



DUAL INDUCTION LOG

Company RITCHEE EXPLORATION, INC.
 Well BANGERTER 12C NO.1
 Field WILDCAT
 County WICHITA
 State KANSAS

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 Well BANGERTER 12C NO.1
 Field WILDCAT
 County WICHITA State KANSAS

Location: API #: 15-203-203335-00-00
 343' FSL & 925' FWL
 SEC 12 TWP 15S RGE 38W
 Permanent Datum GROUND LEVEL Elevation 3419'
 Log Measured From KELLY BUSHING
 Drilling Measured From KELLY BUSHING
 Other Services
 CNL/CDL
 Elevation
 K.B. 3431'
 D.F. N/A
 G.L. 3419'

Date	5/31/2018
Run Number	ONE
Depth Driller	5085'
Depth Logger	5090'
Bottom Logged Interval	5089'
Top Log Interval	250'
Casing Driller	8.625" @ 267'
Casing Logger	264'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	5400
Density / Viscosity	9.6 60
pH / Fluid Loss	10.0 8.8
Source of Sample	FLOWLINE
Rm @ Meas. Temp	.55 @ 74
Rmt @ Meas. Temp	.41 @ 74
Rmc @ Meas. Temp	.74 @ 74
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.32 @ 127
Operating Rig Time	5 HOURS
Max Rec. Temp. F	127 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	MAX LOVELY

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

RUSSELL SPRINGS
 SOUTH TO D ROAD, 5 WEST, 1 NORTH, 3/4 WEST, NORTH INTO

Log Measured From: KELLY BUSHING 12 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

Your Pioneer Energy Services Crew Engineer: J. HENRICKSON Operator: Operator: Operator:	This Log Record Was Witnessed By Primary Witness: MAX LOVELY Secondary Witness: Secondary Witness: Secondary Witness:
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Log Variables

DatabaseC:\ProgramData\Warrior\Data\ritchie_bangerter_12c_1.db
Dataset field/well/stack/pass4.1/_vars_

Top - 4104.00 ft

A	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	FLUIDDEN g/cc	M	MATRXDEN g/cc
1	7.875	126	5.5	0	1	2	2.71
NPORSEL	PERFS	SNDERR mmho/m	SNDERRM mmho/m	SPSHIFT mV	SRFTEMP degF	SZCOR	TDEPTH ft
Limestone	0	8	-2	-140	82	Off	5090

4104.00 ft - Bottom

A	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	FLUIDDEN g/cc	M	MATRXDEN g/cc
1	7.875	126	5.5	0	1	2	2.71
NPORSEL	PERFS	SNDERR mmho/m	SNDERRM mmho/m	SPSHIFT mV	SRFTEMP degF	SZCOR	TDEPTH ft
Limestone	0	8	-2	-140	82	Off	5090

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	33.00		GR-M&W (89-M&W)	3.00	3.50	50.00
CNLSC CNSSC	29.90 29.15		CNT-M&W (tk10-MW)	5.50	3.50	100.00
LSD DCAL SSD	20.85 20.83 20.35		CDL-M&W (128-4110)	8.50	4.00	250.00
RLL3 RLL3F	15.80 15.79					

CILD 8.00

CILM 4.70

SP 0.20

DIL-M&W (1987)

18.50

3.50

220.00

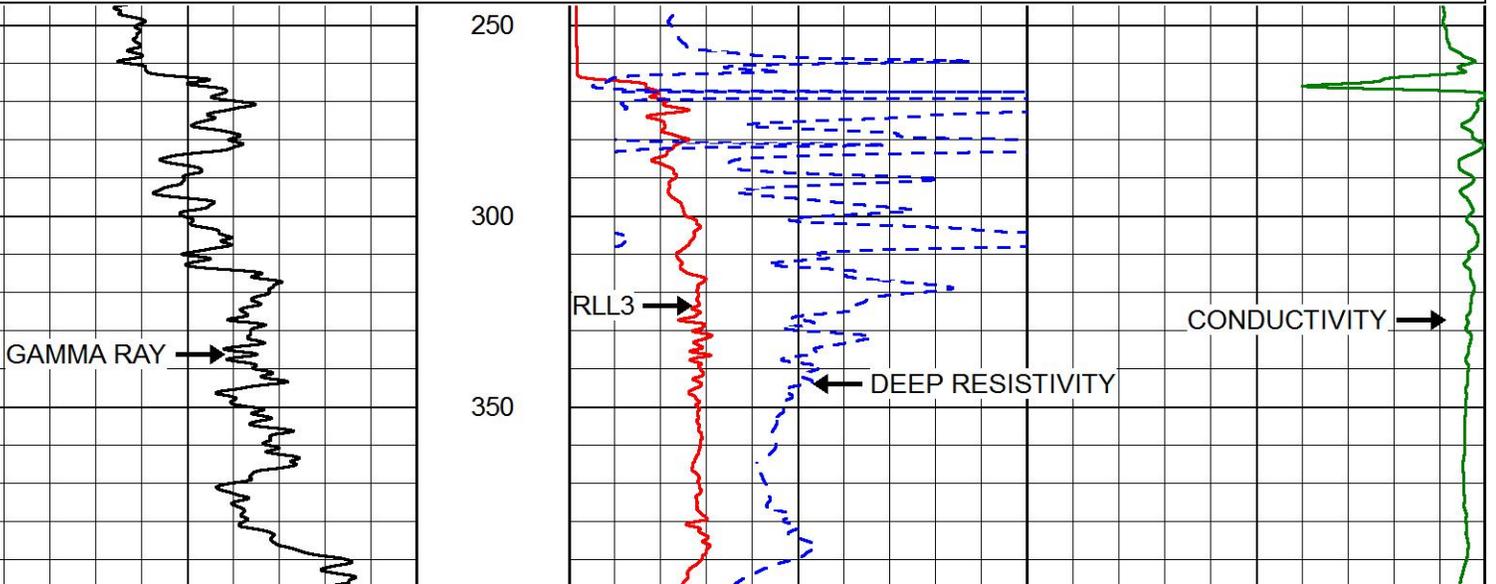
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 Total length: 35.50 ft
 Total weight: 620.00 lb
 O.D.: 4.00 in

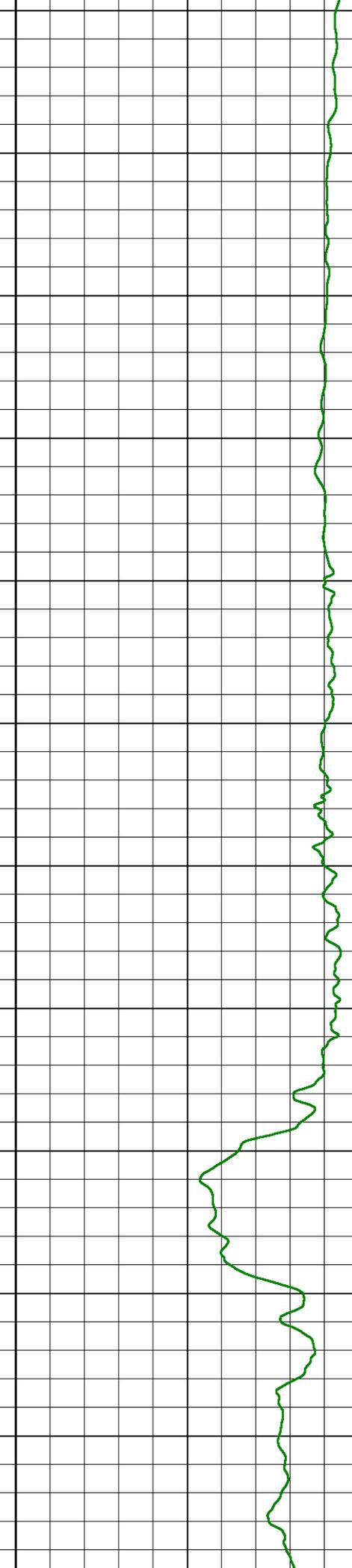
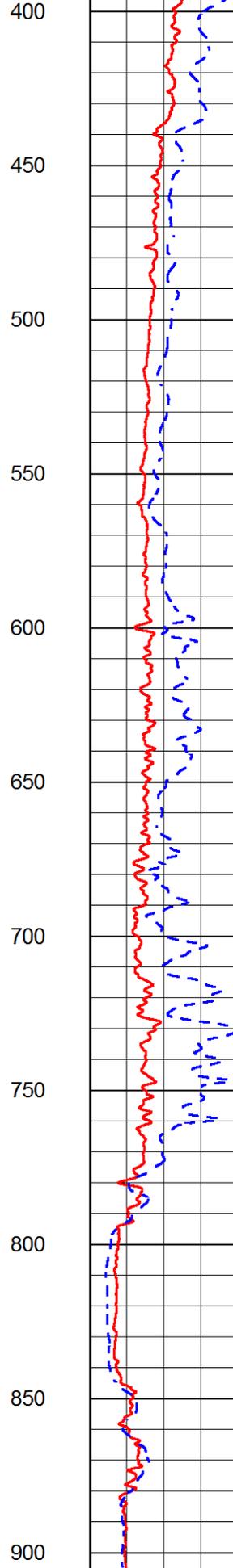
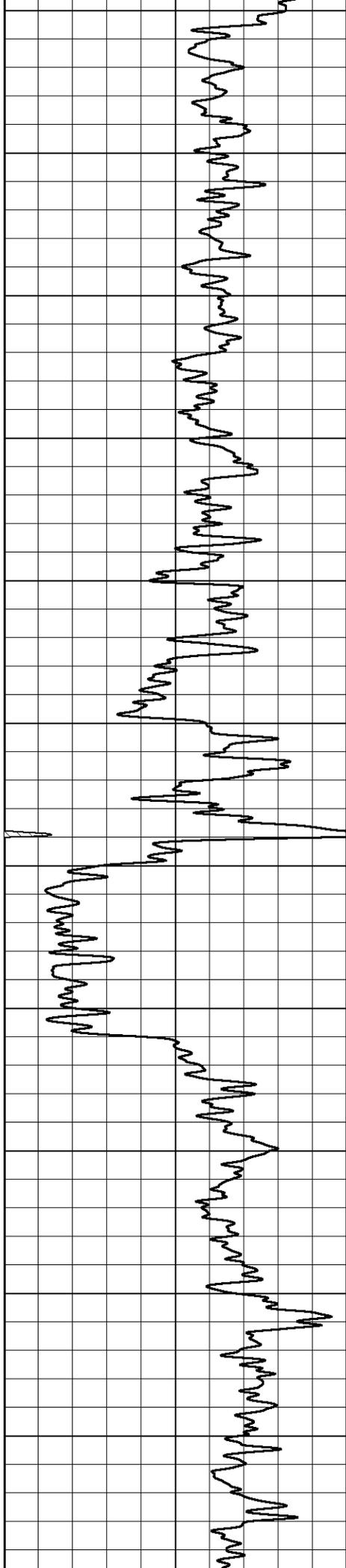


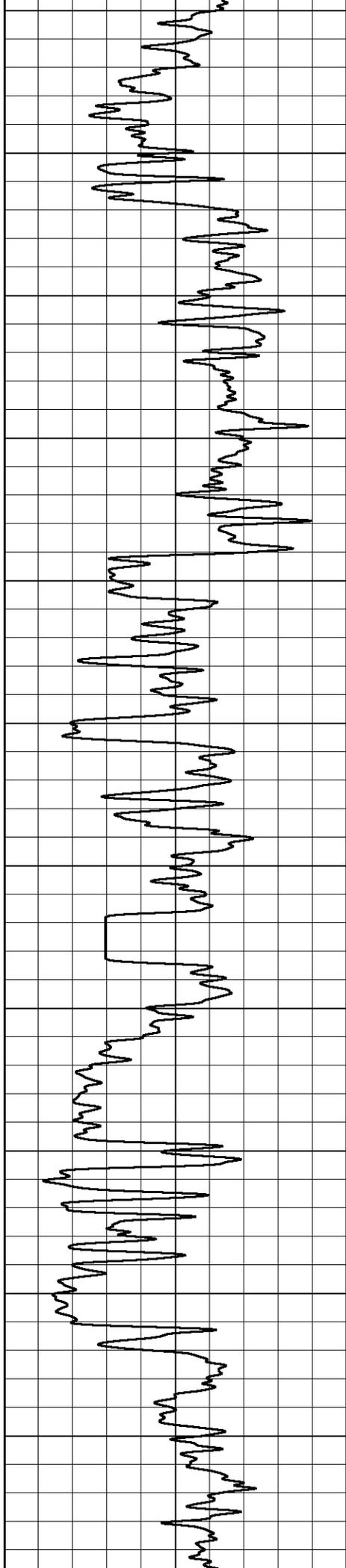
MAIN PASS

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 Presentation Format dil2in
 Dataset Creation Thu May 31 22:25:31 2018
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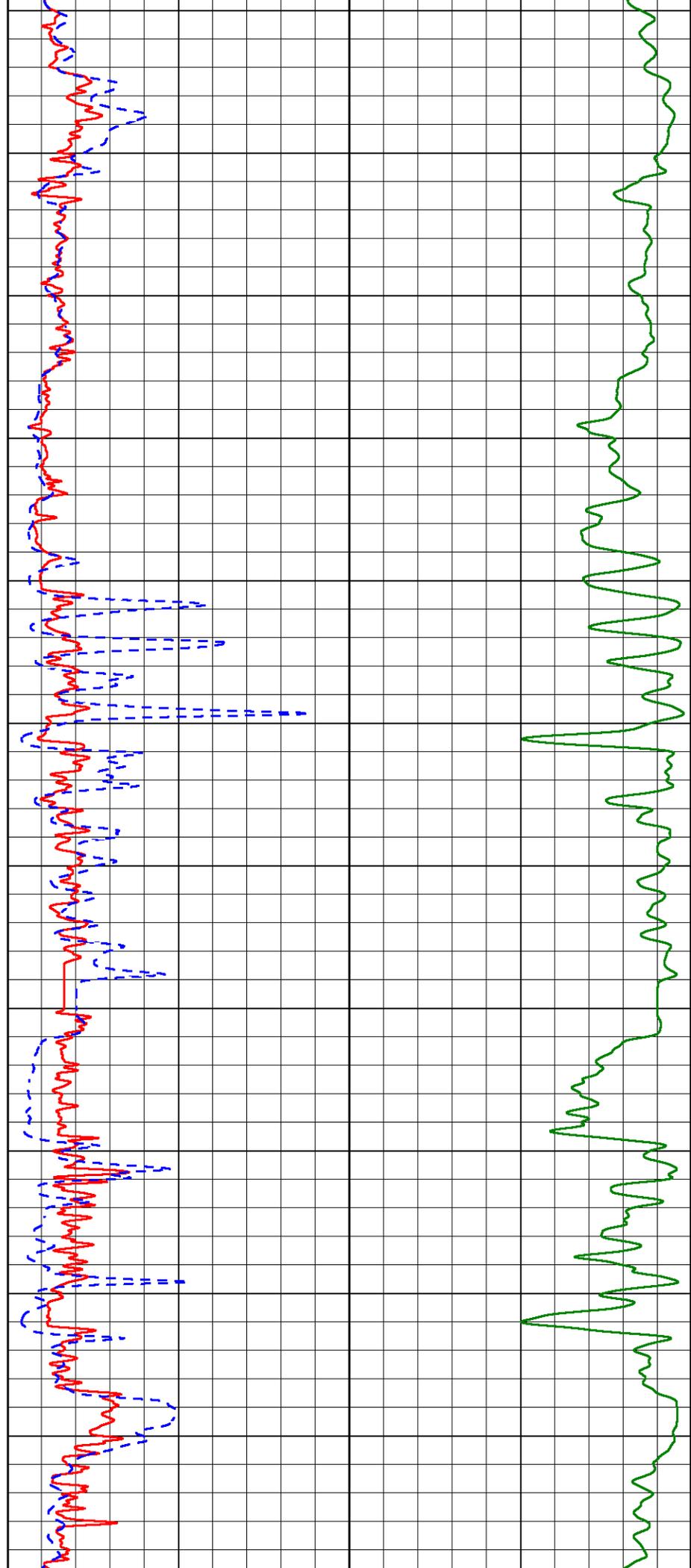
0	GAMMA RAY (GAPI)	150	2000	CONDUCTIVITY (mmho/m)	0
0	RLL3 (Ohm-m)	50	0	DEEP RESISTIVITY (Ohm-m)	50
50	RLL3 (Ohm-m)	500	50	DEEP RESISTIVITY (Ohm-m)	500
50	DEEP RESISTIVITY (Ohm-m)	500	50	DEEP RESISTIVITY (Ohm-m)	500

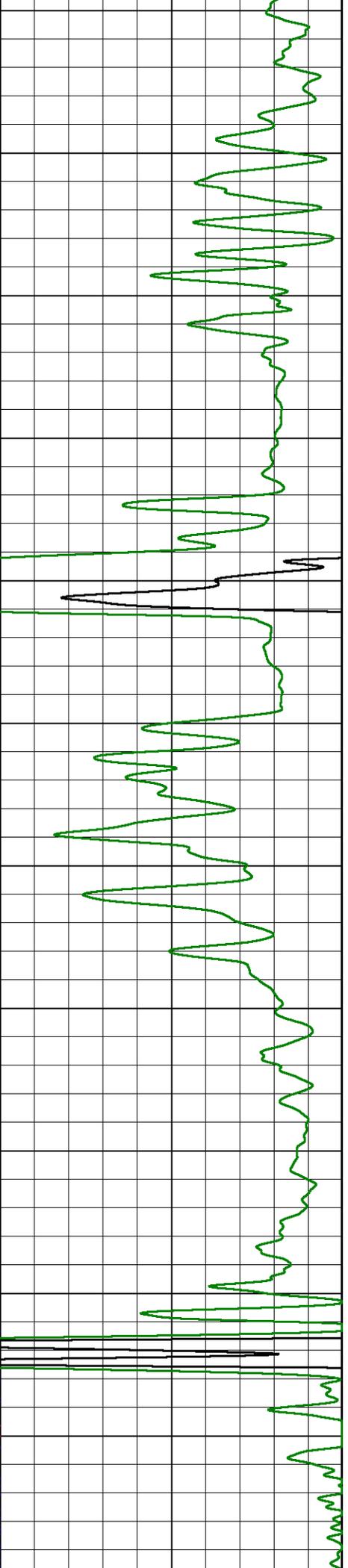
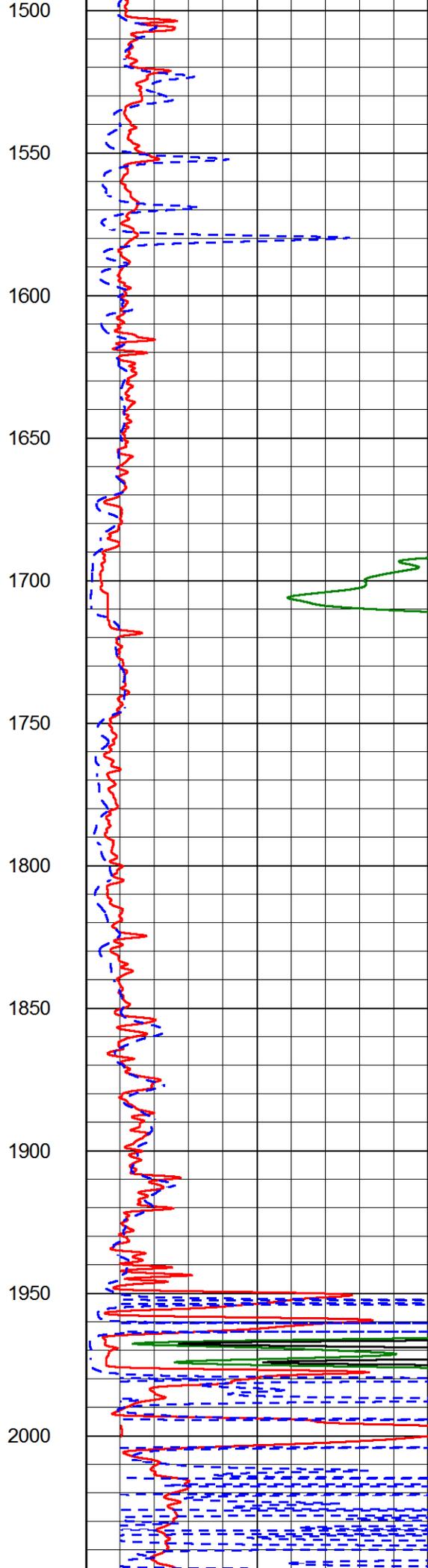
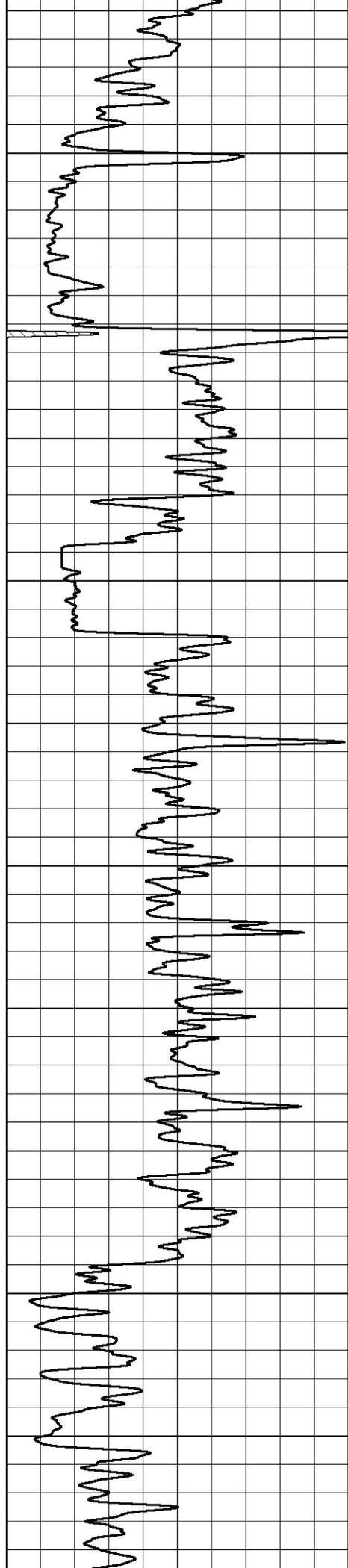


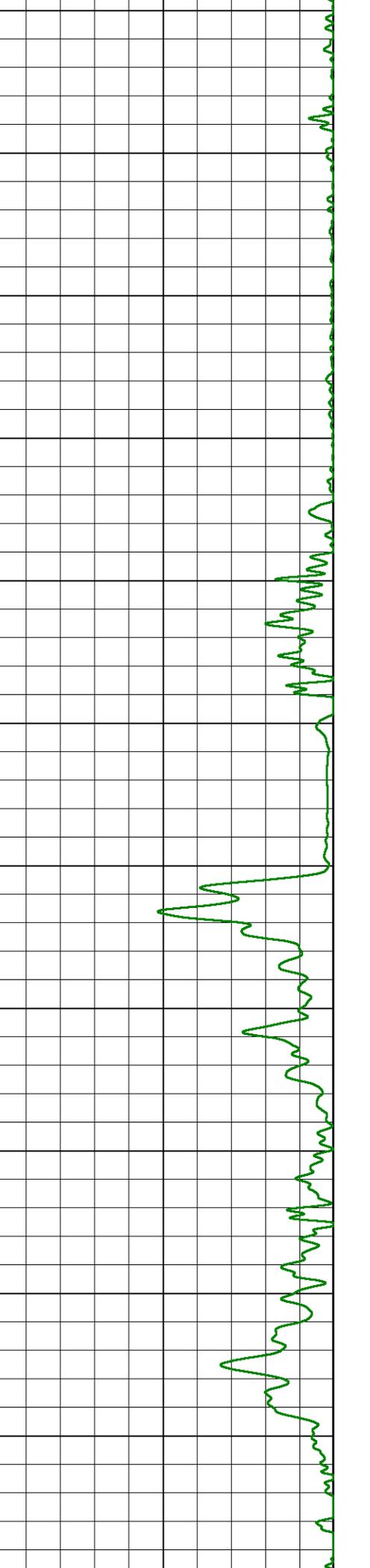
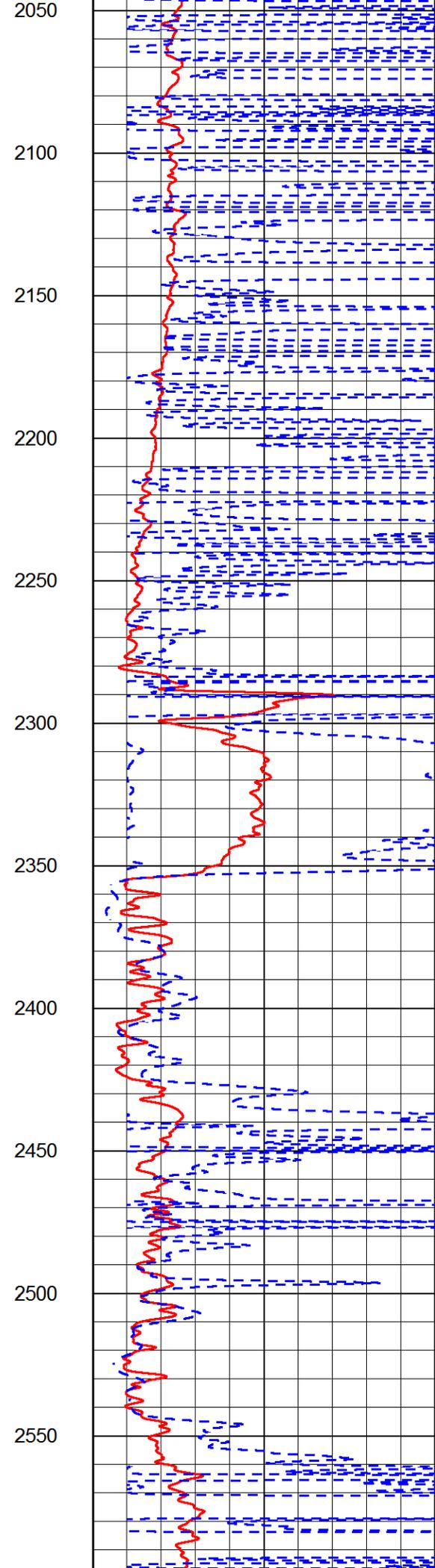
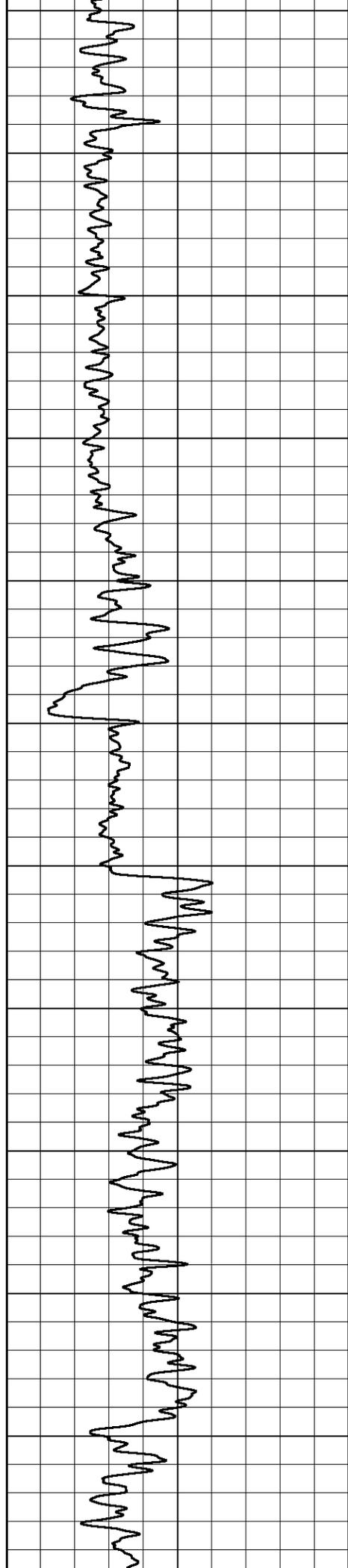


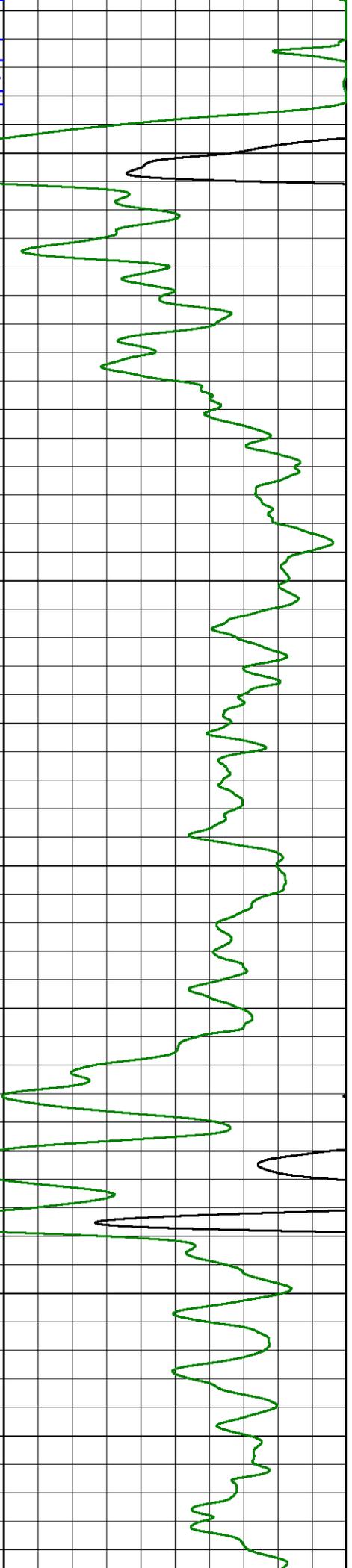
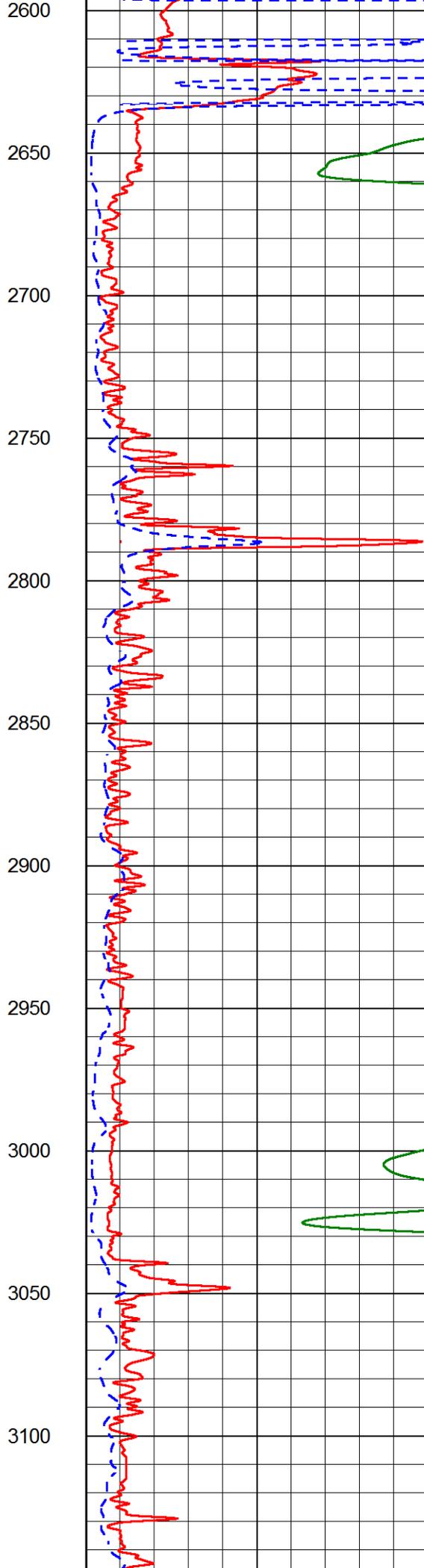
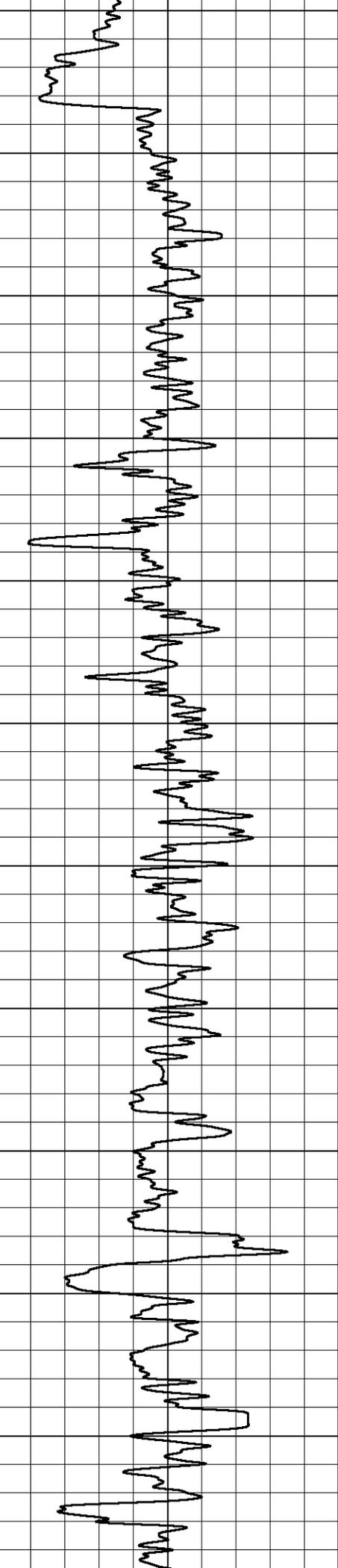


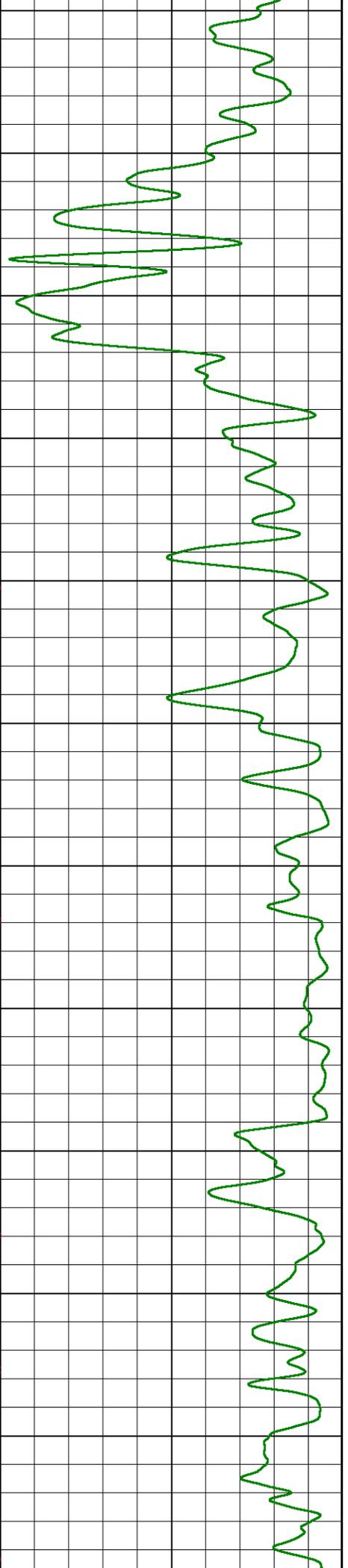
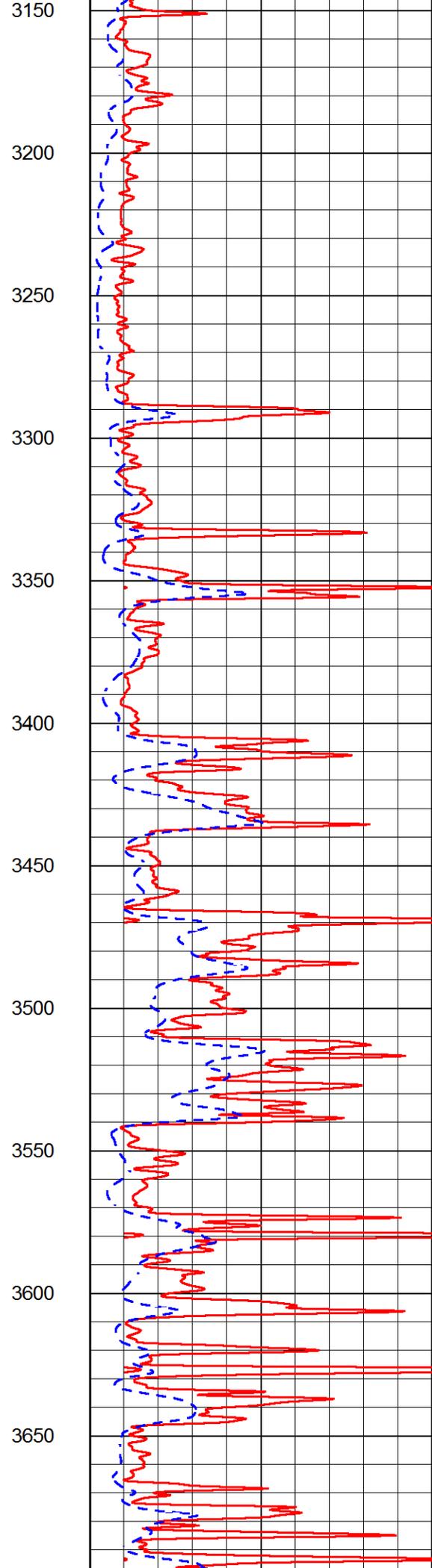
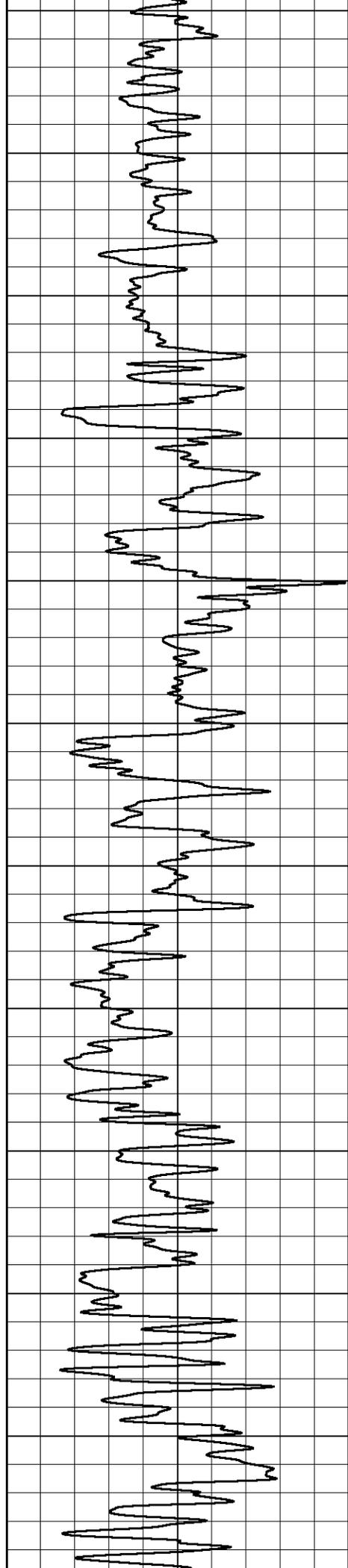
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1400
1450

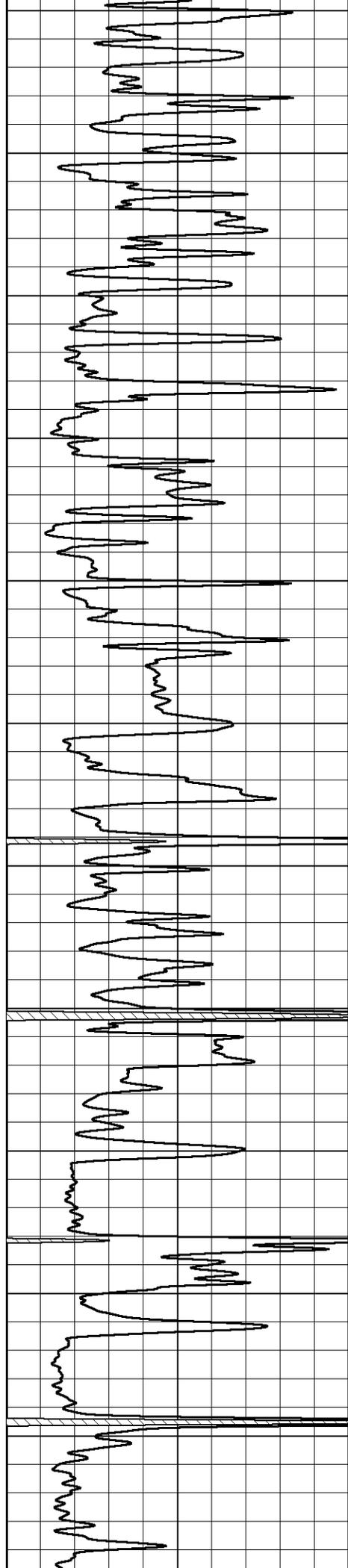




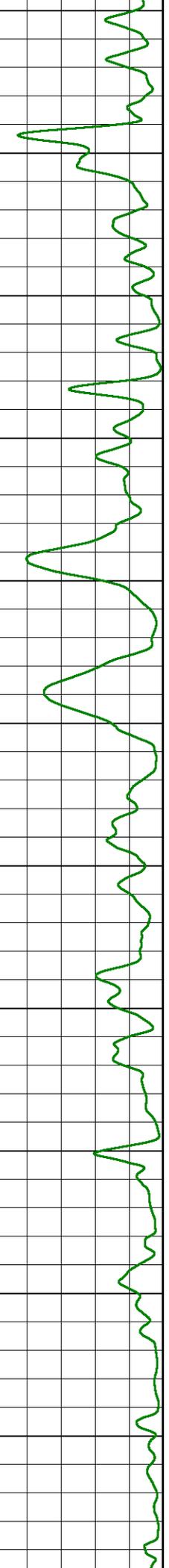
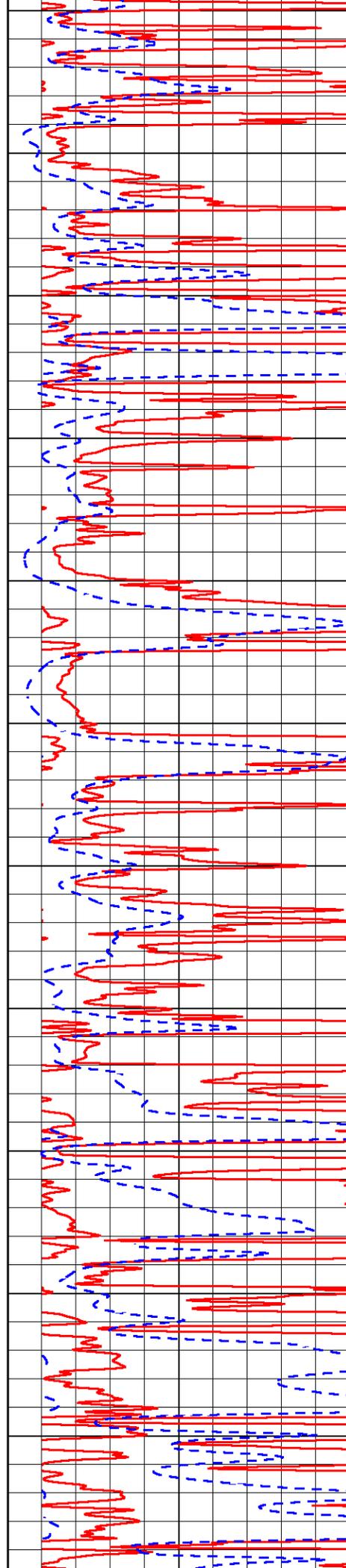


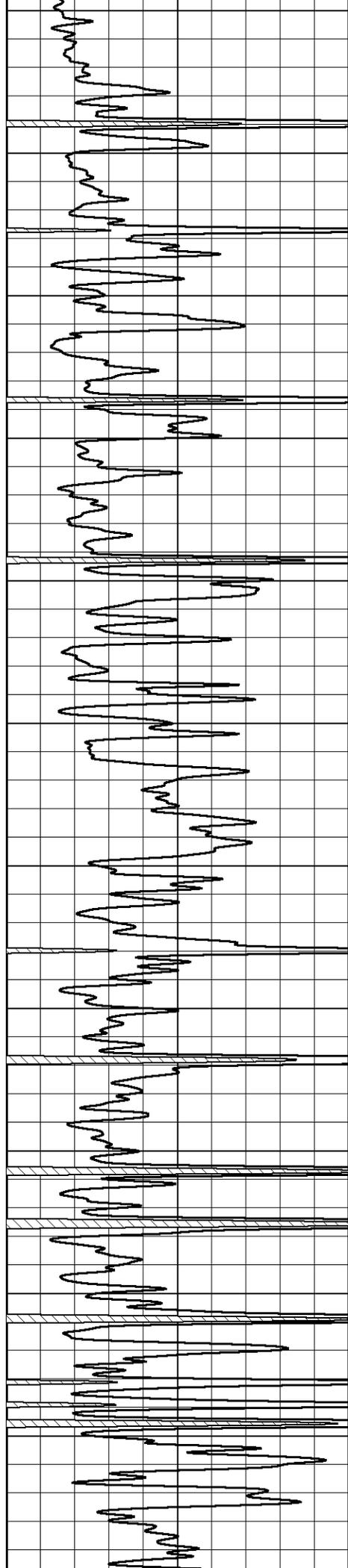




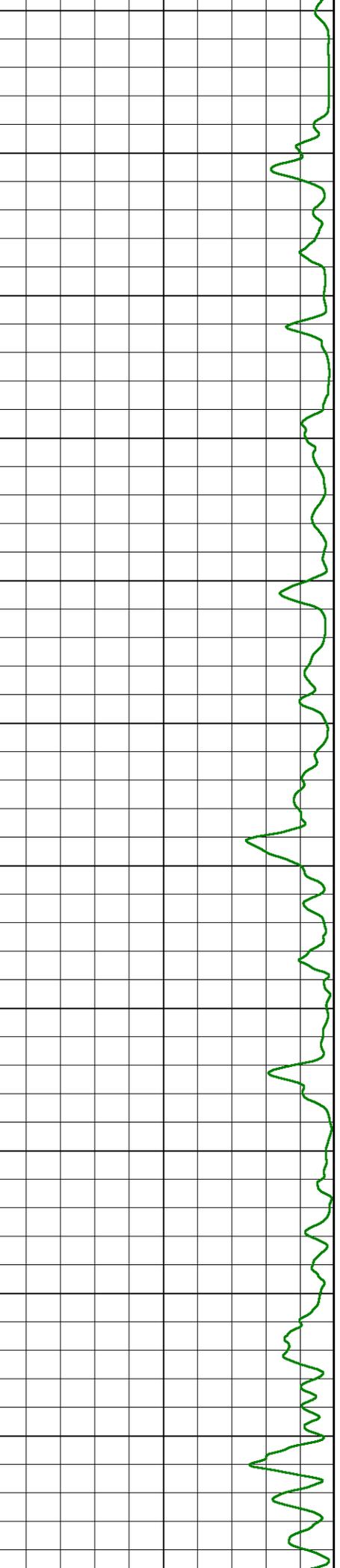
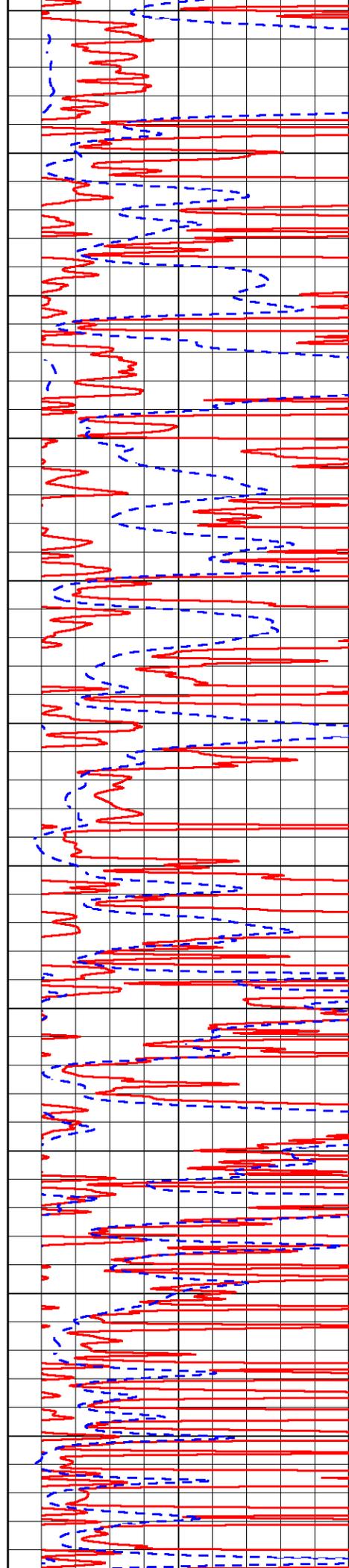


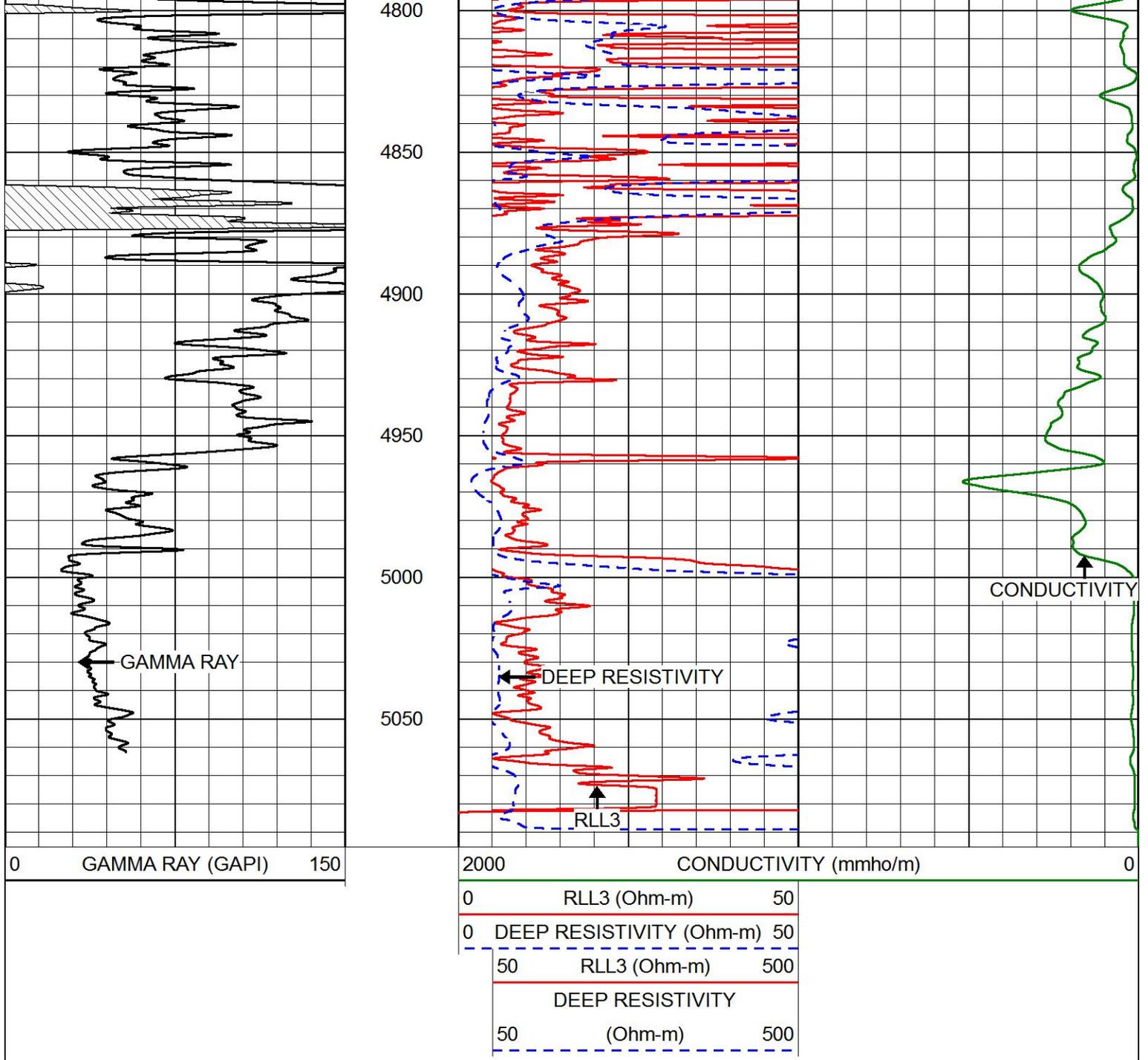
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3750
3800
3850
3900
3950
4000
4050
4100
4150
4200





4250
4300
4350
4400
4450
4500
4550
4600
4650
4700
4750

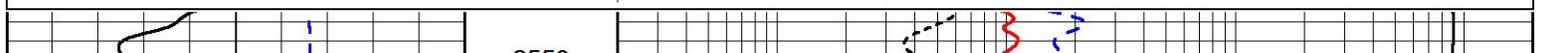


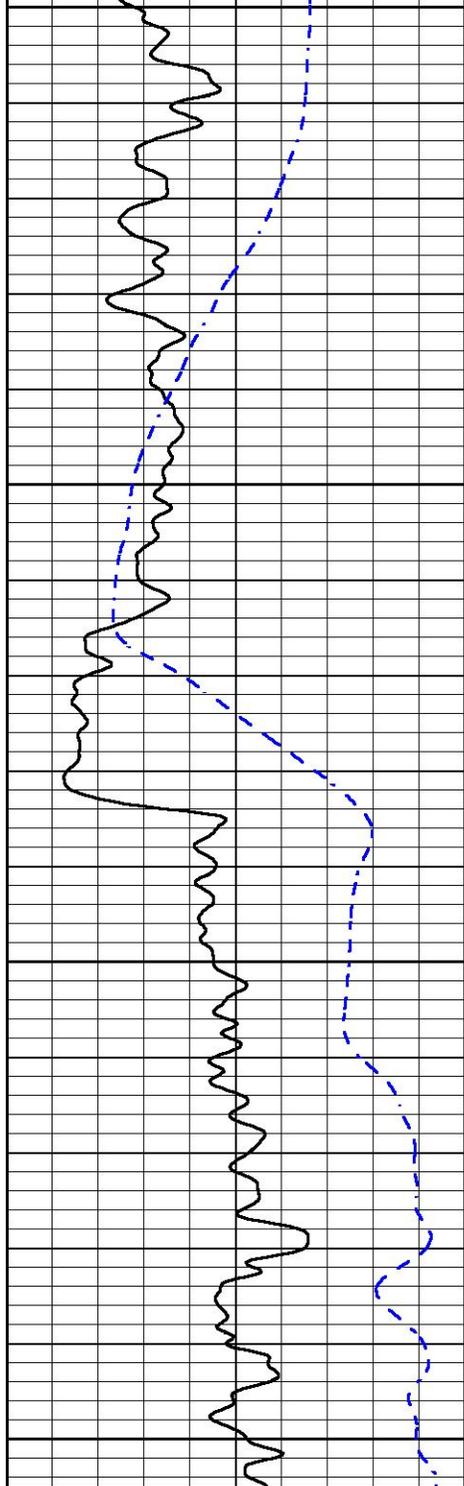


MAIN PASS

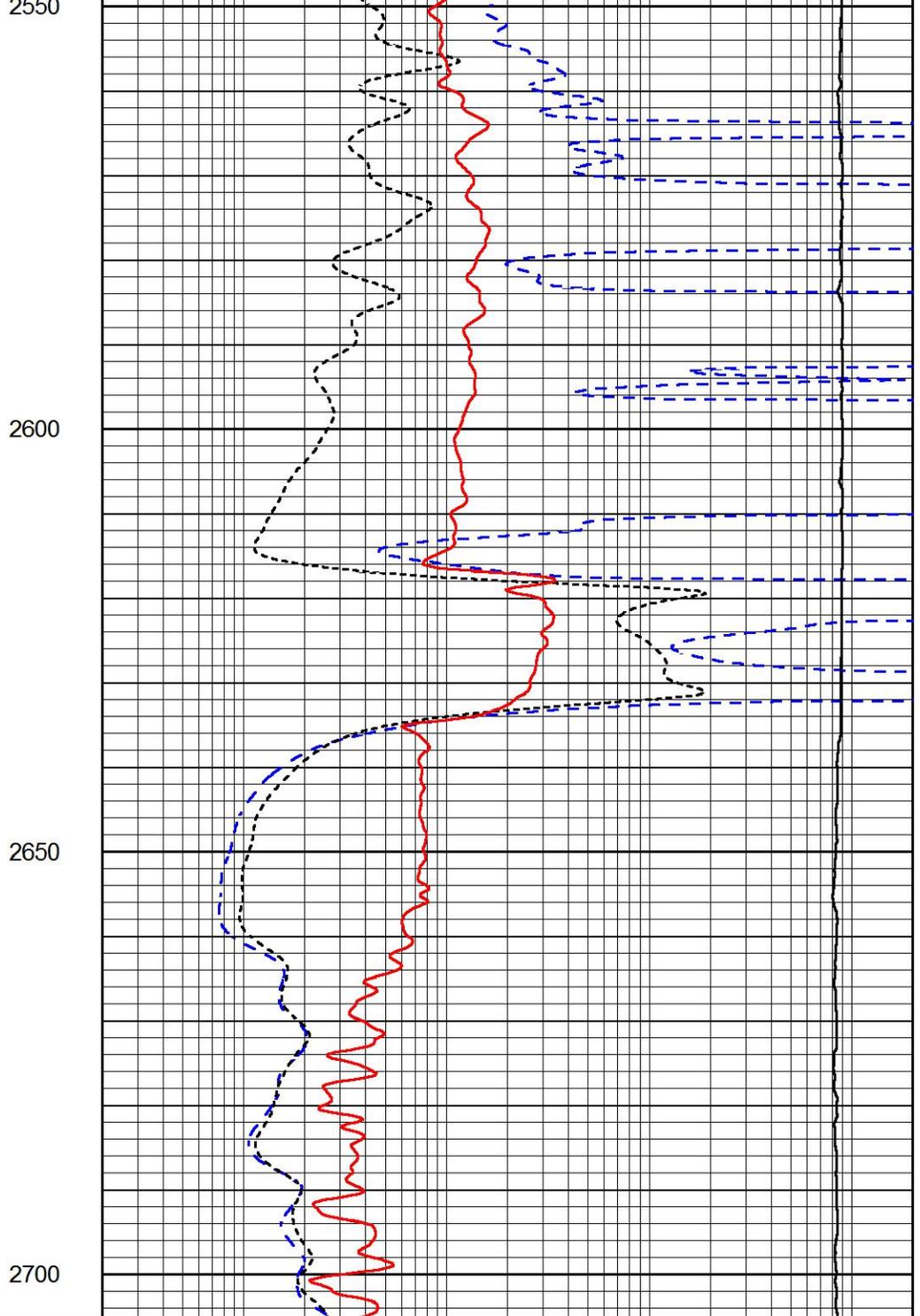
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 Presentation Format: dil
 Dataset Creation: Thu May 31 22:25:31 2018
 Charted by: Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150	0.2	DEEP RESISTIVITY (Ohm-m)	2000
-200	SP (mV)	0	0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
			0.2	RLL3 (Ohm-m)	2000
			15000	LINE TENSION (lb)	0





0 GAMMA RAY (GAPI) 150
 -200 SP (mV) 0



0.2 DEEP RESISTIVITY (Ohm-m) 2000
 0.2 MEDIUM RESISTIVITY (Ohm-m) 2000
 0.2 RLL3 (Ohm-m) 2000
 15000 LINE TENSION (lb) 0

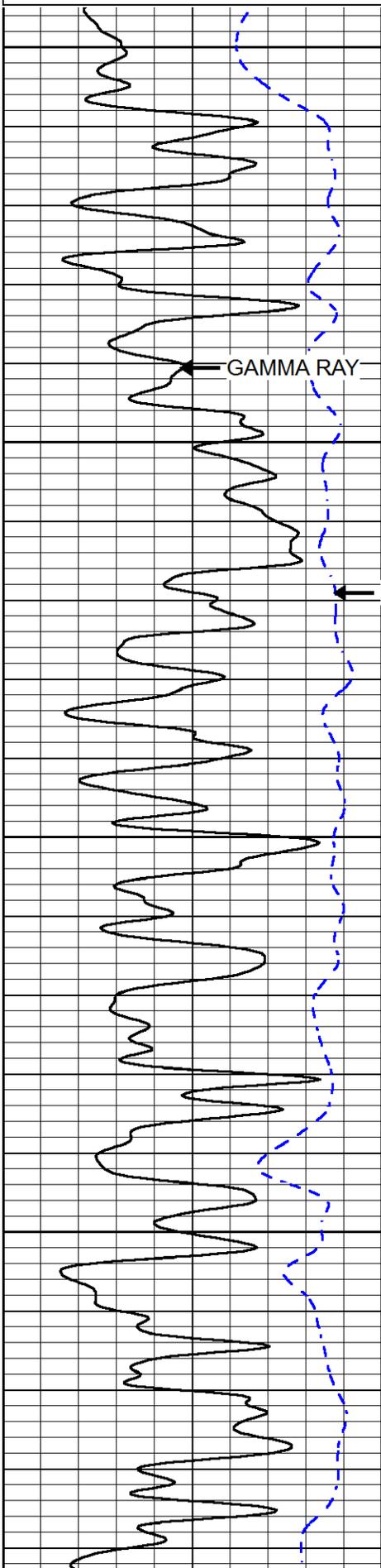


MAIN PASS

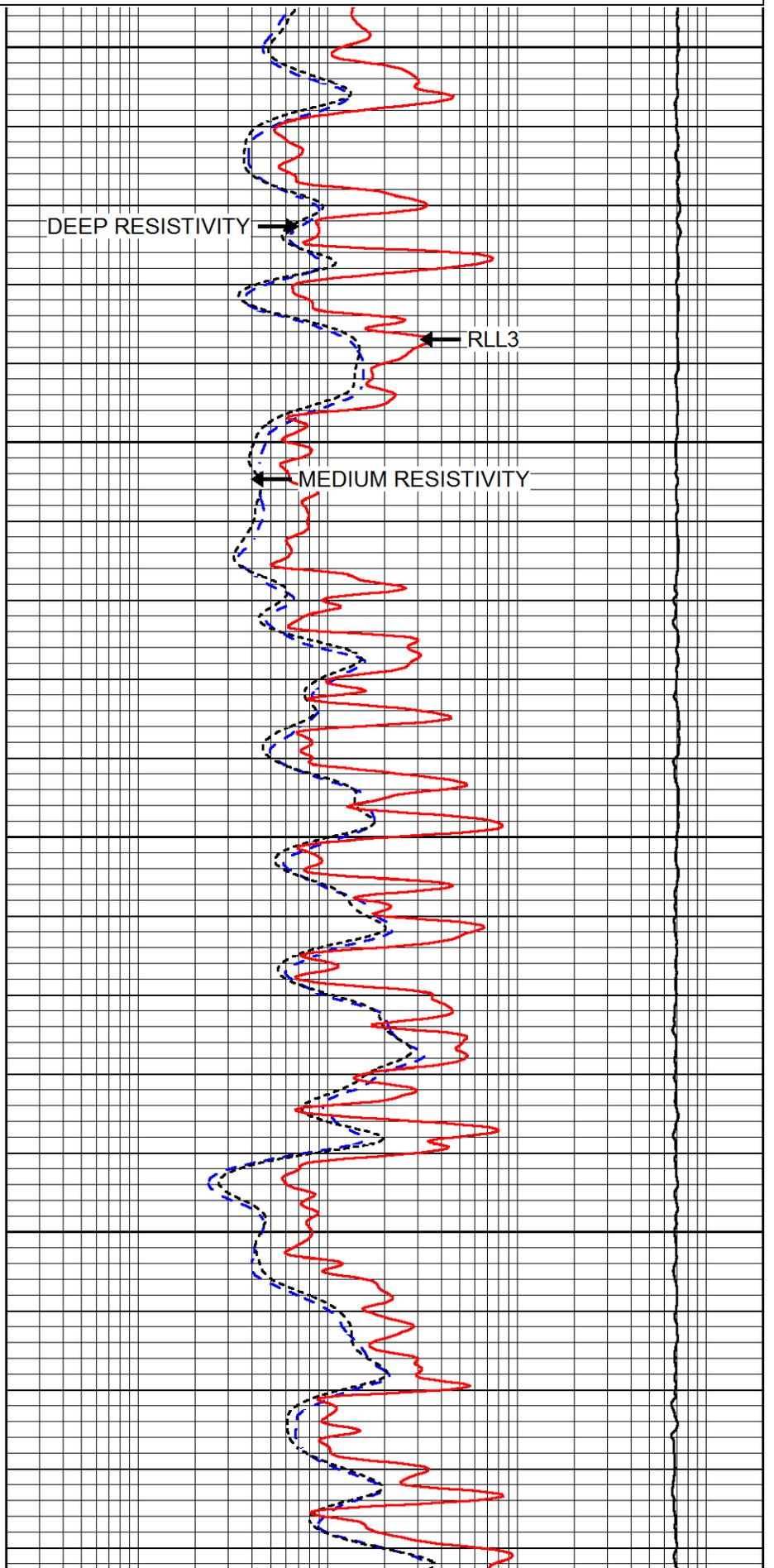
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 Dataset Pathname stack/pass4.1
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 Charted by Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
-200	SP (mV)	0

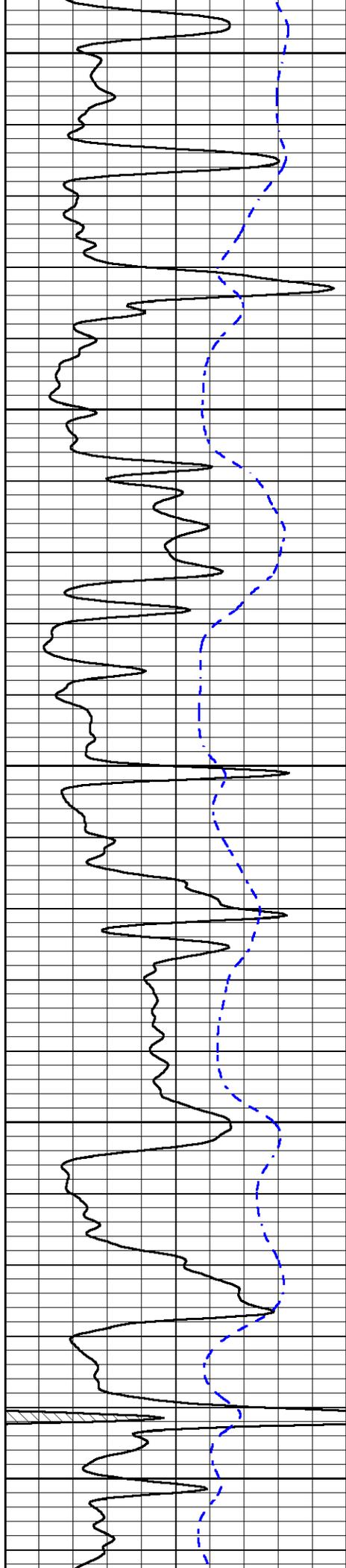
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0



3600
3650
3700
3750



DEEP RESISTIVITY
RLL3
MEDIUM RESISTIVITY



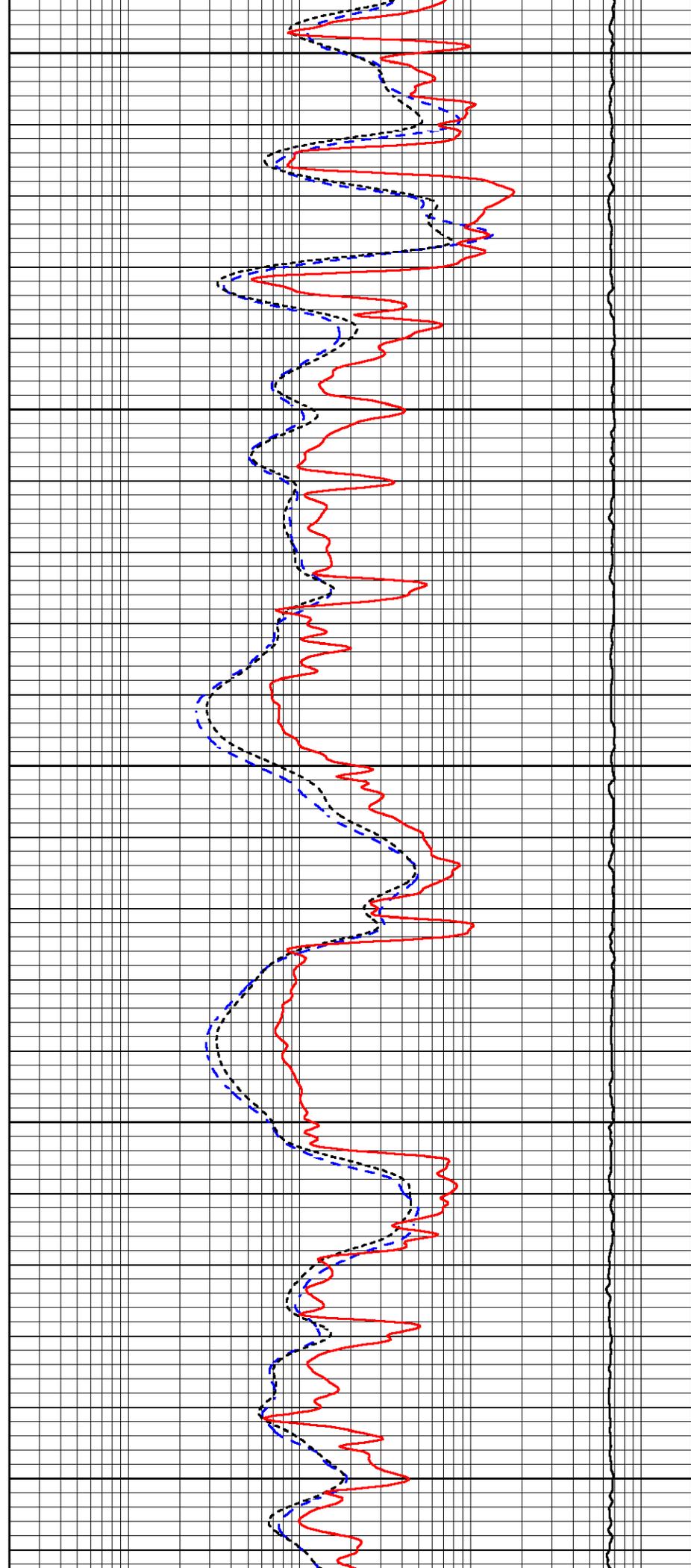
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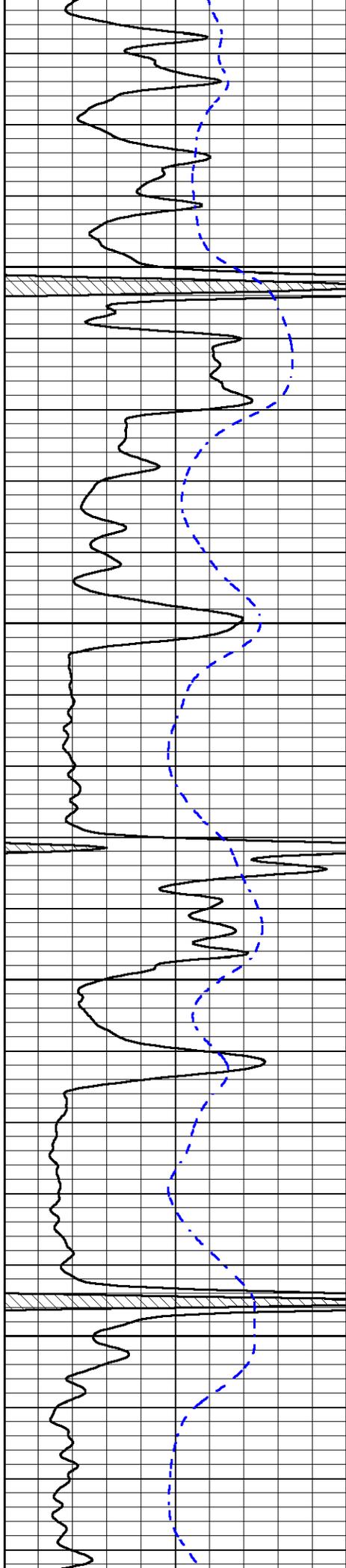
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3900

3950

4000



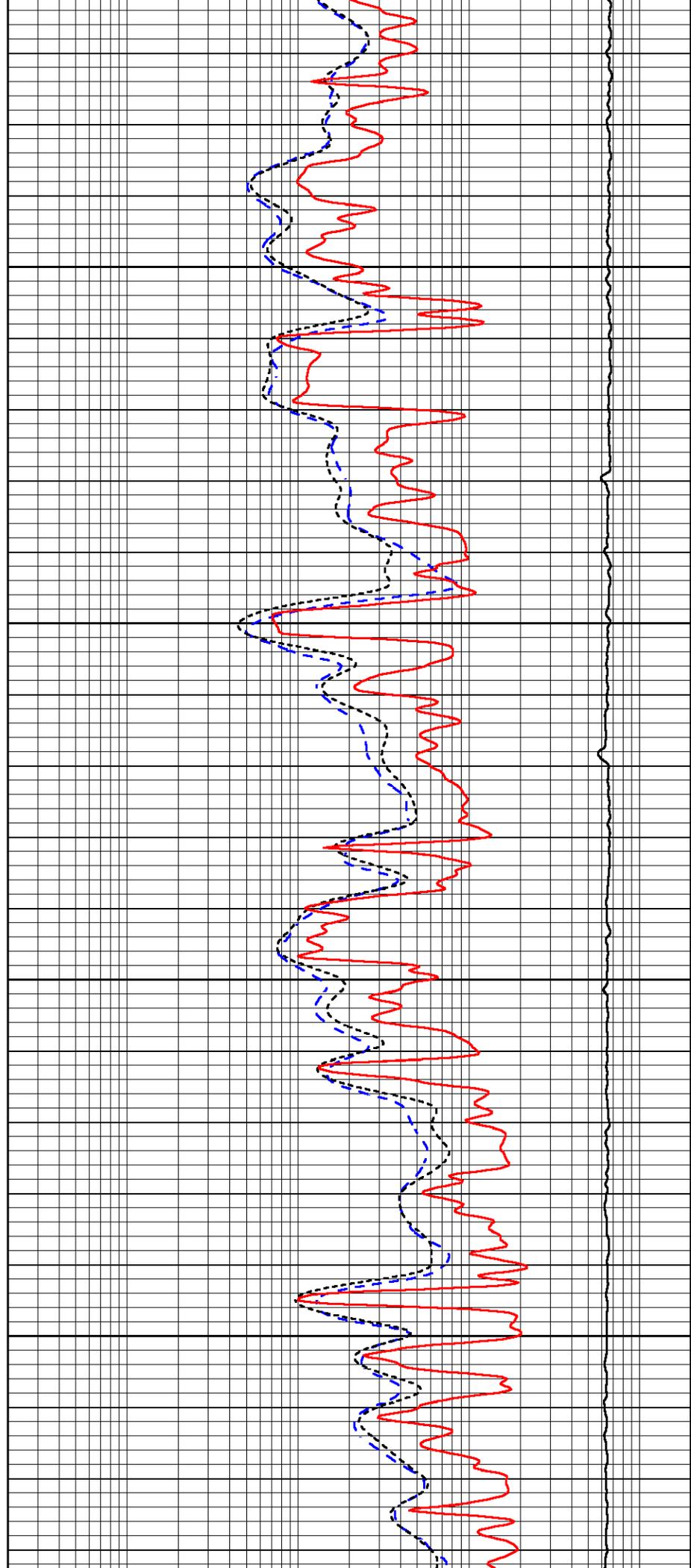


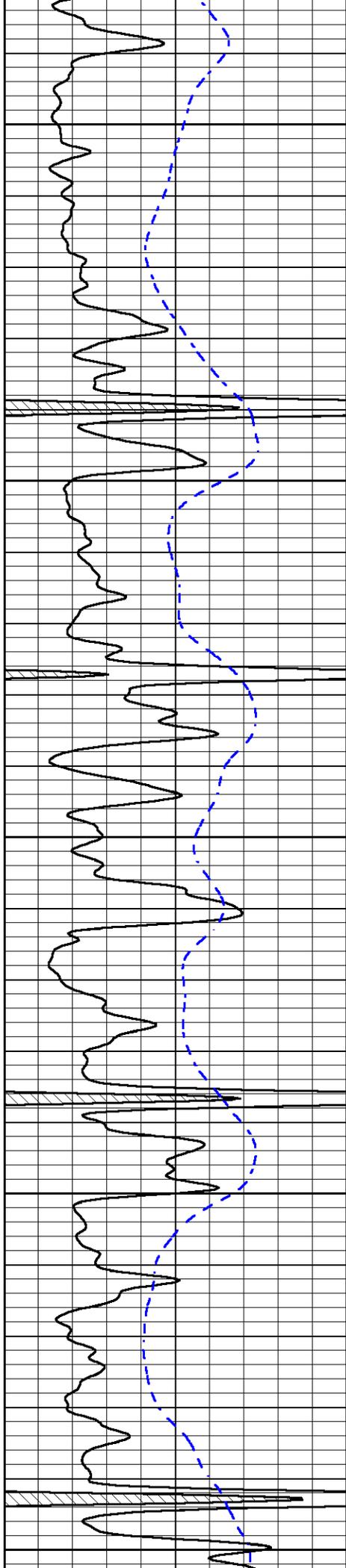
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4100

4150

4200





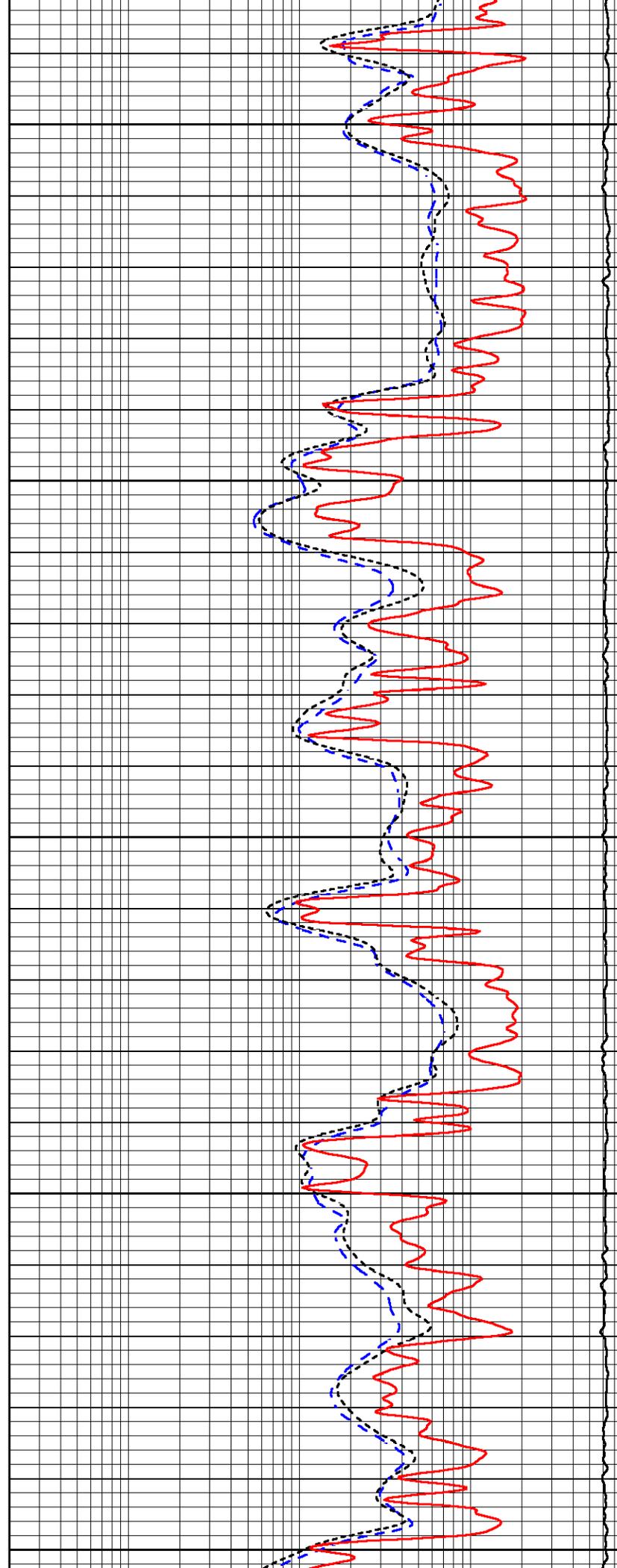
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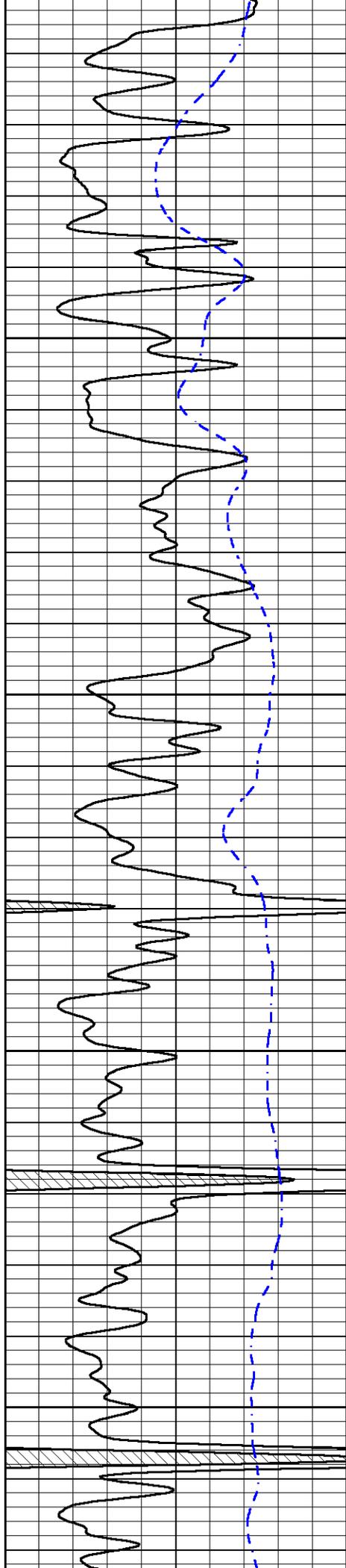
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4350

4400

4450



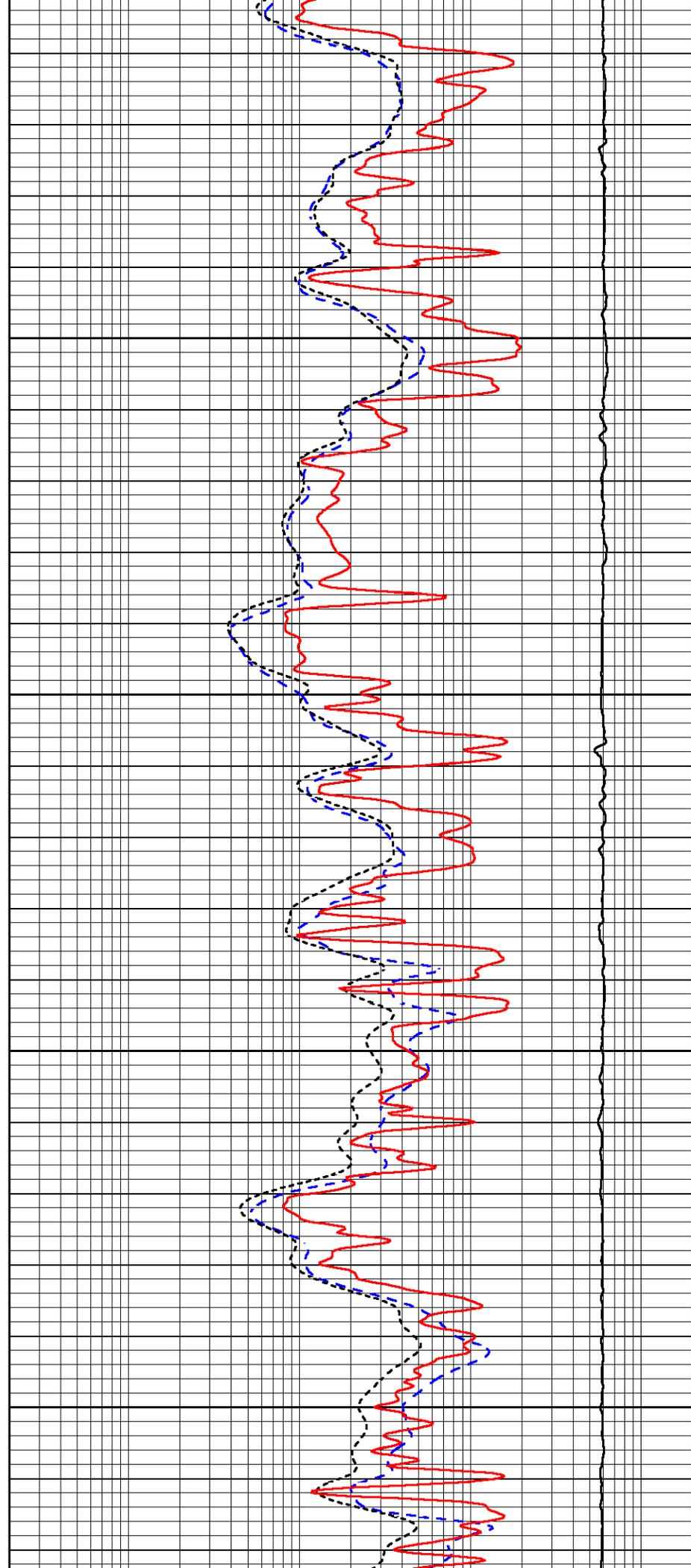


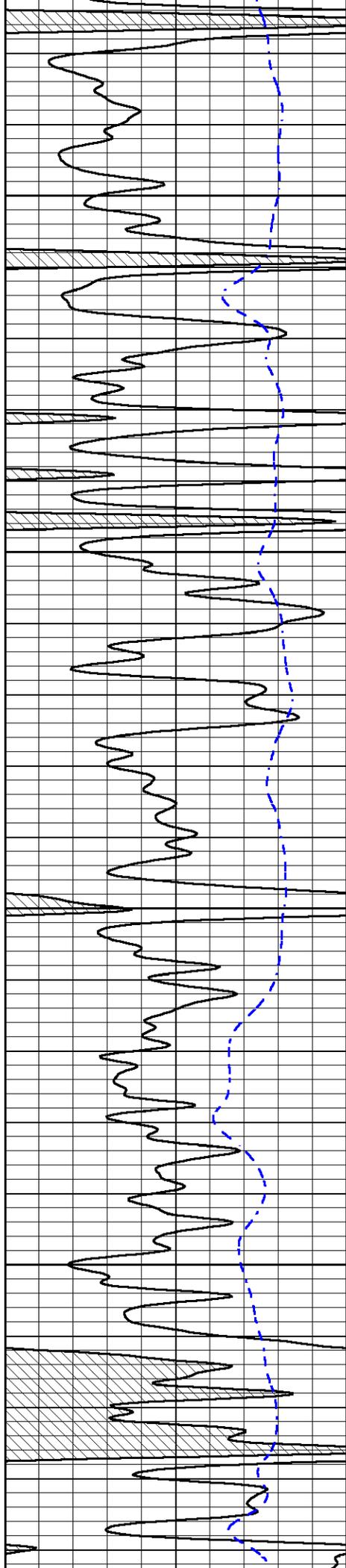
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4550

4600

4650



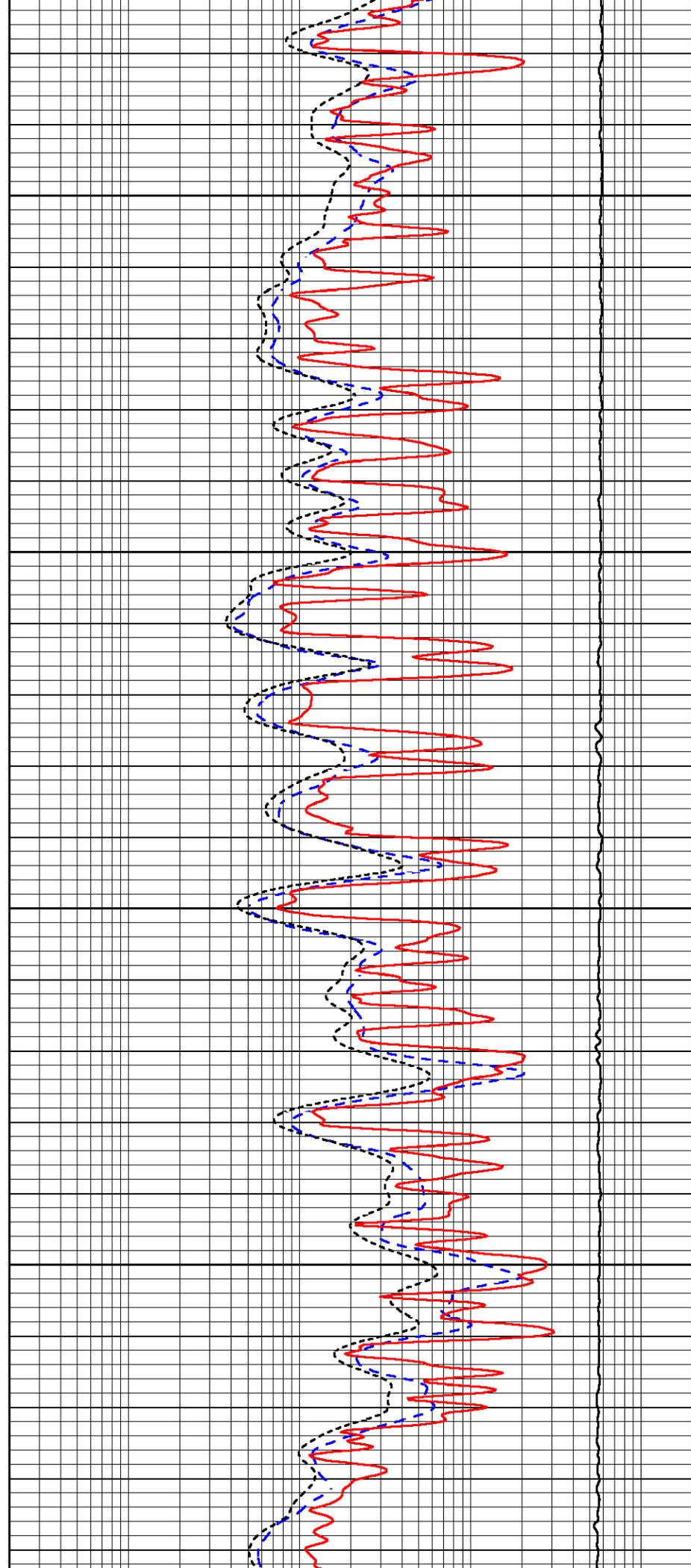


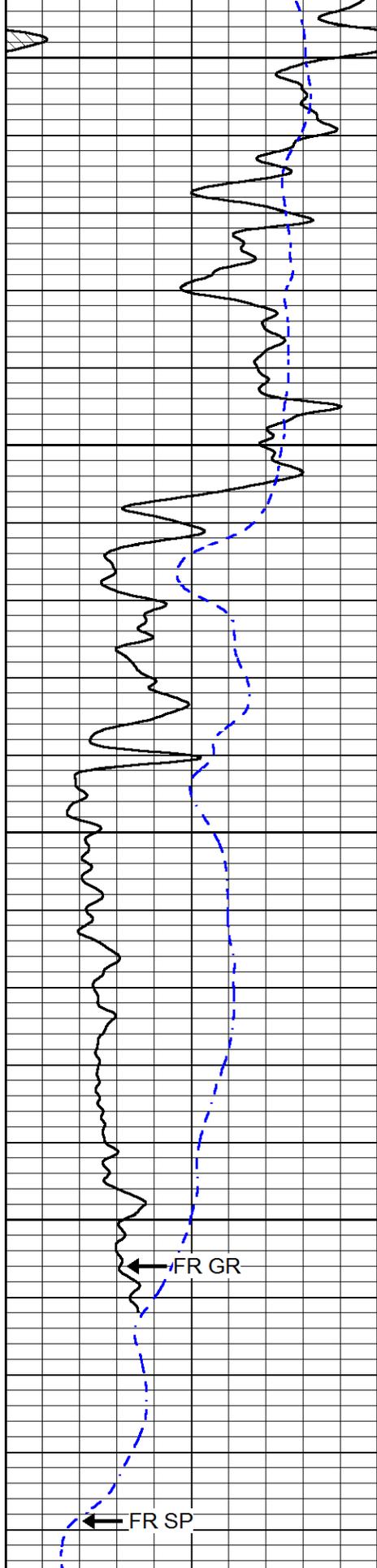
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4750

4800

4850





4900

4950

5000

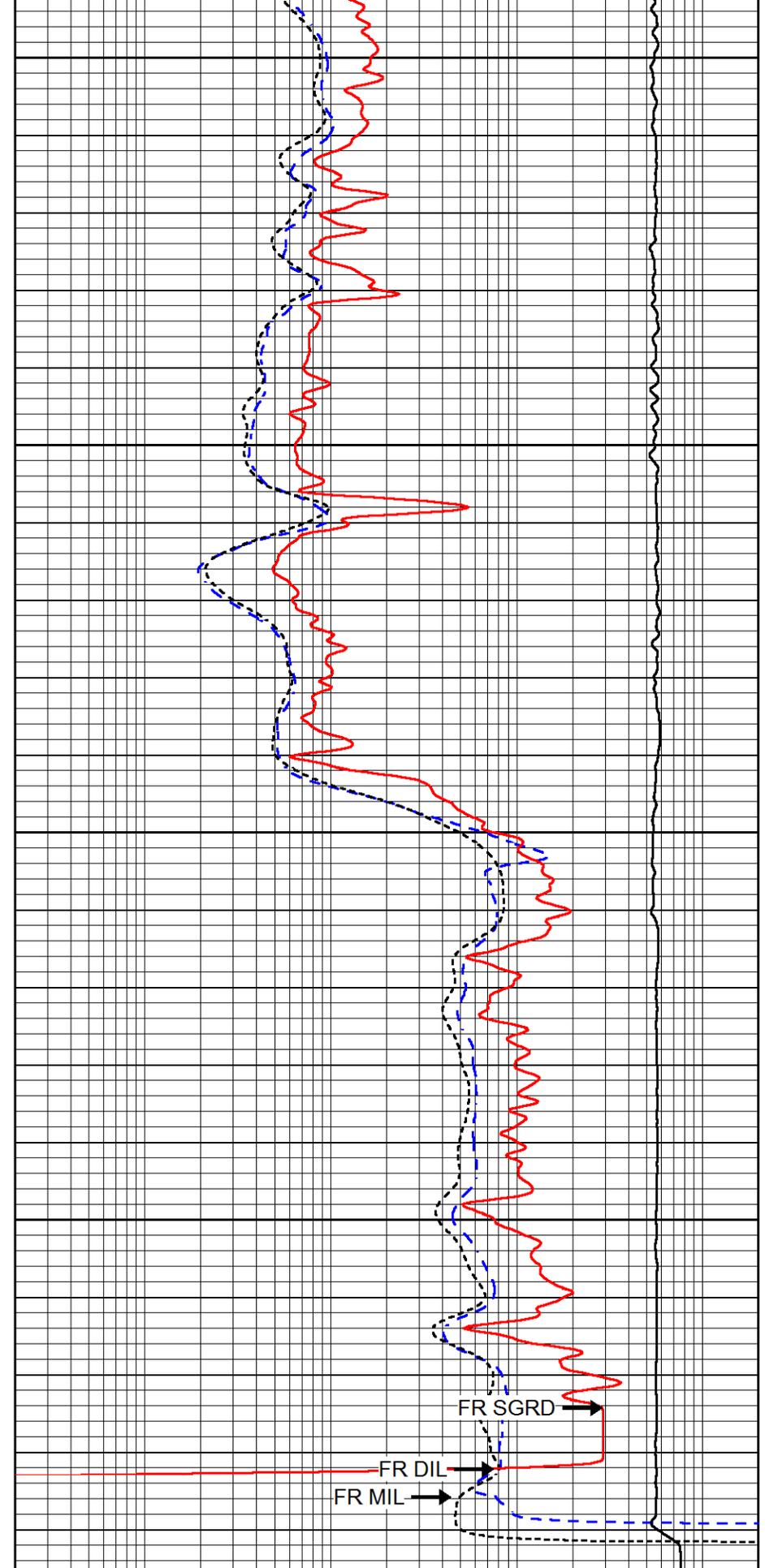
5050

FR GR

FR SP

0 GAMMA RAY (GAPI) 150

-200 SP (mV) 0



FR SGRD

FR DIL

FR MIL

0.2 DEEP RESISTIVITY (Ohm-m) 2000

0.2 MEDIUM RESISTIVITY (Ohm-m) 2000

0.2 RLL3 (Ohm-m) 2000

15000 LINE TENSION (lb) 0

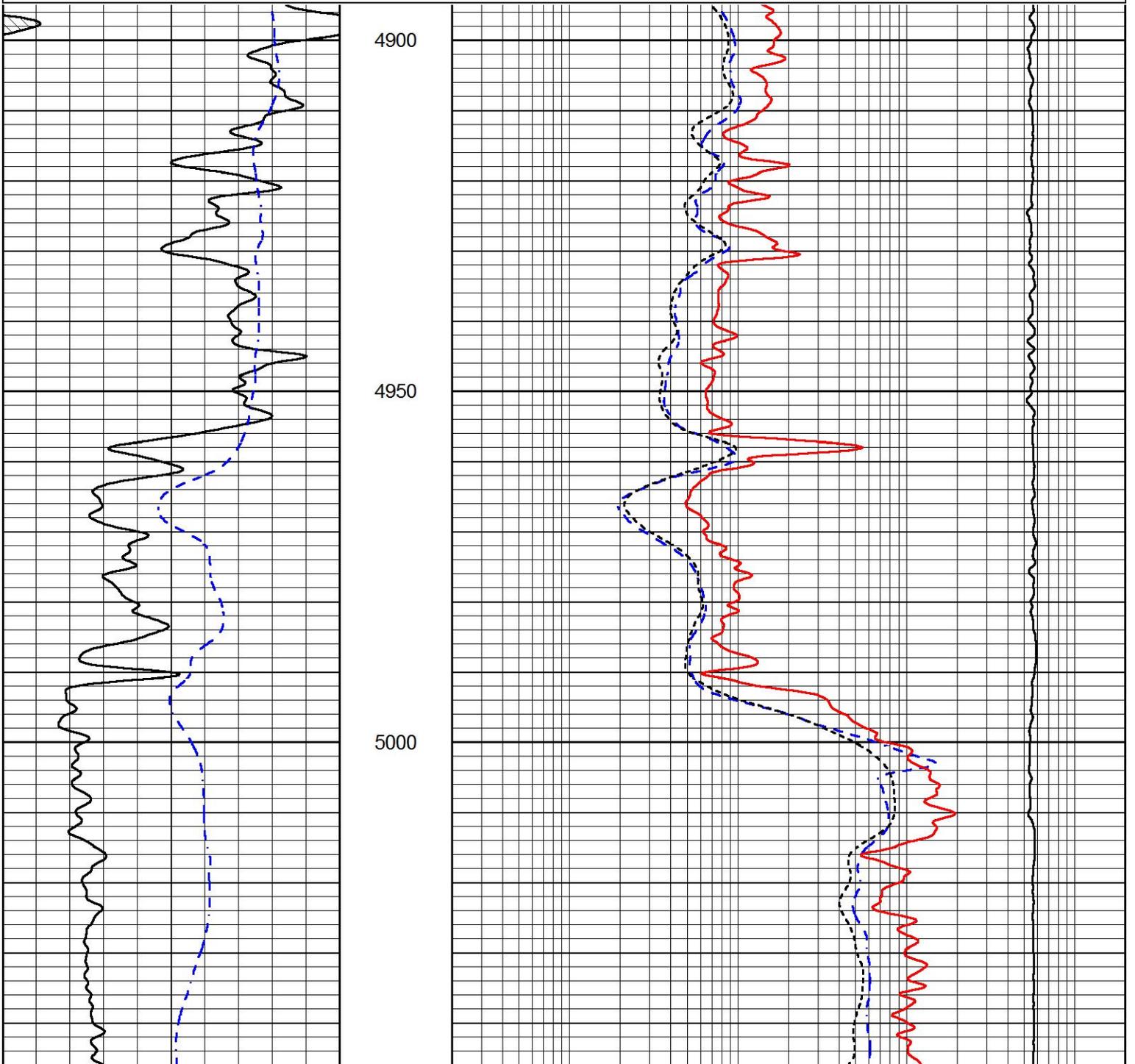


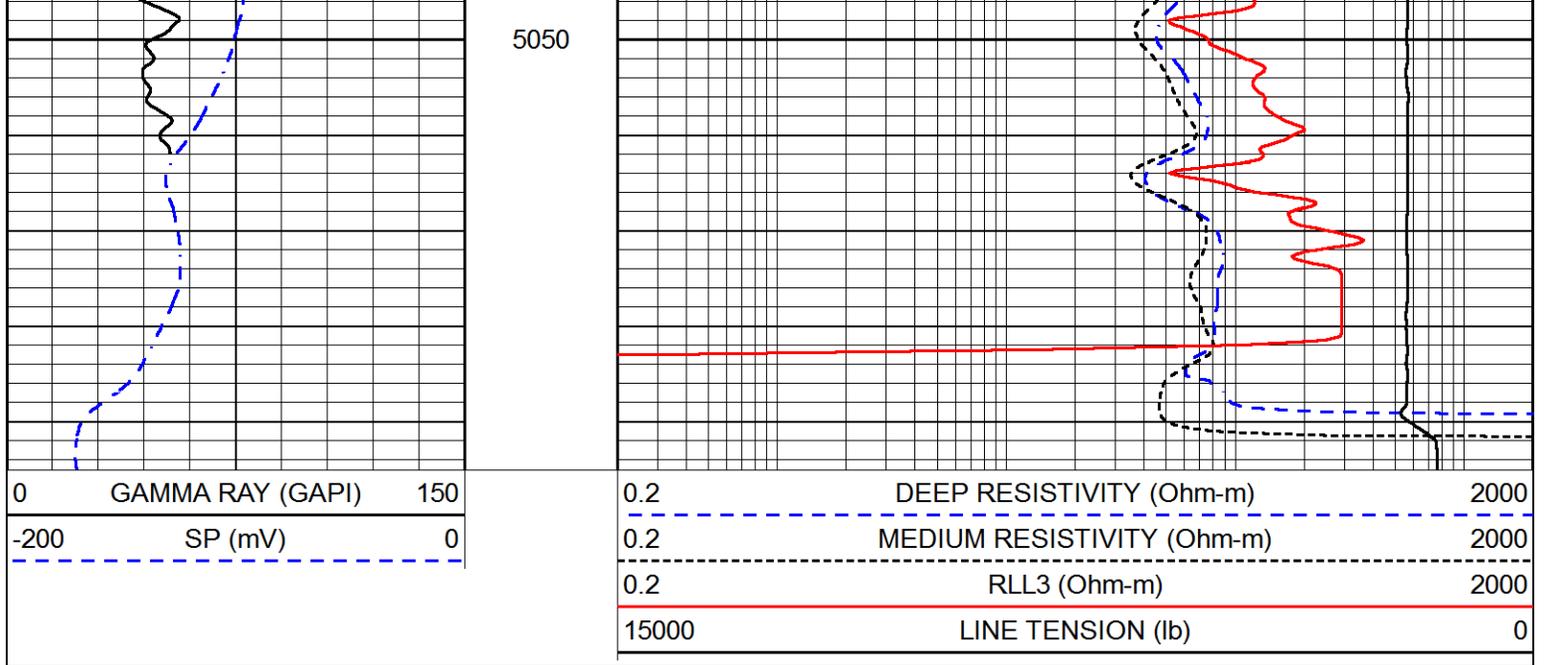
REPEAT SECTION

Database File ritchie_bangerter_12c_1.db
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 Presentation Format dil
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 Charted by Depth in Feet scaled 1:240

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-200	SP (mV)	0

0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0





Calibration Report

Database File ritchie_bangerter_12c_1.db
 Dataset Pathname stack/pass4.1
 Dataset Creation Thu May 31 22:25:31 2018

Dual Induction Calibration Report

Serial-Model: 1987-M&W
 Calibration Performed: Tue Apr 11 17:07:38 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	178.615	710.235	0.000	255.800	mmho/m	0.530	-36.500
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.440	-110.500

Compensated Density Calibration Report

Serial-Model: 128-4110-M&W
 Source / Verifier: /
 Master Calibration Performed: Thu Mar 02 17:30:49 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.750	g/cc	4555.61	2204.19	cps
Aluminum	2.650	g/cc	856.69	1405.61	cps
Spine Angle = 74.93			Density/Spine Ratio = 0.520		
	Size		Reading		
Small Ring	4.00	in	1.15		
Large Ring	14.00	in	1.04		

Compensated Neutron Calibration Report

Serial Number: #110 M&W

Serial Number: TK 10-M&W
Tool Model: M&W
Calibration Performed: Wed Nov 16 11:21:36 2016

Detector	Readings	Target	Normalization
Short Space	6240.00 cps	1000.00 cps	1.6025
Long Space	460.00 cps	1000.00 cps	1.9500

Gamma Ray Calibration Report

Serial Number: 89-M&W
Tool Model: M&W
Calibration Performed: Tue Apr 11 17:08:01 2017

Calibrator Value: 1000.0 GAPI

Background Reading: 0.0 cps
Calibrator Reading: 6.2 cps

Sensitivity: 0.5200 GAPI/cps



PIONEER
Pioneer Energy Services

Company RITCHIE EXPLORATION, INC.
Well BANGERTER 12C NO.1
Field WILDCAT
County WICHITA
State KANSAS