



**Radial Cement Bond
Variable Density Log
W/ Temp/GammaRay/CCL**

Company Antero Resources
Well Bronco 2H
Field North Canton
County Tyler
State West Virginia

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Field North Canton
County Tyler State West Virginia

Location: 39.403892 -80.787906 API #: 4709506610000
SEC N/A TWP N/A RGE N/A
Permanent Datum Ground Level Elevation
Log Measured From Kelly Bushing 25' A.P.D.
Drilling Measured From Kelly Bushing
Other Services N/A
Elevation K.B. D.F. G.L.

Date	30-Apr-20							
Run Number	One							
Depth Driller	17,173 ft.							
Depth Logger	7,477 ft.							
Bottom Logged Interval	7,477 ft.							
Top Log Interval	Surface							
Open Hole Size	n/a							
Type Fluid	Freshwater							
Density / Viscosity	n/a							
Max. Recorded Temp.	166 deg F							
Estimated Cement Top	5,403 ft.							
Time Well Ready	07:00							
Time Logger on Bottom	10:15							
Equipment Number	132							
Location	Marietta, Ohio							
Recorded By	Tom Weese							
Witnessed By	Chris Young							
Borehole Record								
Run Number	Bit	From	To	Size	Tubing Record			
					Weight	From	To	
Casing Record								
Surface String	Size	13 3/8 in.	Wgt/Ft	54.5 #	Top	Surface	Bottom	446 ft.
Prot. String		9 5/8 in.		36 #		Surface		3,189 ft.
Production String		5 1/2		20#		Surface		17,173 ft.
Liner								
Marker Joint						6,242 ft.		6,251 ft.

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Primary Log on Well

Log Correlated to Marker Joint at (6,242' - 6,251')
Depth Correction (+4)

Main Pass 0 PSI
Repeat Pass 0 PSI

Thank You For Using Nine Energy Wireline of Marietta, Ohio

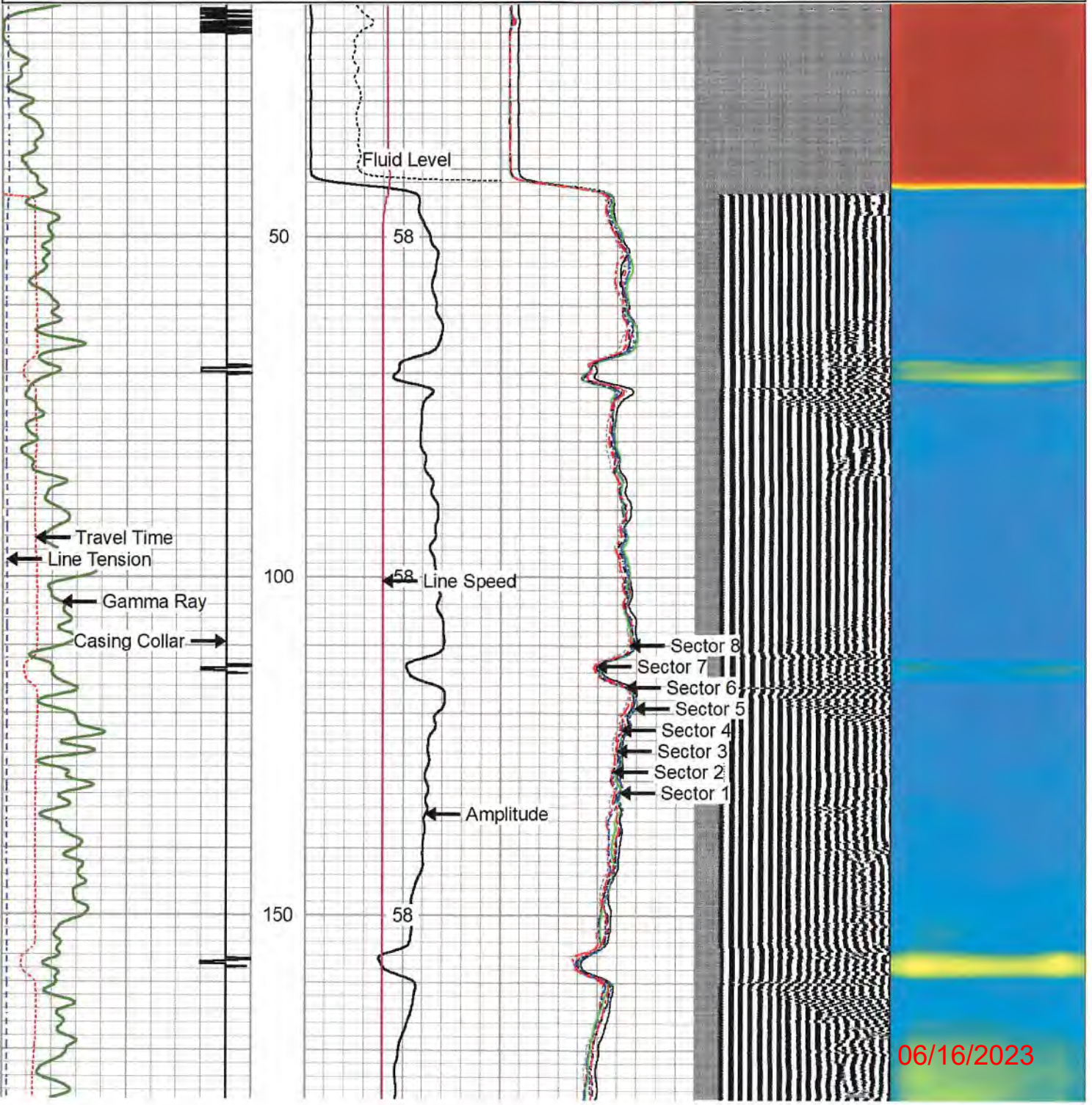


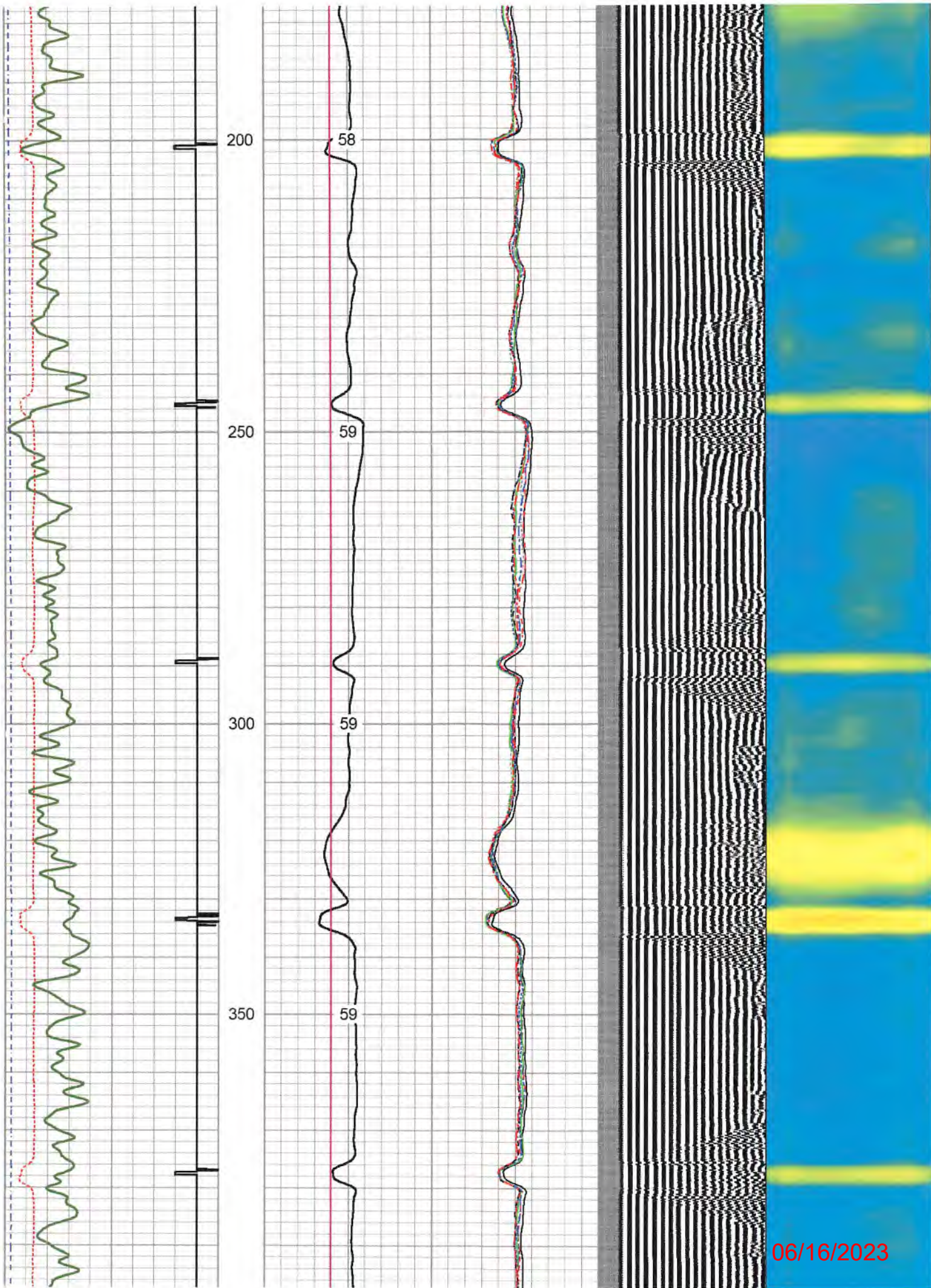
Main Pass 0 PSI

Handwritten initials

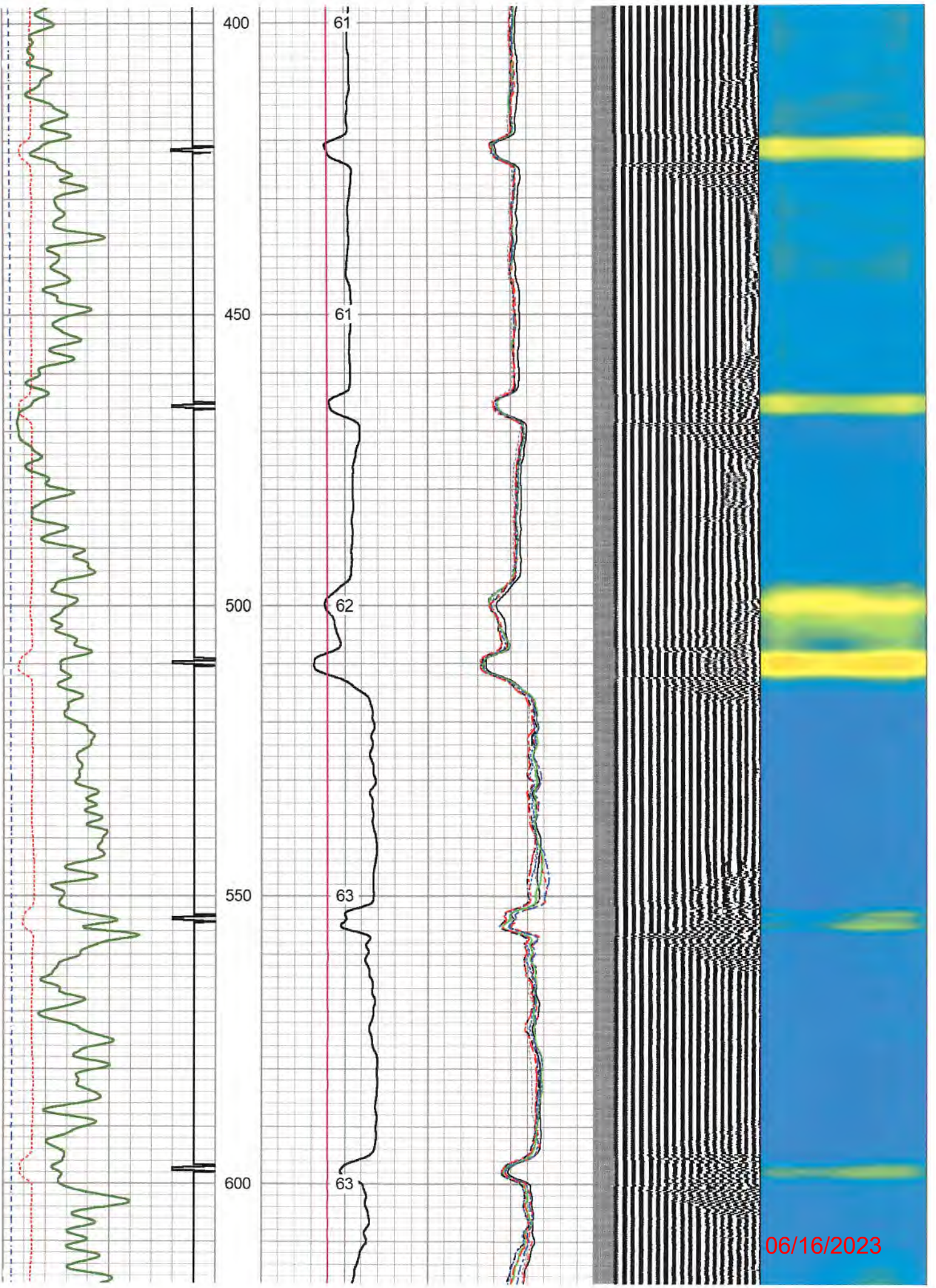
Database File antero_coloradowest_bronco2h_rcbl_nineenergy_apr_30_2020.db
 Dataset Pathname Marcellus/Bronco_2H/RCBL_1/pass4.2
 Presentation Format 9rcbl
 Dataset Creation Thu Apr 30 10:30:39 2020
 Charted by Depth in Feet scaled 1:240

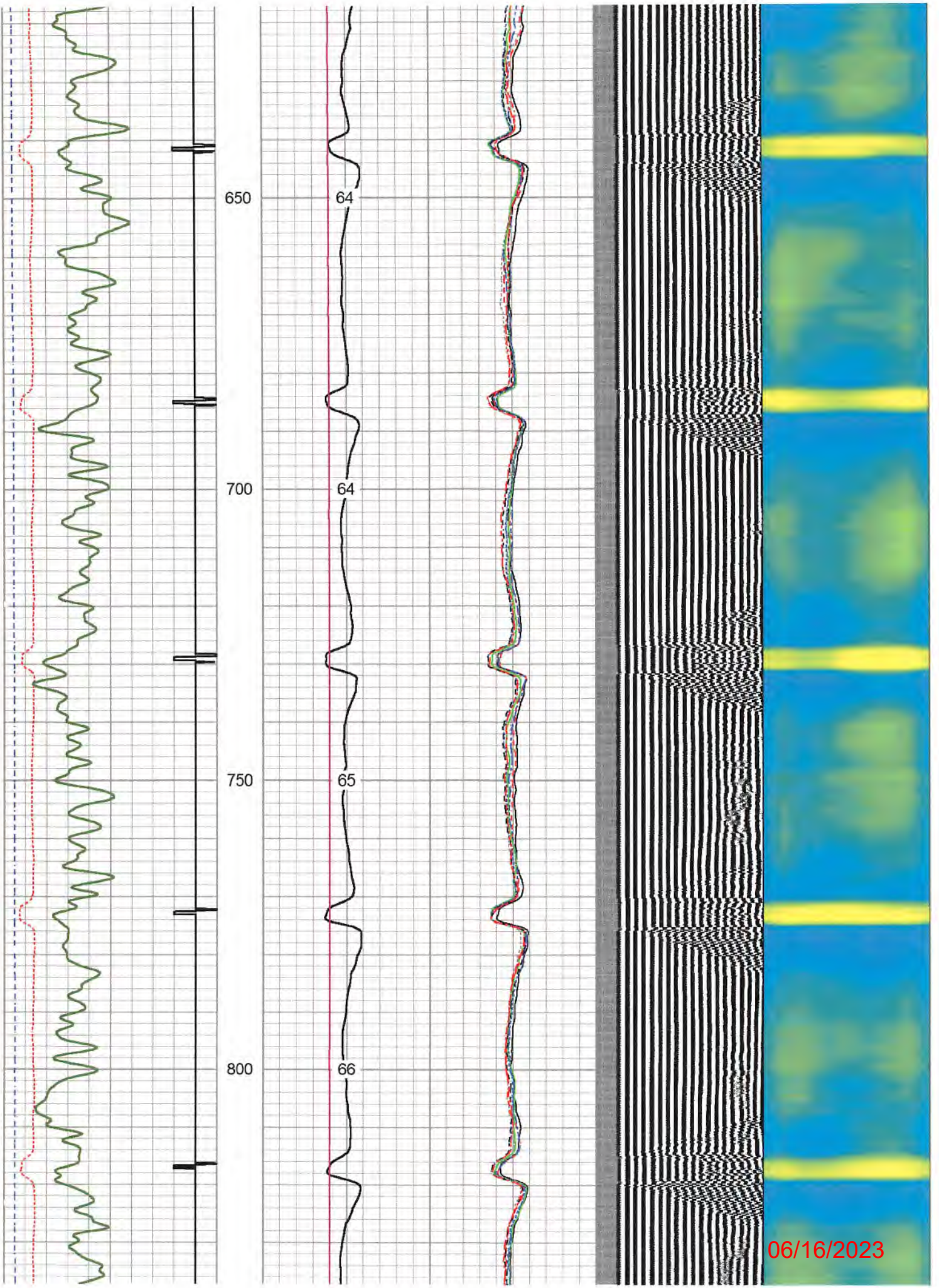
270	Travel Time (usec)	200	0	Amplitude (mV)	100	-5	Sector 1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1		Amplified Amplitude		-5	Sector 2	150	200	(usec)		
0	Gamma Ray (GAPI)	150	0	(mV)	10	-5	Sector 3	150				
0	Line Tension (lb)	5000		Line Speed		-5	Sector 4	150				
			-500	(ft/min)	500	-5	Sector 5	150				
				TEMP		-5	Sector 6	150				
				(degF)		-5	Sector 7	150				
						-5	Sector 8	150				

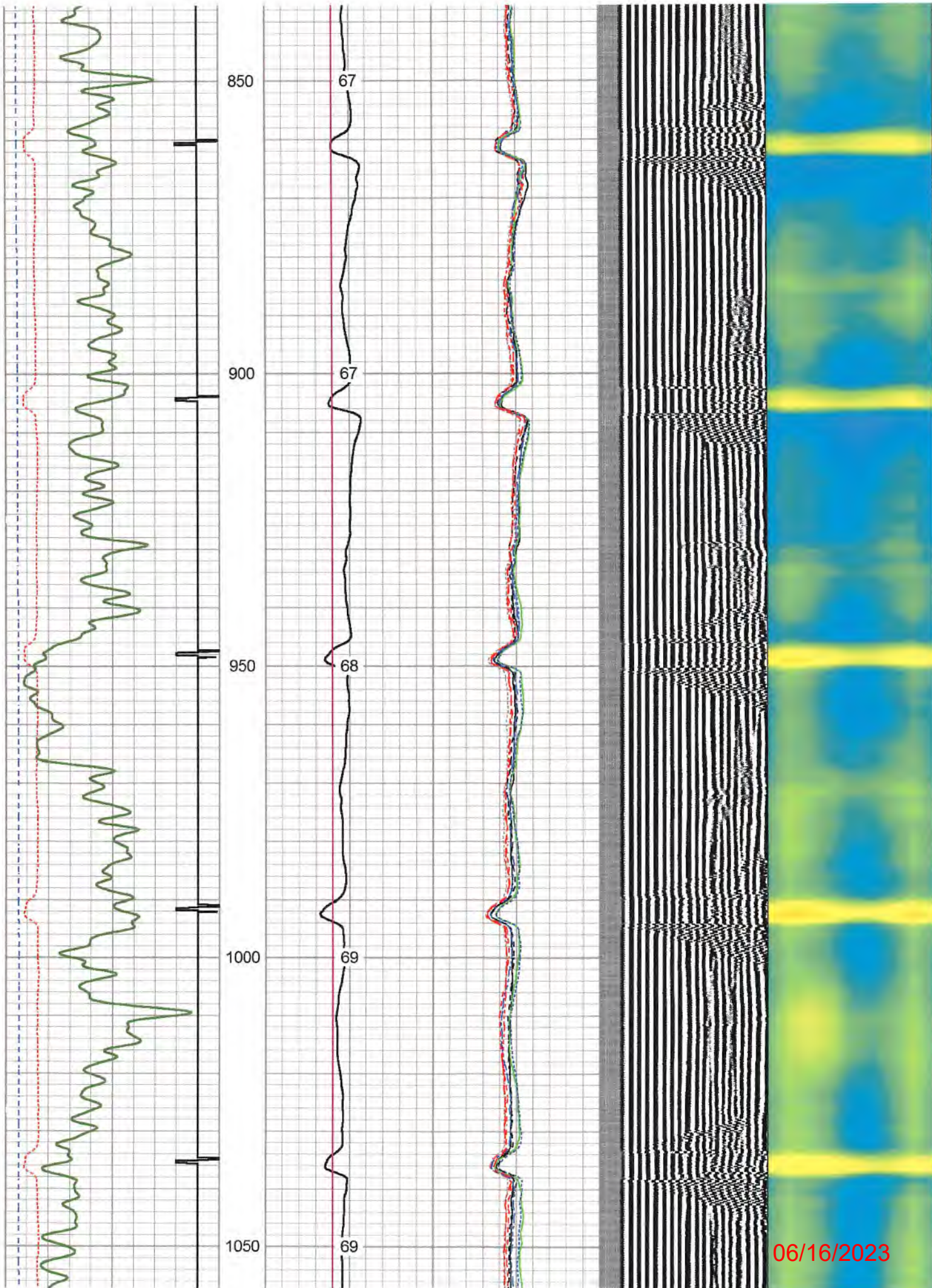




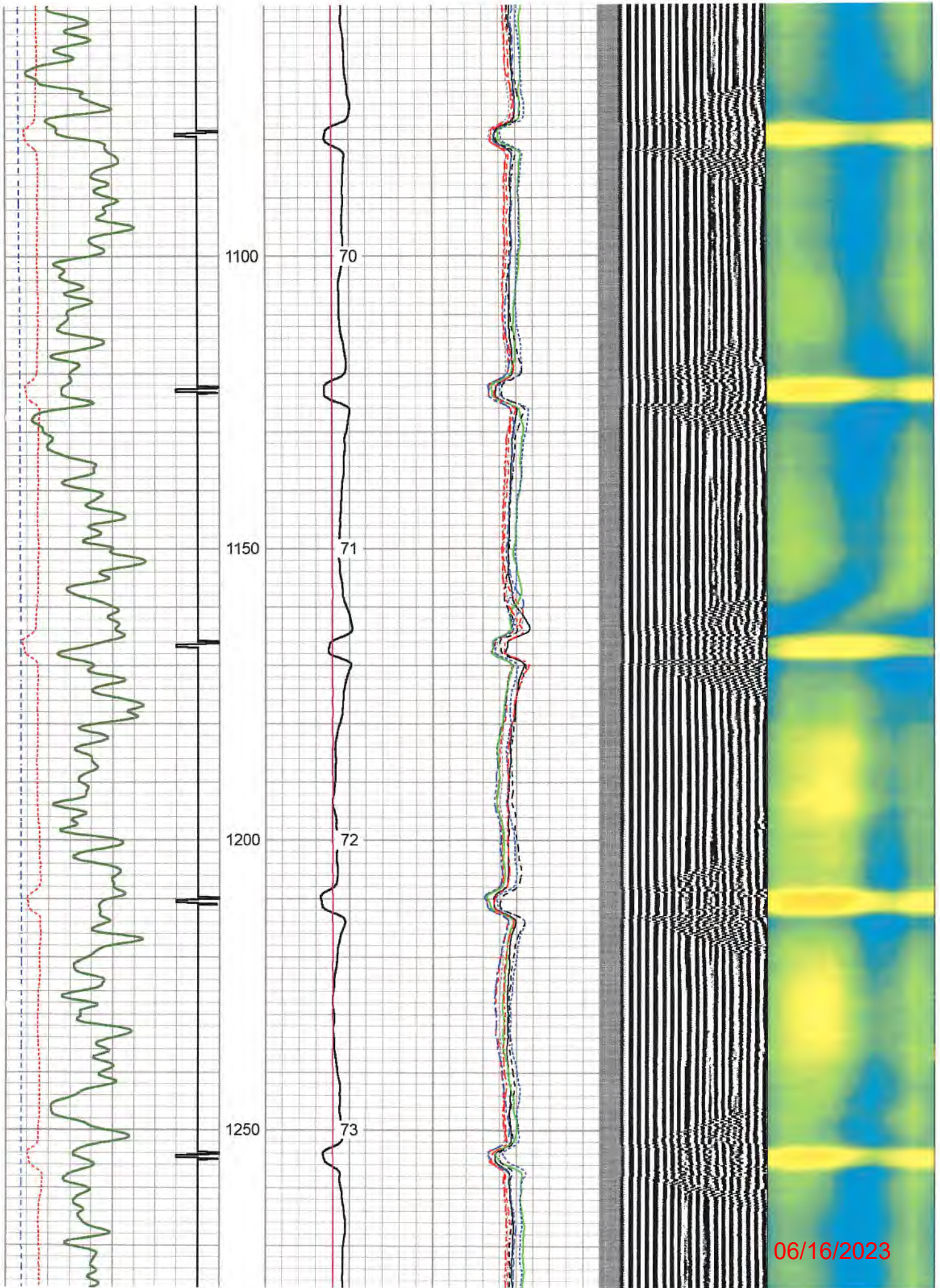
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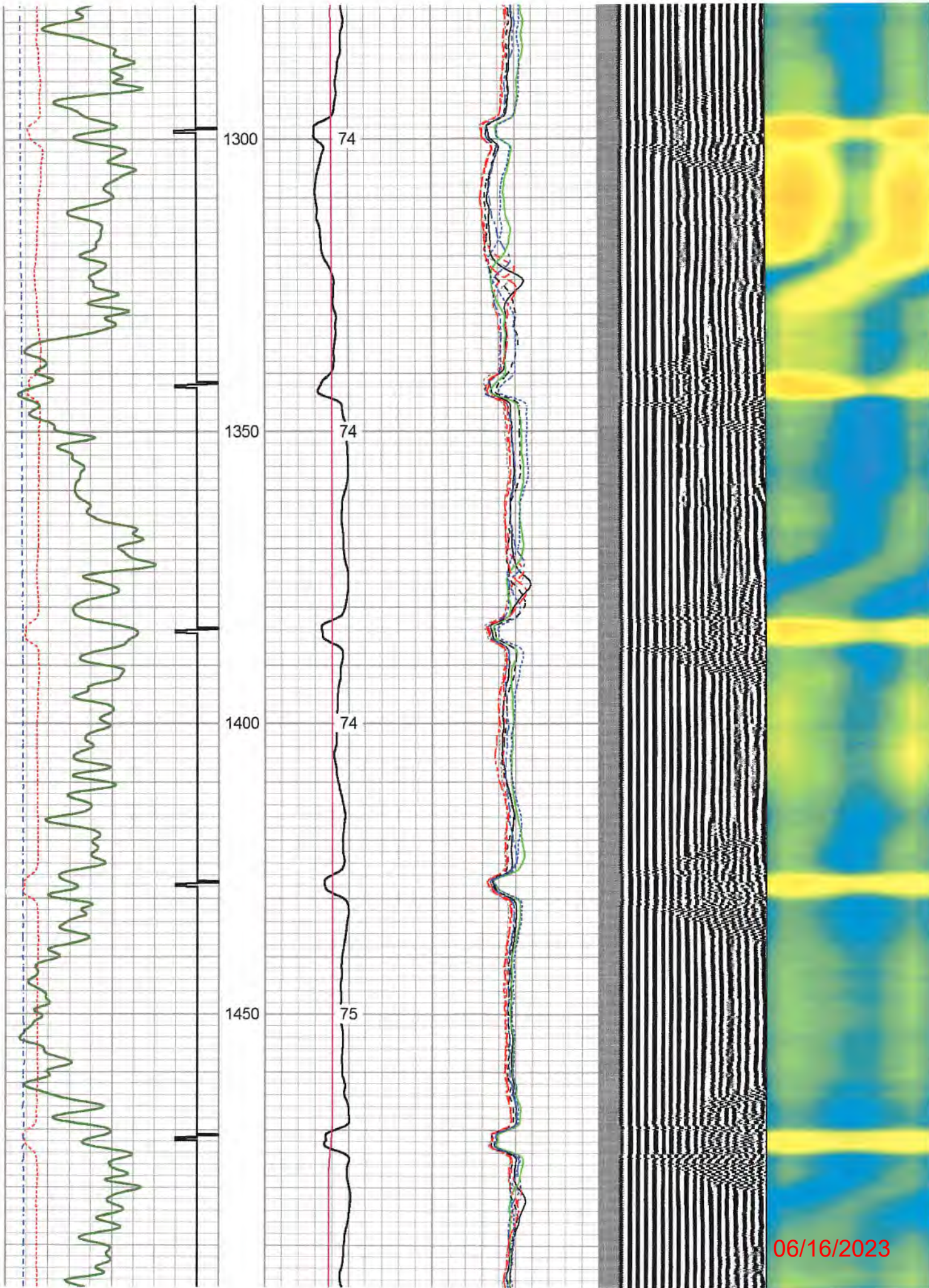




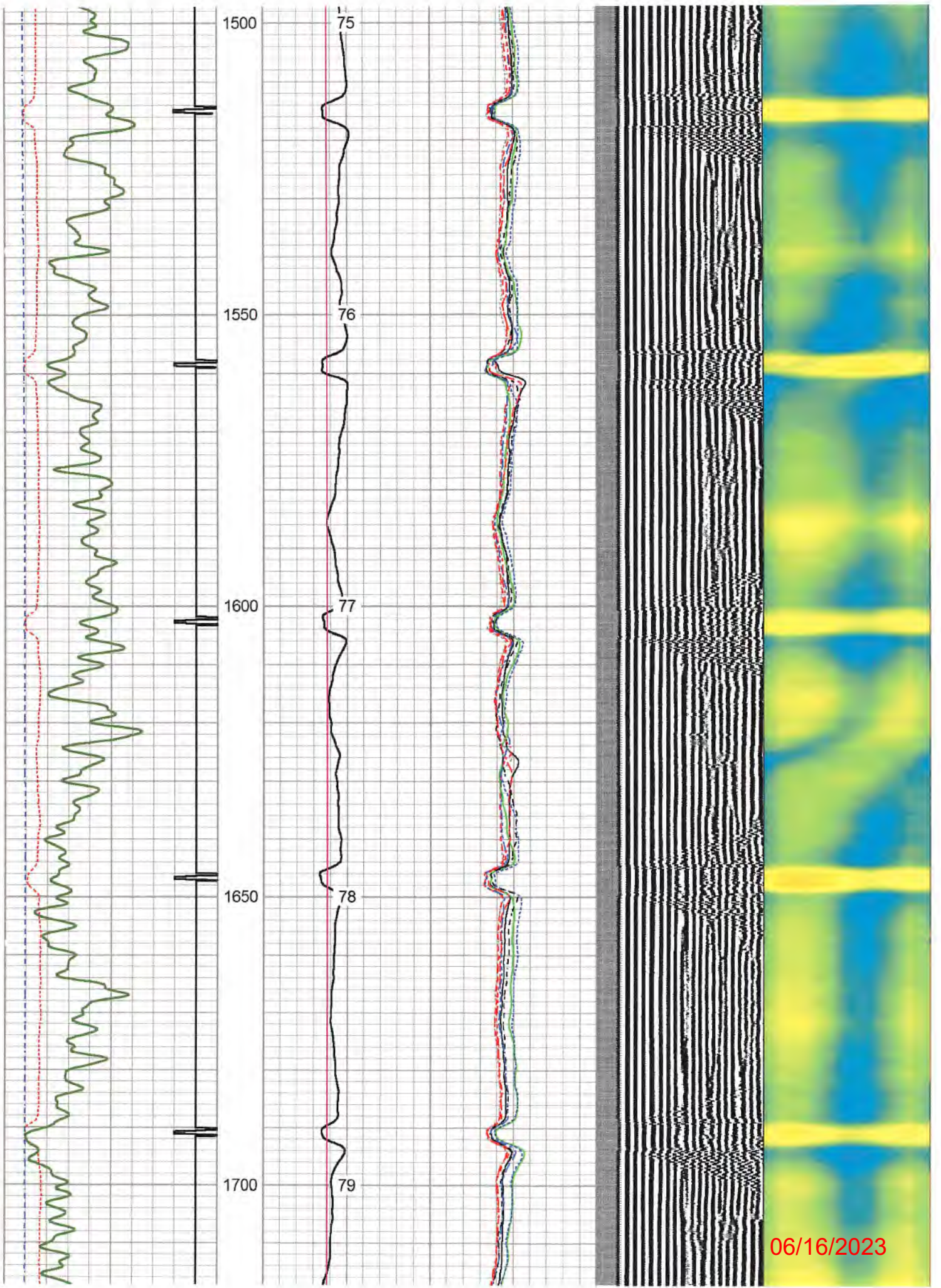


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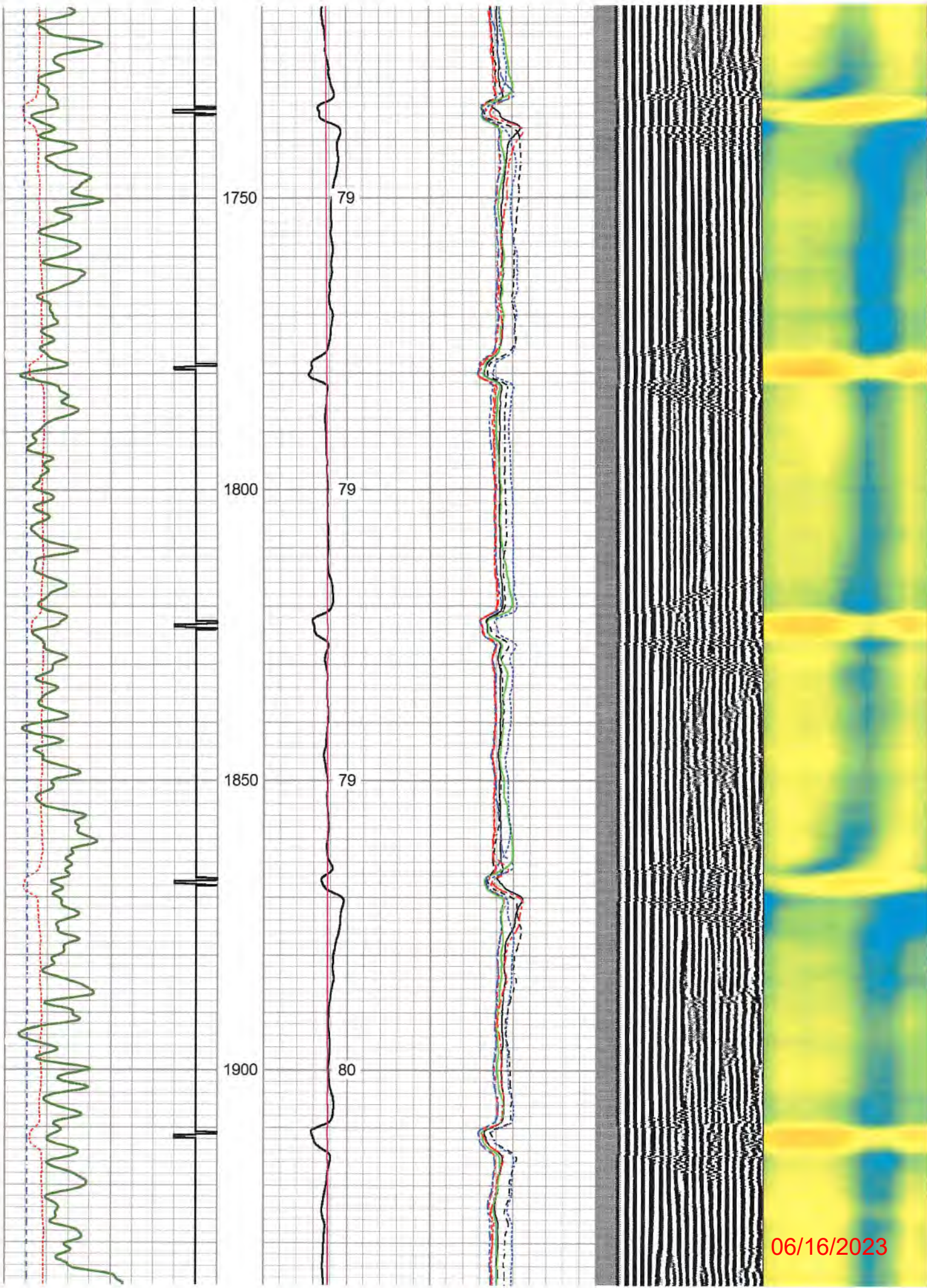




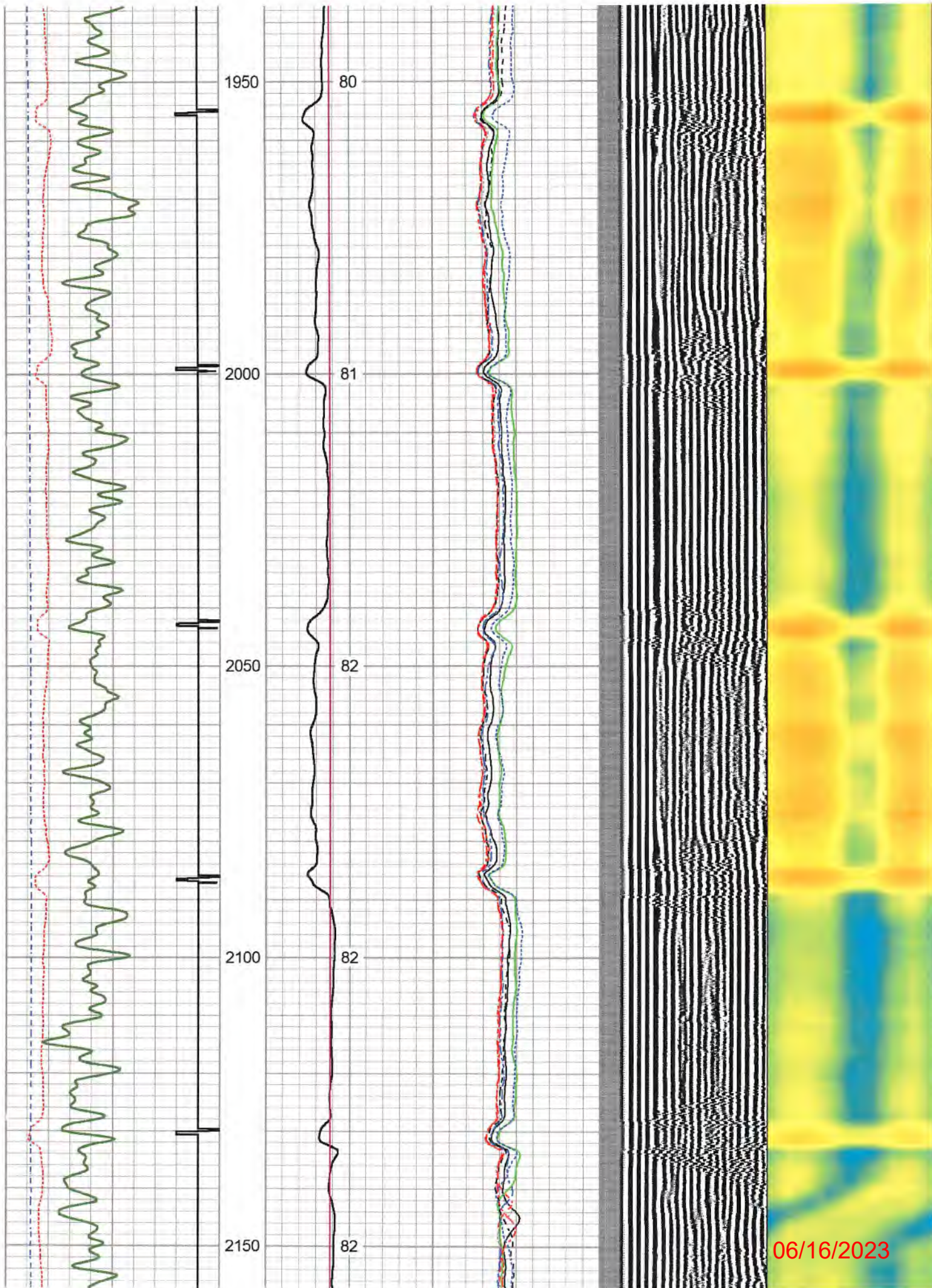
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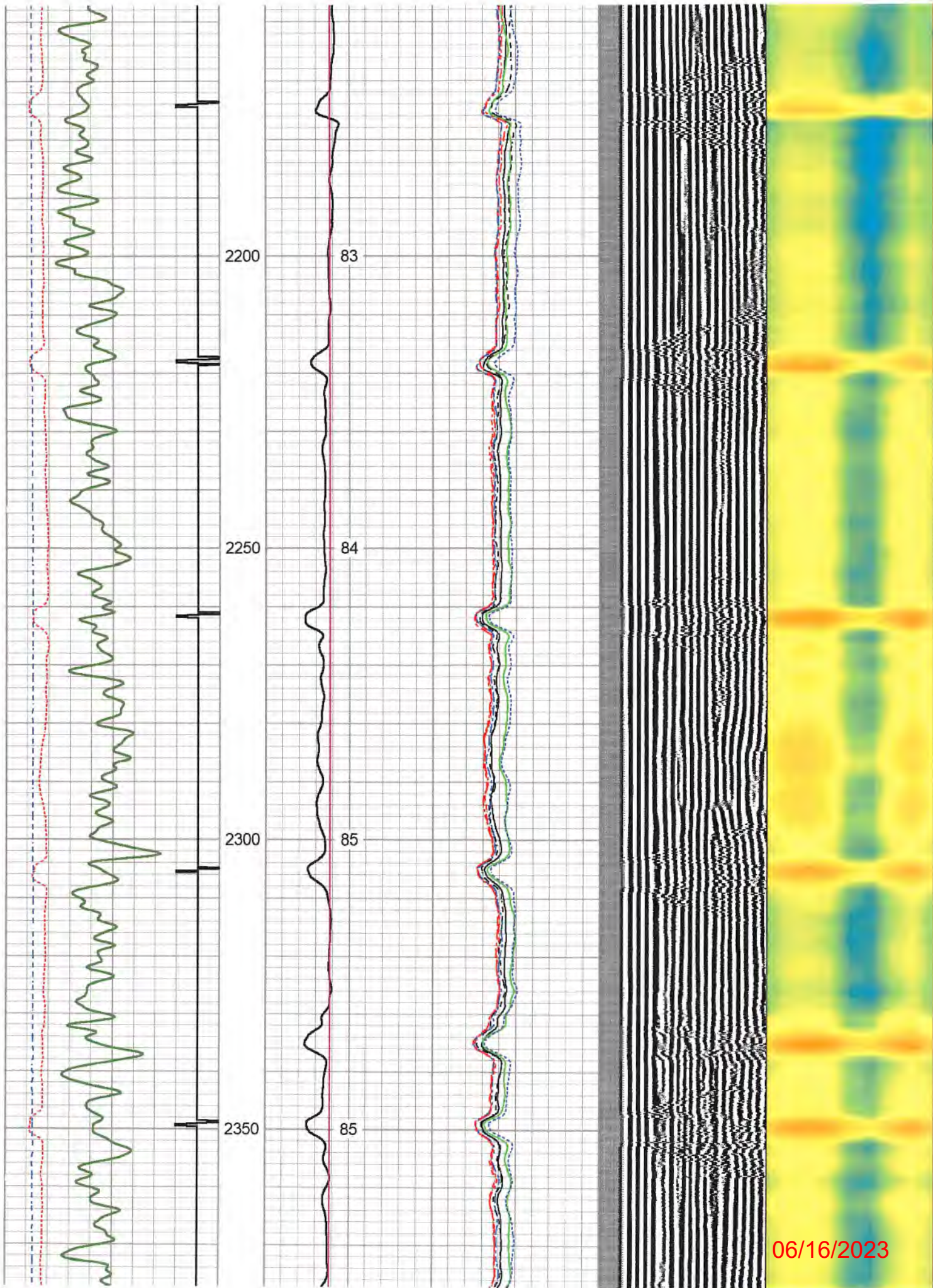


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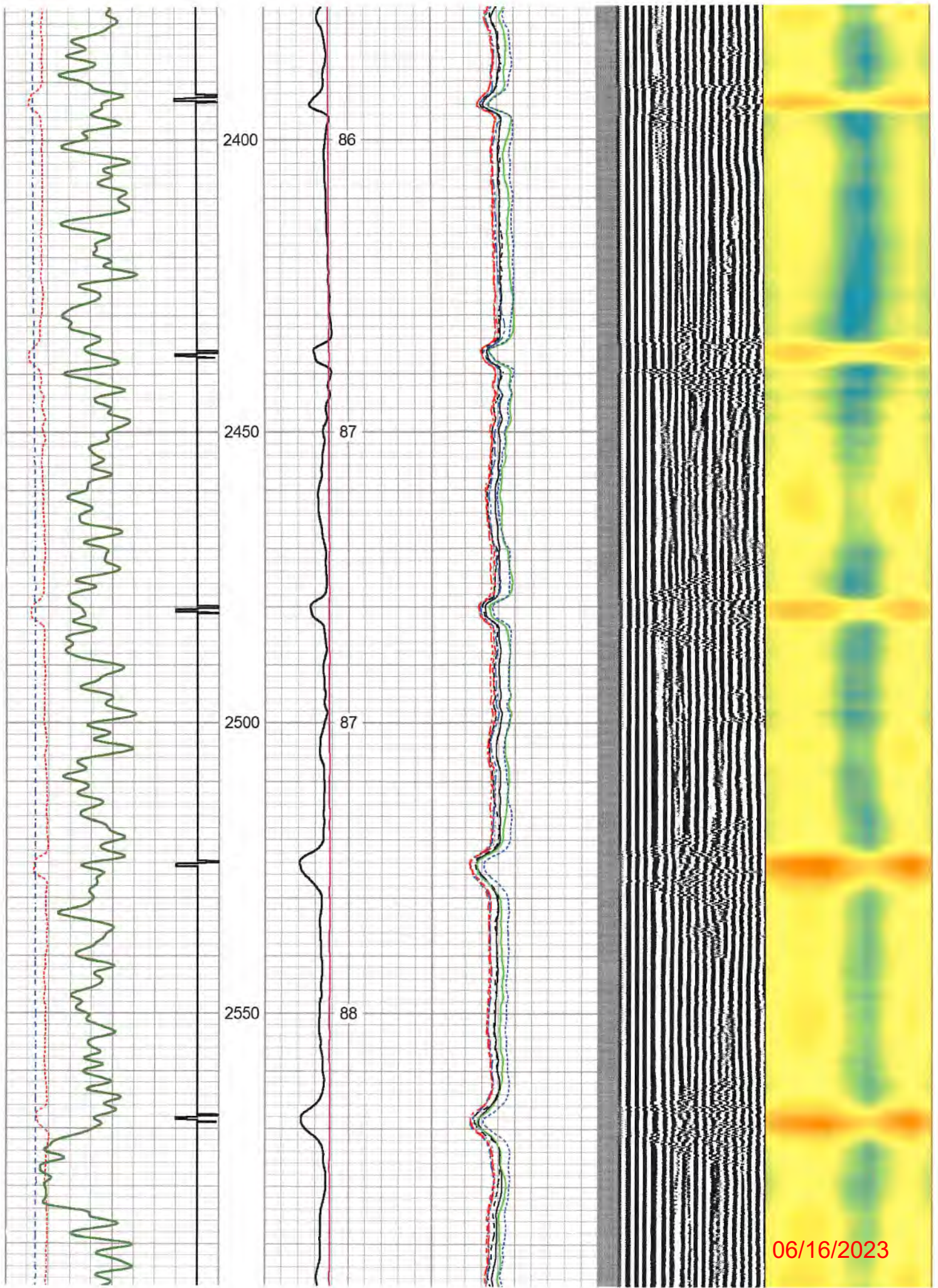


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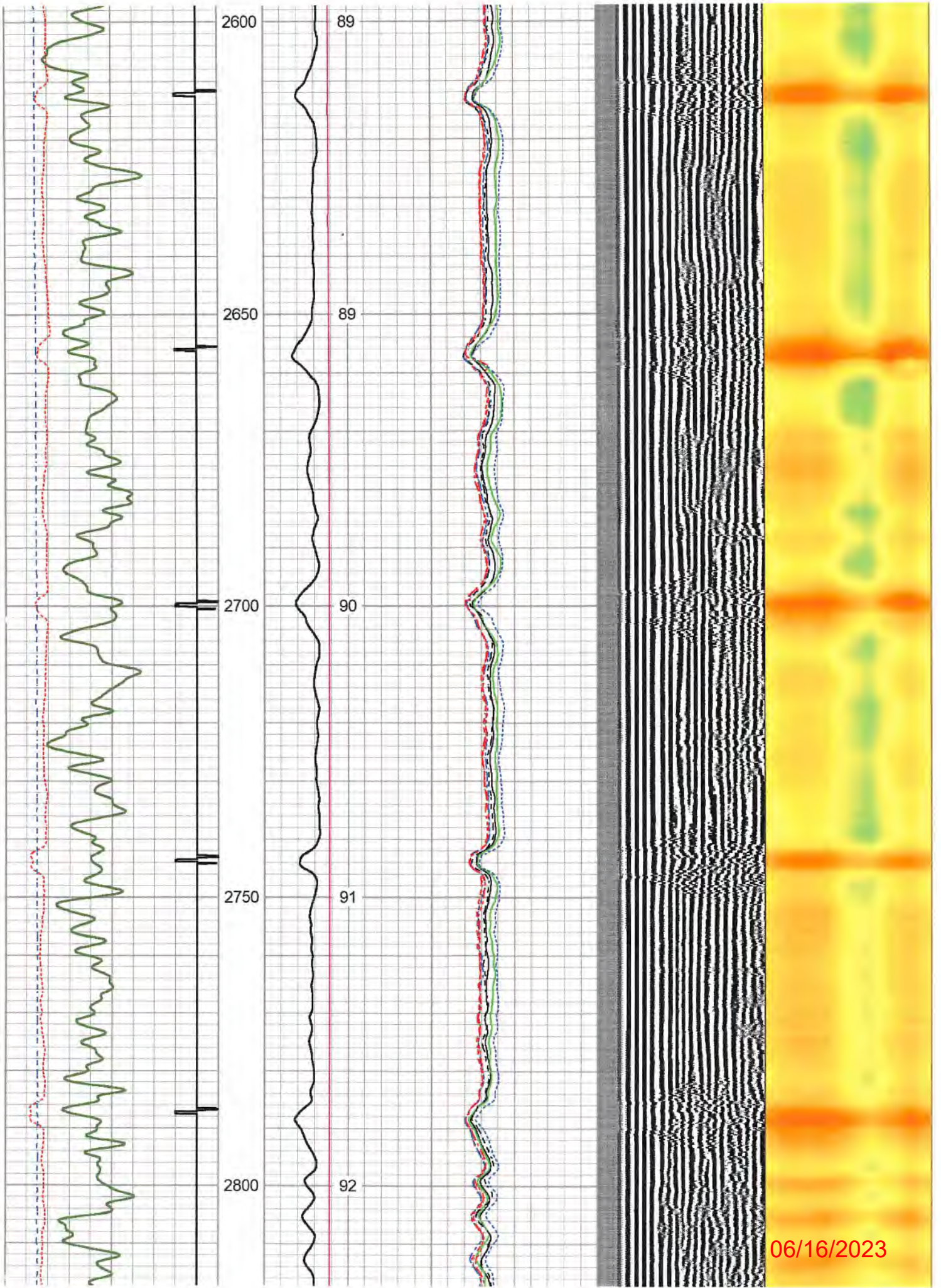




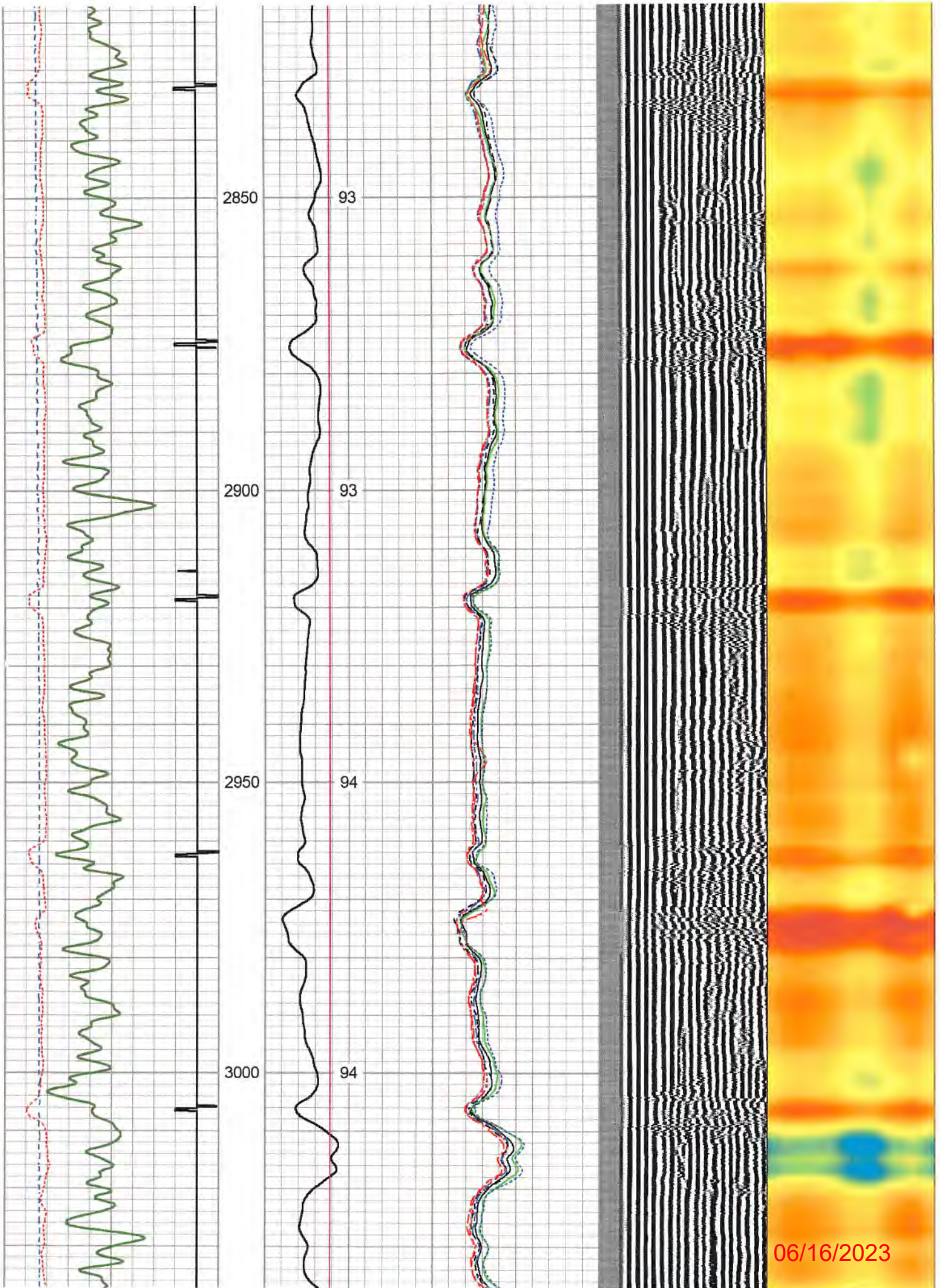
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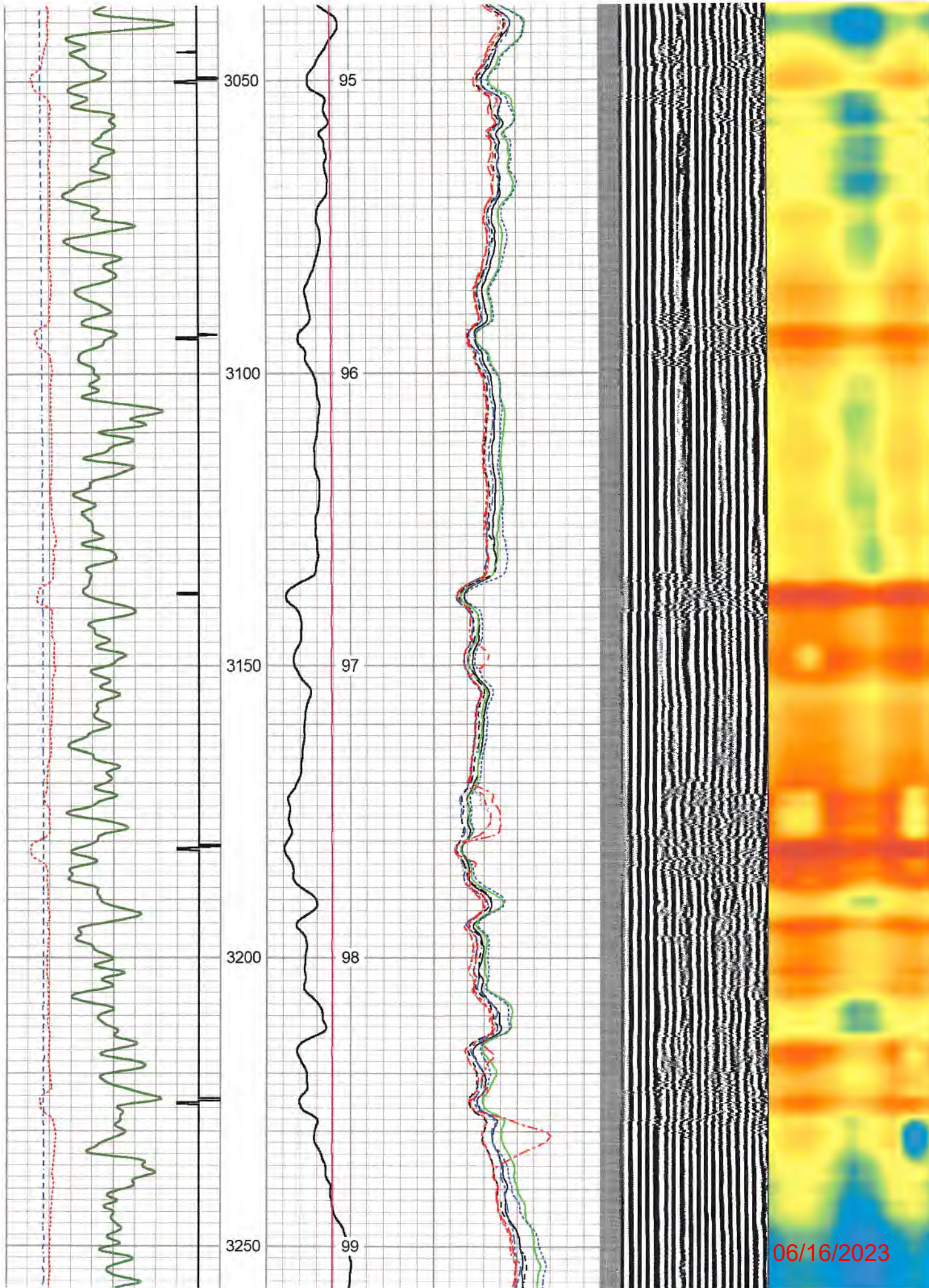


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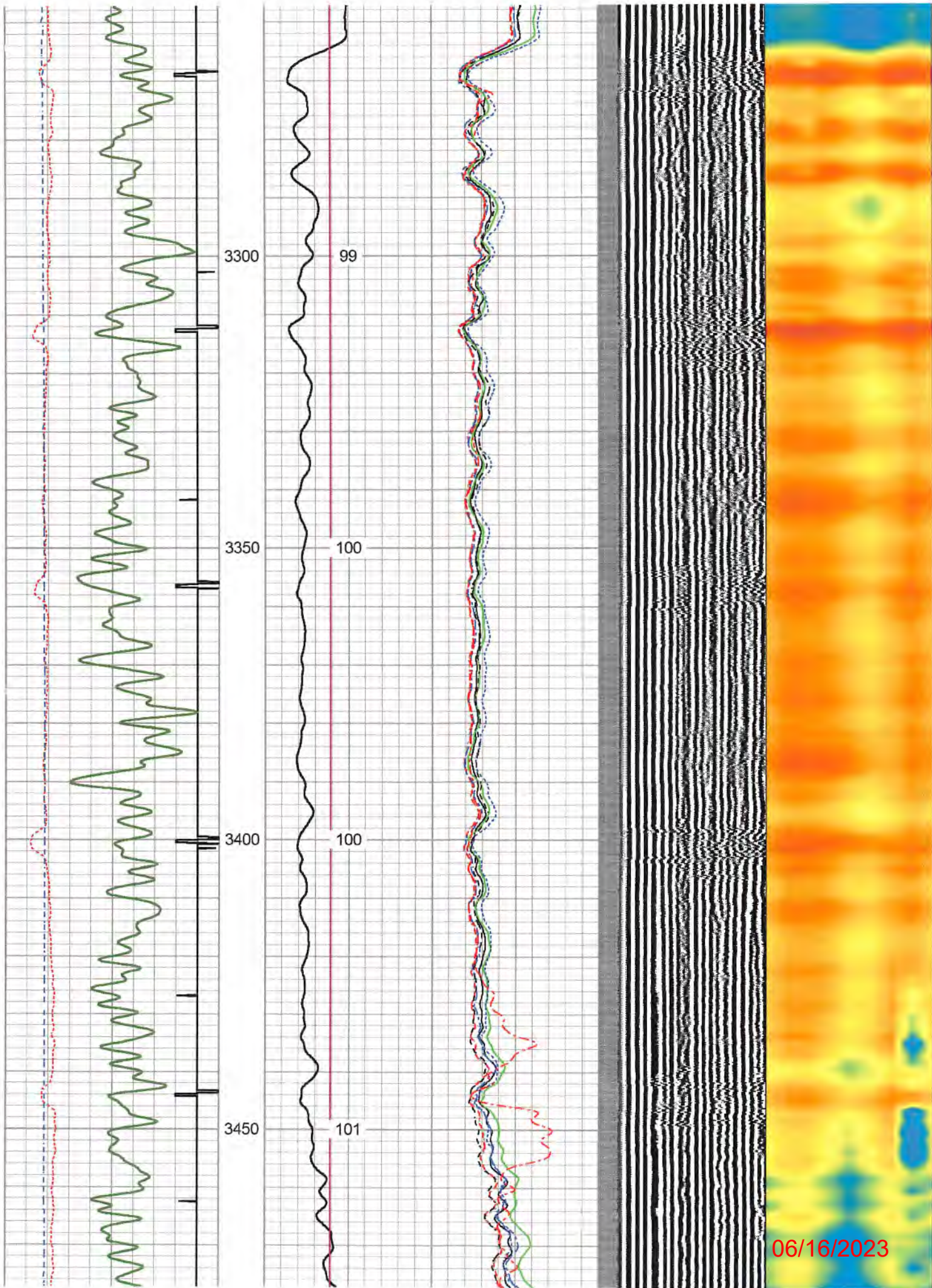


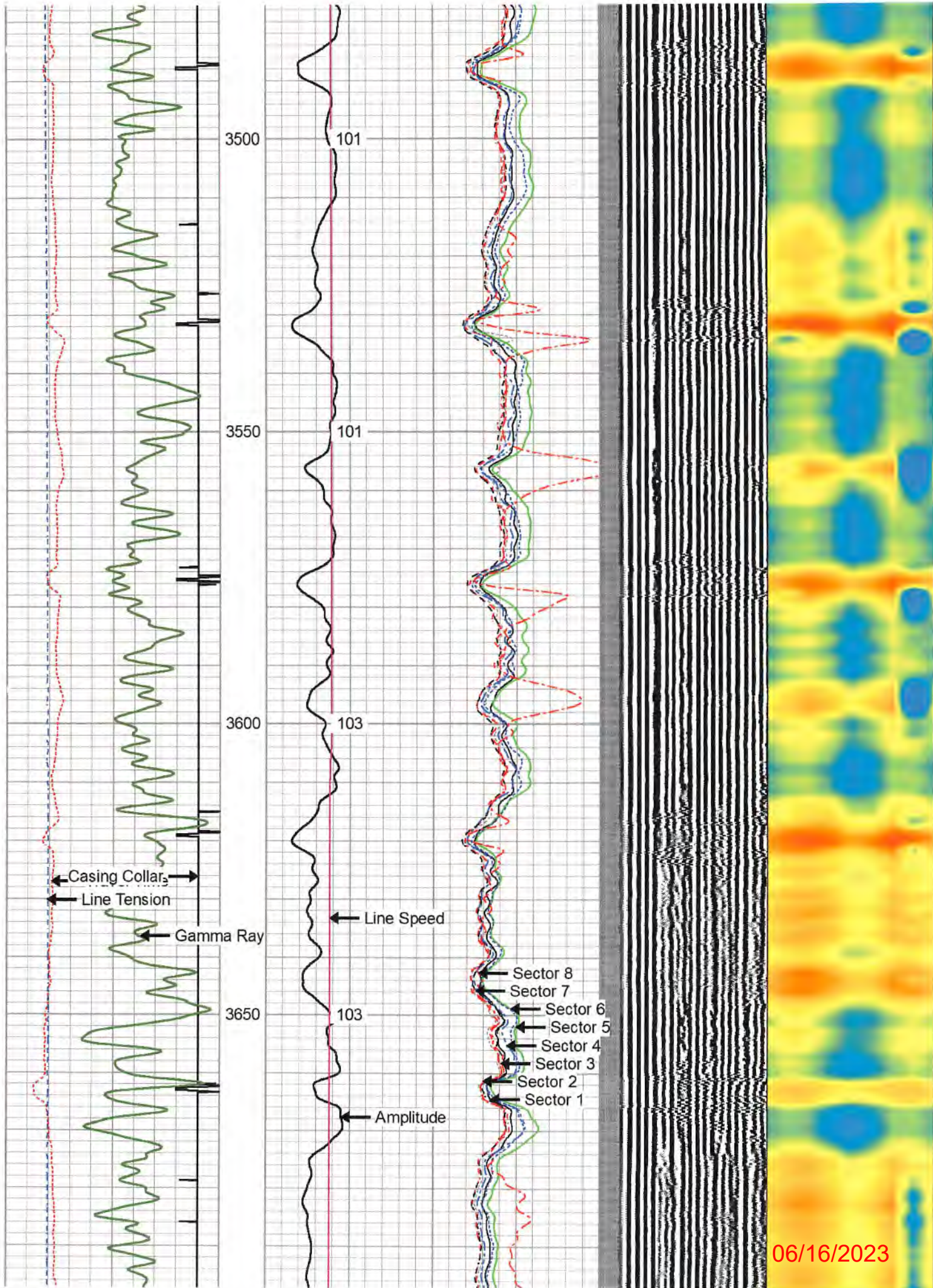
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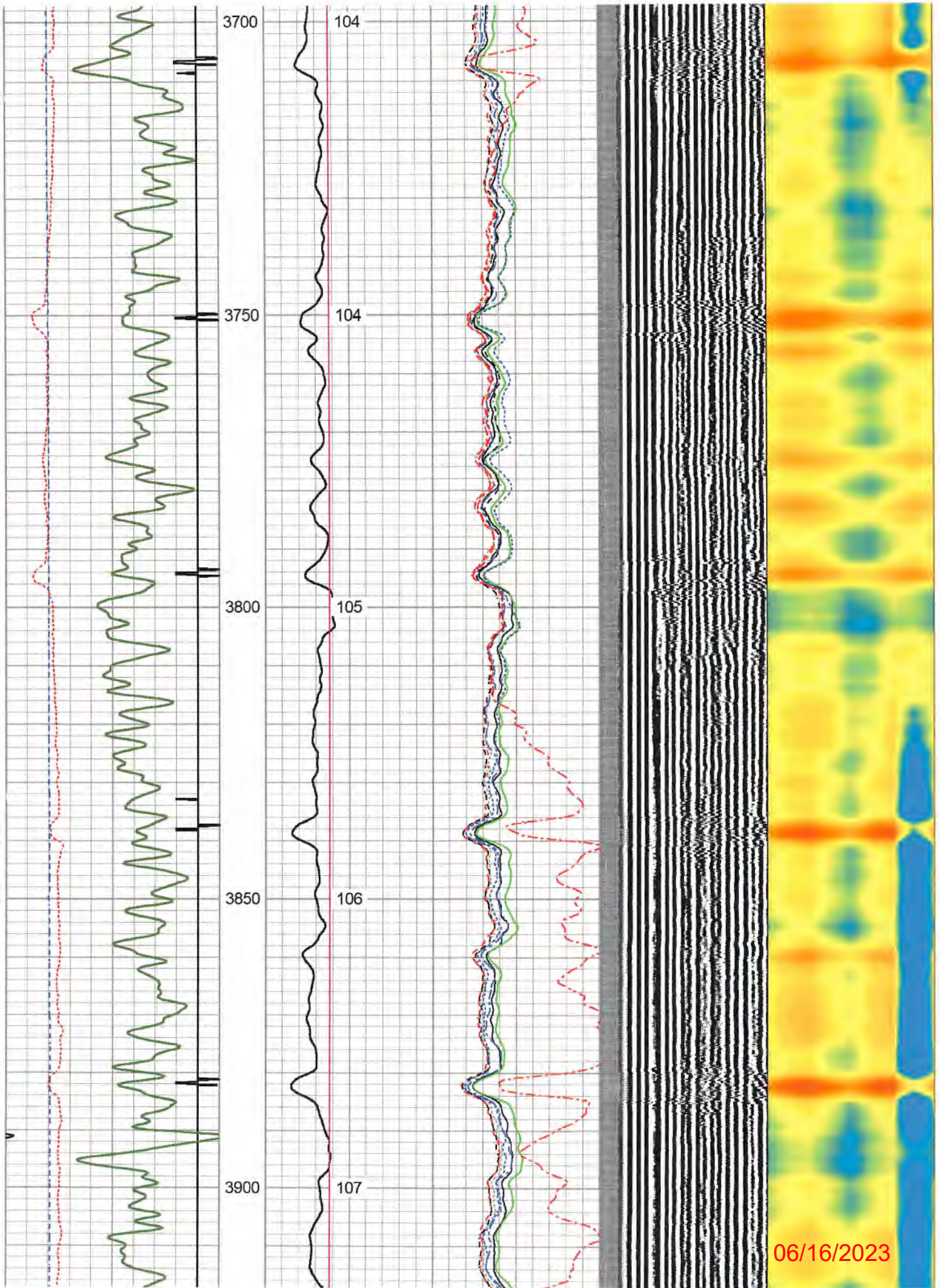


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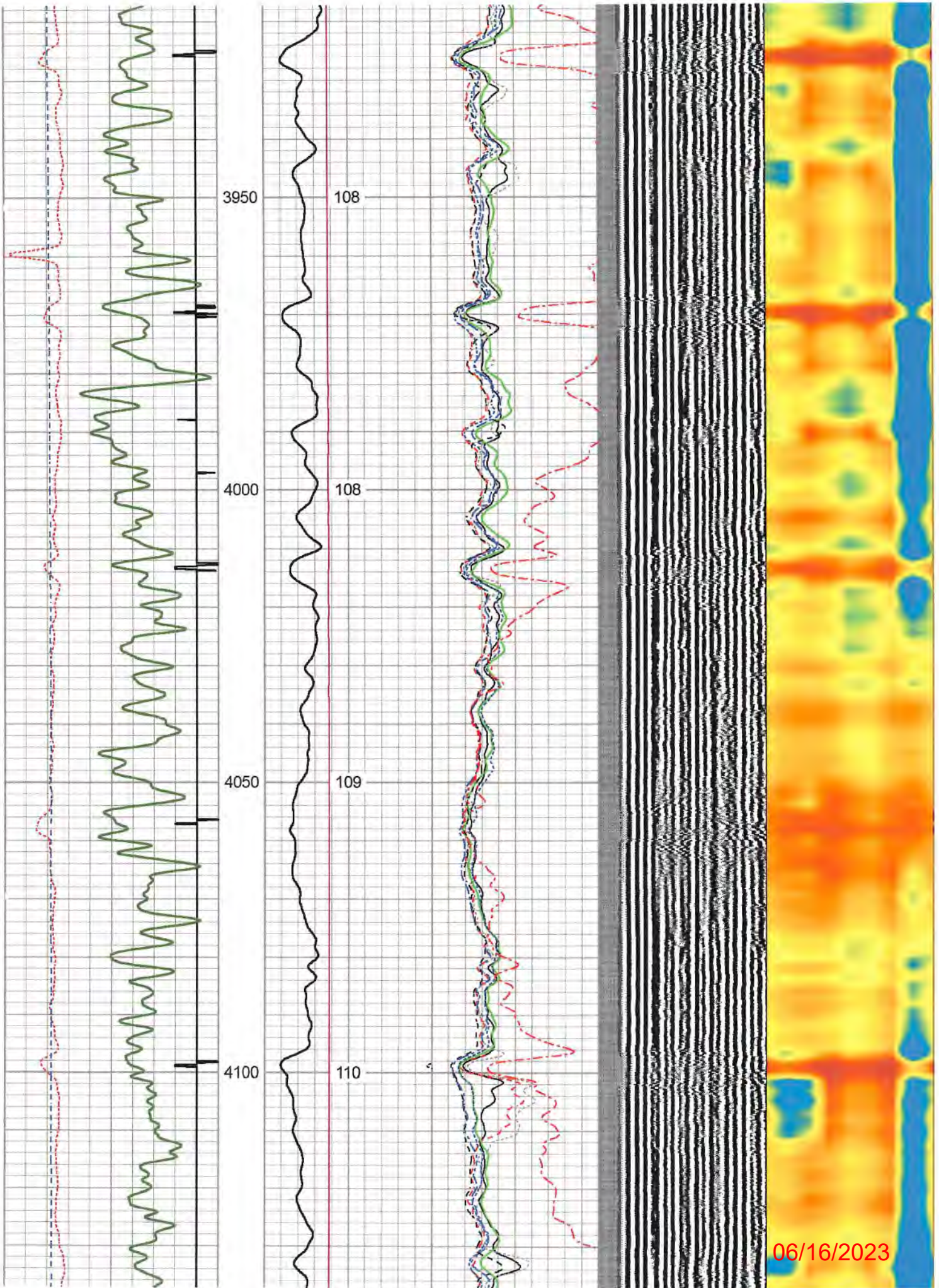


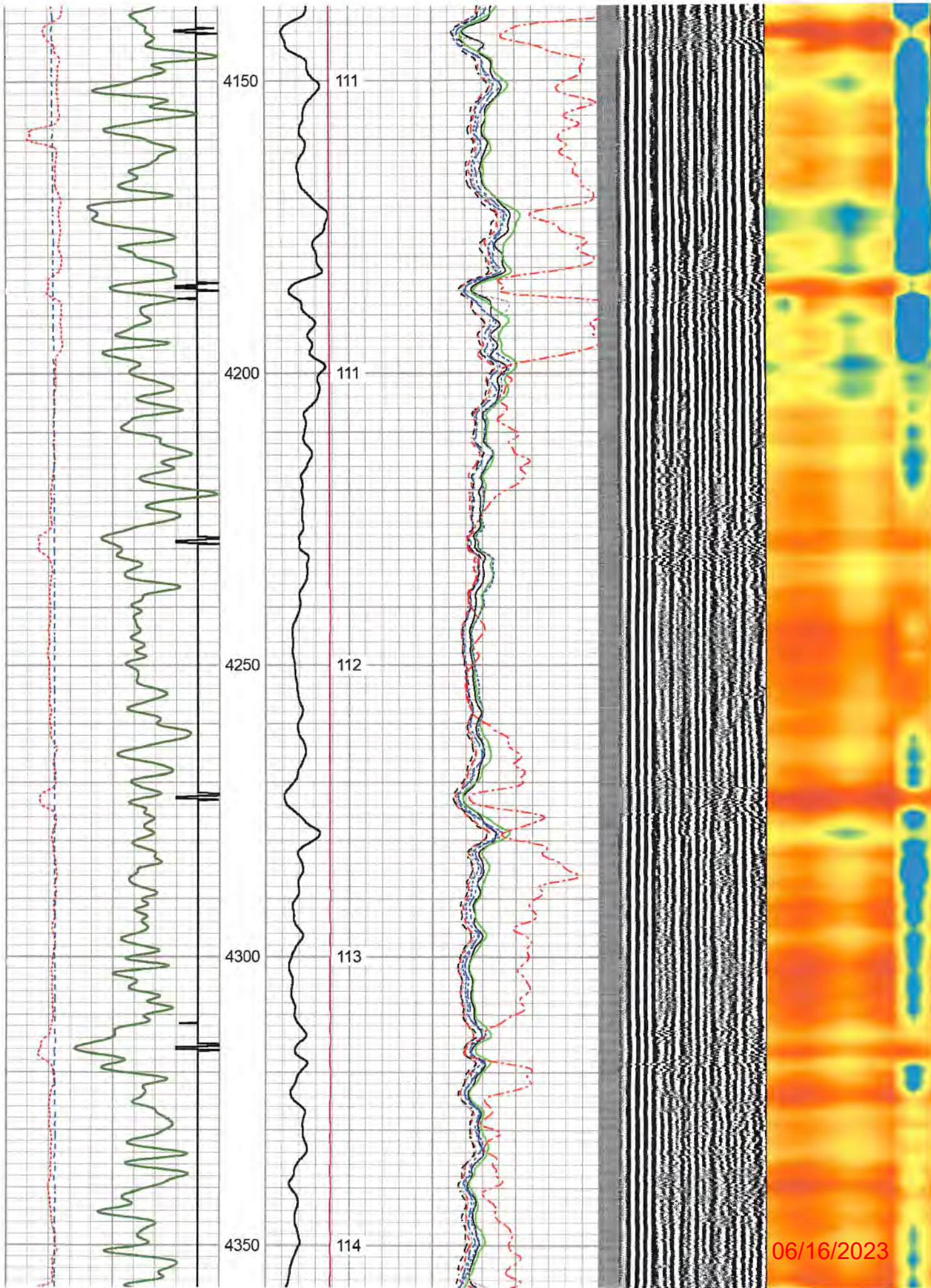


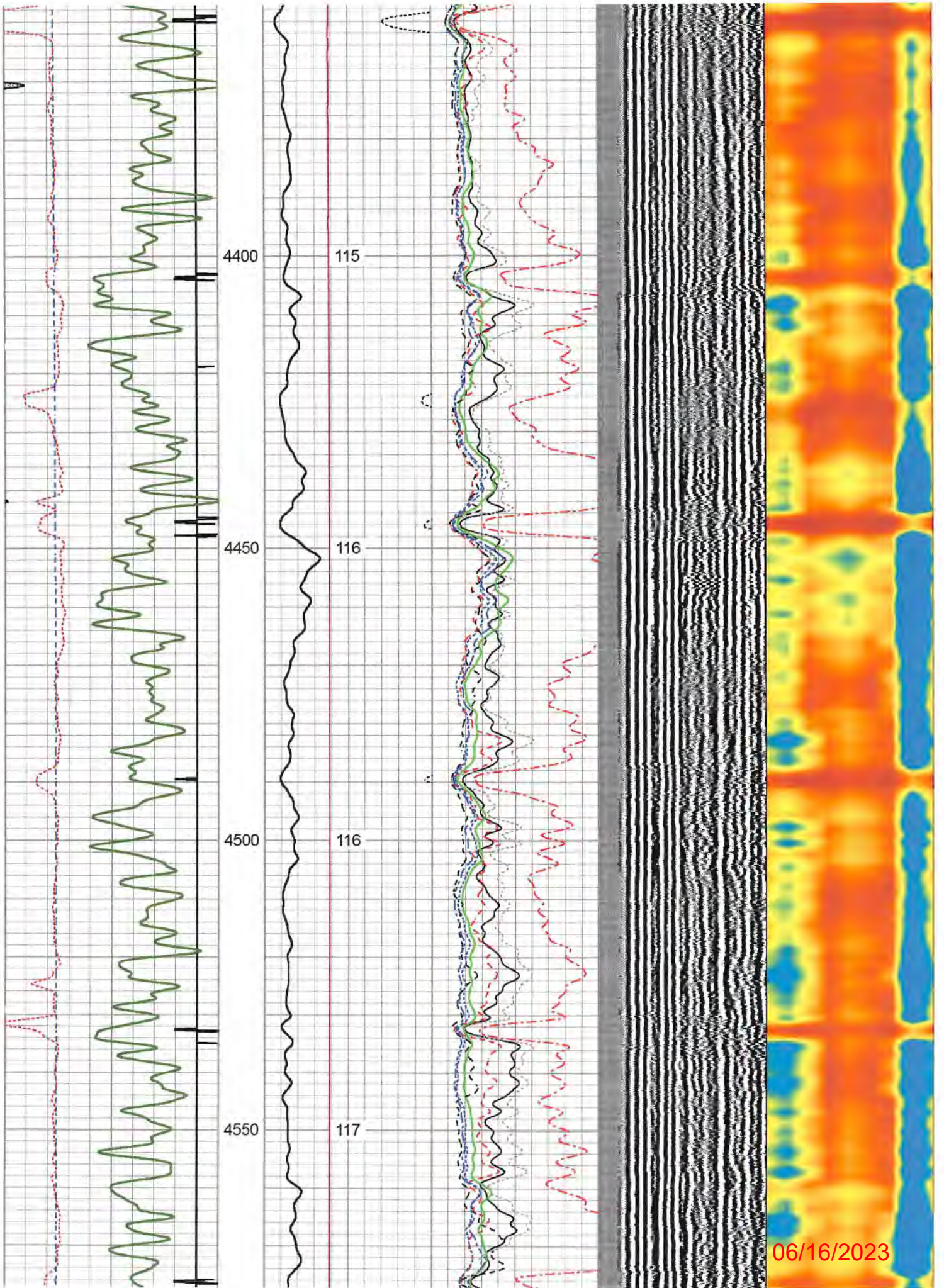
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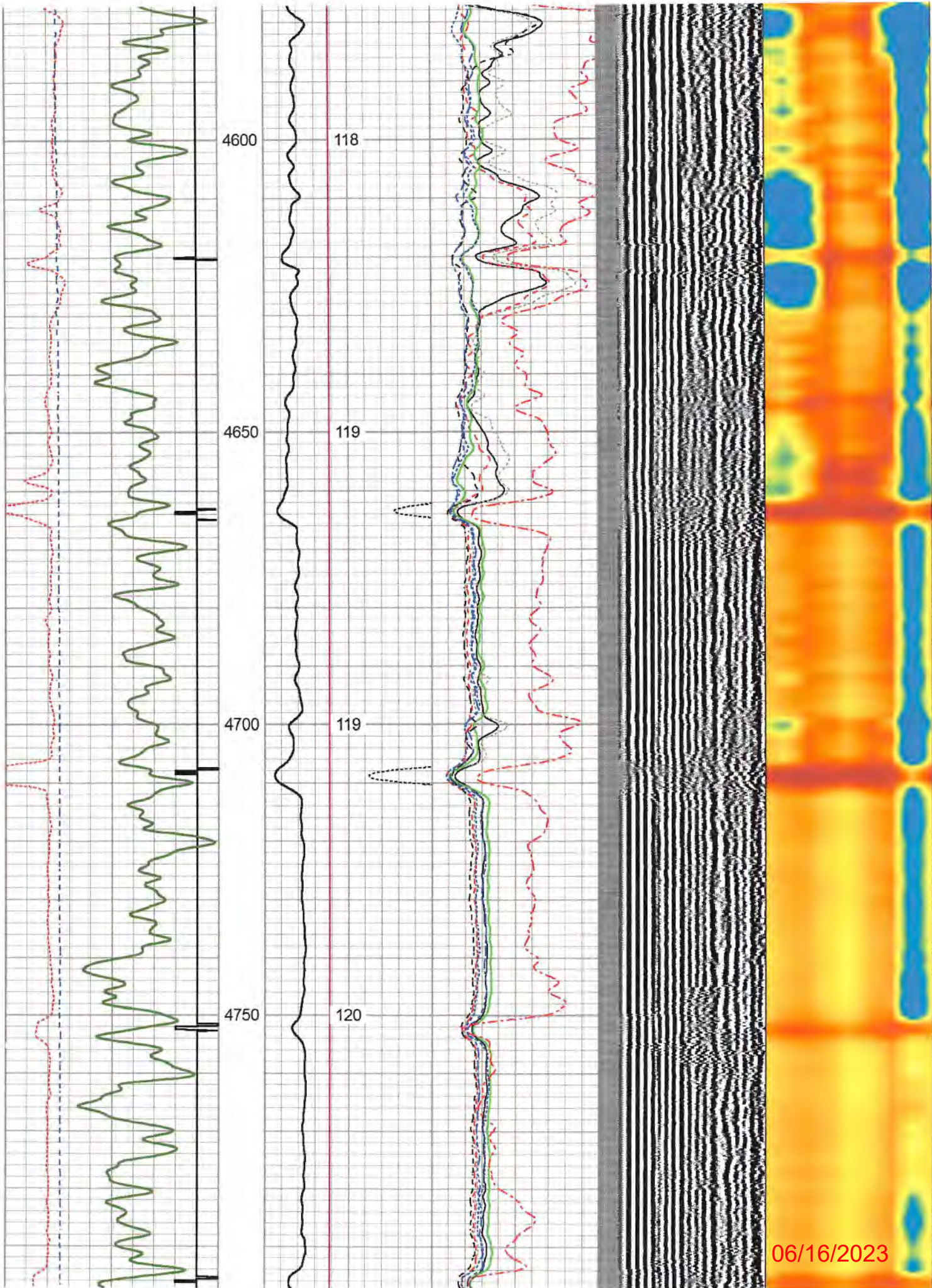


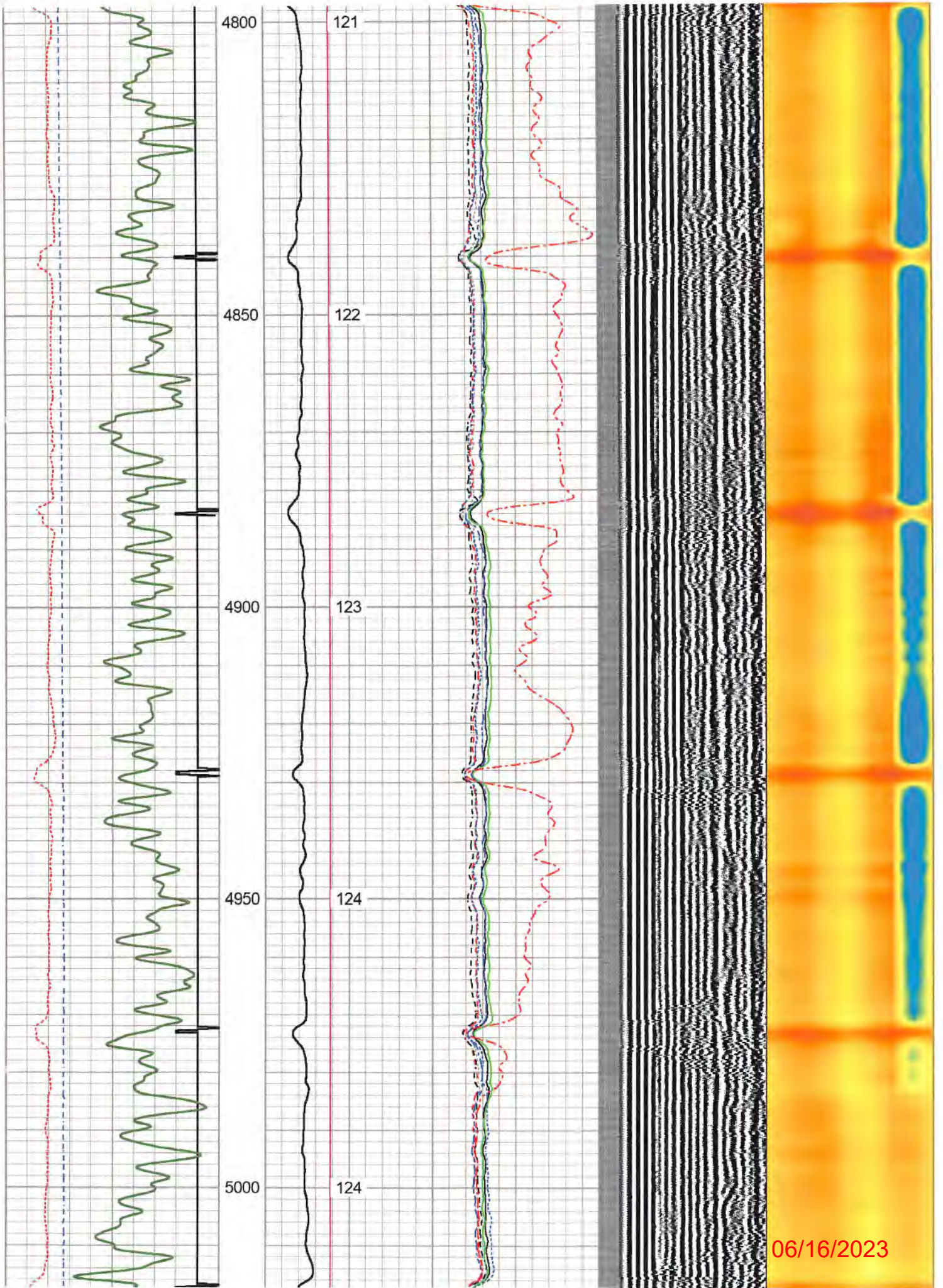
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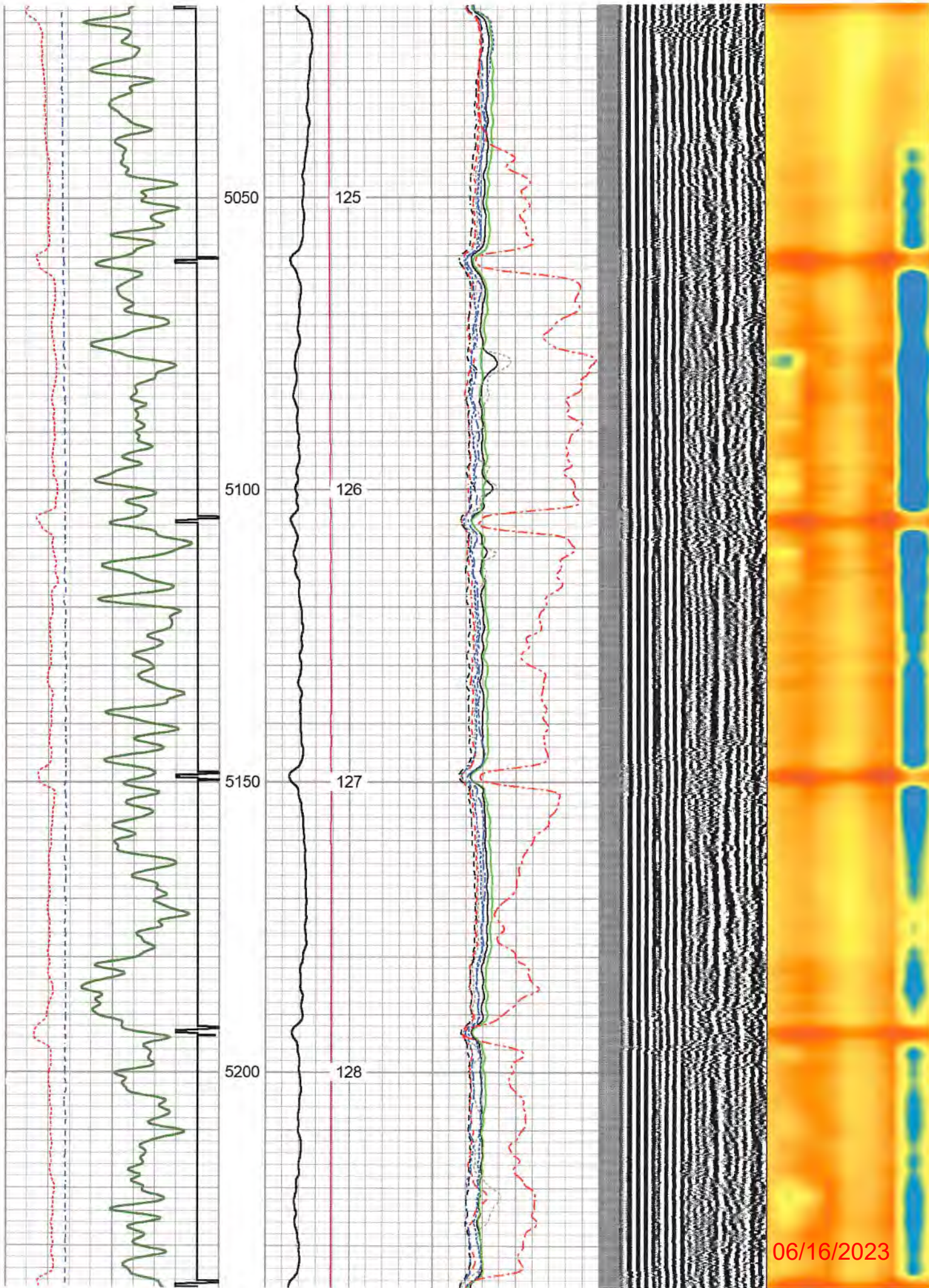


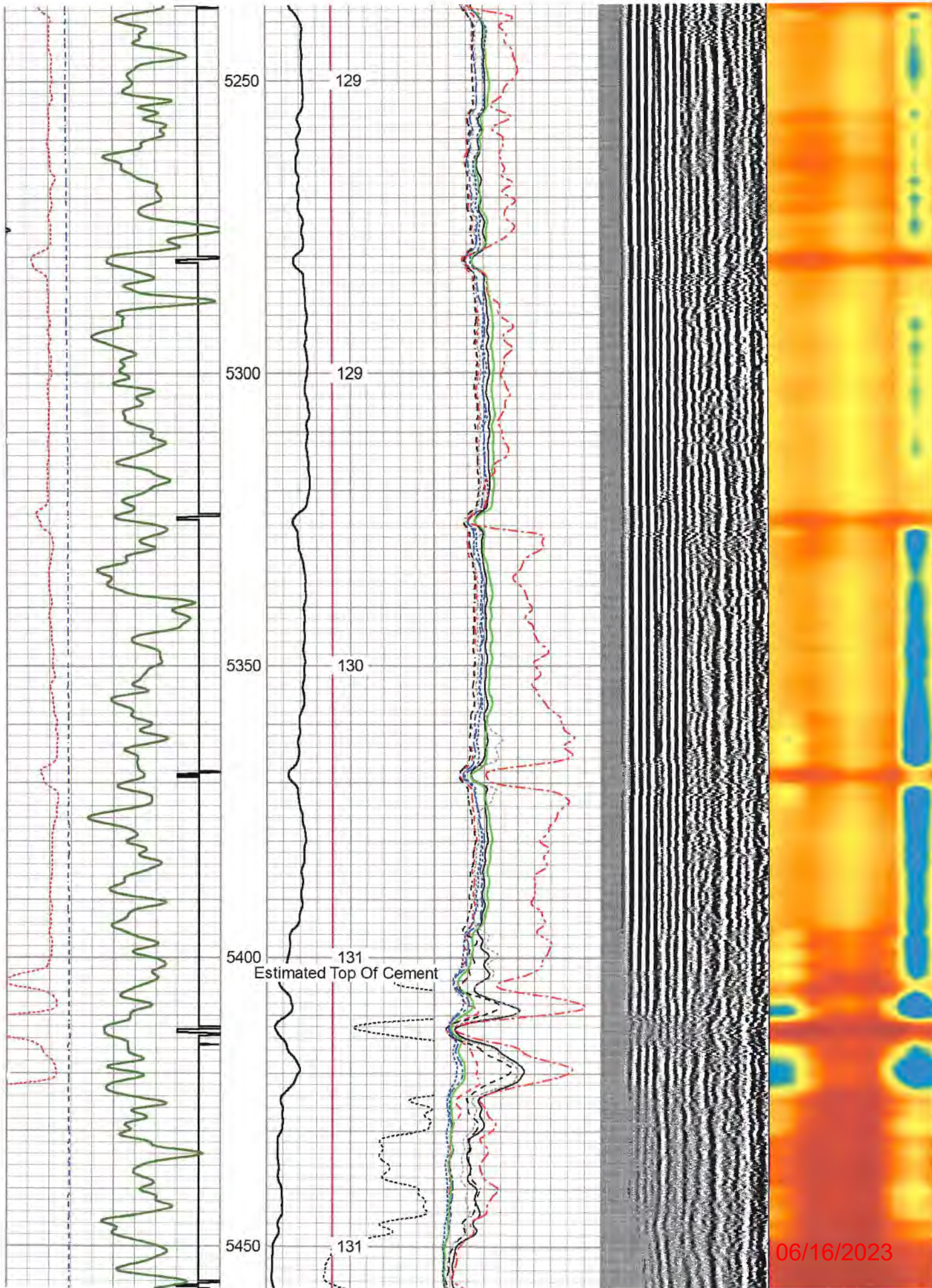




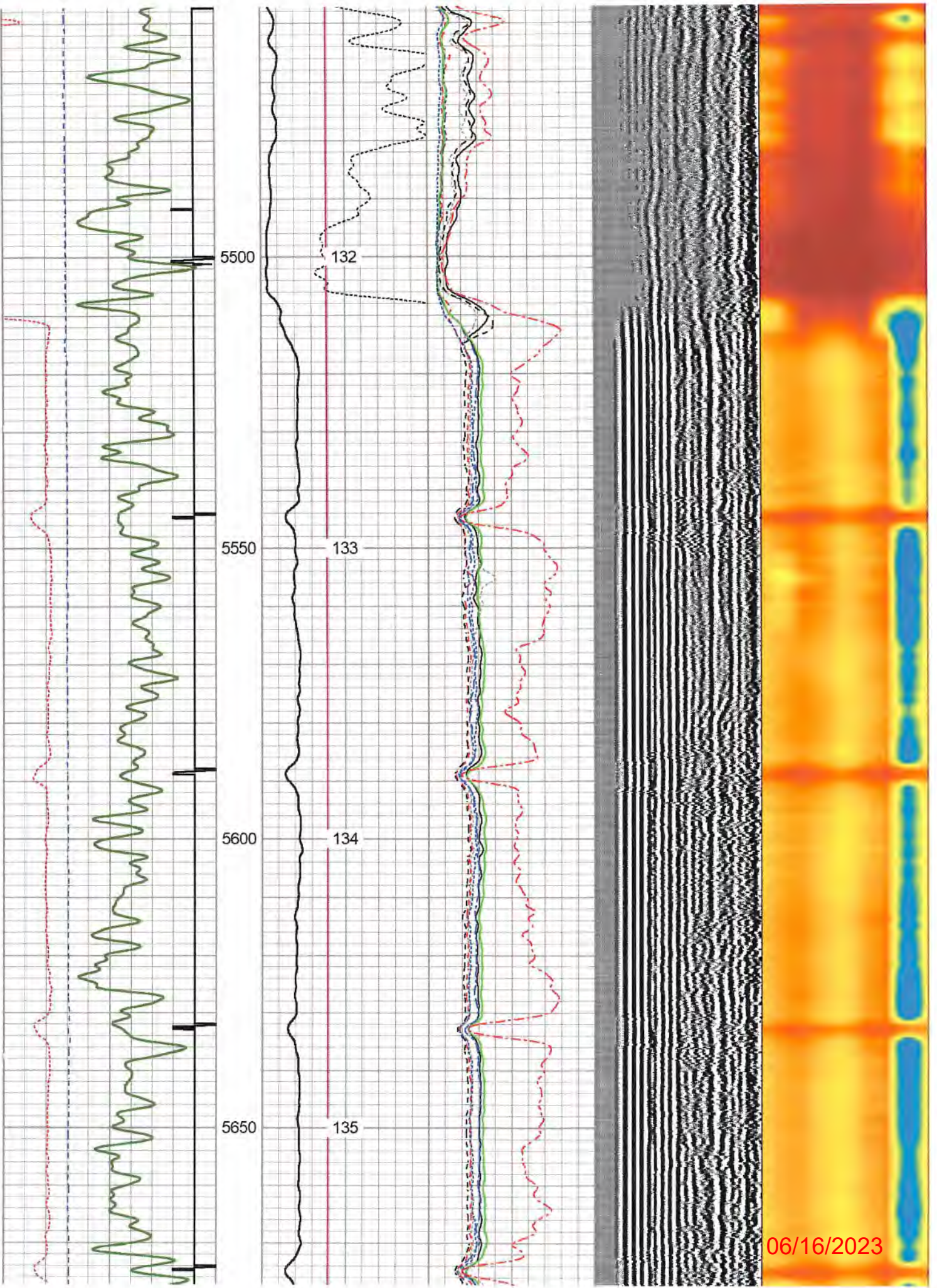




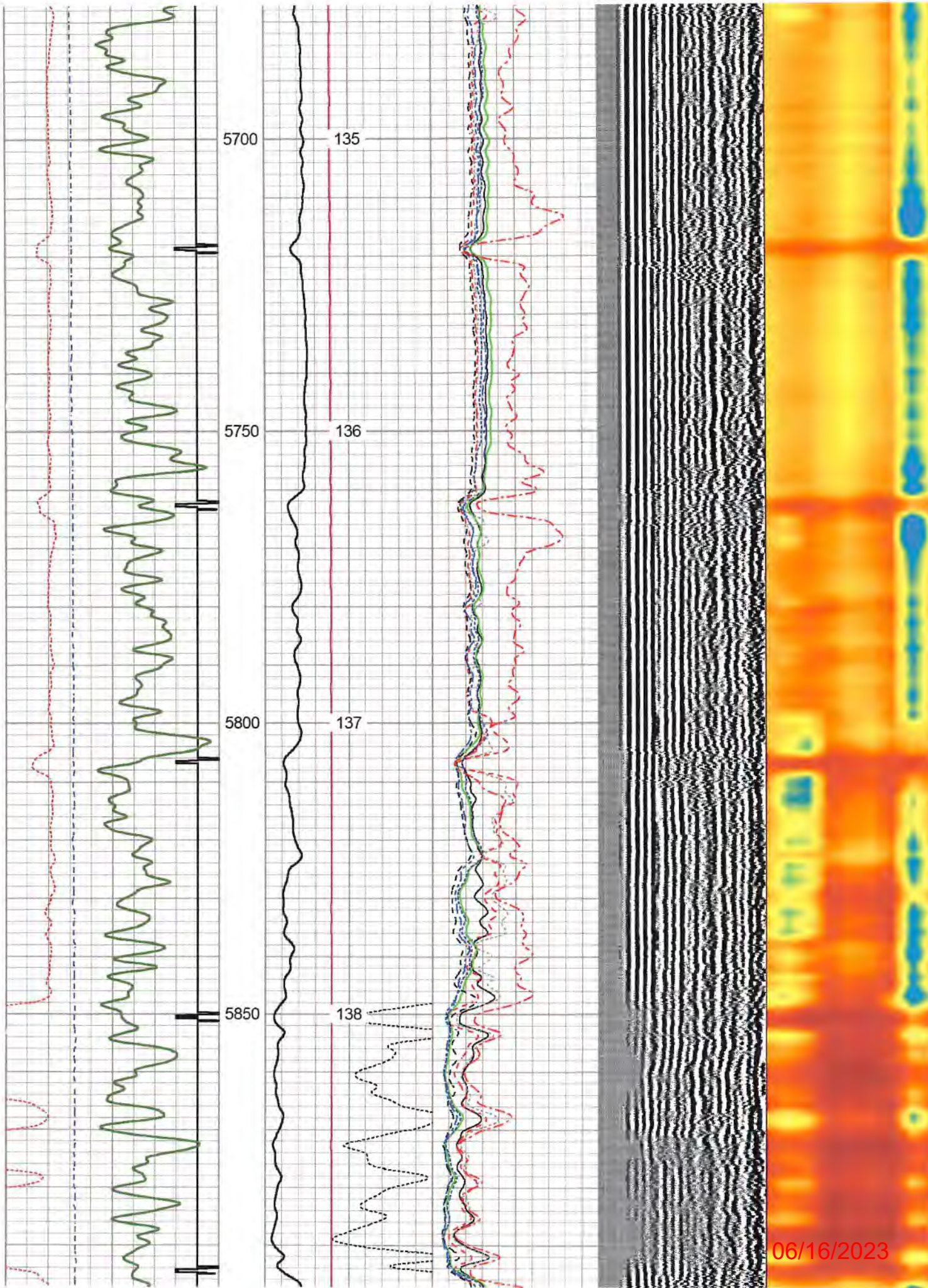


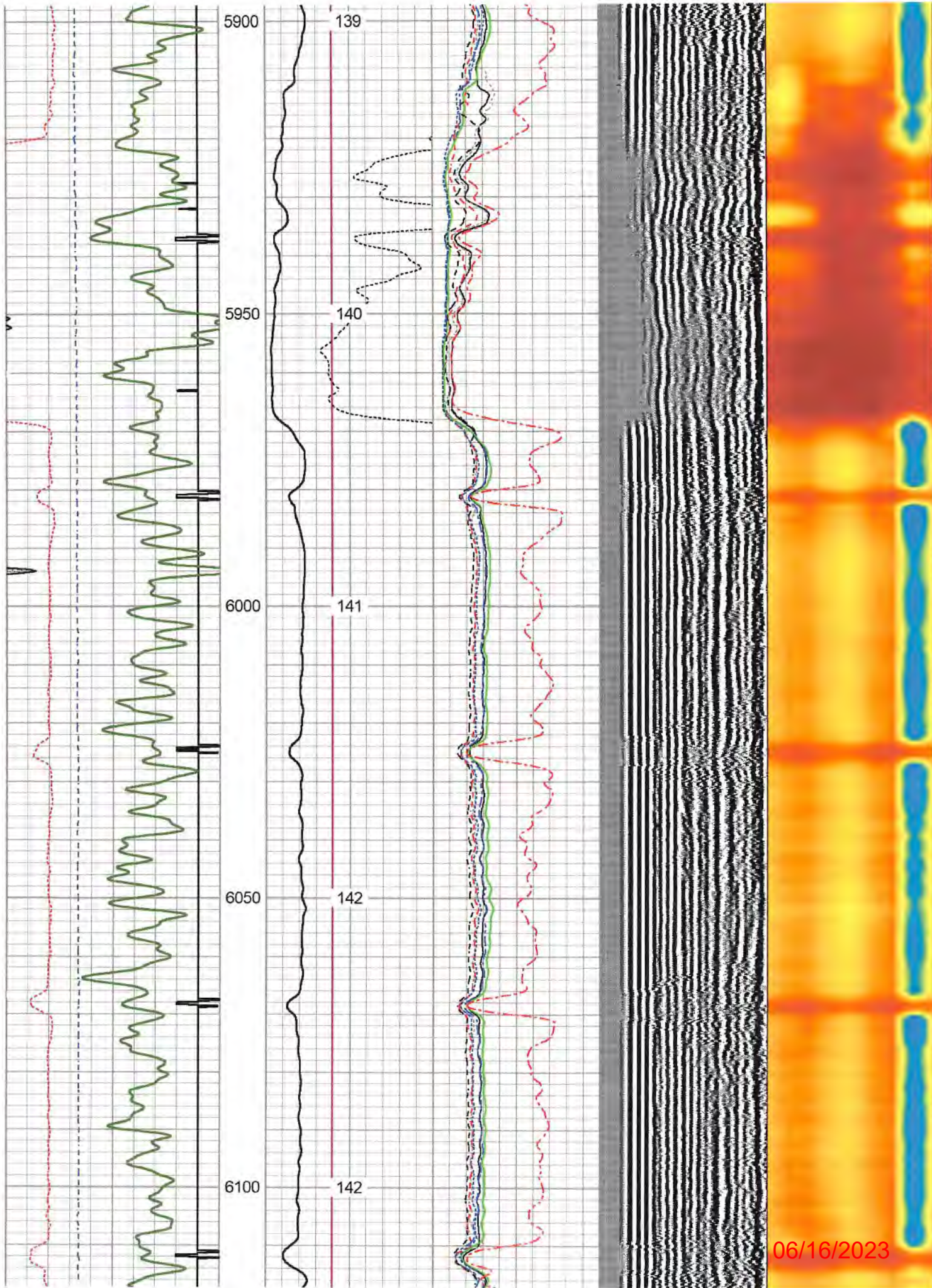


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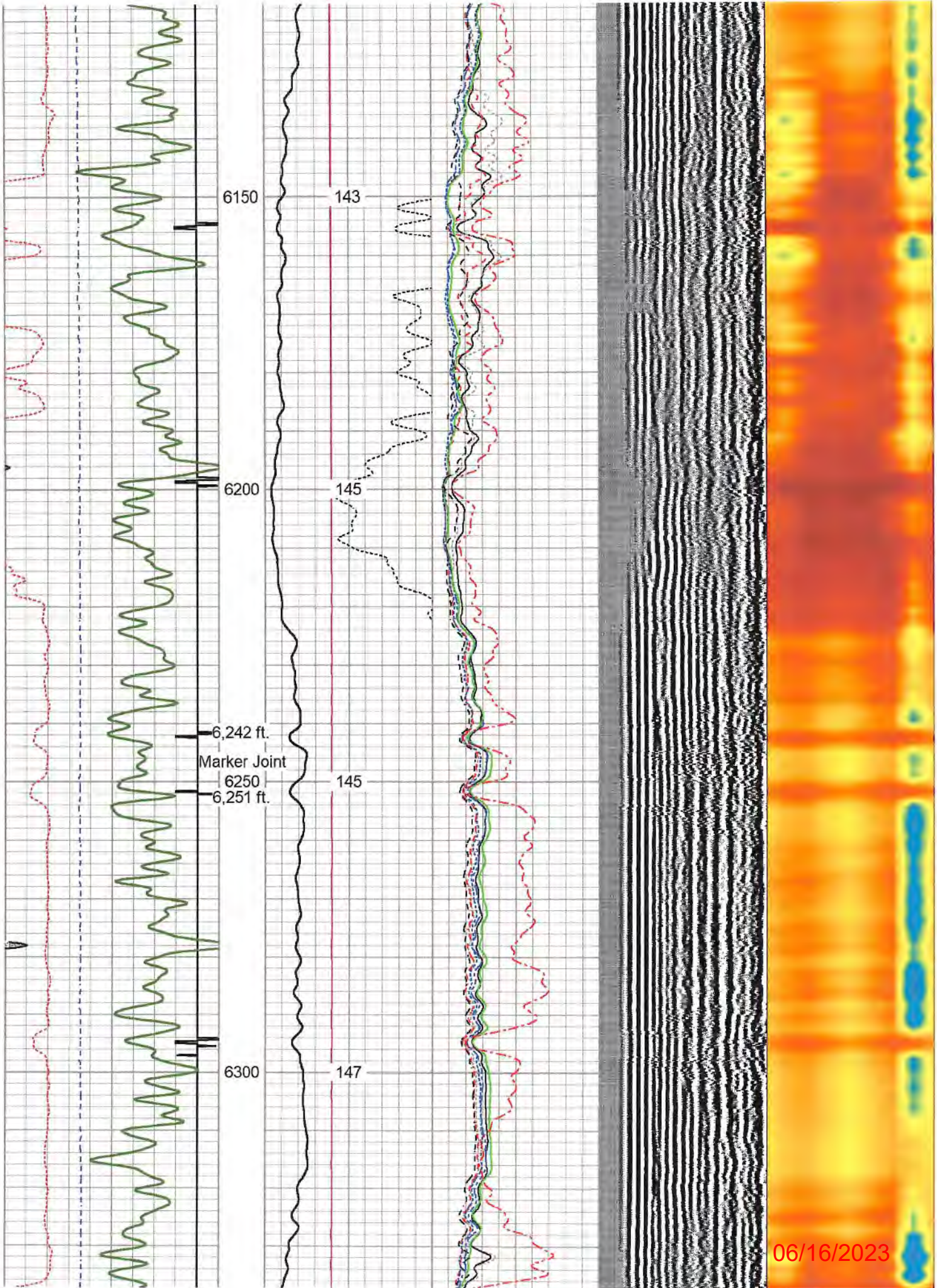


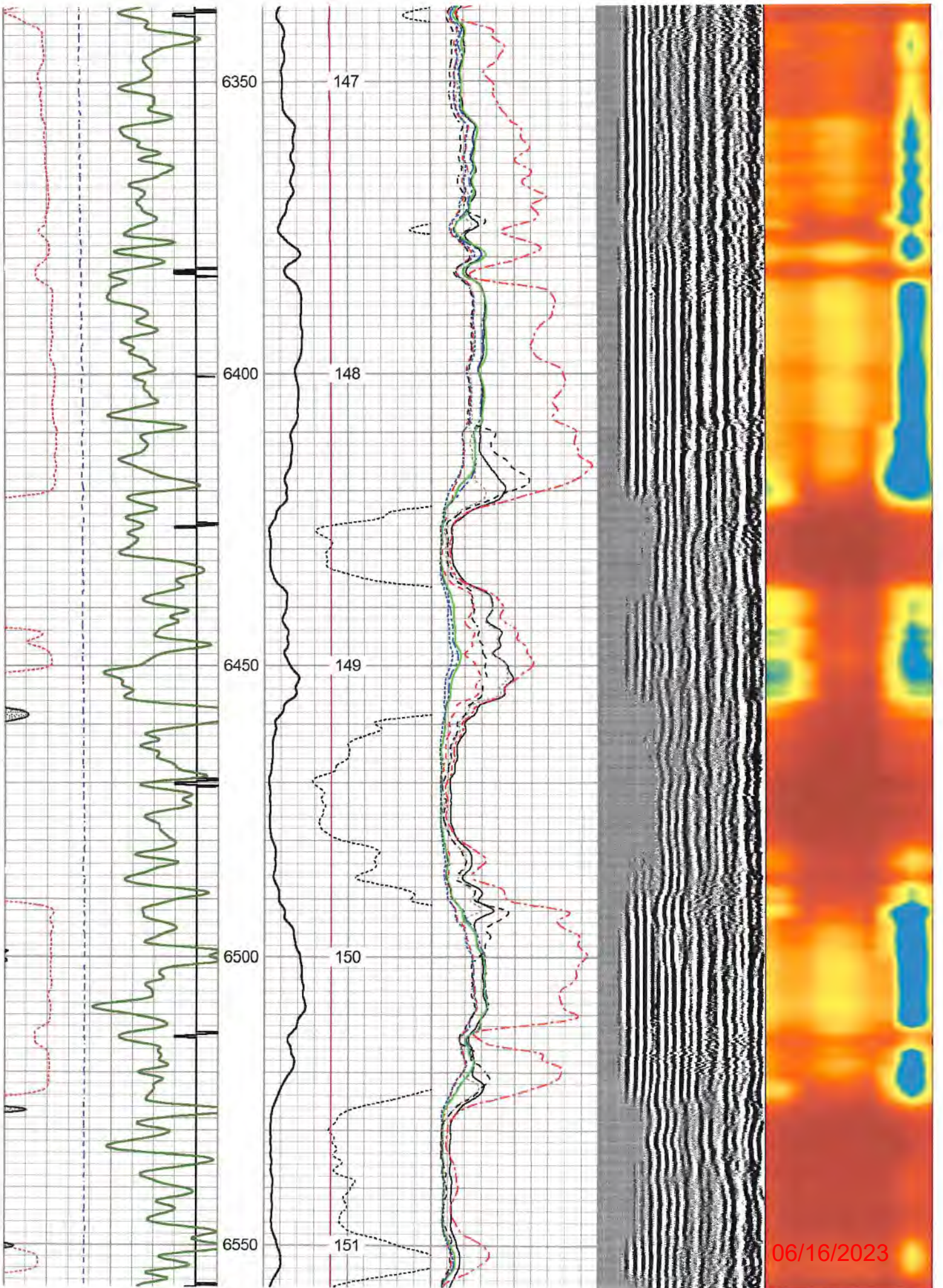
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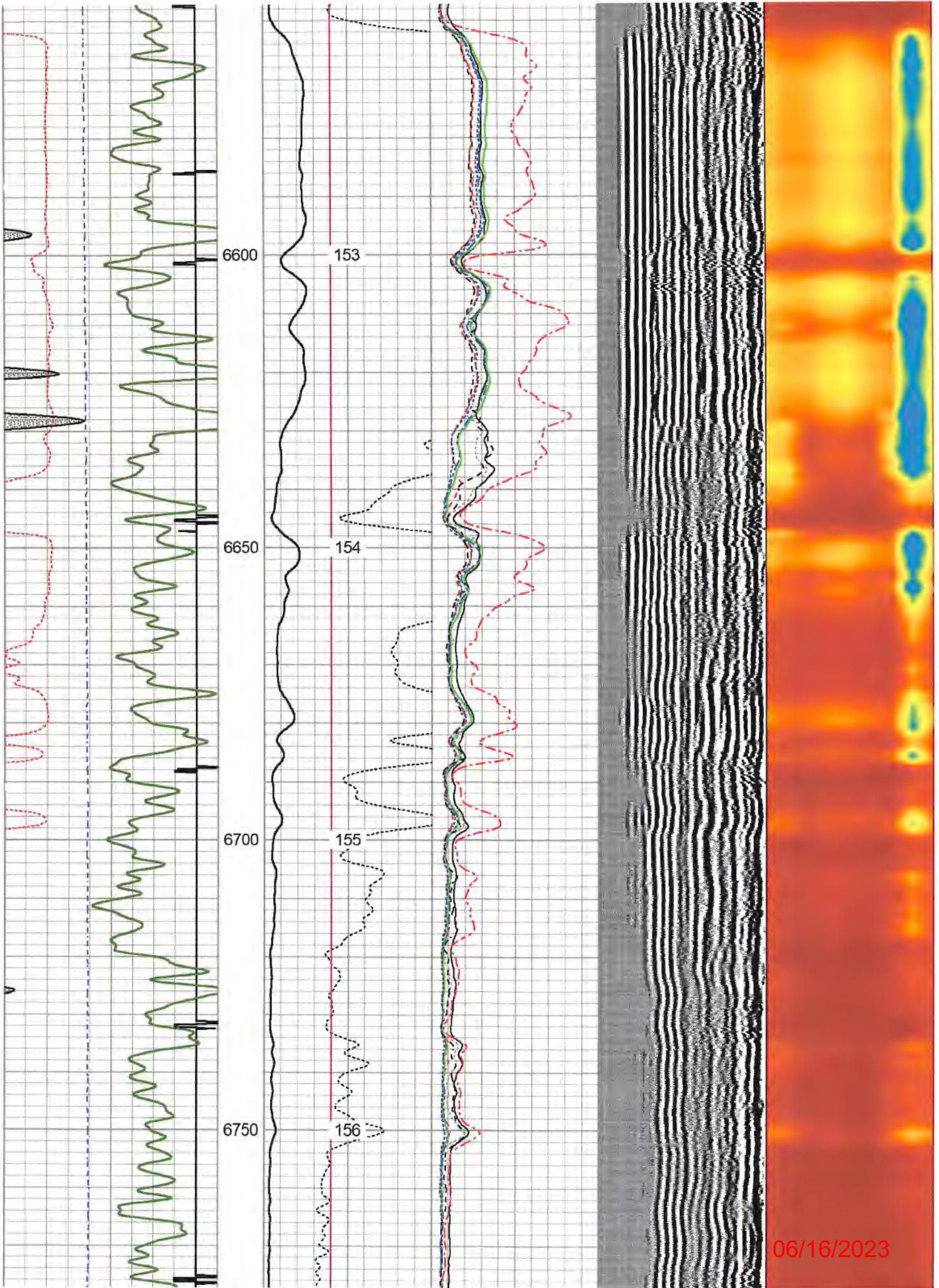


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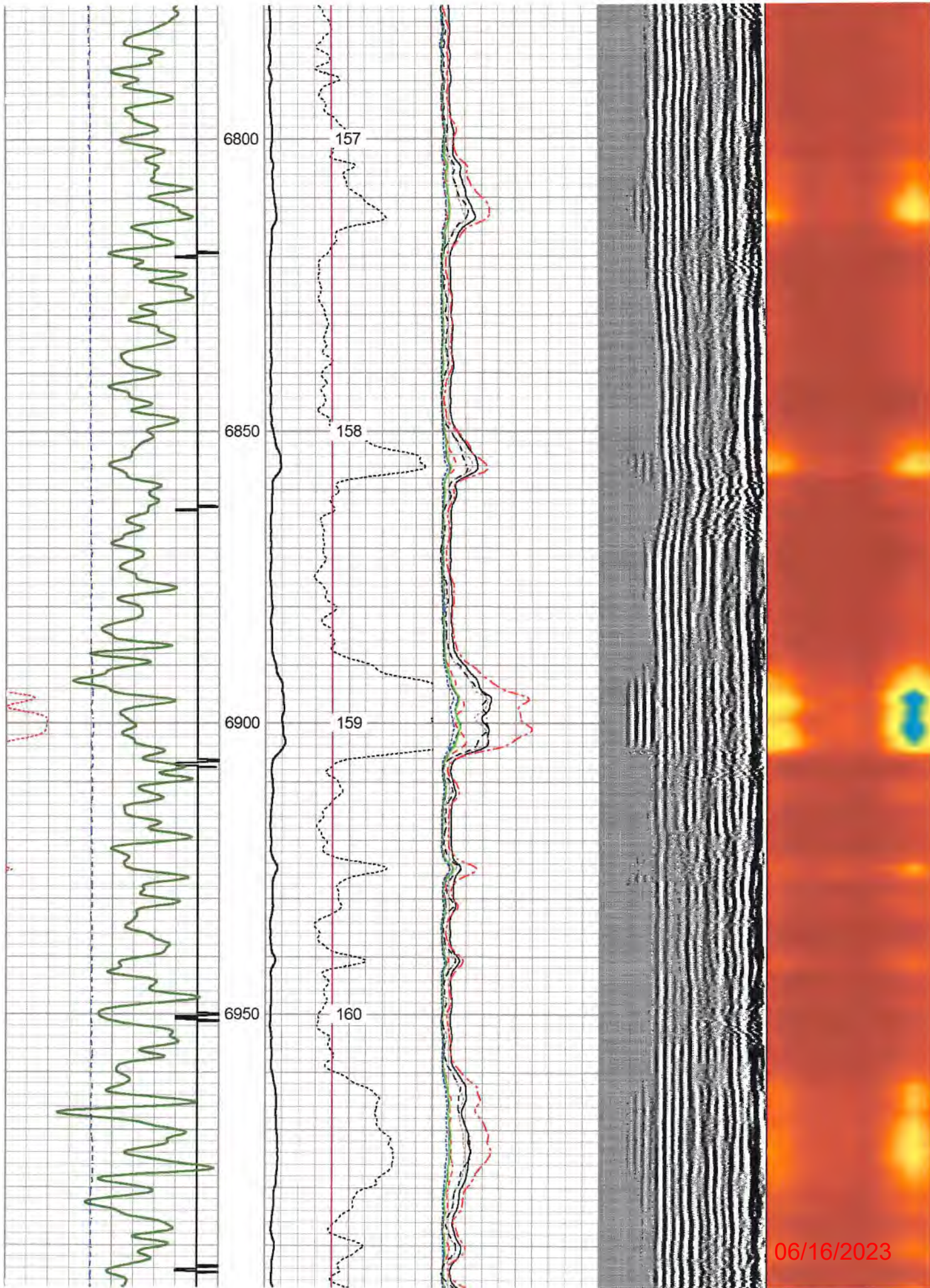


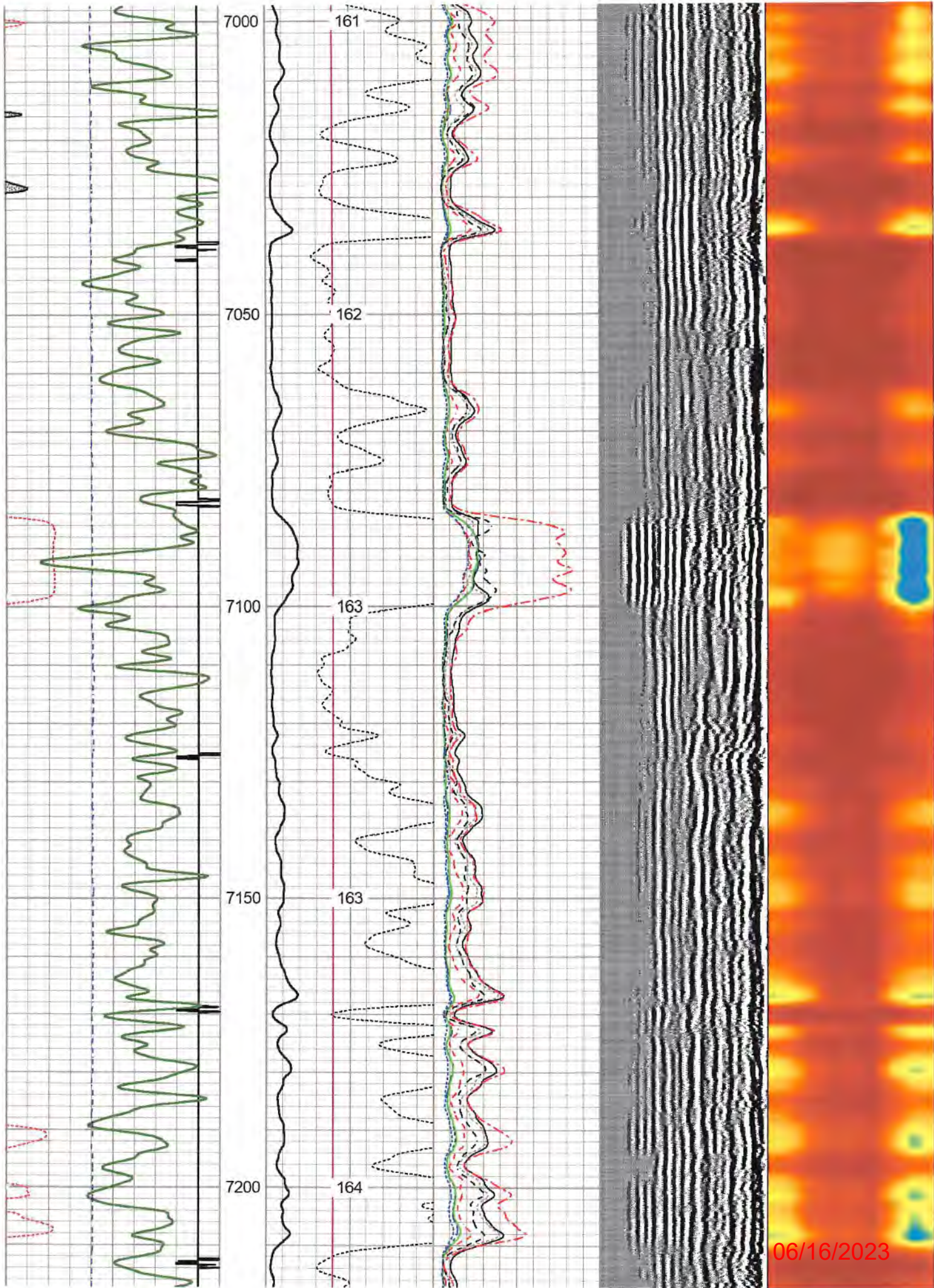


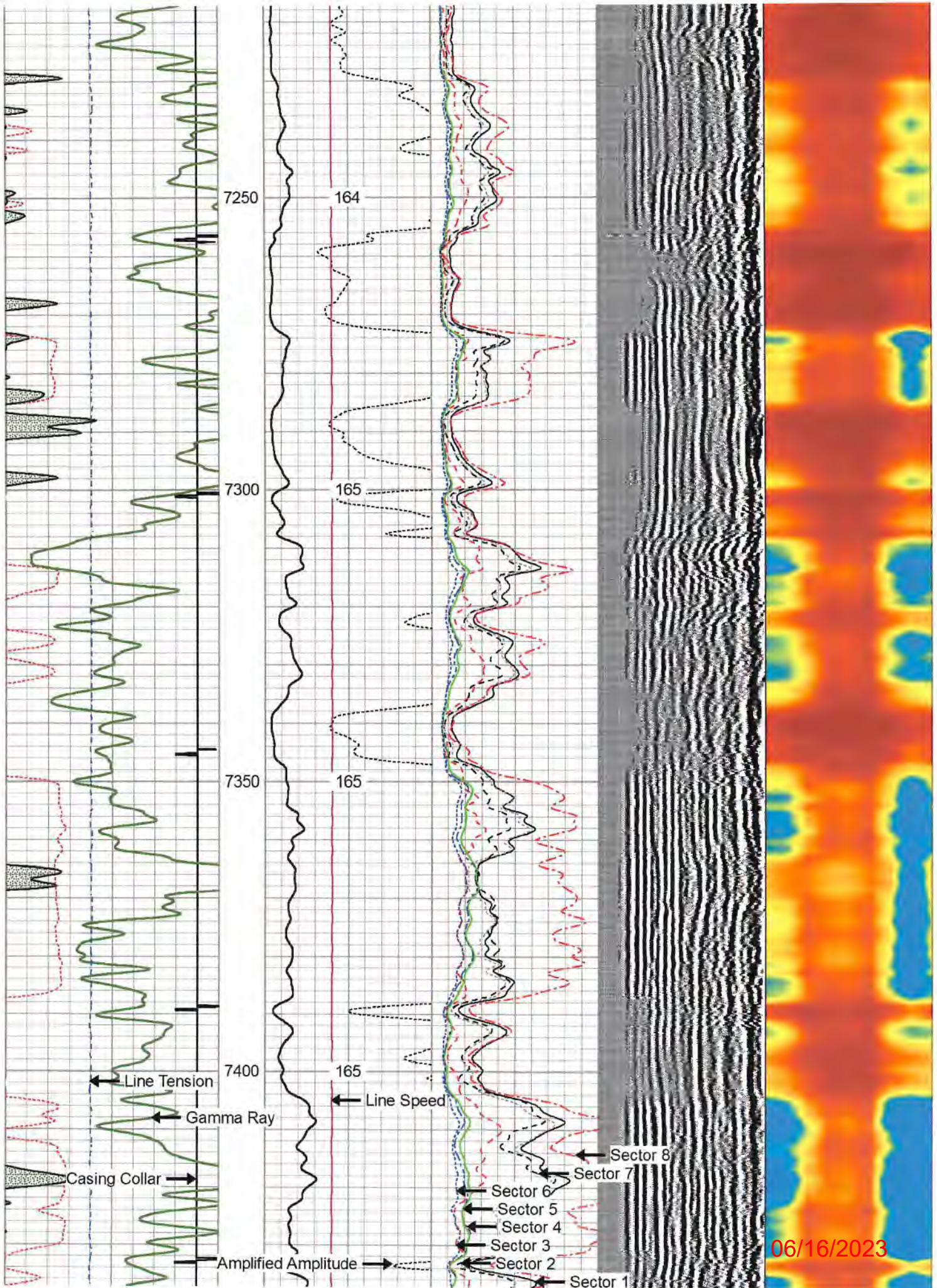
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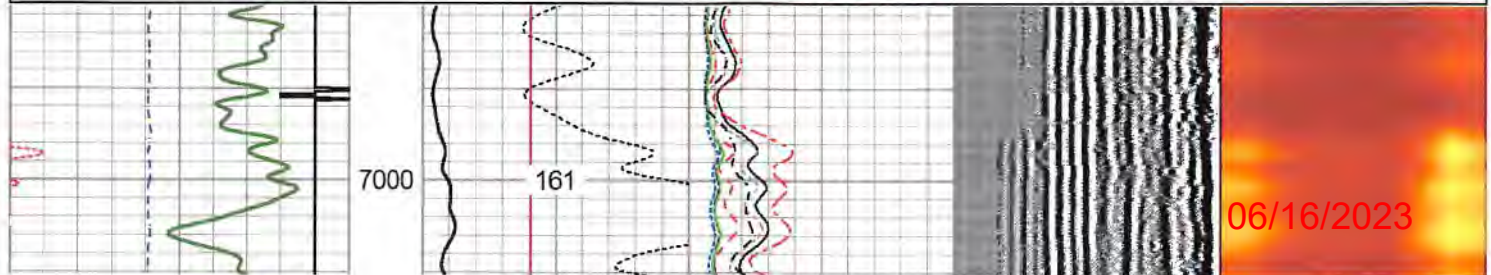
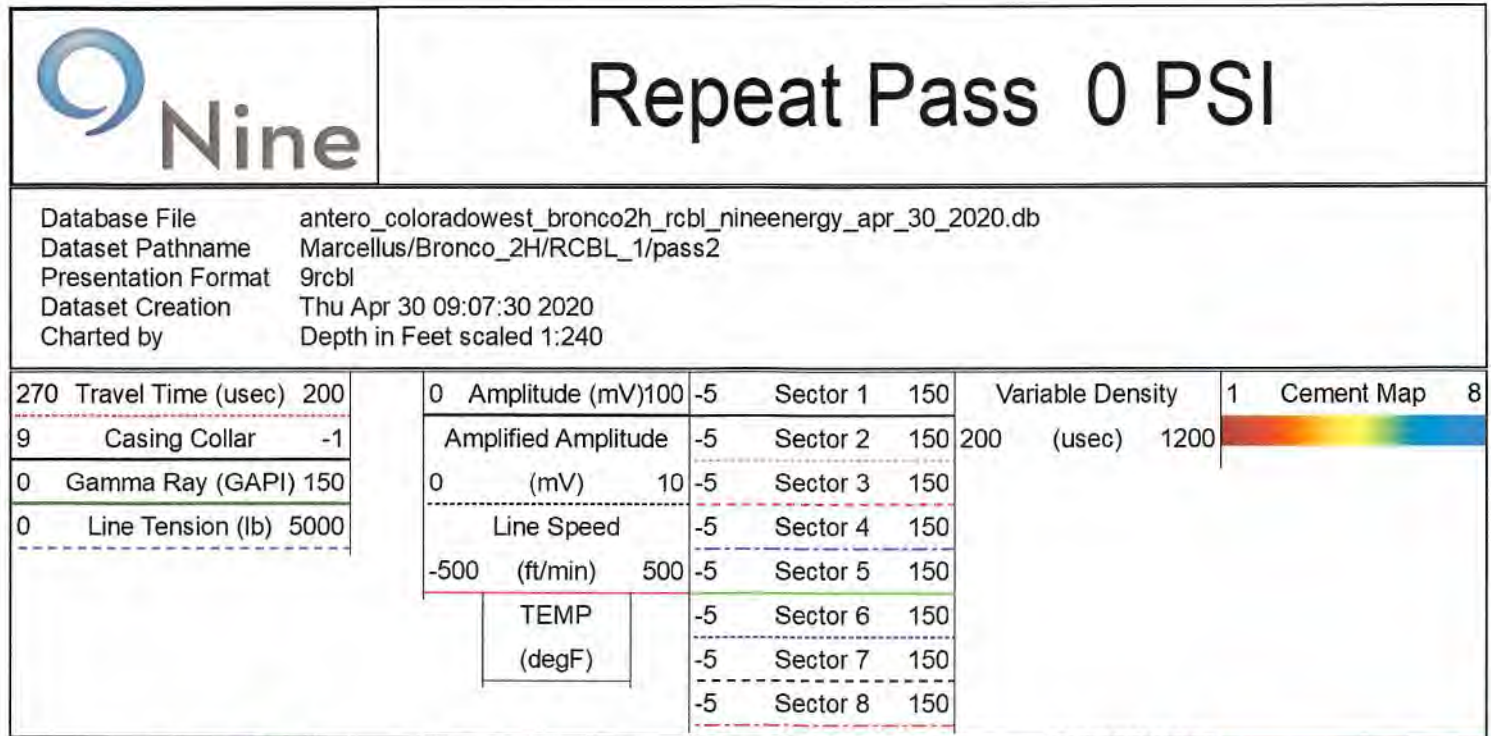
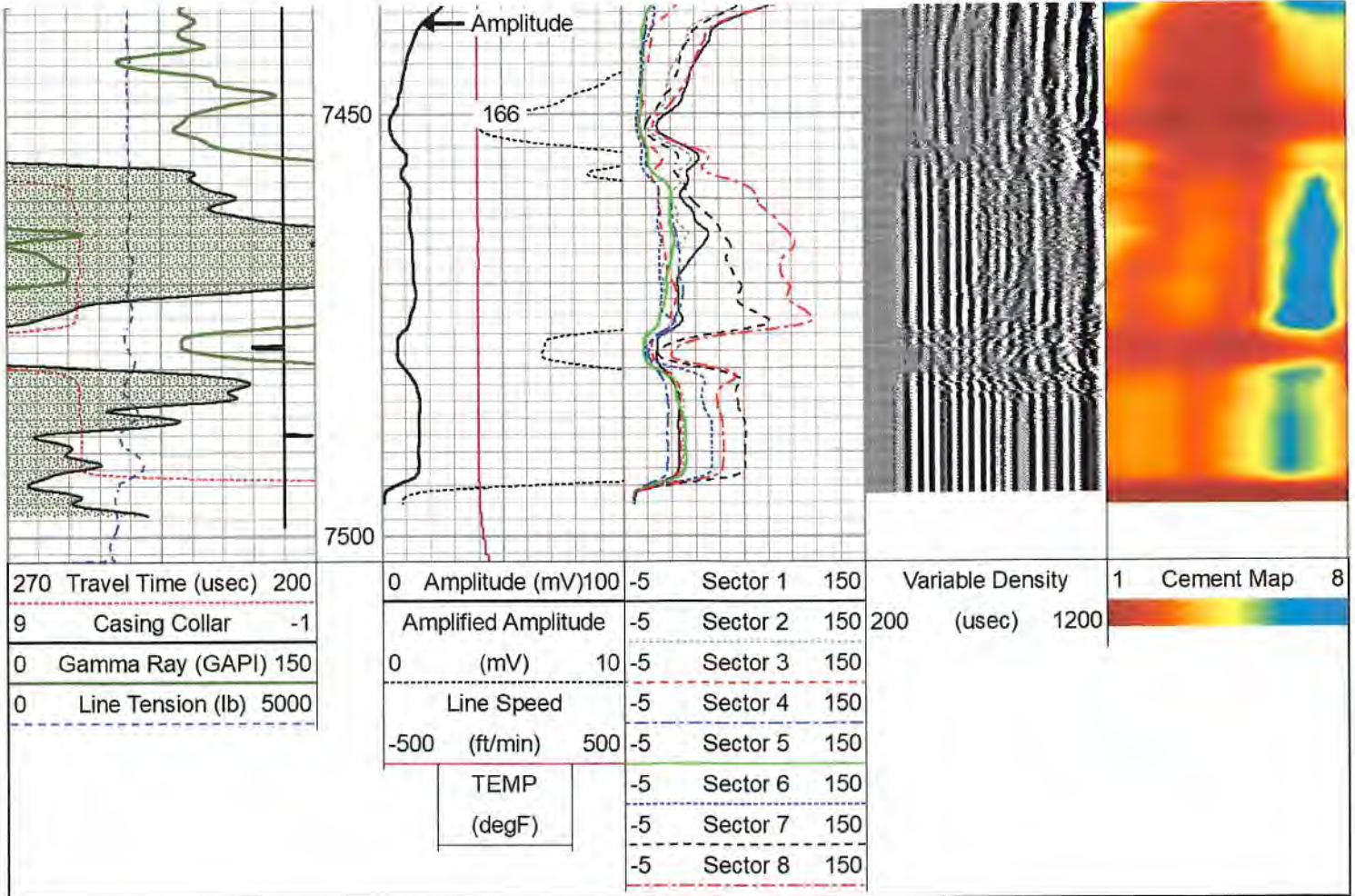
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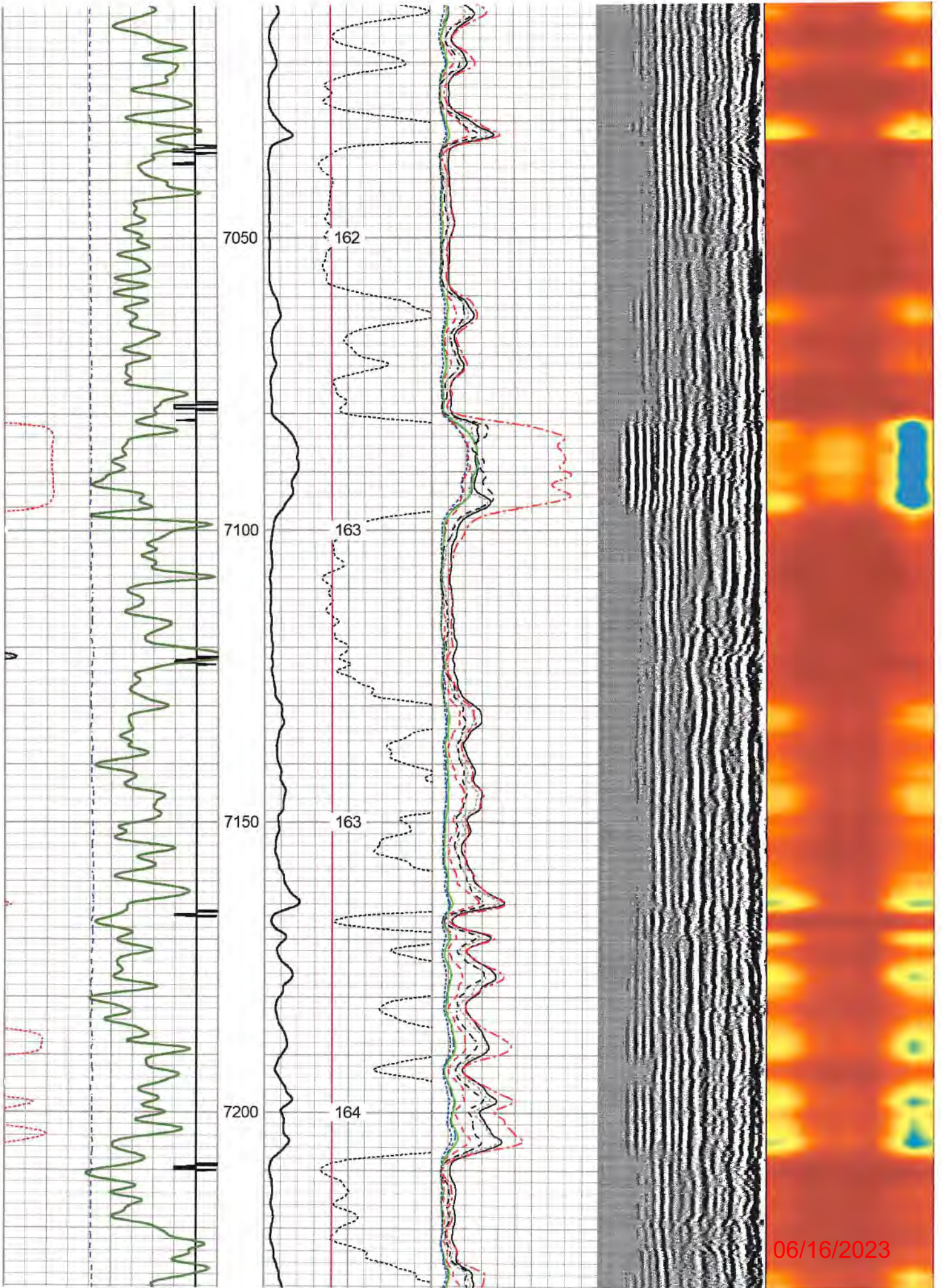
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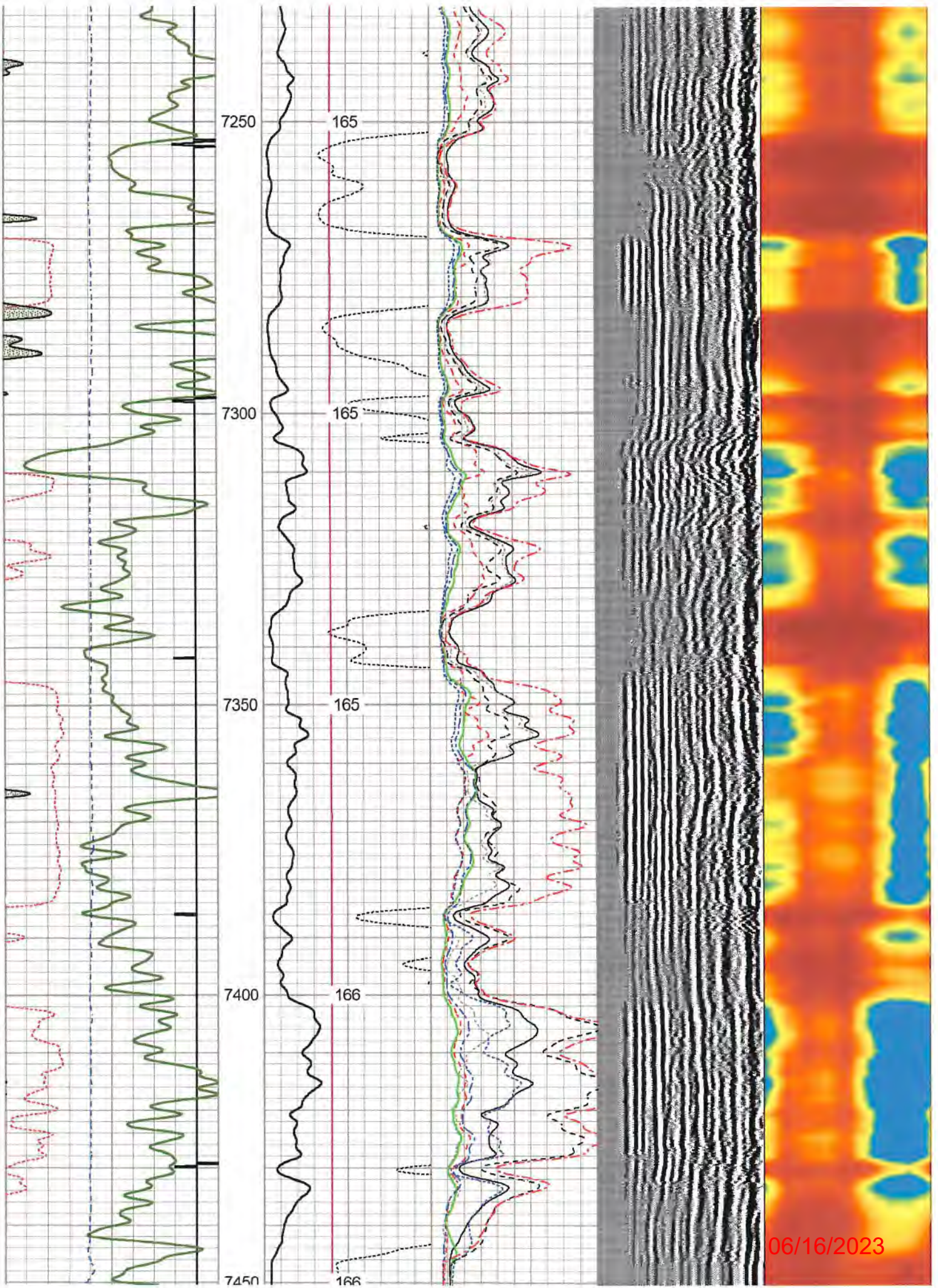
Repeat Pass 0 PSI

Database File antero_coloradowest_bronco2h_rcbl_nineenergy_apr_30_2020.db
 Dataset Pathname Marcellus/Bronco_2H/RCBL_1/pass2
 Presentation Format 9rcbl
 Dataset Creation Thu Apr 30 09:07:30 2020
 Charted by Depth in Feet scaled 1:240

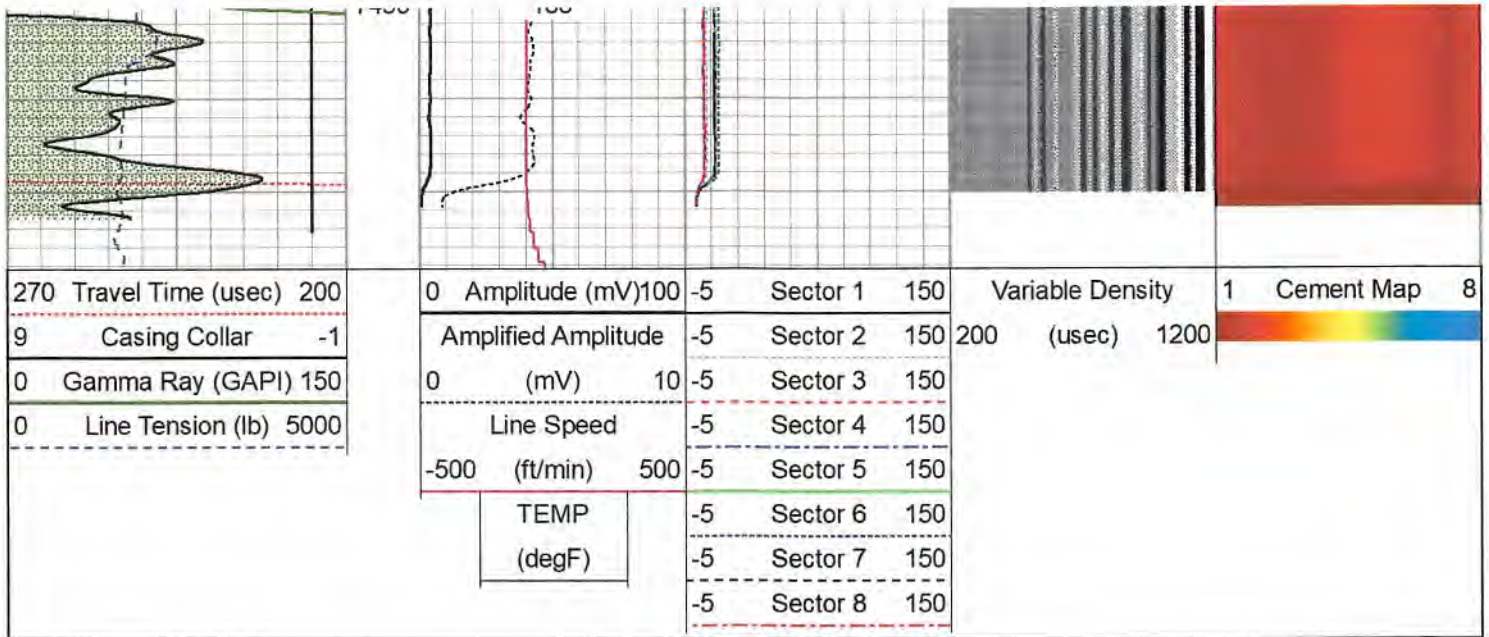
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Log Variables DatabaseC:\ProgramData\Warrior\Data\antero_coloradowest_bronco2h_rcbl_nineenergy_apr_30_2020 Dataset Marcellus/Bronco_2H/RCBL_1/pass4.2/_vars_

Top - Bottom							
BHTEMP_Src	BOREID	BOTTEMP	CASEOD	CASETHCK	CASEWGHT	MAXAMPL	MINAMPL
TEMP	in	degF	in	in	lb/ft	mV	mV
	7.875	148	5.5	0.361	20	71.9	2.2
MINATTN	PERFS	PPT	SRFTEMP	TDEPTH			
db/ft		usec	degF	ft			
0.8	No	0	0	0			

Variable Description

BHTEMP_Src : BHTEMP Input Source Selector	MINAMPL : Minimum Amplitude
BOREID : Borehole I.D.	MINATTN : Minimum Attenuation
BOTTEMP : Bottom Hole Temperature	PERFS : Perforation Flag
CASEOD : Casing O.D.	PPT : Predicted Pipe Time
CASETHCK : Casing Thickness	SRFTEMP : Surface Temperature
CASEWGHT : Casing Weight	TDEPTH : Total Depth
MAXAMPL : Maximum Amplitude	

Calibration Report

Database File	antero_coloradowest_bronco2h_rcbl_nineenergy_apr_30_2020.db
Dataset Pathname	Marcellus/Bronco_2H/RCBL_1/pass4.2
Dataset Creation	Thu Apr 30 10:30:39 2020

Gamma Ray Calibration Report

Serial Number:	FW1211-86
Tool Model:	Probe
Performed:	Thu Dec 19 22:27:19 2019
Calibrator Value:	1.0 GAPI
Background Reading:	0.0 cps
Calibrator Reading:	1.0 cps
Sensitivity:	0.8000 GAPI/cps

Serial Number: FW1312-32
 Tool Model: Probe275T
 Calibration Casing Diameter: 5.500 in
 Calibration Depth: 225.917 ft

Master Calibration, performed Thu Apr 30 08:37:19 2020:


	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.017	0.865	2.200	71.921	105.212	0.834
CAL	0.994	0.997				
5'	0.015	0.861	2.200	71.921	112.418	0.960
SUM						
S1	0.051	0.881	2.200	100.000	147.874	1.790
S2	0.008	0.857	2.200	100.000	145.249	1.262
S3	0.007	0.844	2.200	100.000	146.897	1.365
S4	0.007	0.849	2.200	100.000	146.123	1.389
S5	0.008	0.856	2.200	100.000	145.264	1.290
S6	0.007	0.863	2.200	100.000	144.333	1.365
S7	0.006	0.856	2.200	100.000	145.143	1.463
S8	0.007	0.857	2.200	100.000	145.113	1.403

Internal Reference Calibration, performed (Not Performed):

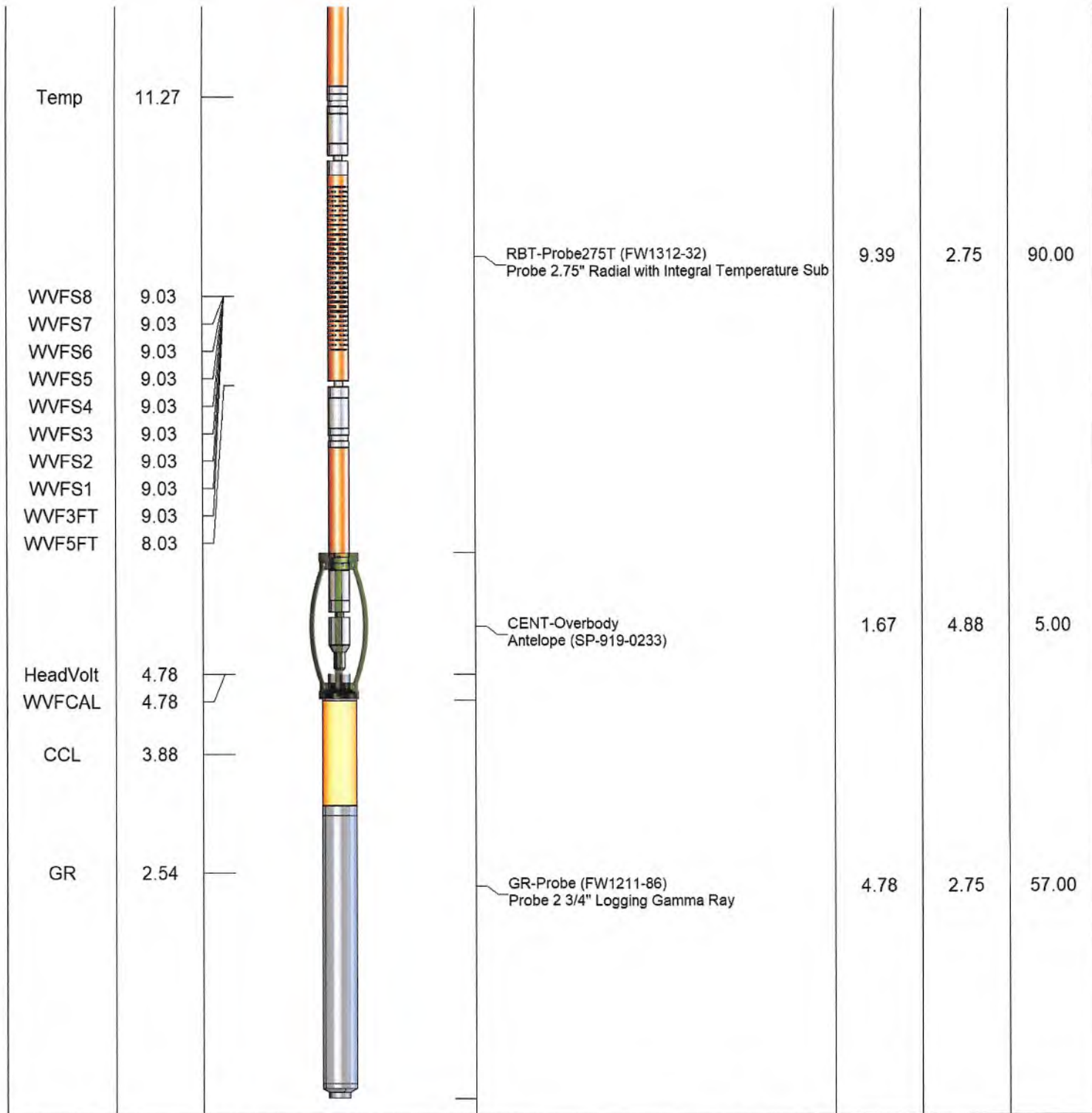
	Raw (v)		Calibrated (v)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
CAL	0.000	0.000	0.994	0.997	1.000	0.000

Air Zero Calibration, performed Thu Apr 30 06:34:50 2020:

	Raw (v)		Calibrated (v)		Results	
	Zero		Zero		Offset	
3'	0.000		0.000		0.000	
5'	0.000		0.000		0.000	
SUM						
S1	0.000		0.000		0.000	
S2	0.000		0.000		0.000	
S3	0.000		0.000		0.000	
S4	0.000		0.000		0.000	
S5	0.000		0.000		0.000	
S6	0.000		0.000		0.000	
S7	0.000		0.000		0.000	
S8	0.000		0.000		0.000	

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			CENT-Overbody Antelope (SP-919-0233)	1.67	4.88	5.00
			CHD-Titan Titan 1 7/16" GO Cablehead	1.00	1.44	5.00

06/16/2023



Dataset: antero_coloradowest_bronco2h_rcbl_nineenergy_apr_30_2020.db: Marcellus/Bronco_2H/RCBL_1/pass4.2
 Total length: 15.17 ft
 Total weight: 162.00 lb
 O.D.: 4.88 in

	Company	Antero Resources
	Well	Bronco 2H
	Field	North Canton
	County	Tyler
	State	West Virginia