



MICRORESISTIVITY LOG

Company LARSON ENGINEERING, INC.
 Well MILLER O #2
 Field COWDERY
 County LANE
 State KANSAS

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 County LANE State KANSAS

Location: API #: 15-101-22606-00-00
 SE SW NE NW
 1140' FNL & 1800' FWL
 SEC 29 TWP 18S RGE 30W
 Permanent Datum GROUND LEVEL Elevation 2891'
 Log Measured From KELLY BUSHING
 Drilling Measured From KELLY BUSHING
 Other Services
 CNL/CDL
 DIL
 Elevation
 K.B. 2901'
 D.F. 2899'
 G.L. 2891'

| | |
|------------------------|---------------|
| Date | 4/28/2018 |
| Run Number | ONE |
| Depth Driller | 4450' |
| Depth Logger | 4448' |
| Bottom Logged Interval | 4447' |
| Top Log Interval | 3600' |
| Casing Driller | 8.625" @ 265' |
| Casing Logger | 263' |
| Bit Size | 7.875" |
| Type Fluid in Hole | CHEMICAL |
| Salinity, ppm CL | 2600 |
| Density / Viscosity | 9.2 46 |
| pH / Fluid Loss | 10.0 6.8 |
| Source of Sample | FLOWLINE |
| Rm @ Meas. Temp | 0.75 @ 70 |
| Rmt @ Meas. Temp | 0.56 @ 70 |
| Rmc @ Meas. Temp | 1.01 @ 70 |
| Source of Rmf / Rmc | CHARTS |
| Rm @ BHT | 0.44 @ 121 |
| Operating Rig Time | 2 1/2 HOURS |
| Max Rec. Temp. F | 121 DEG F |
| Equipment Number | 108 |
| Location | HAYS |
| Recorded By | T. MARTIN |
| Witnessed By | VERN SCHRAG |

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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.

DIGHTON, 10 W TO BISON RD, 1 S, 1/2 W, S INTO AT TB

Log Measured From: KELLY BUSHING 10 Ft. Above Permanent Datum

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www.pioneerenergy.com 785-625-3858

| | | | |
|-----------------------------------|-----------|----------------------------------|--------------------|
| Your Pioneer Energy Services Crew | | This Log Record Was Witnessed By | |
| Engineer: T. MARTIN | Operator: | Primary Witness: VERN SCHRAG | Secondary Witness: |
| Operator: | Operator: | Secondary Witness: | Secondary Witness: |
| Operator: | | Secondary Witness: | |

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

Dataset: laron_miller o_#2.db: field/well/stkml/pass3.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

Log Variables

DatabaseC:\ProgramData\Warrior\Data\laron_miller o_#2.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 | 121 | 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 | -170 | -170 | Off | 4448 |

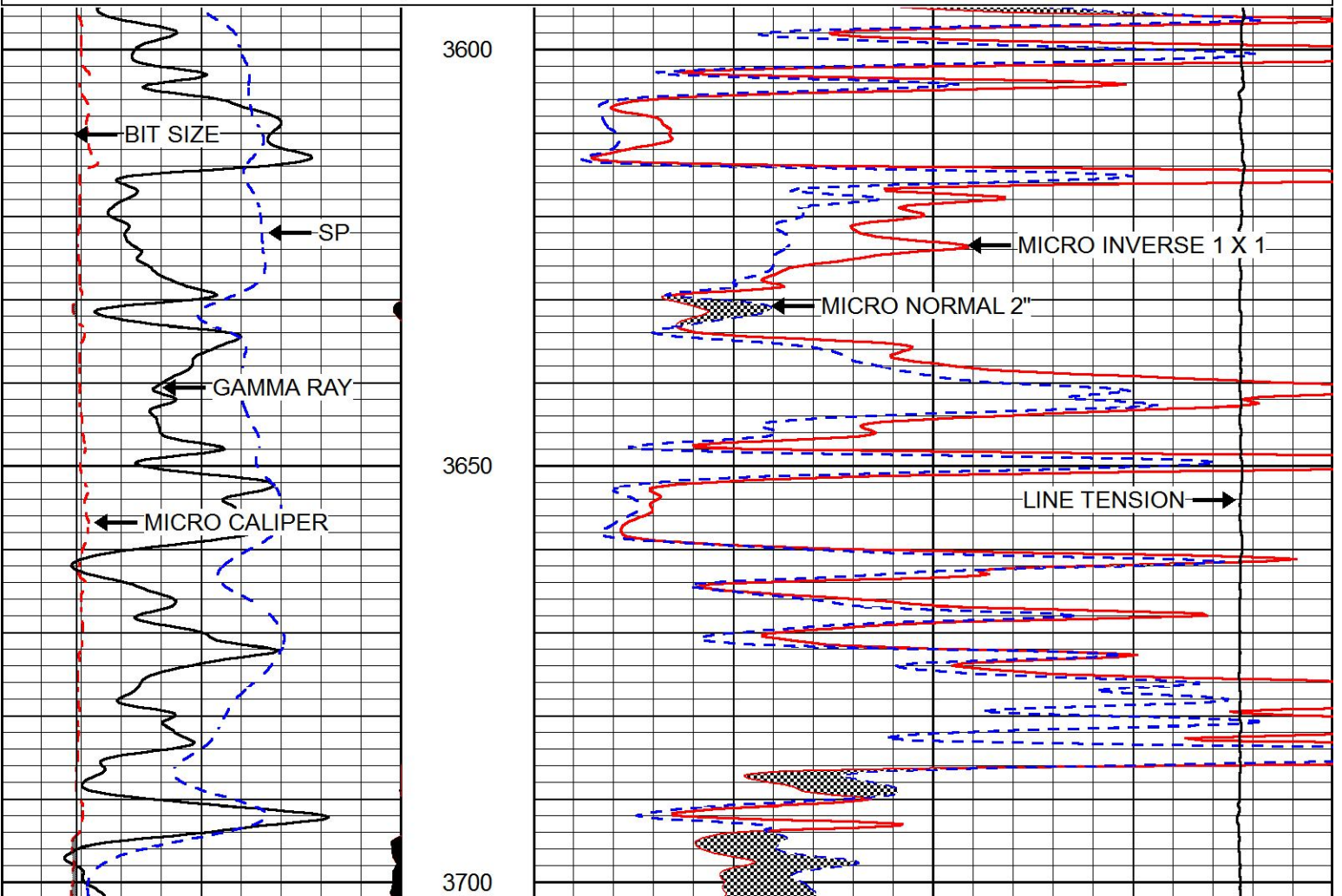


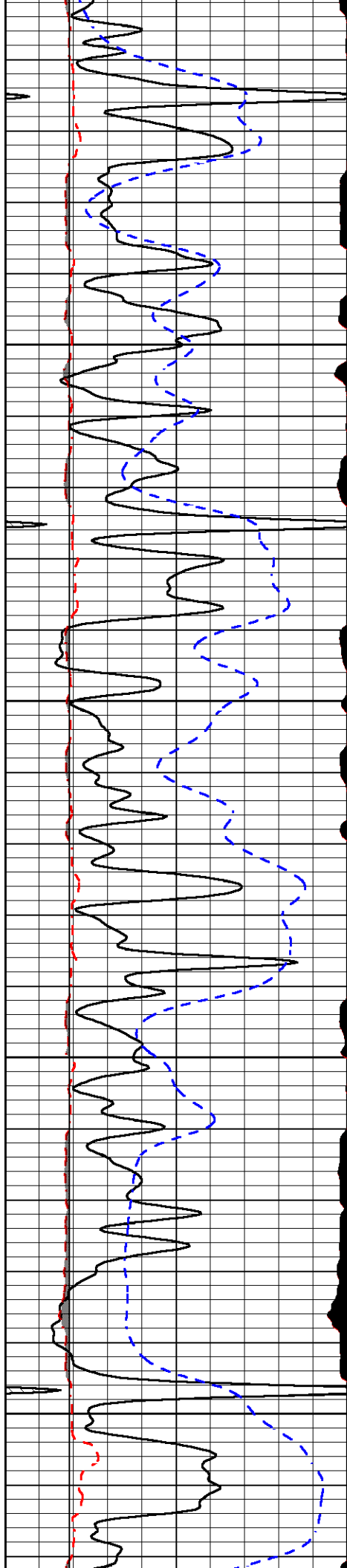
MAIN PASS

Database File laron_miller o_#2.db
 Dataset Pathname stkml/pass3.1
 Presentation Format micro
 Dataset Creation Sat Apr 28 19:50:34 2018
 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 |



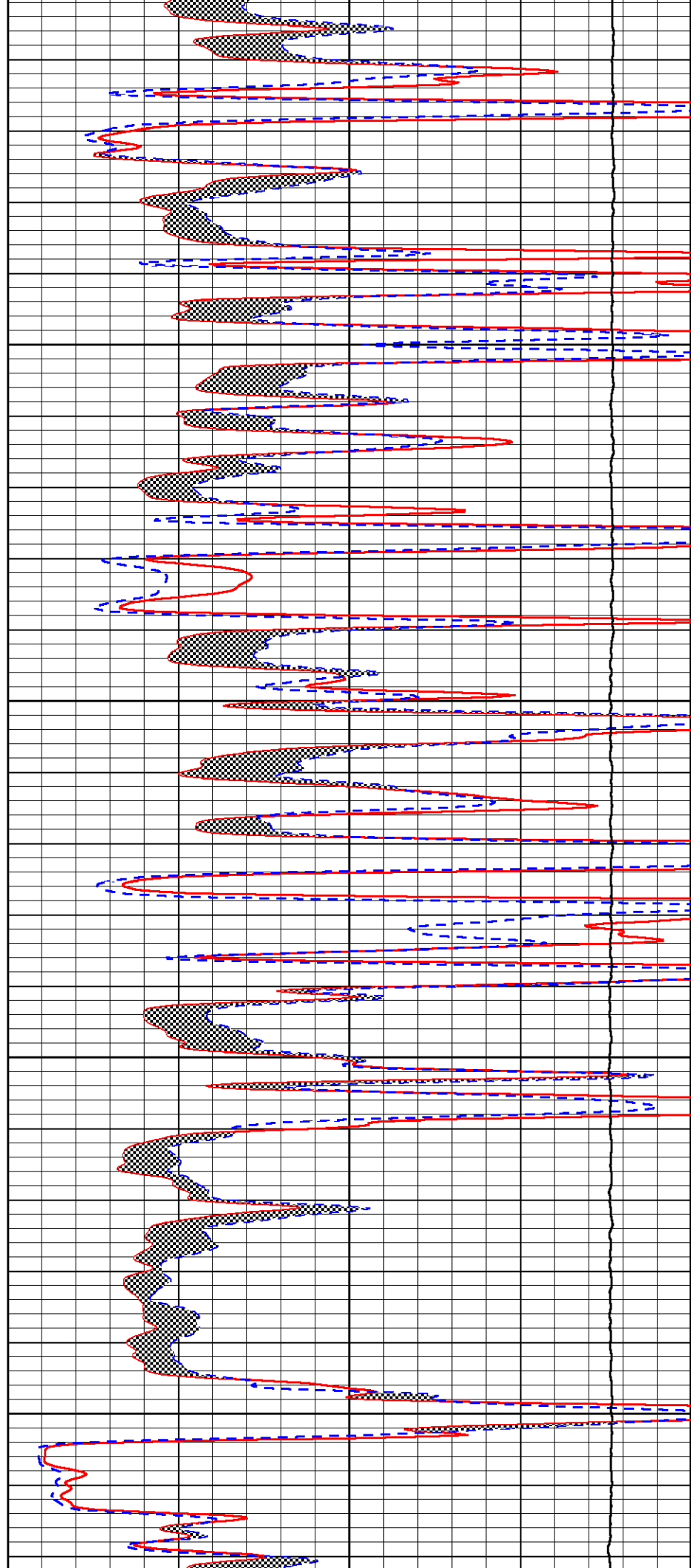


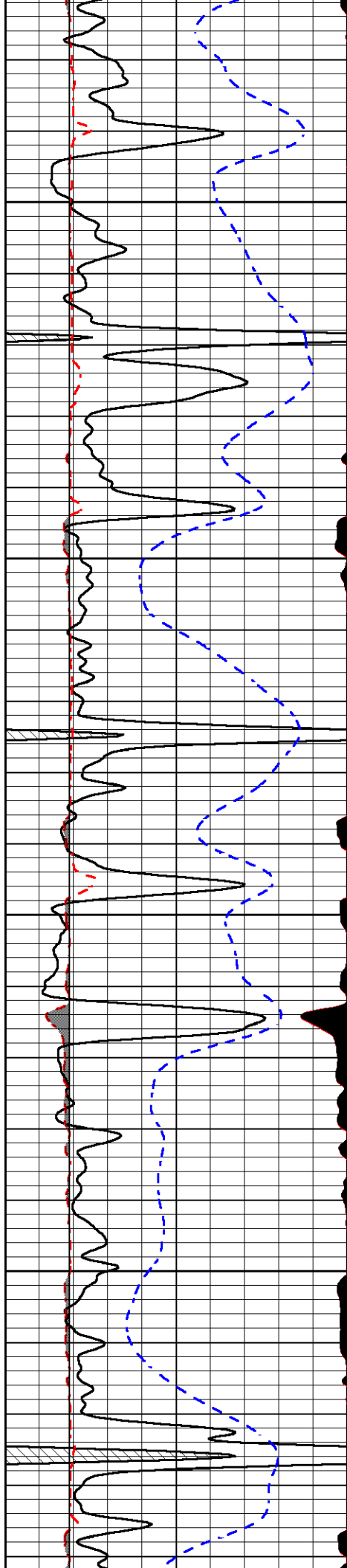
3750

3800

3850

3900



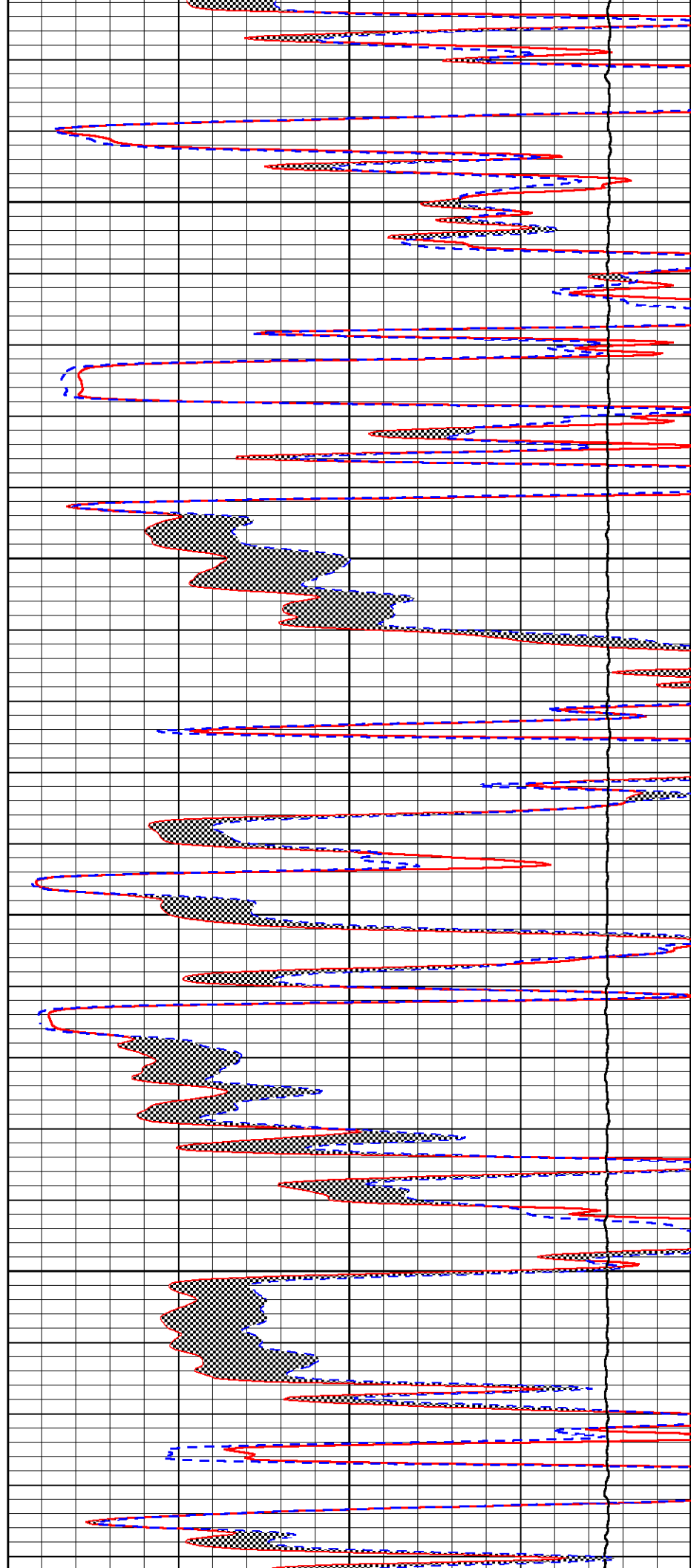


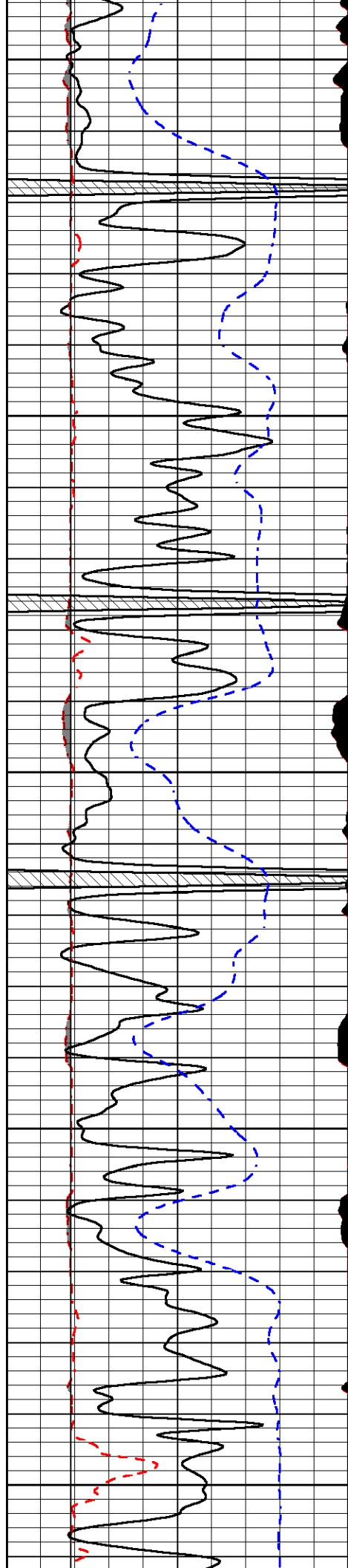
3950

4000

4050

4100





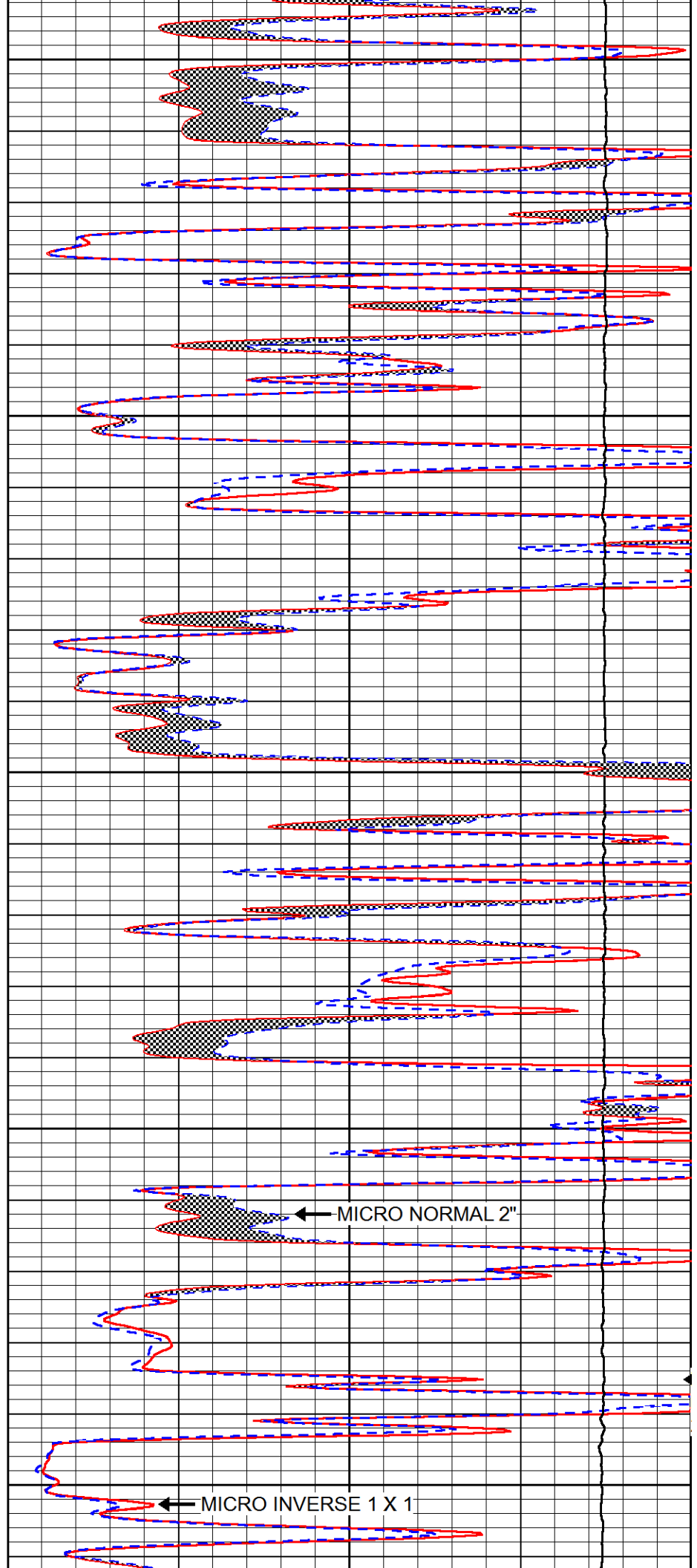
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4200

4250

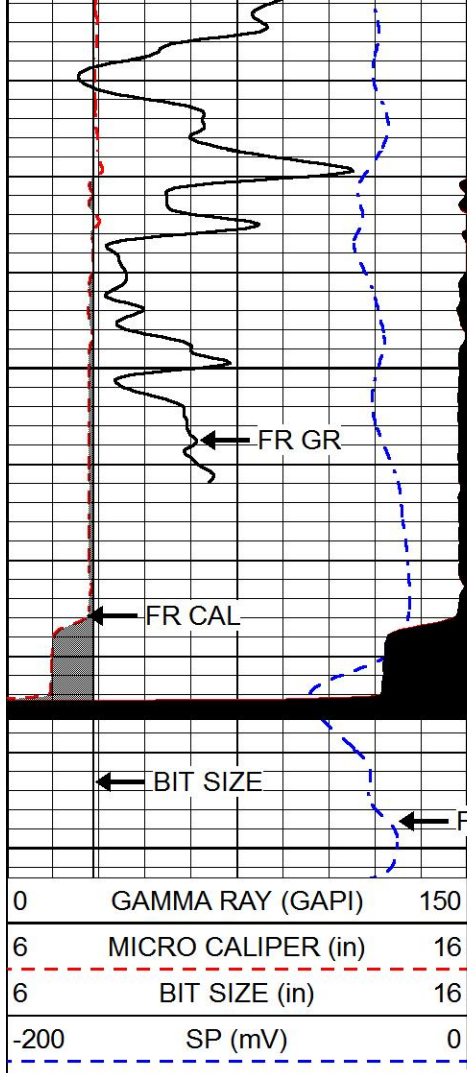
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4350



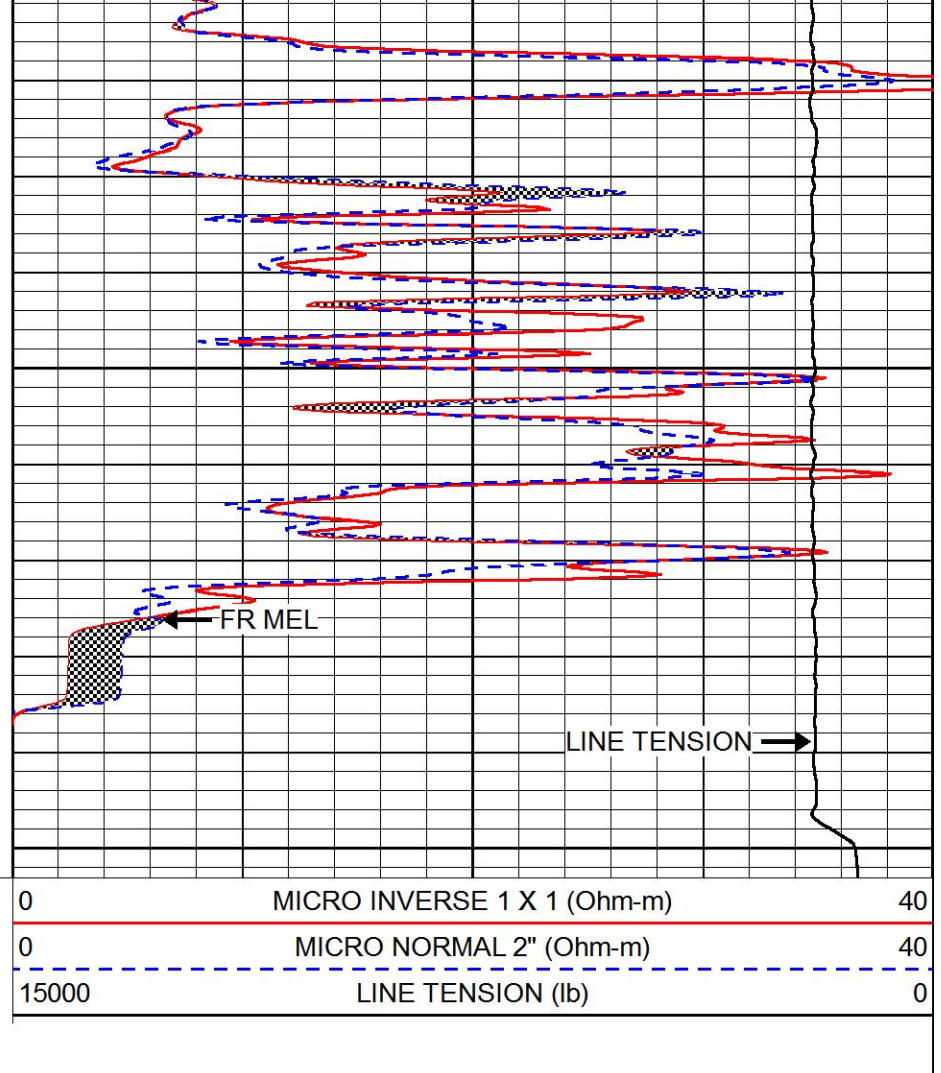
← MICRO NORMAL 2''

← MICRO INVERSE 1 X 1



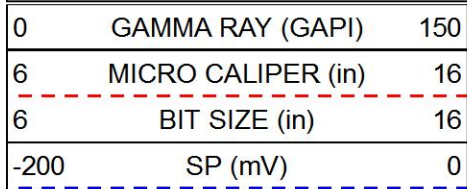
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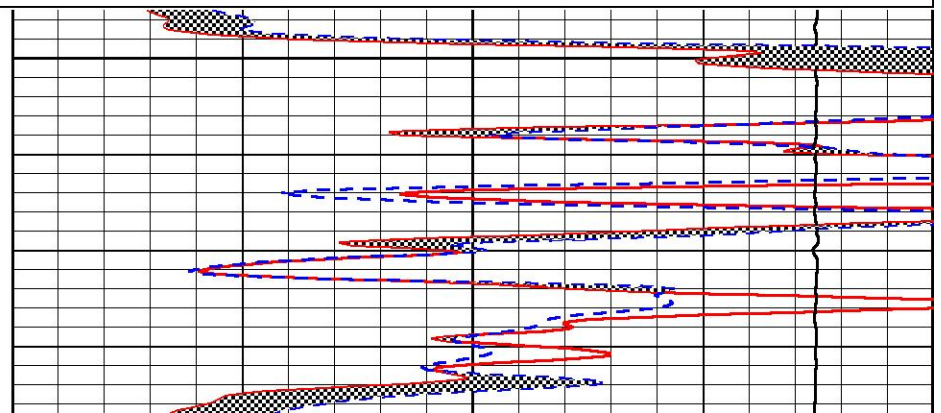
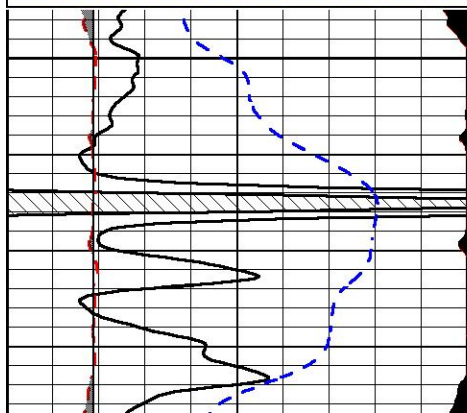
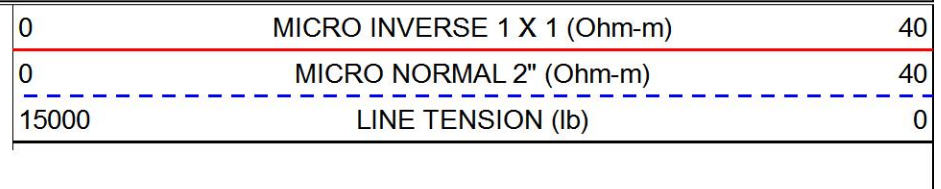


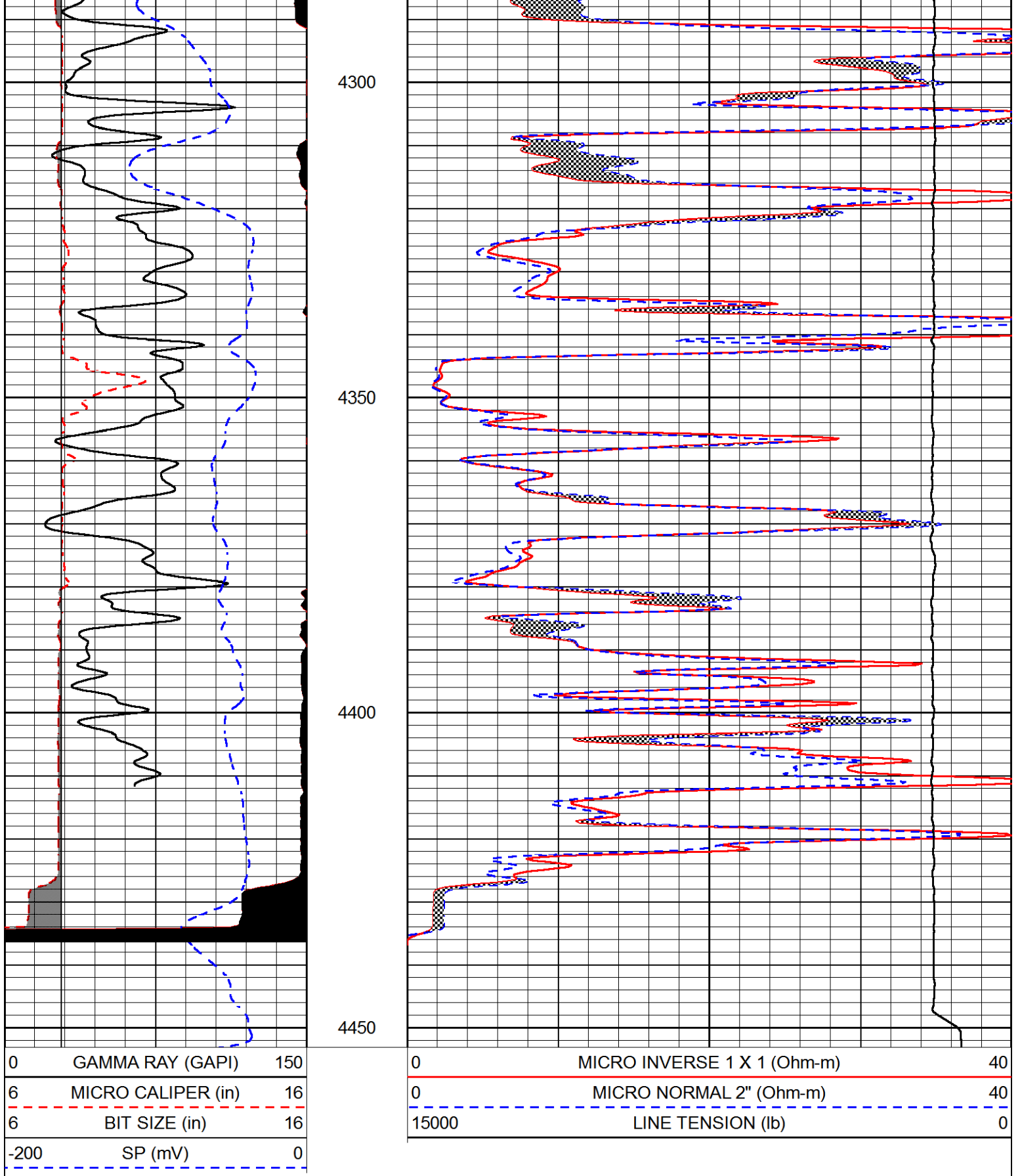
REPEAT SECTION

Database File laron_miller o_#2.db
 Dataset Pathname stkml/pass2.1
 Presentation Format micro
 Dataset Creation Sat Apr 28 19:04:56 2018
 Charted by Depth in Feet scaled 1:240



4250





Calibration Report

Database File laron_miller o_#2.db
 Dataset Pathname stkml/pass3.1
 Dataset Creation Sat Apr 28 19:50:34 2018

Dual Induction Calibration Report

Serial-Model:

PSI 978-M&W

| Loop: | Readings | | References | | | Results | |
|--------|----------|----------|------------|---------|--------|---------|---------|
| | Air | Loop | Air | Loop | | Gain | Offset |
| Deep | 178.615 | 710.235 | 0.000 | 255.800 | mmho/m | 0.570 | -43.500 |
| Medium | 161.982 | 1441.110 | 0.000 | 255.800 | mmho/m | 0.400 | -36.500 |

Microlog Calibration Report

Serial-Model: PSI-02-PSI STKBL ML
 Performed: Sat Apr 07 12:01:20 2018

| | Readings | | References | | | Results | |
|---------|----------|--------|------------|---------|-------|------------|-----------|
| | Zero | Cal | Zero | Cal | | m | b |
| Normal | 0.0031 | 0.0043 | 0.0000 | 10.0000 | Ohm-m | 12000.0000 | -1.0000 |
| Inverse | 0.0000 | 0.0013 | 0.0000 | 10.0000 | Ohm-m | 10000.0000 | 0.0000 |
| Caliper | 1.0020 | 1.0834 | 5.5000 | 16.5000 | in | 135.1560 | -131.7500 |

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

| | | |
|---------------------|--------|----------|
| Background Reading: | 0.0 | cps |
| Calibrator Reading: | 6.2 | cps |
| Sensitivity: | 0.5200 | GAPI/cps |



PIONEER

Pioneer Energy Services

| | |
|---------|--------------------------|
| Company | LARSON ENGINEERING, INC. |
| Well | MILLER O #2 |
| Field | COWDERY |
| County | LANE |
| State | KANSAS |