



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY				SHAKESPEARE OIL INC.			
WELL				TUCKER #2-9			
FIELD				WILDCAT			
PROVINCE/COUNTY				SCOTT			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				2216' FSL & 1695' FWL			
SEC	TWP	RGE	Other Services				
9	16S	34W	MPD/MDN				
API Number		15-171-20973		MAI/MFE			
Permit Number				MSS			
Permanent Datum G.L., Elevation 3139 feet							
Log Measured From KB							
Drilling Measured From K.B. @ 10FEET							
Date	20-SEP-2013				Elevations:		
Run Number	ONE				KB 3149.00		
Service Order	3541087				DF 3147.00		
Depth Driller	4865.00				GL 3139.00		
Depth Logger	4862.00						
First Reading	4816.00						
Last Reading	3800.00						
Casing Driller	260.00						
Casing Logger	264.00						
Bit Size	7.875						
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.30 lb/USg		52.00 CP				
PH / Fluid Loss	10.00		8.80 ml/30Min				
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.72 @ 81.0		ohm-m				
Rmf @ Measured Temp	0.58 @ 81.0		ohm-m				
Rmc @ Measured Temp	0.86 @ 81.0		ohm-m				
Source Rmf / Rmc	CALC	CALC					
Rm @ BHT	0.53 @111.0		ohm-m				
Time Since Circulation	3 HOURS						
Max Recorded Temp	111.00		deg F				
Equipment / Base	13096	LIB					
Recorded By	ROB HOFFMAN						
Witnessed By	TIM PRIEST						
JOB #	LB13-266						

BOREHOLE RECORD

Last Edited: 20-SEP-2013 11:51

Bit Size inches	Depth From feet	Depth To feet
7.875	260.00	4865.00

CASING RECORD

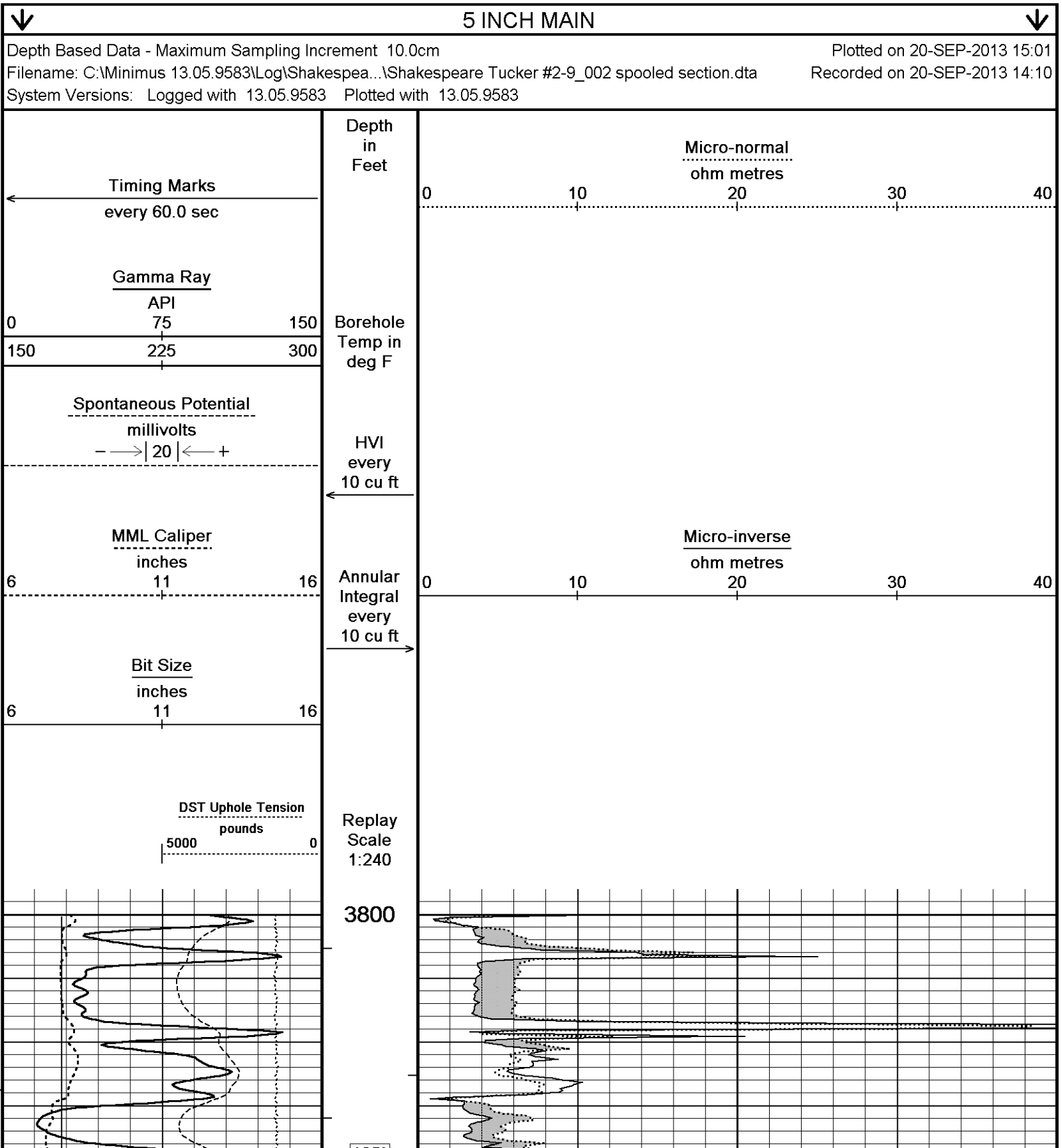
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	260.00	24.00

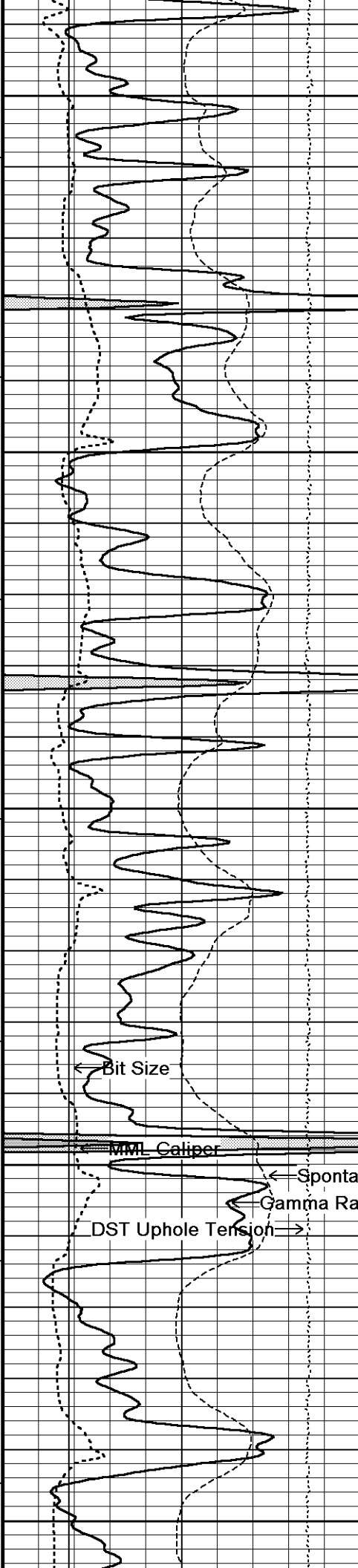
REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING 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.
- ANNULAR HOLE VOLUME WITH 4.5 INCH CASING FROM TD TO 3800 FEET: 279 CU. FT.
- SERVICE ORDER # 3541087

- RIG: HD DRILLING #2.
- ENGINEER: ROB HOFFMAN
- OPERATOR(S): K. RINEHART, D. CANADAY

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°
3850
105°
3900
105°
3950
105°
4000
106°
4050

Micro-inverse

Micro-normal

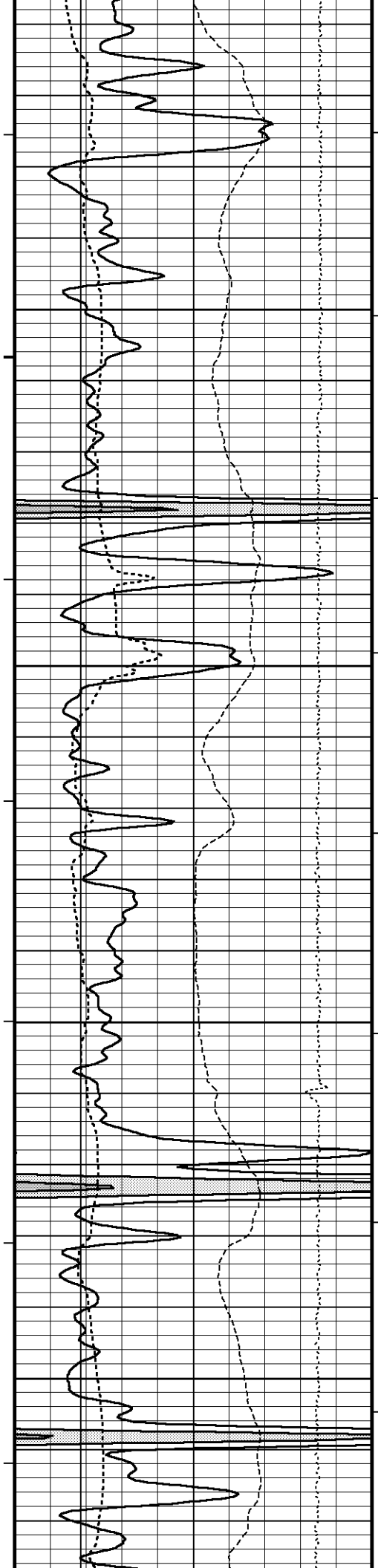
Spontaneous Potential

Gamma Ray

DST Uphole Tension

MML Caliper

Bit Size



106°

200

4100

107°

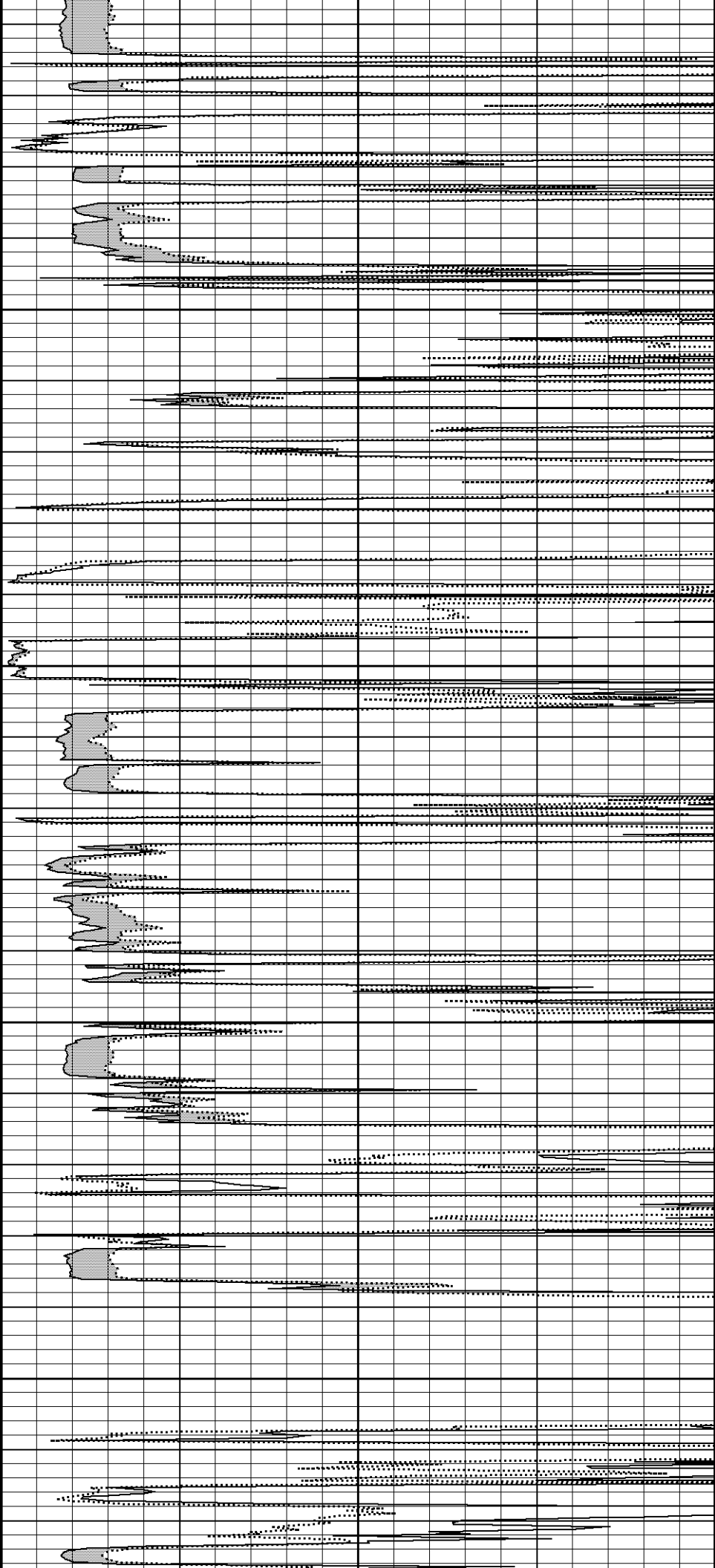
4150

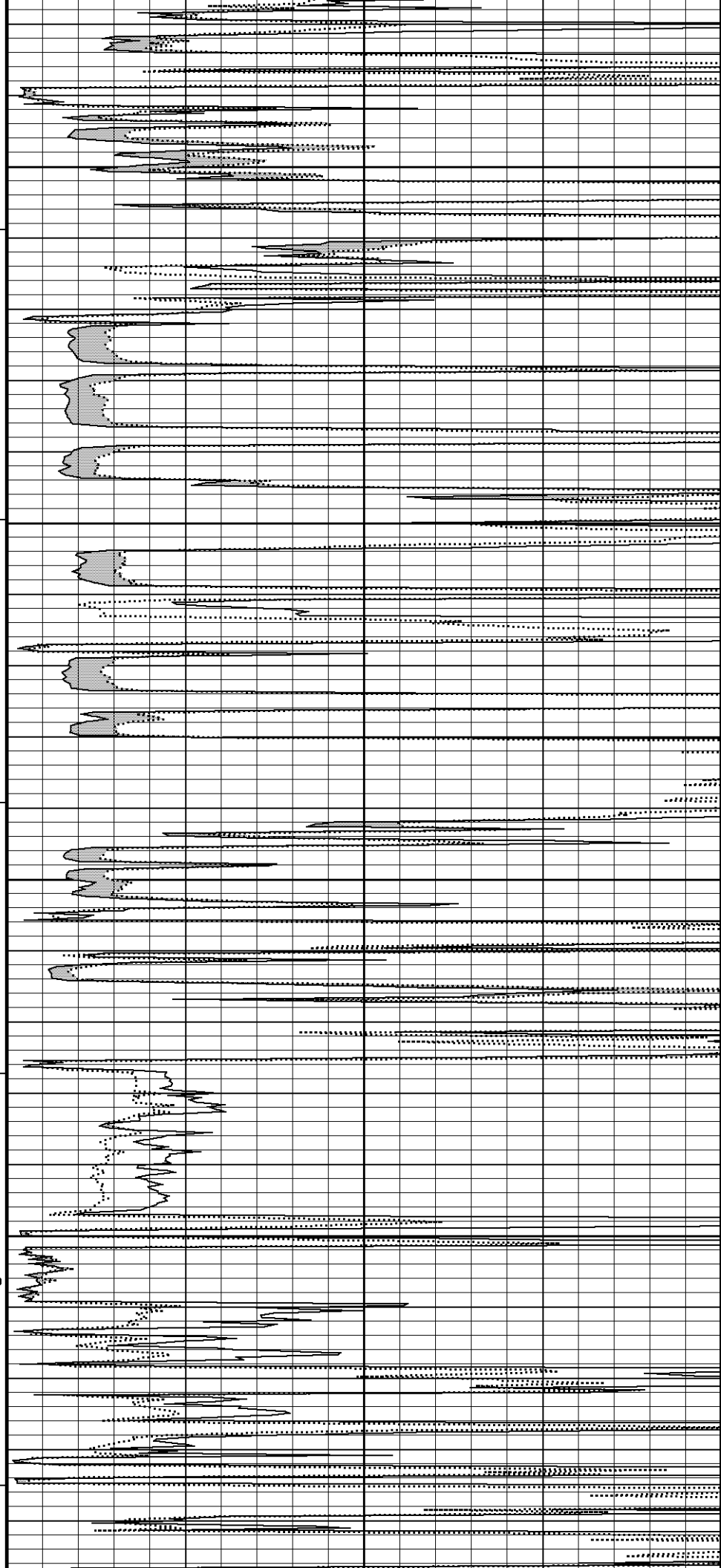
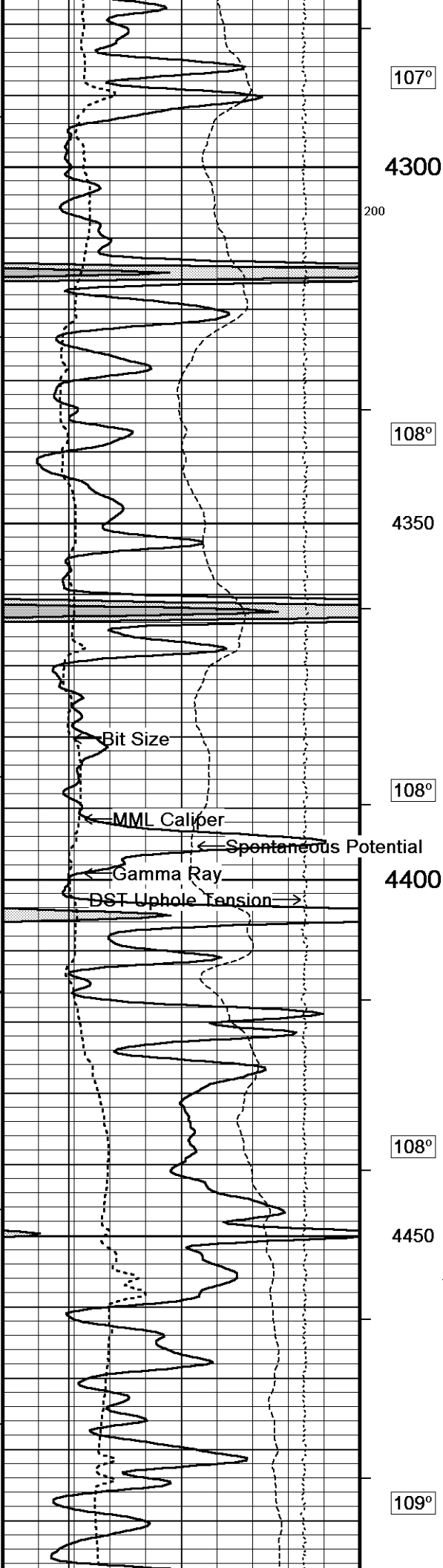
107°

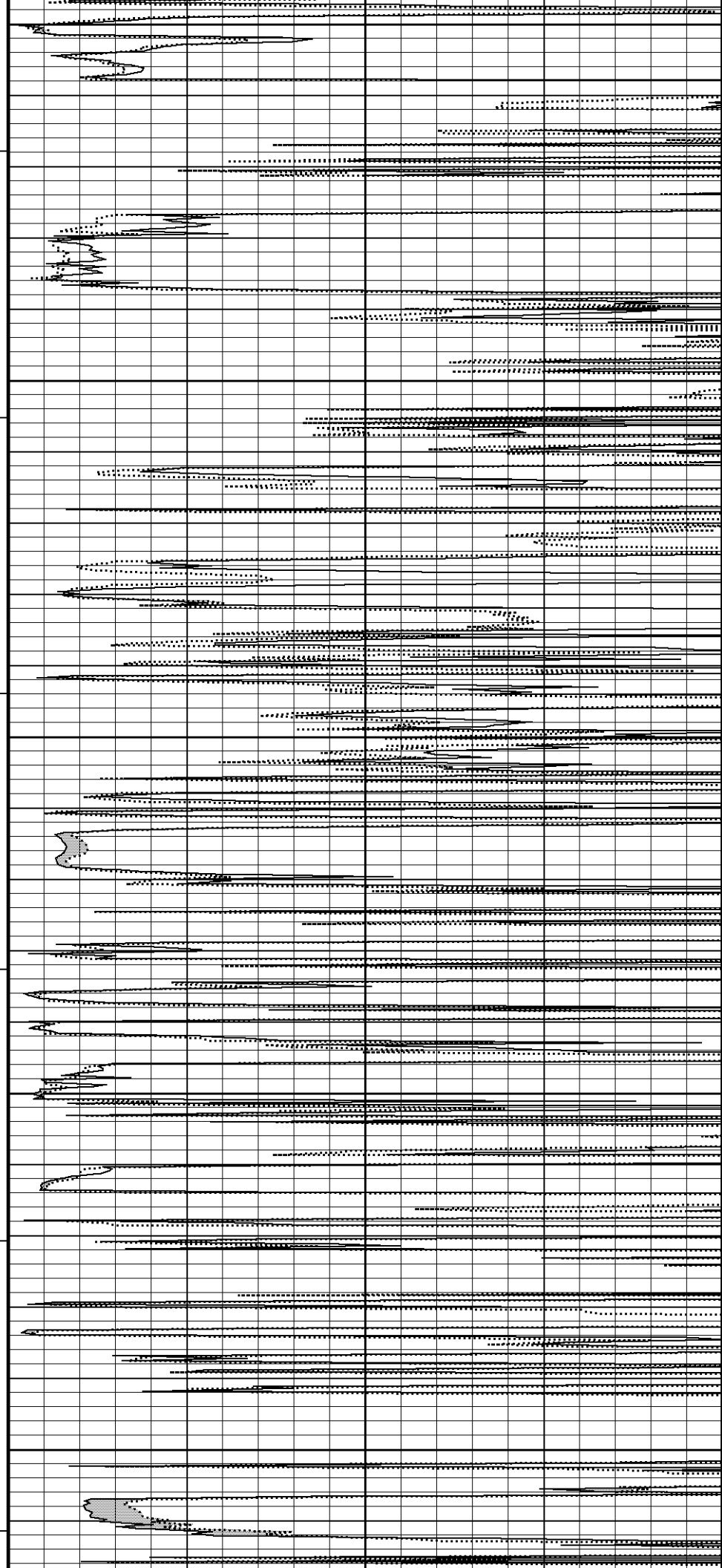
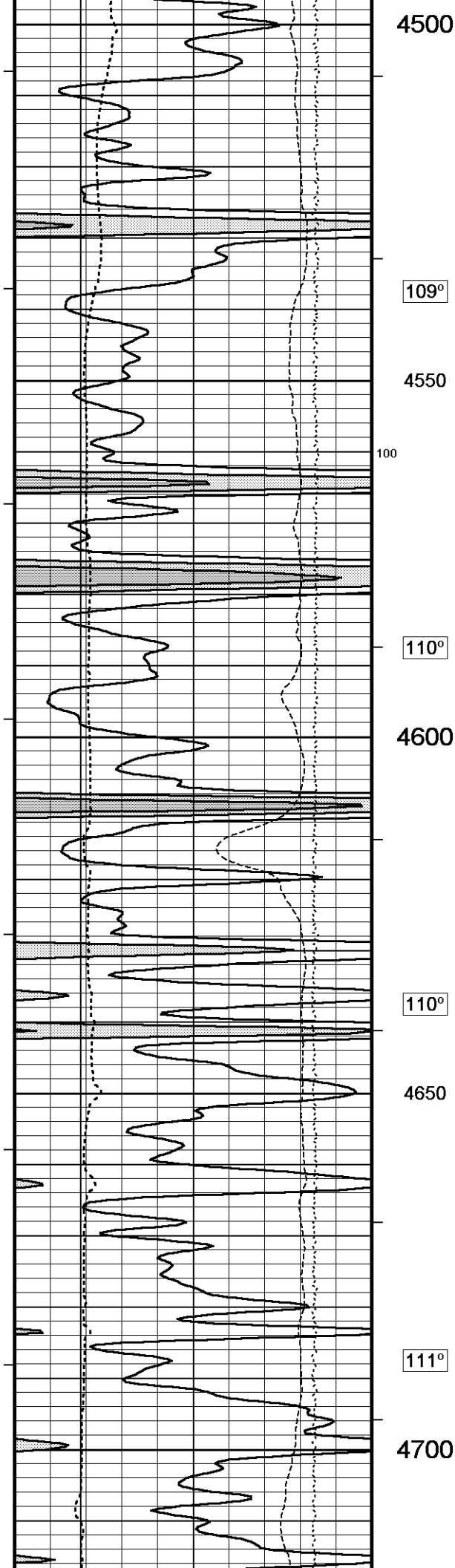
4200

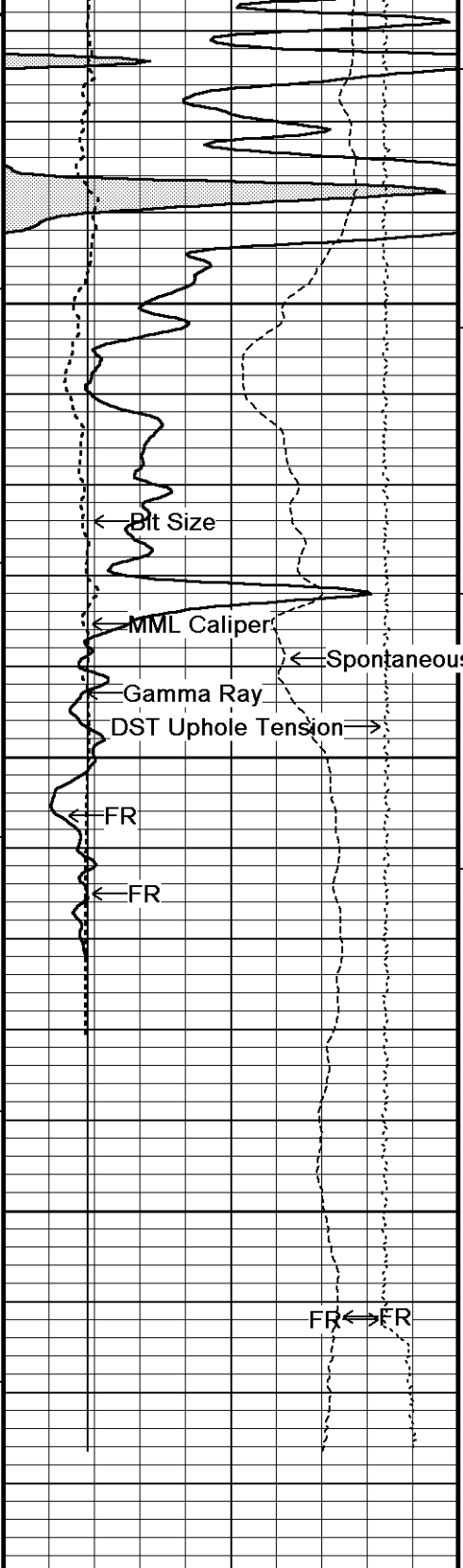
107°

4250









112°

4750

Micro-inverse

Micro-normal

111°

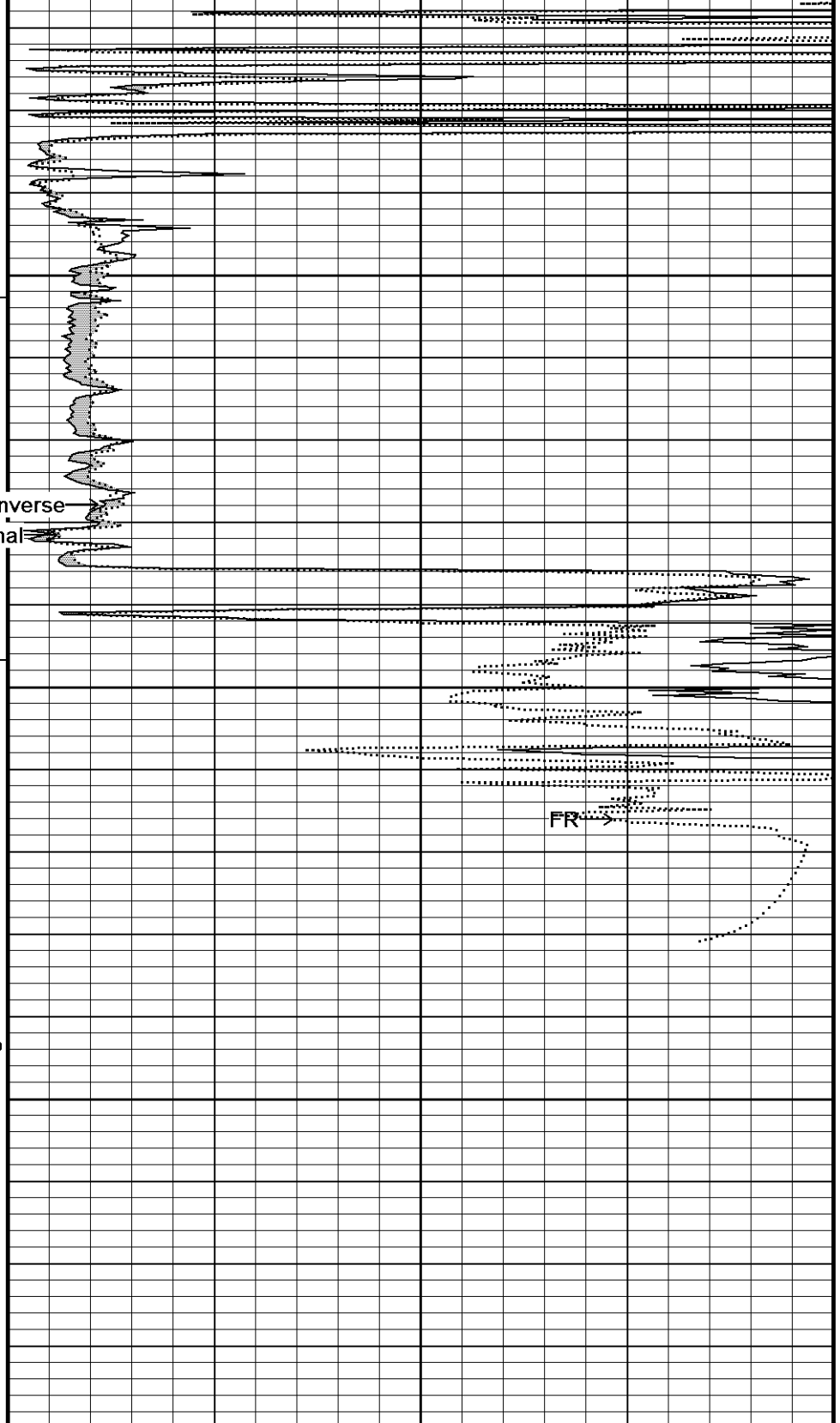
4800

0

4850

4888

Depth in Feet



← Timing Marks
every 60.0 sec

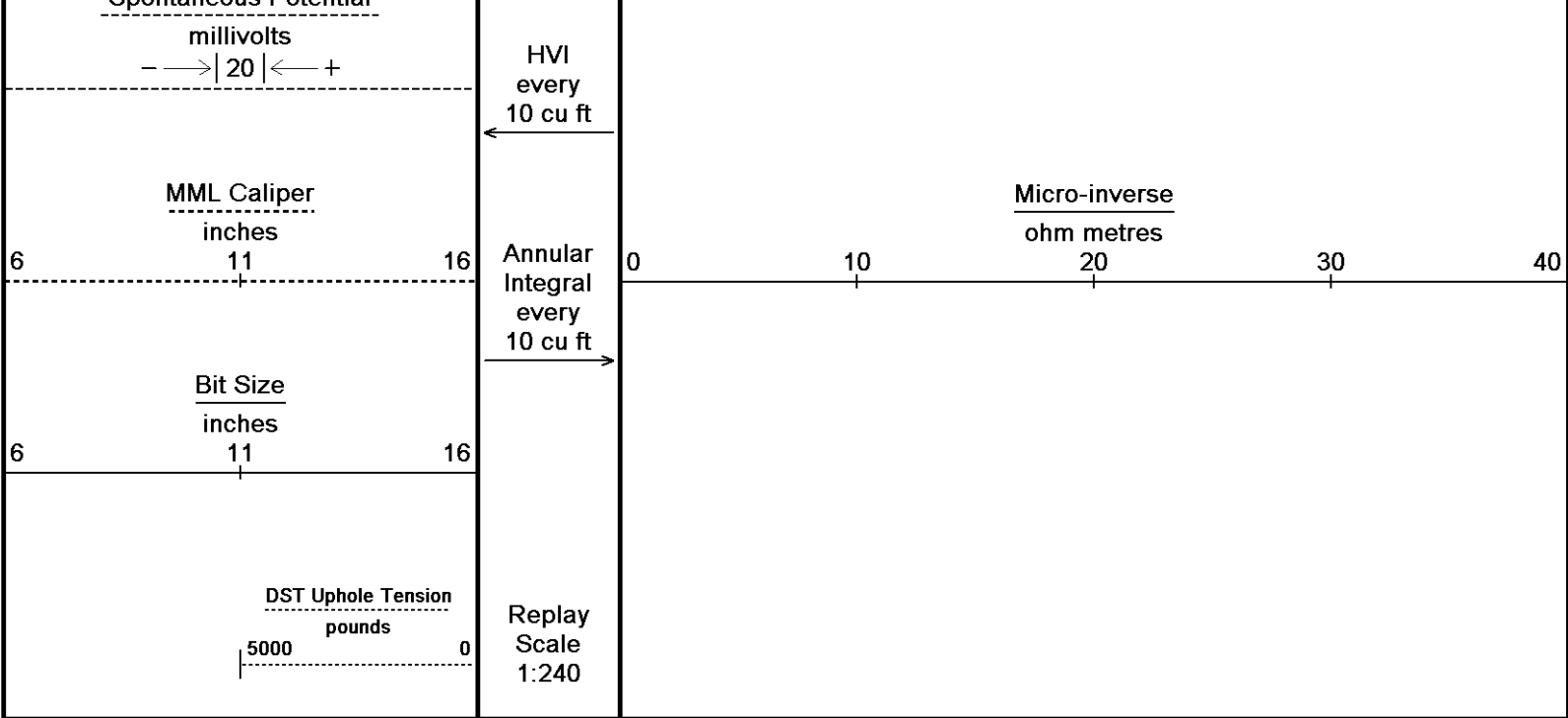
Gamma Ray

API		
0	75	150
150	225	300

Borehole Temp in deg F

Micro-normal
ohm metres

0	10	20	30	40



Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 20-SEP-2013 15:01

Filename: C:\Minimus 13.05.9583\Log\Shakespeare...\Shakespeare Tucker #2-9_002 spooled section.dtaRecorded on 20-SEP-2013 14:10

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

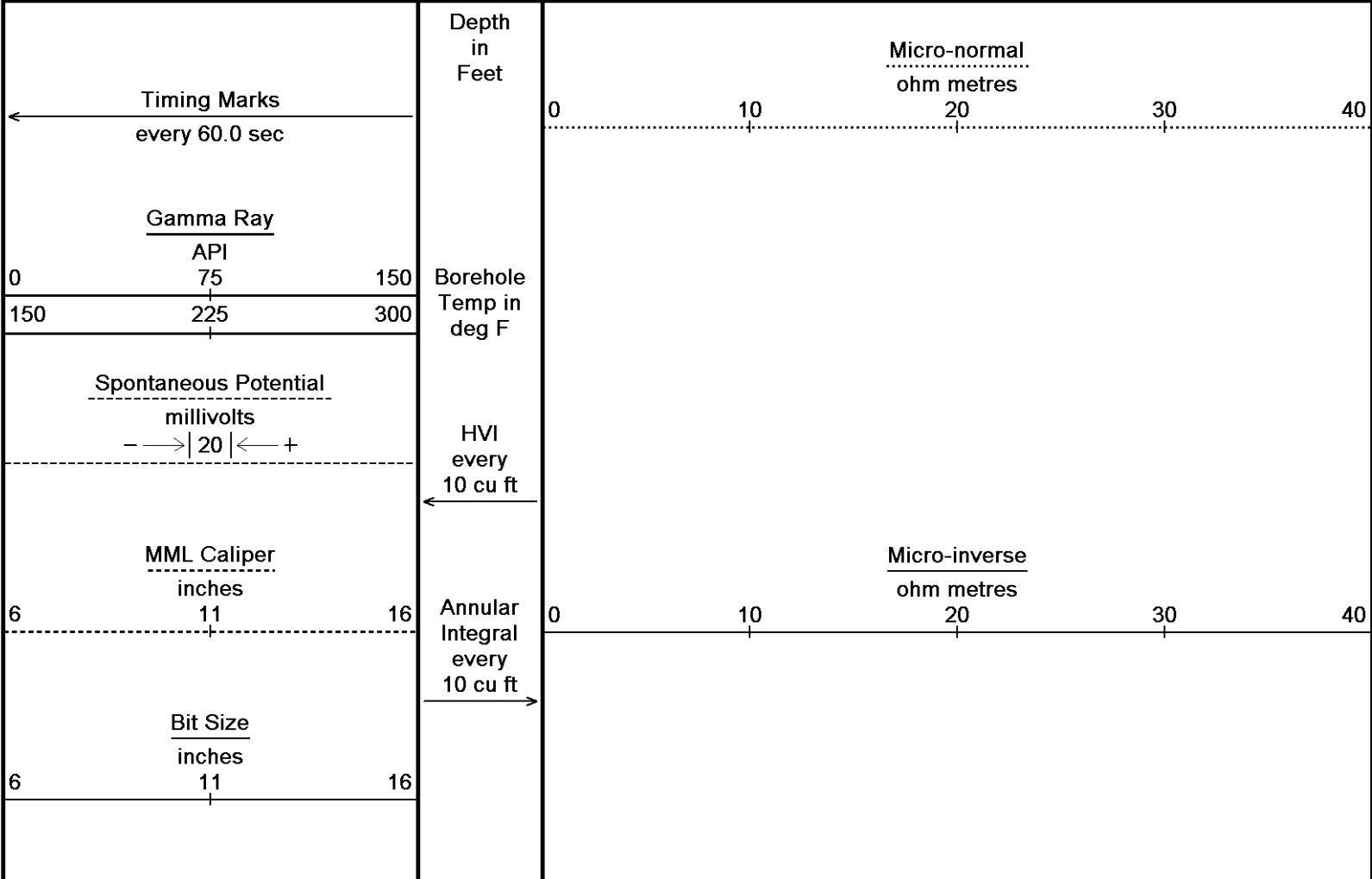
↑5 INCH MAIN↑

↓REPEAT SECTION↓

Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 20-SEP-2013 15:01

Filename: C:\Minimus 13.05.9583\Log\Shakespeare Tucker #2-9\Shakespeare Tucker #2-9_001.dtaRecorded on 20-SEP-2013 13:10

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583



DST Uphole Tension
pounds

5000 0

Replay
Scale
1:240

4500

109°

4550

100

109°

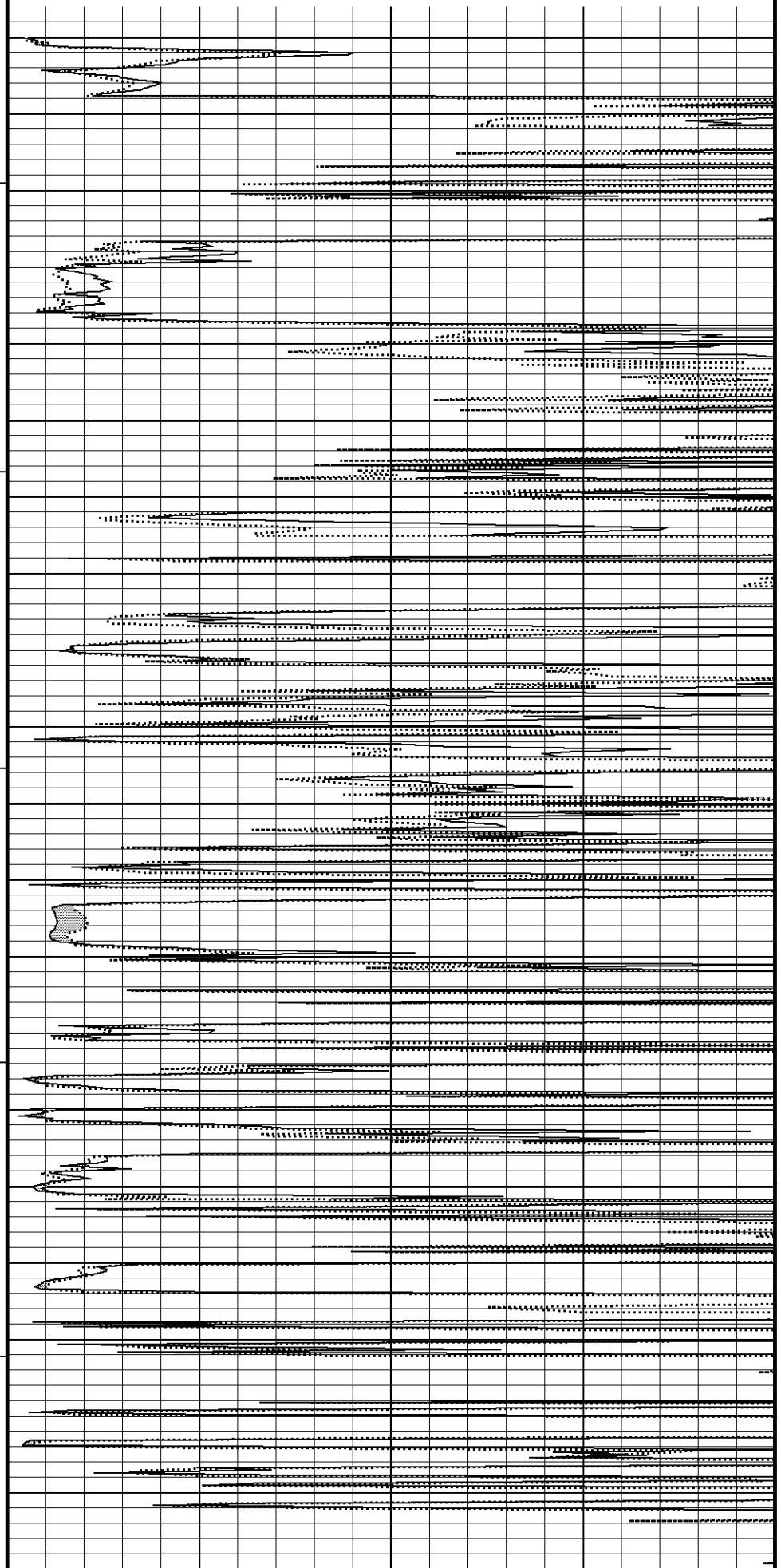
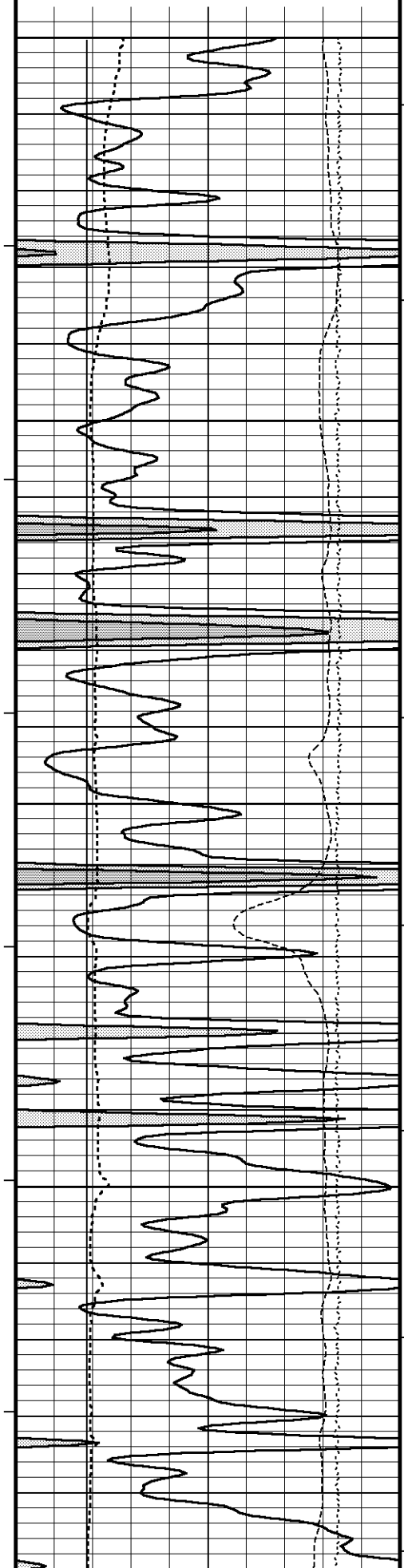
4600

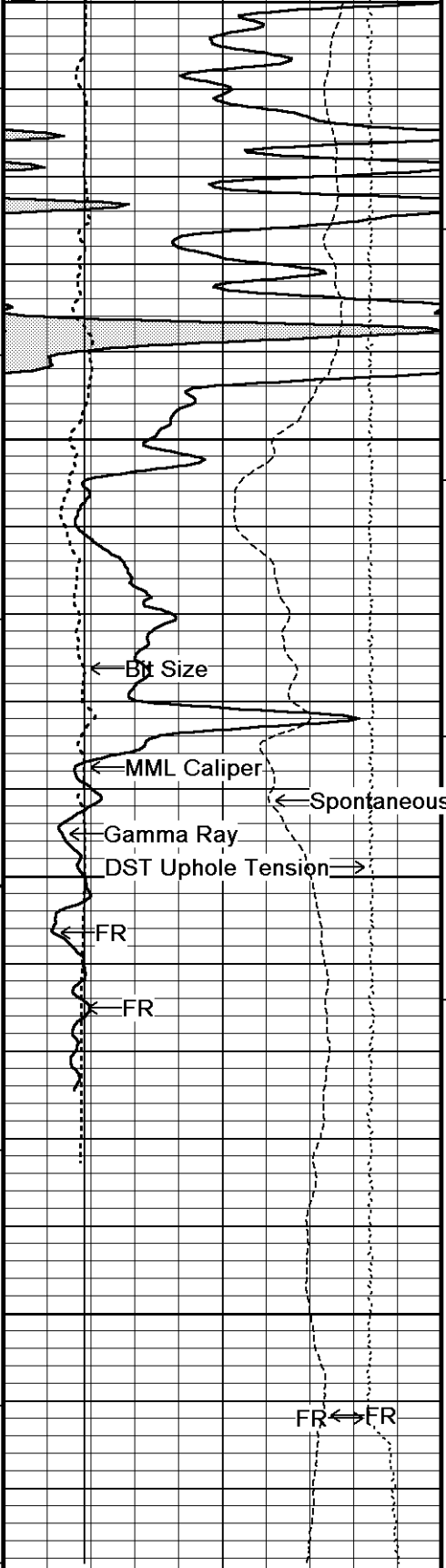
110°

4650

110°

4700



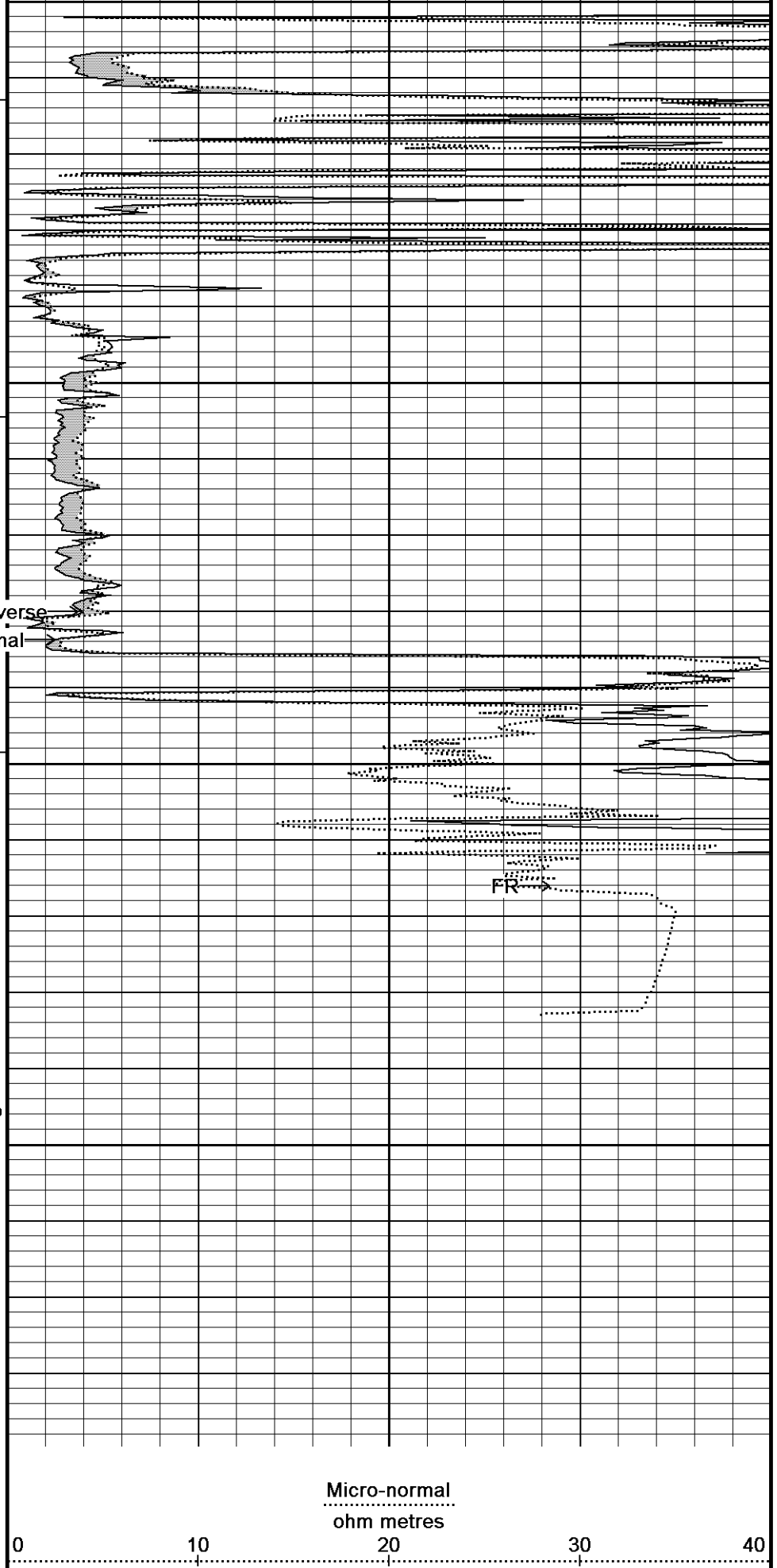


4700
111°
4750
Micro-inverse
Micro-normal
110°
4800
0
4850
FR↔FR
4888

Depth
in
Feet

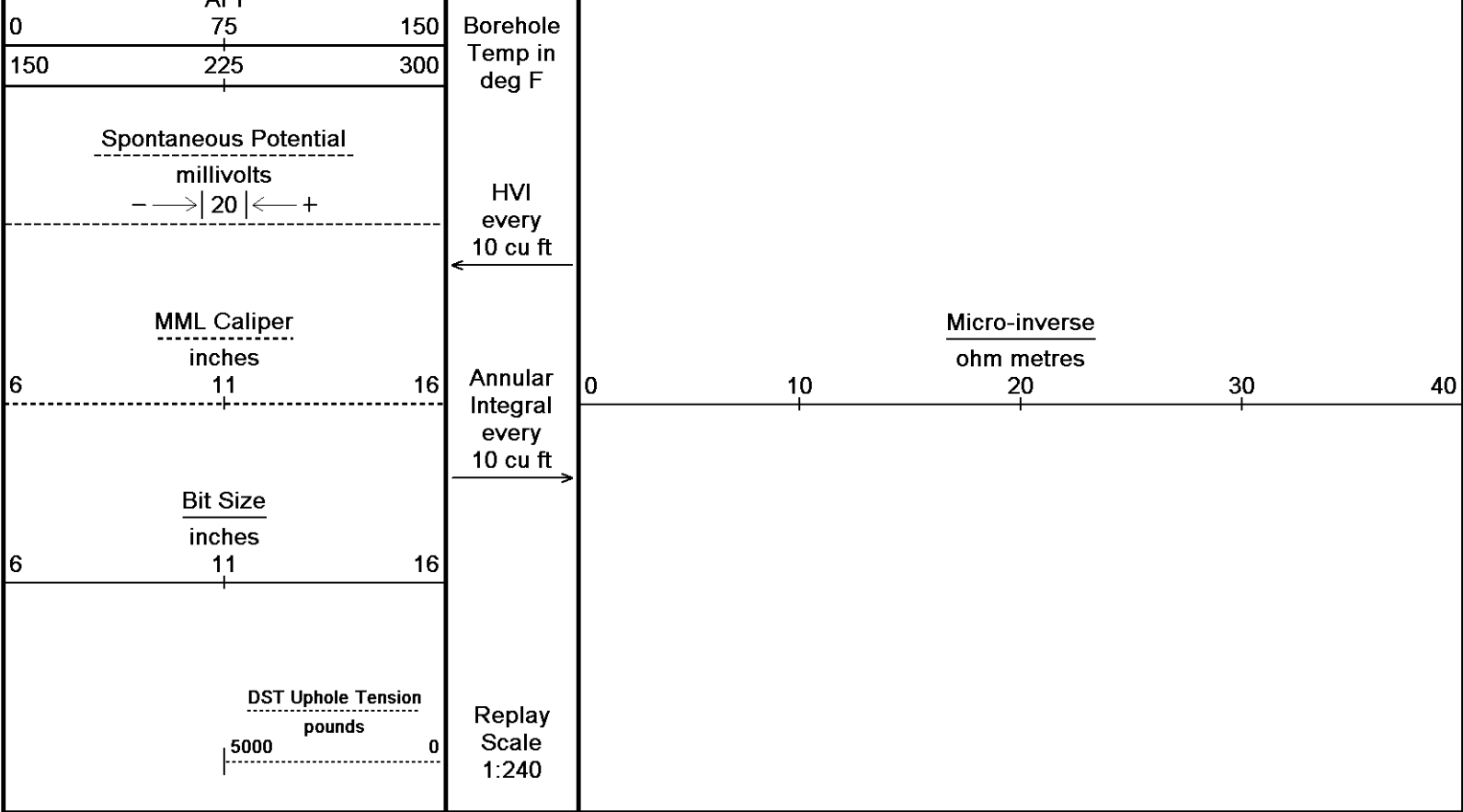
Timing Marks
every 60.0 sec

Gamma Ray
API



Micro-normal
ohm metres

0 10 20 30 40



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 20-SEP-2013 15:01

Filename: C:\Minimus 13.05.9583\Log\Shakespeare Tucker #2-9\Shakespeare Tucker #2-9_001.dta

Recorded on 20-SEP-2013 13:10

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Log\Shakespeare Tucker #2-9\Shakespeare Tucker #2-9_002 spooled section.dta

General Constants All 000			Last Edited on 20-SEP-2013,11:53	
General Parameters				
Mud Resistivity	0.720	ohm-metres		
Mud Resistivity Temperature	81.000	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	4.500	inches		
Caliper for Differential Caliper	Density Caliper			
Rwa Parameters				
Porosity used	Base Density Porosity			
Resistivity used	Array Ind. Six 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 20-SEP-2013 12:33
Reading No	Measured	Calibrated (lbs)	
1	13525.61	0.00	
2	14214.48	470.00	

Gamma Calibration MCG-D.K 469			Field Calibration on 18-SEP-2013 10:56
	Measured	Calibrated (API)	
	27	42	

Background	67	46
Calibrator (Gross)	1127	771
Calibrator (Net)	1061	725

Gamma Constants MCG-D.K 469			Last Edited on 20-SEP-2013,11:53
Gamma Calibrator Number	GRC38		
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-AUG-2013,02:35
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MCG-D.K 469			Last Edited on 18-AUG-2013,02:35
Pre-filter Length	11		

SP Calibration MCG-D.K 469			Field Calibration on 12-SEP-2013 15:11
	Measured	Calibrated (mV)	
Reference 1	100.2	100.0	
Reference 2	-99.2	-100.1	

Neutron Calibration MDN-A.B 66					Base Calibration on 31-JUL-2013 10:25	
					Field Check on 18-SEP-2013 11:03	
Base Calibration						
		Measured		Calibrated (cps)		
		Near	Far	Near	Far	
		3180	99	3714	110	
Ratio		32.180		33.764		
Field Calibrator at Base				Calibrated (cps)		
				1617	2323	
Ratio				0.696		
Field Check				Calibrated (cps)		
				1626	2326	
Ratio				0.690		

Neutron Constants MDN-A.B 66			Last Edited on 18-SEP-2013,10:57
Neutron Source Id	P0204NN		
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	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-B.J 353			Base Calibration on 15-AUG-2013 09:33 Field Check on 18-SEP-2013 10:37
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	964.1	126.8	

Base Check		280.9			
Field Check		281.1			
FE Constants MFE-B.J 353					Last Edited on 18-SEP-2013,10:32
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	
Sonic Constants MSS-C.K 330					Last Edited on 29-JUN-2013,19:32
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		3-4' 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	
Sonde Mode		Compensated			
Hole Type		Open Hole			
Sonde Parameters					
		Measured	Calibrated		
Offset		N/A	0.0000		
Free Pipe		N/A	N/A		
Peak Amplitude Source		N/A			
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)	N/A		
N/A	N/A	N/A			
N/A	N/A	N/A	N/A		
N/A	N/A	N/A	N/A		
N/A	N/A	N/A	N/A		
N/A	N/A	N/A	N/A		
Full Waveform Parameters					
Use 3' Waveform to derive TR		N/A			
Use 4' Waveform to derive TR		N/A			
Use 5' Waveform to derive TR		N/A			
Use 6' Waveform to derive TR		N/A			
3' Waveform Discriminator Level		N/A		mV	
4' Waveform Discriminator Level		N/A		mV	
5' Waveform Discriminator Level		N/A		mV	
6' Waveform Discriminator Level		N/A		mV	
3' Waveform Filter		N/A			
4' Waveform Filter		N/A			
5' Waveform Filter		N/A			
6' Waveform Filter		N/A			
Semblance Level		N/A			
Semblance Window Width		N/A		micro-sec	
Sonic 1 Despiker		N/A		N/A	

Induction Calibration MAI-A.A 167

Base Calibration on 19-APR-2013,13:41

Field Check on 18-SEP-2013 10:27

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			13.2	3838.7
2			29.6	3476.3
3			29.2	3052.4
4			19.8	2081.2
Deep			18.7	2048.5
Medium			42.3	3990.4
Shallow			43.0	5053.3

Array Temperature 75.7 Deg F

Induction Constants MAI-A.A 167

Last Edited on 18-SEP-2013,10:24

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	60.00	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-AUG-2013,02:21

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

Pre-filter Length 11

Caliper Calibration MML-A 3

Base Calibration on 15-AUG-2013 08:50

Field Calibration on 18-SEP-2013 10:50

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14887	5.98
2	18120	7.97
3	21042	9.86
4	25322	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.08	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 15-AUG-2013 09:16

Field Check on 18-SEP-2013 10:45

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.3	60.3	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 3

Last Edited on 18-SEP-2013,10:44

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 MPD-B 64

Base Calibration on 15-AUG-2013 14:54

Field Calibration on 18-SEP-2013 10:44

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16560	3.99
2	24992	5.98
3	32880	7.97
4	41184	9.86
5	50688	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.04	5.96

Photo Density Calibration MPD-B 64

Base Calibration on 15-AUG-2013 14:37

Field Check on 18-SEP-2013 10:42

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	60206	33560	59556	30836
Reference 2	25378	2915	24941	2541

Field Check at Base

1155.1	1345.7
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Field Check

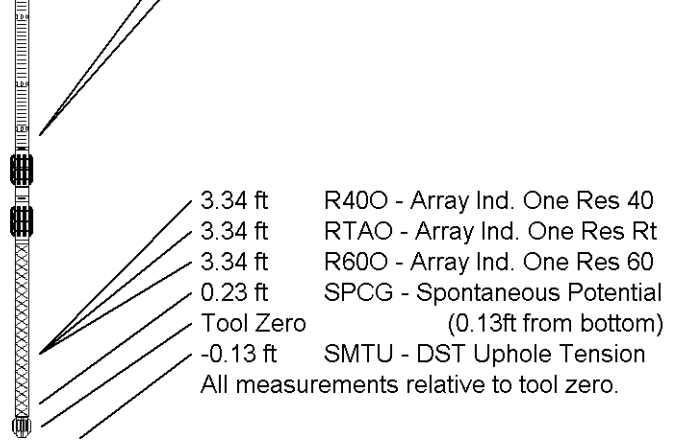
1158.4	1339.4
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PE Calibration

Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	211	1029		
Reference 1	22957	60005	0.386	0.371
Reference 2	6004	25228	0.276	0.272

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 62.25 ft Weight: 471.8 lb



COMPANY	SHAKESPEARE OIL INC.
WELL	TUCKER #2-9
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3149.00	feet	First Reading	4816.00	feet
Elevation Drill Floor	3147.00	feet	Depth Driller	4865.00	feet
Elevation Ground Level	3139.00	feet	Depth Logger	4862.00	feet



Weatherford®

MICRORESISTIVITY LOG