



# DUAL INDUCTION LOG

Company TDI, INC.  
 Well FURTHMYER #4  
 Field DREILING EAST  
 County ELLIS  
 State KANSAS

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 Well FURTHMYER #4  
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 State KANSAS

Location: API #: 15-051-26935-00-00  
 330' FSL & 1190' FWL  
 SEC 23 TWP 14S RGE 16W  
 Permanent Datum GROUND LEVEL Elevation 1888'  
 Log Measured From KELLY BUSHING  
 Drilling Measured From KELLY BUSHING  
 Other Services  
 CNL/CDL  
 MEL  
 Elevation  
 K.B. 1893'  
 D.F. N/A  
 G.L. 1888'

Date	11/15/2018
Run Number	ONE
Depth Driller	3510'
Depth Logger	3502'
Bottom Logged Interval	3501'
Top Log Interval	200'
Casing Driller	8.625" @ 215'
Casing Logger	213'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	4600
Density / Viscosity	9.0 53
pH / Fluid Loss	10.5 6.0
Source of Sample	FLOWLINE
Rm @ Meas. Temp	.65 @ 65
Rmt @ Meas. Temp	.49 @ 65
Rmc @ Meas. Temp	.88 @ 65
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.38 @ 111
Operating Rig Time	2 HOURS
Max Rec. Temp. F	111 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	TOM DENNING

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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.

WALKER EXIT I 70  
 3 1/2 SOUTH, 1/2 EAST, NORTH 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

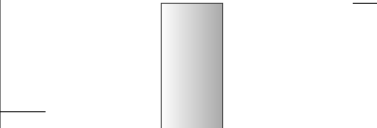
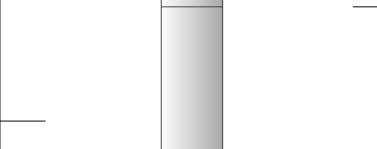
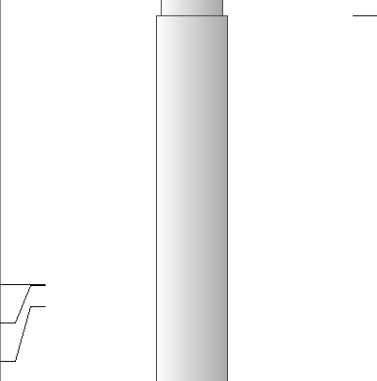
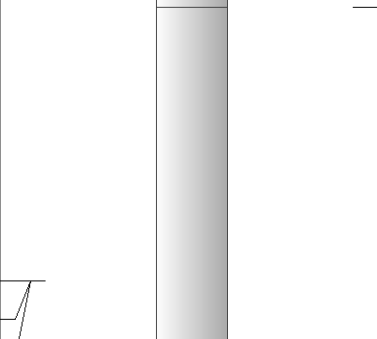
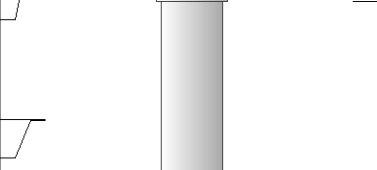
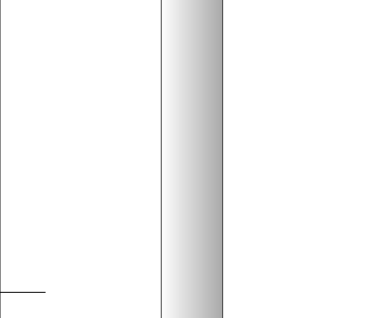
<b>Your Pioneer Energy Services Crew</b> Engineer: J. HENRICKSON Operator: Operator: Operator:	<b>This Log Record Was Witnessed By</b> Primary Witness: TOM DENNING Secondary Witness: HERB DEINES Secondary Witness: Secondary Witness:
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# Log Variables

DatabaseC:\ProgramData\Warrior\Data\tdi\_furthmyer\_4.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	111	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	390	47	Off	0

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 (96-916)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSI STKBL ML (PSI-01) Stackable Microlog Tools	7.58	4.00	65.00
RLL3 RLL3F	15.80 15.79					
CILD	8.00		DIL-M&W (976)	18.50	3.50	220.00

CILM

4.70

SP

0.20

Dataset: tdi\_furthmyer\_4.db: field/well/stackml/pass3.1  
 Total length: 43.08 ft  
 Total weight: 685.00 lb  
 O.D.: 4.00 in

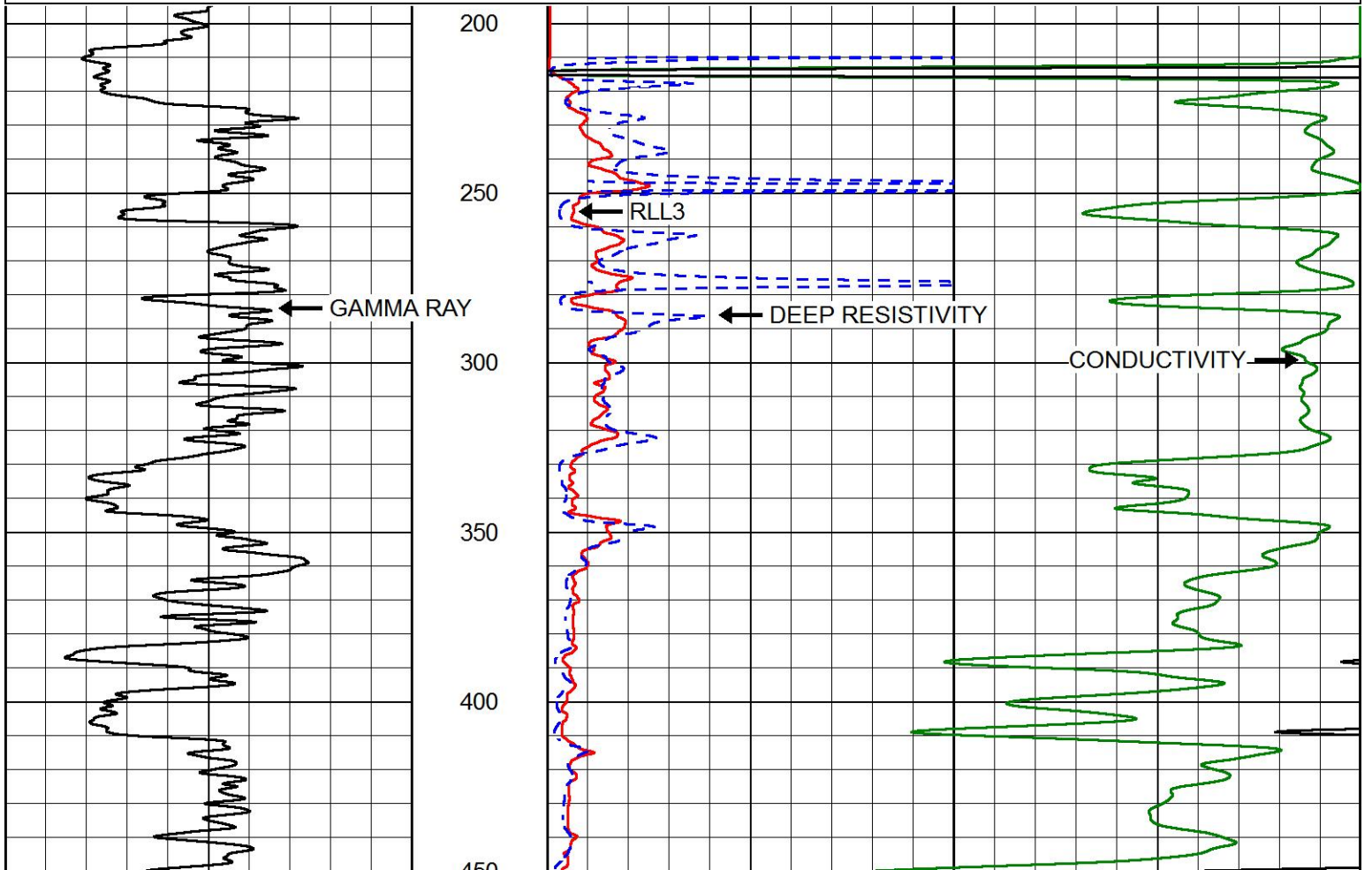
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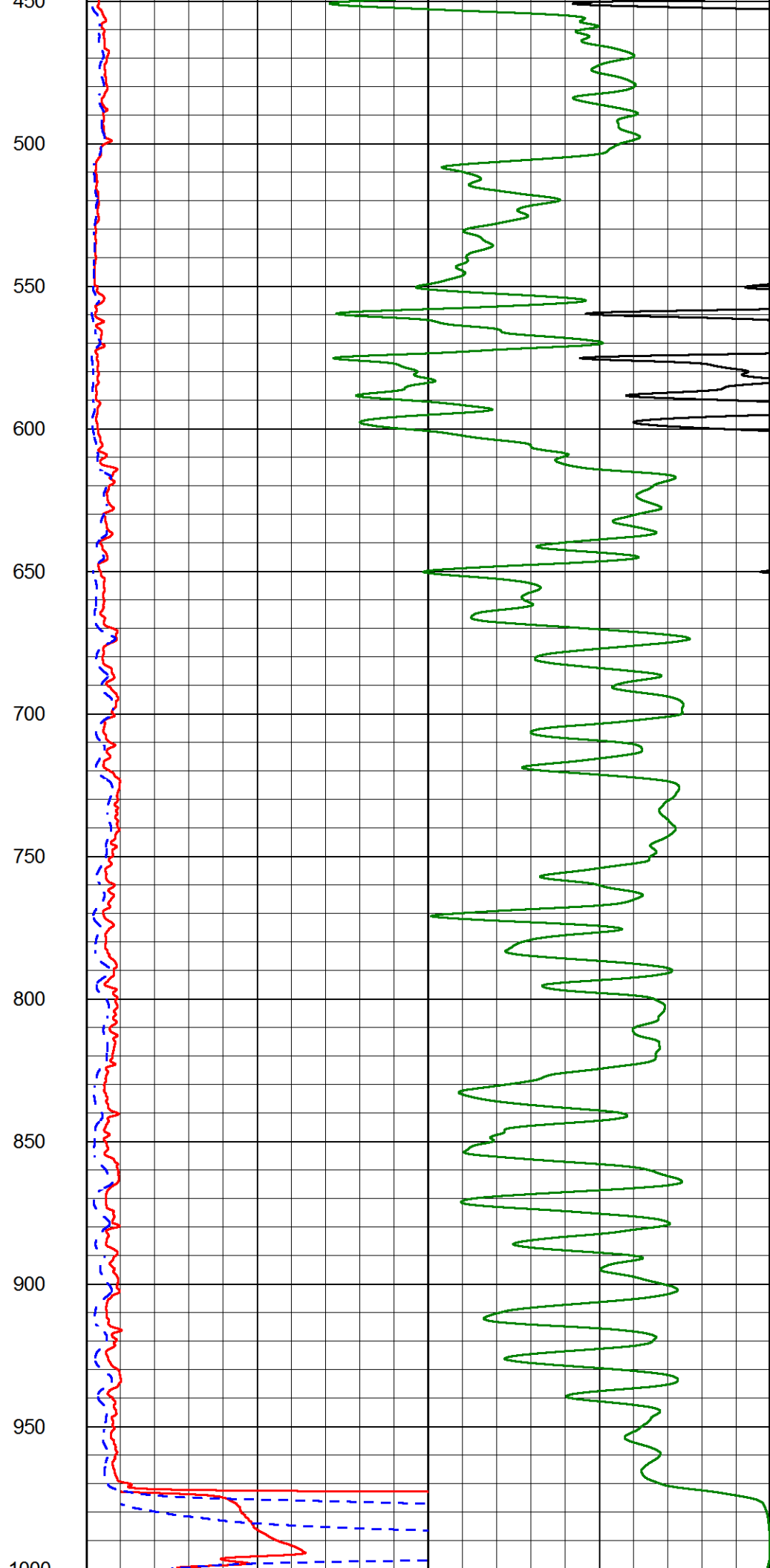
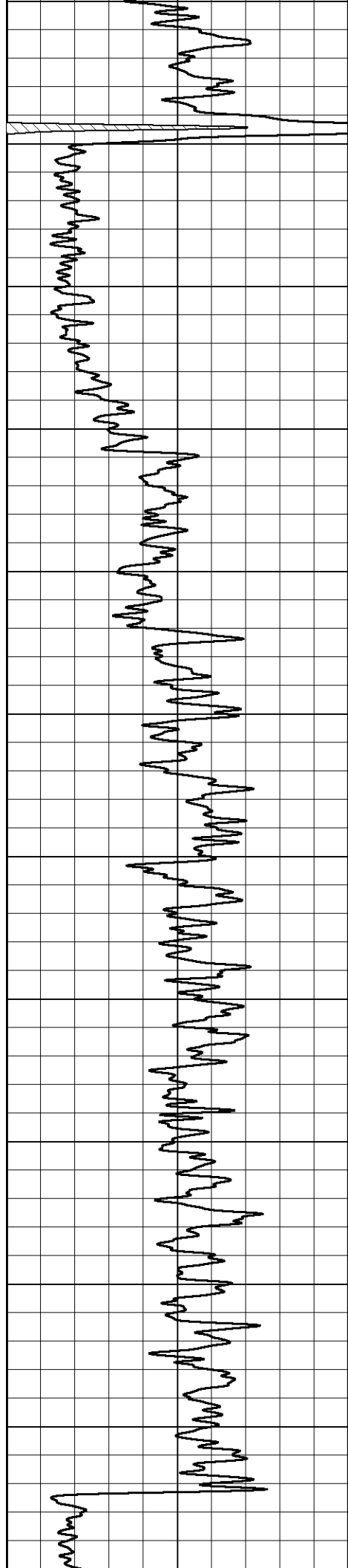
Pioneer Energy Services

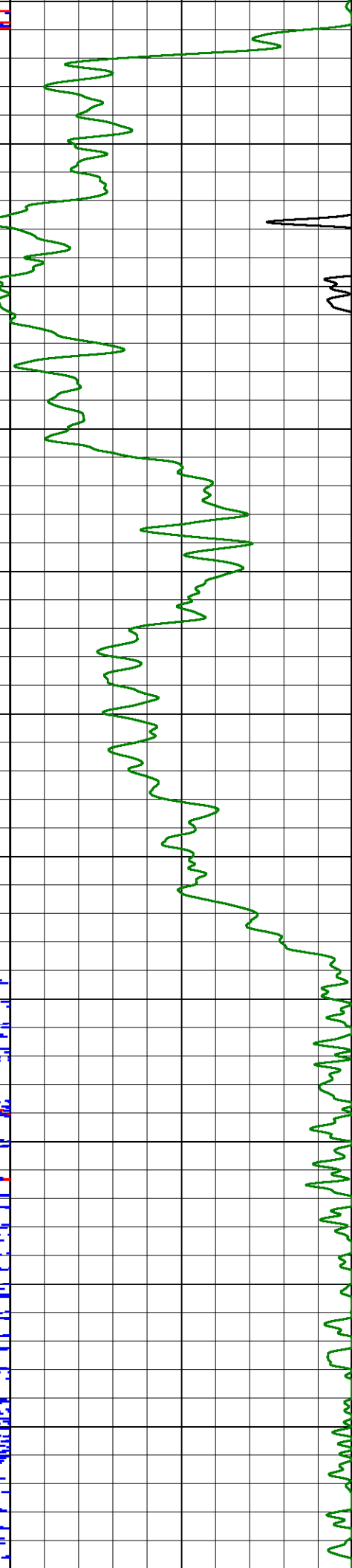
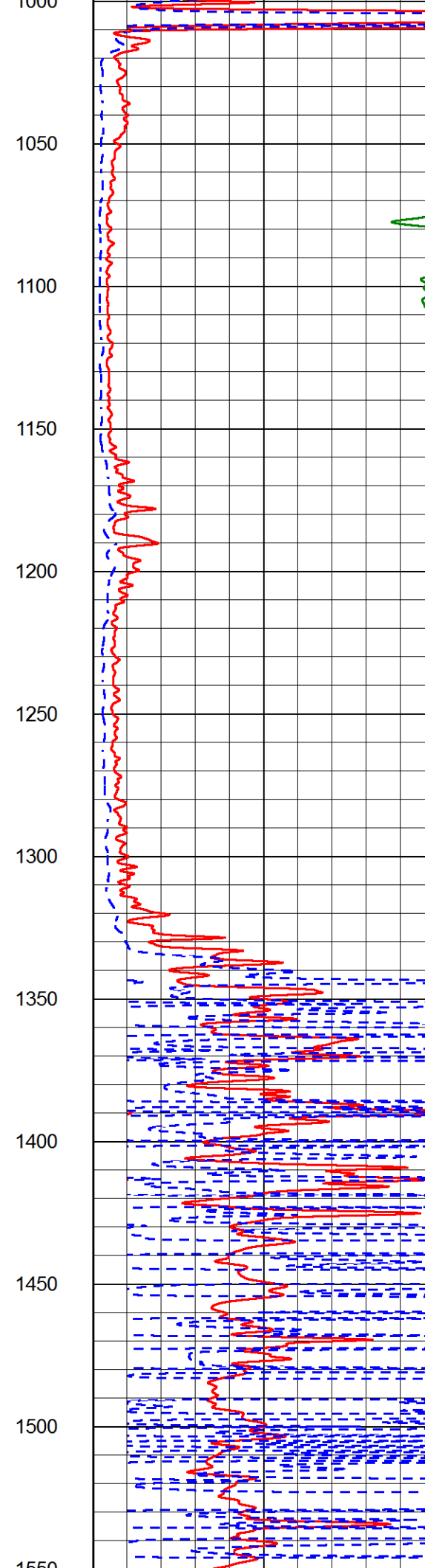
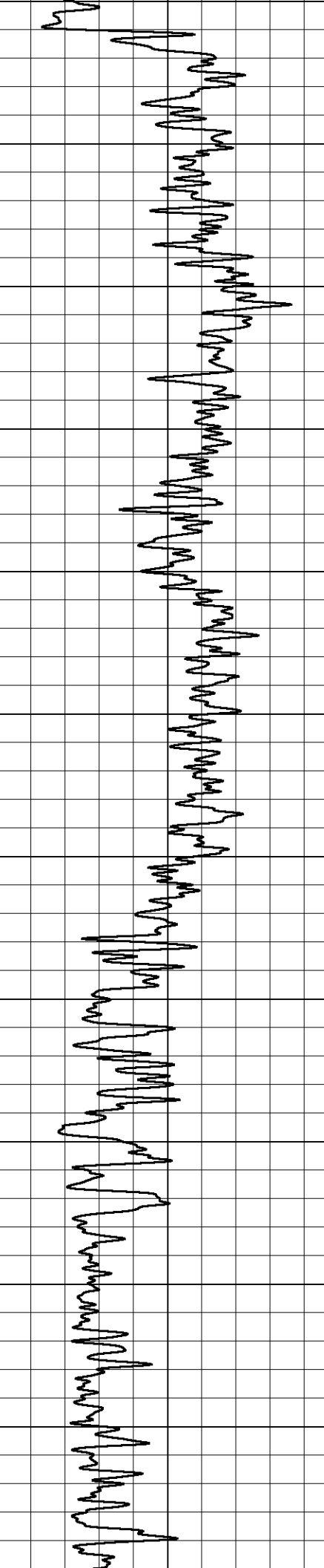
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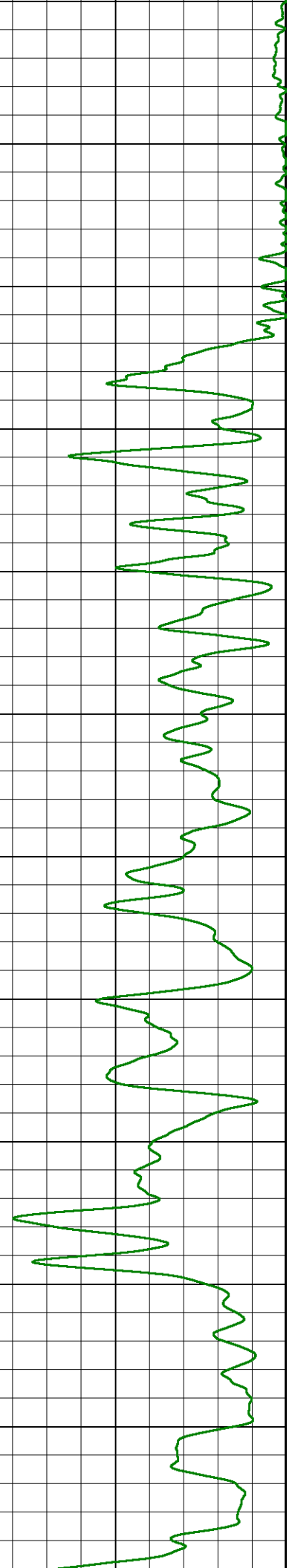
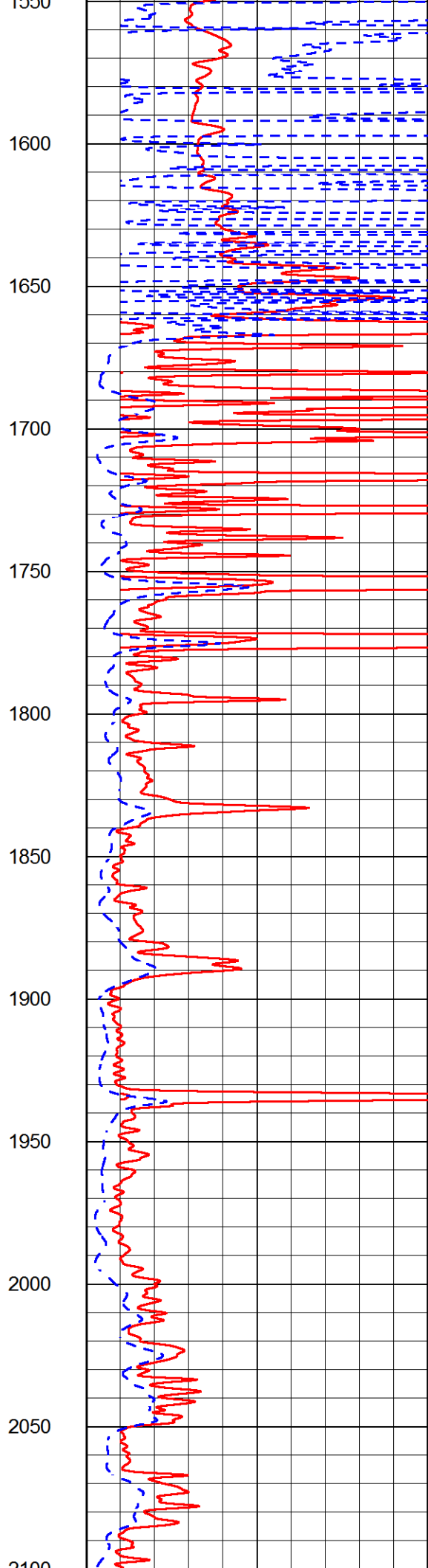
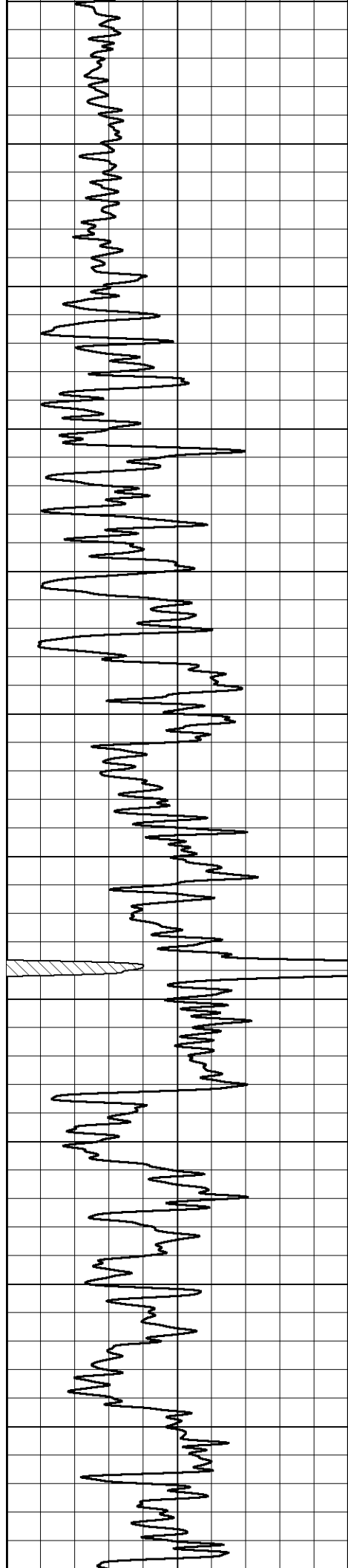
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 Presentation Format dil2in  
 Dataset Creation Thu Nov 15 23:44:11 2018  
 Charted by Depth in Feet scaled 1:600

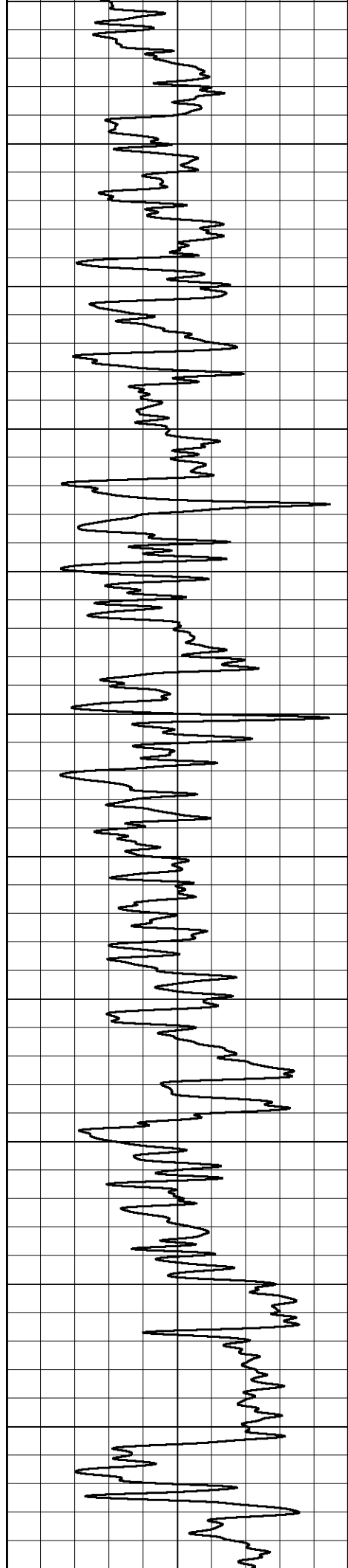
0	GAMMA RAY (GAPI)	150	2000	CILD (mmho/m)	0
			0	RLL3 (Ohm-m)	50
			0	DEEP RESISTIVITY (Ohm-m)	50
			50	RLL3 (Ohm-m)	500
			50	RILD (Ohm-m)	500



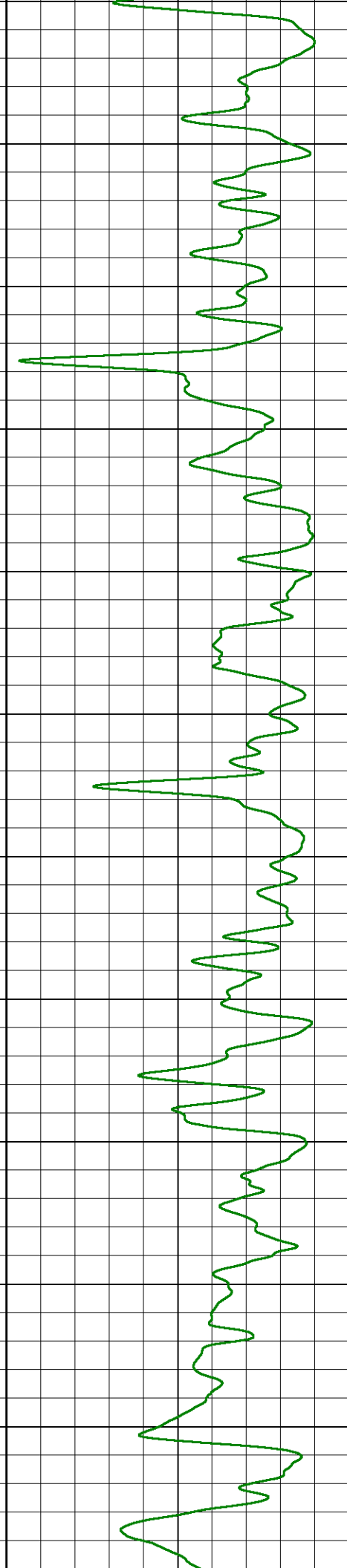
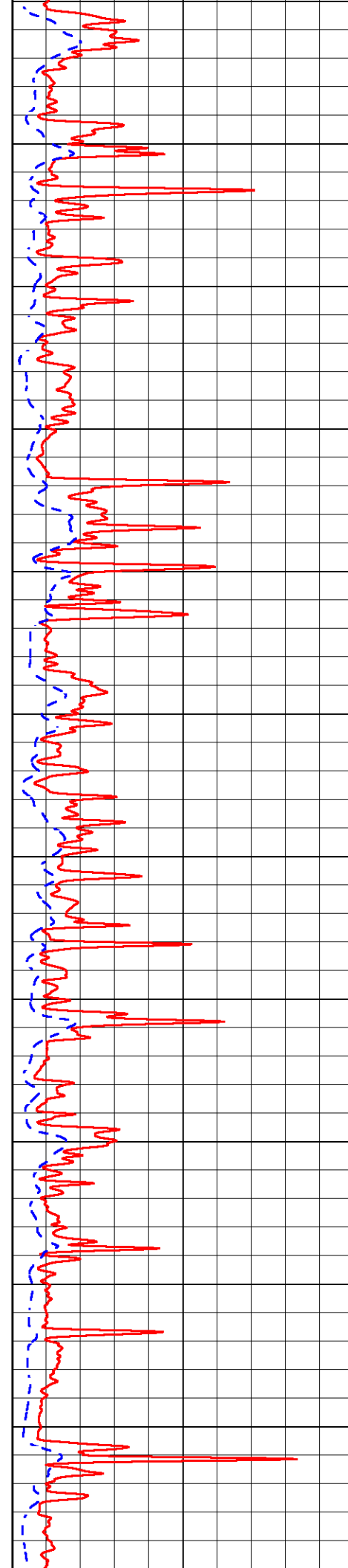


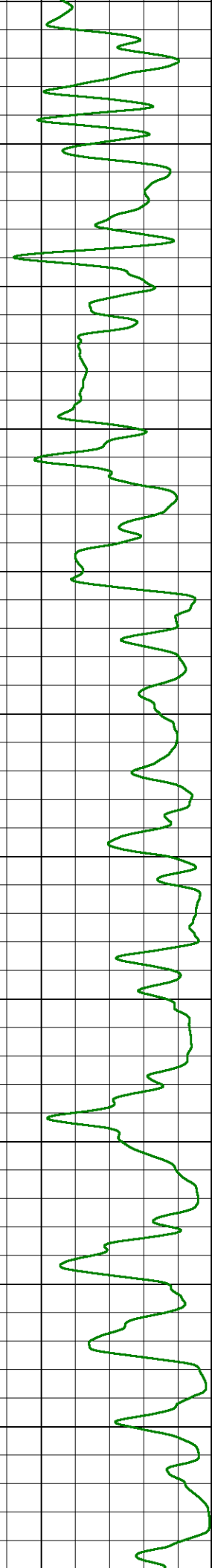
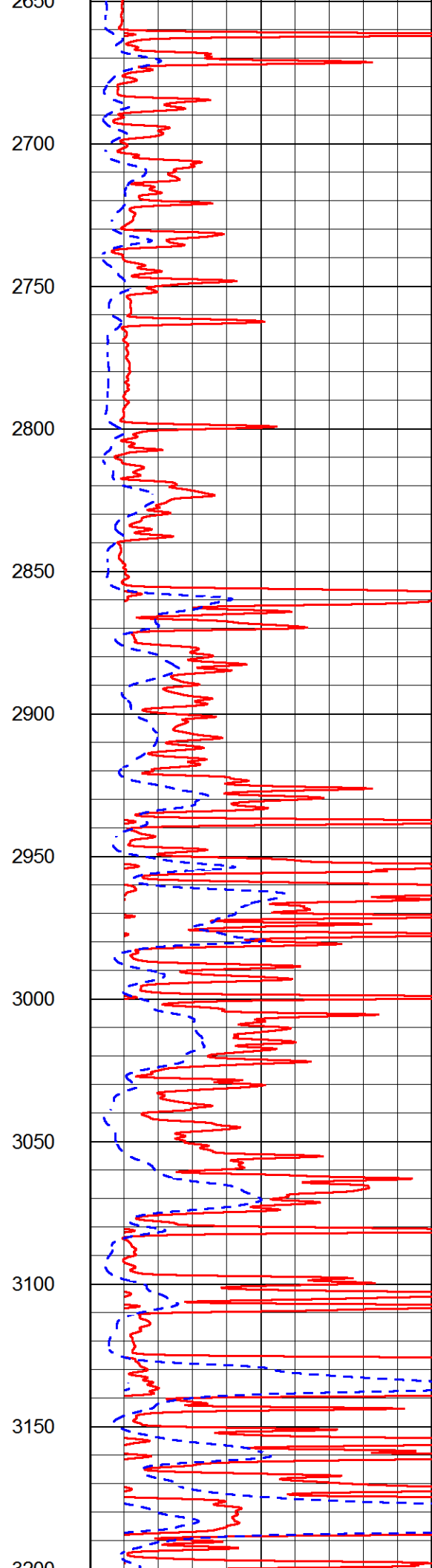
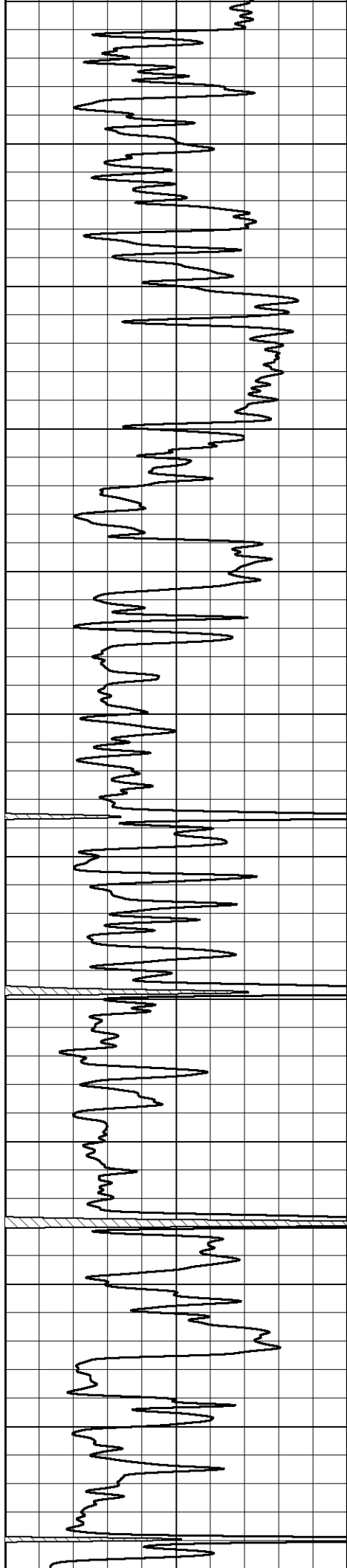


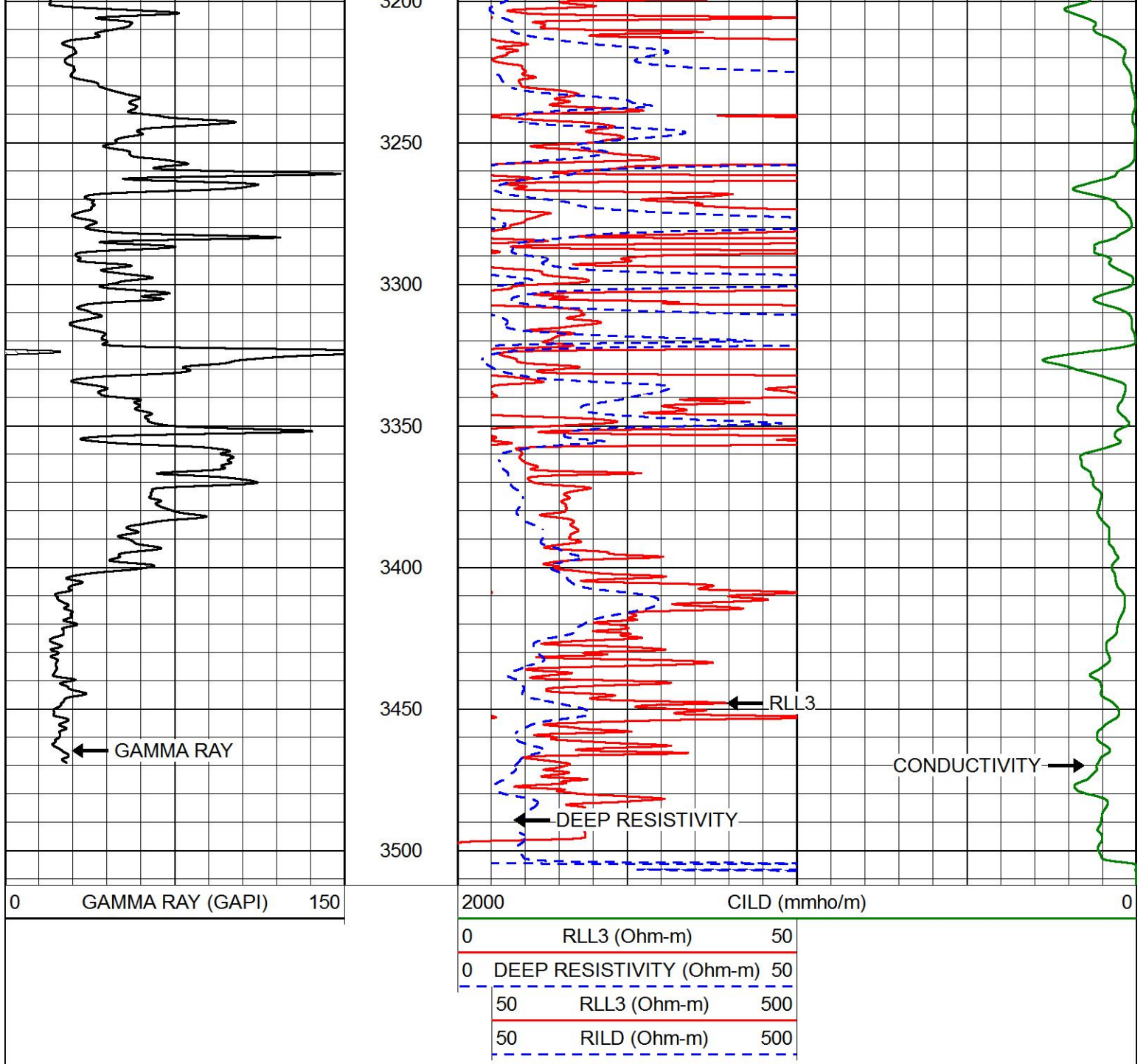




2100  
2150  
2200  
2250  
2300  
2350  
2400  
2450  
2500  
2550  
2600  
2650



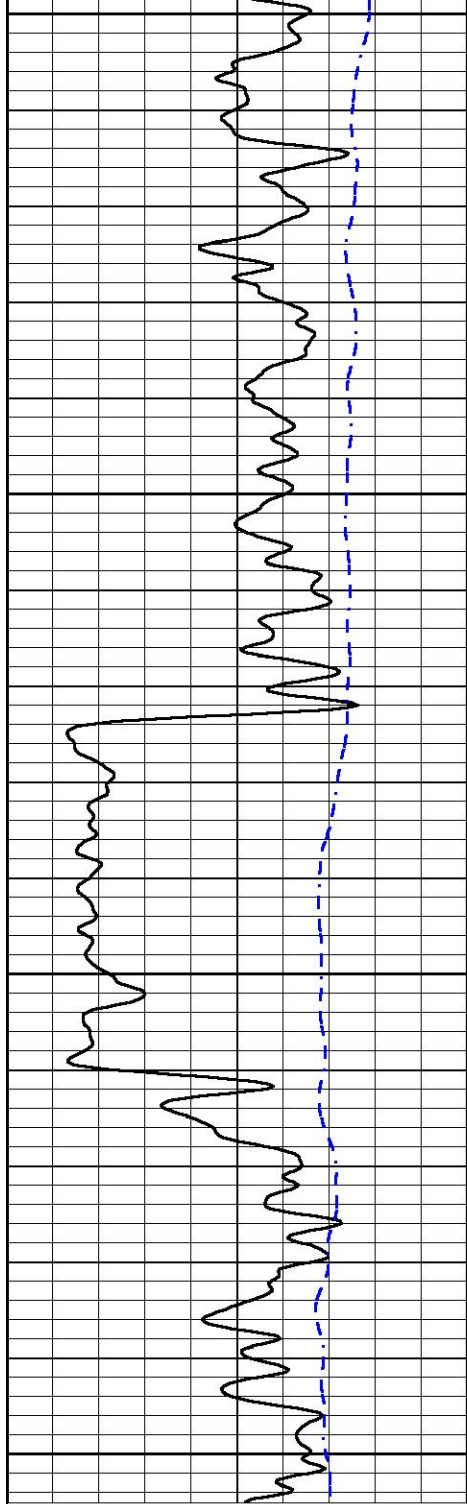




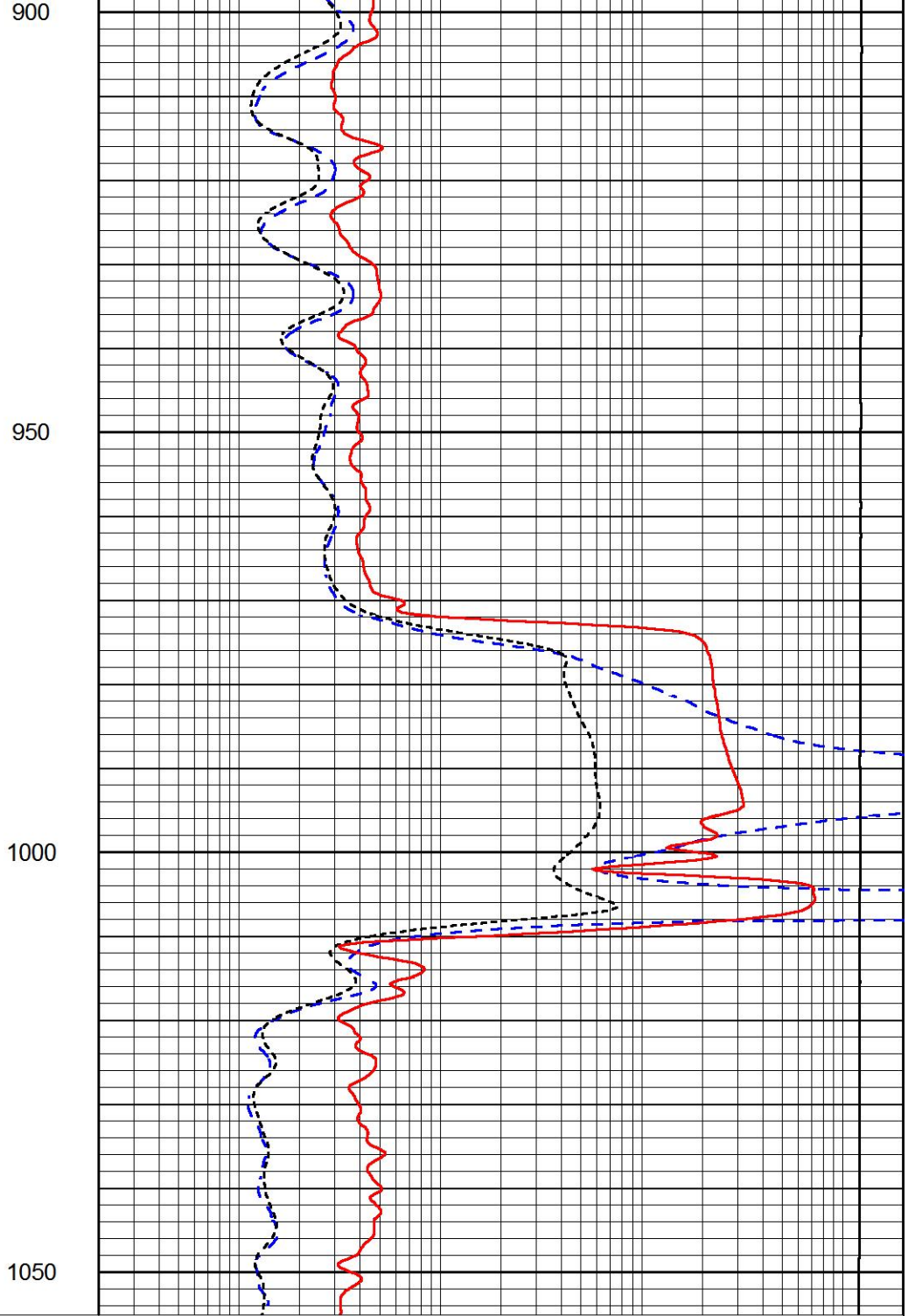
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 Dataset Pathname stackml/pass3.1  
 Presentation Format dil  
 Dataset Creation Thu Nov 15 23:44:11 2018  
 Charted by Depth in Feet scaled 1:240

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



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

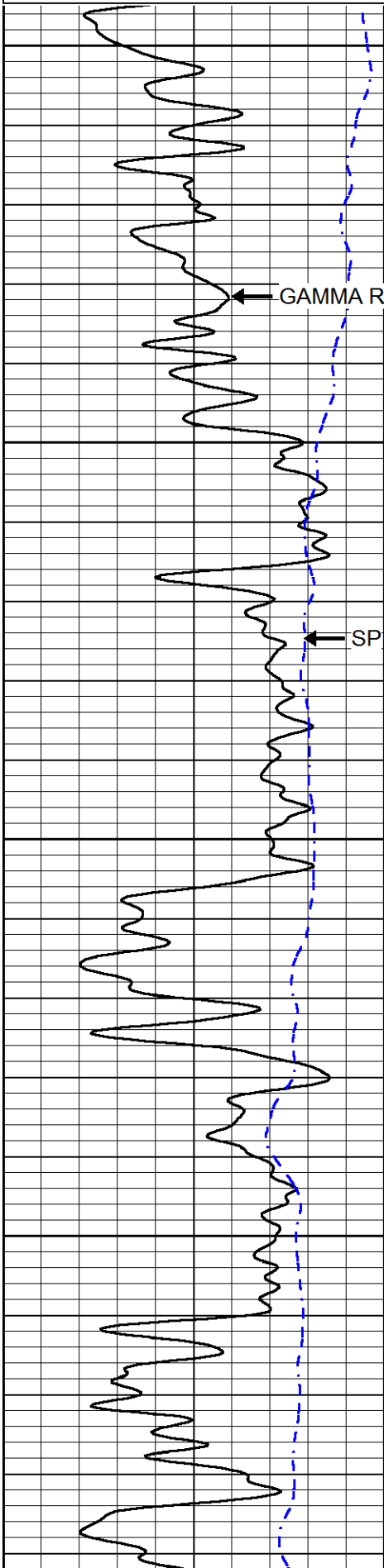


# MAIN PASS

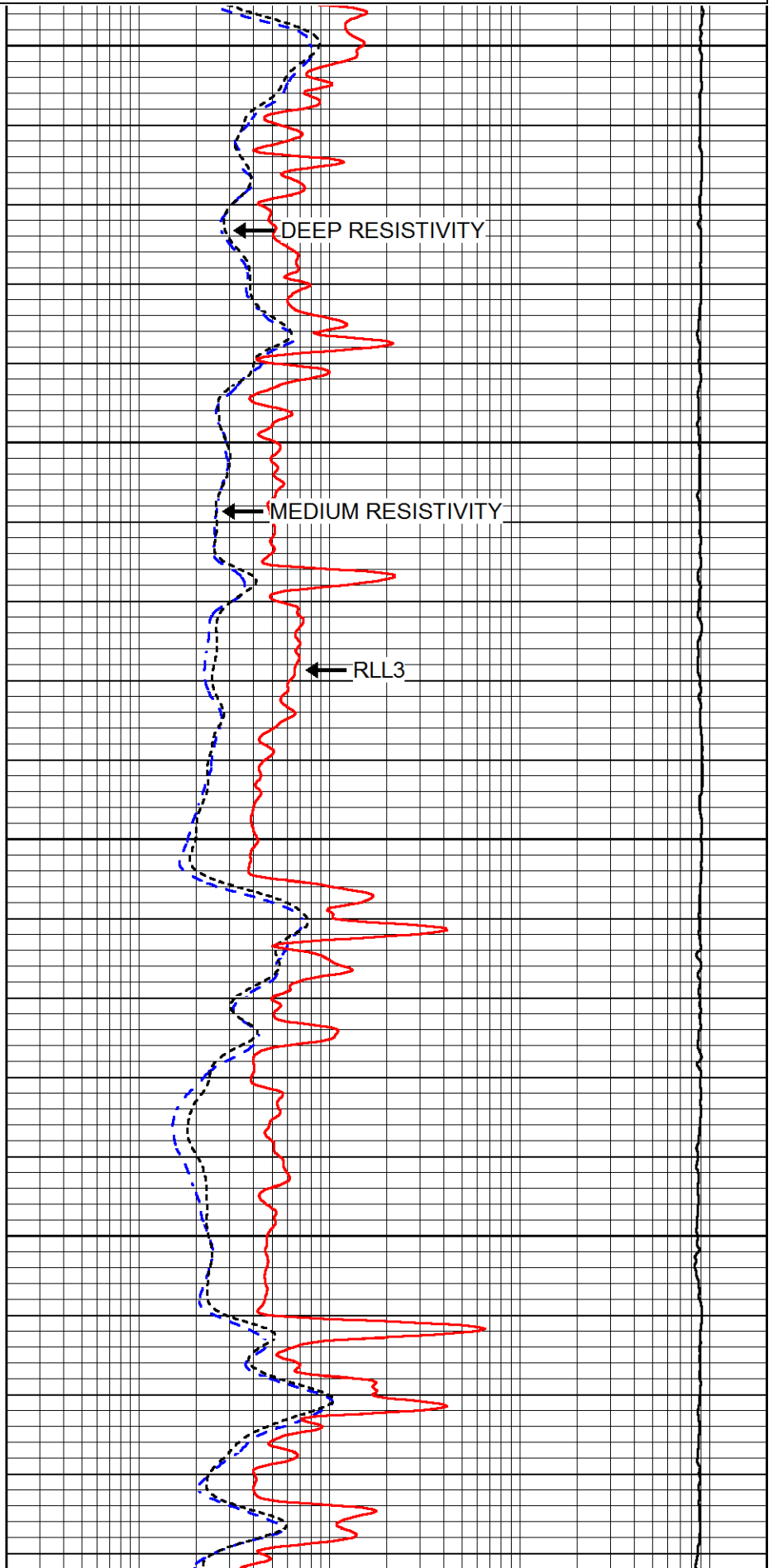
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 Dataset Pathname stackml/pass3.1  
 Presentation Format dil  
 Dataset Creation Thu Nov 15 23:44:11 2018  
 Charted by Depth in Feet scaled 1:240

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

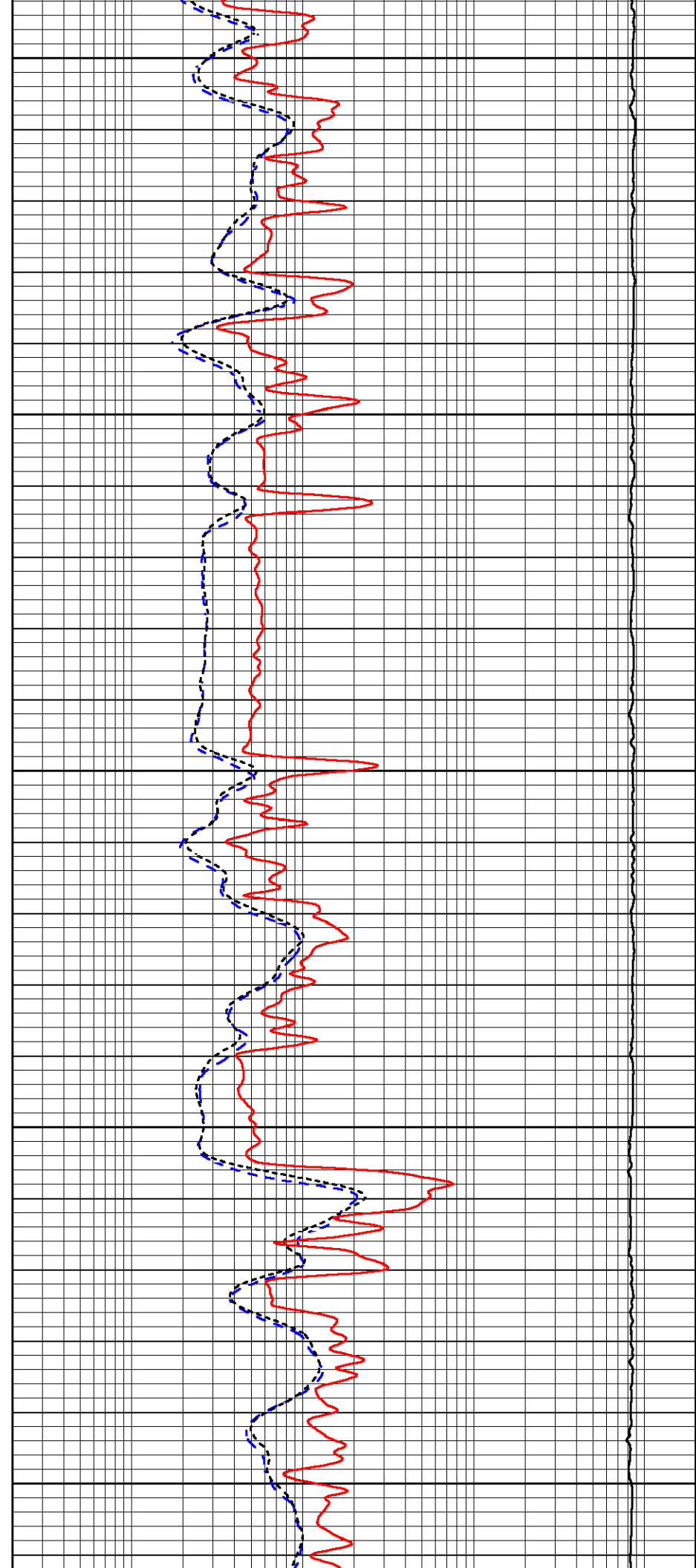
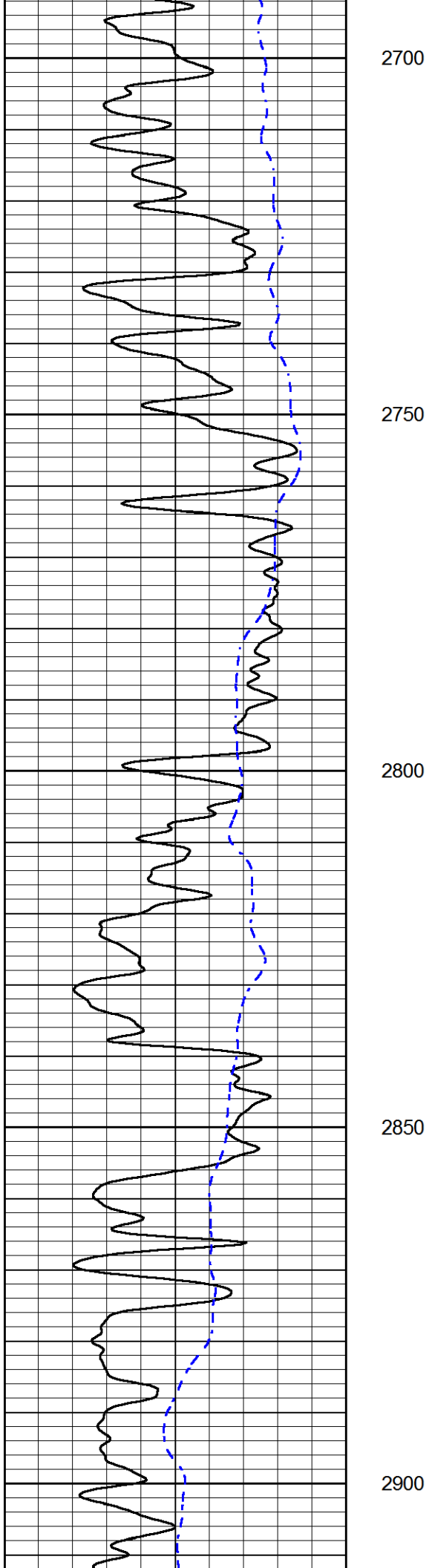
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0

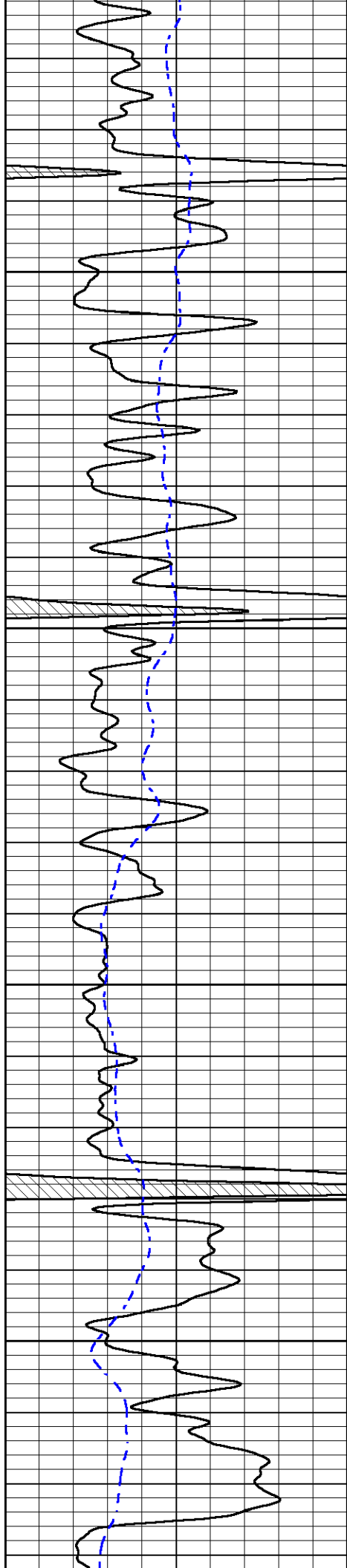


2500  
2550  
2600  
2650



DEEP RESISTIVITY  
MEDIUM RESISTIVITY  
RLL3



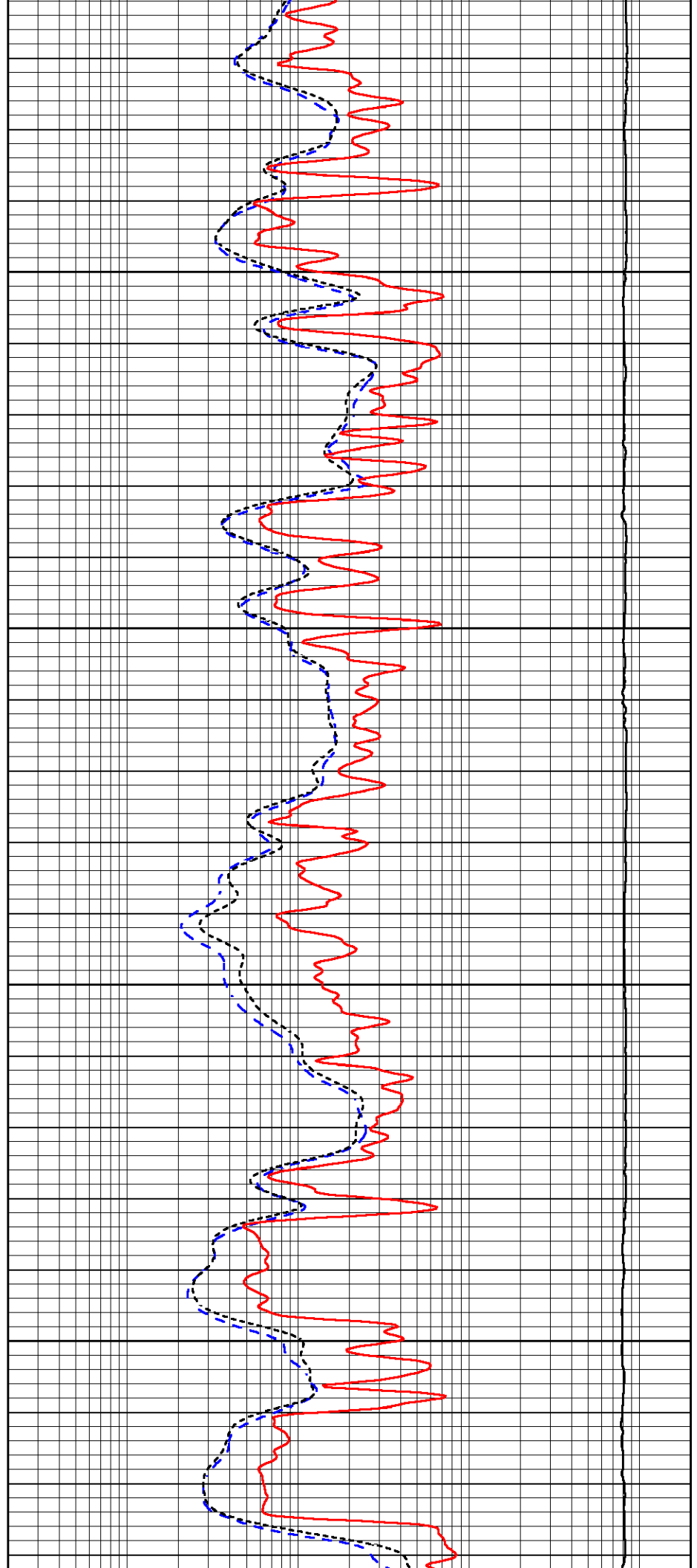


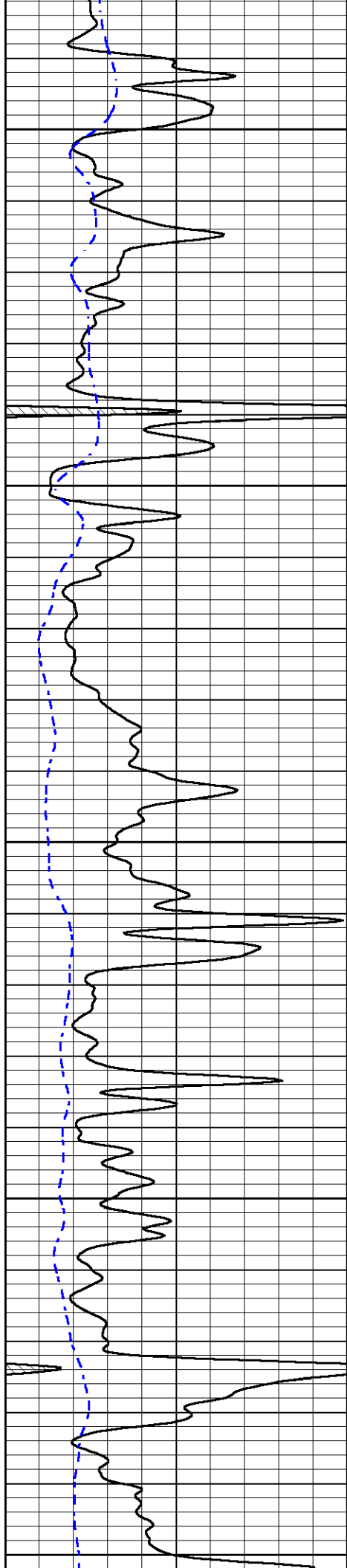
2950

3000

3050

3100





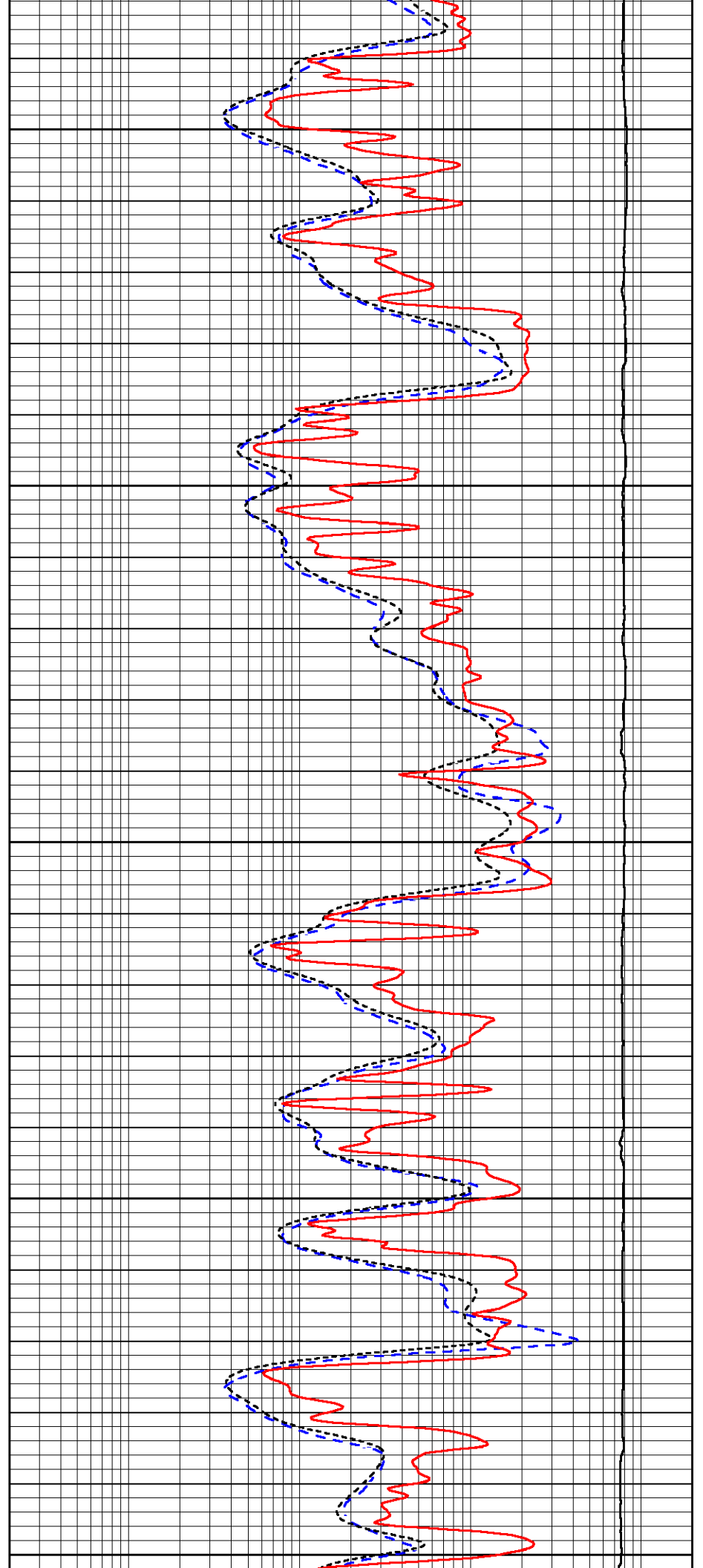
3150

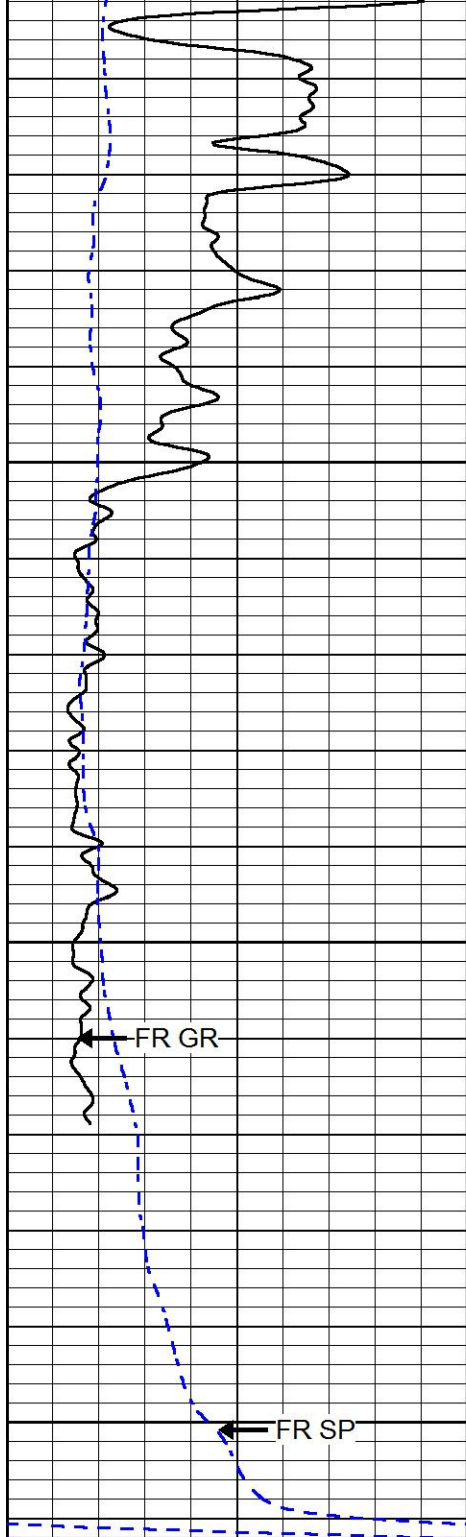
3200

3250

3300

3350





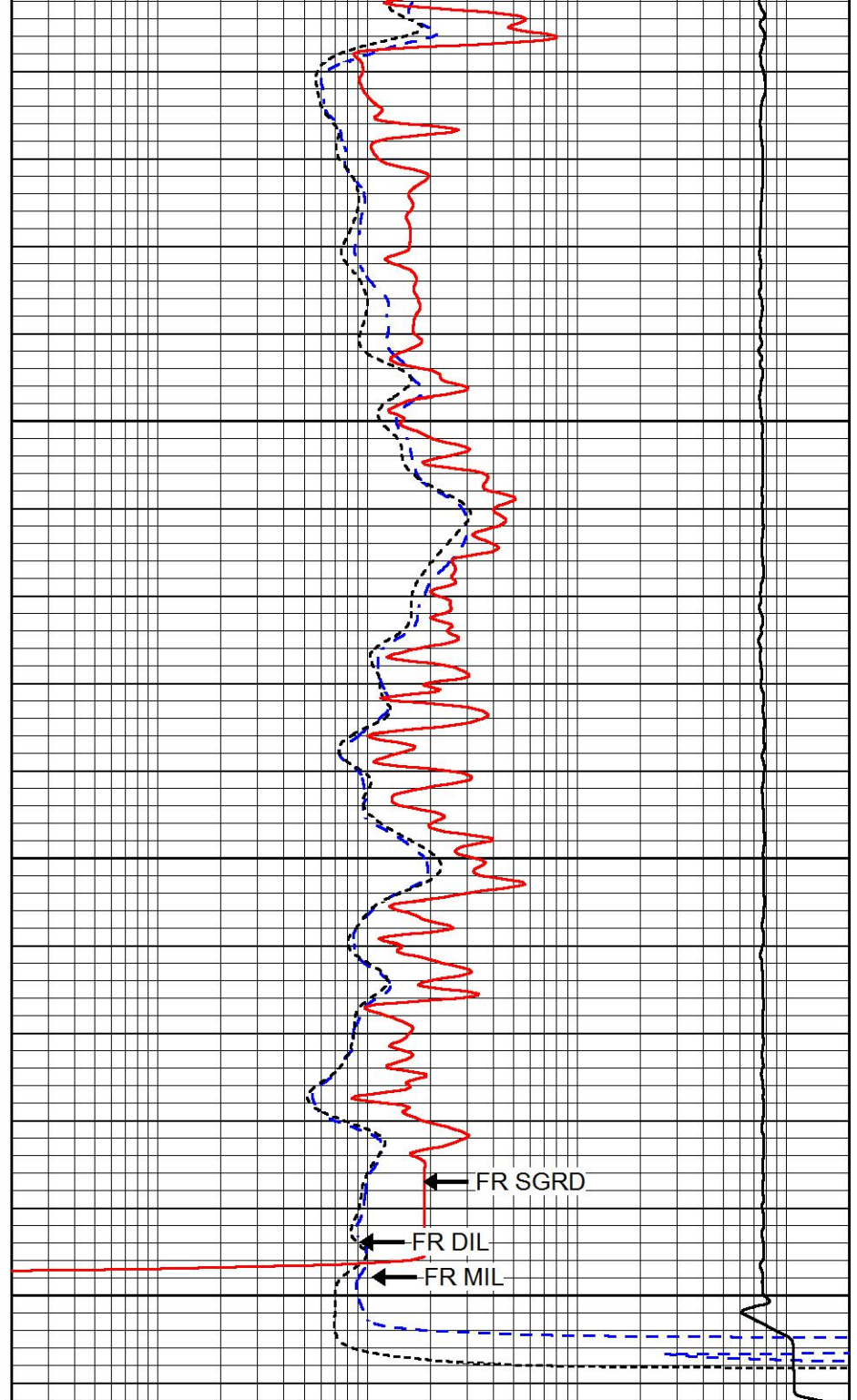
3400

3450

3500

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

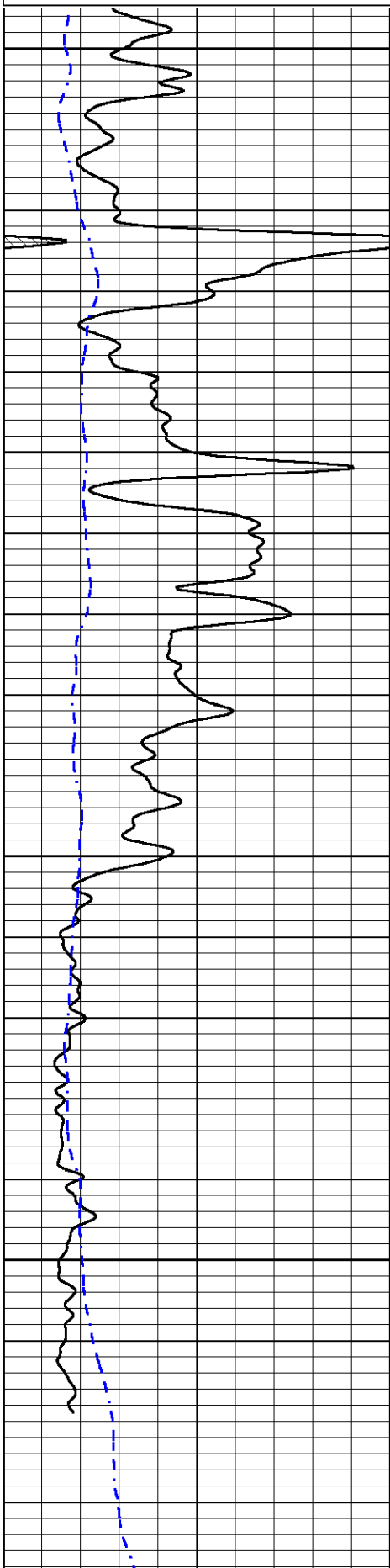


# REPEAT SECTION

Database File tdi\_furthmyer\_4.db  
 Dataset Pathname stackml/pass2.1  
 Presentation Format dil  
 Dataset Creation Thu Nov 15 23:51:08 2018

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

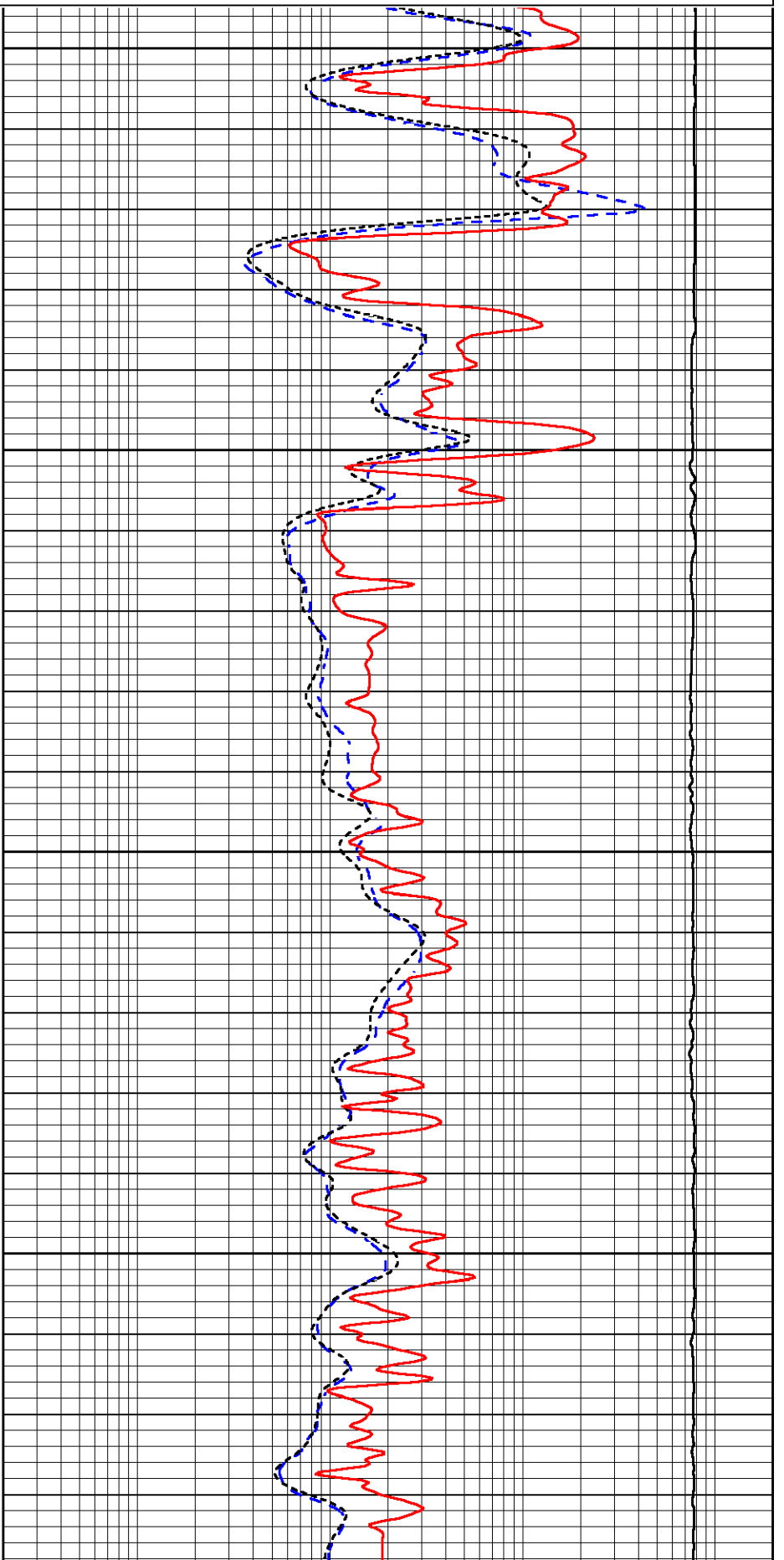


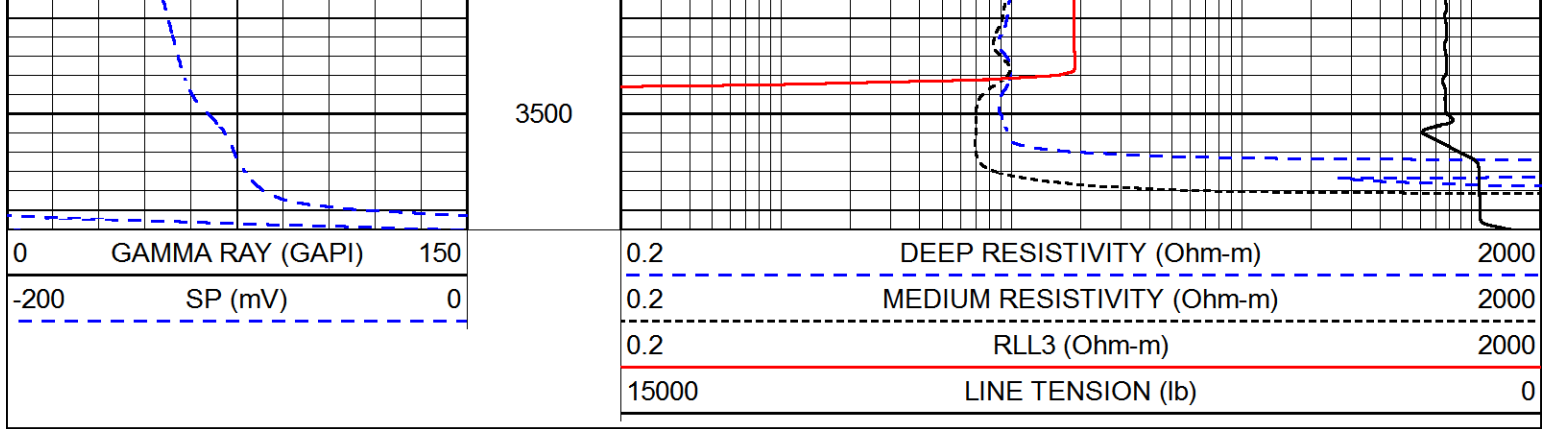
3300

3350

3400

3450





### Calibration Report

Database File      tdi\_furthmyer\_4.db  
 Dataset Pathname   stackml/pass3.1  
 Dataset Creation    Thu Nov 15 23:44:11 2018

### Dual Induction Calibration Report

Serial-Model:                      976-M&W  
 Calibration Performed:          Thu Nov 15 20:52:51 2018

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	167.000	835.000	0.000	255.800	mmho/m	0.620	-17.500
Medium	0.000	1348.000	142.000	255.800	mmho/m	0.430	-40.000

### Microlog Calibration Report

Serial-Model:                      PSI-01-PSI STKBL ML  
 Performed:                          Thu Mar 31 18:14:32 2016

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	22500.0000	-1.0000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	29500.0000	-1.0000
Caliper	1.0001	1.1397	6.5000	18.5000	in	86.0000	-82.4800

### Compensated Density Calibration Report

Serial-Model:                      96-916-M&W  
 Source / Verifier:                  /  
 Master Calibration Performed:    Wed Nov 14 15:40:42 2018

### Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	7965.66	8750.45	cps
Aluminum	2.635	g/cc	1433.52	5335.67	cps

Spine Angle = 73.91

Density/Spine Ratio = 0.493

Size

Reading

Small Ring  
Large Ring

4.00 in  
14.00 in

2.61  
1.67

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 TDI, INC.  
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Field DREILING EAST  
County ELLIS  
State KANSAS