

Company: Noble Energy Inc

Well: Vigilant State AC16-01

Field: Wattenberg

County: Weld

State: Colorado

Isolation Scanner	
Cement Evaluation	
FIELD PRINT	
NENE Sec. 16, T7N, R63W	
SHL: 745 FNL X 679' FEL	
Elev.: K.B. 4879.00 ft	G.L. 4866.00 ft
D.F. 4879.00 ft	
Permanent Datum: Ground Level	
Log Measured From: Kelly Bushing	
Drilling Measured From: Kelly Bushing	
Elev.: 4866.00 ft	
13.00 ft above Perm. Datum	
LOCATION	
API Serial No. 05-123-37246-000C	
Section 16	
Township 7N	
Range 63W	

	Run 1	Run 2	Run 3
Oil Density			
Water Salinity			
Gas Gravity			
Bo			
Bw			
1/Bg			
Bubble Point Pressure			
Bubble Point Temperature			
Solution GOR			
Maximum Deviation	0 deg		
CEMENTING DATA			
Primary/Squeeze	Primary		
Casing String No			
Lead Cement Type			
Volume			
Density			
Water Loss			
Additives			
Tail Cement Type			
Volume			
Density			
Water Loss			
Additives			
Expected Cement Top			

Logging Date		8-Jul-2013	
Run Number	1		
Depth Driller	8990 ft		
Schlumberger Depth	8820 ft		
Bottom Log Interval	8830 ft		
Top Log Interval	0 ft		
Casing Fluid Type	Fresh Water		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	0 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.750 in		
From			
To			
Casing/Tubing Size	7.000 in		
Weight	26 lbm/ft		
Grade	L-80		
From			
To			
Maximum Recorded Temperatures			
Logger On Bottom	8-Jul-2013		13:45
Unit Number	3022	Ft. Morgan, CO	
Recorded By	Tim Hoffman		
Witnessed By	Brett Fisher		

## DEPTH SUMMARY LISTING

Date Created: 8-JUL-2013 16:11:22

## Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-39P-LXS
Serial Number:	7249	Serial Number:	1109	Serial Number:	
Calibration Date:	12-June-2013	Calibration Date:	30-May-2013	Length:	17100 FT
Calibrator Serial Number:		Calibrator Serial Number:	78135	Conveyance Method:	Wireline
Calibration Cable Type:	7-39P-LXS	Number of Calibration Points:	10	Rig Type:	LAND
Wheel Correction 1:	-4	Calibration RMS:	15		
Wheel Correction 2:	-4	Calibration Peak Error:	26		

## Depth Control Parameters

Log Sequence:	Subsequent Trip To the Well
Reference Log Name:	Haliburton Dual Spaced Neutron log
Reference Log Run Number:	1
Reference Log Date:	27-June-2013
Subsequent Trip Down Log Correction:	

### Depth Control Remarks

1. All Schlumberger depth control policies followed.
2. IDW used as primary depth reference. Z-Chart used as secondary
- 3.
- 4.
- 5.
- 6.

## DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

OTHER SERVICES1 OS1:   None OS2: OS3: OS4: OS5:	OTHER SERVICES2 OS1: OS2: OS3: OS4: OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Toolstring run as per tool sketch	
Well cemented on 30–June–2013 by Halliburton	
Well pressured up to 3000 psi for the main pass. 0 psi for the repeat	
First stage cement: 13.8 lbm/gal Expandacem to 6.893'	

Second stage cement: 15.8 lbm/gal HalCem G to 6,788'	
13.0 lbm/gal Varicem B1 to 5,489'	
10.0 lbm/gal Tuned Light B1 to 1,000'	
Tagged fill around 8845', logged up from 8830'	
Rig: Workover	
Crew: Jay Musgrave, Josh Strand	









RUN 1			RUN 2		
SERVICE ORDER #: CCN1-00015			SERVICE ORDER #:		
PROGRAM VERSION: 19C2-270			PROGRAM VERSION:		
FLUID LEVEL: 0 ft			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION					
RUN 1			RUN 2		

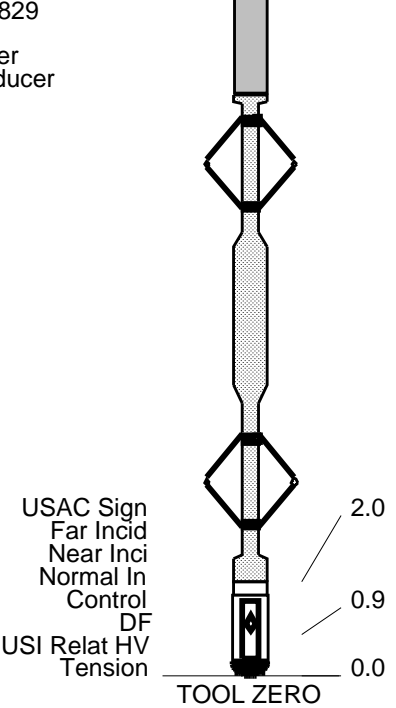
**SURFACE EQUIPMENT**

GSR-U/Y  
WITM (DTS)-A

**DOWNHOLE EQUIPMENT**

LEH-QT LEH-QT			33.9
DTC-H ECH-KC 9562 DTCH0-A DTCH1-A	CTEM		31.0
	TelStatus ToolStatu		28.0
SGT-N SGH-K 3039 SGC-TB SGD-TAB	Gamma Ray		28.0
			22.5
AH-107 AH-107			20.5
AH-CEN AH-CEN			16.7
USIT-E ECH-MFA 1964 USAC-A 992 USIS-A 2797 USSC-B			

BCS B-100158202 829  
Top Transducer  
Middle Top Transducer  
Middle Bottom Transducer  
Bottom Transducer

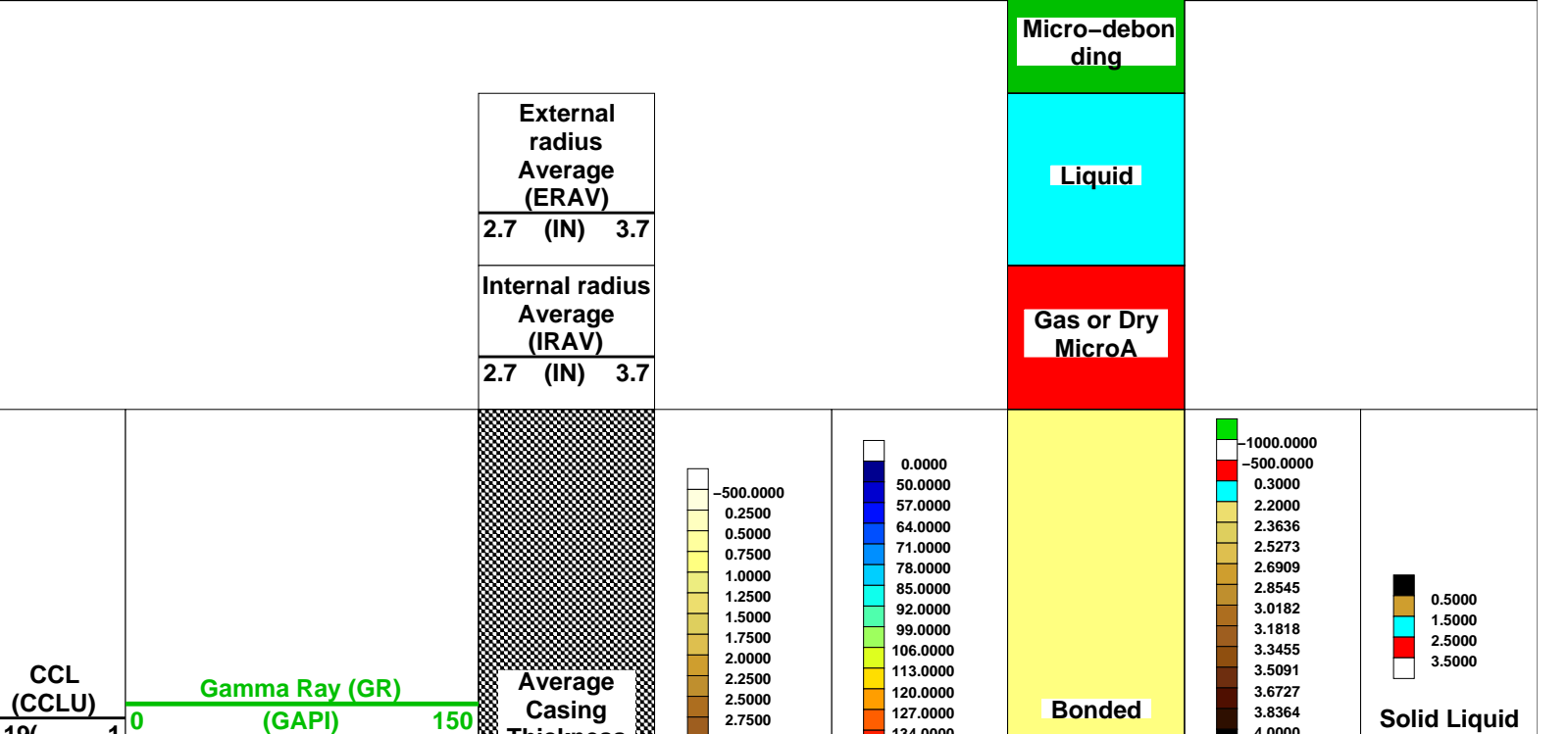


MAXIMUM STRING DIAMETER 7.50 IN  
MEASUREMENTS RELATIVE TO TOOL ZERO  
ALL LENGTHS IN FEET

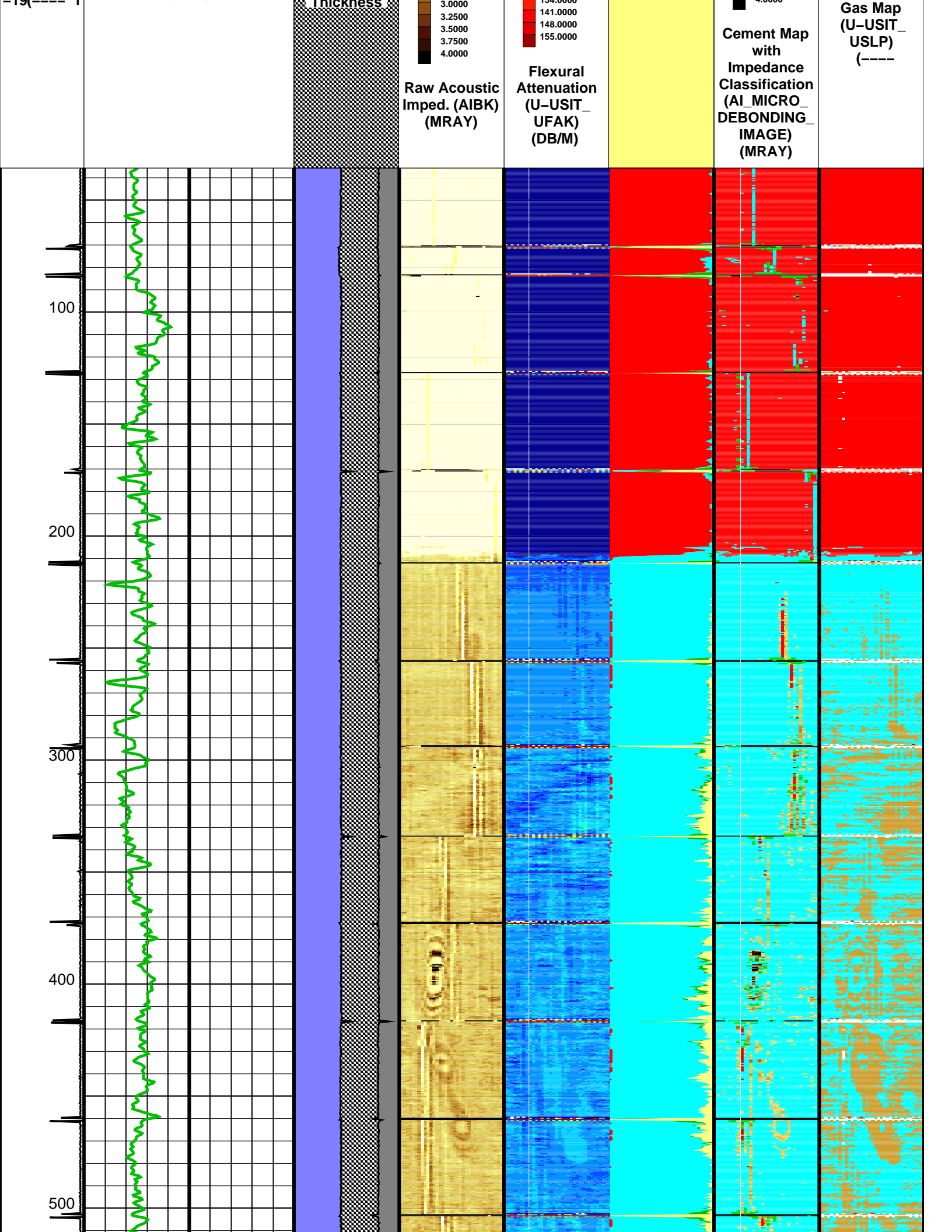
Company: Noble Energy Inc Well: Vigilant State AC16-01

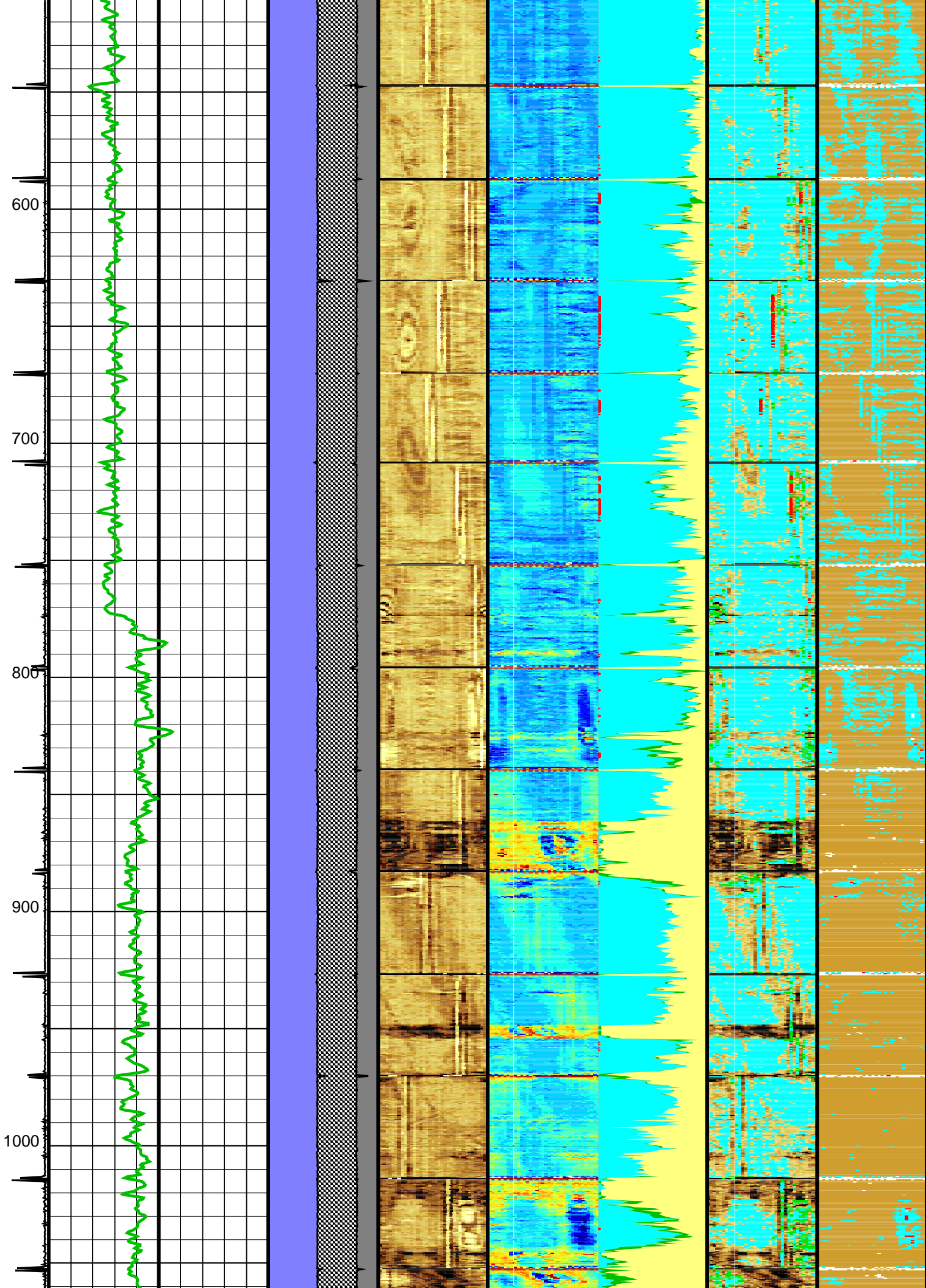
Input DLIS Files						
DEFAULT	Splice_USI_020CUP	FN:1	PRODUCER	10-Jul-2013 09:40	8812.0 FT	34.6 FT
Output DLIS Files						
DEFAULT	USI_021PUP	FN:12	PRODUCER	10-Jul-2013 09:42		

OP System Version: 19C2-270			
USIT-E	19C2-270	SGT-N	19C2-270
DTC-H	19C2-270		

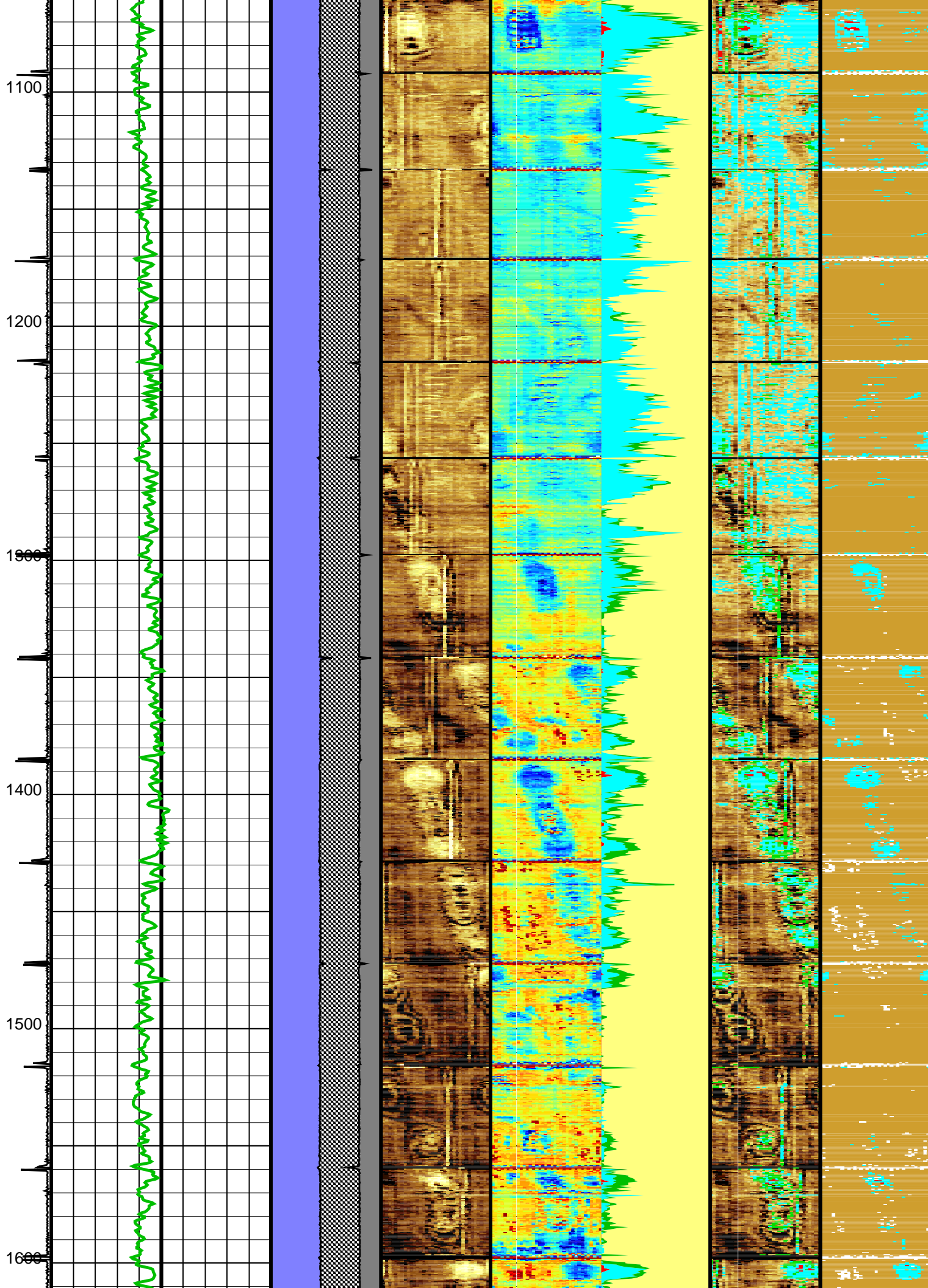


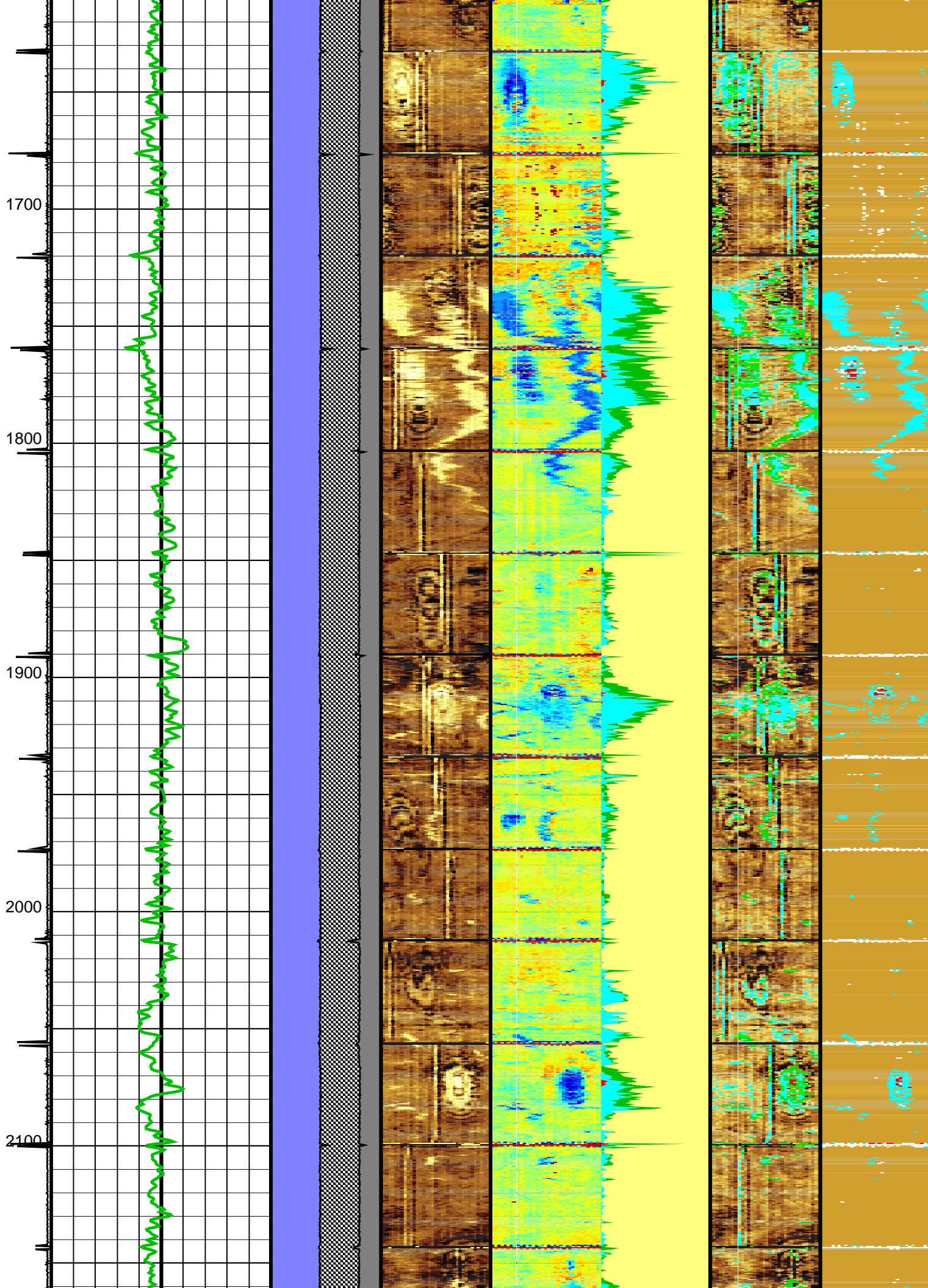




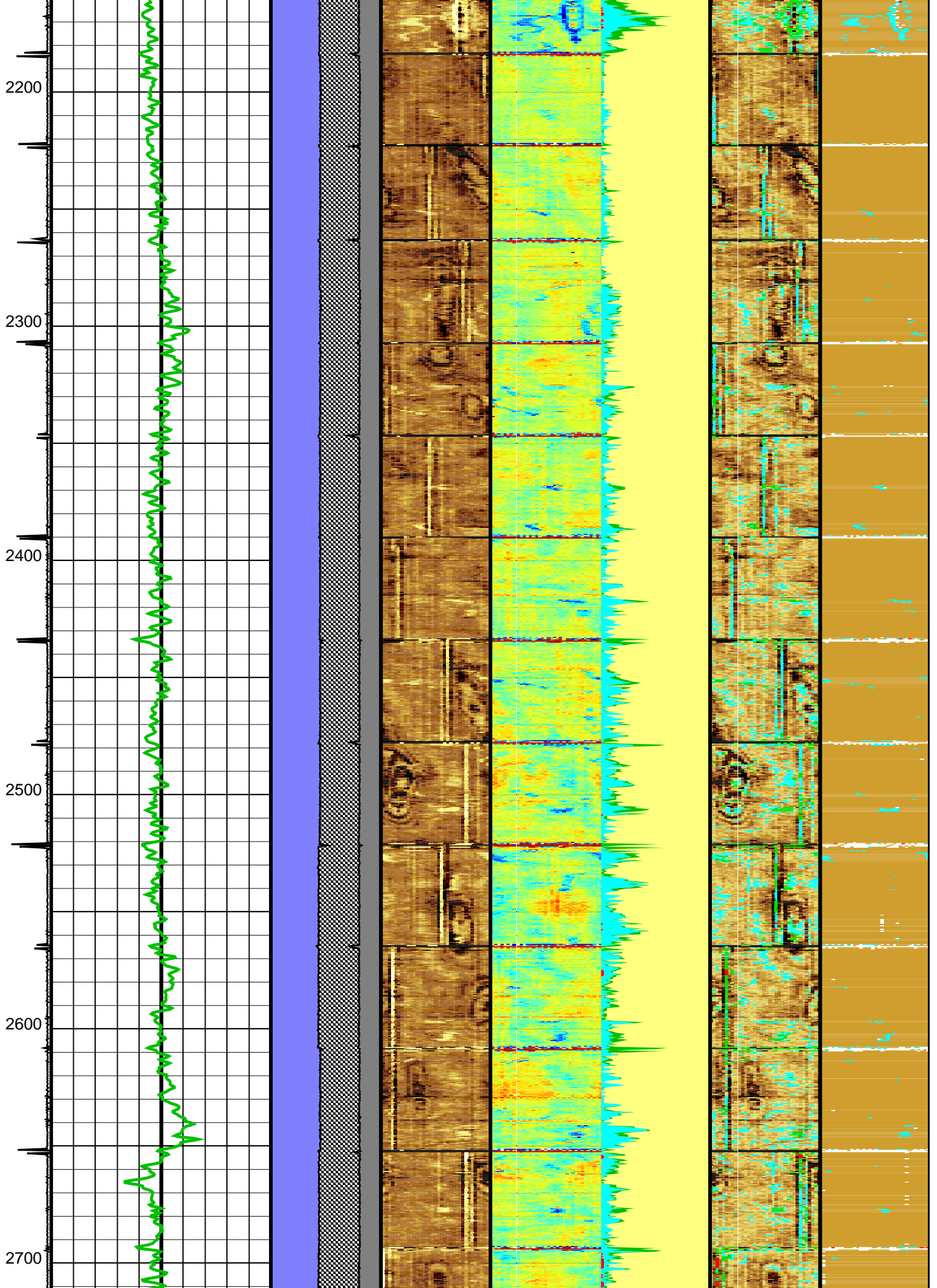


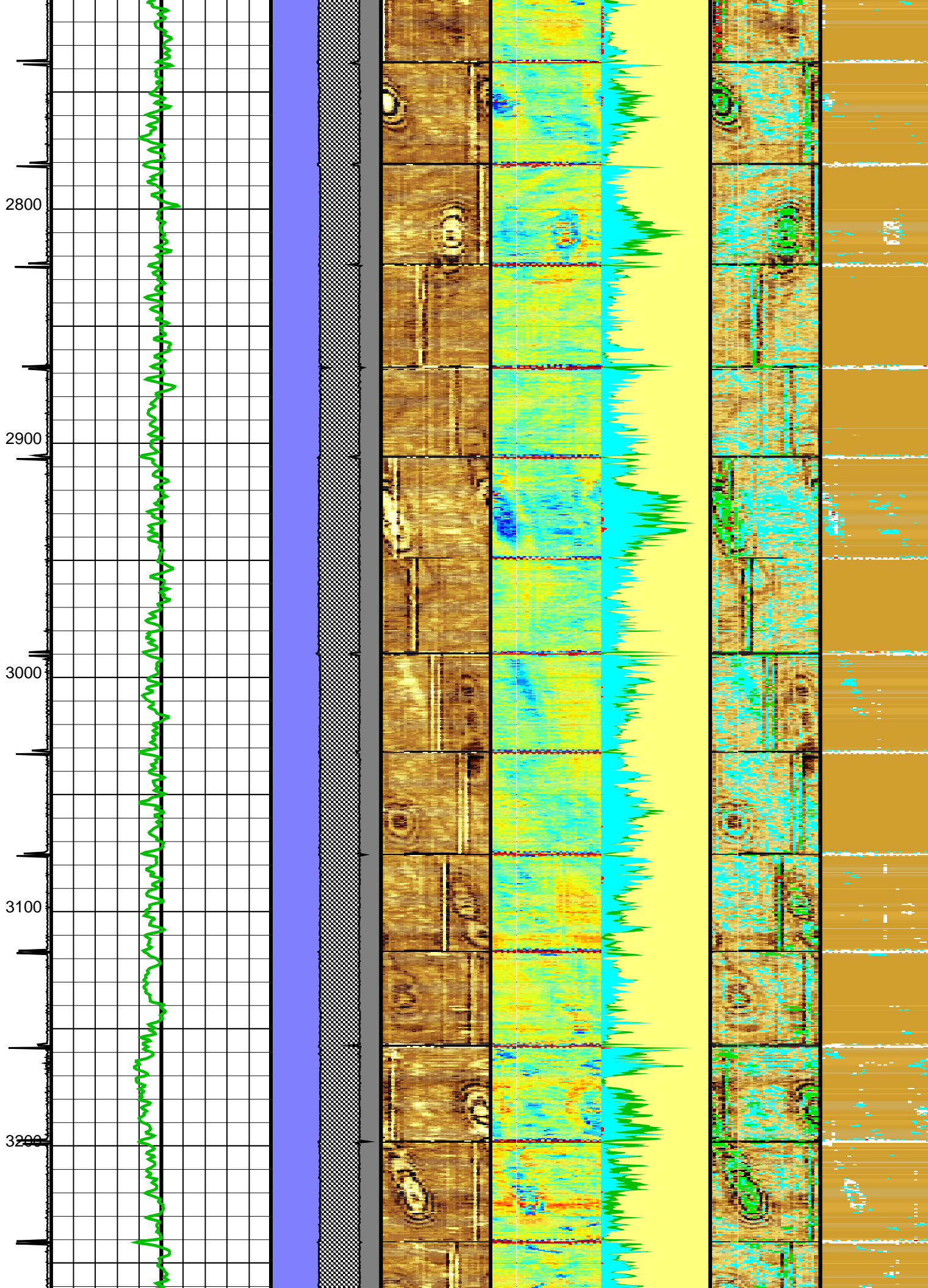




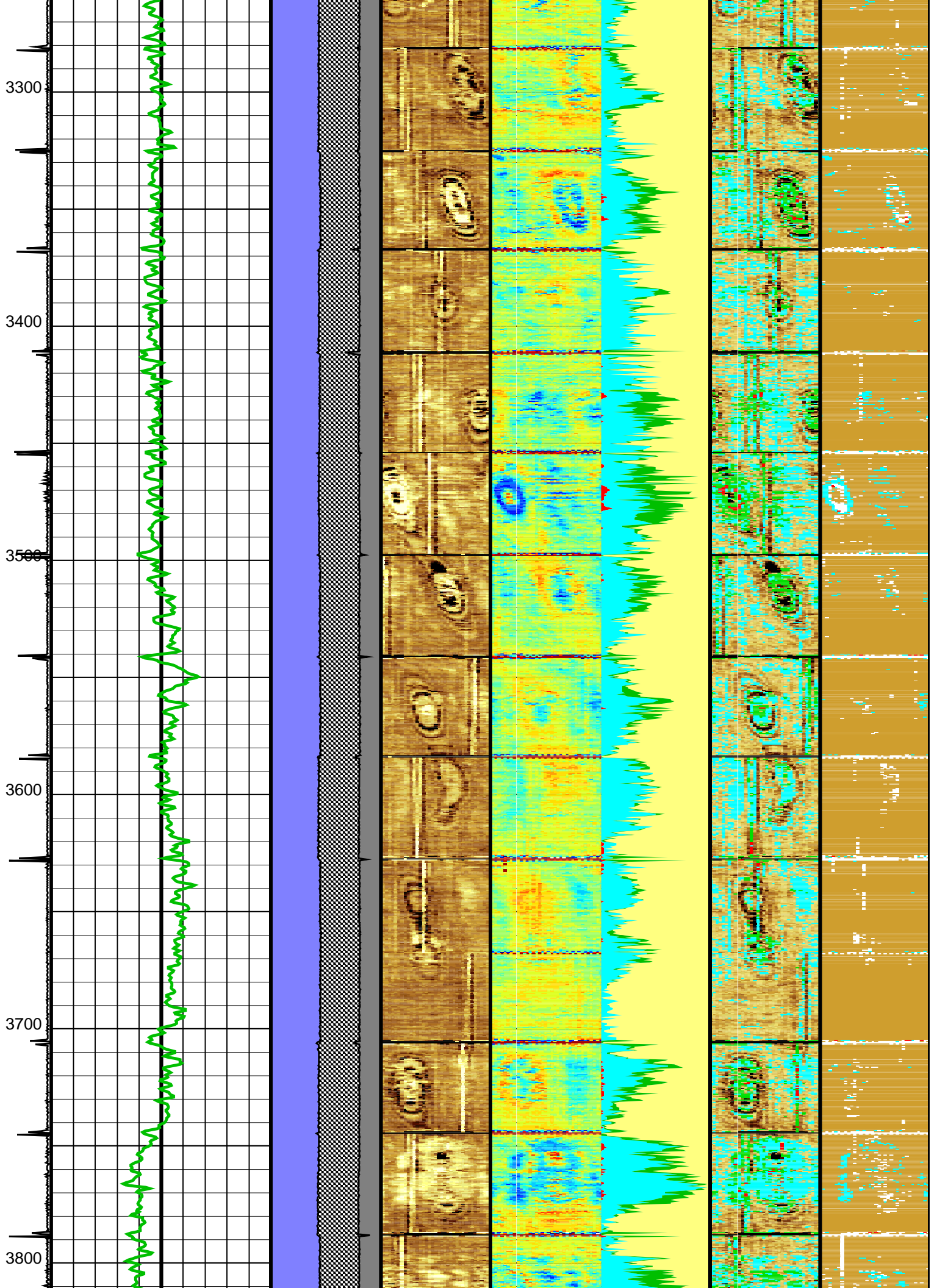


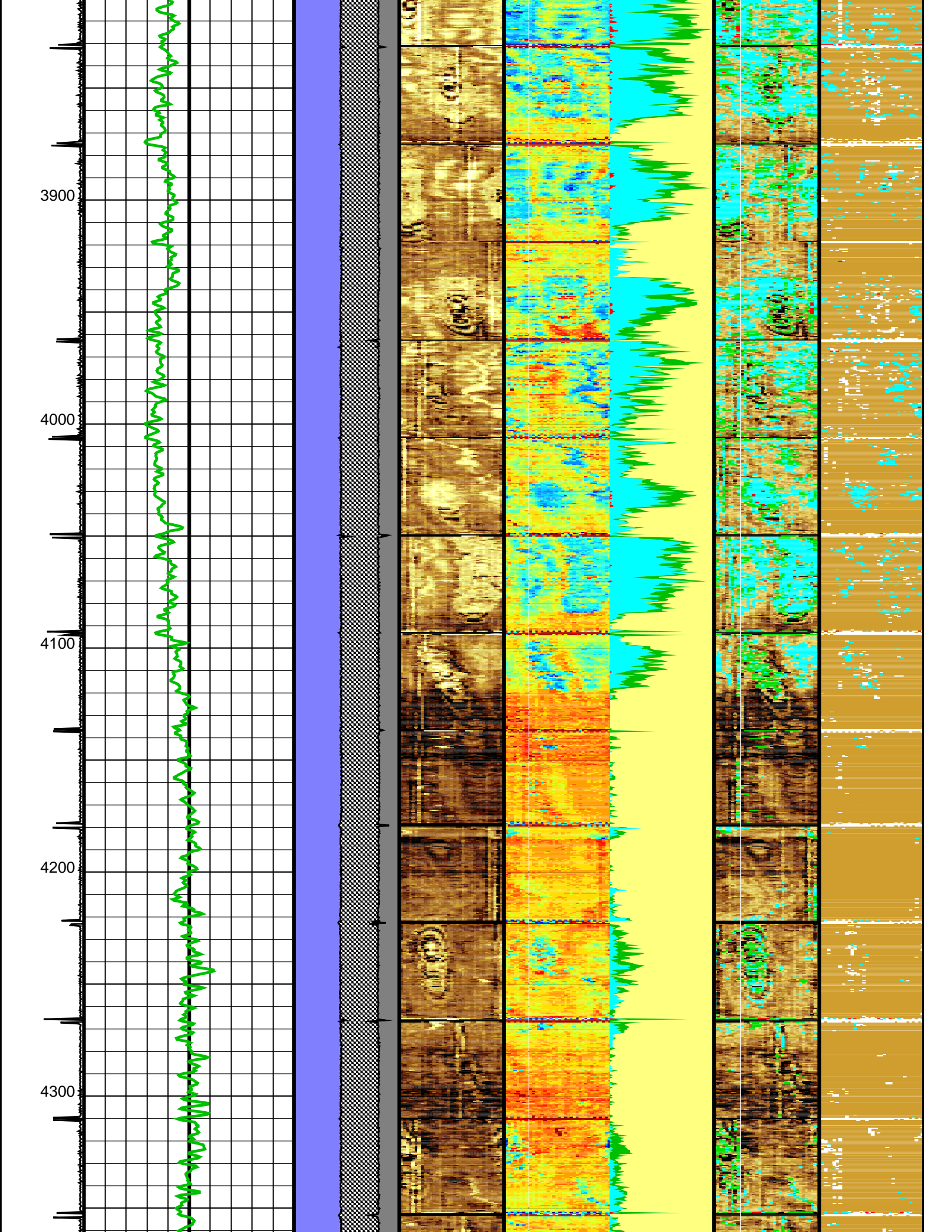




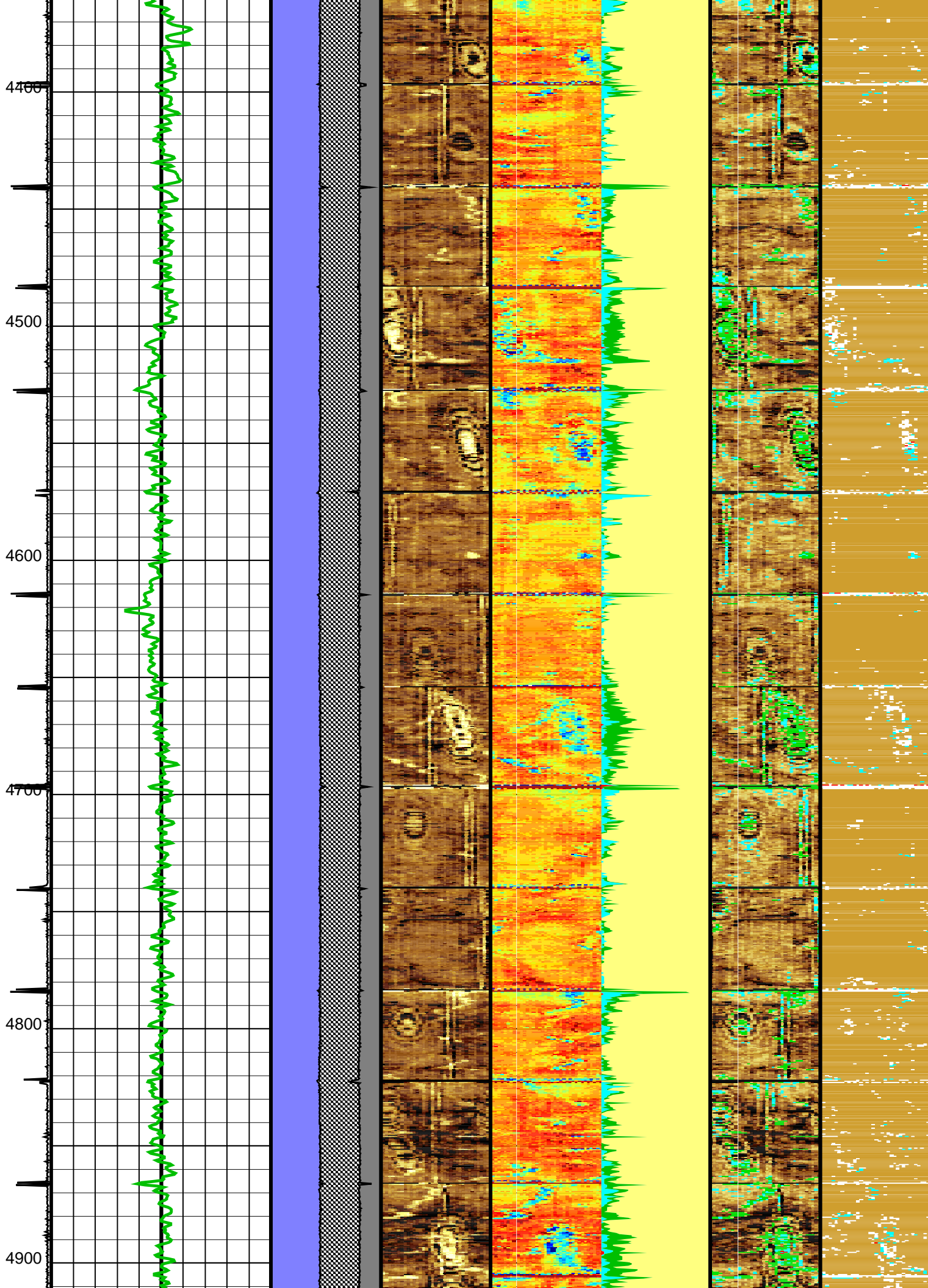


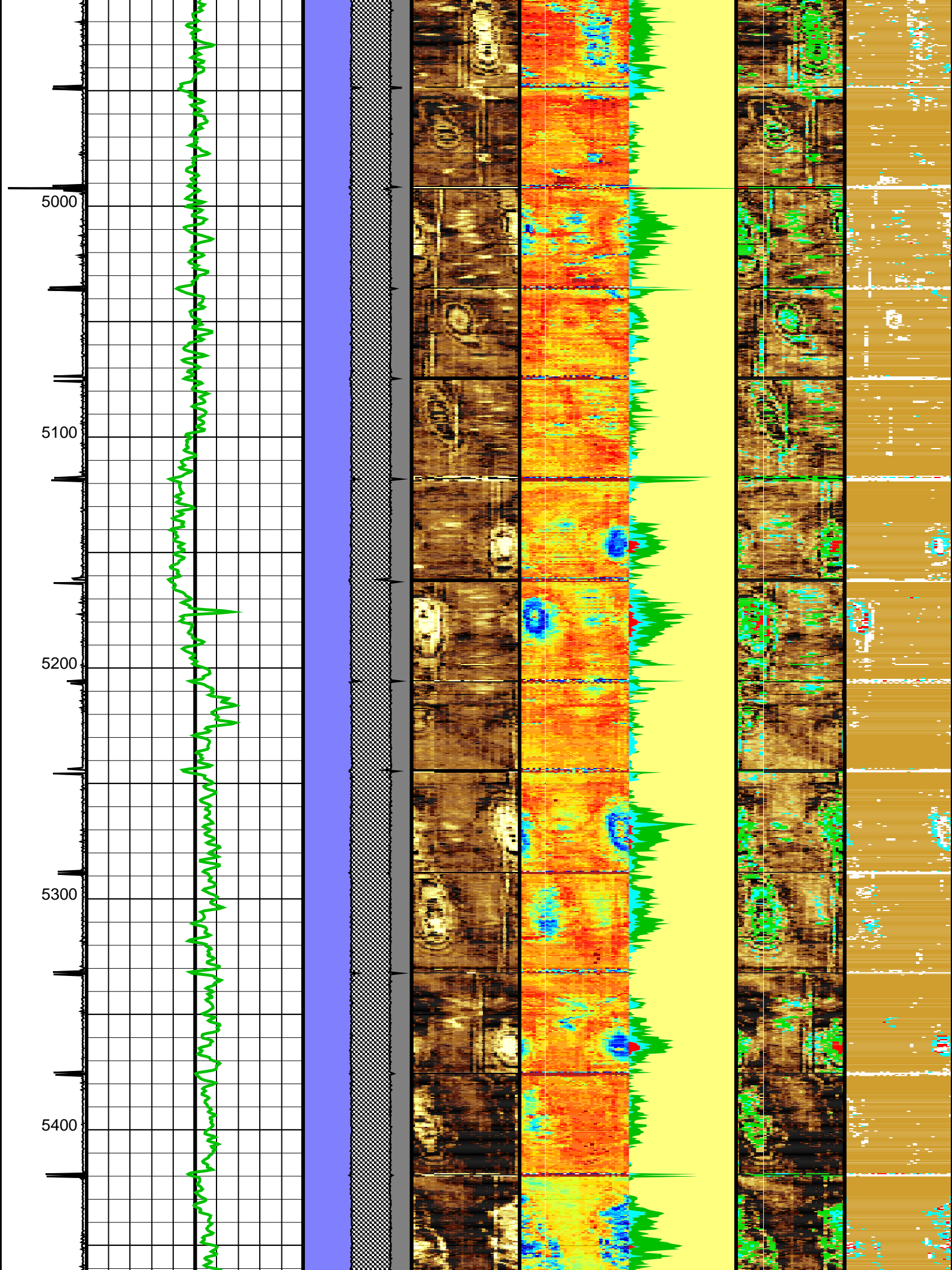




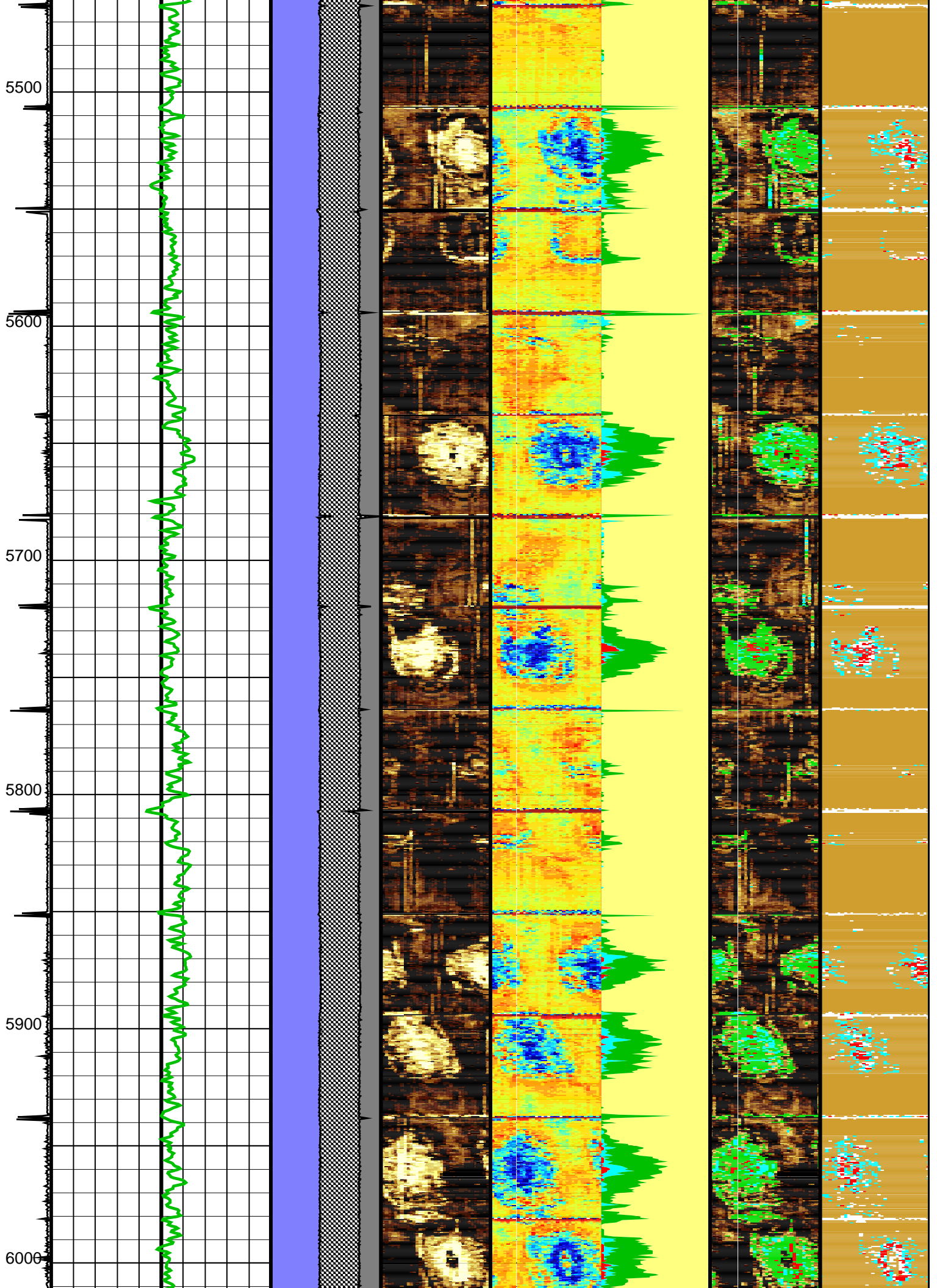


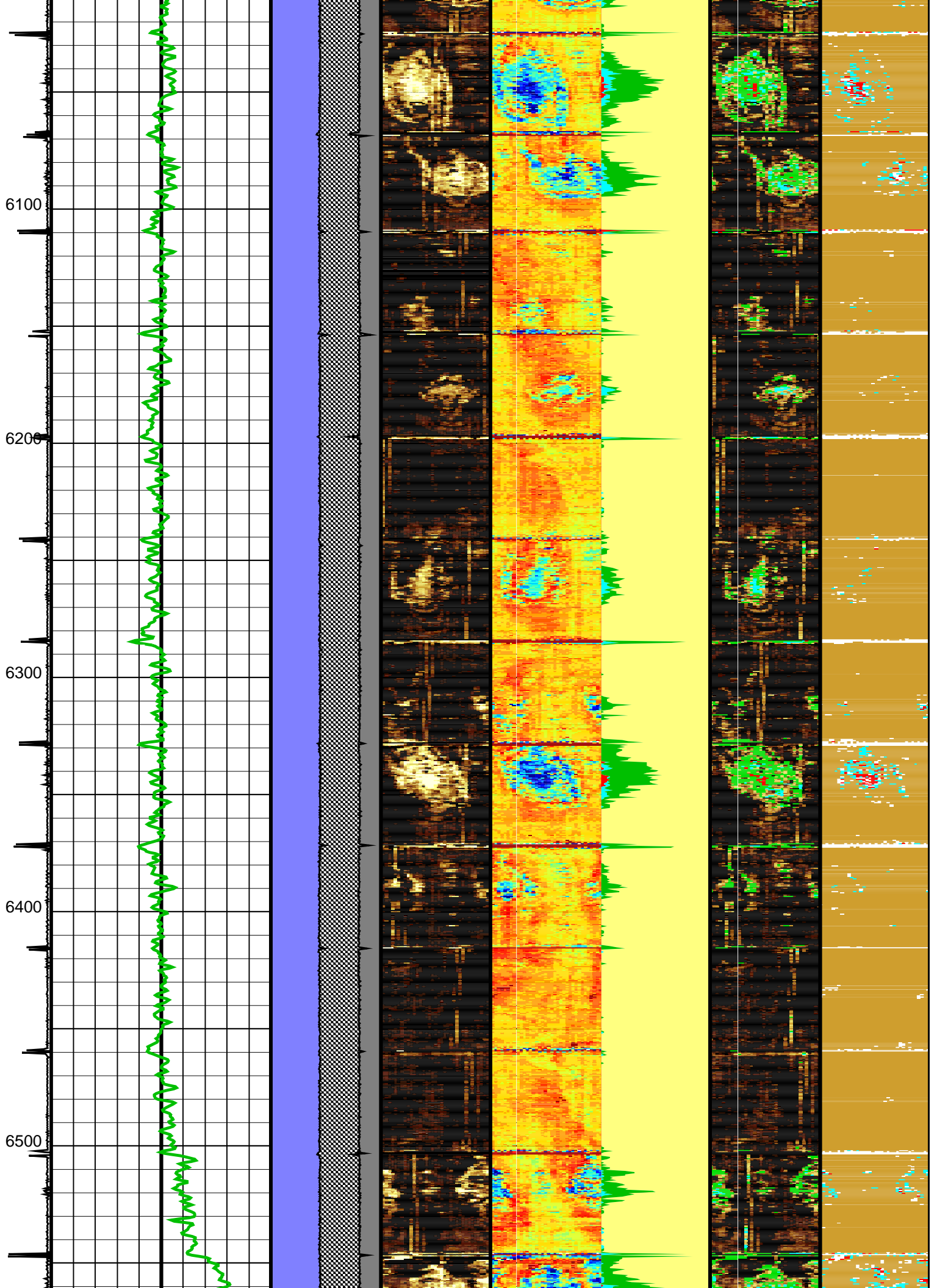




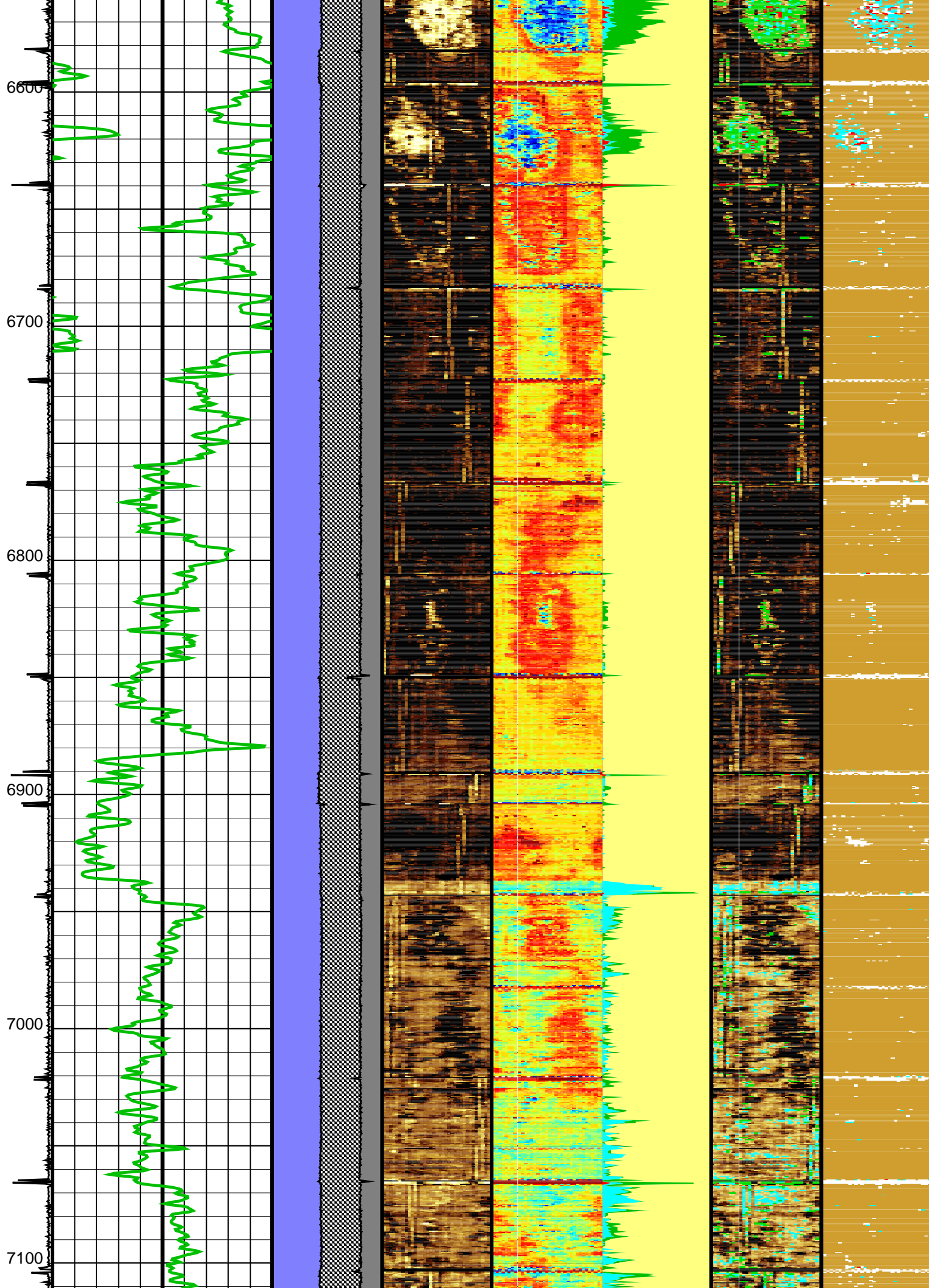


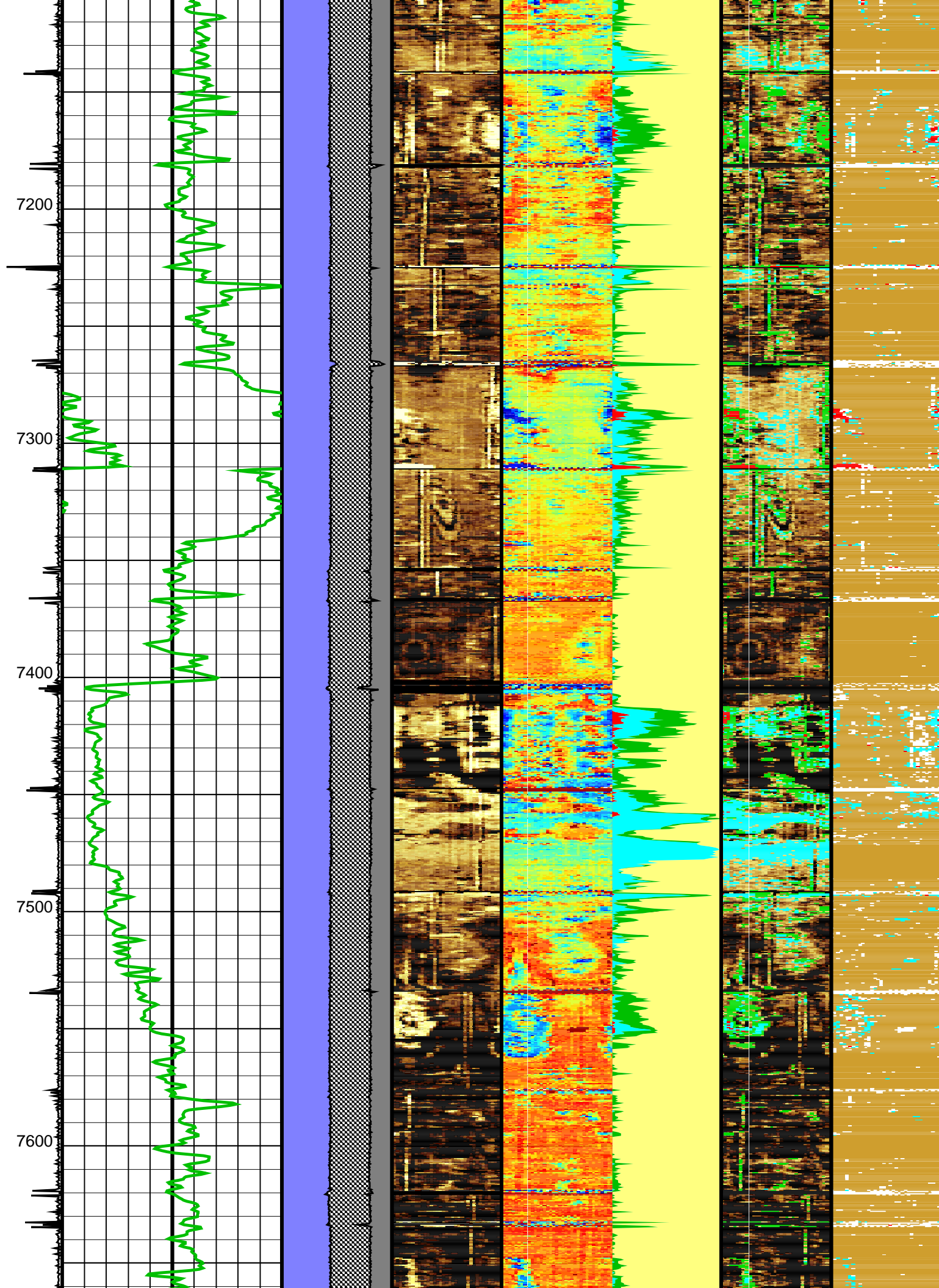




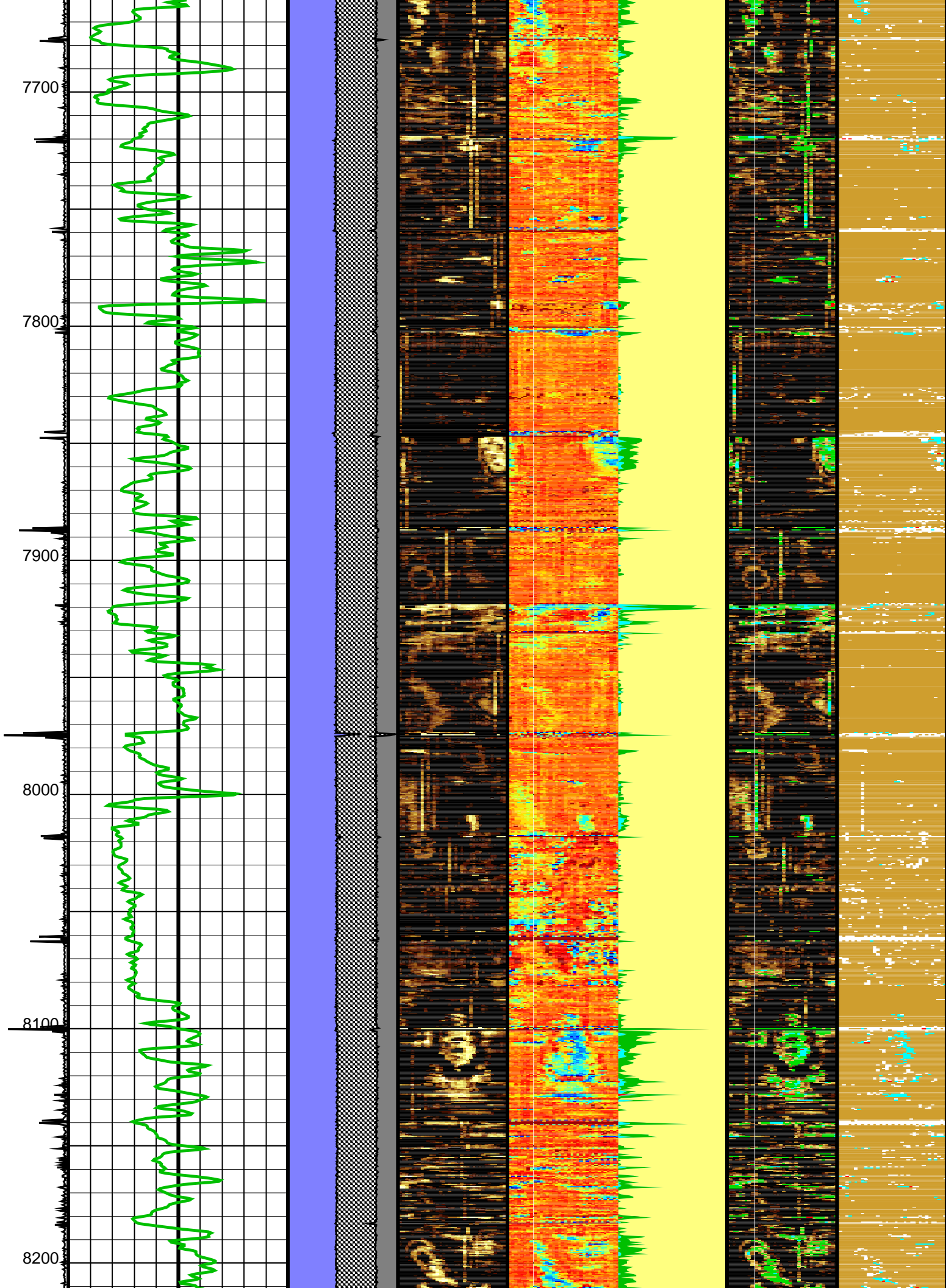


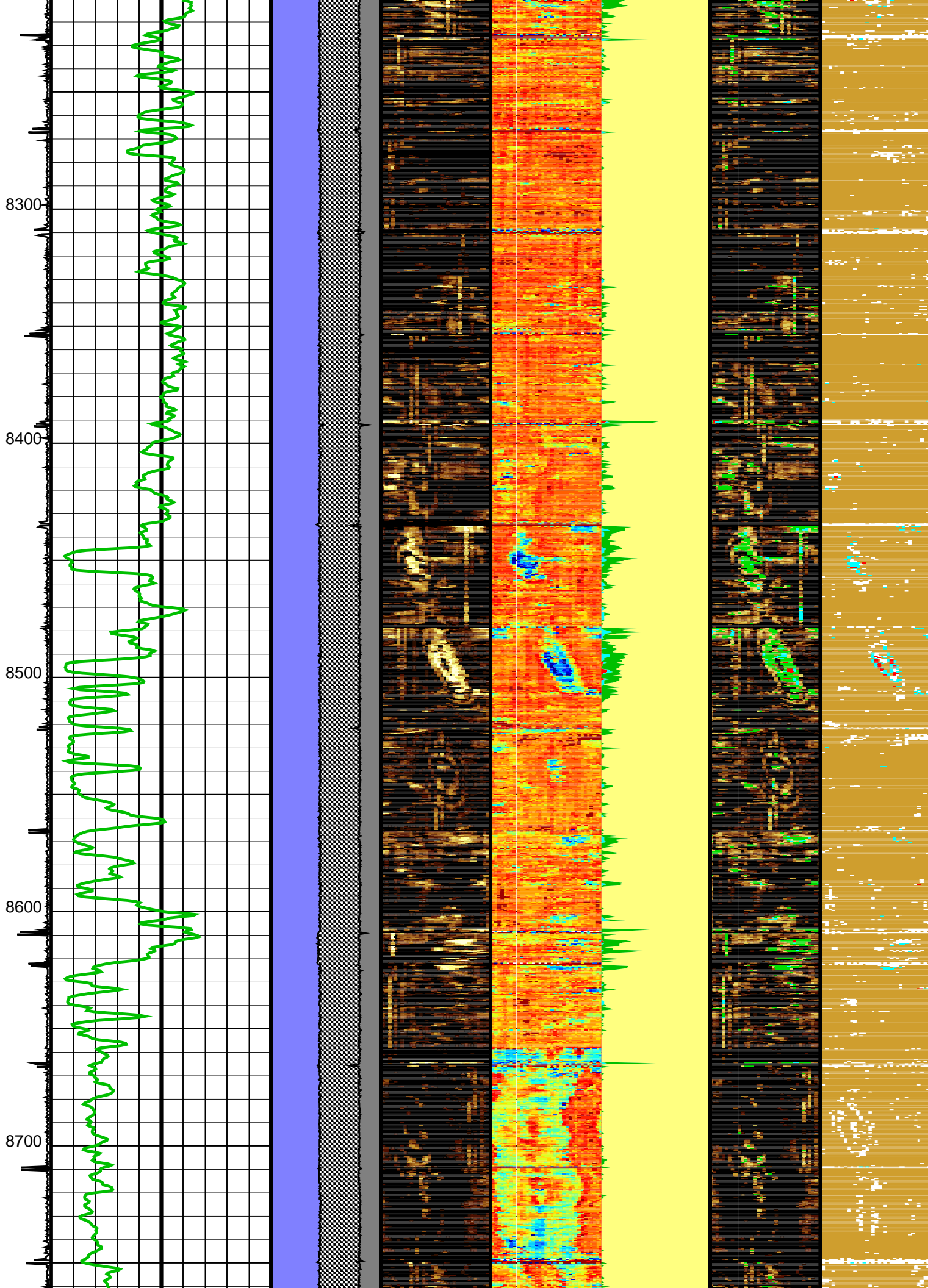




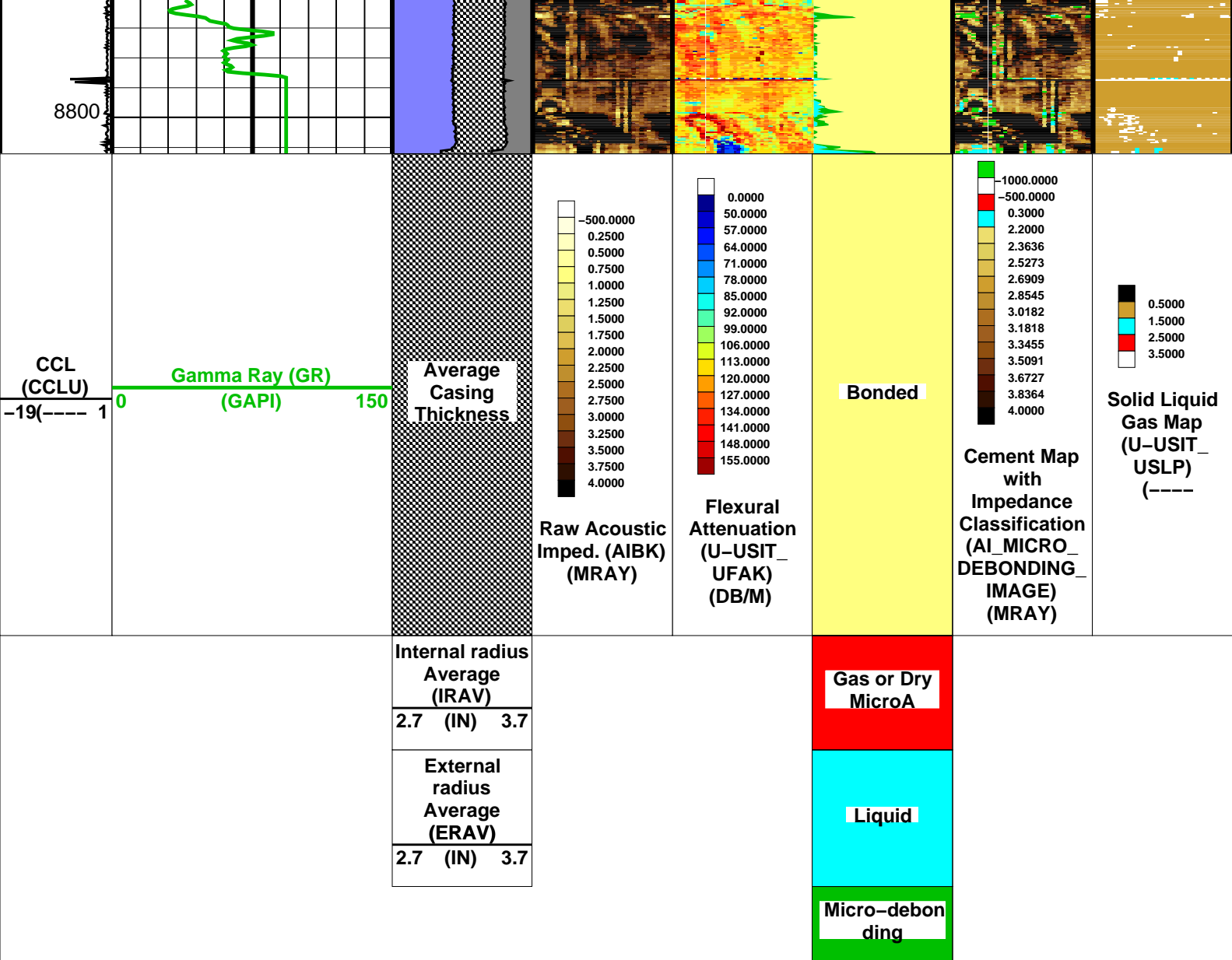












Format: IBC ND State Only 2 inch Vertical Scale: 2" per 100' Graphics File Created: 10-Jul-2013 09:42

## OP System Version: 19C2-270

USIT-E	19C2-270	SGT-N	19C2-270
DTC-H	19C2-270		

All USI Images are outside views

USI : LOW Frequency Compression Mode Used For Logging.

Recommended casing thickness range for optimum cement impedance measurement : 0.27 to 0.6 IN.

## Parameters

DLIS Name	Description	Value
USIT-E: Ultrasonic Imaging - E		
AGMN	Minimum Gain of Cartridge	-4 DB
AGMX	Maximum Gain of Cartridge	20 DB
BERJ	Bad Echo Rejection	ON
CDIA	Casing Outer Diameter	7 IN
CSDE	Casing Density	486.94 LBCF
CSID	Casing Inner Diameter	6.276 IN

DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	2.874	IN
EMXV	EMEX Voltage	50	V
FSOD	Fluid Slowness Fits Casing Outer Diameter	1_UTFS_N_MW	
MW	Mud Weight	9	LB/G
RCOD	Reference Calibrator Outer Diameter	7	IN
RCSO	Reference Calibrator Standoff	1.1811	IN
RCTH	Reference Calibrator Thickness	0.2952	IN
SDNV	Number of Vertical Samples used for Micro-debonding Computation	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	0.5	
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	0.3	
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	0.362	IN
U-USIT_CEMT	USIT Cement Type	ULTRA_LIGHT	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	0	MRAY
U-USIT_IISR	USIT IBC Inverted Fluid Slowness Resolution	1.0_US_P_FT	
U-USIT_IIZR	USIT IBC Inverted ZMUD Resolution	0.050_MRAY	
U-USIT_OCDI	USIT Outer Casing Diameter	0	IN
U-USIT_OCSH	USIT Outer Casing Shoe	0	FT
U-USIT_OCWE	USIT Outer Casing Weight	0	LB/F
U-USIT_TIEB	IBC Third Interface Echo Bin Processing	YES	
U-USIT_TIEC	IBC Third Interface Echo Cleaning	NONE	
U-USIT_TIEM	IBC Third Interface Echo Multi Tracking	NO	
U-USIT_TIEP	IBC Third Interface Echo Policy	BFEP	
U-USIT_TIER	IBC Third Interface Echo Receivers	BOTH	
U-USIT_U3WE	Third Interface Echo Window End	110	US
U-USIT_UBTP	USIT Bottom Transducer Position	UNKNOWN	
U-USIT_UFAO	USIT Flexural Attenuation Offset	-20	DB/M
U-USIT_UIAP	USIT IBC Answer Product Enabled	SolidLiquidGasMap	
U-USIT_UIST	Ultrasonic IBC Sonde Type	Sub_ibcs_B	
U-USIT_UTAN	USIT Transducer Angles	33_DEG	
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	10DEG_6IN_136UNF_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	21.7078	US
ZCAS	Acoustic Impedance of Casing	46.2537	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.68	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.2	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
BS	Bit Size	8.750	IN
CWEI	Casing Weight	26.00	LB/F
DO	Depth Offset for Playback	0.0	FT
PP	Playback Processing	RECOMPUTE	

### Input DLIS Files

DEFAULT	Splice_USI_020CUP	FN:1	PRODUCER	10-Jul-2013 09:40	8812.0 FT	34.6 FT
---------	-------------------	------	----------	-------------------	-----------	---------

### Output DLIS Files

DEFAULT	USI_021PUP	FN:12	PRODUCER	10-Jul-2013 09:42
---------	------------	-------	----------	-------------------

Company: **Noble Energy Inc**

**Schlumberger**

Well: **Vigilant State AC16-01**

Field: **Wattenberg**

County: **Weld**

State: **Colorado**

Isolation Scanner  
Cement Evaluation  
FIELD PRINT