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Pioneer Energy Services

DUAL INDUCTION LOG

Company MURFIN DRILLING COMPANY, INC.
Well CULWELL 'J' #1-19
Field WILDCAT
County CHEYENNE State KANSAS

Location: API # : 15-023-21482-00-00
2310' FNL & 495' FEL
SEC 19 TWP 2S RGE 37W

Other Services: CNL/CDL, MEL/BHCS

Permanent Datum: GROUND LEVEL Elevation 3384'
Log Measured From: KELLY BUSHING
Drilling Measured From: KELLY BUSHING

Elevation: K.B. 3389', D.F. N/A, G.L. 3384'

Date	4/11/2019			
Run Number	ONE			
Depth Driller	4910'			
Depth Logger	4912'			
Bottom Logged Interval	4911'			
Top Log Interval	00			
Casing Driller	8.625" @ 330'			
Casing Logger	327'			
Bit Size	7.875"			
Type Fluid in Hole	CHEMICAL			
Salinity,ppm CL	600			
Density / Viscosity	9.2 / 59			
pH / Fluid Loss	11.5 / 6.0			
Source of Sample	FLOWLINE			
Rm @ Meas. Temp	1.0 @ 58			
Rmf @ Meas. Temp	.75 @ 58			
Rmc @ Meas. Temp	1.35 @ 58			
Source of Rmf / Rmc	CHARTS			
Rm @ BHT	.46 @ 125			
Operating Rig Time	4 HOURS			
Max Rec. Temp. F	125 DEG/F			
Equipment Number	P-108			
Location	HAYS			
Recorded By	J. HENRICKSON			
Witnessed By	JEFF CHRISTIAN			

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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.

BIRD CITY KANSAS
2 EAST TO 30 RD, 7 1/2 NORTH, WEST INTO

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

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

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

Log Variables

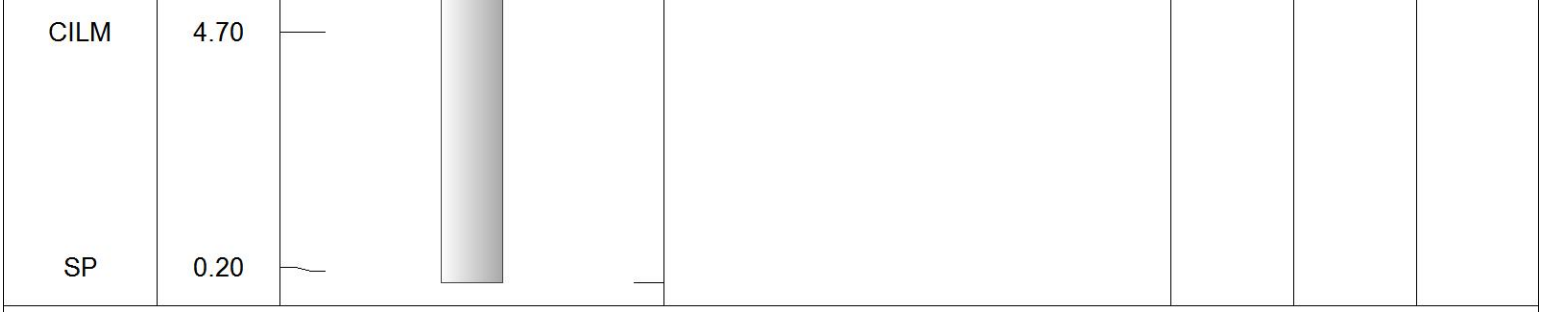
DatabaseC:\ProgramData\Warrior\Data\murfin_culwell_j_1_19.db
Dataset field/well/stack/pass3.1/_vars_

Top - Bottom

A	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	FLUIDDEN g/cc	M	MATRXDEN g/cc
1	7.875	125	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	8	35	Off	4912

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb
			GR-M&W (89-M&W)	3.00	3.50	50.00
GR	33.00					
CNLSC	29.90		CNT-M&W (tk10-MW)	5.50	3.50	100.00
CNSSC	29.15					
			CDL-M&W (144-84)	8.50	4.00	250.00
LSD	20.85					
DCAL	20.83					
SSD	20.35					
RLL3	15.80					
RLL3F	15.79					
			DIL-M&W (PSI 988)	18.50	3.50	220.00
CILD	8.00					

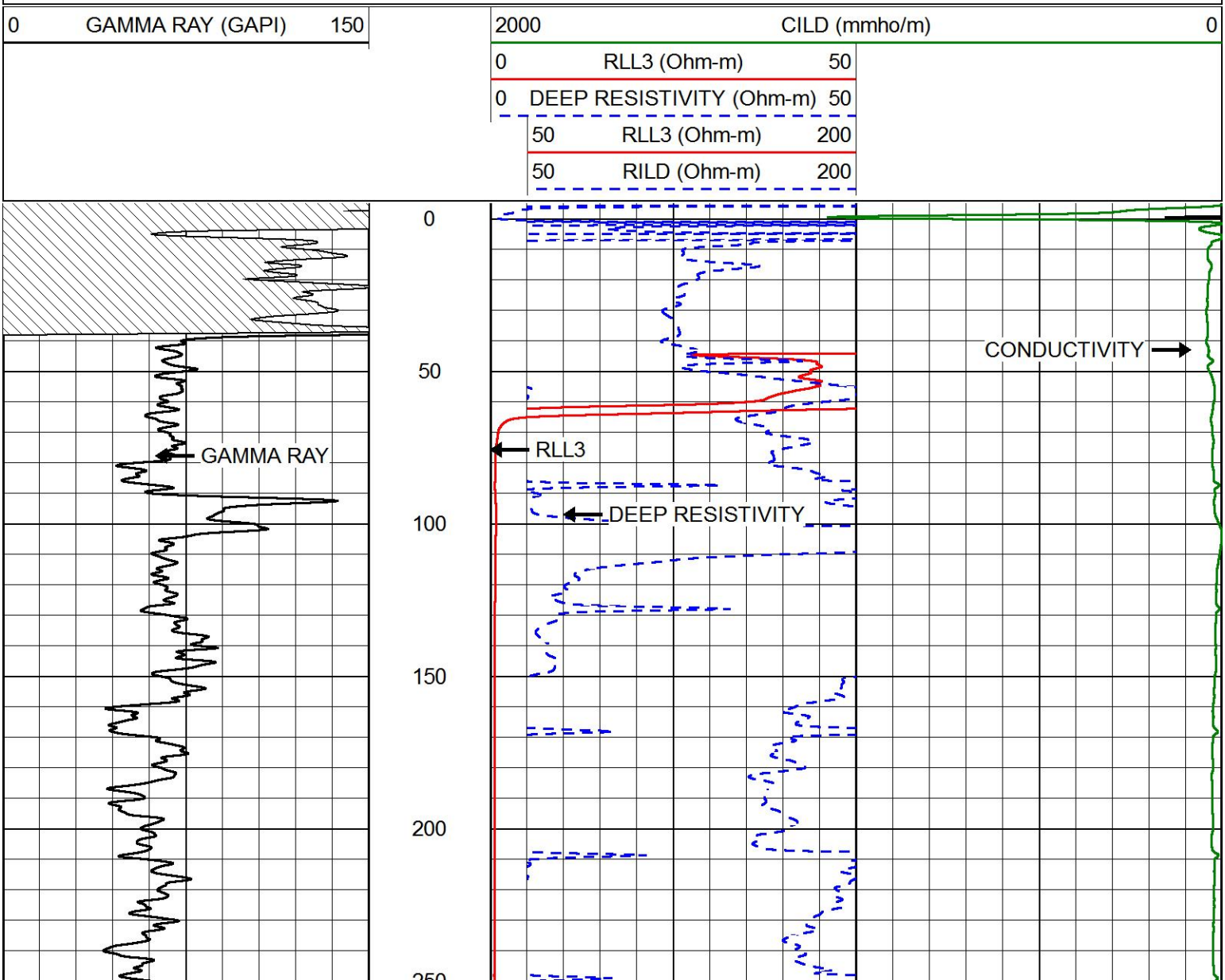


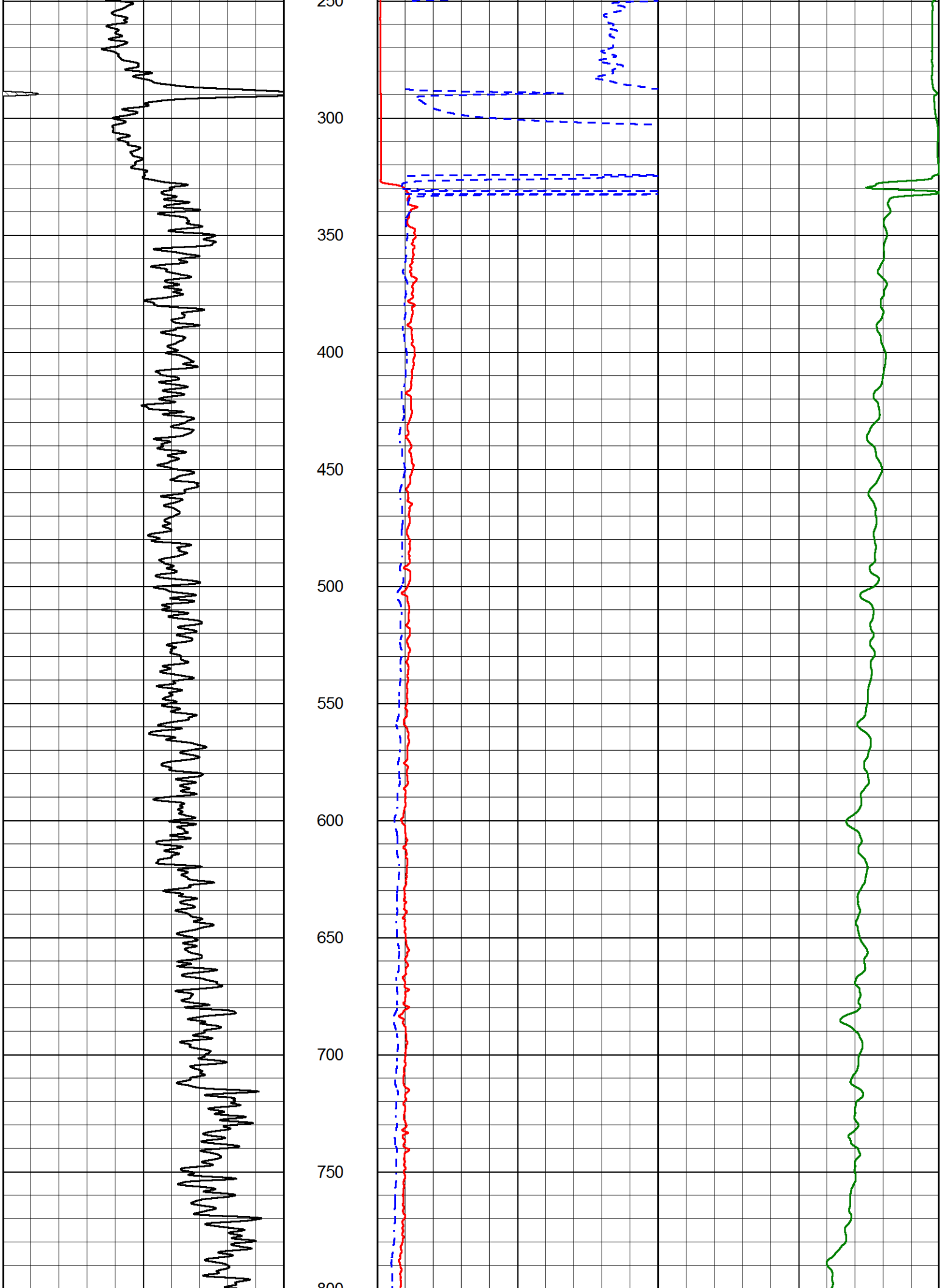
Dataset:	murfin_culwell_j_1_19.db: field/well/stack/pass3.1
Total length:	35.50 ft
Total weight:	620.00 lb
O.D.:	4.00 in

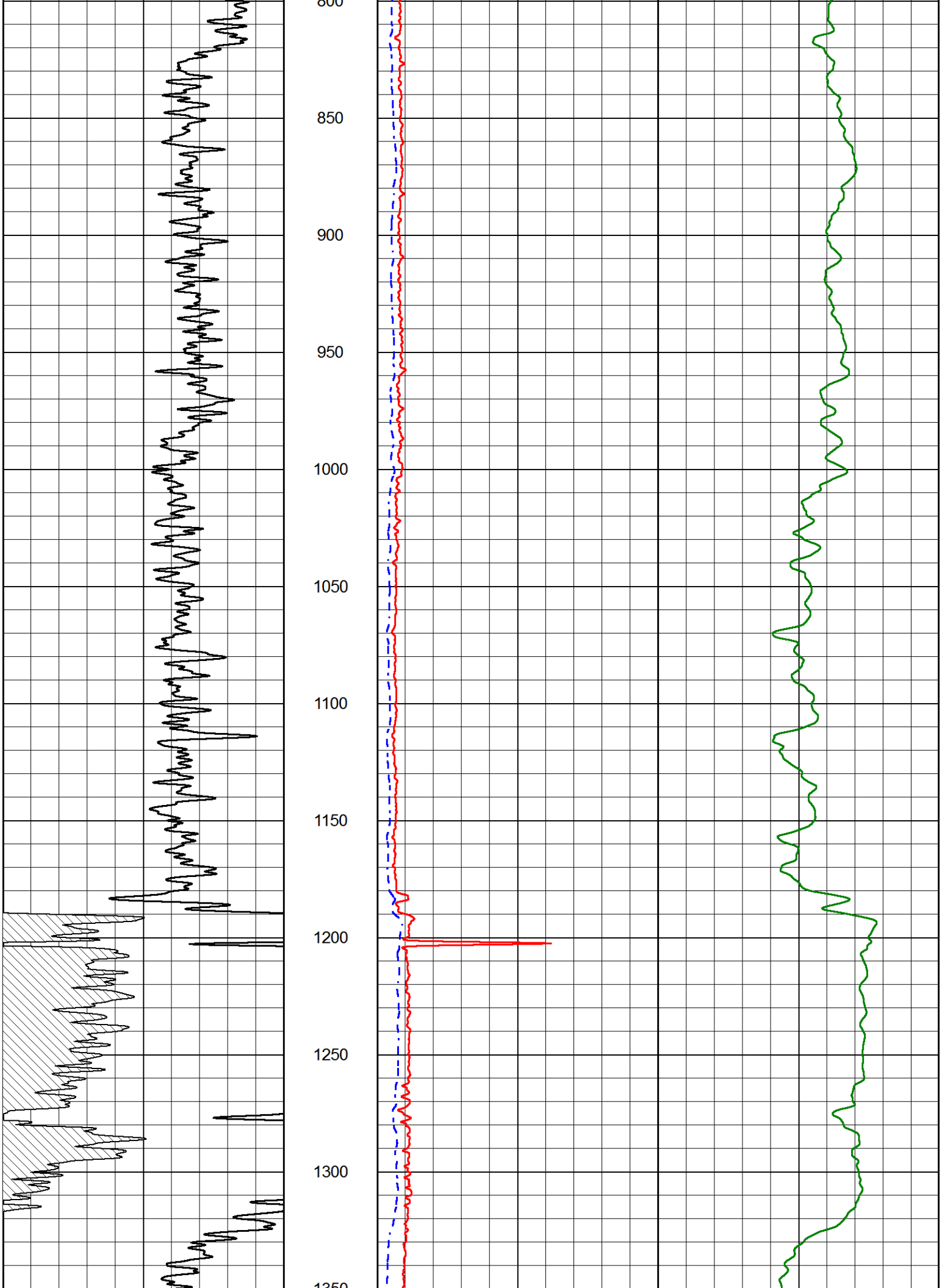
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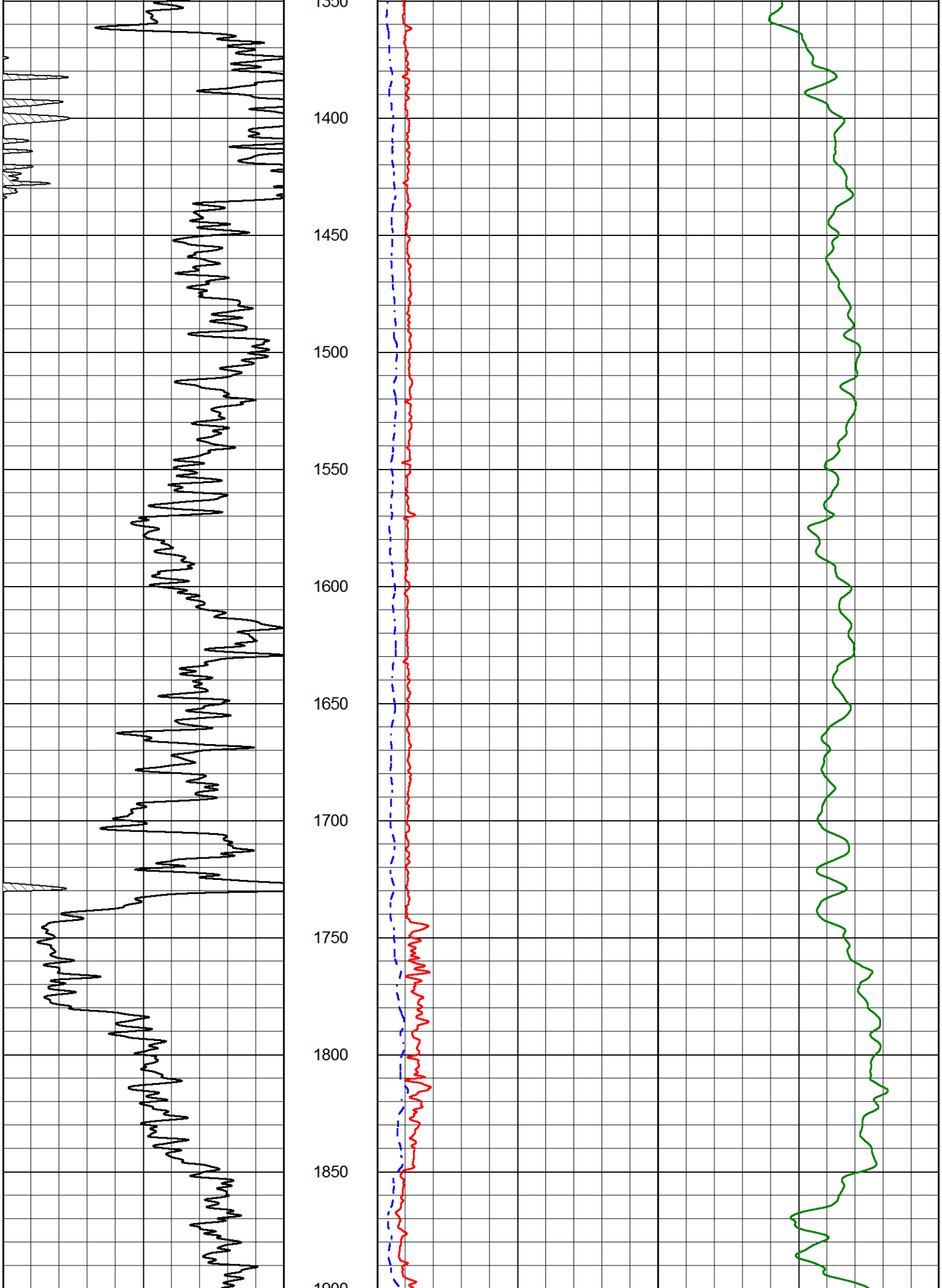
MAIN PASS

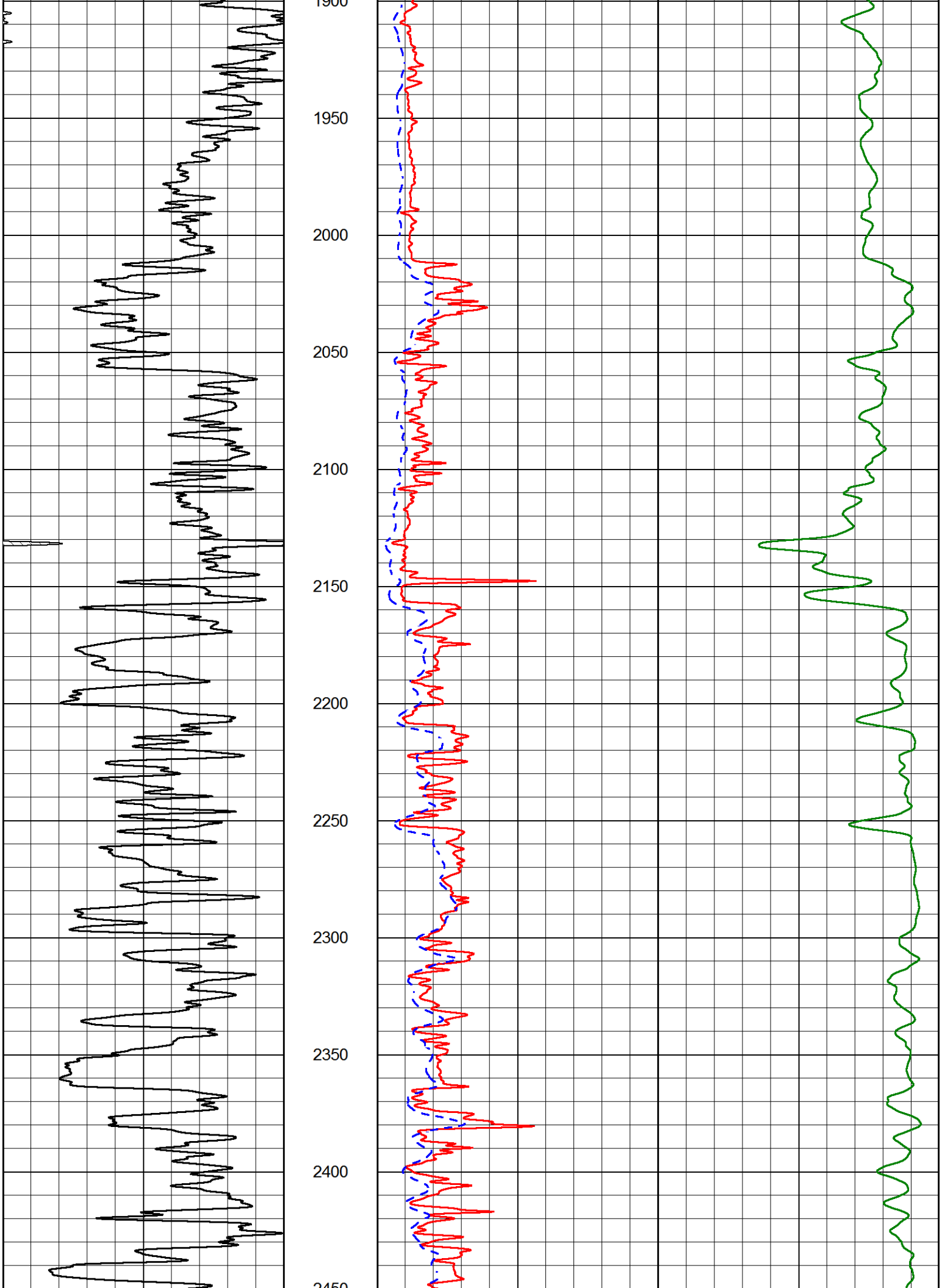
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Presentation Format	dil2in
Dataset Creation	Thu Apr 11 15:59:16 2019
Charted by	Depth in Feet scaled 1:600

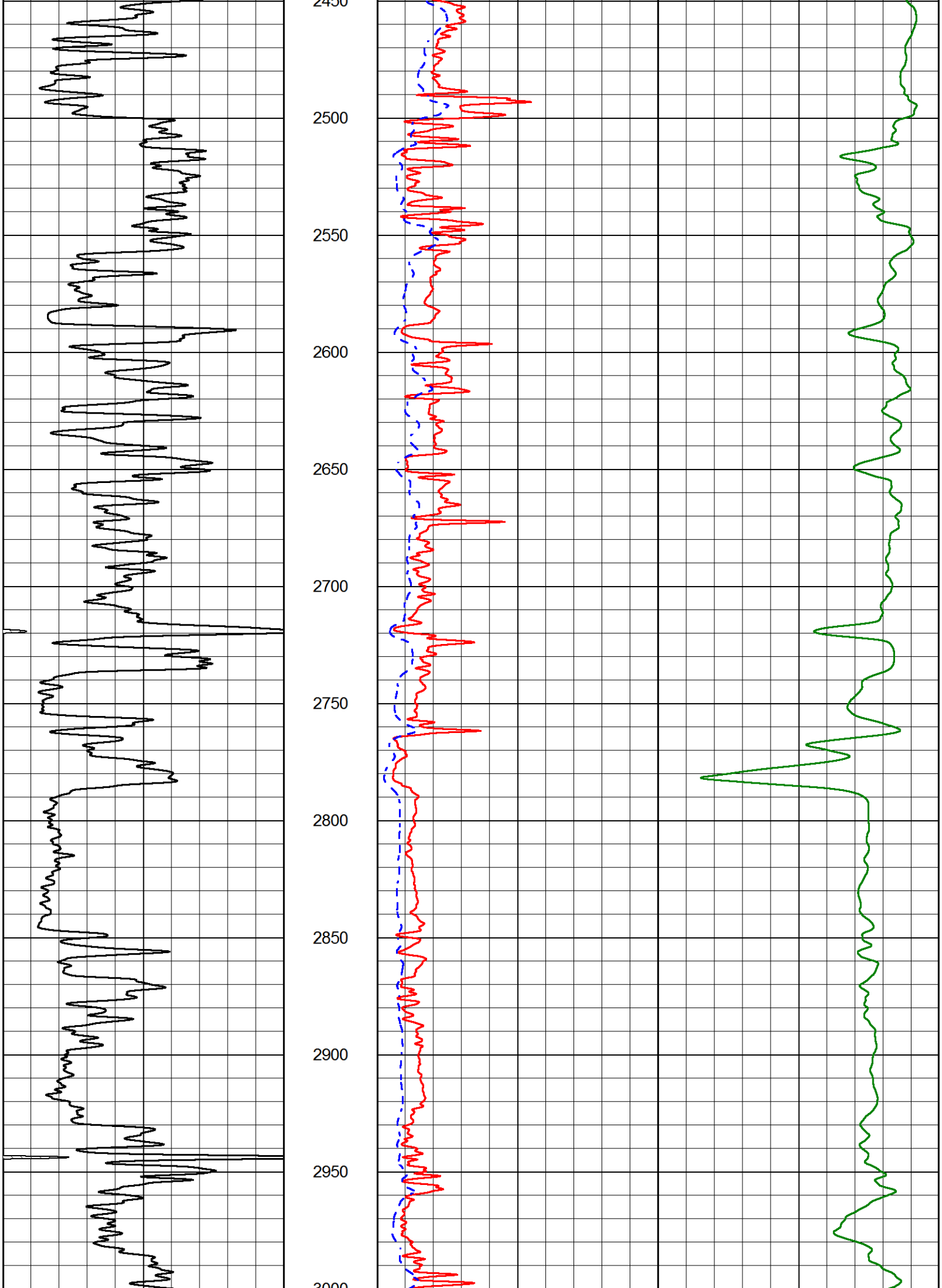


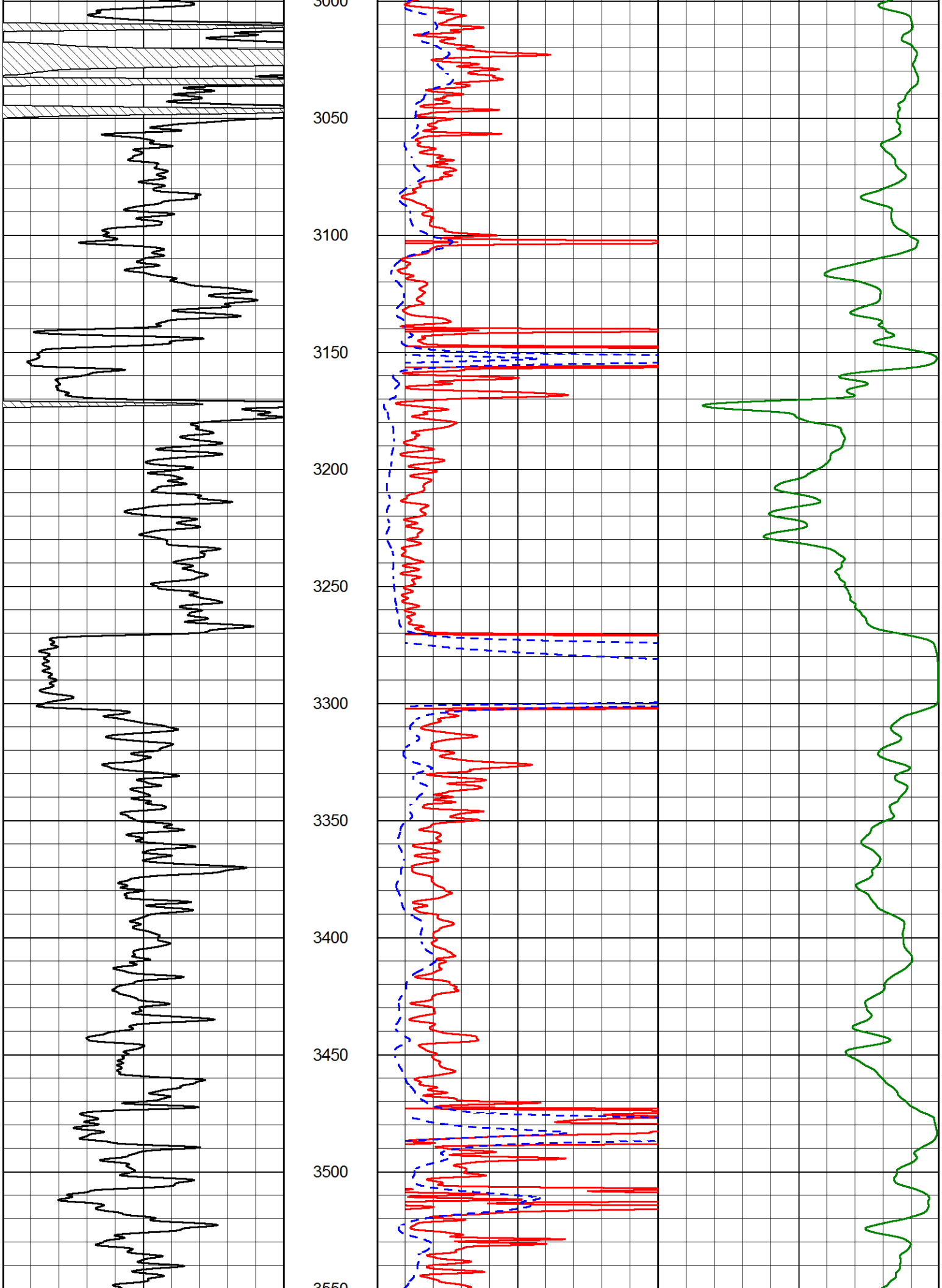

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500
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700
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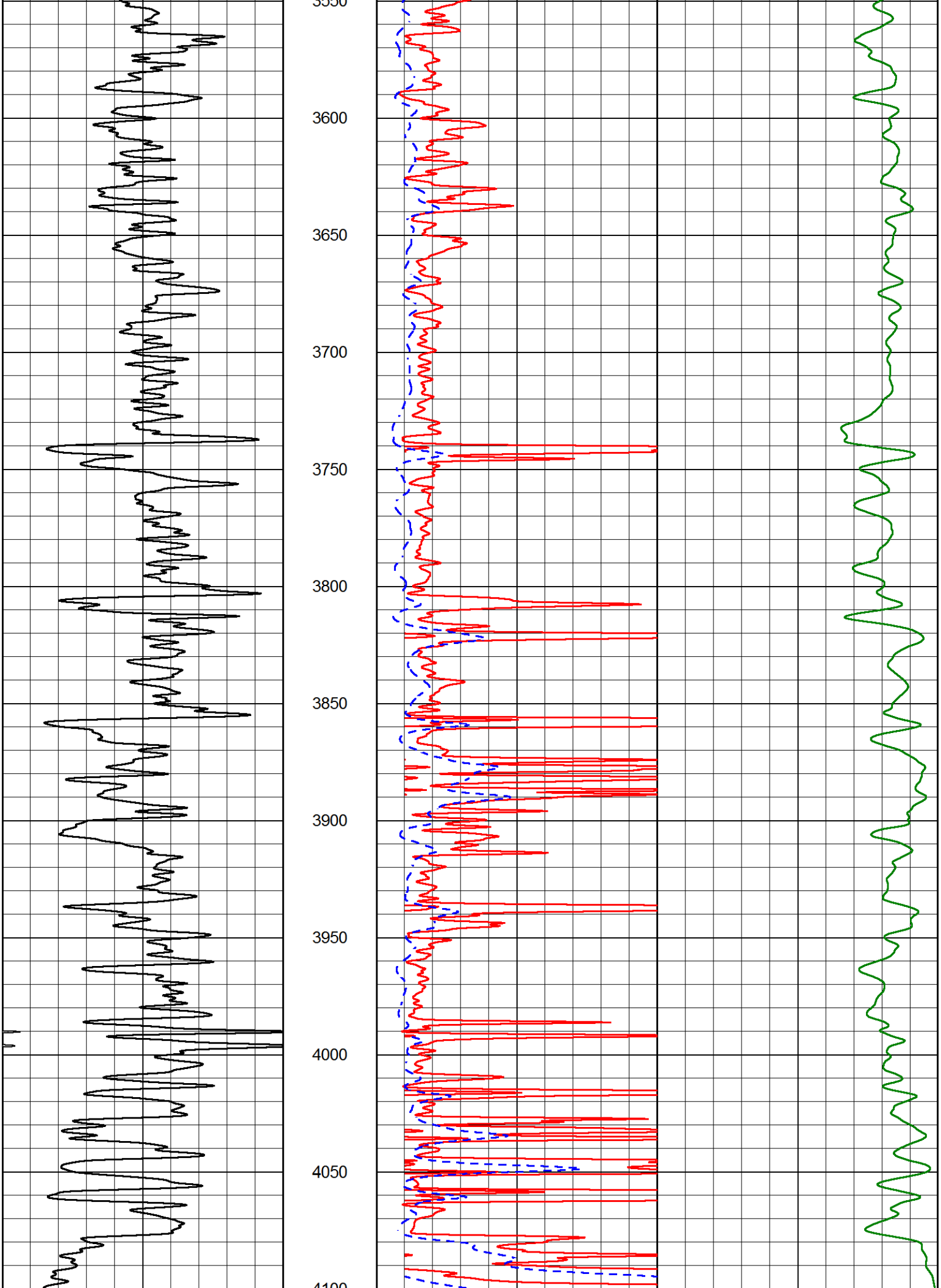

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1300
1350

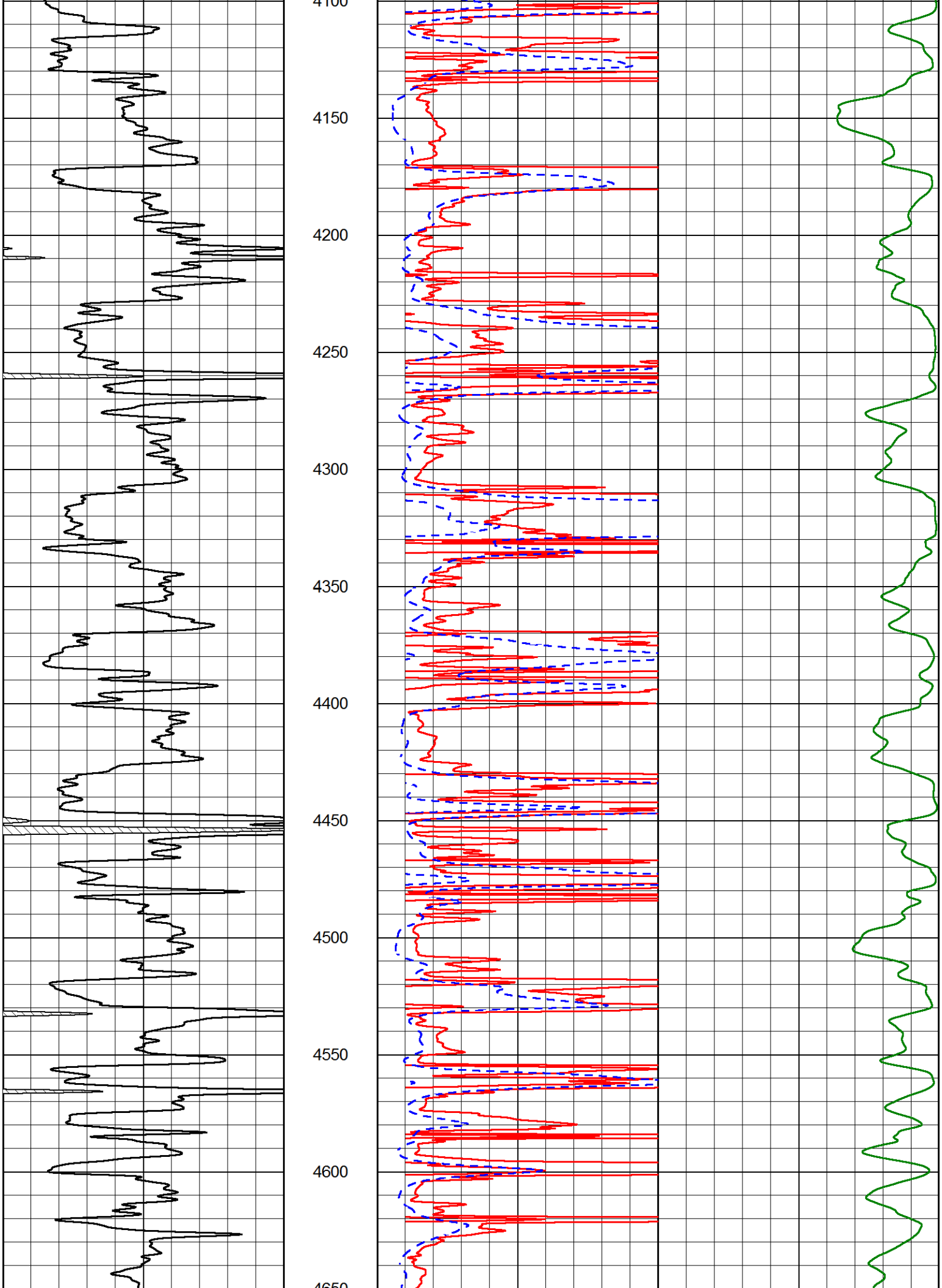

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1850
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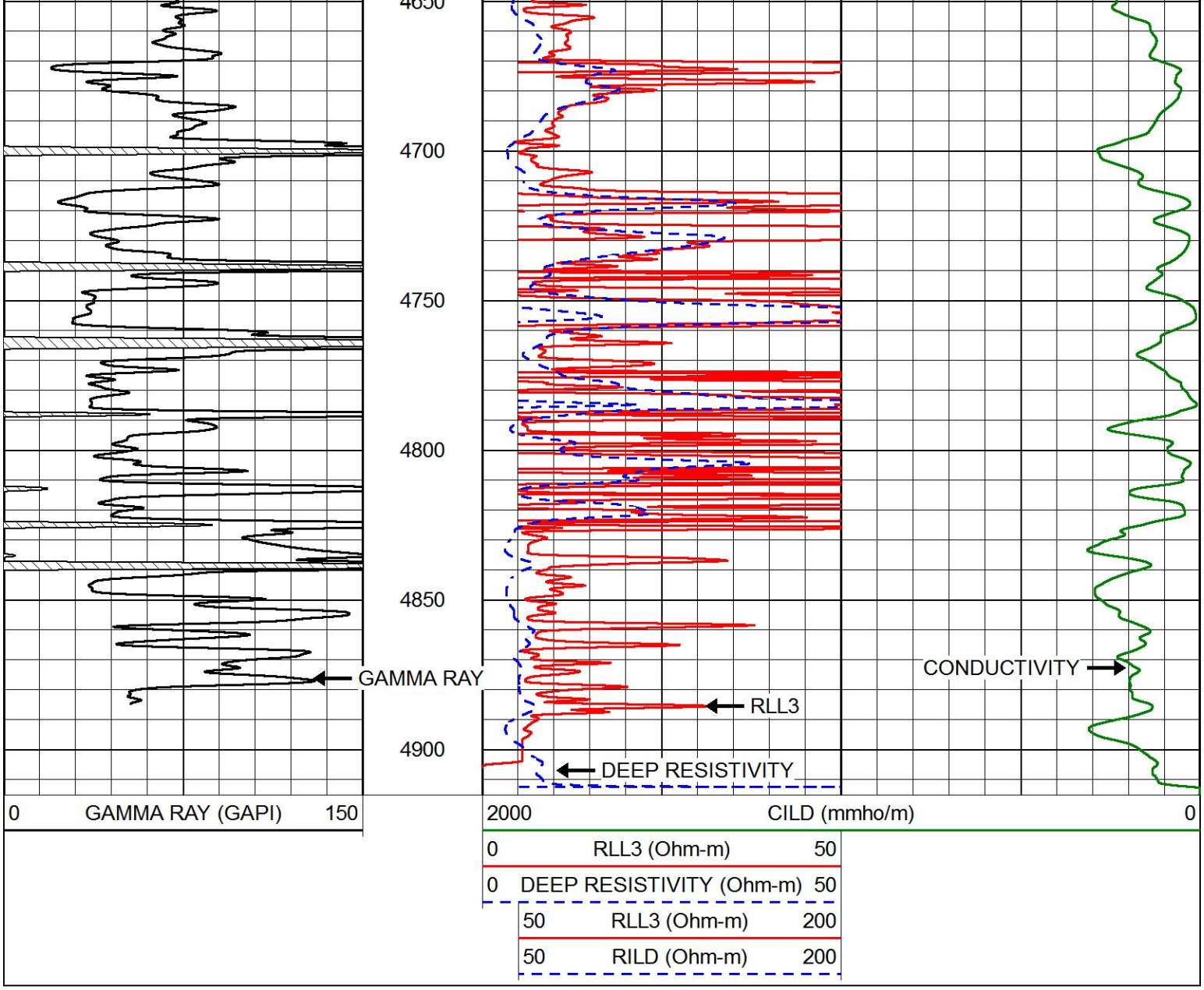

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4600
4650



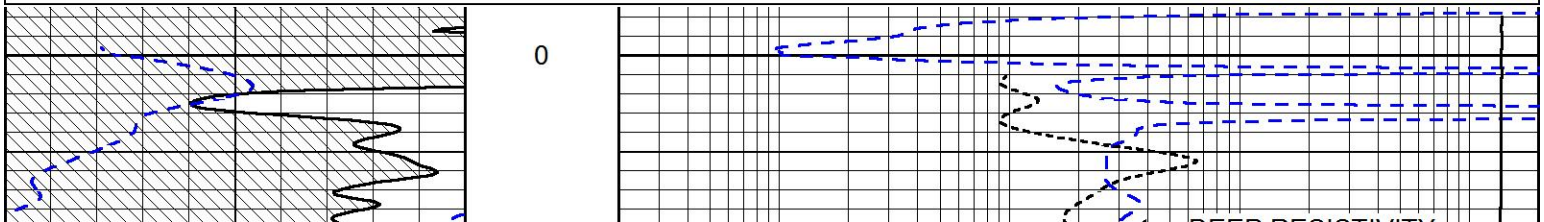
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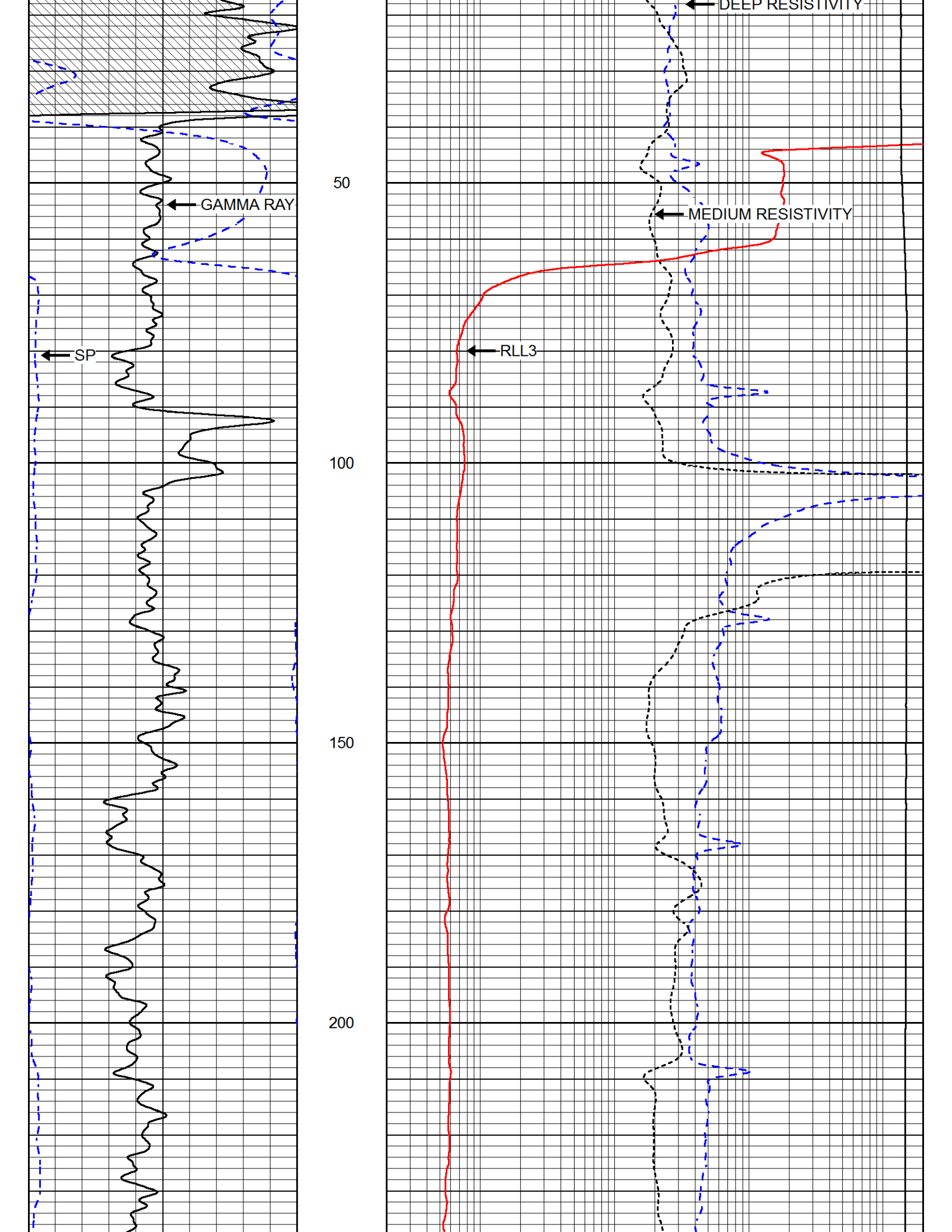
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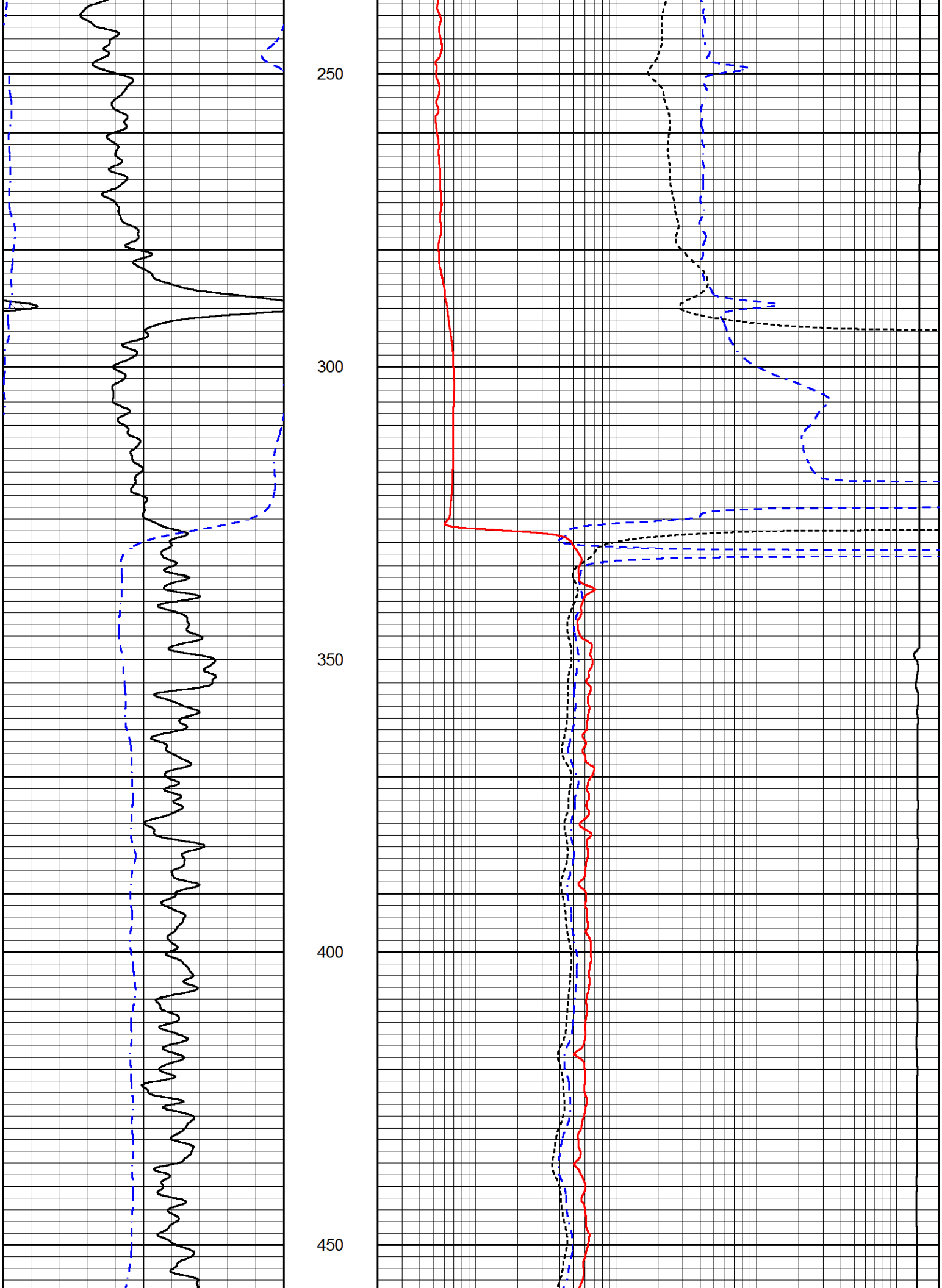
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Presentation Format	dil
Dataset Creation	Thu Apr 11 15:59:16 2019
Charted by	Depth in Feet scaled 1:240

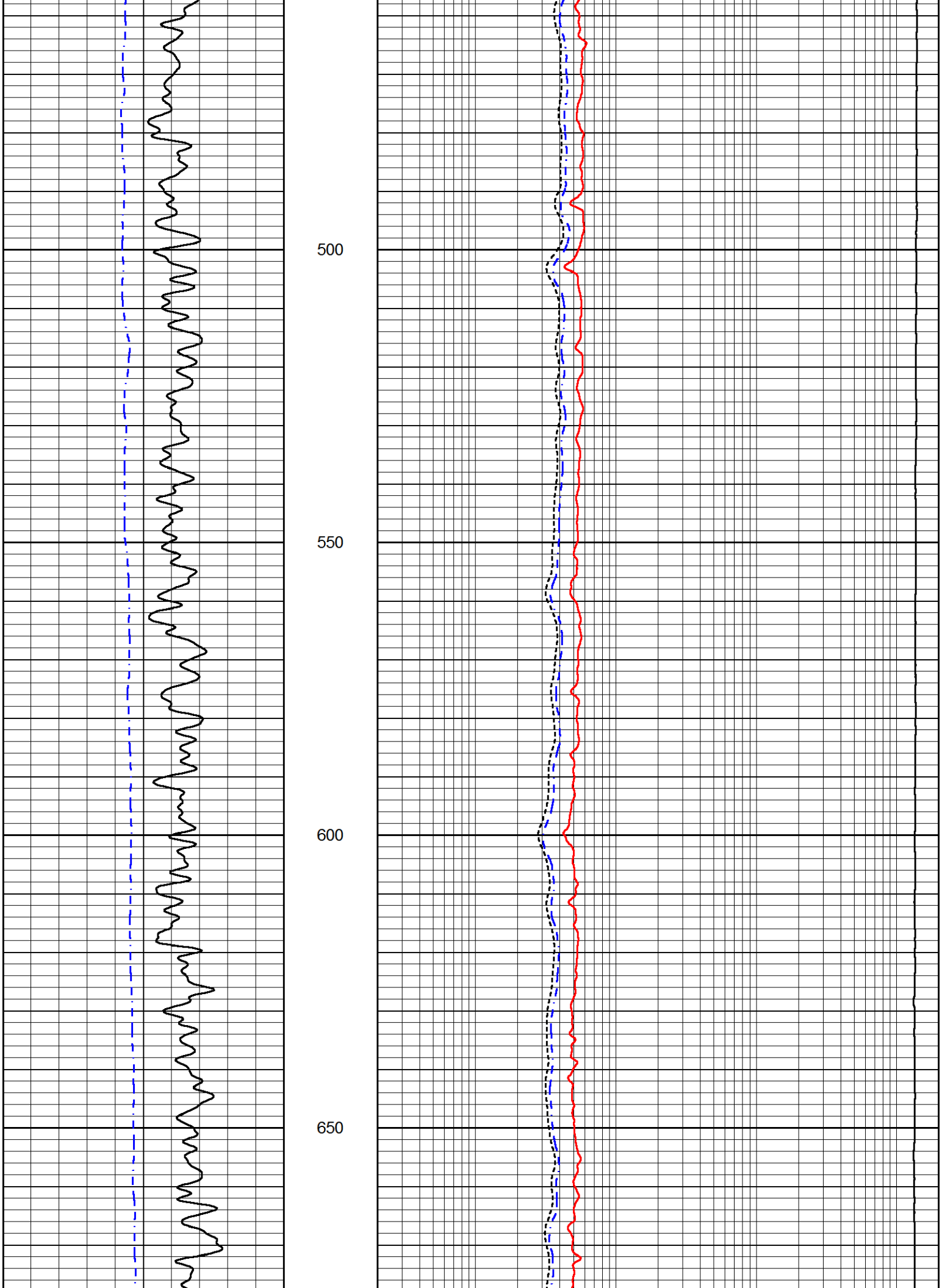
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-200	SP (mV)	0

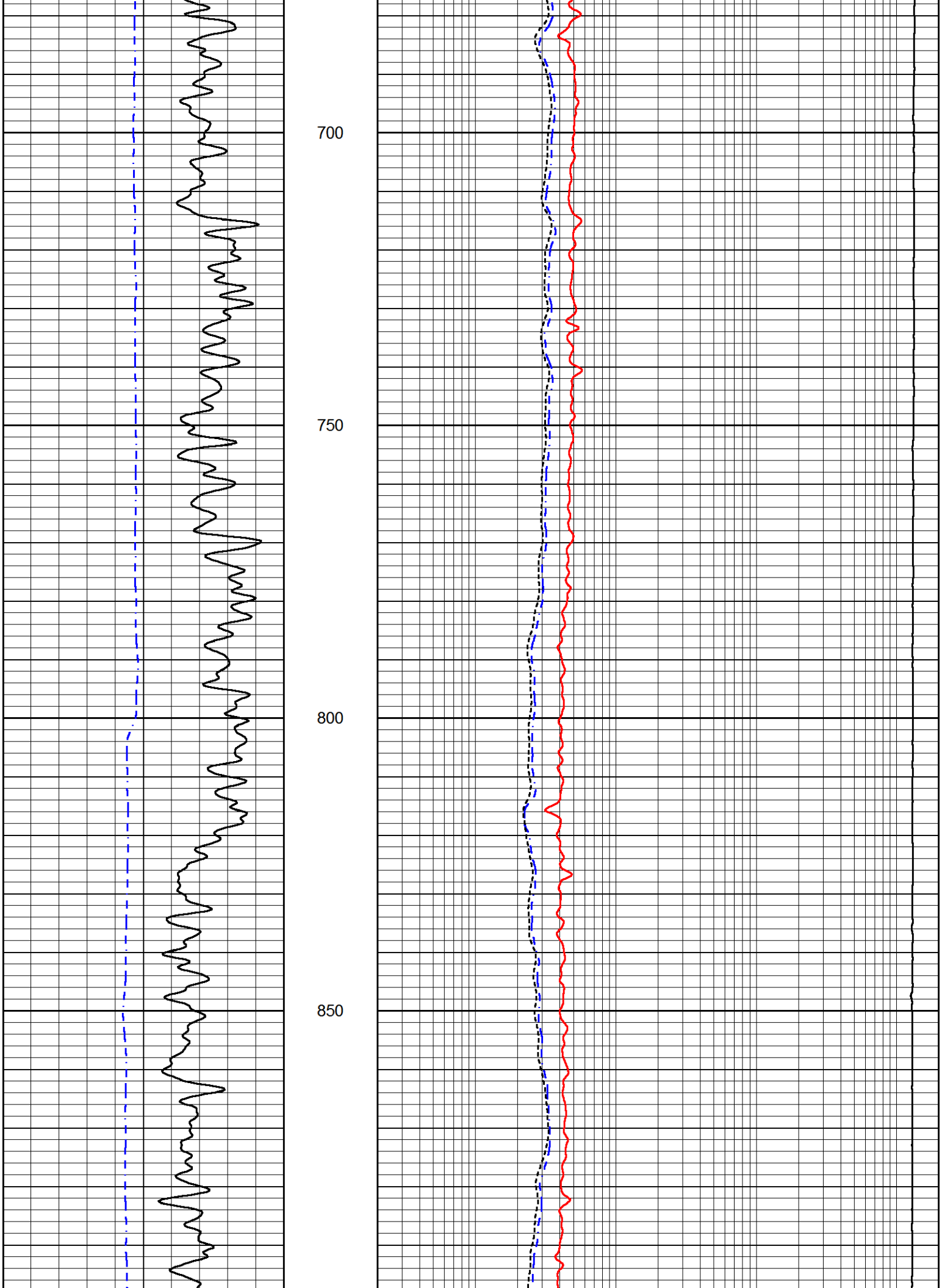
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0

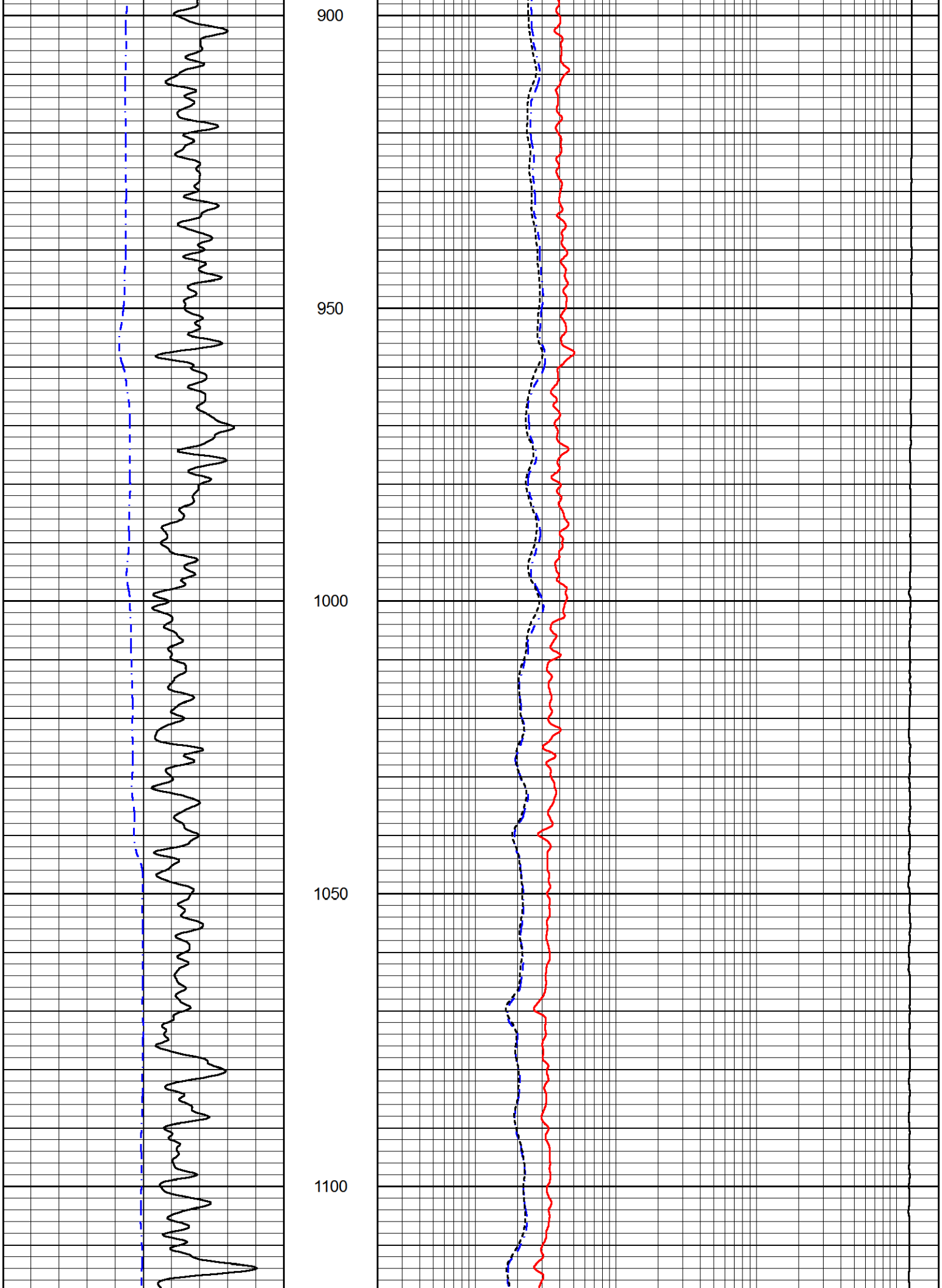


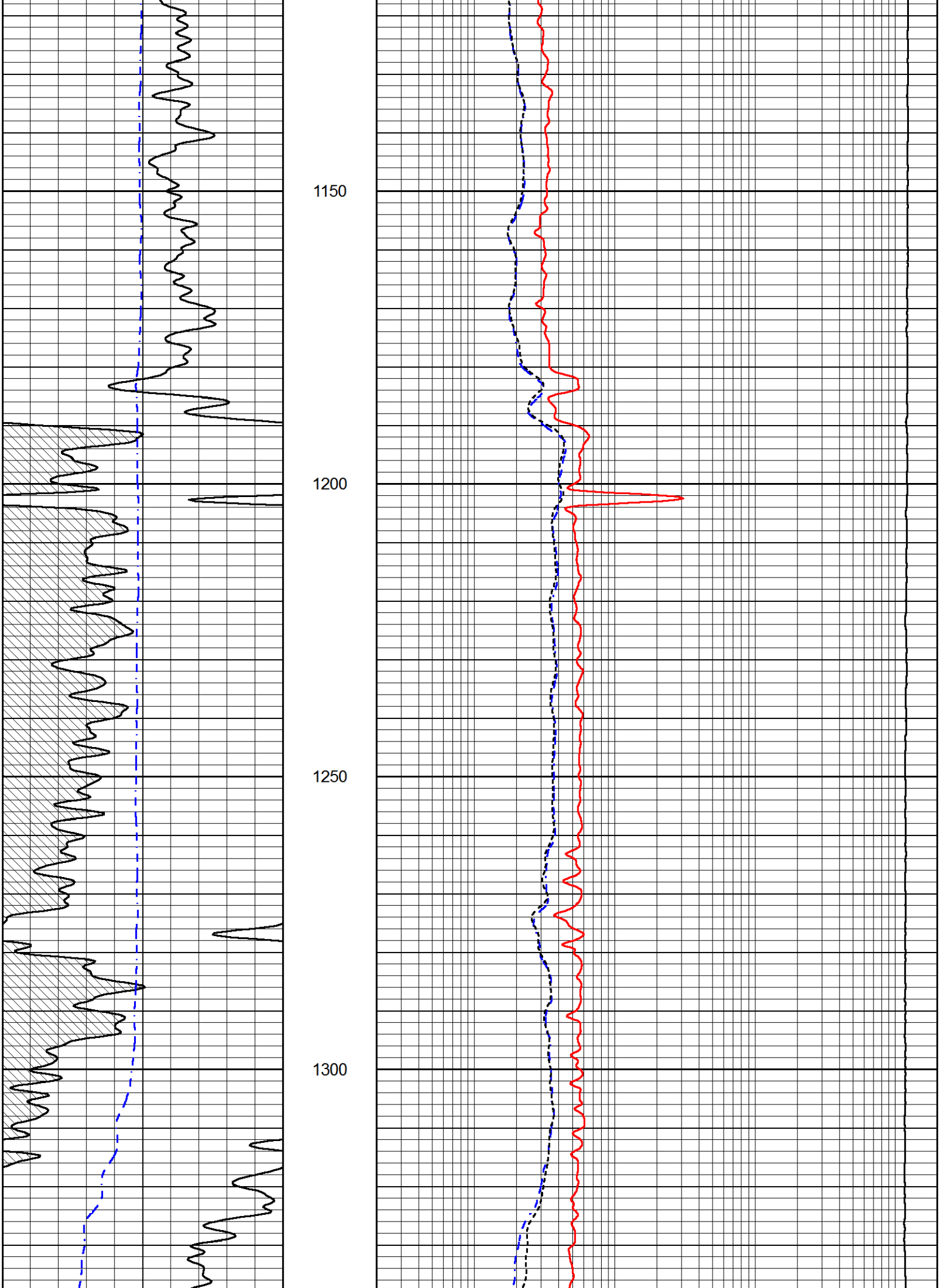

DEEP RESISTIVITY
GAMMA RAY
MEDIUM RESISTIVITY
SP
RLL3
50
100
150
200

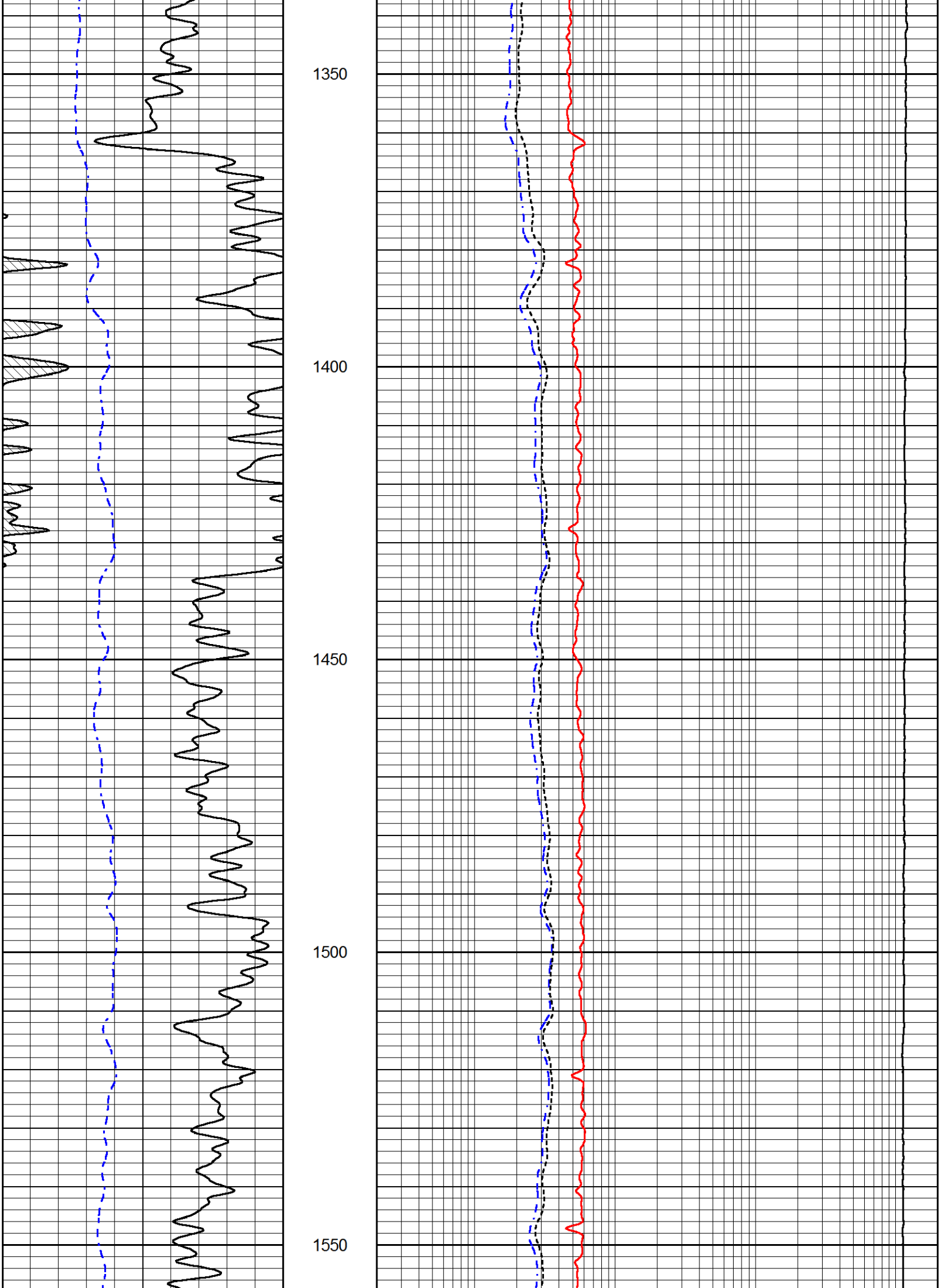

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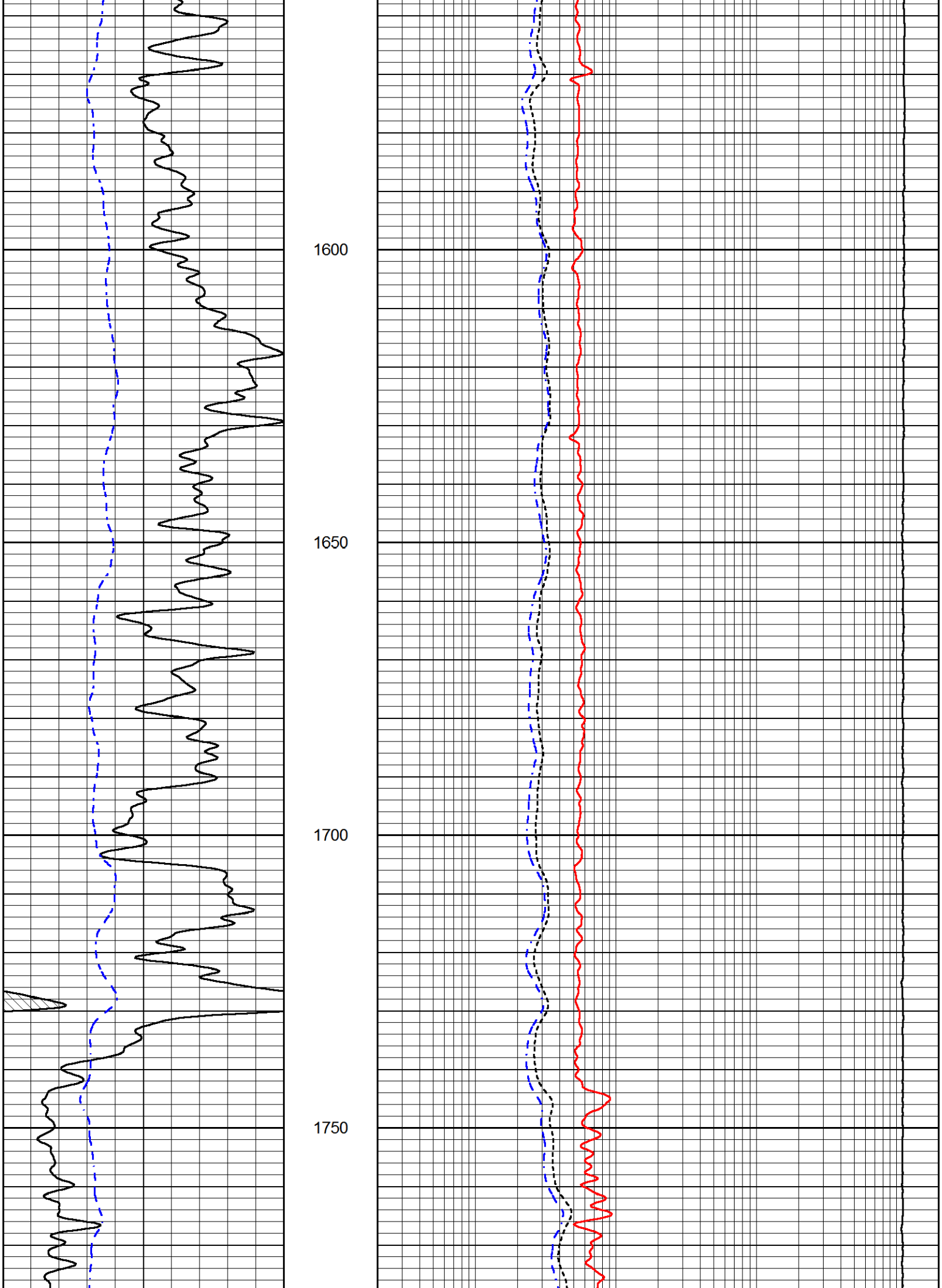

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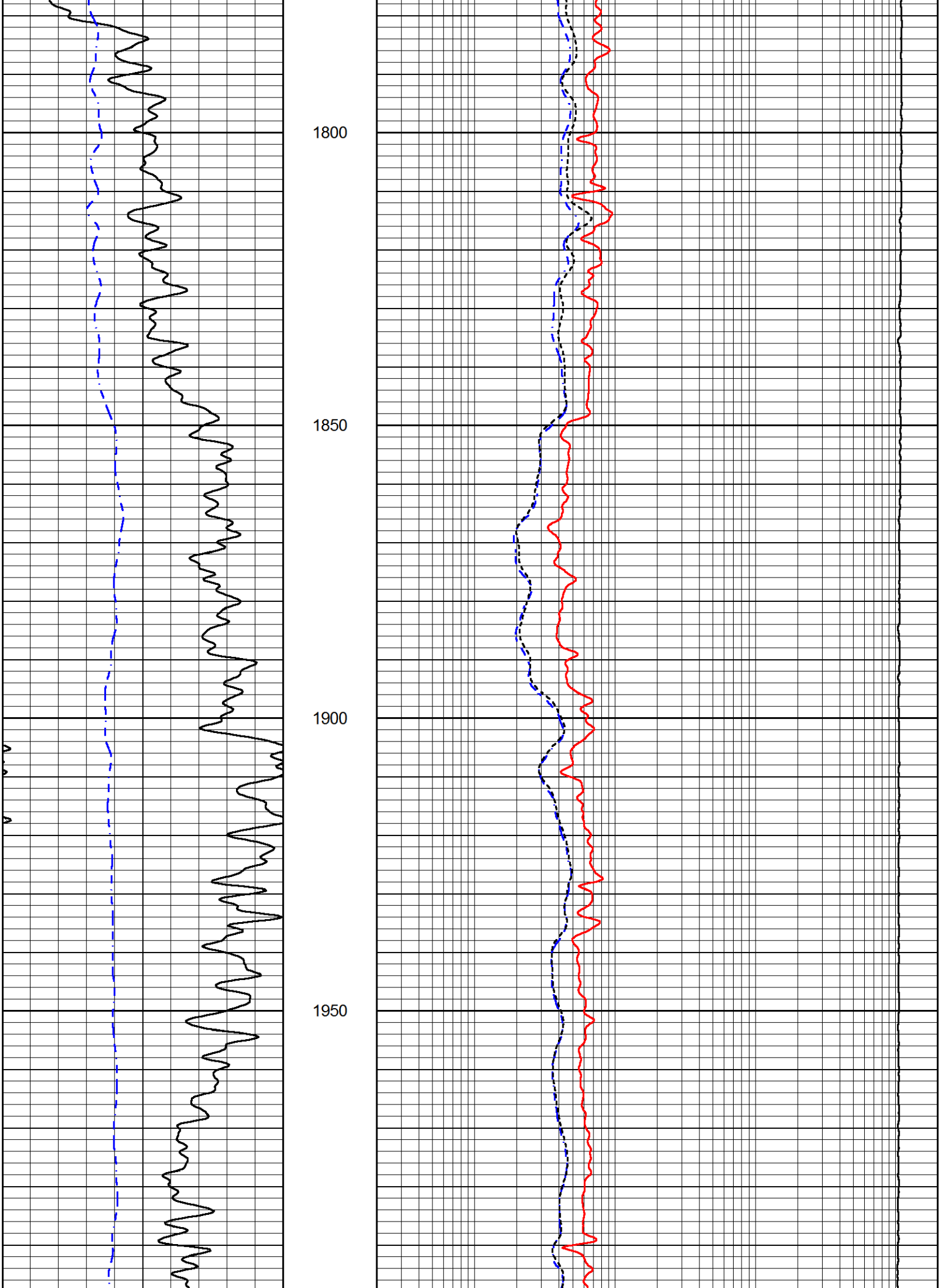

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750
800
850

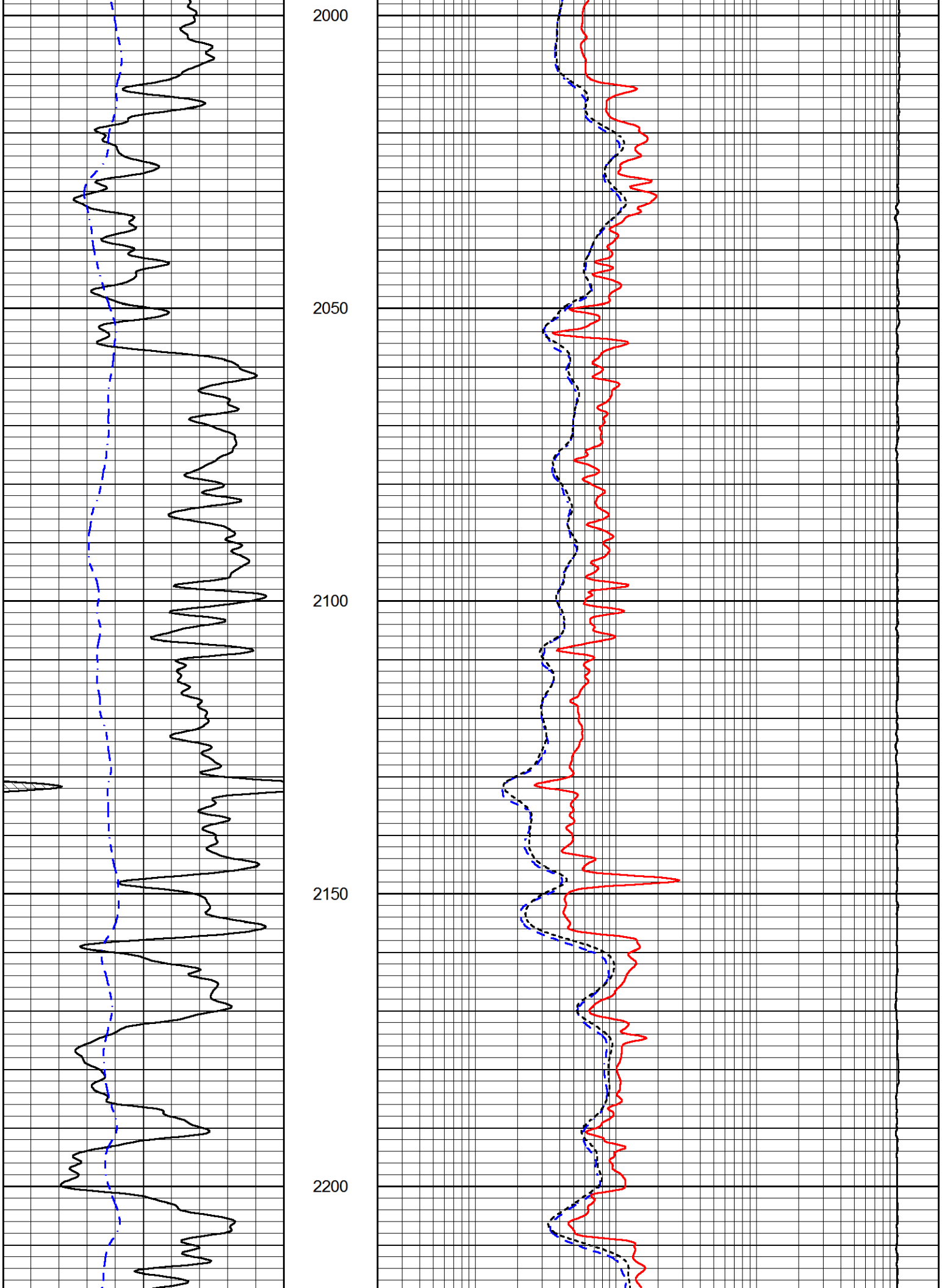

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1050
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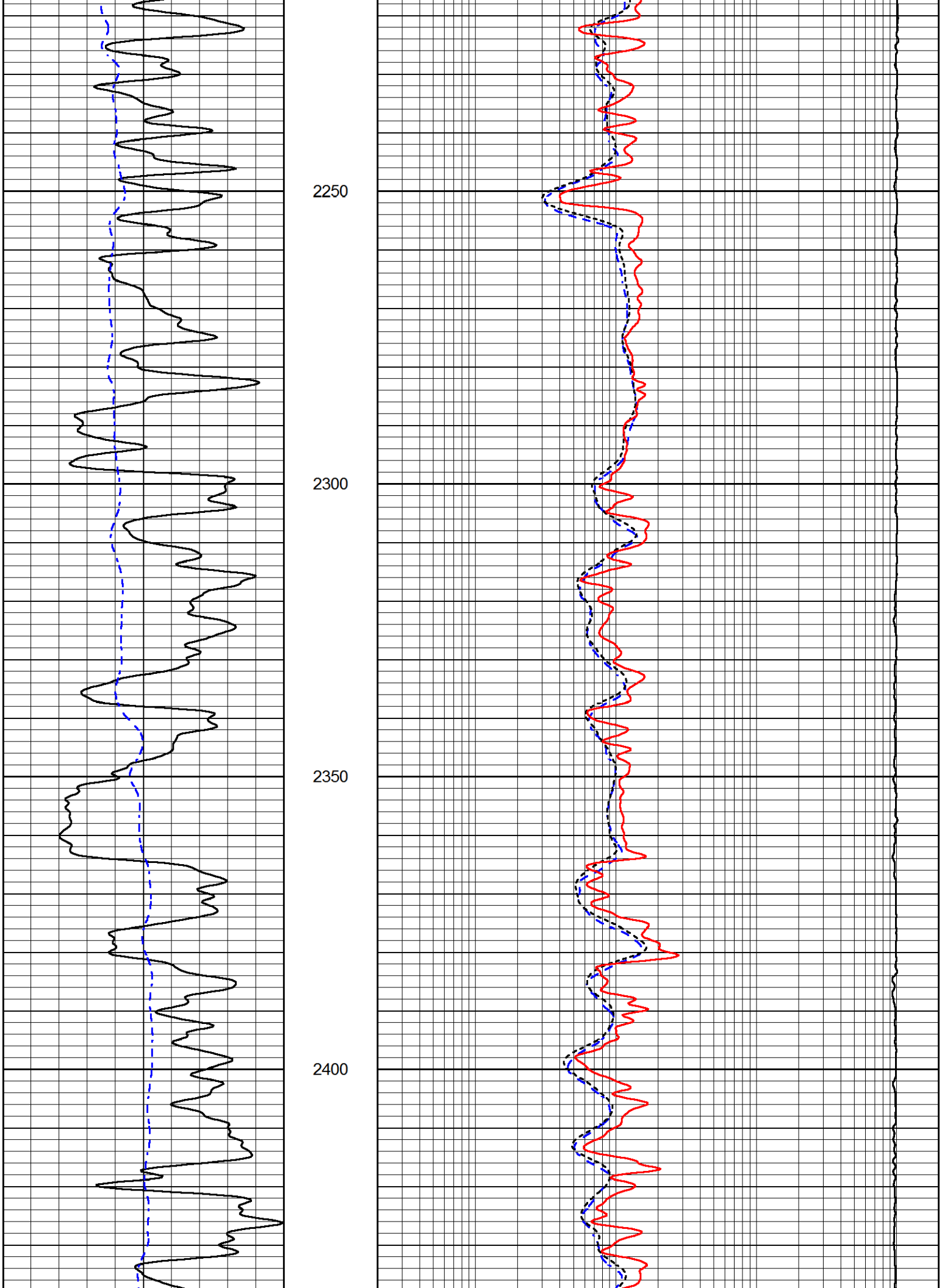

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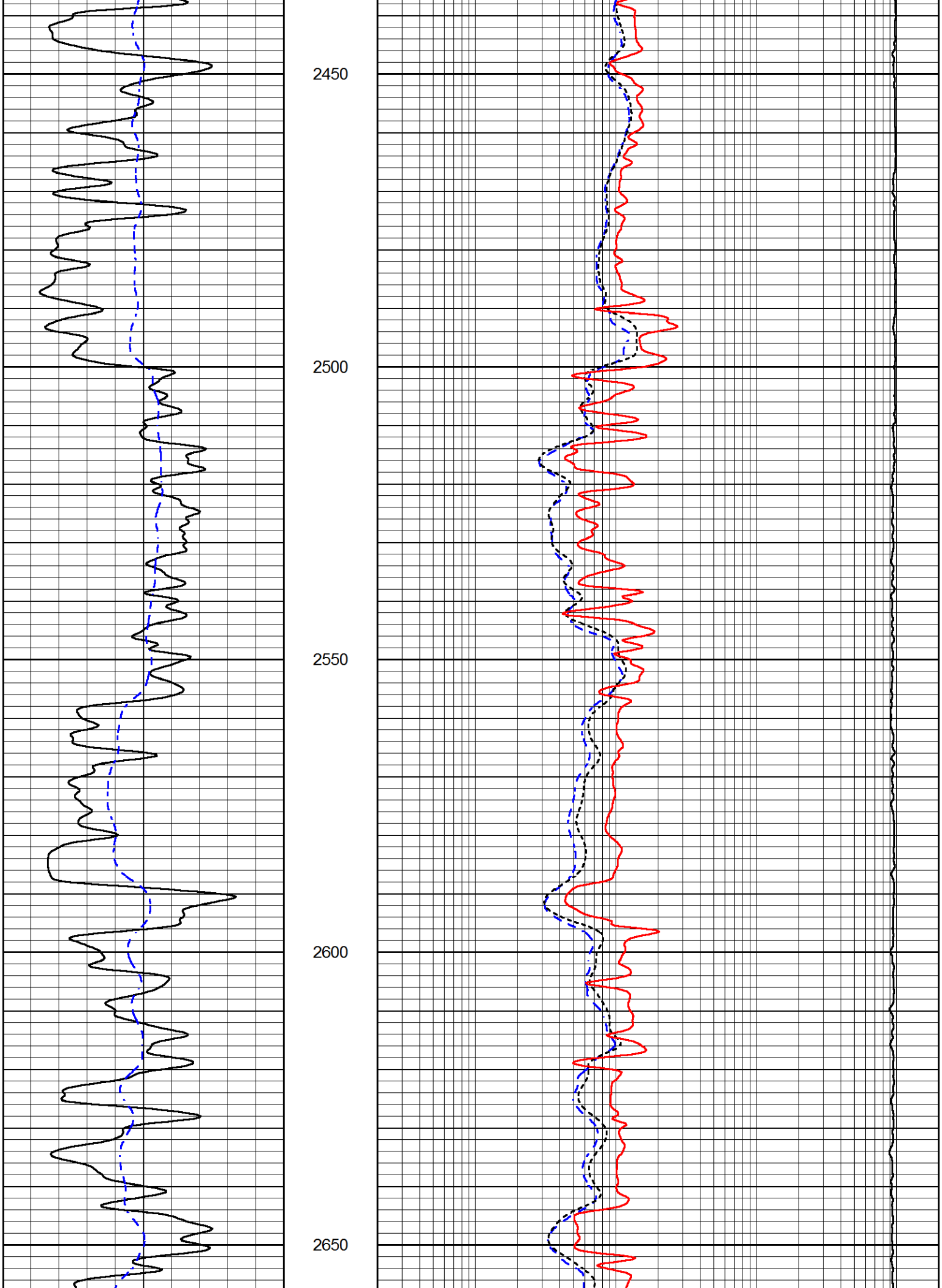

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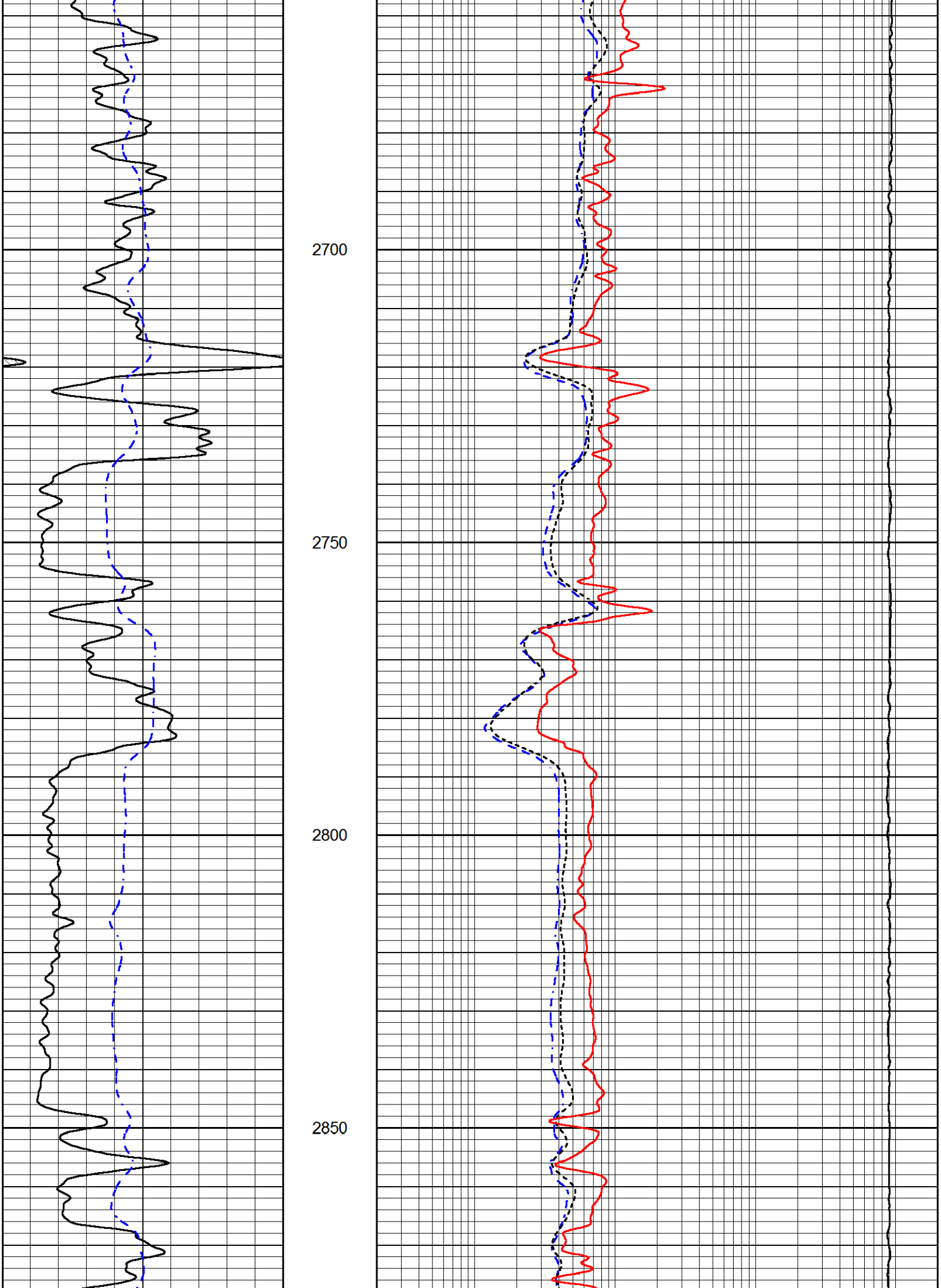

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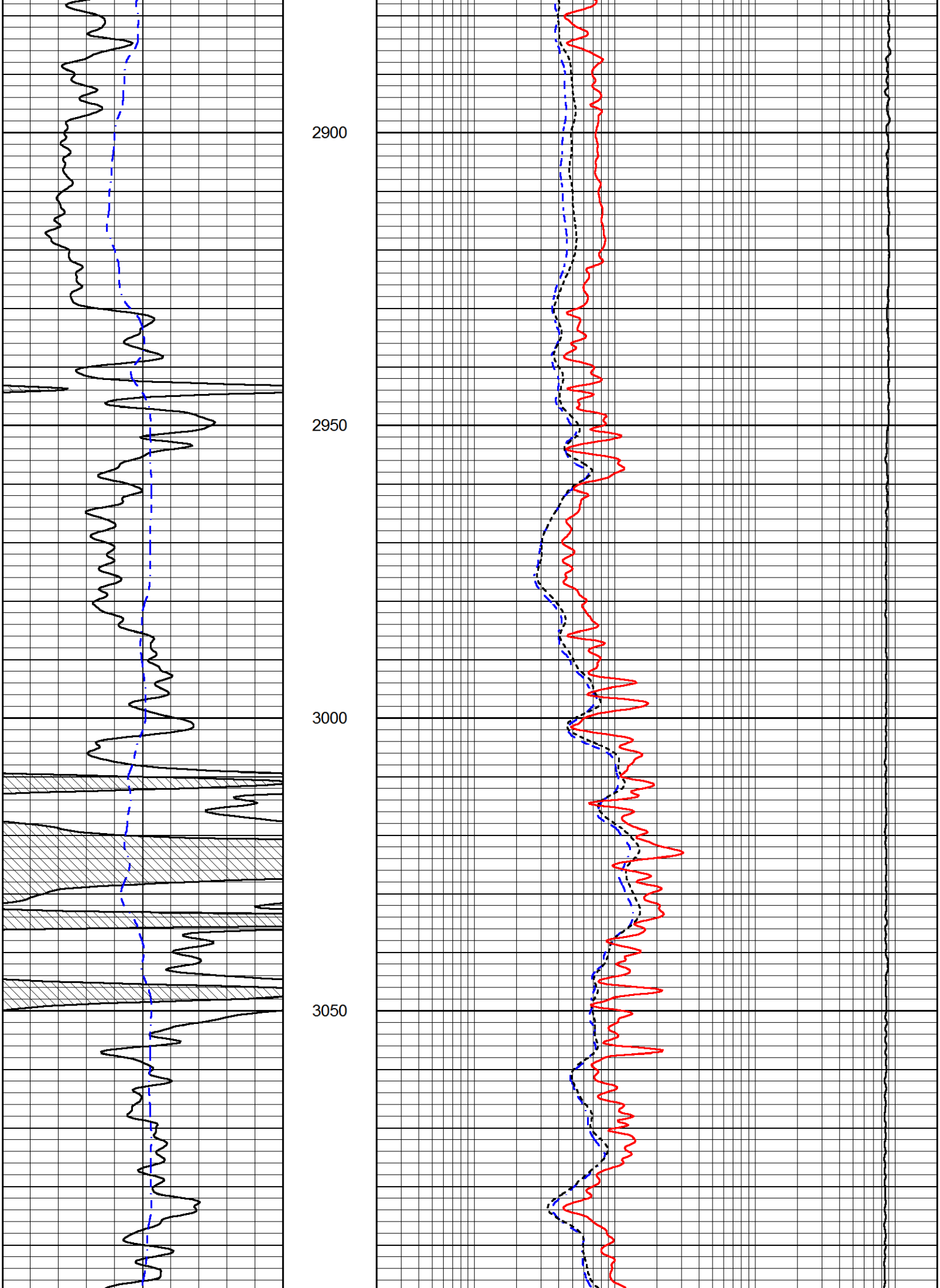

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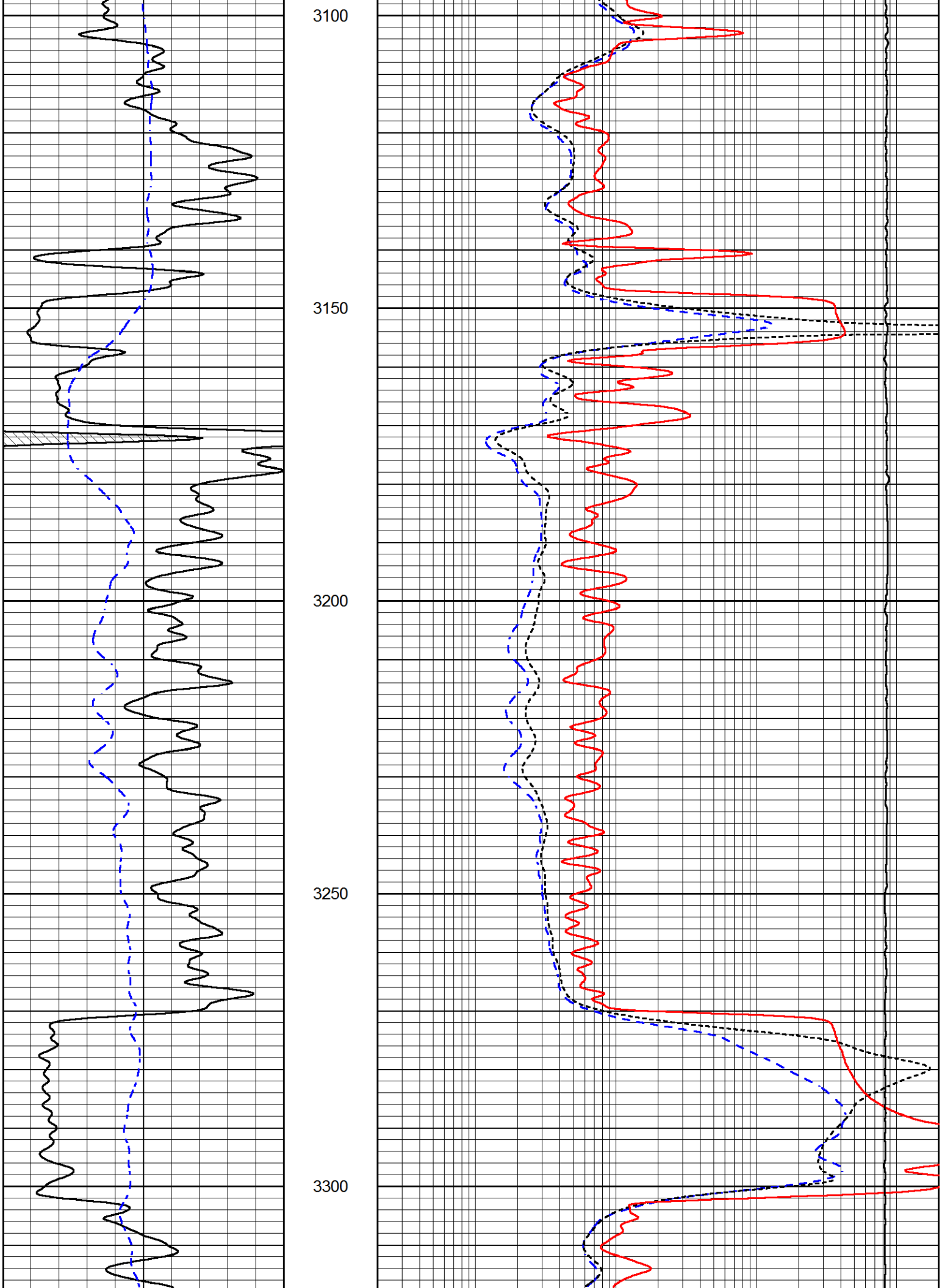

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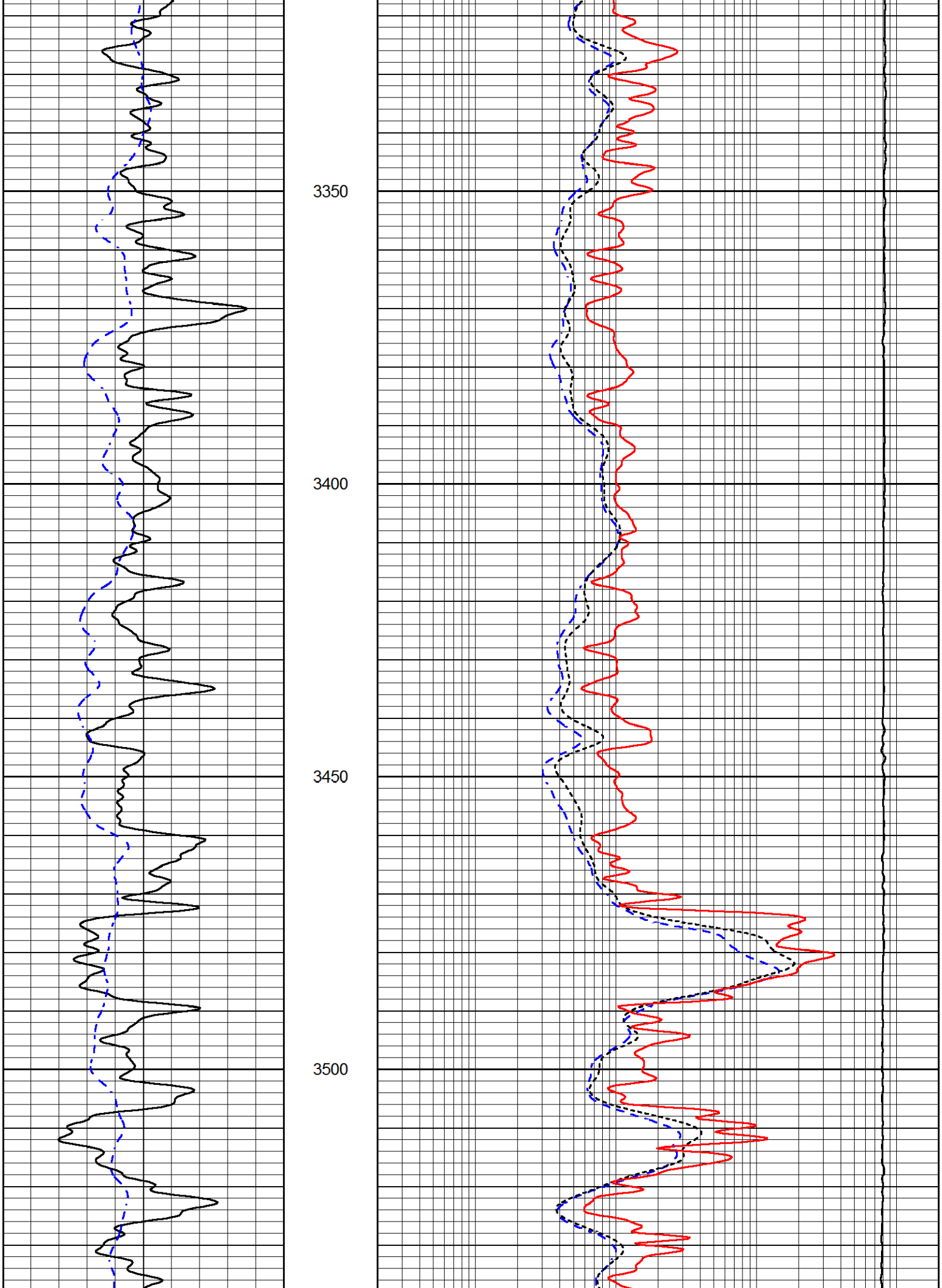

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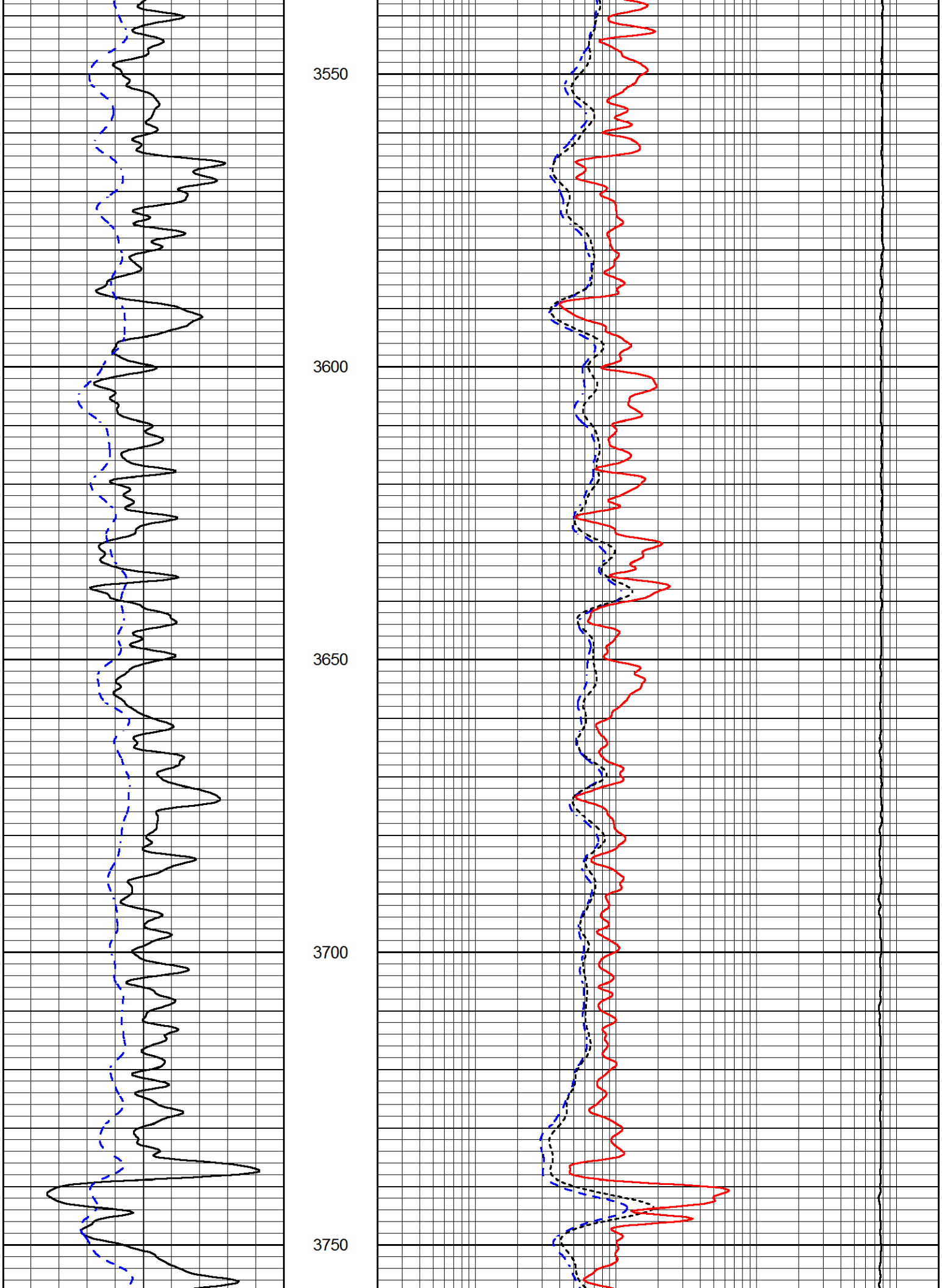

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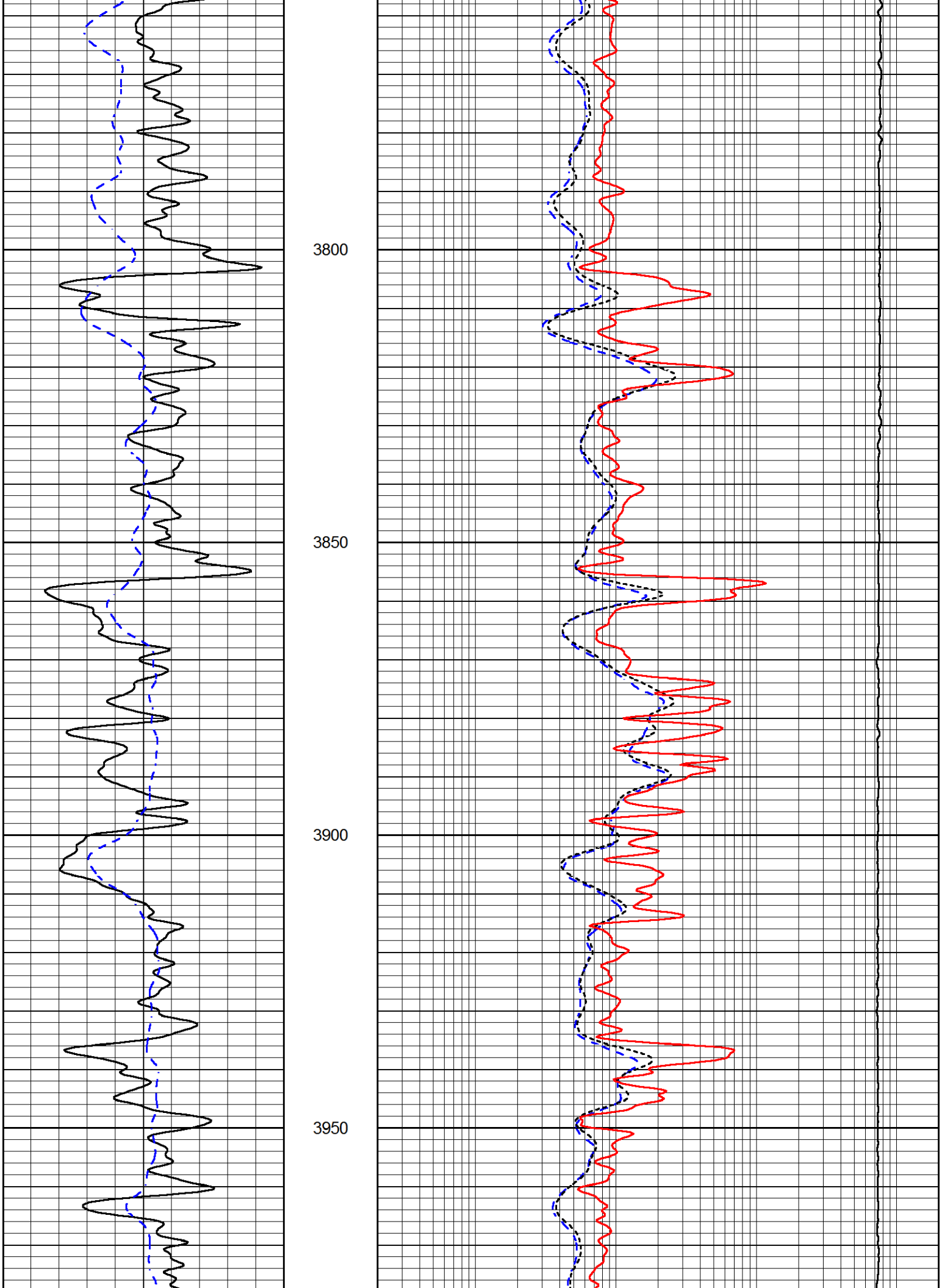

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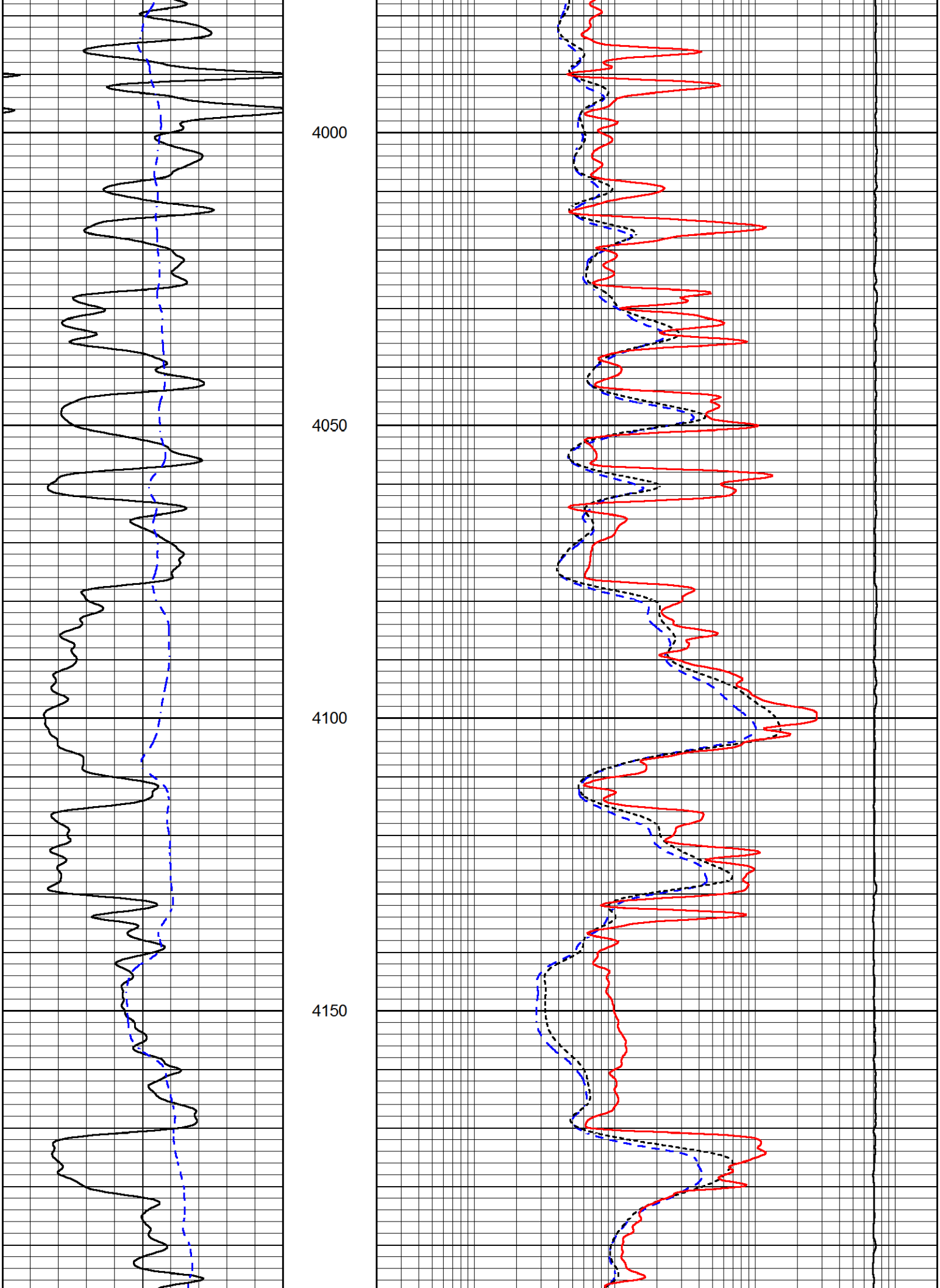

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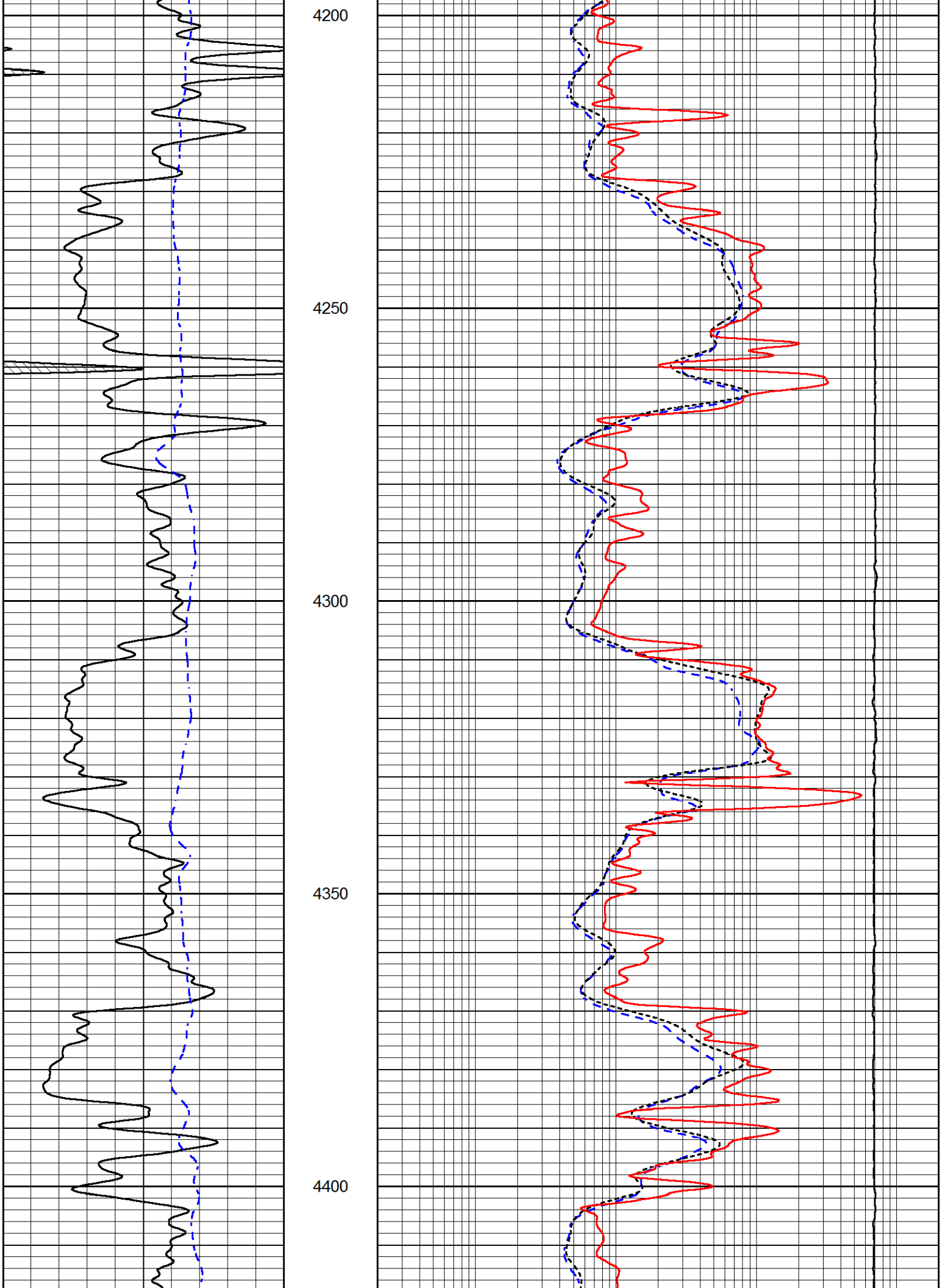

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3200
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3300

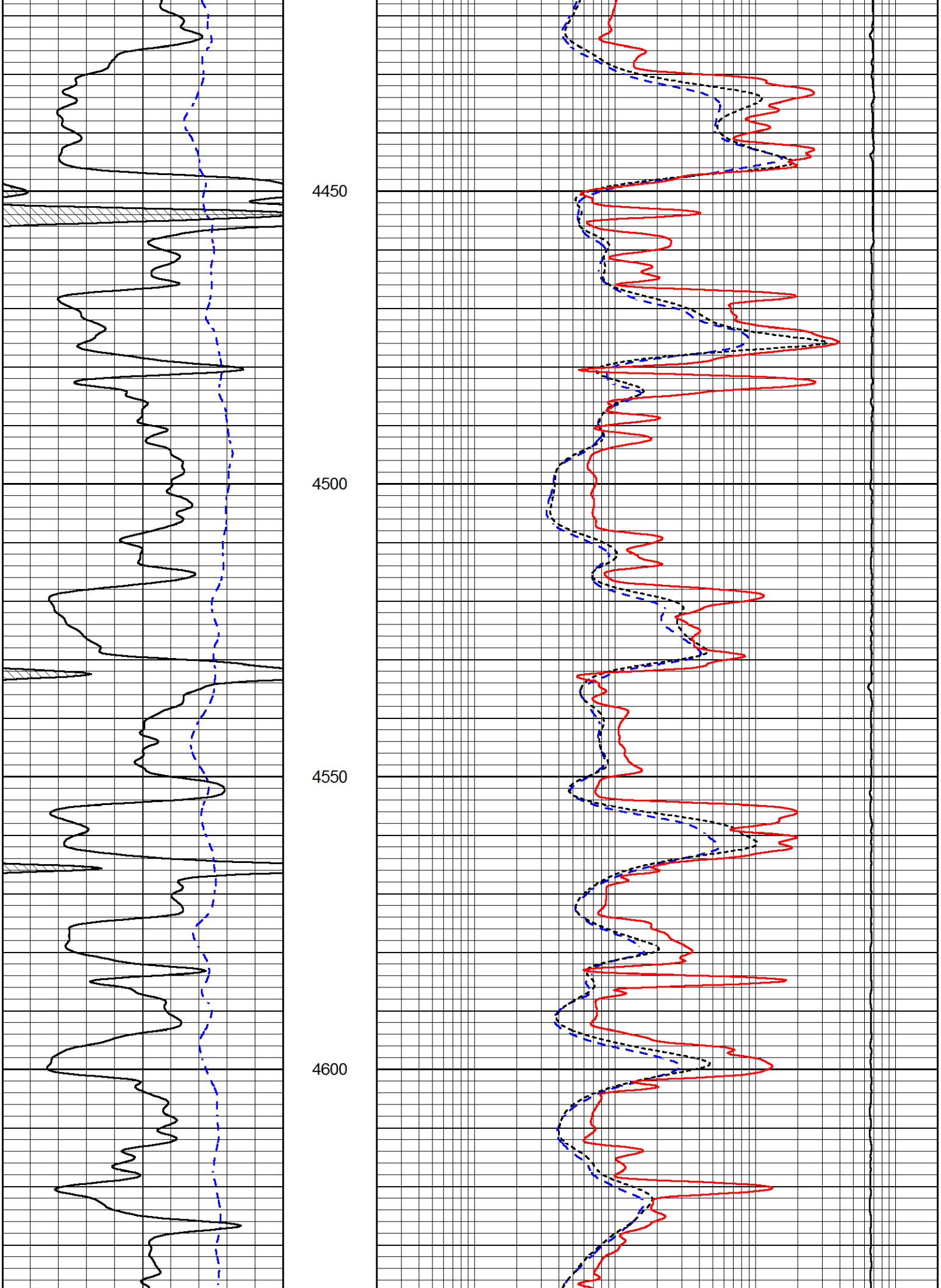

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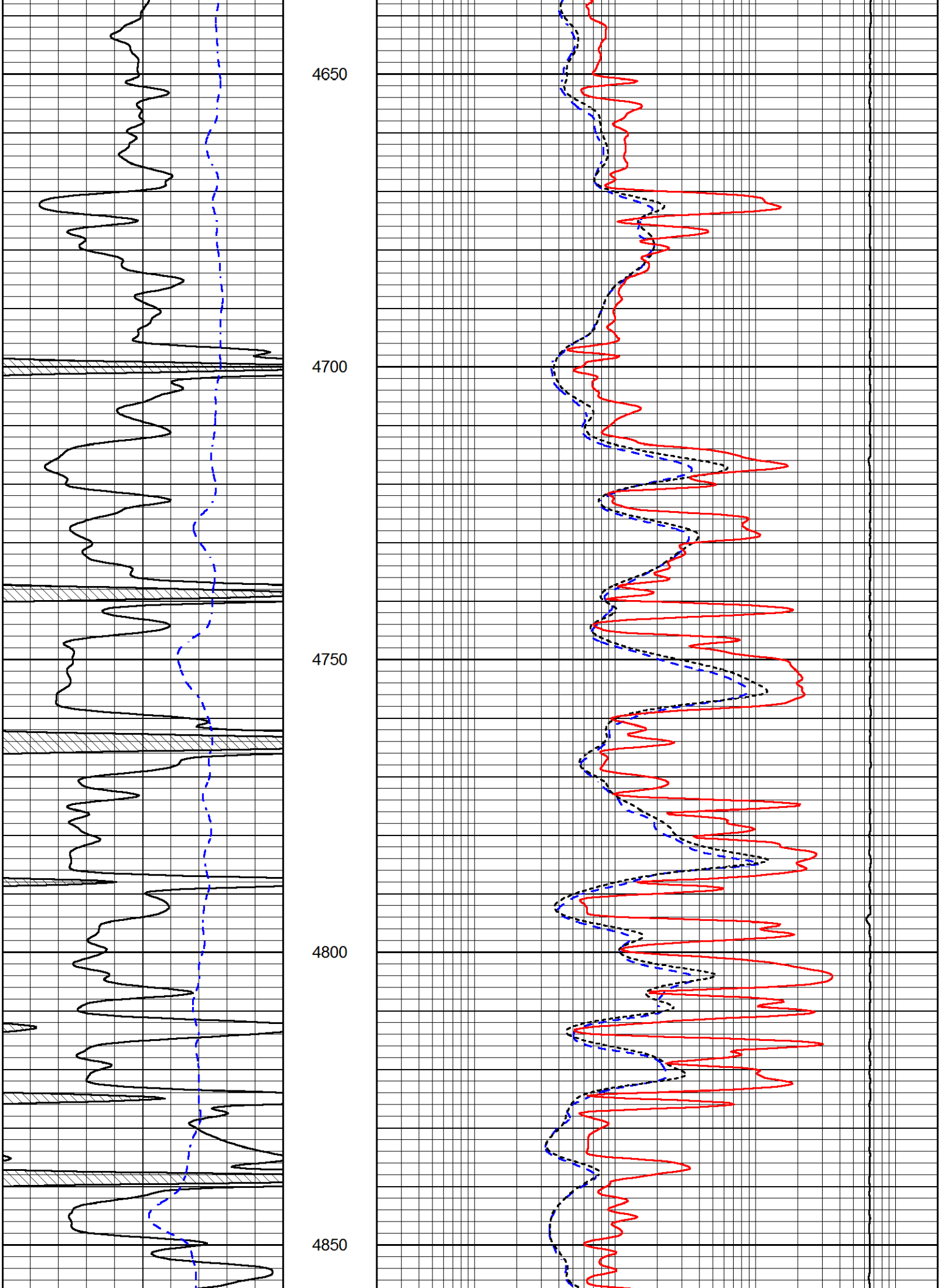

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3750

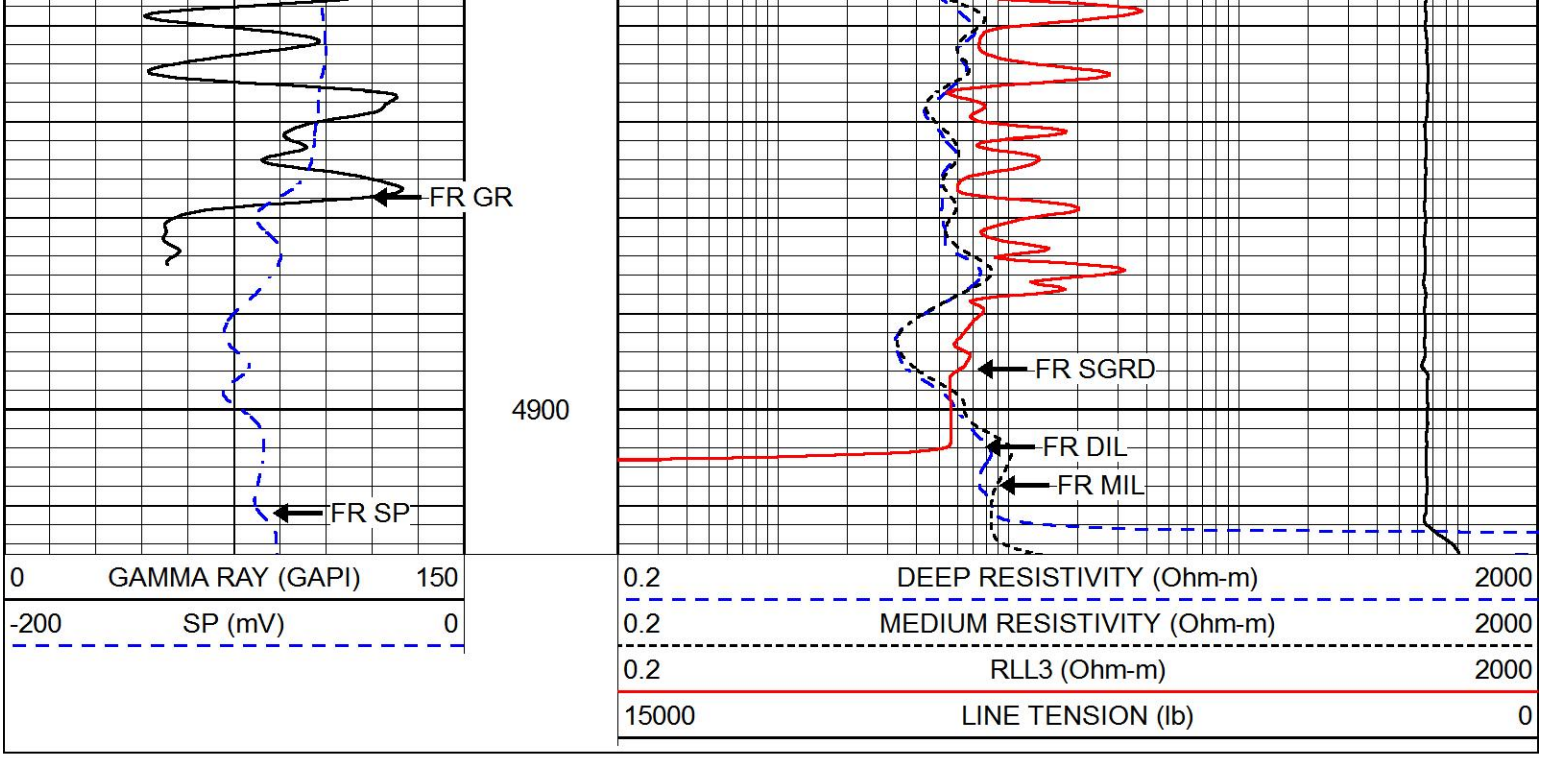

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3950


4000
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4100
4150


4200
4250
4300
4350
4400


4450
4500
4550
4600


4650
4700
4750
4800
4850



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

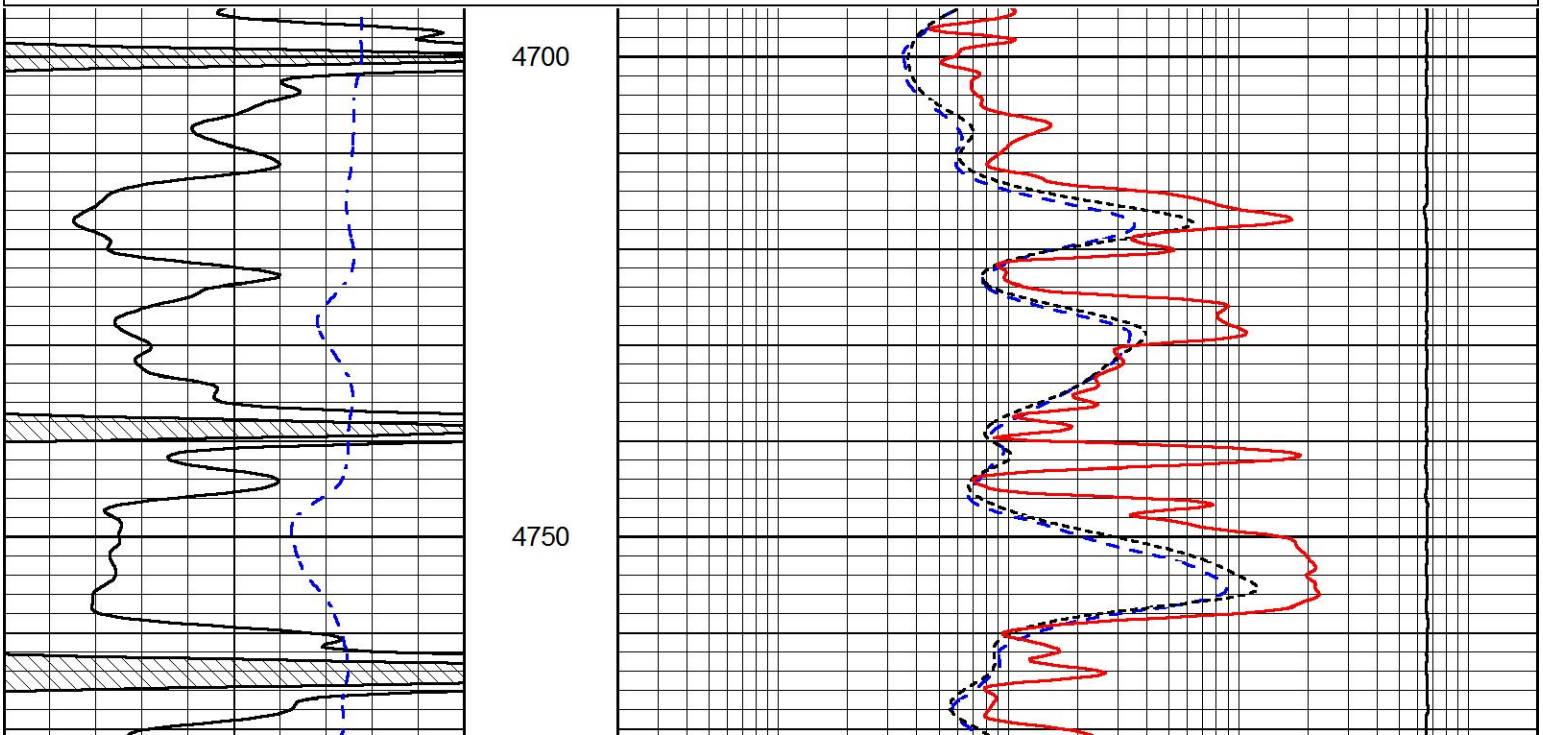
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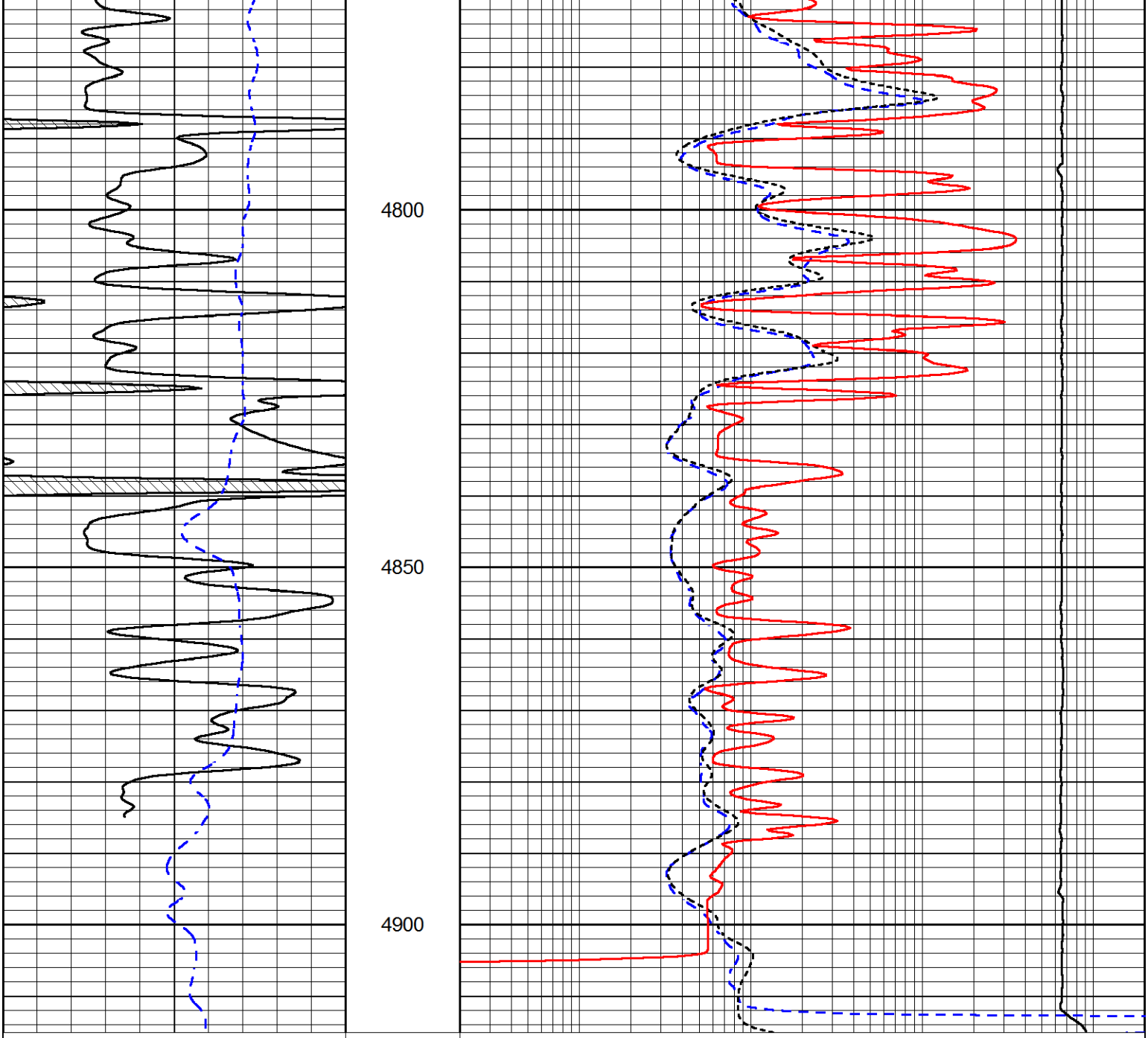
REPEAT SECTION

Database File	murfin_culwell_j_1_19.db
Dataset Pathname	stack/pass2.1
Presentation Format	dil
Dataset Creation	Thu Apr 11 15:40:45 2019
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	murfin_culwell_j_1_19.db
Dataset Pathname	stack/pass3.1
Dataset Creation	Thu Apr 11 15:59:16 2019

Dual Induction Calibration Report

Serial-Model:	PSI 988-M&W
Calibration Performed:	Tue Nov 20 10:50:19 2018

	Readings		References		Results	
Loop:	Air	Loop	Air	Loop	Gain	Offset

Deep	178.615	710.235	0.000	255.800	mmho/m	0.525	-44.000
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.400	-17.000

Compensated Density Calibration Report

Serial-Model:	144-84-M&W
Source / Verifier:	/
Master Calibration Performed:	Mon Jan 07 15:00:31 2019

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	4315.49	5309.89	cps
Aluminum	2.675	g/cc	825.26	3443.46	cps

Spine Angle = 75.33 Density/Spine Ratio = 0.538

	Size		Reading
Small Ring	4.00	in	0.69
Large Ring	14.00	in	0.04

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

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Company	MURFIN DRILLING COMPANY, INC.
Well	CULWELL 'J' #1-19
Field	WILDCAT
County	CHEYENNE
State	KANSAS