



PIONEER
Pioneer Energy Services

**MICRORESISTIVITY
LOG**

Company **MURFIN DRILLING COMPANY, INC.**
Well **MCCLURG #2-12**
Field **BRUMM WEST**
County **CHEYENNE** State **KANSAS**

Location: **API #: 15-023-21501-00-00**
1860' FSL & 1320' FEL
SEC 12 TWP 2S RGE 37W
Permanent Datum **GROUND LEVEL** Elevation **3375'**
Log Measured From **KELLY BUSHING**
Drilling Measured From **KELLY BUSHING**
Other Services
**CNL/CDL
DIL/BHCS**

Date	12/16/2018
Run Number	TWO
Depth Driller	4900'
Depth Logger	4900'
Bottom Logged Interval	4899'
Top Log Interval	3900'
Casing Driller	8.625" @ 337'
Casing Logger	346'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	800
Density / Viscosity	9.1 45
pH / Fluid Loss	11.0 6.0
Source of Sample	FLOWLINE
Rm @ Meas. Temp	.80 @ 57
Rmt @ Meas. Temp	.60 @ 57
Rmc @ Meas. Temp	1.08 @ 57
Source of Rmf / Rmc	CHARTS
Rm @ BHT	.37 @ 124
Operating Rig Time	4 HOURS
Max Rec. Temp. F	124 DEGF
Equipment Number	108
Location	HAYS
Recorded By	J. HENRICKSON
Witnessed By	ROBERT HENDRICKS

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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.
MCDONALD KANSAS
8 NORTH, 2 WEST, 1/2 NORTH, WEST INTO

Log Measured From: **KELLY BUSHING** 5 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerres.com 785-625-3858

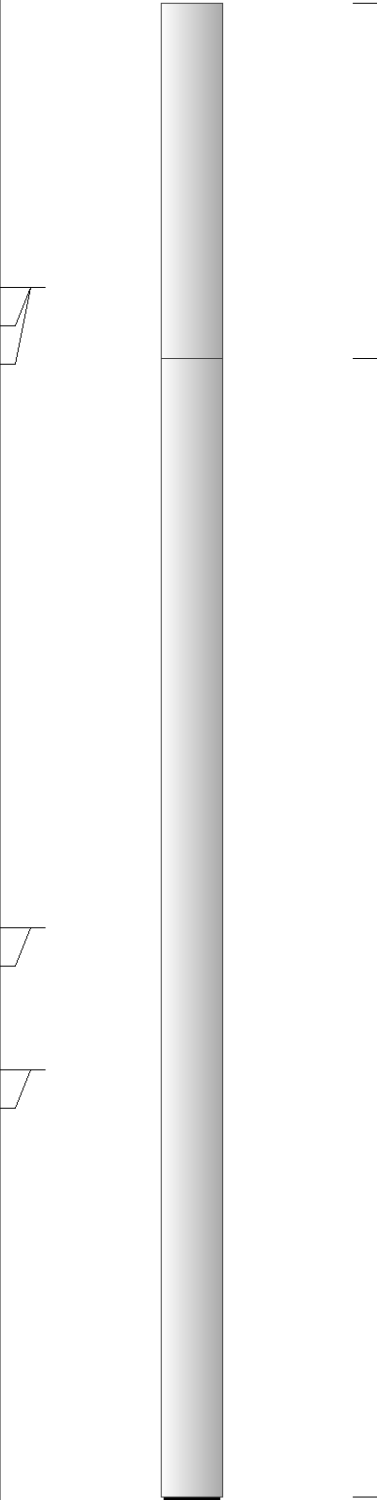
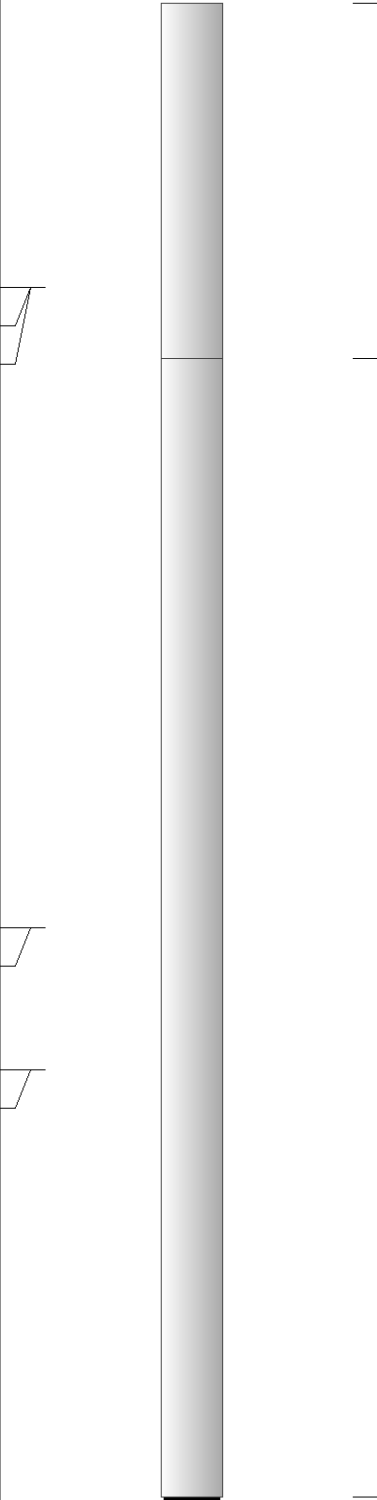
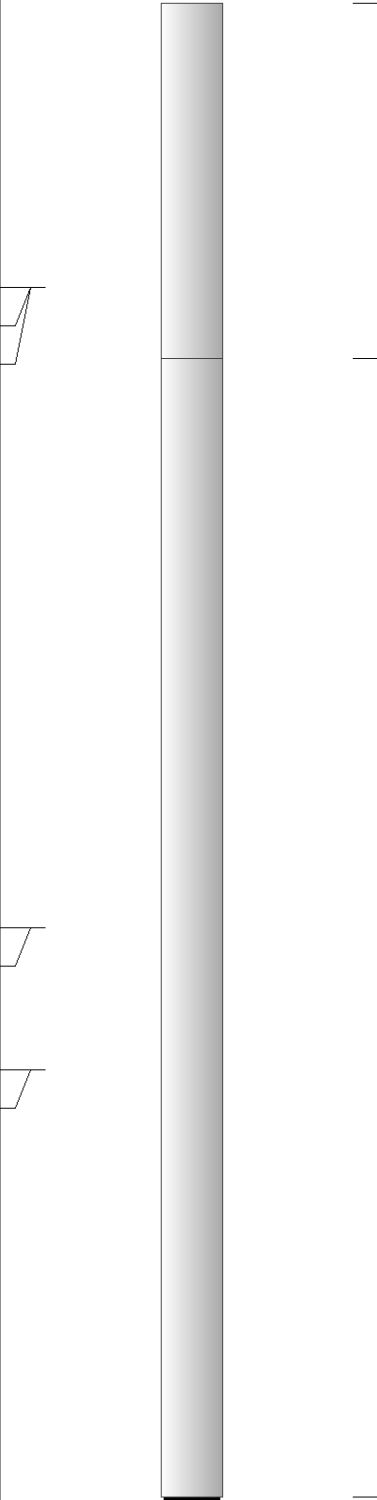
Your Pioneer Energy Services Crew	This Log Record Was Witnessed By
Engineer: J. HENRICKSON	Primary Witness: ROBERT HENDRICKS
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

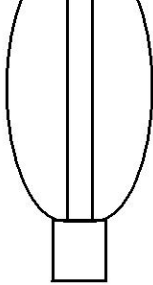
Log Variables

DatabaseC:\ProgramData\Warrior\Data\murfin_mcclurg_2_12.db
 Dataset field/well/stack/pass4.1/_vars_

Top - Bottom

A	BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	FLUIDDEN g/cc	M	MATRXDEN g/cc
1	7.875	124	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	-15	31	Off	4900

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



CENT-PENGO

5.50

3.00

70.00

Dataset: murfin_mcclurg_2_12.db: field/well/SONMEL/pass3
 Total length: 26.50 ft
 Total weight: 470.00 lb
 O.D.: 3.50 in

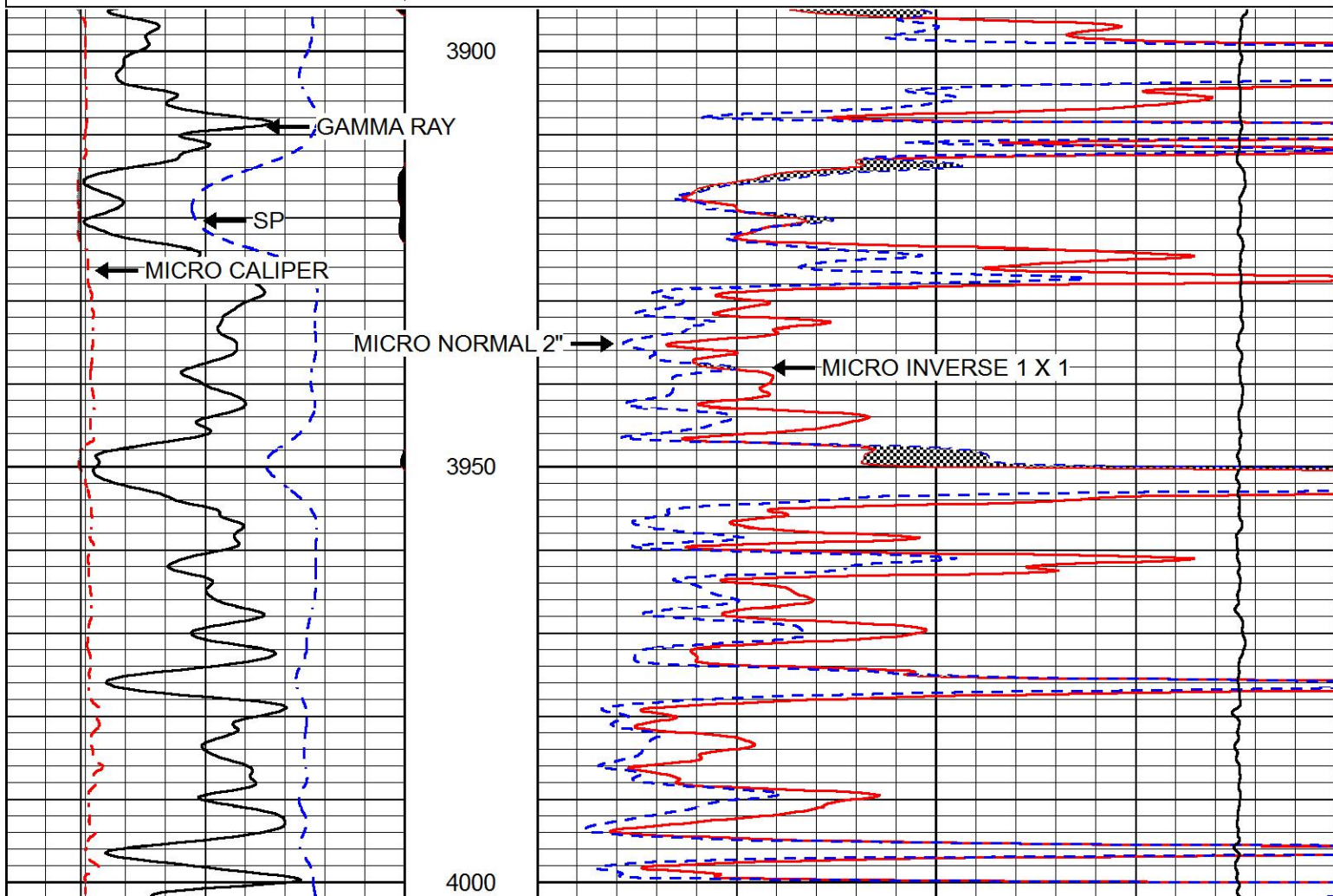
PIONEER
 Pioneer Energy Services

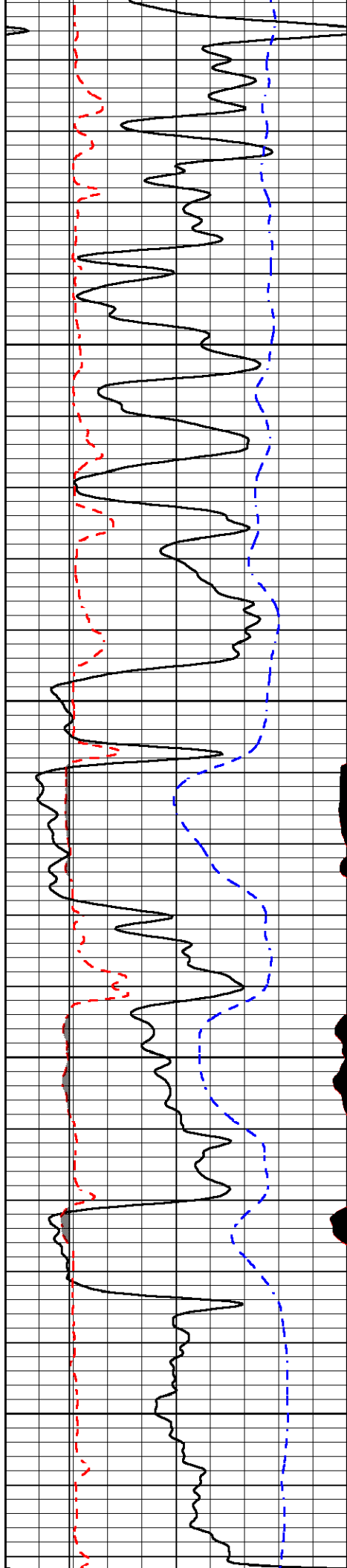
MAIN PASS

Database File: murfin_mcclurg_2_12.db
 Dataset Pathname: stack/pass4.1
 Presentation Format: micro
 Dataset Creation: Mon Dec 17 00:40:53 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



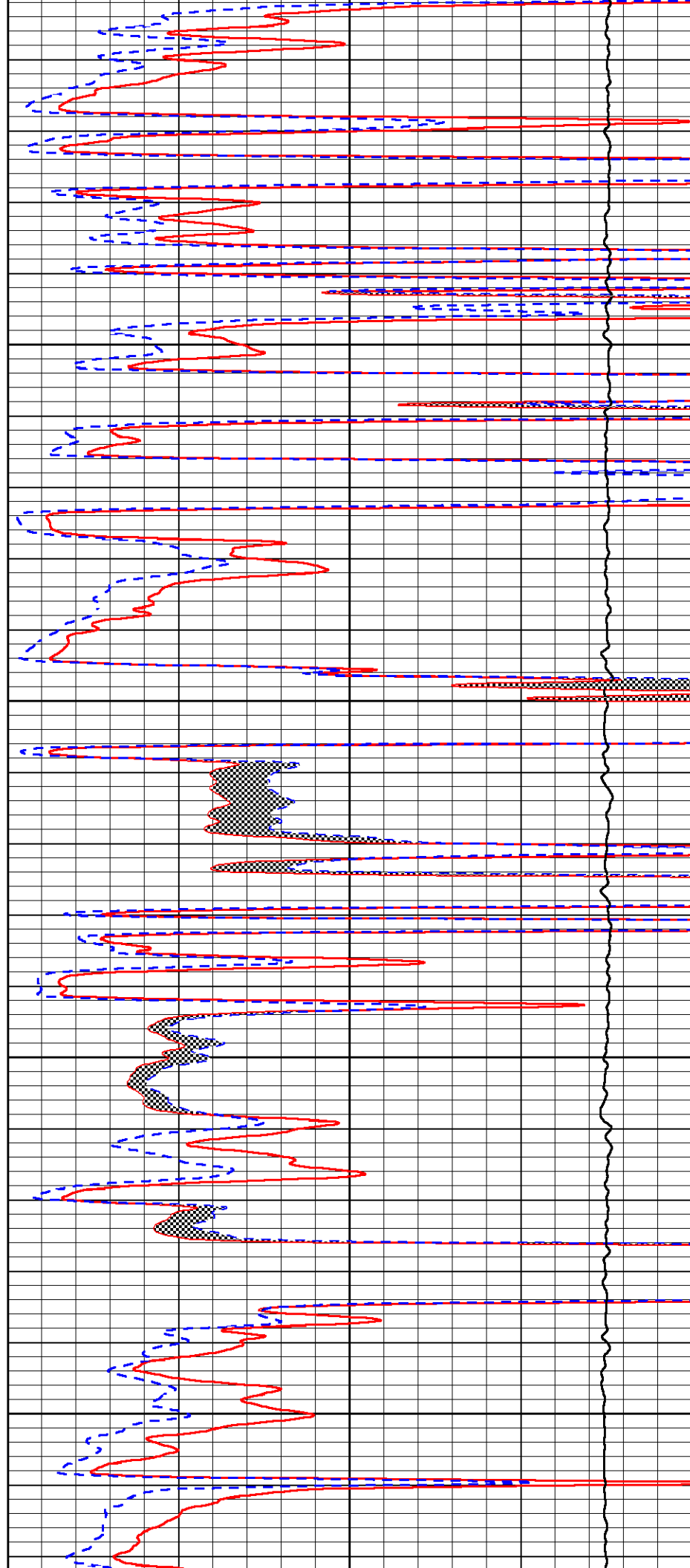


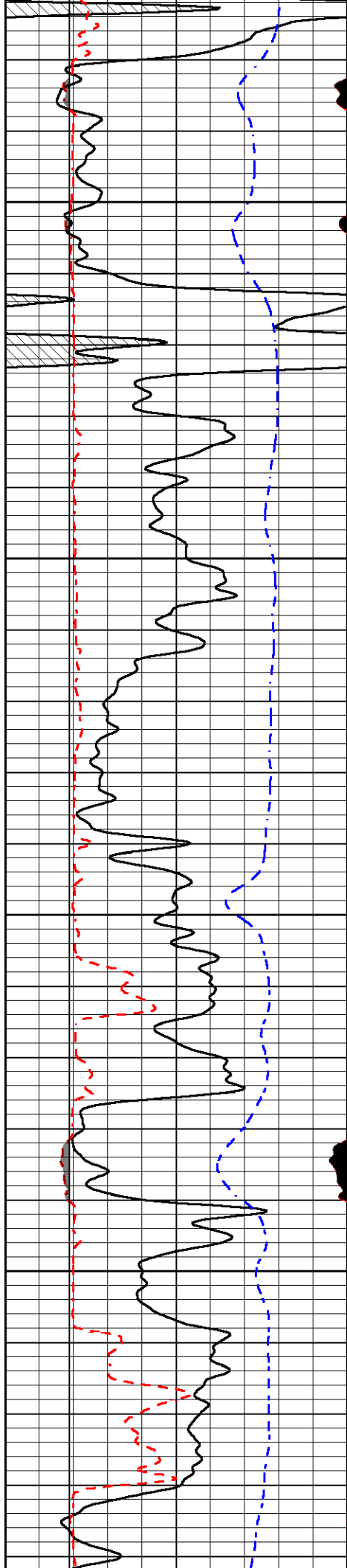
4050

4100

4150

4200



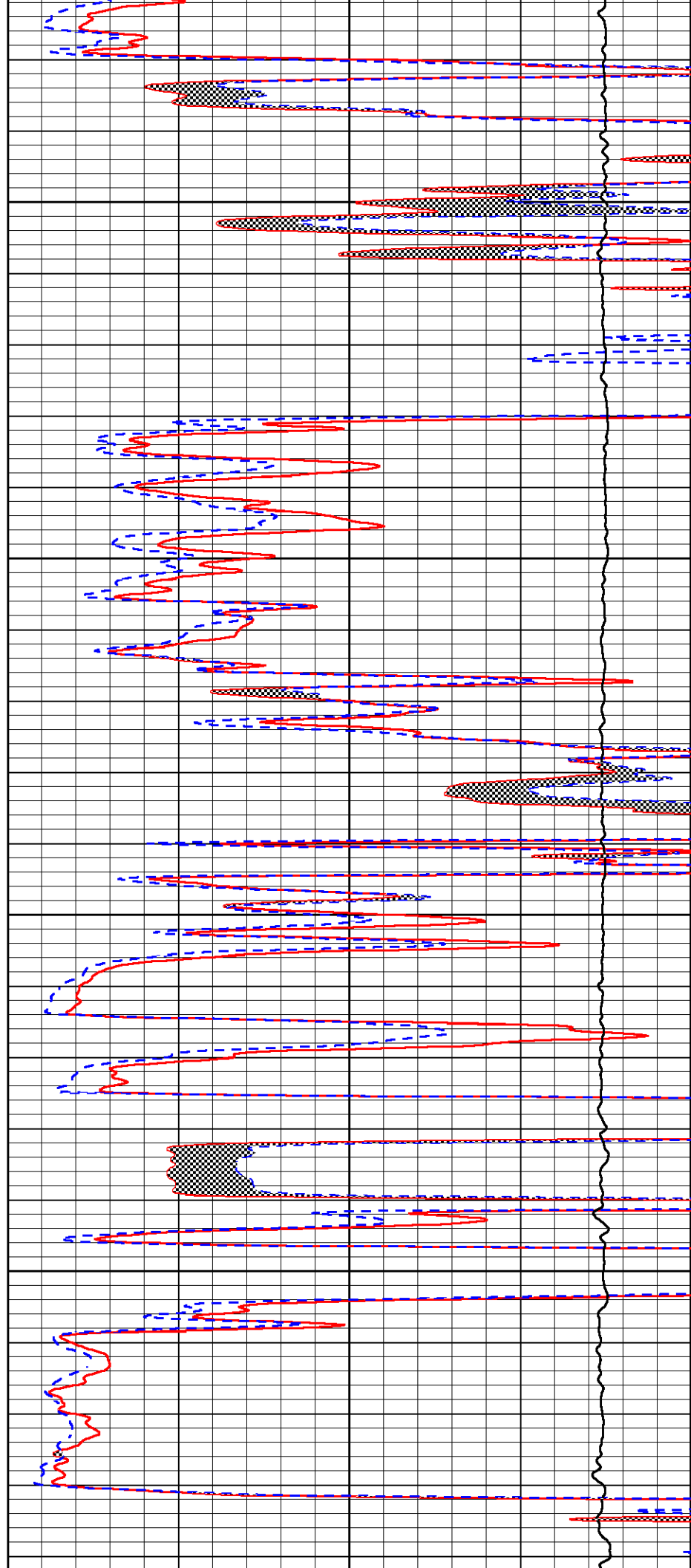


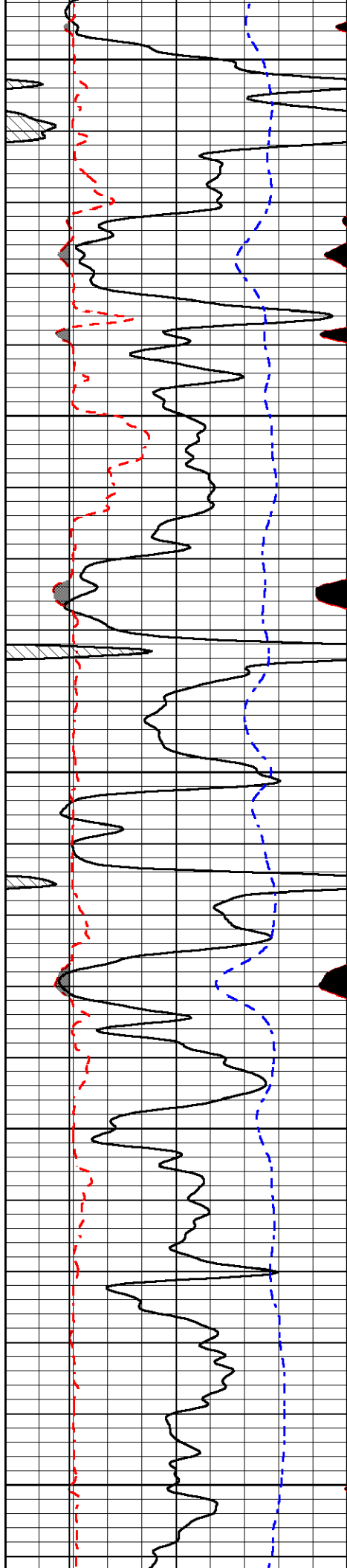
4250

4300

4350

4400





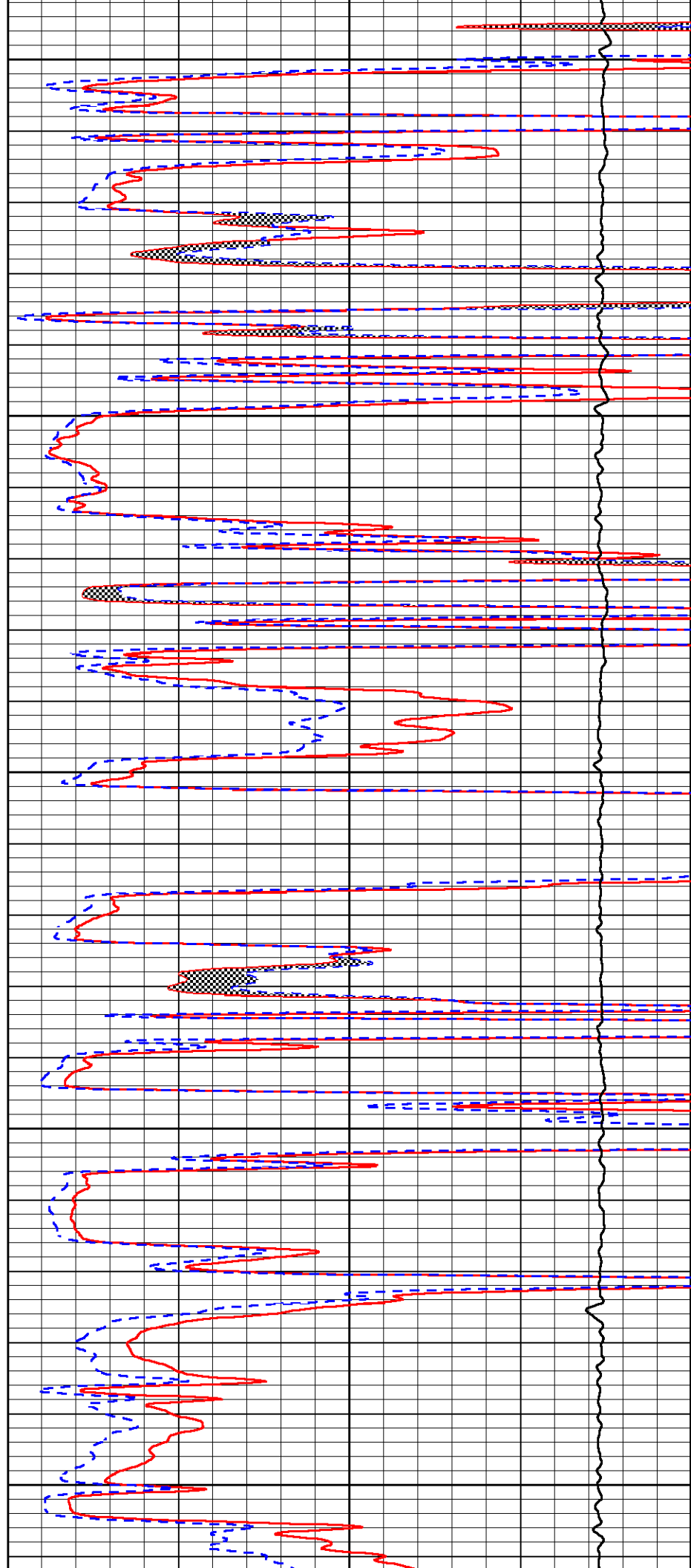
4450

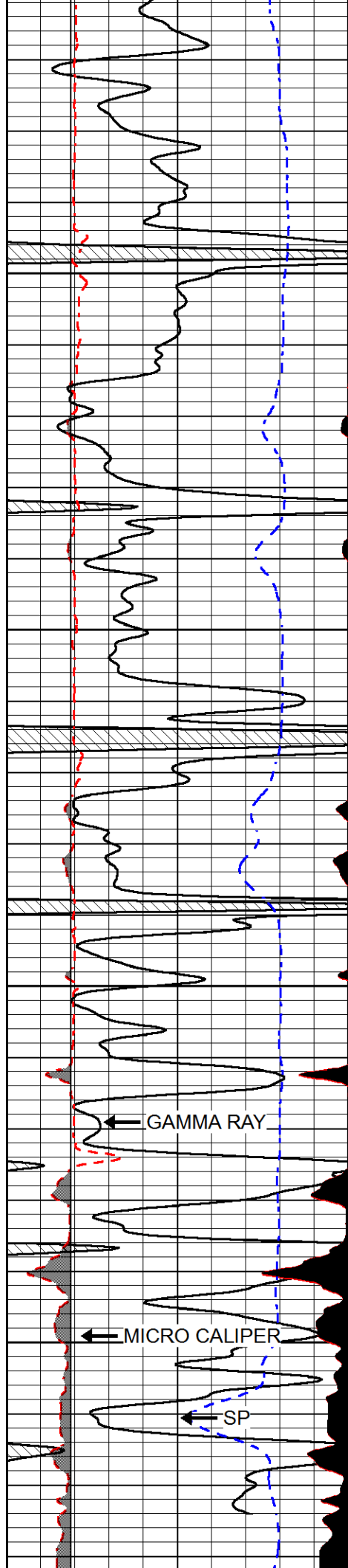
4500

4550

4600

4650





4700

4750

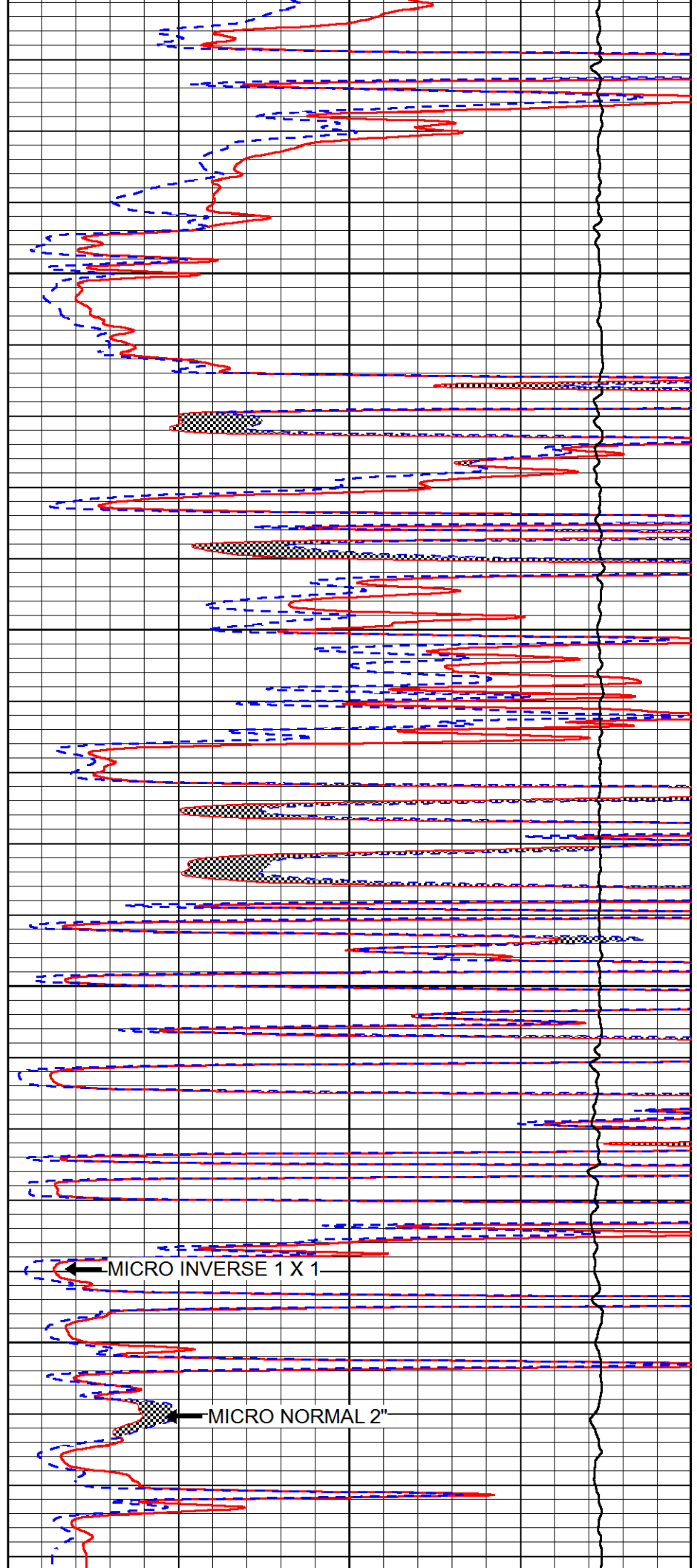
4800

4850

GAMMA RAY

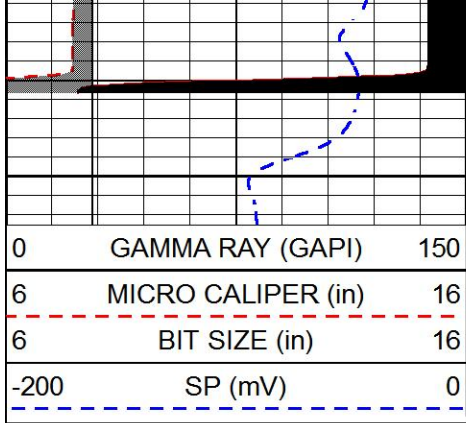
MICRO CALIPER

SP

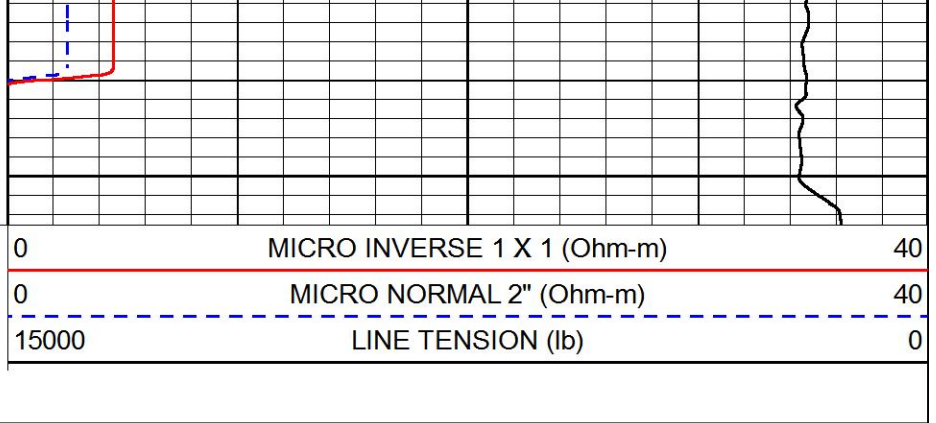


MICRO INVERSE 1 X 1

MICRO NORMAL 2"

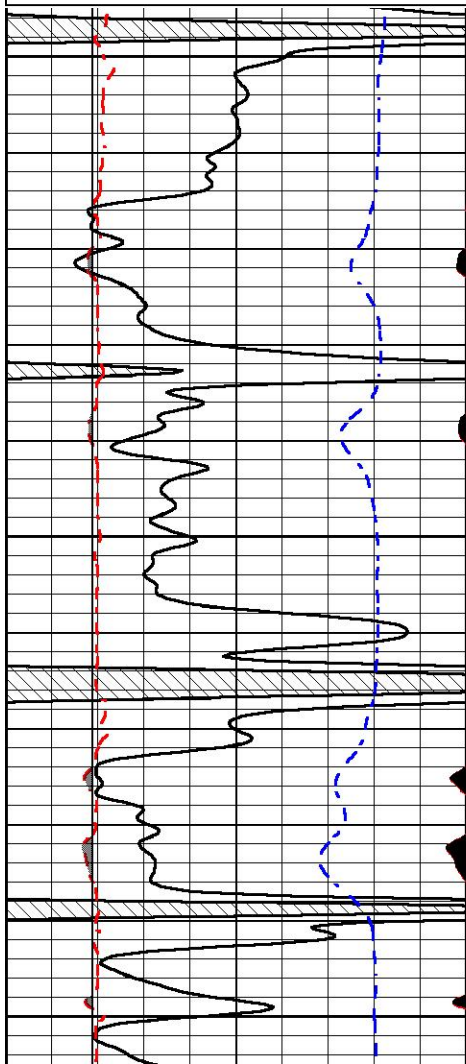
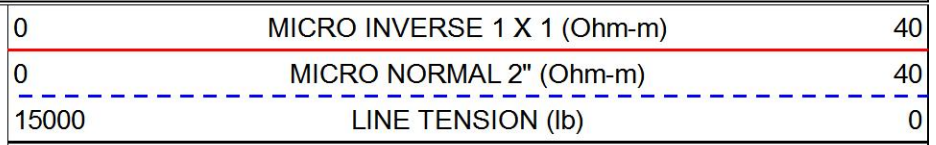
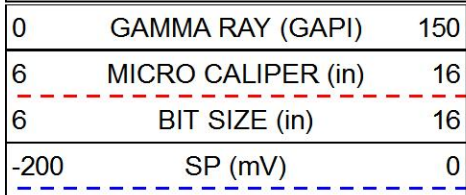


4900



REPEAT SECTION

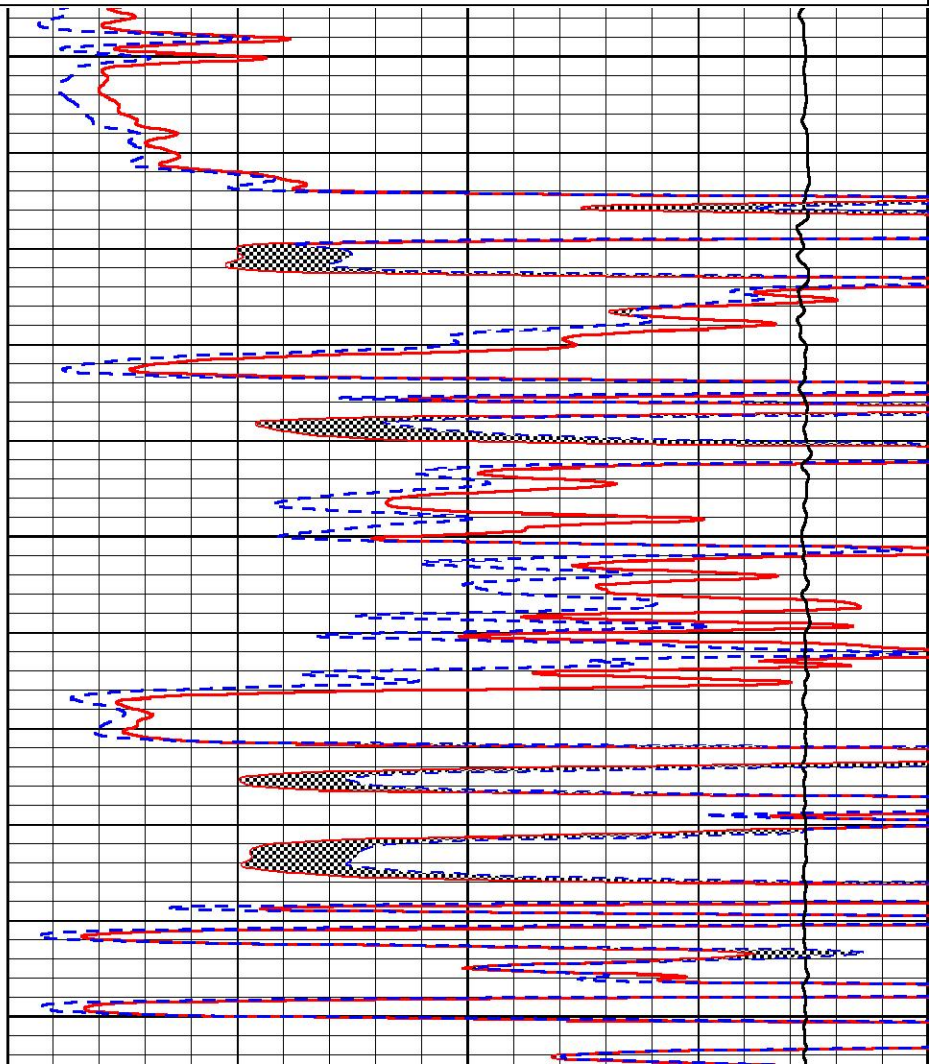
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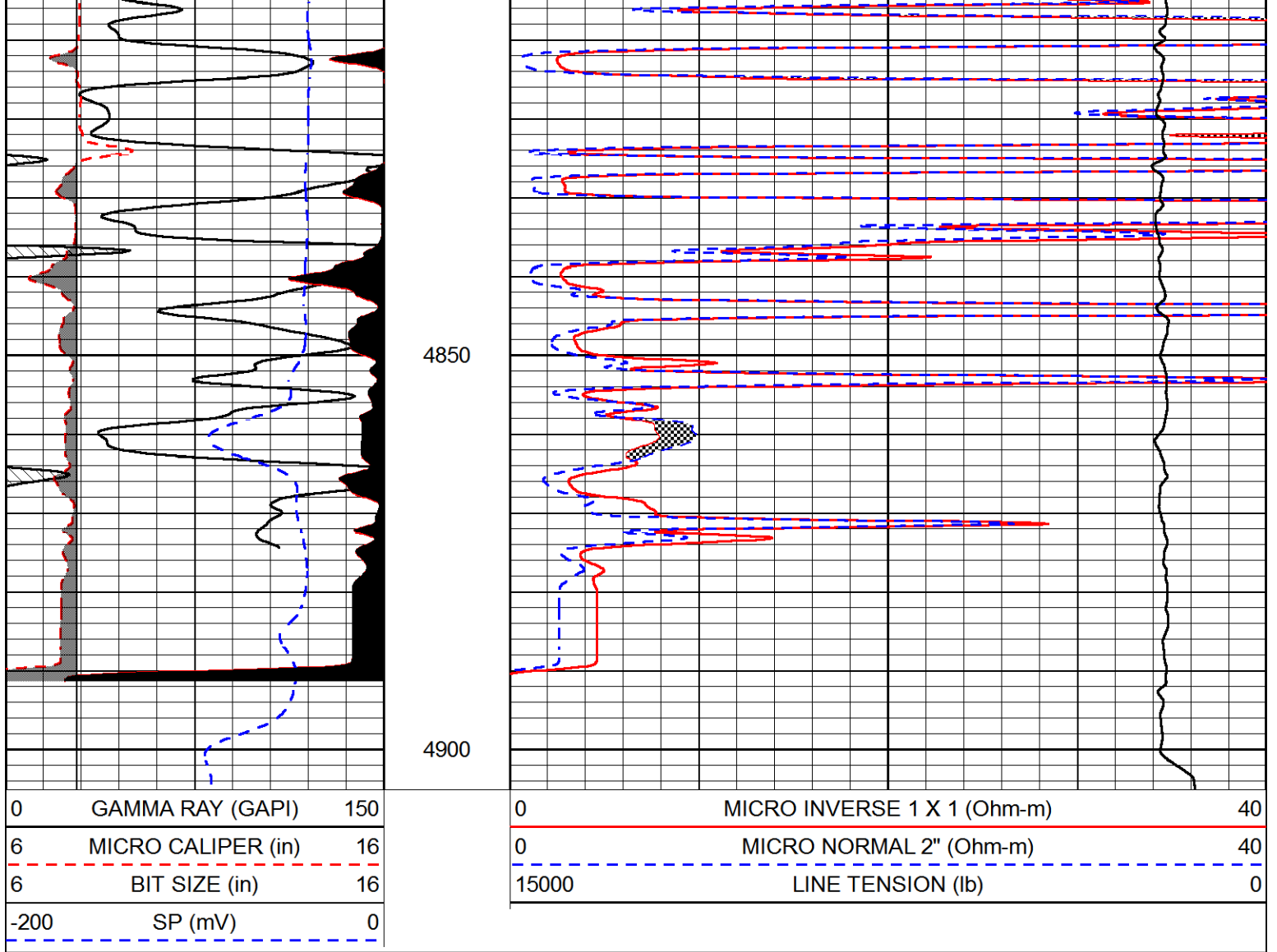


4700

4750

4800





Calibration Report

Database File murfin_mcclurg_2_12.db
 Dataset Pathname stack/pass4.1
 Dataset Creation Mon Dec 17 00:40:53 2018

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	mmho/m	Gain	Offset
Deep	178.615	710.235	0.000	255.800	mmho/m	0.500	-44.000
Medium	161.982	1441.110	0.000	255.800	mmho/m	0.400	-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	2.685	g/cc	696.57	1725.83	cps
Spine Angle = 75.50			Density/Spine Ratio = 0.537		
	Size		Reading		
Small Ring	4.00	in	1.16		
Large Ring	16.00	in	1.01		

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

 <p>PIONEER Pioneer Energy Services</p>	Company	MURFIN DRILLING COMPANY, INC.
	Well	MCCLURG #2-12
	Field	BRUMM WEST
	County	CHEYENNE
	State	KANSAS