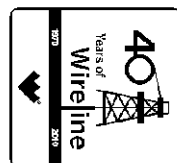




Weatherford

MICRORESISTIVITY LOG



COMPANY

CISCO OPERATING LLC.

WELL

MFWF UNIT # 14

FIELD

MISSOURI FLATS NORTHEAST

PROVINCE/COUNTY

GOVE

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

2300' FNL & 335' FWL

SEC

TWP
22 14S

RGE
28W

Other Services
MPD/MDN
MAI/MFE

API Number

15-063-21916

Permit Number

Permanent Datum G.L., Elevation 2575 feet

Log Measured From KB

Drilling Measured From KB

Date 05-DEC-2011

Elevations:
KB 2586.00
DF 2584.00
GL 2575.00

Run Number

ONE

Depth Driller

4200.00 feet

Depth Logger

4203.00 feet

First Reading

4168.00 feet

Last Reading

3204.00 feet

Casing Driller

384.00 feet

Casing Logger

382.00 feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

8.90 lb/USg

60.00 CP
6.80 ml/30Min

PH / Fluid Loss

11.00

Sample Source

FLOWLINE

Rm @ Measured Temp

1.74 @ 35.0 ohm-m

Rmf @ Measured Temp

1.39 @ 35.0 ohm-m

Rmc @ Measured Temp

2.09 @ 35.0 ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.59 @ 116.0 ohm-m

Time Since Circulation

5 HOURS

Max Recorded Temp

116.00 deg F

Equipment Name

COMPACT

Equipment / Base

13096 LIB

Recorded By

A. SILL

LIB

JOHN JORDAN

LB11-308

BOREHOLE RECORD

Last Edited: 05-DEC-2011 02:57

Bit Size
inches

12.250

7.875

Depth From
feet

0.00

400.00

Depth To
feet

400.00

4200.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

384.00

Weight
pounds/ft

24.00

REMARKS

Tools Used: MPD, MCG, MDN, MFE, MAI, MML

Hardware: MPD: 8 inch profile plate used. MAI AND MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.

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 volume with 5.5 inch production casing = 171 cu. ft

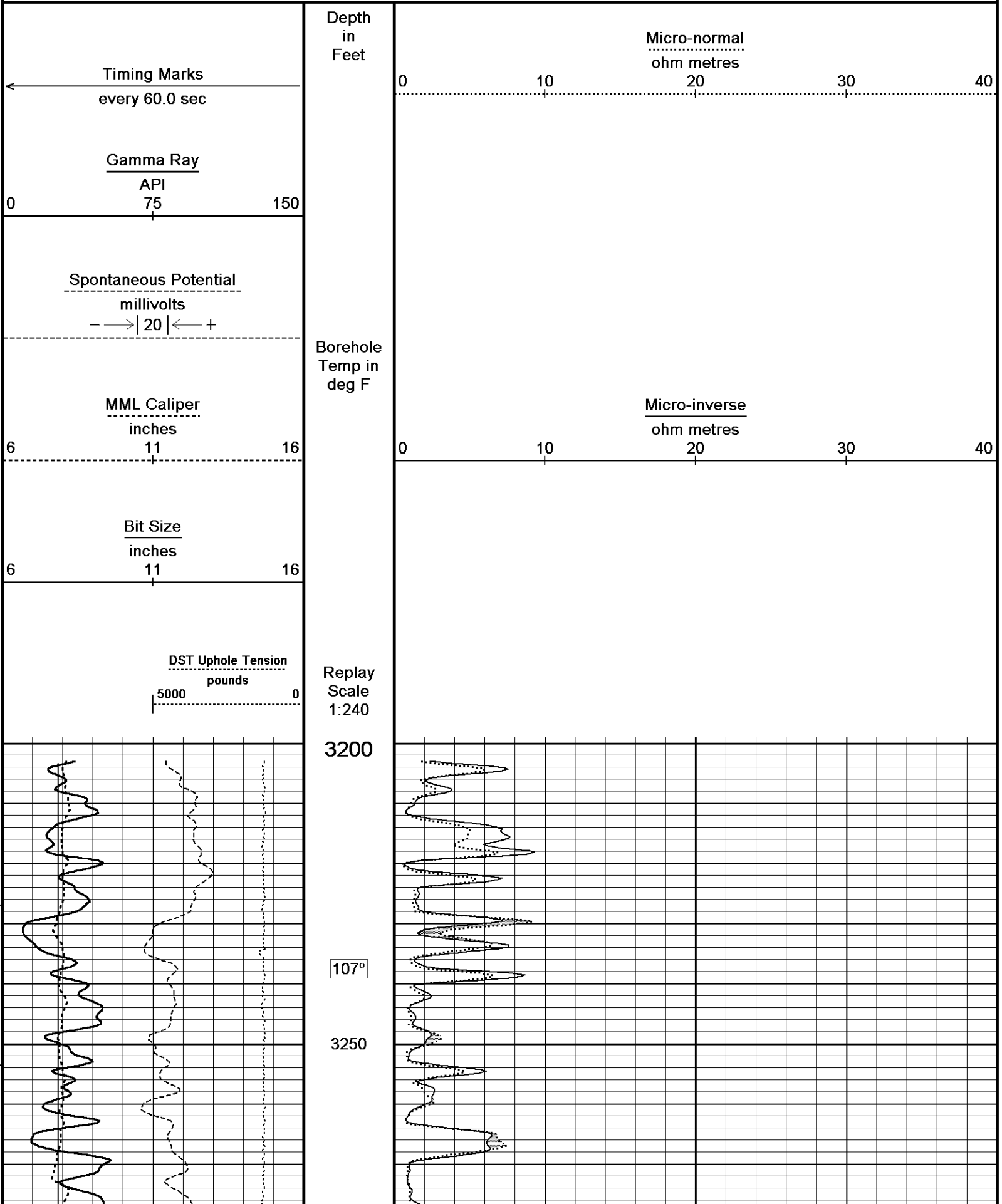
Service order #3534678

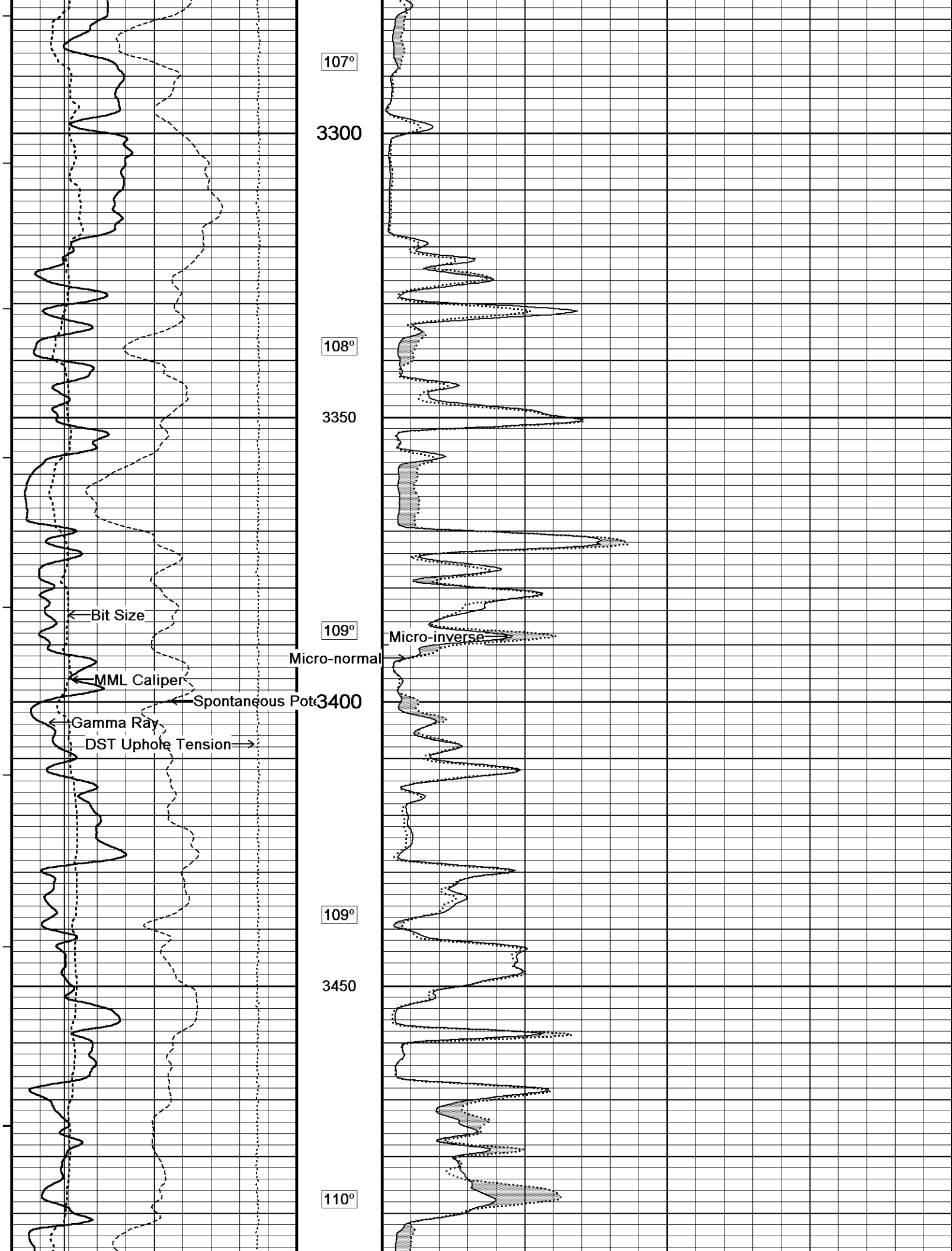
Rig: Murfin # 22

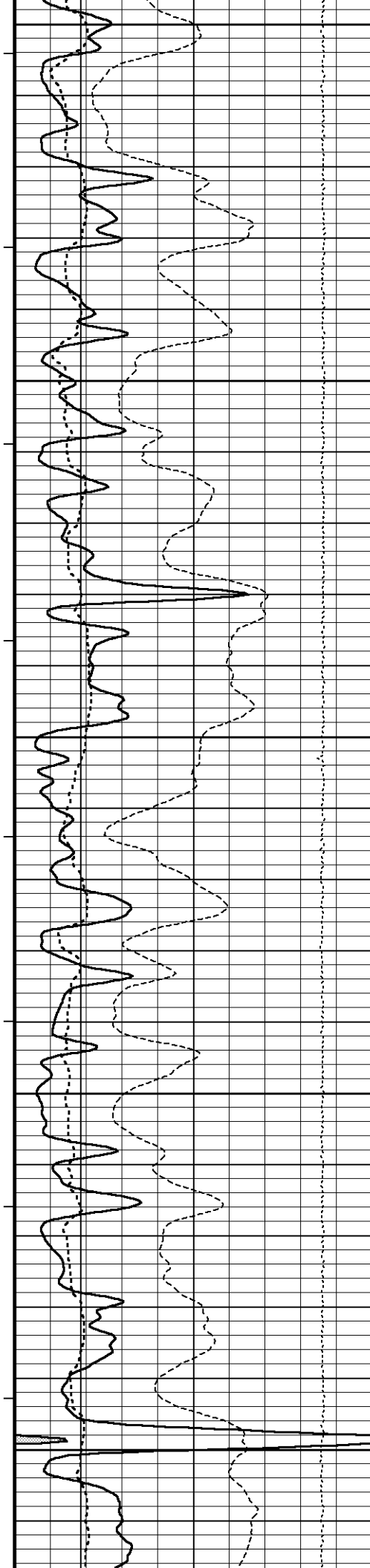
Engineer: A. Sill

Operator(s): M. Stegman

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.







3500

111°

3550

112°

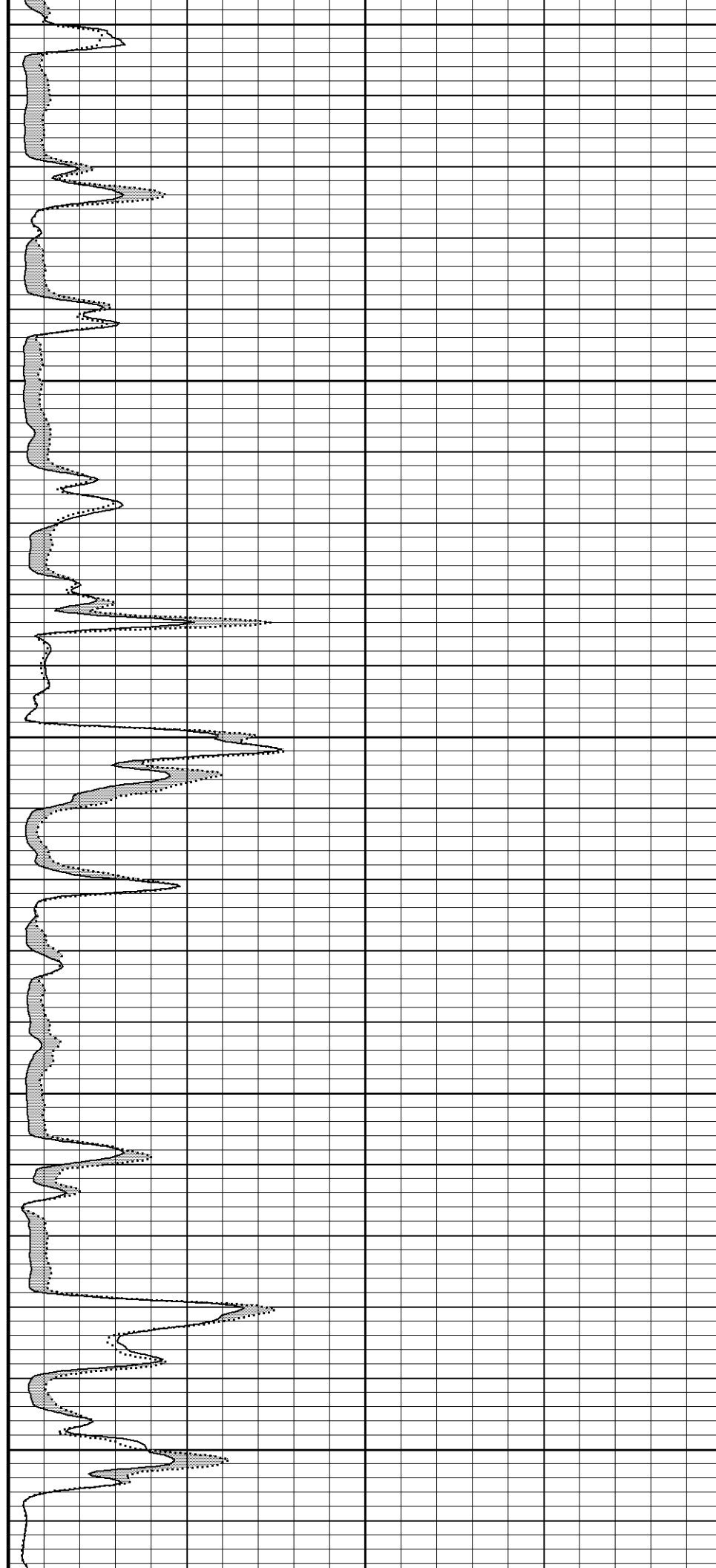
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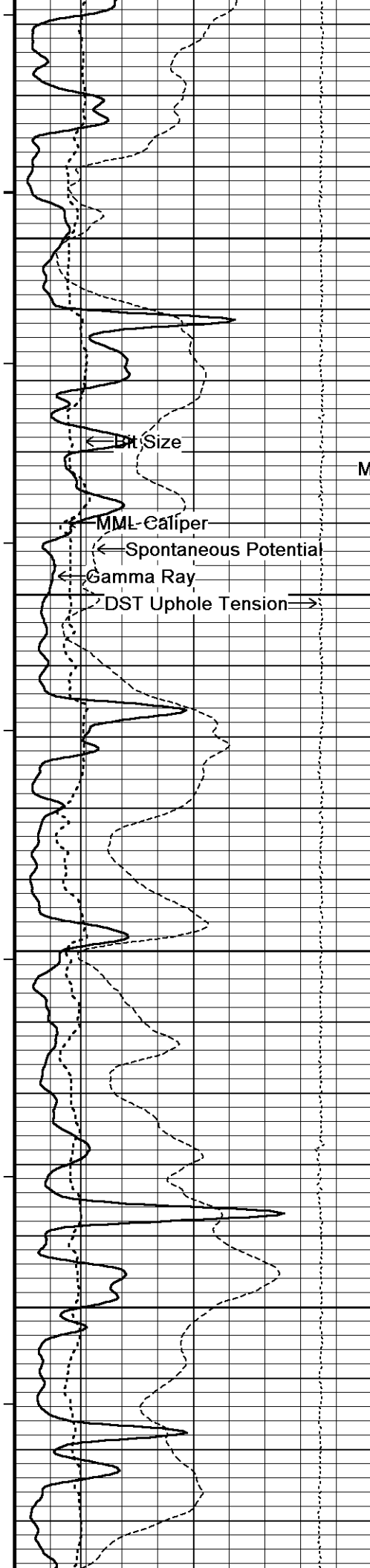
112°

3650

112°

3700





113°

3750

Micro-inverse

Micro-normal

114°

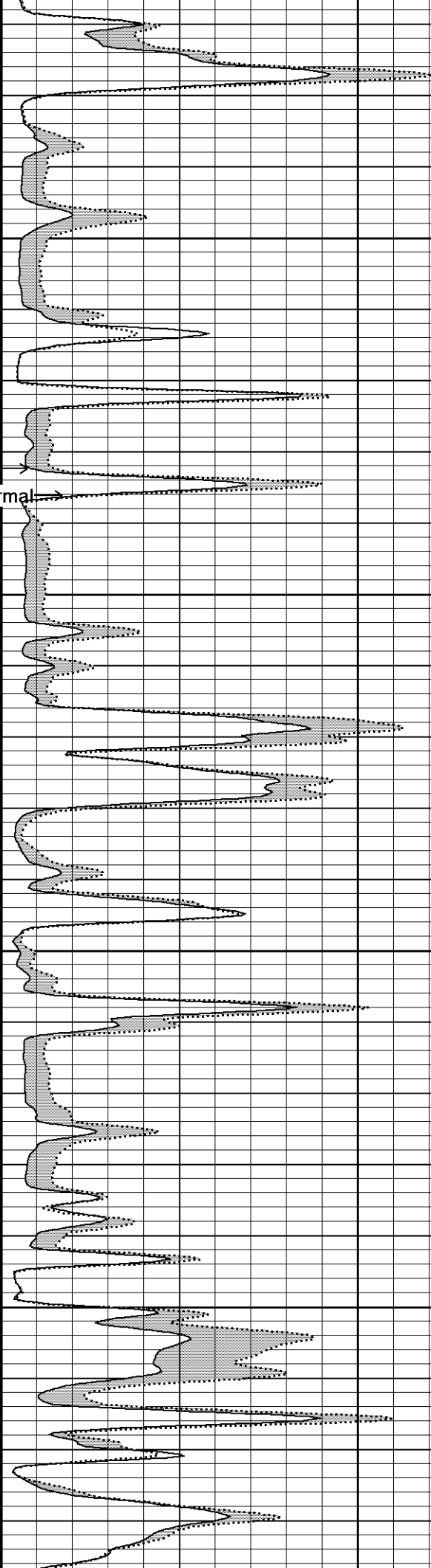
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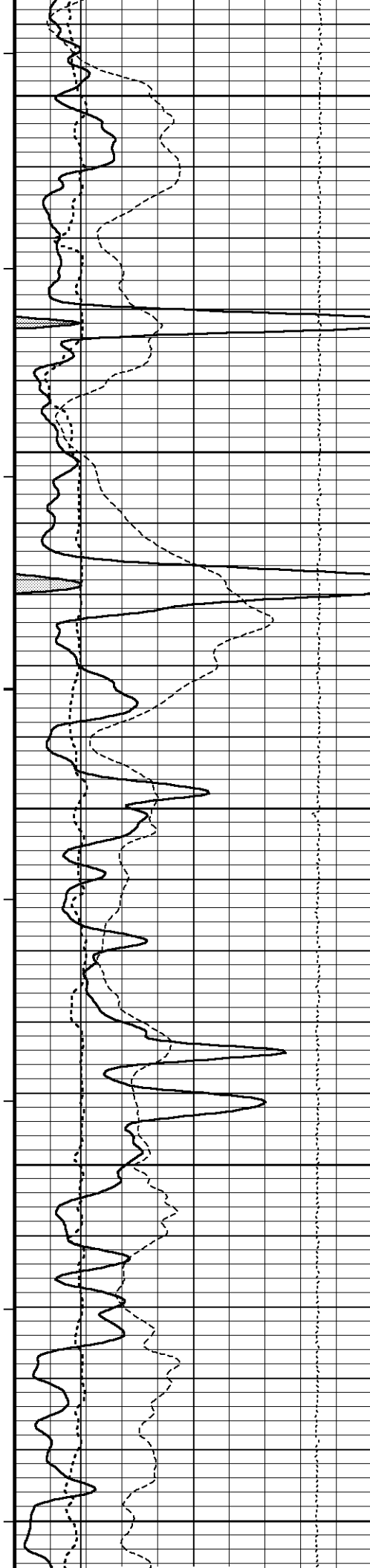
114°

3850

114°

3900





115°

3950

116°

4000

116°

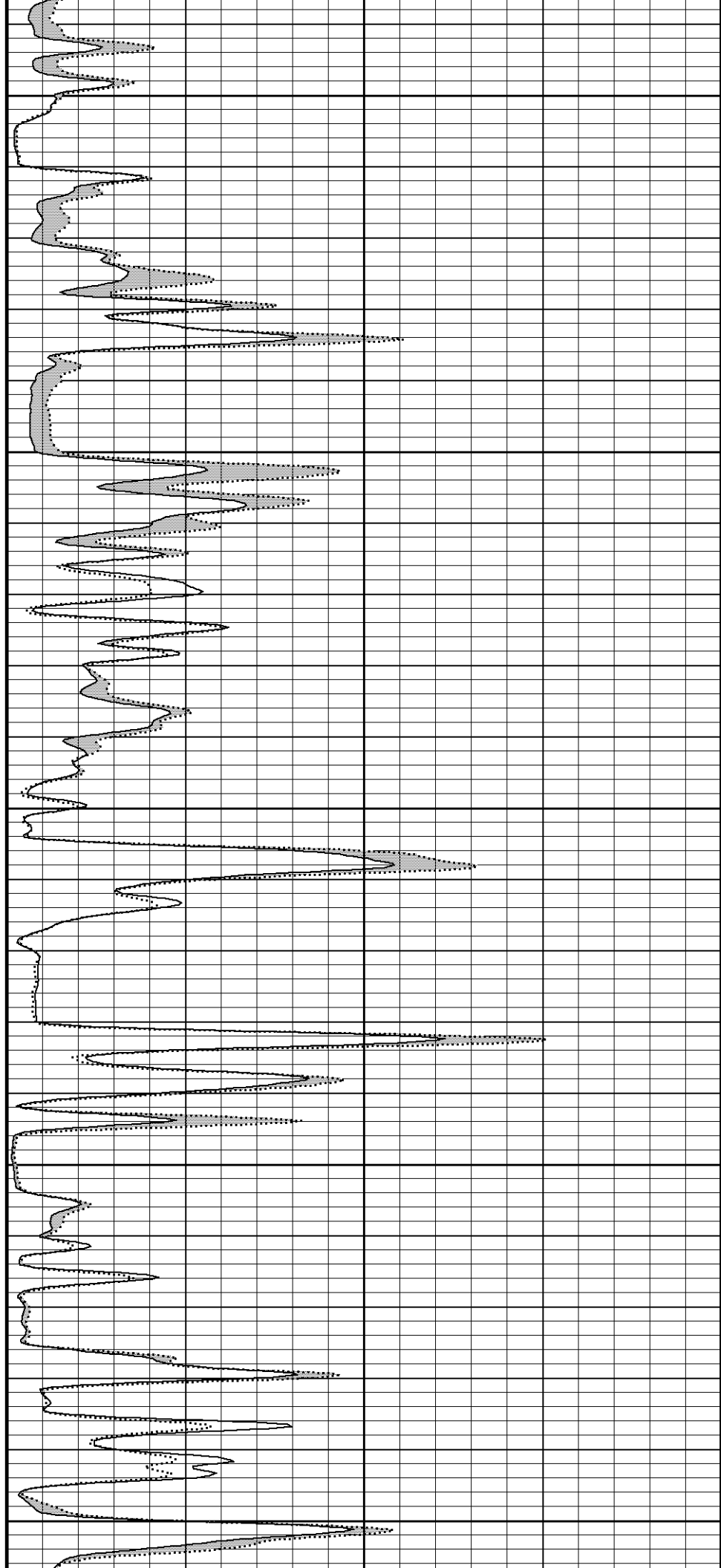
4050

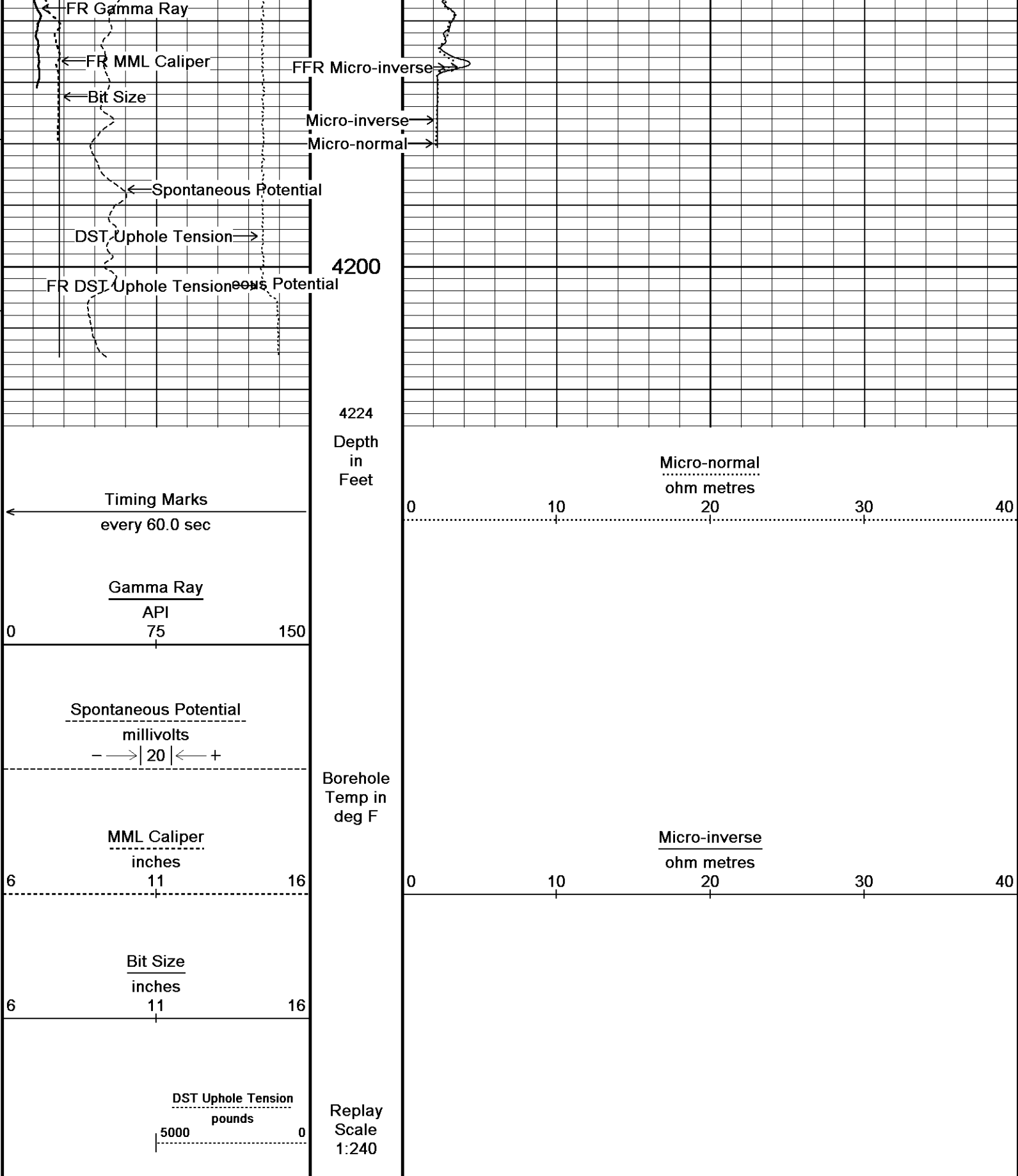
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4100

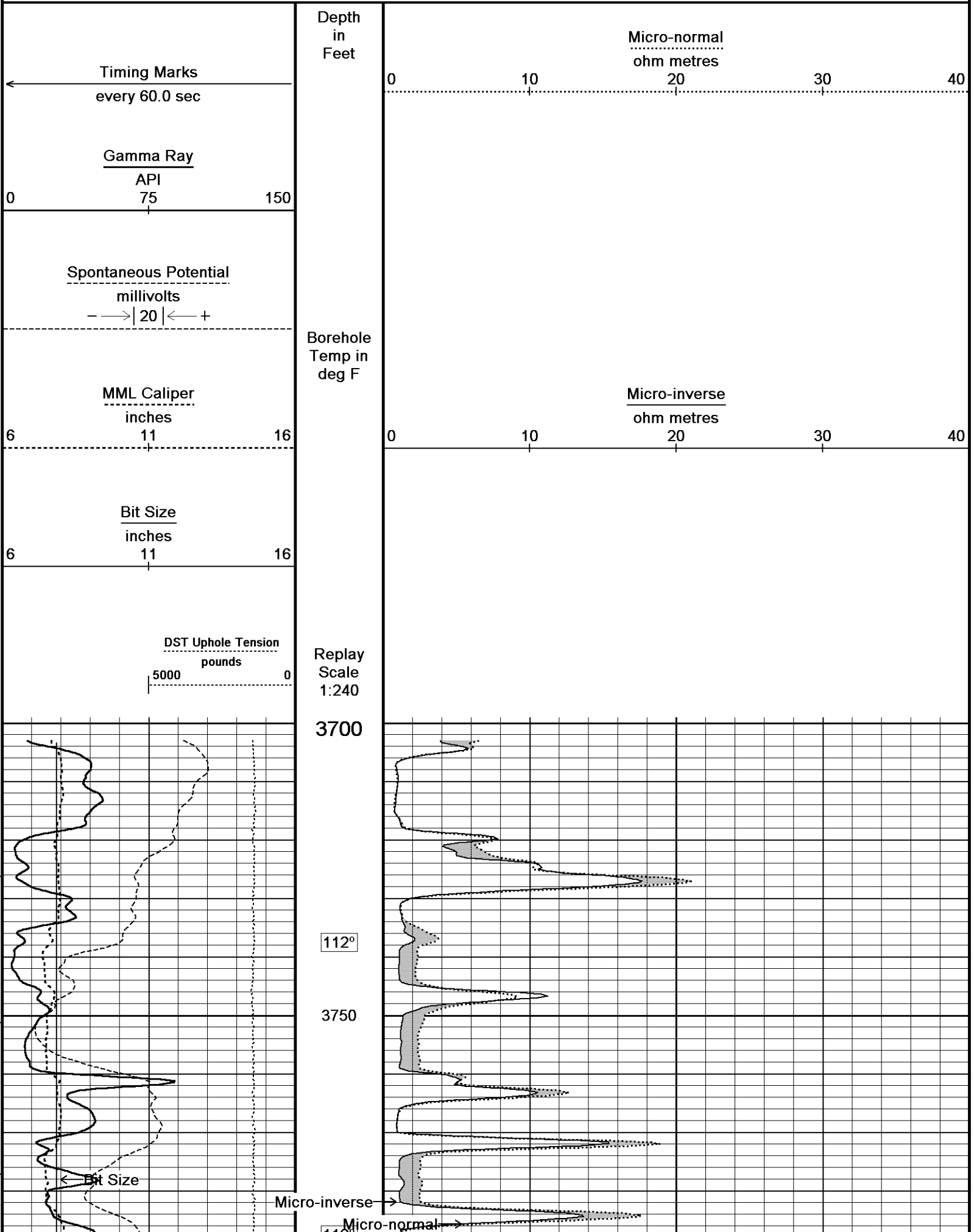
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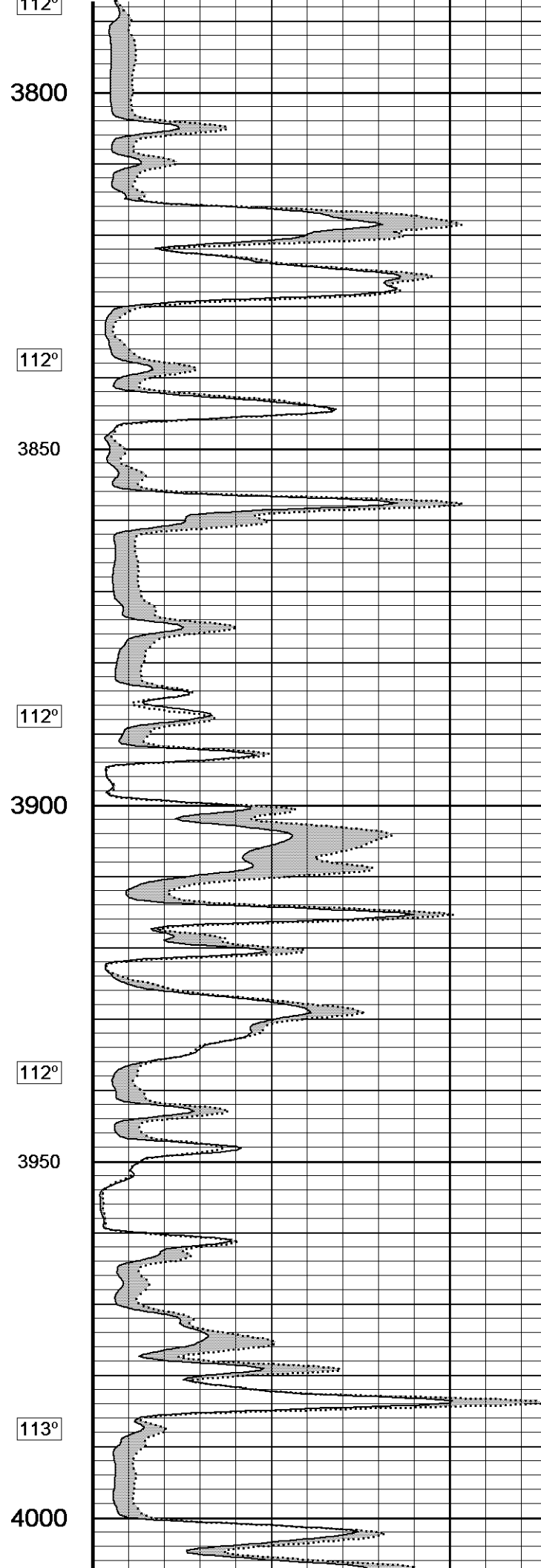
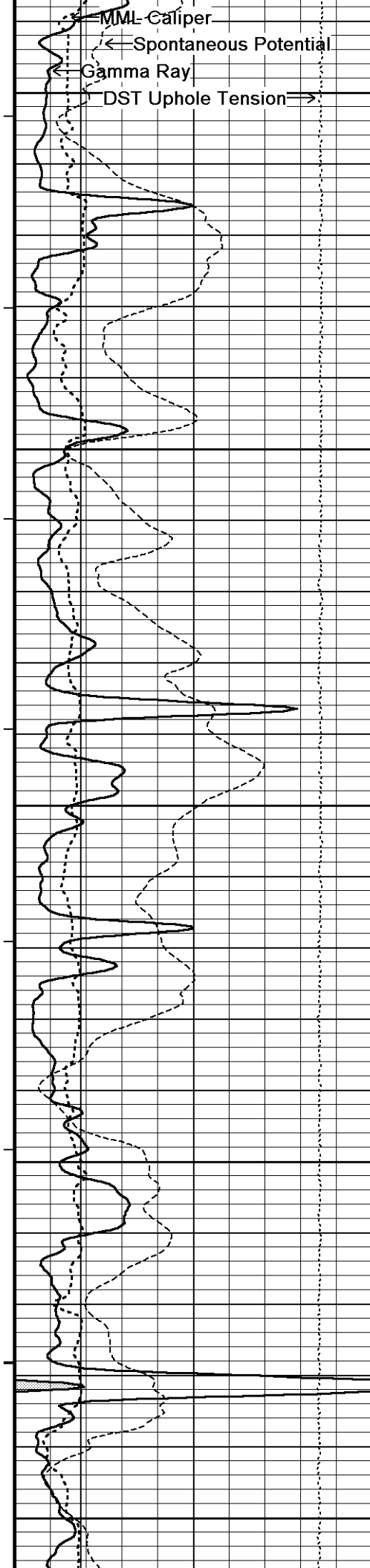
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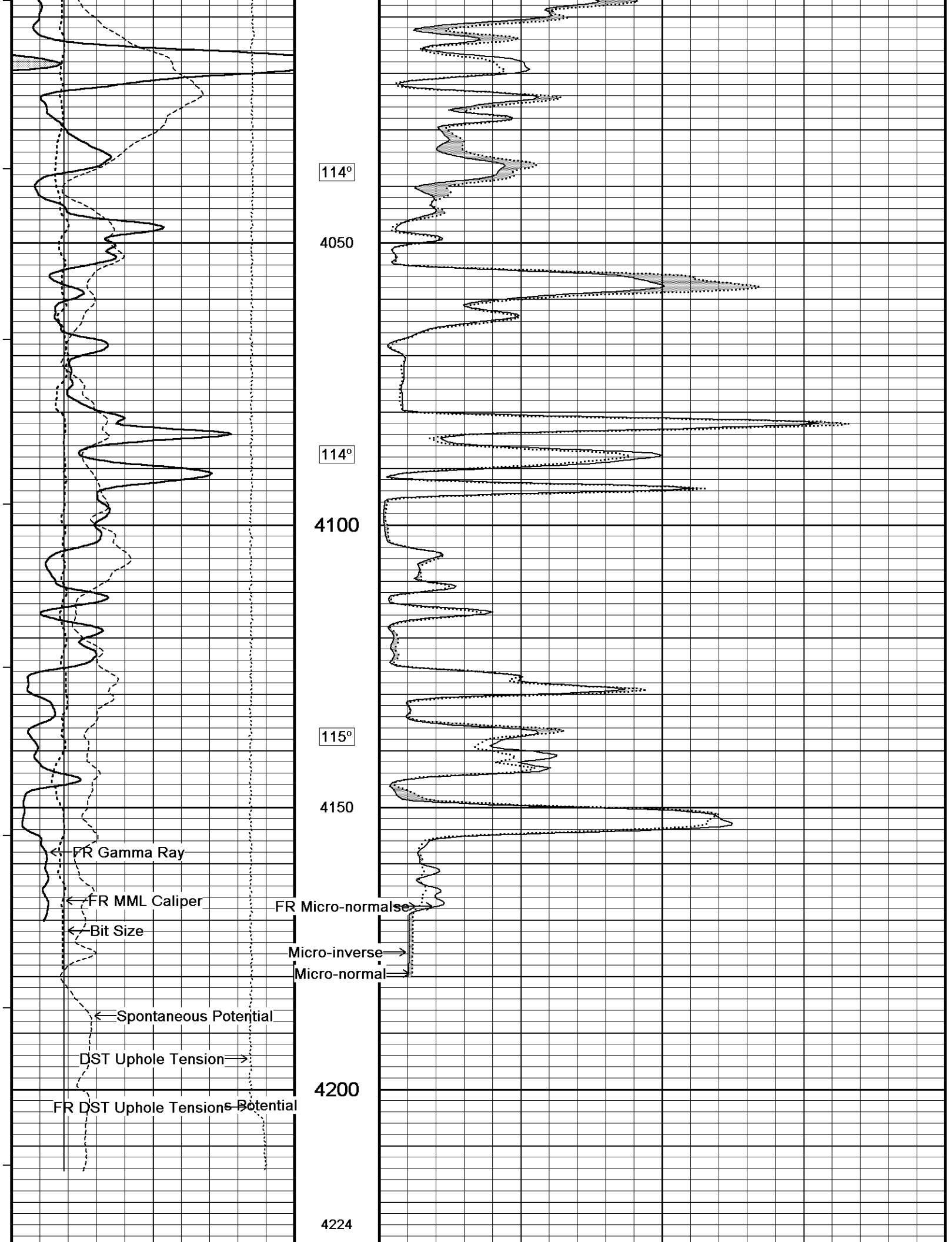


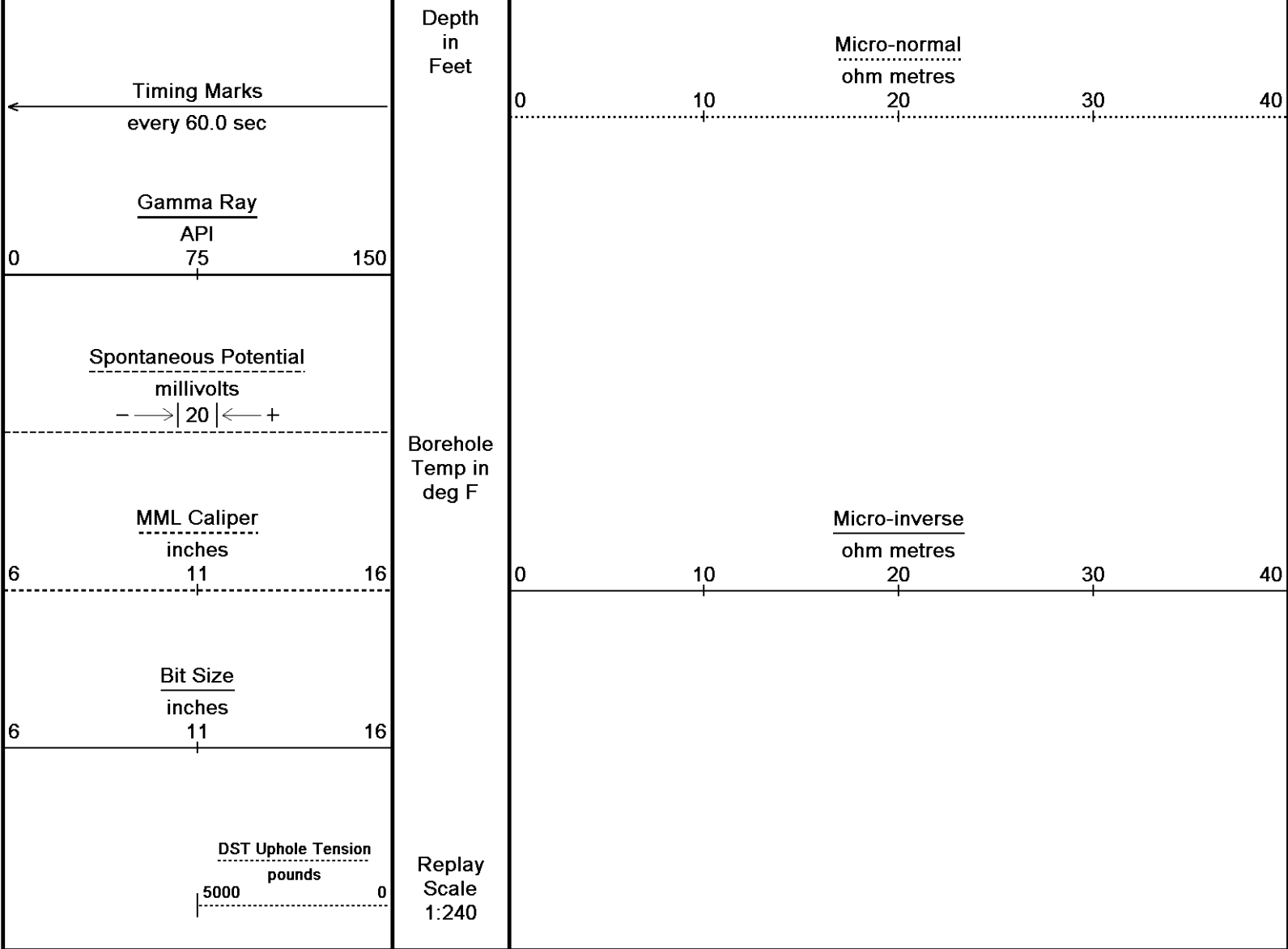


Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11_03_4044\Data\Cisco MFWF Unit # 14\Cisco MFWF Unit # 14_002.dta
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044









BEFORE SURVEY CALIBRATION		
C:\Minimus 11_03_4044\Data\Cisco MFWF Unit # 14\Cisco MFWF Unit # 14_002.dta		
General Constants All 000		Last Edited on 05-DEC-2011,03:00
General Parameters		
Mud Resistivity	0.640	ohm-metres
Mud Resistivity Temperature	86.000	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. Six Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0			Field Calibration on 23-OCT-2011 03:19	
Reading No	Measured	Calibrated (lbs)		
1	12734.06	0.00		
2	13523.27	454.00		
Gamma Calibration MCG-D.K 442			Field Calibration on 04-DEC-2011 22:30	
	Measured	Calibrated (API)		
Background	72	20		
Calibrator (Gross)	1747	476		
Calibrator (Net)	1675	456		
Gamma Constants MCG-D.K 442			Last Edited on 05-DEC-2011,03:01	
Gamma Calibrator Number	GRC141			
Mud Density	1.07	gm/cc		
Caliper Source for Processing	Density Caliper			
Tool Position	Eccentred			
Concentration of KCl	0.00	kppm		
SP Calibration MCG-D.K 442			Field Calibration on 07-NOV-2011,09:01	
	Measured	Calibrated (mV)		
Reference 1	100.0	100.0		
Reference 2	-100.0	-100.0		
High Resolution Temperature Calibration MCG-D.K 442			Field Calibration on 07-NOV-2011,09:01	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	100.00	100.00		
High Resolution Temperature Constants MCG-D.K 442			Last Edited on	
Pre-filter Length	11			
Caliper Calibration MML-A 9			Base Calibration on 17-OCT-2011 11:45 Field Calibration on 04-DEC-2011 22:18	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15145	5.98		
2	18563	7.97		
3	21887	9.86		
4	25872	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	5.95	5.98		
Micro Normal and Micro Inverse Calibration MML-A 9			Base Calibration on 17-OCT-2011 11:28 Field Check on 04-DEC-2011 22:21	
Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated (ohm-m)	
		Resistor 1	Resistor 2	
Micro Normal	12.1	59.5	2.6	12.8
Micro Inverse	15.6	77.7	1.7	8.4
Channel	Base Check (ohm-m)	Field Check (ohm-m)		
Micro Normal	32.5	32.5		
Micro Inverse	16.4	16.4		
Micro Normal and Micro Inverse Constants MML-A 9			Last Edited on 05-DEC-2011,03:03	
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		N/A	inches	
Neutron Calibration MDN-A.B 39			Base Calibration on 19-OCT-2011 15:30 Field Check on 04-DEC-2011 22:37	
Base Calibration				
	Measured	Calibrated (cps)		

	Measured	Calibrated (cps)
	Near 2769	Near 3714
	Far 86	Far 110
Ratio	32.016	33.764
Field Calibrator at Base		Calibrated (cps)
		2150 3003
Ratio		0.716
Field Check		Calibrated (cps)
		2381 1226
Ratio		1.941

Neutron Constants MDN-A.B 39		Last Edited on 05-DEC-2011,03:03	
Neutron Source Id	N1095		
Neutron Jig Number	NECD117		
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	
Formation Fluid Salinity Source	Constant Value		
Formation Fluid Salinity	0.00	kppm	
Barite Mud Correction	Not Applied		

FE Calibration MFE-A.A 67		Base Calibration on 21-NOV-2011 10:01 Field Check on 04-DEC-2011 22:11	
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	959.2	126.8	
Base Check		281.1	
Field Check		281.1	

FE Constants MFE-A.A 67			Last Edited on 05-DEC-2011,03:02		
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	

High Resolution Temperature Calibration MAI-A.A 188		Field Calibration on 12-AUG-2011,21:41	
	Measured	Calibrated(Deg F)	
Lower	32.00	32.00	
Upper	68.00	68.00	

High Resolution Temperature Constants MAI-A.A 188		Last Edited on 21-JUN-2011,19:05	
Pre-filter Length	11		

Induction Calibration MAI-A.A 188		Base Calibration on 19-OCT-2011 14:25 Field Check on 04-DEC-2011 22:09	
Base Calibration			
Test Loop Calibration			
Channel	Low	High	Low High
1	16.9	470.2	9.3 966.2
2	6.4	377.1	7.6 821.4
3	3.9	257.8	5.2 566.0
4	1.7	135.1	2.6 279.2

Array Temperature	66.3	Deg F
Channel	Base Check (mmho/m)	Field Check (mmho/m)
	Low High	Low High
1	0.0 0.0	13.7 3867.1
2	0.0 0.0	30.0 3584.1
3	0.0 0.0	27.9 3078.3
4	0.0 0.0	19.8 2046.5
Deep	0.0 0.0	17.2 1954.7
Medium	0.0 0.0	40.3 4114.2
Shallow	0.0 0.0	44.9 5368.6
Array Temperature	0.0	68.3 Deg F

Induction Constants MAI-A.A 188

Last Edited on 05-DEC-2011,03:02

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.	Borehole Temp. Unfilt.
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

Caliper Calibration MPD-B 65

Base Calibration on 28-NOV-2011 10:07

Field Calibration on 04-DEC-2011 22:12

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13805	3.99
2	22448	5.98
3	31025	7.97
4	39247	9.86
5	48400	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-B 65

Base Calibration on 28-NOV-2011 10:33

Field Check on 04-DEC-2011 22:17

Density Calibration		Measured		Calibrated (sdu)	
Base Calibration		Near	Far	Near	Far
Reference 1		60872	28838	59556	30836
Reference 2		24326	2449	24941	2541
Field Check at Base					
		1237.1	1179.7		
Field Check					
		1234.4	1182.7		

PE Calibration				
Base Calibration		Measured		Calibrated
	WS	WH	Ratio	Ratio
Background		225	1100	
Reference 1		22729	60656	0.378
Reference 2		6549	24175	0.274
Field Check at Base				
		224.7	1100.1	
Field Check				
		222.4	1095.8	

Density Constants MPD-B 65

Last Edited on 05-DEC-2011,03:02

Density Source Id	P57072B
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	1.07 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

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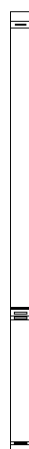
Compact Comms Gamma
MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MNL-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in



45.04 ft GRGC - Gamma Ray
45.04 ft GRGC - Gamma Ray
42.13 ft CGXT - MCG External Temperature
42.13 ft CGXT - MCG External Temperature

35.41 ft MINV - Micro-inverse
35.41 ft MNRL - Micro-normal
36.40 ft MLTC - MML Caliper
35.41 ft MINV - Micro-inverse
35.41 ft MNRL - Micro-normal

MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

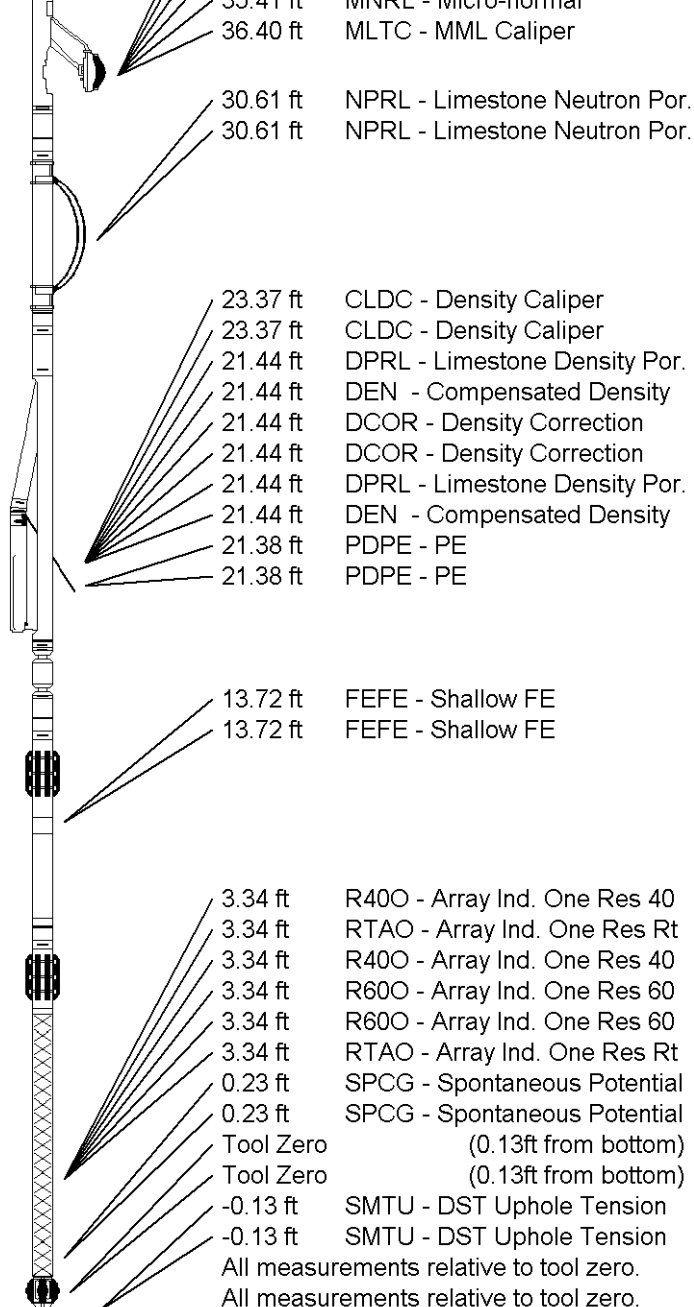
Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.32 ft Weight: 407.9 lb

Total Length: 50.32 ft Weight: 407.9 lb



COMPANY CISCO OPERATING LLC.
WELL MFWF UNIT # 14
FIELD MISSOURI FLATS NORTHEAST
PROVINCE/COUNTY GOVE
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2586.00	feet	First Reading	4168.00	feet
Elevation Drill Floor	2584.00	feet	Depth Driller	4200.00	feet
Elevation Ground Level	2575.00	feet	Depth Logger	4203.00	feet



Weatherford®

MICRORESISTIVITY LOG

