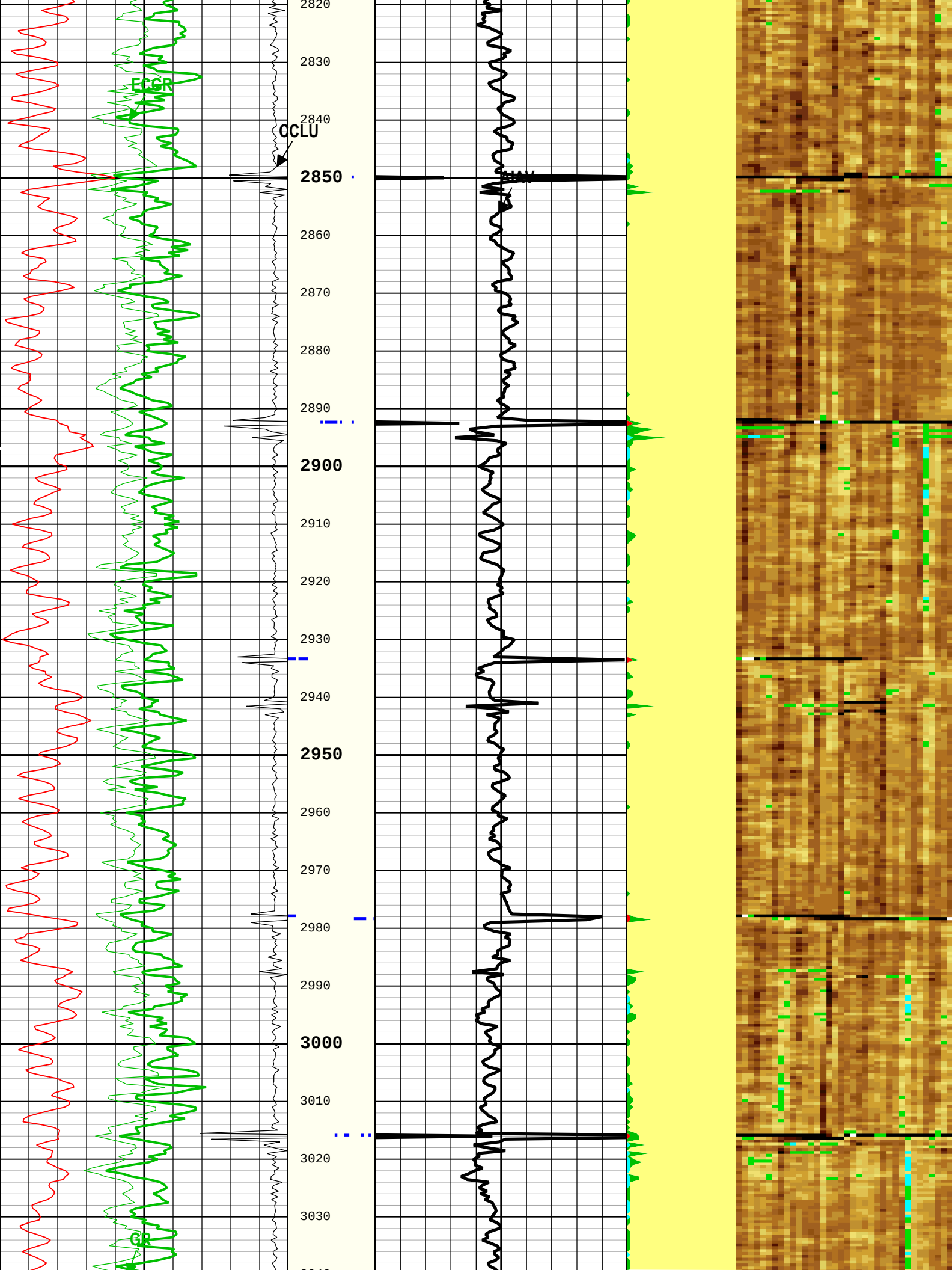
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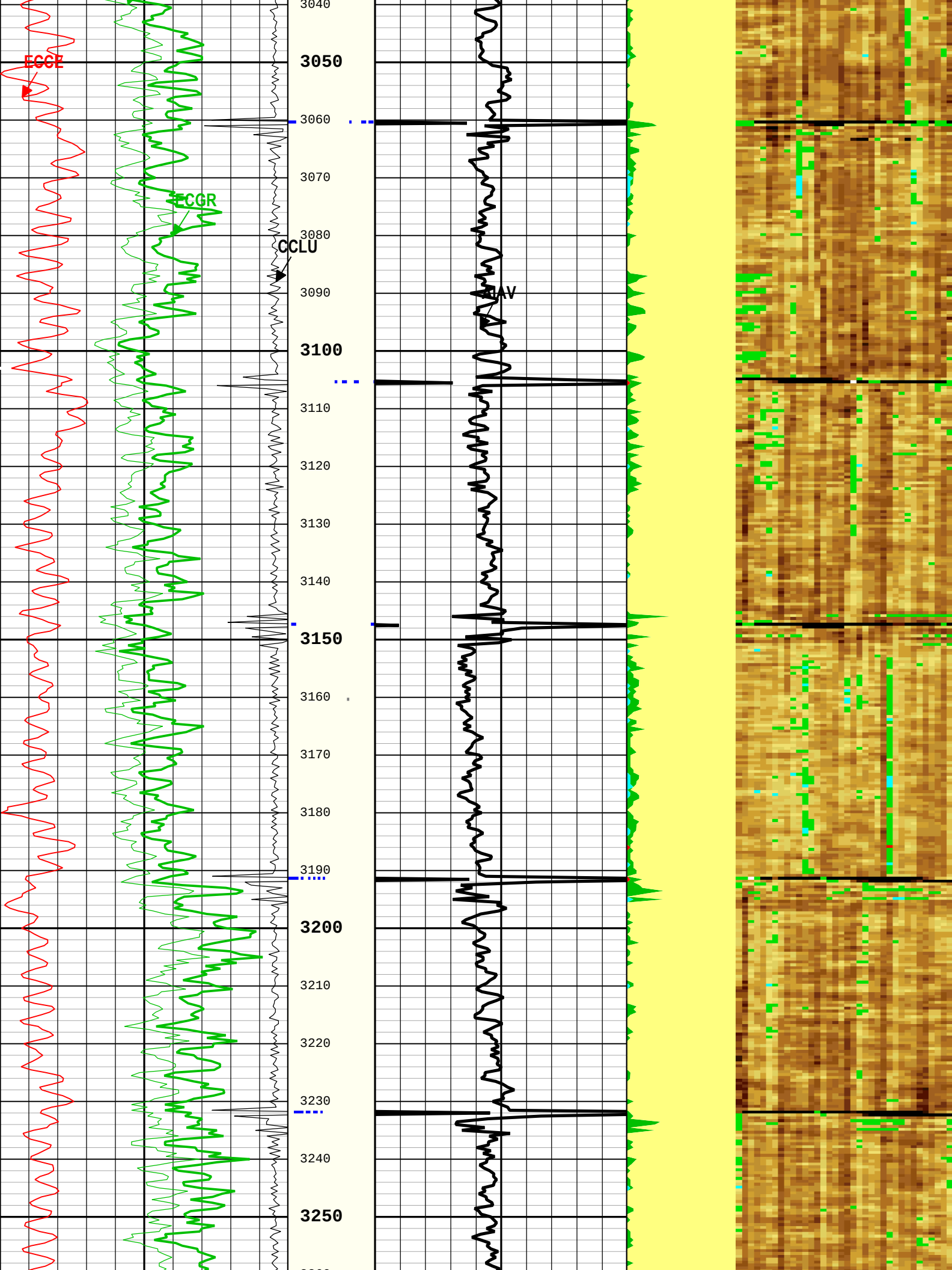
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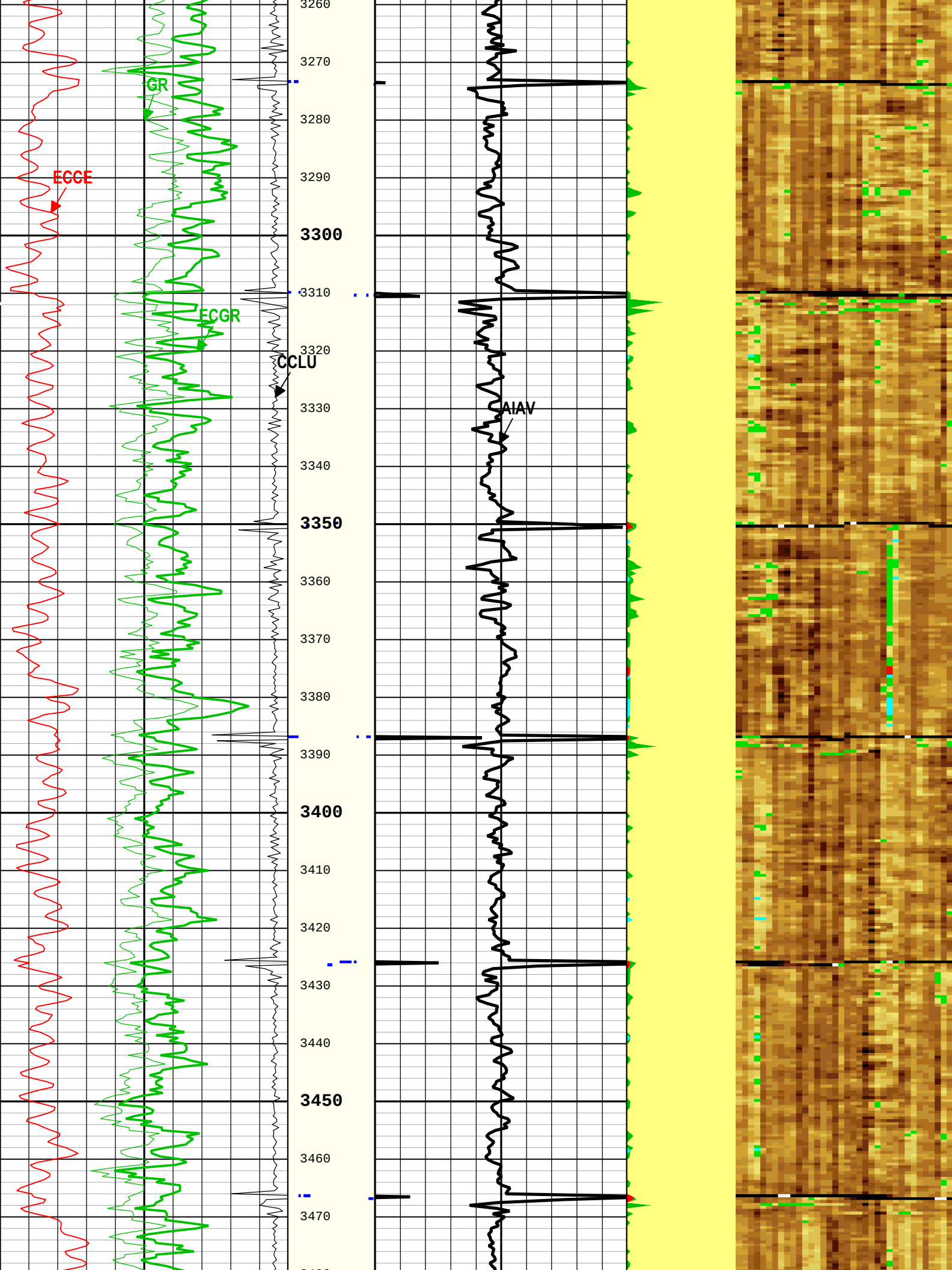
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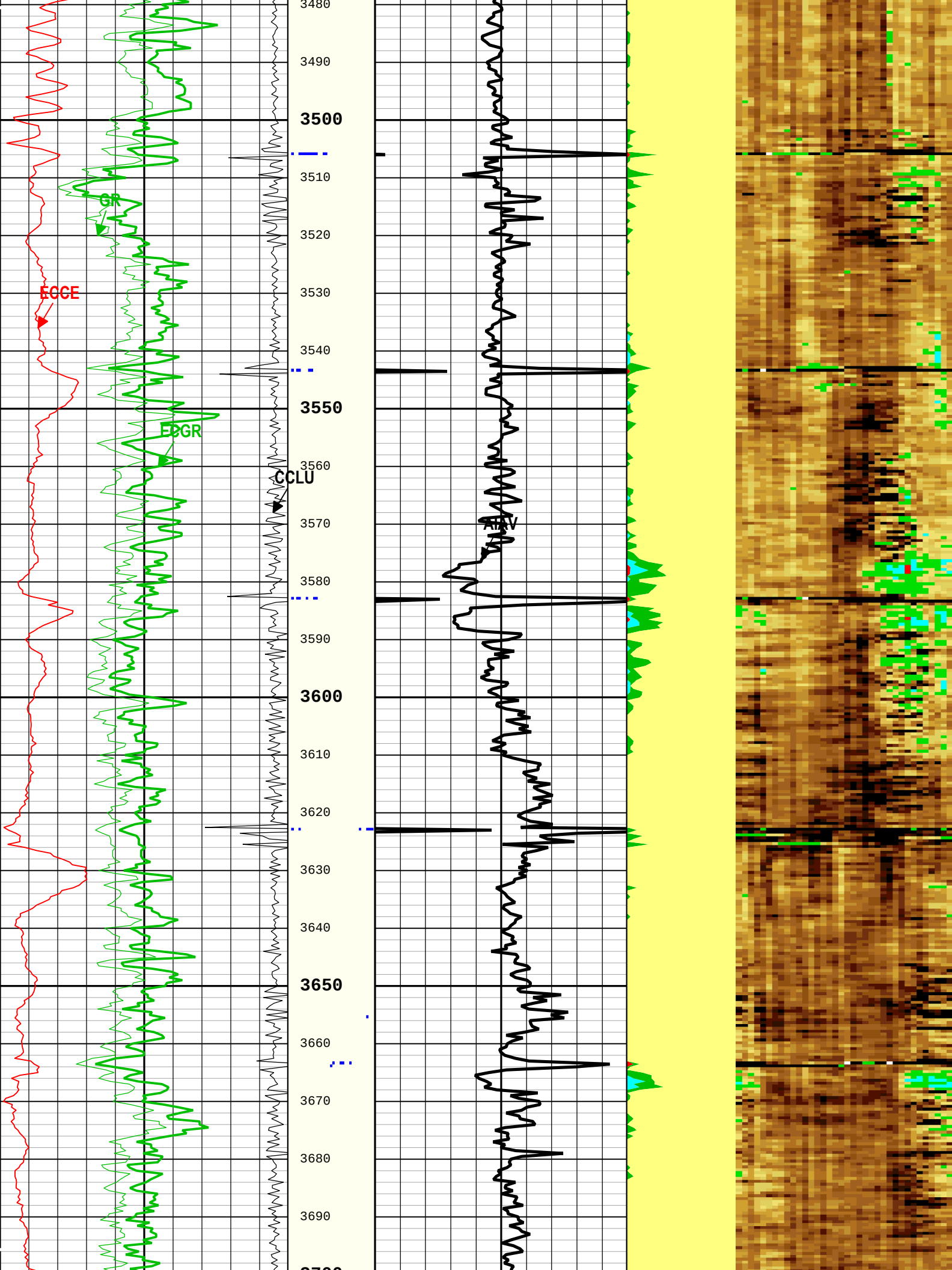
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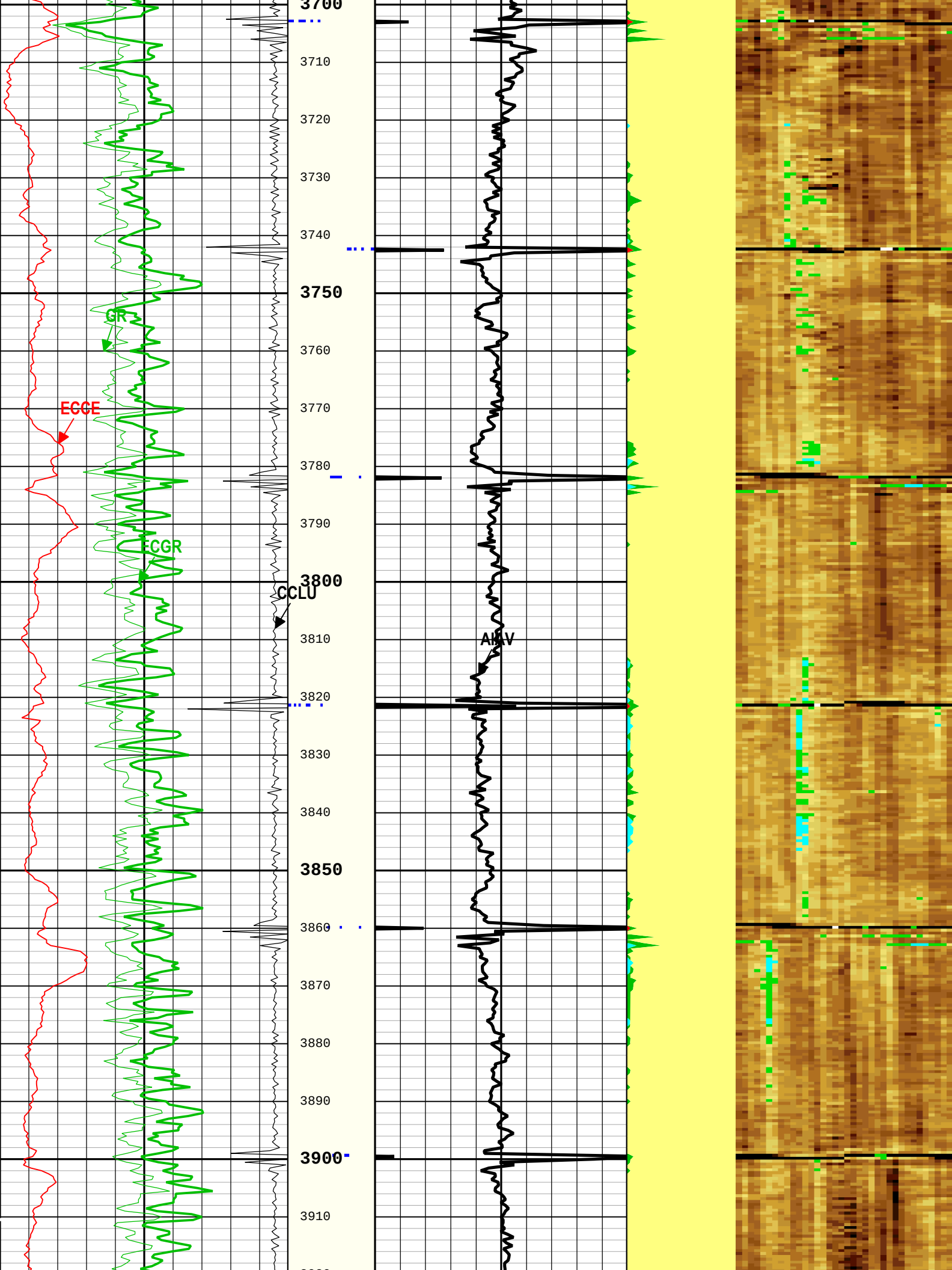
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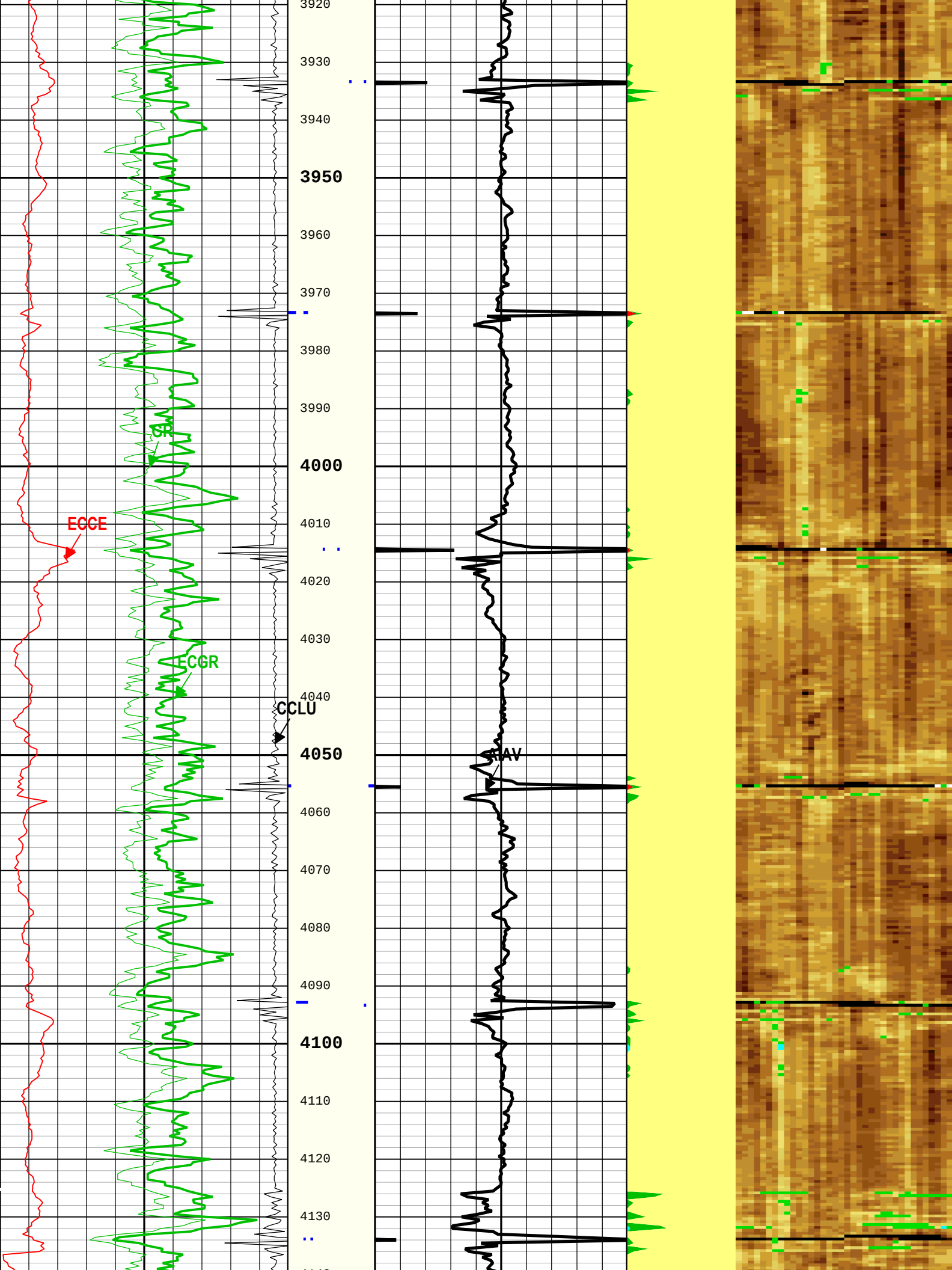
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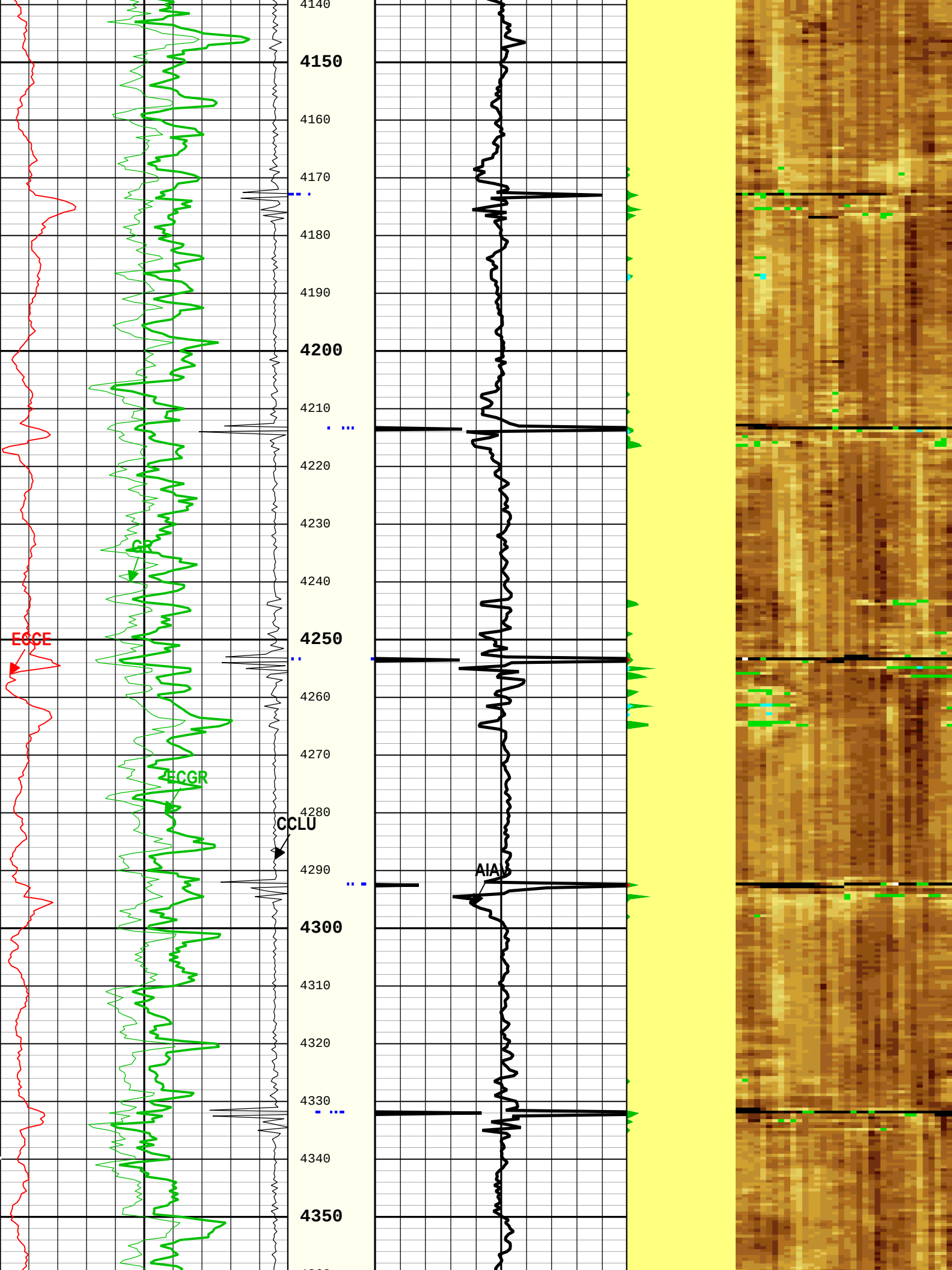
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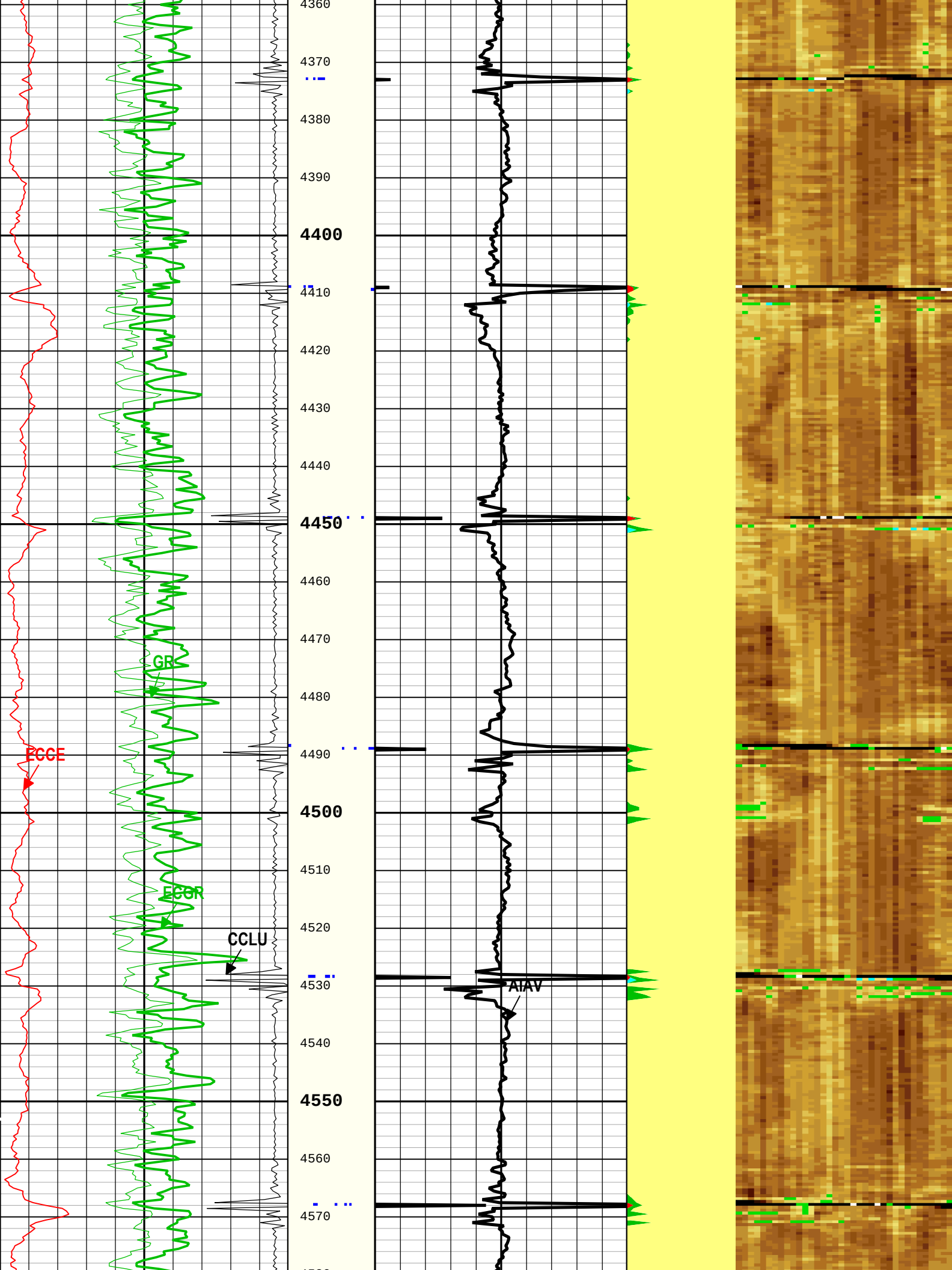
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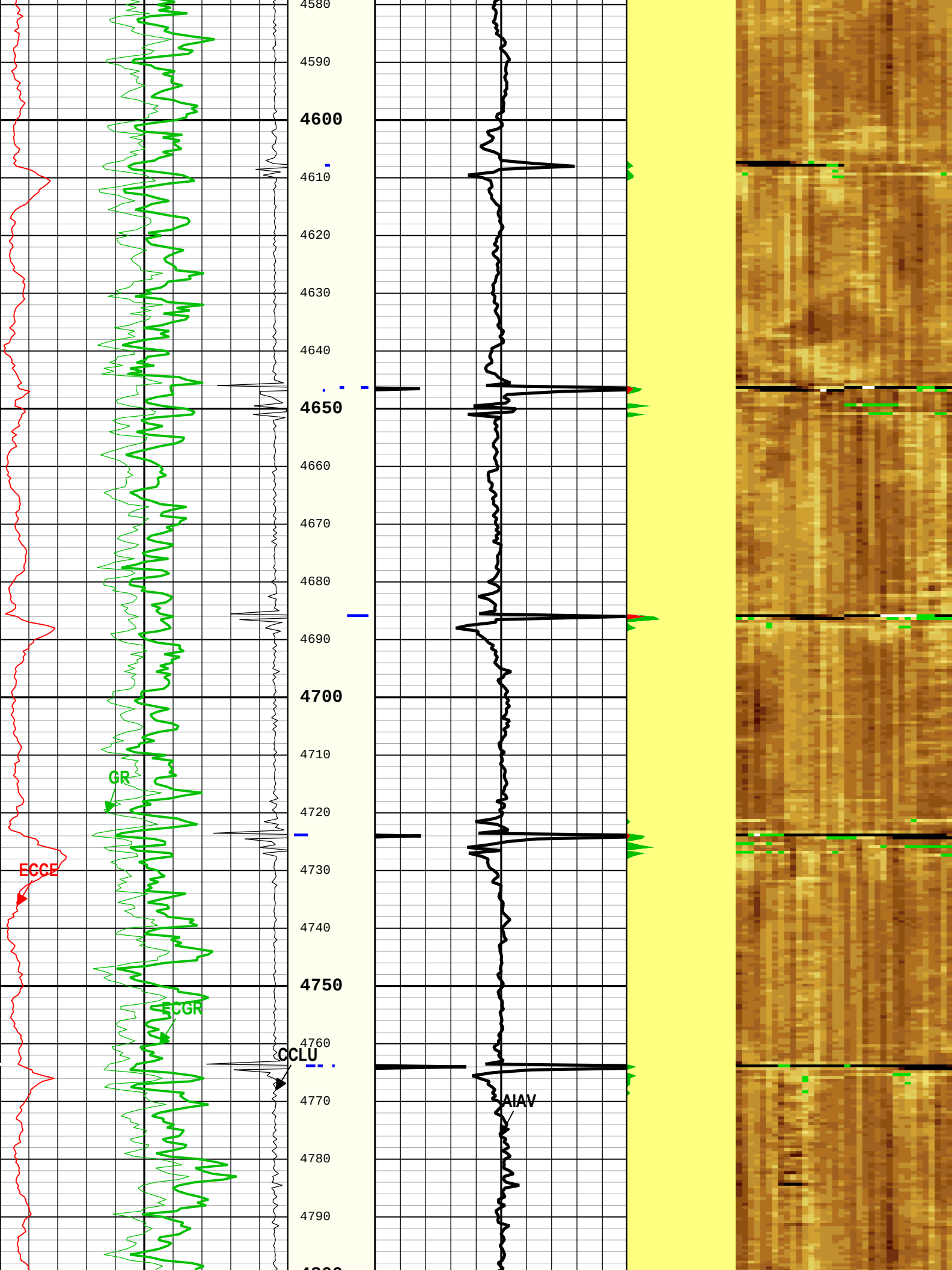
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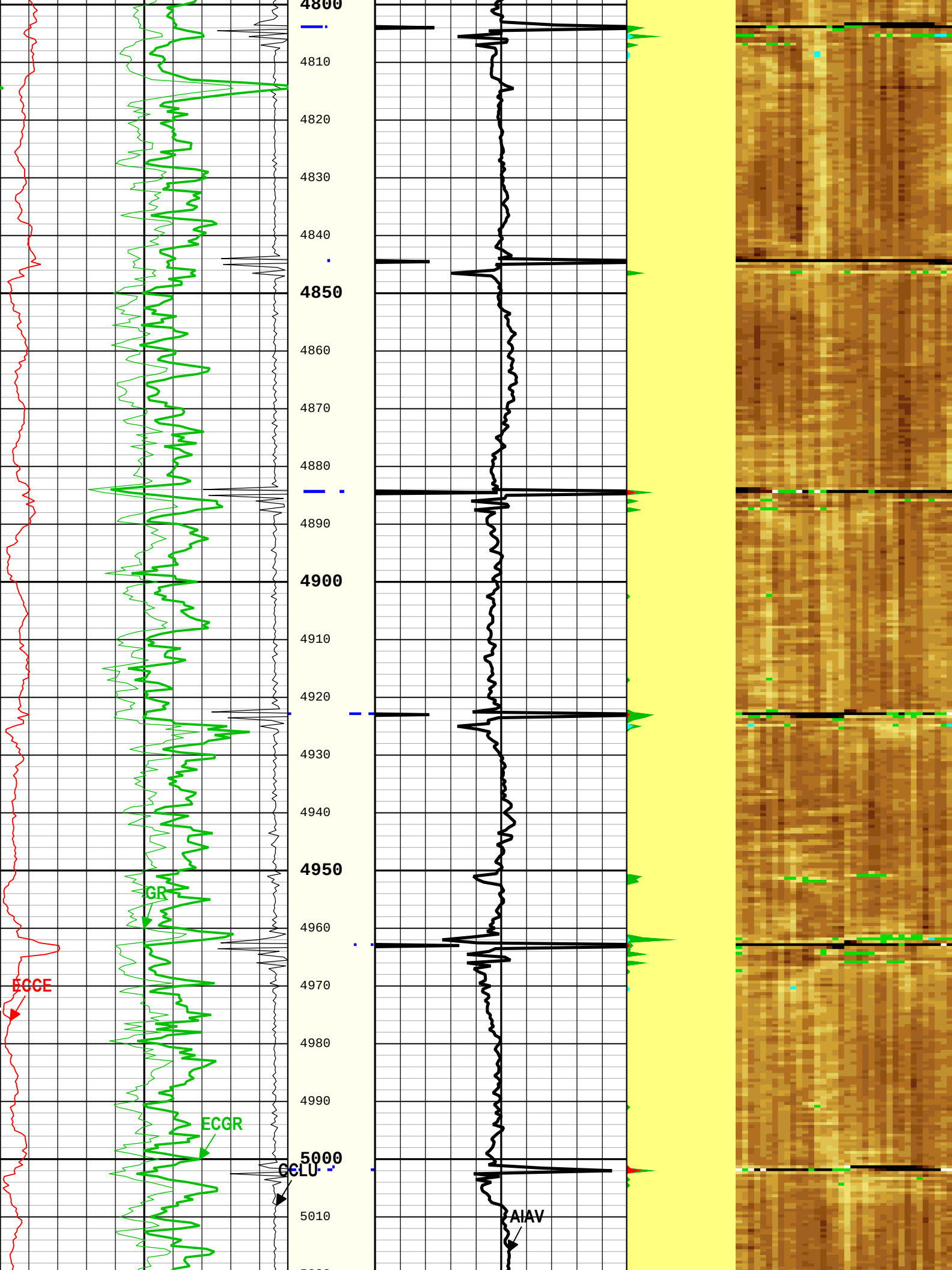
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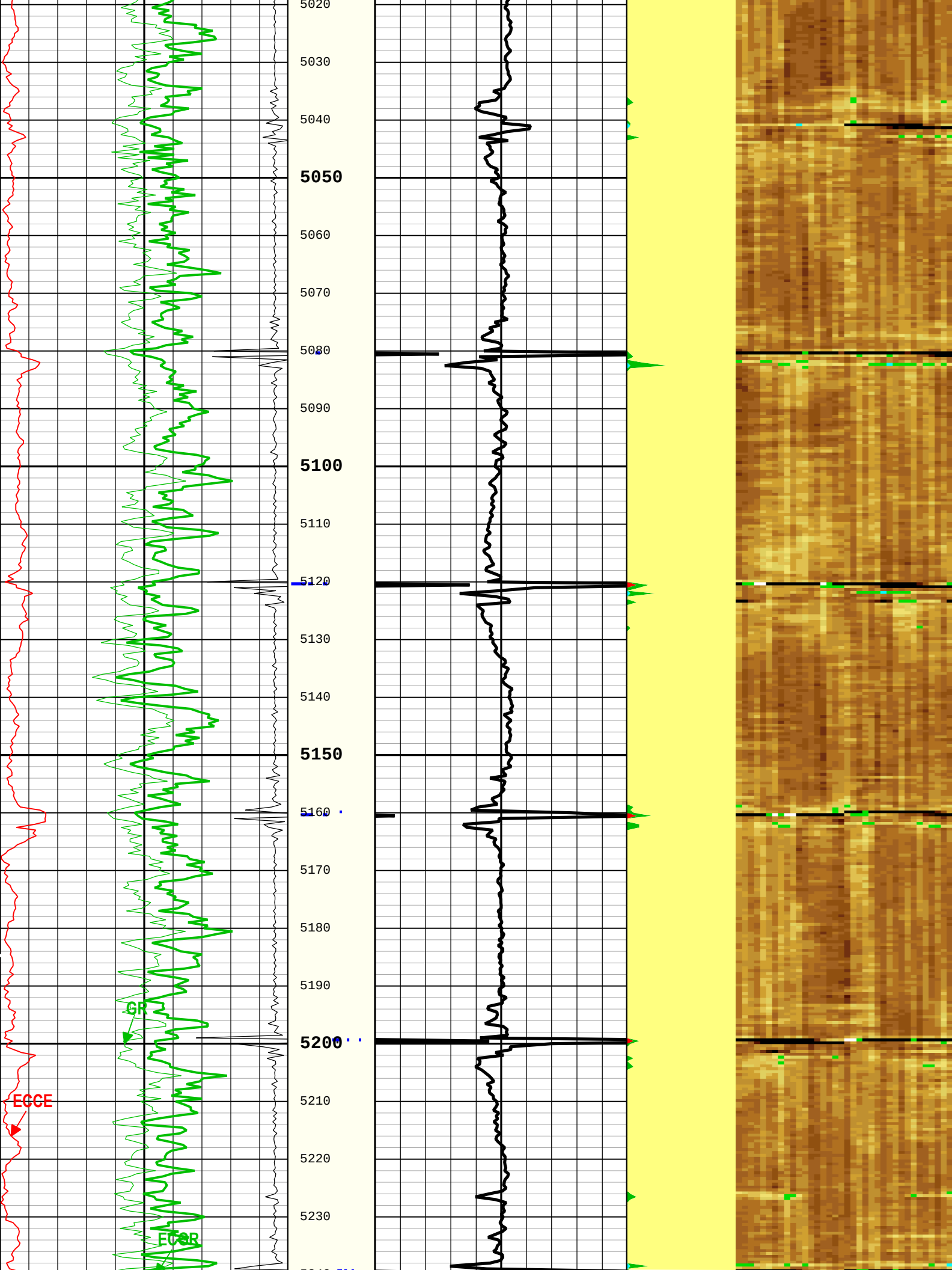
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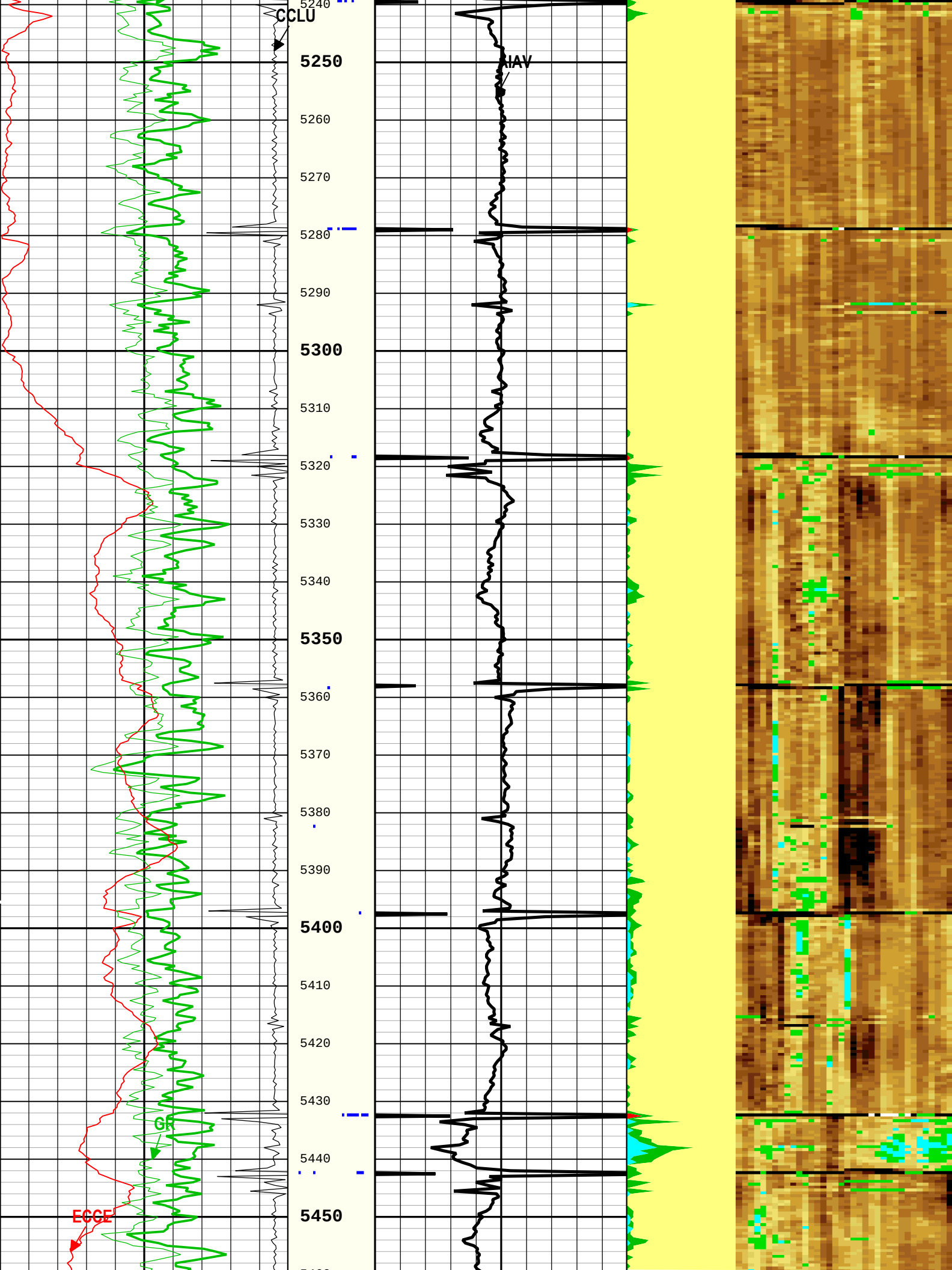
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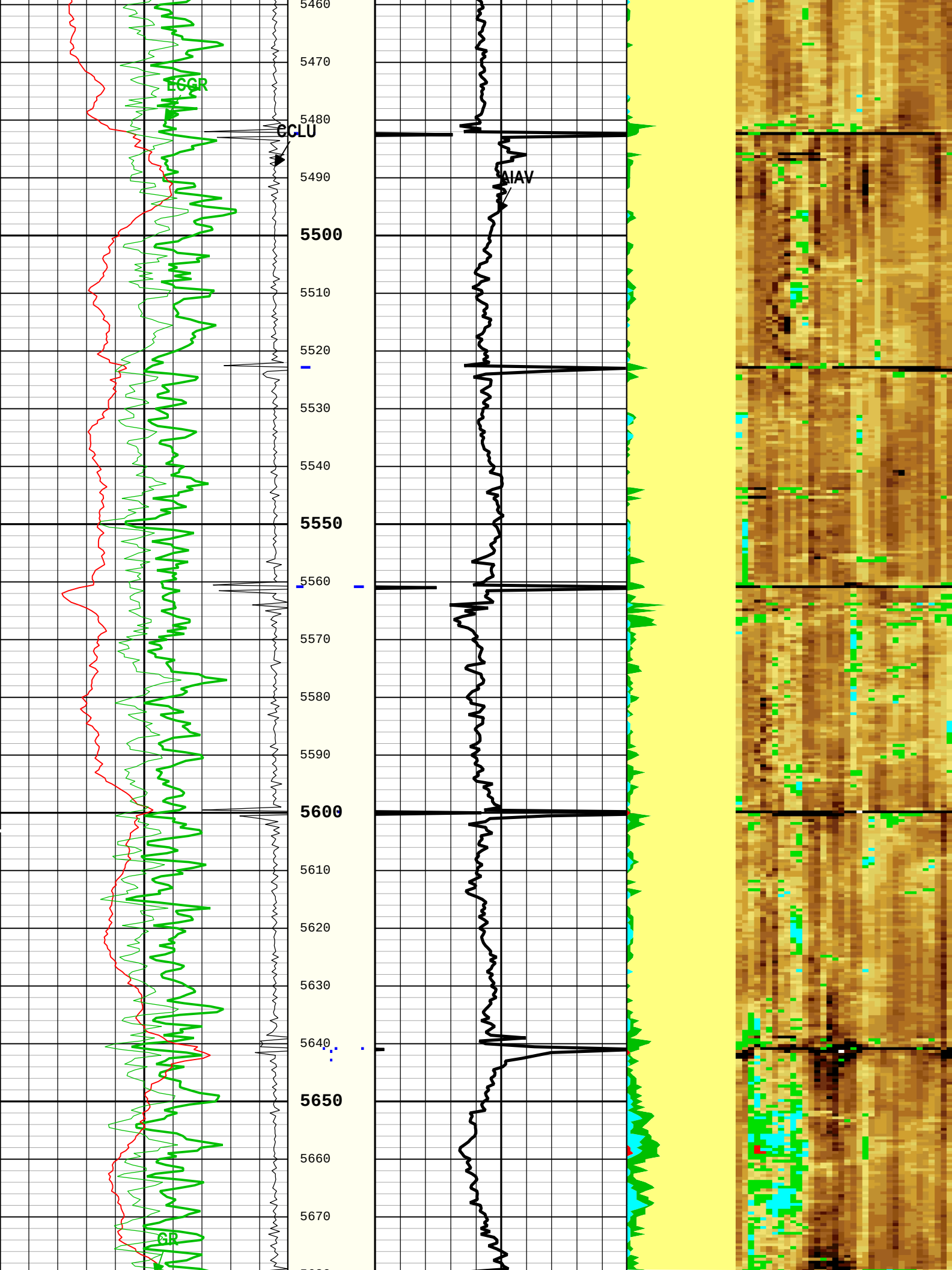
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CCLU
AIAV
GR
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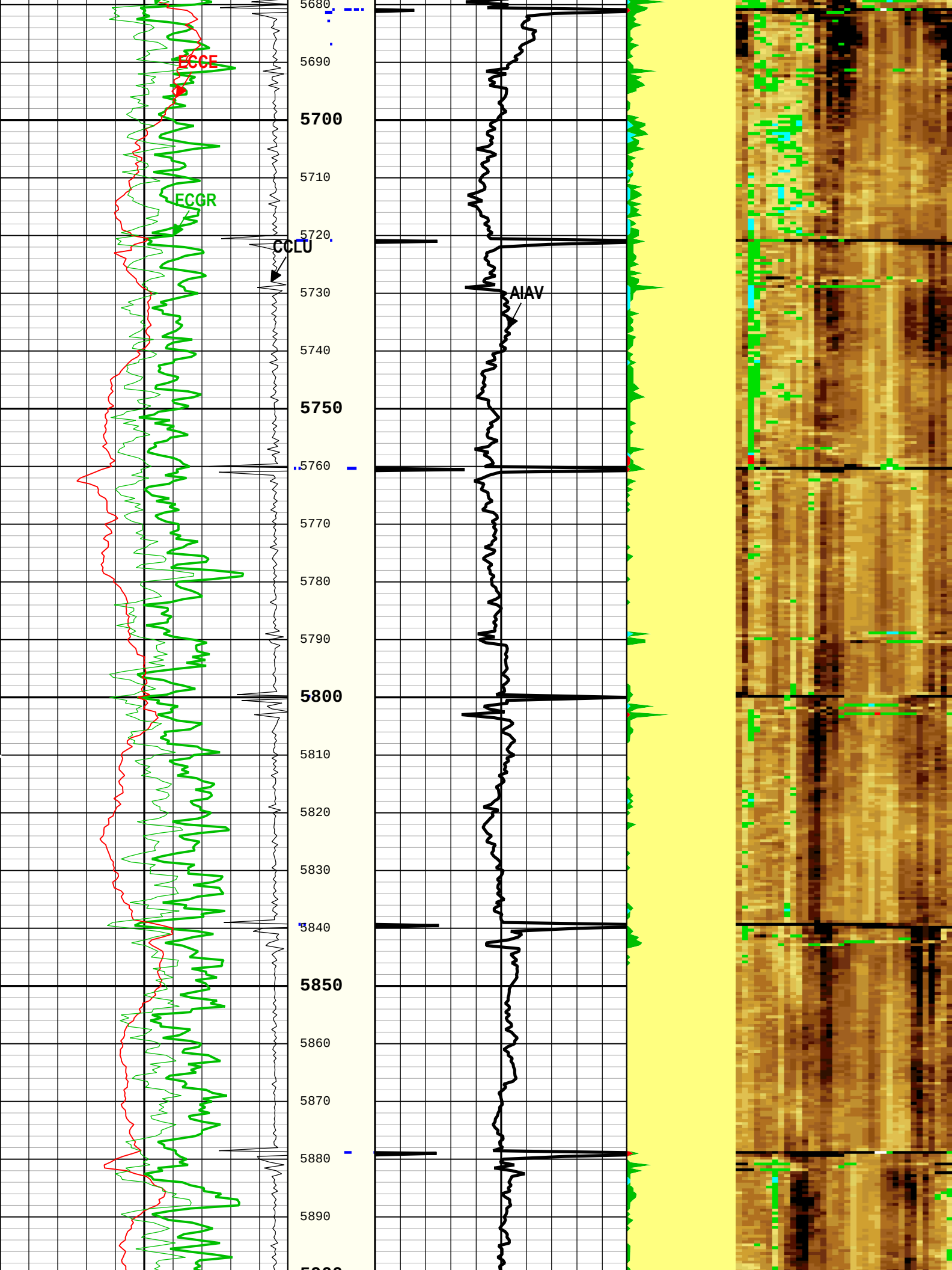
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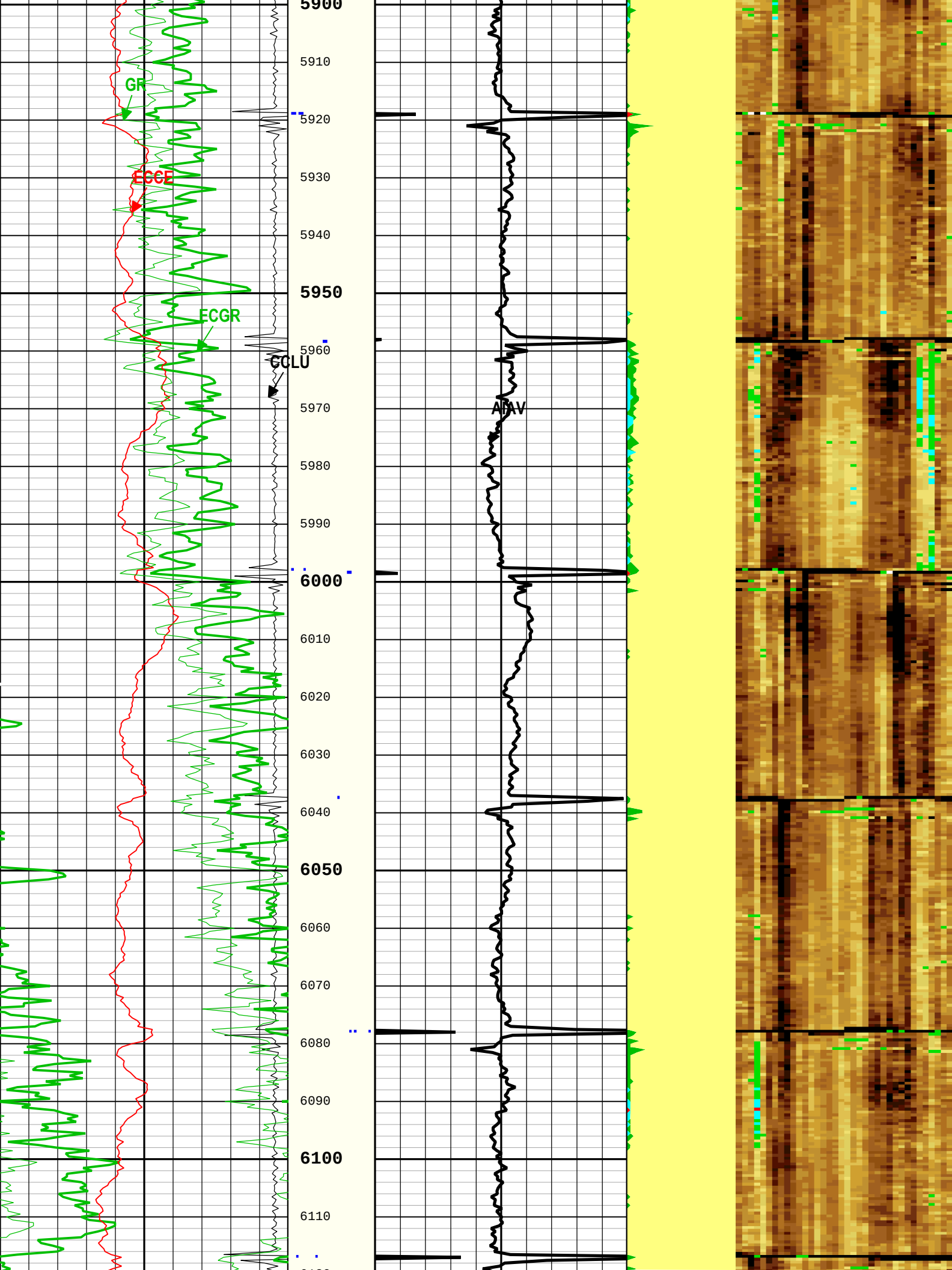
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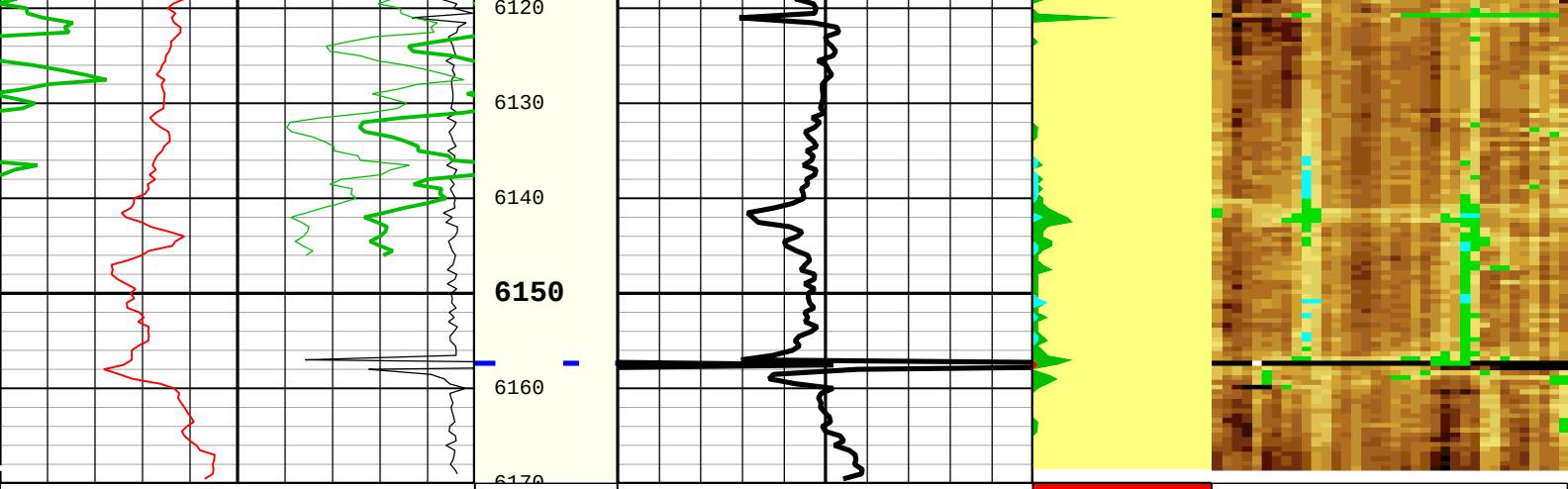


Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 1

Gamma Ray (ECGR) SGT-N

0 gAPI 150

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Calibrated Gamma Ray (GR) SGT-N

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: 30-Jan-2017 10:18:59

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	16465	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	8.9	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	1.07	
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)
BS	26	28.5	110
BS	13.5	110	1941
BS	8.5	1941	6170
MEAS_WLEN	20	28.5	30
MEAS_WLEN	22.44	30	6170

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	30	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	45	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	6200	ft
WINB	Window Begin Time	USIT-E	28	us
WINE	Window End Time	USIT-E	85	us

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	1987.79 ft	2506.58 ft	30-Jan-2017 8:24:42 AM	30-Jan-2017 8:27:51 AM	ON	3.00 ft	No

All depths are referenced to toolstring zero

Log

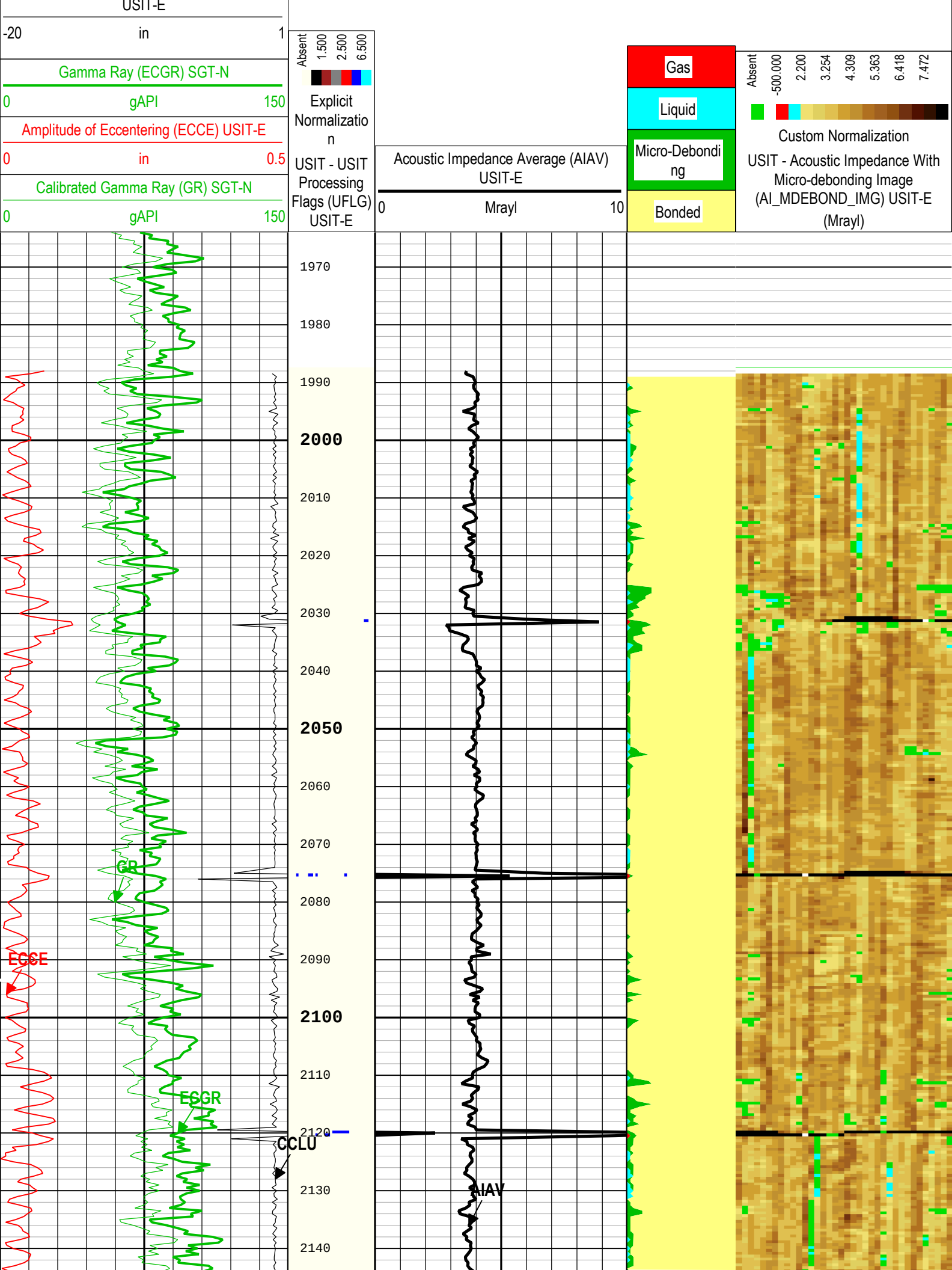
Company:Noble Energy Inc Well:Earp Federal LC23-745

One: Log[2]:Up:S007

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-Jan-2017 10:19:05

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
Calibrated Gamma Ray (GR) SGT-N
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)
1970
1980
1990
2000
2010
2020
2030
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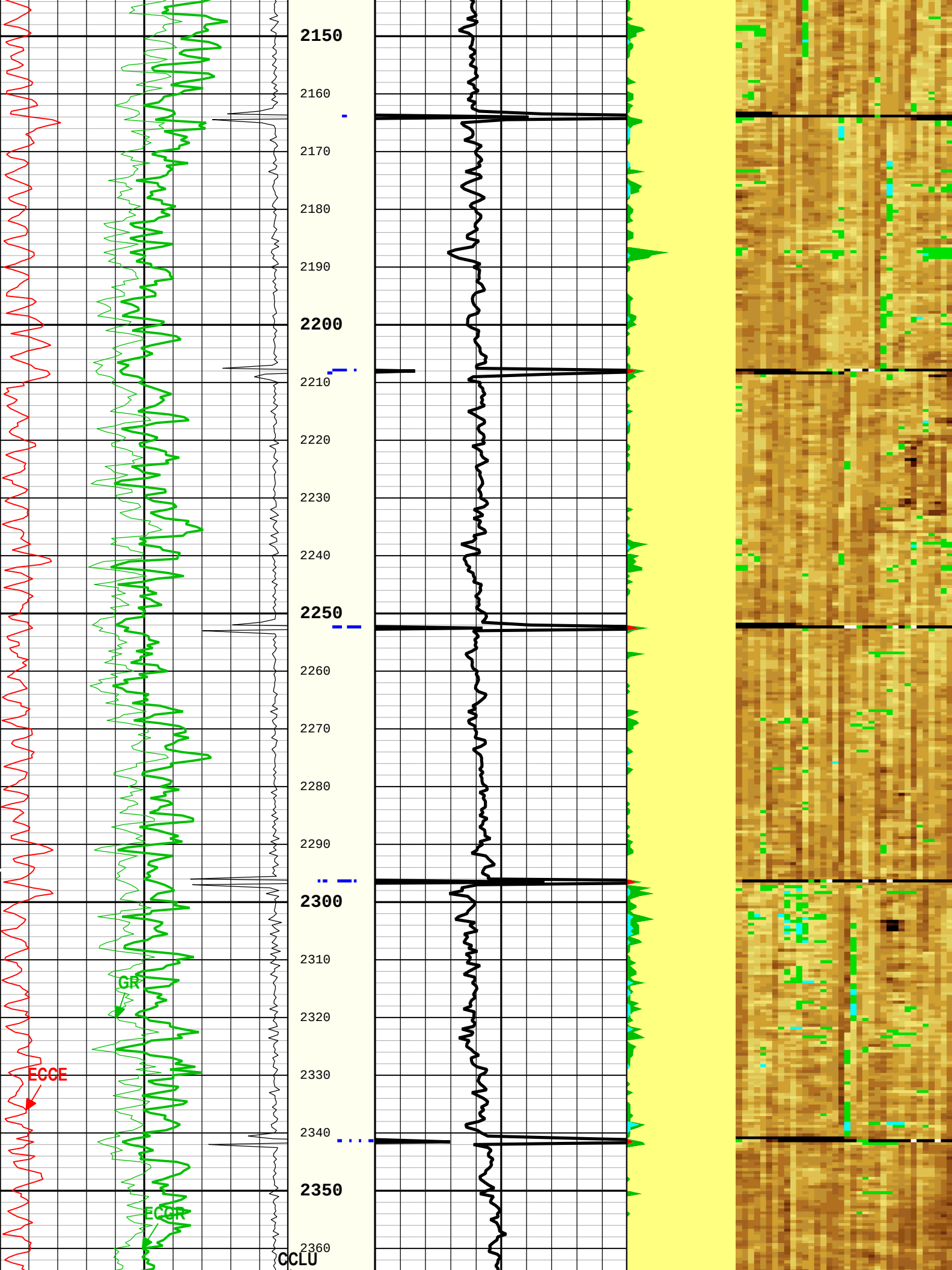
ECGR
CCLU
AIAV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GR
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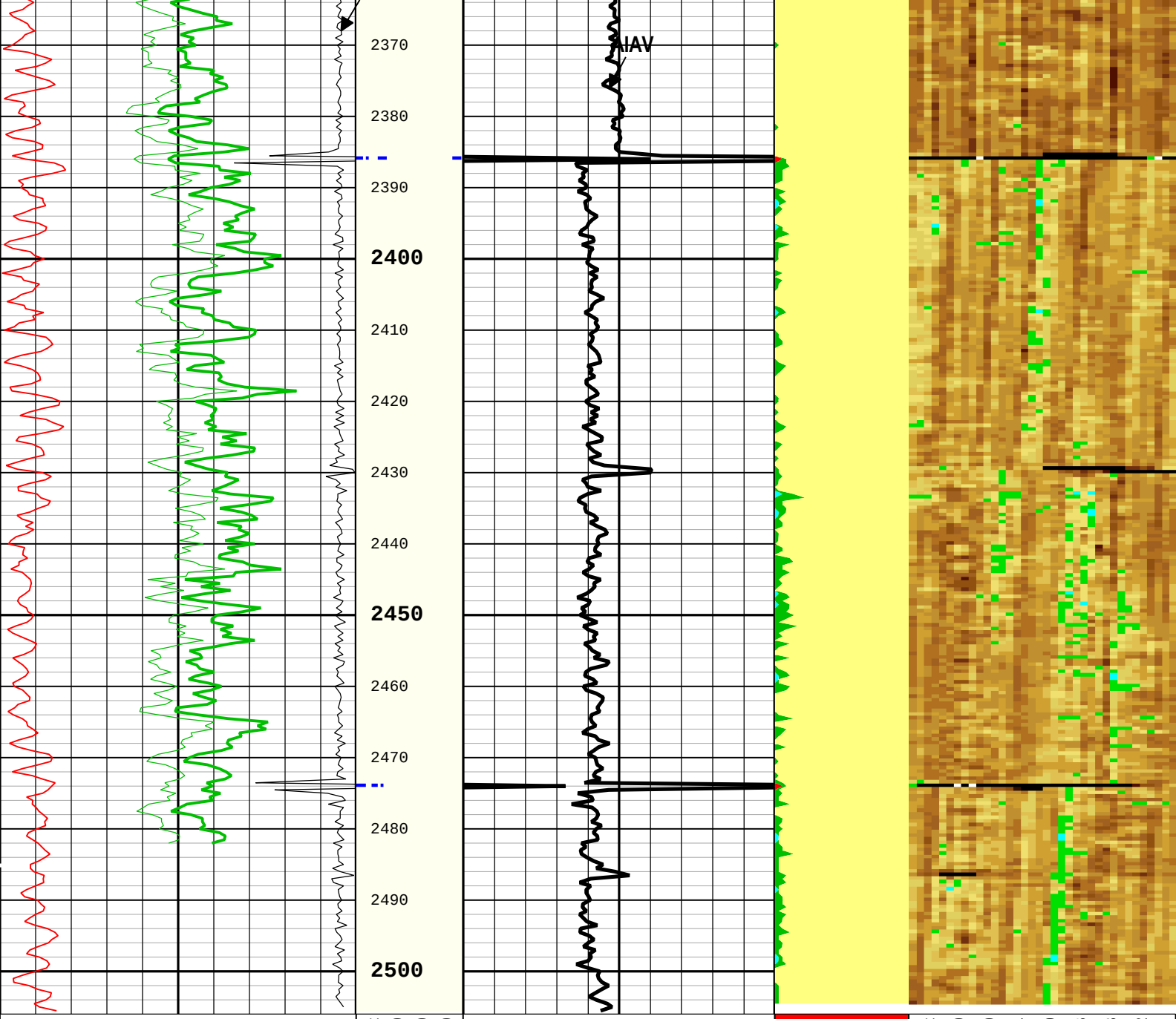
ECGR
CCLU



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

Calibrated Gamma Ray (GR) SGT-N

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: 30-Jan-2017 10:19:05

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	8.5	in
CBLO	Casing Bottom (Logger)	WLSESSION	16465	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	8.9	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	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.07	
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

Tool Control Parameters

One: Parameters

Parameter	Description	Tool	Value	Unit
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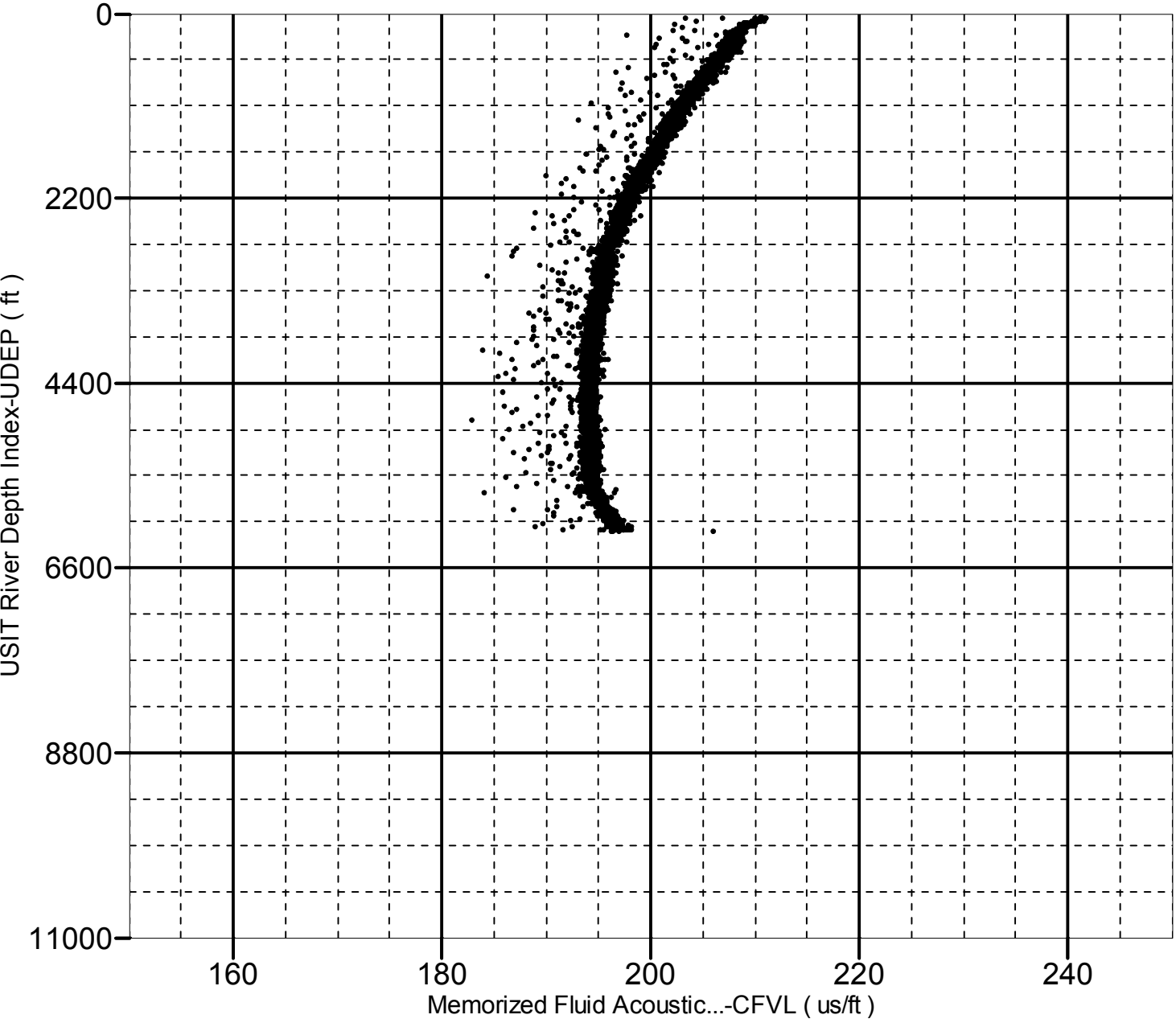
AGMX	Maximum Gain of Cartridge	USIT-E	30	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	45	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic 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	2504	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 6170.00 to 52.00 ft

● CFVL-UDEP



XYZ

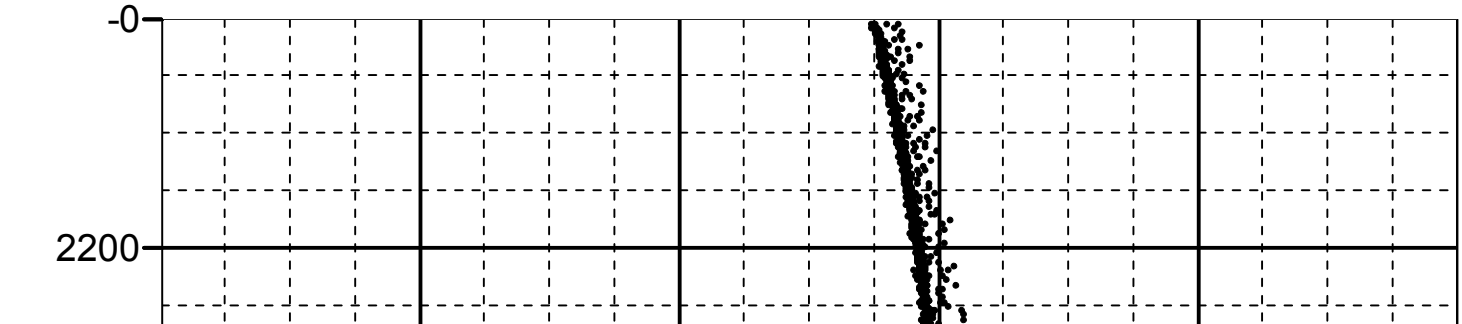
Company:Noble Energy Inc Well:Earp Federal LC23-745
One: Log[5]:Up:S007

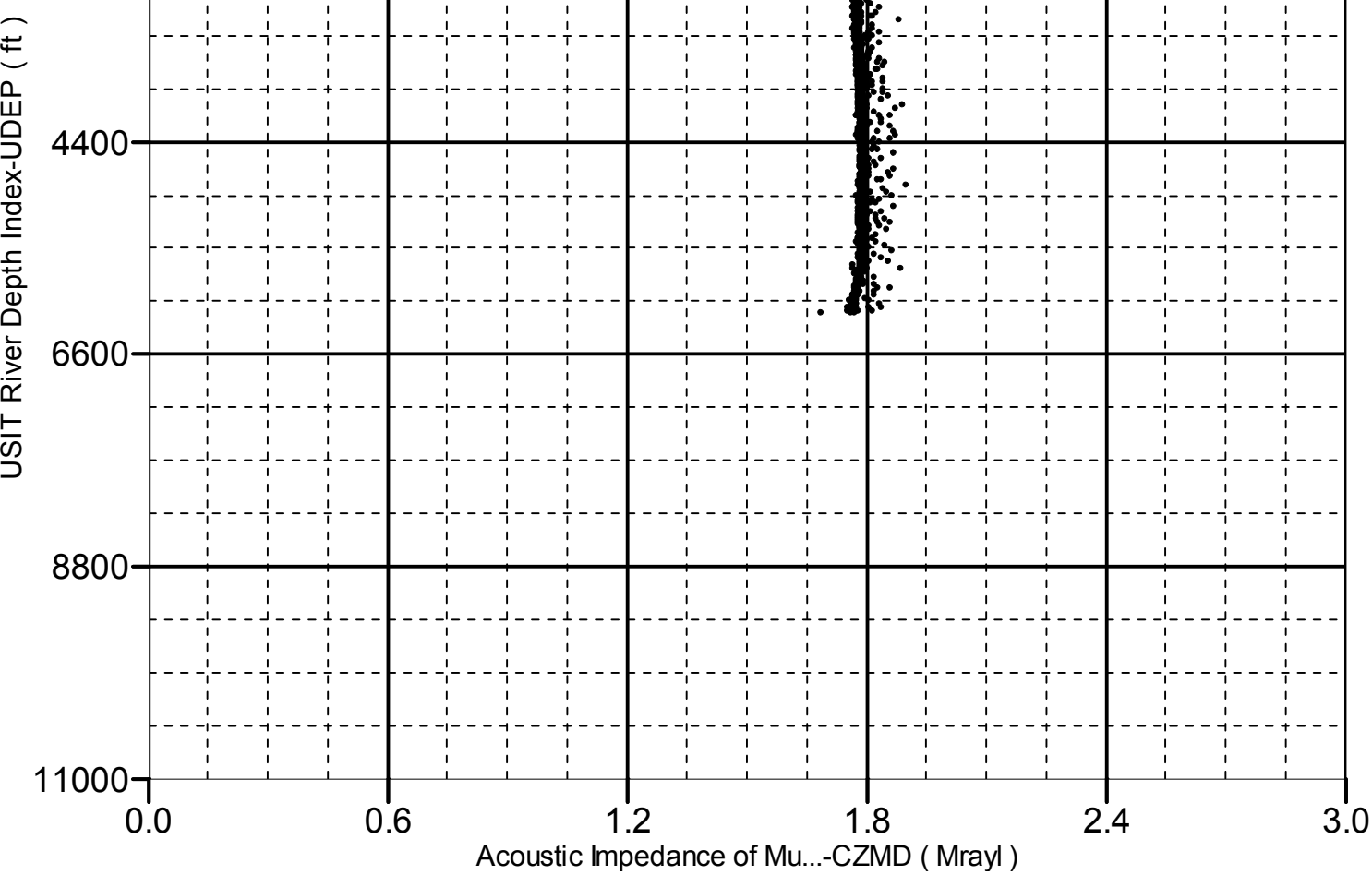
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6170.00 to 52.00 ft

● CZMD-UDEP





Company:	Noble Energy Inc
Well:	Earp Federal LC23-745
Field:	Wildcat
County:	WELD
Country:	US

Schlumberger

UltraSonic Summary Print