

Company Antero Resources
Well Crown 1H
Field Marcellus
County Tyler
State West Virginia

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Location: API #: 4709502453
Latitude:
Longitude:
SEC TWP RGE
Permanent Datum Ground Level Elevation
Log Measured From Ground Level
Drilling Measured From Kelly Bushing
Other Services
Elevation
K.B. -
D.F. -
G.L. -

Date	13 - December - 2018	
Run Number	One	
Depth Driller	17,619 ft	
Depth Logger	6,412 ft	
Bottom Logged Interval	6,402 ft	
Top Log Interval	Surface	
Open Hole Size	N/A	
Type Fluid	Fresh Water	
Density / Viscosity	8.3 lbs/gal	
Max. Recorded Temp.	134 °F	
Estimated Cement Top	1,463 ft	
Time Well Ready	19:40	
Time Logger on Bottom	20:20	
Equipment Number	2612	
Location	Inwin, PA	
Recorded By	Z. Gregory	
Witnessed By	Curt Anderson	
Borehole Record		
Run Number	Bit	From
	To	Size
	Weight	From
	To	
Tubing Record		
	Weight	From
	To	
Casing Record	Size	Wgt/ft
Surface String	13-3/8"	-
Prot. String	9-5/8"	-
Production String	5 1/2 in	20#
Liner		17,619 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.

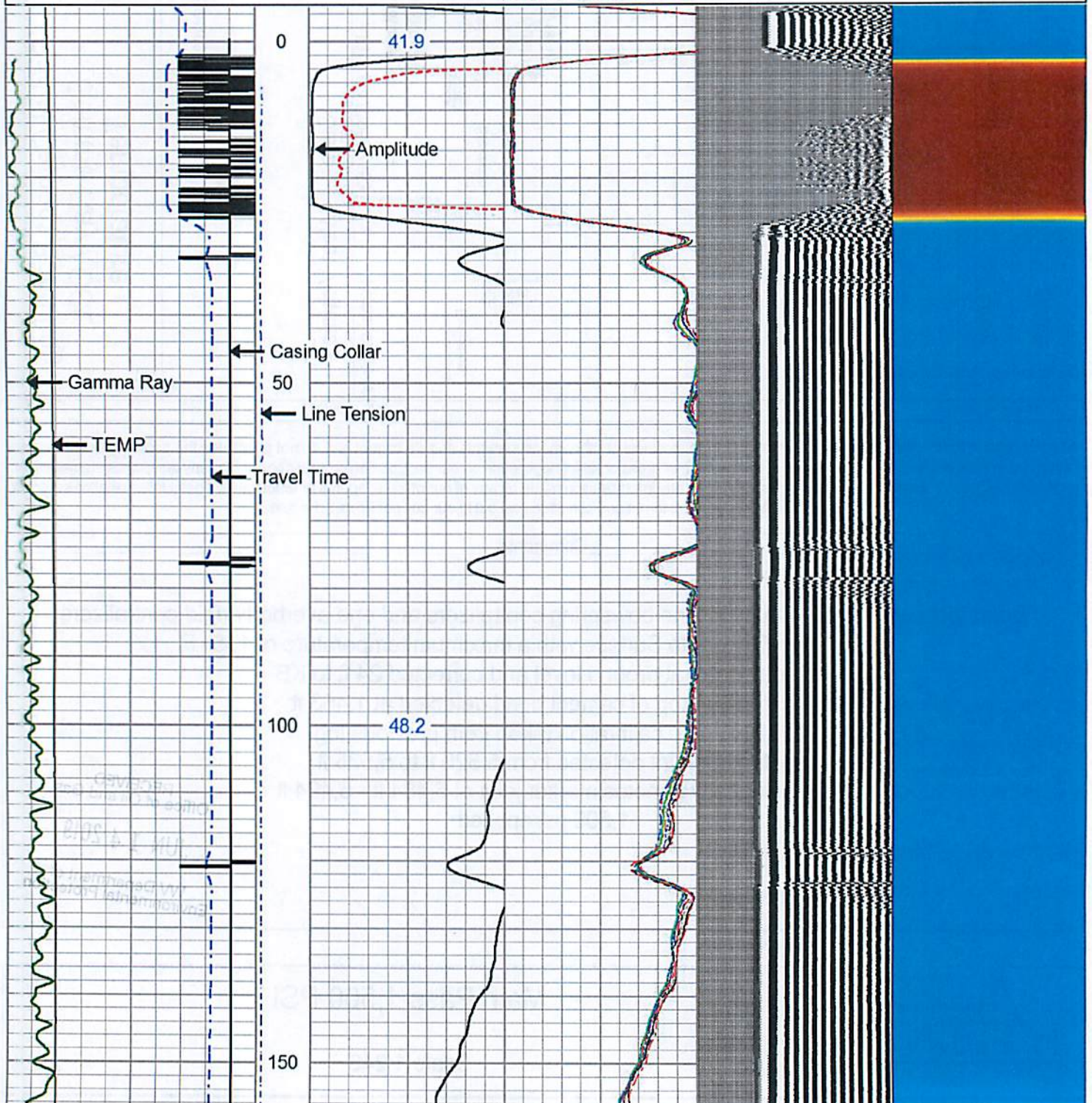
Comments

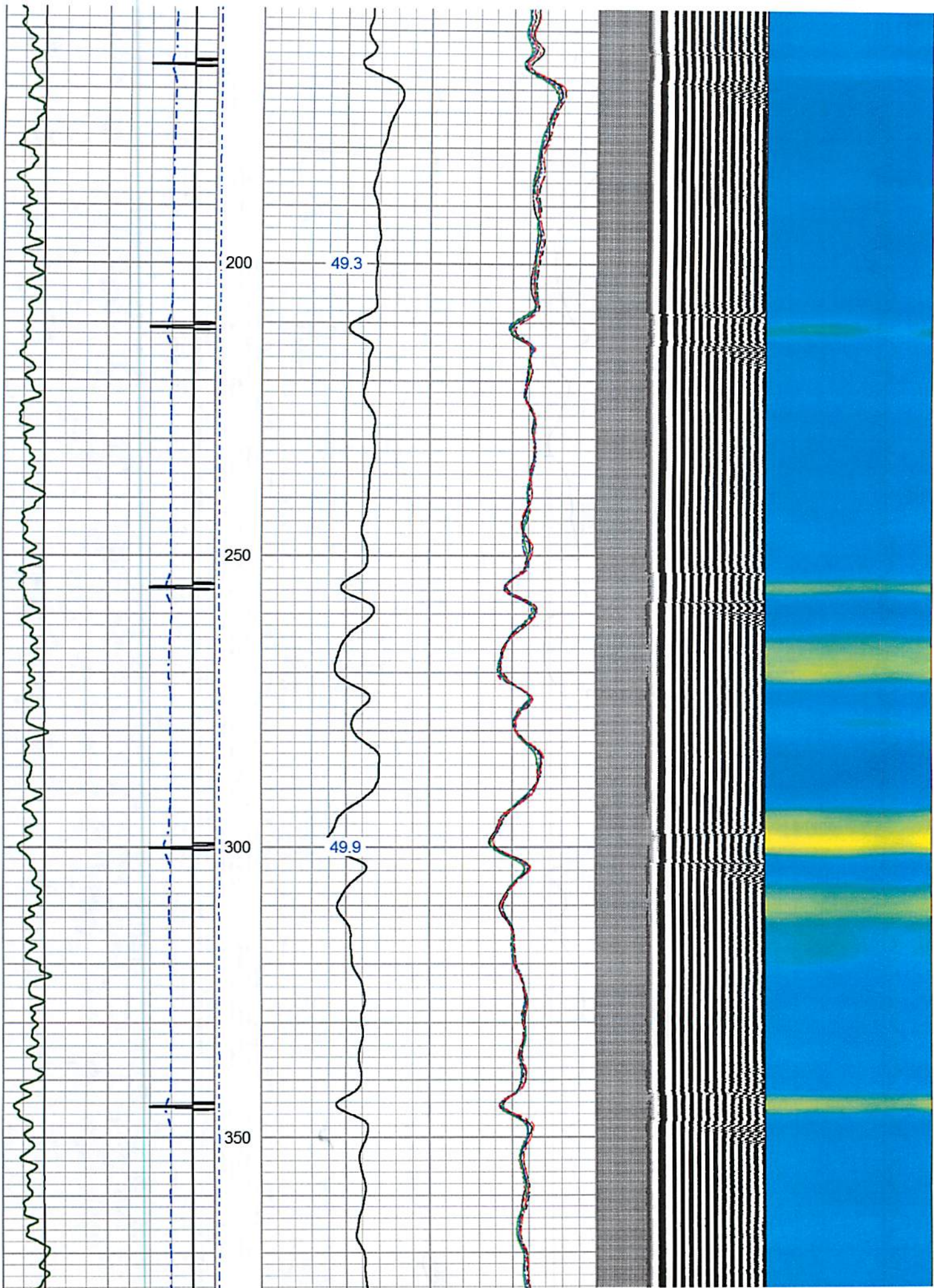
Bond tool centralized with two inline bowspring centralizers and one overbody rigid centralizers
 Logged from 6,402 ft to Surface with a maximum temperature of 135° F
 Tool zeroed at ground level and corrected 24 ft to KB
 Estimated top of cement bond detected at 1,463 ft
 Free pipe calibration taken from previous log
 Marker joint detected from 5,525 ft to 5,535 ft
 Casing tally denotes marker joint at 5,484 ft - 5,494 ft
 1,500 psi applied

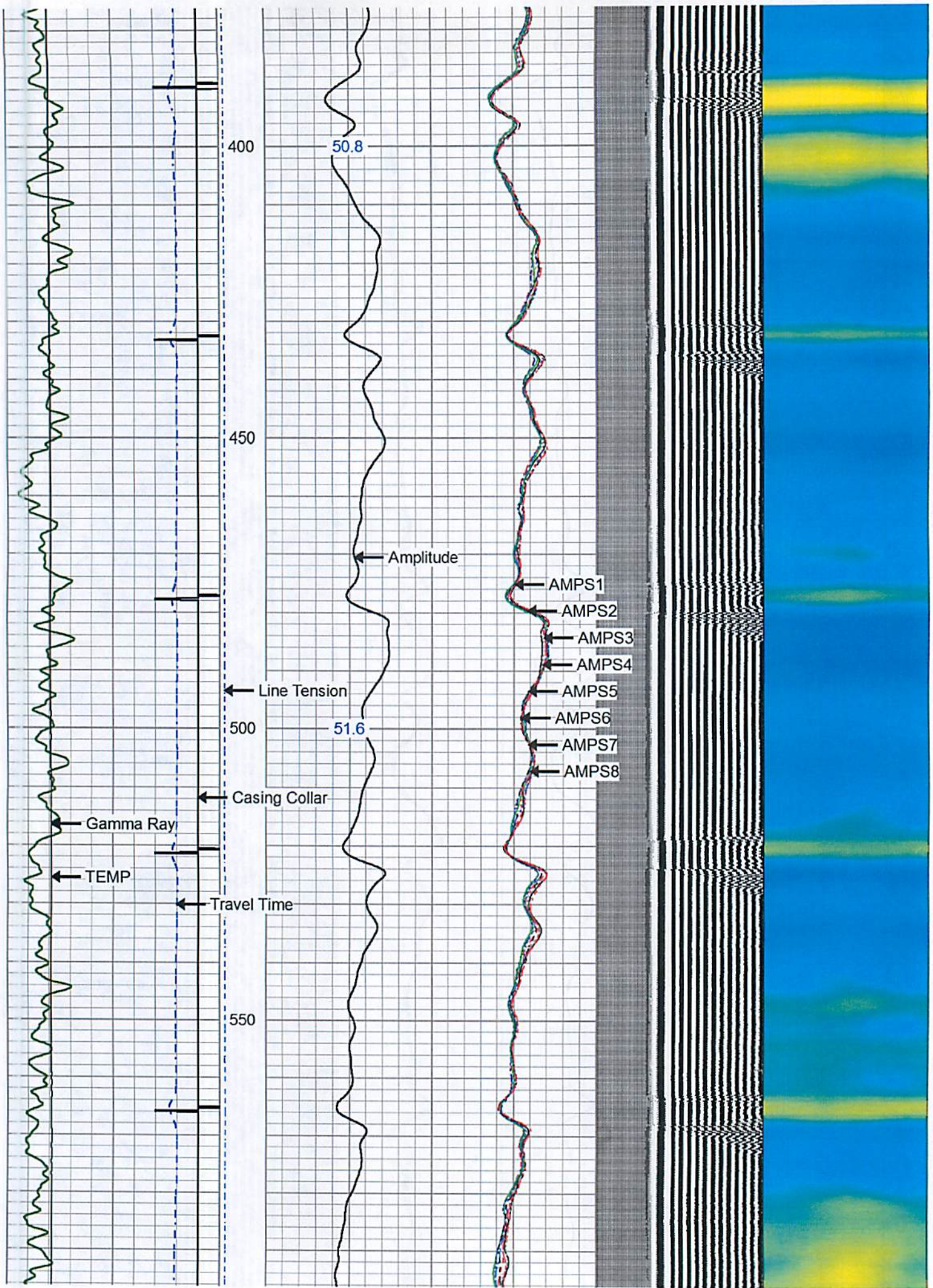
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Office of Oil and Gas
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Environmental Protection

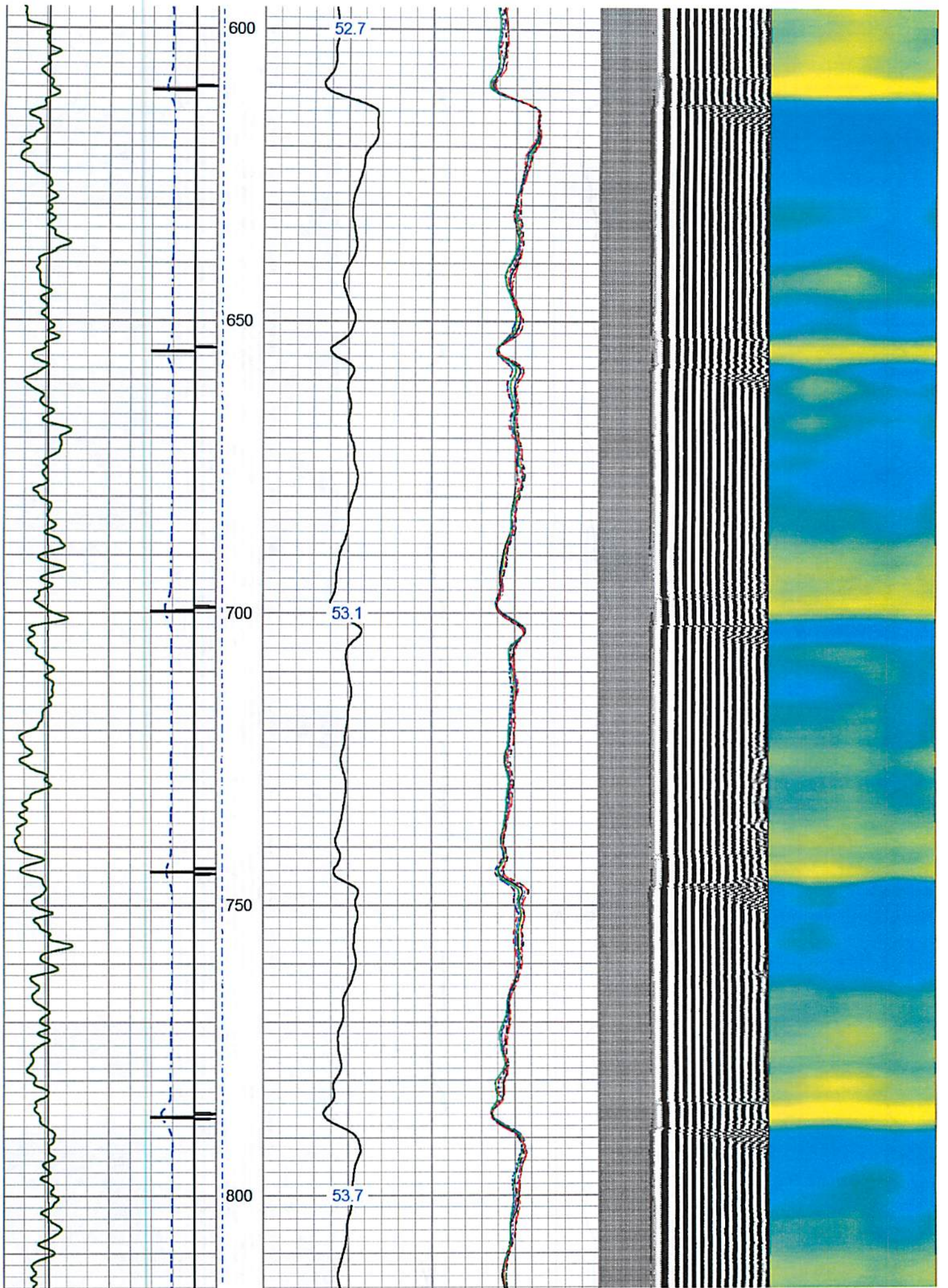
Database File c:\users\user\desktop\antero neat logs\antero_neat_crown_unit1h_rcbl_12132018.db
 Dataset Pathname pass6
 Presentation Format ahws_rcbl_jc
 Dataset Creation Thu Dec 13 20:17:07 2018
 Charted by Depth in Feet scaled 1:240

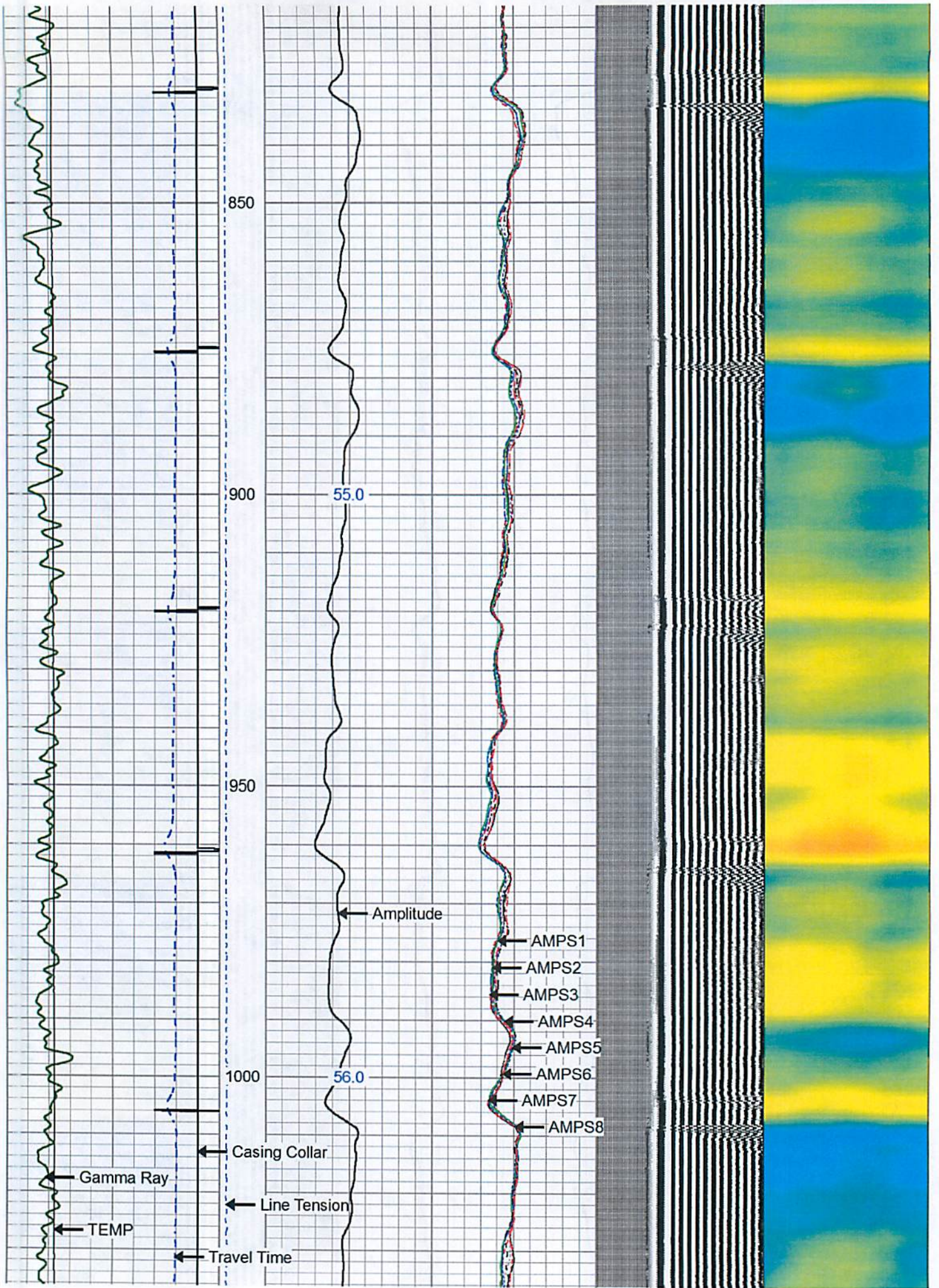
420	Travel Time (usec)	220	0	Amplitude (mV)	100	-5	AMPS1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	(lb)	Amplified Amplitude	-5	AMPS2	150	200		1200		0
0	Gamma Ray (GAPI)	300	(2500)	(mV)	10	-5	AMPS3	150				
0	TEMP (degF)	250		TEMP		-5	AMPS4	150				
				(degF)		-5	AMPS5	150				
						-5	AMPS6	150				
						-5	AMPS7	150				
						-5	AMPS8	150				

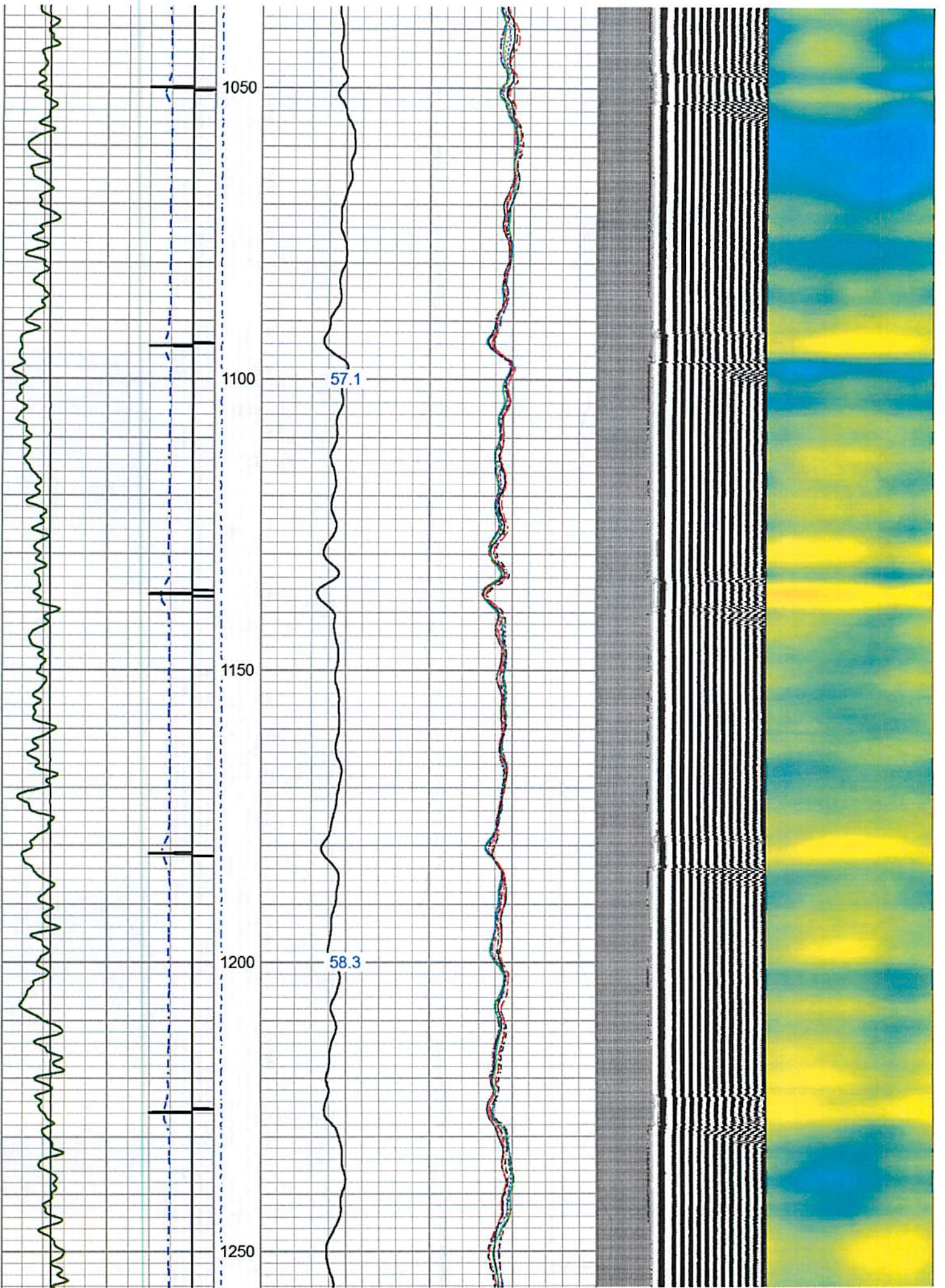


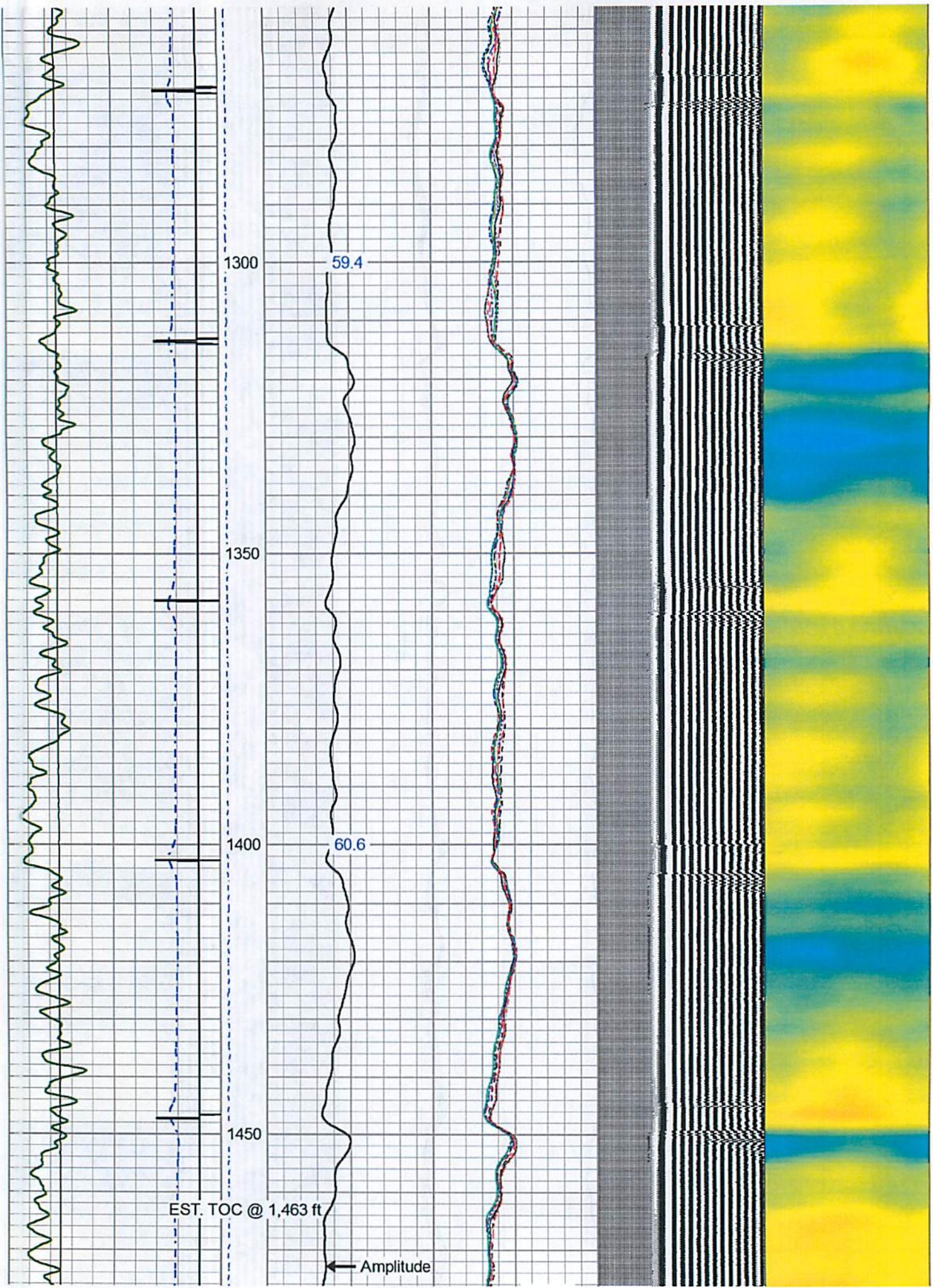


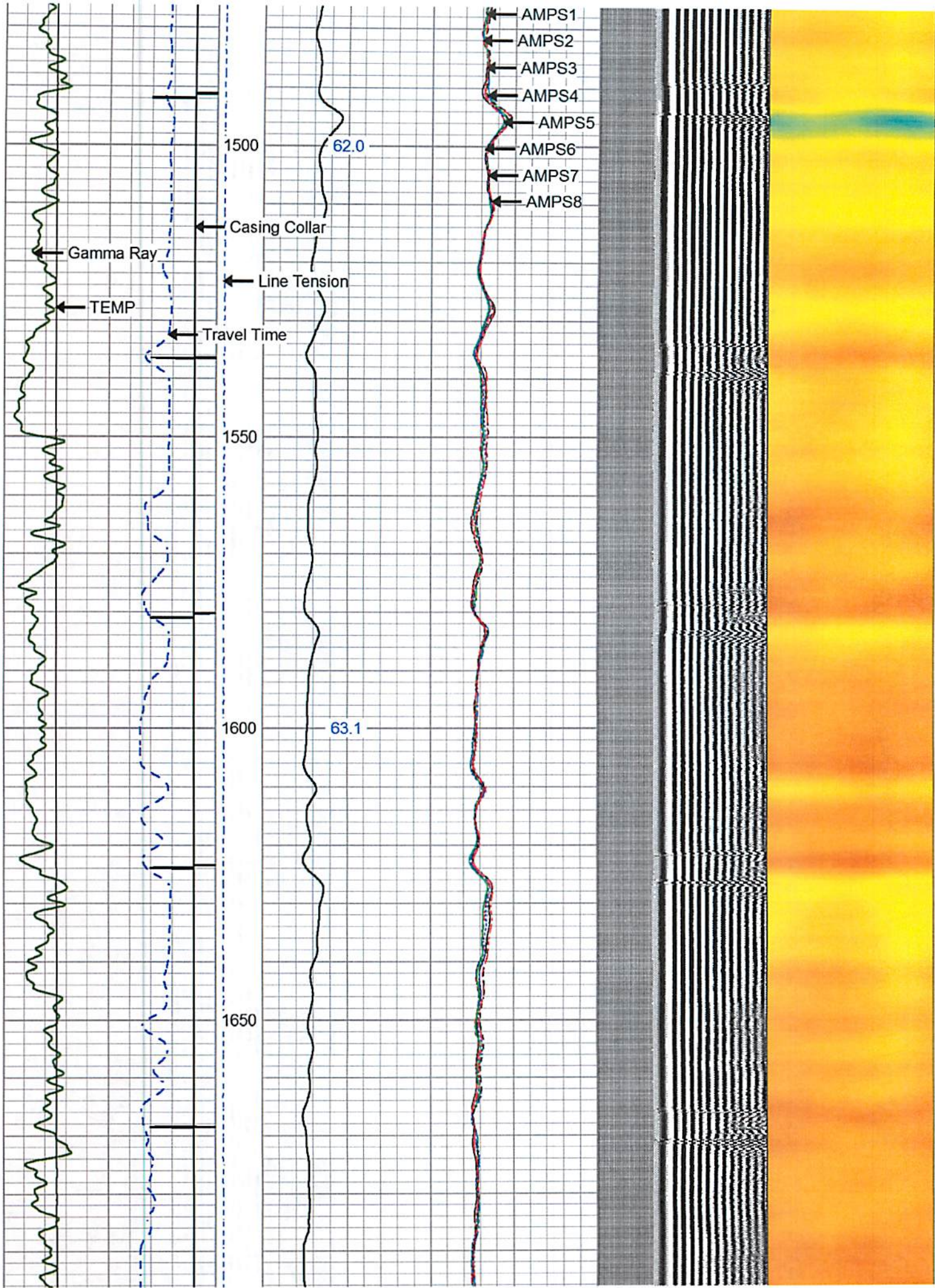


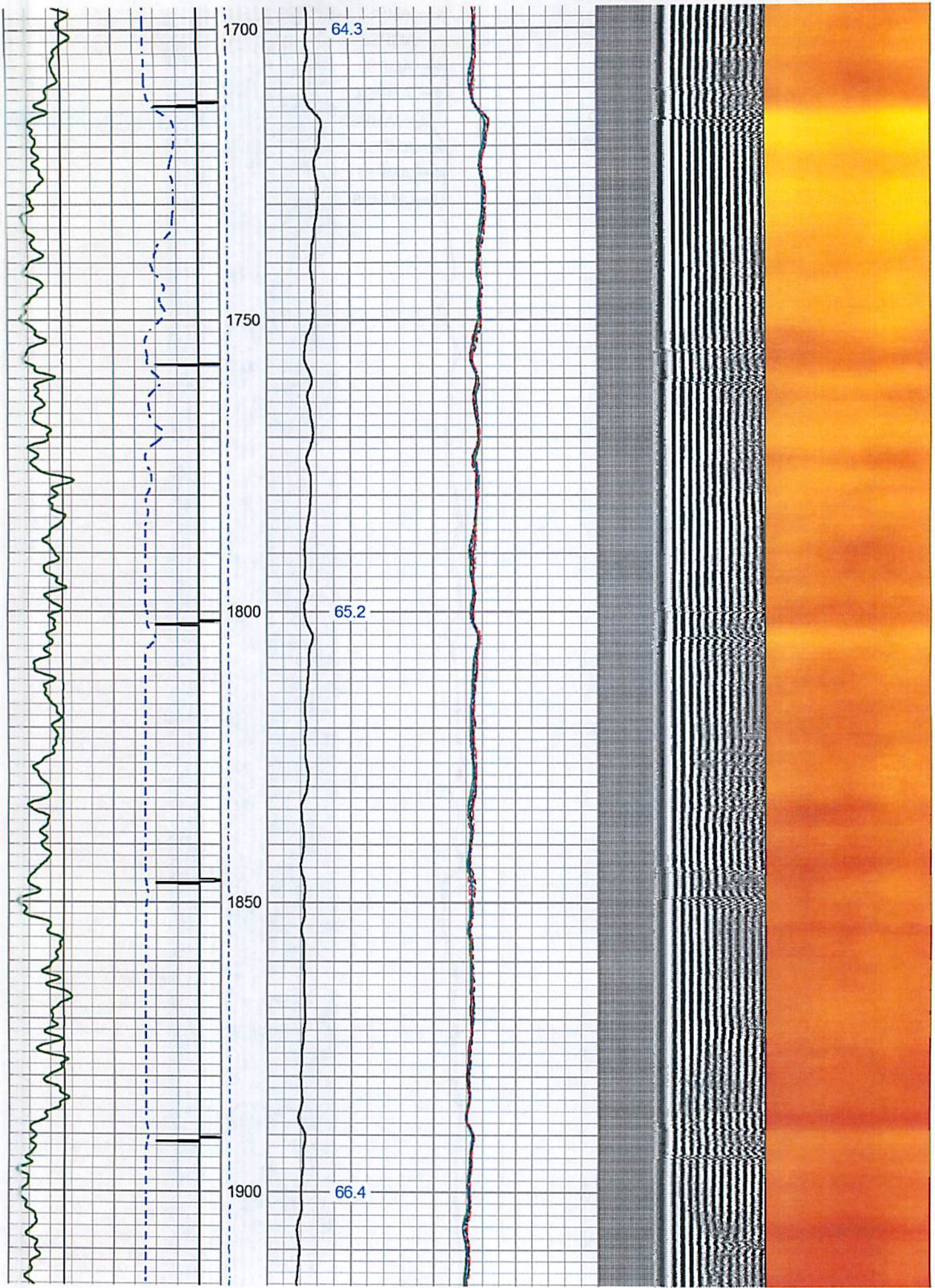


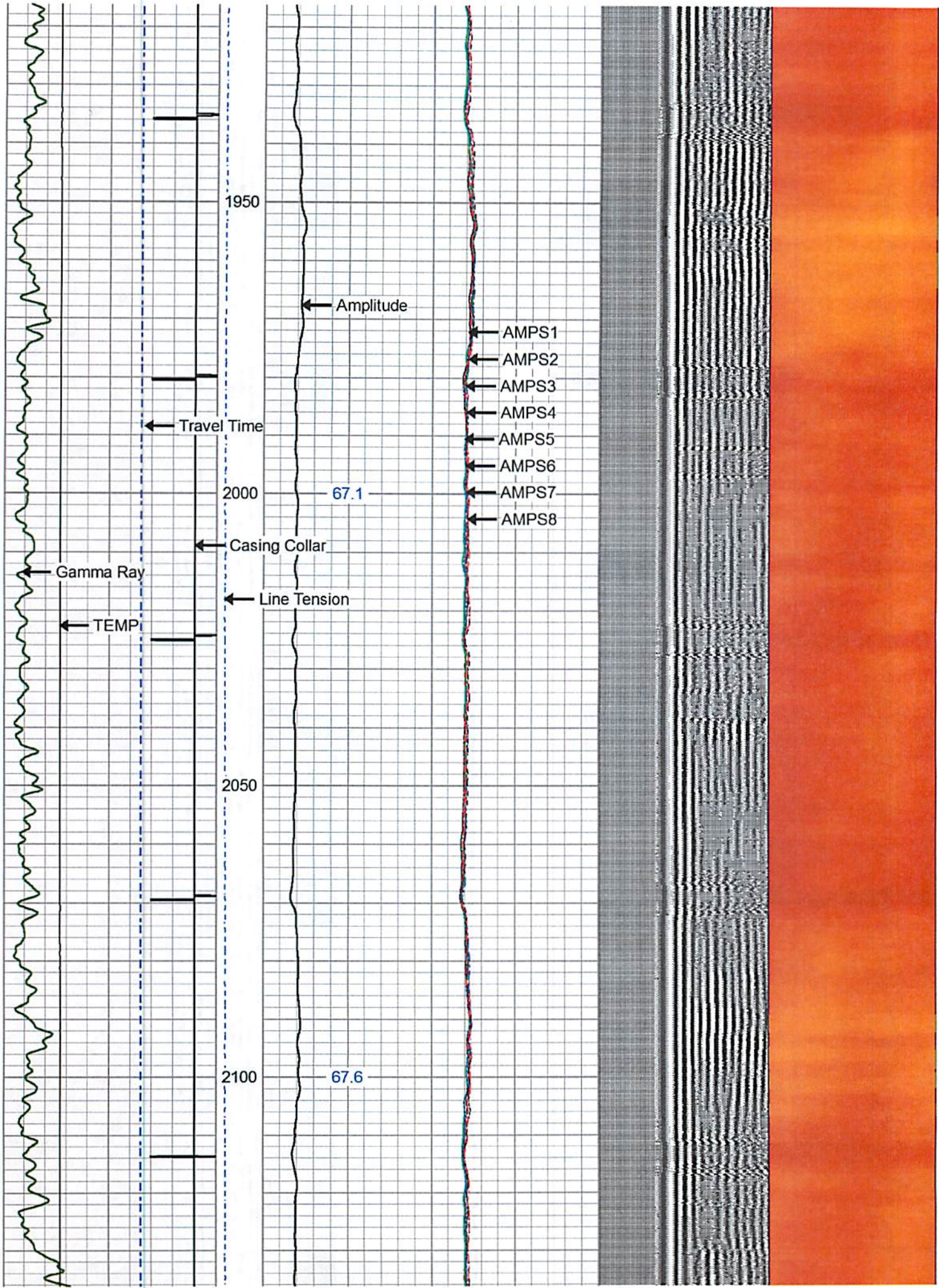


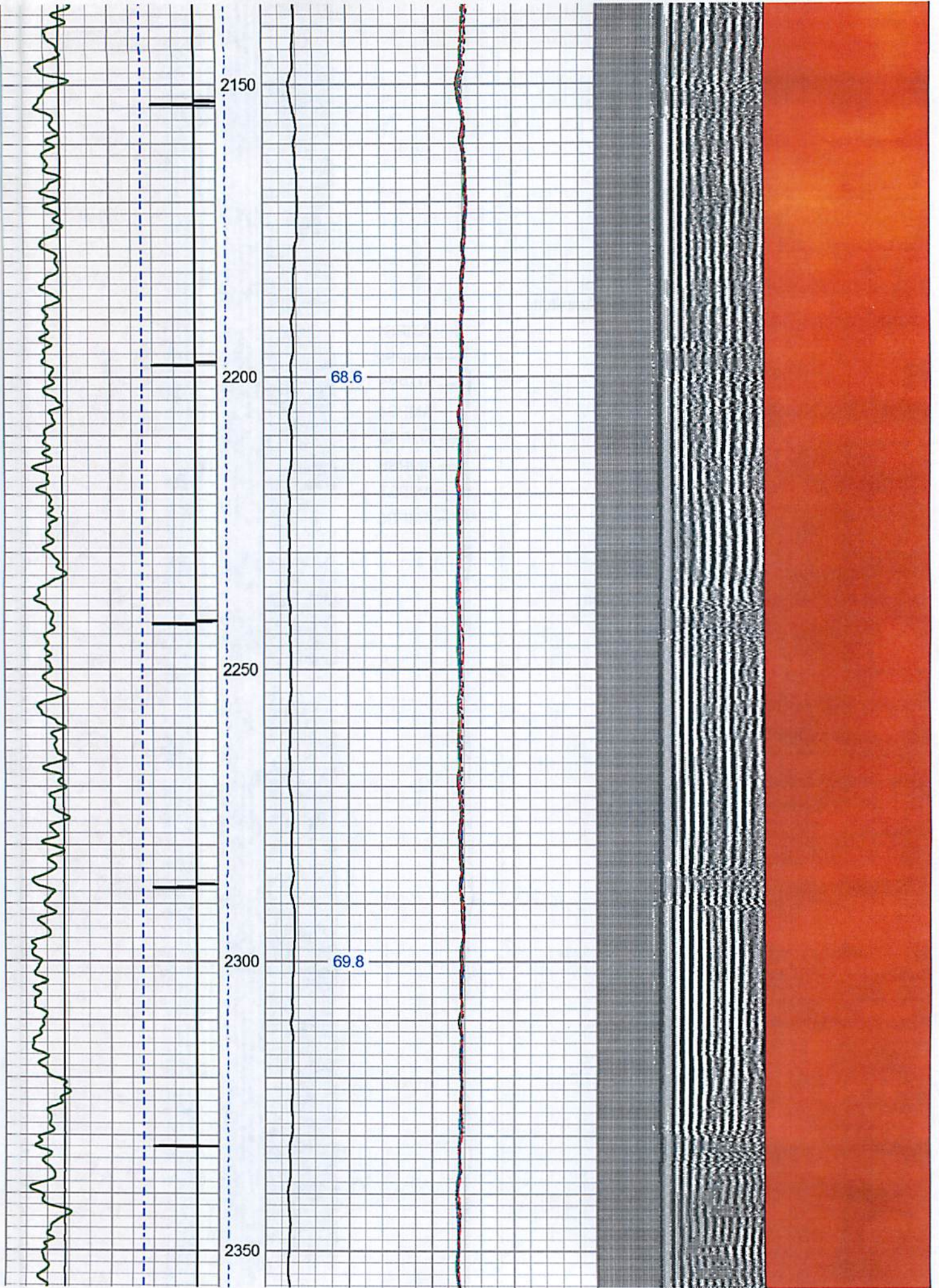


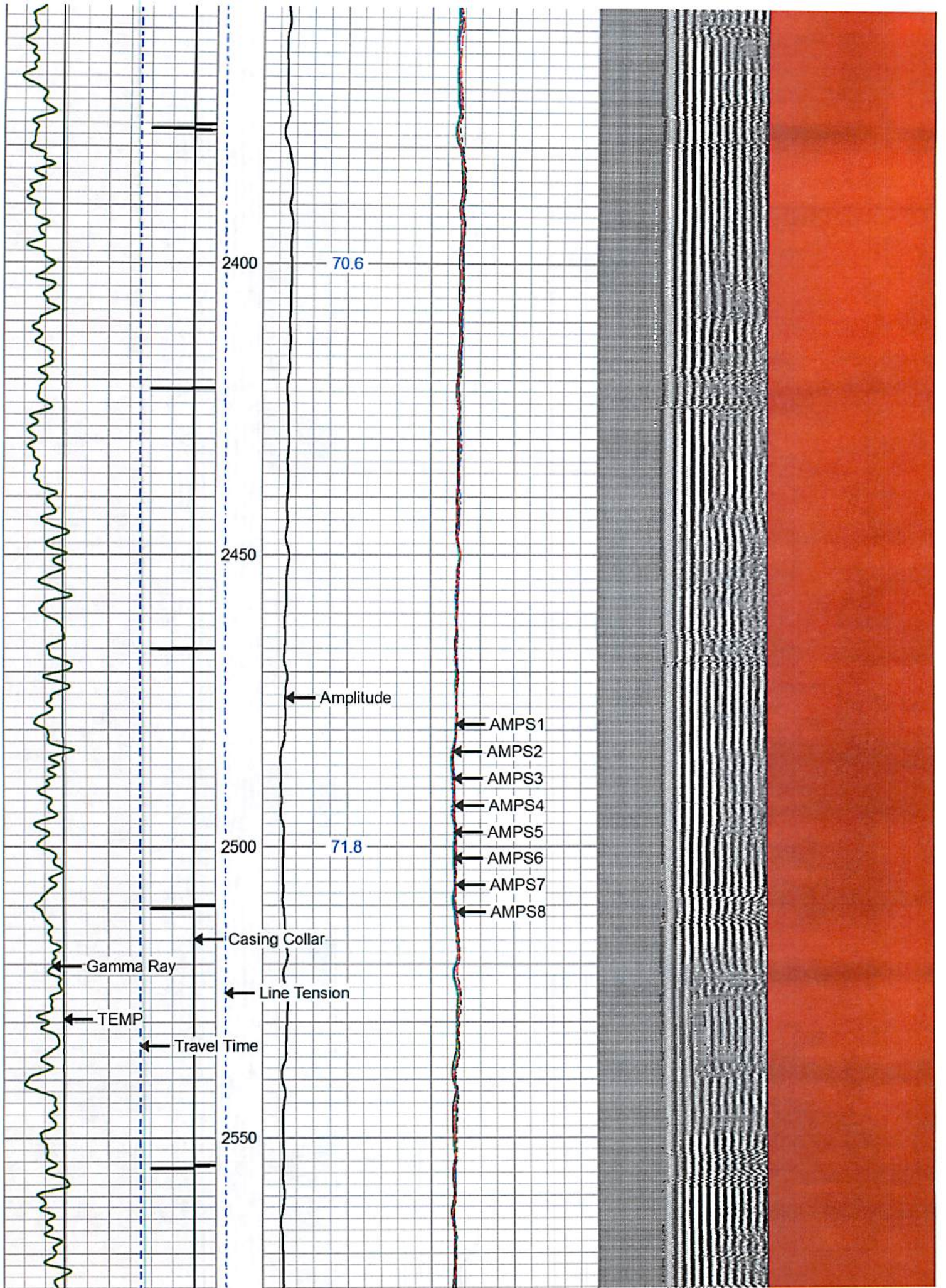


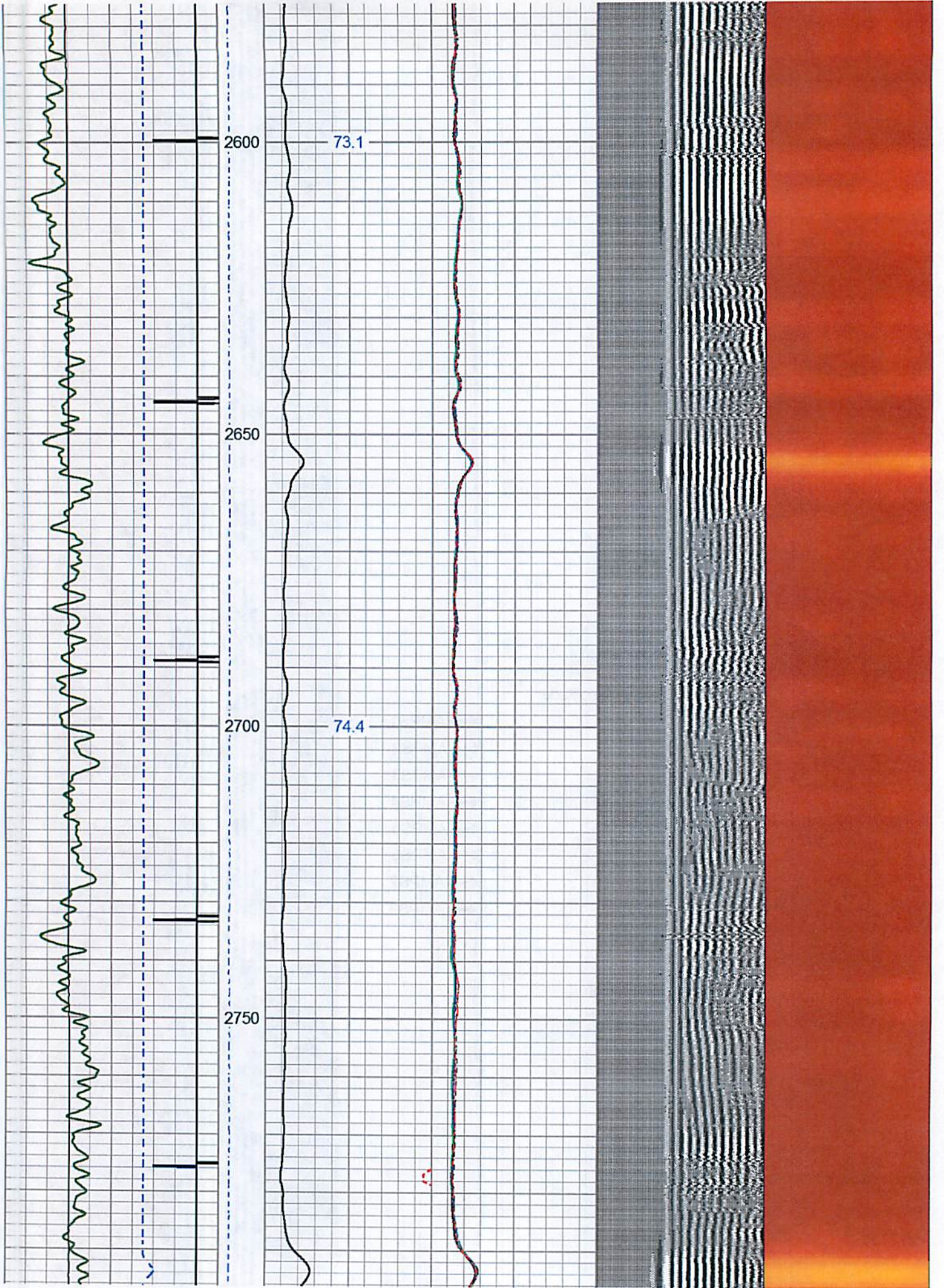


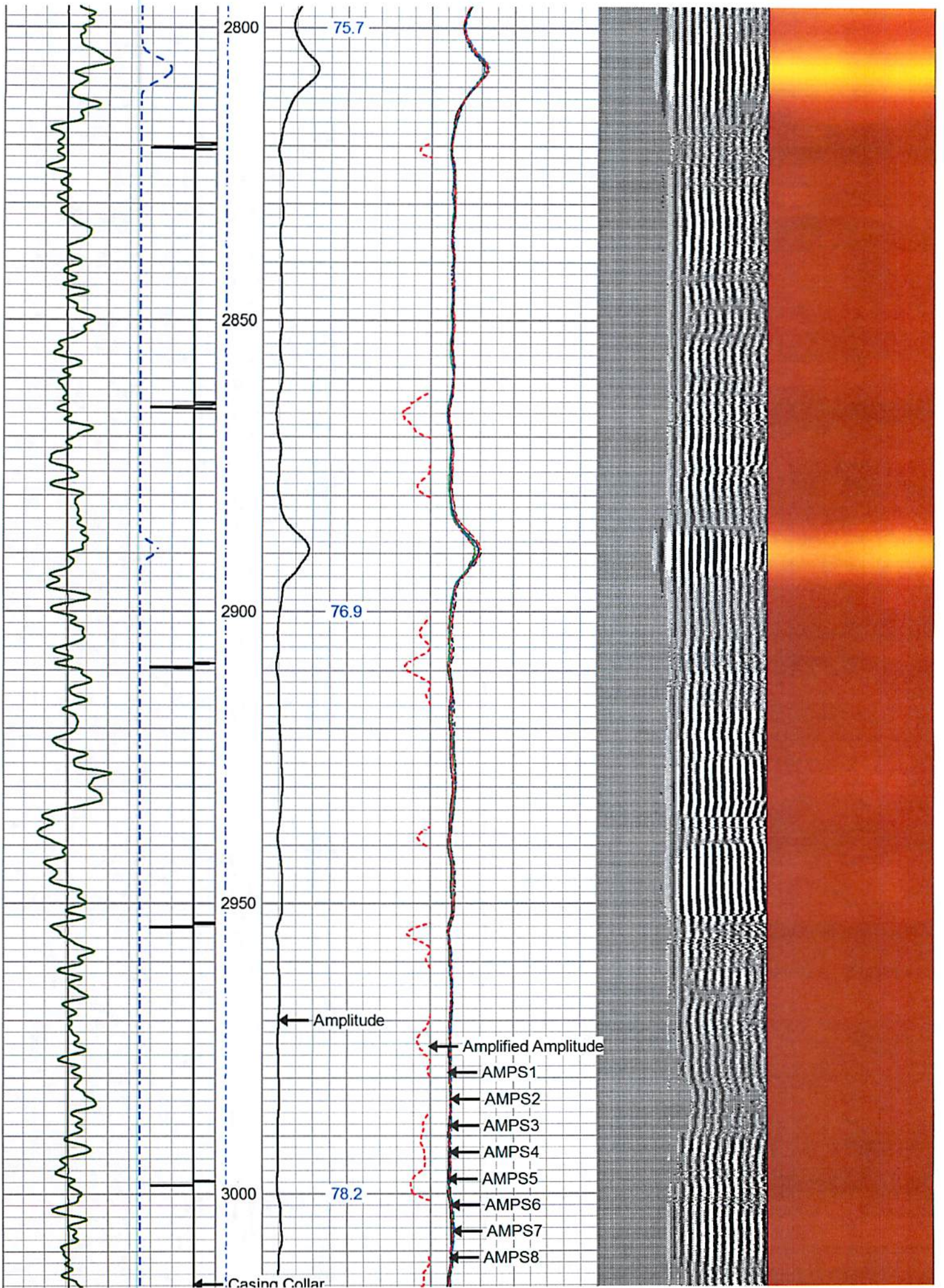


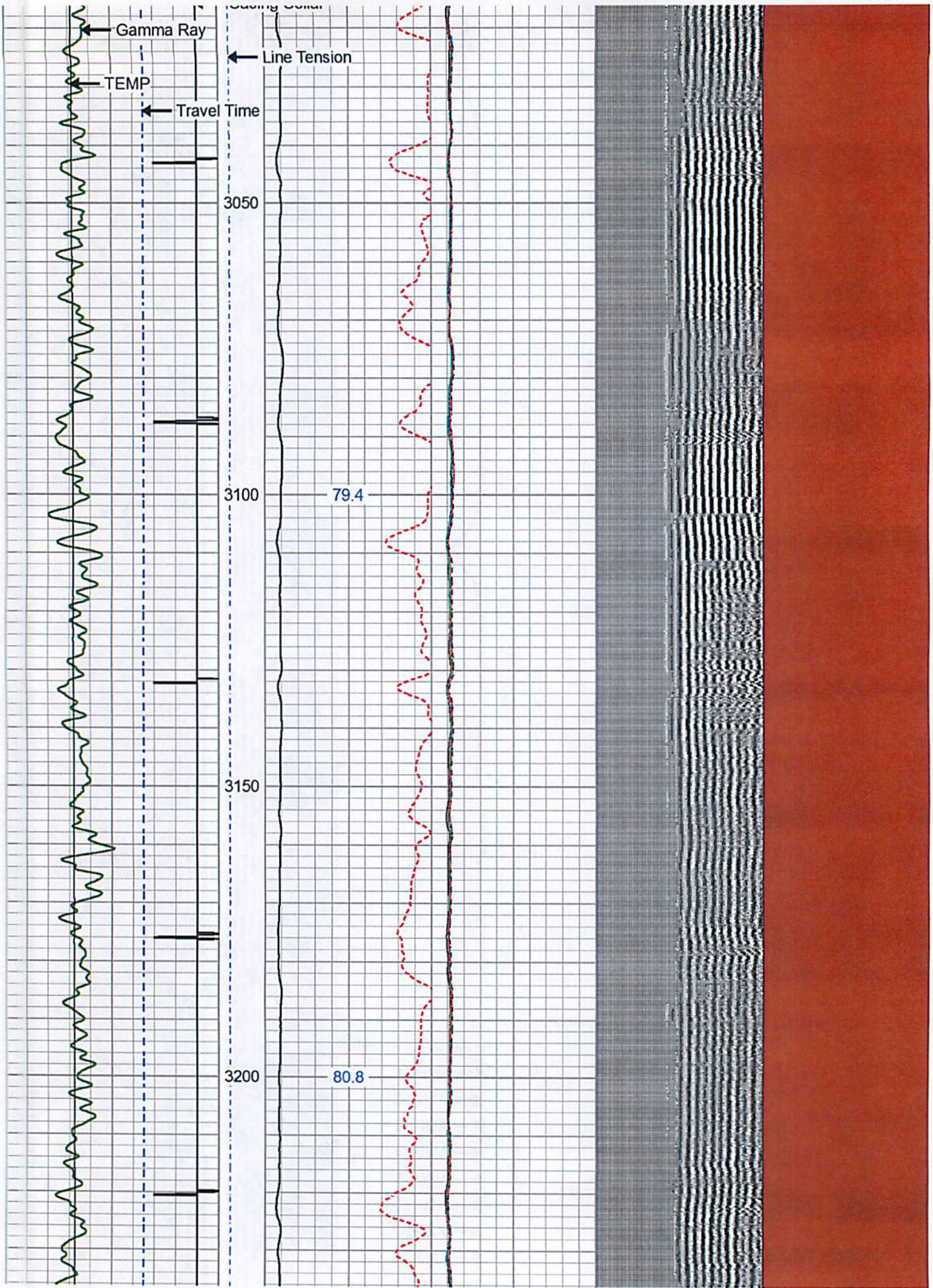


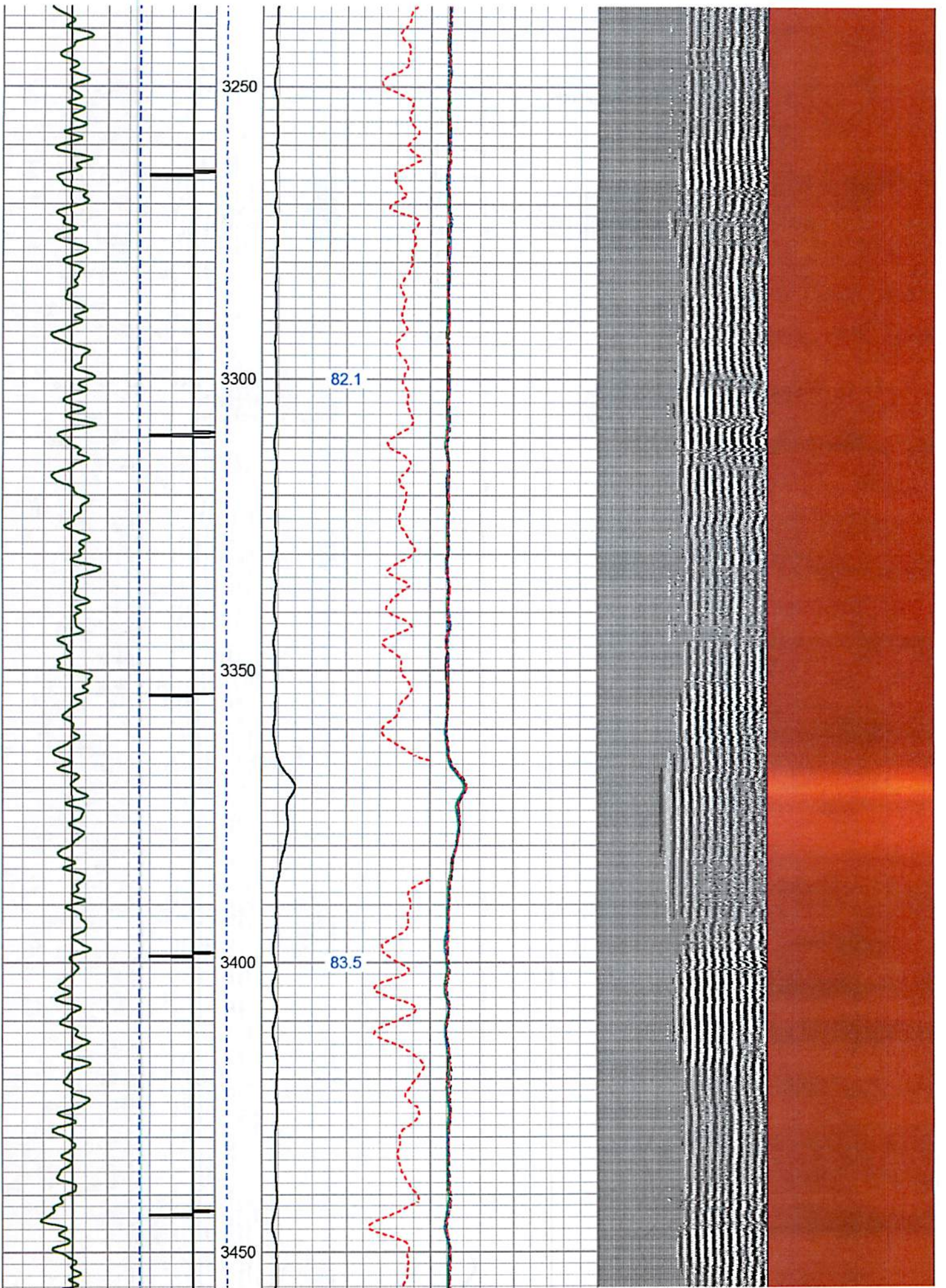


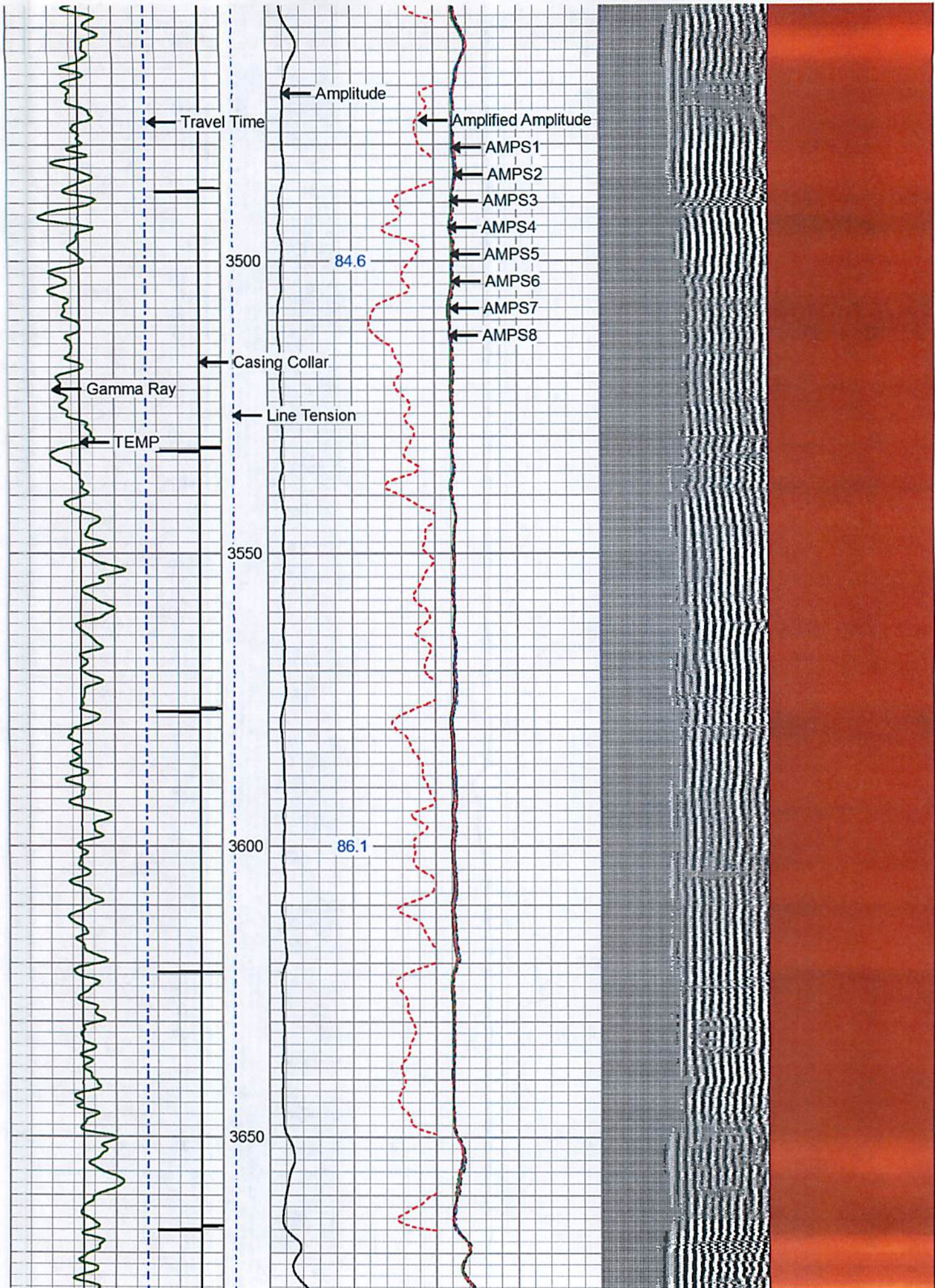


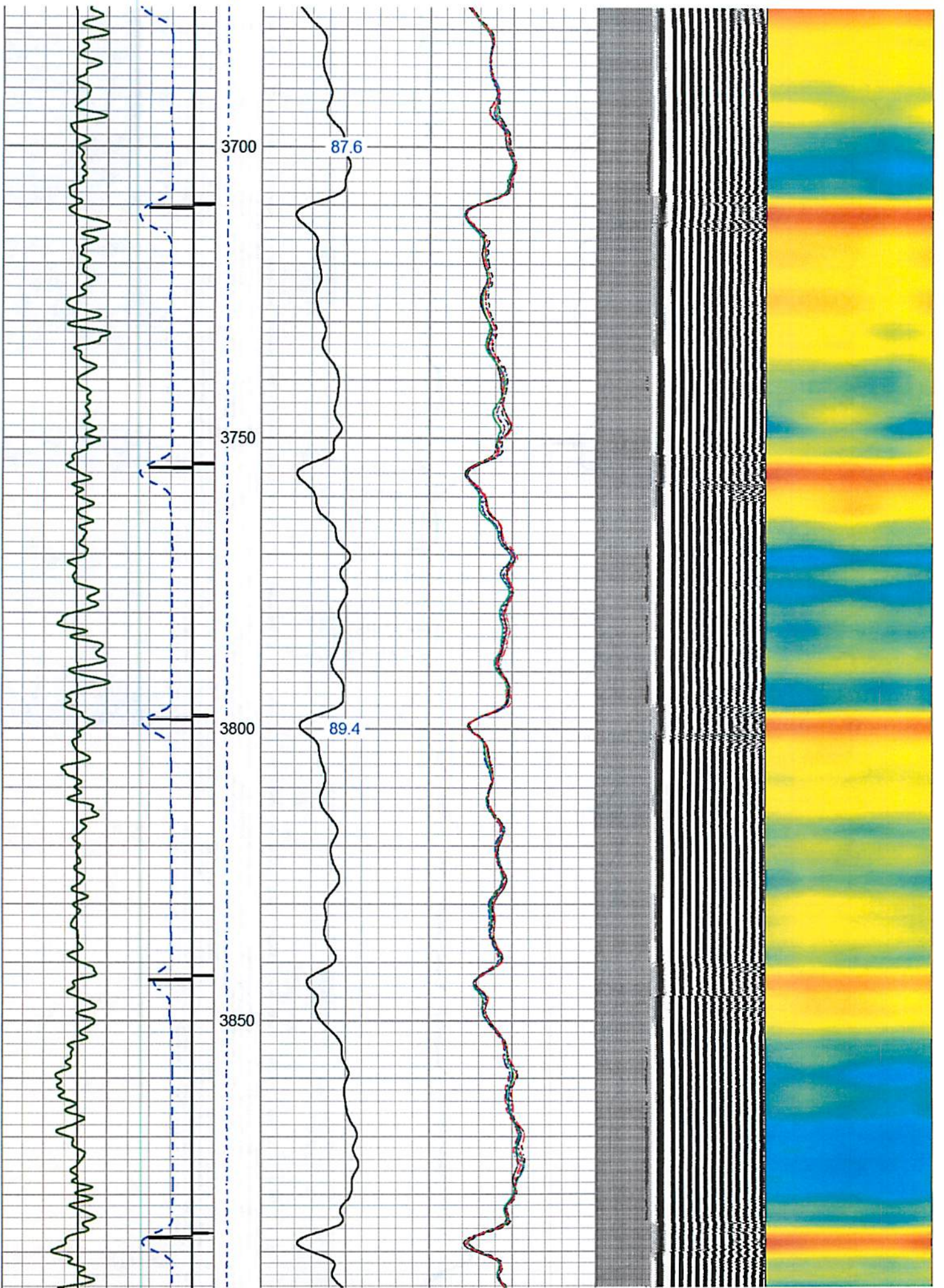


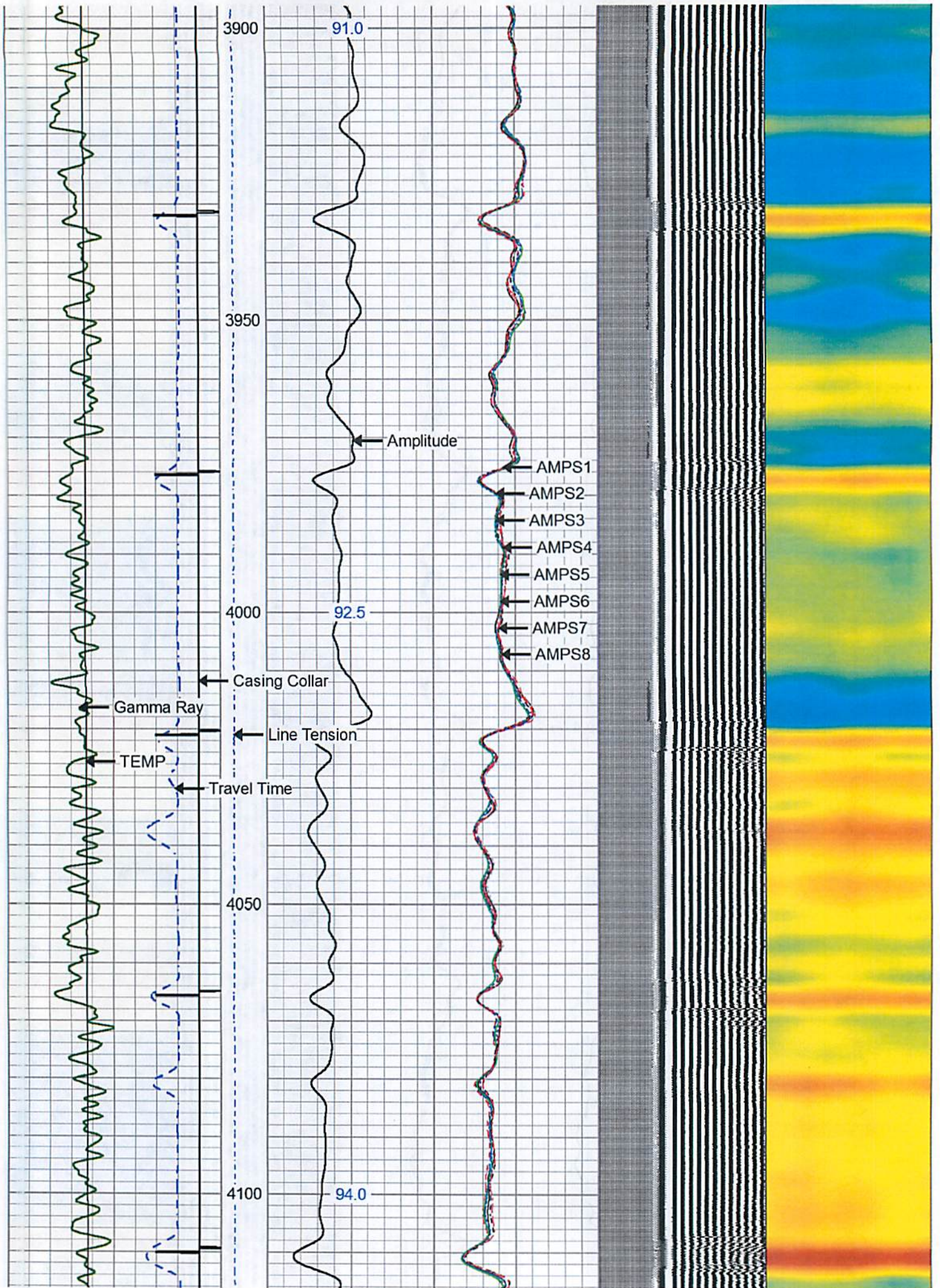


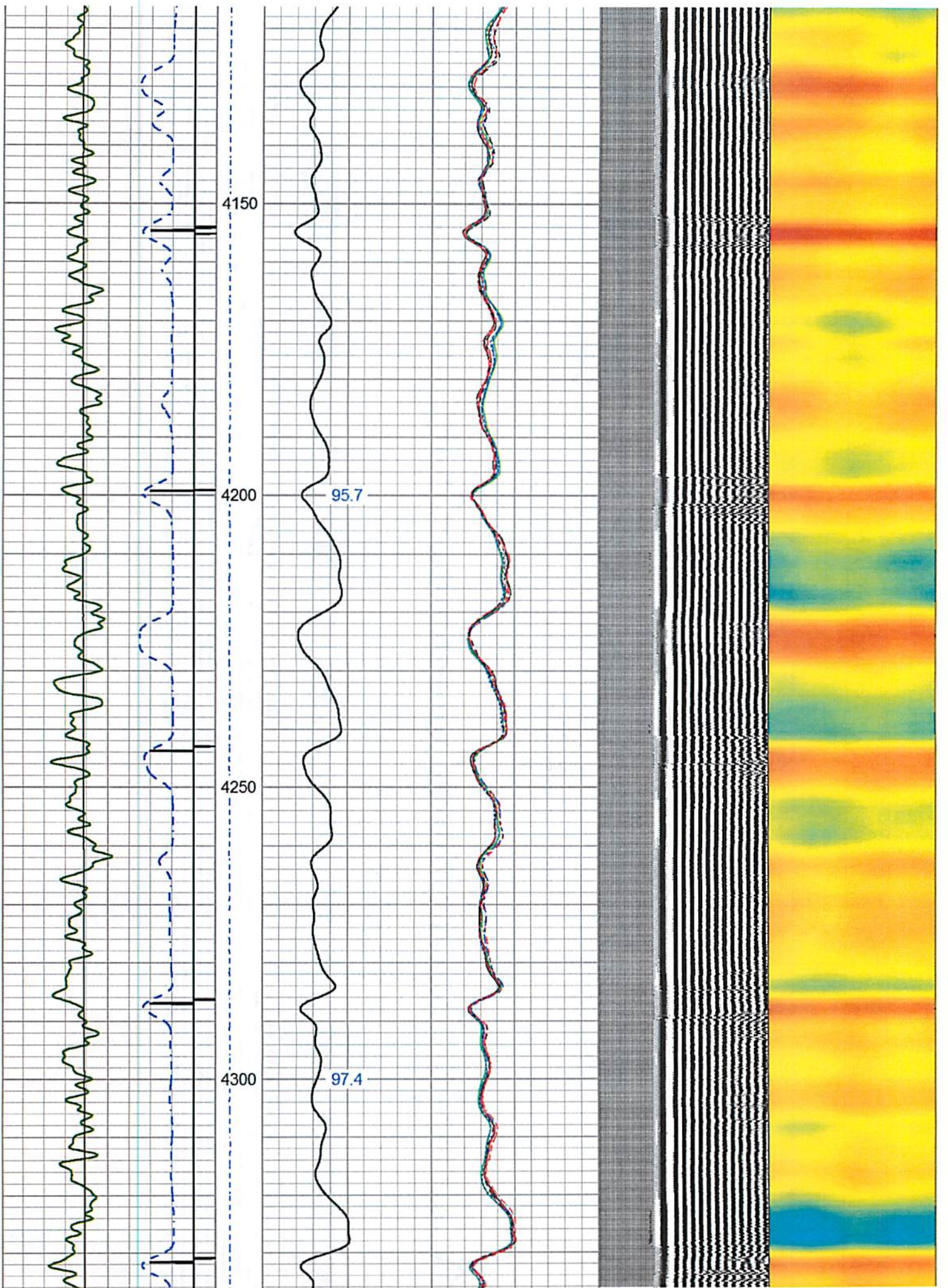


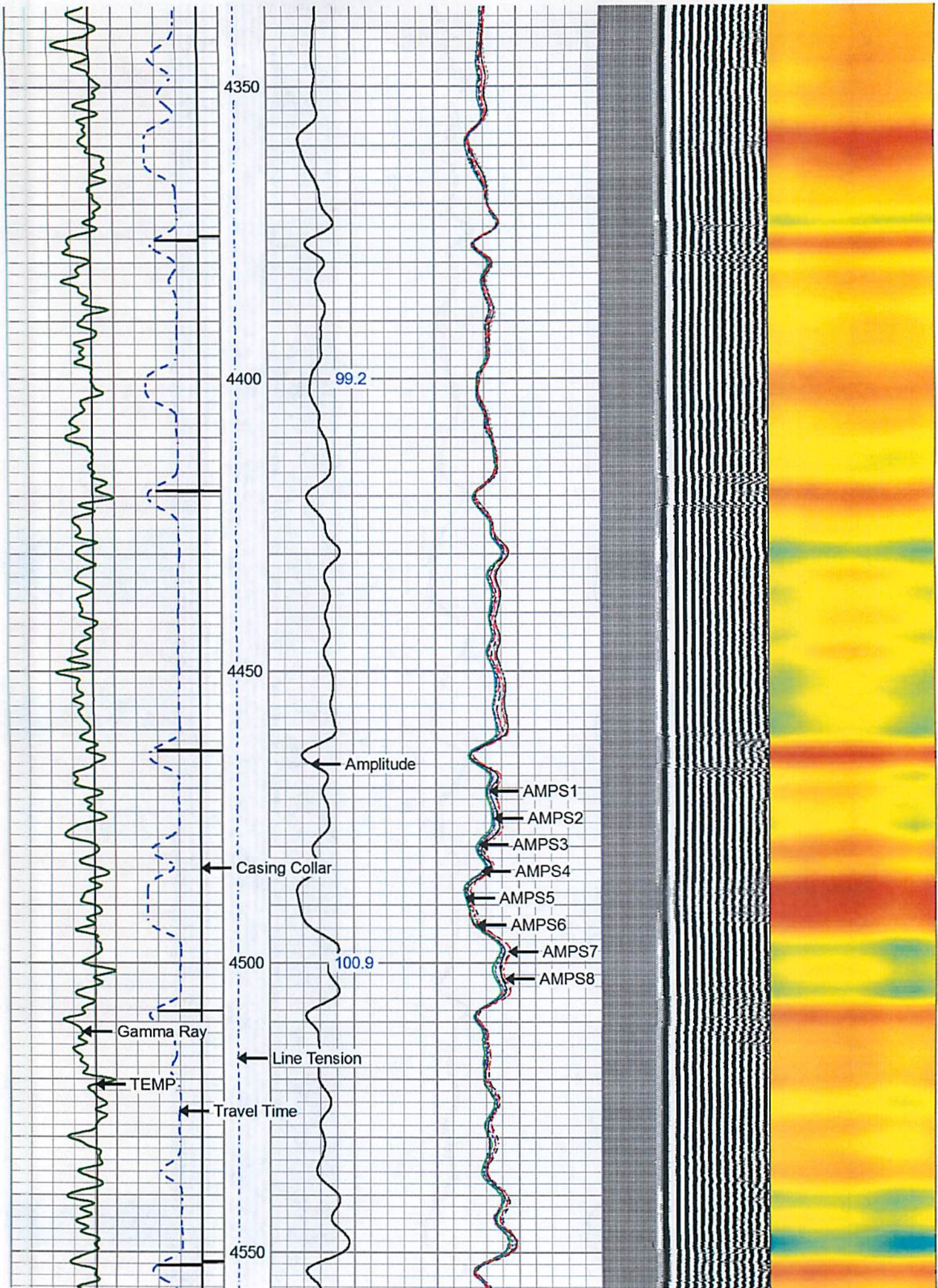


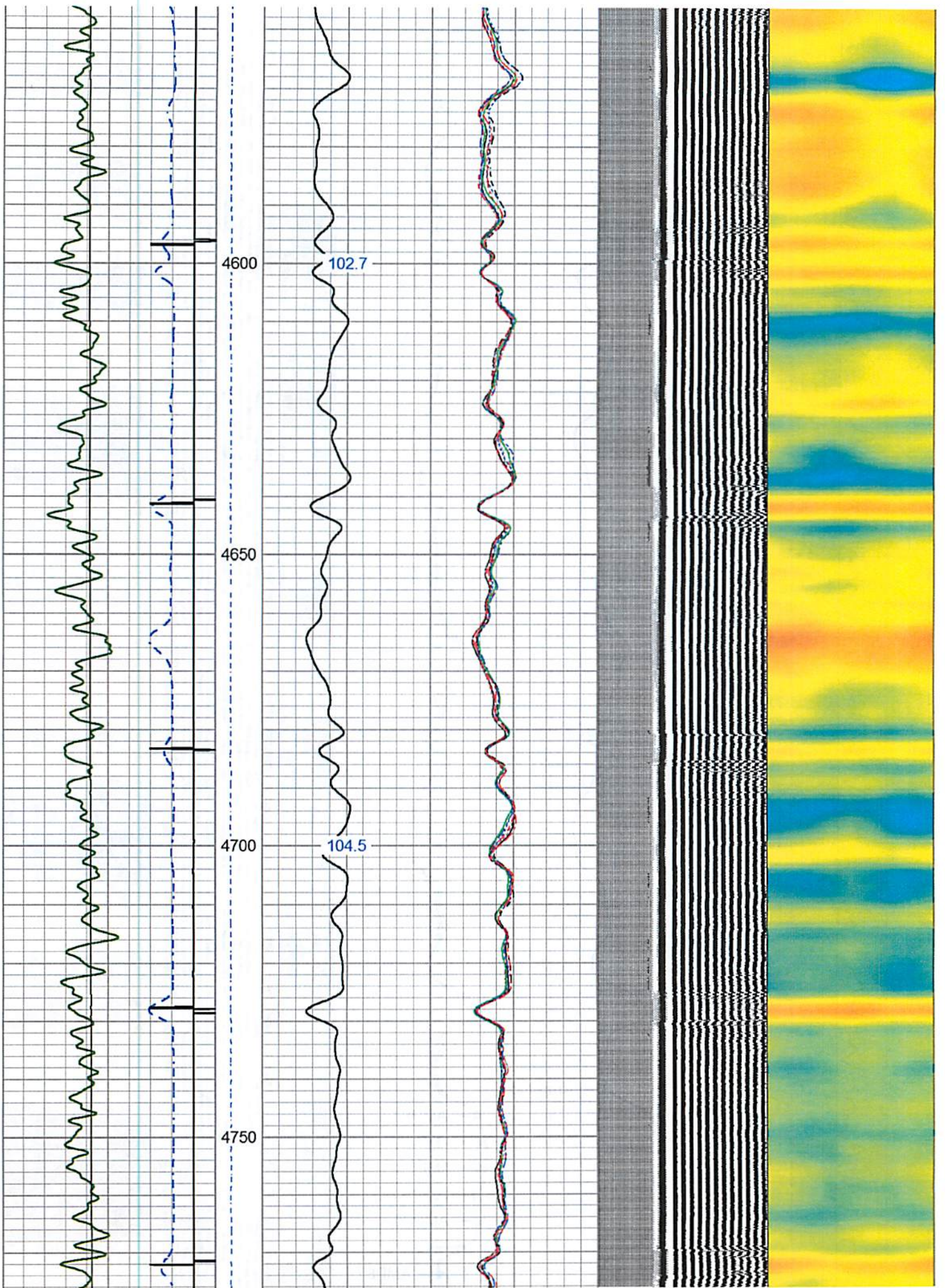


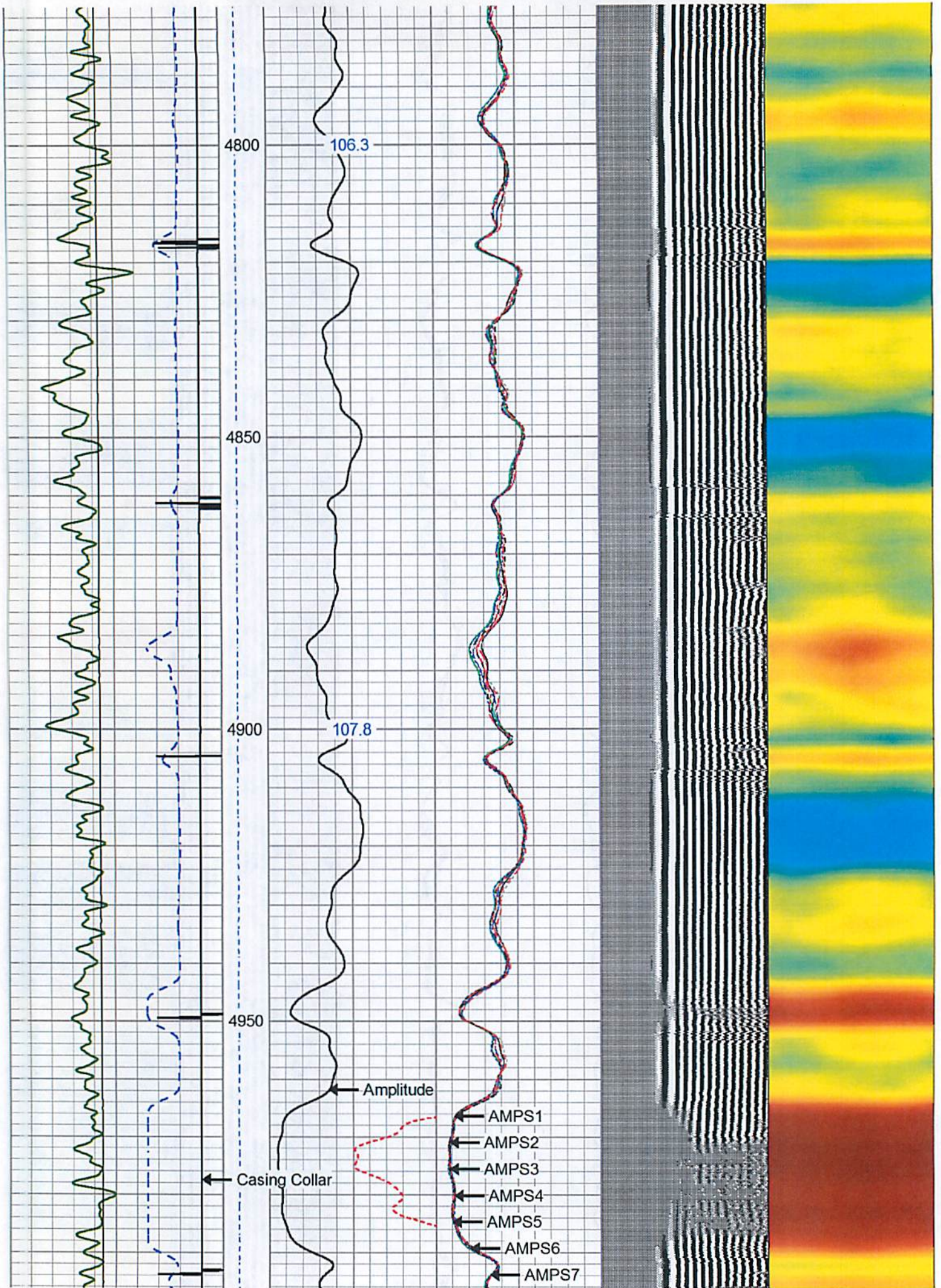


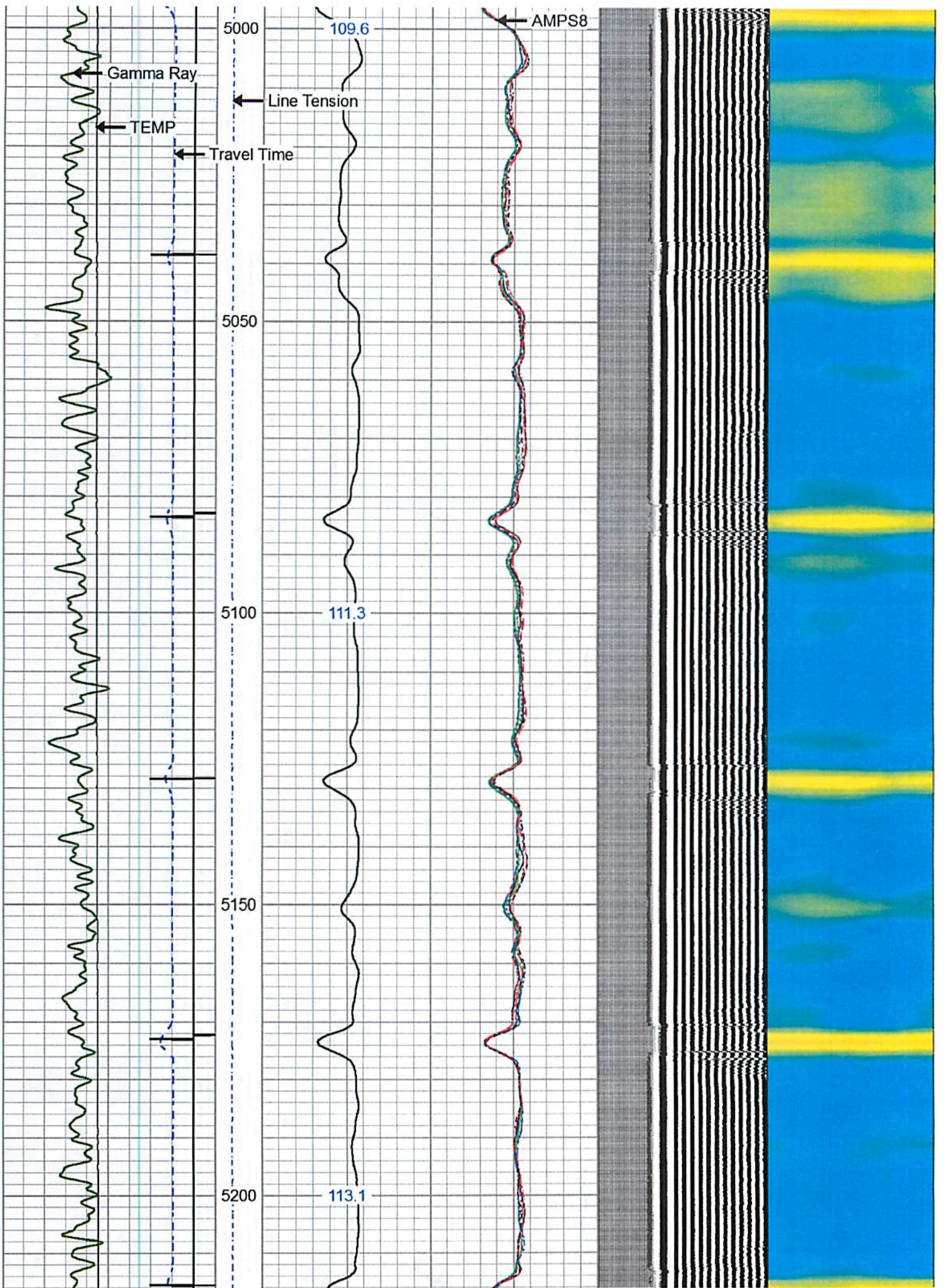


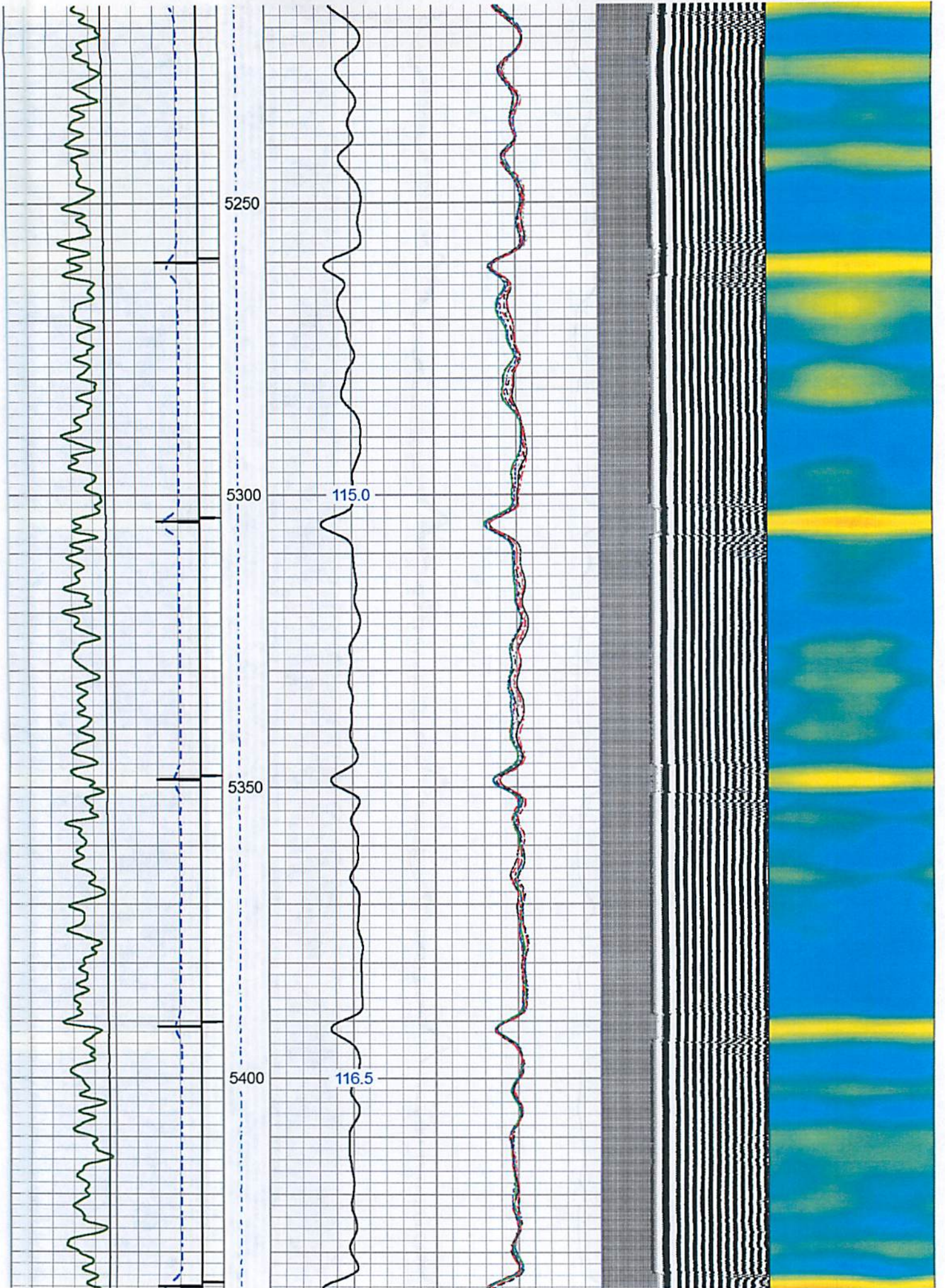


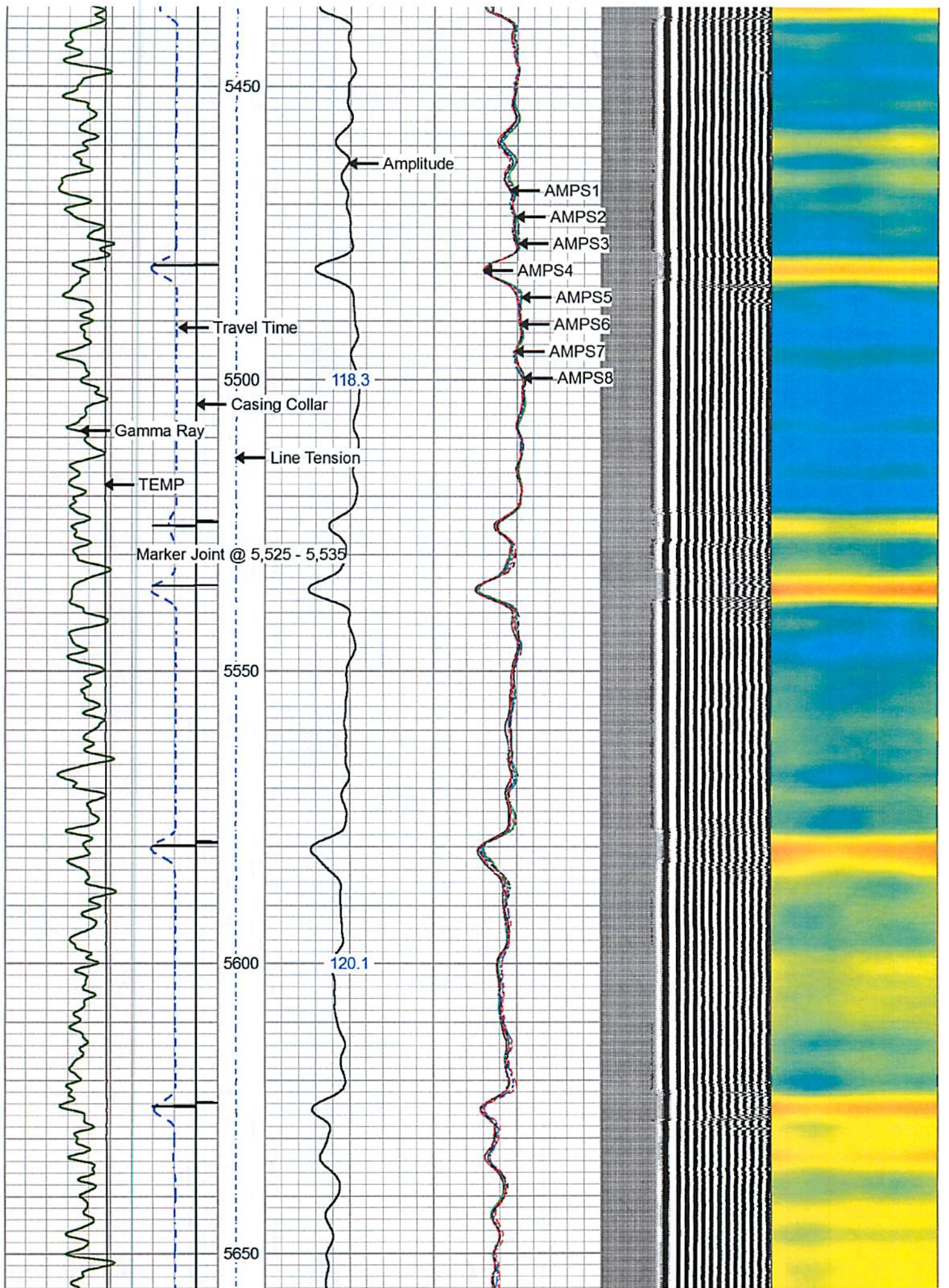


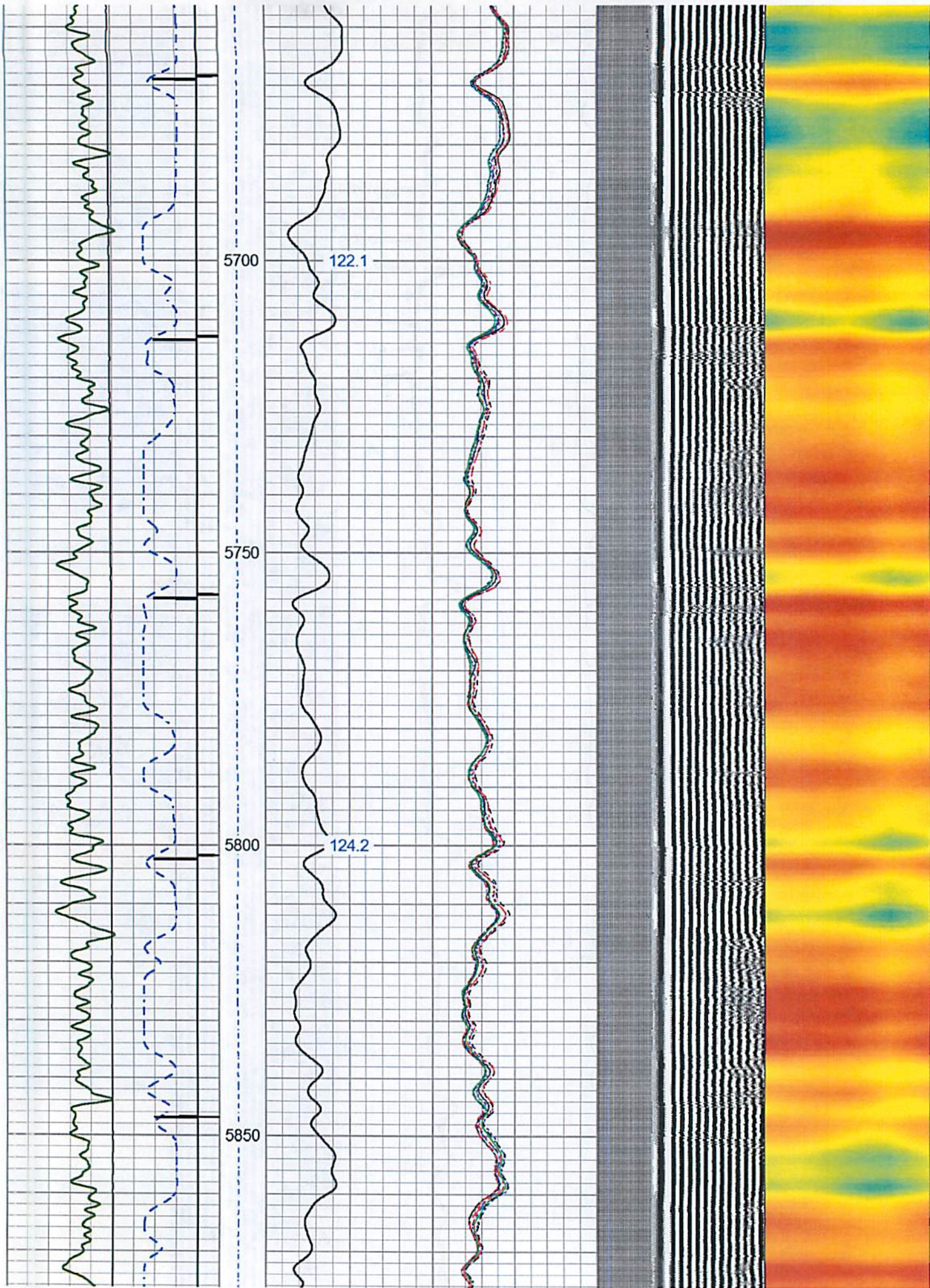


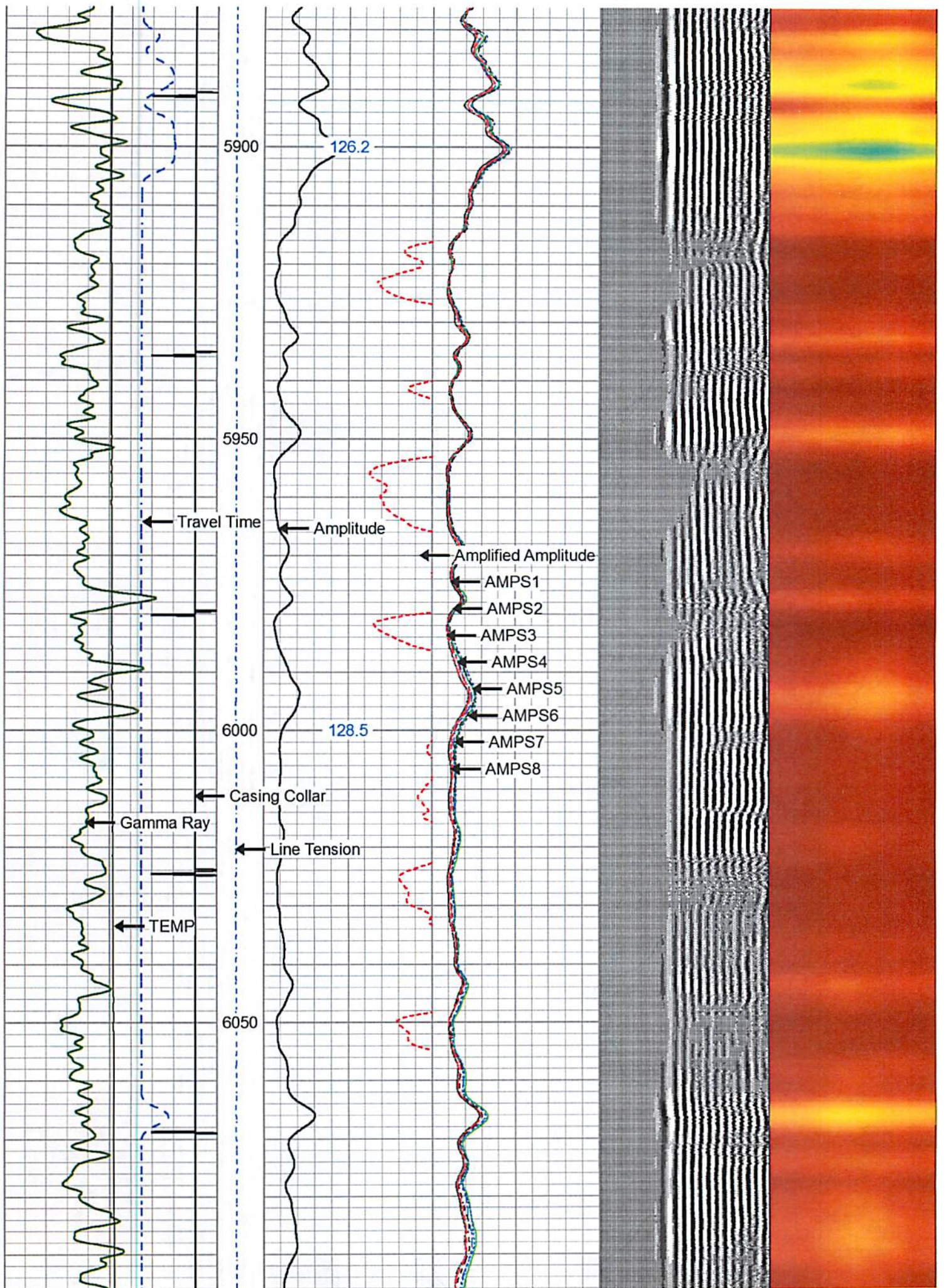


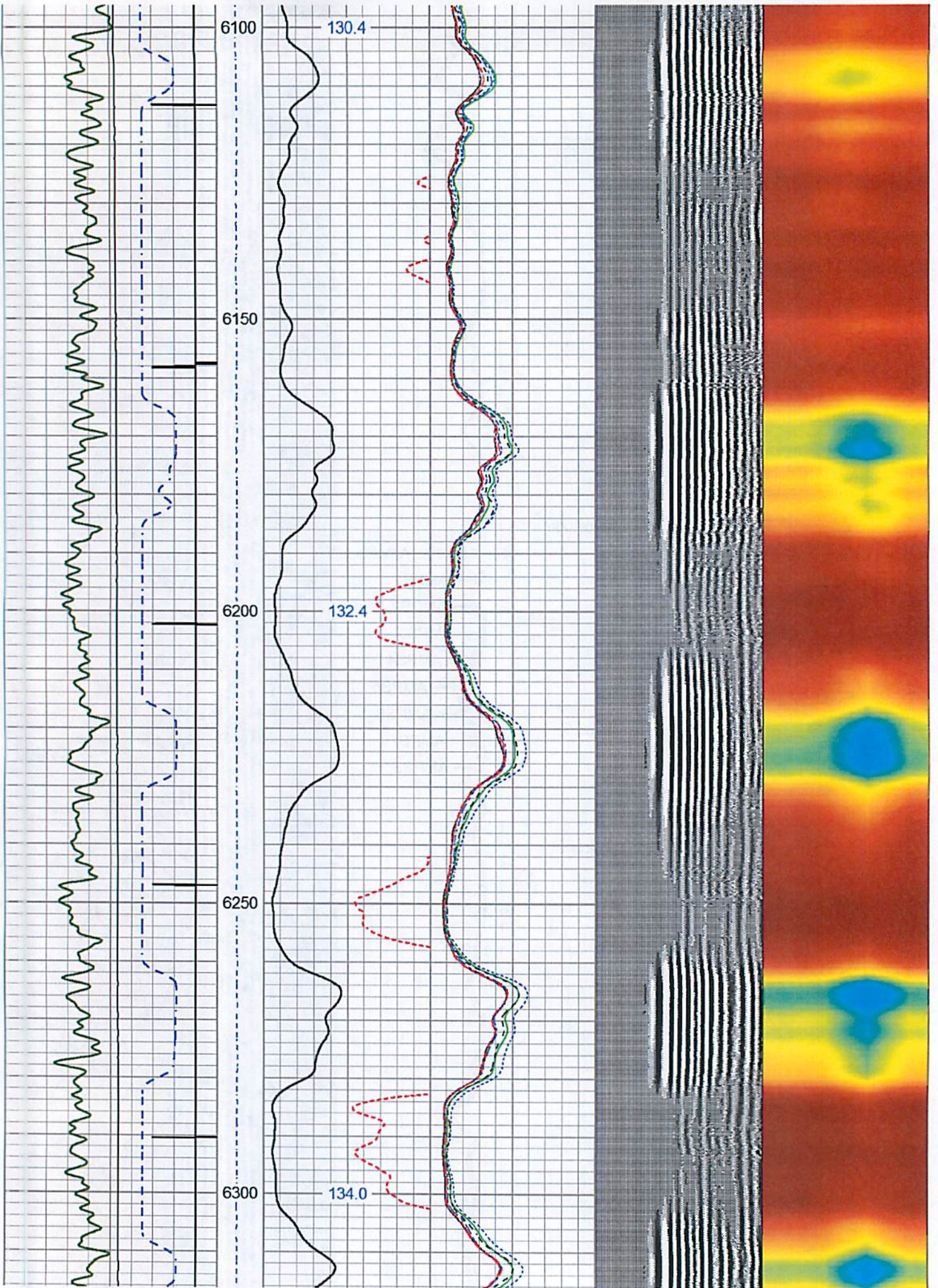


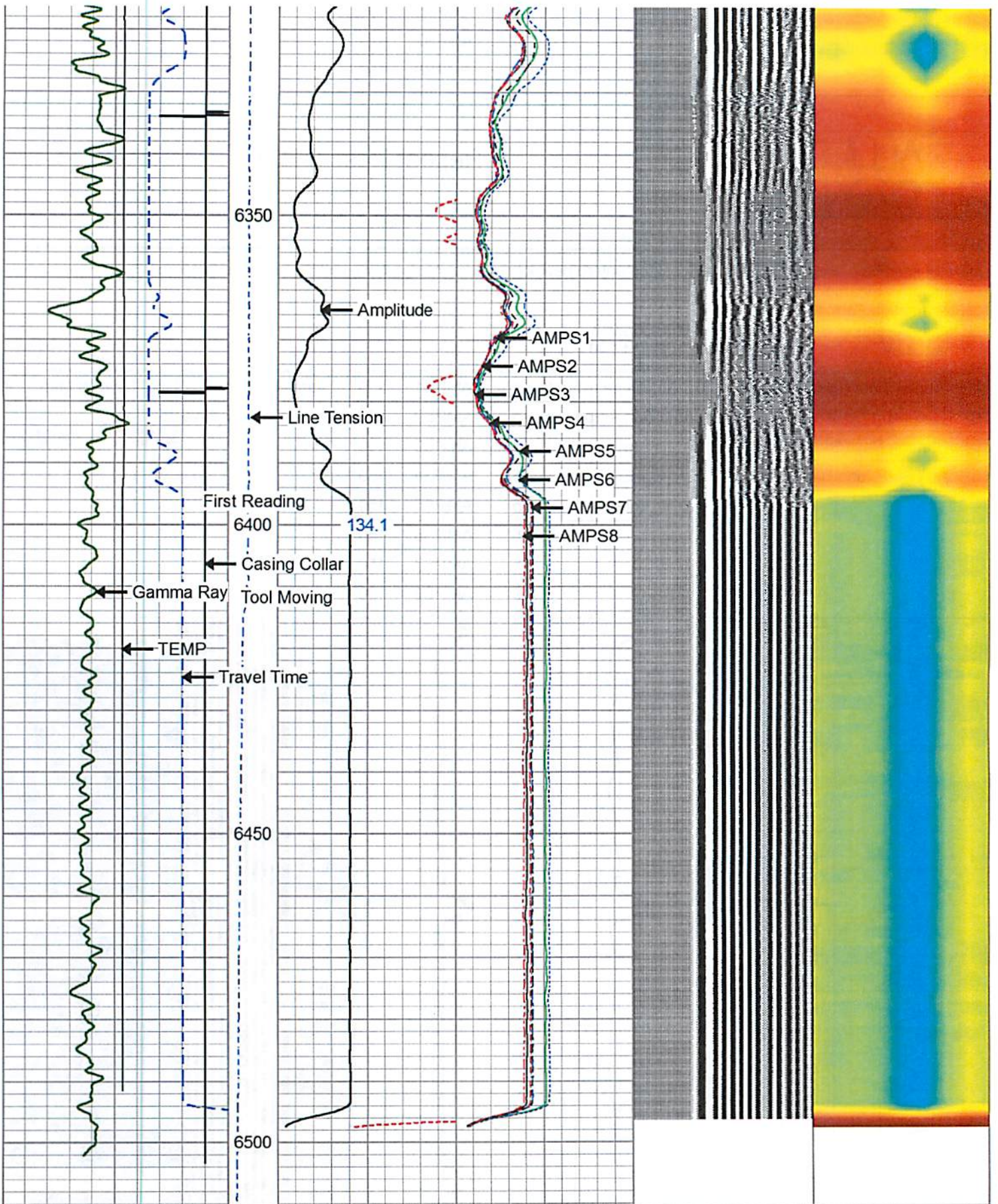












420	Travel Time (usec)	220	Line Tension (lb)	0	Amplitude (mV)	100	-5	AMPS1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	(lb)	0	Amplified Amplitude	10	-5	AMPS2	150	200	1200	0	100
0	Gamma Ray (GAPI)	300	(2500)	0	(mV)	10	-5	AMPS3	150				
0	TEMP (degF)	250			TEMP		-5	AMPS4	150				
					(degF)		-5	AMPS5	150				

-5	AMPS6	150
-5	AMPS7	150
-5	AMPS8	150

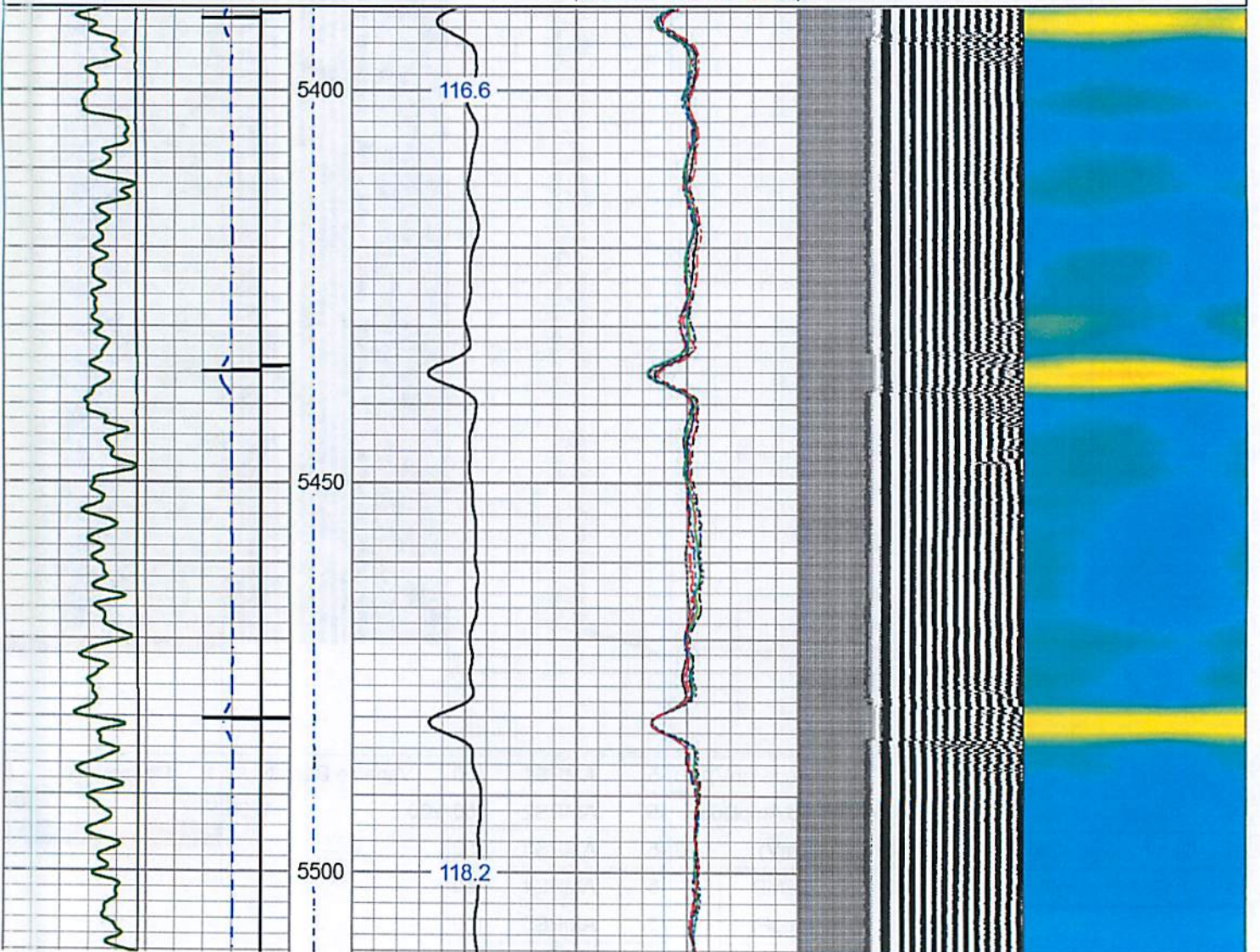


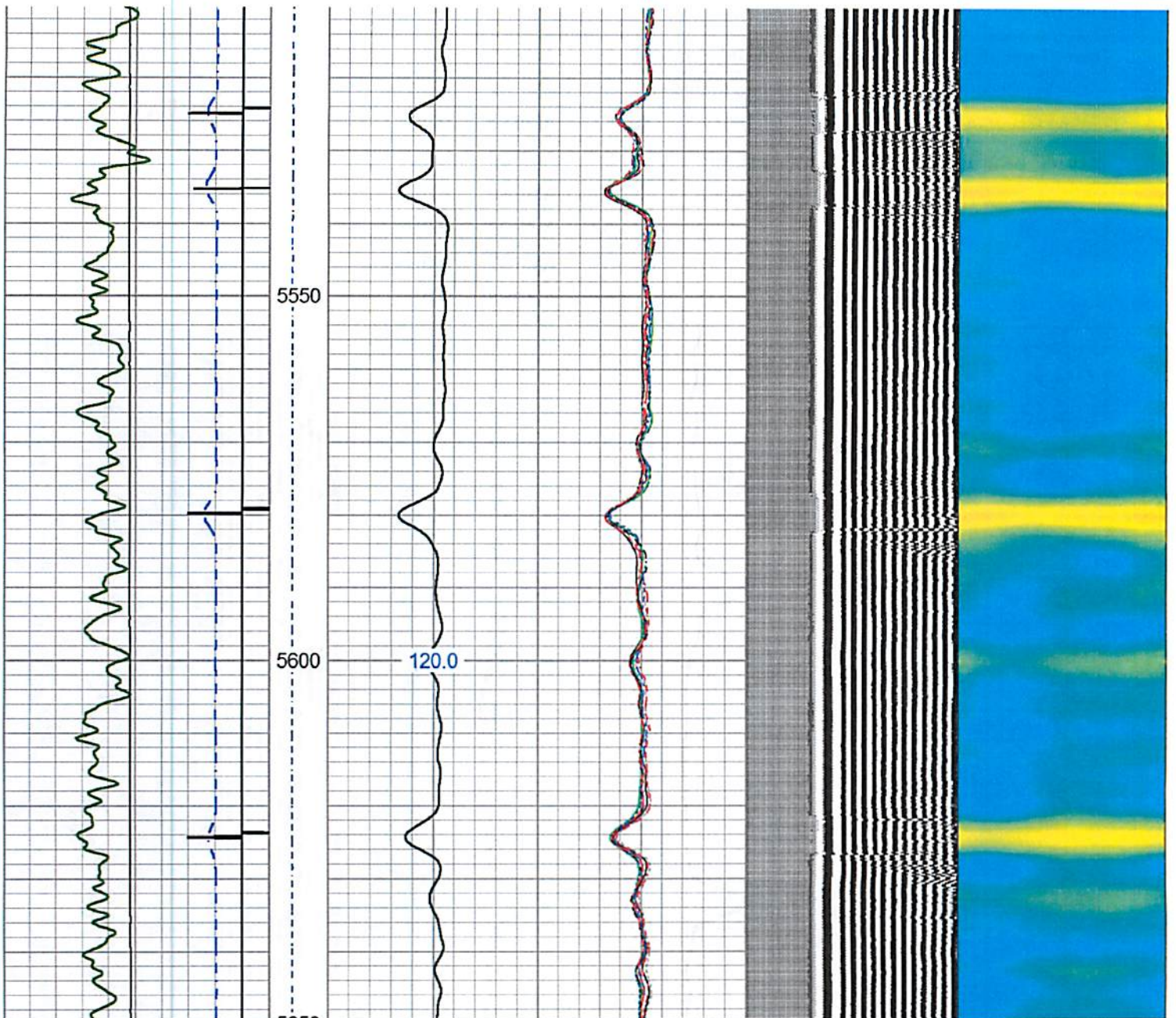
Repeat Pass 0 PSI

Scale 1:240

Database File c:\users\user\desktop\antero neat logs\antero_neat_crown_unit1h_rcbl_12132018.db
 Dataset Pathname pass4
 Presentation Format ahws_rcbl_jc
 Dataset Creation Thu Dec 13 20:08:36 2018
 Charted by Depth in Feet scaled 1:240

420	Travel Time (usec)	220	e Tens	0	Amplitude (mV)	100	-5	AMPS1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	(lb)	0	Amplified Amplitude	10	-5	AMPS2	150	200	1200	0	100
0	Gamma Ray (GAPI)	300	(2500)	0	(mV)	10	-5	AMPS3	150				
0	TEMP (degF)	250			TEMP		-5	AMPS4	150				
					(degF)		-5	AMPS5	150				
							-5	AMPS6	150				
							-5	AMPS7	150				
							-5	AMPS8	150				





420	Travel Time (usec)	220	0	Amplitude (mV)	100	-5	AMPS1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	(lb)	Amplified Amplitude		-5	AMPS2	150	200	1200	0	100
0	Gamma Ray (GAPI)	300	(2500)	(mV)	10	-5	AMPS3	150				
0	TEMP (degF)	250		TEMP		-5	AMPS4	150				
				(degF)		-5	AMPS5	150				
						-5	AMPS6	150				
						-5	AMPS7	150				
						-5	AMPS8	150				

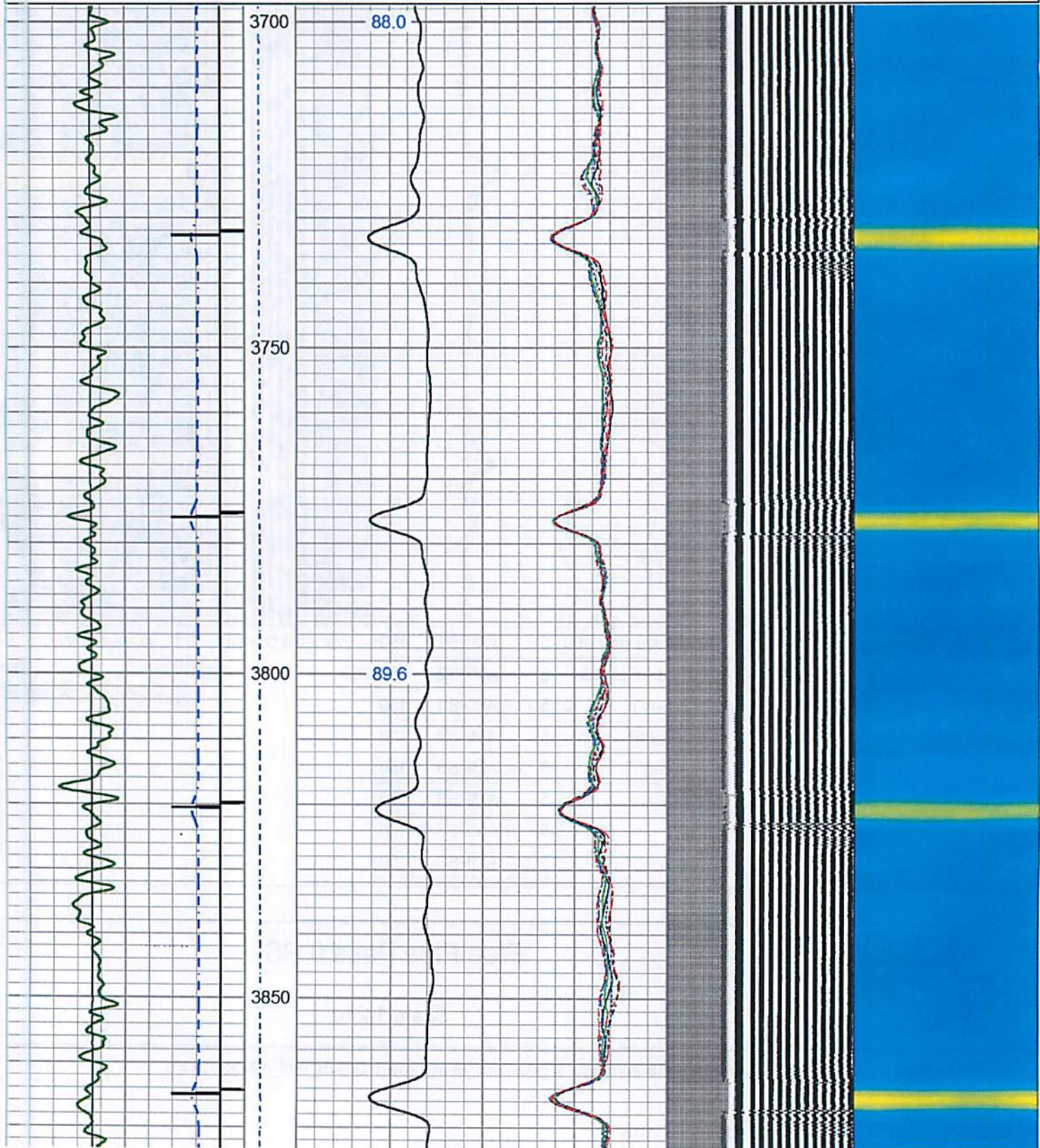


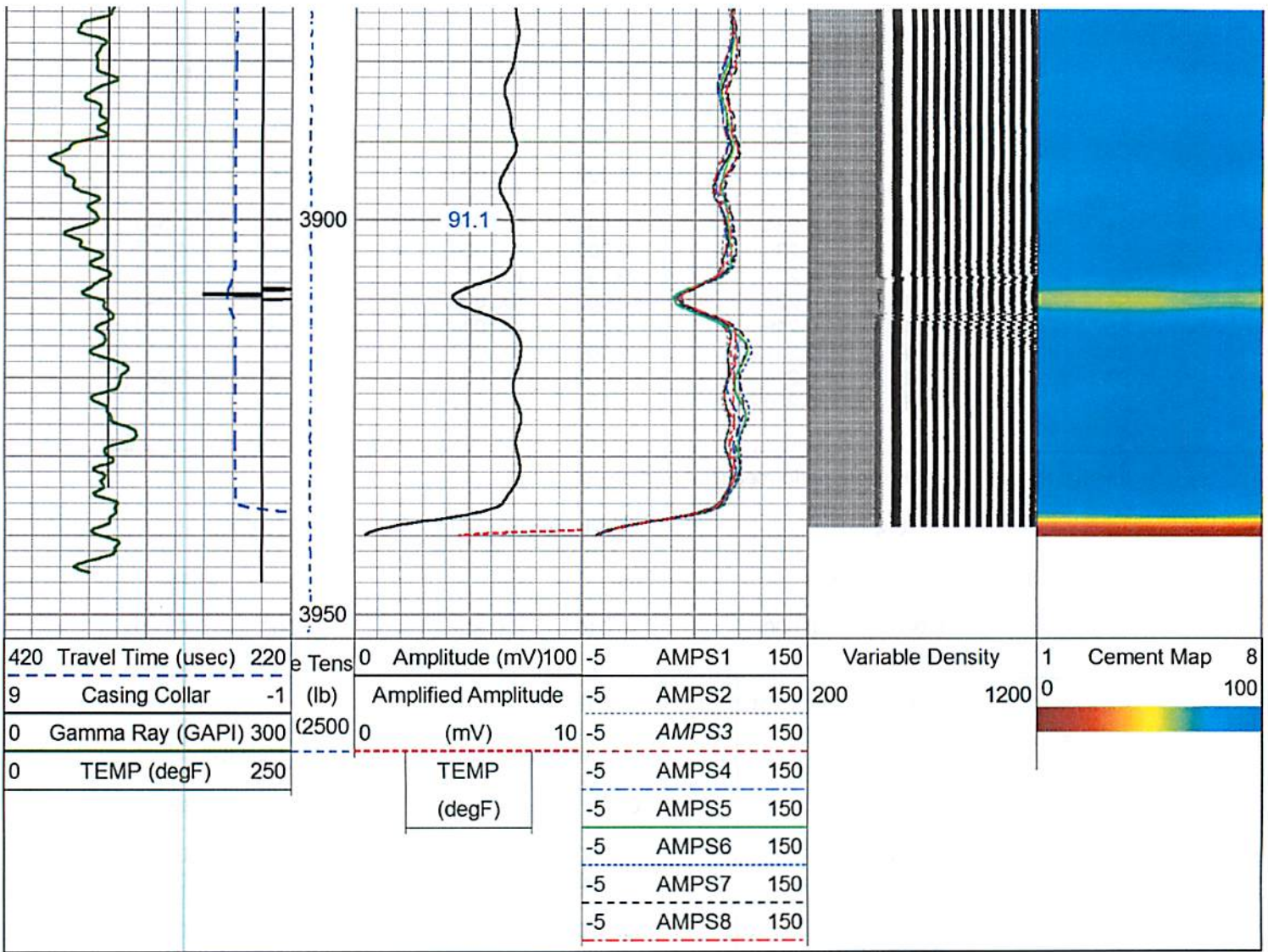
Free Pipe Pass 0 PSI

Scale 1:240

Database File	c:\users\user\desktop\antero neat logs\antero_neat_crown_unit1h_rcbl_12132018.db
Dataset Pathname	pass2
Presentation Format	ahws_rcbl_jc
Dataset Creation	Thu Dec 13 19:58:26 2018
Charted by	Depth in Feet scaled 1:240

Charted by		Depth in Feet scaled 1.240										
420	Travel Time (usec)	220	0	Amplitude (mV)	100	-5	AMPS1	150	Variable Density	1	Cement Map	8
9	Casing Collar	-1	(lb)	Amplified Amplitude		-5	AMPS2	150	200	1200	0	100
0	Gamma Ray (GAPI)	300	(2500)	(mV)	10	-5	AMPS3	150				
0	TEMP (degF)	250		TEMP		-5	AMPS4	150				
				(degF)		-5	AMPS5	150				
						-5	AMPS6	150				
						-5	AMPS7	150				
						-5	AMPS8	150				





Calibration Report

Database File c:\users\user\desktop\lantero neat logs\lantero_neat_crown_unit1h_rcbl_12132018.db
 Dataset Pathname pass6
 Dataset Creation Thu Dec 13 20:17:07 2018

Gamma Ray Calibration Report

Serial Number: FW1408-38 Corr
 Tool Model: GC_C3
 Performed: Thu May 25 15:00:07 2017

Calibrator Value: 1636.0 GAPI

Background Reading: 40.1 cps
 Calibrator Reading: 1964.2 cps

Sensitivity: 0.8503 GAPI/cps

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Segmented Cement Bond Log Calibration Report

Serial Number: FW1406-126
 Tool Model: RBTC3 Temp

Calibration Casing Diameter: 5.500 in
 Calibration Depth: 3771.042 ft

WV Department of
 Environmental Protection

Master Calibration, performed Thu Dec 13 19:57:22 2018:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	-0.009	0.222	1.000	72.000	306.461	3.836
CAL	-0.010	0.372				
5'	-0.009	0.182	1.000	72.000	373.032	4.215
SUM						
S1	-0.009	0.234	0.000	100.000	412.010	3.596
S2	-0.012	0.235	0.000	100.000	404.344	4.985
S3	-0.013	0.231	0.000	100.000	410.133	5.132
S4	-0.014	0.227	0.000	100.000	414.638	5.942
S5	-0.011	0.219	0.000	100.000	435.675	4.760
S6	-0.011	0.211	0.000	100.000	449.271	5.073
S7	-0.014	0.214	0.000	100.000	438.450	6.294
S8	-0.012	0.220	0.000	100.000	430.795	5.374

Internal Reference Calibration, performed (Not Performed):

	Raw (v)		Calibrated (v)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
CAL	0.000	0.000	-0.010	0.372	1.000	0.000

Air Zero Calibration, performed Thu Feb 15 08:40:59 2018:

	Raw (v)		Calibrated (v)		Results	
	Zero		Zero		Gain	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

Log Variables

Database:\users\user\desktop\antero neat logs\antero_neat_crown_unit1h_rcbl_12132018.db
Dataset field/well/run1/pass6/_vars_

Top - Bottom

BHTEMP_Src TEMP	BOREID in 8.625	BOTTEMP degF 135	CASEOD in 5.5	CASETHCK in 0.415	CASEWGHT lb/ft 23	MAXAMPL mV 72	MINAMPL mV 1
MINATTN db/ft 0.8	PERFS 0	PPT usec 260	SRFTEMP degF 0	TDEPTH ft 0			

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

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

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)	
			CHD-STNDRD (GOI) Standard Cable Head	1.00	1.69	10.00	
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00	
Temp	17.35						
			RBT-RBTC3 Temp (FW1406-126) Probe 2.75" Corrosion RCBL With Integral Temp Sub	9.39	2.75	90.00	
WVFS8	15.12						
WVFS7	15.12						
WVFS6	15.12						
WVFS5	15.12						
WVFS4	15.12						
WVFS3	15.12						
WVFS2	15.12						
WVFS1	15.12						
WVFCAL	15.12						
WVF3FT	15.12						
WVF5FT	14.12						
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00	
CCL	7.09						
GR	6.01						
			GR-GC_C3 (FW1408-38 Corr) Probe 2.75" Gamma Ray-CCL Corrosion Modified	5.10	2.75	55.00	
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00	

Total weight: 263.00 lb
O.D.: 2.75 in



Company Antero Resources
Well Crown 1H
Field Marcellus
County Tyler
State West Virginia

Country