Schlumberger

Company: Noble Energy INC

Well: Wells Ranch BB11-674

Field: Wattenberg

County: WELD State: Colorado

UltraSonic Summary Print

County: WELD
Field: Wattenberg
Location: NWNW Sec. 11, T5N, R63W
Well: Wells Ranch BB11-674
Company: Noble Energy INC

Location:				
NWNW Sec. 11, T5N, R63W		Elev.:	K.B.	4715.00 ft
SHL: 1135' FNL & 300' FWL			G.L.	4685.00 ft
Lat/Long: 40.41908, -104.41268			D.F.	4715.00 ft
Permanent Datum:	Ground Level	Elev.:	4685.00 f	
Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

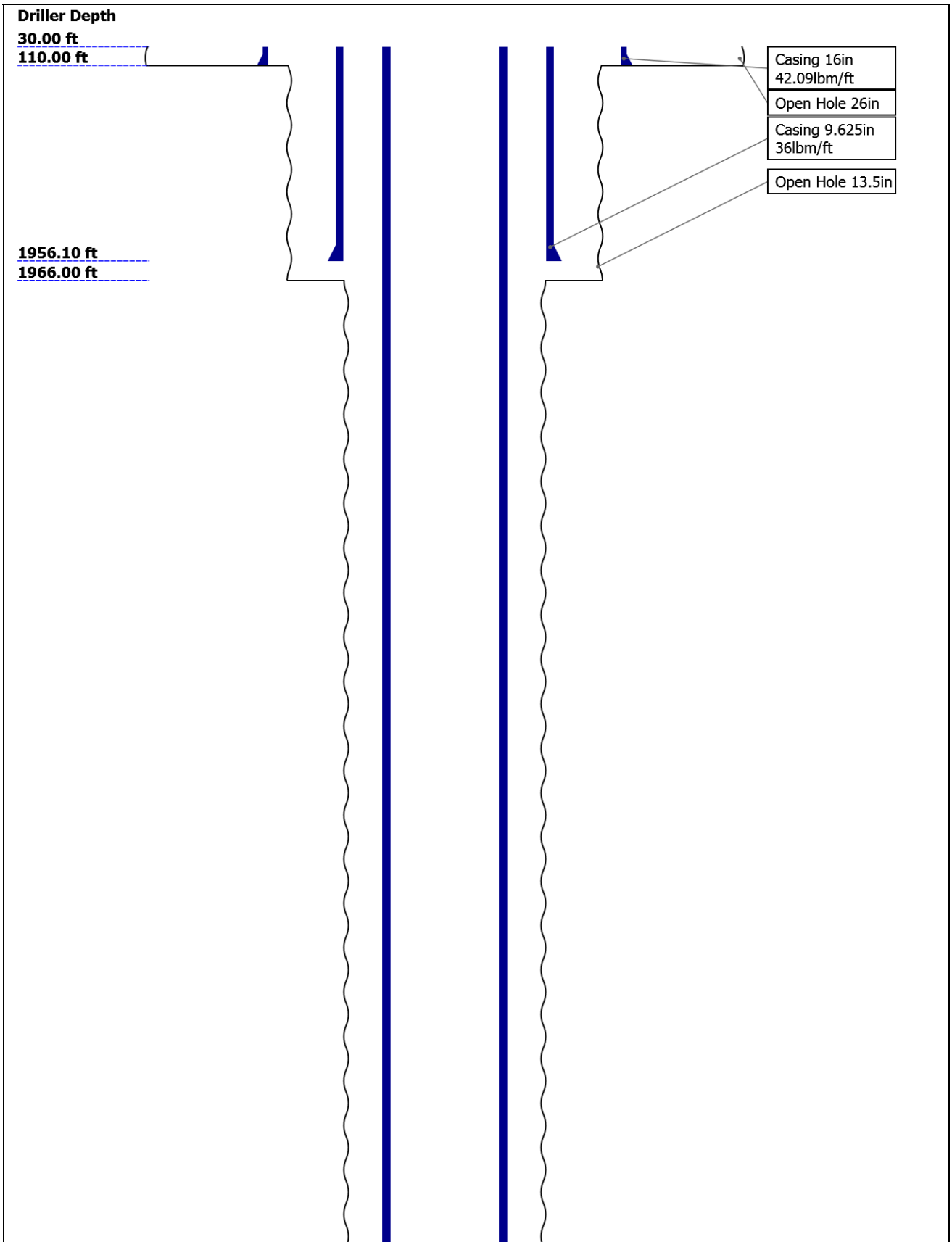
API Serial No.	Section:	Township:	Range:
05-123-44966	11	5N	63W

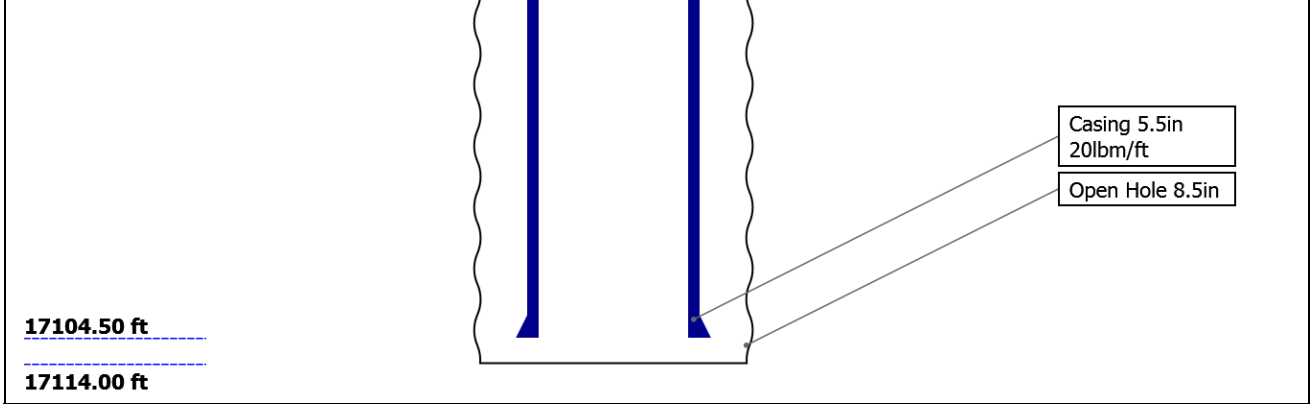
Logging Date	22-Sep-2017		
Run Number	One		
Depth Driller	17114.00 ft		
Schlumberger Depth	5850.00 ft		
Bottom Log Interval	5850.00 ft		
Top Log Interval	69.00 ft		
Casing Fluid Type	Brine		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	0.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.50 in		
From	1966.00 ft		
To	5850.00 ft		
Casing/Tubing Size	5.5 in		
Weight	20 lbm/ft		
Grade	N/A		
From	30.00 ft		
To	5850.00 ft		
Max Recorded Temperatures	207 degF		
Logger on Bottom Time	22-Sep-2017	13:40:00	
Unit Number Location:	2161	Fort Morgan	
Recorded By	Camila Lang		
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)	30	110	1966			
Top Logger (ft)	30	110	1966			
Bottom Driller (ft)	110	1966	17114			
Bottom Logger (ft)	110	1966	5850			
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)	30	30	30			
Top Logger (ft)	30	30	30			
Bottom Driller (ft)	110	1956.1	17104.5			
Bottom Logger (ft)	110	1956.1	5850			

Operational Run Summary

Parameter (unit)	One					
Date Log Started	22-Sep-2017					
Time Log Started	12:53:24					
Date Log Finished	22-Sep-2017					
Time Log Finished	14:19:06					
Top Log Interval (ft)	69.00					
Bottom Log Interval (ft)	5850.00					
Total Depth (ft)	5850.00					
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	Camila Lang					

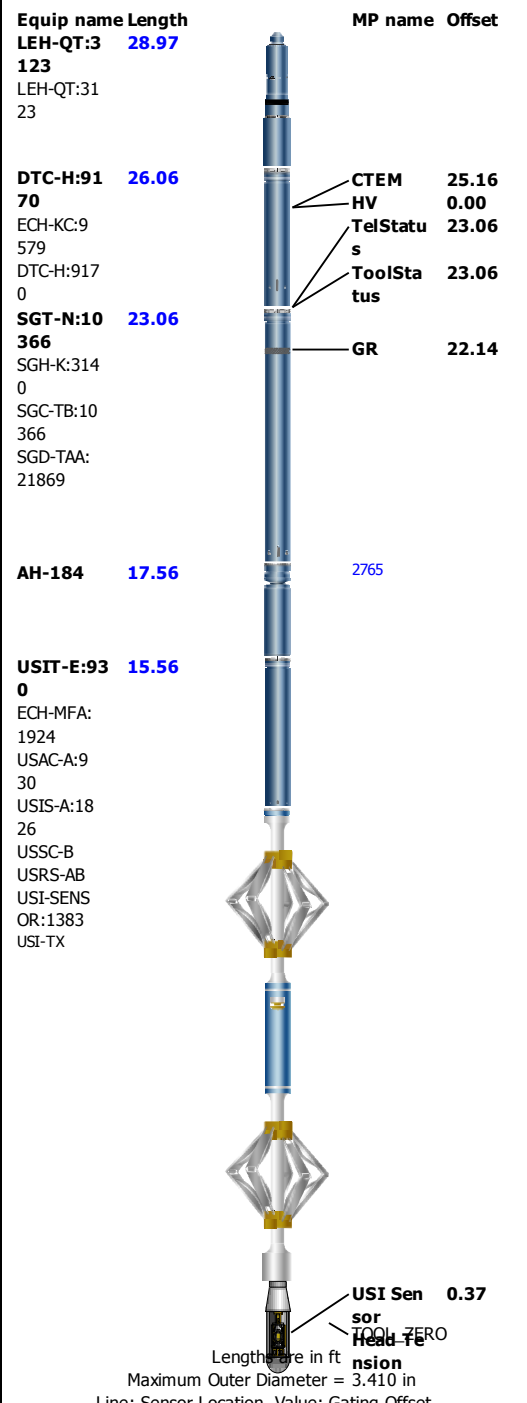
Witnessed By	Bill Mansfield					
Service Order Number	DX2C-00007					

Borehole Fluids

Parameter(unit)	One					
Fluid Type	Water					
Fluid Name	Brine					
Max Recorded Temperatures (degF)	207					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Date Logger on Bottom	22-Sep-2017					
Time Logger on Bottom	13:40:00					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

One: Toolstring



One: Remarks

Tool run as per tool sketch.

This is the first log in well.

CSG: 9.625" 36lb/ft @ 1956.1'
5.5" 20lb/ft @ 17104.5'

Fluid: Fresh Water 8.4 lb/gal

Main pass recorded under 2500 PSI, and repeat pass recorded under 0 PSI.

BHT: 207 degF

Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

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	7-39P-LXS		
Serial Number			
Length	10000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane USA		

One:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth control policies were followed.
Rig Up Length At Surface		IDW used as a primary depth reference.
Rig Up Length At Bottom		Z-chart used as a secondary depth reference.
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[4]:Up	6168.72	70.36

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 : 22.36m(73.36ft) to 23.70m(77.74ft)
MUD_N_FRP = 1.13
DFD = 1.01g/cm3(8.40lbm/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

Acquisition System	Version
Maxwell 2017 SP1	7.1.82245.3100
Application Patch	Wireline_NPD-ICE2-2017SP1_7.1.87324

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[4]:Up	Up	70.36 ft	6168.72 ft	22-Sep-2017 1:43:23 PM	22-Sep-2017 2:18:29 PM	ON	5.54 ft	Yes

All depths are referenced to toolstring zero

Log

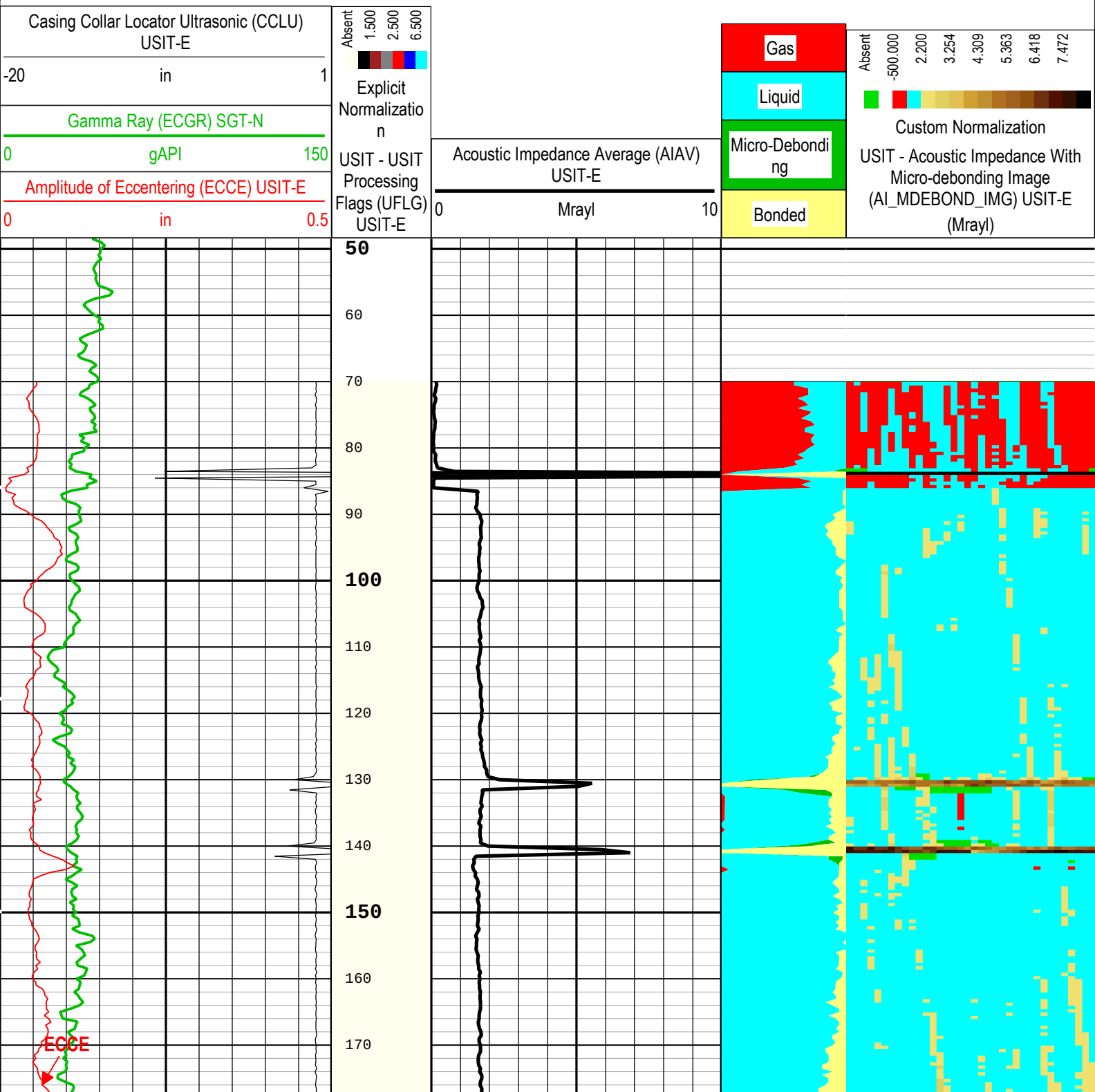
Company:Noble Energy INC Well:Wells Ranch BB11-674

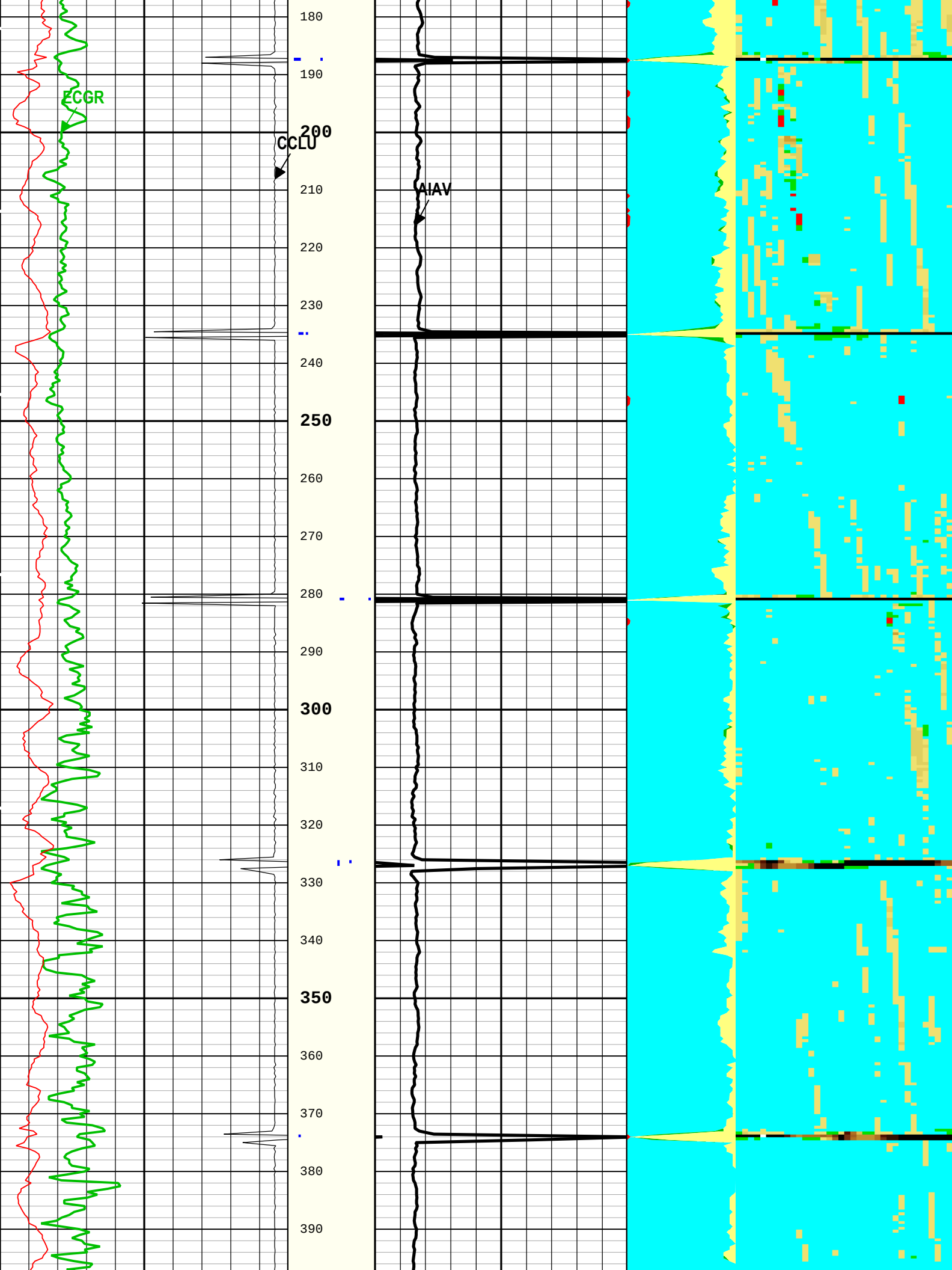
One: Log[4]:Up:S007

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: 22-Sep-2017 15:31:57

TIME_1900 - Time Marked every 60.00 (s)

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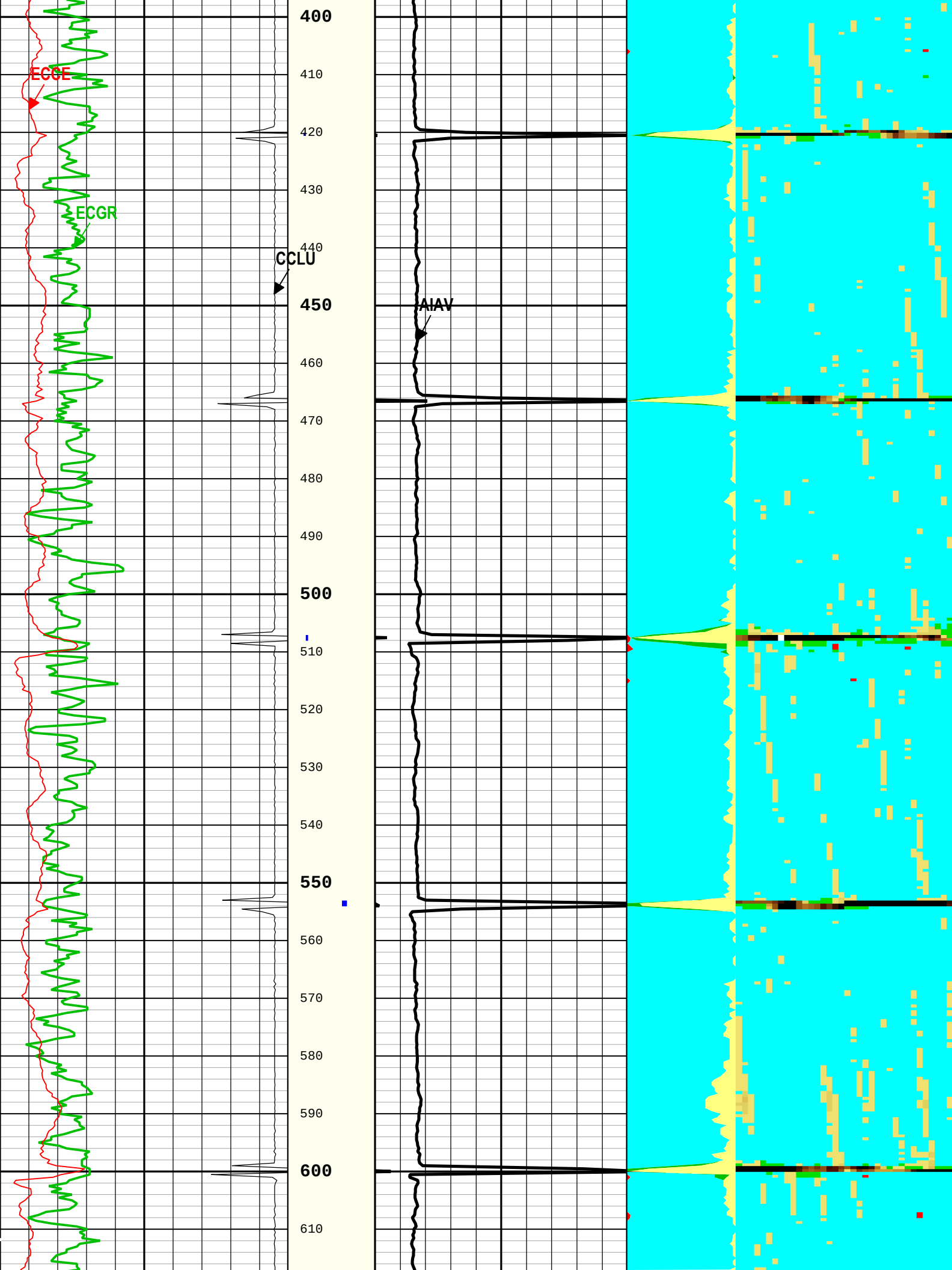
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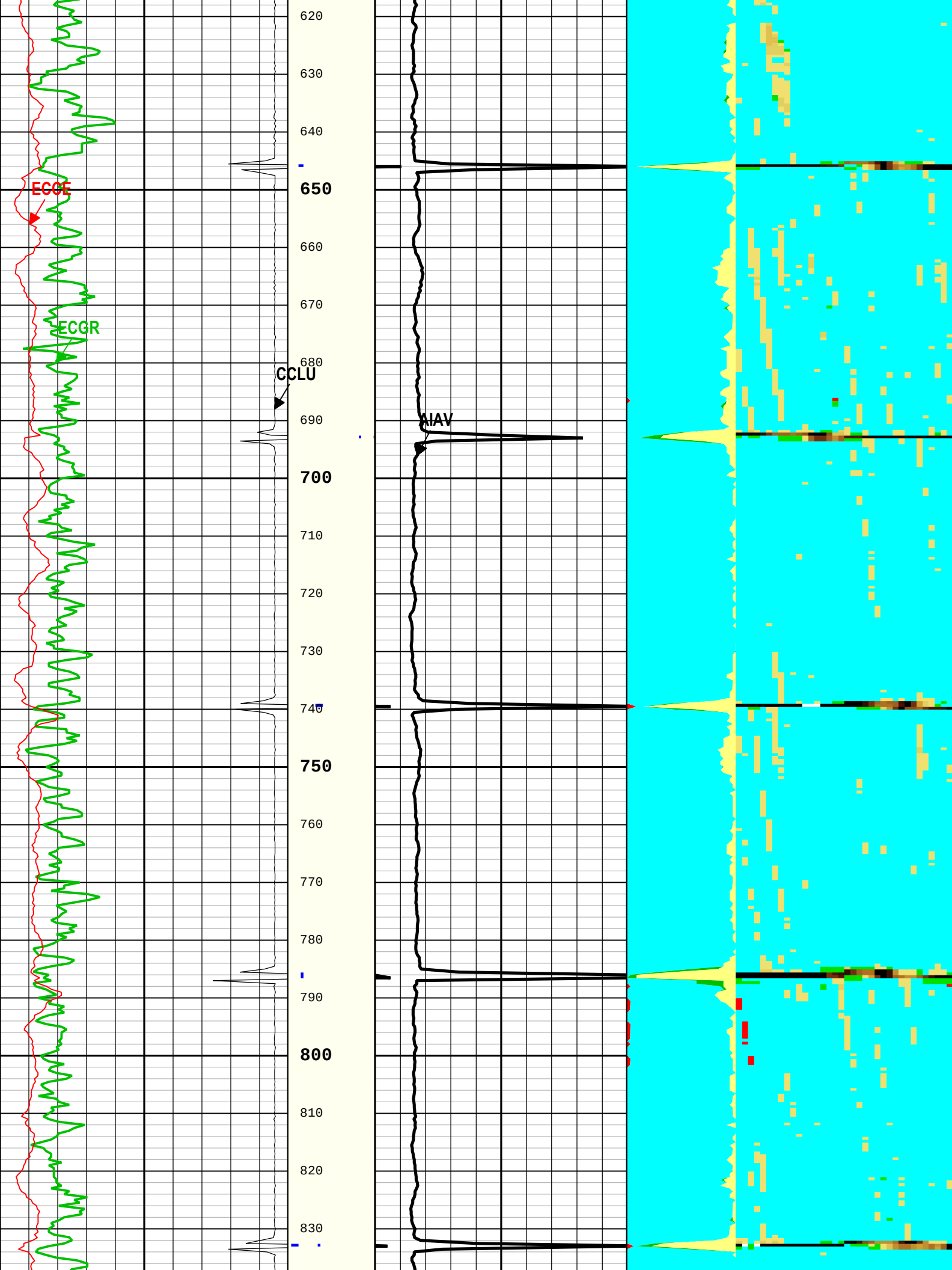
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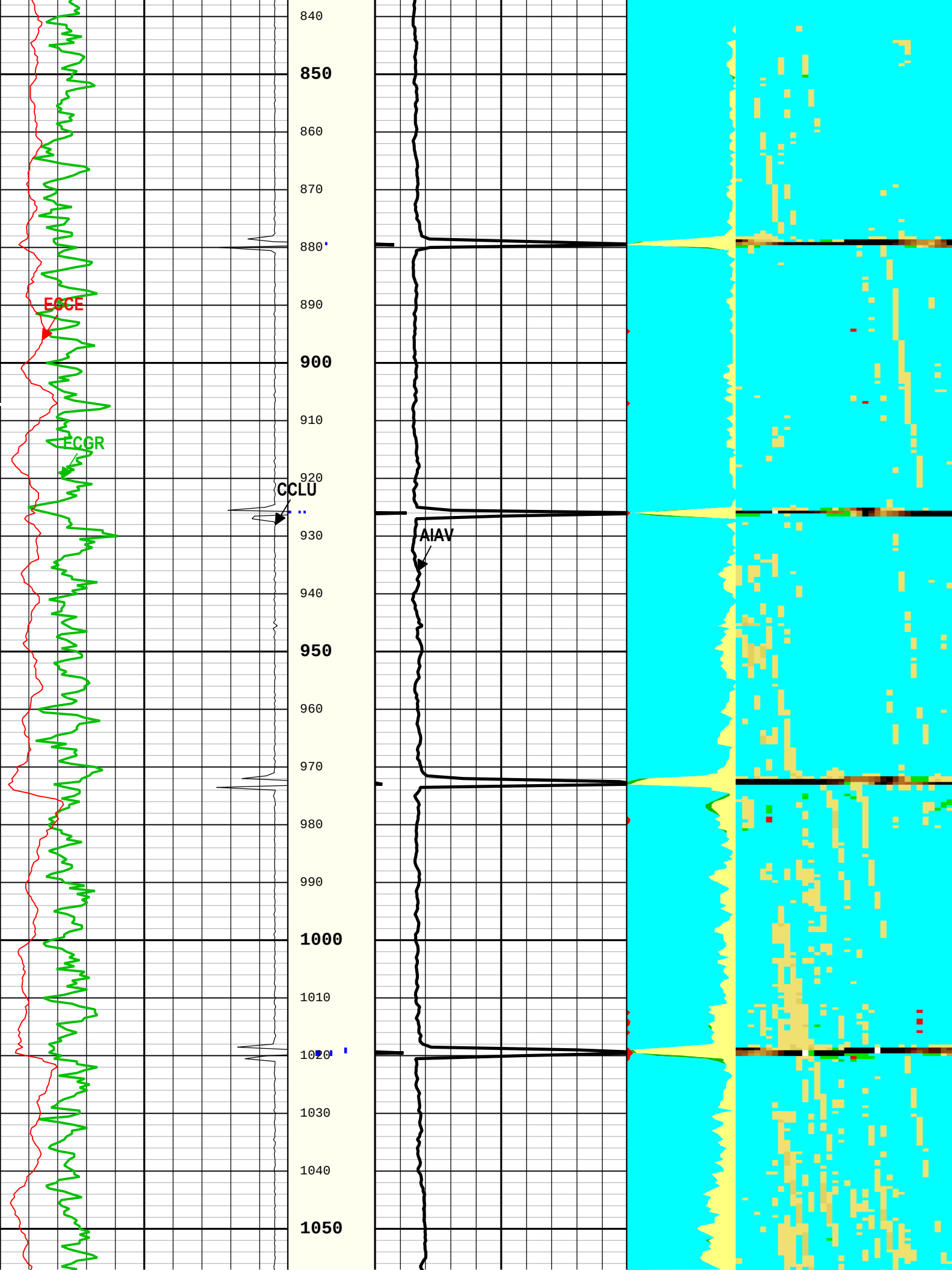
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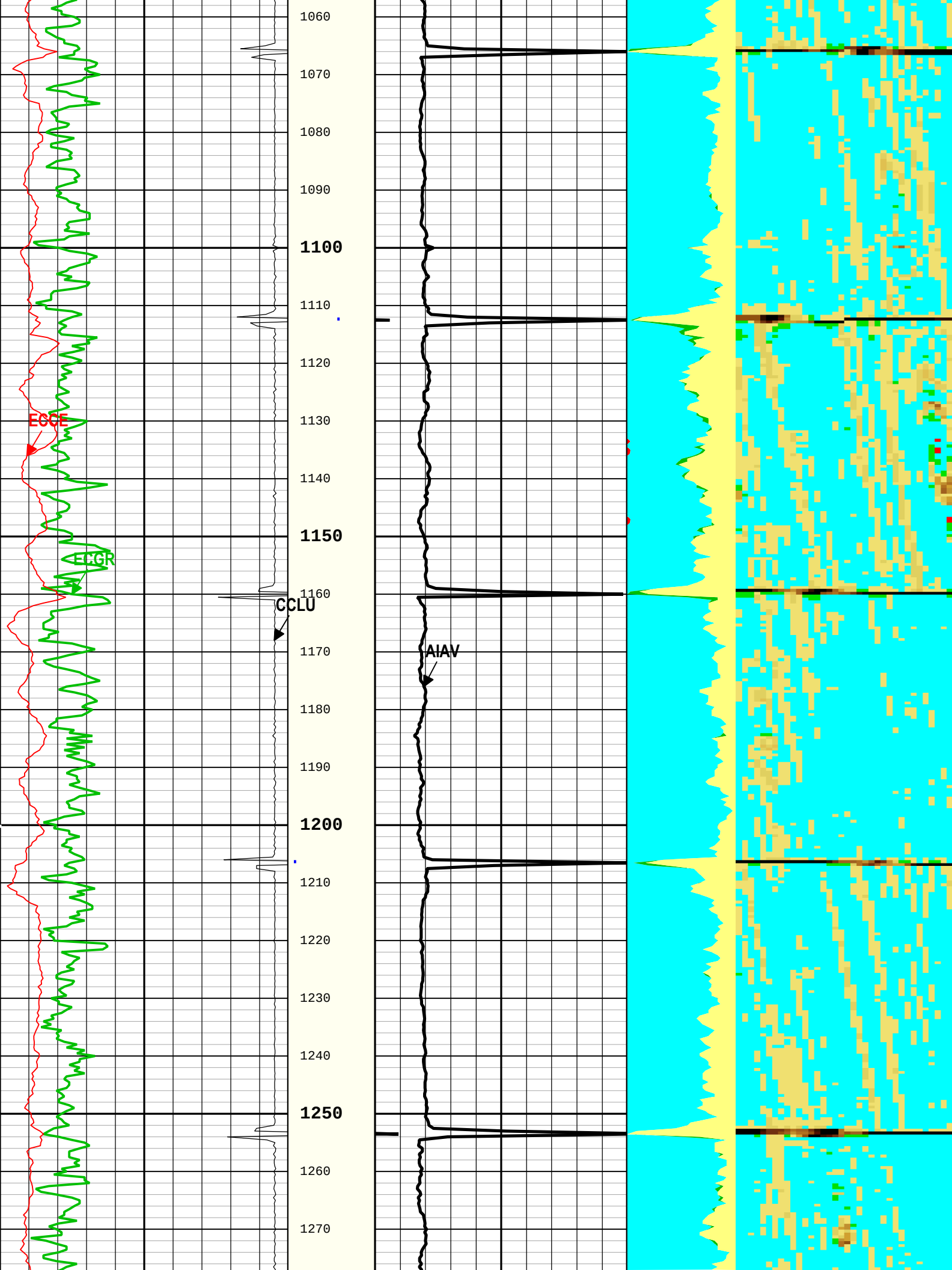
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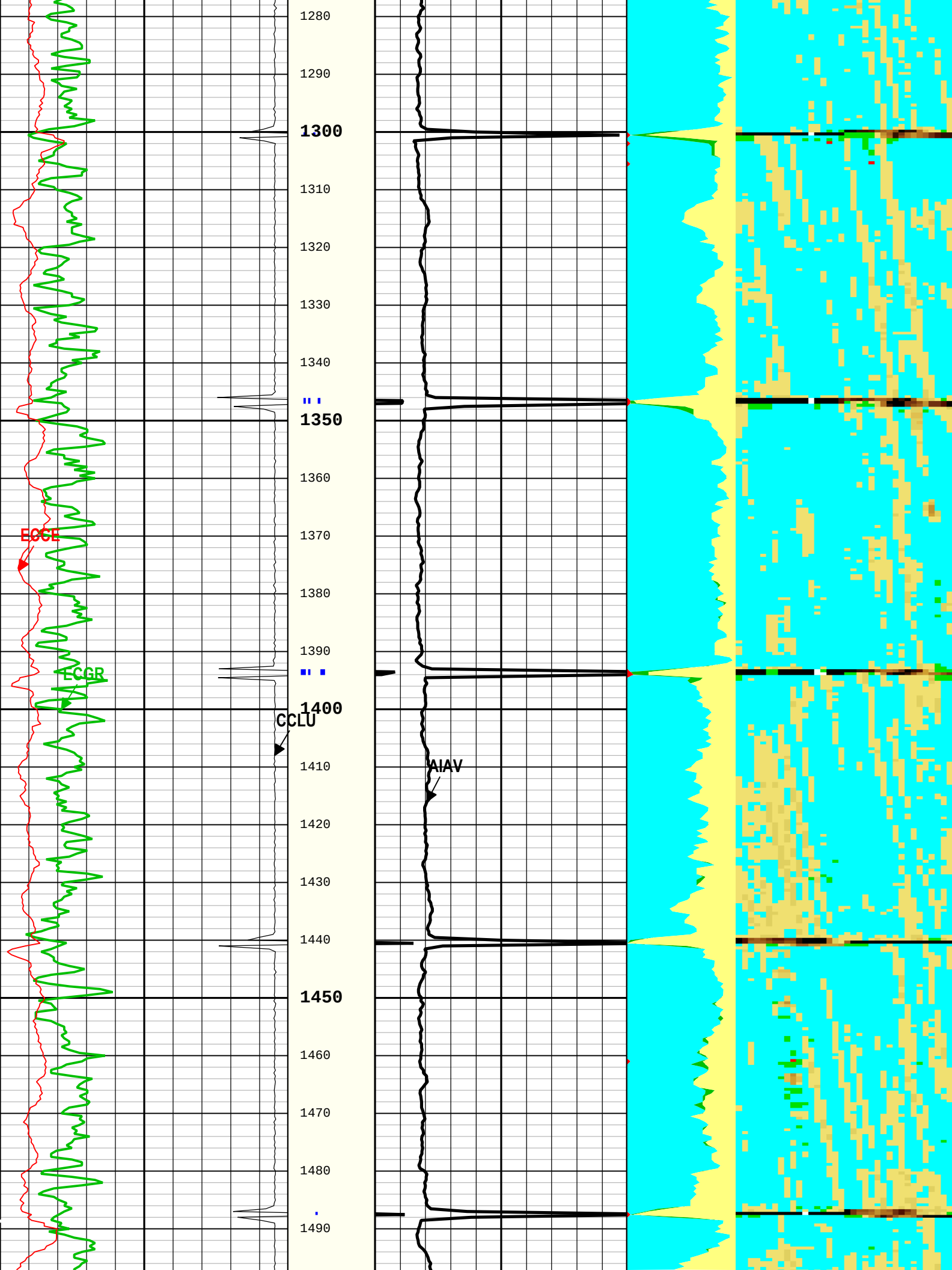
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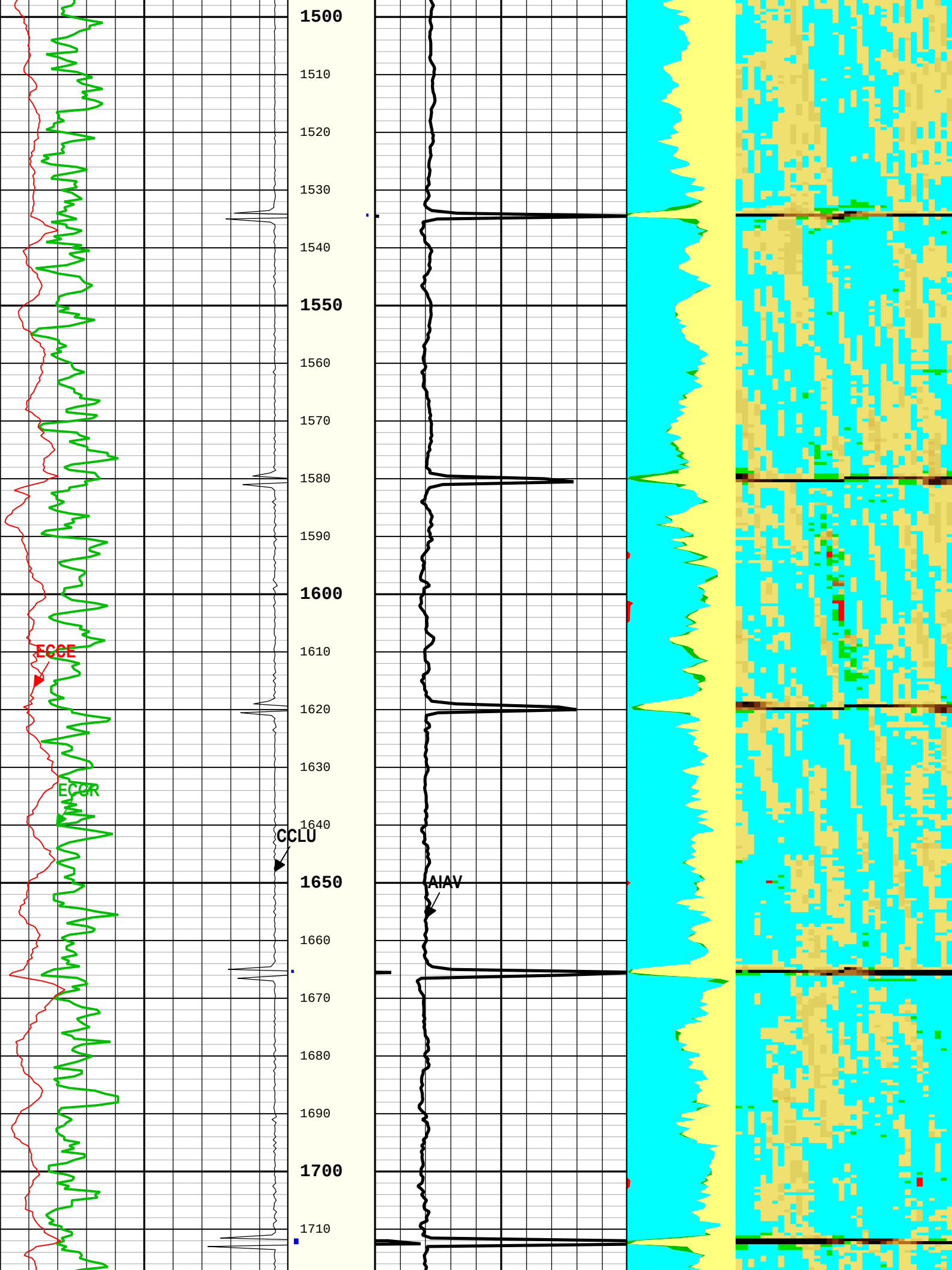
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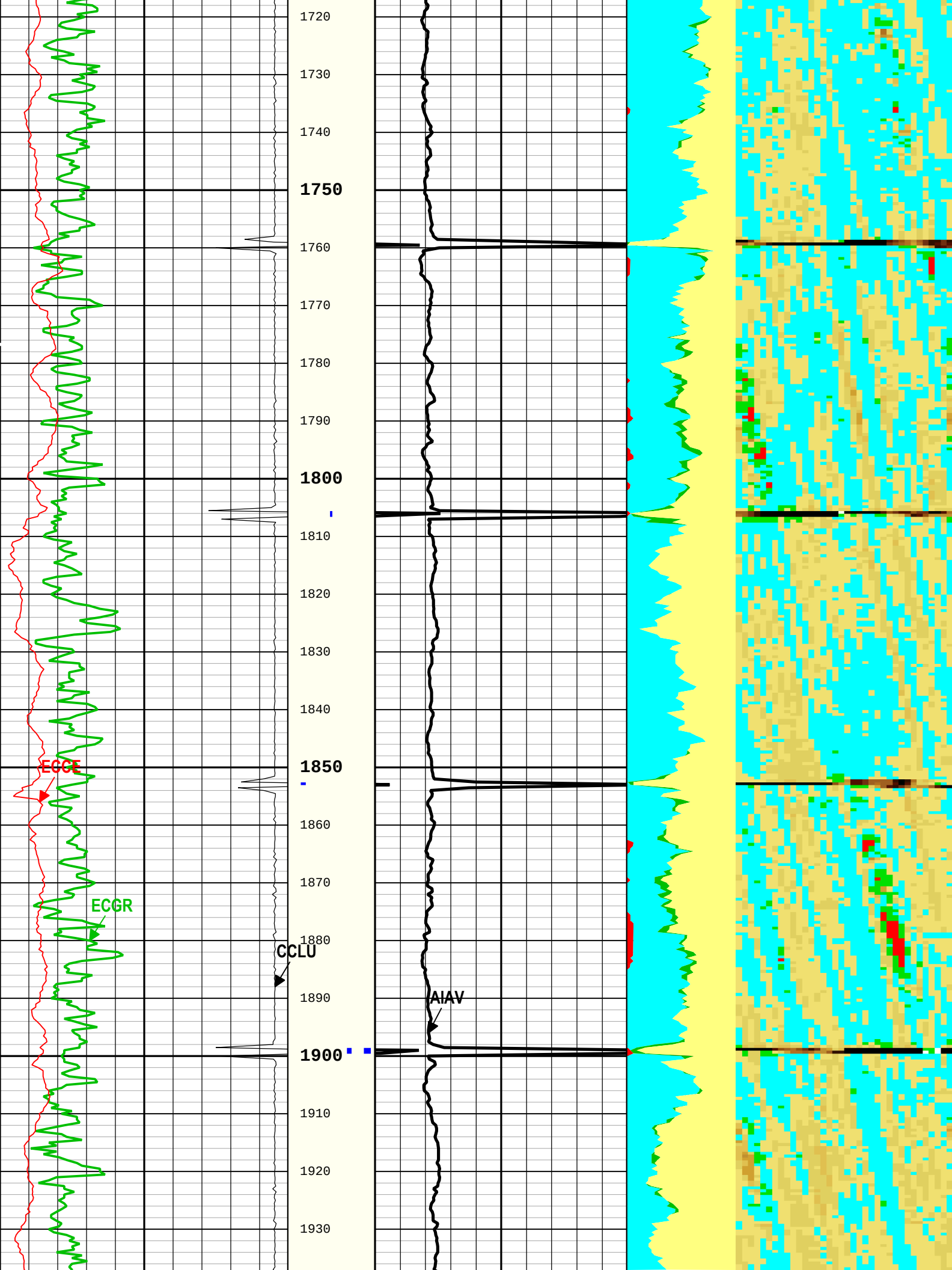
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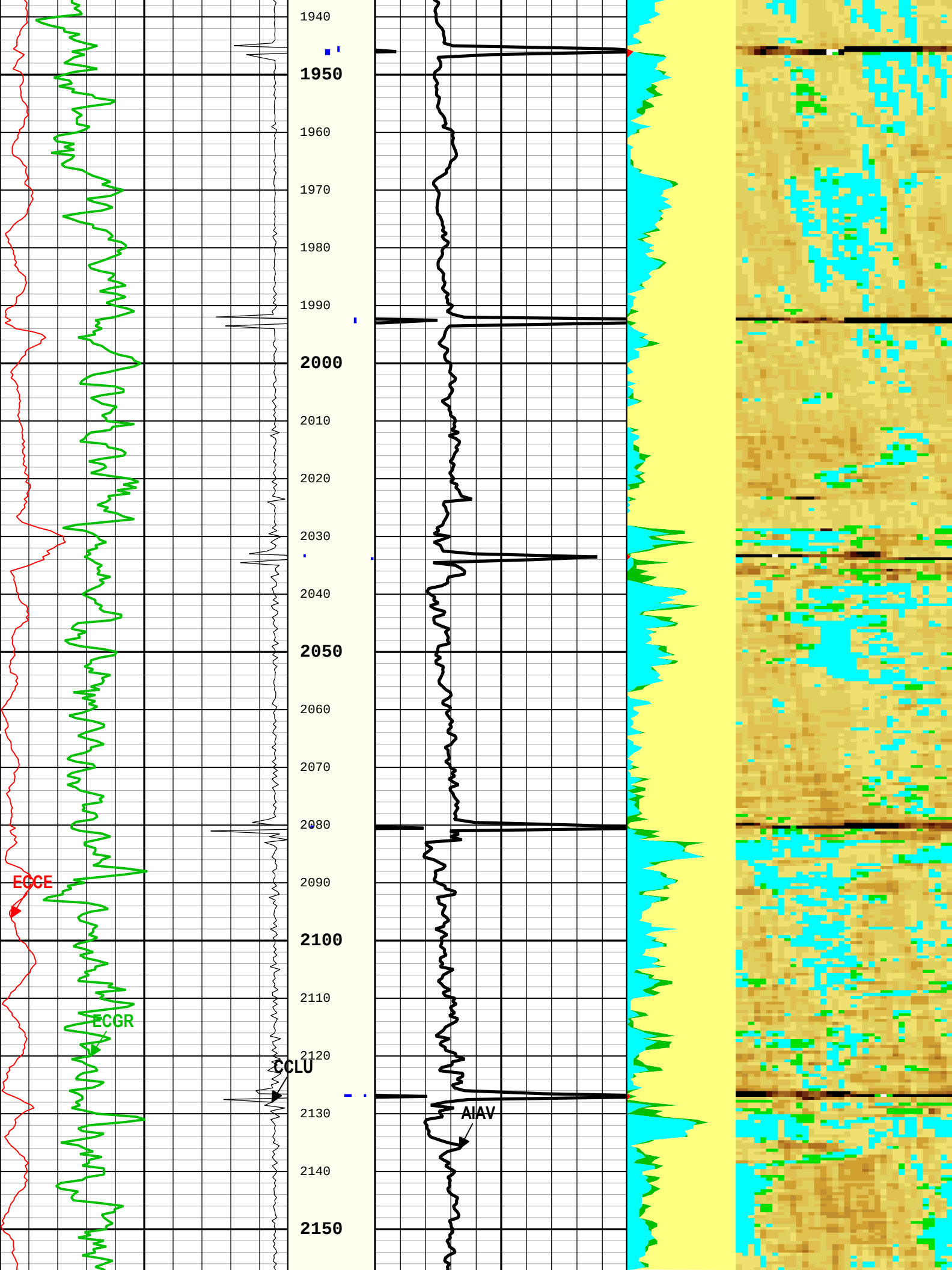
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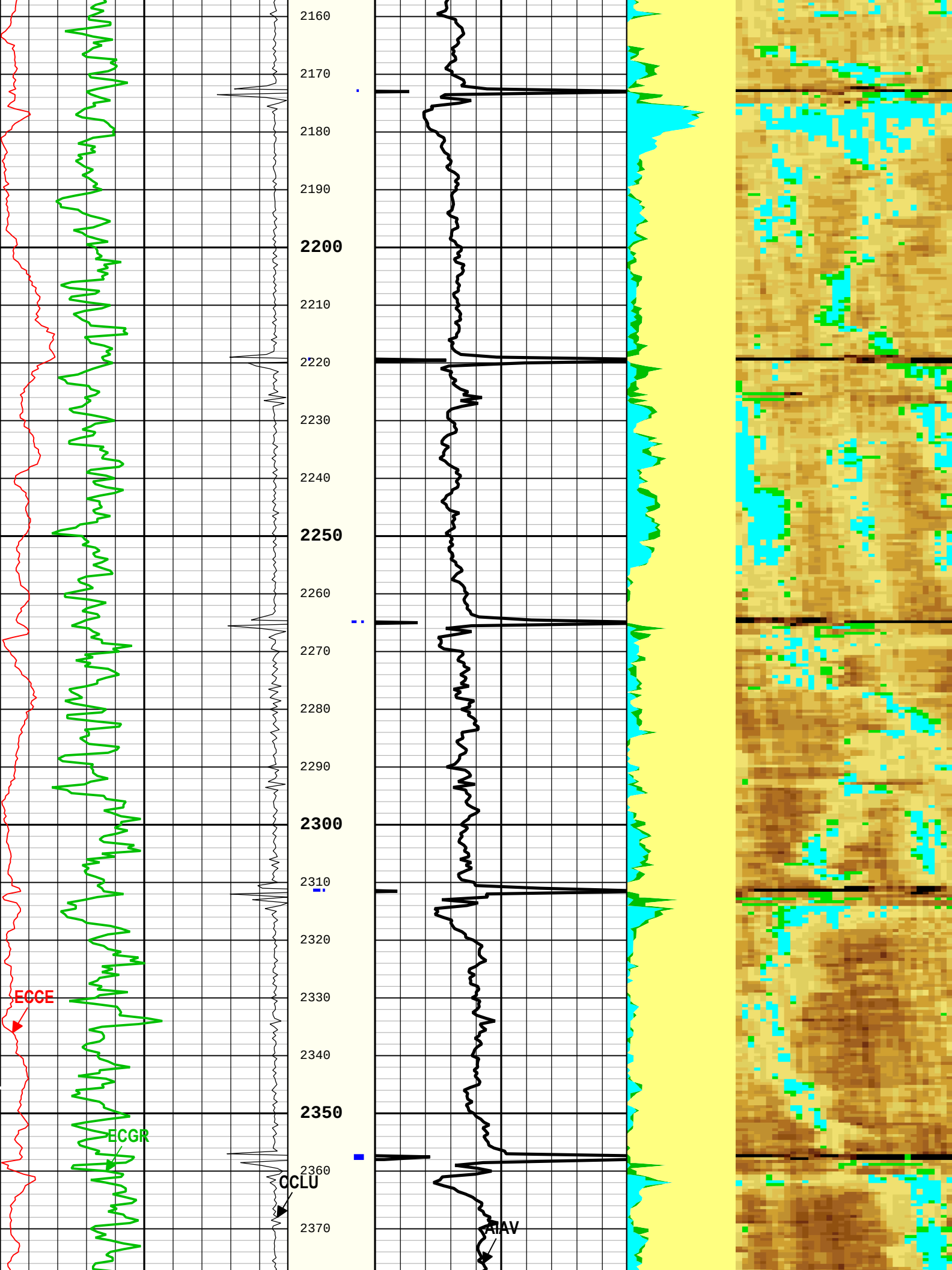
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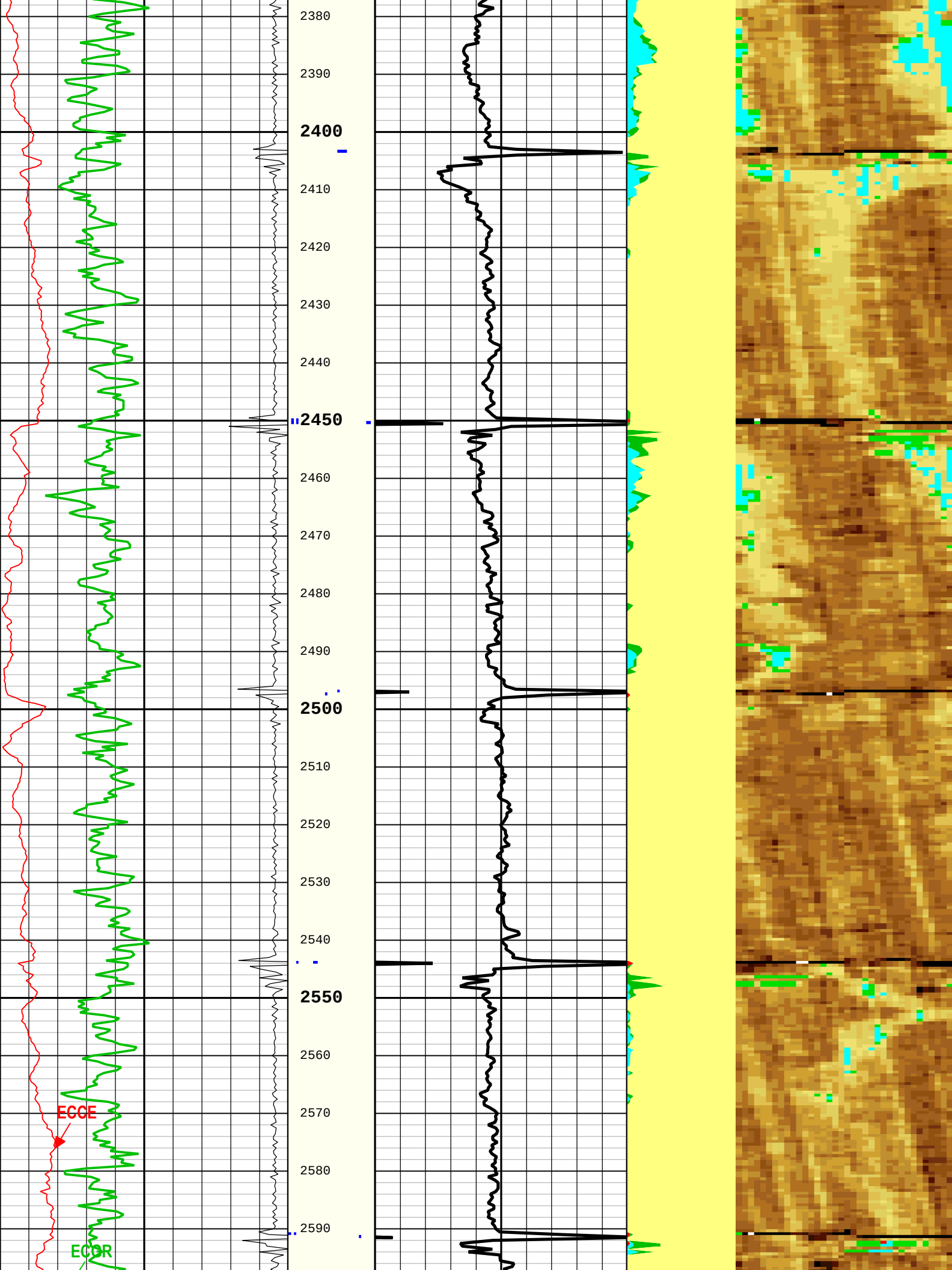
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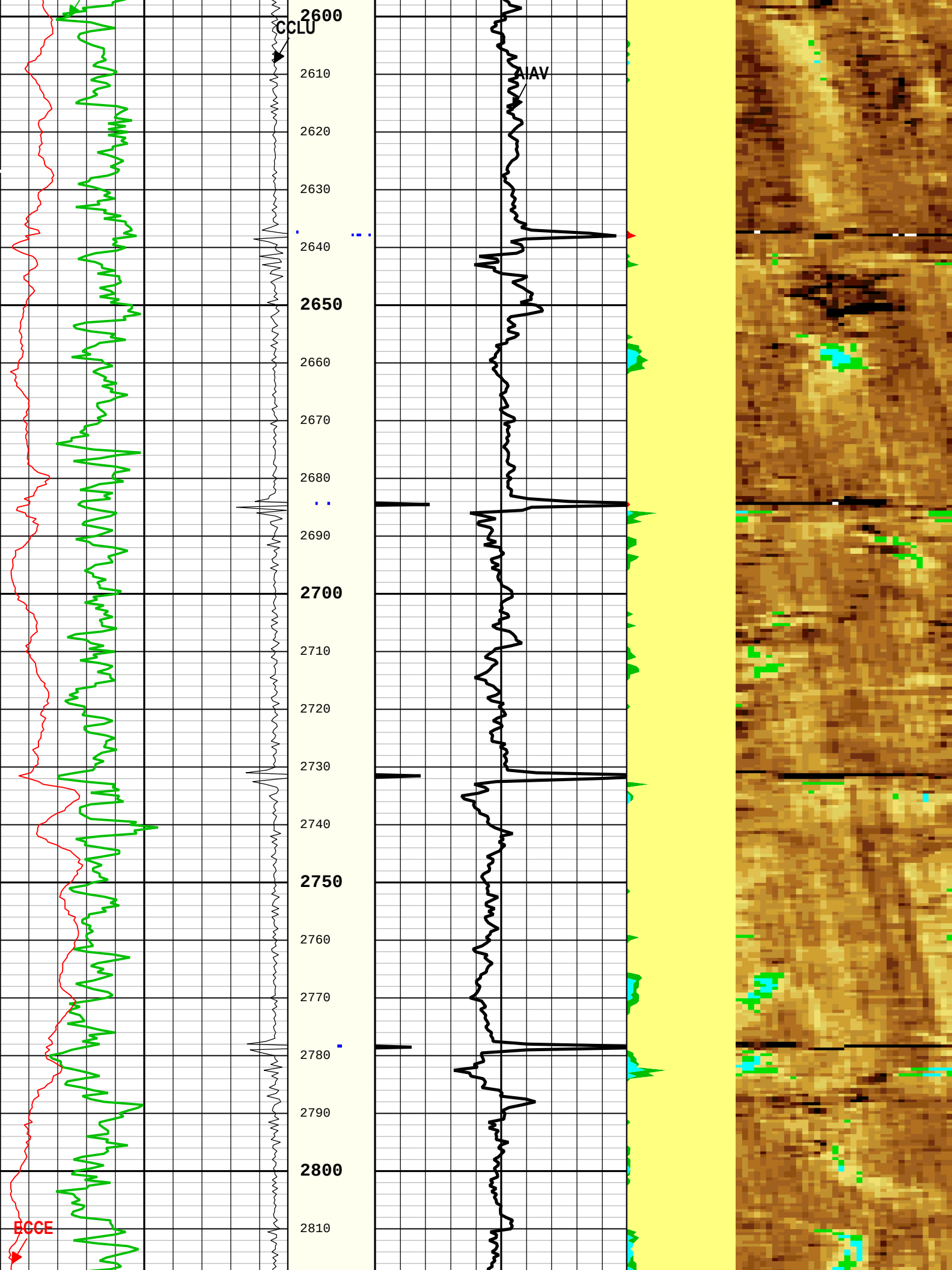
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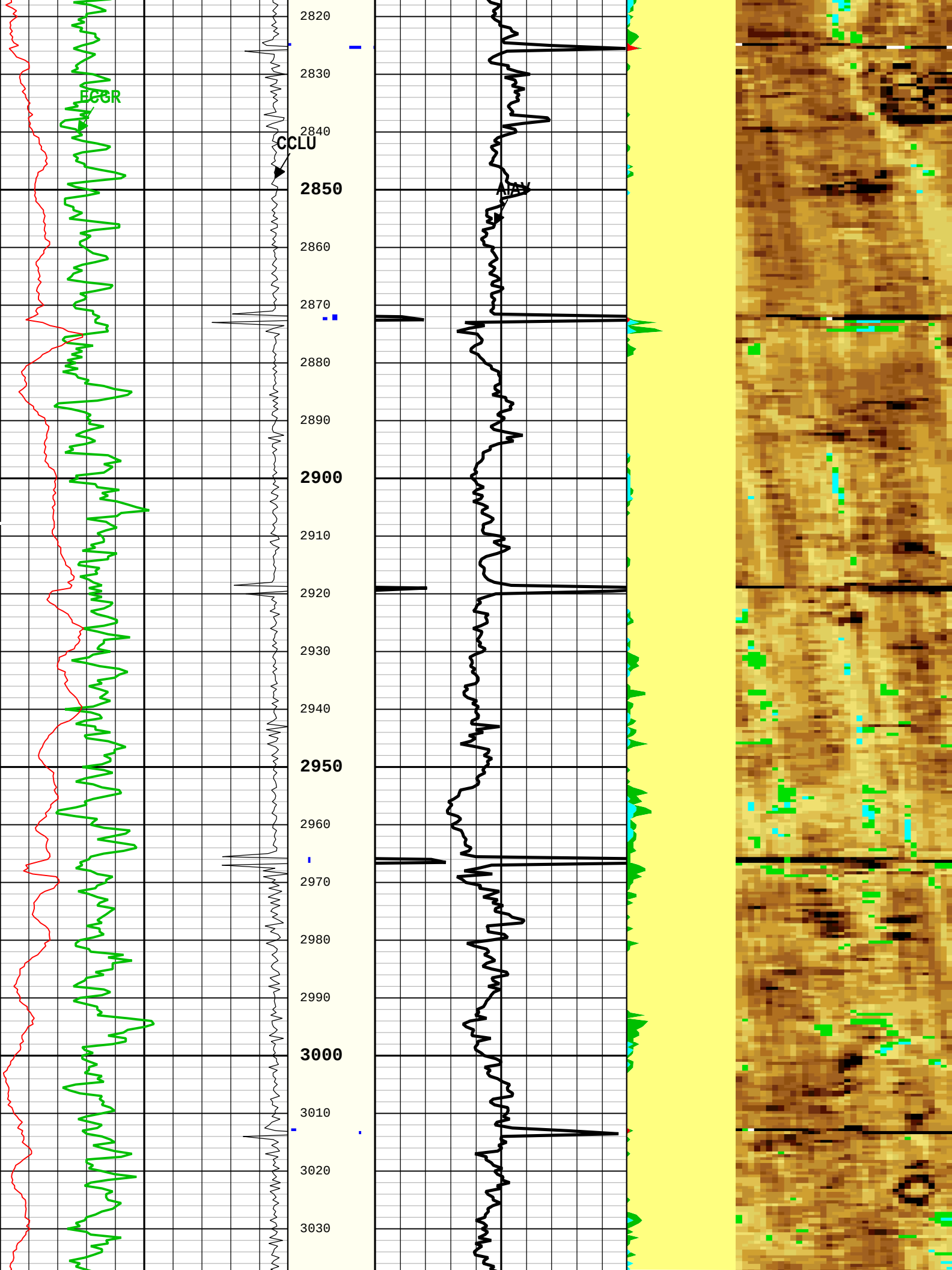
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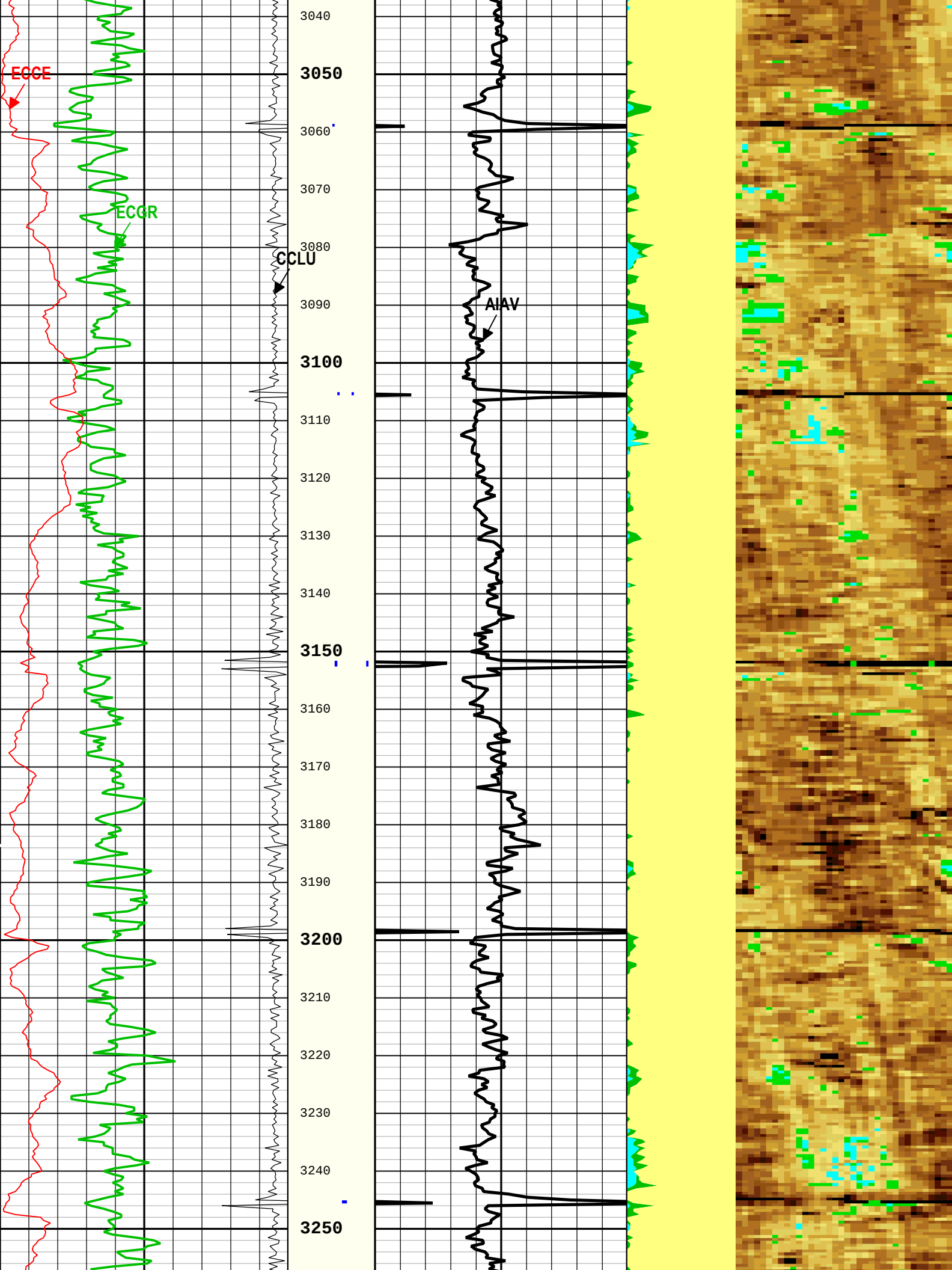
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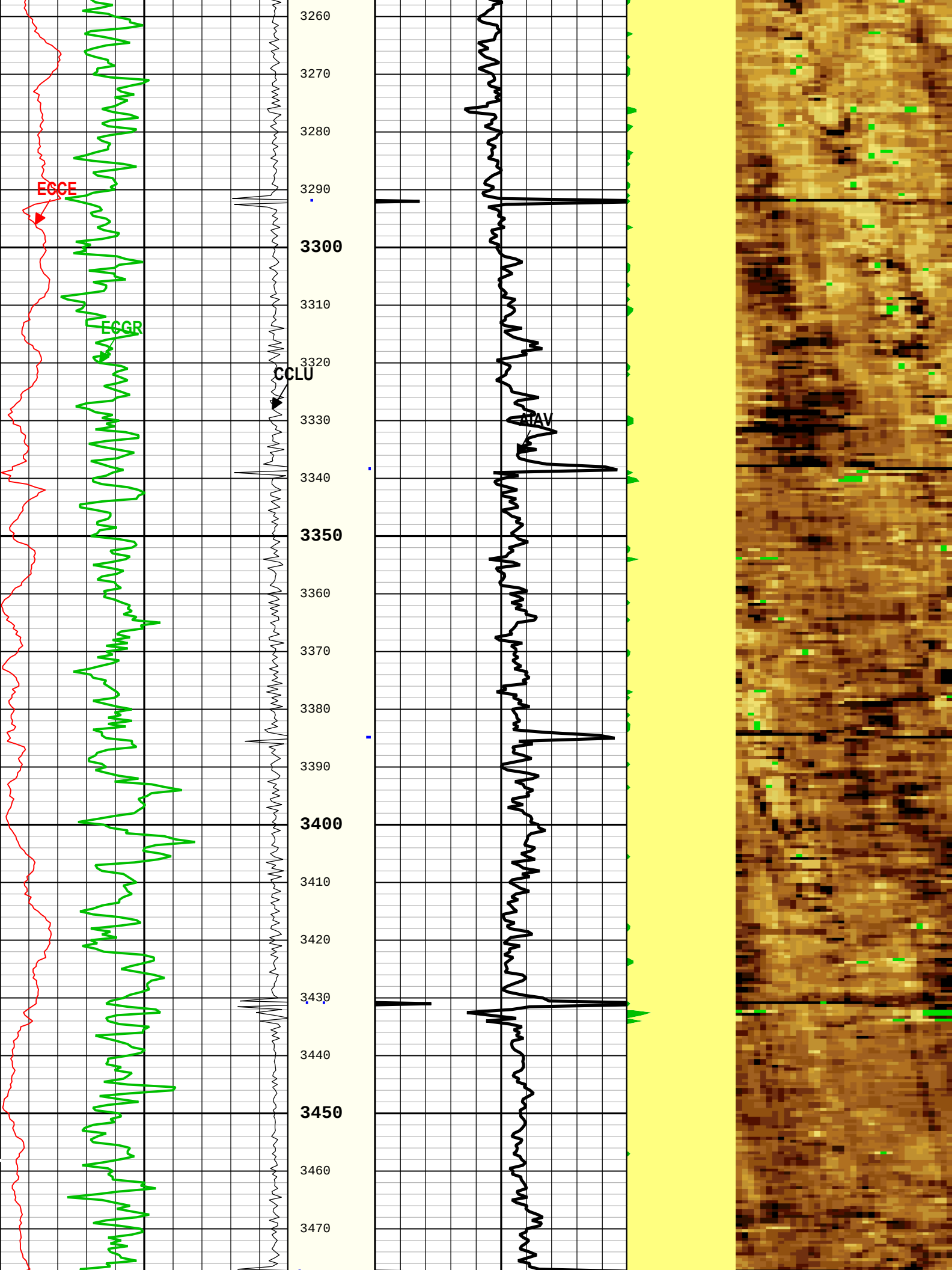
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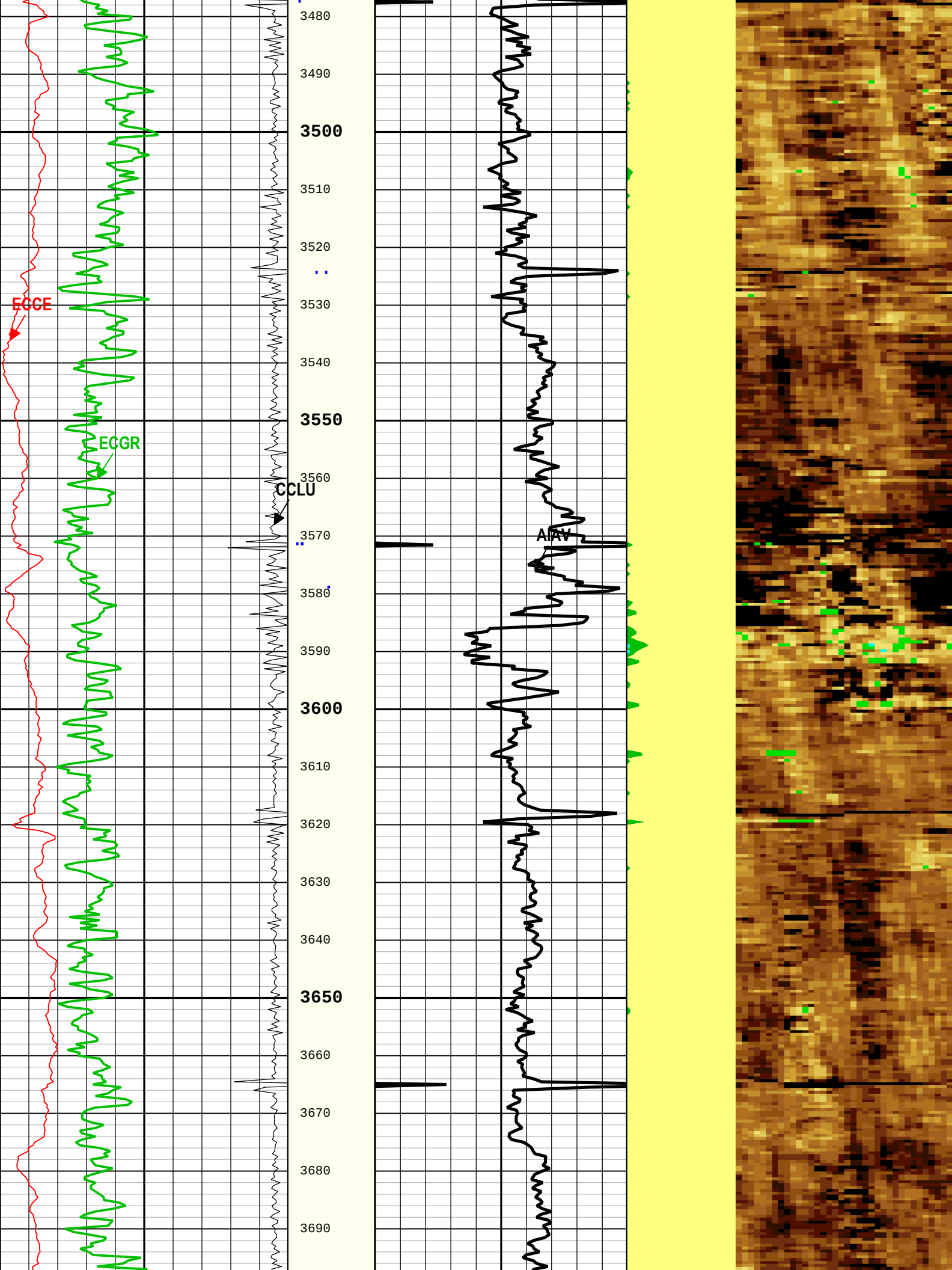
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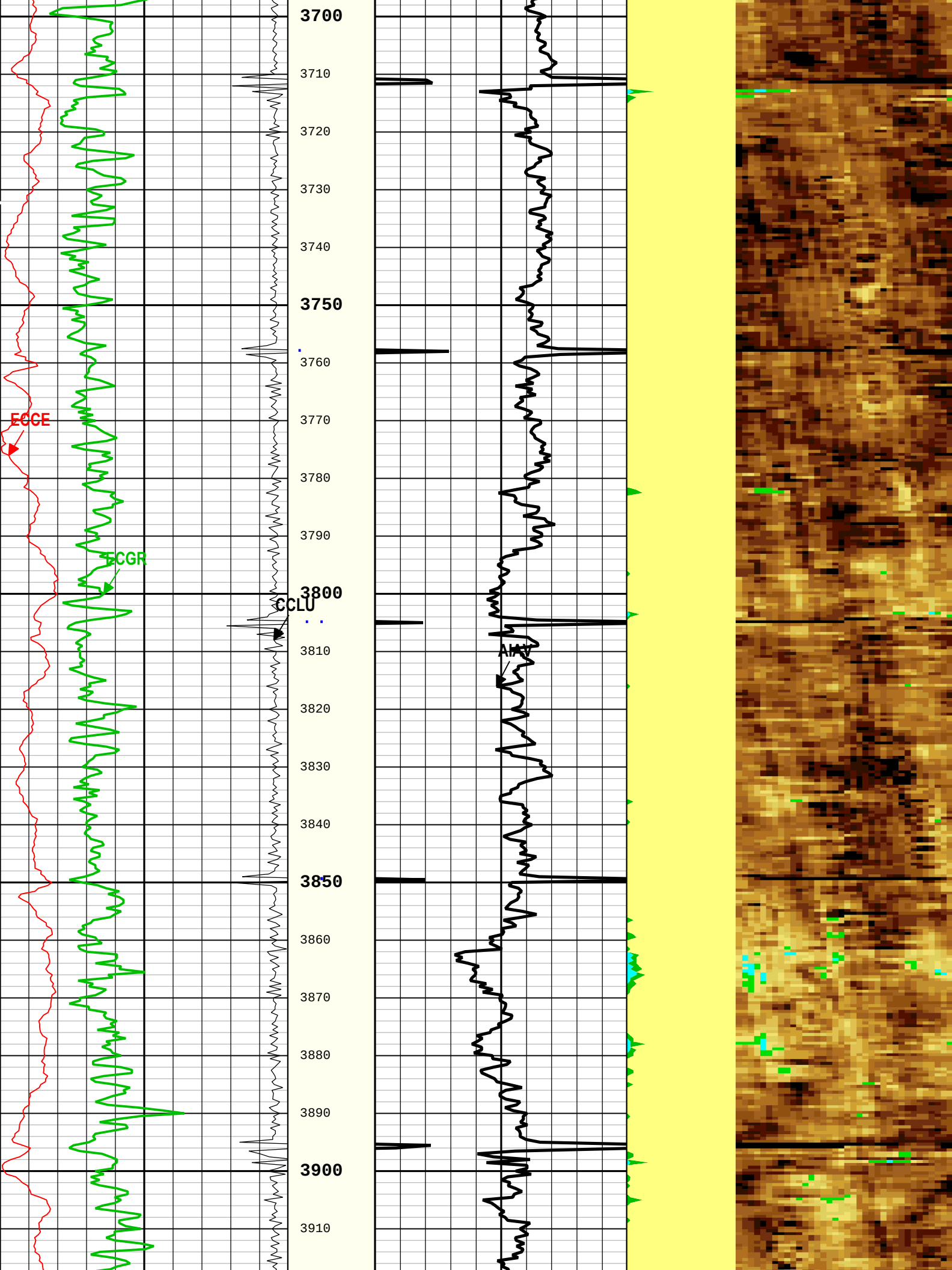
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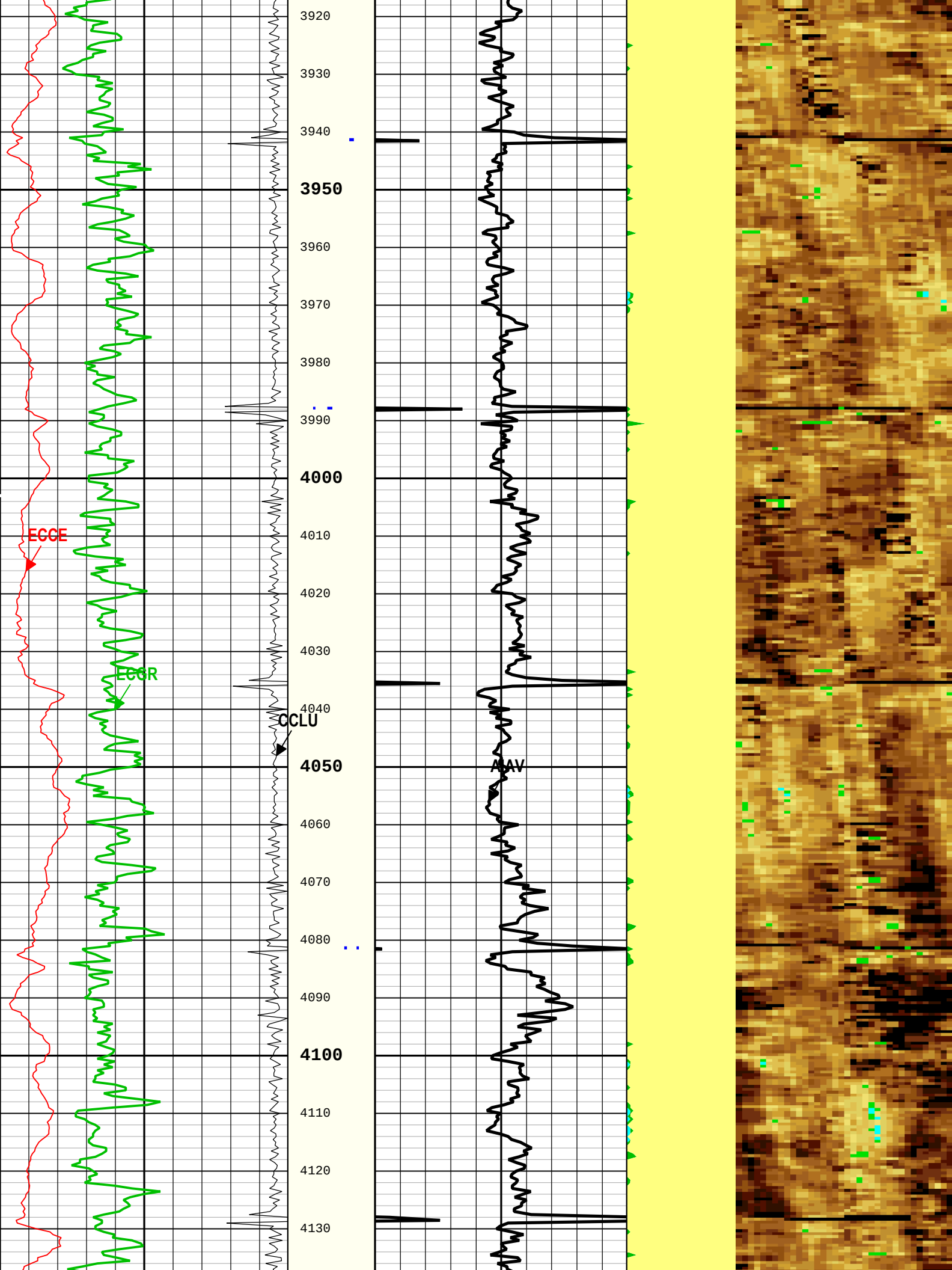
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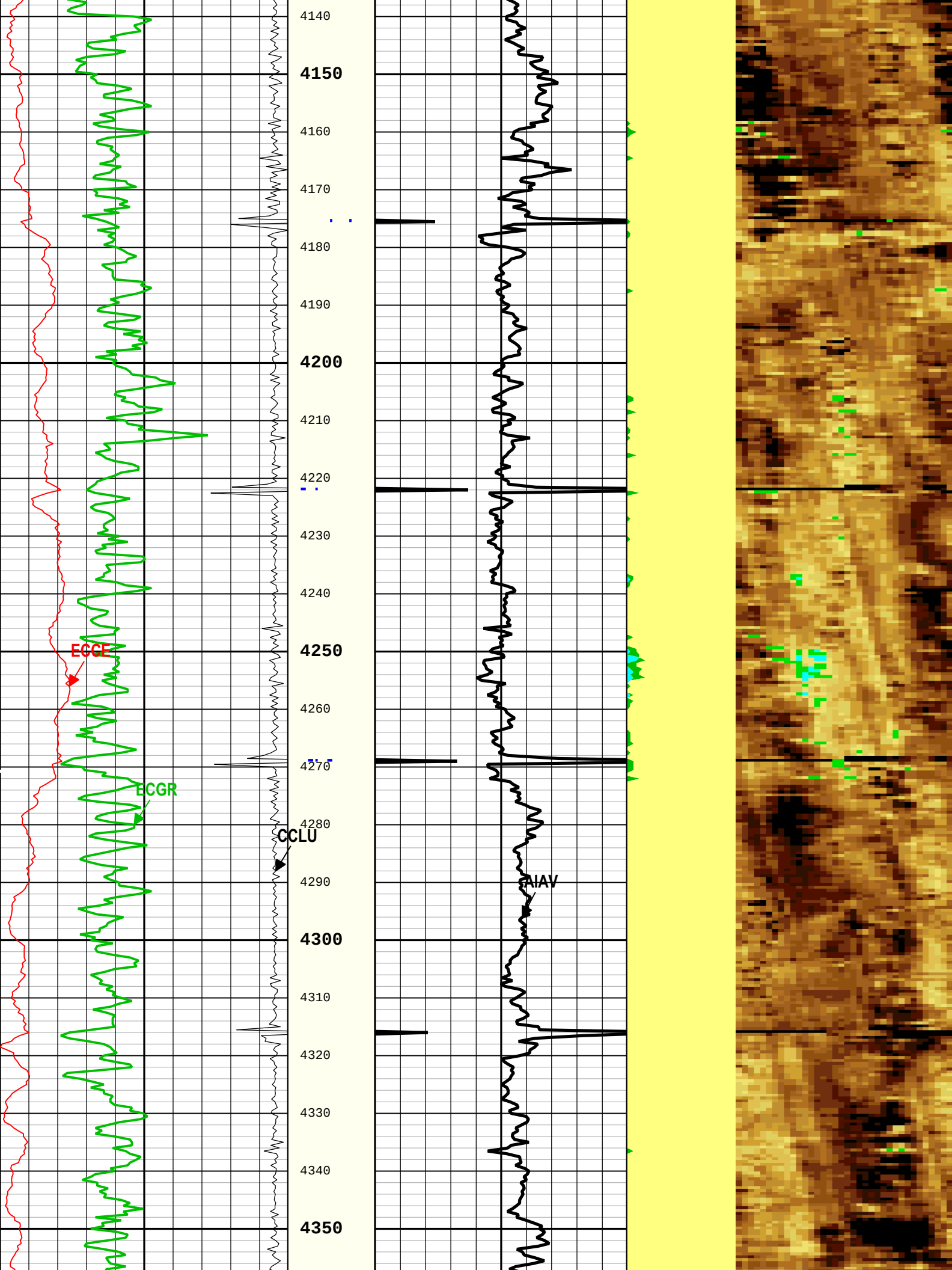
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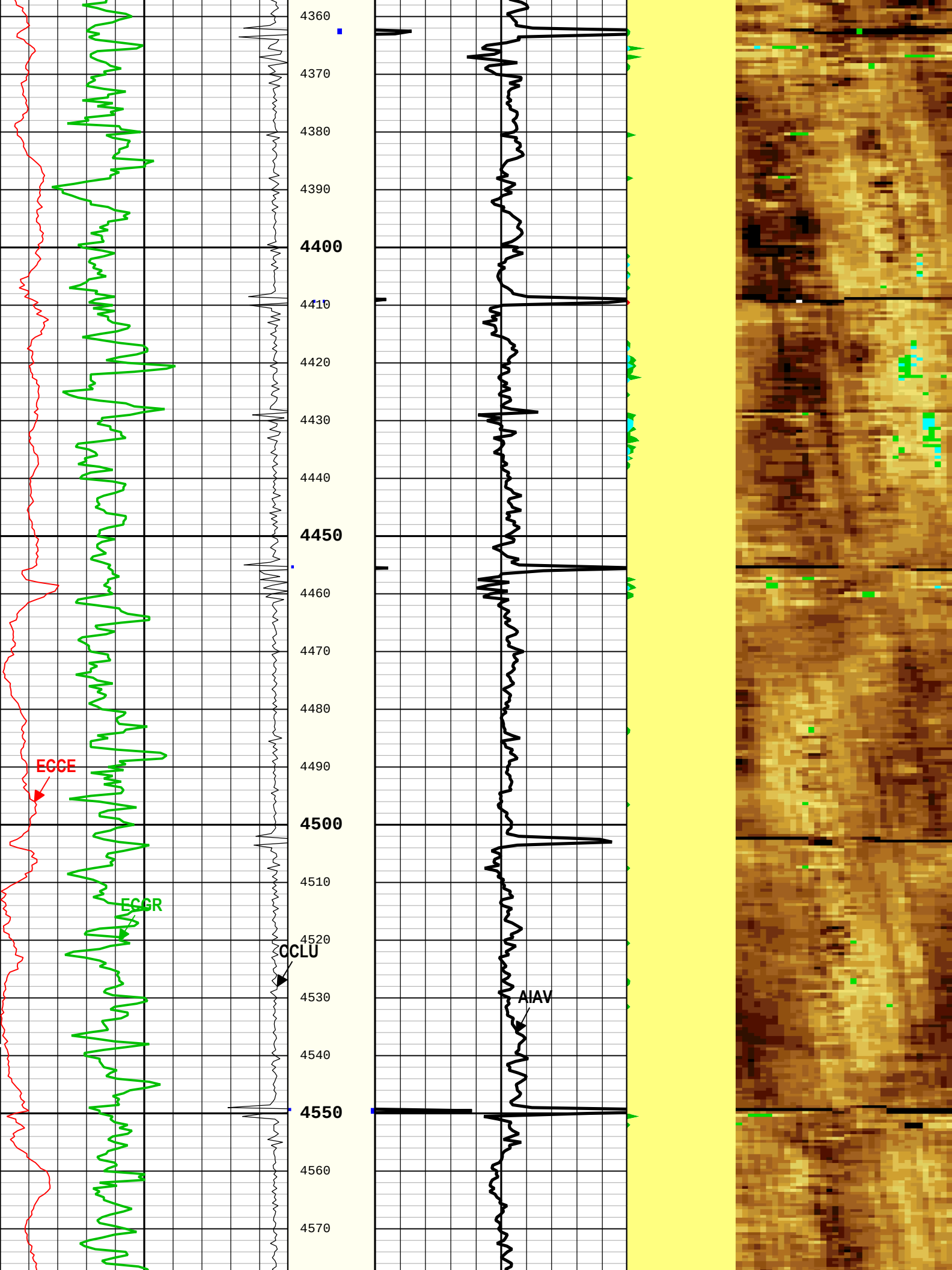
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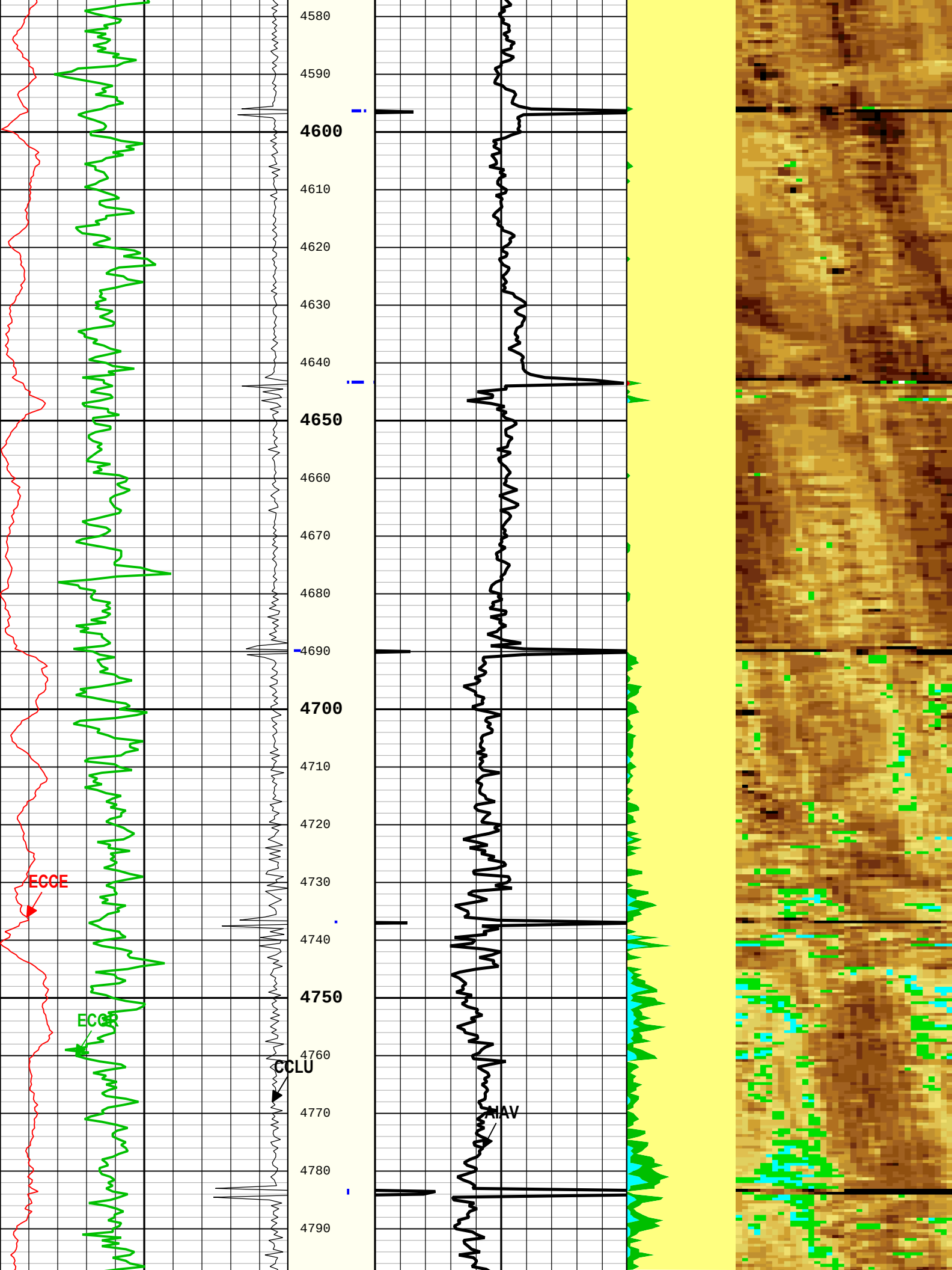
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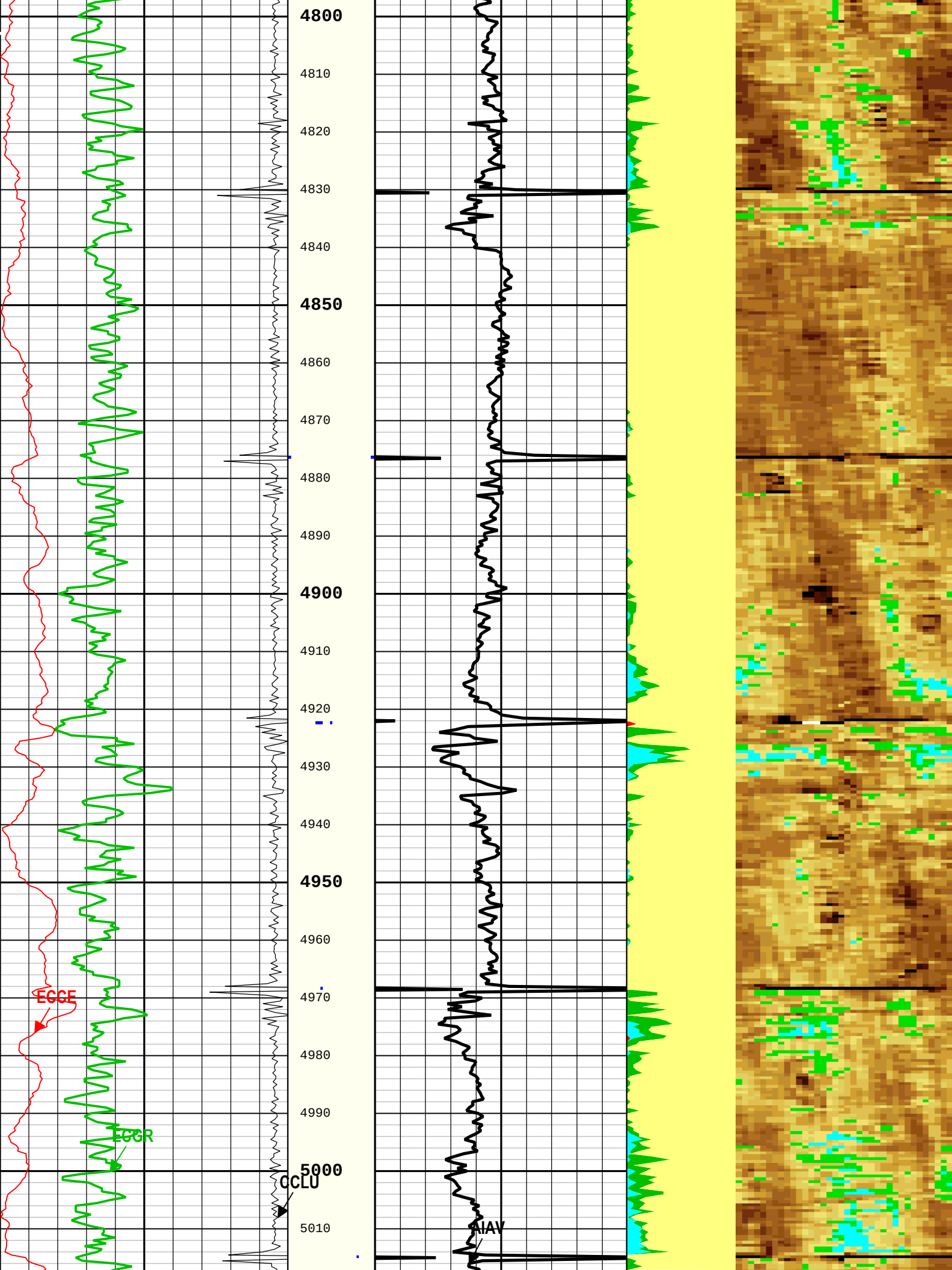
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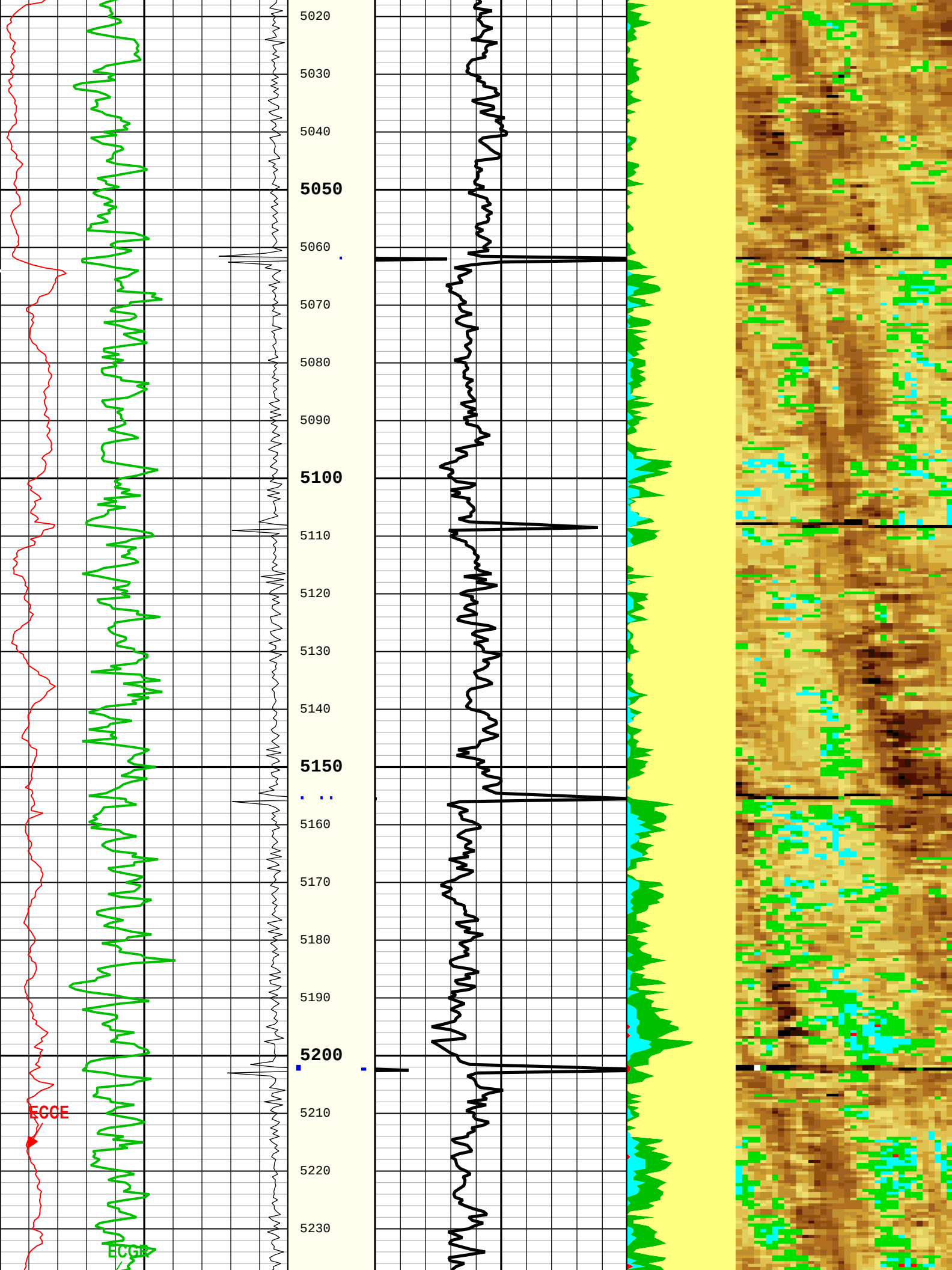
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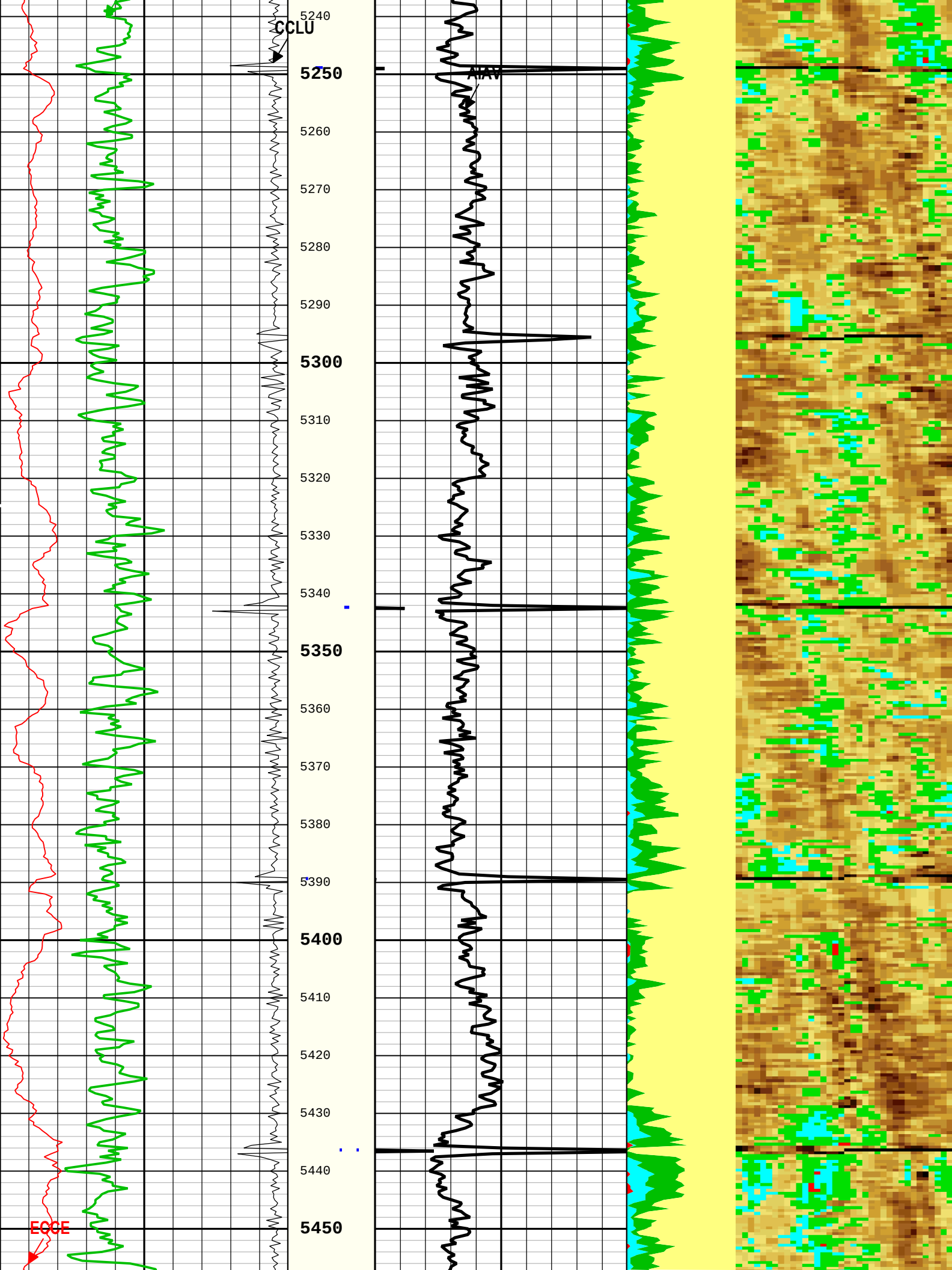
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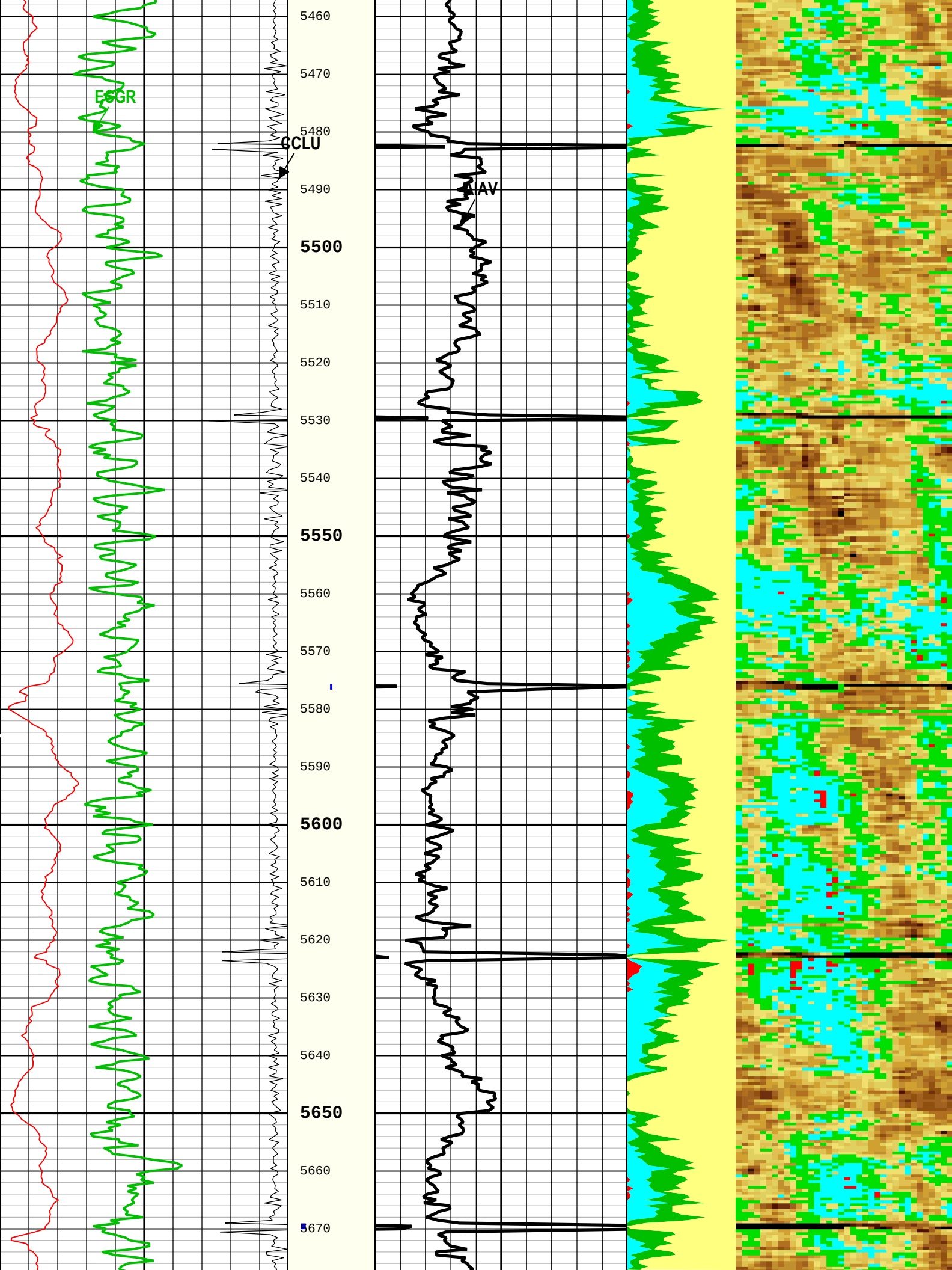
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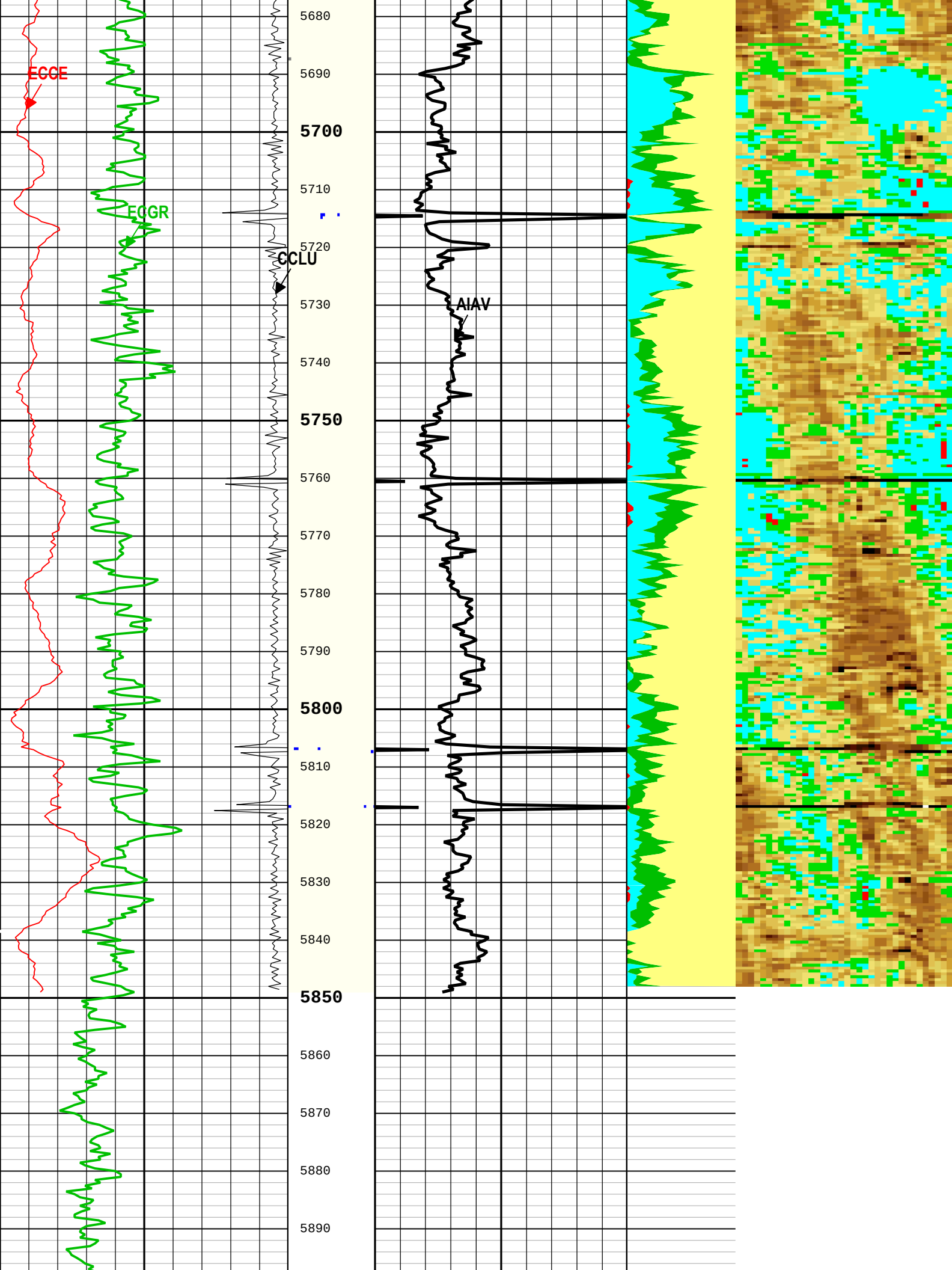
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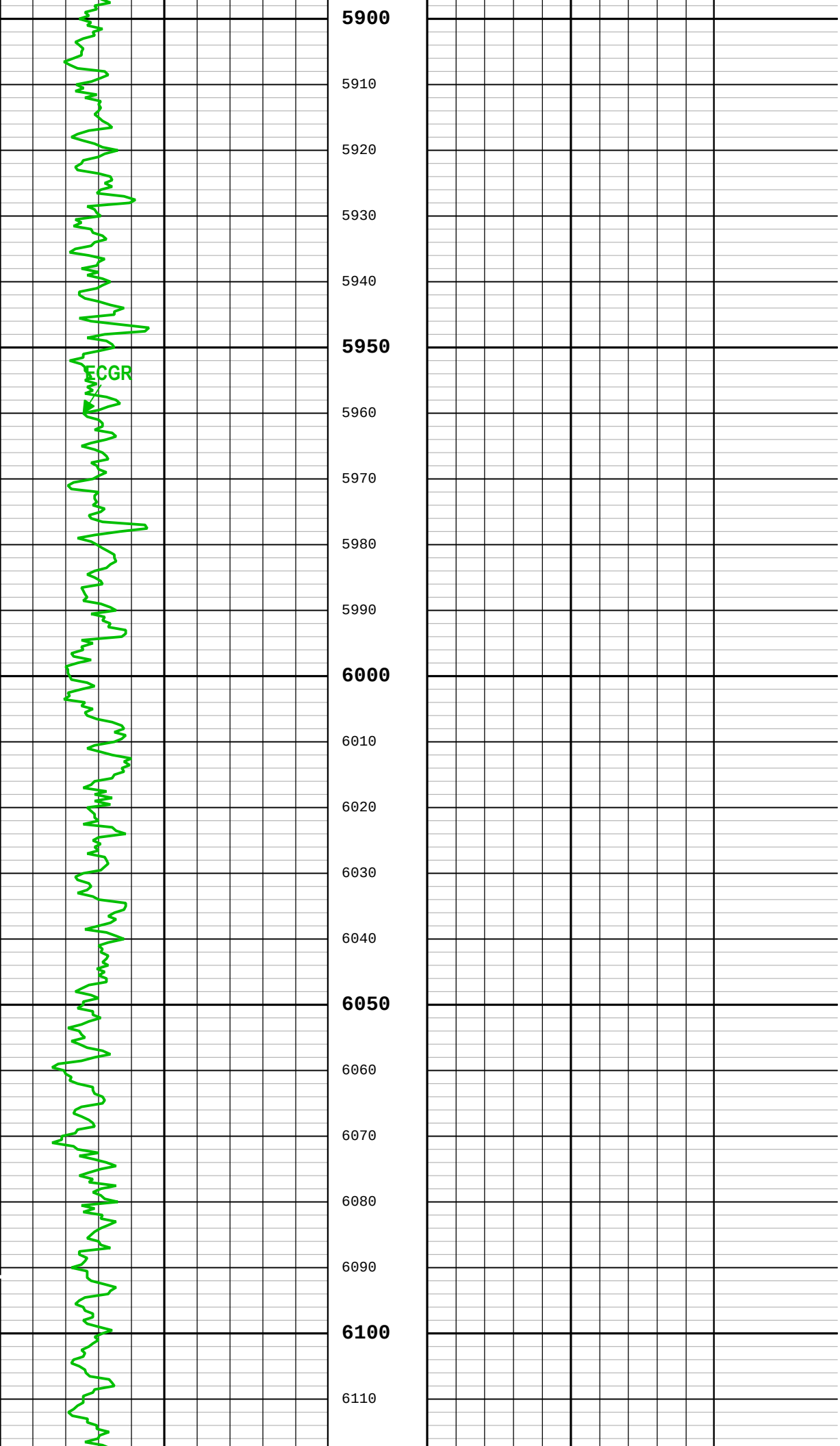
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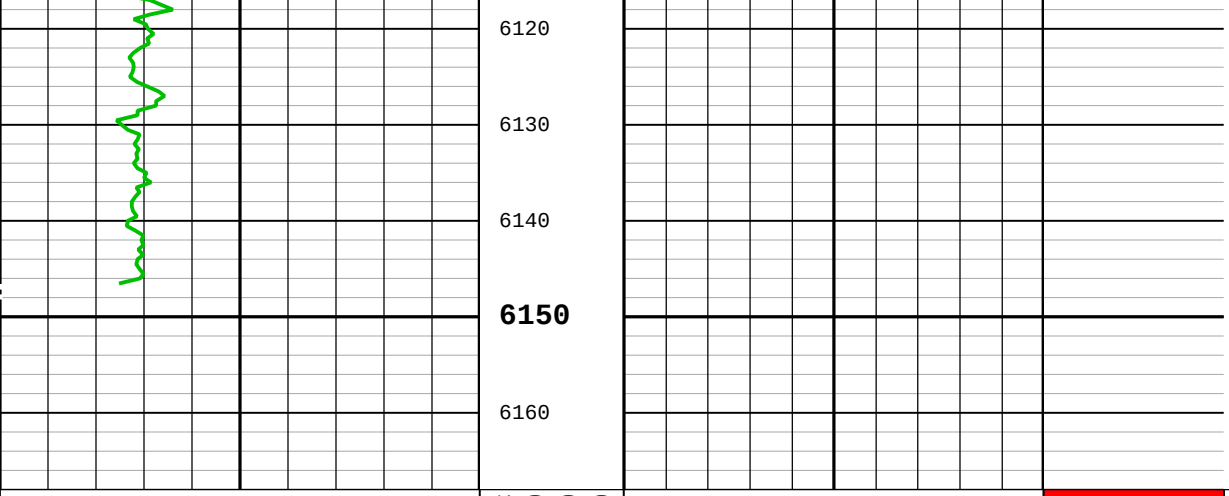


Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 1

Gamma Ray (ECGR) SGT-N

0 gAPI 150

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

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: 22-Sep-2017 15:31:57

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	5850	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	
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	1.13	
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	48.5	110
BS	13.5	110	1966
BS	8.5	1966	5850
MEAS_WLEN	22.44	48.5	5850
MEAS_WLEN	20	5850	6168

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	70	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UPLIHT	Ultrasonic Pulse Echo Large Inhibit Time	USIT-E	Off	
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6200	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINE	71.88	22-Sep-2017 13:43:23	22-Sep-2017 13:43:51	6168.72	6154.8
WINE	73.64	22-Sep-2017 13:43:51	22-Sep-2017 14:18:29	6154.8	70.36

All depth are at tool zero.

One

0 PSI Repeat Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP1	7.1.82245.3100
Application Patch	Wireline_NPD-ICE2-2017SP1_7.1.87324

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
One	Log[2]:Up	Up	1053.17 ft	2525.80 ft	22-Sep-2017 1:13:14 PM	22-Sep-2017 1:21:03 PM	ON	3.51 ft	Yes

All depths are referenced to toolstring zero

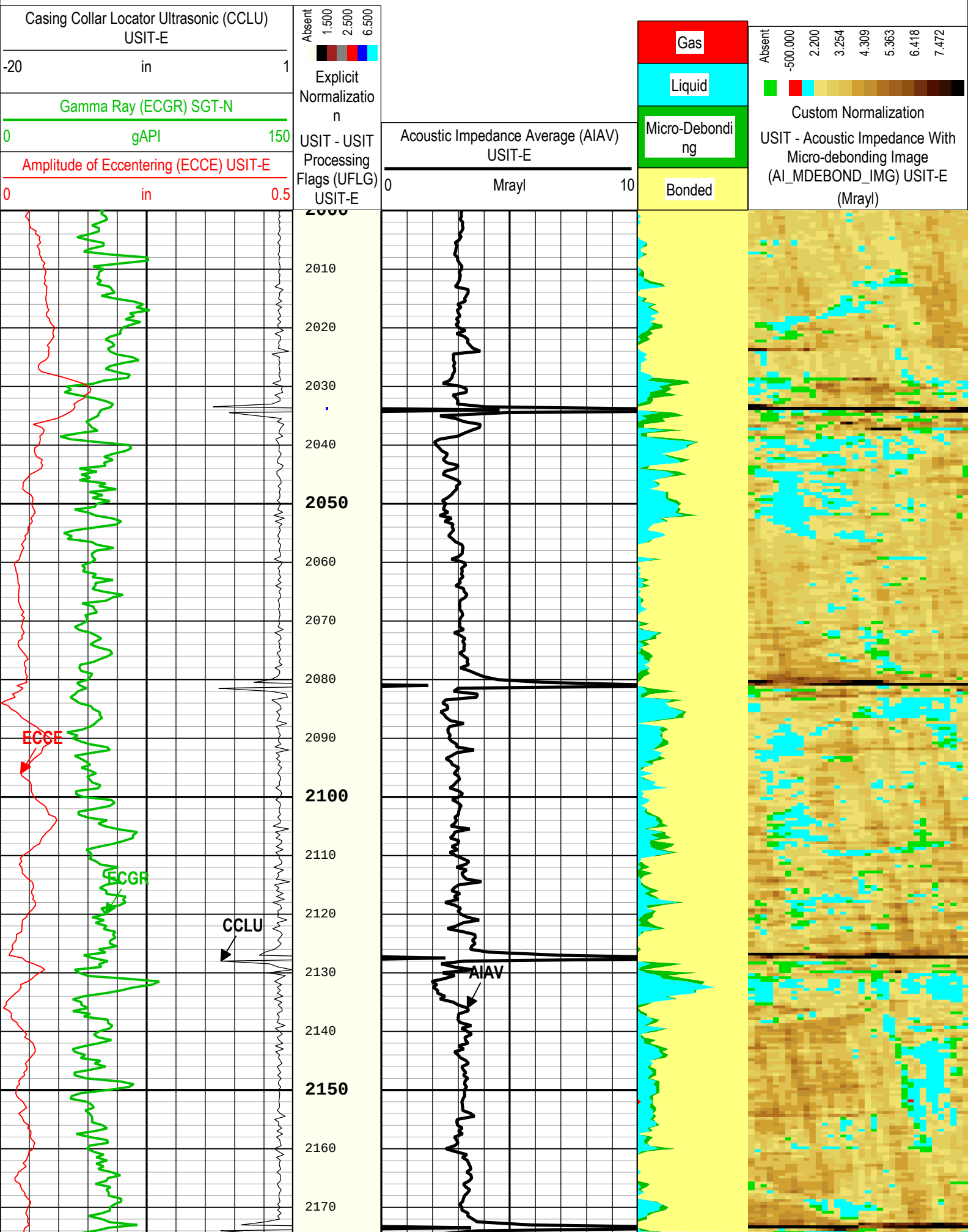
Log

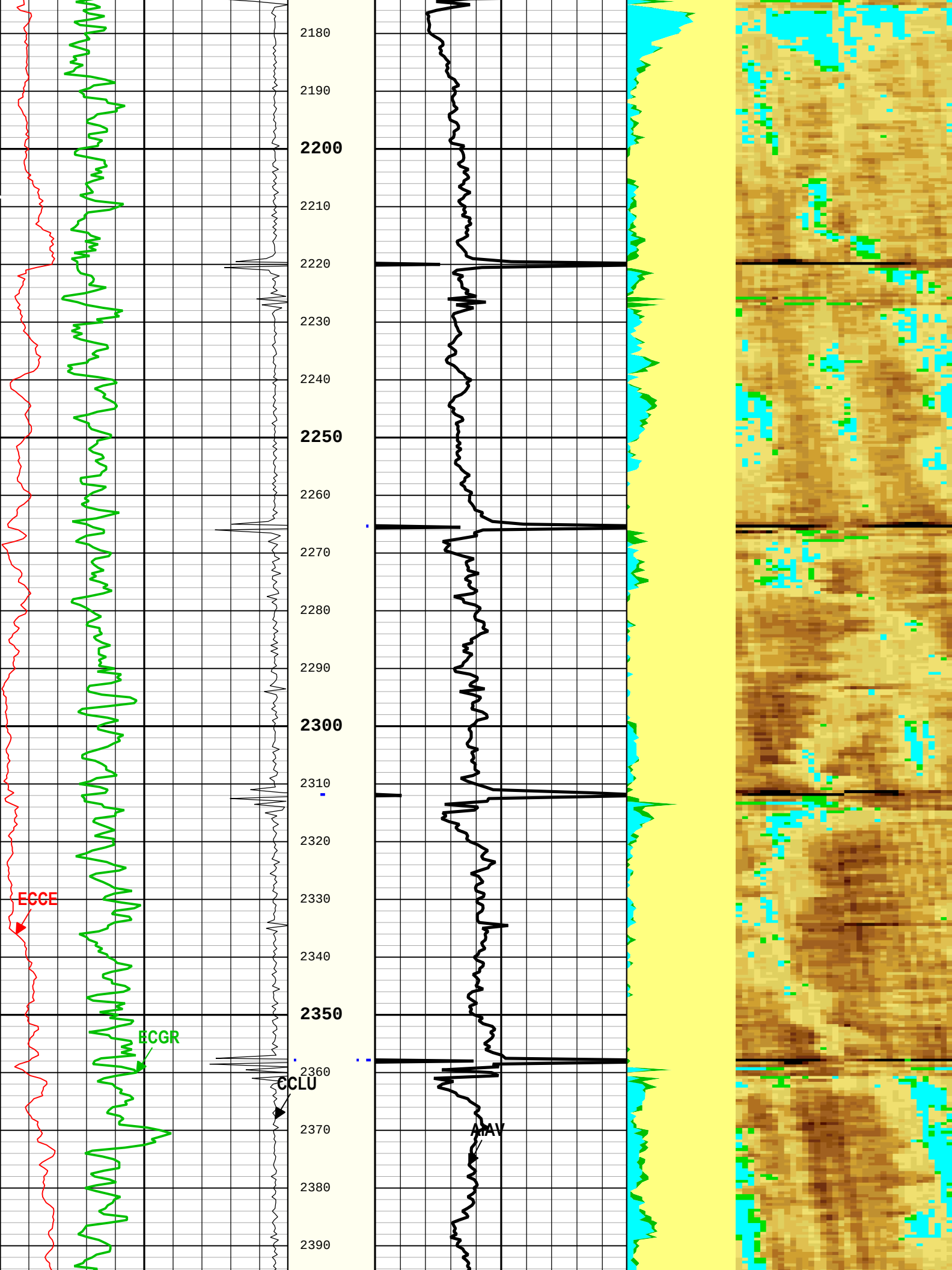
Company:Noble Energy INC Well:Wells Ranch BB11-674

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: 22-Sep-2017 15:32:02

TIME_1900 - Time Marked every 60.00 (s)

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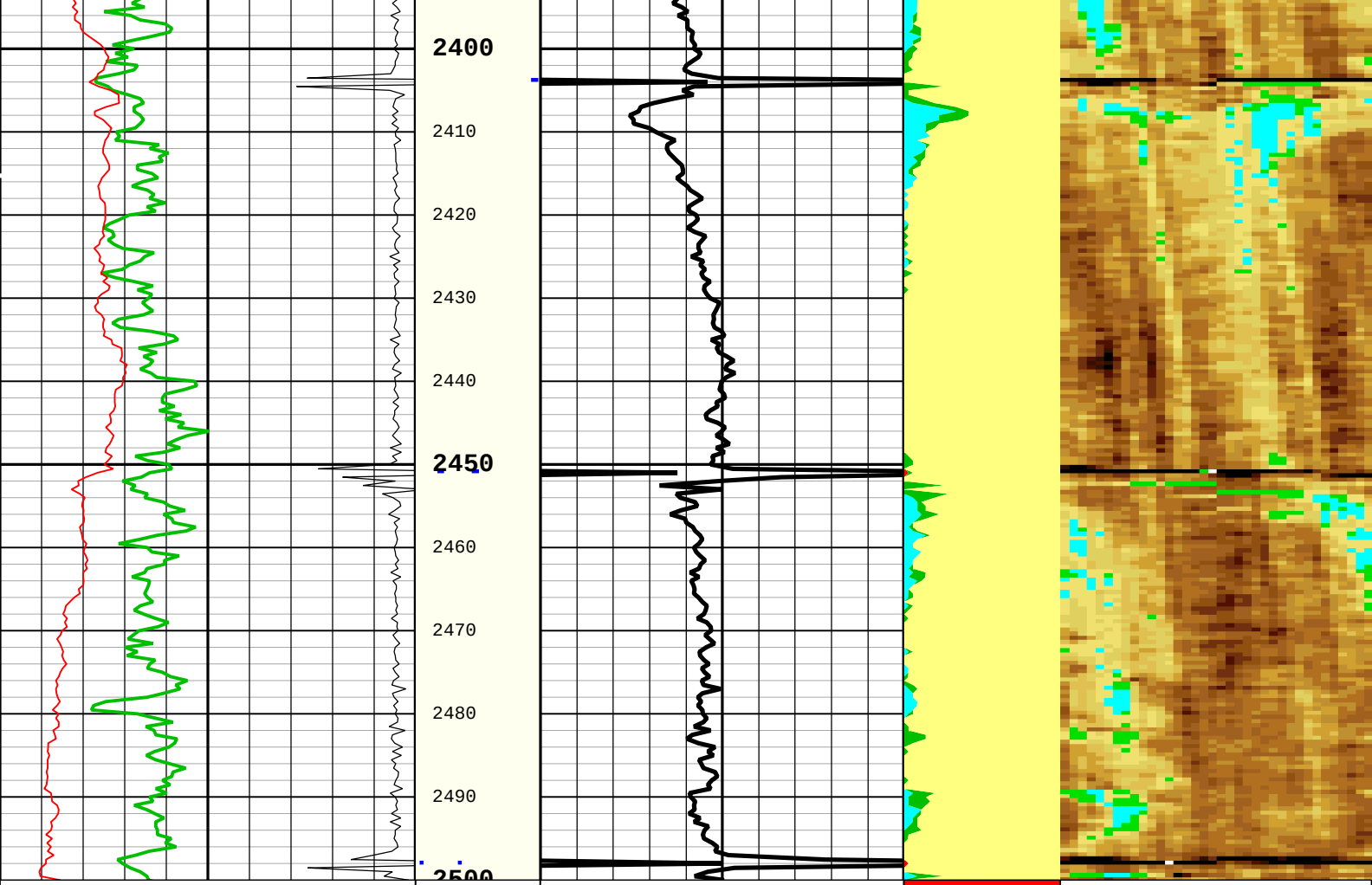
CCLU
AMAV



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: 22-Sep-2017 15:32:02

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	5850	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)	

GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
HEMA	Hematite Presence Flag	Borehole	No	
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	1.13	
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
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	70	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UPLIHT	Ultrasonic Pulse Echo Large Inhibit Time	USIT-E	Off	
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINE	71.88	22-Sep-2017 13:13:14	22-Sep-2017 13:13:26	2525.8	2517.97
WINE	220	22-Sep-2017 13:13:26	22-Sep-2017 13:13:30	2517.97	2509.7
WINE	127.9	22-Sep-2017 13:13:30	22-Sep-2017 13:13:36	2509.7	2495.35
WINE	73.41	22-Sep-2017 13:13:36	22-Sep-2017 13:21:03	2495.35	1053.17

All depth are at tool zero.

XYZ

Company:Noble Energy INC Well:Wells Ranch BB11-674

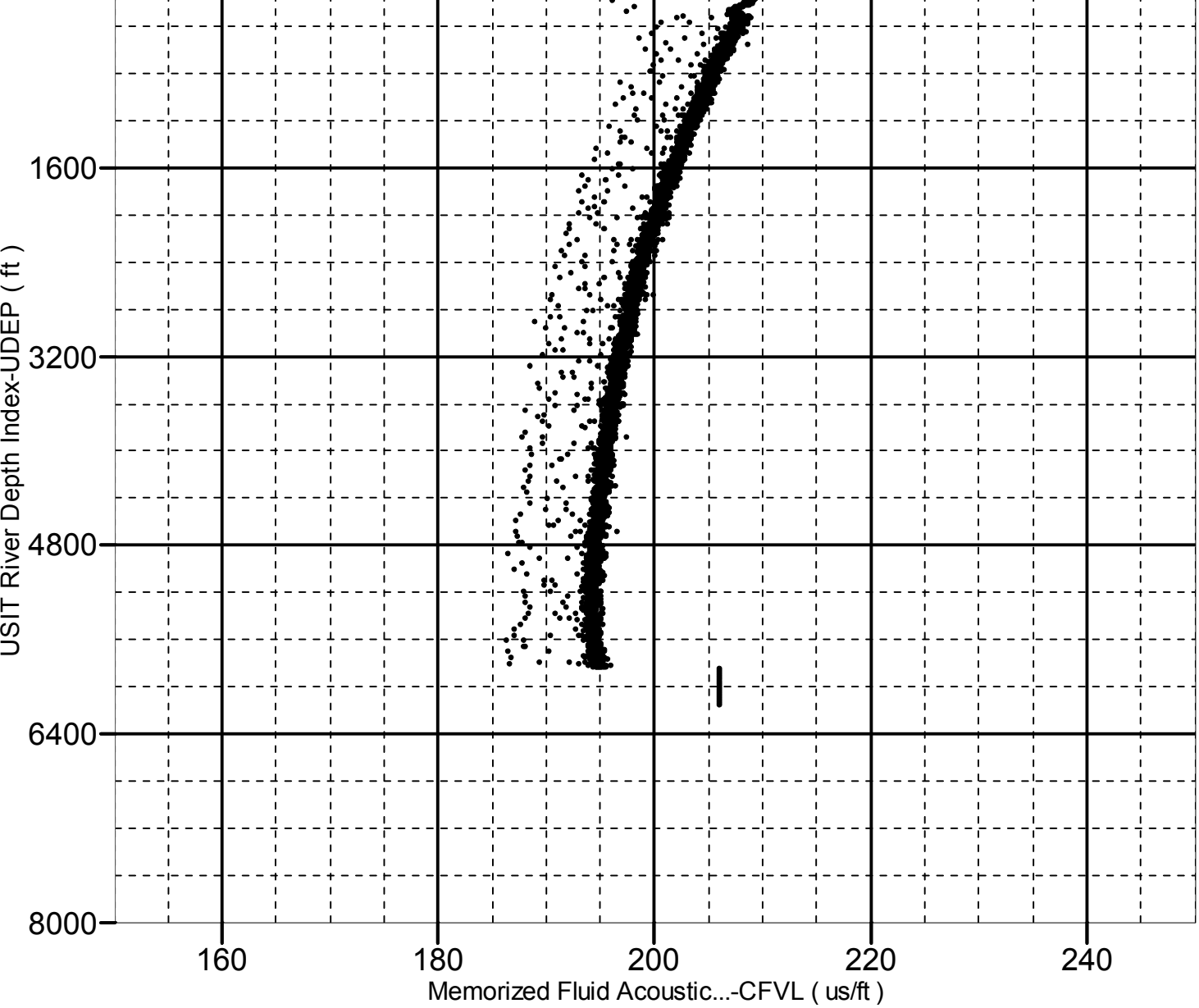
One: Log[4]:Up:S007

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6168.50 to 70.00 ft

- CFVL-UDEP



XYZ

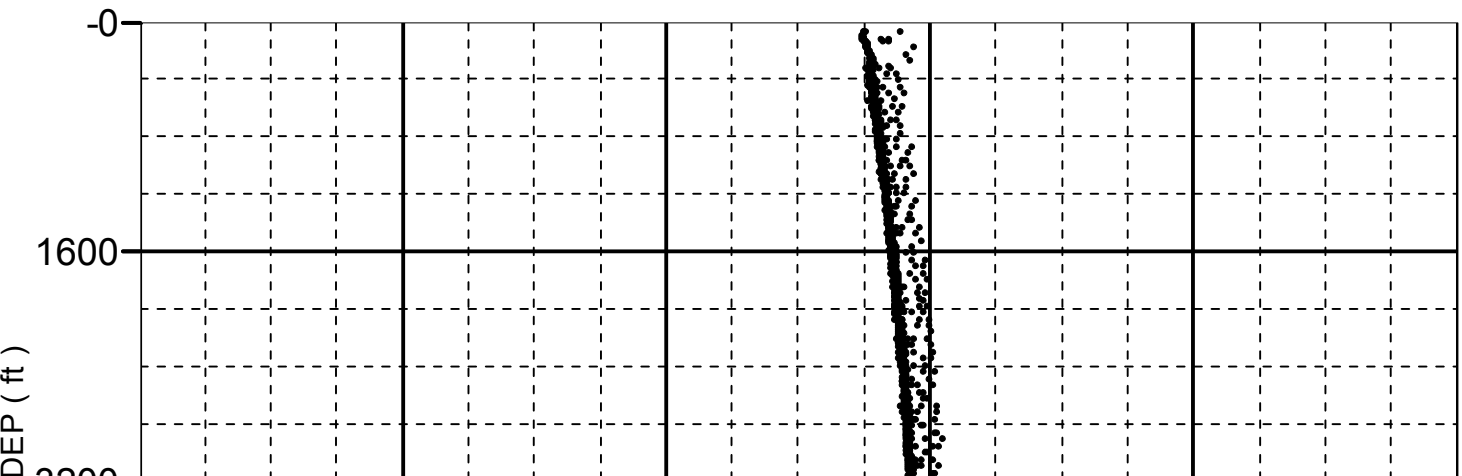
Company:Noble Energy INC Well:Wells Ranch BB11-674
One: Log[4]:Up:S007

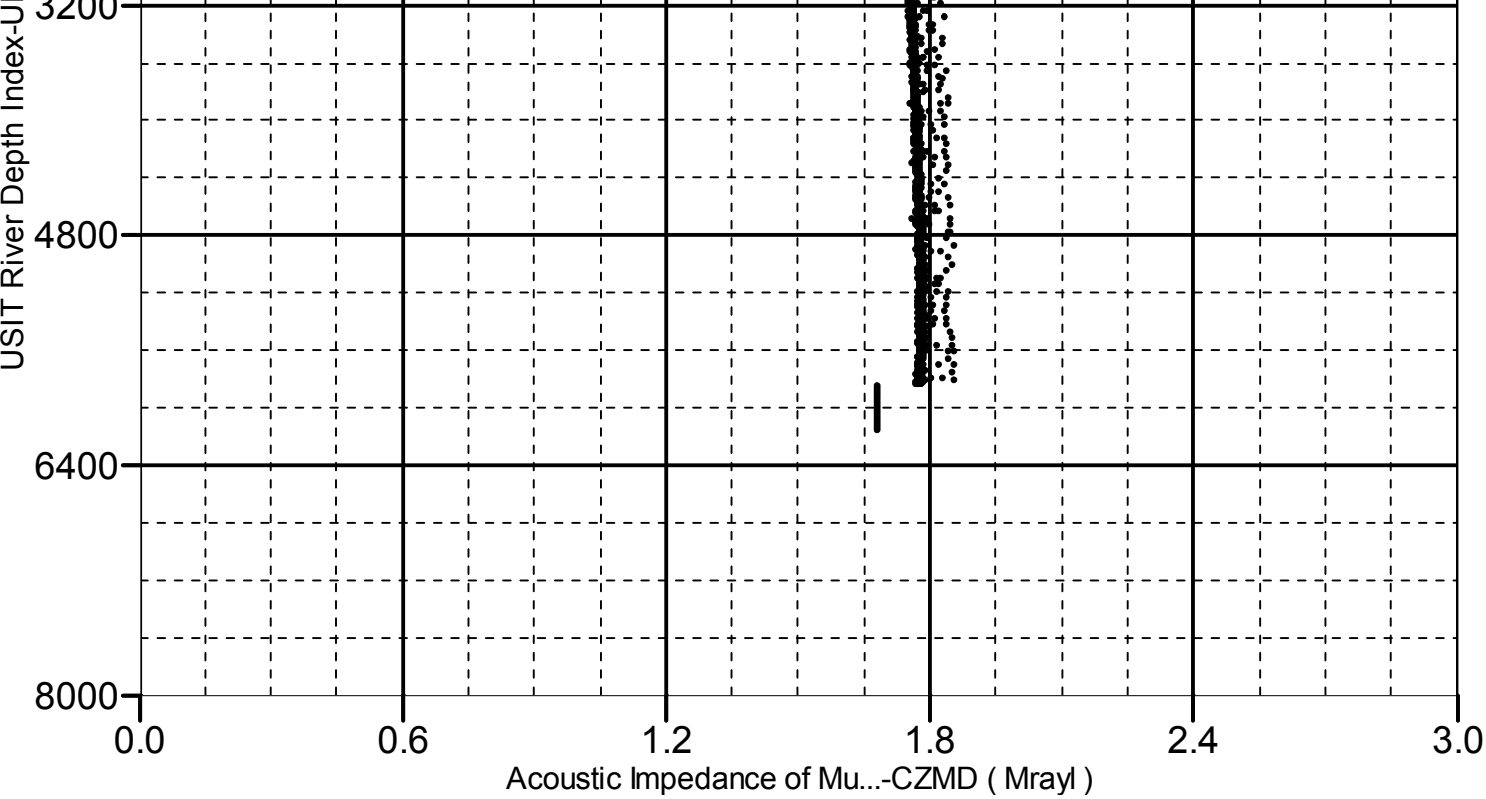
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6168.50 to 70.00 ft

● CZMD-UDEP





Company:	Noble Energy INC
Well:	Wells Ranch BB11-674
Field:	Wattenberg
County:	WELD
State:	Colorado

Schlumberger

UltraSonic Summary Print