County:	Garfield

Schlumberger

Company: **Antero Resources Corp**

Well: **Valley Farms E9**

Field: **Mamm Creek**

County: **Garfield** State: **Colorado**

Ultrasonic Inspection Tool

GR / CCL

Field: Mamm Creek
Location: 1919' FNL & 697' FEL
Well: Valley Farms E9
Company: Antero Resources Corp

LOCATION

1919' FNL & 697' FEL
Sec. 15, T−08S, R−92W

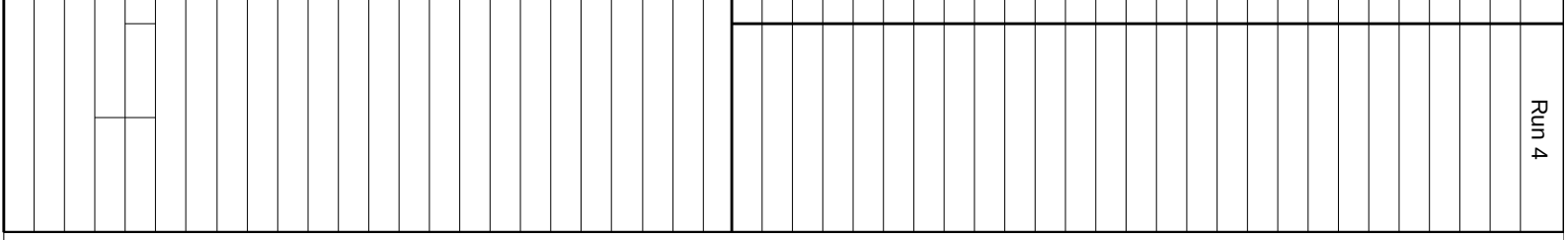
Elev.: K.B. 5622 ft
G.L. 5604 ft
D.F. 5621 ft

Permanent Datum: GROUND LEVEL Elev.: 5604 ft
Log Measured From: KELLY BUSHING 18.0 ft above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	Section	Township	Range
05045132230000	15	8S	92W

	Run 1	Run 2	Run 3
PVT DATA			
Oil Density			
Water Salinity			
Gas Gravity			
Bo			
Bw			
1/Bg			
Bubble Point Pressure			
Bubble Point Temperature			
Solution GOR			
Maximum Deviation			
CEMENTING DATA			
Primary/Squeeze	Primary		
Casing String No			
Lead Cement Type			
Volume			
Density	12.2 lbm/gal		
Water Loss			
Additives			
Tail Cement Type			
Volume			
Density			
Water Loss			
Additives			
Expected Cement Top			

ogging Date		5−Dec−2008			Logging Date		
un Number		1			Run Number		
epth Driller		9085 ft			Depth Driller		
chlumberger Depth		8970 ft			Schlumberger Depth		
ottom Log Interval		8960 ft			Bottom Log Interval		
op Log Interval		5200 ft			Top Log Interval		
asing Fluid Type		Fresh Water			Casing Fluid Type		
alinity					Salinity		
ensity		8.5 lbm/gal			Density		
luid Level					Fluid Level		
BIT/CASING/TUBING STRING					BIT/CASING/TUBING STRING		
it Size		7.875 in			Bit Size		
rom		18 ft			From		
o		9085 ft			To		
asing/Tubing Size		4.500 in			Casing/Tubing Size		
/eight		15.1 lbm/ft			Weight		
rade					Grade		
rom		18 ft			From		
o		9085 ft			To		
laximum Recorded Temperatures					Maximum Recorded Temperatures		
ogger On Bottom	Time	5−Dec−2008	16:22		Logger On Bottom	Time	
nit Number	Location	3188	Grand Junction, CO		Unit Number	Location	
ecorded By		Abhi Banerjee			Recorded By		
/itnessed By					Witnessed By		



DEPTH SUMMARY LISTING

Date Created: 5−DEC−2008 22:48:33

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−B	Type:	CMTD−B/A	Type:	7−39P−LXS
Serial Number:	907	Serial Number:	1614	Serial Number:	6177
Calibration Date:	04−Sep−2008	Calibration Date:	22−Nov−2008	Length:	17140.00 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	1159		
Calibration Cable Type:	7−39P−LXS	Calibration Gain:	1.00	Conveyance Method:	Wireline
Wheel Correction 1:	−5	Calibration Offset:	0.00	Rig Type:	LAND
Wheel Correction 2:	−6				

Depth Control Parameters

Log Sequence:	Subsequent Log In the Well
Reference Log Name:	Mesa Cement Bond Log
Reference Log Run Number:	
Reference Log Date:	18−Nov−2008

Depth Control Remarks

1. All SLB Depth Control Policies followed
2. IDW used as primary, Zchart used as secondary
3. CMTD RMS = 22; Peak Error = 42
4.
5.
6.

OTHER SERVICES1	OTHER SERVICES2
OS1: None	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Log correlated to Mesa CBL dated 18−Nov−2008	
Casing: 4.5" & 15.1 lb/f	
Used USRS−A/B, had minimum cleareance with ID of casing.	
Loged from ~8970 ft to 5000 ft as per client request.	
Nitrogen Foam Cement used in well.	

ZMUD set at 1.5 MRAY (close to theoretical value)

Your Crew: Abhi B, Mike M, Jess L

Thank you for choosing Schlumberger!

970.683.4013

RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION:	15C0−309		PROGRAM VERSION:		
FLUID LEVEL:			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

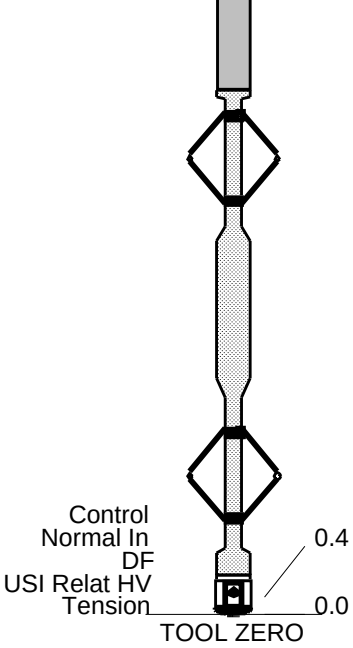
LEH−Q 34.7
LEH−Q

CAL−Y 32.6
CAL−Y
CCL — 31.8

DTC−H 29.1
ECH−KC
DTCH0−A
DTCH1−A
CTEM — 28.1
TelStatus
ToolStatu — 26.1

SGT−N 26.1
SGH−K
SGC−TB
SGD−TAB
Gamma Ray — 25.1

USIT−D 20.6
ECH−MRA
USIC−D
USIS−A
USSC−A
USRS−A/AB



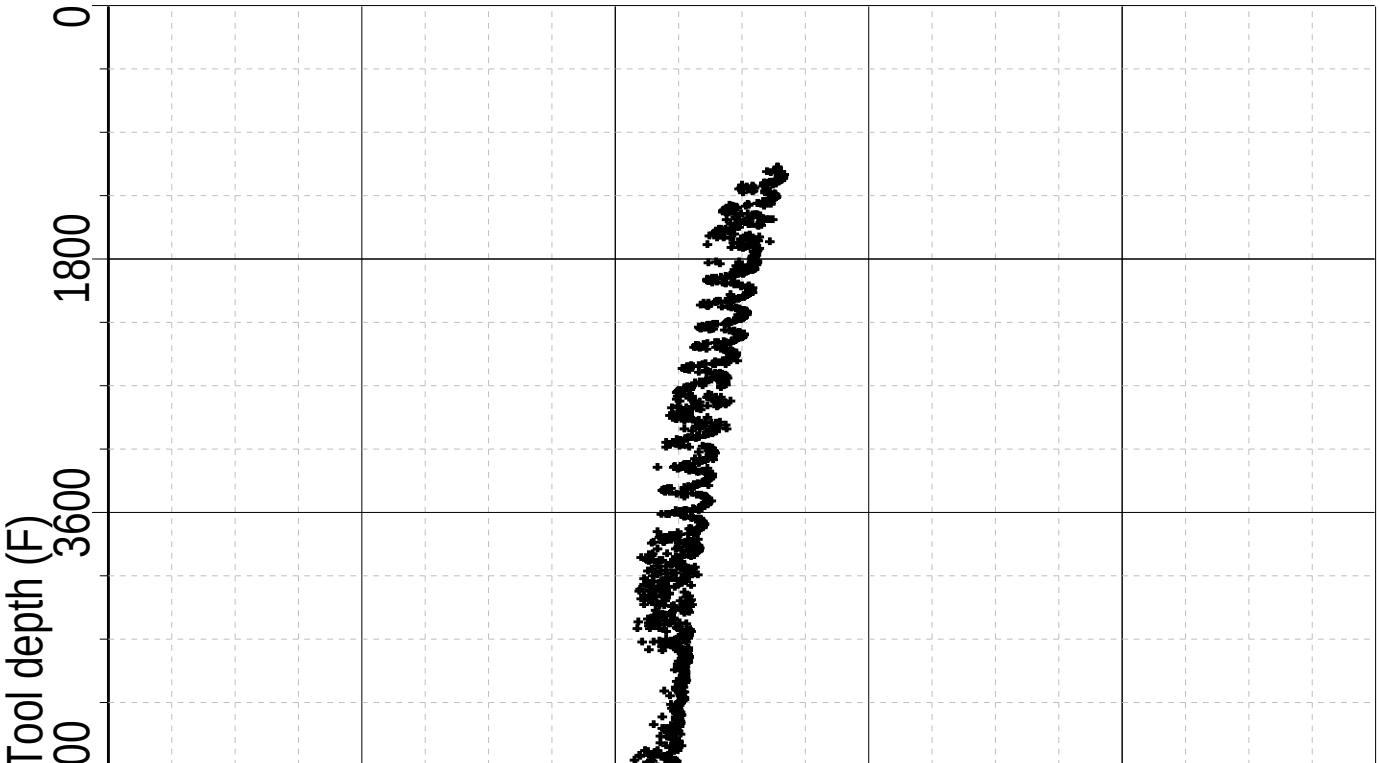
MAXIMUM STRING DIAMETER 3.56 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

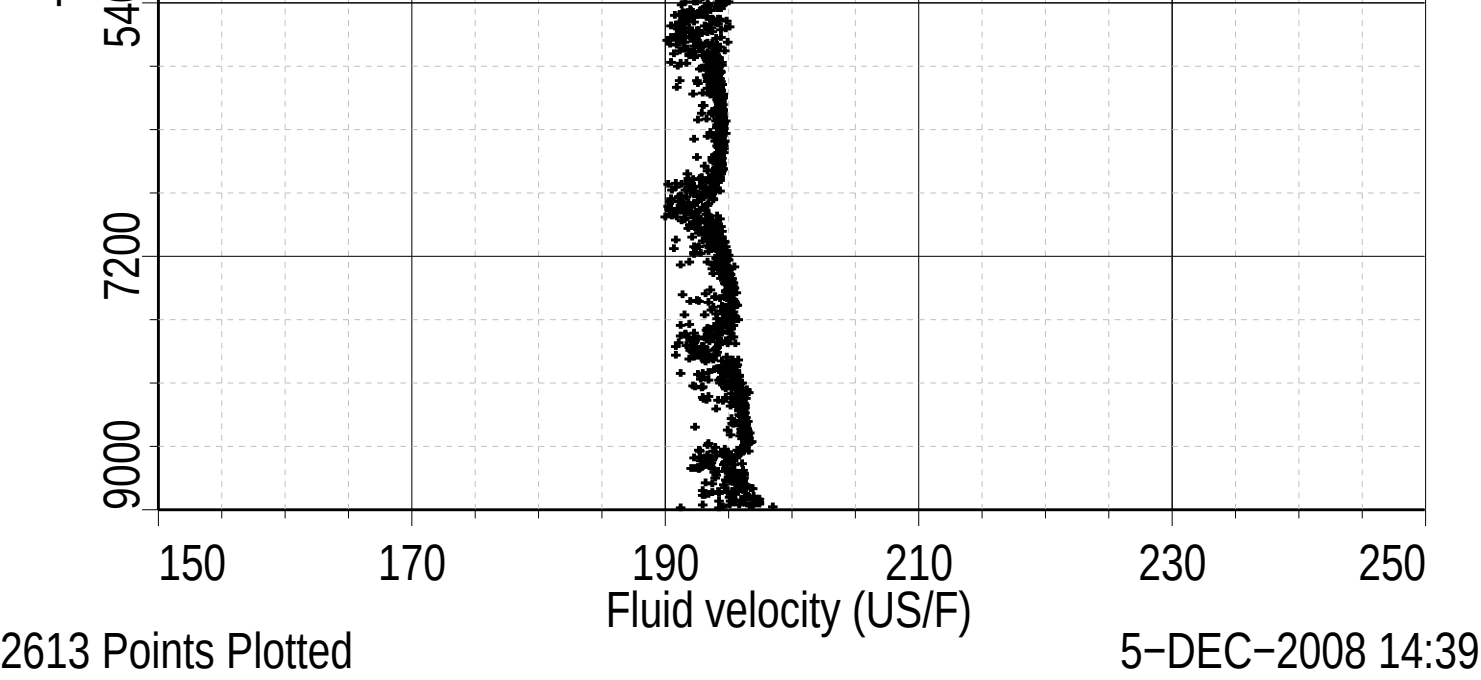
Schlumberger

Fluid Properties Log

MAXIS Field Log

Index: 1146.0 − 8982.0 FT

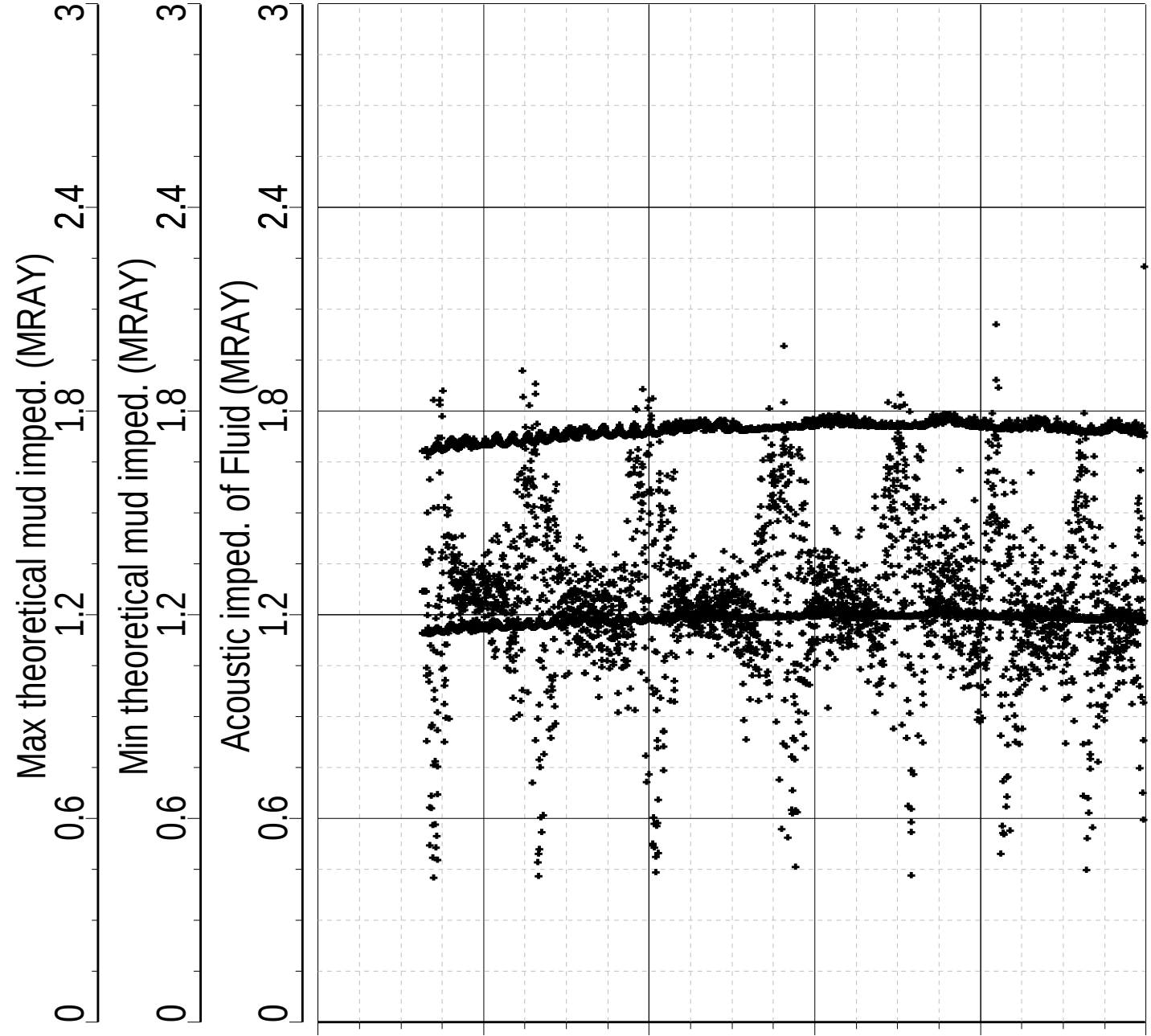




2613 Points Plotted

5−DEC−2008 14:39

Index: 1146.0 − 8982.0 FT



0 1800 3600 5400 7200 9000

Tool depth (F)

7839 Points Plotted 5−DEC−2008 14:39

Schlumberger

Main Pass

MAXIS Field Log

Company: Antero Resources Corp **Well: Valley Farms E9**

Input DLIS Files

DEFAULT	Splice_USI_002CUP	FN:1	PRODUCER	05−Dec−2008 20:24	8968.5 FT	4992.0 FT

Output DLIS Files

DEFAULT	USI_006PUP	FN:4	PRODUCER	05−Dec−2008 21:53	8976.0 FT	5001.0 FT

OP System Version: 15C0−309

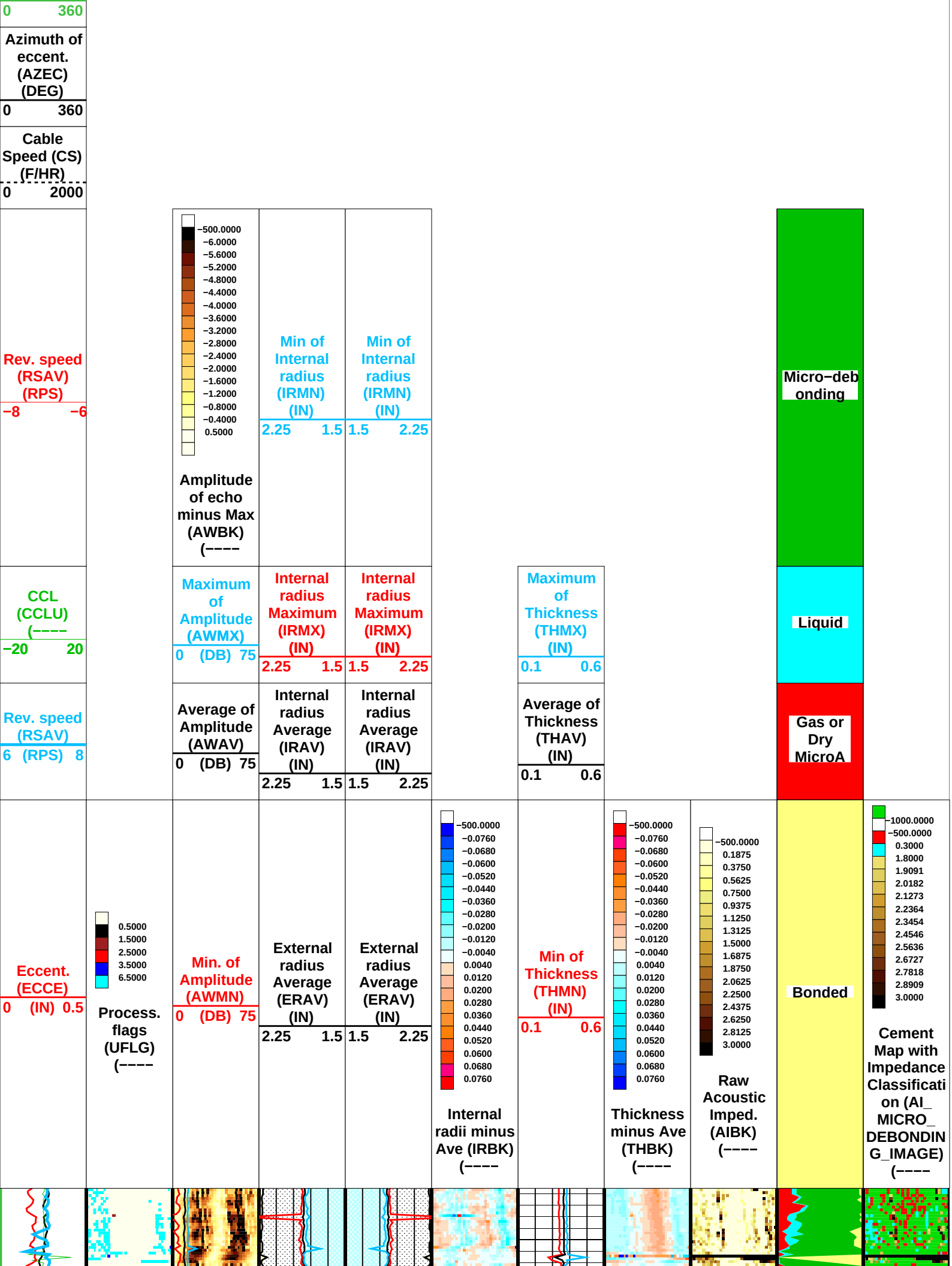
MCM

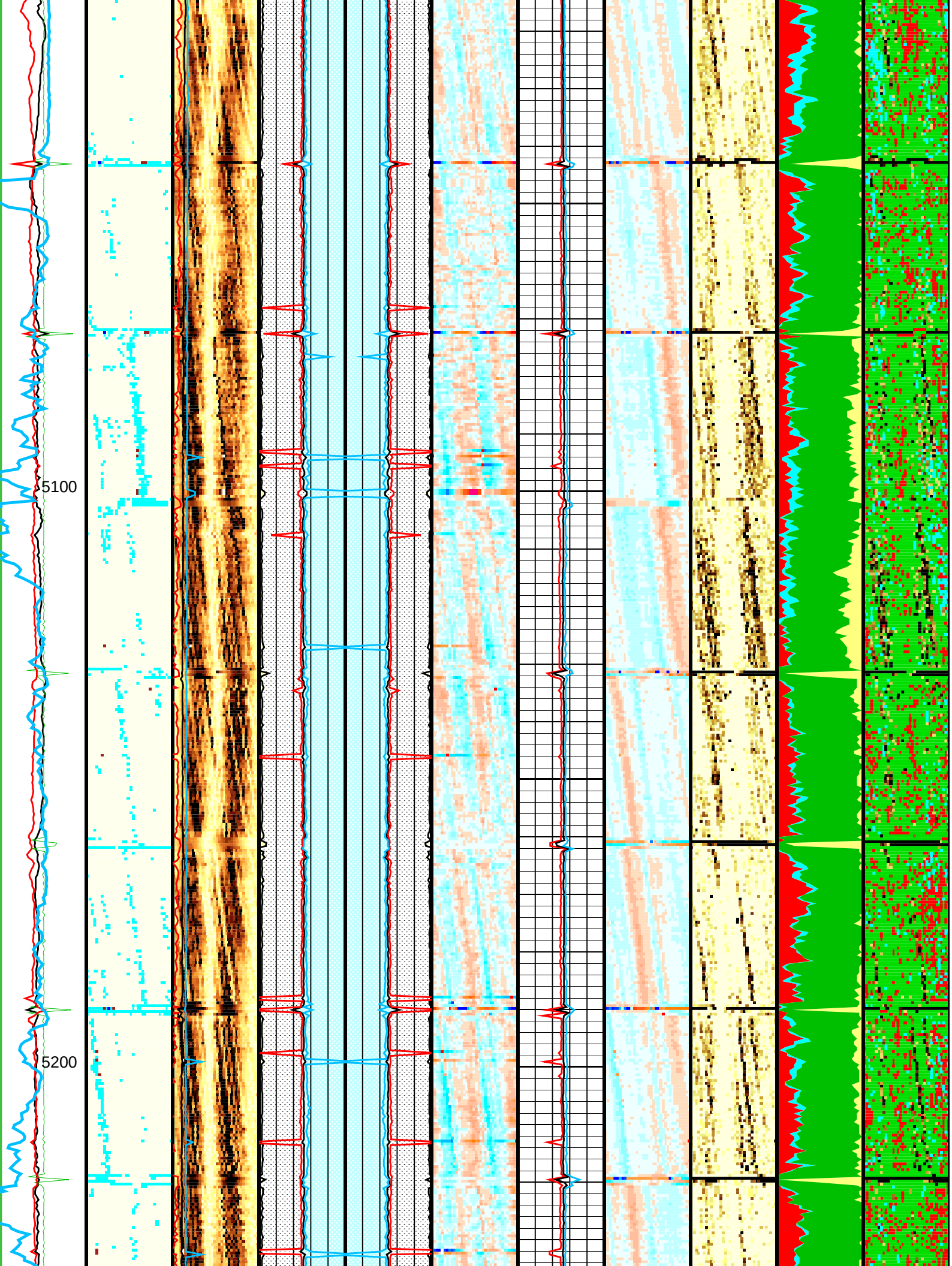
USIT−D	15C0−309	SGT−N	15C0−309
DTC−H	15C0−309	CAL−Y	15C0−309

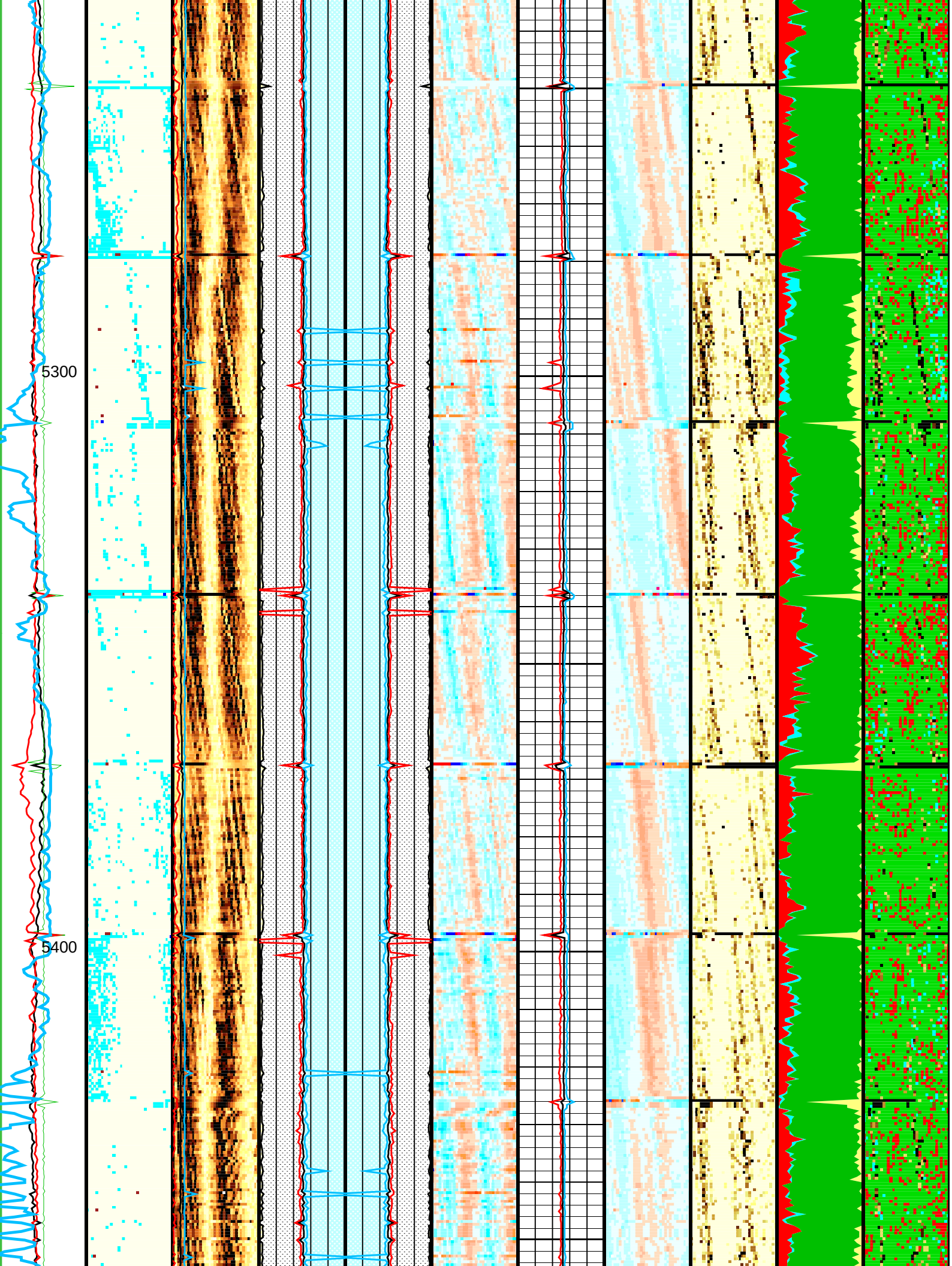
Zoning of Mud Parameters

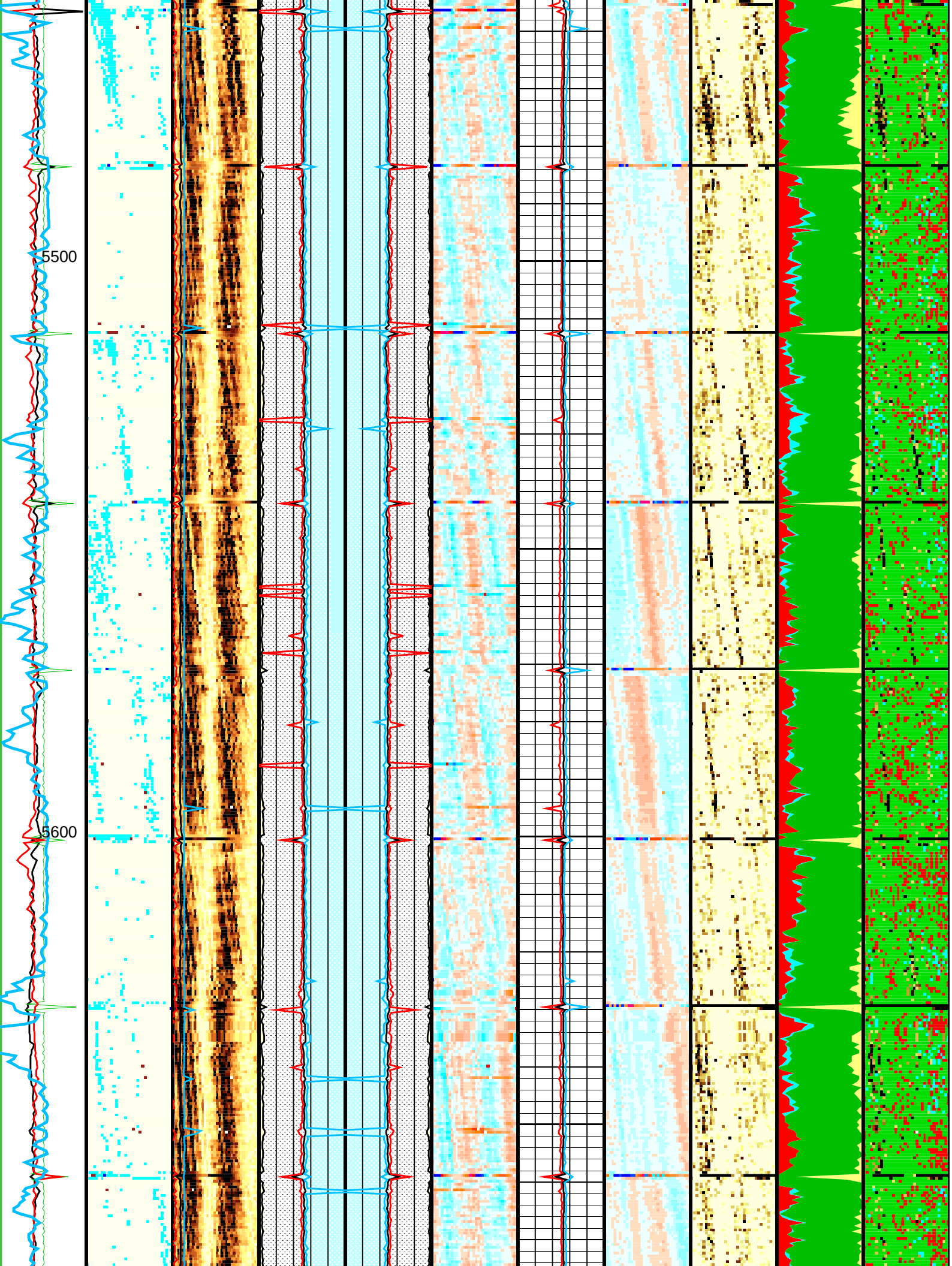
Depth	Fluid Velocity (DFVL)	Acoustic Impedance (ZMUD)
9000.00	196.80	1.50
8500.00	196.41	1.50
8000.00	194.68	1.50
7500.00	195.29	1.50
7000.00	193.23	1.50
6500.00	194.14	1.50
6000.00	193.22	1.50
5500.00	192.68	1.50
5000.00	194.91	1.50

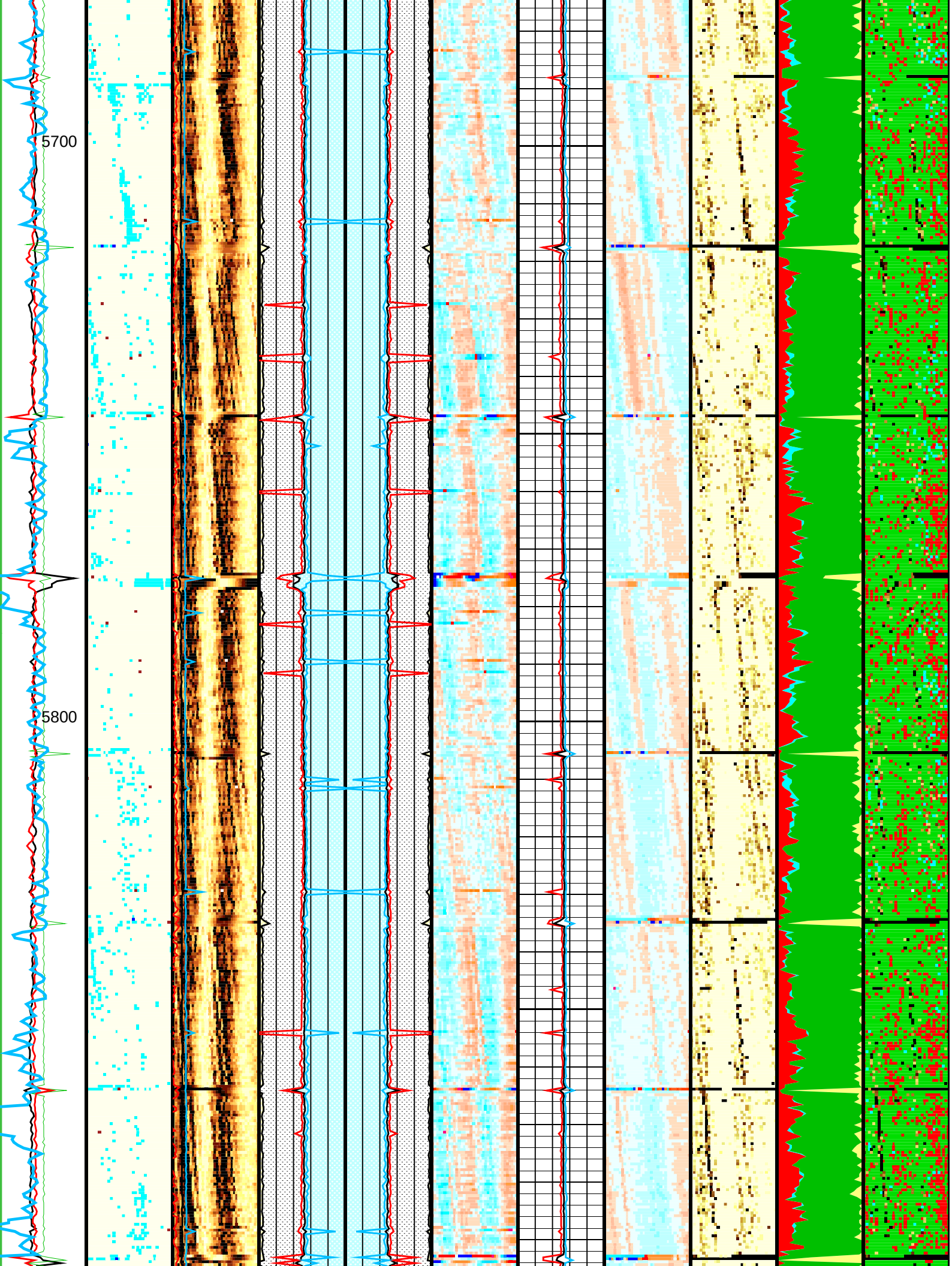
Image rotation (UCAZ) (DEG)

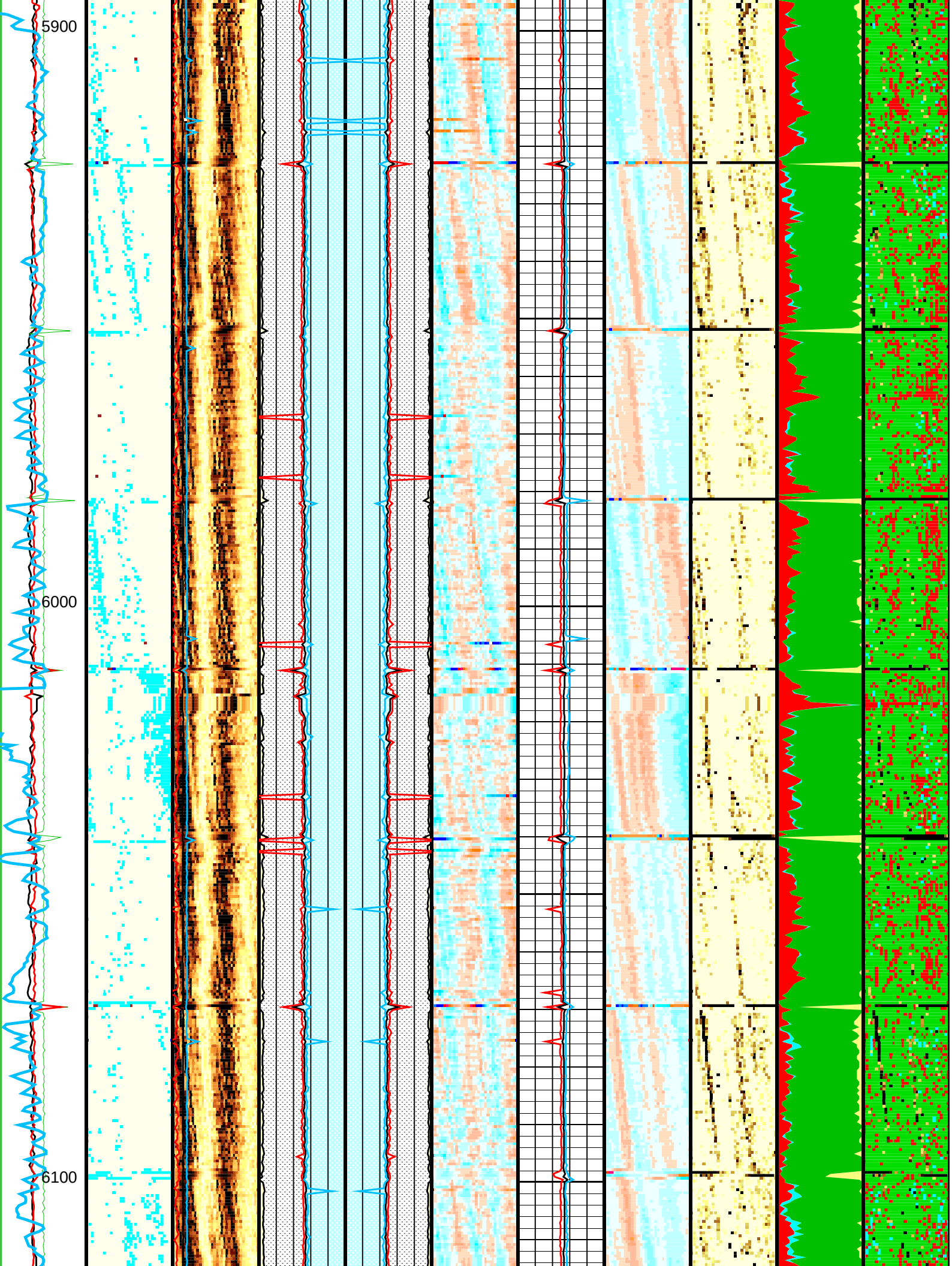

0 360
Azimuth of eccent. (AZEC) (DEG)
0 360
Cable Speed (CS) (F/HR)
0 2000
Rev. speed (RSAV) (RPS)
−8 −6
CCL (CCLU) (----
−20 20
Rev. speed (RSAV)
6 (RPS) 8
Eccent. (ECCE)
0 (IN) 0.5
0.5000
1.5000
2.5000
3.5000
6.5000
Process. flags (UFLG) (----
−500.0000
−6.0000
−5.6000
−5.2000
−4.8000
−4.4000
−4.0000
−3.6000
−3.2000
−2.8000
−2.4000
−2.0000
−1.6000
−1.2000
−0.8000
−0.4000
0.5000
Amplitude of echo minus Max (AWBK) (----
Maximum of Amplitude (AWMX)
0 (DB) 75
Average of Amplitude (AWAV)
0 (DB) 75
Min. of Amplitude (AWMN)
0 (DB) 75
Min of Internal radius (IRMN) (IN)
2.25 1.5
Internal radius Maximum (IRMX) (IN)
2.25 1.5
Internal radius Average (IRAV) (IN)
2.25 1.5
External radius Average (ERAV) (IN)
2.25 1.5
Min of Internal radius (IRMN) (IN)
1.5 2.25
Internal radius Maximum (IRMX) (IN)
1.5 2.25
Internal radius Average (IRAV) (IN)
1.5 2.25
External radius Average (ERAV) (IN)
1.5 2.25
−500.0000
−0.0760
−0.0680
−0.0600
−0.0520
−0.0440
−0.0360
−0.0280
−0.0200
−0.0120
−0.0040
0.0040
0.0120
0.0200
0.0280
0.0360
0.0440
0.0520
0.0600
0.0680
0.0760
Internal radii minus Ave (IRBK) (----
Maximum of Thickness (THMX) (IN)
0.1 0.6
Average of Thickness (THAV) (IN)
0.1 0.6
Min of Thickness (THMN) (IN)
0.1 0.6
−500.0000
−0.0760
−0.0680
−0.0600
−0.0520
−0.0440
−0.0360
−0.0280
−0.0200
−0.0120
−0.0040
0.0040
0.0120
0.0200
0.0280
0.0360
0.0440
0.0520
0.0600
0.0680
0.0760
Thickness minus Ave (THBK) (----
−500.0000
0.1875
0.3750
0.5625
0.7500
0.9375
1.1250
1.3125
1.5000
1.6875
1.8750
2.0625
2.2500
2.4375
2.6250
2.8125
3.0000
Raw Acoustic Imped. (AIBK) (----
Micro−debonding
Liquid
Gas or Dry MicroA
Bonded
−1000.0000
−500.0000
0.3000
1.8000
1.9091
2.0182
2.1273
2.2364
2.3454
2.4546
2.5636
2.6727
2.7818
2.8909
3.0000
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (----

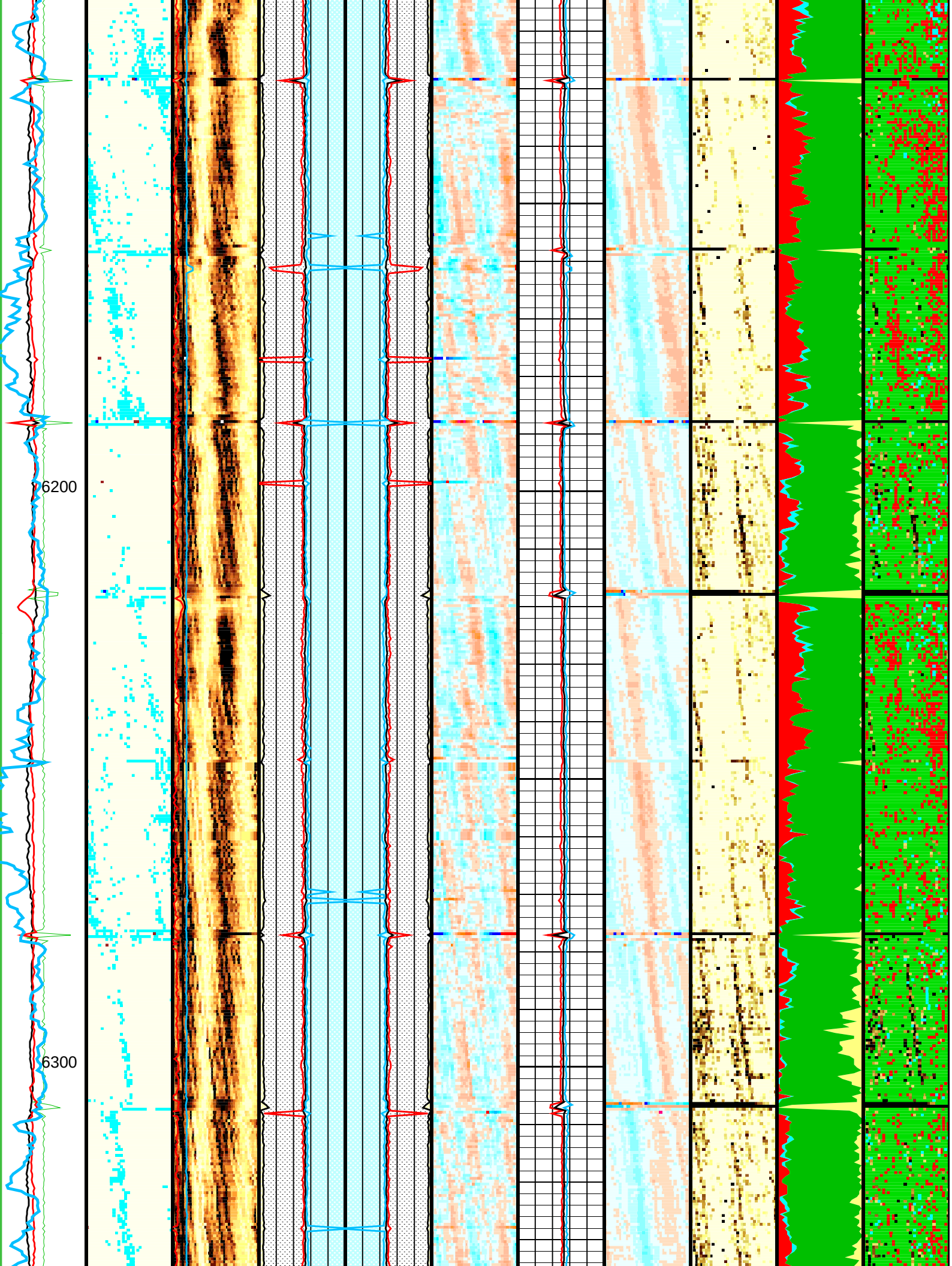

5100
5200

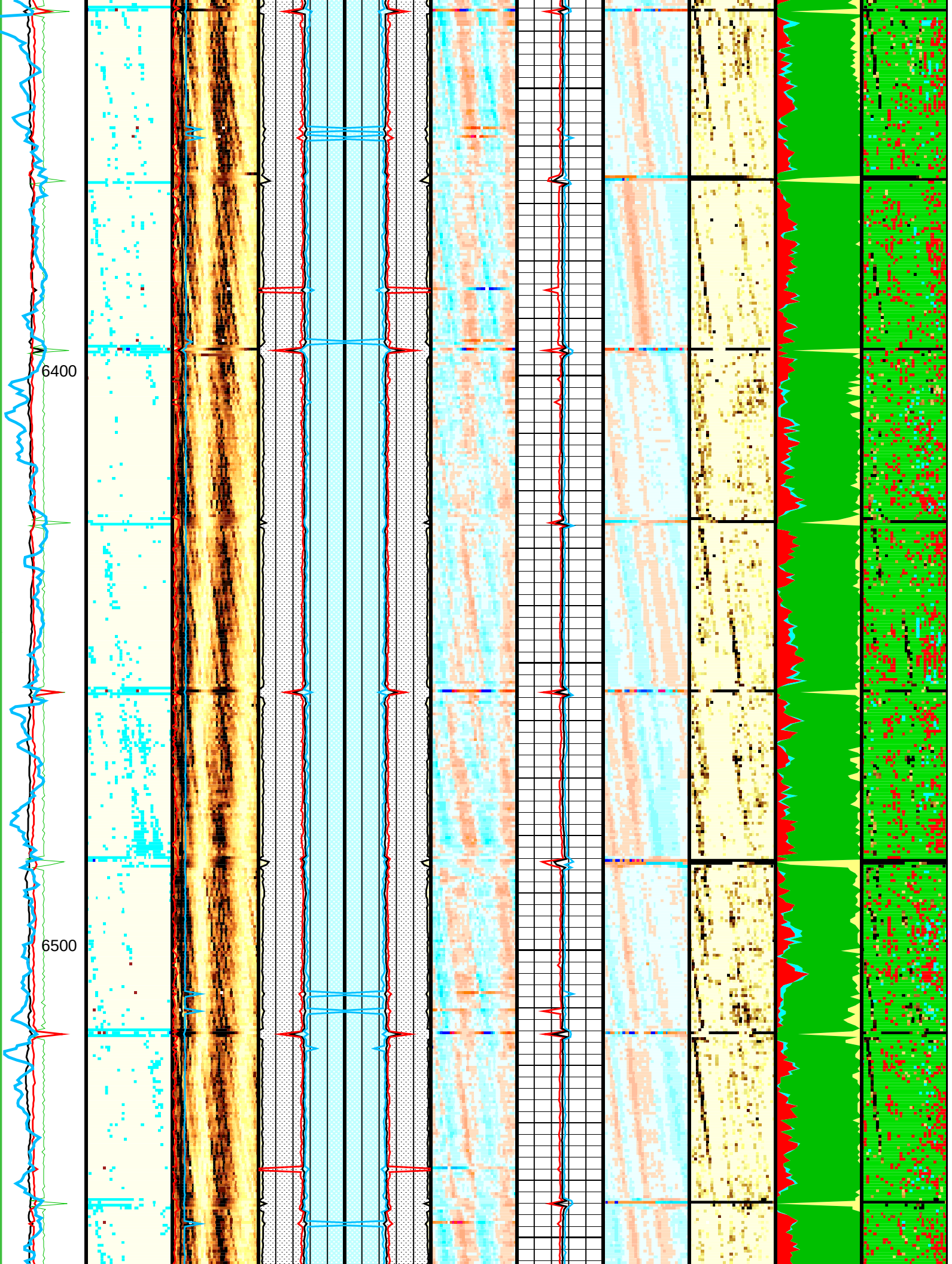

5300
5400

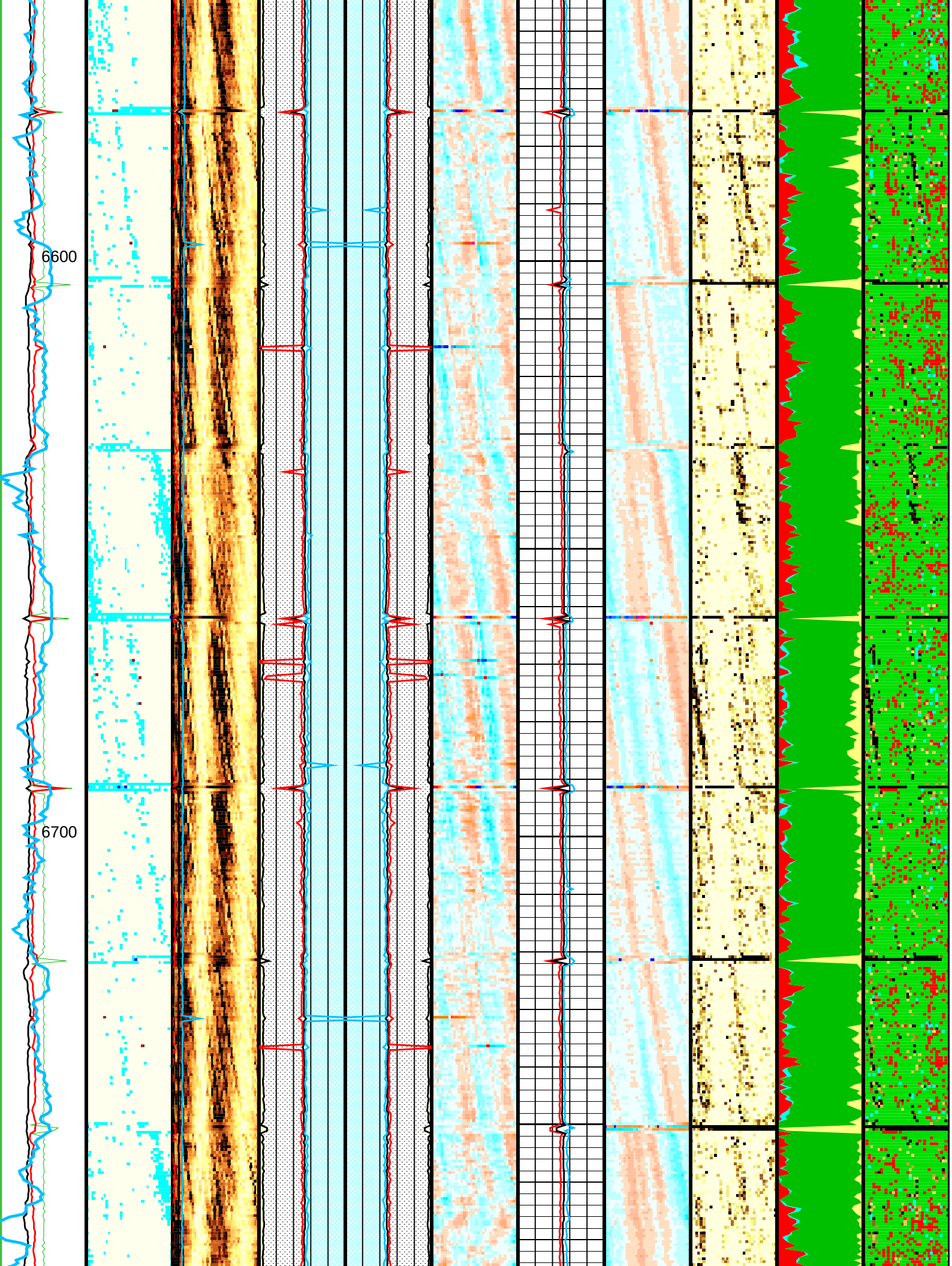

5500
5600

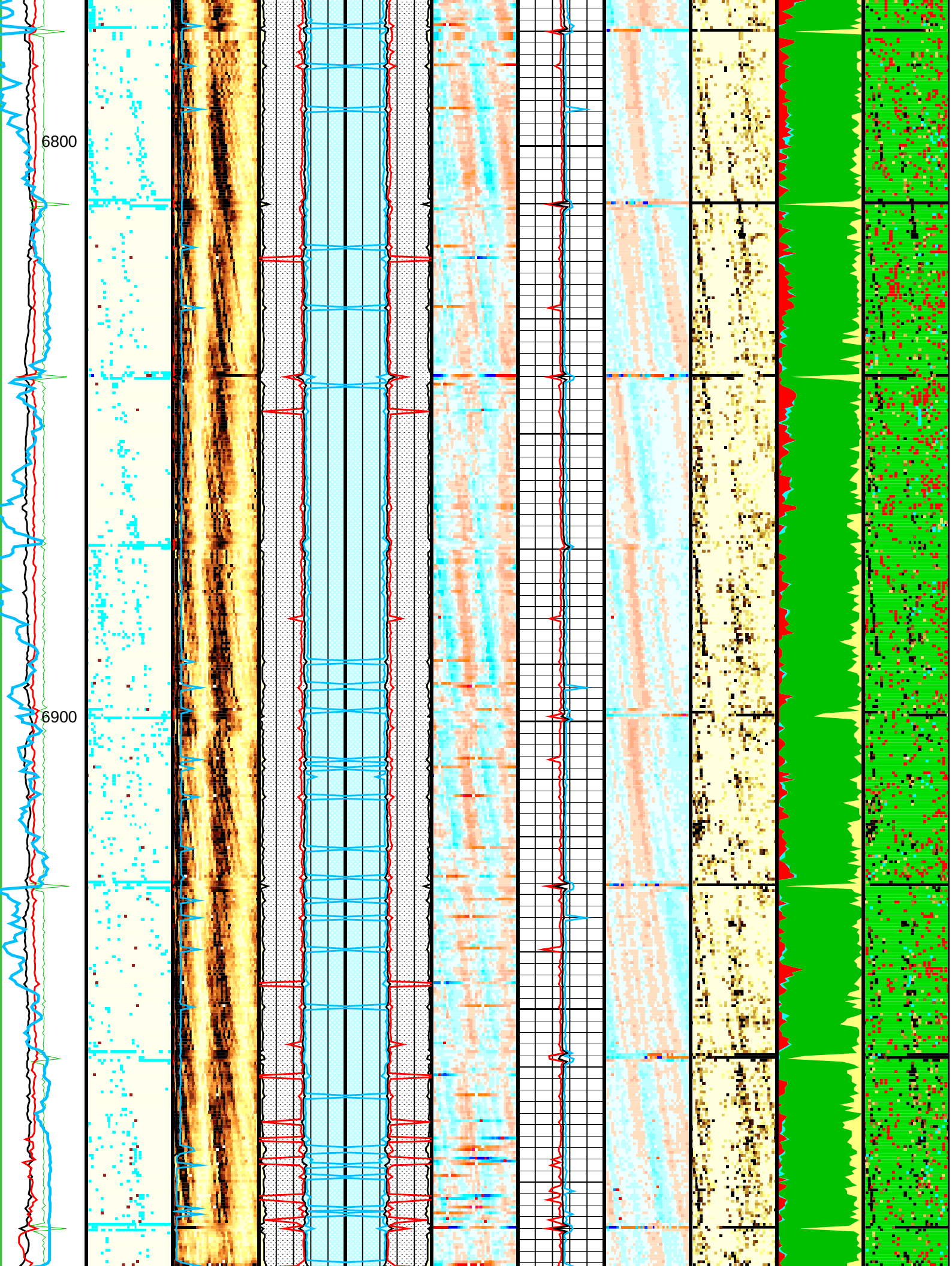

5700
5800

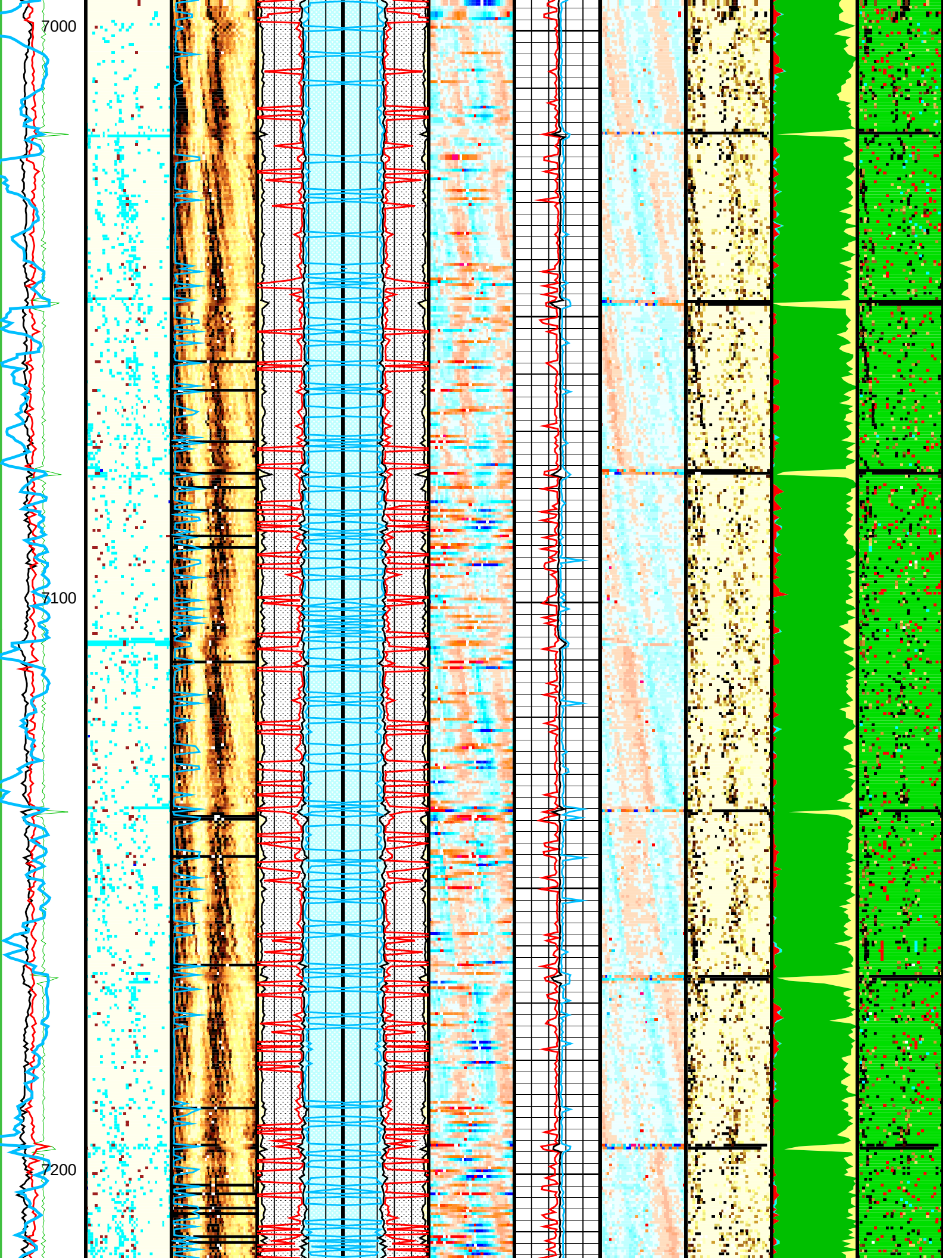

5900
6000
6100

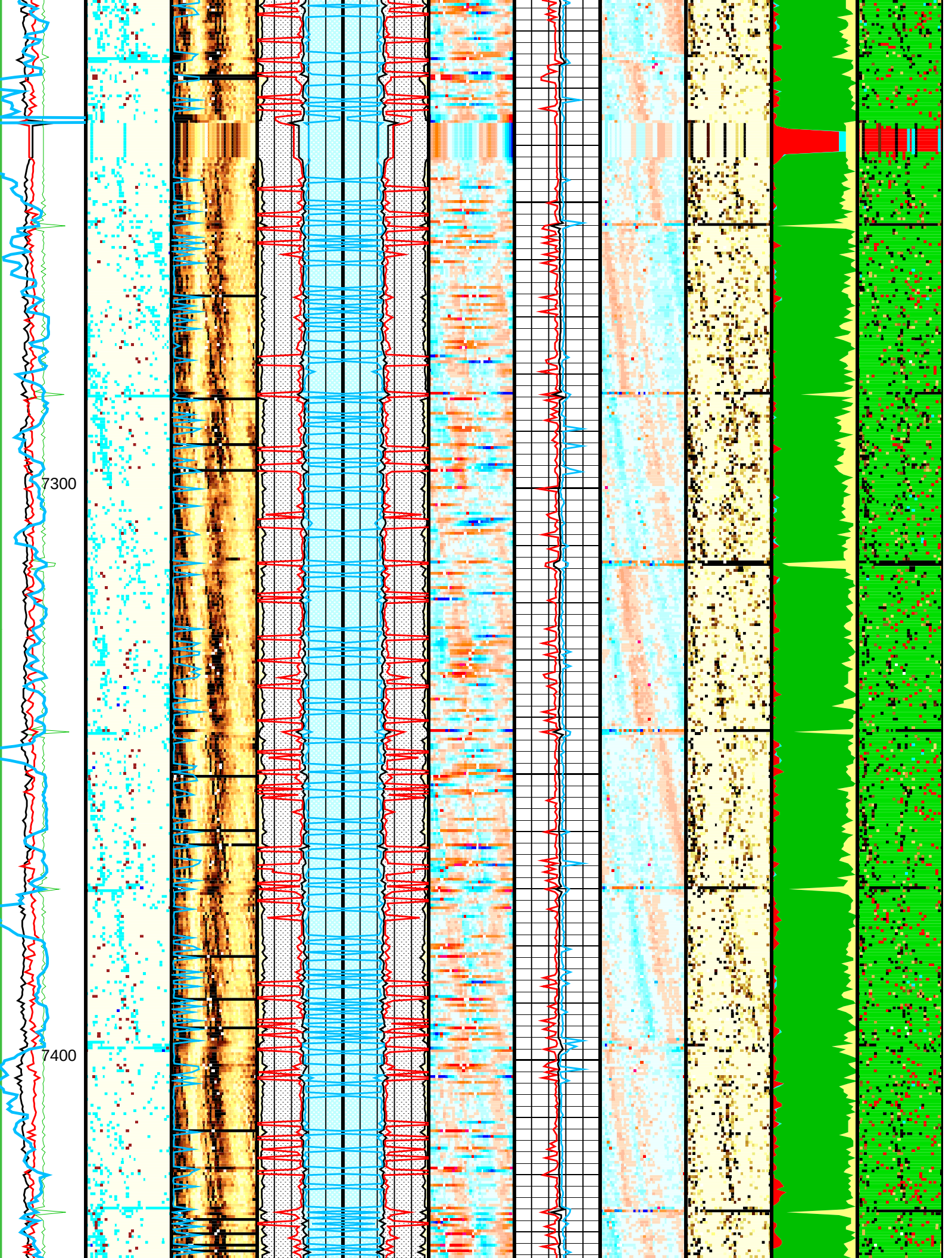

6200
6300

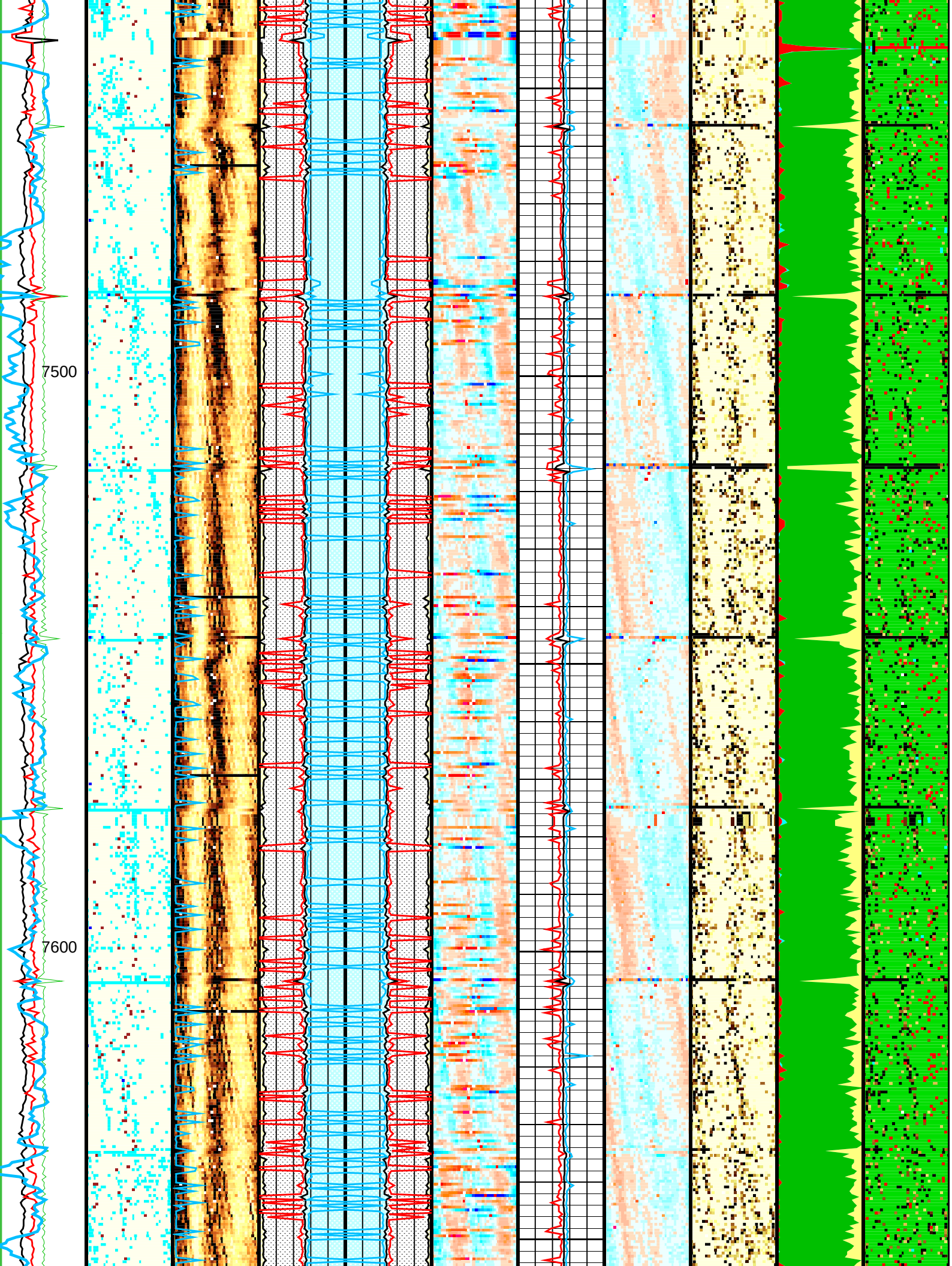

6400
6500

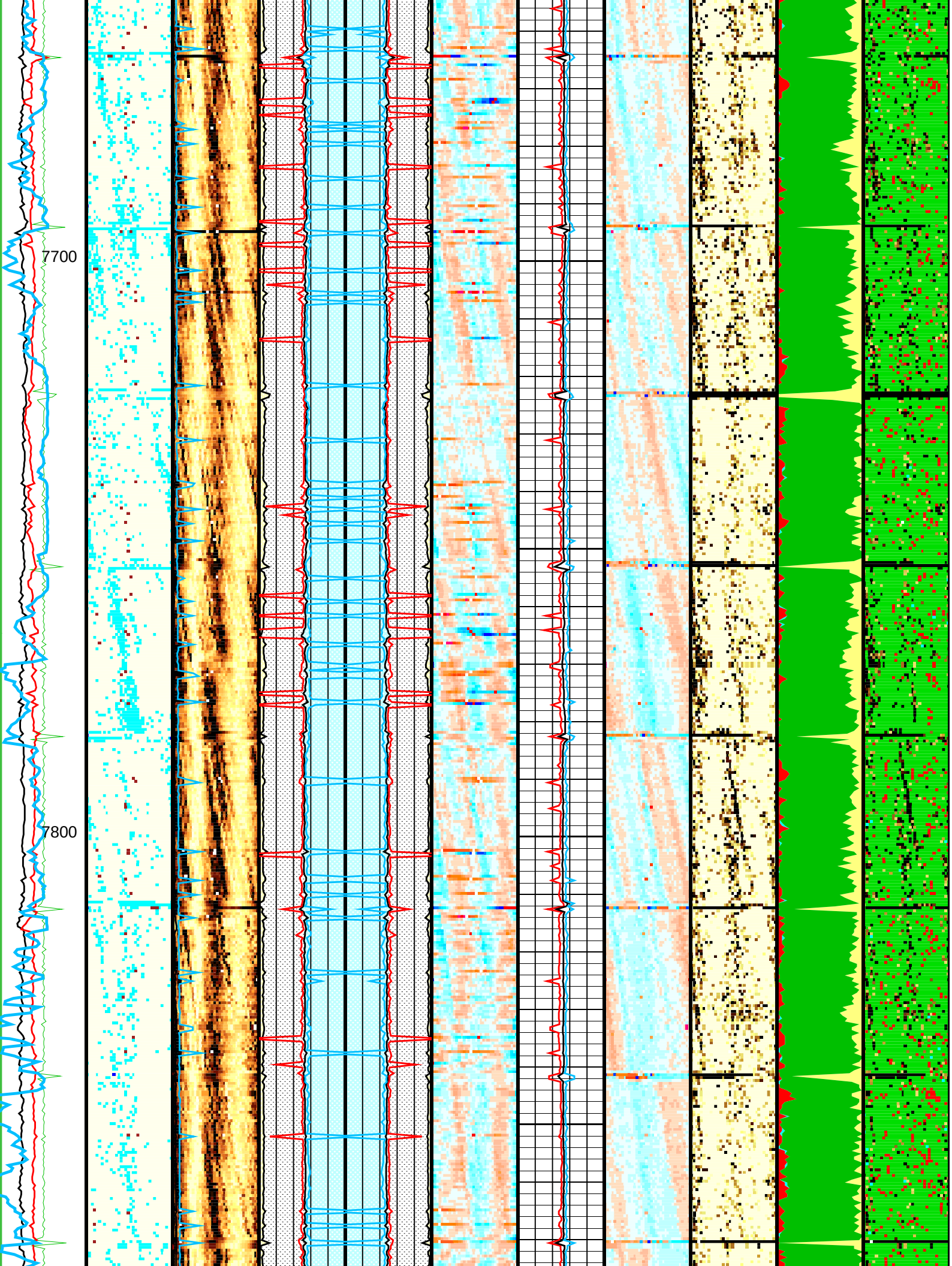

6600
6700

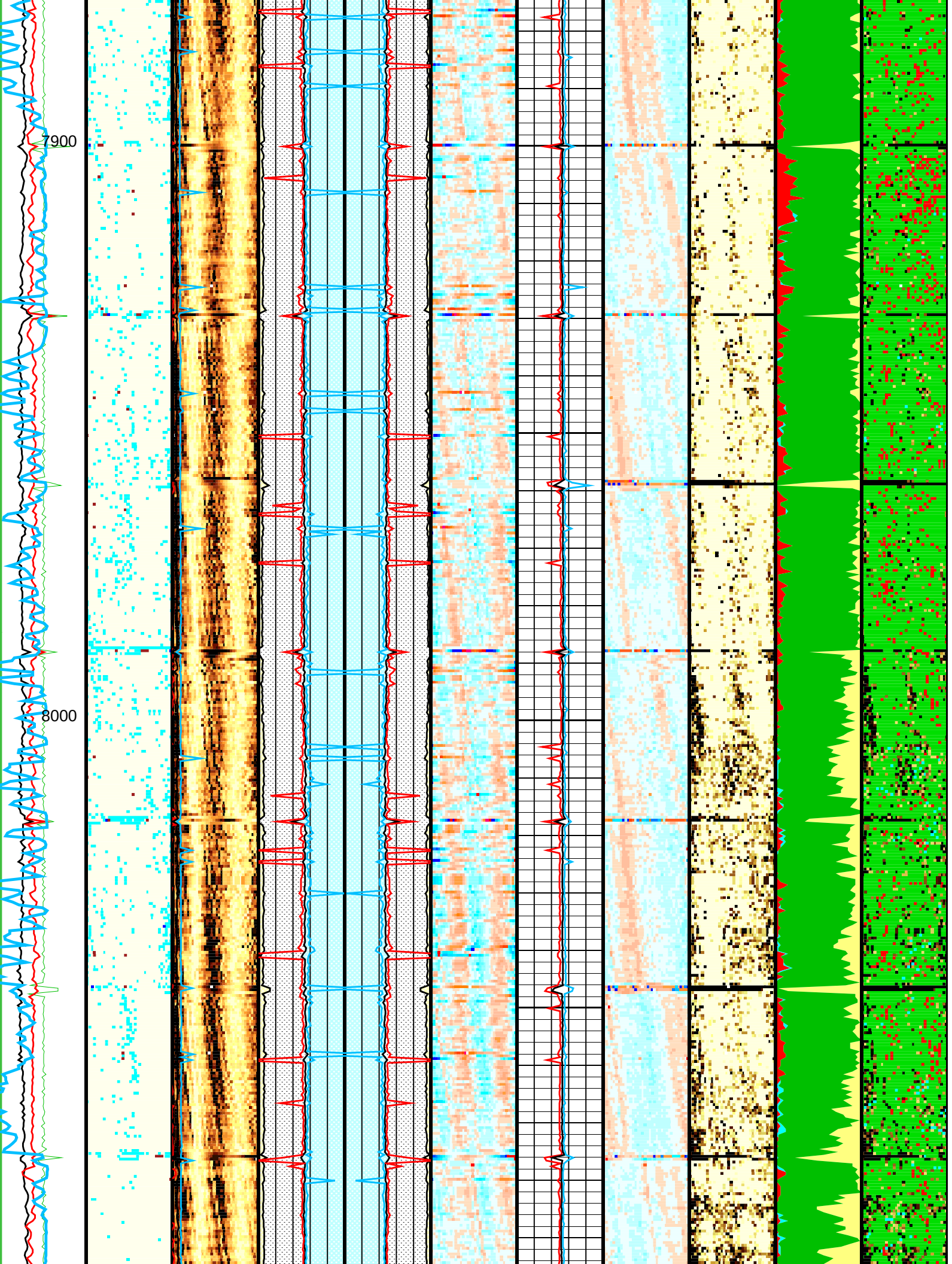

6800
6900

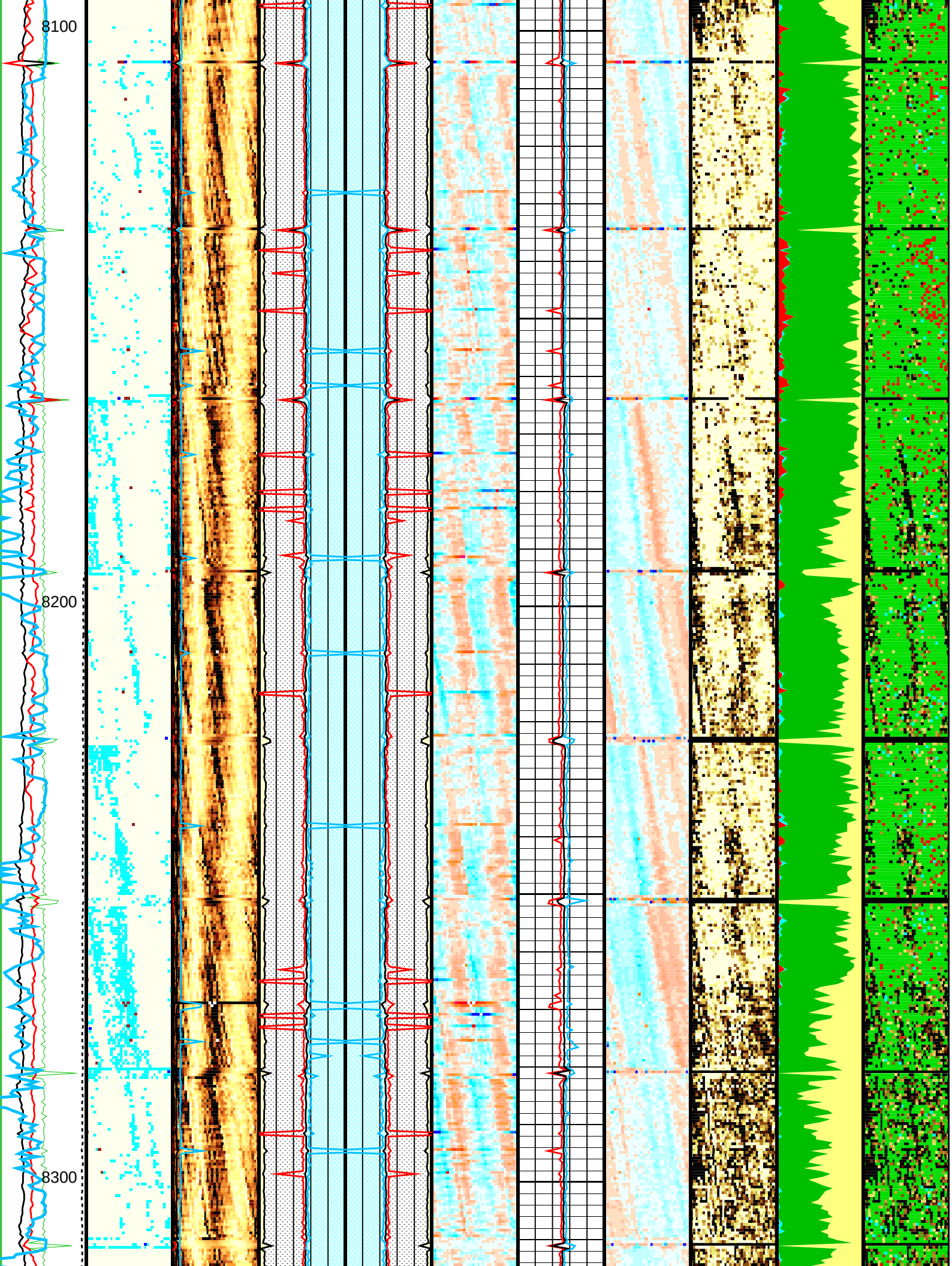

7000
7100
7200

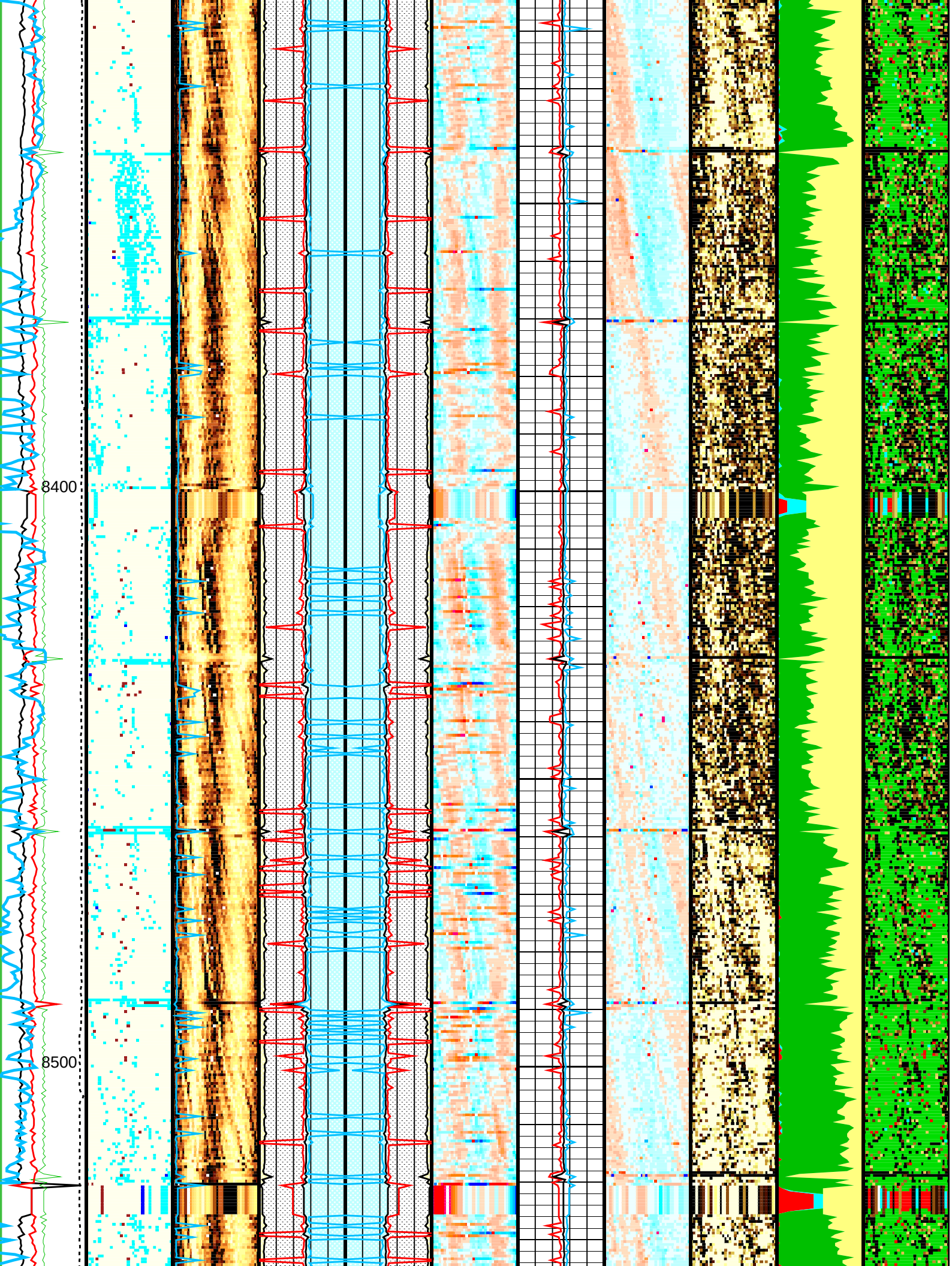

7300
7400

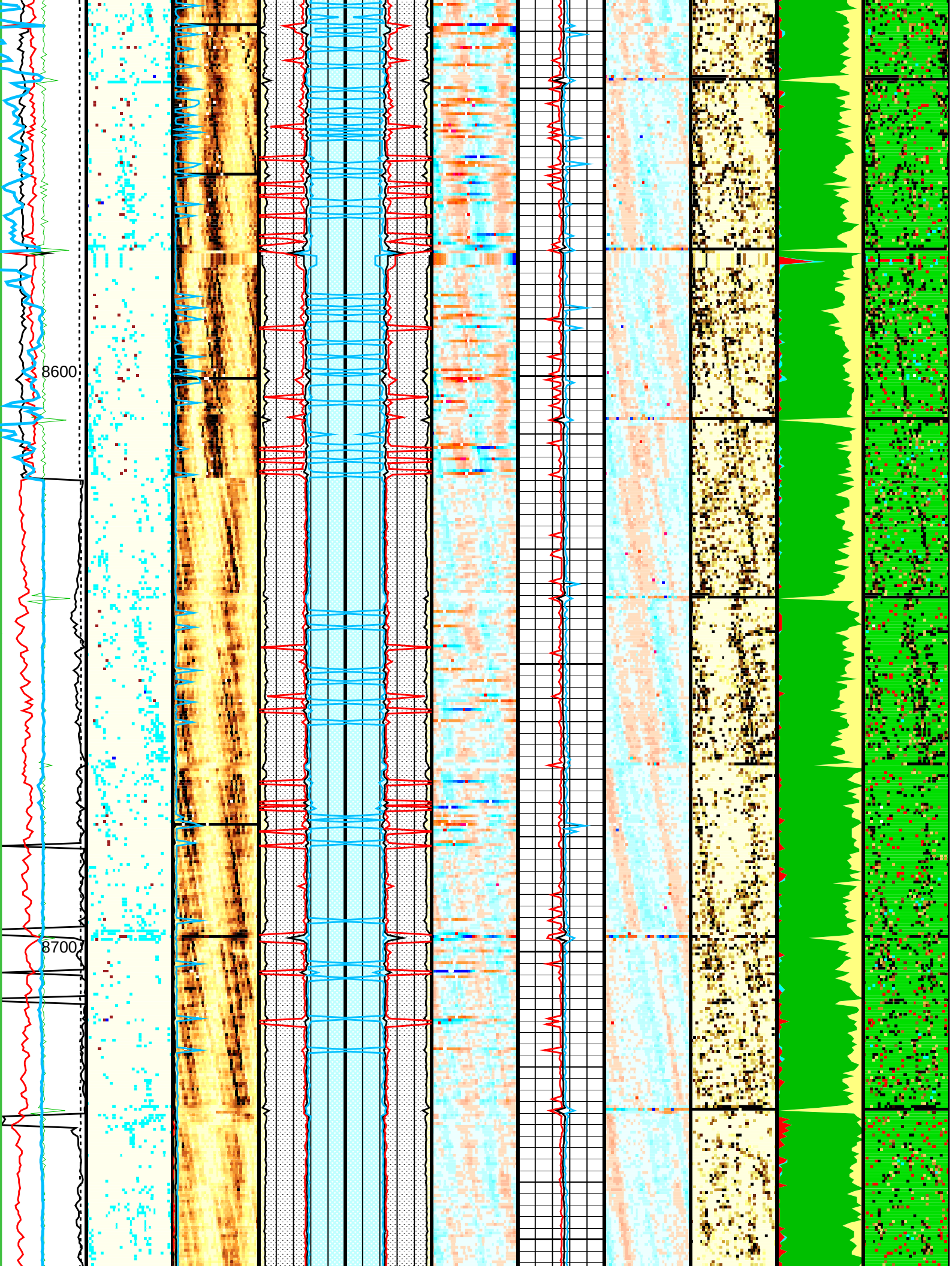

7500
7600

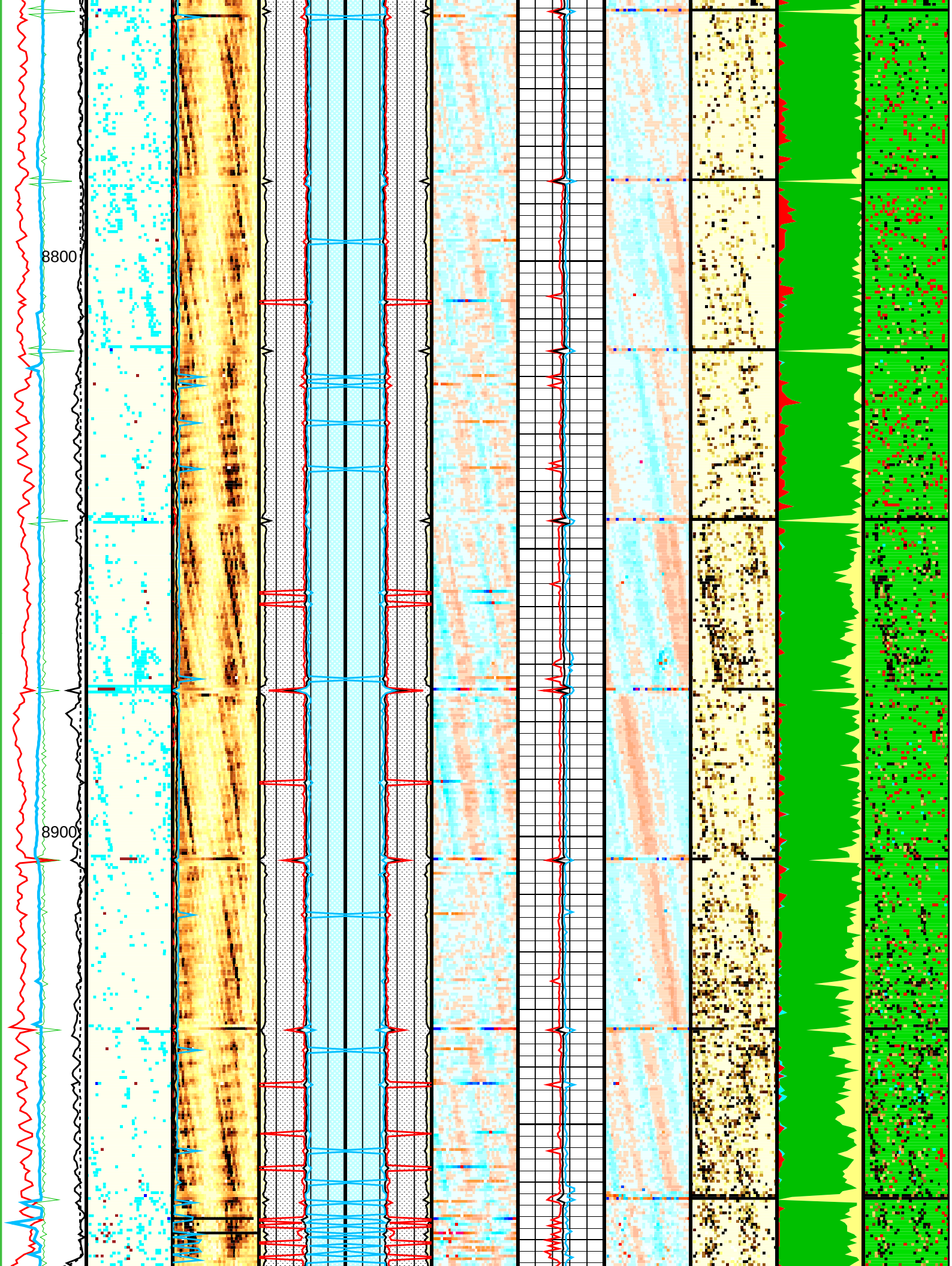

7700
7800

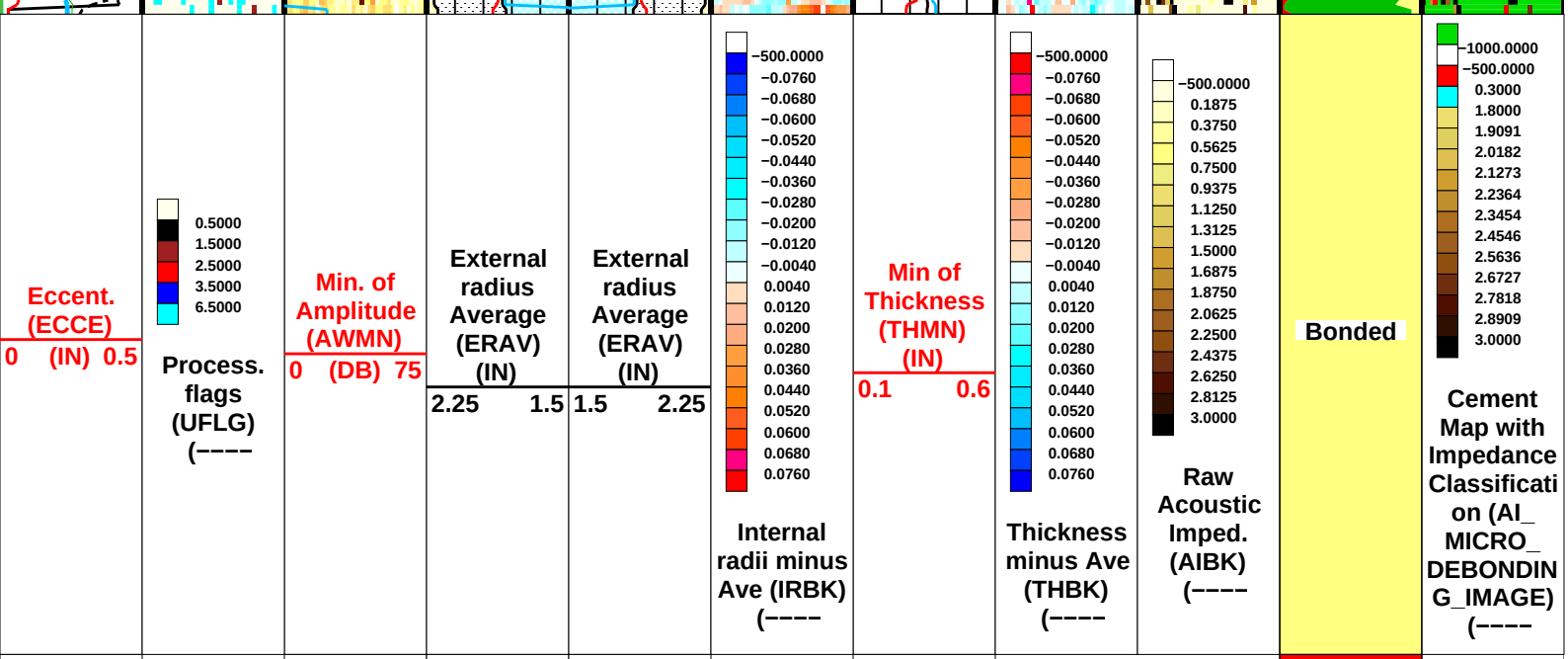

7900
8000


8100
8200
8300


8400
8500


8600
8700


8800
8900


Eccent. (ECCE)
0 (IN) 0.5
0.5000
1.5000
2.5000
3.5000
6.5000
Process. flags (UFLG) (----
Min. of Amplitude (AWMN)
0 (DB) 75
External radius Average (ERAV) (IN)
2.25 1.5
External radius Average (ERAV) (IN)
1.5 2.25
−500.0000
−0.0760
−0.0680
−0.0600
−0.0520
−0.0440
−0.0360
−0.0280
−0.0200
−0.0120
−0.0040
0.0040
0.0120
0.0200
0.0280
0.0360
0.0440
0.0520
0.0600
0.0680
0.0760
Internal radii minus Ave (IRBK) (----
Min of Thickness (THMN) (IN)
0.1 0.6
−500.0000
−0.0760
−0.0680
−0.0600
−0.0520
−0.0440
−0.0360
−0.0280
−0.0200
−0.0120
−0.0040
0.0040
0.0120
0.0200
0.0280
0.0360
0.0440
0.0520
0.0600
0.0680
0.0760
Thickness minus Ave (THBK) (----
−500.0000
0.1875
0.3750
0.5625
0.7500
0.9375
1.1250
1.3125
1.5000
1.6875
1.8750
2.0625
2.2500
2.4375
2.6250
2.8125
3.0000
Raw Acoustic Imped. (AIBK) (----
Bonded
−1000.0000
−500.0000
0.3000
1.8000
1.9091
2.0182
2.1273
2.2364
2.3454
2.4546
2.5636
2.6727
2.7818
2.8909
3.0000
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (----
Rev. speed (RSAV)
6 (RPS) 8
Average of Amplitude (AWAV)
0 (DB) 75
Internal radius Average (IRAV) (IN)
2.25 1.5
Internal radius Average (IRAV) (IN)
1.5 2.25
Average of Thickness (THAV) (IN)
0.1 0.6
Gas or Dry MicroA
CCL (CCLU) (----
−20 20
Maximum of Amplitude (AWMX)
0 (DB) 75
Internal radius Maximum (IRMX) (IN)
2.25 1.5
Internal radius Maximum (IRMX) (IN)
1.5 2.25
Maximum of Thickness (THMX) (IN)
0.1 0.6
Liquid
Rev. speed (RSAV) (RPS)
−8 −6
−500.0000
−6.0000
−5.6000
−5.2000
−4.8000
−4.4000
−4.0000
−3.6000
−3.2000
−2.8000
−2.4000
−2.0000
−1.6000
−1.2000
−0.8000
−0.4000
0.5000
Amplitude of echo minus Max (AWBK) (----
Min of Internal radius (IRMN) (IN)
2.25 1.5
Min of Internal radius (IRMN) (IN)
1.5 2.25
Micro−debonding
Cable Speed (CS) (F/HR)
0 2000
Azimuth of eccent. (AZEC) (DEG)
0 360
Image rotation (UCAZ) (DEG)
0 360

Format: USI_Composite Vertical Scale: 5" per 100' Graphics File Created: 05−Dec−2008 21:53

OP System Version: 15C0−309

MCM

USIT−D	15C0−309	SGT−N	15C0−309
DTC−H	15C0−309	CAL−Y	15C0−309

All USI Images are outside views

COMPUTATION FLAGS LABELLING

(0 − 1.5)	UFLG 1	UTIM error
(1.5 − 2.5)	UFLG 2	Pulse origin not detected
(2.5 − 3.5)	UFLG 3	WINLEN error
(3.5 − 6.5)	UFLG 4 UFLG 5 UFLG 6	CASING THICKNESS error
(6.5 − 10)	UFLG 7 UFLG 8 UFLG 9	LOOP PROCESSING error

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	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	3.826	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	45	V
FDII	FPM Data Interpolation Interval	0	FT
IMAR	Image Rotation	OFF	
MW	Mud Weight	8.5	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
RCTH	Reference Calibrator Thickness	0.2165	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	0.337	IN
UMAO	USIT Measurement Angular Offset	−10	DEG
USTO	Ultrasonic Time Offset	−2	US
USUB	Ultrasonic Subassembly Identifier	Sub_5_inch	
UWKM	Ultrasonic Working Mode	10DEG_6IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	51.4	US/F
WLEN	T^3 Processing Length	20.2086	US
ZCAS	Acoustic Impedance of Casing	46.2537	MRAY
ZINI	Initial Estimate of Cement Impedance	−1	MRAY
ZMUD	Acoustic Impedance of Mud	1.48	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	1.8	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY

	System and Miscellaneous		
CWEI	Casing Weight	15.10	LB/F
DO	Depth Offset for Playback	7.5	FT
PP	Playback Processing	RECOMPUTE	

Input DLIS Files

DEFAULT	Splice_USI_002CUP	FN:1	PRODUCER	05−Dec−2008 20:24	8968.5 FT	4992.0 FT

Output DLIS Files

DEFAULT	USI_006PUP	FN:4	PRODUCER	05−Dec−2008 21:53		

Schlumberger

LQC of Main Pass

MAXIS Field Log

Company: Antero Resources Corp **Well: Valley Farms E9**

Input DLIS Files

DEFAULT	Splice_USI_002CUP	FN:1	PRODUCER	05−Dec−2008 20:24	8968.5 FT	4992.0 FT

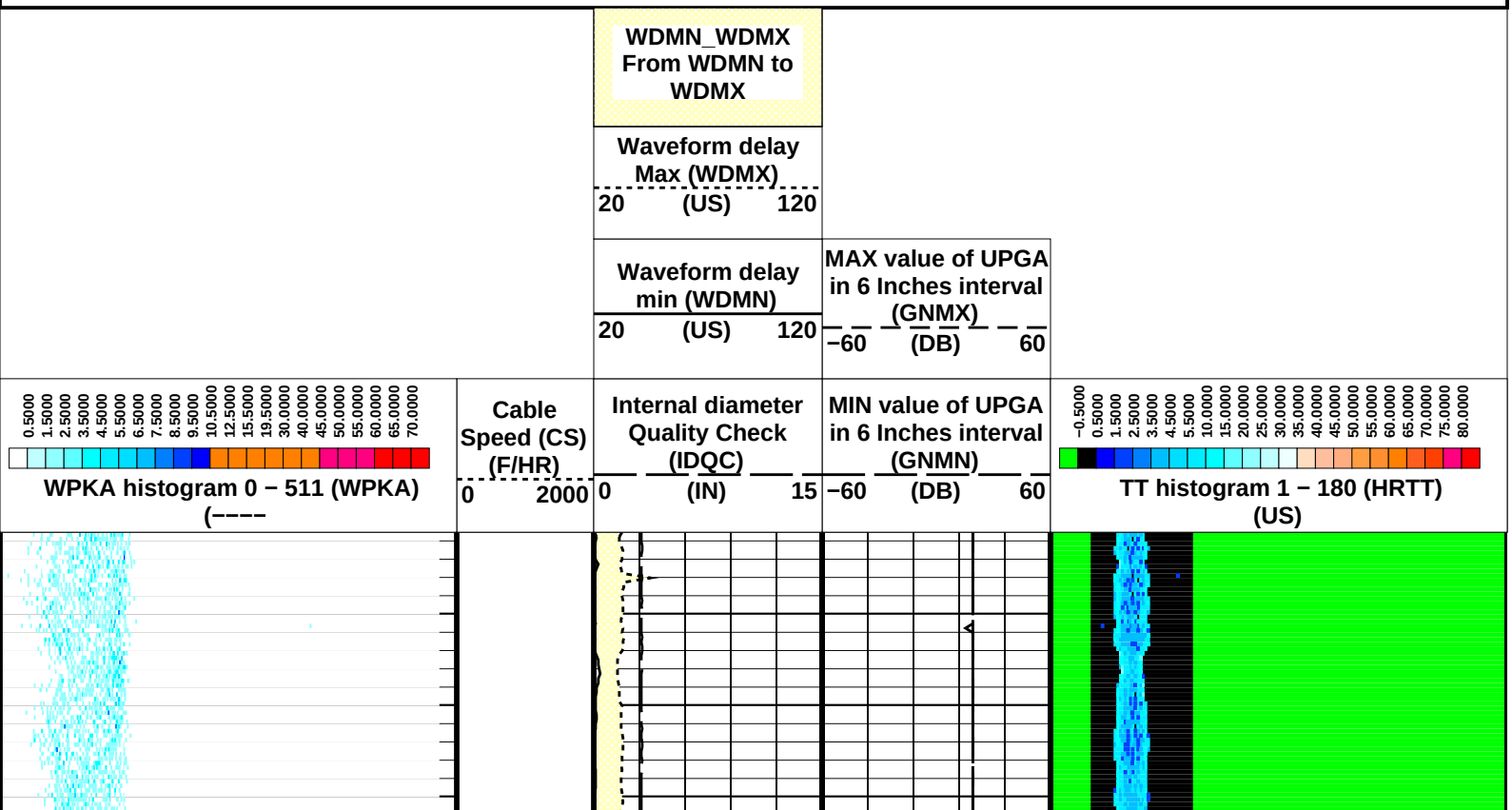
Output DLIS Files

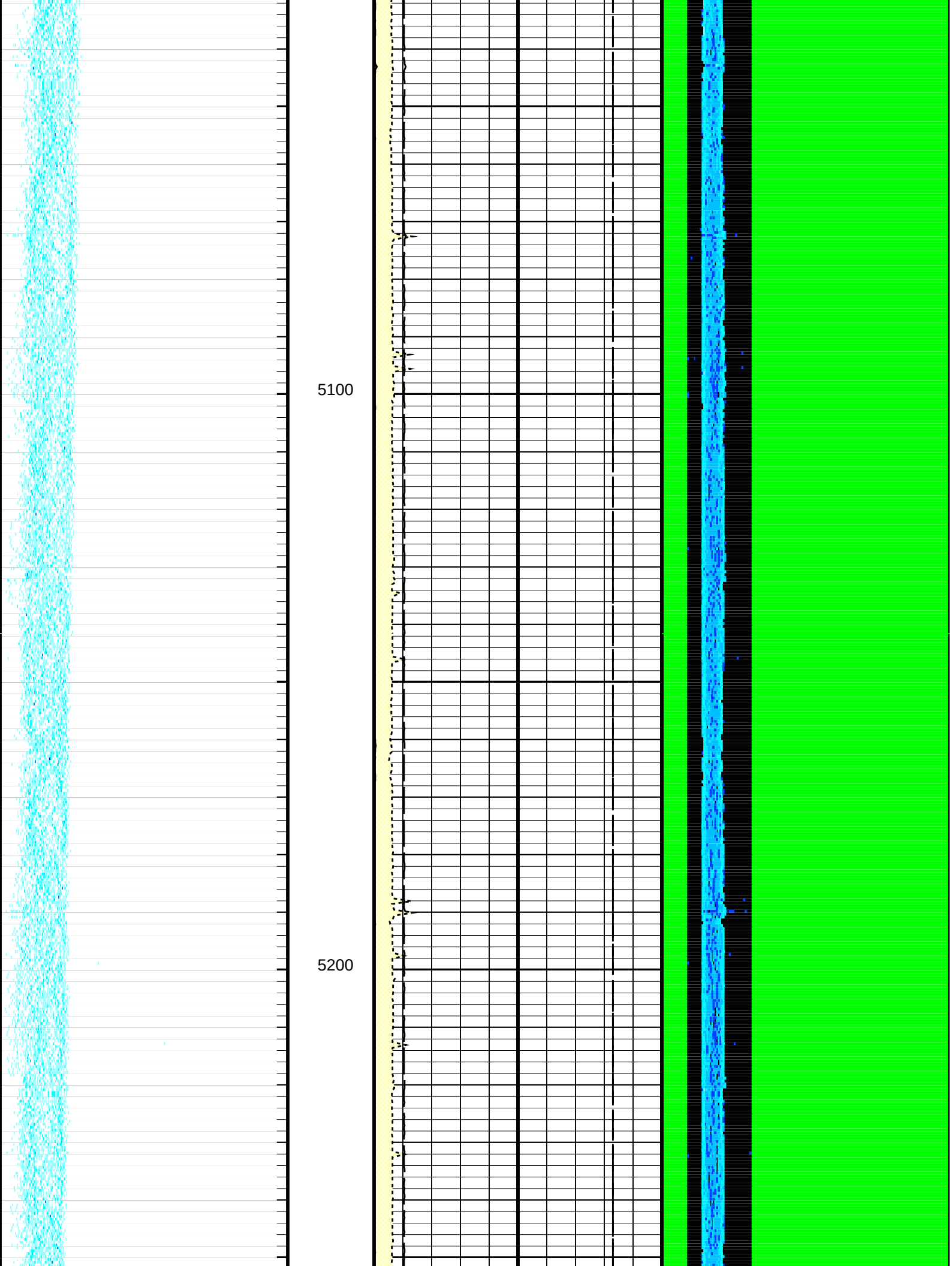
DEFAULT	USI_006PUP	FN:4	PRODUCER	05−Dec−2008 21:53	8976.0 FT	5001.0 FT

OP System Version: 15C0−309

MCM

USIT−D	15C0−309	SGT−N	15C0−309
DTC−H	15C0−309	CAL−Y	15C0−309

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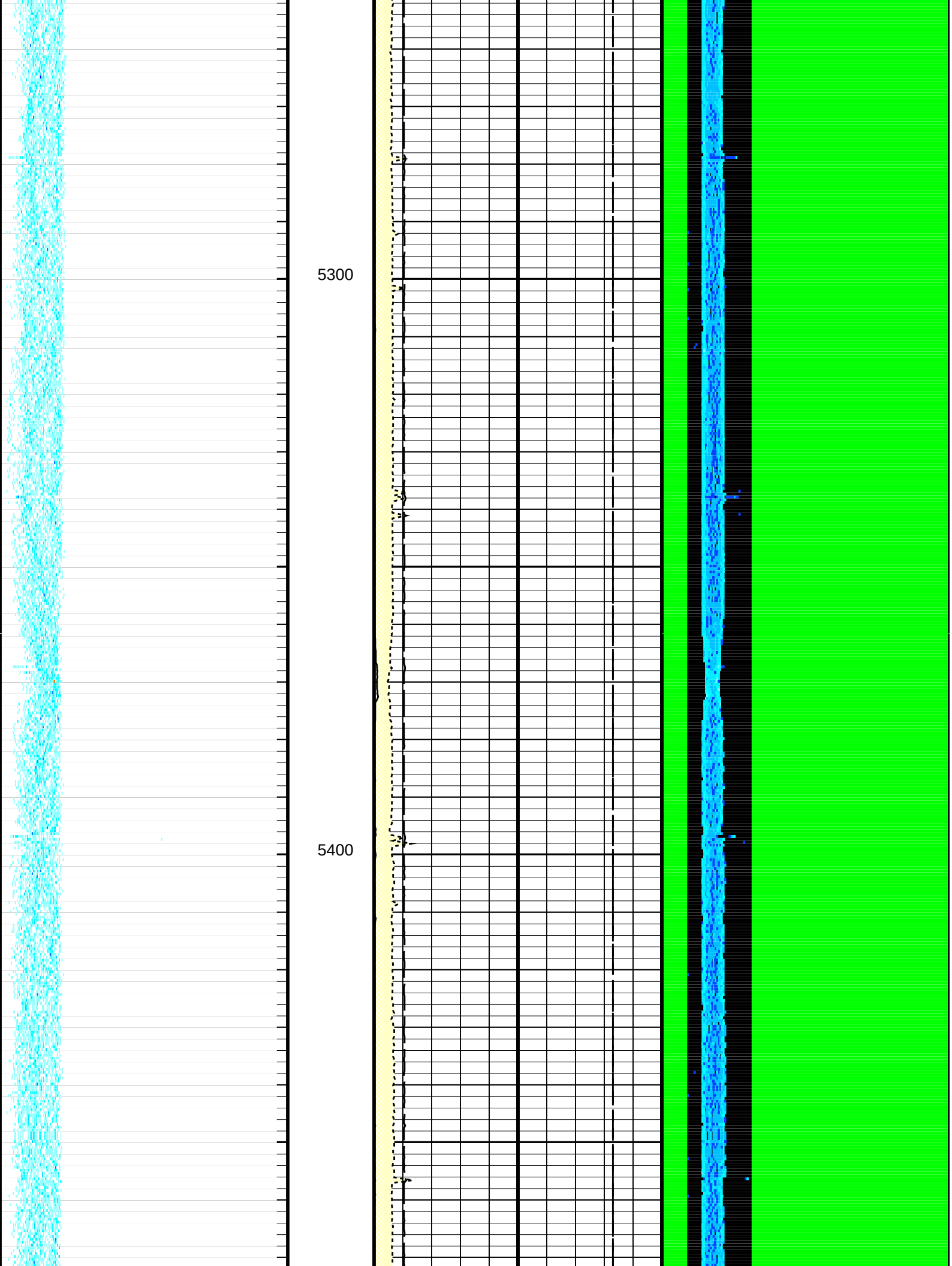
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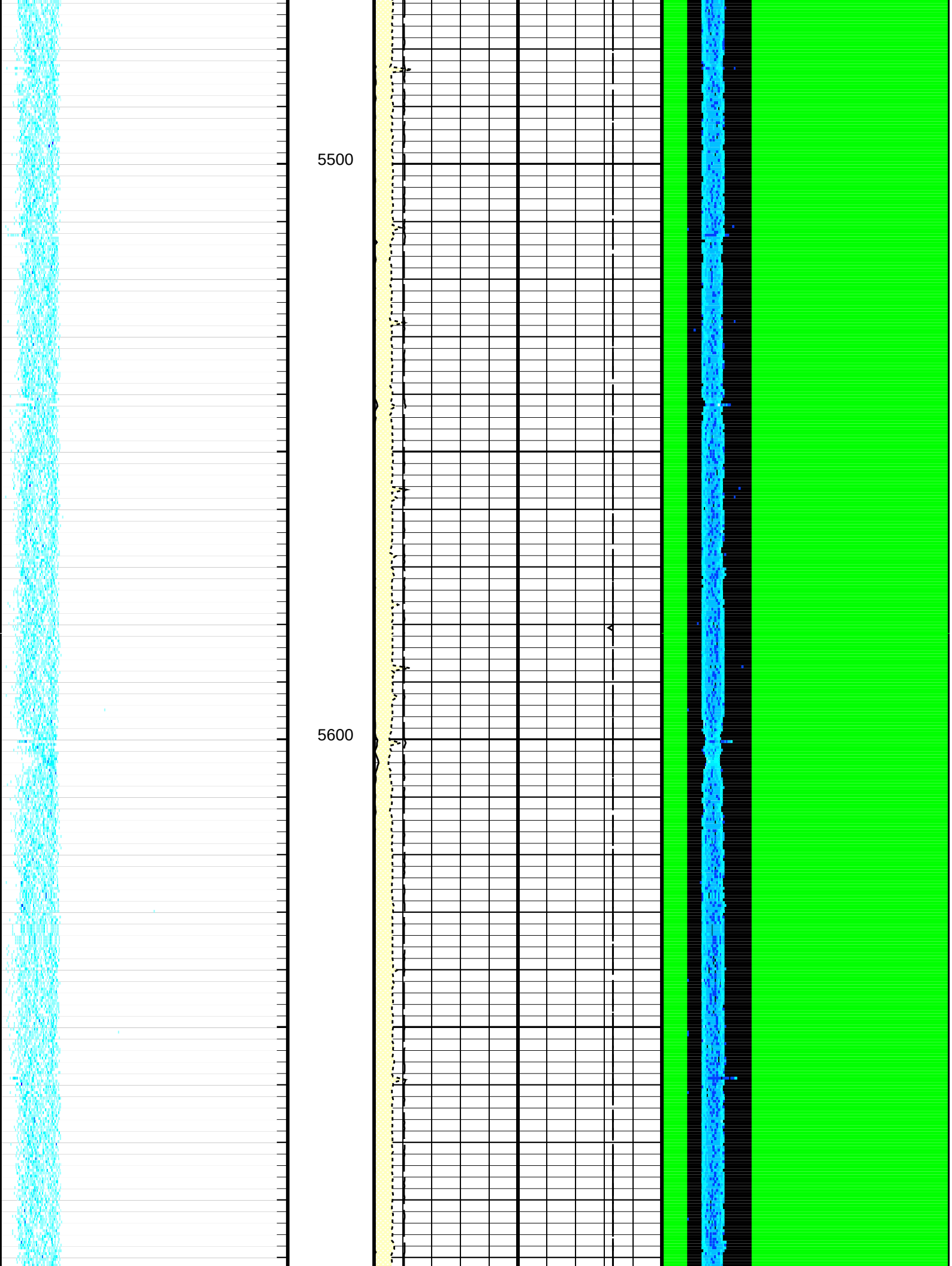
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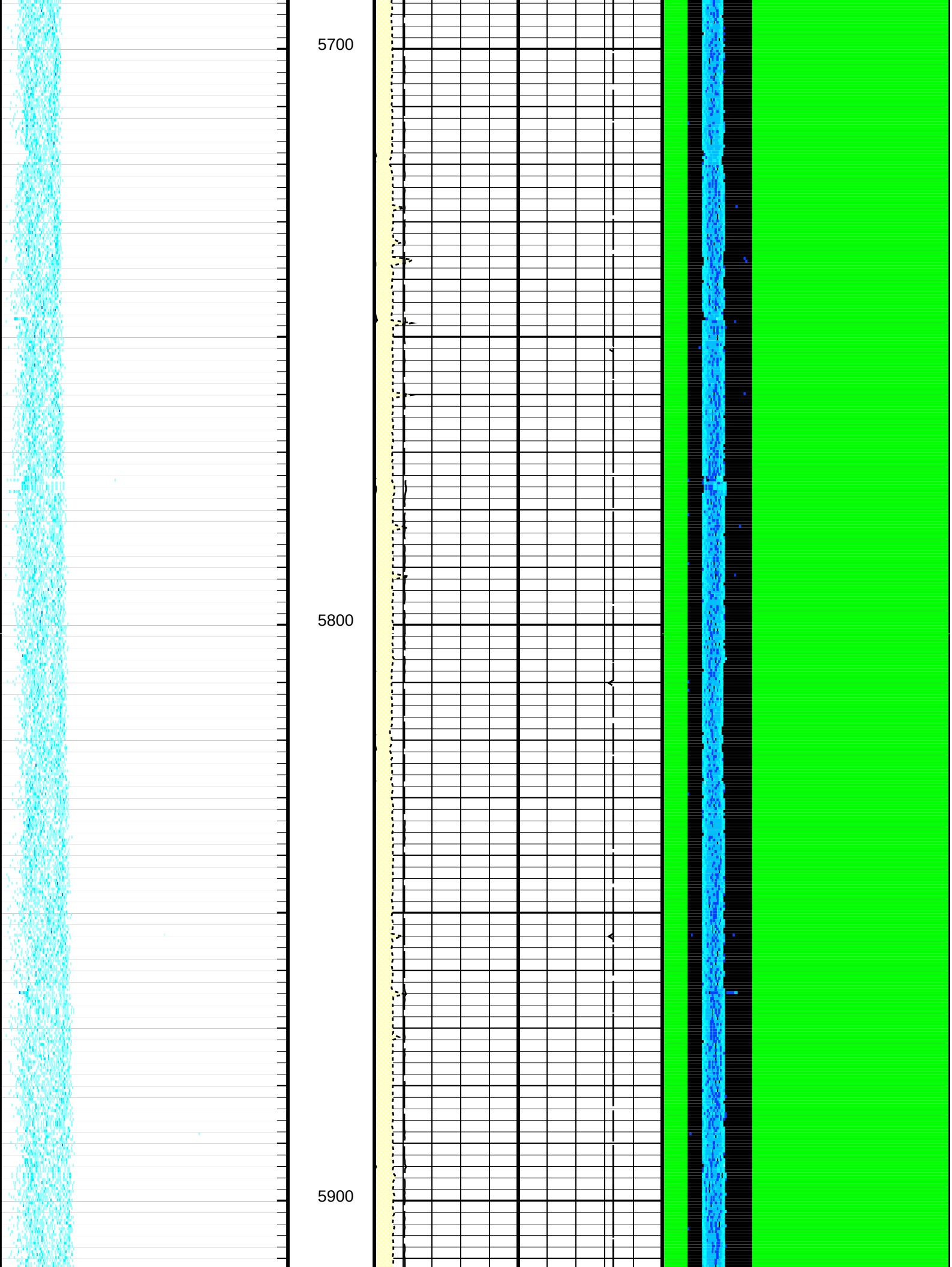
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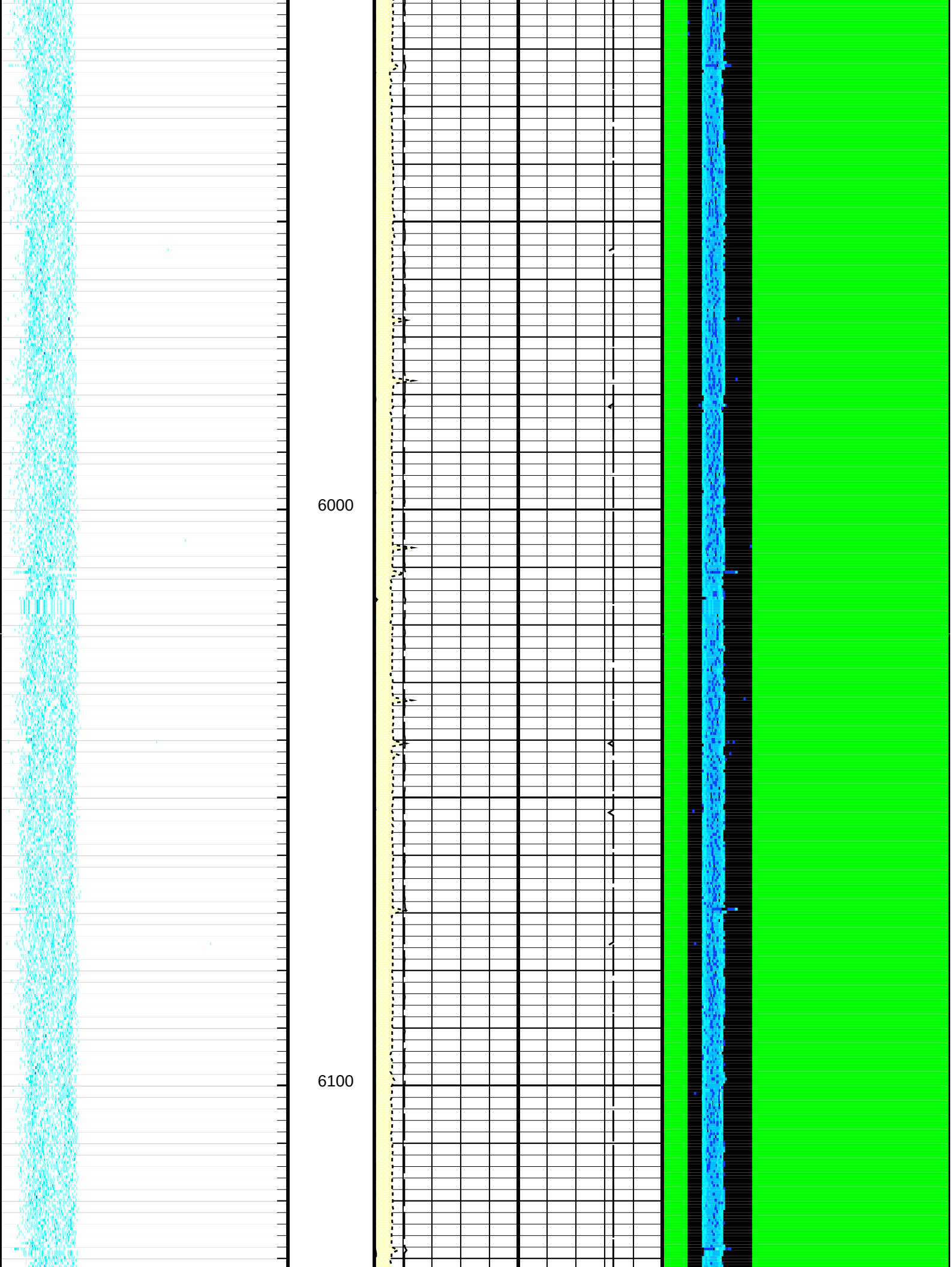
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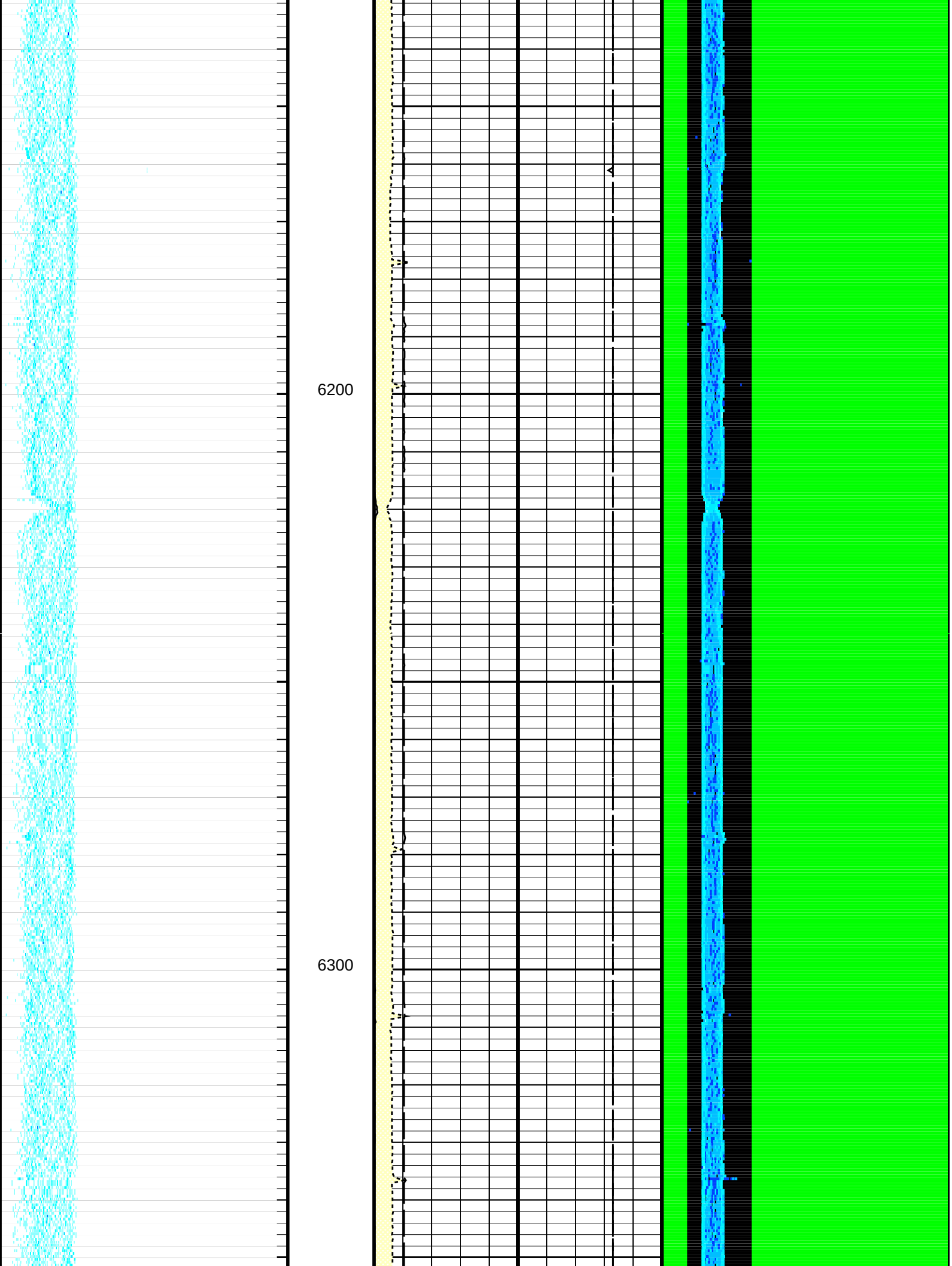
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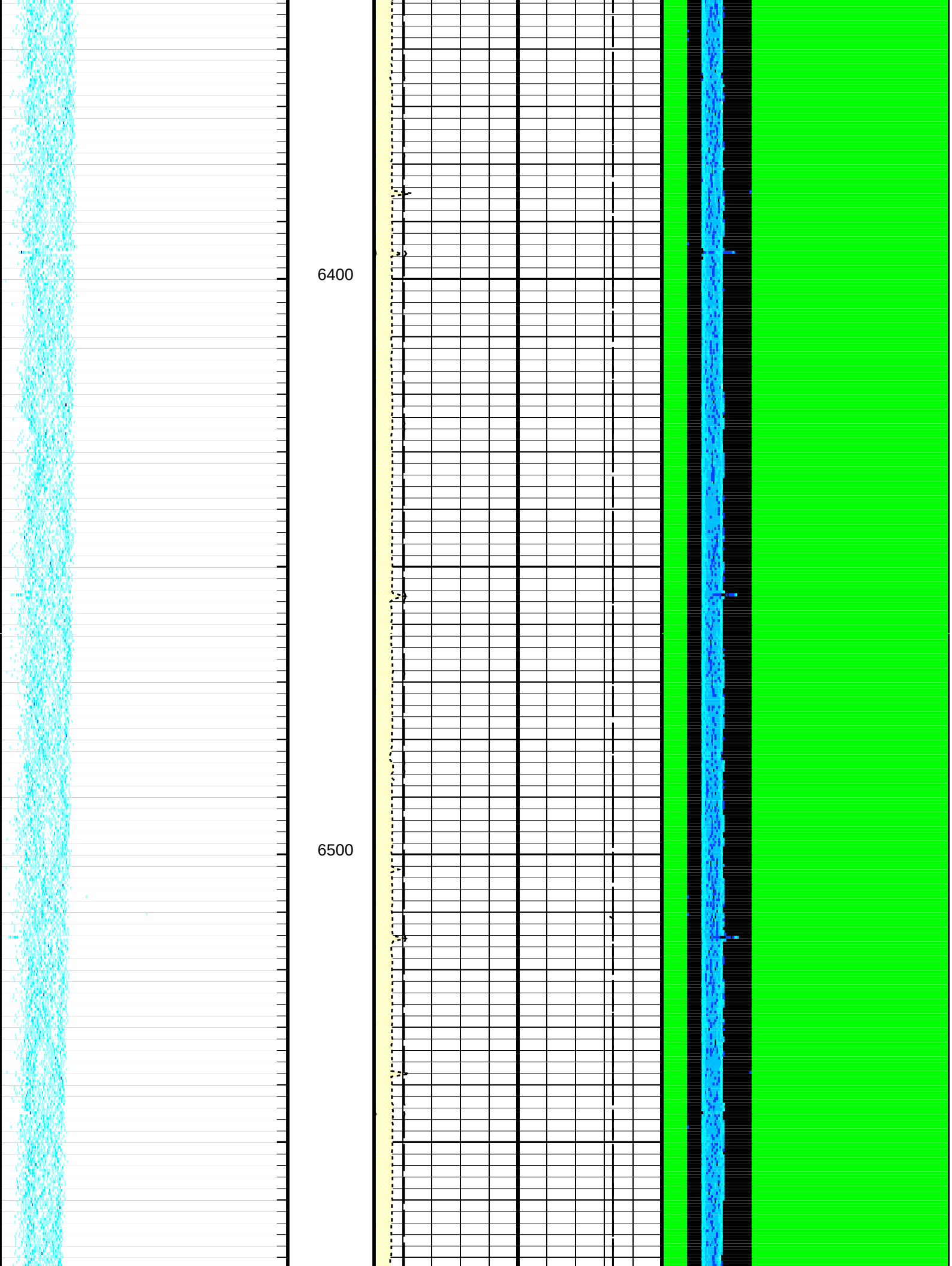
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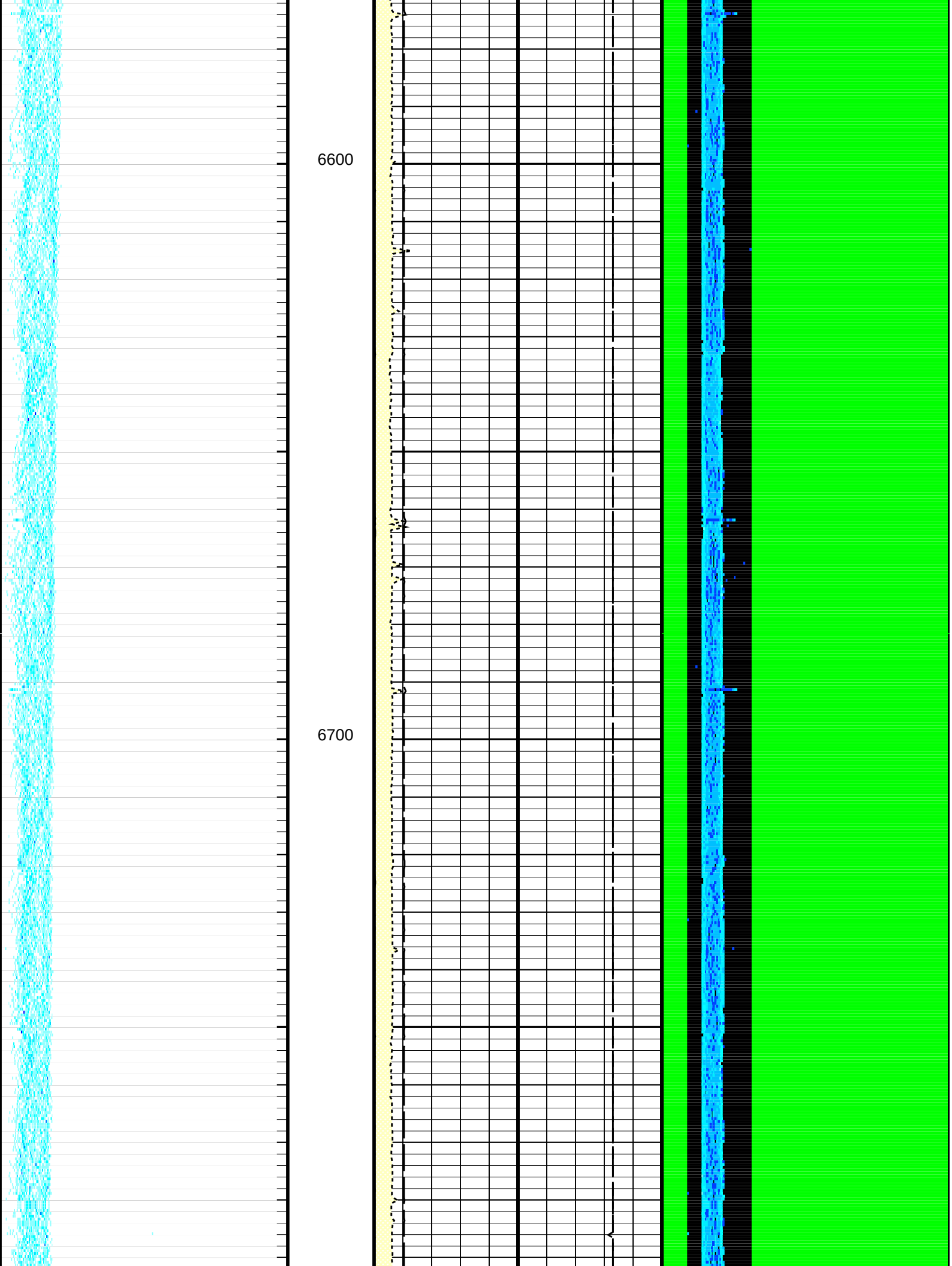
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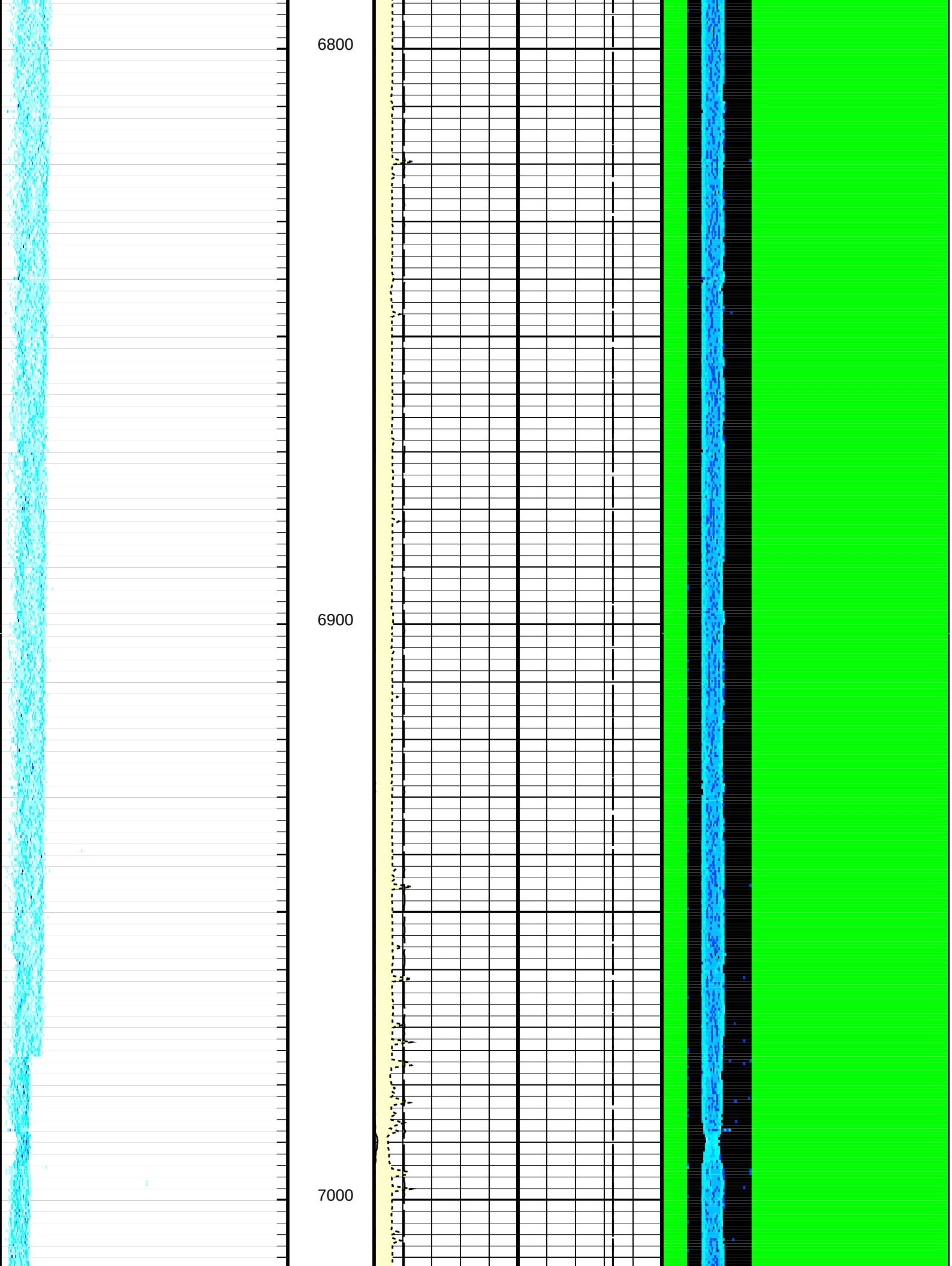
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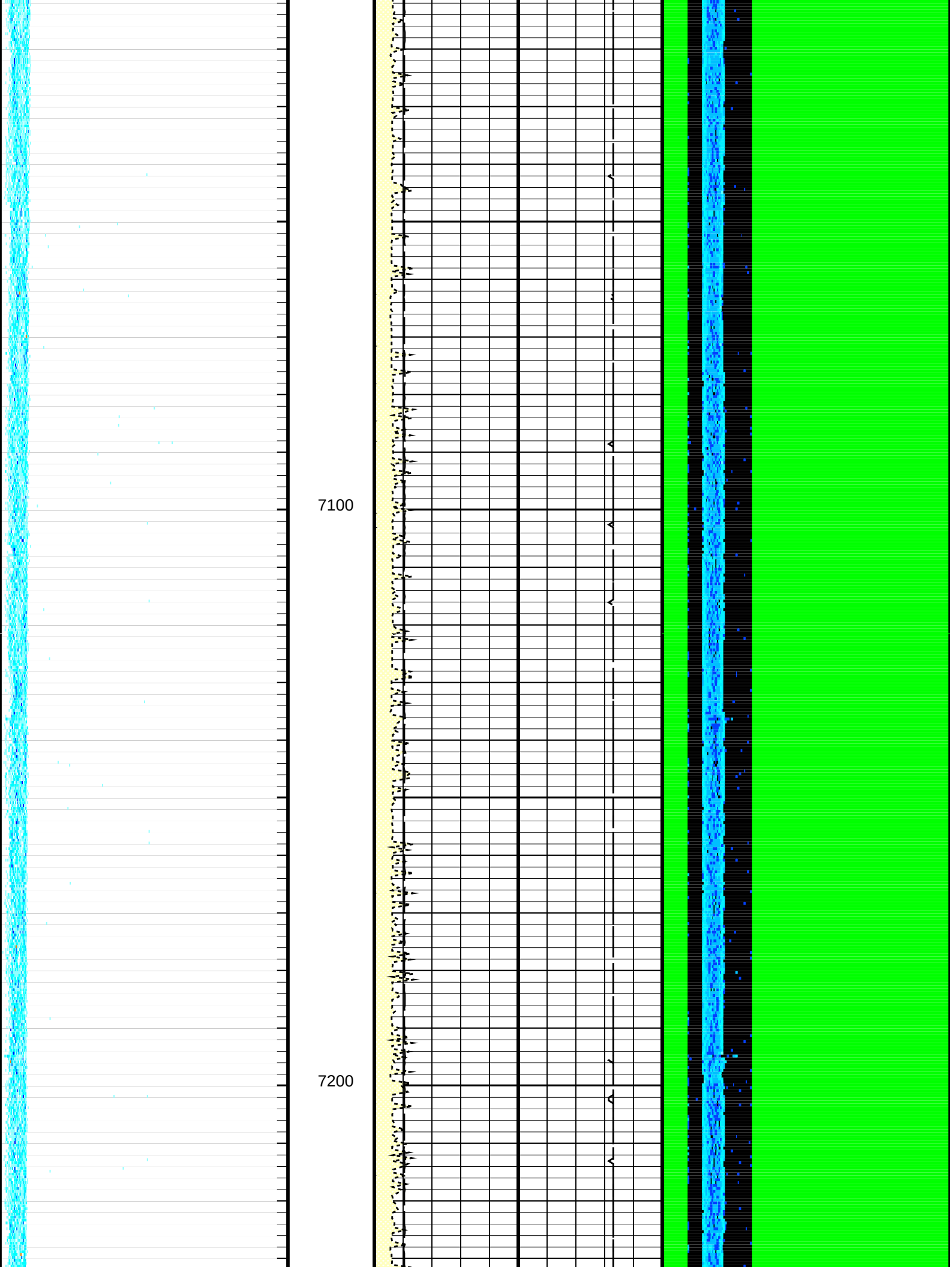
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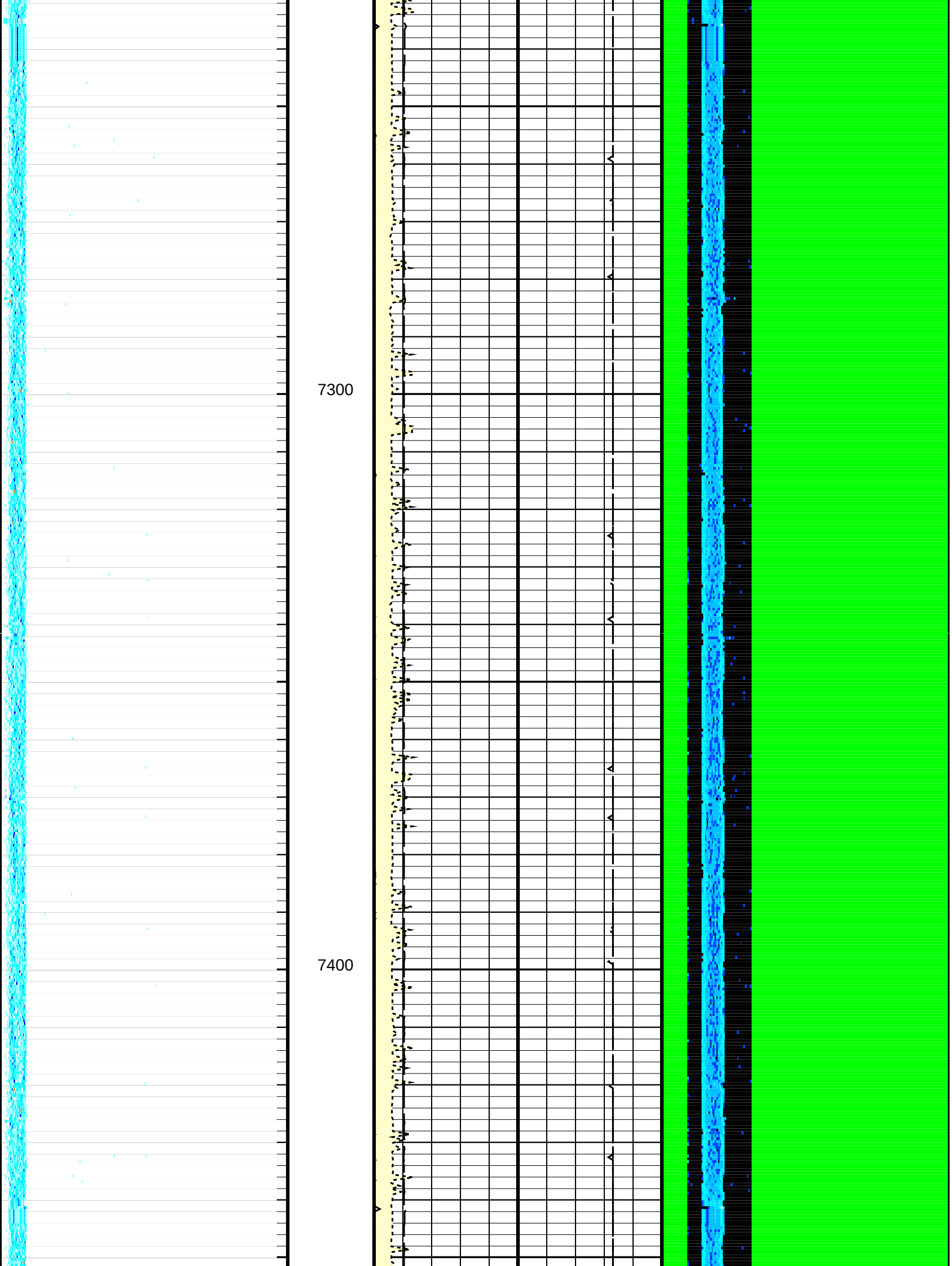
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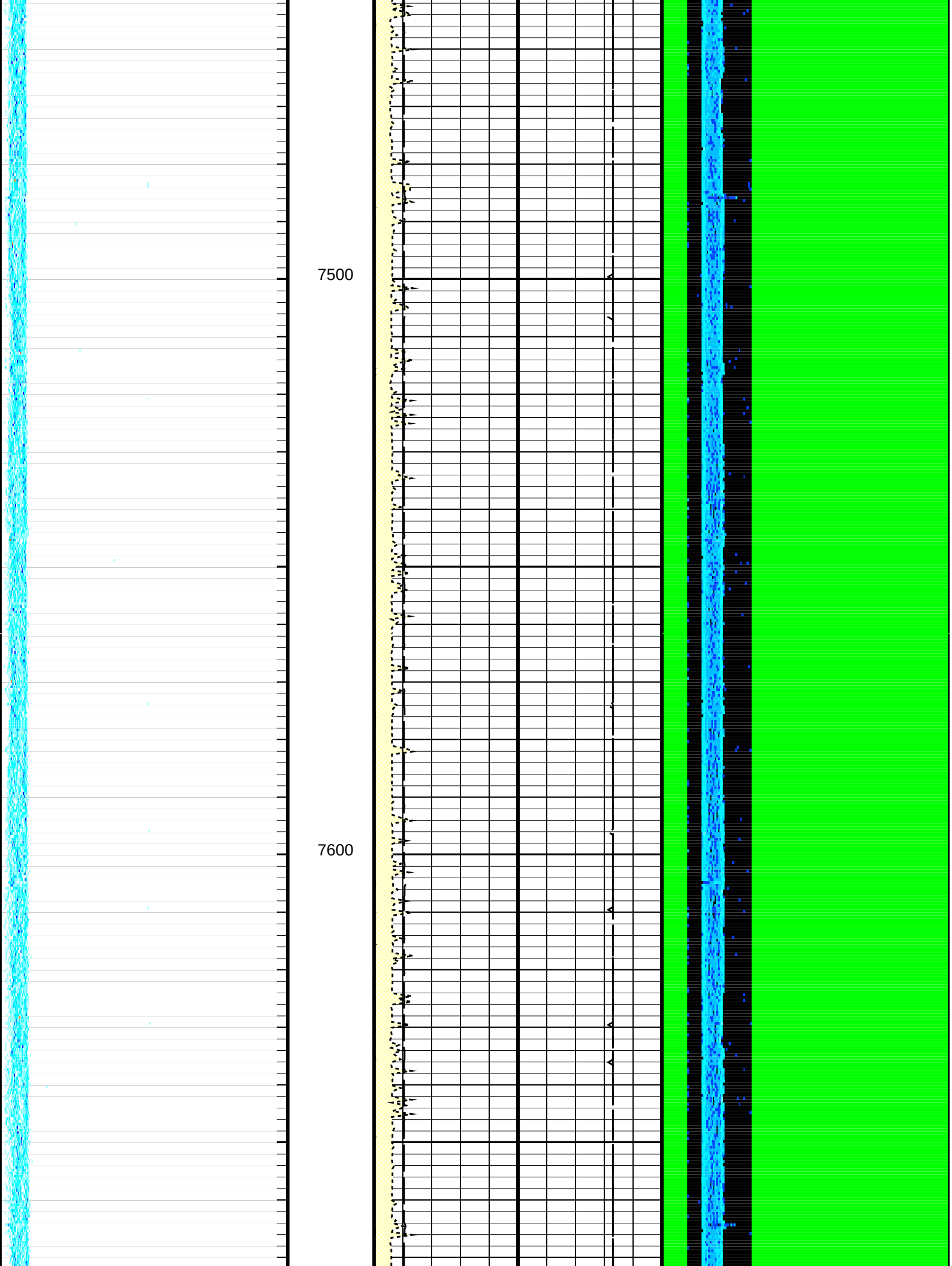
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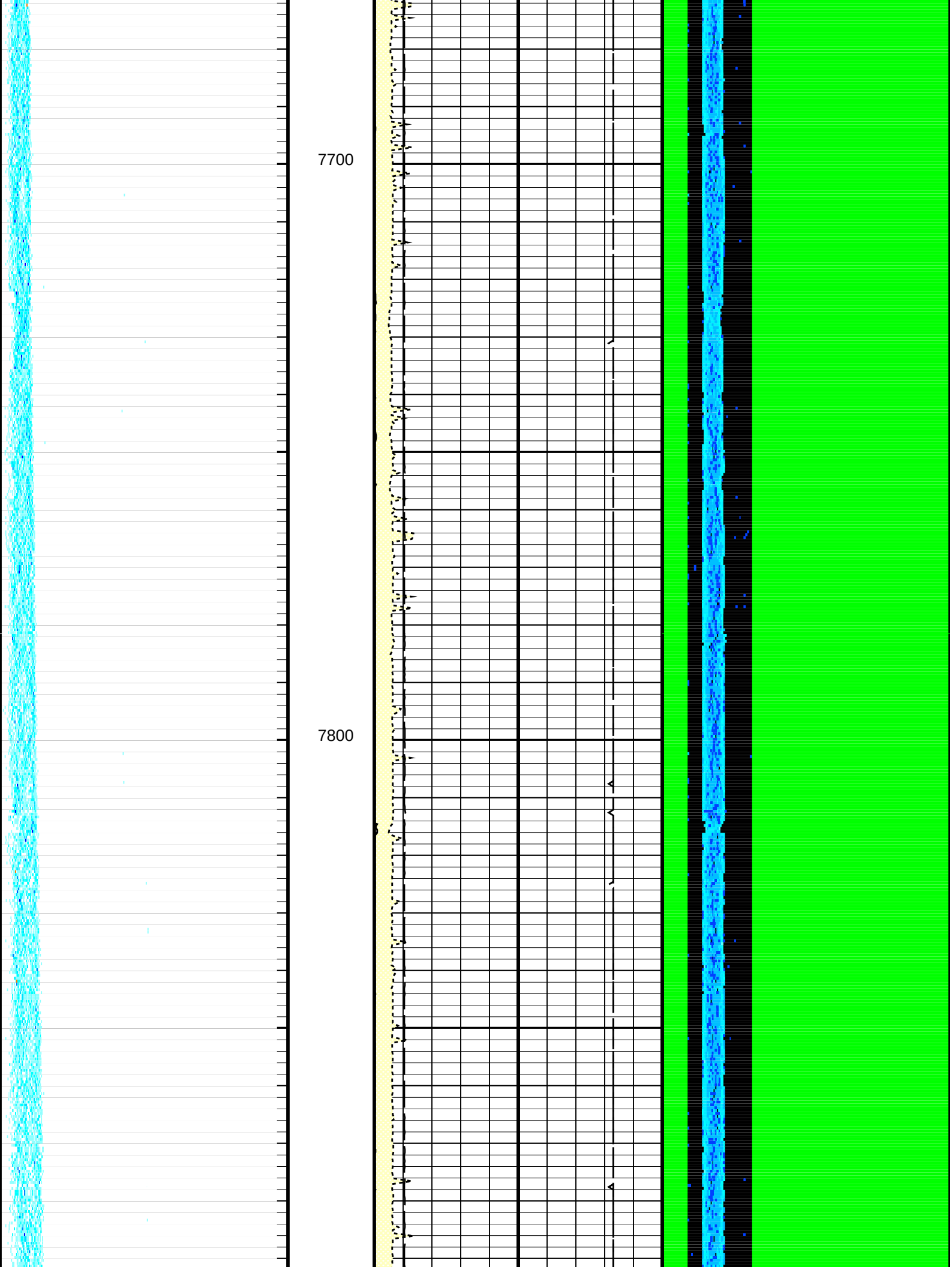
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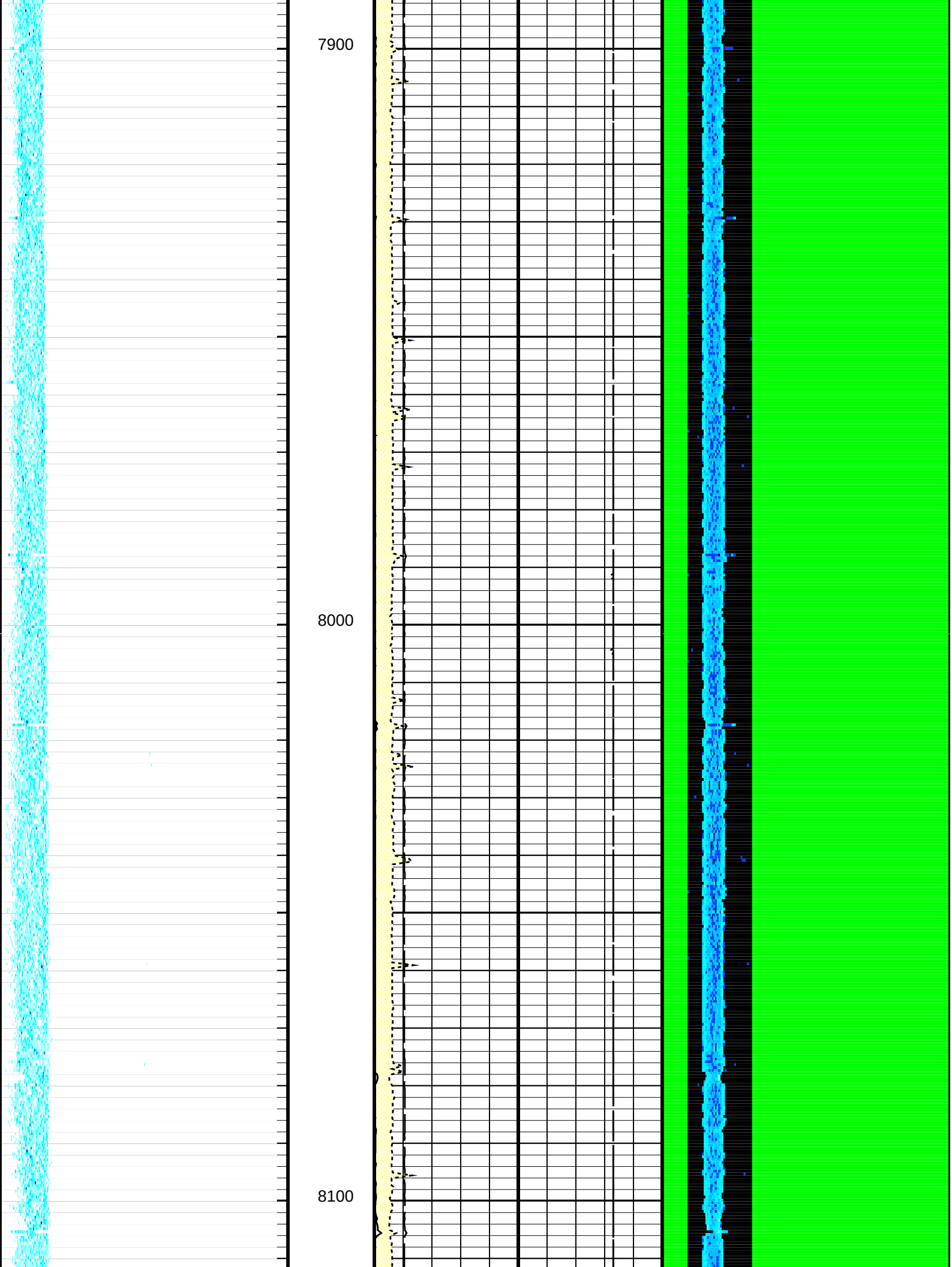
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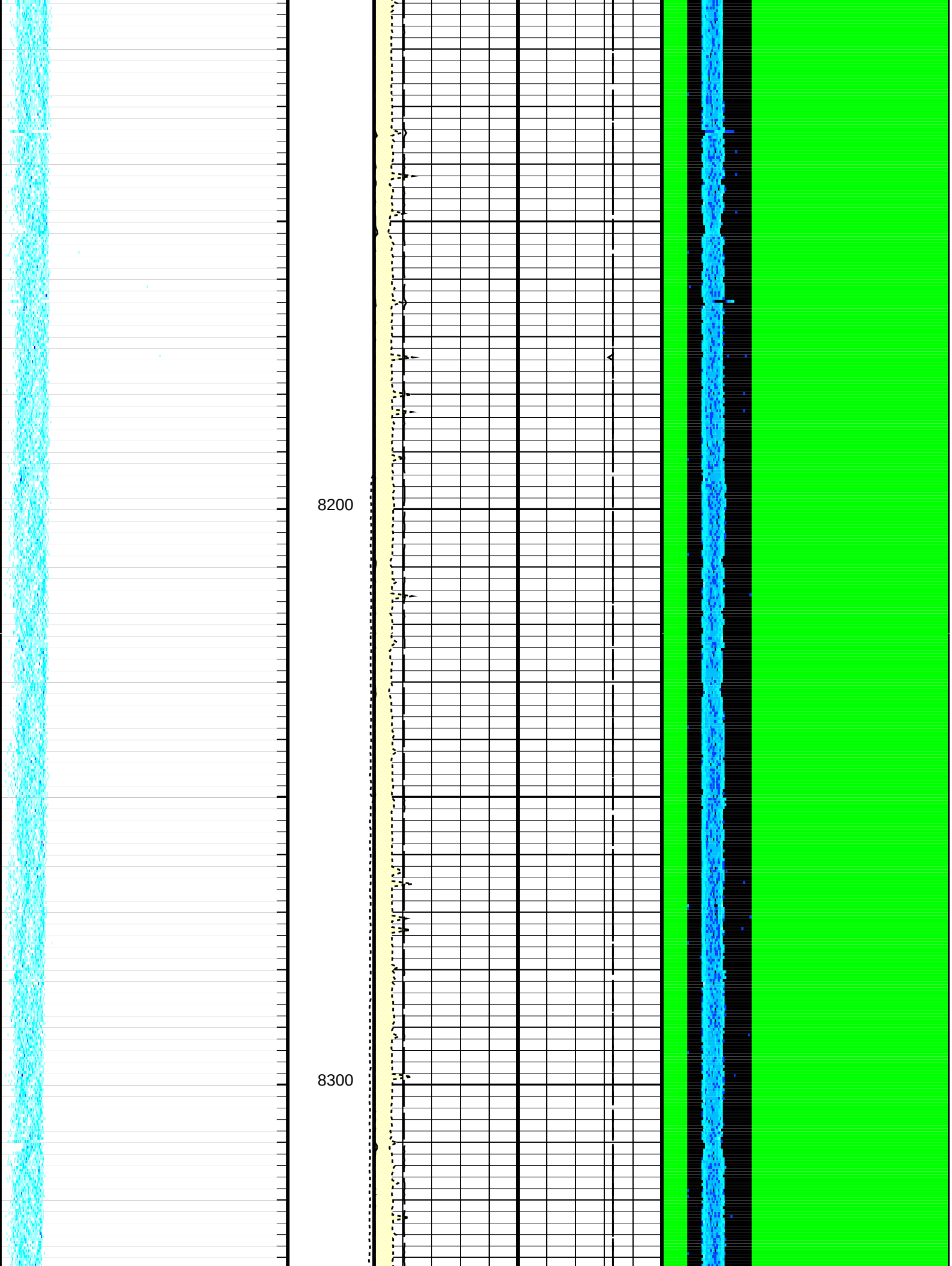
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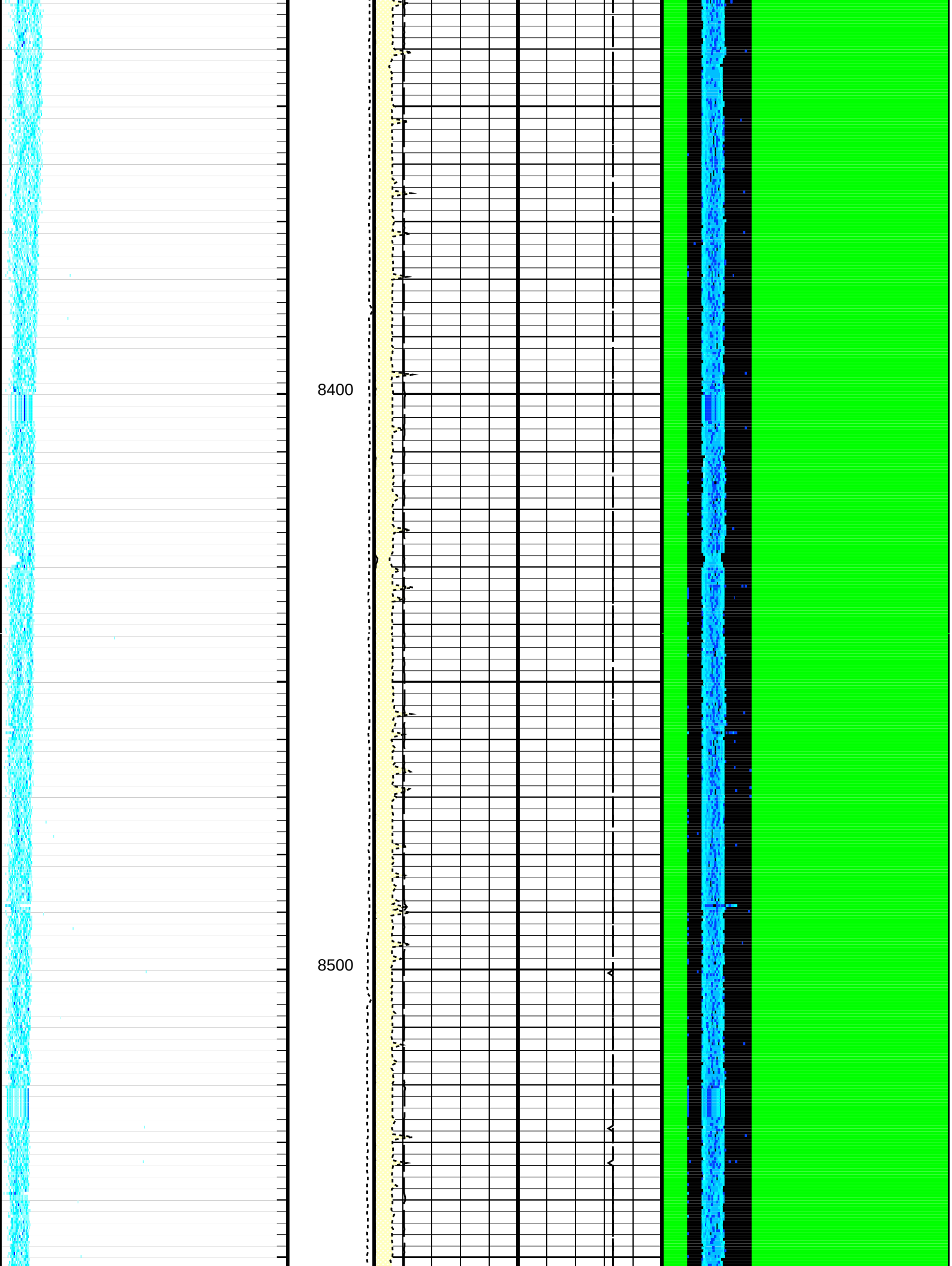
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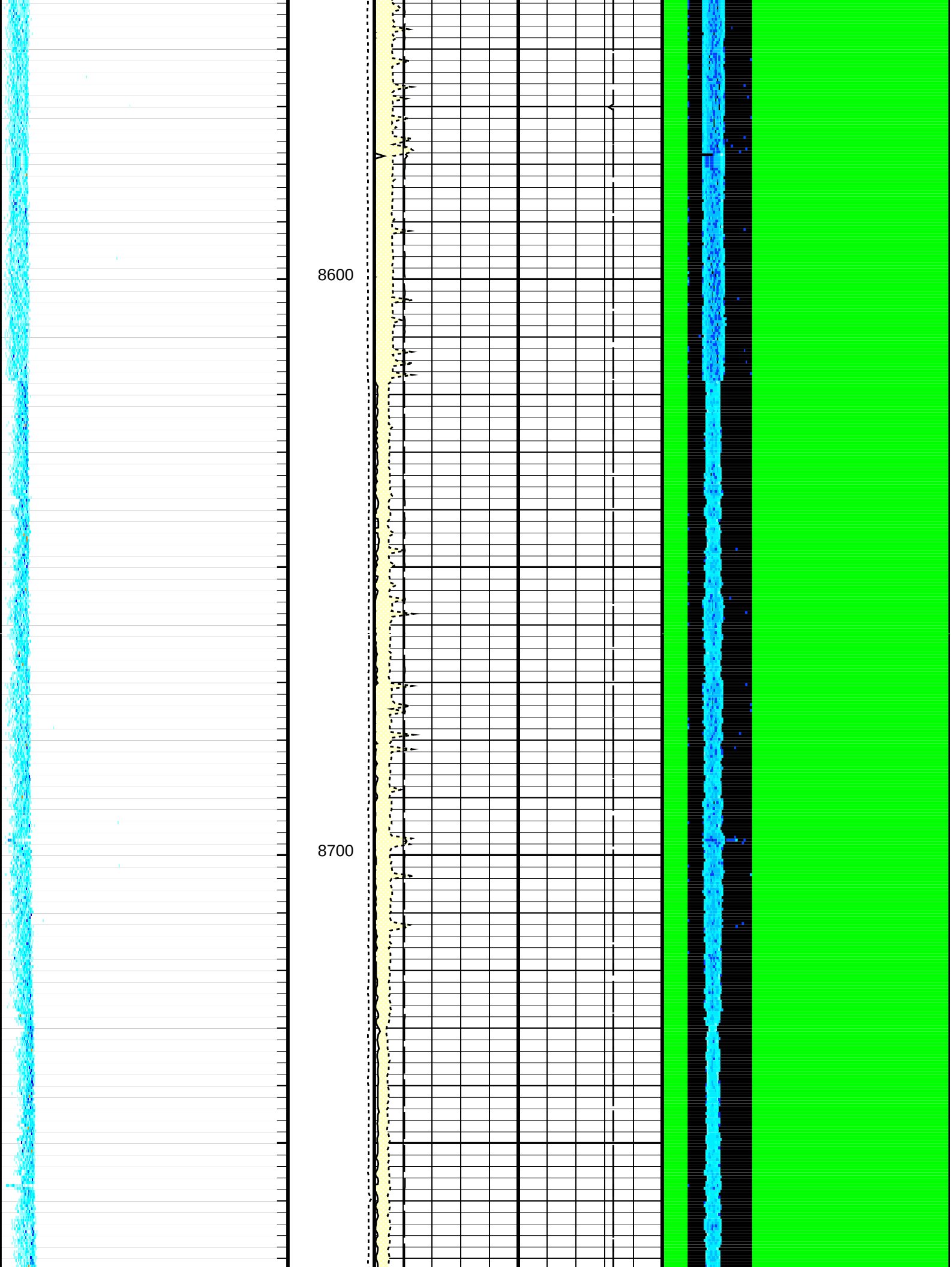
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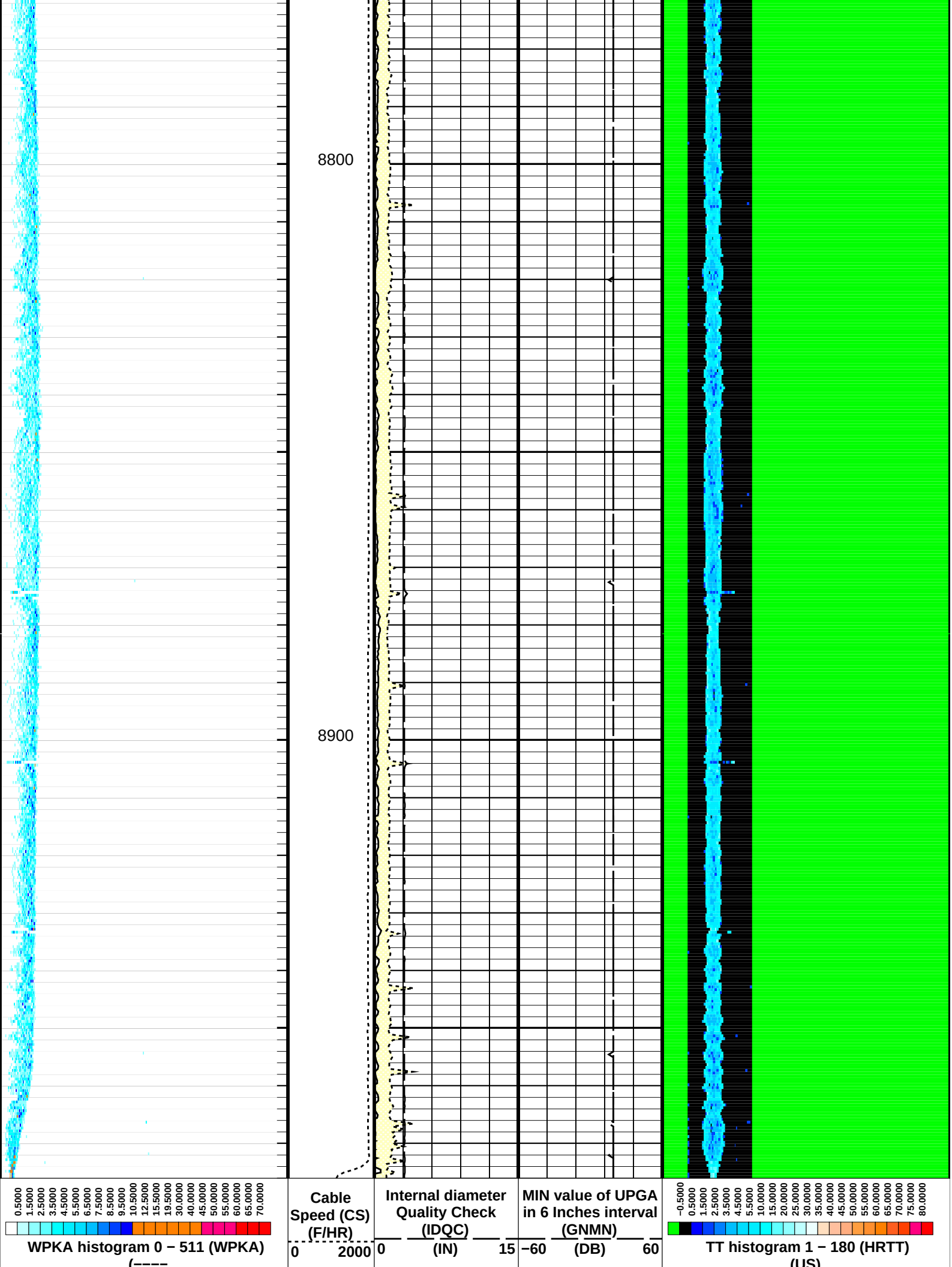
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WPKA histogram 0 − 511 (WPKA)
Cable Speed (CS) (F/HR)
0
2000
Internal diameter Quality Check (IDQC)
0
(IN)
15
MIN value of UPGA in 6 Inches interval (GNMN)
−60
(DB)
60
−0.5000 0.5000 1.5000 2.5000 3.5000 4.5000 5.5000 10.0000 15.0000 20.0000 25.0000 30.0000 35.0000 40.0000 45.0000 50.0000 55.0000 60.0000 65.0000 70.0000 75.0000 80.0000
TT histogram 1 − 180 (HRTT)
(US)

Waveform delay min (WDMN) 20 (US) 120	MAX value of UPGA in 6 Inches interval (GNMX) −60 (DB) 60	
Waveform delay Max (WDMX) 20 (US) 120		
WDMN_WDMX From WDMN to WDMX		

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	4.5	IN
CSDE	Casing Density	486.94	LBCF
CSID	Casing Inner Diameter	3.826	IN
DFVL	Default Fluid Velocity	206	US/F
DOT	Diameter of Transducer Sensor	1.756	IN
EMXV	EMEX Voltage	45	V
FDII	FPM Data Interpolation Interval	0	FT
MW	Mud Weight	8.5	LB/G
RCOD	Reference Calibrator Outer Diameter	4.5	IN
RCSO	Reference Calibrator Standoff	0.8425	IN
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ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
	System and Miscellaneous		
CWEI	Casing Weight	15.10	LB/F
DO	Depth Offset for Playback	7.5	FT
PP	Playback Processing	RECOMPUTE	

Format: USIT_QC Vertical Scale: 5" per 100’ Graphics File Created: 05−Dec−2008 21:53

OP System Version: 15C0−309

MCM

USIT−D	15C0−309	SGT−N	15C0−309
DTC−H	15C0−309	CAL−Y	15C0−309

Input DLIS Files

DEFAULT	Splice_USI_002CUP	FN:1	PRODUCER	05−Dec−2008 20:24	8968.5 FT	4992.0 FT

Output DLIS Files

DEFAULT	USI_006PUP	FN:4	PRODUCER	05−Dec−2008 21:53

Company: **Antero Resources Corp**

Schlumberger

Well: **Valley Farms E9**

Field: **Mamm Creek**

County:	**Garfield**
State:	**Colorado**

Ultrasonic Inspection Tool
GR / CCL