



**PIONEER**  
Pioneer Energy Services

## DUAL INDUCTION LOG

Company **COBALT ENERGY, LLC**  
Well **EVELYN A #1-27**  
Field **DECATUR**  
County **NORTON** State **KANSAS**

Location: API #: 15-039-21239-00-00

Other Services

SEC 27 TWP 3S RGE 26W  
1361' FSL & 2154' FWL

CNL/CDL  
MEL

Permanent Datum **GROUND LEVEL** Elevation **2549'**  
Log Measured From **KELLY BUSHING**  
Drilling Measured From **KELLY BUSHING**

Elevation  
K.B. 2554'  
D.F. N/A  
G.L. 2549'

Date **6/20/2017**

|                        |                 |  |  |
|------------------------|-----------------|--|--|
| Run Number             | ONE             |  |  |
| Depth Driller          | 4010'           |  |  |
| Depth Logger           | 4012'           |  |  |
| Bottom Logged Interval | 4011'           |  |  |
| Top Log Interval       | 200'            |  |  |
| Casing Driller         | 8.625" @ 213'   |  |  |
| Casing Logger          | 211'            |  |  |
| Bit Size               | 7.875"          |  |  |
| Type Fluid in Hole     | CHEMICAL        |  |  |
| Salinity, ppm CL       | 2000            |  |  |
| Density / Viscosity    | 9.3 60          |  |  |
| pH / Fluid Loss        | 10.5 6.8        |  |  |
| Source of Sample       | FLOWLINE        |  |  |
| Rm @ Meas. Temp        | 0.60 @ 80       |  |  |
| Rmt @ Meas. Temp       | 0.45 @ 80       |  |  |
| Rmc @ Meas. Temp       | 0.81 @ 80       |  |  |
| Source of Rmt / Rmc    | CHARTS          |  |  |
| Rm @ BHT               | 0.41 @ 116      |  |  |
| Operating Rig Time     | 3 HOURS         |  |  |
| Max Rec. Temp. F       | 116             |  |  |
| Equipment Number       | 91              |  |  |
| Location               | HAYS            |  |  |
| Recorded By            | D. SCHMIDT      |  |  |
| Witnessed By           | LARRY NICHOLSON |  |  |

<<< 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.

CLAYTON,  
1.7 NORTH, 2 1/2 WEST,  
NORTH 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

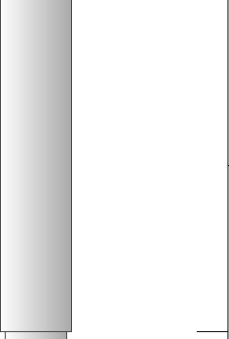
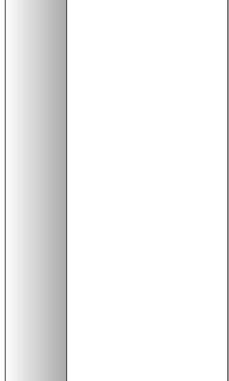
Engineer: D. SCHMIDT  
Operator:  
Operator:  
Operator:

### This Log Record Was Witnessed By

Primary Witness: LARRY NICHOLSON  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

Top - Bottom

|                  |                 |                |              |                  |                  |                 |                   |
|------------------|-----------------|----------------|--------------|------------------|------------------|-----------------|-------------------|
| M                | A               | SZCOR          | NPORSEL      | FLUIDDEN<br>g/cc | MATRXDEN<br>g/cc | SPSHIFT<br>mV   | SNDERRM<br>mmho/m |
| 2                | 1               | Off            | Limestone    | 1                | 2.71             | 15              | 0                 |
| SNDERR<br>mmho/m | SRFTEMP<br>degF | CASETHCK<br>in | CASEOD<br>in | PERFS            | TDEPTH<br>ft     | BOTTEMP<br>degF | BOREID<br>in      |
| 0                | 40              | 0              | 5.5          | 0                | 4012             | 116             | 7.875             |

| Sensor             | Offset (ft)             | Schematic                                                                           | Description                                                              | Length (ft) | O.D. (in) | Weight (lb) |
|--------------------|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------|-----------|-------------|
| GR                 | 40.58                   |    | GR-M&W (89)                                                              | 3.00        | 3.50      | 50.00       |
| CNLSC<br>CNSSC     | 37.48<br>36.73          |   | CNT-M&W (207-MW)                                                         | 5.50        | 3.50      | 100.00      |
| LSD<br>DCAL<br>SSD | 28.43<br>28.42<br>27.93 |  | CDL-M&W (90-1031)                                                        | 8.50        | 4.00      | 250.00      |
| MCAL<br>MI<br>MN   | 19.83<br>19.83<br>19.83 |  | ML-PSIML (PSI-01)<br>GO Micro log tools converted to Simplec electronics | 7.58        | 4.00      | 65.00       |
| RLL3F<br>RLL3      | 15.80<br>15.80          |  |                                                                          |             |           |             |

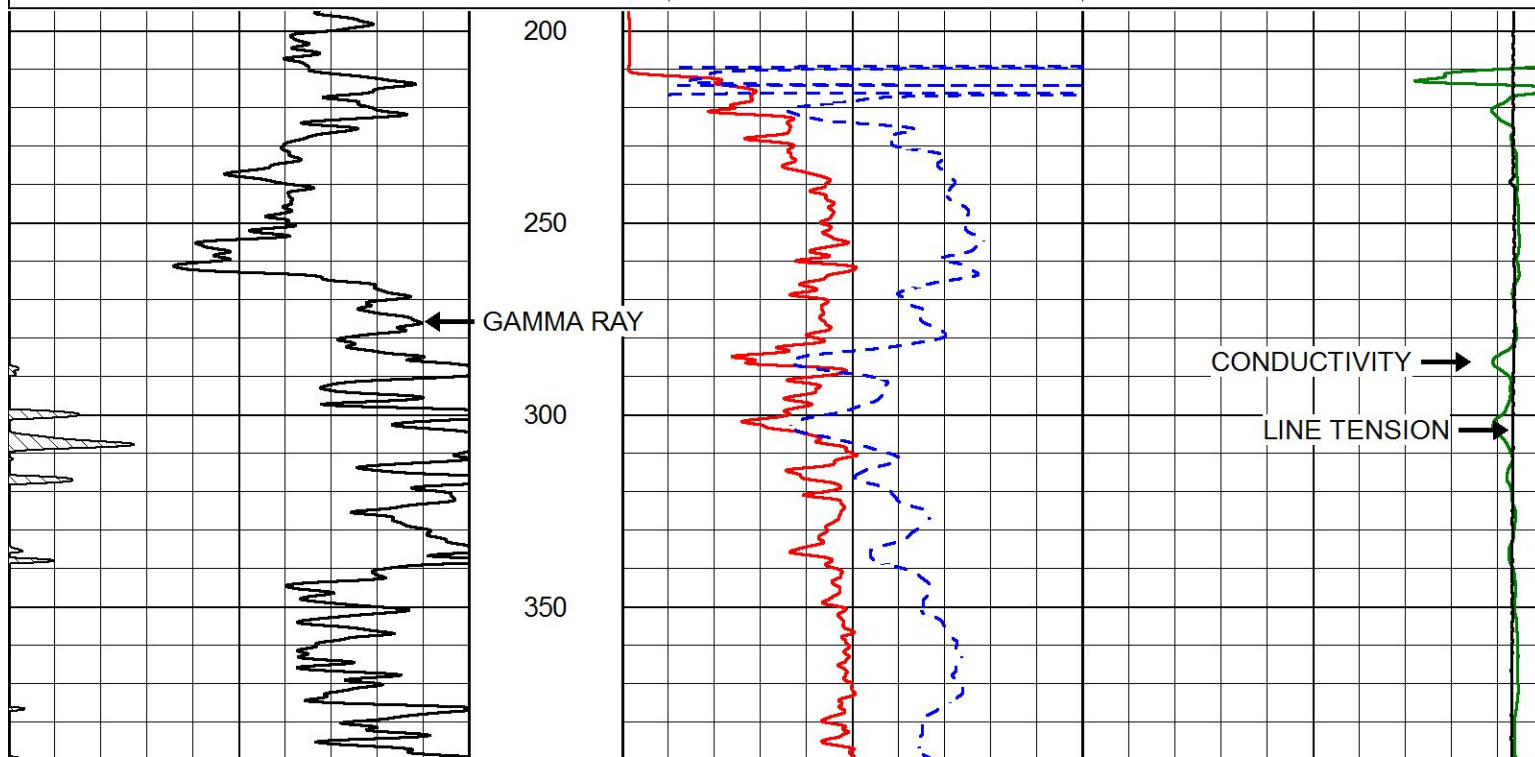
|                                                                                                                                  |      |  |                  |       |      |        |
|----------------------------------------------------------------------------------------------------------------------------------|------|--|------------------|-------|------|--------|
|                                                                                                                                  |      |  | DIL-M&W (PSI 91) | 18.50 | 3.50 | 220.00 |
| CILD                                                                                                                             | 8.00 |  |                  |       |      |        |
| CILM                                                                                                                             | 4.70 |  |                  |       |      |        |
| SP                                                                                                                               | 0.20 |  |                  |       |      |        |
| Dataset: cobalt_evelyn a_1-27.db: field/well/STKML/pass3.5<br>Total length: 43.08 ft<br>Total weight: 685.00 lb<br>O.D.: 4.00 in |      |  |                  |       |      |        |

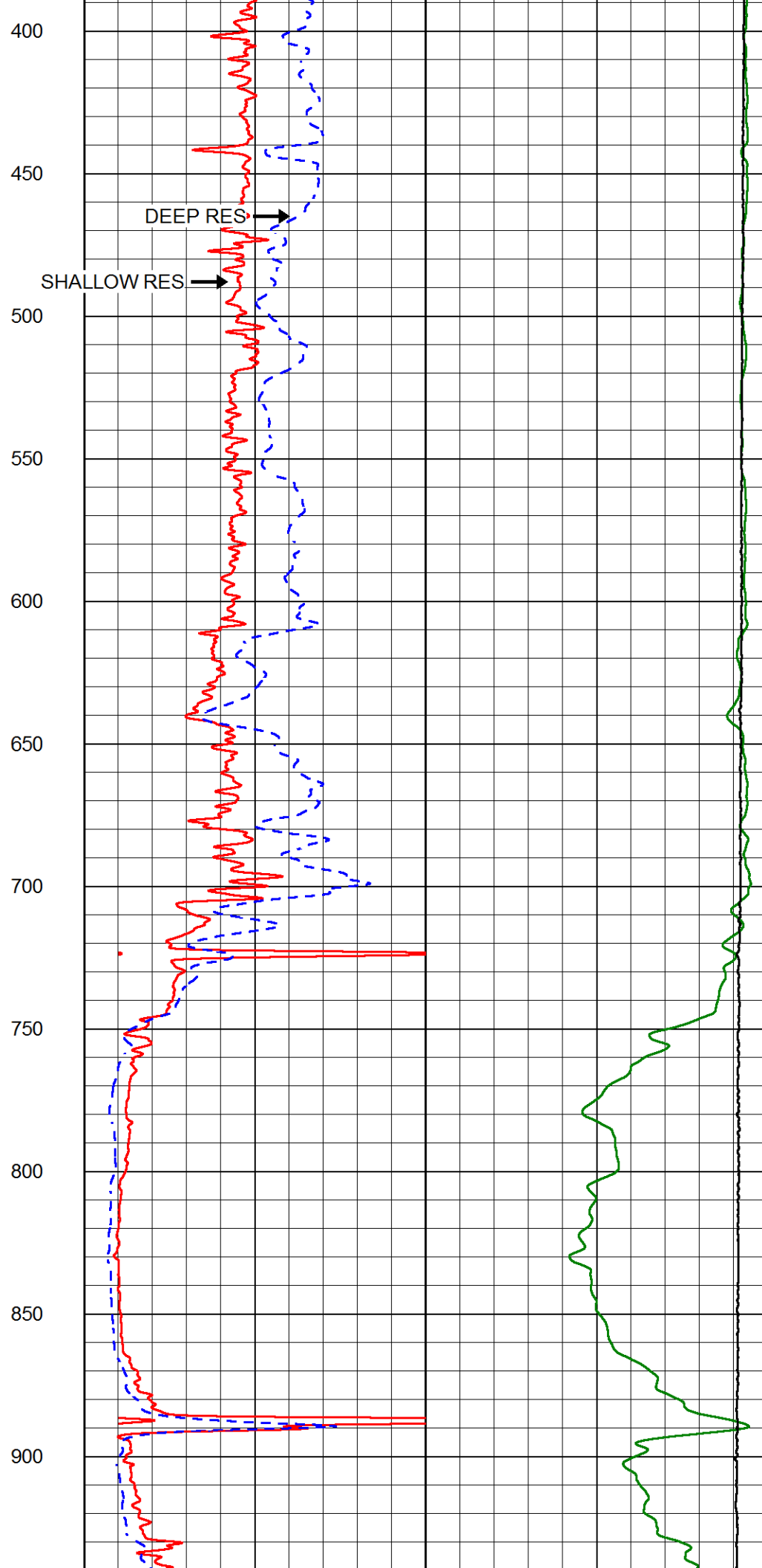
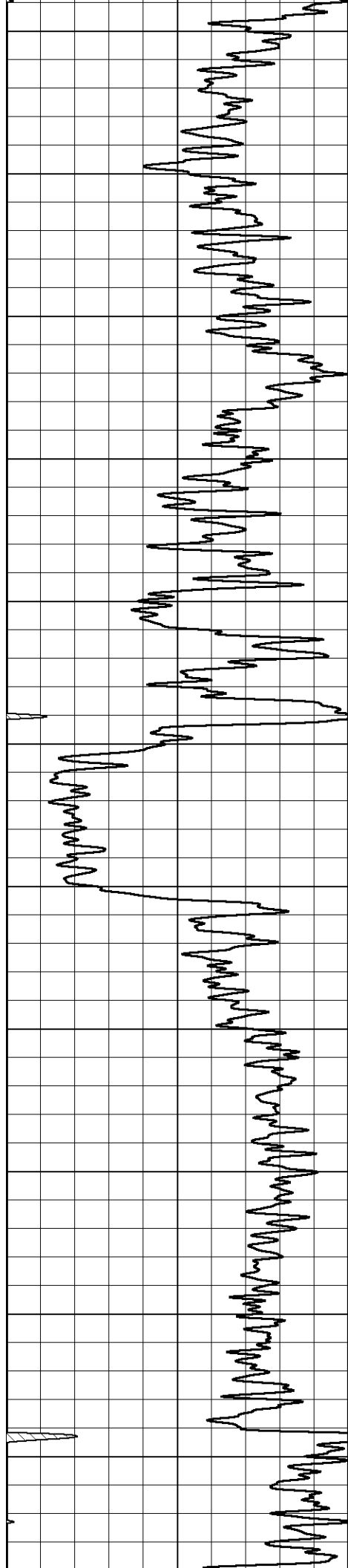


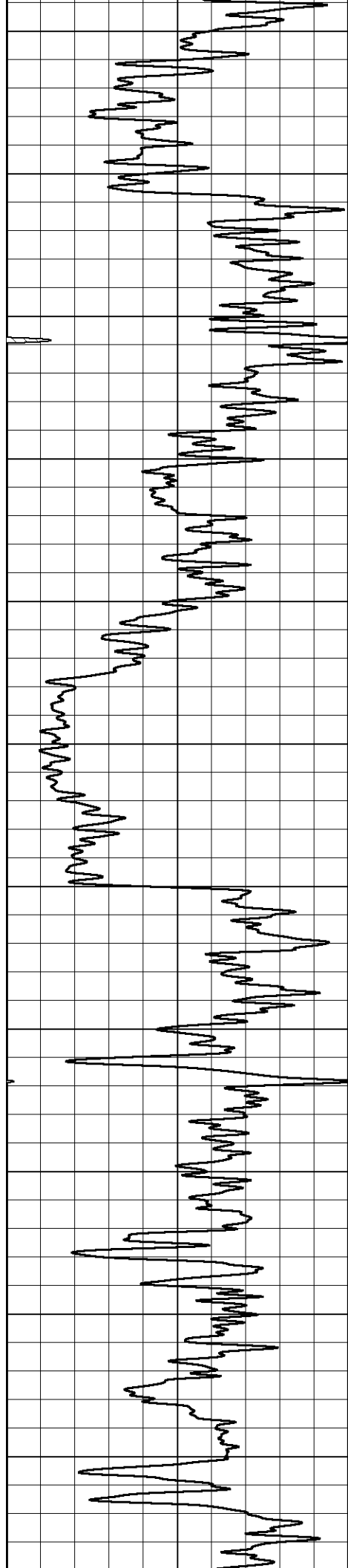
# MAIN PASS

|                     |                            |
|---------------------|----------------------------|
| Database File       | cobalt_evelyn a_1-27.db    |
| Dataset Pathname    | STKML/pass3.1              |
| Presentation Format | dil2in                     |
| Dataset Creation    | Tue Jun 20 22:15:32 2017   |
| Charted by          | Depth in Feet scaled 1:600 |

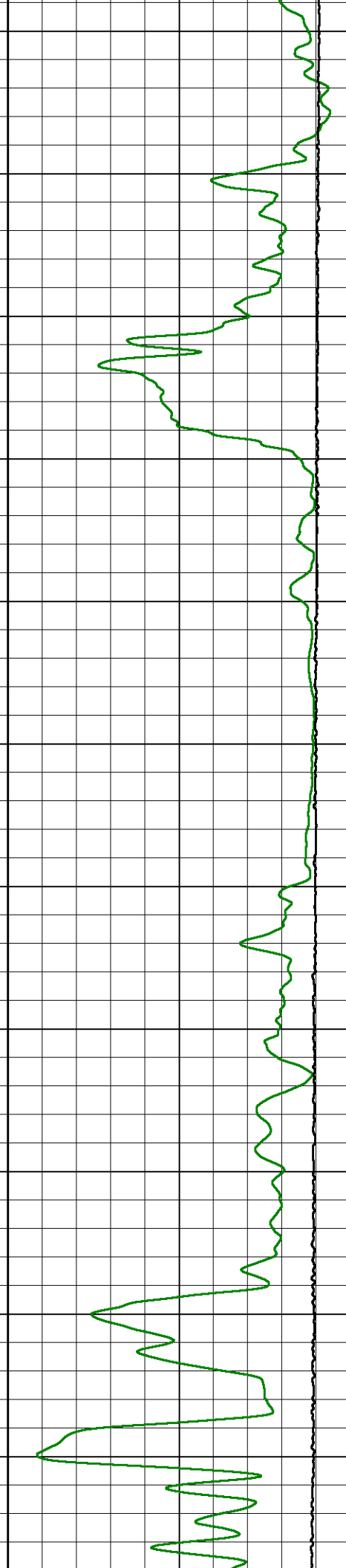
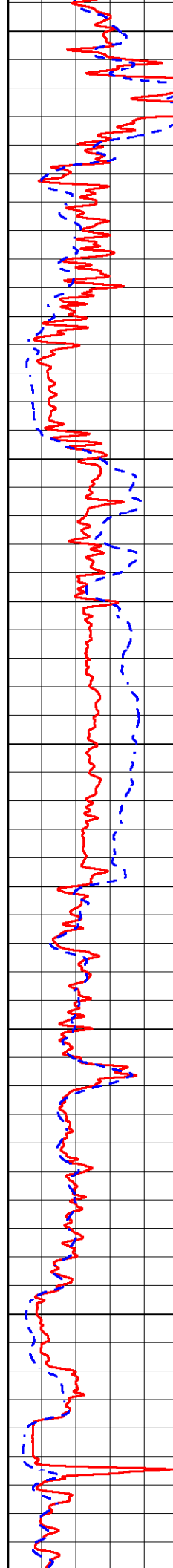
|   |                  |     |       |                             |     |
|---|------------------|-----|-------|-----------------------------|-----|
| 0 | Gamma Ray (GAPI) | 150 | 1000  | Conductivity (mmho/m)       | 0   |
|   |                  |     | 15000 | Line Tension (lb)           | 0   |
|   |                  |     | 0     | Shallow Resistivity (Ohm-m) | 50  |
|   |                  |     | 0     | Deep Resistivity (Ohm-m)    | 50  |
|   |                  |     |       | Shallow Resistivity         |     |
|   |                  |     | 50    | (Ohm-m)                     | 500 |
|   |                  |     | 50    | Deep Resistivity (Ohm-m)    | 500 |

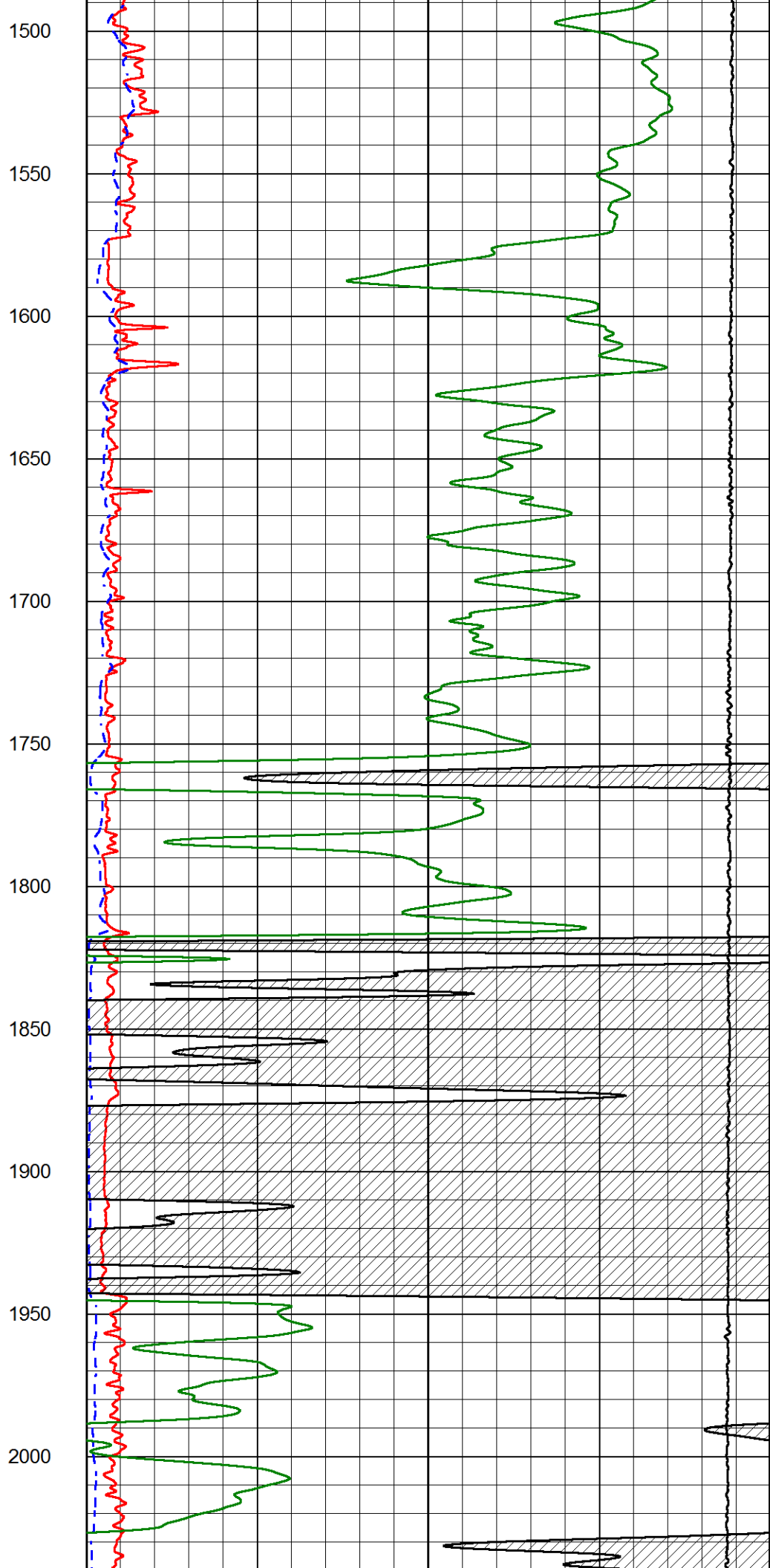
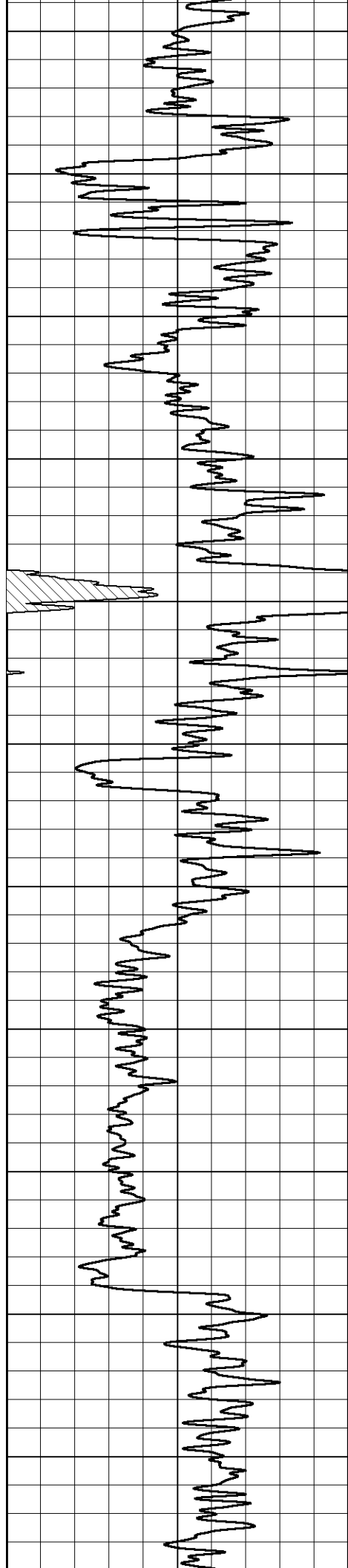


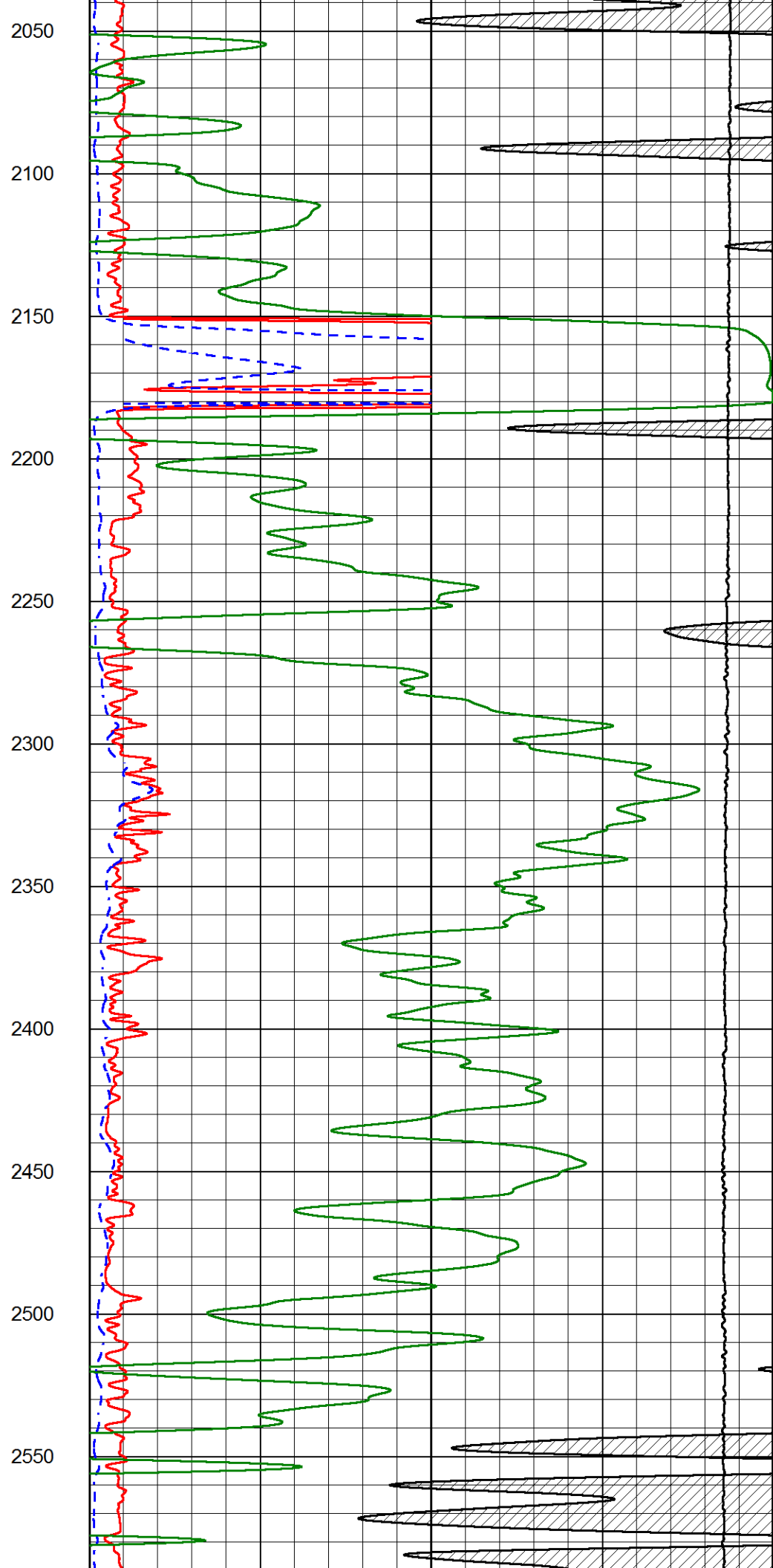
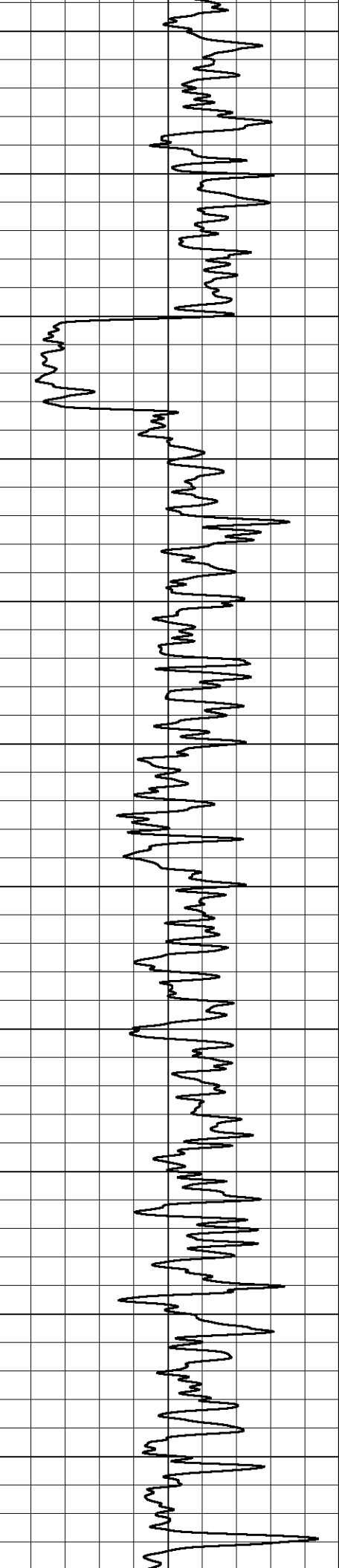


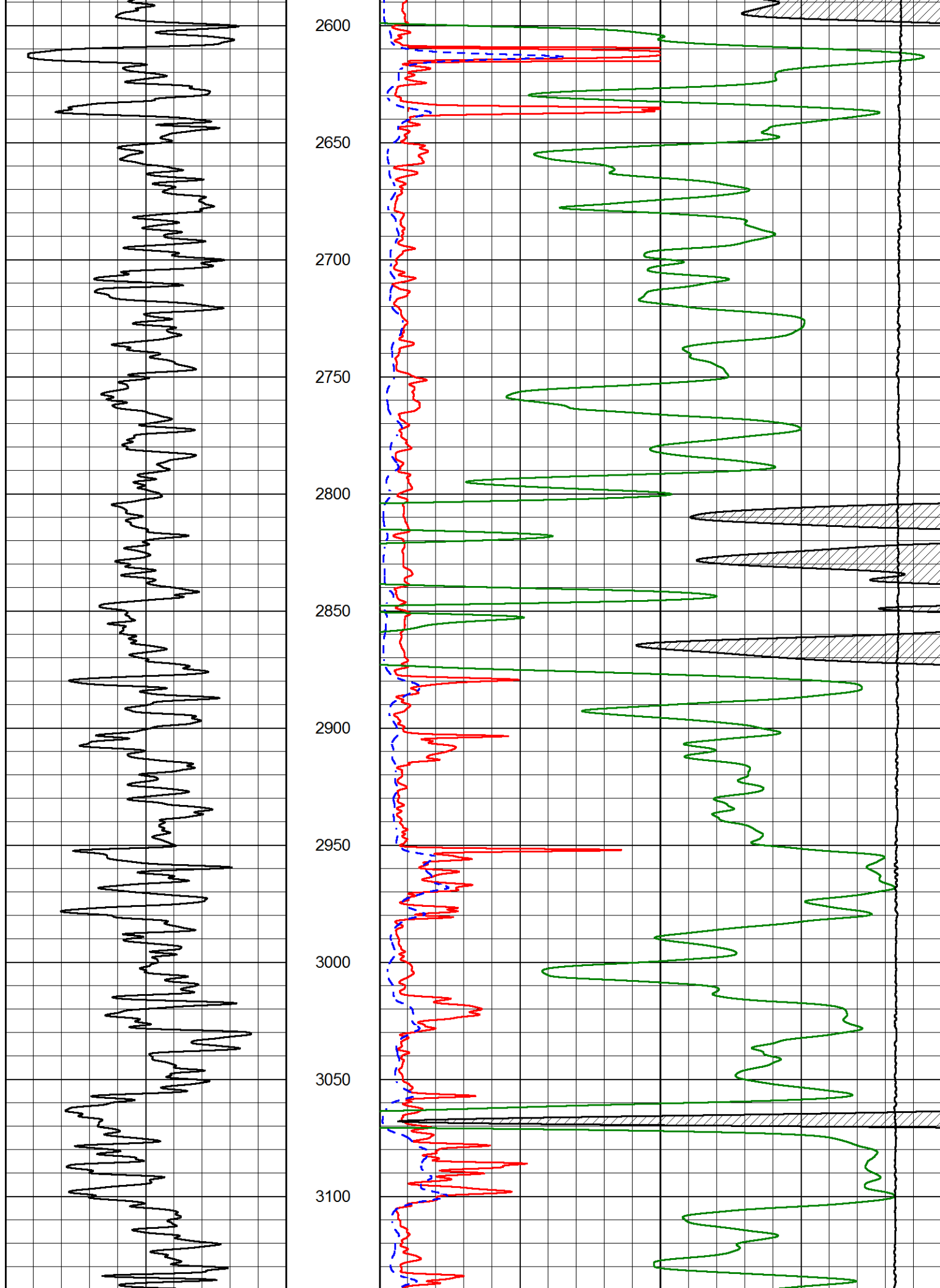


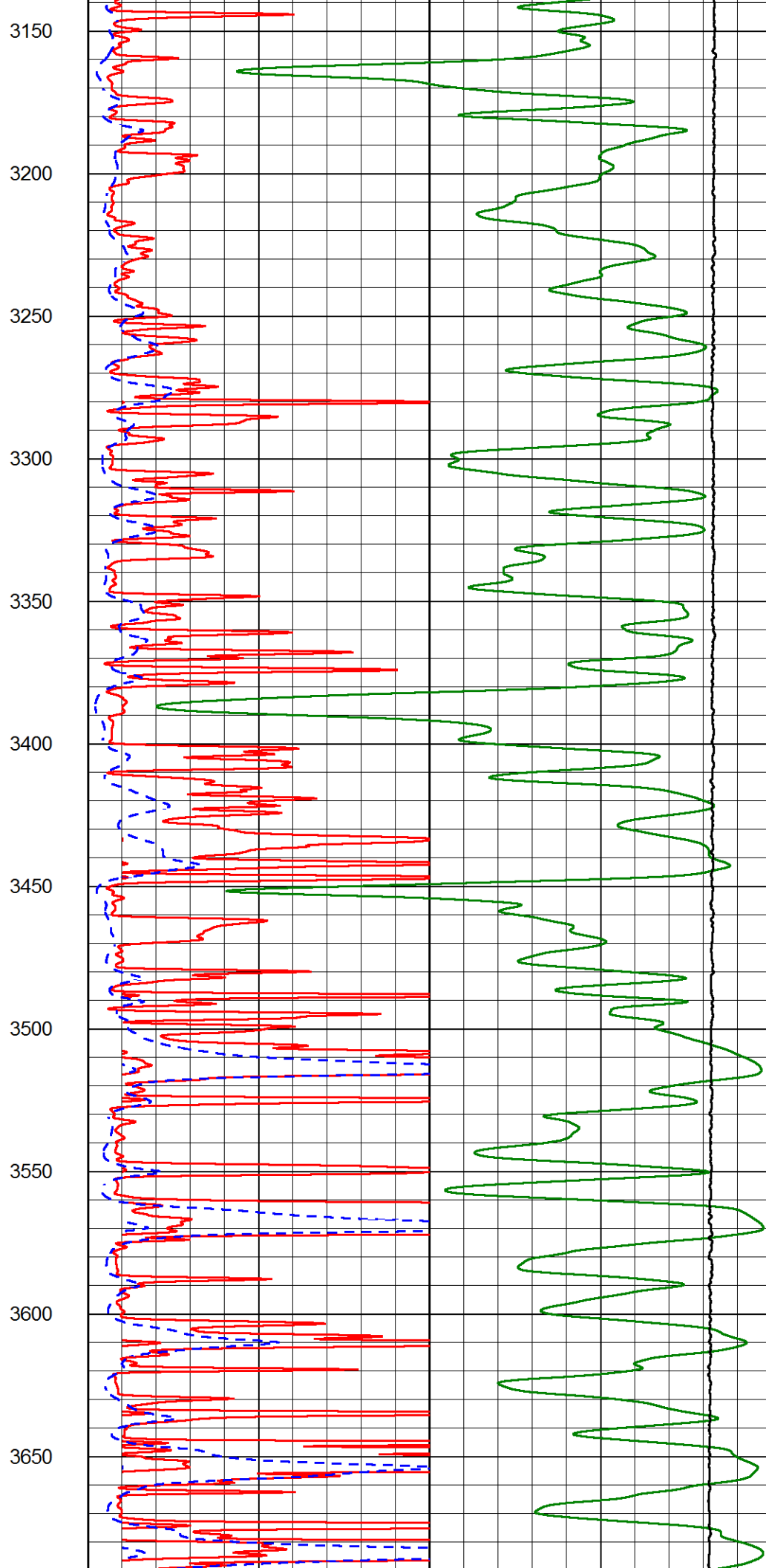
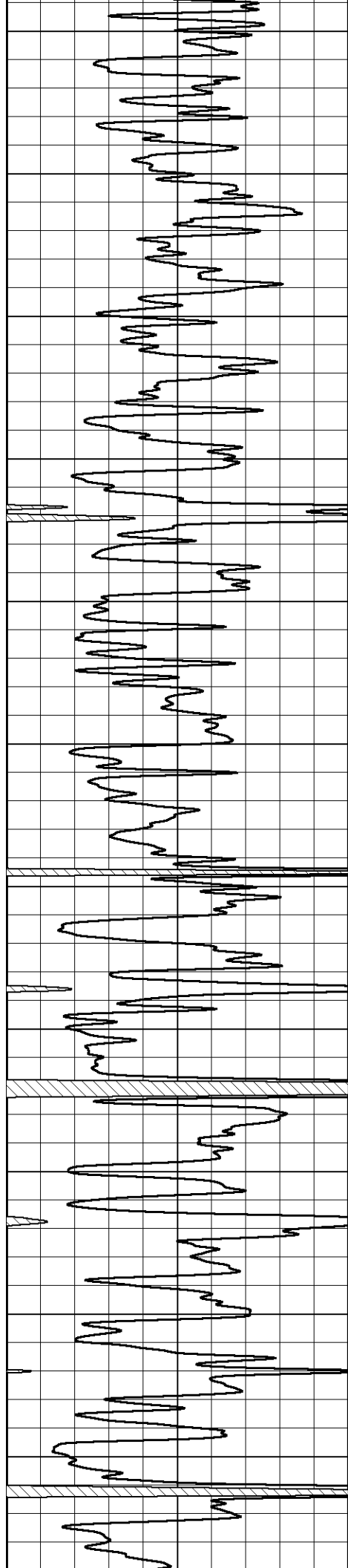
950  
1000  
1050  
1100  
1150  
1200  
1250  
1300  
1350  
1400  
1450

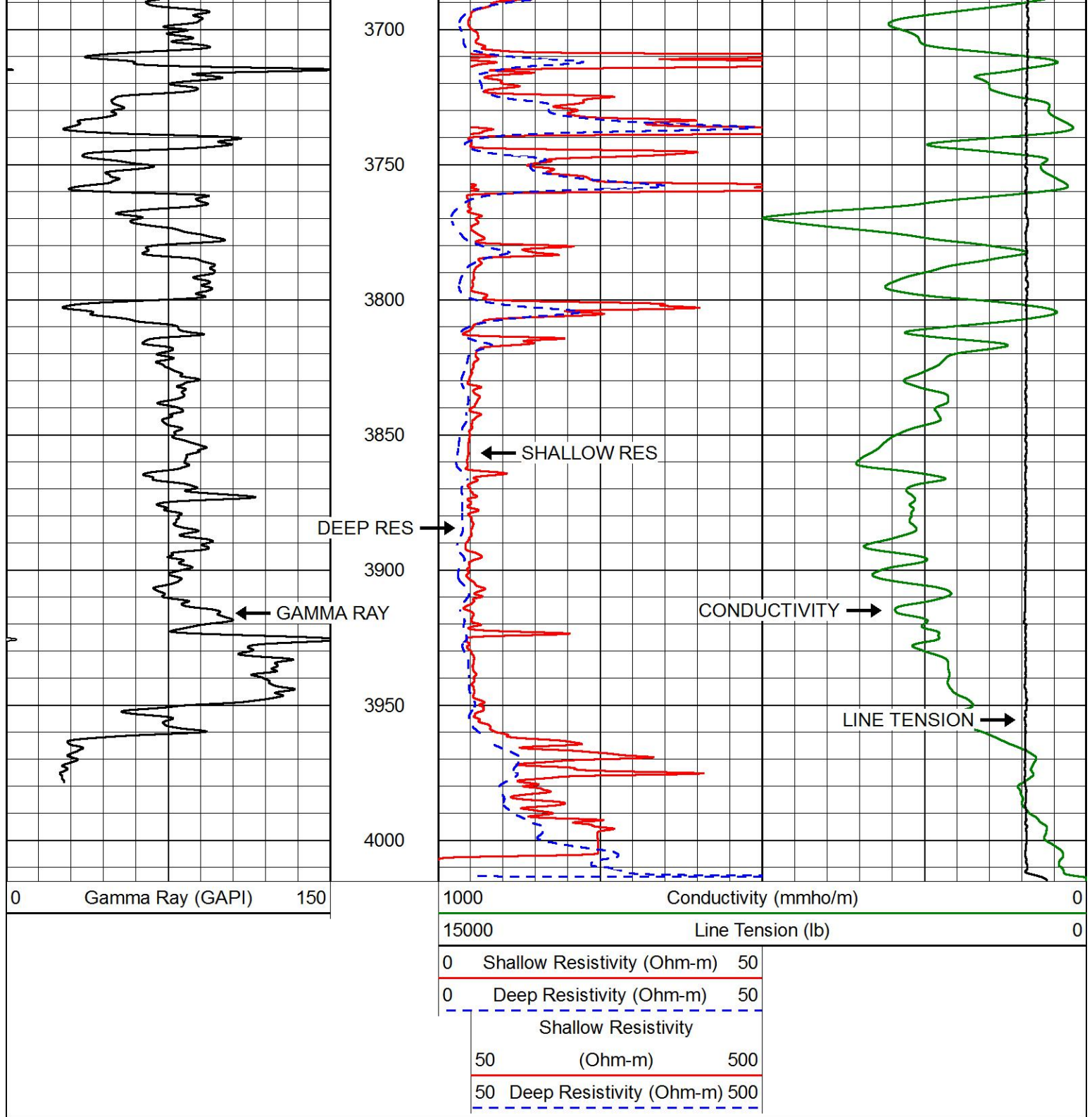












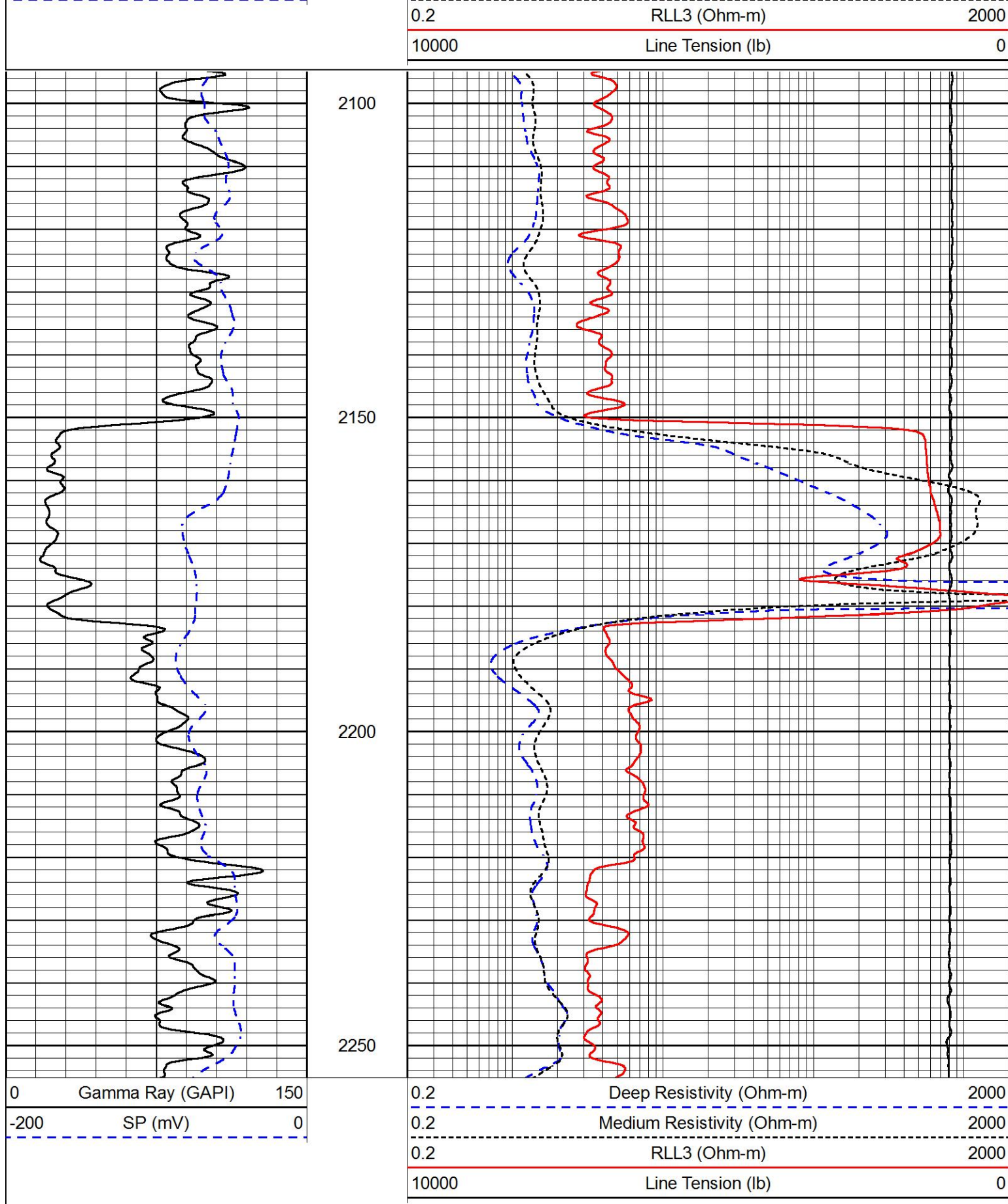


**PIONEER**  
Pioneer Energy Services

# MAIN PASS

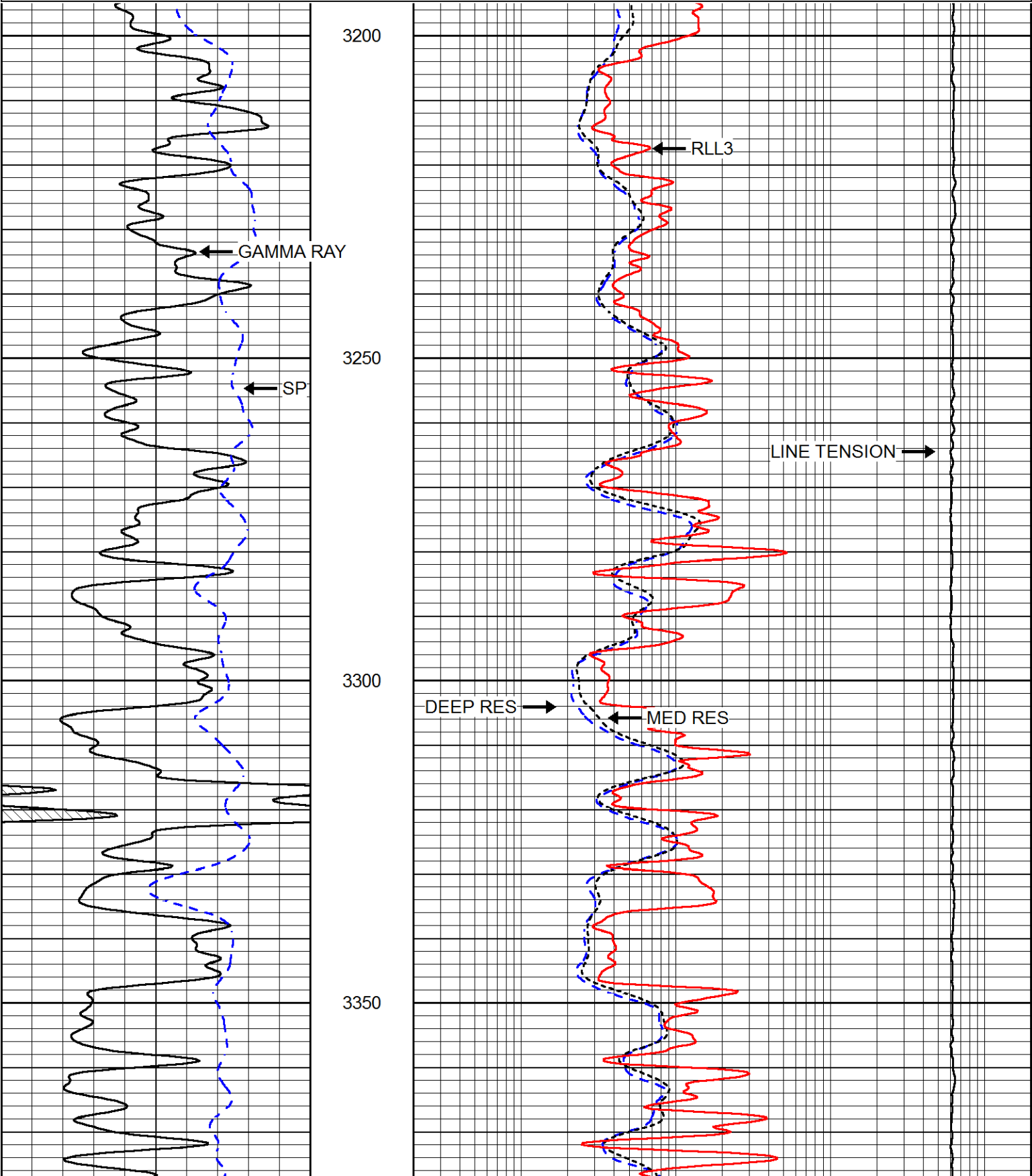
|                     |                            |
|---------------------|----------------------------|
| Database File       | cobalt_evelyn a_1-27.db    |
| Dataset Pathname    | STKML/pass3.1              |
| Presentation Format | dil                        |
| Dataset Creation    | Tue Jun 20 22:15:32 2017   |
| Charted by          | Depth in Feet scaled 1:240 |

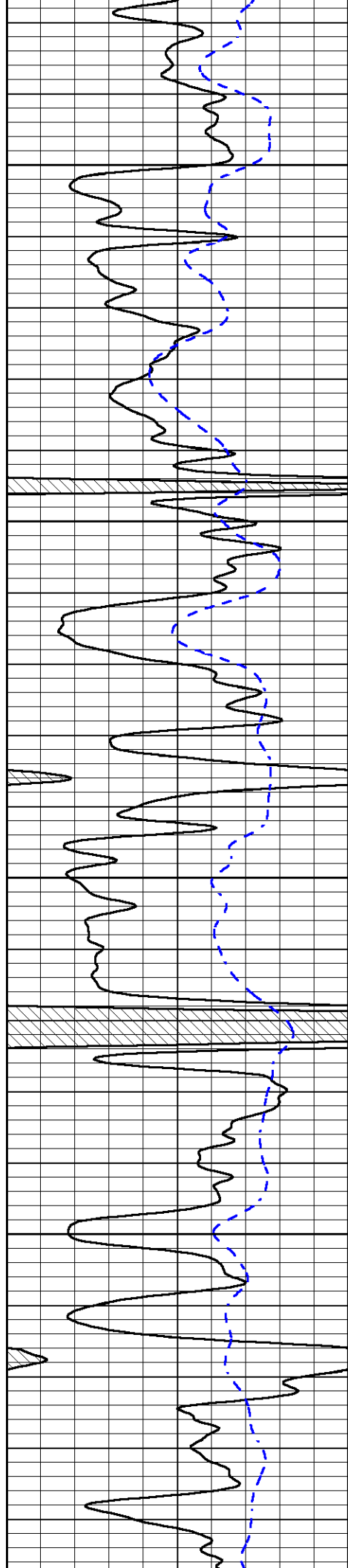




|                     |                            |
|---------------------|----------------------------|
| Database File       | cobalt_evelyn a_1-27.db    |
| Dataset Pathname    | STKML/pass3.1              |
| Presentation Format | dil                        |
| Dataset Creation    | Tue Jun 20 22:15:32 2017   |
| 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 |
|      |                  |     | 10000 | Line Tension (lb)          | 0    |



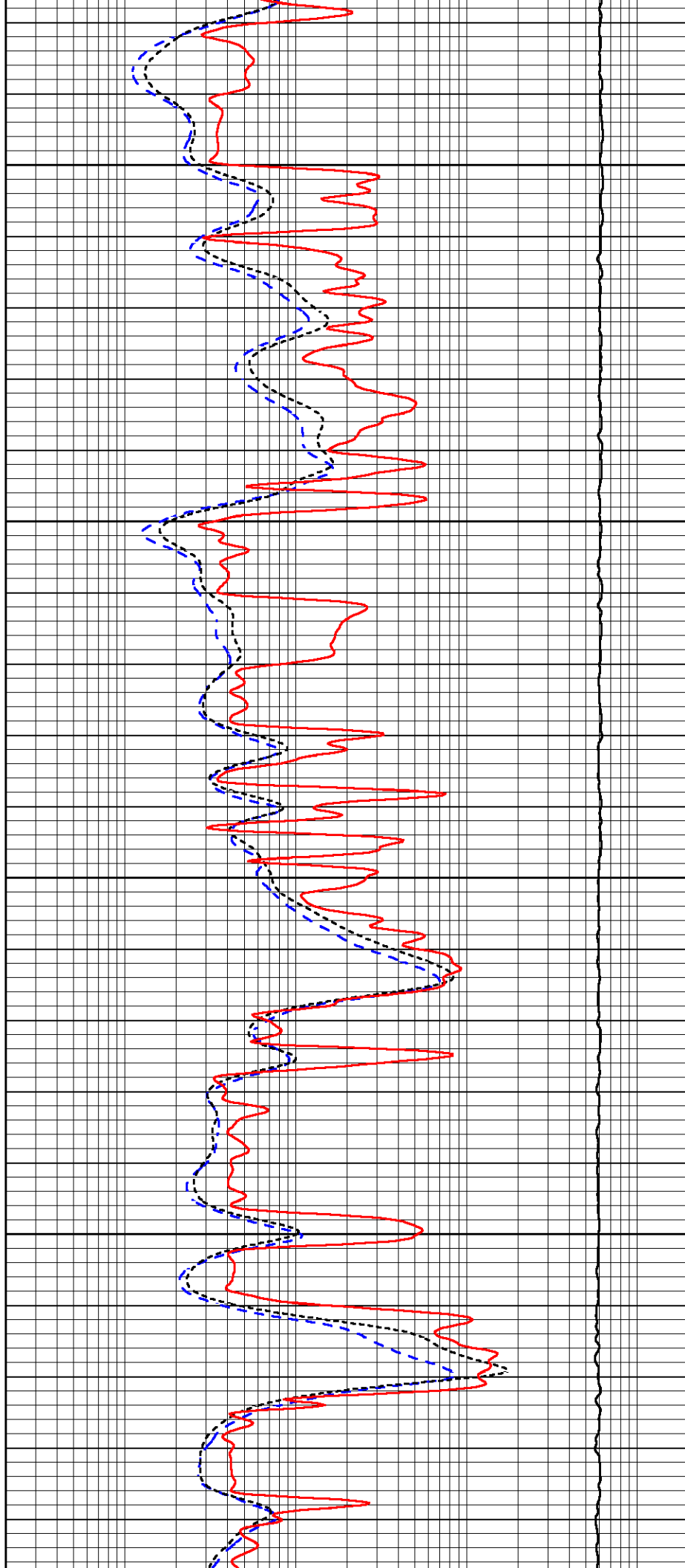


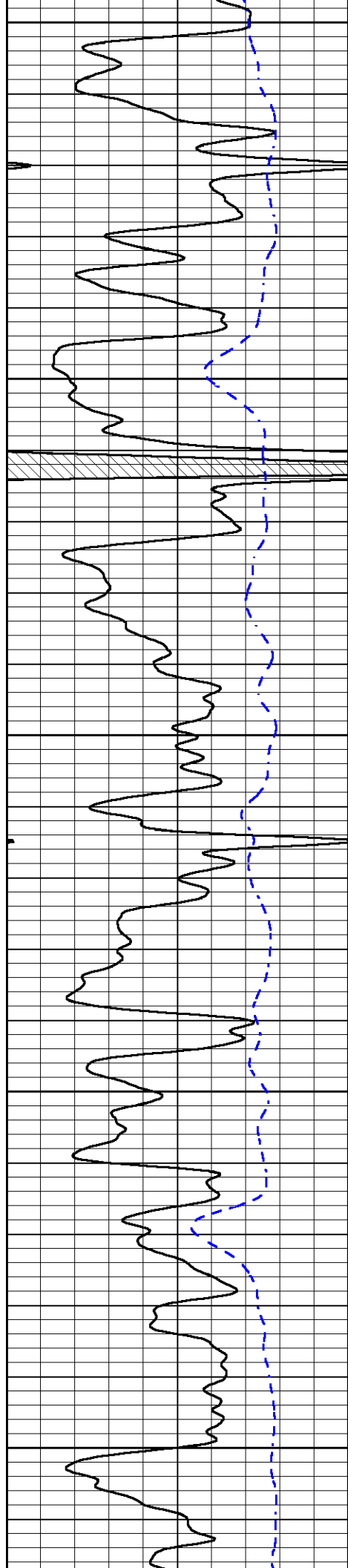
3400

3450

3500

3550





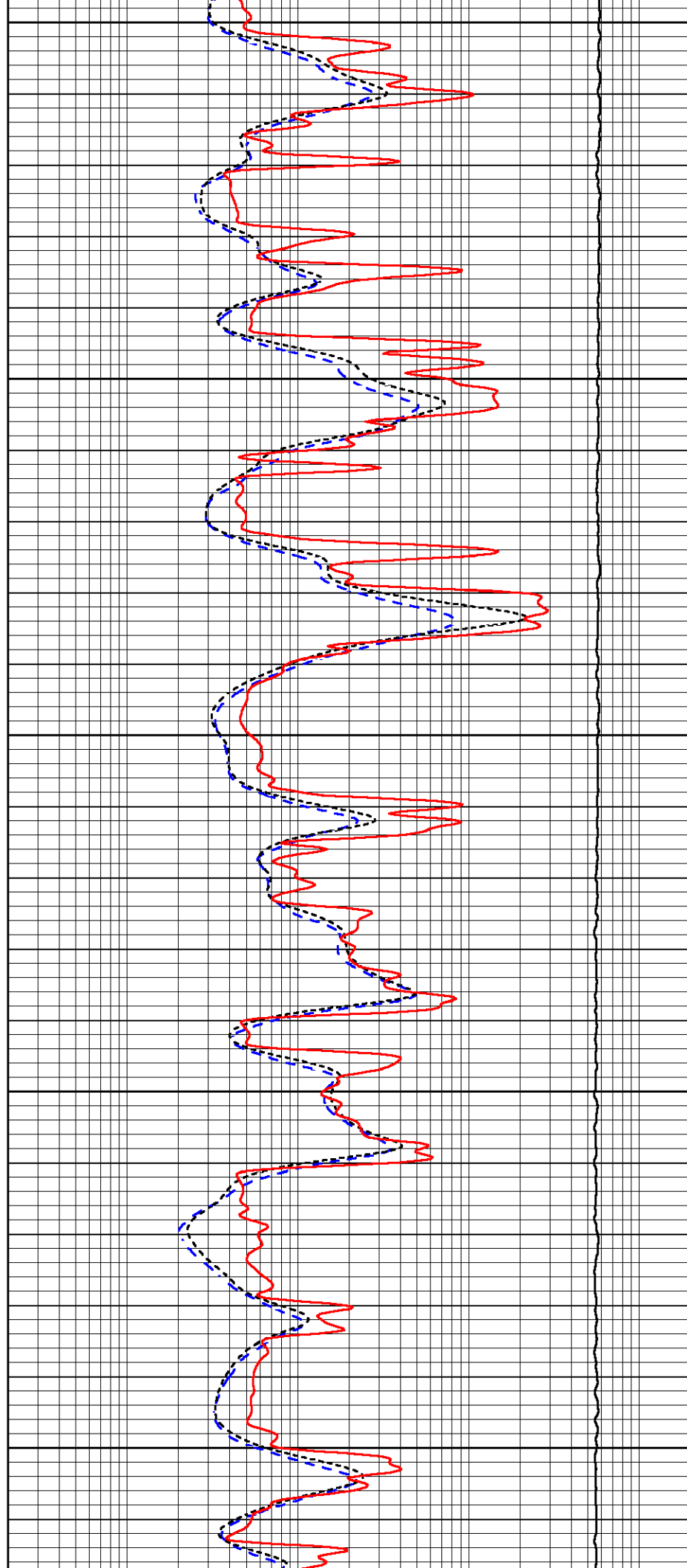
3600

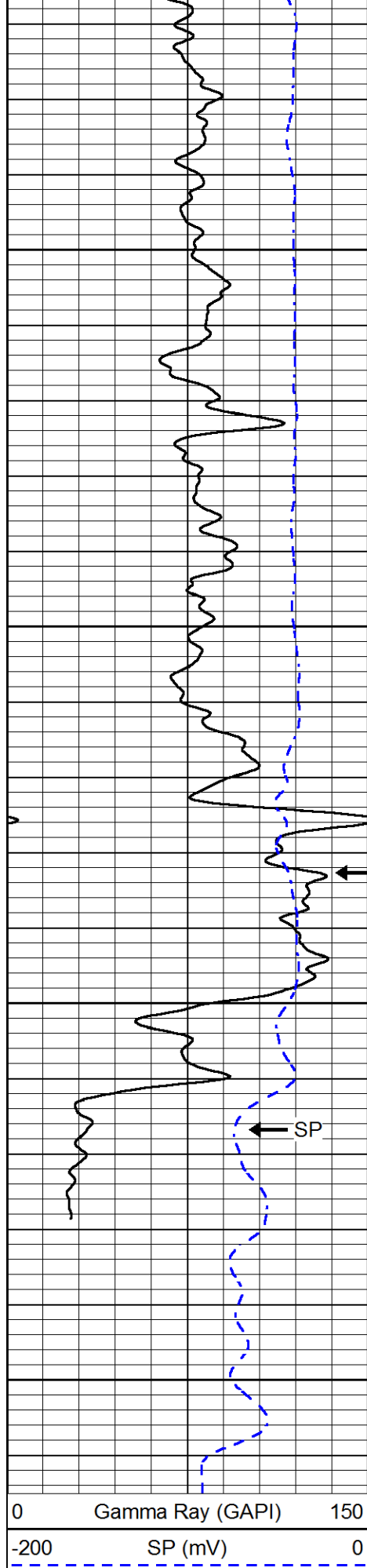
3650

3700

3750

3800





0 Gamma Ray (GAPI) 150  
-200 SP (mV) 0

3850

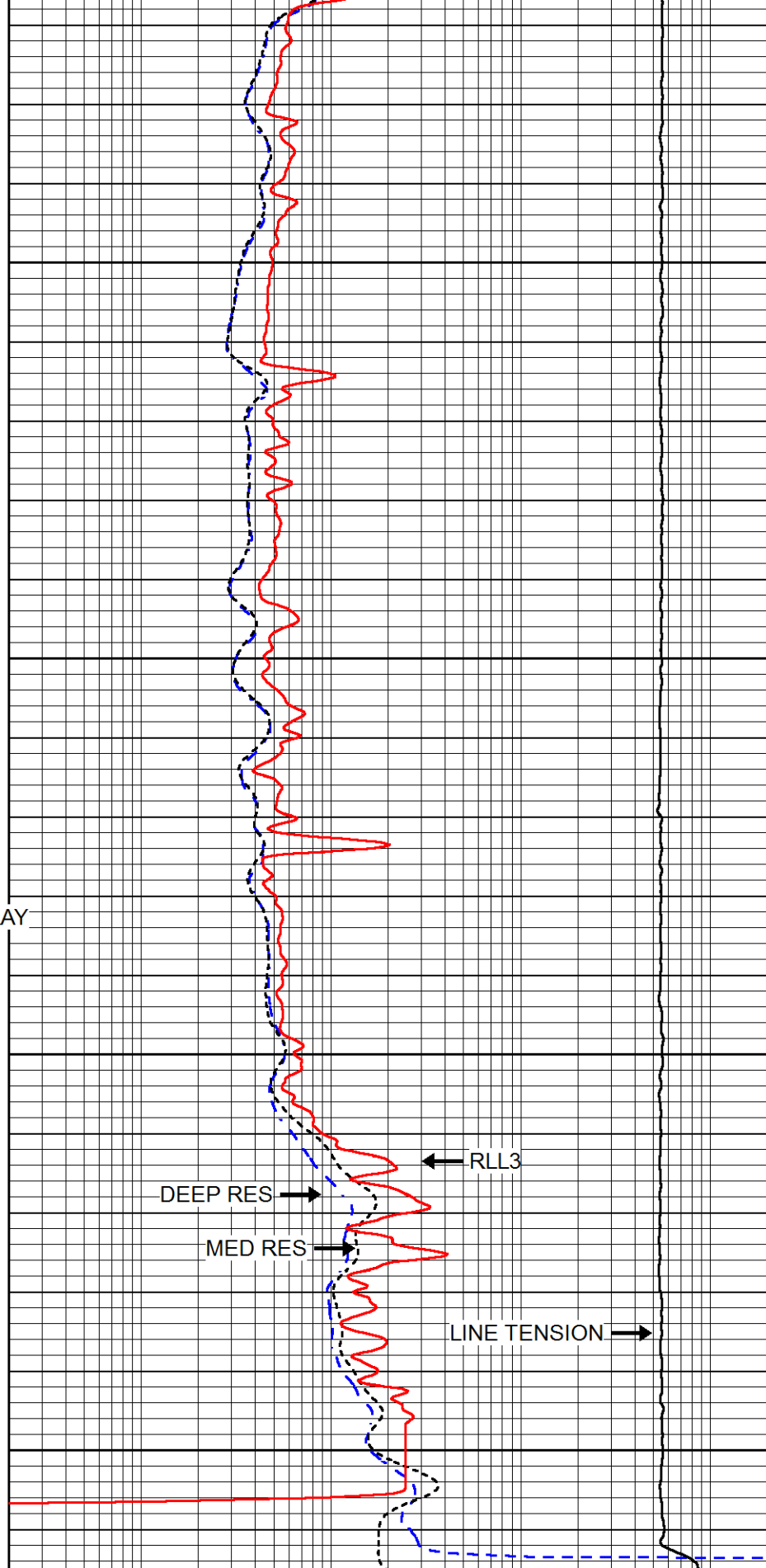
3900

3950

4000

GAMMA RAY

SP



DEEP RES

MED RES

LINE TENSION

RLL3

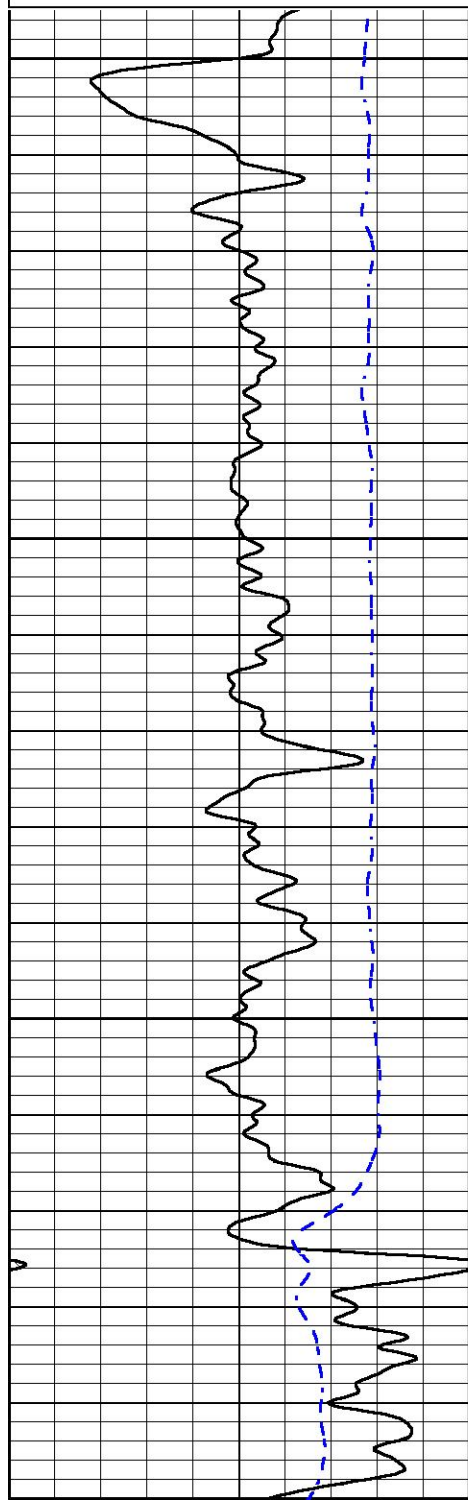
0.2 Deep Resistivity (Ohm-m) 2000  
0.2 Medium Resistivity (Ohm-m) 2000  
0.2 RLL3 (Ohm-m) 2000  
10000 Line Tension (lb) 0

# REPEAT SECTION

Database File cobalt\_evelyn a\_1-27.db  
 Dataset Pathname STKML/pass2.2  
 Presentation Format dil  
 Dataset Creation Tue Jun 20 21:31:28 2017  
 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 |
| 10000 | Line Tension (lb)          | 0    |

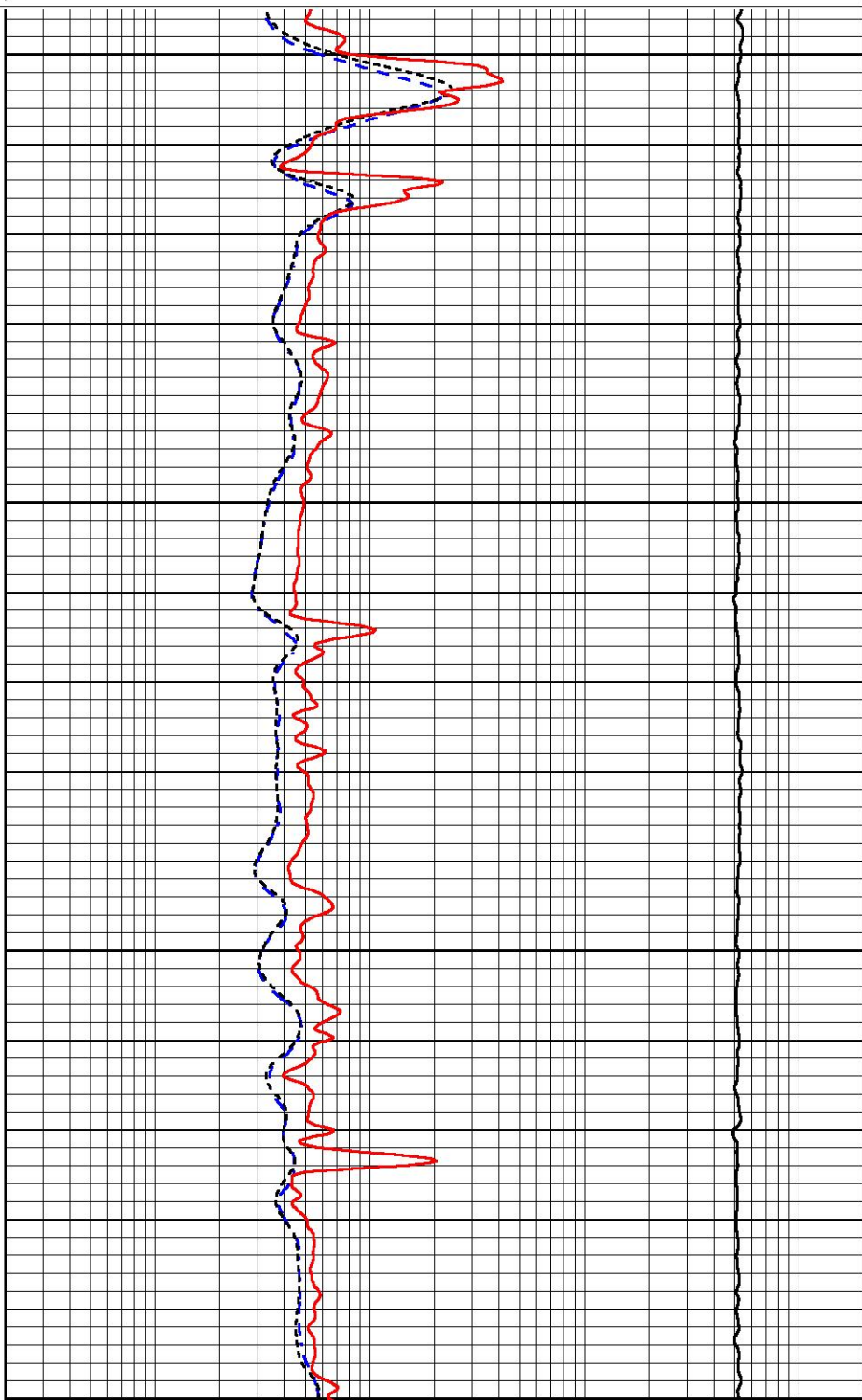


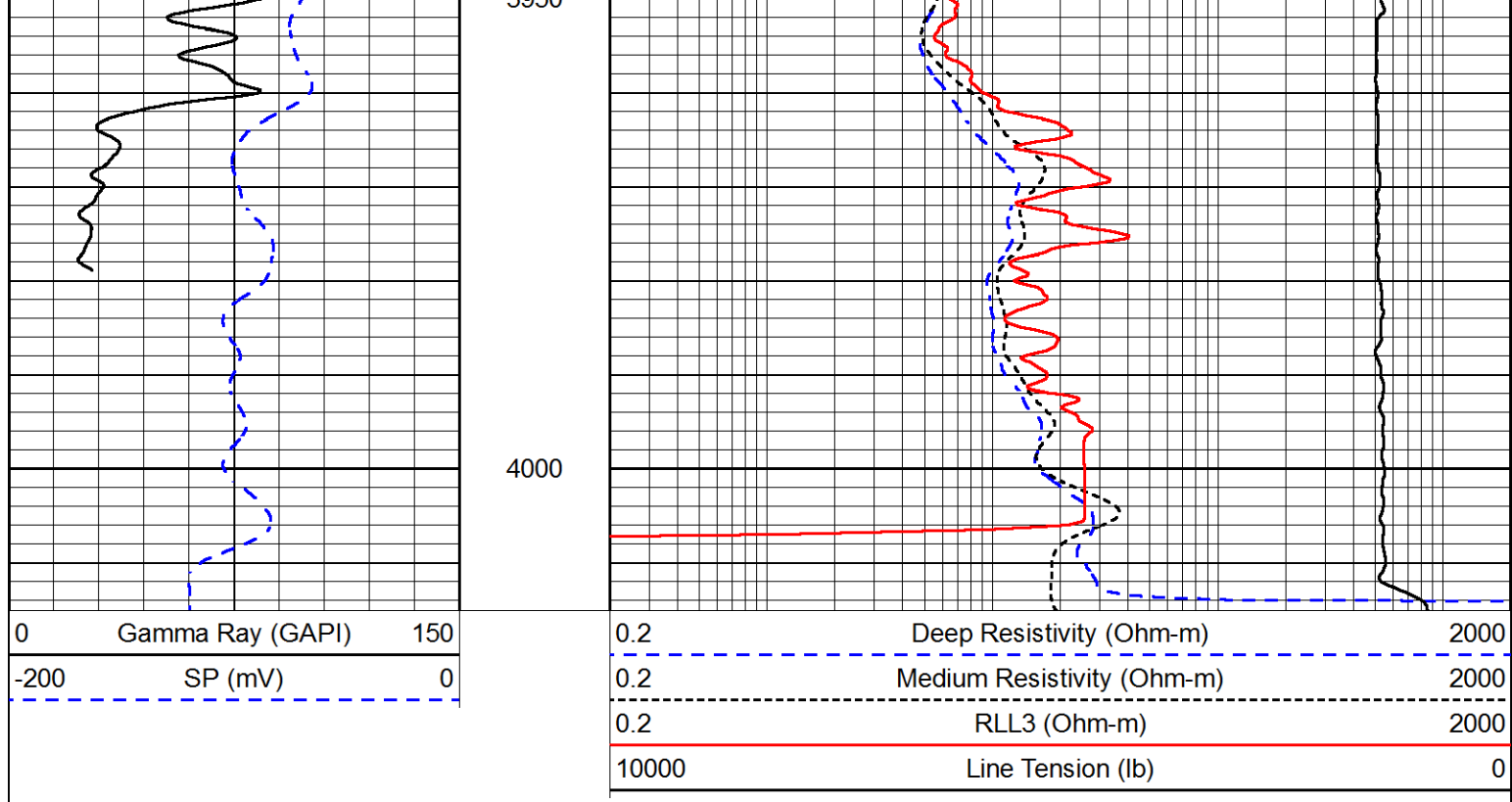
3800

3850

3900

3950





### Calibration Report

Database File cobalt\_evelyn a\_1-27.db  
 Dataset Pathname STKML/pass3.5  
 Dataset Creation Tue Jun 20 21:22:46 2017

### Dual Induction Calibration Report

Serial-Model: PSI 91-M&W  
 Calibration Performed: Sat Jun 17 12:42:37 2017

| Loop:  | Readings |          | References |         |        | Results |         |
|--------|----------|----------|------------|---------|--------|---------|---------|
|        | Air      | Loop     | Air        | Loop    |        | Gain    | Offset  |
| Deep   | 166.796  | 835.089  | 0.000      | 255.800 | mmho/m | 0.420   | -31.500 |
| Medium | 142.009  | 1348.560 | 0.000      | 255.800 | mmho/m | 0.360   | -31.000 |

### Microlog Calibration Report

Serial-Model: PSI-01-PSIML  
 Performed: Sat Jun 17 12:42:28 2017

|         | Readings |        | References |         |       | Results    |          |
|---------|----------|--------|------------|---------|-------|------------|----------|
|         | Zero     | Cal    | Zero       | Cal     |       | m          | b        |
| Normal  | 0.0000   | 1.0000 | 0.0000     | 1.0000  | Ohm-m | 32500.0000 | -1.5000  |
| Inverse | 0.0000   | 1.0000 | 0.0000     | 1.0000  | Ohm-m | 27000.0000 | -0.3000  |
| Caliper | 1.0001   | 1.1397 | 6.5000     | 18.5000 | in    | 100.0000   | -97.1500 |

### Compensated Density Calibration Report

Serial-Model: 90-1031-M&W  
 Source / Verifier: 16955B / 2ci  
 Master Calibration Performed: Sat Jun 17 12:42:56 2017

## Master Calibration

|                     | Density |      | Far Detector                | Near Detector |     |
|---------------------|---------|------|-----------------------------|---------------|-----|
| Magnesium           | 1.755   | g/cc | 5174.18                     | 6425.27       | cps |
| Aluminum            | 2.665   | g/cc | 963.17                      | 4037.42       | cps |
| Spine Angle = 74.55 |         |      | Density/Spine Ratio = 0.522 |               |     |
|                     | Size    |      | Reading                     |               |     |
| Small Ring          | 8.00    | in   | 1.84                        |               |     |
| Large Ring          | 22.00   | in   | 1.46                        |               |     |

## Compensated Neutron Calibration Report

Serial Number: 207-MW  
Tool Model: M&W  
Calibration Performed: Sat Jun 17 10:30:30 2017

| 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  
Tool Model: M&W  
Calibration Performed: Sat Jun 17 12:44:49 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



Company COBALT ENERGY, LLC  
Well EVELYN A #1-27  
Field WILDCAT  
County DECATUR  
State KANSAS