Schlumberger

Company: **Conoco Phillips Company**

Well: **Tebo 32−2**
Field: **Wildcat**
County: **Arapahoe** State: **Colorado**

Ultrasonic Cement Log

County: Arapahoe
Field: Wildcat
Location: SENW Sec. 32, T 4S, R 64W
Well: Tebo 32−2
Company: Conoco Phillips Company

LOCATION

SENW Sec. 32, T 4S, R 64W
SHL: 2728' FSL X 1472' FWL
Lat/lLong: 39.65986/−104.57923

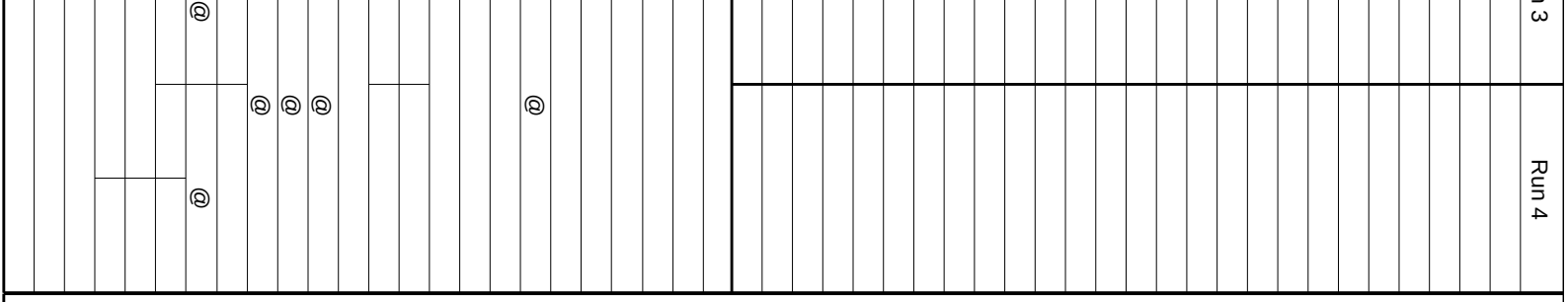
Elev.: K.B. 5944.00 ft
G.L. 5926.00 ft
D.F. 5943.00 ft

Permanent Datum: Ground Level Elev.: 5926.00 ft
Log Measured From: Kelly Bushing 18.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
05−005−07177−0000	32	4S	64W

	Run 1	Run 2	Run
Logging Date	23−Apr−2012		
Run Number	1		
Depth Driller	8530 ft		
Schlumberger Depth	8450 ft		
Bottom Log Interval	8450 ft		
Top Log Interval	70 ft		
Casing Driller Size @ Depth	7.000 in @	@	
Casing Schlumberger			
Bit Size	8.750 in		
Type Fluid In Hole	Fresh Water		
MUD Density / Viscosity	8.34 lbm/gal		
MUD Fluid Loss / PH			
MUD Source Of Sample			
RM @ Measured Temperature	@	@	
RMF @ Measured Temperature	@	@	
RMC @ Measured Temperature	@	@	
Source RMF / RMC			
RM @ MRT / RMF @ MRT	@ / @	@ / @	
Maximum Recorded Temperatures			
Circulation Stopped / Time			
Logger On Bottom / Time	23−Apr−2012 12:30		
Unit Number / Location	7006 Fort Morgan, CO		
Recorded By	Philip Grant		
Witnessed By	Scott Chipperfield		

	Run 1	Run 2	Run
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth	@		
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density / Viscosity			
MUD Fluid Loss / PH			
MUD Source Of Sample			
RM @ Measured Temperature	@		
RMF @ Measured Temperature	@		
RMC @ Measured Temperature	@		
Source RMF / RMC			
RM @ MRT / RMF @ MRT	@	@	
Maximum Recorded Temperatures			
Circulation Stopped / Time			
Logger On Bottom / Time			
Unit Number / Location			
Recorded By			
Witnessed By			



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OTHER SERVICES1	OTHER SERVICES2
OS1: Junk Basket	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Tool run as per tool sketch.	
Log tied into Platform Express 16−Jan−2012 log	
Repeat pass made with 0 psi on well head, main pass made under 1000 psi.	
Unhomogenius fluid may affected log quality.	
Although the hole was filled with fresh water, fluid properties indicated a	
brine. After each run the tool came out of hole covered in uncured cement and	
what appeared to be chucks of a silicone gell substance.	
FPM data not used to to fluid conditions.	
Crew: Josh Strand, Gary Lapp, Mark Hoffman	

RUN 1

SERVICE ORDER #: BE0K−00219
PROGRAM VERSION: 18C0−147
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

RUN 2

SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 RUN 2

SURFACE EQUIPMENT

GSR−U/Y
WITM (DTS)−A

DOWNHOLE EQUIPMENT

LEH−QT 39.8
LEH−QT

AH−In−Line Cen 36.8
AH−In−Line Cen

AH−In−Line Cen

DTC−H
ECH−KC 9562
DTCH0−A
DTCH1−A

CTEM
TelStatus
ToolStatu

32.1
30.0

33.0

SGT−N
SGH−K 2615
SGC−TB
SGD−TAB

Gamma Ray

29.1

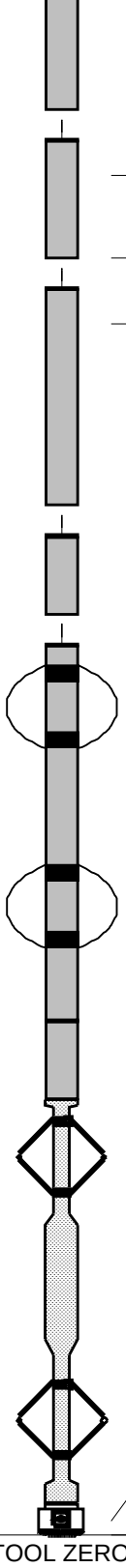
30.0

AH−107
AH−107

24.5

USIT−D
ECH−MRA 4949
USIC−D 947
AH−107
USIS−A 1804
USSC−A
USRS−B 1717

22.5



Control
Normal In
DF
USI Relat HV
Tension

0.4
0.0

TOOL ZERO

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

Schlumberger

Main Pass
Pressure = 1000 psi

MAXIS Field Log

Company: Conoco Phillips Company **Well: Tebo 32−2**

Input DLIS Files

DEFAULT	USI_016LUP	FN:15	PRODUCER	25−Apr−2012 16:17	8450.0 FT	80.5 FT

Output DLIS Files

DEFAULT	USI_003PUP	FN:2	PRODUCER	26−Apr−2012 15:51	8452.5 FT	83.0 FT

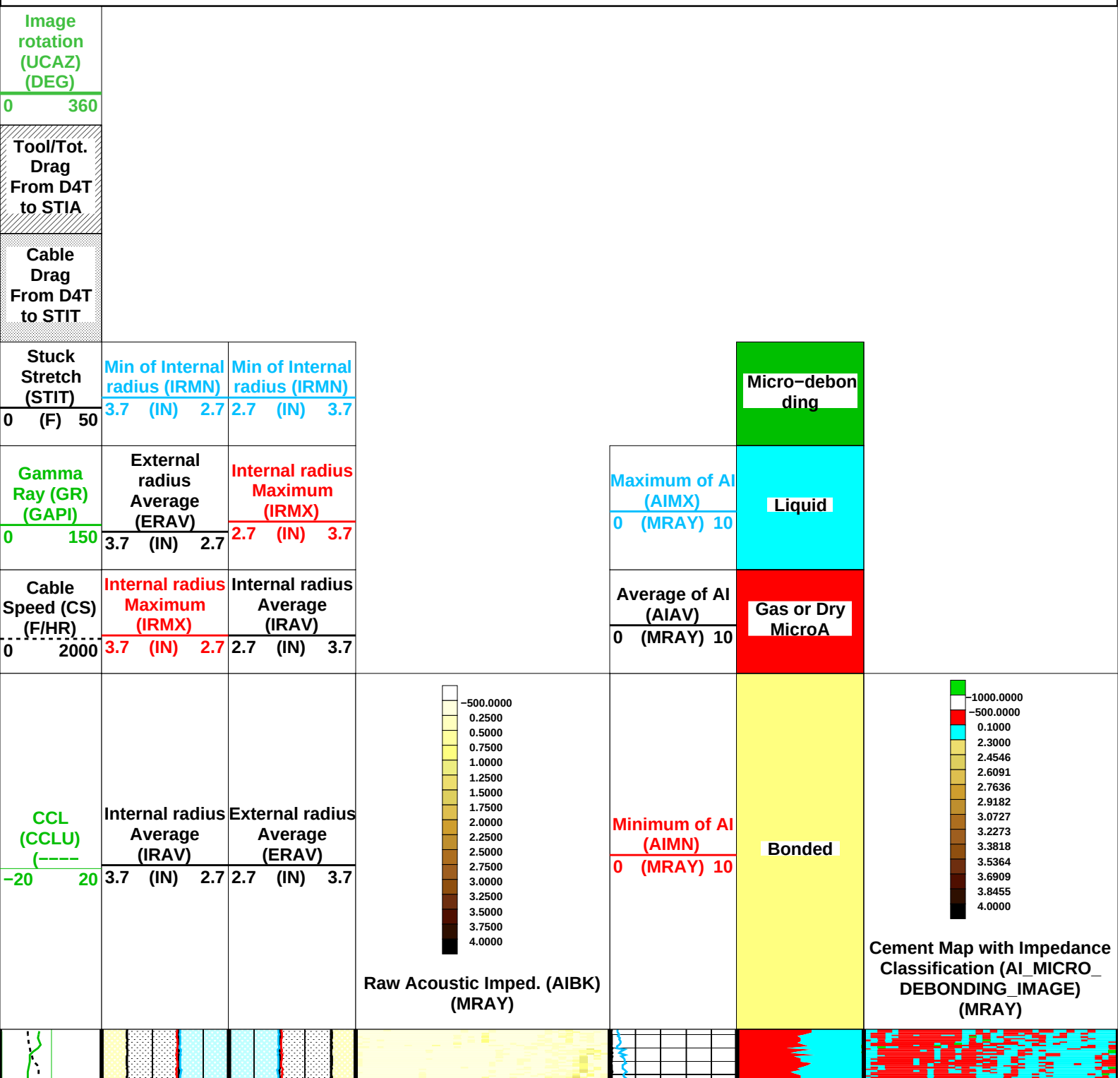
OP System Version: 19C0−187

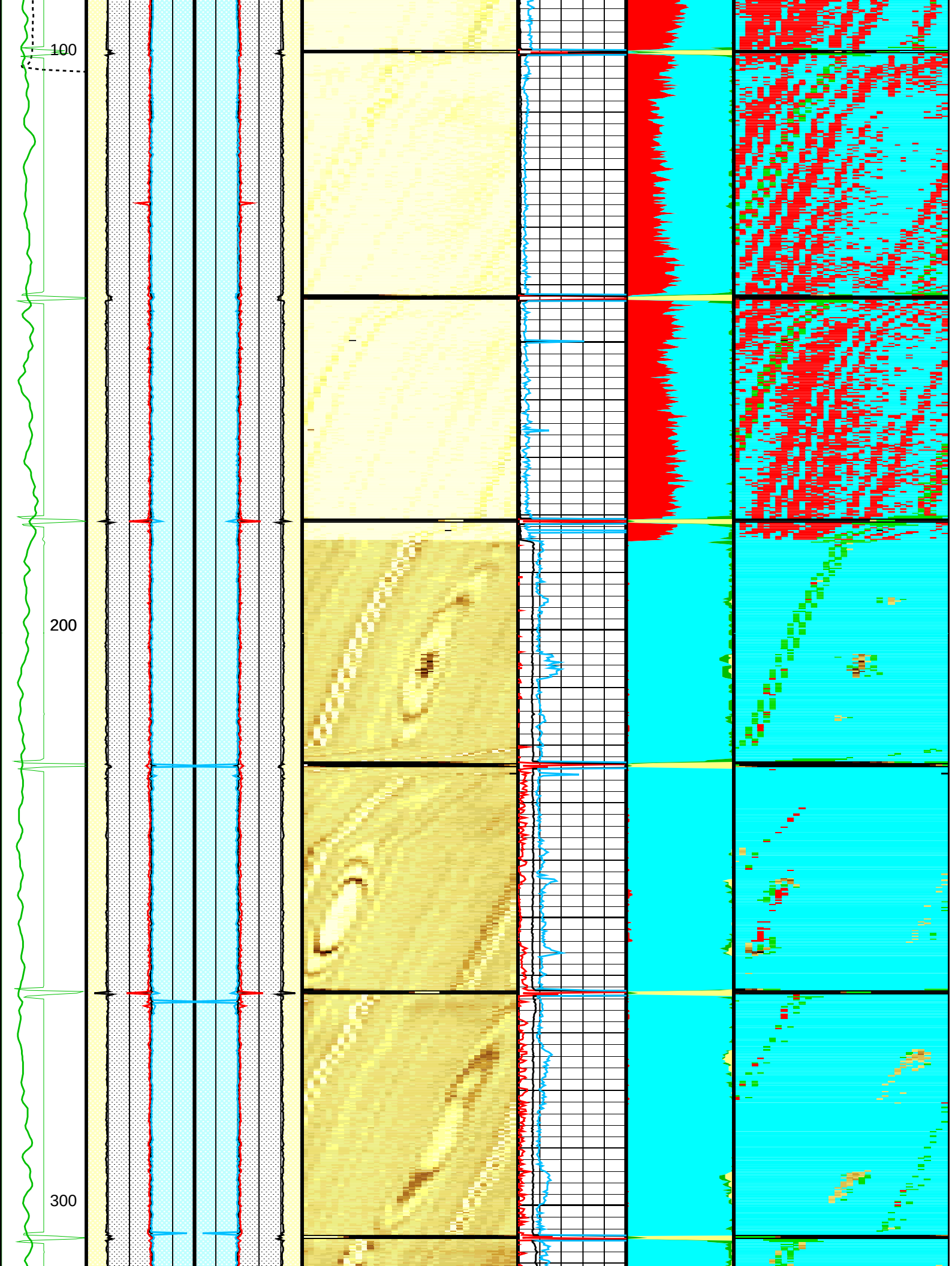
USIT−D	19C0−187	SGT−N	19C0−187
DTC−H	19C0−187		

Zoning of Mud Parameters

Depth	Fluid Velocity (DFVL)	Acoustic Impedance (ZMUD)
8000.00	191.00	1.62
7500.00	191.00	1.62

7500.00	191.00	1.62
6000.00	189.00	1.64
5000.00	190.00	1.66
4000.00	191.00	1.70
3000.00	192.00	1.70
2750.00	193.00	1.68
2500.00	194.00	1.68
2250.00	195.00	1.68
2000.00	196.00	1.68

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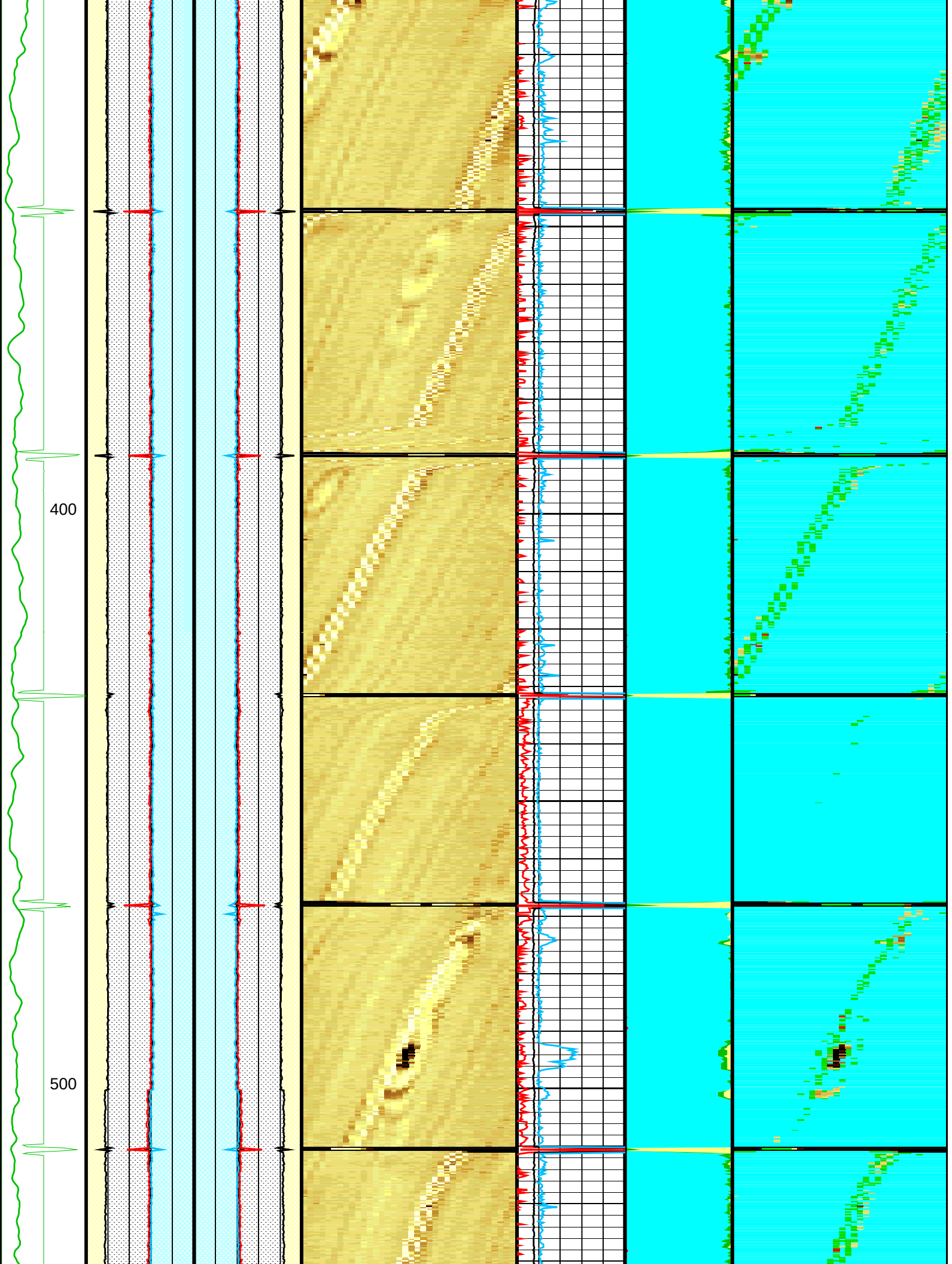
200
300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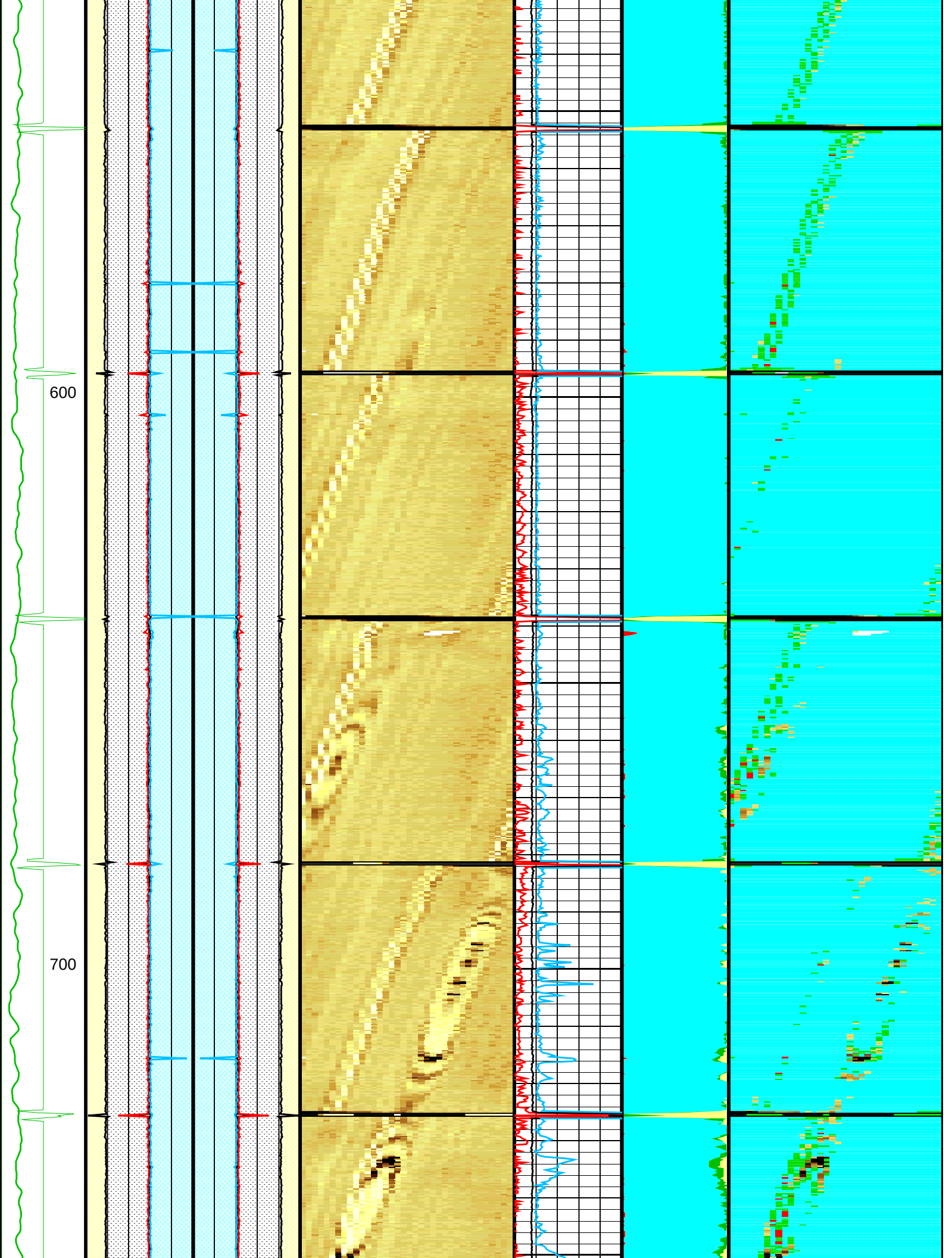
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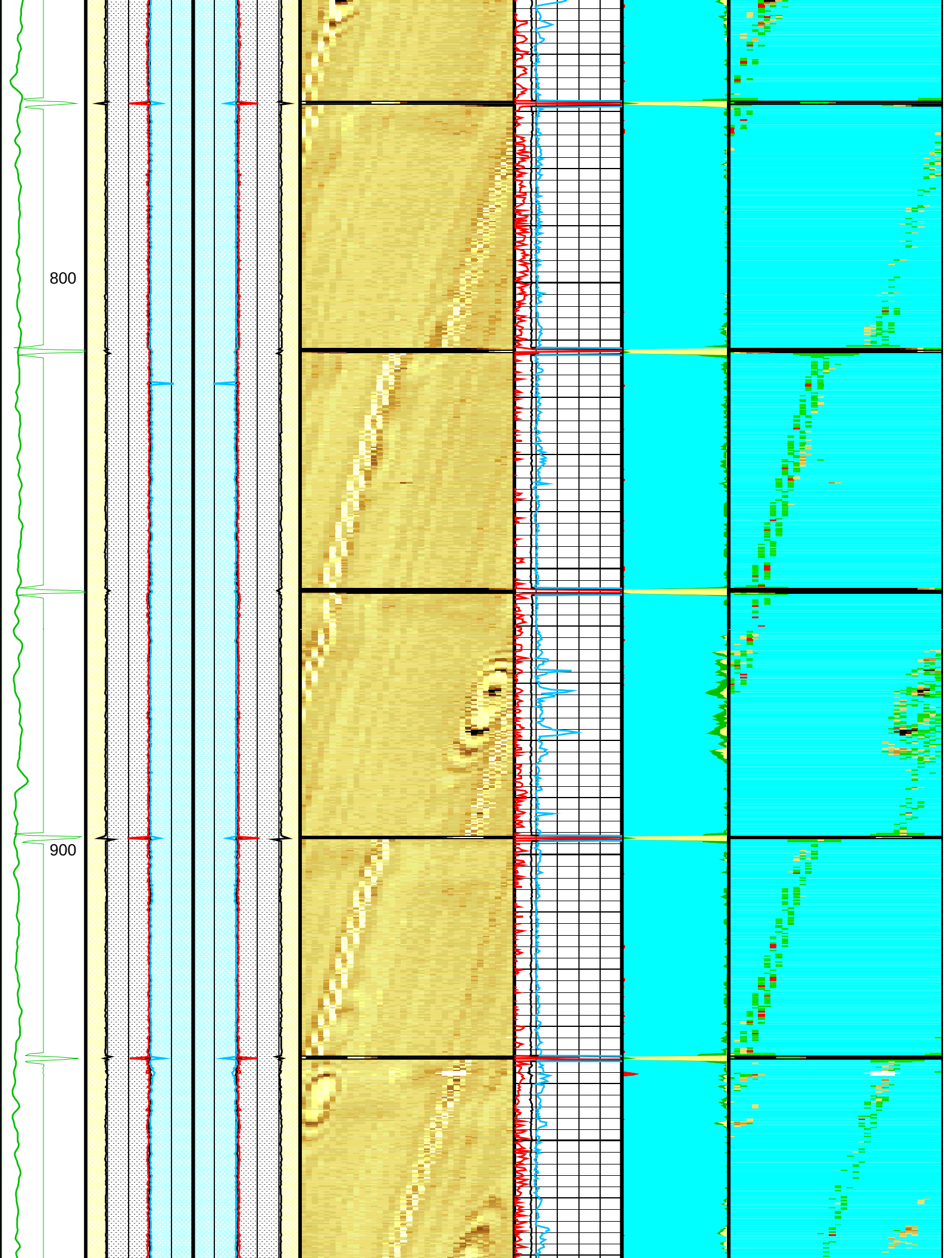
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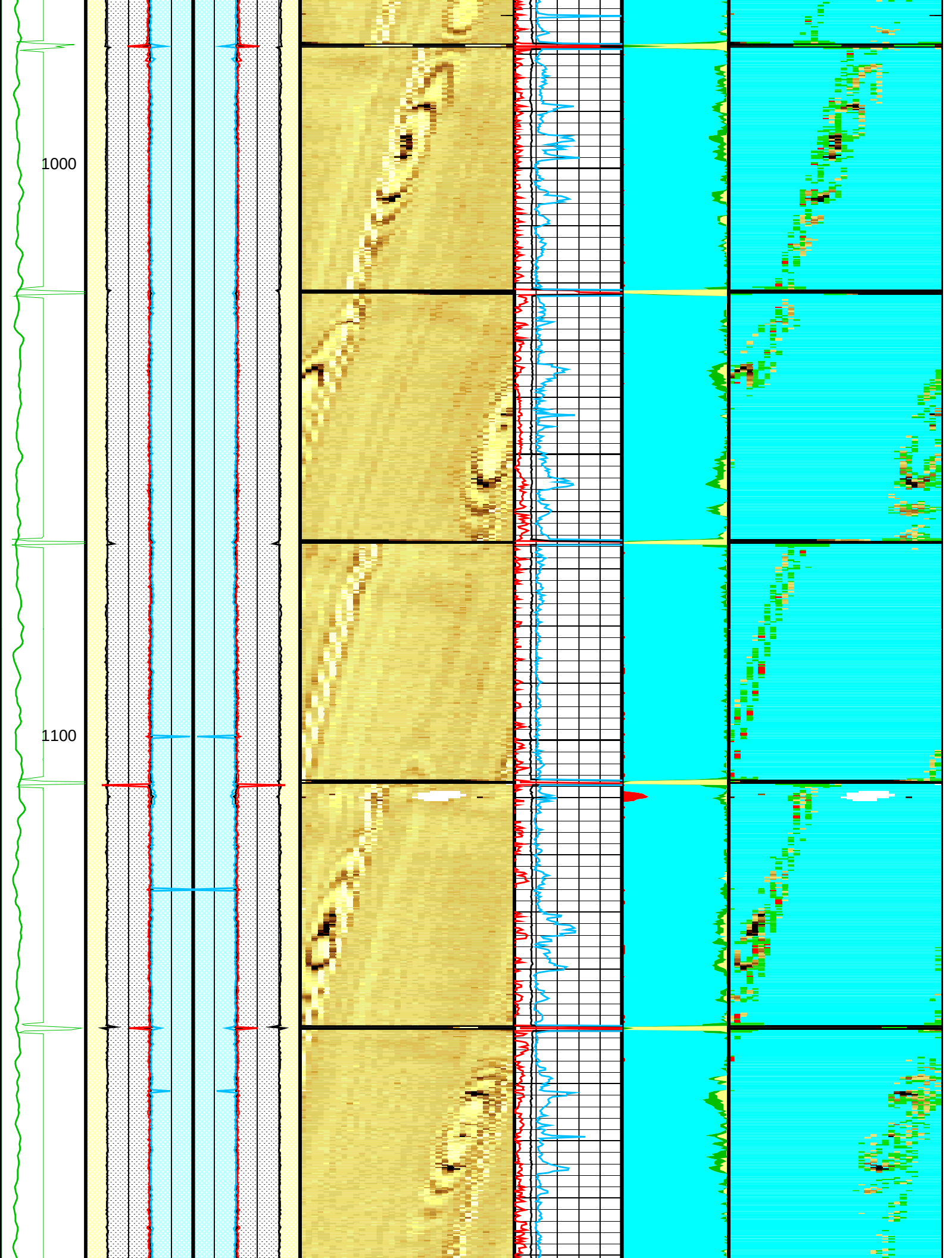
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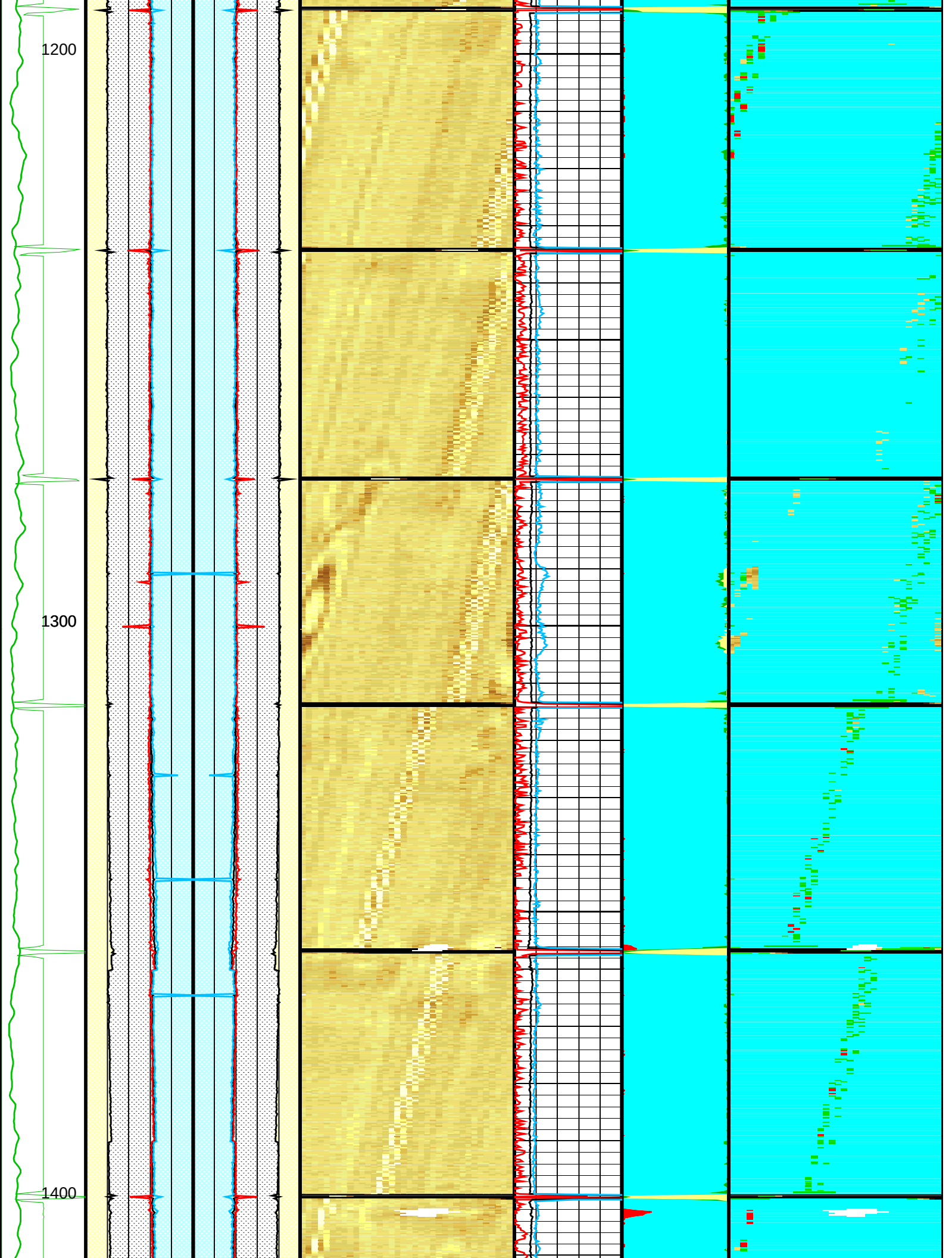
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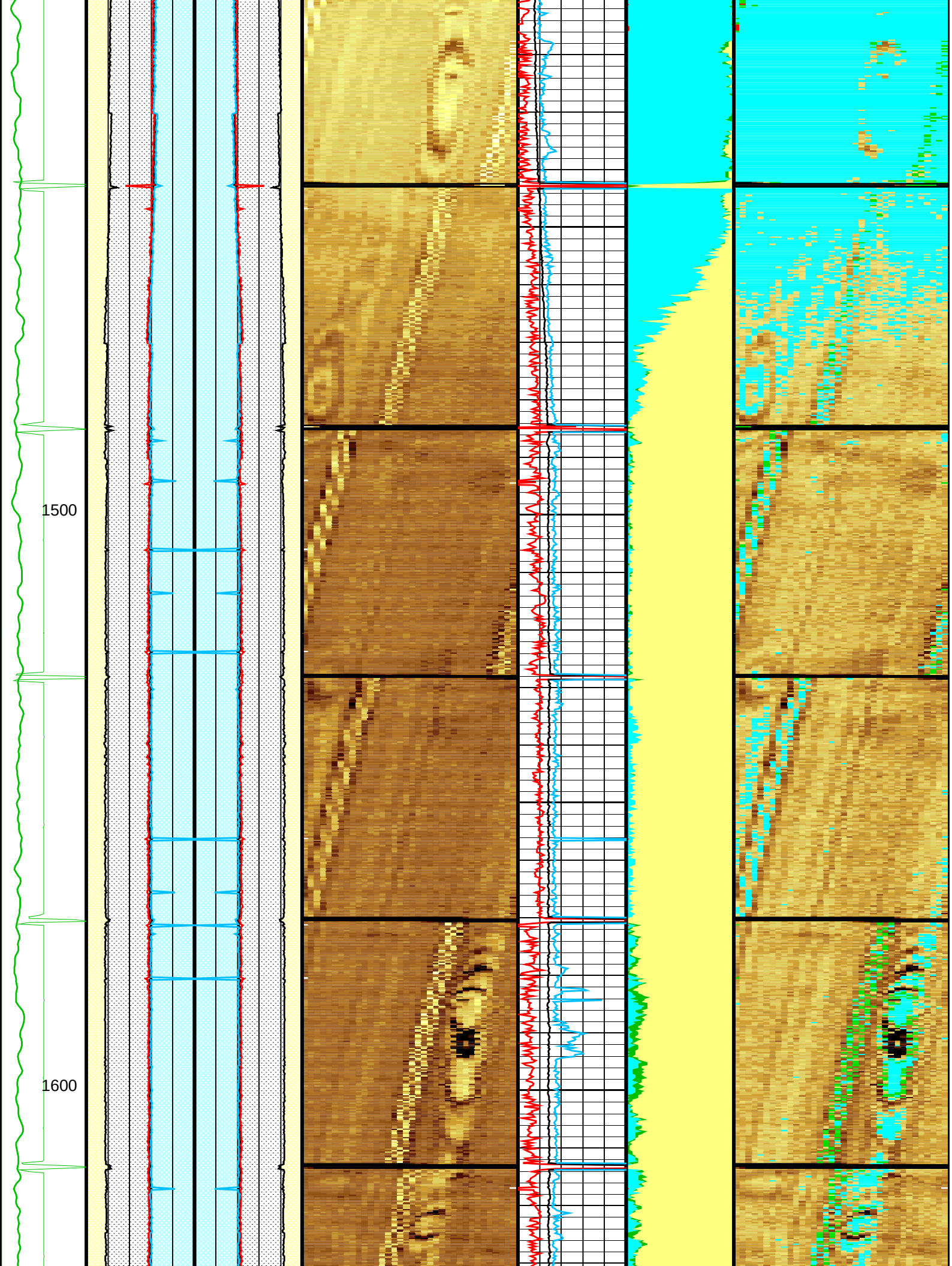
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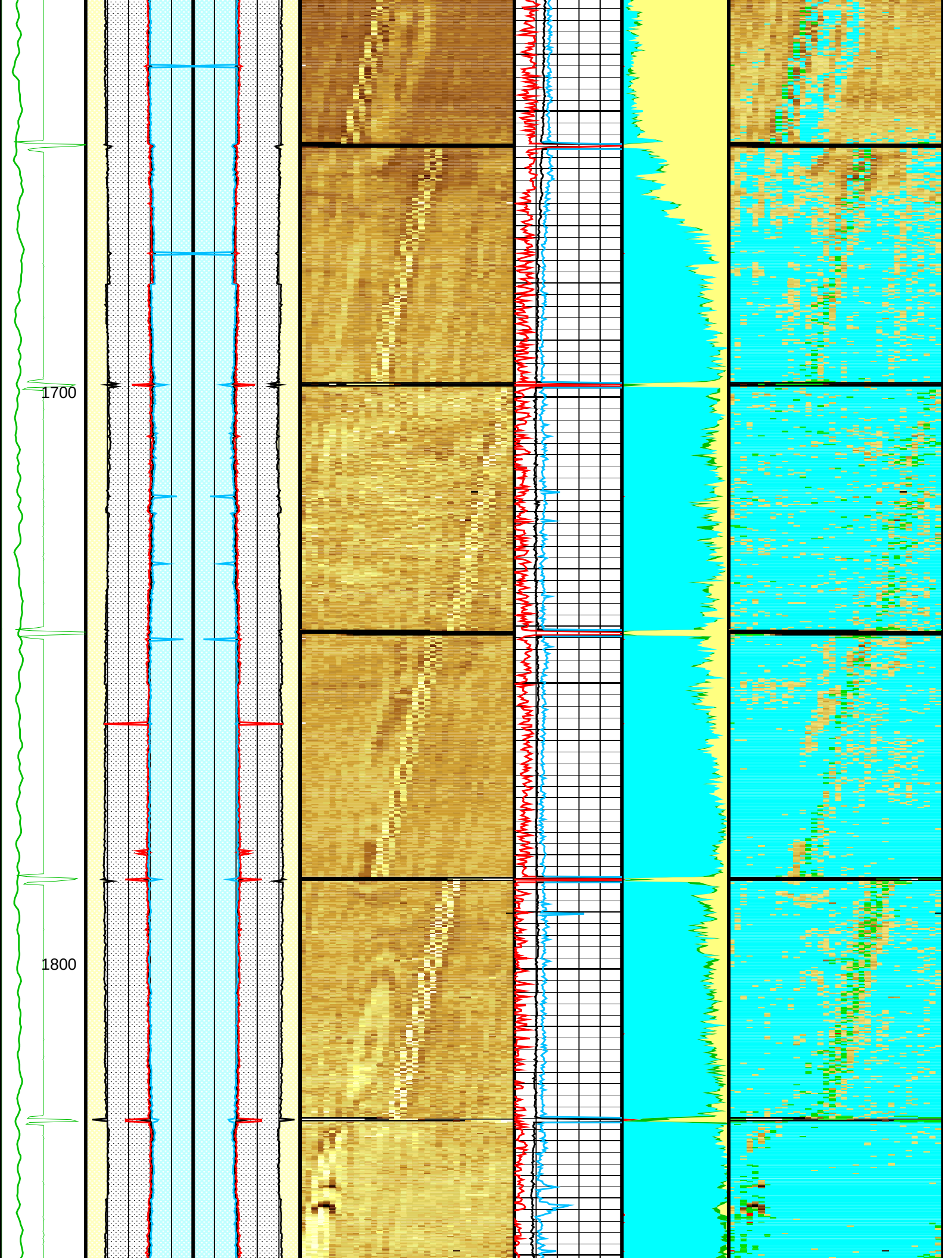
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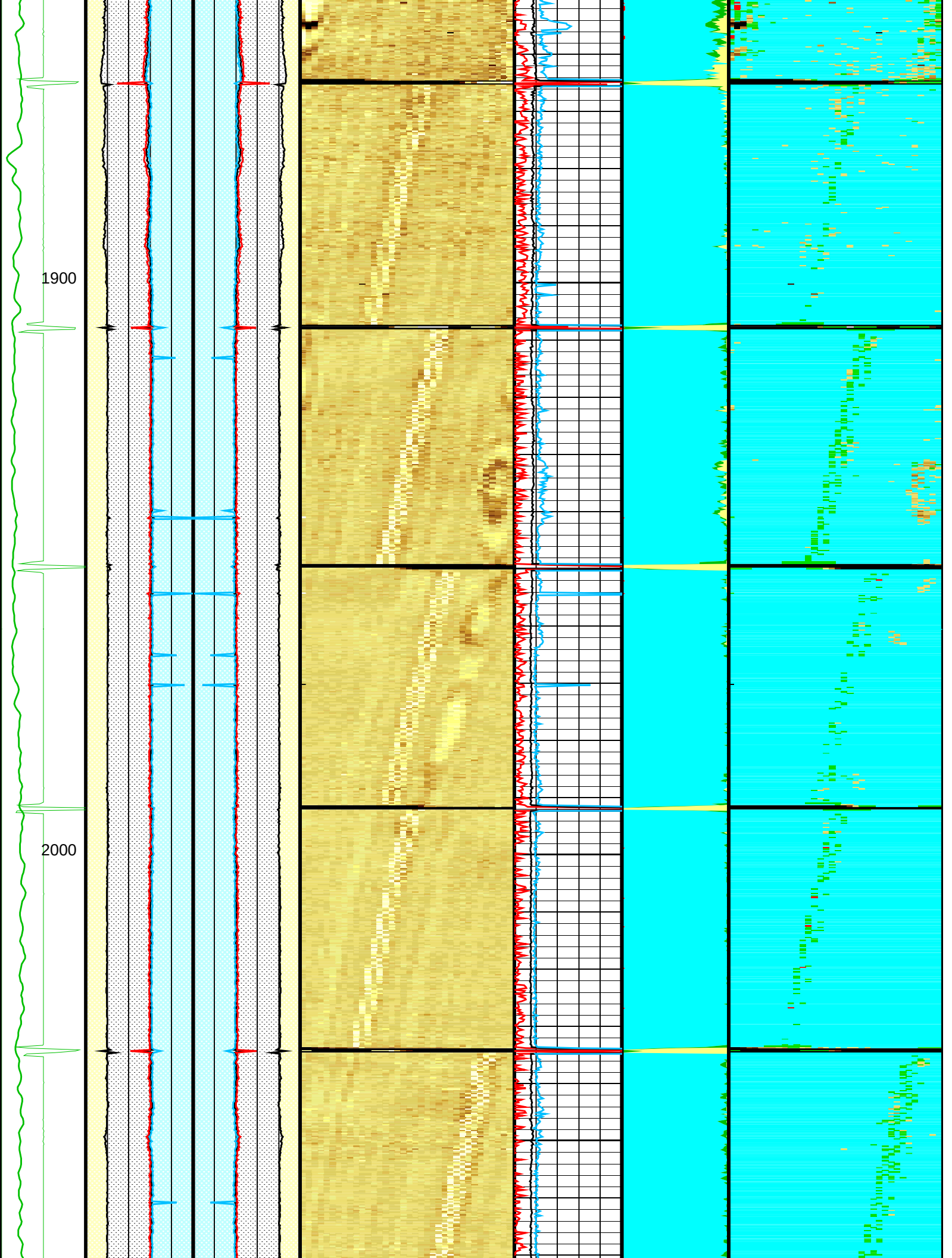
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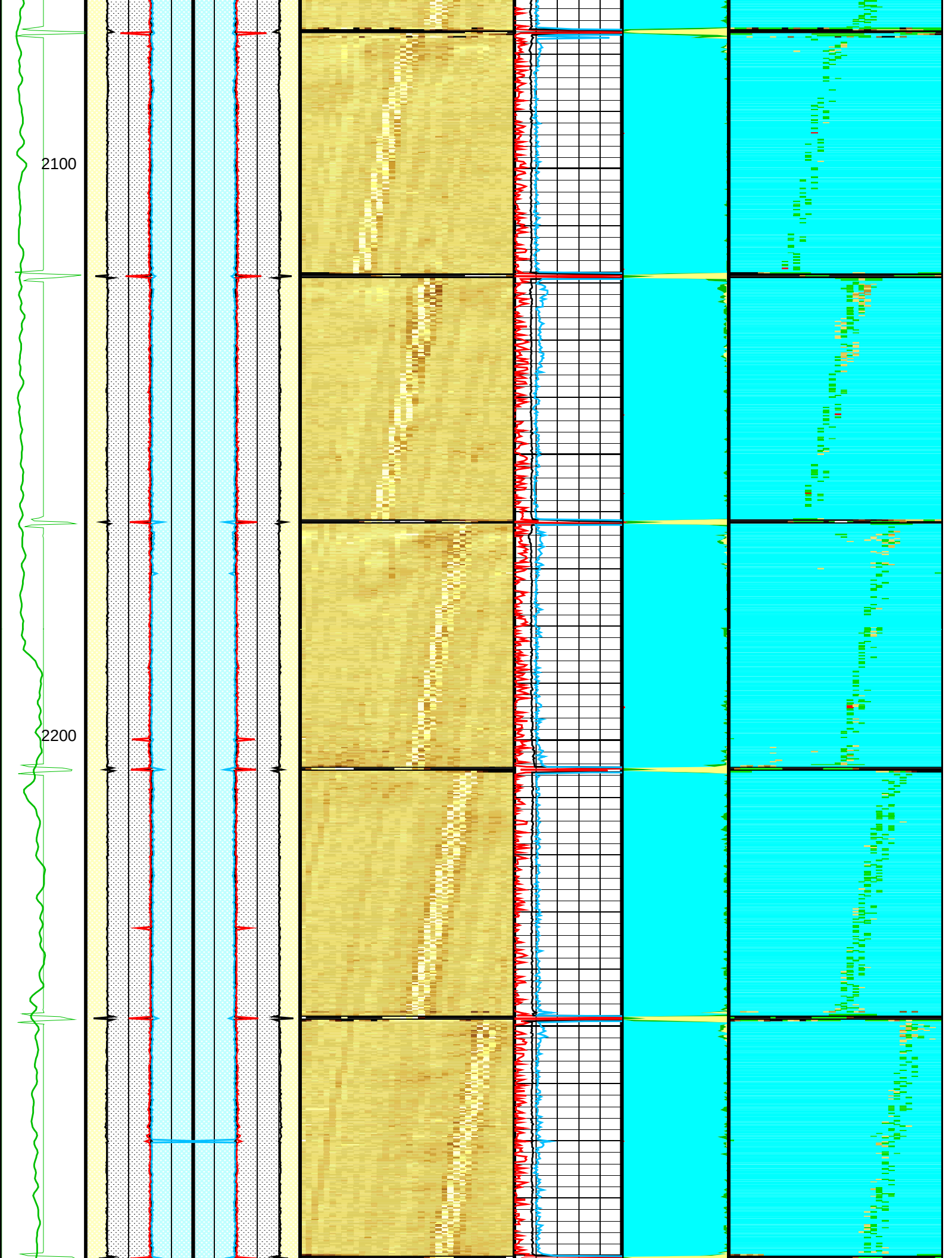
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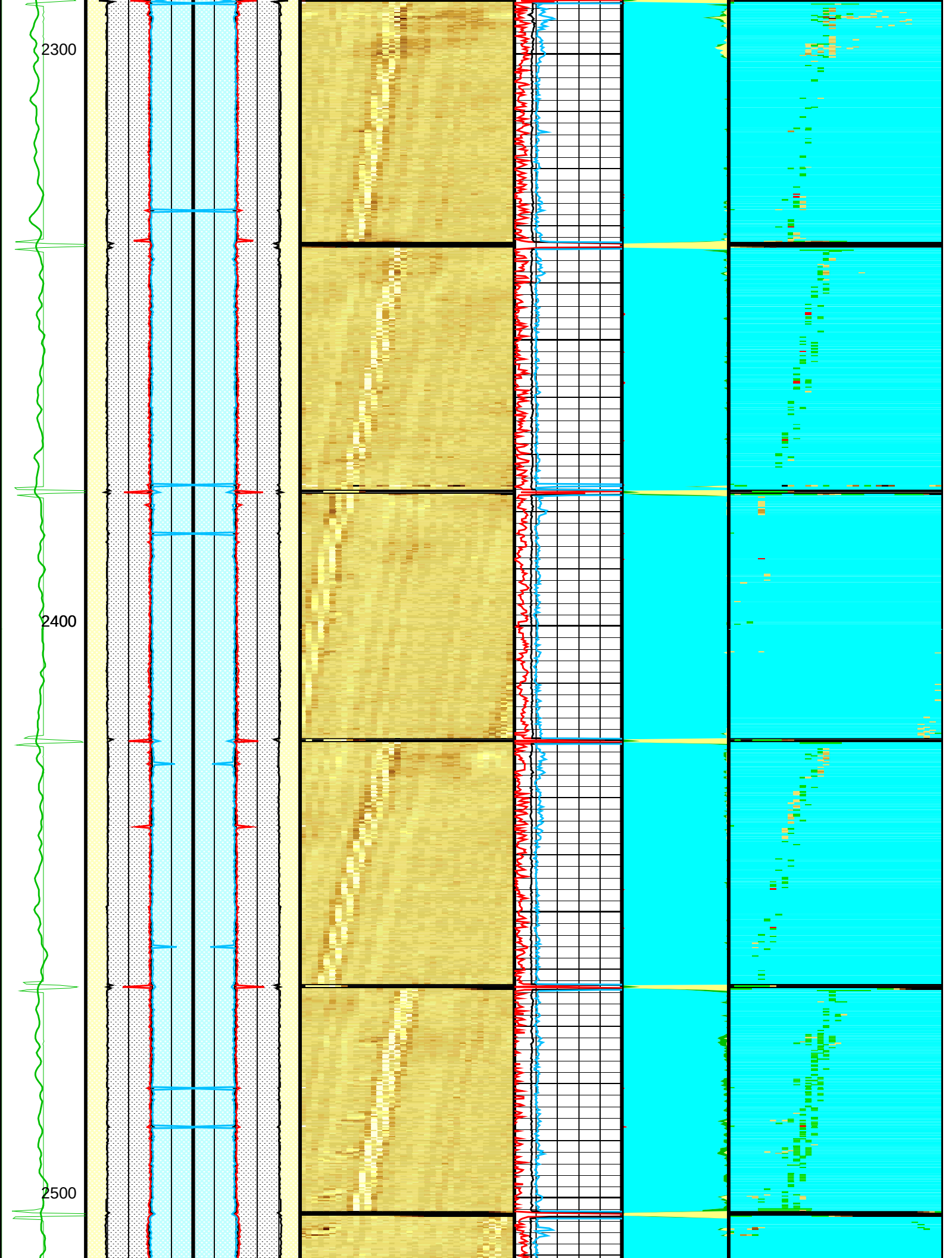
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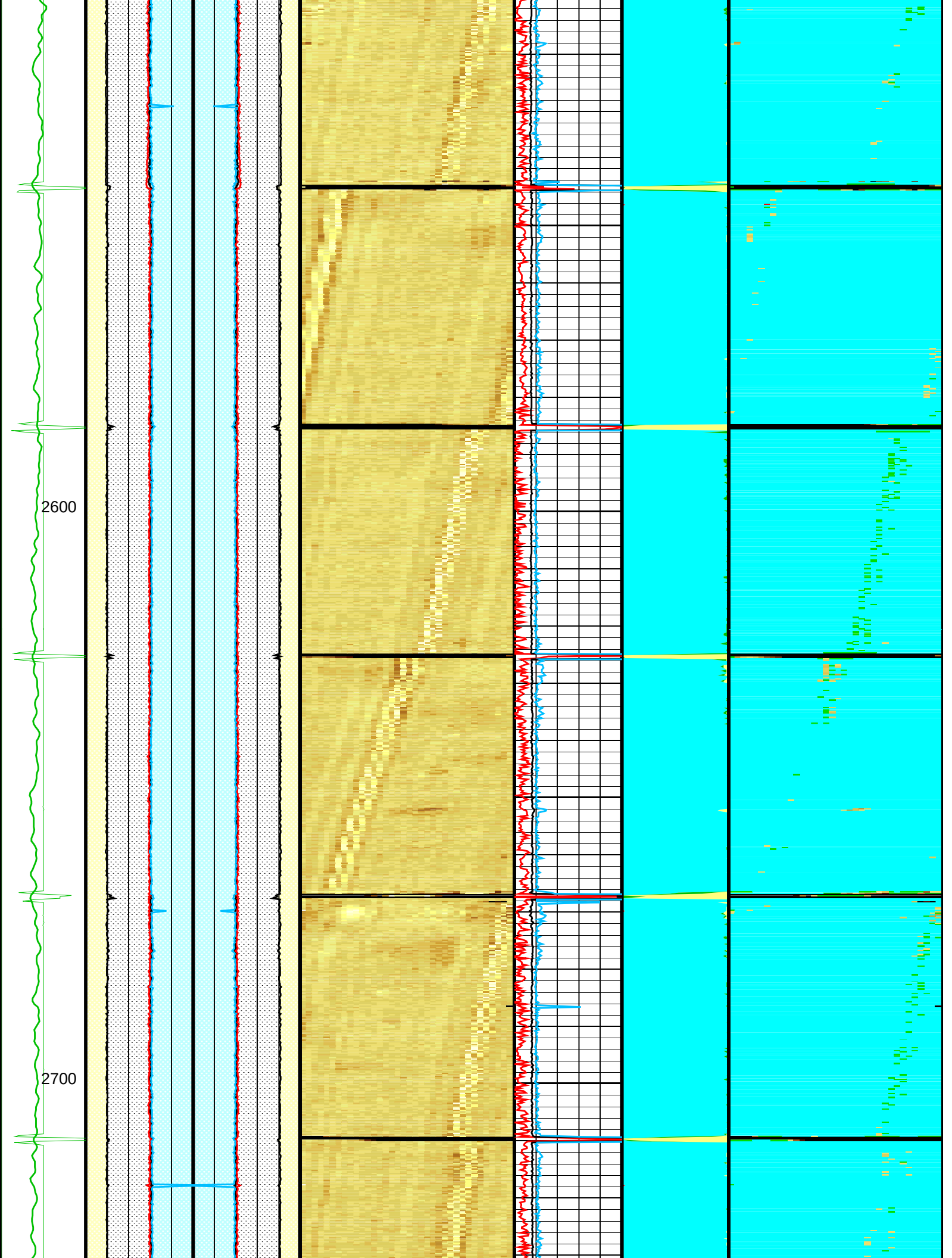
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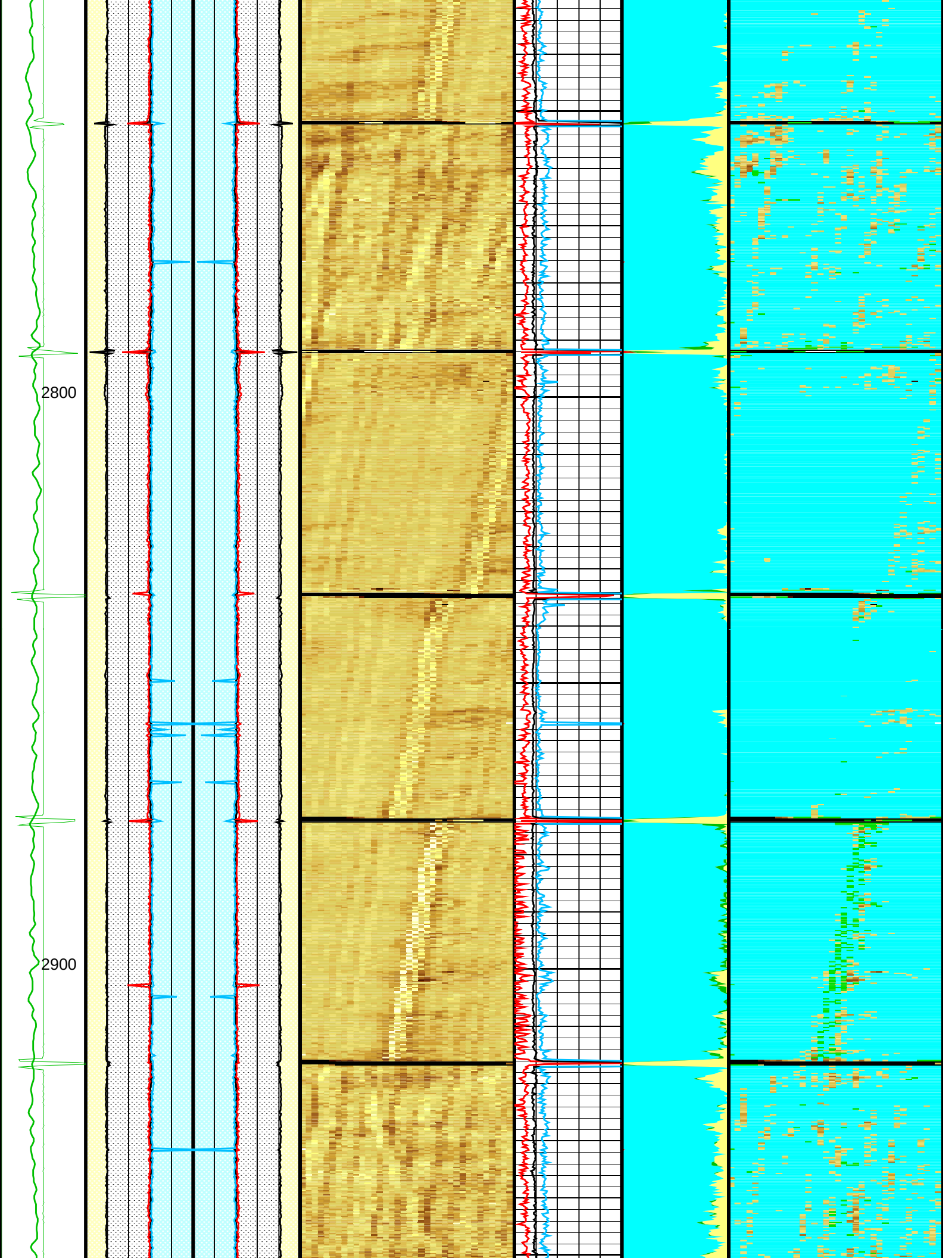
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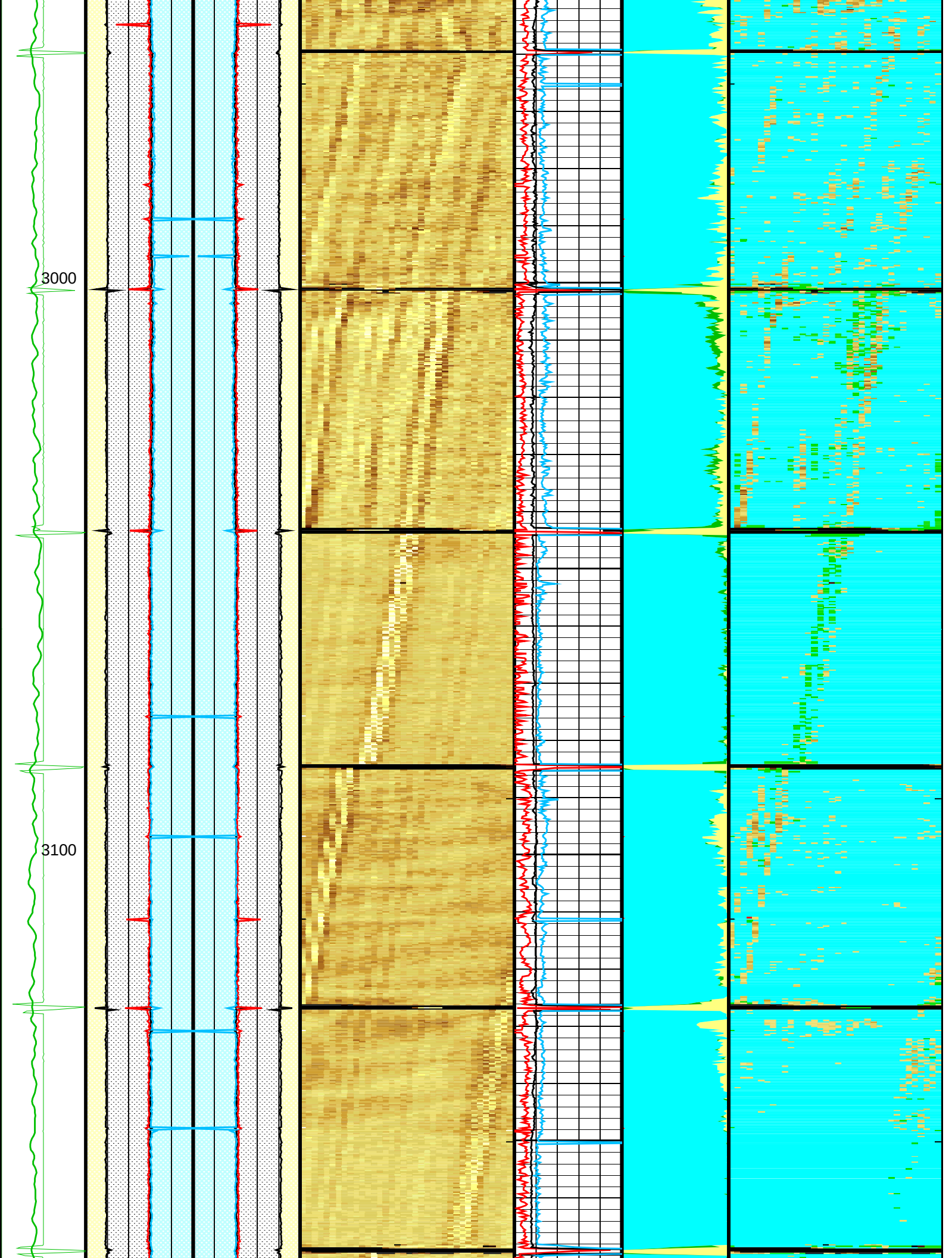
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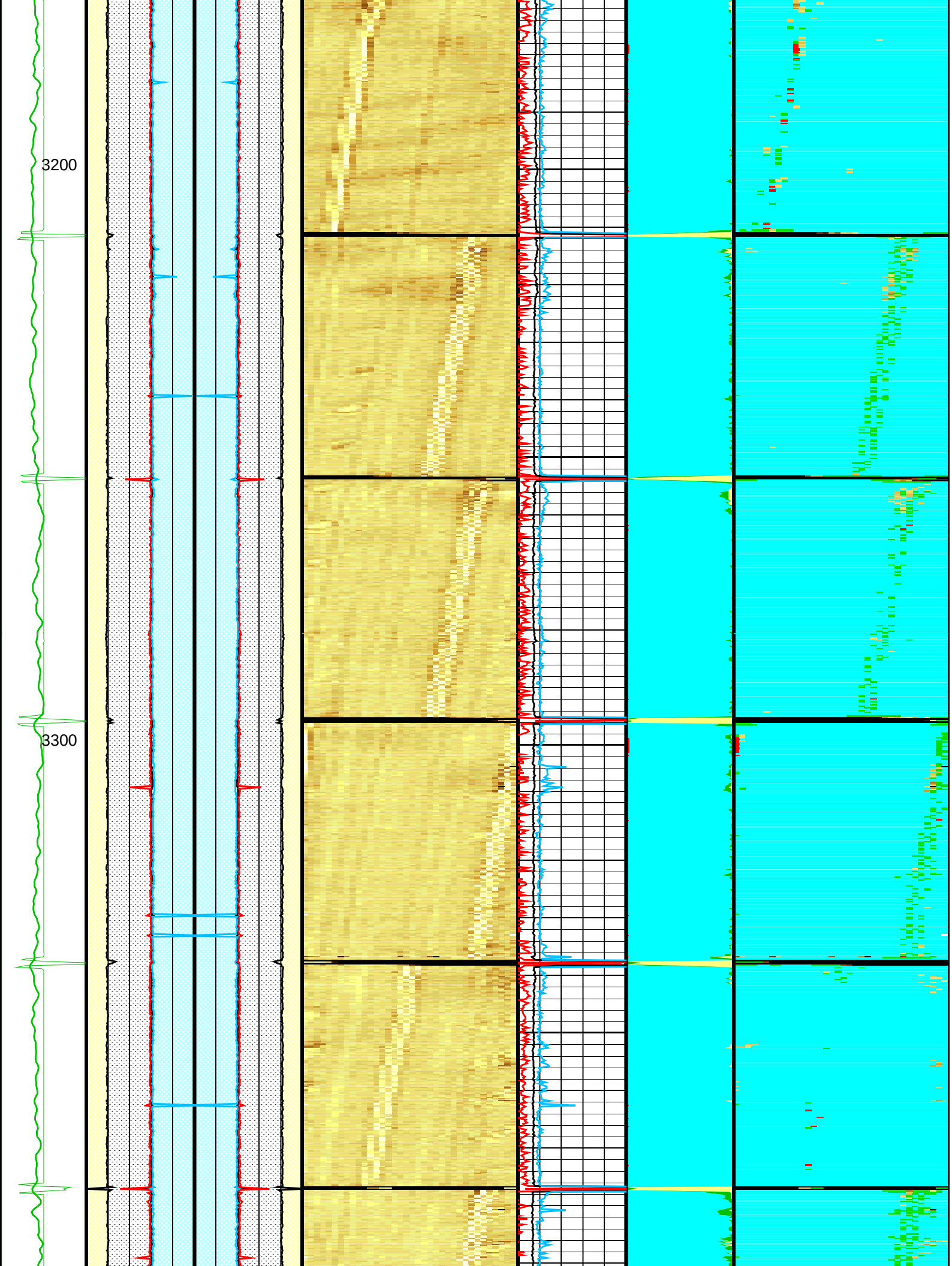
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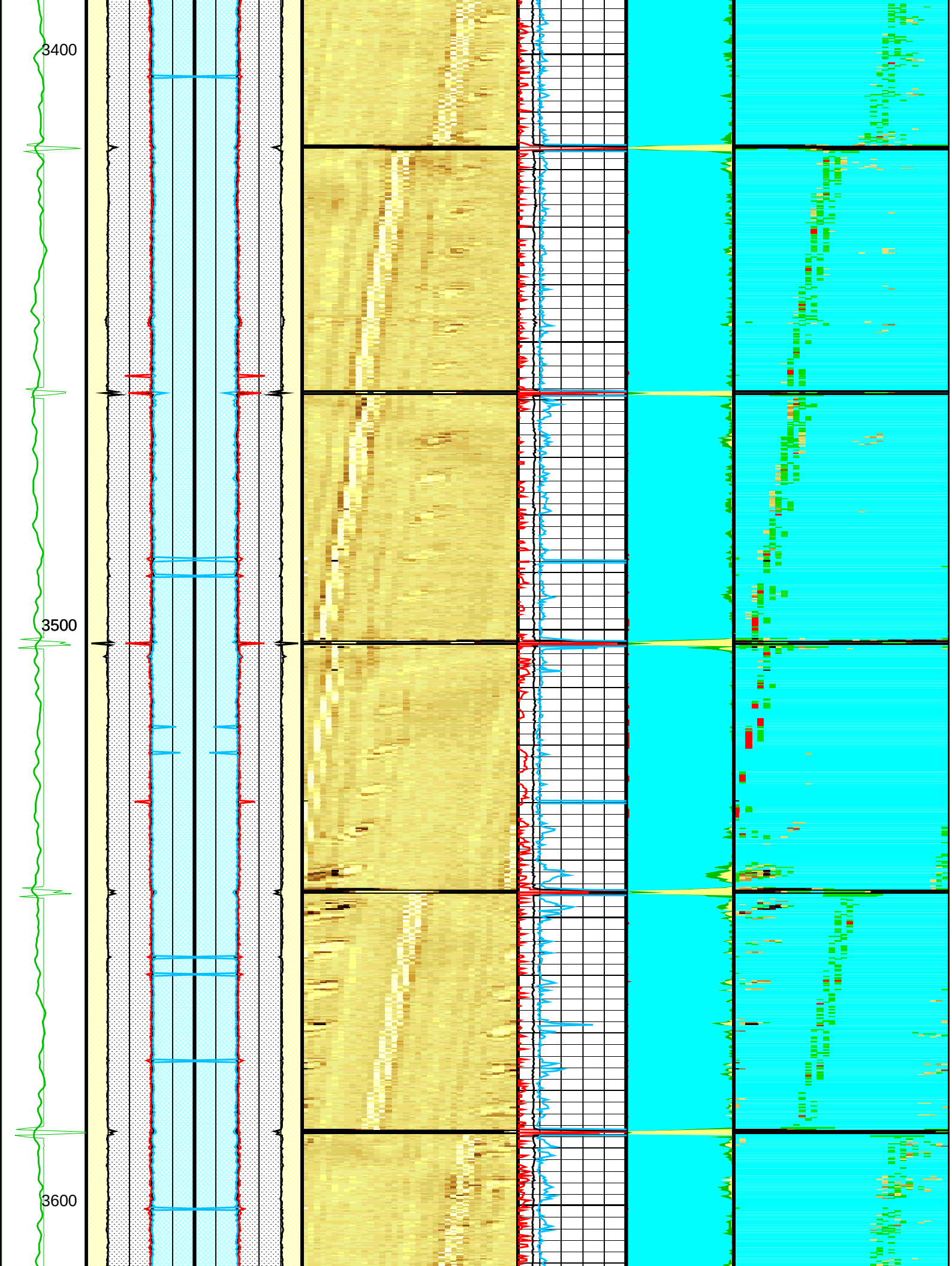
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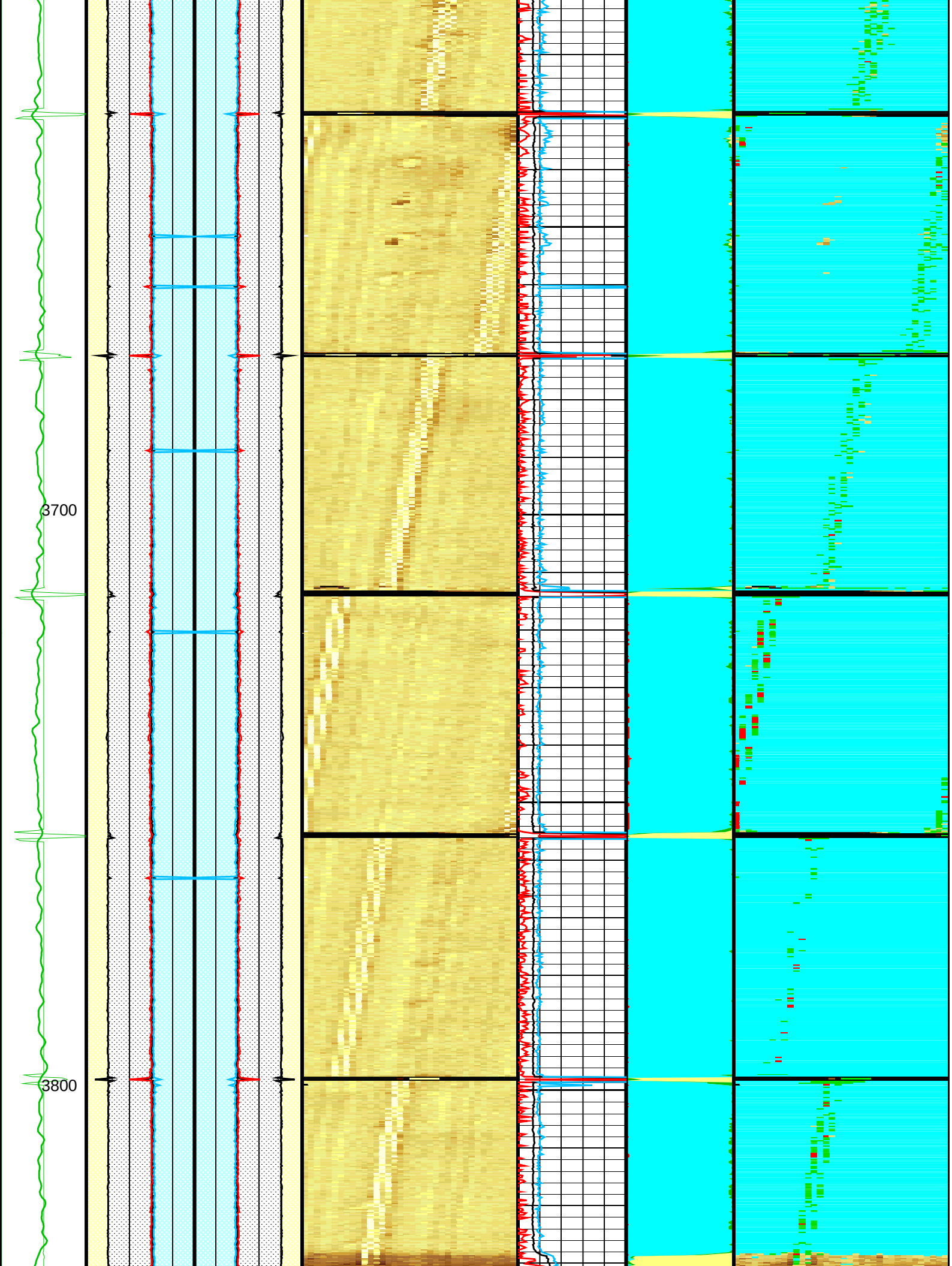
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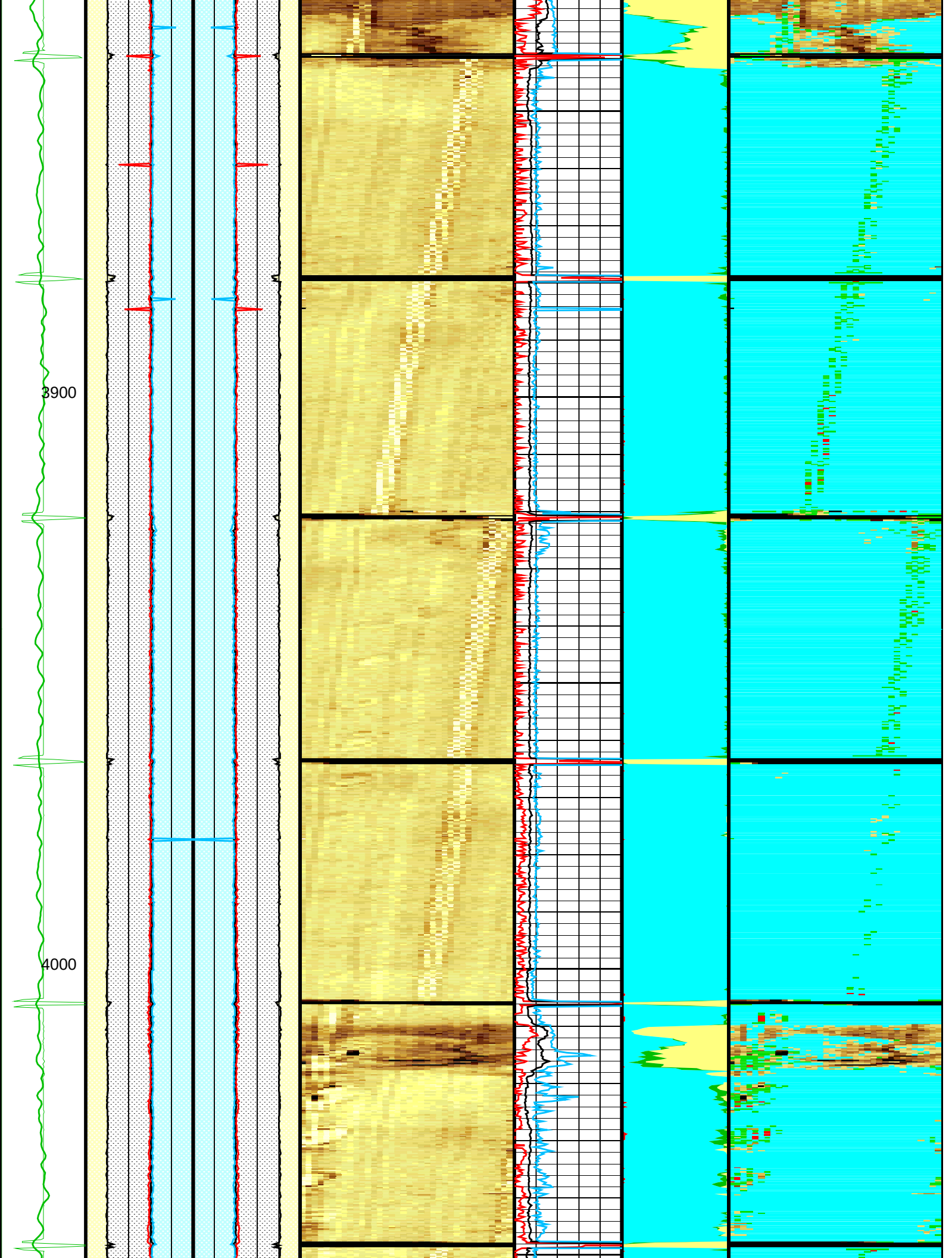
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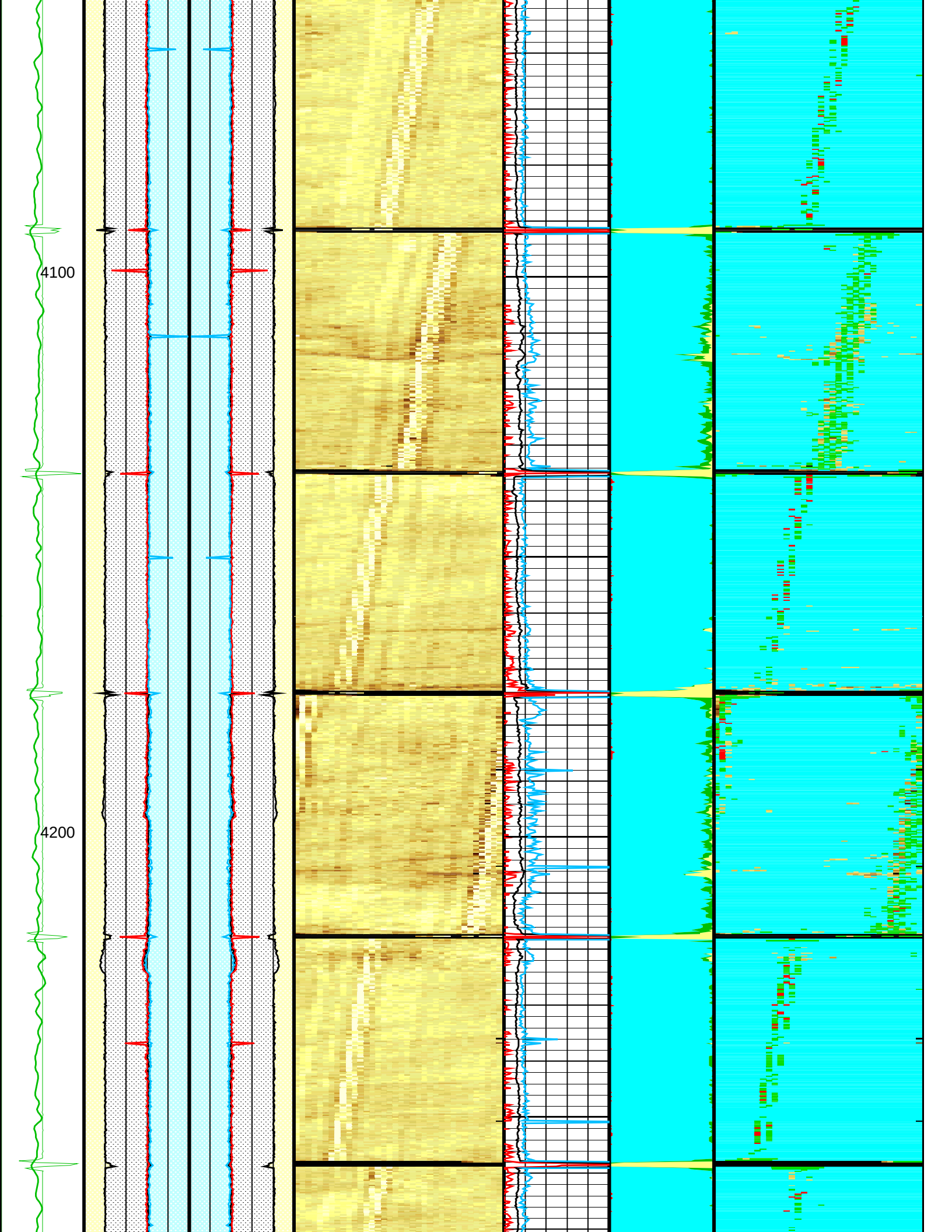
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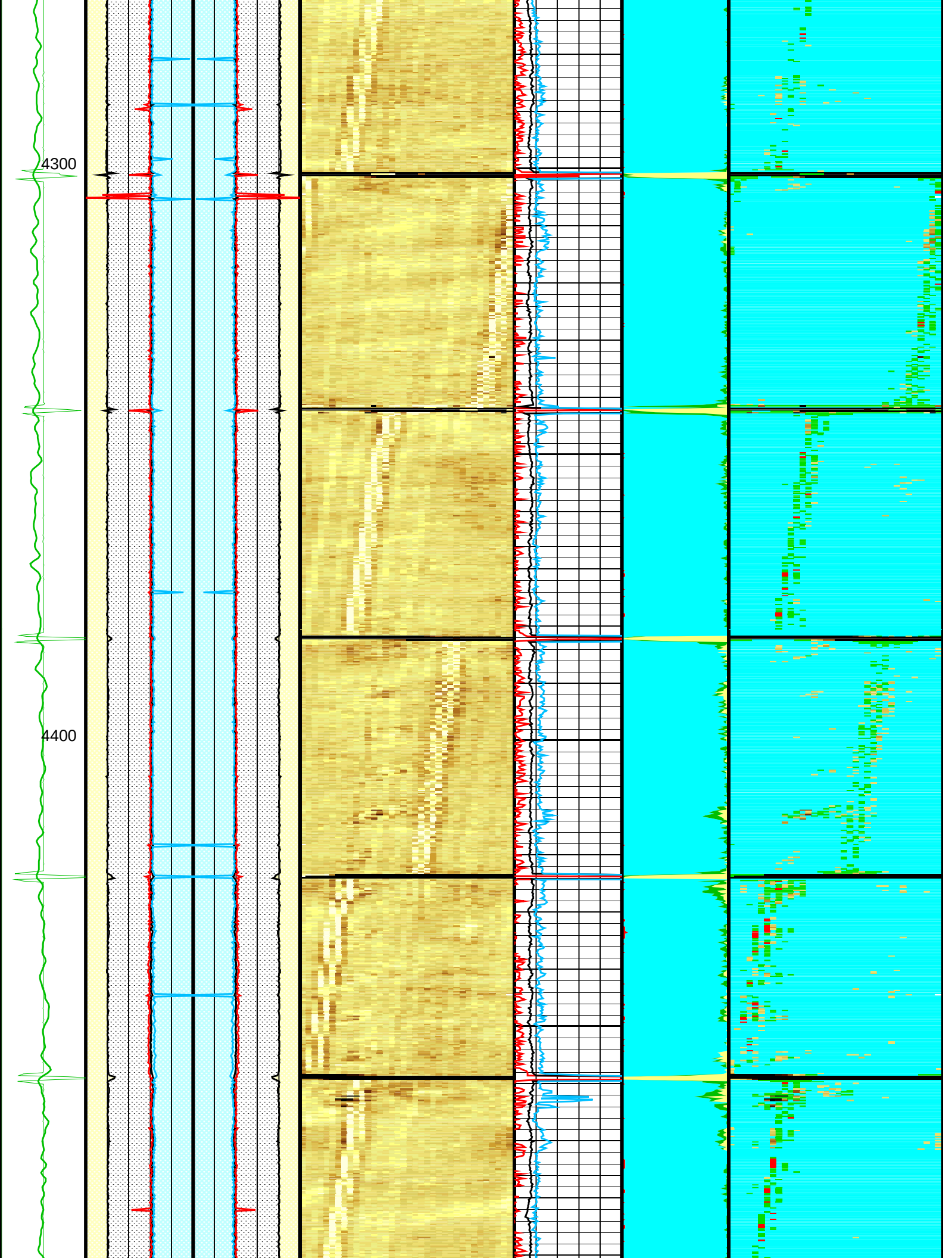
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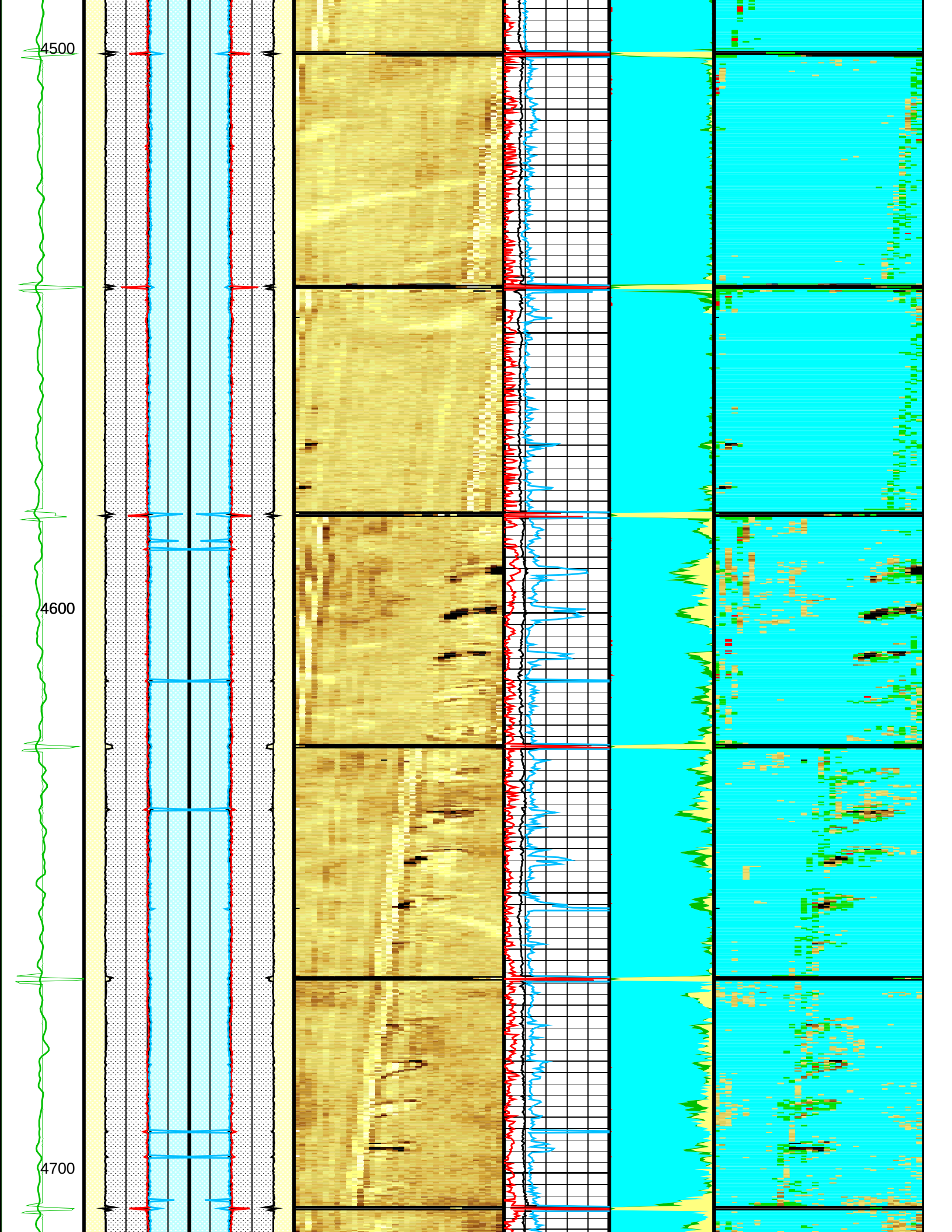
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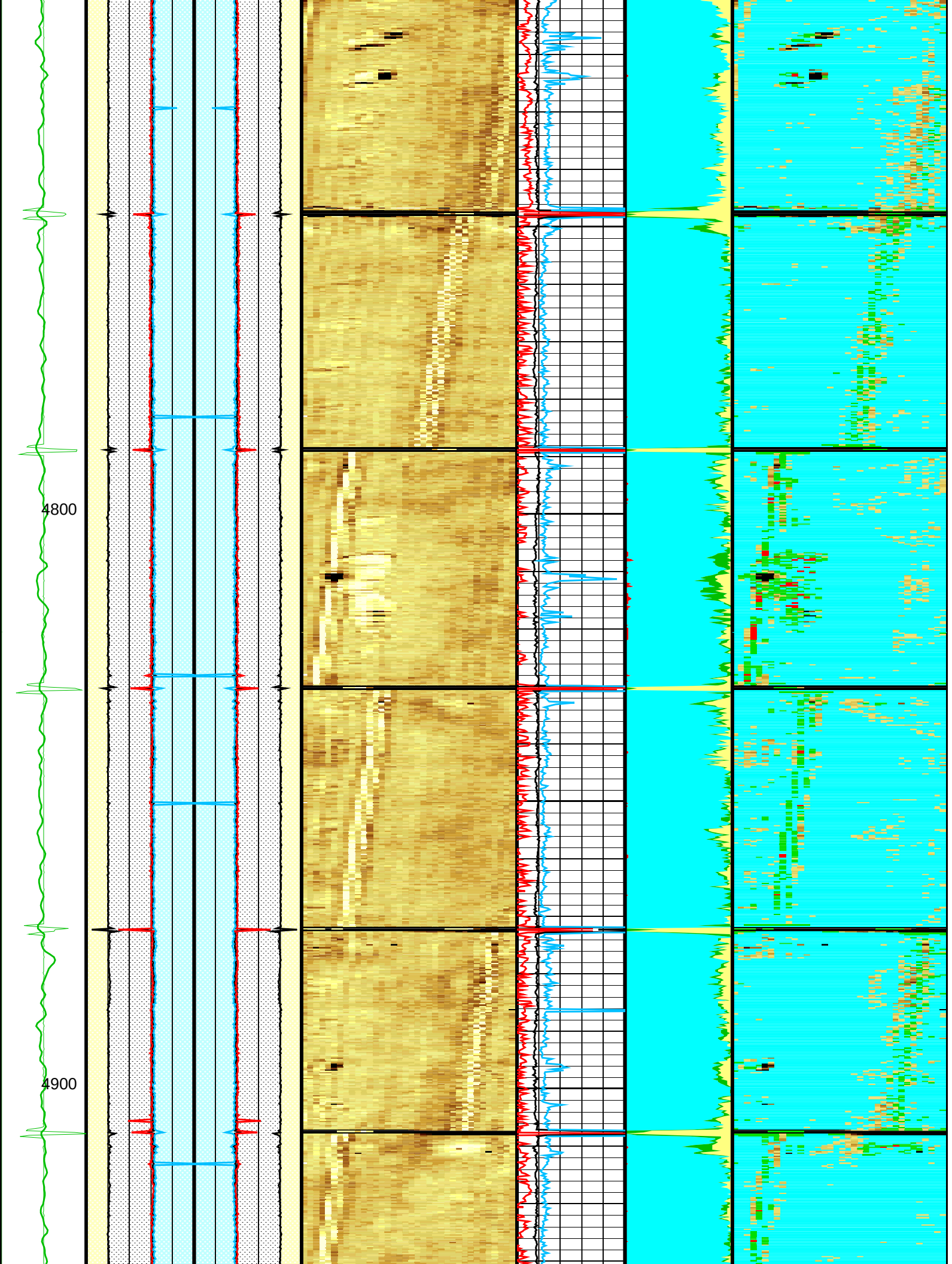
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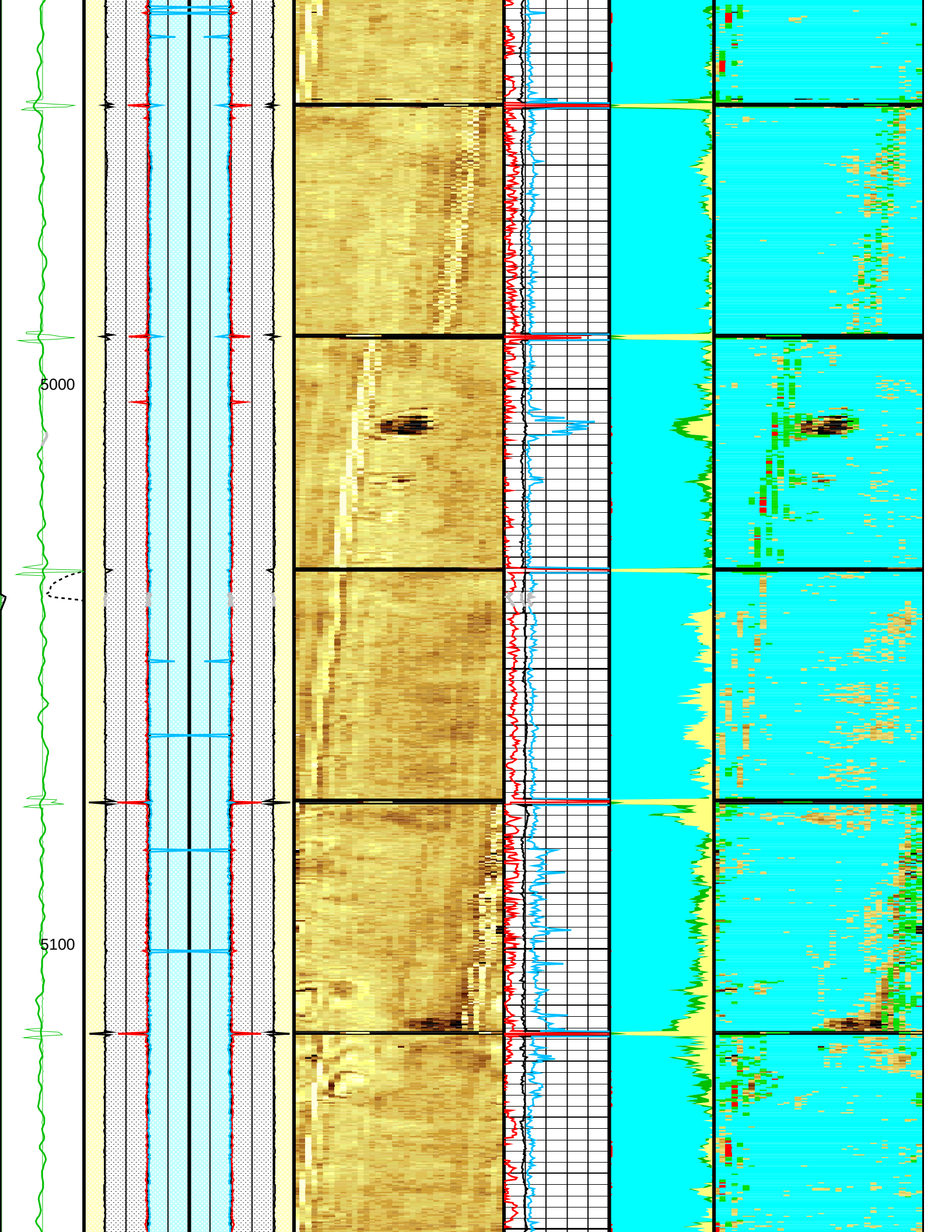
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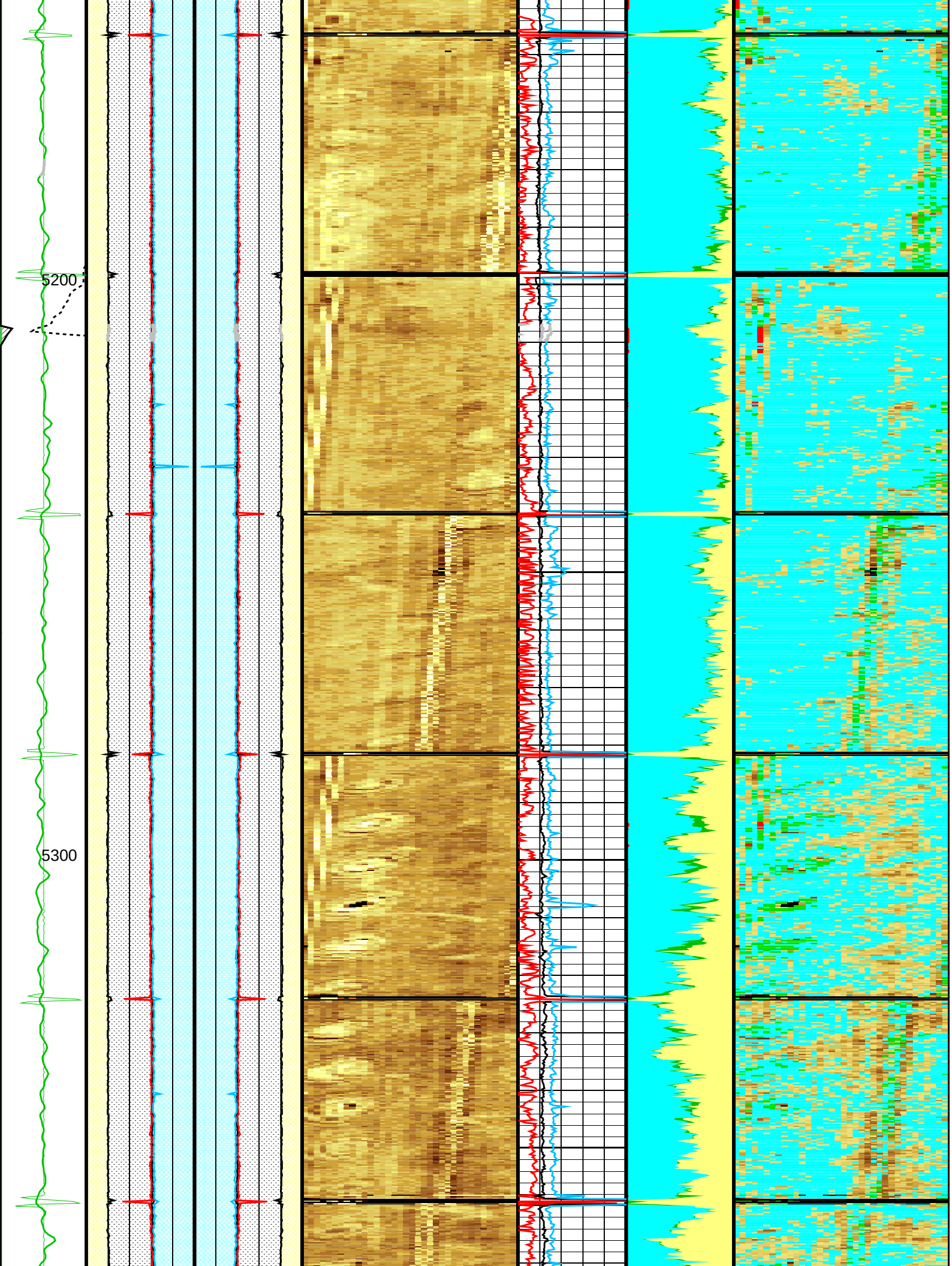
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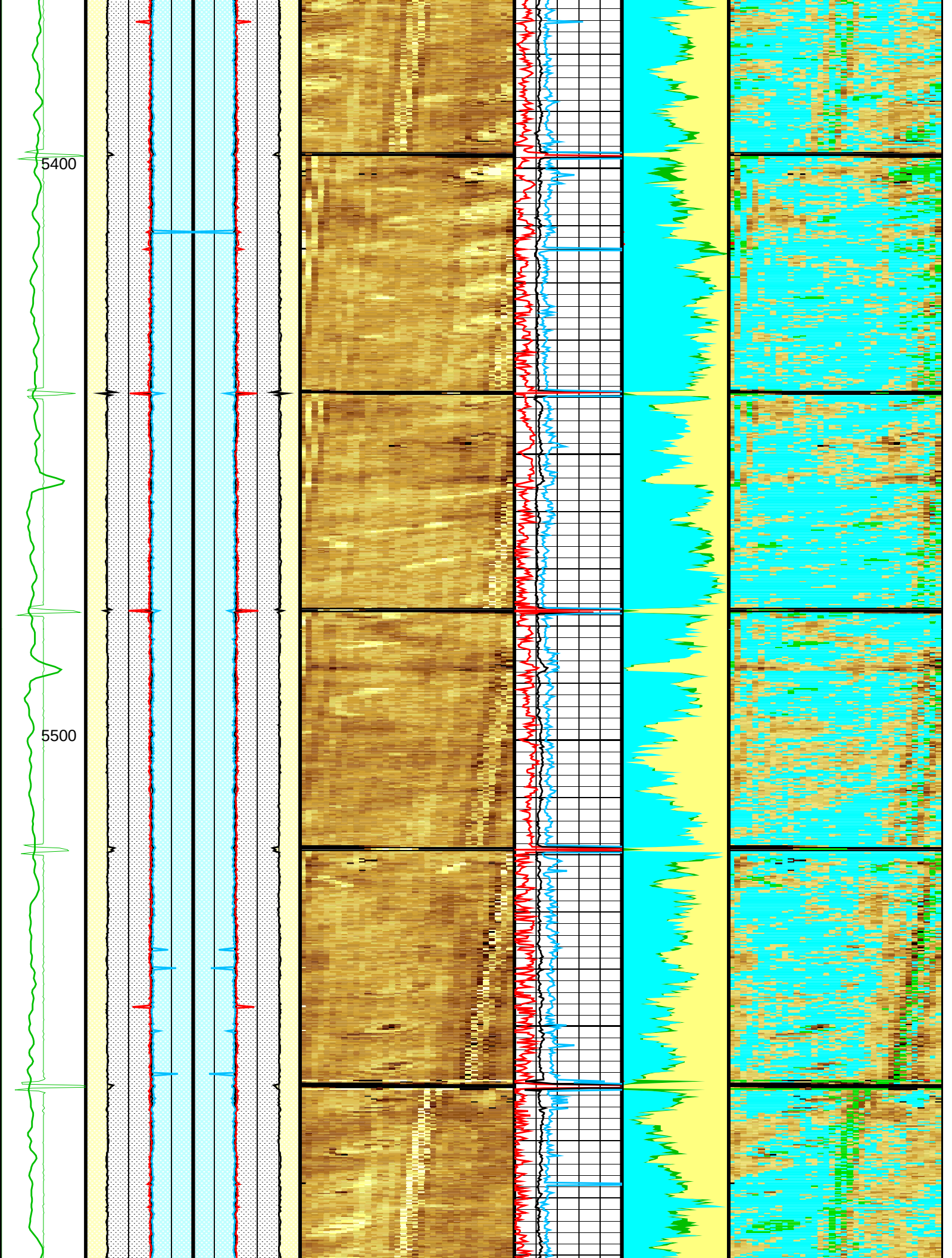
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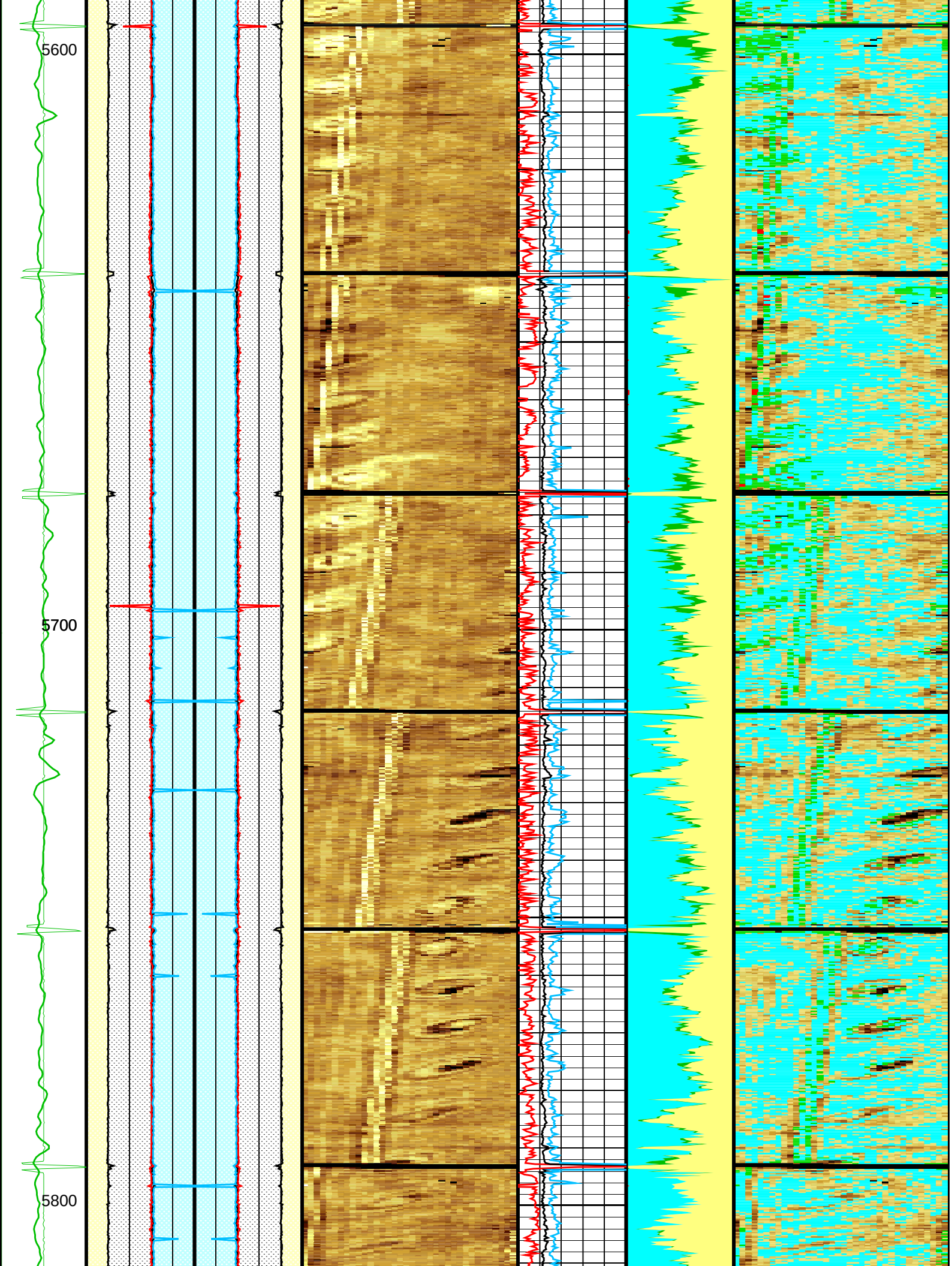
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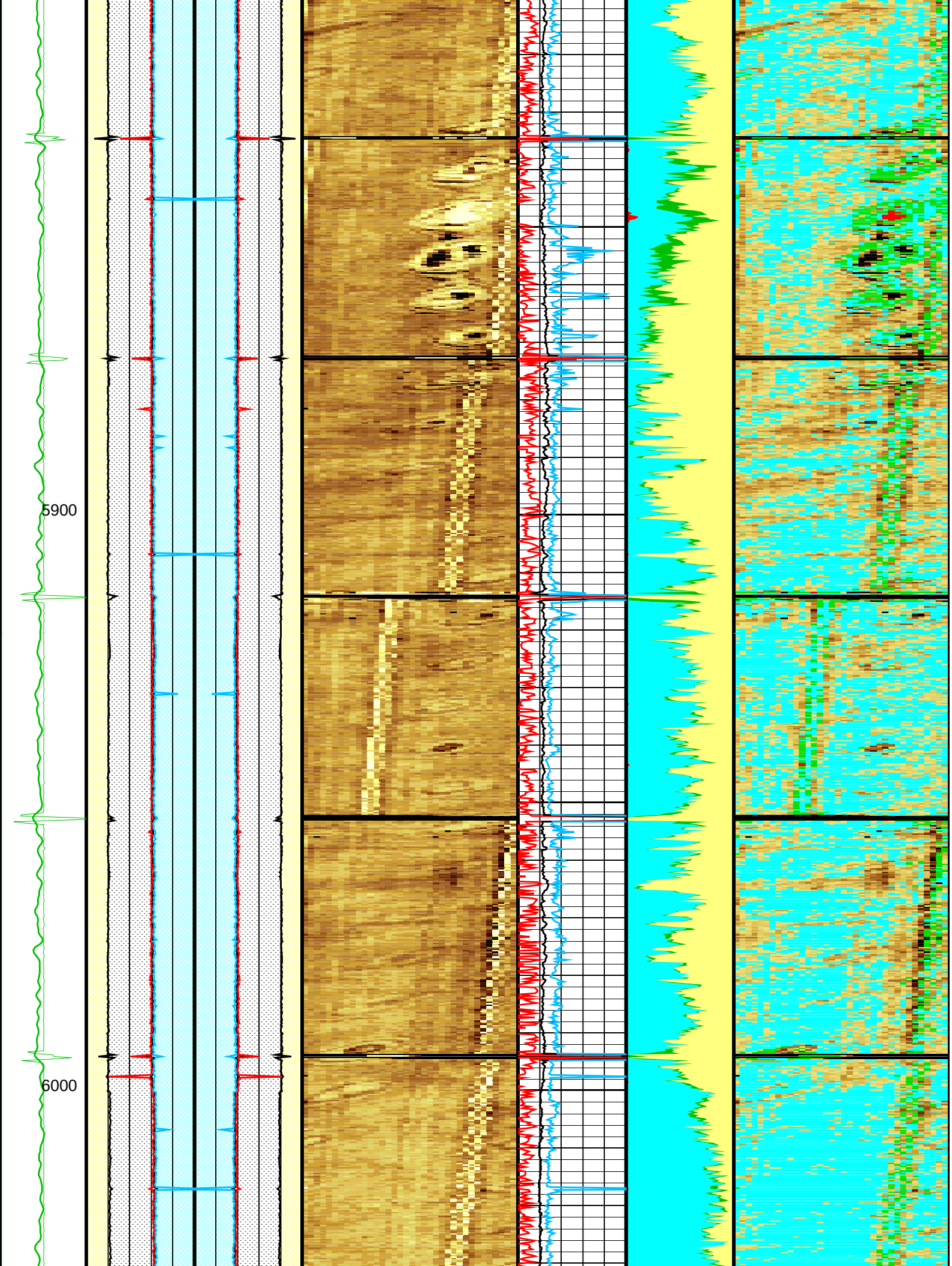
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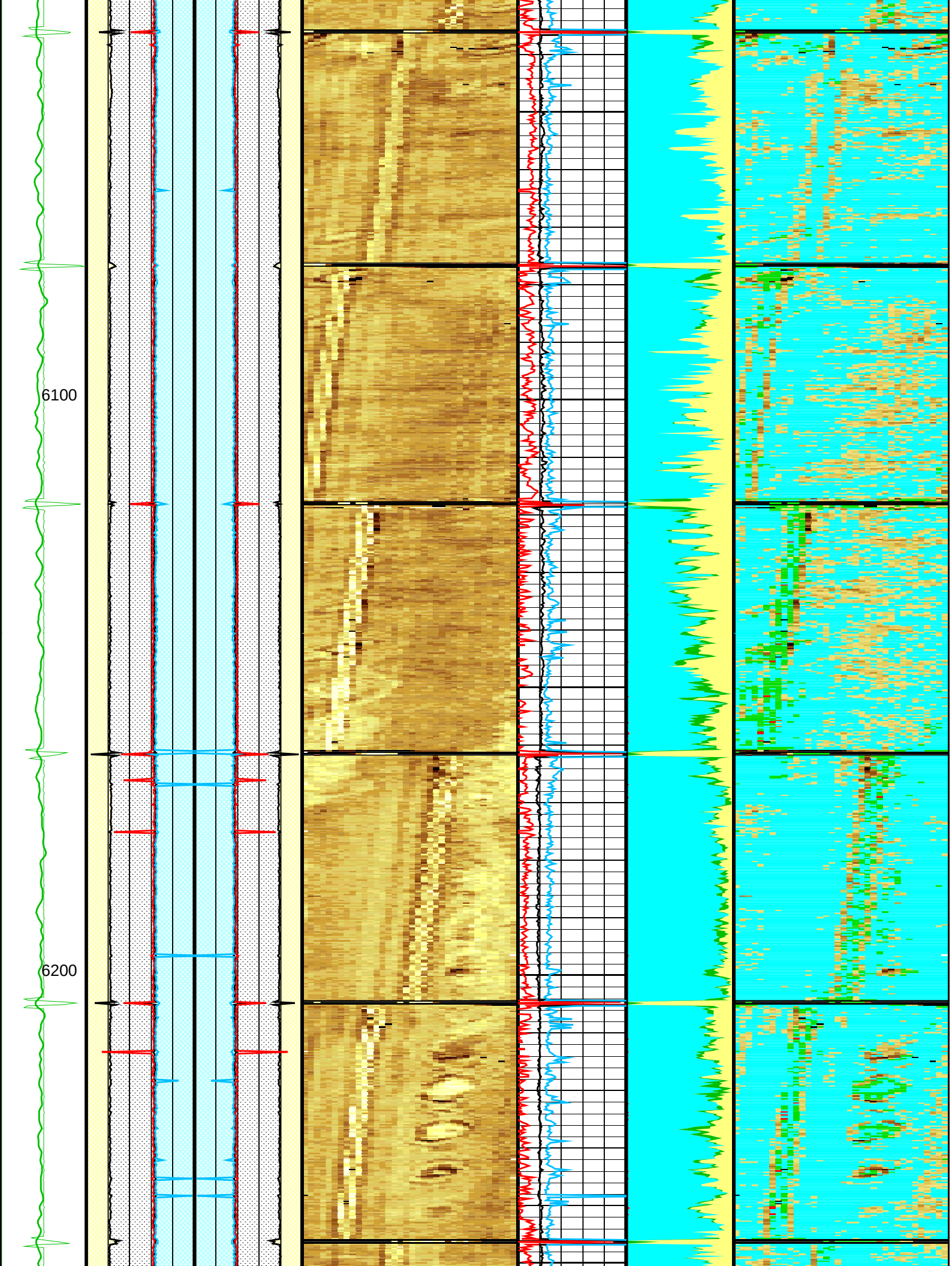
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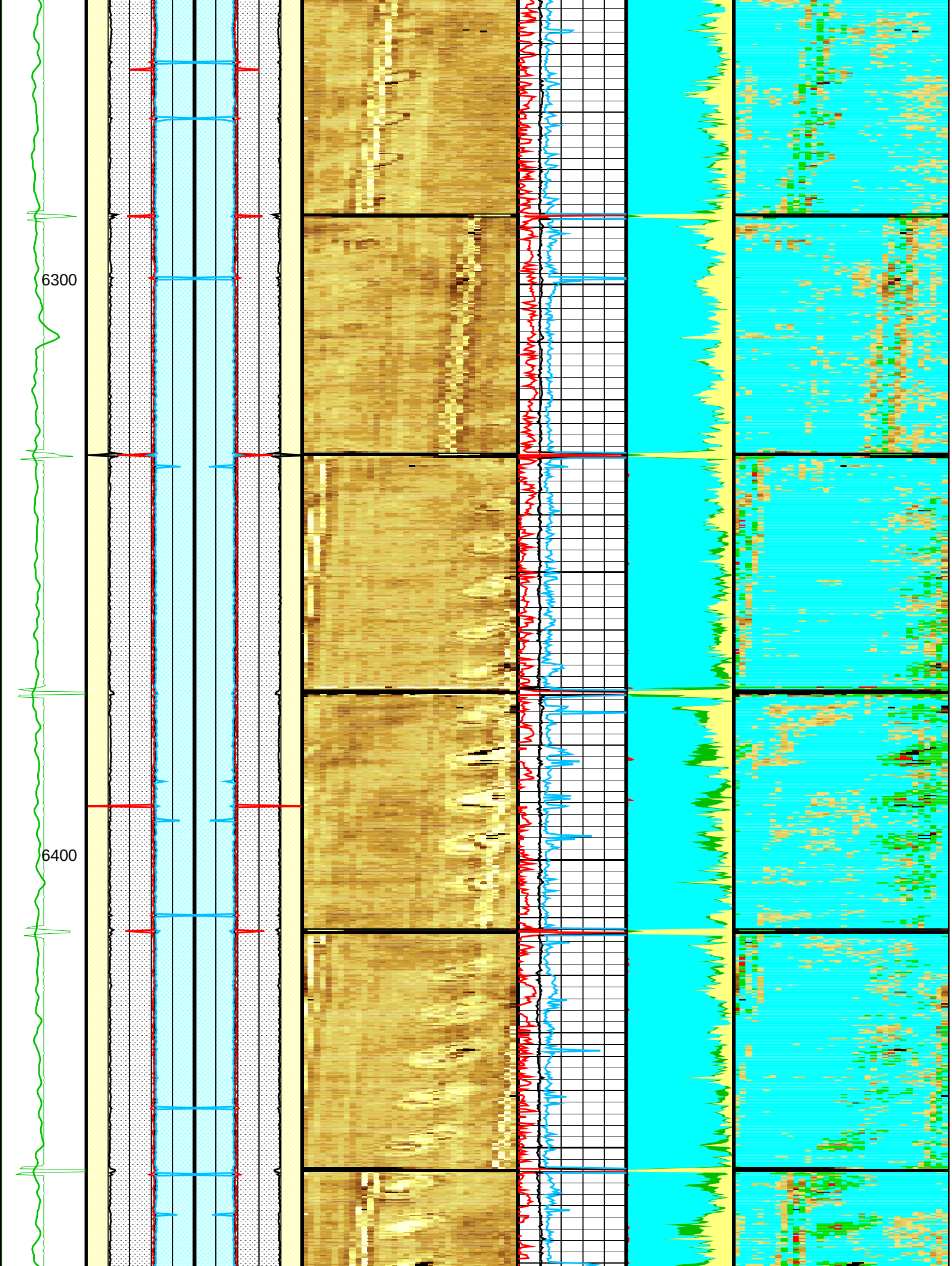
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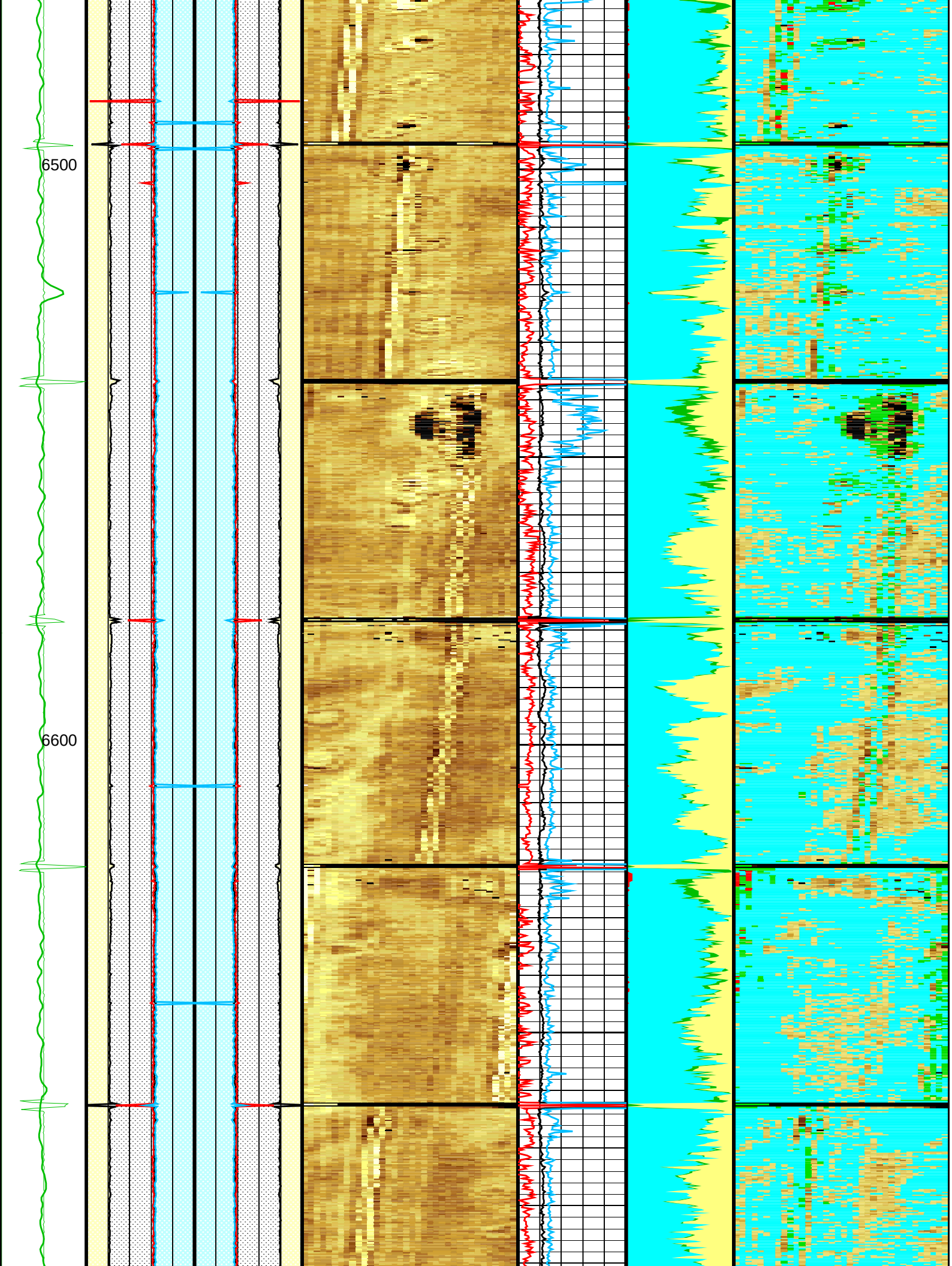
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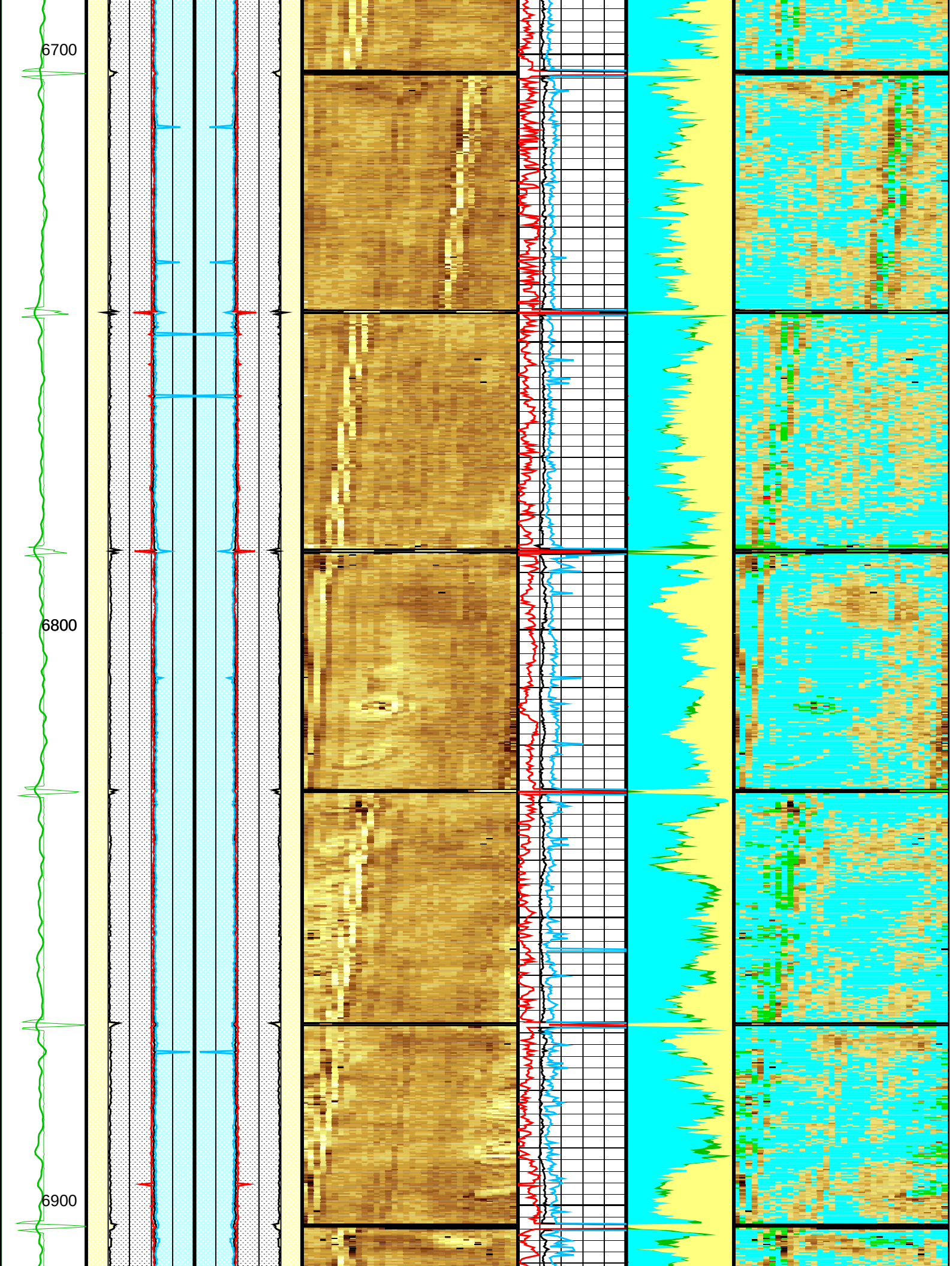
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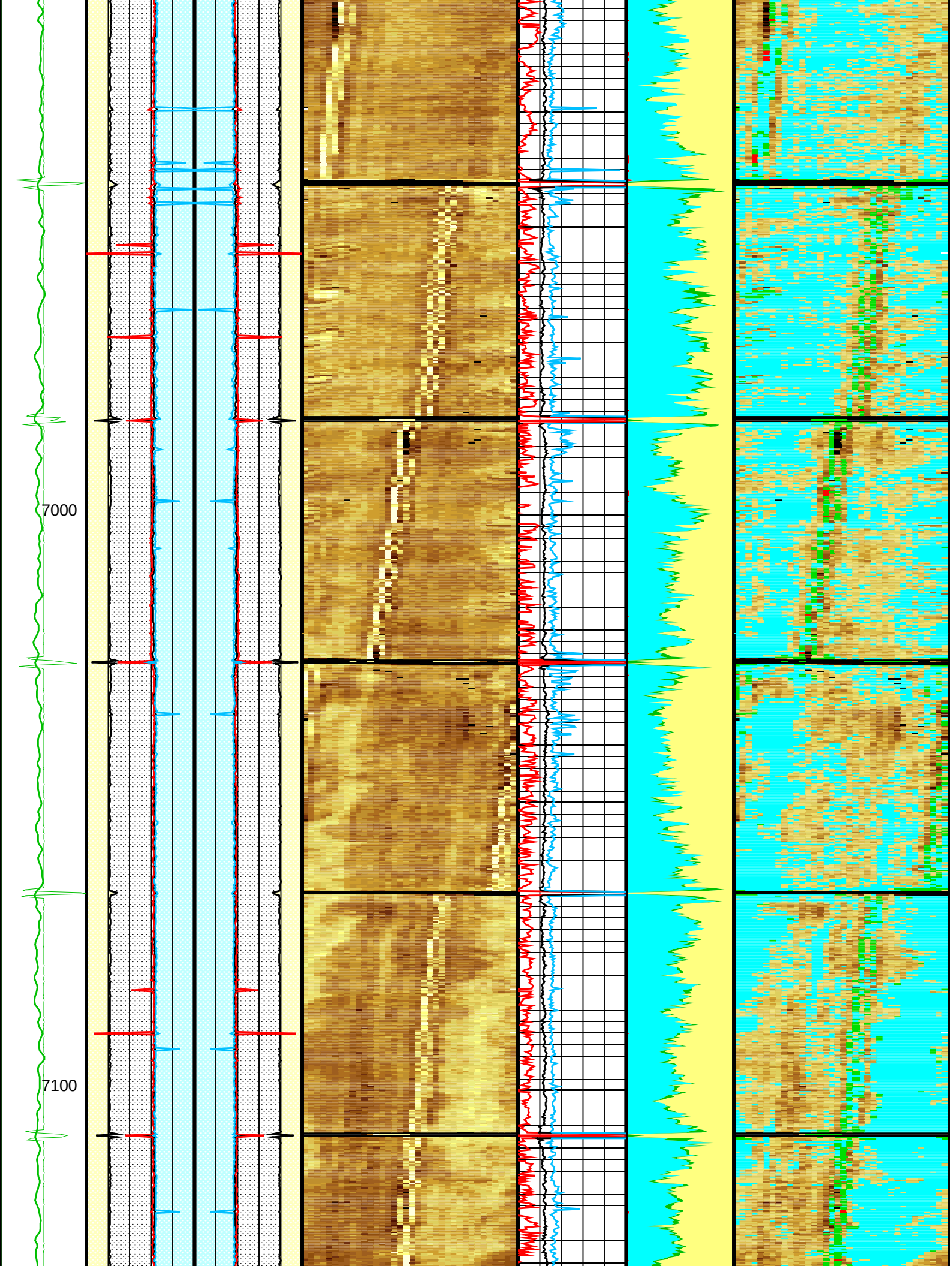
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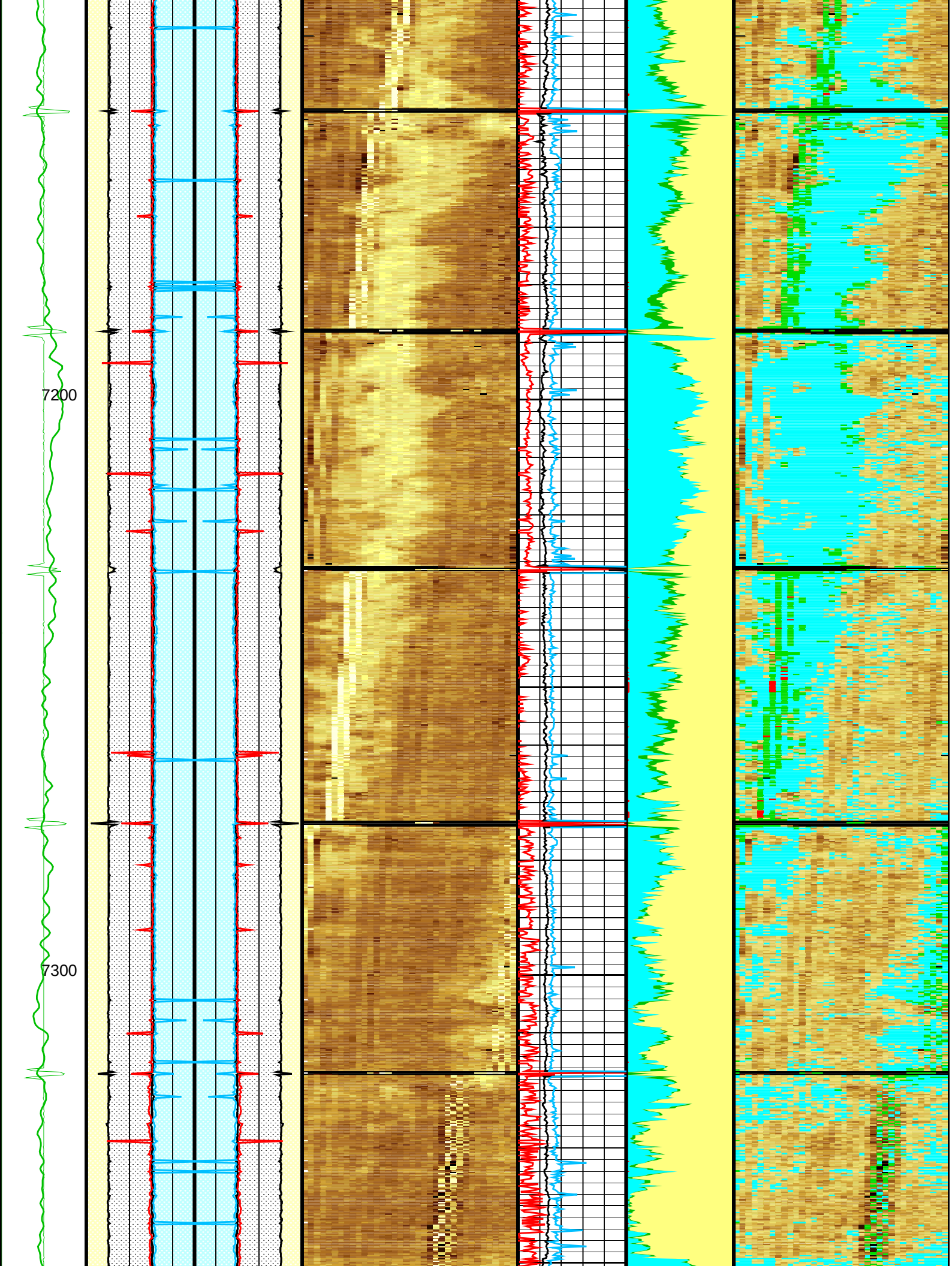
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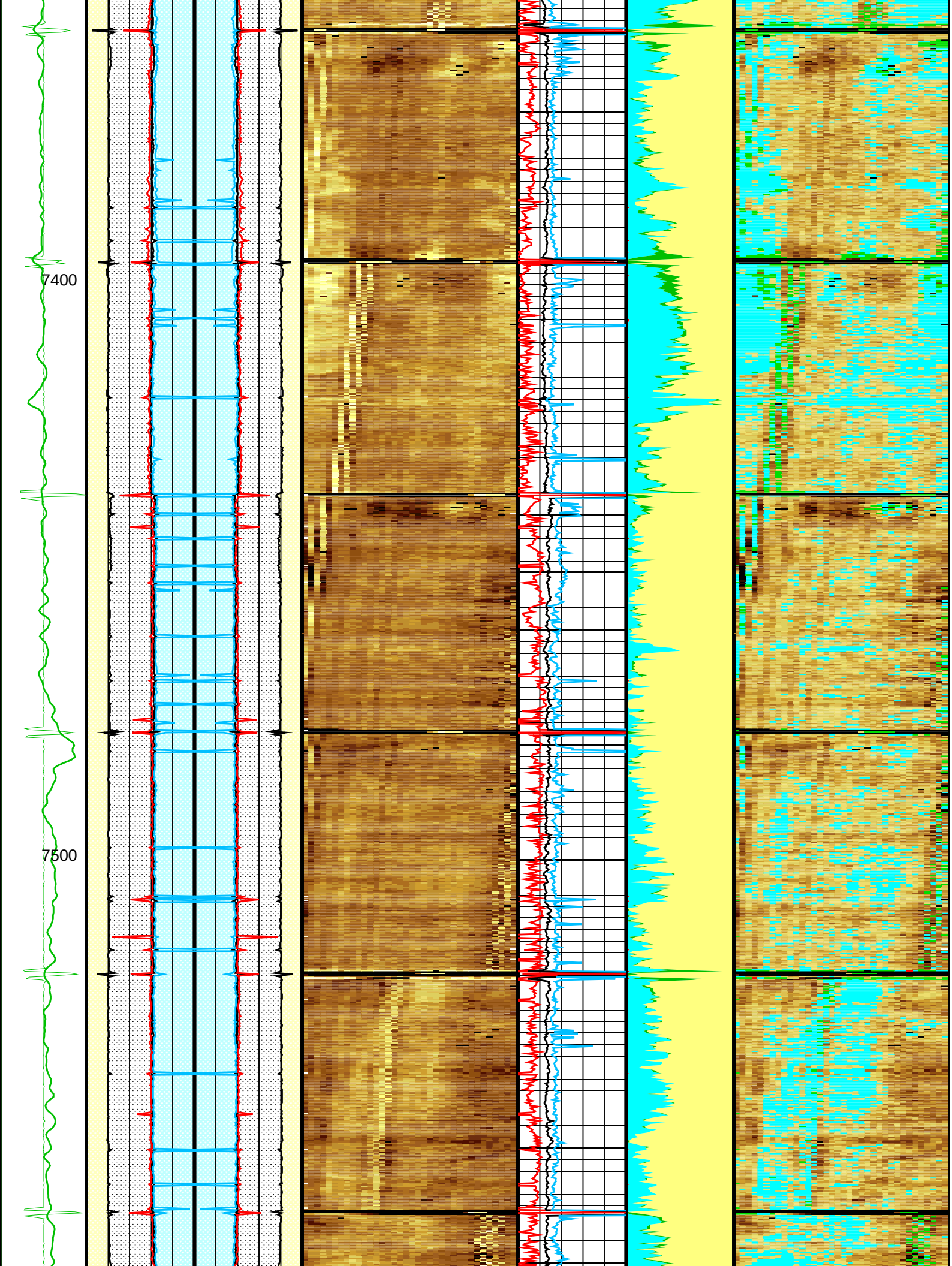
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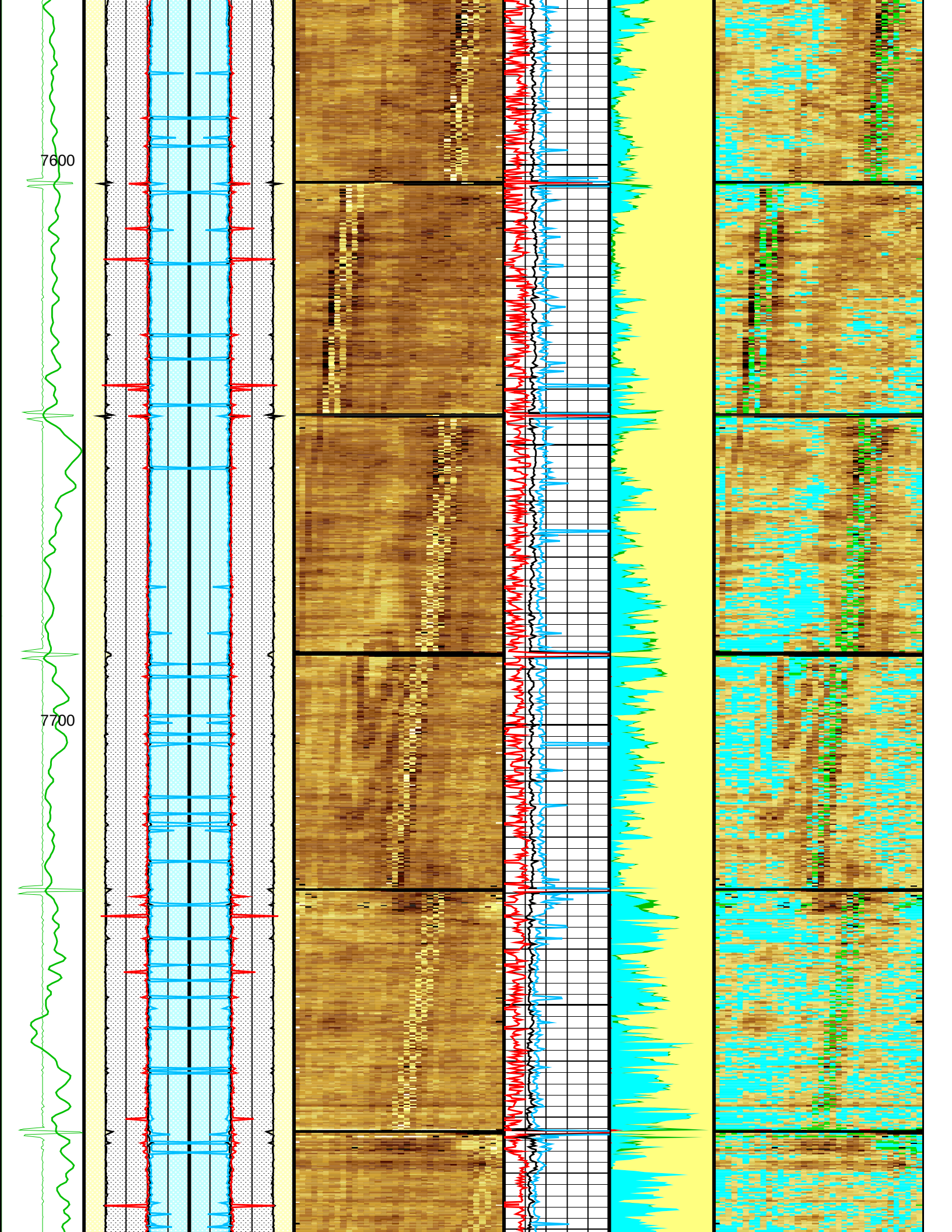
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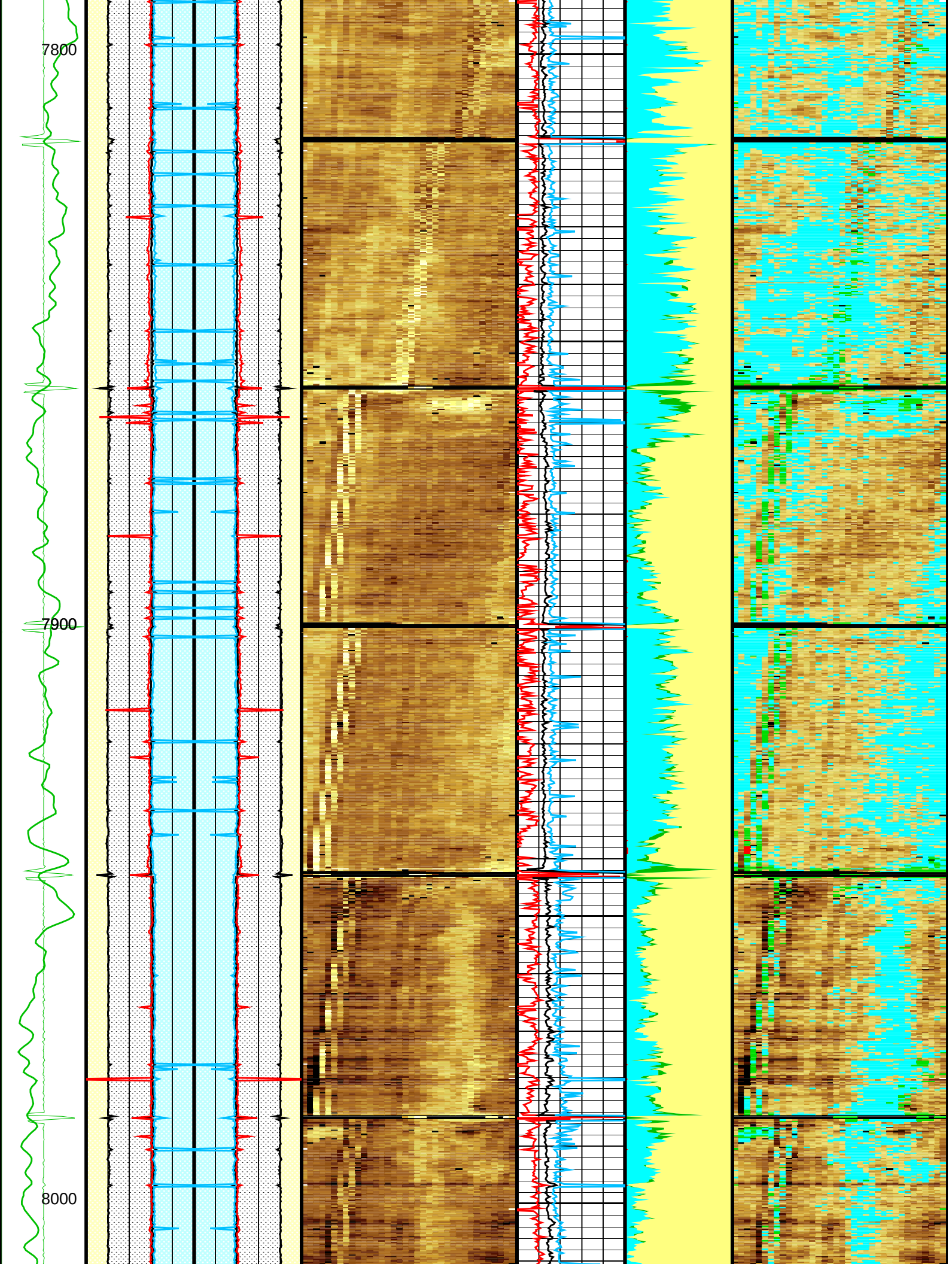
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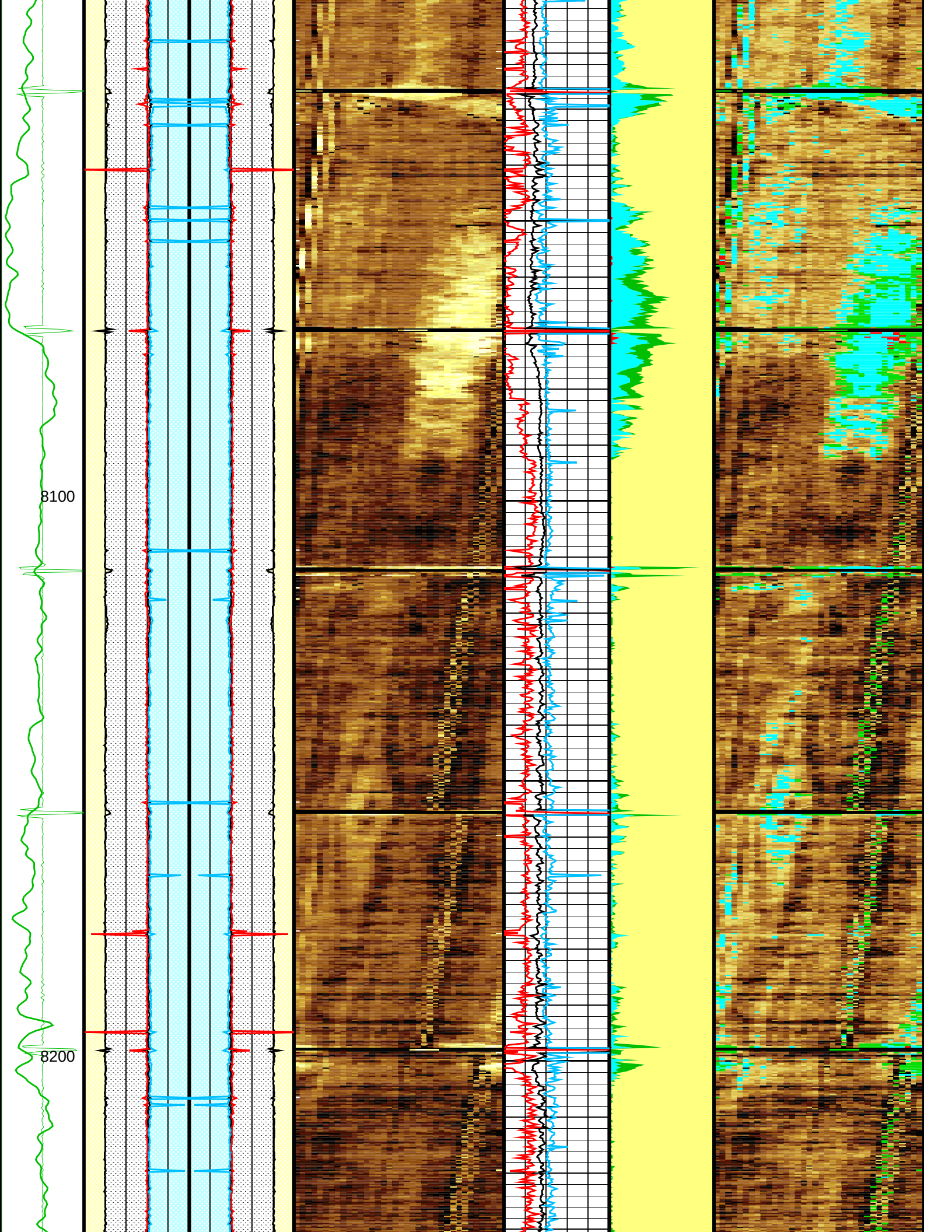
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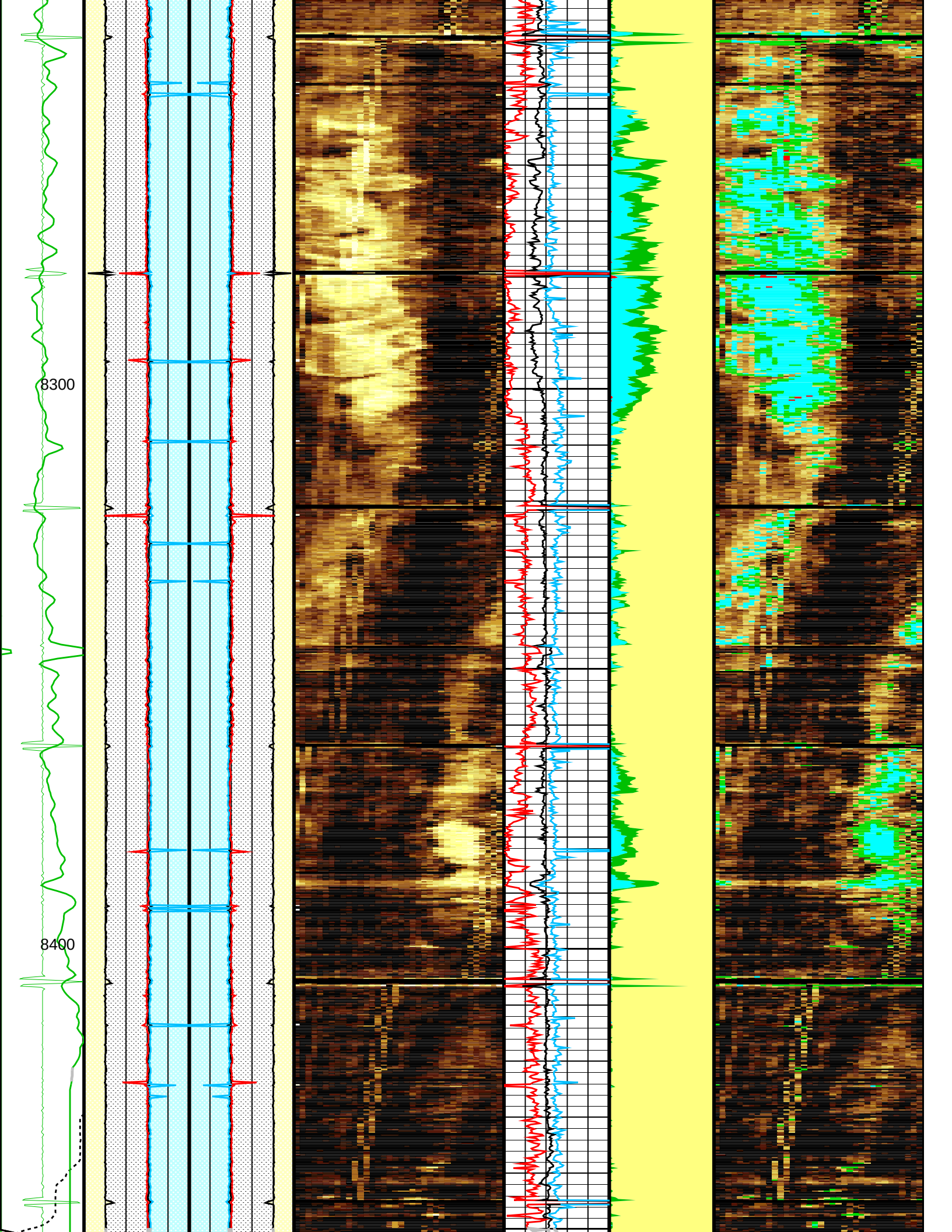
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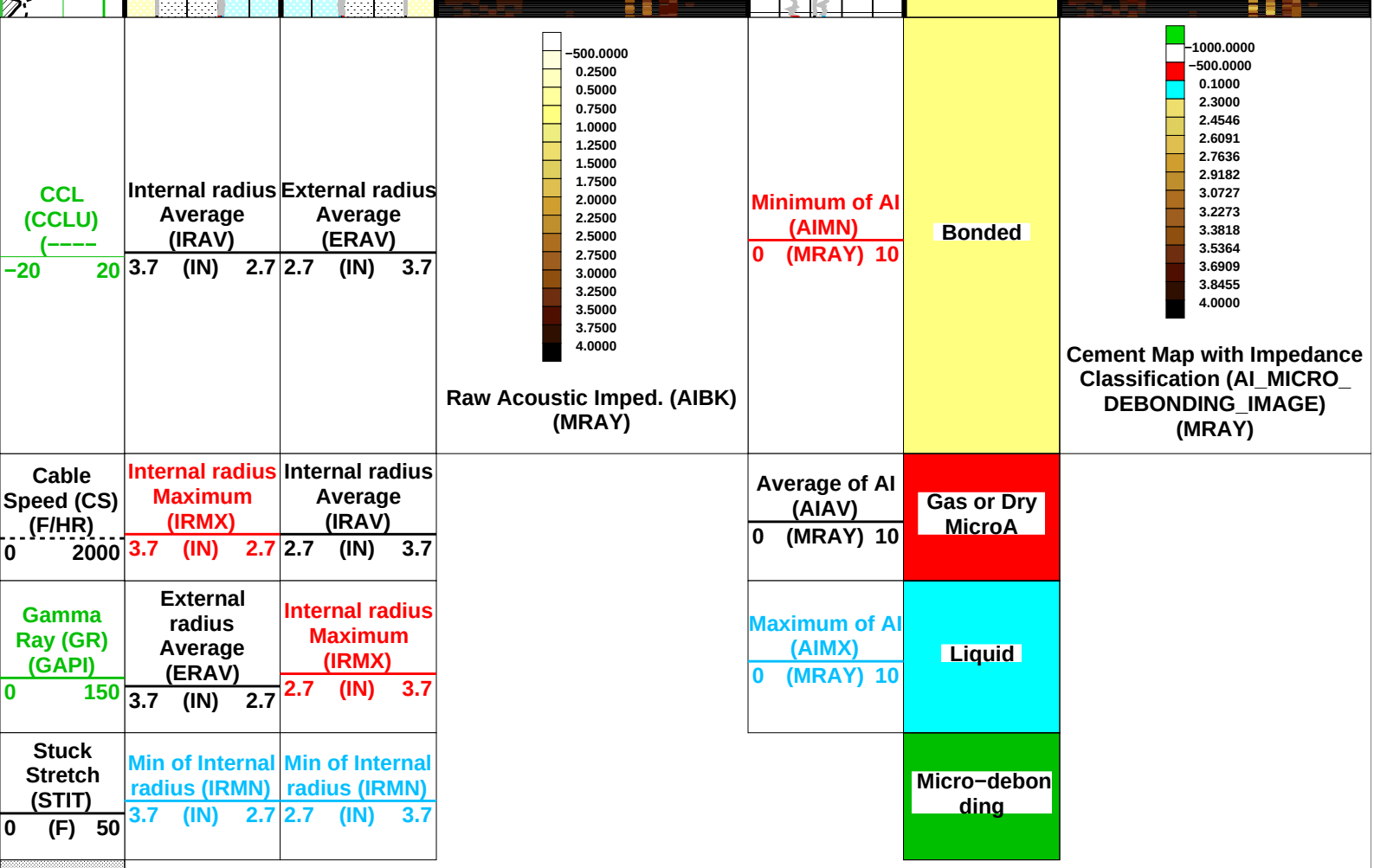


Format: USIT CEMENT 5 inch Vertical Scale: 5" per 100' Graphics File Created: 26-Apr-2012 15:51

OP System Version: 19C0-187

USIT-D	19C0-187	SGT-N	19C0-187
DTC-H	19C0-187		

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−D: Ultrasonic Imaging − D		
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	6.184	IN
DFVL	Default Fluid Velocity	192	US/F
DOT	Diameter of Transducer Sensor	2.874	IN
EMXV	EMEX Voltage	70	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.5	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	0.408	IN
UMAO	USIT Measurement Angular Offset	−10	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	24.4662	US
ZCAS	Acoustic Impedance of Casing	46.2537	MRAY
ZINI	Initial Estimate of Cement Impedance	−1	MRAY
ZMUD	Acoustic Impedance of Mud	1.7	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.3	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.1	MRAY
	STI: Stuck Tool Indicator		
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8160.00	FT
TDL	Total Depth − Logger	−50000.00	FT
	System and Miscellaneous		
CWEI	Casing Weight	29.00	LB/F
DO	Depth Offset for Playback	2.5	FT
PP	Playback Processing	NORMAL	

Input DLIS Files

DEFAULT	USI_016LUP	FN:15	PRODUCER	25−Apr−2012 16:17	8450.0 FT	80.5 FT

Output DLIS Files

DEFAULT	USI_003PUP	FN:2	PRODUCER	26−Apr−2012 15:51		

Schlumberger

Repeat Pass
Pressure = 0 psi

MAXIS Field Log

Company: Conoco Phillips Company **Well: Tebo 32−2**

Input DLIS Files

DEFAULT	USI_015LUP	FN:14	PRODUCER	25−Apr−2012 16:17	8449.5 FT	8126.2 FT

Output DLIS Files

DEFAULT	USI_005PUP	FN:4	PRODUCER	26−Apr−2012 17:09	8451.0 FT	8128.0 FT

OP System Version: 19C0−187

USIT−D	19C0−187	SGT−N	19C0−187
DTC−H	19C0−187		

Zoning of Mud Parameters

Depth	Fluid Velocity (DFVL)	Acoustic Impedance (ZMUD)
8000.00	191.00	1.62
7500.00	191.00	1.62
6000.00	189.00	1.64
5000.00	190.00	1.66
4000.00	191.00	1.70
3000.00	192.00	1.70
2750.00	193.00	1.68
2500.00	194.00	1.68
2250.00	195.00	1.68
2000.00	196.00	1.68

Image rotation (UCAZ) (DEG)
0 360

Tool/Tot. Drag From D4T to STIA

Cable Drag From D4T to STIT

Stuck Stretch (STIT)
0 (F) 50

Min of Internal radius (IRMN)
3.7 (IN) 2.7

Min of Internal radius (IRMN)
2.7 (IN) 3.7

Gamma Ray (GR) (GAPI)
0 150

External radius Average (ERAV)
3.7 (IN) 2.7

Internal radius Maximum (IRMX)
2.7 (IN) 3.7

Cable Speed (CS) (F/HR)
0 2000

Internal radius Maximum (IRMX)
3.7 (IN) 2.7

Internal radius Average (IRAV)
2.7 (IN) 3.7

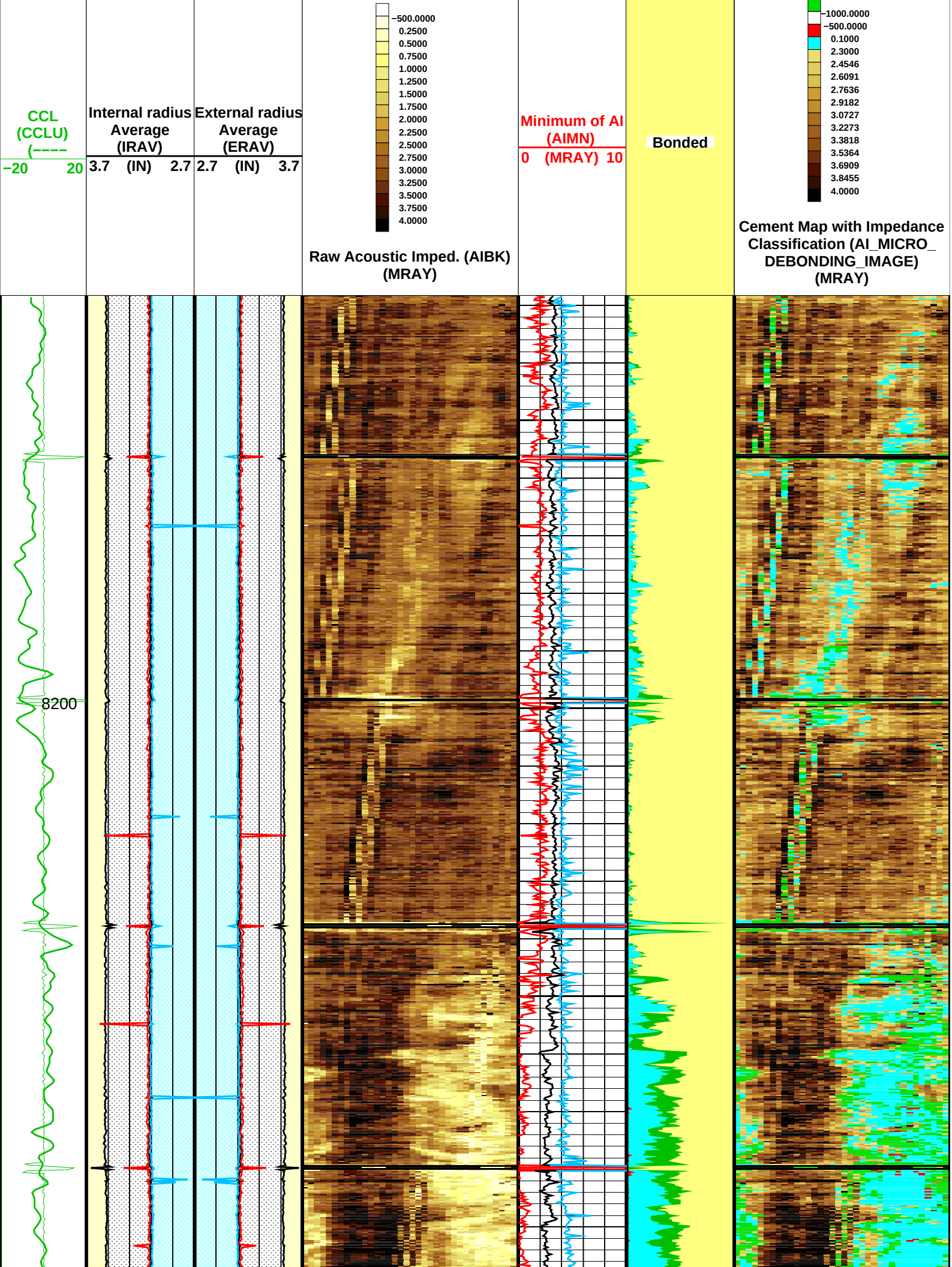
Maximum of AI (AIMX)
0 (MRAY) 10

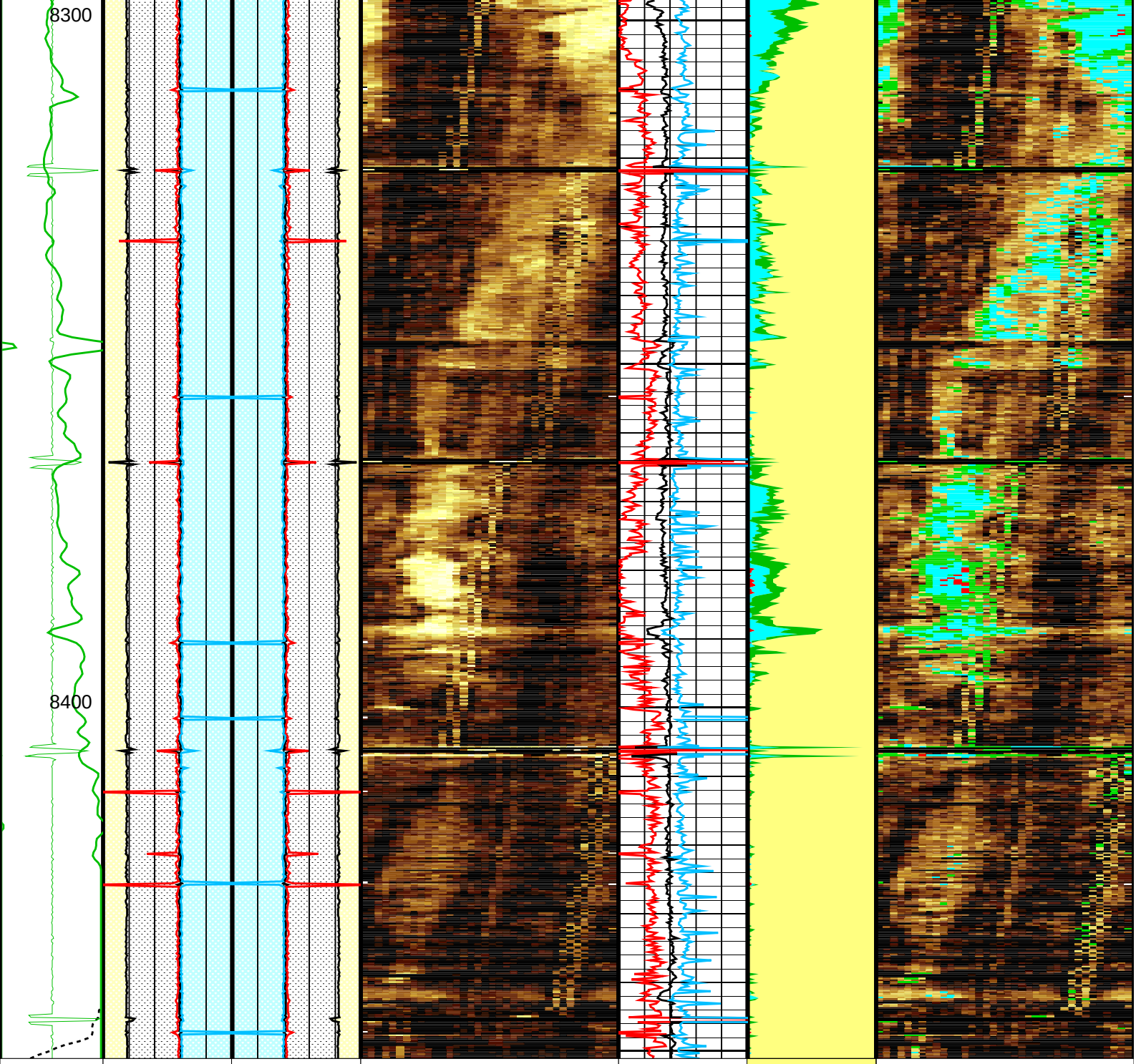
Average of AI (AIAV)
0 (MRAY) 10

Micro−debonding

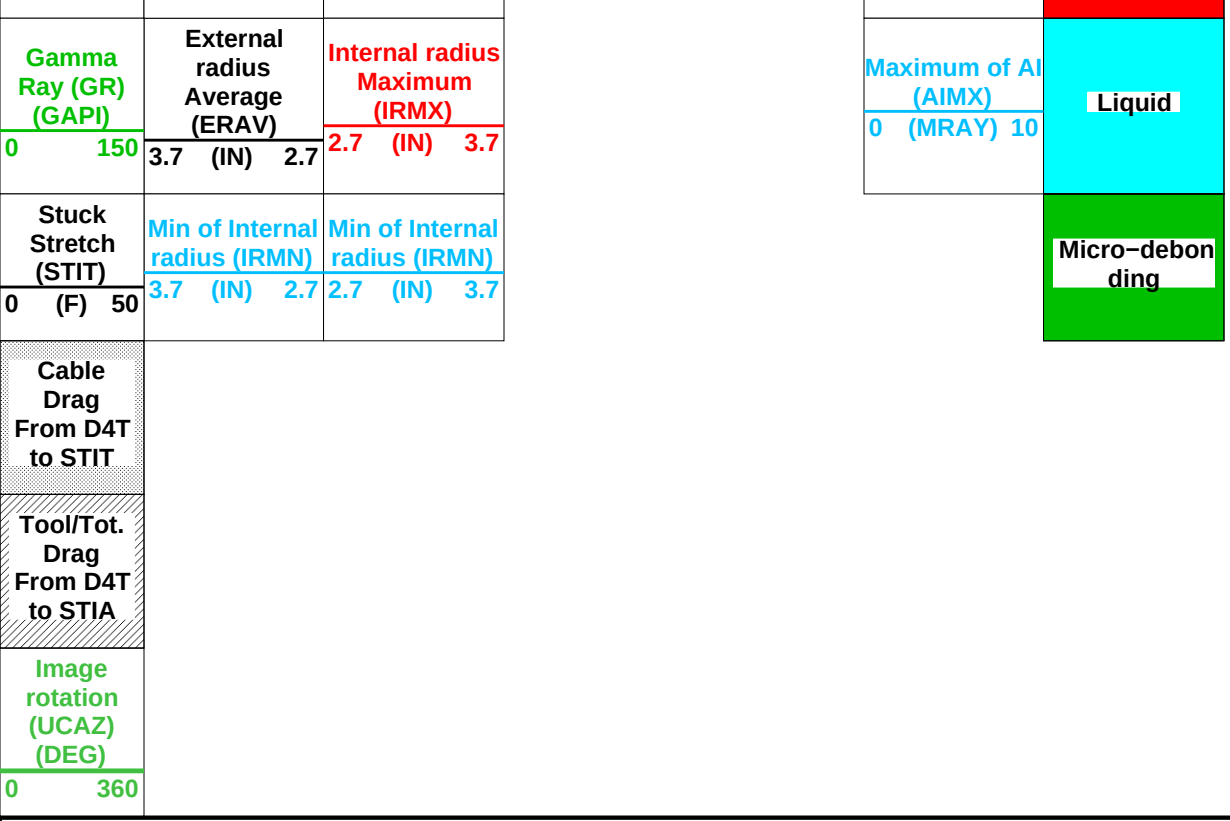
Liquid

Gas or Dry MicroA


CCL
(CCLU)
(----
-20
20
Internal radius
Average
(IRAV)
3.7 (IN) 2.7
External radius
Average
(ERAV)
2.7 (IN) 3.7
-500.0000
0.2500
0.5000
0.7500
1.0000
1.2500
1.5000
1.7500
2.0000
2.2500
2.5000
2.7500
3.0000
3.2500
3.5000
3.7500
4.0000
Raw Acoustic Imped. (AIBK)
(MRAY)
Minimum of AI
(AIMN)
0 (MRAY) 10
Bonded
-1000.0000
-500.0000
0.1000
2.3000
2.4546
2.6091
2.7636
2.9182
3.0727
3.2273
3.3818
3.5364
3.6909
3.8455
4.0000
Cement Map with Impedance
Classification (AI_MICRO_
DEBONDING_IMAGE)
(MRAY)
8200



CCL (CCLU) (-----	Internal radius Average (IRAV)	External radius Average (ERAV)	Raw Acoustic Imped. (AIBK) (MRAY)	Minimum of AI (AIMN)	Bonded	Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (MRAY)
−20 20	3.7 (IN) 2.7	2.7 (IN) 3.7	−500.0000 0.2500 0.5000 0.7500 1.0000 1.2500 1.5000 1.7500 2.0000 2.2500 2.5000 2.7500 3.0000 3.2500 3.5000 3.7500 4.0000	0 (MRAY) 10		−1000.0000 −500.0000 0.1000 2.3000 2.4546 2.6091 2.7636 2.9182 3.0727 3.2273 3.3818 3.5364 3.6909 3.8455 4.0000
Cable Speed (CS) (F/HR)	**Internal radius Maximum (IRMX)**	**Internal radius Average (IRAV)**		**Average of AI (AIAV)**	**Gas or Dry MicroA**	
0 2000	3.7 (IN) 2.7	2.7 (IN) 3.7		0 (MRAY) 10		



Format: USIT CEMENT 5 inch **Vertical Scale: 5" per 100'** **Graphics File Created: 26−Apr−2012 17:09**

OP System Version: 19C0−187

USIT−D	19C0−187	SGT−N	19C0−187
DTC−H	19C0−187		

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−D: Ultrasonic Imaging − D		
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	6.184	IN
DFVL	Default Fluid Velocity	192	US/F
DOT	Diameter of Transducer Sensor	2.874	IN
EMXV	EMEX Voltage	70	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.5	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	0.408	IN

UMAO	USIT Measurement Angular Offset	−10	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	24.4662	US
ZCAS	Acoustic Impedance of Casing	46.2537	MRAY
ZINI	Initial Estimate of Cement Impedance	−1	MRAY
ZMUD	Acoustic Impedance of Mud	1.7	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.3	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.1	MRAY
STI: Stuck Tool Indicator			
LBFR	Trigger for MAXIS First Reading Label	TDL	
STKT	STI Stuck Threshold	2.5	FT
TDD	Total Depth − Driller	8160.00	FT
TDL	Total Depth − Logger	−50000.00	FT
System and Miscellaneous			
CWEI	Casing Weight	29.00	LB/F
DO	Depth Offset for Playback	1.5	FT
PP	Playback Processing	NORMAL	

Input DLIS Files

DEFAULT	USI_015LUP	FN:14	PRODUCER	25−Apr−2012 16:17	8449.5 FT	8126.2 FT

Output DLIS Files

DEFAULT	USI_005PUP	FN:4	PRODUCER	26−Apr−2012 17:09		

Schlumberger

Goodwyn Compressed

MAXIS Field Log

Company: Conoco Phillips Company **Well: Tebo 32−2**

Input DLIS Files

DEFAULT	USI_016LUP	FN:15	PRODUCER	25−Apr−2012 16:17	8450.0 FT	80.5 FT

Output DLIS Files

DEFAULT	USI_003PUP	FN:2	PRODUCER	26−Apr−2012 15:51	8452.5 FT	83.0 FT

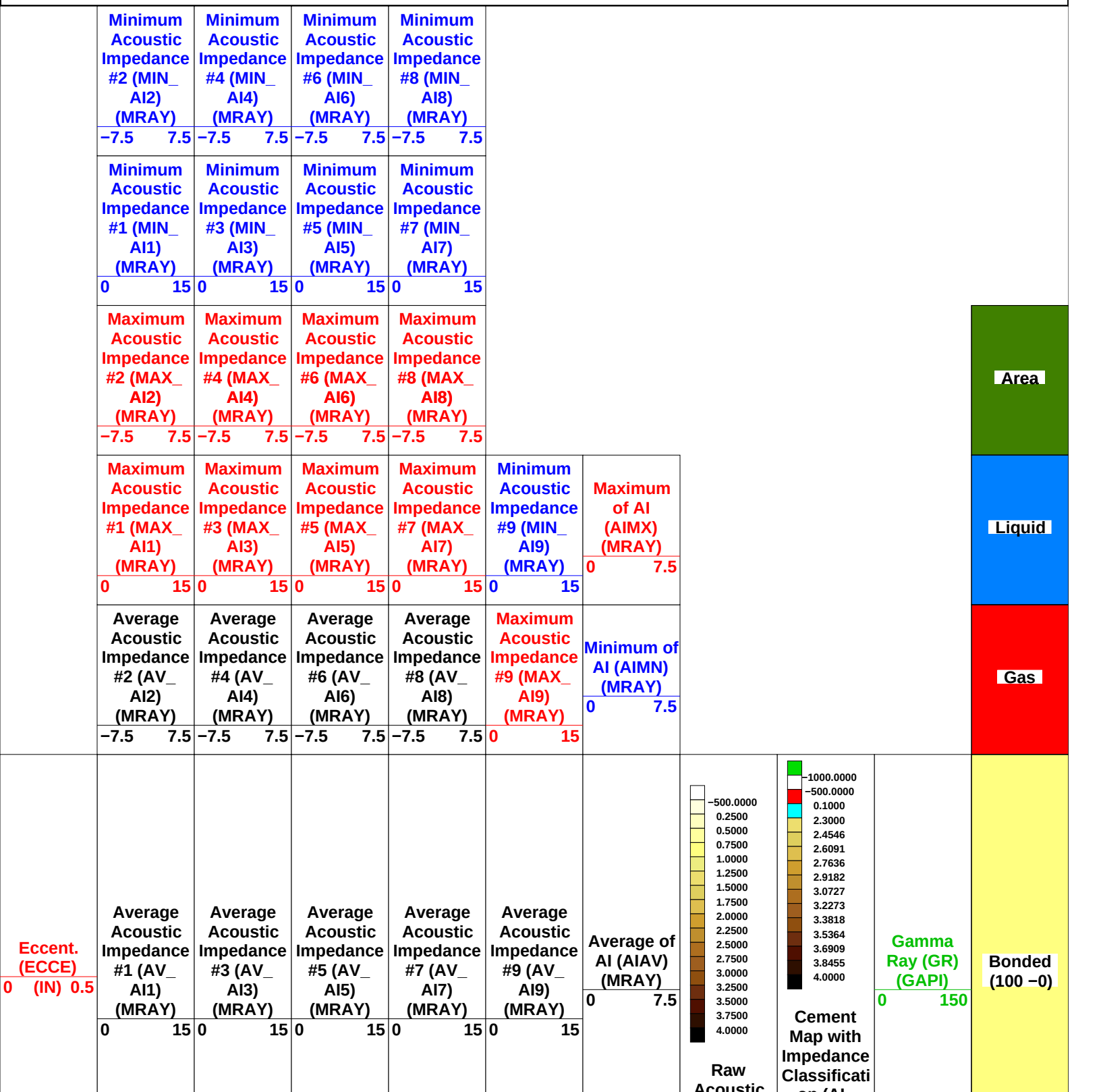
OP System Version: 19C0−187

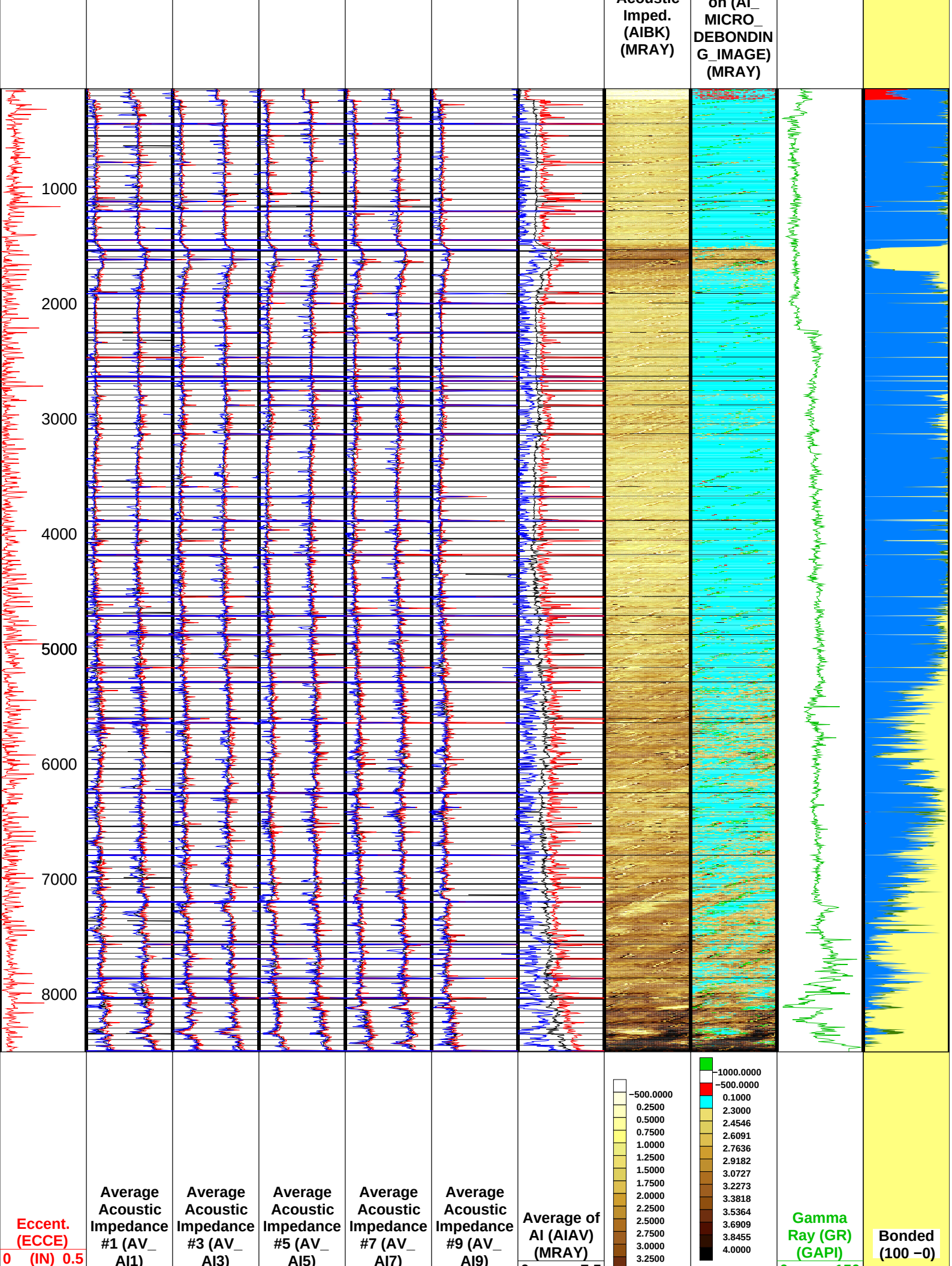
USIT−D	19C0−187	SGT−N	19C0−187
DTC−H	19C0−187		

Zoning of Mud Parameters

Depth	Fluid Velocity (DFVL)	Acoustic Impedance (ZMUD)
8000.00	191.00	1.62
7500.00	191.00	1.62
6000.00	189.00	1.64

5000.00	190.00	1.66
4000.00	191.00	1.70
3000.00	192.00	1.70
2750.00	193.00	1.68
2500.00	194.00	1.68
2250.00	195.00	1.68
2000.00	196.00	1.68




Acoustic Imped. (AIBK) (MRAY)
on (AI_ MICRO_ DEBONDIN G_IMAGE) (MRAY)
1000
2000
3000
4000
5000
6000
7000
8000
−500.0000
0.2500
0.5000
0.7500
1.0000
1.2500
1.5000
1.7500
2.0000
2.2500
2.5000
2.7500
3.0000
3.2500
−1000.0000
−500.0000
0.1000
2.3000
2.4546
2.6091
2.7636
2.9182
3.0727
3.2273
3.3818
3.5364
3.6909
3.8455
4.0000
Eccent. (ECCE)
0 (IN) 0.5
Average Acoustic Impedance #1 (AV_ AI1)
Average Acoustic Impedance #3 (AV_ AI3)
Average Acoustic Impedance #5 (AV_ AI5)
Average Acoustic Impedance #7 (AV_ AI7)
Average Acoustic Impedance #9 (AV_ AI9)
Average of AI (AIAV) (MRAY)
Gamma Ray (GR) (GAPI)
Bonded (100 −0)

(MRAY) 0 15	(MRAY) 0 15	(MRAY) 0 15	(MRAY) 0 15	(MRAY) 0 15	0 7.5	3.5000 3.7500 4.0000 Raw Acoustic Imped. (AIBK) (MRAY)	Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (MRAY) 0 150		
Average Acoustic Impedance #2 (AV_AI2) (MRAY) −7.5 7.5	Average Acoustic Impedance #4 (AV_AI4) (MRAY) −7.5 7.5	Average Acoustic Impedance #6 (AV_AI6) (MRAY) −7.5 7.5	Average Acoustic Impedance #8 (AV_AI8) (MRAY) −7.5 7.5	Maximum Acoustic Impedance #9 (MAX_AI9) (MRAY) 0 15	Minimum of AI (AIMN) (MRAY) 0 7.5				Gas
Maximum Acoustic Impedance #1 (MAX_AI1) (MRAY) 0 15	Maximum Acoustic Impedance #3 (MAX_AI3) (MRAY) 0 15	Maximum Acoustic Impedance #5 (MAX_AI5) (MRAY) 0 15	Maximum Acoustic Impedance #7 (MAX_AI7) (MRAY) 0 15	Minimum Acoustic Impedance #9 (MIN_AI9) (MRAY) 0 15	Maximum of AI (AIMX) (MRAY) 0 7.5				Liquid
Maximum Acoustic Impedance #2 (MAX_AI2) (MRAY) −7.5 7.5	Maximum Acoustic Impedance #4 (MAX_AI4) (MRAY) −7.5 7.5	Maximum Acoustic Impedance #6 (MAX_AI6) (MRAY) −7.5 7.5	Maximum Acoustic Impedance #8 (MAX_AI8) (MRAY) −7.5 7.5						Area
Minimum Acoustic Impedance #1 (MIN_AI1) (MRAY) 0 15	Minimum Acoustic Impedance #3 (MIN_AI3) (MRAY) 0 15	Minimum Acoustic Impedance #5 (MIN_AI5) (MRAY) 0 15	Minimum Acoustic Impedance #7 (MIN_AI7) (MRAY) 0 15						
Minimum Acoustic Impedance #2 (MIN_AI2) (MRAY) −7.5 7.5	Minimum Acoustic Impedance #4 (MIN_AI4) (MRAY) −7.5 7.5	Minimum Acoustic Impedance #6 (MIN_AI6) (MRAY) −7.5 7.5	Minimum Acoustic Impedance #8 (MIN_AI8) (MRAY) −7.5 7.5						

Format: USIT only Goodwin Compressed **Vertical Scale: 0.1" per 100'** **Graphics File Created: 26−Apr−2012 15:51**

OP System Version: 19C0−187

USIT−D	19C0−187	SGT−N	19C0−187
DTC−H	19C0−187		

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.

Input DLIS Files

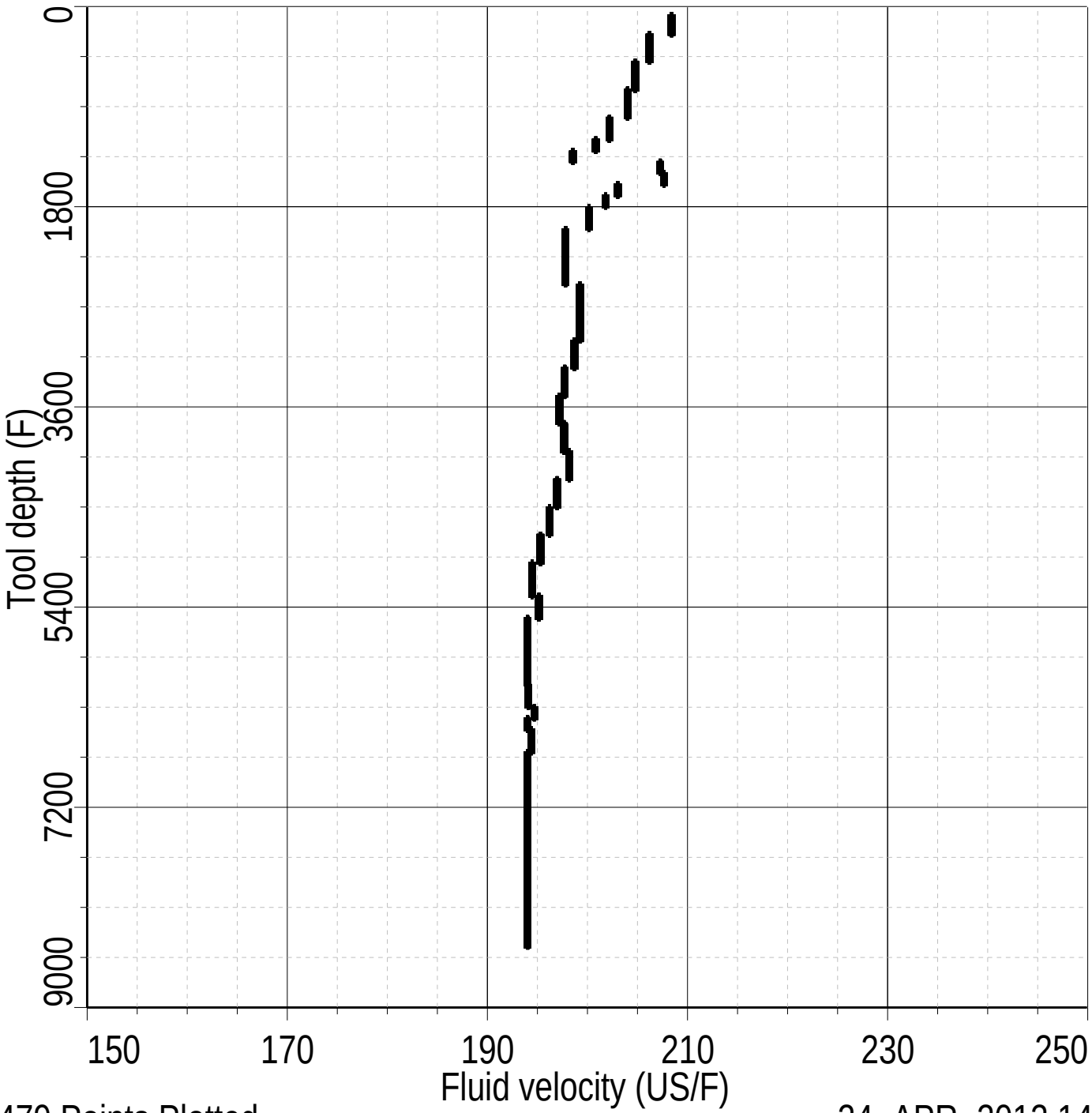
DEFAULT	USI_016LUP	FN:15	PRODUCER	25−Apr−2012 16:17	8450.0 FT 80.5 FT

Schlumberger

FPM Pass
Fluid Velocity vs Depth

MAXIS Field Log

Index: 8450.0 − 80.5 FT



33479 Points Plotted

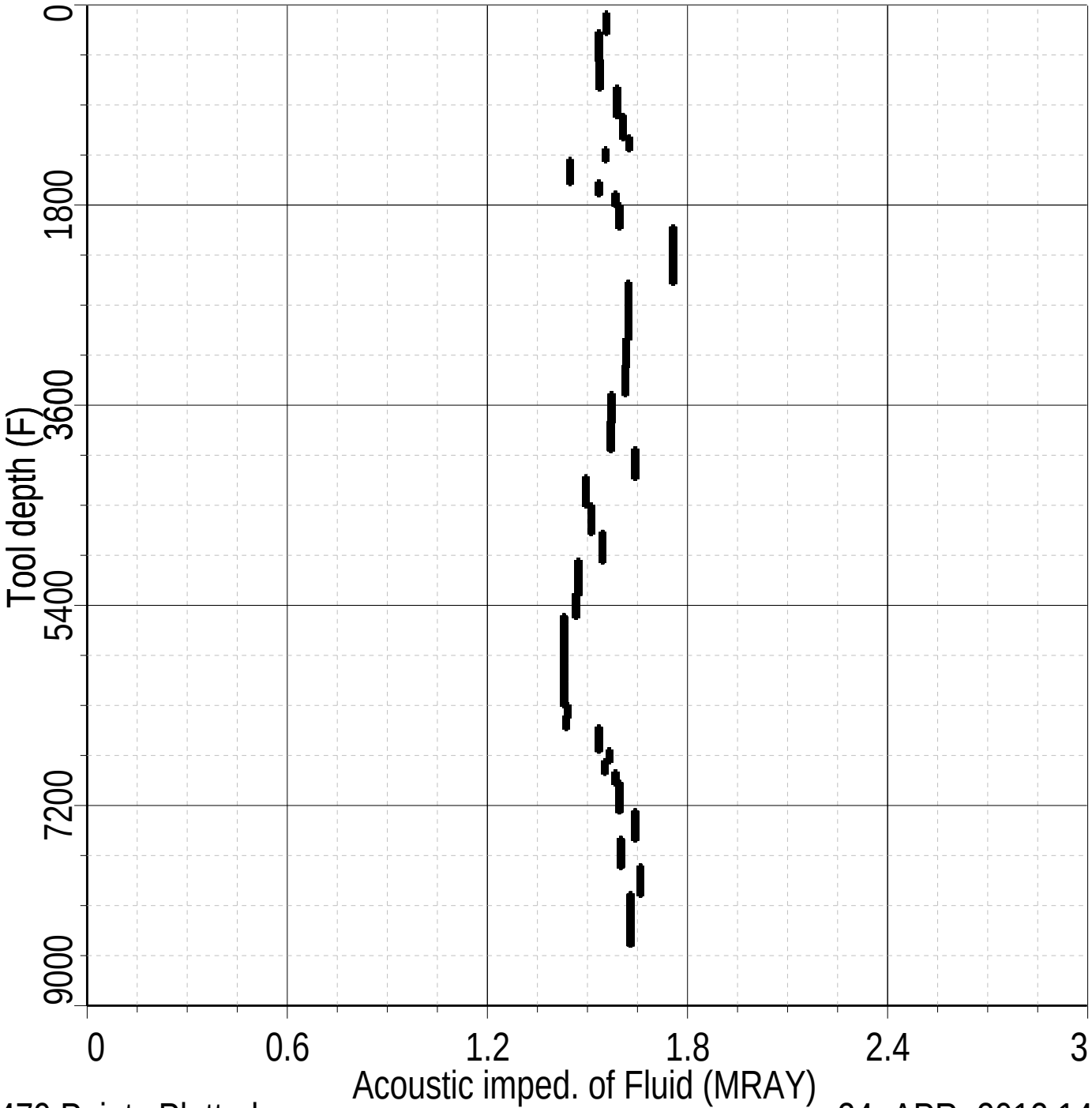
24−APR−2012 14:55

Schlumberger

FPM Pass
ZMud vs Depth

MAXIS Field Log

Index: 8450.0 − 80.5 FT



33479 Points Plotted

24−APR−2012 14:55

Company: **Conoco Phillips Company**

Schlumberger

Well: **Tebo 32−2**

Field: **Wildcat**
County: **Arapahoe**
State: **Colorado**

Ultrasonic Cement Log