



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY **SHAKESPEARE OIL COMPANY, INC.**
 WELL **ZERR TRUST #3-23**
 FIELD **WILDCAT**
 PROVINCE/COUNTY **GOVE**
 COUNTRY/STATE **U.S.A. / KANSAS**
 LOCATION **335' FSL & 1500' FWL**
NW SW SE SW

SEC 23	TWP 13S	RGE 31W	Other Services MPD/MDN MAI/MFE MSS	Elevations: KB 2874.00 DF 2872.00 GL 2864.00
API Number	15-063-22016	Permit Number	MSS	
Permanent Datum G.L., Elevation 2864 feet				
Log Measured From KB				
Drilling Measured From K.B.				
Date	29-JUL-2012			
Run Number	ONE			
Depth Driller	4630.00	feet		
Depth Logger	4632.00	feet		
First Reading	4586.00	feet		
Last Reading	3600.00	feet		
Casing Driller	251.00	feet		
Casing Logger	251.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.40 g/cc	56.00 CP		
PH / Fluid Loss	10.50	8.80 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.58 @ 93.0	ohm-m		
Rmf @ Measured Temp	0.46 @ 93.0	ohm-m		
Rmc @ Measured Temp	0.70 @ 93.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.45 @ 121.0	ohm-m		
Time Since Circulation	3 HOURS			
Max Recorded Temp	121.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13057	LIB		
Recorded By	L. SCOTT			
Witnessed By	TIM PRIEST			
S.O. / JOB #	3534564			LB12-193

BOREHOLE RECORD

Last Edited: 29-JUL-2012 11:10

Bit Size inches	Depth From feet	Depth To feet
7.875	251.00	4632.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	251.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MSS, MAI.
 Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE, MSS and MAI 0.5 inch standoffs used.
 2.71 g/cc Limestone Density Matrix used to calculate porosity.
 Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
 All intervals logged and scaled per customer's request.
 Tight pulls, washouts and borehole rugosity will affect data quality.
 Annular volume with 4.5 inch production casing= 258 cu. ft.
 Total hole volume from TD to Surface casing= 1900 cu. ft.
 Service order: #3534564
 Rig: HD Drilling #2
 Engineer: L. Scott
 Operator(s): K. Rinehart, J. LaPoint

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.

5 INCH MAIN

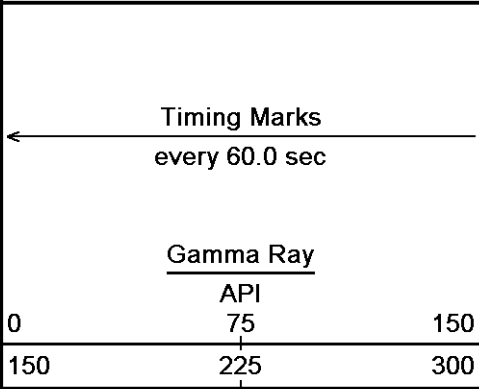
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Plotted on 29-JUL-2012 12:12

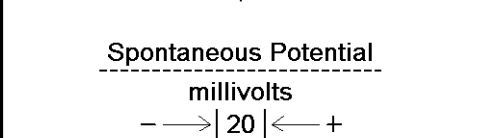
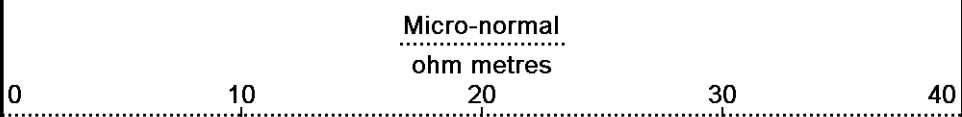
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Recorded on 29-JUL-2012 09:36

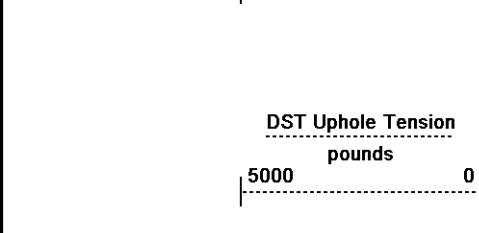
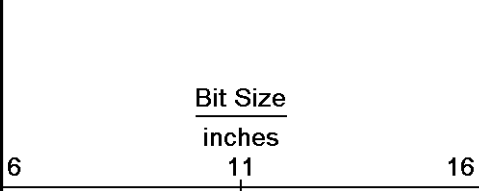
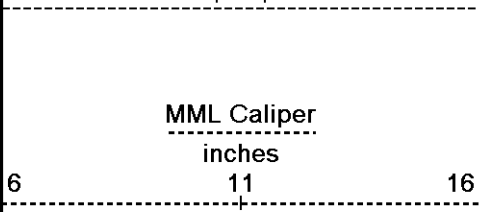
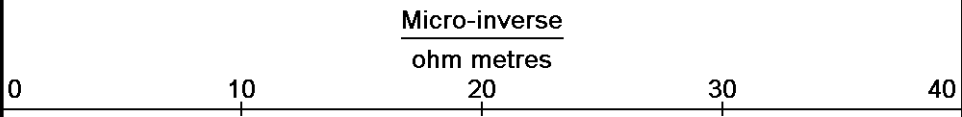
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600



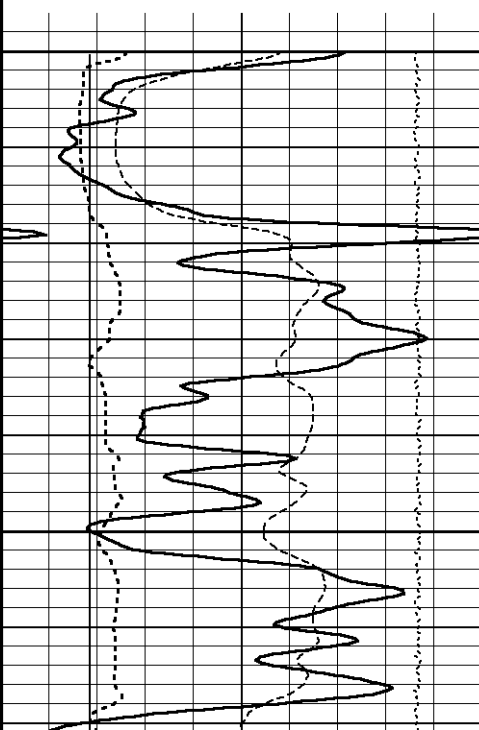
Depth in Feet



Borehole Temp in deg F



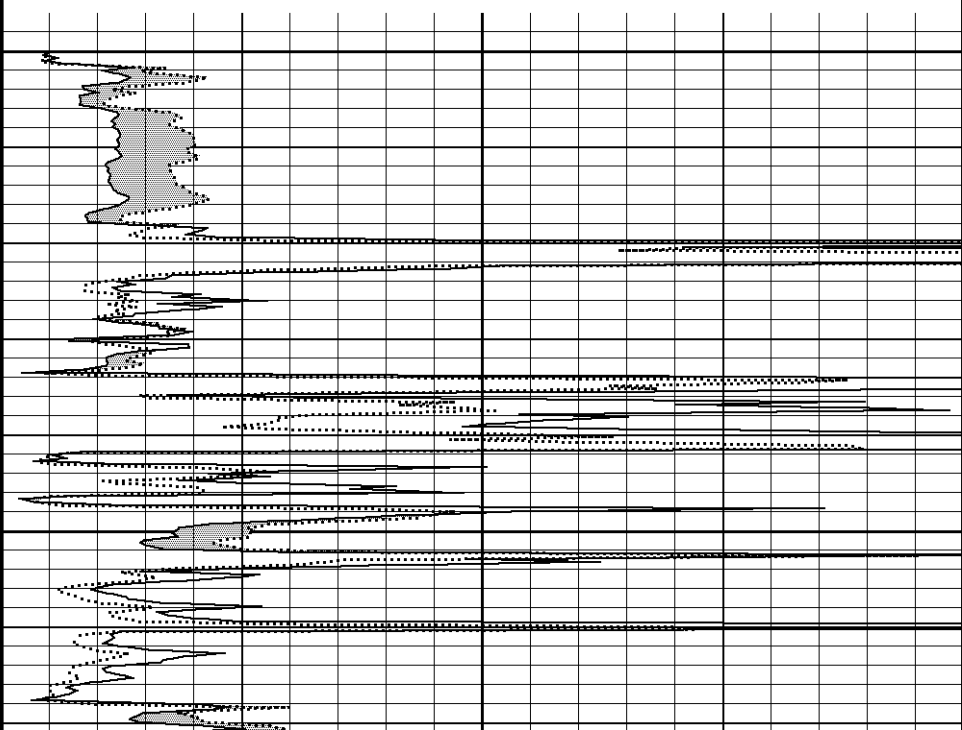
Replay Scale 1:240

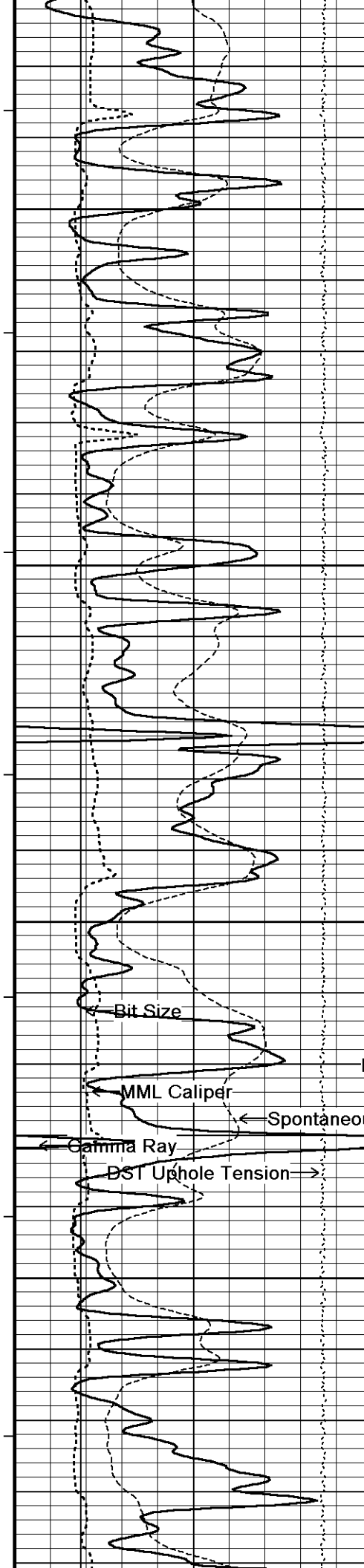


3600

115°

3650





116°

3700

116°

3750

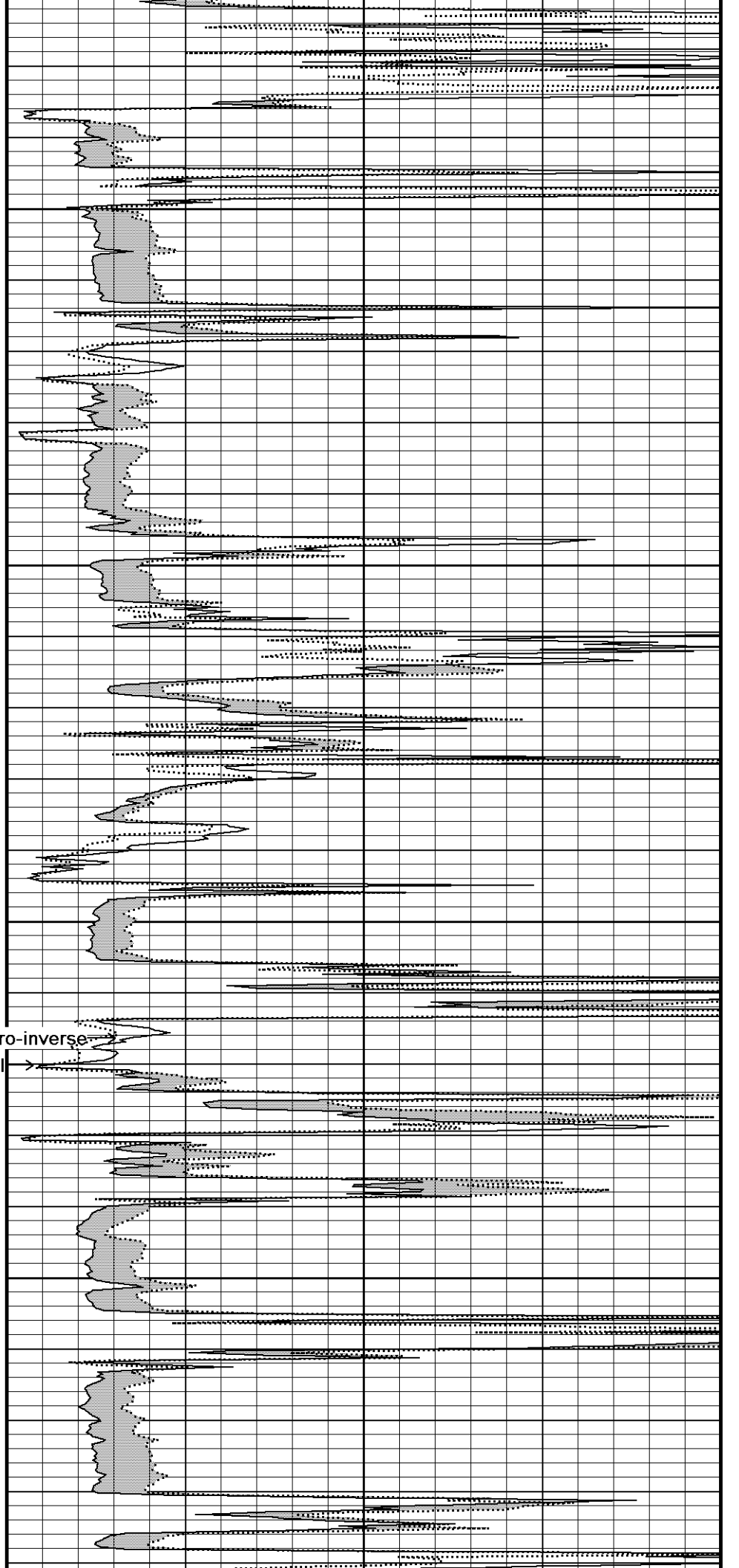
116°

3800

116°

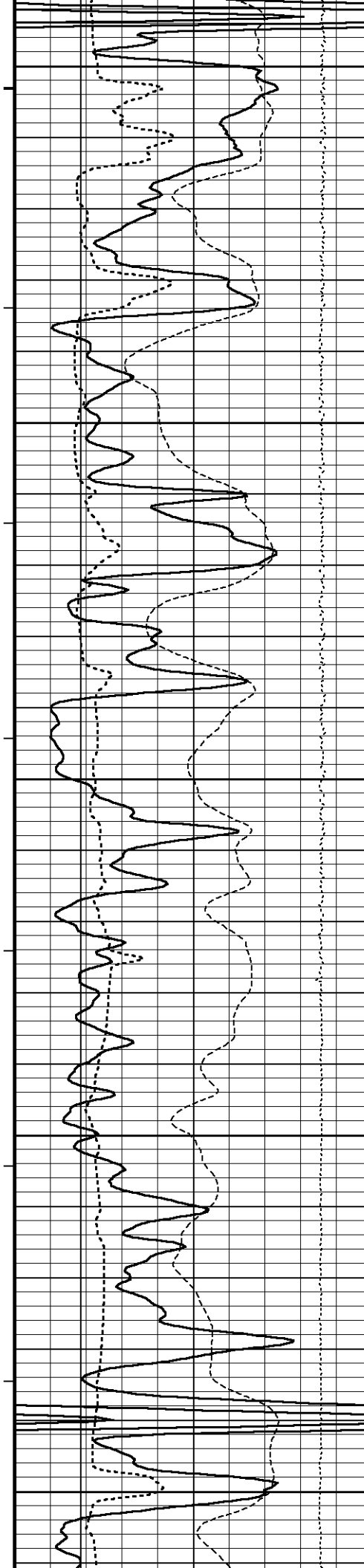
3850

117°



Micro-inverse

Micro-normal



3900

117°

3950

117°

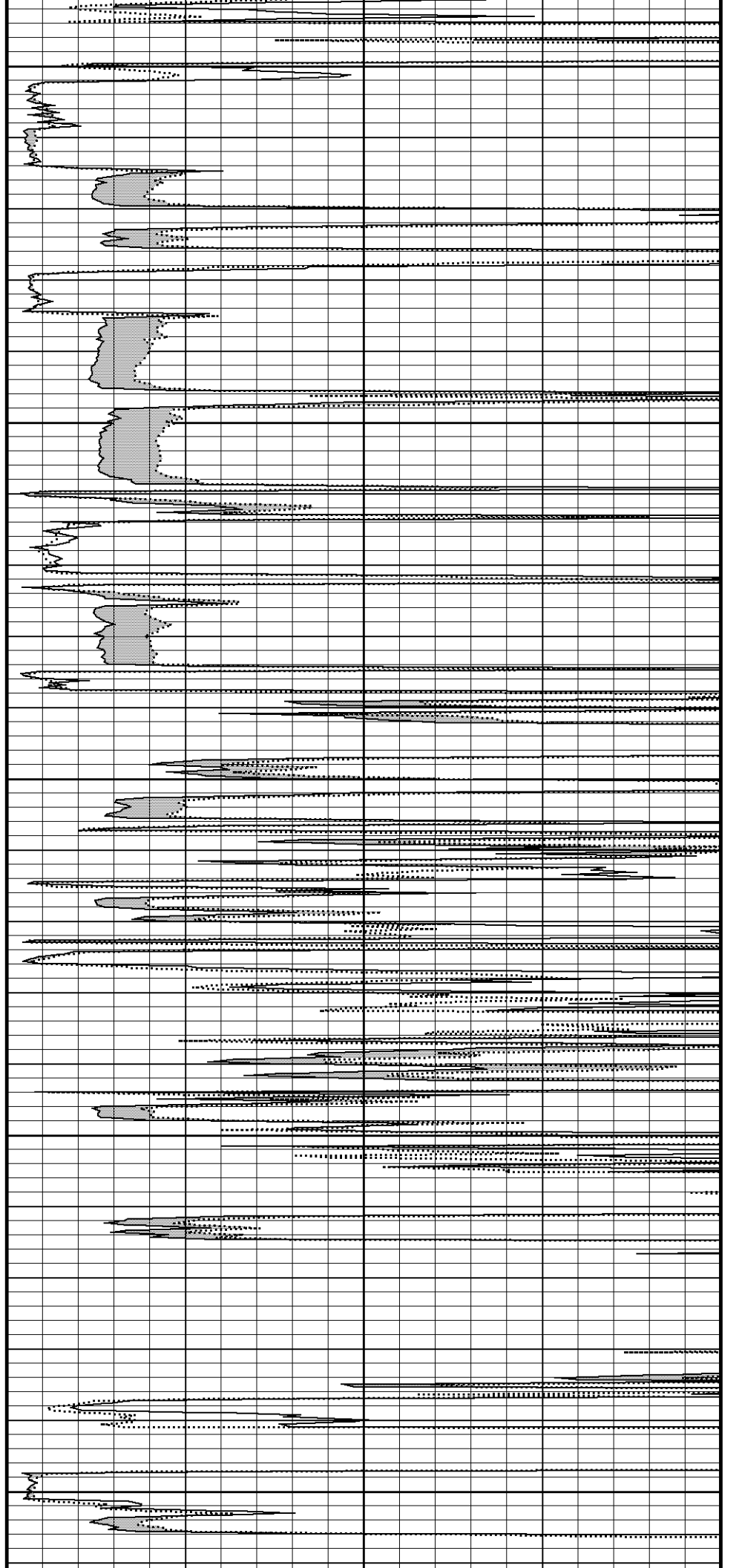
4000

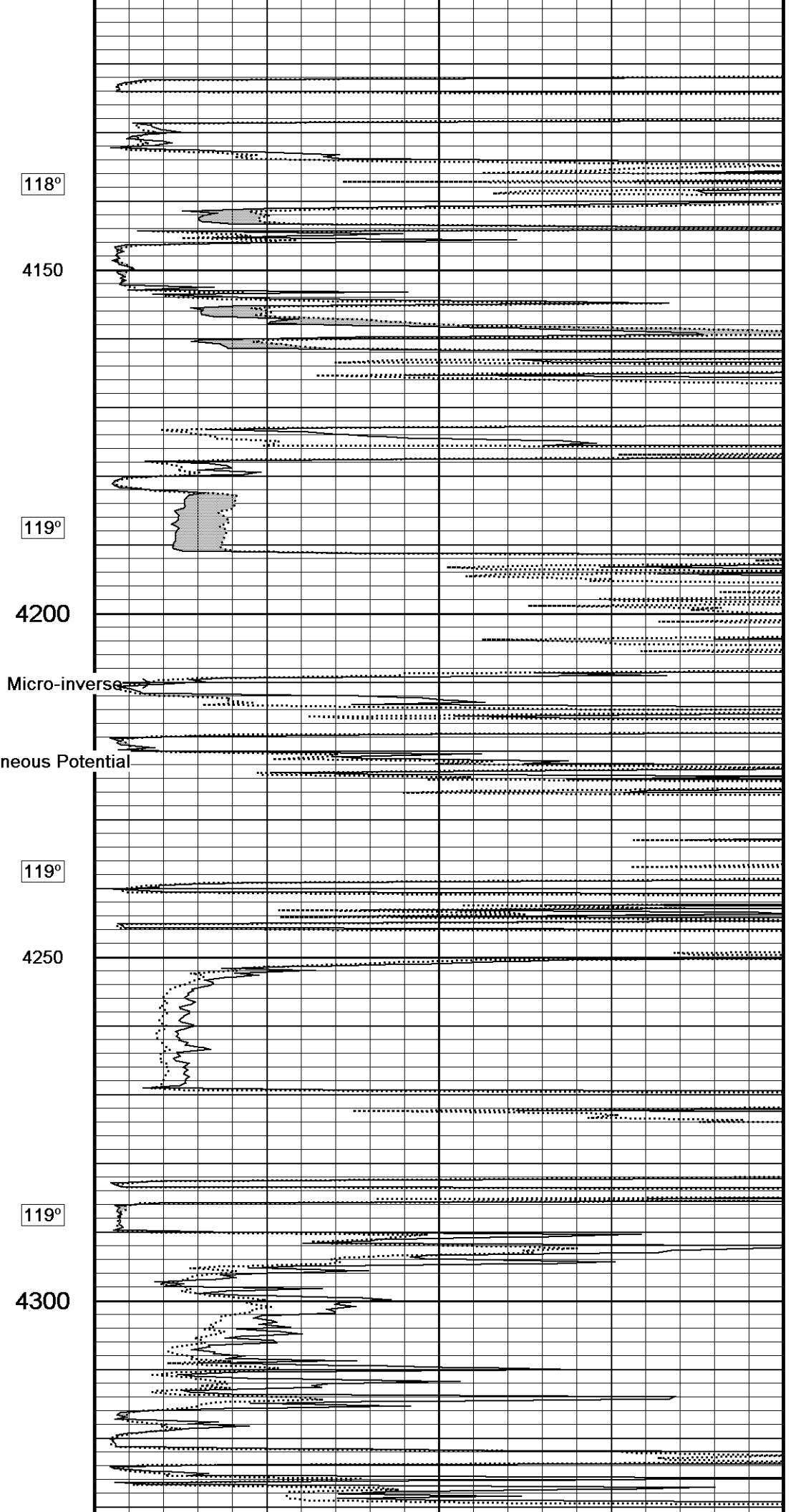
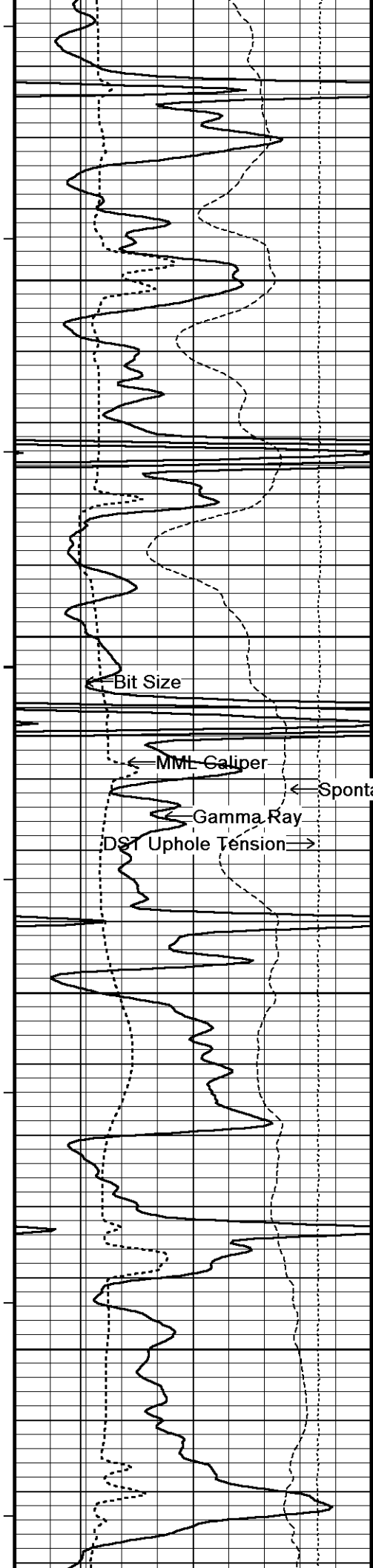
118°

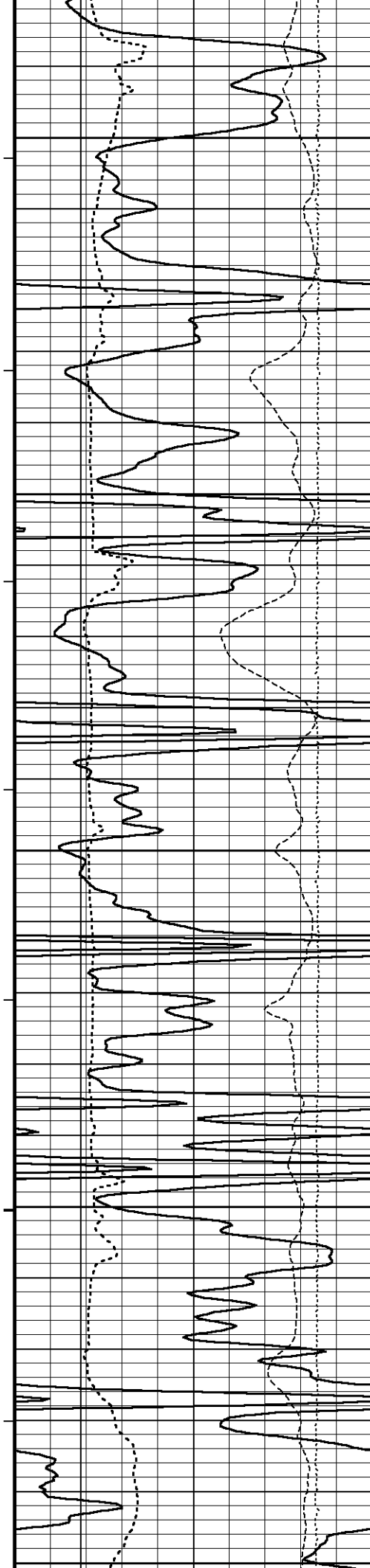
4050

118°

4100







120°

4350

120°

4400

121°

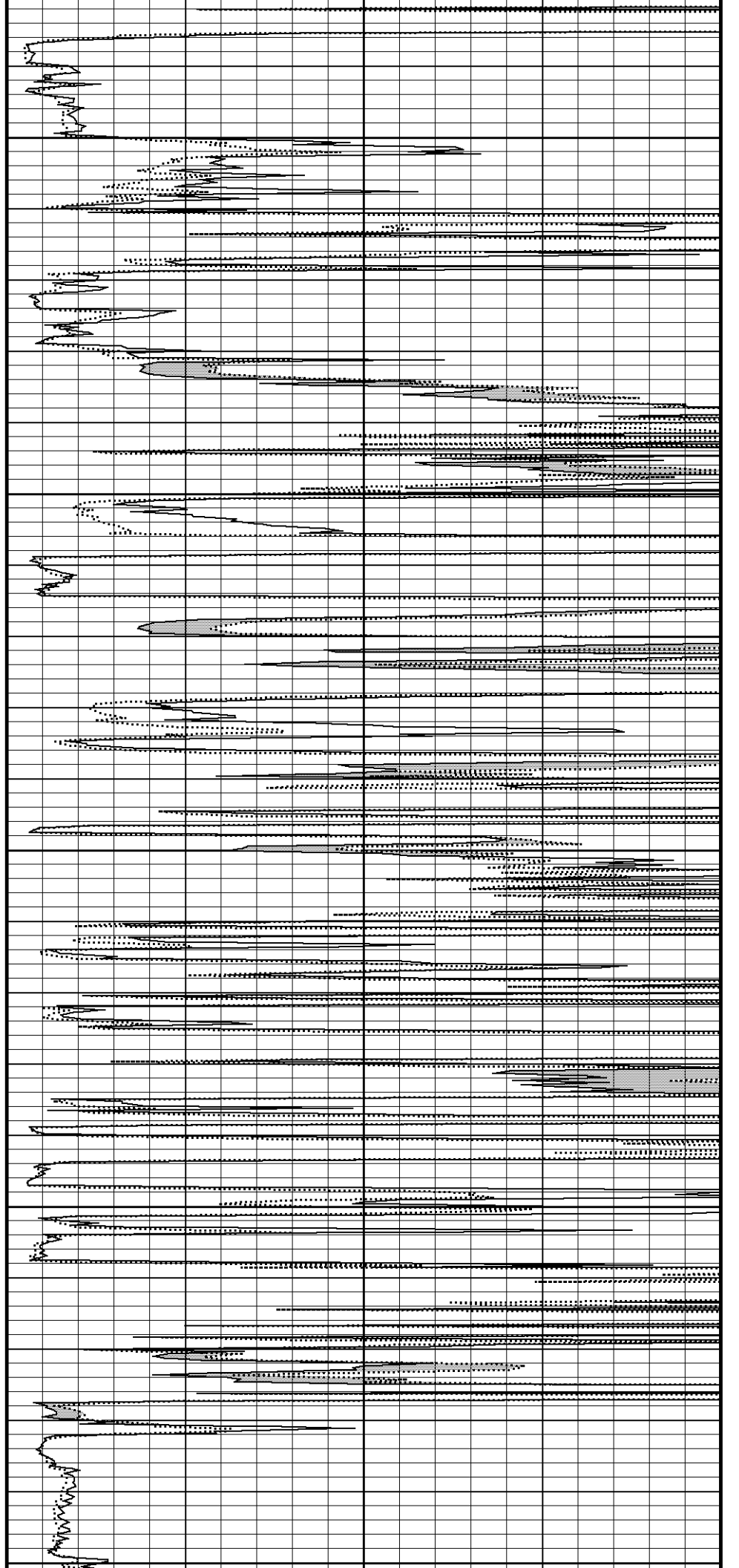
4450

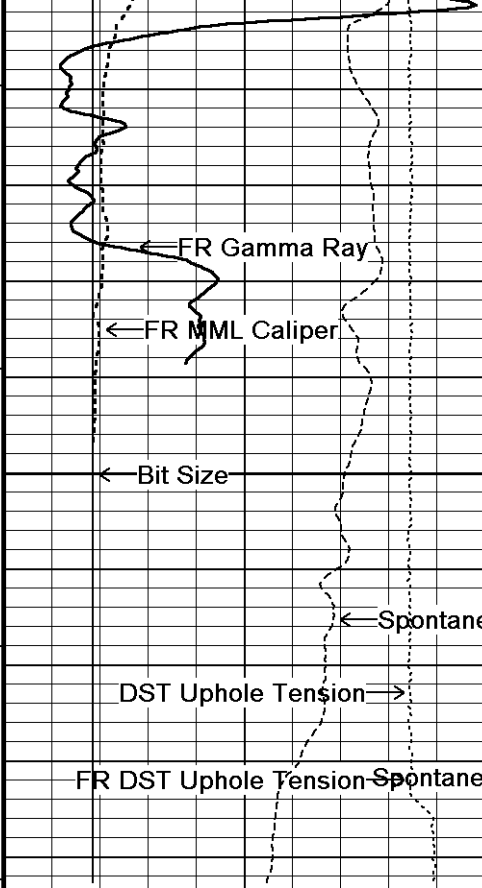
121°

4500

122°

4550





121°

4600

4650

4660

Depth in Feet

Timing Marks every 60.0 sec

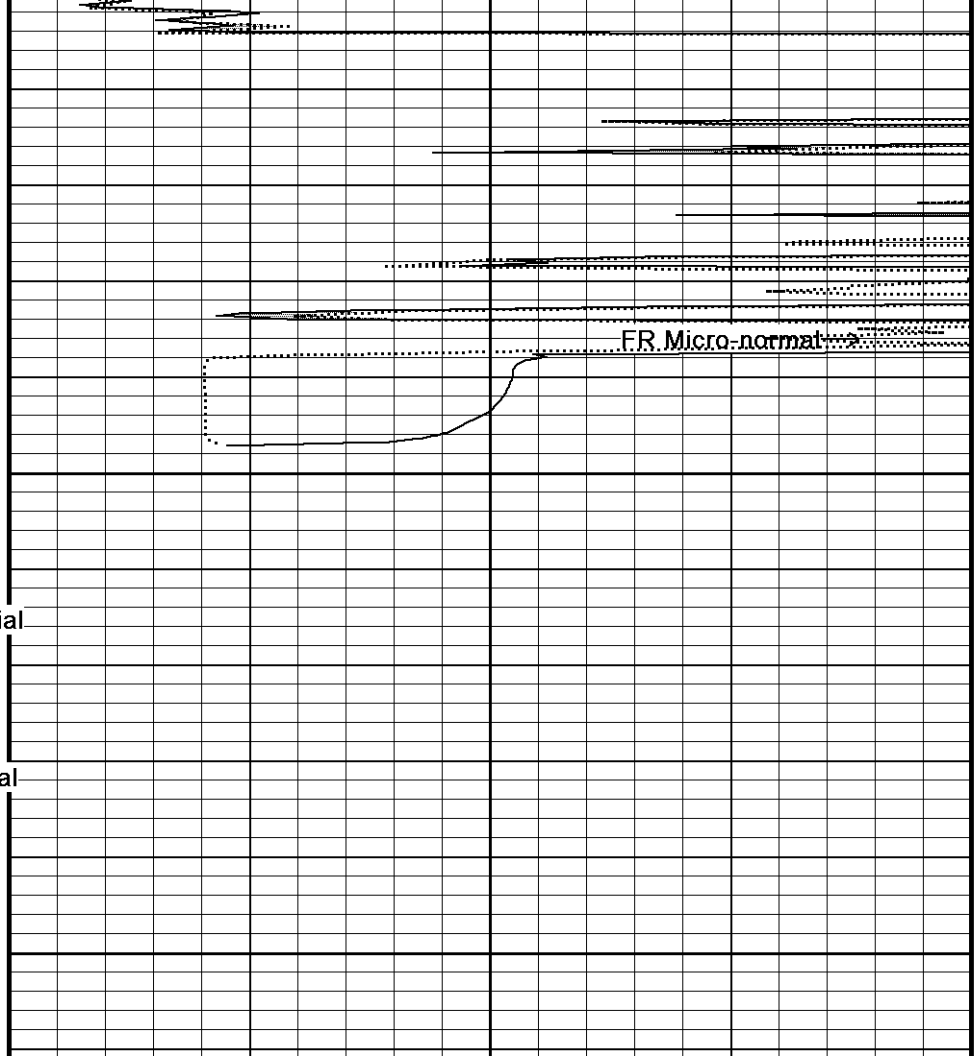
Gamma Ray
API
0 75 150
150 225 300

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

MML Caliper
inches
6 11 16

Bit Size
inches
6 11 16

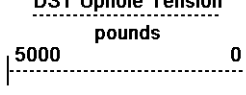
DST Uphole Tension



0 10 20 30 40

0 10 20 30 40

Borehole Temp in deg F



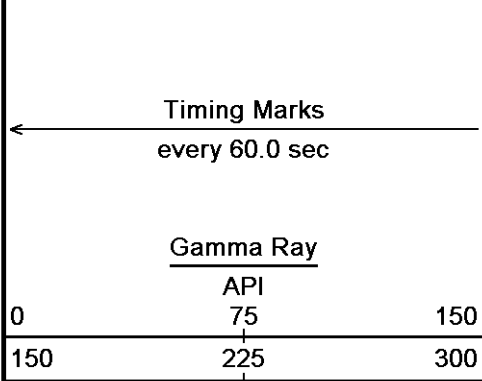
Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 29-JUL-2012 12:12
 Filename: C:\Minimus 13.02.6600\Data\Shakespeare Zerr Tru...\Shakespeare Zerr Trust #3-23_002.dta
 Recorded on 29-JUL-2012 09:36
 System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

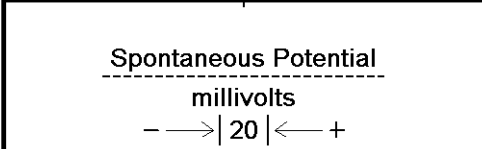
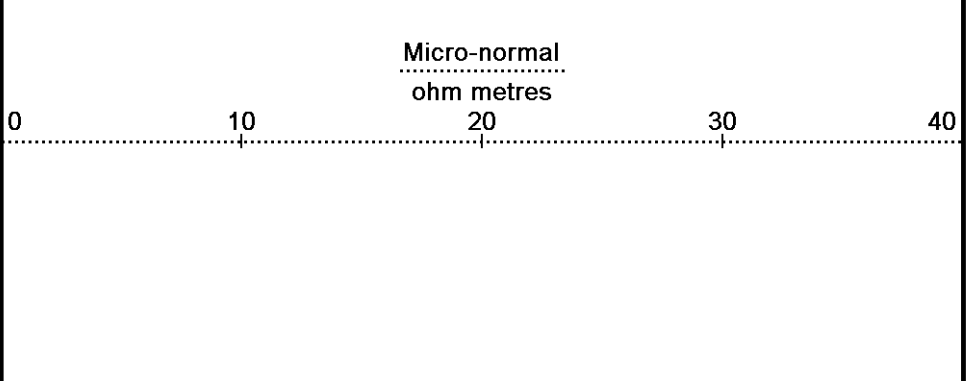
↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

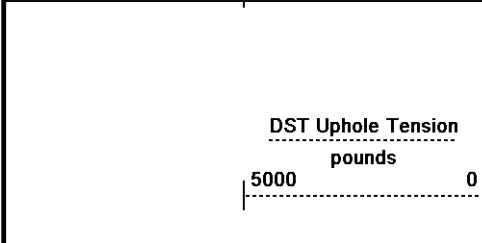
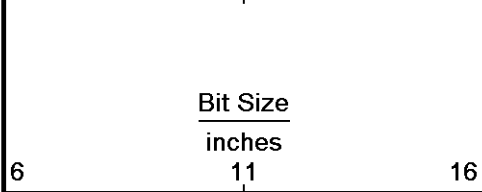
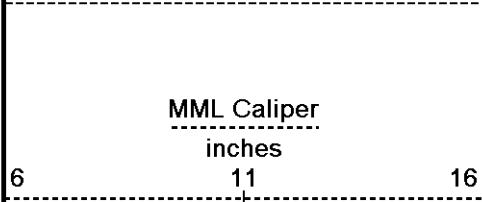
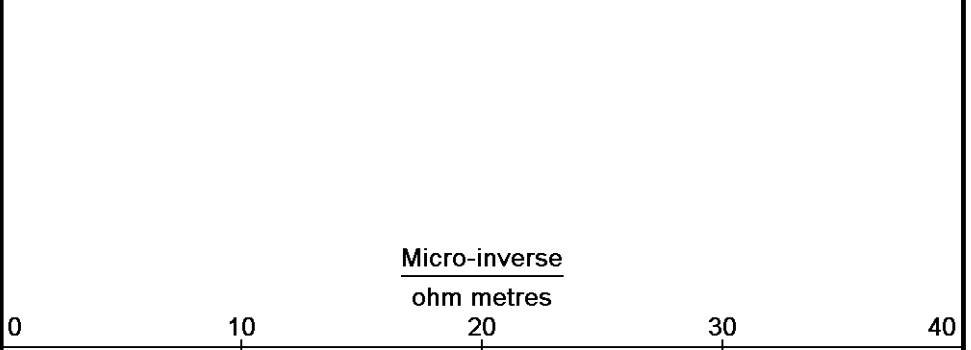
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 29-JUL-2012 12:12
 Filename: C:\Minimus 13.02.6600\Data\Shakespeare Zerr Tru...\Shakespeare Zerr Trust #3-23_001.dta
 Recorded on 29-JUL-2012 09:09
 System Versions: Logged with 13.02.6600 Plotted with 13.02.6600



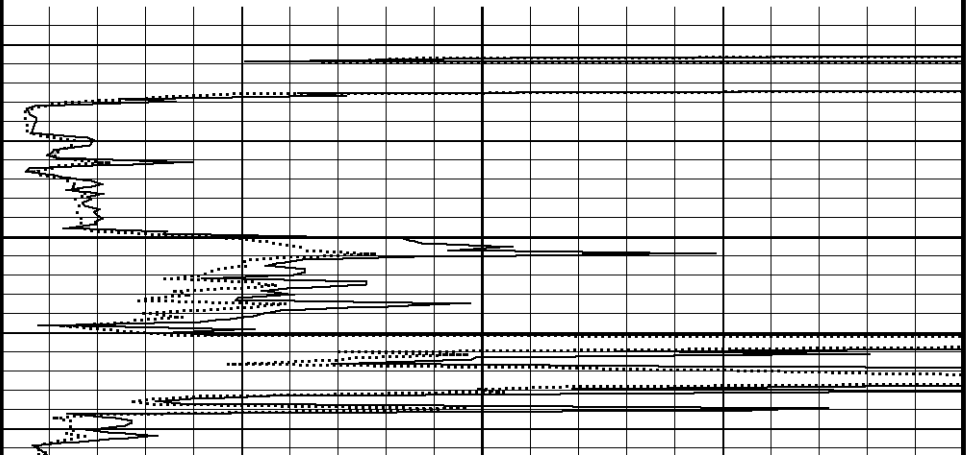
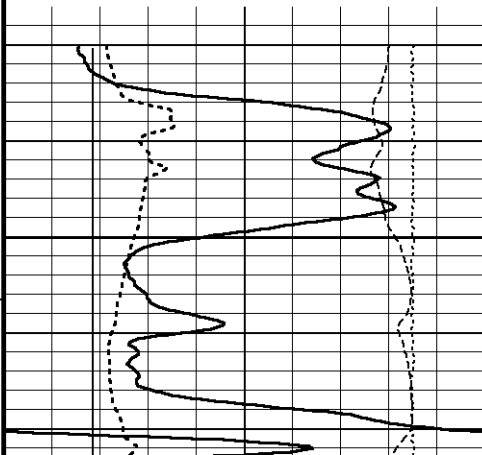
Depth
in
Feet

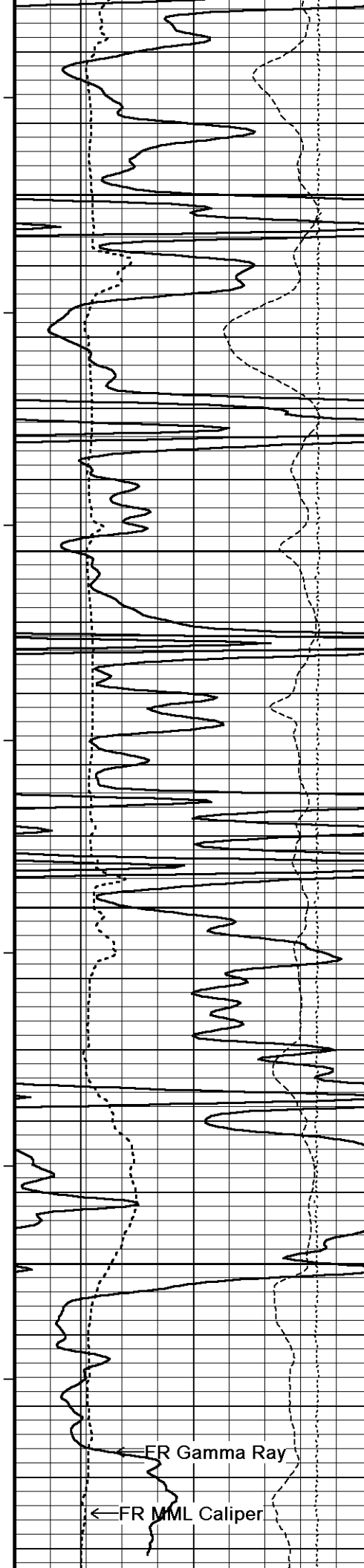


Borehole
Temp in
deg F



Replay
Scale
1:240





119°

4400

120°

4450

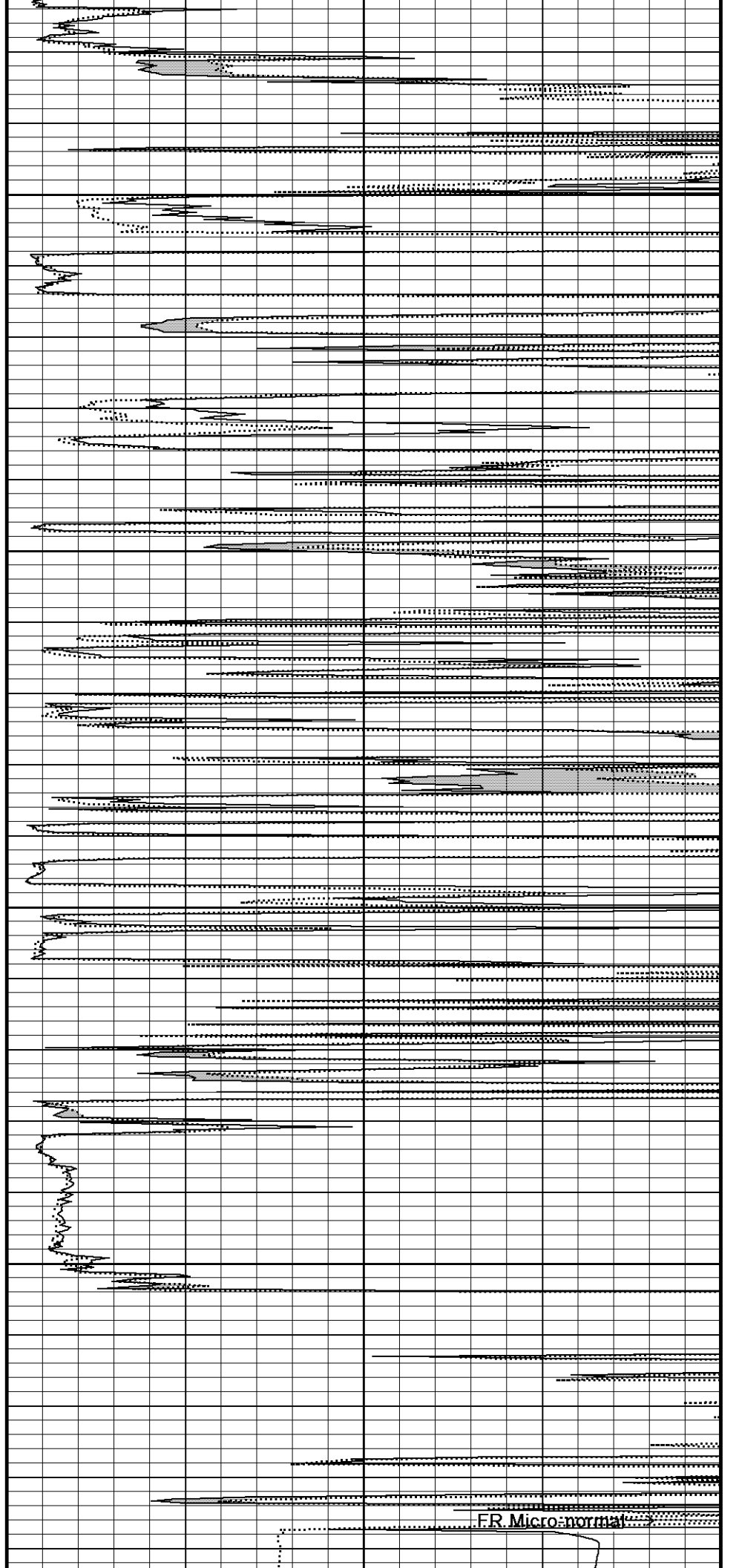
120°

4500

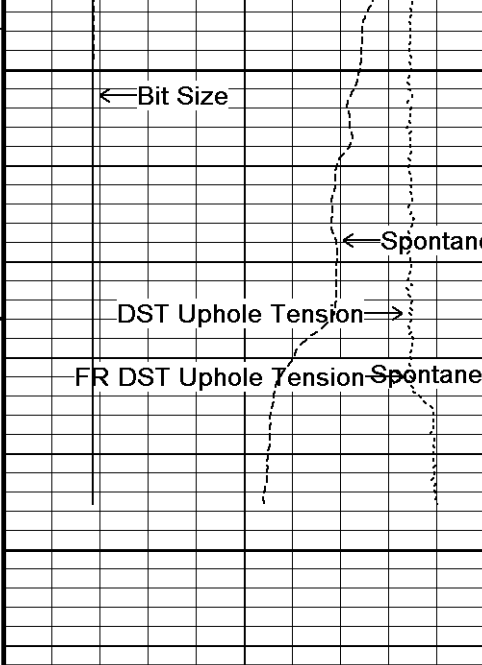
120°

4550

119°



FR Micro-normal



4600

4650

4660

Depth in Feet

Timing Marks every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

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

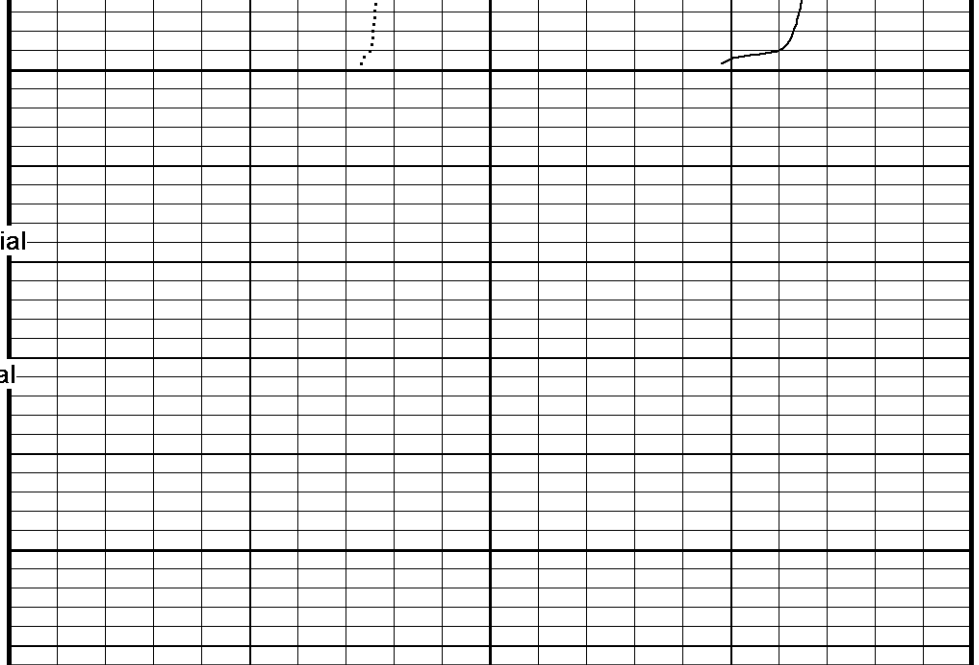
MML Caliper inches
6 11 16

Bit Size inches
6 11 16

DST Uphole Tension pounds
5000 0

Borehole Temp in deg F

Replay Scale 1:240



0 10 20 30 40

0 10 20 30 40

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 29-JUL-2012 12:12
 Filename: C:\Minimus 13.02.6600\Data\Shakespeare Zerr Tru...\Shakespeare Zerr Trust #3-23_001.dta Recorded on 29-JUL-2012 09:09
 System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

General Constants All 000

Last Edited on 29-JUL-2012,07:18

General Parameters

Mud Resistivity	0.580	ohm-metres
Mud Resistivity Temperature	93.000	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. Four Res Rt
RWA Constant A	0.610
RWA Constant M	2.150

Gamma Calibration MCG-C 84

Field Calibration on 29-JUL-2012 02:56

	Measured	Calibrated (API)
Background	71	48
Calibrator (Gross)	1147	773
Calibrator (Net)	1075	725

Gamma Constants MCG-C 84

Last Edited on 29-JUL-2012,07:13

Gamma Calibrator Number	GR38	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-C 84

Field Calibration on 24-JUL-2012,09:07

	Measured	Calibrated (mV)
Reference 1	105.6	101.0
Reference 2	-96.1	-101.0

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 23-JUL-2012,09:56

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-C 84

Last Edited on 23-JUL-2012,09:56

Pre-filter Length	11
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Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 24-JUL-2012 08:59

Field Check on 26-JUL-2012 13:26

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.7	78.4	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	62.9	62.9
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 29-JUL-2012,07:14

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159
Micro Normal K Factor	1.0000
Micro Inverse K Factor	1.0000
Standoff Offset	N/A inches

Caliper Calibration MML-A 4

Base Calibration on 24-JUL-2012 08:53

Field Calibration on 26-JUL-2012 13:26

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15504	5.98
2	18771	7.97
3	22124	9.86
4	25894	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.96	5.98

Neutron Calibration MDN-A.B 65

Base Calibration on 26-JUL-2012 11:25
Field Check on 29-JUL-2012 03:01

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3179	99	3714	110
Ratio	32.263		33.764	

Field Calibrator at Base

	Calibrated (cps)
	1621 2347
Ratio	0.691

Field Check

	Calibrated (cps)
	1622 2345
Ratio	0.692

Neutron Constants MDN-A.B 65

Last Edited on 29-JUL-2012,07:14

Neutron Source Id	PN-521	
Neutron Jig Number	5824NE	
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	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 55

Base Calibration on 24-JUL-2012 09:23
Field Check on 29-JUL-2012 02:44

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	968.0	126.8

Base Check	276.7
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Field Check	276.7
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FE Constants MFE-A.A 55

Last Edited on 29-JUL-2012,07:09

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 126

Last Edited on 27-JUL-2012 20:15

	Low	High	Low	High
1	0.0	0.0	20.1	3854.1
2	0.0	0.0	32.2	3630.6
3	0.0	0.0	28.9	3050.2
4	0.0	0.0	18.5	2079.4
Deep	0.0	0.0	16.3	1911.4
Medium	0.0	0.0	42.7	4061.6
Shallow	0.0	0.0	50.4	5485.5
Array Temperature		0.0		86.9 Deg F

Induction Constants MAI-A.A 45

Last Edited on 29-JUL-2012,07:09

Induction Model		RtAP-WBM	
Caliper for Borehole Corr.		Density Caliper	
Hole Size for Borehole Correction		N/A	inches
Tool Centred		Yes	
Stand-off Type		N/A	
Stand-off		N/A	inches
Number of Fins on Stand-off		N/A	
Stand-off Fin Angle		N/A	degrees
Stand-off Fin Width		N/A	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 45

Field Calibration on 26-JUL-2012,09:09

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MAI-A.A 45

Last Edited on

Pre-filter Length	11
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Caliper Calibration MPD-B 31

Base Calibration on 26-JUL-2012 09:16
Field Calibration on 29-JUL-2012 02:46

Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	17567	3.99	
2	26416	5.98	
3	35056	7.97	
4	43488	9.86	
5	52816	11.92	
6	N/A	N/A	

Field Calibration

Measured Caliper (in)
5.93

Actual Caliper (in)
5.98

Photo Density Calibration MPD-B 31

Base Calibration on 26-JUL-2012 10:02
Field Check on 29-JUL-2012 02:51

Density Calibration

Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	48085	24200	59556	30836
Reference 2	19674	1989	24941	2541

Field Check at Base

692.2 849.9

Field Check

690.8 849.9

PE Calibration

Base Calibration

	WS	Measured		Calibrated
		WH	Ratio	Ratio
Background	127	608		
Reference 1	19234	47953	0.404	0.371
Reference 2	5695	19580	0.293	0.272

Field Check at Base

126.7 608.3

Field Check

127.1 605.4

Density Constants MPD-B 31

Last Edited on 29-JUL-2012,07:12

Density Source Id	254	
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	1.30	gm/cc
Mud Density Z/A Multiplier	1.13	
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 (m)
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	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.02.6600\Data\Shakespeare Zerr Trust #3-23\Shakespeare Zerr Trust #3-23_001.dta

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in



Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

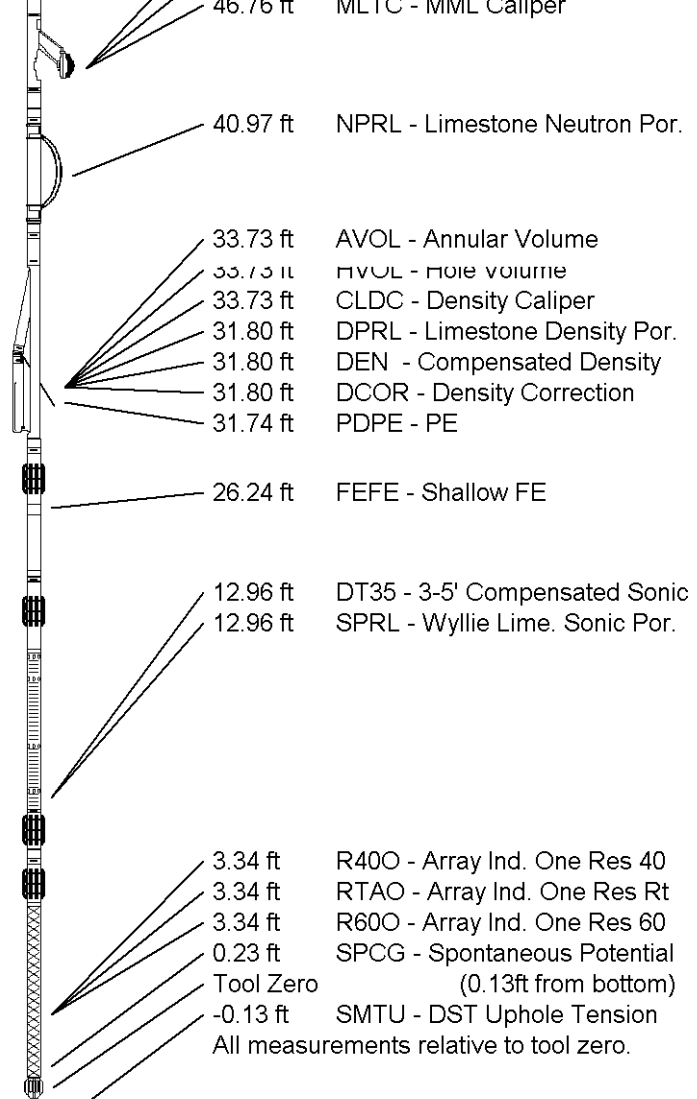
Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 60.68 ft Weight: 456.4 lb



COMPANY	SHAKESPEARE OIL COMPANY, INC.
WELL	ZERR TRUST #3-23
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2874.00	feet	First Reading	4586.00	feet
Elevation Drill Floor	2872.00	feet	Depth Driller	4630.00	feet
Elevation Ground Level	2864.00	feet	Depth Logger	4632.00	feet



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