



# DUAL INDUCTION LOG

**Company** BOWMAN OIL COMPANY  
**Well** EUNICE BERLAND #1  
**Field** BERLAND EAST  
**County** ROOKS **State** KANSAS

**Company** BOWMAN OIL COMPANY  
**Well** EUNICE BERLAND #1  
**Field** BERLAND EAST  
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**Location:** API #: 15-163-24396-00-00  
 4520' FSL & 2500' FEL  
 SEC 20 TWP 10S RGE 19W  
**Permanent Datum** GROUND LEVEL Elevation 2198'  
**Log Measured From** KELLY BUSHING  
**Drilling Measured From** KELLY BUSHING  
**Other Services** CNL/CDL MEL  
**Elevation** K.B. 2203'  
**D.F.** N/A  
**G.L.** 2198'

Date	9/13/2019
Run Number	ONE
Depth Driller	3880'
Depth Logger	3880'
Bottom Logged Interval	3879'
Top Log Interval	250'
Casing Driller	8.625" @ 259'
Casing Logger	258'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	3500
Density / Viscosity	9.4 54
pH / Fluid Loss	9.5 8.8
Source of Sample	FLOWLINE
Rm @ Meas. Temp	.65 @ 71
Rmt @ Meas. Temp	.49 @ 71
Rmc @ Meas. Temp	.88 @ 71
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.40 @ 115
Operating Rig Time	2 HOURS
Max Rec. Temp. F	115 DEGF
Equipment Number	P-108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	ROGER MOSES

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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.  
 ZURICH KANSAS  
 WEST TO 8 ROAD, 4 1/2 SOUTH, EAST INTO

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

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

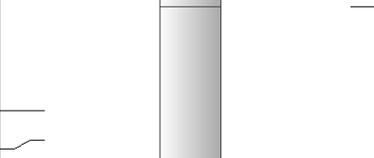
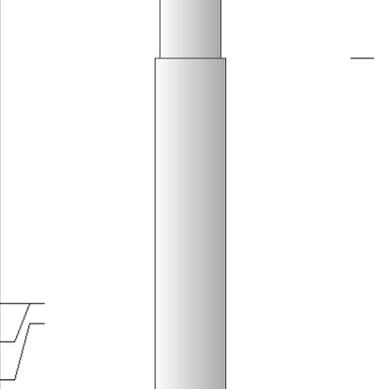
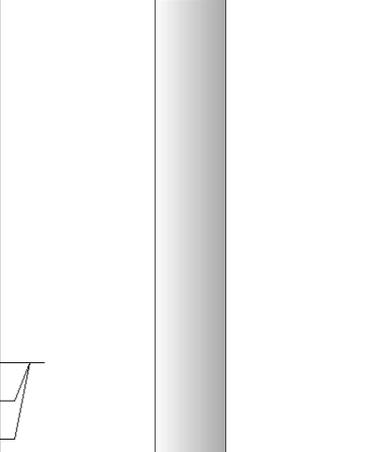
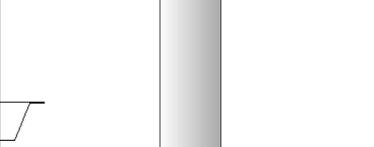
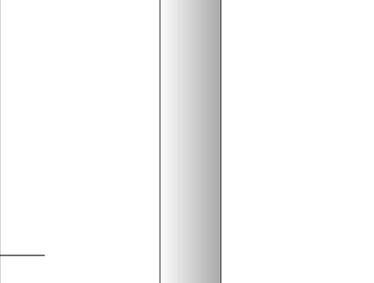
<b>Your Pioneer Energy Services Crew</b> Engineer: J. HENRICKSON Operator: Operator: Operator:	<b>This Log Record Was Witnessed By</b> Primary Witness: ROGER MOSES Secondary Witness: Secondary Witness: Secondary Witness:
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# Log Variables

DatabaseC:\ProgramData\Warrior\Data\borman\_eunice\_berland\_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	115	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	60	0	Off	3880

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	44.50		GR-M&W (89-M&W)	3.00	3.50	50.00
CNLSC CNSSC	41.40 40.65		CNT-M&W (tk10-MW)	5.50	3.50	100.00
LSD DCAL SSD	32.35 32.33 31.85		CDL-M&W (979-229)	8.50	4.00	250.00
MCAL MI MN	20.87 20.87 20.87		ML-PSI UDM ML (UDM-01) Stackable Microlog Tools	11.50	4.00	215.00
RLL3 RLL3F	15.80 15.79					
CILD	8.00		DIL-M&W (PSI 988)	18.50	3.50	220.00

CILM 4.70

SP 0.20

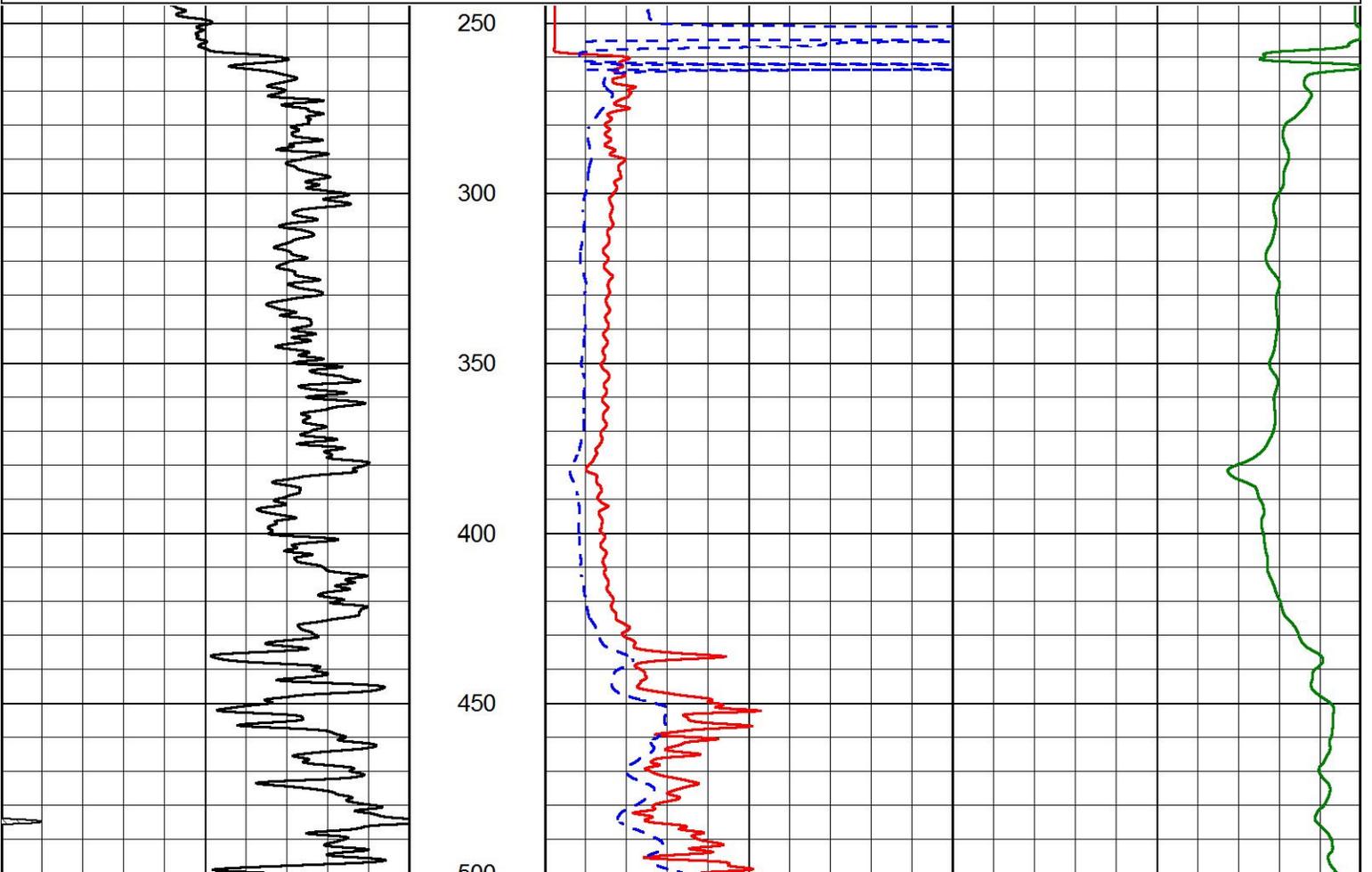
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 Total weight: 835.00 lb  
 O.D.: 4.00 in

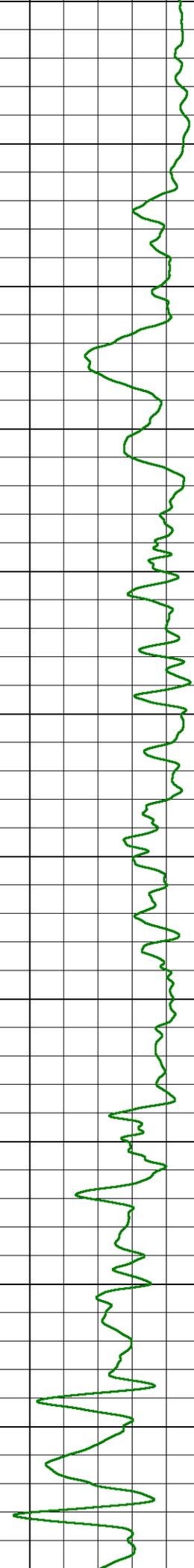
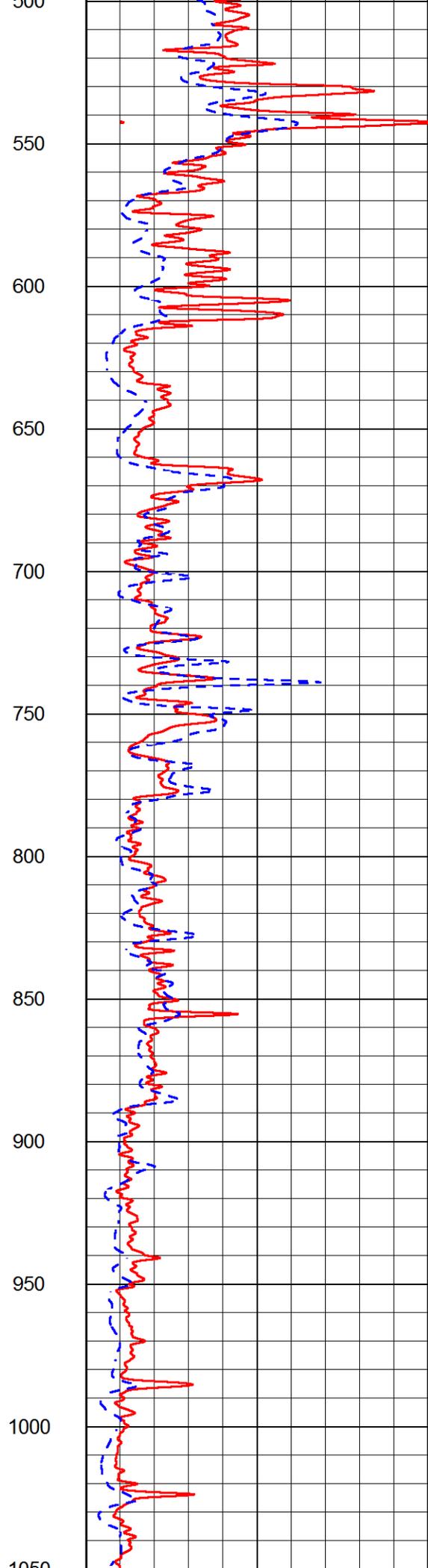
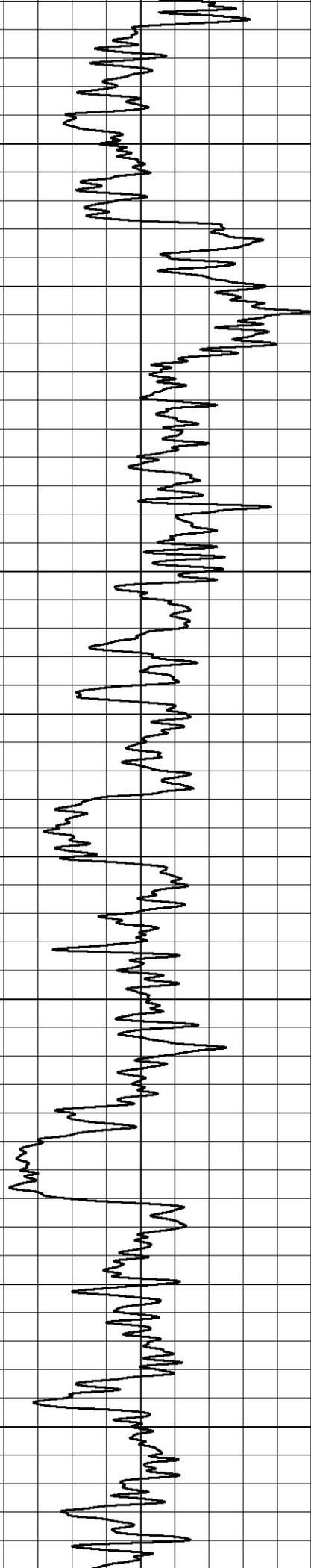


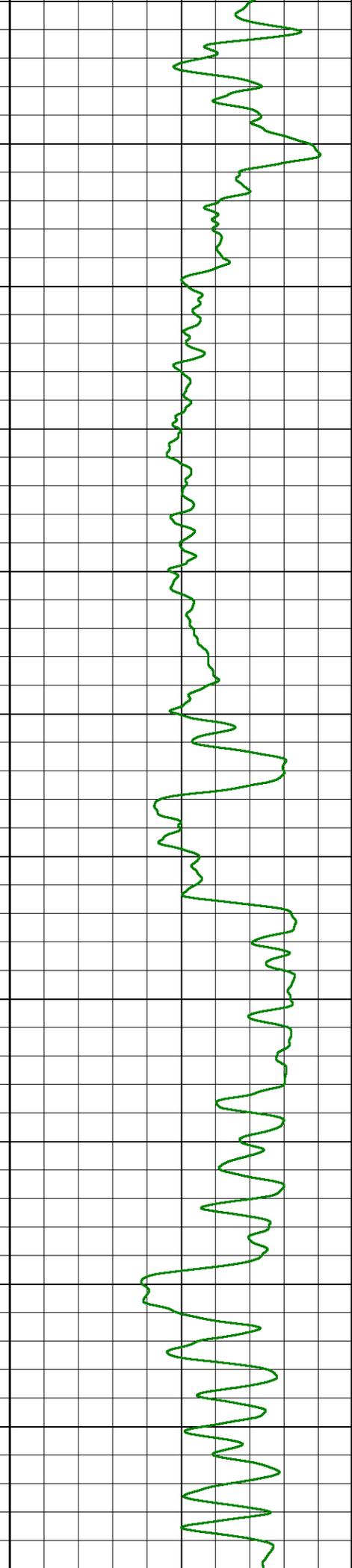
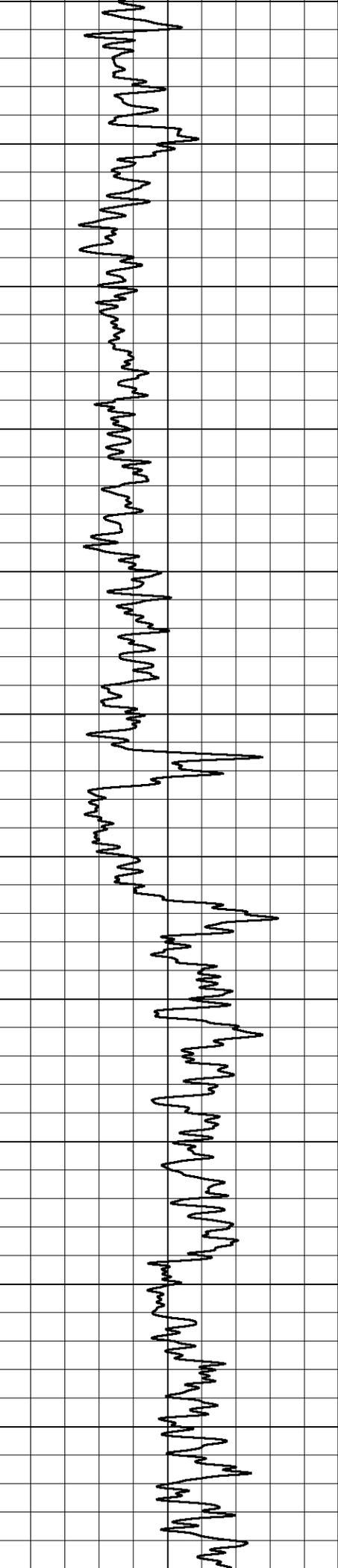
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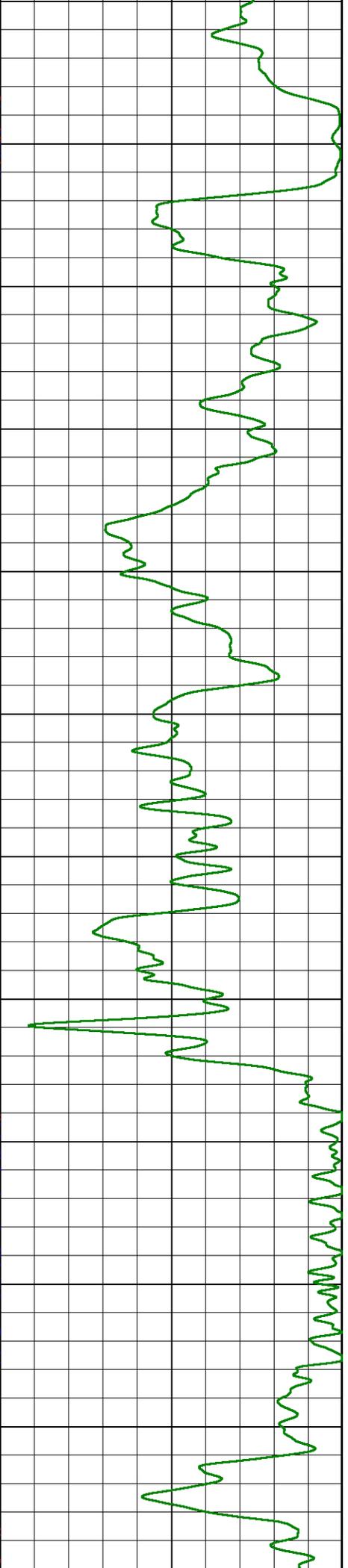
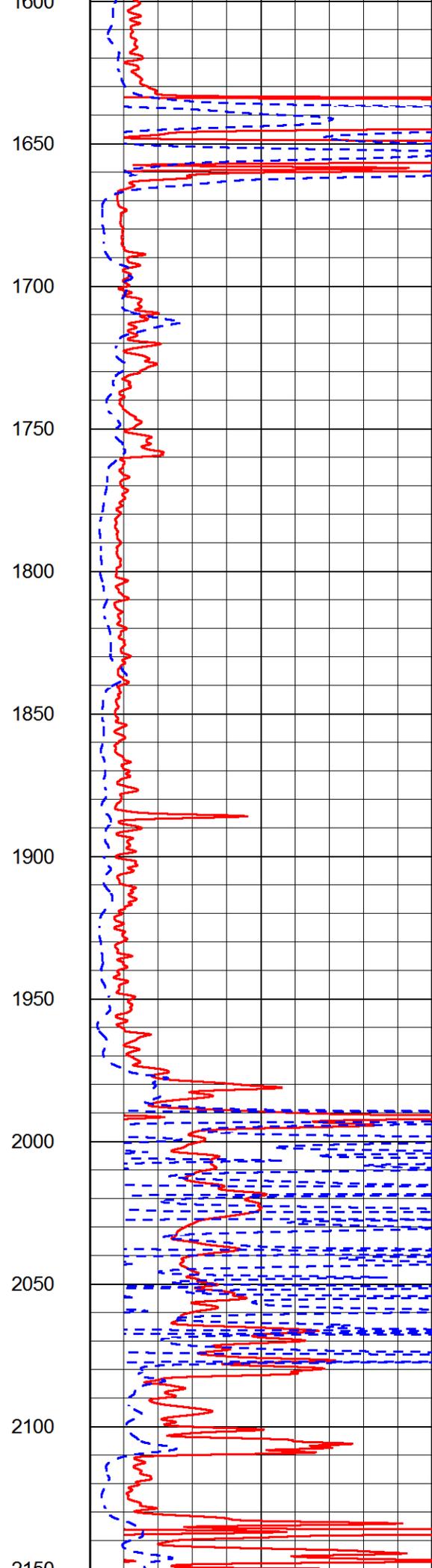
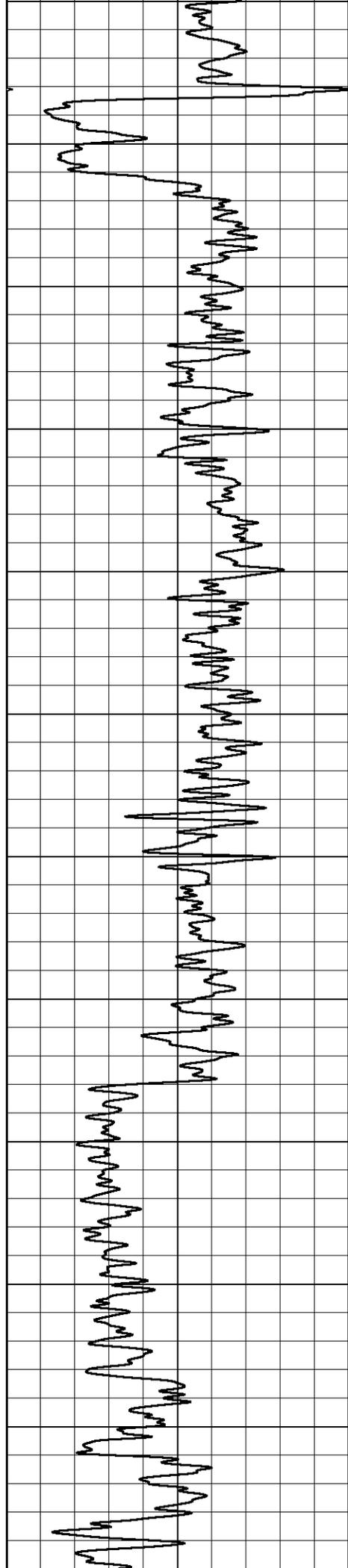
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 Presentation Format dil2in  
 Dataset Creation Fri Sep 13 18:03:42 2019  
 Charted by Depth in Feet scaled 1:600

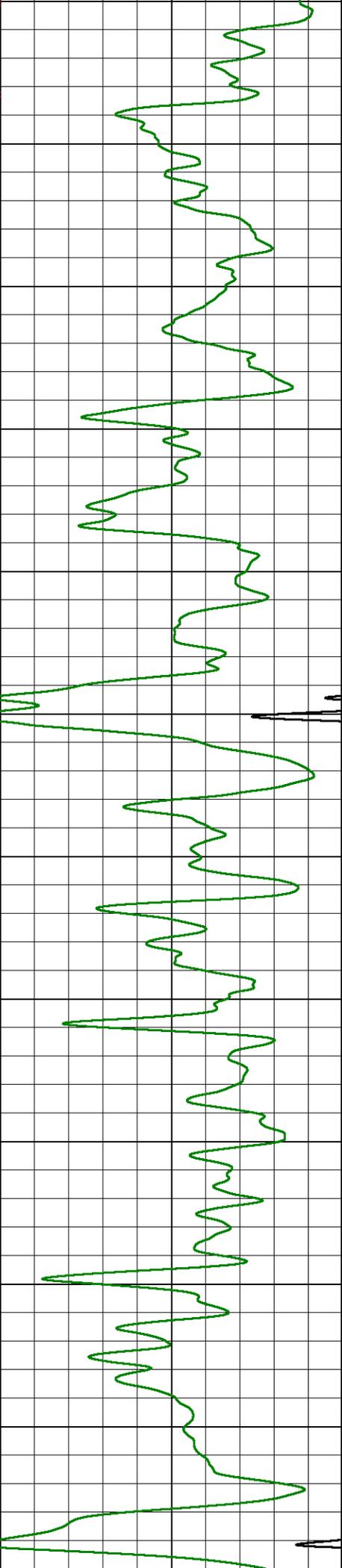
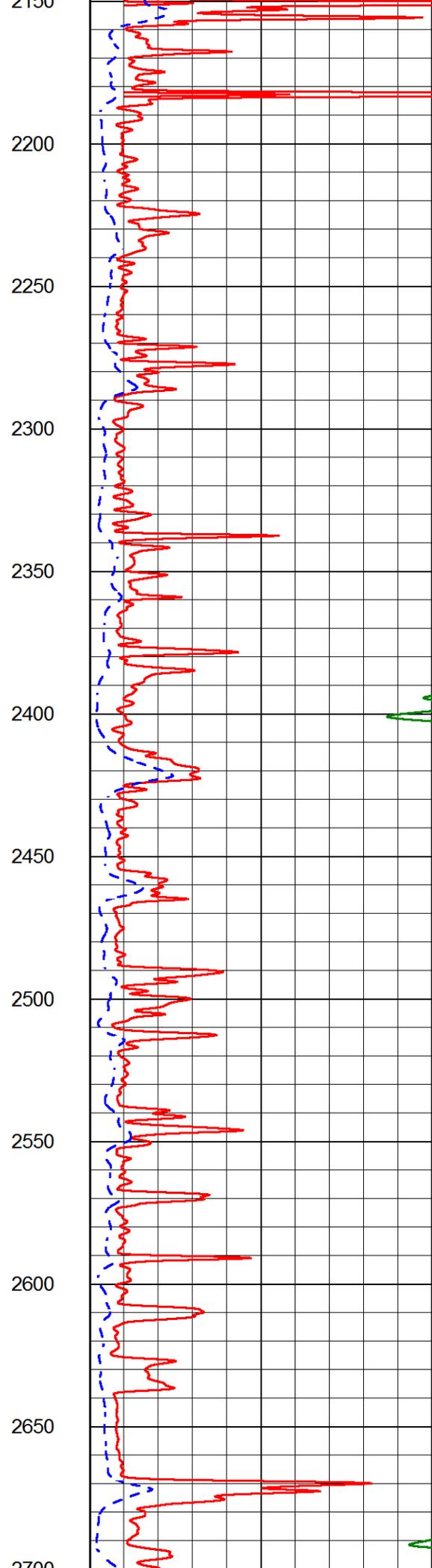
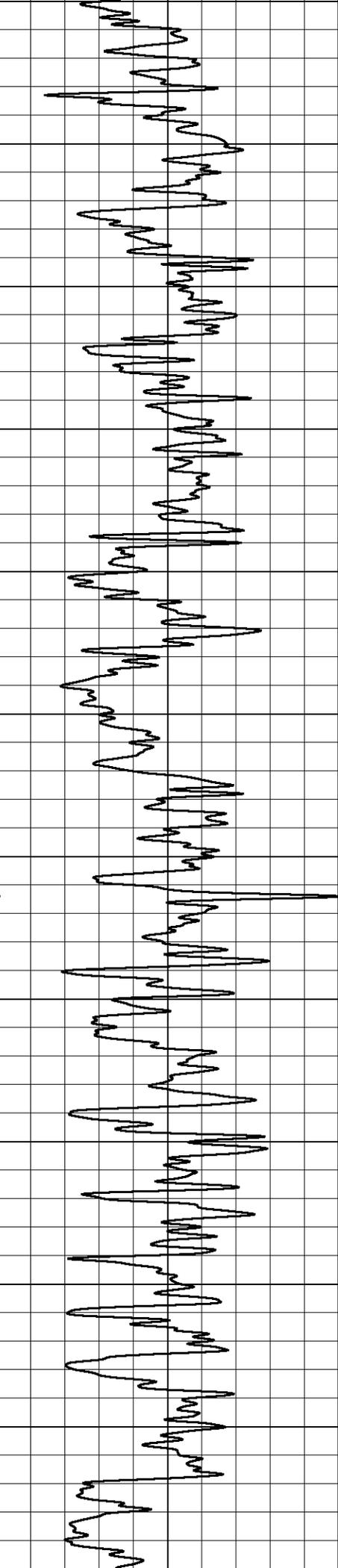
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			0	RLL3 (Ohm-m)	50
			0	DEEP RESISTIVITY (Ohm-m)	50
			50	RLL3 (Ohm-m)	200
			50	RILD (Ohm-m)	200

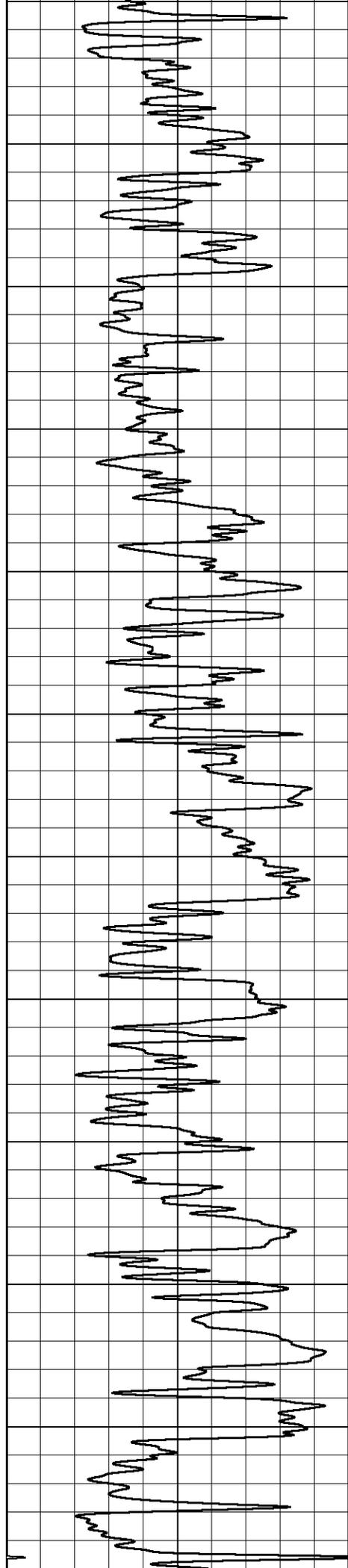




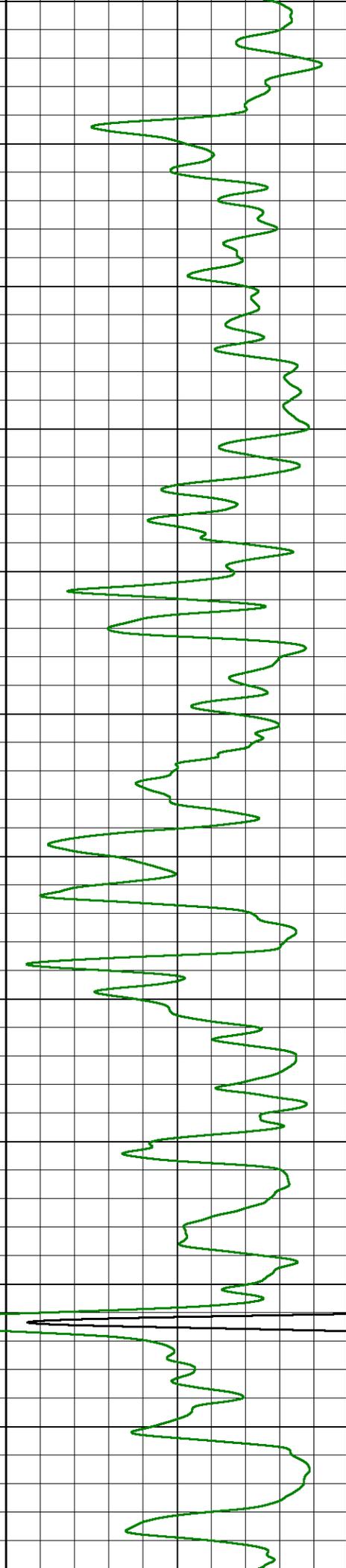
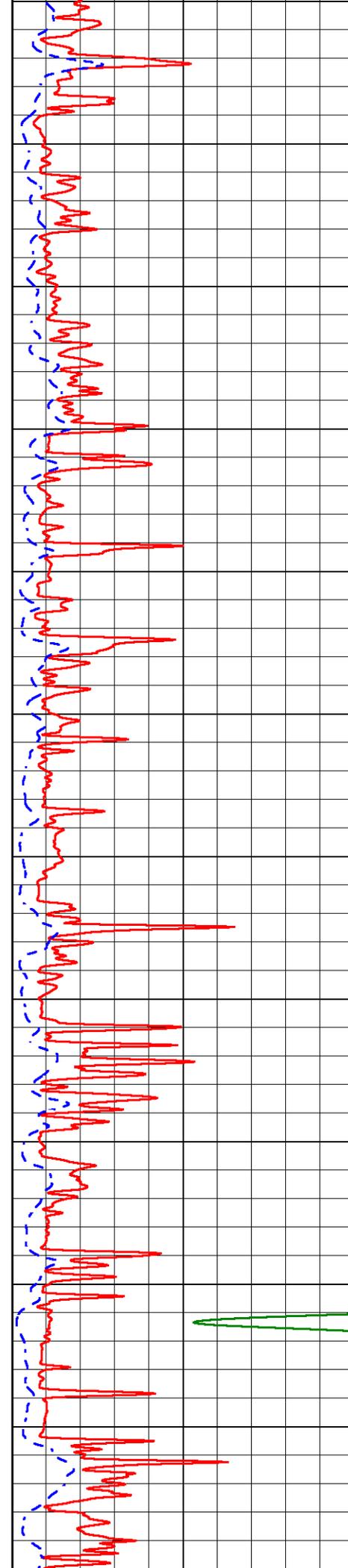


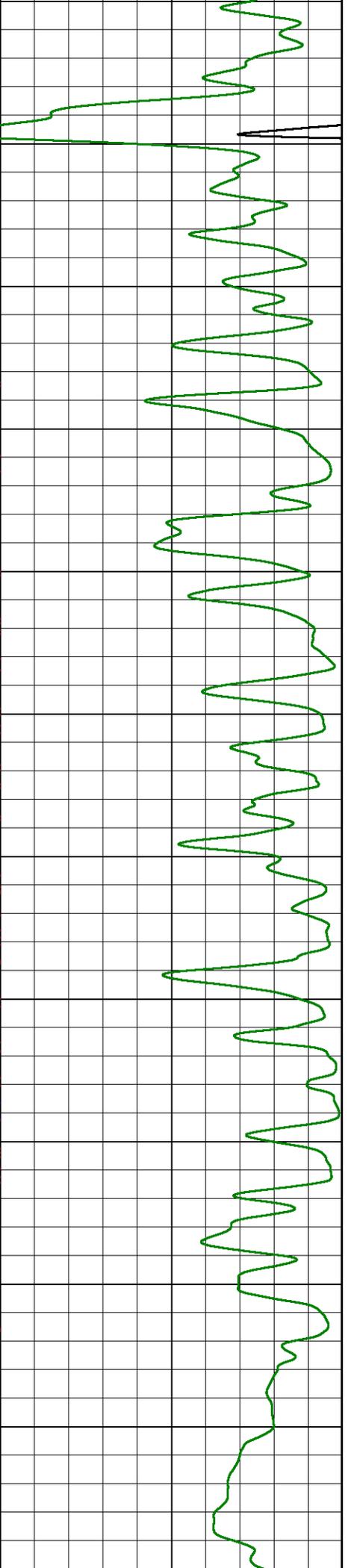
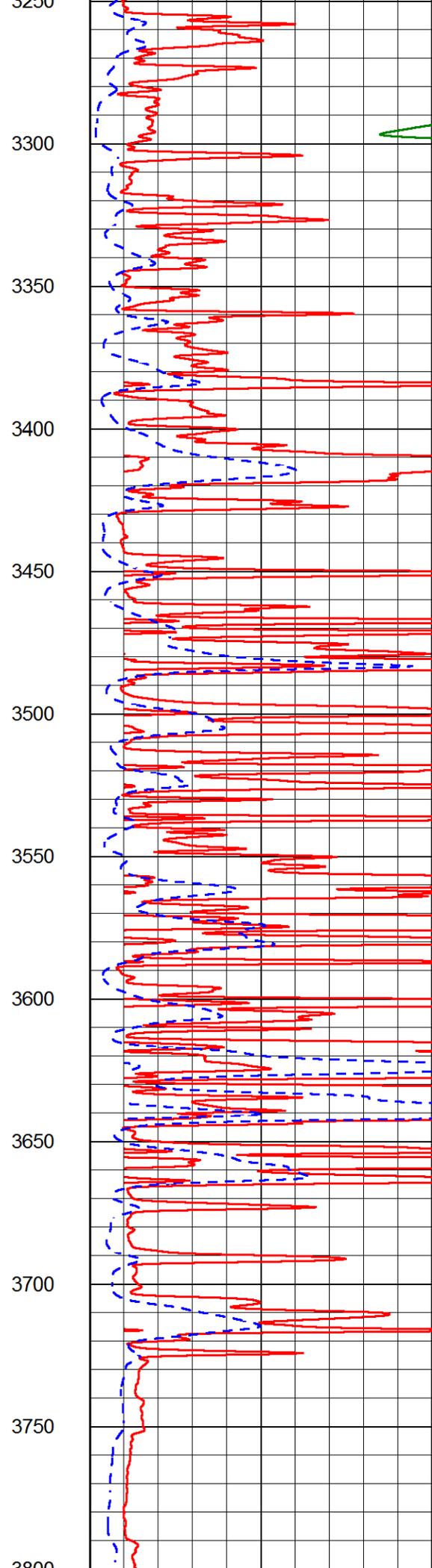
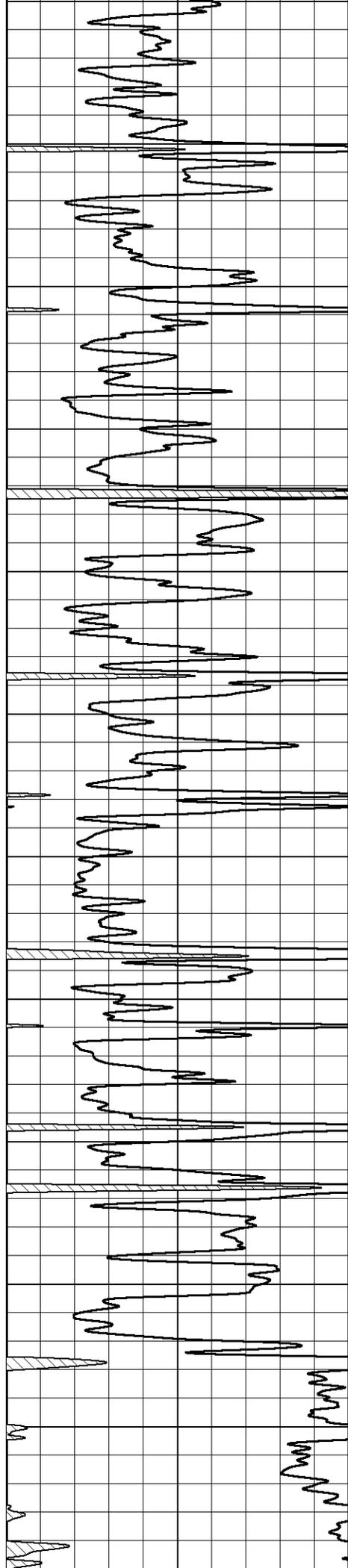


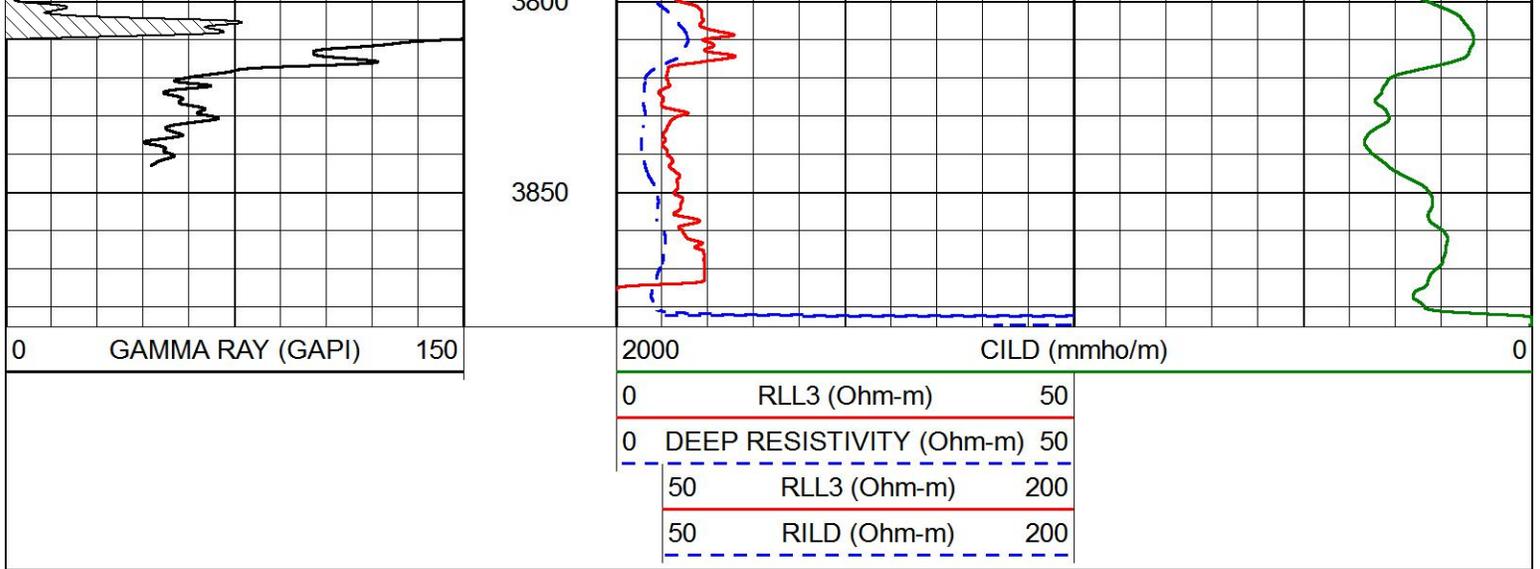




2700  
2750  
2800  
2850  
2900  
2950  
3000  
3050  
3100  
3150  
3200  
3250



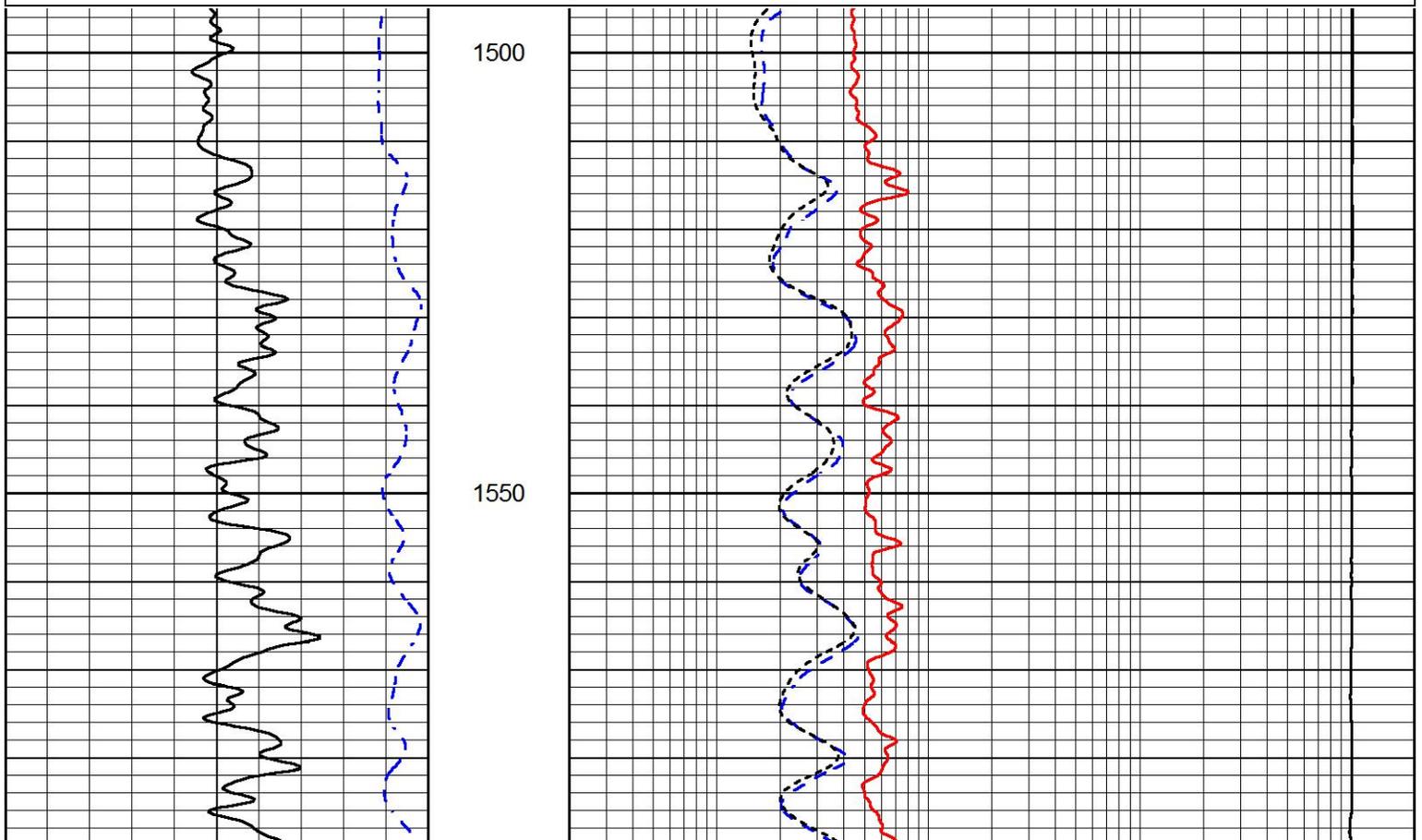


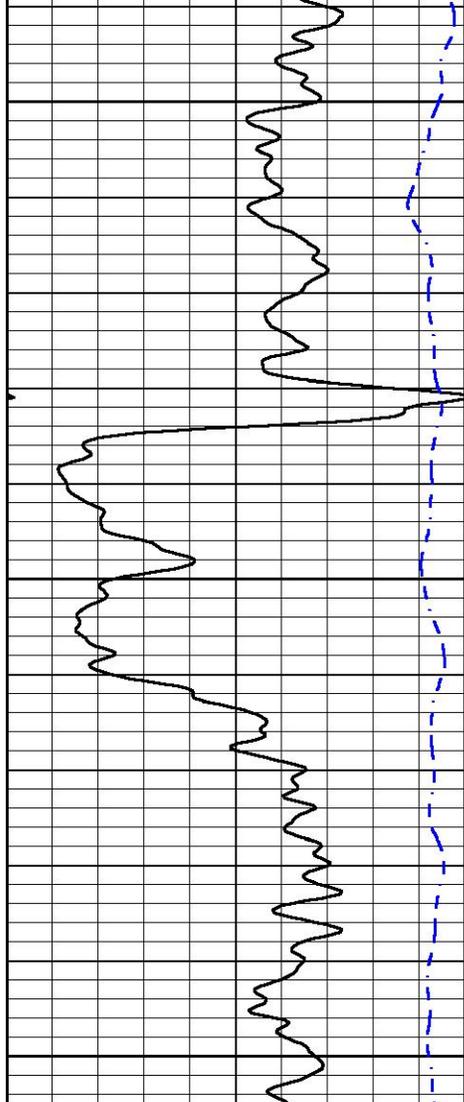


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 Presentation Format    dil  
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 Charted by            Depth in Feet scaled 1:240

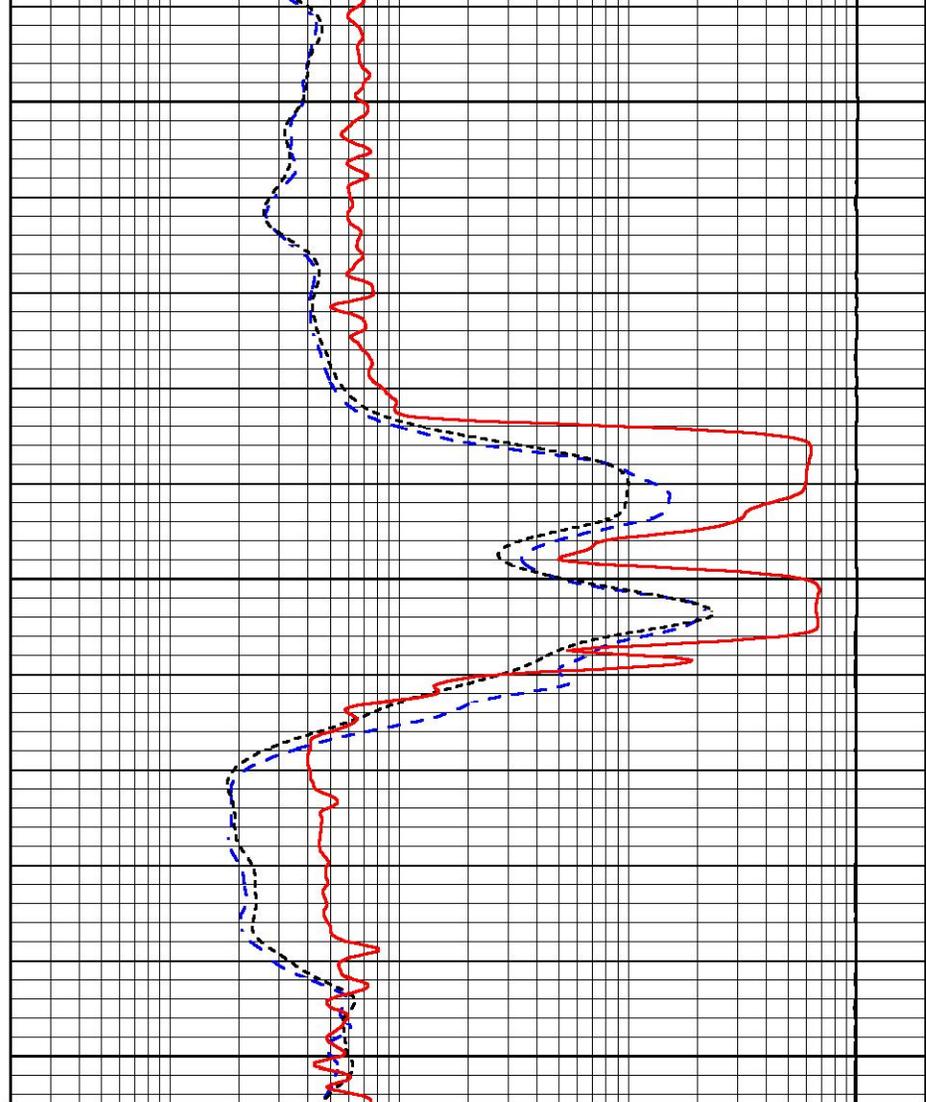
0	GAMMA RAY (GAPI)	150	0.2	DEEP RESISTIVITY (Ohm-m)	2000
-200	SP (mV)	0	0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
			0.2	RLL3 (Ohm-m)	2000
			15000	LINE TENSION (lb)	0





1600  
1650  
1700

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

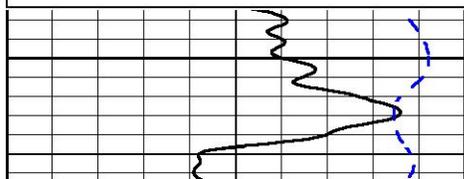


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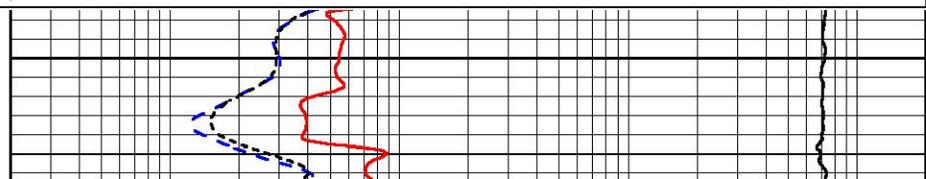
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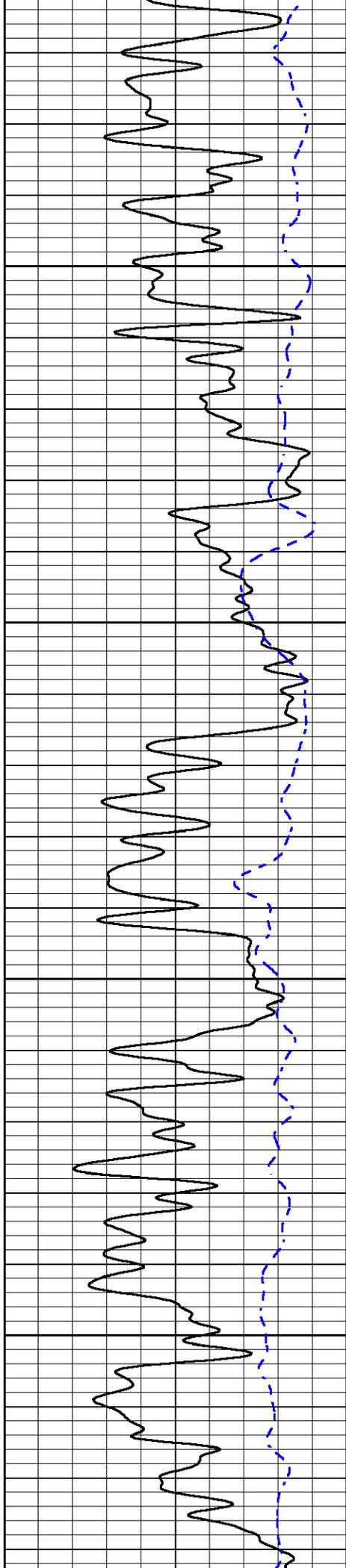
0	GAMMA RAY (GAPI)	150
-200	SP (mV)	0

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



2900



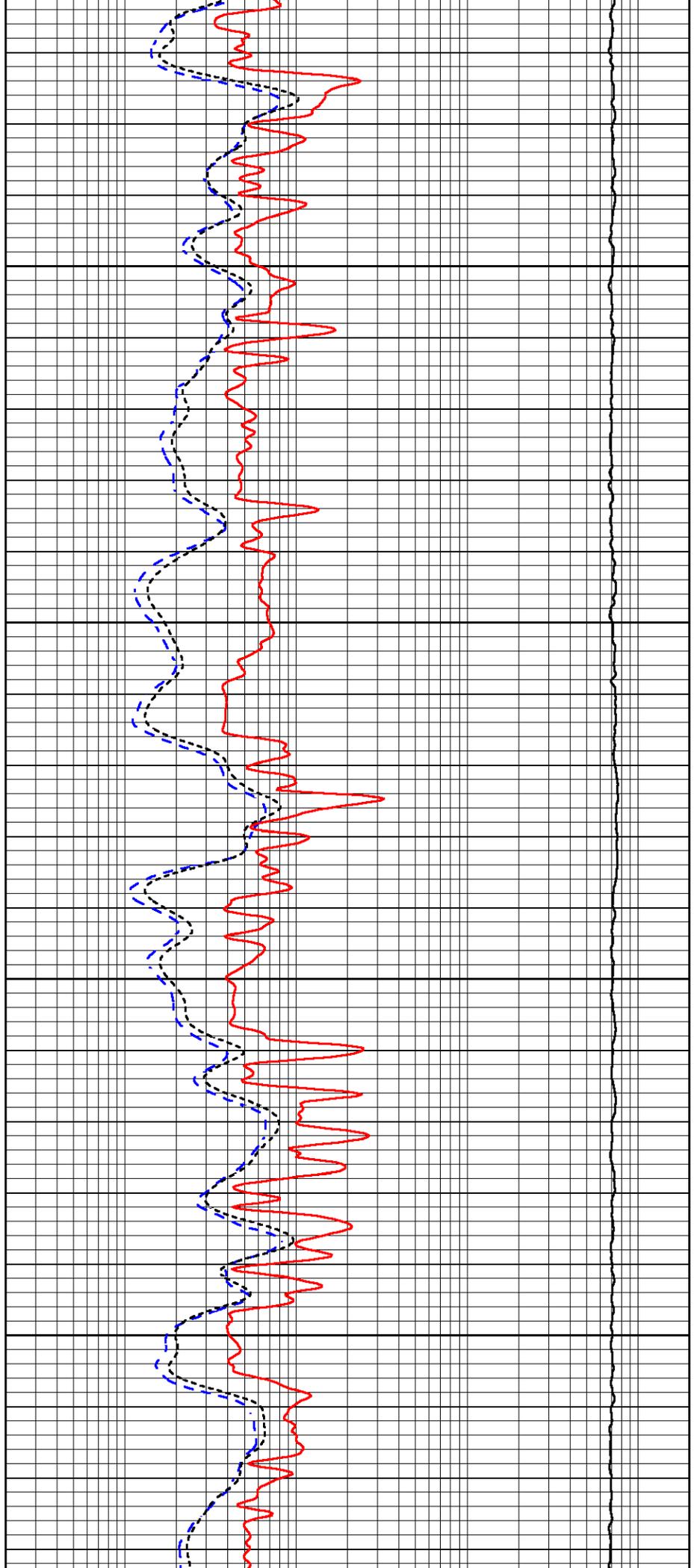


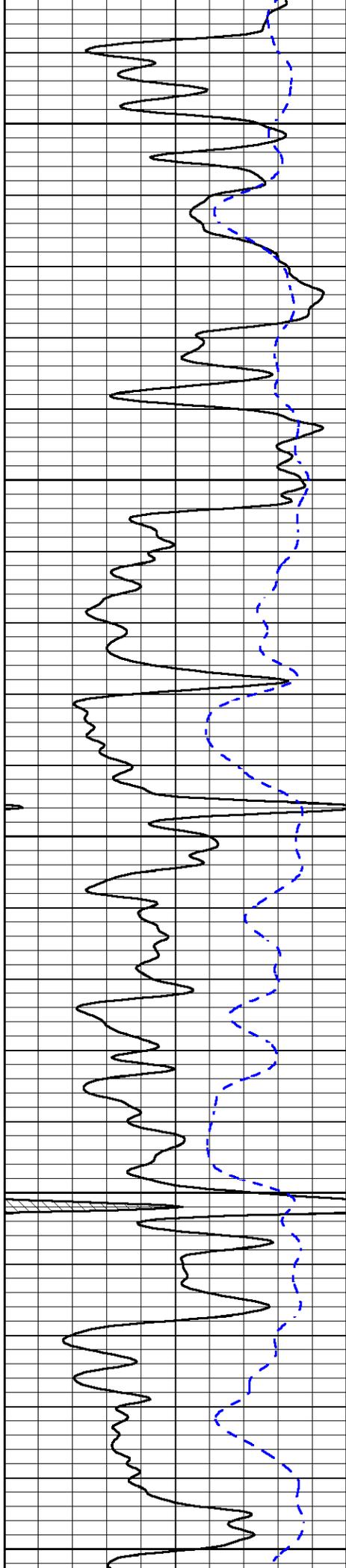
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3000

3050

3100





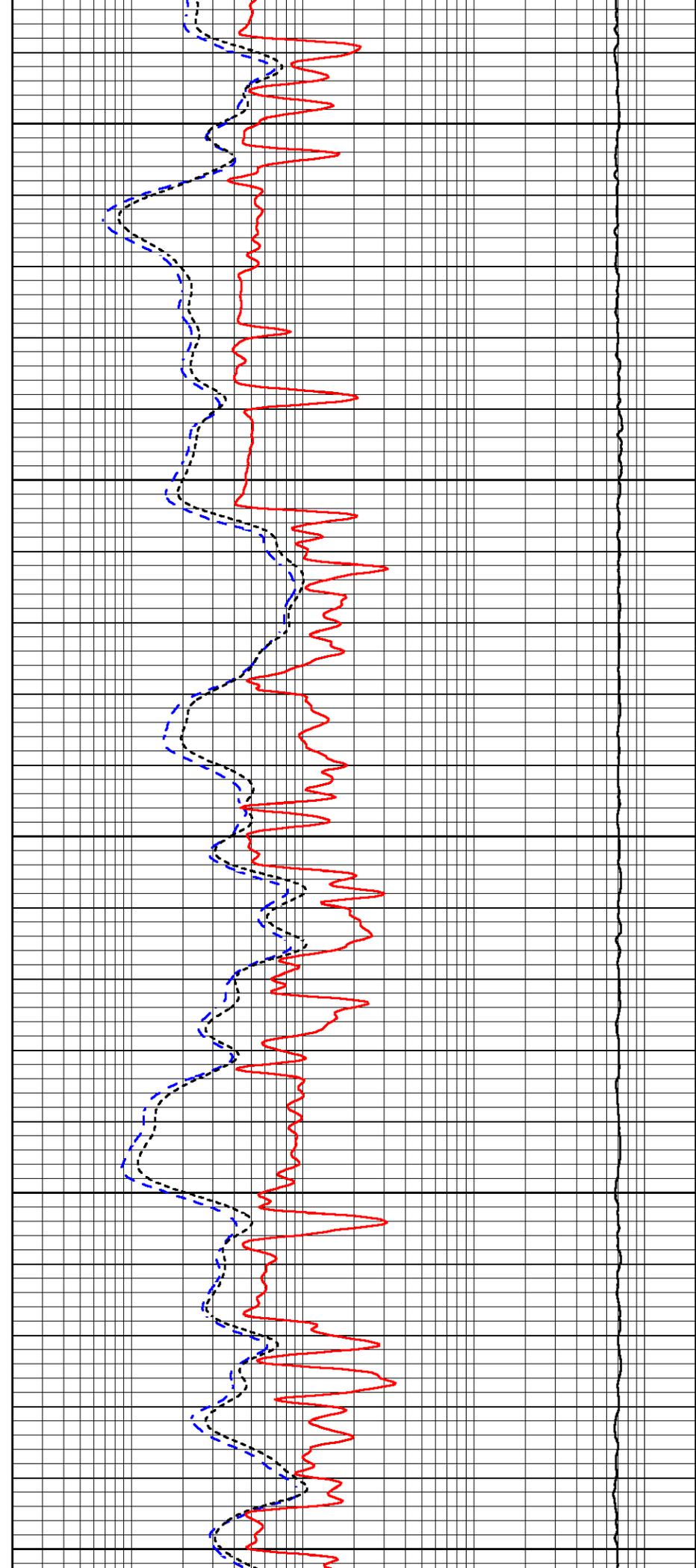
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3200

3250

3300

3350



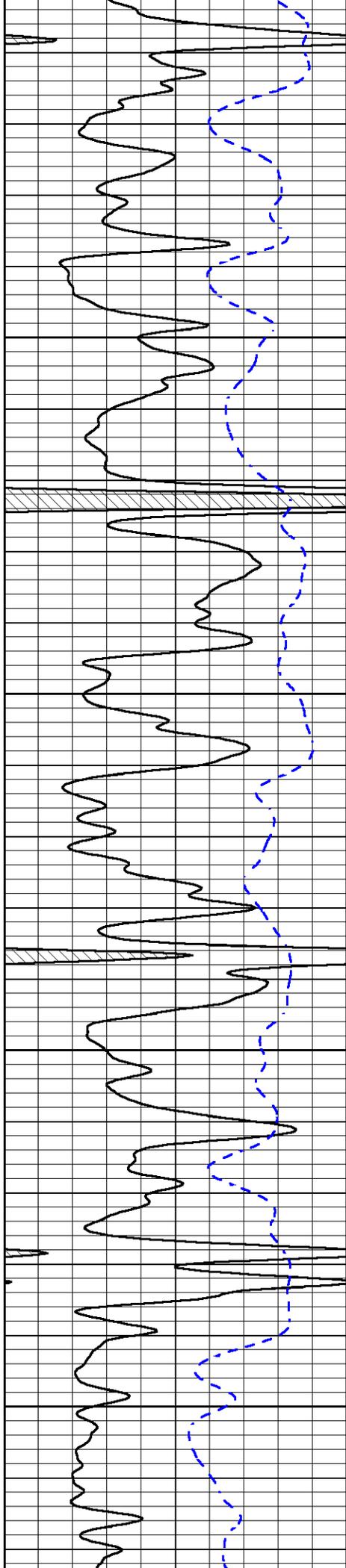
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3200

3250

3300

3350

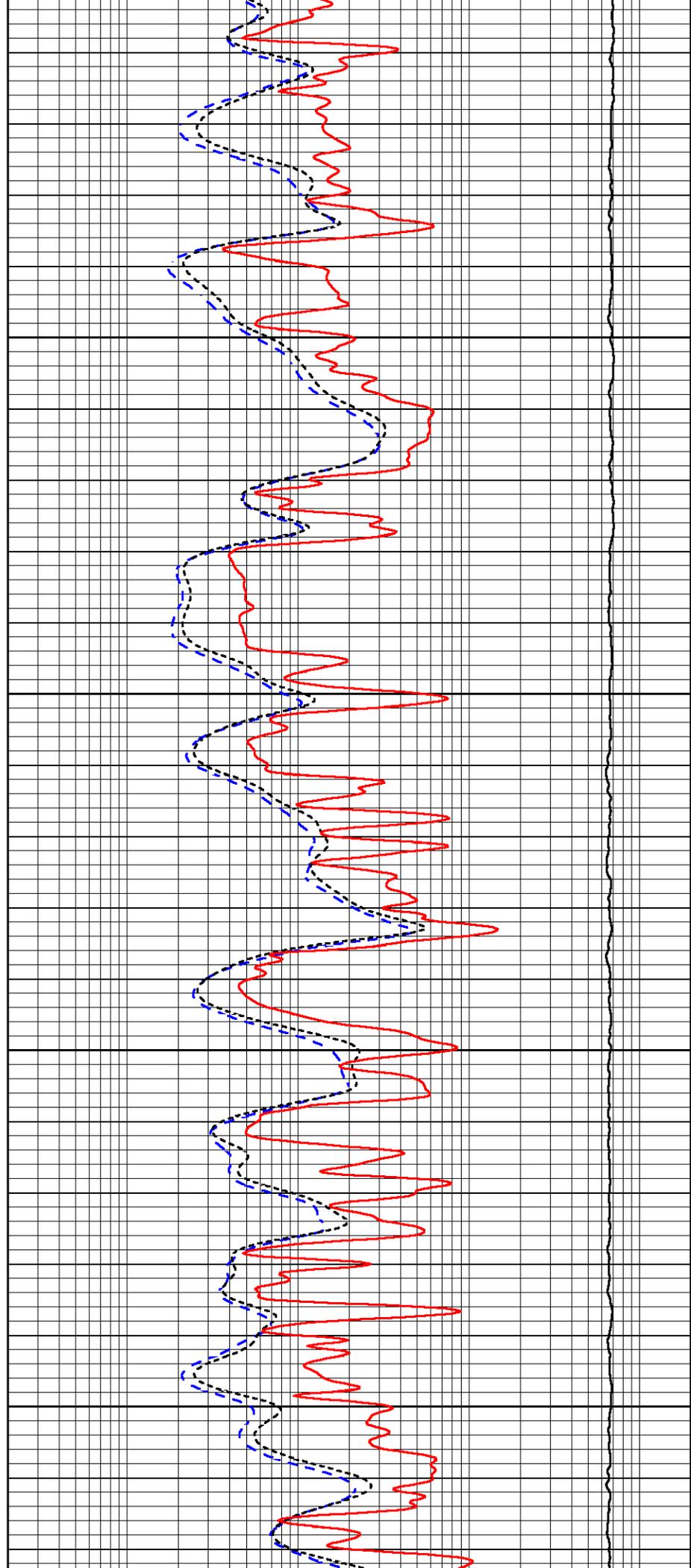


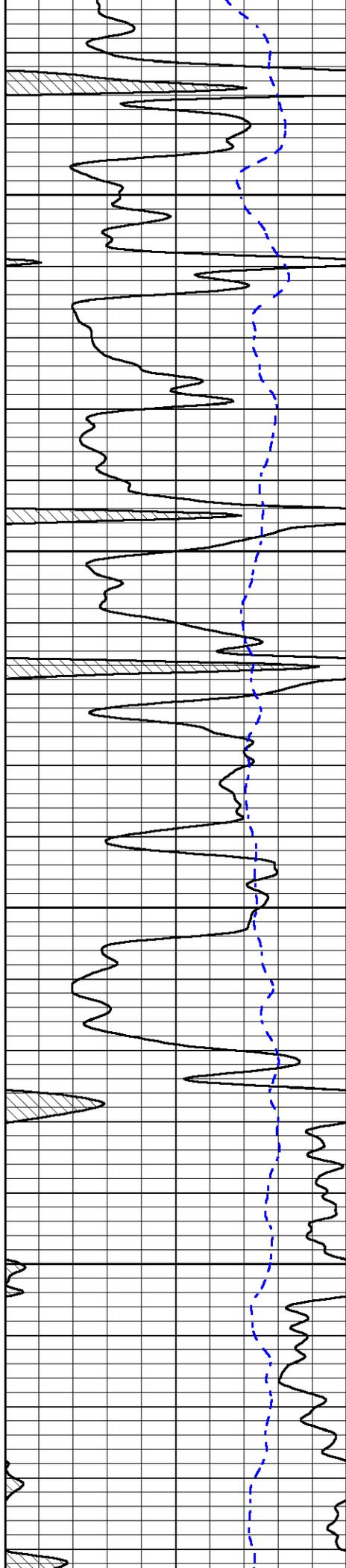
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3450

3500

3550



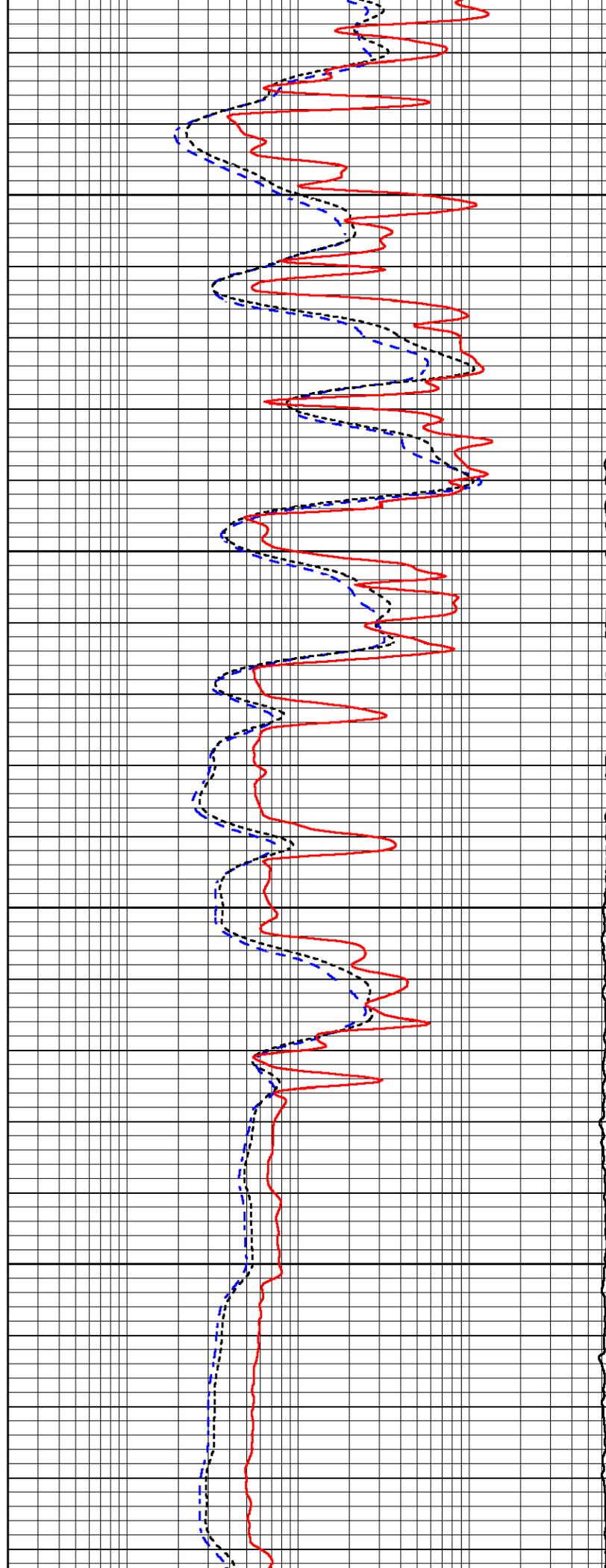


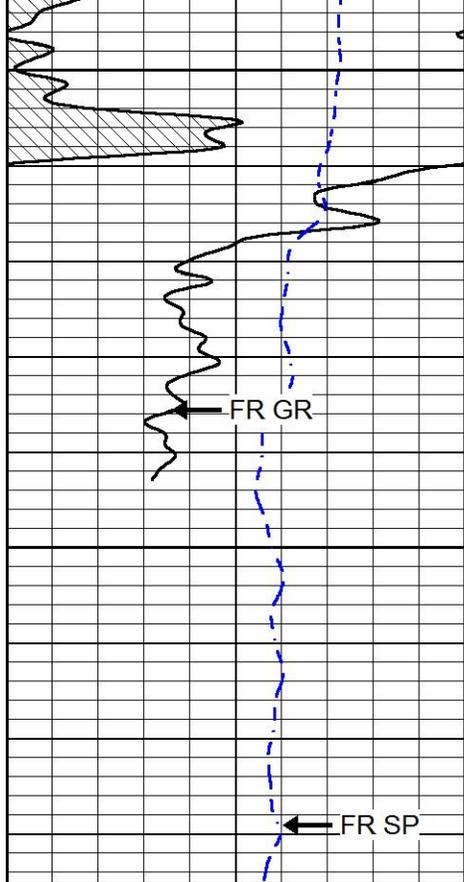
3600

3650

3700

3750

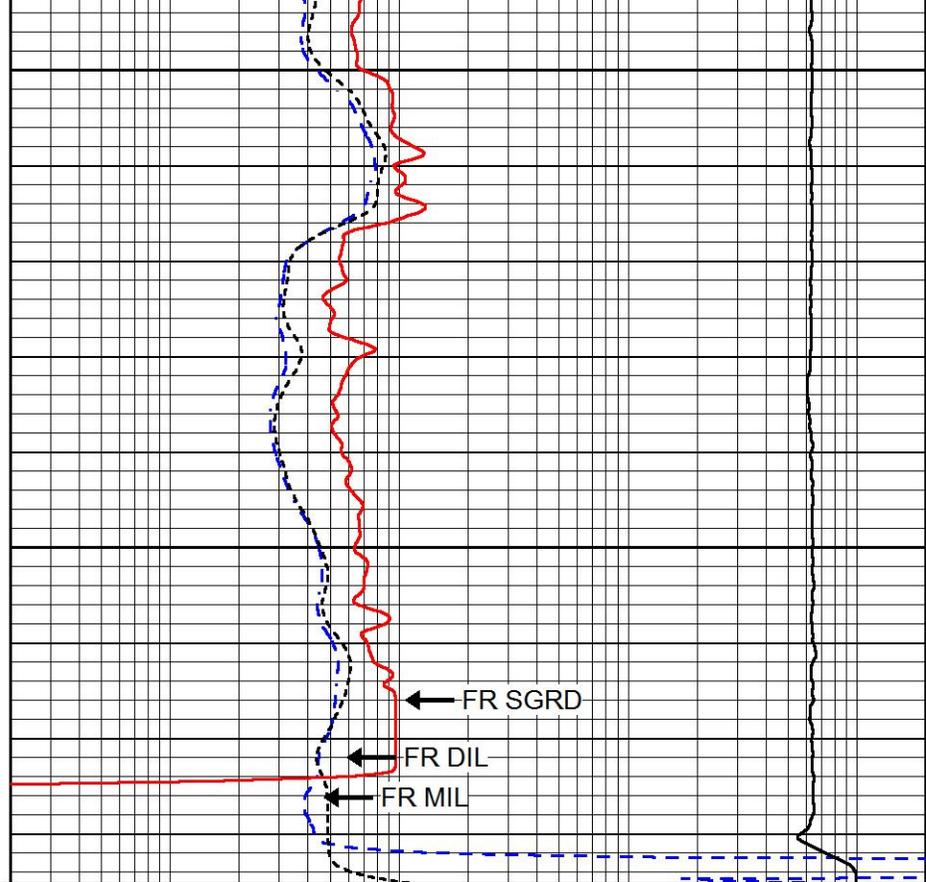




3800

3850

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

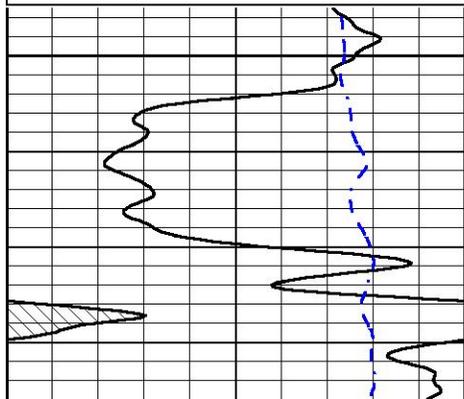


# REPEAT SECTION

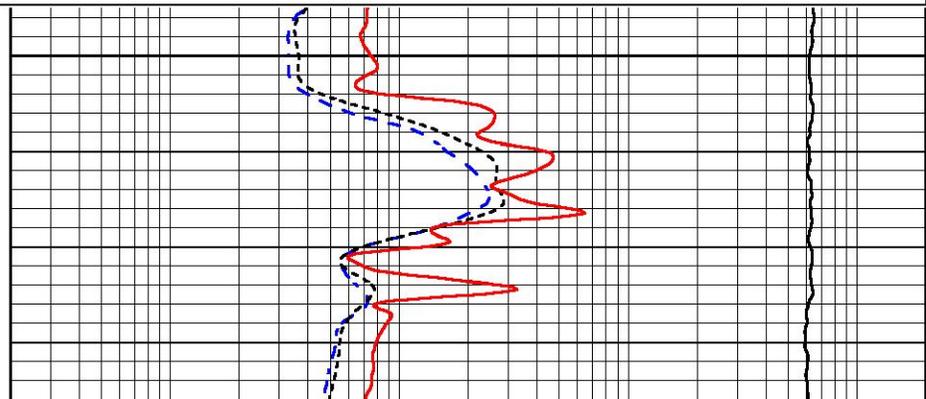
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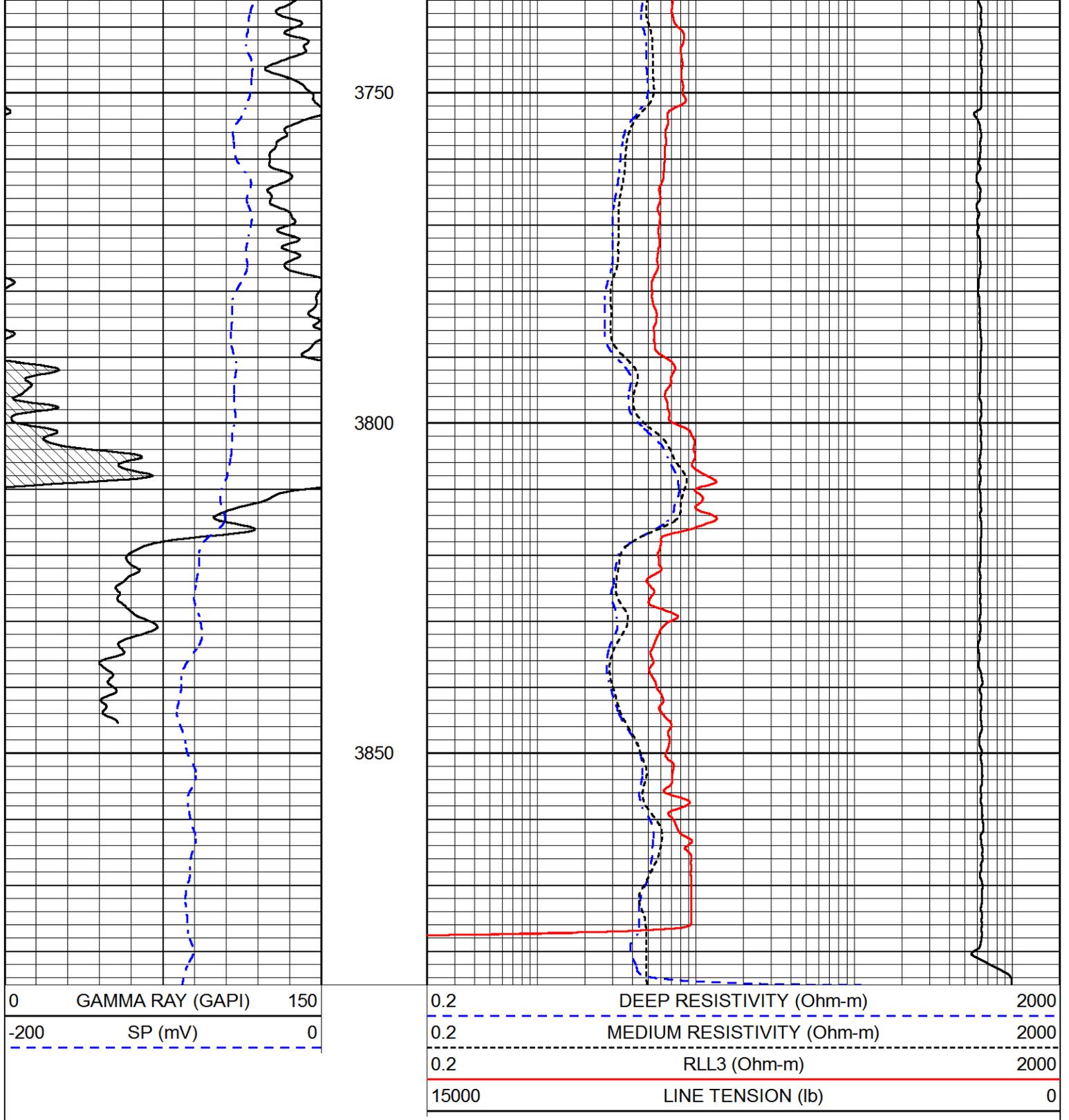
0	GAMMA RAY (GAPI)	150
-200	SP (mV)	0

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



3700





Calibration Report

Database File      bowman\_eunice\_berland\_1.db  
Dataset Pathname      stackml/pass3.1  
Dataset Creation      Fri Sep 13 18:03:42 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

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	0.380	-17.000

### Microlog Calibration Report

Serial-Model: UDM-01-PSI UDM ML  
 Performed: Fri May 31 06:10:42 2019

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	25000.0000	0.0000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	23000.0000	0.0000
Caliper	1.3409	1.3109	8.0000	22.0000	in	-466.5090	619.5500

### Compensated Density Calibration Report

Serial-Model: 979-229-M&W  
 Source / Verifier: 21170B /  
 Master Calibration Performed: Tue Jul 23 10:17:03 2019

#### Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	7680.82	9959.08	cps
Aluminum	2.690	g/cc	1424.07	6427.19	cps
Spine Angle = 75.43			Density/Spine Ratio = 0.537		
	Size		Reading		
Small Ring	4.00	in	1.15		
Large Ring	16.00	in	1.03		

### 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	BOWMAN OIL COMPANY
Well	EUNICE BERLAND #1
Field	BERLAND EAST
County	ROOKS
State	KANSAS