



DUAL INDUCTION LOG

Company COBALT ENERGY LLC
 Well RADNOR A #1-30
 Field N/A
 County LOGAN
 State KANSAS

Company COBALT ENERGY LLC
 Well RADNOR A #1-30
 Field N/A
 County LOGAN State KANSAS

Location: API #: 15-109-21540-00-00
 NE NW SE SW
 1218' FSL & 1878' FWL
 SEC 30 TWP 15S RGE 33W
 Permanent Datum GROUND LEVEL Elevation 2925'
 Log Measured From KELLY BUSHING
 Drilling Measured From KELLY BUSHING

Other Services
 CNL/CDL
 MEL

Date	4/6/2018
Run Number	ONE
Depth Driller	4680'
Depth Logger	4681'
Bottom Logged Interval	4680'
Top Log Interval	200'
Casing Driller	8.625" @ 218'
Casing Logger	216'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	8000
Density / Viscosity	9.3 67
pH / Fluid Loss	9.5 11.2
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.3 @ 62
Rmt @ Meas. Temp	.23 @ 62
Rmc @ Meas. Temp	0.41 @ 62
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.15 @ 123
Operating Rig Time	2 1/2 HOURS
Max Rec. Temp. F	123 DEG F
Equipment Number	108
Location	HAYS
Recorded By	T. MARTIN
Witnessed By	COREY BAKER

<<< Fold Here >>>

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.

PENCE, 2 E TO EAGLE RD, 4.5 N, E AND S 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: T. MARTIN	Operator:	Primary Witness: COREY BAKER	Secondary Witness:
Operator:	Operator:	Secondary Witness:	Secondary Witness:
Operator:		Secondary Witness:	

Company	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
---------	-------------	-----------	-------------	-------------	-----------	-------------

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		DIL-M&W (PSI 978)	18.50	3.50	220.00
CILD	8.00		CILD	8.00		
CILM	4.70		CILM	4.70		
SP	0.20		SP	0.20		

Dataset: cobalt_radnor a_#1-30.db: field/well/stkml/pass3.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

Log Variables

Database: C:\ProgramData\Warrior\Data\cobalt_radnor_a_#1-30.db
 Dataset: field/well/stkml/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	-310	50	Off	4681

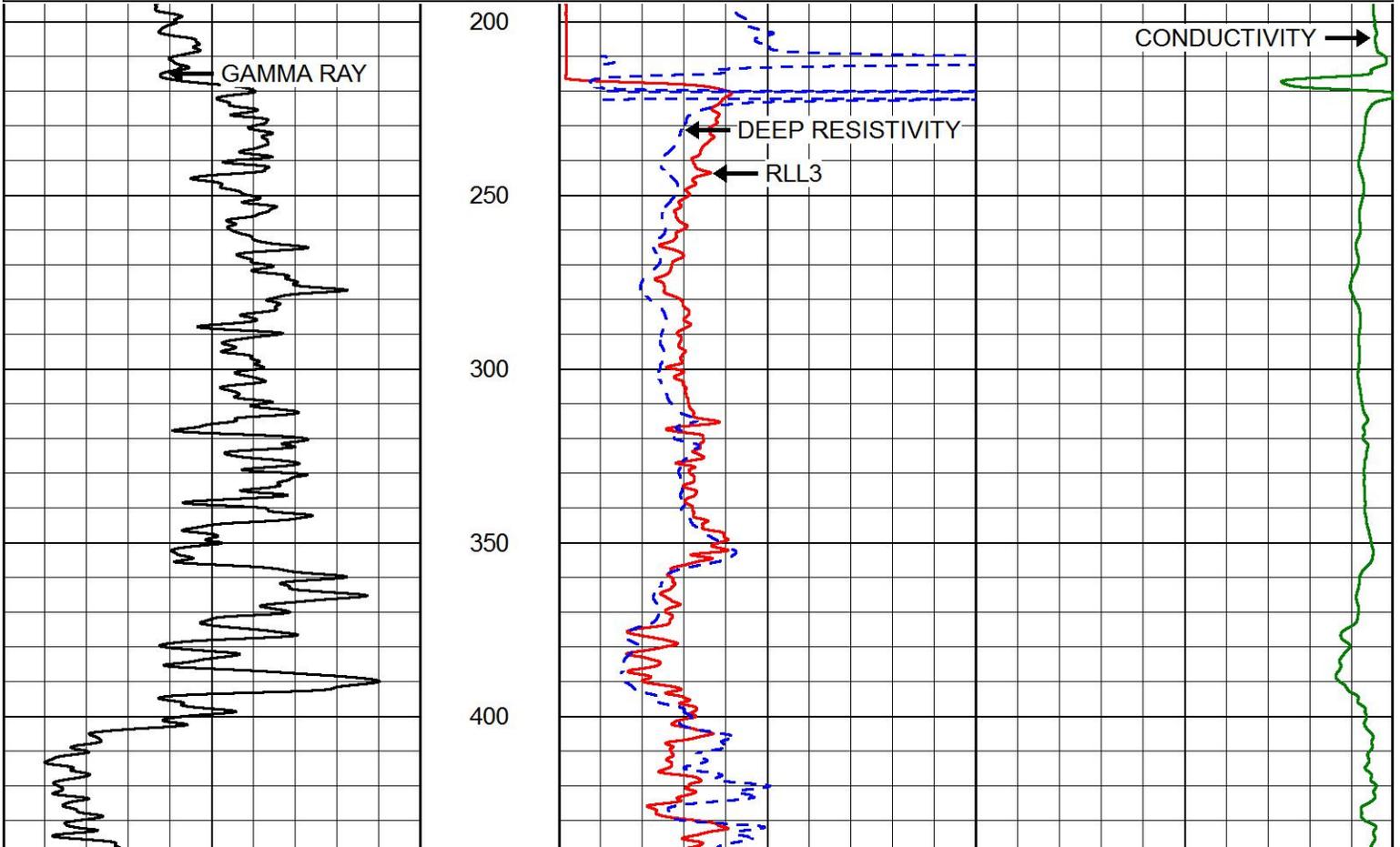


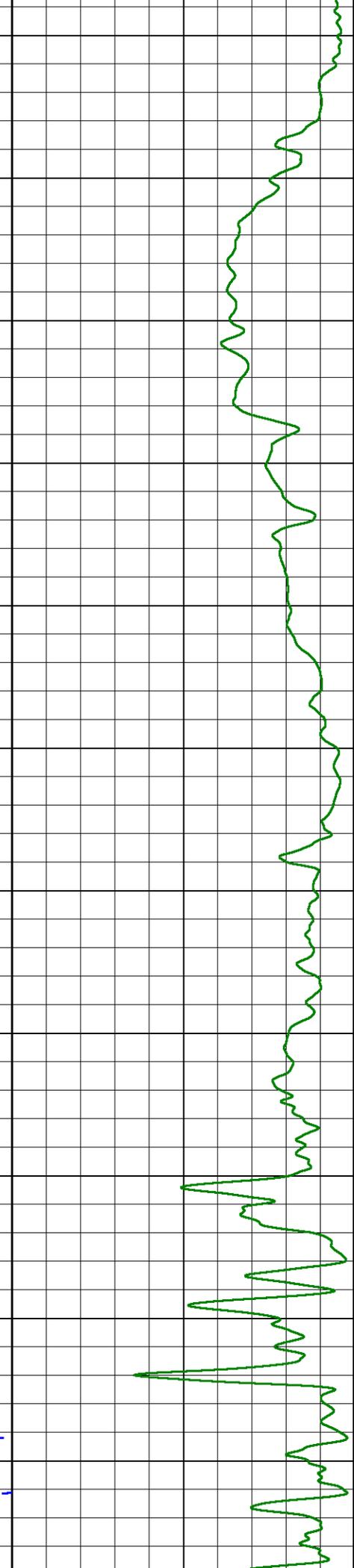
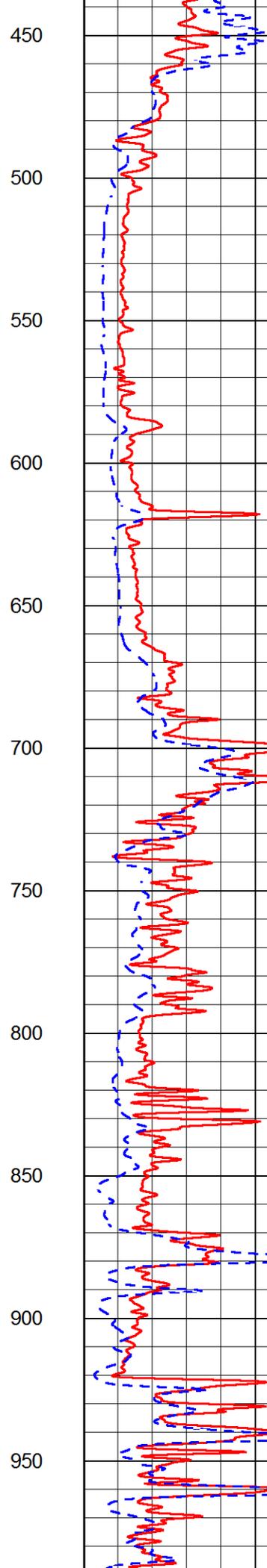
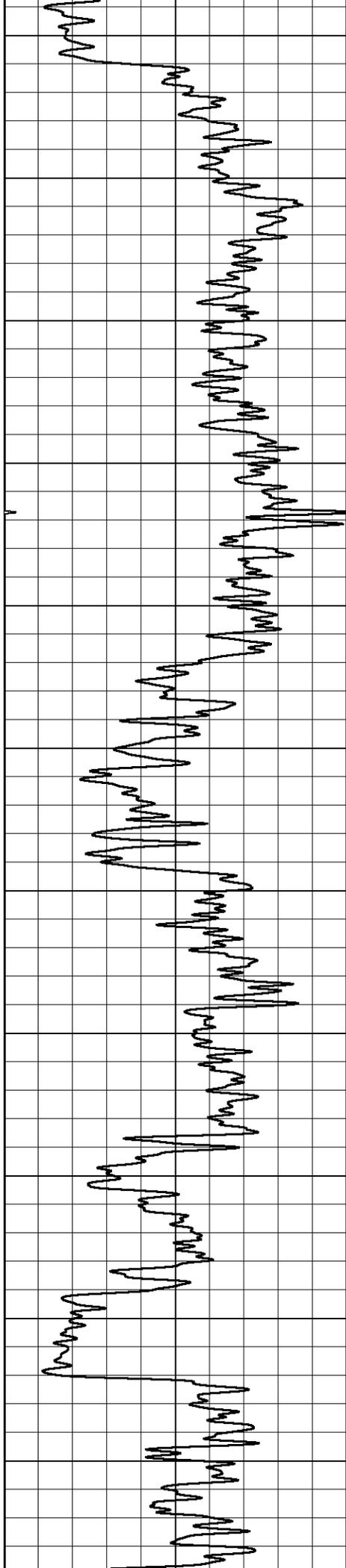
2" SCALE RESISTIVITY

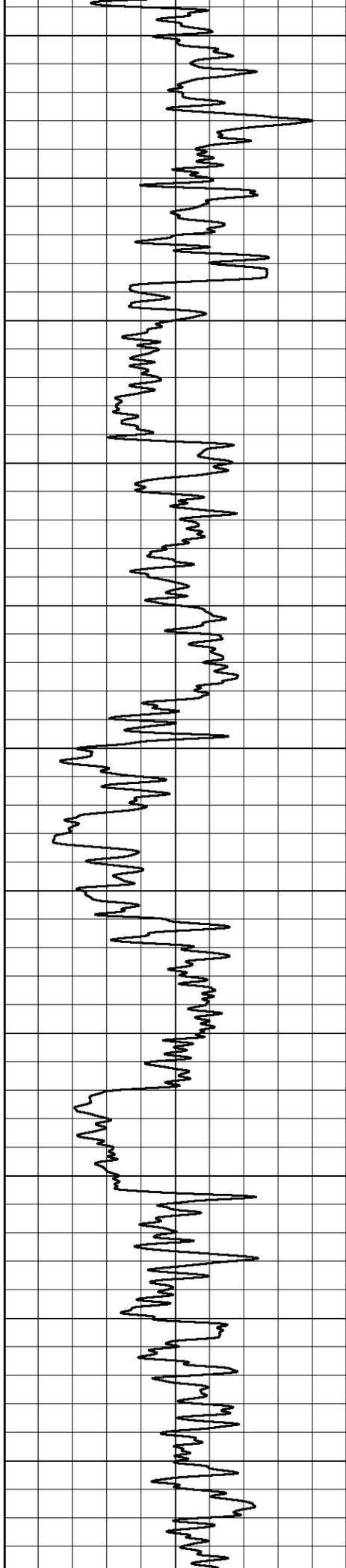
MAIN PASS

Database File: cobalt_radnor_a_#1-30.db
 Dataset Pathname: stkml/pass3.2
 Presentation Format: dil2in
 Dataset Creation: Sat Apr 07 00:42:07 2018
 Charted by: Depth in Feet scaled 1:600

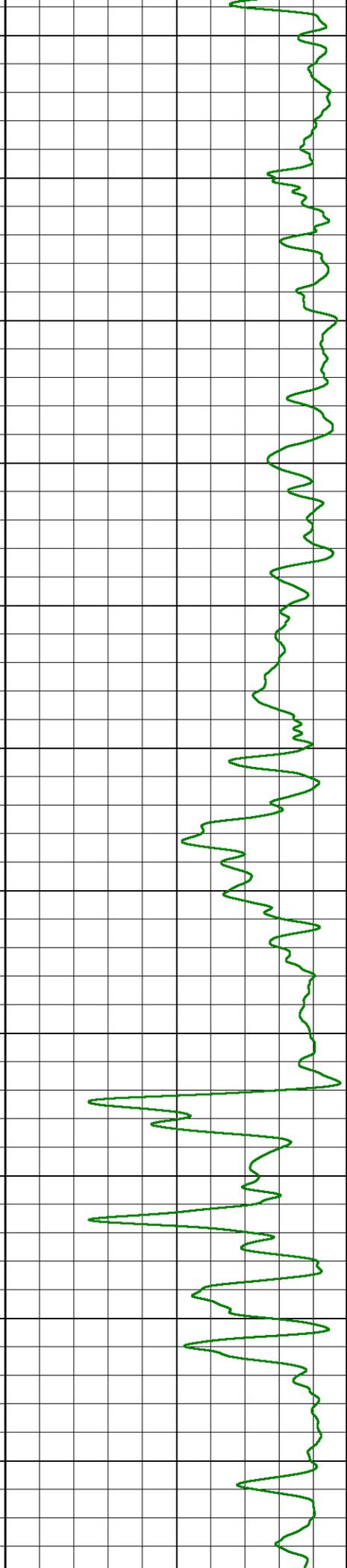
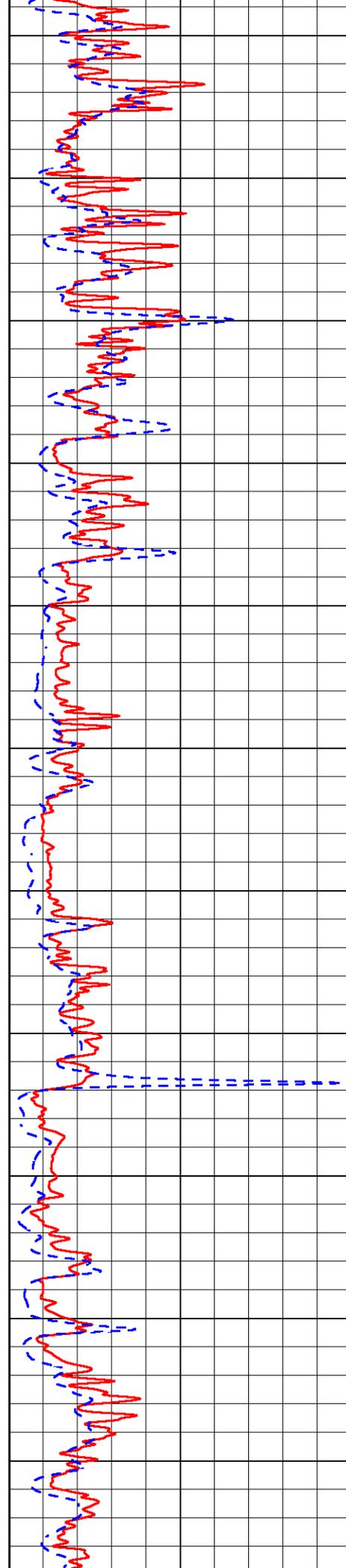
0	GAMMA RAY (GAPI)	150	2000	CONDUCTIVITY (mmho/m)	0
0	RLL3 (Ohm-m)	50	0	DEEP RESISTIVITY (Ohm-m)	50
50	RLL3 (Ohm-m)	500	50	DEEP RESISTIVITY	500
50	(Ohm-m)	500	50	(Ohm-m)	500

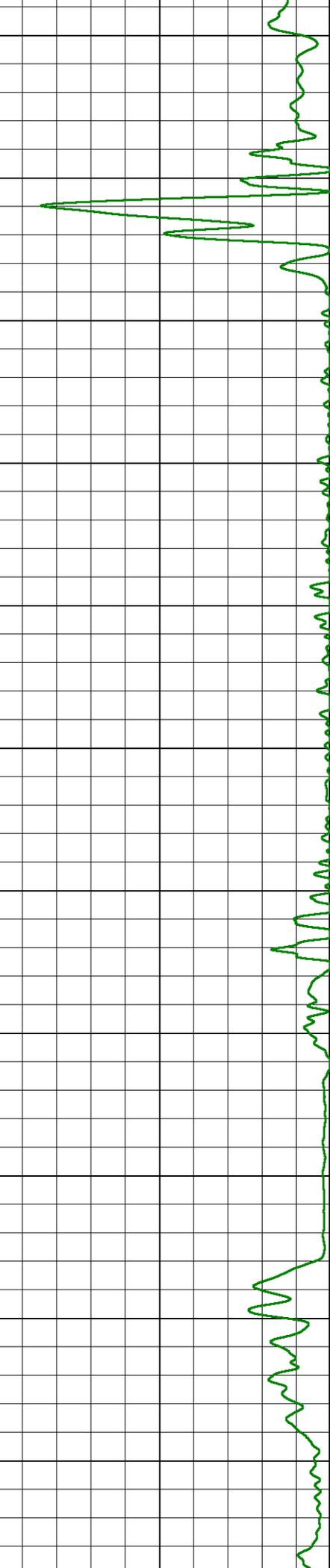
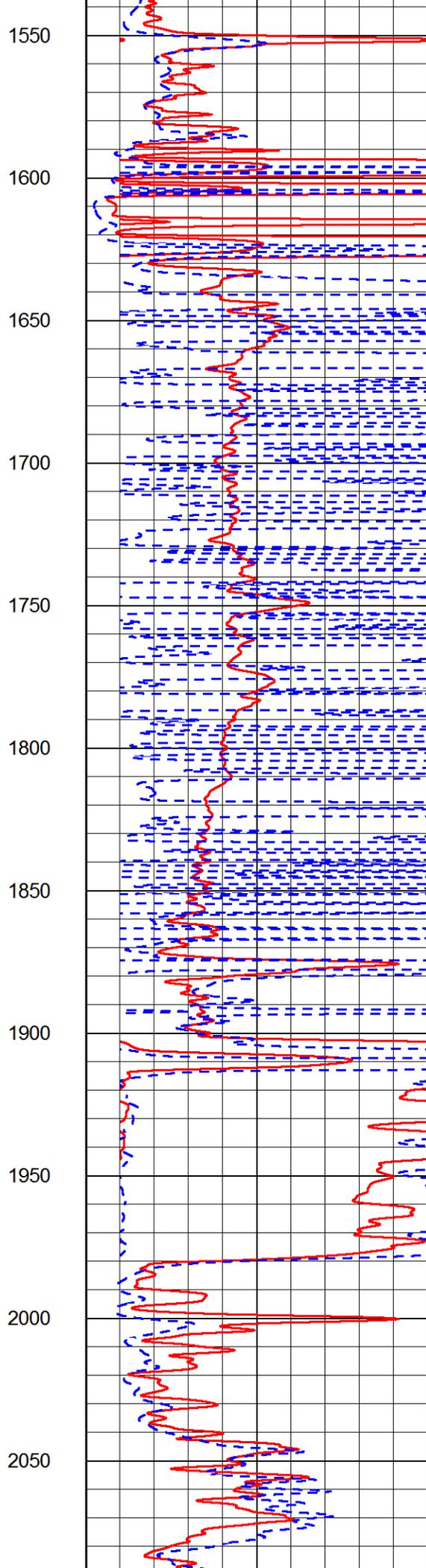
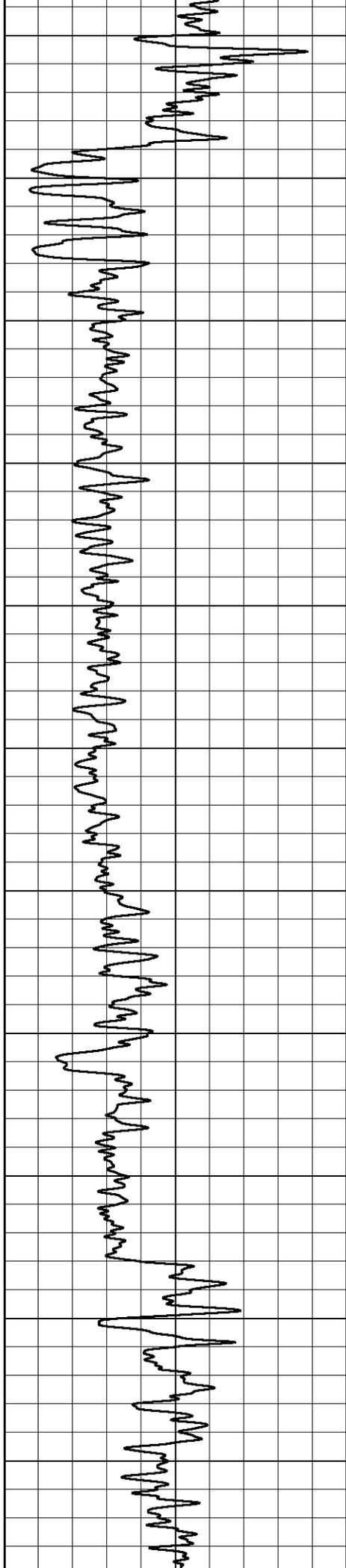


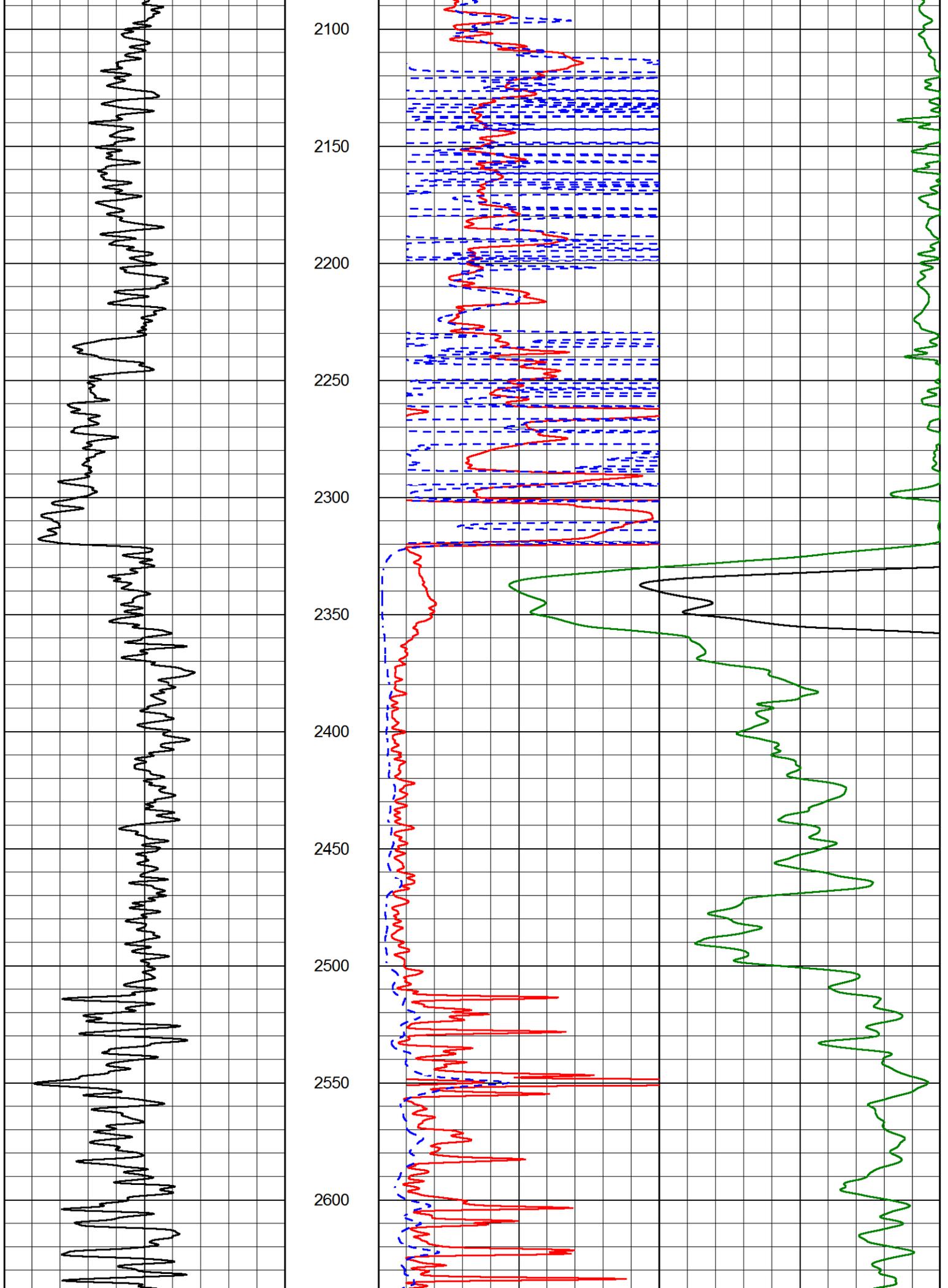


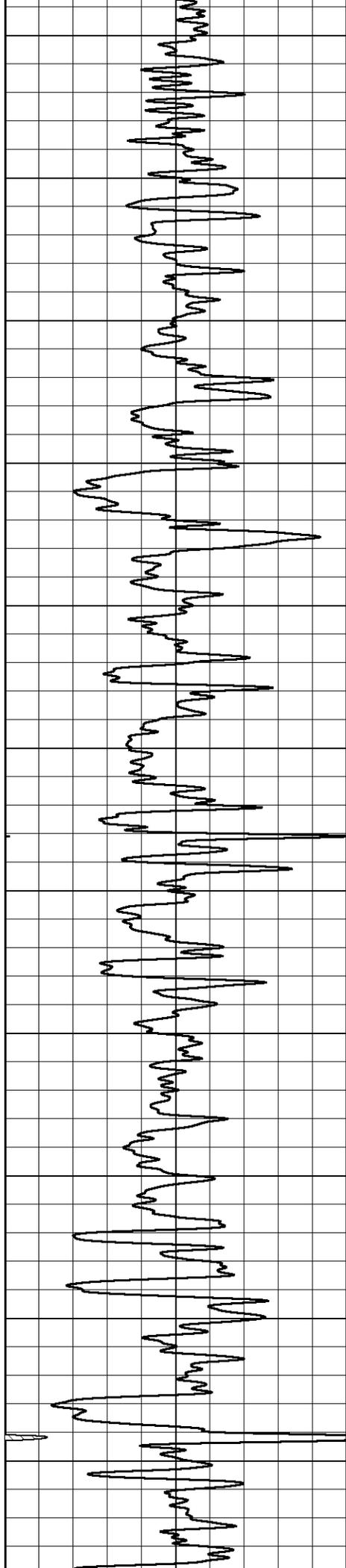


1000
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500









2650

2700

2750

2800

2850

2900

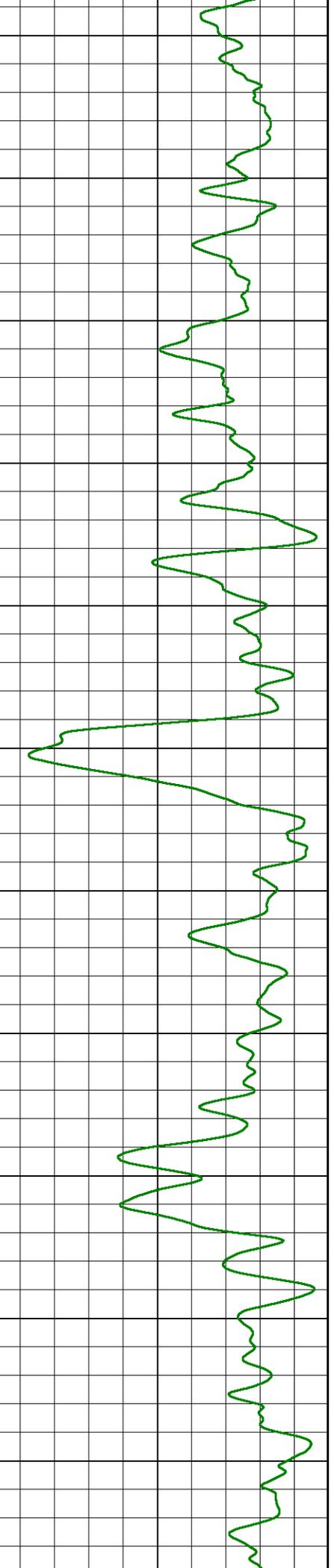
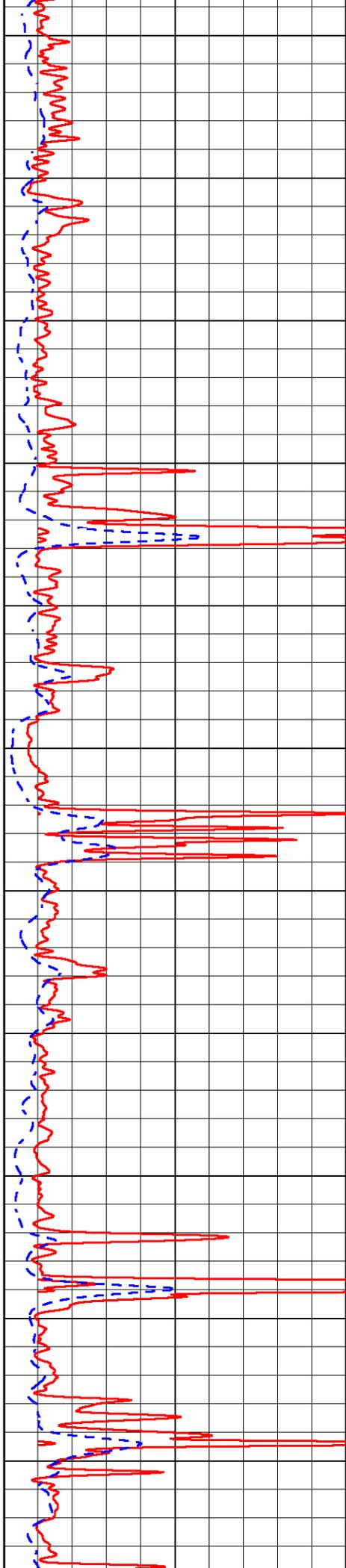
2950

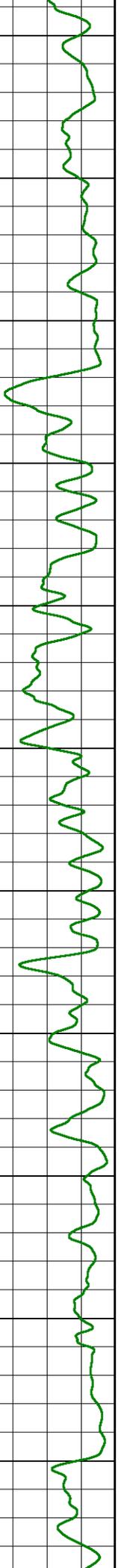
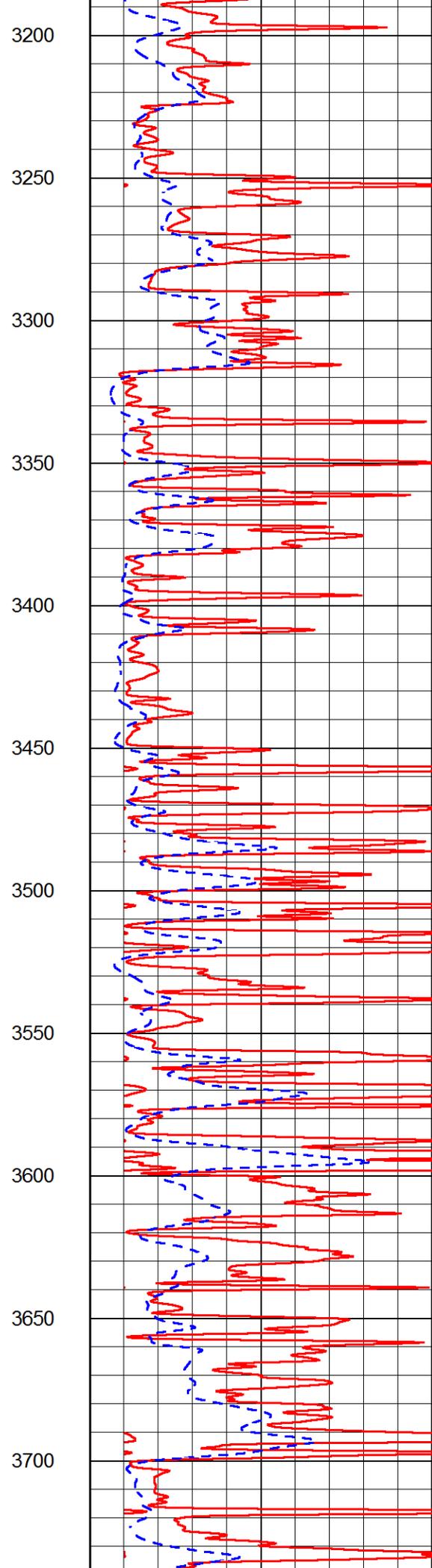
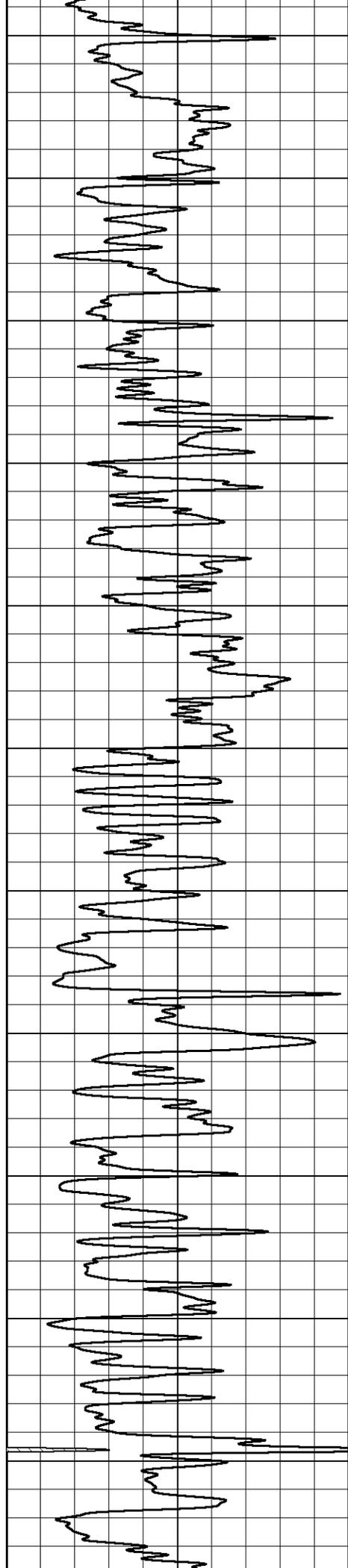
3000

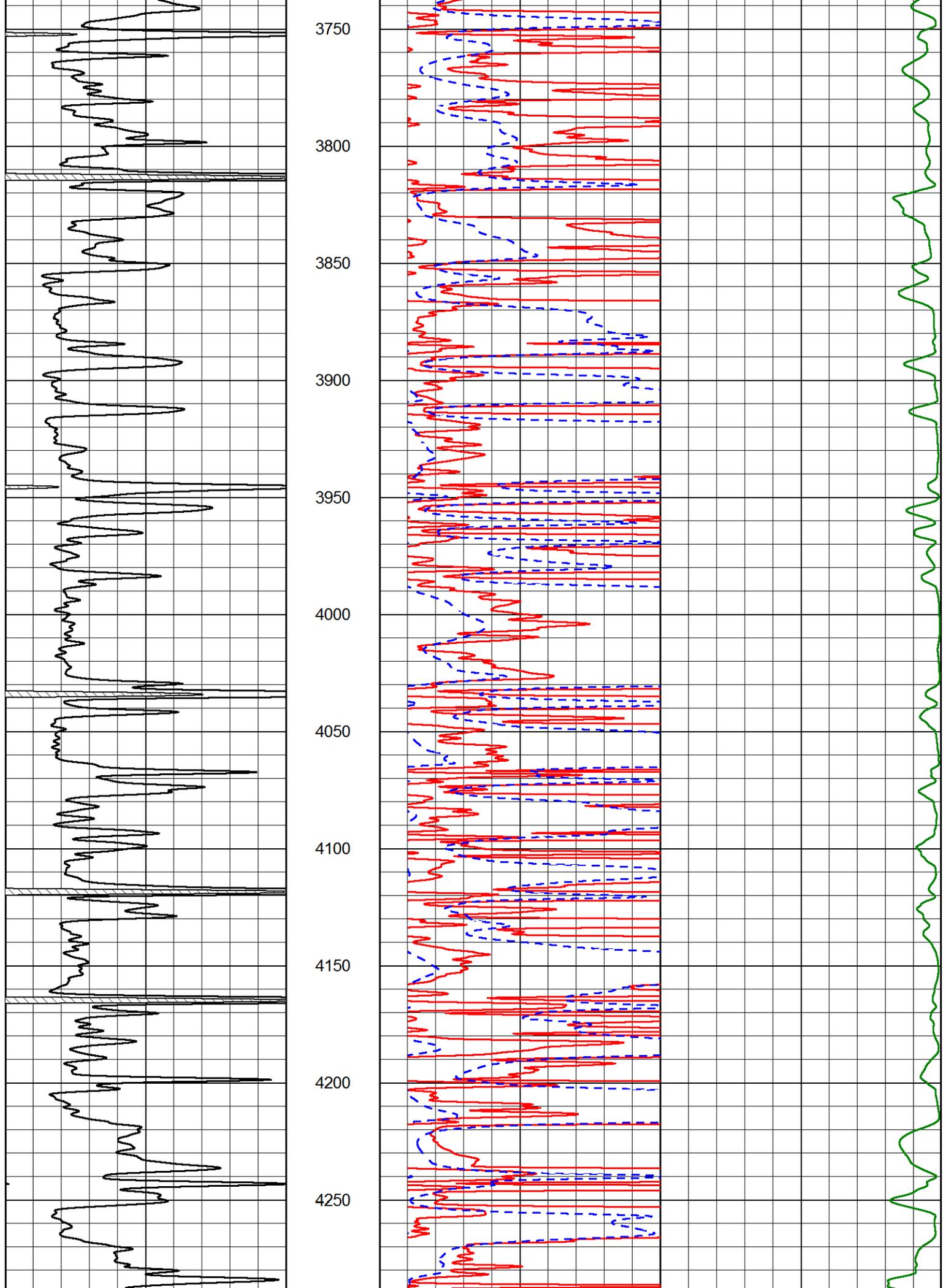
3050

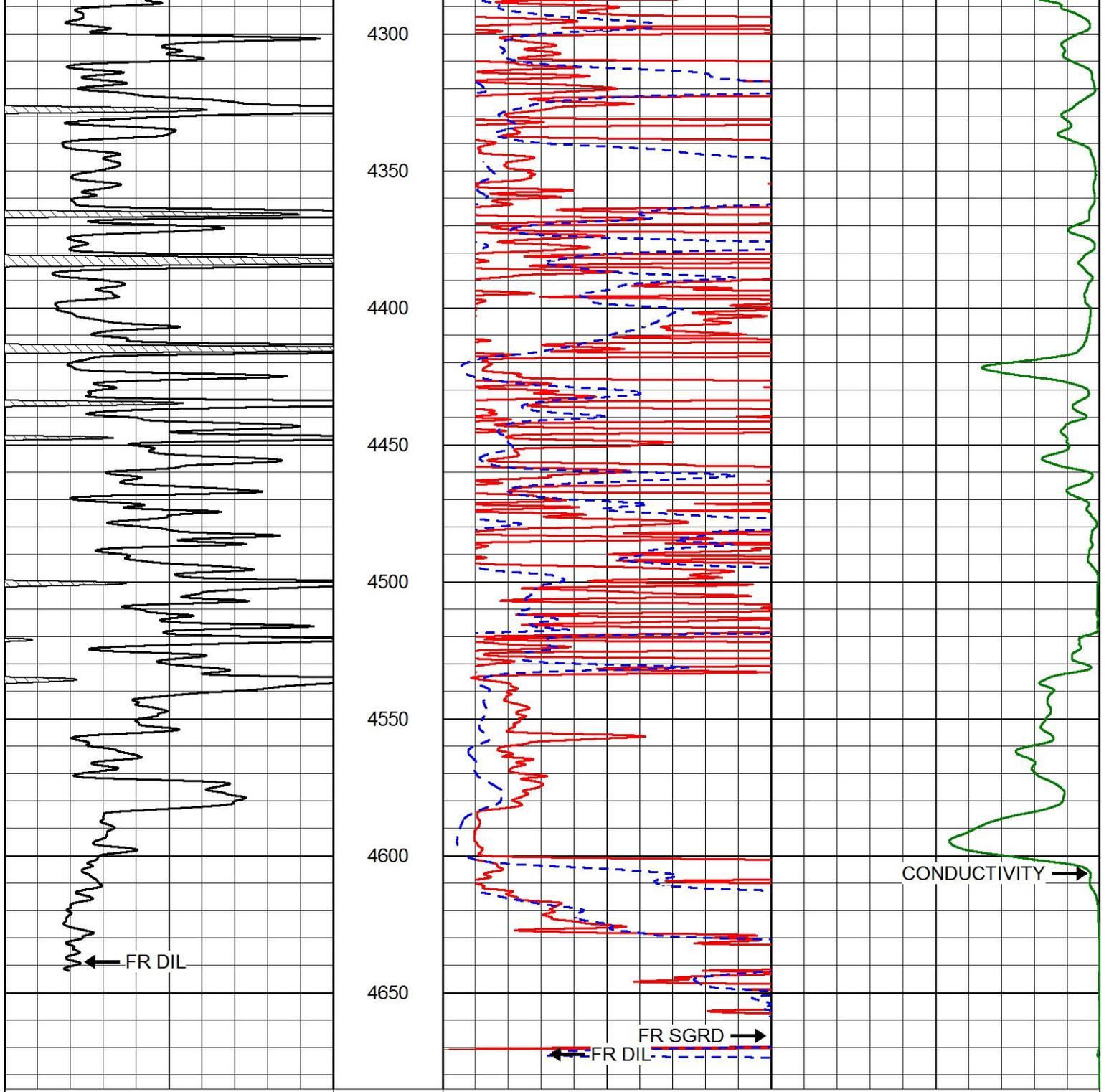
3100

3150









0 GAMMA RAY (GAPI) 150

2000 CONDUCTIVITY (mmho/m) 0

0	RLL3 (Ohm-m)	50
0	DEEP RESISTIVITY (Ohm-m)	50
50	RLL3 (Ohm-m)	500
50	DEEP RESISTIVITY (Ohm-m)	500

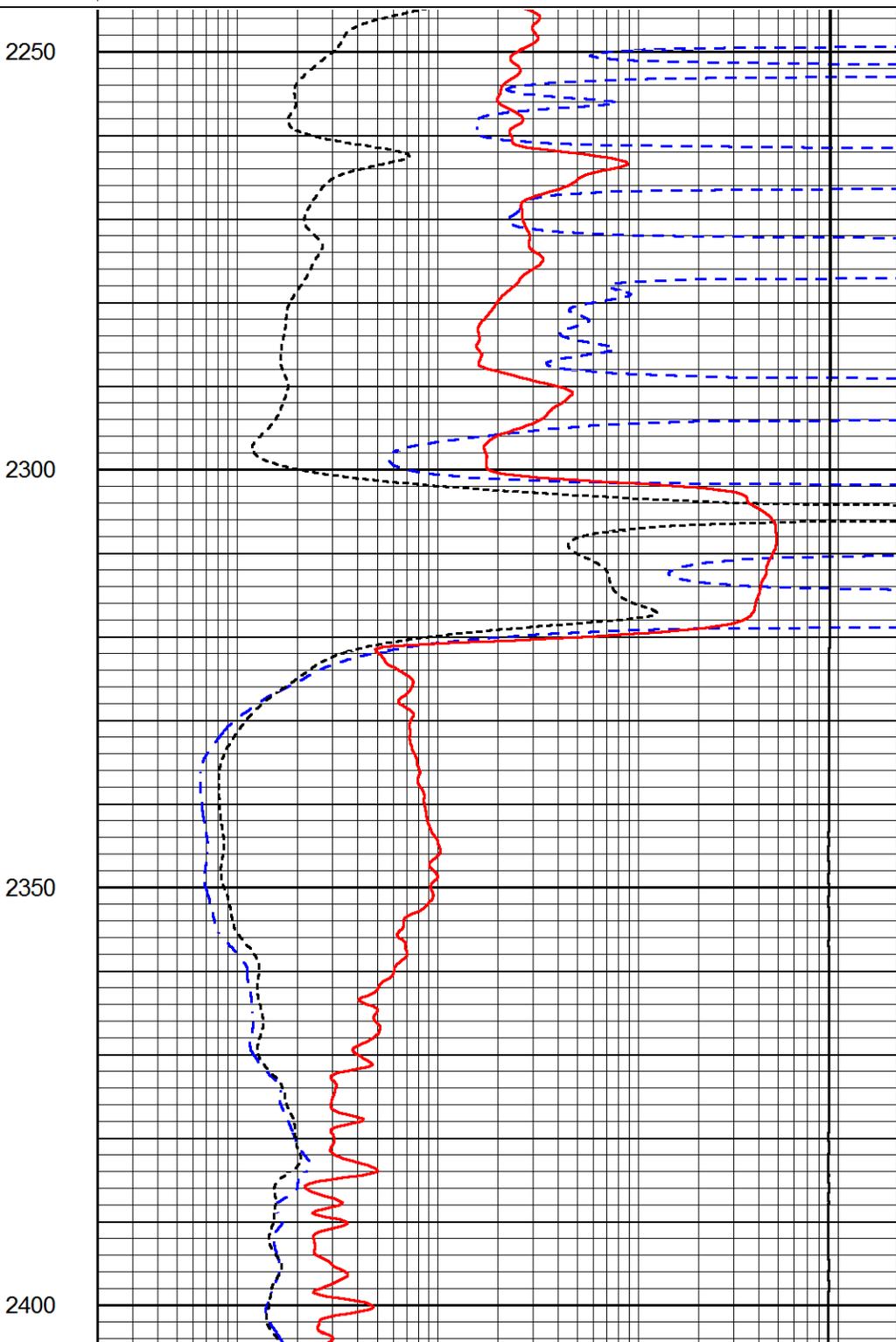
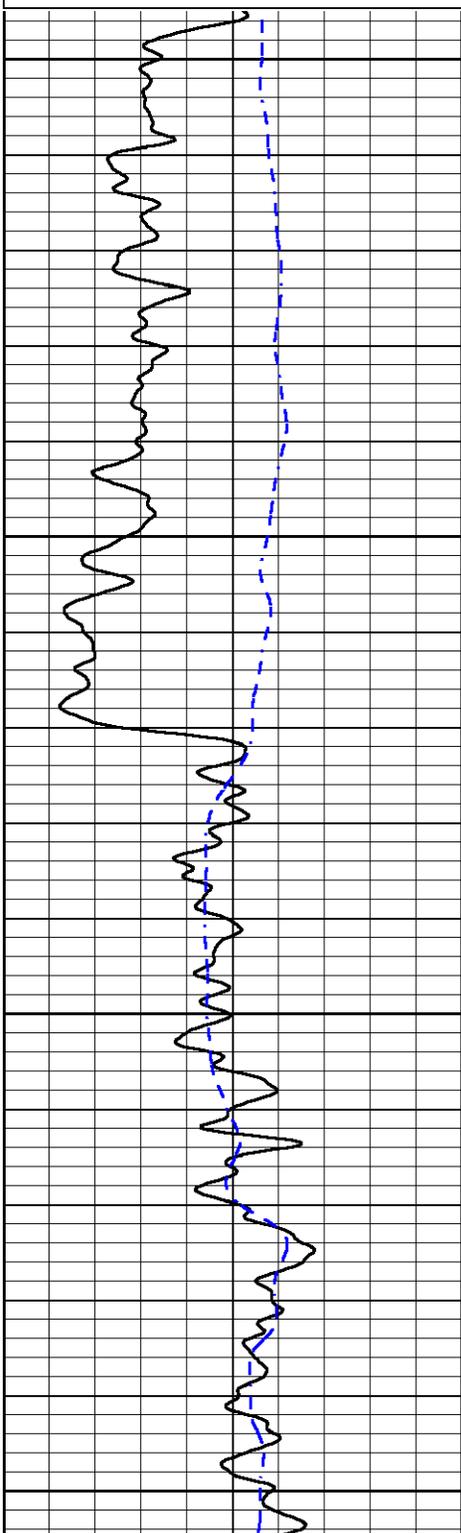


ANHYDRITE SECTION

MAIN PASS

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



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

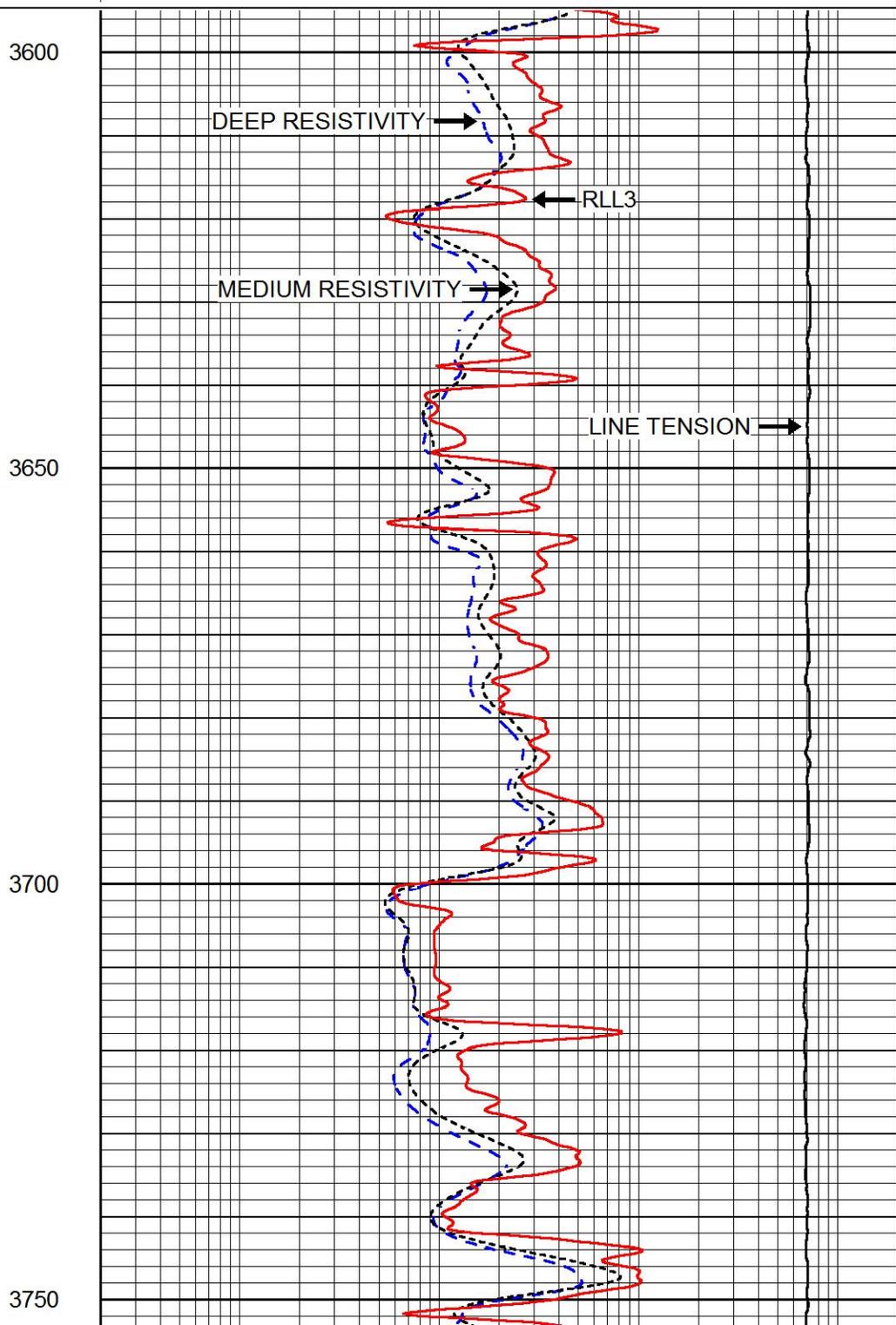
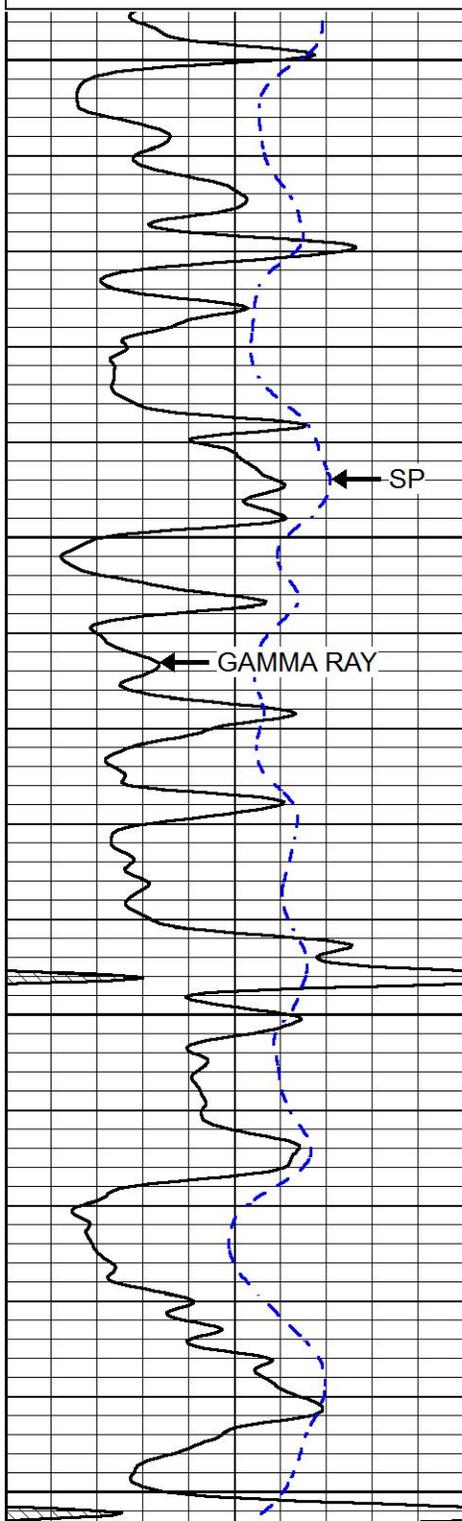
0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0

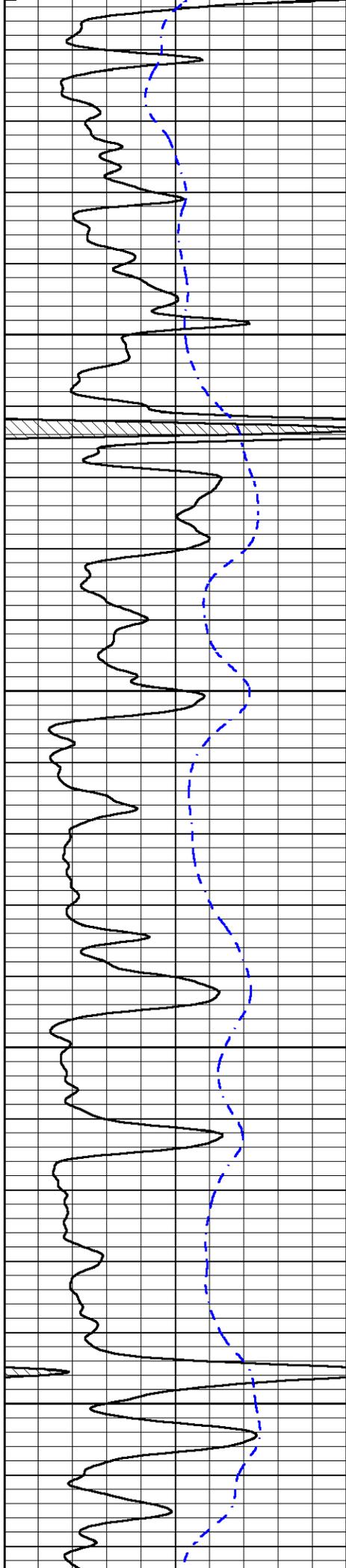
MAIN PASS

Database File cobalt_radnor a_#1-30.db
 Dataset Pathname stkml/pass3.1
 Presentation Format dil
 Dataset Creation Sat Apr 07 00:42:18 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



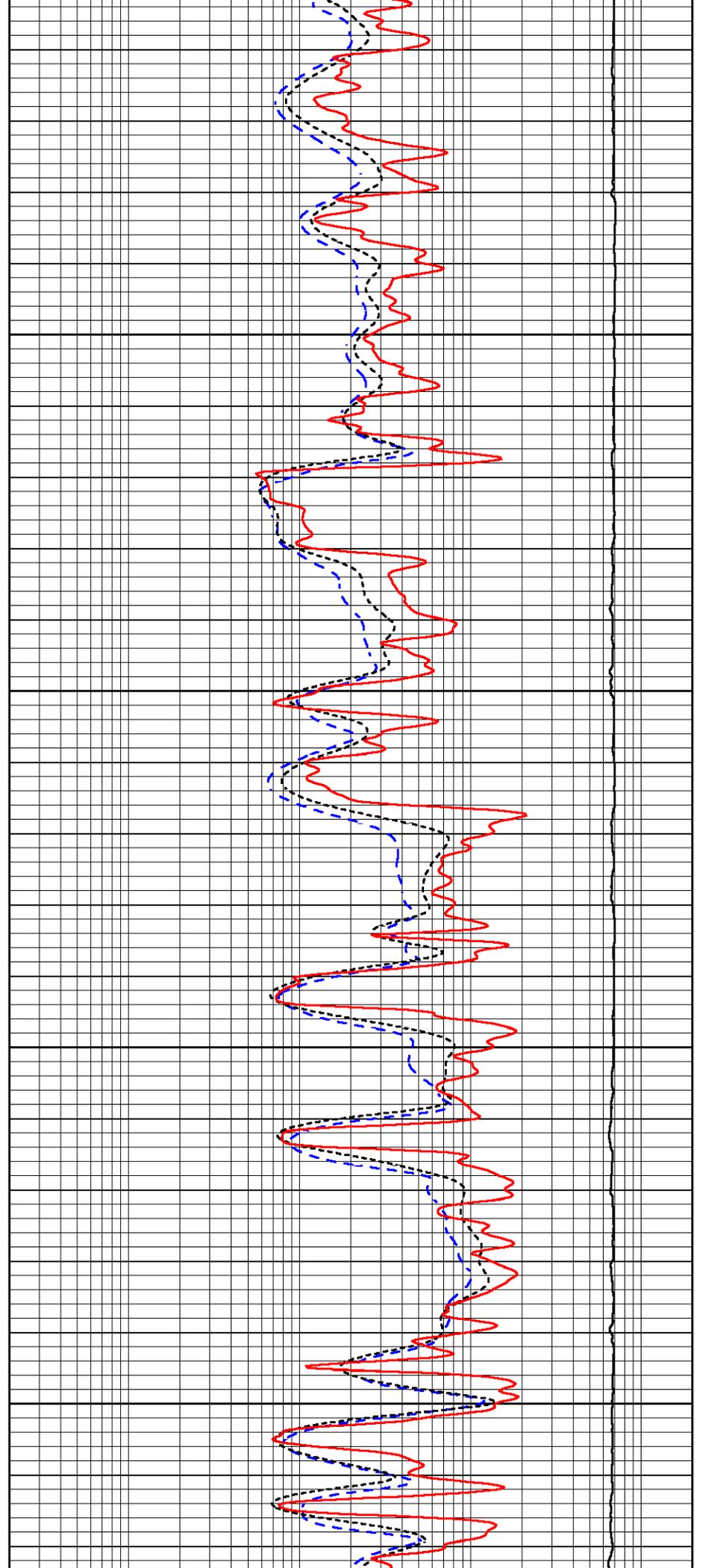


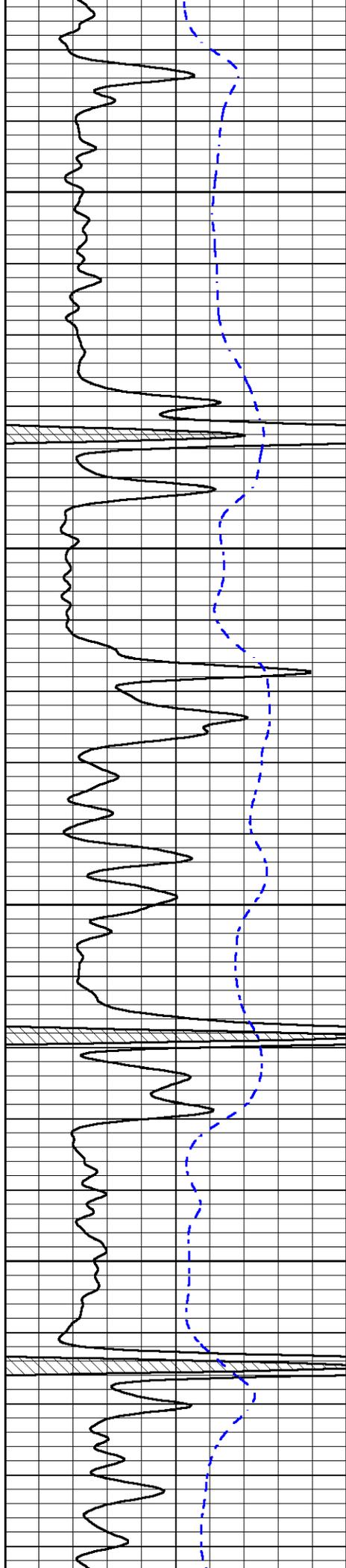
3800

3850

3900

3950



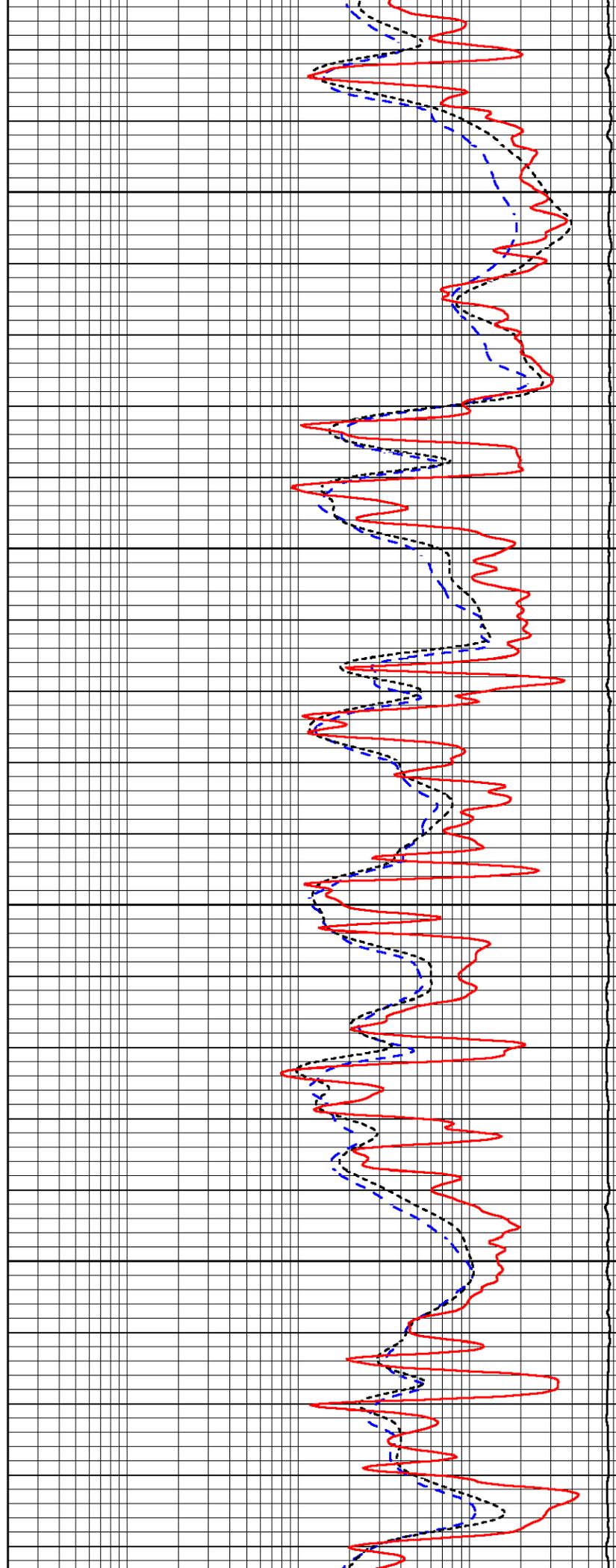


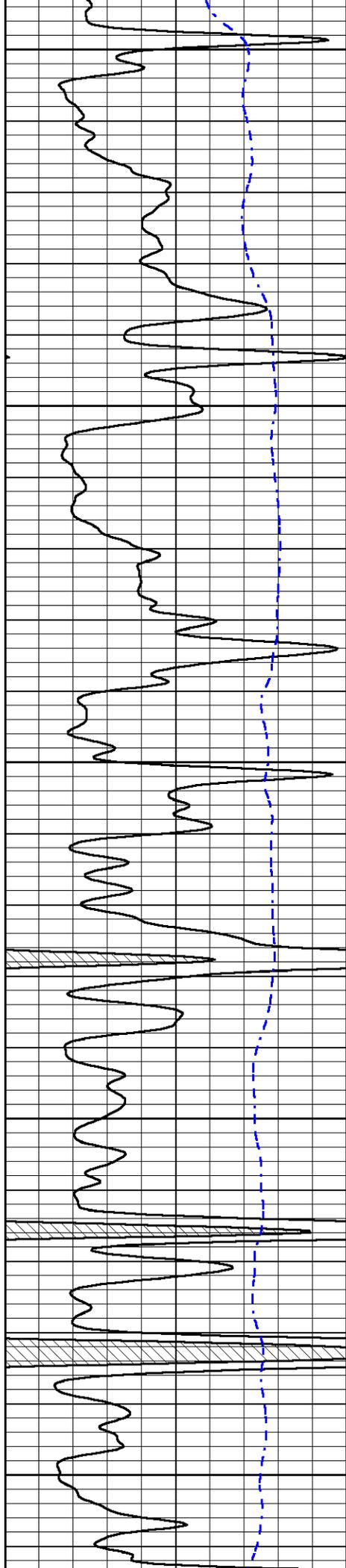
4000

4050

4100

4150





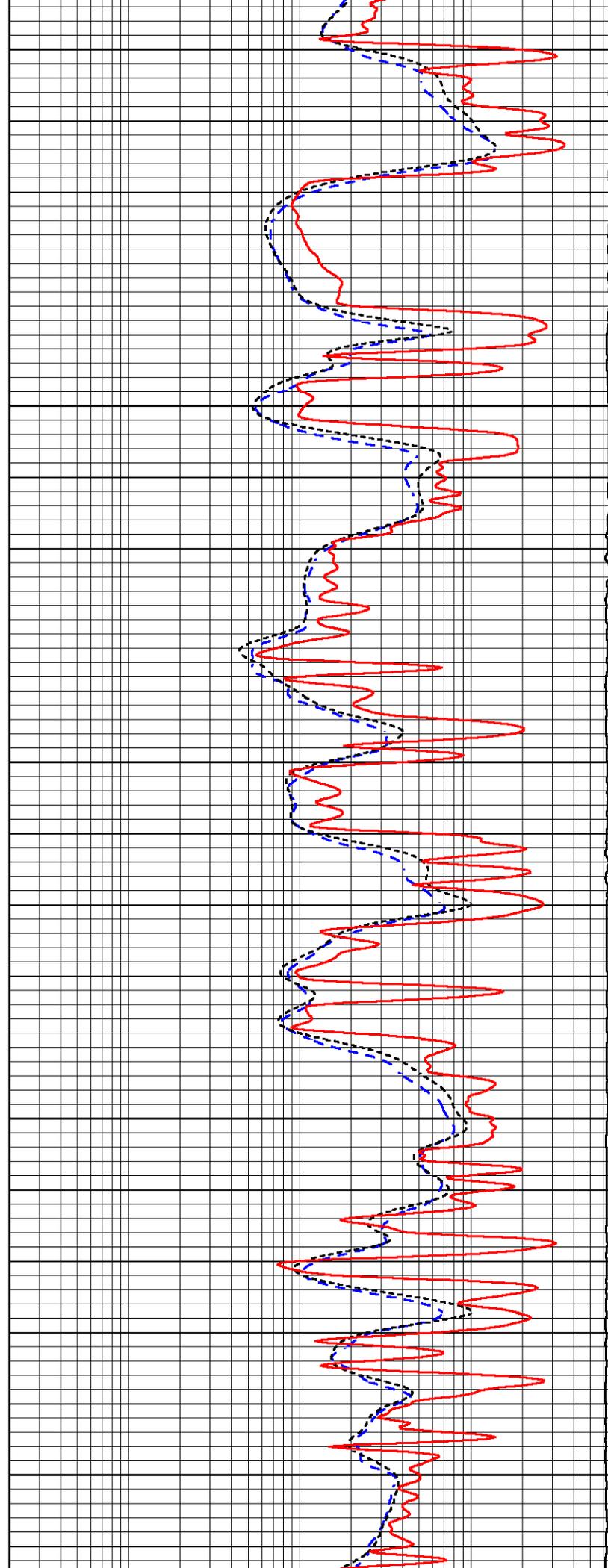
4200

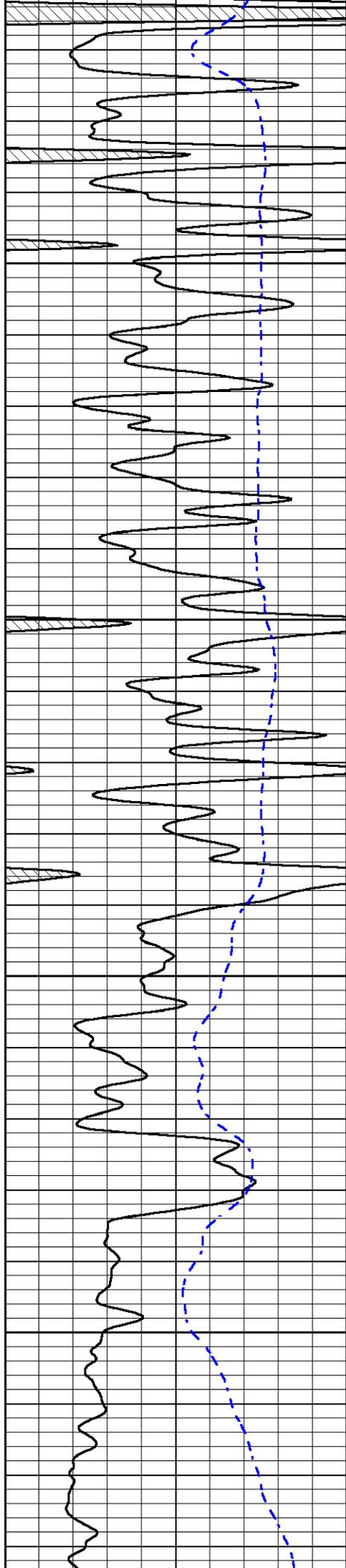
4250

4300

4350

4400



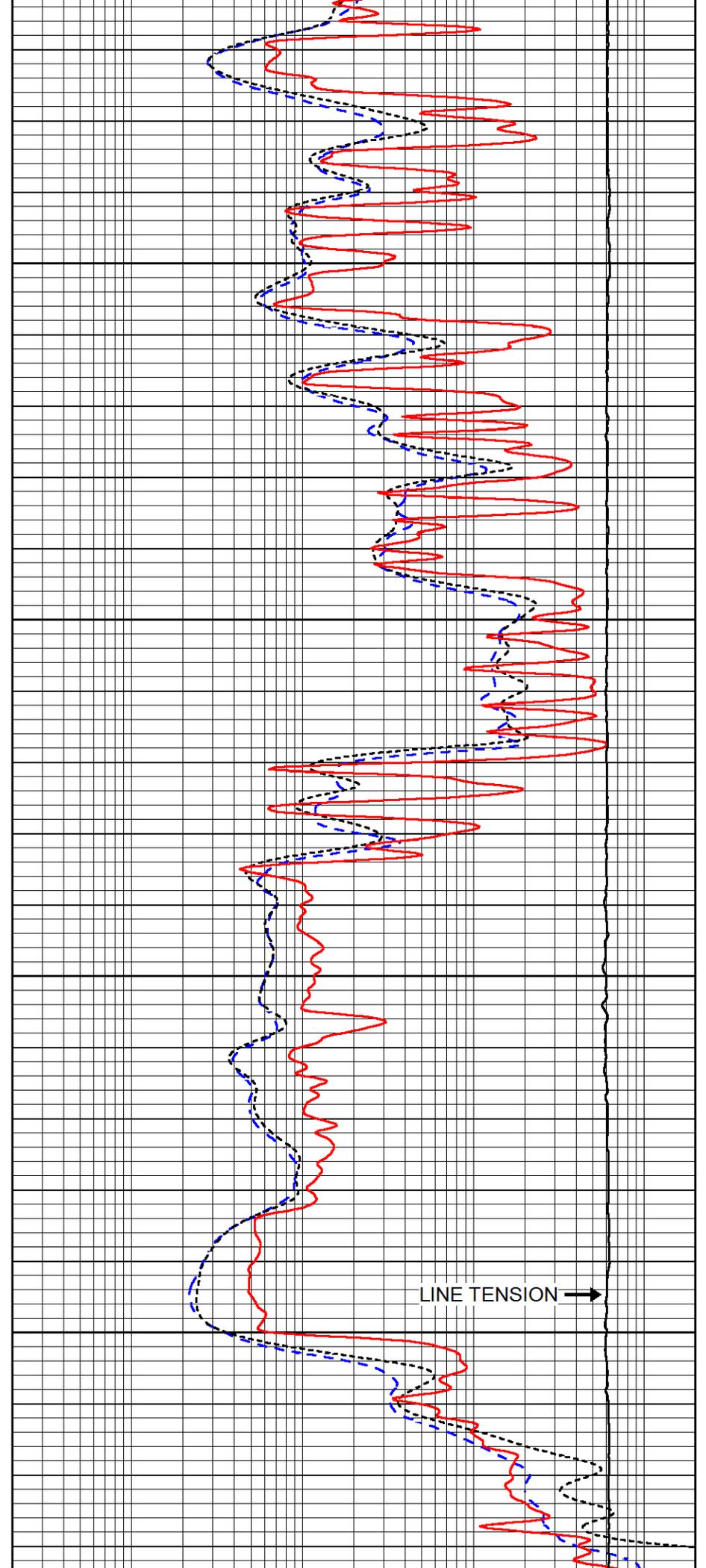


4450

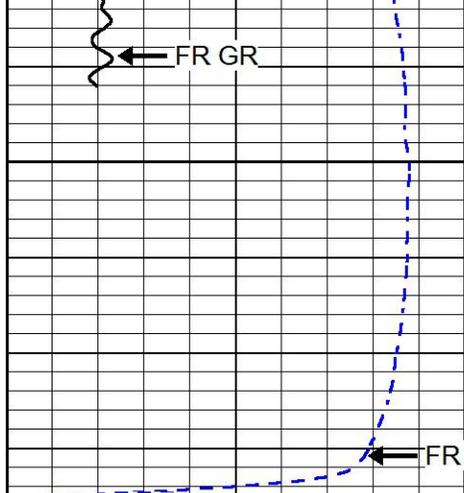
4500

4550

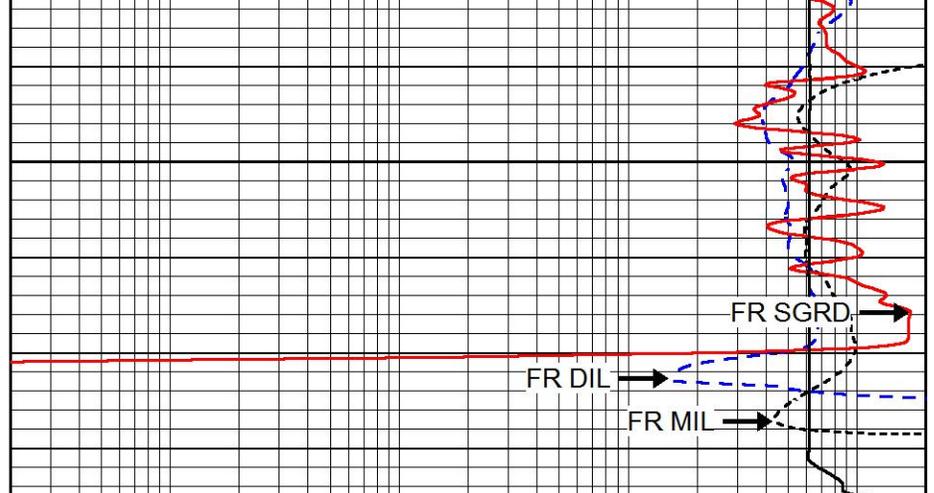
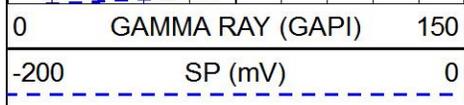
4600



LINE TENSION →



4650

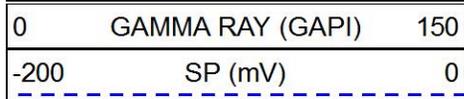


0.2	DEEP RESISTIVITY (Ohm-m)	2000
0.2	MEDIUM RESISTIVITY (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
15000	LINE TENSION (lb)	0



REPEAT SECTION

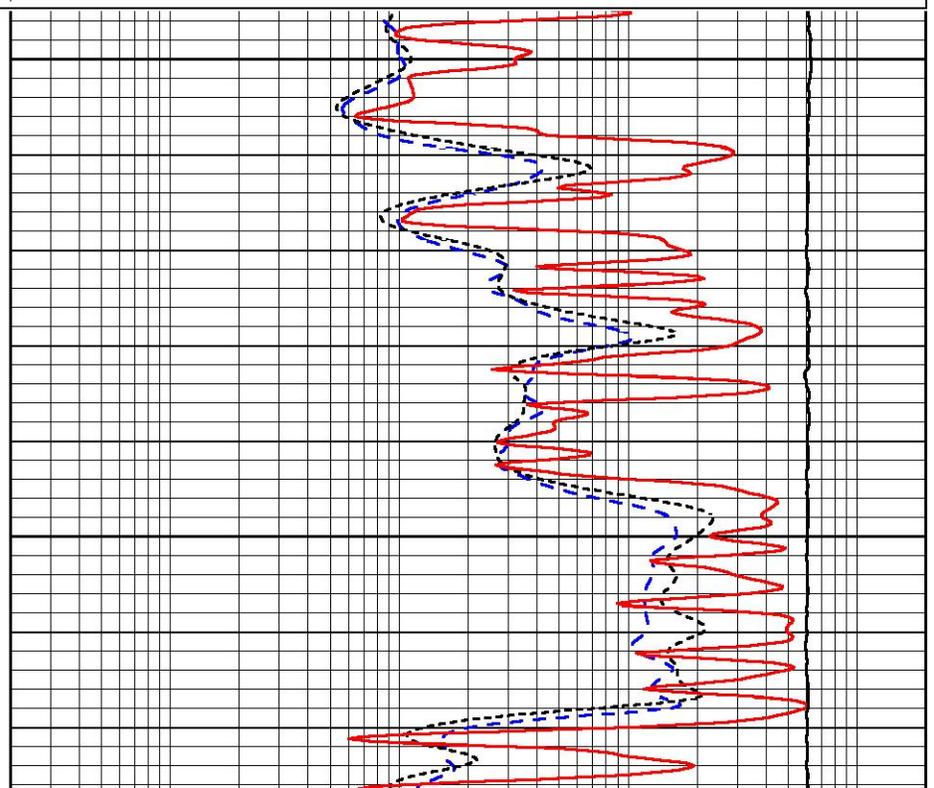
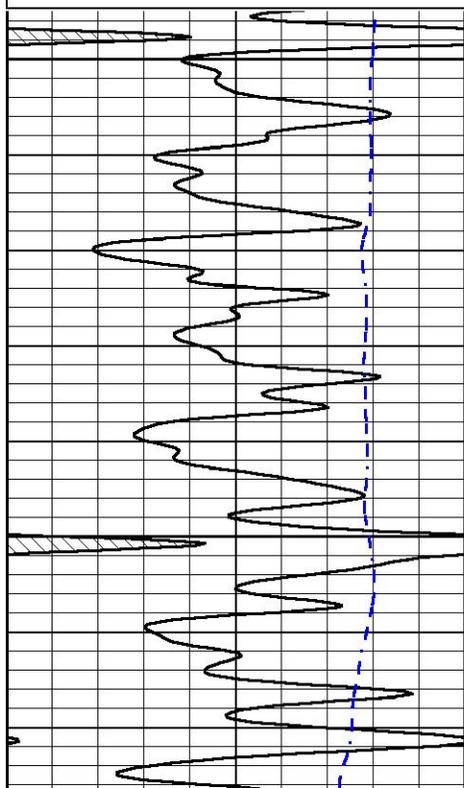
Database File cobalt_radnor a_#1-30.db
 Dataset Pathname stkml/pass2.1
 Presentation Format dil
 Dataset Creation Sat Apr 07 00:18:24 2018
 Charted by Depth in Feet scaled 1:240

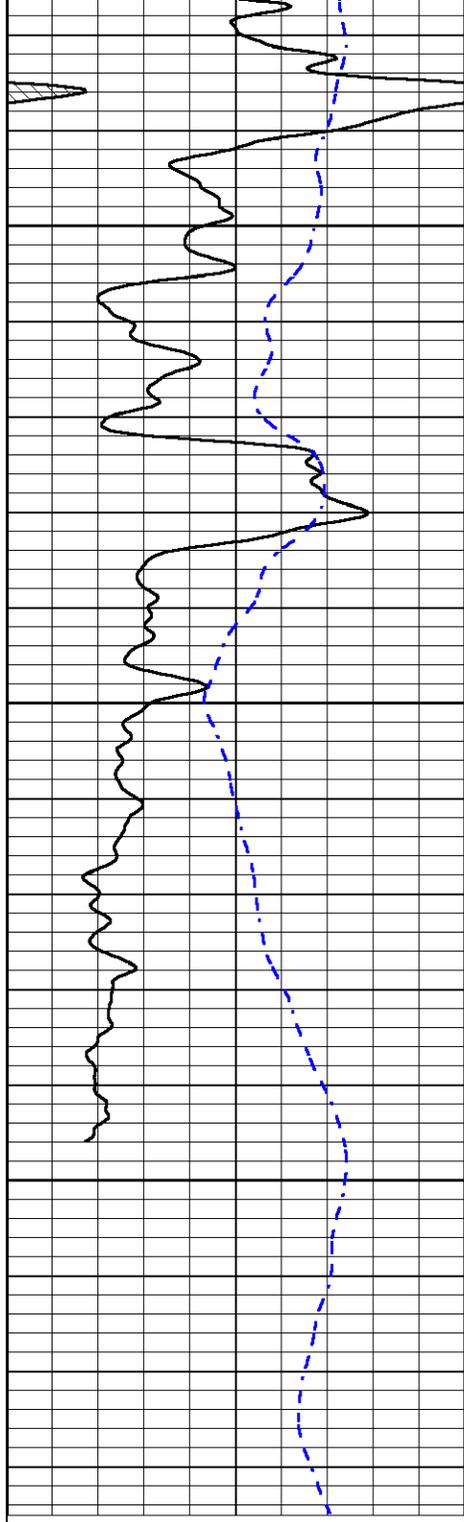


4450

4500

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



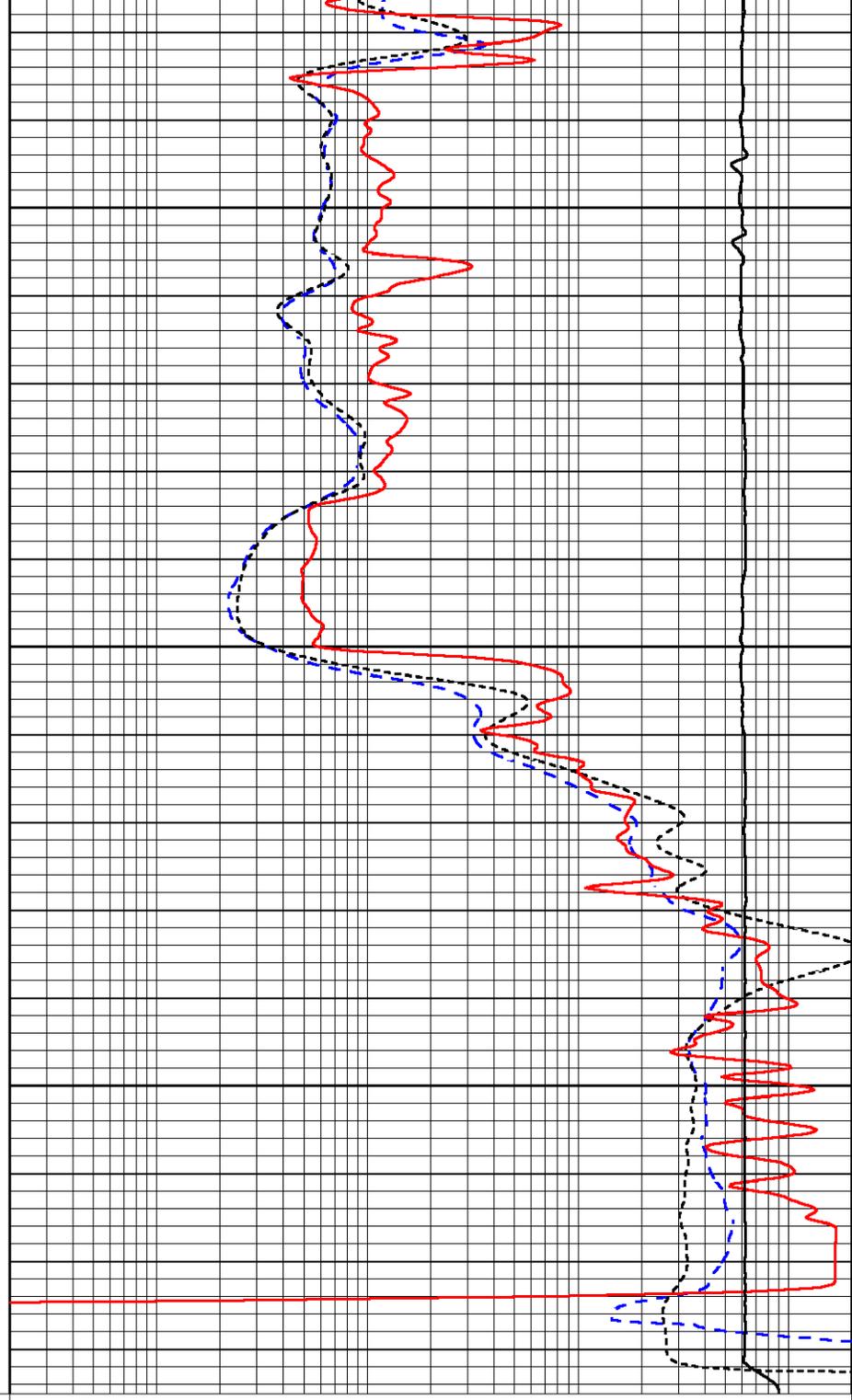


4550

4600

4650

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 cobalt_radnor a_#1-30.db
 Dataset Pathname stkml/pass3.1
 Dataset Creation Sat Apr 07 00:42:18 2018

Dual Induction Calibration Report

Serial-Model: PSI 978-M&W
 Calibration Performed: Sun Feb 04 11:50:02 2018

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	178.615	710.235	0.000	255.800	mmho/m	0.570	-39.500
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.400	-34.500

Microlog Calibration Report

Serial-Model: PSI-02-PSI STKBL ML
 Performed: Fri Jun 23 01:25:19 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0031	0.0043	0.0000	10.0000	Ohm-m	27000.0000	-1.5000
Inverse	0.0000	0.0013	0.0000	10.0000	Ohm-m	20000.0000	0.0000
Caliper	1.0020	1.0834	5.5000	16.5000	in	135.1560	-131.8000

Compensated Density Calibration Report

Serial-Model: 168-986-M&W
 Source / Verifier: /
 Master Calibration Performed: Tue Apr 11 17:07:47 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	1.00		
Large Ring	14.00	in	1.20		

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



PIONEER

Pioneer Energy Services

Company	COBALT ENERGY LLC
Well	RADNOR A #1-30
Field	N/A
County	LOGAN
State	KANSAS