



**RADIAL CEMENT BOND LOG
VARIABLE DENSITY LOG
GAMMA/CCL/TEMP**

Company ANTERO RESOURCES
Well Beech Run Emmons 2H
Field Rabbit Ears
County Tyler
State WV

Company ANTERO RESOURCES
Well Beech Run Emmons 2H
Field Rabbit Ears
County Tyler State WV

Location: API #: 47-095-02802
SEC TWP RGE
Permanent Datum GROUND LEVEL Elevation
Log Measured From KELLY BUSHING 25.5'
Drilling Measured From KELLY BUSHING
Other Services
Elevation
K.B.
D.F.
G.L.

Date	JANUARY 19, 2023		
Run Number	ONE		
Depth Driller	19,919'		
Depth Logger	7,890'		
Bottom Logged Interval	7,895'		
Top Log Interval	SURFACE		
Open Hole Size	NA		
Type Fluid	FRESH WATER		
Density / Viscosity	8.6 LB/GAL		
Max. Recorded Temp.	143 DEG.F.		
Estimated Cement Top	2,844'		
Time Well Ready	16:30		
Time Logger on Bottom	17:00		
Equipment Number	116		
Location	CHARLEROI, PA		
Recorded By	M.MCNALLY		
Witnessed By	Bob Reed		
Borehole Record			
Run Number	Bit	From	To
Tubing Record			
	Size	Weight	From To
Casing Record			
Conductor String	28"	Wgt/Ft	Top Bottom
Surface String	17 1/2"		SURFACE 125.5'
Intermediate String	12 1/4"		SURFACE 996'
Intermediate String	8 3/4"		SURFACE 3,635'
Production String	5.5"	20#	SURFACE 6,000'
			SURFACE 19,919'

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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


LOG CORRELATED TO MARKER JOINT
DEPTH SHIFT -13'
MARKER JOINT 6,633'-6,648'
MAIN PASS LOGGED WITH 1500 PSI
REPEAT PASS LOGGED WITH 0 PSI

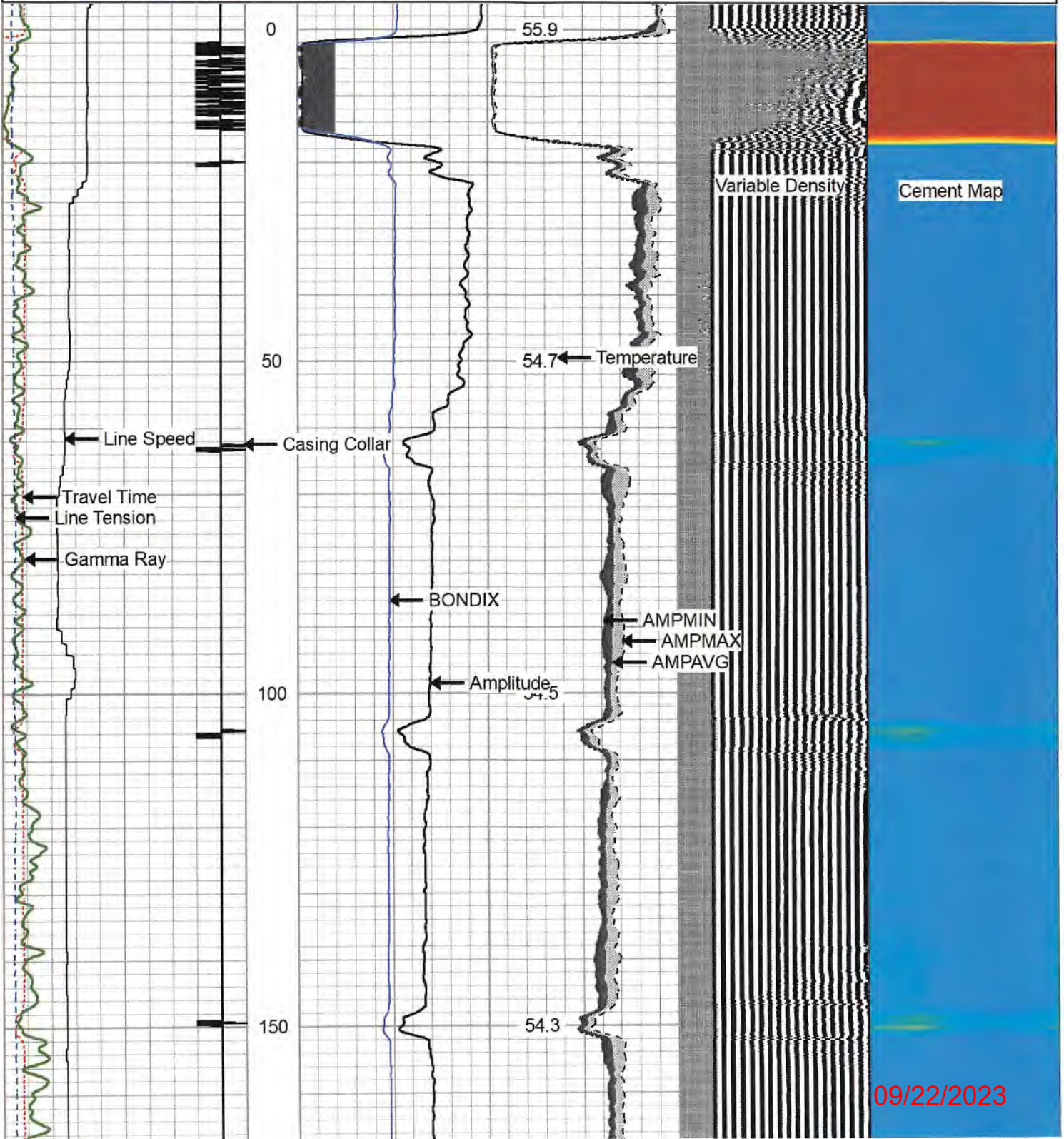
THANK YOU FOR USING NINE ENERGY SERVICES



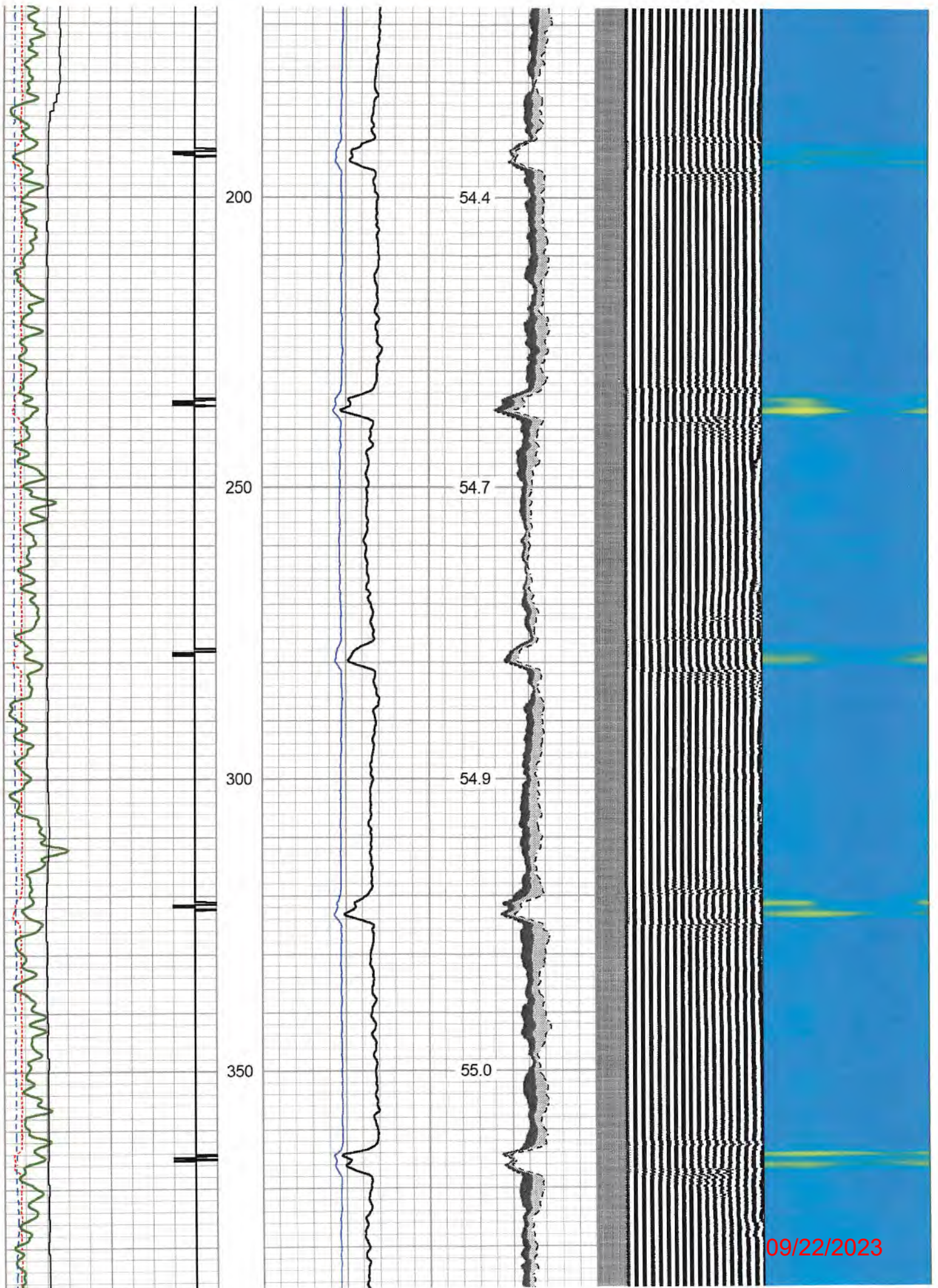
Main Pass 1500 PSI

Database File antero_emmons_2h_rcbl_19_jan_2022.db
 Dataset Pathname emmons2h/rcbl/pass15
 Presentation Format rcbl 2
 Dataset Creation Thu Jan 19 17:06:19 2023
 Charted by Depth in Feet scaled 1:240

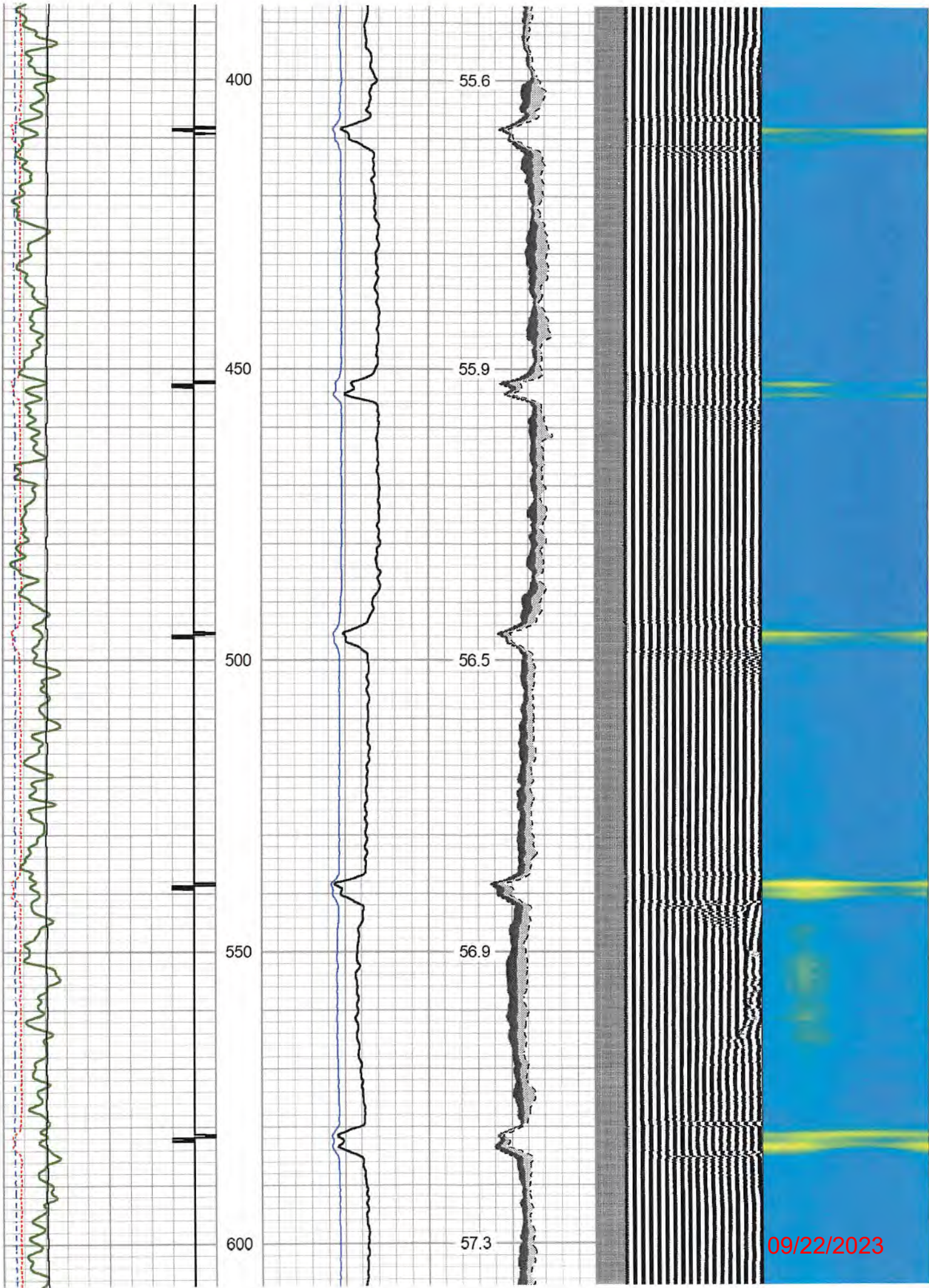
270	Travel Time (usec)	160	0	Amplitude (mV)	100	-5	AMPMIN	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	1	BONDIX	0	-5	AMPMAX	150	(usec)	1200		
0	Gamma Ray (GAPI)	150				-5	AMPAVG	150				
	Line Speed						TEMP					
-200	(ft/min)	200					(degF)					
0	Line Tension (lb)	5000										



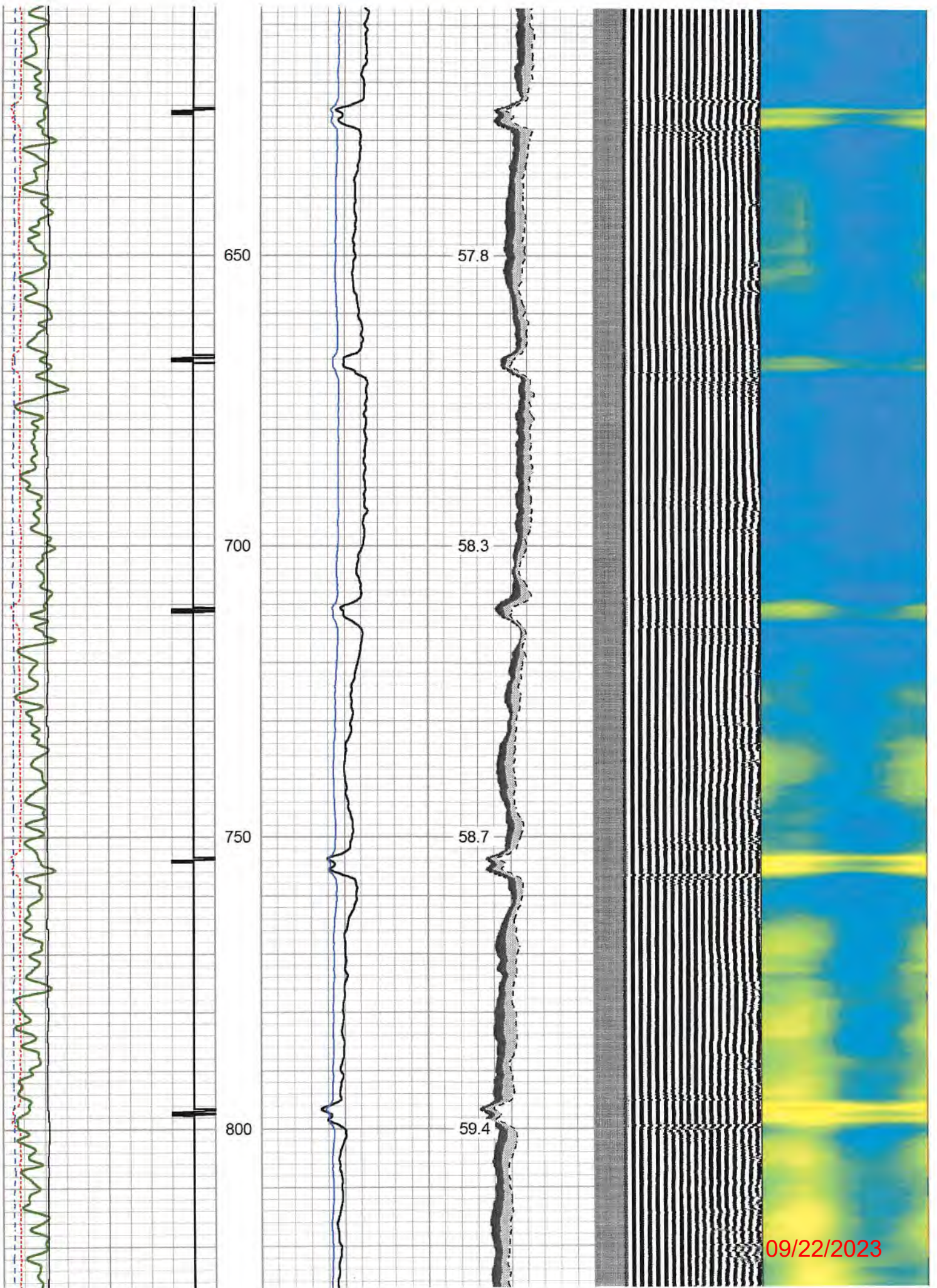
09/22/2023



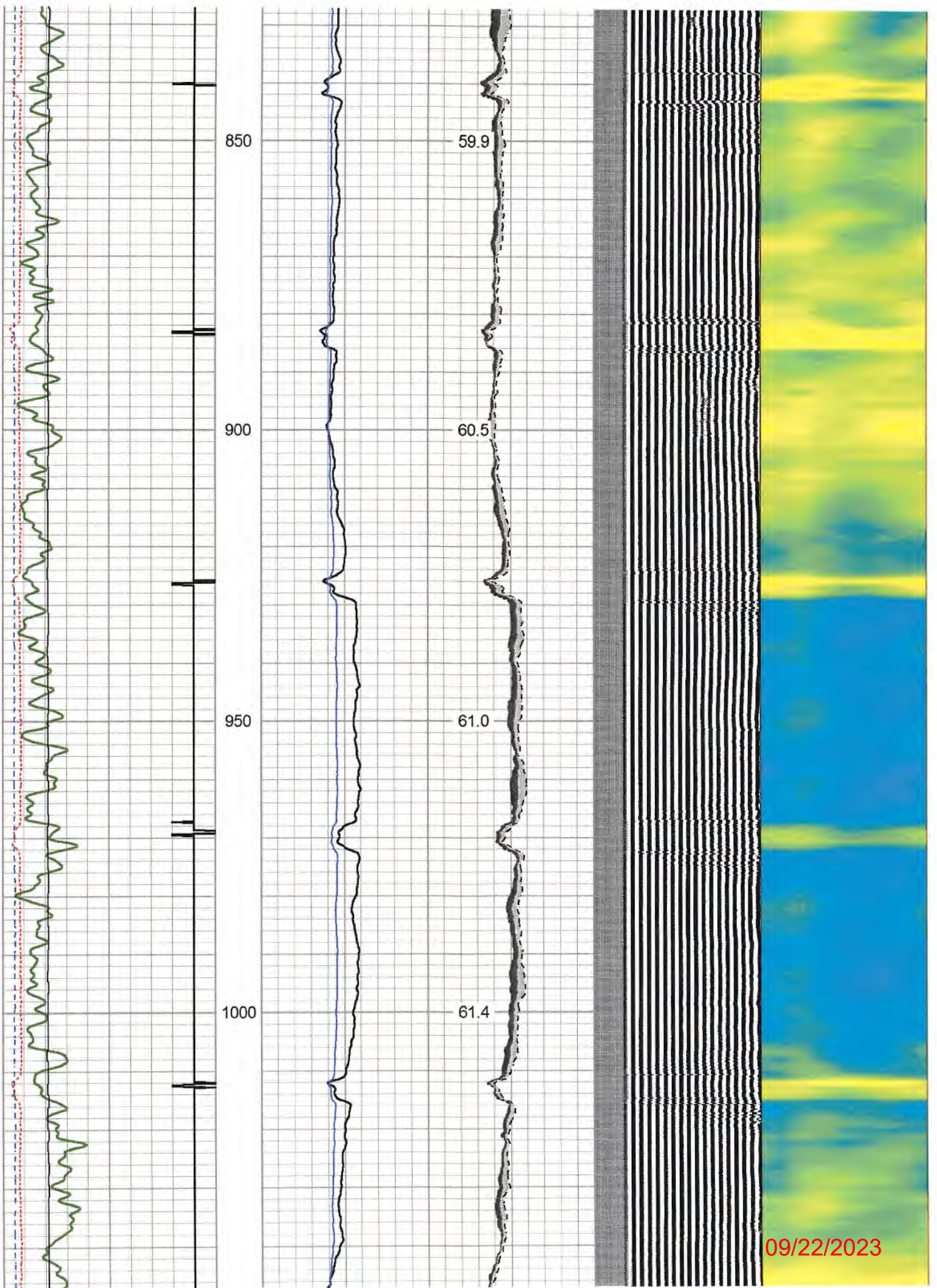
09/22/2023



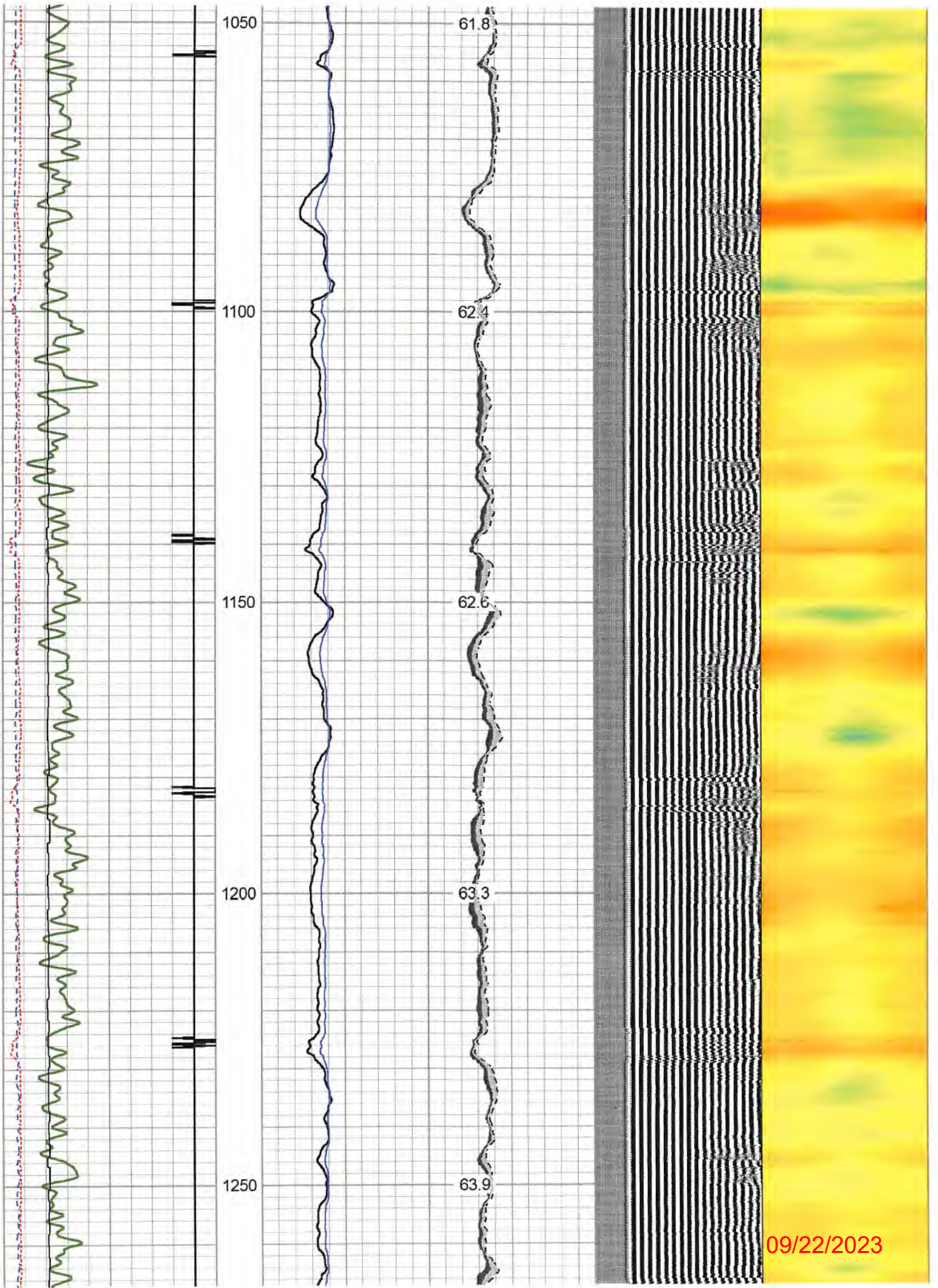
09/22/2023



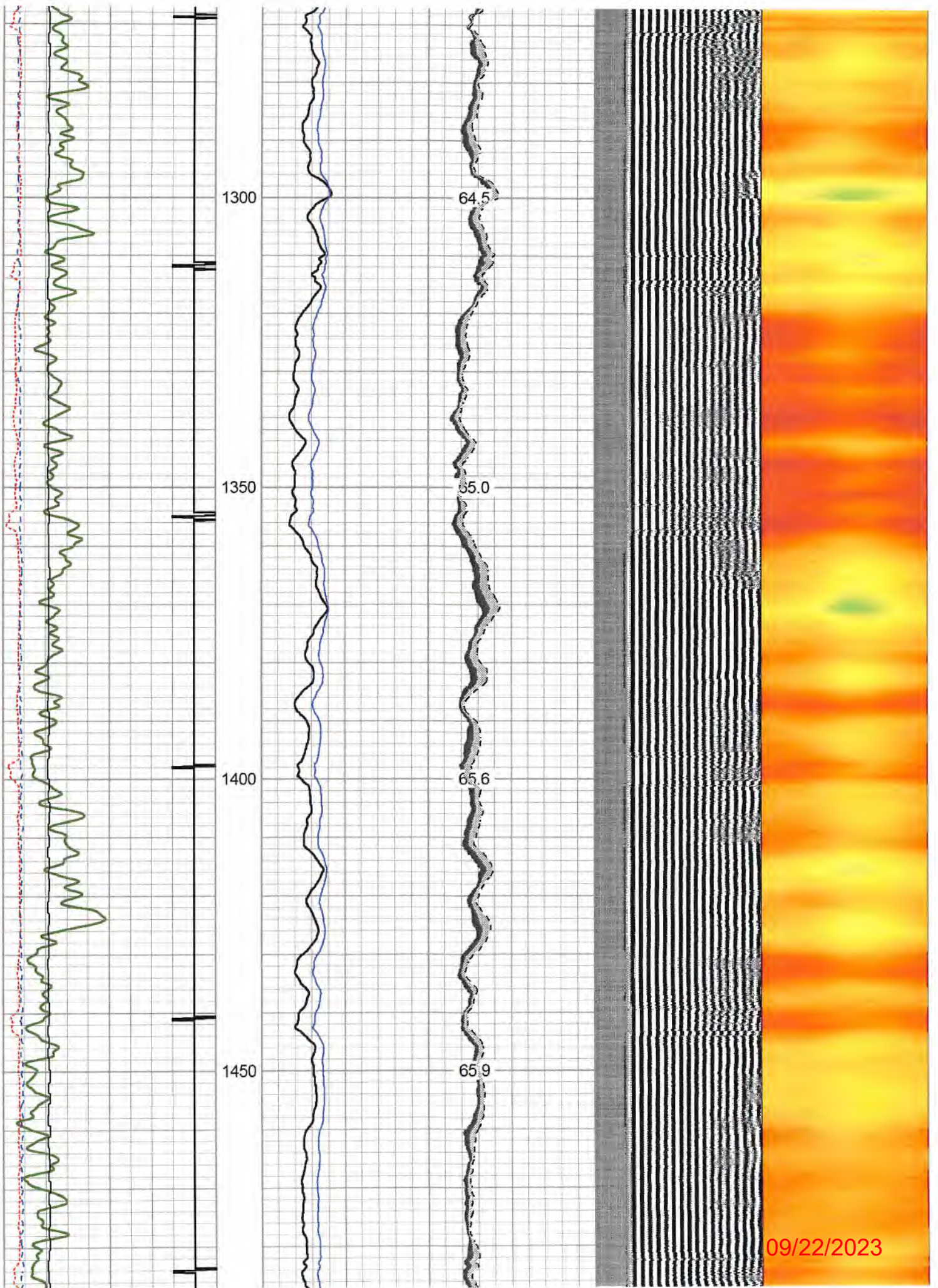
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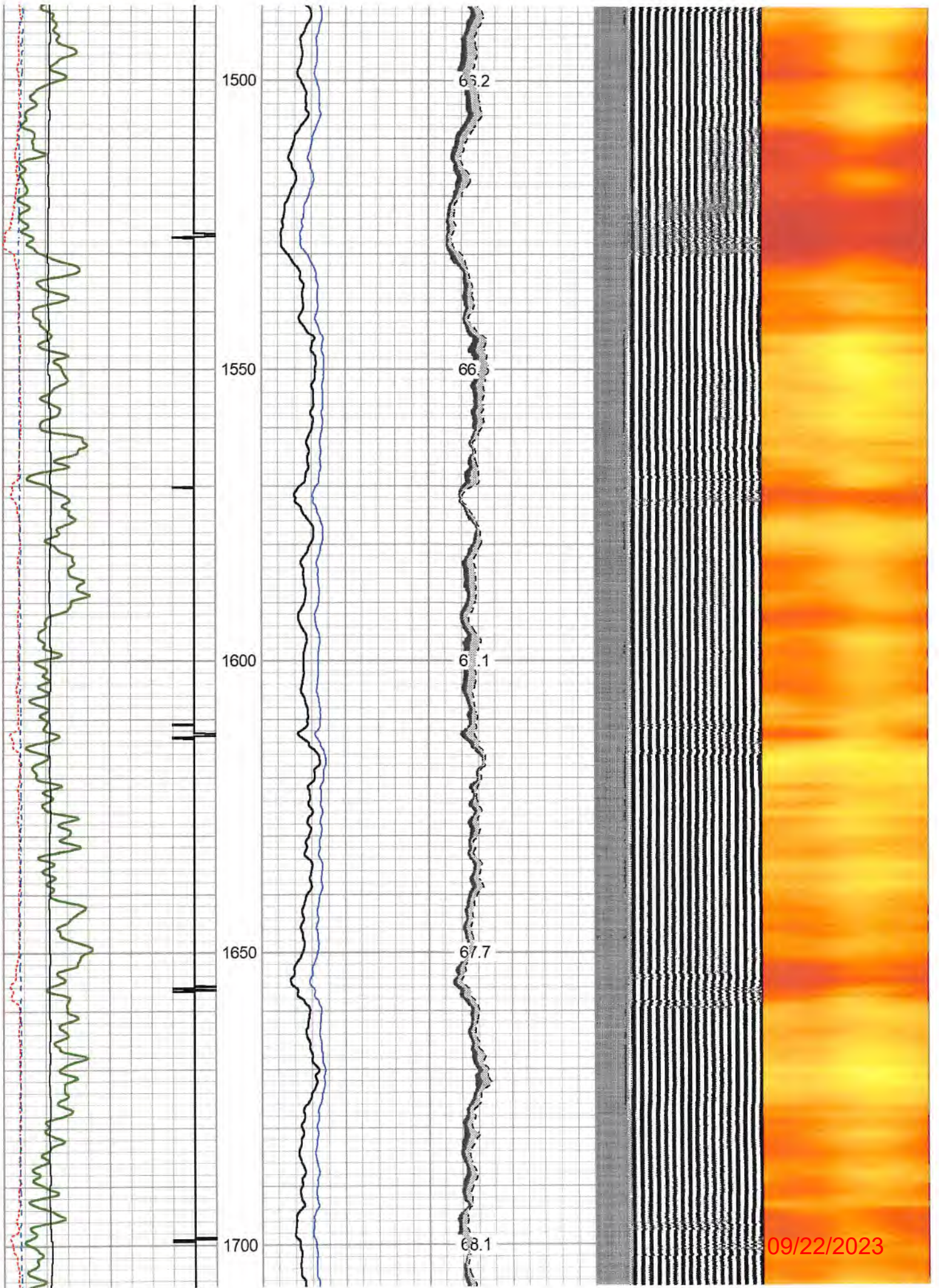


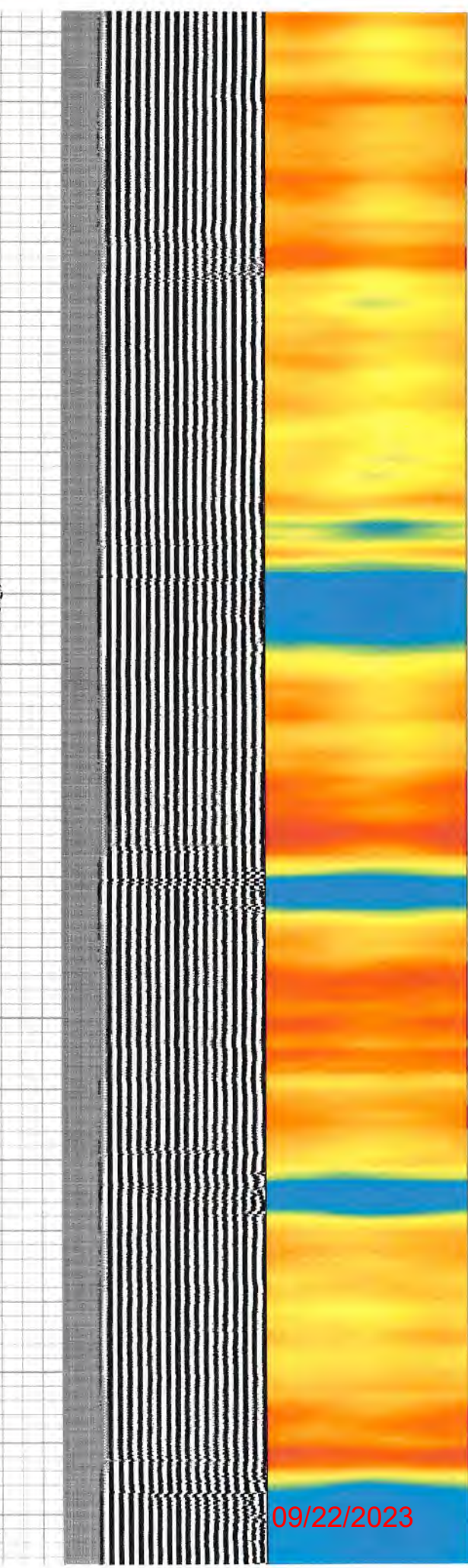
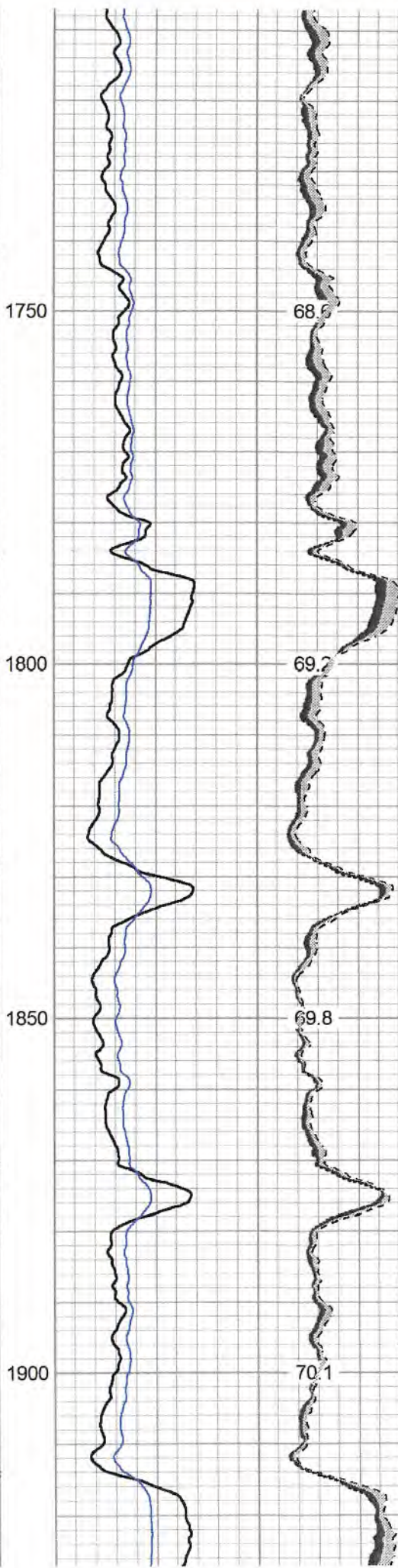
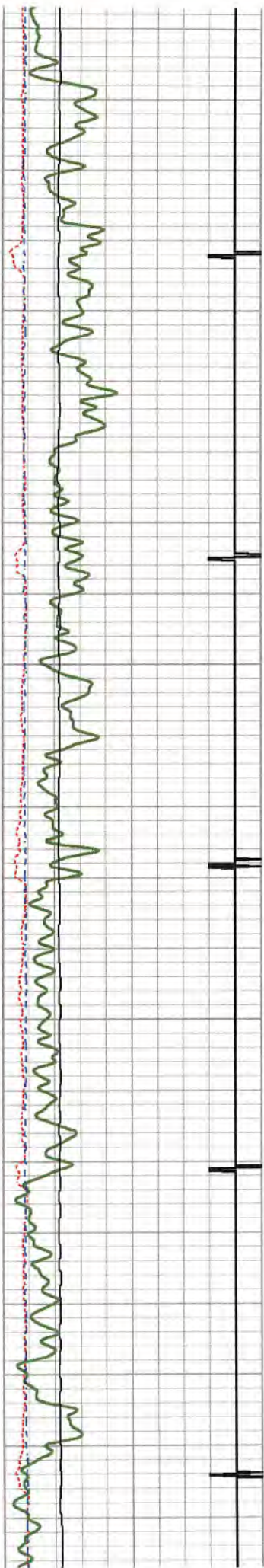
09/22/2023



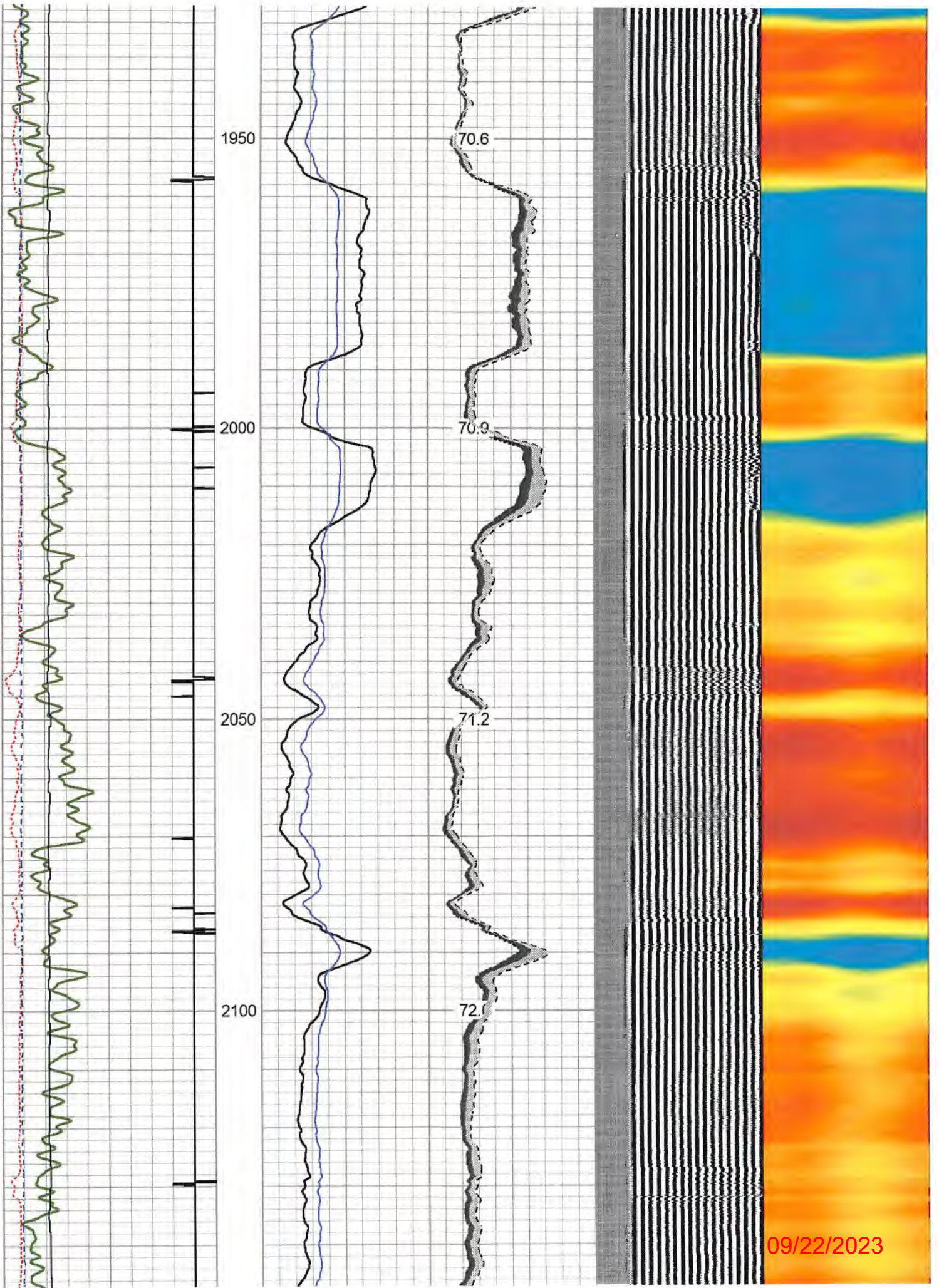
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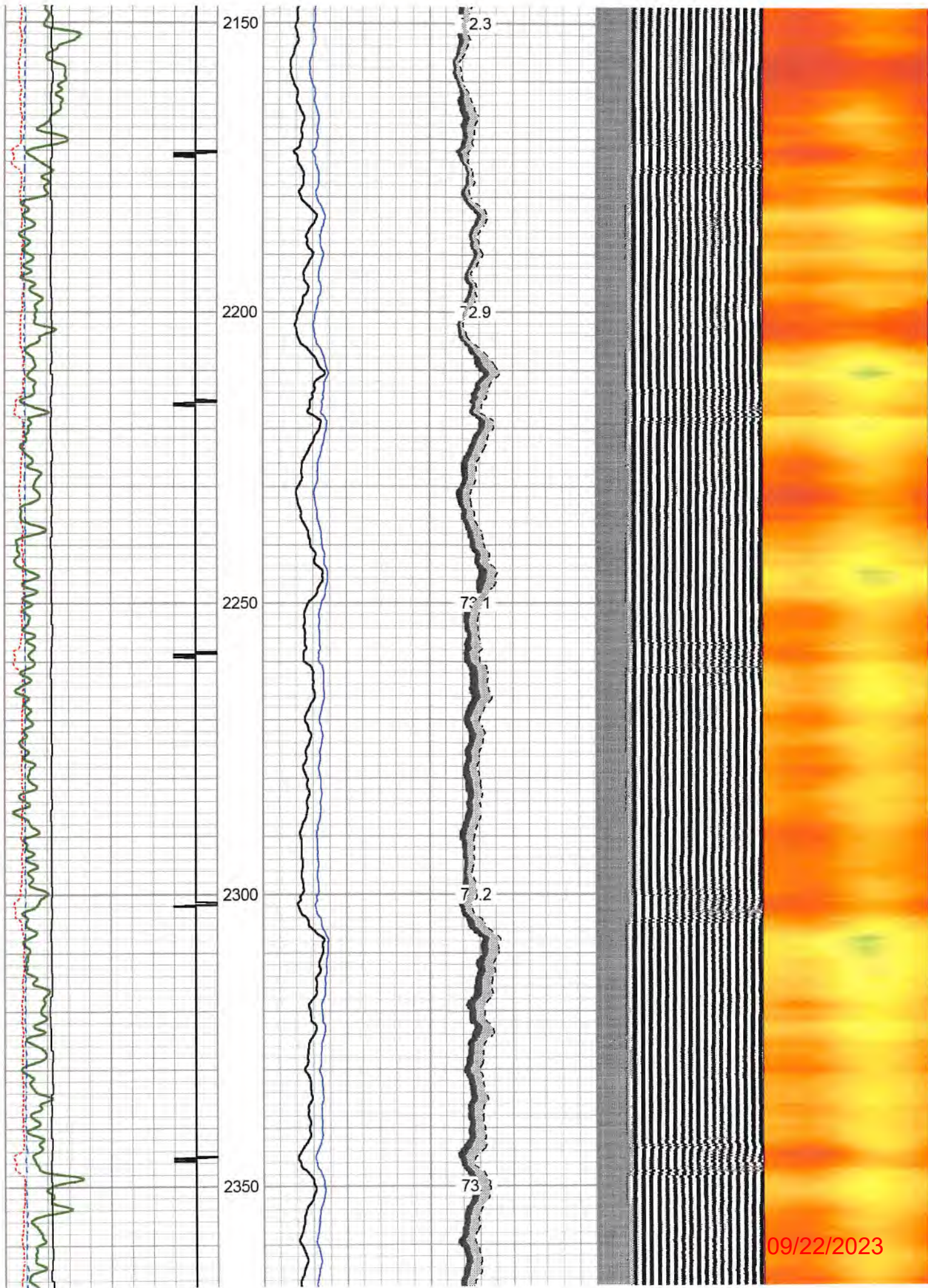




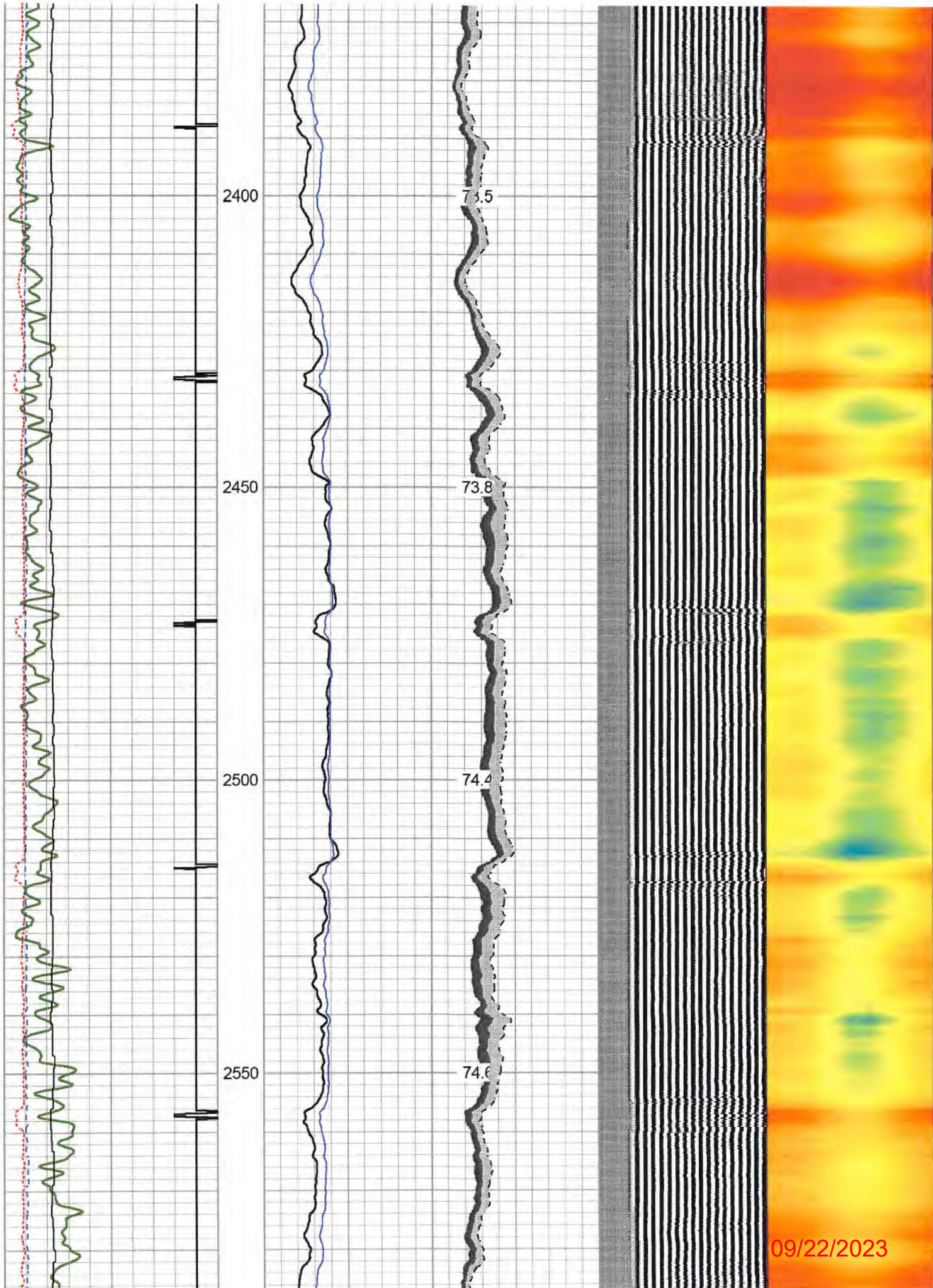
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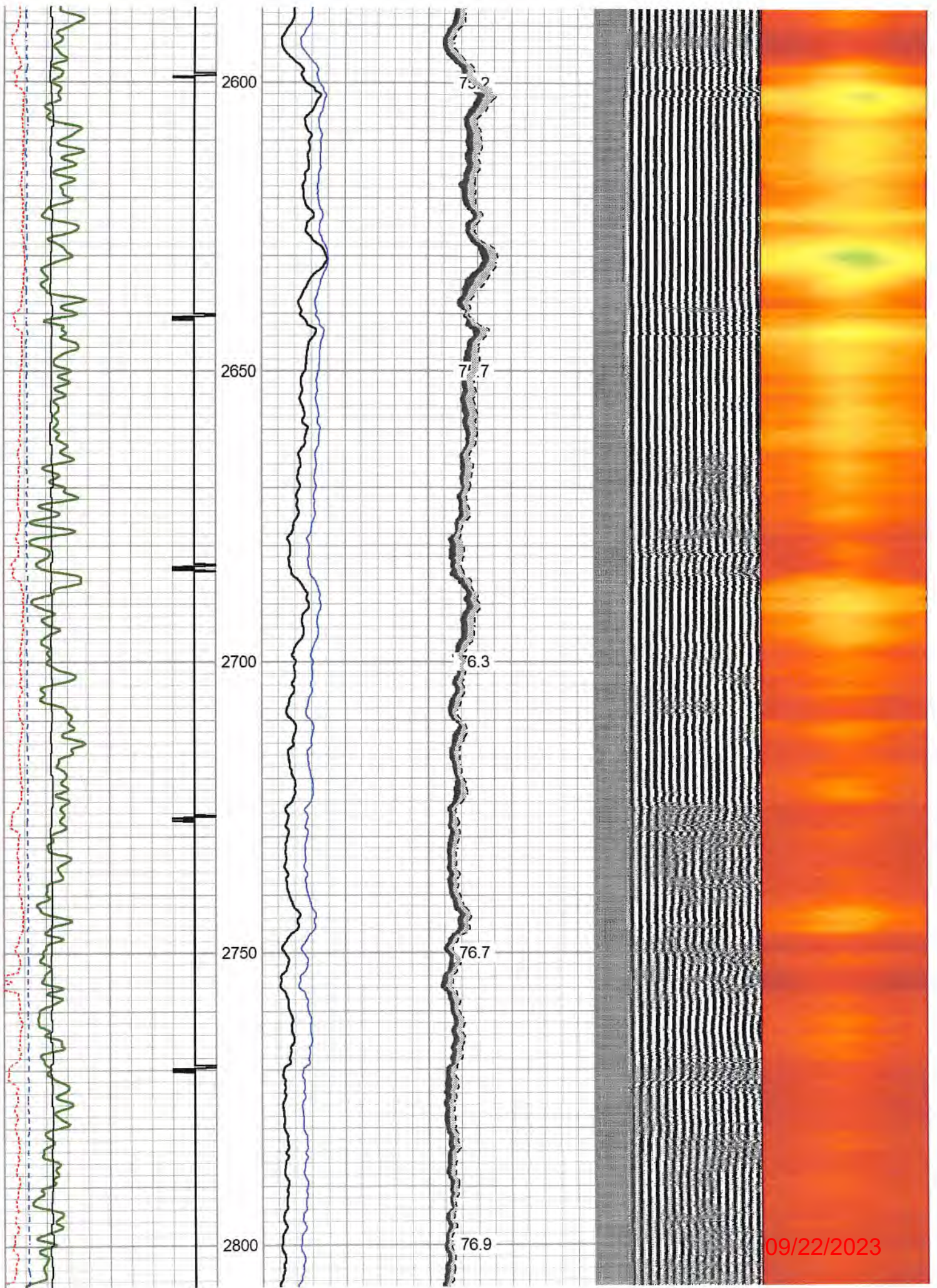


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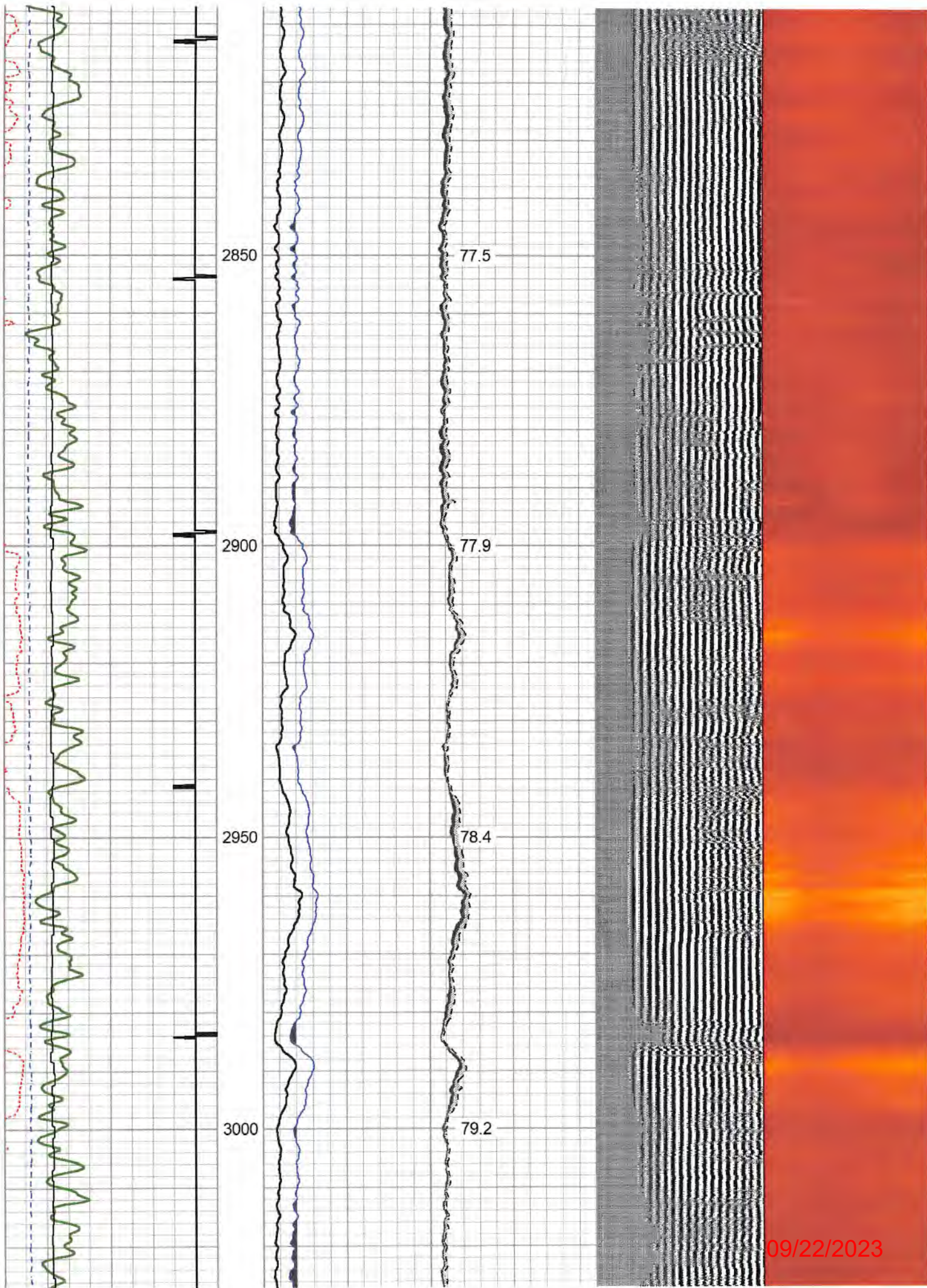


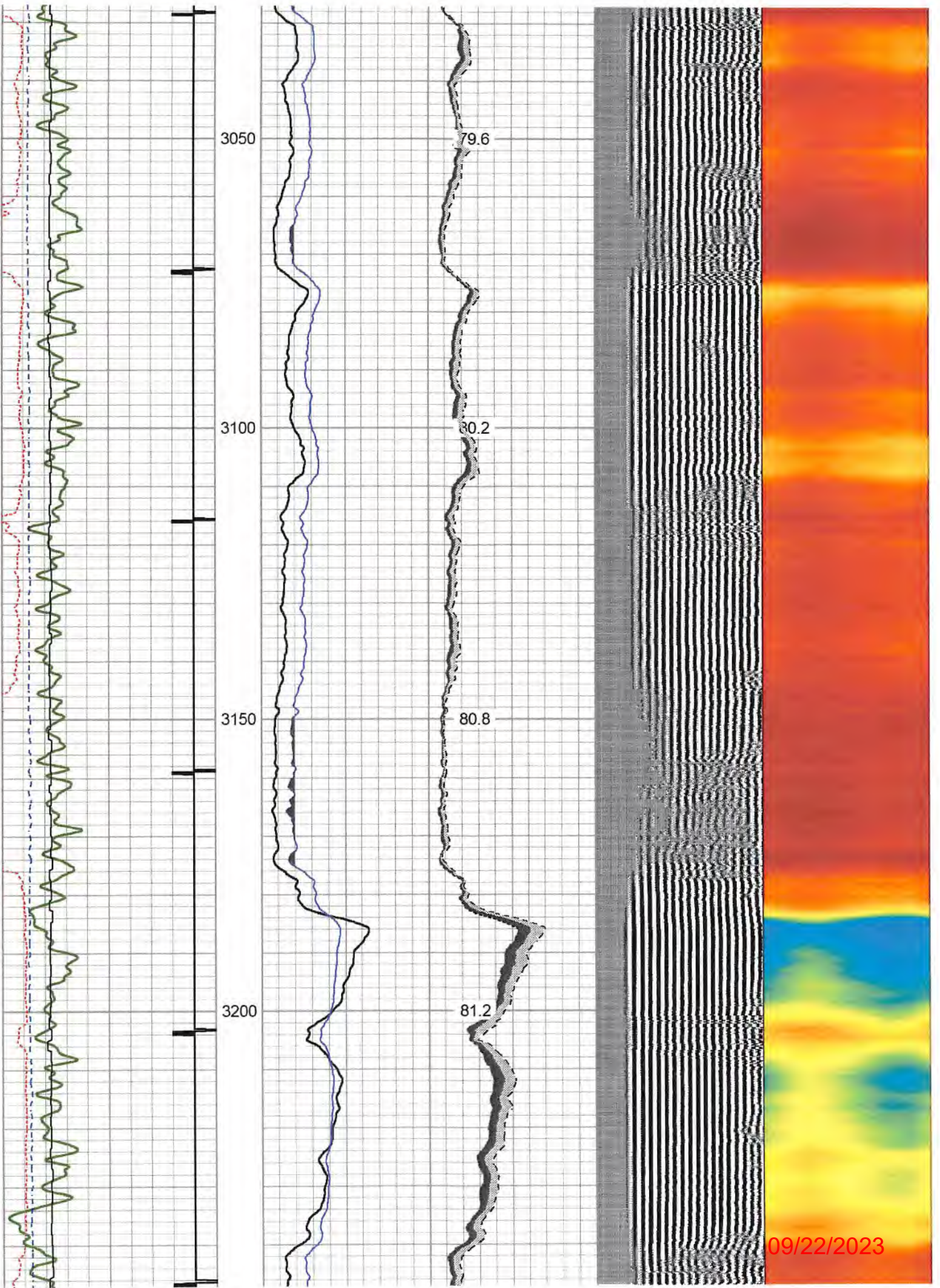
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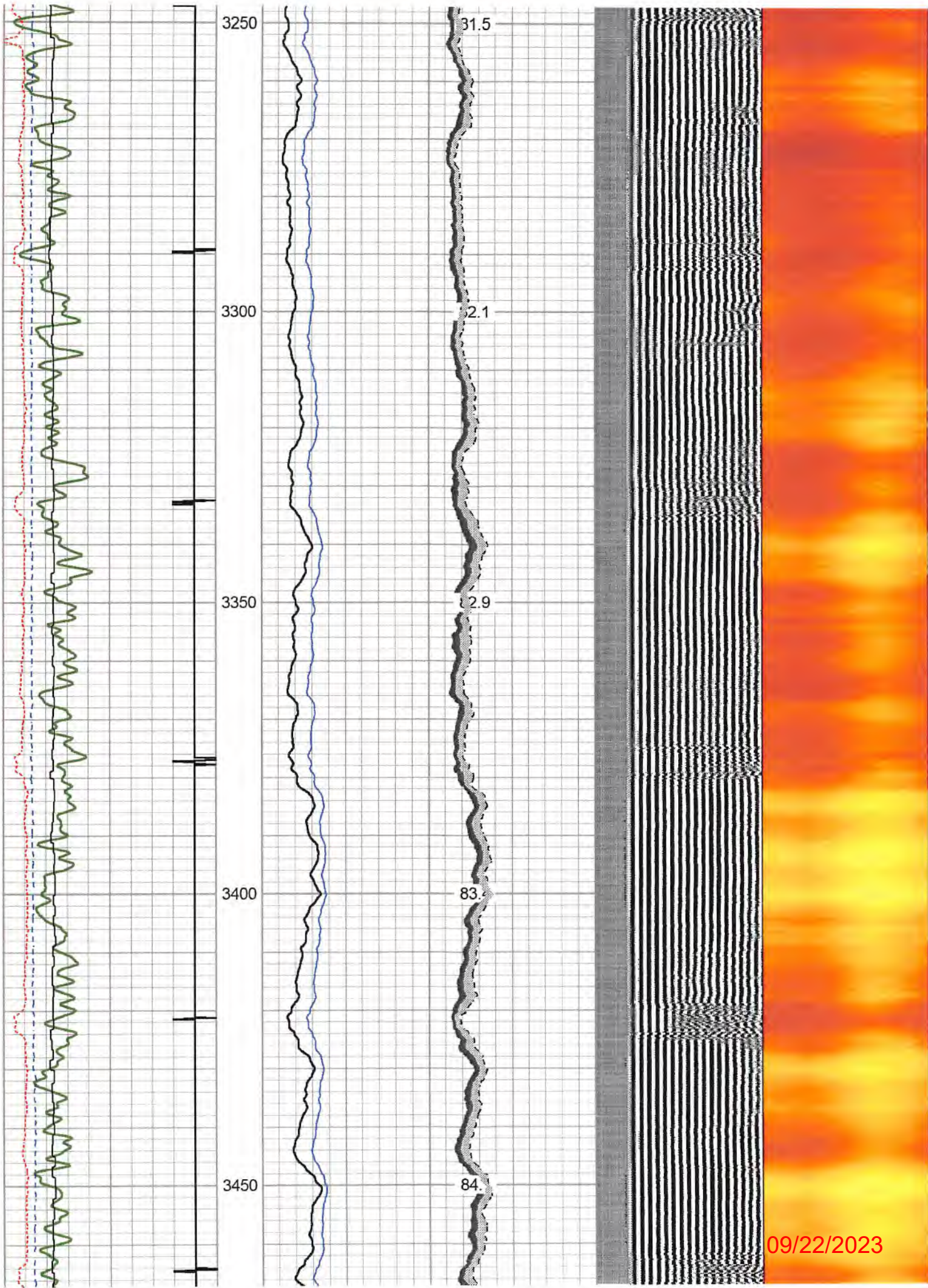


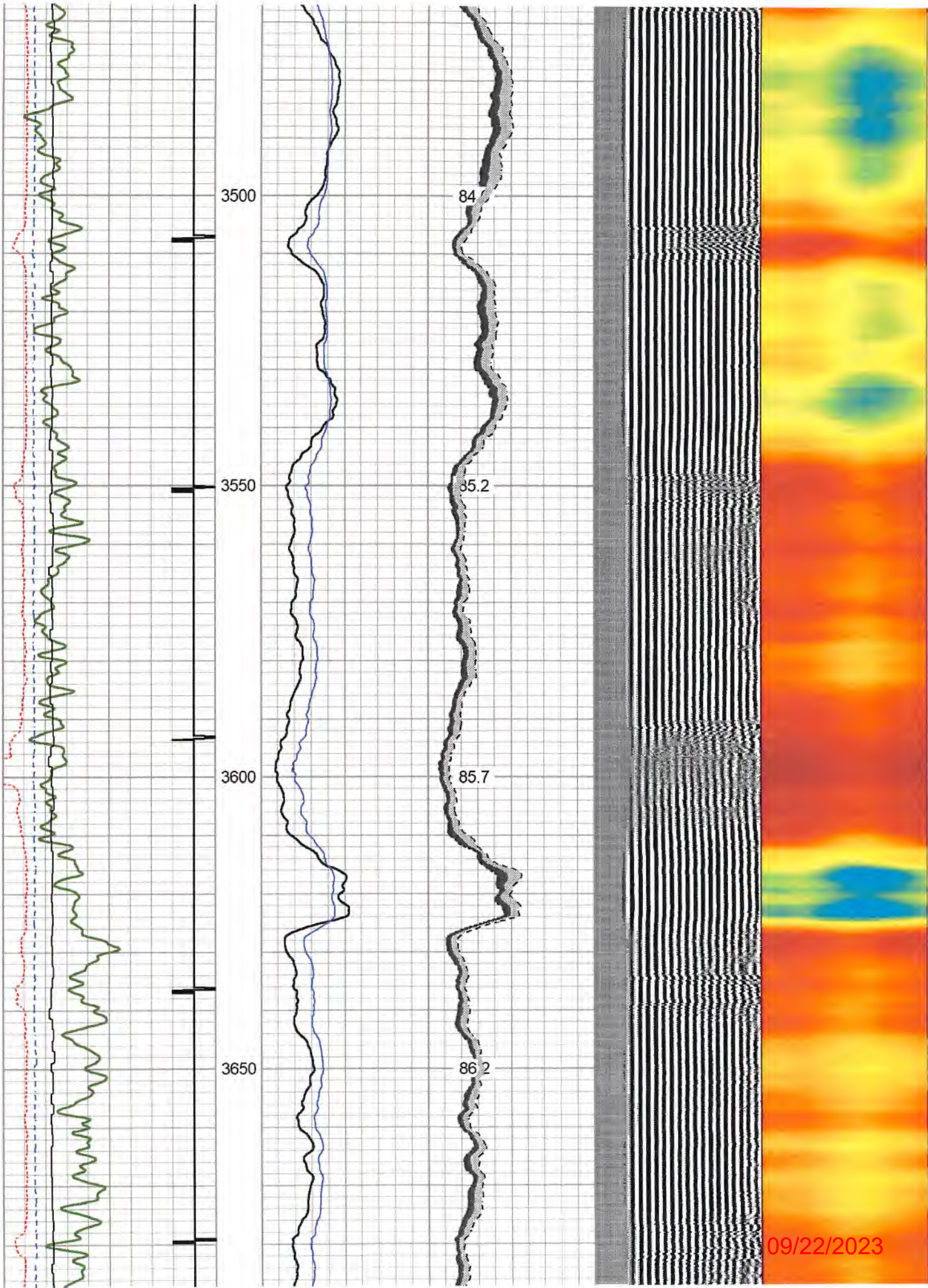


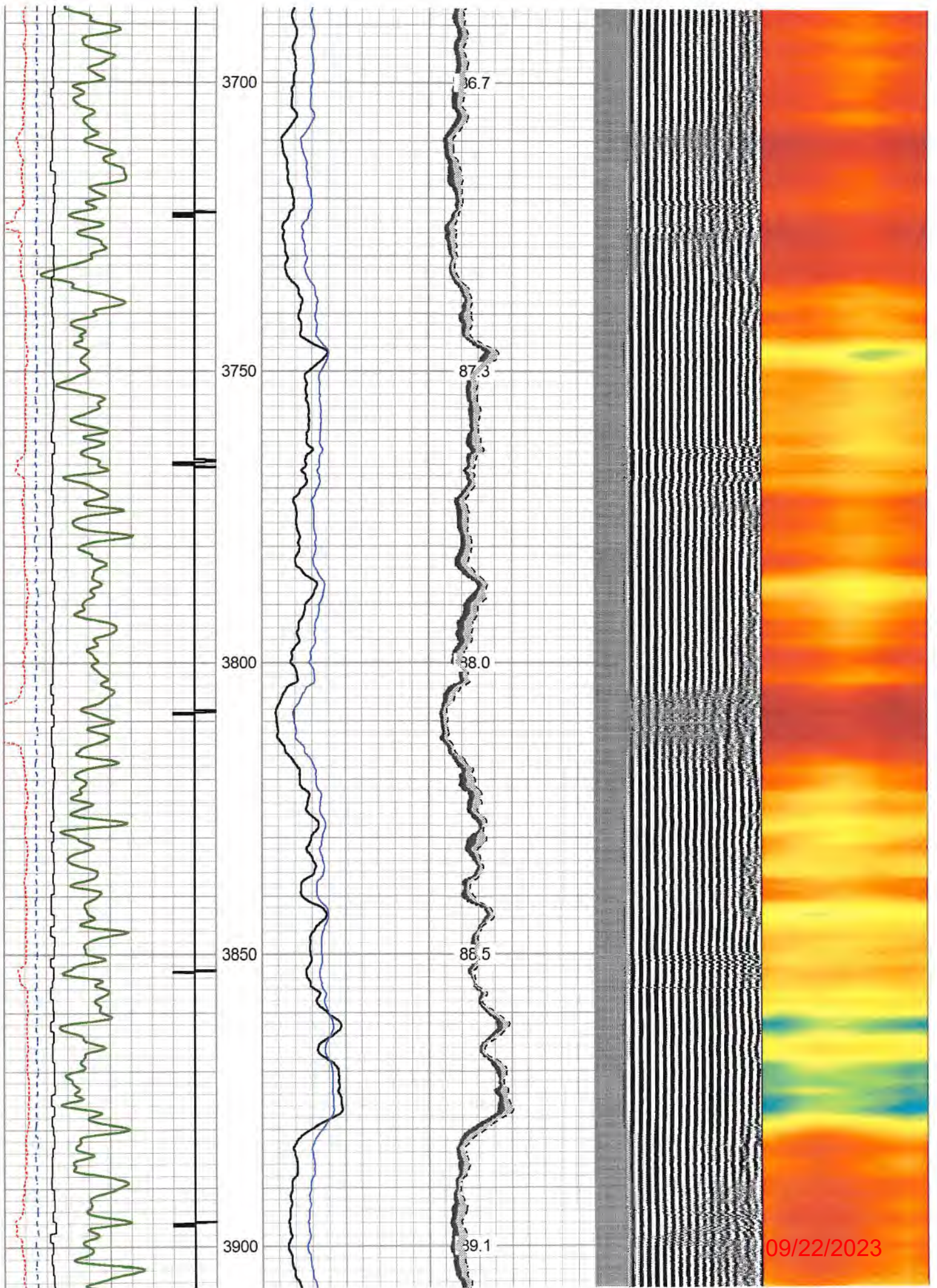
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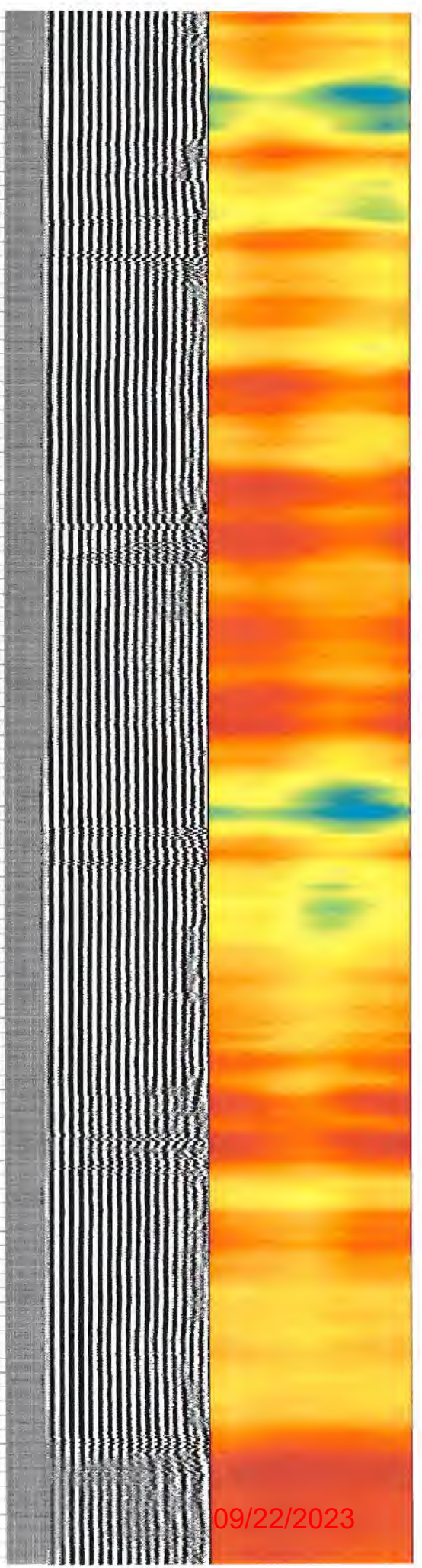
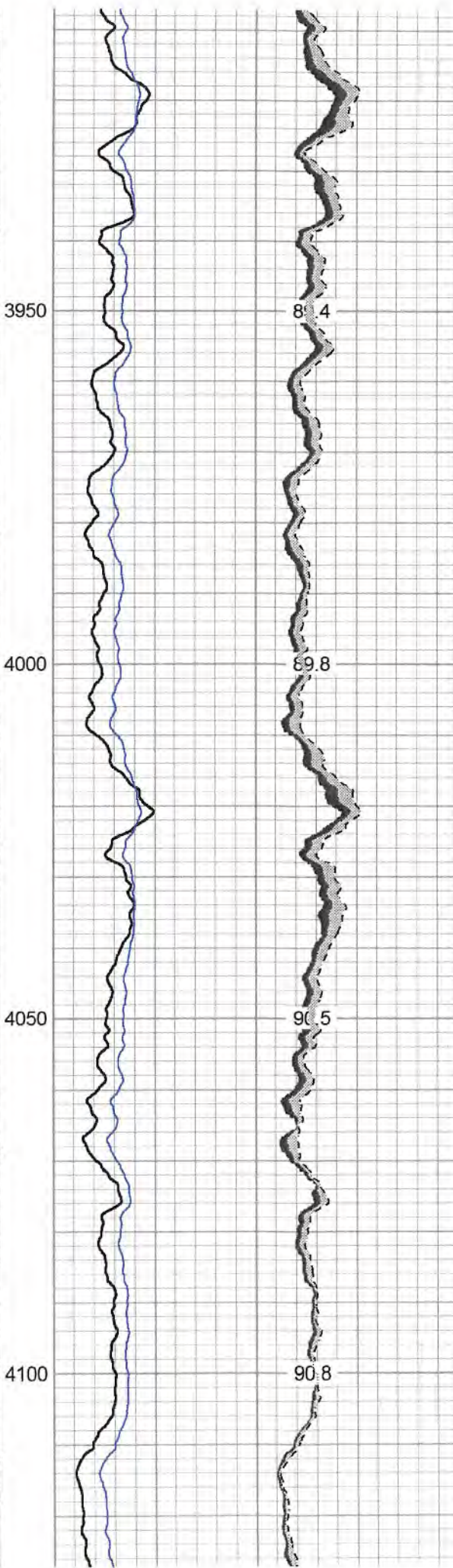
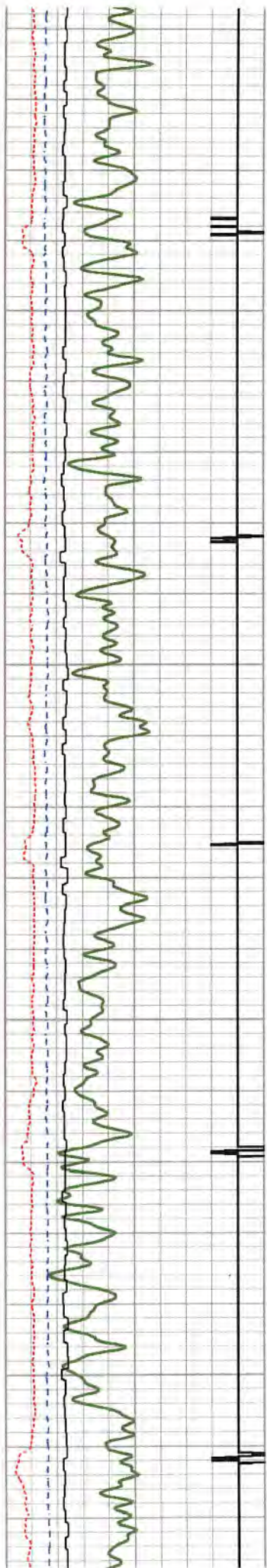




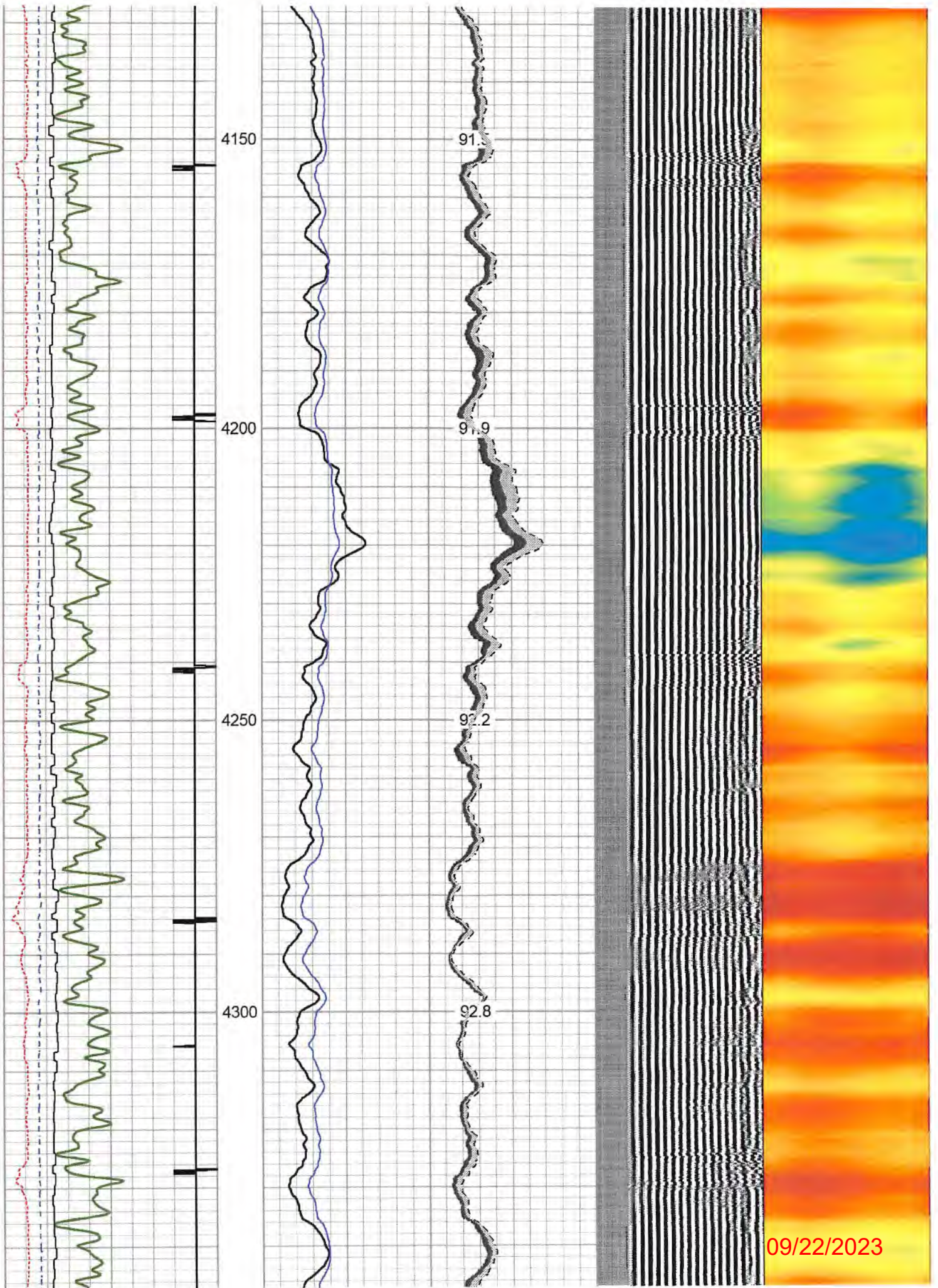


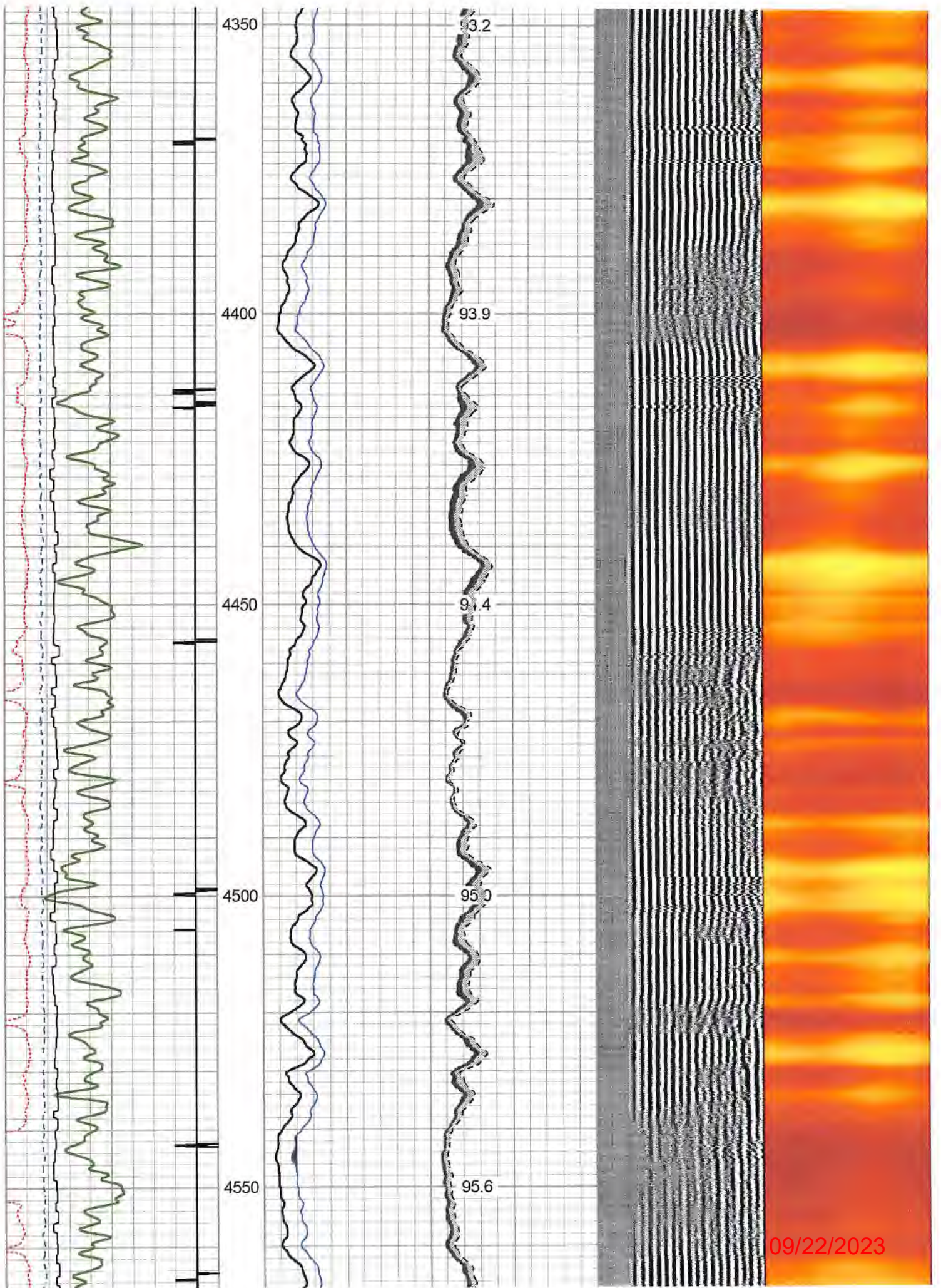




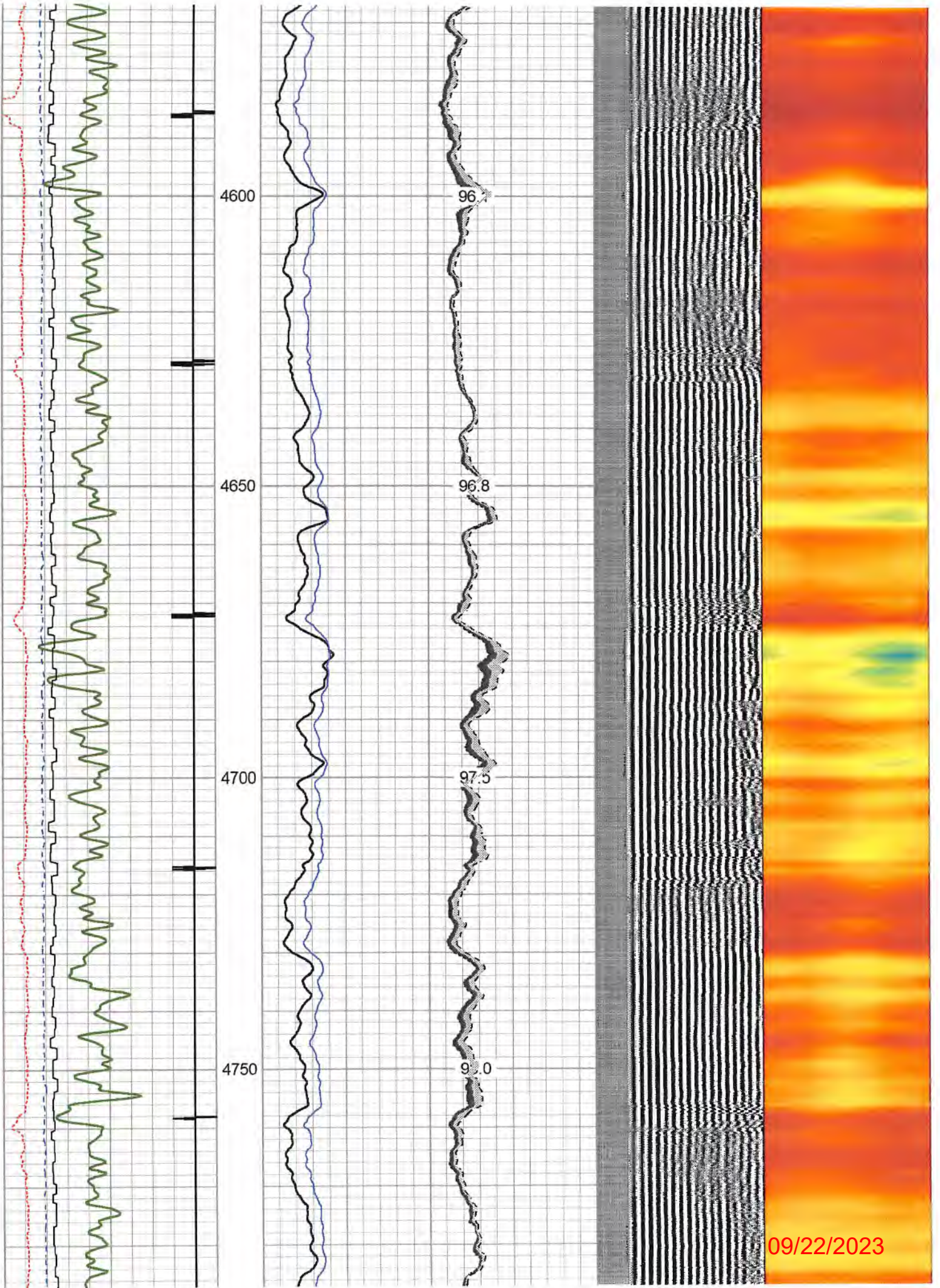


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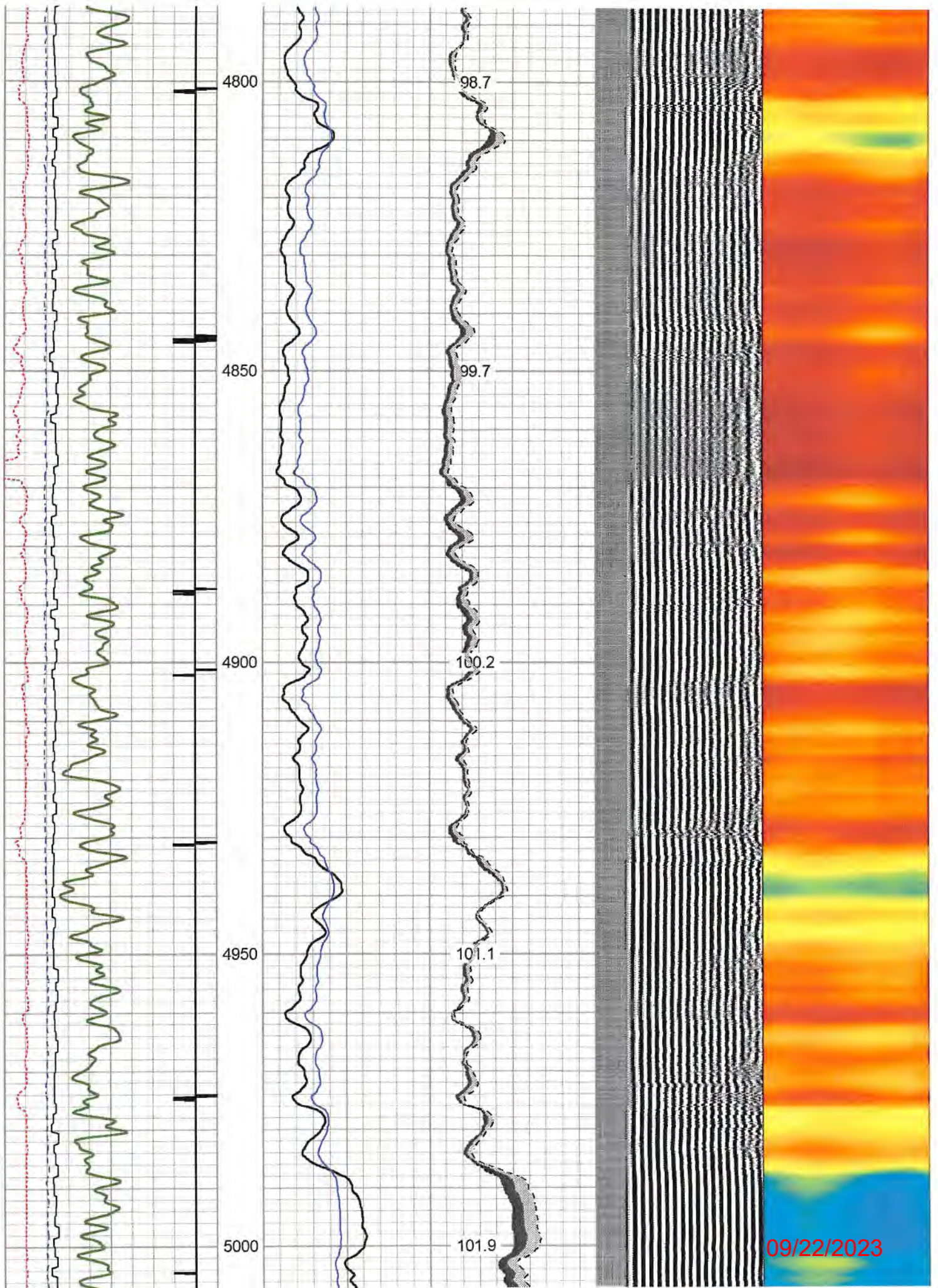


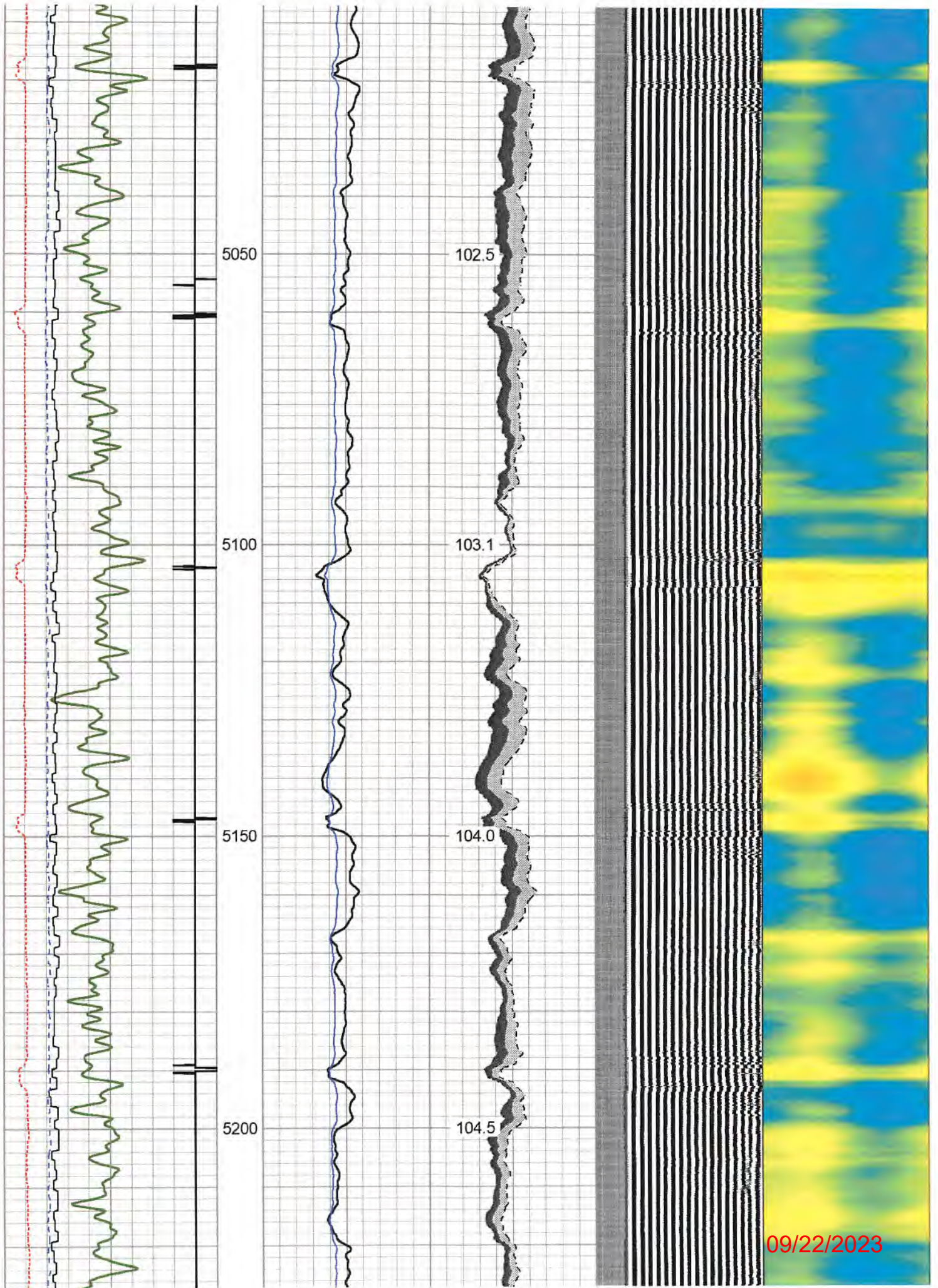


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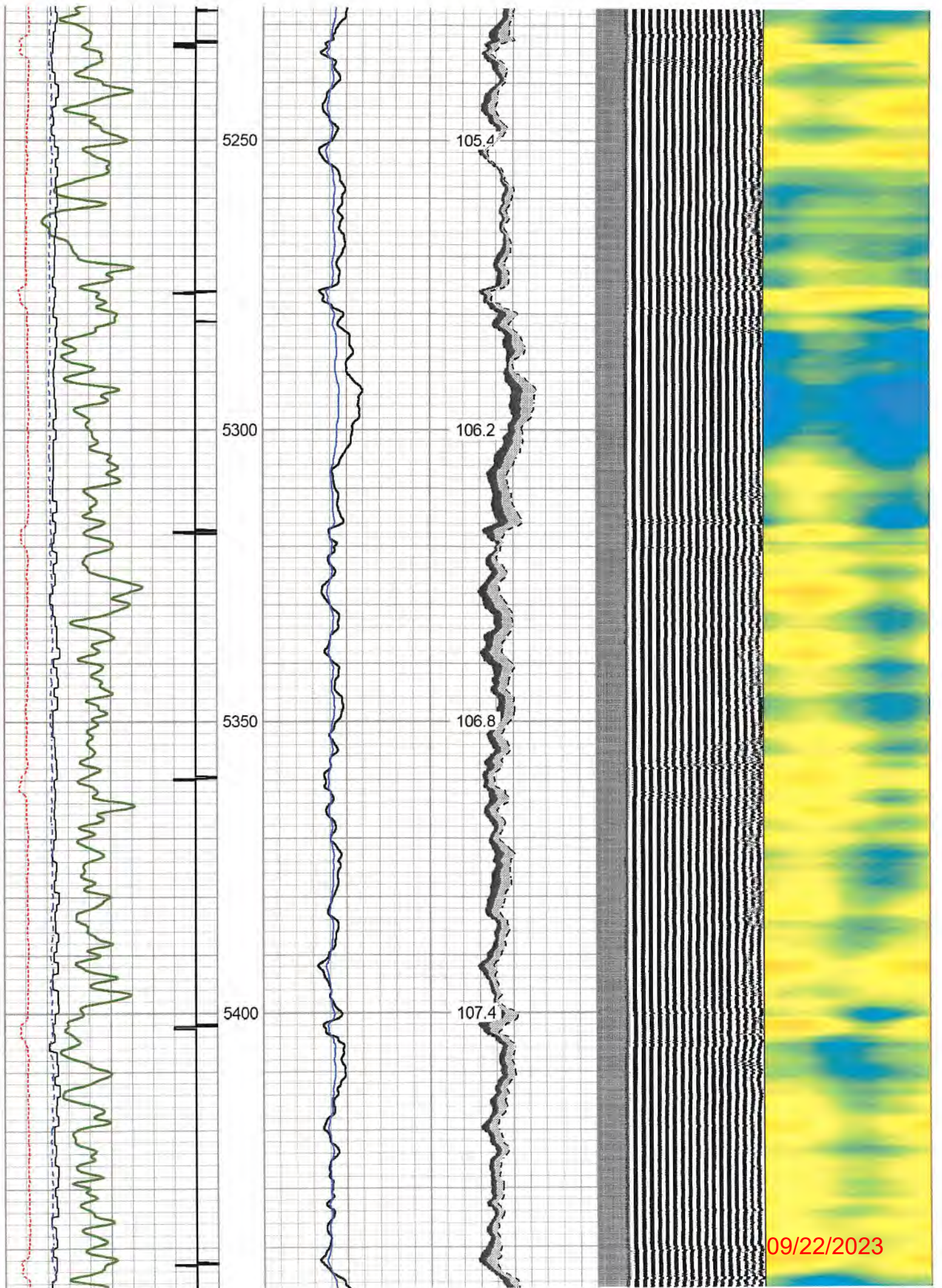


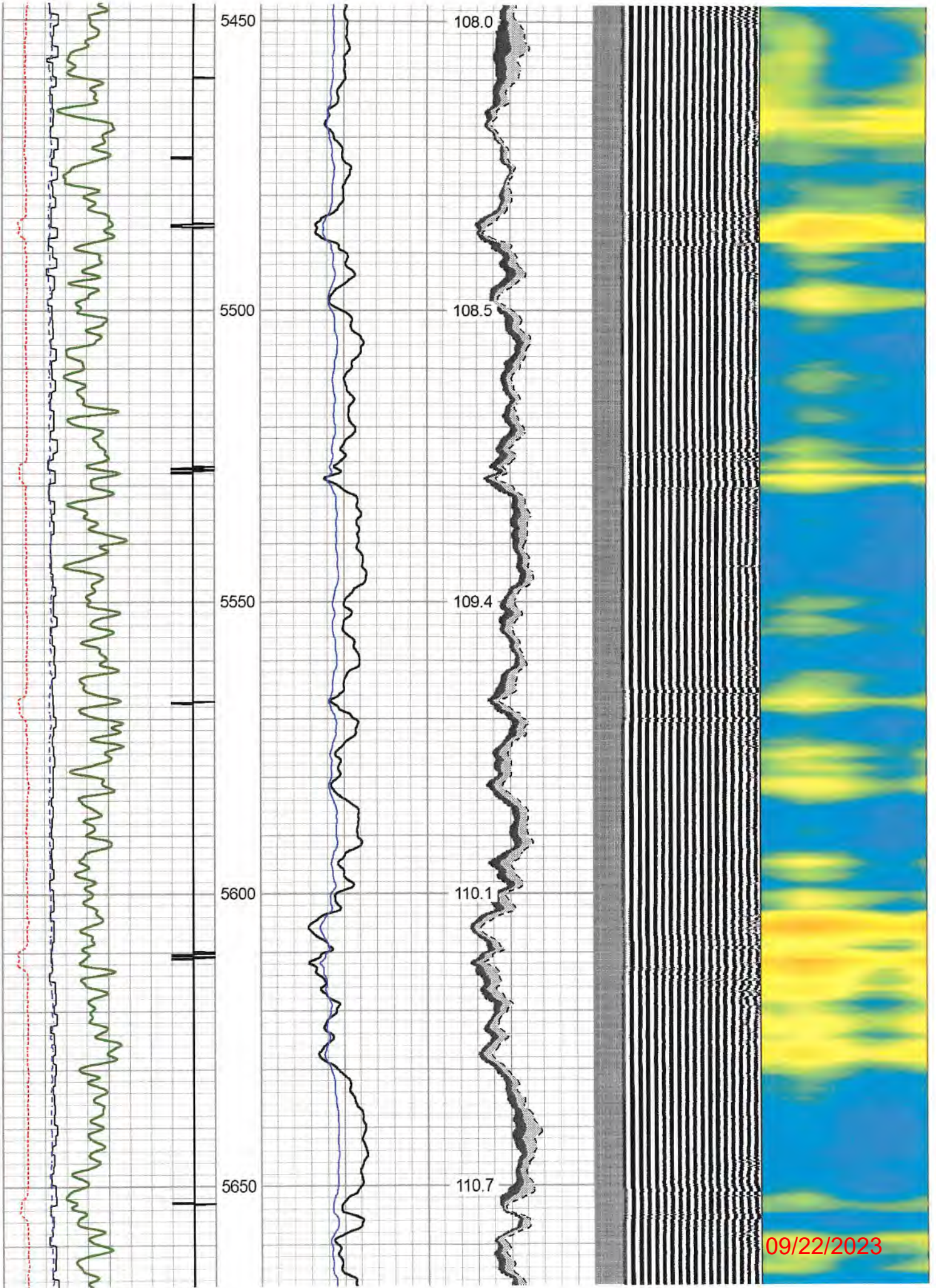
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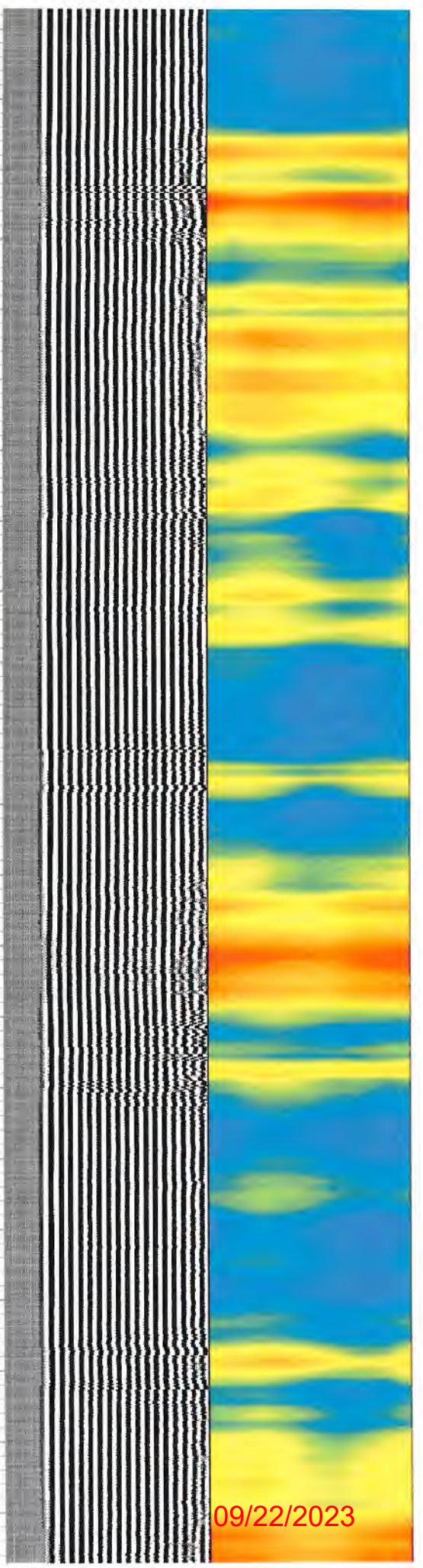
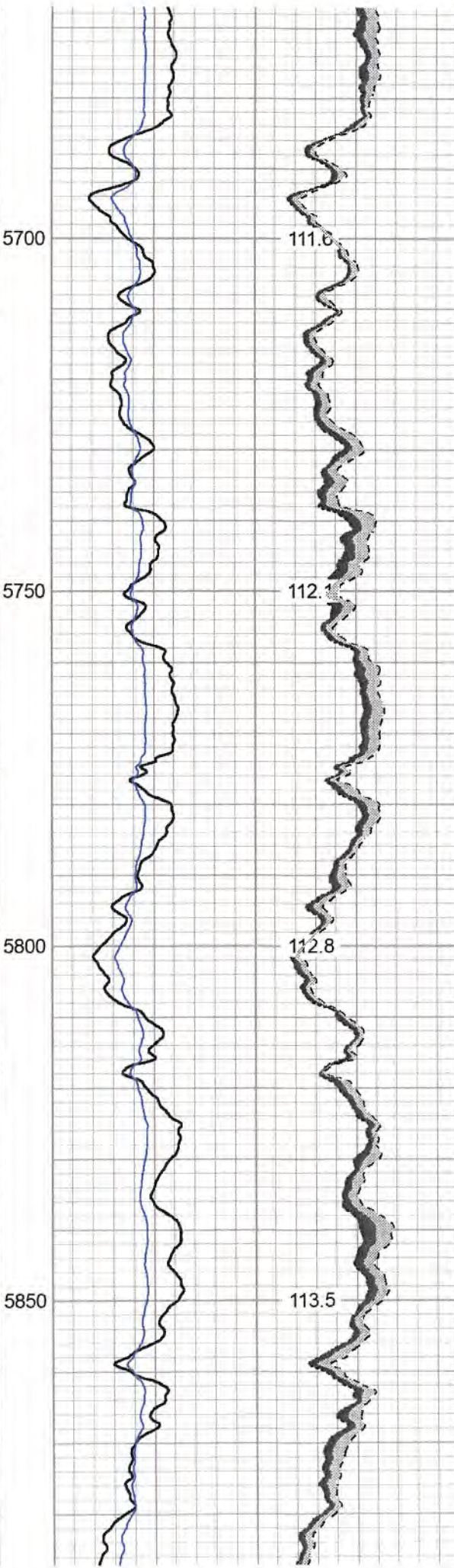
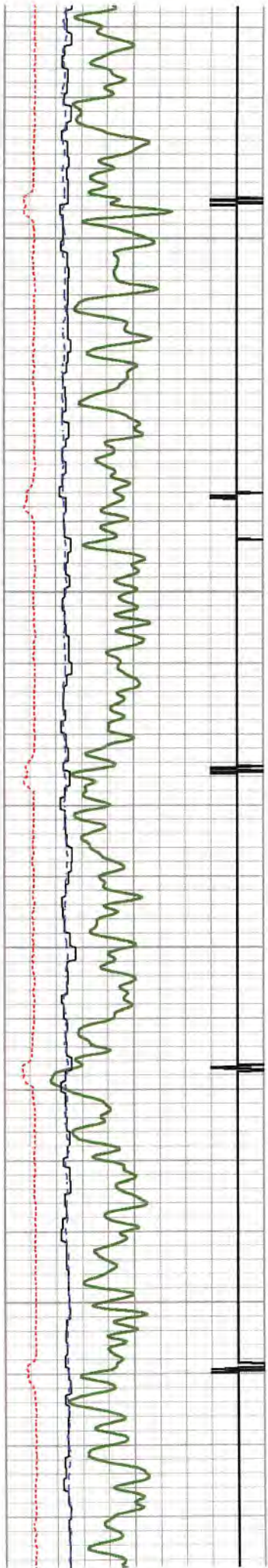


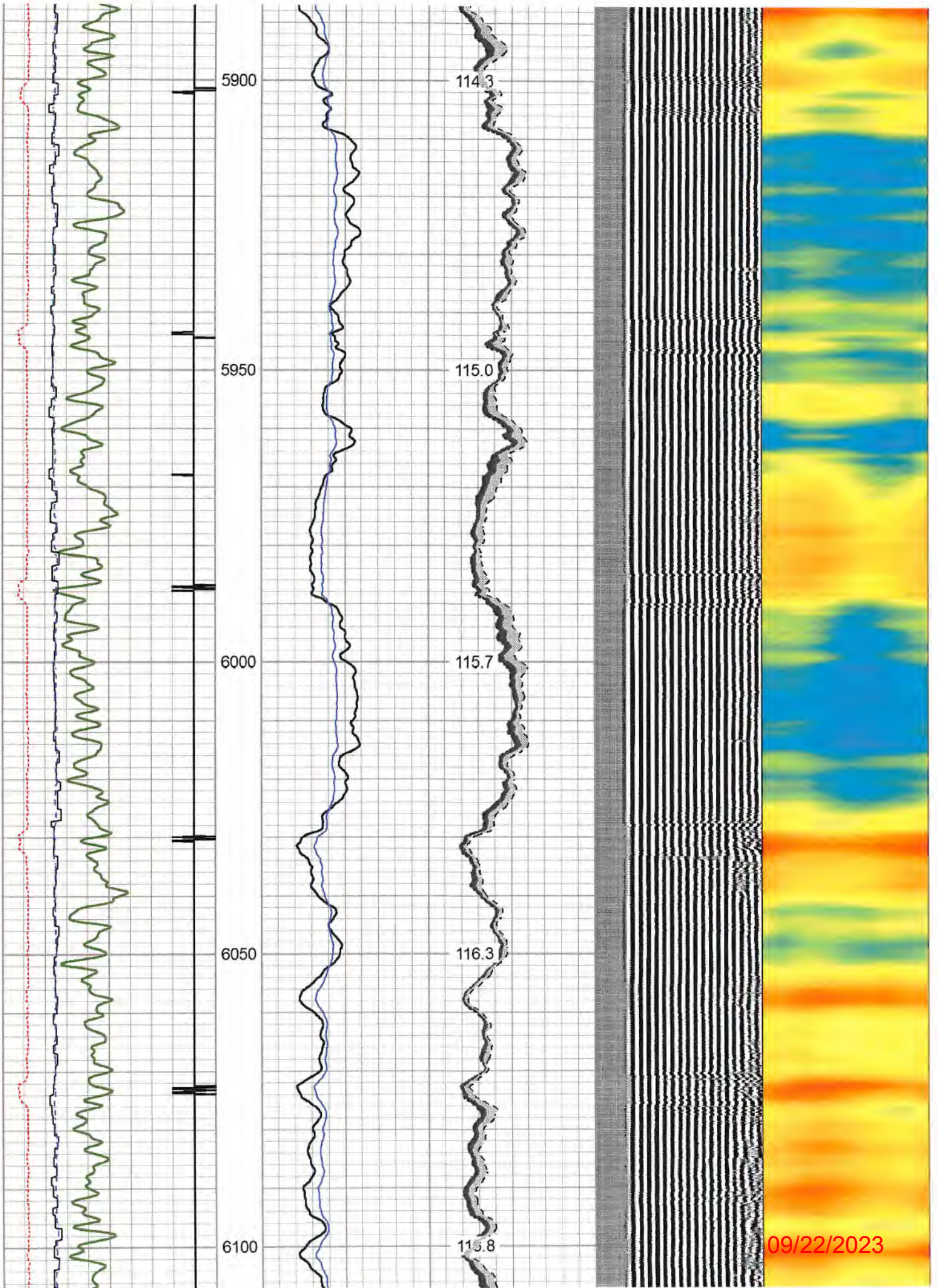
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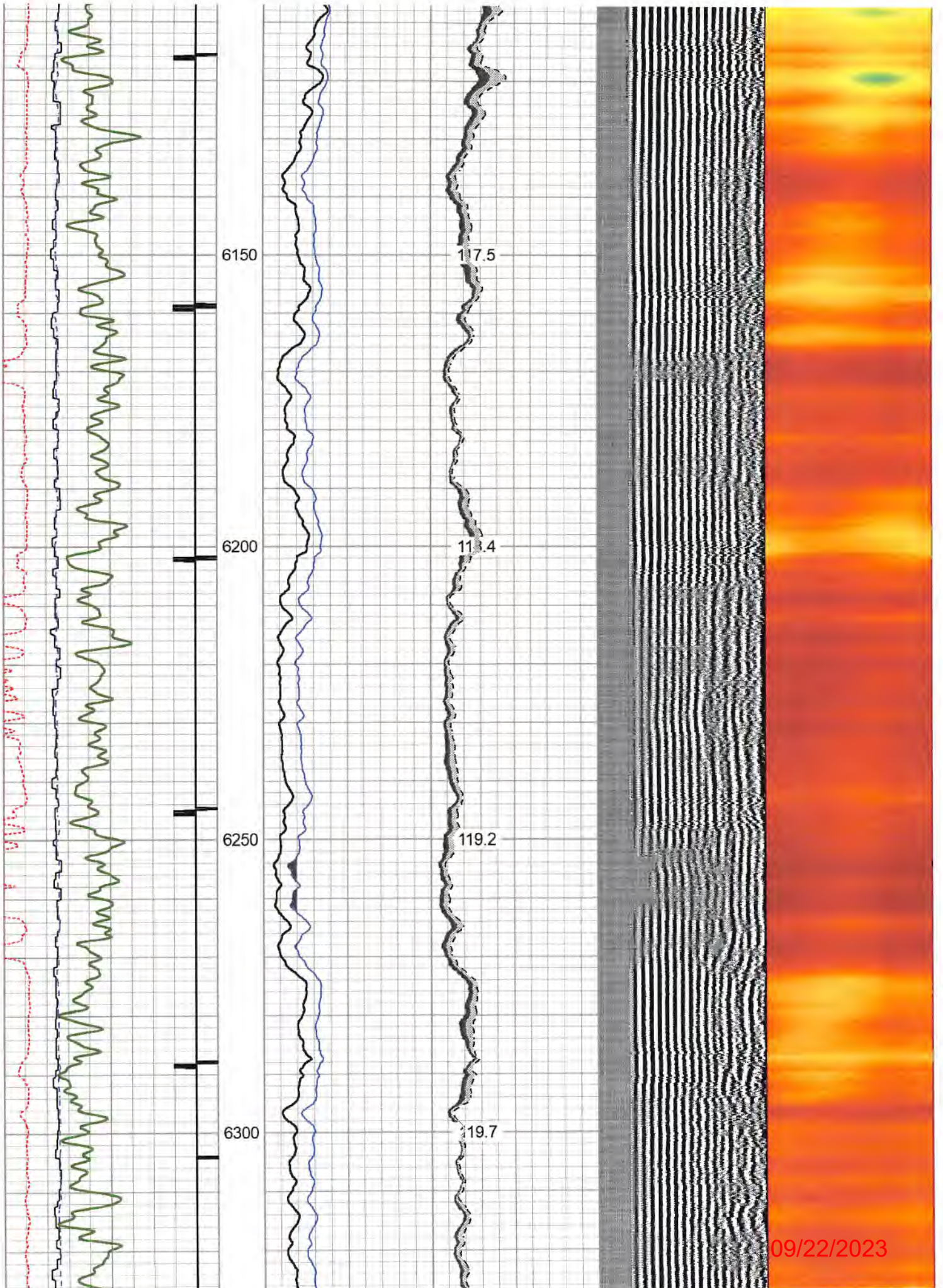




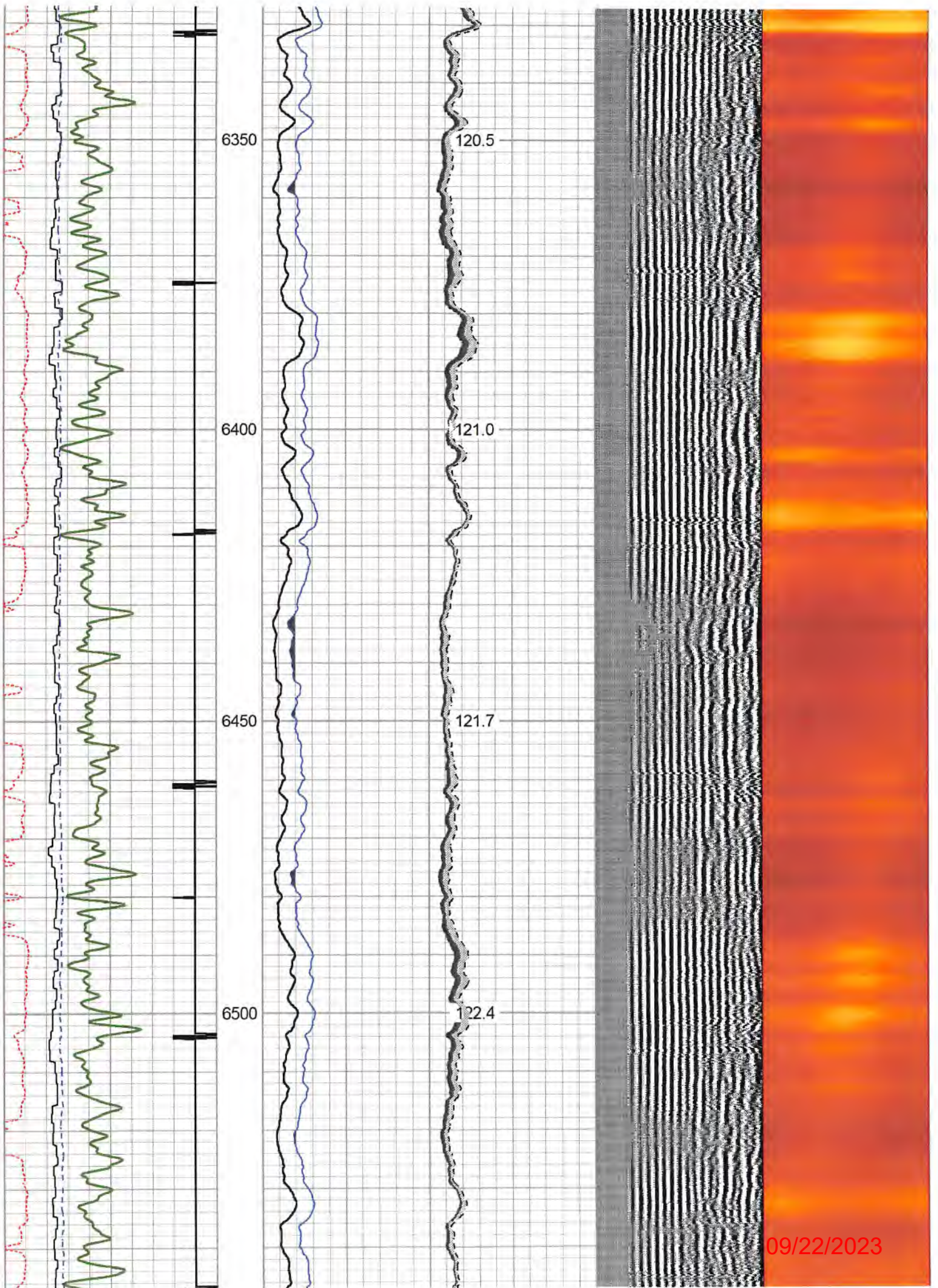
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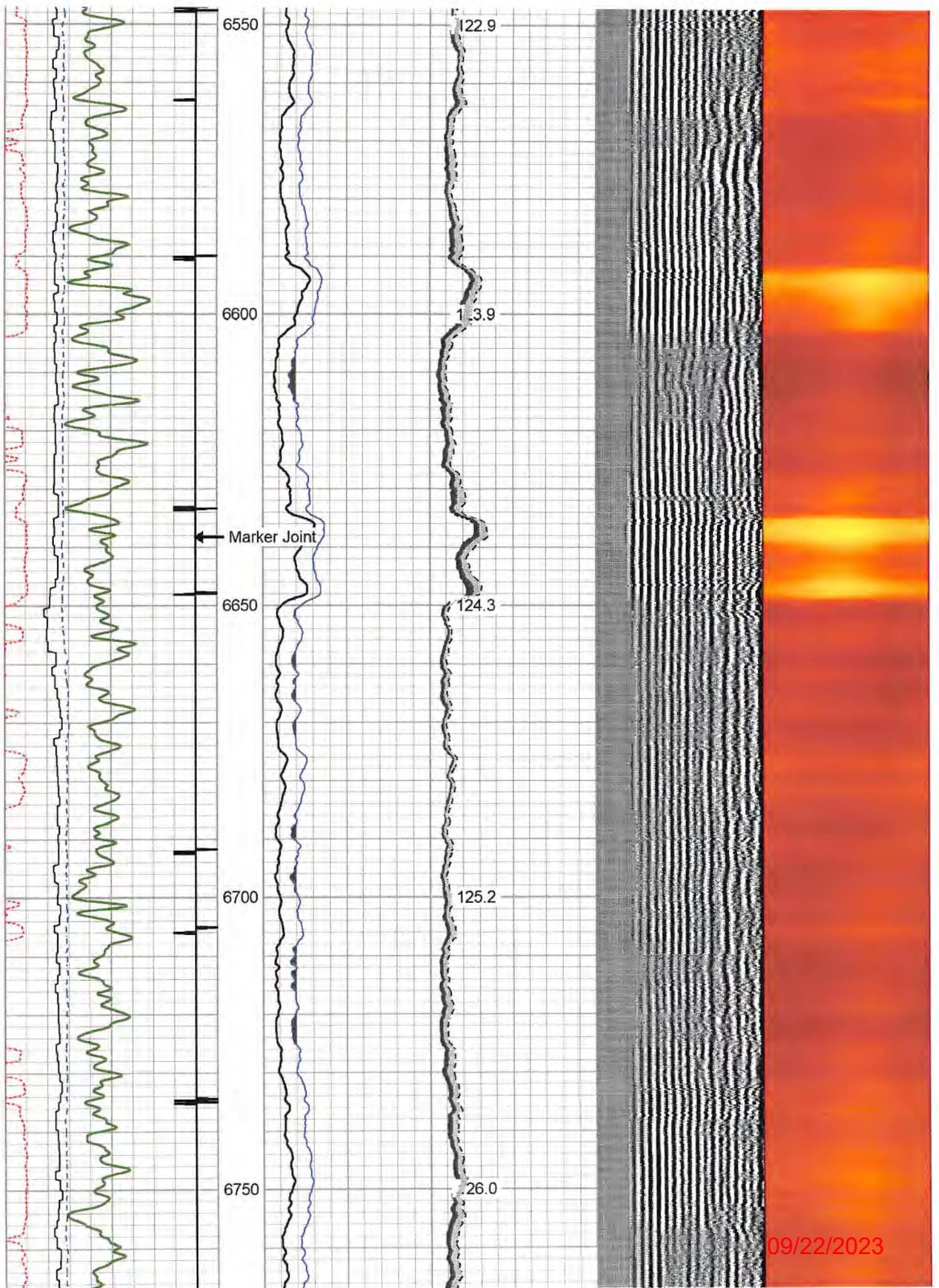




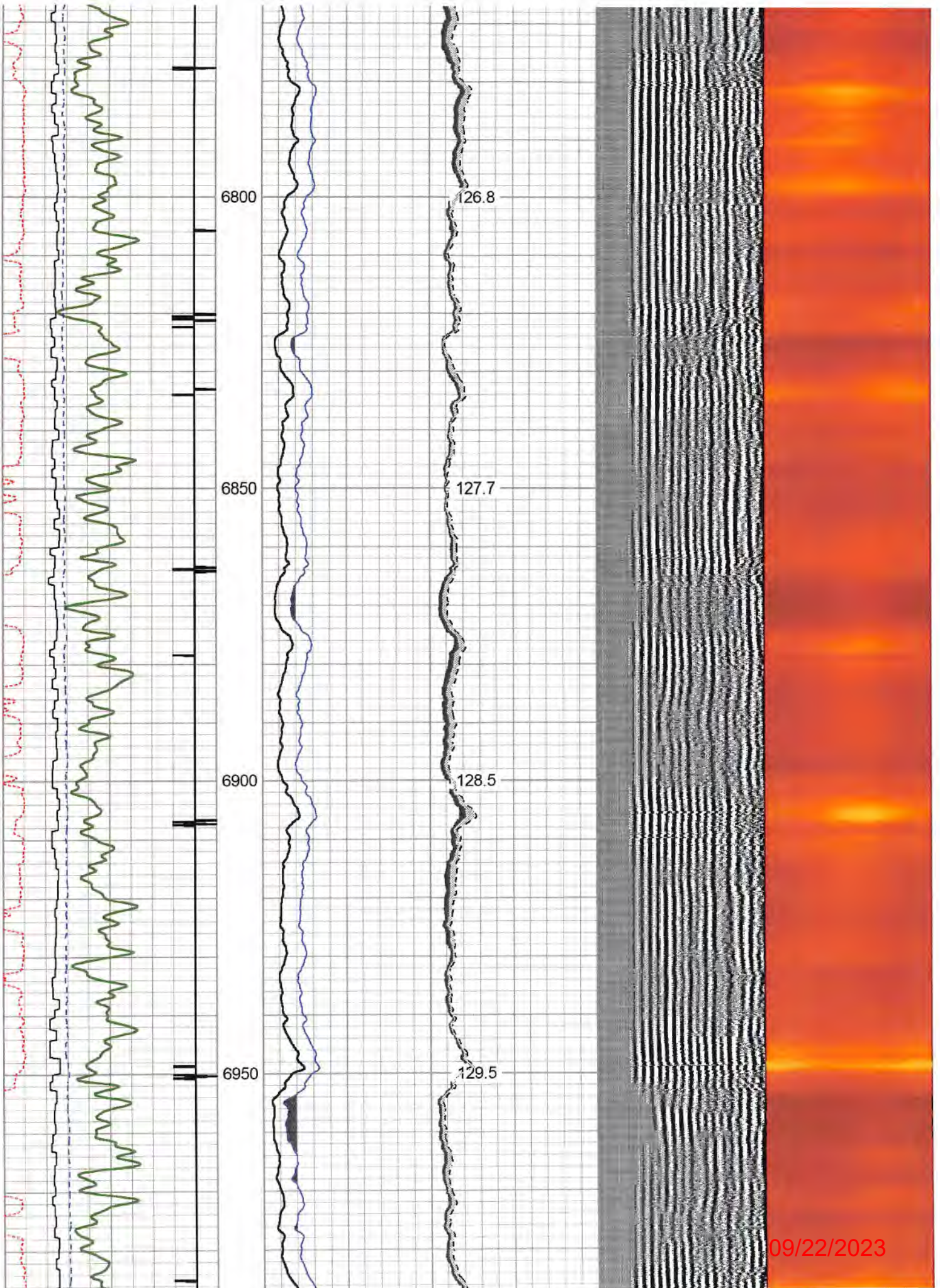


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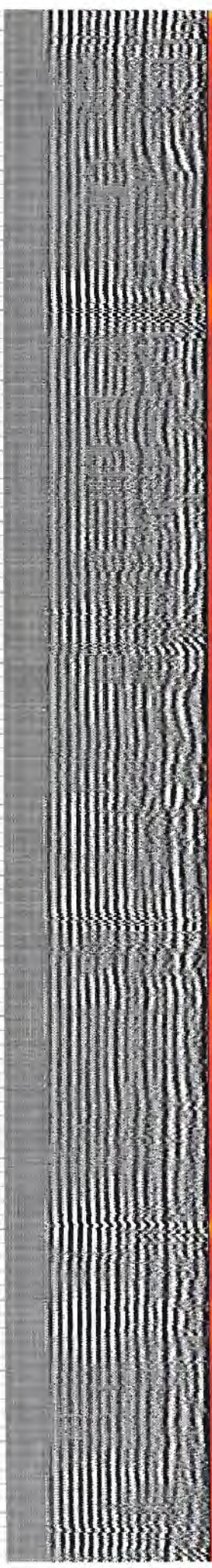
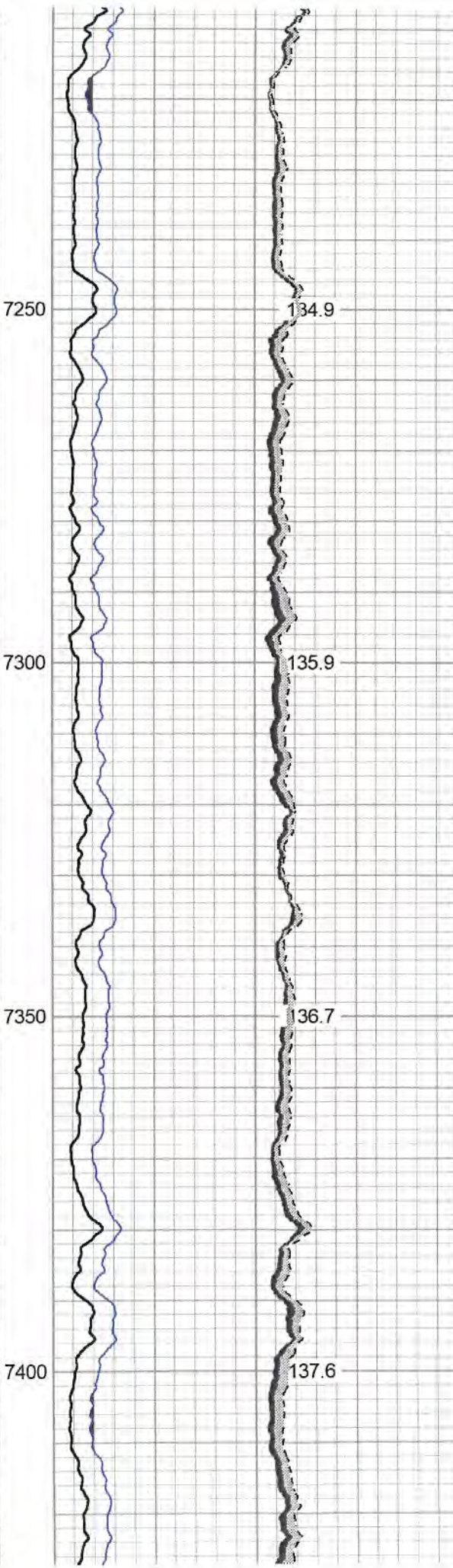
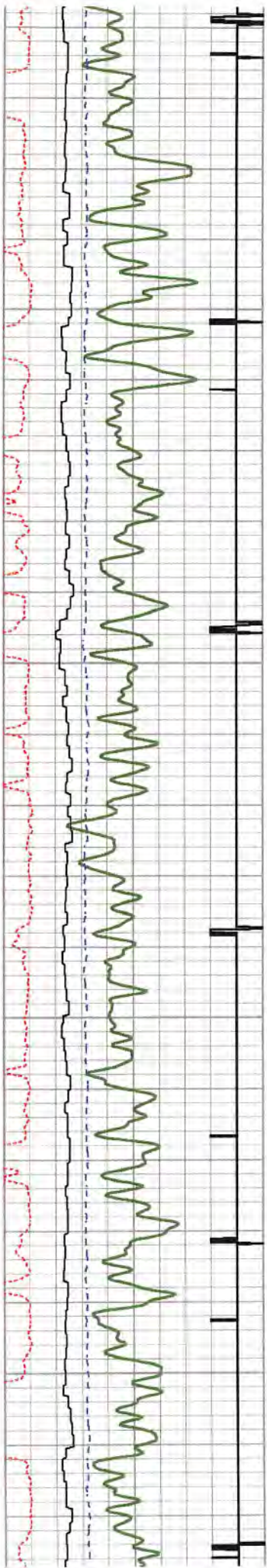




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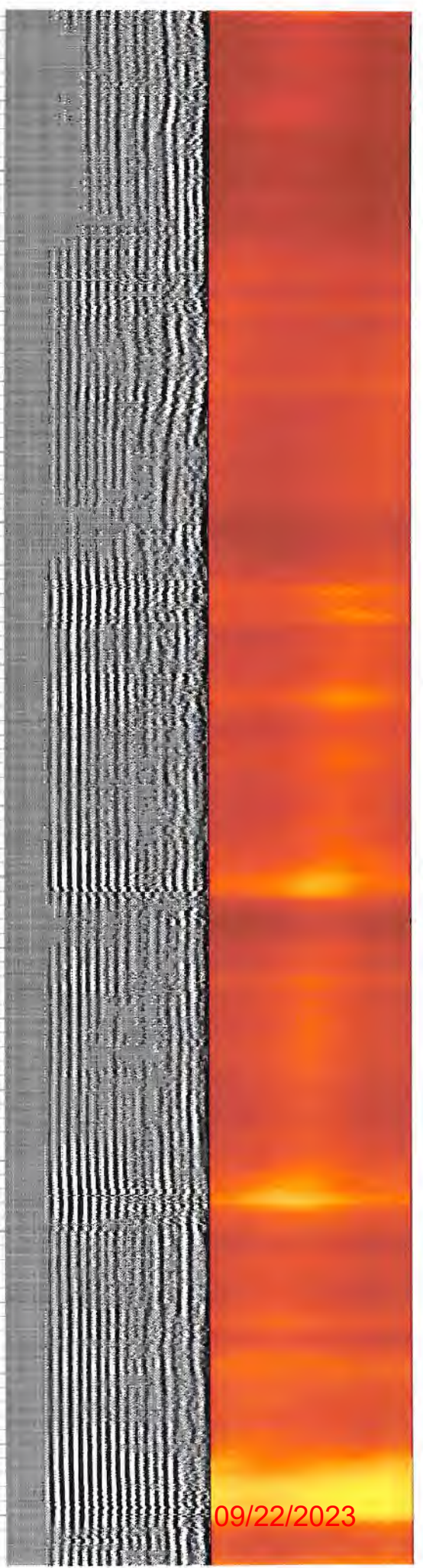
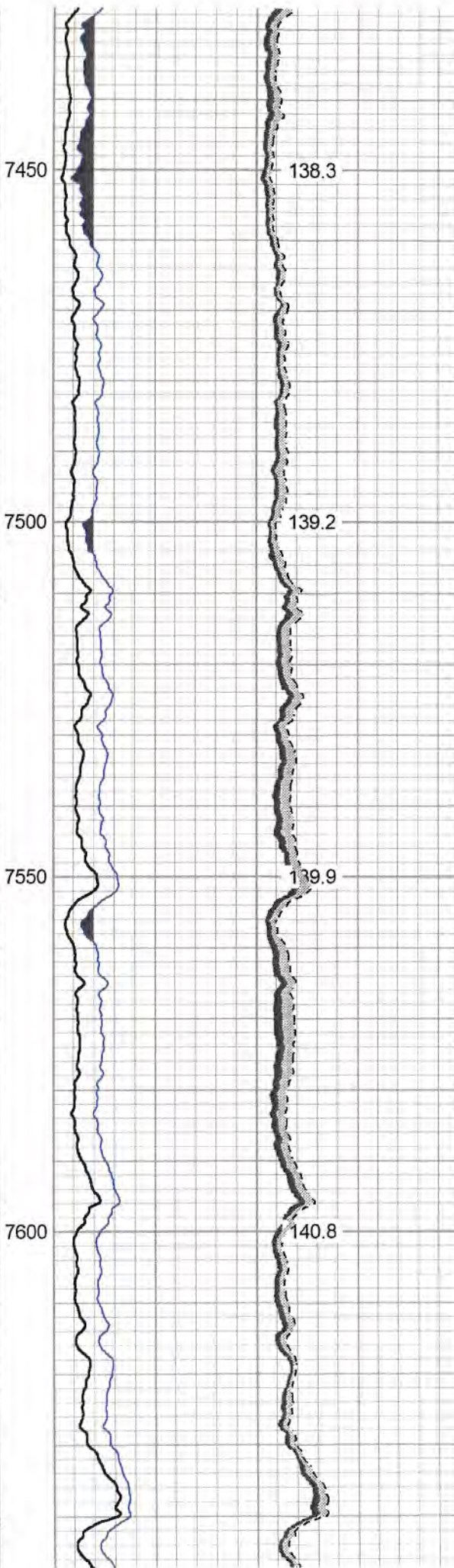
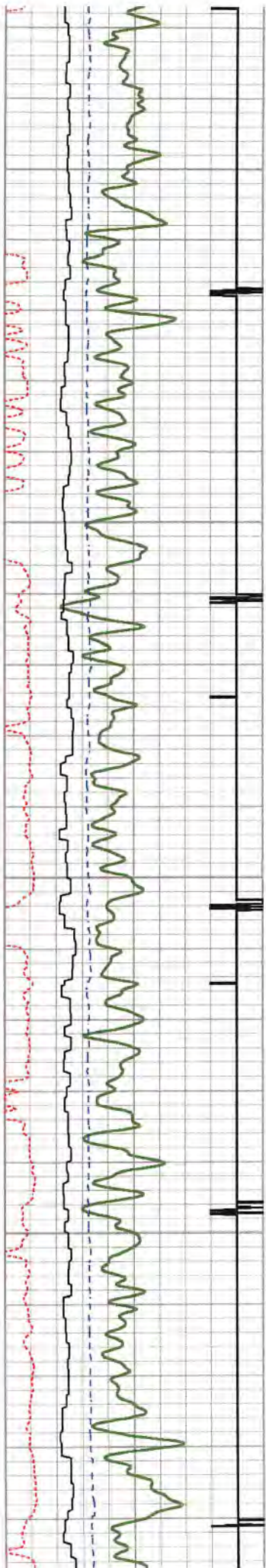
134.9

135.9

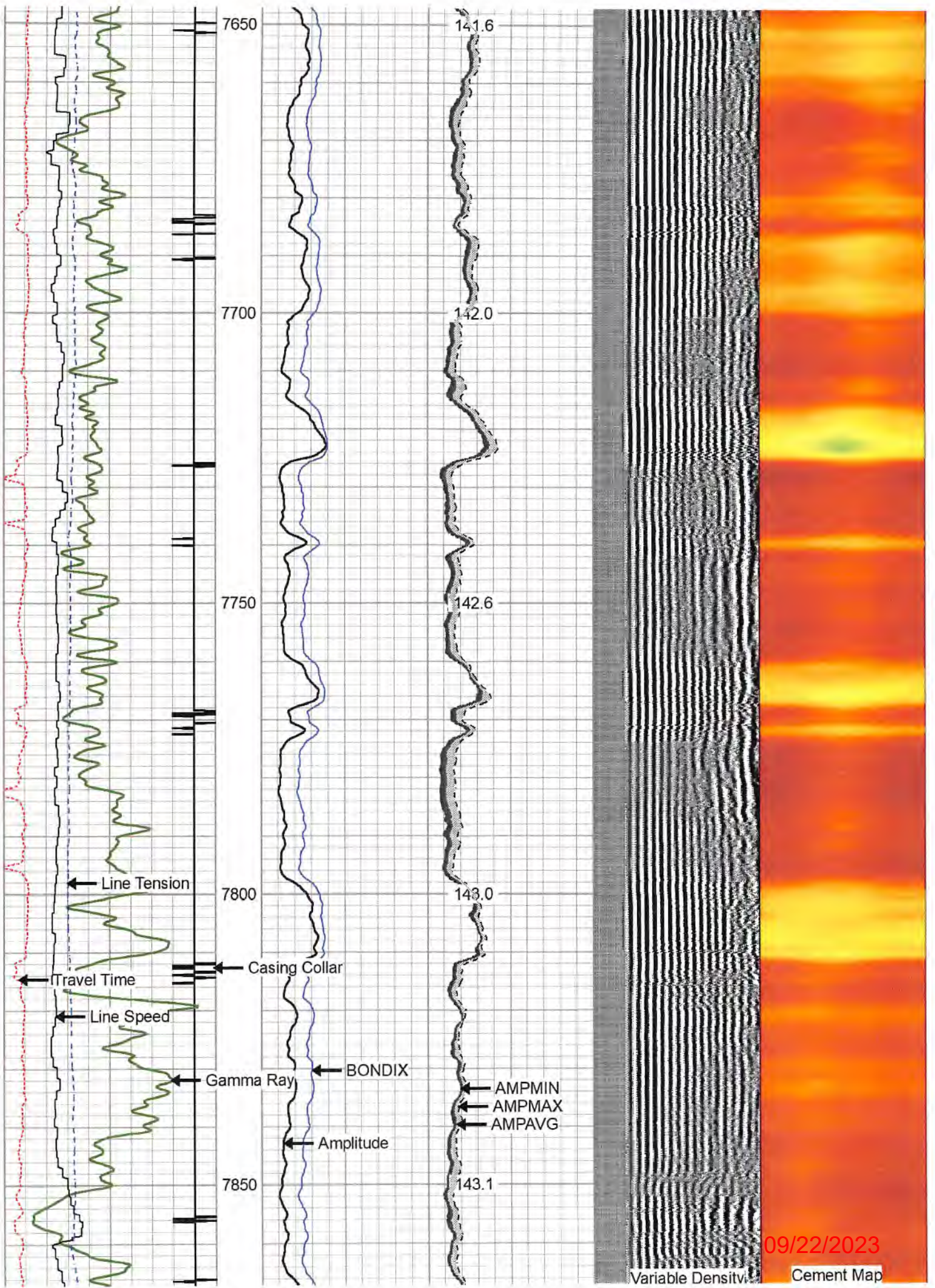
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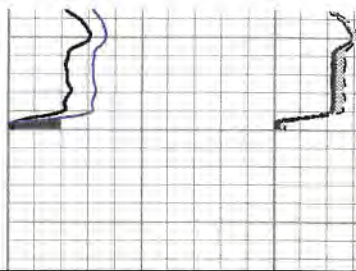
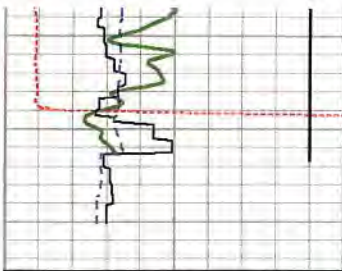
137.6

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270	Travel Time (usec)	160
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
Line Speed		
-200	(ft/min)	200
0	Line Tension (lb)	5000

0	Amplitude (mV)	100	-5	AMPMIN	150
1	BONDIX	0	-5	AMPMAX	150
			-5	AMPAVG	150
TEMP					
(degF)					

Variable Density	1	Cement Map	8
200 (usec)	1200		



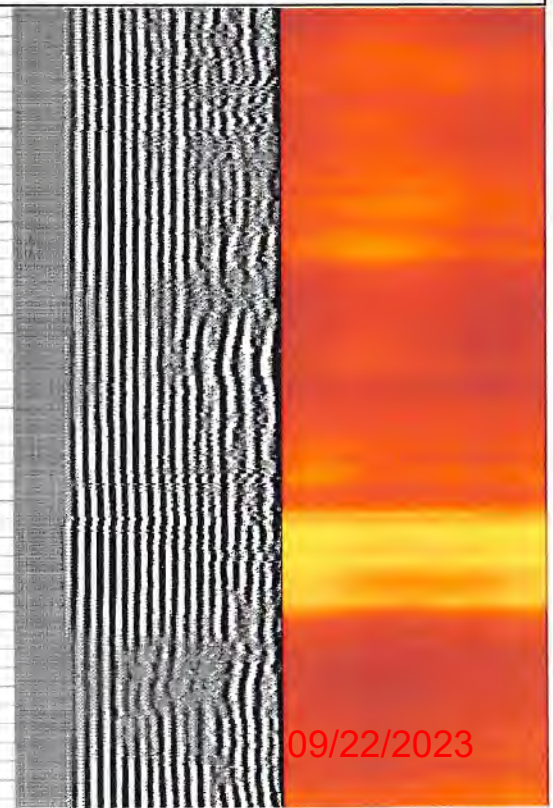
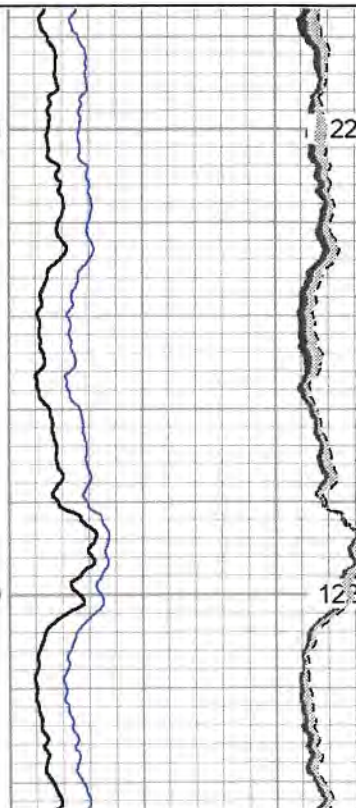
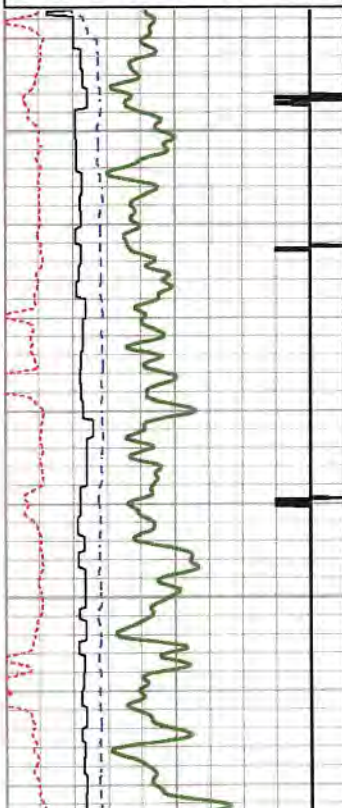
Repeat Pass 0 PSI

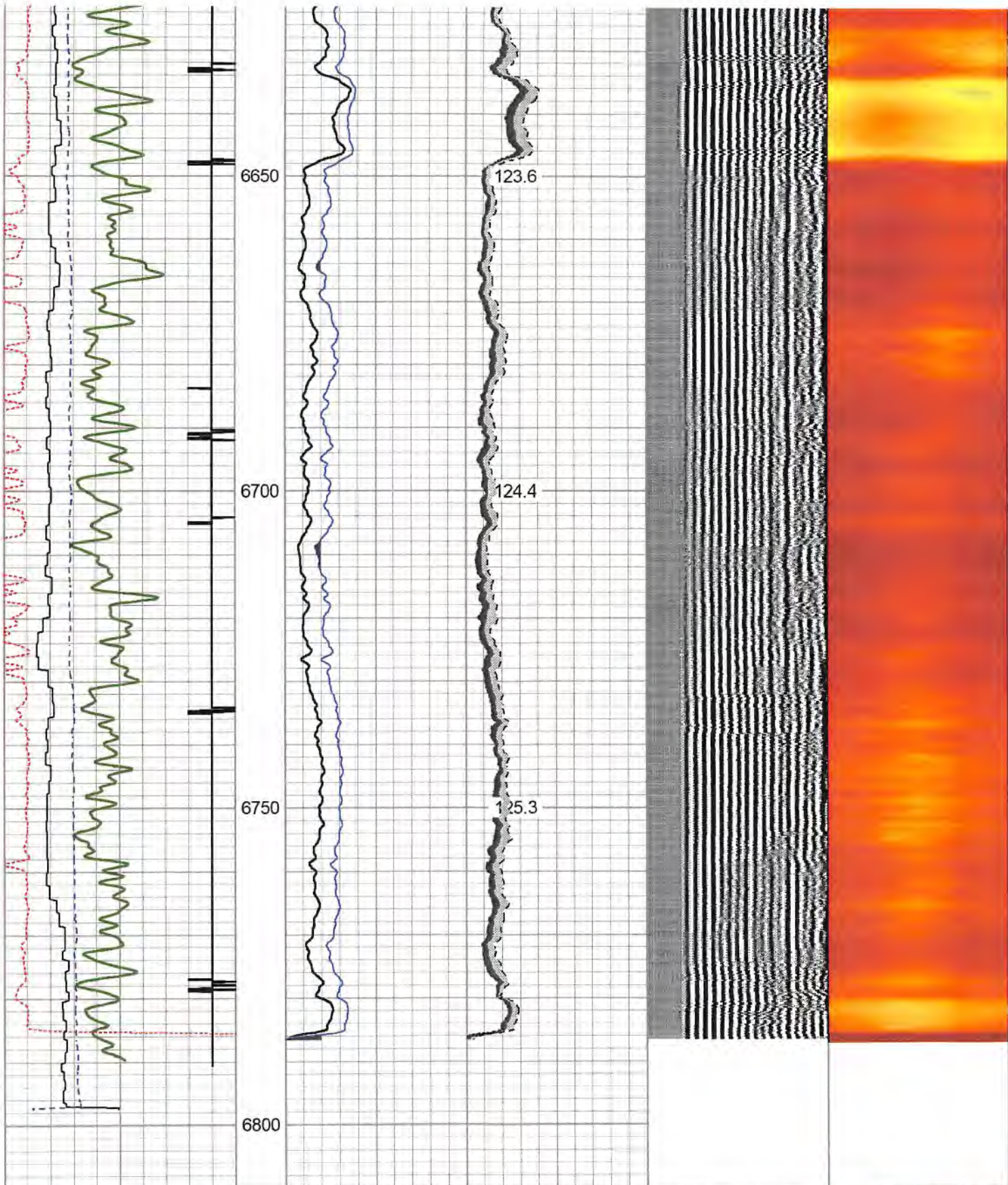
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 Dataset Pathname emmons2h/rcbl/pass5
 Presentation Format rcbl 2
 Dataset Creation Thu Jan 19 16:52:08 2023
 Charted by Depth in Feet scaled 1:240

270	Travel Time (usec)	160
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
Line Speed		
-200	(ft/min)	200
0	Line Tension (lb)	5000

0	Amplitude (mV)	100	-5	AMPMIN	150
1	BONDIX	0	-5	AMPMAX	150
			-5	AMPAVG	150
TEMP					
(degF)					

Variable Density	1	Cement Map	8
200 (usec)	1200		





270	Travel Time (usec)	160
9	Casing Collar	-1
0	Gamma Ray (GAPI)	150
Line Speed		
-200	(ft/min)	200
0	Line Tension (lb)	5000

0	Amplitude (mV)	100	-5	AMPMIN	150
1	BONDIX	0	-5	AMPMAX	150
			-5	AMPAVG	150
TEMP					
(degF)					

Variable Density
200 (usec) 1200

1 Cement Map 8

09/22/2023

Log Variables

DatabaseC:\ProgramData\Warrior\Data\antero_emmons_2h_rcbl_19_jan_2022.db
 Dataset field/emmons2h/rcbl/pass15/_vars_

Top - Bottom

BHTEMP_Src TEMP	BOREID in 7.875	BOTTEMP degF 142	CASEOD in 5.5	CASETHCK in 0.361	CASEWGHT lb/ft 20	MAXAMPL mV 71.9	MINAMPL mV 2.2
MINATTN db/ft 10.8	PERFS No	PPT usec 261	SRFTEMP degF 55	TDEPTH ft 7890			

Variable Description

BHTEMP_Src : BHTEMP Input Source Selector
 BOREID : Borehole I.D.
 BOTTEMP : Bottom Hole Temperature
 CASEOD : Casing O.D.
 CASETHCK : Casing Thickness
 CASEWGHT : Casing Weight
 MAXAMPL : Maximum Amplitude

MINAMPL : Minimum Amplitude
 MINATTN : Minimum Attenuation
 PERFS : Perforation Flag
 PPT : Predicted Pipe Time
 SRFTEMP : Surface Temperature
 TDEPTH : Total Depth

Calibration Report

Database File antero_emmons_2h_rcbl_19_jan_2022.db
 Dataset Pathname emmons2h/rcbl/pass15
 Dataset Creation Thu Jan 19 17:06:19 2023

Gamma Ray Calibration Report

Serial Number: FW1211-86
 Tool Model: Probe
 Performed: Sun Nov 13 11:04:25 2022

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 0.5000 GAPI/cps

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JUN 23 2023

Segmented Cement Bond Log Calibration Report

Serial Number: 2.75"
 Tool Model: Probe275T

Calibration Casing Diameter: 5.500 in
 Calibration Depth: 720.117 ft

WV Department of
 Environmental Protection

Master Calibration, performed Thu Jan 19 10:32:37 2023:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.007	0.928	2.200	71.921	75.763	1.645
CAL	0.993	1.490				
5'	-0.005	0.956	2.200	71.921	72.595	2.554
SUM						
S1	0.089	0.975	0.000	100.000	112.910	-10.064
S2	0.006	0.903	0.000	100.000	111.477	-0.659
S3	-0.001	0.963	0.000	100.000	103.779	0.927/2023
S4	-0.005	0.966	0.000	100.000	102.977	0.518
S5	-0.009	0.951	0.000	100.000	104.175	0.929

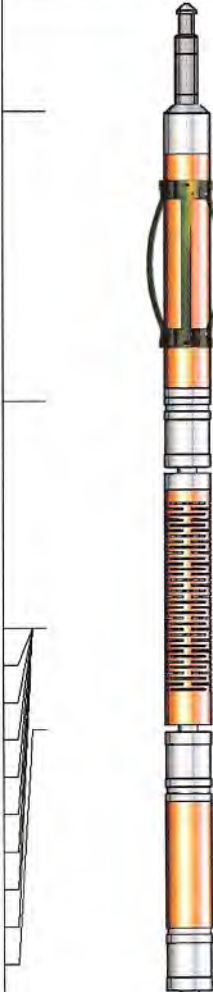
S6	-0.013	0.945	0.000	100.000	104.462	1.320
S7	0.000	0.933	0.000	100.000	107.173	-0.041
S8	0.004	0.918	0.000	100.000	109.335	-0.402

Internal Reference Calibration, performed Wed Nov 23 14:17:52 2011:

	Raw (v)		Calibrated (v)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
CAL	0.000	0.000	0.993	1.490	1.000	0.000

Air Zero Calibration, performed Wed Jan 11 18:02:46 2023:

	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)
HeadVolt	16.95		CHD-Titan Standard 1 7/16" Cable Head	1.02	1.44	1.00
Temp	14.10		CENT-Overbody Antelope (SP-919-0233)	1.67	4.88	5.00
WVFS8	11.86		RBT-Probe275T (2.75") Probe 2.75" Radial with Integral Temperature Sub	9.39	2.75	90.00
WVFS7	11.86					
WVFS6	11.86					
WVFS5	11.86					
WVFS4	11.86					
WVFS3	11.86					
WVFS2	11.86					
WVFS1	11.86					
WVF3FT	11.86					
WVF5FT	10.86					

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JUN 23 2023
WV Department of
Environmental Protection

09/22/2023

WVFCAL	7.61					
HEADVOLT	7.61					
CCL	6.71					
GR	5.38		GR-Probe (FW1211-86) Probe 2 3/4" Logging Gamma Ray CENT-Overbody Antelope (SP-919-0233)	4.78	2.75	57.00
			Centralizer-Probe_2.75 Bowspring Centralizer	1.67	4.88	5.00
				2.83	2.75	24.00

Dataset: antero_emmons_2h_rcbl_19_jan_2022.db: field/emmons2h/rcbl/pass15
 Total length: 18.03 ft
 Total weight: 182.00 lb
 O.D.: 4.88 in

	Company	ANTERO RESOURCES
	Well	Beech Run Emmons 2H
	Field	Rabbit Ears
	County	Tyler
	State	WV

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Office of Oil and Gas

JUN 23 2023

WV Department of
Environmental Protection

.09/22/2023