



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY		SHAKESPEARE OIL CO., INC.		
WELL		CARSON 3-25		
FIELD		PENCE EAST		
PROVINCE/COUNTY		SCOTT		
COUNTRY/STATE		U.S.A. / KANSAS		
LOCATION		1000' FSL & 1600' FWL		
SEC 25	TWP 16S	RGE 34W	Other Services	
Latitude			MPD/MDN	MAI
Longitude			MSS	
API Number	15-171-21064			
Permanent Datum GL, Elevation 3102 feet				Elevations: feet
Log Measured From KB				KB 3114.00
Drilling Measured From KB				DF 3112.00
				GL 3102.00
Date	08-JUN-2014			
Run Number	ONE			
Service Order	4558-89434029			
Depth Driller	4870.00			
Depth Logger	4869.00			
First Reading	4829.00			
Last Reading	3750.00			
Casing Driller	266.00			
Casing Logger	267.00			
Bit Size	7.875			
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg			
PH / Fluid Loss	10.50			
Sample Source	MUDPIT			
Rm @ Measured Temp	0.57 @ 70.0			
Rmf @ Measured Temp	0.46 @ 70.0			
Rmc @ Measured Temp	0.68 @ 70.0			
Source Rmf / Rmc	CALC			
Rm @ BHT	0.35 @115.0			
Time Since Circulation	4 HOURS			
Max Recorded Temp	115.00			
Equipment / Base	13244			
Recorded By	ADAM SILL			
Witnessed By	WES HANSON			
JOB #	LB14-174			

BOREHOLE RECORD					Last Edited: 08-JUN-2014 15:40
Bit Size inches		Depth From feet		Depth To feet	
7.875		265.00		4870.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	265.00	24.00	

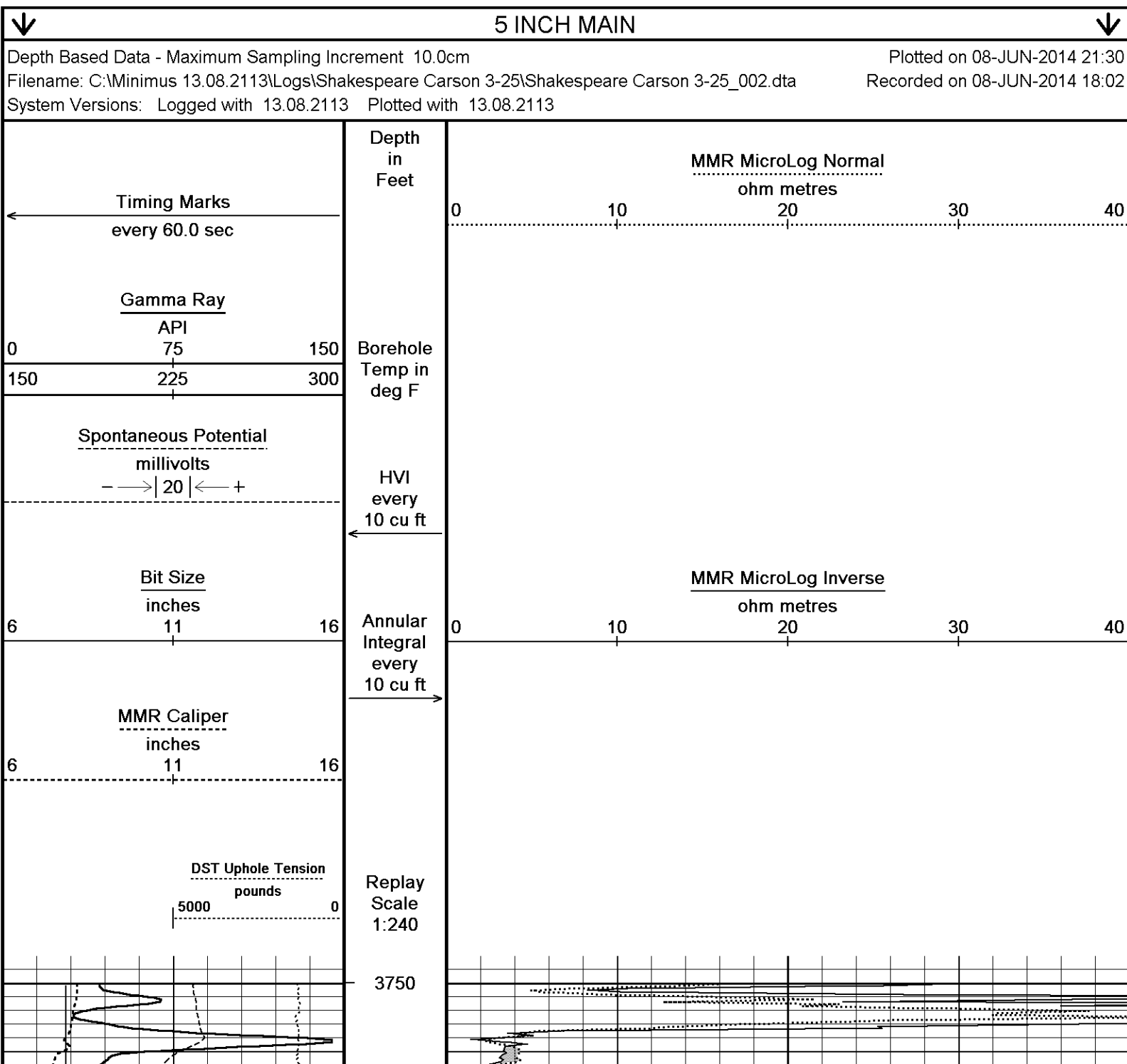
REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MSS, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2141 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3750 FEET: 198 CU.FT.
- RIG: SOUTHWIND #70

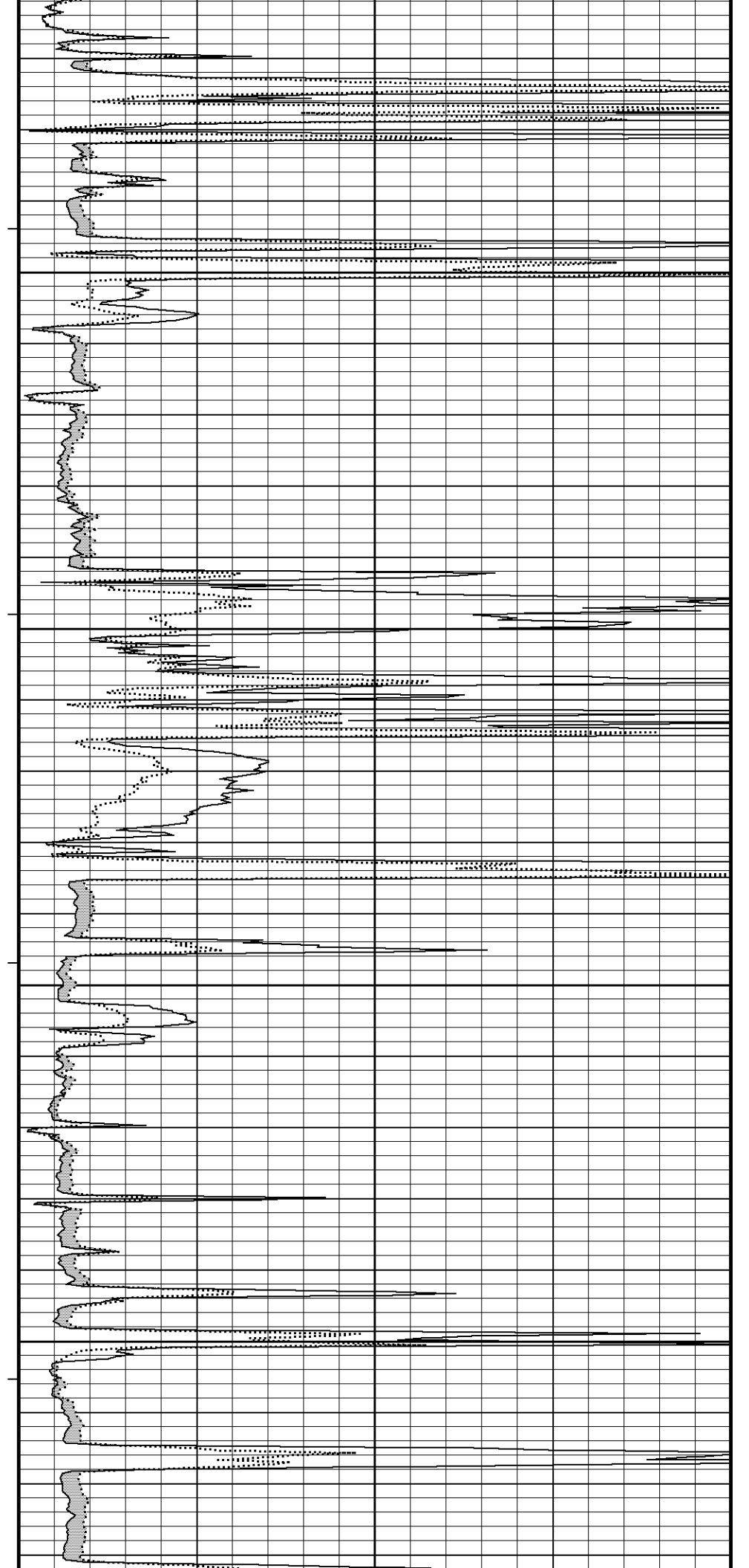
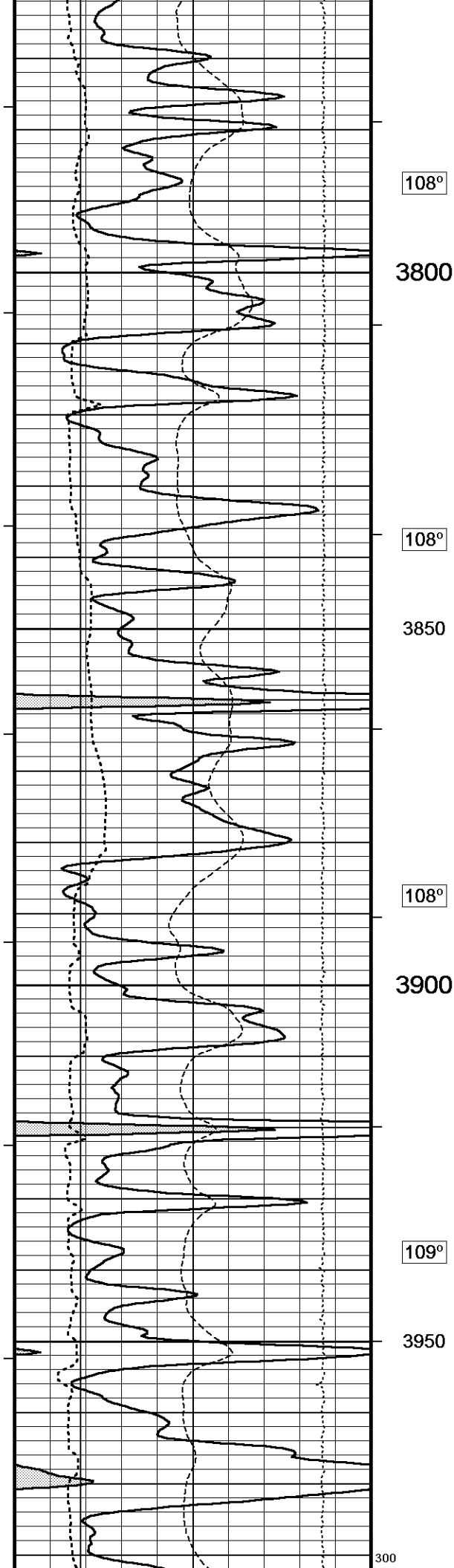
RIS: 000THWIND #70.

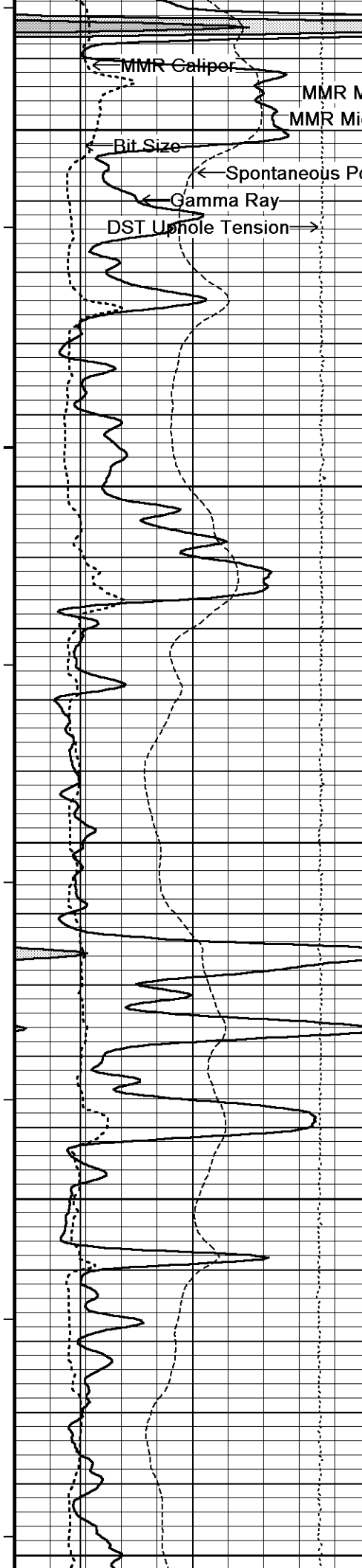
- ENGINEER: A. SILL.

- OPERATOR: K. RINEHART.

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.







109°

4000

109°

4050

109°

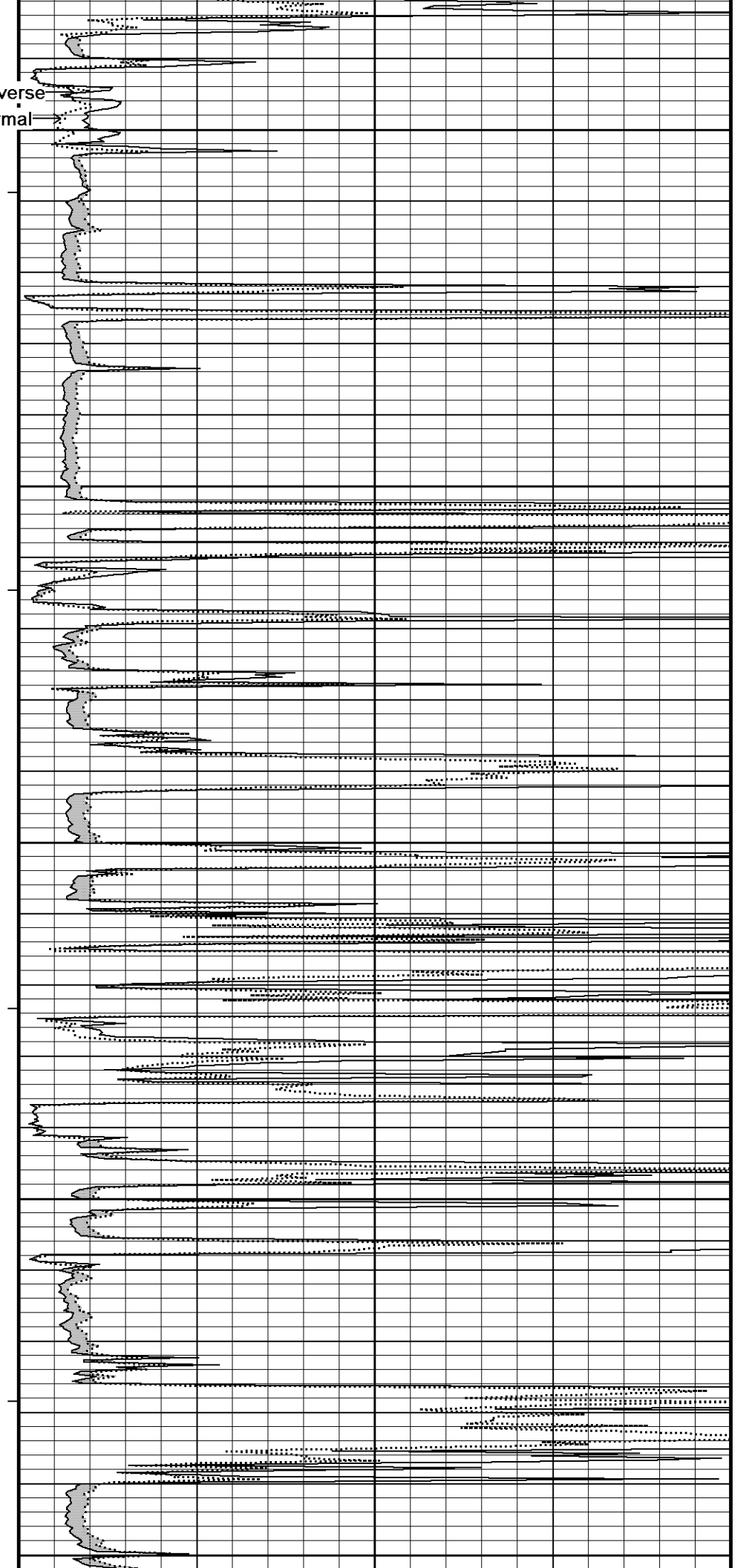
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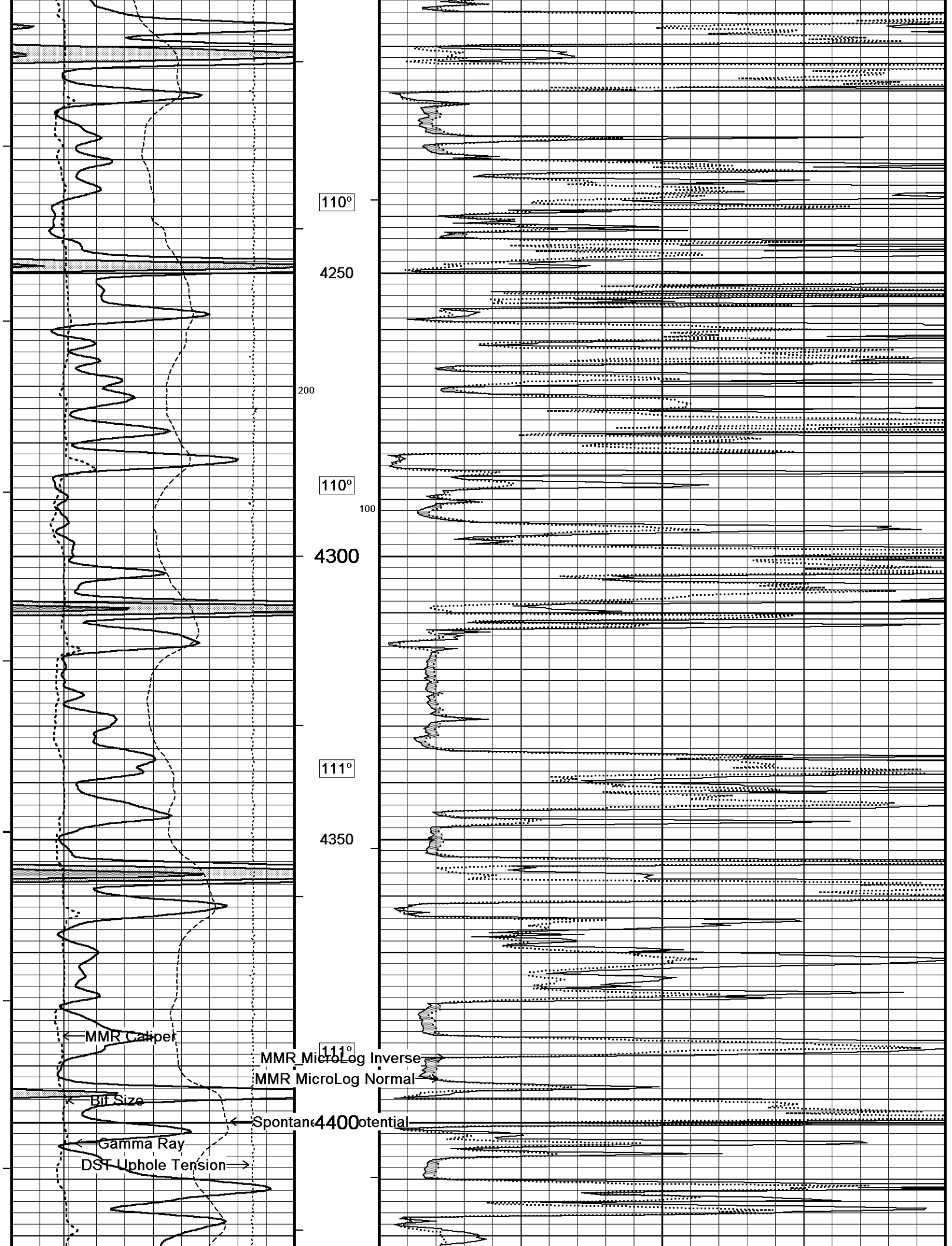
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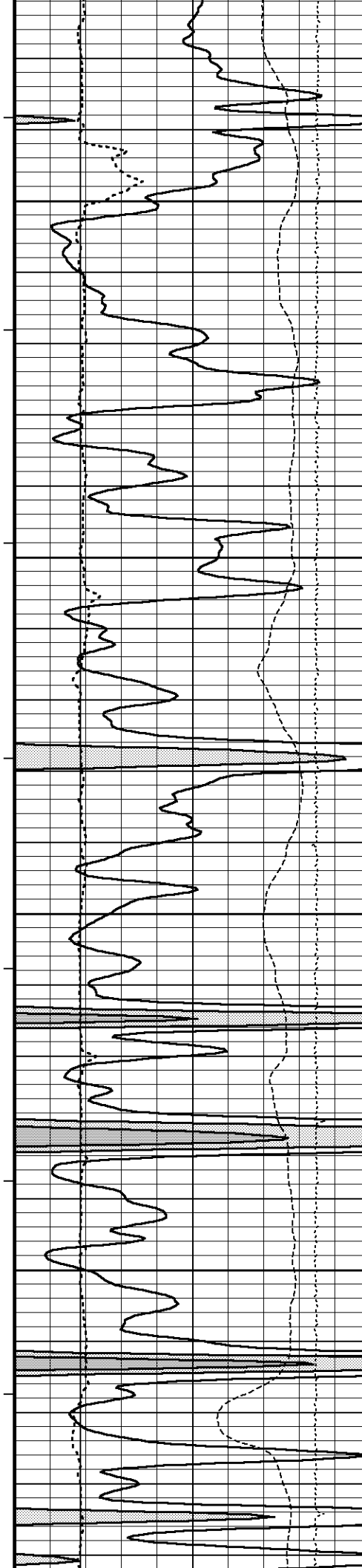
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110°

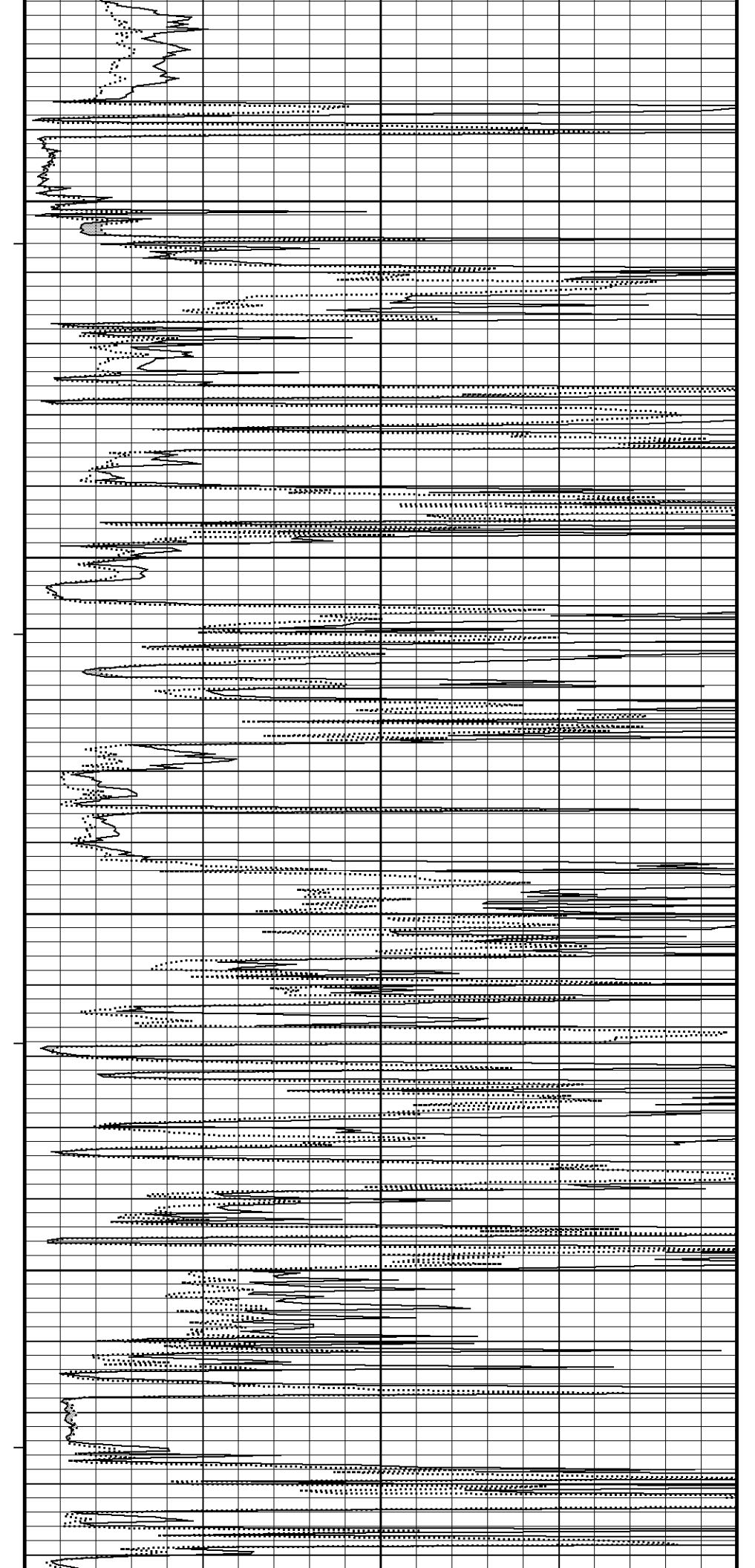
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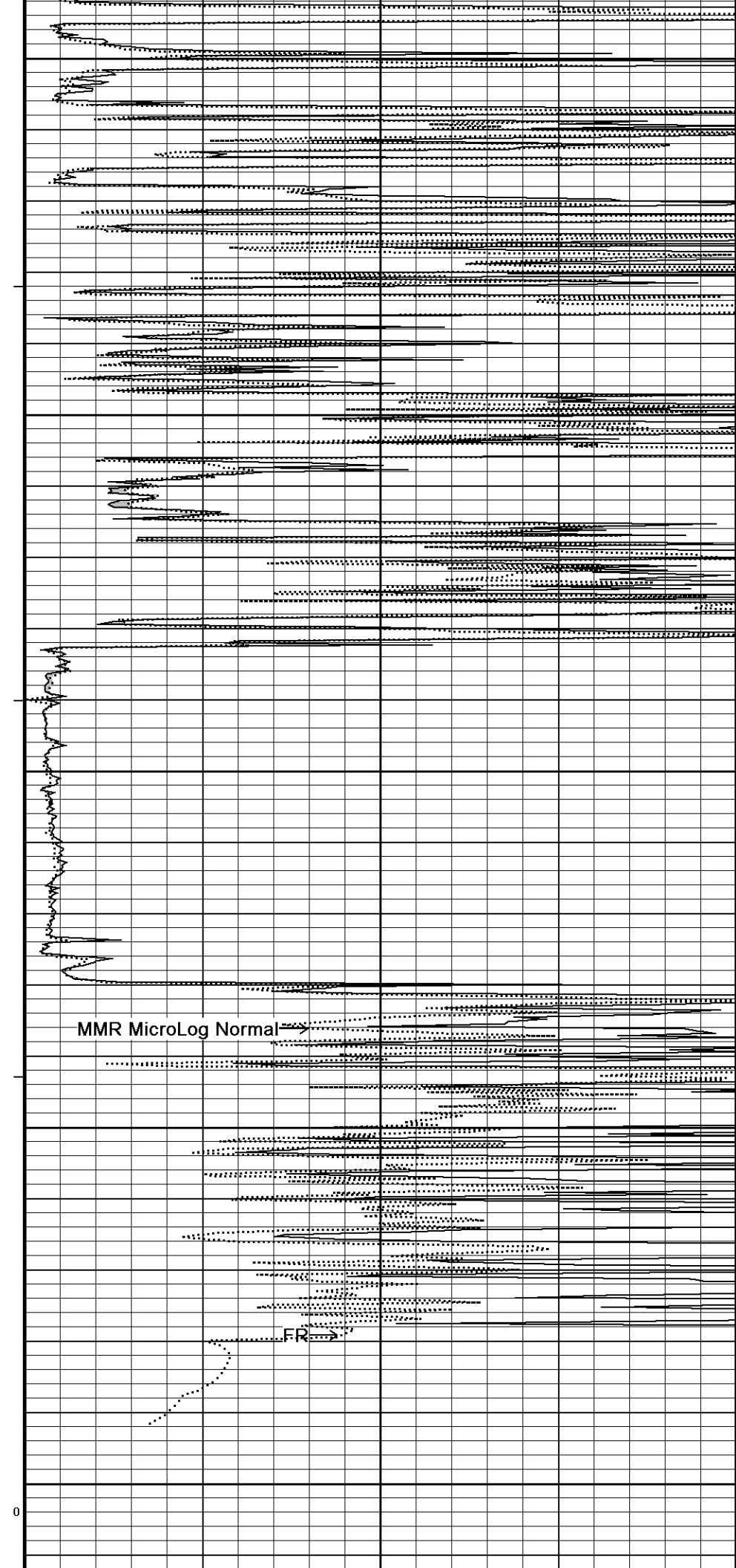
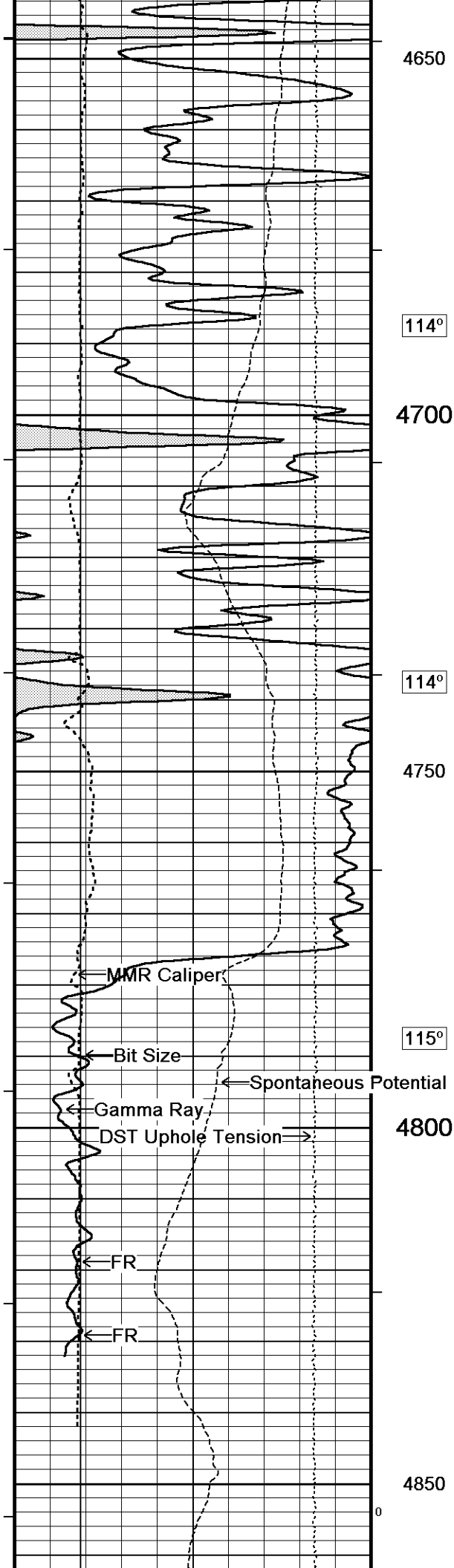


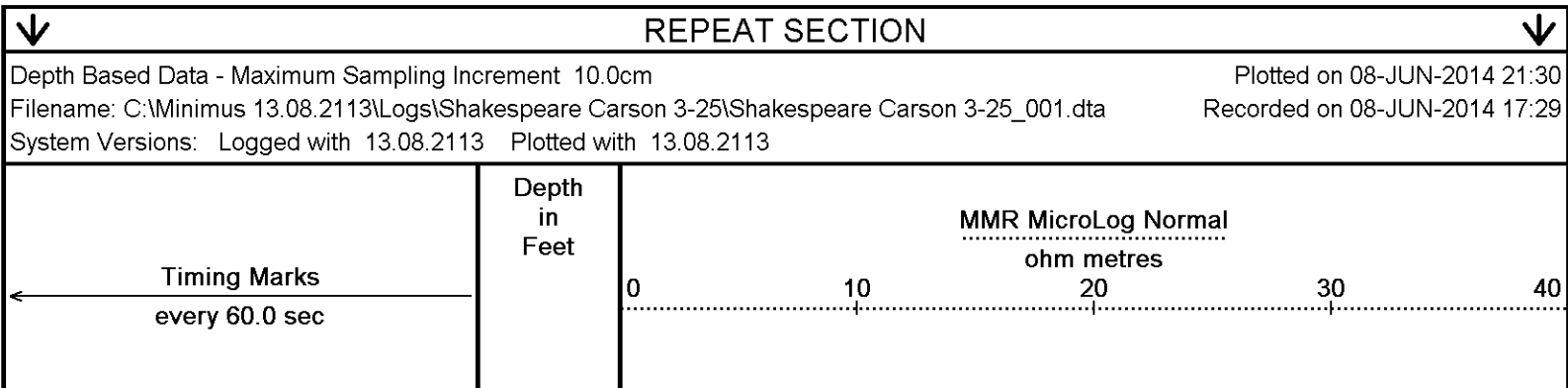
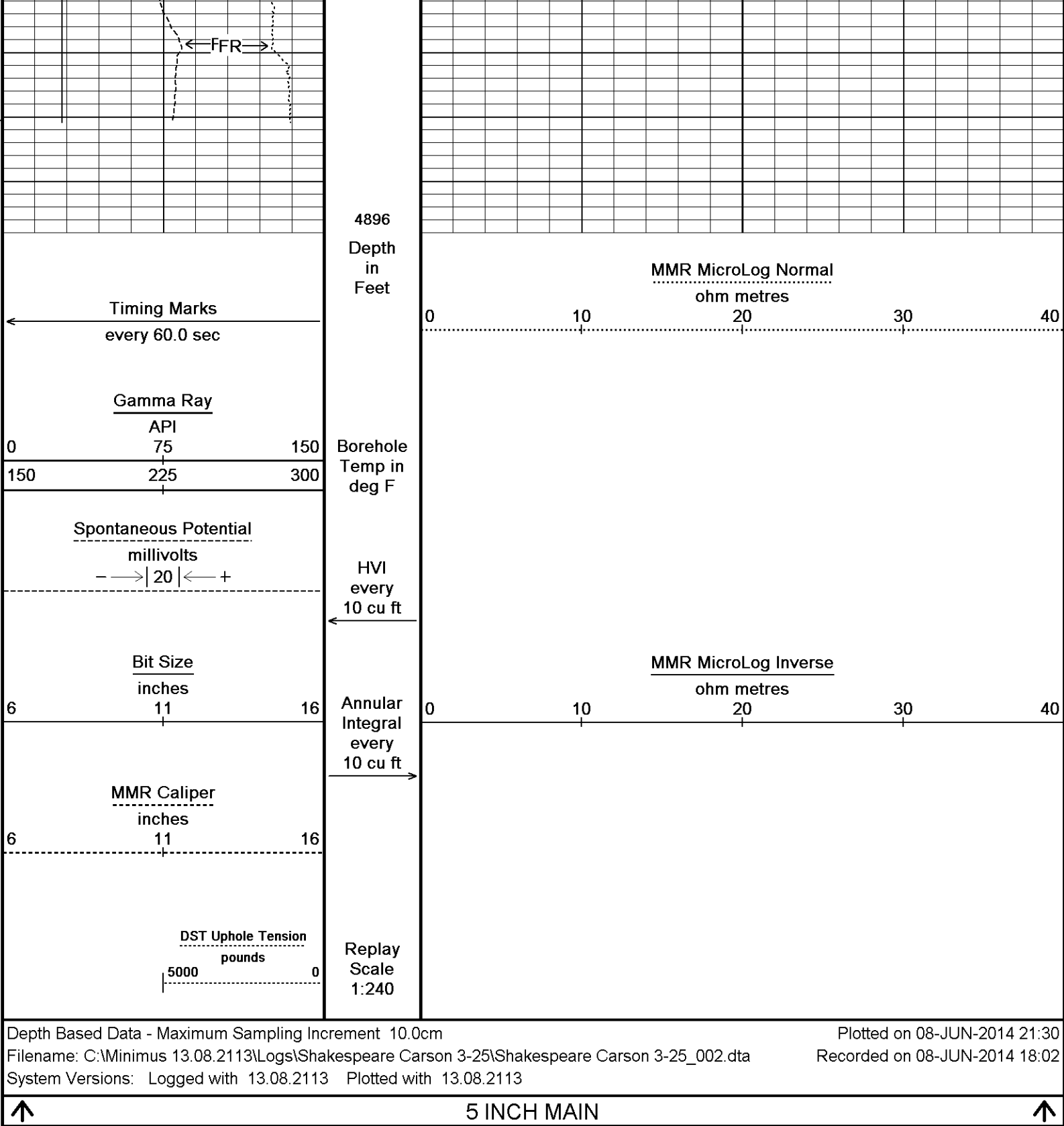


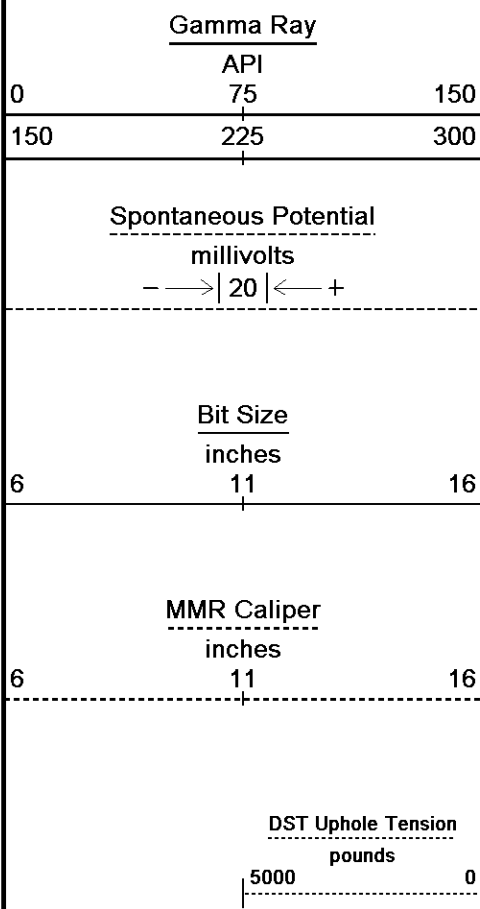


111°
4450
111°
4500
112°
4550
100
112°
4600
113°









Borehole
Temp in
deg F

HVI
every
10 cu ft
←

Annular
Integral
every
10 cu ft
→

Replay
Scale
1:240

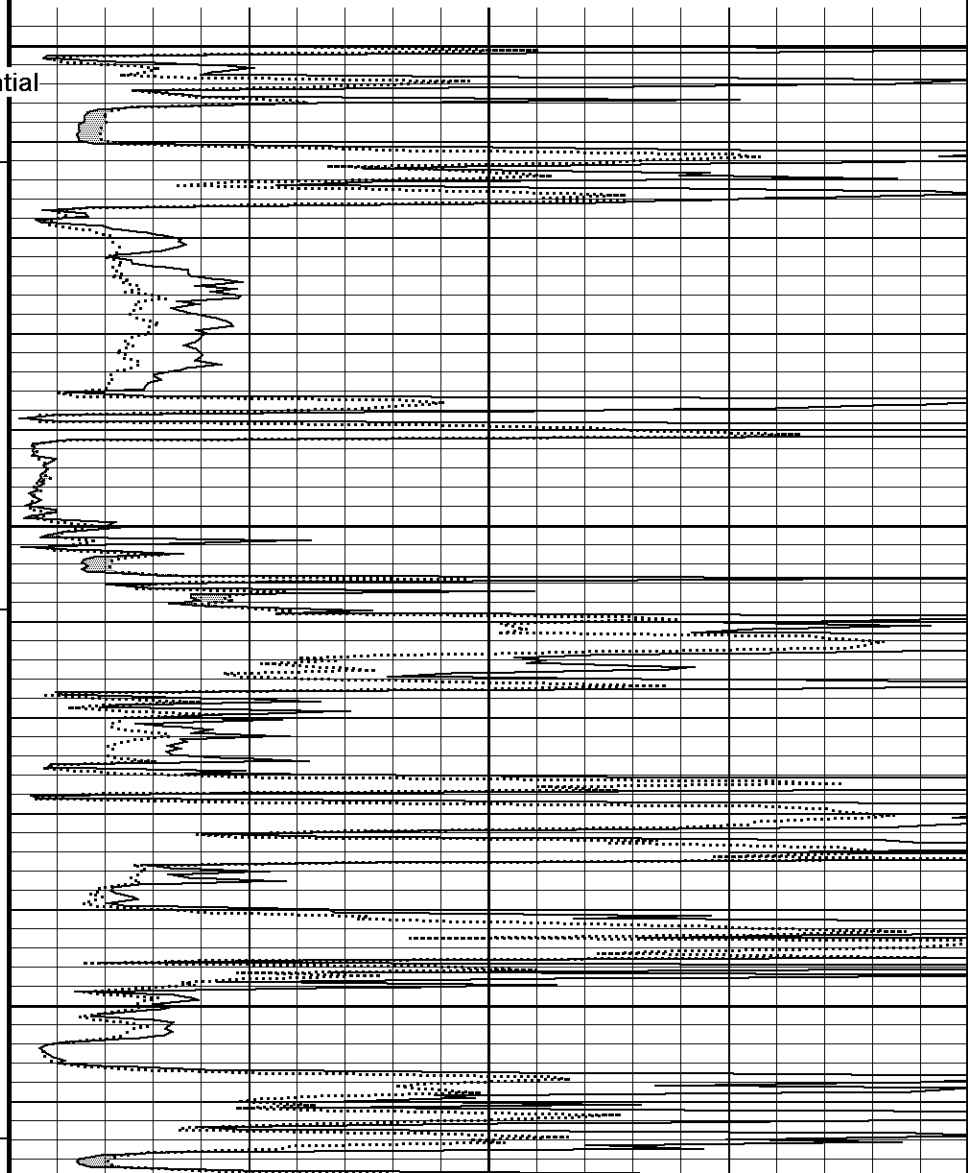
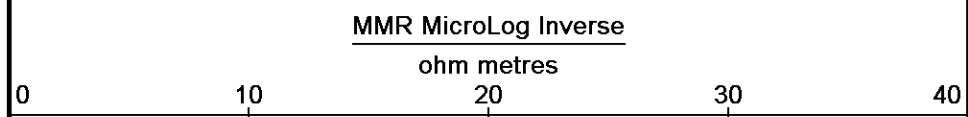
4400

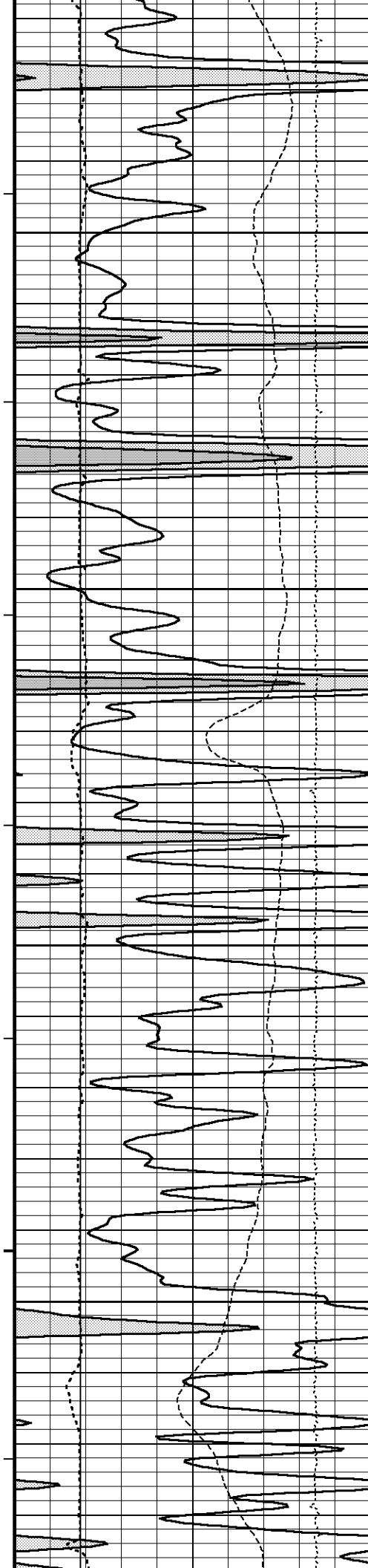
110°

4450

111°

4500





111°

4550

100

112°

4600

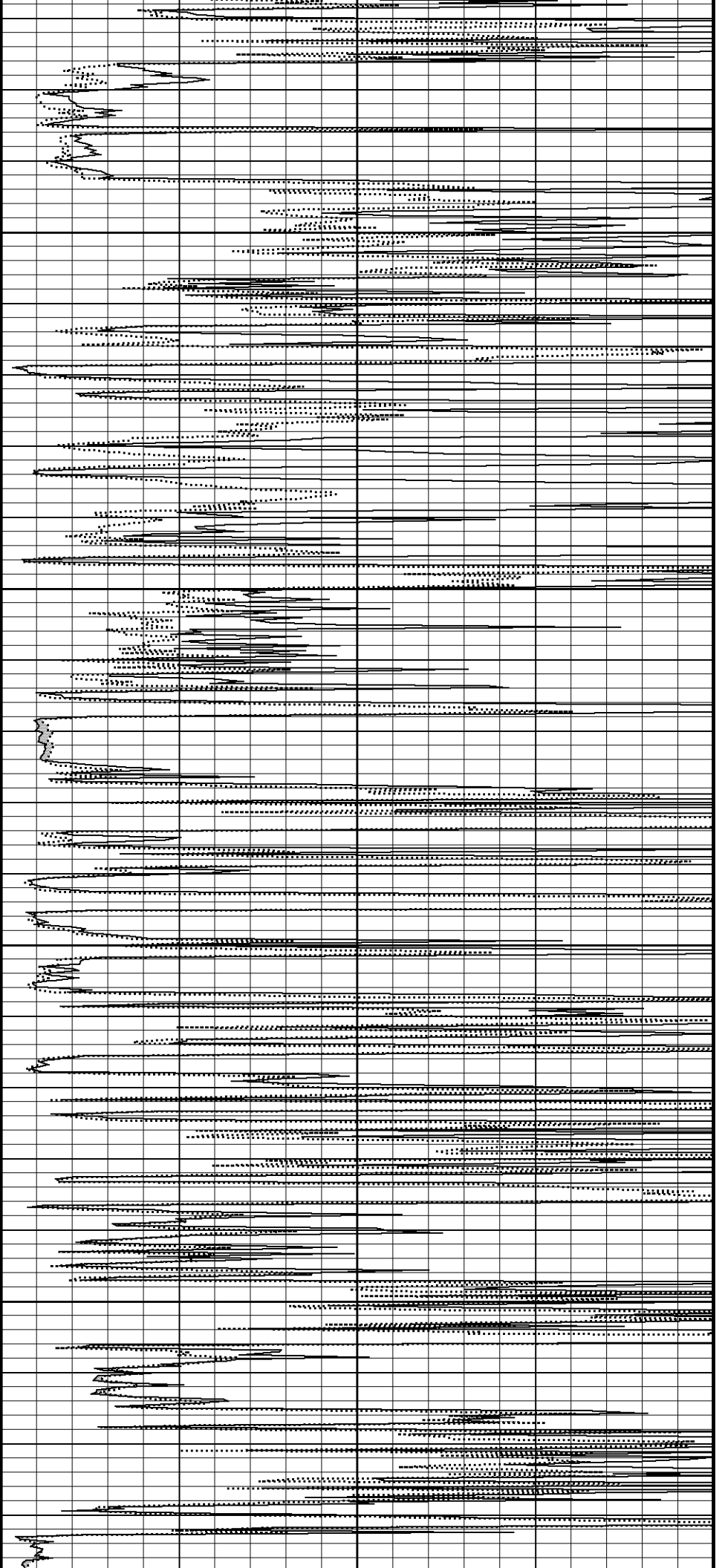
112°

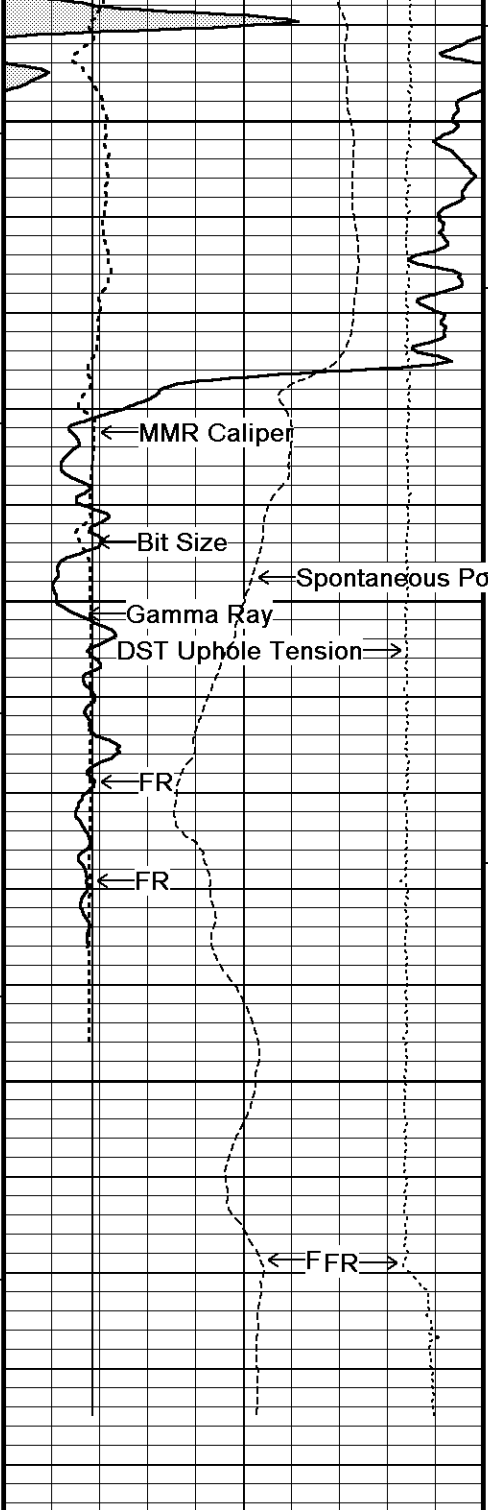
4650

113°

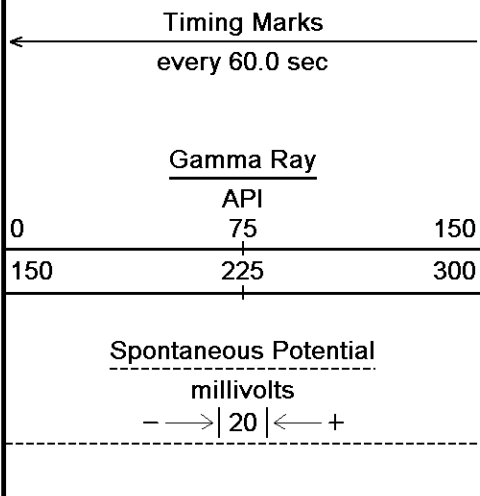
4700

1120



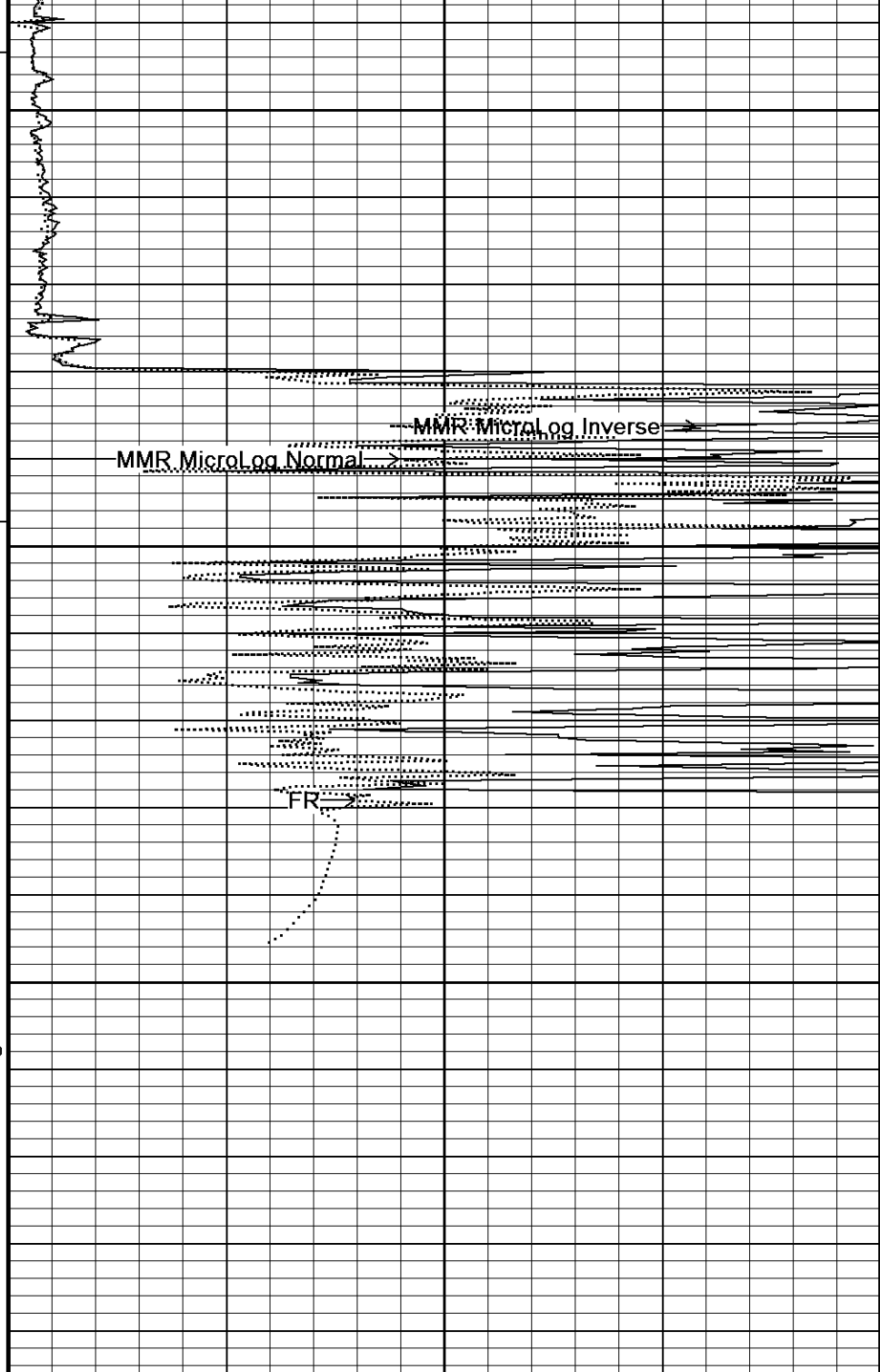


115
4750
114°
4800
112°
4850
0
4892
Depth
in
Feet

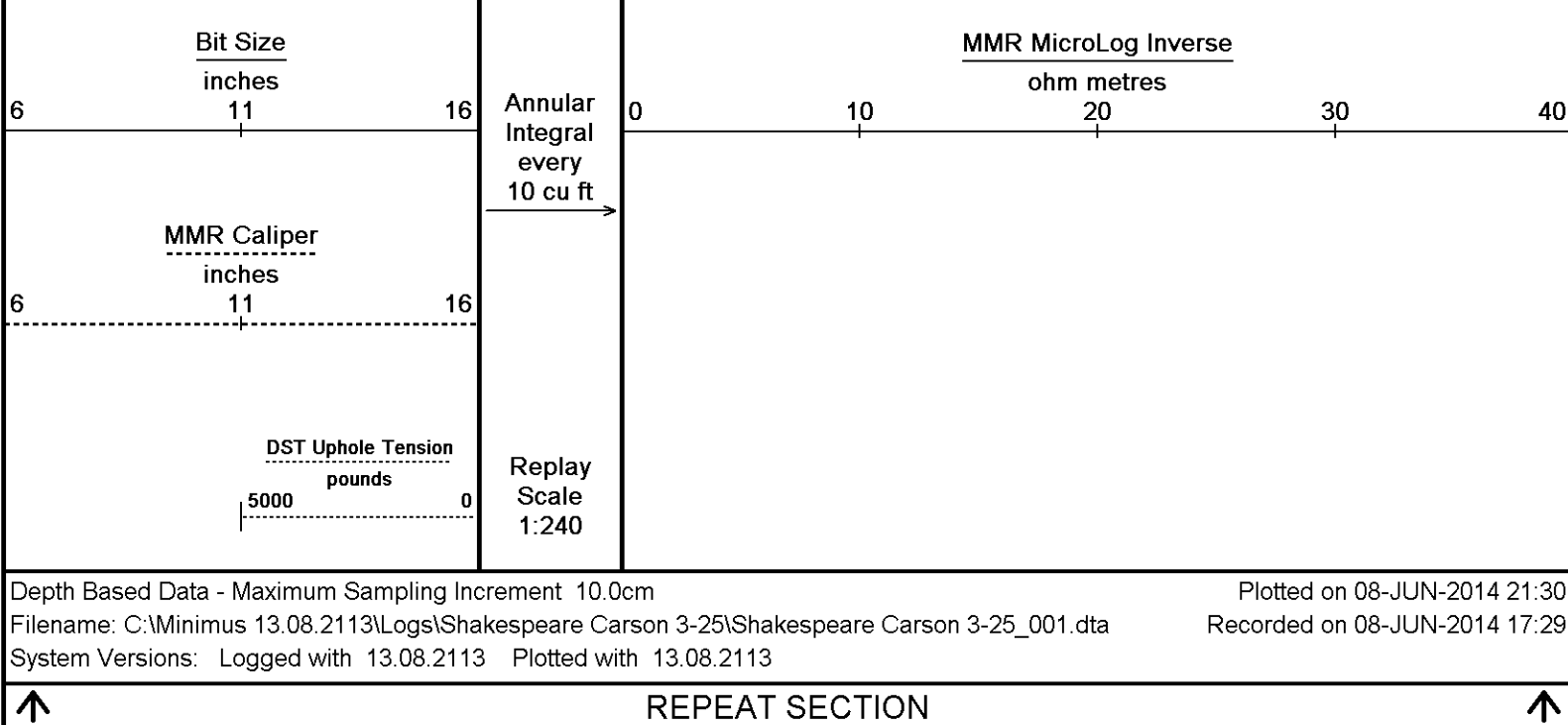


Borehole
Temp in
deg F

HVI
every
10 cu ft



MMR MicroLog Normal
ohm metres
0 10 20 30 40



BEFORE SURVEY CALIBRATION		
C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_001.dta		
General Constants All 000		Last Edited on 08-JUN-2014,16:12
General Parameters Mud Resistivity0.570ohm-metres Mud Resistivity Temperature70.000degrees F Water Level0.000feet Borehole Fluid ProcessingWet Hole Hole/Annular Volume and Differential Caliper Parameters HVOL MethodSingle Caliper HVOL Caliper 1Density Caliper HVOL Caliper 2N/A Annular Volume Diameter5.500inches Caliper for Differential CaliperMMR Caliper Rwa Parameters Porosity usedCrossplot Porosity Resistivity usedArray Ind. One Res Rt RWA Constant A0.610 RWA Constant M2.150 SW/APOR Tool Source0.000		
Down-hole Tension Calibration SMS 0		Field Calibration on 06-JUN-2014 13:04
Reading No	Measured	Calibrated (lbs)
1	15091.74	0.00
2	15786.19	408.00
SP Calibration MCG-C 208		Field Calibration on 04-JUN-2014 10:39
	Measured	Calibrated (mV)
Reference 1	99.6	99.0
Reference 2	-98.1	-98.8
High Resolution Temperature Calibration MCG-C 208		Field Calibration on 23-JAN-2014,17:11
	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00
High Resolution Temperature Constants MCG-C 208		Last Edited on 23-JAN-2014,17:11
Pre filter Length	11	

Gamma Calibration MCG-C 208

Field Calibration on 04-JUN-2014 10:53

	Measured	Calibrated (API)
Background	68	46
Calibrator (Gross)	1134	771
Calibrator (Net)	1067	725

Gamma Constants MCG-C 208

Last Edited on 08-JUN-2014,15:53

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	%

Caliper Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:28

Field Calibration on 04-JUN-2014 10:29

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13446	5.98
2	16585	7.97
3	19782	9.86
4	23693	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.02	7.97

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:40

Field Check on 04-JUN-2014 10:27

Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated Resistor 1	Resistor 2
Micro Normal	10.1	49.8	5.1	25.6
Micro Inverse	9.9	49.5	3.4	16.9
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal		93.6		93.6
Micro Inverse		62.2		62.2

Micro Normal and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

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	0.0000	inches

Neutron Calibration MDN-B.J 387

Base Calibration on 08-MAY-2014 14:03

Field Check on 04-JUN-2014 10:59

Base Calibration				
	Near	Measured Far	Near	Calibrated Far (cps)
	2970	91	3714	110
Ratio		32.668		33.764
Field Calibrator at Base				Calibrated (cps)
			1688	2486
Ratio				0.679
Field Check				Calibrated (cps)
			1689	2475
Ratio				0.683

Neutron Constants MDN-B.J 387

Last Edited on 08-JUN-2014,15:53

Neutron Source Id	P58125B
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	

Sonic Constants MSS-A.A 73

Last Edited on 08-JUN-2014,15:53

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

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		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	

Seismic Level	N/A
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Semblance Level	N/A	micro-sec
Semblance Window Width	N/A	N/A
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50

Field Check on 04-JUN-2014 10:24

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			15.3	3863.0
2			31.7	3590.9
3			29.7	2971.5
4			20.7	2126.3
Deep			18.4	1912.3
Medium			42.9	3861.3
Shallow			47.2	5372.6

Array Temperature 79.2 Deg F

Induction Constants MAI-A.A 5

Last Edited on 08-JUN-2014,16:02

Induction Model

RtAP-NC

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 5

Field Calibration on 21-JAN-2014,15:43

Measured Calibrated(Deg F)

0.00
0.00
0.00

0.00
0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_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-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity

MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

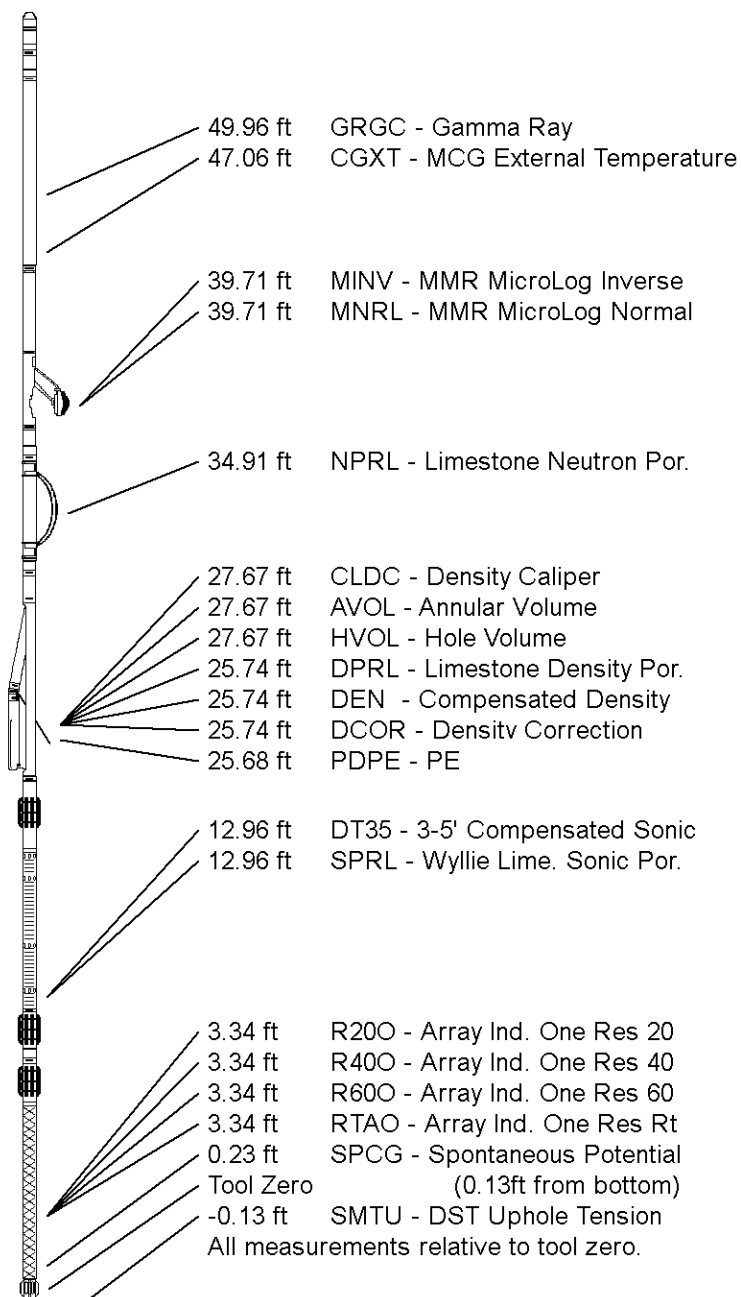
Compact Sonic

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

Compact Induction

MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 57.64 ft Weight: 432.1 lb



COMPANY

SHAKESPEARE OIL CO., INC.

WELL

CARSON 3-25

FIELD

PENCE EAST

PROVINCE/COUNTY

SCOTT

COUNTRY/STATE

U.S.A. / KANSAS

Elevation Kelly Bushing 3114.00 feet

Elevation Drill Floor 3112.00 feet

Elevation Ground Level 3102.00 feet

First Reading 4829.00 feet

Depth Driller 4870.00 feet

Depth Logger 4869.00 feet



MICRORESISTIVITY LOG

