



**PIONEER**  
Pioneer Energy Services

## MICRORESISTIVITY LOG

Company **BEREXCO, LLC**  
Well **HEATON #10**  
Field **MEULLER**  
County **STAFFORD** State **KANSAS**

Location: API #: 15-185-24044-00-00

SEC 17 TWP 21S RGE 12W

Other Services  
CNL/CDL  
DIL/BHCS

Company **BEREXCO, LLC**  
Well **HEATON #10**  
Field **MEULLER**  
County **STAFFORD**  
State **KANSAS**

Permanent Datum **GROUND LEVEL** Elevation **1863'**  
Log Measured From **KELLY BUSHING**  
Drilling Measured From **KELLY BUSHING**

Elevation  
K.B. 1870'  
D.F. 1869'  
G.L. 1863'

Date **1/9/2019**

Run Number **TWO**

Depth Driller **3700'**

Depth Logger **3699'**

Bottom Logged Interval **3698'**

Top Log Interval **2300'**

Casing Driller **8.625" @ 682'**

Casing Logger **680'**

Bit Size **7.875"**

Type Fluid in Hole **CHEMICAL**

Salinity, ppm CL **6000**

Density / Viscosity **9.2 53**

pH / Fluid Loss **9.0 9.6**

Source of Sample **FLOWLINE**

Rm @ Meas. Temp **.50 @ 69**

Rmt @ Meas. Temp **.38 @ 69**

Rmc @ Meas. Temp **.68 @ 69**

Source of Rmt / Rmc **CHARTS**

Rm @ BHT **.31 @ 113**

Operating Rig Time **3 1/2 HOURS**

Max Rec. Temp. F **113 DEGF**

Equipment Number **108**

Location **HAYS**

Recorded By **J. HENRICKSON**

Witnessed By **JERRY SMITH**

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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.

GREAT BEND KANSAS  
SOUTH TO COUNTY LINE, SOUTH TO 180TH, 4 1/4 EAST  
NORTH AND EAST INTO

Log Measured From: **KELLY BUSHING** 7 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

Engineer: **J. HENRICKSON**  
Operator:  
Operator:  
Operator:

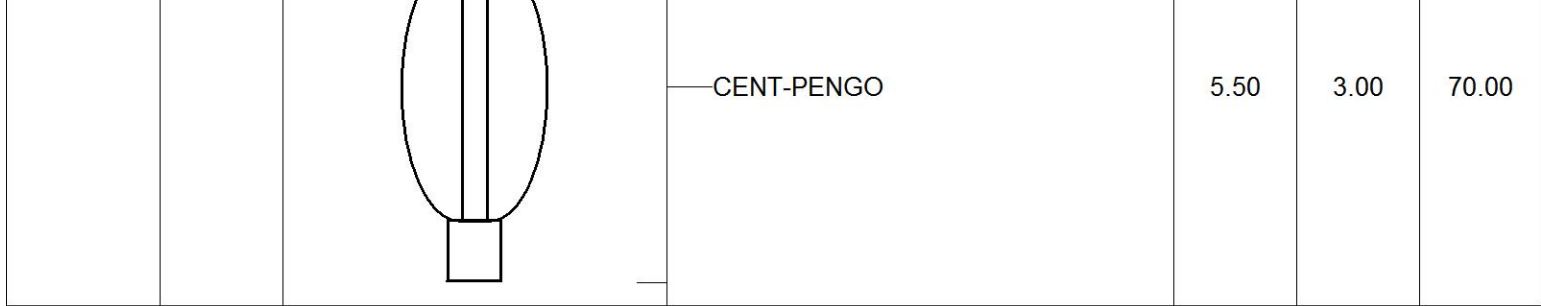
### This Log Record Was Witnessed By

Primary Witness: **JERRY SMITH**  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

Top - Bottom

|           |             |             |             |           |            |       |              |
|-----------|-------------|-------------|-------------|-----------|------------|-------|--------------|
| A         | BOREID      | BOTTEMP     | CASEOD      | CASETHCK  | FLUIDDEN   | M     | MATRXDEN     |
| 1         | in<br>7.875 | degF<br>113 | in<br>5.5   | in<br>0   | g/cc<br>1  | 2     | g/cc<br>2.71 |
| NPORSEL   | PERFS       | SNDERR      | SNDERRM     | SPSHIFT   | SRFTEMP    | SZCOR | TDEPTH       |
| Limestone | 0           | mmho/m<br>0 | mmho/m<br>0 | mV<br>130 | degF<br>32 | Off   | ft<br>3699   |

| Sensor           | Offset (ft)    | Schematic                                                                          | Description                                                                           | Length (ft) | O.D. (in) | Weight (lb) |
|------------------|----------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------|-----------|-------------|
| MCAL<br>MI<br>MN | 22.50          |  | ML-Armadillo (Armadillo-1)<br>Pengo micro log tool mandrel with Armadillo Electronics | 5.00        | 3.50      | 100.00      |
|                  | 22.50          |                                                                                    |                                                                                       |             |           |             |
|                  | 22.50          |                                                                                    |                                                                                       |             |           |             |
| WVF4<br>WVF1     | 13.50<br>13.50 |  | SLT-PENGO (0001)                                                                      | 16.00       | 3.50      | 300.00      |
| WVF3<br>WVF2     | 11.50<br>11.50 |                                                                                    |                                                                                       |             |           |             |



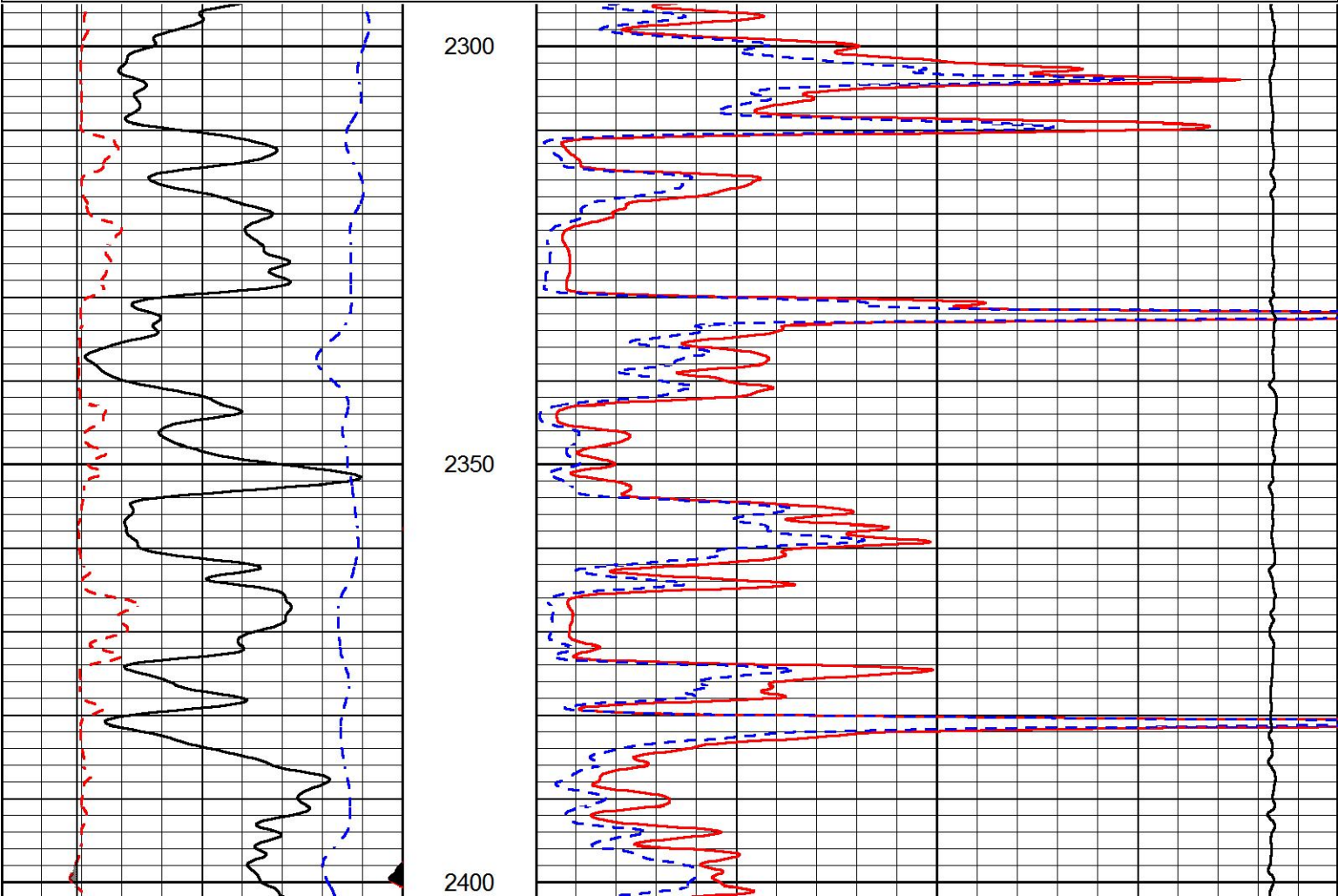
Dataset: berexco\_heaton\_10.db: field/well/SONMEL/pass2  
Total length: 26.50 ft  
Total weight: 470.00 lb  
O.D.: 3.50 in

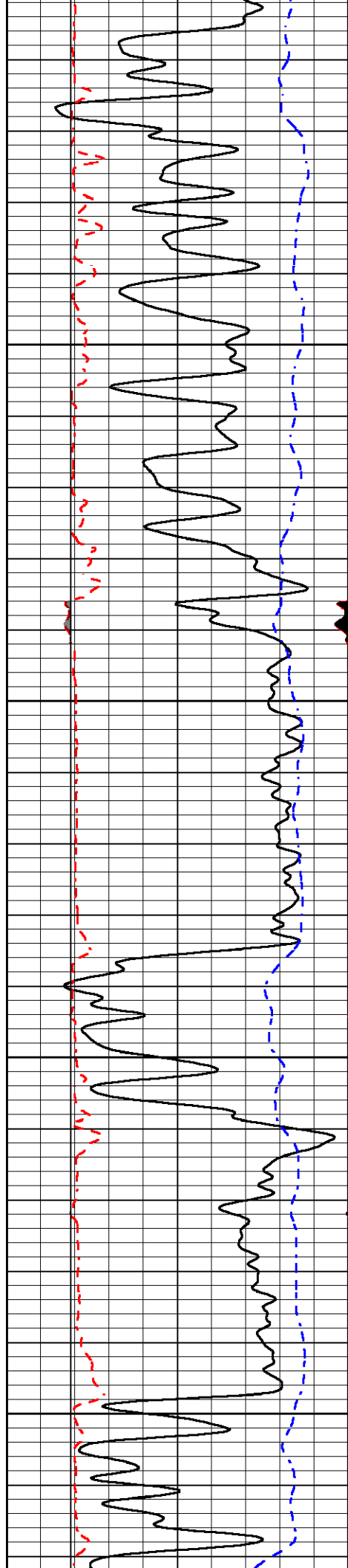


# MAIN PASS

|                     |                            |
|---------------------|----------------------------|
| Database File       | berexco_heaton_10.db       |
| Dataset Pathname    | stack/pass3.1              |
| Presentation Format | micro                      |
| Dataset Creation    | Wed Jan 09 23:00:01 2019   |
| Charted by          | Depth in Feet scaled 1:240 |

|      |                    |     |       |                             |    |
|------|--------------------|-----|-------|-----------------------------|----|
| 0    | GAMMA RAY (GAPI)   | 150 | 0     | MICRO INVERSE 1 X 1 (Ohm-m) | 40 |
| 6    | MICRO CALIPER (in) | 16  | 0     | MICRO NORMAL 2" (Ohm-m)     | 40 |
| 6    | BIT SIZE (in)      | 16  | 15000 | LINE TENSION (lb)           | 0  |
| -200 | SP (mV)            | 0   |       |                             |    |



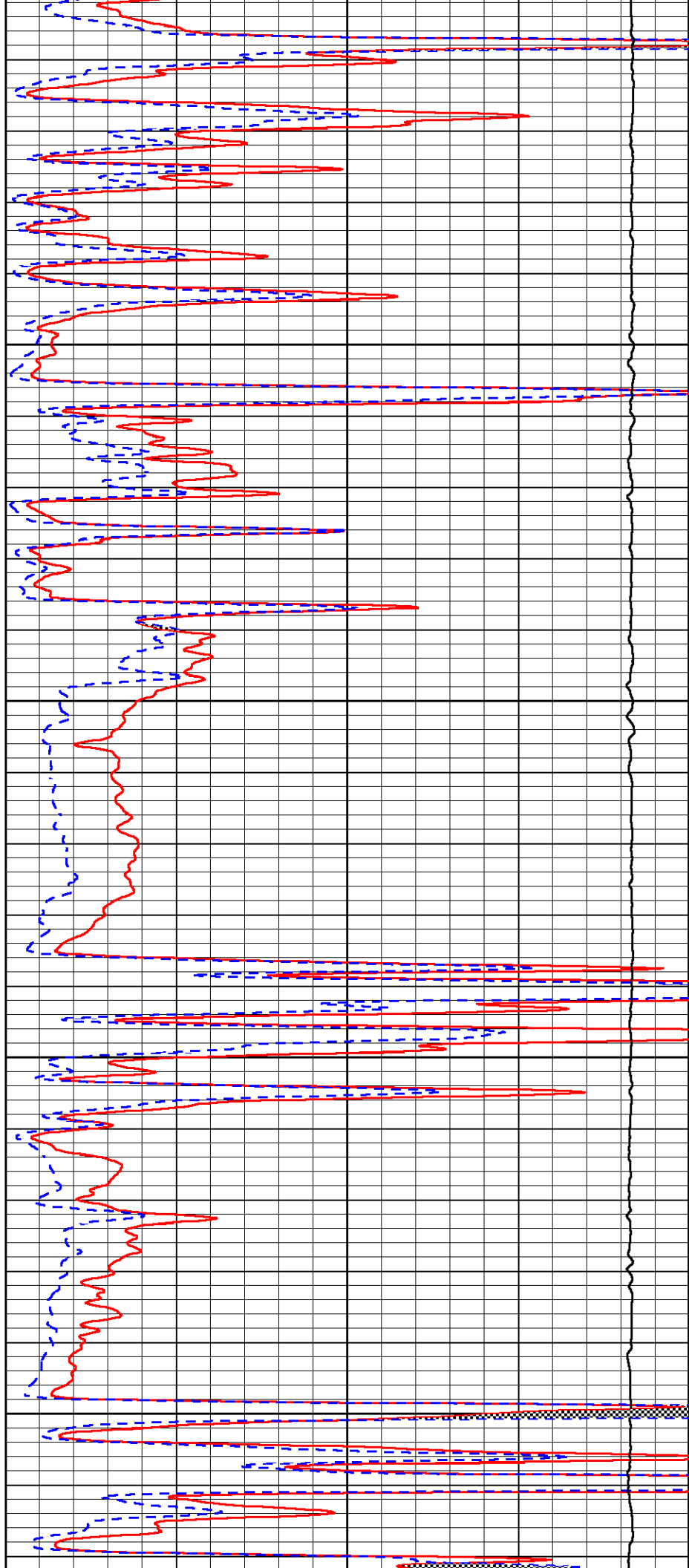


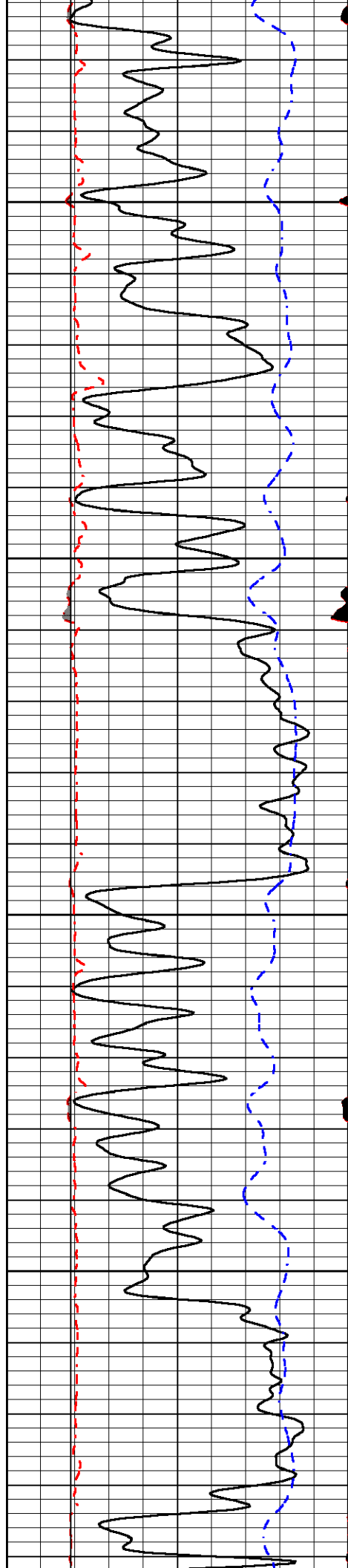
2450

2500

2550

2600



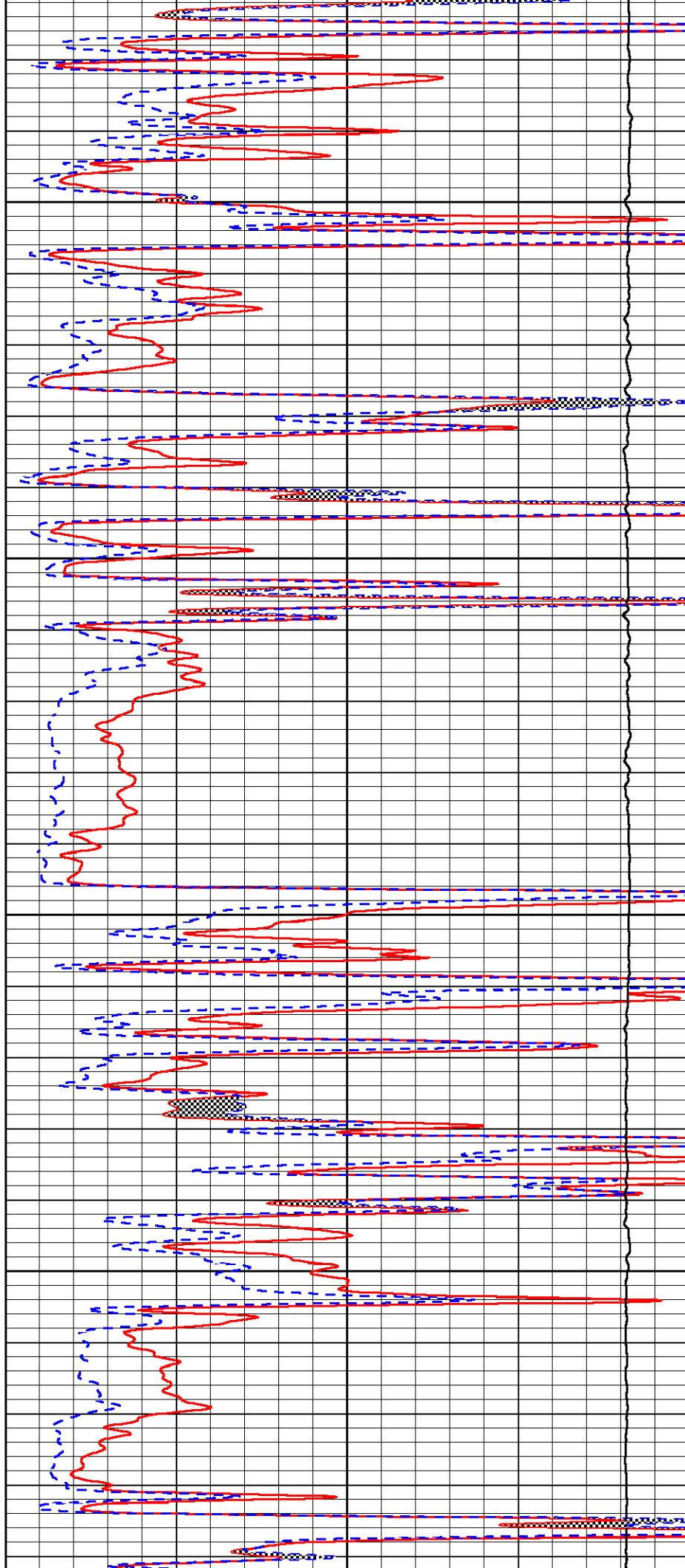


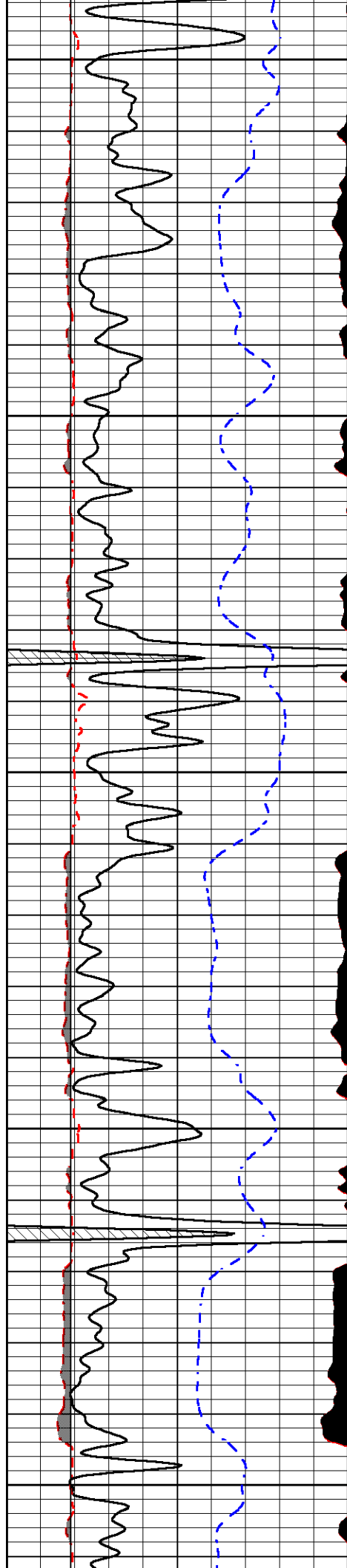
2650

2700

2750

2800





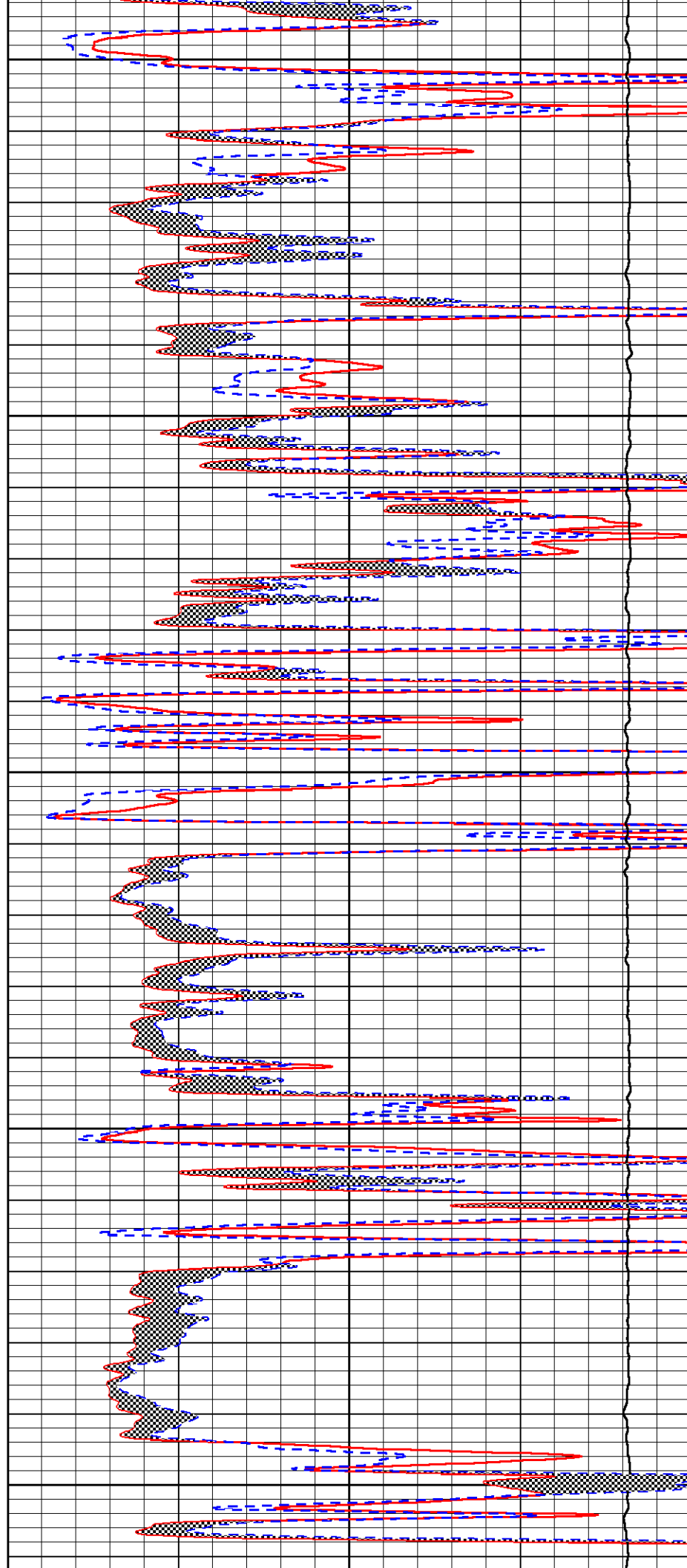
2850

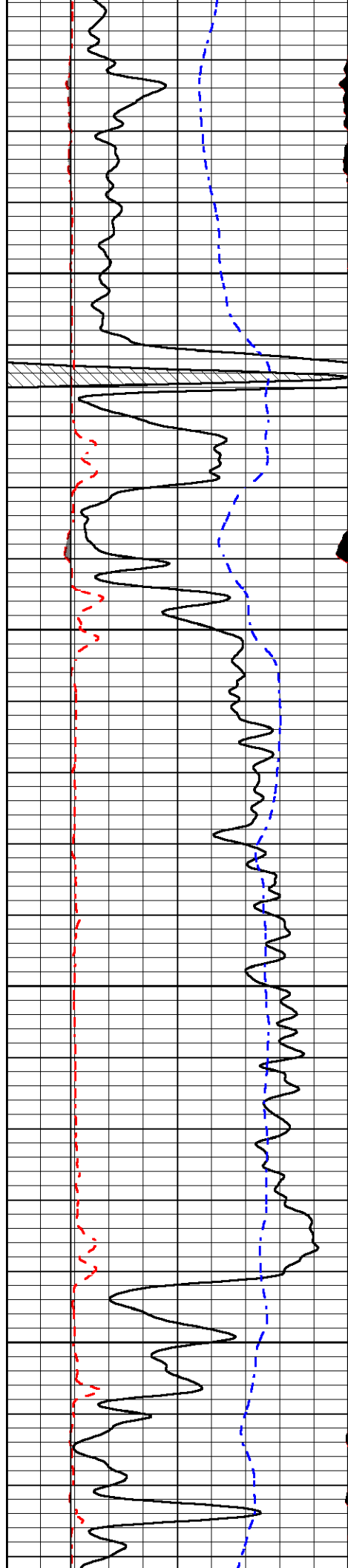
2900

2950

3000

3050



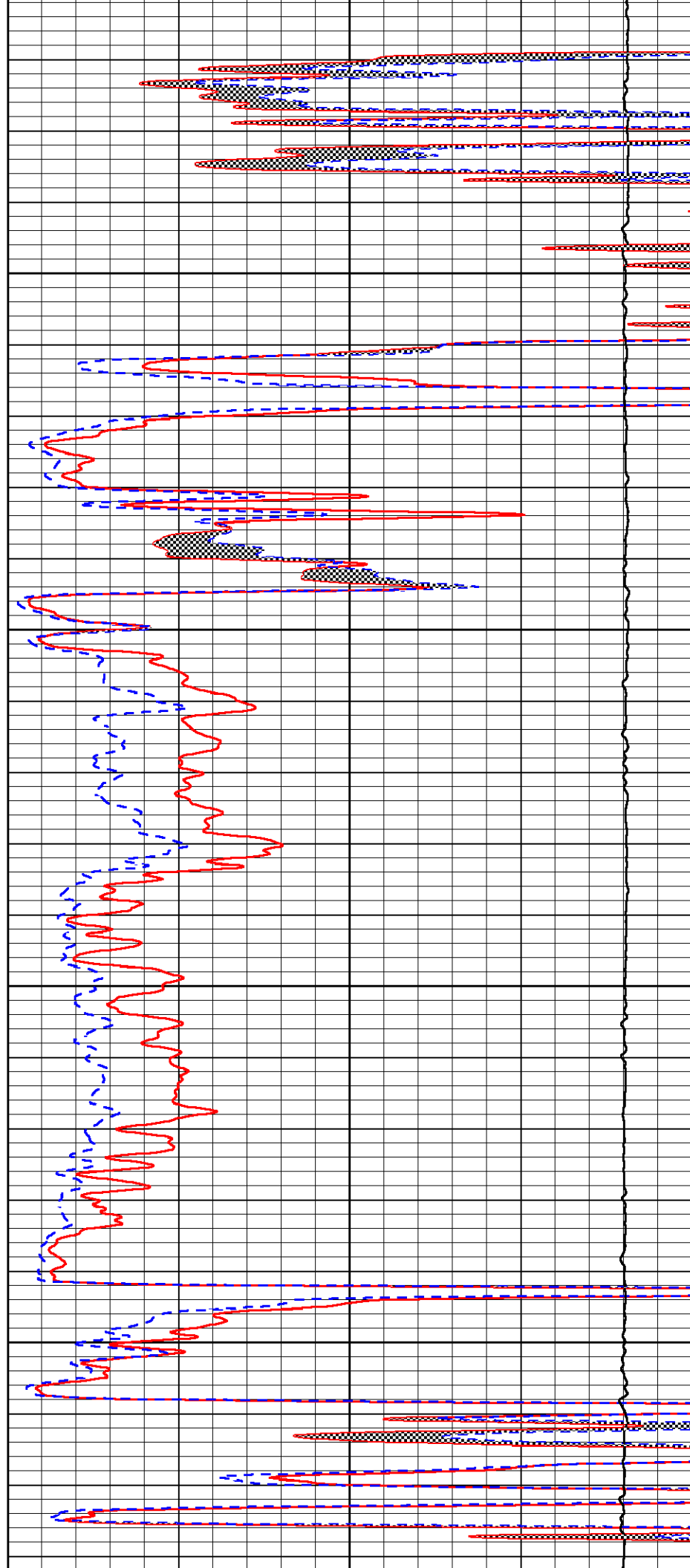


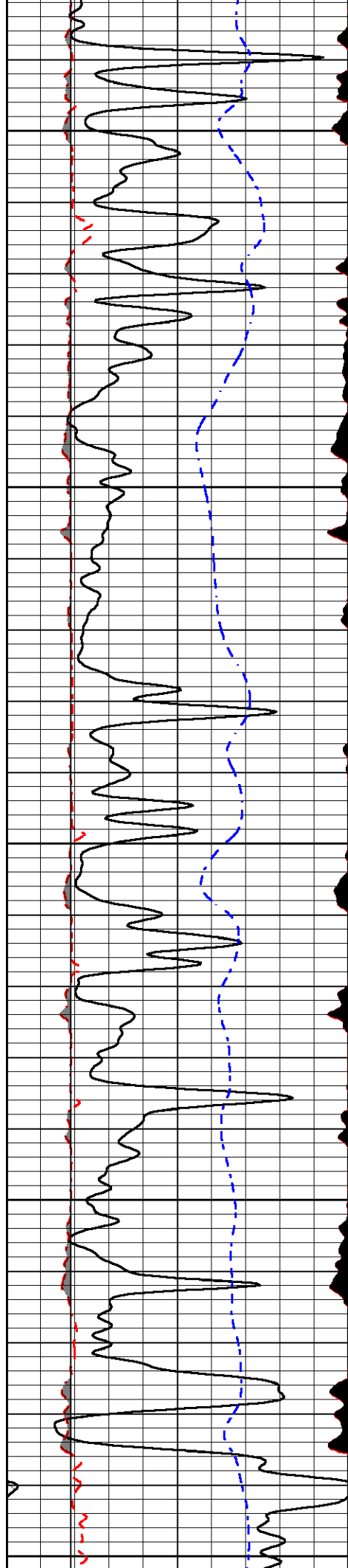
3100

3150

3200

3250





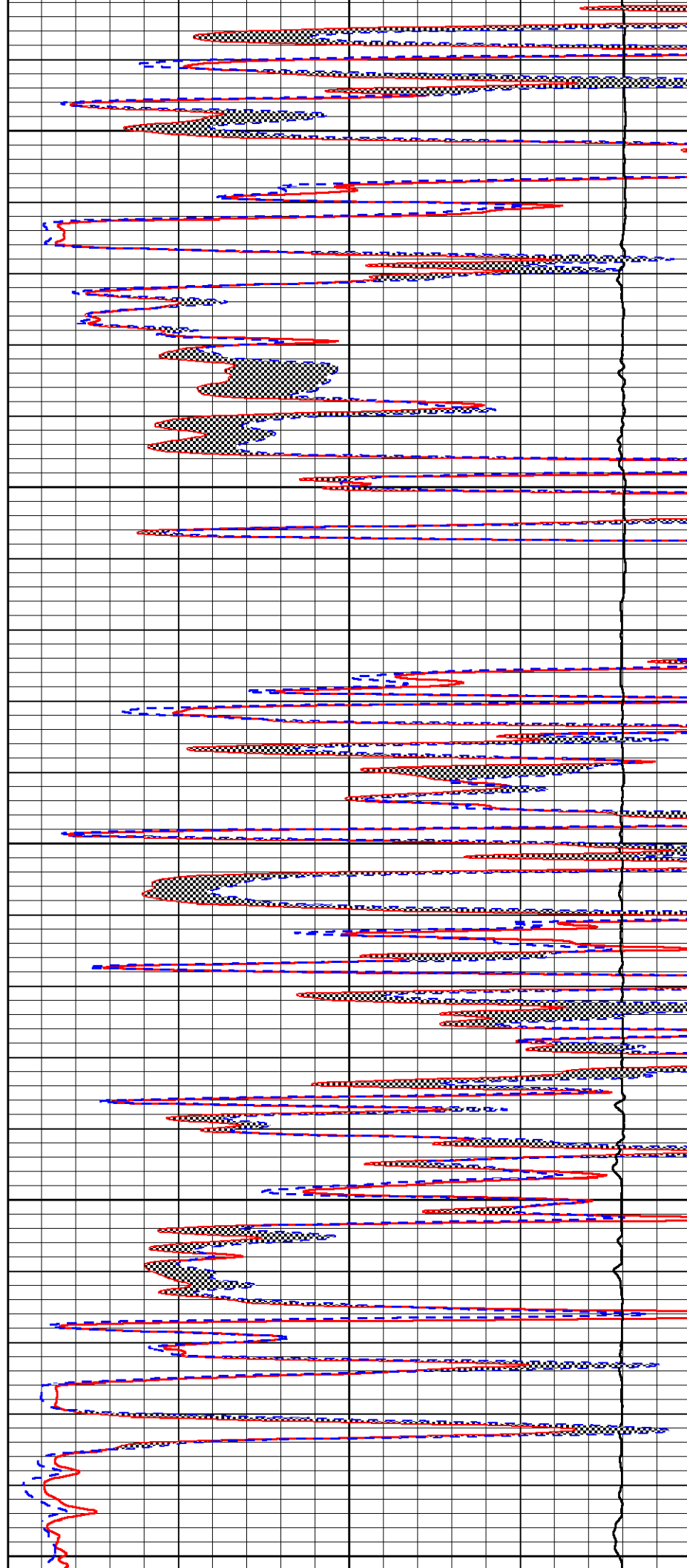
3300

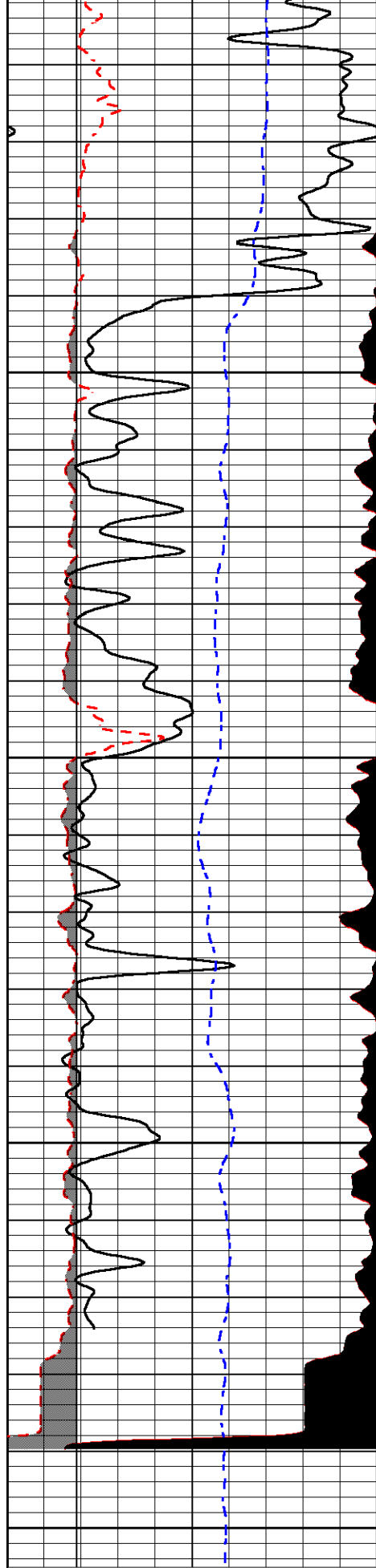
3350

3400

3450

3500





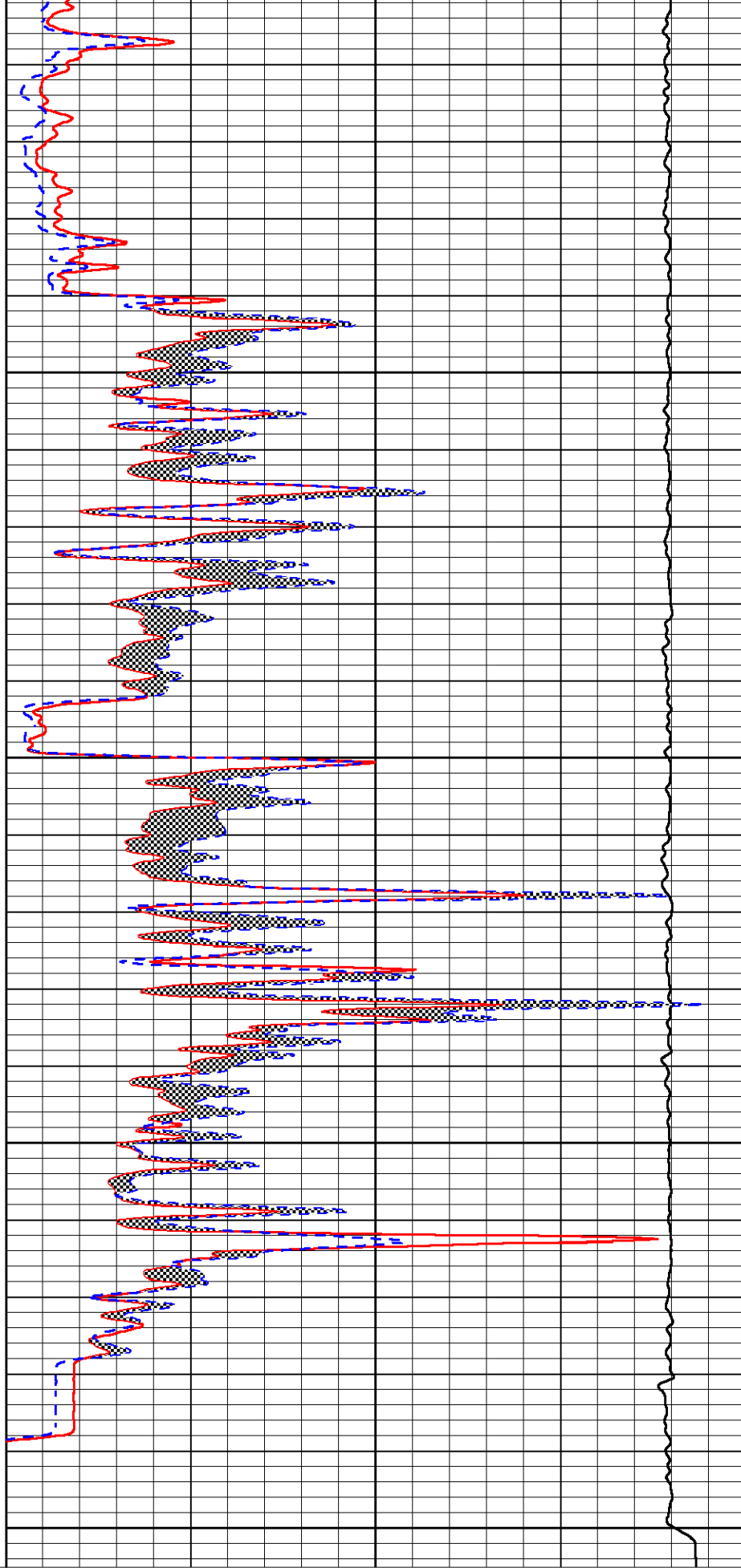
|     |                    |     |
|-----|--------------------|-----|
| 0   | GAMMA RAY (GAPI)   | 150 |
| 6   | MICRO CALIPER (in) | 16  |
| 6   | BIT SIZE (in)      | 16  |
| 200 | SP (mV)            | 0   |

3550

3600

3650

3700



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

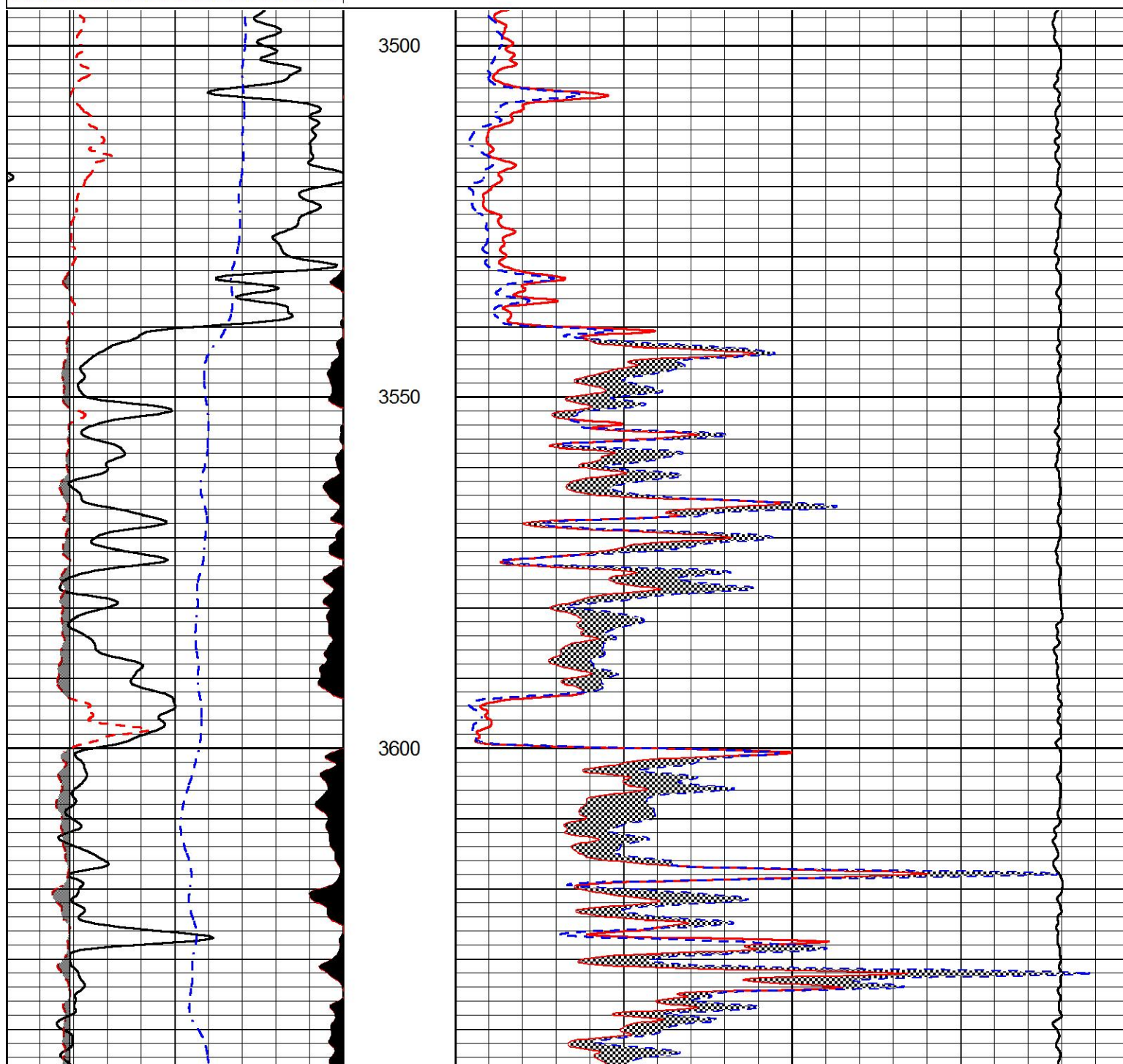


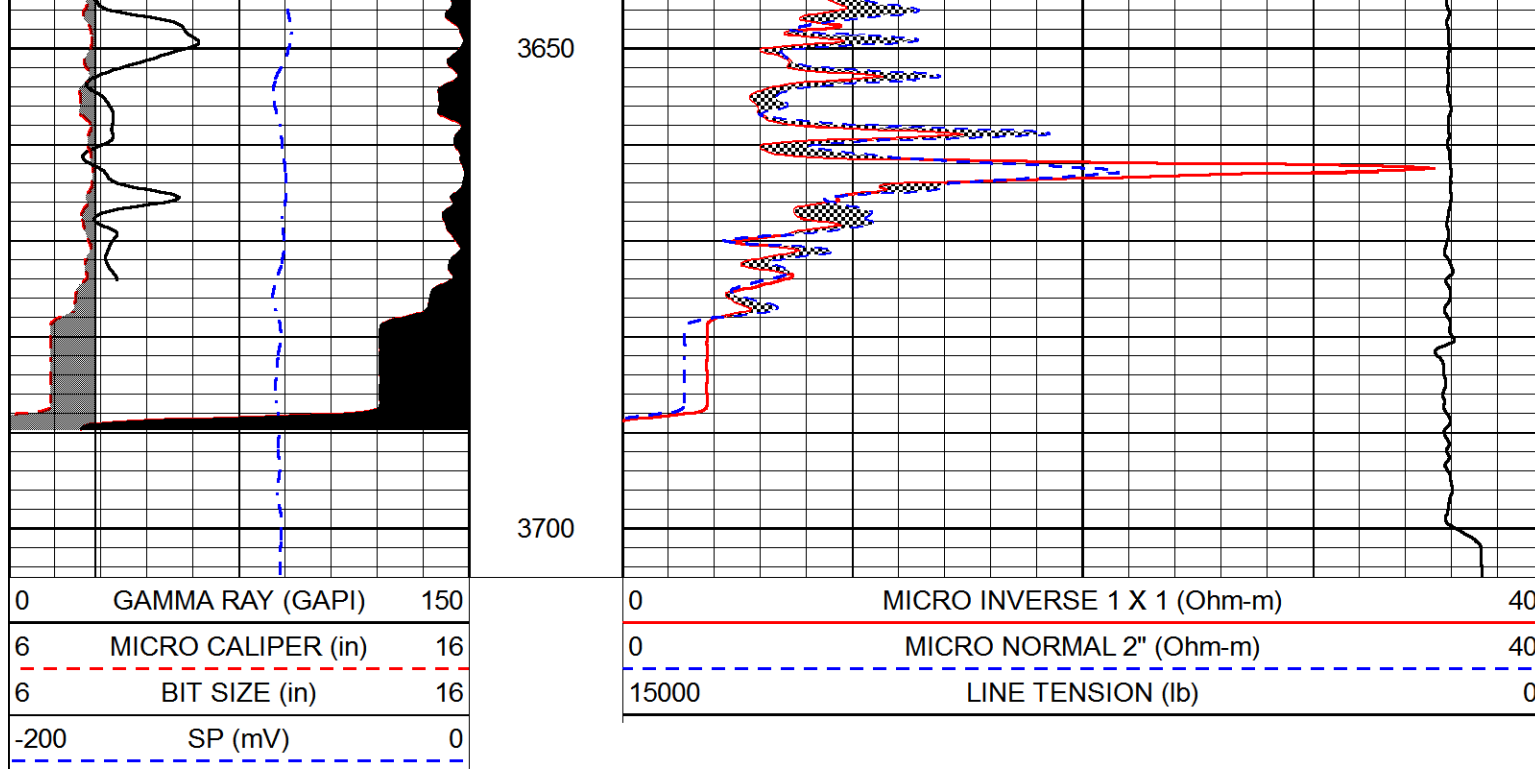
# REPEAT SECTION

Database File berexco\_heaton\_10.db  
Dataset Pathname stack/pass2.1  
Presentation Format micro  
Dataset Creation Wed Jan 09 23:00:18 2019  
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 berexco\_heaton\_10.db  
 Dataset Pathname stack/pass3.1  
 Dataset Creation Wed Jan 09 23:00:01 2019

### Dual Induction Calibration Report

Serial-Model: PSI 988-M&W  
 Calibration Performed: Tue Nov 20 10:50:19 2018

| Loop:  | Readings |          | References |         |        | Results |         |
|--------|----------|----------|------------|---------|--------|---------|---------|
|        | 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 |

### Compensated Density Calibration Report

Serial-Model: 934-5002-M&W  
 Source / Verifier: /  
 Master Calibration Performed: Wed Aug 29 11:03:55 2018

### Master Calibration

|                     | Density |      | Far Detector                | Near Detector |     |
|---------------------|---------|------|-----------------------------|---------------|-----|
| Magnesium           | 1.755   | g/cc | 3720.16                     | 2661.79       | cps |
| Aluminum            | 2.680   | g/cc | 696.57                      | 1725.83       | cps |
| Spine Angle = 75.50 |         |      | Density/Spine Ratio = 0.535 |               |     |
|                     | Size    |      | Reading                     |               |     |
| Small Ring          | 4.00    | in   | 1.16                        |               |     |
| Large Ring          | 16.00   | in   | 1.02                        |               |     |

# 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**  
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Company BEREXCO, LLC  
 Well HEATON #10  
 Field MEULLER  
 County STAFFORD  
 State KANSAS