



MICRORESISTIVITY LOG

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

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 County LOGAN State KANSAS

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
 DIL/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	3600'
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 785-625-3858

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

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
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 (1987)	18.50	3.50	220.00

CILM 4.70

SP 0.20

Dataset: ritchie_blau_schroeder_1.db: field/well/stackml/pass3.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

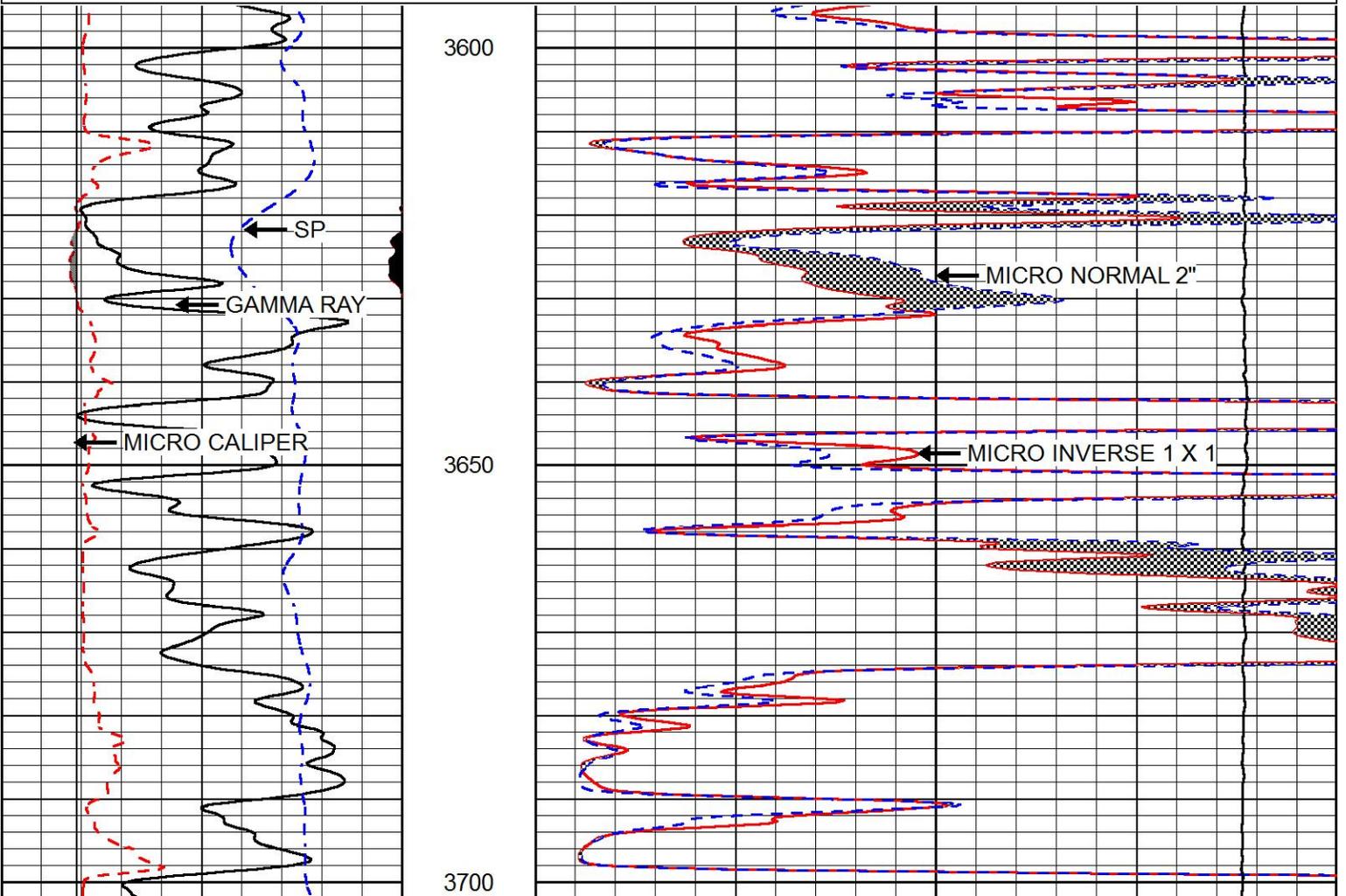


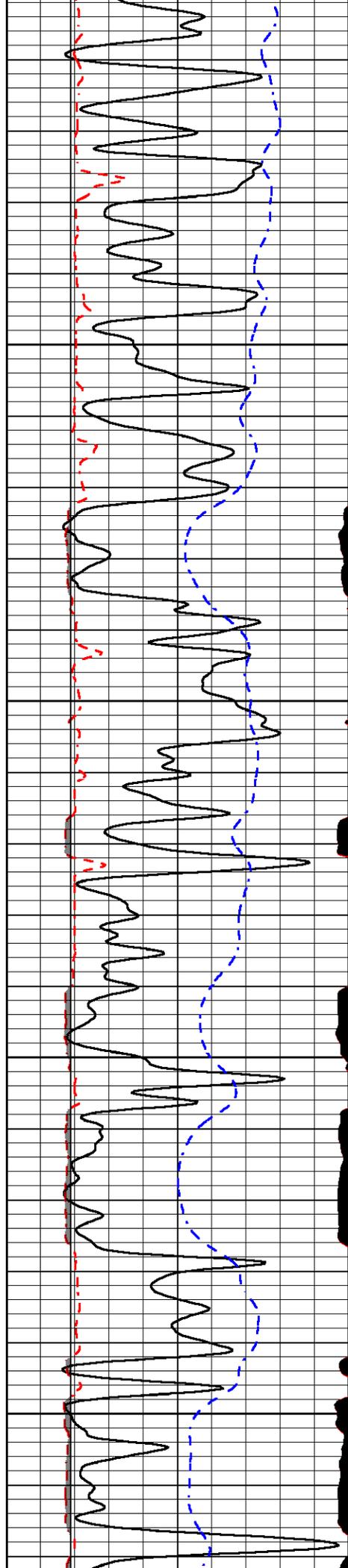
MAIN PASS

Database File ritchie_blau_schroeder_1.db
 Dataset Pathname stackml/pass3.1
 Presentation Format micro
 Dataset Creation Mon Sep 04 13:37:48 2017
 Charted by Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
6	MICRO CALIPER (in)	16
6	BIT SIZE (in)	16
-200	SP (mV)	0

0	MICRO INVERSE 1 X 1 (Ohm-m)	40
0	MICRO NORMAL 2" (Ohm-m)	40
15000	LINE TENSION (lb)	0



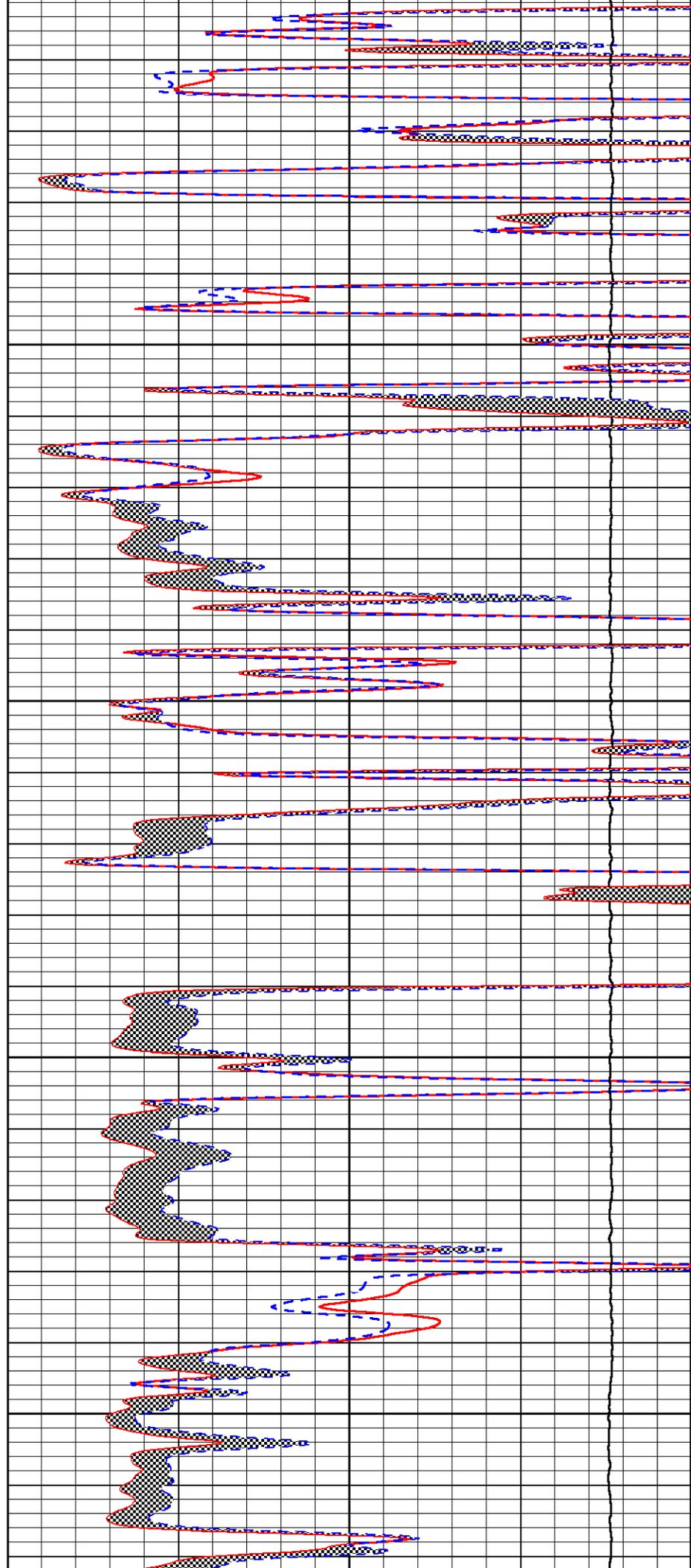


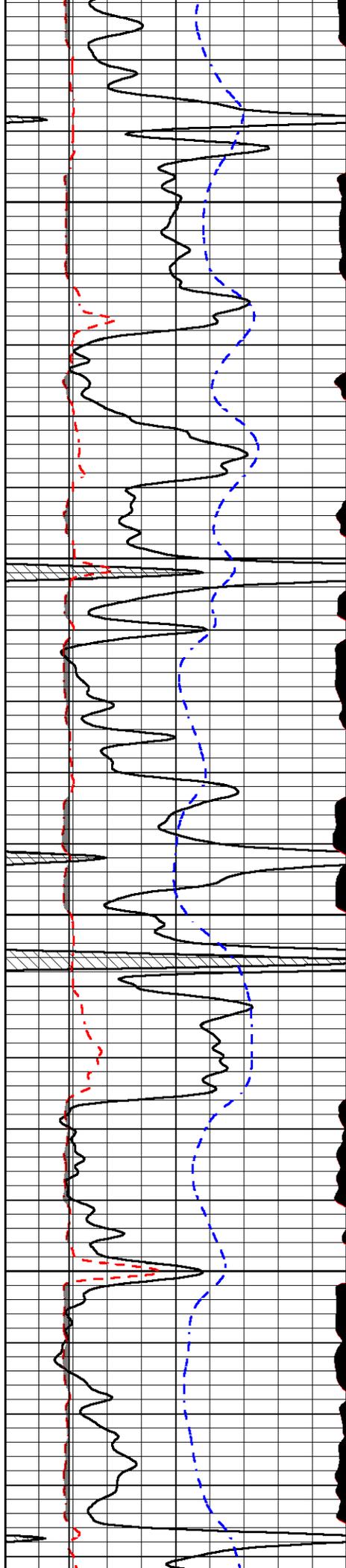
3750

3800

3850

3900



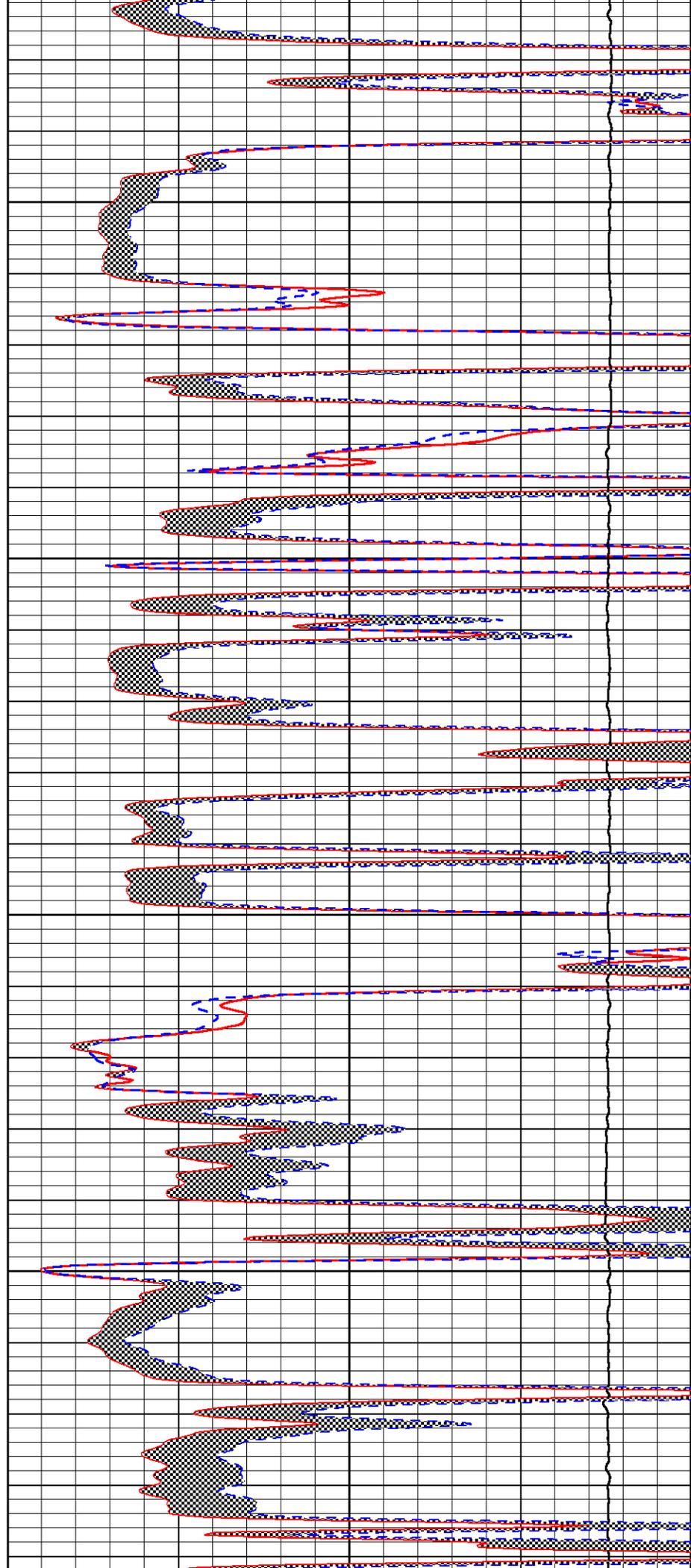


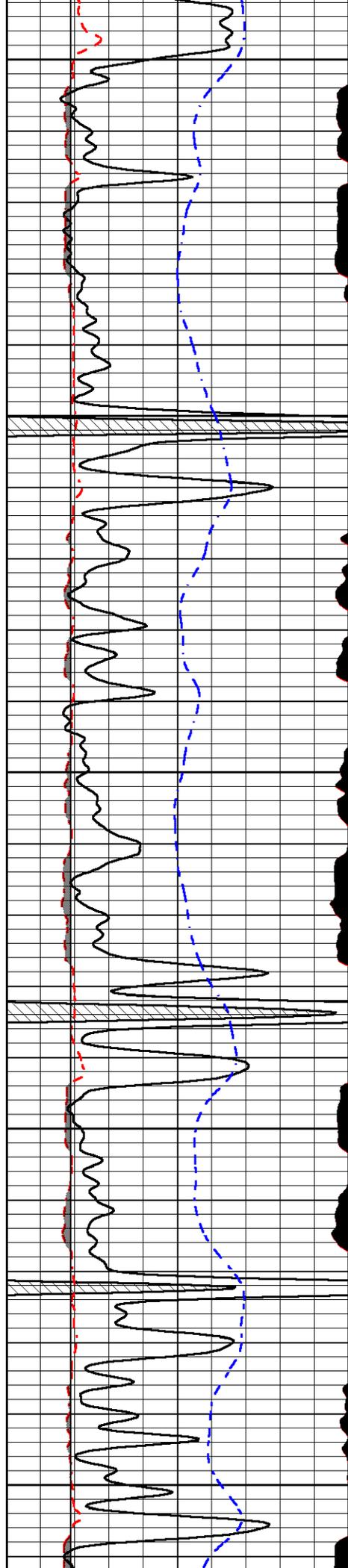
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4000

4050

4100





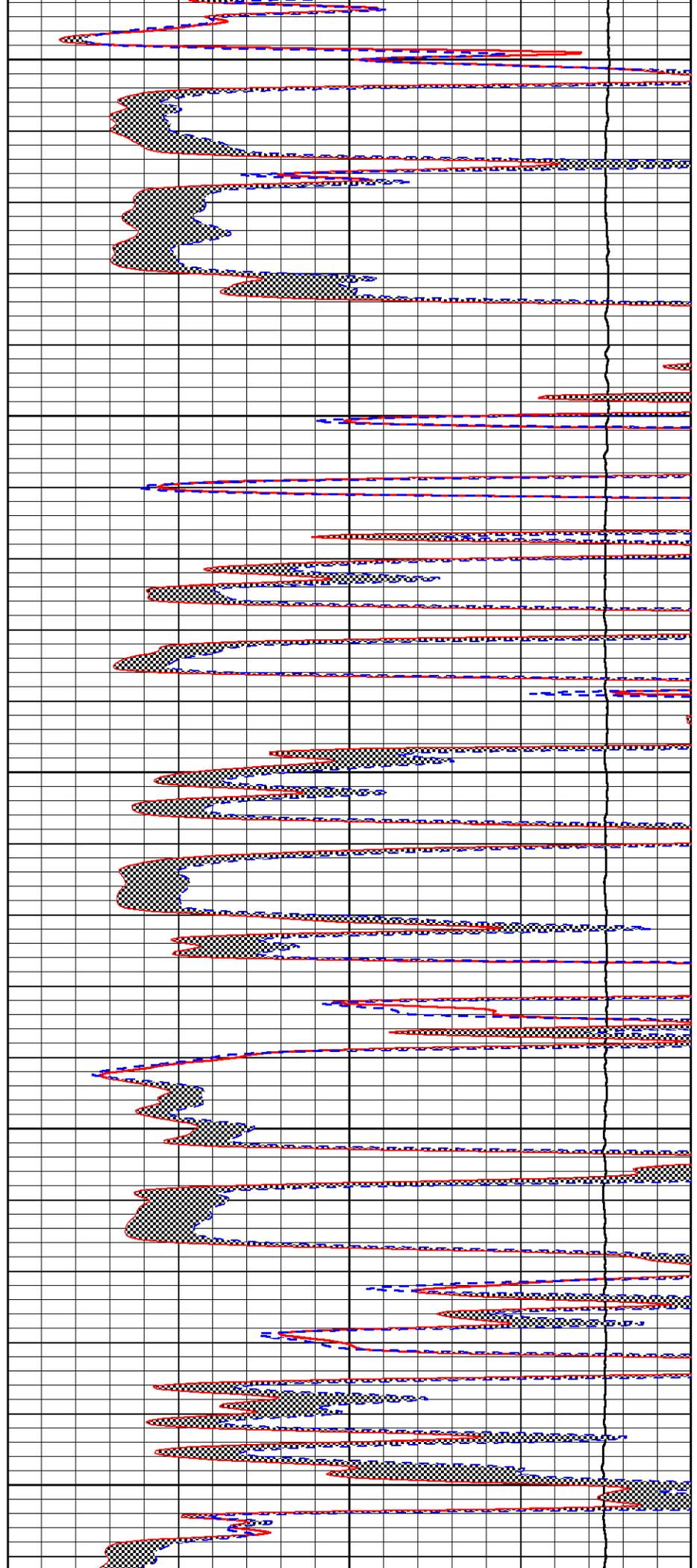
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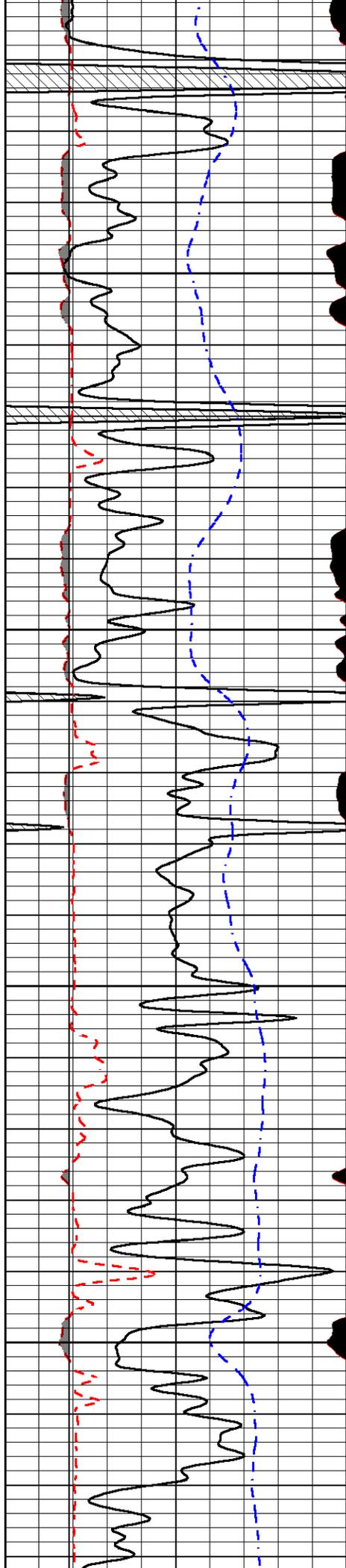
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4250

4300

4350



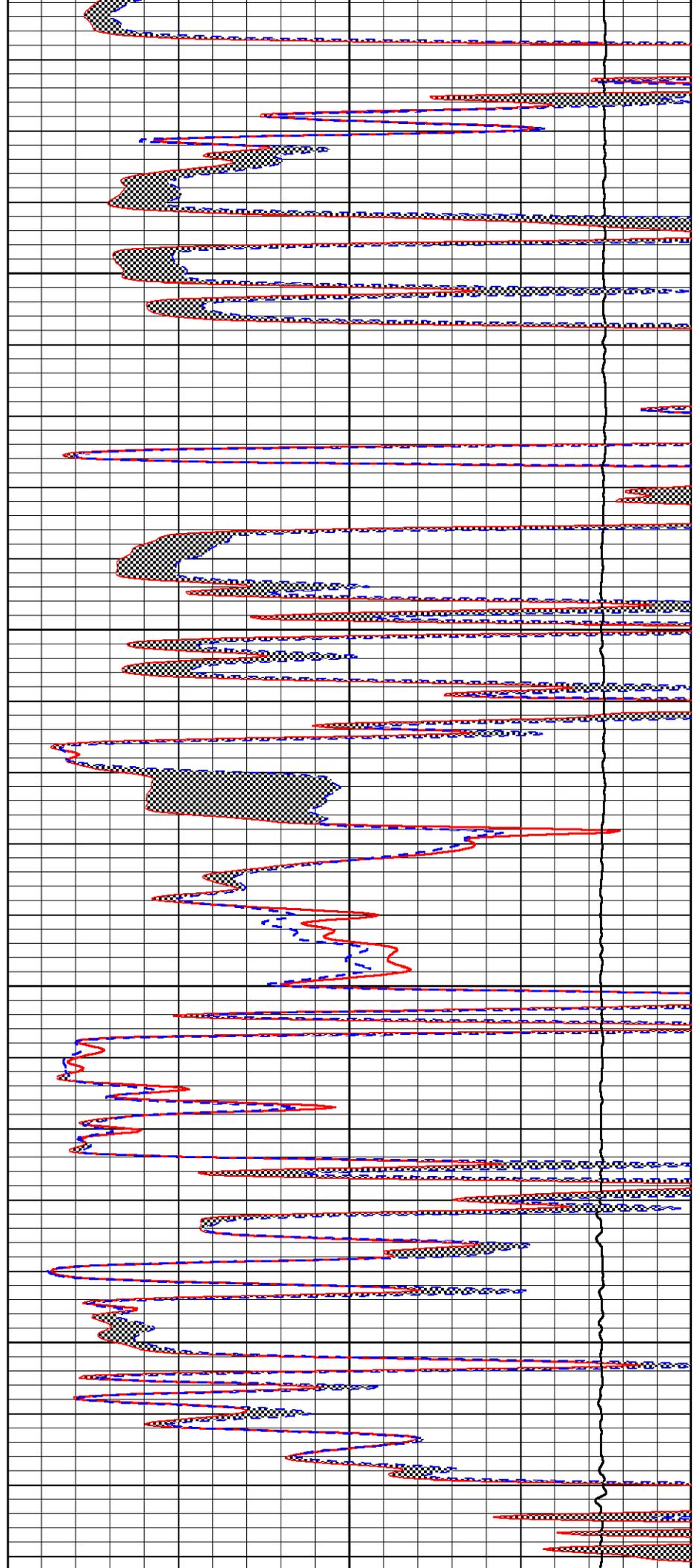


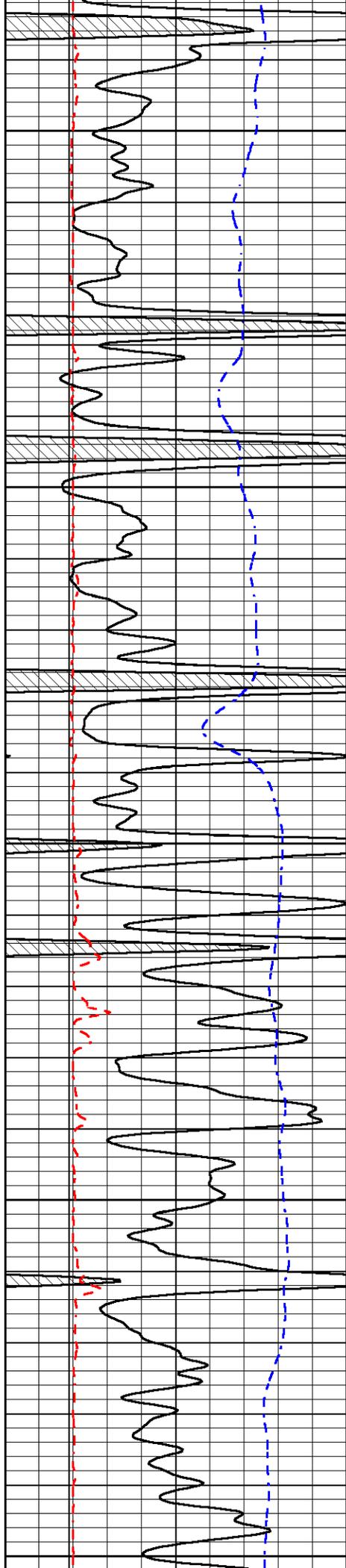
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4550





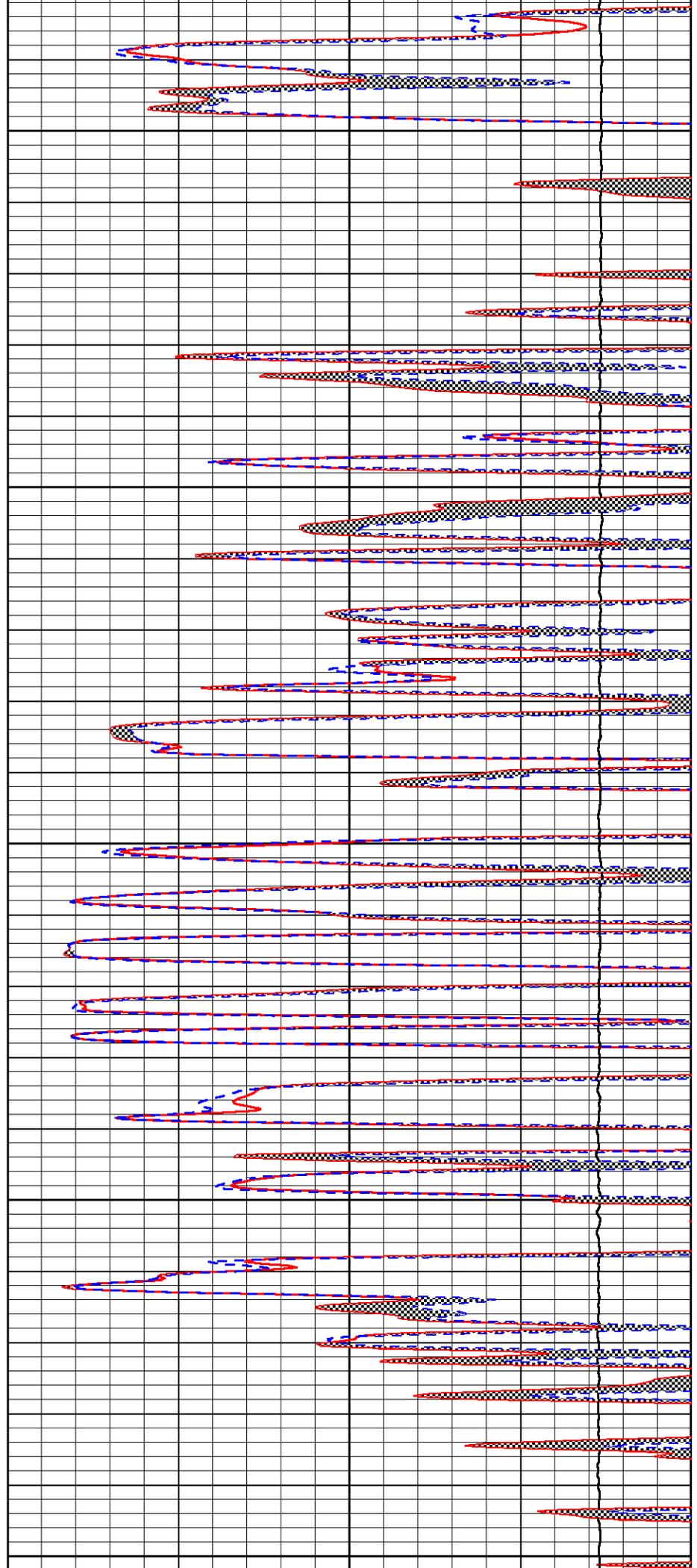
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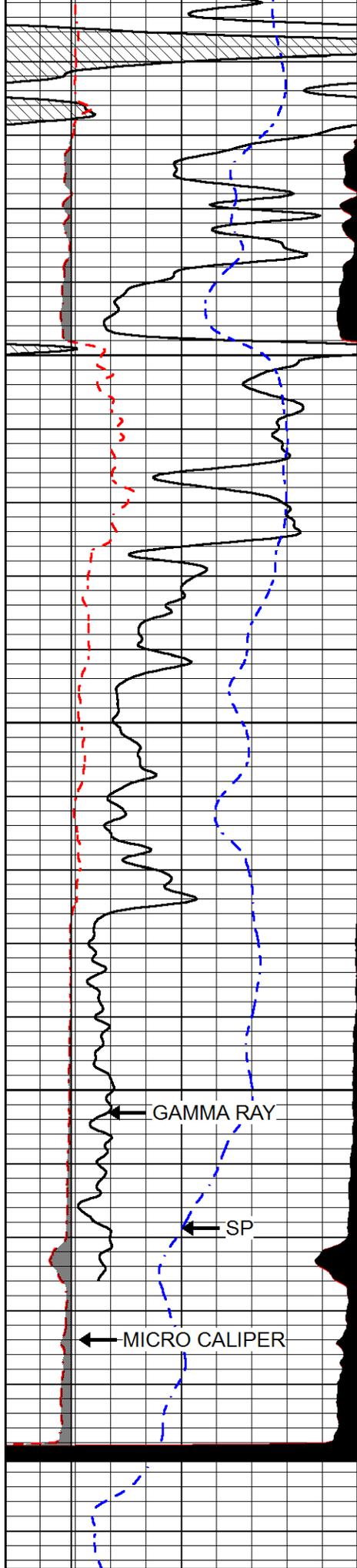
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4700

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4800





4850

4900

4950

5000

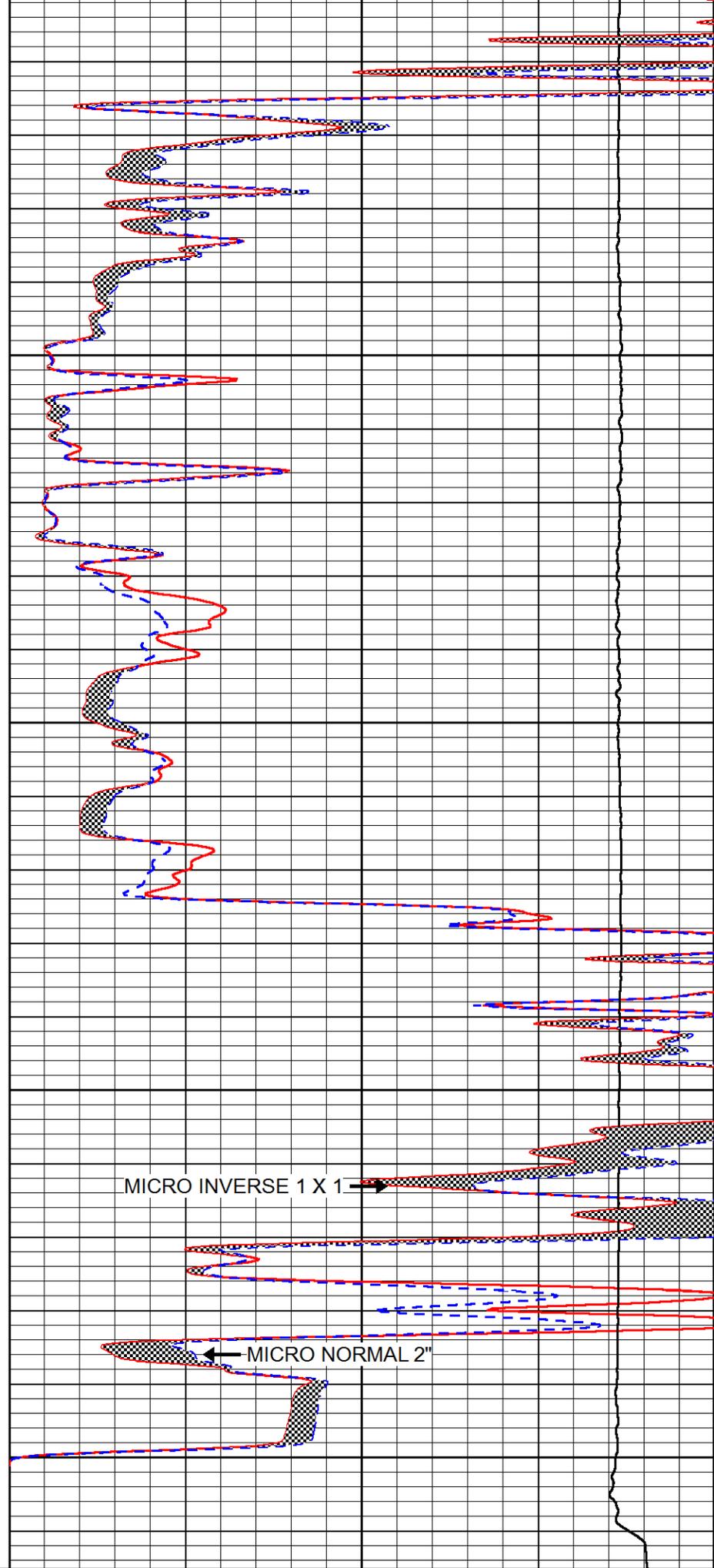
GAMMA RAY

SP

MICRO CALIPER

0 GAMMA RAY (GAPI) 150

0 MICRO CALIPER (") 10



MICRO INVERSE 1 X 1

MICRO NORMAL 2"

0 MICRO INVERSE 1 X 1 (Ohm-m) 40

0 MICRO NORMAL 2" (Ohm-cm) 40

6	MICRO CALIPER (in)	16
6	BIT SIZE (in)	16
-200	SP (mV)	0

0	MICRO NORMAL 2" (Ohm-m)	40
15000	LINE TENSION (lb)	0

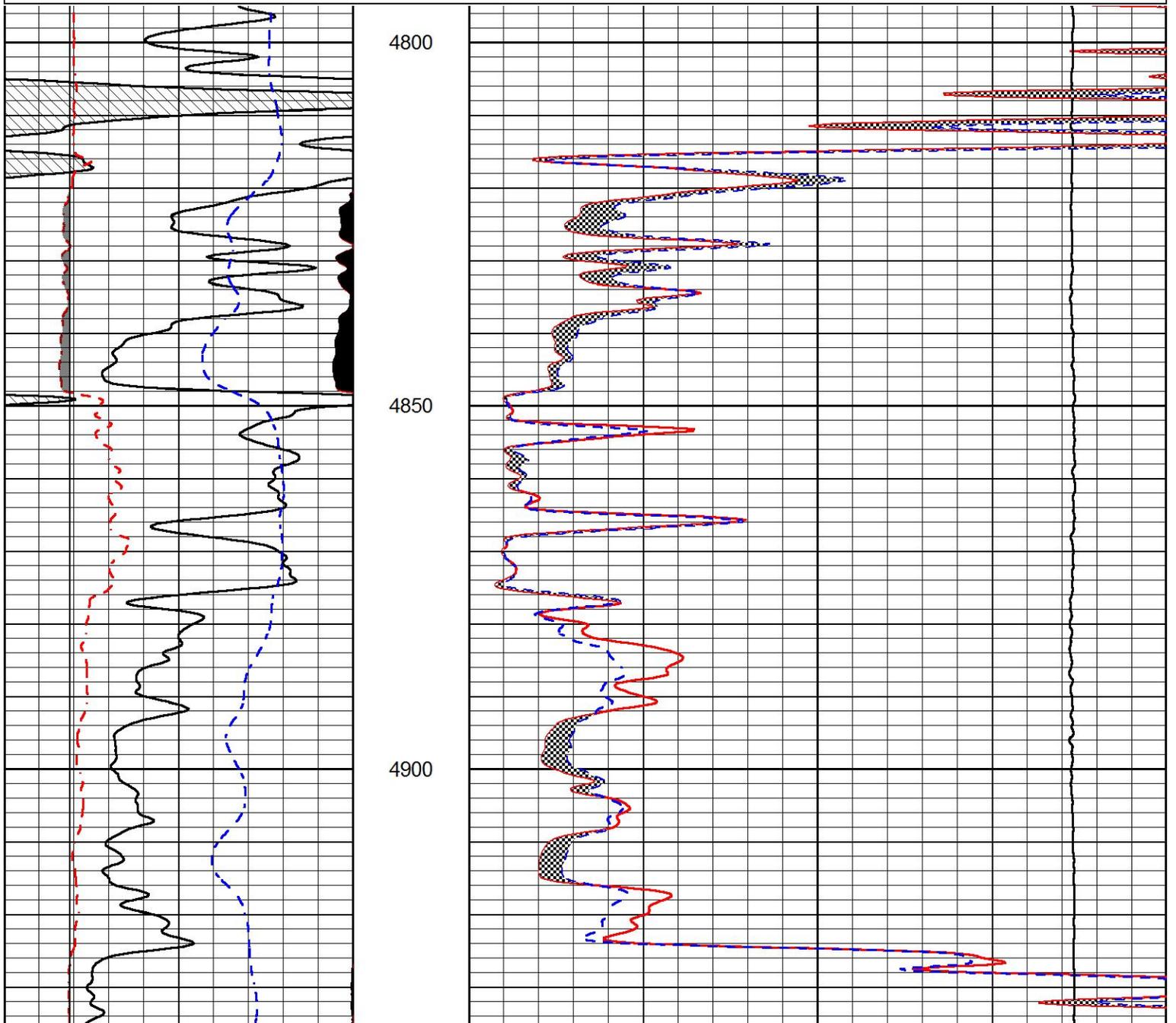


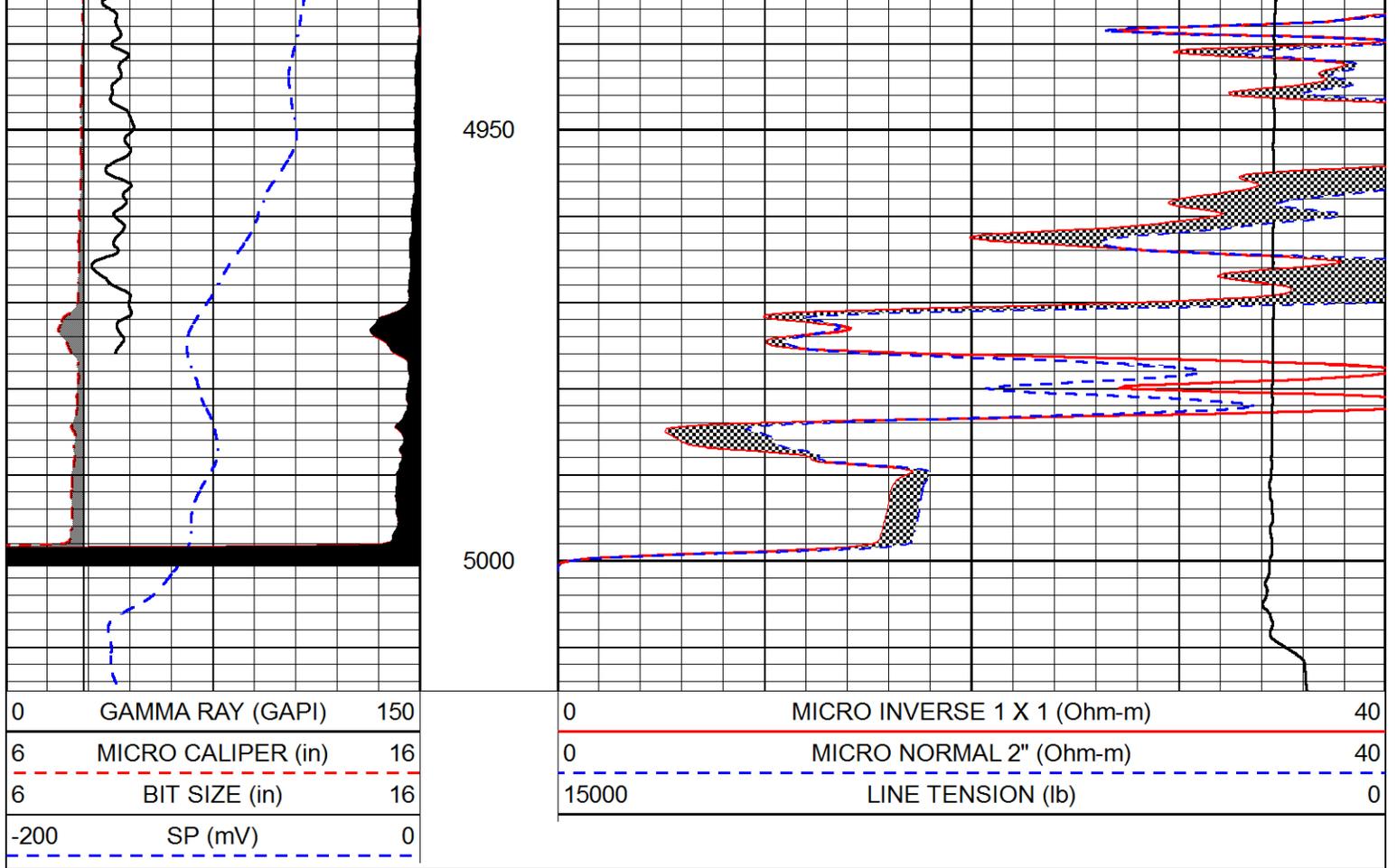
REPEAT SECTION

Database File ritchie_blau_schroeder_1.db
 Dataset Pathname stackml/pass2.1
 Presentation Format micro
 Dataset Creation Mon Sep 04 12:37:28 2017
 Charted by Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
6	MICRO CALIPER (in)	16
6	BIT SIZE (in)	16
-200	SP (mV)	0

0	MICRO INVERSE 1 X 1 (Ohm-m)	40
0	MICRO NORMAL 2" (Ohm-m)	40
15000	LINE TENSION (lb)	0





Calibration Report

Database File ritchie_blau_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	mmho/m	0.530	-36.500
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.440	-110.500

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:
Source / Verifier:
Master Calibration Performed:

168-986-M&W
/
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
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