



# RADIAL CEMENT BOND LOG

FILE NO: CH131986	COMPANY <b>LARAMIE ENERGY LLC</b>
API NO: 05077104150000	WELL <b>NICHOLS 0994-24-06W</b>
	FIELD <b>VEGA</b>
	COUNTY <b>MESA</b> STATE <b>COLORADO</b>

Ver. 4.10	LOCATION: SHL: 39.264514 N, 107.830743 W BHL: 39.265727 N, 107.835353 W SEC <u>24</u> TWP <u>9S</u> RGE <u>94W</u>	OTHER SERVICES RPM
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PERMANENT DATUM LOG MEASURED FROM DRILL. MEAS. FROM	GL ELEVATION 7137 FT KB 24 FT ABOVE P.D. KB GL 7137 FT	ELEVATIONS: KB 7161 FT DF GL 7137 FT
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DATE	24-Jan-2018	
RUN	TRIP	1
SERVICE ORDER	US131986	
DEPTH DRILLER	7456 FT	
DEPTH LOGGER	7401 FT	
BOTTOM LOGGED INTERVAL	7401 FT	
TOP LOGGED INTERVAL	24 FT	
TIME STARTED	21:30	
TIME FINISHED	23:30	
OPERATOR RIG TIME	2 HOURS	
TYPE OF FLUID IN HOLE	WATER	
FLUID DENSITY	NA	
FLUID SALINITY	NA	
FLUID LEVEL	46 FT	
LOGGED CEMENT TOP	2090 FT	
WELLHEAD PRESSURE	0 PSI	
MAXIMUM HOLE DEVIATION	NA	
NOMINAL LOGGING SPEED	100 F/MN	
MAX. RECORDED TEMP.	234 DEGF	
REFERENCE LOG	BAKER HUGHES OPEN HOLE	
REFERENCE LOG DATE	13-Dec-2017	
EQUIP. NO.	ML-4291	GRAND JCT.
RECORDED BY	T. NEWELL	
WITNESSED BY	MATT SETTLES	

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: 5685' - 5707'  
SJ: 6562' - 6584'

## EQUIPMENT DATA

RUN	TRIP	TOOL	SERIES NO.	SERIAL NO.	POSITION
1	1	RAL	1426XA	10417452	CENTRALIZED
1	1	GR/CCL	1355XA	11871507	CENTRALIZED

# RAL MAIN PASS 0 PSI

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

Patches: 2

Plotted: Thu Jan 25 05:21:37 2018

## PARAMETER AND FILTER SUMMARY REPORT

FILE: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_06W/p012g02.prm  
 LOGGING MODE: DEPTH DIRECTION: UP  
 TOP DEPTH: 17.750 ft BOTTOM DEPTH: 7435.895 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*)	187	us	TOP	BOTTOM
	AMP WINDOW START (fgp2*)	187	us	"	"
	AMP WINDOW START (fgp3*)	187	us	"	"
	AMP WINDOW START (fgp4*)	187	us	"	"
	AMP WINDOW START (fgp5*)	187	us	"	"
	AMP WINDOW START (fgp6*)	187	us	"	"
	AMP WINDOW START (fgp7*)	187	us	"	"
	AMP WINDOW START (fgp8*)	187	us	"	"
	AMP WINDOW START (fgpn*)	187	us	"	"
	AMP WINDOW LENGTH	25	us	"	"
TRAVEL TIME WINDOW (NEAR)	TT WINDOW START (ttn*)	175	us	"	"
	TT WINDOW LENGTH	500	us	"	"
	FIRST BRK THRESHOLD (ttn*)	4	mV	"	"
RAL CASING PARAMETERS	PPT NEAR	200.391	us	"	"
RAL TOOL DELAY	TOOL DELAY (str1*)	-66	us	"	"
	TOOL DELAY (str2*)	-66	us	"	"
	TOOL DELAY (str3*)	-66	us	"	"
	TOOL DELAY (str4*)	-66	us	"	"
	TOOL DELAY (str5*)	-66	us	"	"
	TOOL DELAY (str6*)	-66	us	"	"
	TOOL DELAY (str7*)	-66	us	"	"
	TOOL DELAY (str8*)	-66	us	"	"
	TOOL DELAY (strn*)	-66	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	2	mV	"	"
	FULL BOND AMP REC 2	2	mV	"	"
	FULL BOND AMP REC 3	2	mV	"	"
	FULL BOND AMP REC 4	2	mV	"	"

FULL BOND AMP REC 5	2	mV	"	"
FULL BOND AMP REC 6	2	mV	"	"
FULL BOND AMP REC 7	2	mV	"	"
FULL BOND AMP REC 8	2	mV	"	"

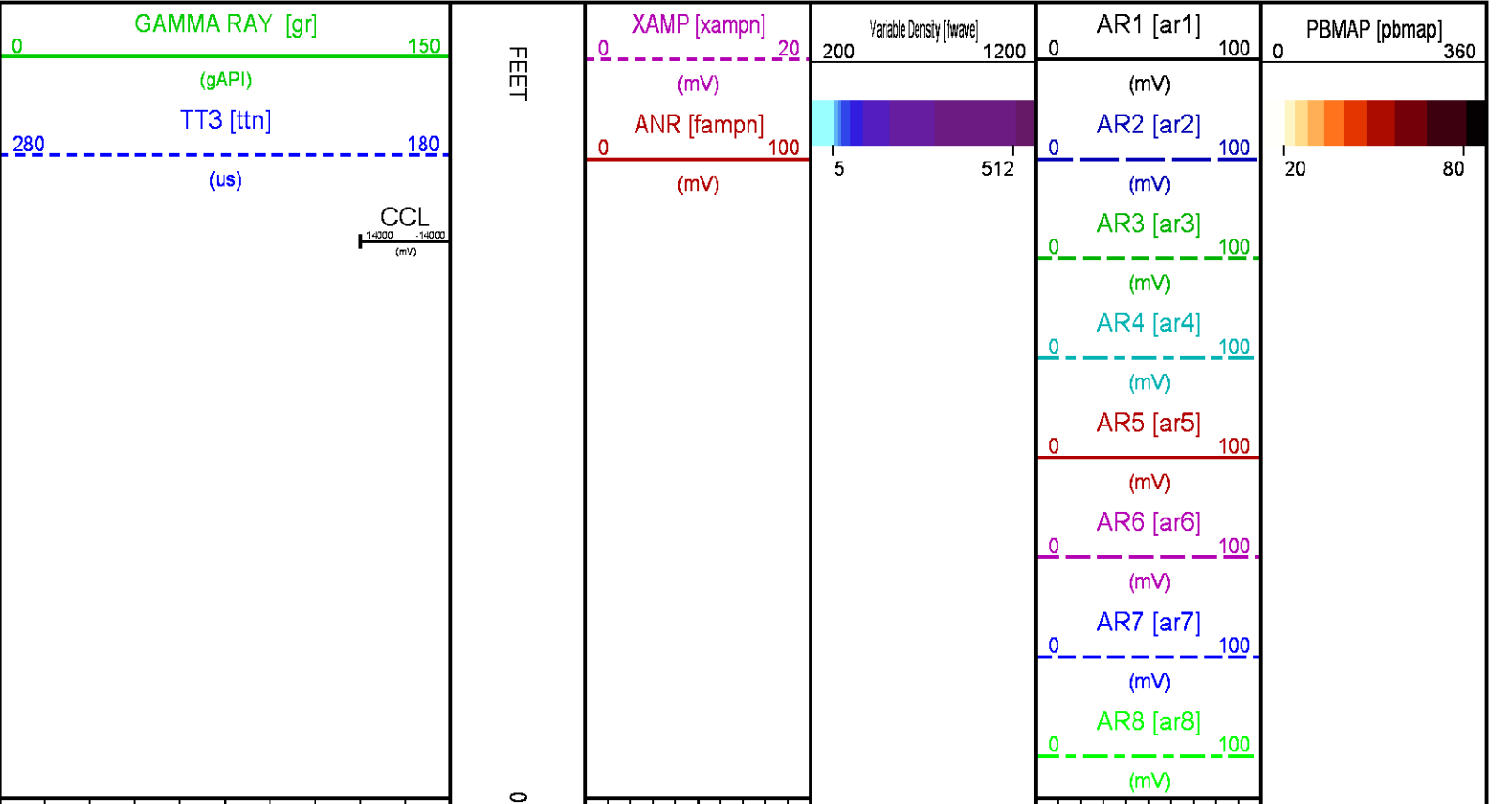
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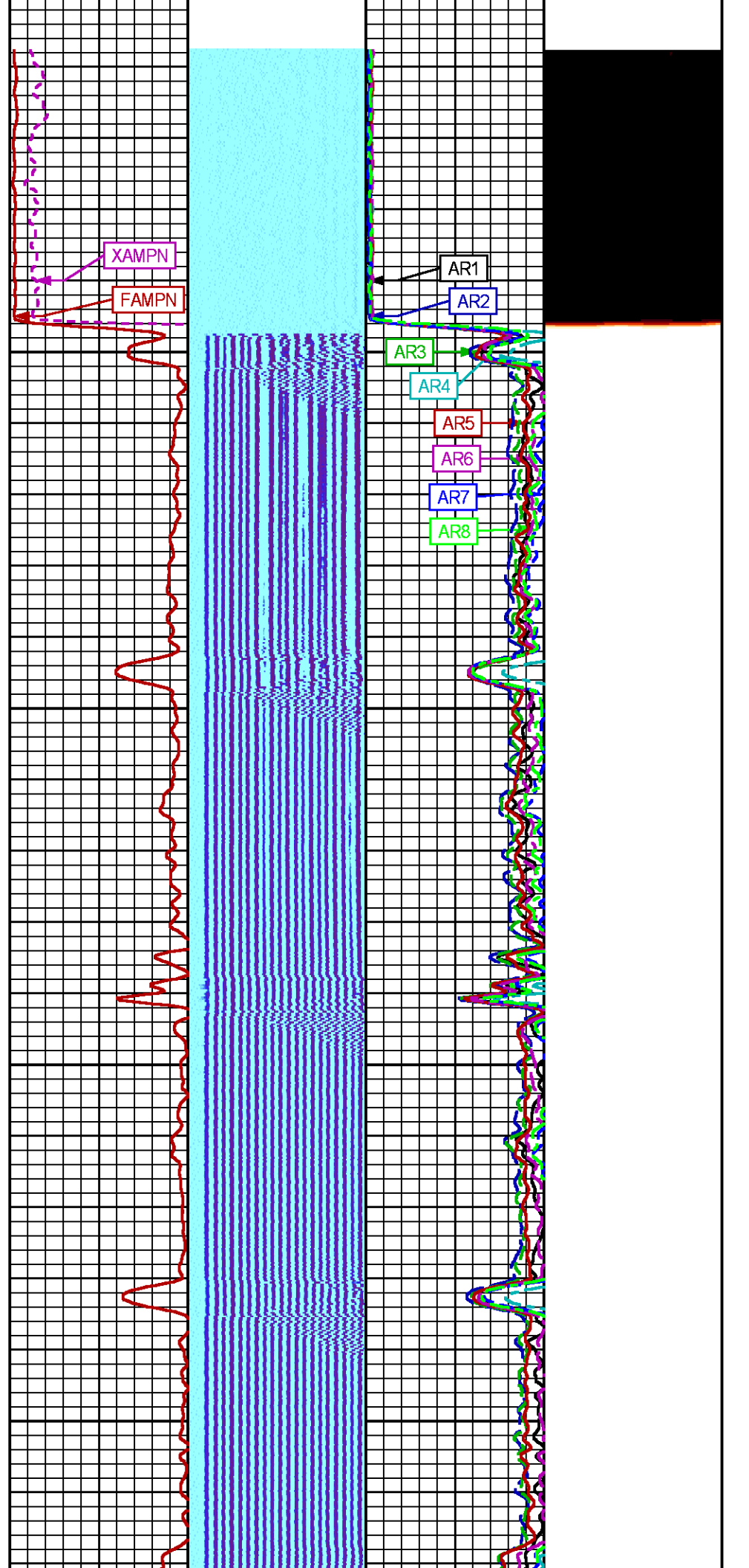
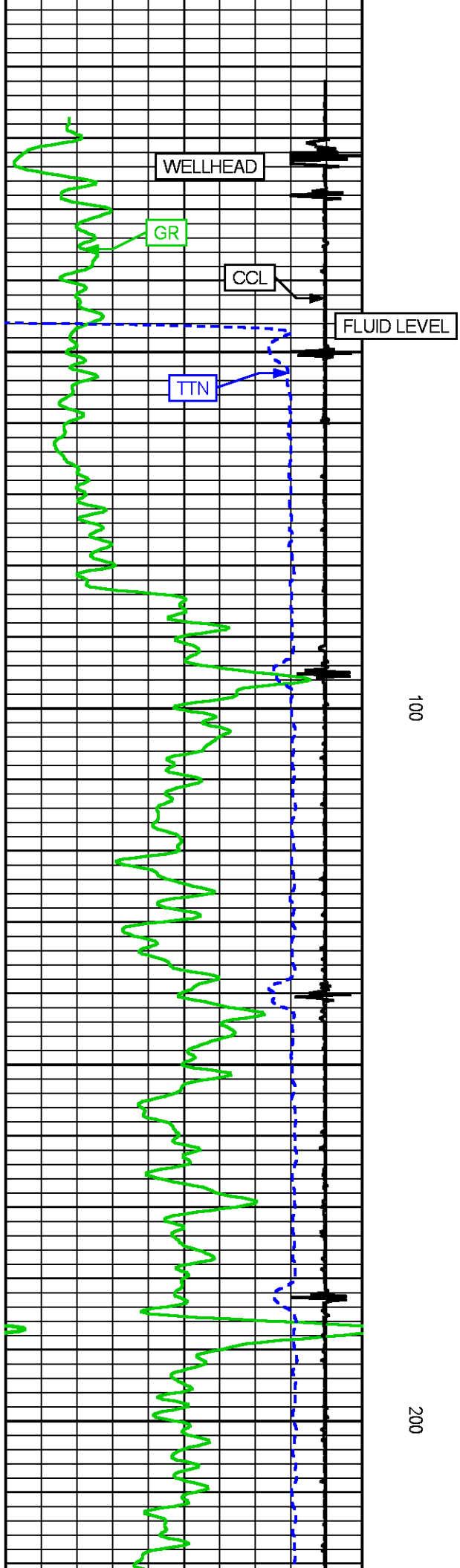
CURVE NAME	CREATION DATE	CURVE DESCRIPTION
F1:AR1	N/A	FIXED GATE AMPLITUDE T-R1
F1:AR2	N/A	FIXED GATE AMPLITUDE T-R2
F1:AR3	N/A	FIXED GATE AMPLITUDE T-R3
F1:AR4	N/A	FIXED GATE AMPLITUDE T-R4
F1:AR5	N/A	FIXED GATE AMPLITUDE T-R5
F1:AR6	N/A	FIXED GATE AMPLITUDE T-R6
F1:AR7	N/A	FIXED GATE AMPLITUDE T-R7
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

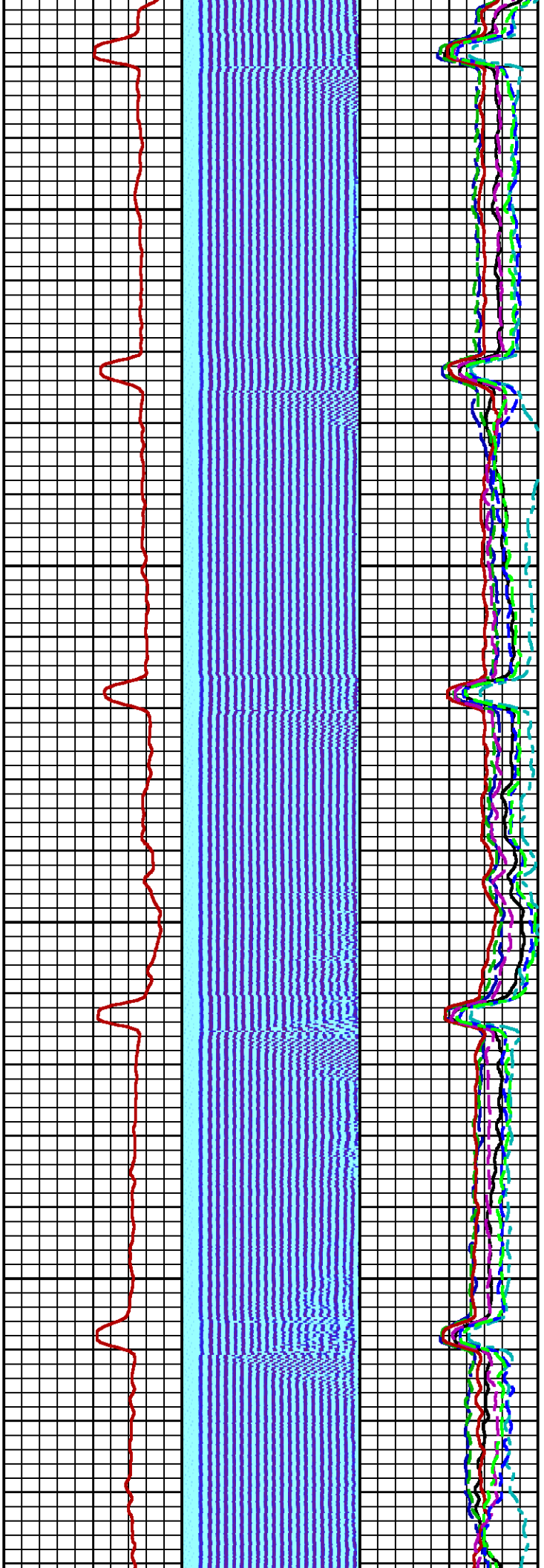
CURVE MEASURE POINT OFFSET

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_06W/24-06W_RAL_MAIN.fvpdf [5"/100' Scale]
Plot Interval	: 0 - 7425 Feet
Data File 1	: F1 : SysA:/dat1a/LARAMIE_NICHOLS_0994_24_06W/24-06W_RAL_MAIN.xtf
Created On	: N/A
Company	: LARAMIE ENERGY
Well	: NICHOLS-0994-24-06W
Field	: VEGA
File Interval	: 6.5 - 7434.5 Feet
OCT	: p012g

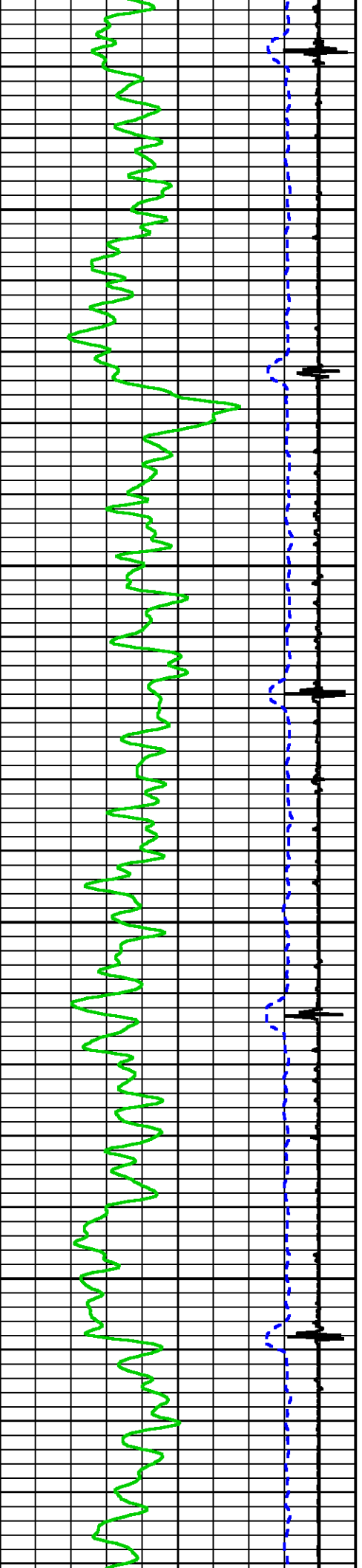


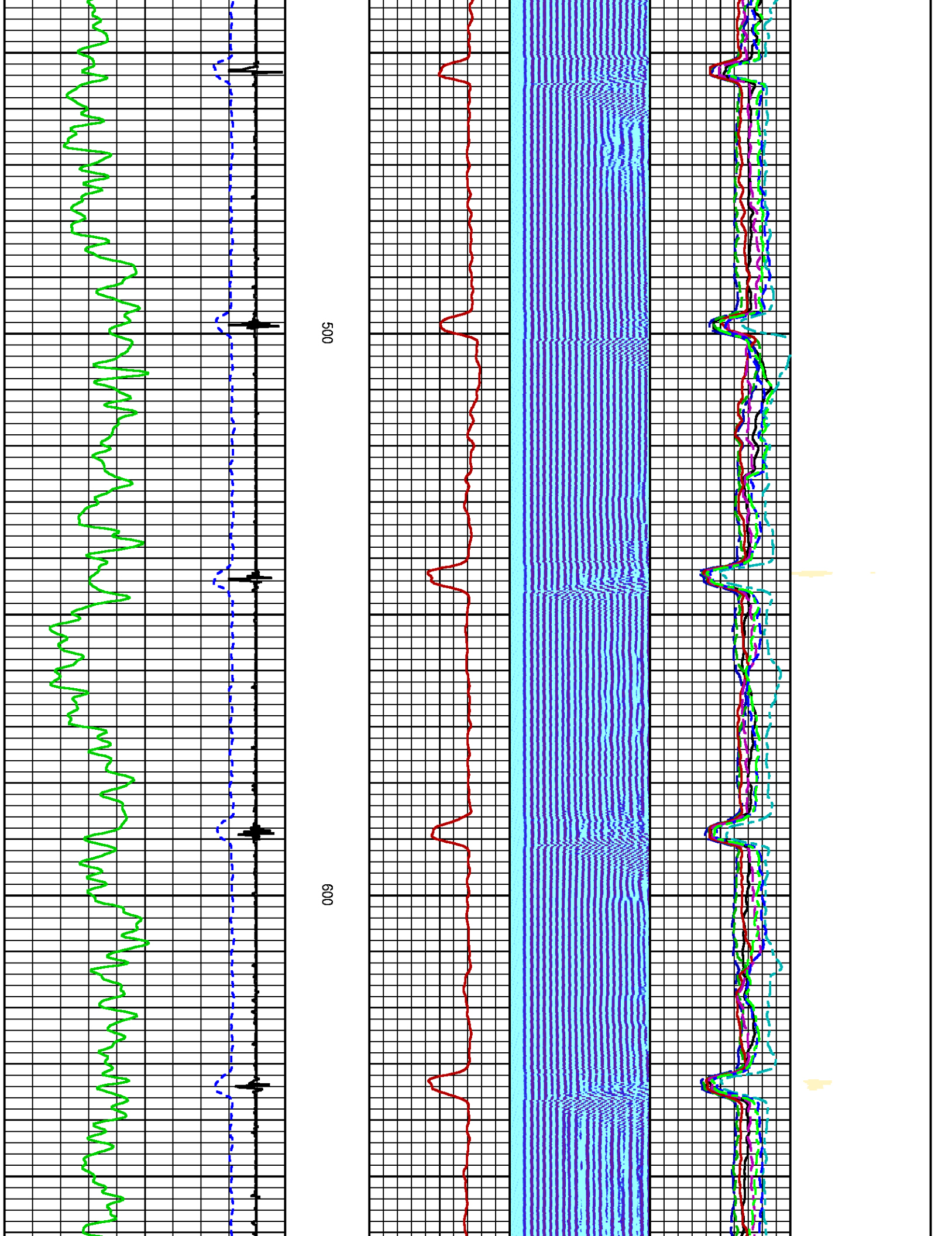




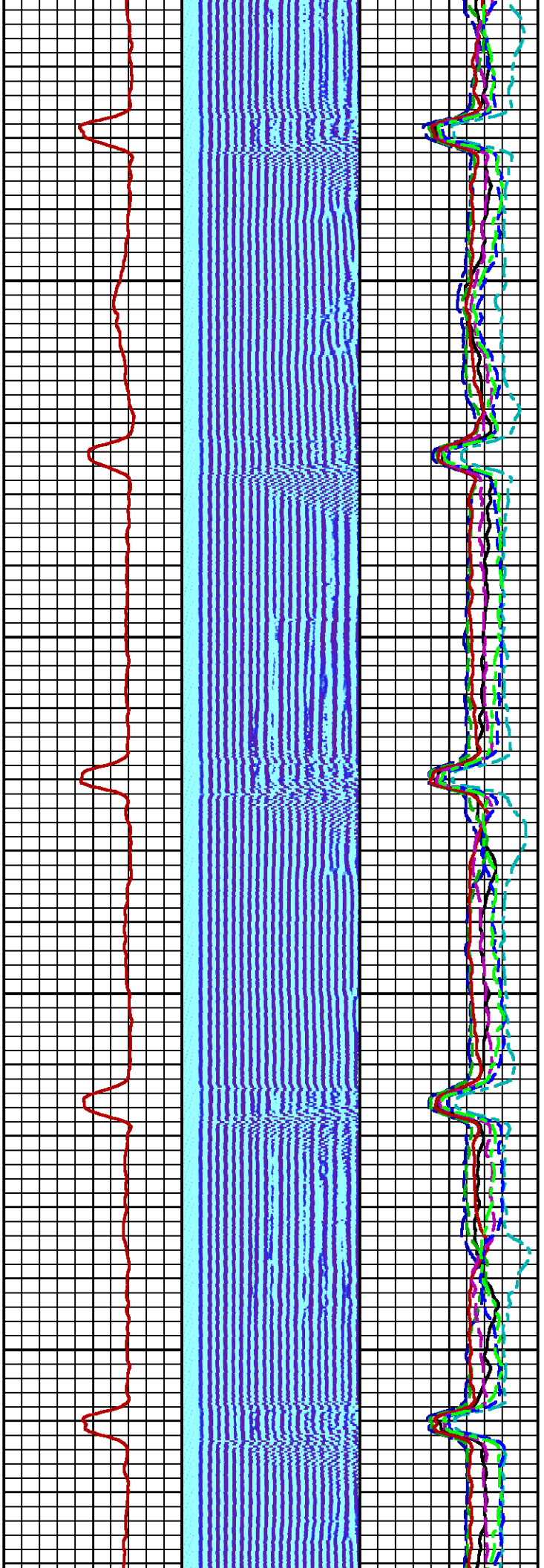
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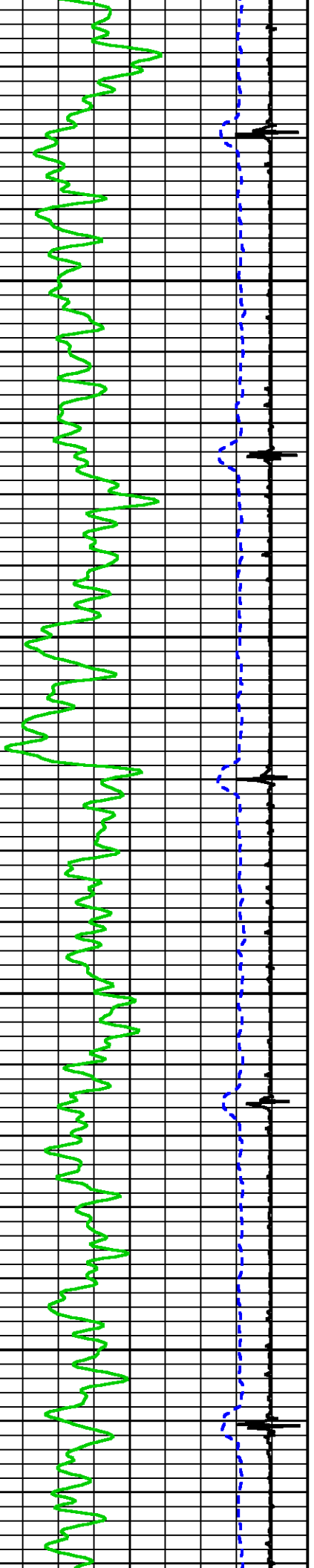


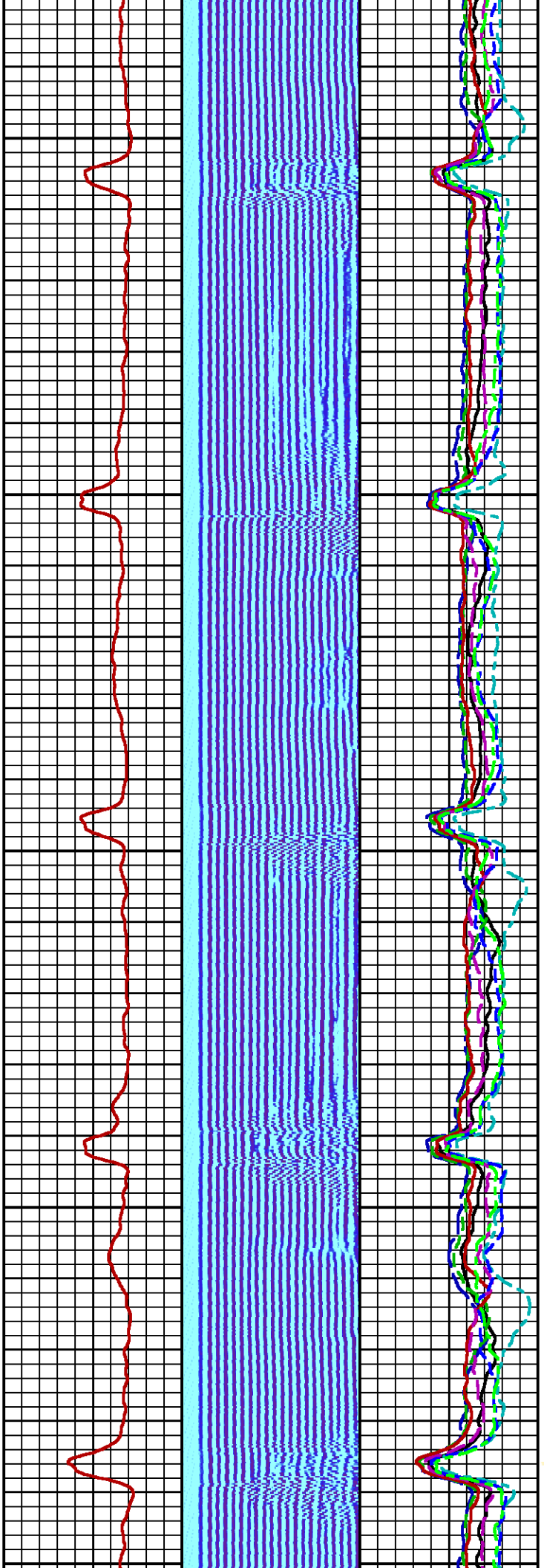




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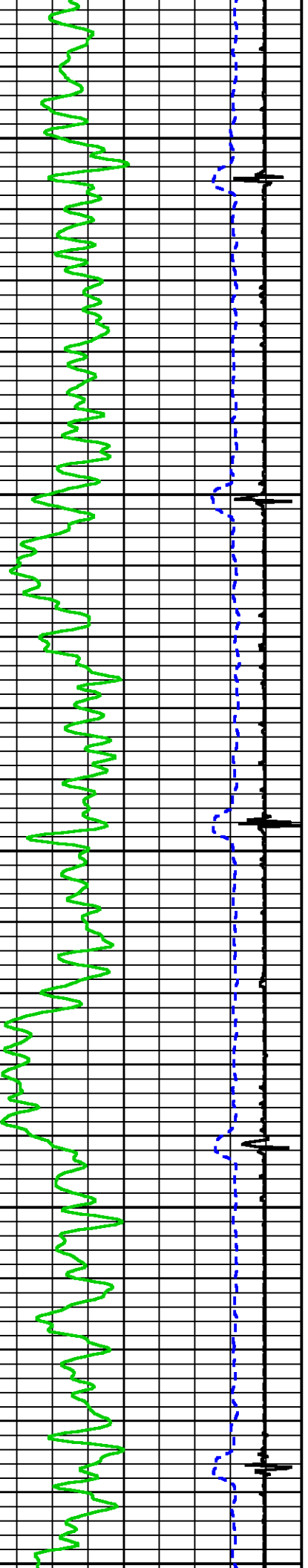




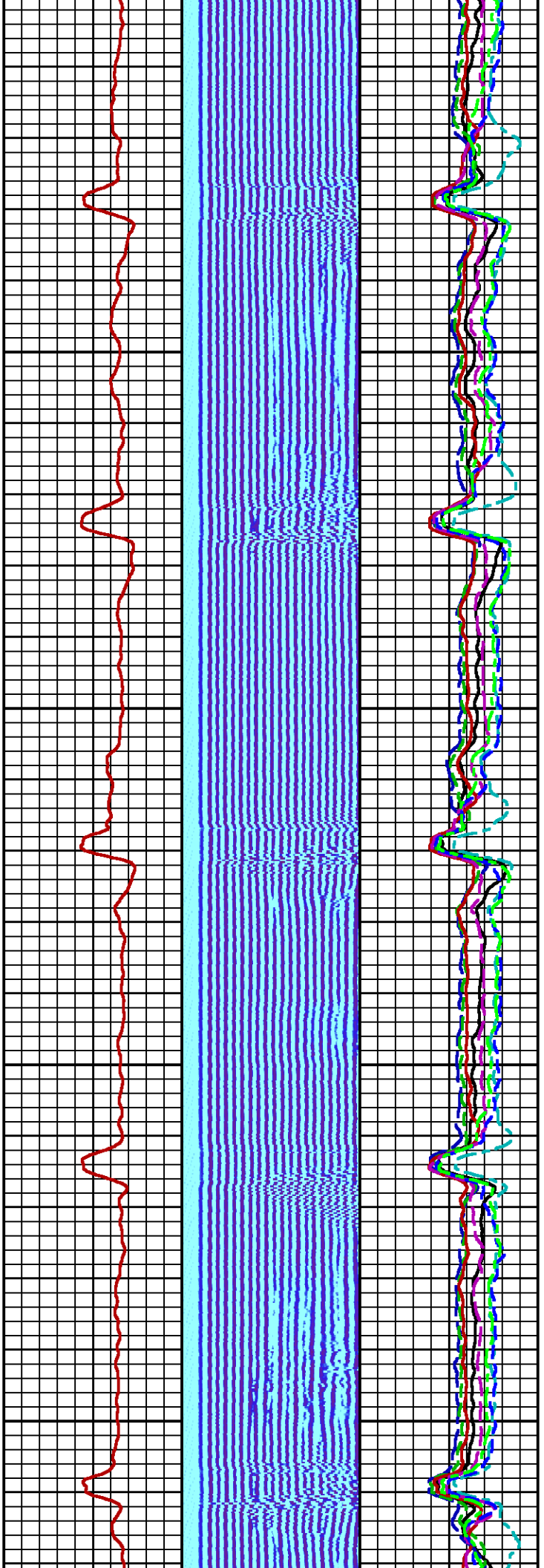
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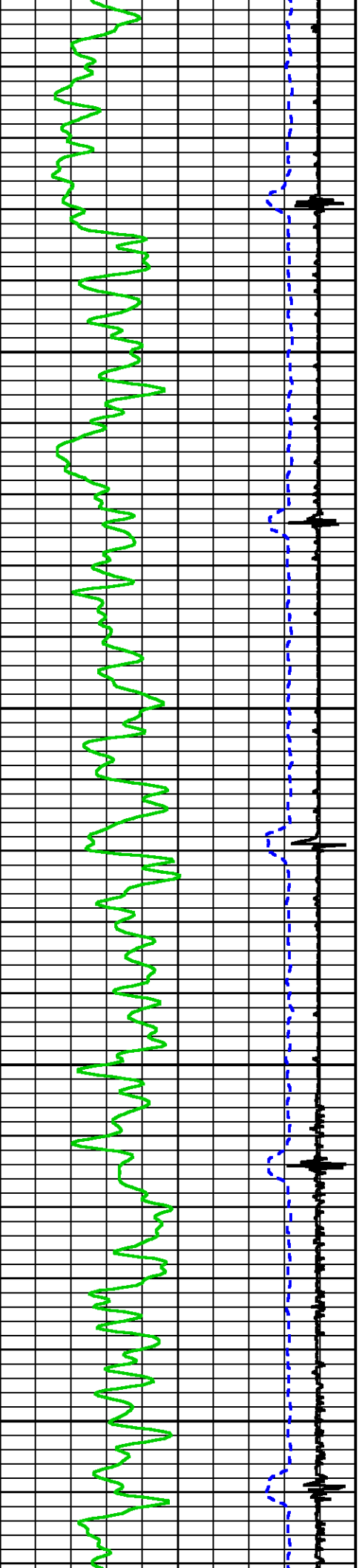


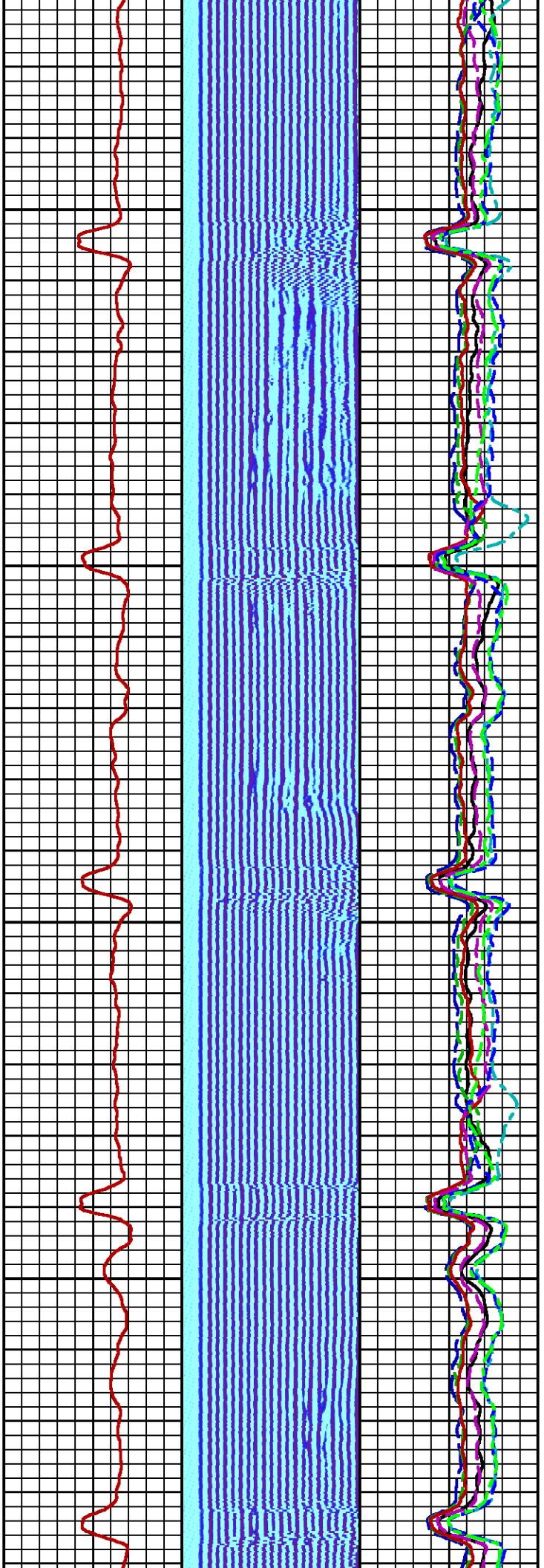


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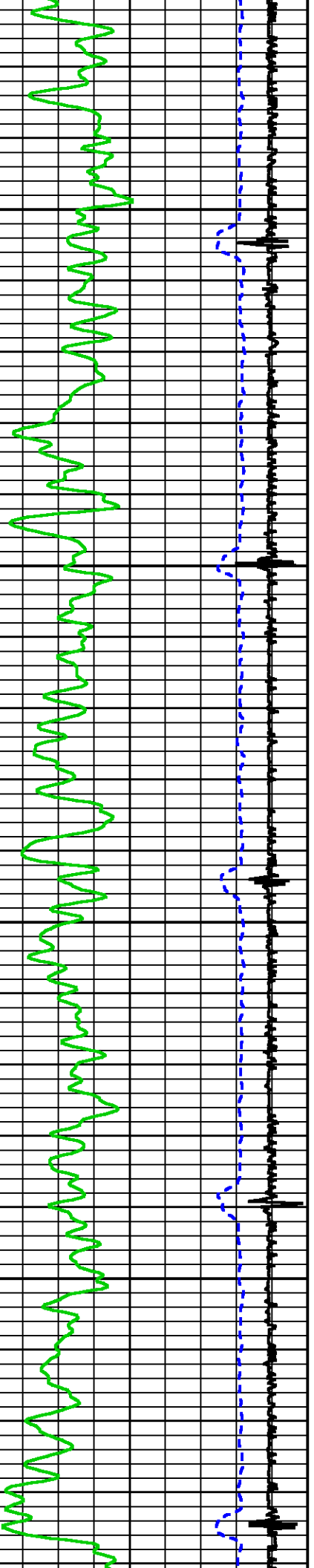
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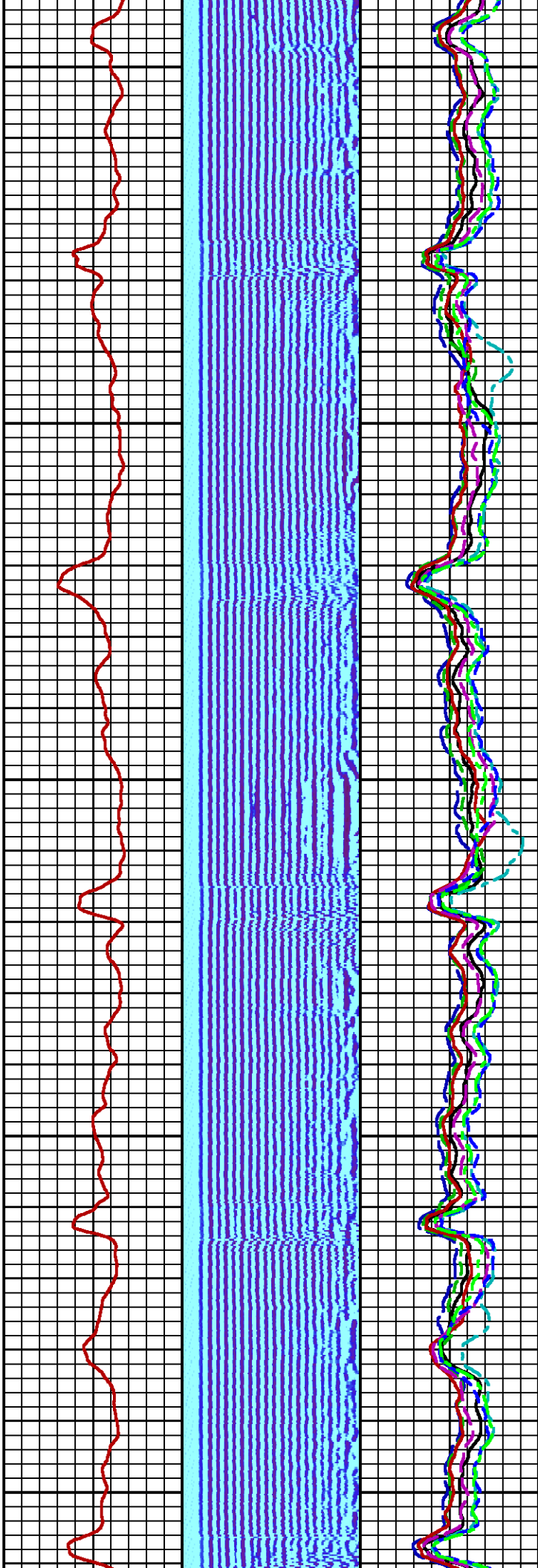
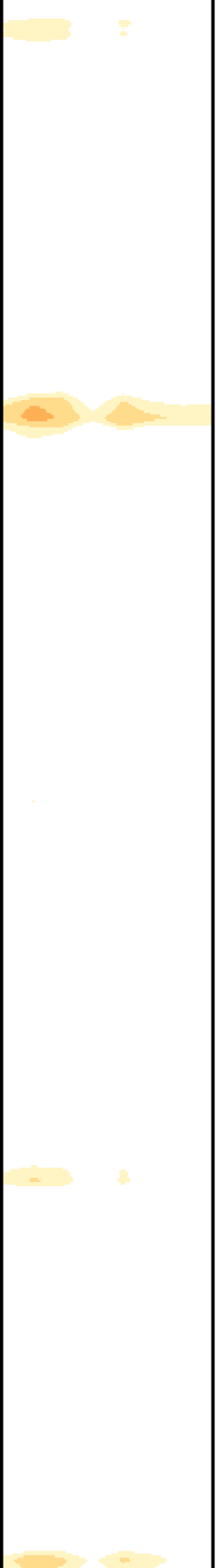




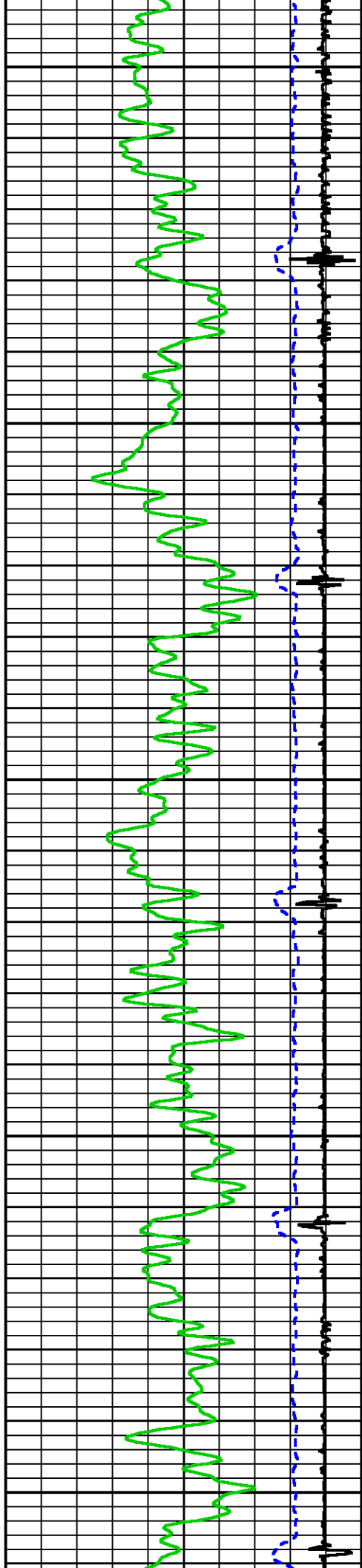
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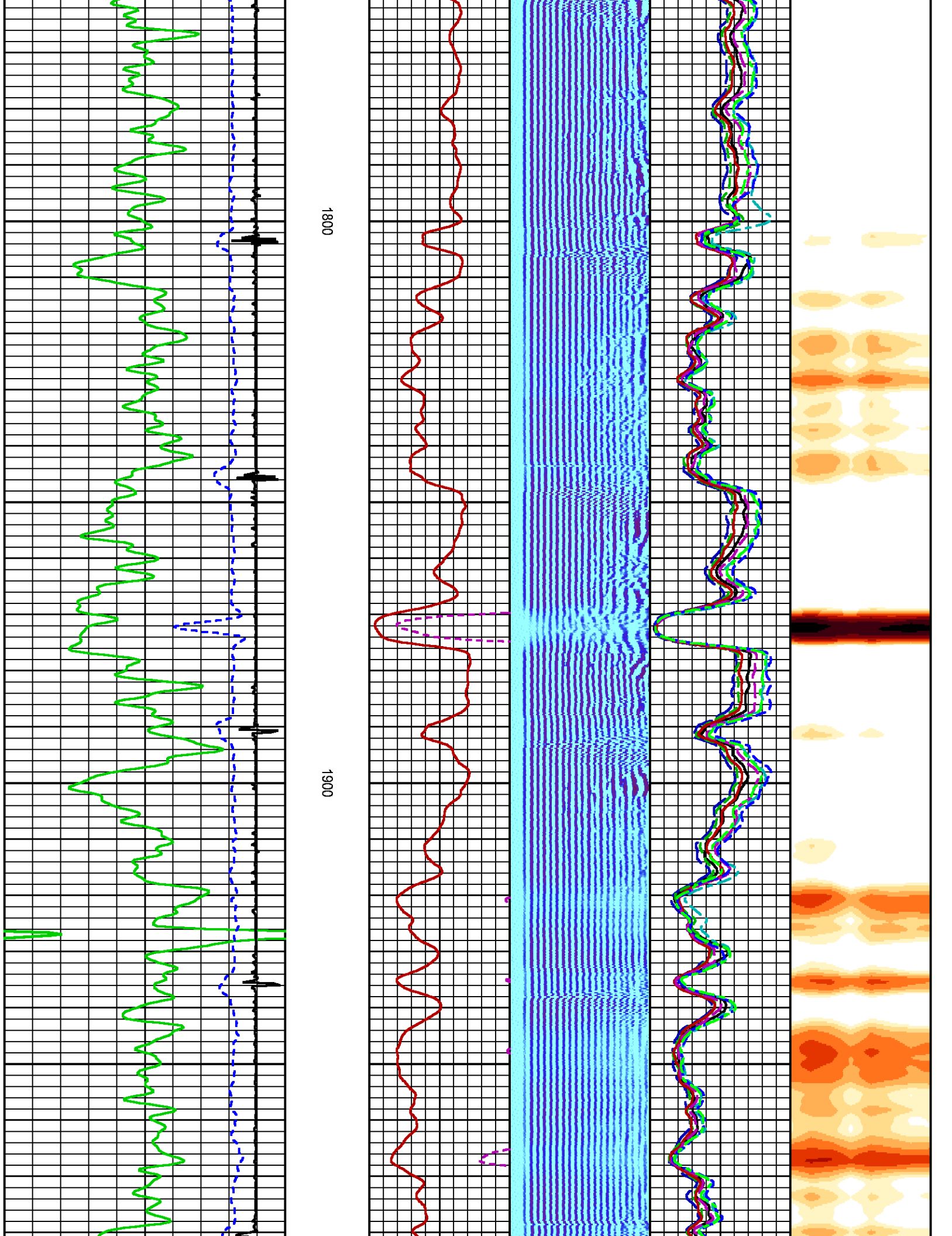
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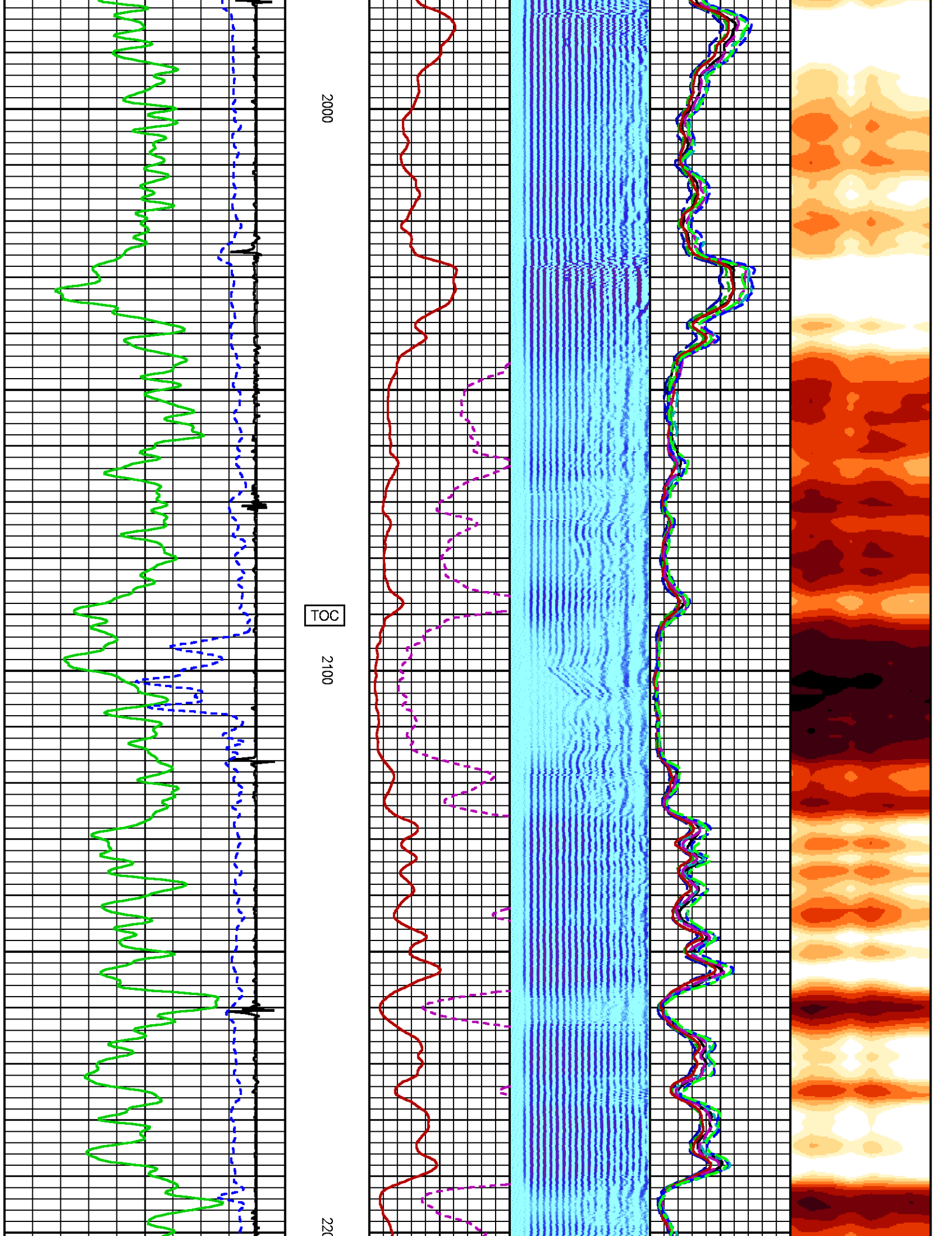


1600 1700

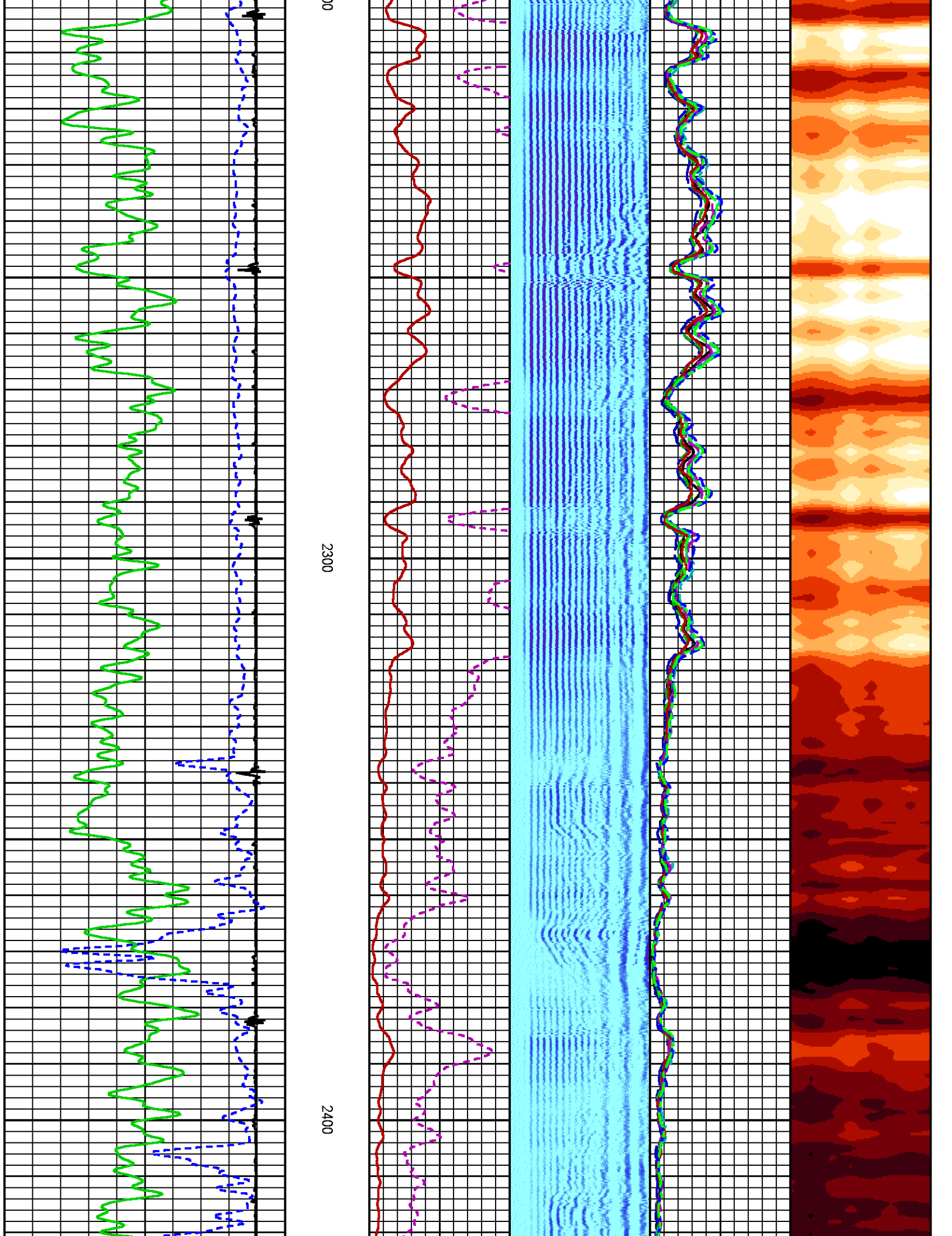


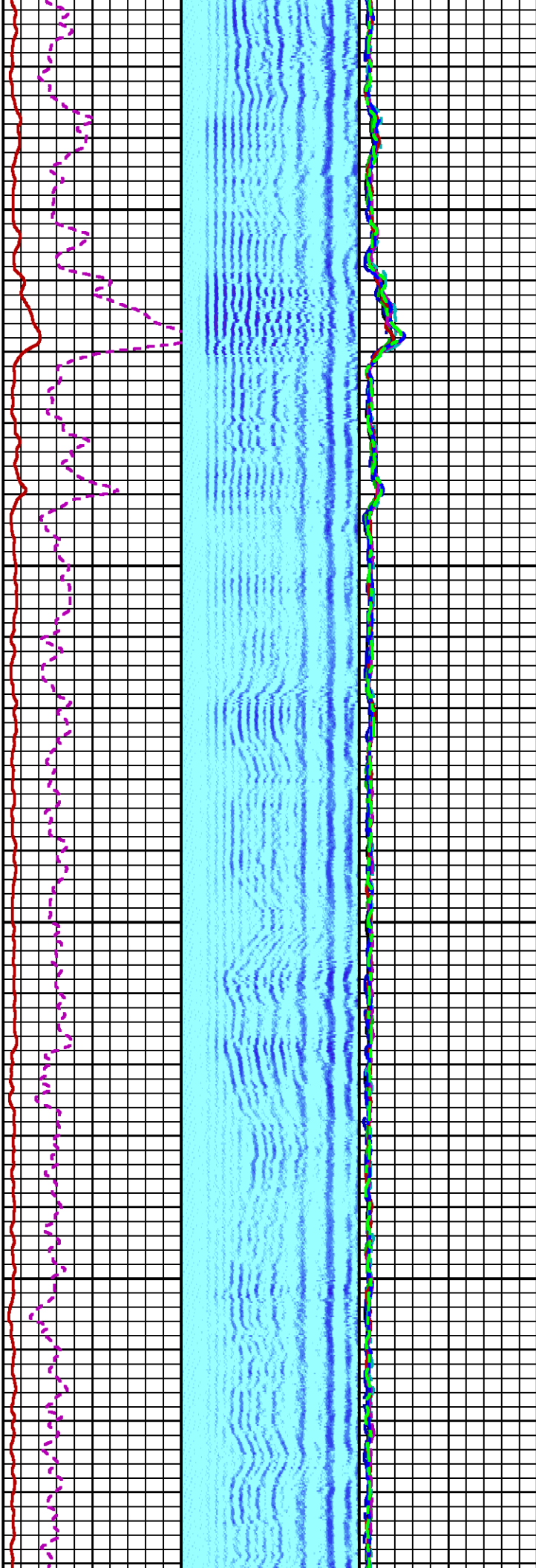






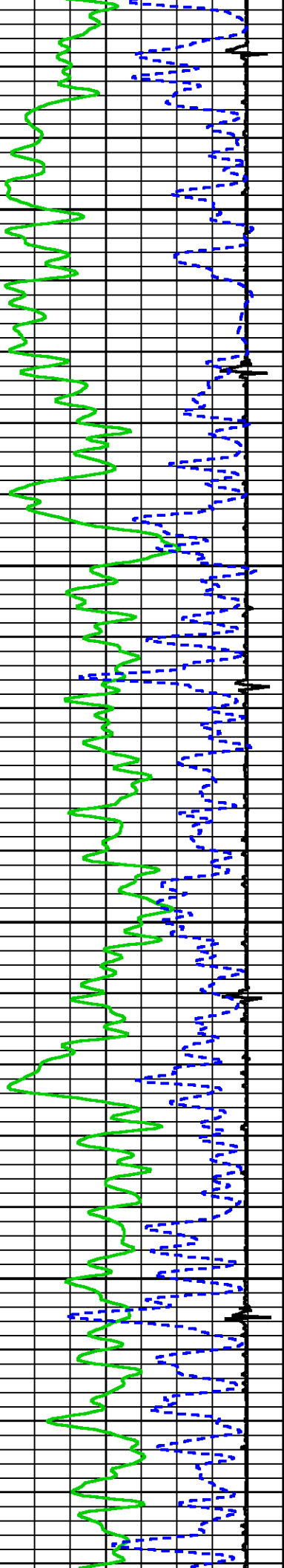


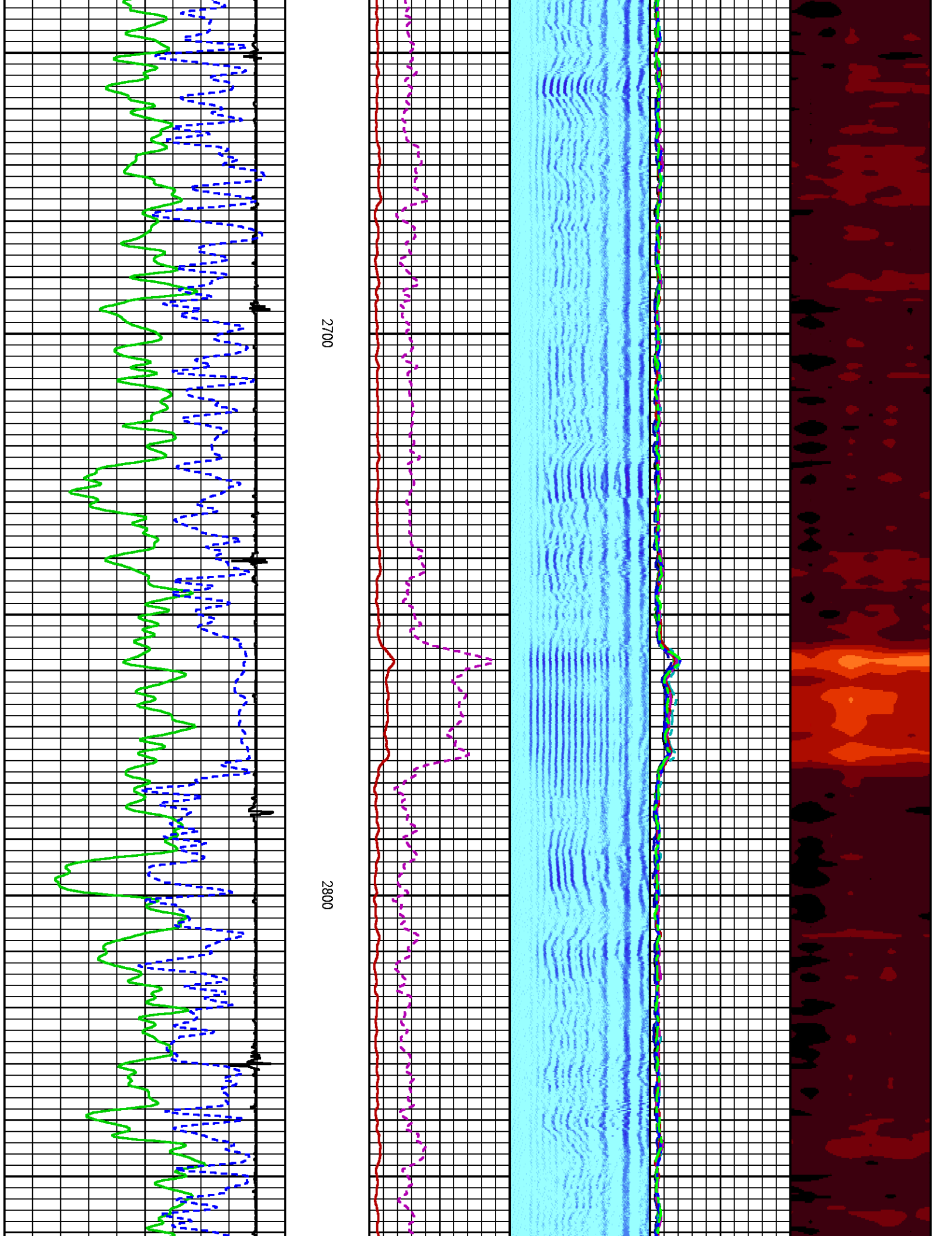


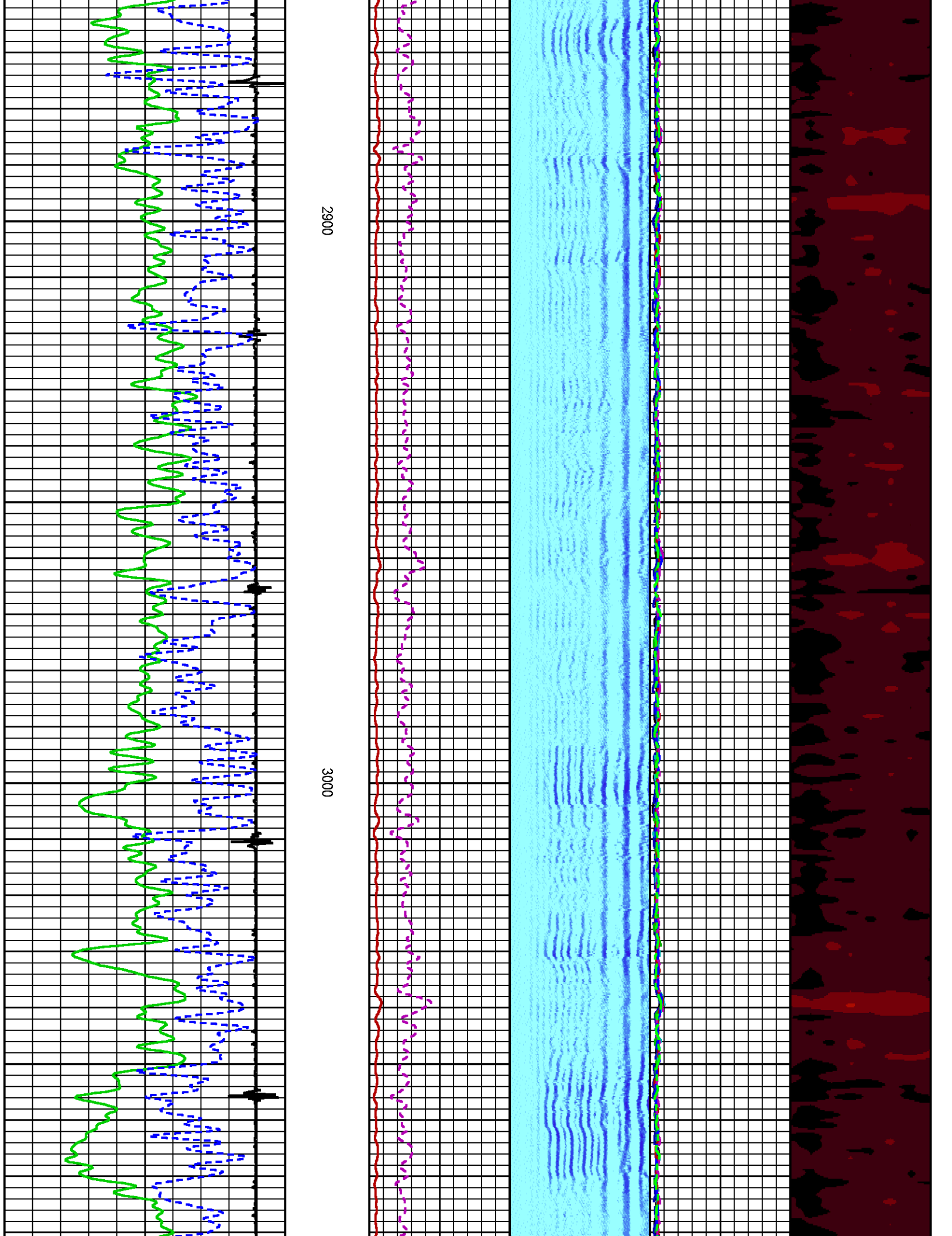


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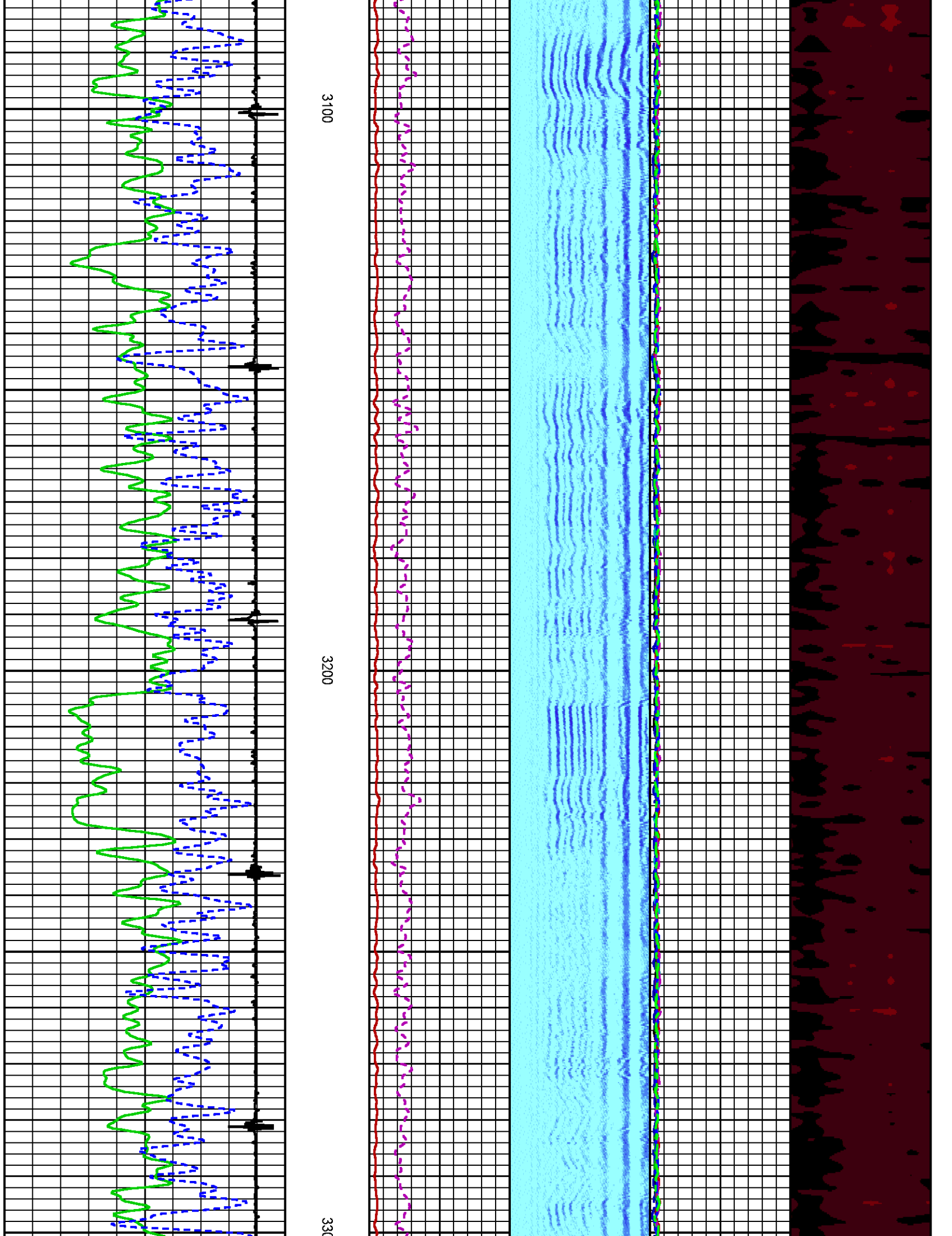
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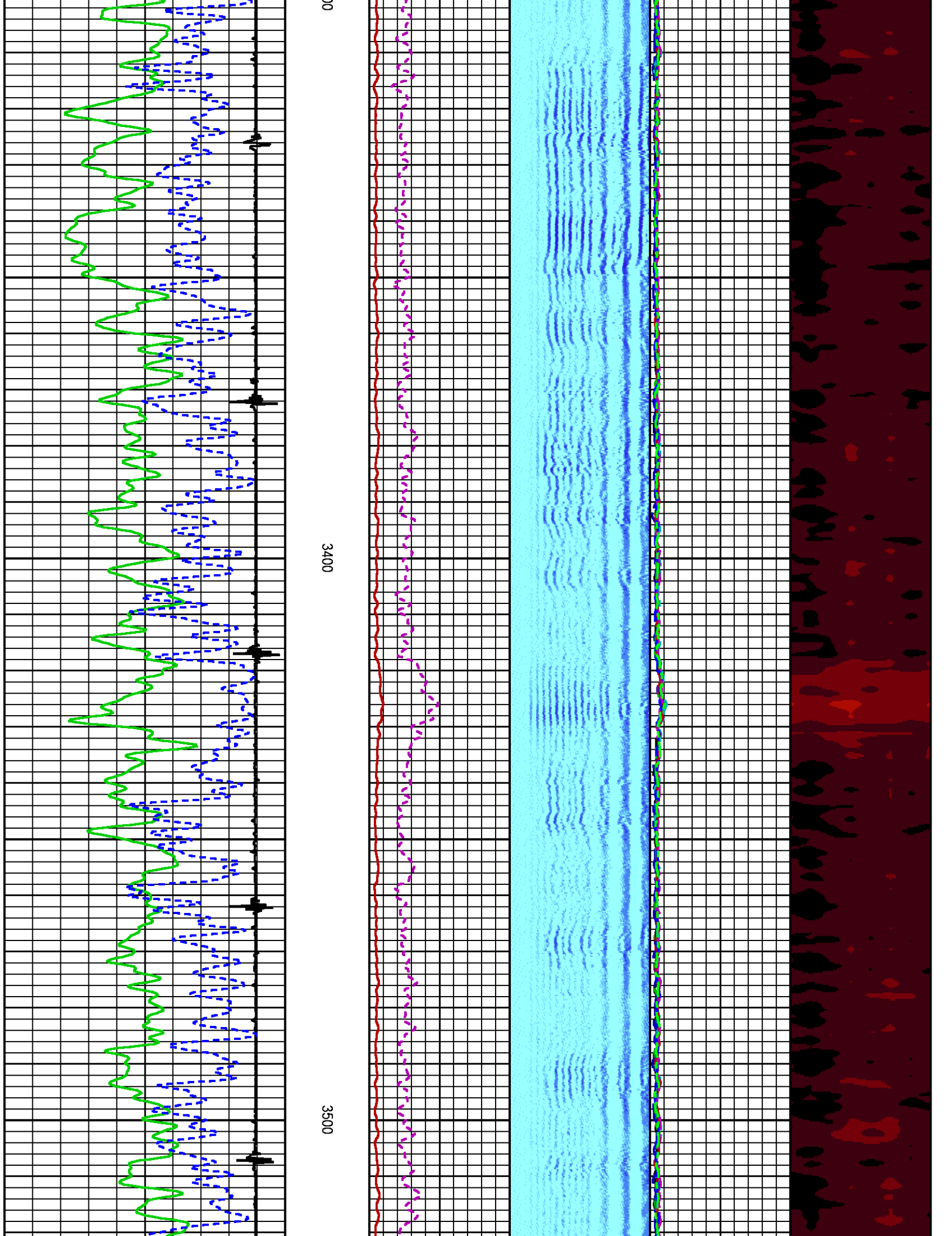


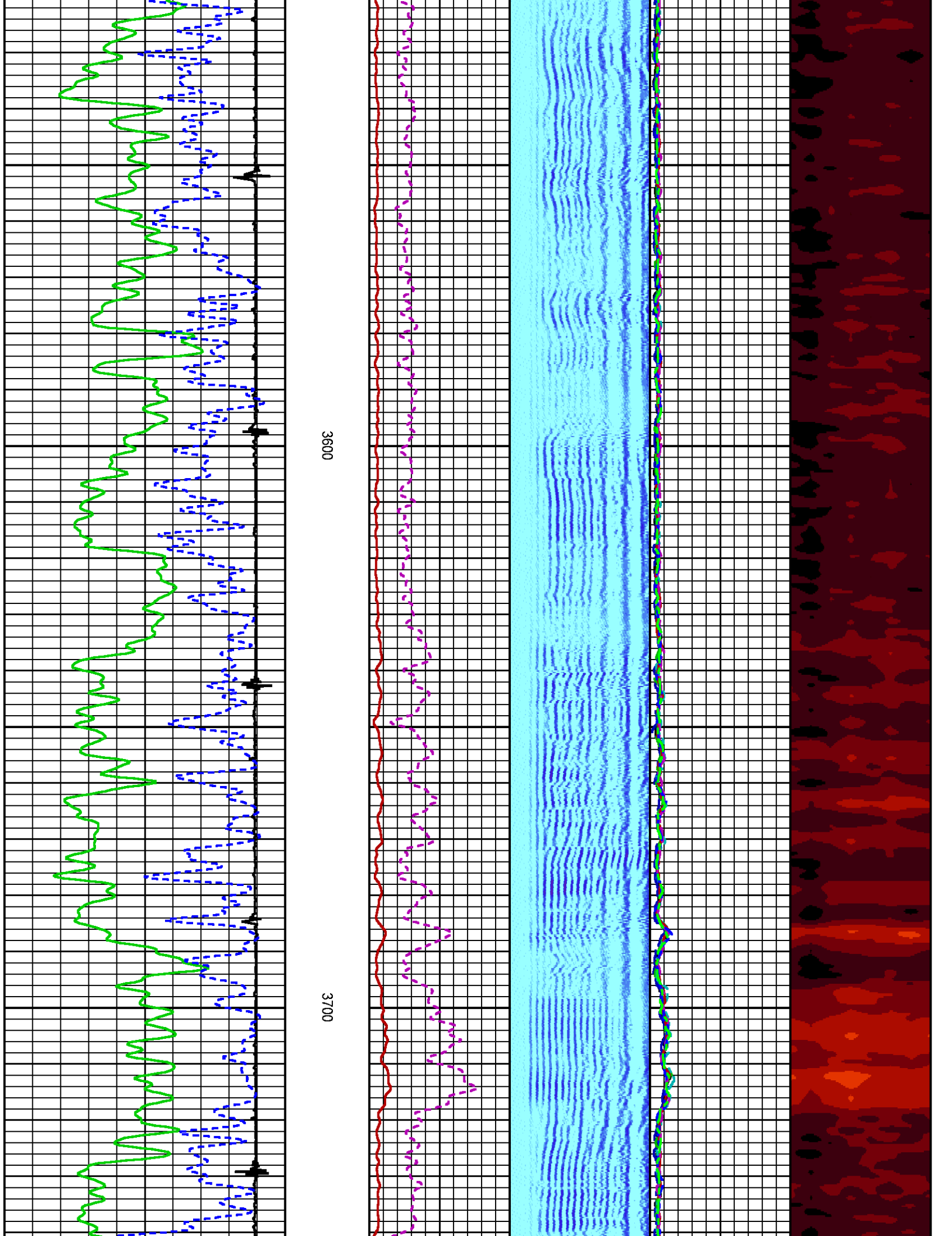


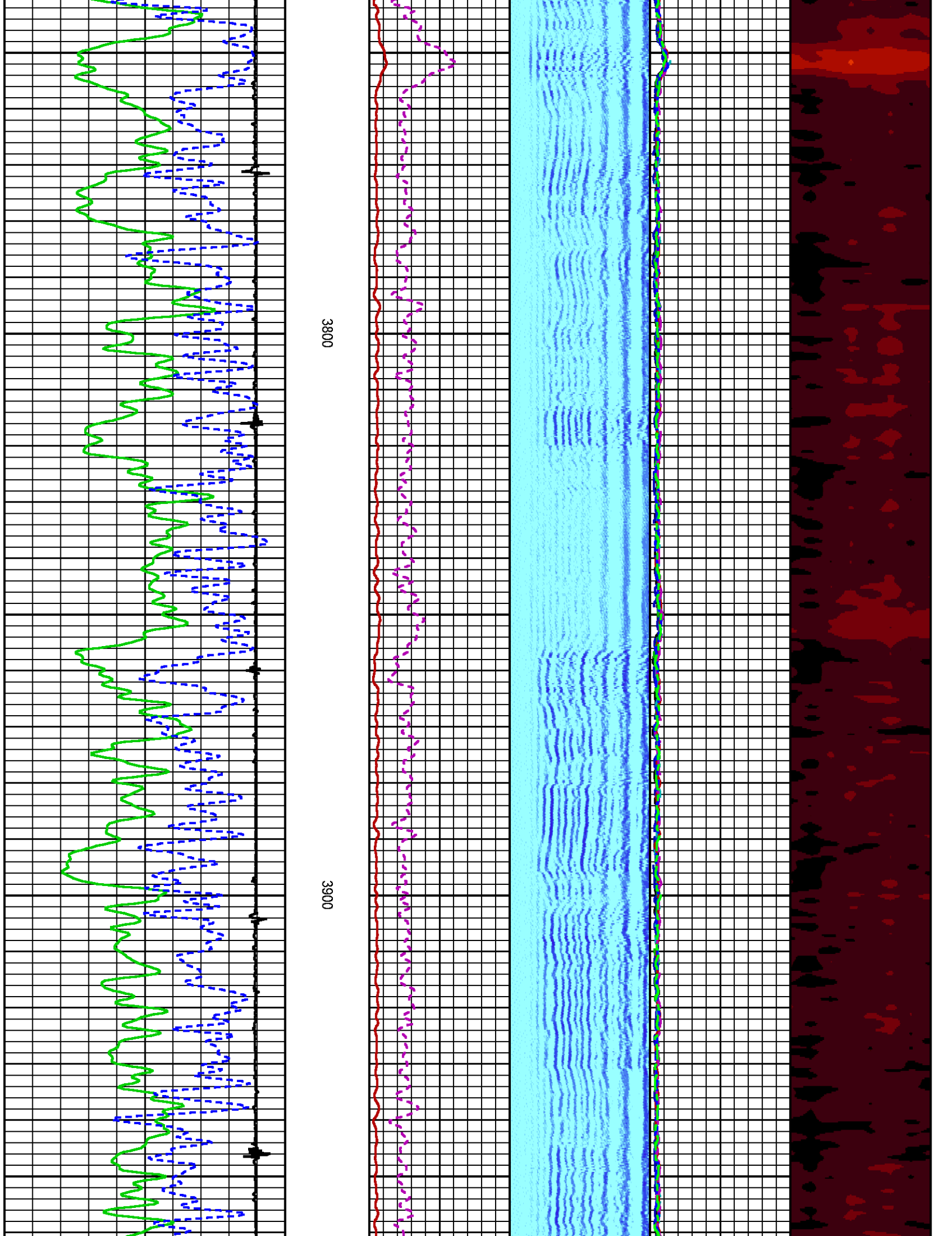


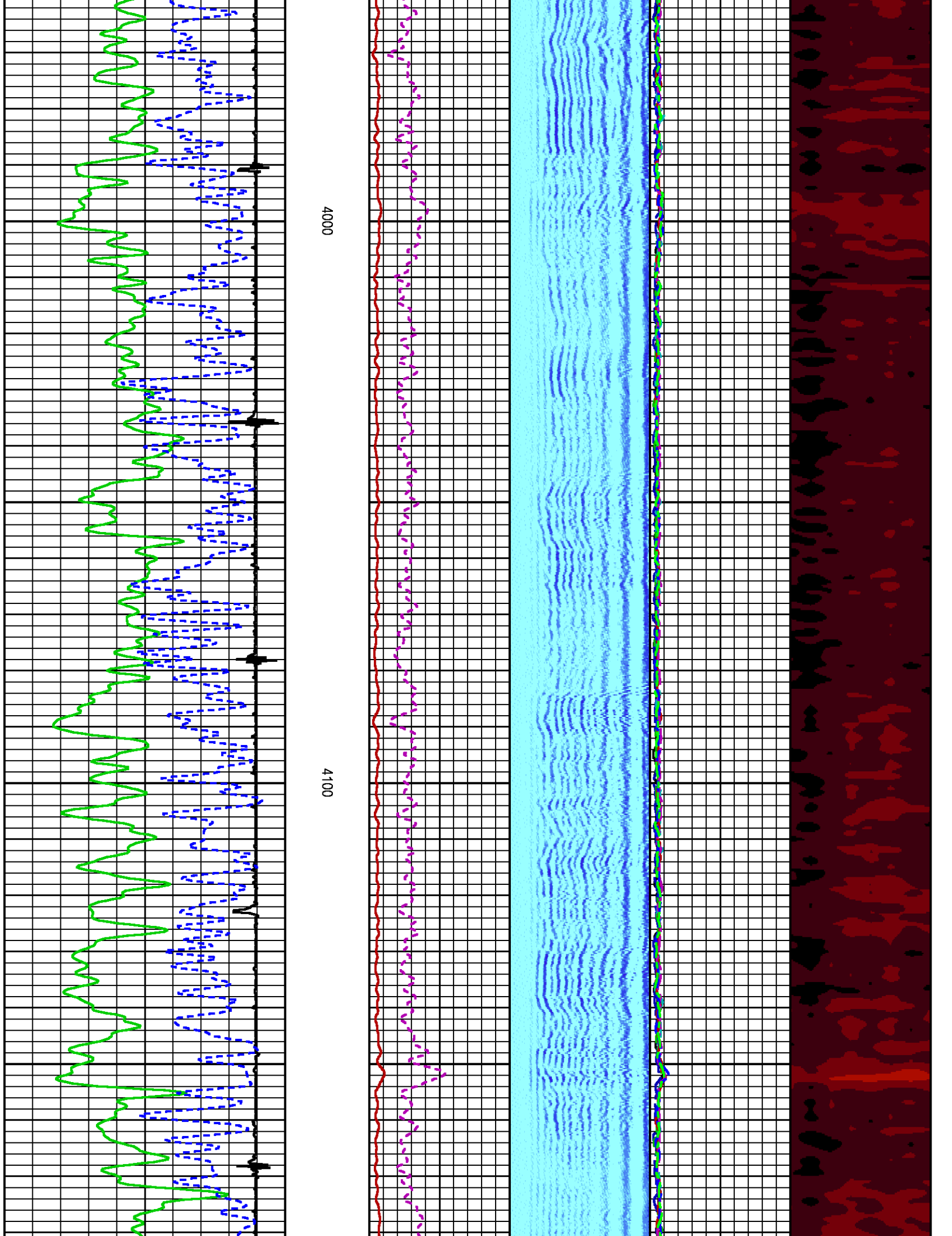




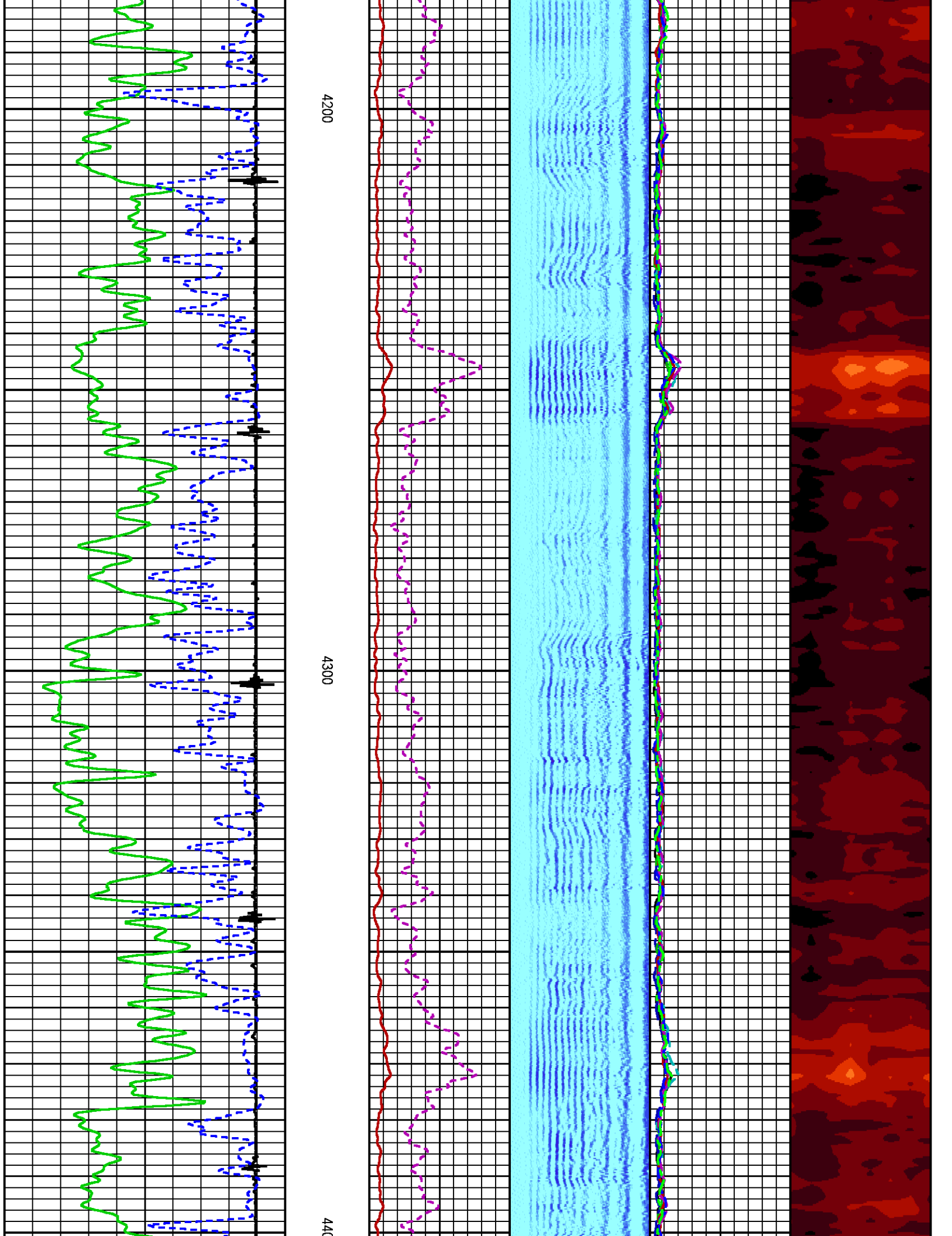




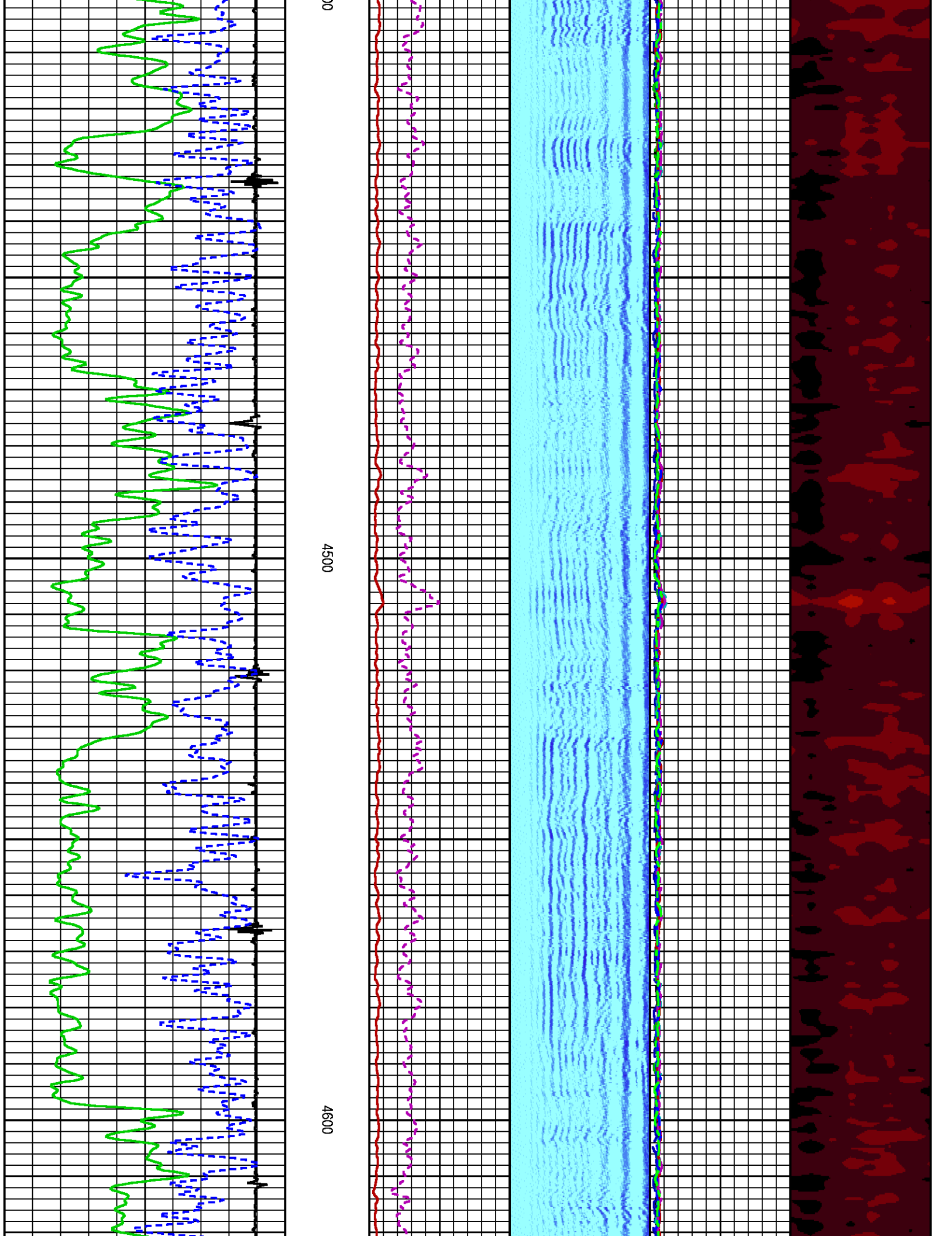


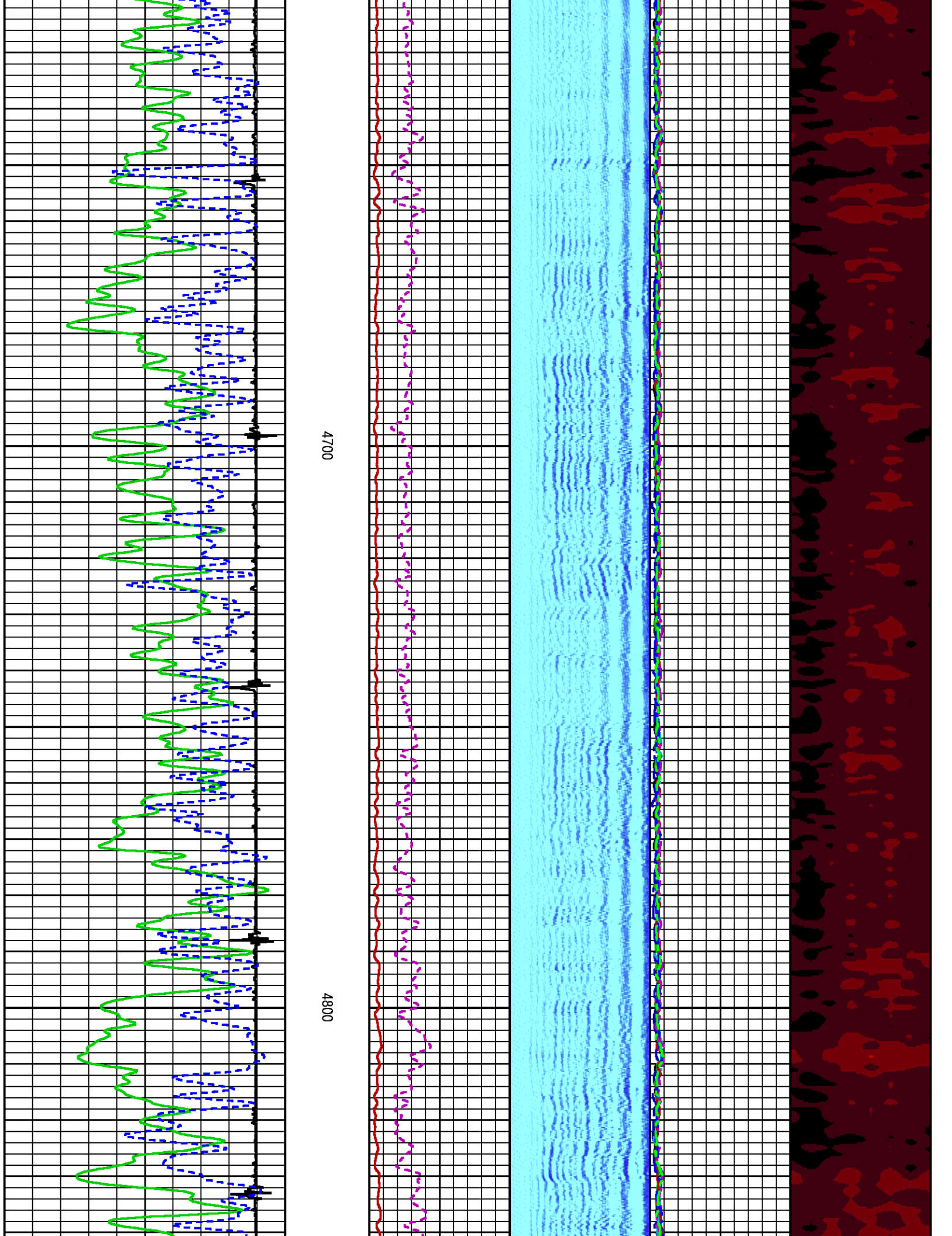


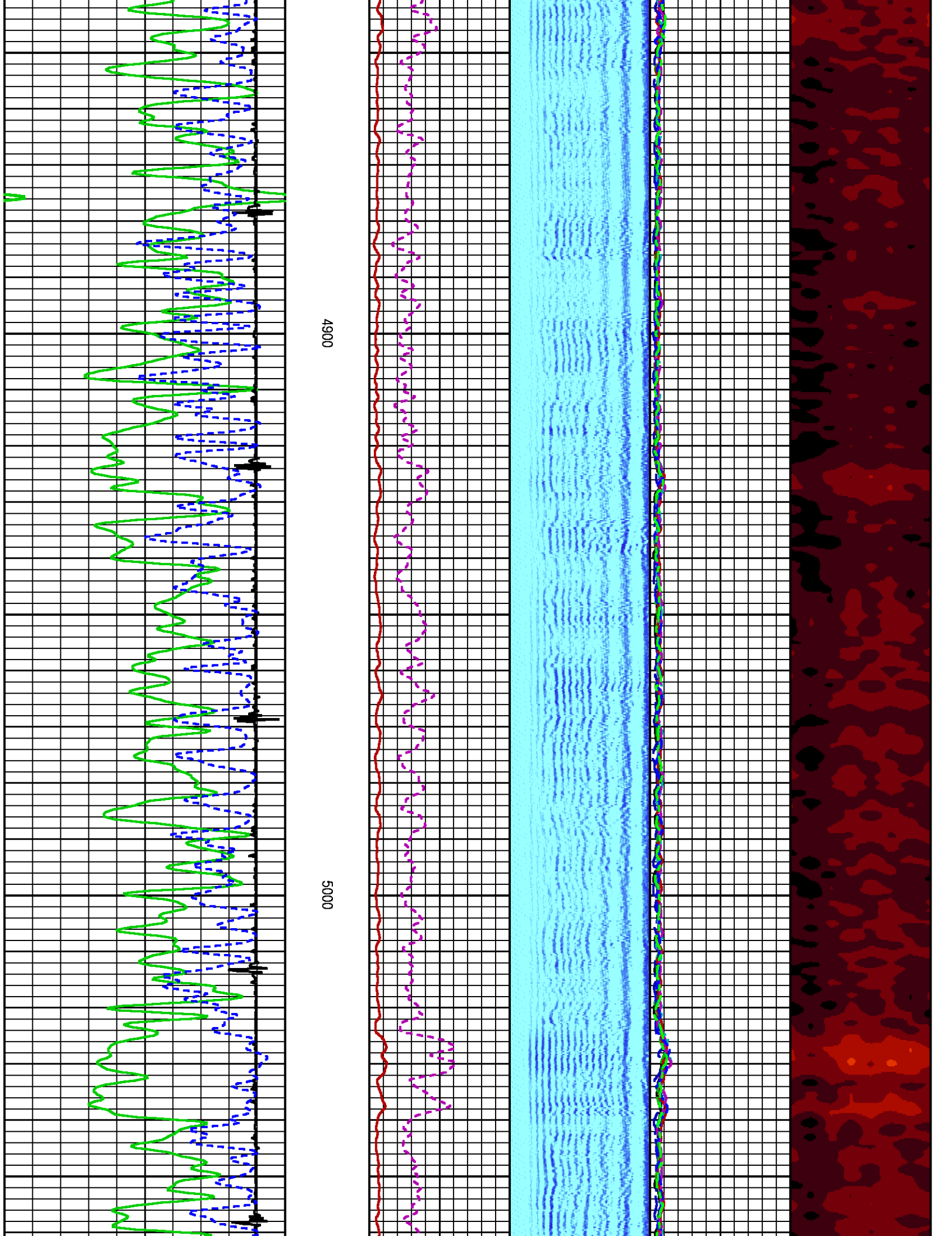


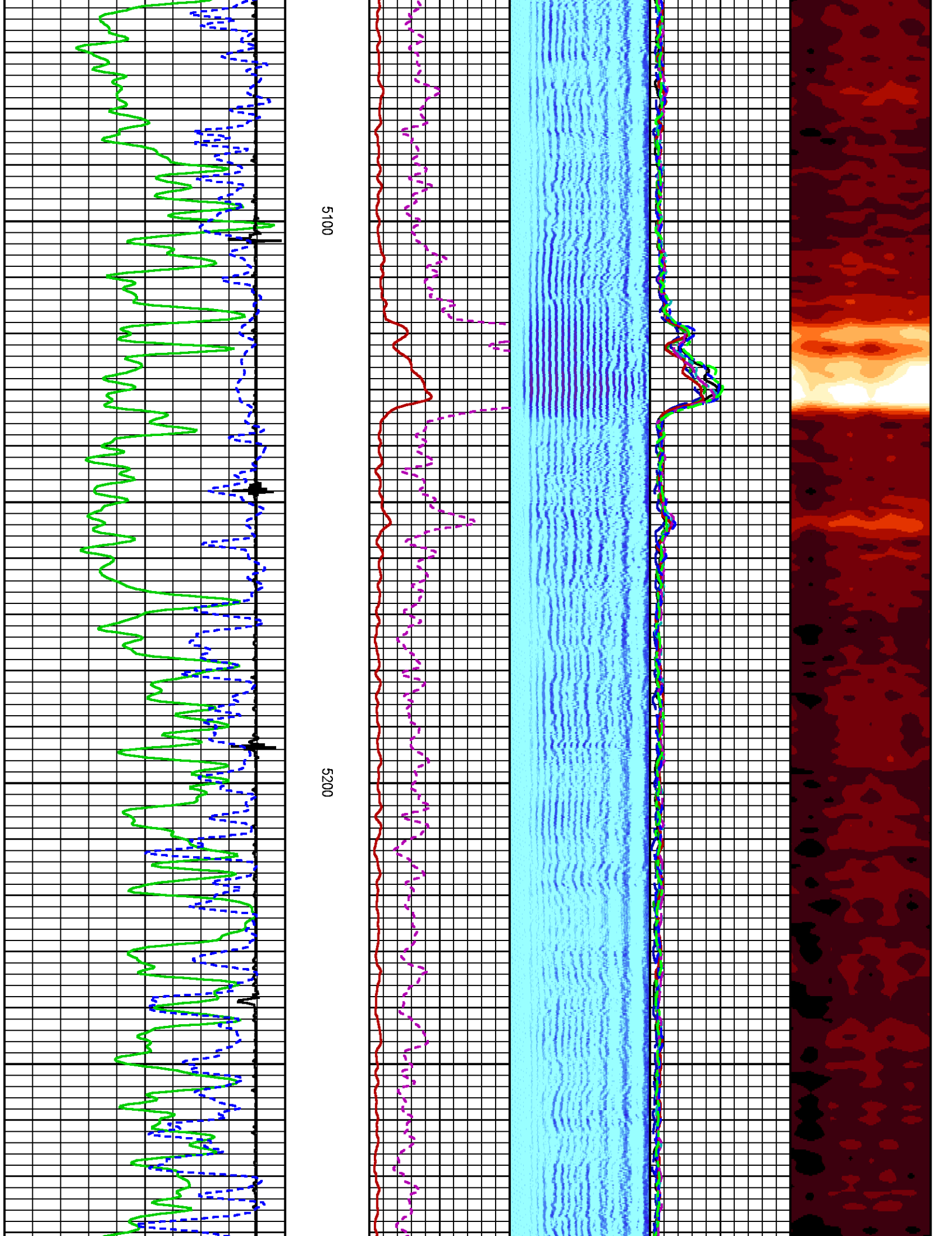




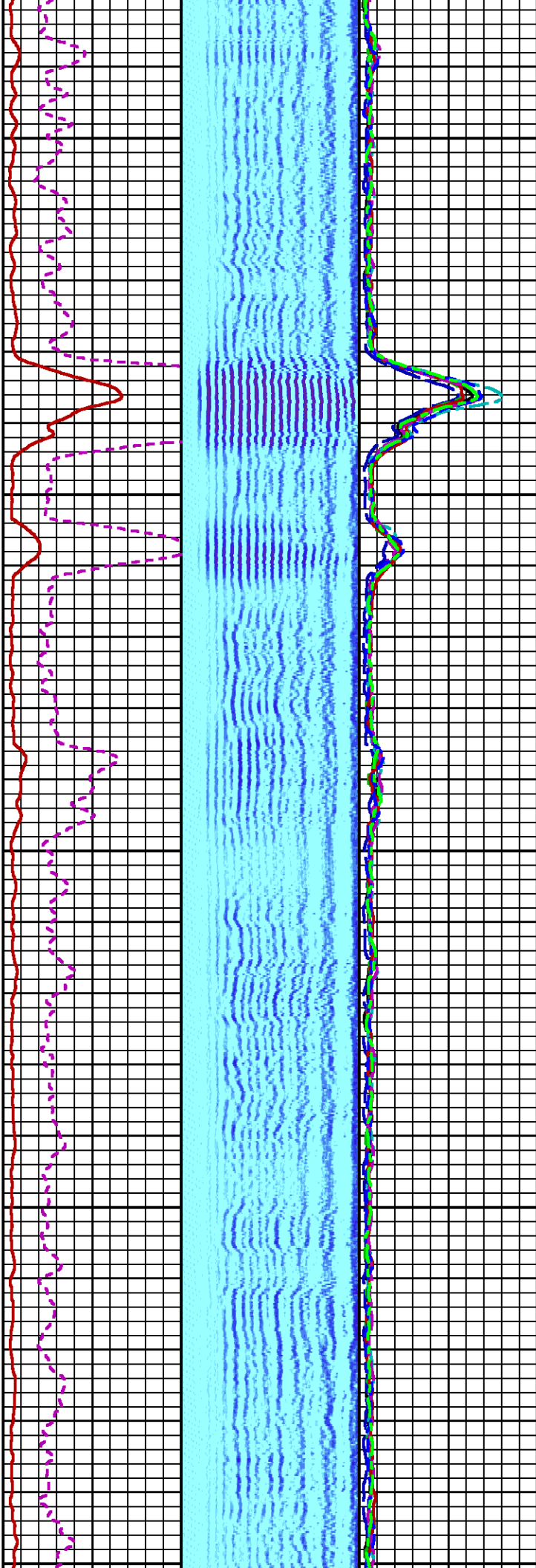
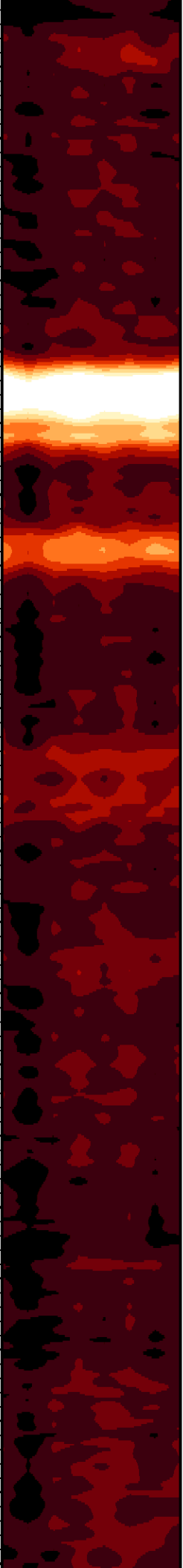








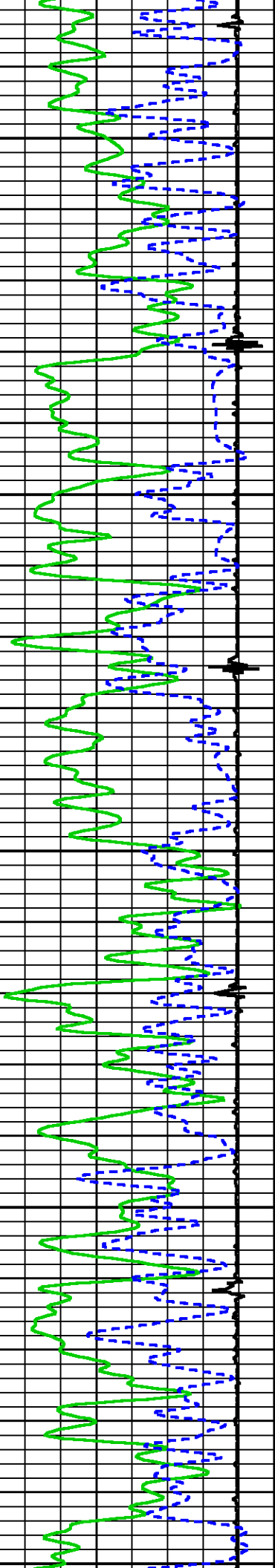




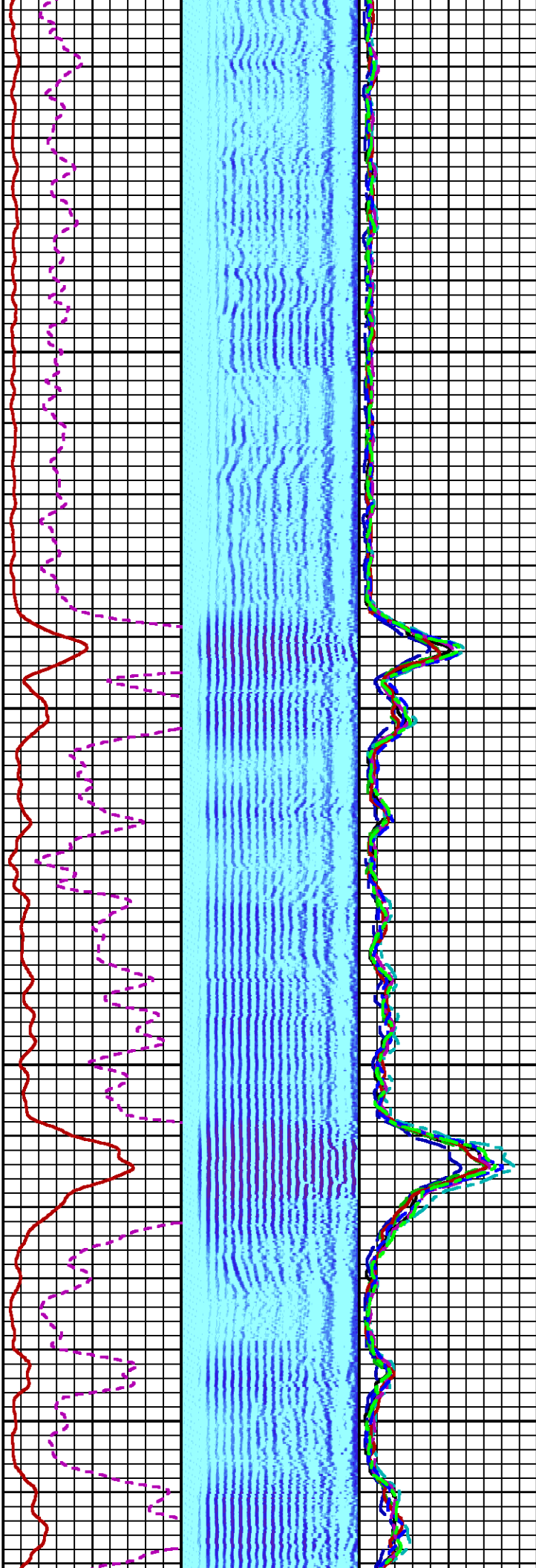
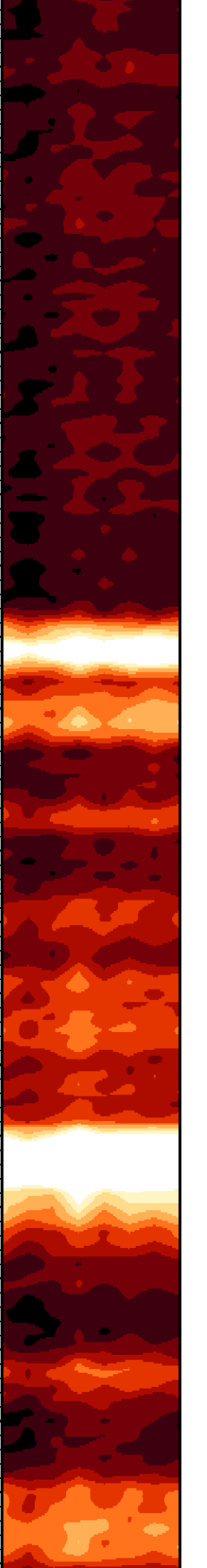
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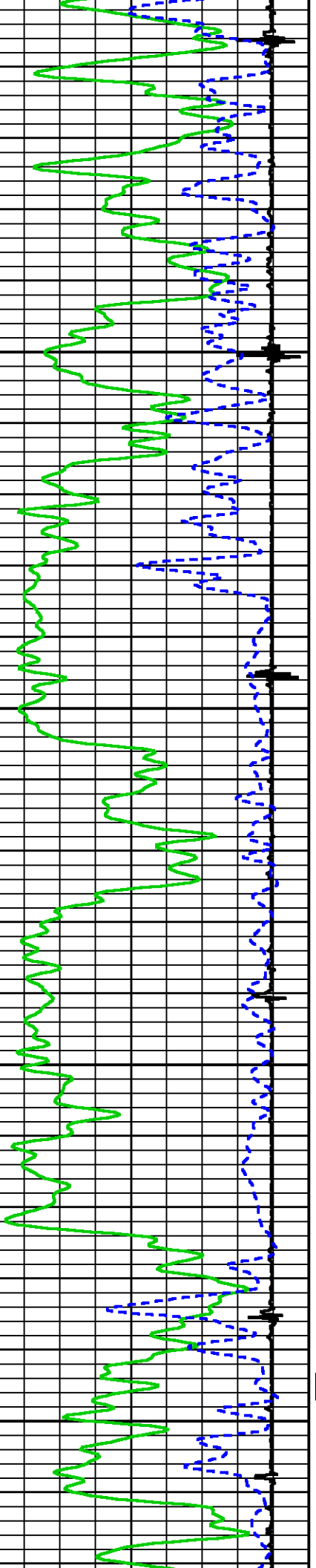


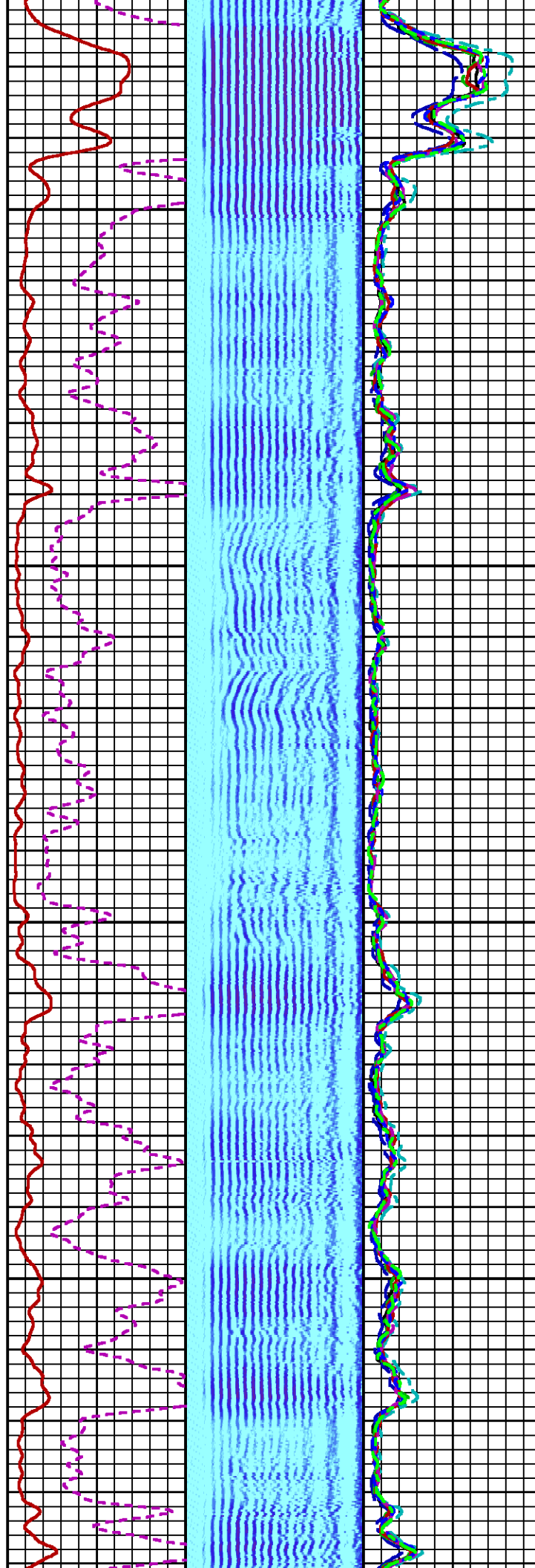
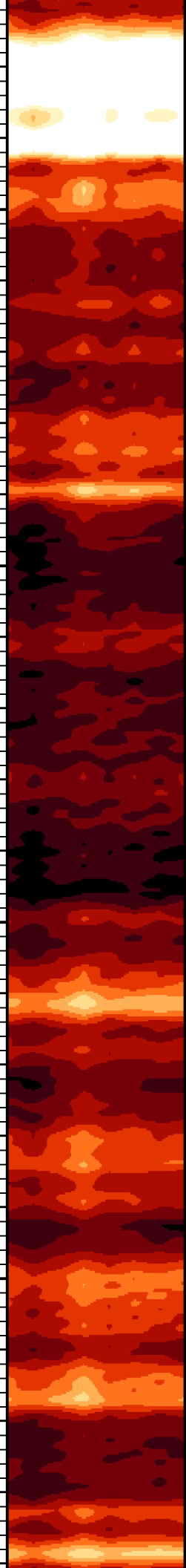


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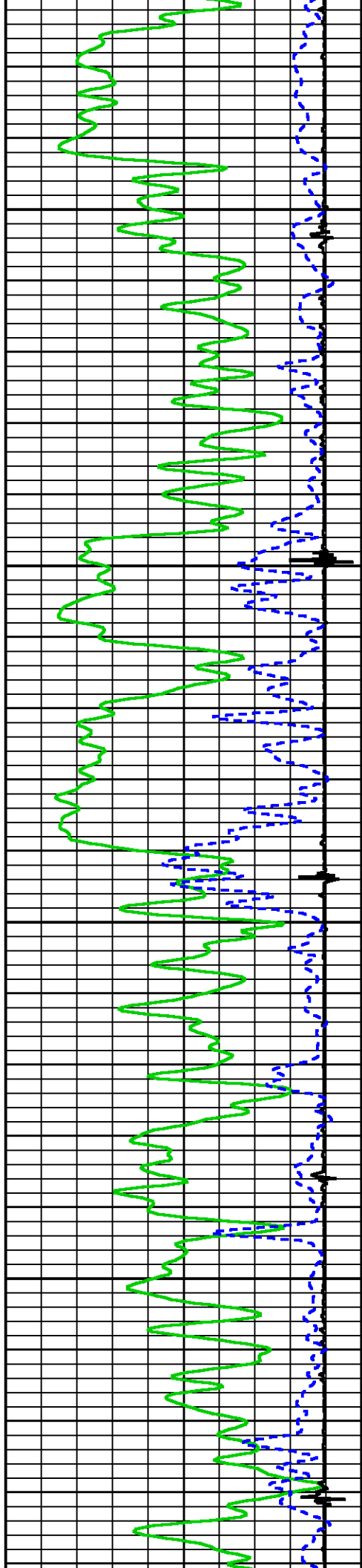
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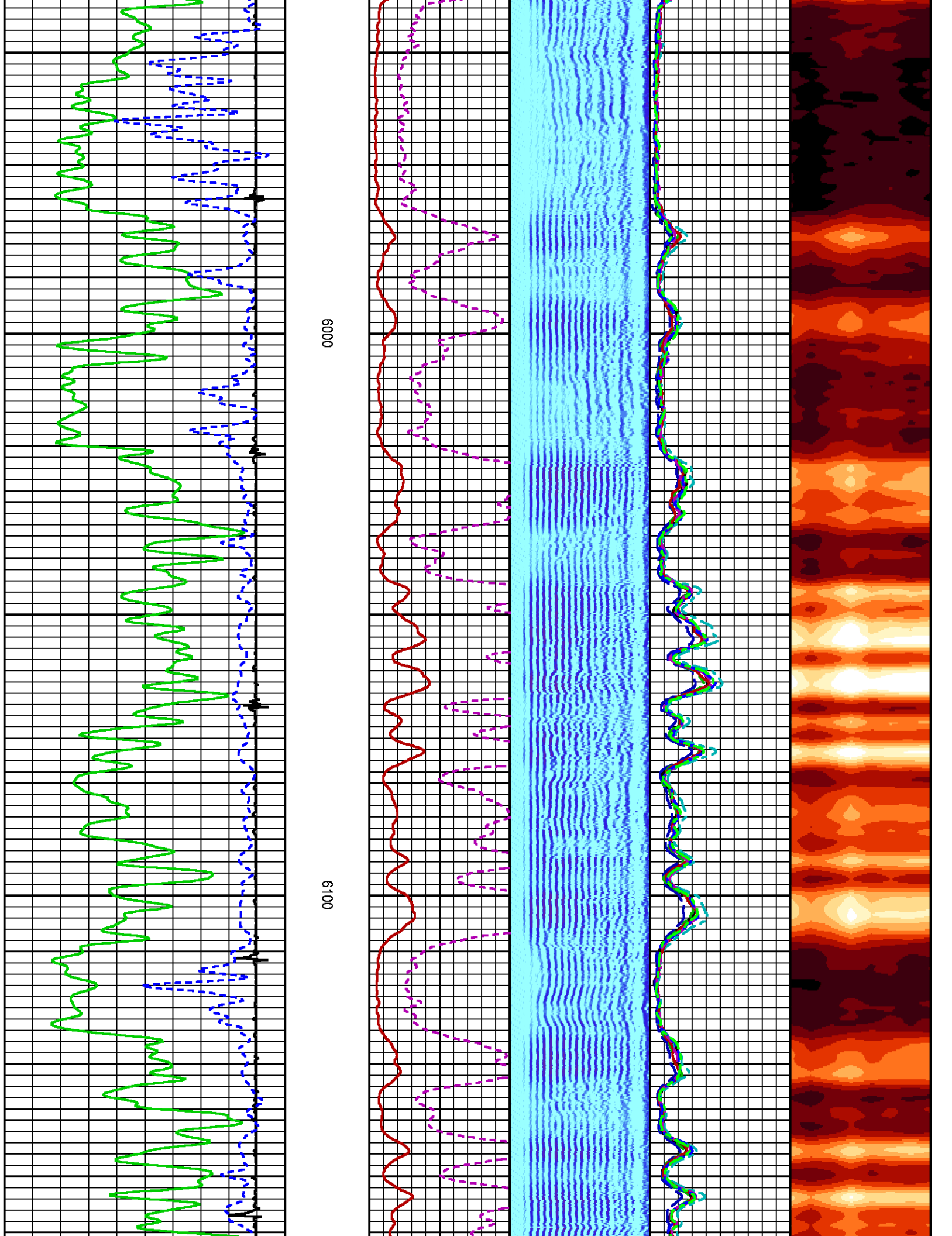


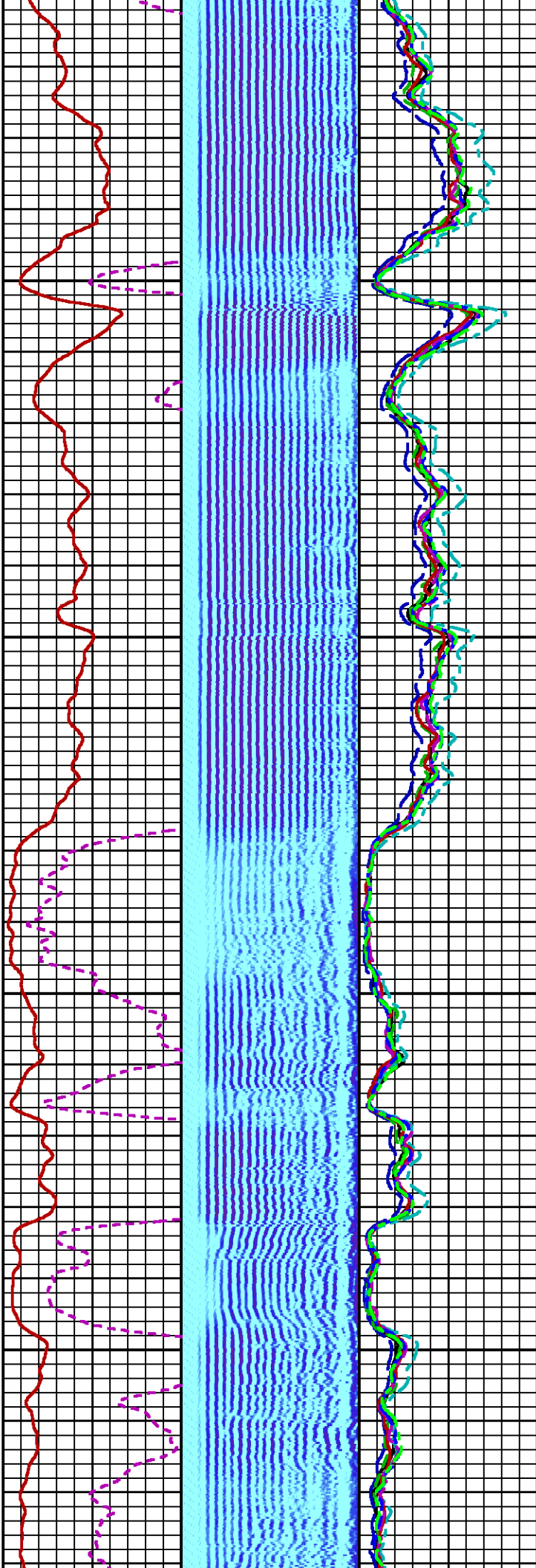
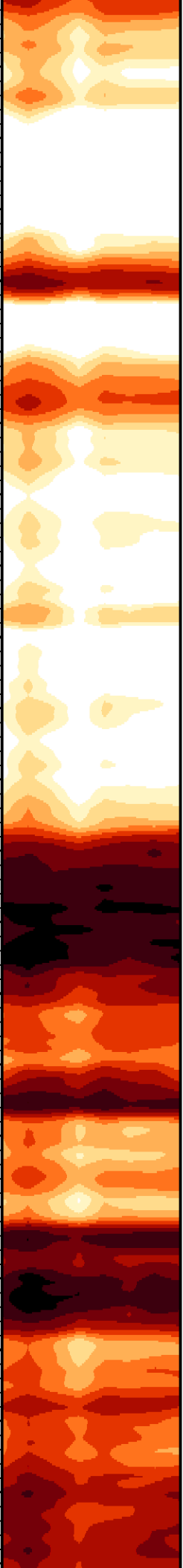


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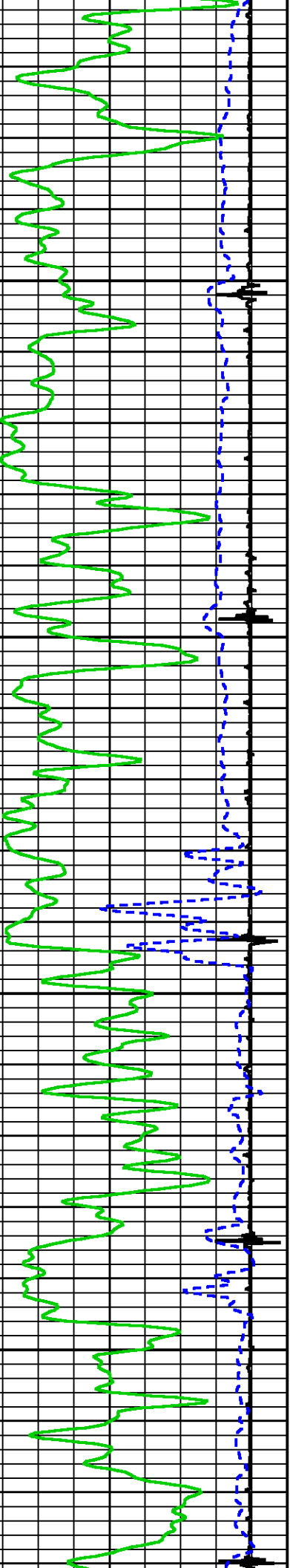




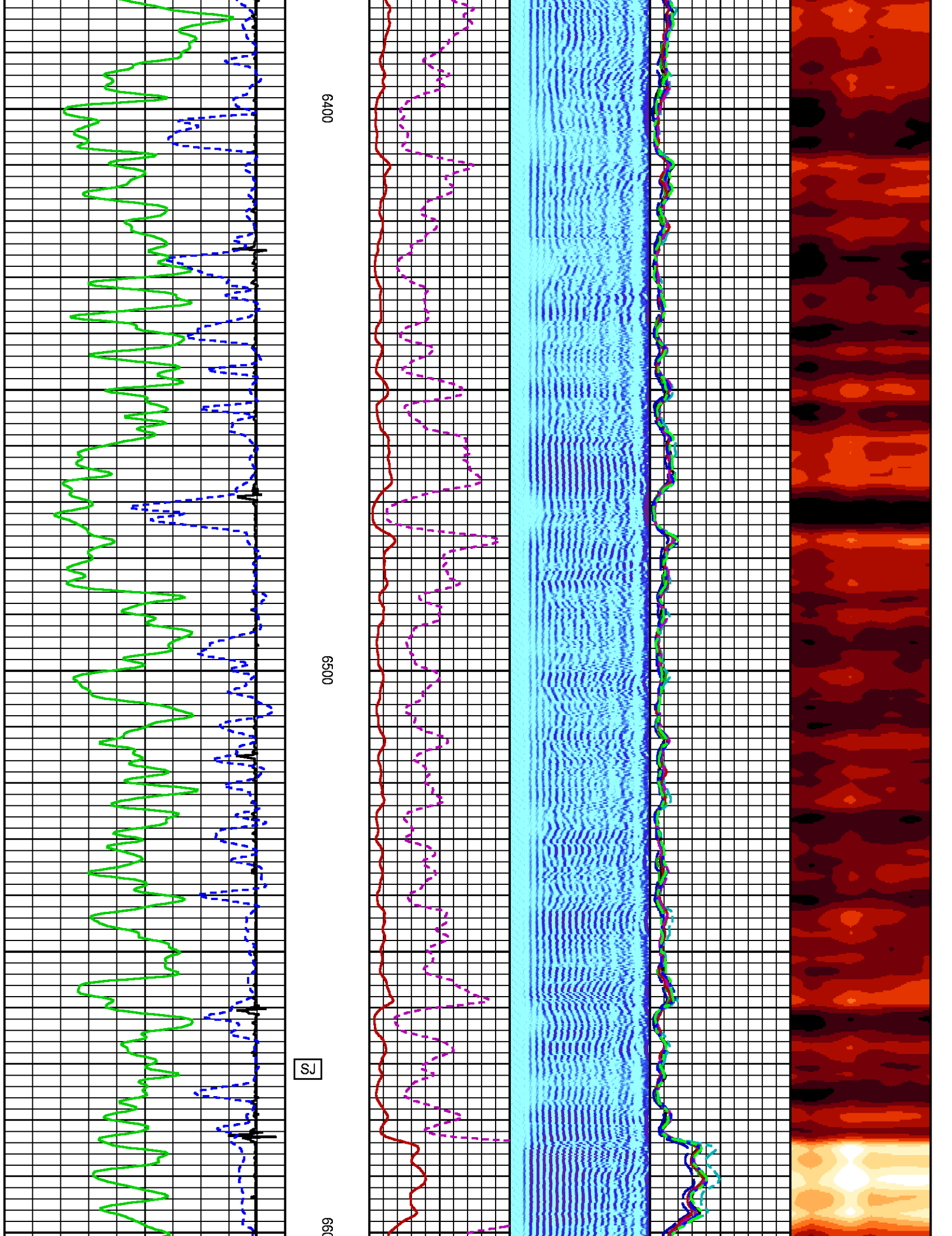


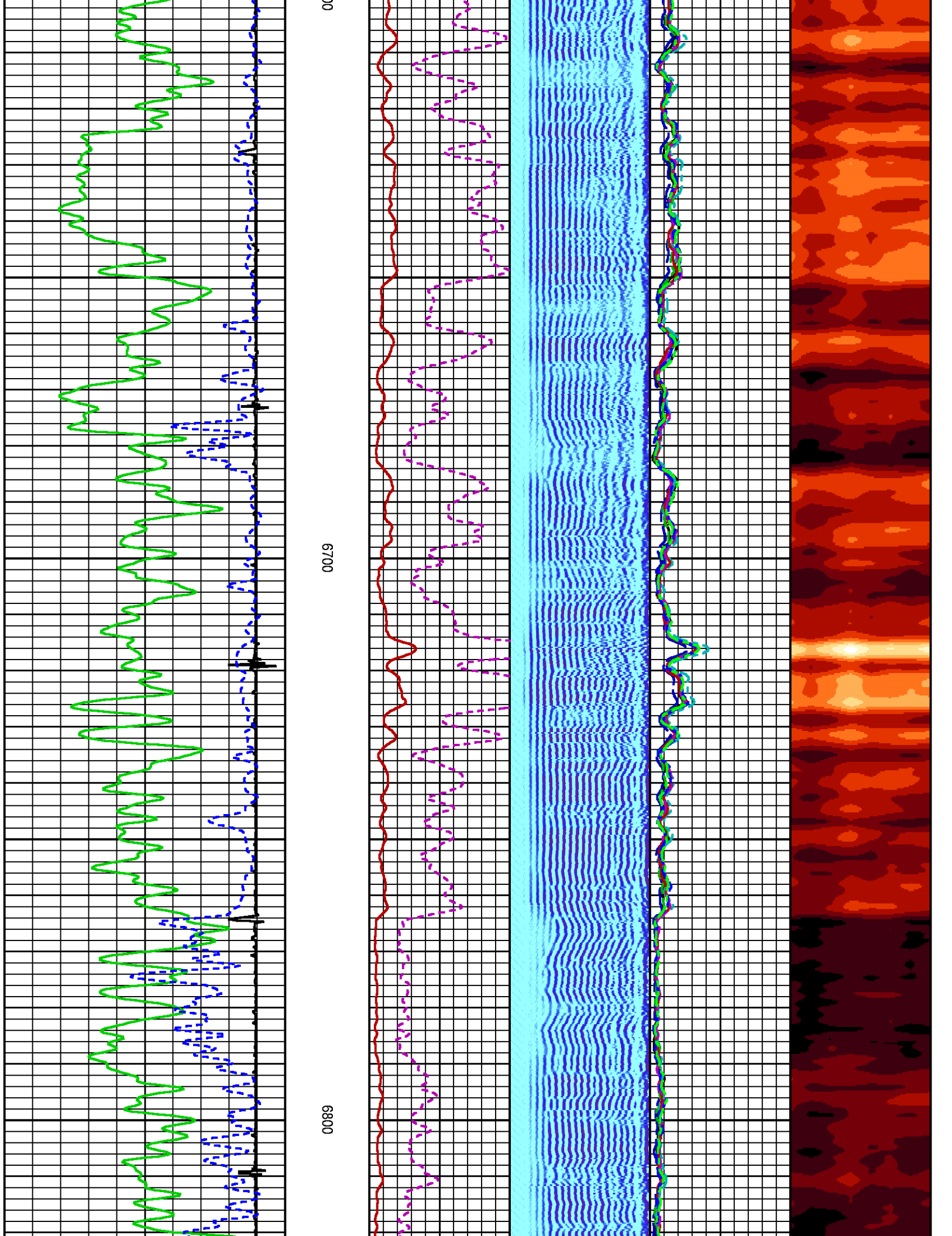
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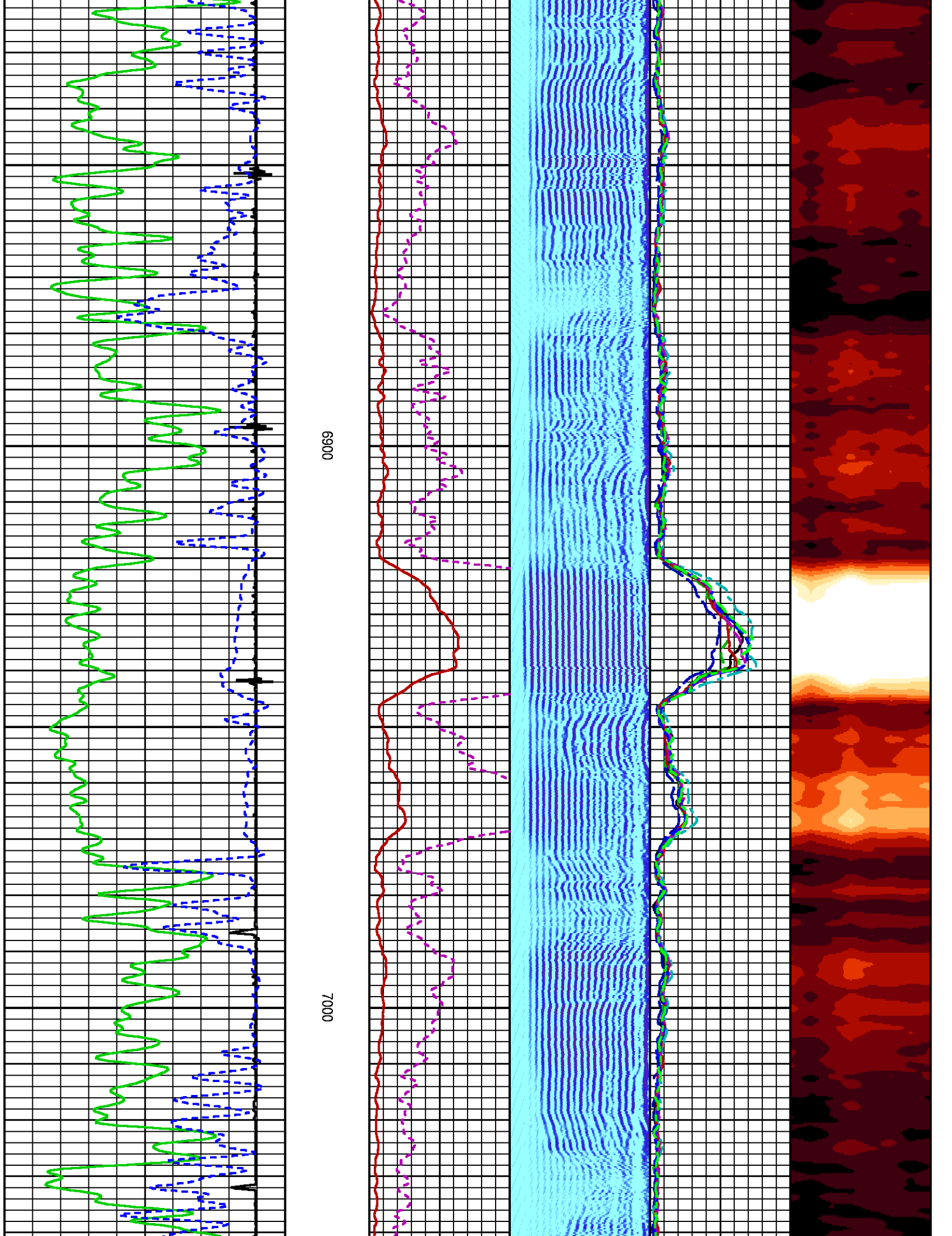
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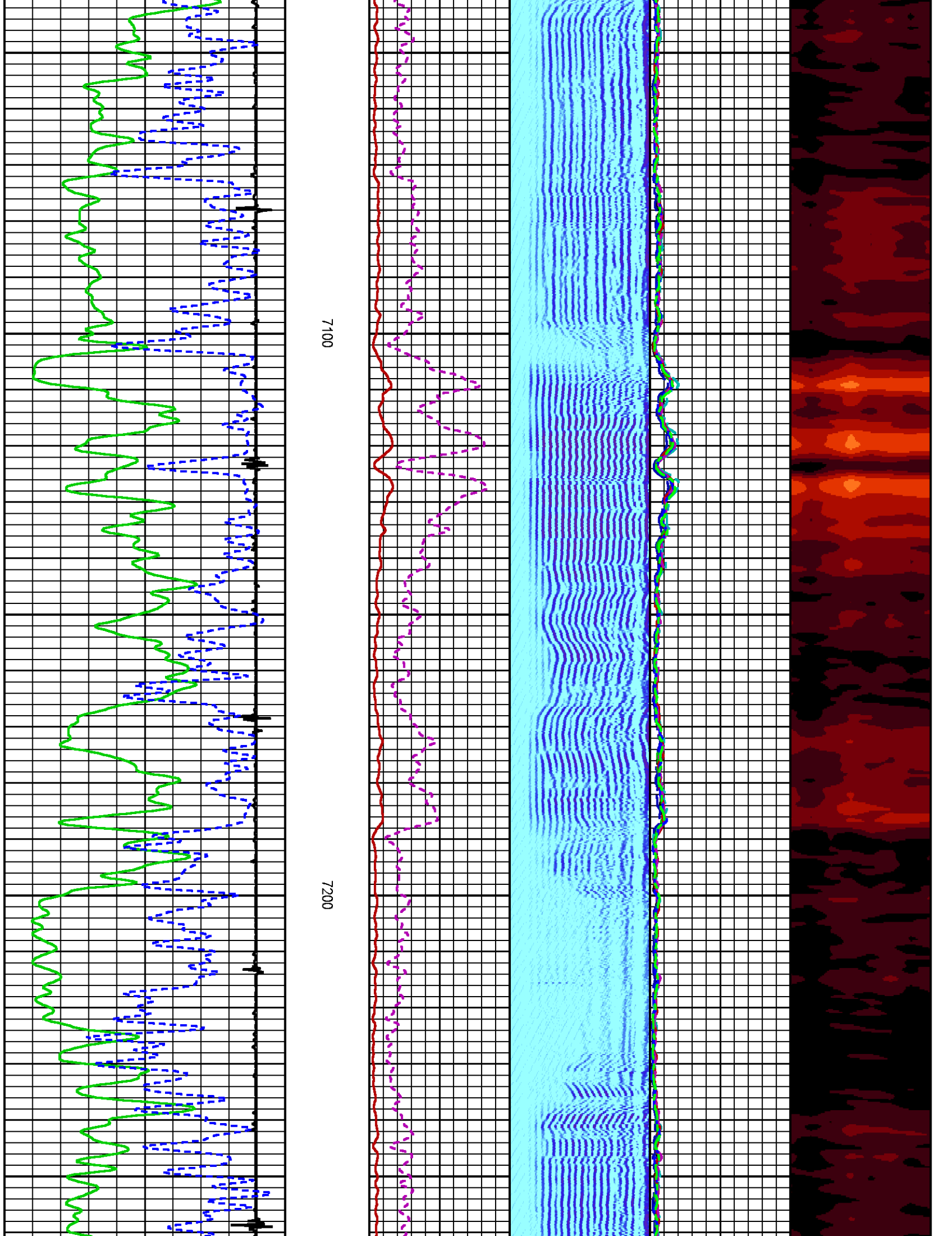




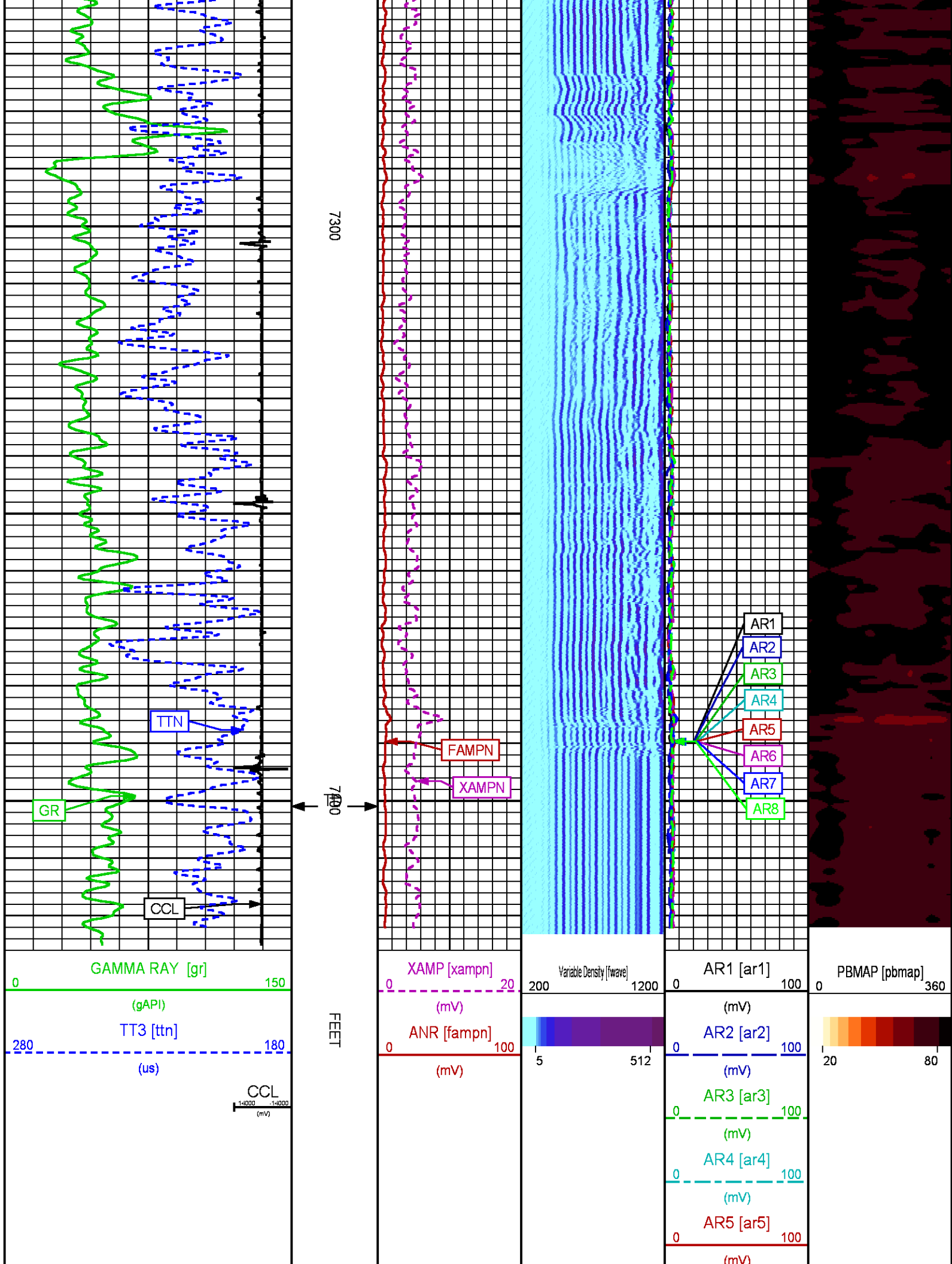


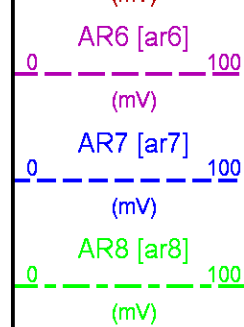












REPEAT PASS 0 PSI

ECLIPS 7.0i ECLIPS General Release Rel 7.0i Thu Jun 08 20:36:10 CDT 2017  
Patches: 2

Plotted: Wed Jan 24 23:06:06 2018

PARAMETER AND FILTER SUMMARY REPORT

FILE: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_06W/p012g01.prm  
LOGGING MODE: DEPTH DIRECTION: UP  
TOP DEPTH: 7175.500 ft BOTTOM DEPTH: 7406.000 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

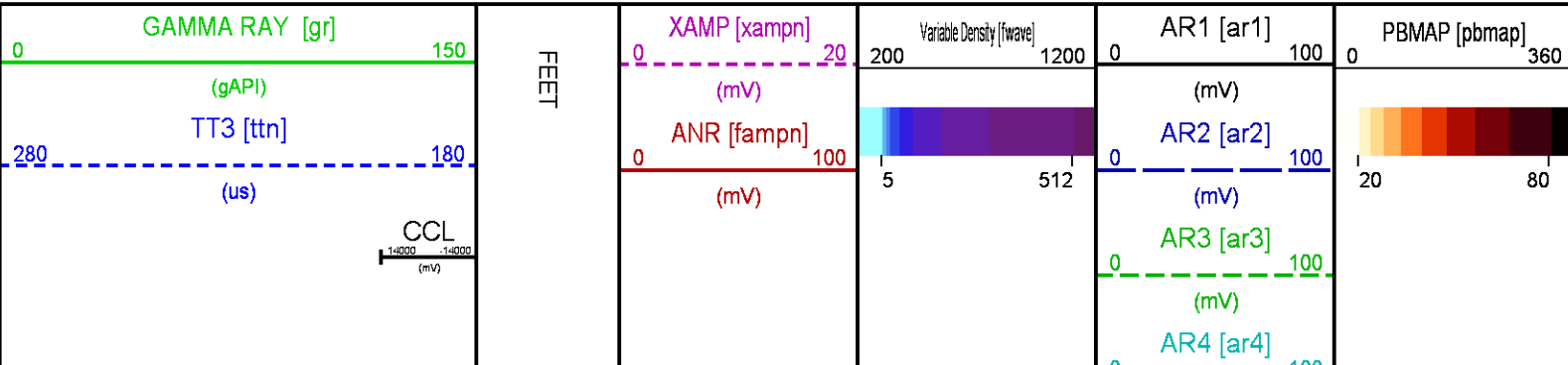
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)	
AMPLITUDE WINDOW (NEAR)	AMP WINDOW START (fgp1*)	187	us	TOP	BOTTOM
	AMP WINDOW START (fgp2*)	187	us	"	"
	AMP WINDOW START (fgp3*)	187	us	"	"
	AMP WINDOW START (fgp4*)	187	us	"	"
	AMP WINDOW START (fgp5*)	187	us	"	"
	AMP WINDOW START (fgp6*)	187	us	"	"
	AMP WINDOW START (fgp7*)	187	us	"	"
	AMP WINDOW START (fgp8*)	187	us	"	"
	AMP WINDOW START (fgpn*)	187	us	"	"
	AMP WINDOW LENGTH	25	us	"	"
TRAVEL TIME WINDOW (NEAR)	TT WINDOW START (ttn*)	175	us	"	"
	TT WINDOW LENGTH	500	us	"	"
	FIRST BRK THRESHOLD (ttn*)	4	mV	"	"
RAL CASING PARAMETERS	PPT NEAR	200.391	us	"	"
RAL TOOL DELAY	TOOL DELAY (str1*)	-66	us	"	"
	TOOL DELAY (str2*)	-66	us	"	"
	TOOL DELAY (str3*)	-66	us	"	"
	TOOL DELAY (str4*)	-66	us	"	"
	TOOL DELAY (str5*)	-66	us	"	"
	TOOL DELAY (str6*)	-66	us	"	"
	TOOL DELAY (str7*)	-66	us	"	"
	TOOL DELAY (str8*)	-66	us	"	"
	TOOL DELAY (strn*)	-66	us	"	"
BASELINE NOISE (NEAR)	NOISE WINDOW START	125	us	"	"

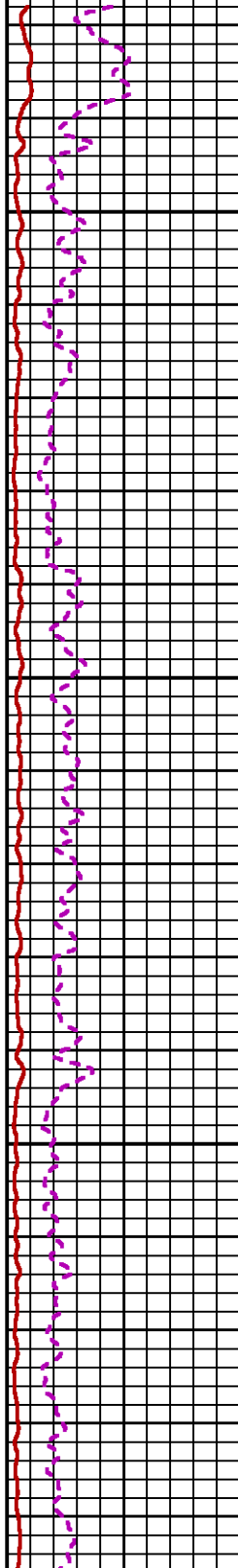
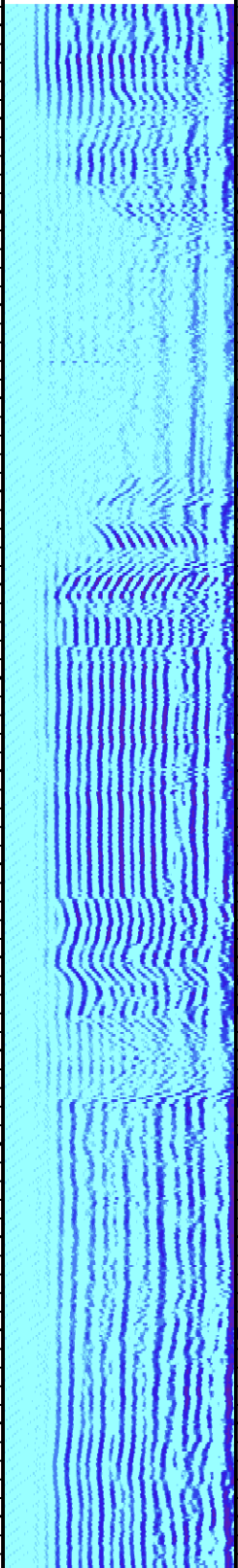
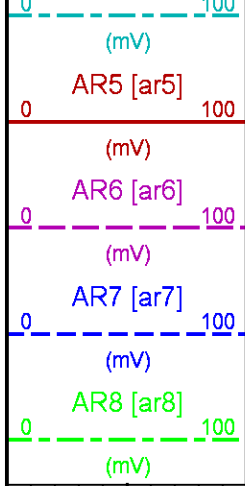
BASELINE NOISE (NEAR)		NOISE WINDOW START	125	us	"	"
		NOISE WINDOW LENGTH	25	us	"	"
PERCENT BOND CEMENT MAP						
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	INTERVAL (ft)		
RAL FREE PIPE AMPLITUDE	FREE AMP REC 1	80	mV	TOP	BOTTOM	
	FREE AMP REC 2	80	mV	"	"	
	FREE AMP REC 3	80	mV	"	"	
	FREE AMP REC 4	80	mV	"	"	
	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	2	mV	"	"	
	FULL BOND AMP REC 2	2	mV	"	"	
	FULL BOND AMP REC 3	2	mV	"	"	
	FULL BOND AMP REC 4	2	mV	"	"	
	FULL BOND AMP REC 5	2	mV	"	"	
	FULL BOND AMP REC 6	2	mV	"	"	
	FULL BOND AMP REC 7	2	mV	"	"	
	FULL BOND AMP REC 8	2	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		

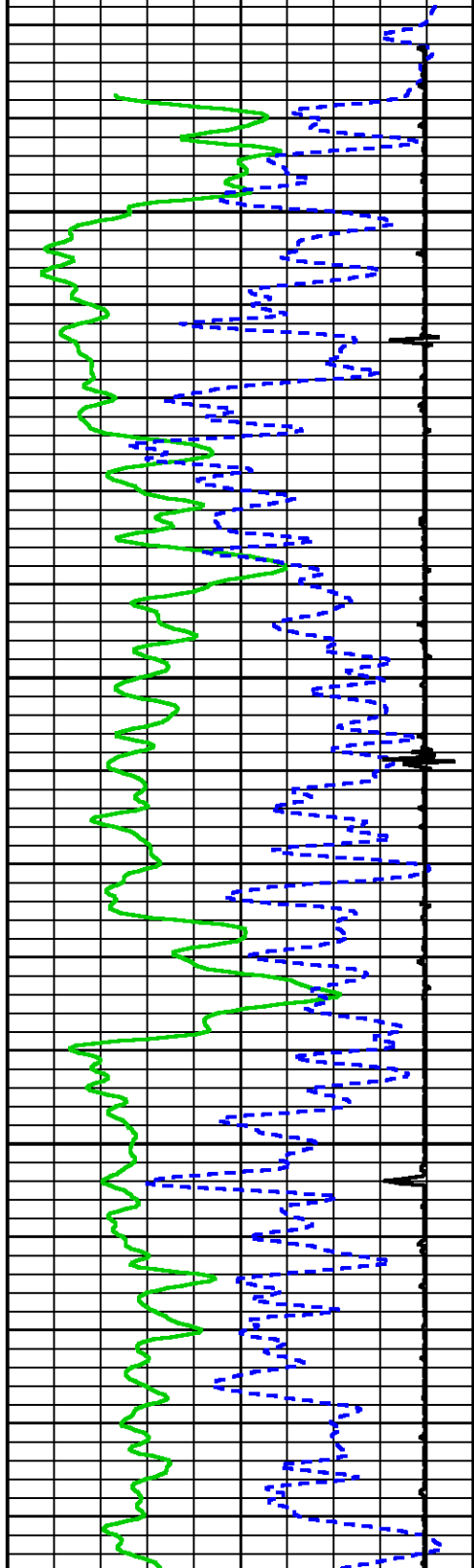
Presentation	: SysA:/dat1a/LARAMIE_NICHOLS_0994_24_06W/24-06W_RAL_REPEAT.fvpdf [5"/100' Scale]
Plot Interval	: 7177.75 - 7417.25 Feet
Data File 1	: F1 : SysA:/dat1a/LARAMIE_NICHOLS_0994_24_06W/24-06W_RAL_REPEAT.xtf
Created On	: N/A
Company	: LARAMIE ENERGY
Well	: NICHOLS-0994-24-06W
Field	: VEGA
File Interval	: 7175.5 - 7418.5 Feet
OCT	: p012g



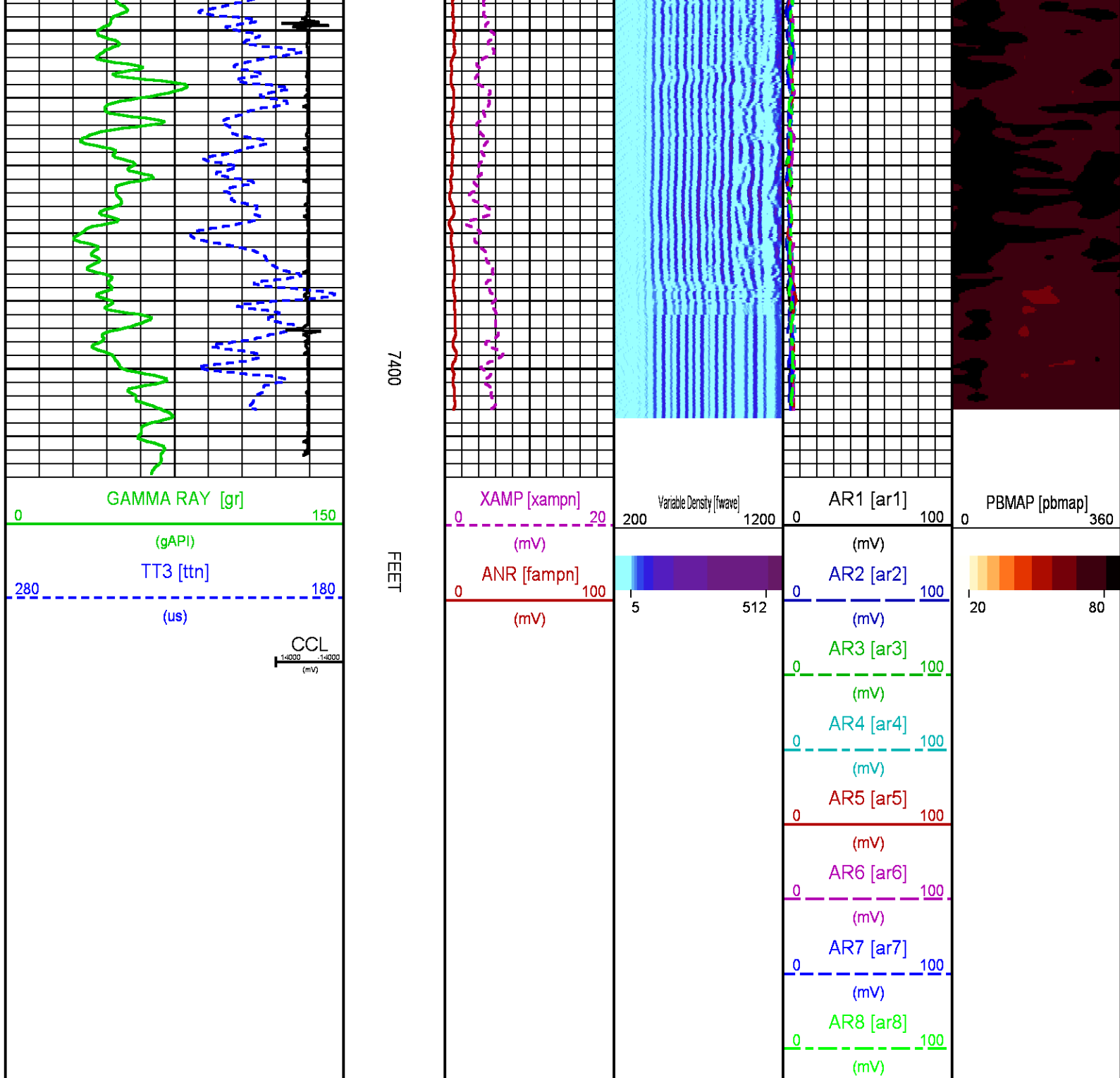


7200

7300







## CALIBRATION / VERIFICATION SUMMARY

Source File: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_06W/p012g.tp1

### RAL PRIMARY CALIBRATION SUMMARY

TOOL #: 1426XA 10417452

DATE/TIME PERFORMED: Wed Jan 24 22:22:38 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)	-0.06	-0.06	0.08	0.02	0.02	-0.07	-0.06	0.09	-0.02	0.15	-0.01
AMP FLUID (mV)	43	43	43	42	41	42	42	43	44	55	43
TT (us)	217	217	217	218	217	217	217	216	217	324	217
M FACTOR	2.33	2.33	2.34	2.37	2.43	2.39	2.36	2.32	2.30	2.73	2.34

### RAL BEFORE LOG VERIFICATION SUMMARY

TOOL #: 1426XA 10417452 DATE/TIME PERFORMED: Wed Jan 24 22:34:48 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	-0.02	0.04	-0.02	0.08	-0.10	0.01	0.04	-0.13	0.01	0.44	0.01
AMP AIR	1.81	1.12	1.17	1.29	1.60	2.31	2.21	1.35	1.37	1.39	99.95

SHOP M FACTOR	SHOP A FACTOR	WIRELIN E FACTOR
2.34	0.00	1.00

### GR PRIMARY CALIBRATION SUMMARY

TOOL #: 1355XA 11871507 DATE/TIME PERFORMED: Fri Nov 17 14:10:53 2017

UNIT #: 3882TD HL6728 CALB JIG #: 4702NK DA\_228

	BACKGROUND (cts)	CALBRTR ON (cts)	CR DIFF (cts/s)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	CALBRTR (gAPI)
GR	59.07	162.98	103.9	0.962	56.84	156.84	100

### GR PRIMARY VERIFICATION SUMMARY

TOOL #: 1355XA 11871507 DATE/TIME PERFORMED: Fri Nov 17 14:12:49 2017

UNIT #: 3882TD HL6728 VERI JIG #: 4702NK DA\_228

	BACKGROUND (cts)	CALBRTR ON (cts)	MULT	BACKGROUND (gAPI)	CALBRTR ON (gAPI)	DIFF. (gAPI)
GR	59.73	170.53	0.962	57.49	164.11	106.63
						90.00 110.00

## INSTRUMENT CONFIGURATION

Source File: /dat1a/LARAMIE\_NICHOLS\_0994\_24\_06W/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: 4.21': NEAR RCVR  
 Measure Point: 3.25': FAR RCVR

NEAR RCVR — 11.17'

FAR RCVR — 10.21'

**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** LARAMIE ENERGY LLC  
**WELL** NICHOLS 0994-24-06W  
**FIELD** VEGA  
**COUNTY** MESA **STATE** COLORADO

**FILE NO:**  
CH131986  
**API NO:**  
05077104150000

**LOCATION:**

SHL: 39.264514 N, 107.830743 W  
 BHL: 39.265727 N, 107.835353 W

SEC 24 TWP 9S RGE 94W

**ELEVATIONS:**

KB 7161 FT  
 DF  
 GL 7137 FT

DATE 24-Jan-2018

**ECLIPS**