



DUAL INDUCTION LOG

Pioneer Energy Services

Company **GREAT PLAINS ENERGY, INC.**

Well **LANG NO.1**

Field **WILDCAT**

County **NORTON** State **KANSAS**

Location: API #: 15-137-20749-00-00

1650' FSL & 1400' FWL

SEC 32 TWP 2S RGE 23W

Other Services
CNL/CDL
MEL

Permanent Datum **GROUND LEVEL** Elevation **2339'**
Log Measured From **KELLY BUSHING**
Drilling Measured From **KELLY BUSHING**

Elevation
K.B. **2346'**
D.F. **N/A**
G.L. **2339'**

Company **GREAT PLAINS ENERGY, INC.**
Well **LANG NO.1**
Field **WILDCAT**
County **NORTON**
State **KANSAS**

| | |
|------------------------|------------------|
| Date | 7/26/2018 |
| Run Number | ONE |
| Depth Driller | 3645' |
| Depth Logger | 3639' |
| Bottom Logged Interval | 3638' |
| Top Log Interval | 200' |
| Casing Driller | 8.625" @ 221' |
| Casing Logger | 219' |
| Bit Size | 7.875" |
| Type Fluid in Hole | CHEMICAL |
| Salinity, ppm CL | 1400 |
| Density / Viscosity | 9.1 57 |
| pH / Fluid Loss | 10.5 6.4 |
| Source of Sample | FLOWLINE |
| Rm @ Meas. Temp | .85 @ 74 |
| Rmt @ Meas. Temp | .64 @ 74 |
| Rmc @ Meas. Temp | 1.15 @ 74 |
| Source of Rmf / Rmc | CHARTS |
| Rm @ BHT | .56 @ 112 |
| Operating Rig Time | 3 HOURS |
| Max Rec. Temp. F | 112 DEGF |
| Equipment Number | 108 |
| Location | HAYS |
| Recorded By | J. HENRICKSON |
| Witnessed By | CLAYTON ERICKSON |

<<< 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.

NORTON KANSAS
3 WEST TO W3 ROAD, 1/4 NORTH, EAST INTO

Log Measured From: **KELLY BUSHING** 7 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
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: **CLAYTON ERICKSON**
Secondary Witness:
Secondary Witness:
Secondary Witness:

Log Variables






DatabaseC:\ProgramData\Warrior\Data\great_plains_lang_1.db
Dataset field/well/stackml/pass3.1/_vars_

Top - 3556.00 ft

| | | | | | | | |
|-----------|--------------|------------------|-------------------|----------------|------------------|-------|------------------|
| A | BOREID in | BOTTEMP degF | CASEOD in | CASETHCK in | FLUIDDEN g/cc | M | MATRXDEN g/cc |
| 1 | 7.875 | 112 | 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 | -190 | 78 | Off | 3639 |

3556.00 ft - Bottom

| | | | | | | | |
|-----------|--------------|------------------|-------------------|----------------|------------------|-------|------------------|
| A | BOREID in | BOTTEMP degF | CASEOD in | CASETHCK in | FLUIDDEN g/cc | M | MATRXDEN g/cc |
| 1 | 7.875 | 112 | 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 | -190 | 78 | Off | 3639 |

| 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 (168-130) | 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

CILM 4.70

SP 0.20

DIL-M&W (1987)

18.50

3.50

220.00

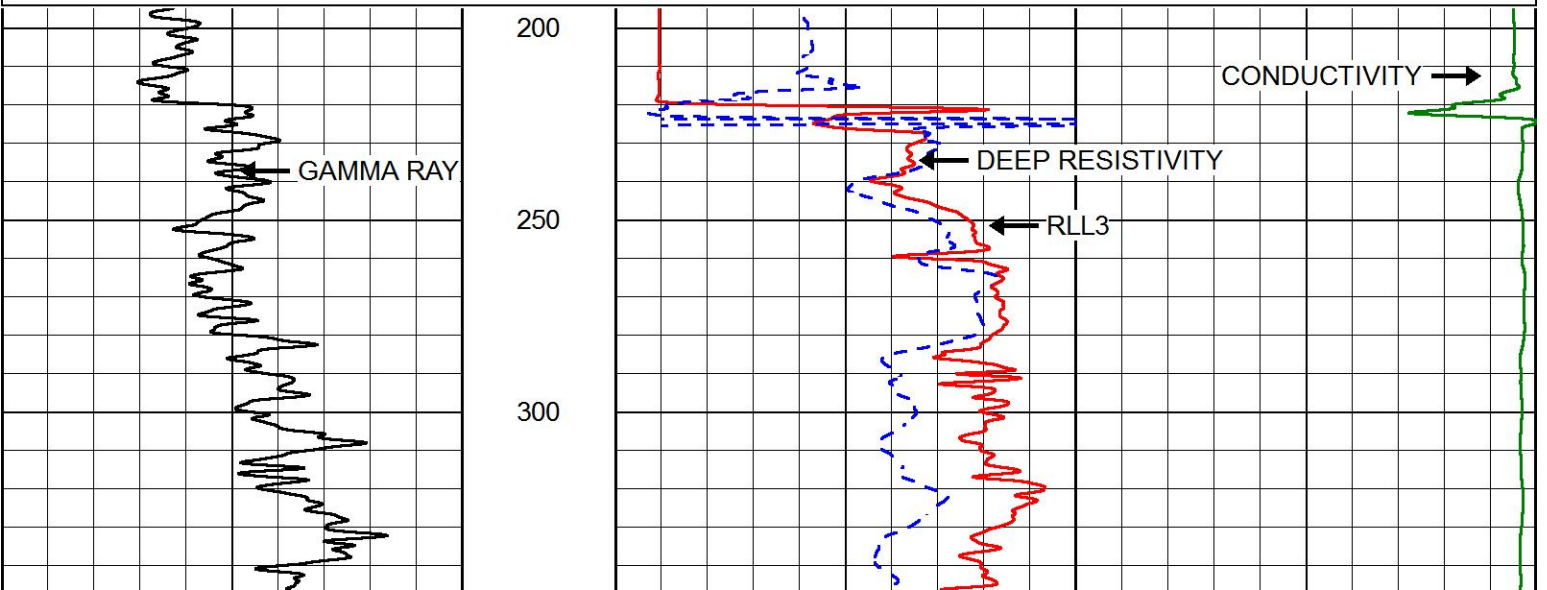
Dataset: great_plains_lang_1.db: field/well/stackml/pass3.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

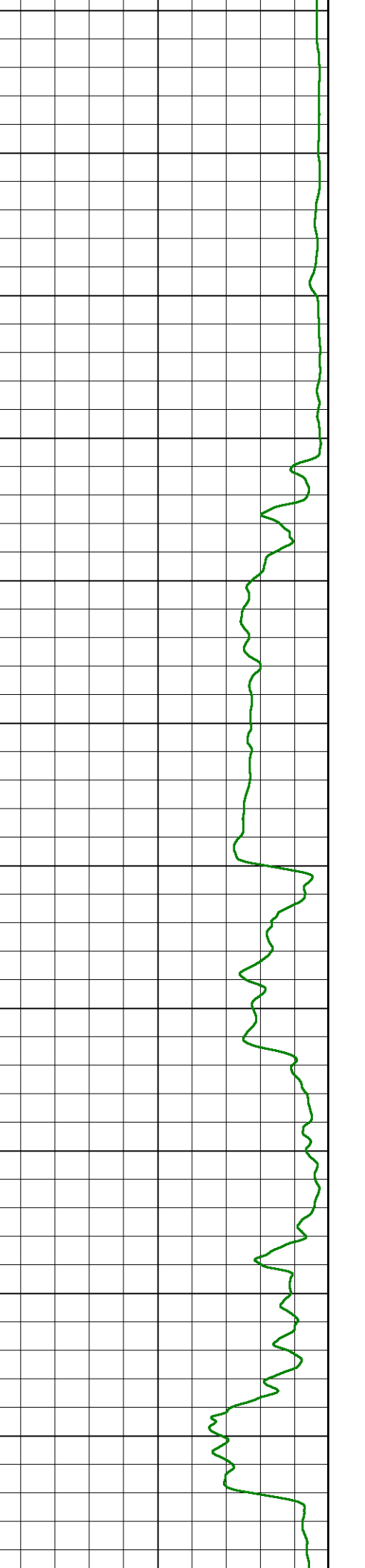
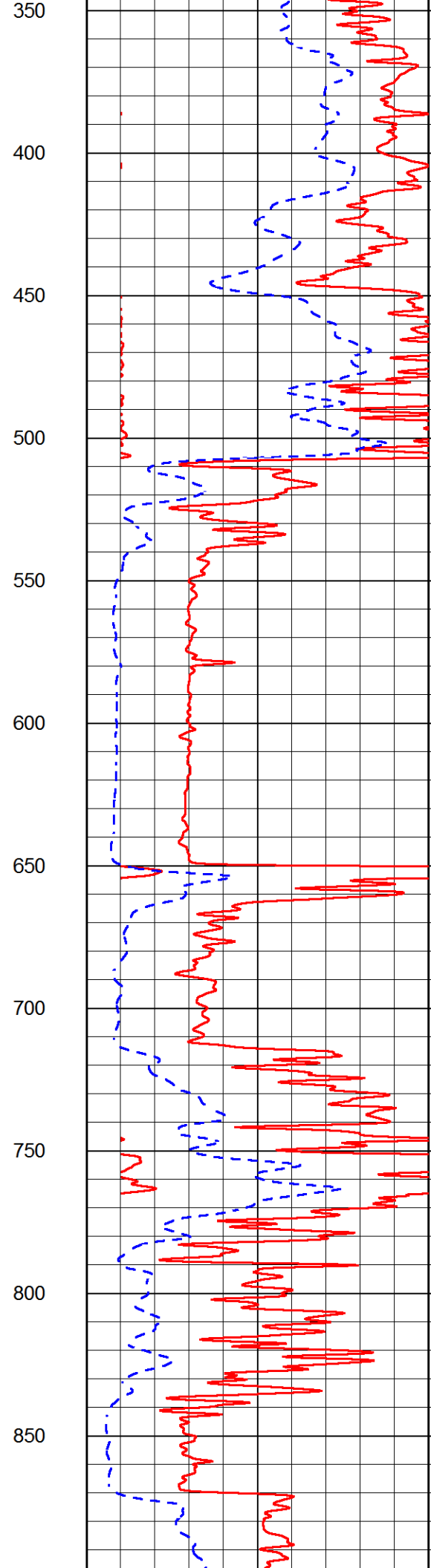
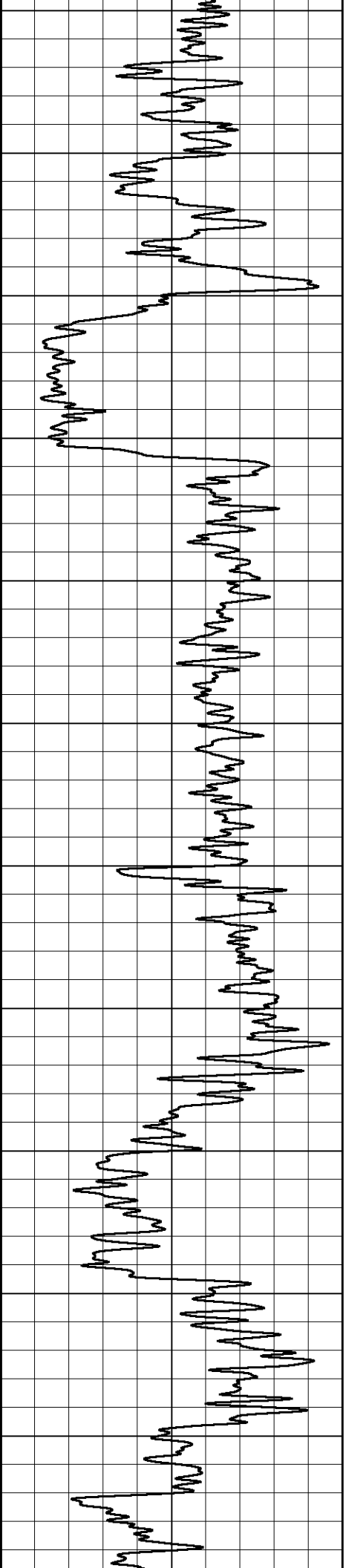


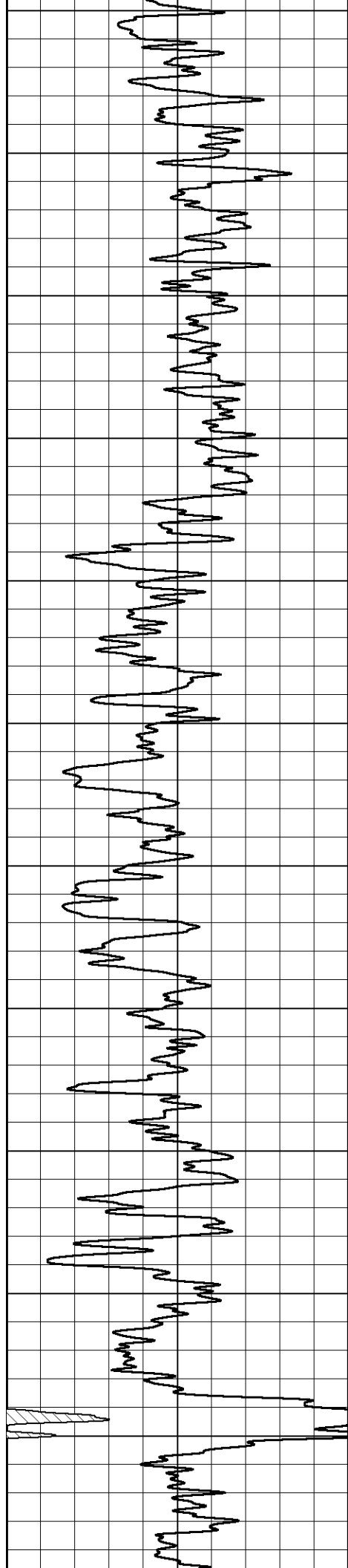
MAIN PASS

Database File: great_plains_lang_1.db
 Dataset Pathname: stackml/pass3.1
 Presentation Format: dil2in
 Dataset Creation: Thu Jul 26 14:12:50 2018
 Charted by: Depth in Feet scaled 1:600

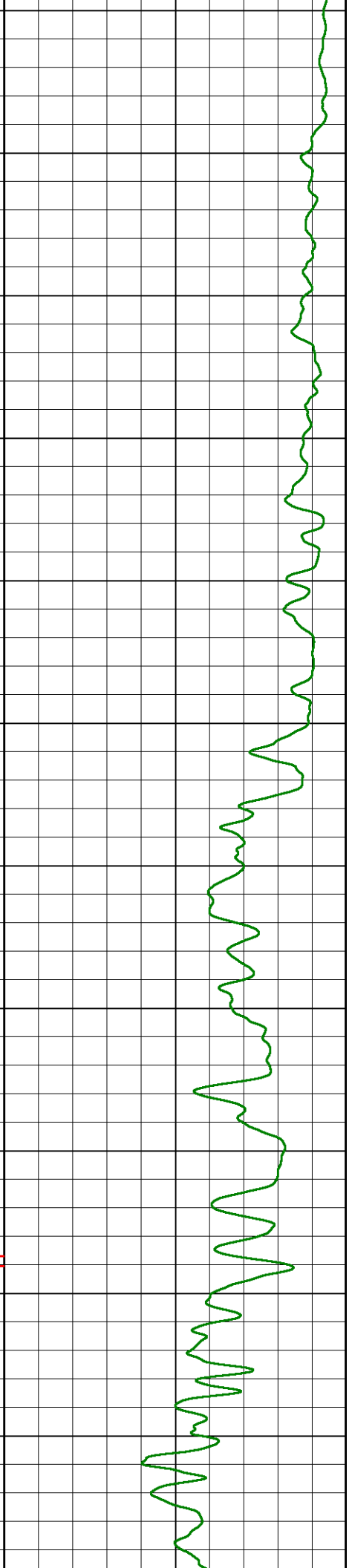
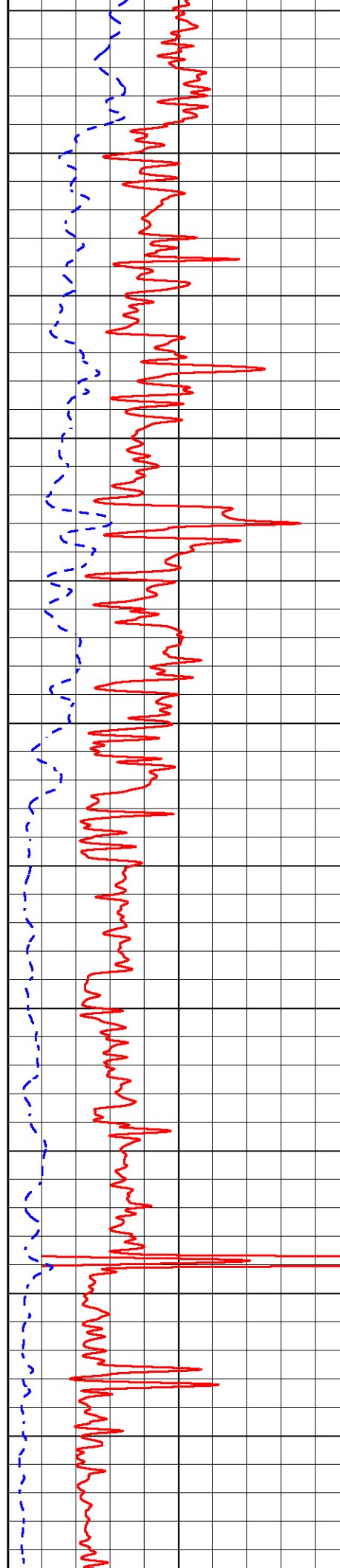
| | | | | | |
|----|--------------------------|-----|------|-----------------------|---|
| 0 | GAMMA RAY (GAPI) | 150 | 2000 | CONDUCTIVITY (mmho/m) | 0 |
| 0 | RLL3 (Ohm-m) | 50 | | | |
| 0 | DEEP RESISTIVITY (Ohm-m) | 50 | | | |
| 50 | RLL3 (Ohm-m) | 500 | | | |
| | DEEP RESISTIVITY | | | | |
| 50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

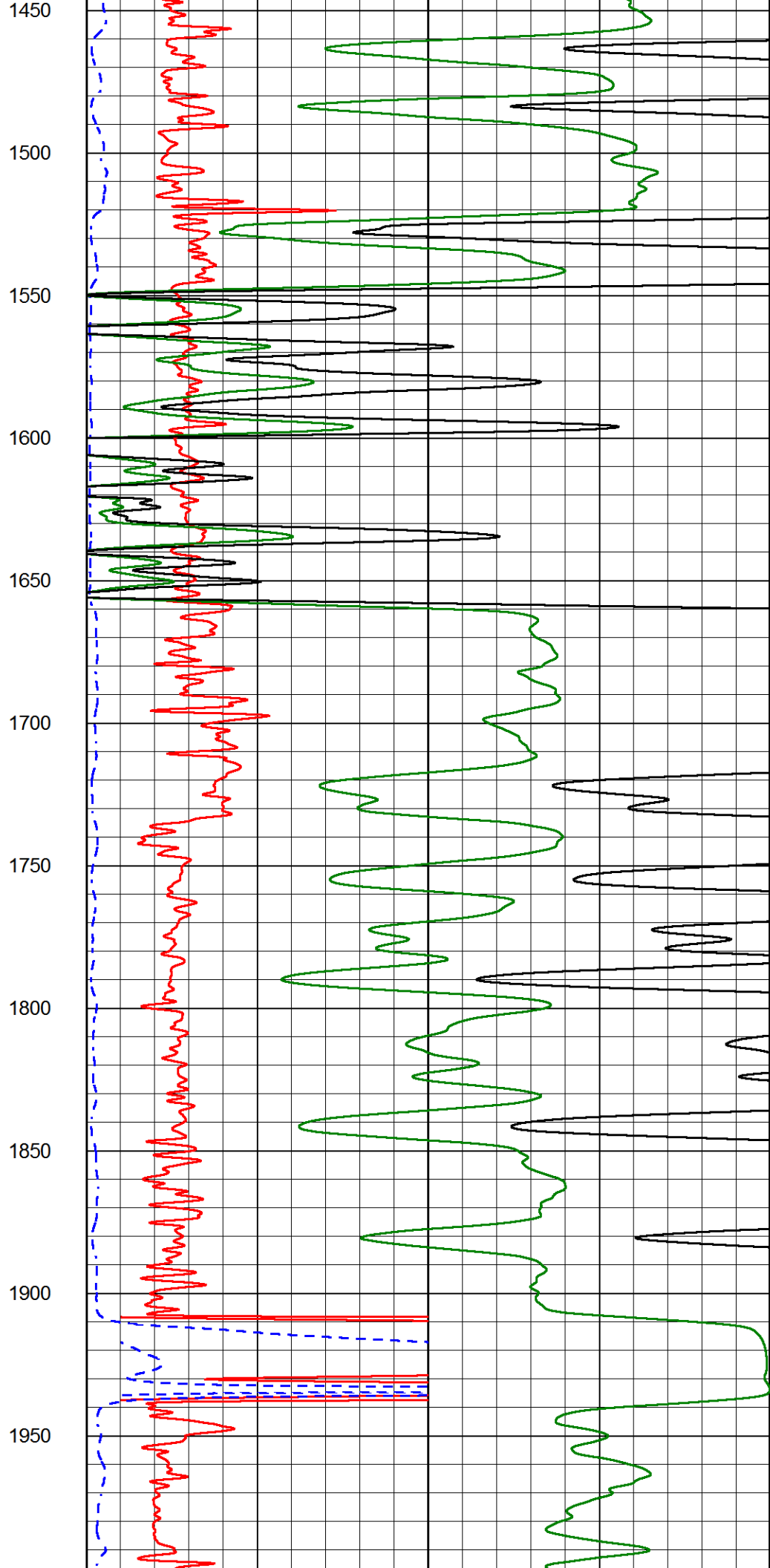
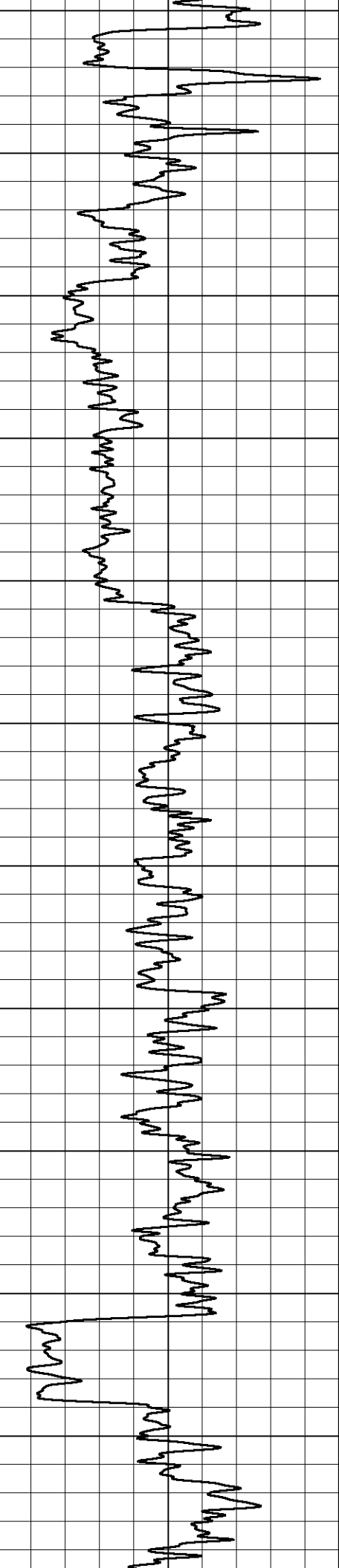


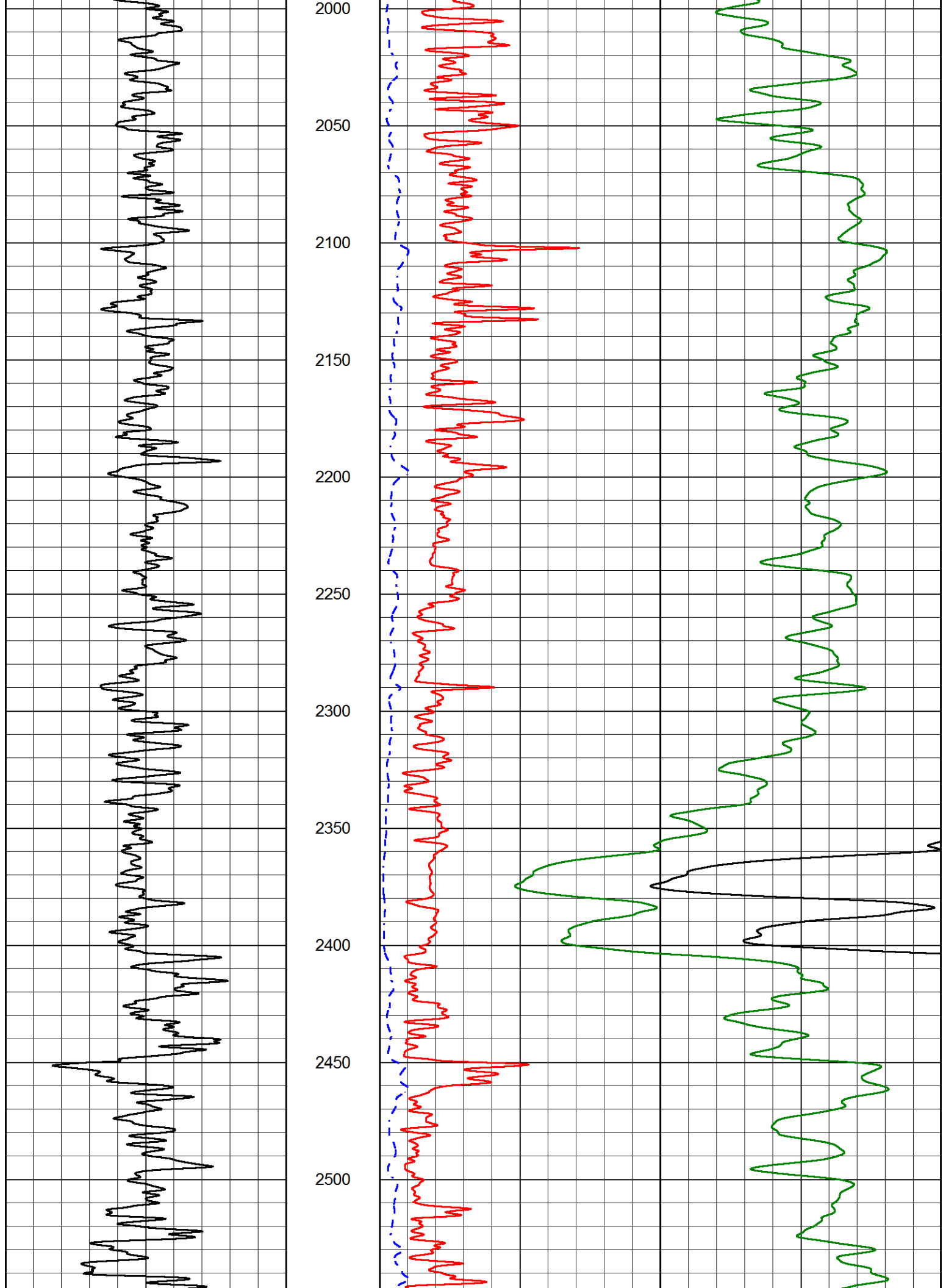


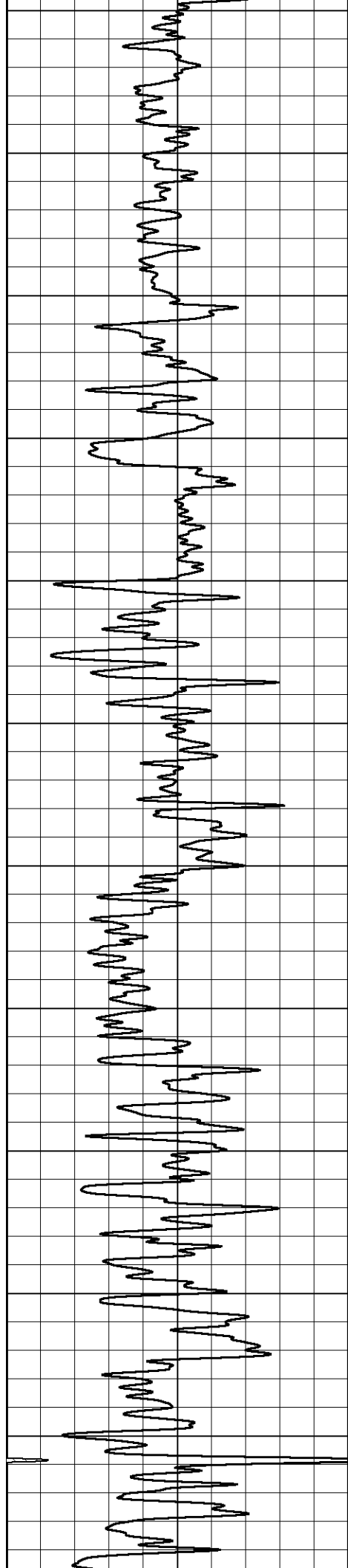


900
950
1000
1050
1100
1150
1200
1250
1300
1350
1400

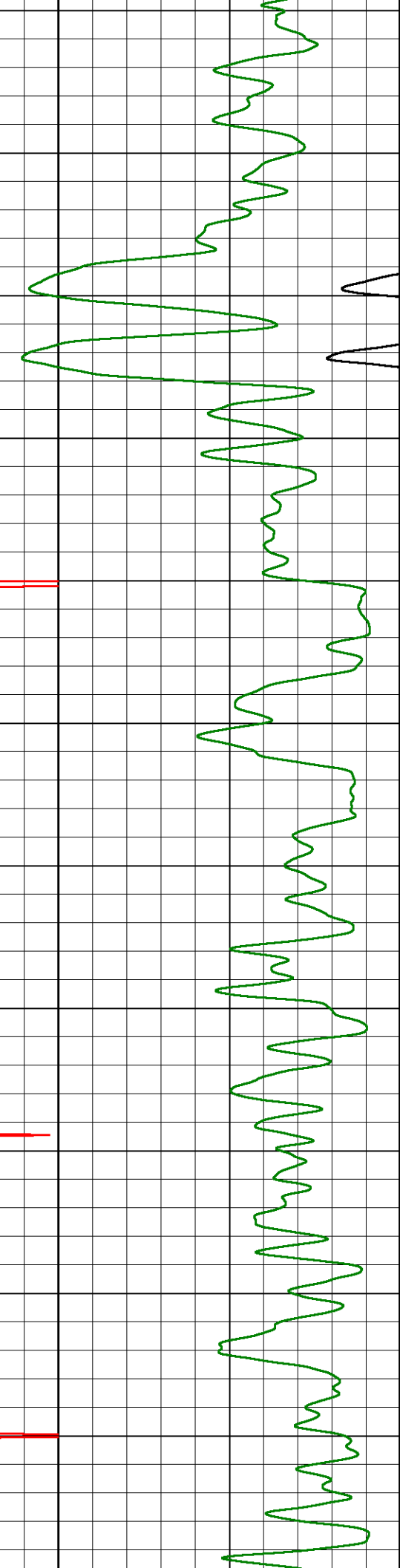
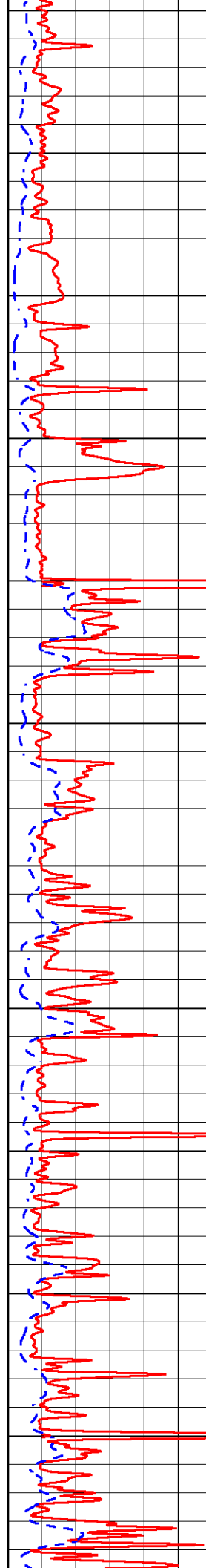


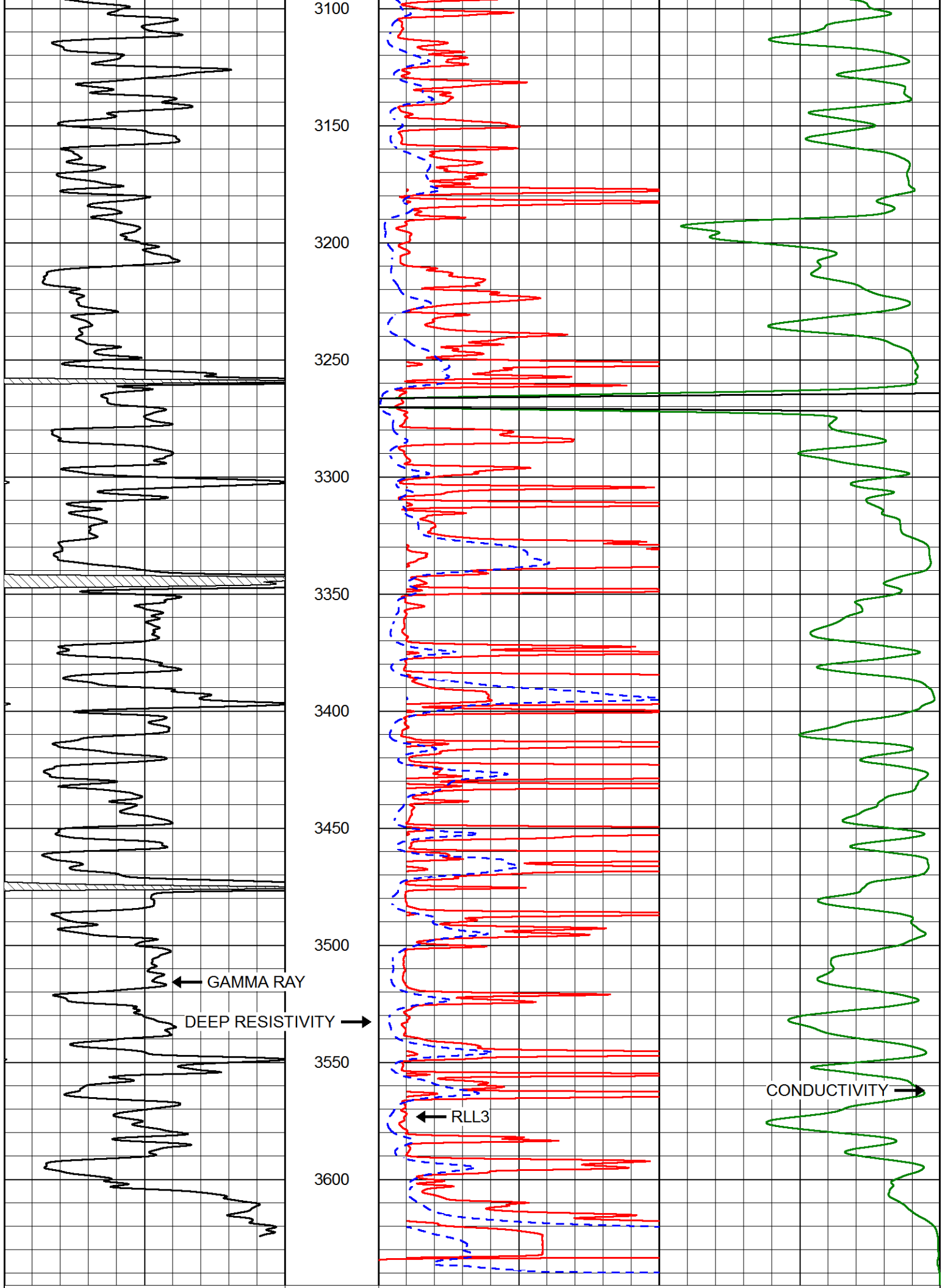






2550
2600
2650
2700
2750
2800
2850
2900
2950
3000
3050





| | | |
|---|------------------|-----|
| 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 |
| | DEEP RESISTIVITY | |
| 50 | (Ohm-m) | 500 |

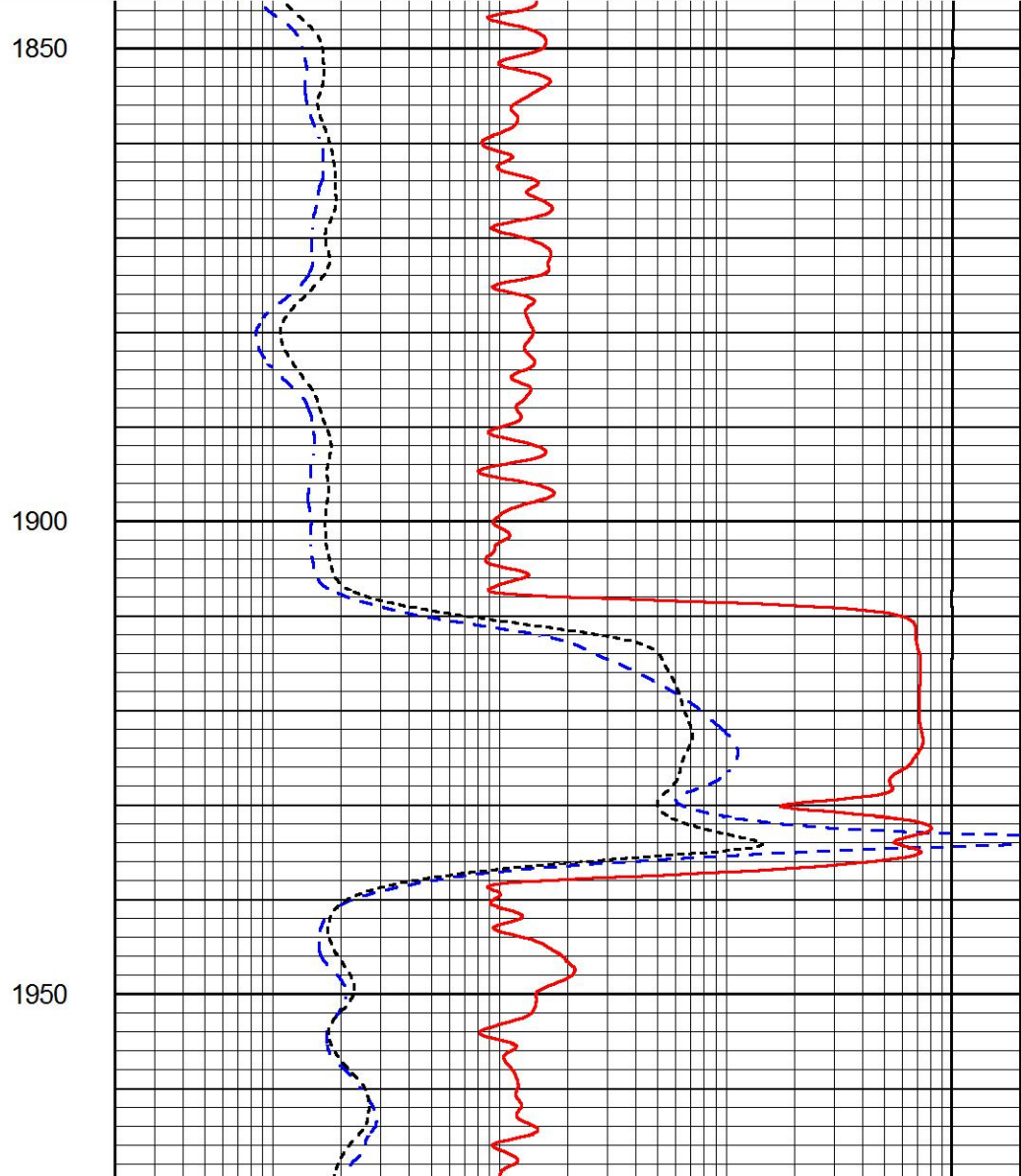
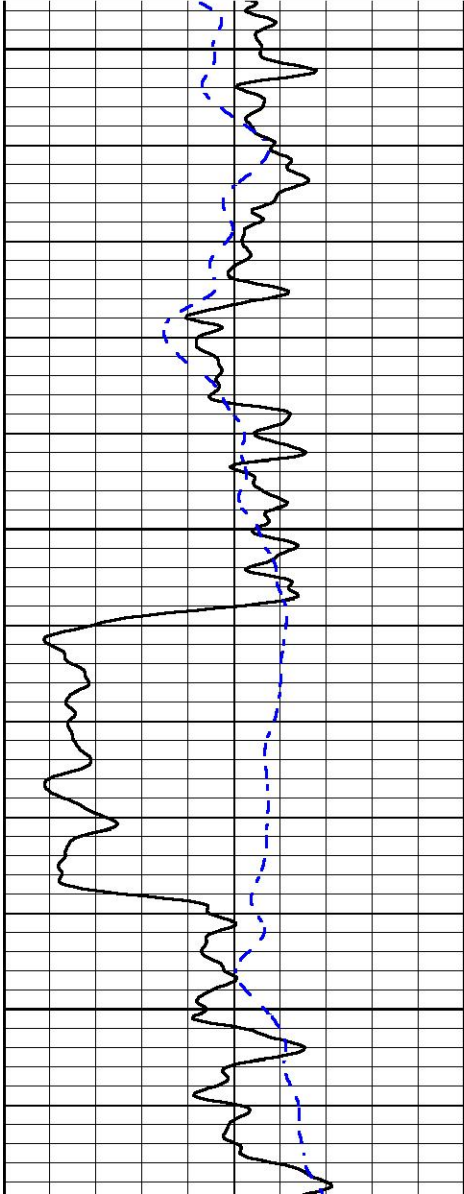


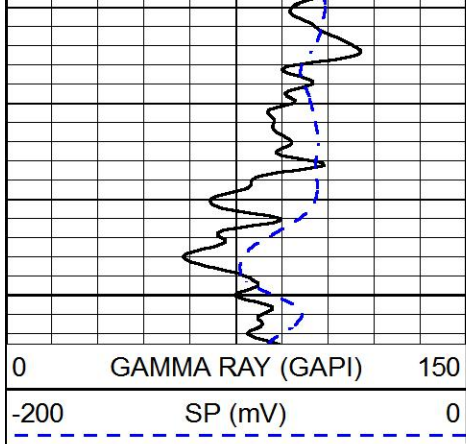
MAIN PASS

Database File: great_plains_lang_1.db
 Dataset Pathname: stackml/pass3.1
 Presentation Format: dil
 Dataset Creation: Thu Jul 26 14:12:50 2018
 Charted by: Depth in Feet scaled 1:240

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

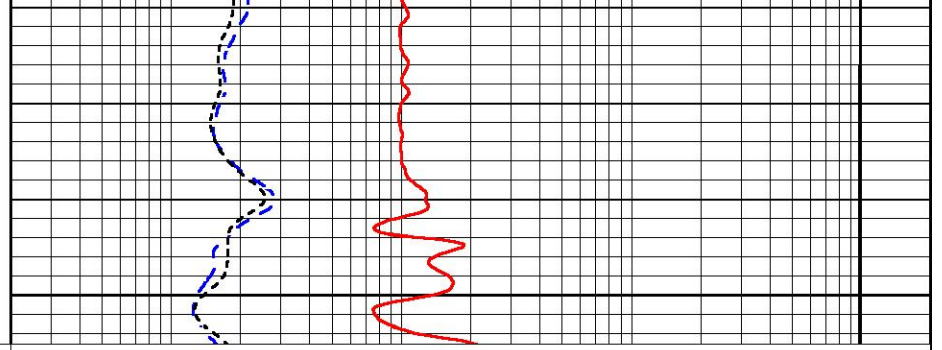
| | | |
|-------|----------------------------|------|
| 0.2 | DEEP RESISTIVITY (Ohm-m) | 2000 |
| 0.2 | MEDIUM RESISTIVITY (Ohm-m) | 2000 |
| 0.2 | RLL3 (Ohm-m) | 2000 |
| 15000 | LINE TENSION (lb) | 0 |





2000

| | | |
|------|------------------|-----|
| 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 |

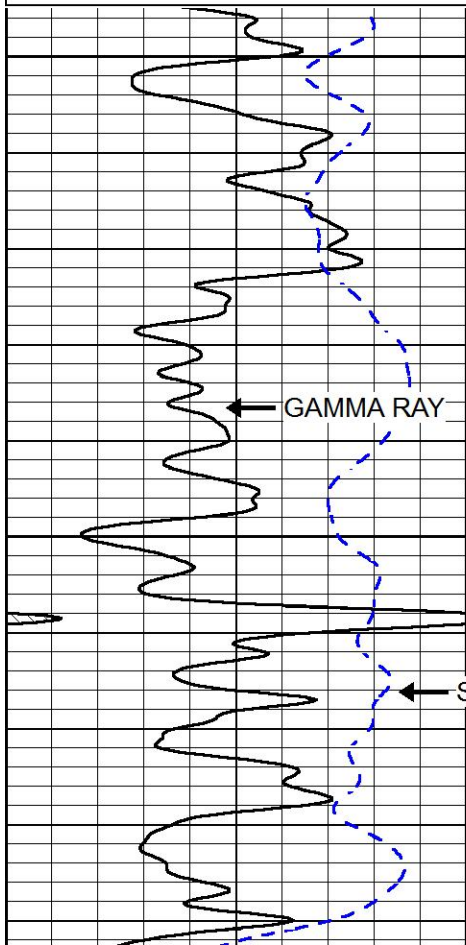


MAIN PASS

Database File great_plains_lang_1.db
 Dataset Pathname stackml/pass3.1
 Presentation Format dil
 Dataset Creation Thu Jul 26 14:12:50 2018
 Charted by Depth in Feet scaled 1:240

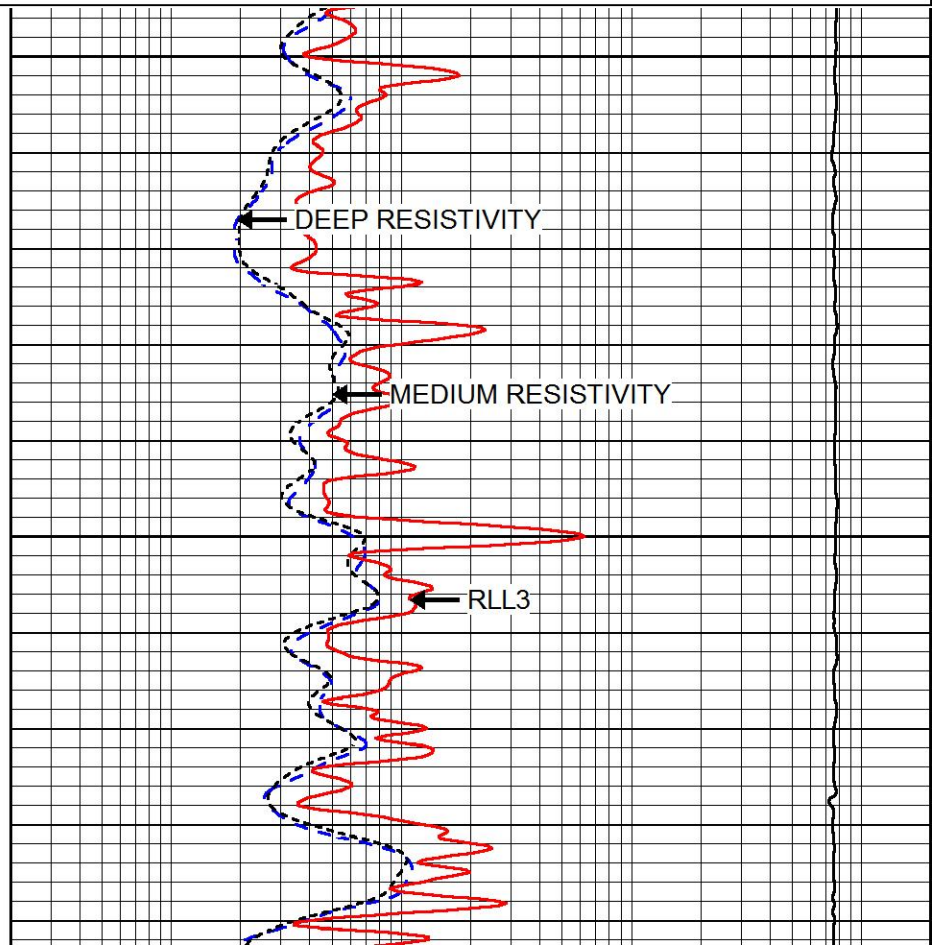
| | | |
|------|------------------|-----|
| 0 | GAMMA RAY (GAPI) | 150 |
| -200 | SP (mV) | 0 |

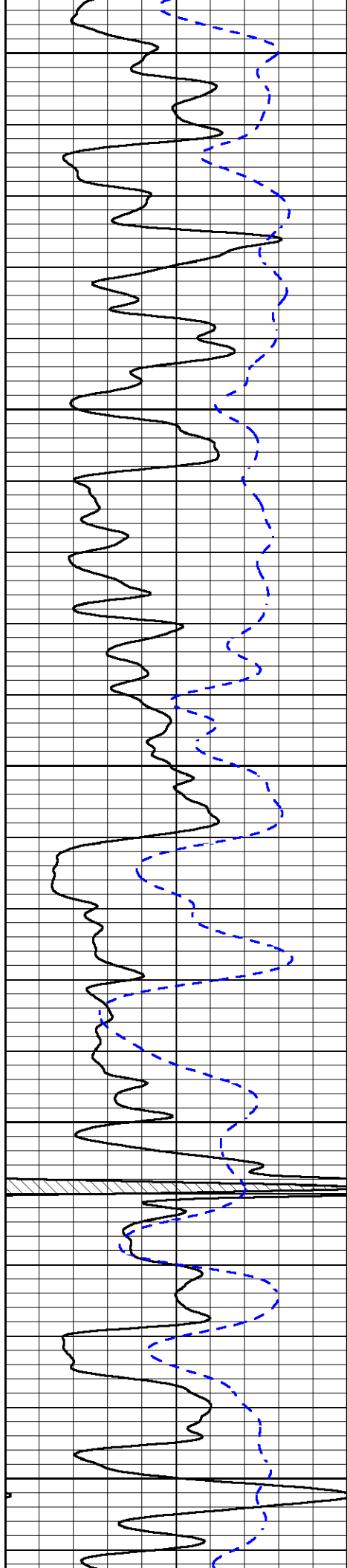
| | | |
|-------|----------------------------|------|
| 0.2 | DEEP RESISTIVITY (Ohm-m) | 2000 |
| 0.2 | MEDIUM RESISTIVITY (Ohm-m) | 2000 |
| 0.2 | RLL3 (Ohm-m) | 2000 |
| 15000 | LINE TENSION (lb) | 0 |



3000

3050





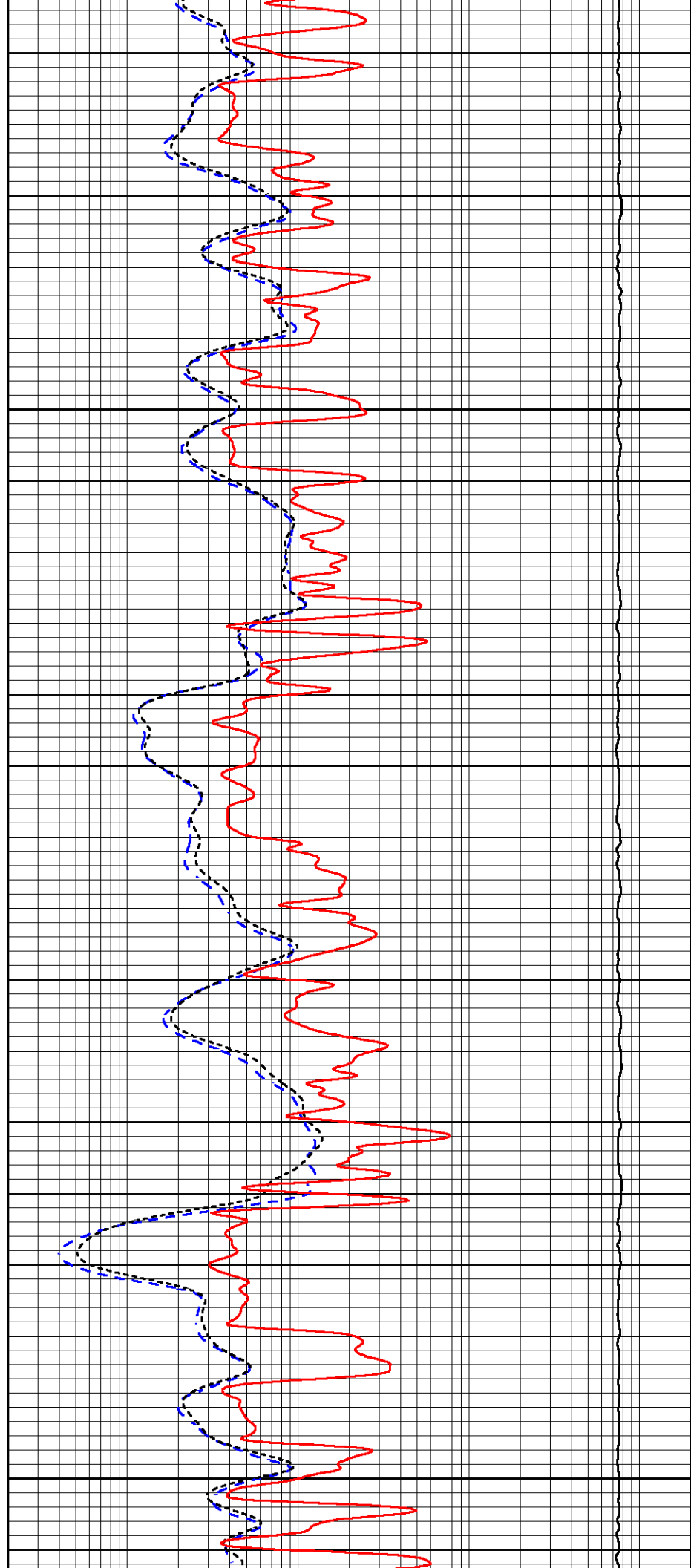
3100

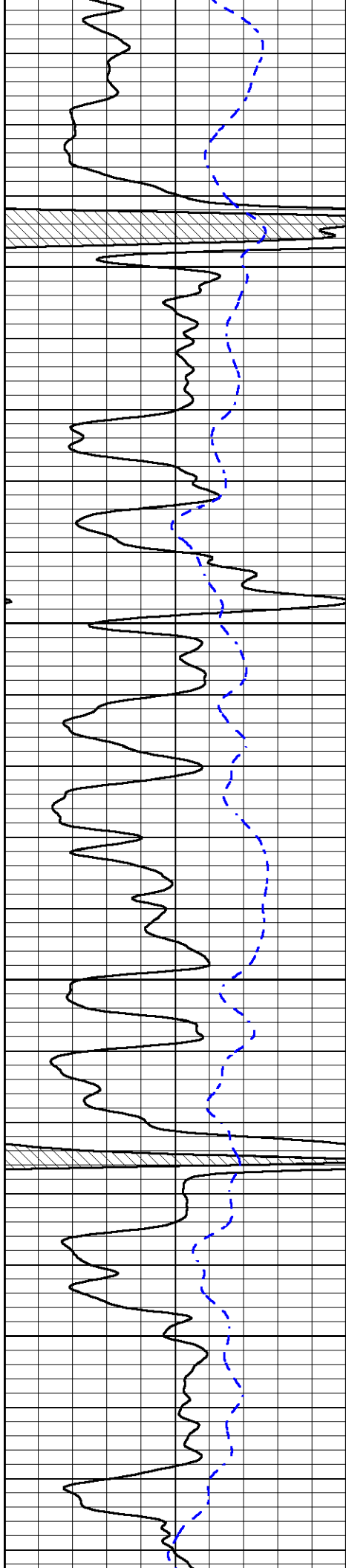
3150

3200

3250

3300



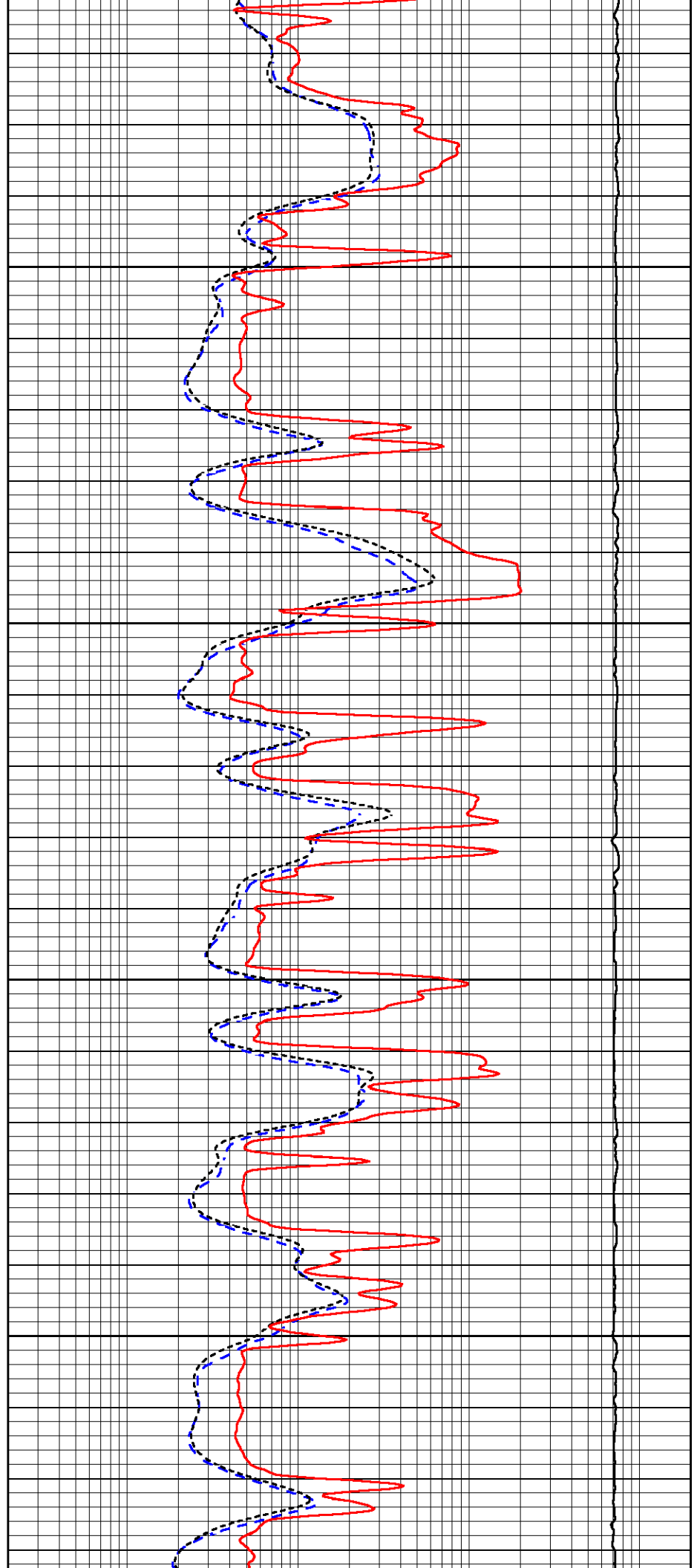


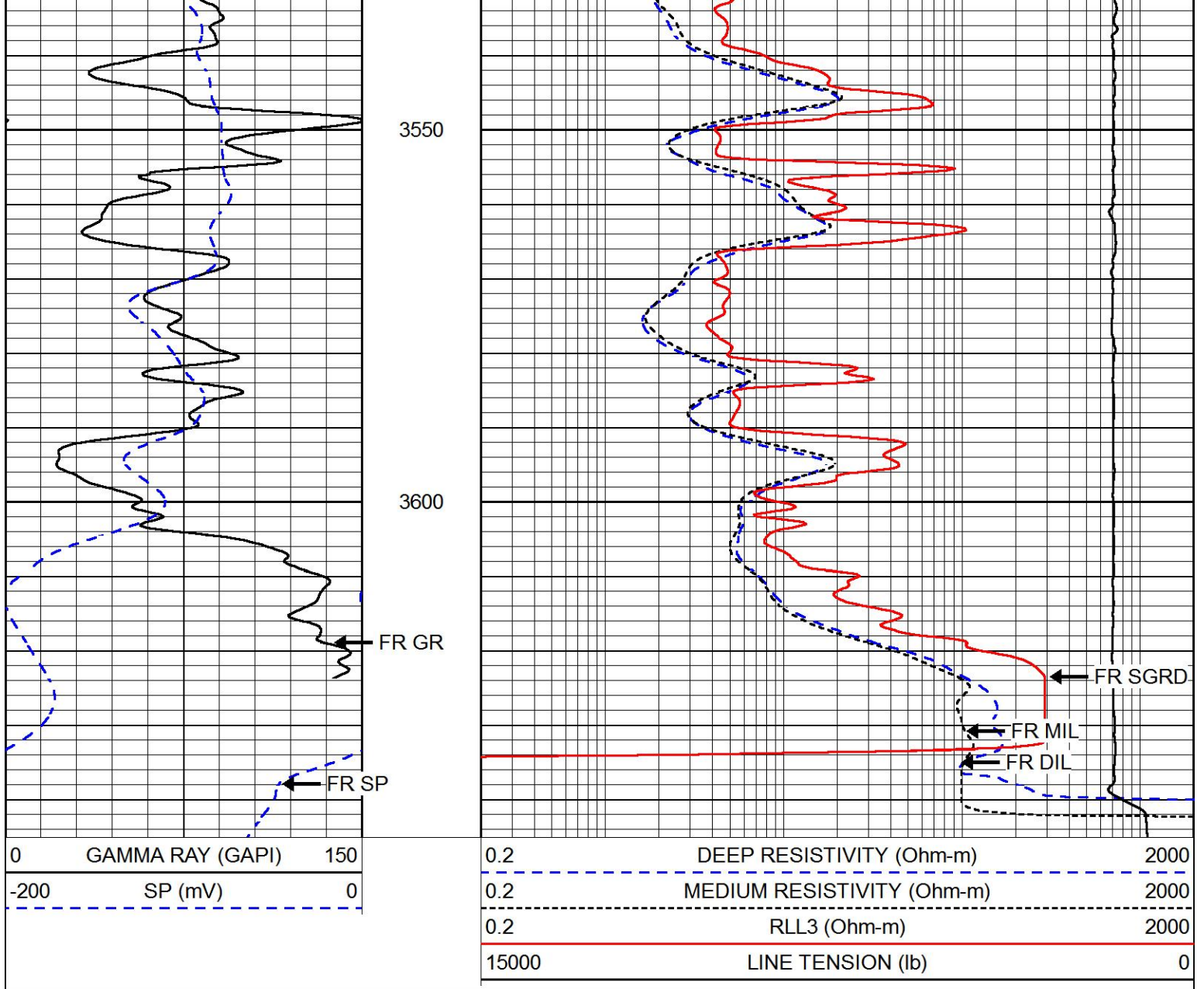
3350

3400

3450

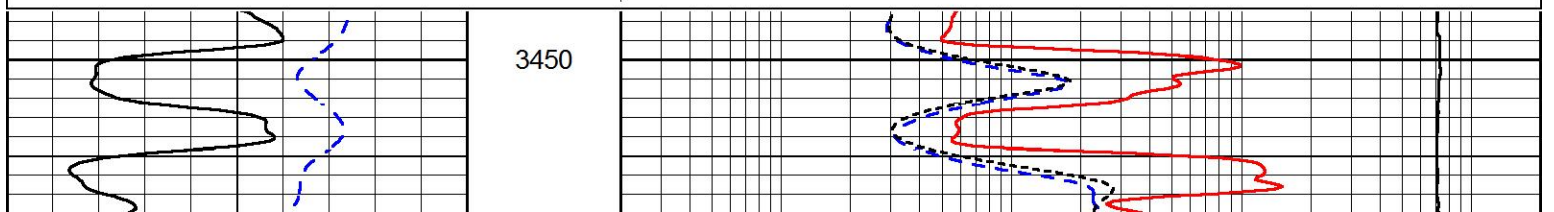
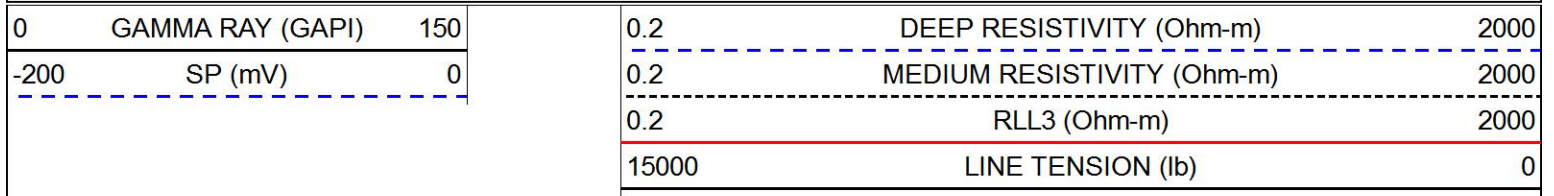
3500

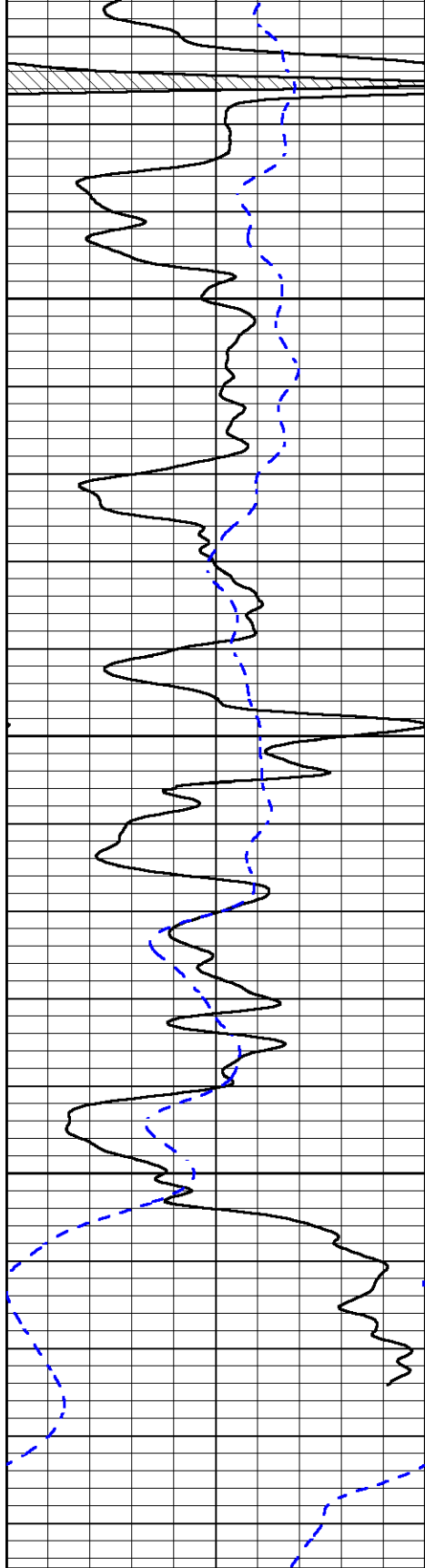





REPEAT SECTION

Database File: great_plains_lang_1.db
 Dataset Pathname: stackml/pass2.1
 Presentation Format: dil
 Dataset Creation: Thu Jul 26 14:49:42 2018
 Charted by: Depth in Feet scaled 1:240



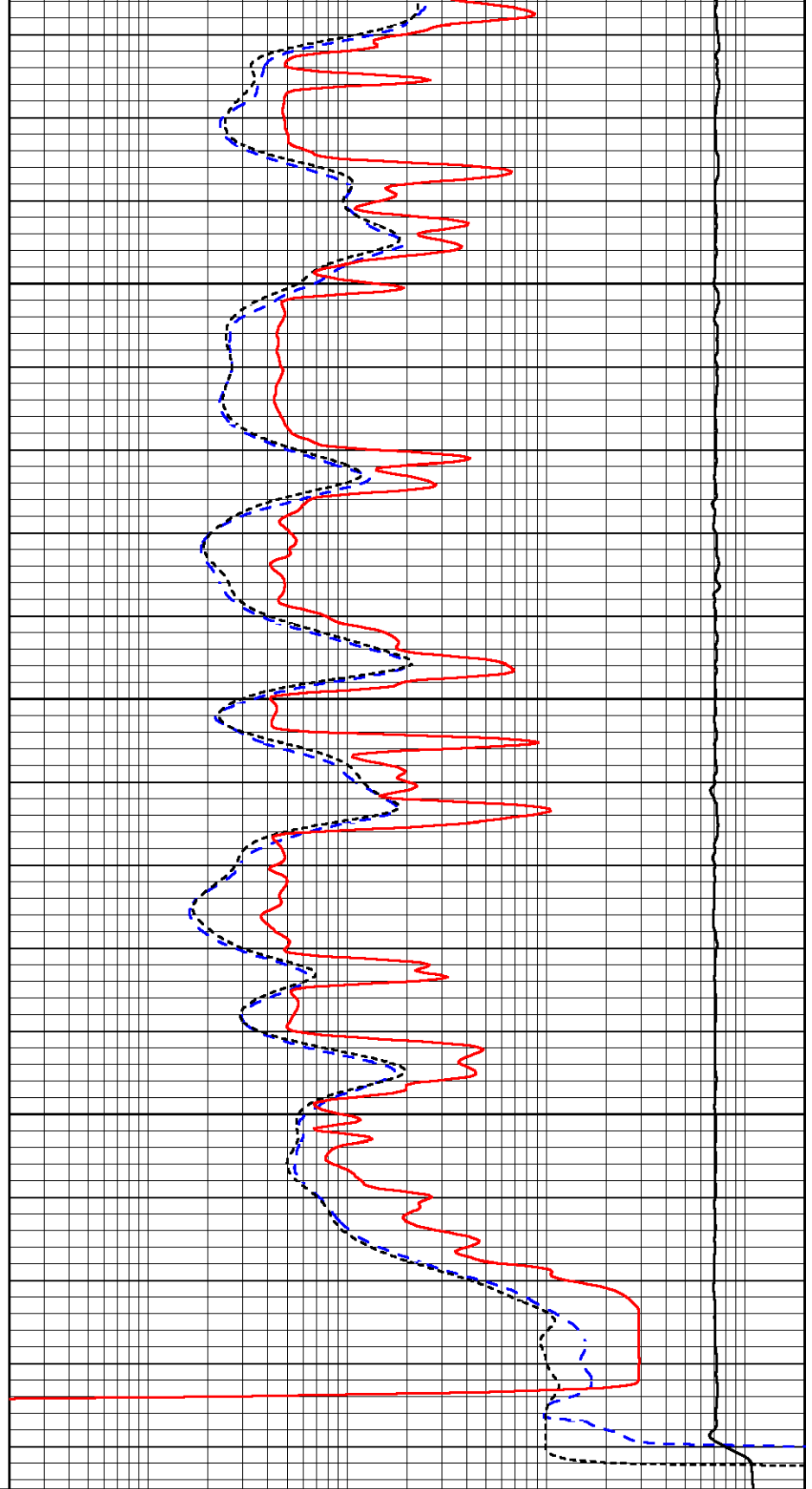


3500

3550

3600

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 great_plains_lang_1.db
 Dataset Pathname stackml/pass3.1
 Dataset Creation Thu Jul 26 14:12:50 2018

Dual Induction Calibration Report

Serial-Model: 1987-M&W
 Calibration Performed: Tue Apr 11 17:07:38 2017

| Loop: | Readings | | References | | | Results | |
|--------|----------|----------|------------|---------|--------|---------|----------|
| | Air | Loop | Air | Loop | | Gain | Offset |
| Deep | 178.615 | 710.235 | 0.000 | 255.800 | mmho/m | 0.530 | -36.500 |
| Medium | 161.982 | 1441.110 | 0.000 | 255.800 | mmho/m | 0.440 | -110.500 |

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 | 14500.0000 | 0.0000 |
| Inverse | 0.0000 | 1.0000 | 0.0000 | 1.0000 | Ohm-m | 16000.0000 | 0.0000 |
| Caliper | 1.0001 | 1.1397 | 6.5000 | 18.5000 | in | 86.0000 | -82.7000 |

Compensated Density Calibration Report

Serial-Model: 168-130-M&W
 Source / Verifier: /
 Master Calibration Performed: Sun Nov 17 12:46:06 2013

Master Calibration

| | Density | | Far Detector | Near Detector | |
|---------------------|---------|------|-----------------------------|---------------|-----|
| Magnesium | 1.755 | g/cc | 4659.47 | 5064.14 | cps |
| Aluminum | 2.680 | g/cc | 853.93 | 3180.74 | cps |
| Spine Angle = 74.67 | | | Density/Spine Ratio = 0.526 | | |
| | Size | | Reading | | |
| Small Ring | 4.00 | in | 0.91 | | |
| Large Ring | 14.00 | in | 0.22 | | |

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 17:00:04 2017

| | | |
|------------------------|--------------------------|----------|
| 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 | GREAT PLAINS ENERGY, INC. |
| Well | LANG NO.1 |
| Field | WILDCAT |
| County | NORTON |
| State | KANSAS |