

**Weatherford****MICRORESISTIVITY LOG**

COMPANY

O'BRIEN ENERGY RESOURCES CORP.

WELL

CROOKED CREEK OFFSET # 4-8

FIELD

ANGELL SOUTH

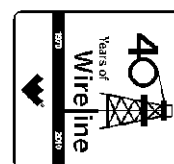
PROVINCE/COUNTY

MEADE

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

2271' FSL & 526' FEL**SW NE NE SE**

SEC

TWP

RGE

Other Services

8

33S

29W

MPD/MDN

API Number

15-119-21309

MAI/MFE

Permit Number

Permanent Datum G.L., Elevation 2644 feet

Log Measured From KB

Drilling Measured From K.B.

Date

16-FEB-2012

Elevations:

feet

KB

2656.00

DF

2654.00

GL

2644.00

Run Number

ONE

Depth Driller

6323.00

feet

Depth Logger

6323.00

feet

First Reading

6287.00

feet

Last Reading

4400.00

feet

Casing Driller

1501.00

feet

Casing Logger

1497.00

feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.00

lb/USg

58.00 CP

PH / Fluid Loss

10.50

8.00

ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

1.35 @ 65.0

ohm-m

Rmf @ Measured Temp

1.08 @ 65.0

ohm-m

Rmc @ Measured Temp

1.62 @ 65.0

ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.76 @ 118.0

ohm-m

Time Since Circulation

6 HOURS

Max Recorded Temp

118.00

deg F

Equipment Name

COMPACT

Equipment / Base

13096

LIB

BOREHOLE RECORD

Last Edited: 16-FEB-2012 14:05

Bit Size
inches

7.875

Depth From
feet

1497.00

Depth To
feet

6323.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

12.00

Shoe Depth
feet

1497.00

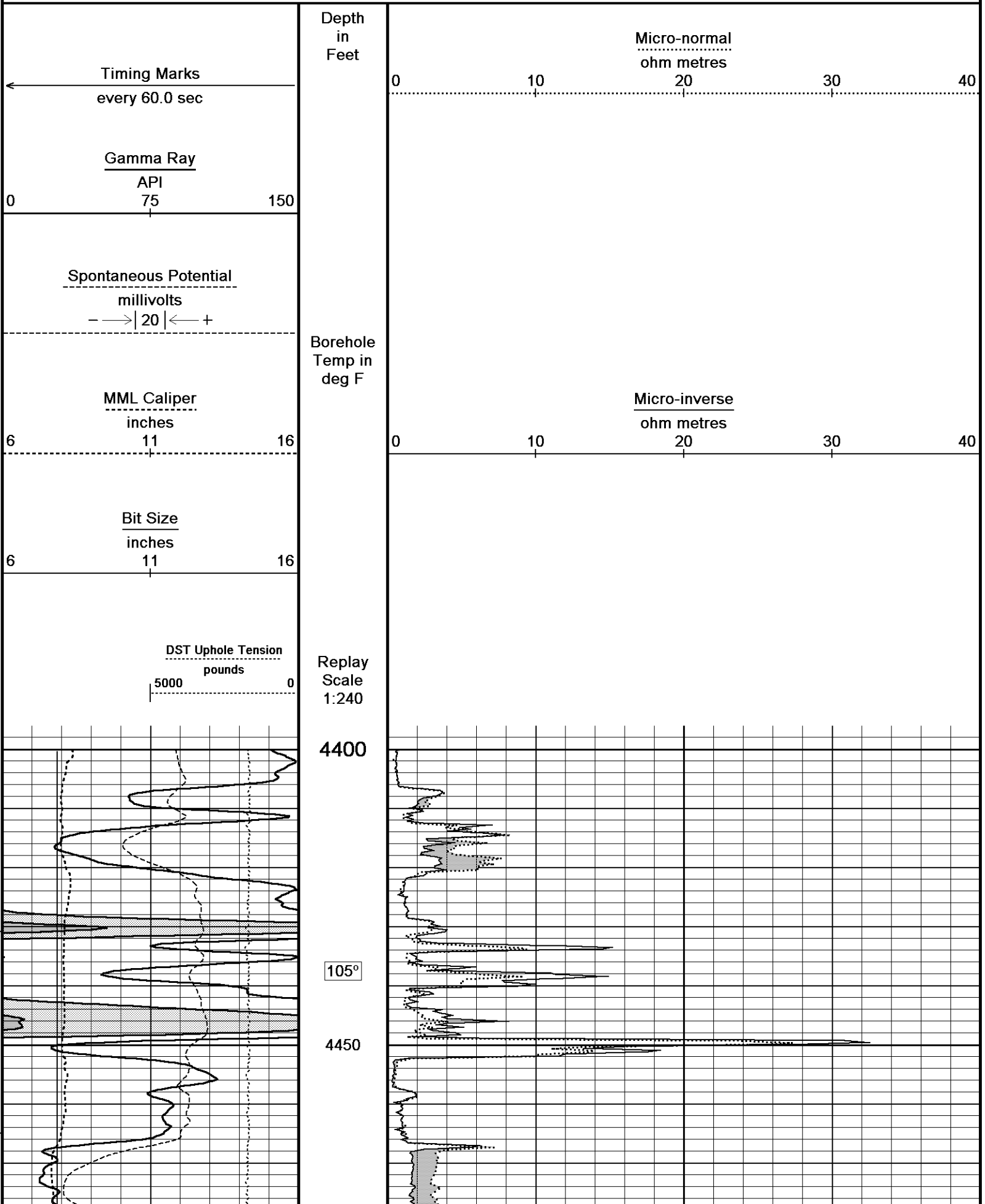
Weight
pounds/ft

24.00

REMARKS

Tools Run: MAI, MPD, MCG, MDN, MFE, MML,
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 inch standoffs used. MDN: Dual Eccentralizer used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Borhole rugosity, tight pulls, and washouts will affect data quality.
All intervals logged and scaled per customer's request.
Annular volume with 4.5 inch production casing = 442 Cubic Feet
Service order #3534704
Rig: Duke #6
Engineer: A. Giambalvo
Operator(s): K. Rinehart

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, 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. These interpretations are also subject to our general terms and conditions in our price schedule.





105°

4500

106°

4550

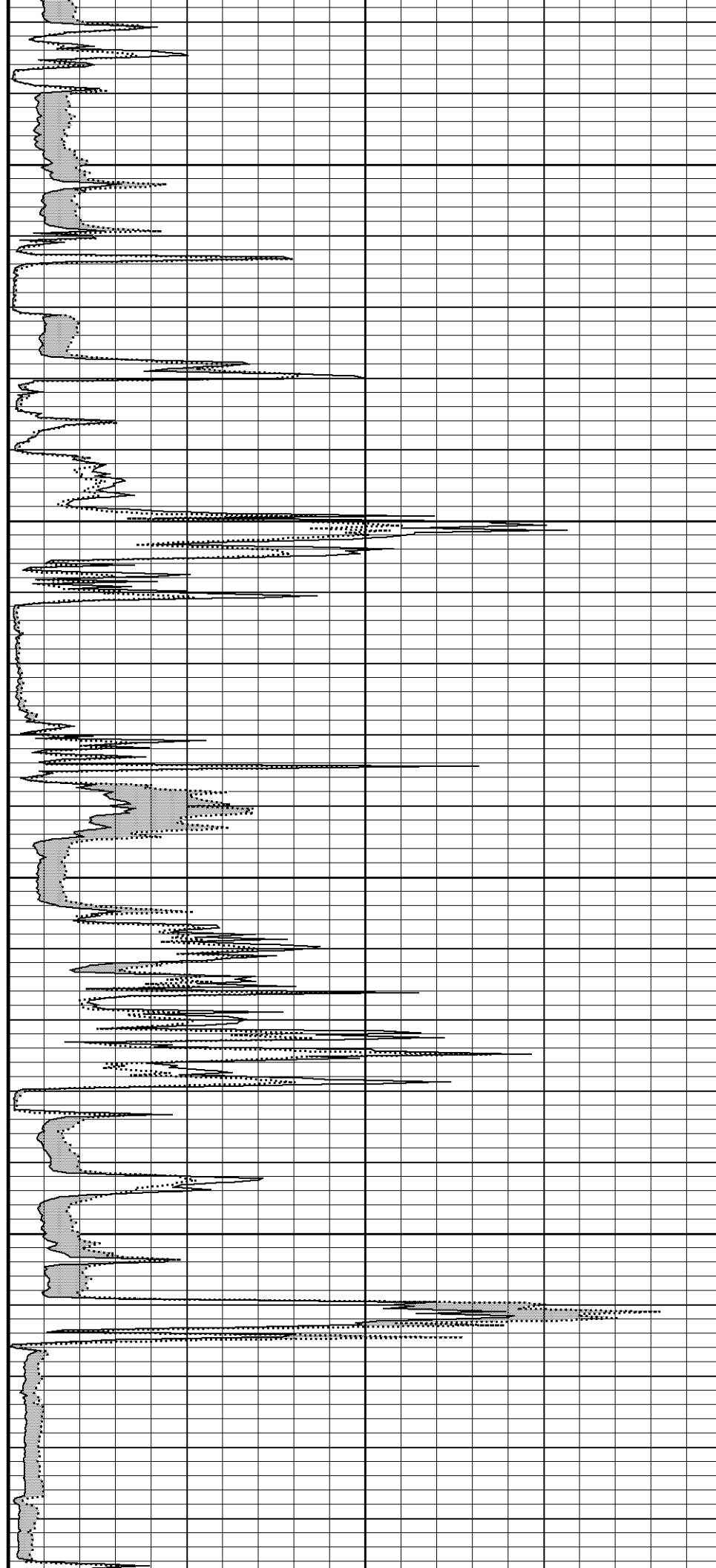
106°

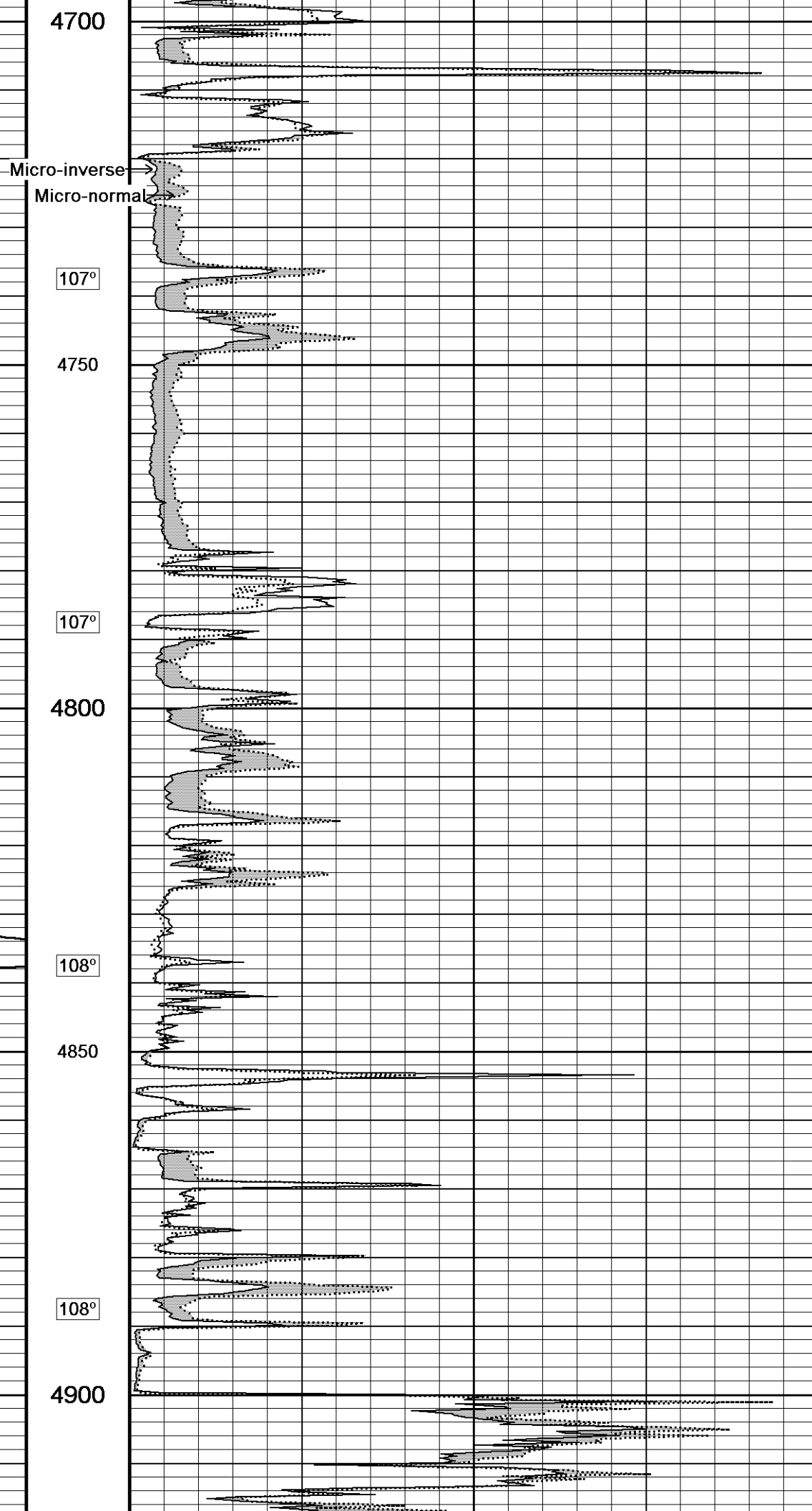
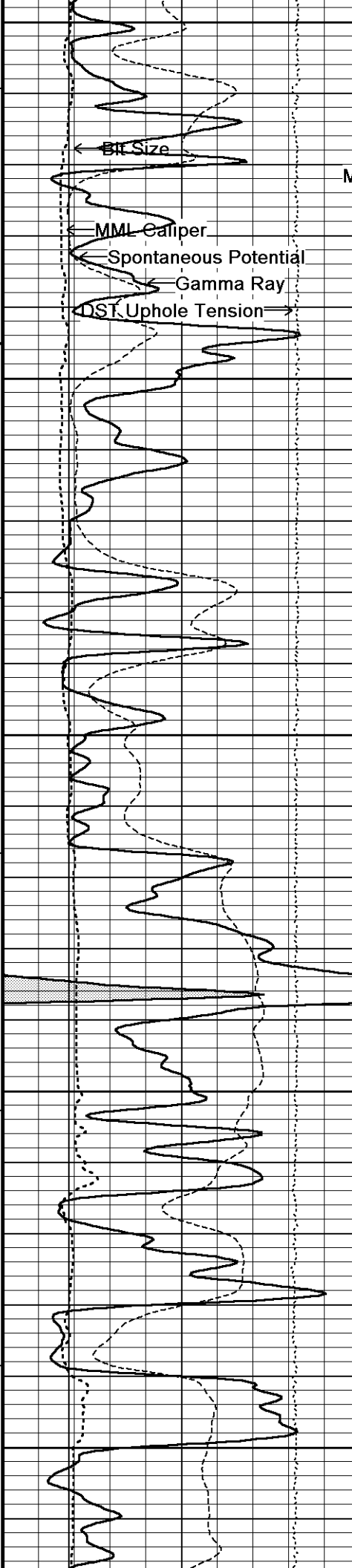
4600

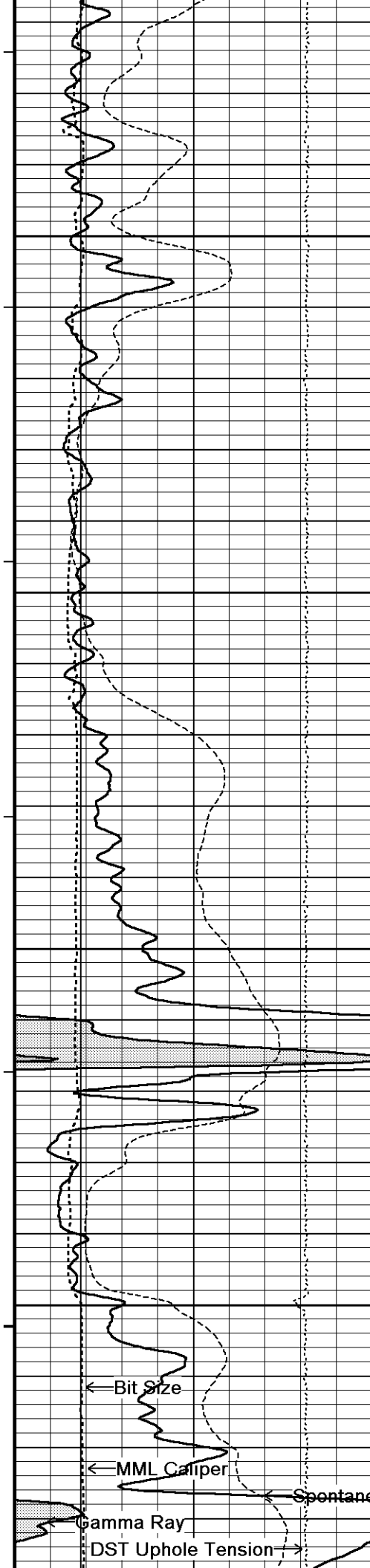
107°

4650

107°







108°

4950

109°

5000

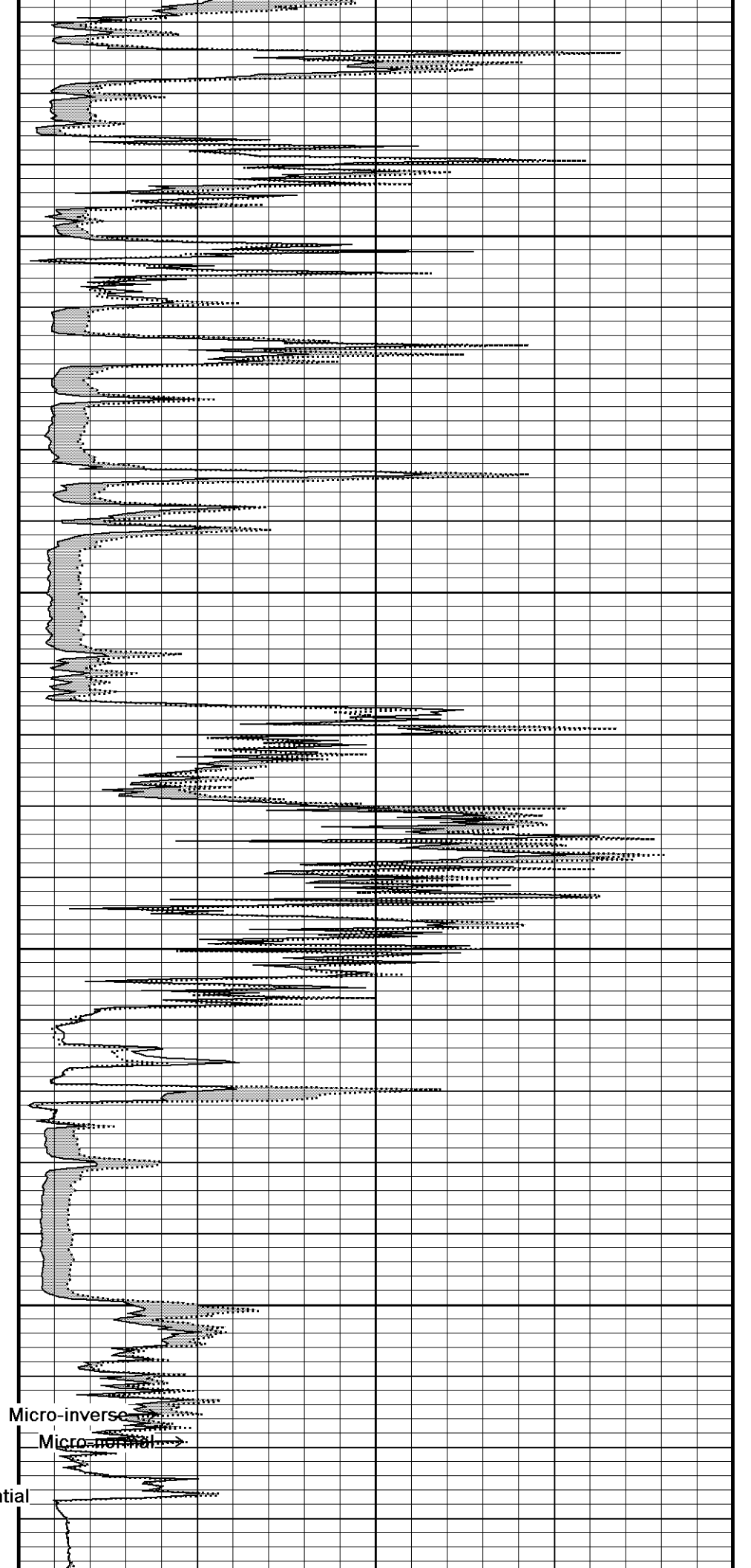
109°

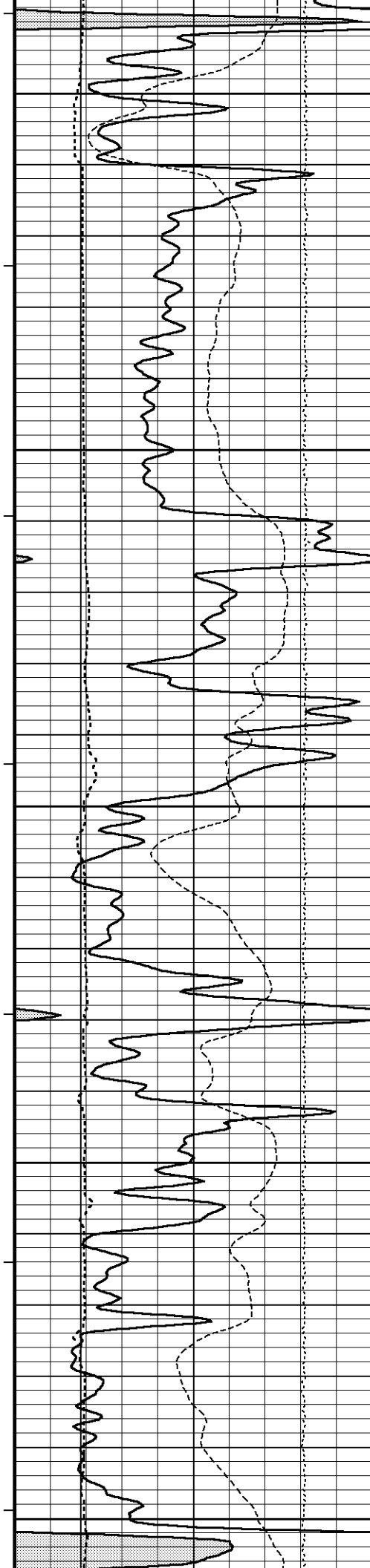
5050

109°

5100

110°





110°

5150

110°

5200

111°

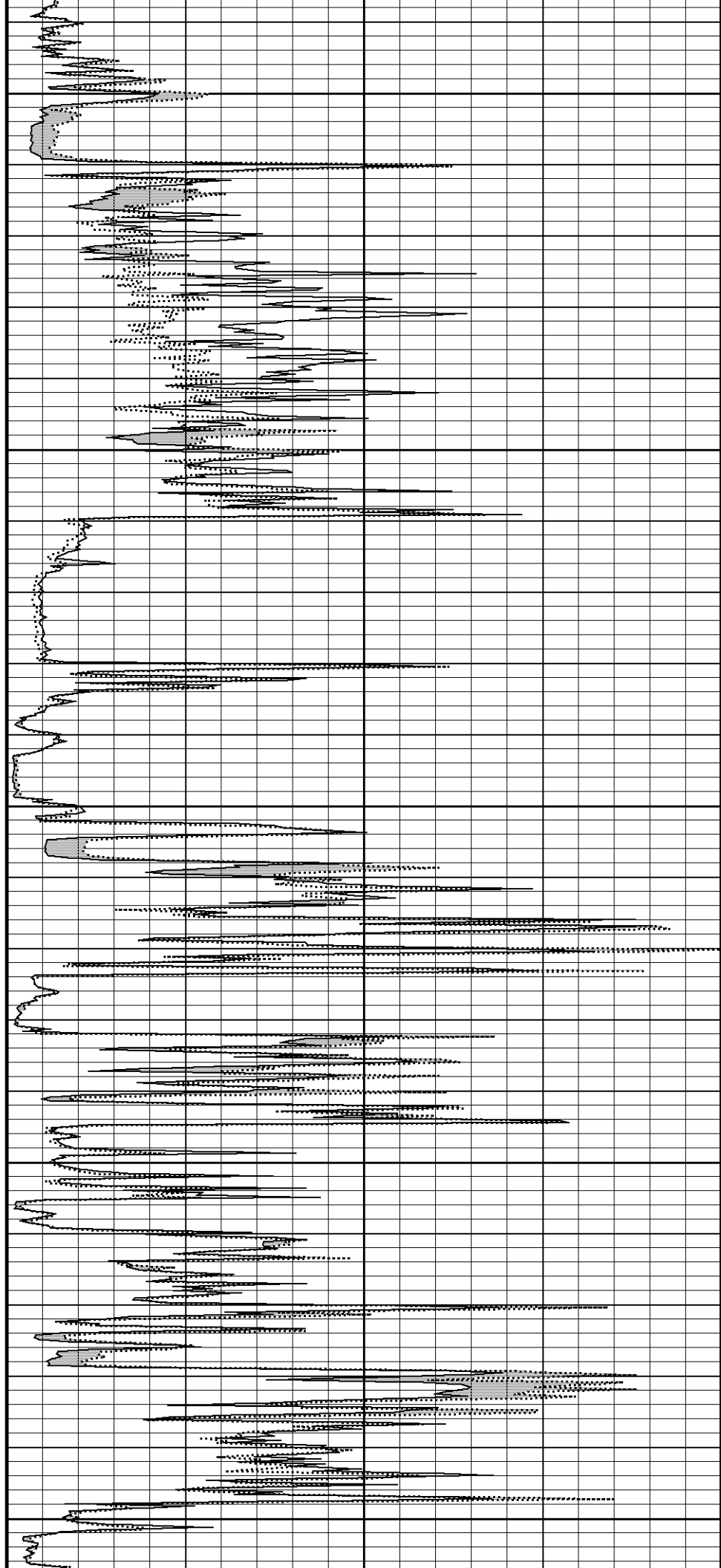
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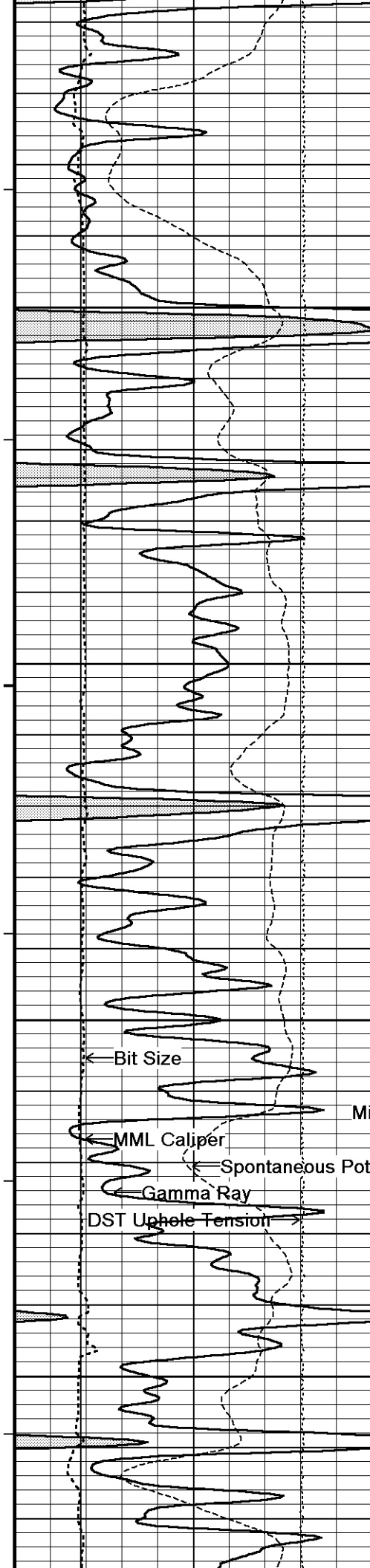
111°

5300

111°

5350





112°

5400

111°

5450

111°

5500

← Bit Size

← MML Caliper

← Spontaneous Potential

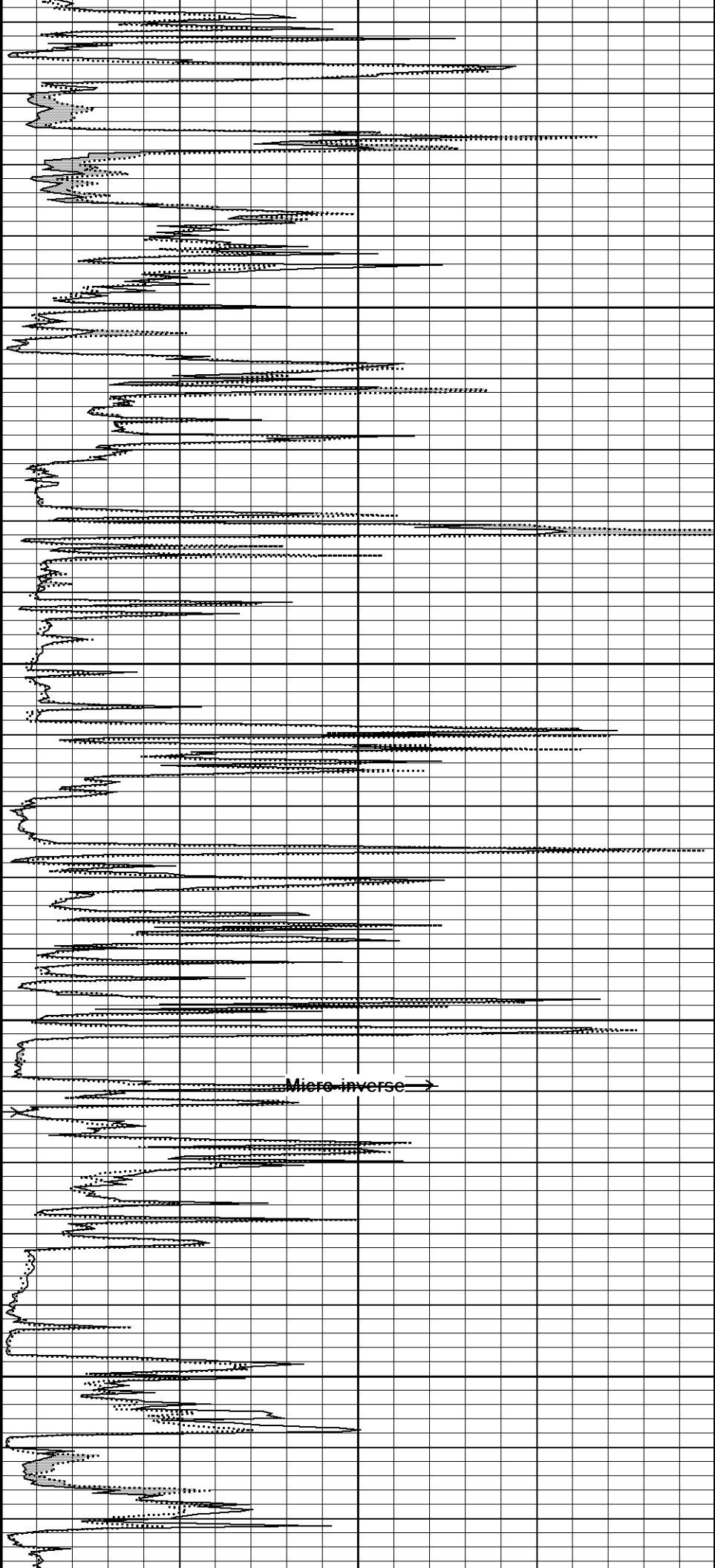
← Gamma Ray

DST Uphole Tension →

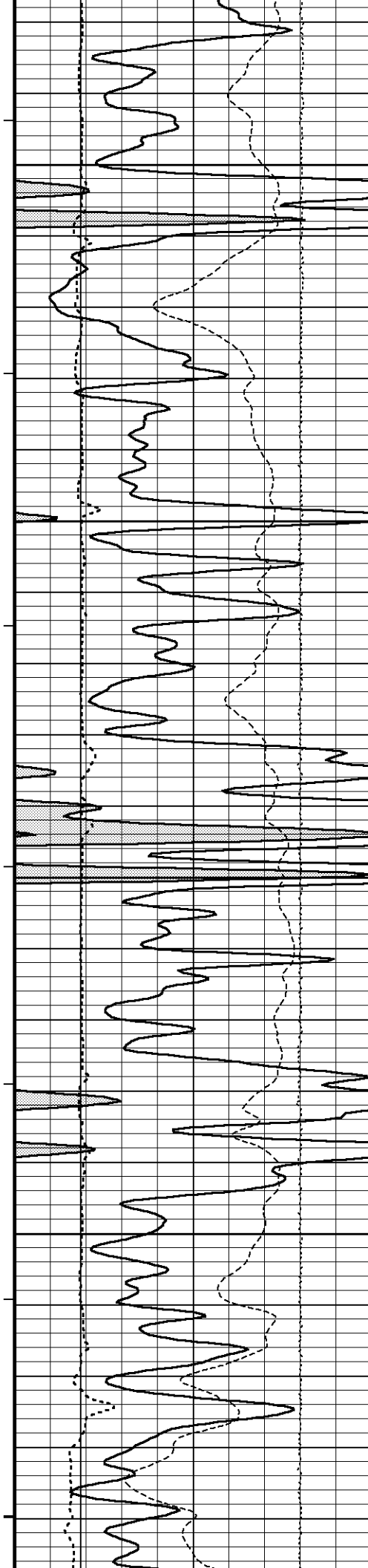
Micro-normal

112°

5550



Micro-inverse →



112°

5600

112°

5650

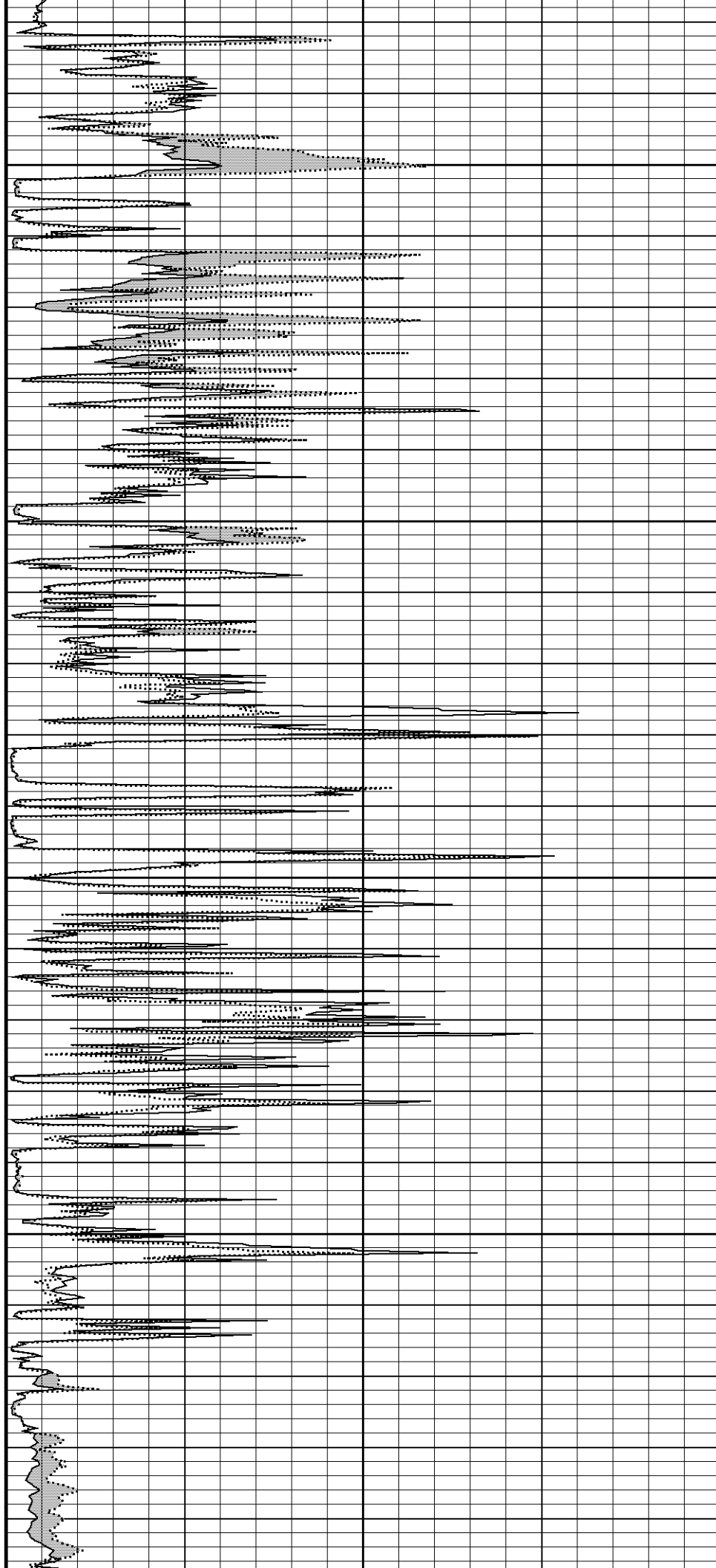
112°

5700

113°

5750

114°



5800

115°

5850

115°

5900

Micro-inverse

Micro-normal

Spontaneous Potential

Gamma Ray

Bit Size

MML Caliper

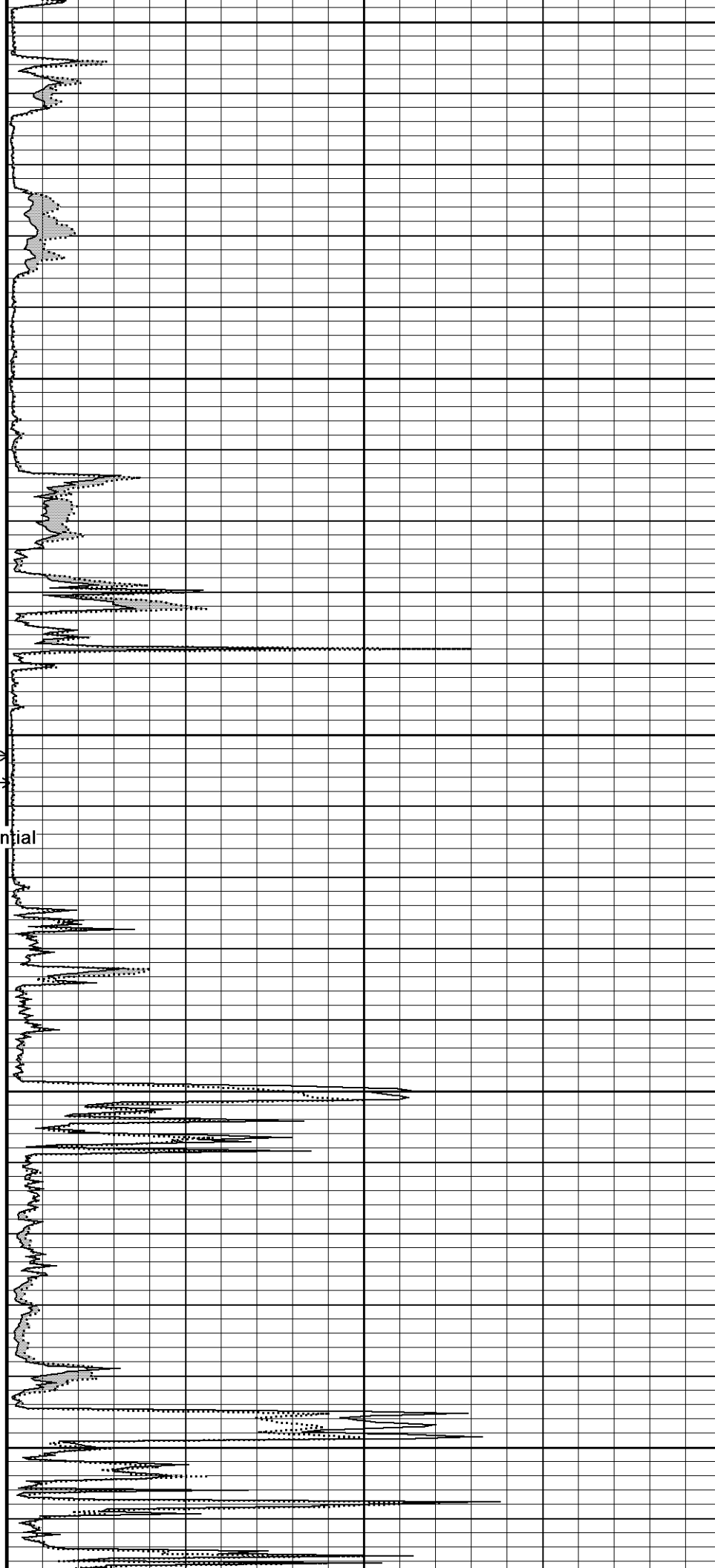
DST Uphole Tension

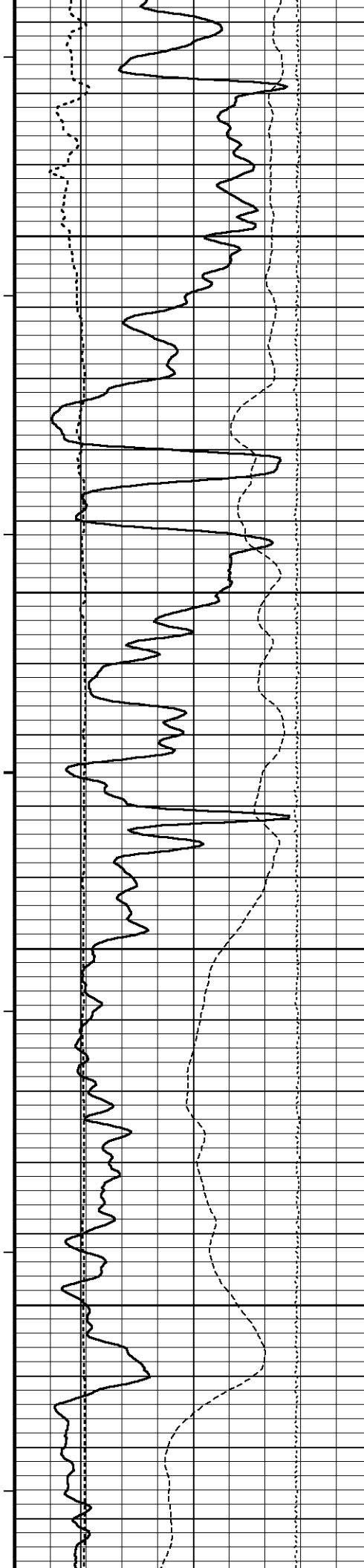
115°

5950

115°

6000





117°

6050

118°

6100

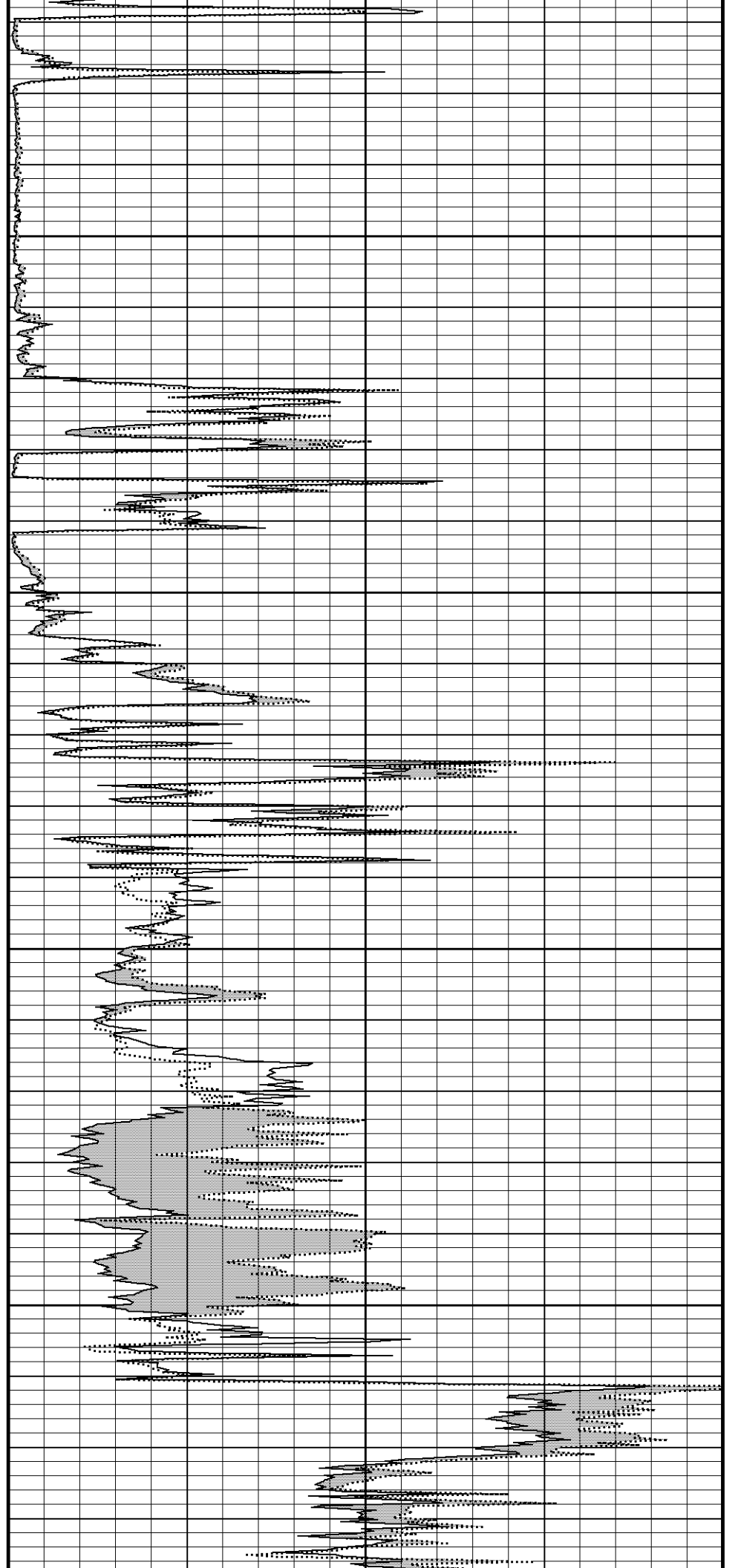
118°

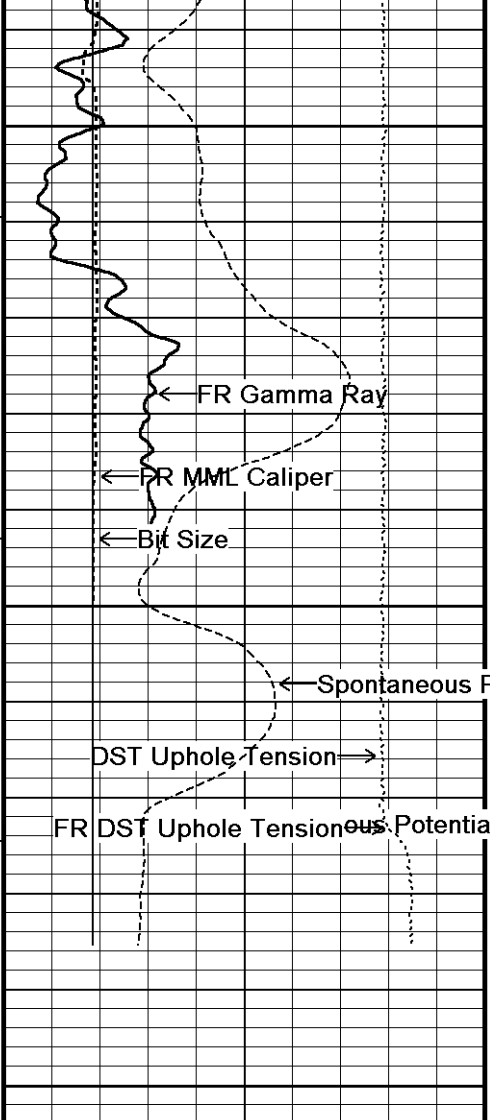
6150

118°

6200

118°





118°

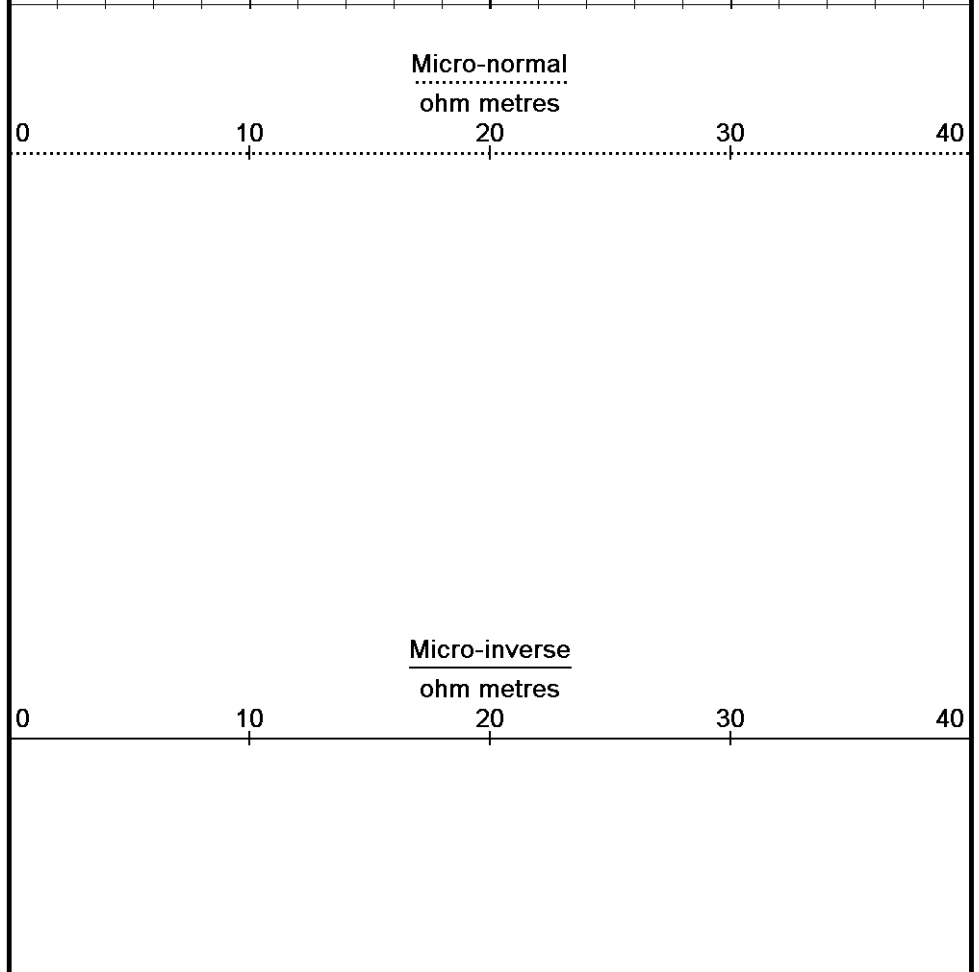
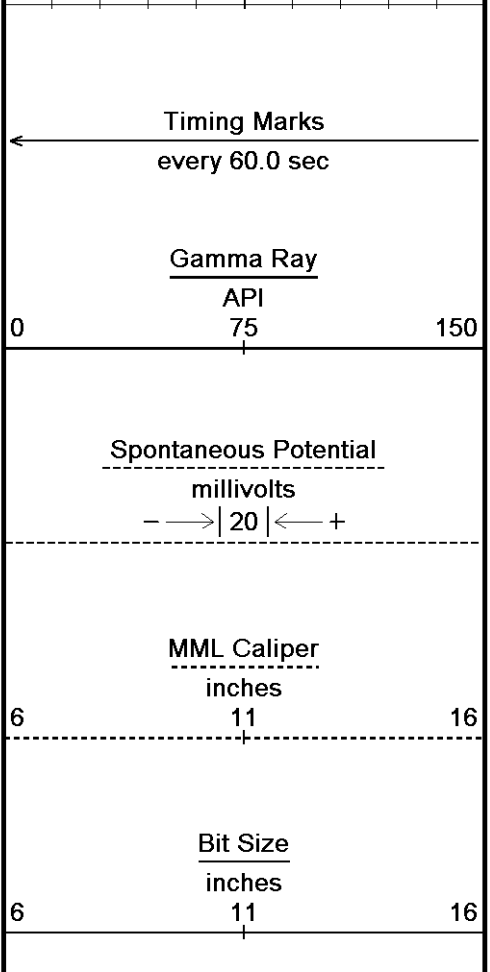
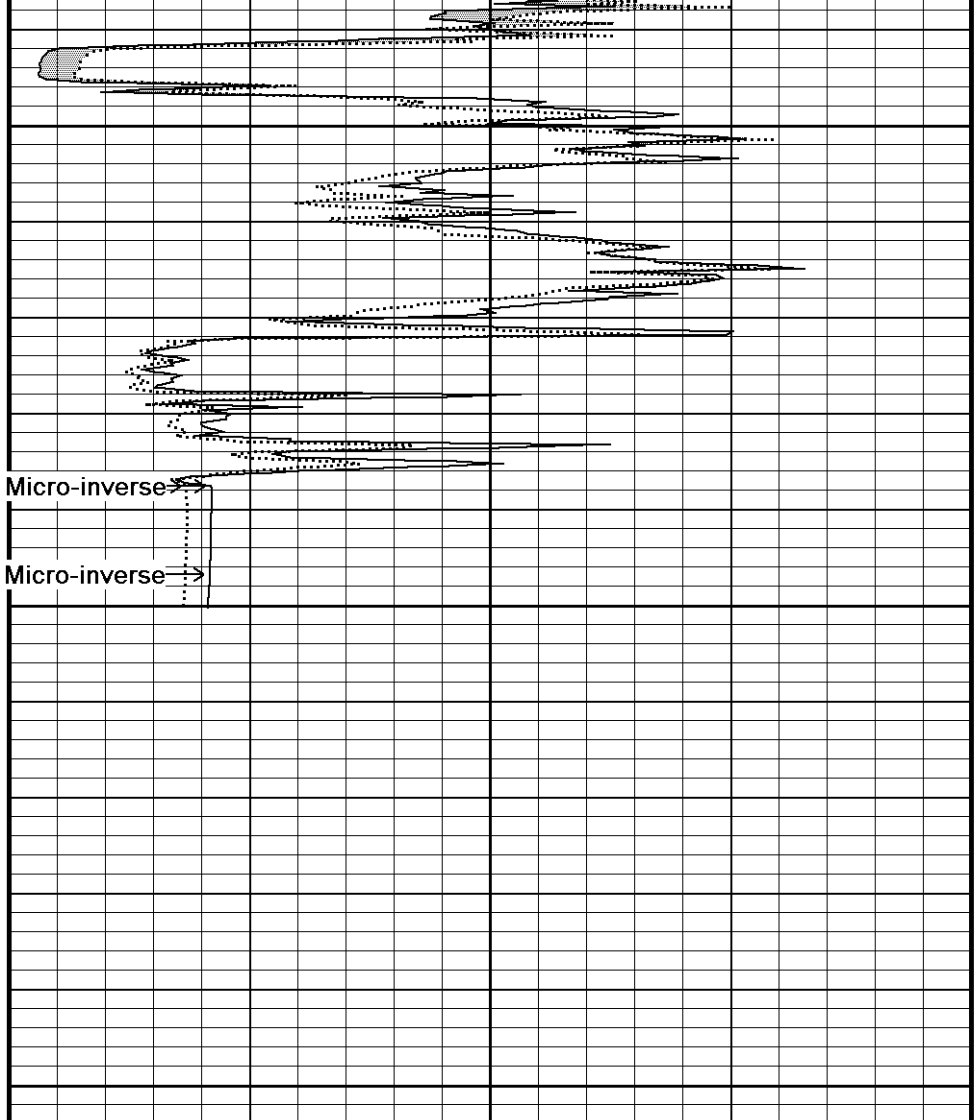
6250

118°

6300

6350

Depth in Feet



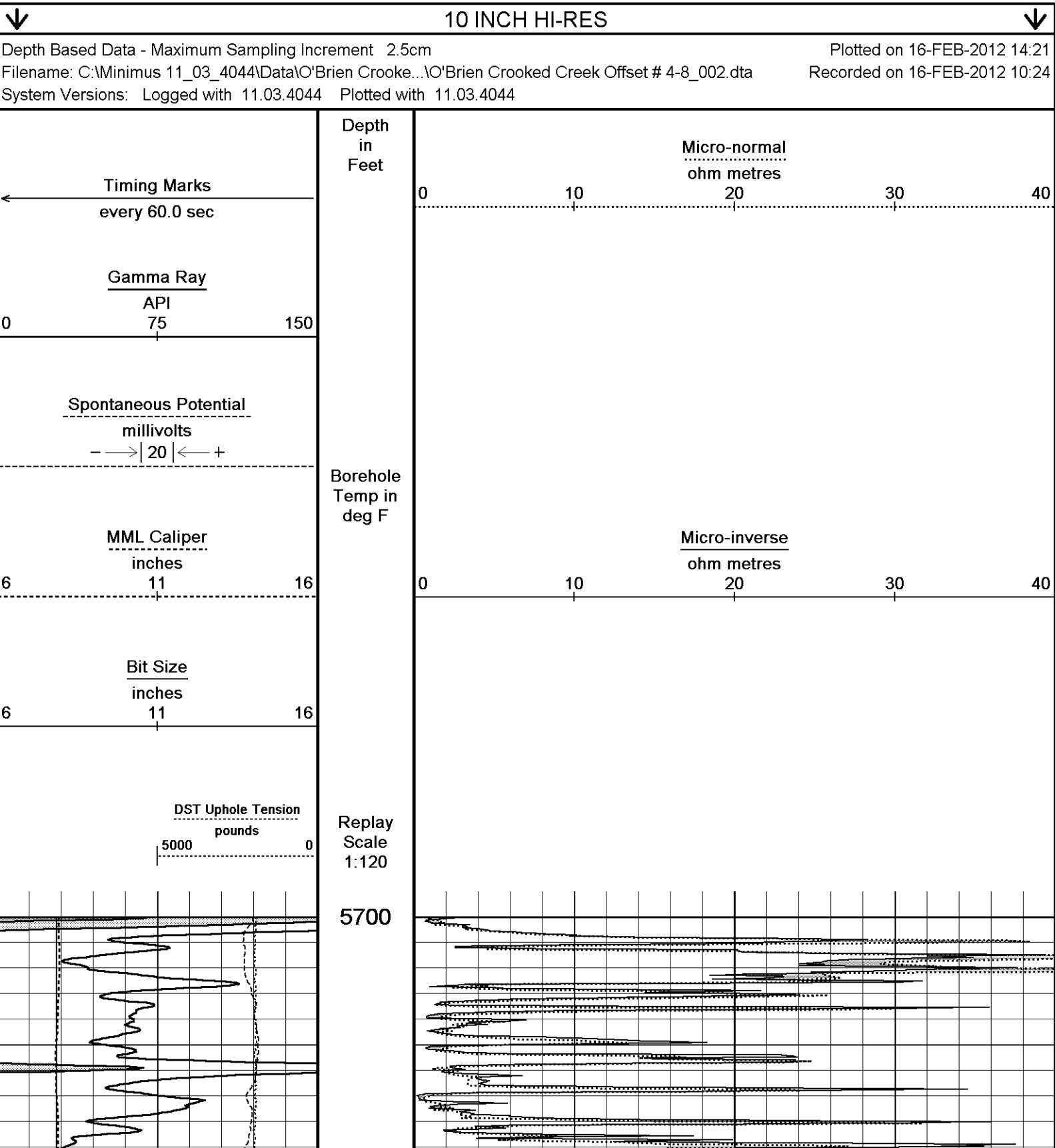
DST Uphole Tension
pounds

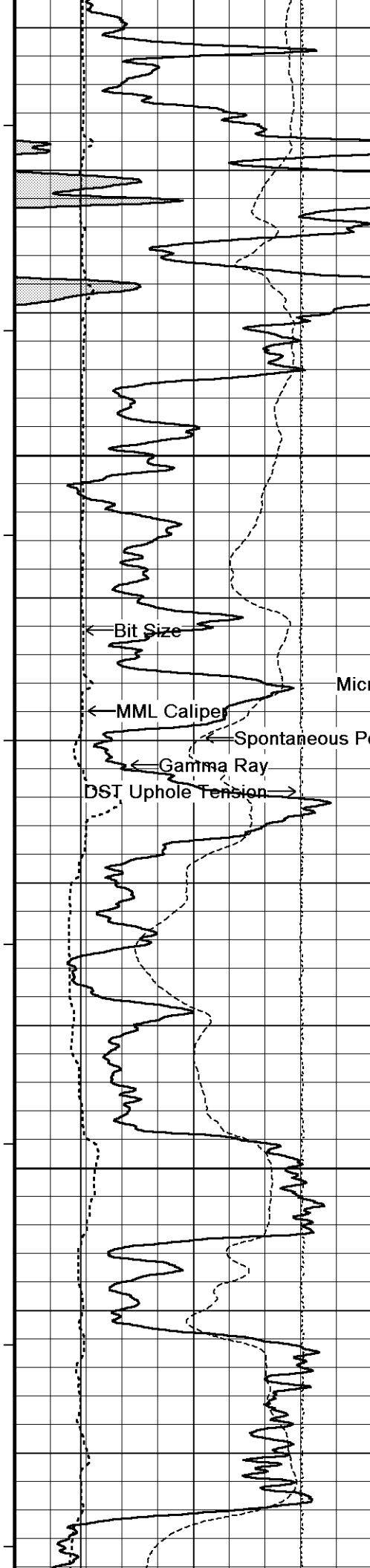
50000

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11_03_4044\Data\O'Brien Crooked Creek Offset # 4-8_004.dta
System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044

↑5 INCH MAIN↑





112°

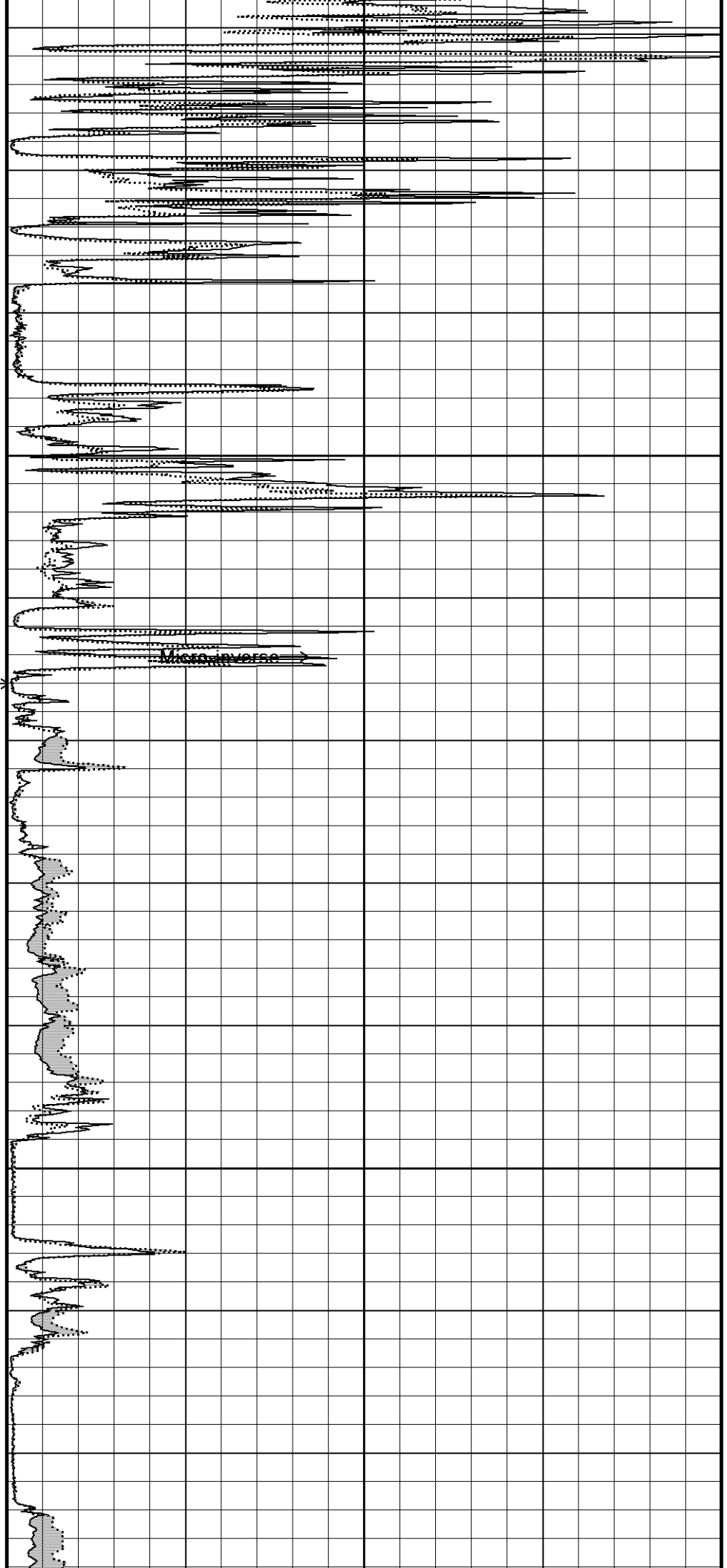
5750

← Bit Size
← MML Caliper
← Spontaneous Potential
← Gamma Ray
DST Uphole Tension →

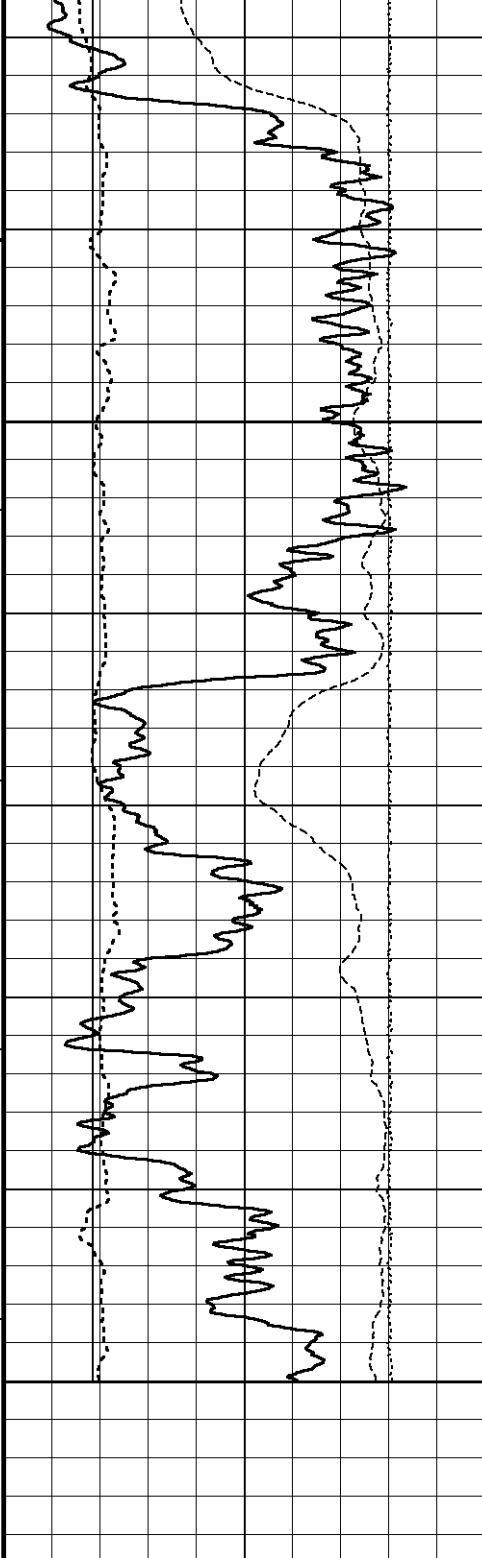
Micro-normal →

112°

5800



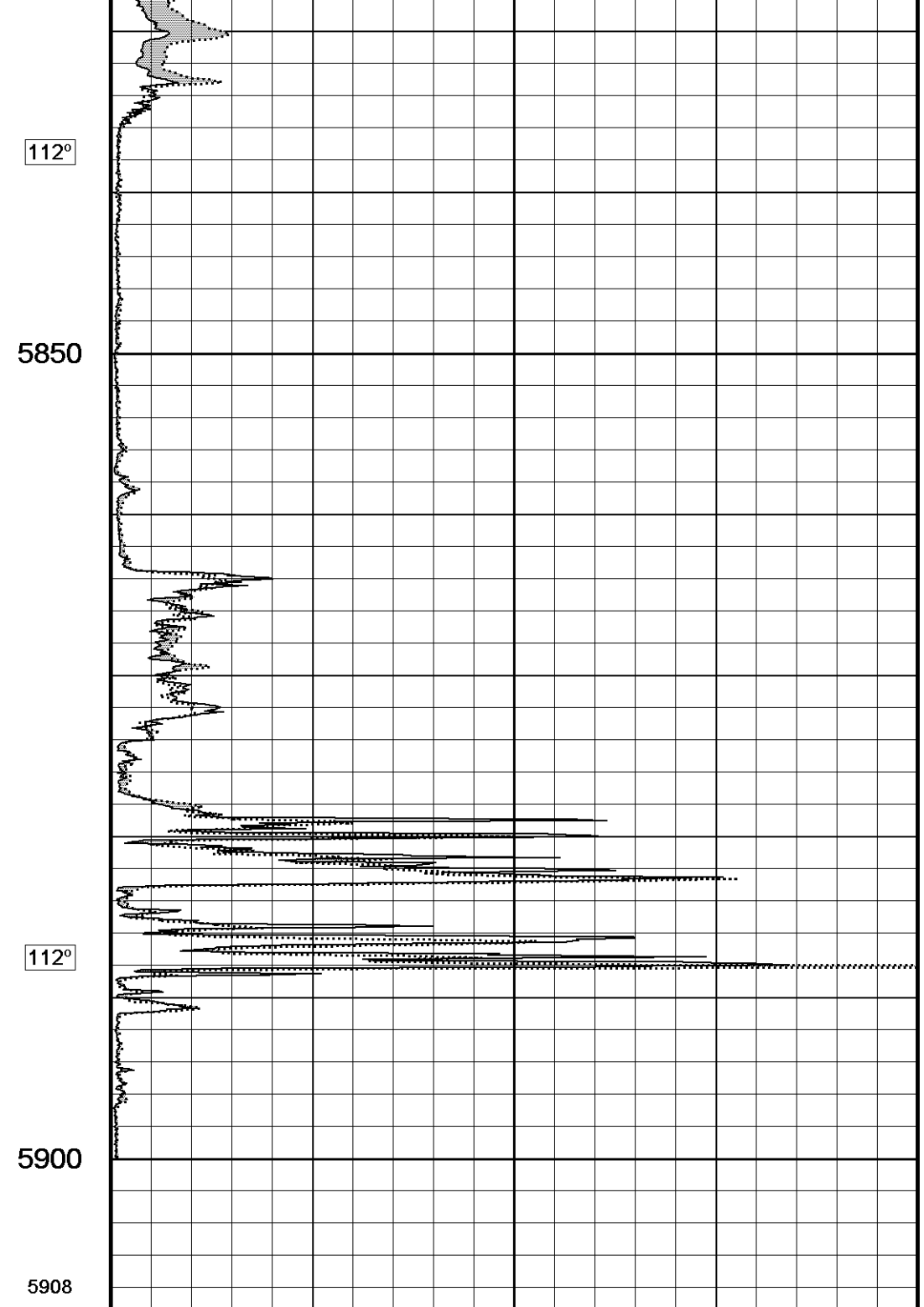
Micro-inverse →



Timing Marks
every 60.0 sec

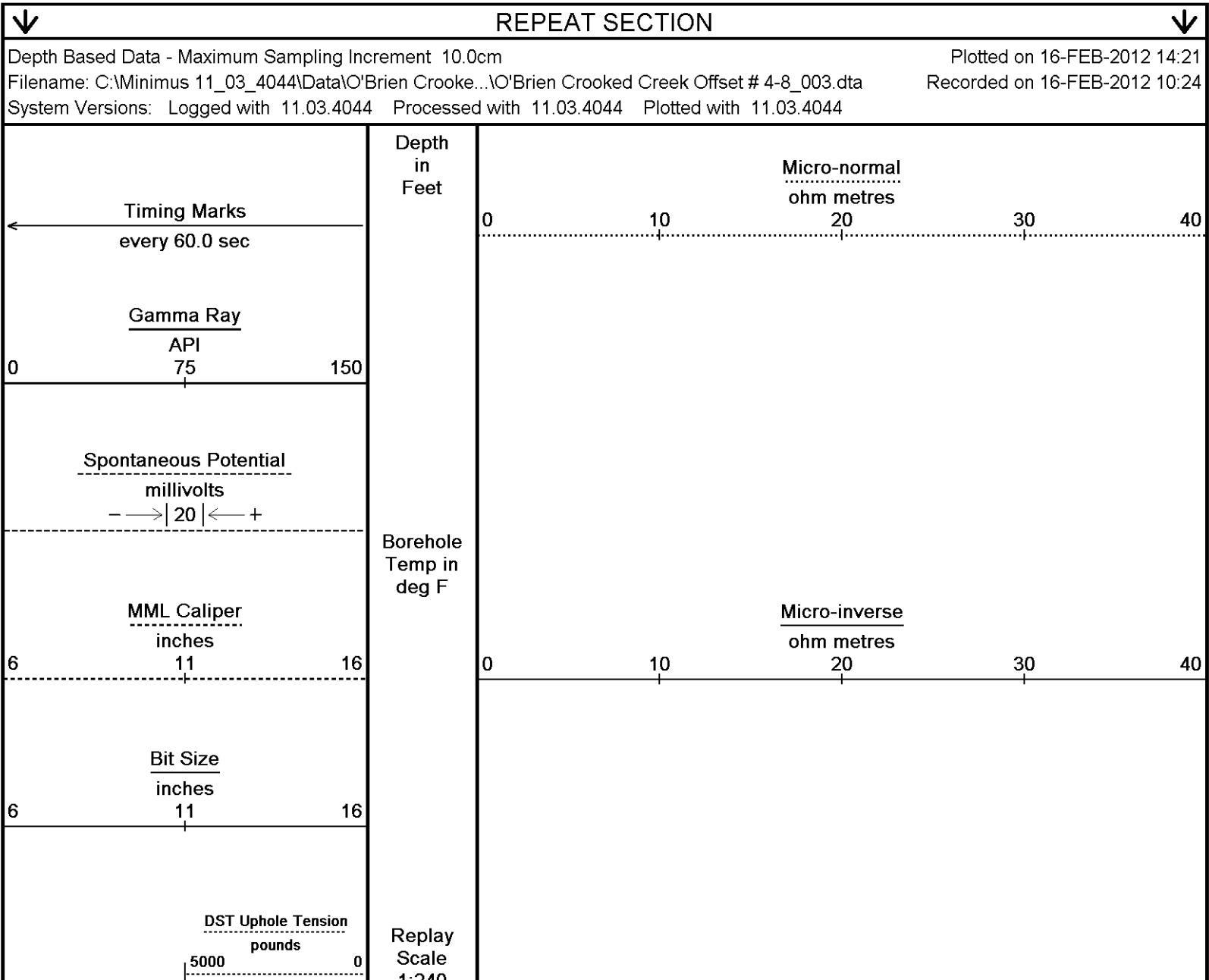
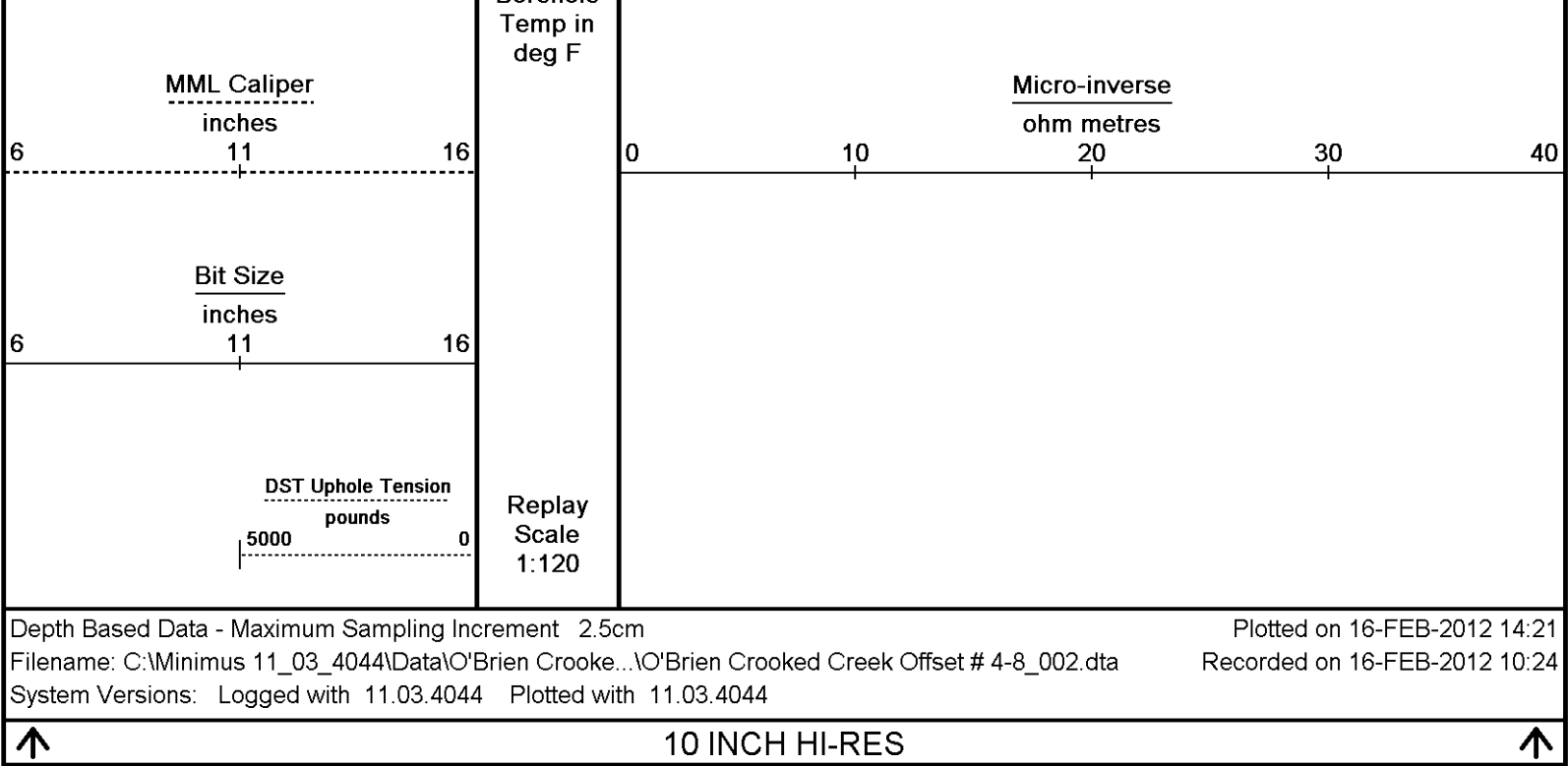
Gamma Ray
API
0 75 150

Spontaneous Potential
millivolts
- -> | 20 | <- +



Micro-normal
ohm metres
0 10 20 30 40

Borehole



1.240

5700

112°

5750

112°

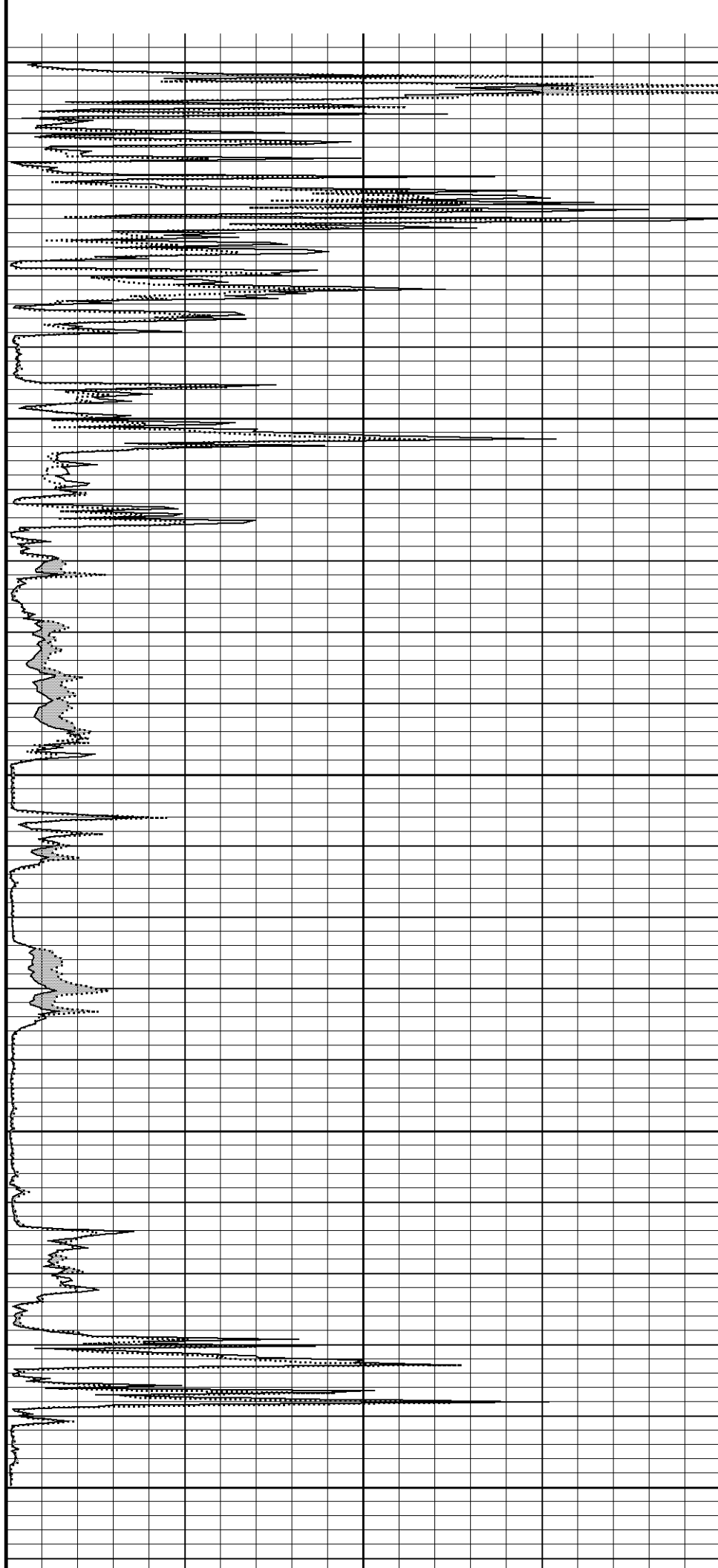
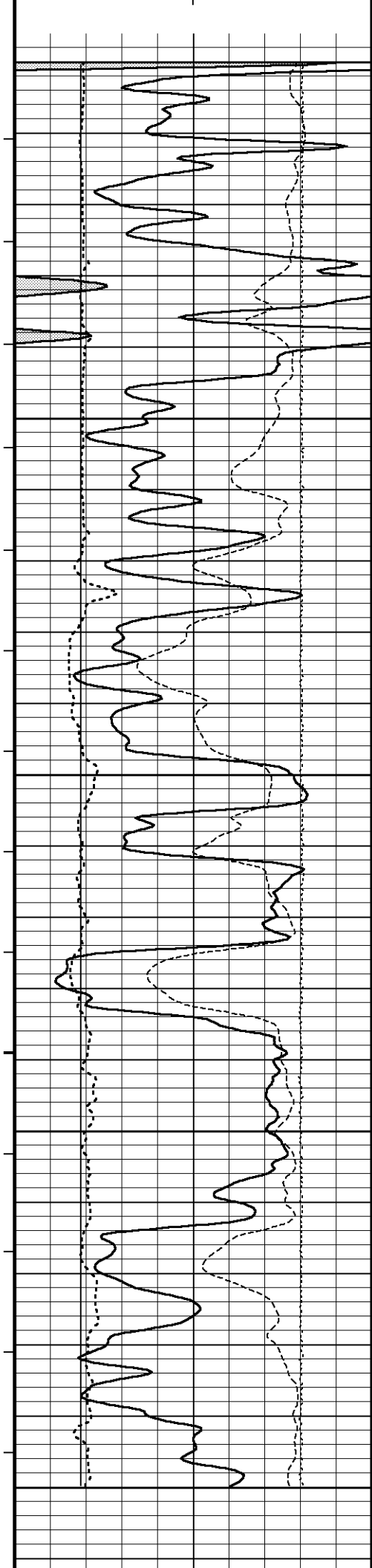
5800

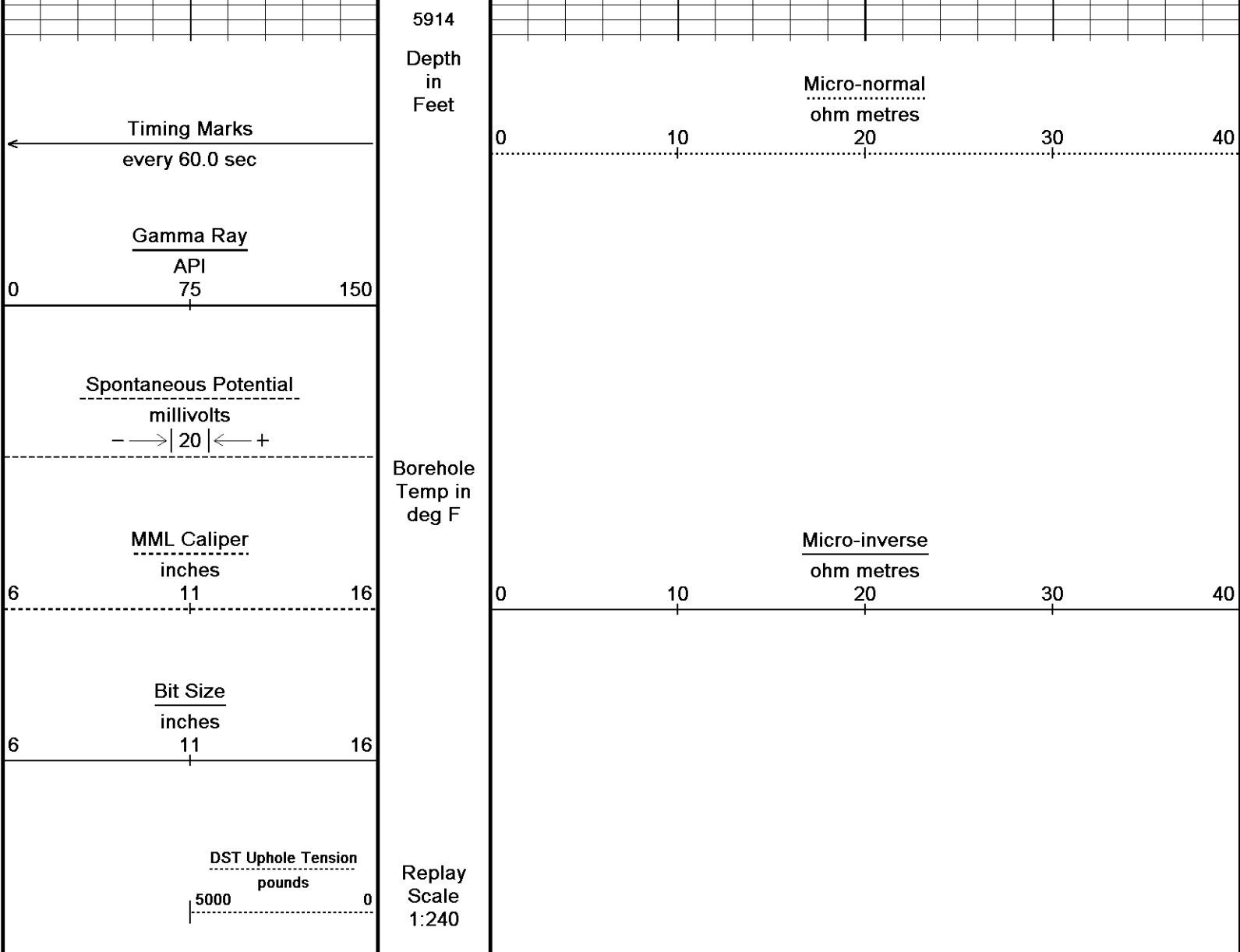
112°

5850

111°

5900





Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 16-FEB-2012 14:21

Filename: C:\Minimus 11_03_4044\Data\O'Brien Crooked Creek Offset # 4-8_003.dta

Recorded on 16-FEB-2012 10:24

System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044

↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 11_03_4044\Data\O'Brien Crooked Creek Offset # 4-8\O'Brien Crooked Creek Offset # 4-8_004.dta		
General Constants All 000		Last Edited on 16-FEB-2012,08:30
General Parameters		
Mud Resistivity	1.350	ohm-metres
Mud Resistivity Temperature	65.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	

Down-hole Tension Calibration SMS 0

Field Calibration on 23-OCT-2011 03:19

Reading No	Measured	Calibrated (lbs)
1	12734.06	0.00
2	13523.27	454.00

Gamma Calibration MCG-D.K 443

Field Calibration on 15-FEB-2012 09:28

	Measured	Calibrated (API)
Background	80	53
Calibrator (Gross)	765	509
Calibrator (Net)	685	456

Gamma Constants MCG-D.K 443

Last Edited on 16-FEB-2012,08:31

Gamma Calibrator Number	grc141	
Mud Density	1.08	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-D.K 443

Field Calibration on 01-FEB-2012 10:26

	Measured	Calibrated (mV)
Reference 1	100.9	100.0
Reference 2	-98.4	-100.0

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 12-JAN-2012,09:06

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 443

Last Edited on

Pre-filter Length	11
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Caliper Calibration MML-A 9

Base Calibration on 06-FEB-2012 09:52

Field Calibration on 15-FEB-2012 09:41

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	15071	5.98
2	18450	7.97
3	21808	9.86
4	25812	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Micro Normal and Micro Inverse Calibration MML-A 9

Base Calibration on 06-FEB-2012 09:39

Field Check on 15-FEB-2012 09:40

Base Calibration

		Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1 Resistor 2
Micro Normal	12.1	59.8	2.6 12.8
Micro Inverse	15.6	78.1	1.7 8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.4	32.4
Micro Inverse	16.4	16.4

Micro Normal and Micro Inverse Constants MML-A 9

Last Edited on 09-FEB-2012,13:46

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 39

Base Calibration on 04-JAN-2012 14:55

Field Check on 15-FEB-2012 09:24

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2756	86	3714	110
Ratio	32.152		33.764	

Field Calibrator at Base

	Calibrated (cps)
	2384 3432
Ratio	0.695

Field Check

	Calibrated (cps)
	2372 3438
Ratio	0.690

Neutron Constants MDN-A.B 39

Last Edited on 16-FEB-2012,08:31

Neutron Source Id	N-1095
Neutron Jig Number	NECD117
Epithermal Neutron	No
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
Formation Fluid Salinity Source	Constant Value
Formation Fluid Salinity	0.00 kppm
Barite Mud Correction	Not Applied

FE Calibration MFE-A.A 67

Base Calibration on 06-FEB-2012 10:02

Field Check on 15-FEB-2012 09:36

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	959.8	126.8
Base Check		280.8
Field Check		280.9

FE Constants MFE-A.A 67

Last Edited on 16-FEB-2012,08:32

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

Induction Calibration MAI-A.A 188

Base Calibration on 04-JAN-2012,13:31

Field Check on 15-FEB-2012 09:38

Base Calibration

Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel		Low	High	Low	High
1		16.9	470.2	9.3	966.2
2		6.4	377.1	7.6	821.4
3		3.9	257.8	5.2	566.0
4		1.7	135.1	2.6	279.2
Array Temperature		66.3		Deg F	

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	13.6	3865.9
2	0.0	0.0	29.9	3582.9
3	0.0	0.0	27.9	3077.3

4	0.0	0.0	19.7	2046.0	
Deep	0.0	0.0	17.2	1954.4	
Medium	0.0	0.0	40.2	4112.7	
Shallow	0.0	0.0	44.6	5366.5	
Array Temperature		0.0		68.9	Deg F
Induction Constants MAI-A.A 188			Last Edited on 16-FEB-2012,08:32		
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 188			Field Calibration on 12-AUG-2011,21:41		
	Measured	Calibrated(Deg F)			
Lower	32.00	32.00			
Upper	68.00	68.00			
High Resolution Temperature Constants MAI-A.A 188			Last Edited on 21-JUN-2011,19:05		
Pre-filter Length		11			
Caliper Calibration MPD-B 65			Base Calibration on 06-FEB-2012 15:42 Field Calibration on 15-FEB-2012 09:35		
Base Calibration					
Reading No	Measured	Calibrator Size (in)			
1	14246	3.99			
2	22911	5.98			
3	31473	7.97			
4	39776	9.86			
5	48992	11.92			
6	N/A	N/A			
Field Calibration					
	Measured Caliper (in)	Actual Caliper (in)			
	5.95	5.98			

Density Calibration

Base Calibration

Measured

Calibrated (sdu)

	Near	Far	Near	Far
Reference 1	58421	27705	59556	30836
Reference 2	23654	2410	24941	2541

Field Check at Base

1233.9 1179.6

Field Check

1227.5 1177.2

PE Calibration

Base Calibration

Measured

Calibrated

	WS	WH	Ratio	Ratio
Background	226	1097		
Reference 1	21385	58213	0.370	0.371
Reference 2	6241	23505	0.268	0.272

Field Check at Base

225.7 1097.3

Field Check

223.2 1088.1

Density Constants MPD-B 65

Last Edited on 16-FEB-2012,08:32

Density Source Id	P57072B	
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	1.08	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)	Depth (ft)	
2.71	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	

DOWNHOLE EQUIPMENT

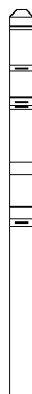
C:\Minimus 11_03_4044\Data\O'Brien Crooked Creek Offset # 4-8\O'Brien Crooked Creek Offset # 4-8_004.dta

MCB-A 11B Tension Cablehead
MCB-A 162 LG: 2.18 ft WT: 19.8 lb OD: 2.24 in

MCB-A 11B Tension Cablehead
MCB-A 162 LG: 2.18 ft WT: 19.8 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 88 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 88 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in



Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

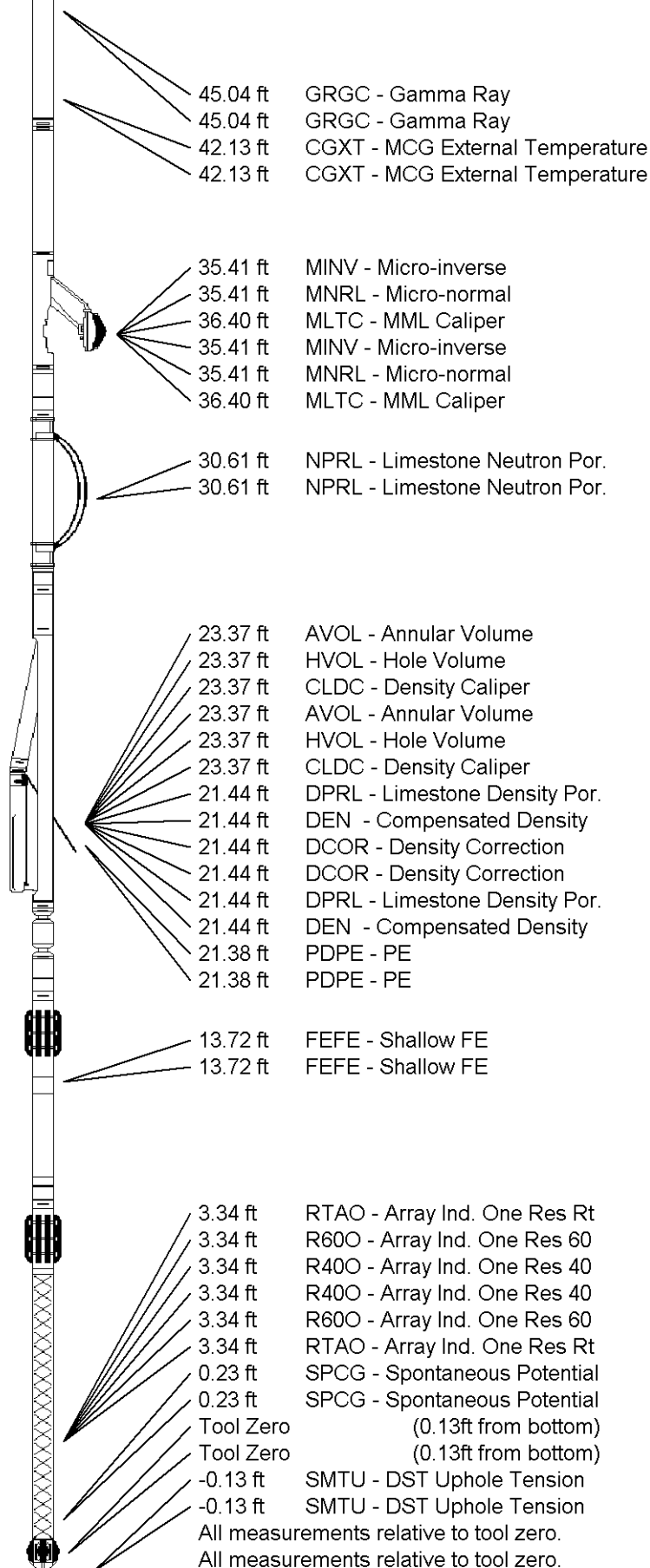
Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 55.24 ft Weight: 454.2 lb

Total Length: 55.24 ft Weight: 454.2 lb



COMPANY
WELL
FIELD
PROVINCE/COUNTY

O'BRIEN ENERGY RESOURCES CORP.
CROOKED CREEK OFFSET # 4-8
ANGELL SOUTH
MEADE

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

Elevation Kelly Bushing	2656.00	feet	First Reading	6287.00	feet
Elevation Drill Floor	2654.00	feet	Depth Driller	6323.00	feet
Elevation Ground Level	2644.00	feet	Depth Logger	6323.00	feet



Weatherford®

MICRORESISTIVITY LOG

