



# DUAL INDUCTION LOG

Company RITCHEE EXPLORATION, INC.  
 Well BLAU-SCHROEDER NO.1  
 Field TWIN BUTTE  
 County LOGAN  
 State KANSAS

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Location: API #: 15-109-21517-00-00  
 610' FSL & 2570' FWL  
 SEC 16 TWP 15S RGE 36W  
 Permanent Datum GROUND LEVEL Elevation 3339'  
 Log Measured From KELLY BUSHING  
 Drilling Measured From KELLY BUSHING  
 Other Services CNL/CDL MEL/BHCS  
 Elevation K.B. 3344'  
 D.F. N/A  
 G.L. 3339'

Date	9/4/2017
Run Number	ONE
Depth Driller	5010'
Depth Logger	5009'
Bottom Logged Interval	5008'
Top Log Interval	250'
Casing Driller	8.625" @ 268'
Casing Logger	265'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	6,400
Density / Viscosity	9.3 56
pH / Fluid Loss	10.5 8.8
Source of Sample	FLOWLINE
Rm @ Meas. Temp	.35 @ 71
Rmt @ Meas. Temp	.26 @ 71
Rmc @ Meas. Temp	.47 @ 71
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.20 @ 126
Operating Rig Time	4 HOURS
Max Rec. Temp. F	126 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	JOHN GOLDSMITH

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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 DAKOTA ROAD, 2 1/2 EAST, NORTH INTO

Log Measured From: KELLY BUSHING 5 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES  
[www.pioneerenergy.com](http://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: JOHN GOLDSMITH Secondary Witness: Secondary Witness: Secondary Witness:
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# Log Variables

DatabaseC:\ProgramData\Warrior\Data\ritchie\_blaui\_schroeder\_1.db  
Dataset field/well/stackml/pass3.1/\_vars\_

## Top - 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	0	0	-86	75	Off	5009

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89-M&W)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (tk10-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (168-986)	8.50	4.00	250.00
ML-PSI STKBL ML (PSI-02) Stackable Microlog Tools			ML-PSI STKBL ML (PSI-02) Stackable Microlog Tools	7.58	4.00	65.00
MCAL MI MN	19.83 19.83 19.83					
RLL3 RLL3F	15.80 15.79					
CILD	8.00		DIL-M&W (1987)	18.50	3.50	220.00

CILM 4.70

SP 0.20

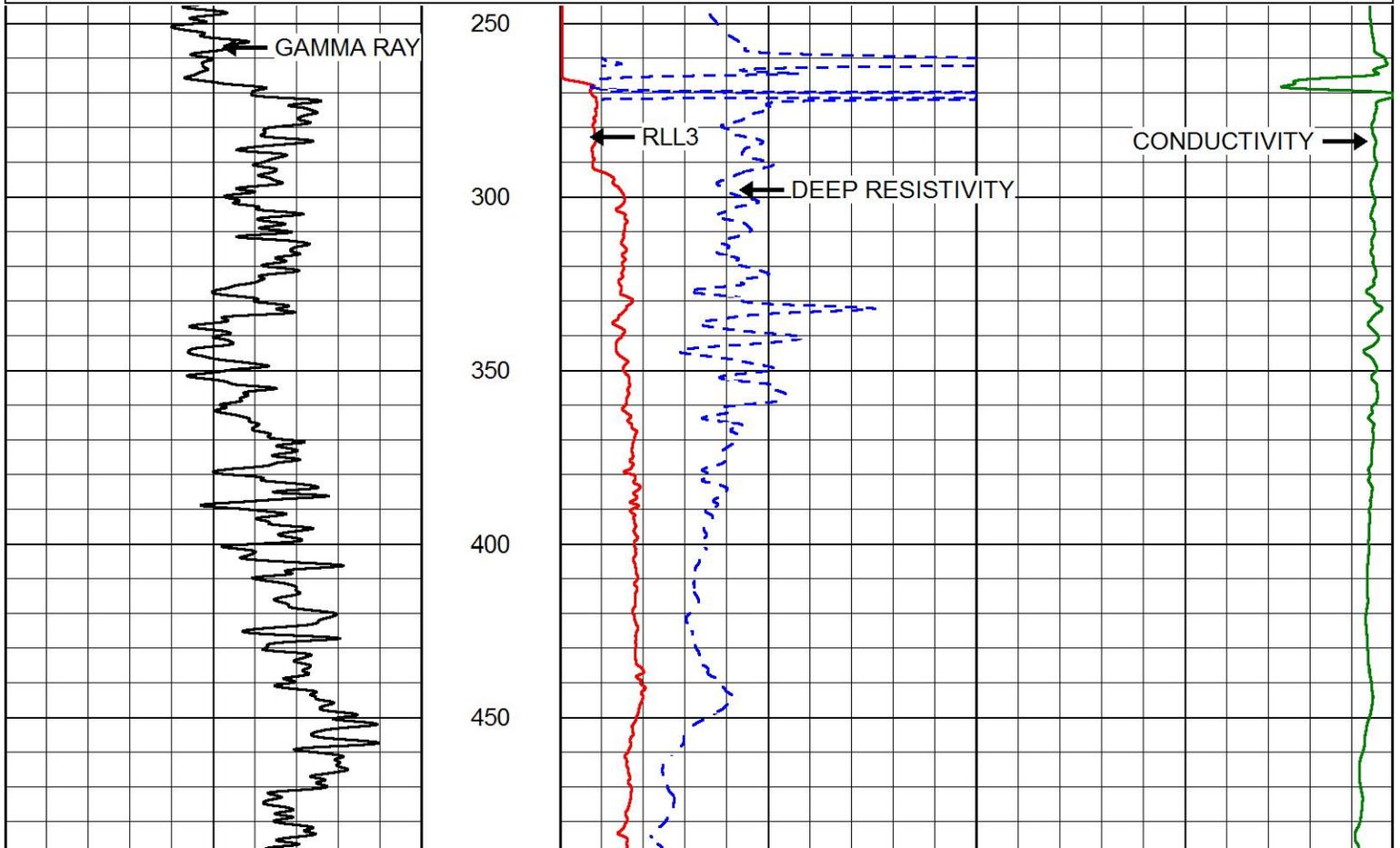
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 Total length: 43.08 ft  
 Total weight: 685.00 lb  
 O.D.: 4.00 in

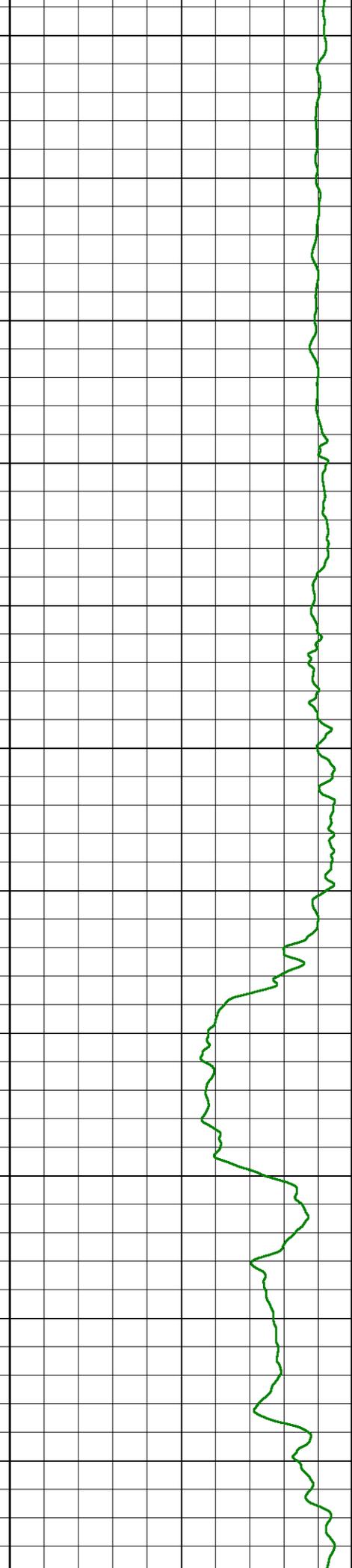
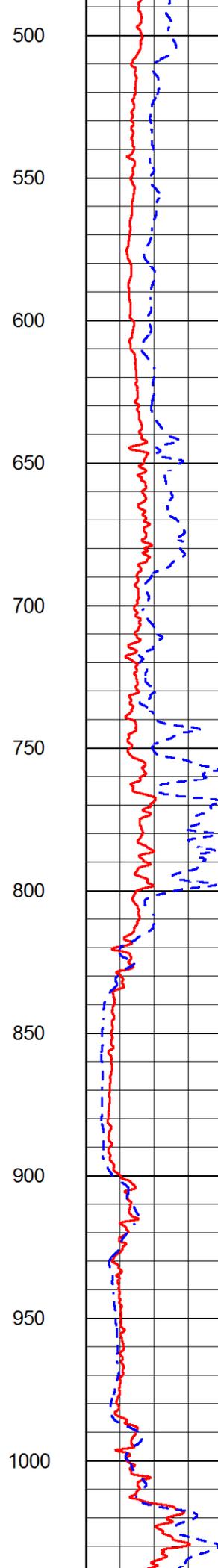
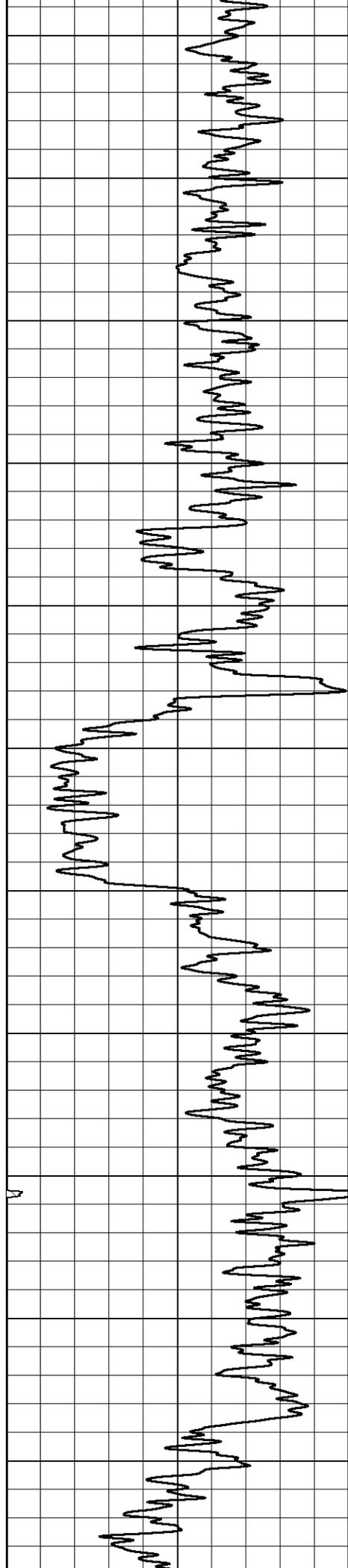


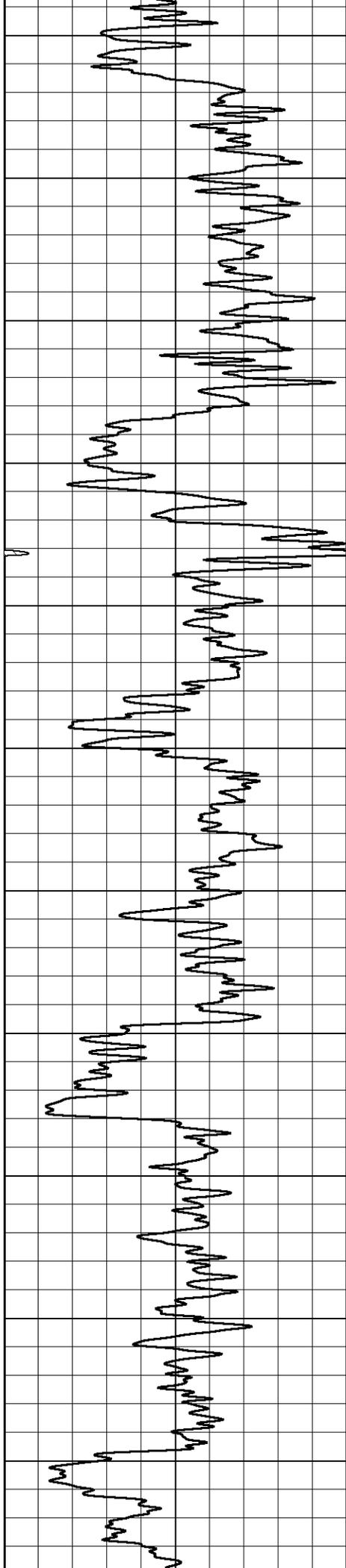
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 Presentation Format dil2in  
 Dataset Creation Mon Sep 04 13:37:48 2017  
 Charted by Depth in Feet scaled 1:600

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			0	RLL3 (Ohm-m)	50
			0	DEEP RESISTIVITY (Ohm-m)	50
			50	RLL3 (Ohm-m)	500
				DEEP RESISTIVITY	
			50	(Ohm-m)	500







1050

1100

1150

1200

1250

1300

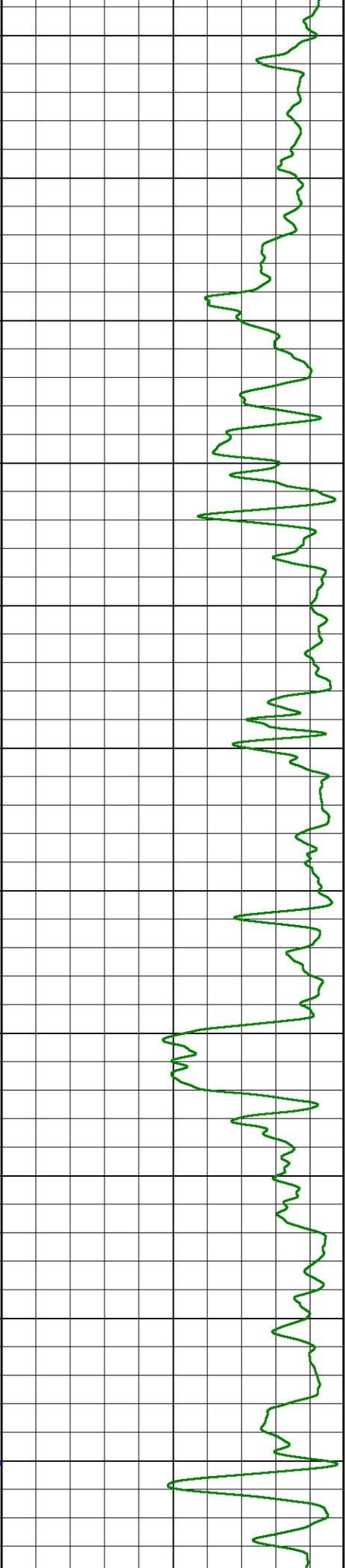
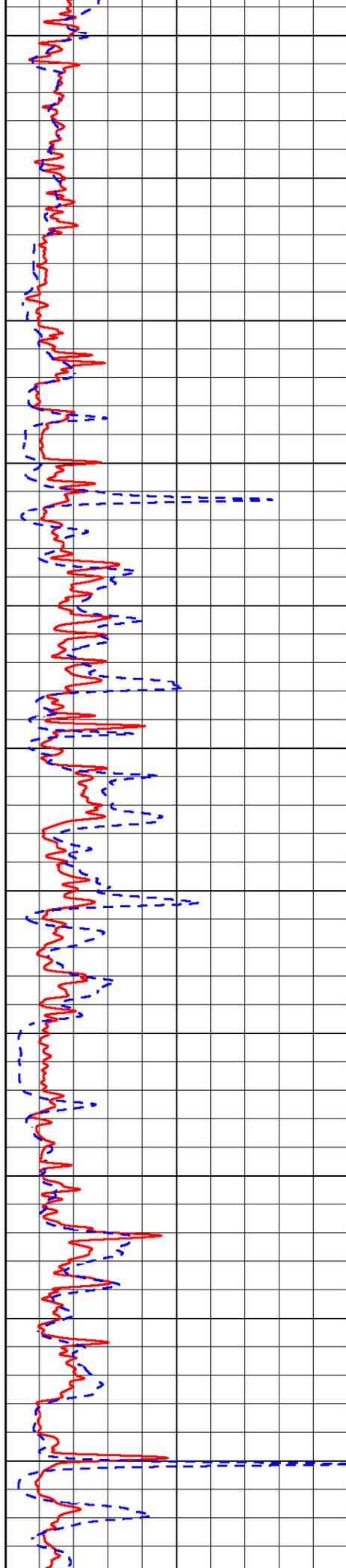
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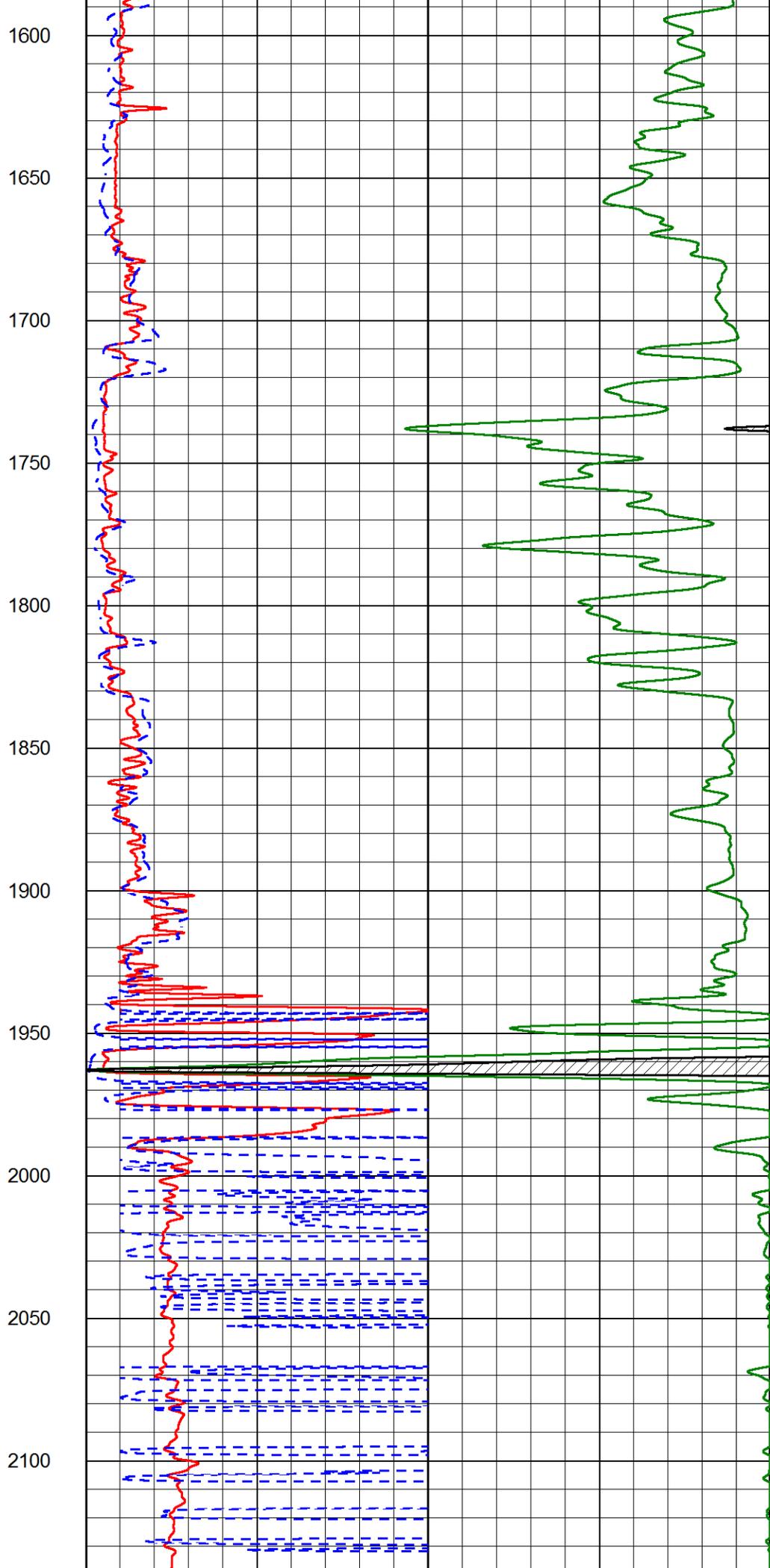
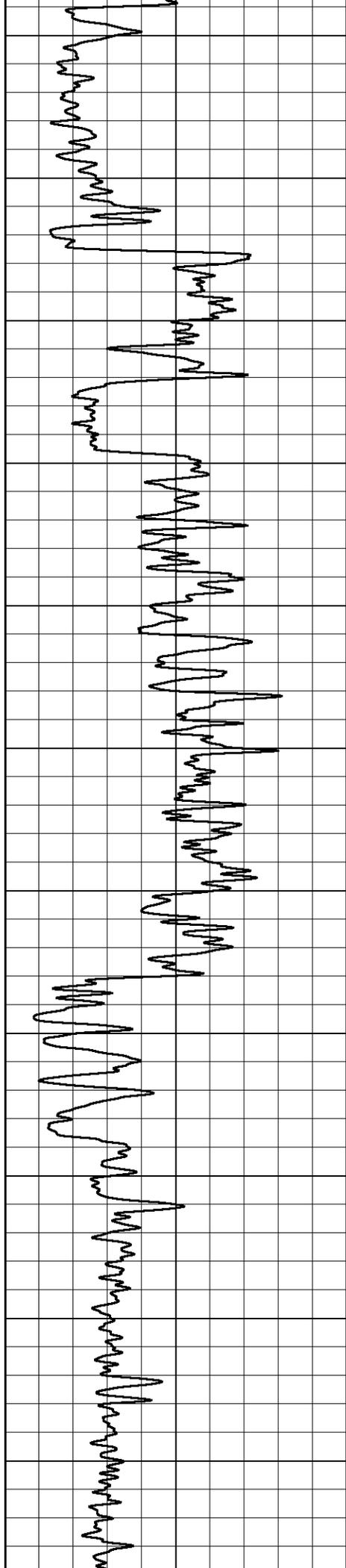
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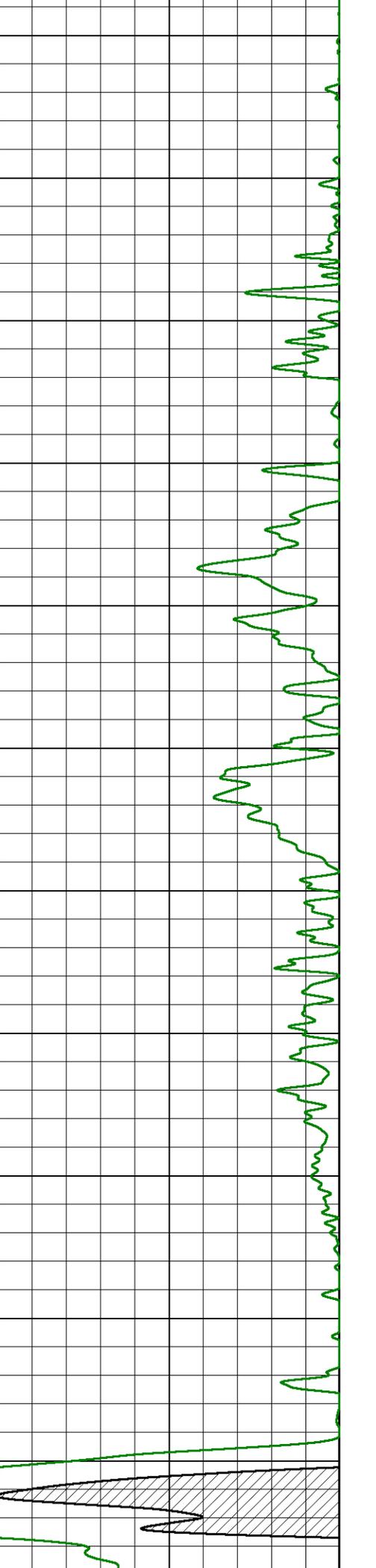
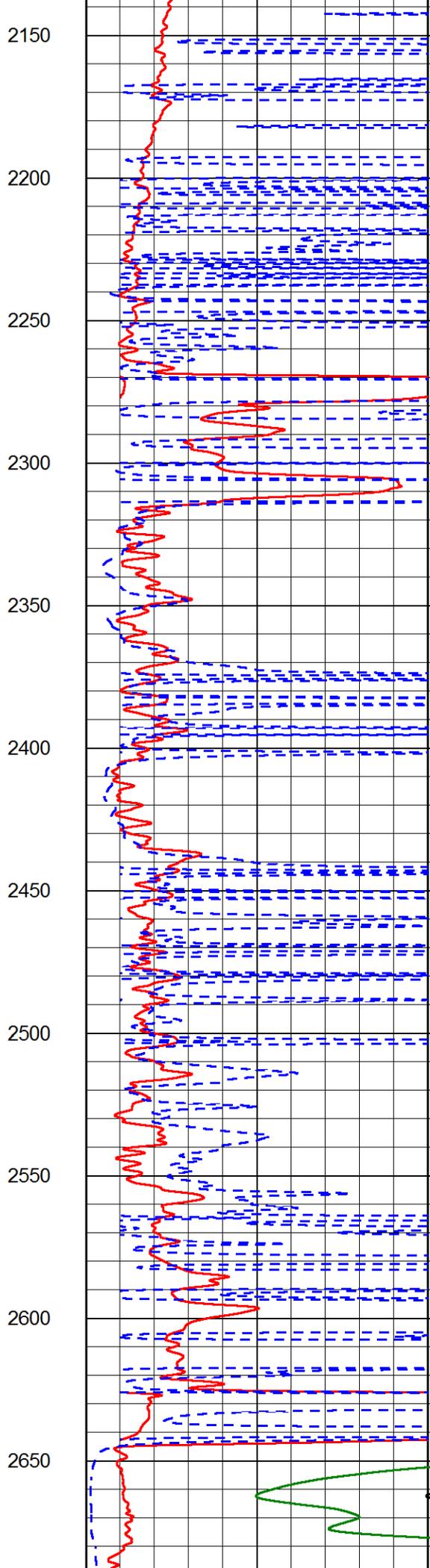
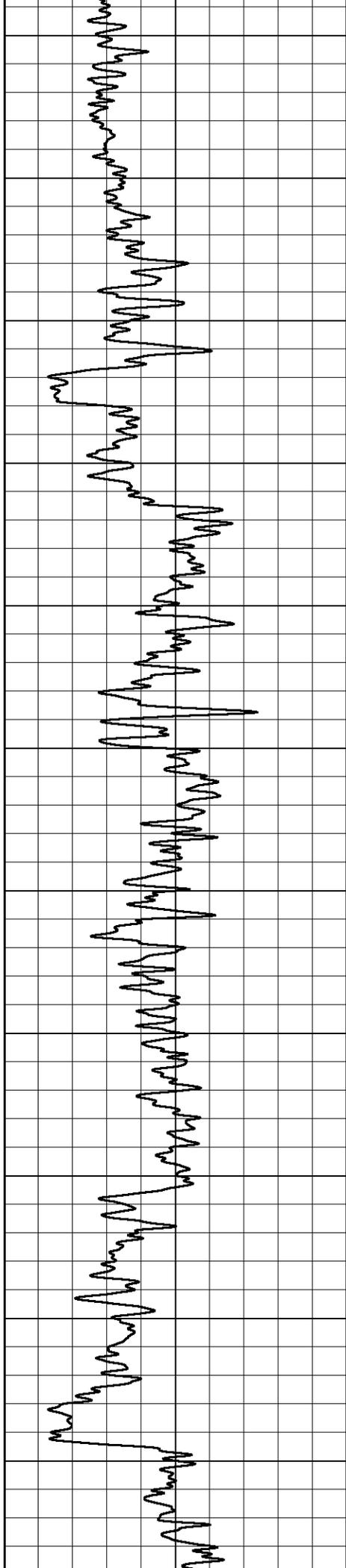
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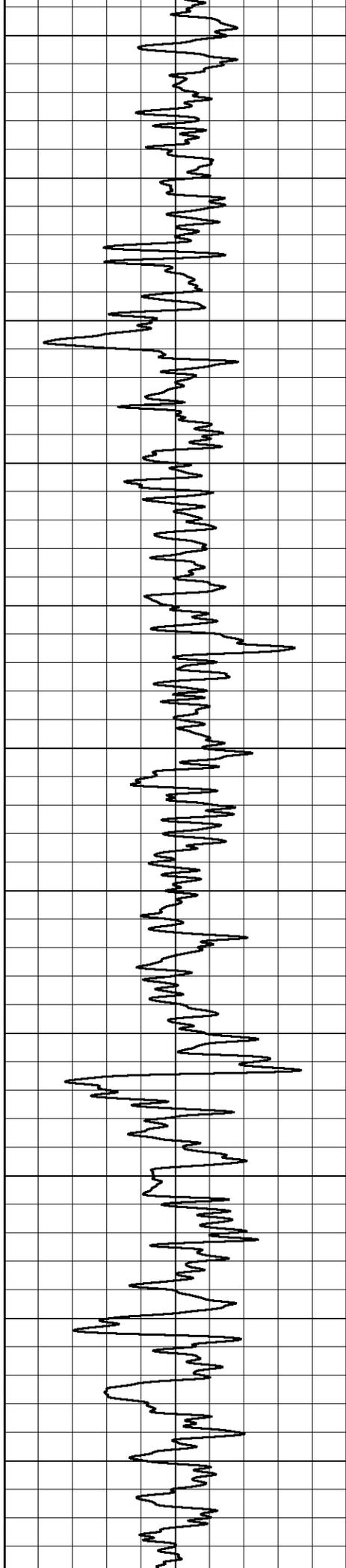
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1550









2700

2750

2800

2850

2900

2950

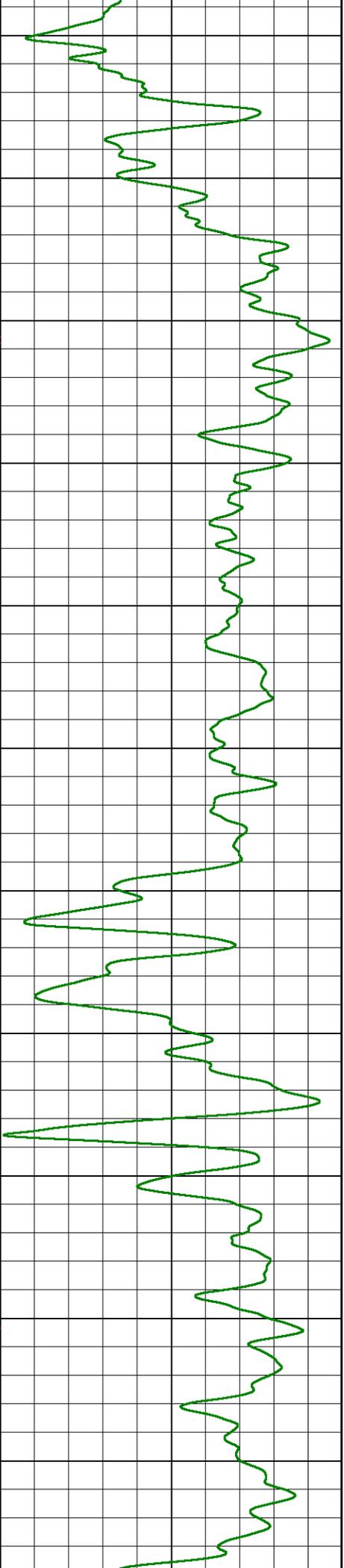
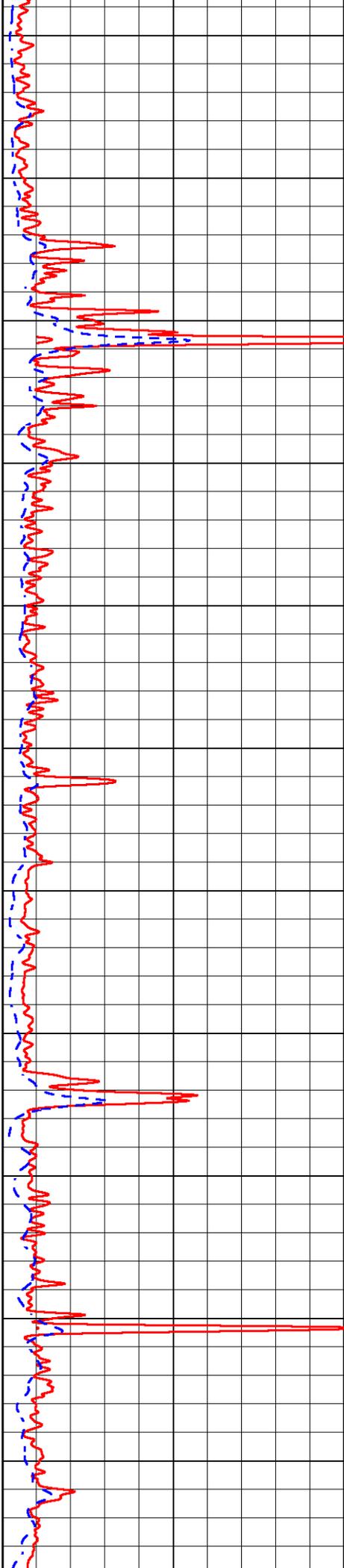
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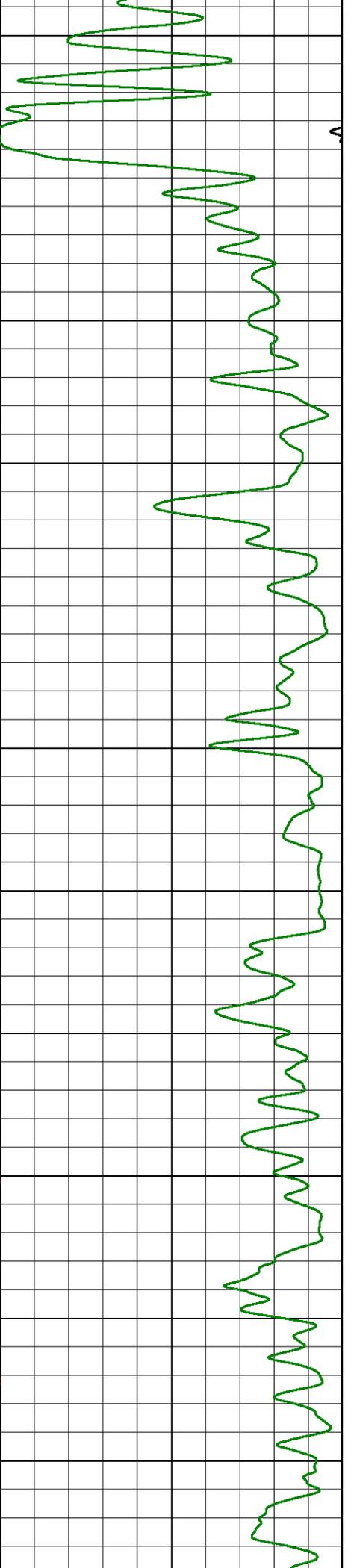
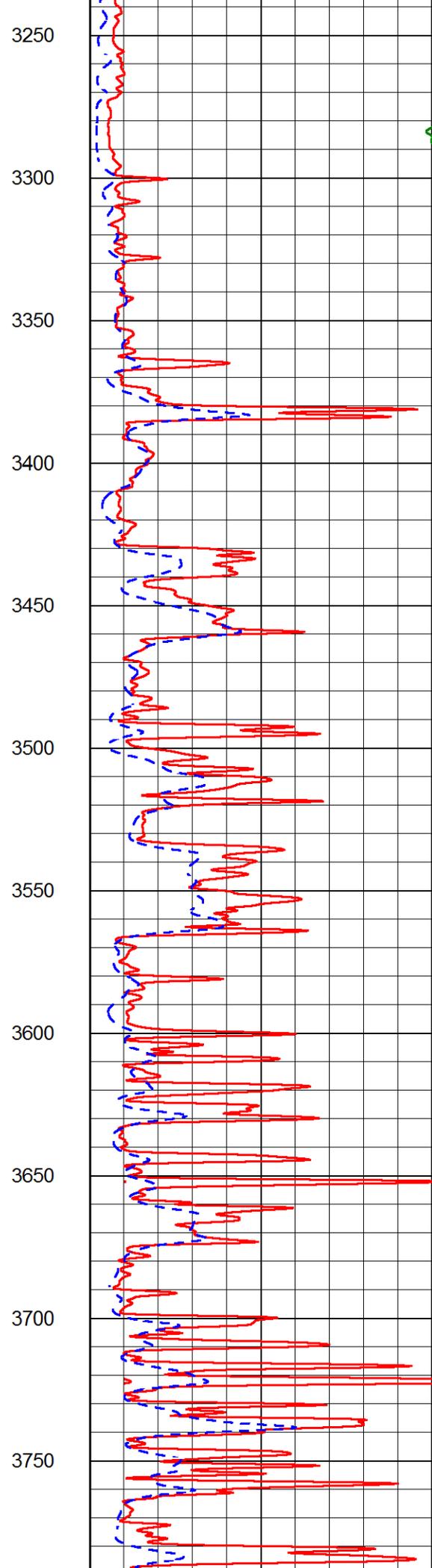
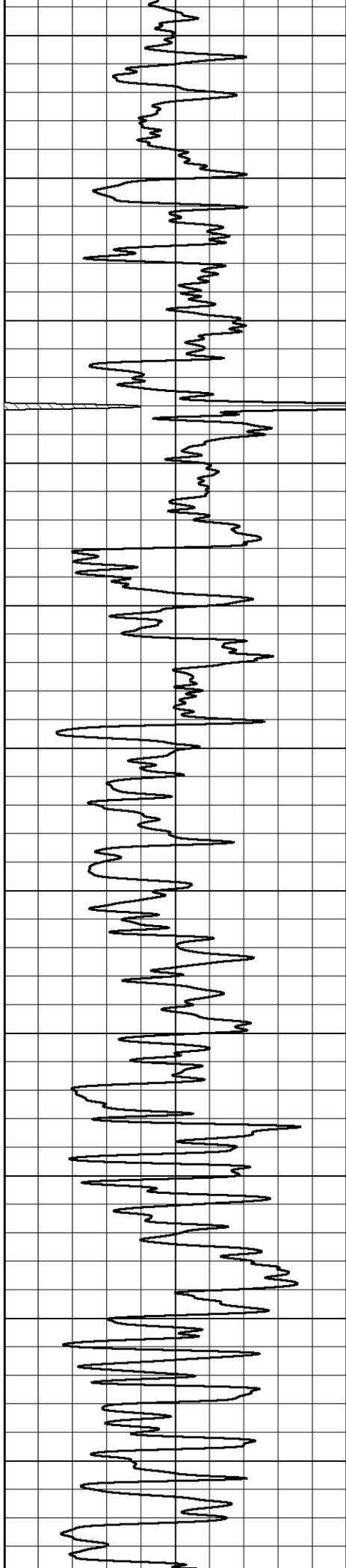
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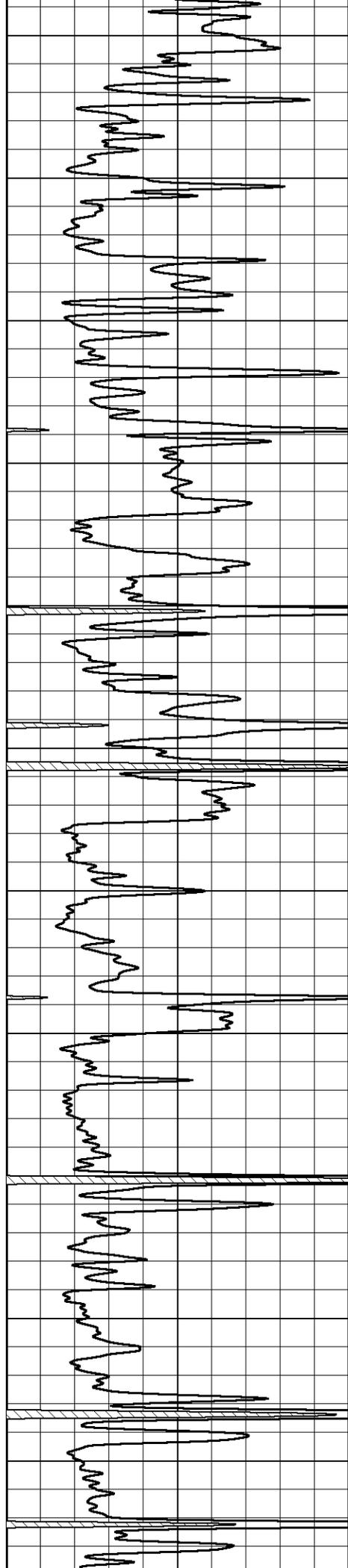
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3800

3850

3900

3950

4000

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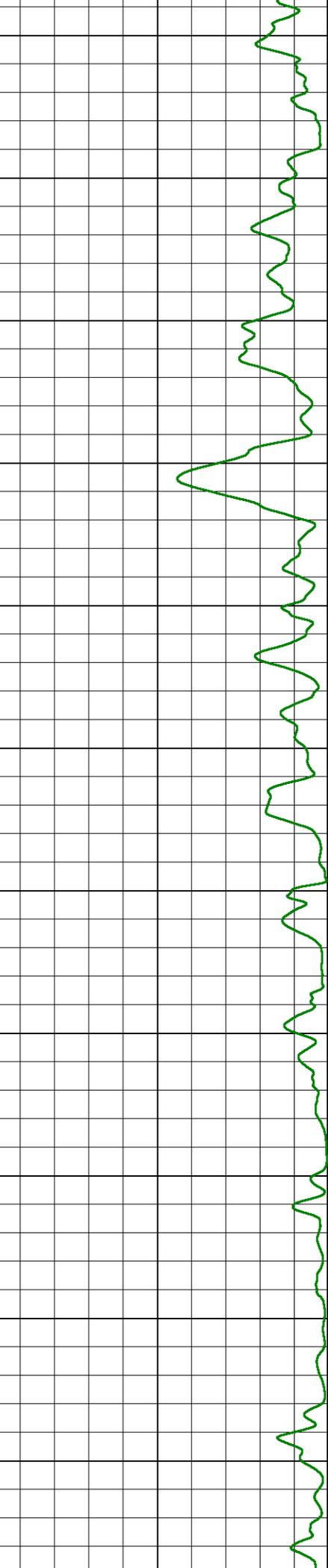
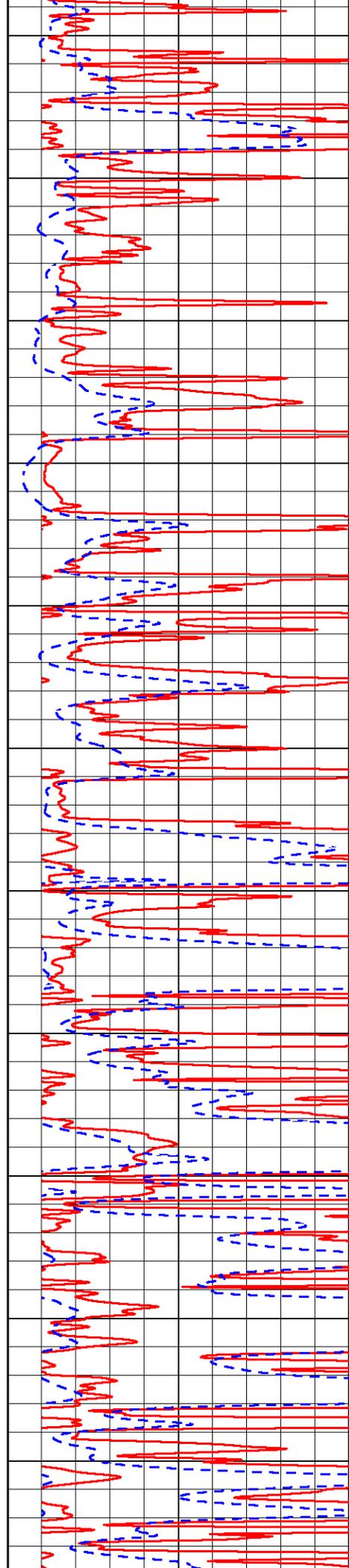
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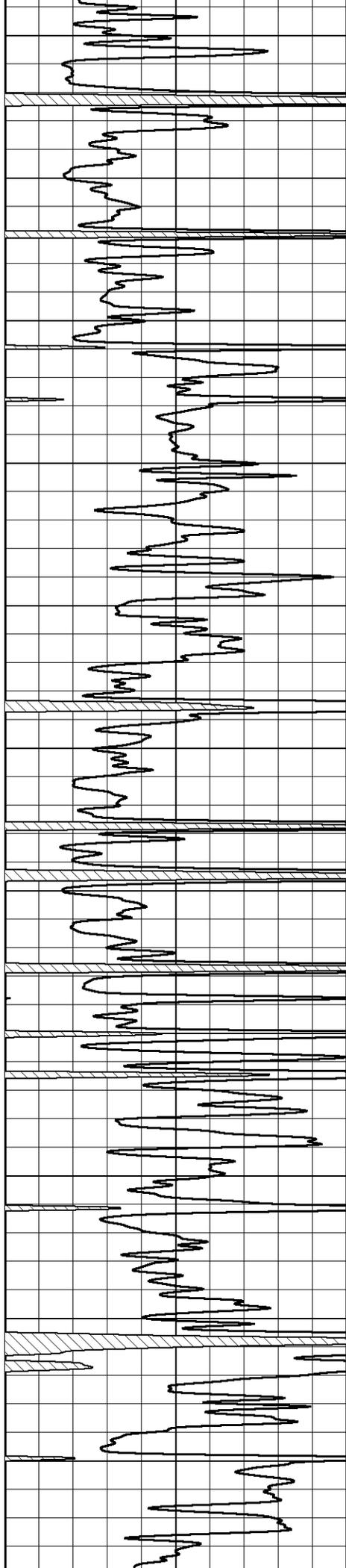
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4400

4450

4500

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4600

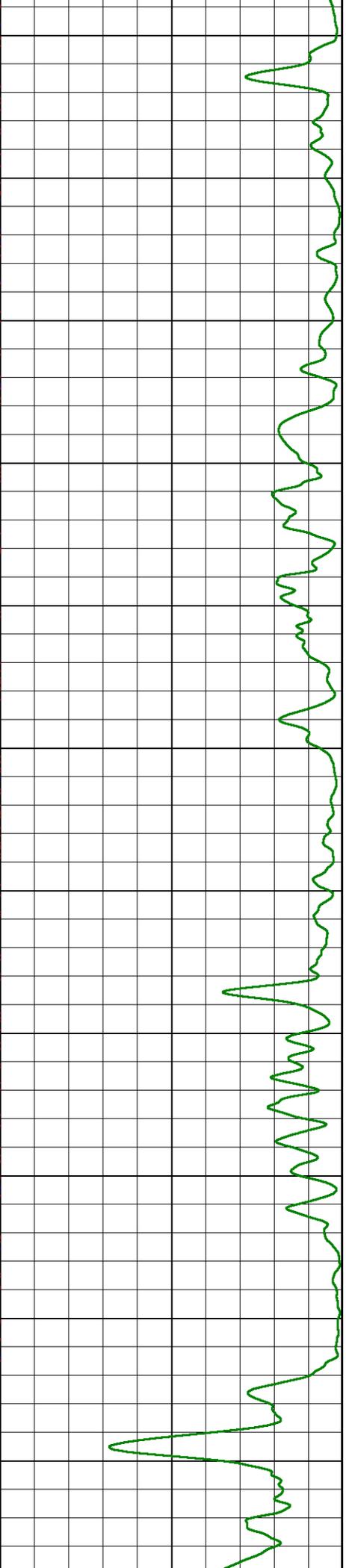
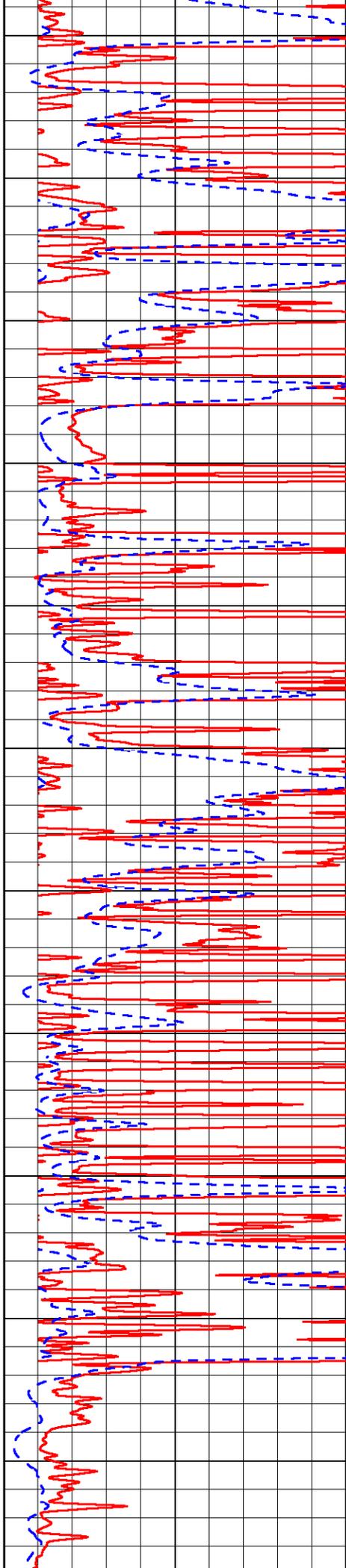
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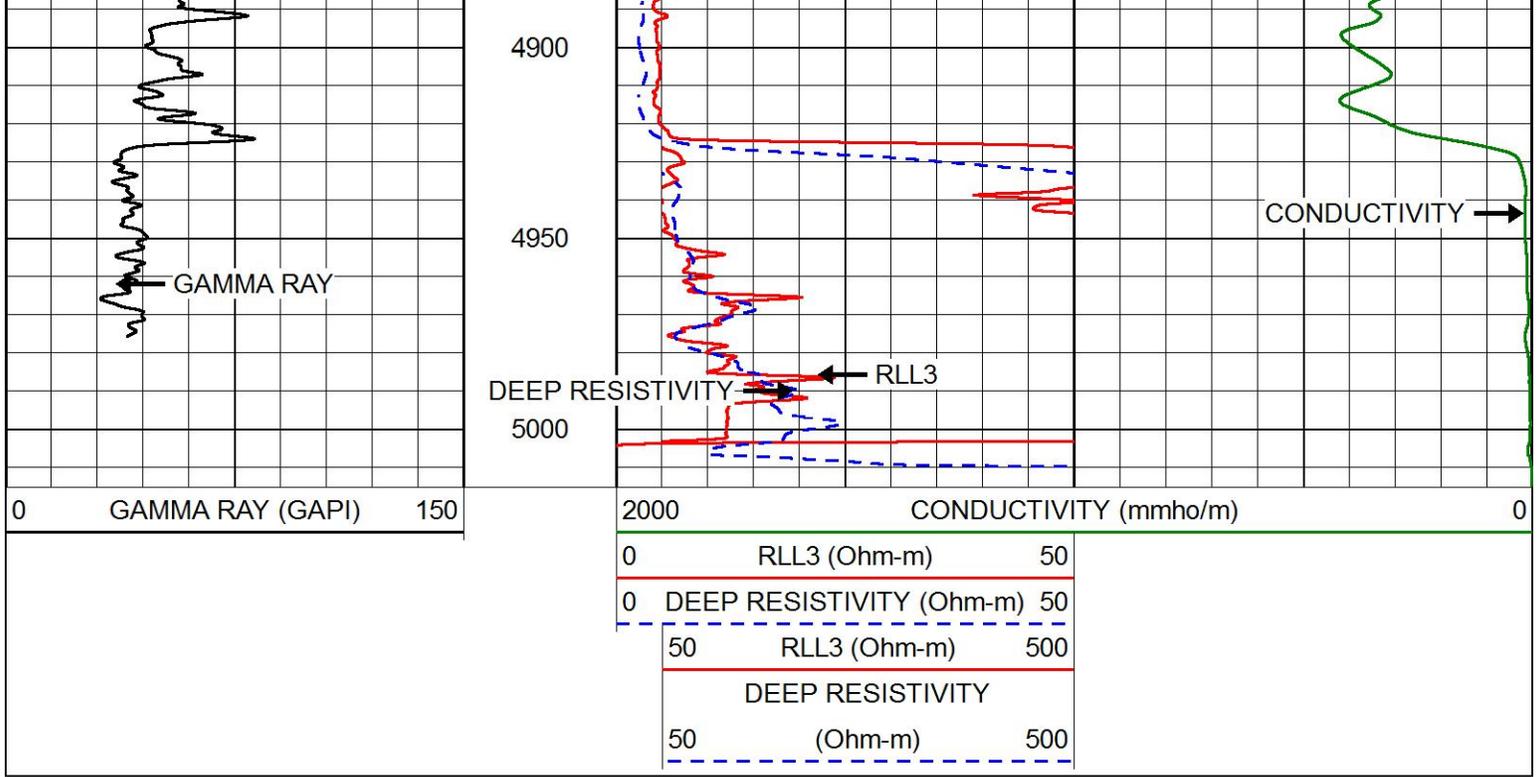
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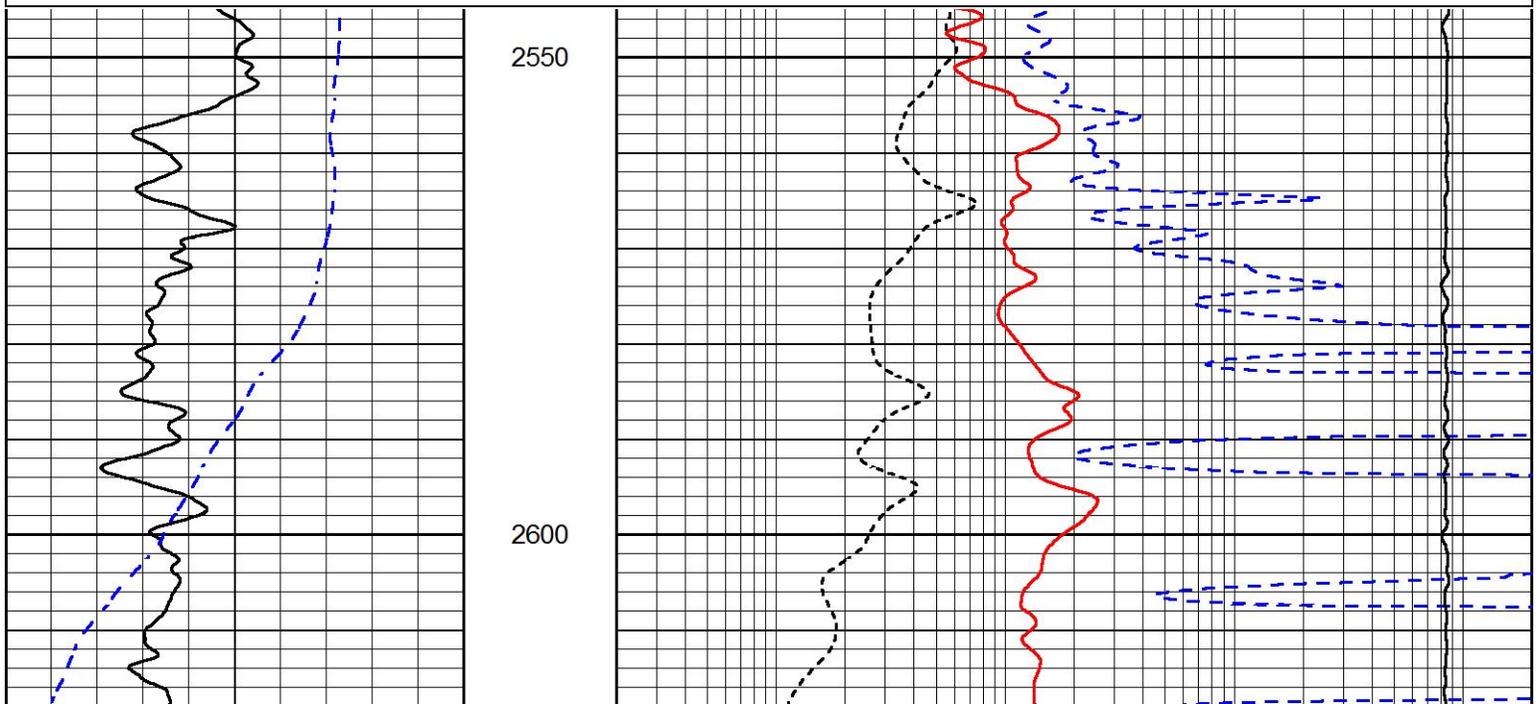


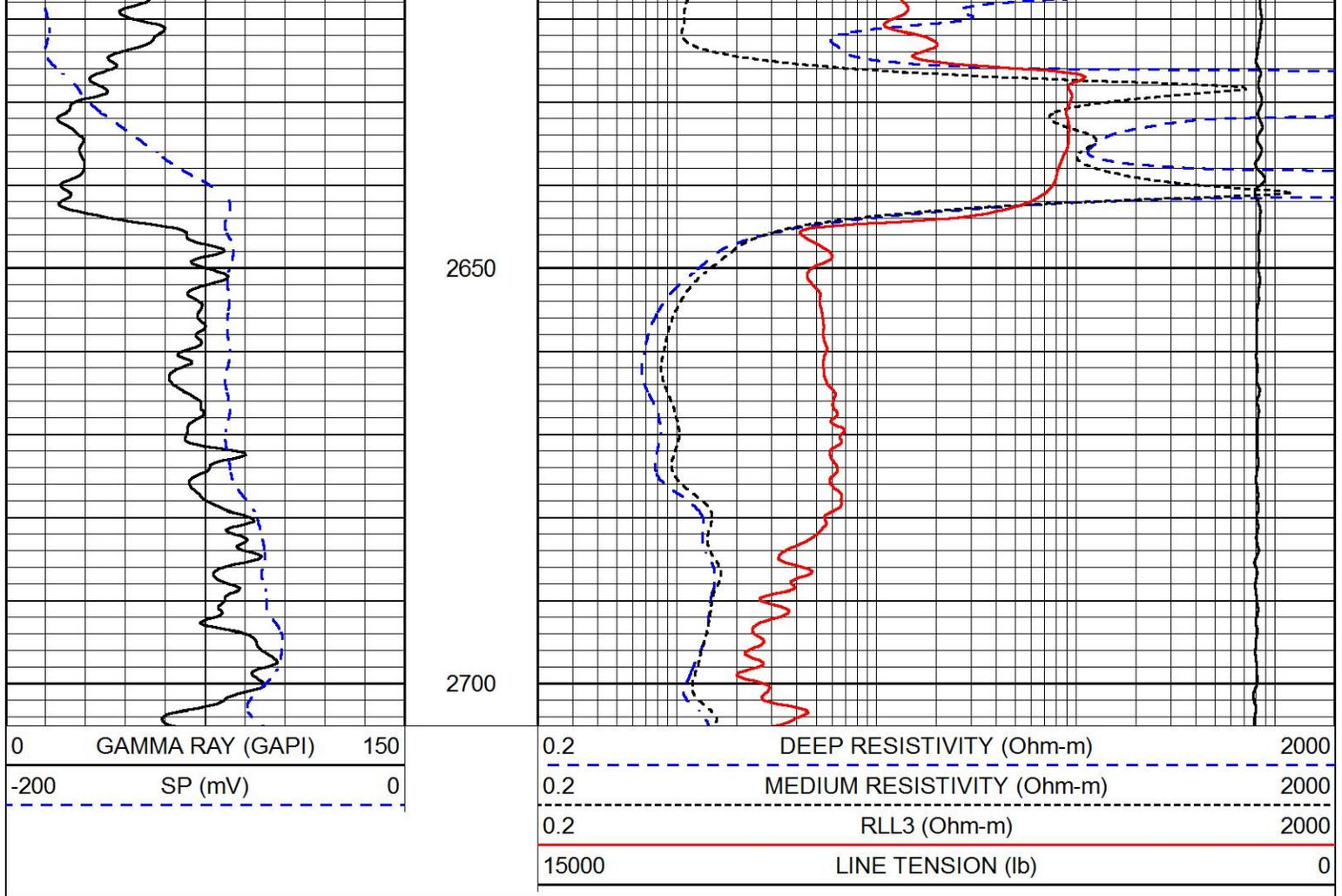



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 Presentation Format    dil  
 Dataset Creation      Mon Sep 04 13:37:48 2017  
 Charted by            Depth in Feet scaled 1:240

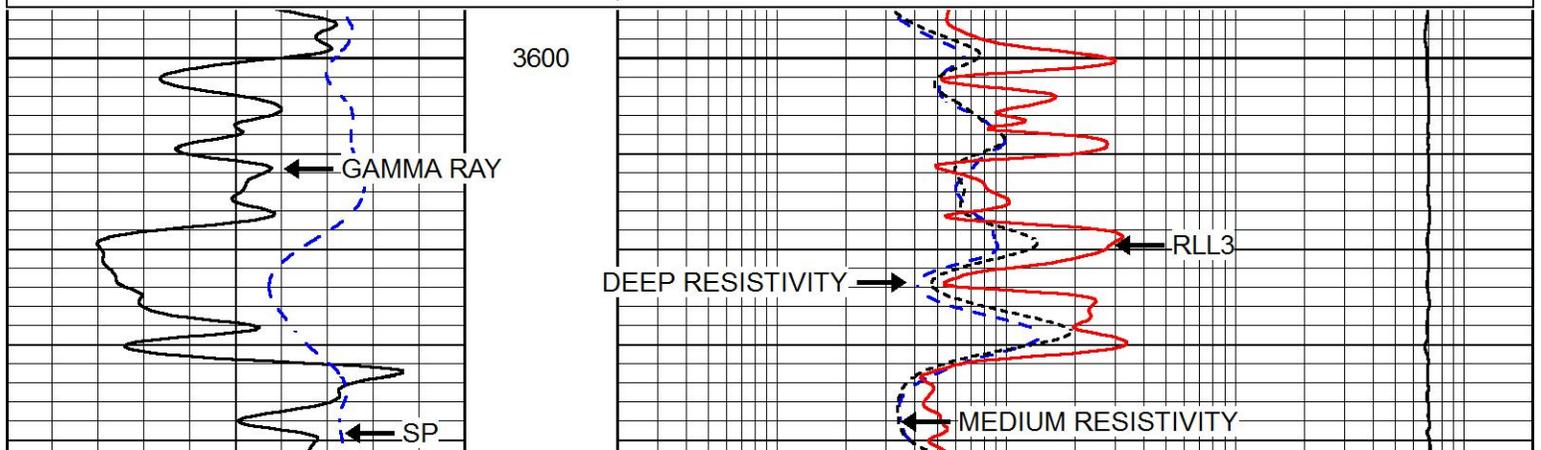
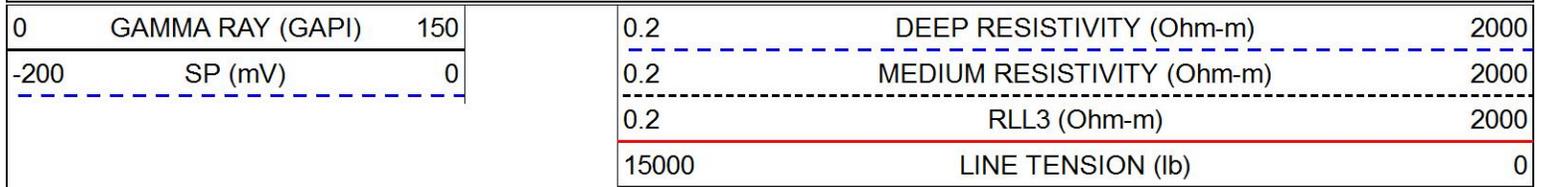
0	GAMMA RAY (GAPI)	150	0.2	DEEP RESISTIVITY (Ohm-m)	2000
-200	SP (mV)	0	0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
			0.2	RLL3 (Ohm-m)	2000
			15000	LINE TENSION (lb)	0

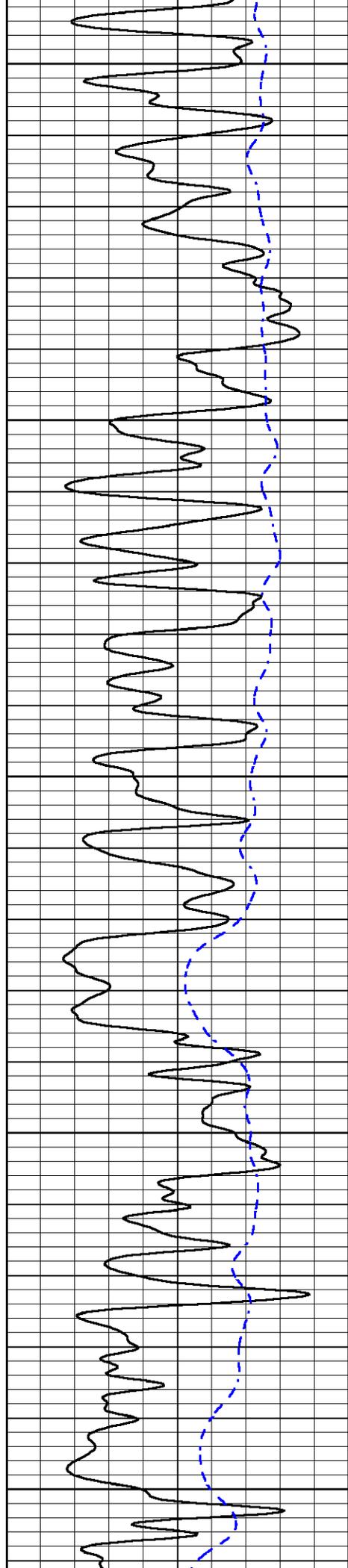




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 Presentation Format   dil  
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 Charted by         Depth in Feet scaled 1:240





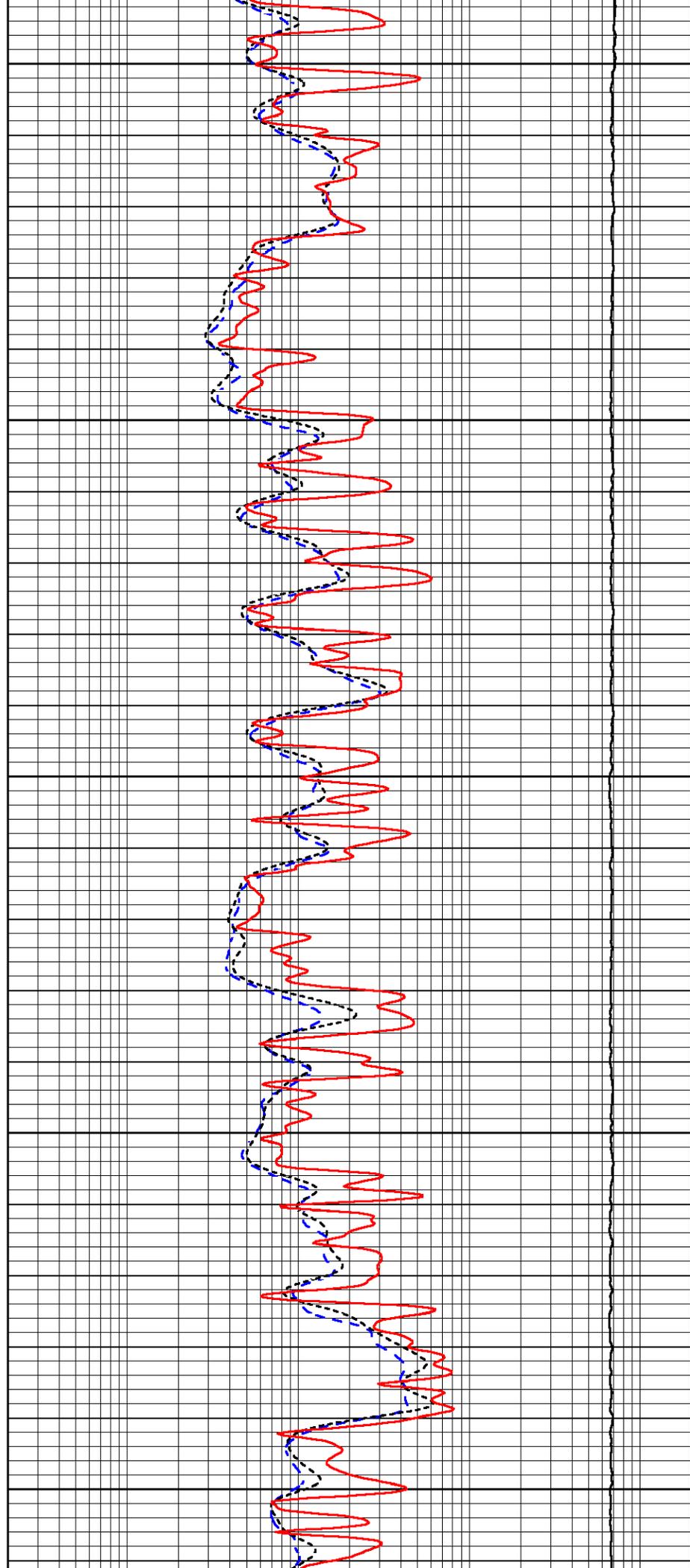
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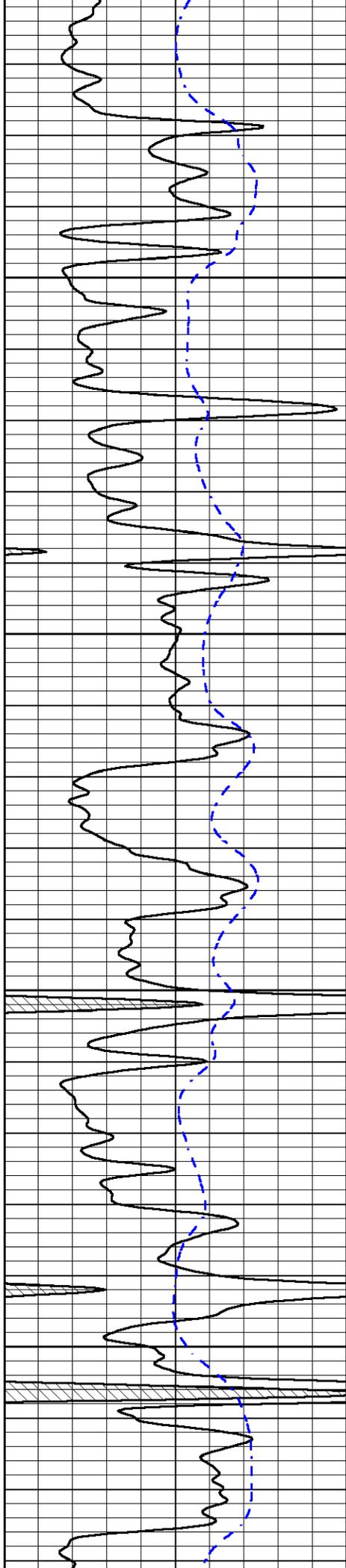
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3750

3800

3850



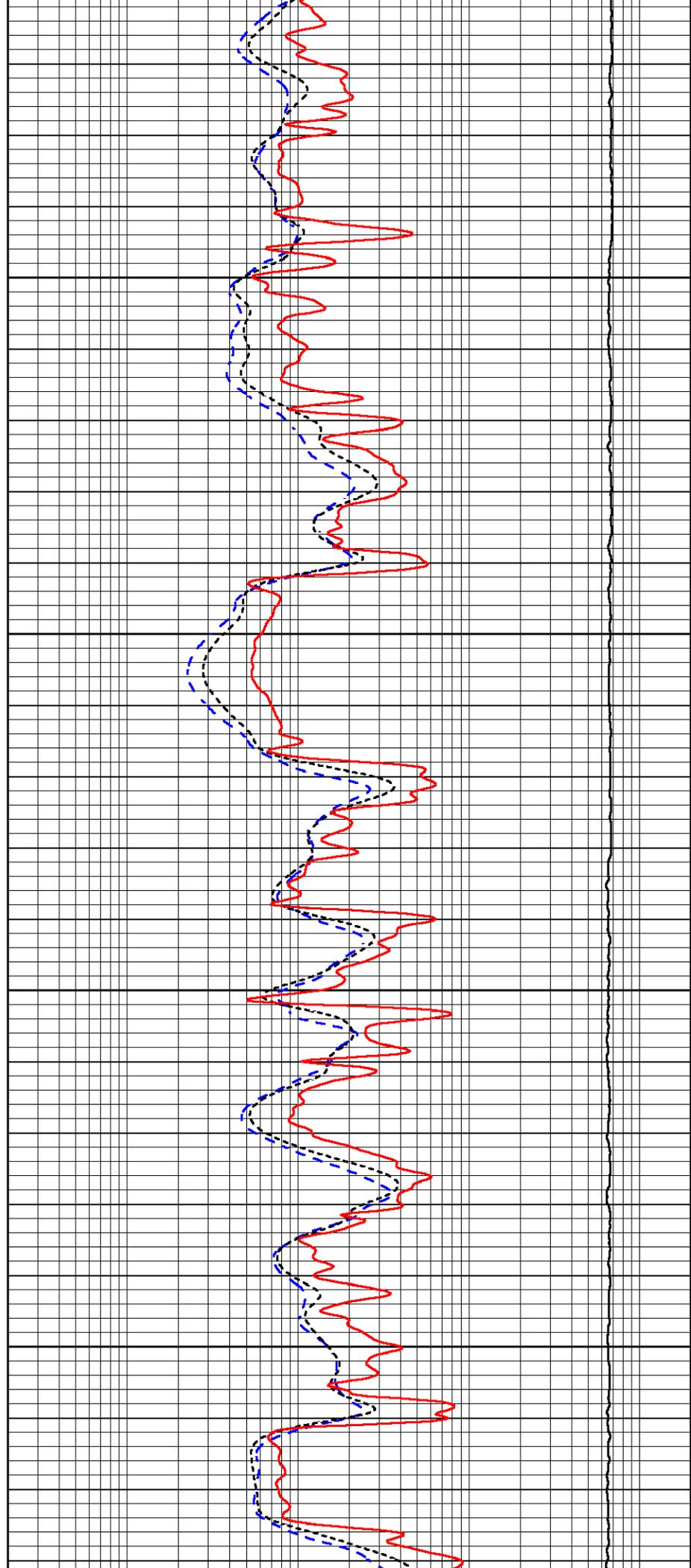


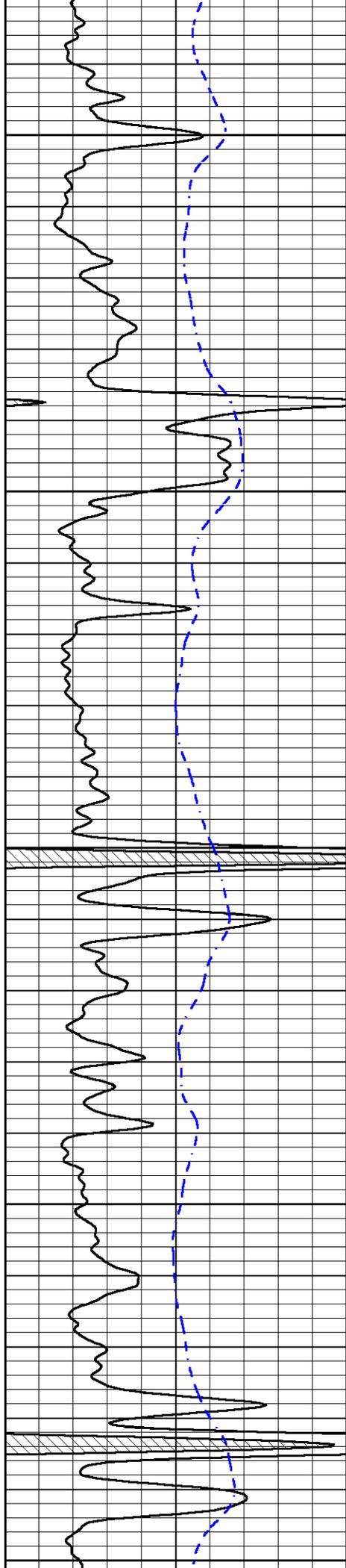
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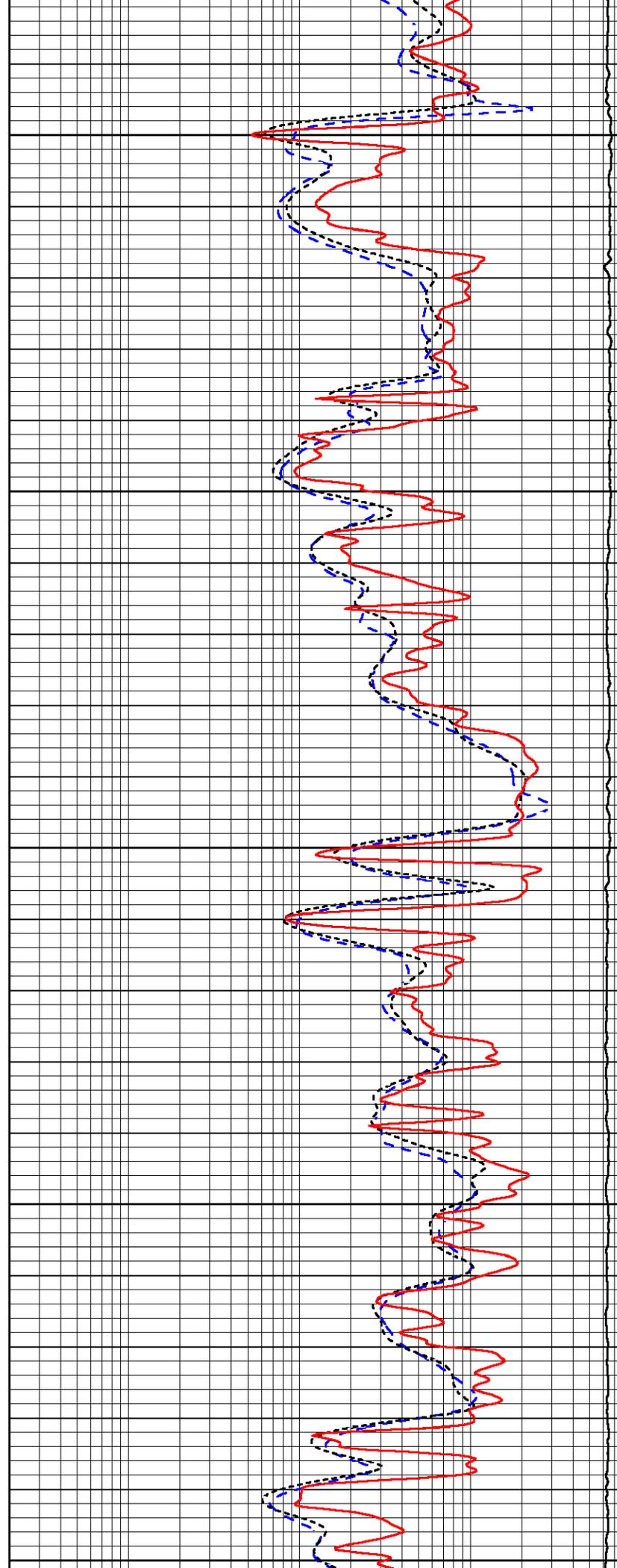
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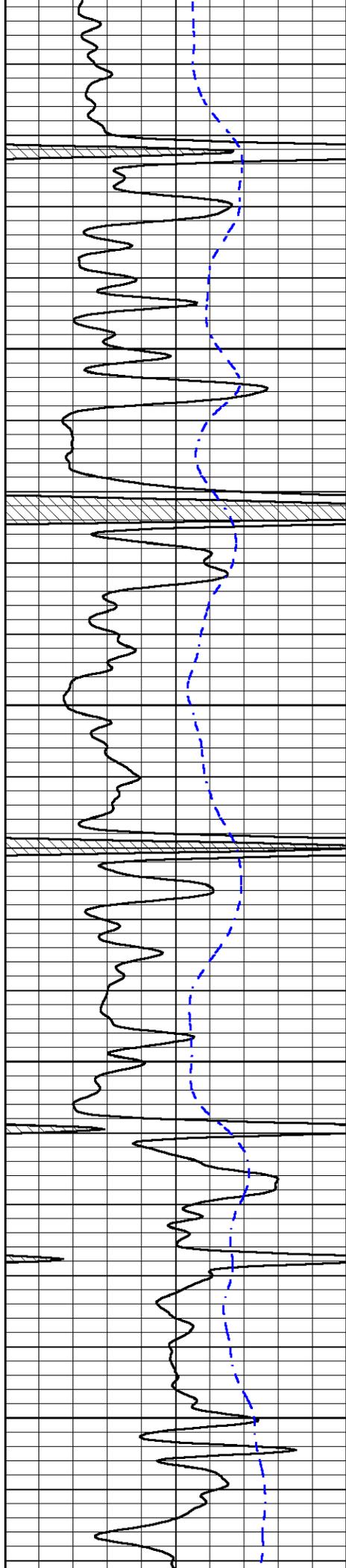
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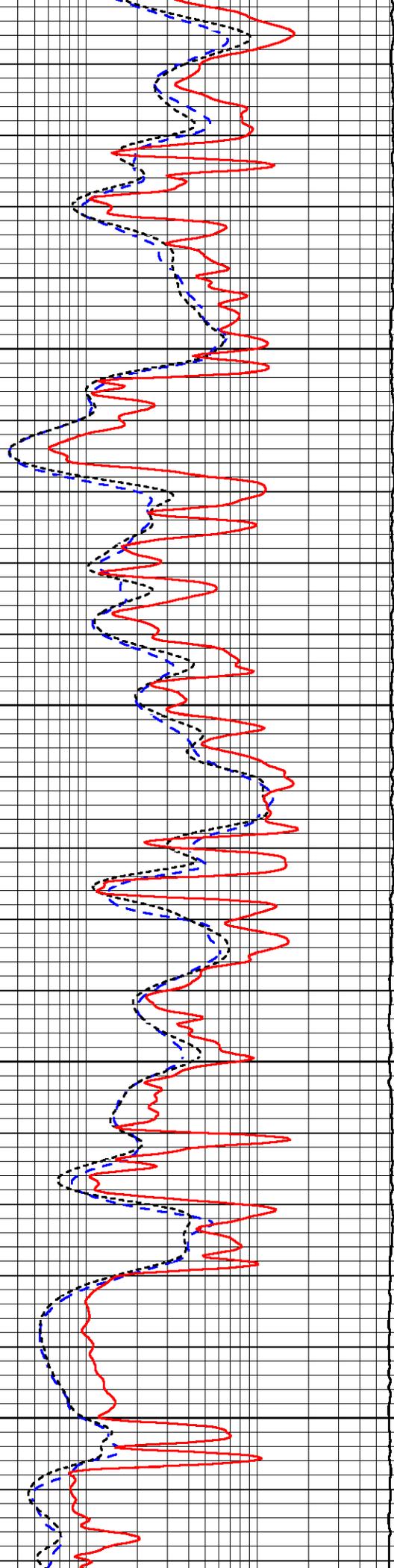


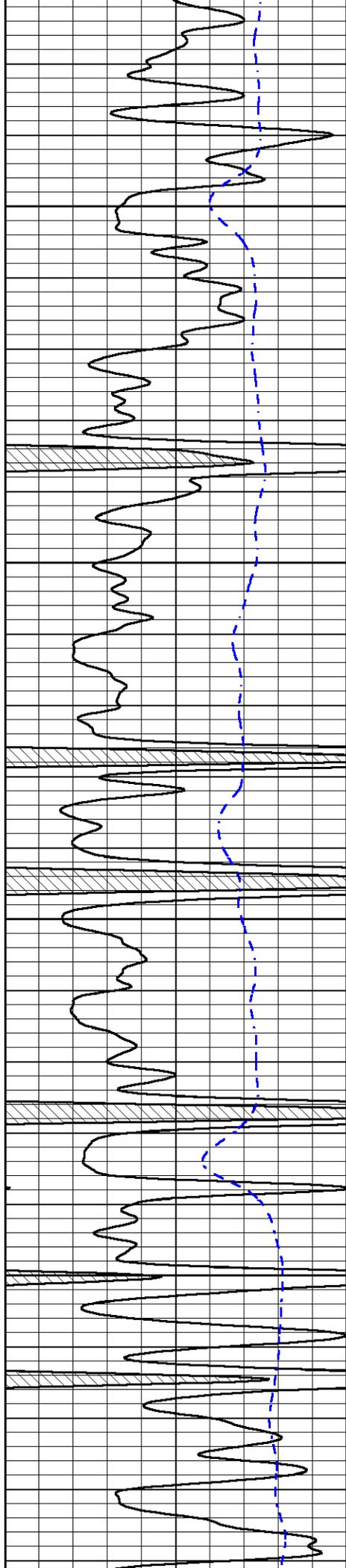
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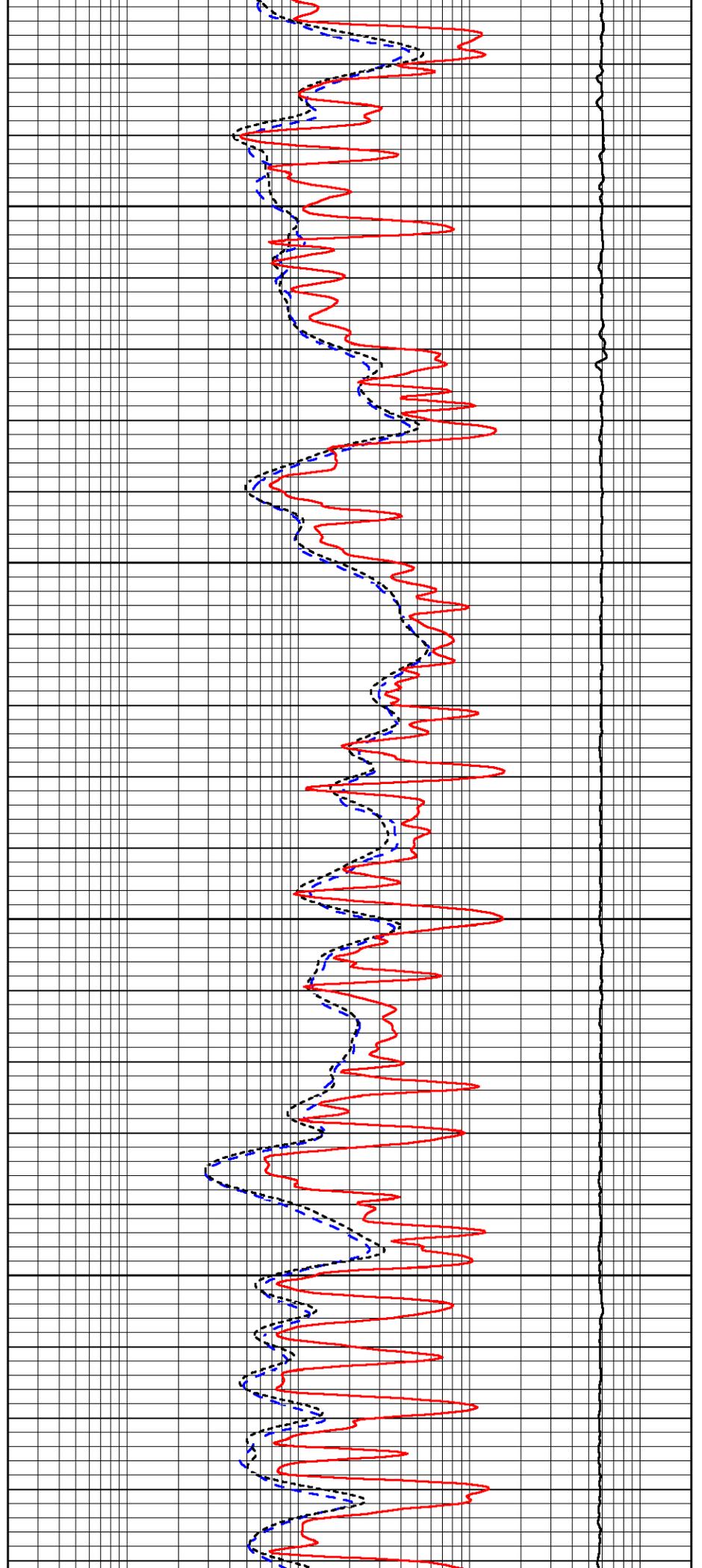


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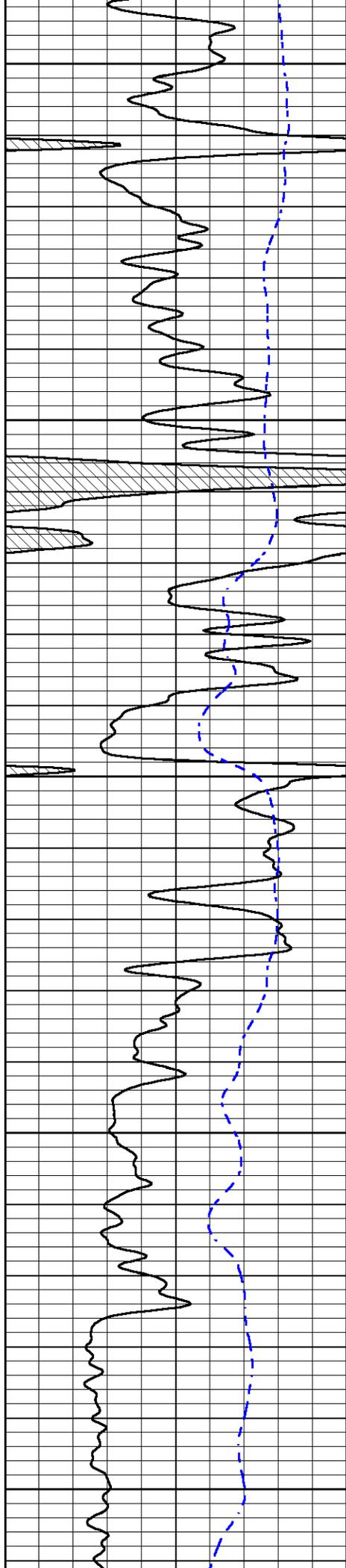


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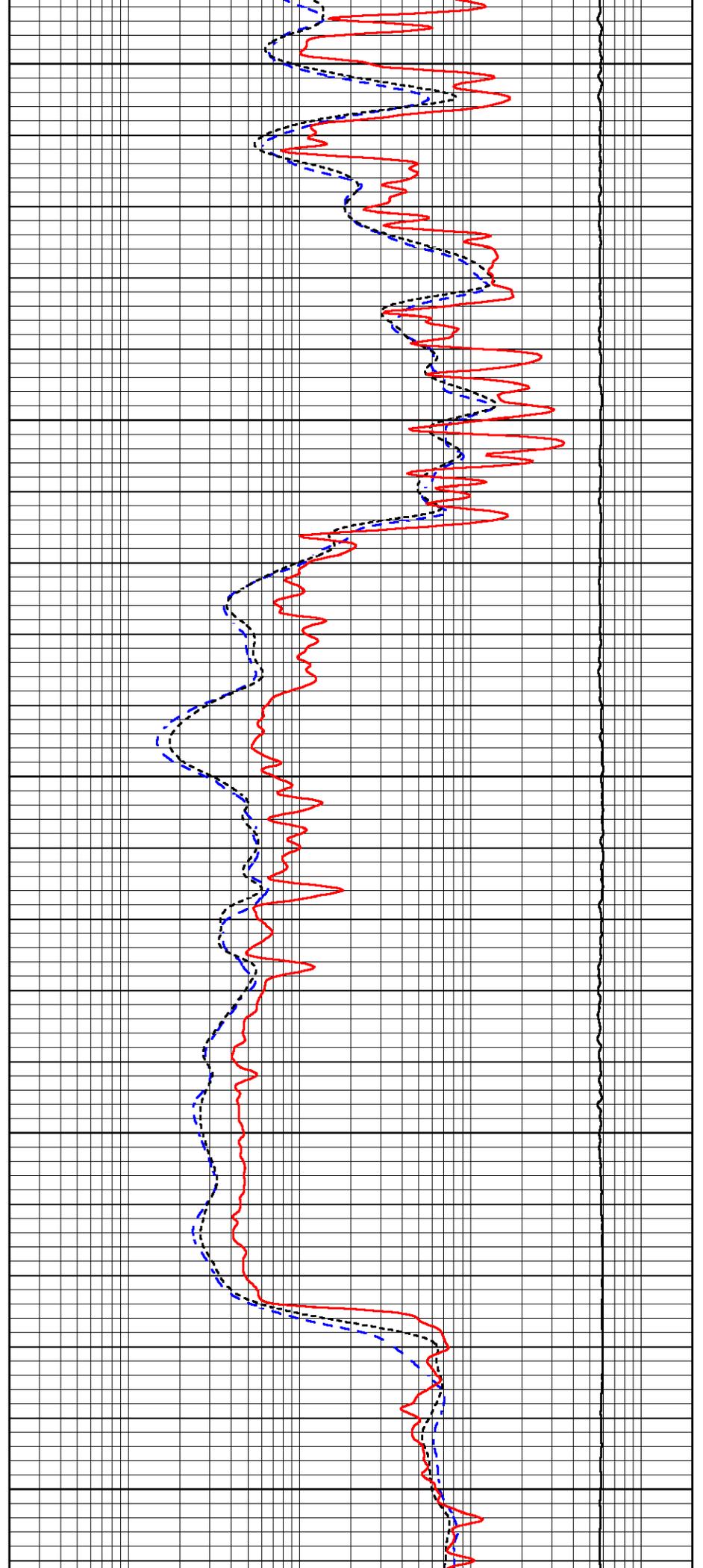
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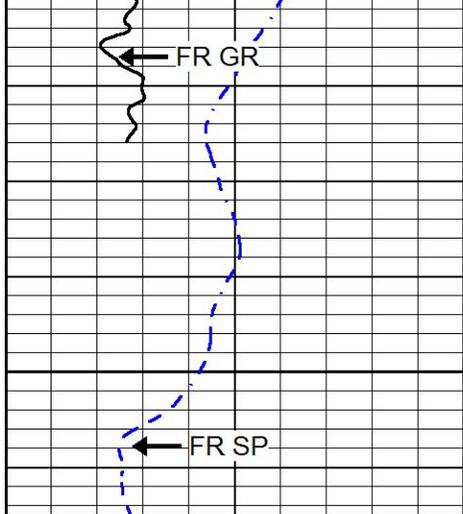
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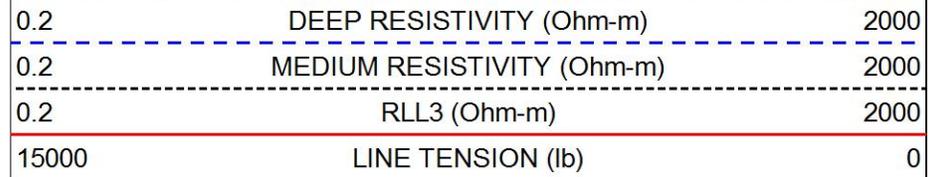
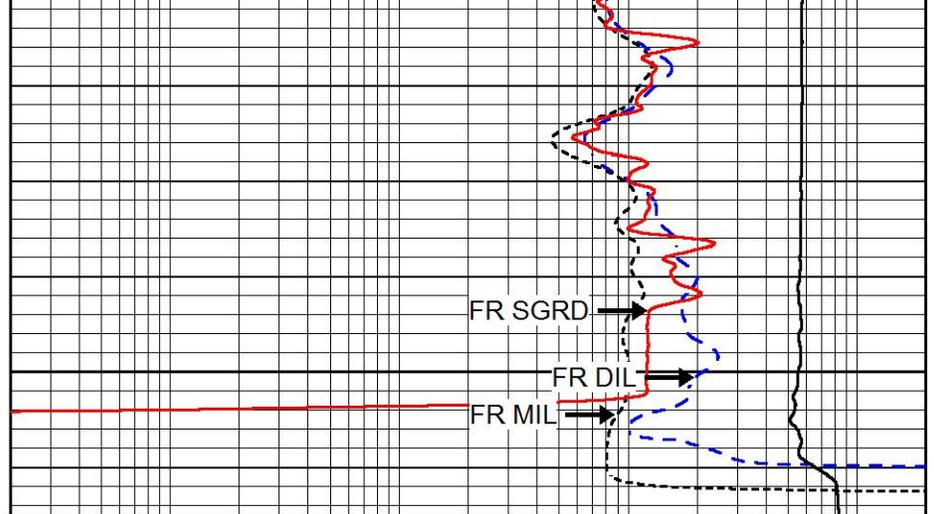
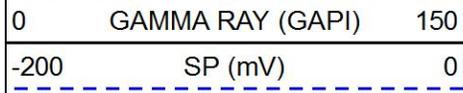
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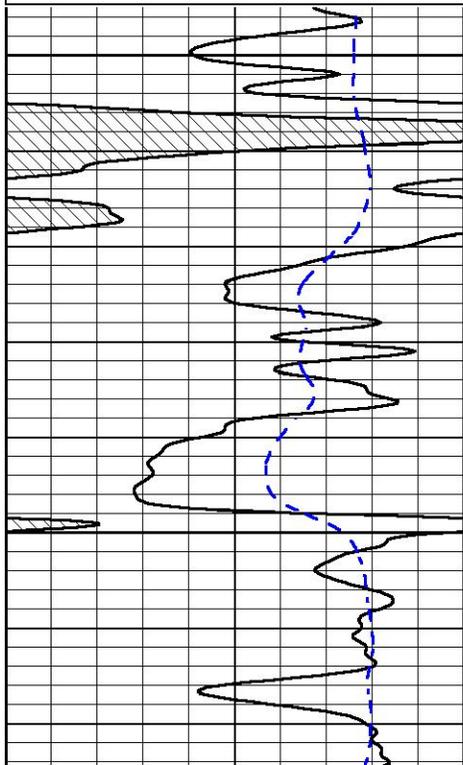
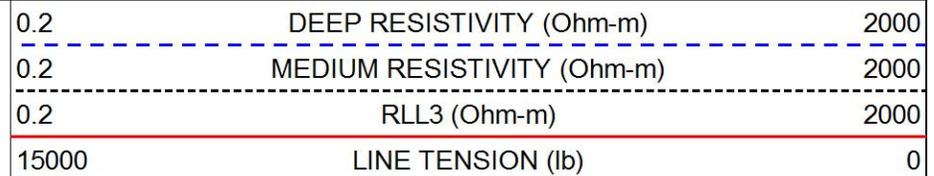
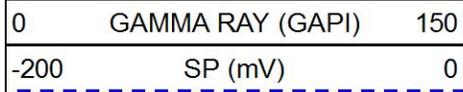


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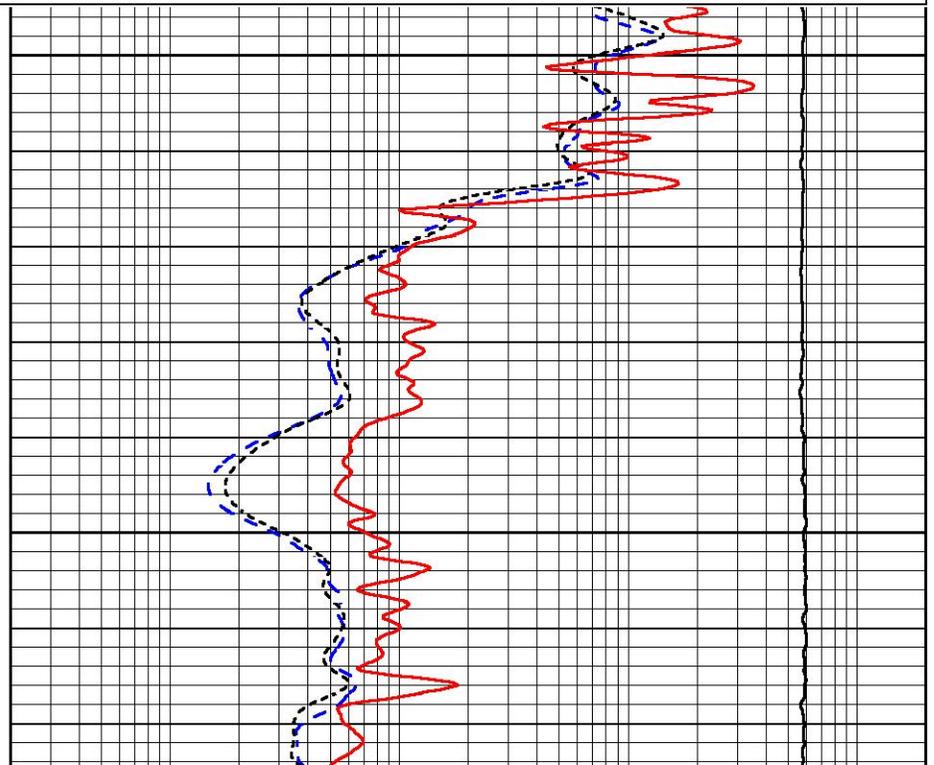
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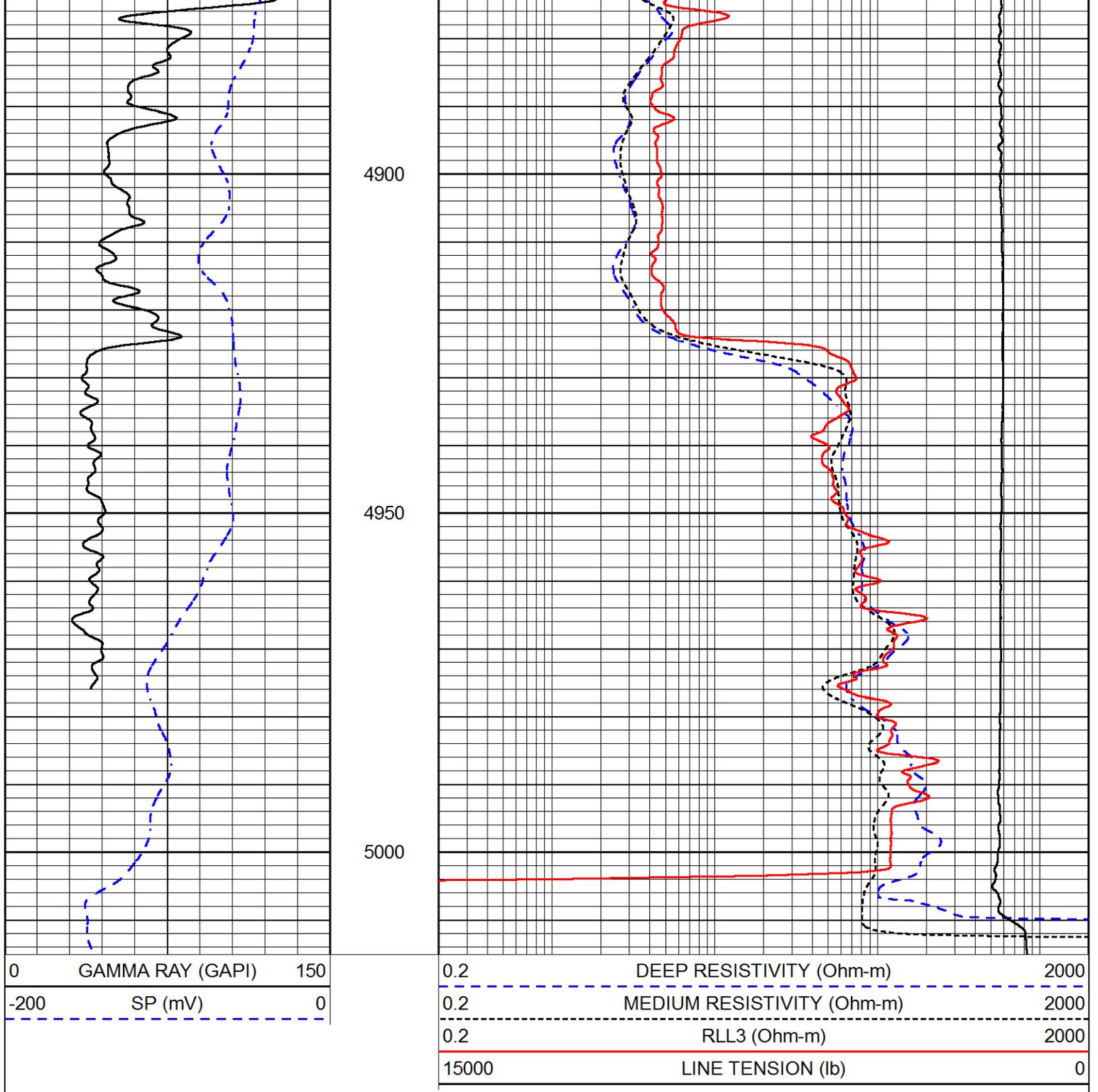
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 Charted by            Depth in Feet scaled 1:240



4800

4850





### Calibration Report

Database File ritchie\_blaue\_schroeder\_1.db  
 Dataset Pathname stackml/pass3.1  
 Dataset Creation Mon Sep 04 13:37:48 2017

### Dual Induction Calibration Report

Serial-Model: 1987-M&W  
 Calibration Performed: Tue Apr 11 16:07:38 2017

Loop:	Readings		References		Results	
	Air	Loop	Air	Loop	Gain	Offset
Deep	178.615	710.235	0.000	255.800	0.530	-36.500

Microlog Calibration Report

Serial-Model: PSI-02-PSI STKBL ML  
 Performed: Fri Jun 23 00:25:19 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0031	0.0043	0.0000	10.0000	Ohm-m	23000.0000	0.0000
Inverse	0.0000	0.0013	0.0000	10.0000	Ohm-m	25000.0000	0.0000
Caliper	1.0020	1.0834	5.5000	16.5000	in	135.1560	-131.3500

Compensated Density Calibration Report

Serial-Model: 168-986-M&W  
 Source / Verifier: /  
 Master Calibration Performed: Tue Apr 11 16:07:47 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	4691.86	4818.19	cps
Aluminum	2.675	g/cc	859.57	3020.22	cps
Spine Angle = 74.61			Density/Spine Ratio = 0.523		
	Size		Reading		
Small Ring	4.00	in	1.03		
Large Ring	14.00	in	1.23		

Compensated Neutron Calibration Report

Serial Number: tk10-MW  
 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 16:08:01 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

Well

BLAU-SCHROEDER NO.1

Field

TWIN BUTTE

County

LOGAN

State

KANSAS