

Company: Noble Energy INC

Well: Wells Ranch BB11-658

Field: Wattenberg

County: WELD State: Colorado

UltraSonic Summary Print

County: WELD
Field: Wattenberg
Location: NWSW Sec. 11, T5N, R63W
Well: Wells Ranch BB11-658
Company: Noble Energy INC

Location:		NWSW Sec. 11, T5N, R63W SHL: 2249' FNL & 300' FWL Lat/Long: 40.41278, -104.41263		Elev.: K.B. 4698.00 ft G.L. 4668.00 ft D.F. 4698.00 ft
Permanent Datum:	Ground Level	Elev.: 4668.00 f		
Log Measured From:	Kelly Bushing	30.00 ft		above Perm.Datum
Drilling Measured From:	Kelly Bushing			
API Serial No. 05-123-44959	Section: 11	Township: 5N	Range: 63W	

Logging Date 17-Sep-2017

Run Number ONE

Depth Driller 16573.00 ft

Schlumberger Depth 16573.00 ft

Bottom Log Interval 5850.00 ft

Top Log Interval 86.00 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 1932.00 ft

To 16573.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade N/A

From 30.00 ft

To 16555.50 ft

Max Recorded Temperatures 226.82 degF

Logger on Bottom 18-Sep-2017 12:30:00

Unit Number 2161 Location: Fort Morgan

Recorded By Camilla Lang

Witnessed By Bill Manfield

Disclaimer

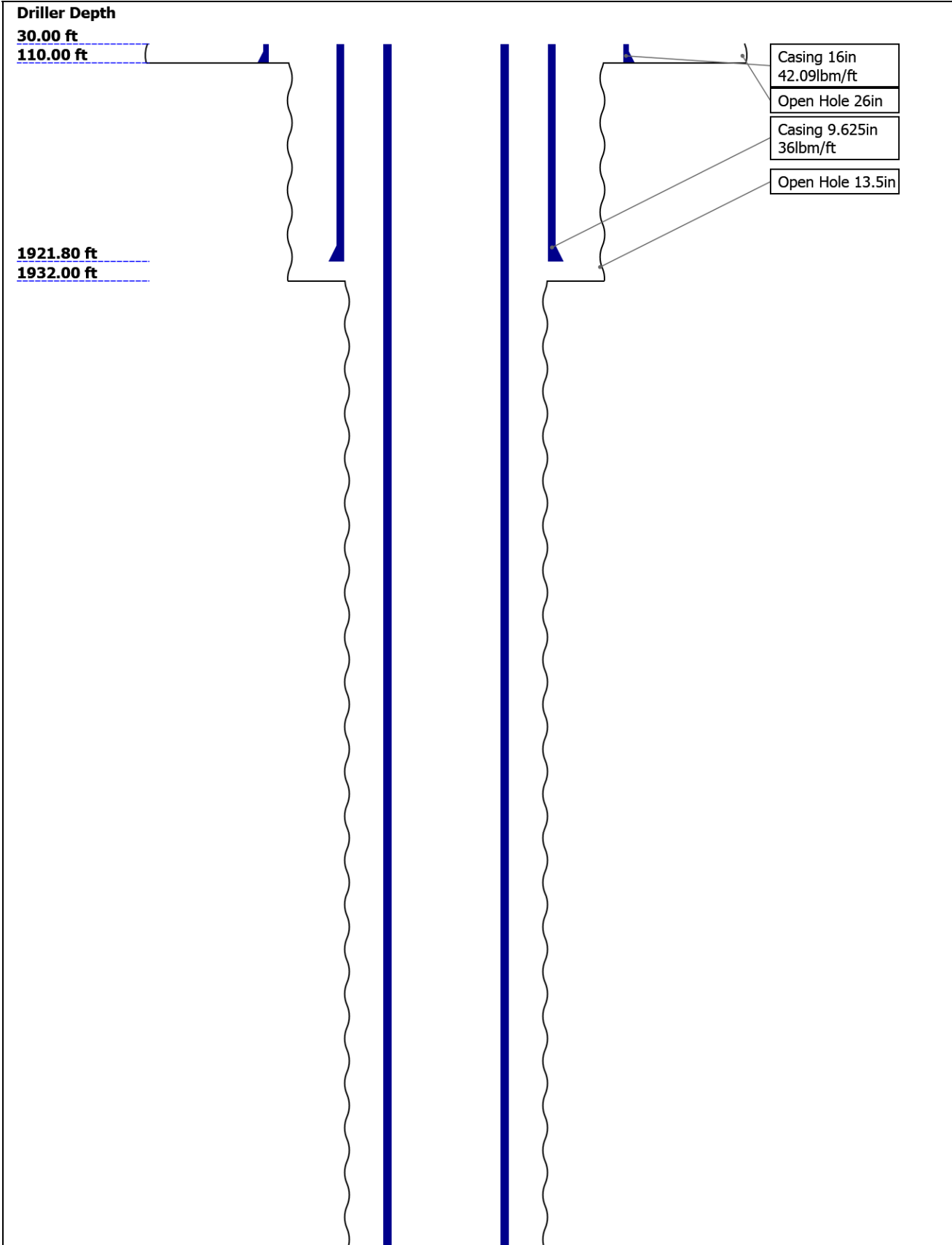
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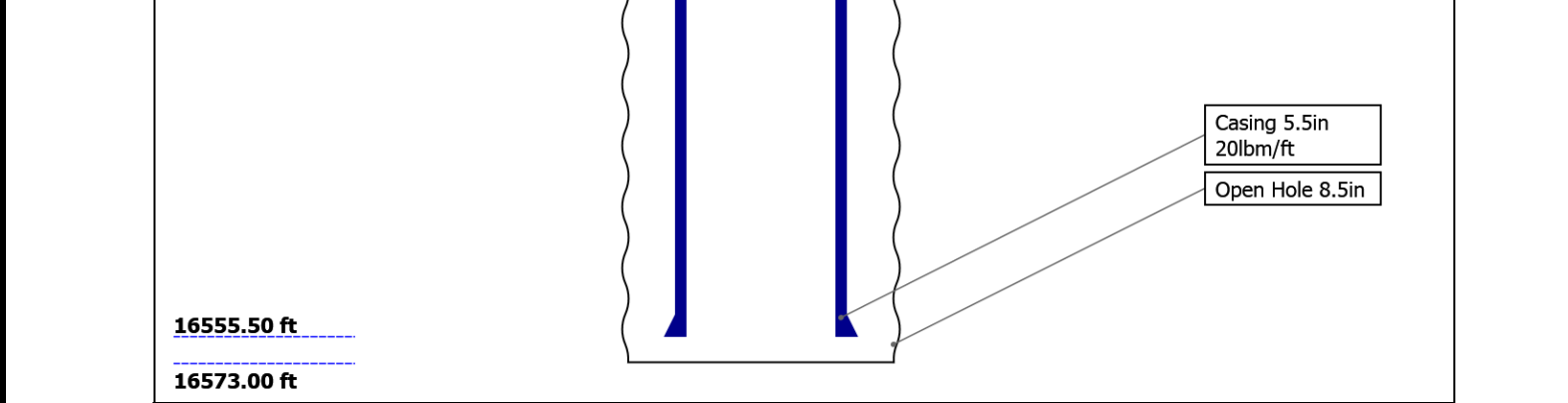
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 - 12.1 Integration Summary
 - 12.2 Software Version
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 - 12.5 Parameter Listing

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	1932			
Top Logger (ft)	30	110	1932			
Bottom Driller (ft)	110	1932	16573			
Bottom Logger (ft)	110	1932	16573			
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	1921.8	16555.5			
Bottom Logger (ft)	110	1921.8	16555.5			

Operational Run Summary

Parameter (unit)	ONE					
Date Log Started	17-Sep-2017					
Time Log Started	23:18:24					
Date Log Finished	18-Sep-2017					
Time Log Finished	01:42:09					
Top Log Interval (ft)	86.00					
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					

Borehole Fluids

Remarks and Equipment Summary

Outer Diameter = 3.410 in

Line: Sensor Location, Value: Gating Onset 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[5]:Up	6452.27	76.03
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 : 24.02m(78.80ft) to 25.61m(84.01ft) MUD_N_FRP = 1.15 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.68 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
ONE			
2500 PSI Main Pass			
Software Version			
Acquisition System		Version	

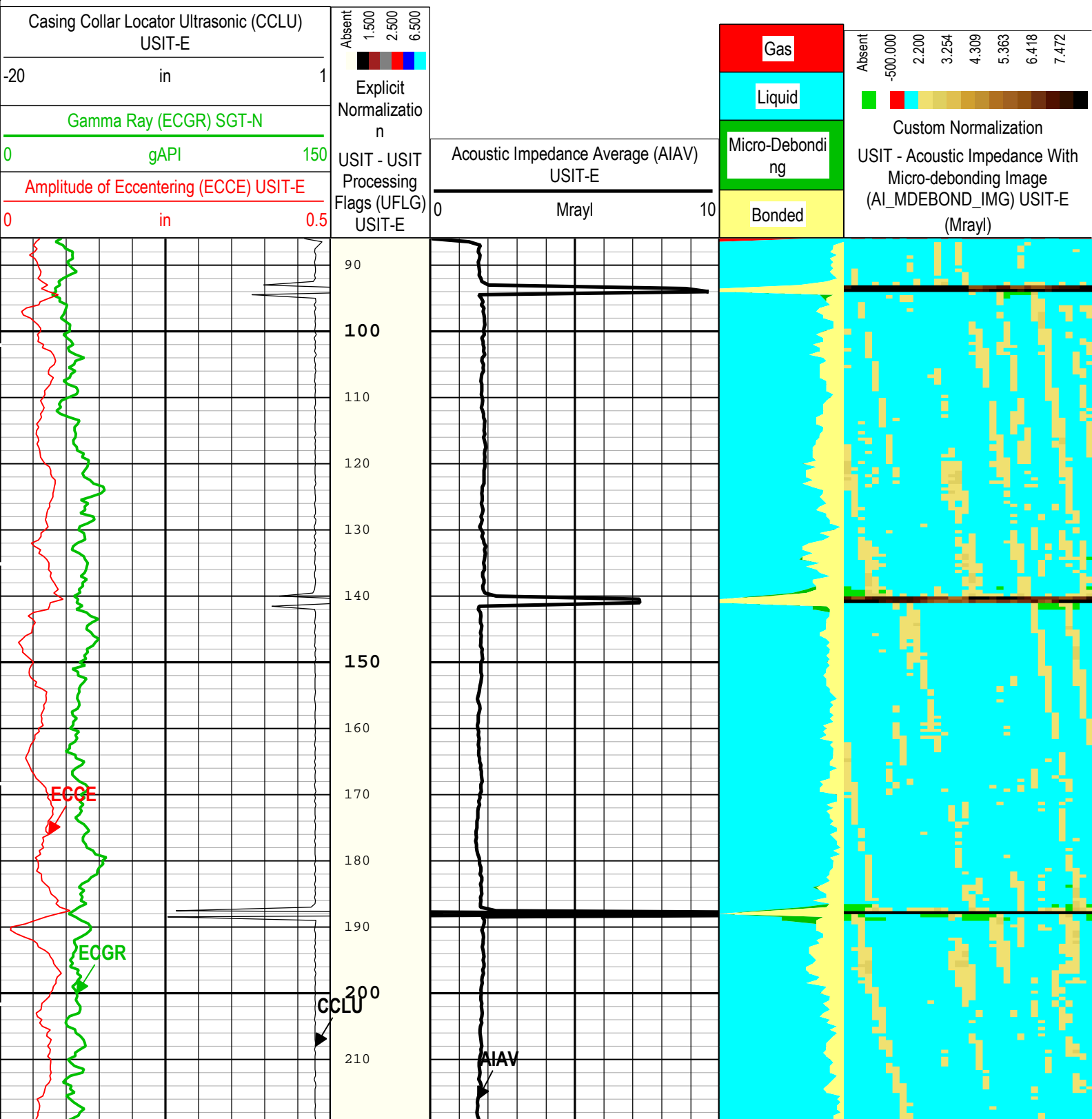
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[5]:Up	Up	76.03 ft	6452.27 ft	18-Sep-2017 12:24:43 AM	18-Sep-2017 1:33:32 AM	ON	2.15 ft	Yes

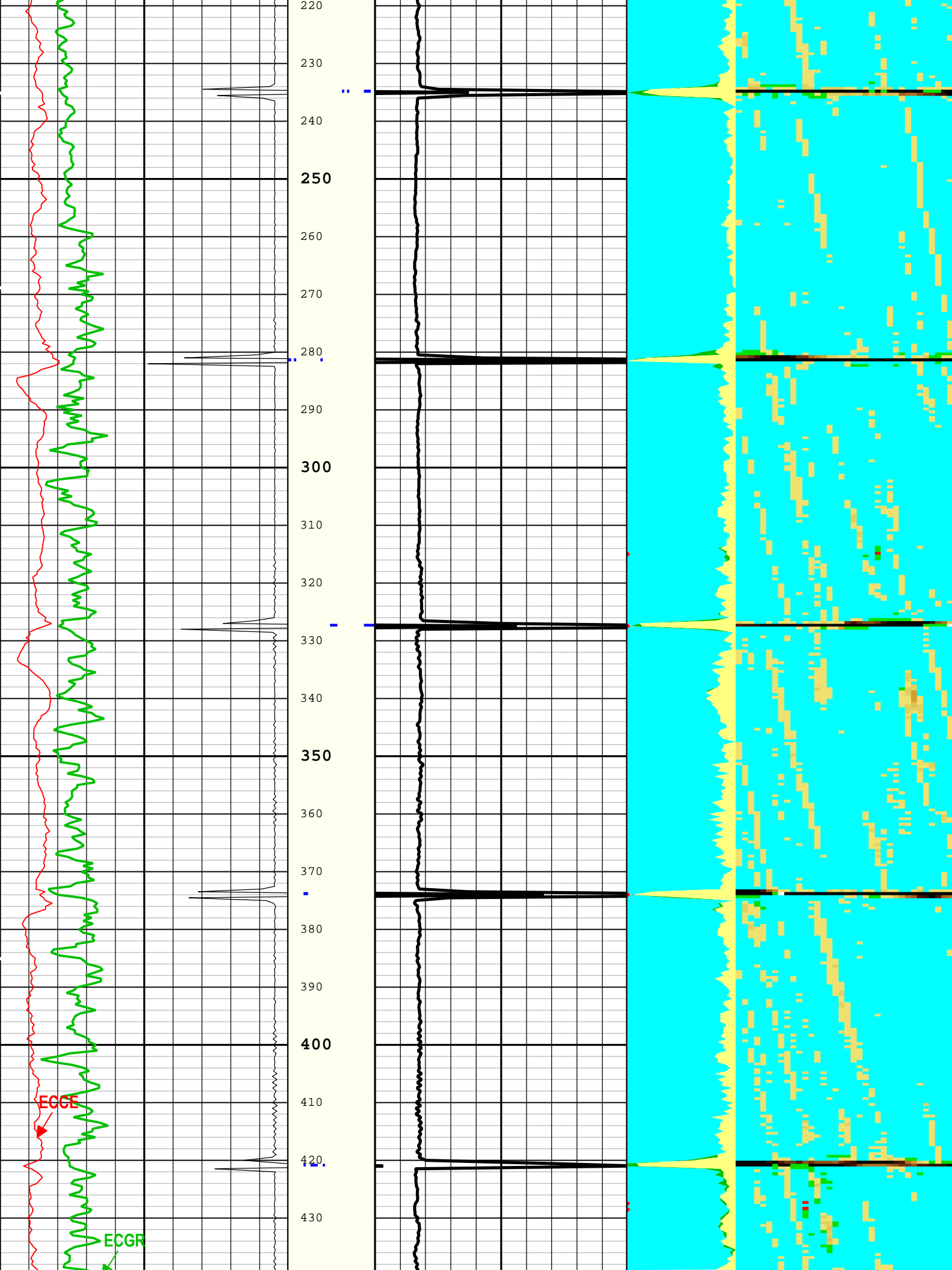
All depths are referenced to toolstring zero

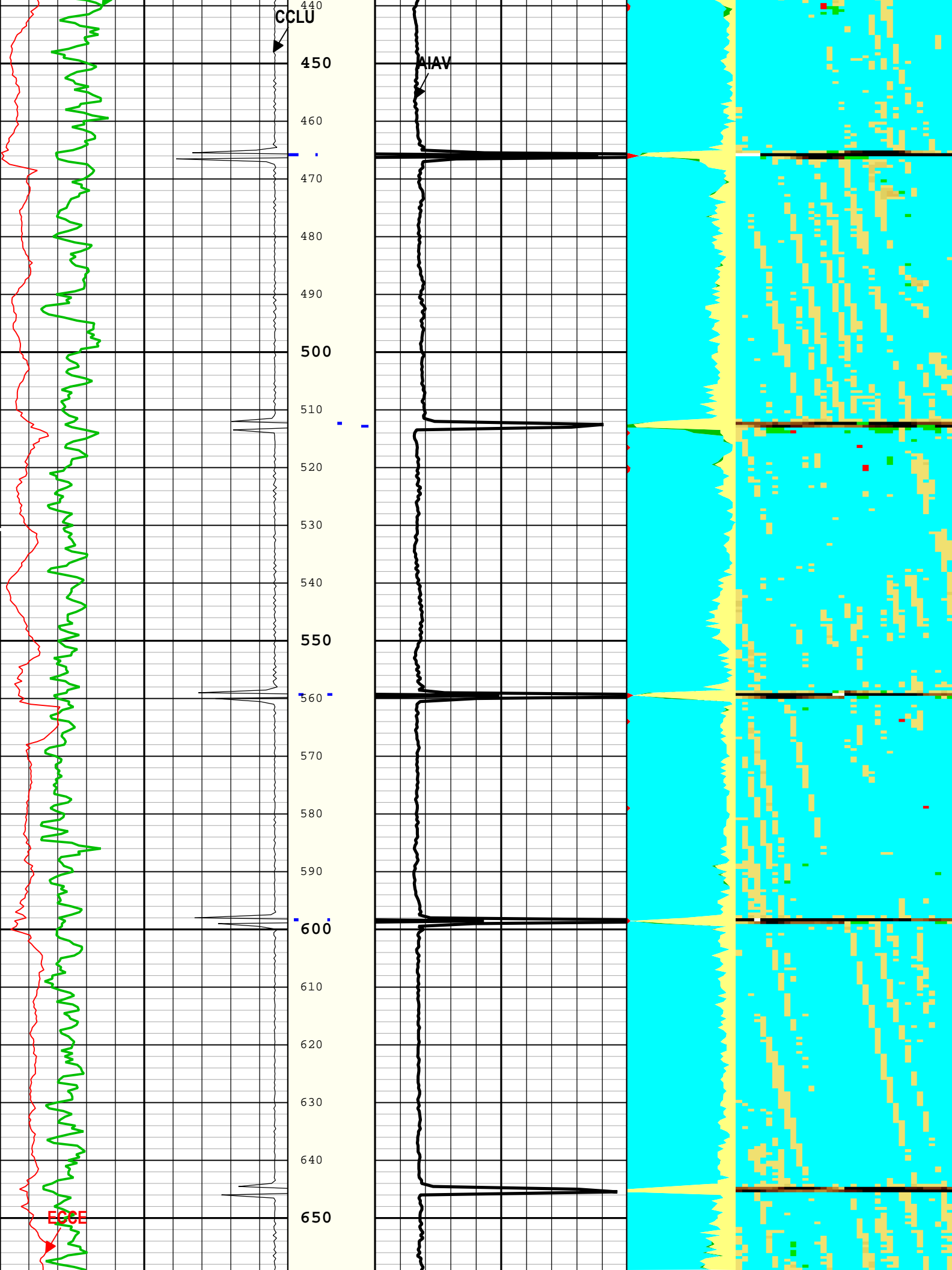
Log	Company:Noble Energy INC	Well:Wells Ranch BB11-658
ONE: Log[5]:Up:S006		

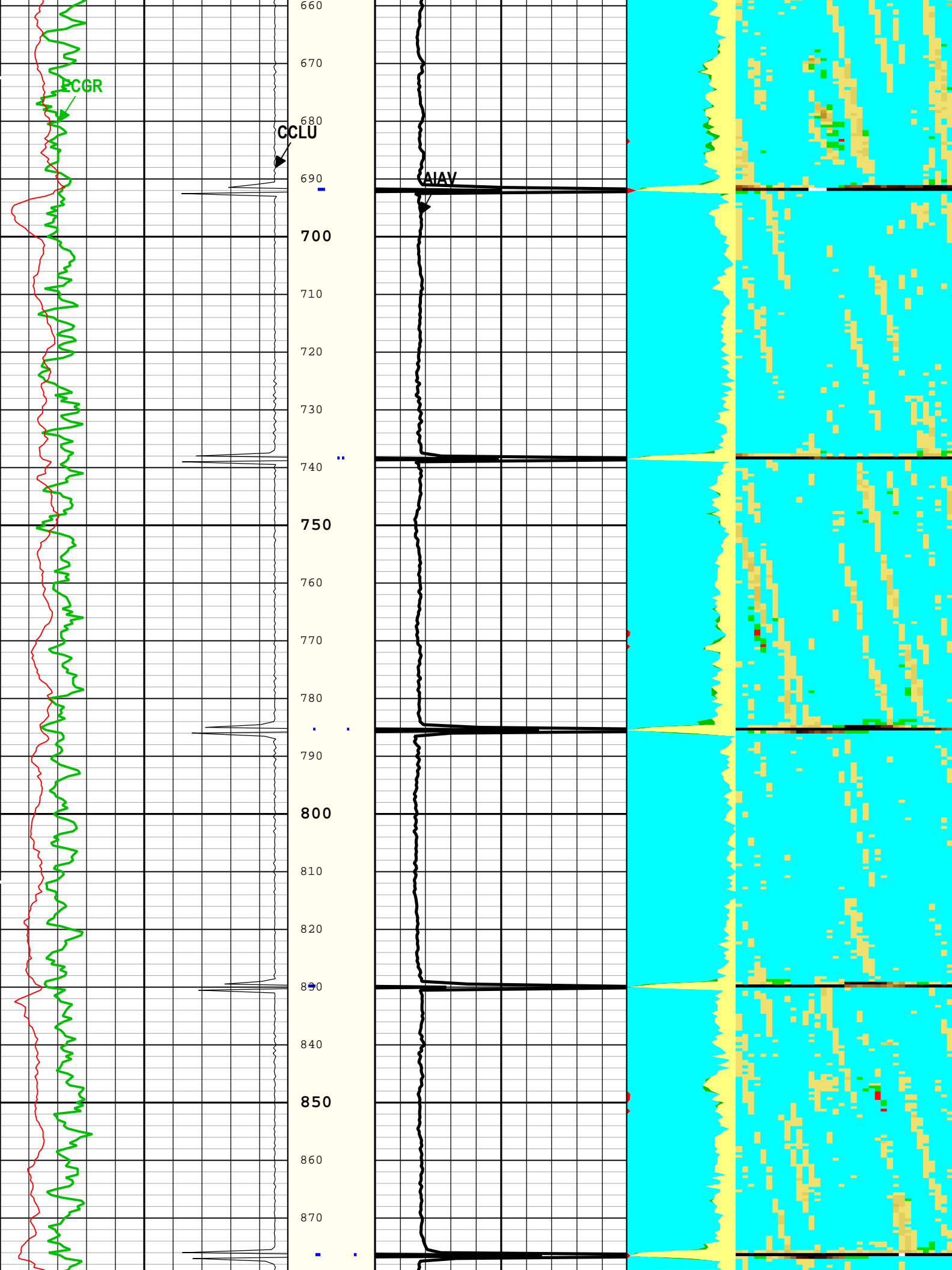
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Creation Date: 18-Sep-2017 02:55:02

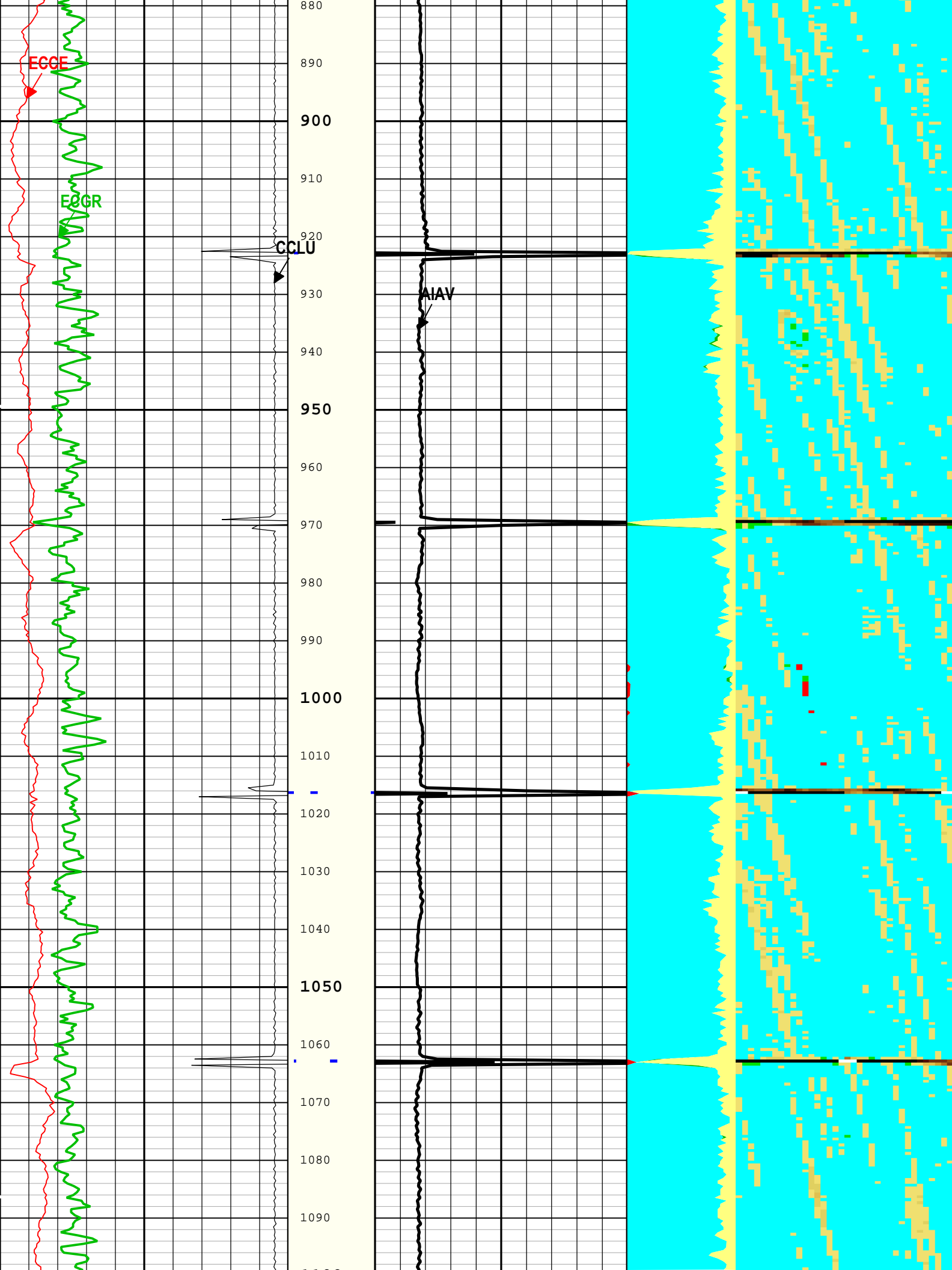
TIME_1900 - Time Marked every 60.00 (s)

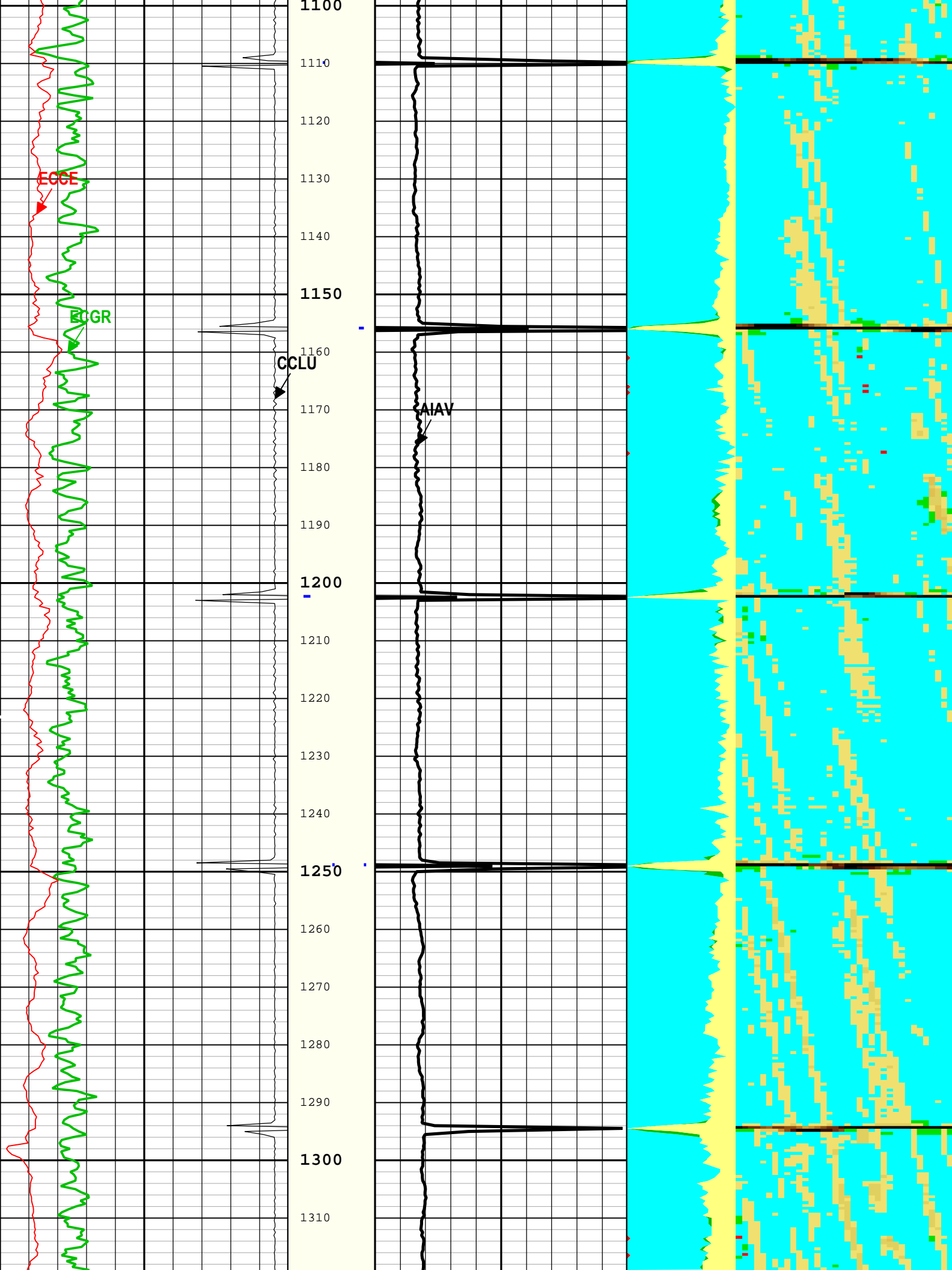


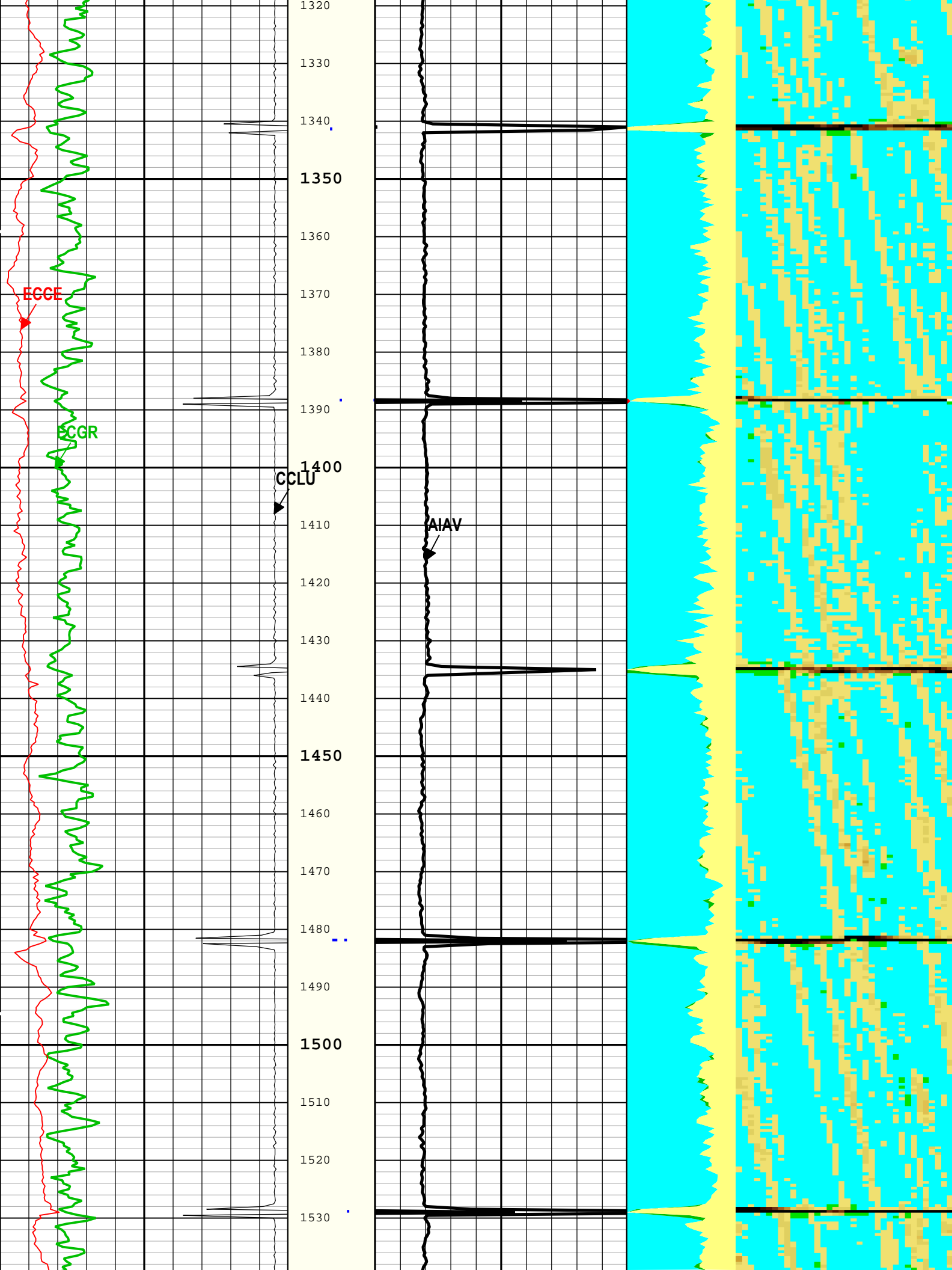


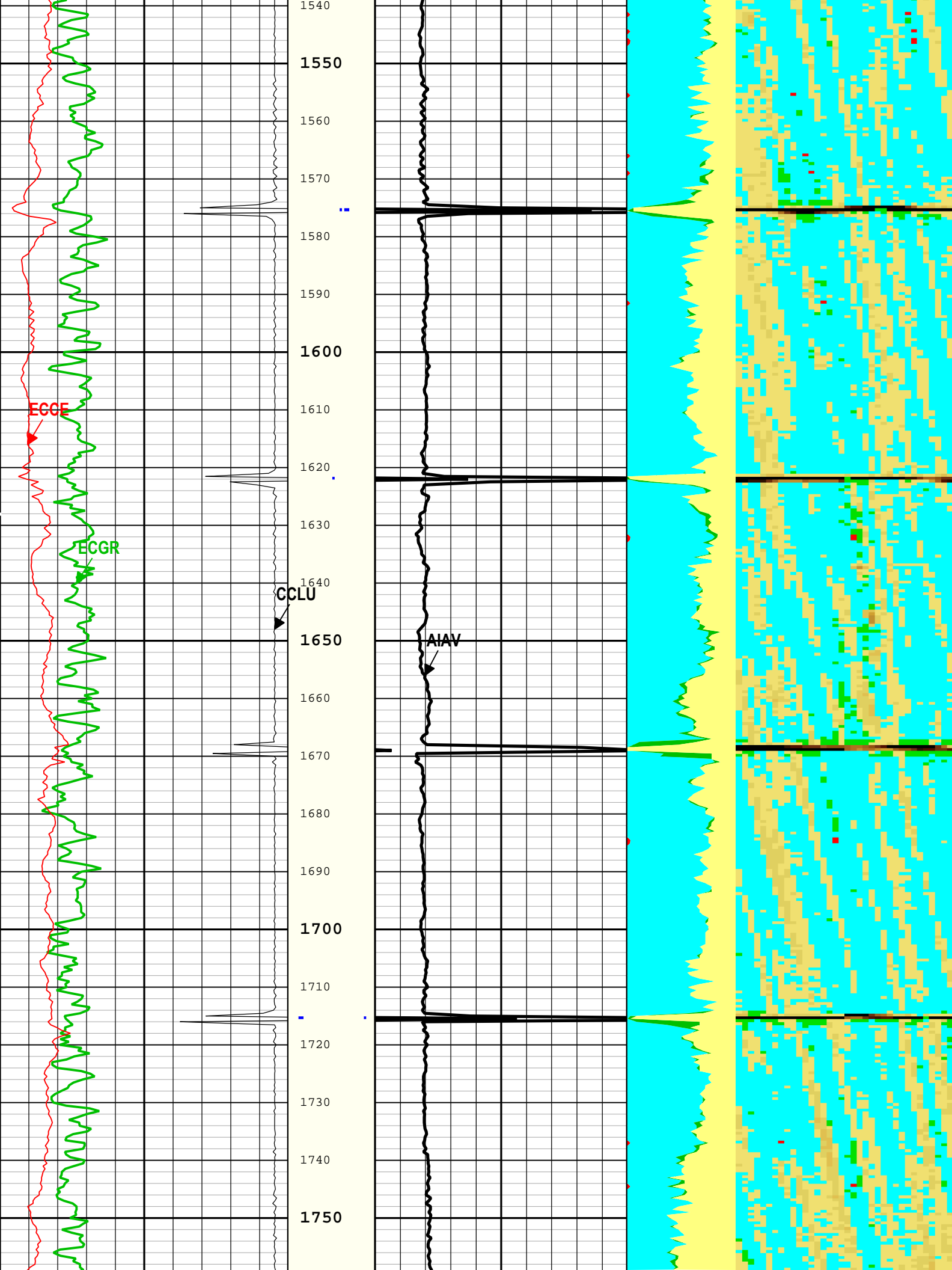


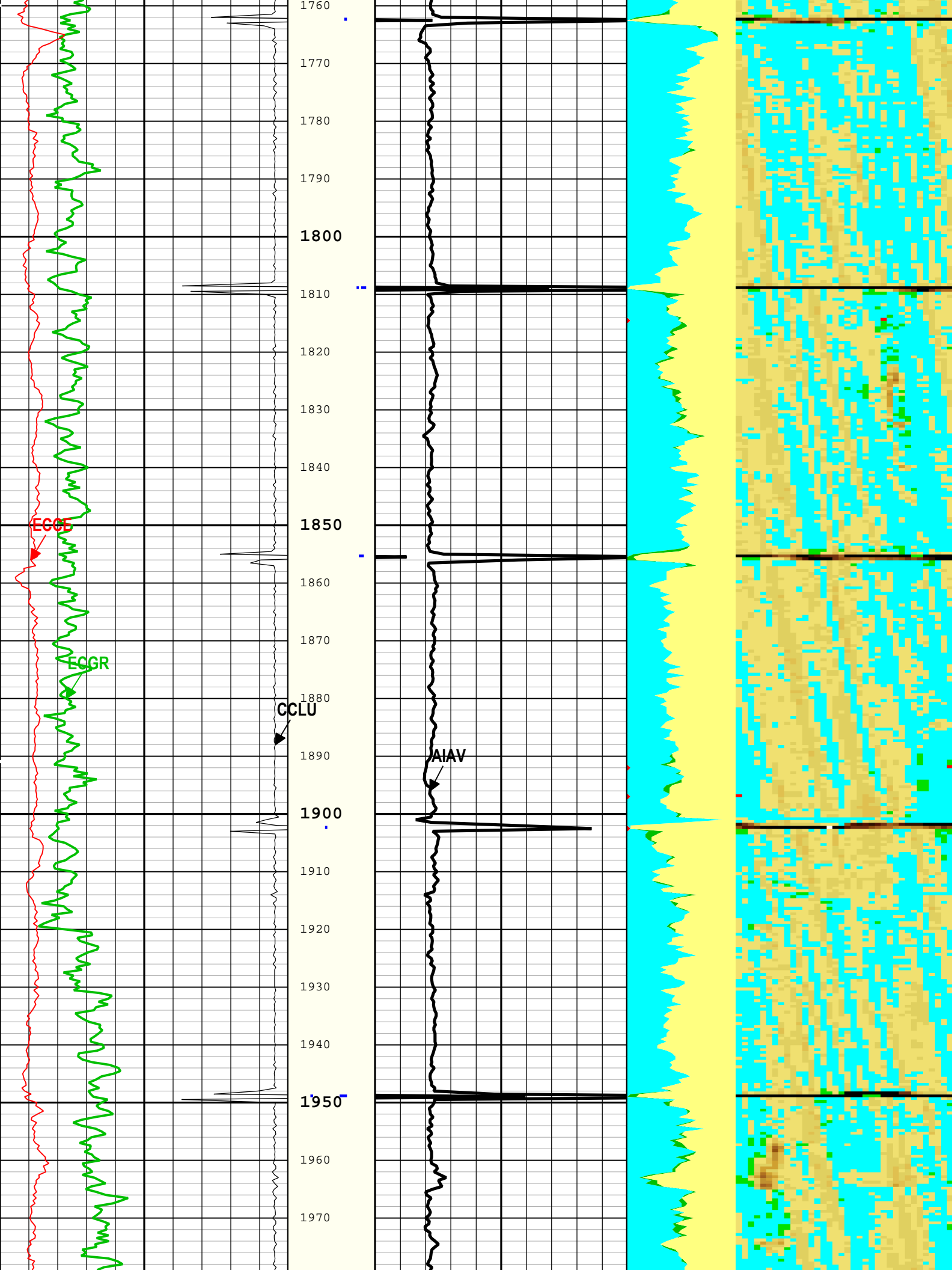


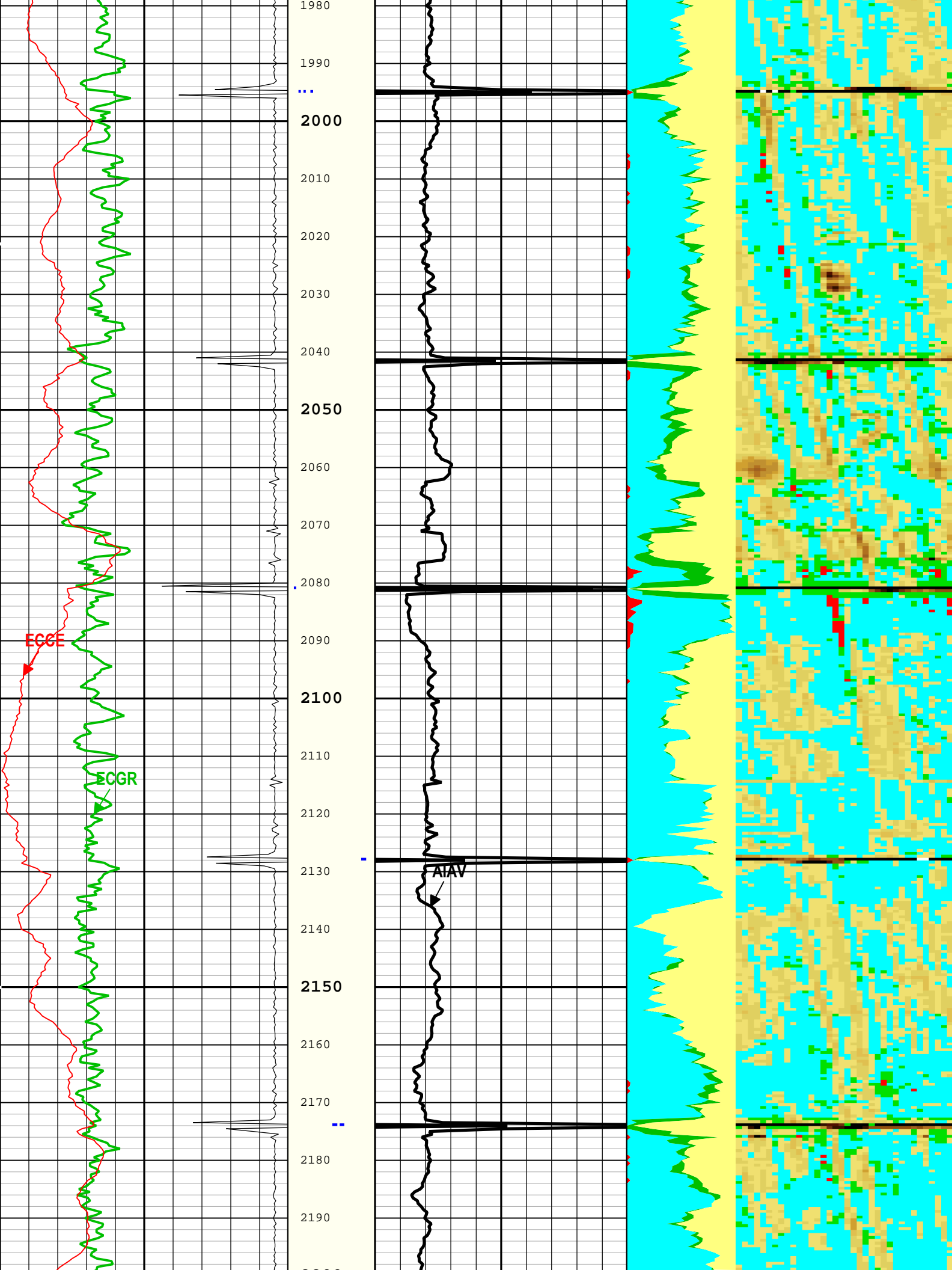


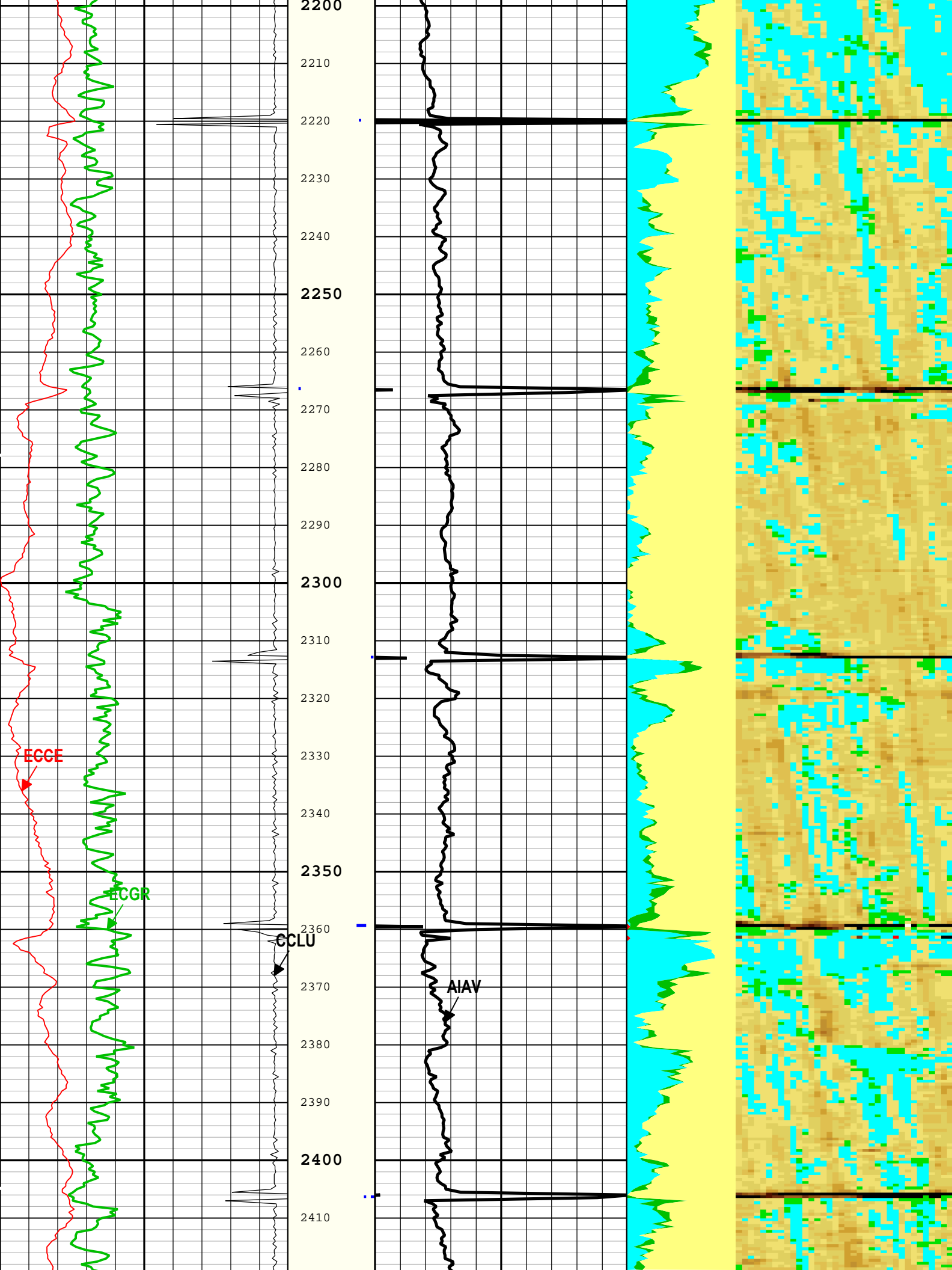


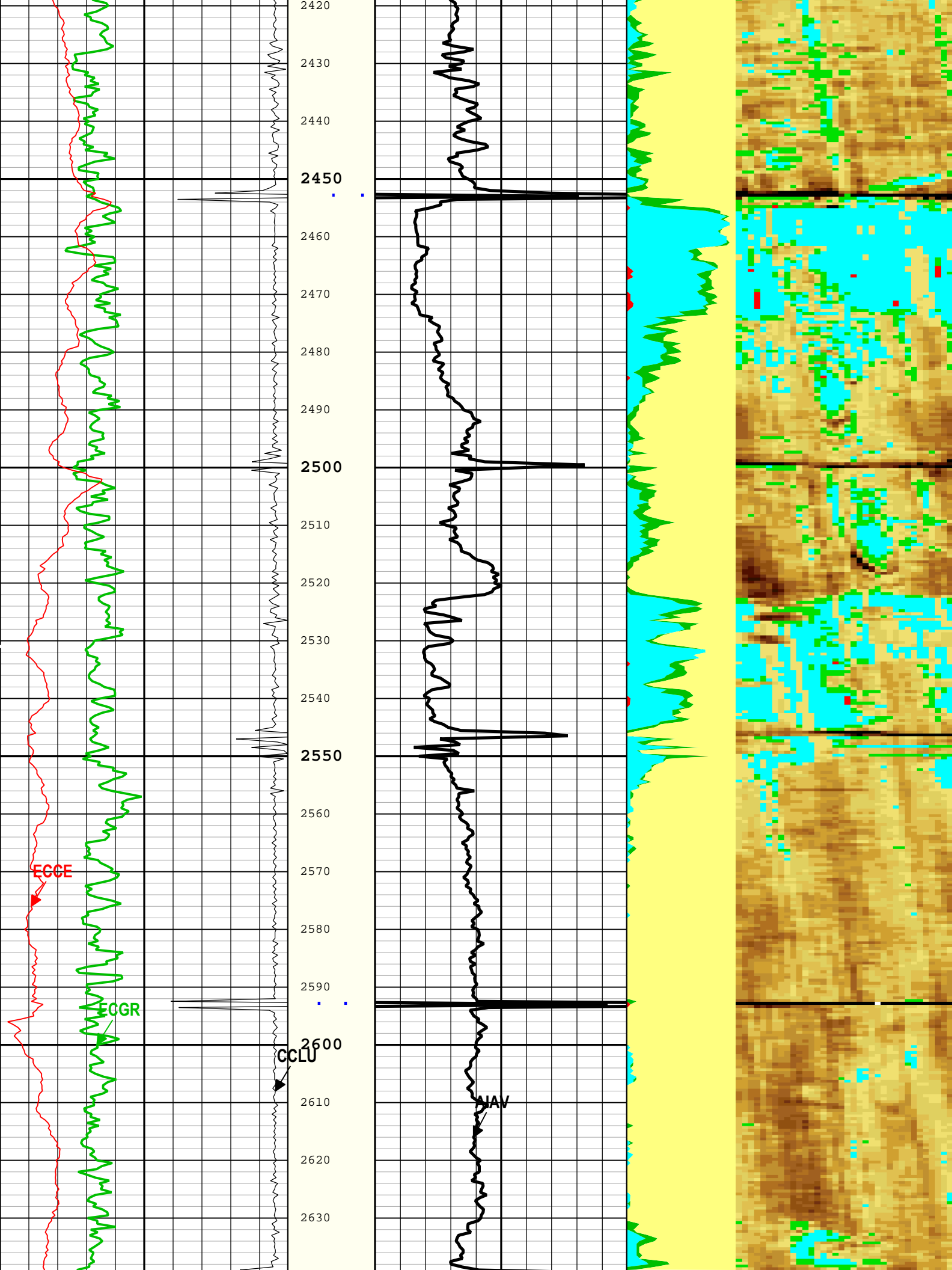


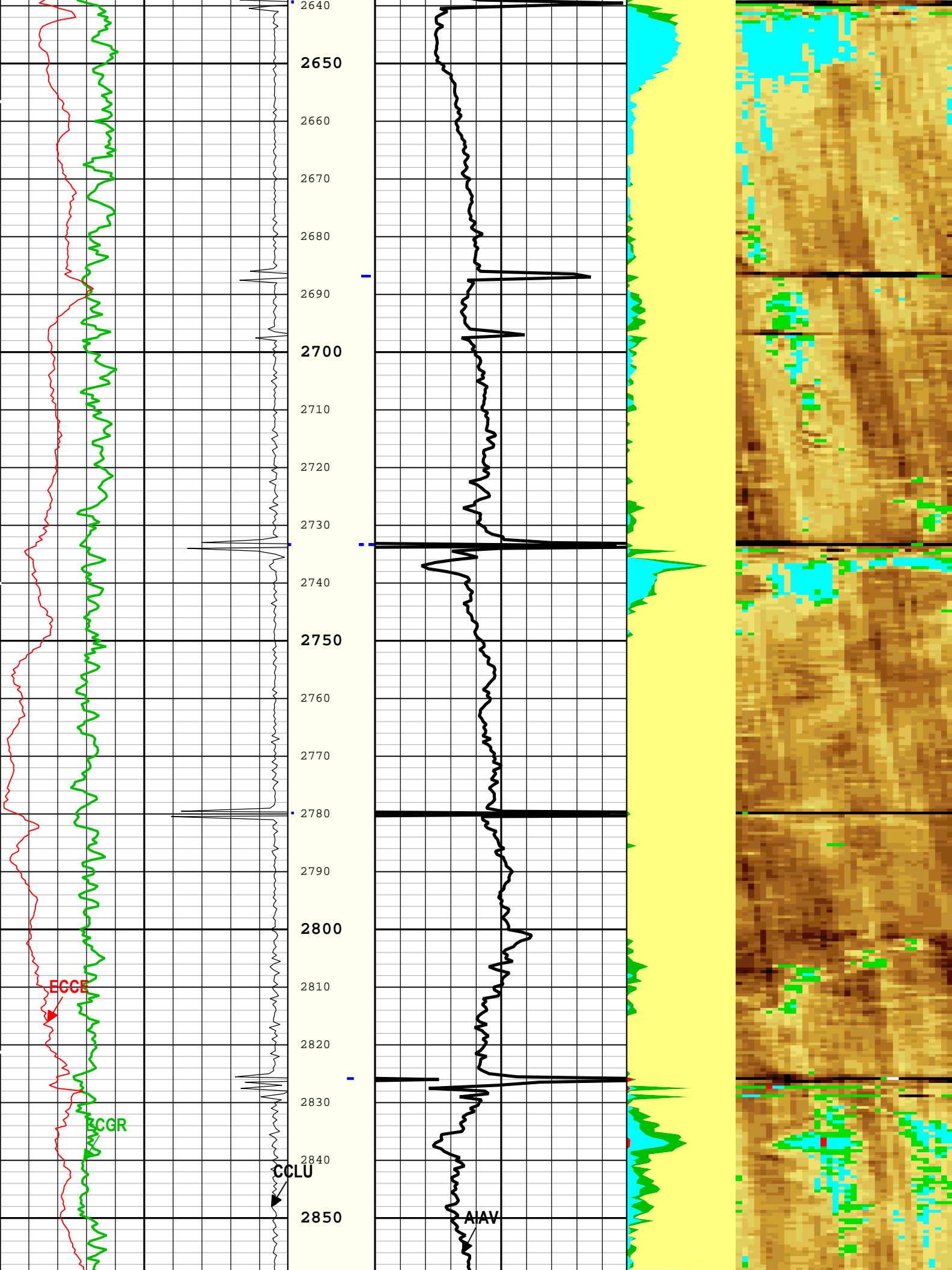


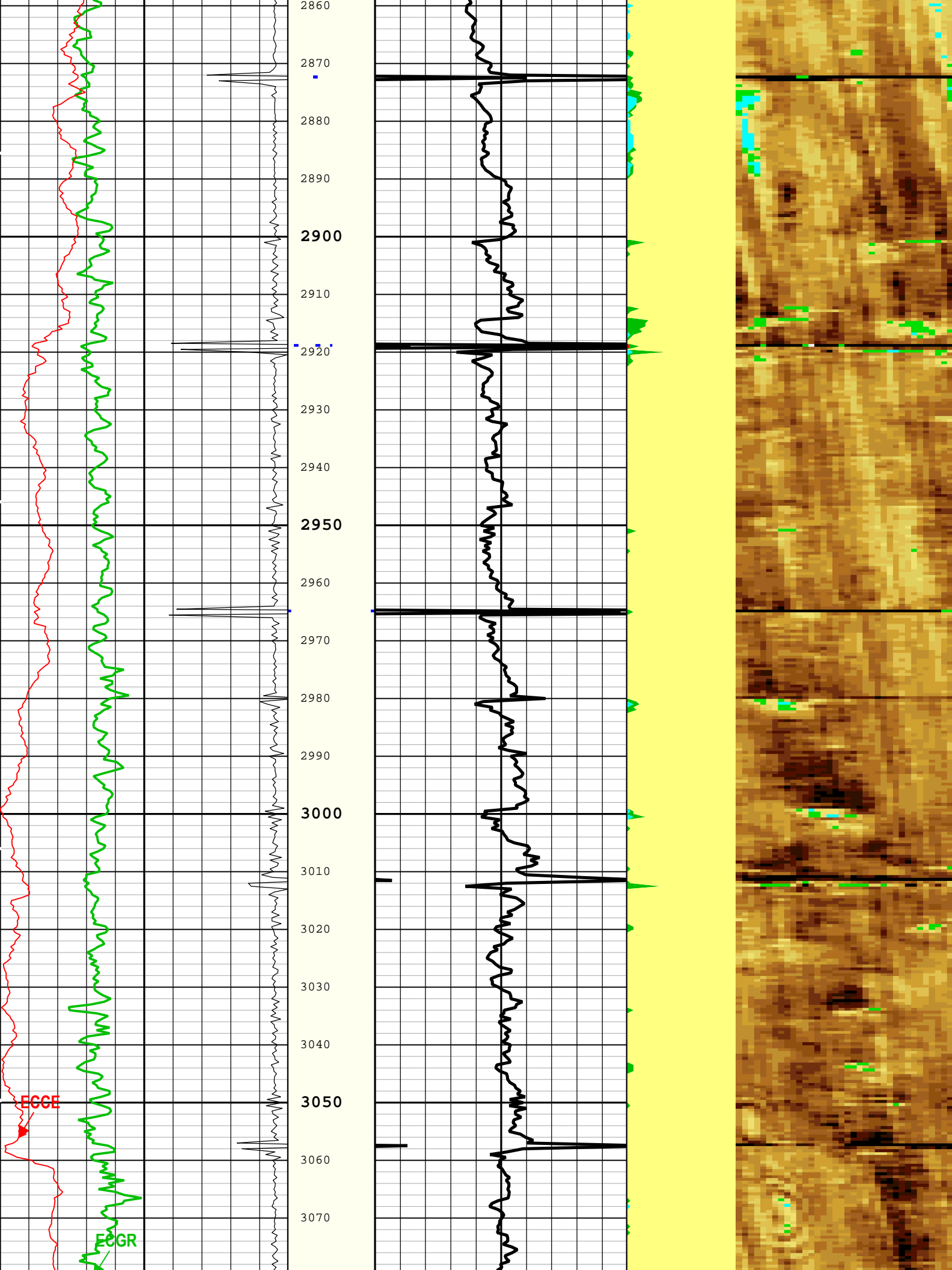


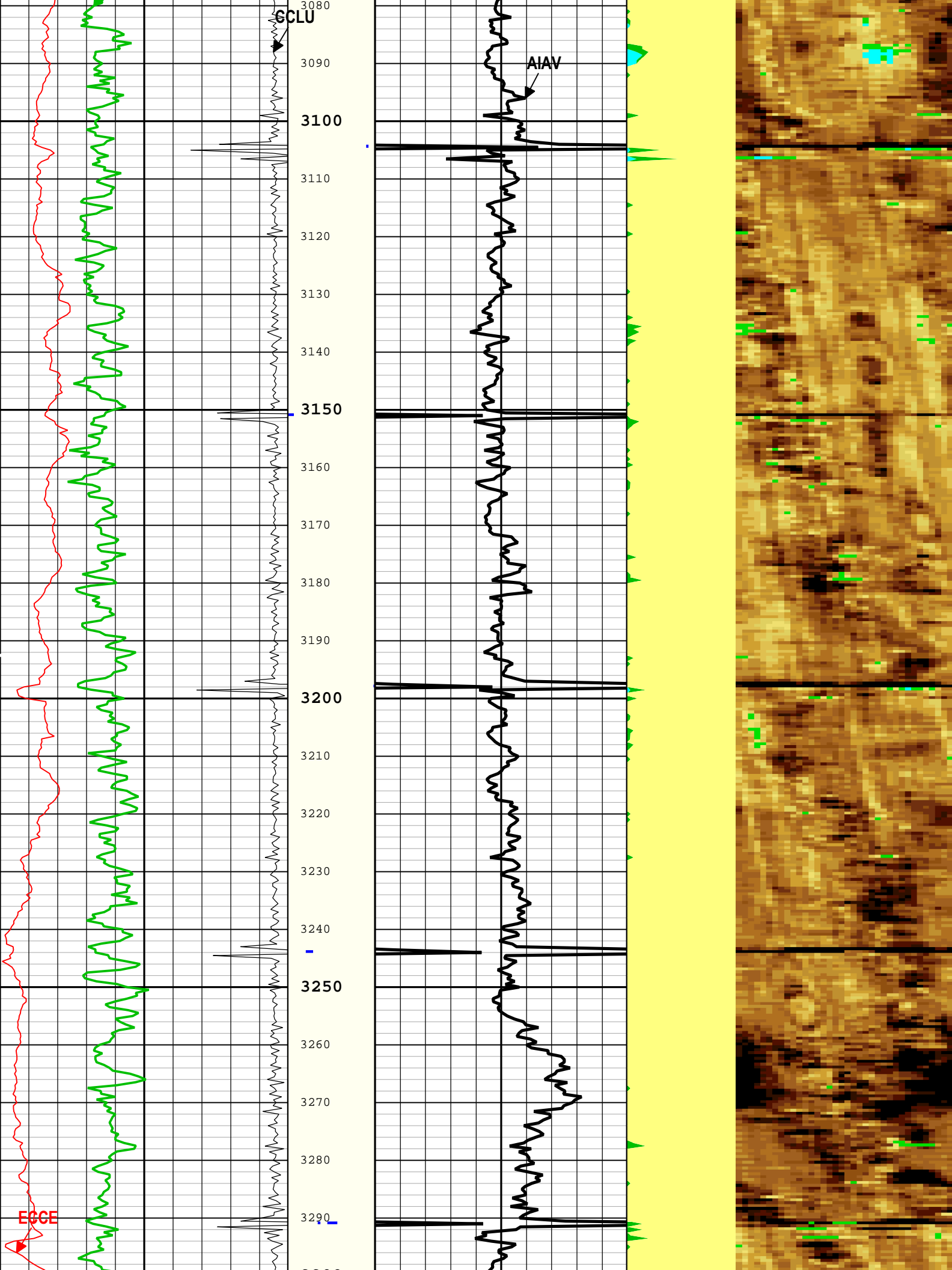


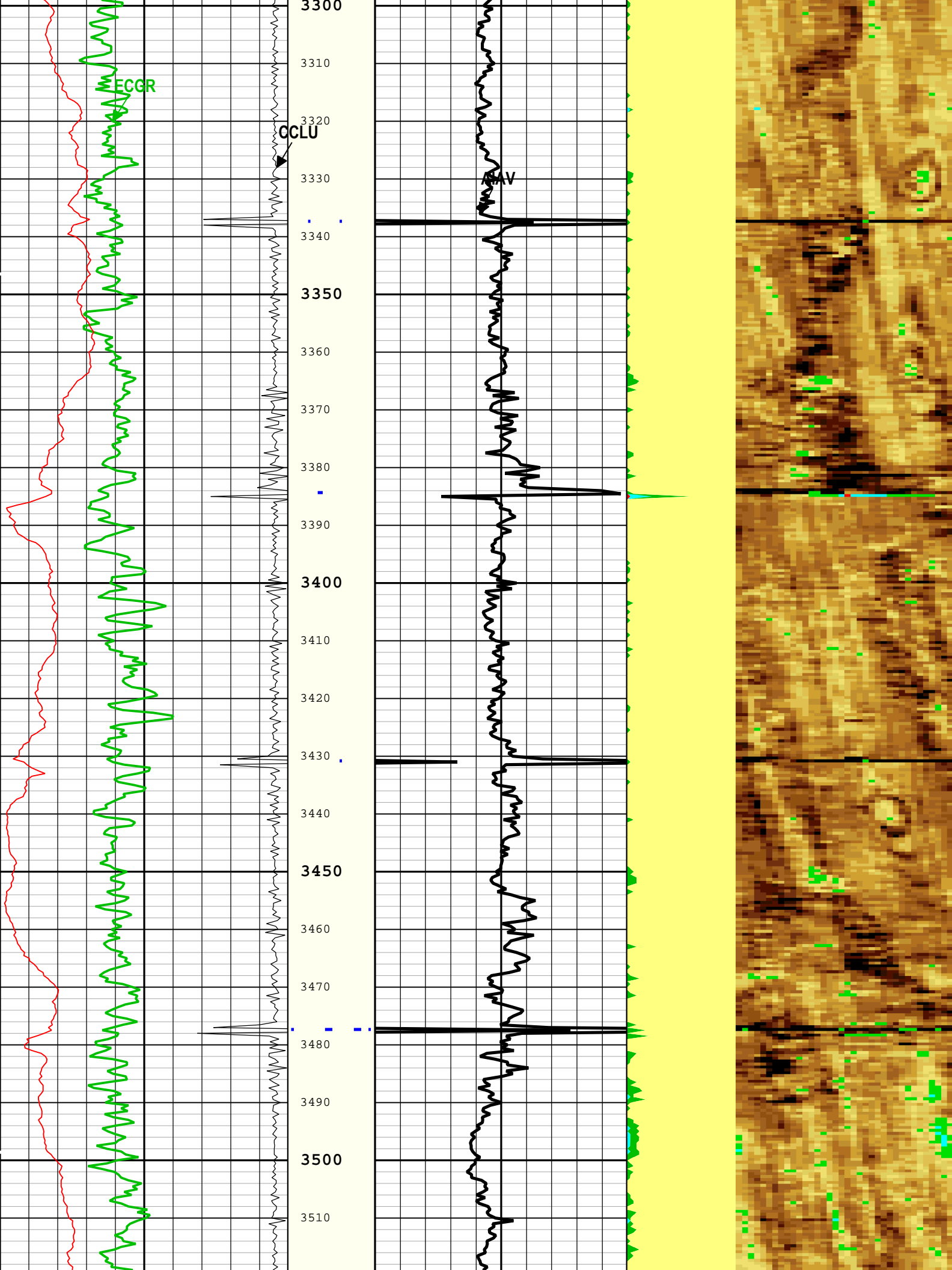


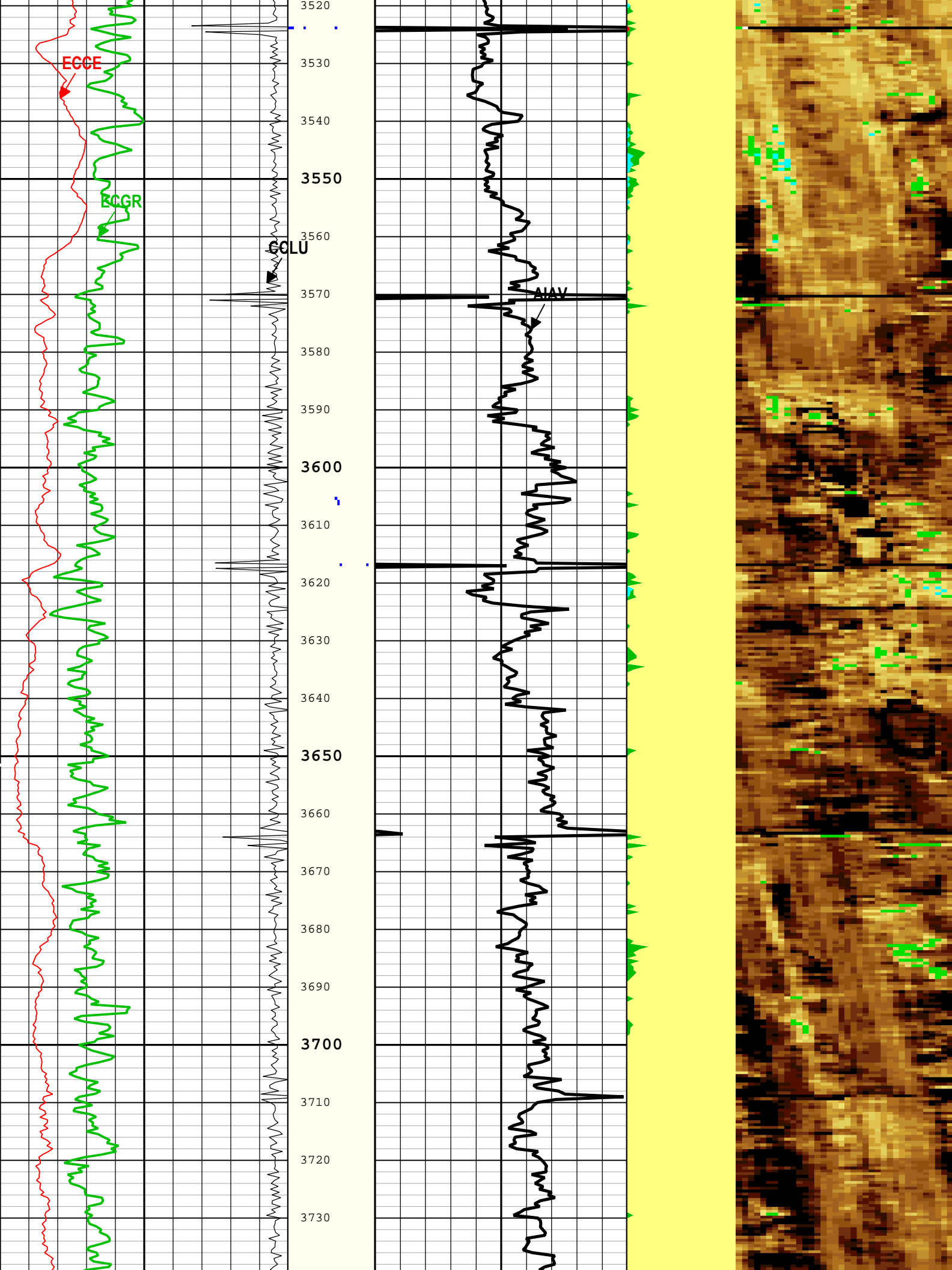


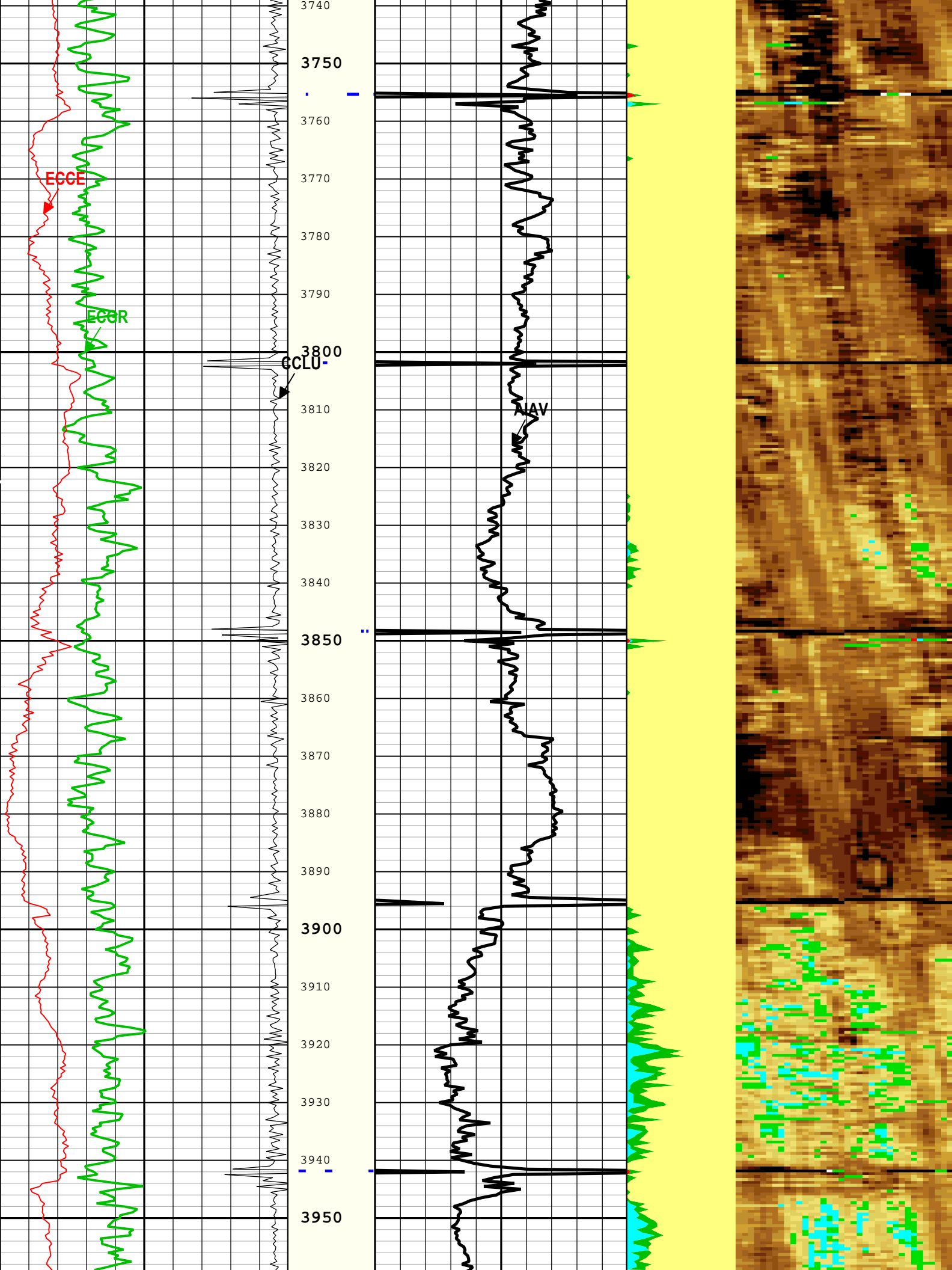


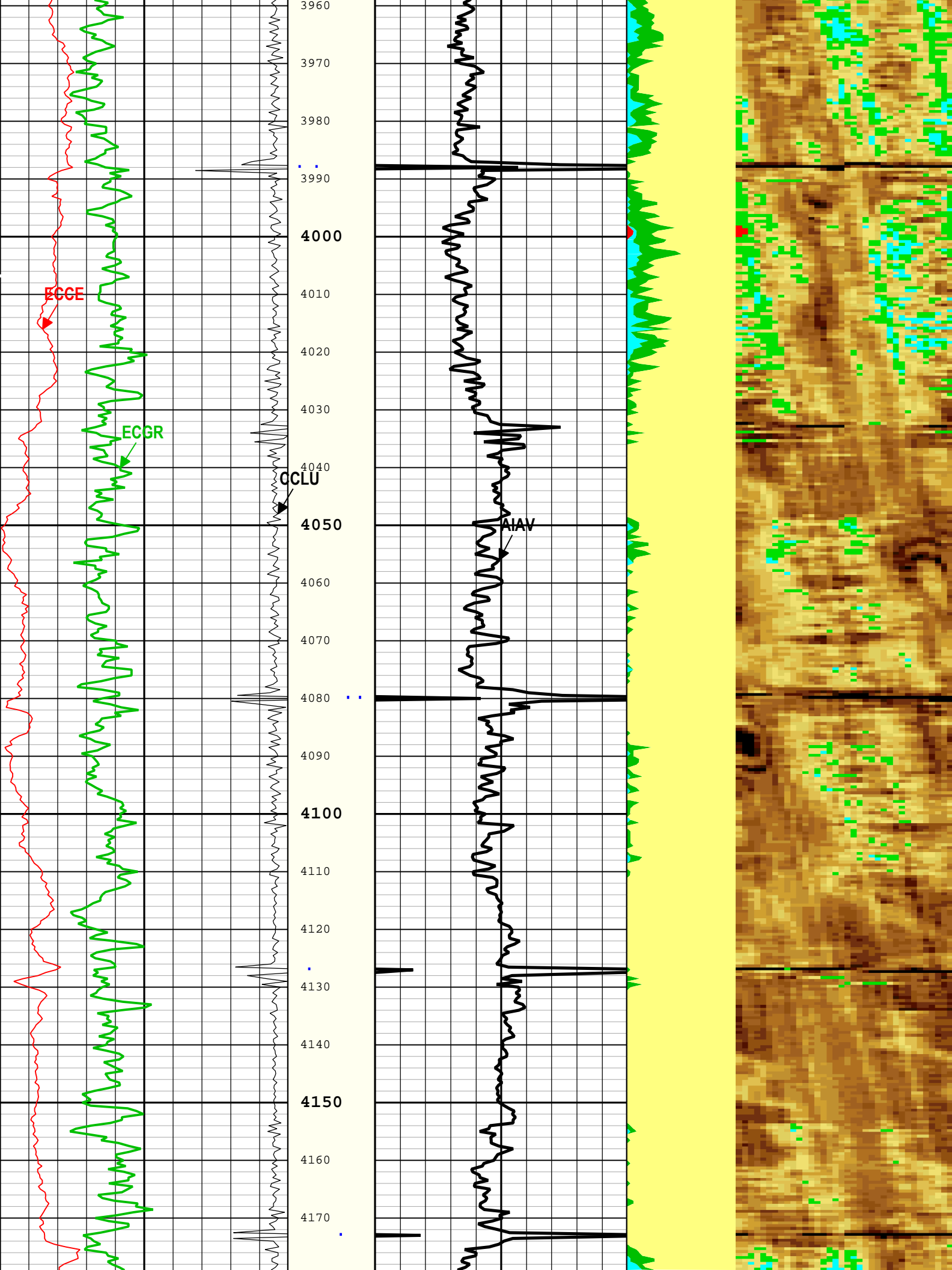


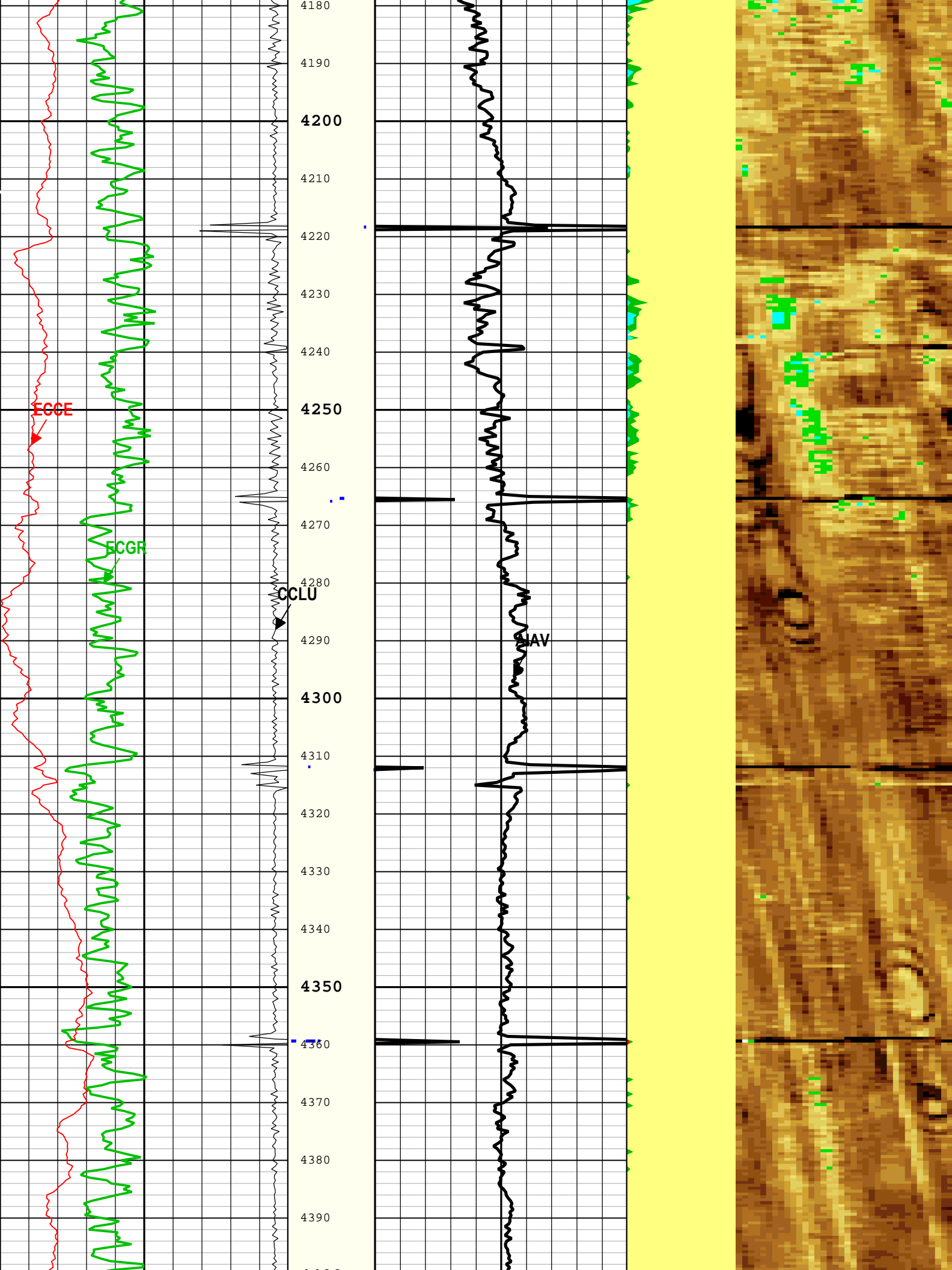


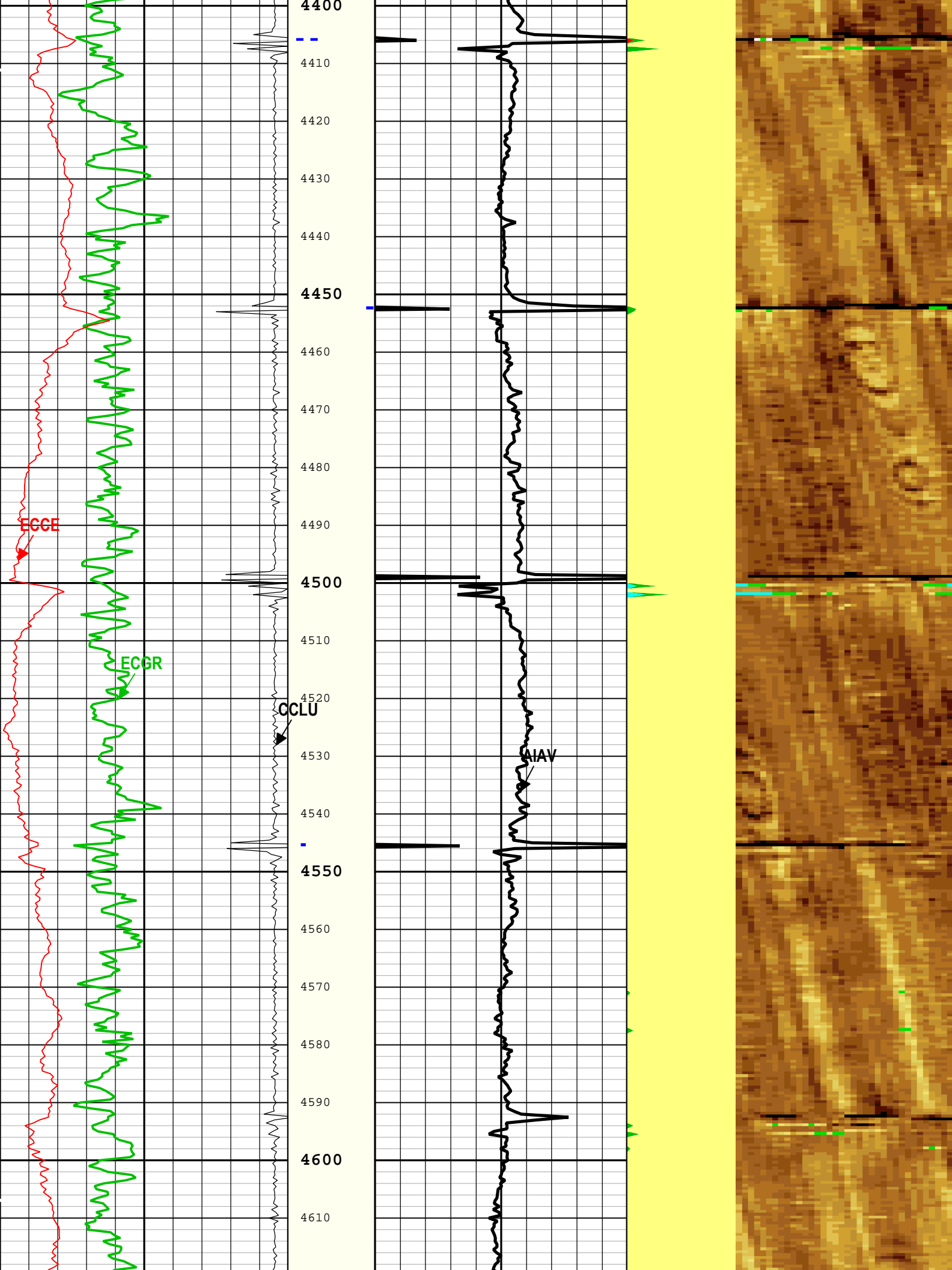


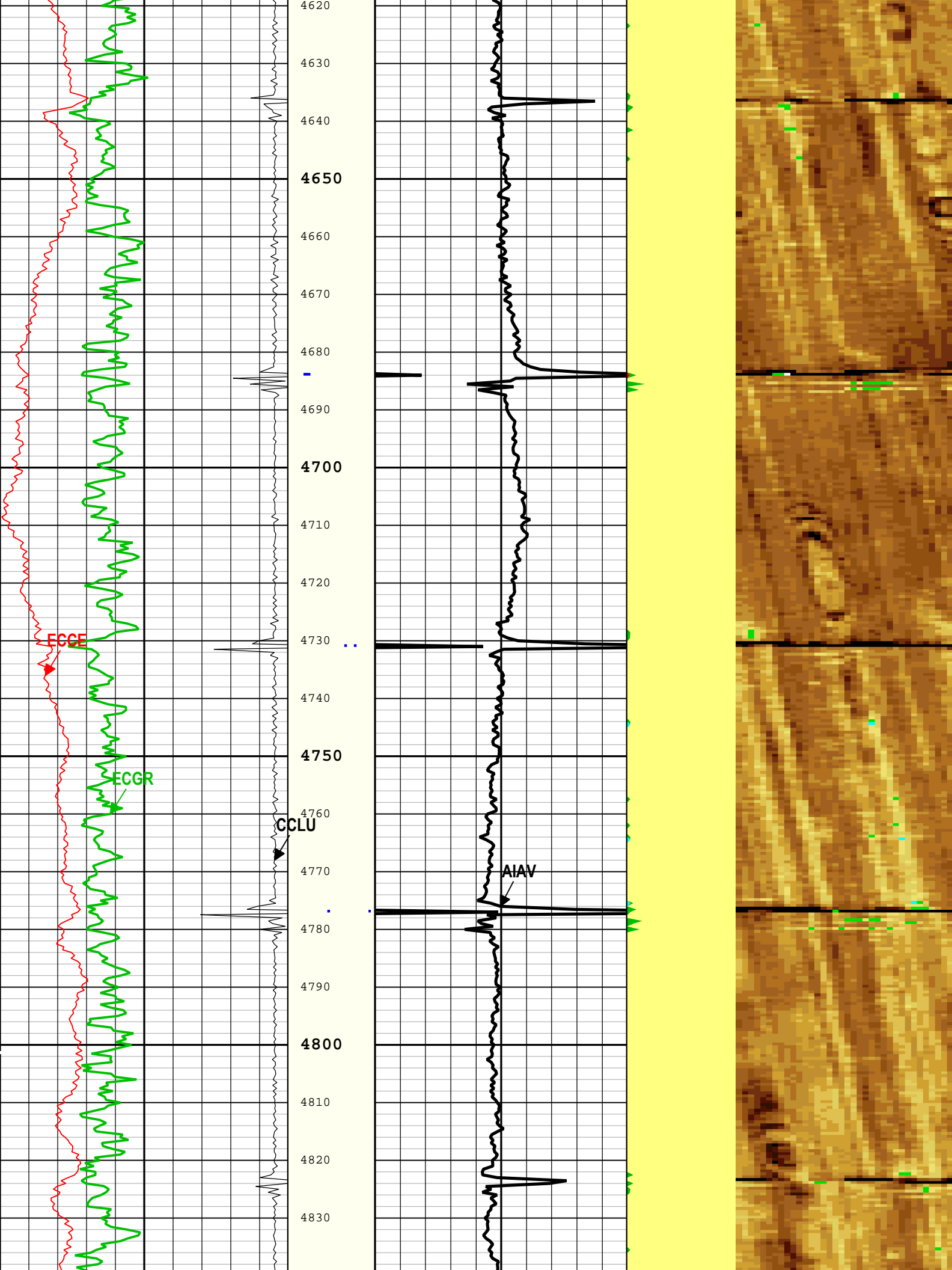


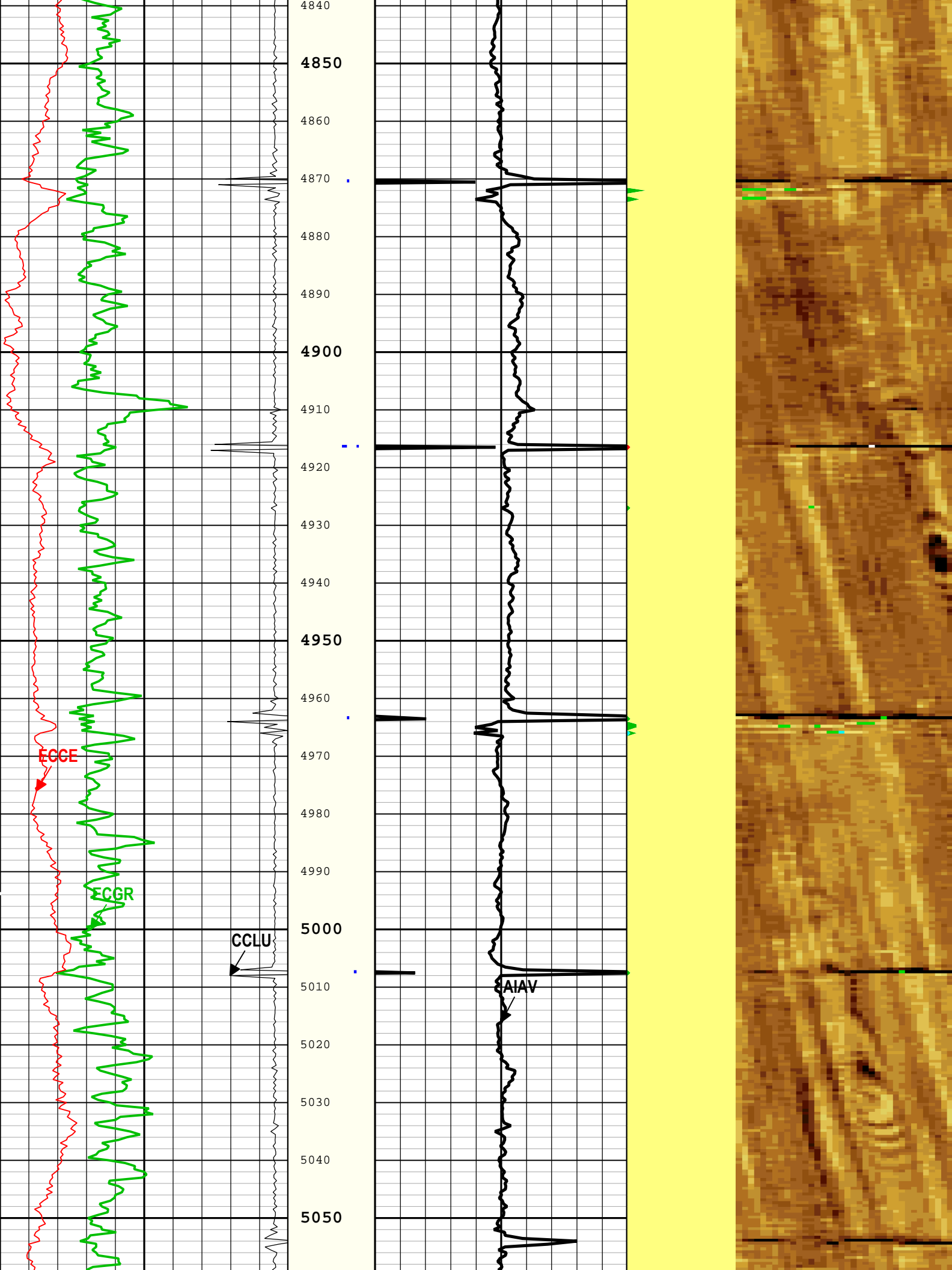


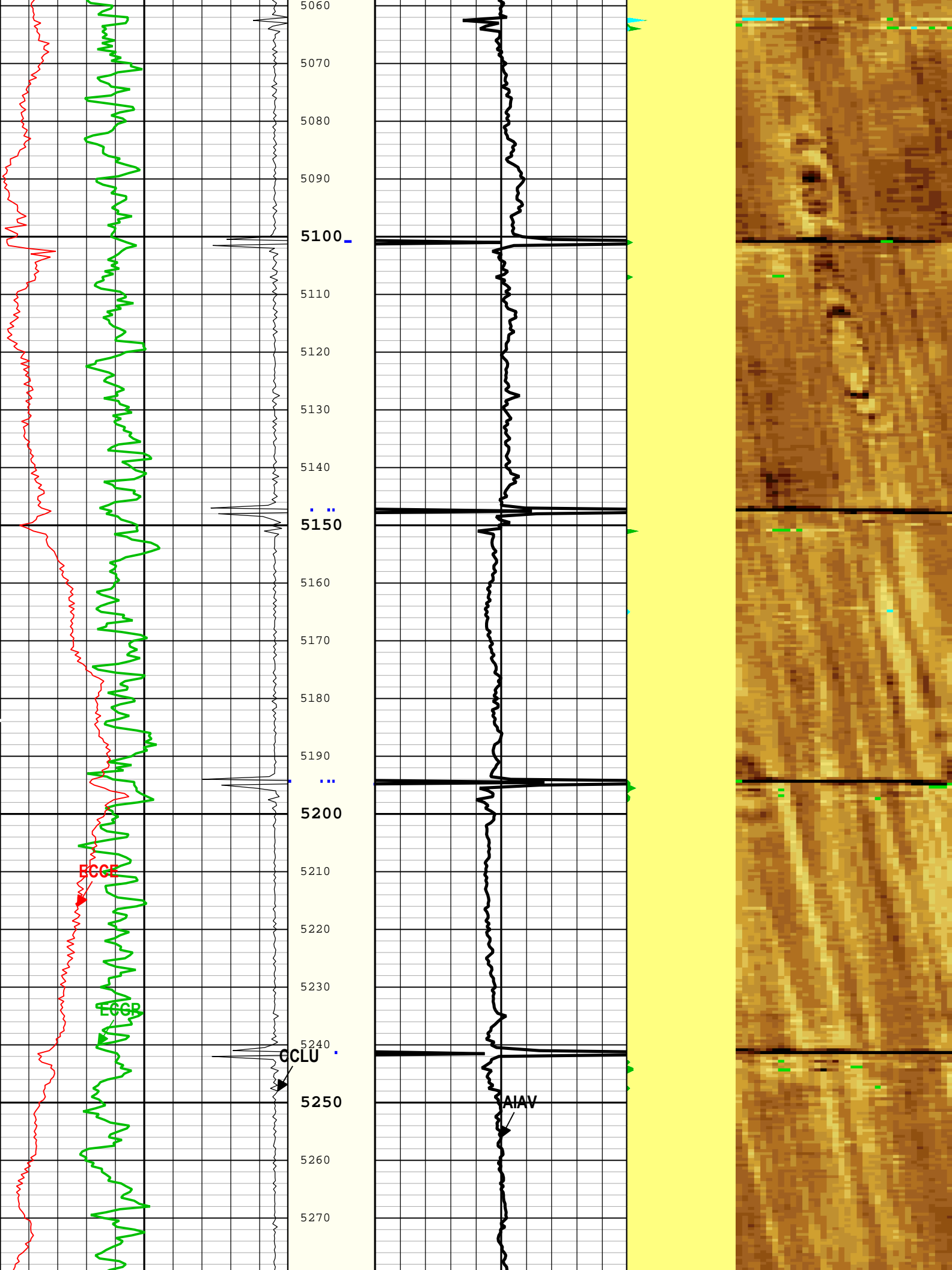


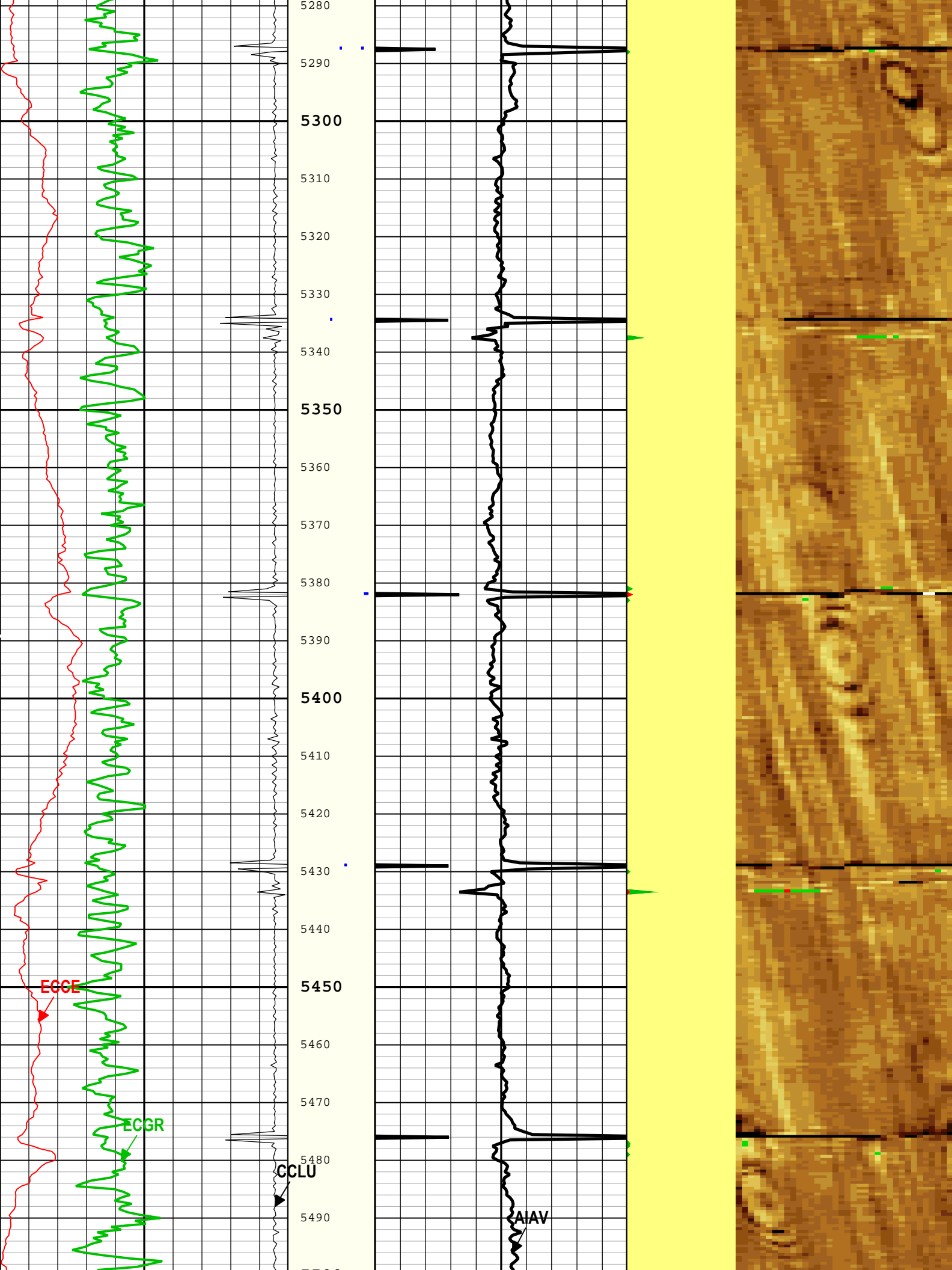


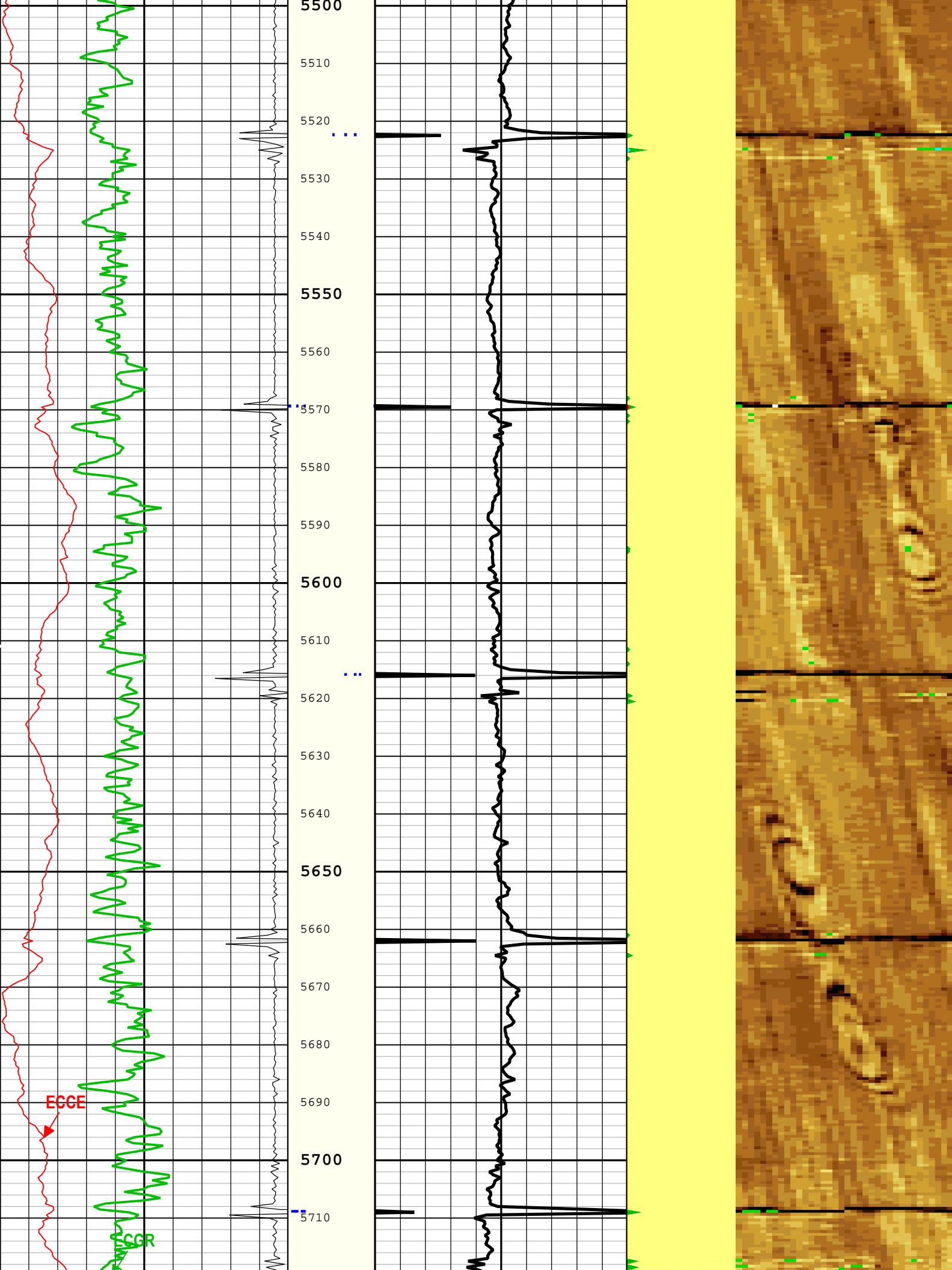


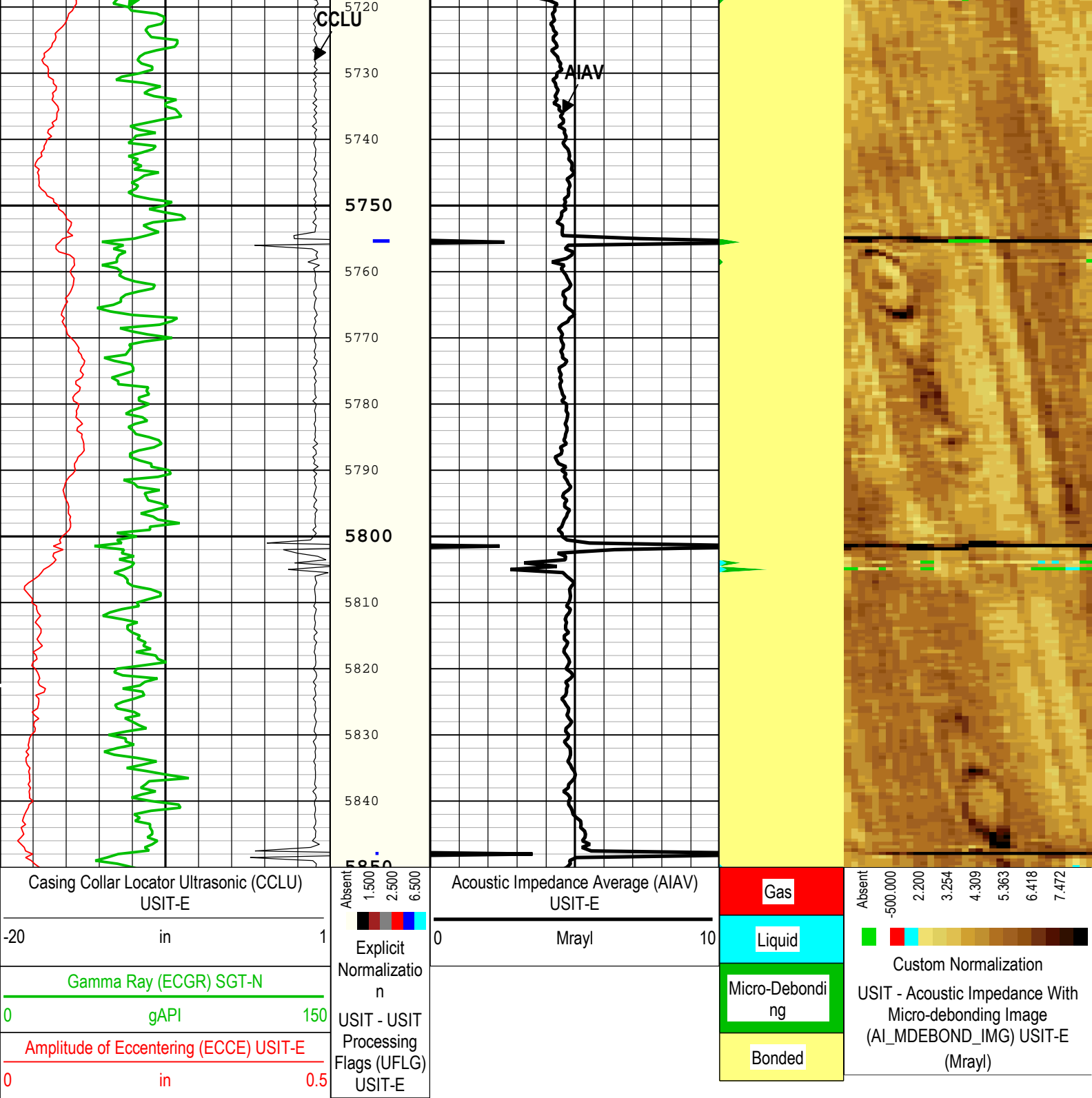












DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized 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	1.15	
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	86	110	
BS	13.5	110	1932	
BS	8.5	1932	5850	
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	7000	ft
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	45	18-Sep-2017 00:24:43	18-Sep-2017 00:25:12	6452.27	6449.82
EMXV	55	18-Sep-2017 00:25:12	18-Sep-2017 00:42:03	6449.82	6402.26

EMXV	65	18-Sep-2017 00:42:03	18-Sep-2017 00:44:07	6402.26	6170.35
EMXV	70	18-Sep-2017 00:44:07	18-Sep-2017 01:33:32	6170.35	76.03
WINB	31.88	18-Sep-2017 00:24:43	18-Sep-2017 01:30:14	6452.27	160.15
WINB	35.04	18-Sep-2017 01:30:14	18-Sep-2017 01:30:33	160.15	149.94
WINB	41.18	18-Sep-2017 01:30:33	18-Sep-2017 01:33:32	149.94	76.03
WINE	71.88	18-Sep-2017 00:24:43	18-Sep-2017 00:24:57	6452.27	6449.85
WINE	79.55	18-Sep-2017 00:24:57	18-Sep-2017 00:24:59	6449.85	6449.82
WINE	75.71	18-Sep-2017 00:24:59	18-Sep-2017 00:42:09	6449.82	6394.72
WINE	68.81	18-Sep-2017 00:42:09	18-Sep-2017 00:46:03	6394.72	5811.04
WINE	69.57	18-Sep-2017 00:46:03	18-Sep-2017 01:23:56	5811.04	680.86
WINE	71.88	18-Sep-2017 01:23:56	18-Sep-2017 01:33:32	680.86	76.03

All depth are at tool zero.

ONE

0 PSI Repeat Pass

Software Version	
Acquisition System	Version
Maxwell 2017 SP2	7.2.87778.3100

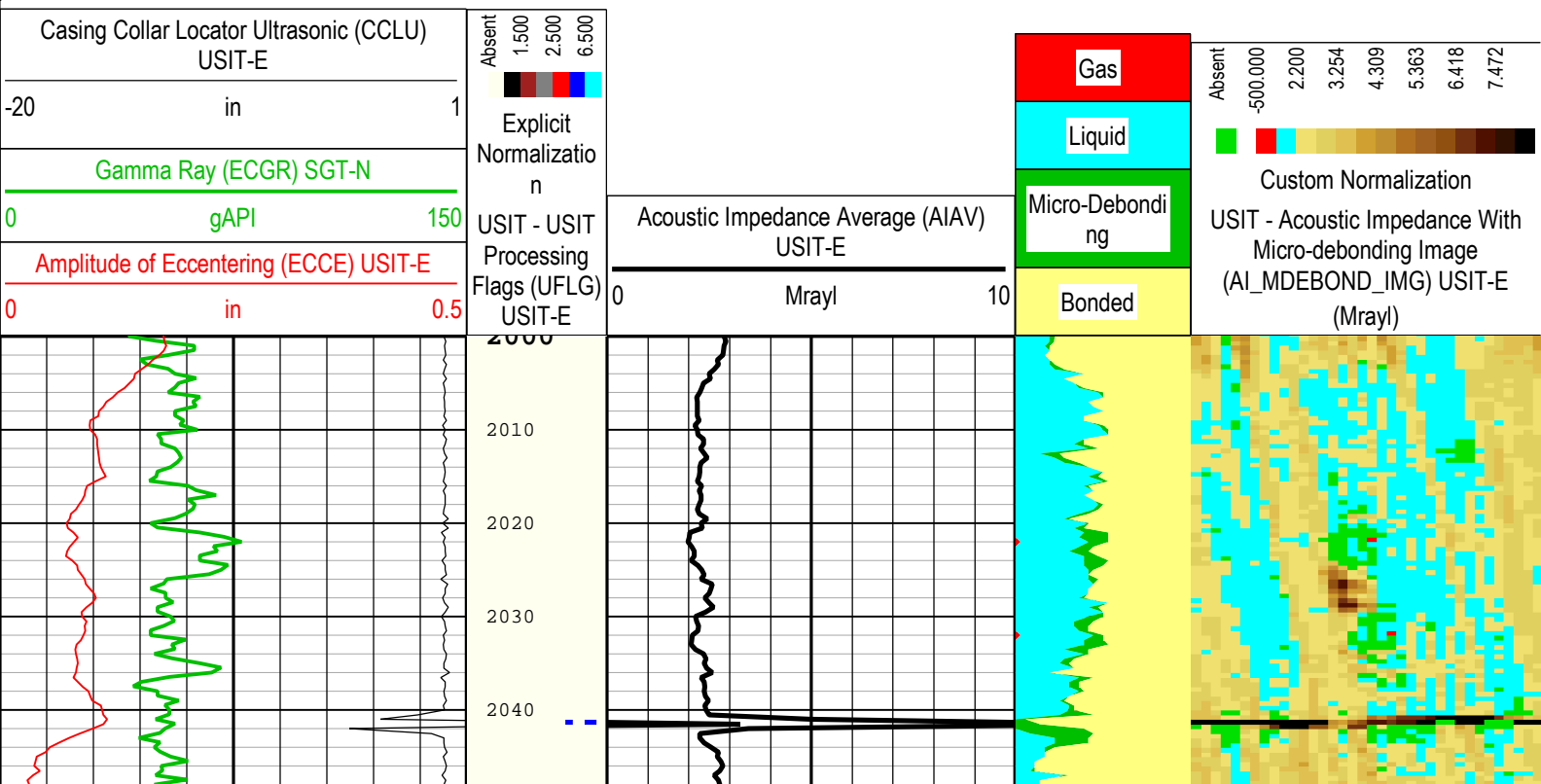
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[2]:Up	Up	1920.29 ft	2533.21 ft	17-Sep-2017 11:51:05 PM	17-Sep-2017 11:55:22 PM	ON	1.28 ft	Yes

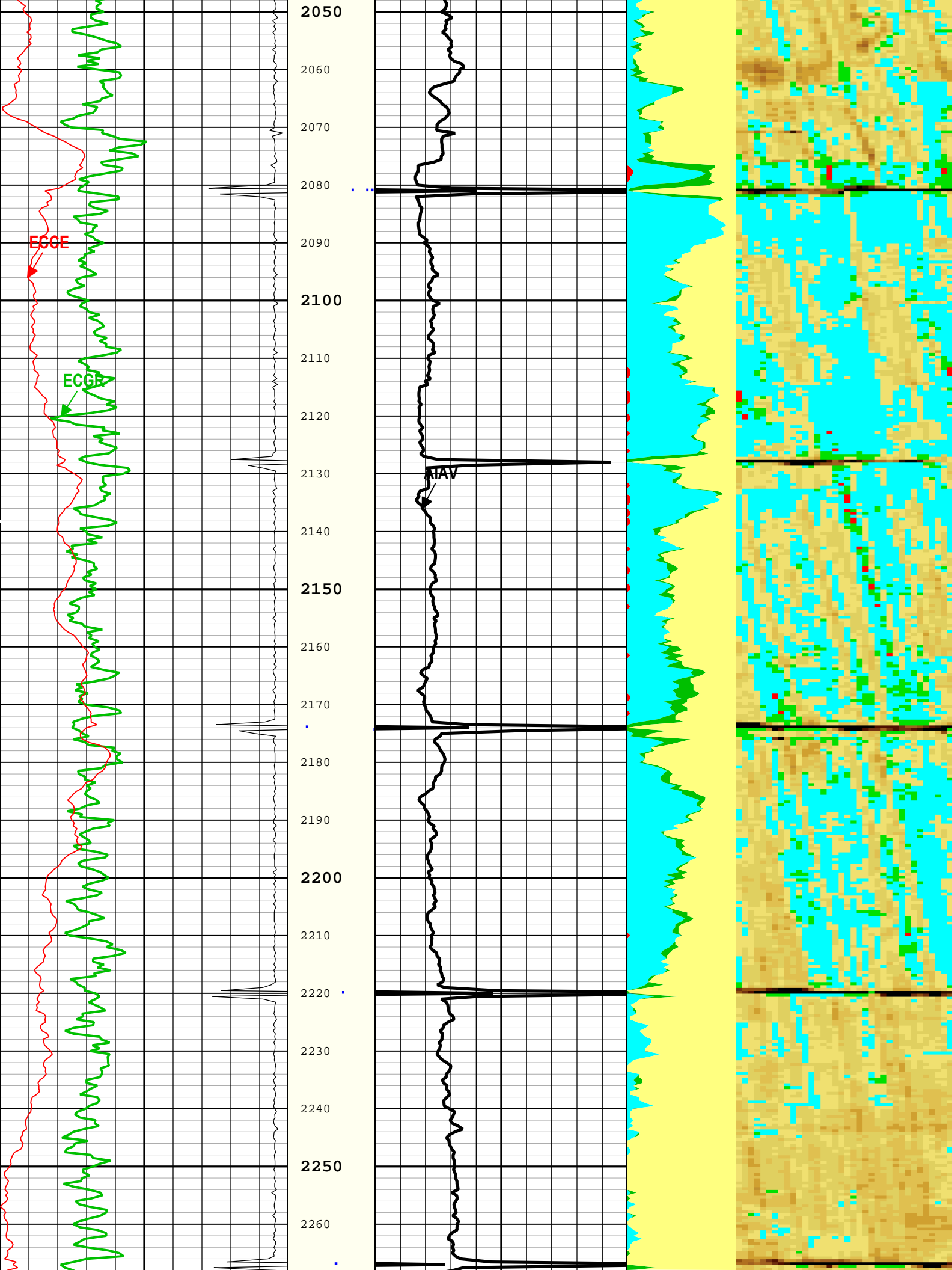
All depths are referenced to toolstring zero

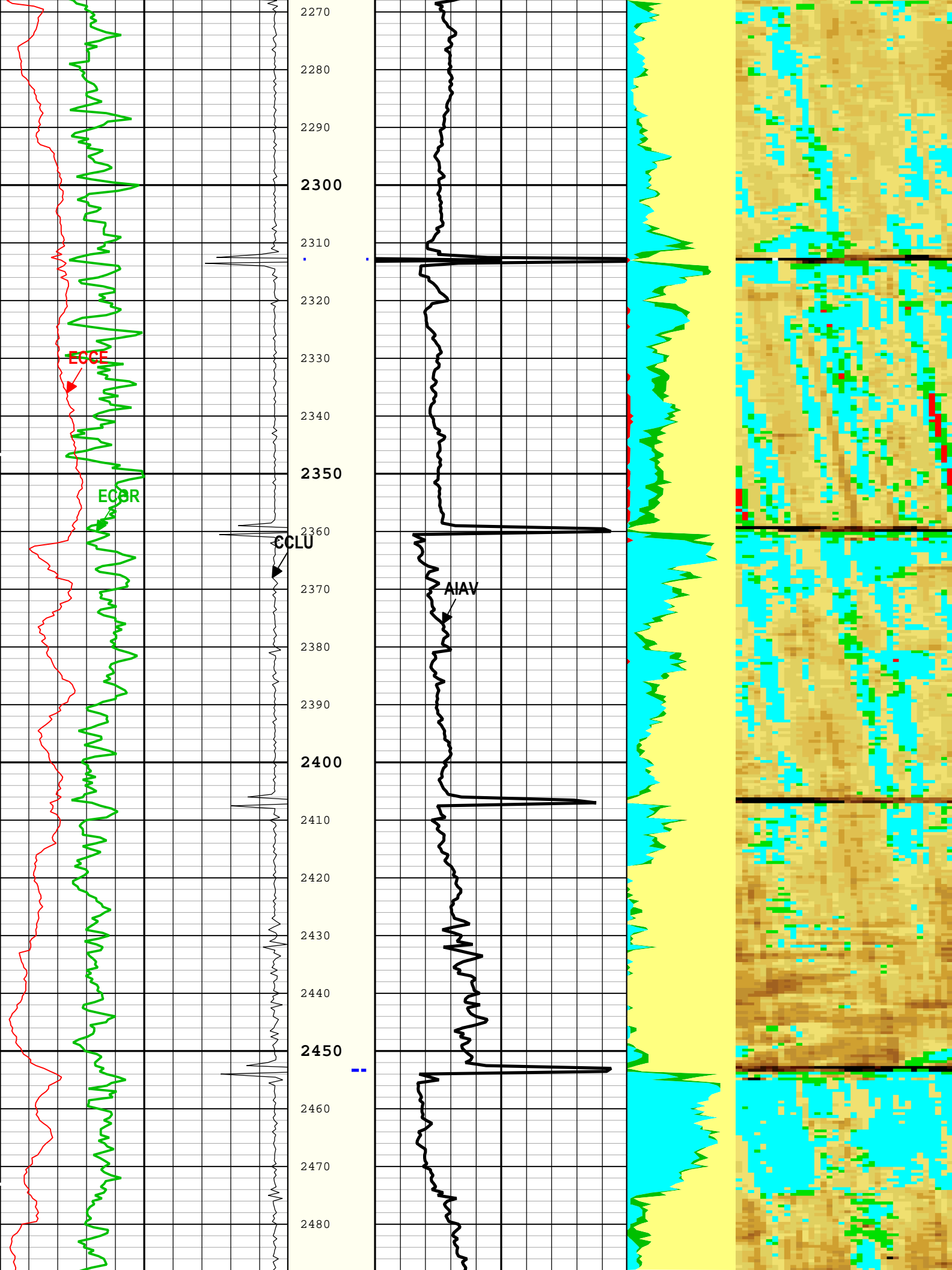
Log	Company:Noble Energy INC Well:Wells Ranch BB11-658 ONE: Log[2]:Up:S006
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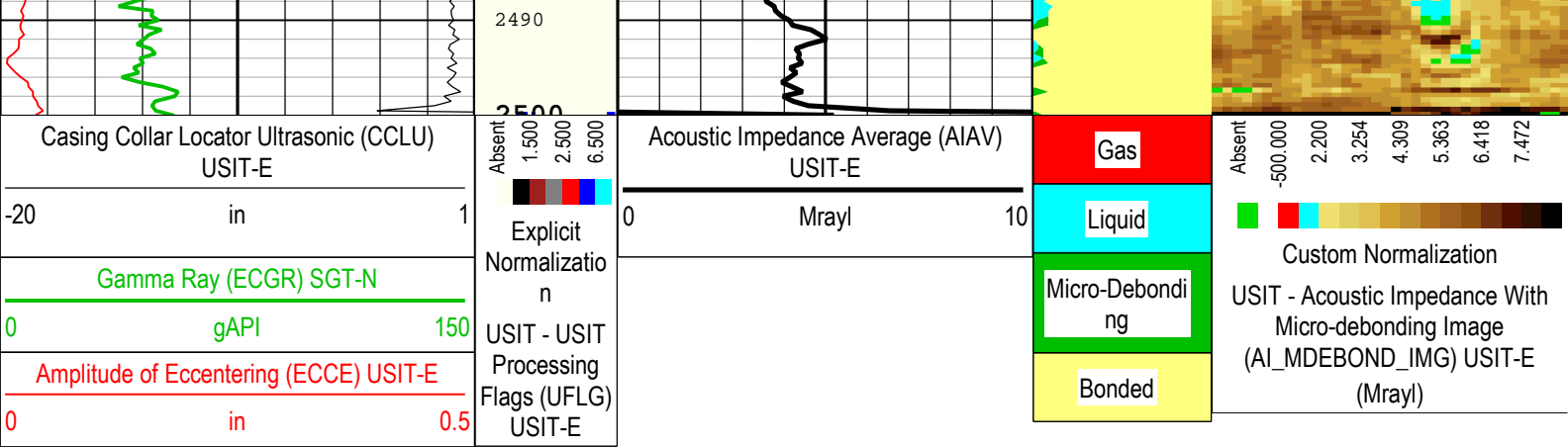
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Creation Date: 18-Sep-2017 02:55:08

TIME_1900 - Time Marked every 60.00 (s)









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	3000	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

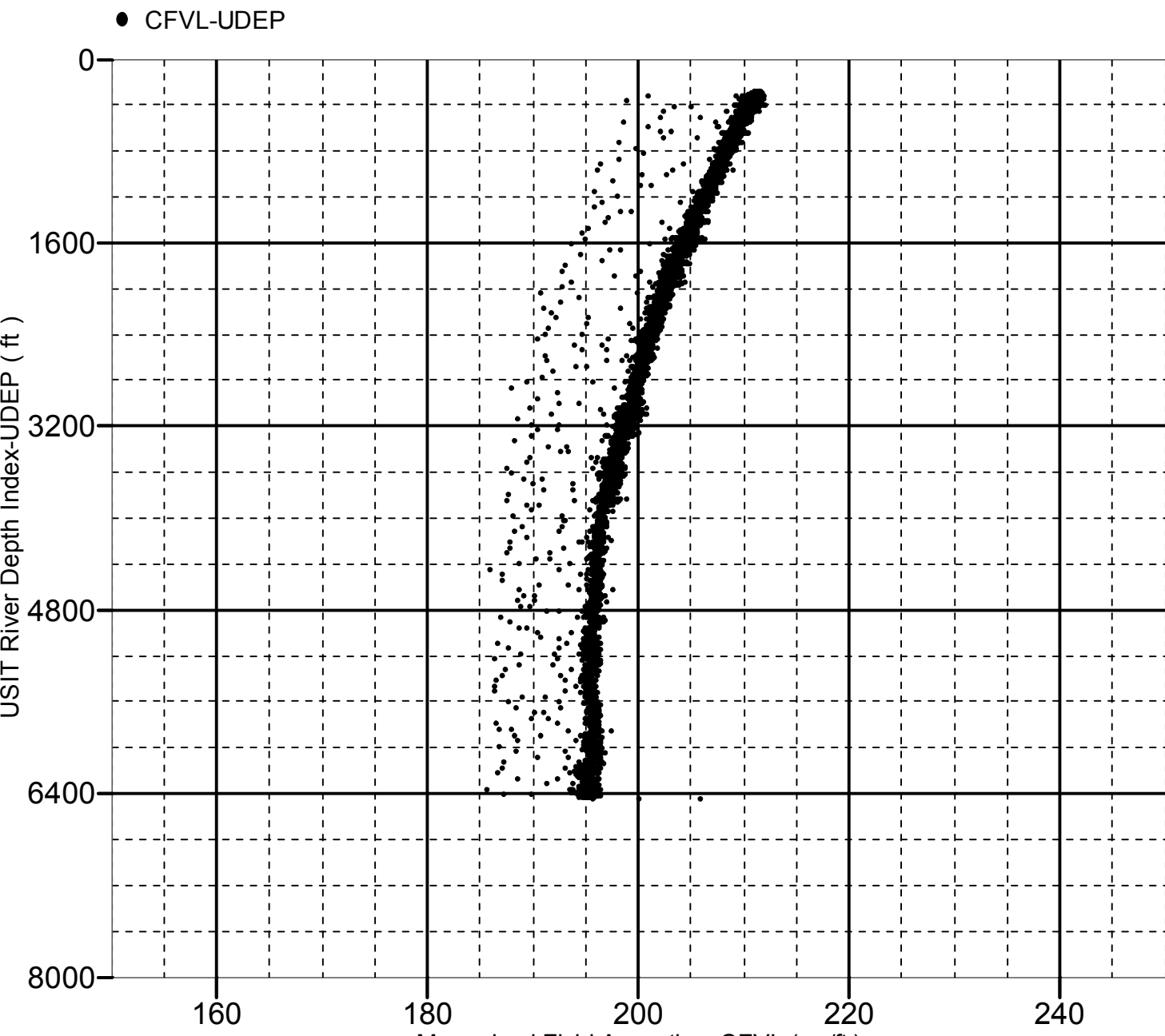
Company:Noble Energy INC Well:Wells Ranch BB11-658

ONE: Log[5]:Up:S006

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 5850.00 to 86.00 ft

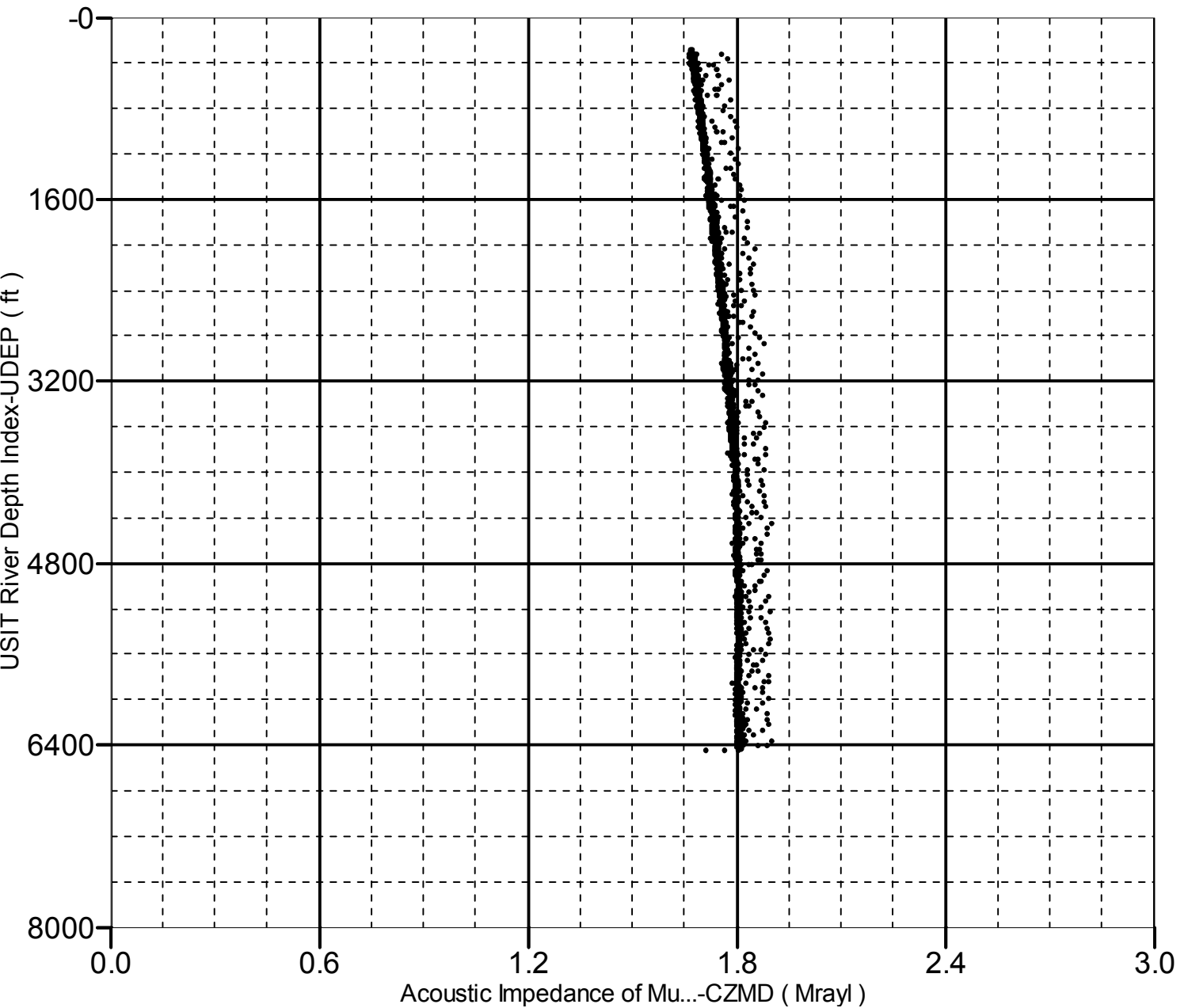


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 5850.00 to 86.00 ft

● CZMD-UDEP



Company:	Noble Energy INC	Schlumberger
Well:	Wells Ranch BB11-658	
Field:	Wattenberg	
County:	WELD	
State:	Colorado	

UltraSonic Summary Print