



# DUAL INDUCTION LOG

Company ELK ENERGY HOLDINGS, LLC  
 Well SHEPHERD NO.2-14  
 Field NOLLETTE SOUTHEAST  
 County THOMAS  
 State KANSAS

Company ELK ENERGY HOLDINGS, LLC  
 Well SHEPHERD NO.2-14  
 Field NOLLETTE SOUTHEAST  
 County THOMAS State KANSAS

Location: API #: 15-193-21072-00-00  
 2310' FSL & 2310' FEL  
 SEC 14 TWP 10S RGE 33W  
 Permanent Datum GROUND LEVEL Elevation 3138'  
 Log Measured From KELLY BUSHING  
 Drilling Measured From KELLY BUSHING  
 Other Services  
 CNL/CDL  
 MEL  
 Elevation  
 K.B. 3146'  
 D.F. N/A  
 G.L. 3138'

Date	2/5/2020
Run Number	ONE
Depth Driller	4700'
Depth Logger	4700'
Bottom Logged Interval	4699'
Top Log Interval	300'
Casing Driller	8.625" @ 308'
Casing Logger	308'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	500
Density / Viscosity	9.4 59
pH / Fluid Loss	10 6.4
Source of Sample	FLOWLINE
Rm @ Meas. Temp	1.1 @ 60
Rmt @ Meas. Temp	.83 @ 60
Rmc @ Meas. Temp	1.49 @ 60
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.54 @ 123
Operating Rig Time	3 HOURS
Max Rec. Temp. F	123 DEG. F.
Equipment Number	P-108
Location	HAYS
Recorded By	M. HISS
Witnessed By	PAT DEENIHAN
	J. HENRICKSON

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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.

OAKLEY WEST EXIT,  
 NORTH TO F RD, WEST TO 23 RD, 1 SOUTH,  
 1/3 EAST, NORTH INTO

Log Measured From: KELLY BUSHING 8 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES  
[www.pioneerenergy.com](http://www.pioneerenergy.com) 785-625-3858

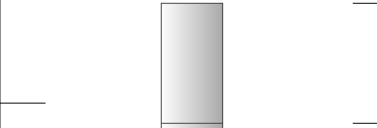
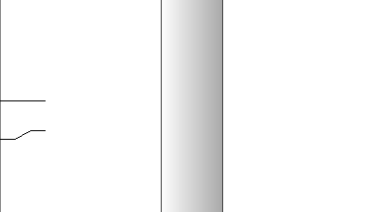
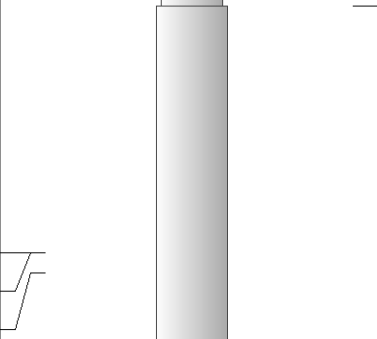
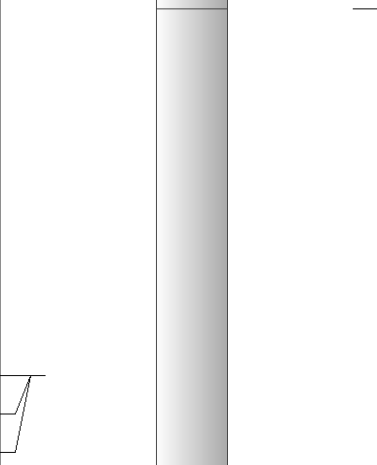
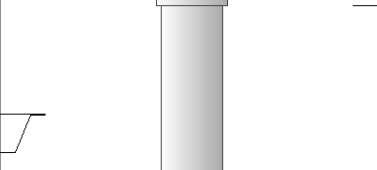
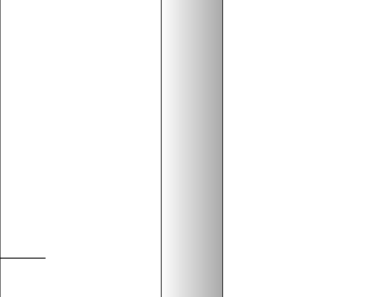
Your Pioneer Energy Services Crew	This Log Record Was Witnessed By
Engineer: M. HISS	Primary Witness: PAT DEENIHAN
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

# Log Variables

DatabaseC:\ProgramData\Warrior\Data\elk\_shepherd\_#2\_14.db  
Dataset field/well/stackmel/pass3.1/\_vars\_

## Top - Bottom

A	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	FLUIDDEN g/cc	M	MATRXDEN g/cc
1	7.875	123	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	295	50	Off	0

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 (934-229)	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 (55-222)	18.50	3.50	220.00

CILM 4.70

SP 0.20

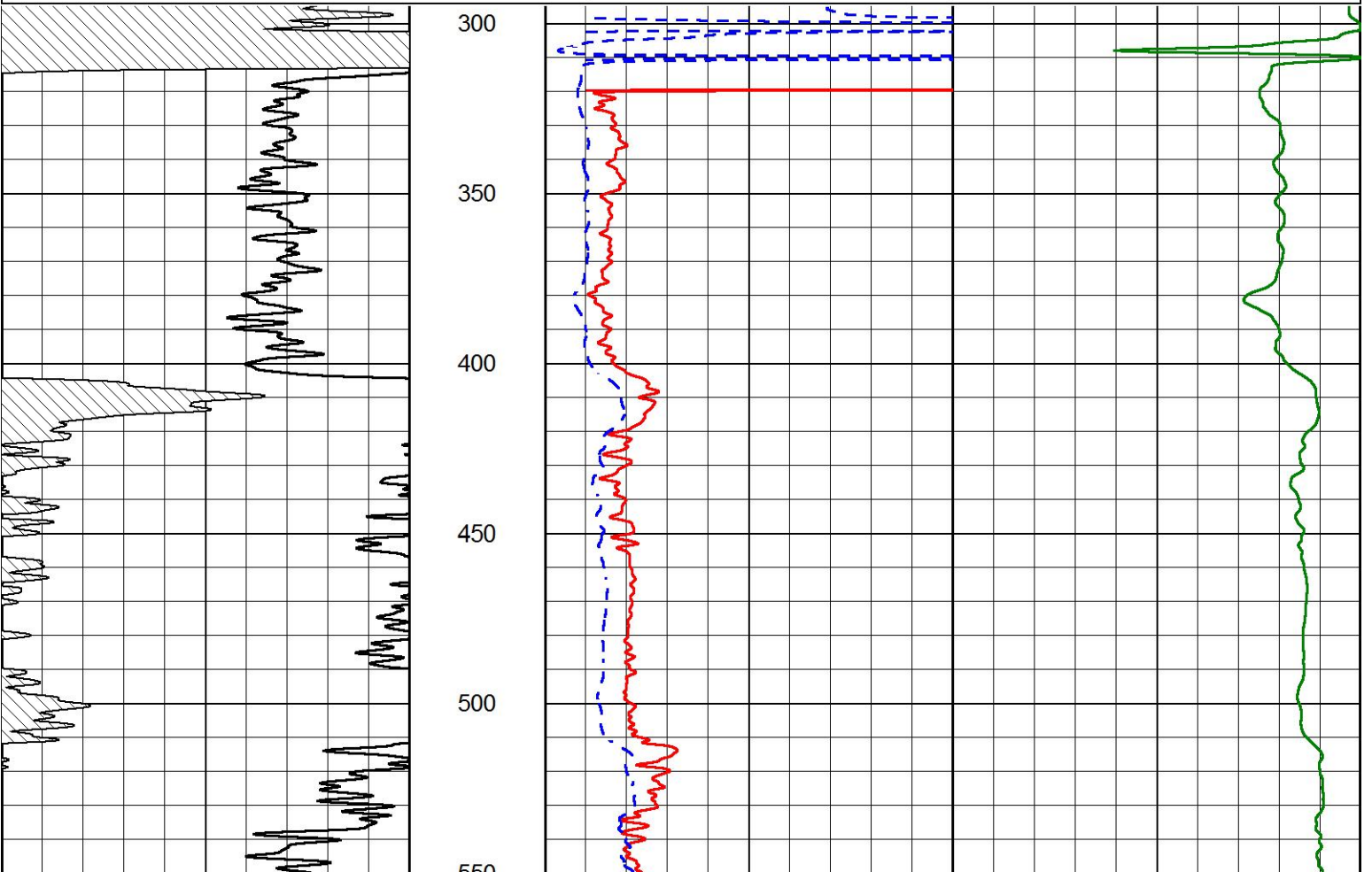
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 Total length: 47.00 ft  
 Total weight: 835.00 lb  
 O.D.: 4.00 in

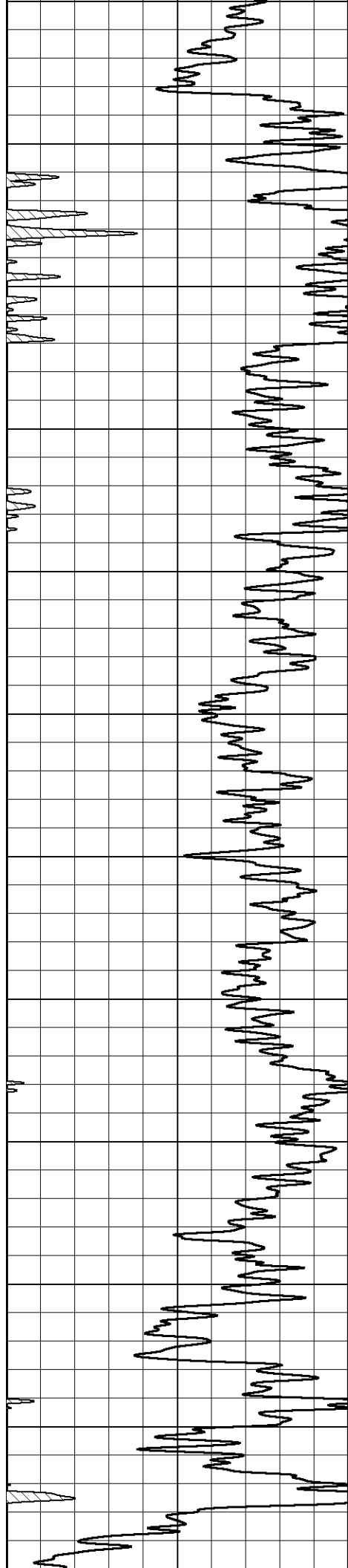


# MAIN PASS

Database File elk\_shepherd\_#2\_14.db  
 Dataset Pathname stackmel/pass3.1  
 Presentation Format dil2in  
 Dataset Creation Wed Feb 05 23:58:26 2020  
 Charted by Depth in Feet scaled 1:600

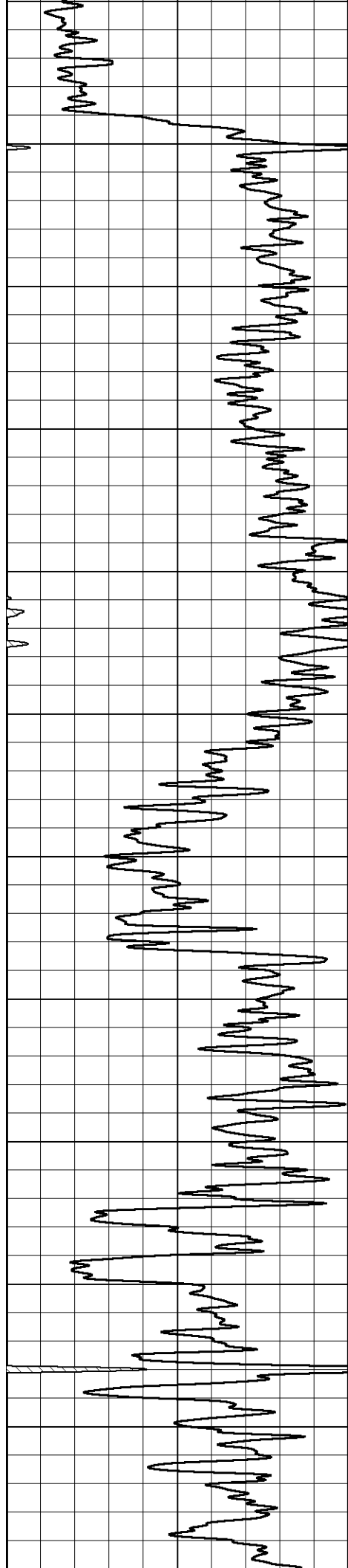
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			0	RLL3 (Ohm-m)	50
			0	DEEP RESISTIVITY (Ohm-m)	50
			50	RLL3 (Ohm-m)	200
			50	RILD (Ohm-m)	200



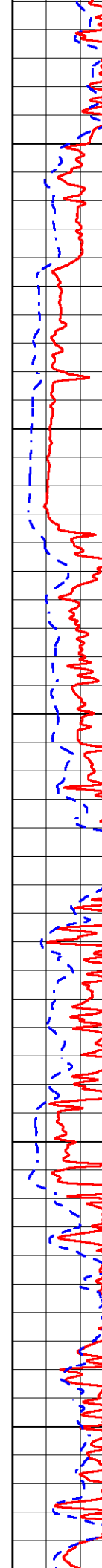


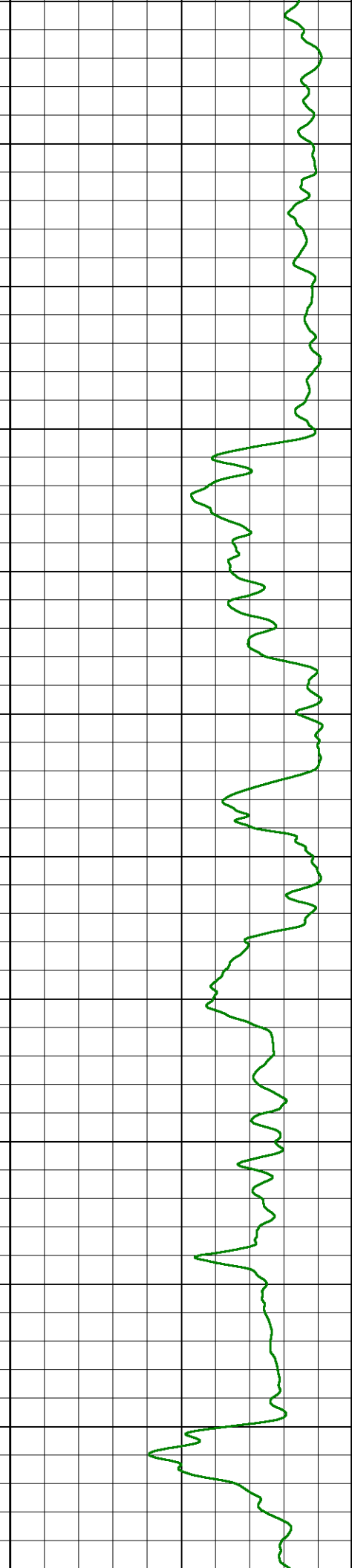
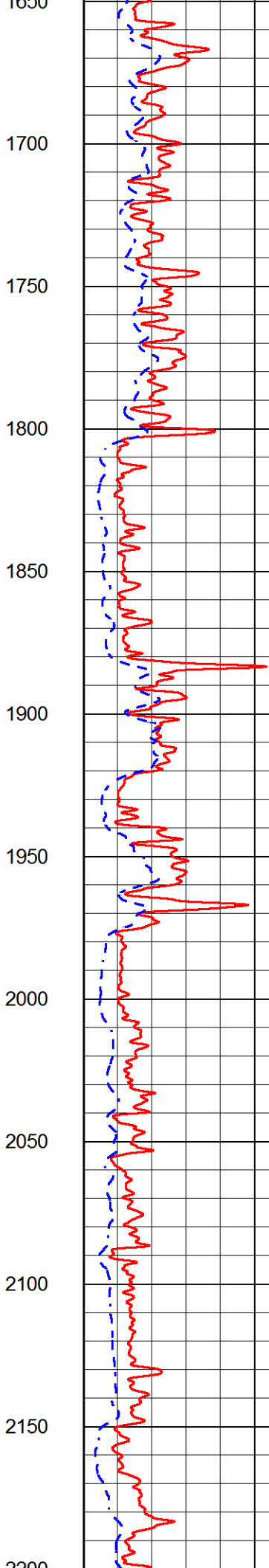
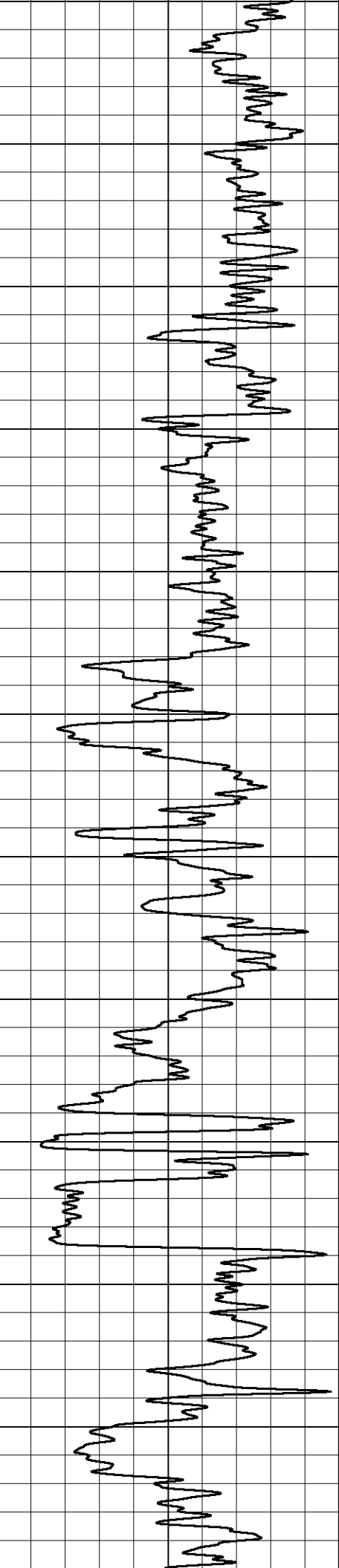
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1000  
1050  
1100

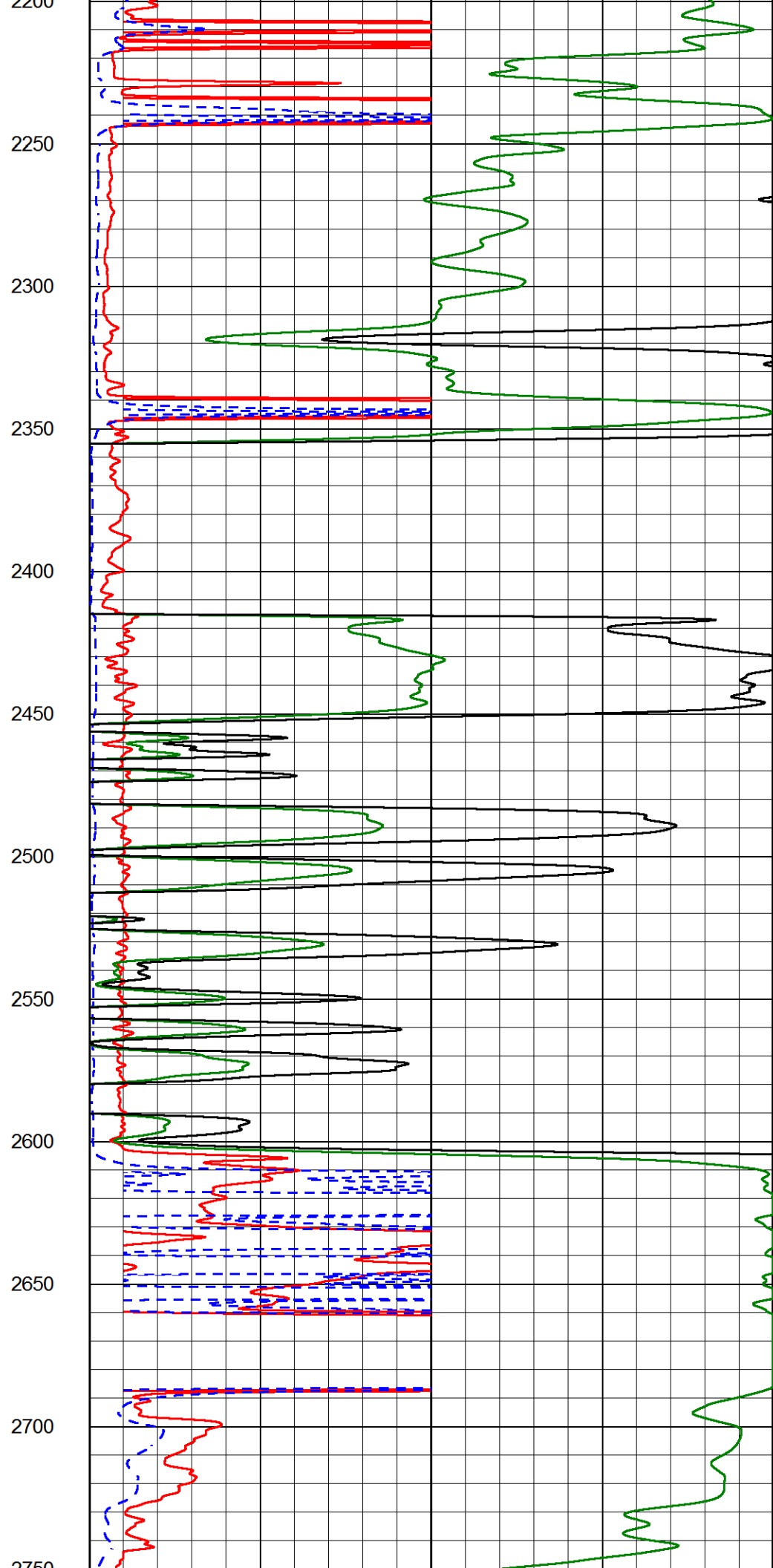
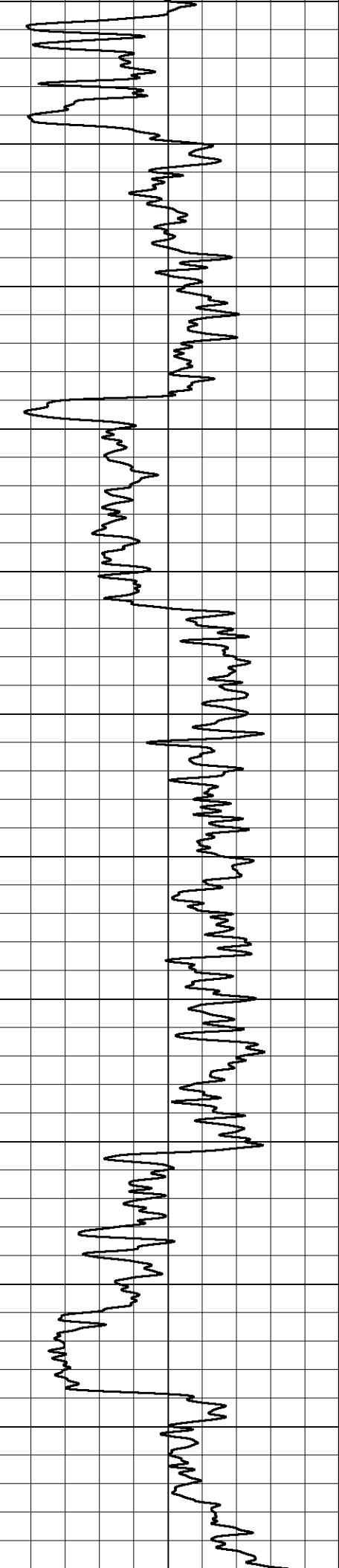


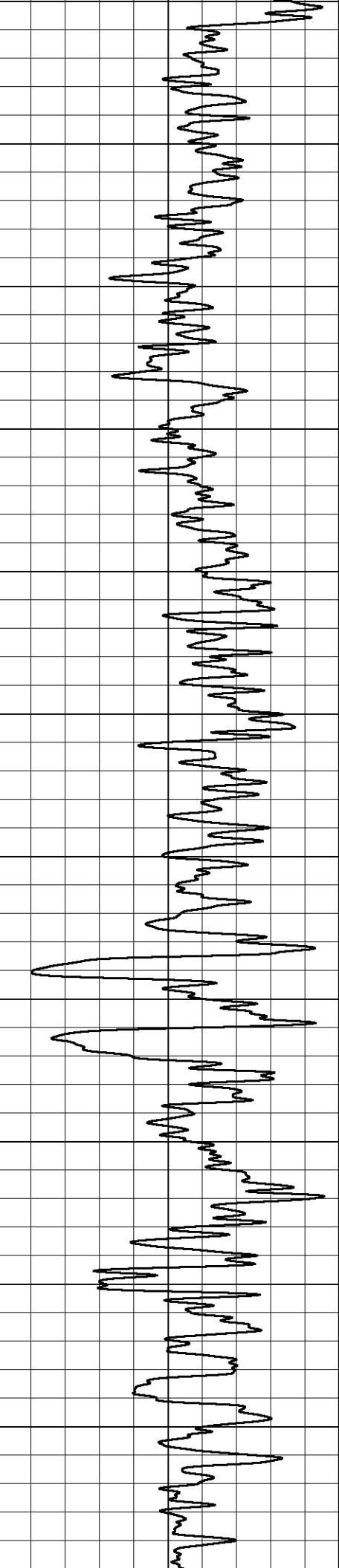


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1500  
1550  
1600  
1650

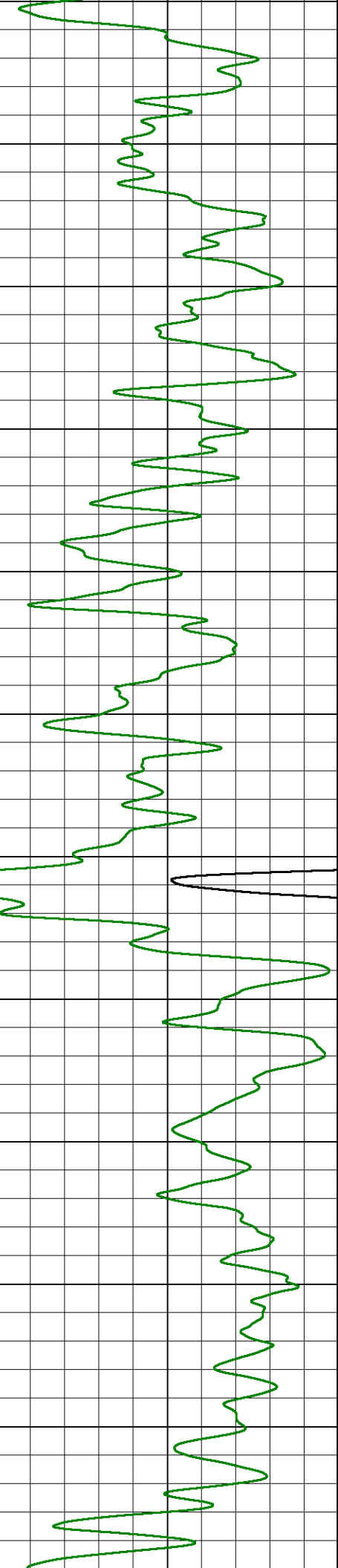
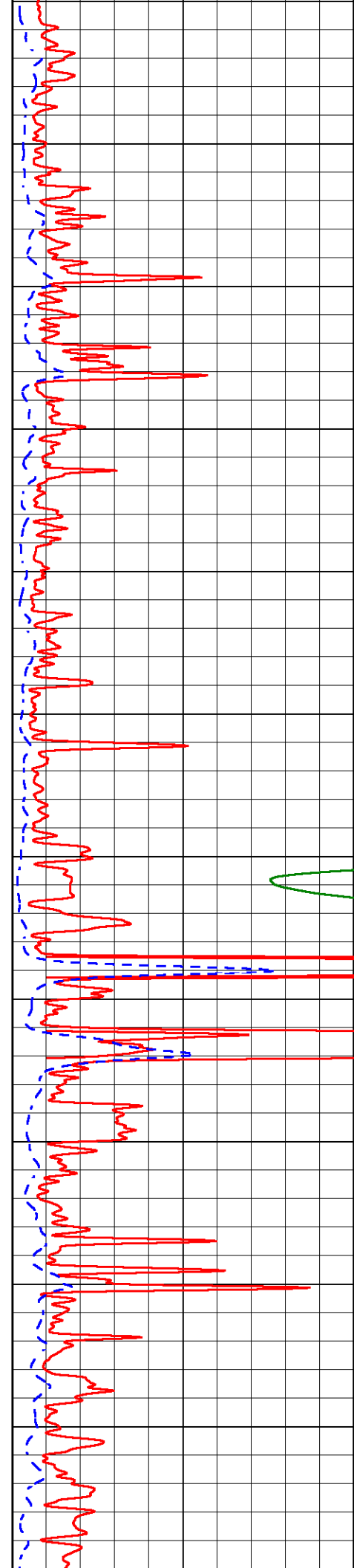


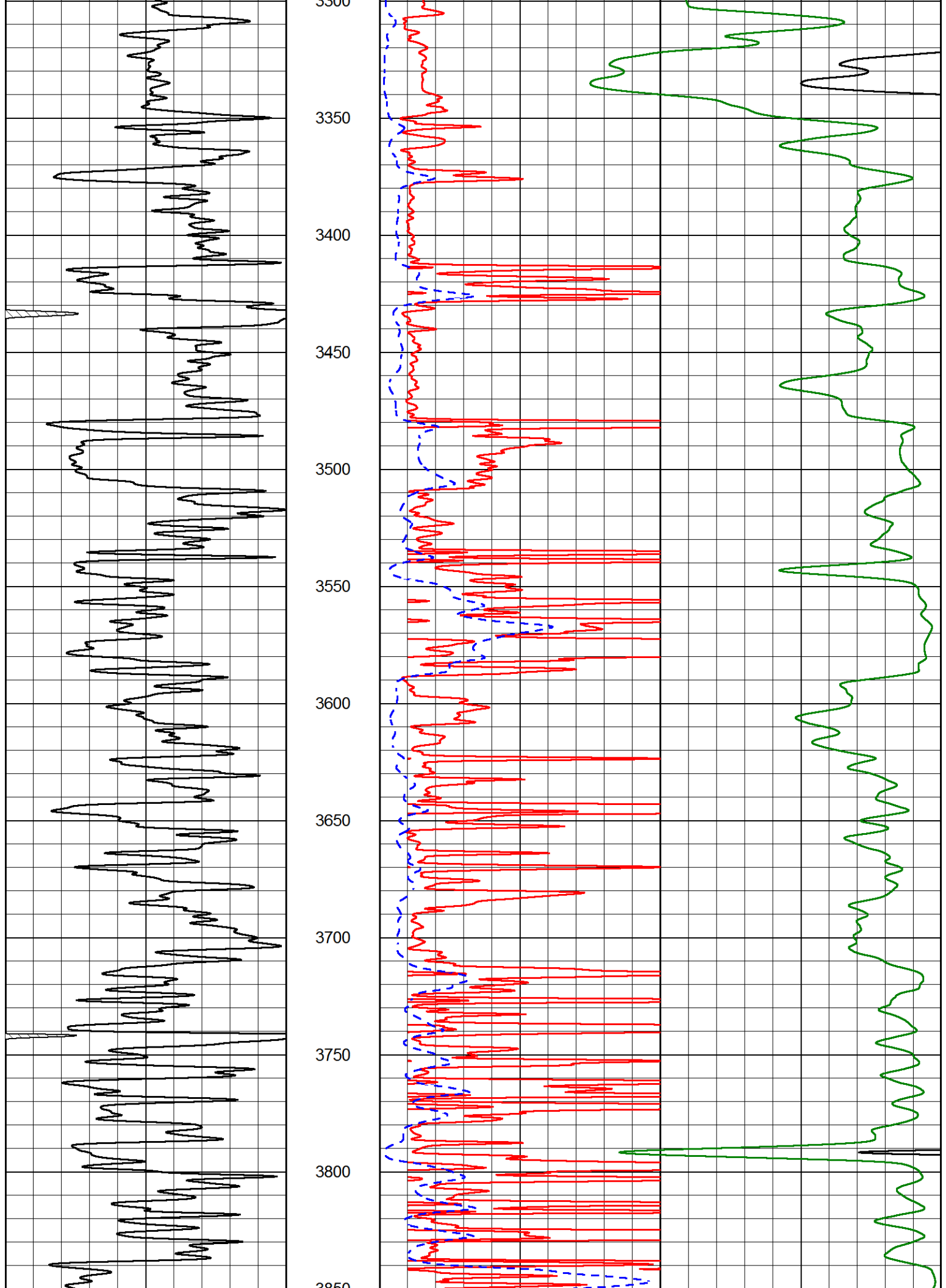


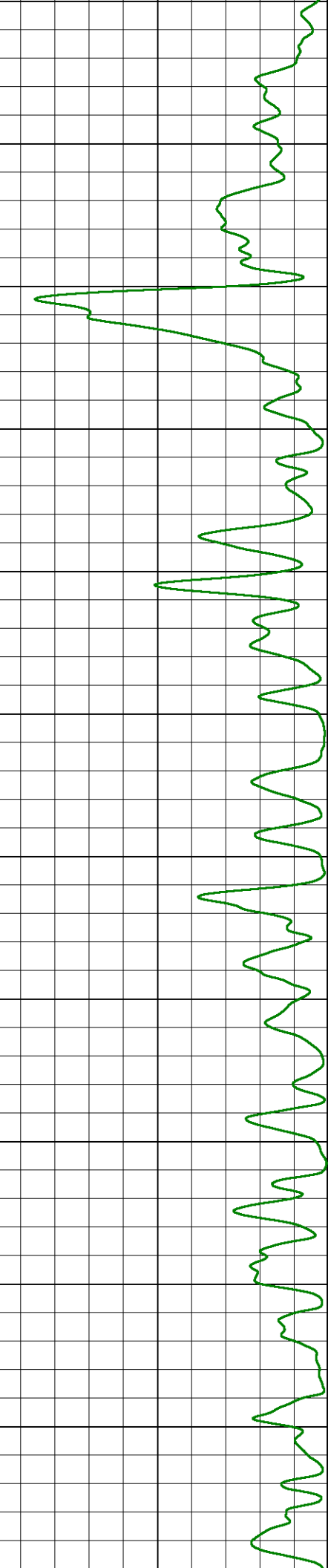
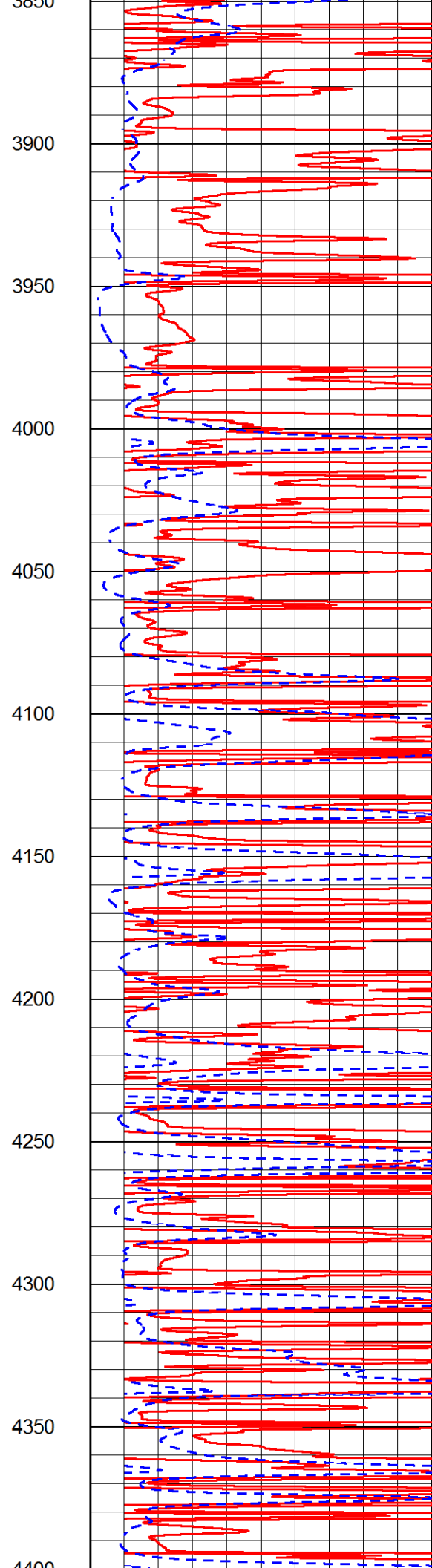
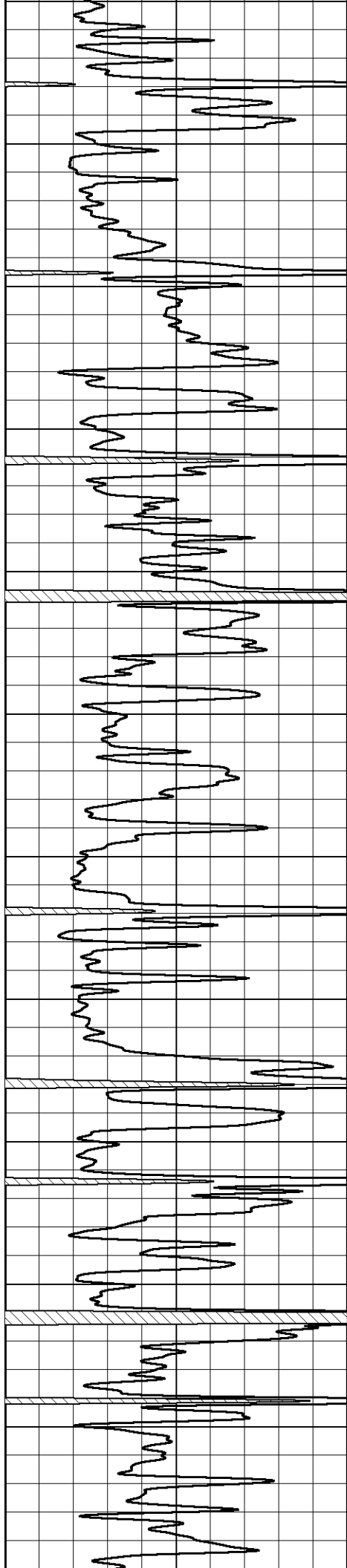


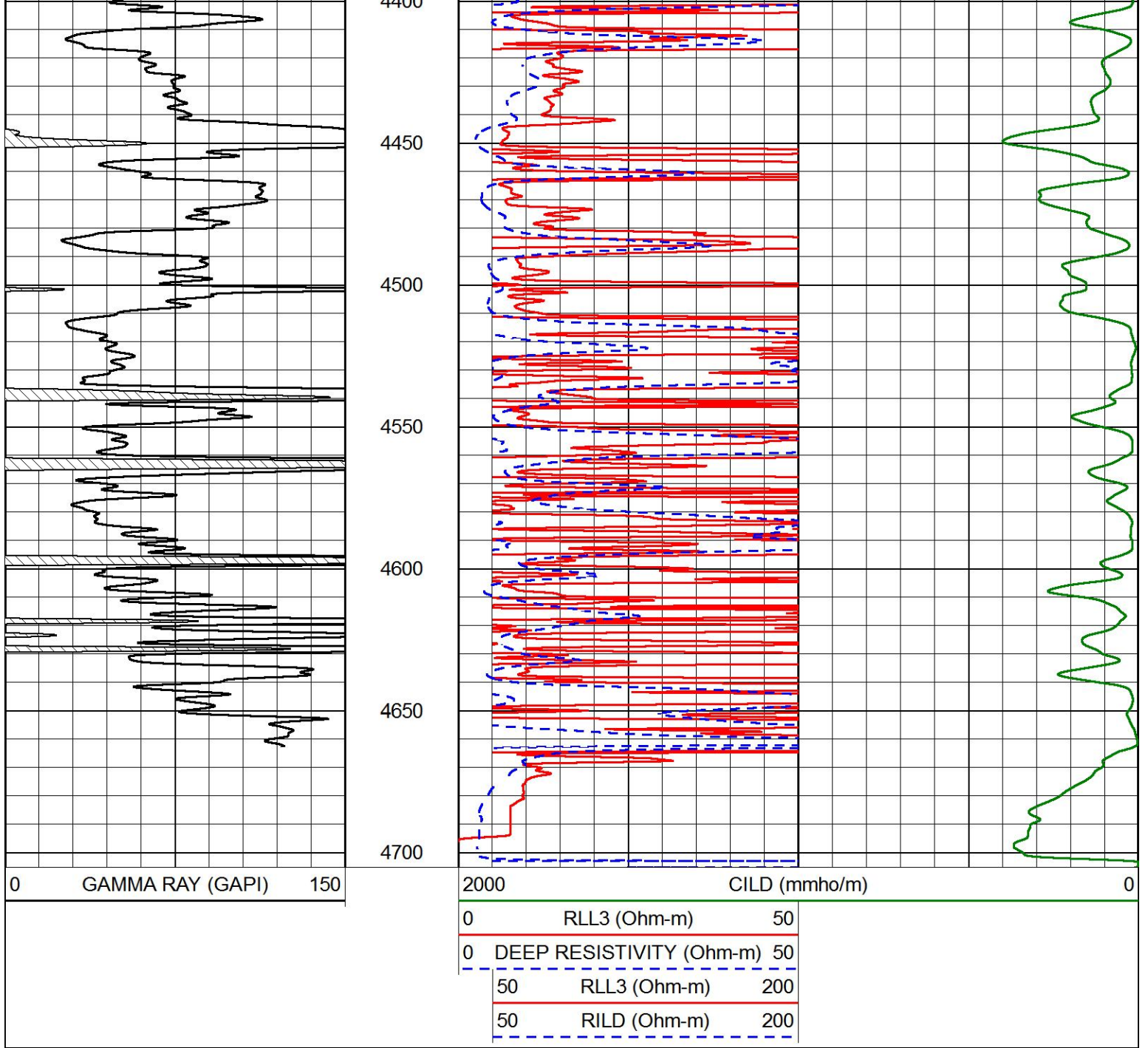


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2900  
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3000  
3050  
3100  
3150  
3200  
3250  
3300





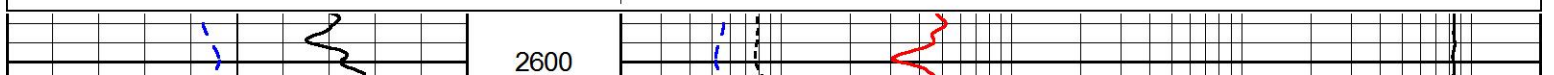


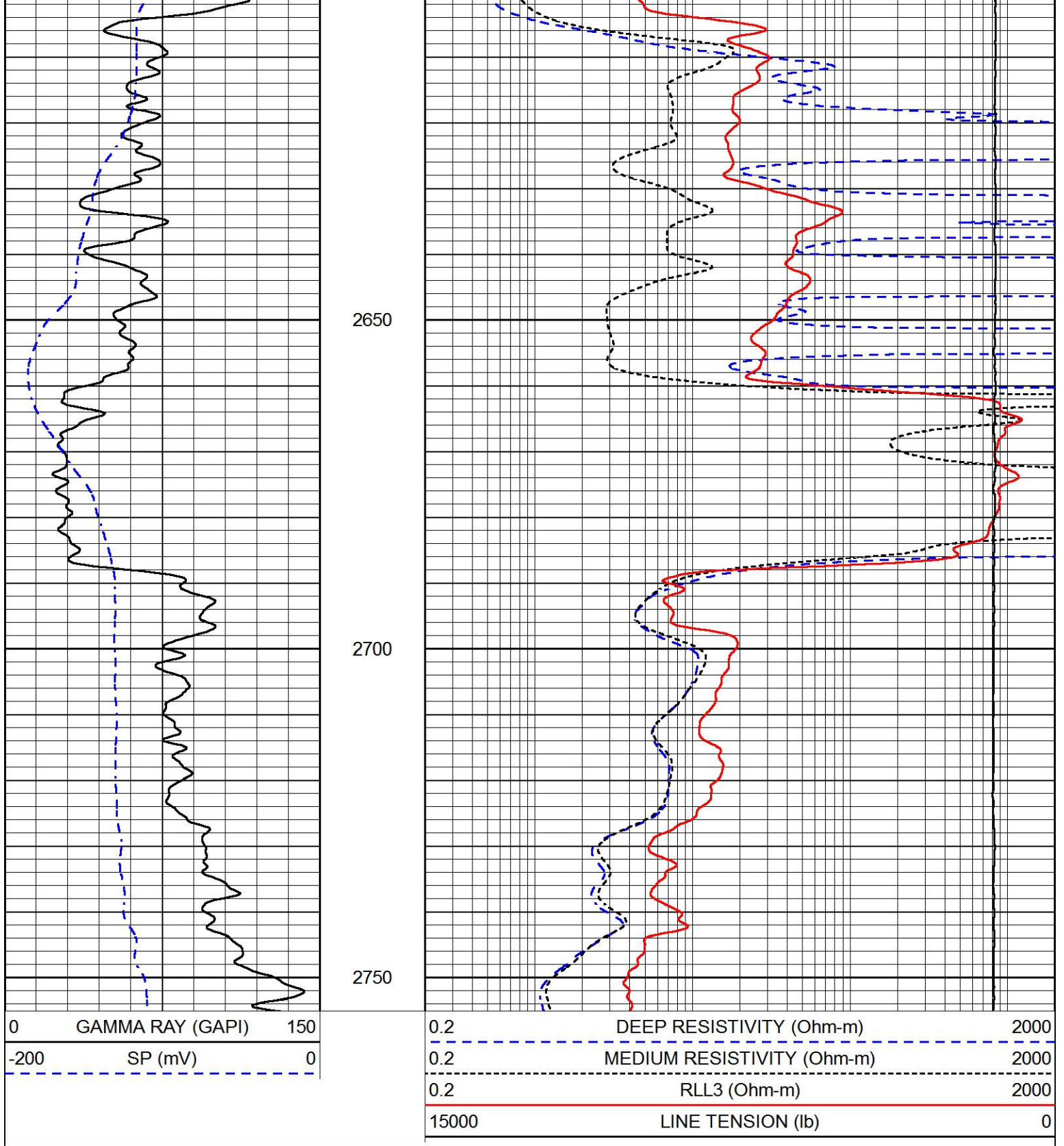


# MAIN PASS

Database File elk\_shepherd\_#2\_14.db  
 Dataset Pathname stackmel/pass3.1  
 Presentation Format dil  
 Dataset Creation Wed Feb 05 23:58:26 2020  
 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



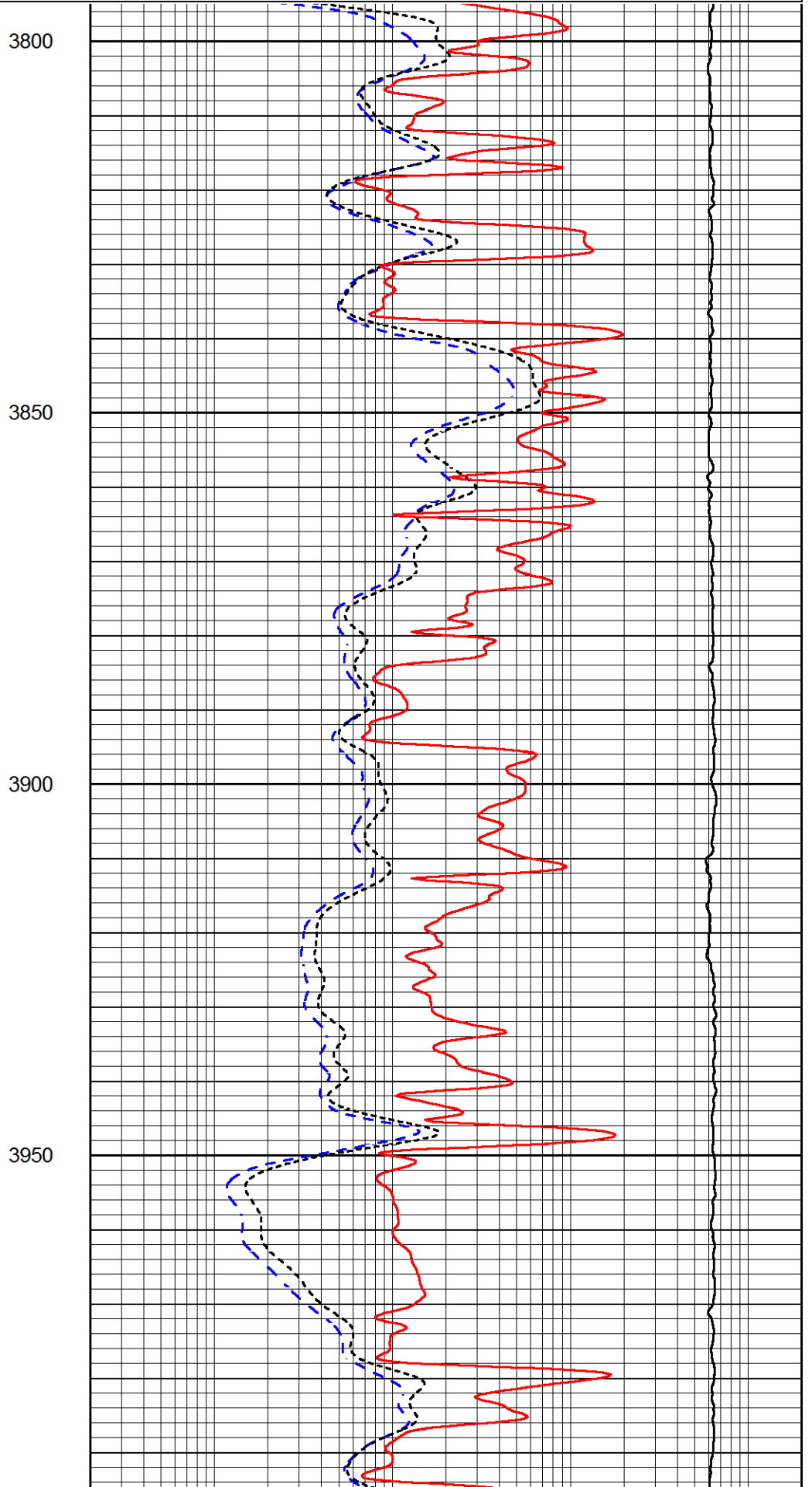
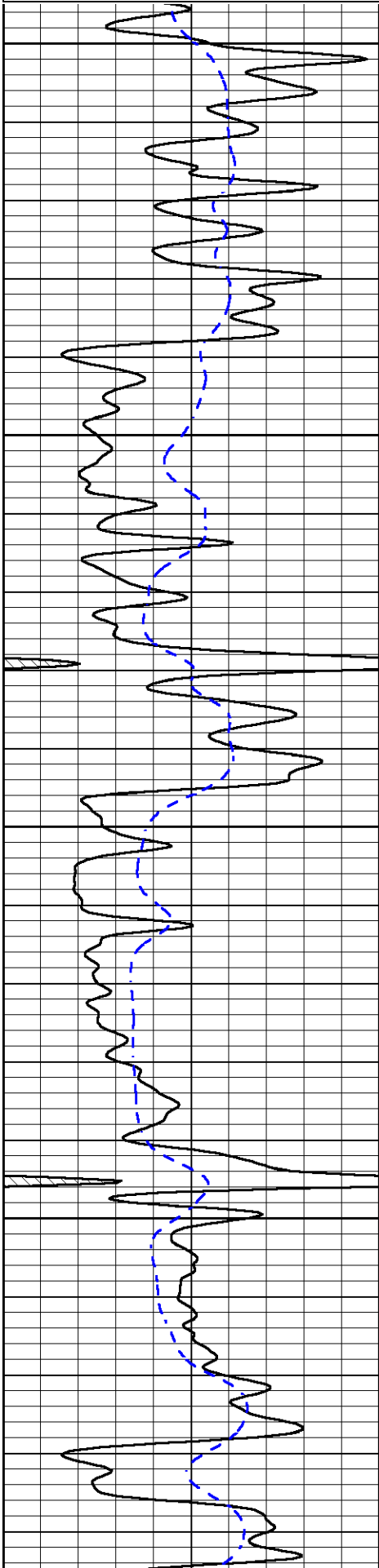


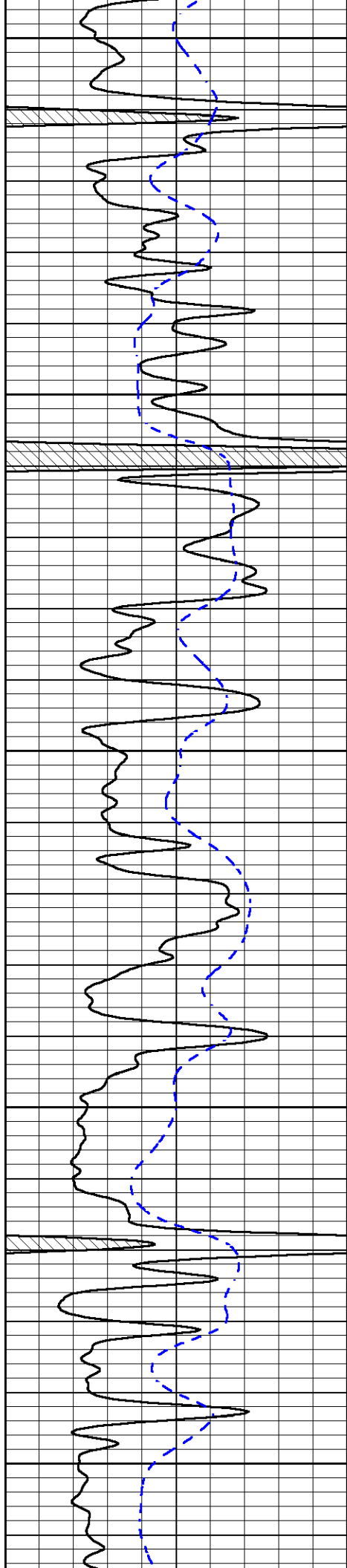
# MAIN PASS

Database File elk\_shepherd\_#2\_14.db  
 Dataset Pathname stackmel/pass3.1  
 Presentation Format dil  
 Dataset Creation Wed Feb 05 23:58:26 2020  
 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





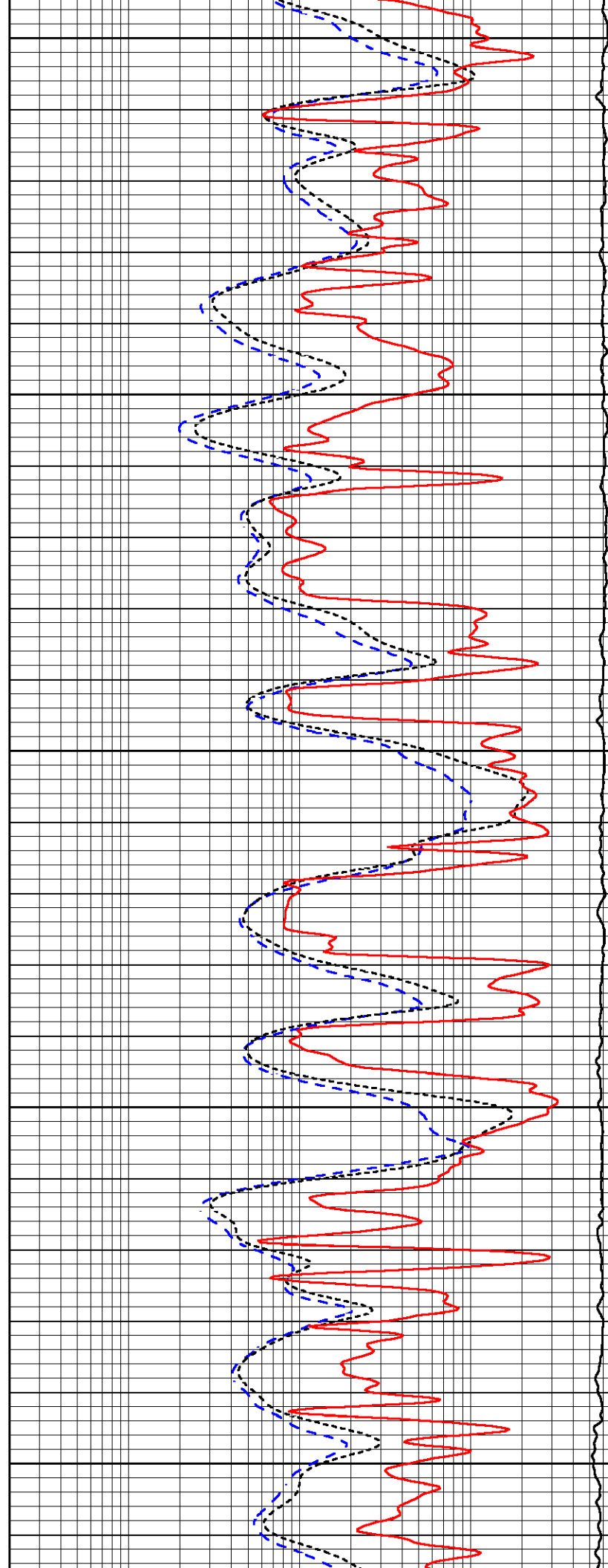
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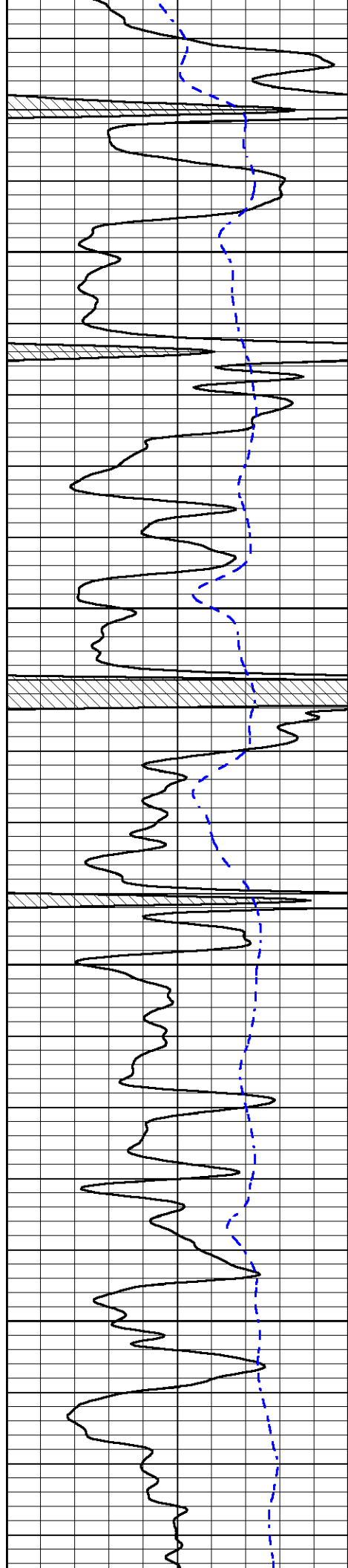
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4150

4200



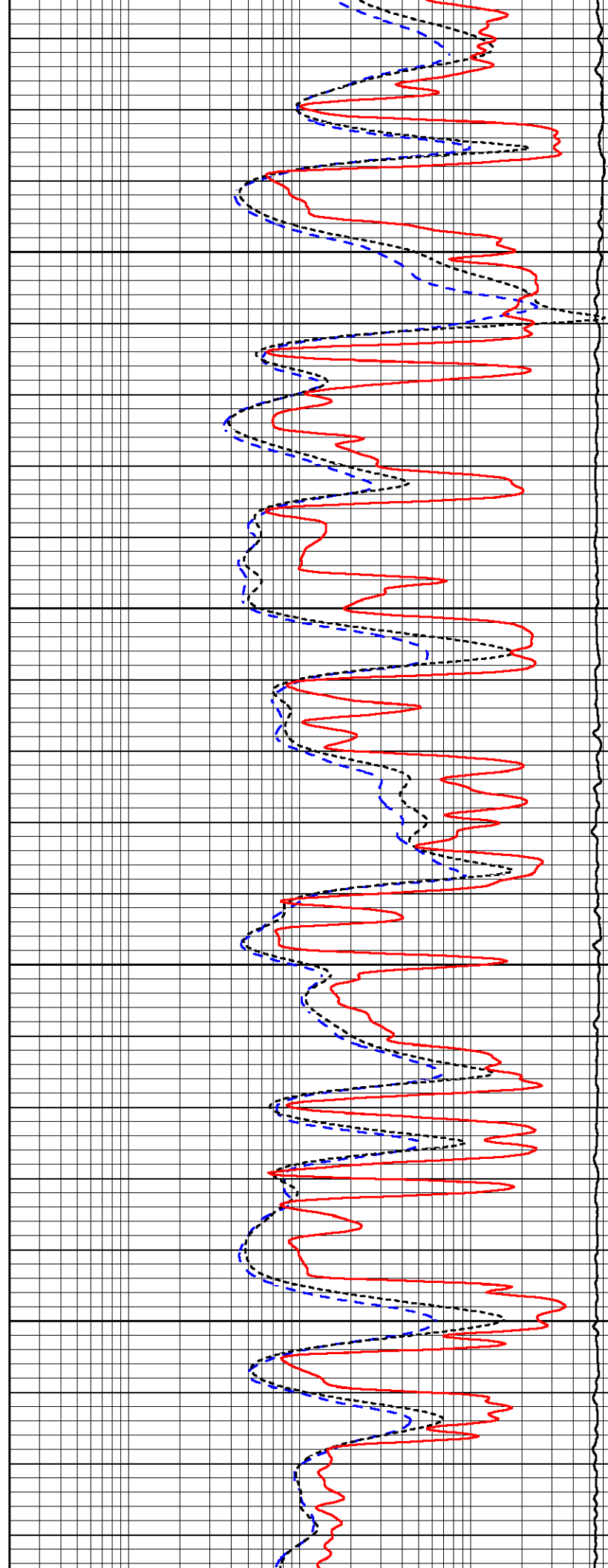


4250

4300

4350

4400

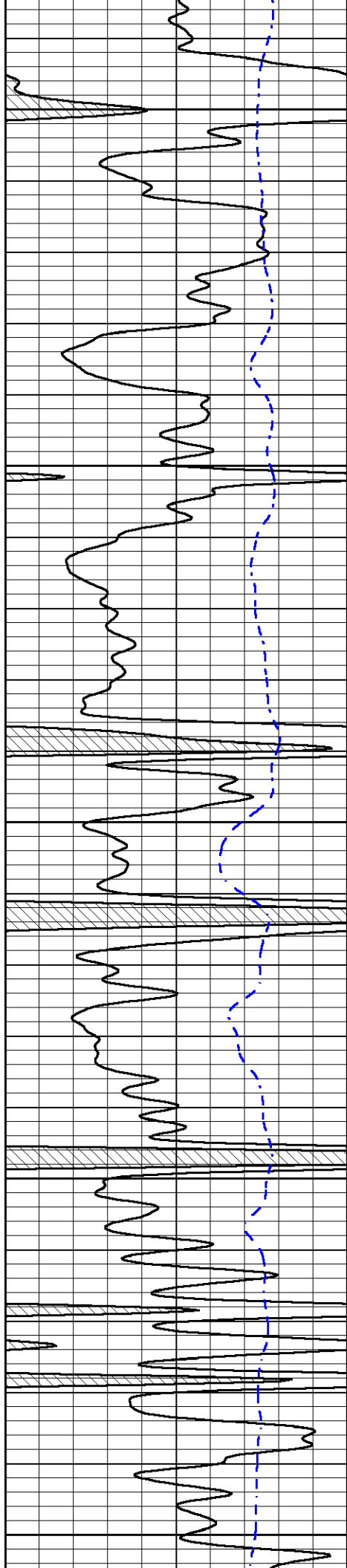


4250

4300

4350

4400



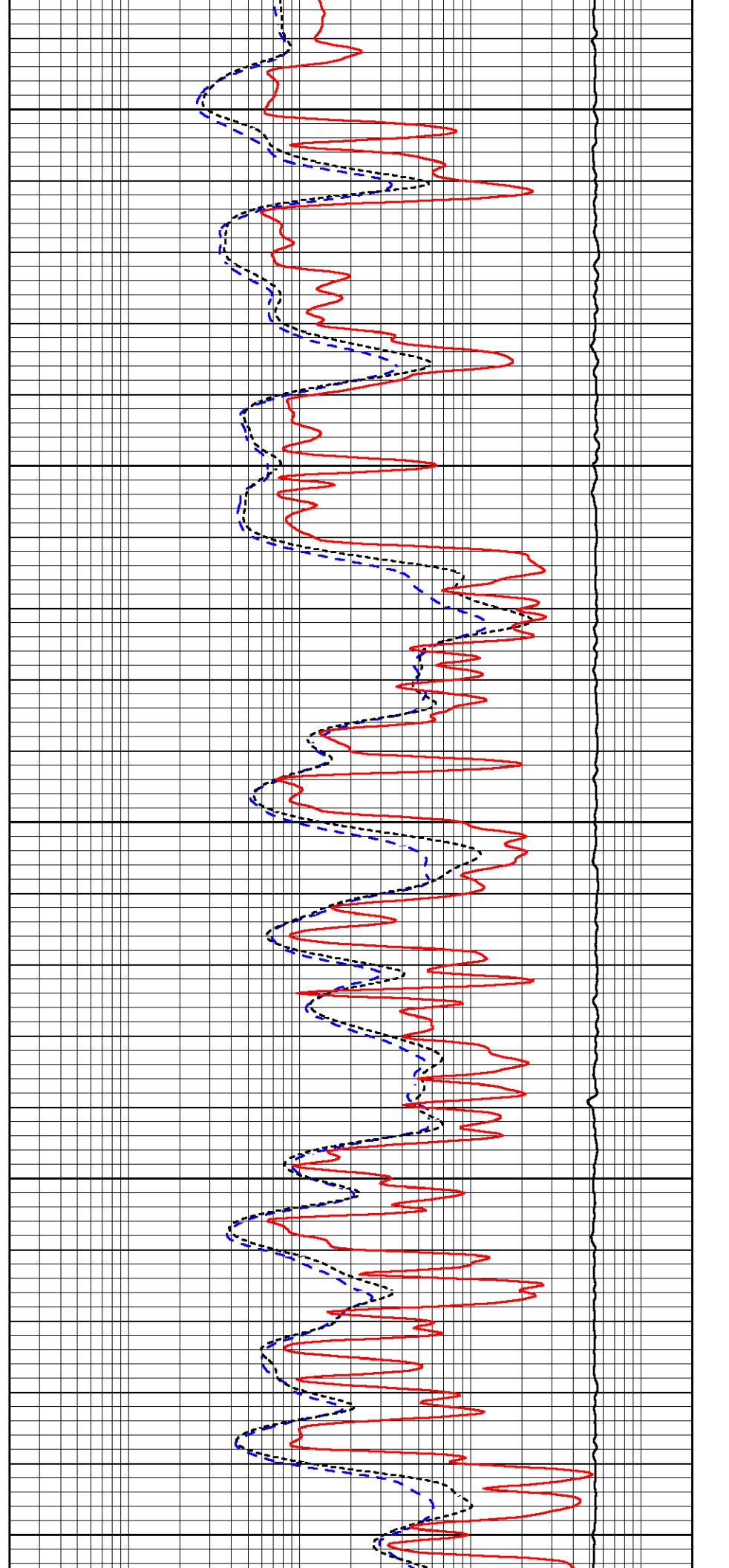
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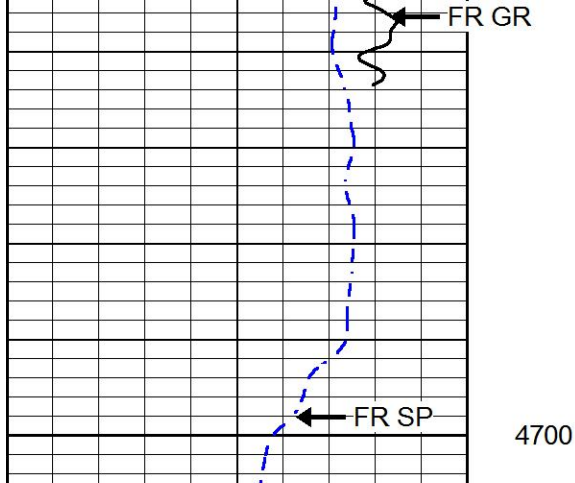
4500

4550

4600

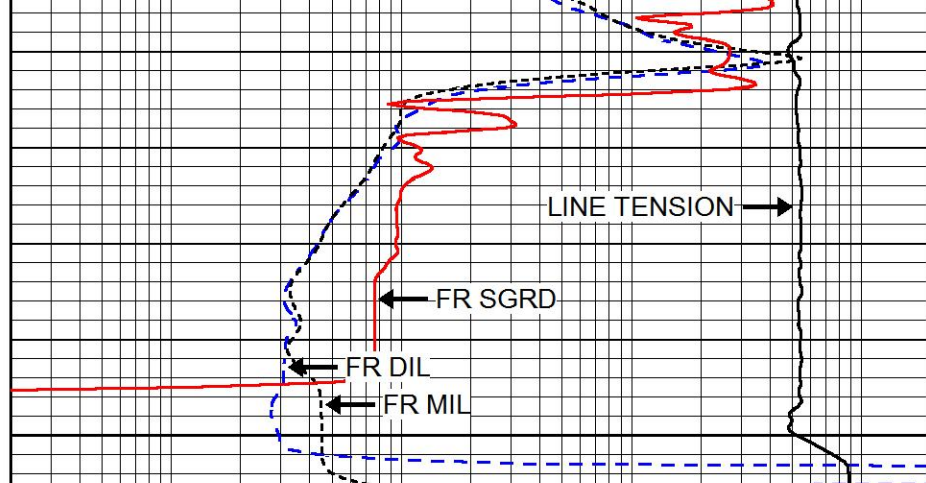
4650





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

4700



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

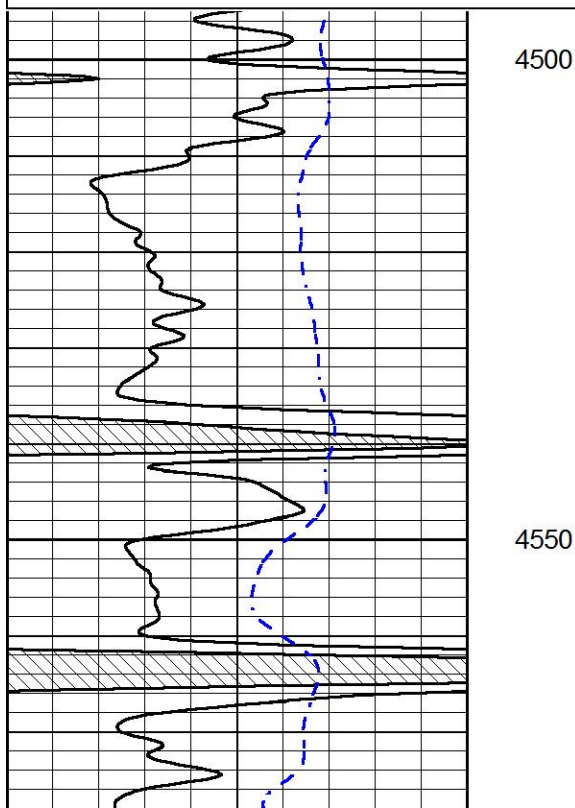


# REPEAT SECTION

Database File elk\_shepherd\_#2\_14.db  
 Dataset Pathname stackmel/pass2.1  
 Presentation Format dil  
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 Charted by Depth in Feet scaled 1:240

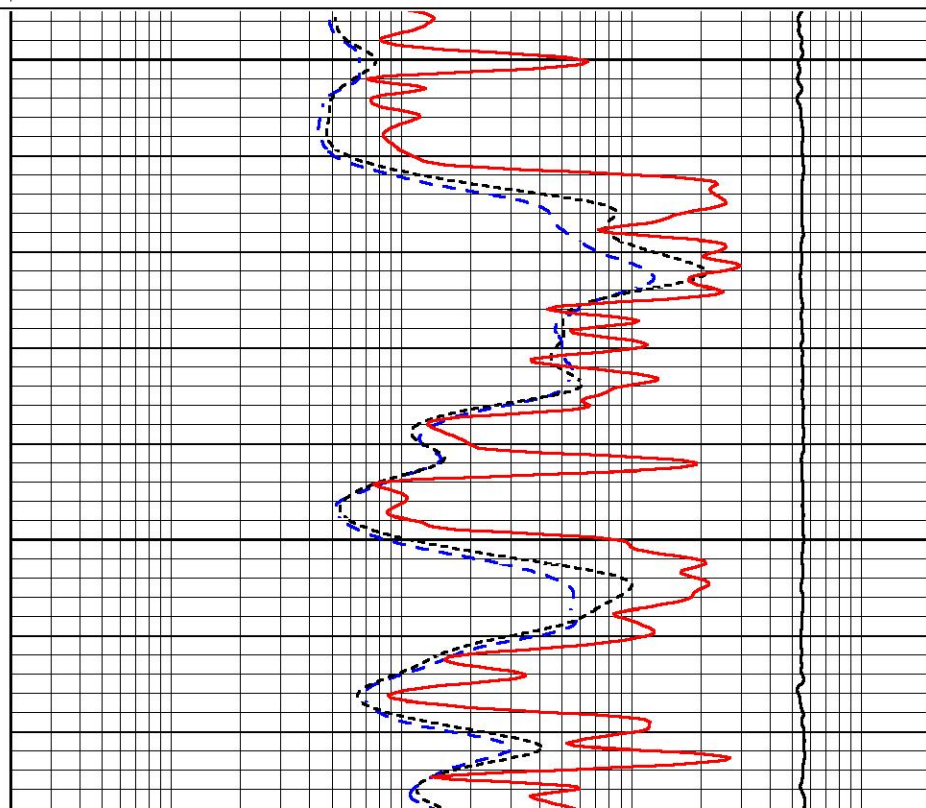
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-200	SP (mV)	0

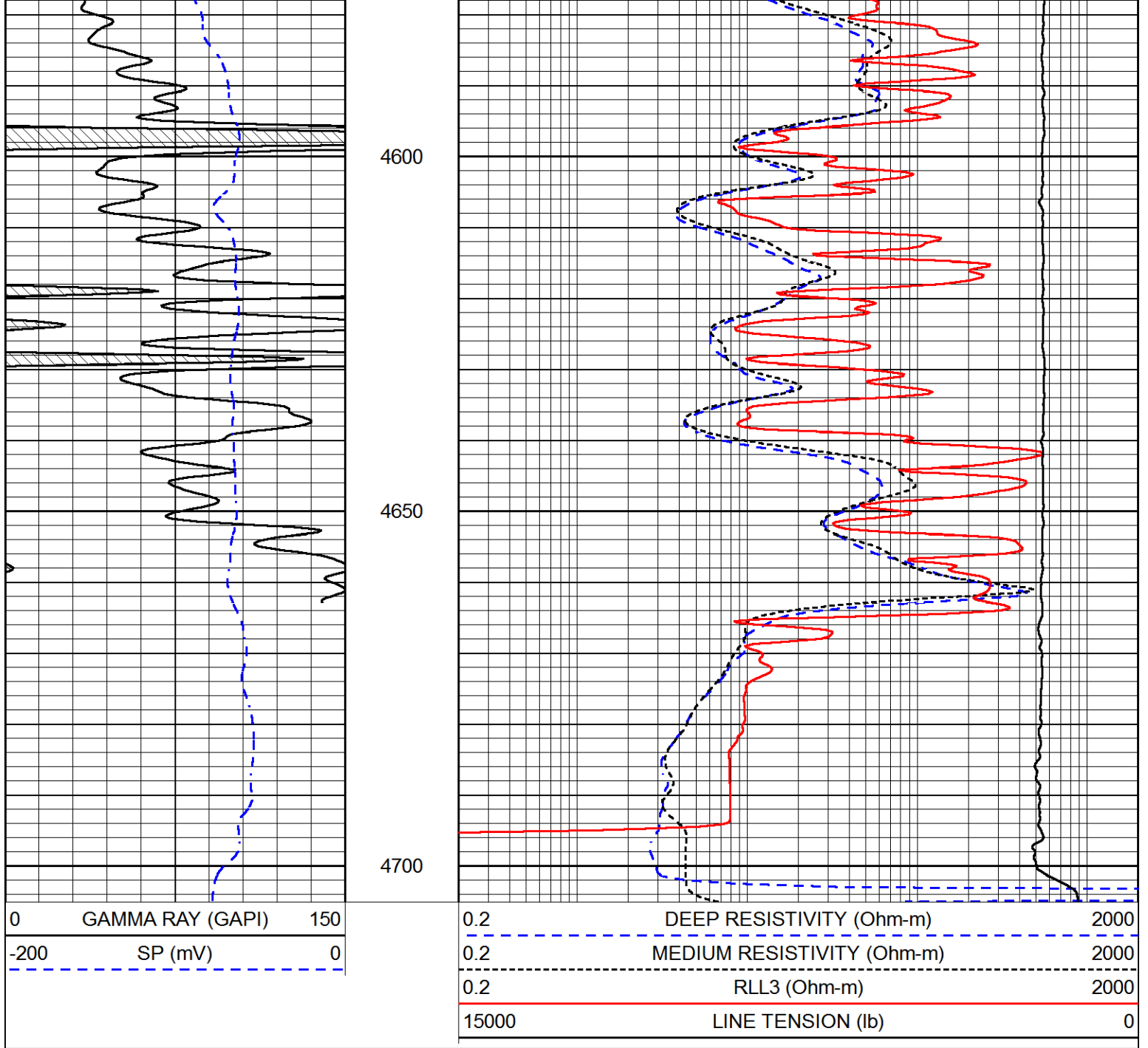
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0



4500

4550





### Calibration Report

Database File elk\_shepherd\_#2\_14.db  
Dataset Pathname stackmel/pass3.1  
Dataset Creation Wed Feb 05 23:58:26 2020

### Dual Induction Calibration Report

Serial-Model: 55-222-M&W  
Calibration Performed: Tue Dec 10 05:11:10 2019

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	167.000	835.000	0.000	255.800	mmho/m	0.500	-41.000
Medium	0.000	1348.000	142.000	255.800	mmho/m	0.370	-15.000

### Microlog Calibration Report

Serial-Model:  
Performed:

UDM-01-PSI UDM ML  
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	16000.0000	-1.0000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	18000.0000	-1.0000
Caliper	1.0019	1.2642	8.0000	22.0000	in	53.3774	-47.5000

Compensated Density Calibration Report

Serial-Model: 934-229-M&W  
Source / Verifier: 21170B /  
Master Calibration Performed: Thu Dec 19 15:46:53 2019

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	3391.68	2392.26	cps
Aluminum	2.670	g/cc	645.86	1568.99	cps
Spine Angle = 75.73		Density/Spine Ratio = 0.535			
	Size		Reading		
Small Ring	4.00	in	1.39		
Large Ring	14.00	in	1.04		

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 Dec 10 05:11:34 2019

Calibrator Value: 1000.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 6.2 cps

Sensitivity: 0.5200 GAPI/cps



**PIONEER**

Company ELK ENERGY HOLDINGS, LLC  
Well SHEPHERD NO.2-14  
Field NOLLETTE SOUTHEAST  
County THOMAS

**PIONEER**  
Pioneer Energy Services

County  
State

THOMAS  
KANSAS