



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY				K3 OIL & GAS OPERATING COMPANY			
WELL				LAMAR FULLMER UNIT 13-10			
FIELD				WILDCAT			
PROVINCE/COUNTY				GOVE			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1824' FSL & 1921' FEL			
SEC 13	TWP 15S	RGE 29W	Other Services		MPD/MDN		
Latitude	Longitude		MAI/MFE				
API Number		15-063-22199		MSS			
Permanent Datum GL, Elevation 2448 feet							
Log Measured From KB							
Drilling Measured From KB							
Date	25-APR-2014						
Run Number	ONE						
Service Order	4558-85583672						
Depth Driller	4421.00			feet			
Depth Logger	4421.00			feet			
First Reading	4375.00			feet			
Last Reading	3300.00			feet			
Casing Driller	270.00			feet			
Casing Logger	265.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.30 lb/USg		48.00 CP				
PH / Fluid Loss	9.00		8.00 ml/30Min				
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.77 @ 92.0			ohm-m			
Rmf @ Measured Temp	0.62 @ 92.0			ohm-m			
Rmc @ Measured Temp	0.92 @ 92.0			ohm-m			
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.58 @123.0		ohm-m				
Time Since Circulation	4 HOURS						
Max Recorded Temp	123.00			deg F			
Equipment / Base	13096		LIB				
Recorded By	ADAM SILL						
Witnessed By	PAT DEENIHAN						
JOB #	LB14-128						

BOREHOLE RECORD					Last Edited: 25-APR-2014 02:45
Bit Size inches		Depth From feet		Depth To feet	
7.875		270.00		4421.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	270.00	24.00	

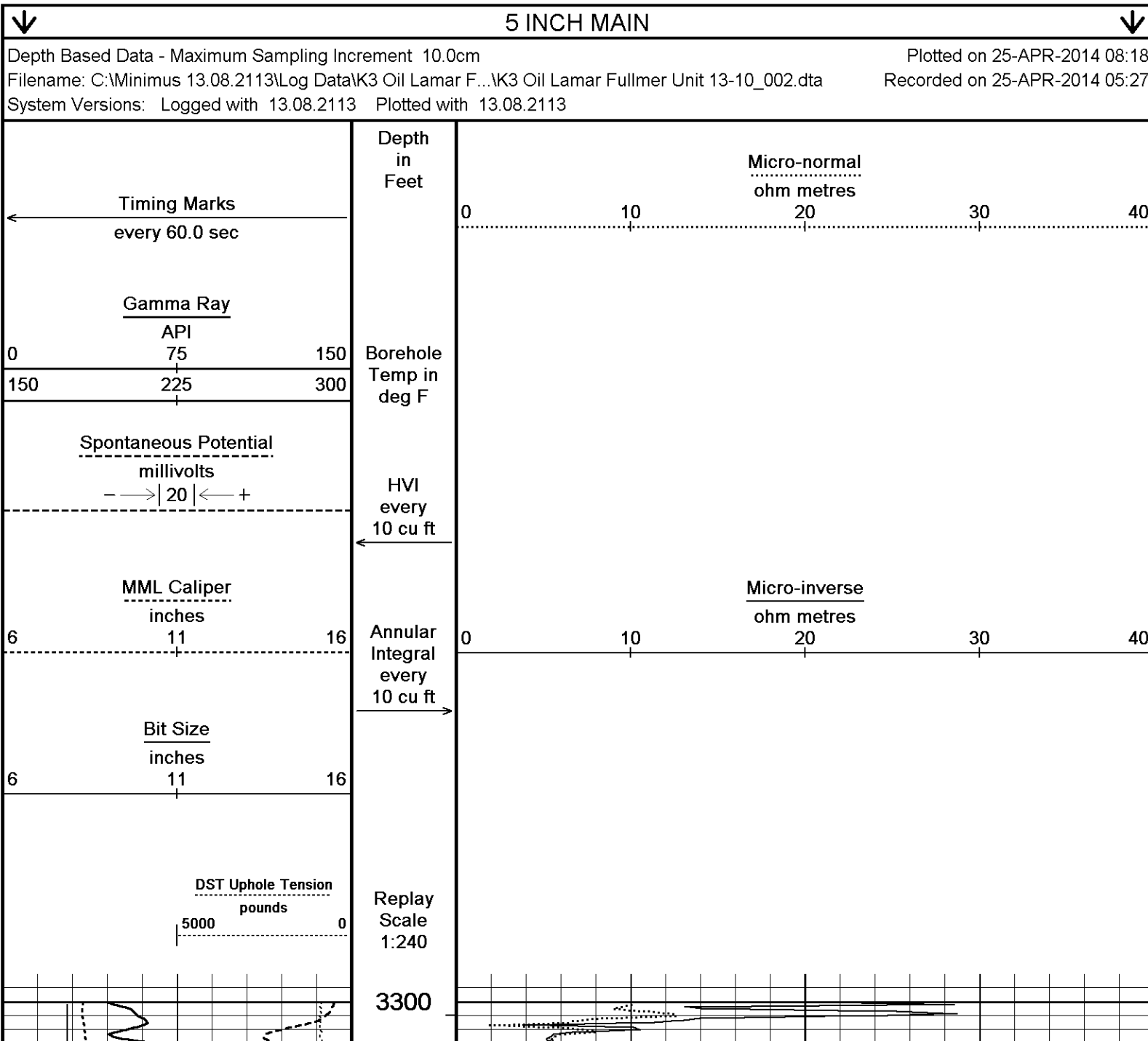
REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE: DUAL BOWSPRING ECCENTRALIZER USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1841 CU. FT.
- ANNUILLAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3300 FEET: 191 CU. FT.

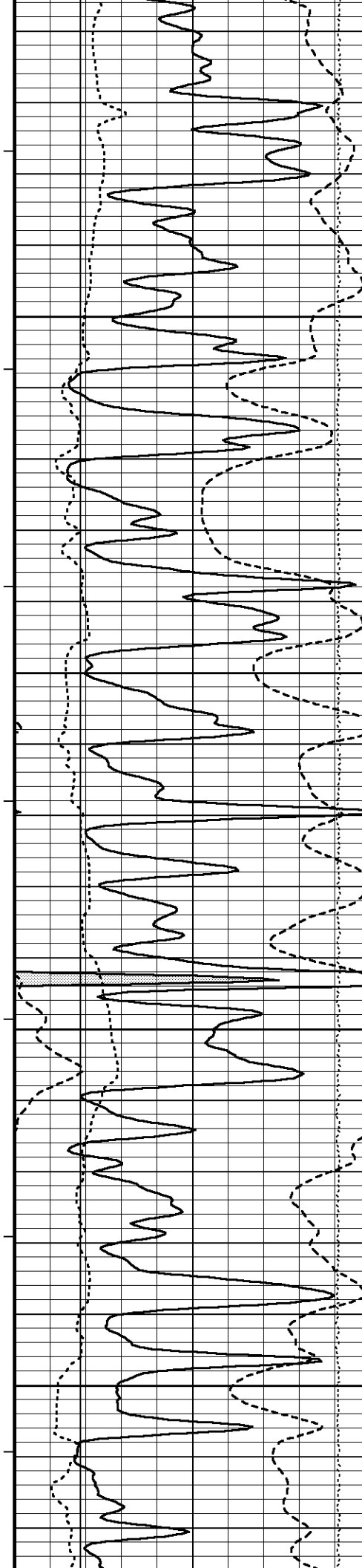
- RIG: DUKE #8.

- ENGINEER: A. SILL.

- OPERATORS: J. LaPOINT.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.





114°

3350

114°

3400

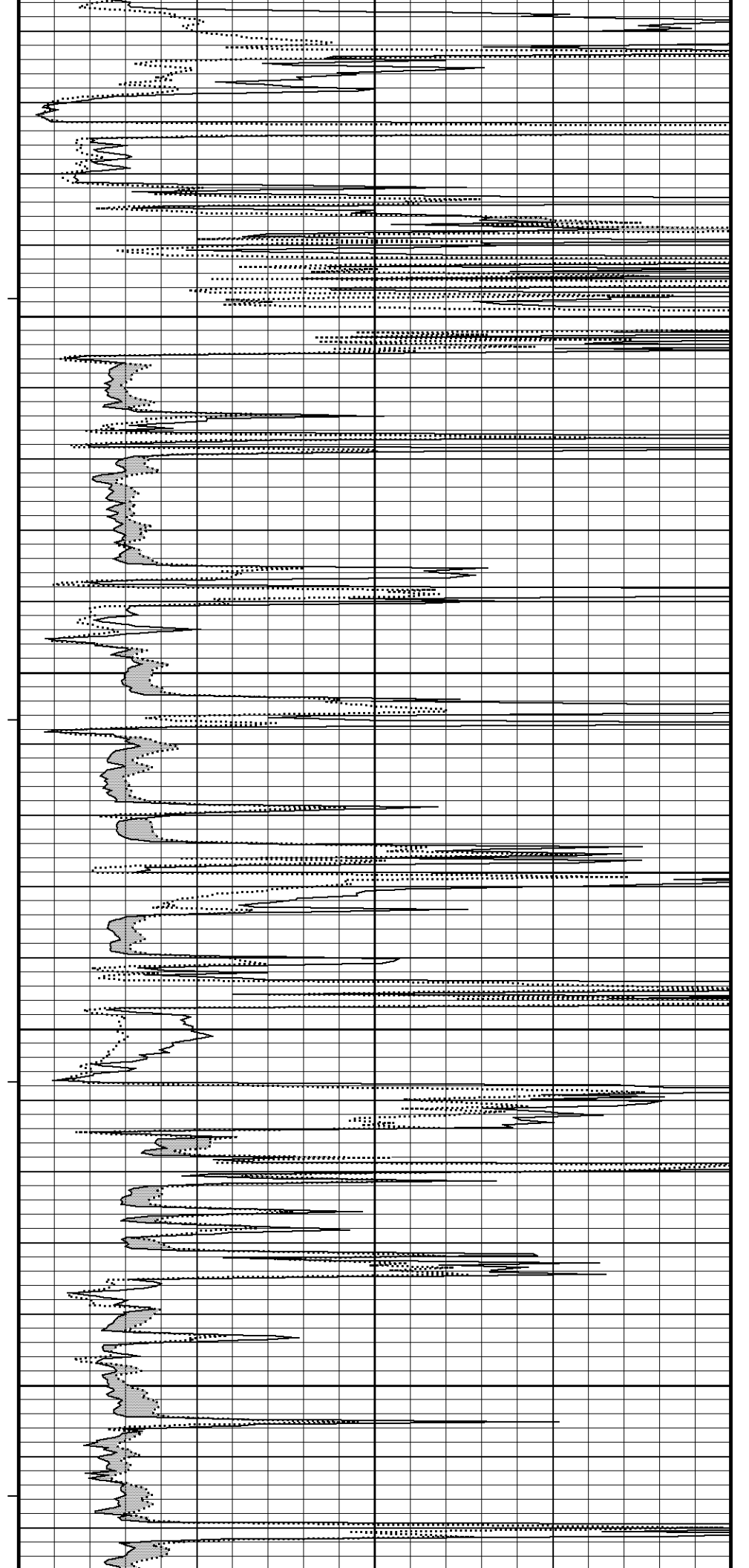
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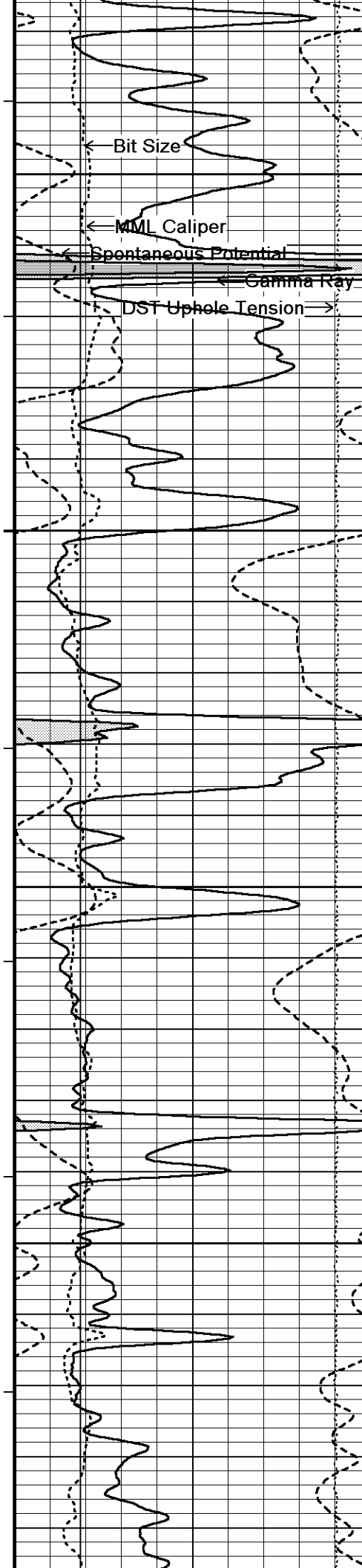
3450

115°

3500

300





115°

3550

115°

3600

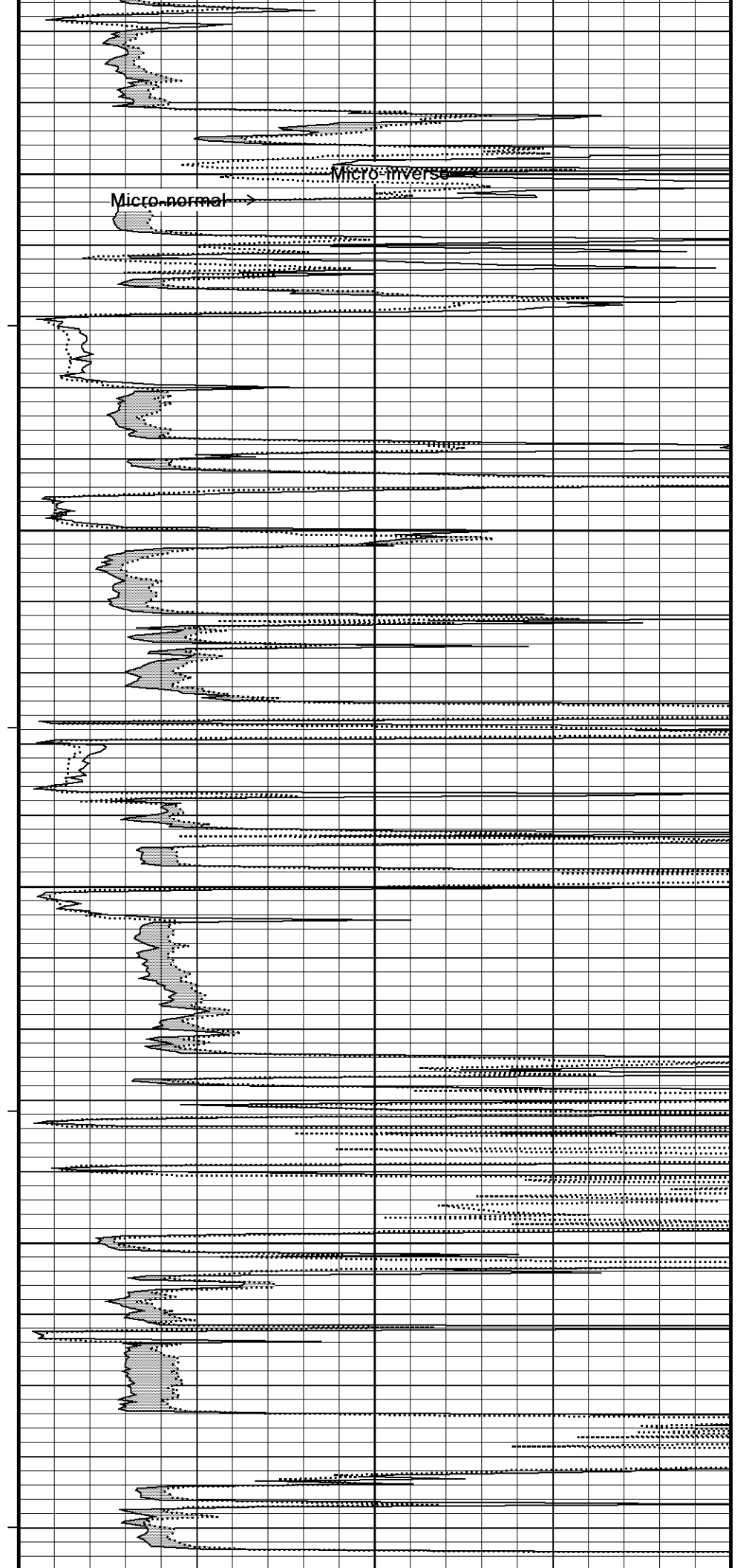
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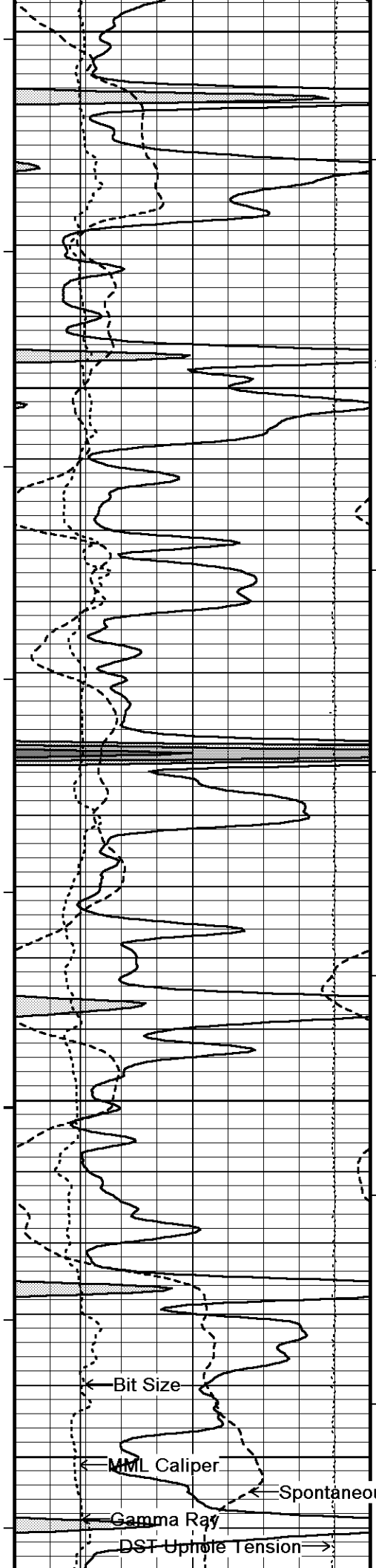
3650

116°

3700

117°





3750

117°

3800

117°

3850

118°

3900

119°

3950

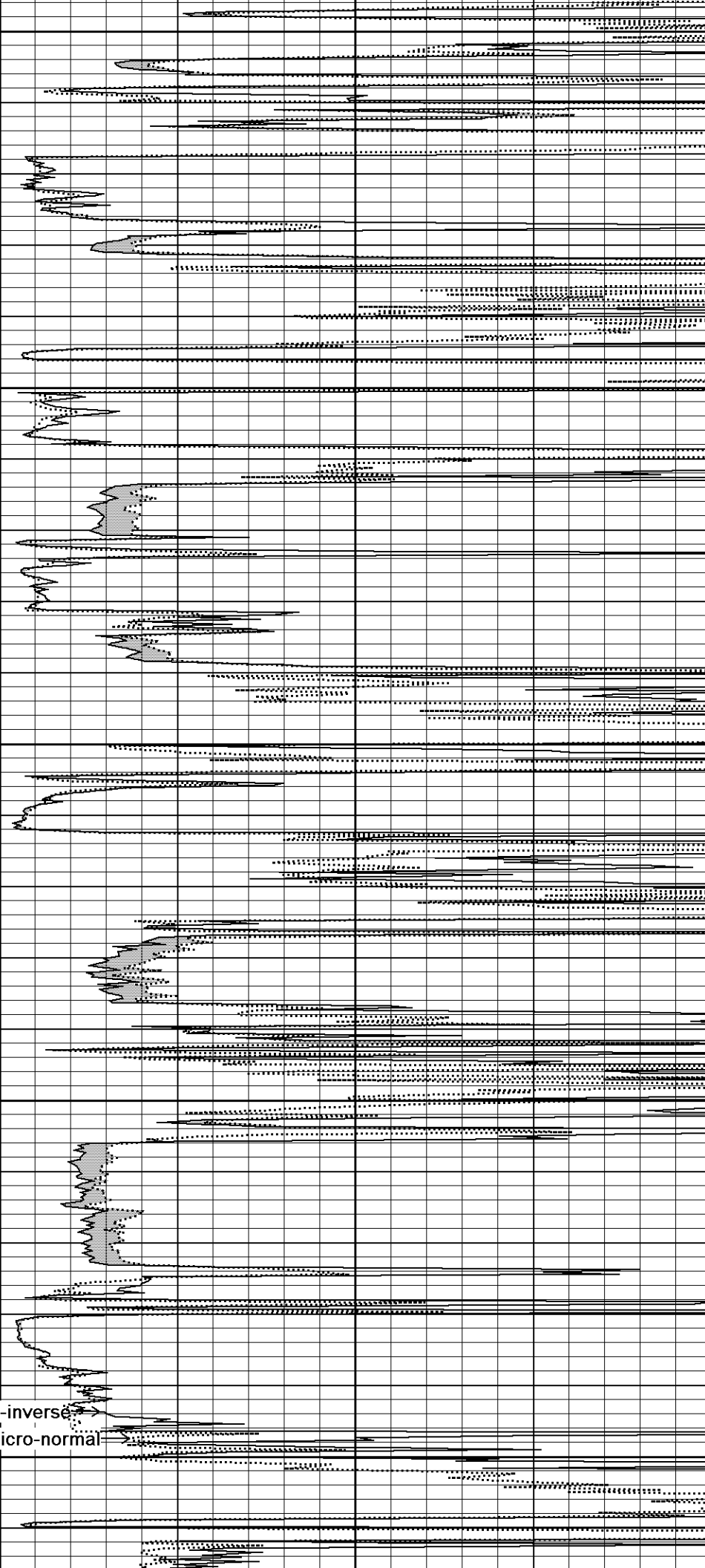
Micro-inverse

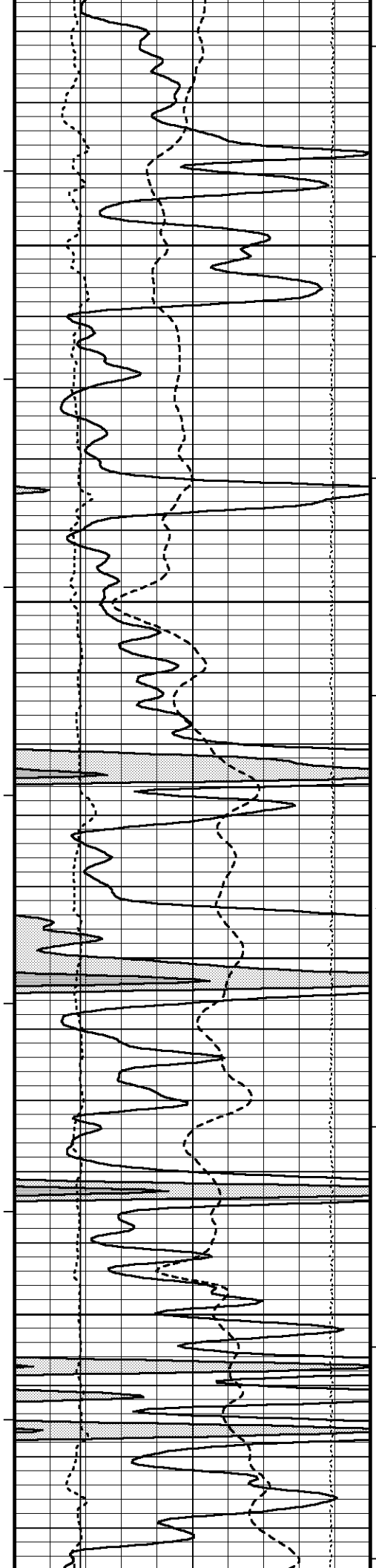
Micro-normal

Spontaneous Potential

Gamma Ray

DST Up-hole Tension





119°

4000

120°

4050

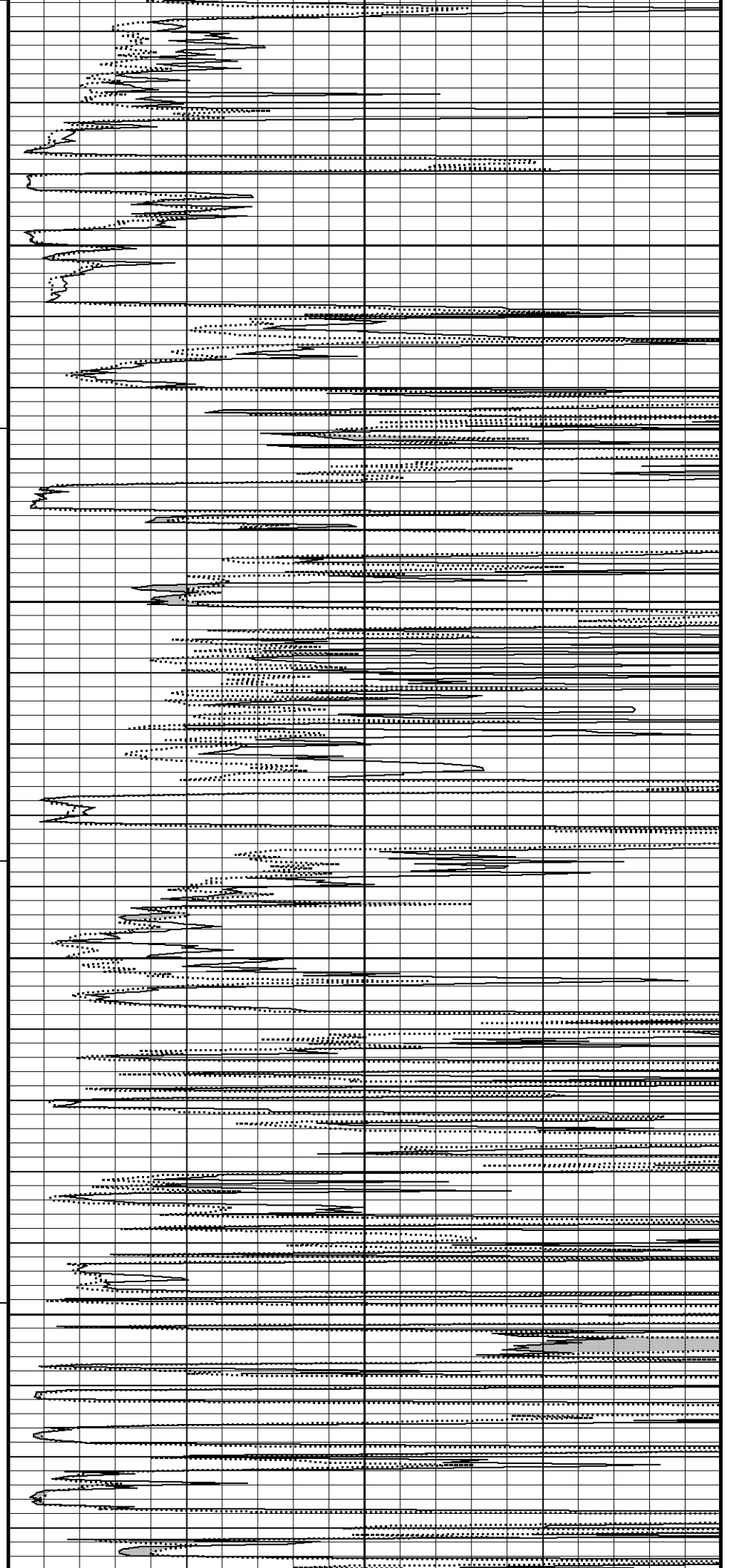
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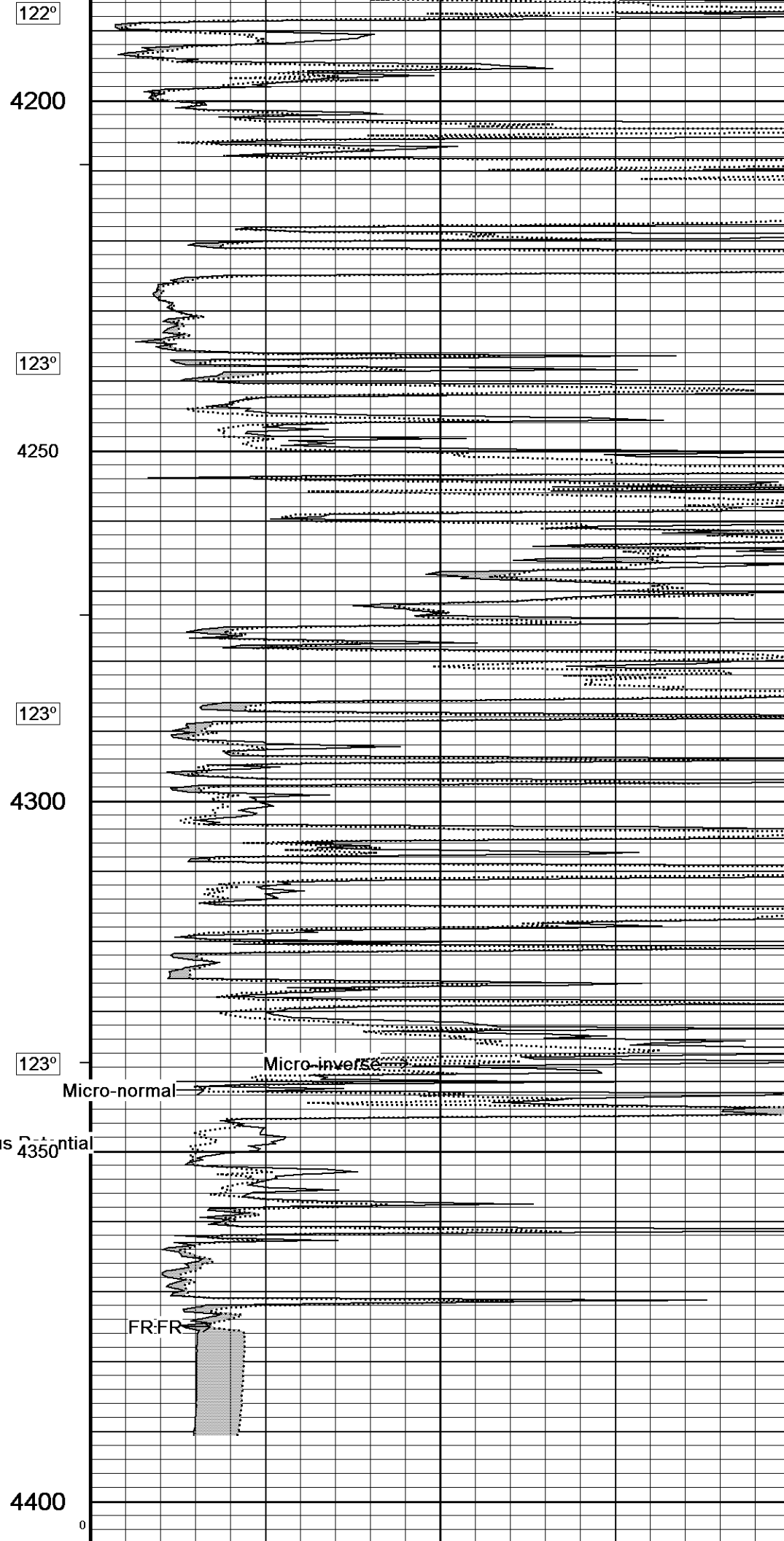
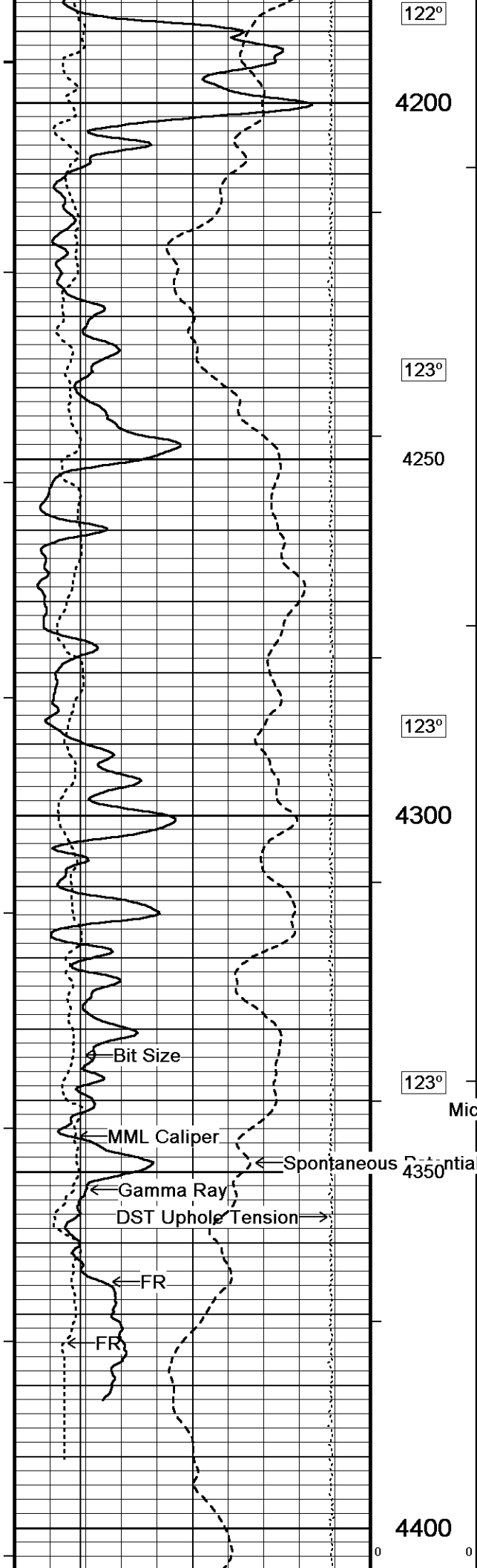
100

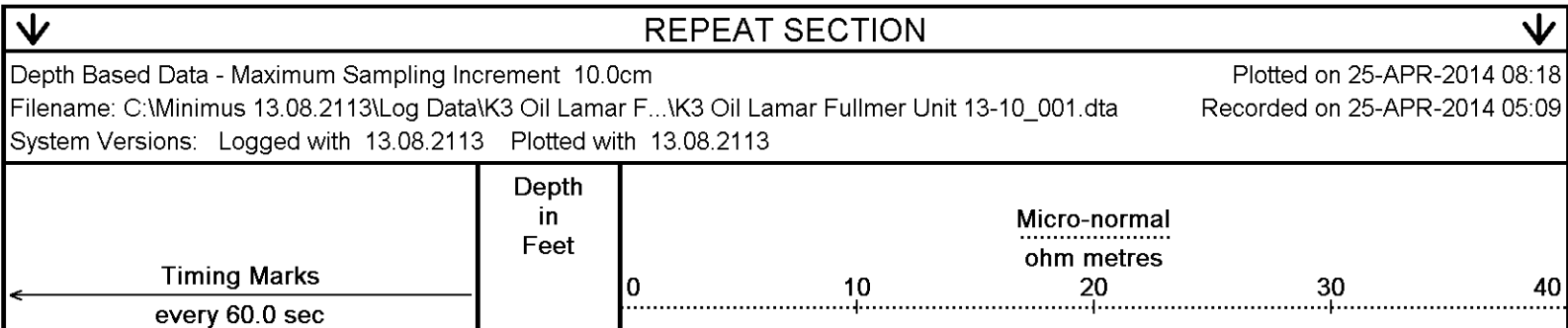
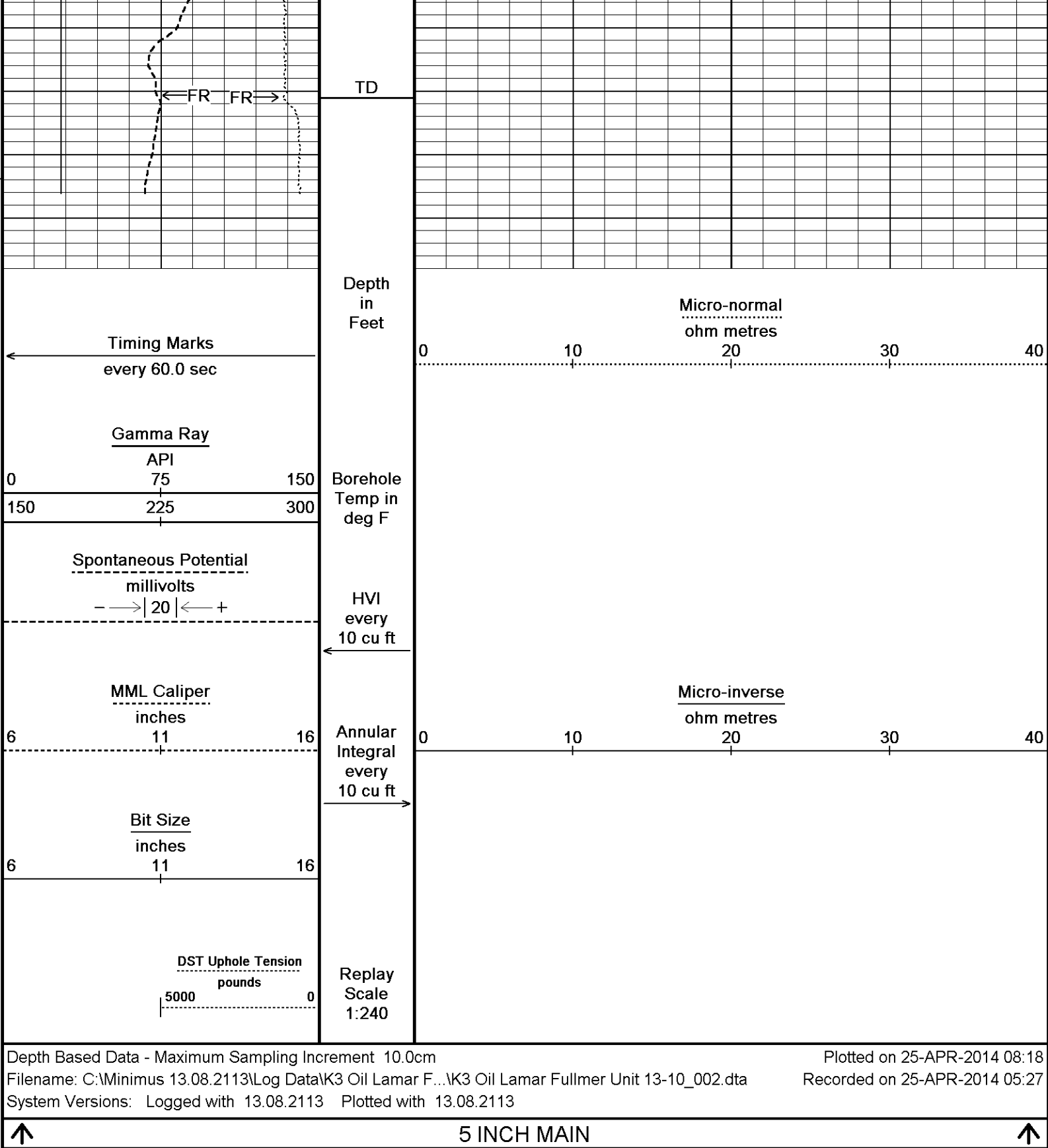
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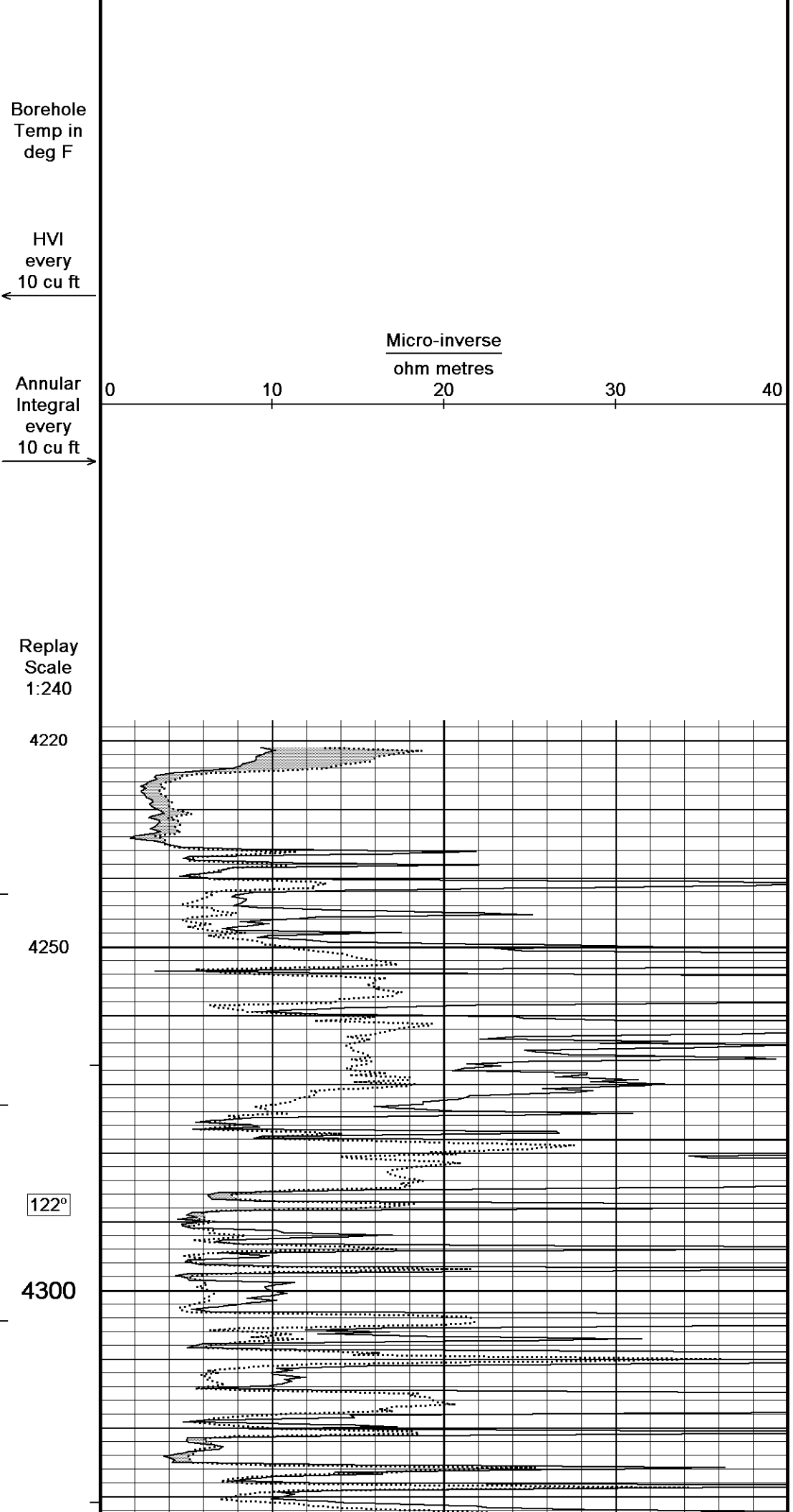
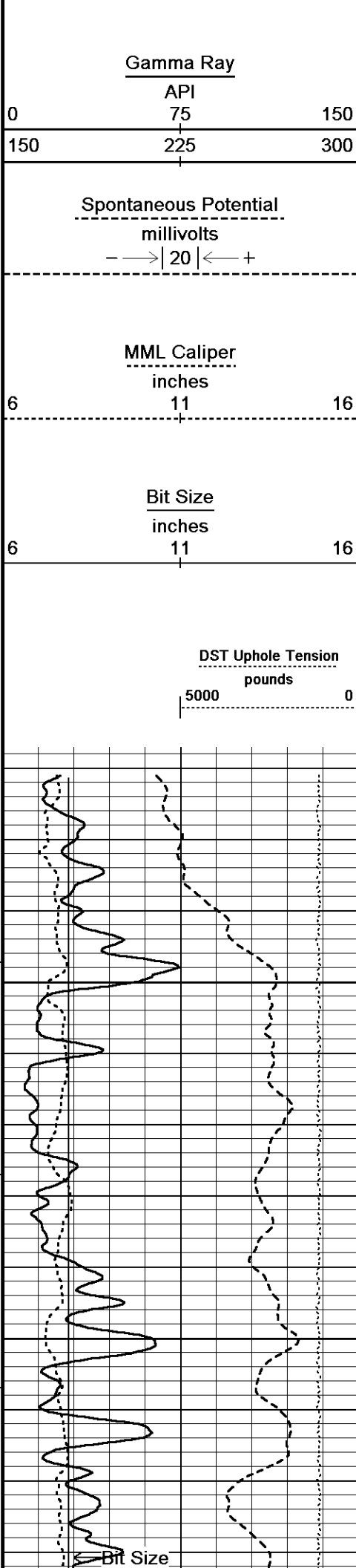
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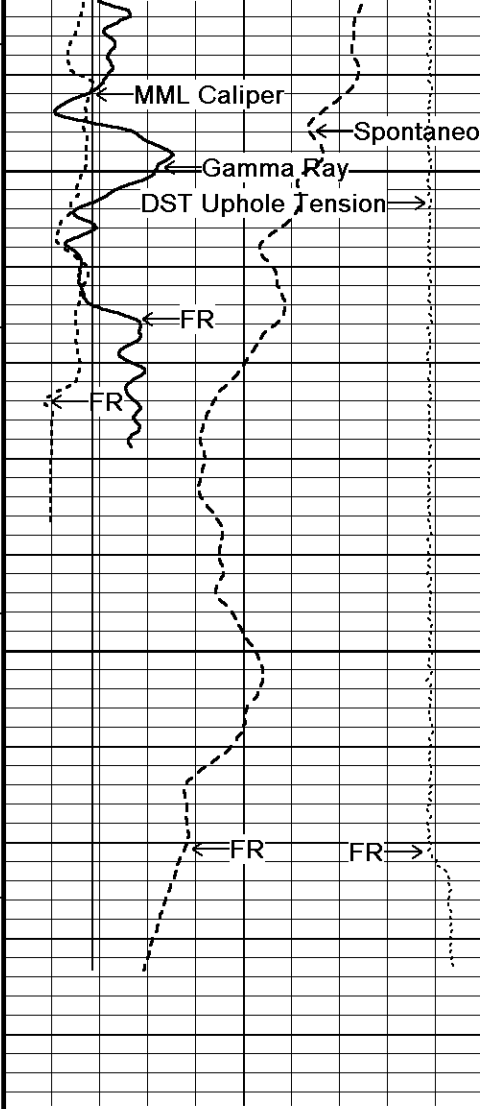
4150









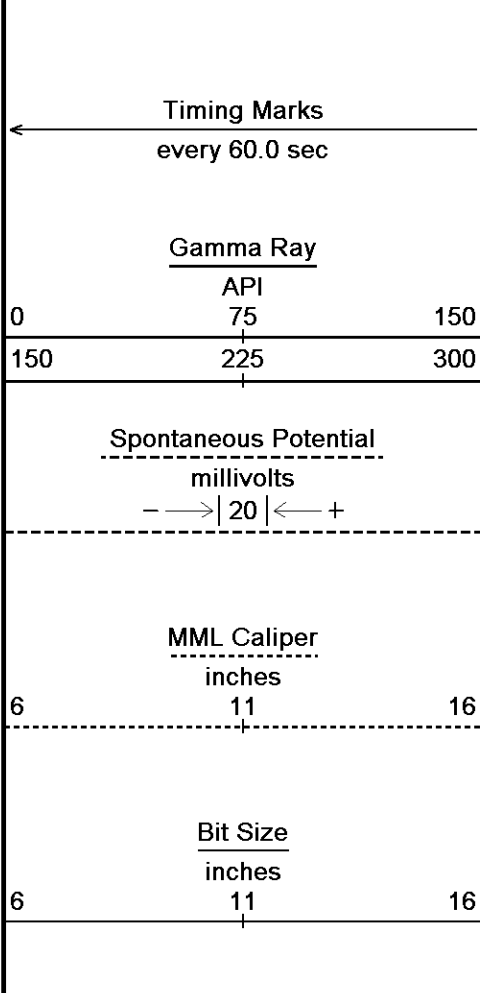
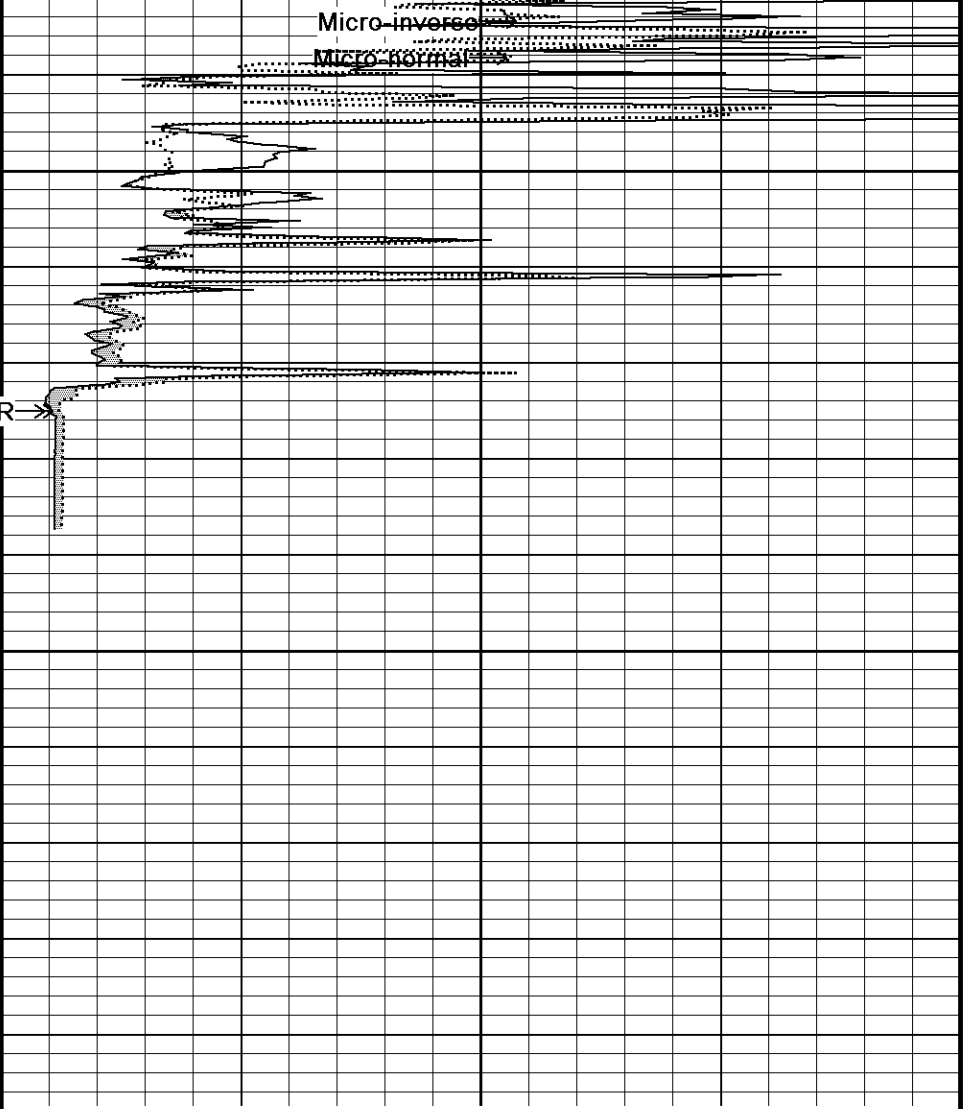


122°

4350

4400

TD

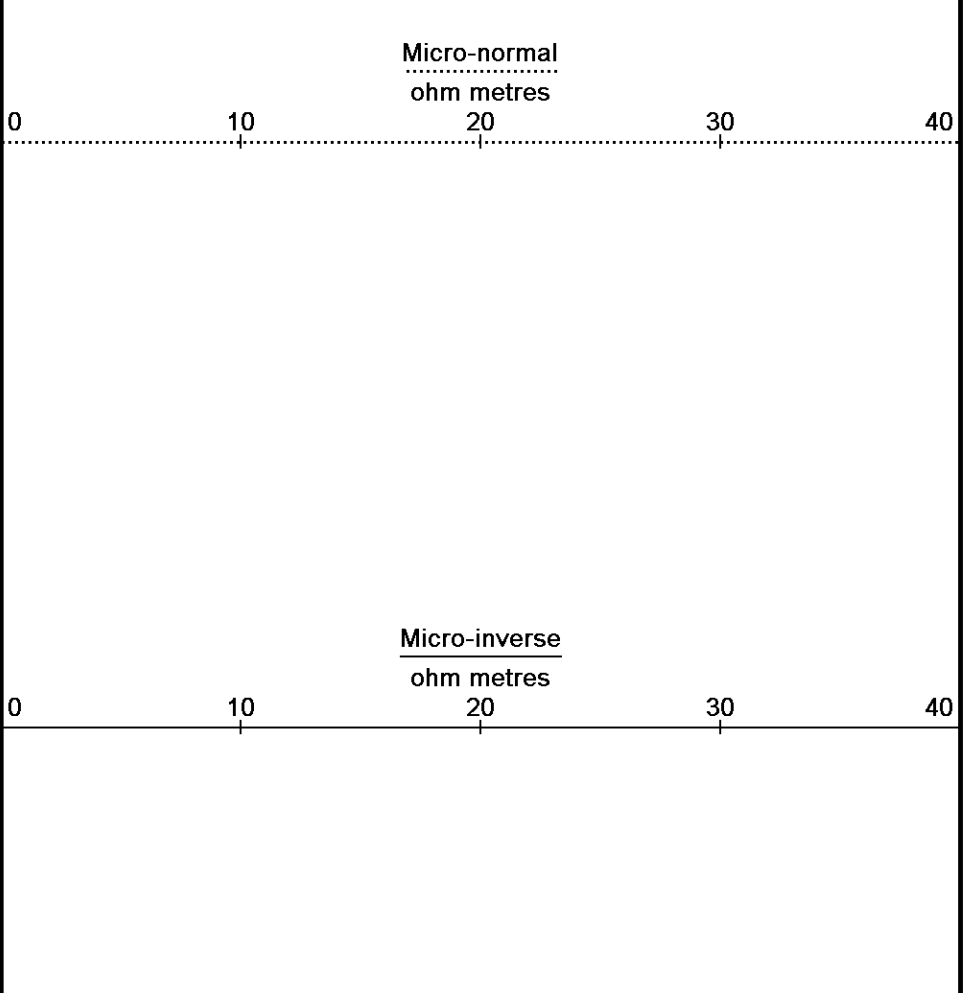


Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft



DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-APR-2014 08:18
Filename: C:\Minimus 13.08.2113\Log Data\K3 Oil Lamar Fullmer Unit 13-10_001.dta
Recorded on 25-APR-2014 05:09
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Log Data\K3 Oil Lamar Fullmer Unit 13-10\K3 Oil Lamar Fullmer Unit 13-10_001.dta

General Constants All 000

Last Edited on 25-APR-2014,04:42

General Parameters

Mud Resistivity	0.770	ohm-metres
Mud Resistivity Temperature	92.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	

Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches
Caliper for Differential Caliper	MML Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	1.000
RWA Constant M	2.000
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 23-APR-2014 20:17

Reading No	Measured	Calibrated (lbs)
1	15076.45	0.00
2	16570.90	577.60

Gamma Calibration MCG-D.K 469

Field Calibration on 18-APR-2014 19:23

	Measured	Calibrated (API)
Background	73	50
Calibrator (Gross)	1115	775
Calibrator (Net)	1042	725

Gamma Constants MCG-D.K 469

Last Edited on 25-APR-2014,03:00

Gamma Calibrator Number	GRC038	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.K 469

Field Calibration on 18-APR-2014,19:10

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 25-APR-2014,03:00

Pre-filter Length	11
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SP Calibration MCG-D.K 469

Field Calibration on 17-APR-2014 09:58

	Measured	Calibrated (mV)
Reference 1	100.1	99.9
Reference 2	-99.0	-100.0

Caliper Calibration MML-A 3			Base Calibration on 25-MAR-2014 11:38	
			Field Calibration on 18-APR-2014 19:07	
Base Calibration				
Reading No		Measured	Calibrator Size (in)	
1		14836	5.98	
2		18178	7.97	
3		21362	9.86	
4		25372	11.92	
5		0	0.00	
6		N/A	N/A	
Field Calibration				
		Measured Caliper (in)	Actual Caliper (in)	
		7.98	7.97	

Micro Normal and Micro Inverse Calibration MML-A 3					Base Calibration on 25-MAR-2014 11:48 Field Check on 18-APR-2014 18:58	
Base Calibration						
		Measured		Calibrated (ohm-m)		
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2		
Micro Normal	10.0	50.0	5.1	25.6		
Micro Inverse	10.0	49.9	3.4	16.9		
Channel		Base Check (ohm-m)		Field Check (ohm-m)		
Micro Normal		77.3		77.3		
Micro Inverse		51.2		51.2		

Micro Normal and Micro Inverse Constants MML-A 3					Last Edited on 25-APR-2014,03:00	
Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159					
Micro Normal K Factor	0.5110					
Micro Inverse K Factor	0.3380					
Standoff Offset	N/A					inches

Neutron Calibration MDN-A.B 66				Base Calibration on 24-MAR-2014 14:50	
				Field Check on 18-APR-2014 19:30	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far		Near	Far
	3064	94		3714	110
Ratio	32.437			33.764	
Field Calibrator at Base					
				Calibrated (cps)	
				1641	2431
Ratio				0.675	
Field Check					
				Calibrated (cps)	
				1667	2436
Ratio				0.684	

Neutron Constants MDN-A.B 66		Last Edited on 25-APR-2014,03:00	
Neutron Source Id	P0204NN		
Neutron Jig Number	5824NE		
Epithermal Neutron			
Caliper Source for Processing	Density Caliper		
Stand-off	0.00	inches	
Mud Density	1.00	gm/cc	
Limestone Sigma	7.10	cu	
Sandstone Sigma	4.26	cu	
Dolomite Sigma	4.70	cu	
Formation Pressure Source	None		
Formation Pressure	N/A	kpsi	
Temperature Source	Constant Value		
Temperature	68.00	degrees F	
Mud Salinity	0.00	kppm	
Salinity Correction	Not Applied		
Formation Fluid Salinity Source	None		

Formation Fluid Salinity N/A kppm
Barite Mud Correction Not Applied

FE Calibration MFE-A.A 135

Base Calibration on 25-MAR-2014 12:07
Field Check on 18-APR-2014 18:56

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.6	126.8
Base Check		281.2
Field Check		281.2

FE Constants MFE-A.A 135

Last Edited on 25-APR-2014,02:59

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

Sonic Constants MSS-A.A 73

Last Edited on 25-APR-2014,02:58

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	0.00	micro-sec
MX3FT	1500.00	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode	Compensated
Hole Type	Open Hole

Sonde Parameters

	Measured	Calibrated
Offset	0.0000	0.0000
Free Pipe	0.0000	

Peak Amplitude Source

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A			
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	No
Use 4' Waveform to derive TR	No
Use 5' Waveform to derive TR	No
Use 6' Waveform to derive TR	No
3' Waveform Discriminator Level	0.30 mV
4' Waveform Discriminator Level	0.30 mV
5' Waveform Discriminator Level	0.15 mV

6' Waveform Discriminator Level	0.15	mV
3' Waveform Filter		
4' Waveform Filter		
5' Waveform Filter		
6' Waveform Filter		
Semblance Level	0.50	
Semblance Window Width	120.00	micro-sec
Sonic 1 Despiker	100.00	micro-sec/ft
Sonic 2 Despiker	100.00	micro-sec/ft

Induction Calibration MAI-A.A 167

Base Calibration on 22-FEB-2014,14:07

Field Check on 18-APR-2014 18:52

Base Calibration

Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel		Low	High	Low	High
1		17.3	474.2	9.3	967.1
2		6.3	388.4	7.6	822.1
3		3.3	259.4	5.2	566.5
4		1.9	133.0	2.6	279.5

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.7	3842.1
2			29.5	3479.9
3			29.1	3056.0
4			19.8	2083.9
Deep			18.6	2051.4
Medium			42.2	3994.9
Shallow			42.8	5057.7

Array Temperature 69.0 Deg F

Induction Constants MAI-A.A 167

Last Edited on 25-APR-2014,02:58

Induction Model		RtAP-WBM	
Caliper for Borehole Corr.		Density Caliper	
Hole Size for Borehole Correction		N/A	inches
Tool Centred		No	
Stand-off Type		Fins	
Stand-off		0.50	inches
Number of Fins on Stand-off		8.0000	
Stand-off Fin Angle		45.00	degrees
Stand-off Fin Width		0.5000	inches
Borehole Corr. Rm Source		Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature		
Squasher Start		0.0020	mhos/metre
Squasher Offset		N/A	mhos/metre
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m

Resistivity of Mud Filtrate for SW	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

High Resolution Temperature Calibration MAI-A.A 167			Field Calibration on 18-APR-2014,18:52
	Measured	Calibrated(Deg F)	
Lower	10.00	10.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MAI-A.A 167		Last Edited on 18-APR-2014,18:52
Pre-filter Length	11	

Caliper Calibration MPD-D.A 482			Base Calibration on 10-APR-2014 12:34
			Field Calibration on 17-APR-2014 10:16
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	16267	3.99	
2	26446	5.98	
3	36593	7.97	
4	46367	9.86	
5	57395	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	7.92	7.97	

Photo Density Calibration MPD-D.A 482			Base Calibration on 24-MAR-2014 13:51
			Field Check on 17-APR-2014 10:21
Density Calibration			
Base Calibration		Measured	Calibrated (sdu)
	Near	Far	Near Far
Background	1244	1407	
Reference 1	59945	29818	59556 30836
Reference 2	25150	2828	24941 2541
Field Check at Base			
	1243.8	1406.7	
Field Check			
	1236.7	1411.8	
PE Calibration			
Base Calibration		Measured	Calibrated
	WS	WH	Ratio
Background	235	1114	
Reference 1	26220	59734	0.443 0.371
Reference 2	7692	25010	0.312 0.272
Field Check at Base			
	235.0	1114.4	
Field Check			
	233.6	1108.6	

Density Constants MPD-D.A 482			Last Edited on 25-APR-2014,02:59
Density Source Id	18235B		
Nylon Calibrator Number	DNCE695		
Aluminium Calibrator Number	DACD698		
Density Shoe Profile	8 inch		
Caliper Source for Processing	Density Caliper		
PE Correction to Density	Not Applied		
Mud Density	1.12	gm/cc	
Mud Density Z/A Multiplier	1.11		
Mud Filtrate Density	1.00	gm/cc	
Dry Hole Mud Filtrate Density	1.00	gm/cc	
DNCT	0.00	gm/cc	
CRCT	0.00	gm/cc	
Density Z/A Correction	Hybrid		

Matrix density (gm/cc)
2.71
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00

Depth (m)
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Log Data\K3 Oil Lamar Fullmer Unit 13-10\K3 Oil Lamar Fullmer Unit 13-10_001.dta

CBH-C, Cablehead, 11 pin

CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log

MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

Compact Neutron

MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

MPD-D.A 482 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric

MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

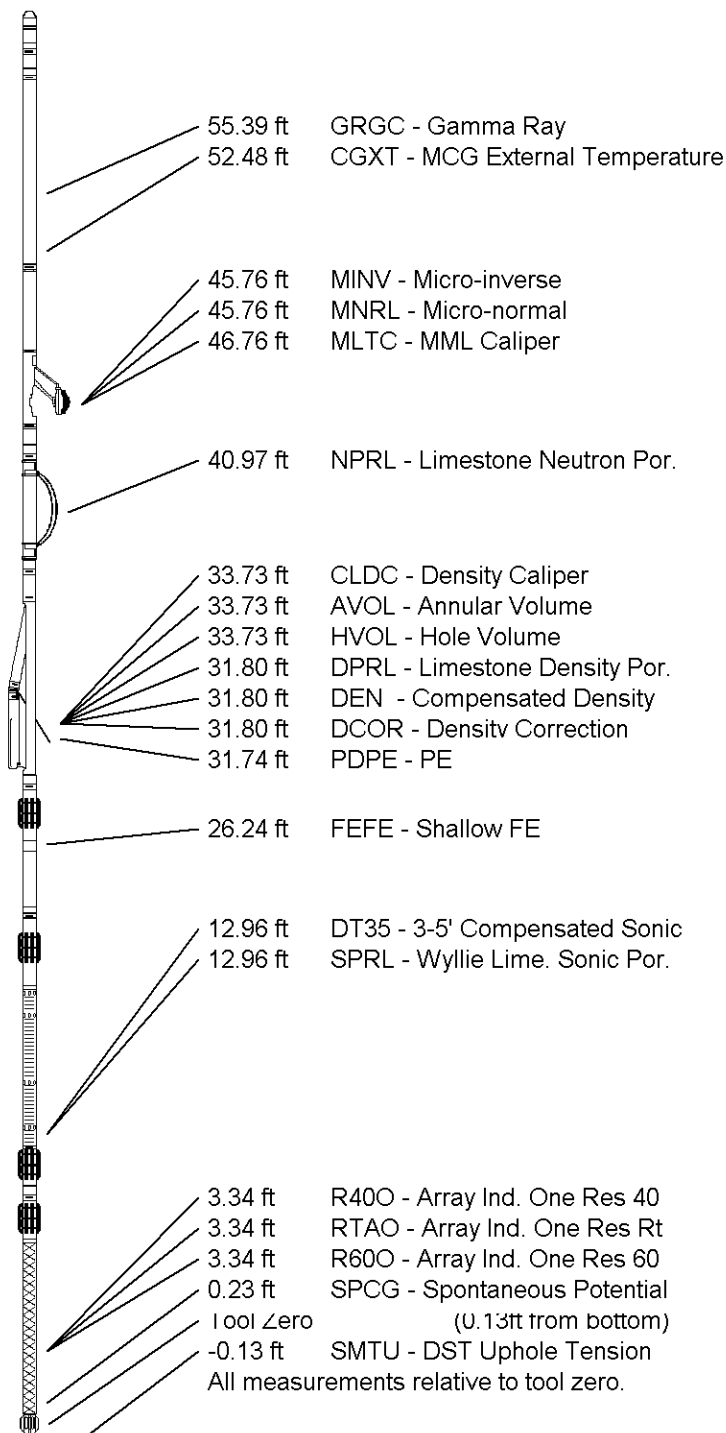
Compact Sonic

MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction

MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.07 ft Weight: 480.6 lb



COMPANY
WELL
FIELD

K3 OIL & GAS OPERATING COMPANY
LAMAR FULLMER UNIT 13-10
WILDCAT

PROVINCE/COUNTY GOVE
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2456.00	feet	First Reading	4375.00	feet
Elevation Drill Floor	2454.00	feet	Depth Driller	4421.00	feet
Elevation Ground Level	2448.00	feet	Depth Logger	4421.00	feet



Weatherford®

MICRORESISTIVITY LOG