

Company: Noble Energy Inc

Well: Wells Ranch AA35-69-1BHNC

Field: Crow Creek

County: Weld

State: Colorado

Ultrasonic Imager
Cement Evaluation

County: Weld

Field: Crow Creek

Location: NWNW Sec. 36, T6N, R63W

Well: Wells Ranch AA35-69-1BHNC

Company: Noble Energy Inc

LOCATION

NWNW Sec. 36, T6N, R63W

SHL: 643' FNL X 164' FWL

Elev.: K.B. 4839.00 ft

G.L. 4809.00 ft

D.F. 4838.00 ft

Permanent Datum: _____

Ground Level _____

Elev.: 4809.00 ft _____

Log Measured From: _____

Ground Level _____

0.00 ft above Perm. Datum

Drilling Measured From: _____

Kelly Bushing _____

API Serial No. 05-123-38662-000C

Section 36

Township 6N

Range 63W

PVT DATA			
Oil Density	Run 1	Run 2	Run 3
Water Salinity			
Gas Gravity			
Bo			
Bw			
1/Bg			
Bubble Point Pressure			
Bubble Point Temperature			
Solution GOR			
Maximum Deviation	90 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	18-Mar-2014			
Run Number	1			
Depth Driller	11322 ft			
Schlumberger Depth	6900 ft			
Bottom Log Interval	6900 ft			
Top Log Interval	0 ft			
Casing Fluid Type	Fresh Water			
Salinity				
Density	8.7 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	P-110			
From				
To				
Maximum Recorded Temperatures				
Logger On Bottom	18-Mar-2014			
Unit Number	3022	Ft. Morgan, CO		
Recorded By	Tim Hoffman			
Witnessed By	Jim Turner			

DEPTH SUMMARY LISTING

Date Created: 18-MAR-2014 8:33:40

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-39P-LXS
Serial Number:	6239	Serial Number:	1109	Serial Number:	
Calibration Date:	10-jan-2014	Calibration Date:	17-Mar-2014	Length:	13500 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:	4		
Wheel Correction 2:	-2	Calibration Peak Error:	7		

Depth Control Parameters

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	0.00 FT
Rig Up Length At Bottom:	0.00 FT
Rig Up Length Correction:	0.00 FT
Stretch Correction:	
Tool Zero Check At Surface:	




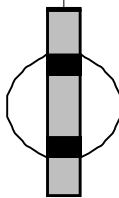


Depth Control Remarks

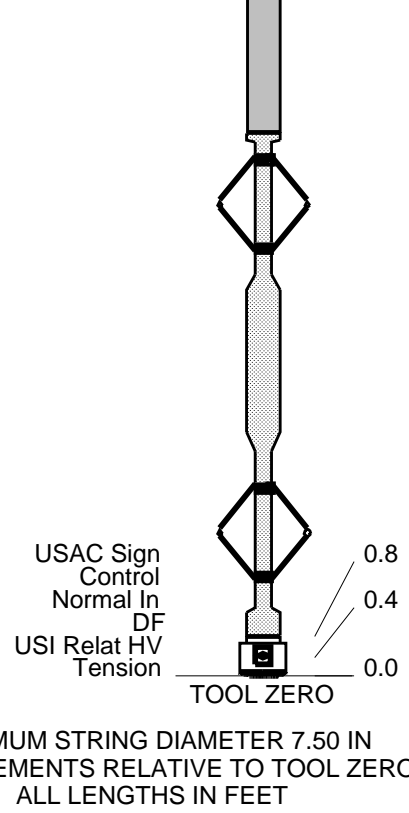
1. All Schlumberger depth policies followed.
2. IDW used as primary depth reference. Z-chart used as secondary.
- 3.
- 4.
- 5.
- 6.

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
This is the first run in hole	
Toolstring run as per tool sketch	
Cement: 12.5 ppg Lead PB5, estimated to 1200 feet	
No Tail cement, only Lead	

0 PSI repeat pass					
Stationary pressure pass from 0 PSI to 3200 PSI done at 5825'					
Main pass ran at 3000 PSI					
Liner top set at 6922'					
Rig: Crane					
Crew: Ian Derry, Tyler Riter, Elizabeth Wilson					
RUN 1			RUN 2		
SERVICE ORDER #: CUW8-00008			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		32.8			
DTC-H ECH-KC 10472 DTCH0-A DTCH1-A	CTEM TelStatus ToolStatu	 28.9 26.8			
SGT-N SGH-K 2693 SGC-TB 9841 SGD-TAB 21365	Gamma Ray	 25.9			
AH-cen AH-cen		21.3			
AH-107 AH-107		17.5			
USIT-E ECH-MFA 2716 USAC-A 1759 USIS-A 2797		15.5			



Schlumberger

Cement Composite
5" = 100'

MAXIS Field Log

Company: Noble Energy Inc

Well: Wells Ranch AA35-69-1BHN

Input DLIS Files

DEFAULT	USI_010LUP	FN:9	PRODUCER	18-Mar-2014 11:41	6853.5 FT	30.5 FT
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Output DLIS Files

DEFAULT	USI_019PUP	FN:18	PRODUCER	18-Mar-2014 13:20
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OP System Version: 19C2-270

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

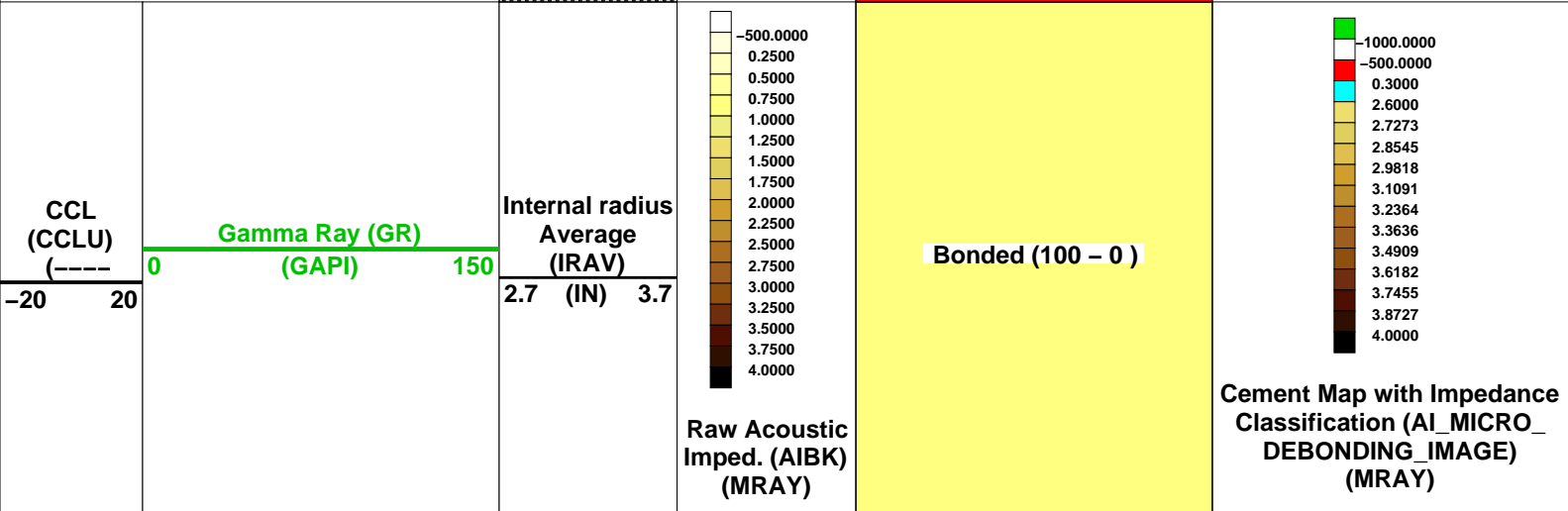
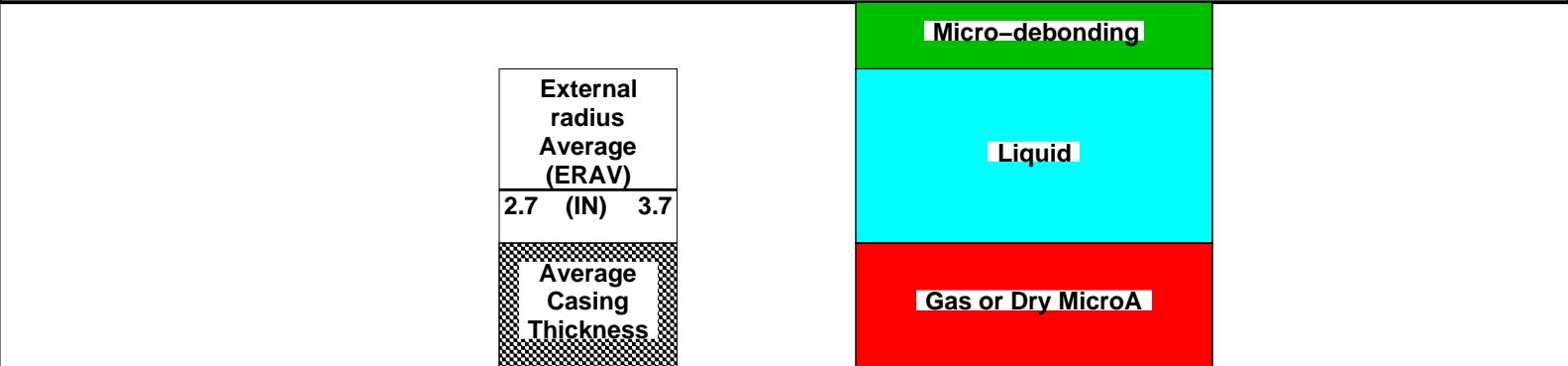
Zoning of Mud Parameters

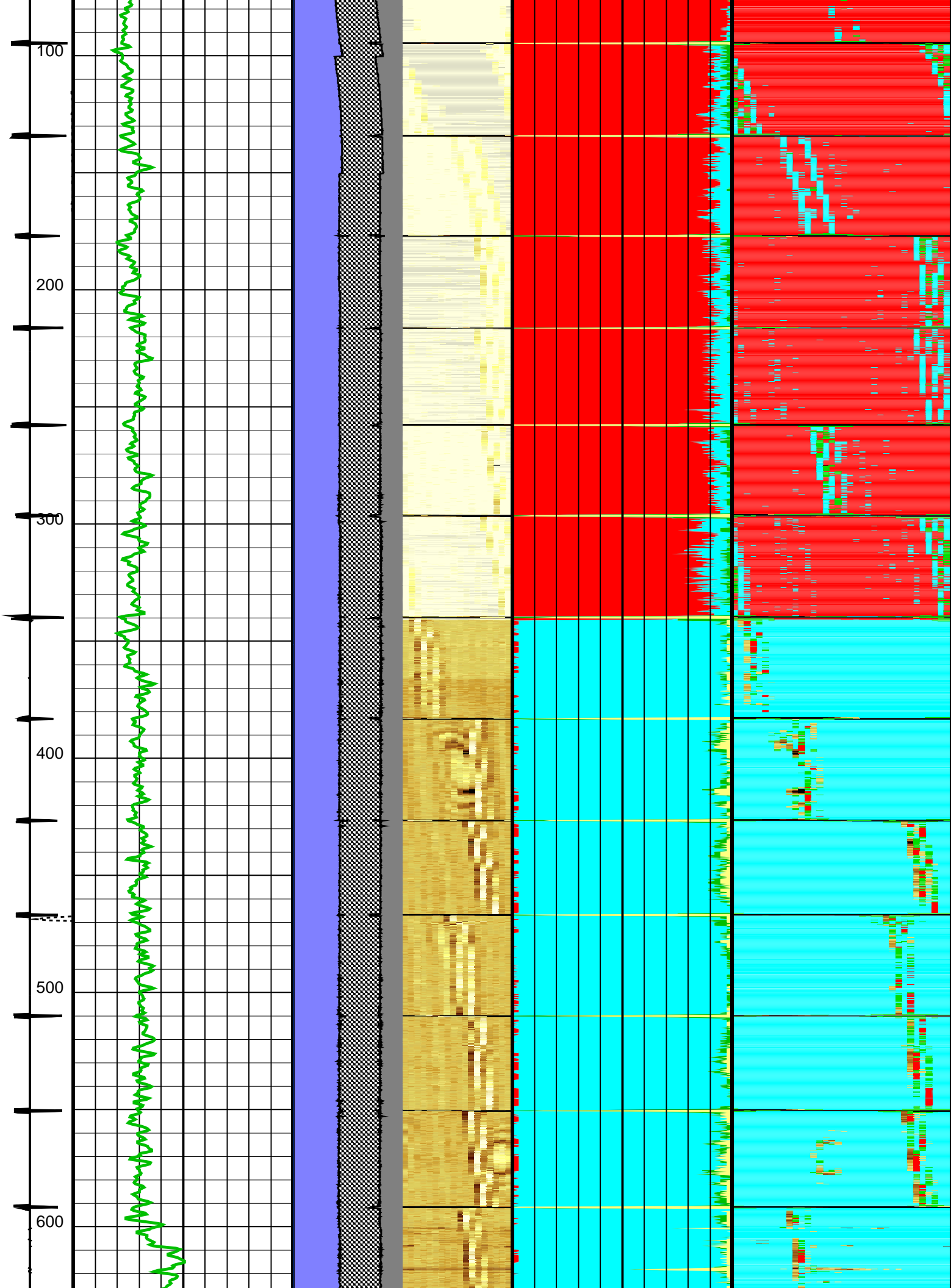
Depth	Fluid Velocity (DFVL)	Acoustic Impedance (ZMUD)
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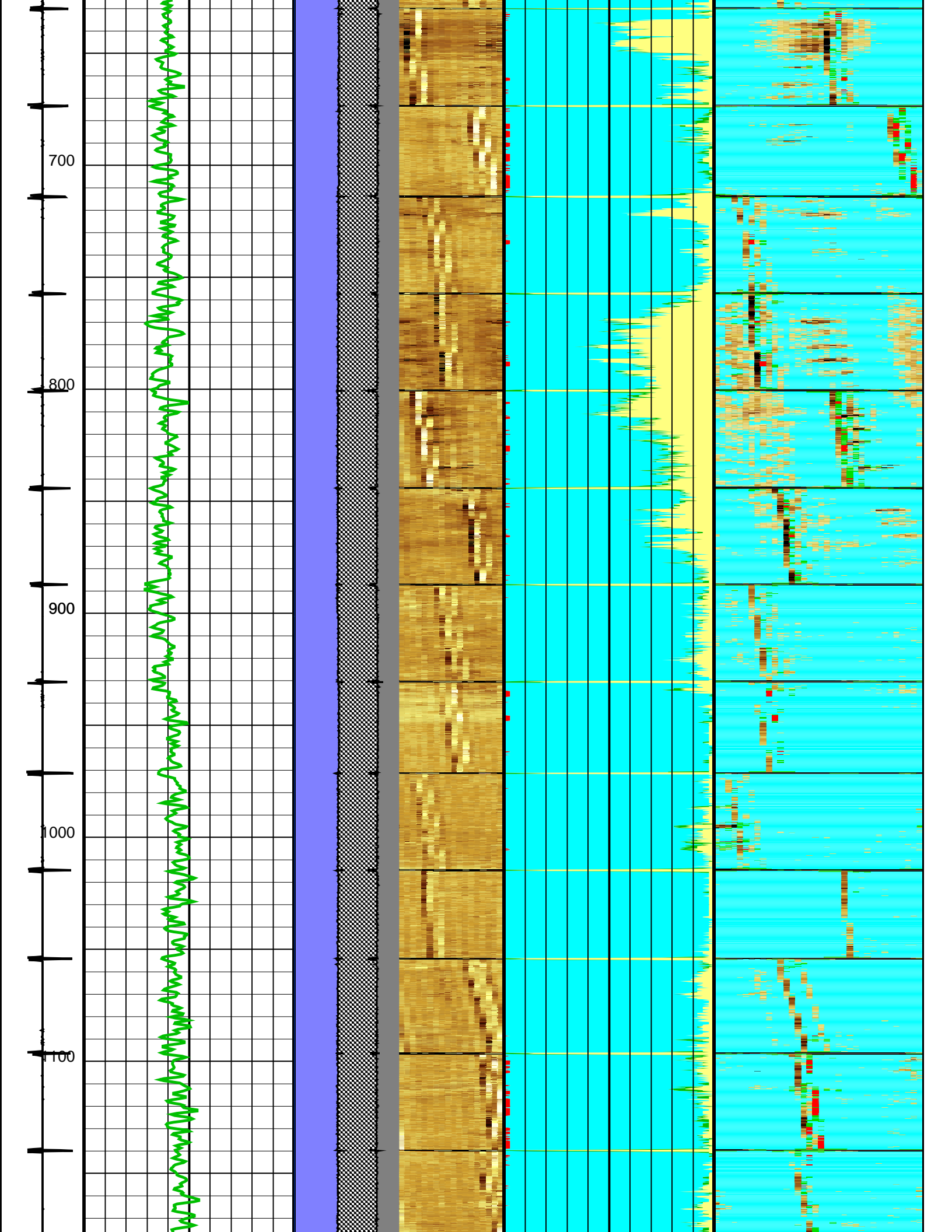
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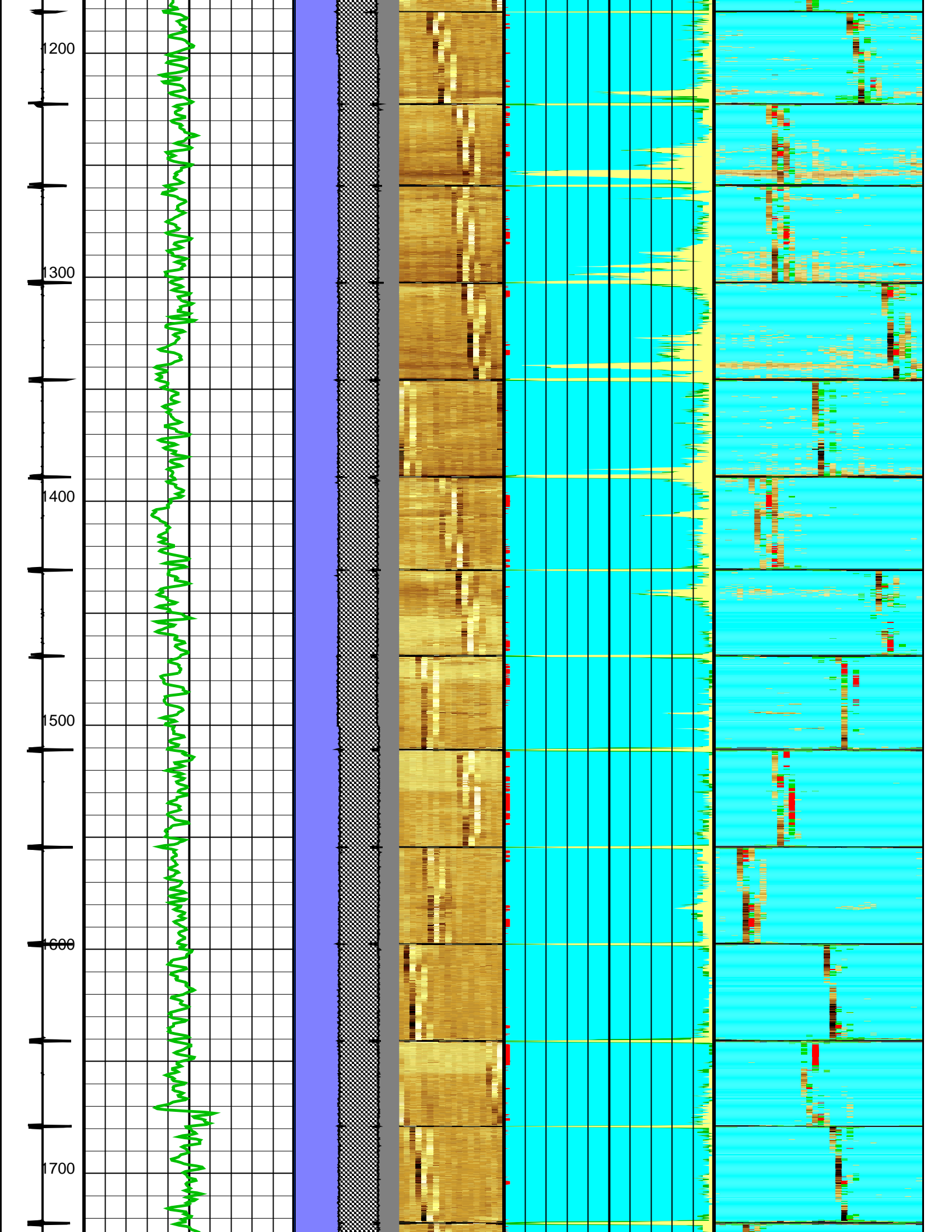
6500.00	185.00	1.75
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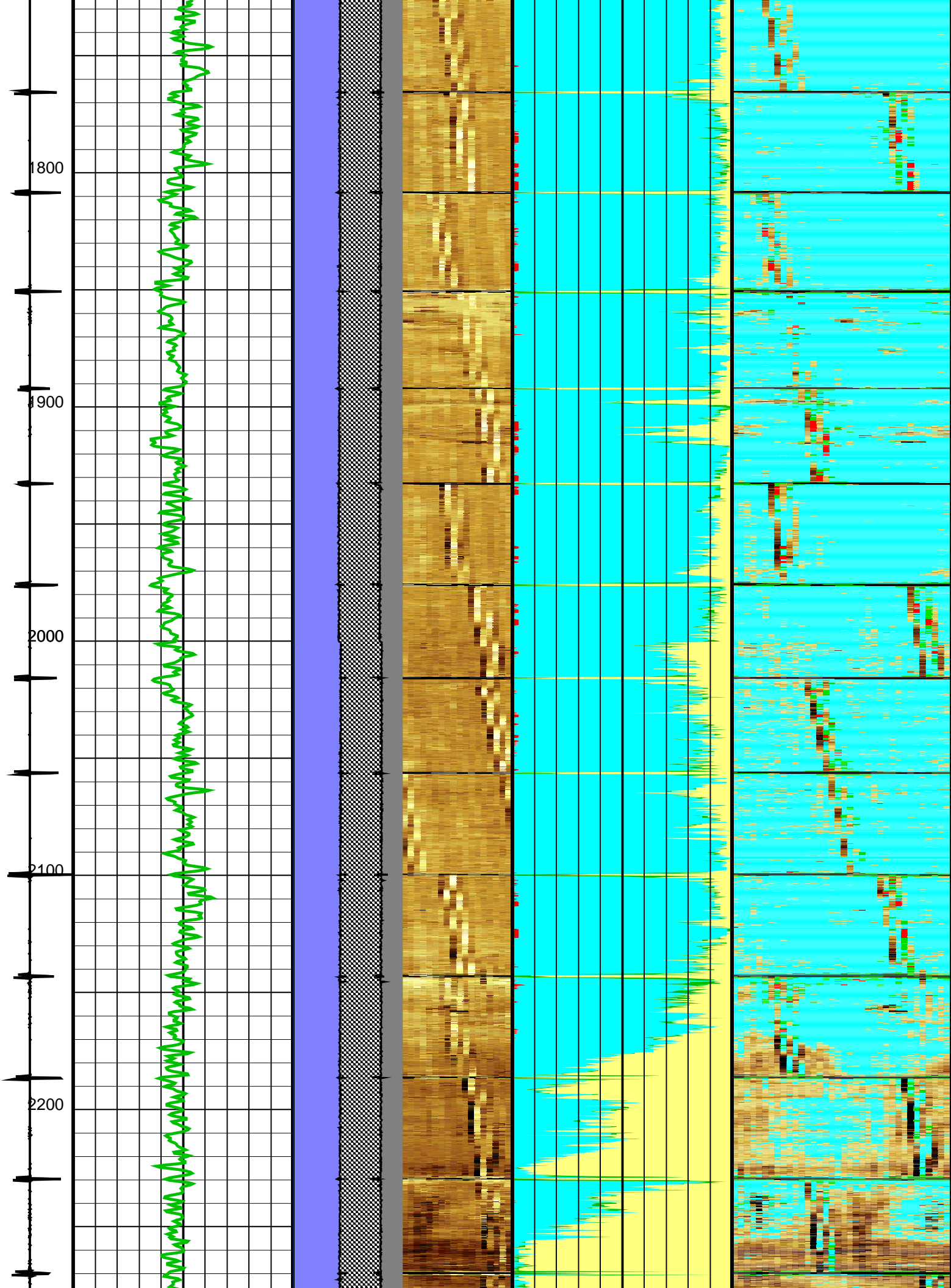
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6000.00	185.00	1.75
5500.00	185.00	1.75
5000.00	185.00	1.75
4500.00	185.00	1.75
4000.00	187.00	1.74
3500.00	188.00	1.73
3000.00	189.00	1.72
2500.00	191.00	1.70
2000.00	193.00	1.68
1500.00	195.00	1.66
1200.00	197.00	1.65
900.00	198.00	1.64
600.00	199.00	1.63
300.00	200.00	1.63
200.00	201.00	1.62
150.00	198.00	1.62
100.00	190.00	1.62
75.00	183.00	1.62

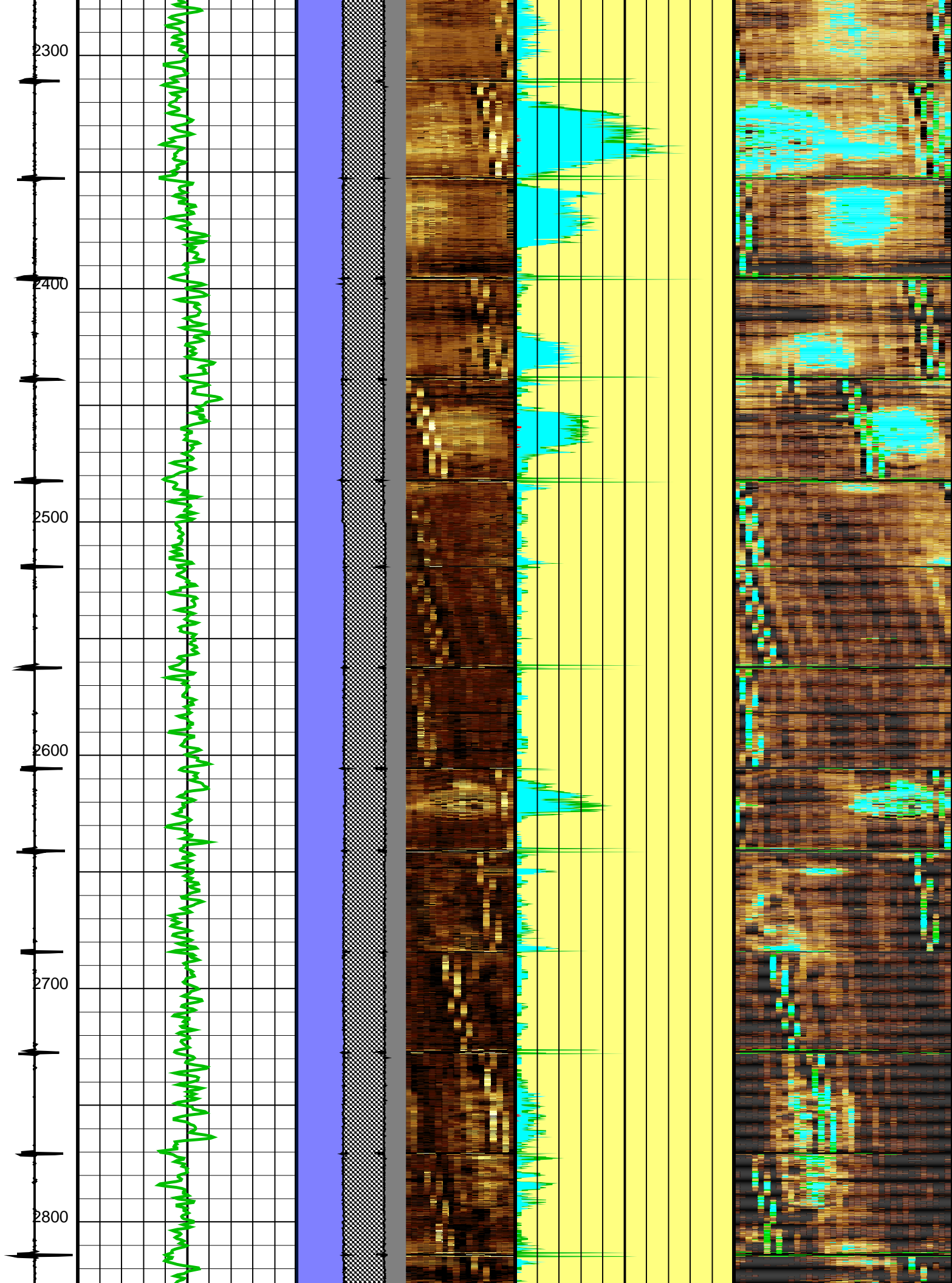


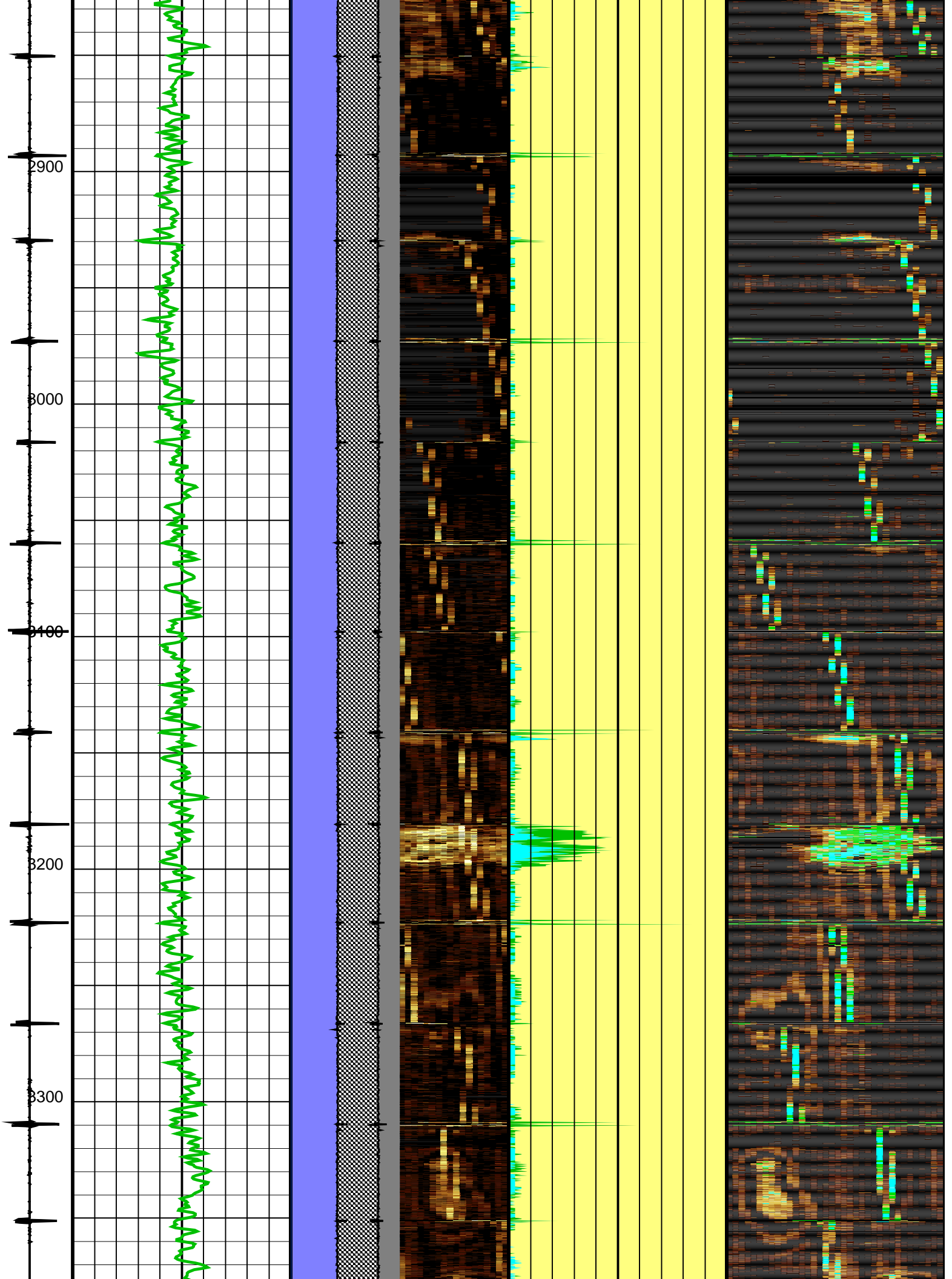


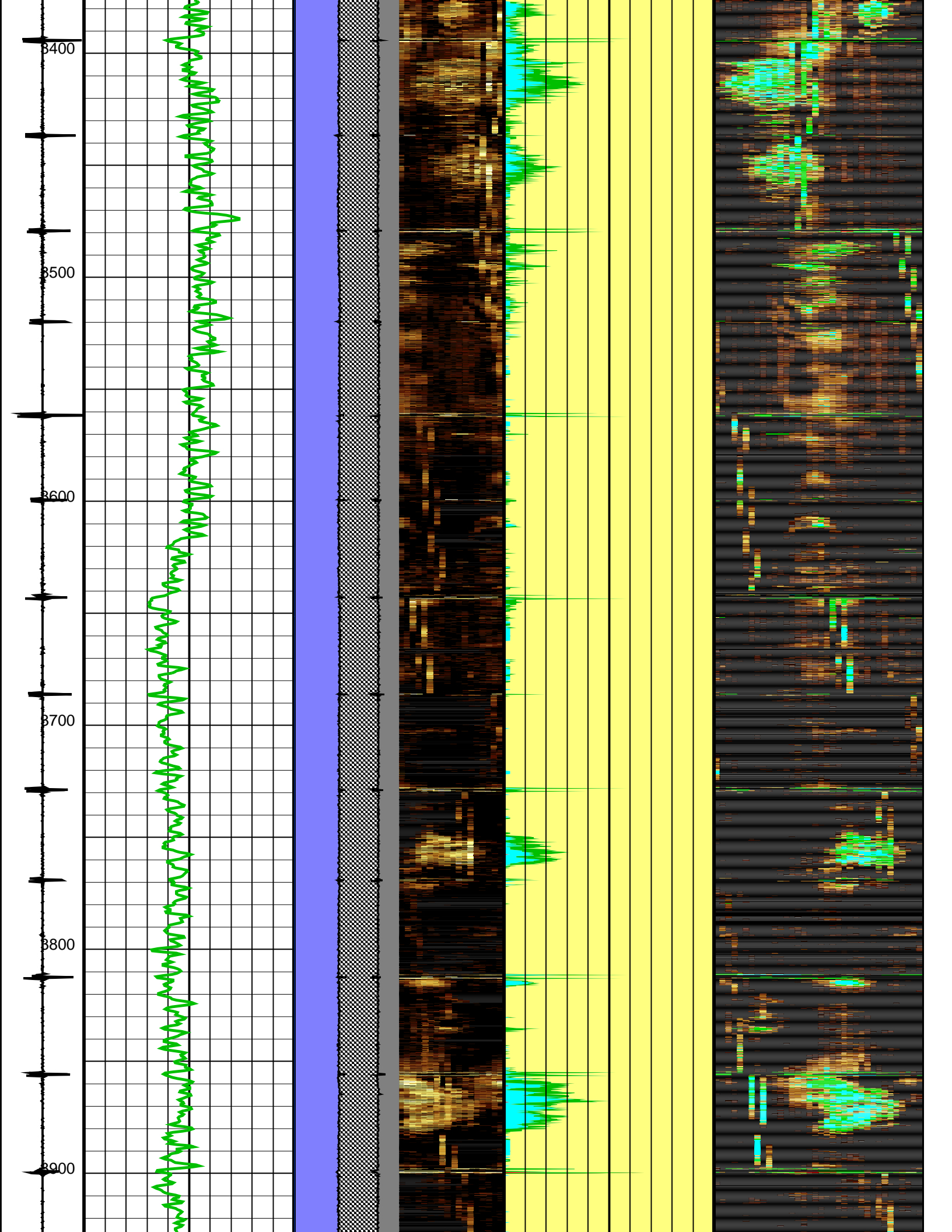


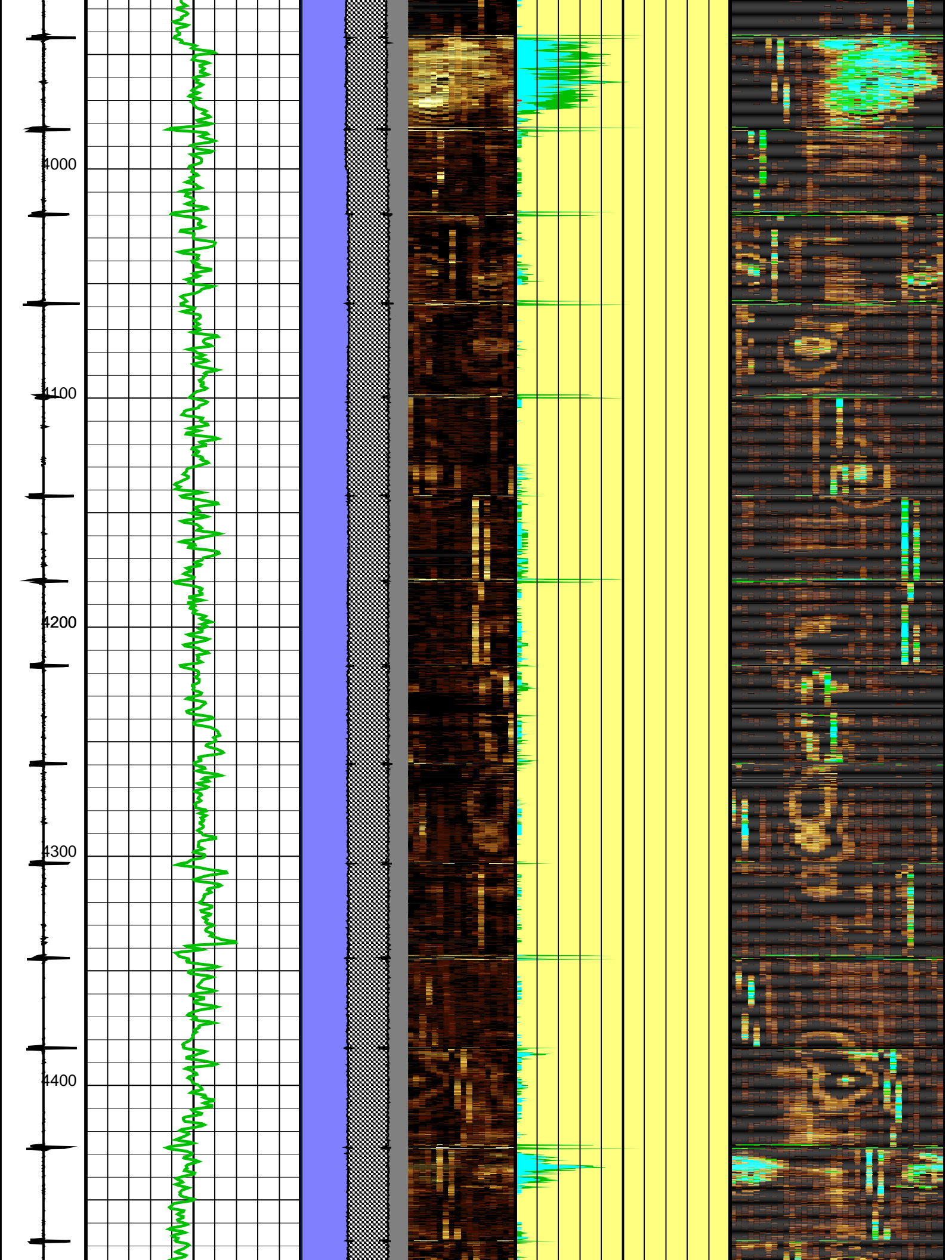


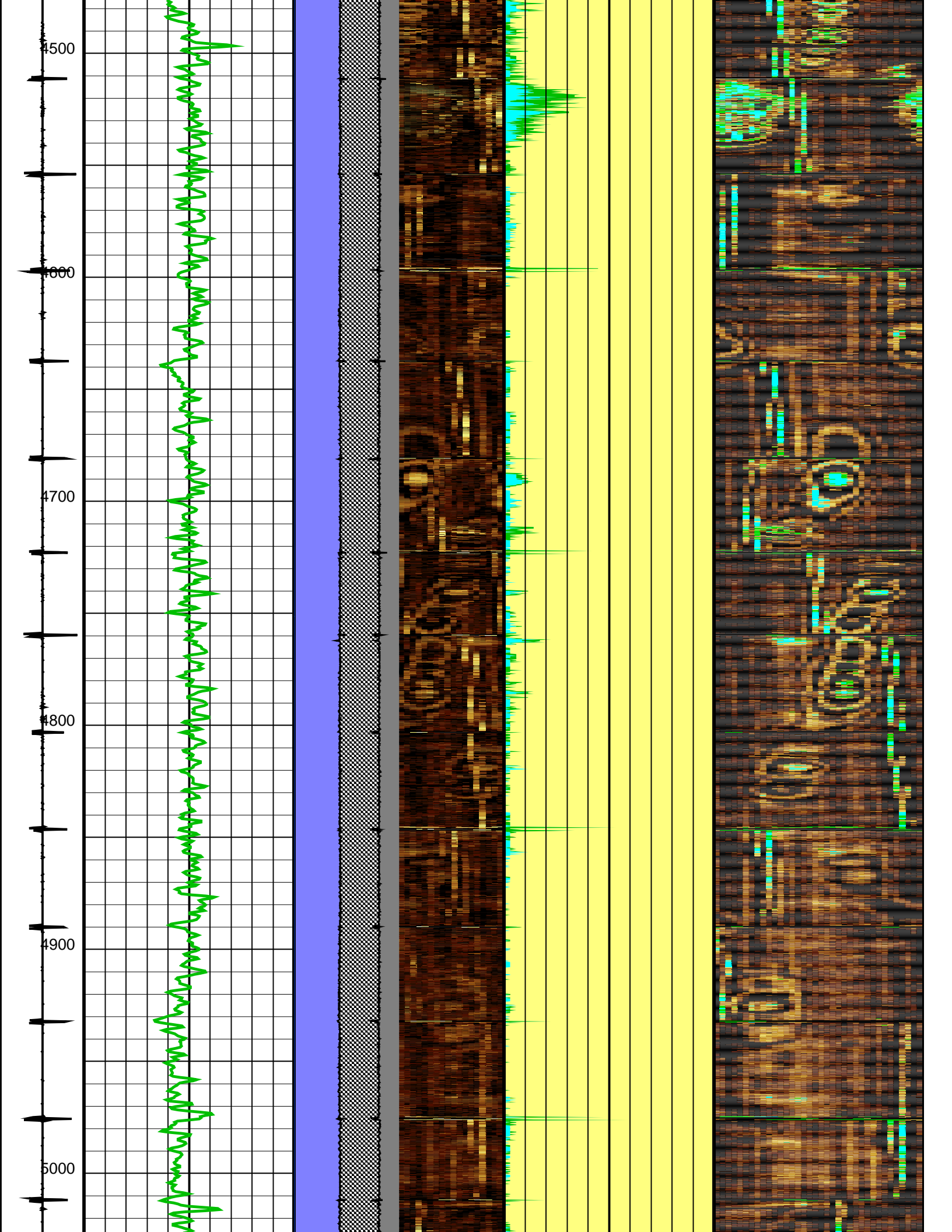


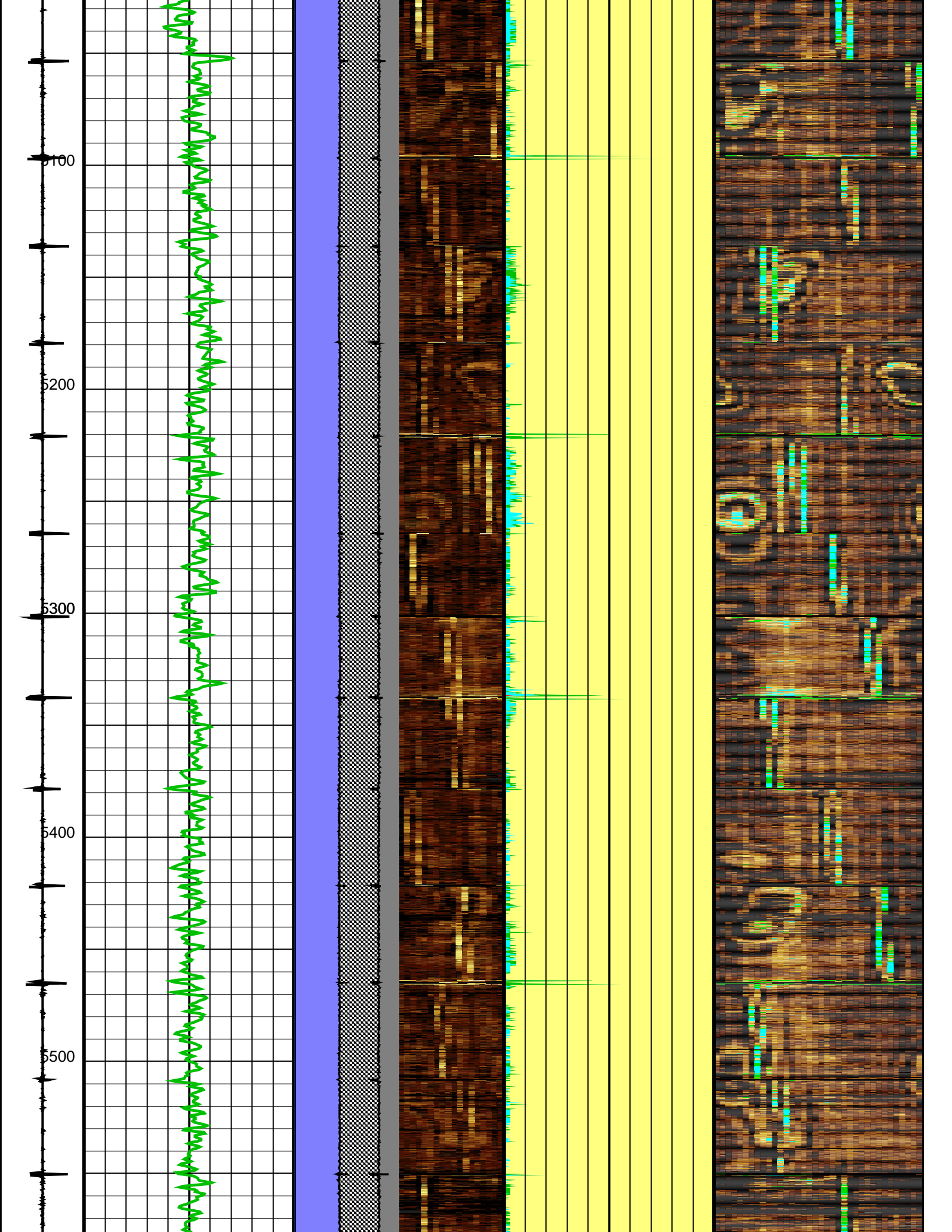


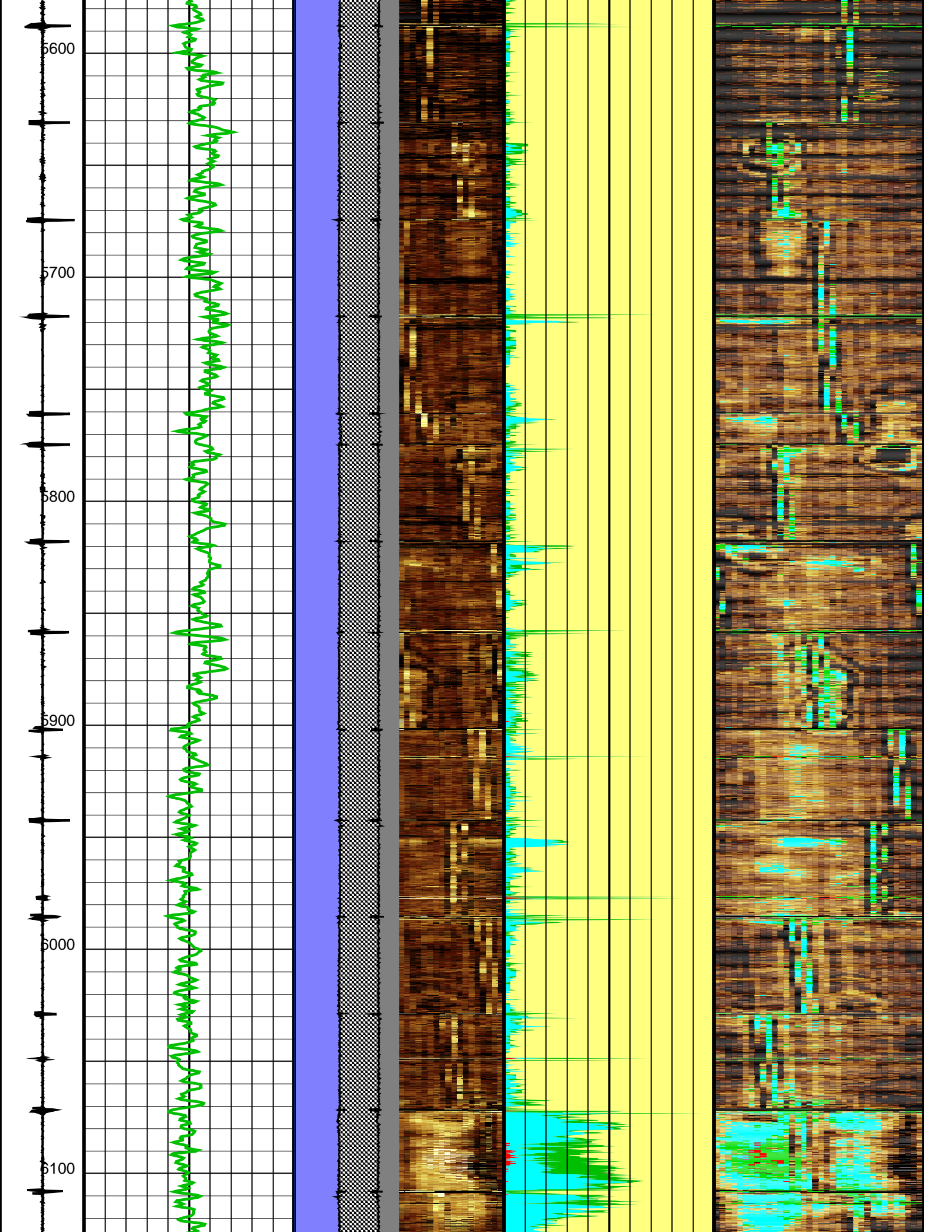


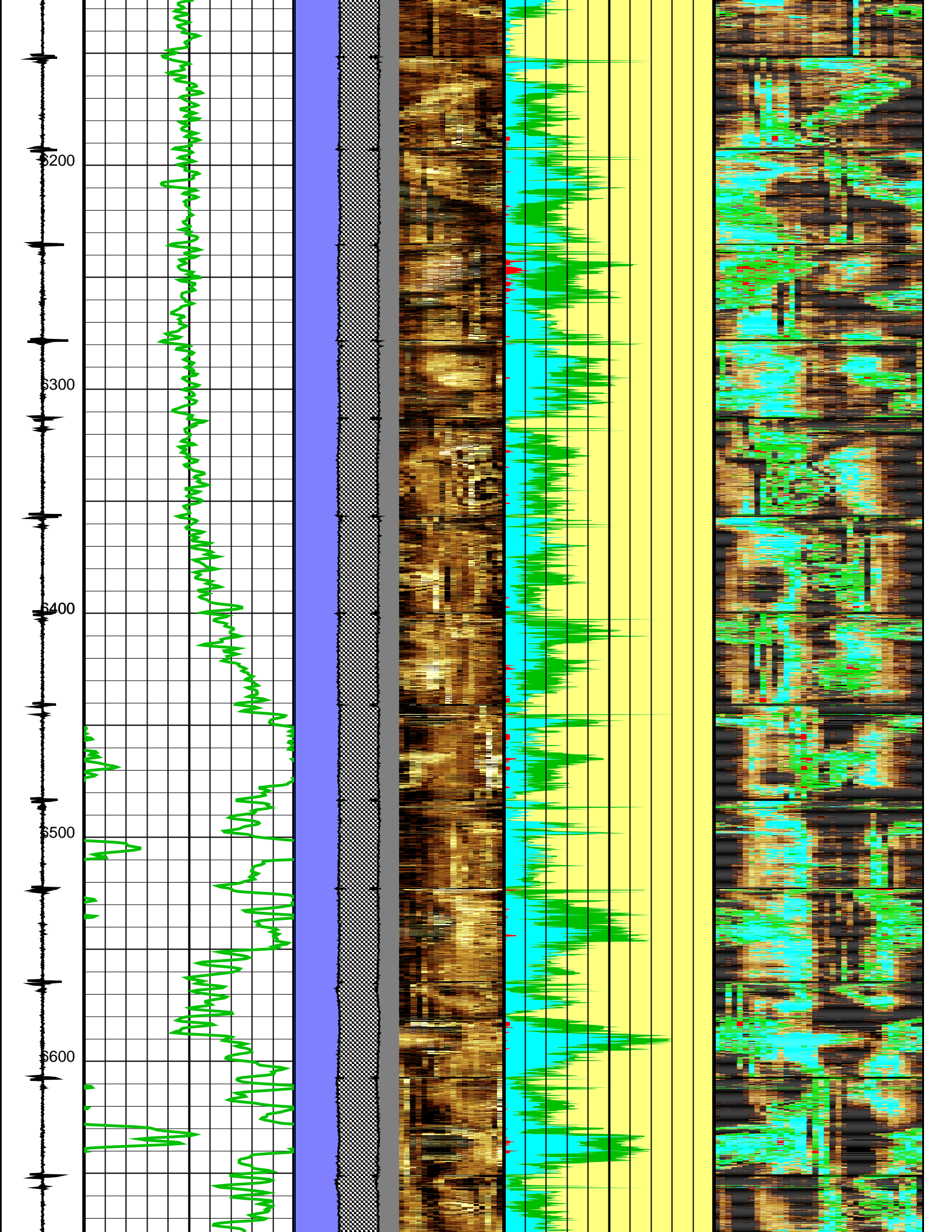


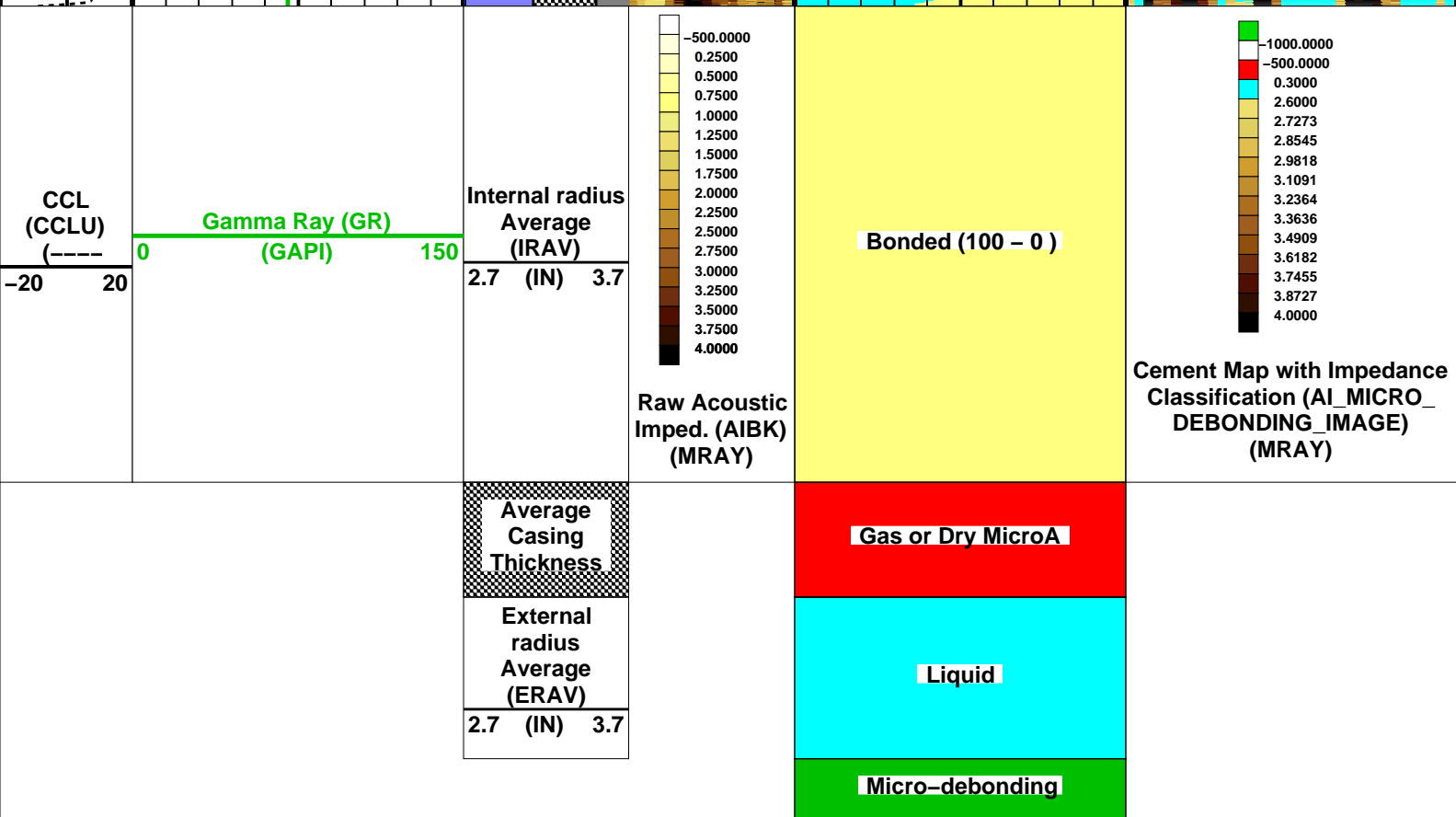
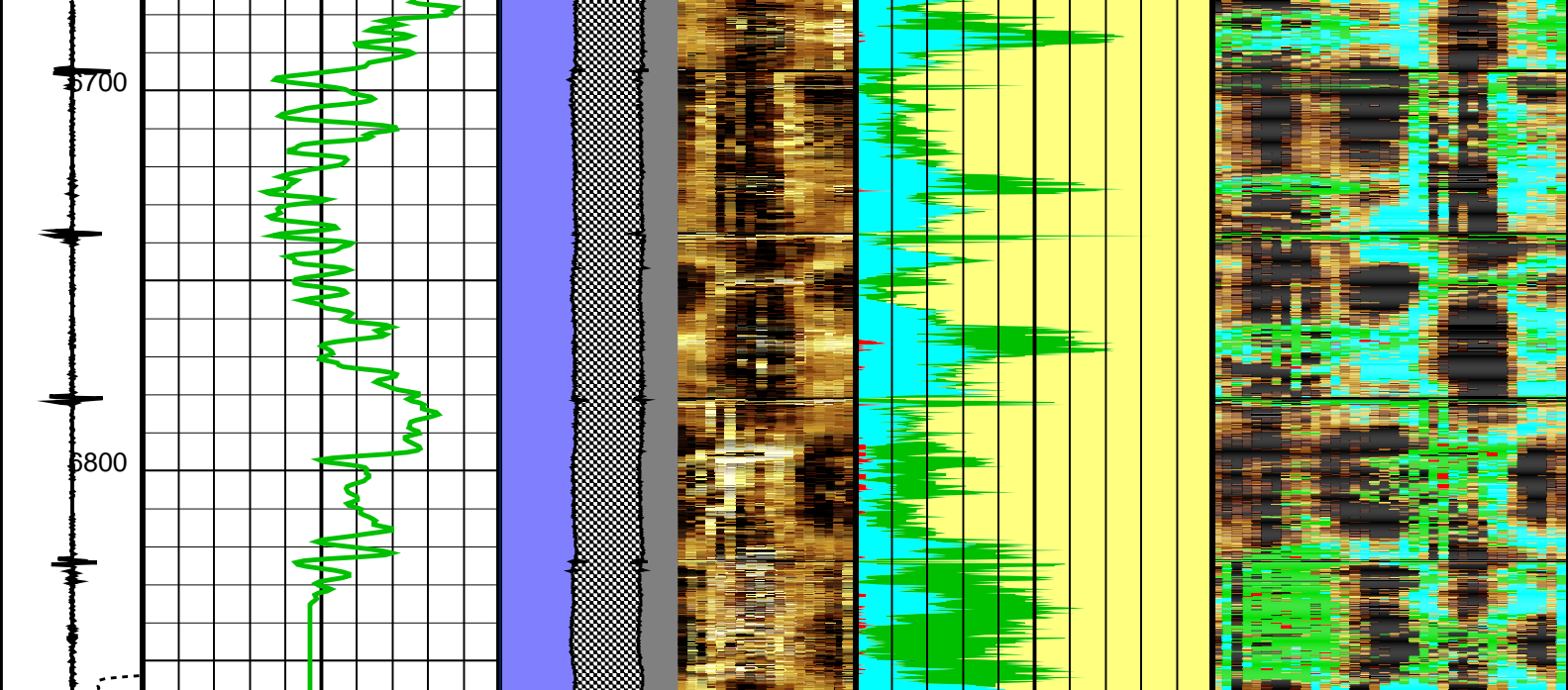












Format: USIT ND State 2 inch Vertical Scale: 2" per 100' Graphics File Created: 18-Mar-2014 13:20

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	185	US/F
DOT	Diameter of Transducer Sensor	2.874	IN
EMXV	EMEX Voltage	45	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.7	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
UMAO	USIT Measurement Angular Offset	18	DEG
USTO	Ultrasonic Time Offset	–2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	10DEG_3IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	21.7078	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	–1	MRAY
ZMUD	Acoustic Impedance of Mud	1.75	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.6	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
System and Miscellaneous			
CWEI	Casing Weight	26.00	LB/F
DO	Depth Offset for Playback	5.5	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

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Output DLIS Files

DEFAULT	USI_019PUP	FN:18	PRODUCER	18–Mar–2014 13:20
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Schlumberger

Compressed Goodwin

MAXIS Field Log

Company: Noble Energy Inc

Well: Wells Ranch AA35–69–1BHNC

Input DLIS Files

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Output DLIS Files

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OP System Version: 19C2-270

USIT-E
DTC-H

19C2-270
19C2-270

SGT-N

19C2-270

Zoning of Mud Parameters

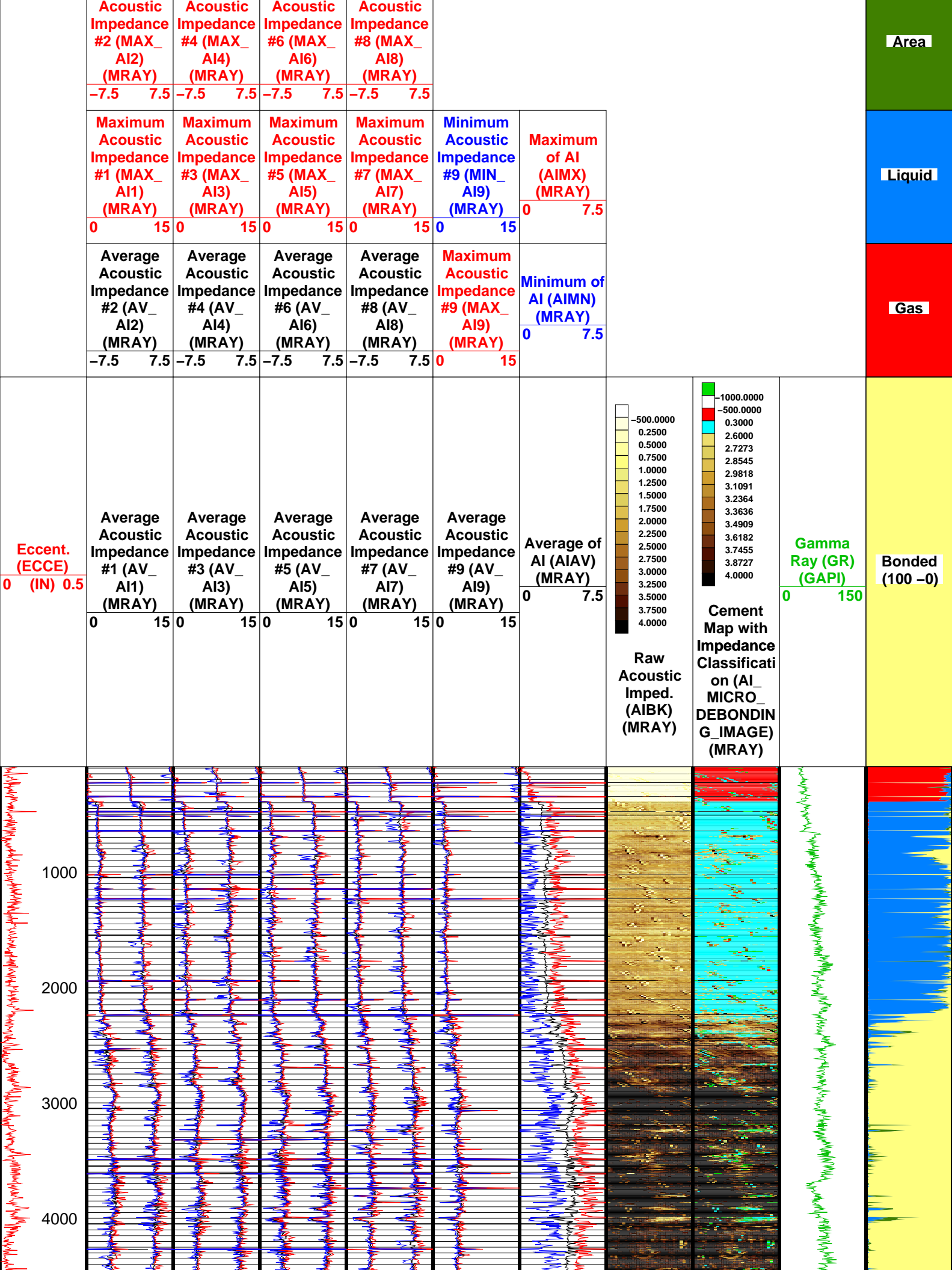
Depth

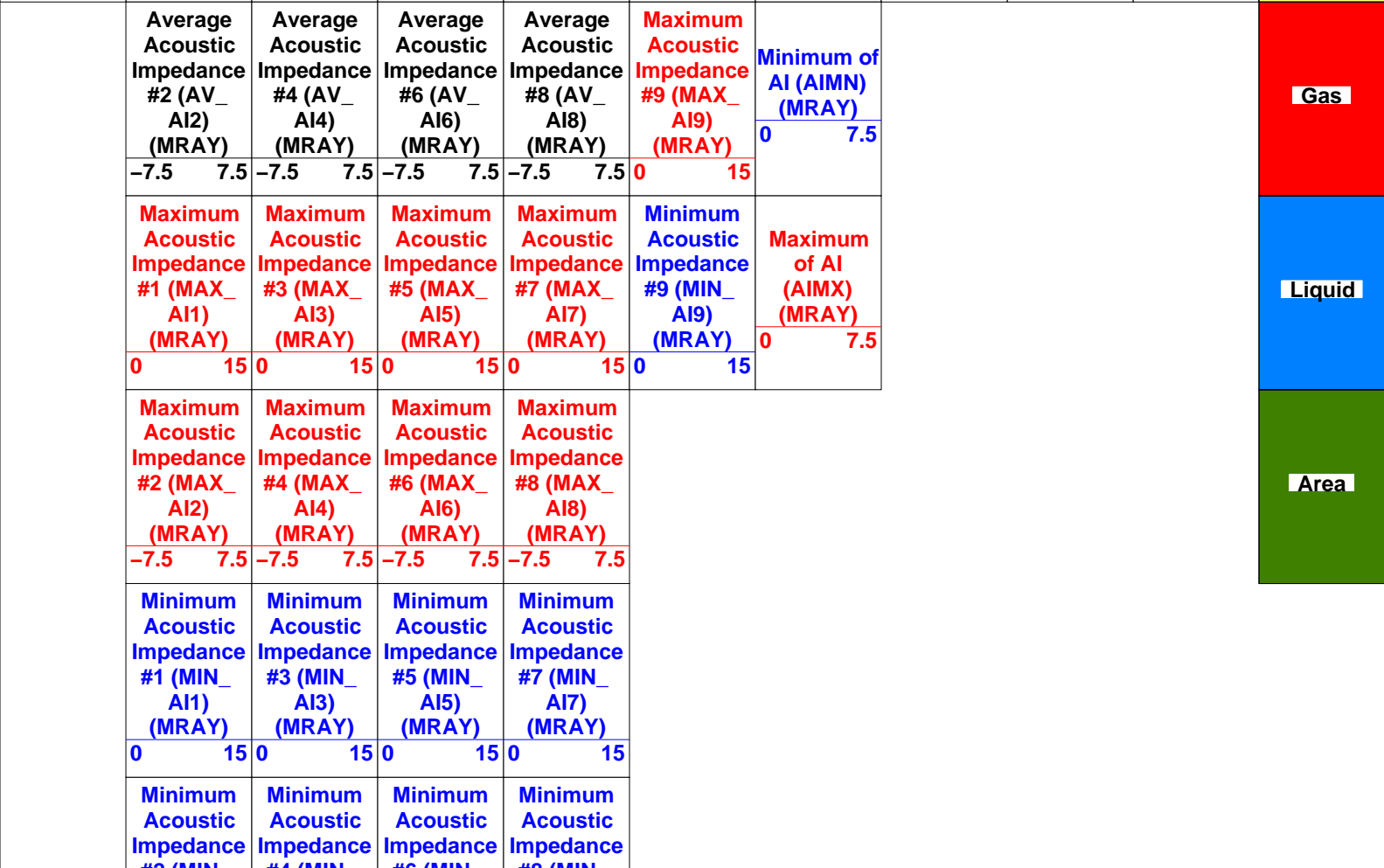
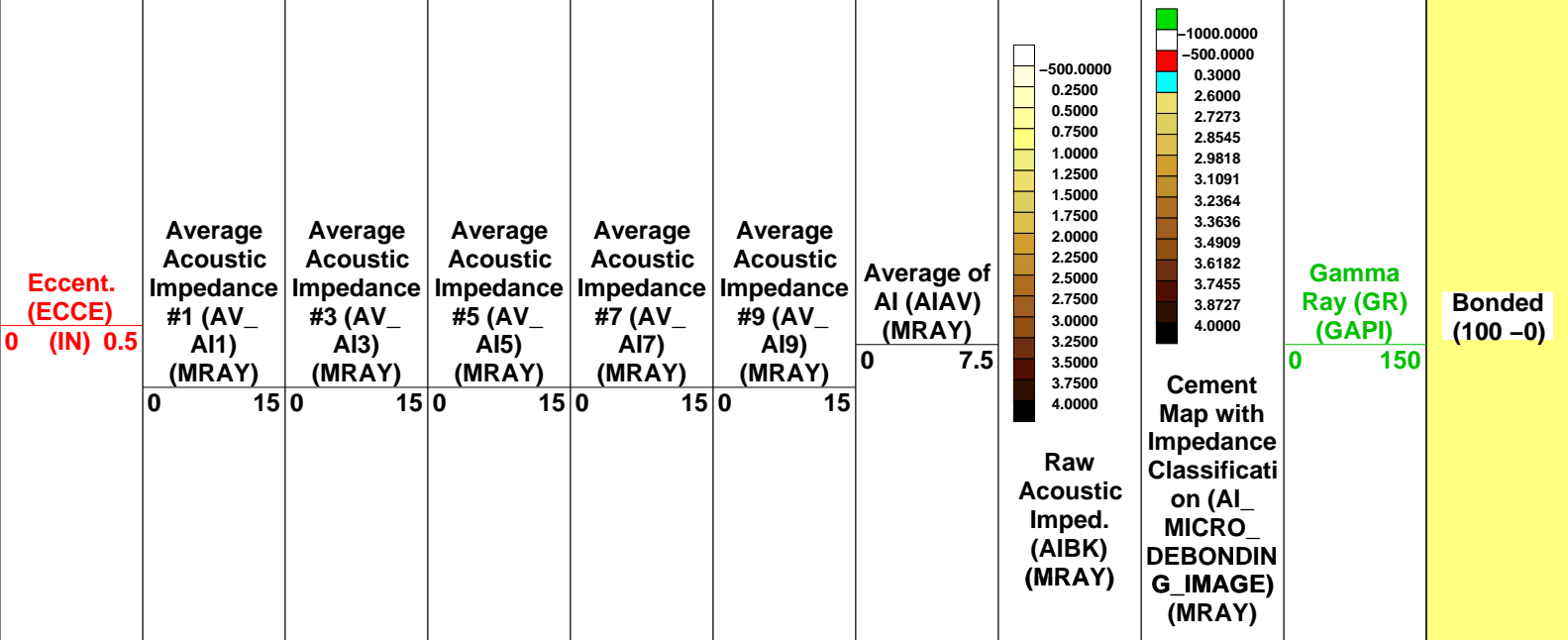
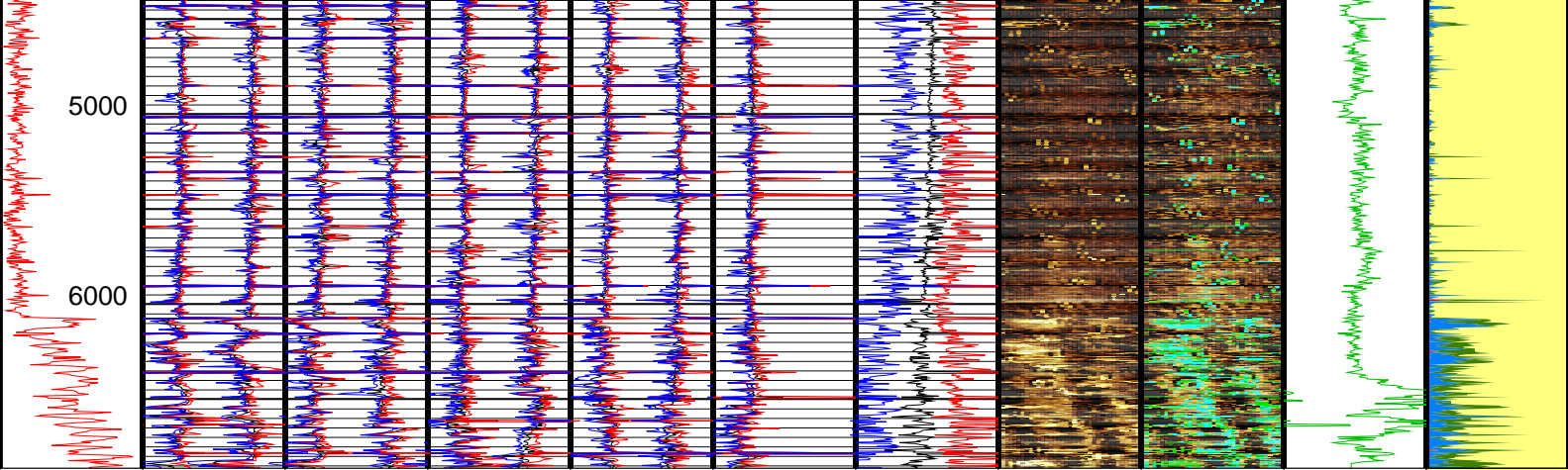
Fluid Velocity (DFVL)

Acoustic Impedance (ZMUD)

7000.00	185.00	1.75
6500.00	185.00	1.75
6000.00	185.00	1.75
5500.00	185.00	1.75
5000.00	185.00	1.75
4500.00	185.00	1.75
4000.00	187.00	1.74
3500.00	188.00	1.73
3000.00	189.00	1.72
2500.00	191.00	1.70
2000.00	193.00	1.68
1500.00	195.00	1.66
1200.00	197.00	1.65
900.00	198.00	1.64
600.00	199.00	1.63
300.00	200.00	1.63
200.00	201.00	1.62
150.00	198.00	1.62
100.00	190.00	1.62
75.00	183.00	1.62

Minimum Acoustic Impedance #2 (MIN_ AI2) (MRAY)	Minimum Acoustic Impedance #4 (MIN_ AI4) (MRAY)	Minimum Acoustic Impedance #6 (MIN_ AI6) (MRAY)	Minimum Acoustic Impedance #8 (MIN_ AI8) (MRAY)
-7.57.5	-7.57.5	-7.57.5	-7.57.5
Minimum Acoustic Impedance #1 (MIN_ AI1) (MRAY)	Minimum Acoustic Impedance #3 (MIN_ AI3) (MRAY)	Minimum Acoustic Impedance #5 (MIN_ AI5) (MRAY)	Minimum Acoustic Impedance #7 (MIN_ AI7) (MRAY)
015	015	015	015
Maximum	Maximum	Maximum	Maximum





	#2 (MIN AI2) (MRAY) -7.5 7.5	#4 (MIN AI4) (MRAY) -7.5 7.5	#6 (MIN AI6) (MRAY) -7.5 7.5	#8 (MIN AI8) (MRAY) -7.5 7.5	
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USI : LOW Frequency Compression Mode Used For Logging. Recommended casing thickness range for optimum cement impedance measurement : 0.27 to 0.6 IN.					
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Ultrasonic Imager Cement Evaluation					