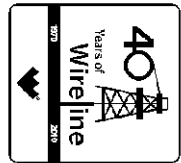




**Weatherford**<sup>®</sup>

**MICRORESISTIVITY LOG**

COMPANY **SHAKESPEARE OIL CO., INC.**  
 WELL **CARSON #1-25**  
 FIELD **WILDCAT**  
 PROVINCE/COUNTY **SCOTT**  
 COUNTRY/STATE **U.S.A. / KANSAS**  
 LOCATION **1540' FNL & 1130' FWL**



SEC **25** TWP **16S** RGE **34W** Other Services  
 API Number **15-171-20883** MPD/MDN  
 Permit Number **MSS** MAI/MFE

Permanent Datum GL, Elevation 3104 feet  
 Log Measured From KB  
 Drilling Measured From KB

Elevations: feet  
 KB 3114.00  
 DF 3112.00  
 GL 3104.00

Date	05-JUN-2012		
Run Number	ONE		
Depth Driller	4880.00	feet	
Depth Logger	4882.00	feet	
First Reading	4836.00	feet	
Last Reading	3700.00	feet	
Casing Driller	264.00	feet	
Casing Logger	265.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.30 lb/USg	62.00 CP	
PH / Fluid Loss	9.50	10.40 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.46 @ 85.0	ohm-m	
Rmf @ Measured Temp	0.37 @ 85.0	ohm-m	
Rmc @ Measured Temp	0.55 @ 85.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.35 @ 113.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	113.00	deg F	
Equipment Name	COMPACT		
Equipment / Base	13057	LIB	
Recorded By	ADAM SILL		
Witnessed By	TIM PRIEST		
S.O. # / JOB #	3534585		LB12-140

BOREHOLE RECORD			Last Edited: 05-JUN-2012 06:15	
Bit Size inches	Depth From feet	Depth To feet		
7.875	264.00	4880.00		
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	264.00	24.00

**REMARKS**

- SOFTWARE ISSUE: WLS 11.03.4044.

- MCG, MML, MDN, MPD, MFE, MSS, MAI RAN IN COMBINATION.  
 - HARDWARE: DUAL BOWSPRING USED ON MDN.  
 0.5 INCH STANDOFF USED ON MAI.  
 TWO 0.5 INCH STANDOFFS USED ON MSS.  
 0.5 INCH STANDOFF USED ON MFE.

- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.

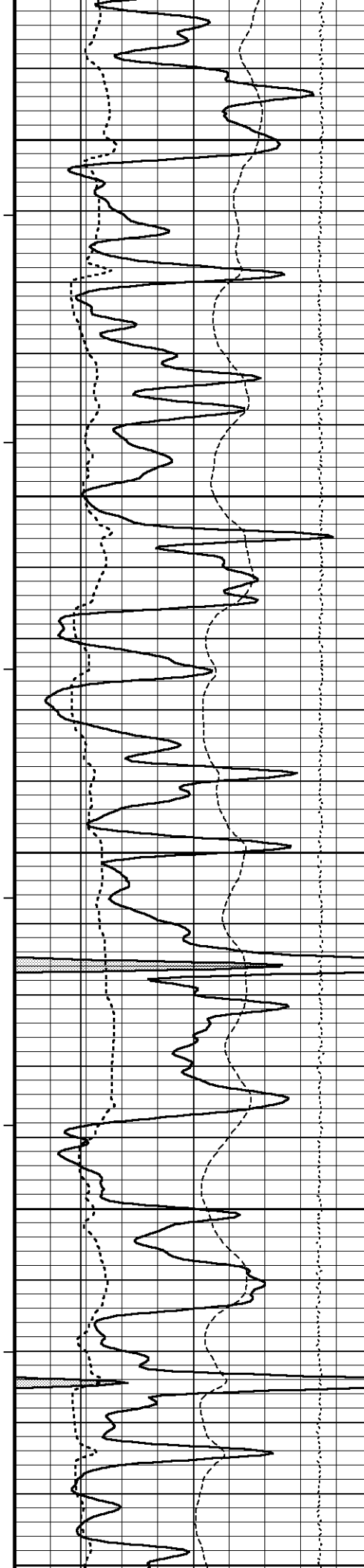
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.

- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

- TOTAL HOLE VOLUME: 445 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING: 255 CU. FT.





106°

3750

107°

3800

107°

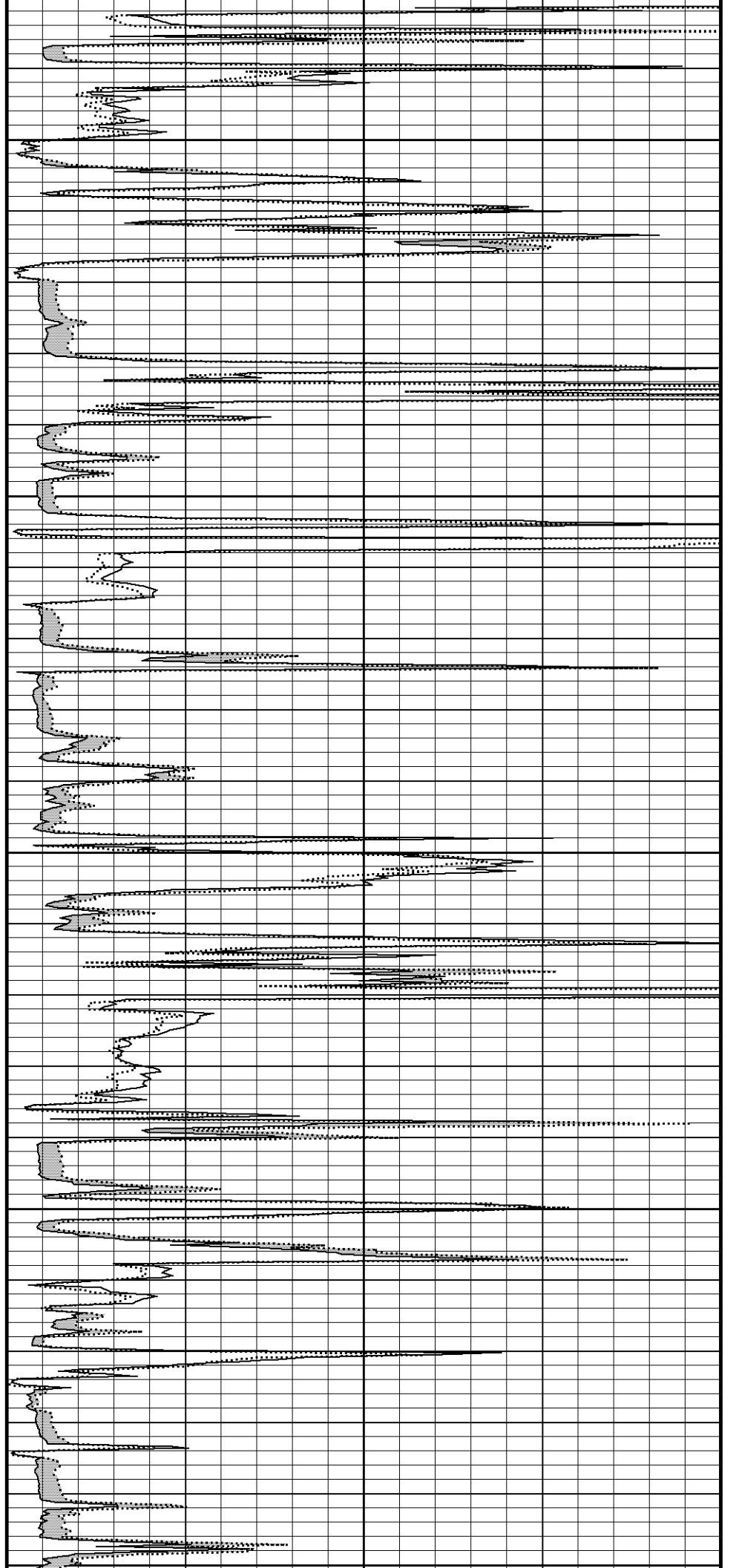
3850

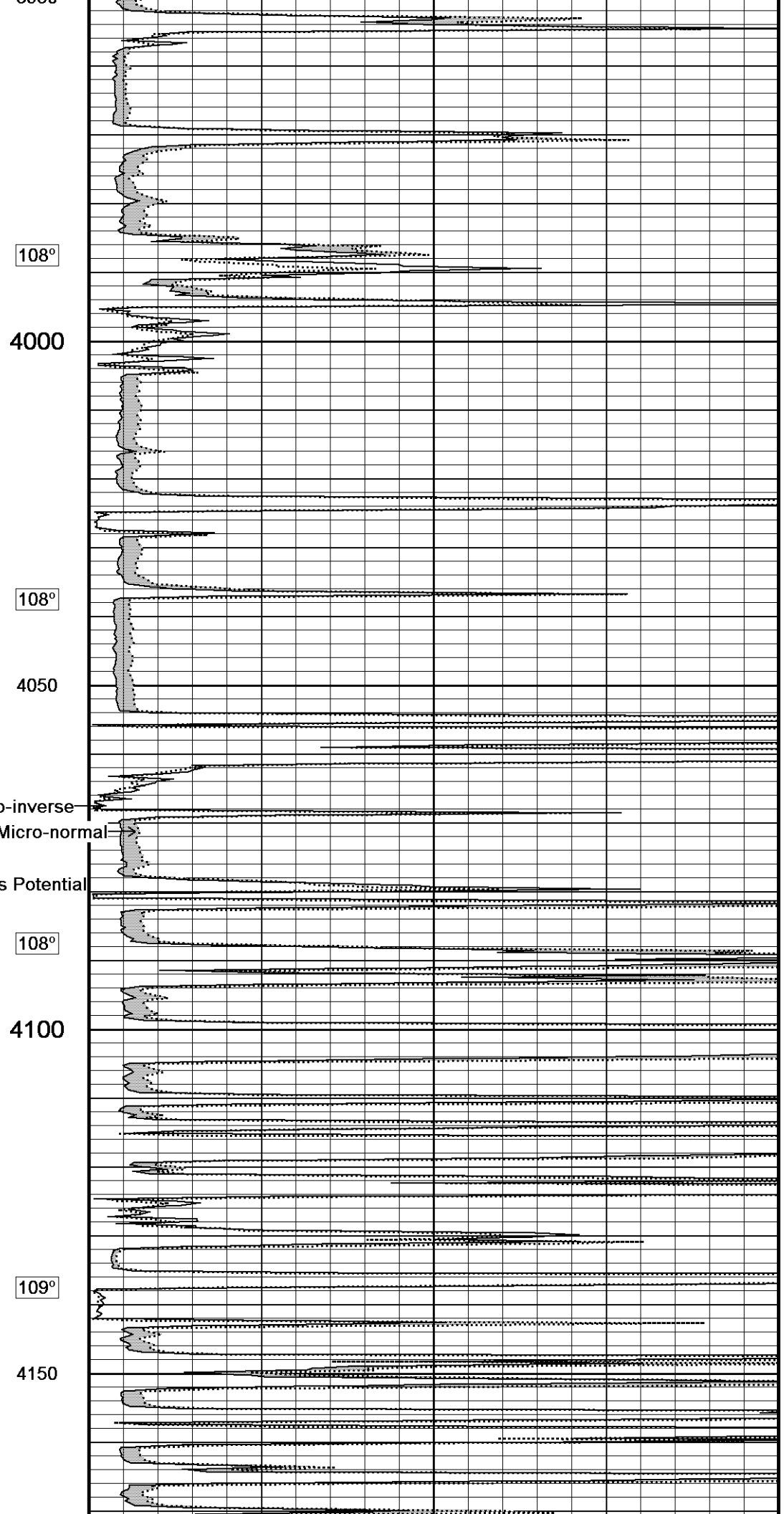
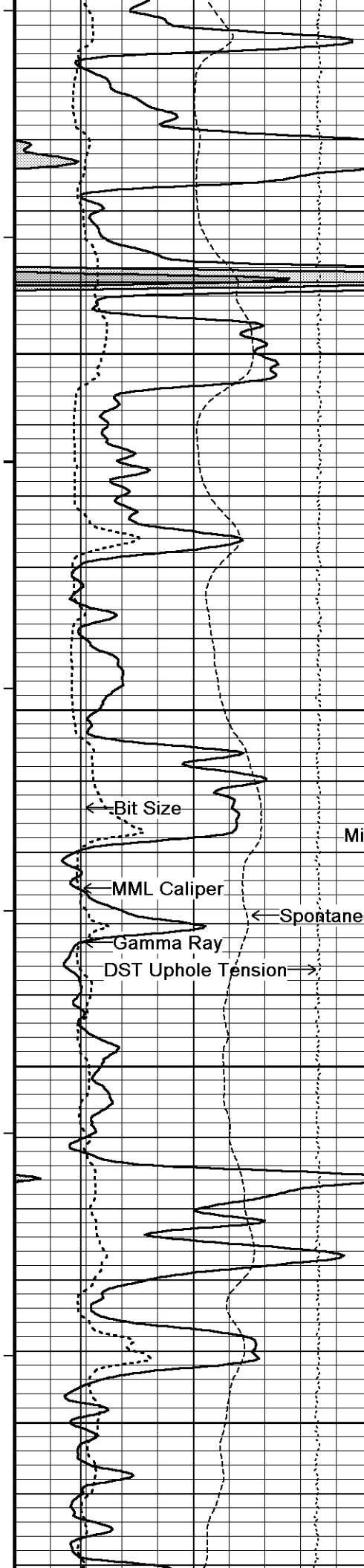
107°

3900

107°

3950





108°

4000

108°

4050

Micro-inverse

Micro-normal

Spontaneous Potential

108°

4100

109°

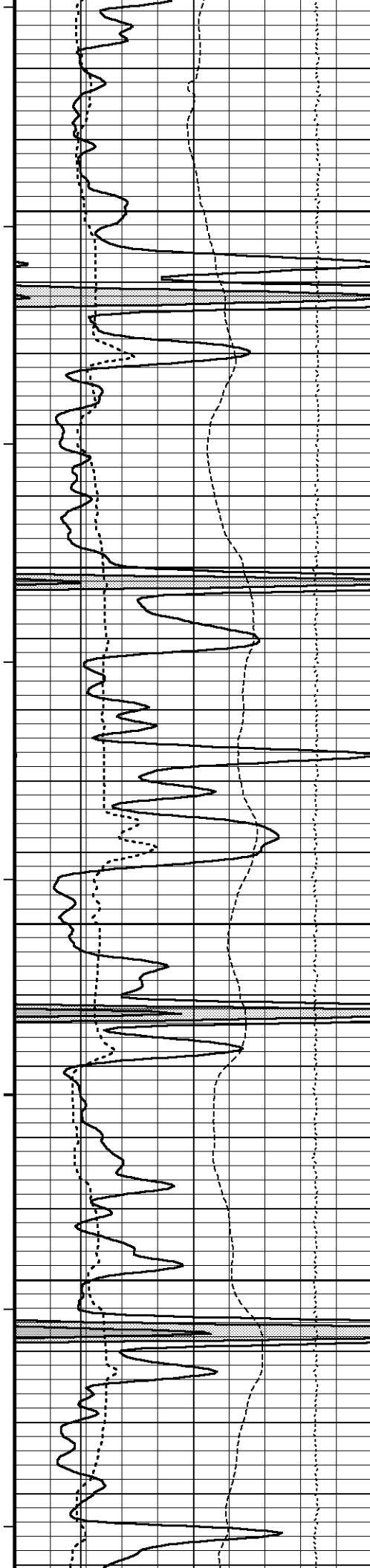
4150

← Bit Size

← MML Caliper

← Gamma Ray

DST Uphole Tension →



109°

4200

109°

4250

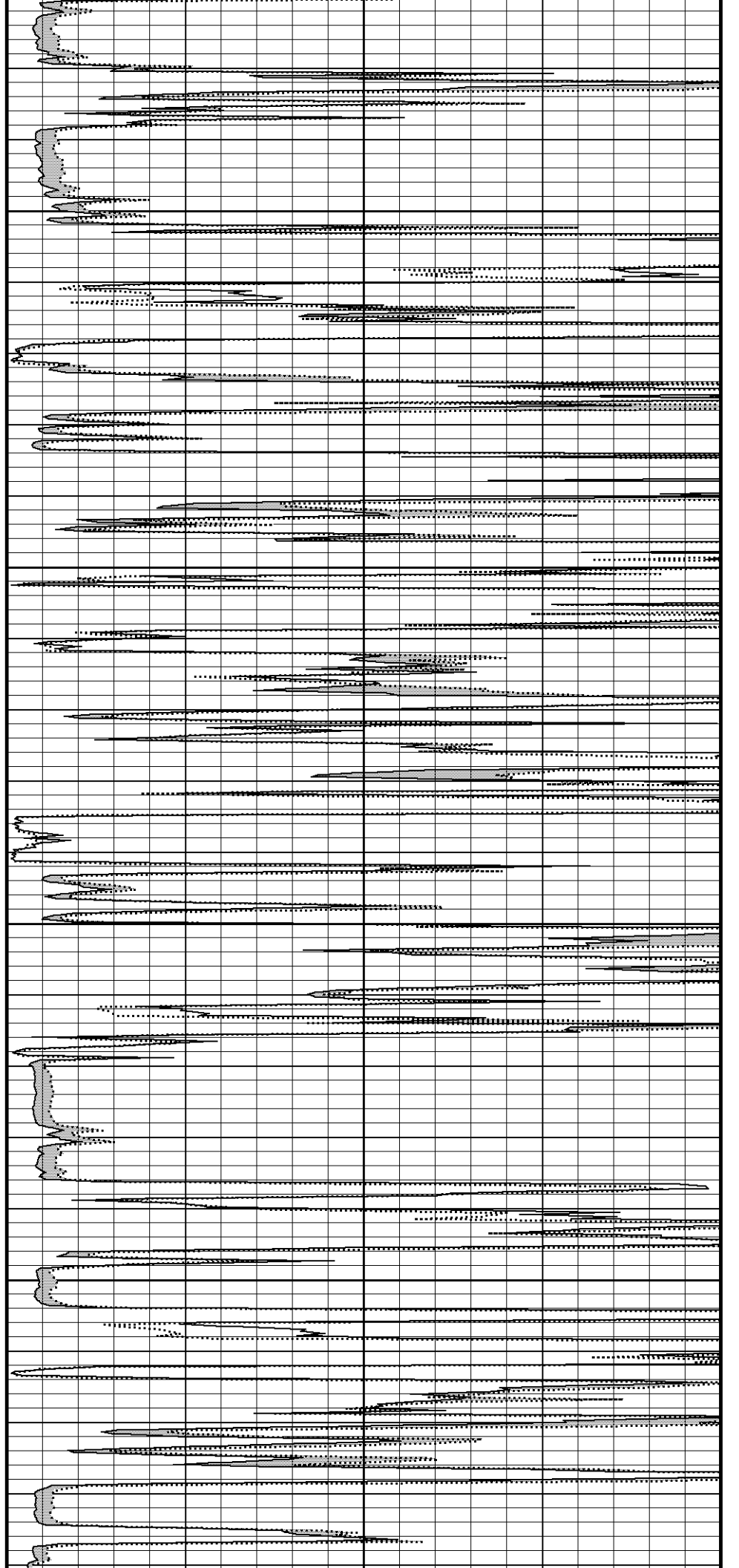
109°

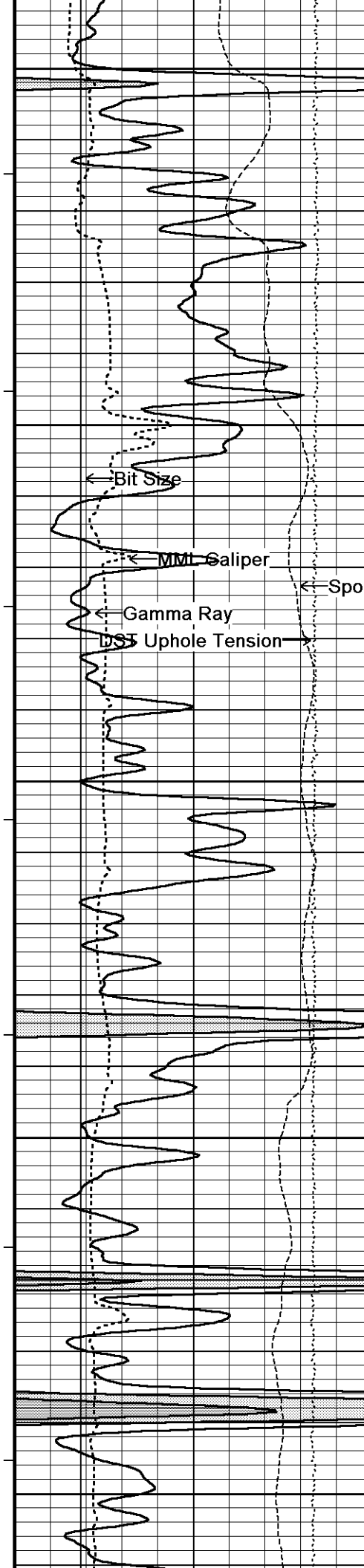
4300

110°

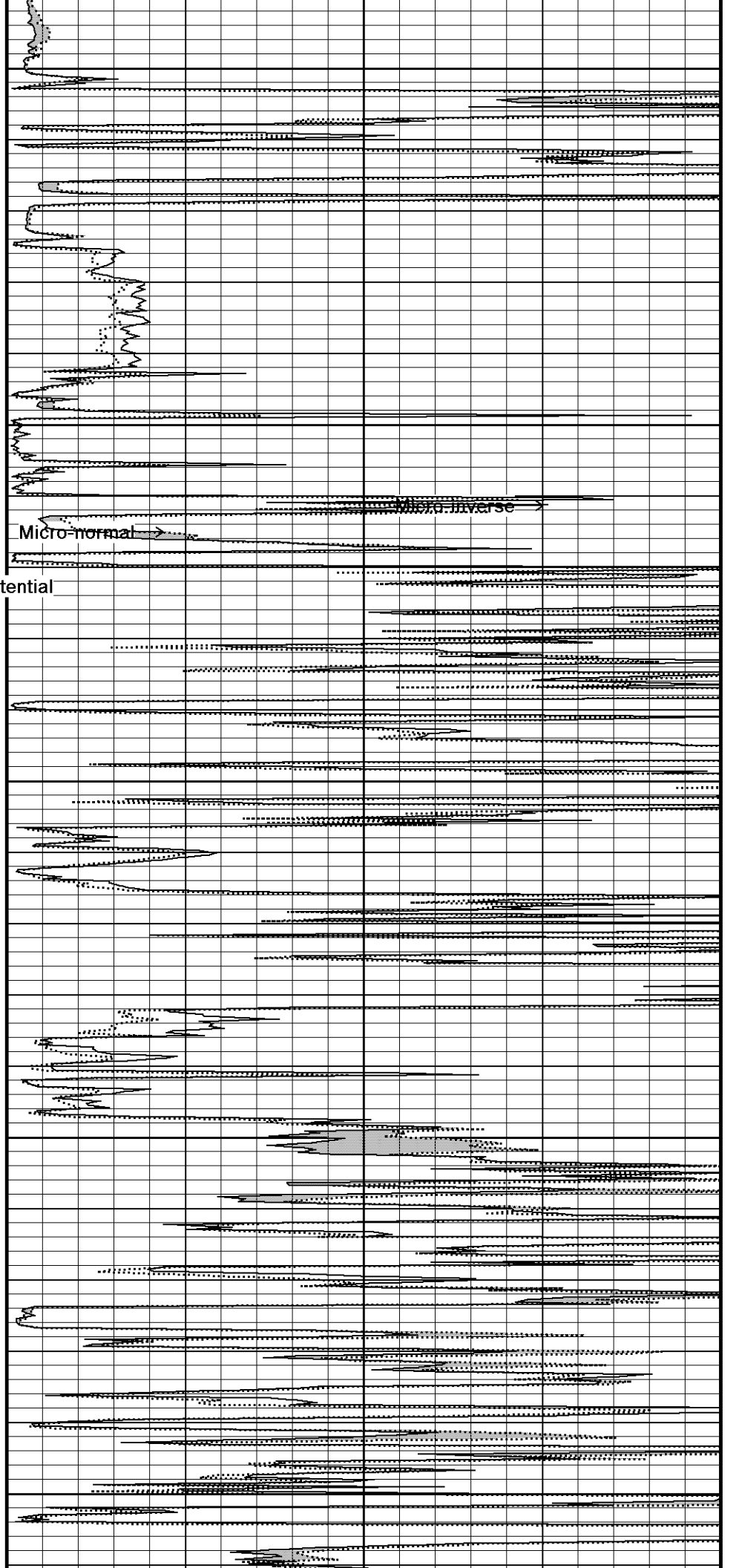
4350

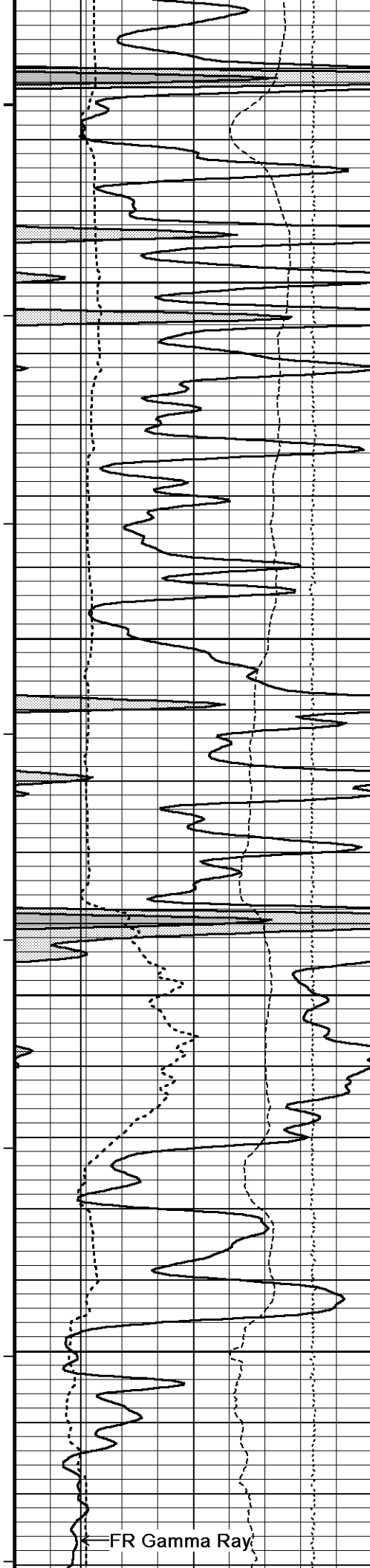
110°





4400  
110°  
4450  
111°  
4500  
112°  
4550  
112°  
4600





112°

4650

113°

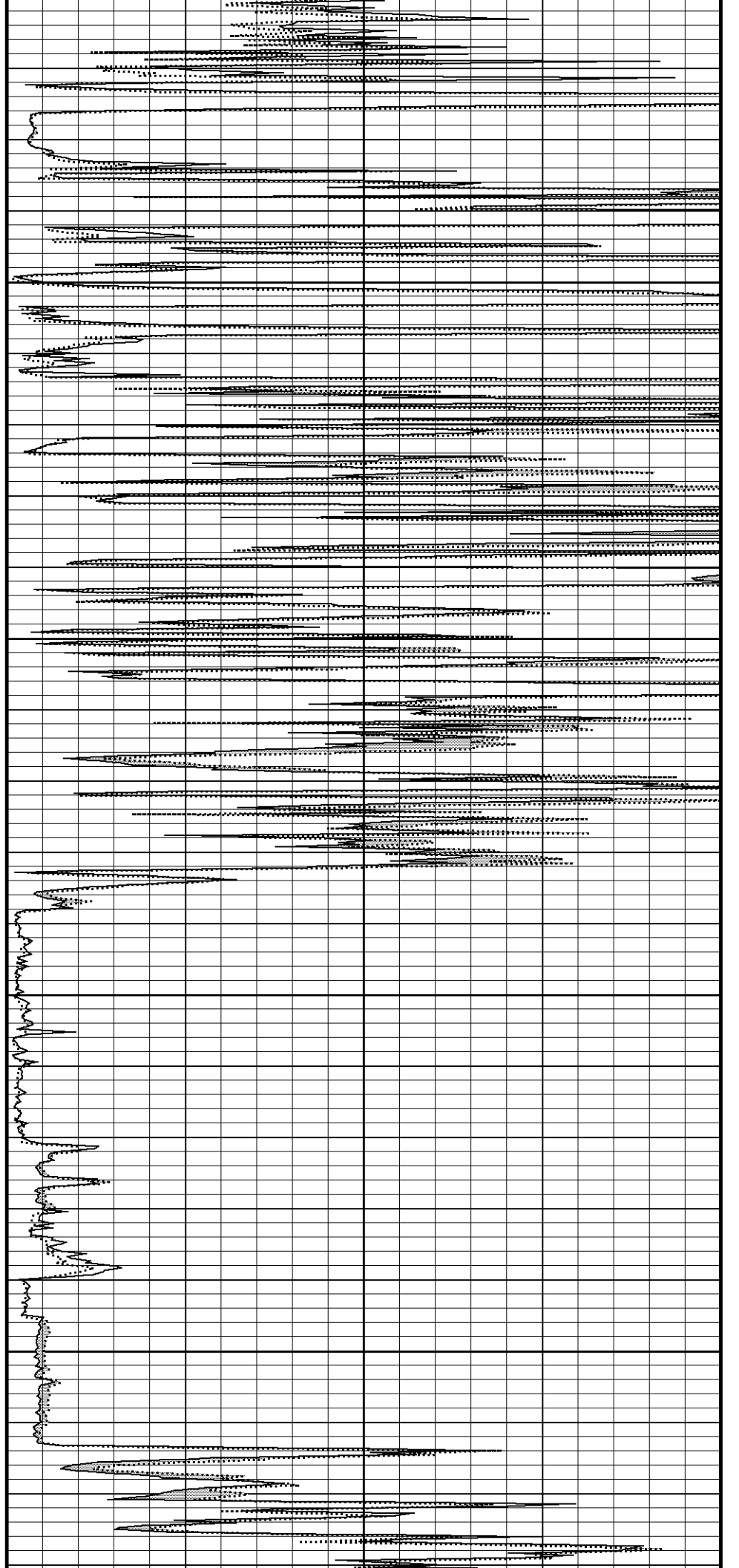
4700

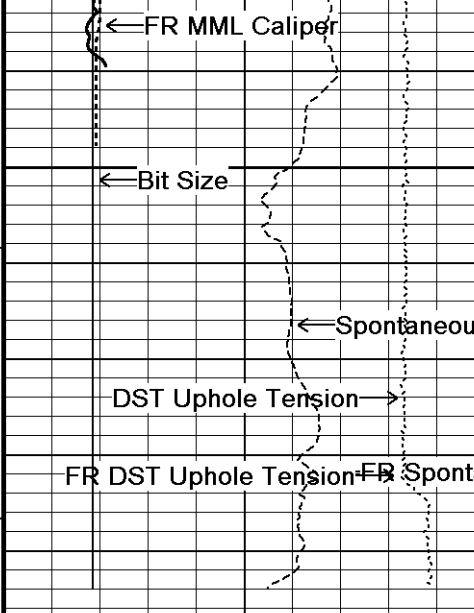
113°

4750

114°

4800





113°

4850

4900

Depth  
in  
Feet

Timing Marks  
every 60.0 sec

Gamma Ray  
API  
0 75 150

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

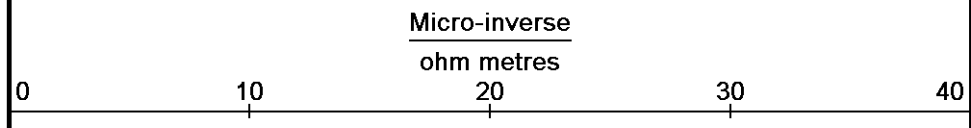
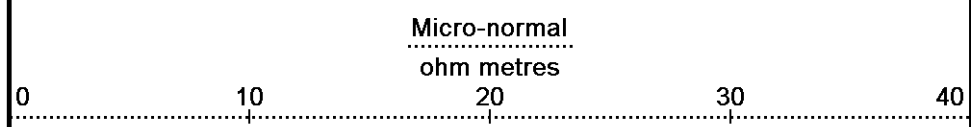
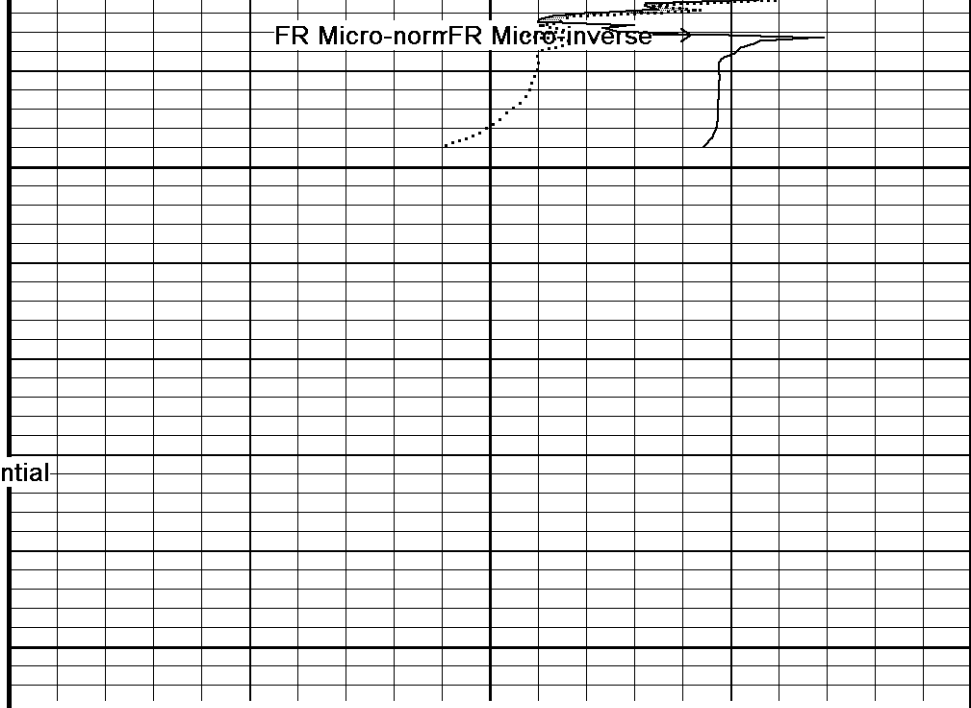
MML Caliper  
inches  
6 11 16

Bit Size  
inches  
6 11 16

DST Uphole Tension  
pounds  
5000 0

Borehole  
Temp in  
deg F

Replay  
Scale  
1:240





# 5 INCH REPEAT PASS

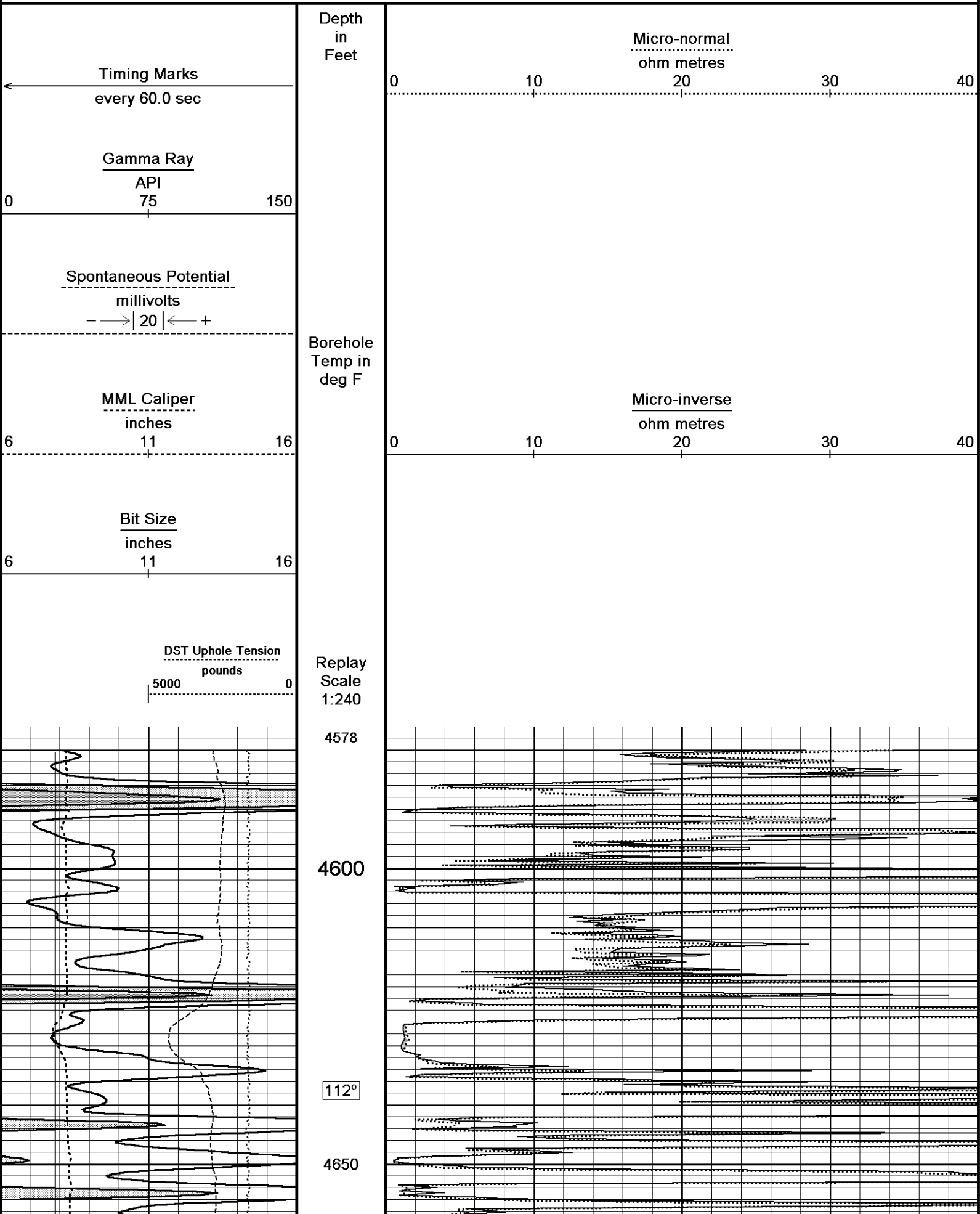
Depth Based Data - Maximum Sampling Increment 10.0cm

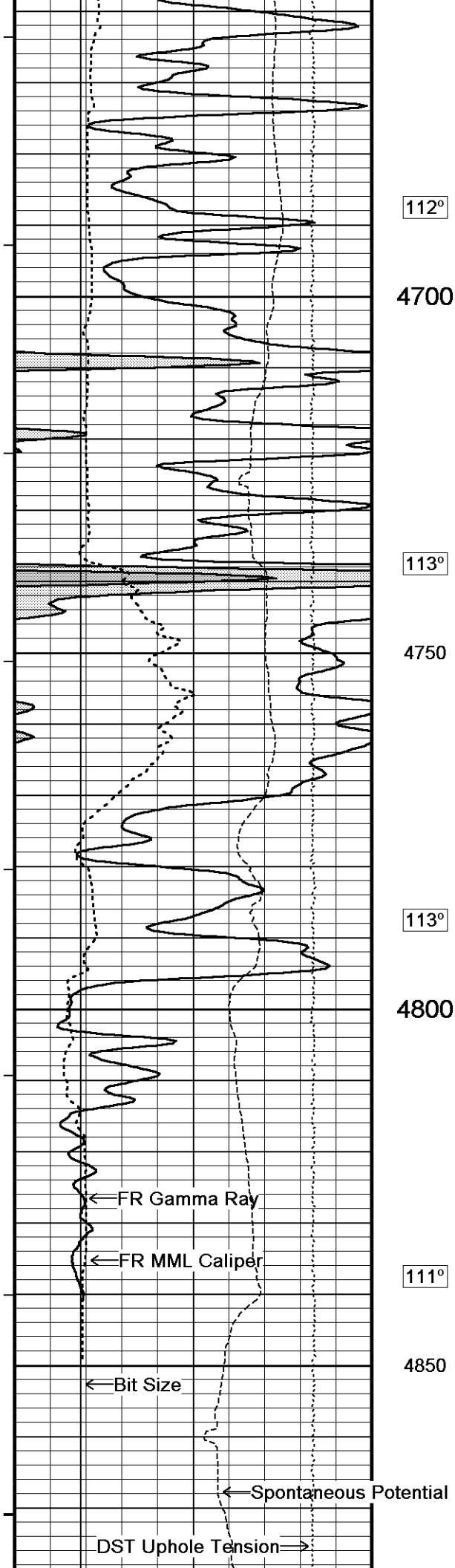
Plotted on 05-JUN-2012 11:26

Filename: C:\Minimus 11.03.4044\Data\Shakespeare Carson #1-25\Shakespeare Carson #1-25\_001.dta

Recorded on 05-JUN-2012 07:45

System Versions: Logged with 11.03.4044 Plotted with 11.03.4044





112°

4700

113°

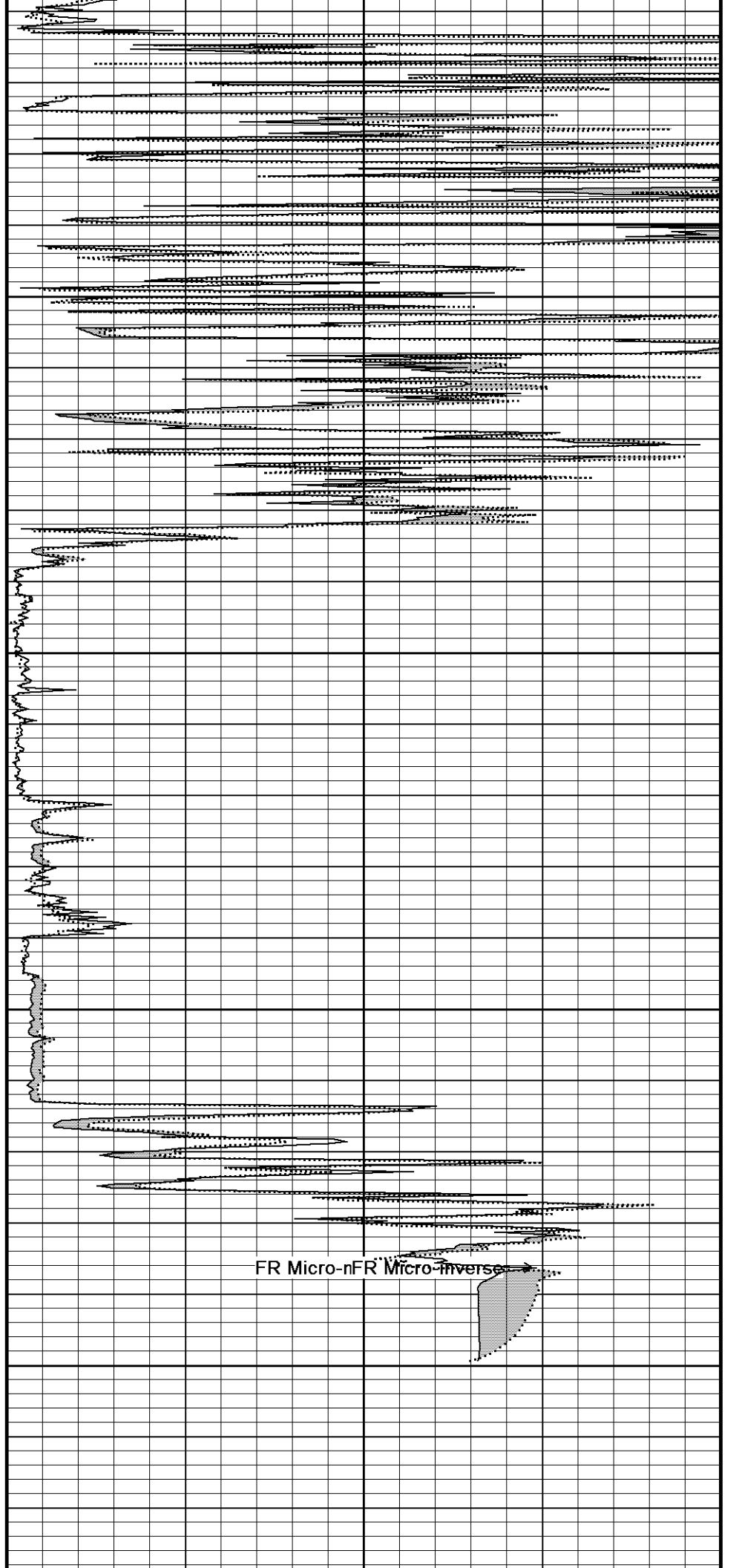
4750

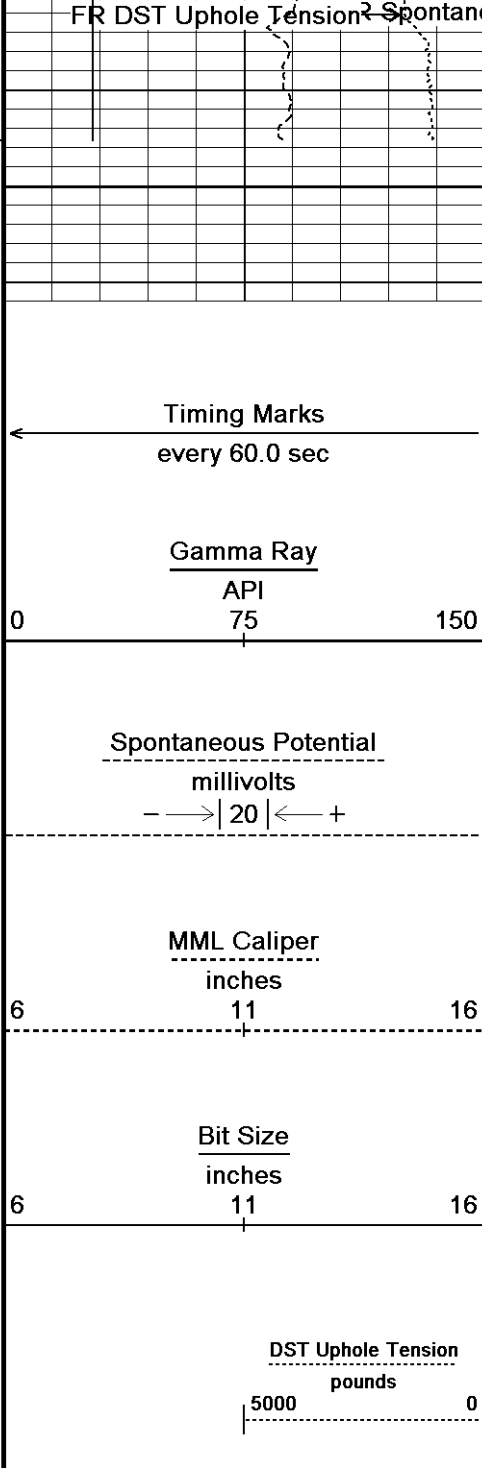
113°

4800

111°

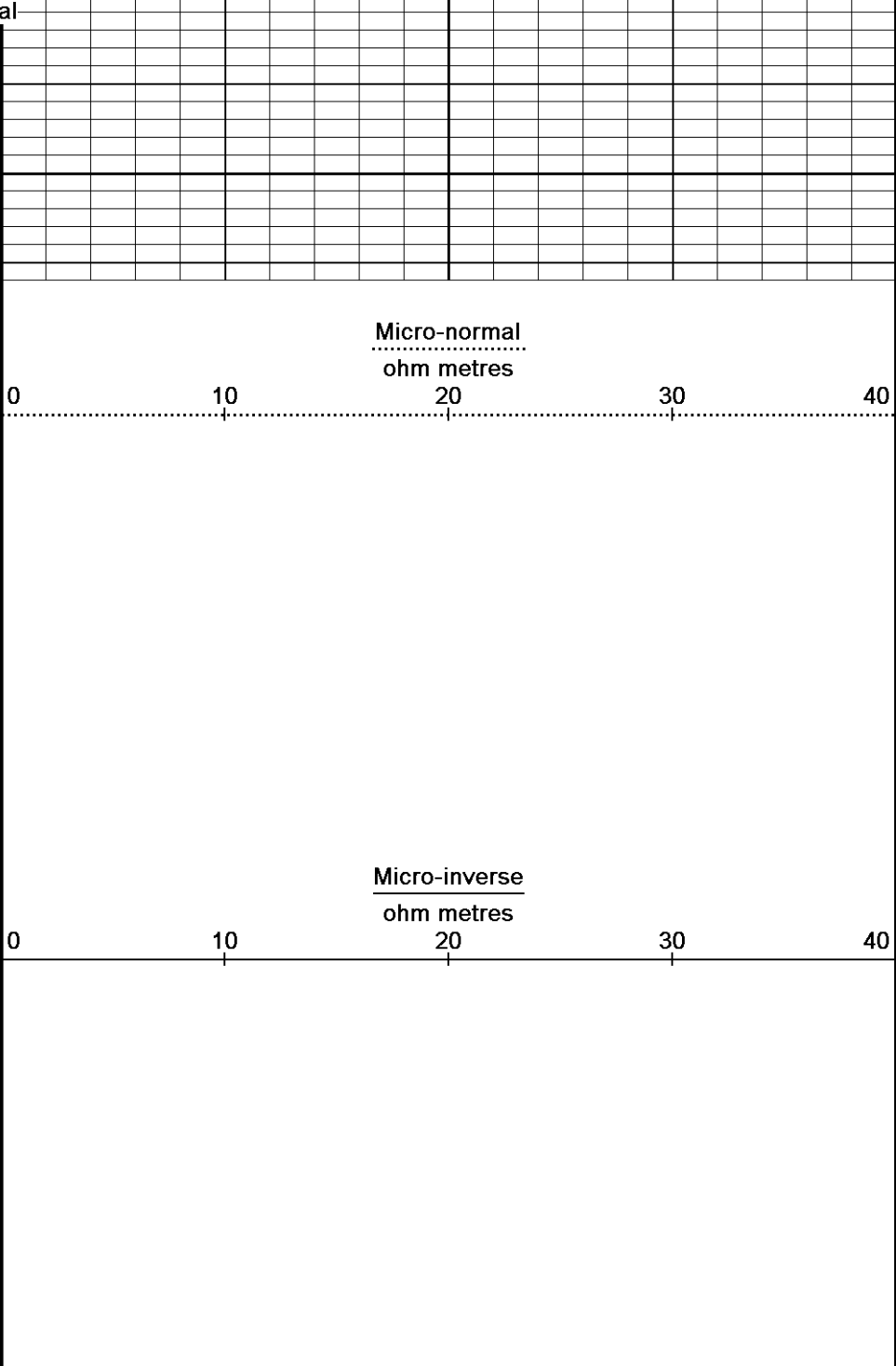
4850





4900

4910  
Depth  
in  
Feet



Borehole  
Temp in  
deg F

Replay  
Scale  
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 05-JUN-2012 11:26  
 Filename: C:\Minimus 11.03.4044\Data\Shakespeare Carson #1-25\Shakespeare Carson #1-25\_001.dta  
 Recorded on 05-JUN-2012 07:45  
 System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

↑ 5 INCH REPEAT PASS ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 11.03.4044\Data\Shakespeare Carson #1-25\Shakespeare Carson #1-25\_001.dta

General Constants All 000

Last Edited on 05-JUN-2012,07:09

General Parameters

Mud Resistivity	0.460	ohm-metres
Mud Resistivity Temperature	85.000	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	5.500	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 31-MAY-2012 09:46

	Measured	Calibrated (API)
Background	66	44
Calibrator (Gross)	1148	769
Calibrator (Net)	1082	725

### Gamma Constants MCG-C 84

Last Edited on 05-JUN-2012,06:12

Gamma Calibrator Number	GR38	
Mud Density	1.12	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 28-MAY-2012,07:31

	Measured	Calibrated (mV)
Reference 1	103.5	100.0
Reference 2	-96.9	-100.0

### High Resolution Temperature Calibration MCG-C 84

Field Calibration on 28-MAY-2012,07:32

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

### High Resolution Temperature Constants MCG-C 84

Last Edited on

Pre-filter Length	11
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### Caliper Calibration MML-A 16

Base Calibration on 23-MAY-2012 11:59  
Field Calibration on 31-MAY-2012 09:39

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14501	5.98
2	17771	7.97
3	21107	9.86
4	24905	11.92
5	0	0.00
6	N/A	N/A

Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.01	5.98

### Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 23-MAY-2012 12:04  
Field Check on 31-MAY-2012 09:40

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	15.6	78.3	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 16

Last Edited on 05-JUN-2012,06:12

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

## Neutron Calibration MDN-A.B 65

Base Calibration on 23-MAY-2012 14:31

Field Check on 31-MAY-2012 09:51

## Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3164	98	3714	110
Ratio	32.187		33.764	

## Field Calibrator at Base

	Calibrated (cps)
	1615 2315
Ratio	0.697

## Field Check

	Calibrated (cps)
	1630 2345
Ratio	0.695

## Neutron Constants MDN-A.B 65

Last Edited on 05-JUN-2012,06:12

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
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 23-MAY-2012 09:37

Field Check on 31-MAY-2012 09:30

## Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	951.5	126.8
Base Check		281.5
Field Check		281.6

## FE Constants MFE-A.A 55

Last Edited on 05-JUN-2012,06:11

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-C.K 330

Last Edited on 05-JUN-2012,06:11

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 Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft



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 45

Field Calibration on 12-JAN-2012,13:36

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 12-JAN-2012,11:13

Pre-filter Length 11

Caliper Calibration MPD-B 59

Base Calibration on 16-MAY-2012 14:32

Field Calibration on 31-MAY-2012 09:33

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19200	3.99
2	29152	5.98
3	39216	7.97
4	48949	9.86
5	60064	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.93	5.98

Photo Density Calibration MPD-B 59

Base Calibration on 16-MAY-2012 14:49

Field Check on 31-MAY-2012 09:38

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	49293	24802	59556	30836
Reference 2	20819	2436	24941	2541

Field Check at Base

Field Check at Base 1213.5 1290.5

Field Check

1206.1 1292.9

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	220	1092		
Reference 1	18022	49118	0.371	0.371
Reference 2	5449	20689	0.267	0.272

Field Check at Base

220.3 1091.9

Field Check

221.9 1084.8

Density Constants MPD-B 59

Last Edited on 05-JUN-2012,06:11

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	1.12	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)	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	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 11.03.4044\Data\Shakespeare Carson #1-25\Shakespeare Carson #1-25\_001.dta

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

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

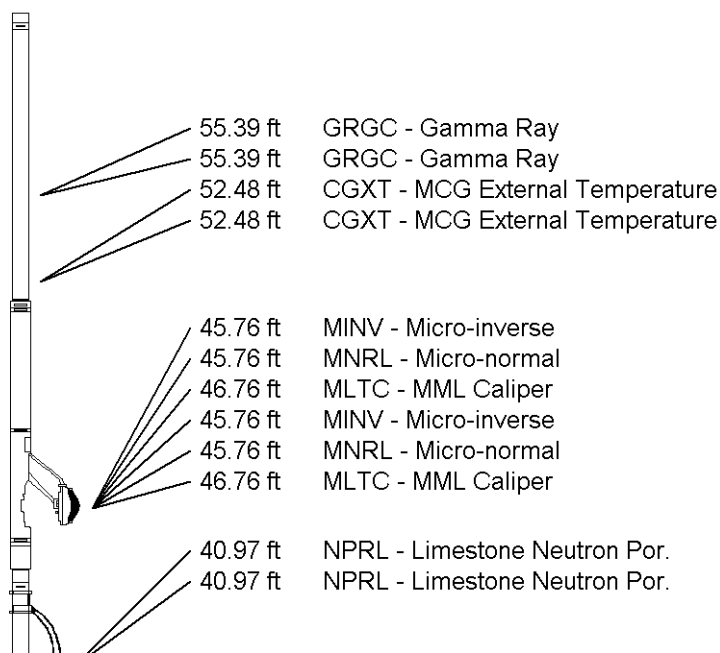
Compact Micro-log  
MML-A 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log  
MML-A 16 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 Neutron  
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper





Compact Density/Caliper  
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper  
MPD-B 59 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 Focussed Electric  
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic  
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

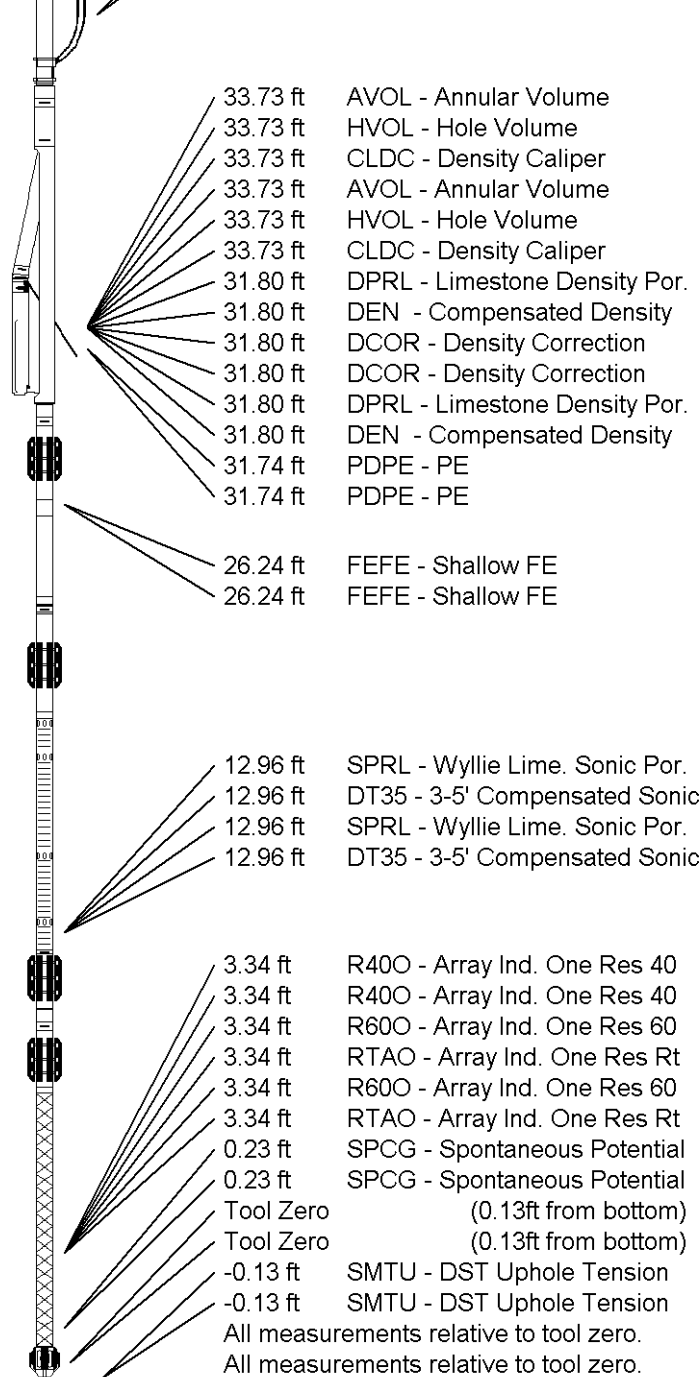
Compact Sonic  
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

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

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

Total Length: 60.68 ft Weight: 456.4 lb



COMPANY SHAKESPEARE OIL CO., INC.  
 WELL CARSON #1-25  
 FIELD WILDCAT  
 PROVINCE/COUNTY SCOTT  
 COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	3114.00	feet	First Reading	4836.00	feet
Elevation Drill Floor	3112.00	feet	Depth Driller	4880.00	feet
Elevation Ground Level	3104.00	feet	Depth Logger	4882.00	feet



MICRORESISTIVITY LOG

