



# RADIAL CEMENT BOND LOG

FILE NO:

API NO:  
05077103870000

COMPANY  
WELL  
FIELD  
COUNTY  
MESA  
STATE  
COLORADO

LARAMIE ENERGY LLC  
NICHOLS 0994-24-11W  
VEGA

Ver. 4.10

LOCATION:

SHL: 2263' FNL & 2786' FWL  
BHL: 2593' FNL & 1537' FWL  
SEC 24 TWP 9S RGE 94W

OTHER SERVICES  
RPM

PERMANENT DATUM  
LOG MEASURED FROM  
DRILL. MEAS. FROM  
GL ELEVATION 7212 FT  
KB 24 FT ABOVE P.D.  
KB  
GL

ELEVATIONS:  
KB 7236 FT  
DF  
GL 7212 FT

DATE	24-Apr-2018
RUN	1
SERVICE ORDER	US136248
DEPTH DRILLER	7426 FT
DEPTH LOGGER	7414 FT
BOTTOM LOGGED INTERVAL	7414 FT
TOP LOGGED INTERVAL	24 FT
TIME STARTED	9:00
TIME FINISHED	12:00
OPERATOR RIG TIME	3 HOURS
TYPE OF FLUID IN HOLE	WATER
FLUID DENSITY	NA
FLUID SALINITY	NA
FLUID LEVEL	45 FT
LOGGED CEMENT TOP	2200 FT
WELLHEAD PRESSURE	0 PSI
MAXIMUM HOLE DEVIATION	NA
NOMINAL LOGGING SPEED	100 F/MIN
MAX. RECORDED TEMP.	224 DEGF
REFERENCE LOG	NA
REFERENCE LOG DATE	NA
EQUIP. NO.	ML-4291
LOCATION	GRAND JCT.
RECORDED BY	T. NEWELL
WITNESSED BY	NA

IN MAKING INTERPRETATIONS OF LOGS OUR EMPLOYEES WILL GIVE THE CUSTOMER THE BENEFIT OF THEIR BEST JUDGEMENT. BUT SINCE ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS, WE CANNOT, AND WE DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION. WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COST, DAMAGES, OR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

## REMARKS

RUN 1 TRIP 1: \*2 OPERATIONS IN WELLBORE\*

\*\*OPERATION 1: RAL/GR/CCL RUN CENTRALIZED\*\*

LOGGED WITH 0 PSI ON WELLHEAD

SJ: 5611' - 5631'  
SJ: 6512' - 6532'

## EQUIPMENT DATA

RUN	TRIP	TOOL	SERIES NO.	SERIAL NO.	POSITION
1	1	RAL	1426XA	11871500	CENTRALIZED
1	1	GR/CCL	1355XA	11871507	CENTRALIZED



# MAIN PASS 0 PSI

ECLIPS 7.0i ECLIPS General Release Rel 7.0i Thu Jun 08 20:36:10 CDT 2017

Patches: 3

Plotted: Tue Apr 24 14:20:45 2018

## PARAMETER AND FILTER SUMMARY REPORT

FILE: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_11W/p012g02.prm  
 LOGGING MODE: DEPTH DIRECTION: UP  
 TOP DEPTH: 21.250 ft BOTTOM DEPTH: 7424.250 ft

### SYMMETRIC FILTER

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
GR	FILTER ()	medium (1)		TOP	BOTTOM
AMPLITUDE	FILTER ()	medium (1)		"	"
TRAVEL TIME	FILTER ()	medium (1)		"	"

### RAL CCL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
CCL FLOOR	CCL FLOOR	0.00		TOP	BOTTOM

### ANALOG RAL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
AMPLITUDE WINDOW (NEAR)	AMP WINDOW START (fgp1*)	188	us	TOP	BOTTOM
	AMP WINDOW START (fgp2*)	188	us	"	"
	AMP WINDOW START (fgp3*)	188	us	"	"
	AMP WINDOW START (fgp4*)	188	us	"	"
	AMP WINDOW START (fgp5*)	188	us	"	"
	AMP WINDOW START (fgp6*)	188	us	"	"
	AMP WINDOW START (fgp7*)	188	us	"	"
	AMP WINDOW START (fgp8*)	188	us	"	"
	AMP WINDOW START (fgpn*)	188	us	"	"
	AMP WINDOW LENGTH	25	us	"	"
TRAVEL TIME WINDOW (NEAR)	TT WINDOW START (ttn*)	198	us	"	"
	TT WINDOW LENGTH	500	us	"	"
	FIRST BRK THRESHOLD (ttn*)	5	mV	"	"
RAL CASING PARAMETERS	PPT NEAR	200.391	us	"	"
RAL TOOL DELAY	TOOL DELAY (str1*)	-67	us	"	"
	TOOL DELAY (str2*)	-67	us	"	"
	TOOL DELAY (str3*)	-67	us	"	"
	TOOL DELAY (str4*)	-67	us	"	"
	TOOL DELAY (str5*)	-67	us	"	"
	TOOL DELAY (str6*)	-67	us	"	"
	TOOL DELAY (str7*)	-67	us	"	"
	TOOL DELAY (str8*)	-67	us	"	"
	TOOL DELAY (strn*)	-67	us	"	"
BASELINE NOISE (NEAR)	NOISE WINDOW START	125	us	"	"
	NOISE WINDOW LENGTH	25	us	"	"

### PERCENT BOND CEMENT MAP

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
RAL FREE PIPE AMPLITUDE	FREE AMP REC 1	80	mV	TOP	BOTTOM
	FREE AMP REC 2	80	mV	"	"
	FREE AMP REC 3	80	mV	"	"
	FREE AMP REC 4	80	mV	"	"
	FREE AMP REC 5	80	mV	"	"
	FREE AMP REC 6	80	mV	"	"
	FREE AMP REC 7	80	mV	"	"
	FREE AMP REC 8	80	mV	"	"
RAL FULL BOND AMPLITUDE	FULL BOND AMP REC 1	3	mV	"	"
	FULL BOND AMP REC 2	3	mV	"	"
	FULL BOND AMP REC 3	3	mV	"	"
	FULL BOND AMP REC 4	3	mV	"	"



FULL BOND AMP REC 5	3	mV	"	"
FULL BOND AMP REC 6	3	mV	"	"
FULL BOND AMP REC 7	3	mV	"	"
FULL BOND AMP REC 8	3	mV	"	"

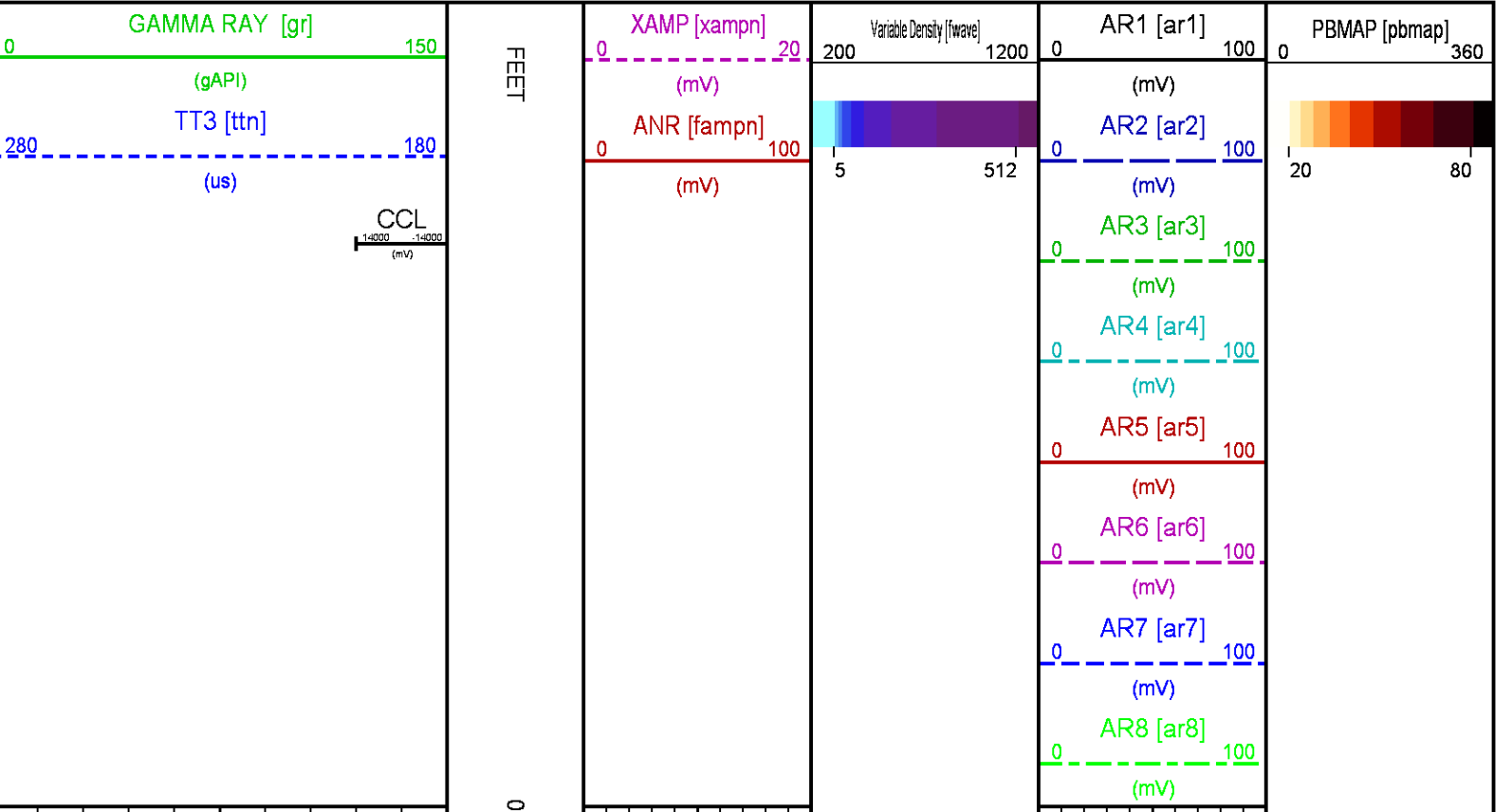
CURVE DESCRIPTION REPORT

CURVE NAME	CREATION DATE	CURVE DESCRIPTION
F1:AR1	N/A	FIXED GATE AMPLITUDE T-R1
F1:AR2	N/A	FIXED GATE AMPLITUDE T-R2
F1:AR3	N/A	FIXED GATE AMPLITUDE T-R3
F1:AR4	N/A	FIXED GATE AMPLITUDE T-R4
F1:AR5	N/A	FIXED GATE AMPLITUDE T-R5
F1:AR6	N/A	FIXED GATE AMPLITUDE T-R6
F1:AR7	N/A	FIXED GATE AMPLITUDE T-R7
F1:AR8	N/A	FIXED GATE AMPLITUDE T-R8
F1:CCL	N/A	CASING COLLAR LOCATOR
F1:FAMPN	N/A	FIXED GATE AMPLITUDE NEAR RECEIVER
F1:FWAVE	N/A	FAR WAVE FORM
F1:GR	N/A	GAMMA RAY
F1:PBMAP	N/A	PERCENT BOND CEMENT MAP
F1:TTN	N/A	TRAVELTIME FROM NEAR TRANSMITTER-RECEIVER
F1:XAMPN	N/A	FIXED GATE AMPLITUDE NEAR RECEIVER TIMES FIVE

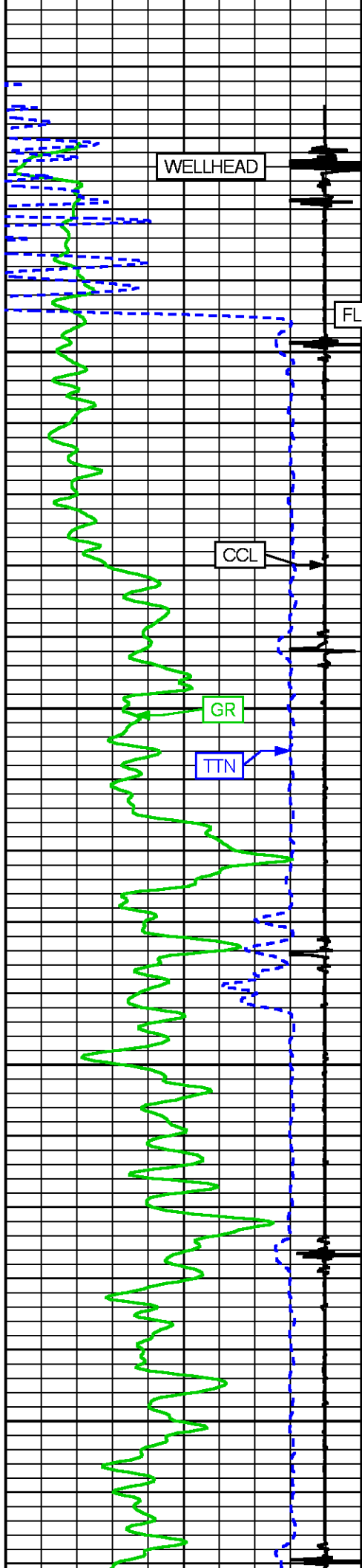
CURVE MEASURE POINT OFFSET

CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)
AR1	-11.25	AR5	-11.25	CCL	-5.75	XAMPN	-11.25
AR2	-11.25	AR6	-11.25	FAMPN	-11.25		
AR3	-11.25	AR7	-11.25	GR	-1.75		
AR4	-11.25	AR8	-11.25	TTN	-11.25		

Presentation	: SysA:/dat1a/LARAMIE_NICHOLS_0994_24_11W/11W_RAL_MIAN.fvpdf [5"/100' Scale]
Plot Interval	: 0 - 7423.25 Feet
Data File 1	: F1 : SysA:/dat1a/LARAMIE_NICHOLS_0994_24_11W/11W_RAL_MAIN.xtf
Created On	: N/A
Company	: LARAMIE ENERGY LLC
Well	: NICHOLS 0994-24-11W
Field	: VEGA
File Interval	: 10 - 7424.5 Feet
OCT	: p012g

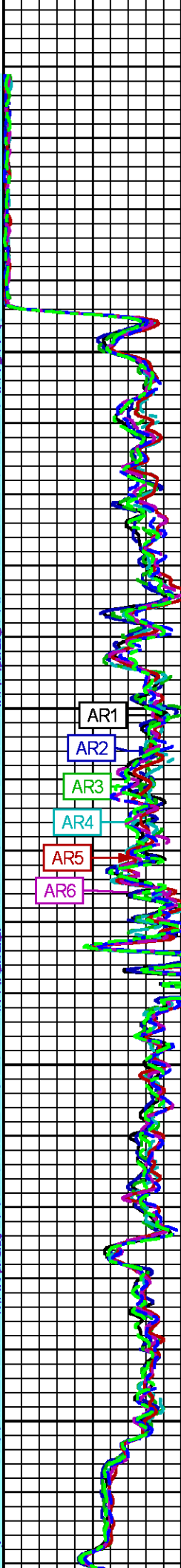
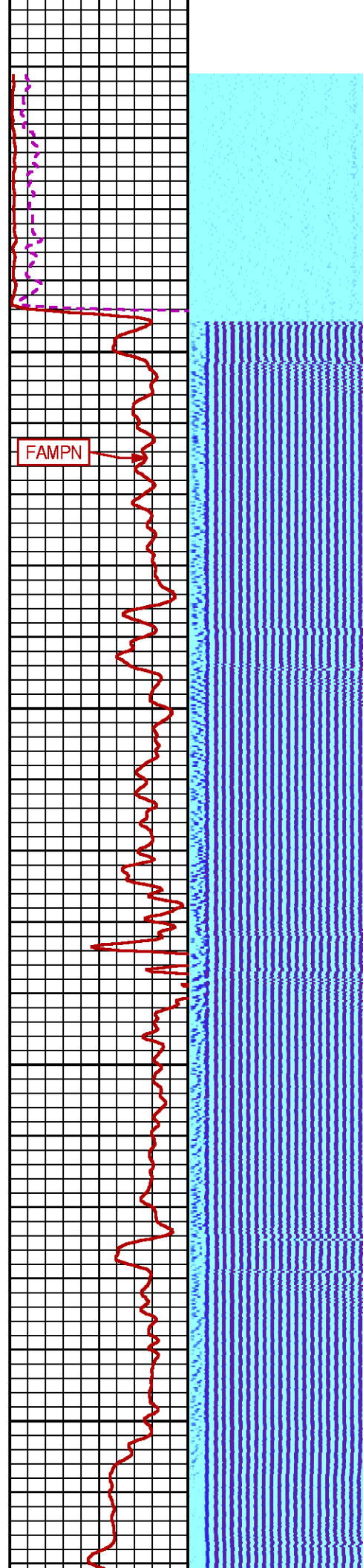




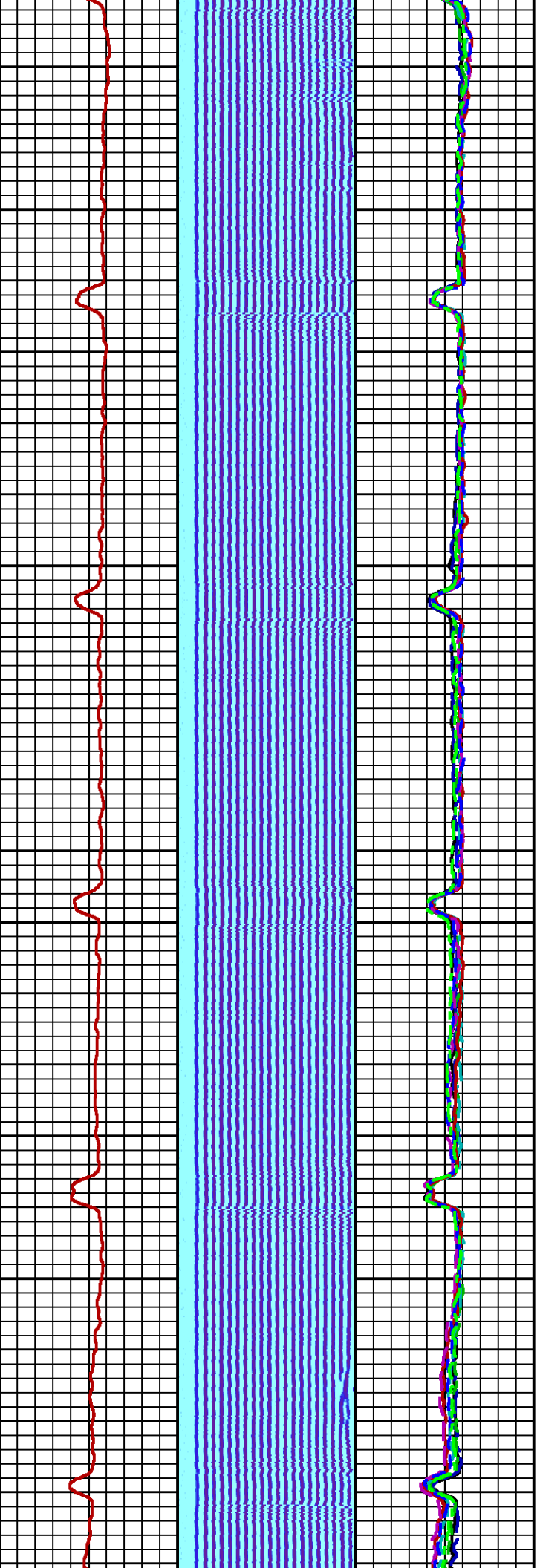


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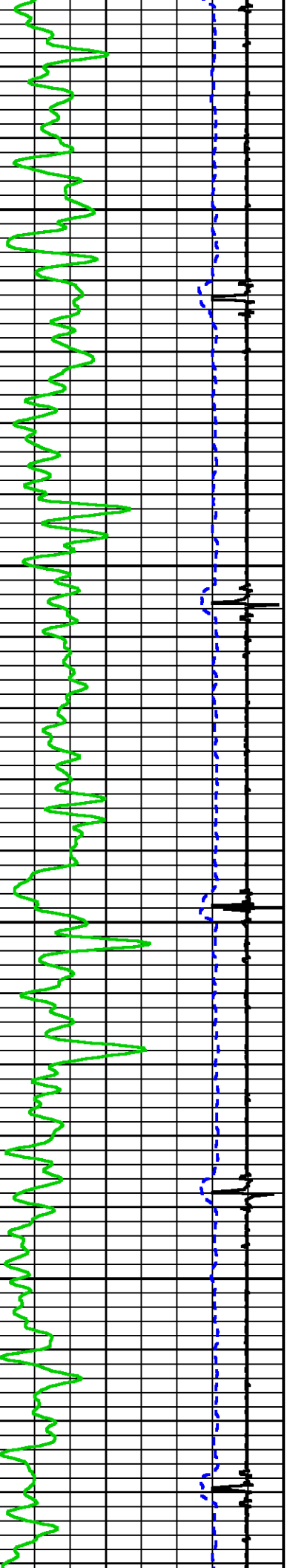




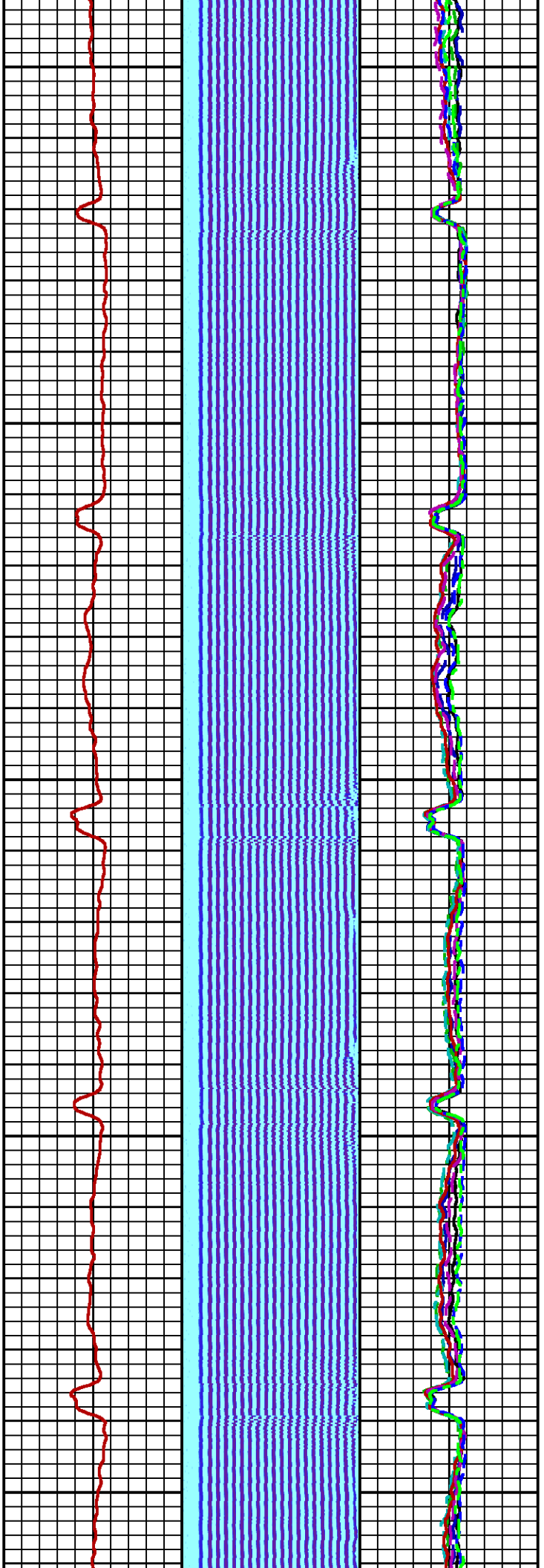


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400

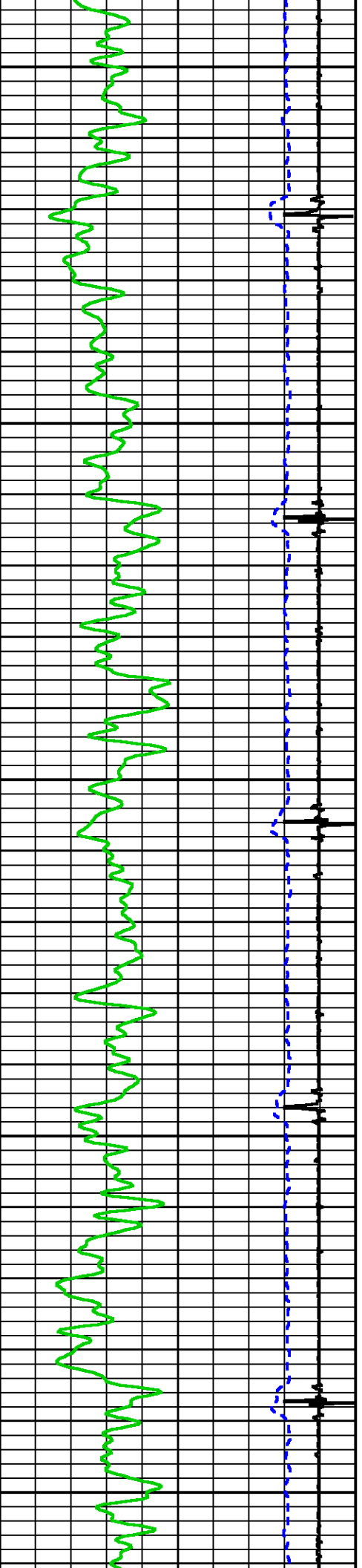




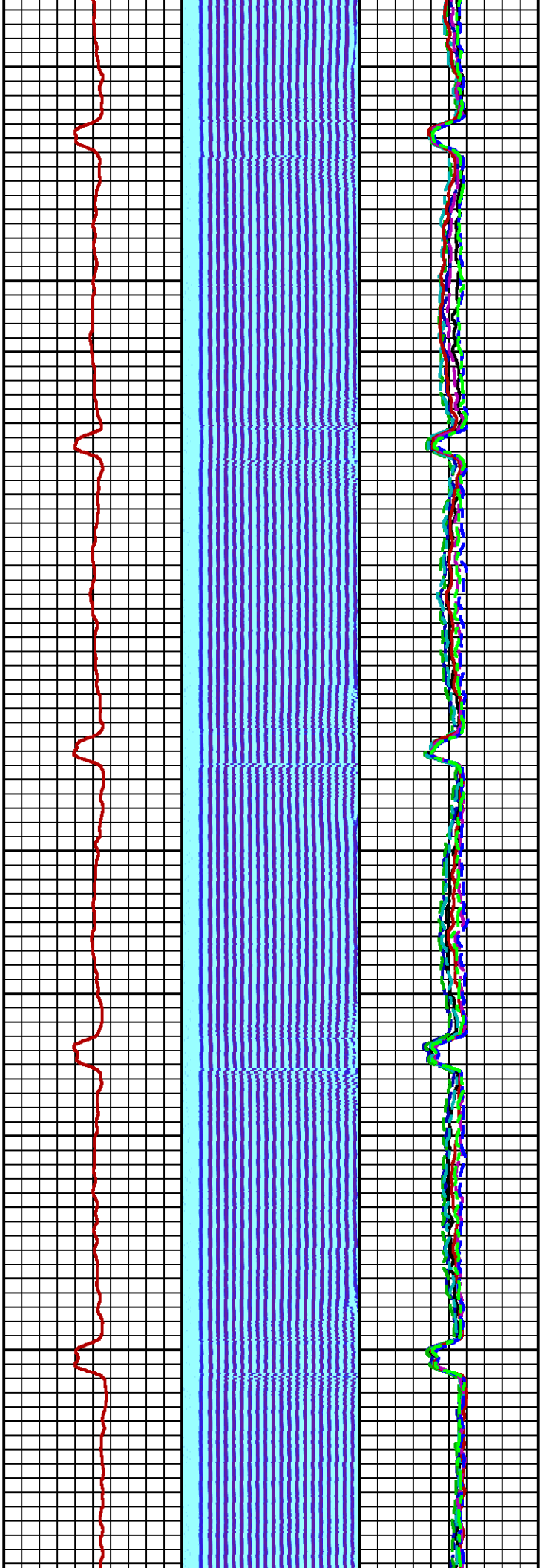


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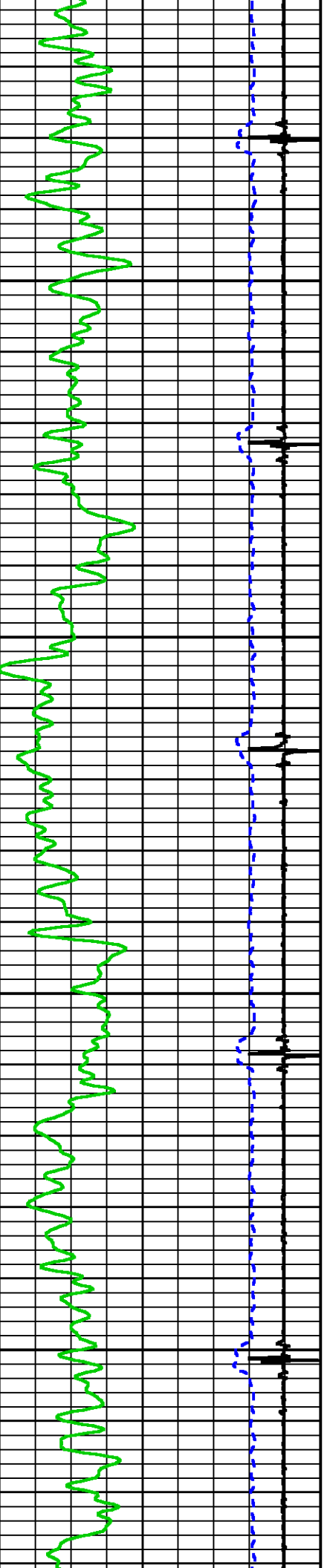




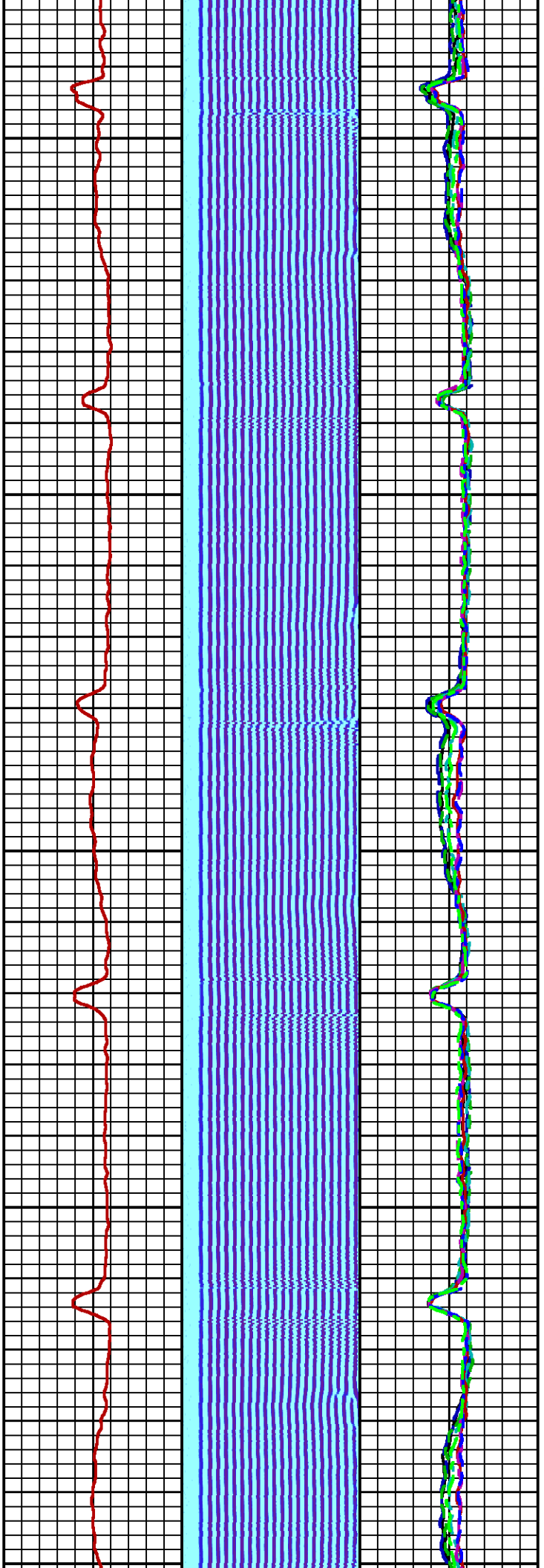


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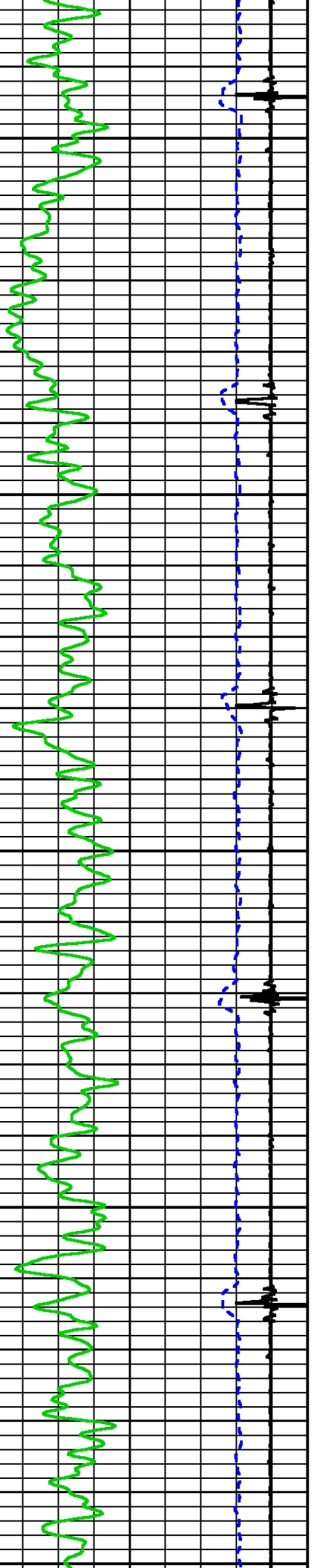




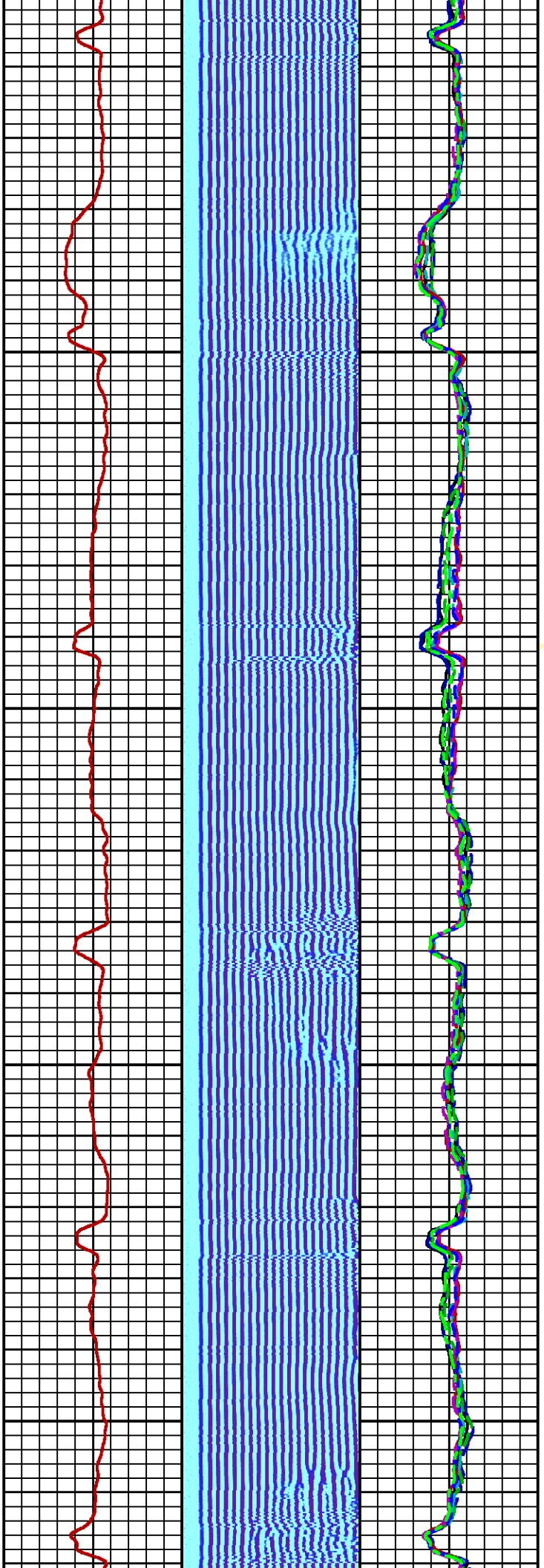
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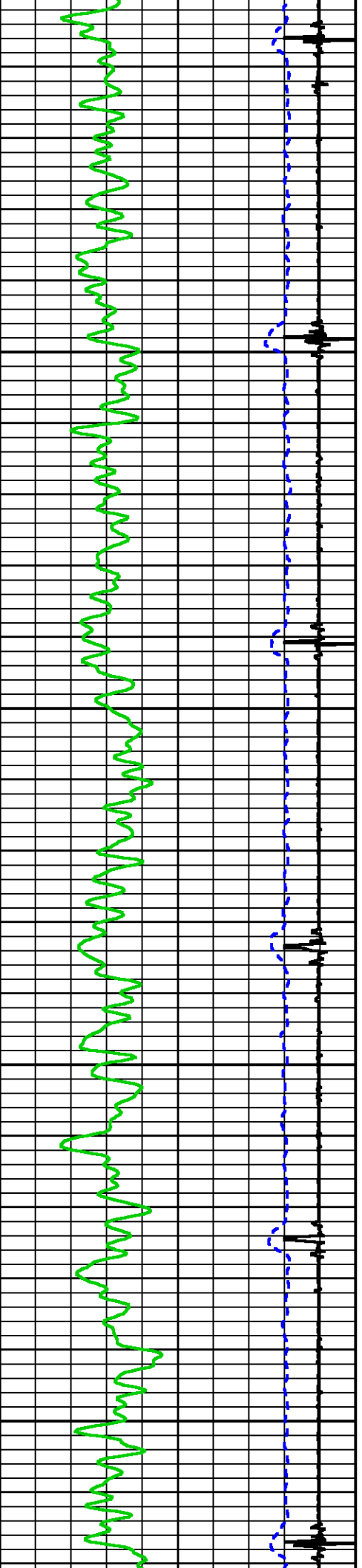




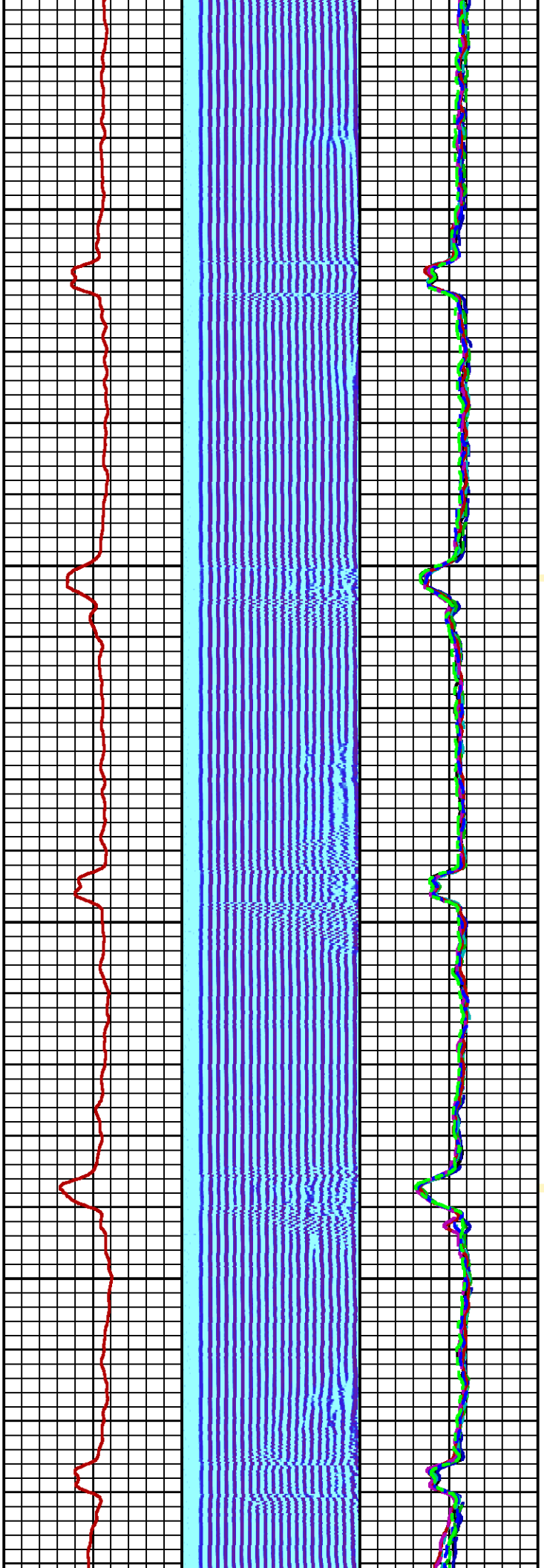
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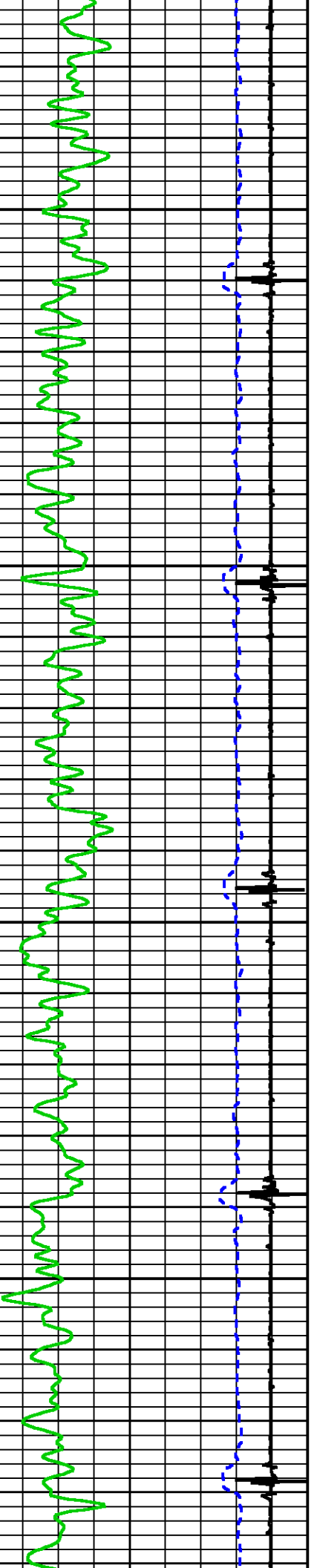




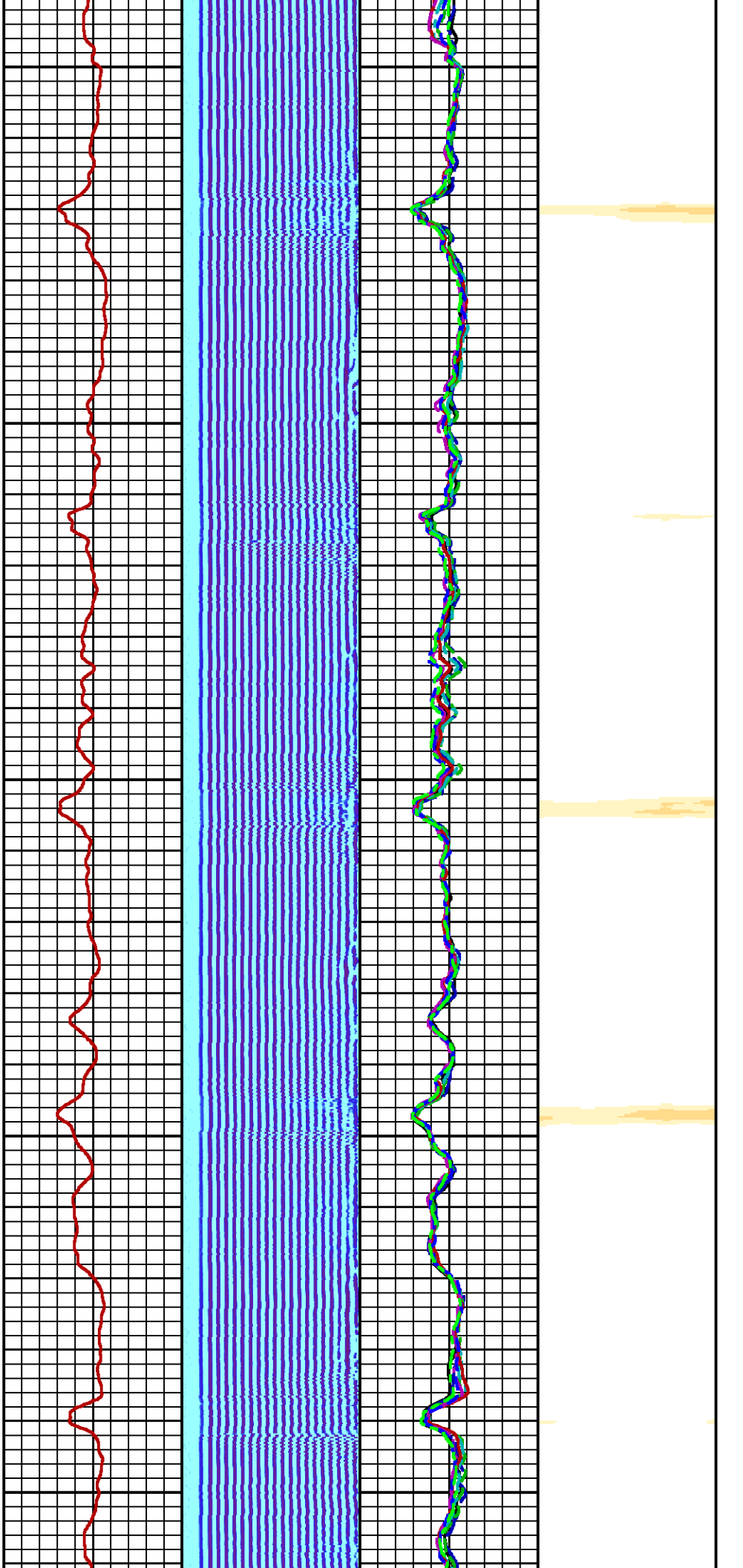


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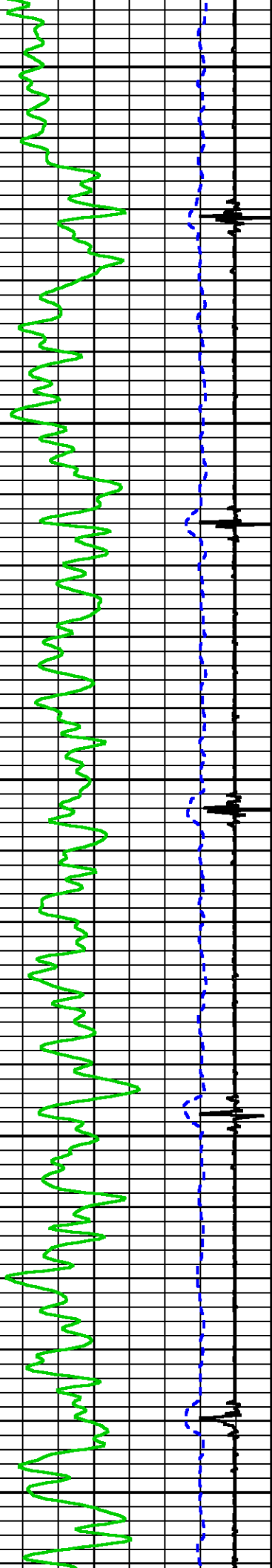




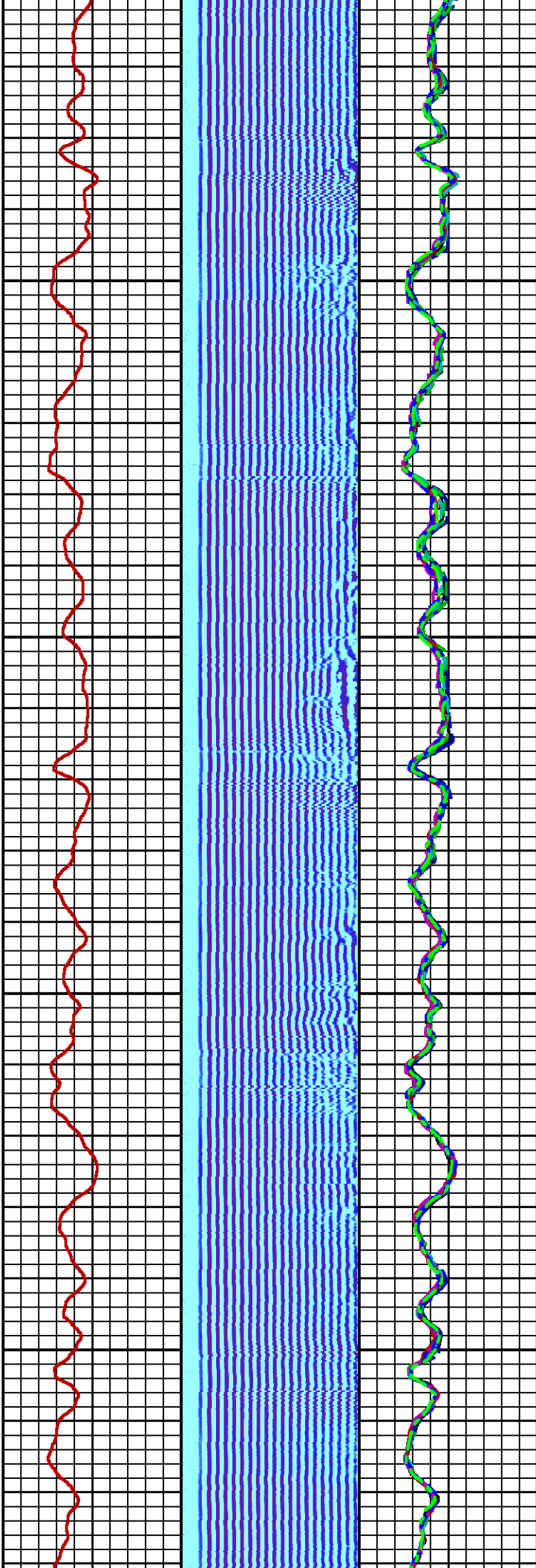


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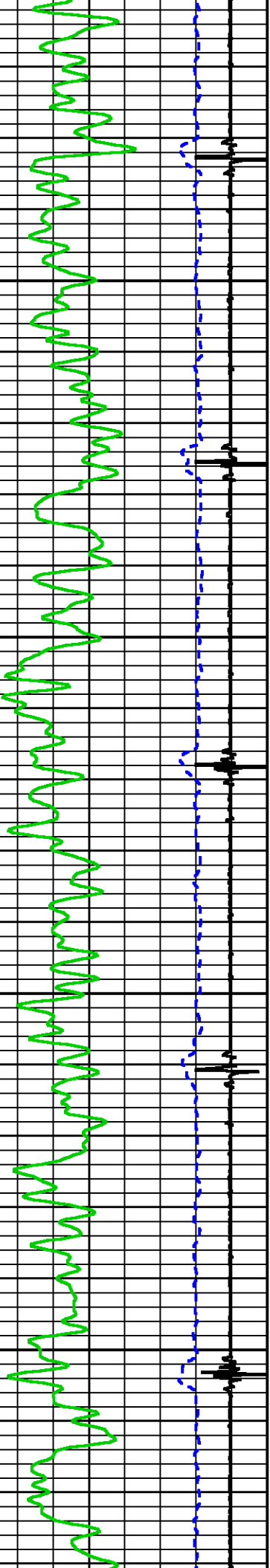




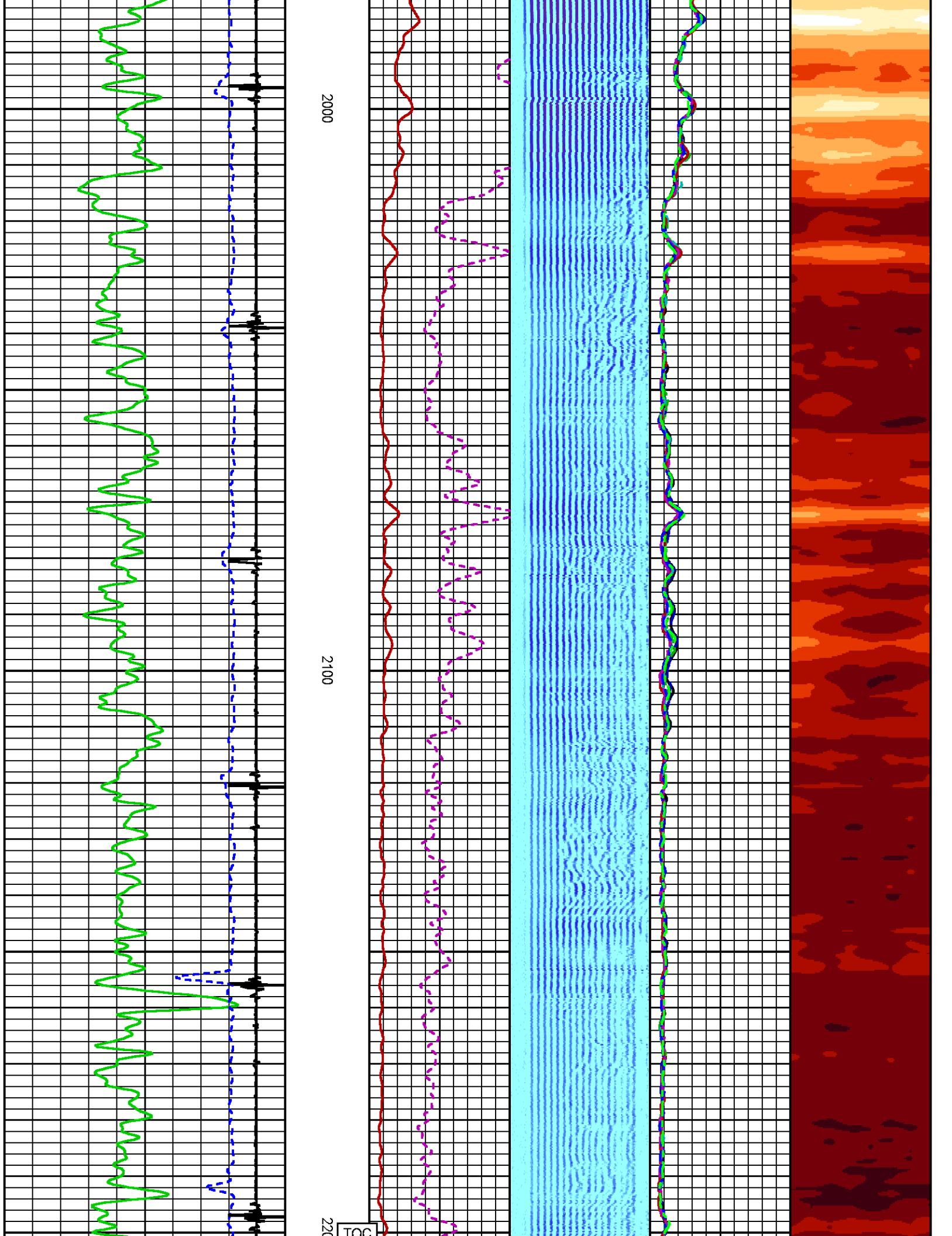


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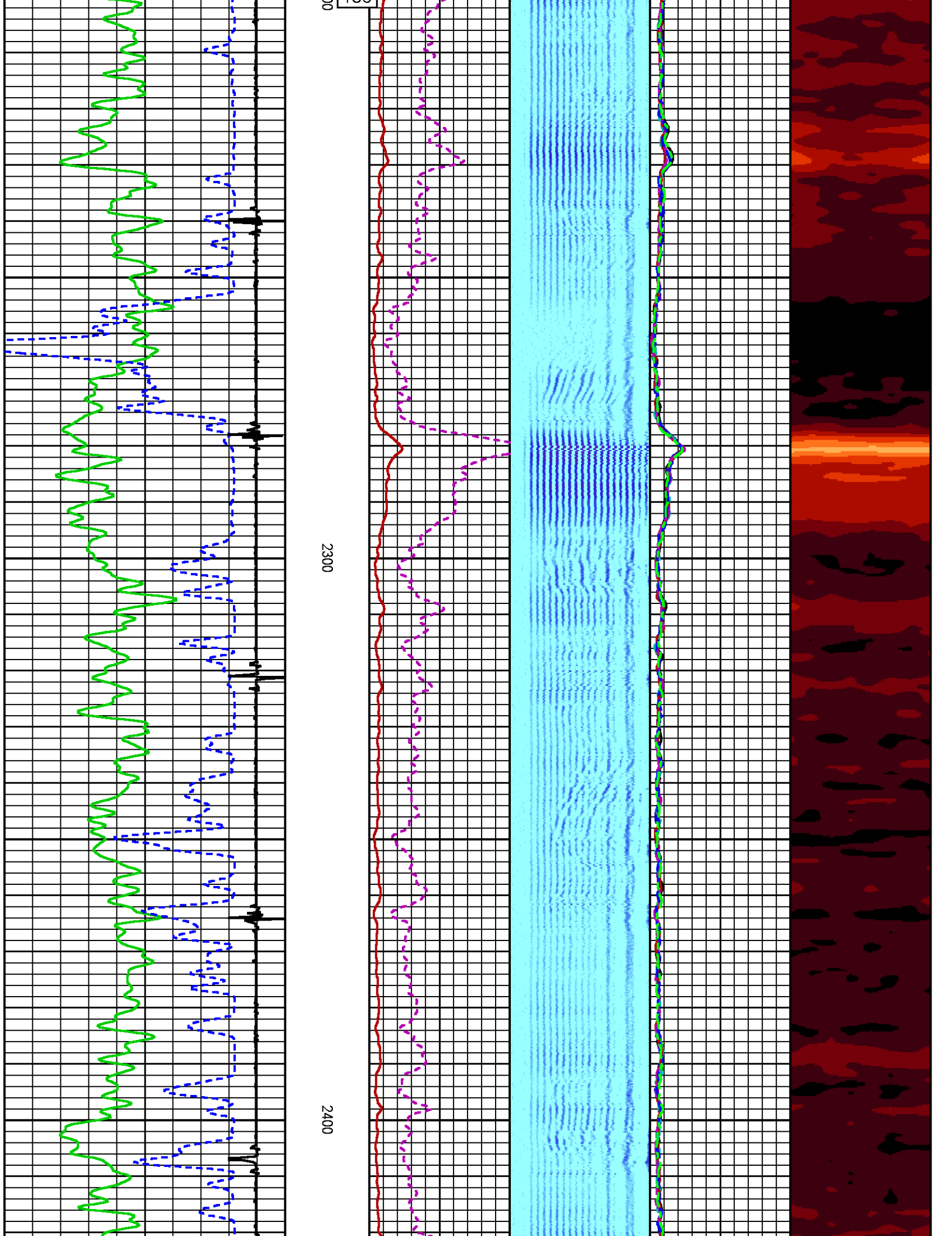
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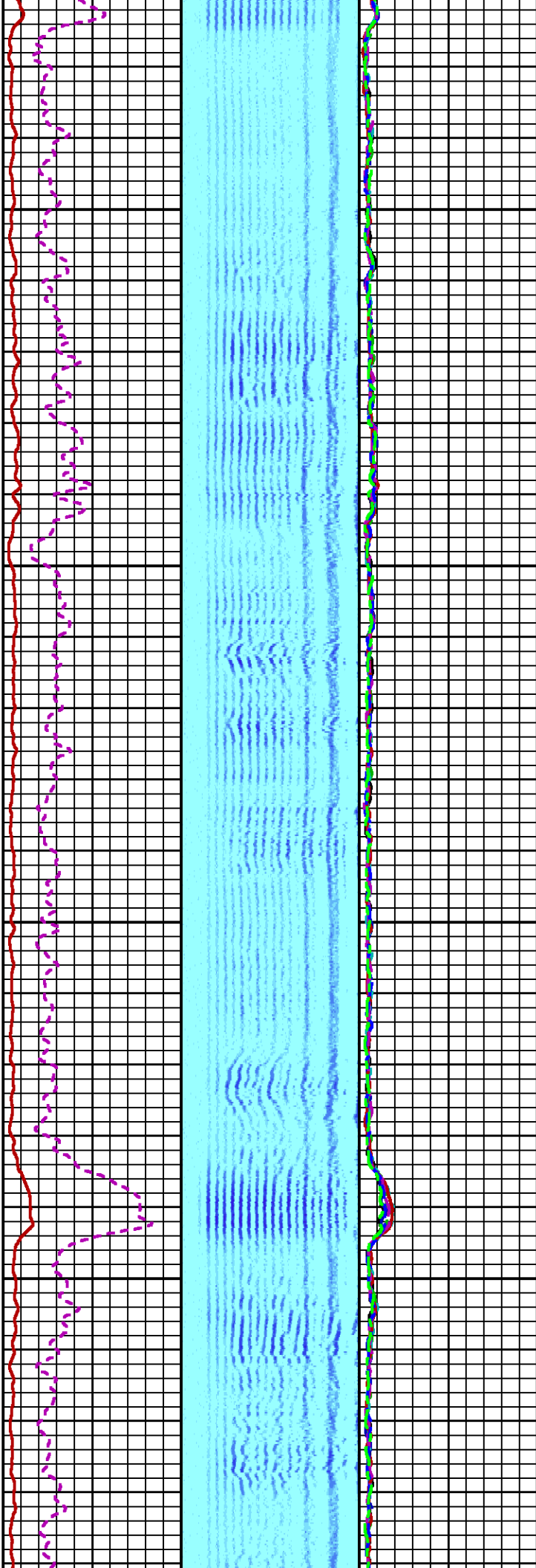






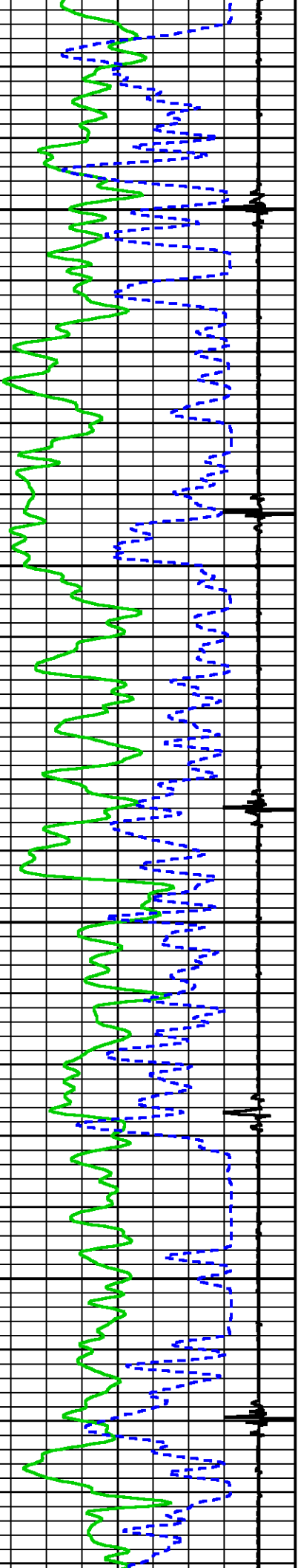




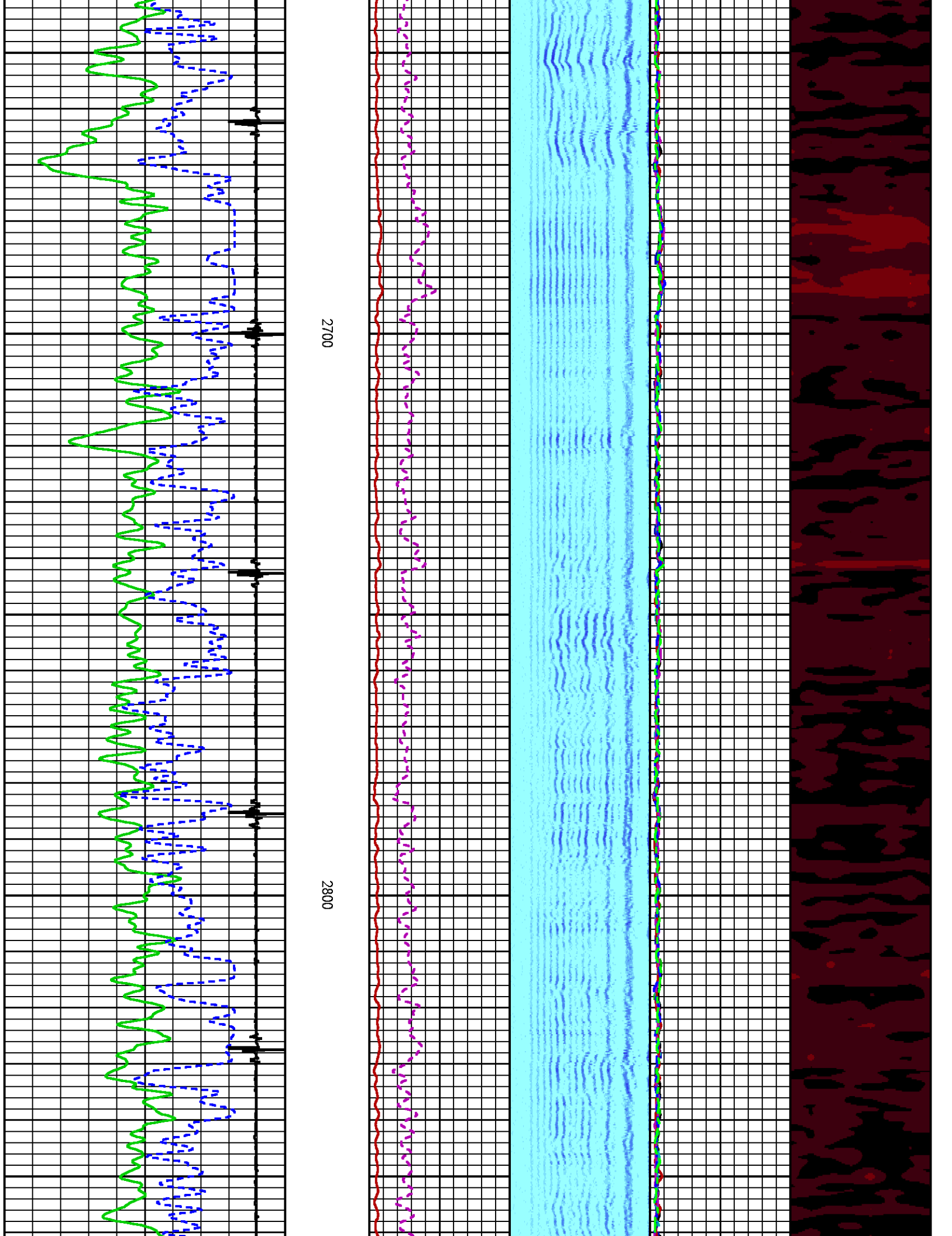


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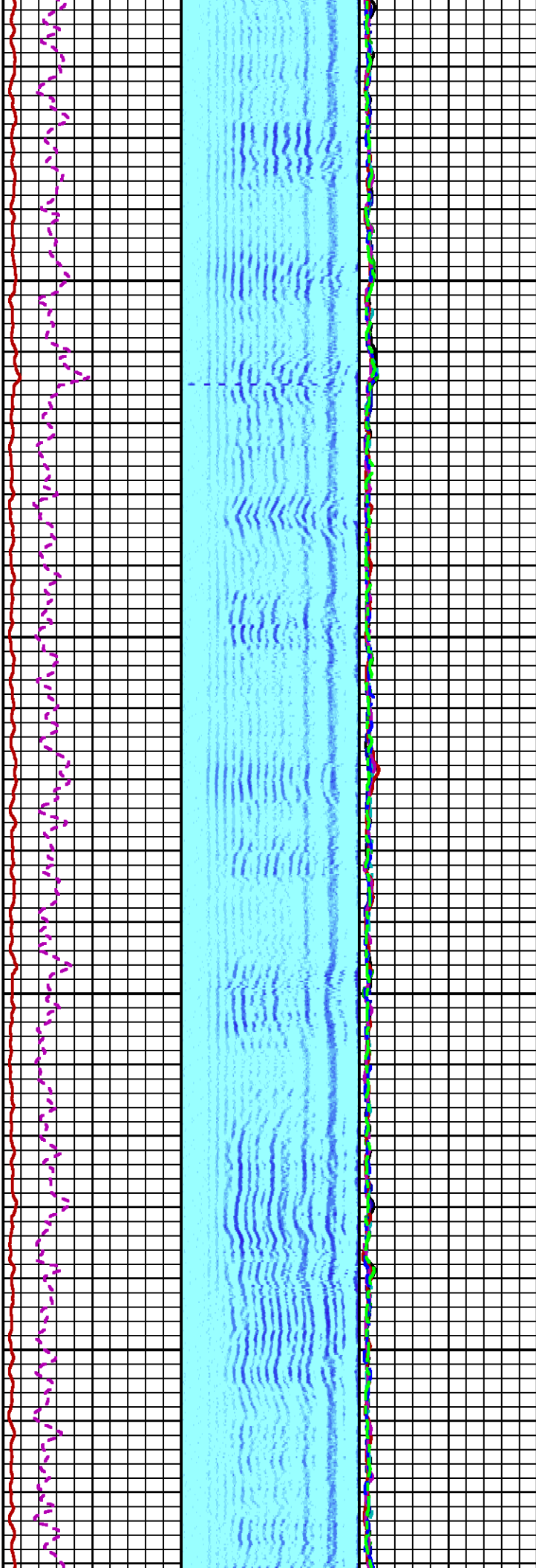
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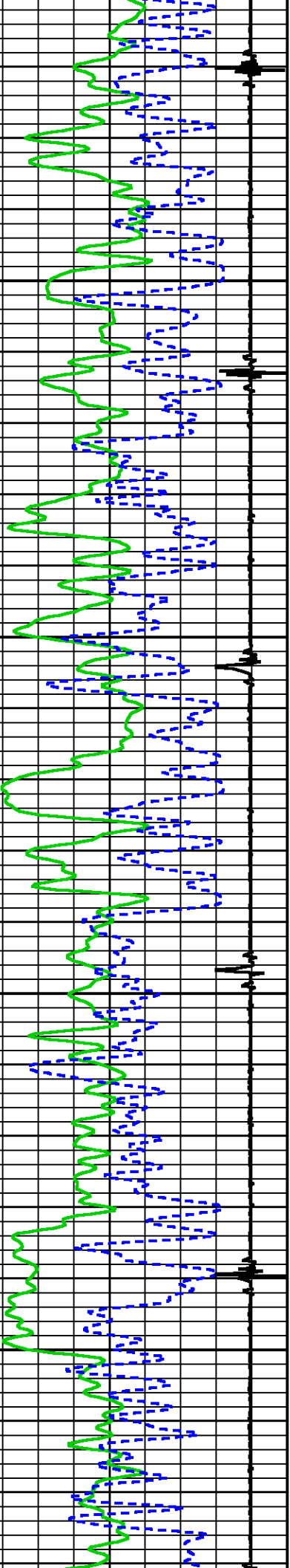




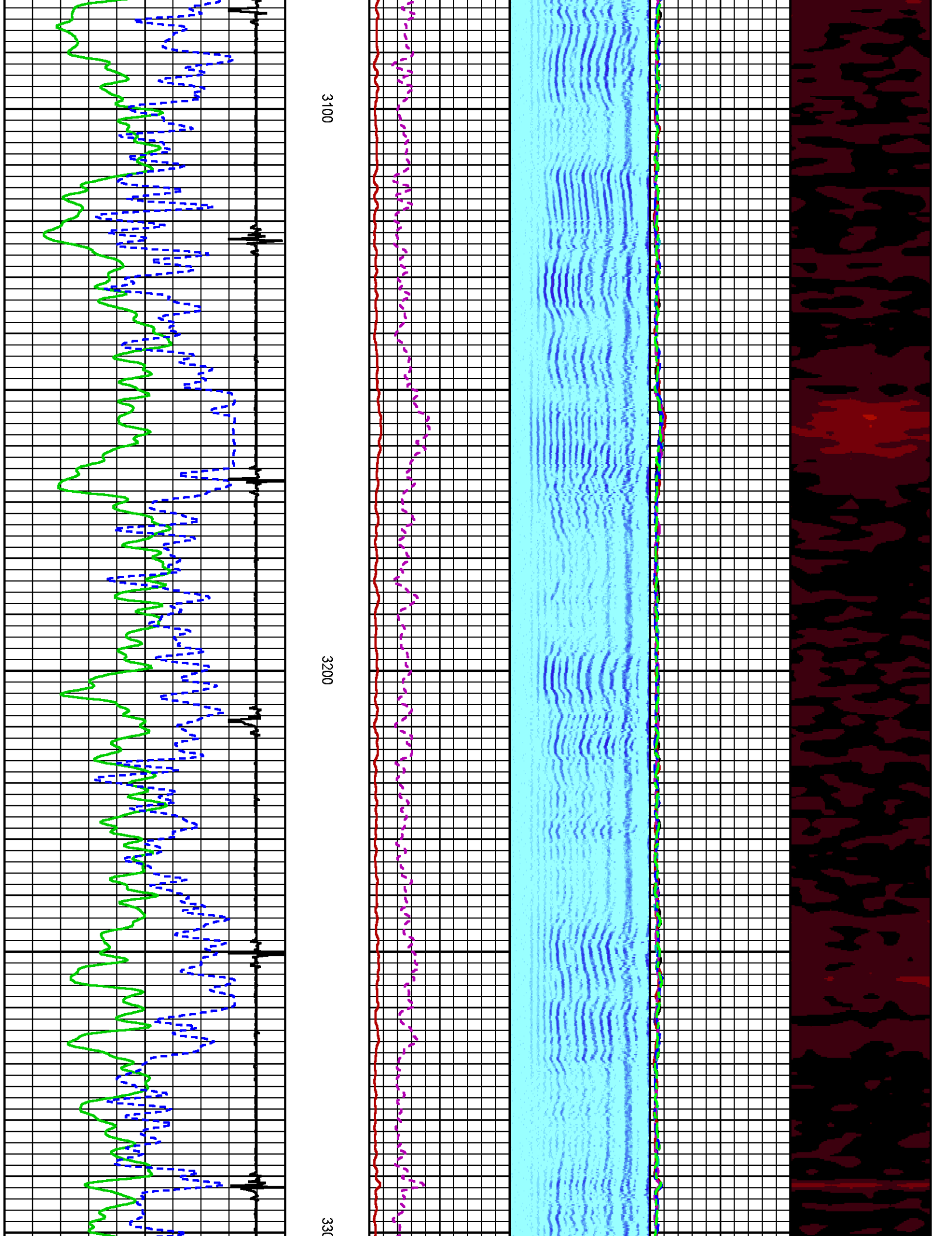


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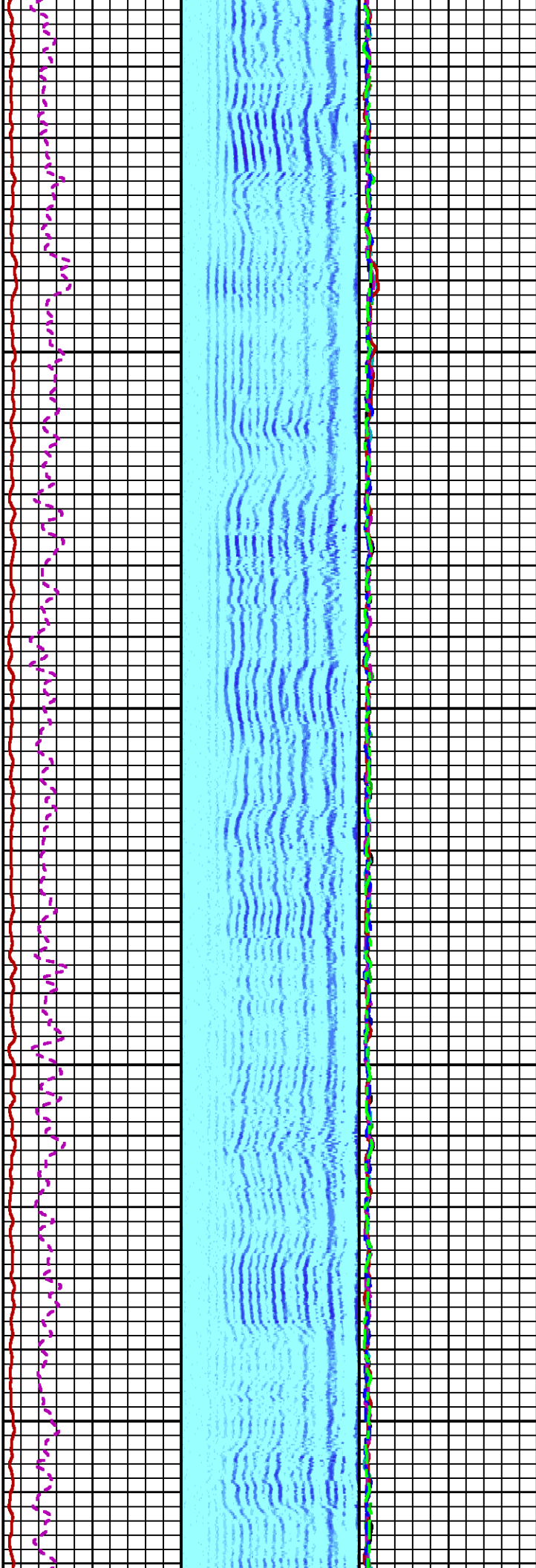
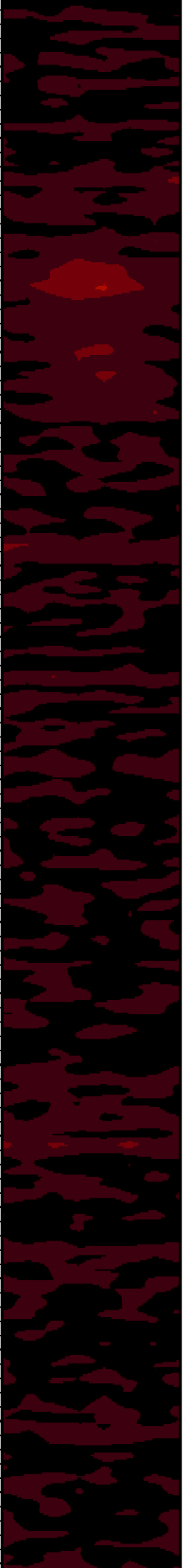
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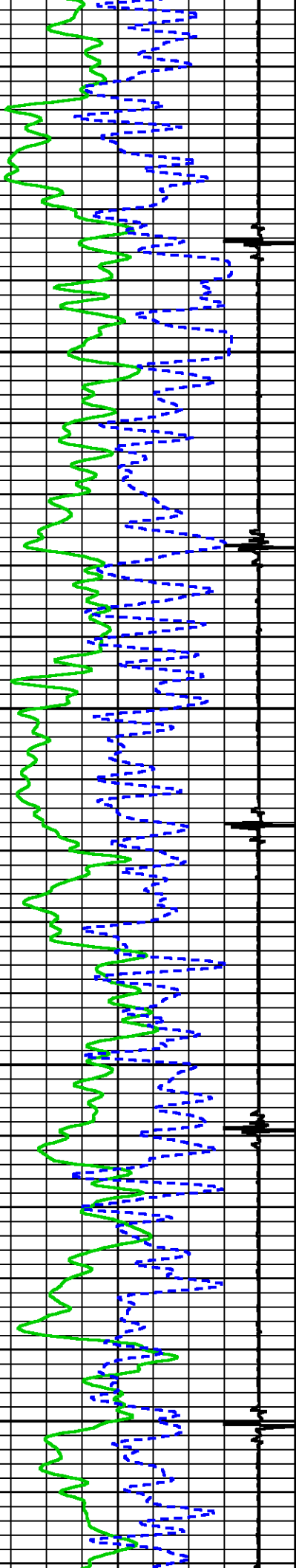




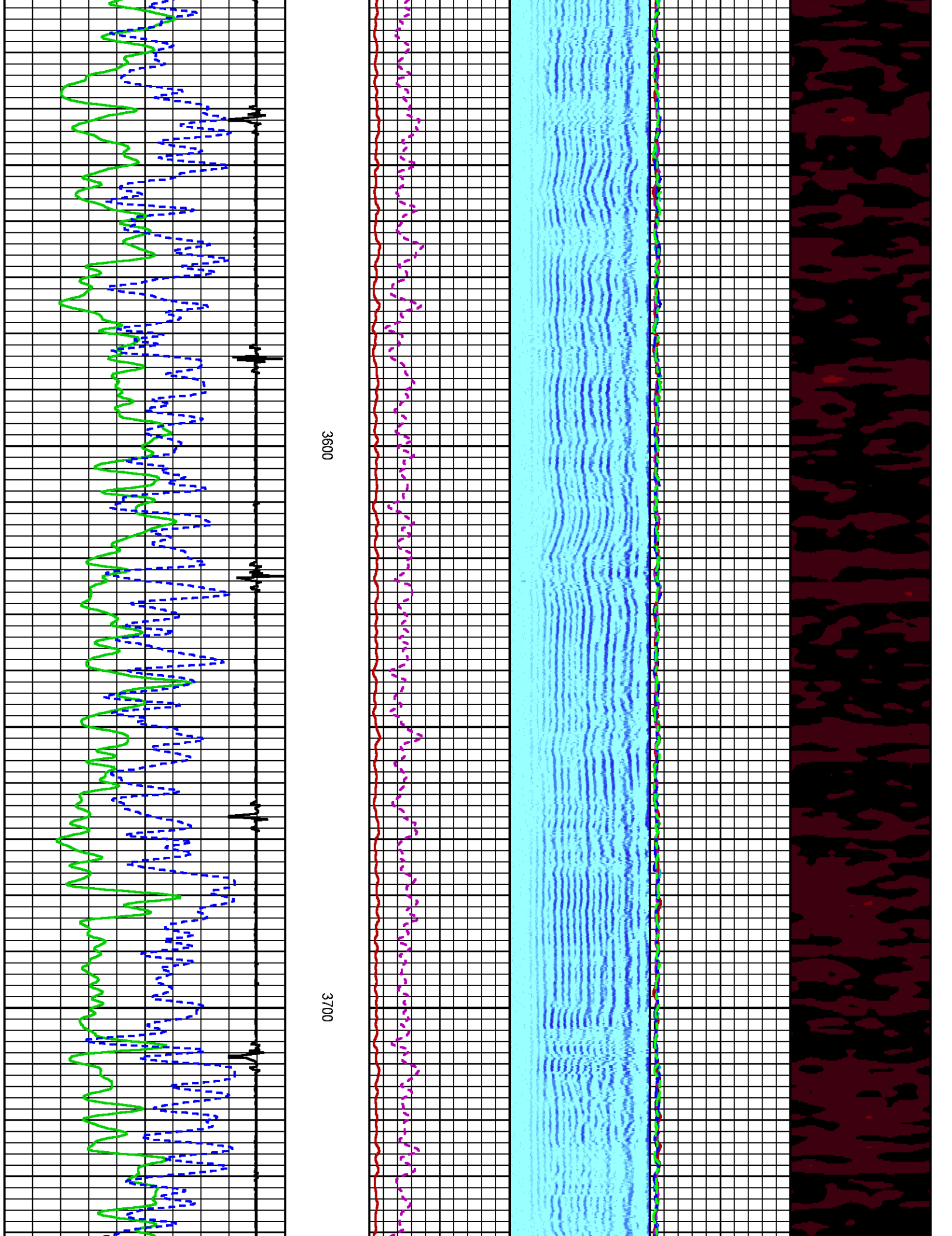




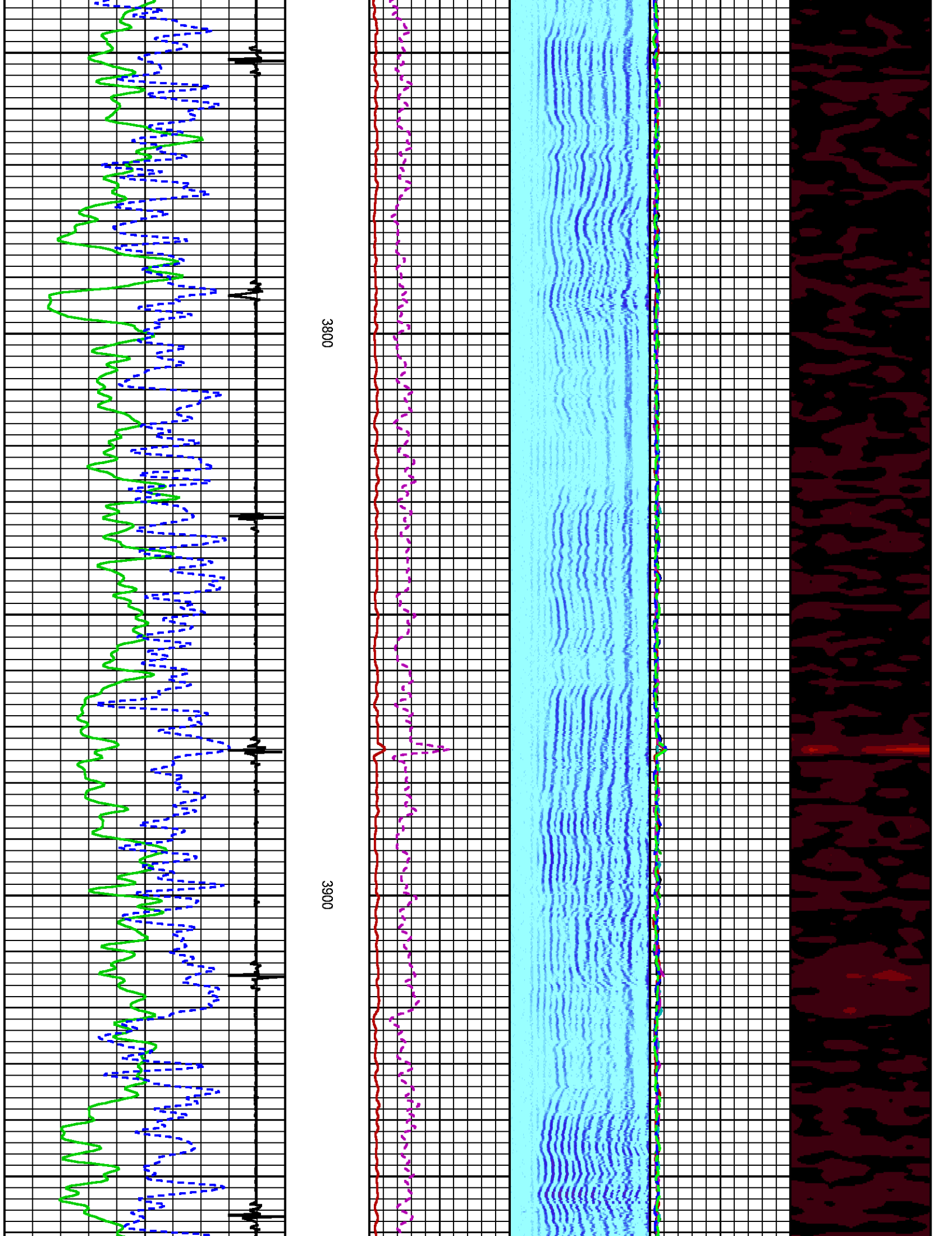
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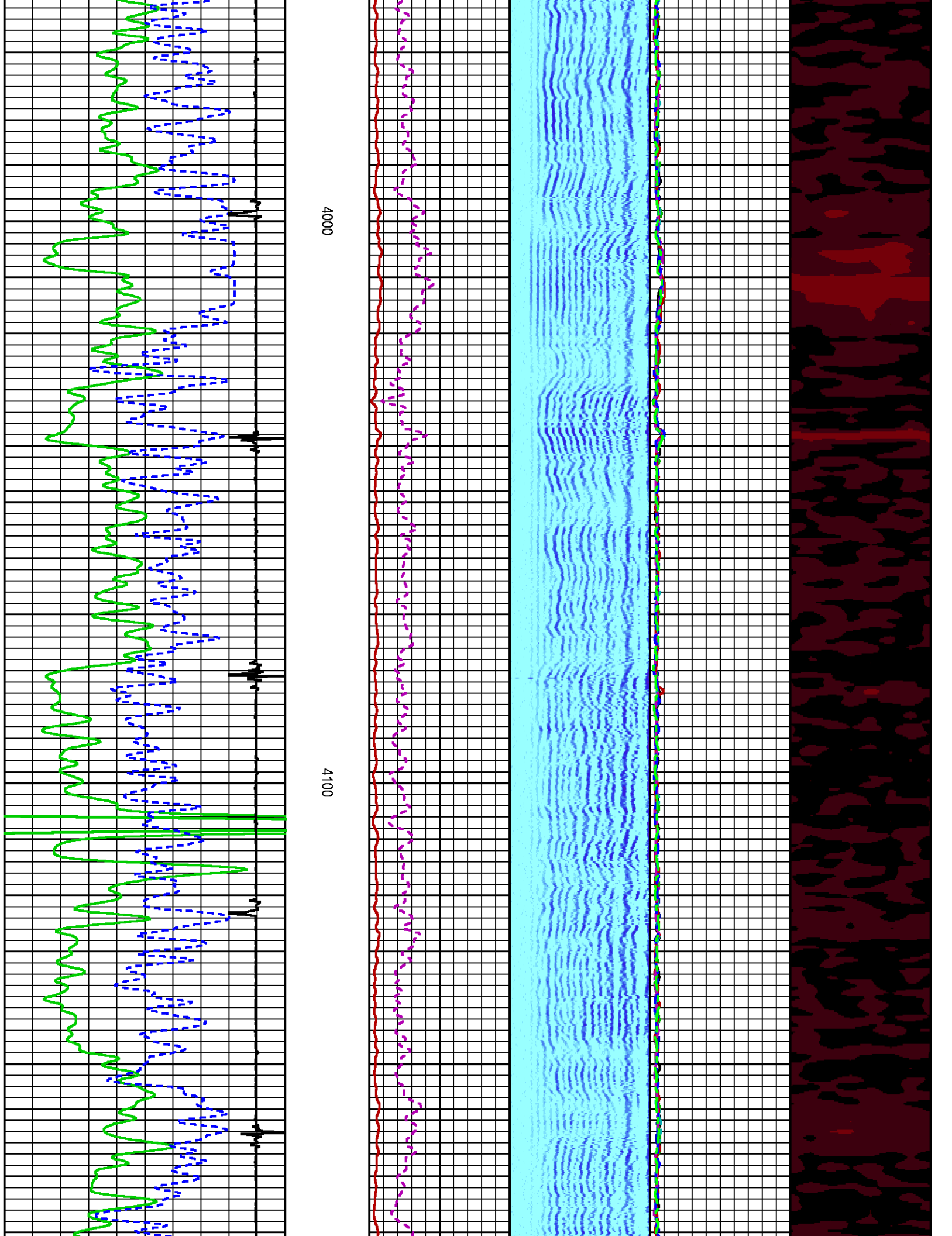




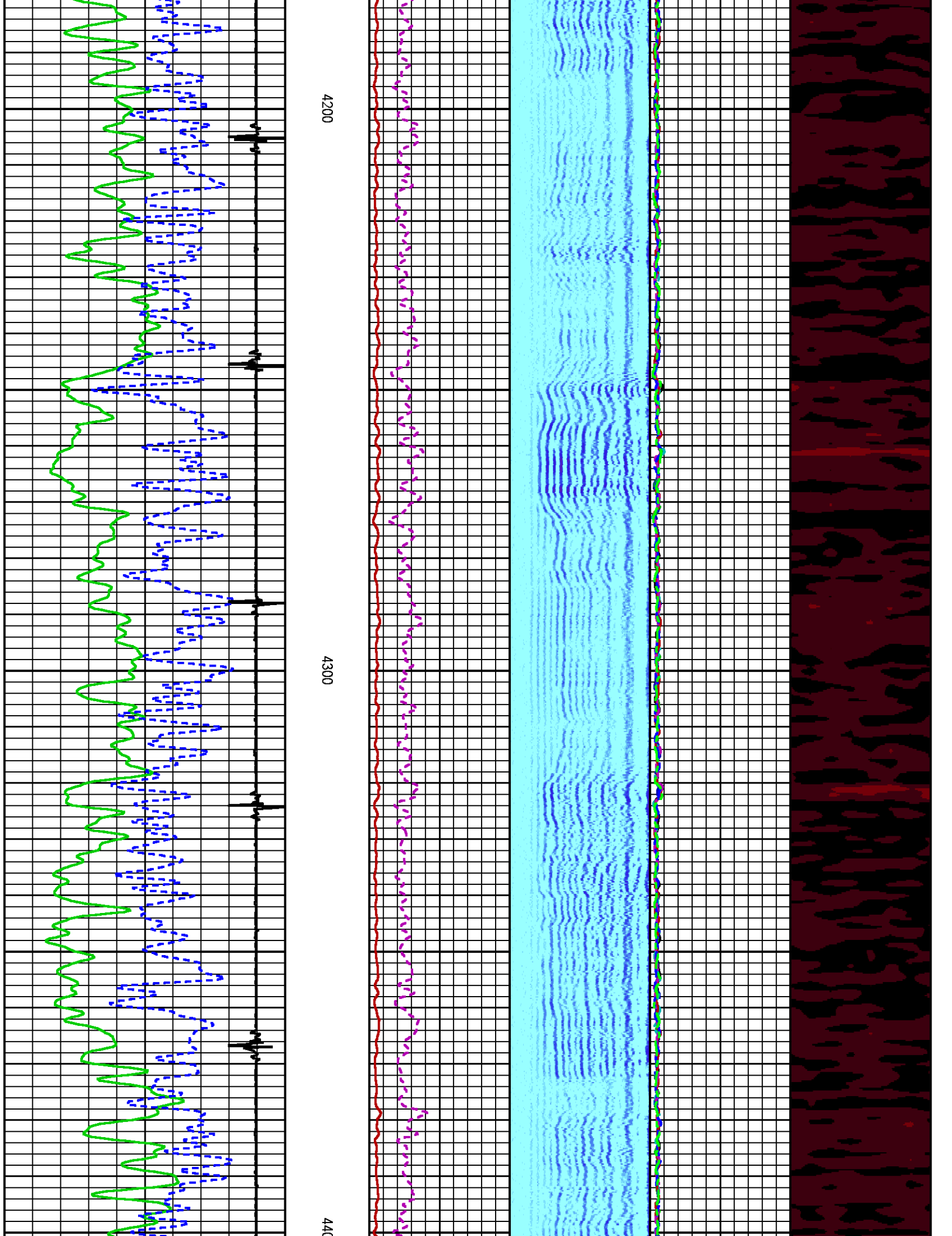




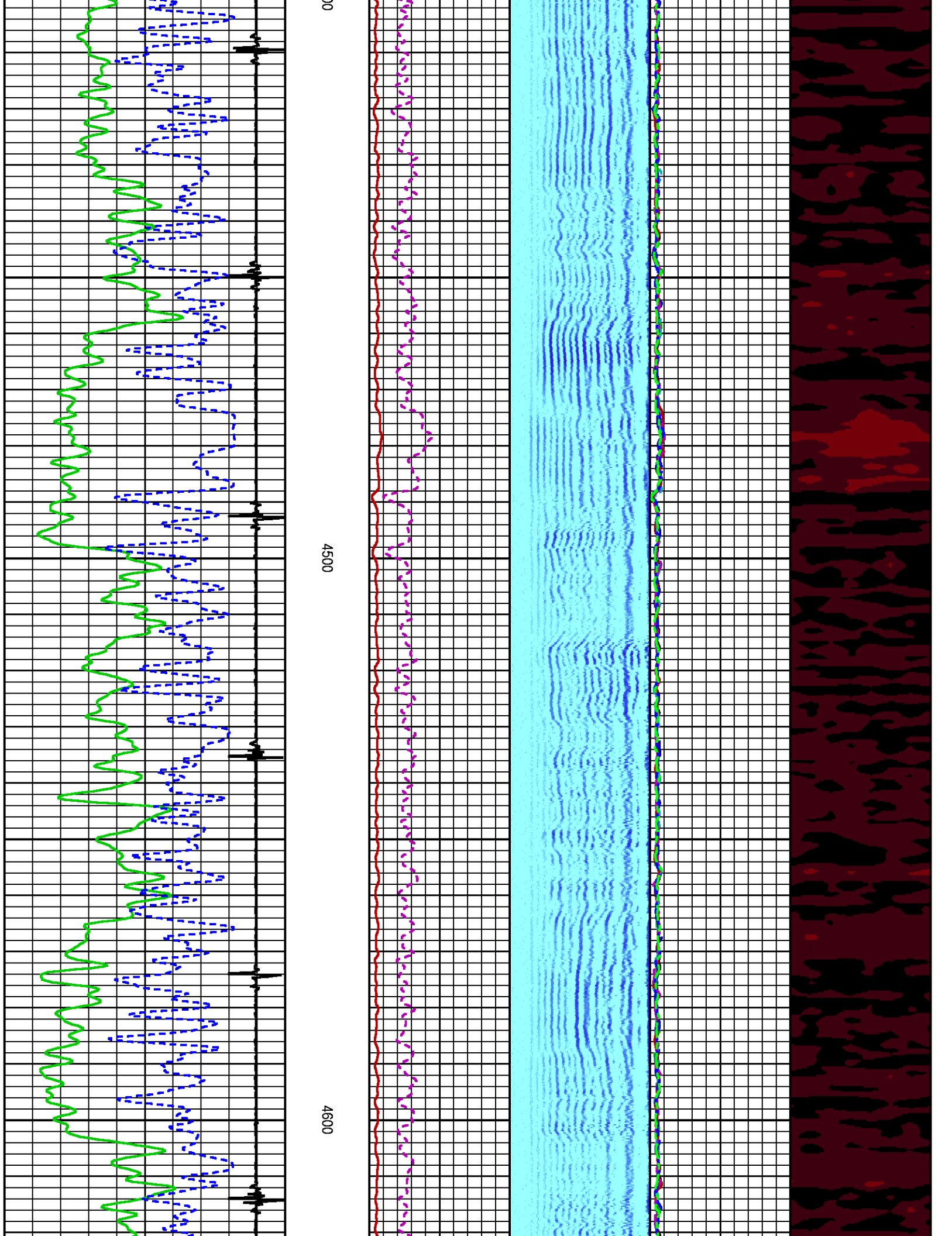




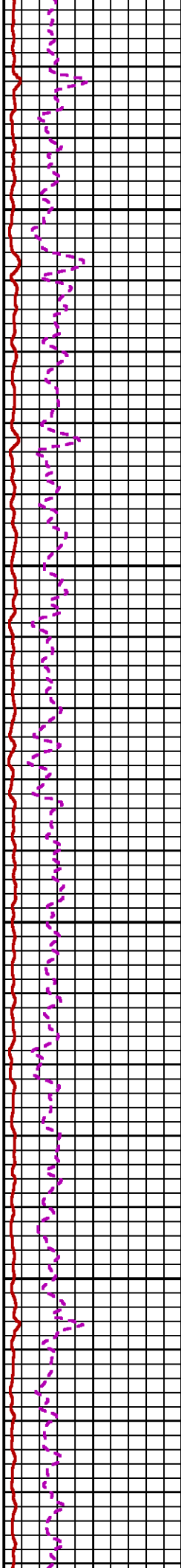
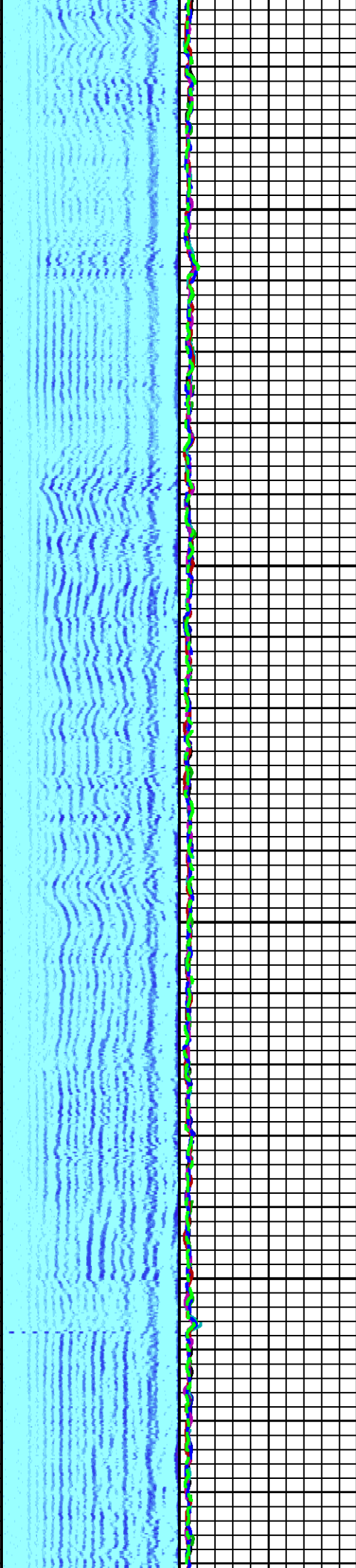






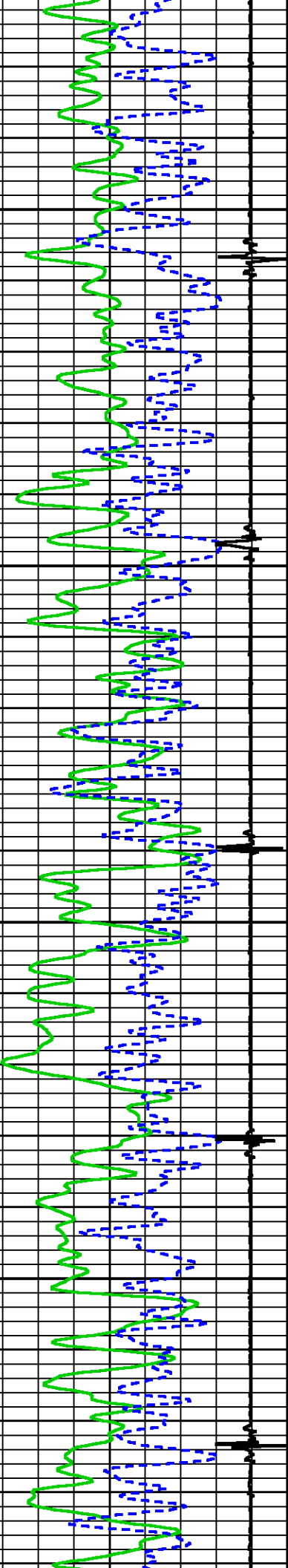




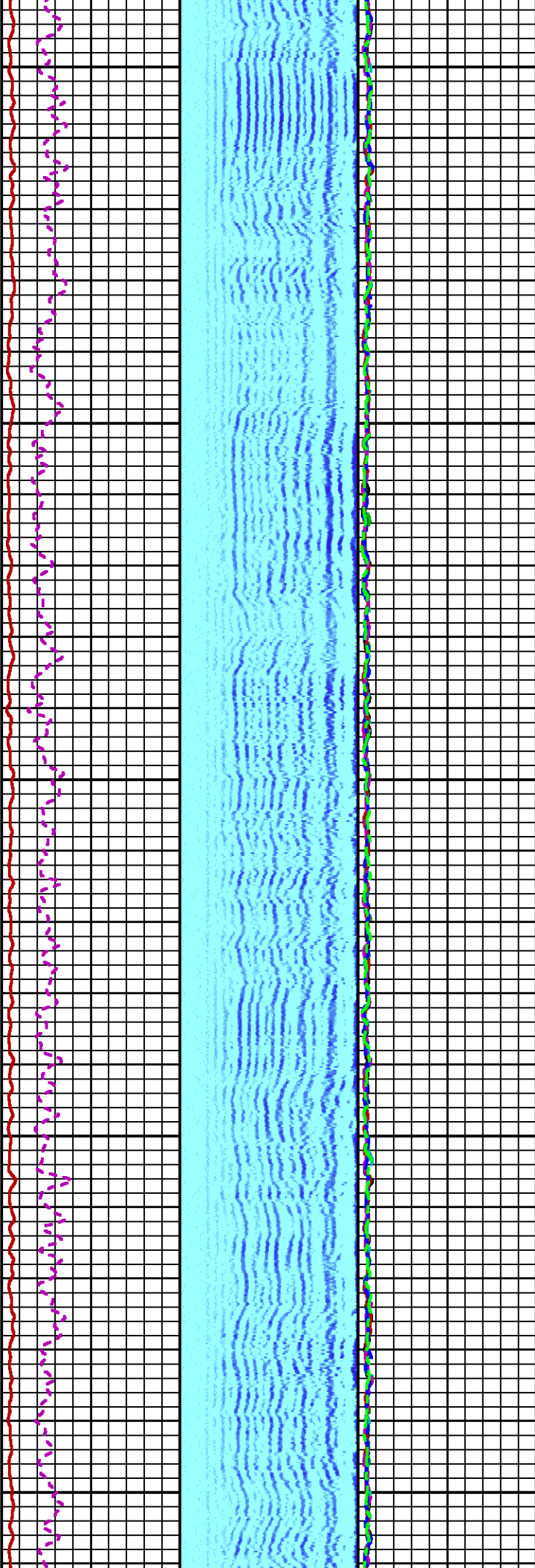


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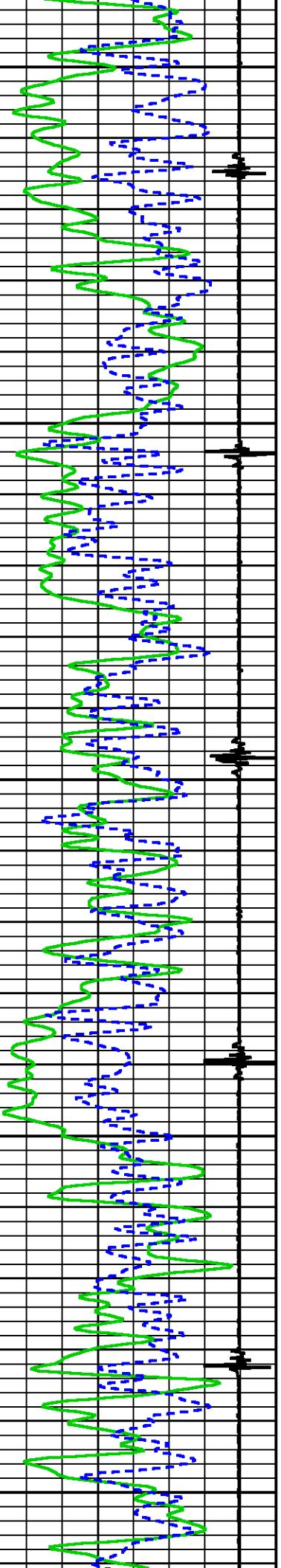




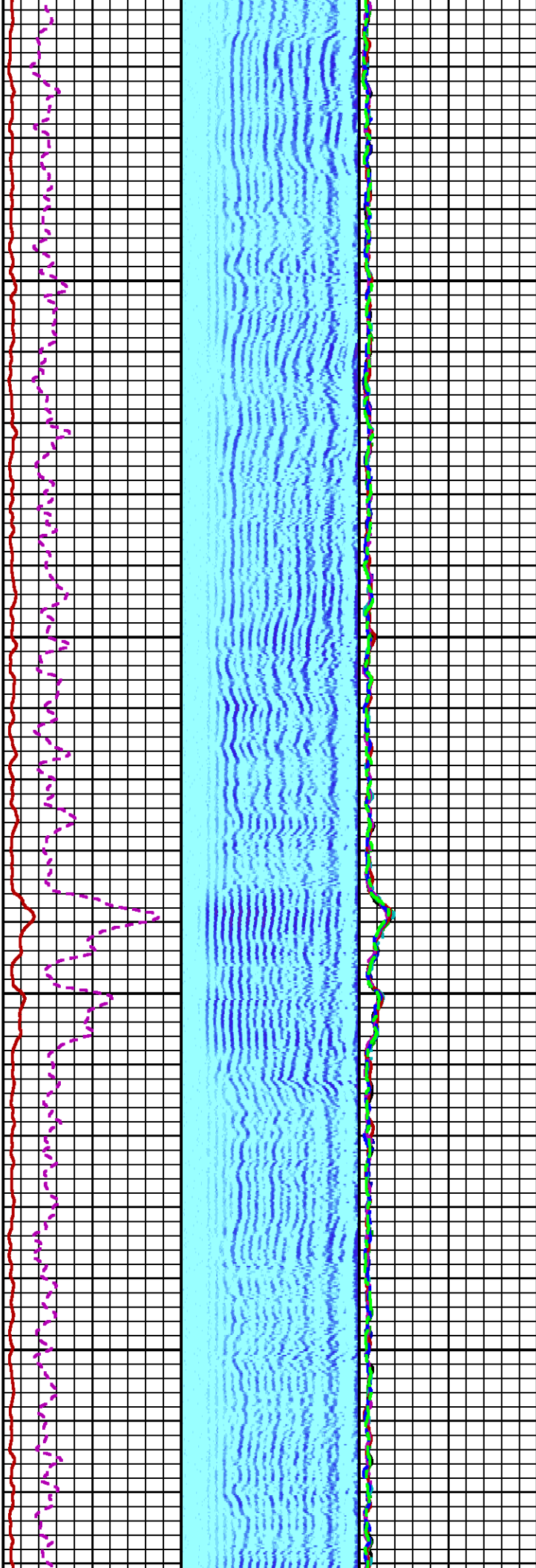


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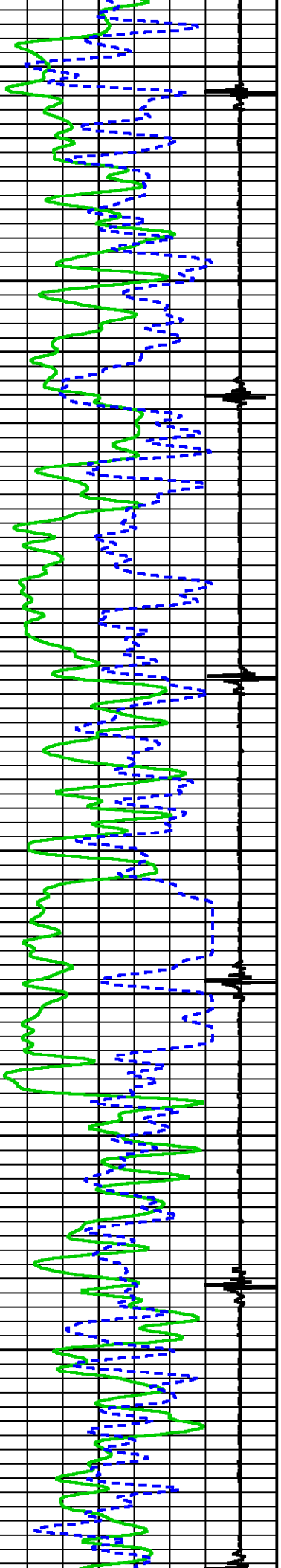




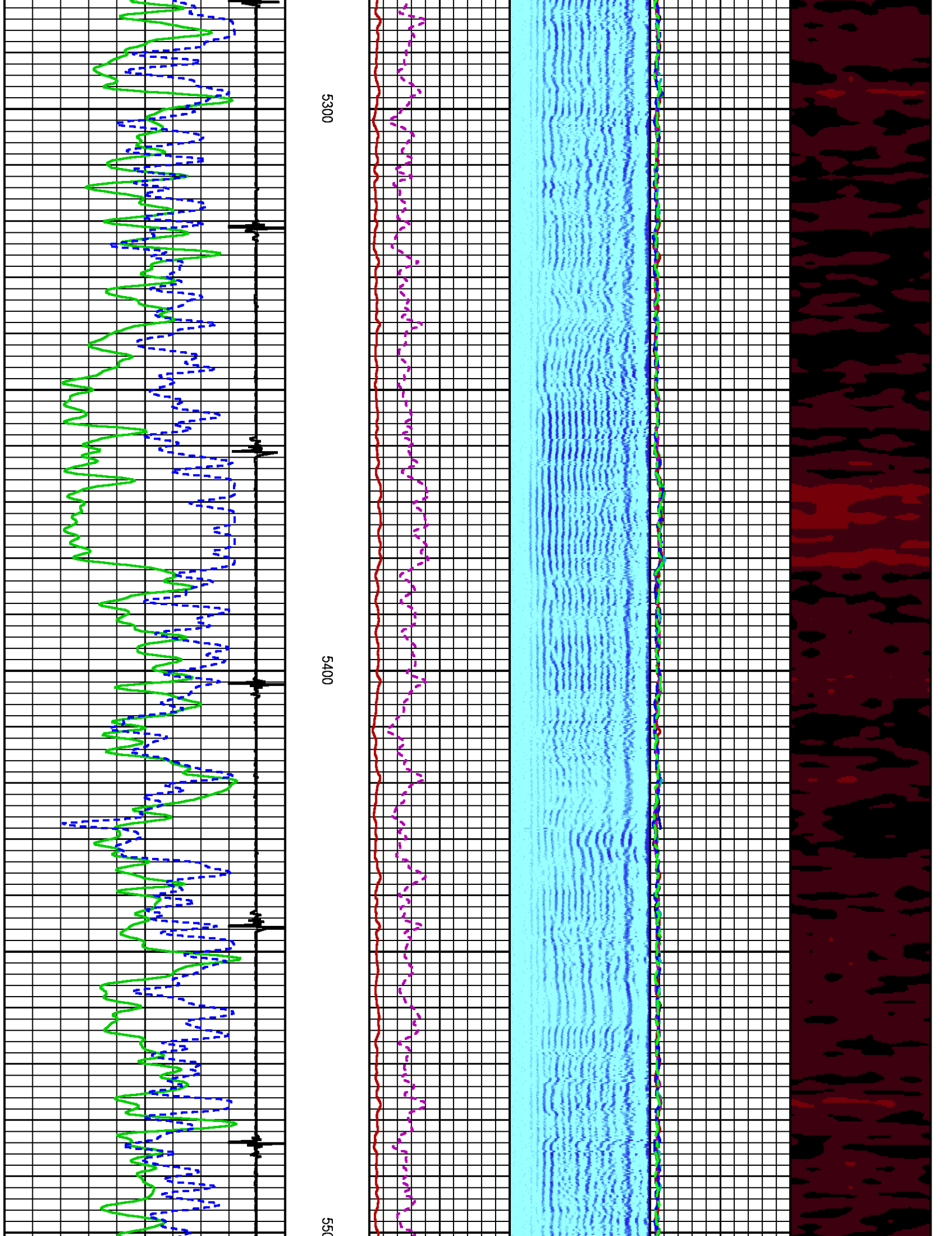


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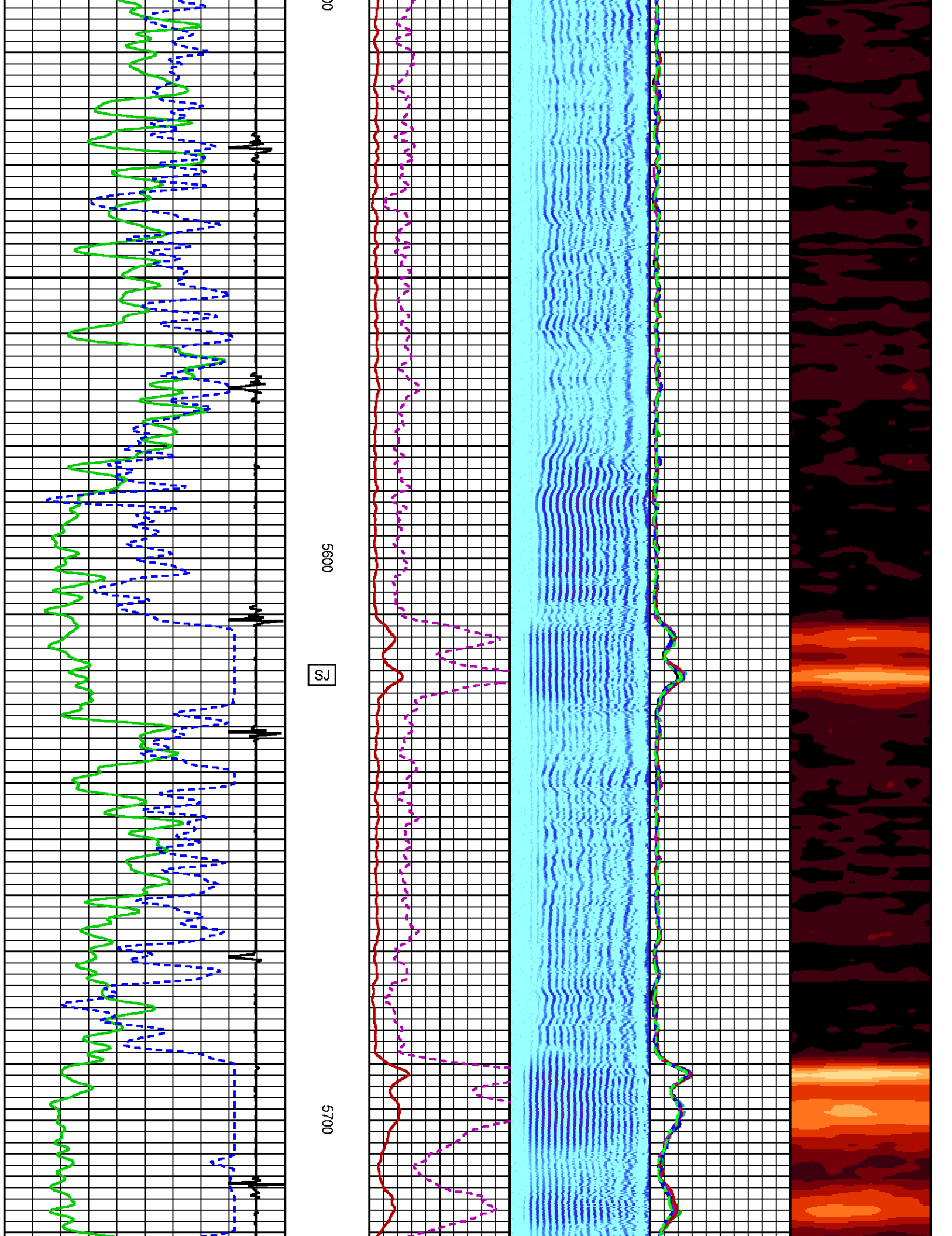
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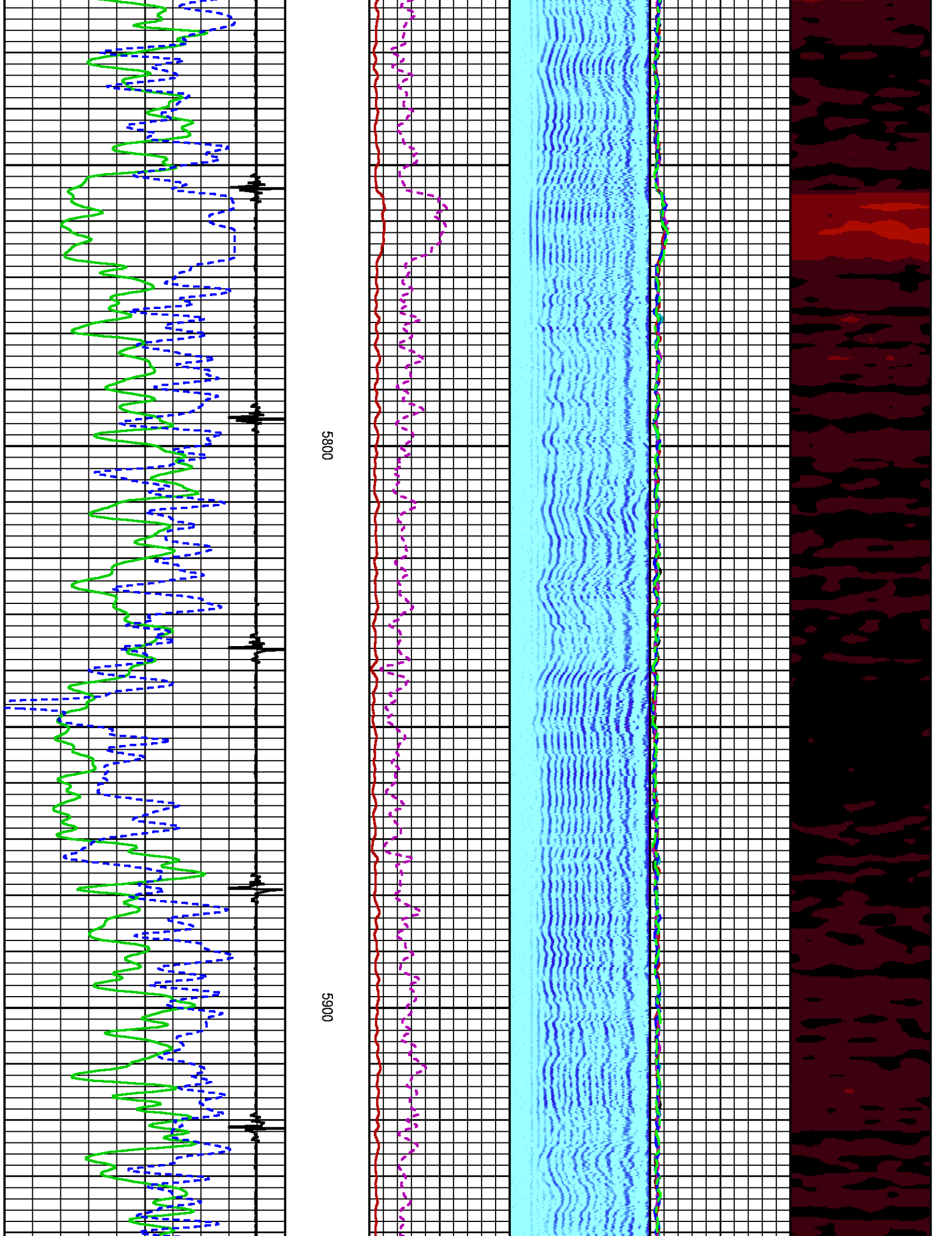




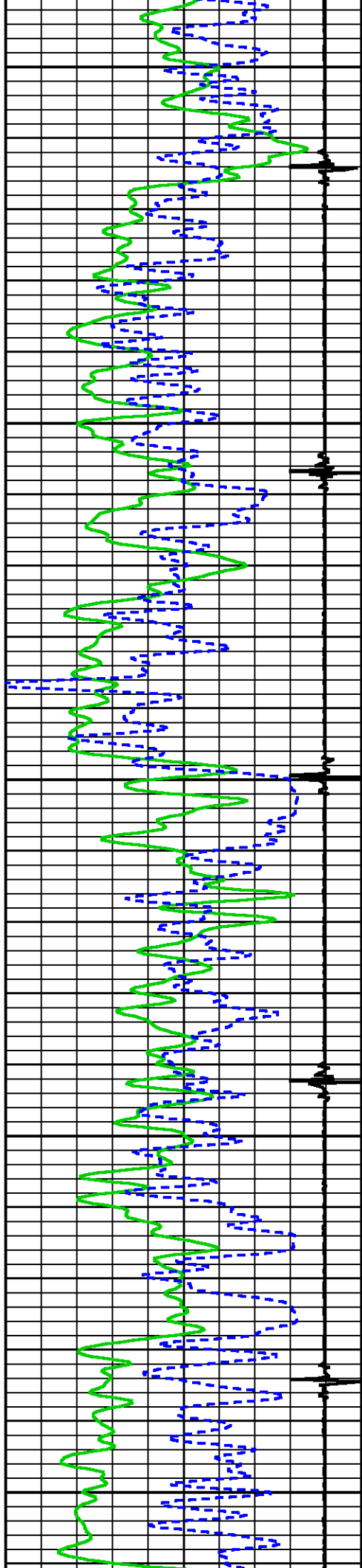






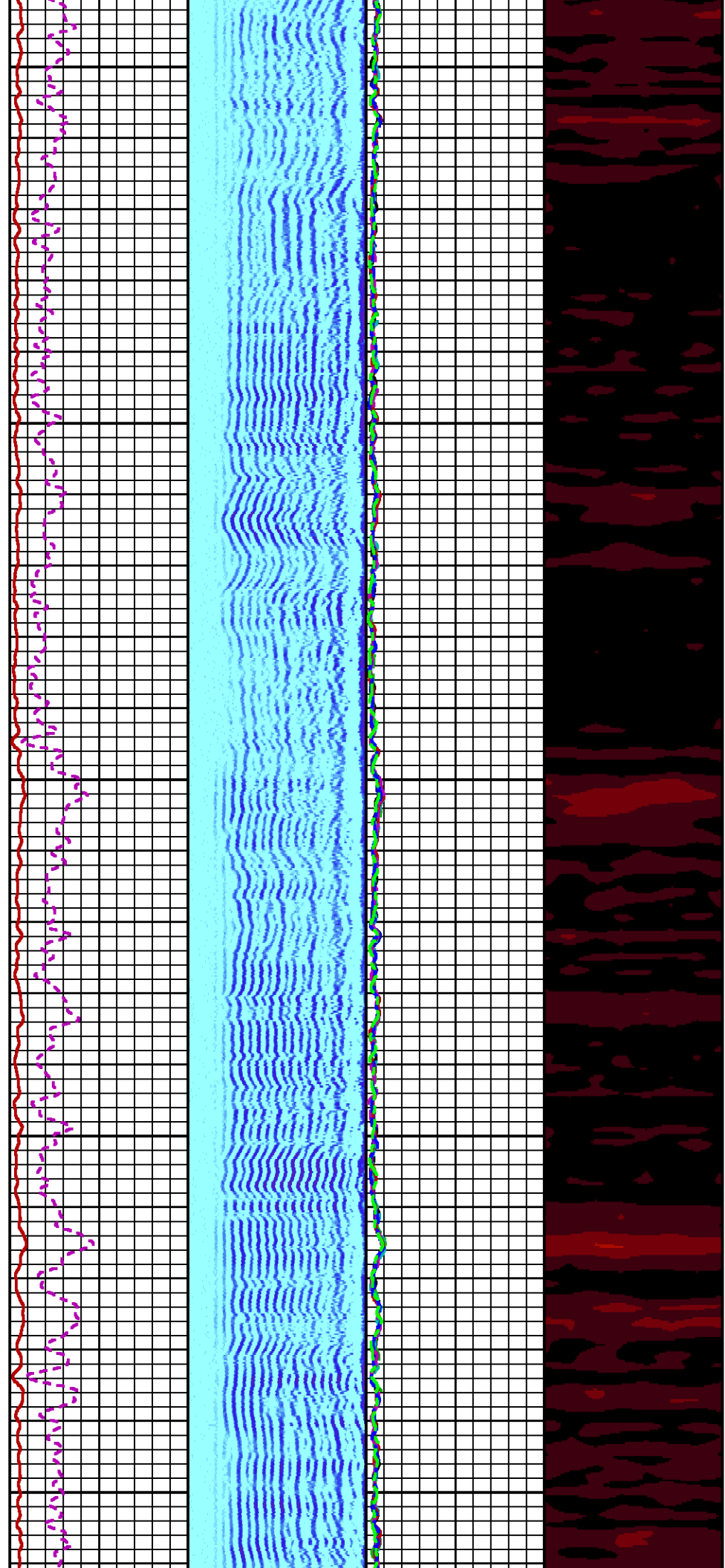




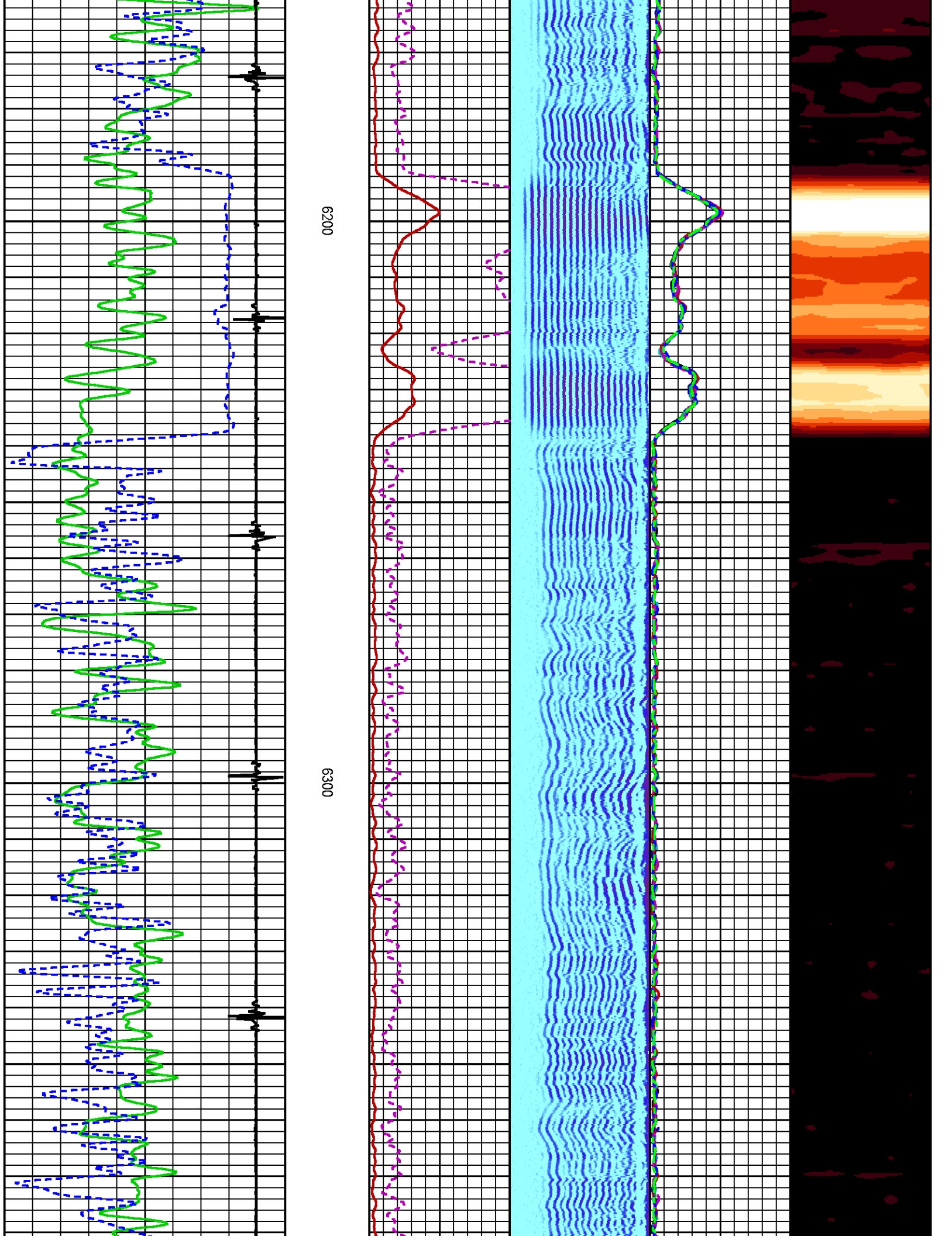


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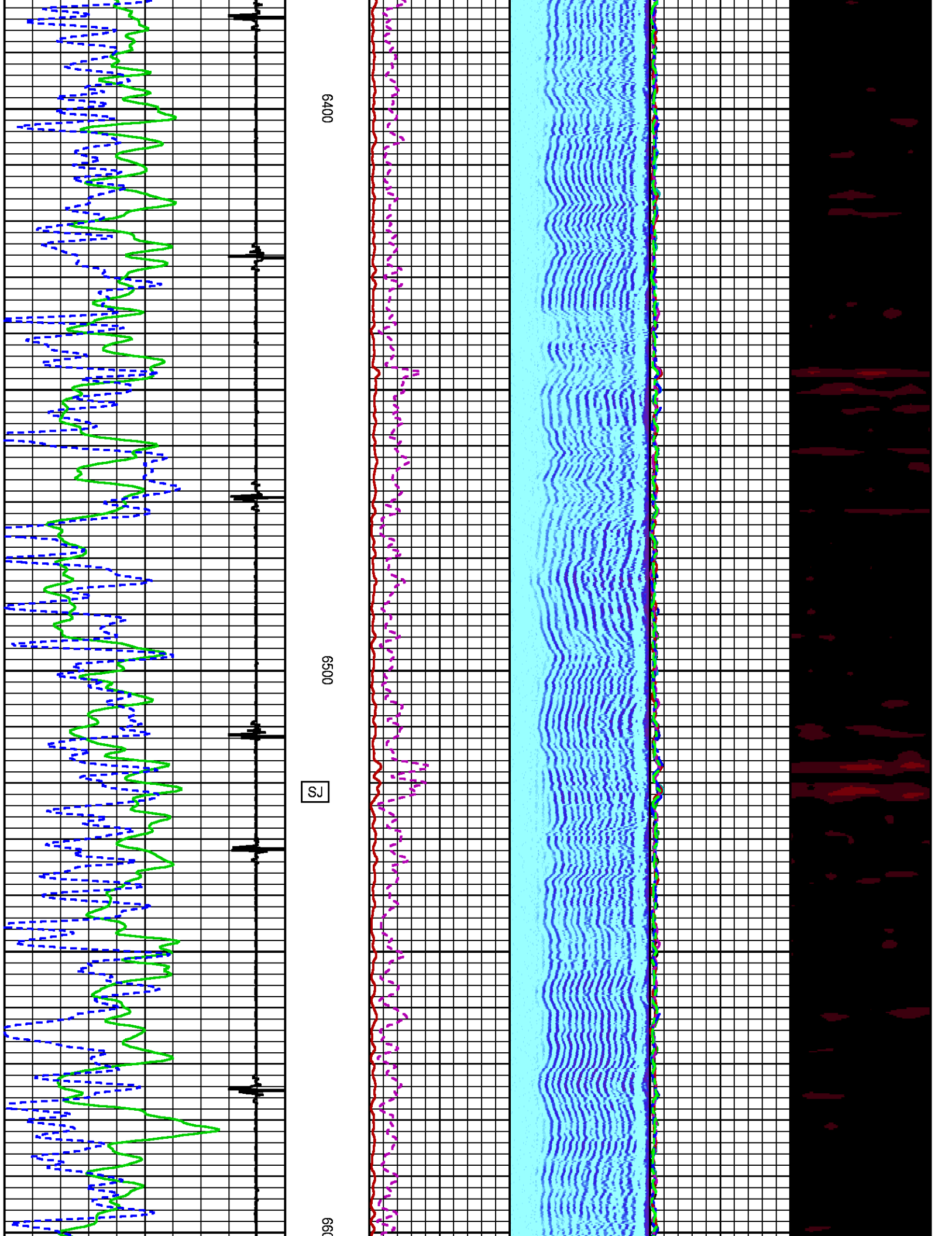
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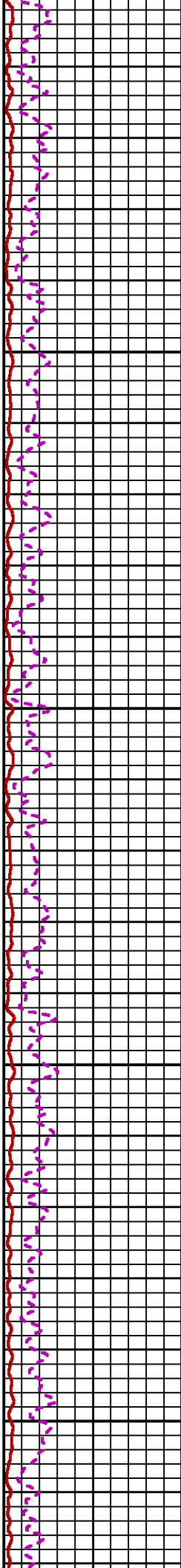
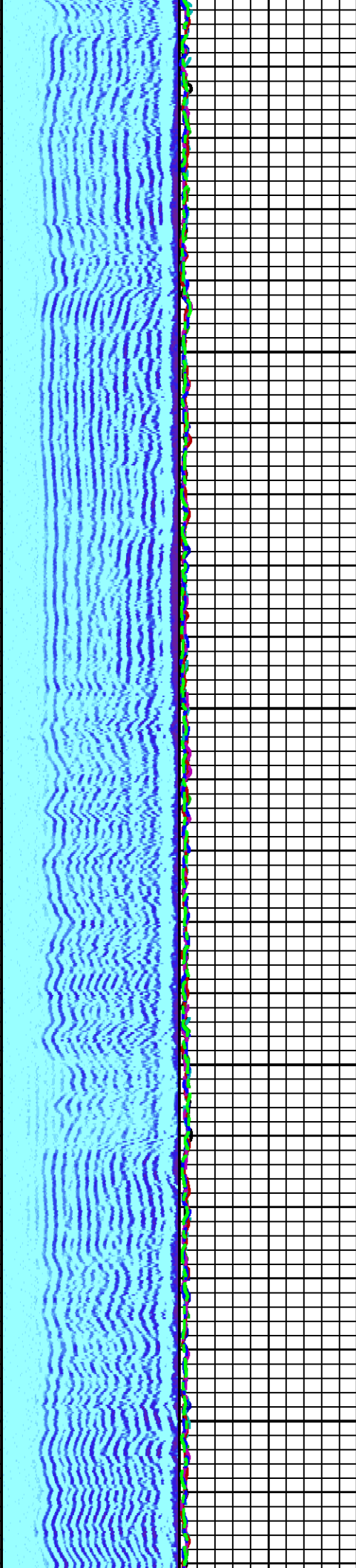






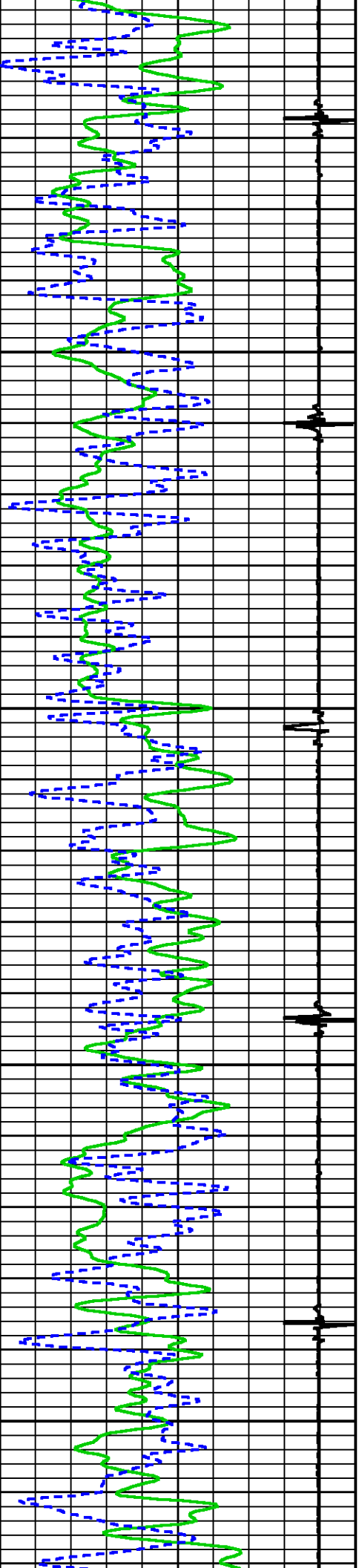




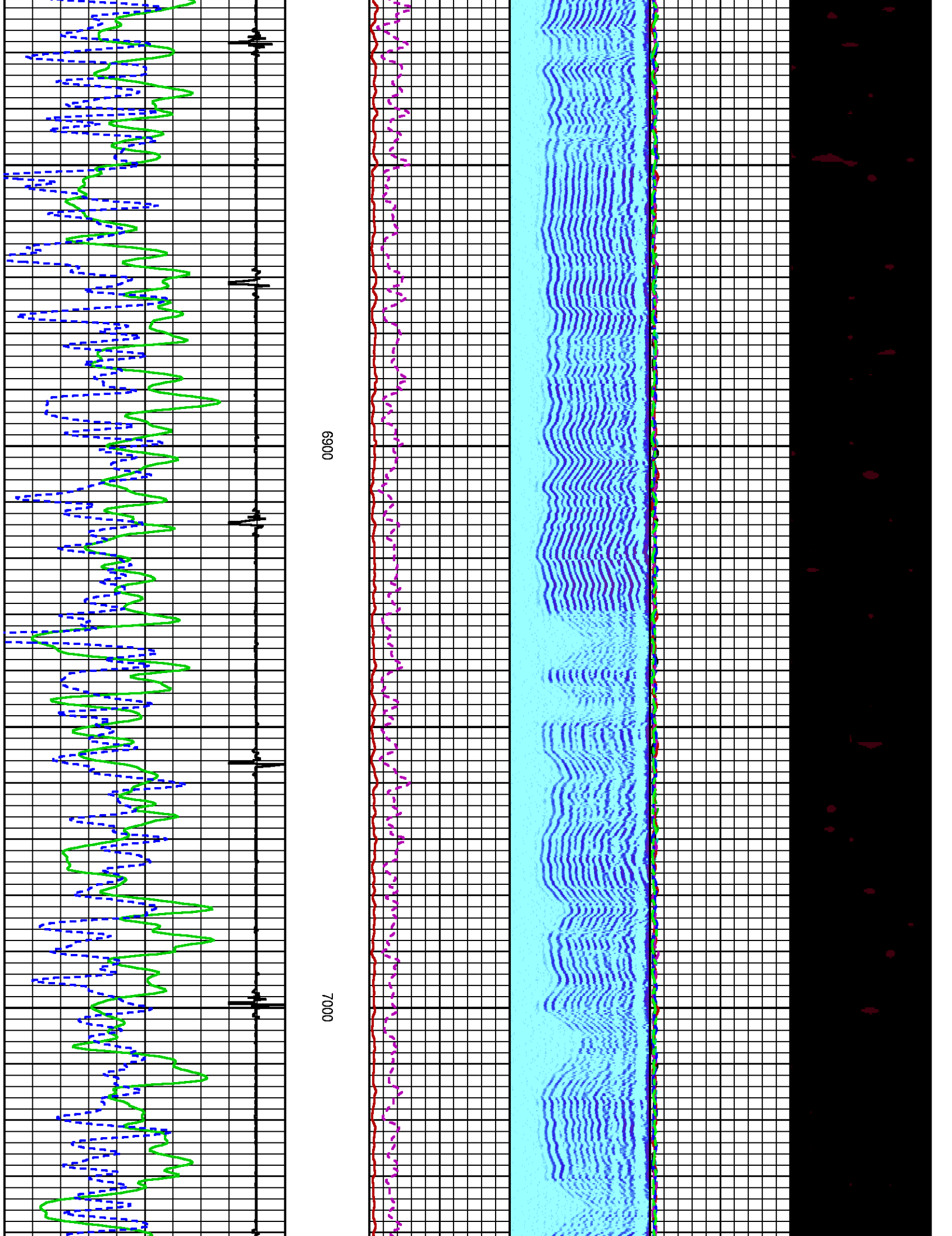


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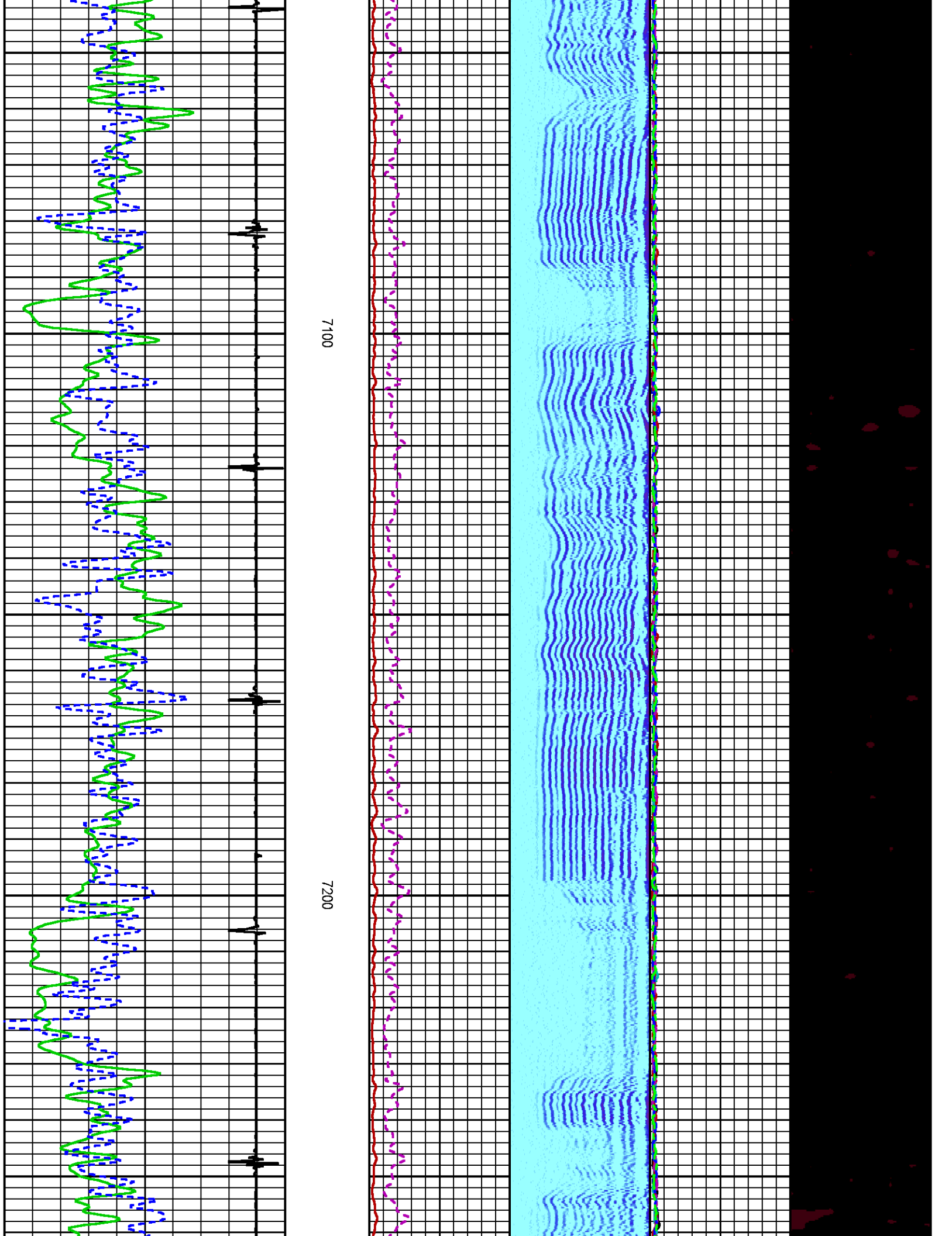




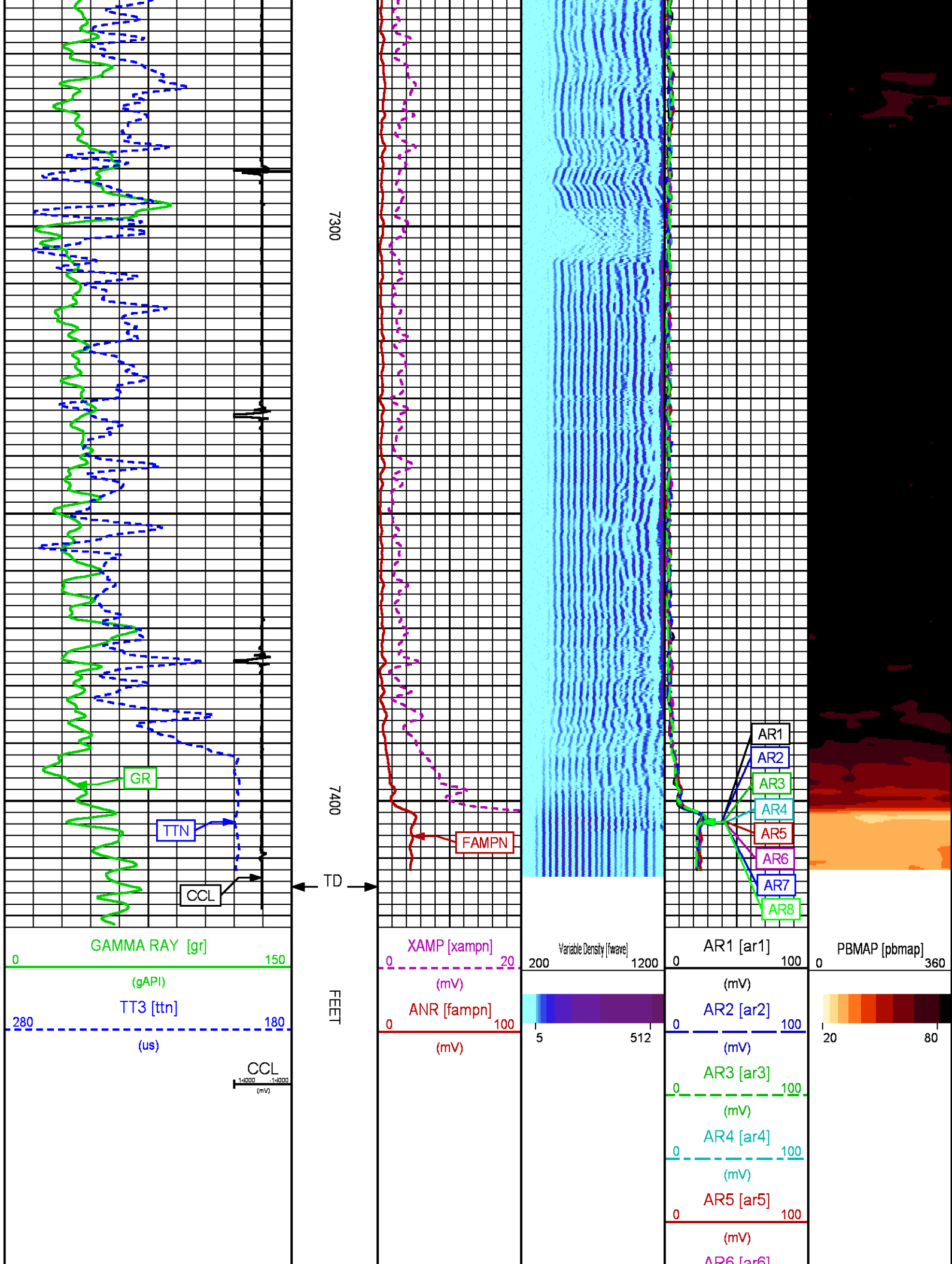
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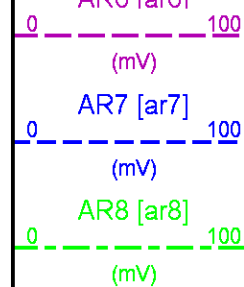












REPEAT PASS 0 PSI

ECLIPS 7.0i ECLIPS General Release Rel 7.0i Thu Jun 08 20:36:10 CDT 2017  
Patches: 3

Plotted: Tue Apr 24 11:55:45 2018

### PARAMETER AND FILTER SUMMARY REPORT

FILE: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_11W/p012g01.prm  
LOGGING MODE: DEPTH DIRECTION: UP  
TOP DEPTH: 7200.500 ft BOTTOM DEPTH: 7425.000 ft

#### SYMMETRIC FILTER

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
GR	FILTER ()	medium (1)		TOP	BOTTOM
AMPLITUDE	FILTER ()	medium (1)		"	"
TRAVEL TIME	FILTER ()	medium (1)		"	"

#### RAL CCL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
CCL FLOOR	CCL FLOOR	0.00		TOP	BOTTOM

#### ANALOG RAL PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
AMPLITUDE WINDOW (NEAR)	AMP WINDOW START (fgp1*)	188	us	TOP	BOTTOM
	AMP WINDOW START (fgp2*)	188	us	"	"
	AMP WINDOW START (fgp3*)	188	us	"	"
	AMP WINDOW START (fgp4*)	188	us	"	"
	AMP WINDOW START (fgp5*)	188	us	"	"
	AMP WINDOW START (fgp6*)	188	us	"	"
	AMP WINDOW START (fgp7*)	188	us	"	"
	AMP WINDOW START (fgp8*)	188	us	"	"
	AMP WINDOW START (fgpn*)	188	us	"	"
	AMP WINDOW LENGTH	25	us	"	"
TRAVEL TIME WINDOW (NEAR)	TT WINDOW START (ttn*)	198	us	"	"
	TT WINDOW LENGTH	500	us	"	"
	FIRST BRK THRESHOLD (ttn*)	5	mV	"	"
RAL CASING PARAMETERS	PPT NEAR	200.391	us	"	"
RAL TOOL DELAY	TOOL DELAY (str1*)	-67	us	"	"
	TOOL DELAY (str2*)	-67	us	"	"
	TOOL DELAY (str3*)	-67	us	"	"
	TOOL DELAY (str4*)	-67	us	"	"
	TOOL DELAY (str5*)	-67	us	"	"
	TOOL DELAY (str6*)	-67	us	"	"
	TOOL DELAY (str7*)	-67	us	"	"
	TOOL DELAY (str8*)	-67	us	"	"
	TOOL DELAY (strn*)	-67	us	"	"
BASELINE NOISE (NEAR)	NOISE WINDOW START	125	us	"	"
	NOISE WINDOW LENGTH	25	us	"	"



PERCENT BOND CEMENT MAP

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
RAL FREE PIPE AMPLITUDE	FREE AMP REC 1	80	mV	TOP	BOTTOM
	FREE AMP REC 2	80	mV	"	"
	FREE AMP REC 3	80	mV	"	"
	FREE AMP REC 4	80	mV	"	"
	FREE AMP REC 5	80	mV	"	"
	FREE AMP REC 6	80	mV	"	"
	FREE AMP REC 7	80	mV	"	"
	FREE AMP REC 8	80	mV	"	"
RAL FULL BOND AMPLITUDE	FULL BOND AMP REC 1	3	mV	"	"
	FULL BOND AMP REC 2	3	mV	"	"
	FULL BOND AMP REC 3	3	mV	"	"
	FULL BOND AMP REC 4	3	mV	"	"
	FULL BOND AMP REC 5	3	mV	"	"
	FULL BOND AMP REC 6	3	mV	"	"
	FULL BOND AMP REC 7	3	mV	"	"
	FULL BOND AMP REC 8	3	mV	"	"

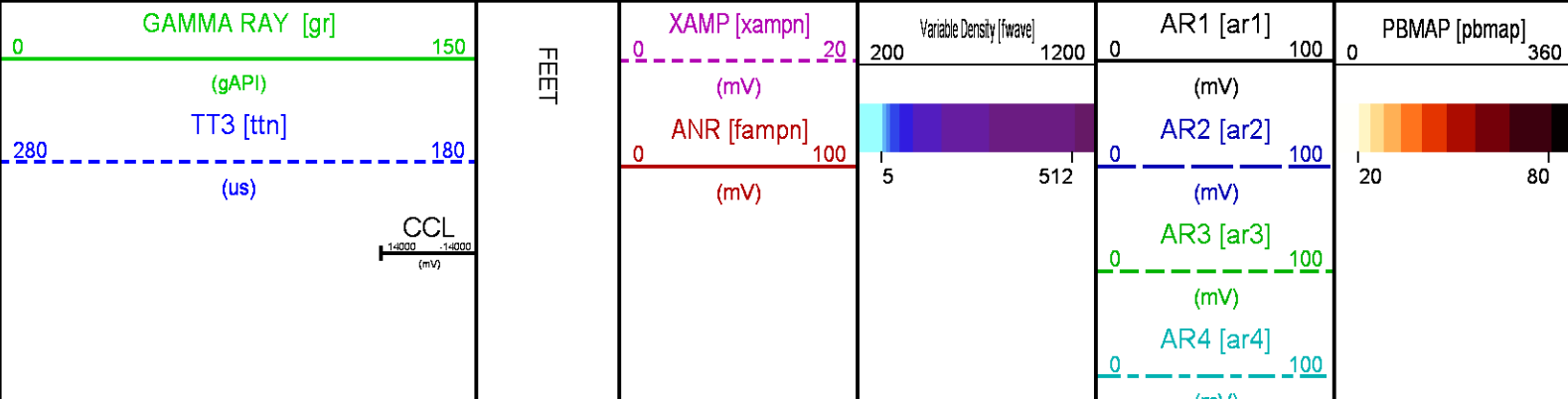
CURVE DESCRIPTION REPORT

CURVE NAME	CREATION DATE	CURVE DESCRIPTION
F1:AR1	N/A	FIXED GATE AMPLITUDE T-R1
F1:AR2	N/A	FIXED GATE AMPLITUDE T-R2
F1:AR3	N/A	FIXED GATE AMPLITUDE T-R3
F1:AR4	N/A	FIXED GATE AMPLITUDE T-R4
F1:AR5	N/A	FIXED GATE AMPLITUDE T-R5
F1:AR6	N/A	FIXED GATE AMPLITUDE T-R6
F1:AR7	N/A	FIXED GATE AMPLITUDE T-R7
F1:AR8	N/A	FIXED GATE AMPLITUDE T-R8
F1:CCL	N/A	CASING COLLAR LOCATOR
F1:FAMPN	N/A	FIXED GATE AMPLITUDE NEAR RECEIVER
F1:FWAVE	N/A	FAR WAVE FORM
F1:GR	N/A	GAMMA RAY
F1:PBMAP	N/A	PERCENT BOND CEMENT MAP
F1:TTN	N/A	TRAVELTIME FROM NEAR TRANSMITTER-RECEIVER
F1:XAMPN	N/A	FIXED GATE AMPLITUDE NEAR RECEIVER TIMES FIVE

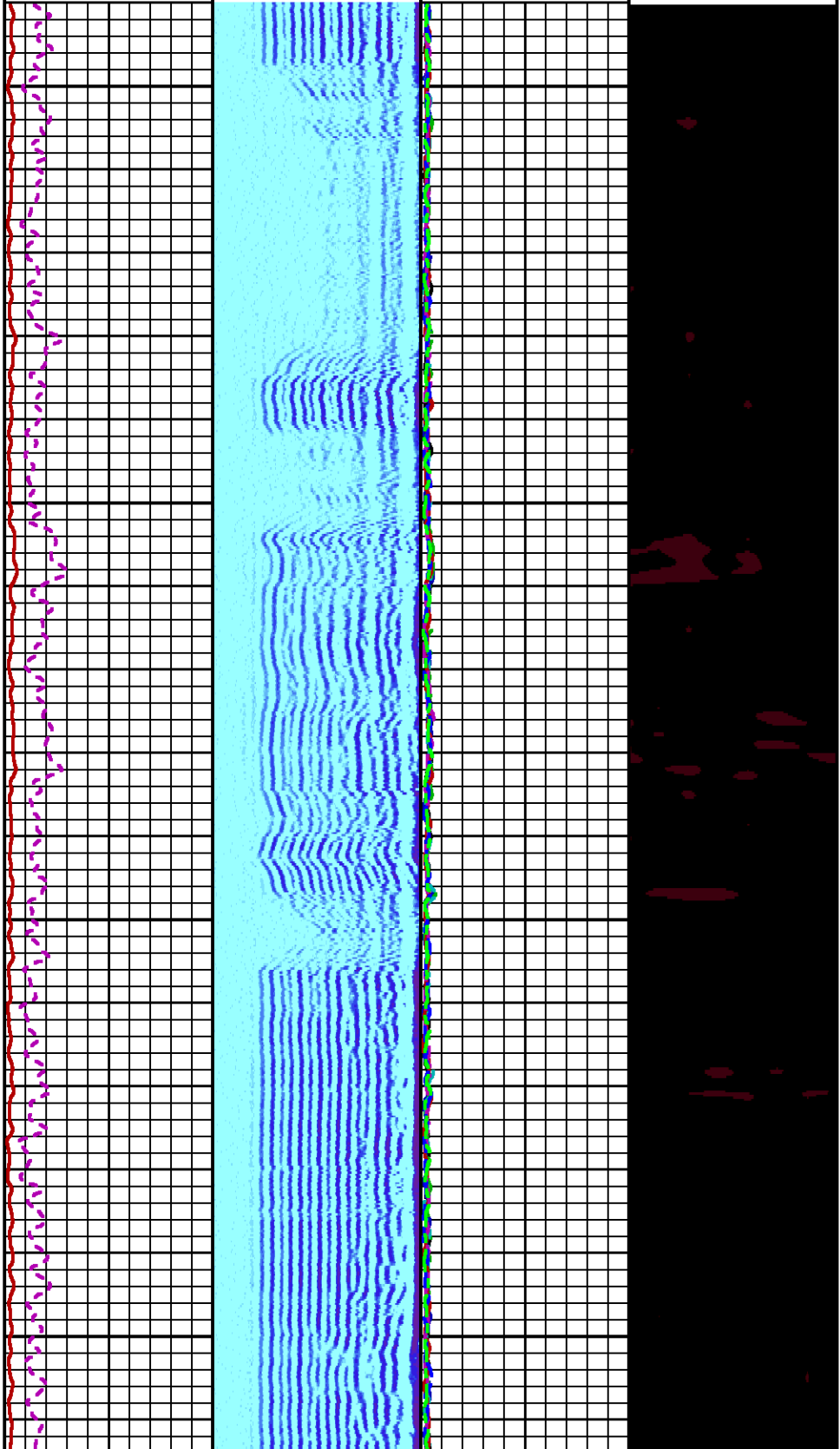
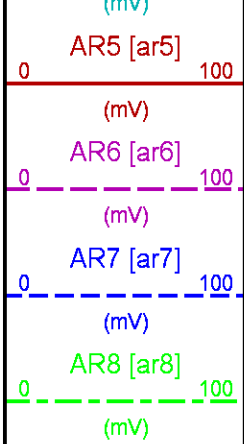
CURVE MEASURE POINT OFFSET

CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)	CURVE	OFFSET (ft)
AR1	-11.25	AR5	-11.25	CCL	-5.75	XAMPN	-11.25
AR2	-11.25	AR6	-11.25	FAMPN	-11.25		
AR3	-11.25	AR7	-11.25	GR	-1.75		
AR4	-11.25	AR8	-11.25	TTN	-11.25		

Presentation	: SysA:/dat1a/LARAMIE_NICHOLS_0994_24_11W/11W_RAL_REPEAT.fvpdf [5"/100' Scale]
Plot Interval	: 7190 - 7423.75 Feet
Data File 1	: F1 : SysA:/dat1a/LARAMIE_NICHOLS_0994_24_11W/11W_RAL_REPEAT.xtf
Created On	: N/A
Company	: LARAMIE ENERGY LLC
Well	: NICHOLS 0994-24-11W
Field	: VEGA
File Interval	: 7189 - 7425 Feet
OCT	: p012g

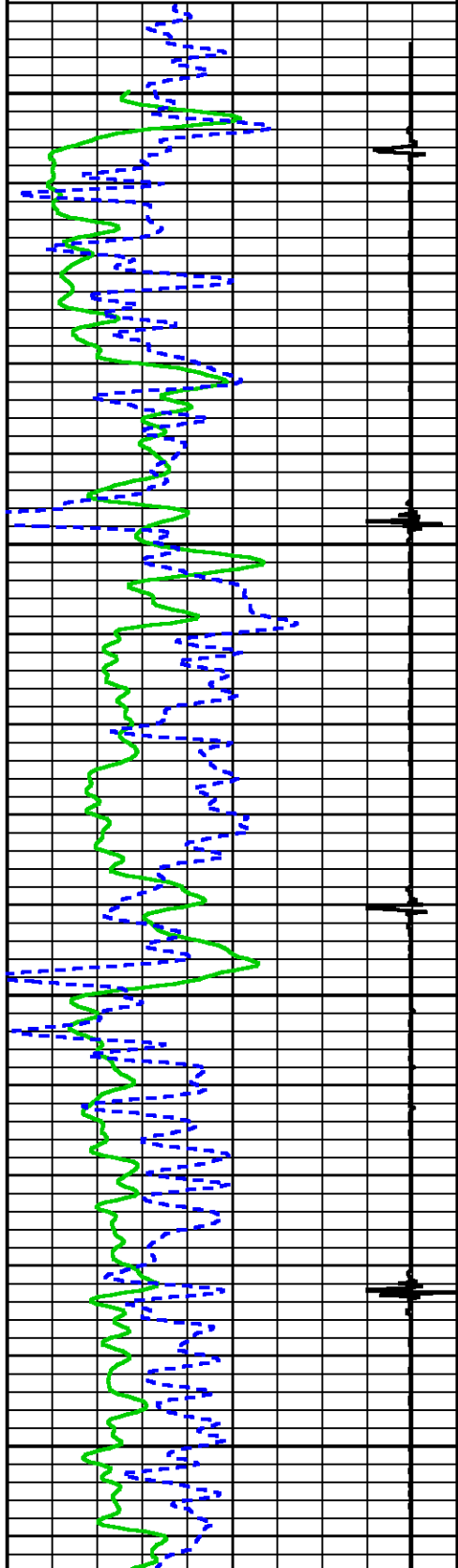




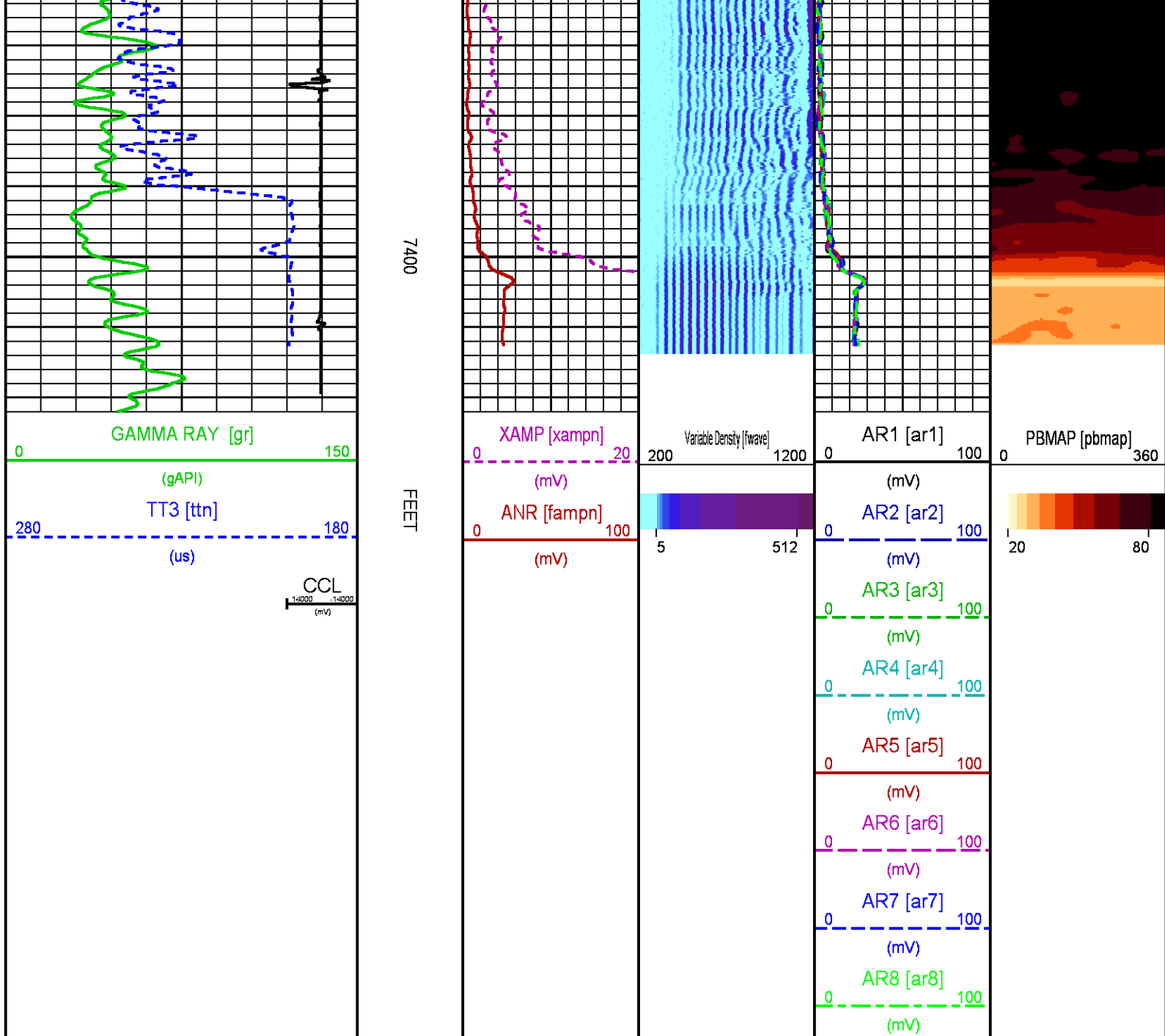


7200

7300







## CALIBRATION / VERIFICATION SUMMARY

Source File: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_11W/p012g.tp1

## RAL PRIMARY CALIBRATION SUMMARY

TOOL #: 1426XA 11871500

DATE/TIME PERFORMED: Tue Apr 24 10:49:52 2018

UNIT #: 5753XD 111111

	NEAR (mV)	RADIAL (mV)	FAR (mV)
TARGETS	100.00	100.00	150.00

NEAR R1 R2 R3 R4 R5 R6 R7 R8 FAR CAL



ZERO (mV)	-0.37	-0.34	-0.10	-0.37	-0.21	-0.05	-0.24	0.30	-0.07	-0.46	0.01
AMP FLUID (mV)	41	40	40	41	41	41	42	40	40	55	40
TT (us)	218	218	218	217	217	216	216	216	218	325	218
M FACTOR	2.40	2.46	2.48	2.43	2.42	2.42	2.39	2.50	2.48	2.70	2.53

### RAL BEFORE LOG VERIFICATION SUMMARY

TOOL #: 1426XA 11871500 DATE/TIME PERFORMED: Tue Apr 24 10:52:03 2018 DAYS SINCE CAL: 0

UNIT #: 5753XD 111111 CABLE #: 4291SM SMALL1

	NEAR (mV)	R1 (mV)	R2 (mV)	R3 (mV)	R4 (mV)	R5 (mV)	R6 (mV)	R7 (mV)	R8 (mV)	FAR (mV)	CAL (mV)
ZERO	-0.75	-1.10	-0.19	-1.56	-0.75	-0.84	-0.92	0.21	-0.94	-0.73	-0.11
AMP AIR	3.44	3.79	3.29	3.54	3.35	2.68	2.93	3.17	2.96	1.83	100.10

SHOP M FACTOR	SHOP A FACTOR	WIRELINE FACTOR
2.53	0.00	1.00

### GR PRIMARY CALIBRATION SUMMARY

TOOL #: 1355XA 11871507 DATE/TIME PERFORMED: Thu Mar 29 16:58:14 2018

UNIT #: 4352 ML4352 CALB JIG #: 4702NK DA\_228

	BACKGROUND (cts)	CALBRTR ON (cts)	CR DIFF (cts/s)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	CALBRTR (gAPI)
GR	26.49	135.56	109.1	0.917	24.29	124.29	100

### GR PRIMARY VERIFICATION SUMMARY

TOOL #: 1355XA 11871507 DATE/TIME PERFORMED: Thu Mar 29 17:00:00 2018

UNIT #: 4352 ML4352 VERI JIG #: 4702NK DA\_228

	BACKGROUND (cts)	CALBRTR ON (cts)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	DIFF. (gAPI)
GR	26.53	135.96	0.917	24.33	124.65	100.33
						90.00 110.00

## INSTRUMENT CONFIGURATION

Source File: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_11W/RAL-tdg

A3 CABLEHEAD  
Diameter : 1.37"

18.85'



# RADIAL BOND TOOL

Diameter : 2.75"  
 Length : 11.17'  
 Weight : 126 lbs  
 Series : 1426XA  
 Mnemonic : RAL  
 Measure Point: 5.75': XMTR  
 Measure Point: 4.21': NEAR MP  
 Measure Point: 3.25': FAR MP  
 Measure Point: 2.67': NEAR RCVR  
 Measure Point: 0.75': FAR RCVR

XMTR — 12.71'  
 NEAR MP — 11.17'  
 FAR MP — 10.21'  
 NEAR RCVR — 9.62'  
 FAR RCVR — 7.71'

# RAL GR/TEMP/CCL/CHV DETECTOR

Diameter : 2.75"  
 Length : 6.96'  
 Weight : 85 lbs  
 Series : 1355XA  
 Mnemonic : RAL  
 Measure Point: 5.79': CCL  
 Measure Point: 1.67': GR  
 Measure Point: 0.17': TEMP

CCL — 5.79'  
 GR — 1.67'  
 TEMP — 0.17'

TOTAL LENGTH: 18.85'  
 TOTAL WEIGHT: 227 lbs  
 MAX DIAMETER: 0'4.00"

**BAKER  
HUGHES**  
a GE company



**COMPANY**  
**WELL**  
**FIELD**  
**COUNTY**

**LARAMIE ENERGY LLC**  
**NICHOLS 0994-24-11W**  
**VEGA**  
**MESA**

**STATE** **COLORADO**

**FILE NO:**

**API NO:**

**05077103870000**

**LOCATION:**

SHL: 2263' FNL & 2786' FWL  
 BHL: 2593' FNL & 1537' FWL

SEC 24 TWP 9S RGE 94W

**ELEVATIONS:**

KB 7236 FT  
 DF  
 GL 7212 FT

**DATE** **24-Apr-2018**

