



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY			K3 OIL & GAS OPERATING COMPANY		
WELL			CATHERINE COBERLY UNIT 30-14		
FIELD			WILDCAT		
PROVINCE/COUNTY			GOVE		
COUNTRY/STATE			U.S.A. / KANSAS		
LOCATION			1209' FSL & 2495' FWL		
SEC 30	TWP 15S	RGE 28W	Other Services		MAI/MFE
Latitude			MPD/MDN		
Longitude			MSS		
API Number	15-063-22187				
Permanent Datum GL, Elevation 2542 feet					
Log Measured From KB					
Drilling Measured From KB					
Date	06-MAY-2014				
Run Number	ONE				
Service Order	4558-86610112				
Depth Driller	4425.00		feet		
Depth Logger	4429.00		feet		
First Reading	4383.00		feet		
Last Reading	3500.00		feet		
Casing Driller	268.00		feet		
Casing Logger	263.00		feet		
Bit Size	7.875		inches		
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.20 lb/Usg		54.00 CP		
PH / Fluid Loss	9.50		8.80 ml/30Min		
Sample Source	FLOWLINE				
Rm @ Measured Temp	0.71 @ 95.0		ohm-m		
Rmf @ Measured Temp	0.57 @ 95.0		ohm-m		
Rmc @ Measured Temp	0.85 @ 95.0		ohm-m		
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.56 @120.0		ohm-m		
Time Since Circulation	4 HOURS				
Max Recorded Temp	120.00		deg F		
Equipment / Base	13244		LIB		
Recorded By	ADAM SILL				
Witnessed By	PAT DEENIHAN				
JOB #	LB14-139				

BOREHOLE RECORD

Last Edited: 06-MAY-2014 22:44

Bit Size inches	Depth From feet	Depth To feet
7.875	268.00	4425.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	268.00	24.00

REMARKS

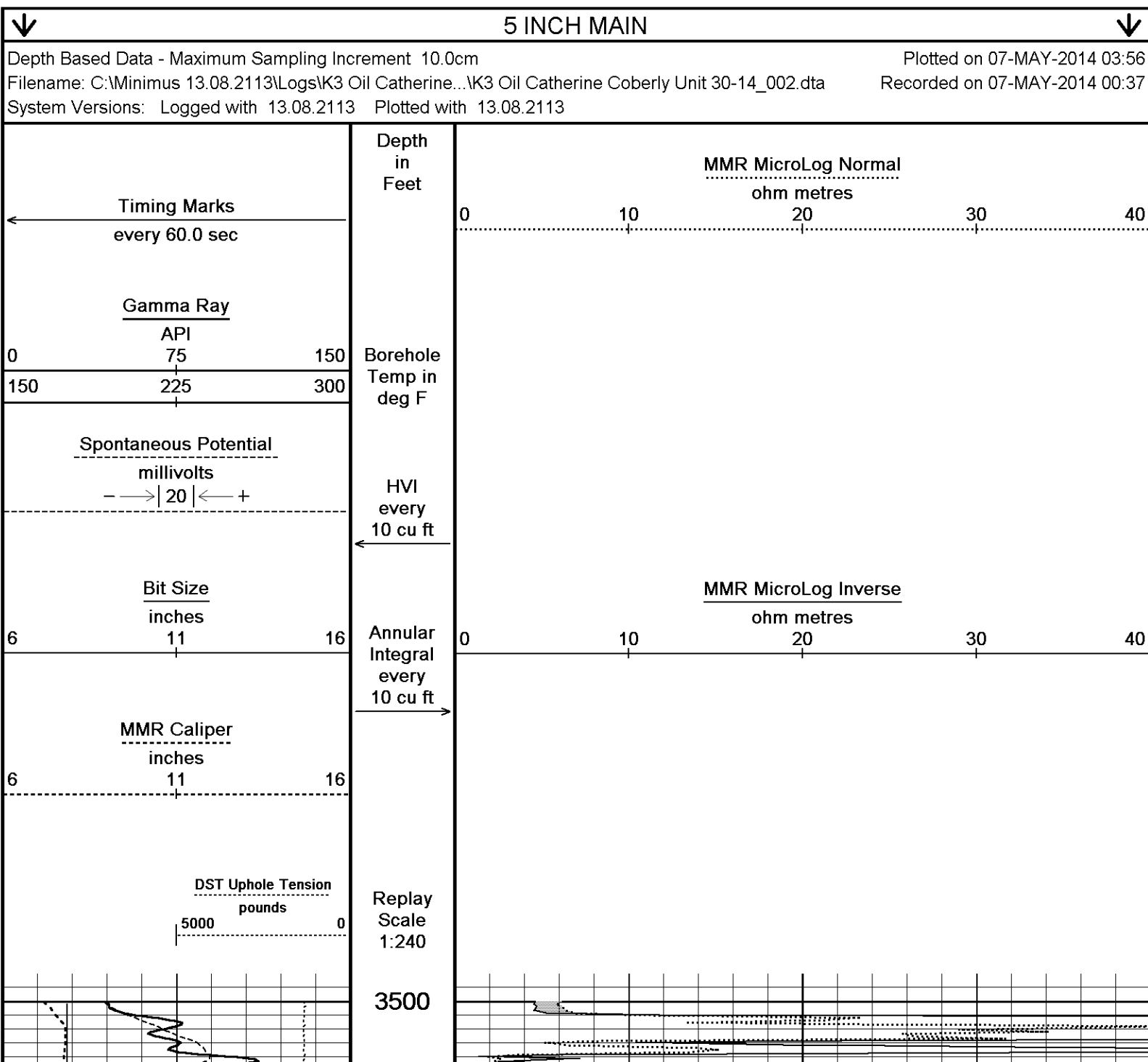
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS USED ON MSS.
 - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1801 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3500 FEET: 157 CU.FT.

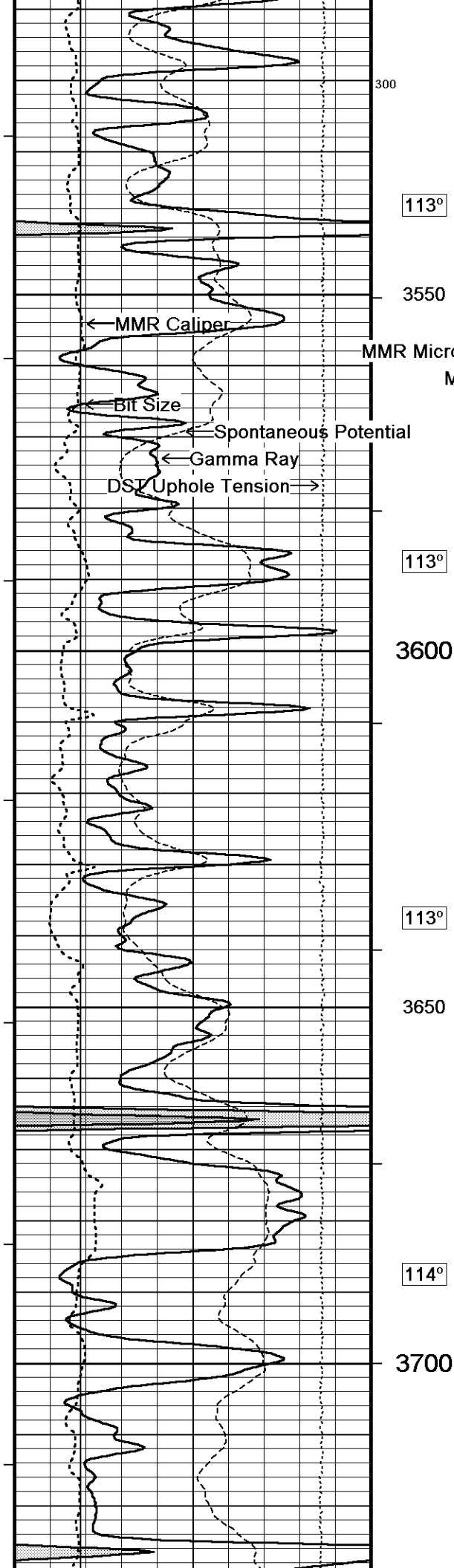
- RIG: DUKE #8.

- ENGINEER: A. SILL.

- OPERATOR: J. LaPOINT.

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.





113°

3550

MMR MicroLog Inverse

MMR MicroLog Normal

113°

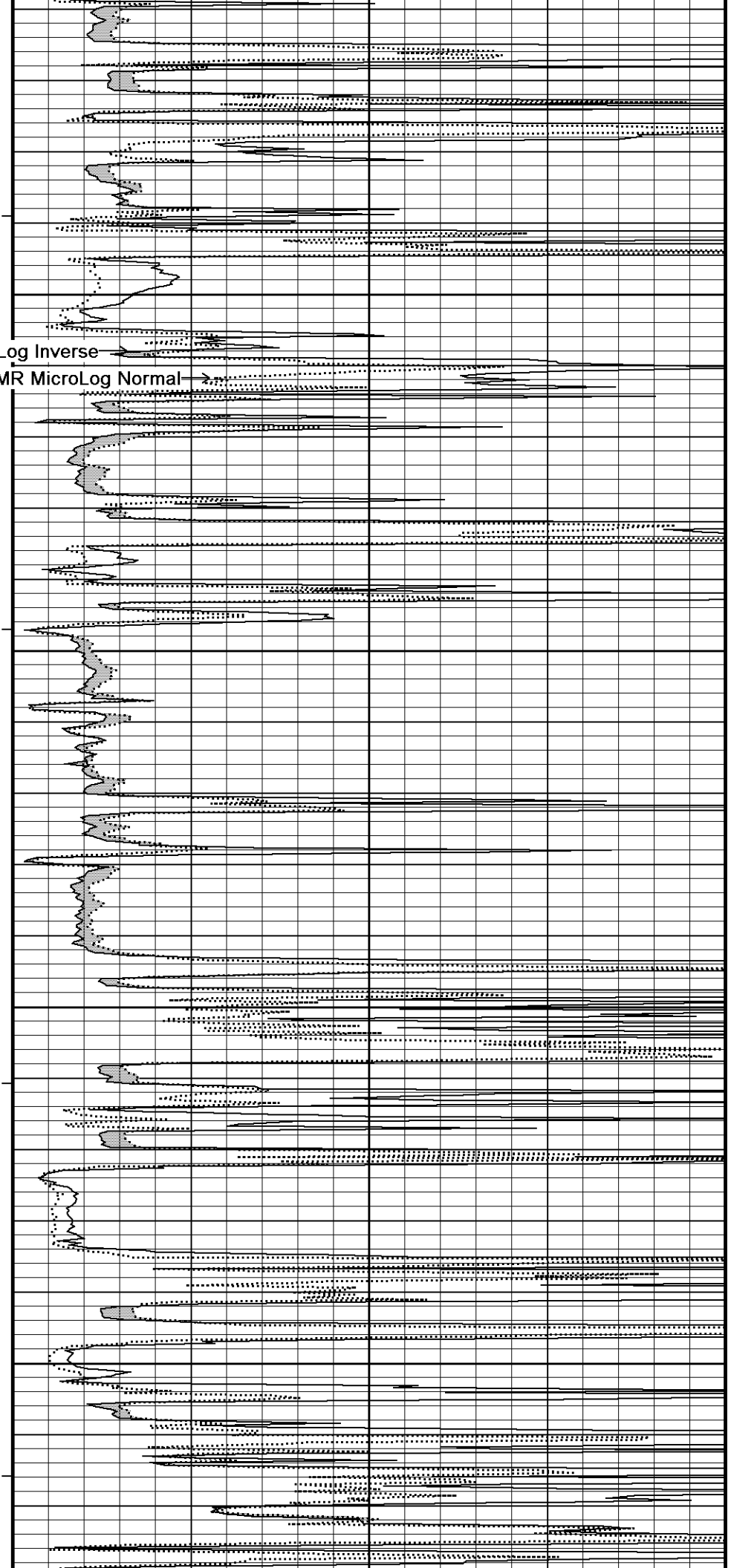
3600

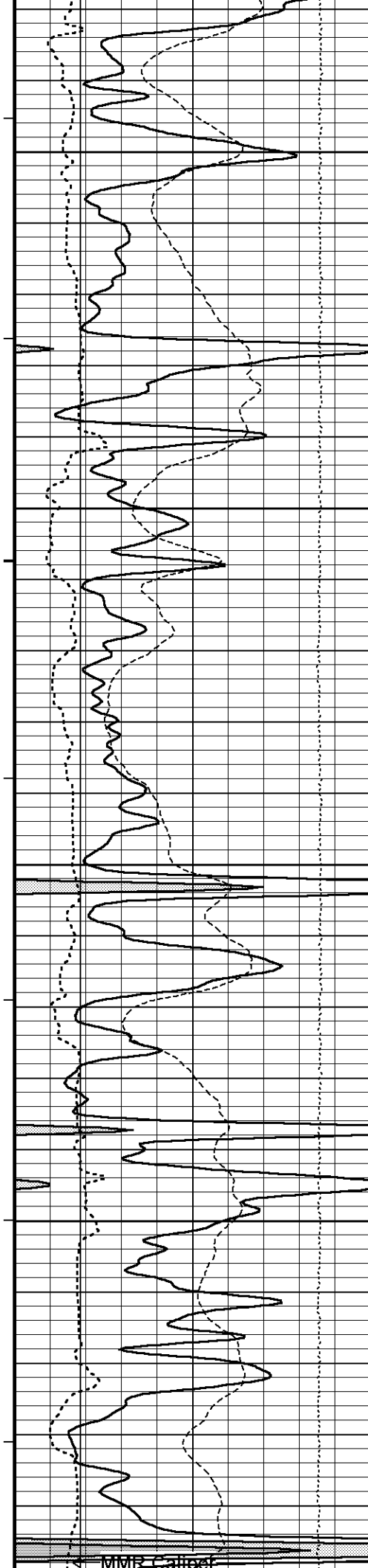
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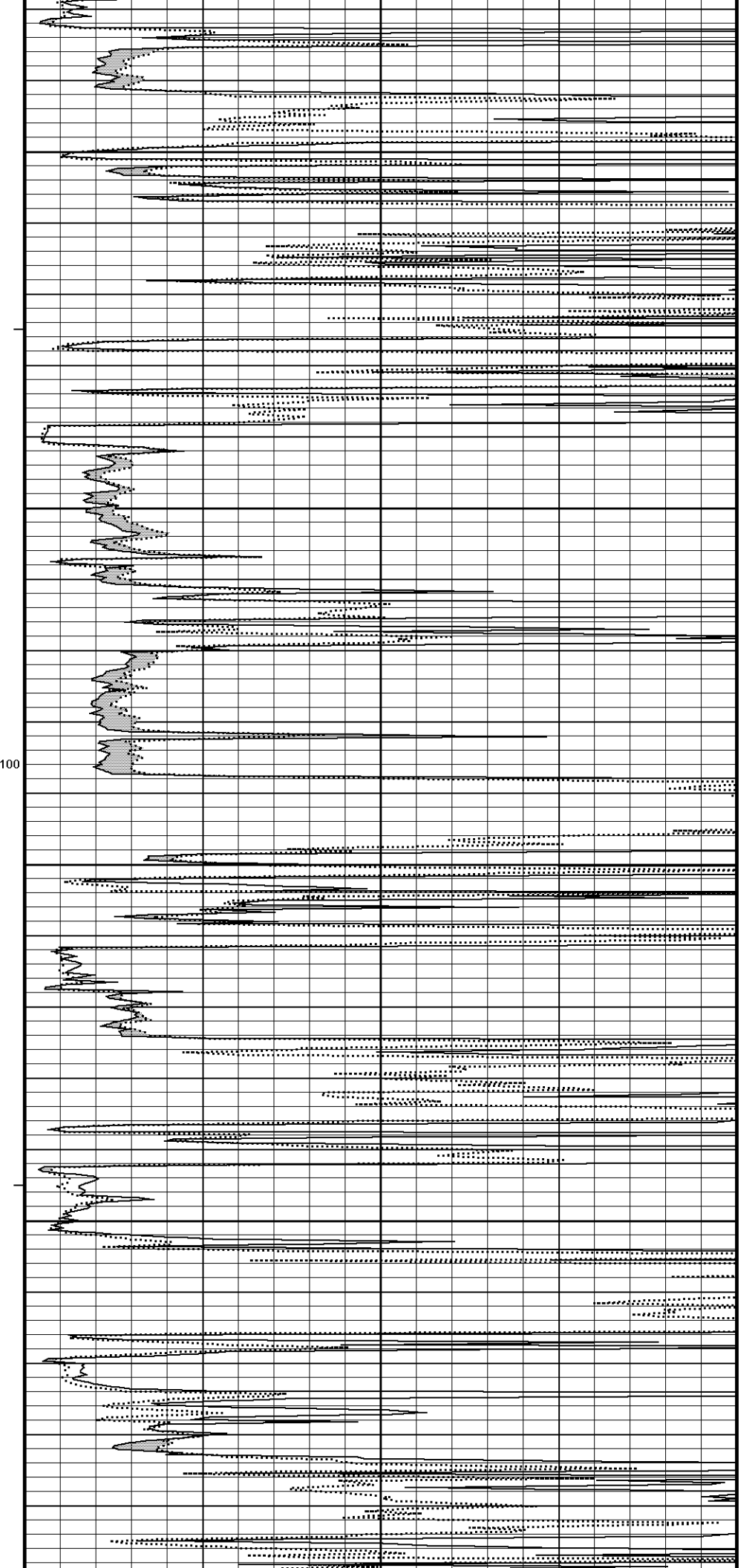
114°

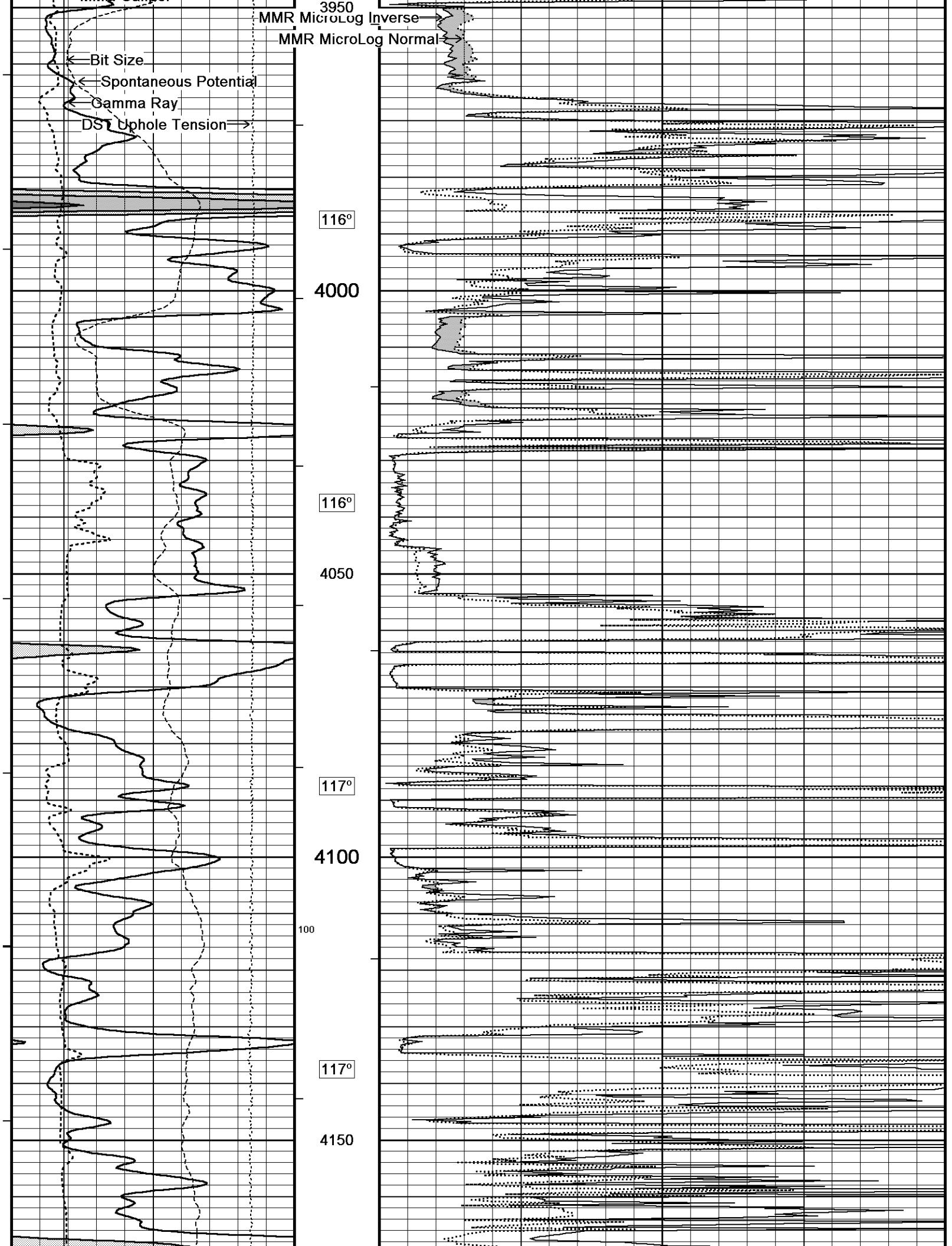
3700

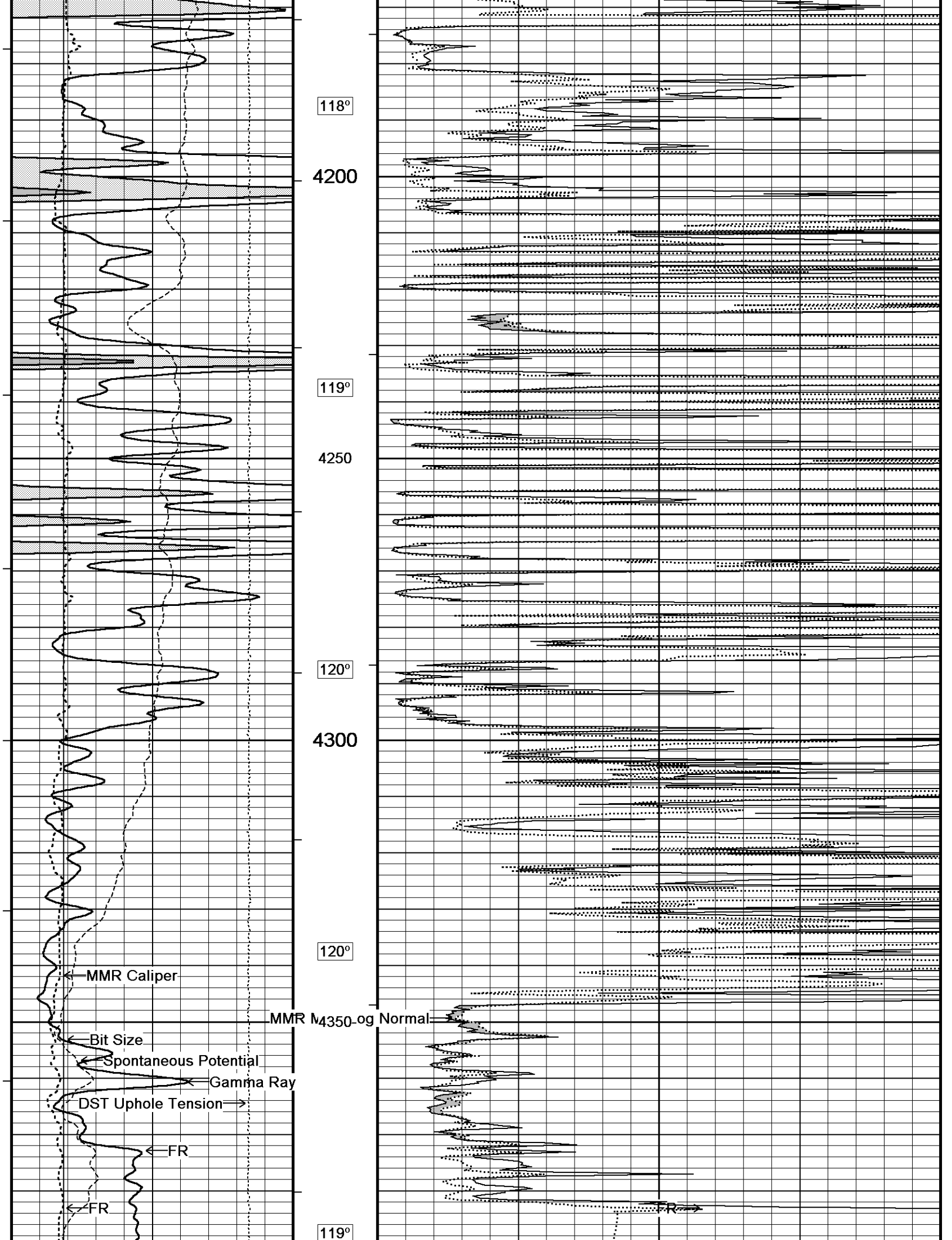


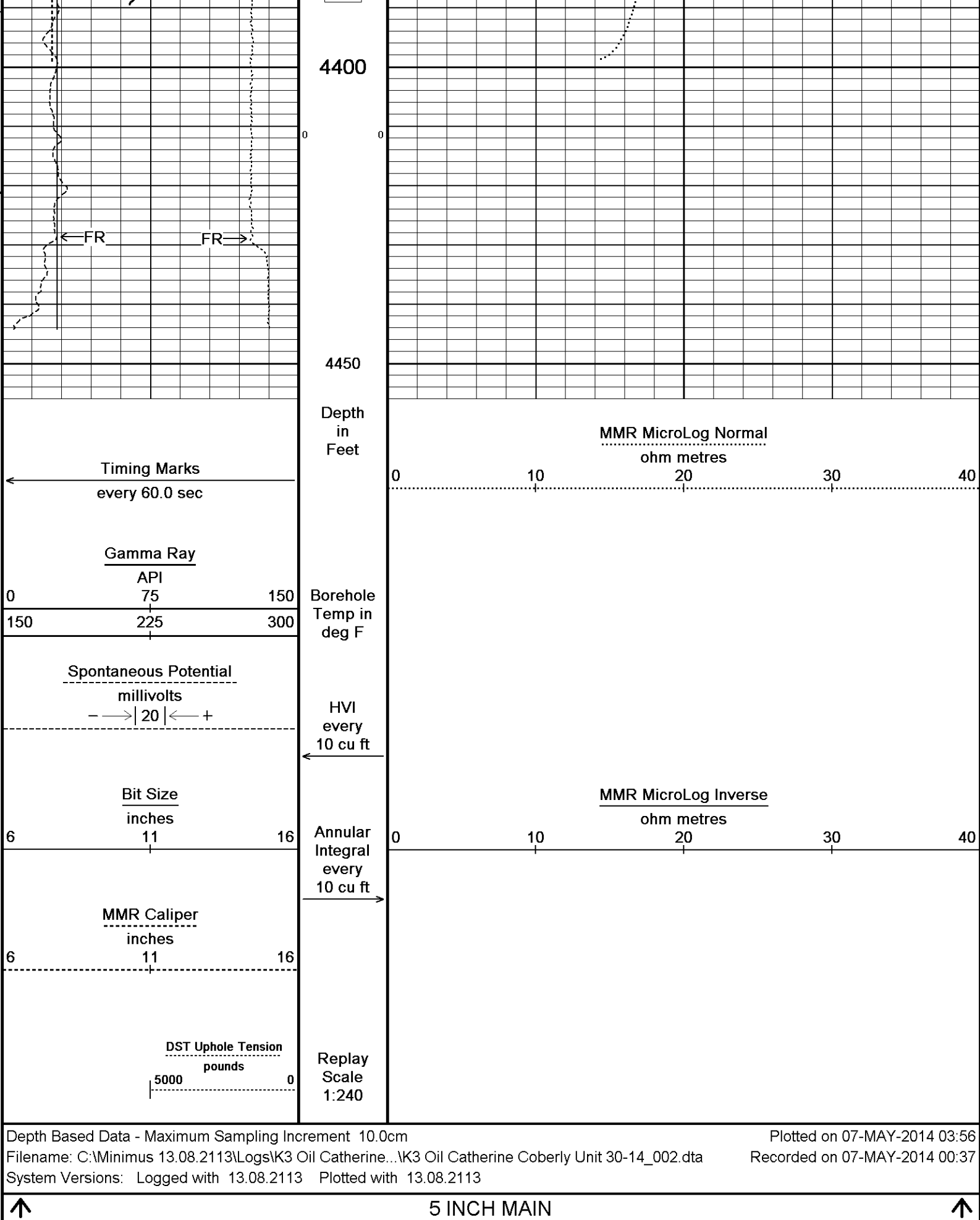


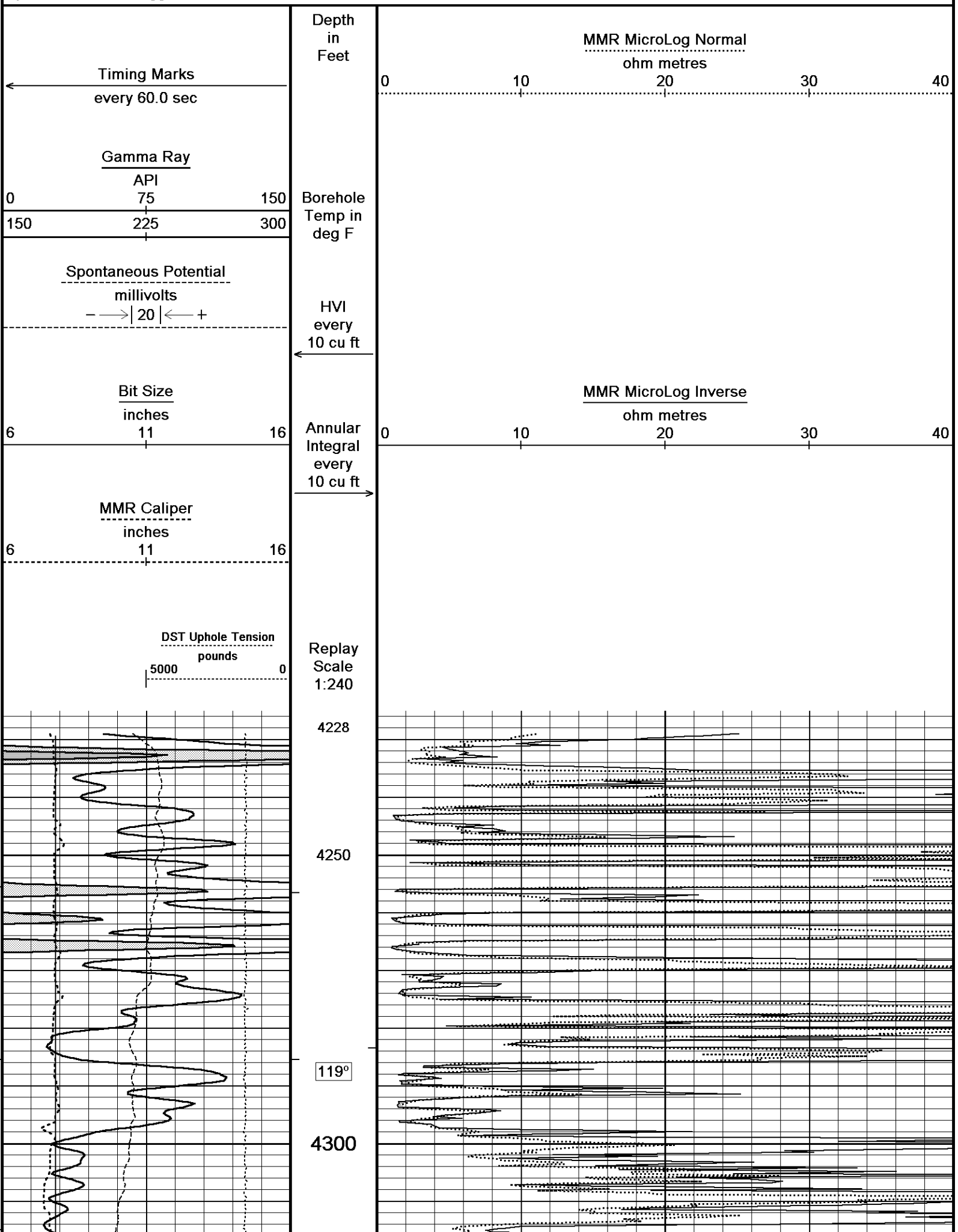
114°
3750
114°
3800
200
115° 100
3850
116°
3900
116°

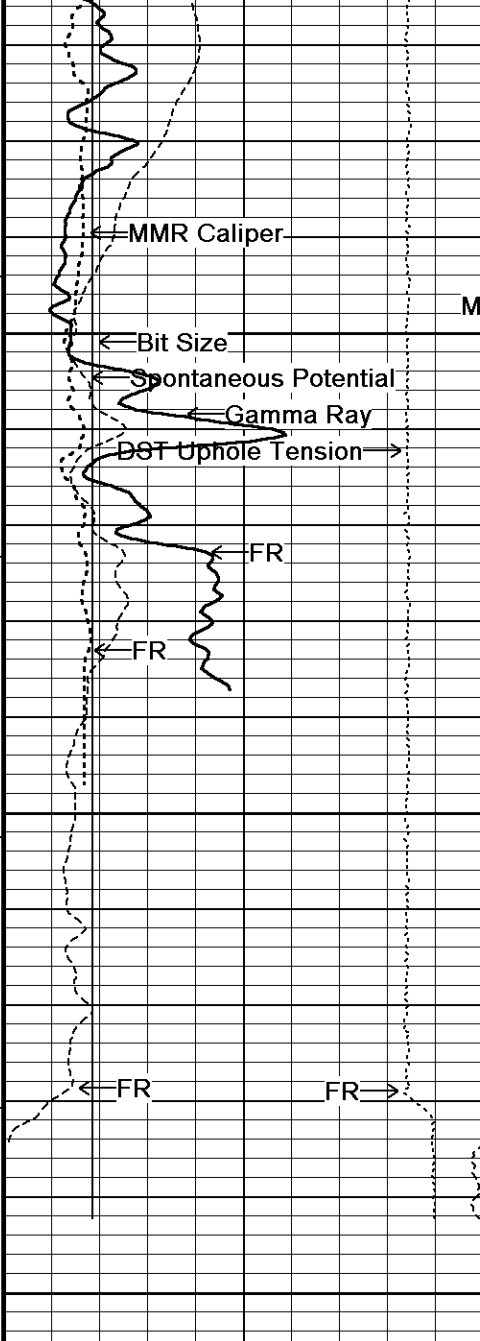












120°

MMR MicroLog Normal
4350

119°

4400

0

4450

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

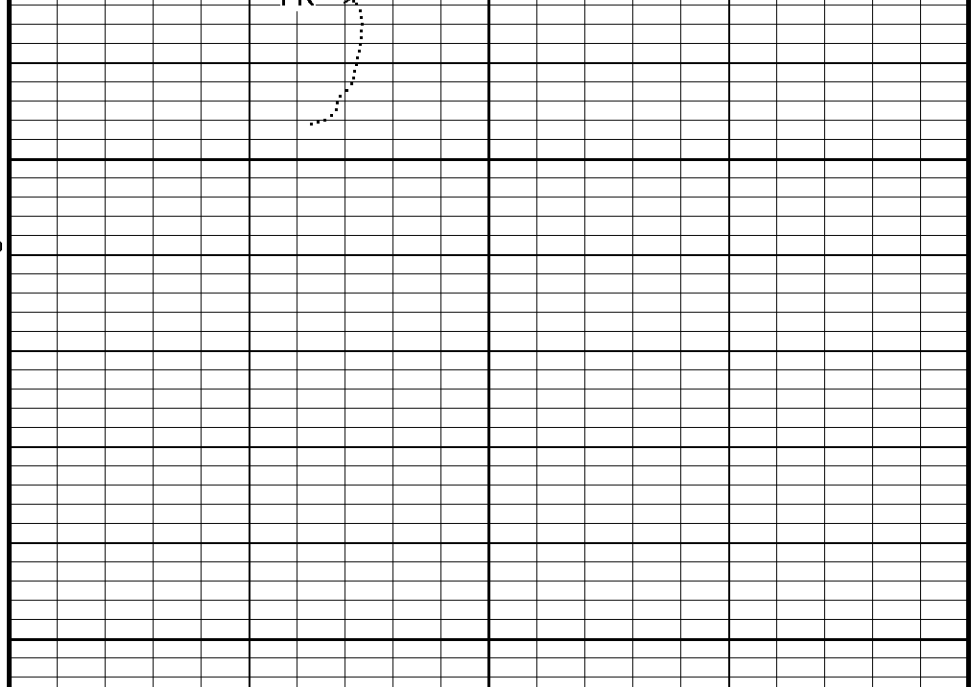
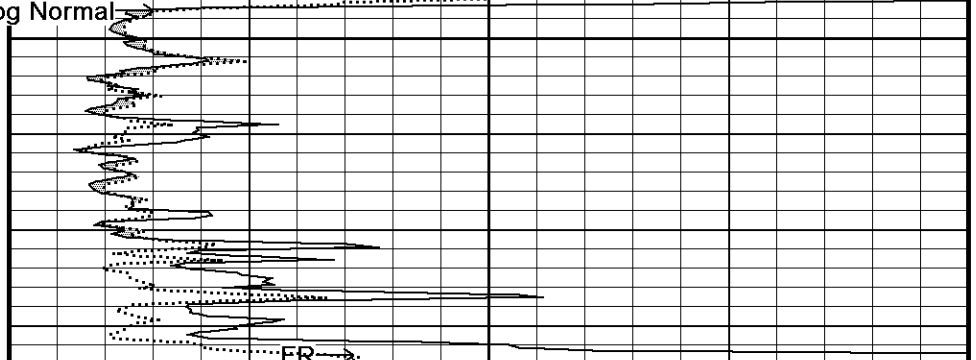
Borehole
Temp in
deg F

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

HVI
every
10 cu ft

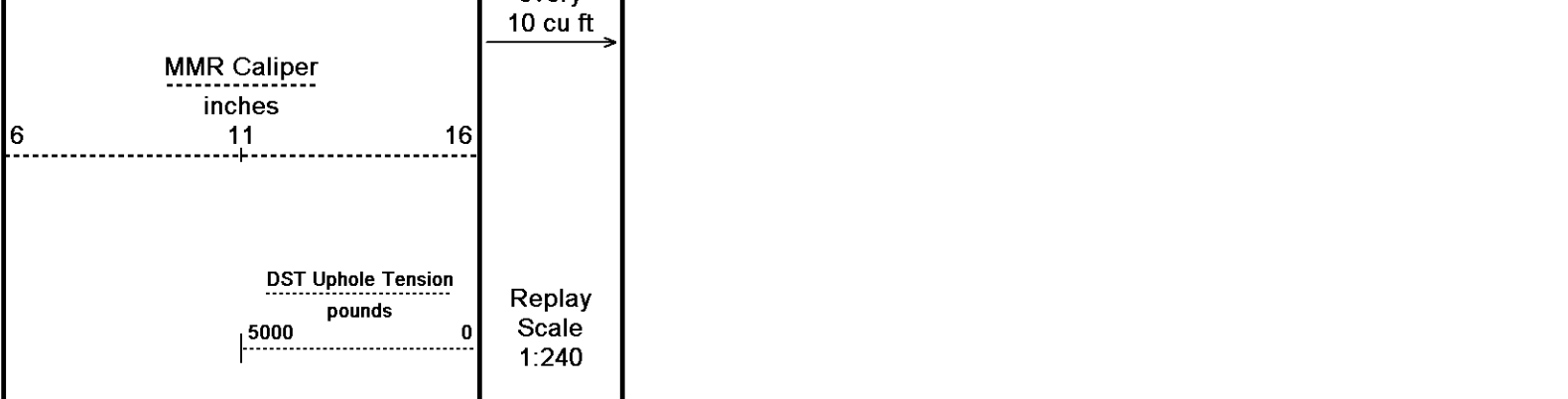
Bit Size
inches
6 11 16

Annular
Integral
every



MMR MicroLog Normal
ohm metres
0 10 20 30 40

MMR MicroLog Inverse
ohm metres
0 10 20 30 40



Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 07-MAY-2014 03:56
 Filename: C:\Minimus 13.08.2113\Logs\K3 Oil Catherine Coberly Unit 30-14_001.dta
 Recorded on 07-MAY-2014 00:20
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\K3 Oil Catherine Coberly Unit 30-14\K3 Oil Catherine Coberly Unit 30-14_002.dta

General Constants All 000			Last Edited on 06-MAY-2014,23:59
General Parameters			
Mud Resistivity	0.710	ohm-metres	
Mud Resistivity Temperature	95.000	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	5.500	inches	
Caliper for Differential Caliper	MMR Caliper		
Rwa Parameters			
Porosity used	Base Density Porosity		
Resistivity used	Array Ind. One Res Rt		
RWA Constant A	0.610		
RWA Constant M	2.150		
SW/APOR Tool Source	0.000		

Down-hole Tension Calibration SMS 0		Field Calibration on 06-MAY-2014 23:40	
Reading No	Measured	Calibrated (lbs)	
1	15071.71	0.00	
2	15879.48	481.00	

Gamma Calibration MCG-C 150		Field Calibration on 06-MAY-2014 18:51	
	Measured	Calibrated (API)	
Background	68	46	
Calibrator (Gross)	1139	771	
Calibrator (Net)	1071	725	

Gamma Constants MCG-C 150		Last Edited on 06-MAY-2014,22:46	
Gamma Calibrator Number	GRC038		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	

SP Calibration MCG-C 150		Field Calibration on 10-MAR-2014 13:42	
	Measured	Calibrated (mV)	

Reference 1	99.9	99.0
Reference 2	-97.7	-98.8
High Resolution Temperature Calibration MCG-C 150		Field Calibration on 08-MAR-2014,10:59
	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00
High Resolution Temperature Constants MCG-C 150		Last Edited on 06-MAY-2014,18:36
Pre-filter Length	11	
Caliper Calibration MMR-C.A 248		Base Calibration on 24-MAR-2014 11:12 Field Calibration on 06-MAY-2014 18:35
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13253	5.96
2	16528	7.97
3	19726	9.95
4	23473	11.91
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	8.04	7.97
Micro Normal and Micro Inverse Calibration MMR-C.A 248		Base Calibration on 24-MAR-2014 11:03 Field Check on 06-MAY-2014 18:36
Base Calibration		
Channel	Resistor 1	Resistor 2
Micro Normal	10.1	49.8
Micro Inverse	9.9	49.5
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 21-JAN-2014 13:56 Field Check on 06-MAY-2014 18:56
Base Calibration		
	Measured	Calibrated (cps)
	Near Far	Near Far
	2848 86	3714 110
Ratio	32.942	33.764
Field Calibrator at Base		Calibrated (cps)
		1737 2564
Ratio		0.677
Field Check		Calibrated (cps)
		1757 2605
Ratio		0.675
Neutron Constants MDN-B.J 387		Last Edited on 06-MAY-2014,22:46
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
Sub-surface	1.78	

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-A.A 55		Base Calibration on 24-MAR-2014 10:21 Field Check on 06-MAY-2014 18:26	
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	951.2	126.8	
Base Check		281.7	
Field Check		281.5	

FE Constants MFE-A.A 55		Last Edited on 06-MAY-2014,22:45	
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 73			Last Edited on 06-MAY-2014,22:45		
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

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
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50
Field Check on 06-MAY-2014 18:24

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			16.2	3863.5
2			32.1	3590.5
3			30.0	2971.0
4			20.9	2126.0
Deep			18.6	1912.1
Medium			43.2	3860.5
Shallow			47.7	5372.0

Array Temperature 90.1 Deg F

Induction Constants MAI-A.A 5

Last Edited on 06-MAY-2014,22:45

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

Channel 4

0.00

mm/mos/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)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MAI-A.A 5

Last Edited on 04-APR-2014,15:47

Pre-filter Length	11
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Caliper Calibration MPD-D.A 480

Base Calibration on 02-APR-2014 14:28

Field Calibration on 06-MAY-2014 18:28

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17565	3.99
2	27501	5.98
3	37544	7.97
4	47406	9.86
5	58484	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.96	7.97

Photo Density Calibration MPD-D.A 480

Base Calibration on 02-APR-2014 14:48

Field Check on 06-MAY-2014 18:33

Density Calibration

Base Calibration	Measured	Calibrated (sdu)
	Near Far	Near Far
Background	1280 1474	
Reference 1	56490 26296	59556 30836
Reference 2	23070 2655	24941 2541

Field Check at Base

1280.1	1473.9
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Field Check

1278.5	1472.7
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PE Calibration

Base Calibration	Measured	Calibrated
	WS WH Ratio	Ratio
Background	244 1141	
Reference 1	23700 56281 0.425	0.371
Reference 2	6865 22924 0.304	0.272

Field Check at Base

243.9	1141.4
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Field Check

241.3	1140.2
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Density Constants MPD-D.A 480

Last Edited on 06-MAY-2014,22:46

Density Source Id	P50557B
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

FE Correction to Density	Not Applied	
Mud Density	1.10	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 (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 13.08.2113\Logs\K3 Oil Catherine Coberly Unit 30-14\K3 Oil Catherine Coberly Unit 30-14_002.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 150 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 Focussed Electric

MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

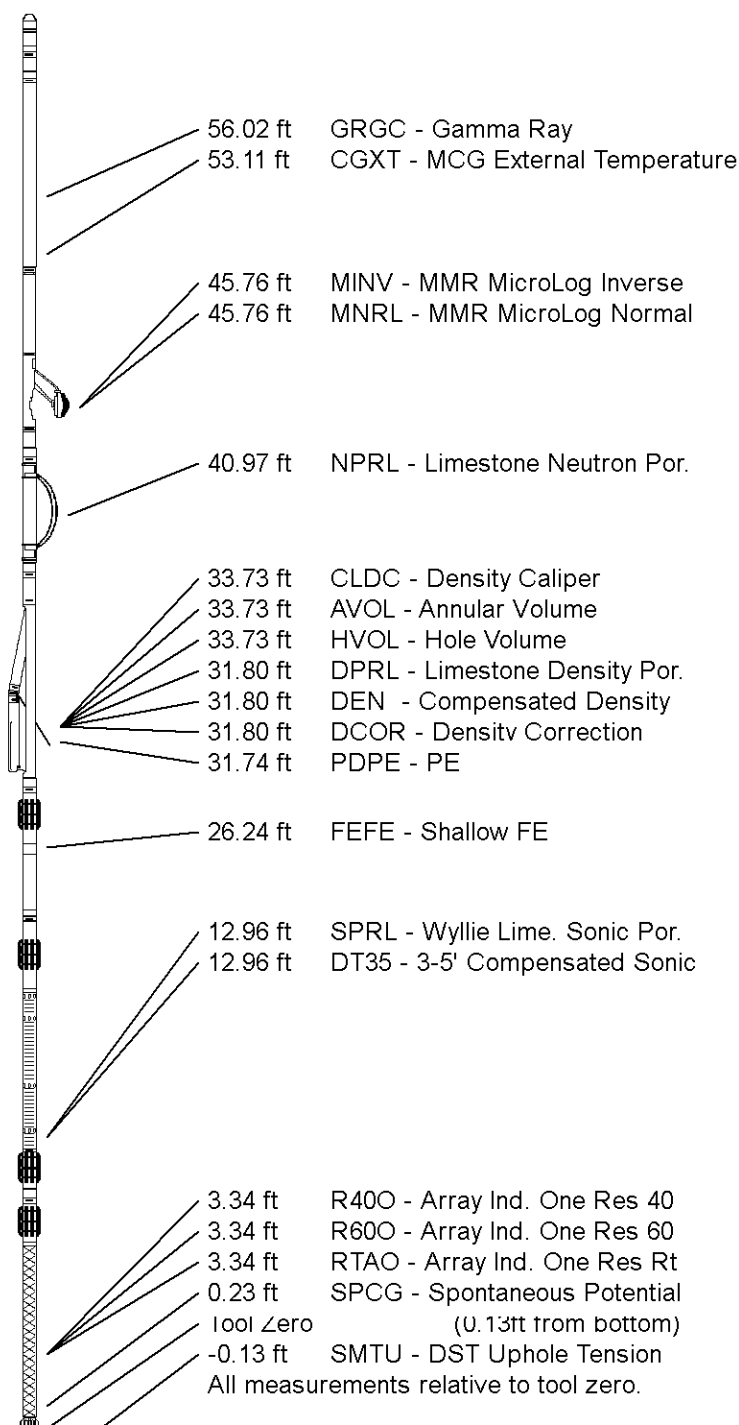
Compact Sonic

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: 63.70 ft Weight: 480.6 lb



COMPANY	K3 OIL & GAS OPERATING COMPANY
WELL	CATHERINE COBERLY UNIT 30-14
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2550.00	feet	First Reading	4383.00	feet
Elevation Drill Floor	2548.00	feet	Depth Driller	4425.00	feet
Elevation Ground Level	2542.00	feet	Depth Logger	4429.00	feet



Weatherford®

MICRORESISTIVITY LOG