

**Weatherford**[®]**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY

M&M EXPLORATION, INC.

WELL

Z-BAR #4-7

FIELD

AETNA

PROVINCE/COUNTY

BARBER

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

**1980' FNL & 2080' FEL
NE/4**

SEC TWP RGE Other Services

4 34S 15W

MA/IME

API Number 15-007-23913

Permit Number

Permanent Datum G.L., Elevation 1635 feet

Log Measured From KB

Drilling Measured From K.B.

Elevations:	feet
KB	1647.00
DF	1646.00
GL	1635.00

Date 25-AUG-2012

Run Number ONE

Depth Driller 4950.00 feet

Depth Logger 4950.00 feet

First Reading 4930.00 feet

Last Reading 3800.00 feet

Casing Driller 985.00 feet

Casing Logger 987.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.20 lb/USg 73.00 CP

PH / Fluid Loss 11.00 10.00 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 0.67 @ 96.0 ohm-m

Rmf @ Measured Temp 0.54 @ 96.0 ohm-m

Rmc @ Measured Temp 0.80 @ 96.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.52 @124.0 ohm-m

Time Since Circulation 5 HOURS

Max Recorded Temp 124.00 deg F

Equipment Name COMPACT

Equipment / Base 13057 LIB

Recorded By L. SCOTT

Witnessed By CHASE THOMAS

S.O.# / JOB# 3537832 LB12-230

BOREHOLE RECORD

Last Edited: 25-AUG-2012 02:06

Bit Size
inches

7.875

Depth From
feet

987.00

Depth To
feet

4950.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

987.00

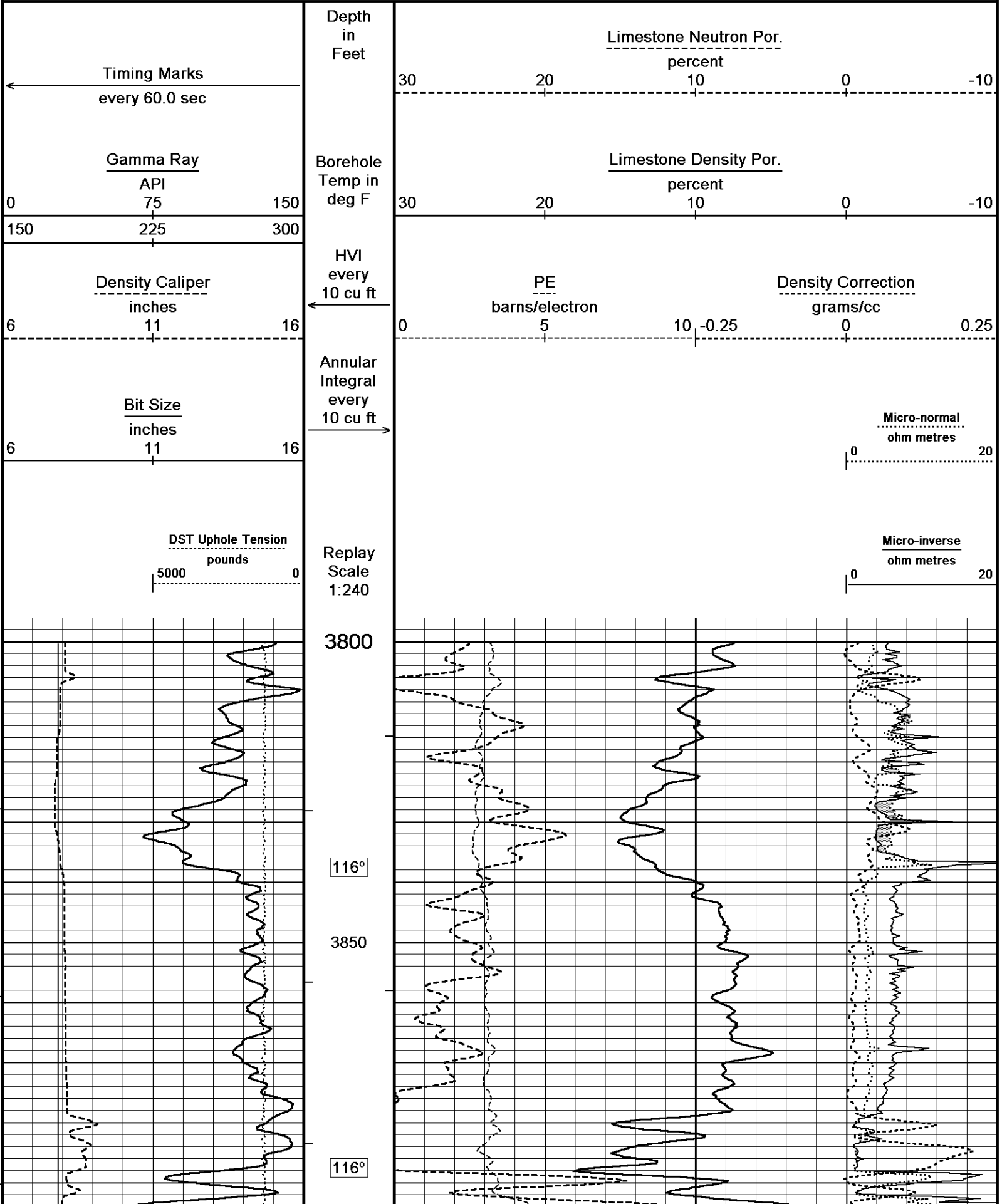
Weight
pounds/ft

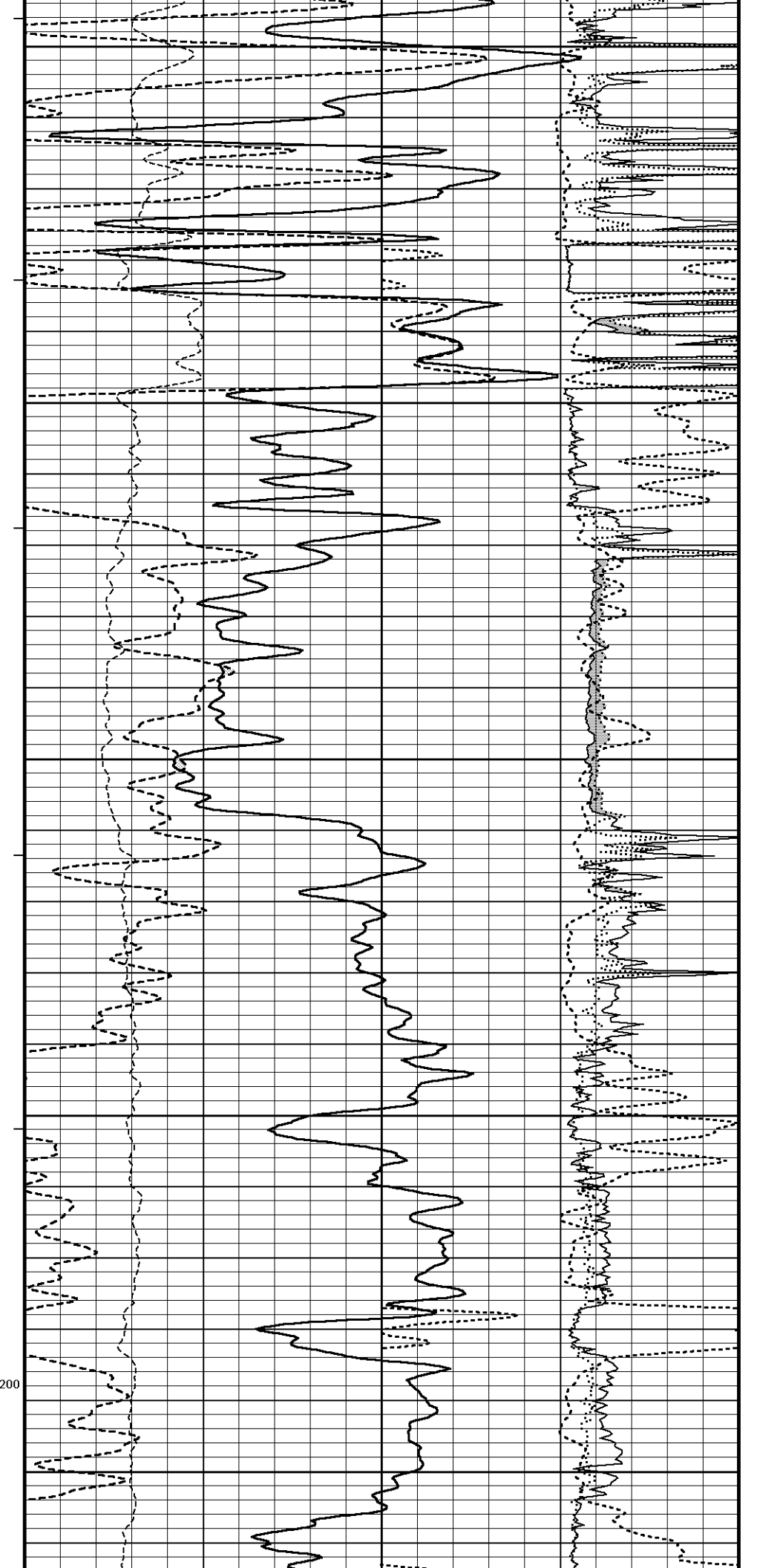
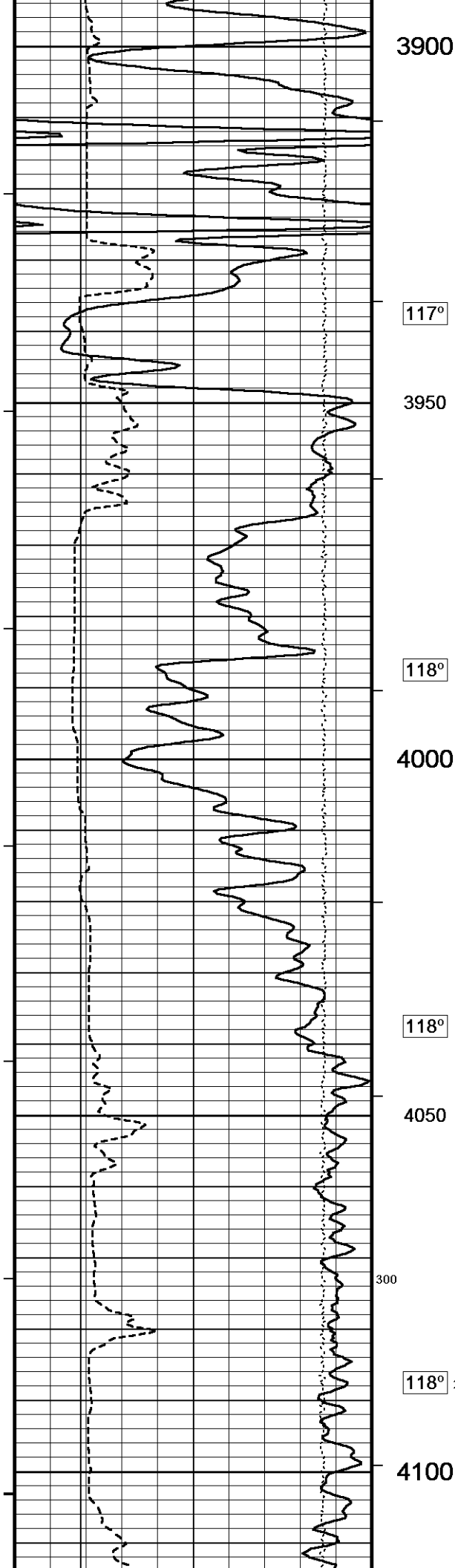
24.00

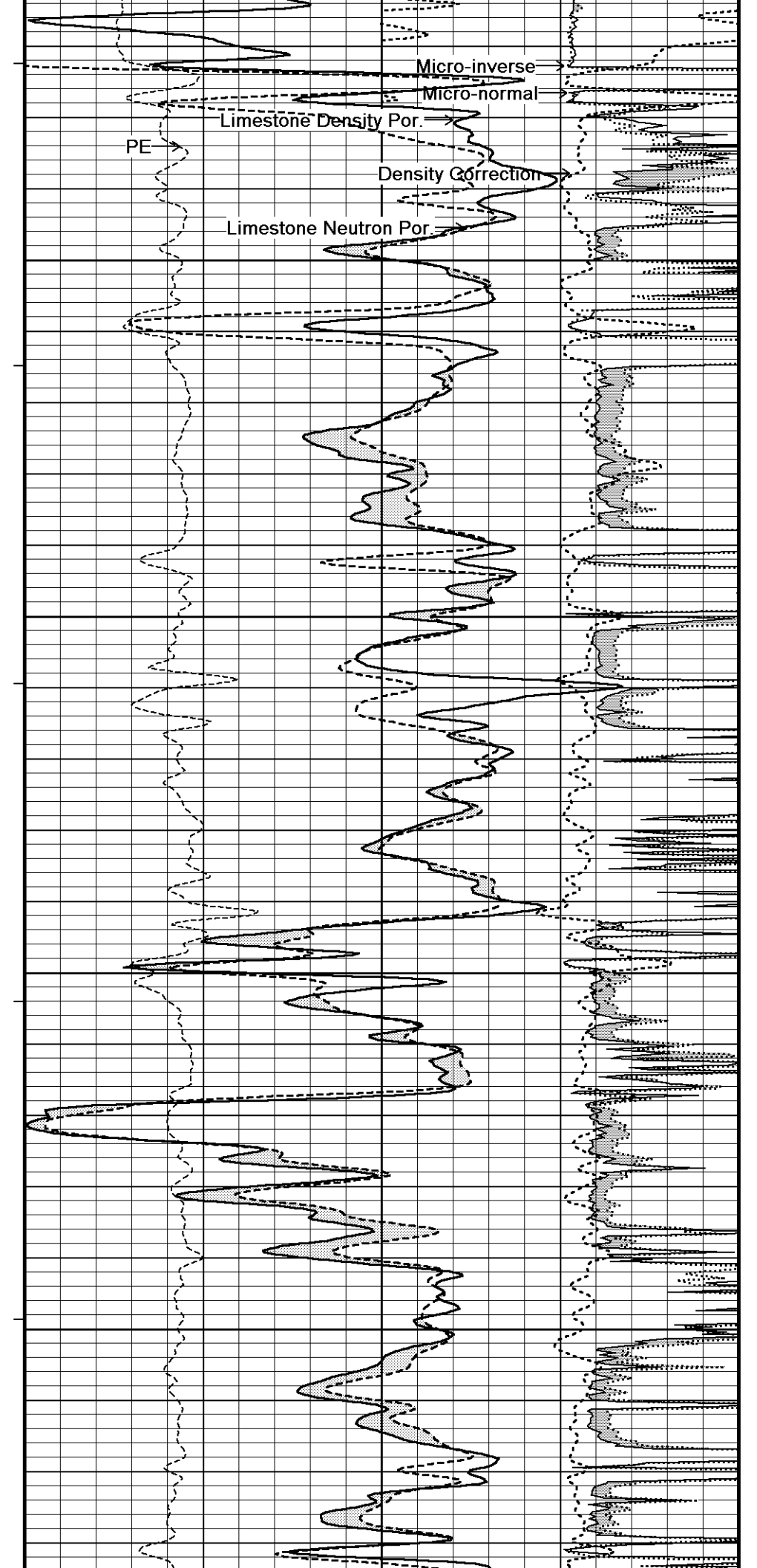
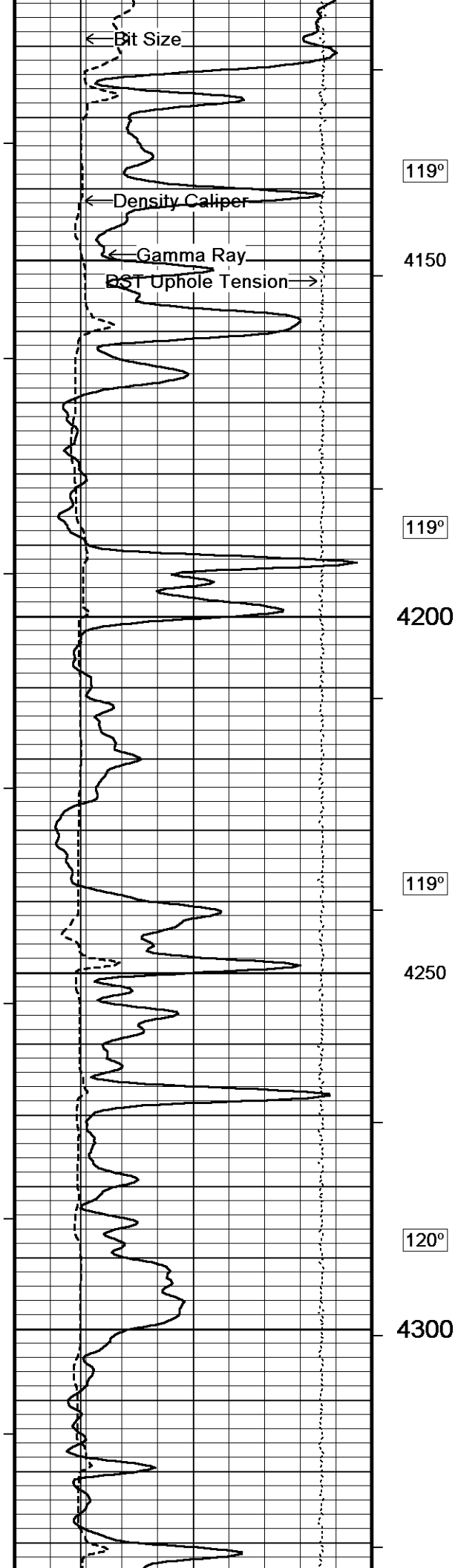
REMARKS

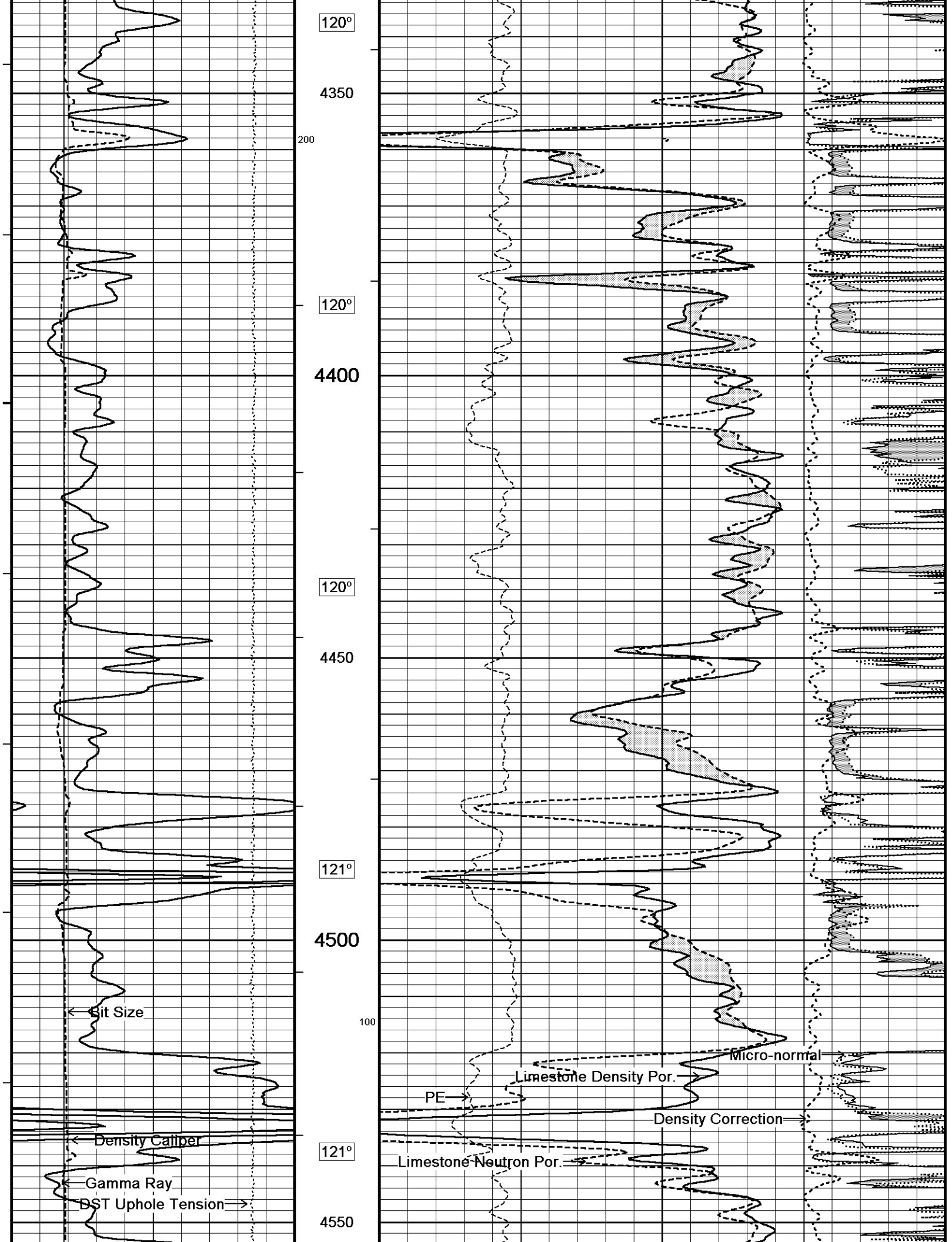
Tools Ran: MCG, MML, MDN, MPD, MFE, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface casing = 1838 cu. ft.
Annular volume with 4.5 inch production casing= 274 cu. ft.
Service order: #3537832
Rig: Southwind Drilling Rig #70
Engineer: L. Scott
Operator(s): K. Rinehart

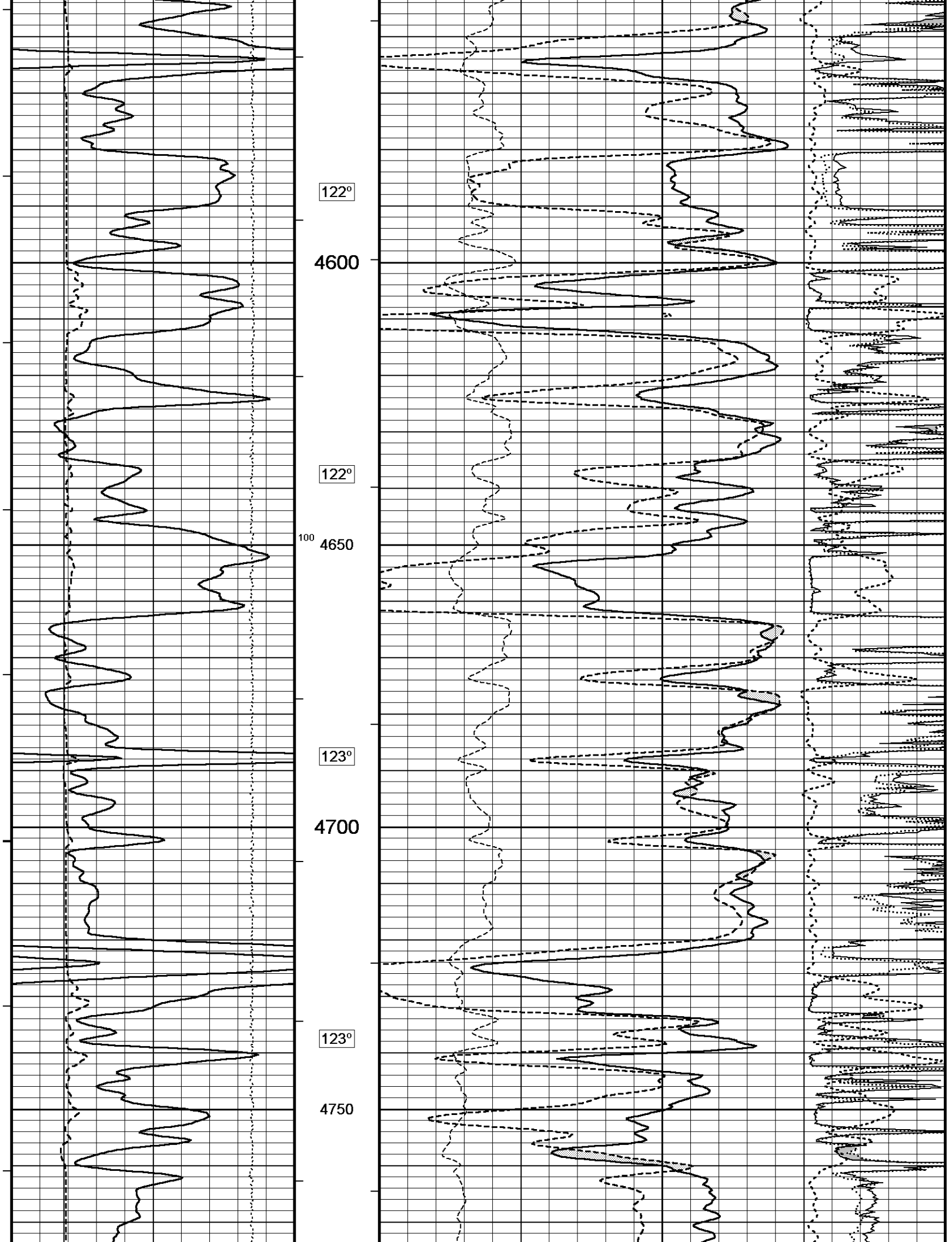
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.

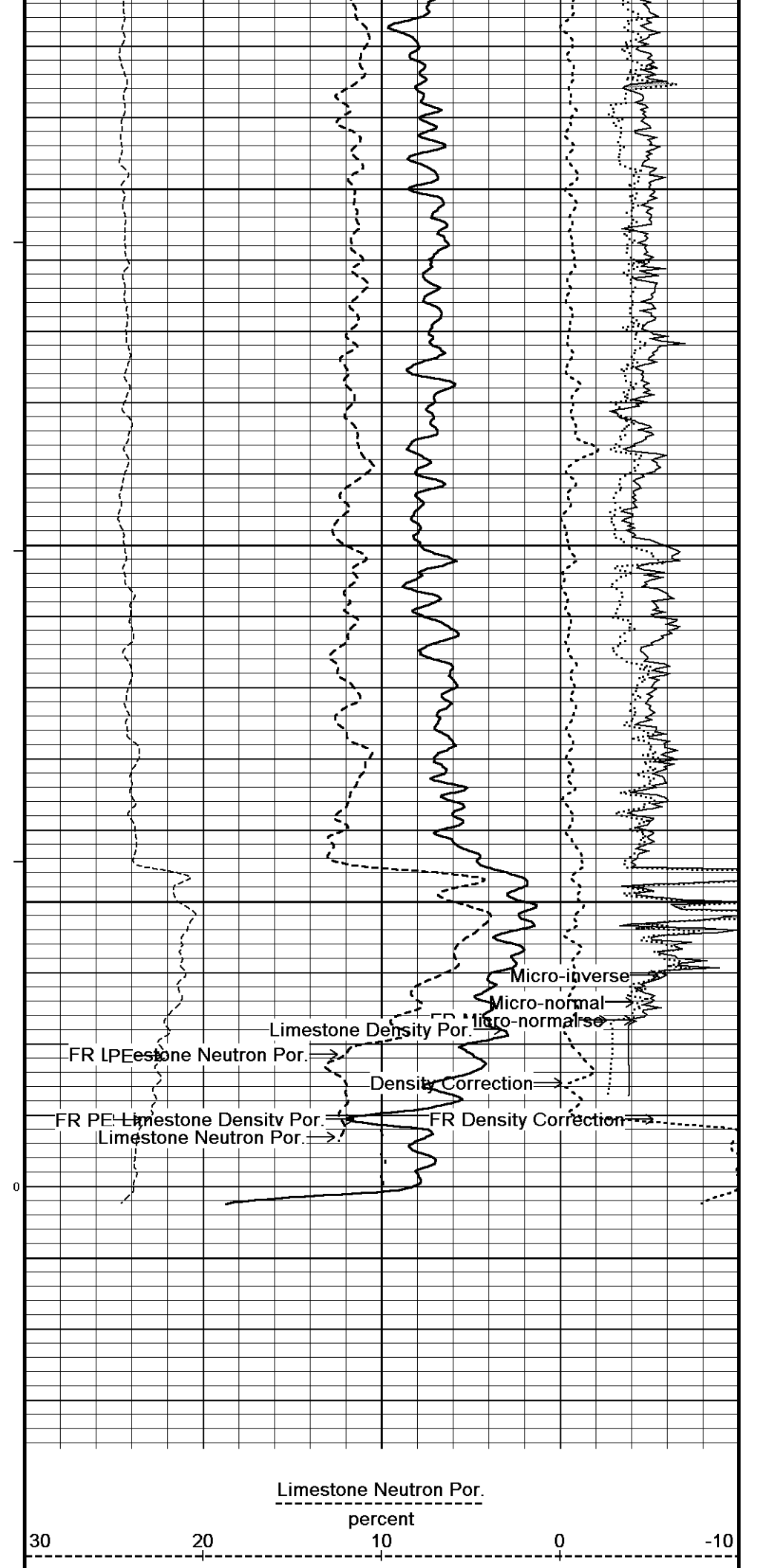
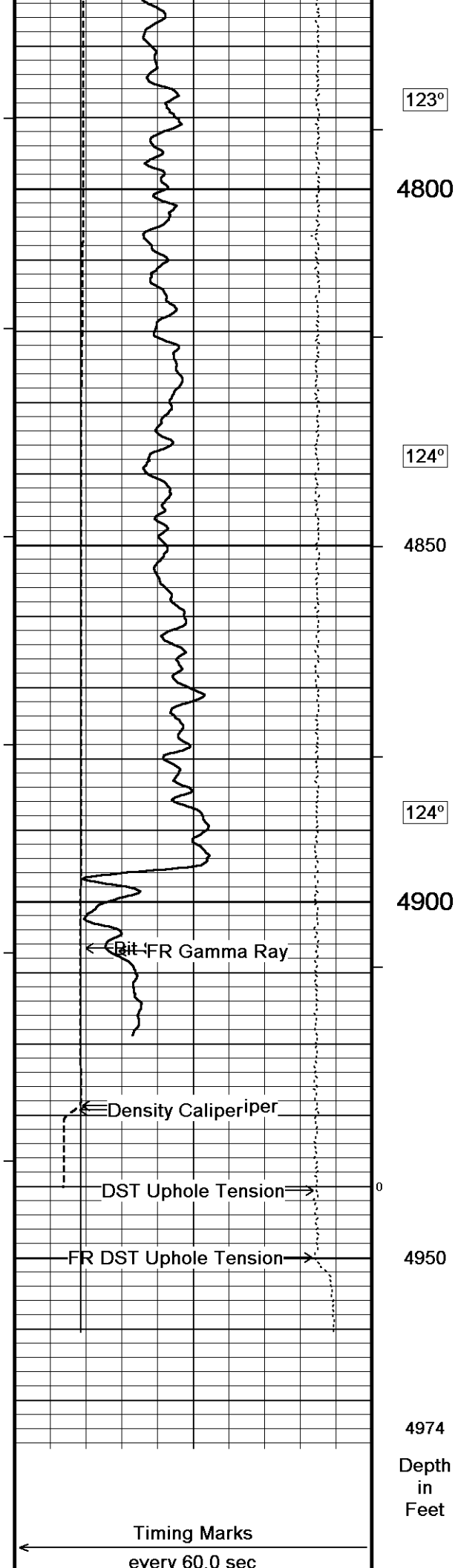


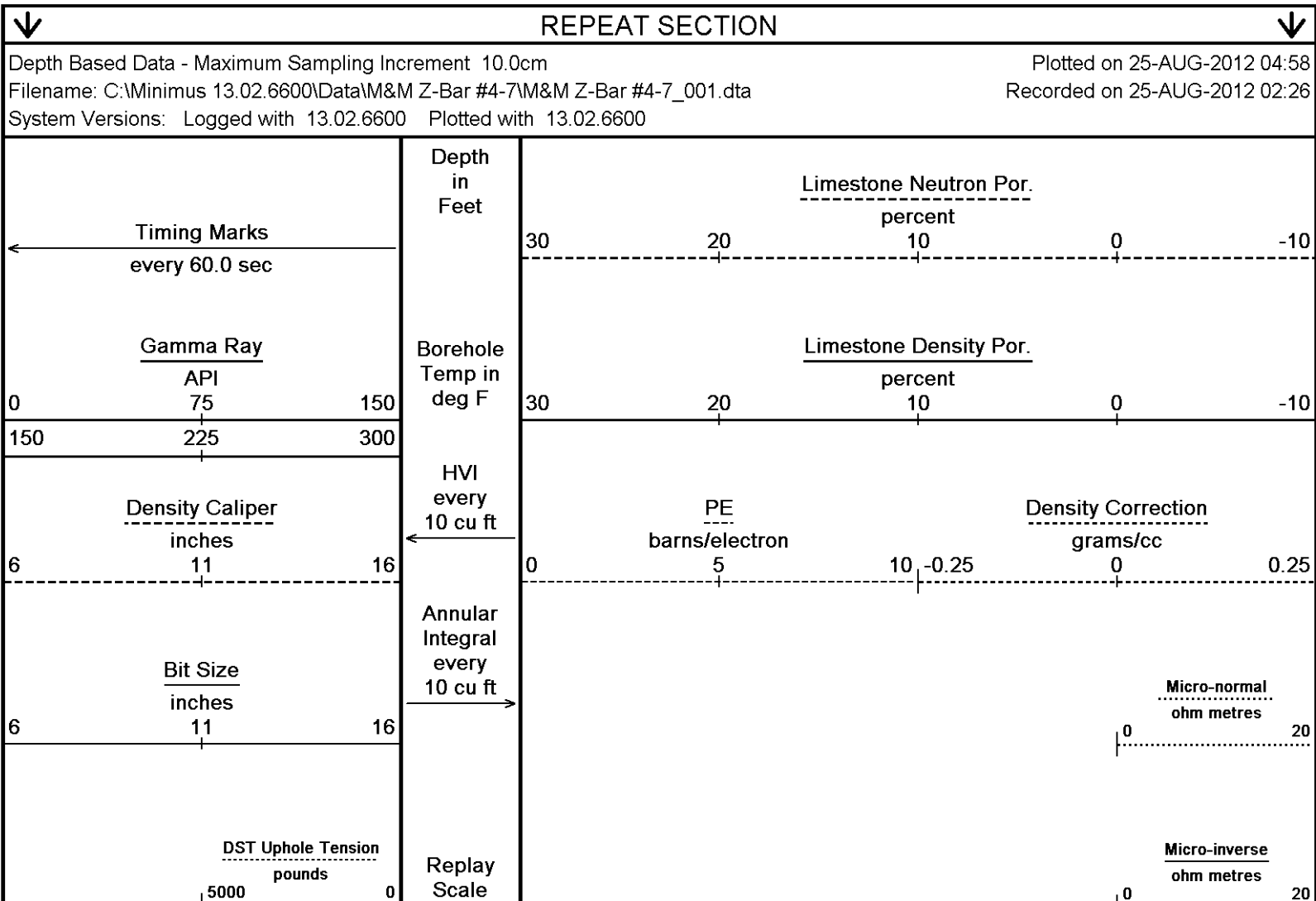
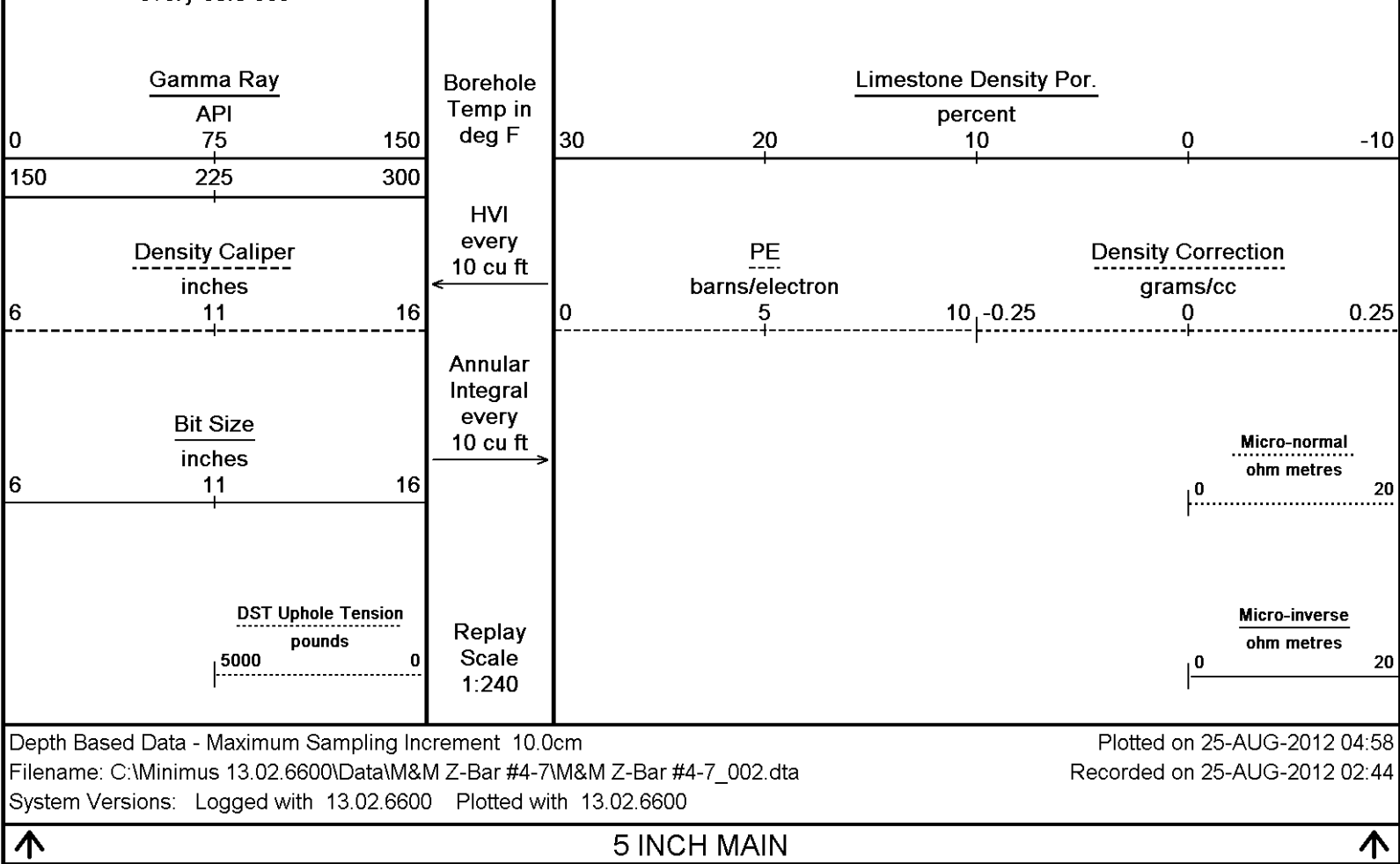


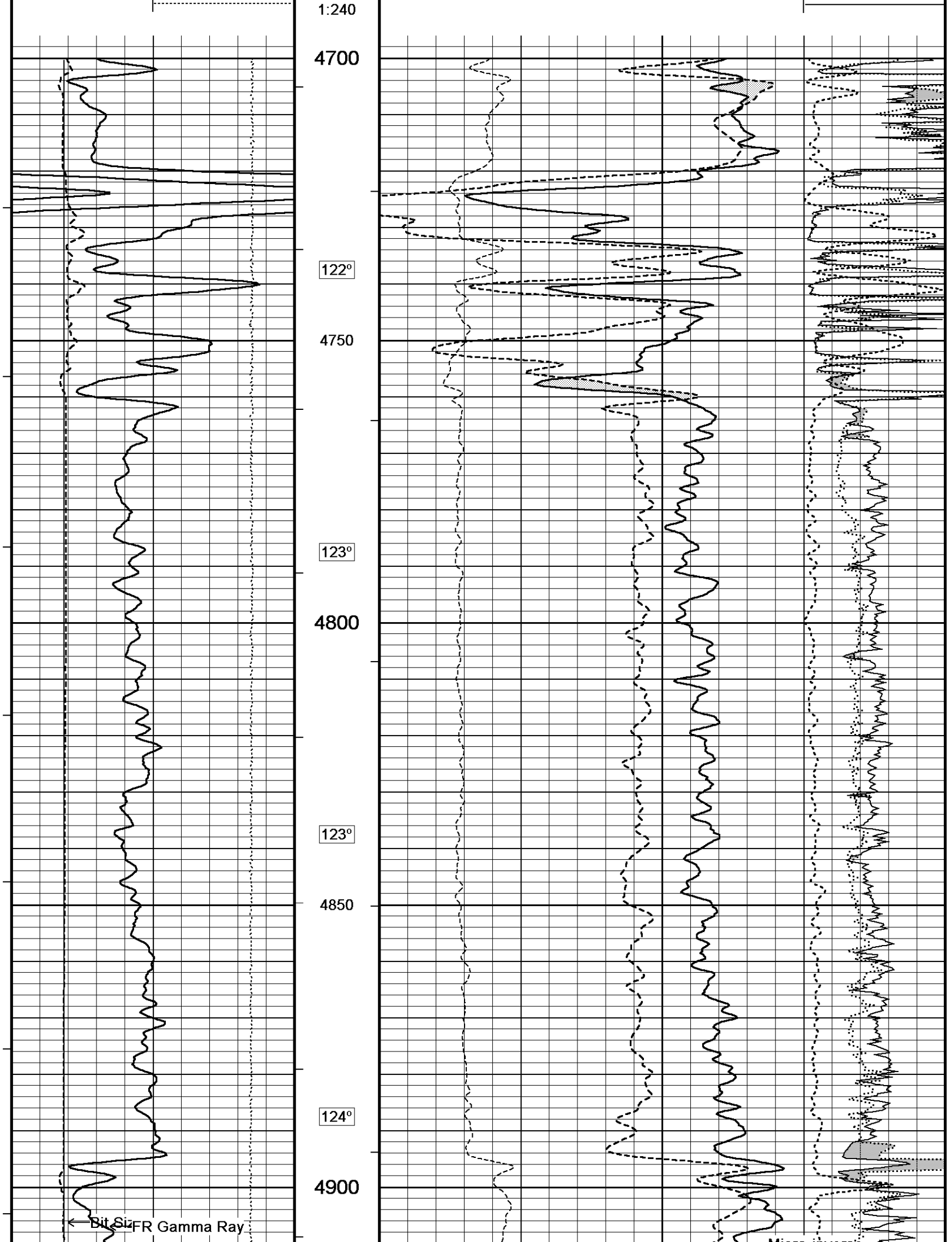


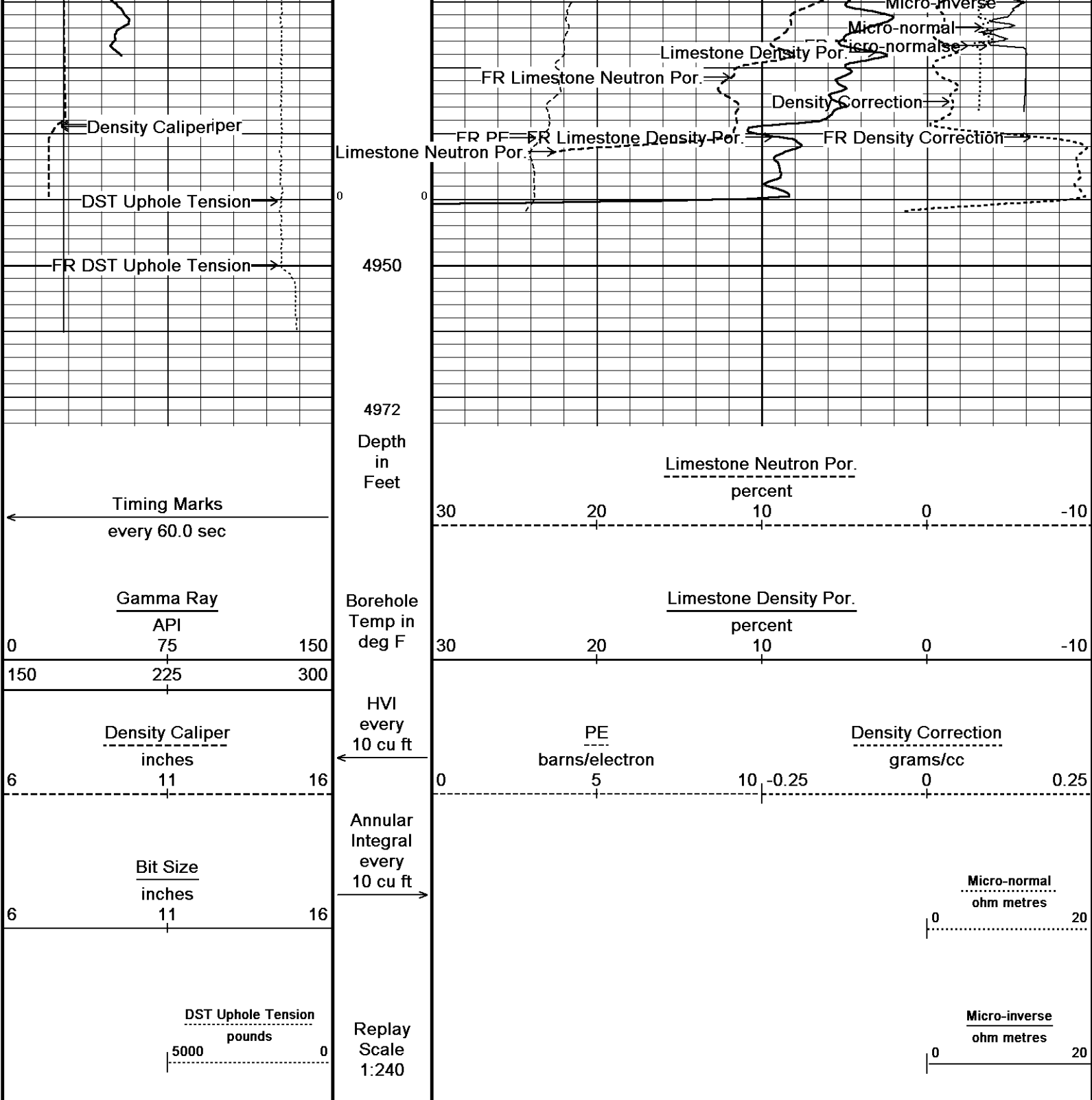












Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_001.dta
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600
Plotted on 25-AUG-2012 04:58
Recorded on 25-AUG-2012 02:26

↑ REPEAT SECTION ↑

↓ 5 INCH MAIN ↓

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_002.dta
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600
Plotted on 25-AUG-2012 04:58
Recorded on 25-AUG-2012 02:44

Timing Marks		Depth in Feet	Compensated Density grams/cc			
			2	2.25	2.50	2.75 3

every 60.0 sec

Gamma Ray

API

75

225

Density Caliper

inches

11

Bit Size

inches

11

DST Uphole Tension

pounds

5000

0

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

3800

116°

3850

116°

3900

Limestone Density Por.

percent

10

0

-10

PE

barns/electron

5

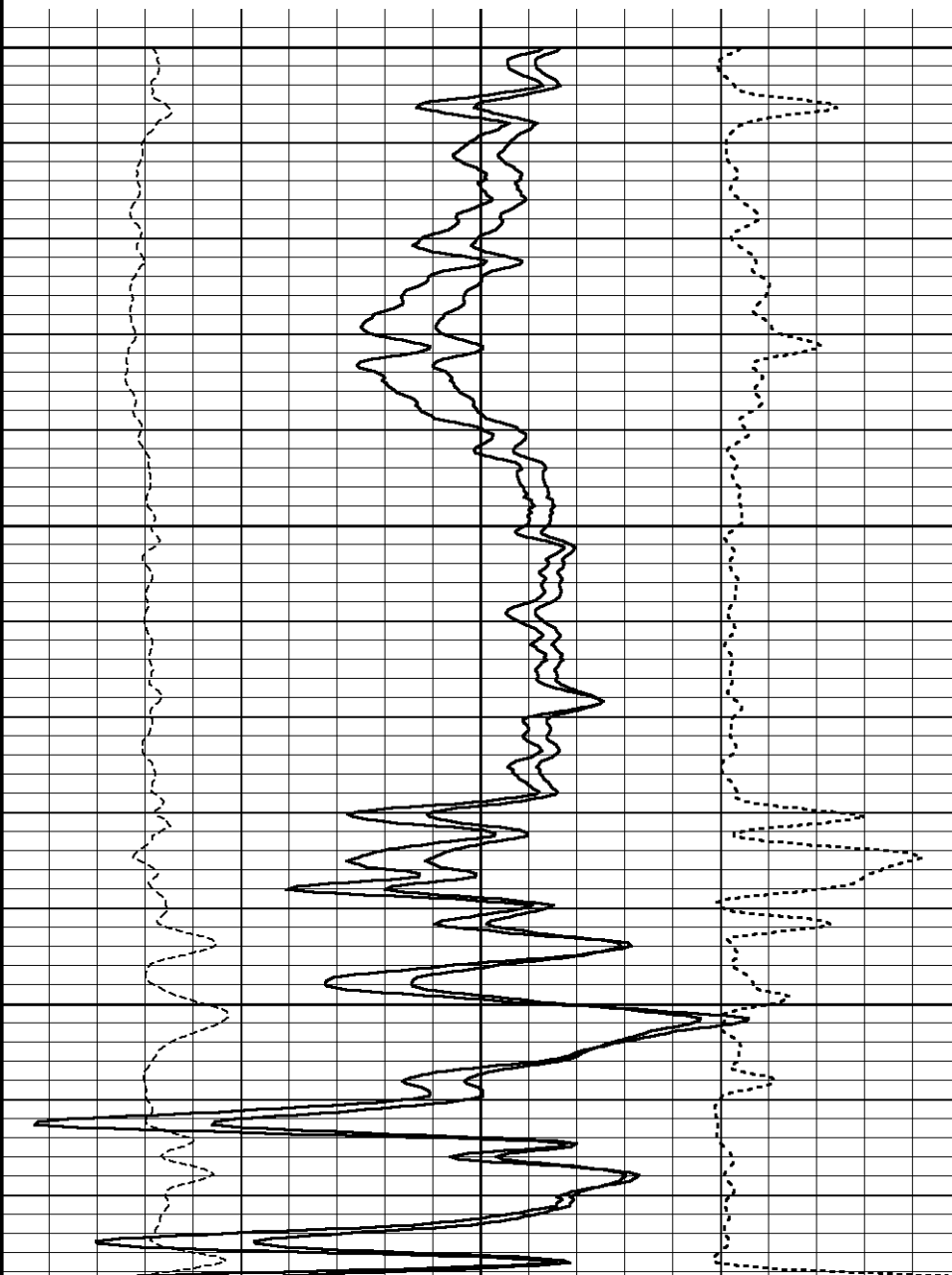
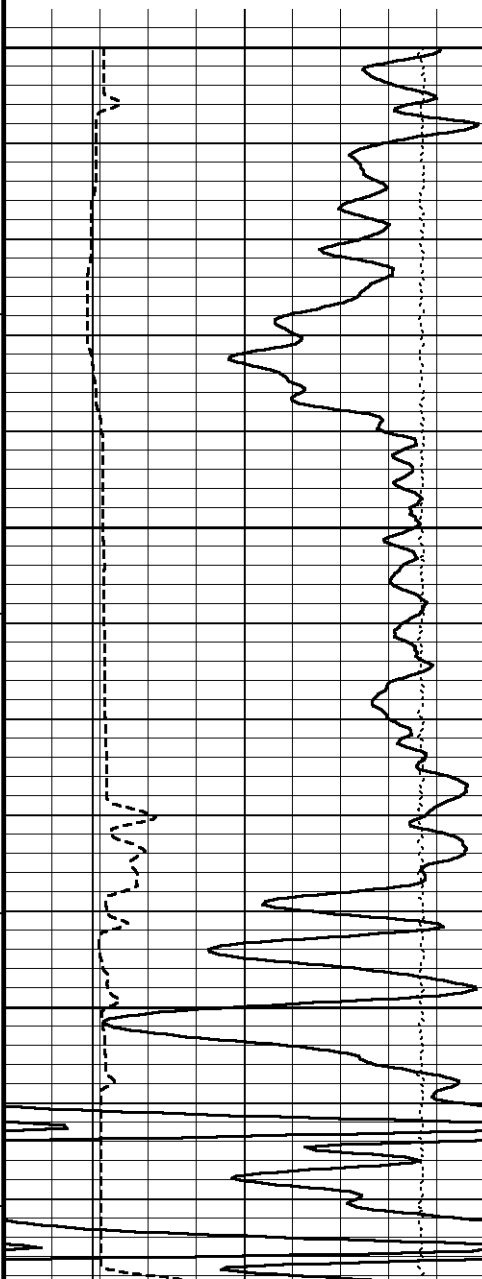
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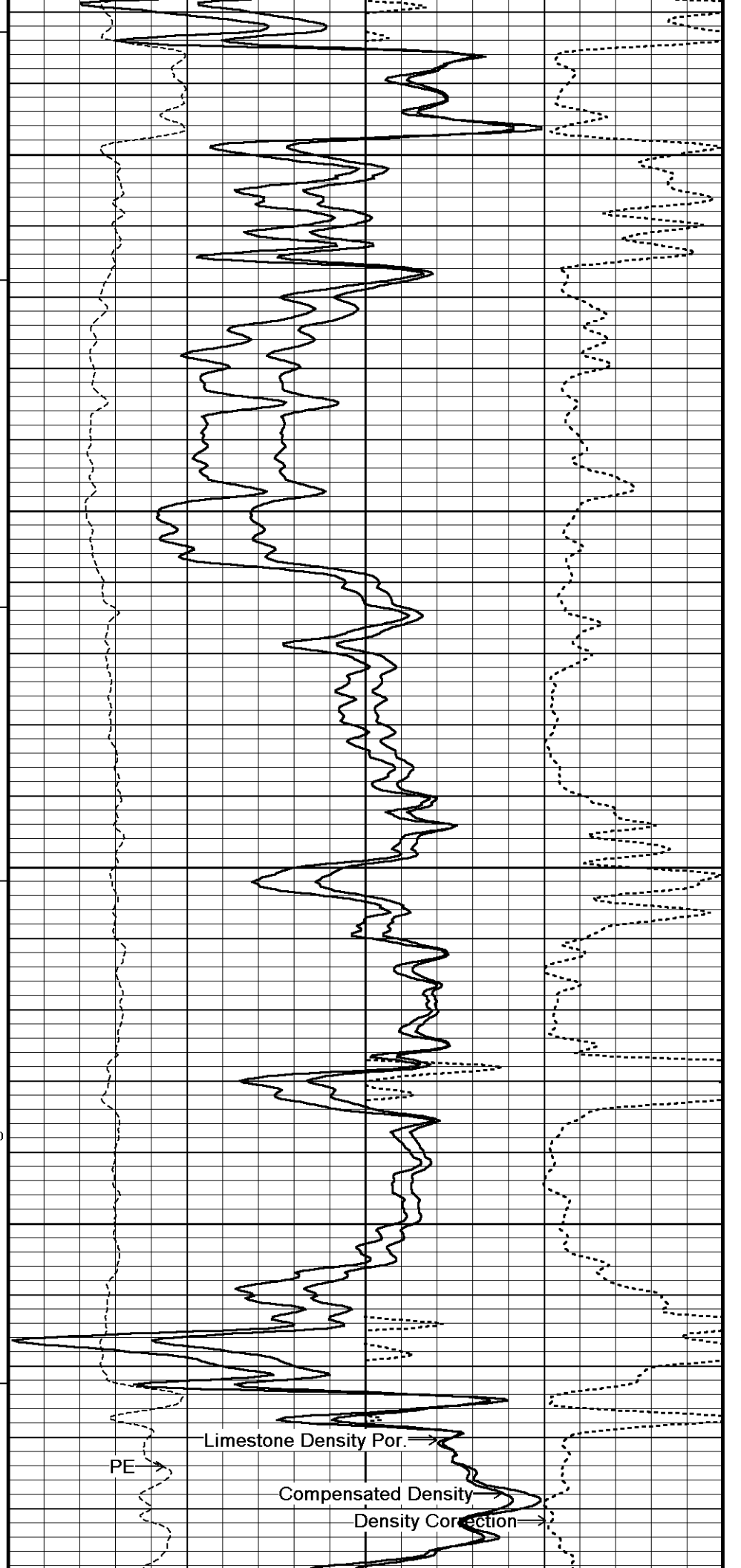
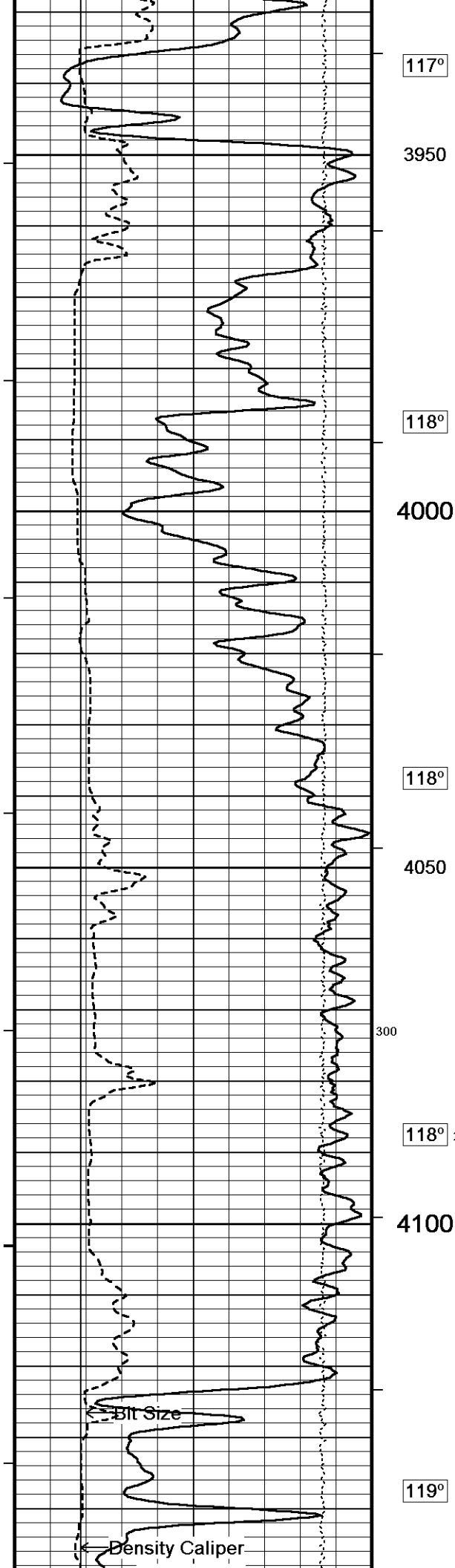
grams/cc

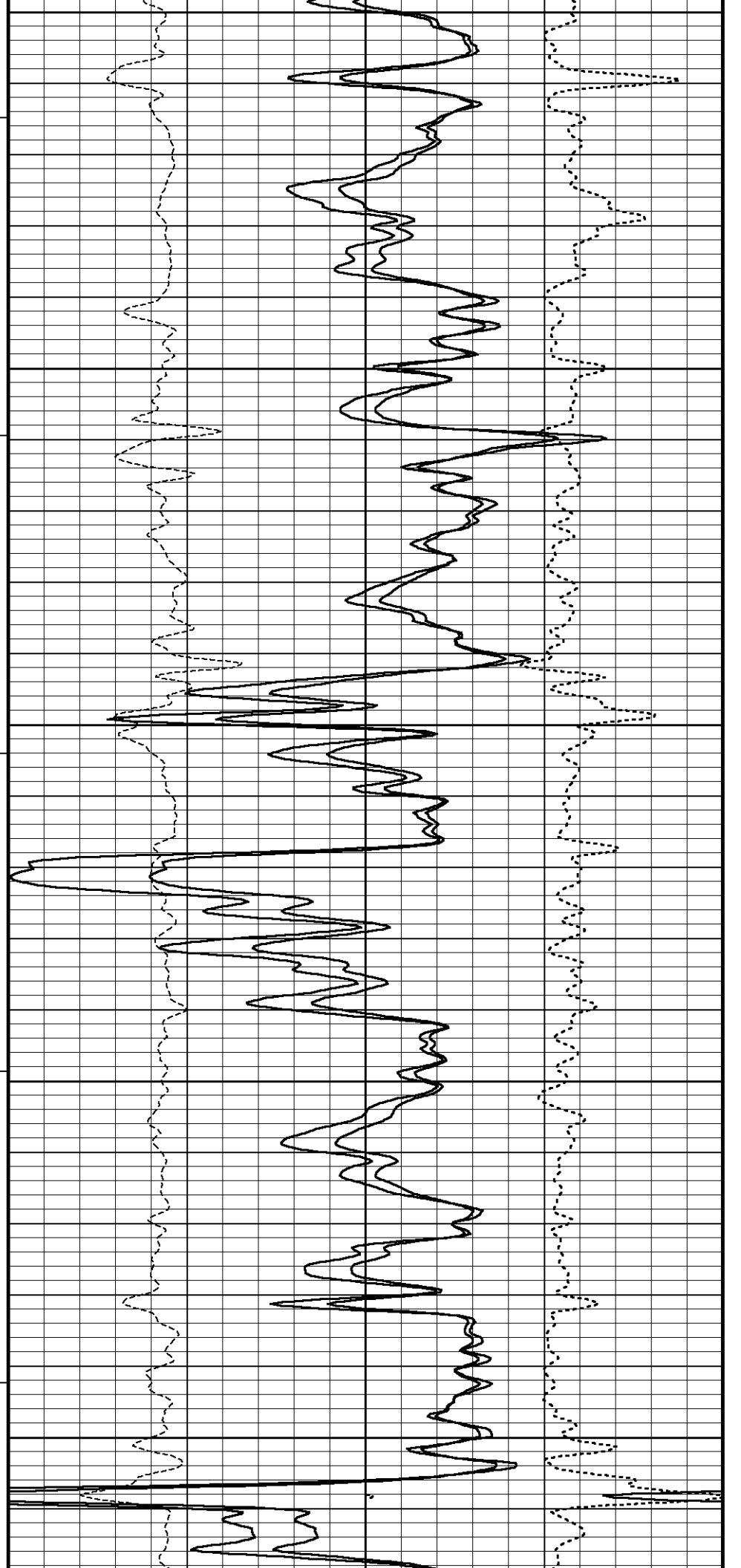
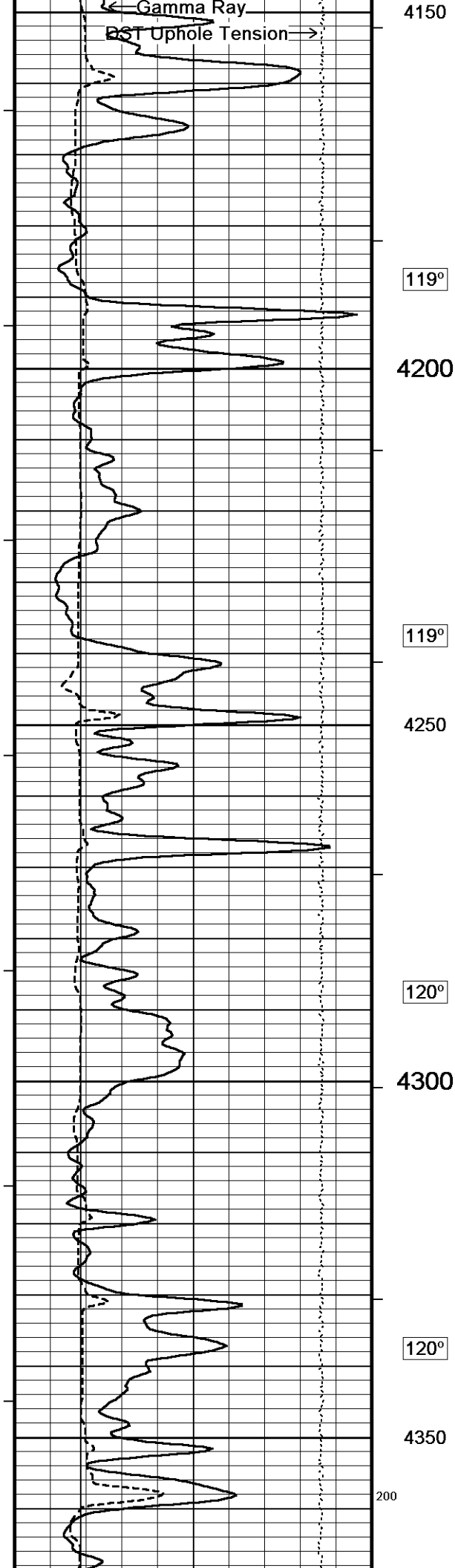
10 -0.25

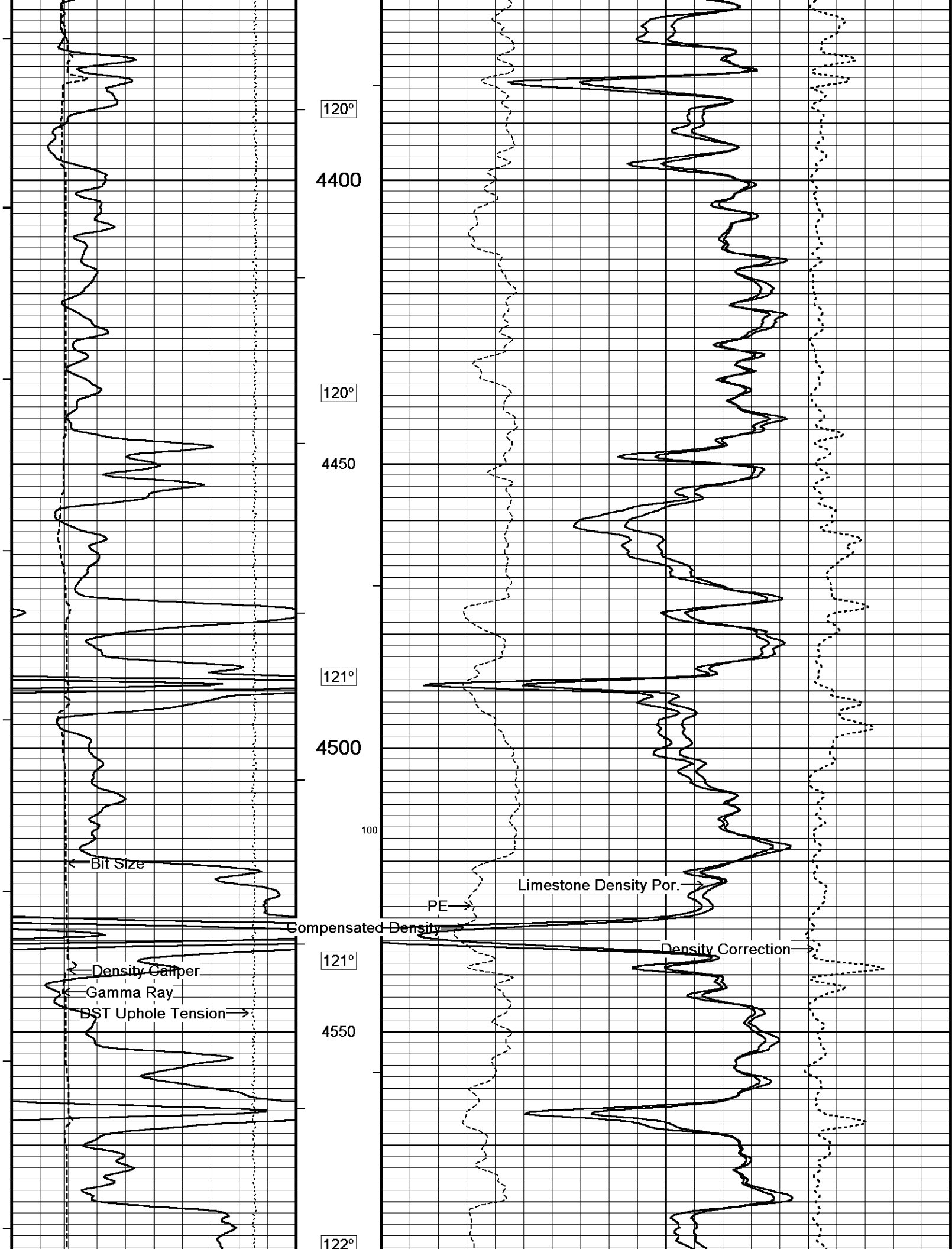
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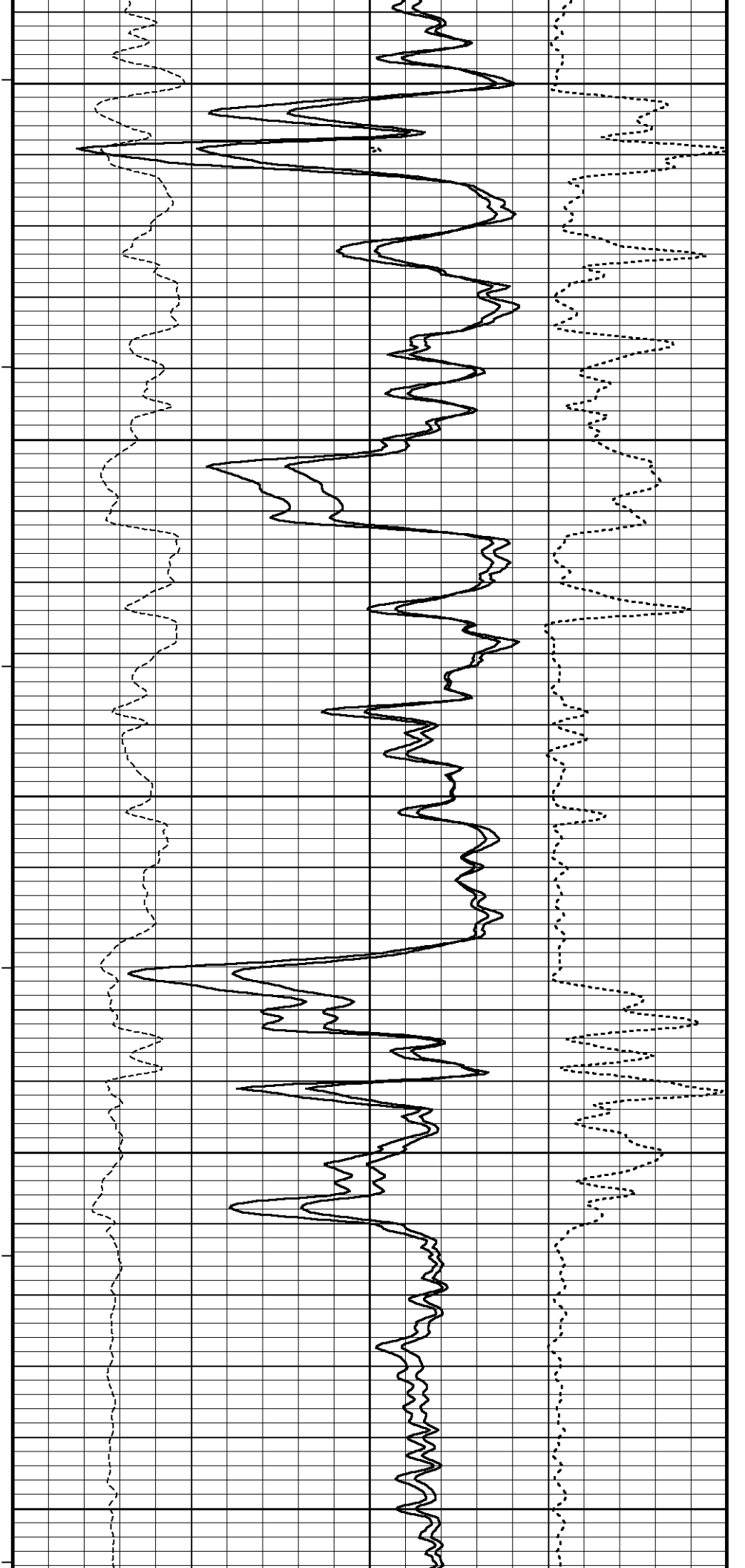
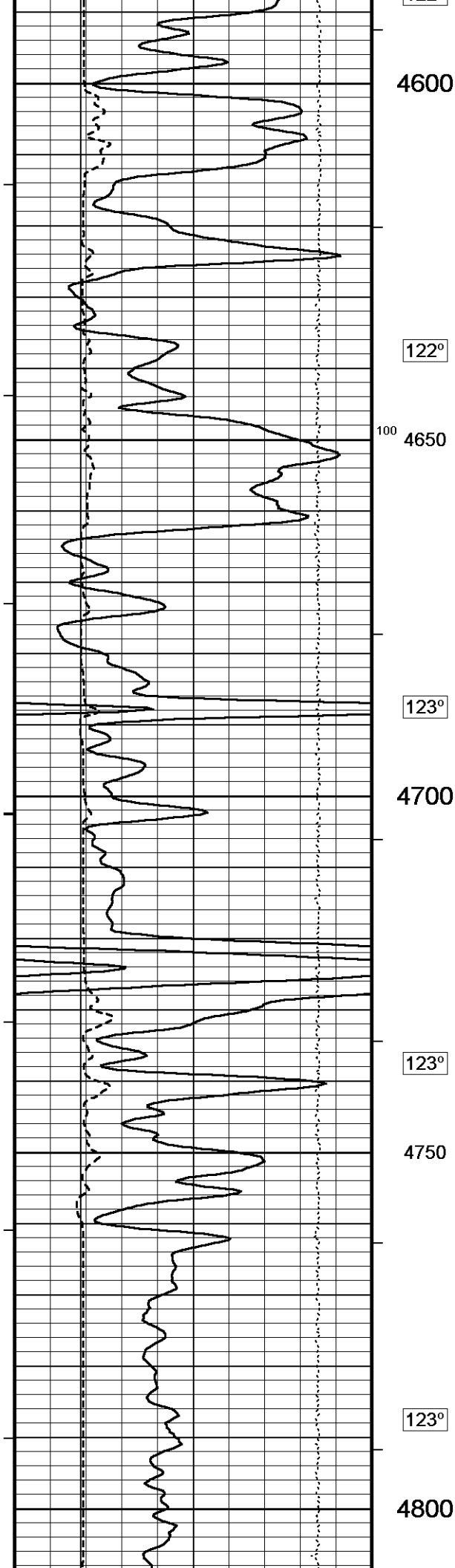
0.25

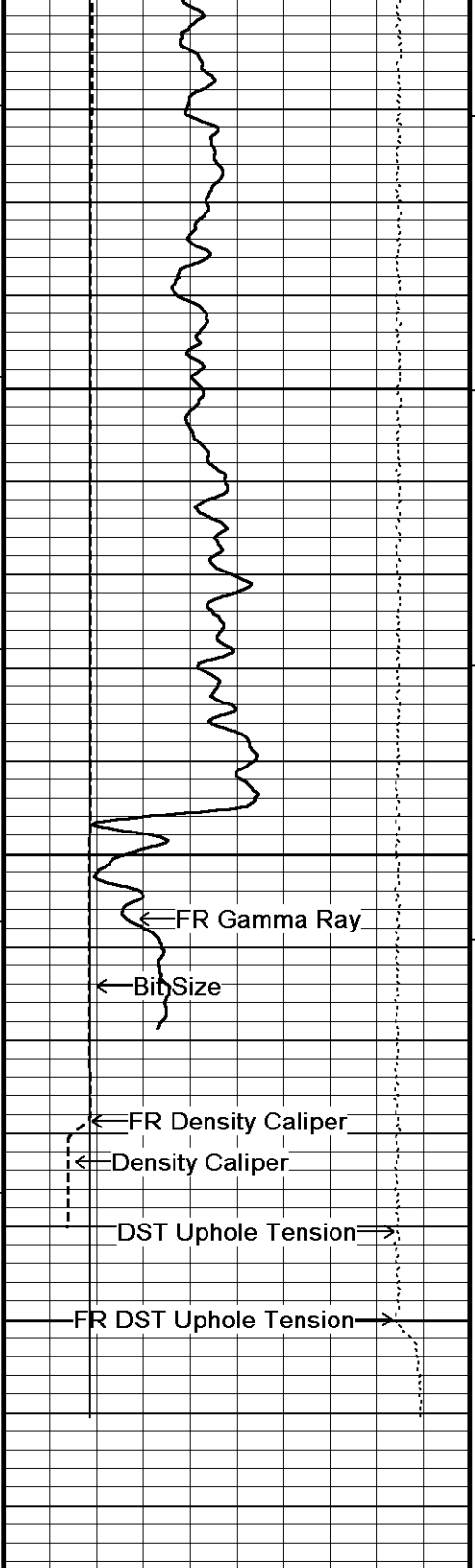




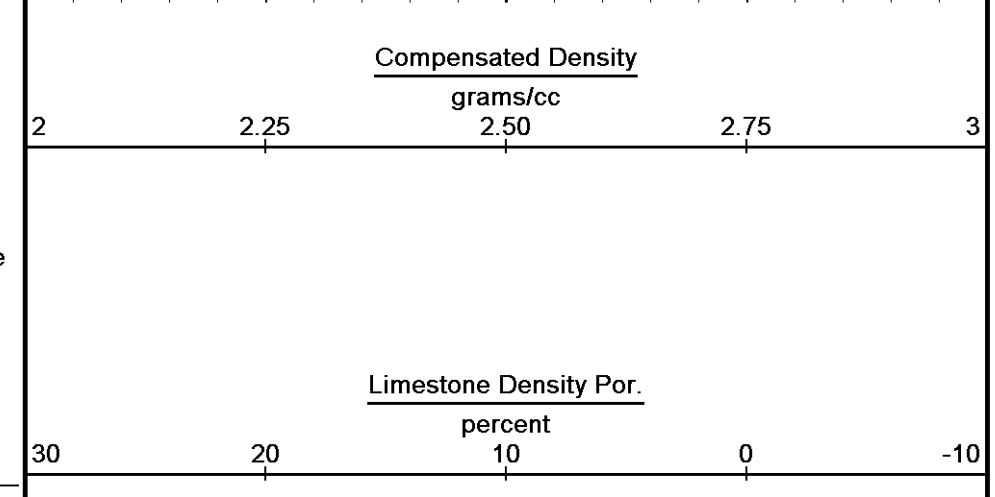
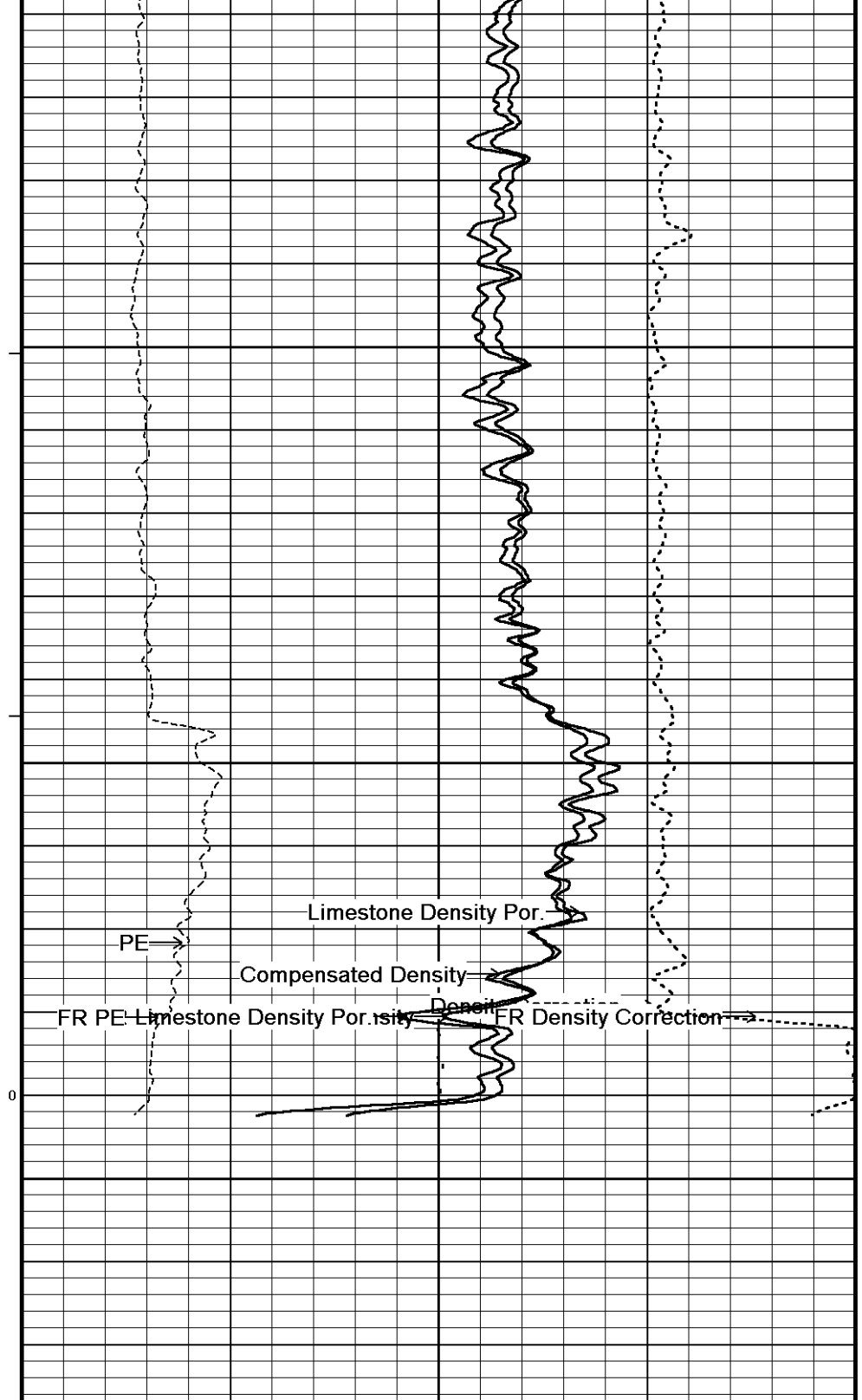
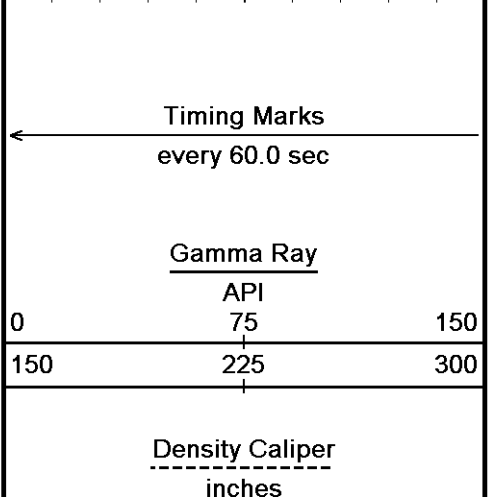


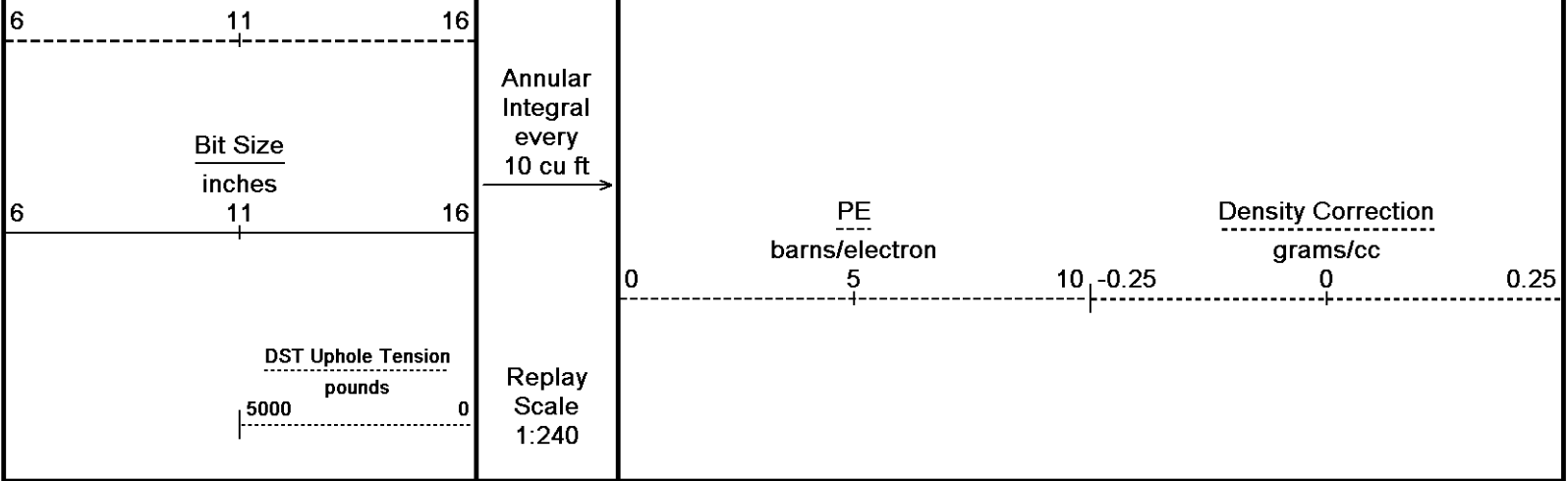






124°
4850
124°
4900
4950
4974
Depth
in
Feet





Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 25-AUG-2012 04:58

Filename: C:\Minimus 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_002.dta

Recorded on 25-AUG-2012 02:44

System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

↑

5 INCH MAIN

↑

↓

REPEAT SECTION

↓

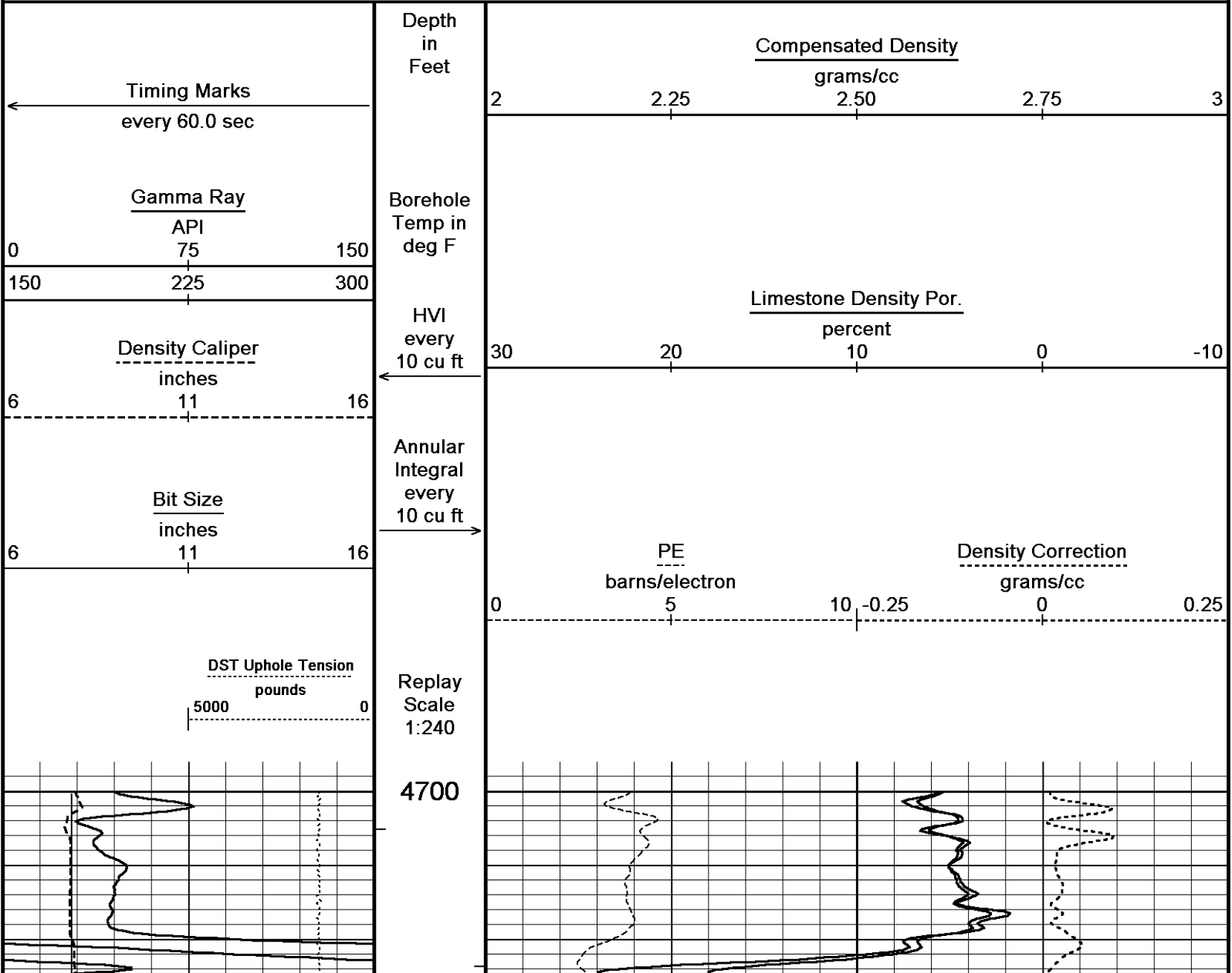
Depth Based Data - Maximum Sampling Increment 10.0cm

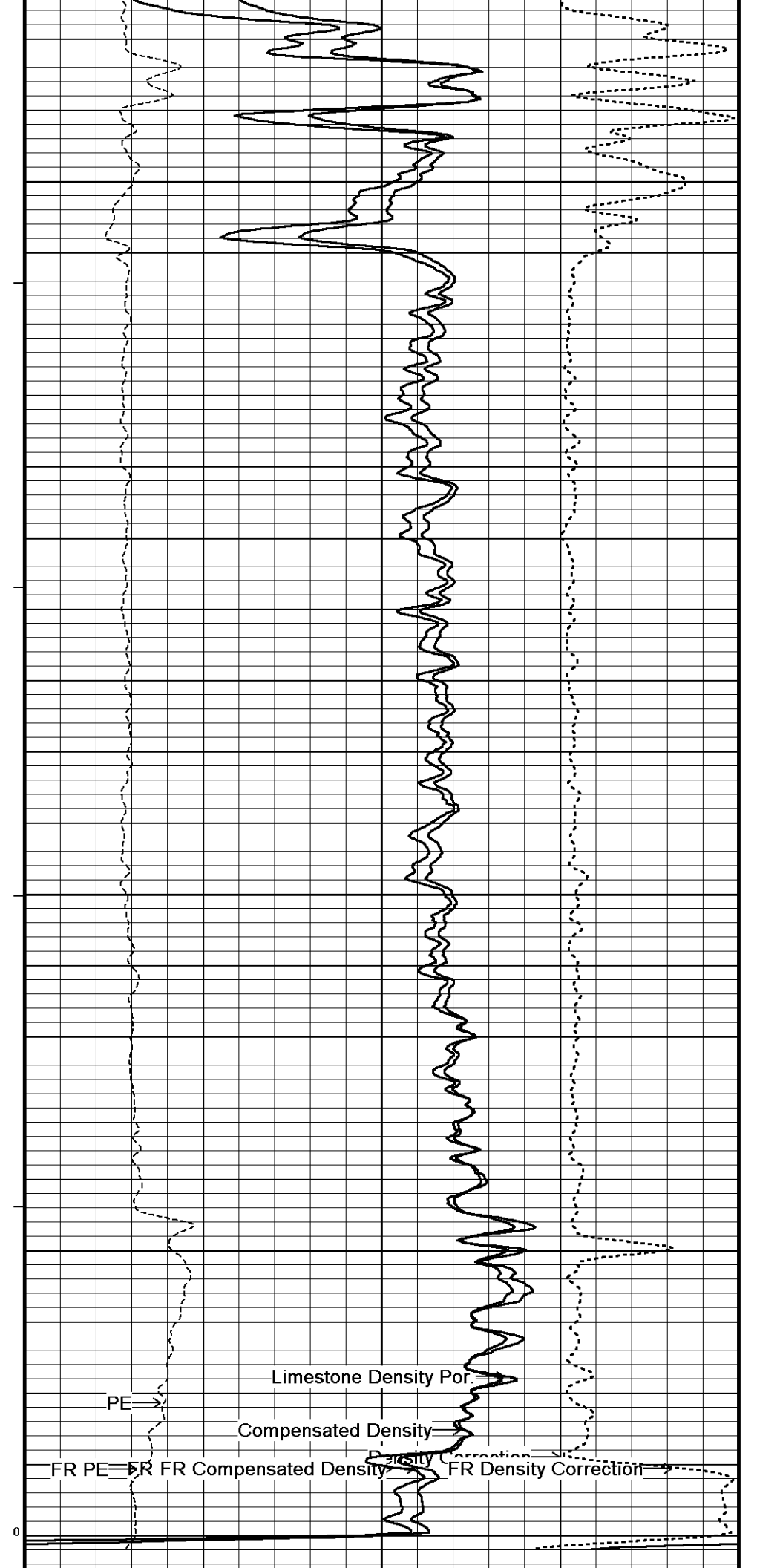
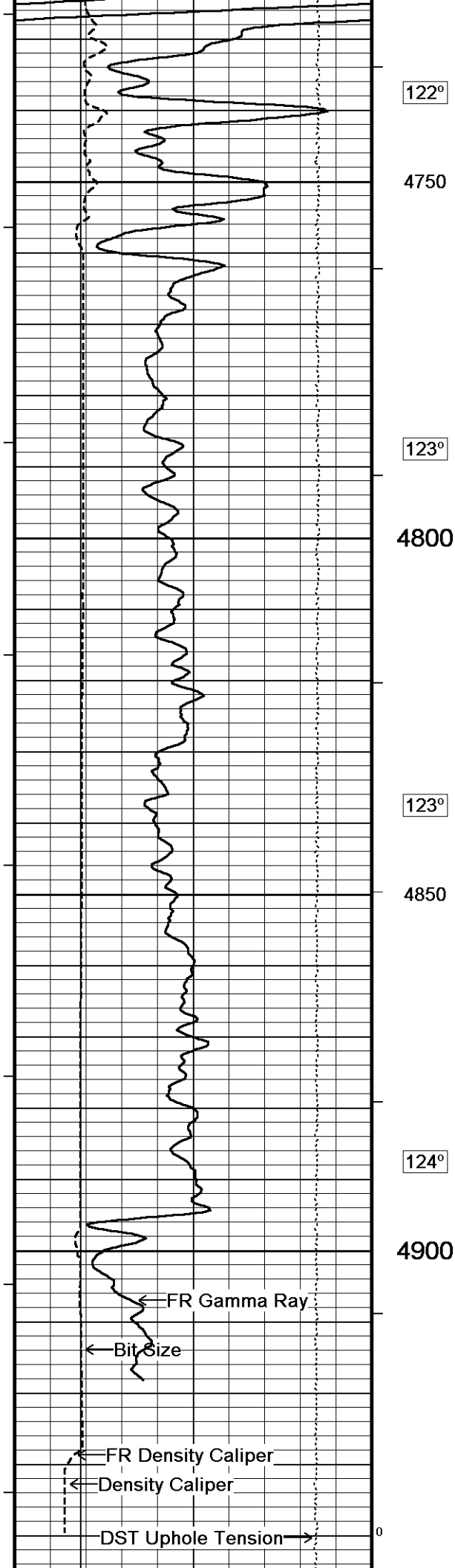
Plotted on 25-AUG-2012 04:58

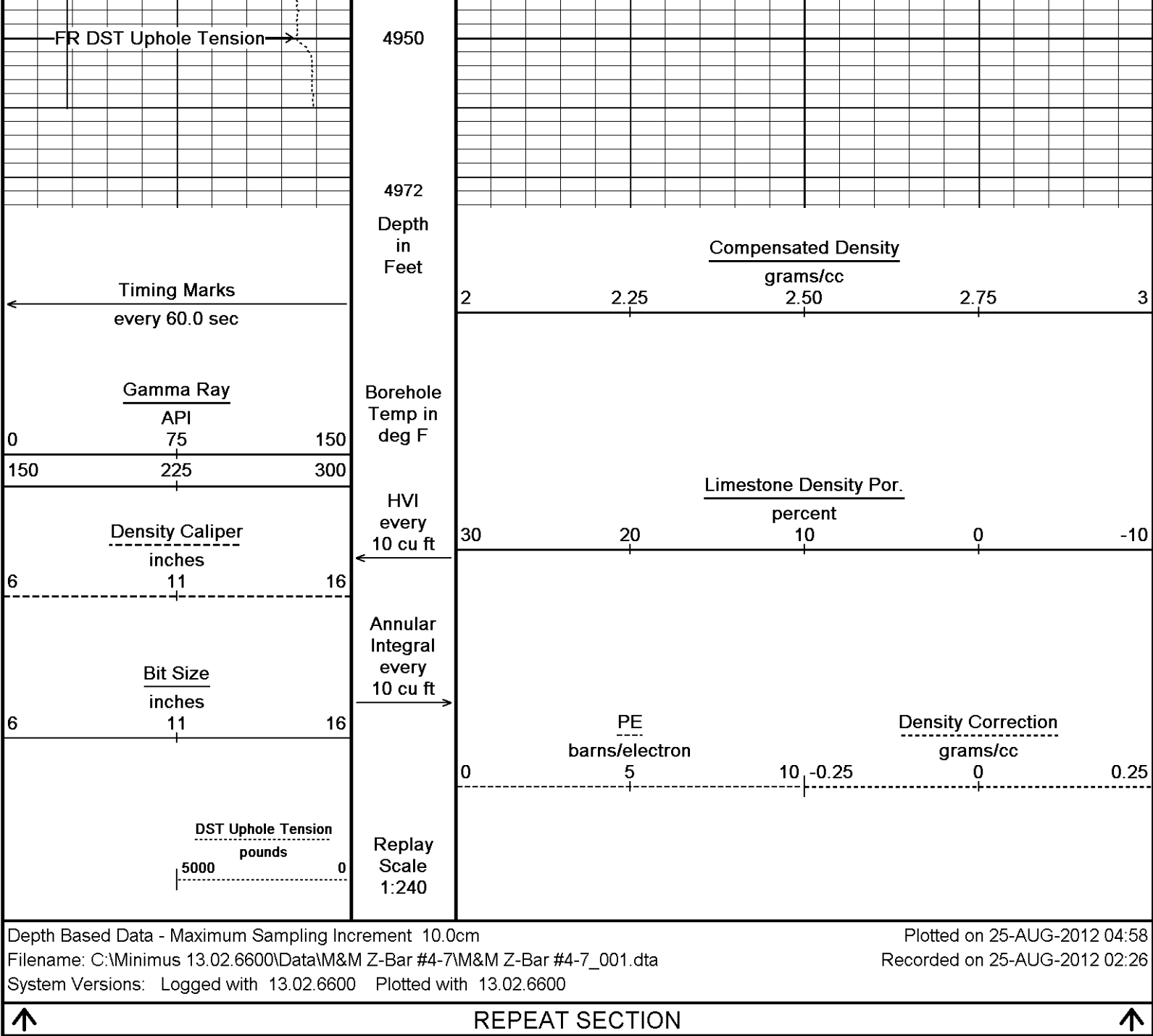
Filename: C:\Minimus 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_001.dta

Recorded on 25-AUG-2012 02:26

System Versions: Logged with 13.02.6600 Plotted with 13.02.6600







BEFORE SURVEY CALIBRATION		
C:\Minimus 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_001.dta		
General Constants All 000		Last Edited on 24-AUG-2012,20:37
General Parameters		
Mud Resistivity	0.670	ohm-metres
Mud Resistivity Temperature	96.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Four Res Pt	

Resistivity used	Array Ind. Four Res Rt	0.610		
RWA Constant A		2.150		
RWA Constant M				
Down-hole Tension Calibration SMS 0			Field Calibration on 07-AUG-2012 11:13	
Reading No	Measured	Calibrated (lbs)		
1	16092.12	0.00		
2	16514.94	399.00		
Gamma Calibration MCG-C 208			Field Calibration on 21-AUG-2012 21:07	
	Measured	Calibrated (API)		
Background	68	47		
Calibrator (Gross)	1127	772		
Calibrator (Net)	1059	725		
Gamma Constants MCG-C 208			Last Edited on 24-AUG-2012,20:37	
Gamma Calibrator Number	GR38			
Mud Density	1.10	gm/cc		
Caliper Source for Processing	Density Caliper			
Tool Position	Eccentred			
Concentration of KCl	0.00	kppm		
SP Calibration MCG-C 208			Field Calibration on 03-AUG-2012 22:37	
	Measured	Calibrated (mV)		
Reference 1	100.2	101.0		
Reference 2	-101.3	-101.0		
High Resolution Temperature Calibration MCG-C 208			Field Calibration on 03-AUG-2012,16:18	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	75.00	75.00		
High Resolution Temperature Constants MCG-C 208			Last Edited on	
Pre-filter Length	11			
Micro Normal and Micro Inverse Calibration MML-A 4			Base Calibration on 24-JUL-2012 08:59 Field Check on 10-AUG-2012 09:05	
Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Resistor 2
Micro Normal	12.2	60.2	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 4			Last Edited on 24-AUG-2012,20:38	
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 MML-A 4			Base Calibration on 24-JUL-2012 08:53 Field Calibration on 10-AUG-2012 09:04	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15504	5.98		
2	18771	7.97		
3	22124	9.86		
4	25894	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	5.95	5.98		

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3179	99	3714	110
Ratio	32.263		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	Near	Far
	1621	2347
Ratio	0.691	

Field Check

	Calibrated (cps)	
	Near	Far
	1631	2355
Ratio	0.693	

Neutron Constants MDN-A.B 65

Last Edited on 24-AUG-2012,20:38

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	
Salinity Correction	Not Applied		
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 24-JUL-2012 09:23

Field Check on 21-AUG-2012 20:29

Base Calibration

	Measured		Calibrated (ohm-m)	
	Low	High	Low	High
Reference 1	0.0		0.0	
Reference 2	968.0		126.8	
Base Check			276.7	
Field Check			276.7	

FE Constants MFE-A.A 55

Last Edited on 24-AUG-2012,20:38

Running Mode	No Sleeve		
MFE K Factor	0.1268		
Caliper Source for FE correction	Density Caliper		
Caliper Value for FE correction	N/A		
Rm Source for FE correction	Temperature Corr		
Temp. for Rm Corr.	MCG External Temperature		
Stand-off	0.5	inches	

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22

Field Check on 21-AUG-2012 20:59

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
Channel 1	14.4	472.6	9.3	966.2
Channel 2	5.7	374.0	7.6	821.4
Channel 3	3.4	261.2	5.2	566.0
Channel 4	2.5	133.9	2.6	279.2
Array Temperature	78.4		Deg F	

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	19.5	3852.8

1	0.0	0.0	19.5	3632.6
2	0.0	0.0	31.8	3630.0
3	0.0	0.0	28.6	3049.8
4	0.0	0.0	18.2	2079.4
Deep	0.0	0.0	16.0	1911.4
Medium	0.0	0.0	42.3	4061.0
Shallow	0.0	0.0	49.9	5484.1
Array Temperature		0.0		83.3 Deg F

Induction Constants MAI-A.A 45

Last Edited on 24-AUG-2012,20:39

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 26-JUL-2012,09:09

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on

Pre-filter Length	11
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Caliper Calibration MPD-B 31

Base Calibration on 26-JUL-2012 09:16
Field Calibration on 21-AUG-2012 20:40

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	17567	3.99
2	26416	5.98
3	35056	7.97
4	43488	9.86
5	52816	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)
6.04

Actual Caliper (in)
5.98

Photo Density Calibration MPD-B 31

Base Calibration on 26-JUL-2012 10:02

Field Check on 21-AUG-2012 20:34

Density Calibration

Base Calibration

	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	48085	24200	59556	30836
Reference 2	19674	1989	24941	2541

Field Check at Base

692.2 849.9

Field Check

692.6 851.2

PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	127	608		
Reference 1	19234	47953	0.404	0.371
Reference 2	5695	19580	0.293	0.272

Field Check at Base

126.7 608.3

Field Check

128.1 606.2

Density Constants MPD-B 31

Last Edited on 24-AUG-2012,20:38

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	1.10 gm/cc
Mud Density Z/A Multiplier	1.13
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 13.02.6600\Data\M&M Z-Bar #4-7\M&M Z-Bar #4-7_001.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in



42.87 ft GRGC - Gamma Ray
39.96 ft CGXT - MCG External Temperature

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

33.24 ft MINV - Micro-inverse
33.24 ft MNRL - Micro-normal
34.24 ft MLTC - MML Caliper

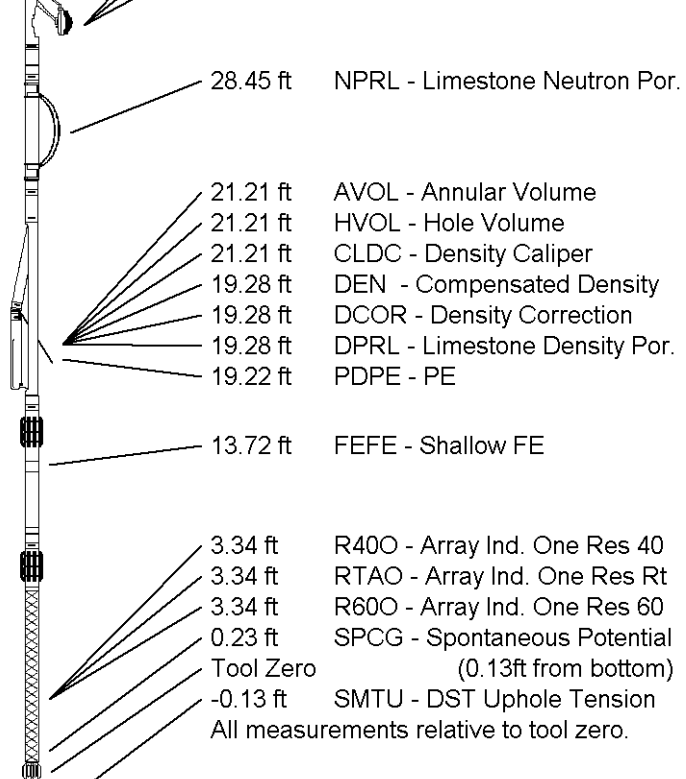
Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 31 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 Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.16 ft Weight: 383.6 lb



COMPANY M&M EXPLORATION, INC.
WELL Z-BAR #4-7
FIELD AETNA
PROVINCE/COUNTY BARBER
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	1647.00	feet	First Reading	4930.00	feet
Elevation Drill Floor	1646.00	feet	Depth Driller	4950.00	feet
Elevation Ground Level	1635.00	feet	Depth Logger	4950.00	feet



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