



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

Company Antero Resources

Well Bronco 1H

Field North Canton

County Tyler State West Virginia

Location: API #: 4709506600000

Other Services  
N/A

39.403892 -80.787906

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

Elevation  
K.B.  
D.F.  
G.L.

Company Antero Resources  
Well Bronco 1H  
Field North Canton  
County Tyler  
State West Virginia

Date 30-Apr-20

Run Number One

Depth Driller 18,166 ft.

Depth Logger 7,146 ft.

Bottom Logged Interval 7,146 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 5,668 ft.

Time Well Ready 07:00

Time Logger on Bottom 12:04

Equipment Number 132

Location Marietta, Ohio

Recorded By Tom Weese

Witnessed By Chris Young

Run Number Bit From To Size Weight From To

Borehole Record

Tubing Record

Casing Record

Surface String 13 3/8 in. 54.5 # 446 ft.

Prot. String 9 5/8 in. 36 # 3,205 ft.

Production String 5 1/2 20# Surface 18,166 ft.

Liner

Marker Joint 5,696 ft. 5,706 ft.

<<< Fold Here >>>

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 ( 5,696' - 5,706' )  
Depth Correction (-15)

Main Pass 0 PSI  
Repeat Pass 0 PSI

Thank You For Using Nine Energy Wireline of Marietta, Ohio

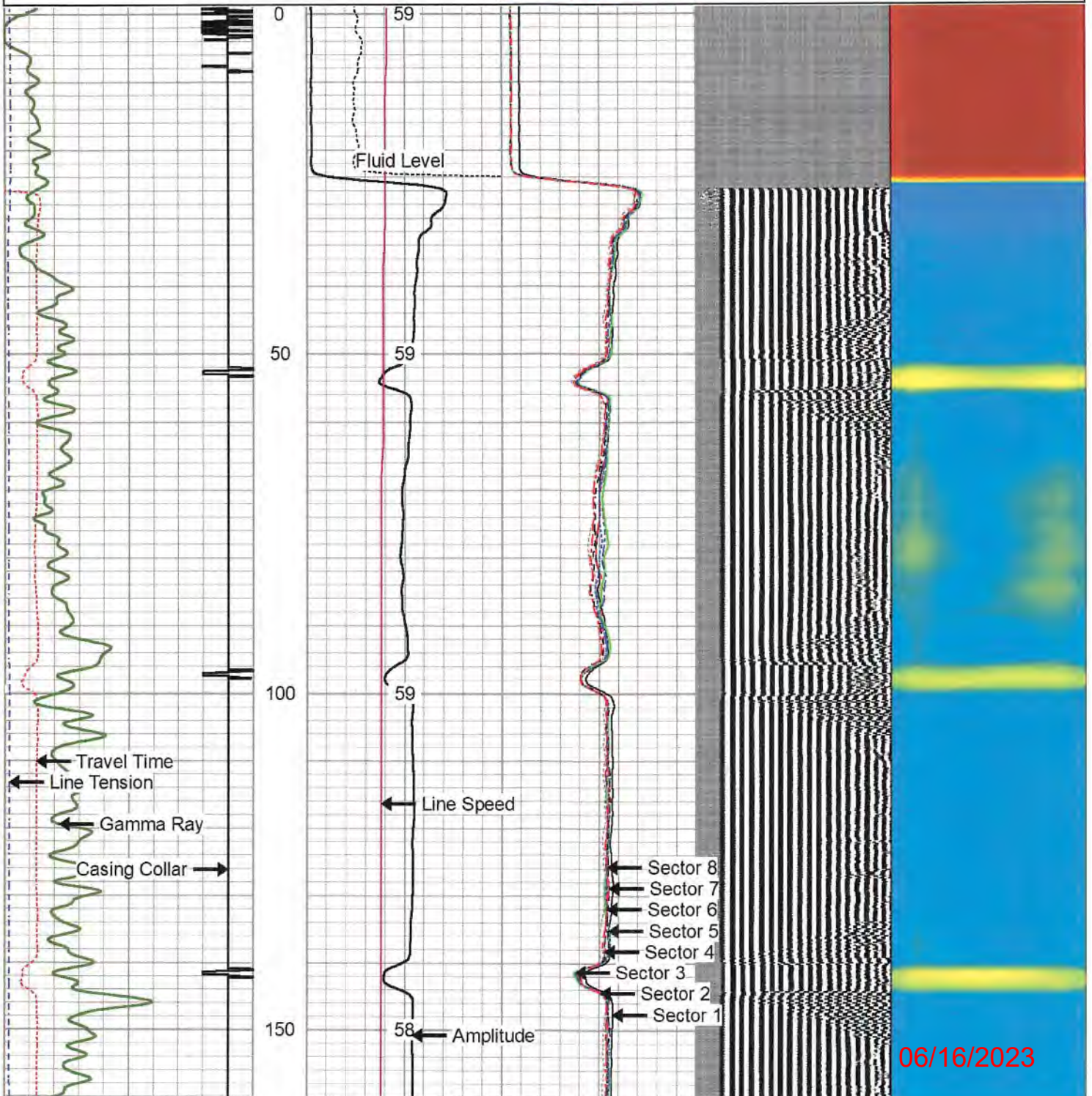


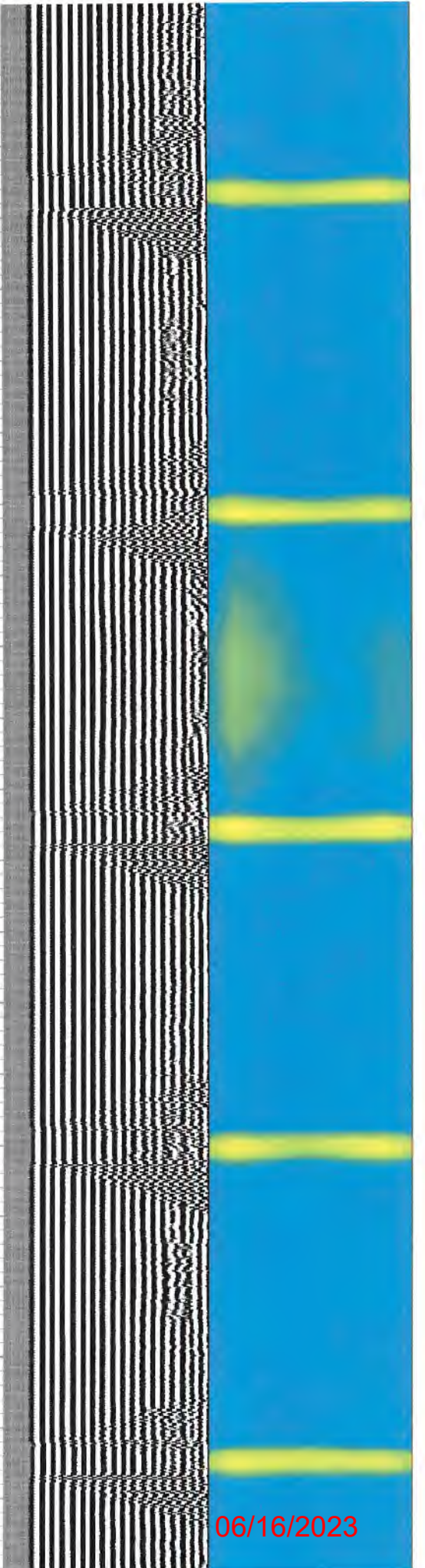
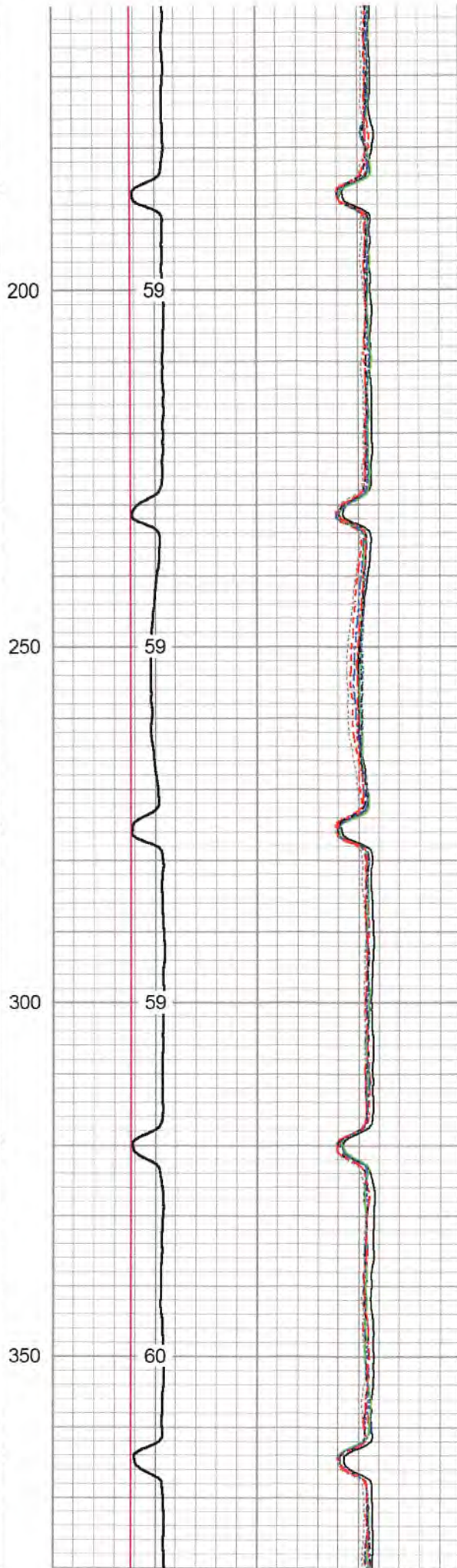
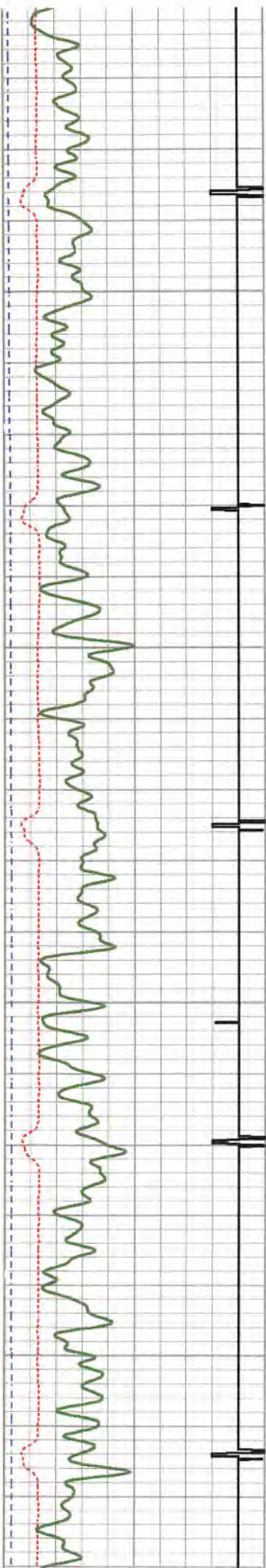
Main Pass 0 PSI

220

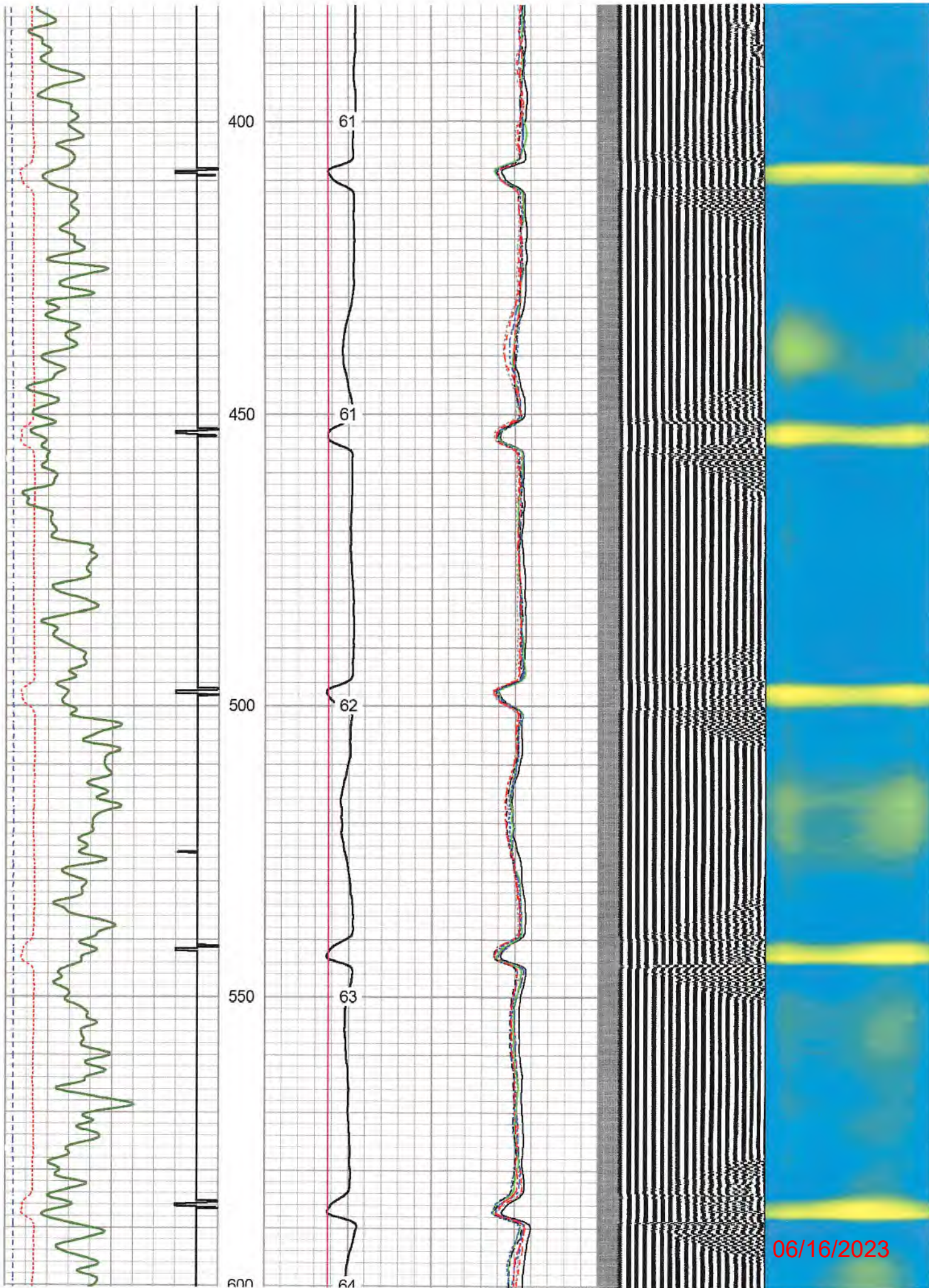
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 Presentation Format 9rcbl  
 Dataset Creation Thu Apr 30 12:16:32 2020  
 Charted by Depth in Feet scaled 1:240

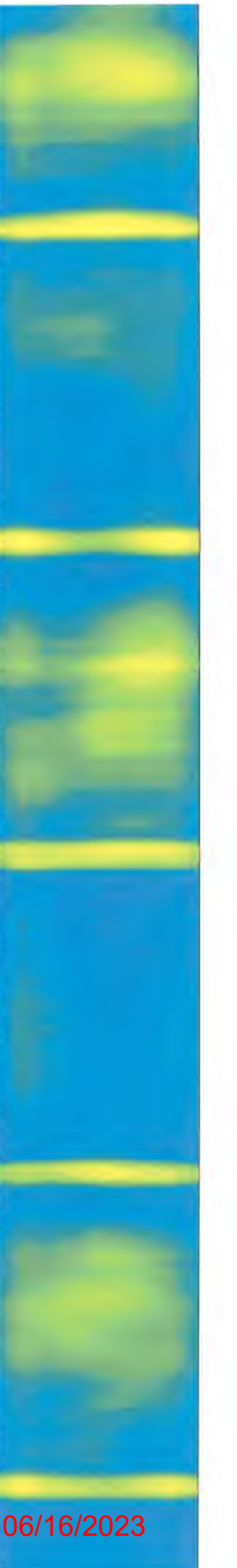
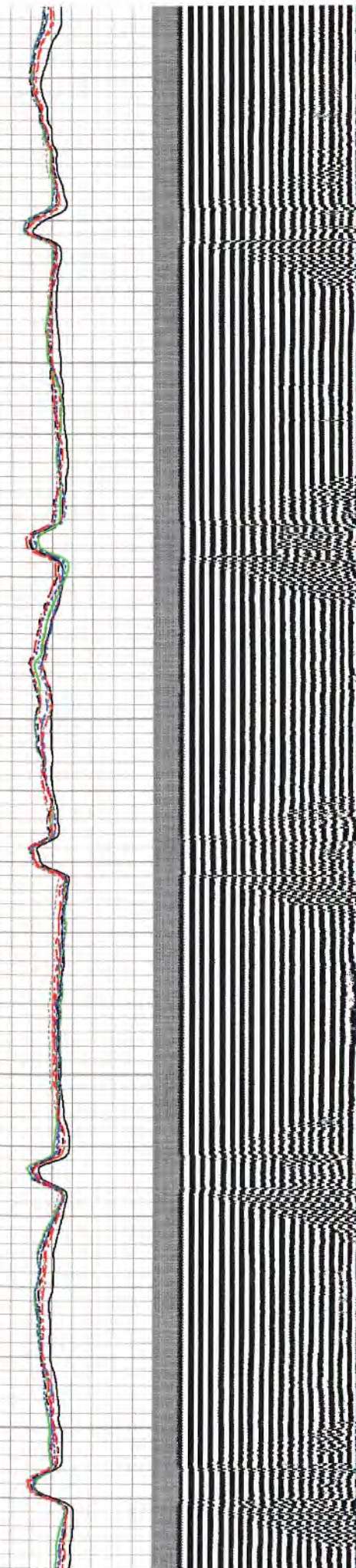
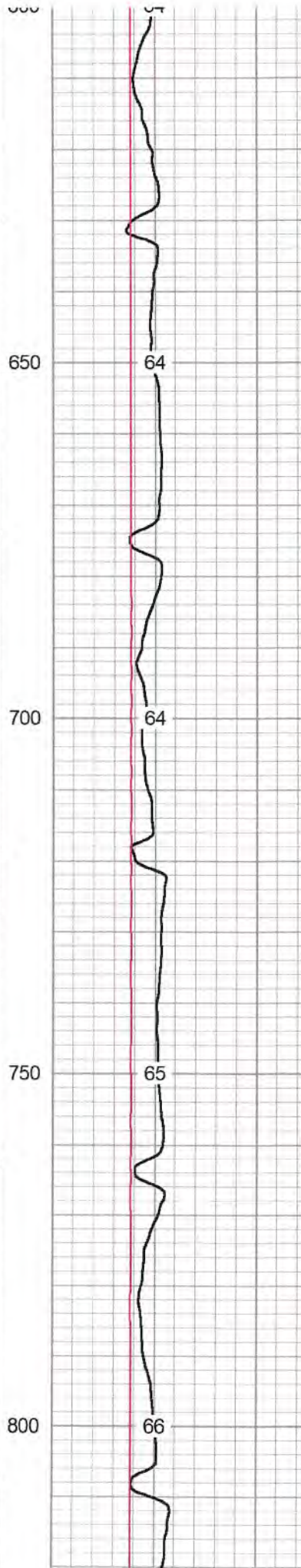
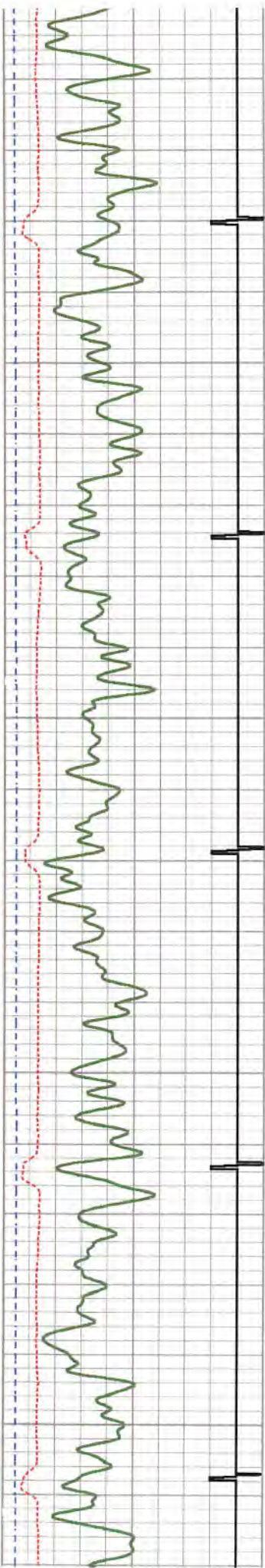
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9	Casing Collar	-1		Amplified Amplitude		-5	Sector 2	150	200 (usec)	1200		
0	Gamma Ray (GAPI)	150	0	(mV)	10	-5	Sector 3	150				
0	Line Tension (lb)	5000		Line Speed		-5	Sector 4	150				
				-500 (ft/min)	500	-5	Sector 5	150				
				TEMP		-5	Sector 6	150				
				(degF)		-5	Sector 7	150				
						-5	Sector 8	150				



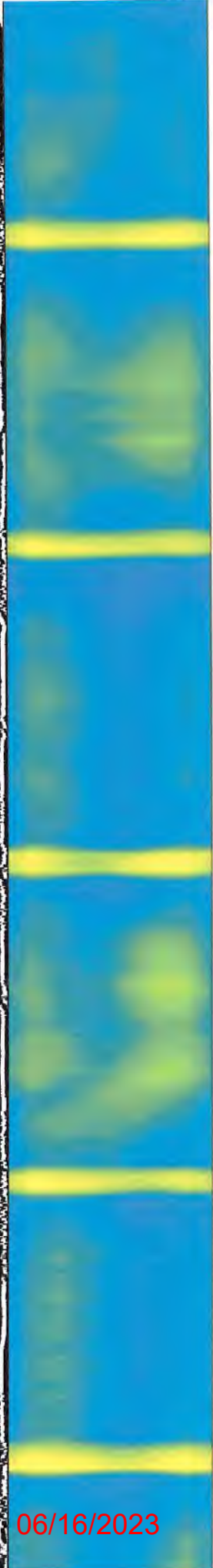
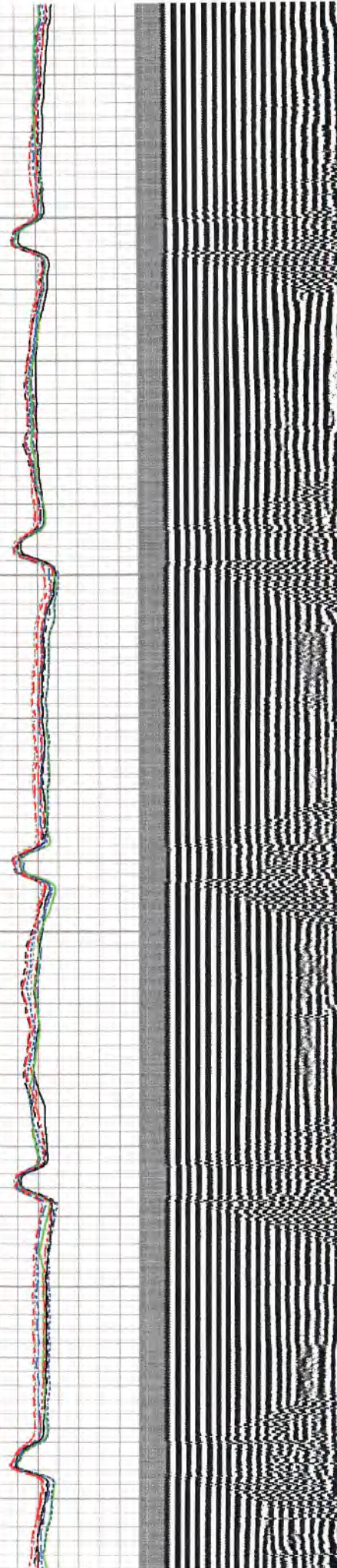
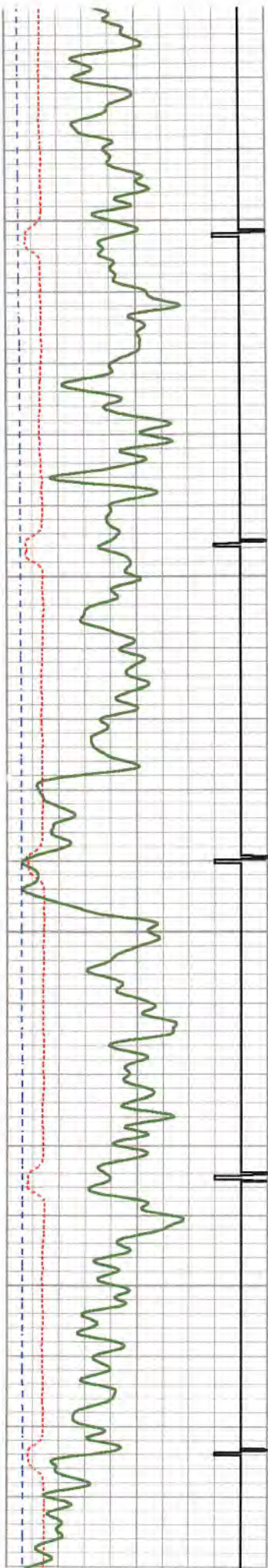


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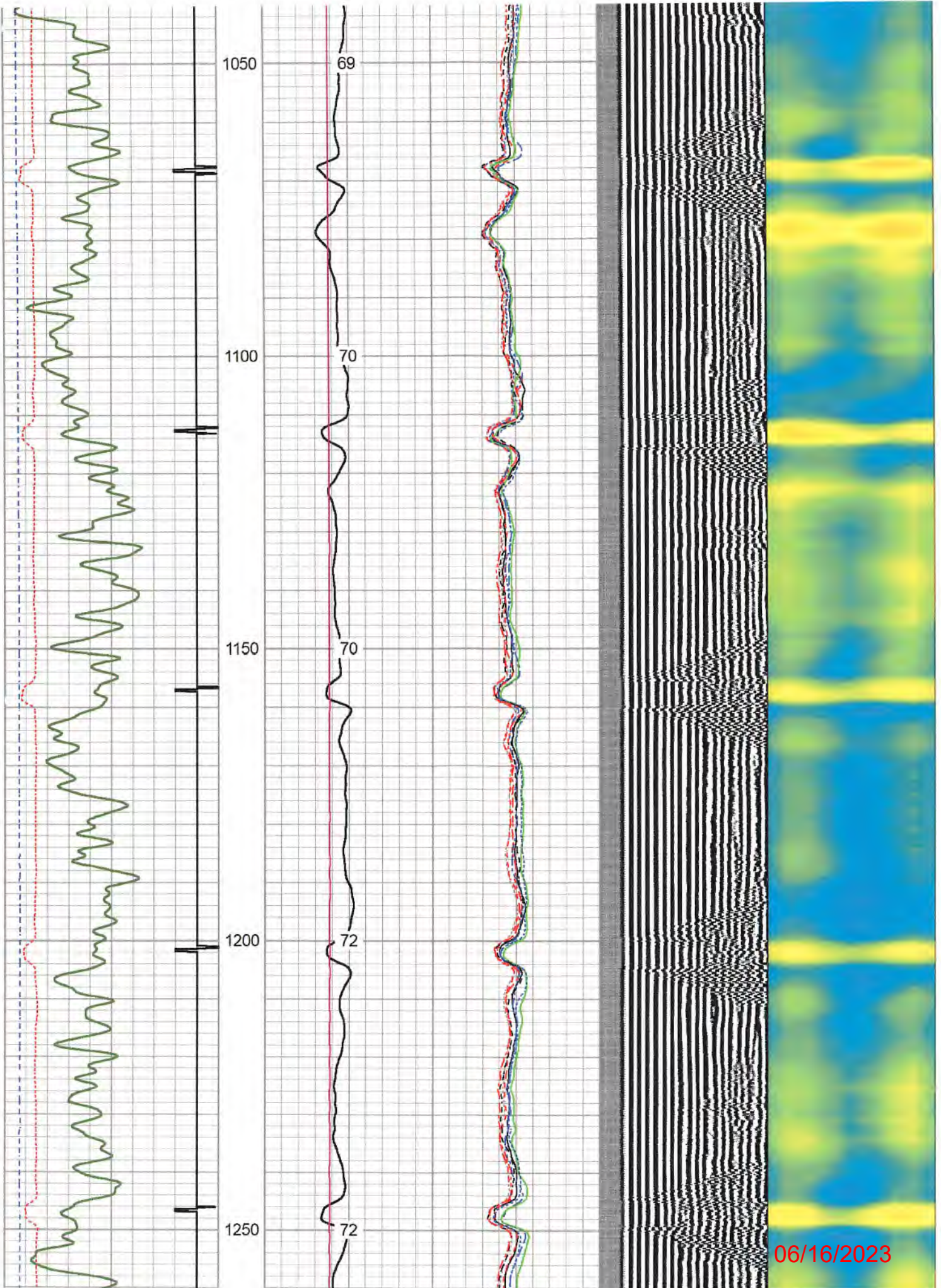




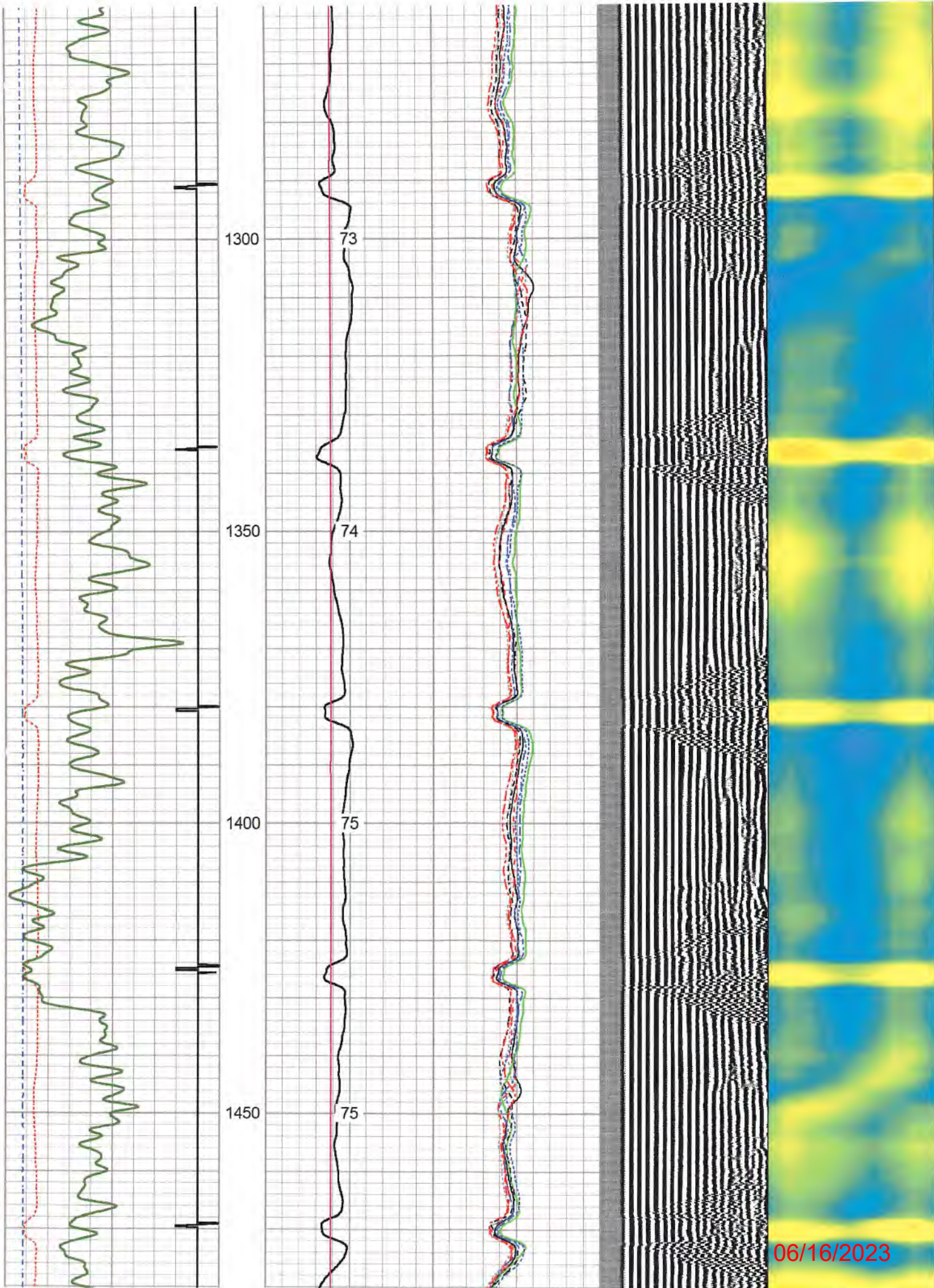
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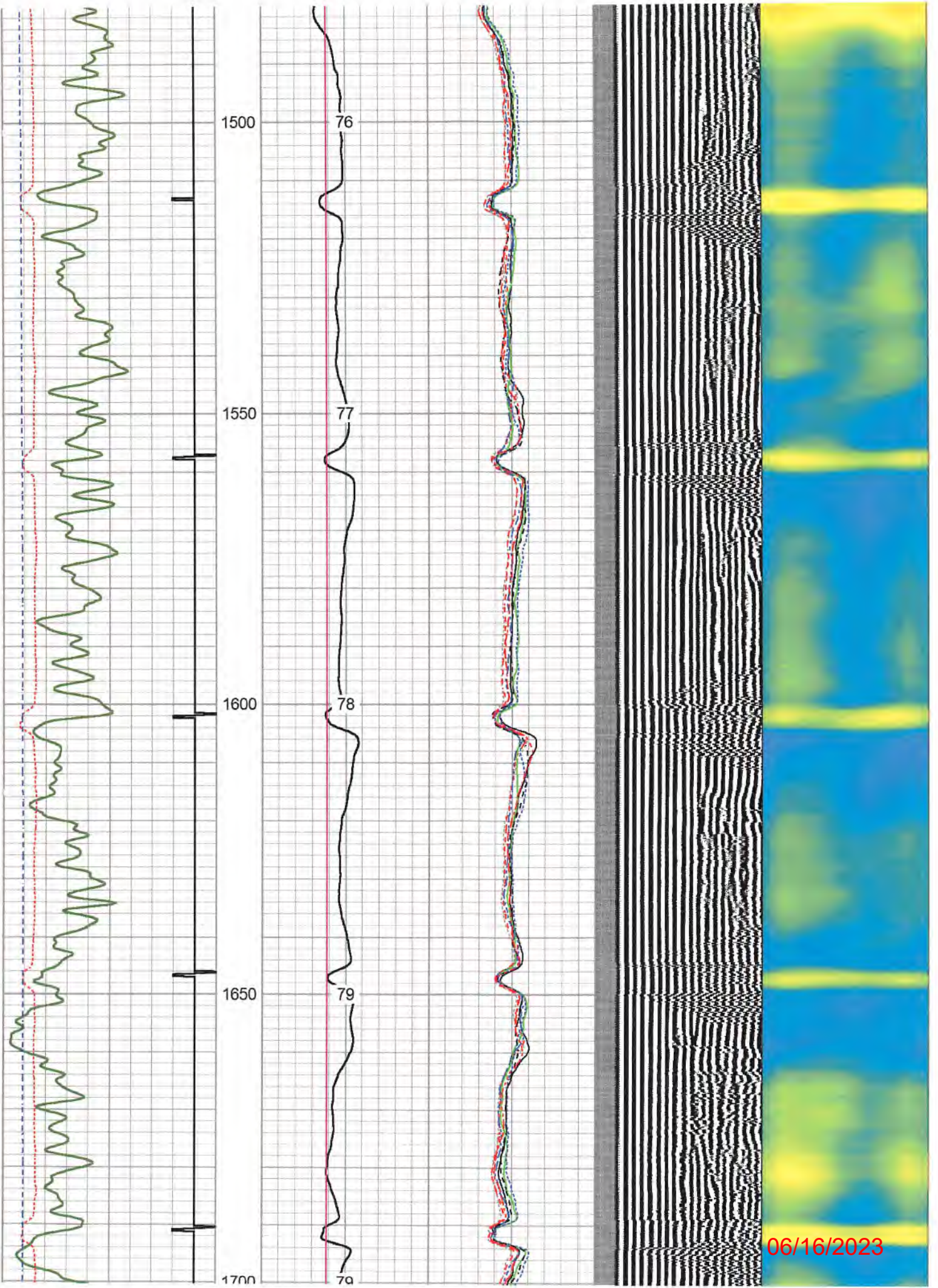
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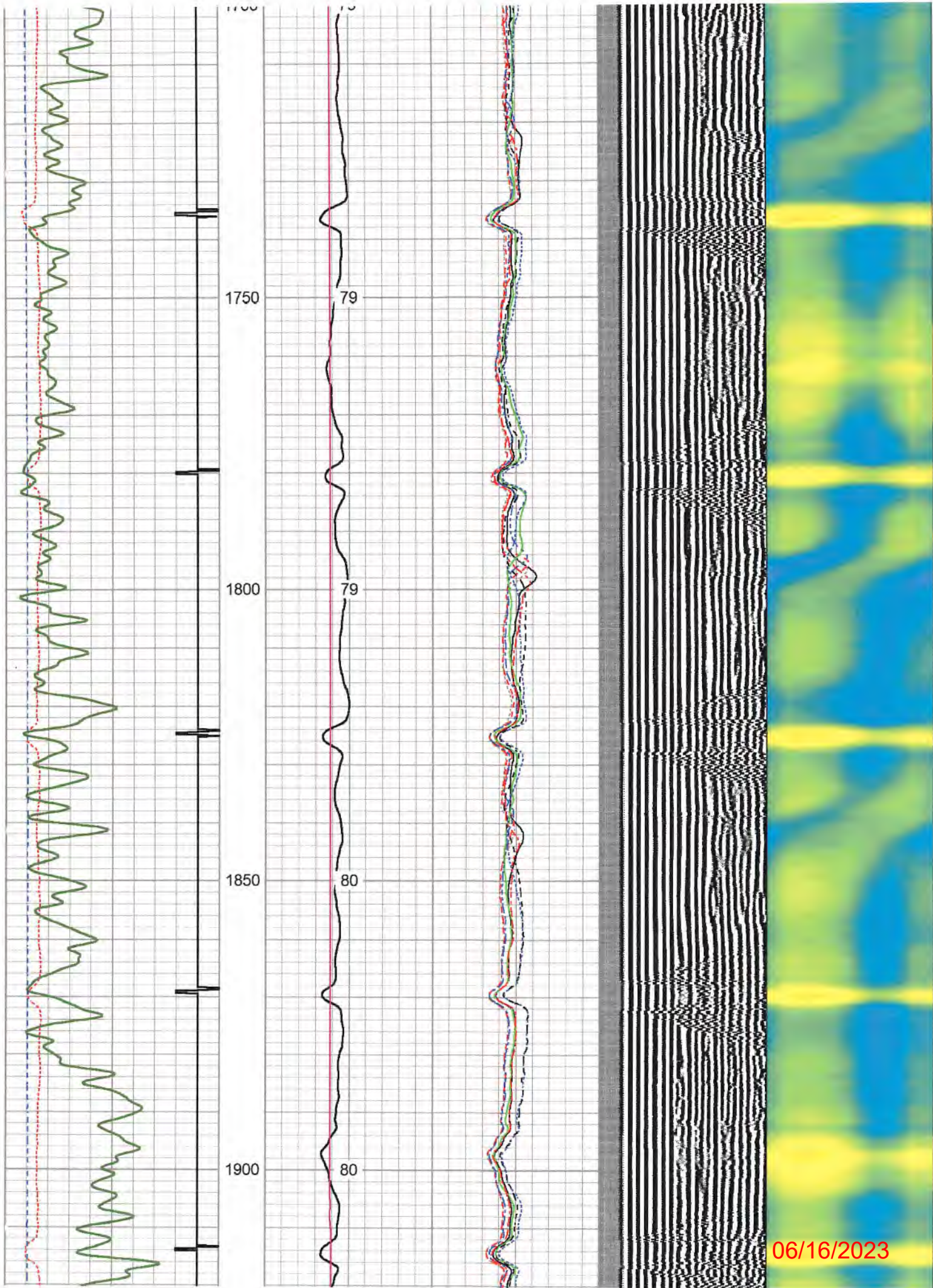


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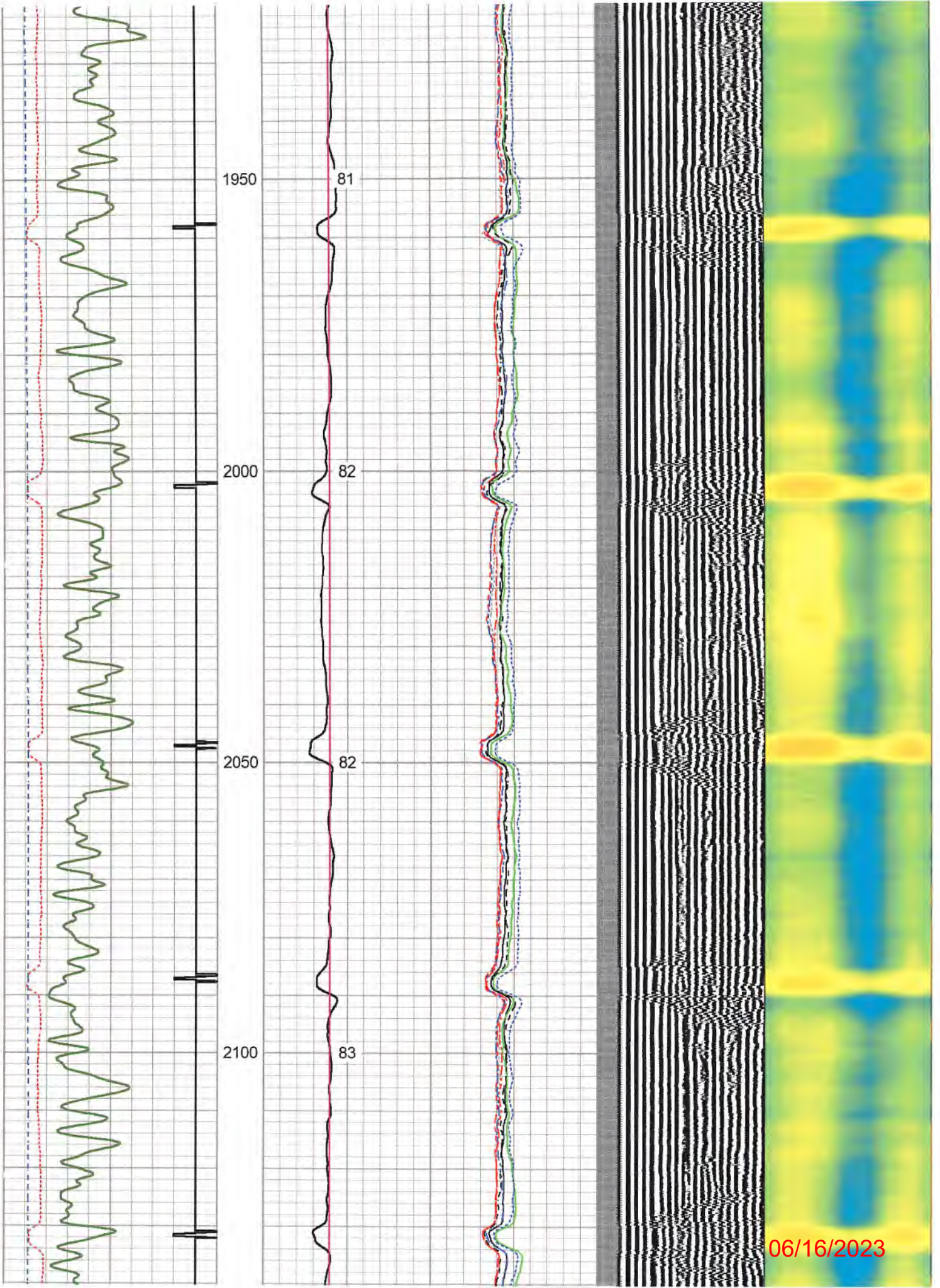


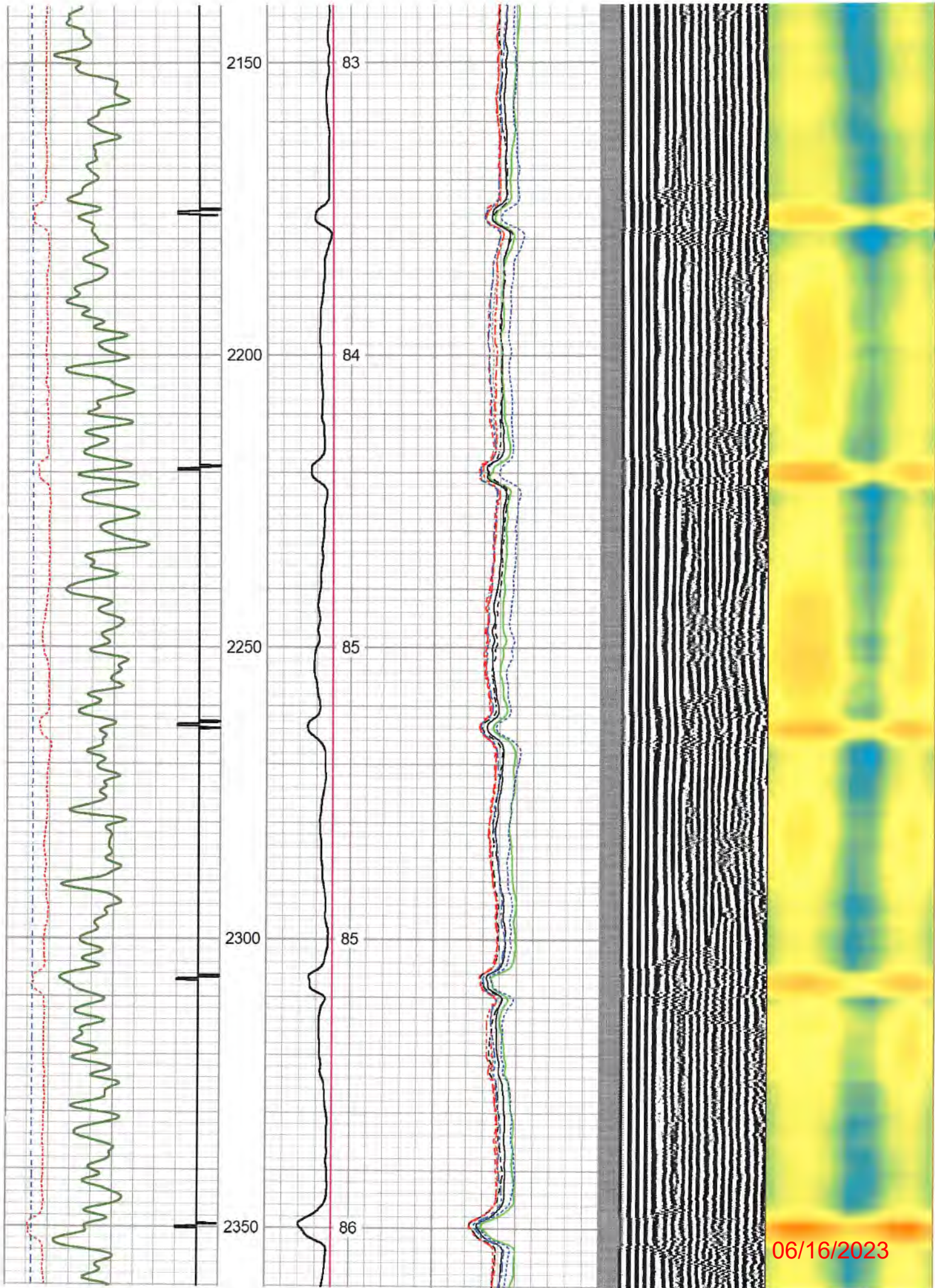


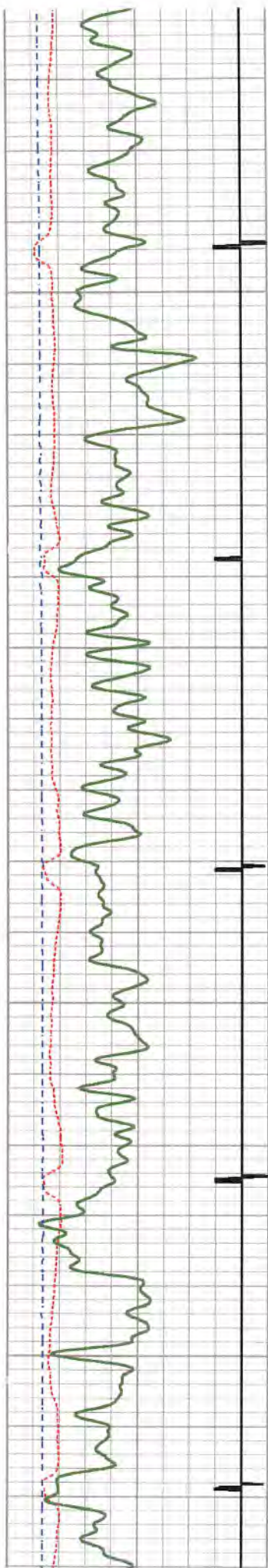




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2400

2450

2500

2550

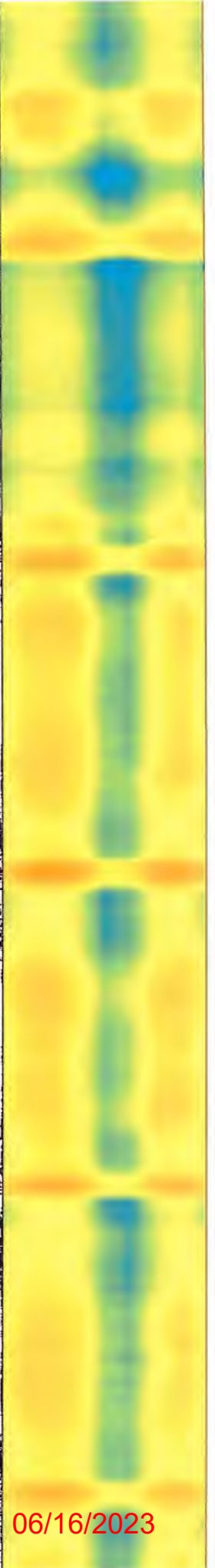
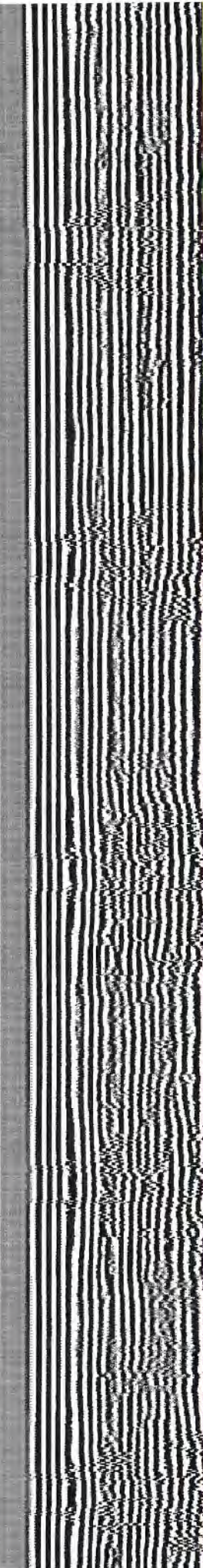


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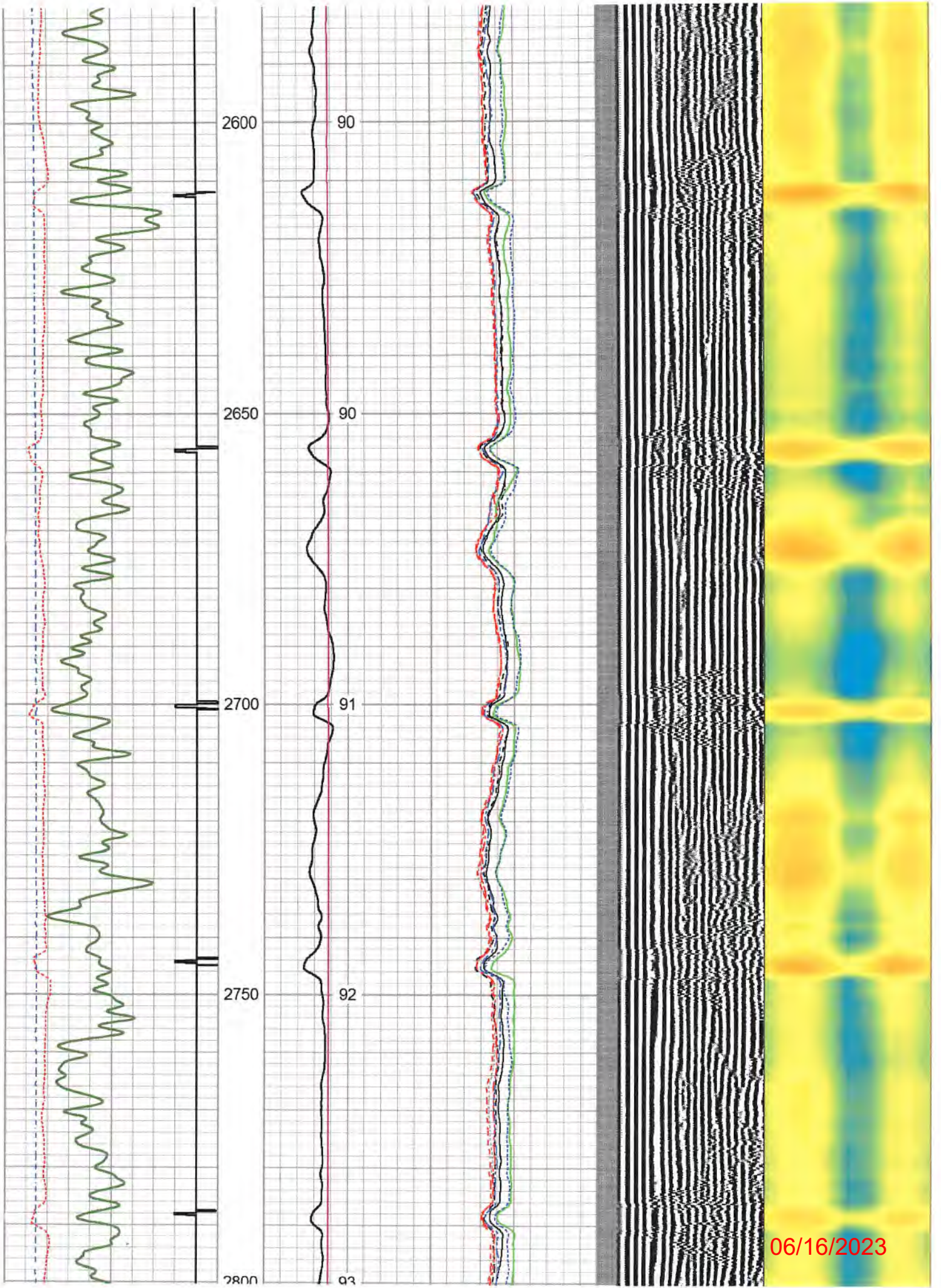
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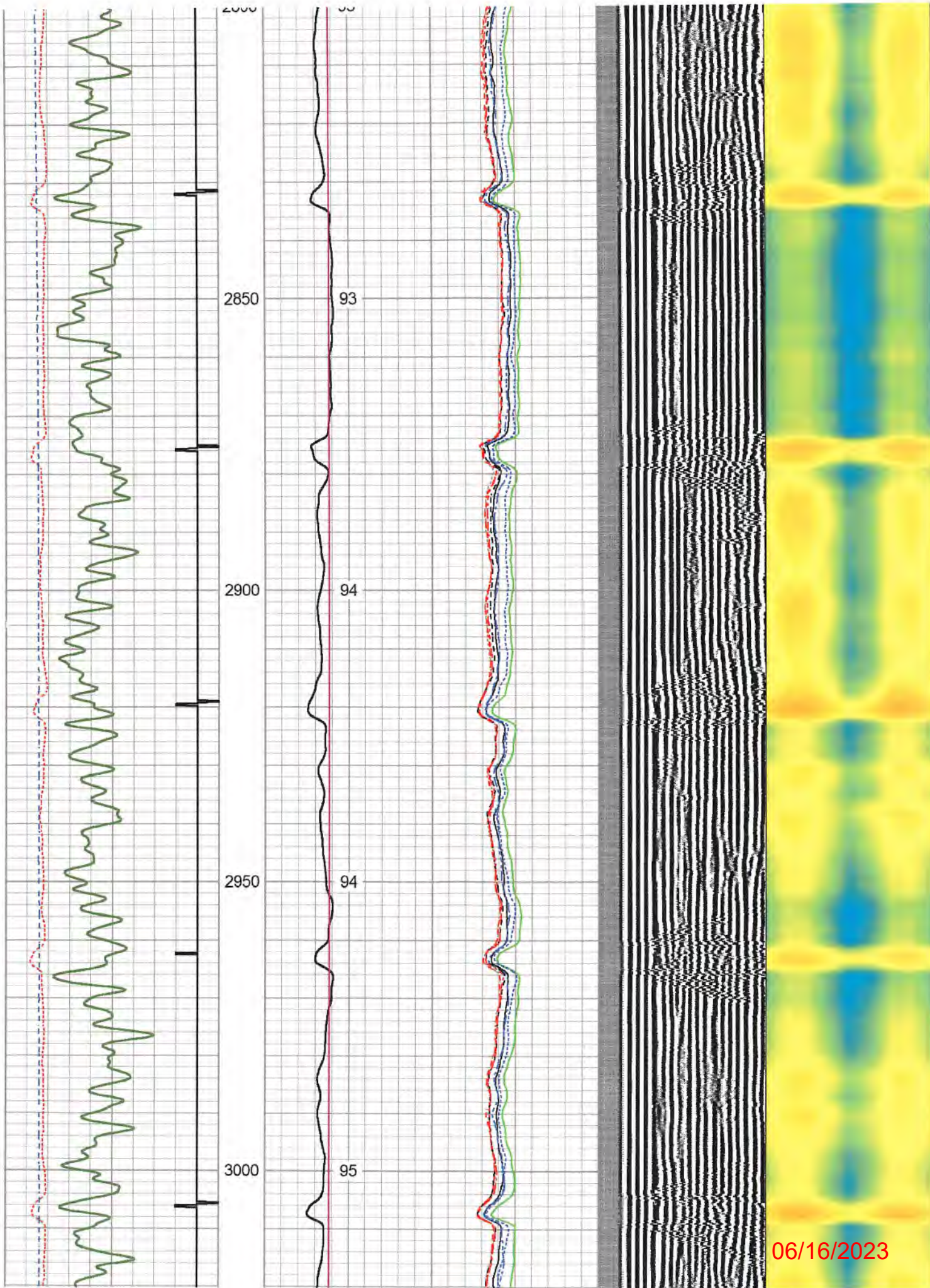
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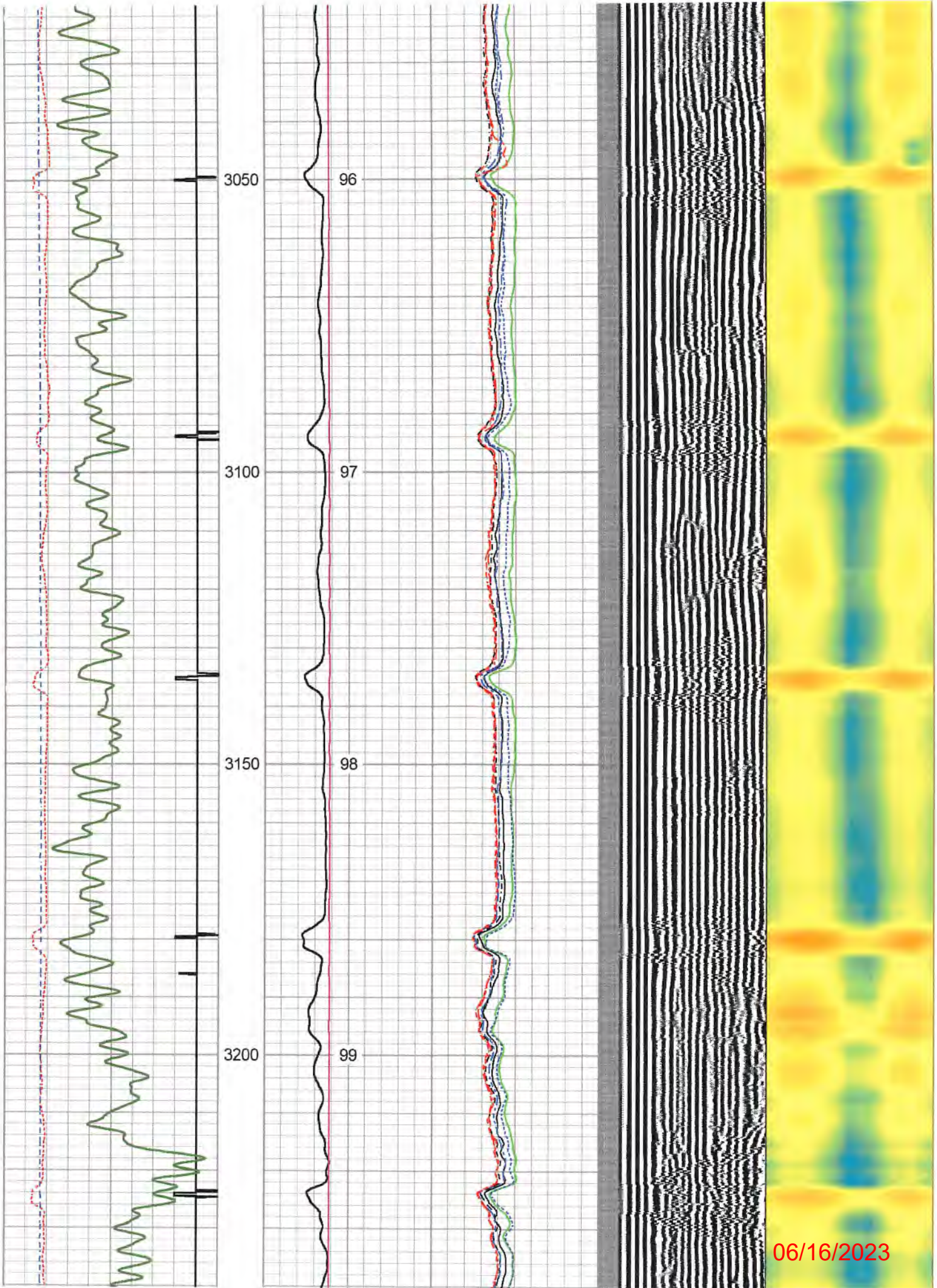
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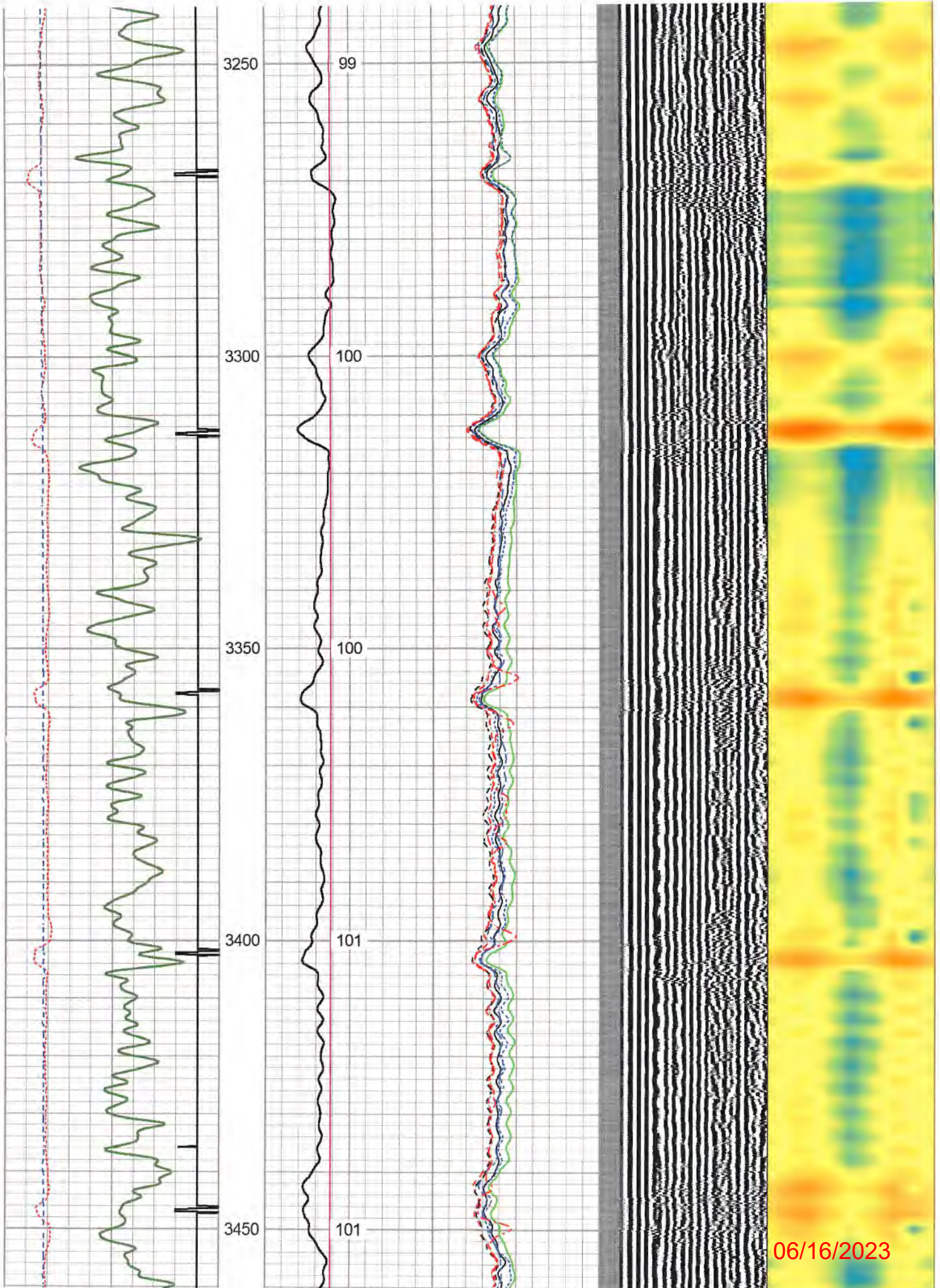
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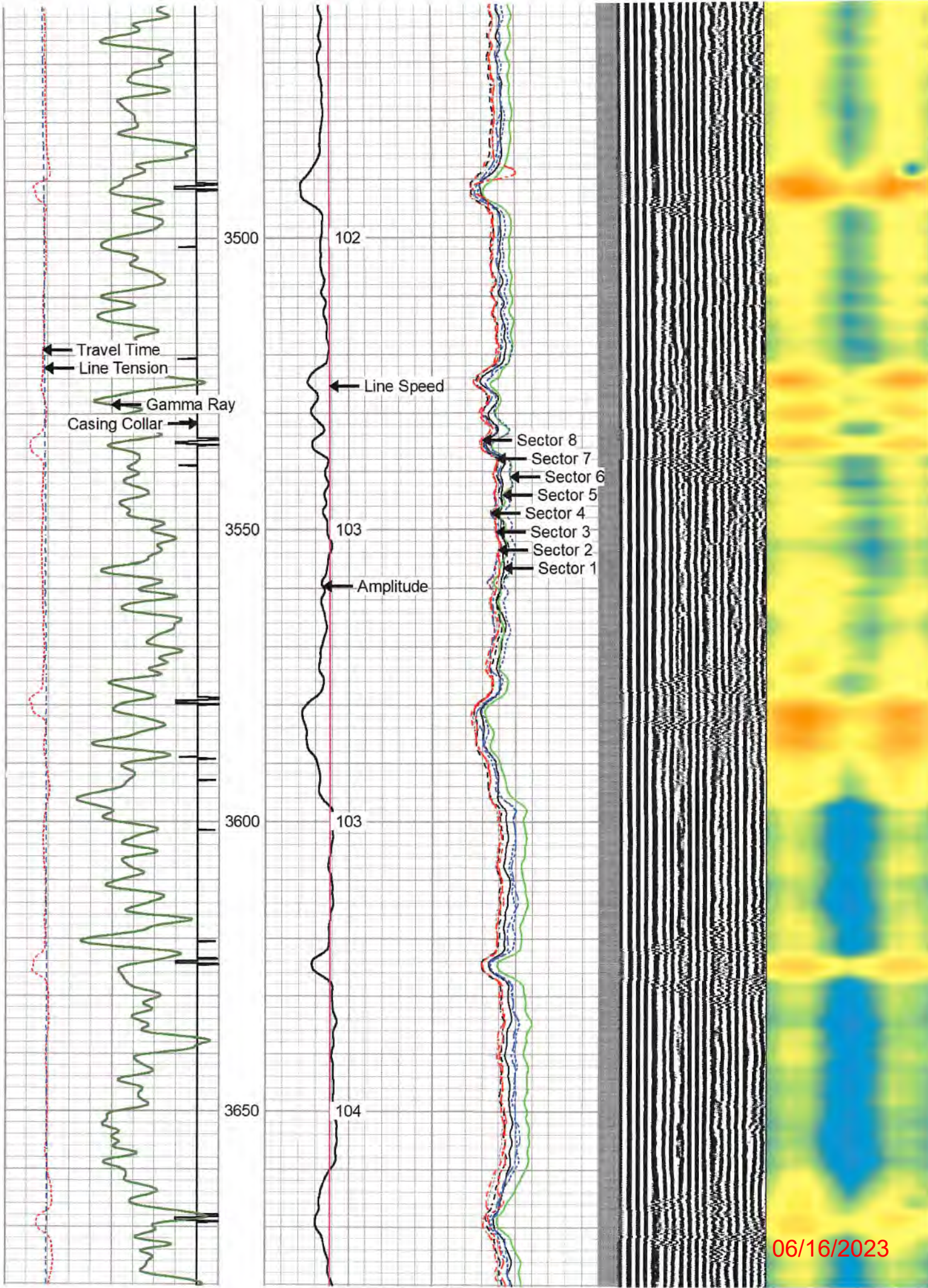
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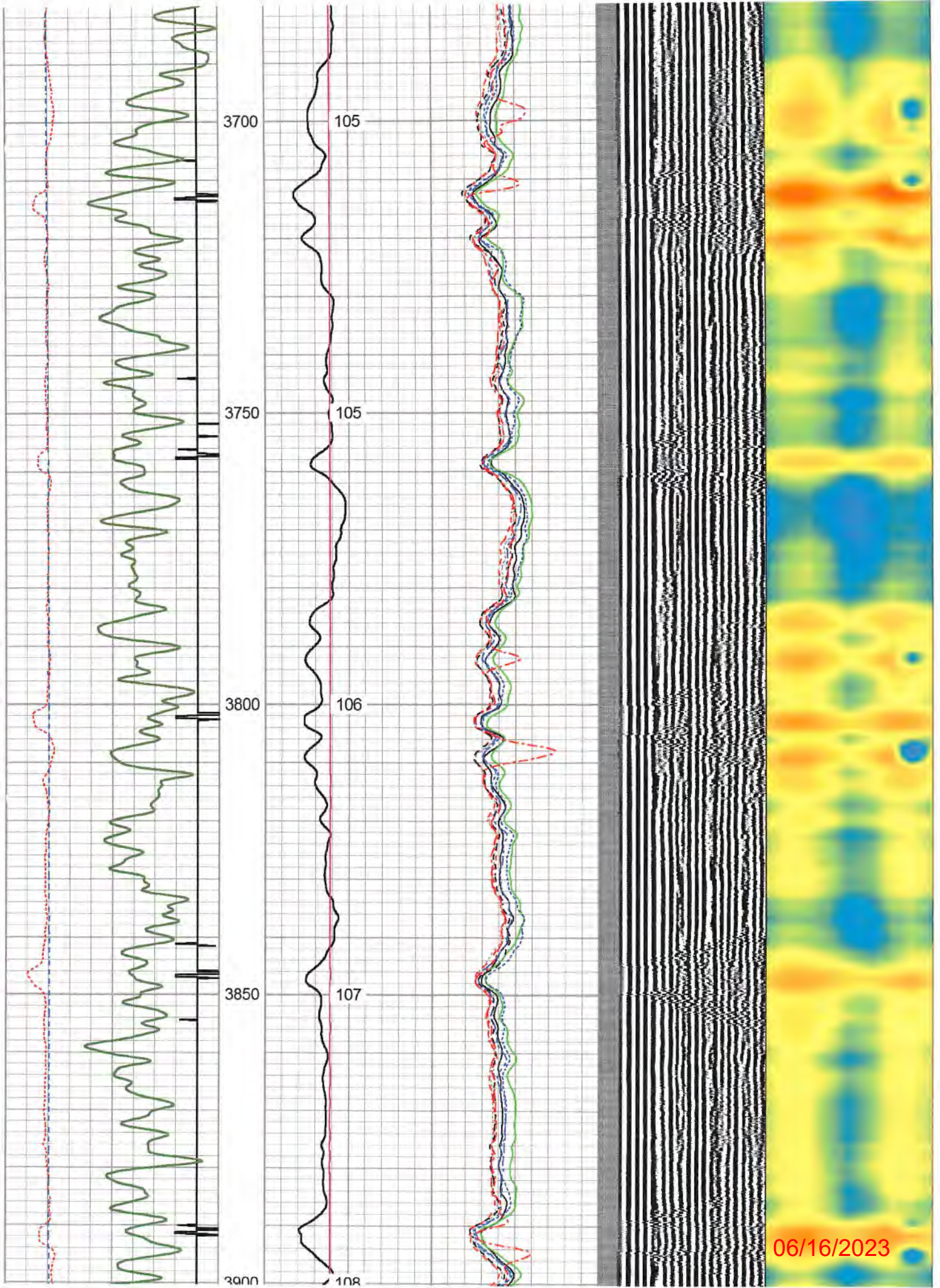


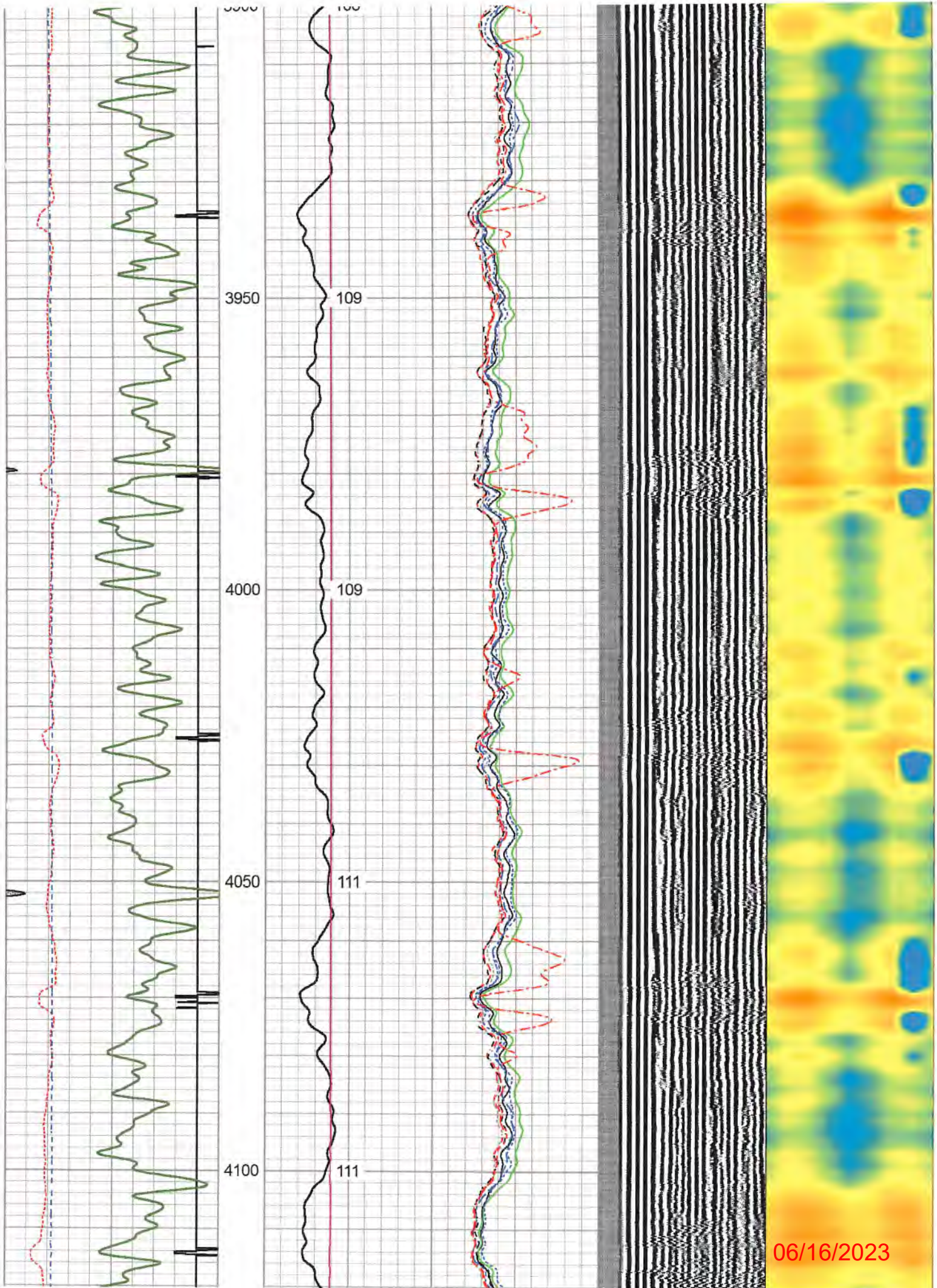


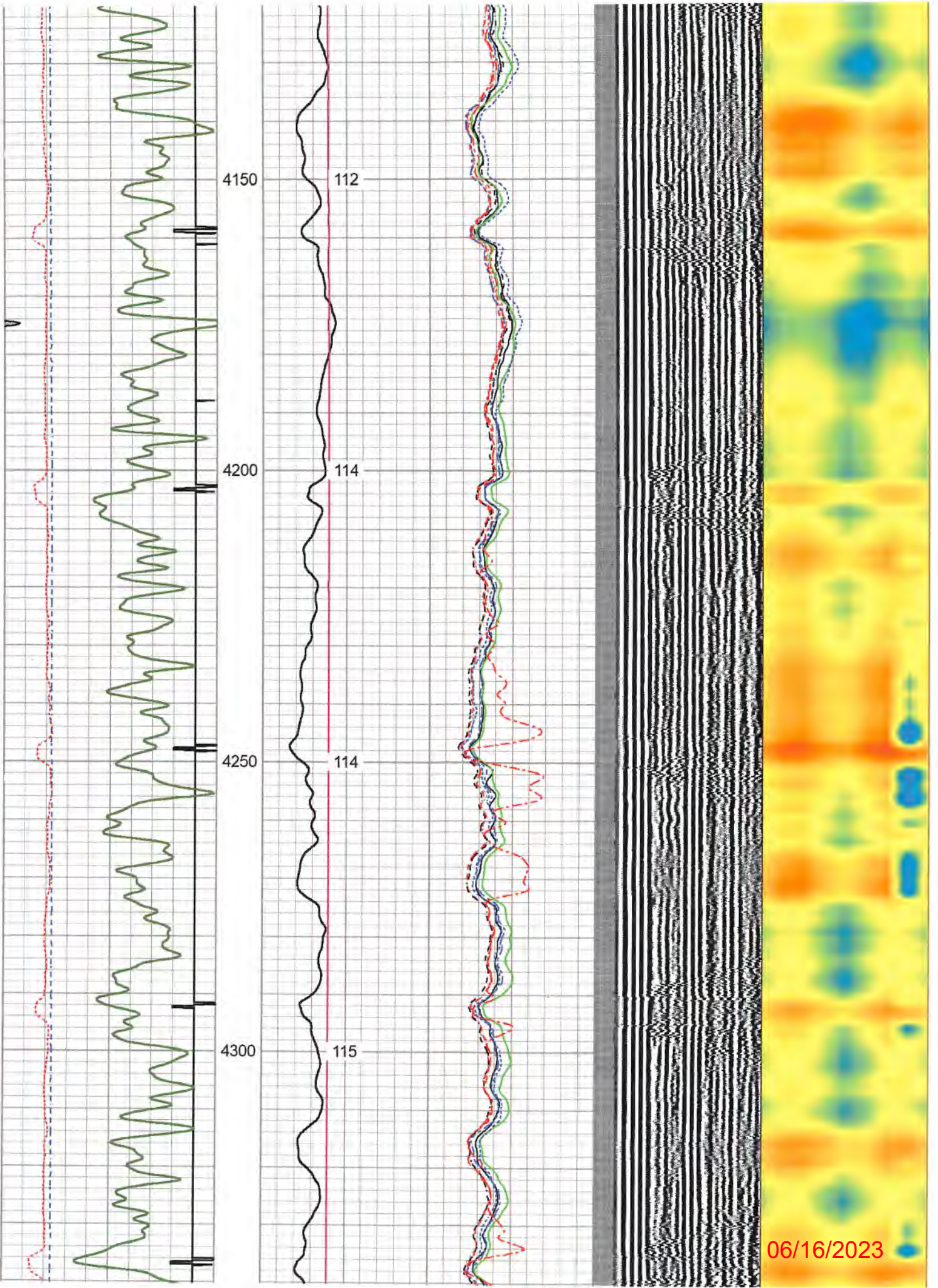


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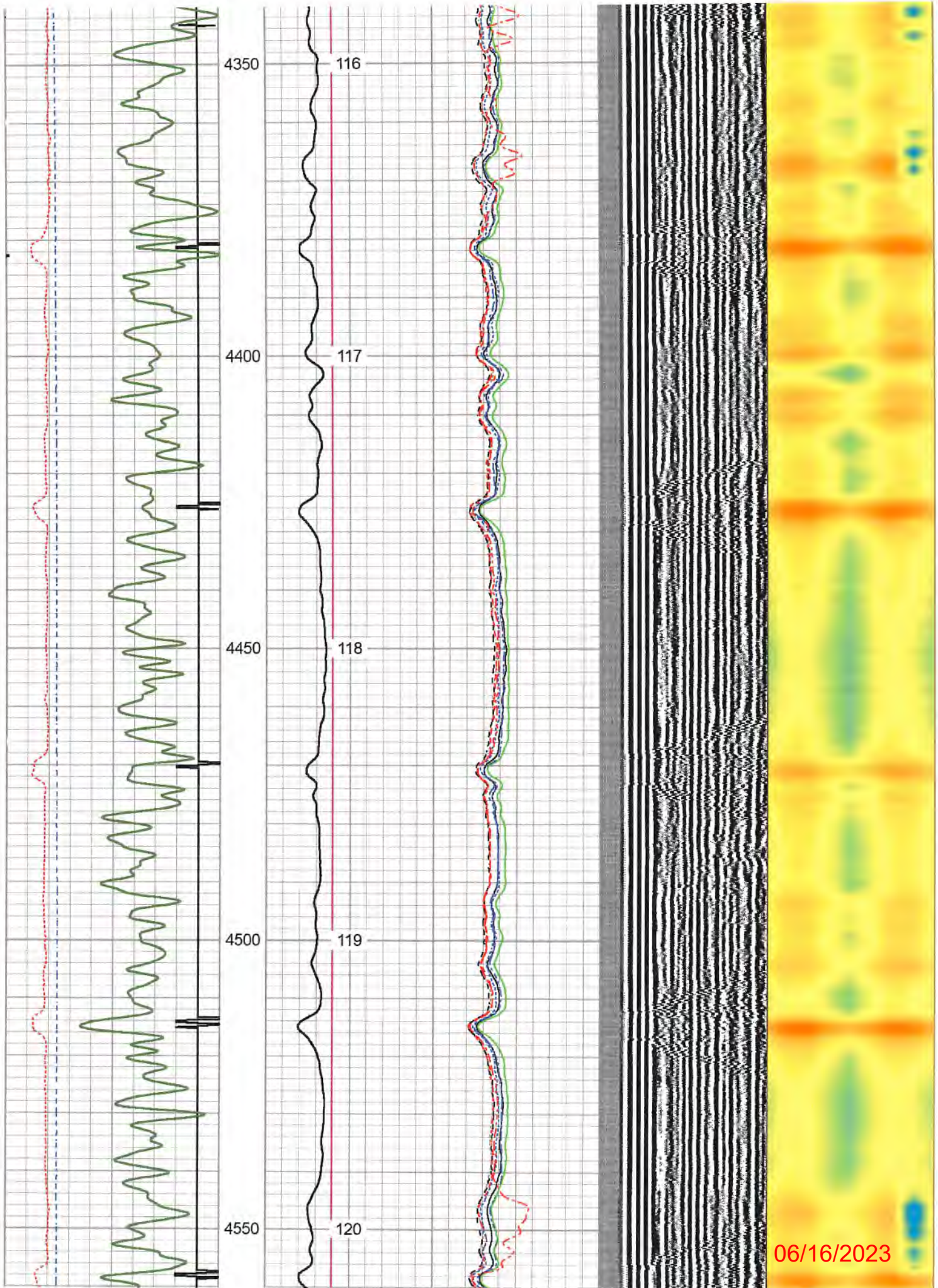


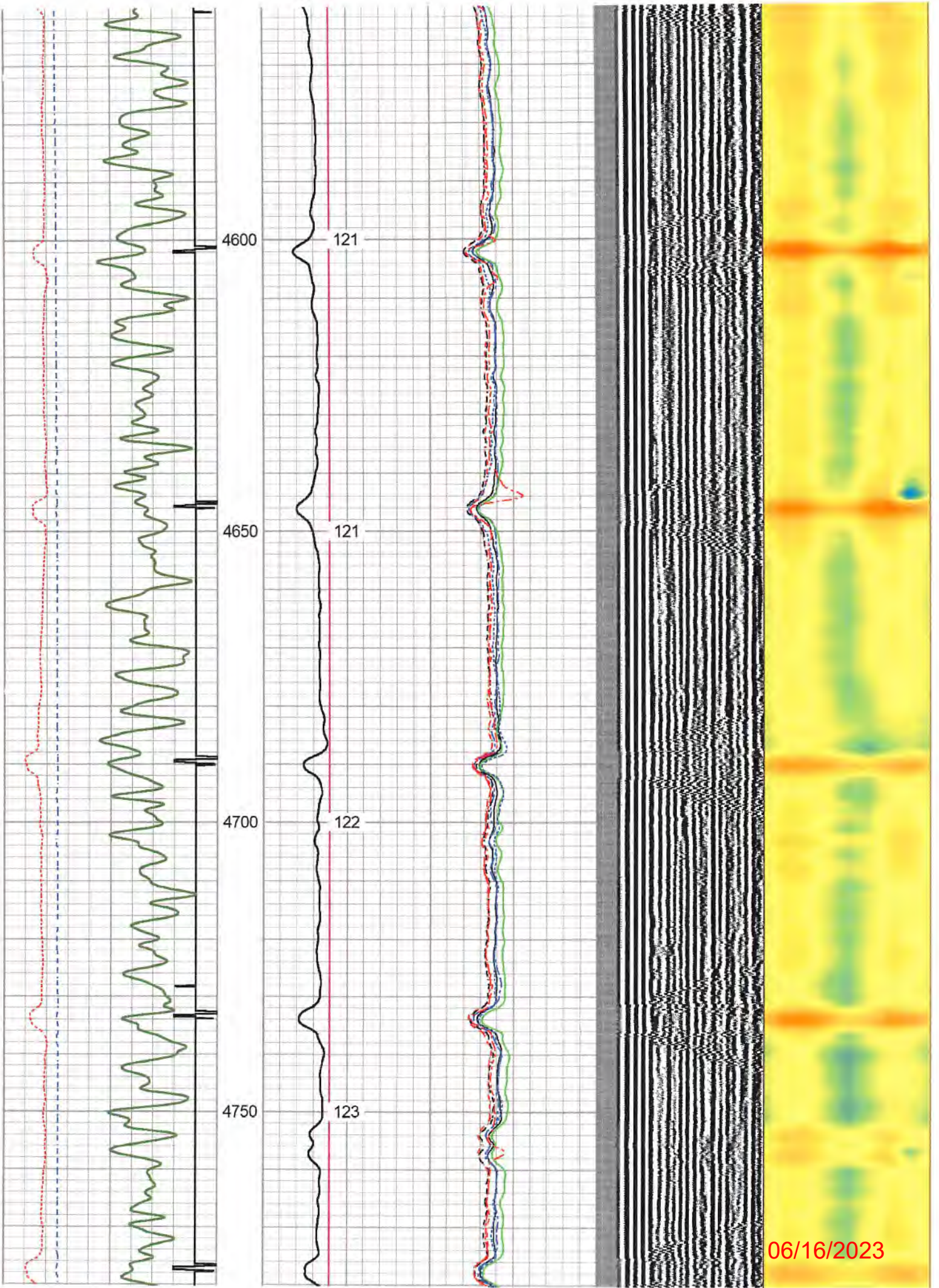


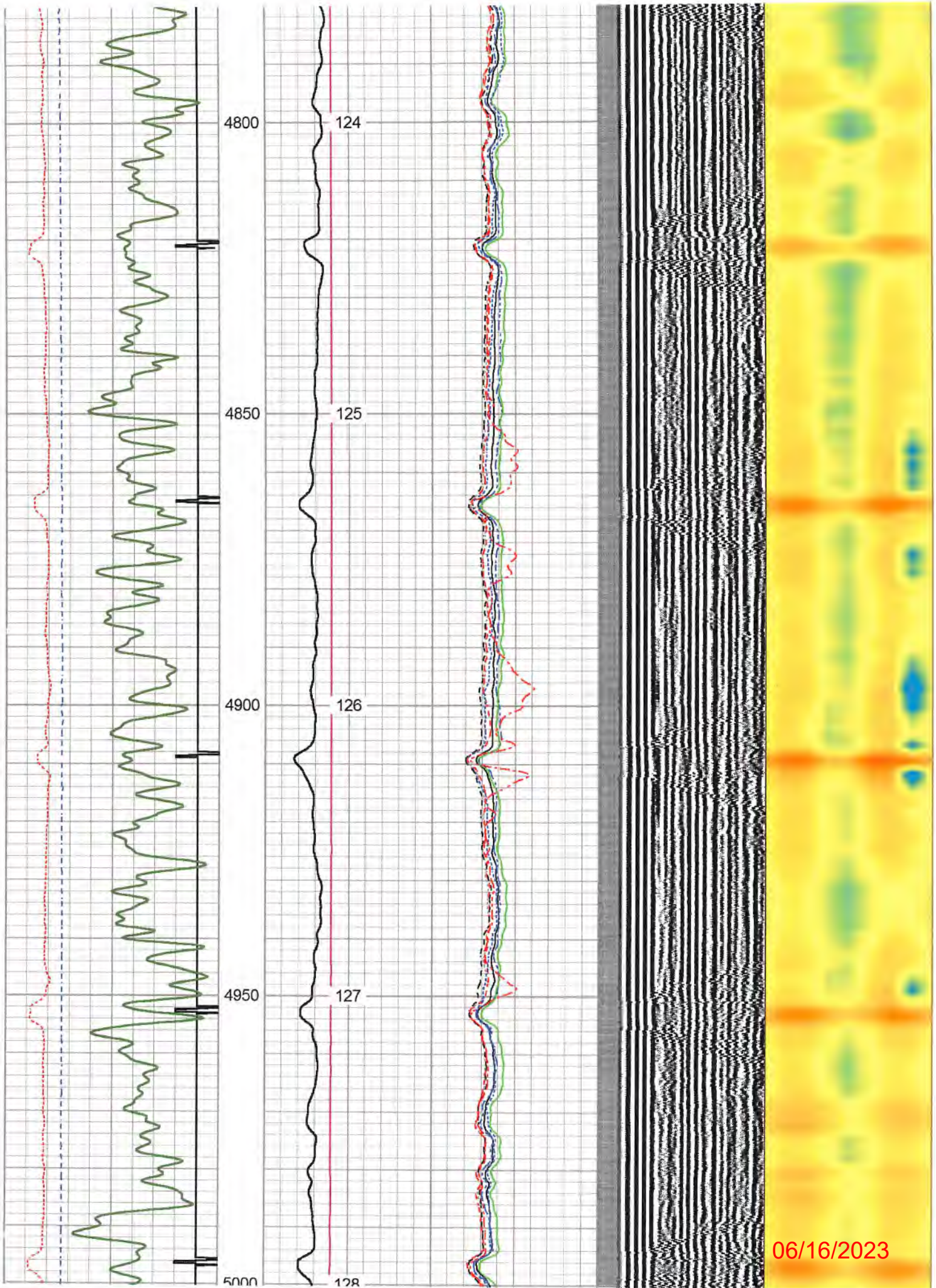




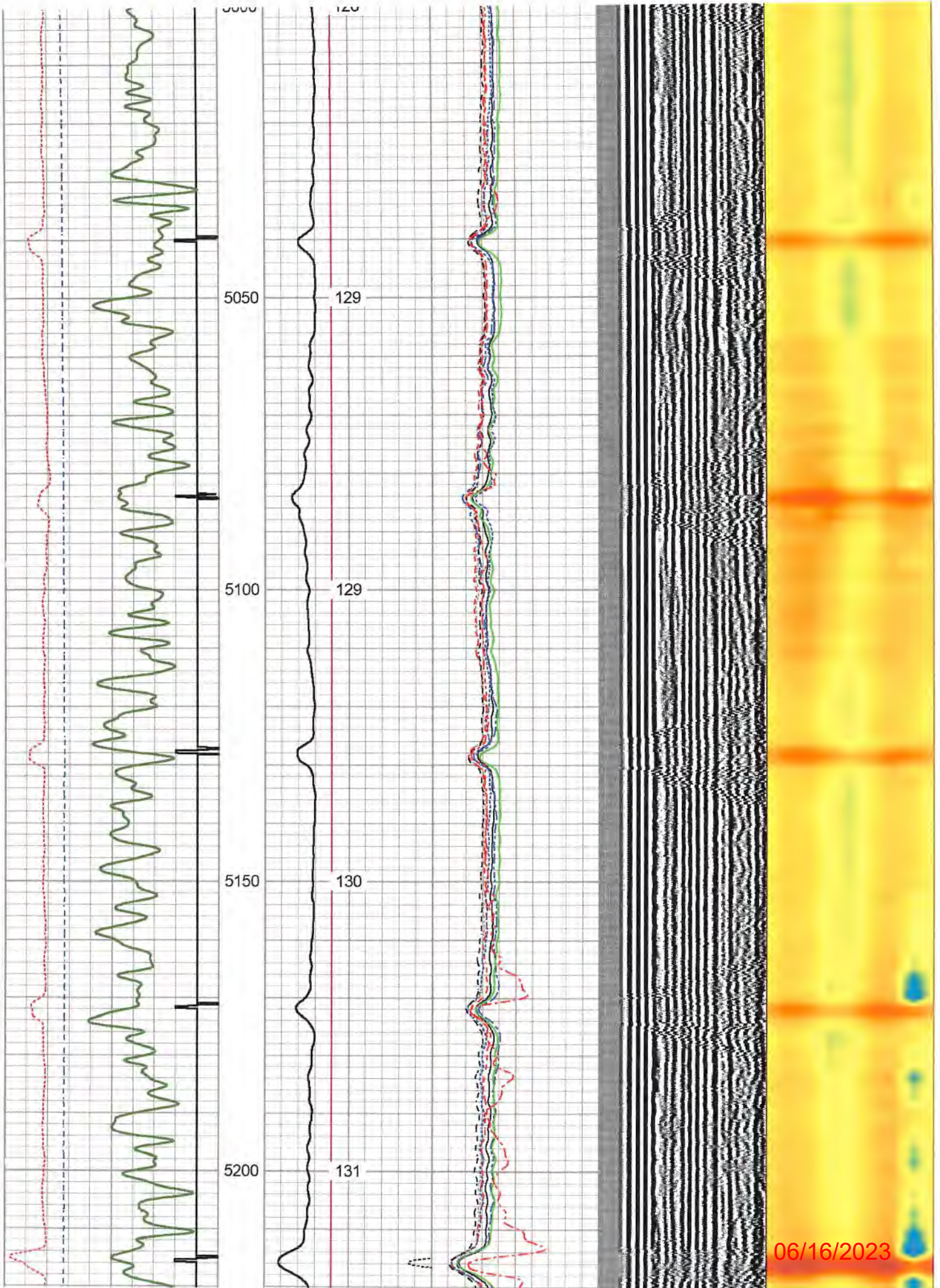
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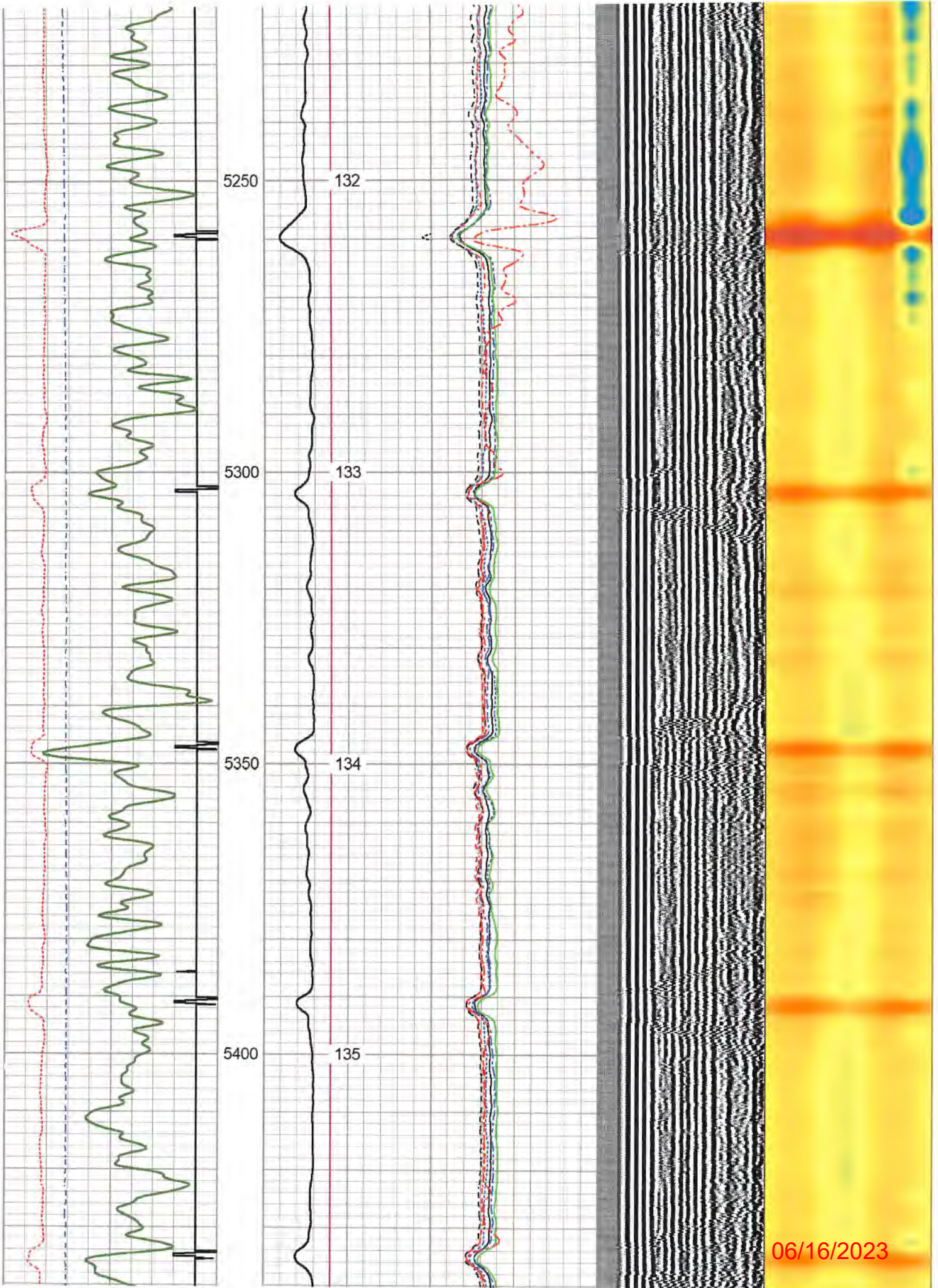


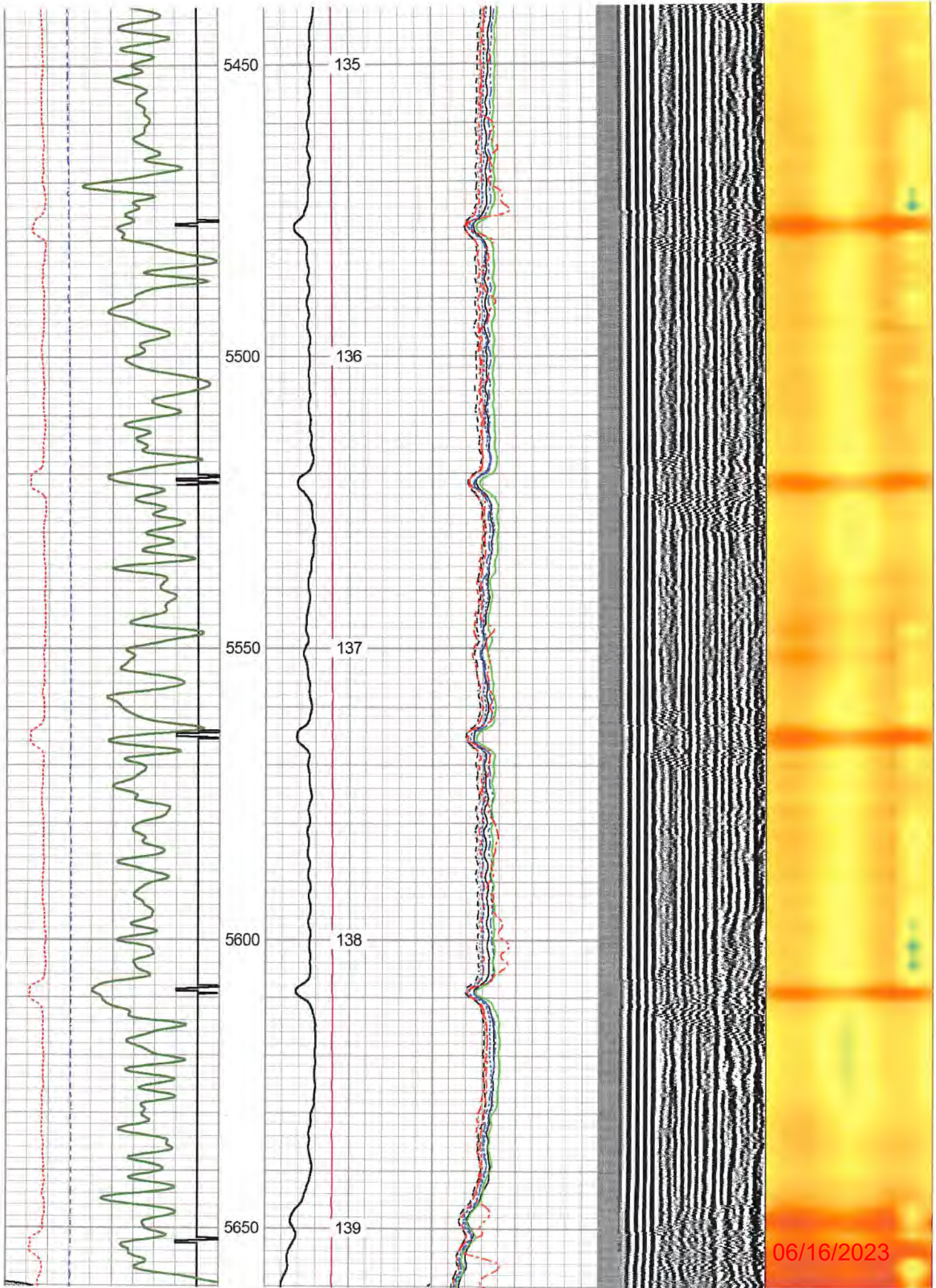


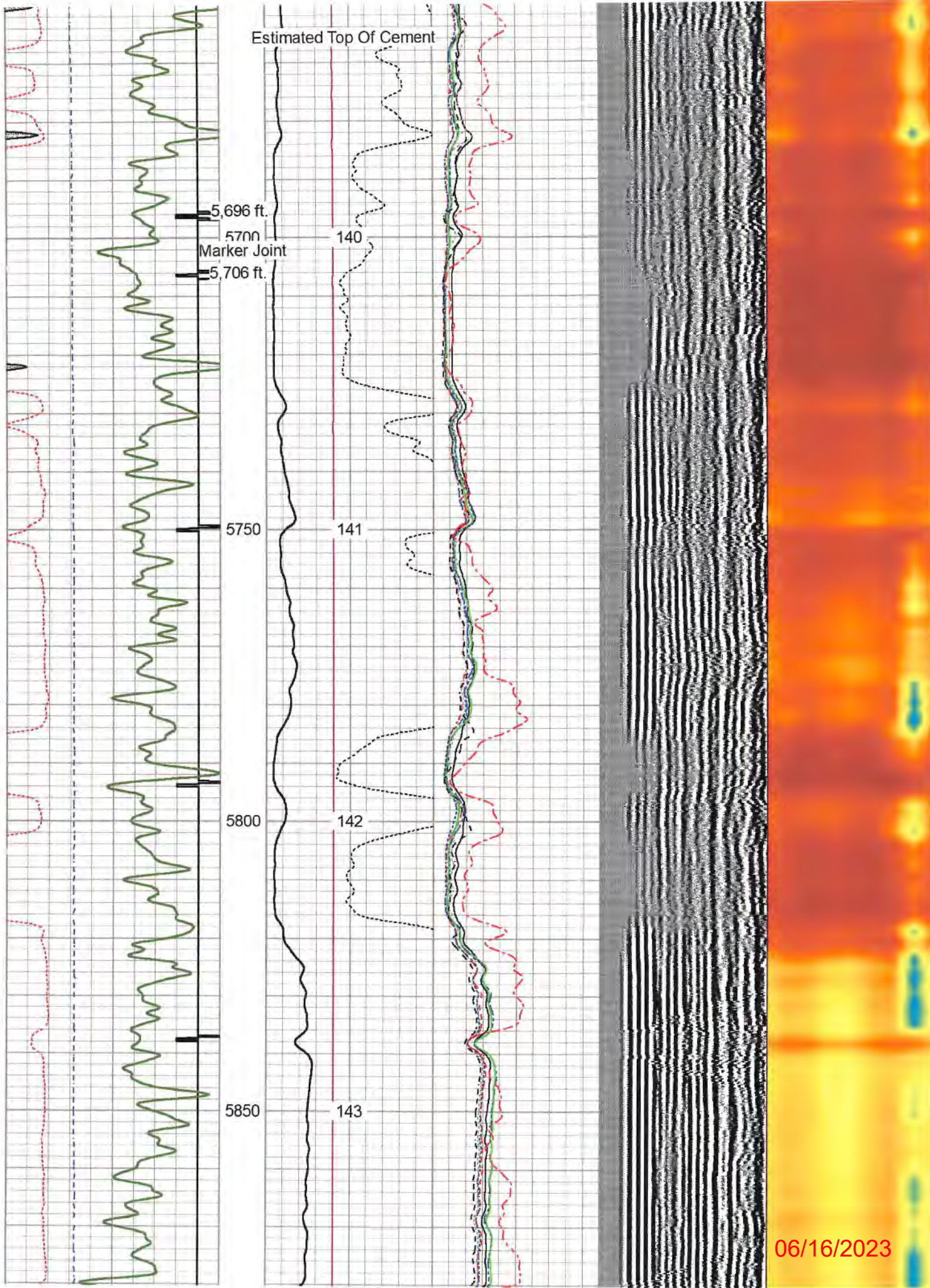


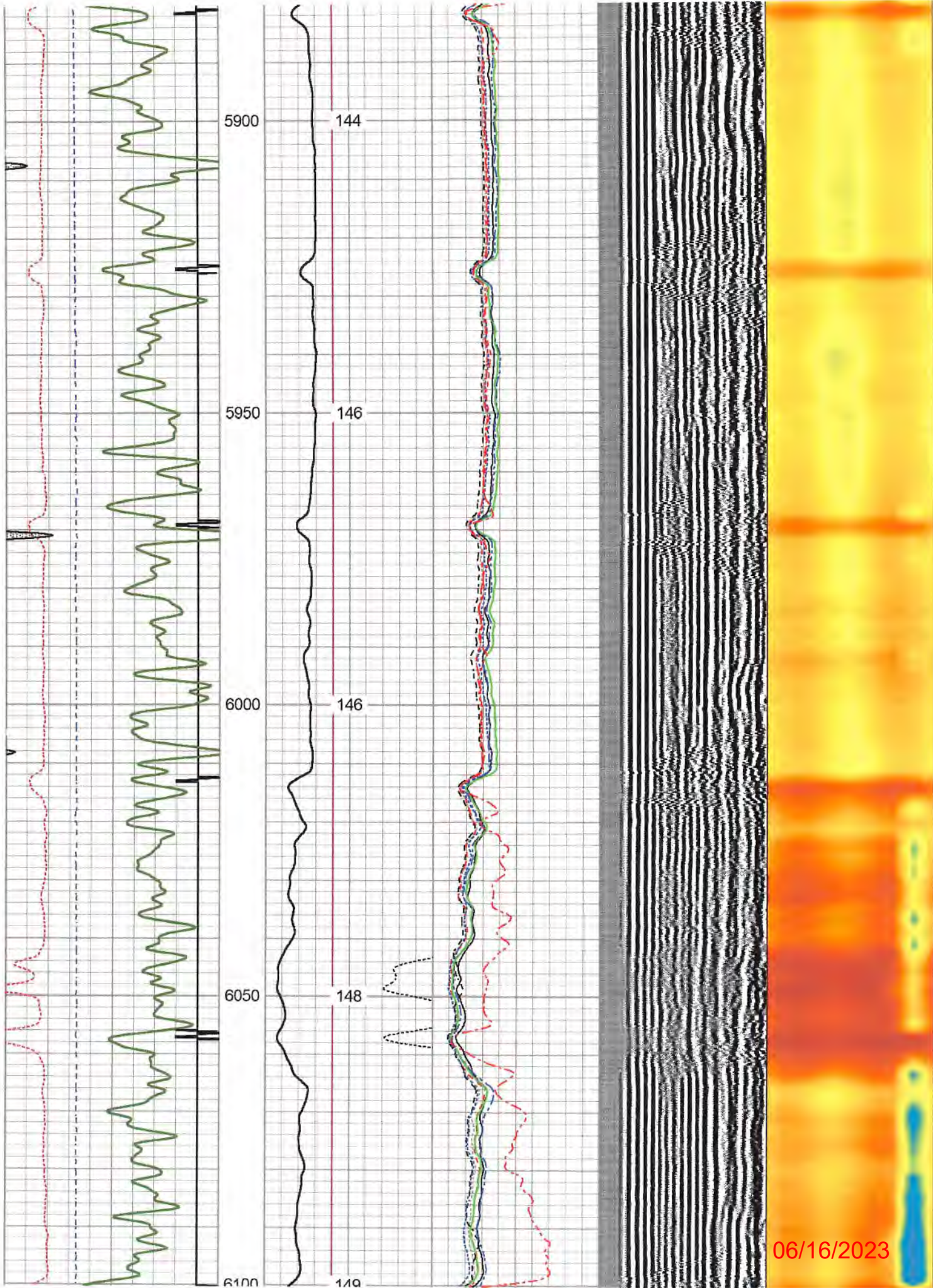


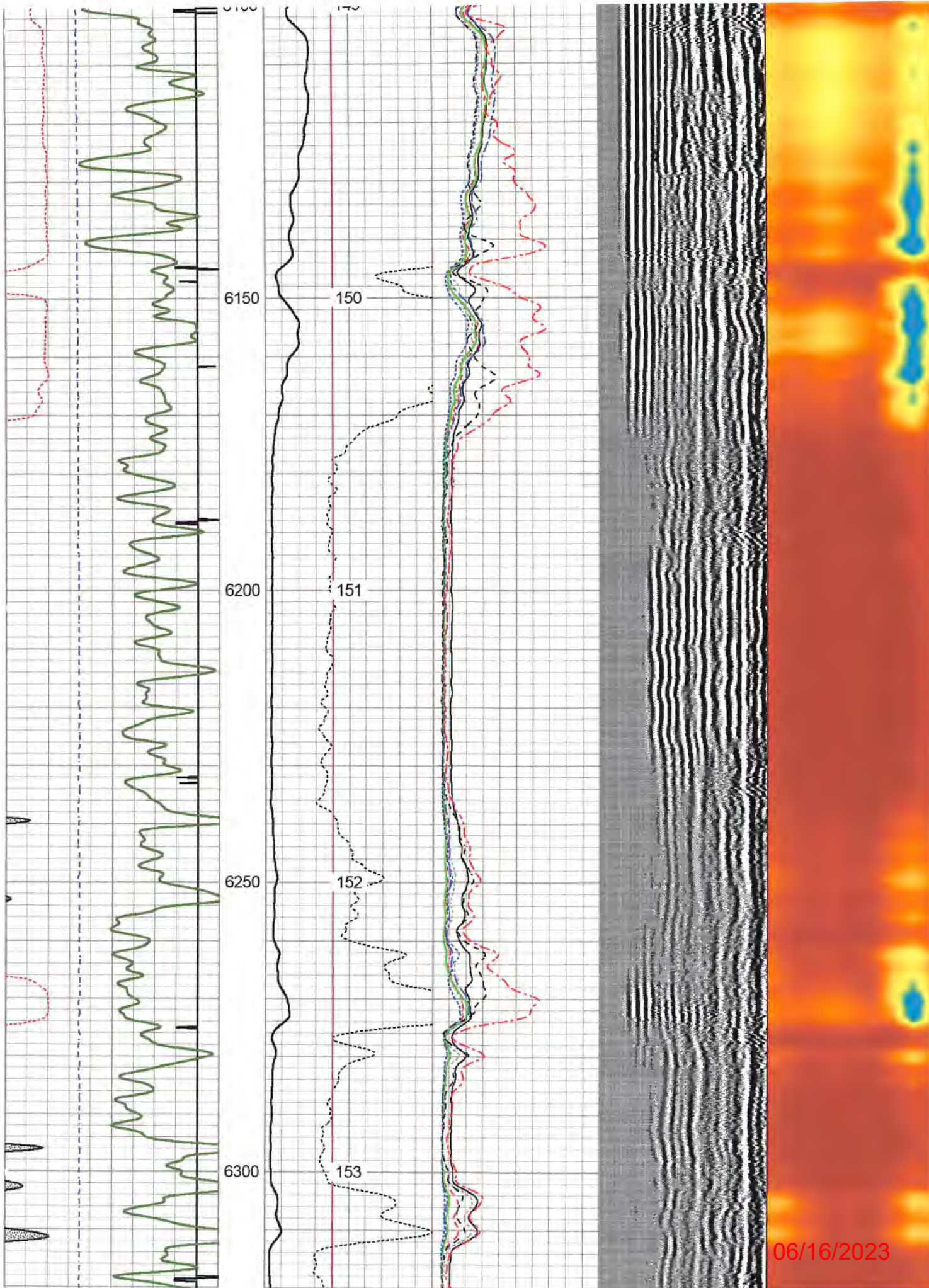


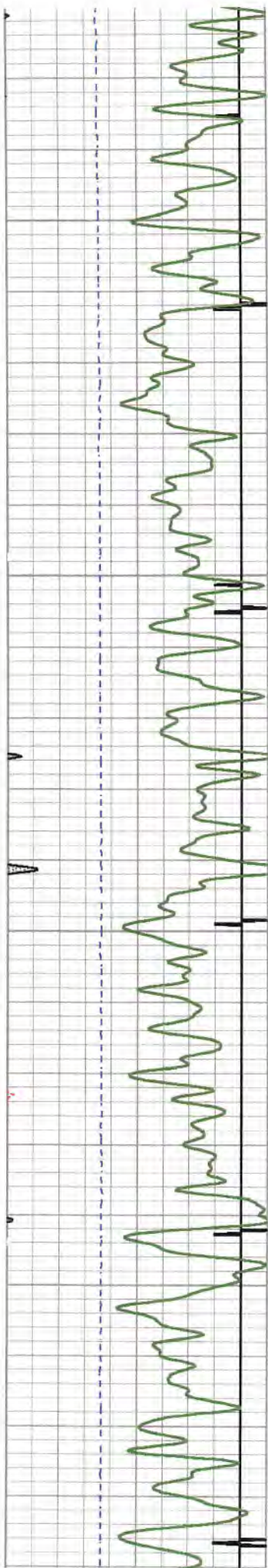












6350

6400

6450

6500

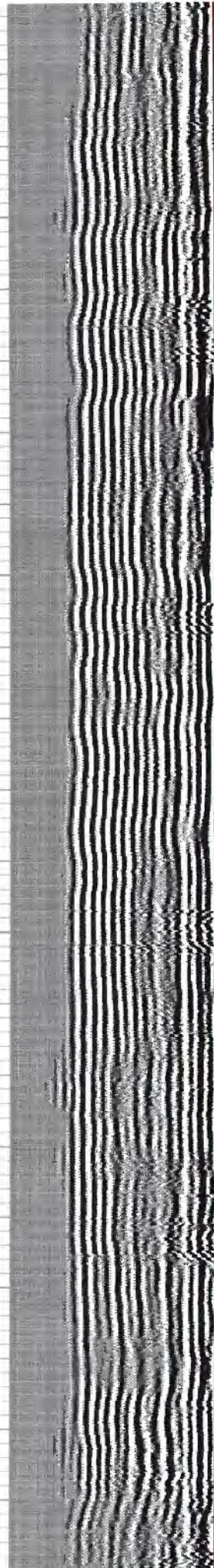


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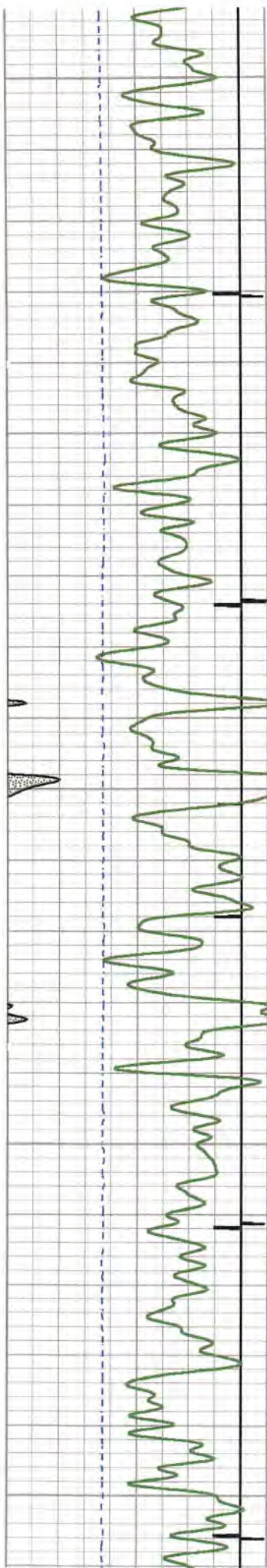
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158



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6550

6600

6650

6700

6750

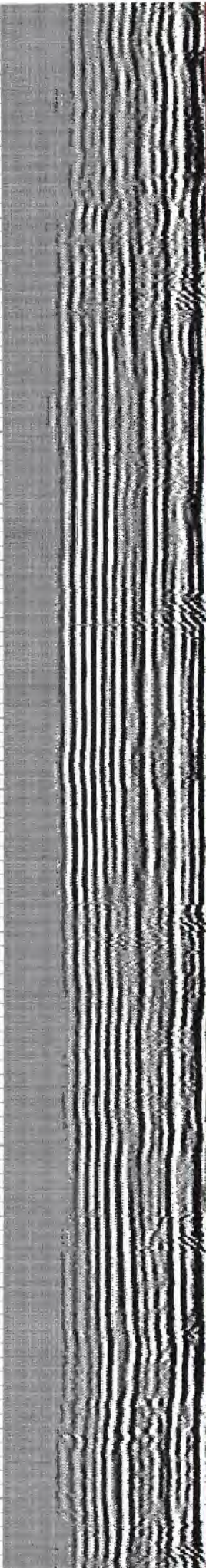
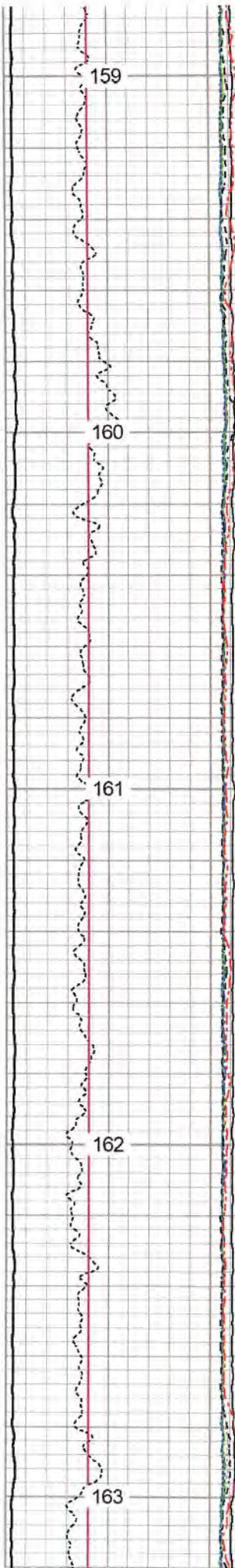
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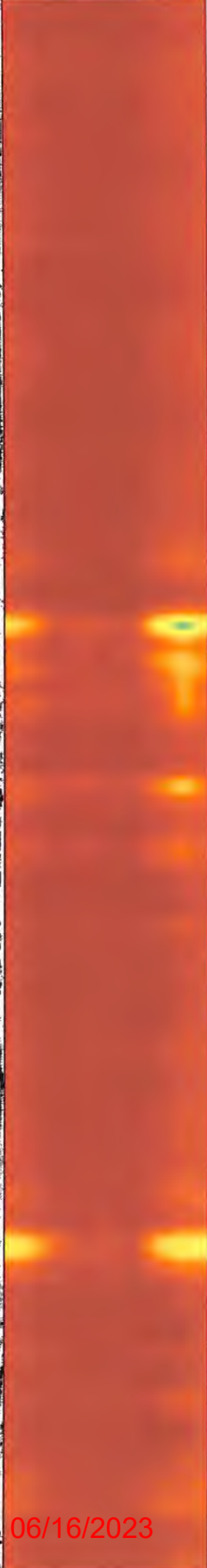
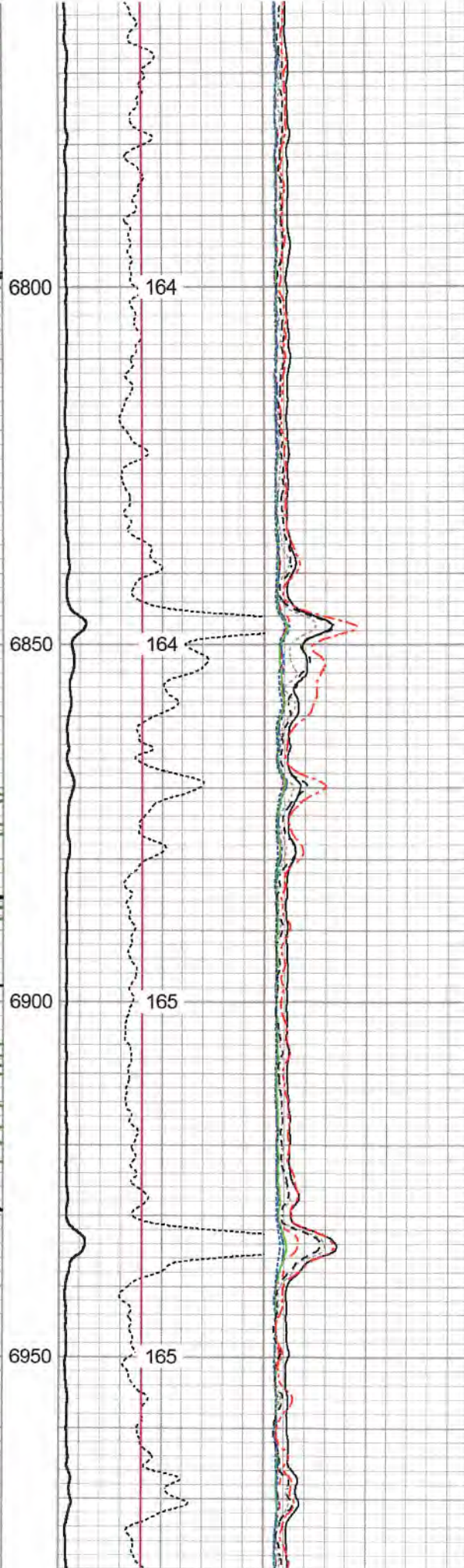
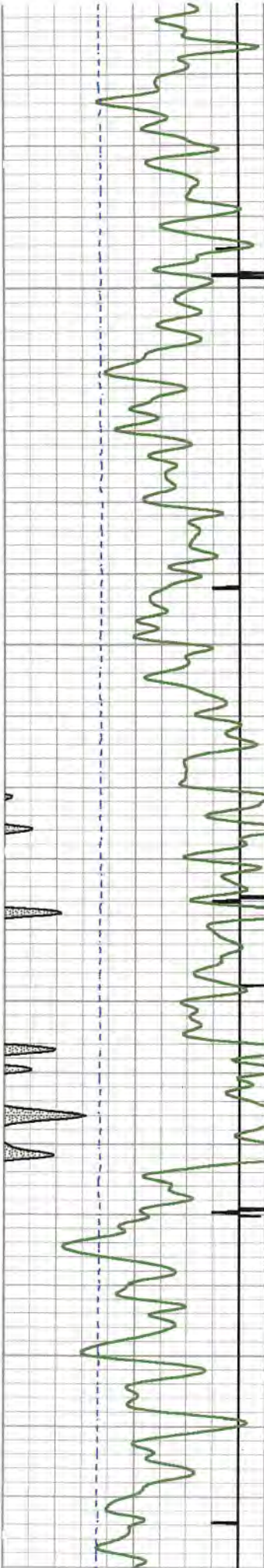
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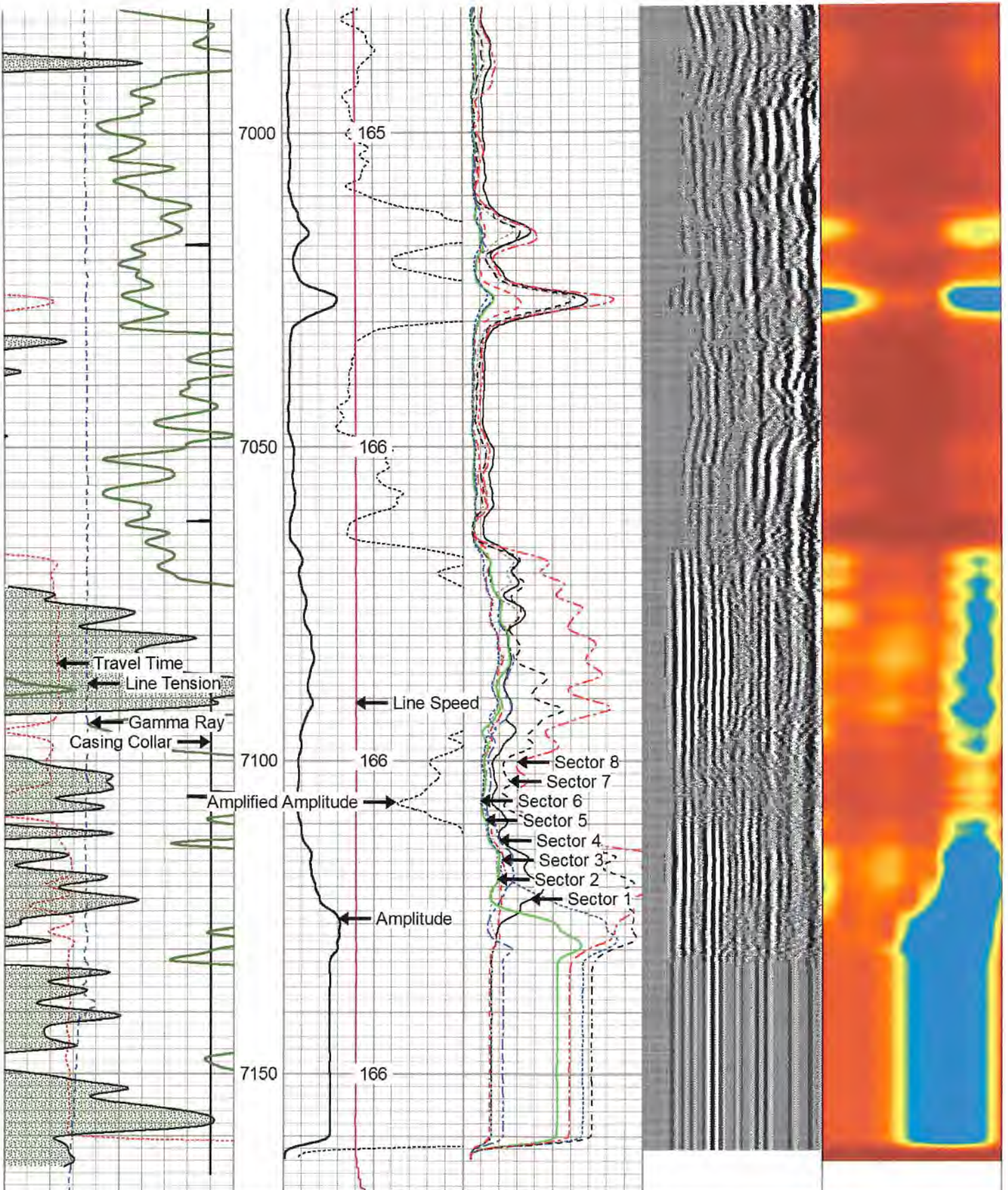


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270	Travel Time (usec)	200
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
0	Line Tension (lb)	5000

0	Amplitude (mV)	100	-5	Sector 1	150
	Amplified Amplitude		-5	Sector 2	150
0	(mV)	10	-5	Sector 3	150
	Line Speed		-5	Sector 4	150
-500	(ft/min)	500	-5	Sector 5	150
	TEMP		-5	Sector 6	150

Variable Density	1	Cement Map	8
200 (usec)			
1200			

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(degF)

-5 Sector 7 150

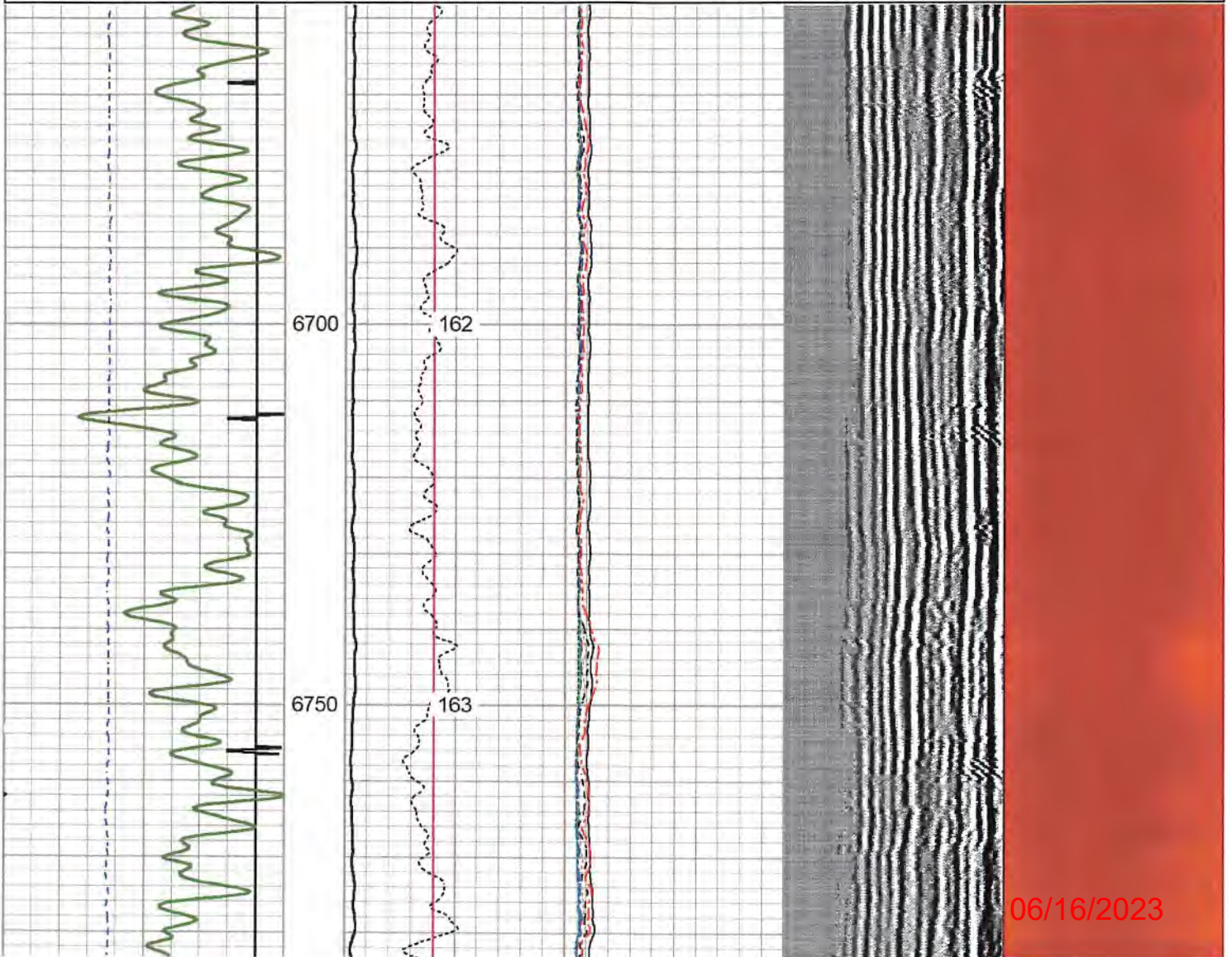
-5 Sector 8 150

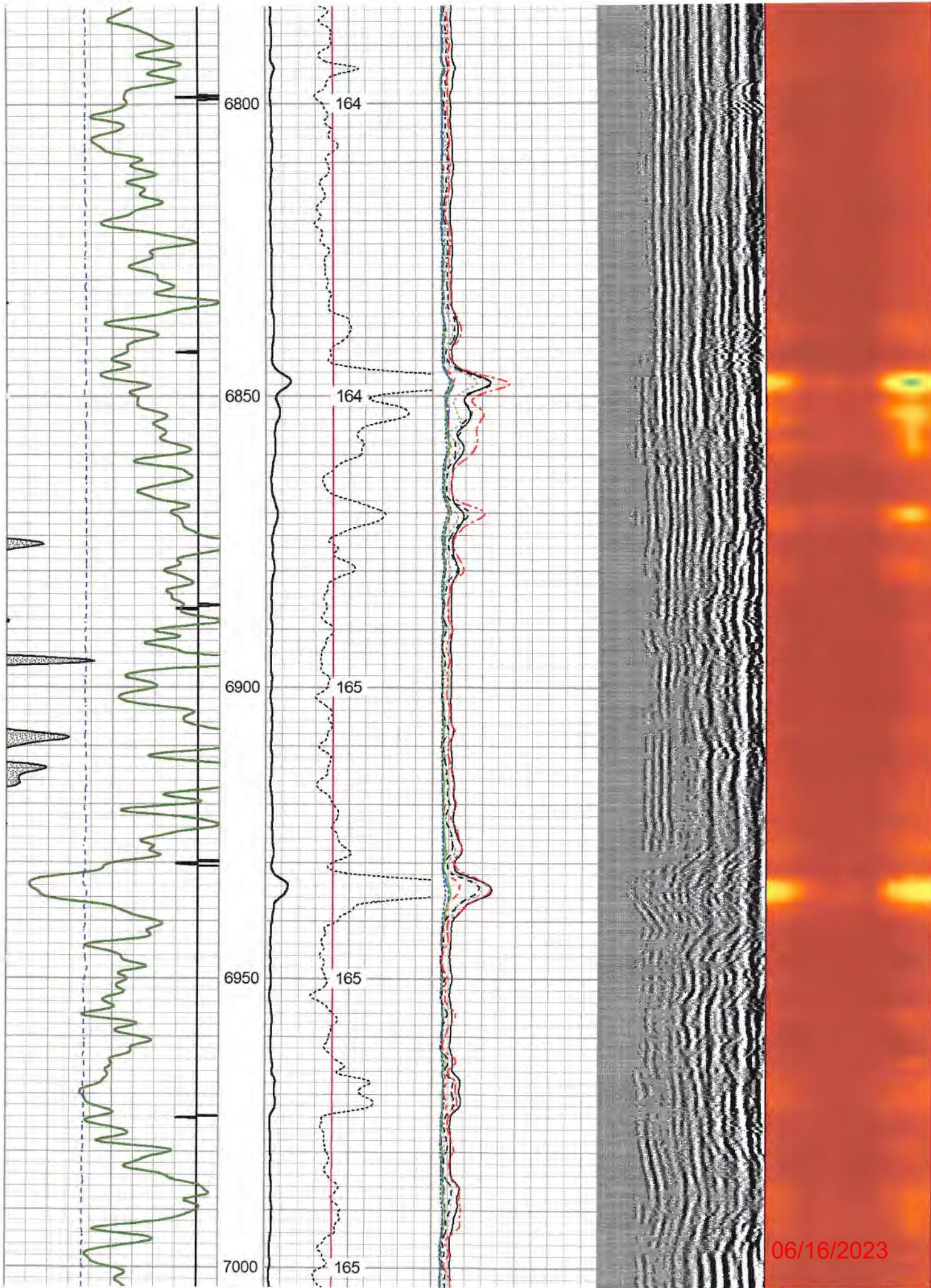


# Repeat Pass 0 PSI

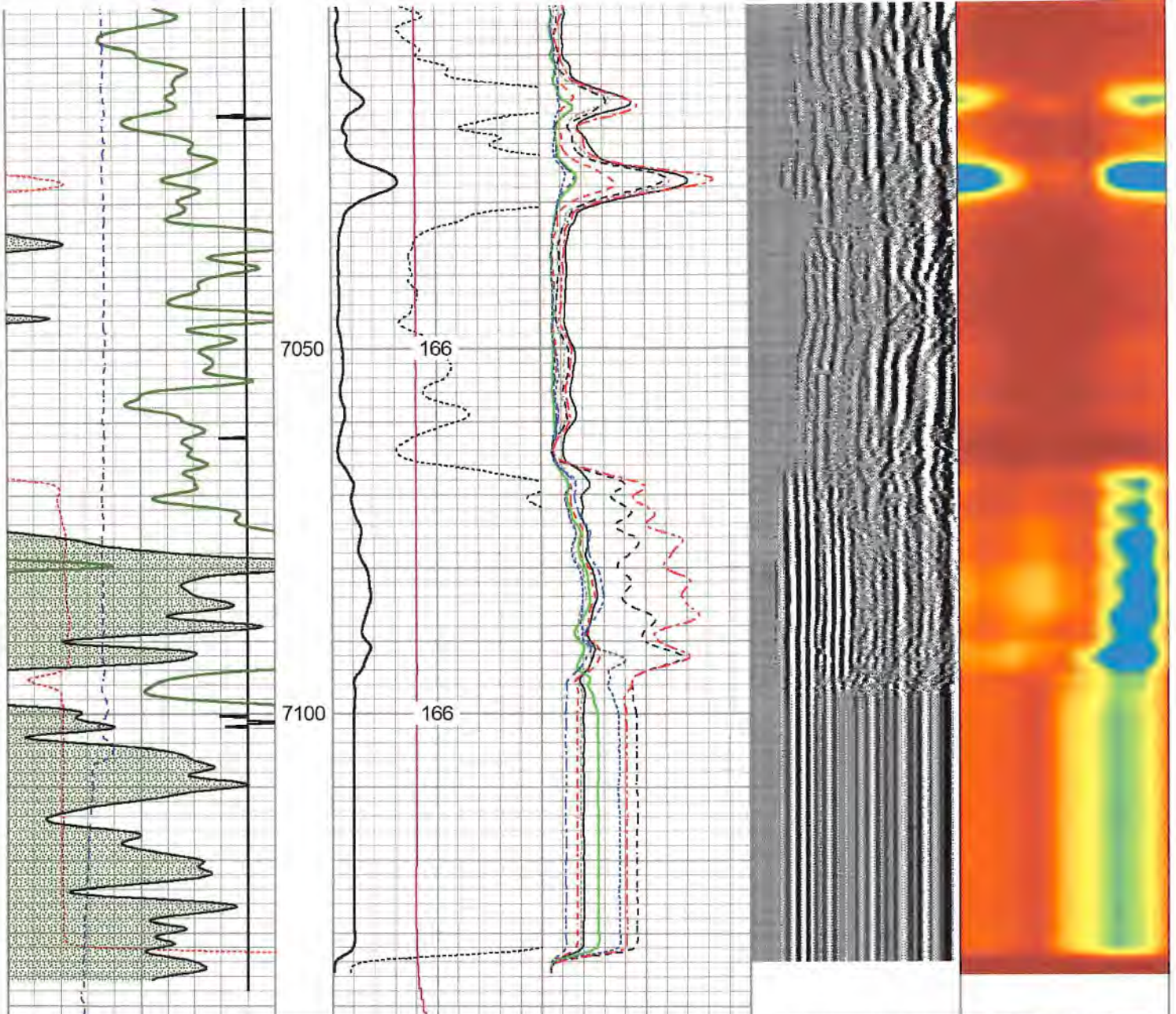
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 Dataset Pathname Marcellus/Bronco\_1H/RCBL\_1/pass2  
 Presentation Format 9rcbl  
 Dataset Creation Thu Apr 30 10:56:34 2020  
 Charted by Depth in Feet scaled 1:240

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)	1200	
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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270	Travel Time (usec)	200
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
0	Line Tension (lb)	5000

0	Amplitude (mV)	100	-5	Sector 1	150
	Amplified Amplitude		-5	Sector 2	150
0	(mV)	10	-5	Sector 3	150
	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

Variable Density	1	Cement Map	8
200	(usec)	1200	

**Log Variables** DatabaseC:\ProgramData\Warrrior\Data\antero\_coloradowest\_bronco1h\_rcbl\_nineenergy\_apr\_30\_2 Dataset Marcellus/Bronco\_1H/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			

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0.8	No	0	0	0
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**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\_bronco1h\_rcbl\_nineenergy\_apr\_30\_2020.db  
Dataset Pathname Marcellus/Bronco\_1H/RCBL\_1/pass4.2  
Dataset Creation Thu Apr 30 12:16:32 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

**Segmented Cement Bond Log Calibration Report**

Serial Number: FW1312-32  
Tool Model: Probe275T

Calibration Casing Diameter: 5.500 in  
Calibration Depth: 225.917 ft

**Master Calibration, performed Thu Apr 30 10:35:14 2020:**

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.017	0.865	2.200	71.921	101.212	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


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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
Temp	11.27		RBT-Probe275T (FW1312-32) Probe 2.75" Radial with Integral Temperature Sub	9.39	2.75	90.00
WVFS8	9.03					
WVFS7	9.03					
WVFS6	9.03					
WVFS5	9.03					
WVFS4	9.03					
WVFS3	9.03					
WVFS2	9.03					
WVFS1	9.03					
WVF3FT	9.03					
WVF5FT	8.03					
			CENT-Overbody Antelope (SP-919-0233)	1.67	4.88	5.00
HeadVolt	4.78					
WVFCAL	4.78					
CCI	3.88					

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GR	2.54		GR-Probe (FW1211-86) Probe 2 3/4" Logging Gamma Ray	4.78	2.75	57.00
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Dataset: antero\_coloradowest\_bronco1h\_rcbl\_nineenergy\_apr\_30\_2020.db: Marcellus/Bronco\_1H/RCBL\_1/pass4.2  
 Total length: 15.17 ft  
 Total weight: 162.00 lb  
 O.D.: 4.88 in

	Company	Antero Resources
	Well	Bronco 1H
	Field	North Canton
	County	Tyler
	State	West Virginia