



# DUAL INDUCTION LOG

Company AMERICAN WARRIOR, INC.  
 Well GANO NO. 9-17  
 Field LAKIN NORTHWEST  
 County KEARNY  
 State KANSAS

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 Well GANO NO. 9-17  
 Field LAKIN NORTHWEST  
 County KEARNY State KANSAS

Location: API #: 15-093-21965-00-00  
 544' FSL & 1098' FEL  
 SEC 17 TWP 25S RGE 36W  
 Permanent Datum GROUND LEVEL Elevation 3016'  
 Log Measured From KELLY BUSHING  
 Drilling Measured From KELLY BUSHING  
 Other Services  
 CNL/CDL  
 MEL  
 Elevation  
 K.B. 3027'  
 D.F. N/A  
 G.L. 3016'

Date	1/24/2018
Run Number	ONE
Depth Driller	5100'
Depth Logger	5098'
Bottom Logged Interval	5097'
Top Log Interval	1750'
Casing Driller	8.625" @ 1785'
Casing Logger	1784'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	1400
Density / Viscosity	9.5 49
pH / Fluid Loss	9.0 8.0
Source of Sample	FLOWLINE
Rm @ Meas. Temp	1.0 @ 58
Rmt @ Meas. Temp	.75 @ 58
Rmc @ Meas. Temp	1.35 @ 58
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.38 @ 127
Operating Rig Time	2 HOURS
Max Rec. Temp. F	127 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	LUKE THOMPSON

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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.

LAKIN KANSAS  
 3 1/2 SOUTH TO 120 RD, 1 WEST, 1 SOUTH TO CURVE, 1 WEST  
 1 1/2 SOUTH TO TANK BATTERY, WEST THEN SOUTH INTO

Log Measured From: KELLY BUSHING 11 Ft. Above Permanent Datum

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[www.pioneerenergy.com](http://www.pioneerenergy.com) 785-625-3858

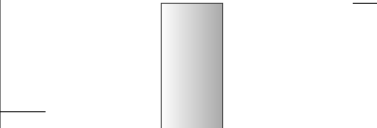
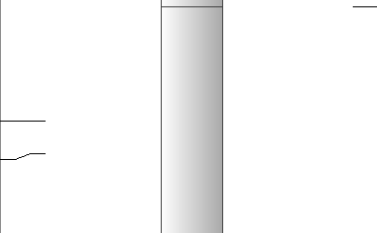
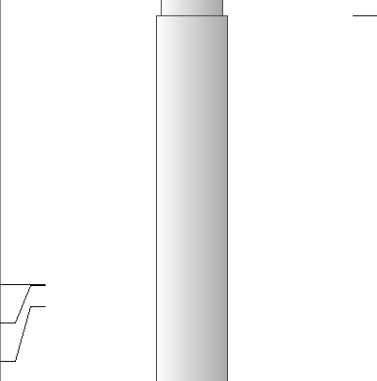
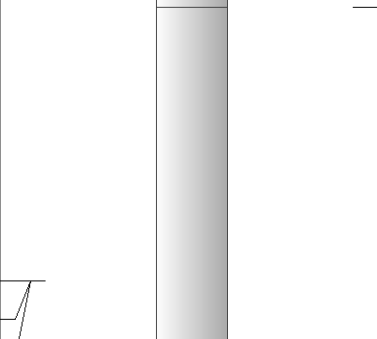
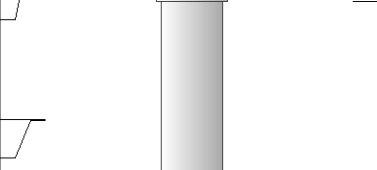
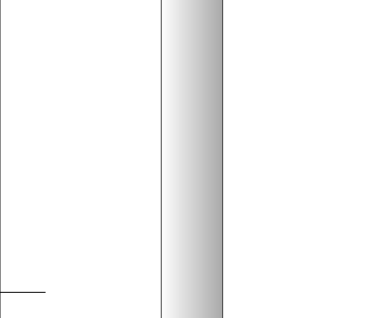
Your Pioneer Energy Services Crew Engineer: J. HENRICKSON Operator: Operator: Operator:	This Log Record Was Witnessed By Primary Witness: LUKE THOMPSON Secondary Witness: Secondary Witness: Secondary Witness:
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# Log Variables

DatabaseC:\ProgramData\Warrior\Data\american\_warrior\_gano\_9\_17.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	127	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	-14	25	Off	5098

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
MCAL MI MN	19.83 19.83 19.83		ML-PSI STKBL ML (PSI-02) Stackable Microlog Tools	7.58	4.00	65.00
RLL3 RLL3F	15.80 15.79					
CILD	8.00		DIL-M&W (PSI 978)	18.50	3.50	220.00

CILM 4.70

SP 0.20

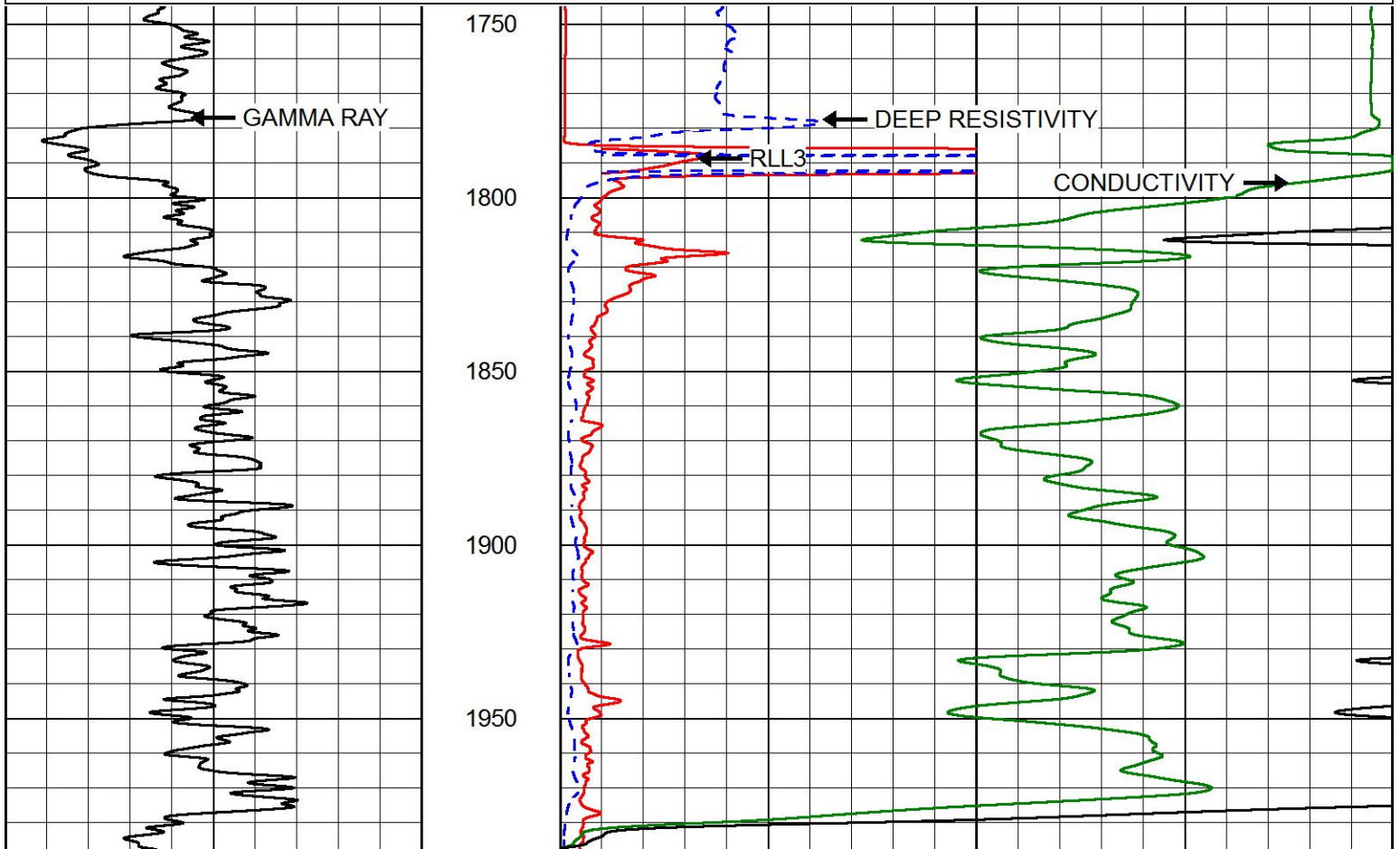
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 Total length: 43.08 ft  
 Total weight: 685.00 lb  
 O.D.: 4.00 in

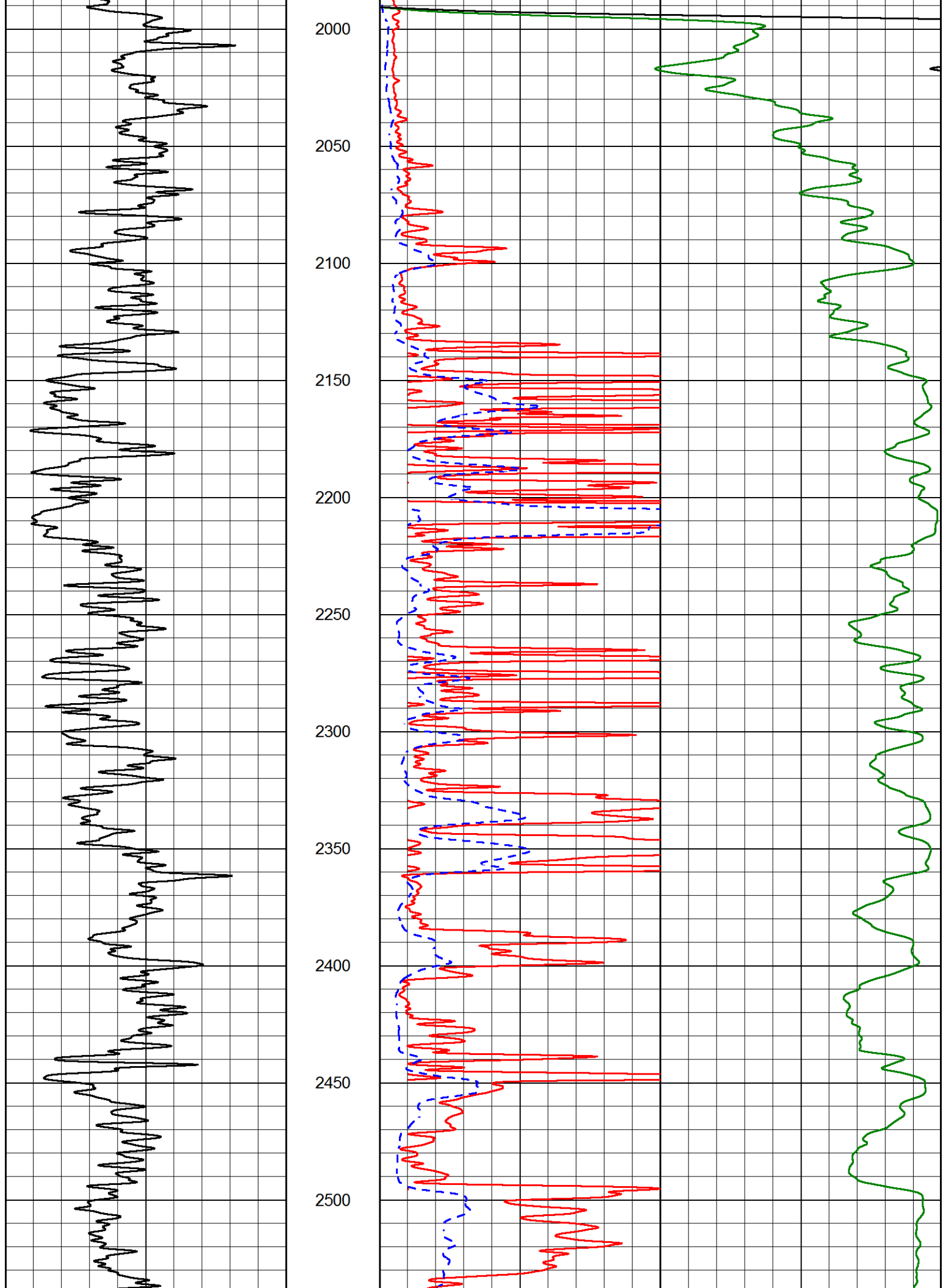


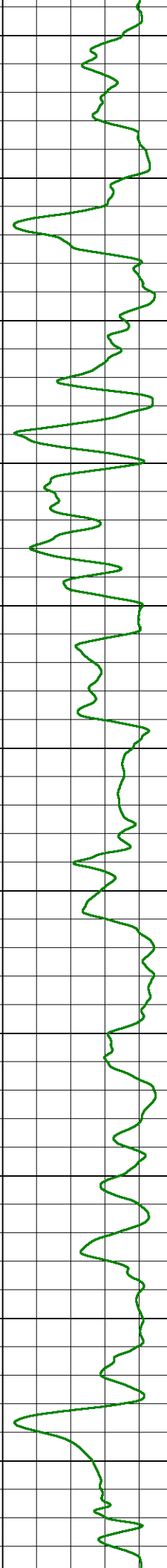
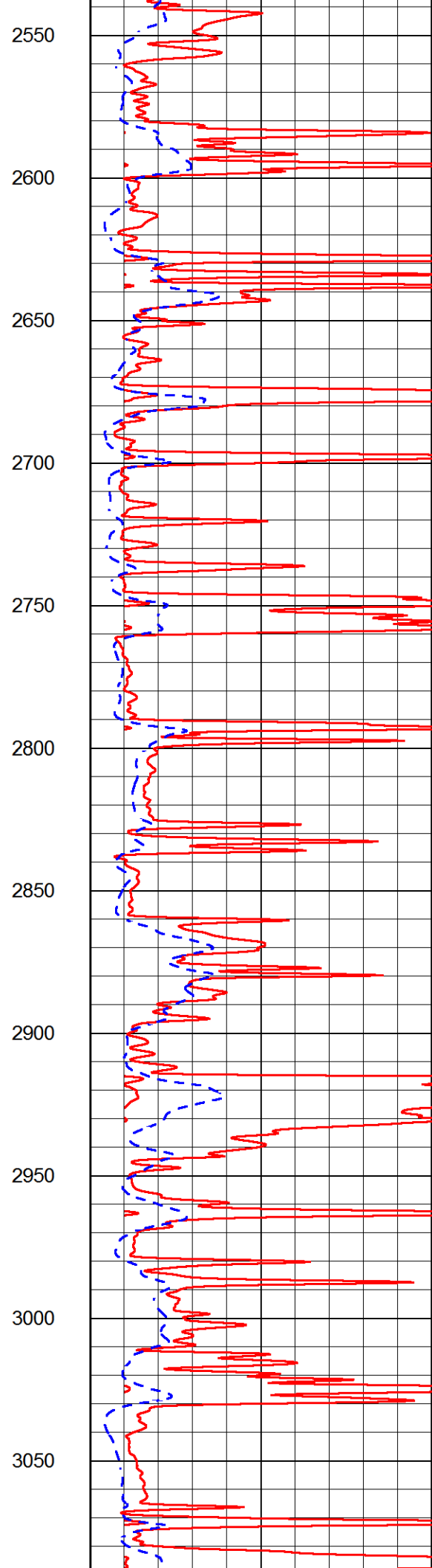
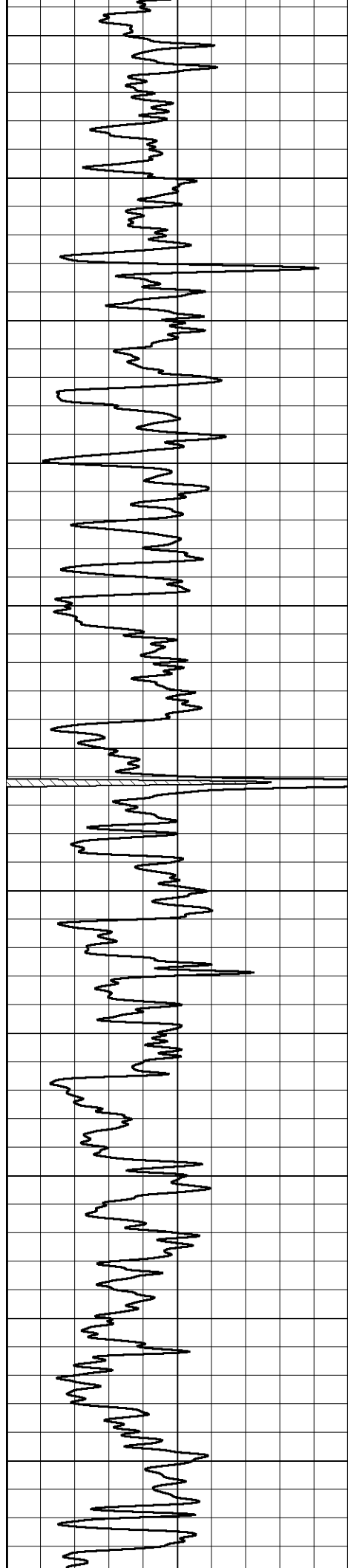
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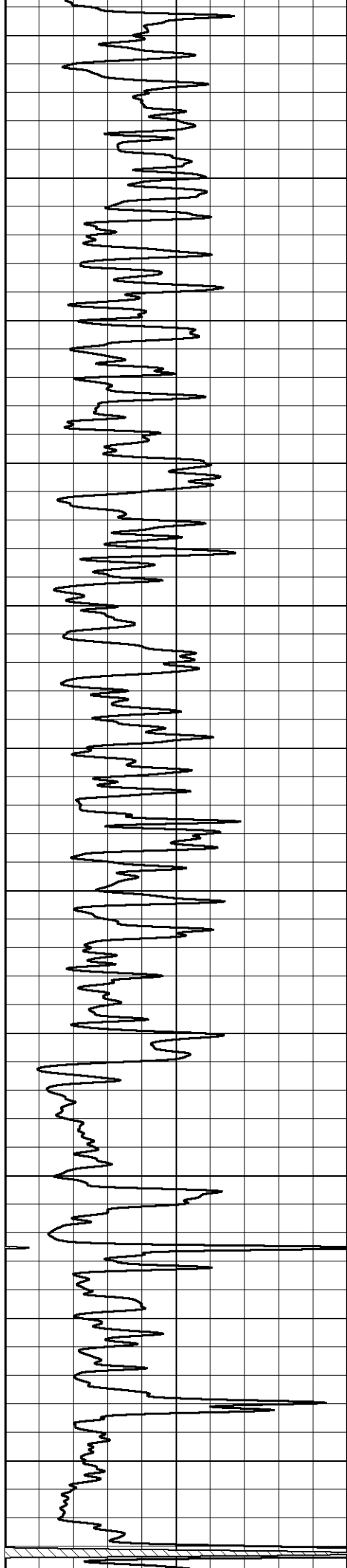
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 Dataset Pathname stackml/pass3.1  
 Presentation Format dil2in  
 Dataset Creation Wed Jan 24 02:36:40 2018  
 Charted by Depth in Feet scaled 1:600

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
				DEEP RESISTIVITY	
			50	(Ohm-m)	500









3100

3150

3200

3250

3300

3350

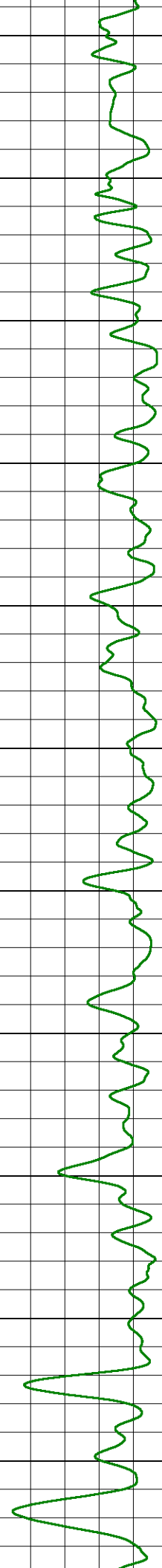
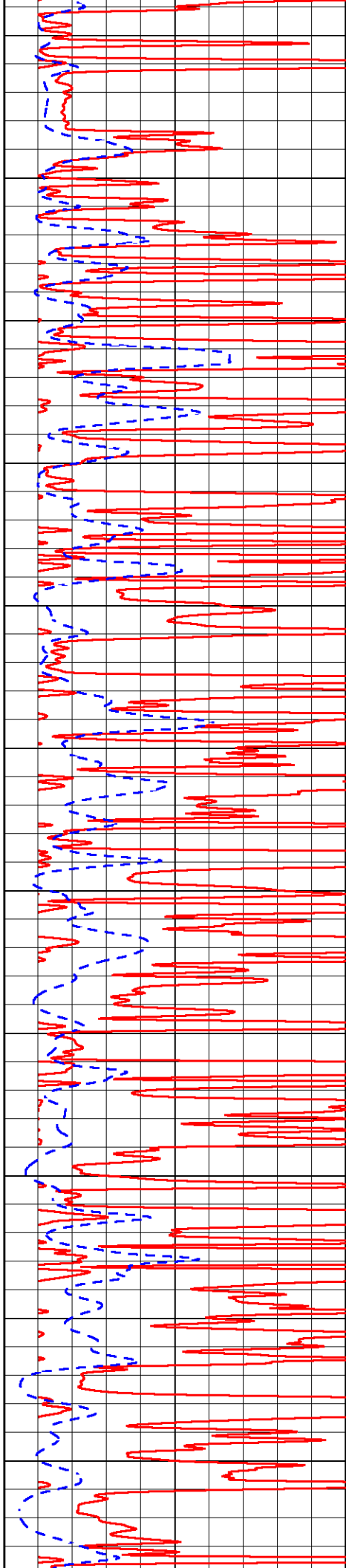
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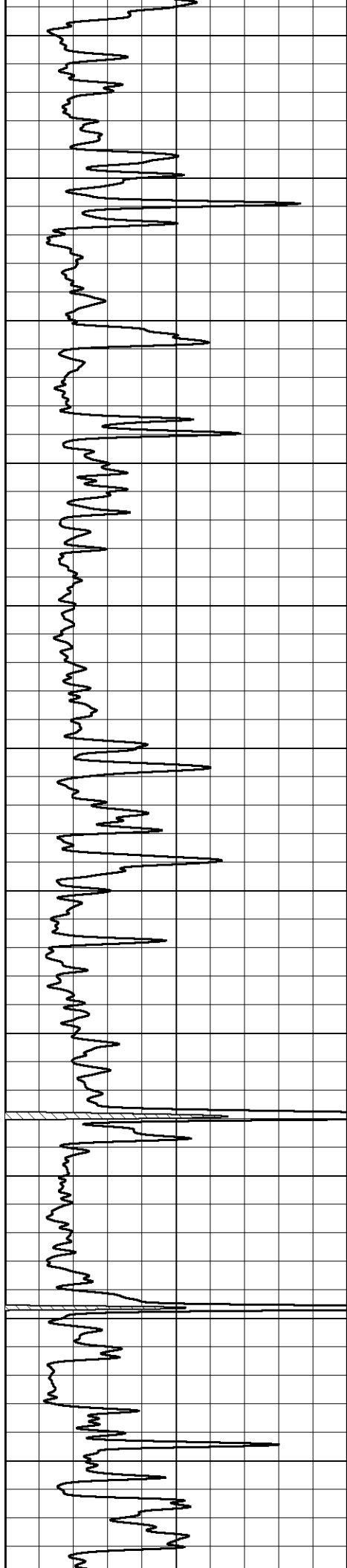
3450

3500

3550

3600





3650

3700

3750

3800

3850

3900

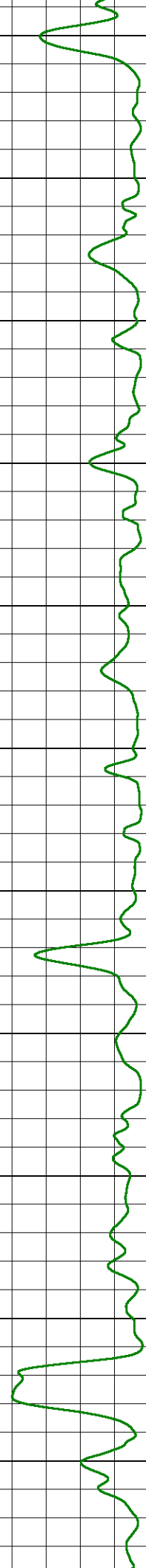
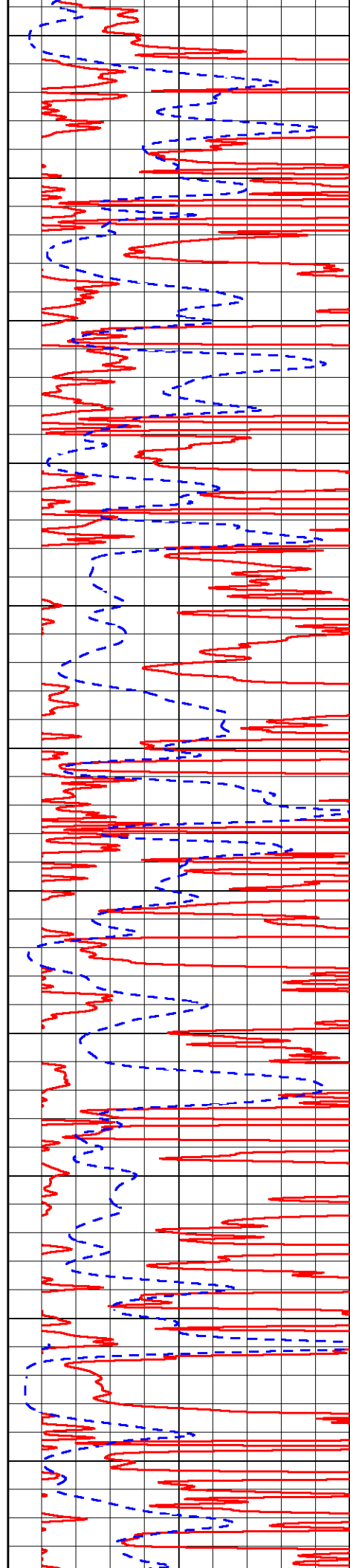
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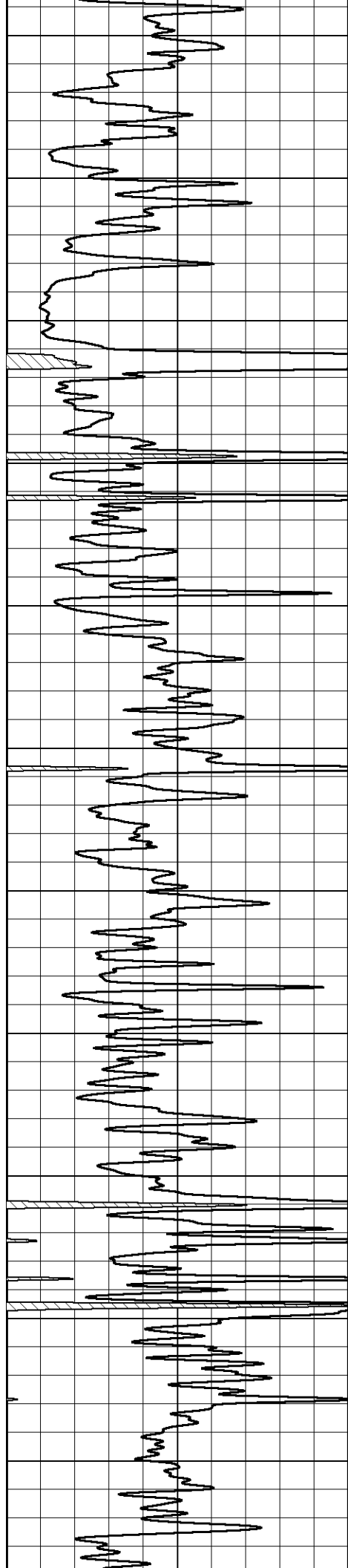
4000

4050

4100

4150





4200

4250

4300

4350

4400

4450

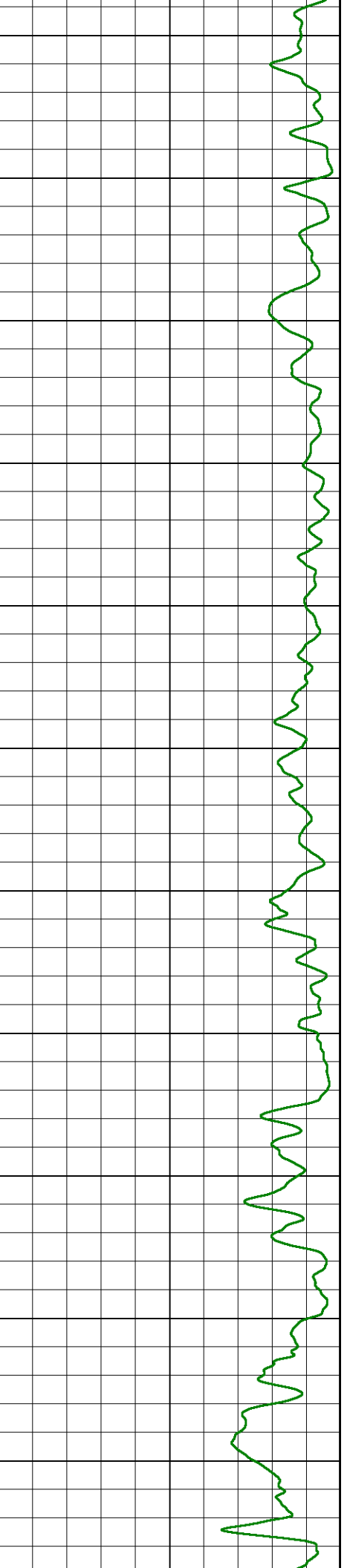
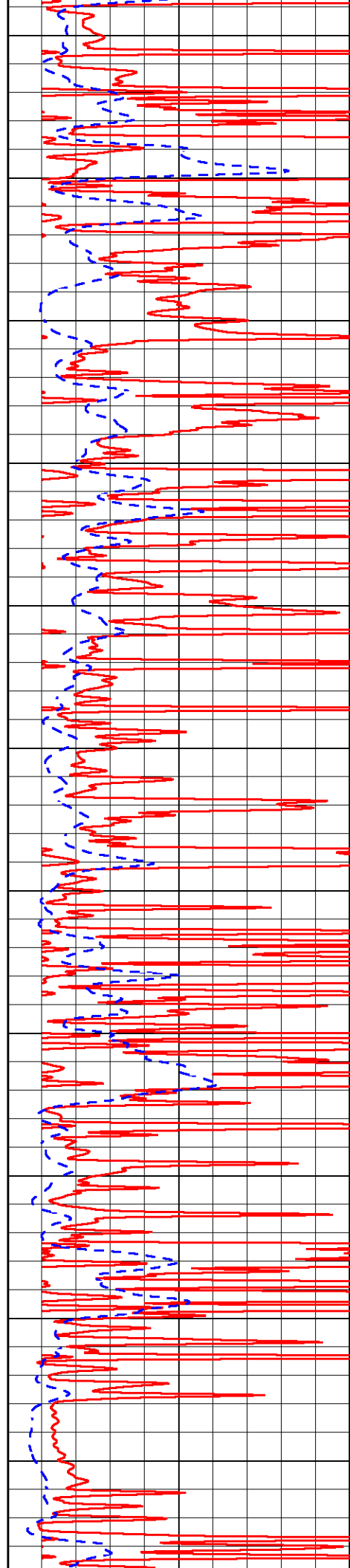
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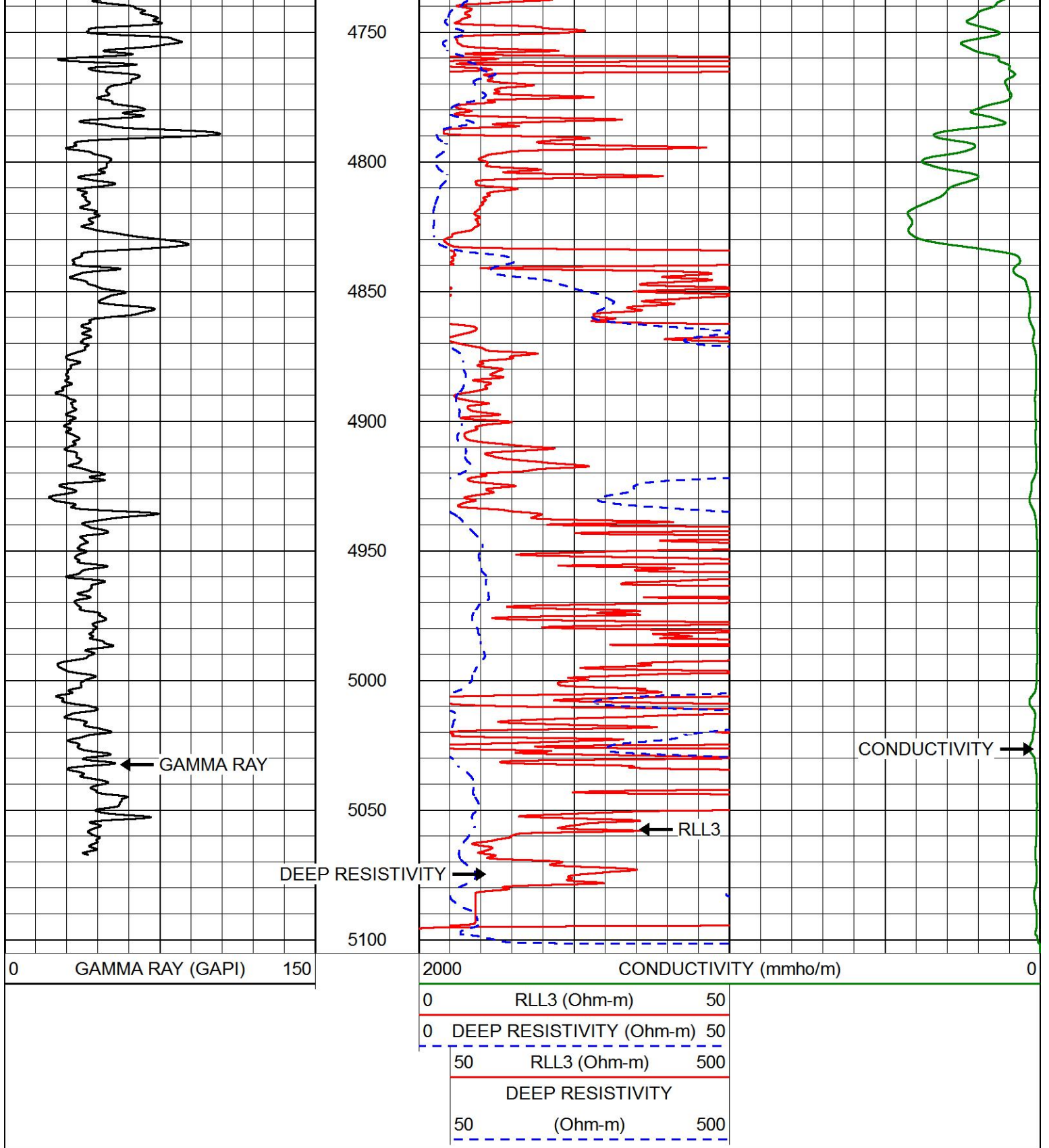
4550

4600

4650

4700



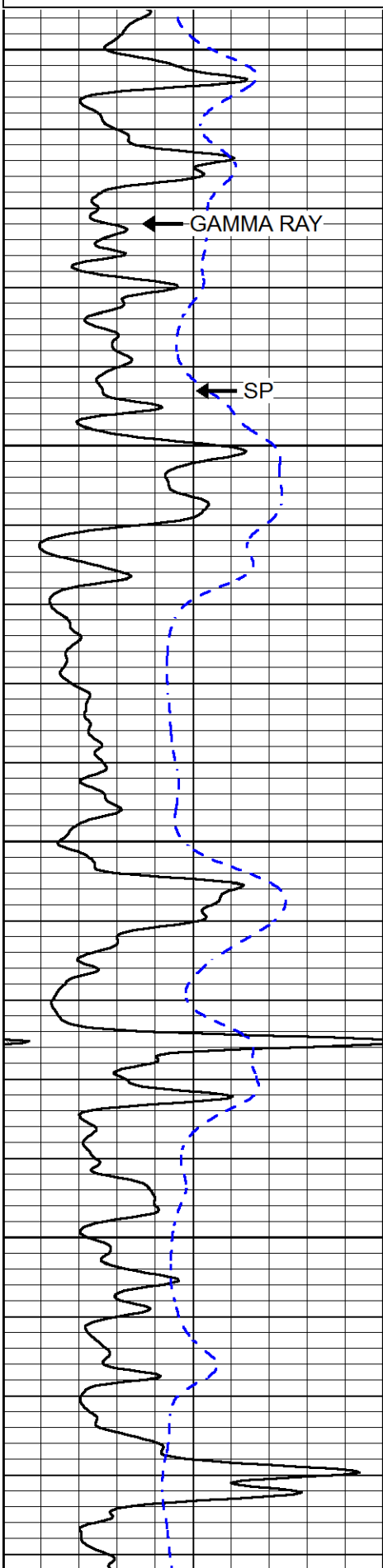


# MAIN PASS

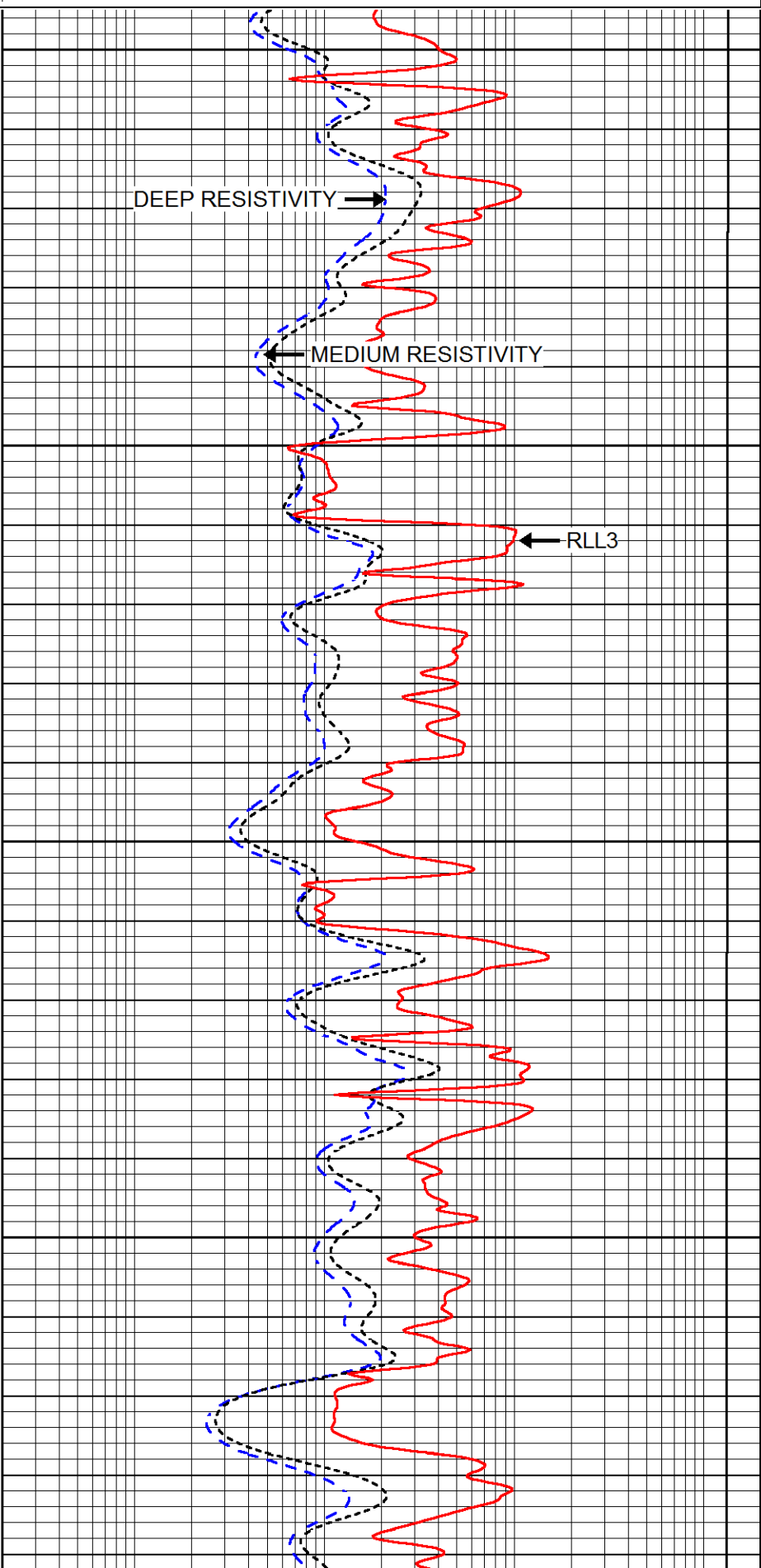
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 Dataset Pathname: stackml/pass3.1  
 Presentation Format: dil  
 Dataset Creation: Wed Jan 24 02:36:40 2018  
 Charted by: Depth in Feet scaled 1:240

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

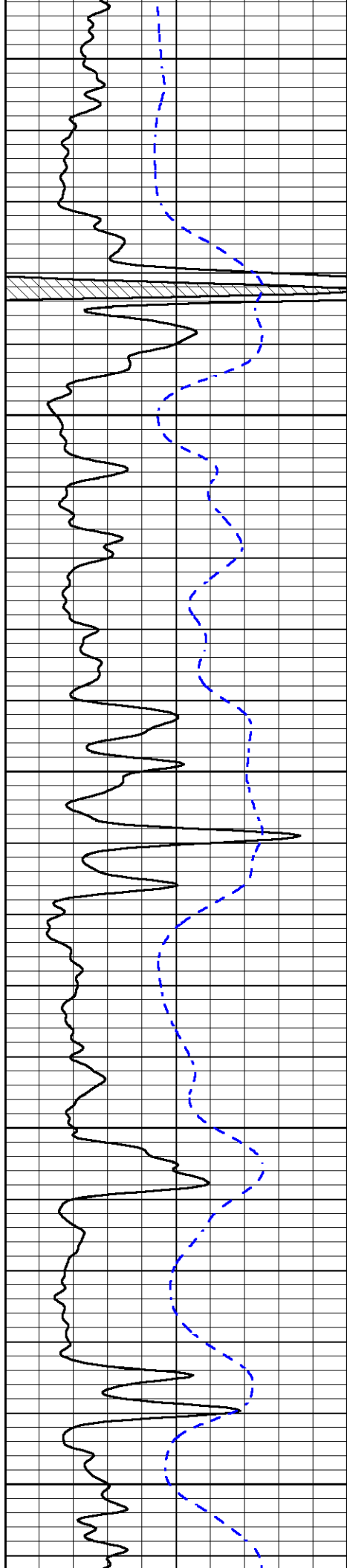
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0



3400  
3450  
3500  
3550



DEEP RESISTIVITY →  
← MEDIUM RESISTIVITY  
← RLL3



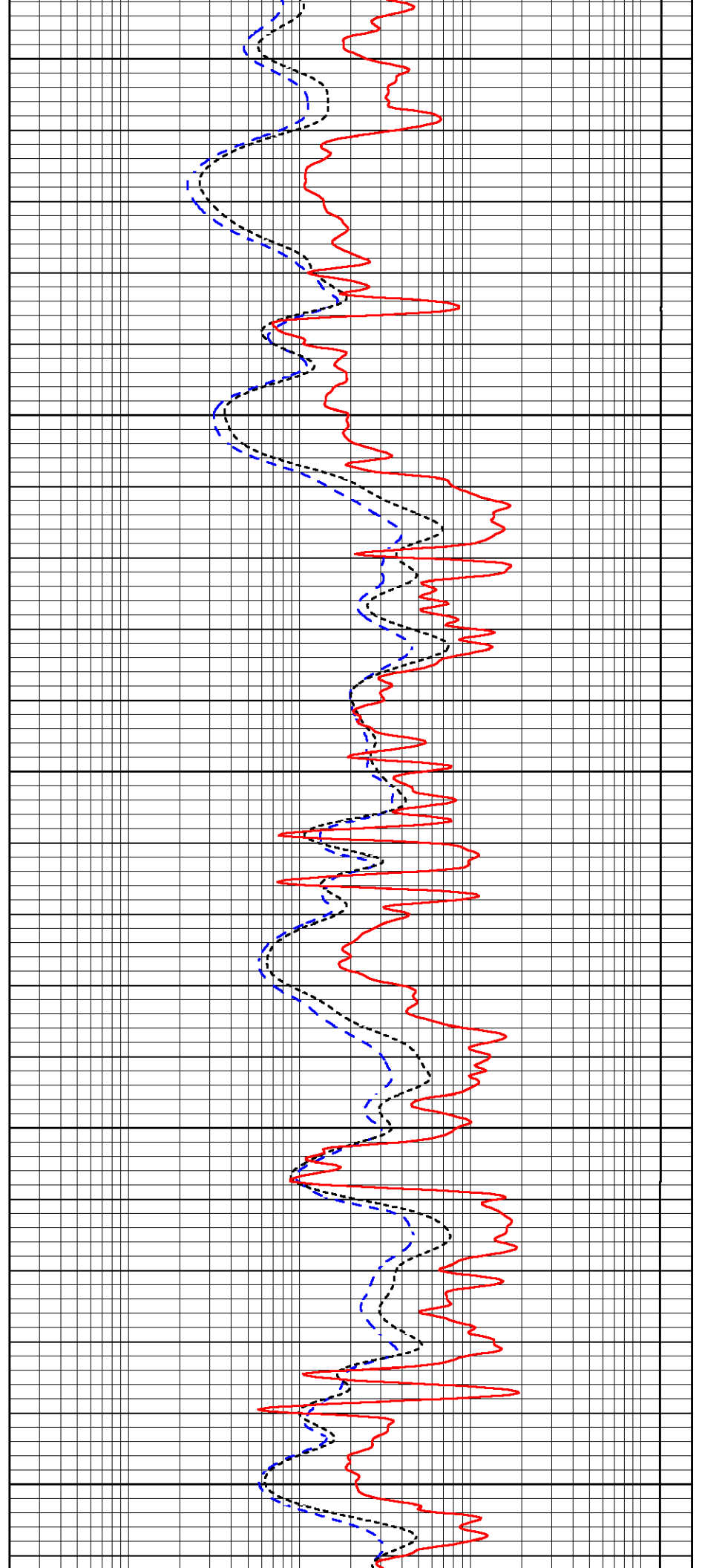
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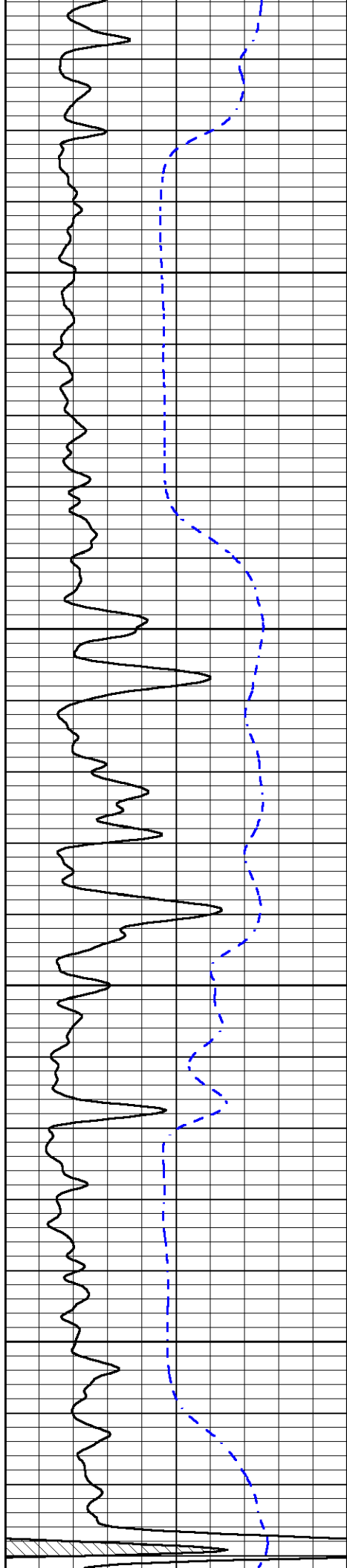
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3700

3750

3800



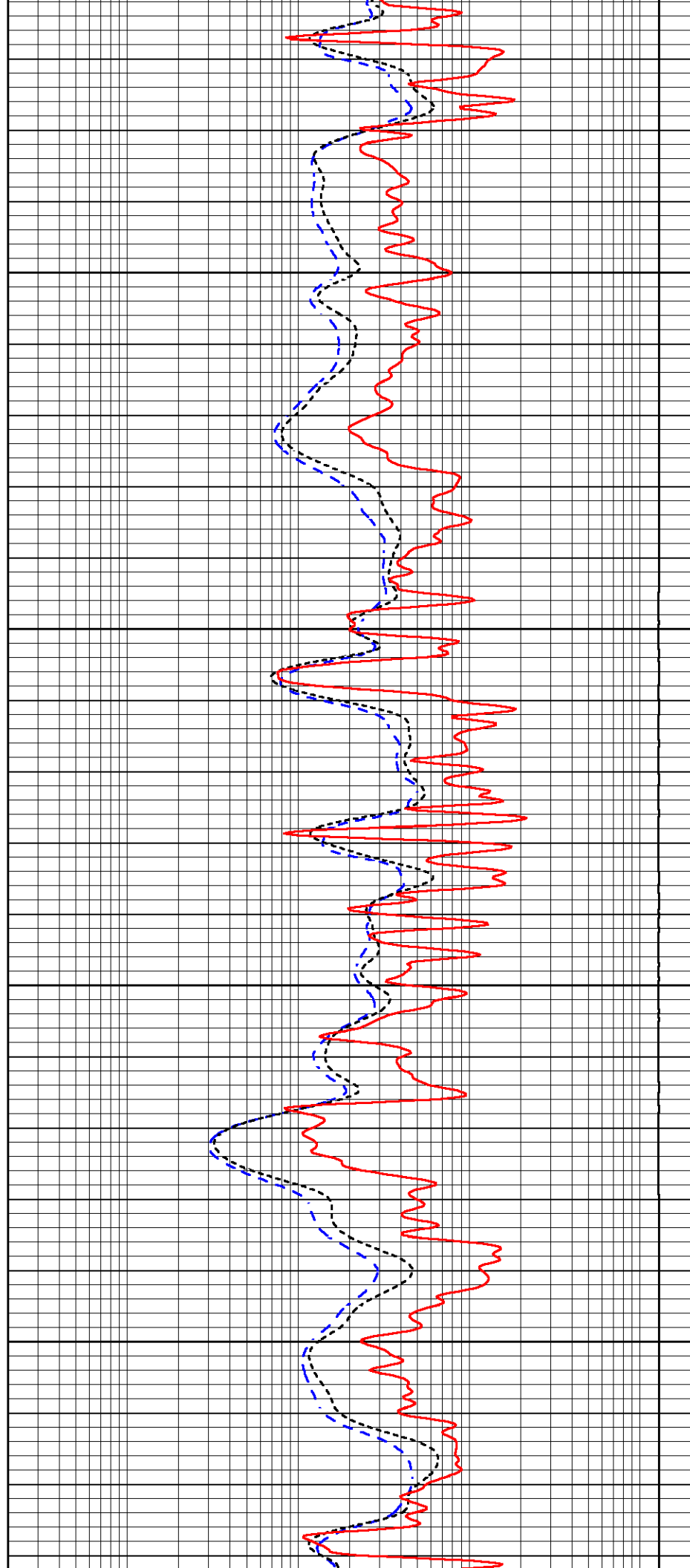


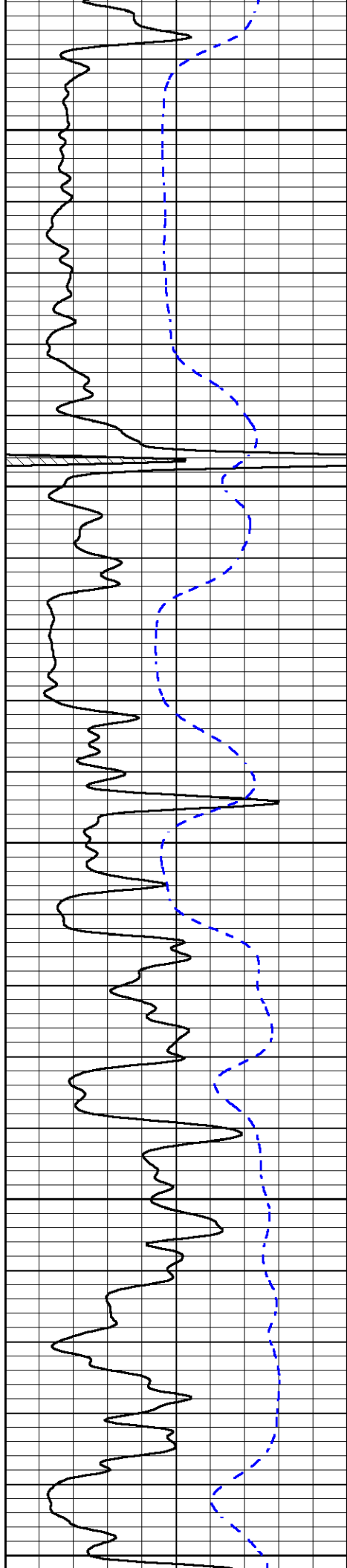
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3900

3950

4000





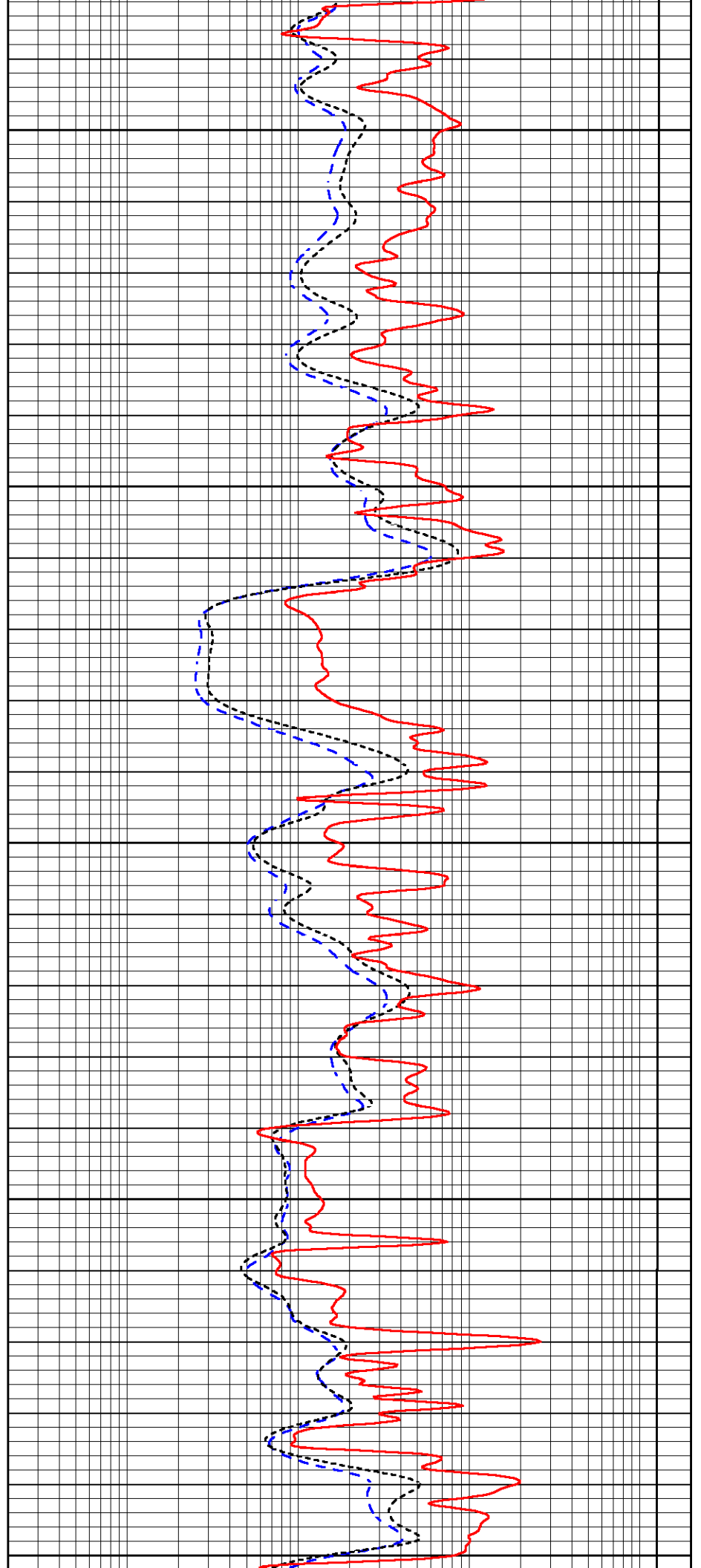
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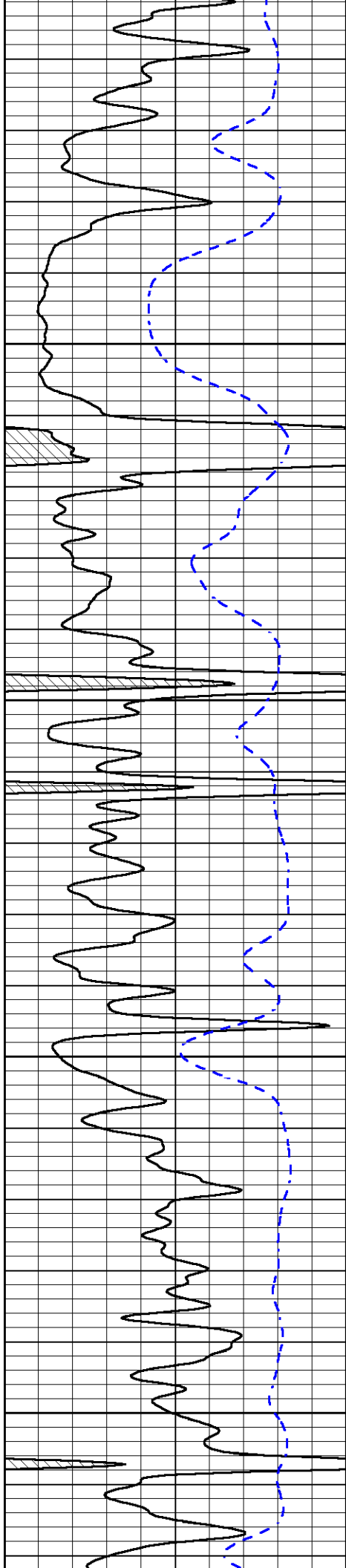
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4150

4200

4250



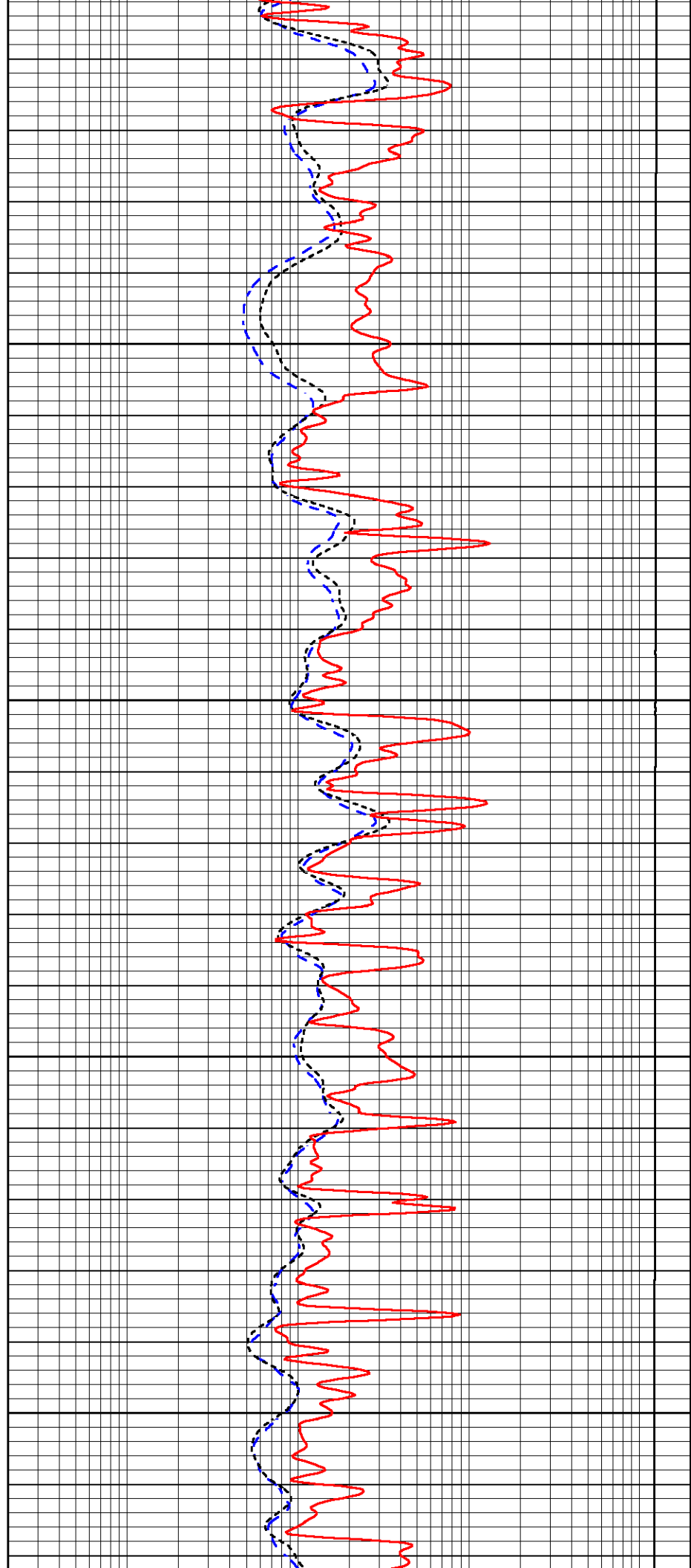


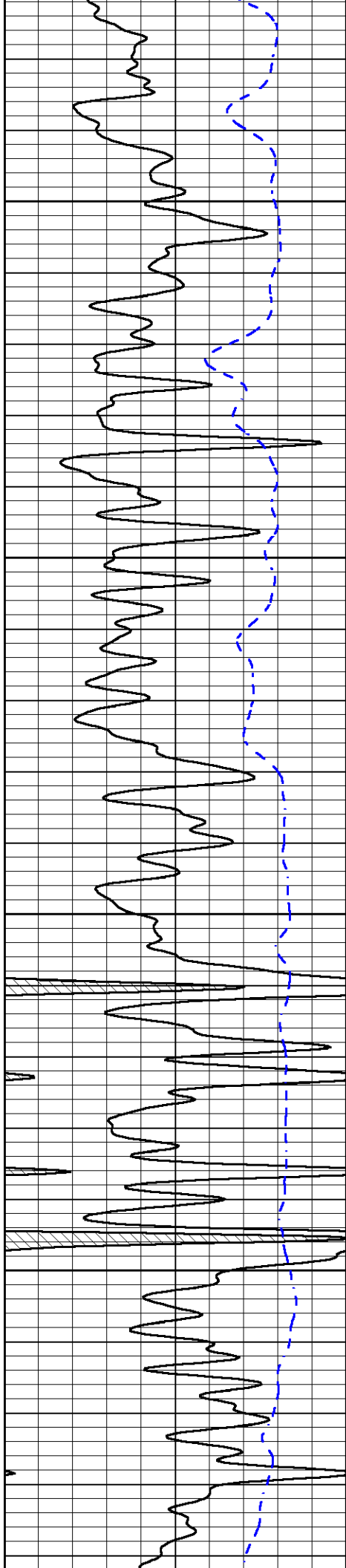
4300

4350

4400

4450



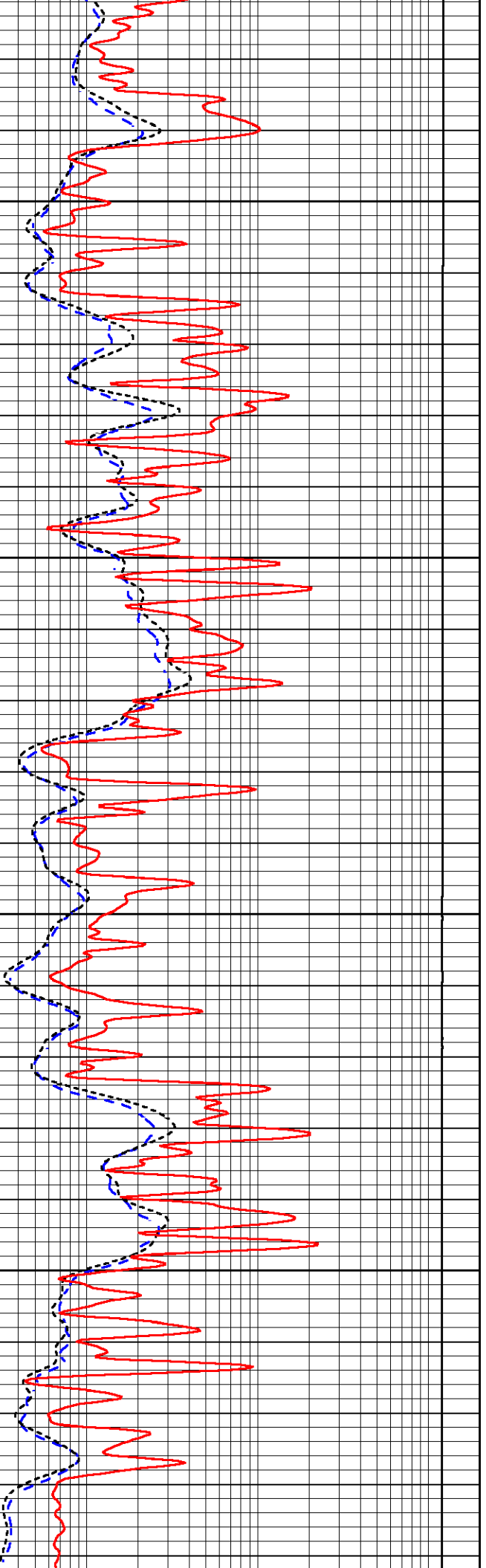


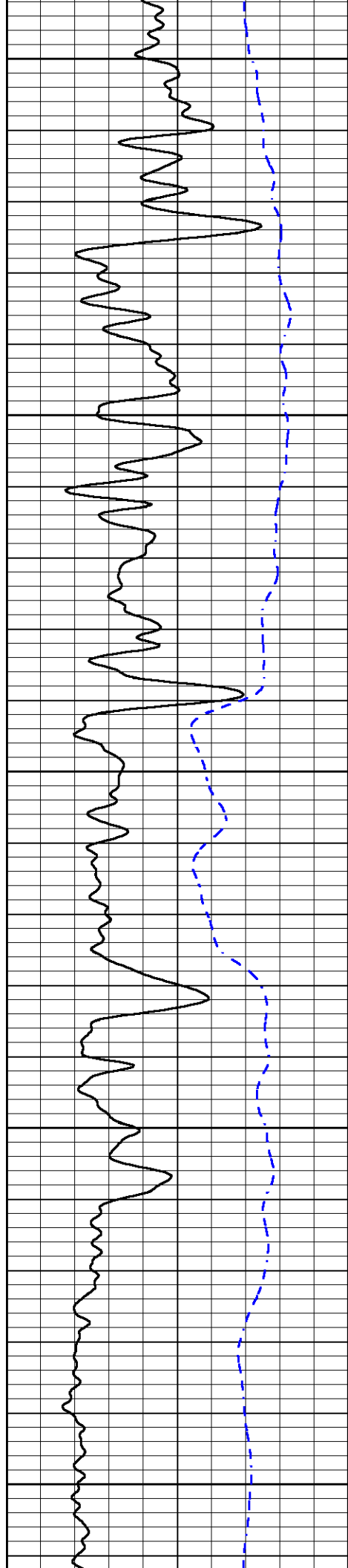
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4550

4600

4650





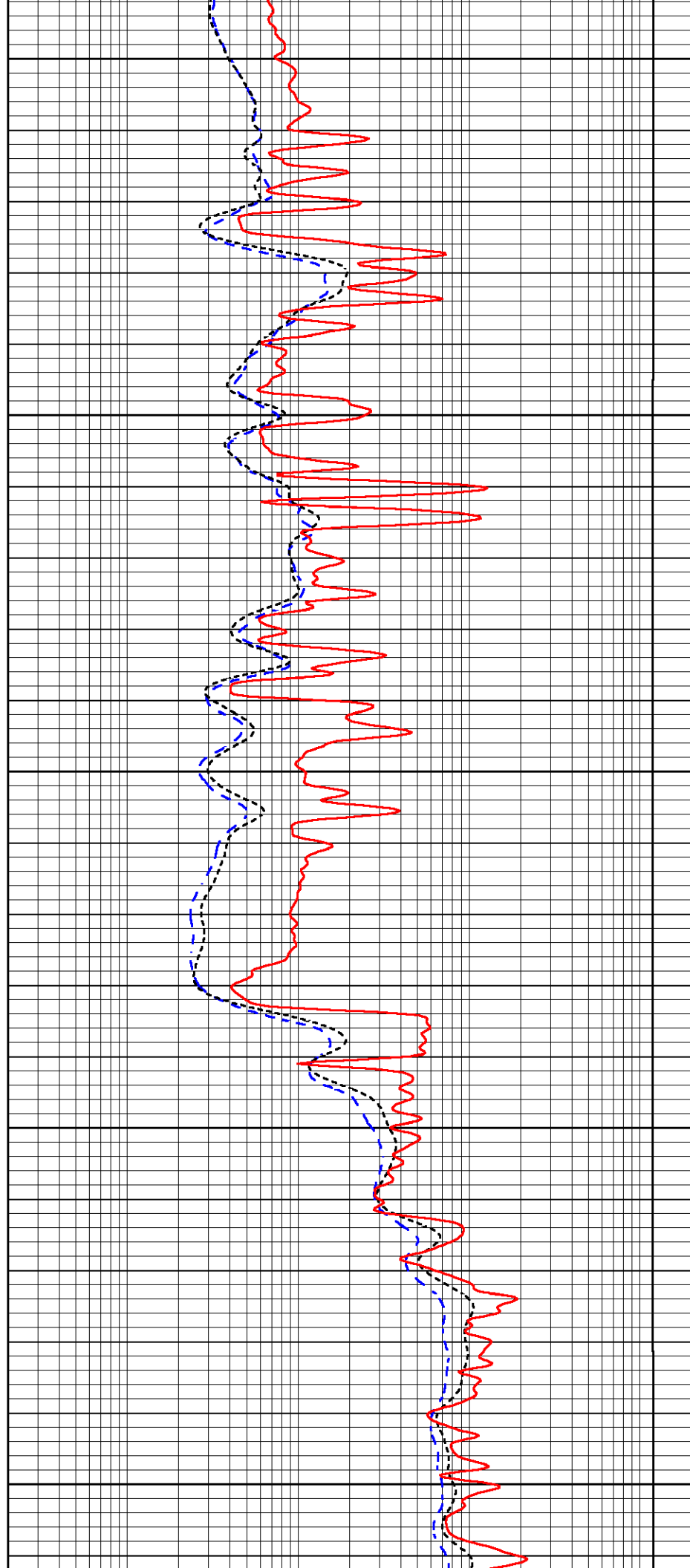
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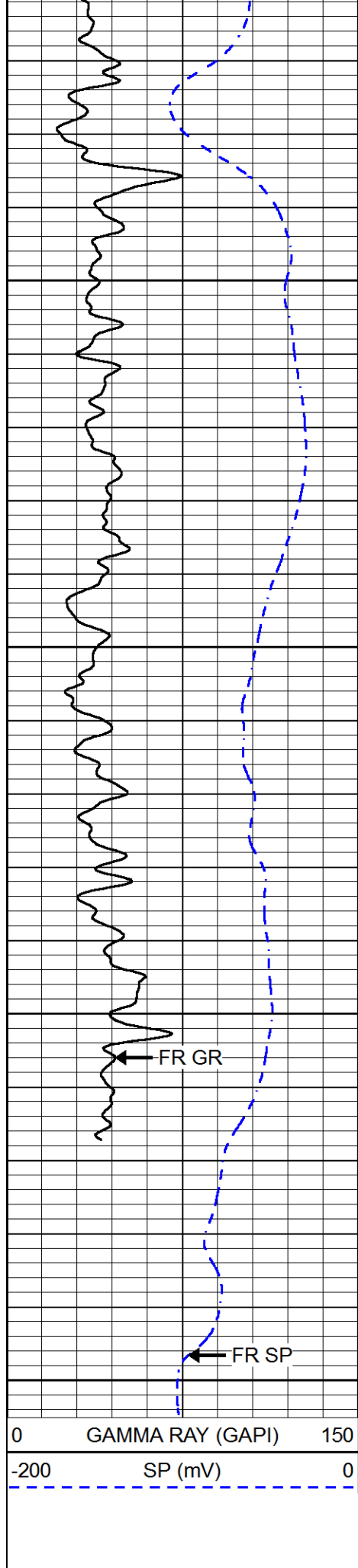
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4800

4850

4900



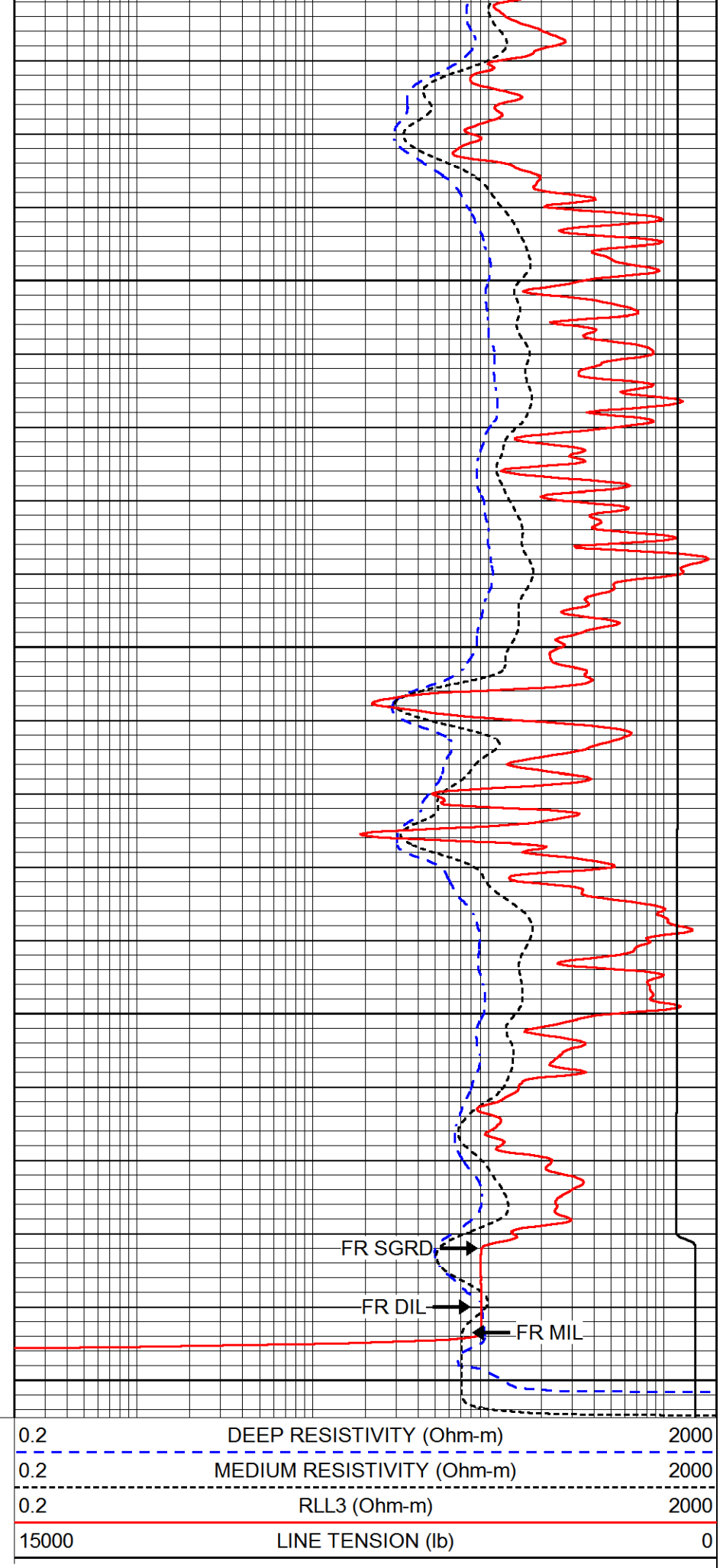


4950

5000

5050

5100

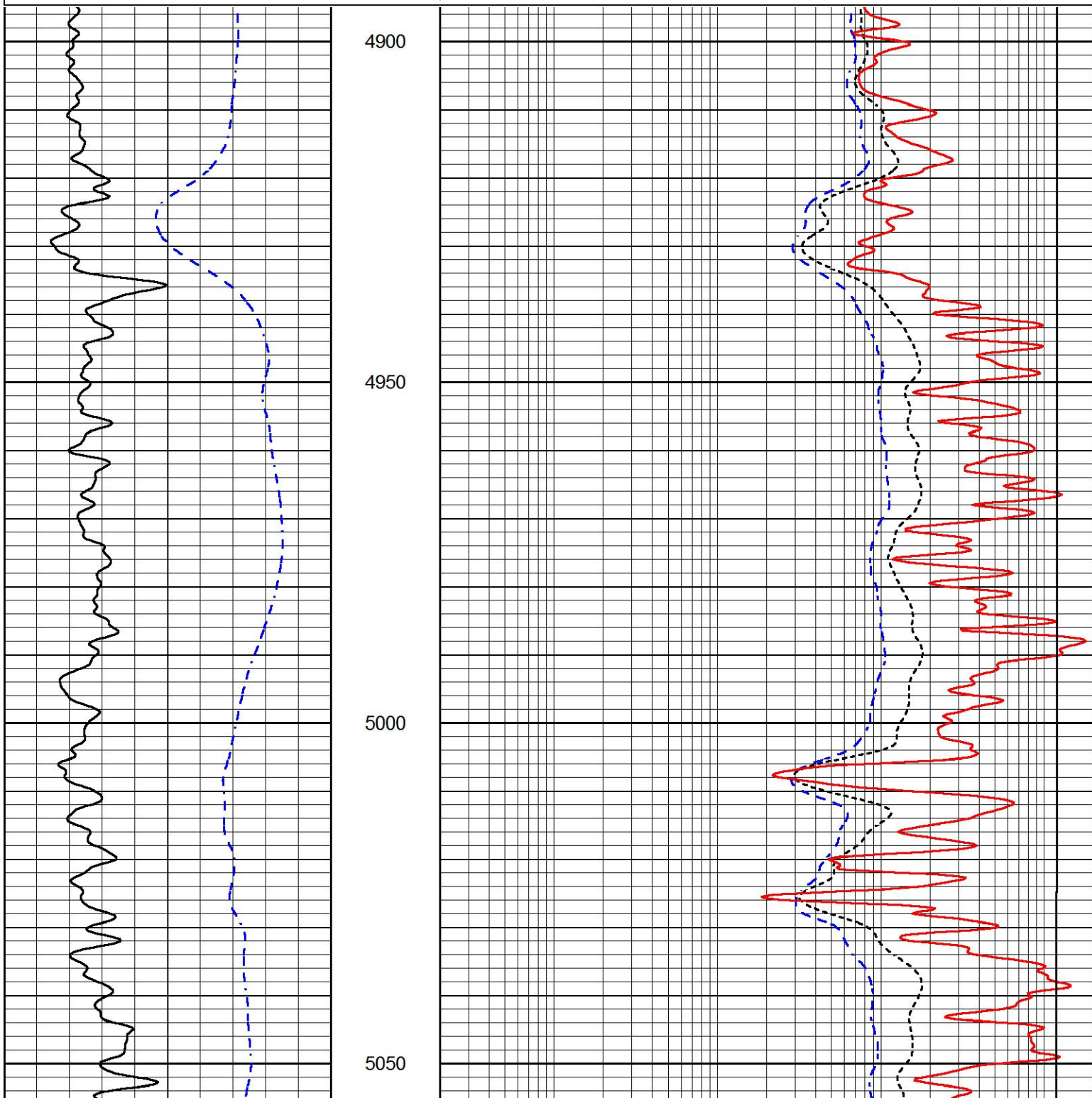


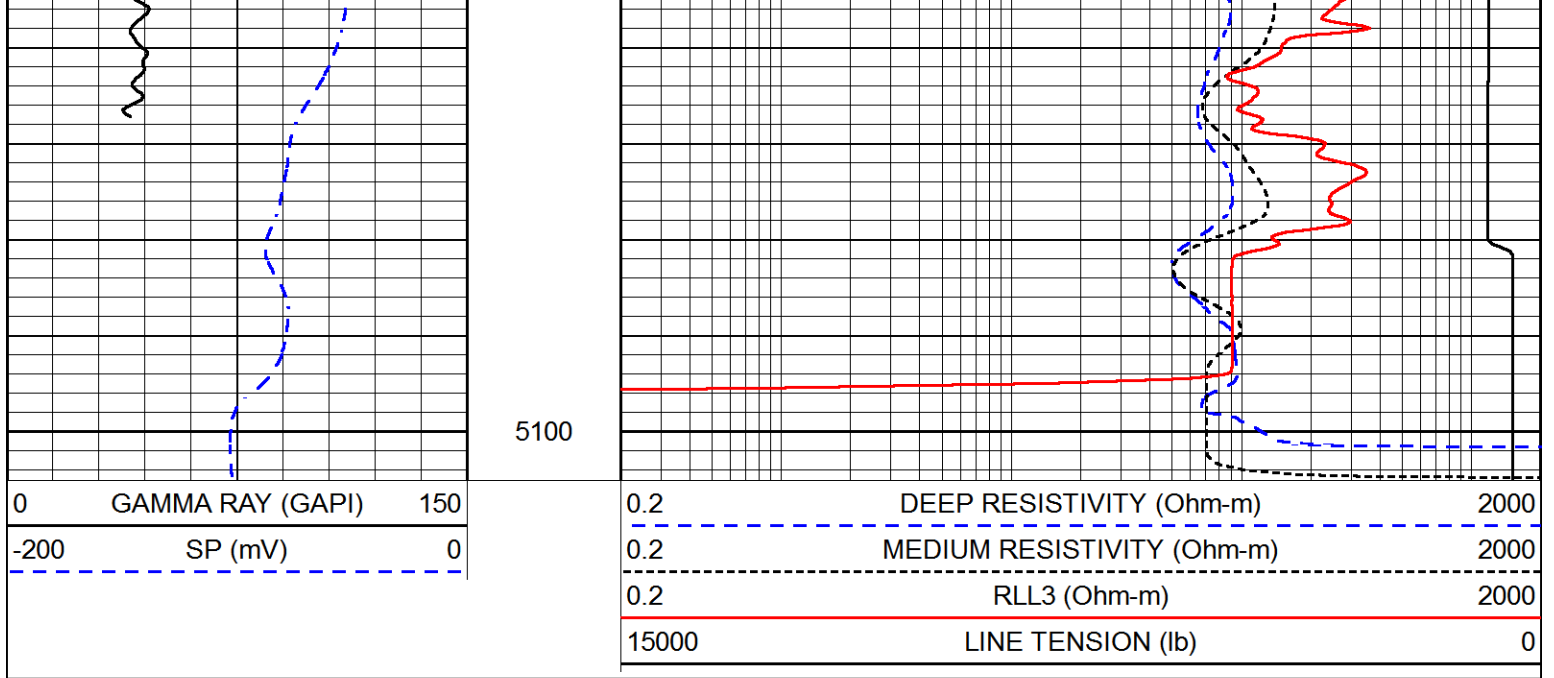
# REPEAT SECTION

Database File      american\_warrior\_gano\_9\_17.db  
 Dataset Pathname  stackml/pass2.1  
 Presentation Format dil  
 Dataset Creation   Wed Jan 24 02:36:50 2018  
 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





### Calibration Report

Database File american\_warrior\_gano\_9\_17.db  
 Dataset Pathname stackml/pass3.1  
 Dataset Creation Wed Jan 24 02:36:40 2018

### Dual Induction Calibration Report

Serial-Model: PSI 978-M&W  
 Calibration Performed: Wed Dec 13 12:45:09 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	178.615	710.235	0.000	255.800	mmho/m	0.570	-36.500
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.420	-35.000

### Microlog Calibration Report

Serial-Model: PSI-02-PSI STKBL ML  
 Performed: Fri Jun 23 01:25:19 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0031	0.0043	0.0000	10.0000	Ohm-m	14000.0000	0.0000
Inverse	0.0000	0.0013	0.0000	10.0000	Ohm-m	16000.0000	0.0000
Caliper	1.0020	1.0834	5.5000	16.5000	in	135.1560	-131.4500

### Compensated Density Calibration Report

Serial-Model: 168-986-M&W  
 Source / Verifier: /  
 Master Calibration Performed: Tue Apr 11 17:07:47 2017

### Master Calibration

Density Far Detector Near Detector

Magnesium	1.755	g/cc	4691.86	4818.19	cps
Aluminum	2.700	g/cc	859.57	3020.22	cps

Spine Angle = 74.61

Density/Spine Ratio = 0.537

	Size		Reading
Small Ring	4.00	in	1.00
Large Ring	14.00	in	1.20

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 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 AMERICAN WARRIOR, INC.  
 Well GANO NO. 9-17  
 Field LAKIN NORTHWEST  
 County KEARNY  
 State KANSAS