



**Weatherford**<sup>®</sup>

**COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON  
MICRORESISTIVITY LOG**

COMPANY **GRAND MESA OPERATING**  
 WELL **BFF #1-35**  
 FIELD **WILDCAT**  
 PROVINCE/COUNTY **SCOTT**  
 COUNTRY/STATE **U.S.A. / KANSAS**  
 LOCATION **2479' FNL & 2772' FEL  
SE SE SE NW**

SEC 35 TWP 16S RGE 33W Other Services  
 MA/MFE  
 API Number 15-171-21013  
 Permit Number  
 Permanent Datum GL, Elevation 2970 feet  
 Log Measured From KB  
 Drilling Measured From KB AT 9 FEET

Elevations:  
 KB 2979.00 feet  
 DF 2977.00  
 GL 2970.00

Date	15-JAN-2014
Run Number	ONE
Service Order	736-76969324
Depth Driller	4800.00 feet
Depth Logger	4800.00 feet
First Reading	4780.79 feet
Last Reading	3800.00 feet
Casing Driller	220.00 feet
Casing Logger	219.00 feet
Bit Size	7.875 inches
Hole Fluid Type	CHEMICAL
Density / Viscosity	9.30 lb/USg 63.00 CP
PH / Fluid Loss	11.00 7.20 ml/30Min
Sample Source	MUDPIT
Rm @ Measured Temp	0.61 @ 75.0 ohm-m
Rmf @ Measured Temp	0.49 @ 75.0 ohm-m
Rmc @ Measured Temp	0.73 @ 75.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.40 @117.0 ohm-m
Time Since Circulation	4 HOURS
Max Recorded Temp	117.00 deg F
Equipment / Base	13096 LIB
Recorded By	DEREK CARTER
Witnessed By	JOHN GOLDSMITH
JOB #	LB14-016

**BOREHOLE RECORD**

Last Edited: 15-JAN-2014 04:14

Bit Size inches 7.875	Depth From feet 220.00	Depth To feet 4800.00
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**CASING RECORD**

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	220.00	24.00

**REMARKS**

- SOFTWARE ISSUE: WLS 13.05.9583
- TOOLS: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION  
HARDWARE:  
MDN: DUAL BOWSPRING ECCENTRALIZER  
MFE: 1 X 0.5 INCH STANDOFF  
MAI: 2 X 0.5 INCH STANDOFF
- 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: 2010 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 1250 CU. FT.

- RIG: DUKE DRILLING COMPANY #4

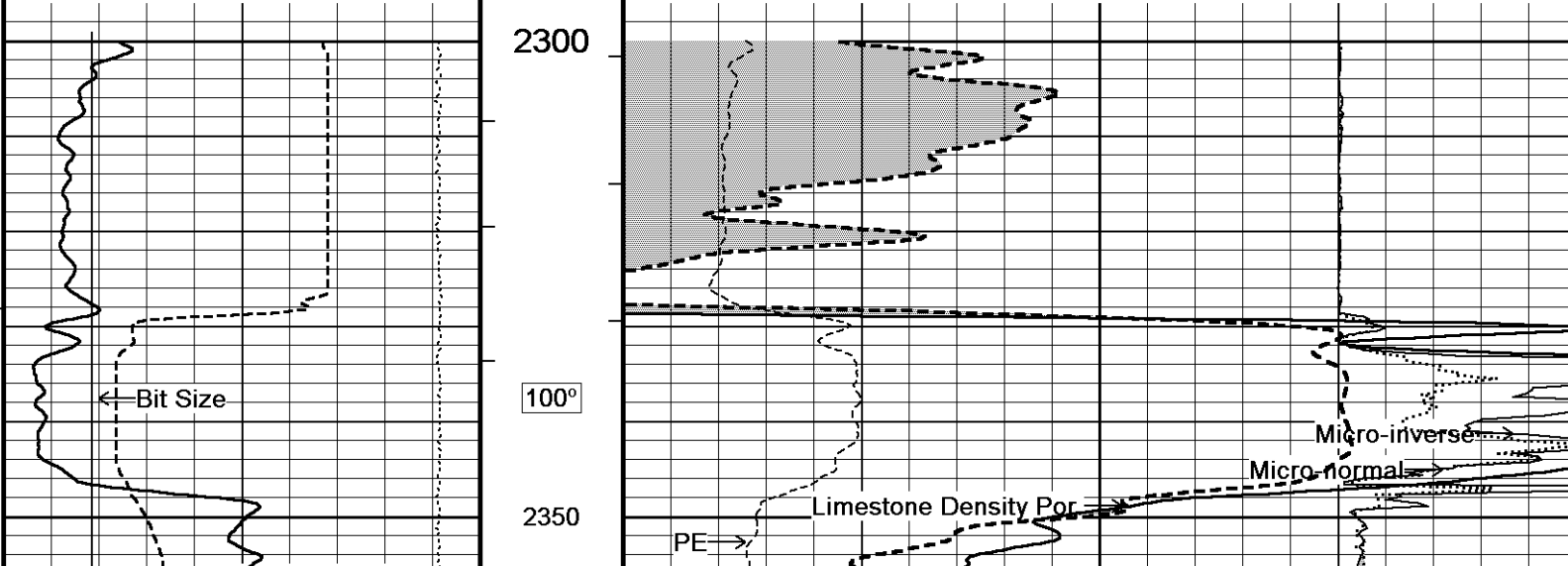
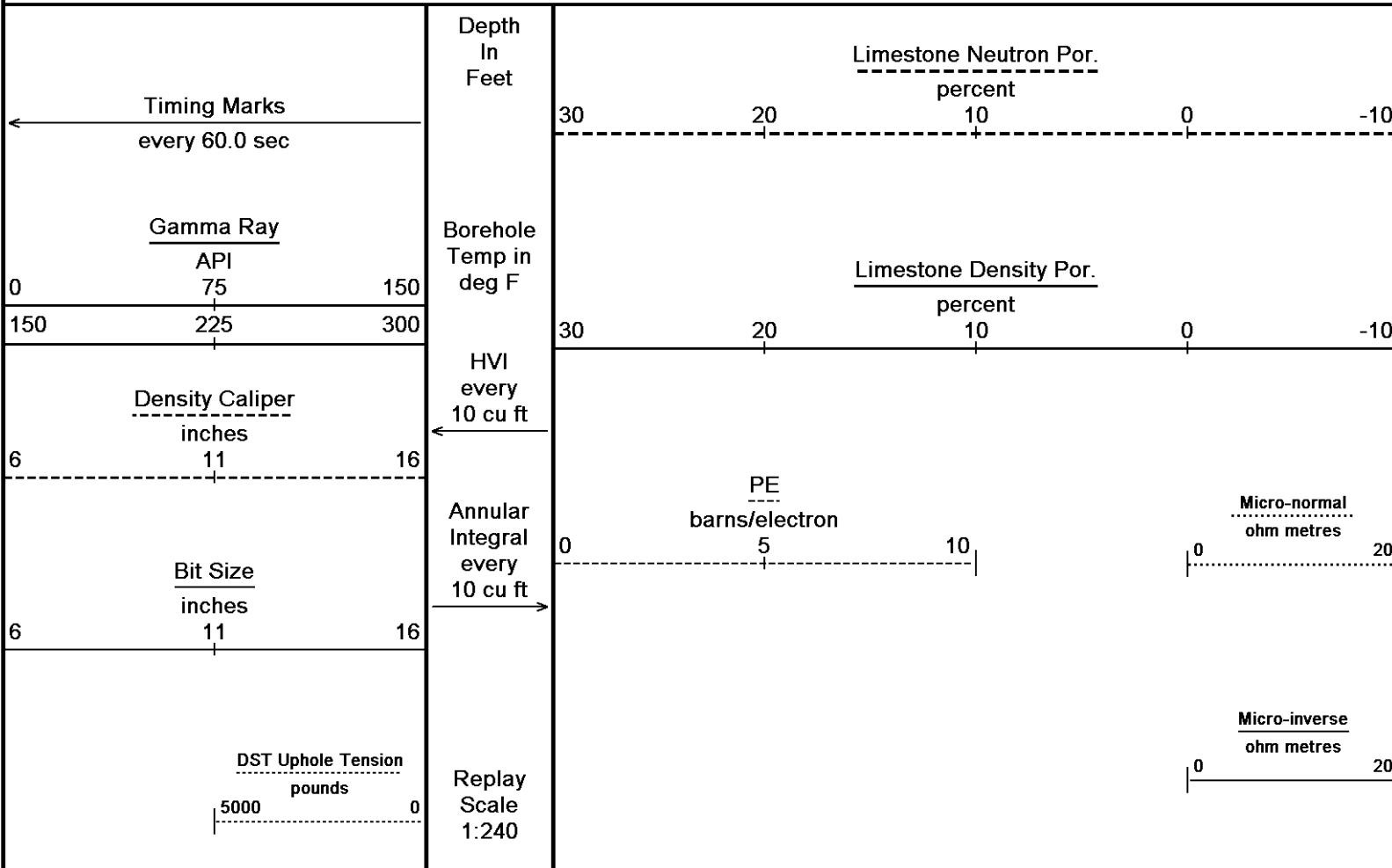
- ENGINEER: DEREK CARTER

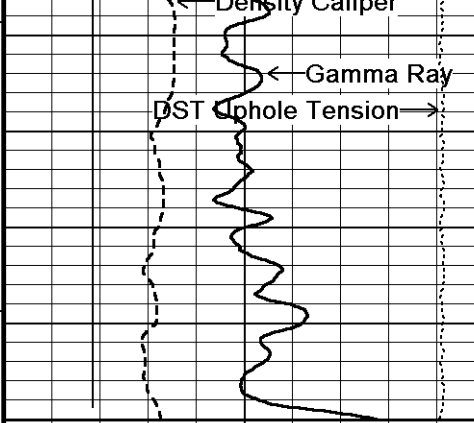
- OPERATORS: KEN RINEHART, TROWDY DICKENS

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.

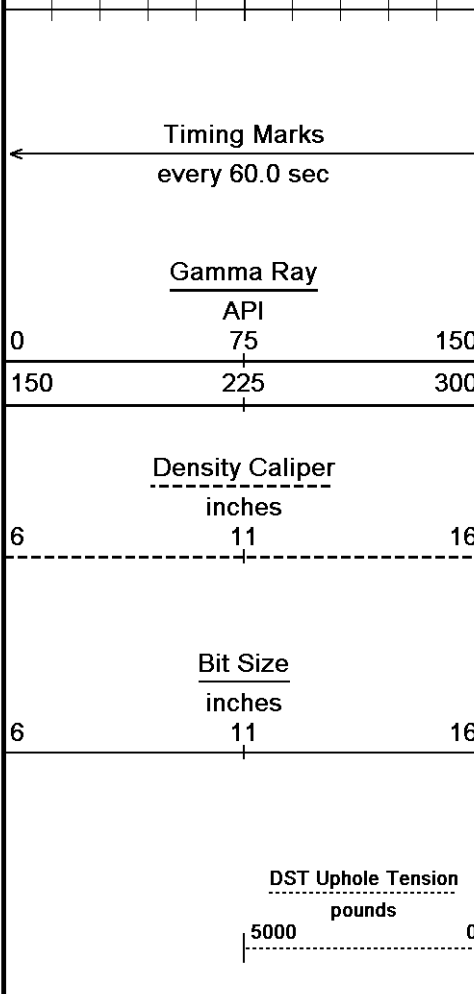
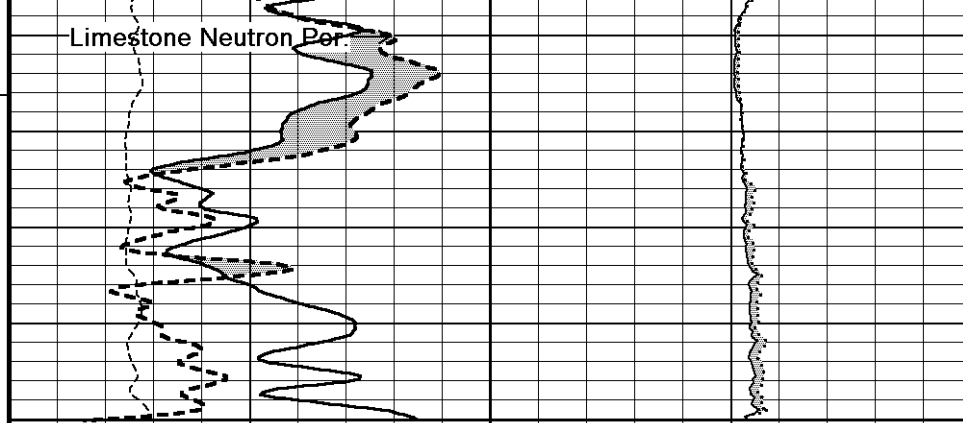
### 5 INCH LIMESTONE MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm  
Plotted on 15-JAN-2014 09:01  
Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta  
Recorded on 15-JAN-2014 05:07  
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

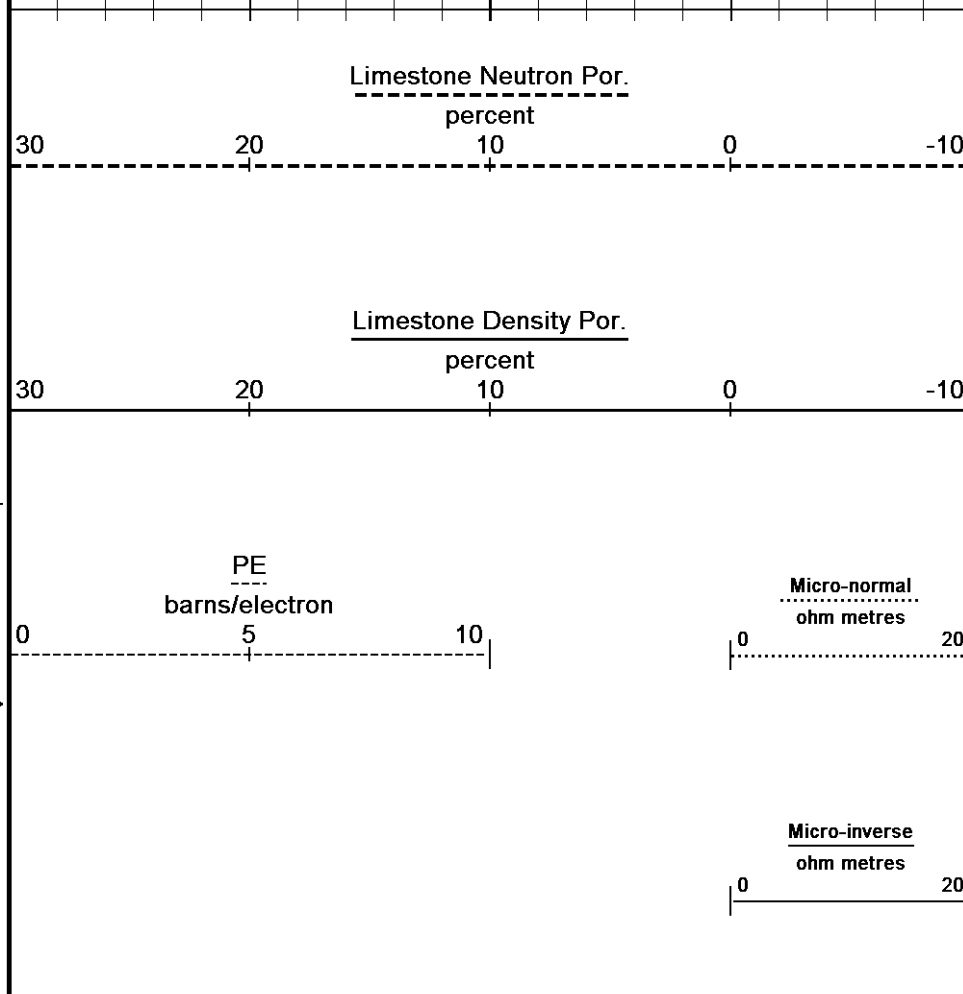




100°  
2400  
2408



Depth In Feet  
Borehole Temp in deg F  
HVI every 10 cu ft  
Annular Integral every 10 cu ft  
Replay Scale 1:240

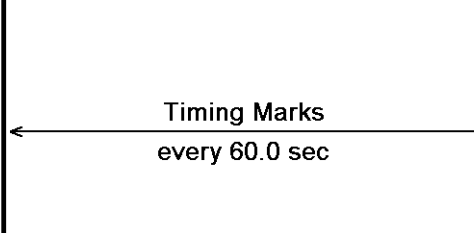


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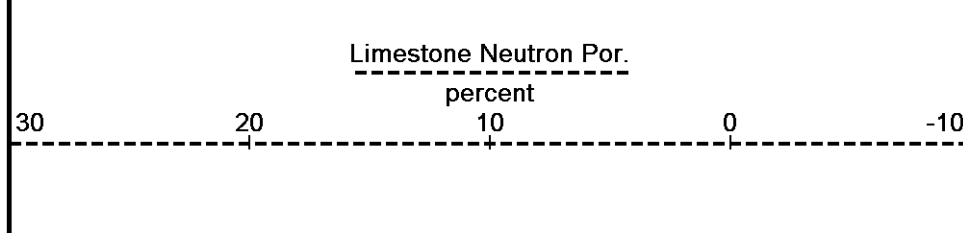
5 INCH LIMESTONE MAIN

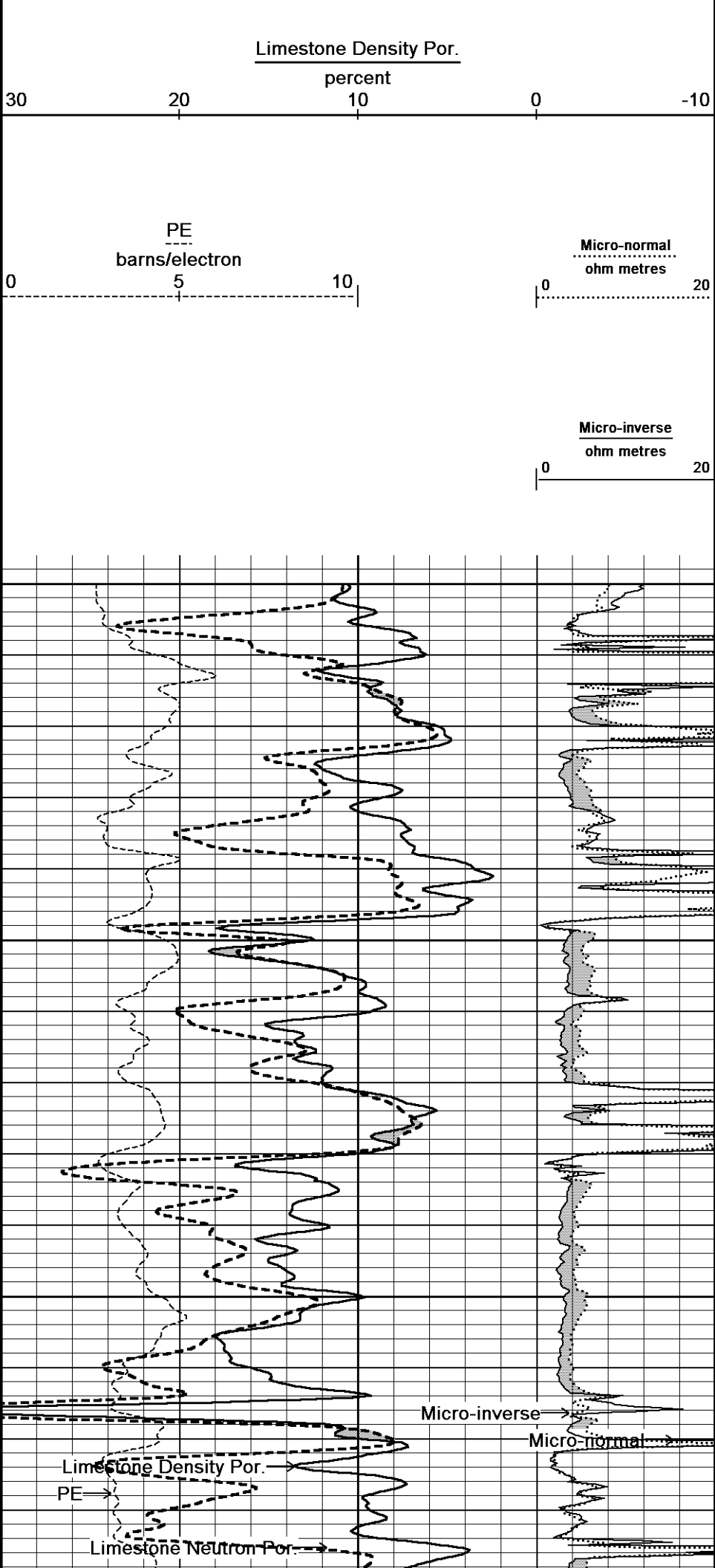
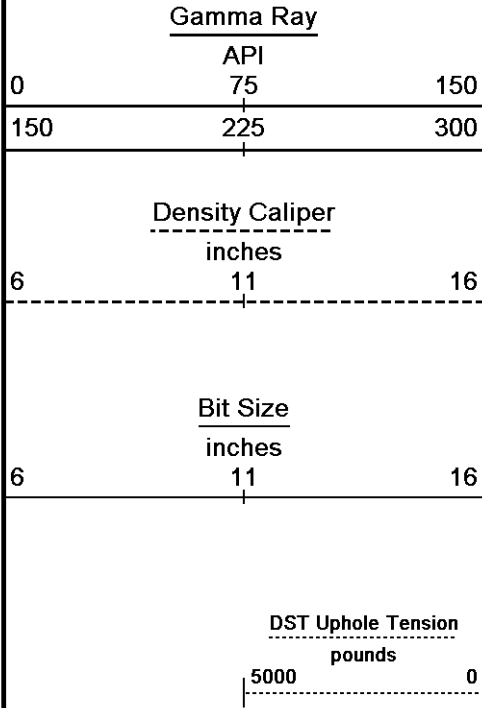
5 INCH LIMESTONE MAIN

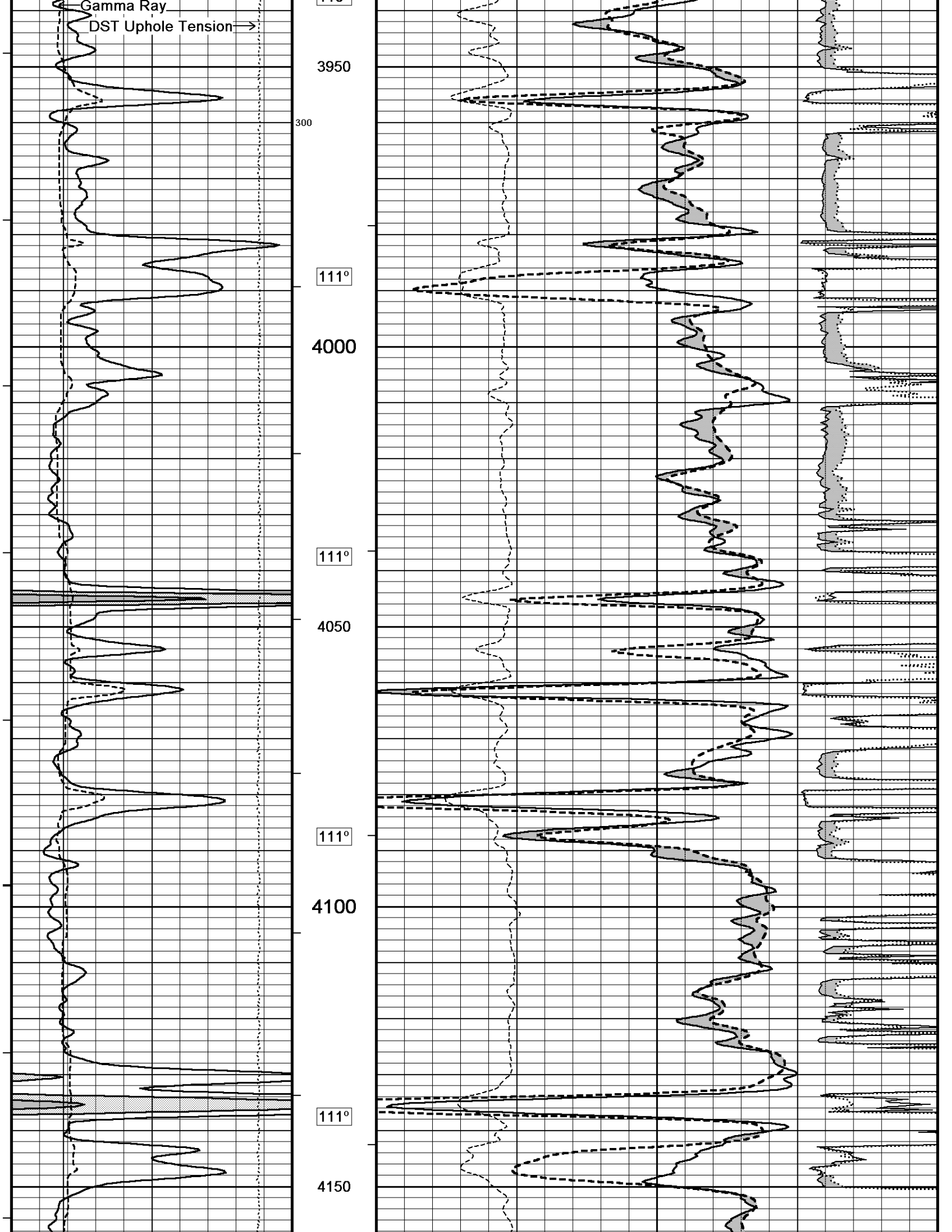
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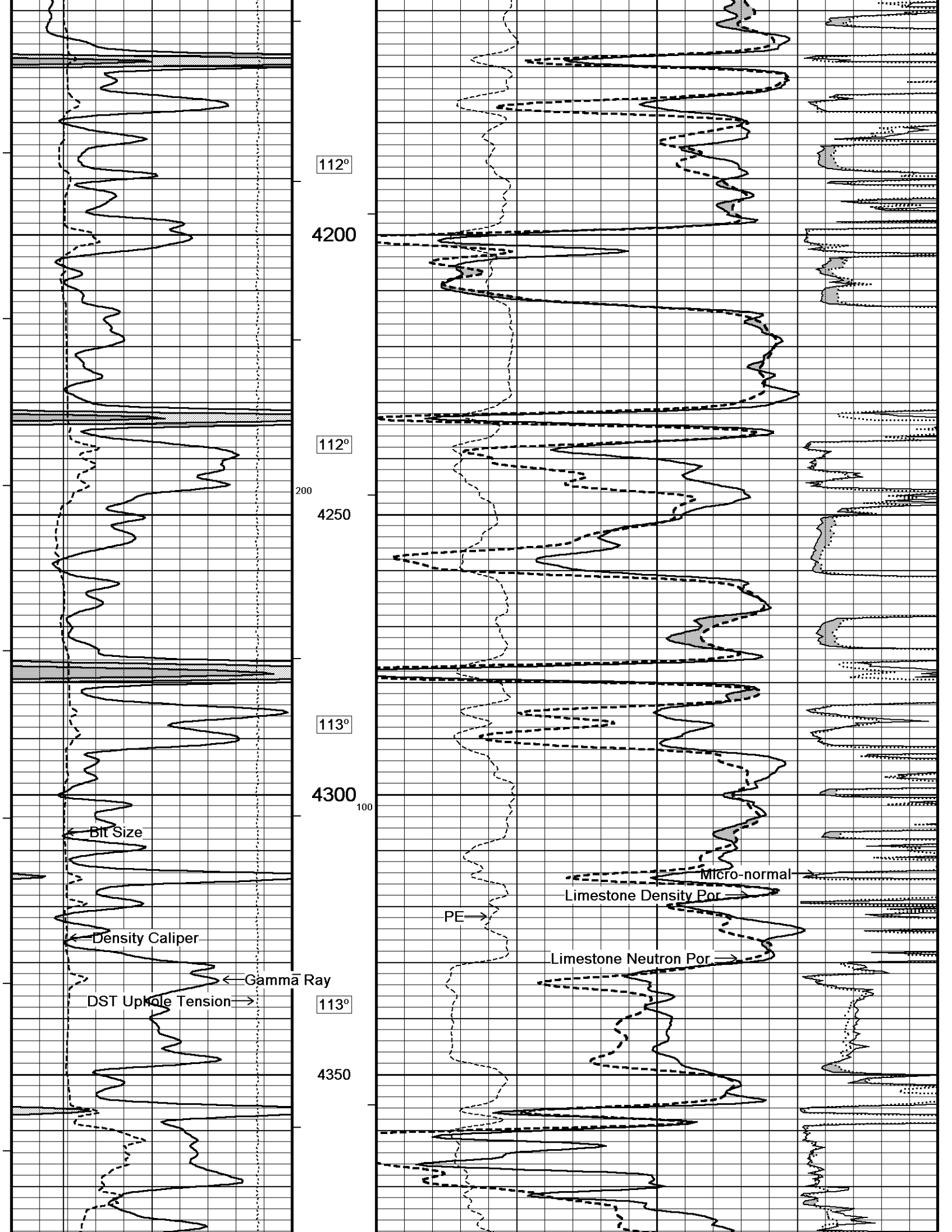


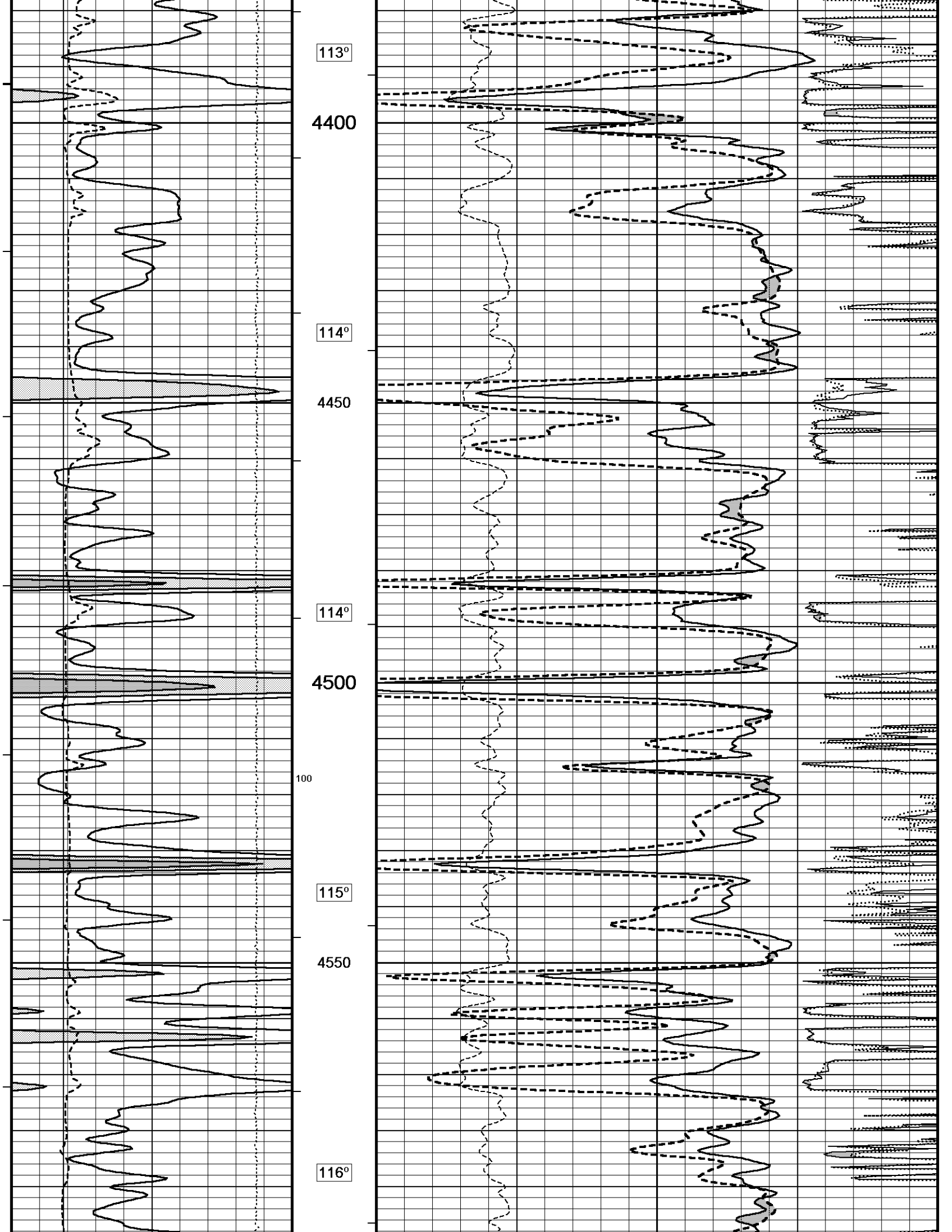
Depth In Feet

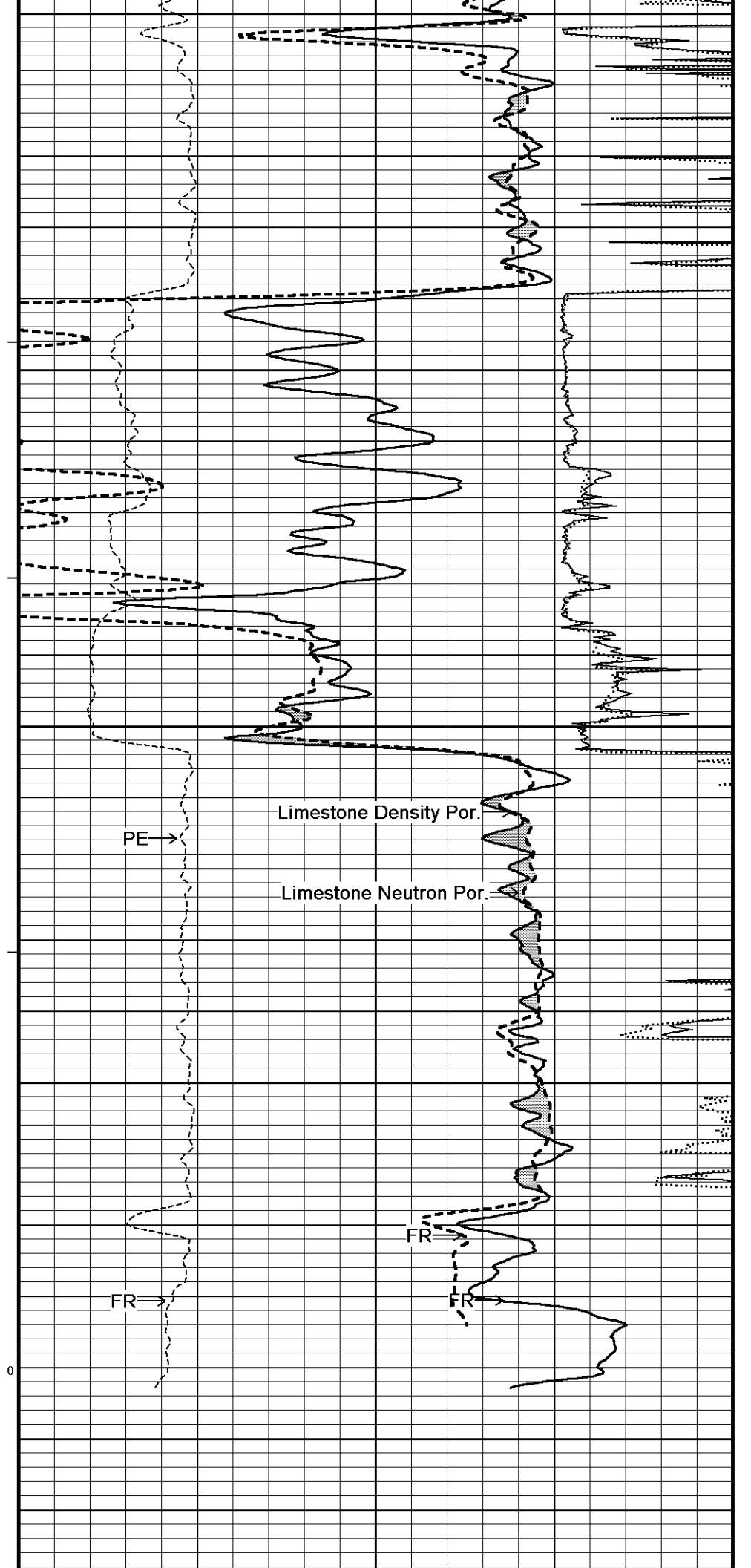
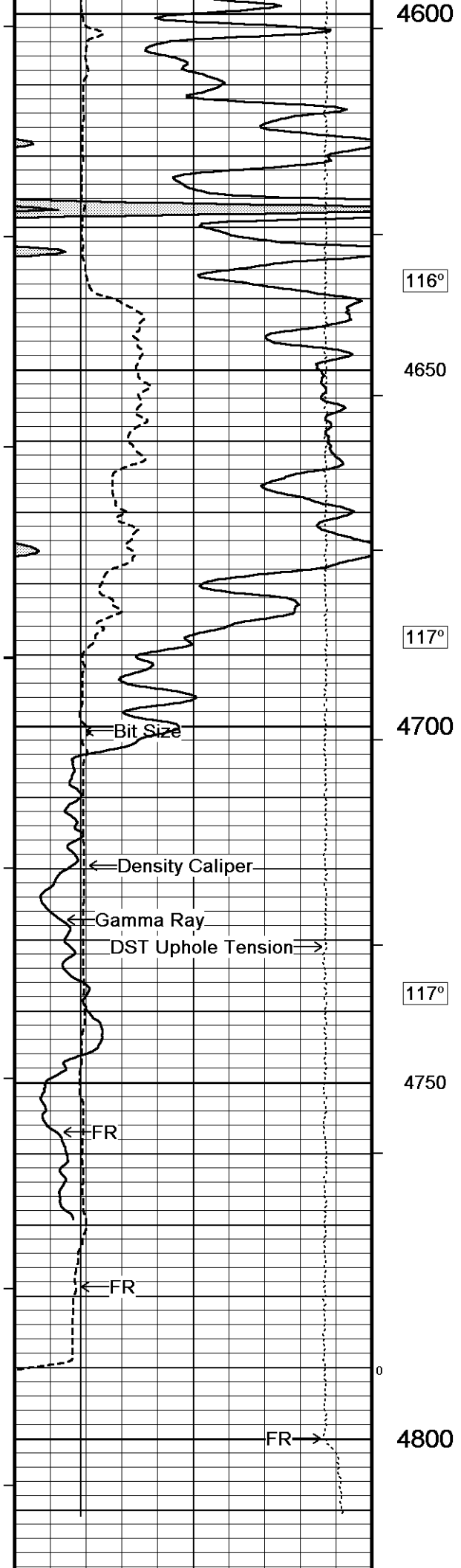


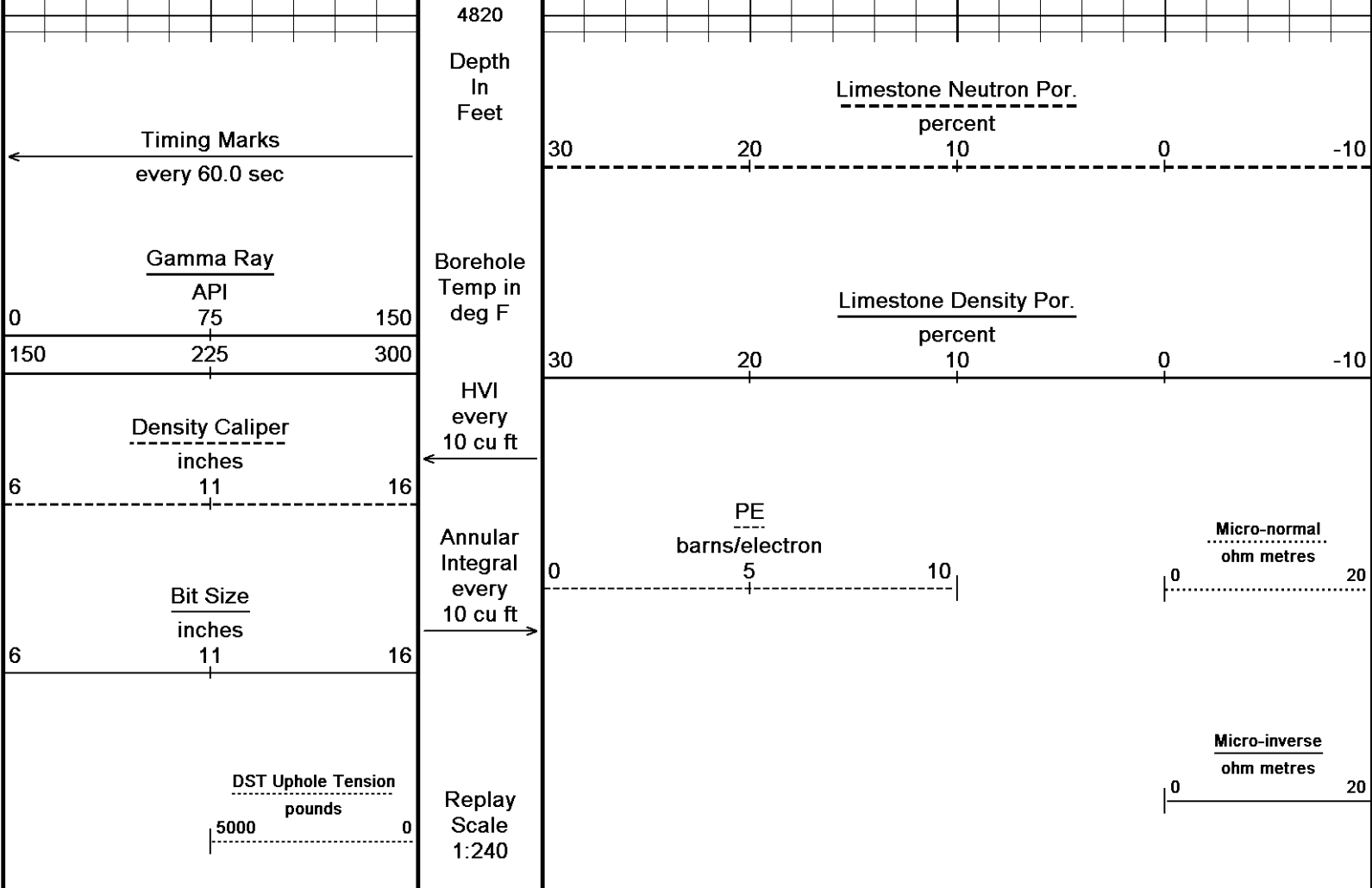










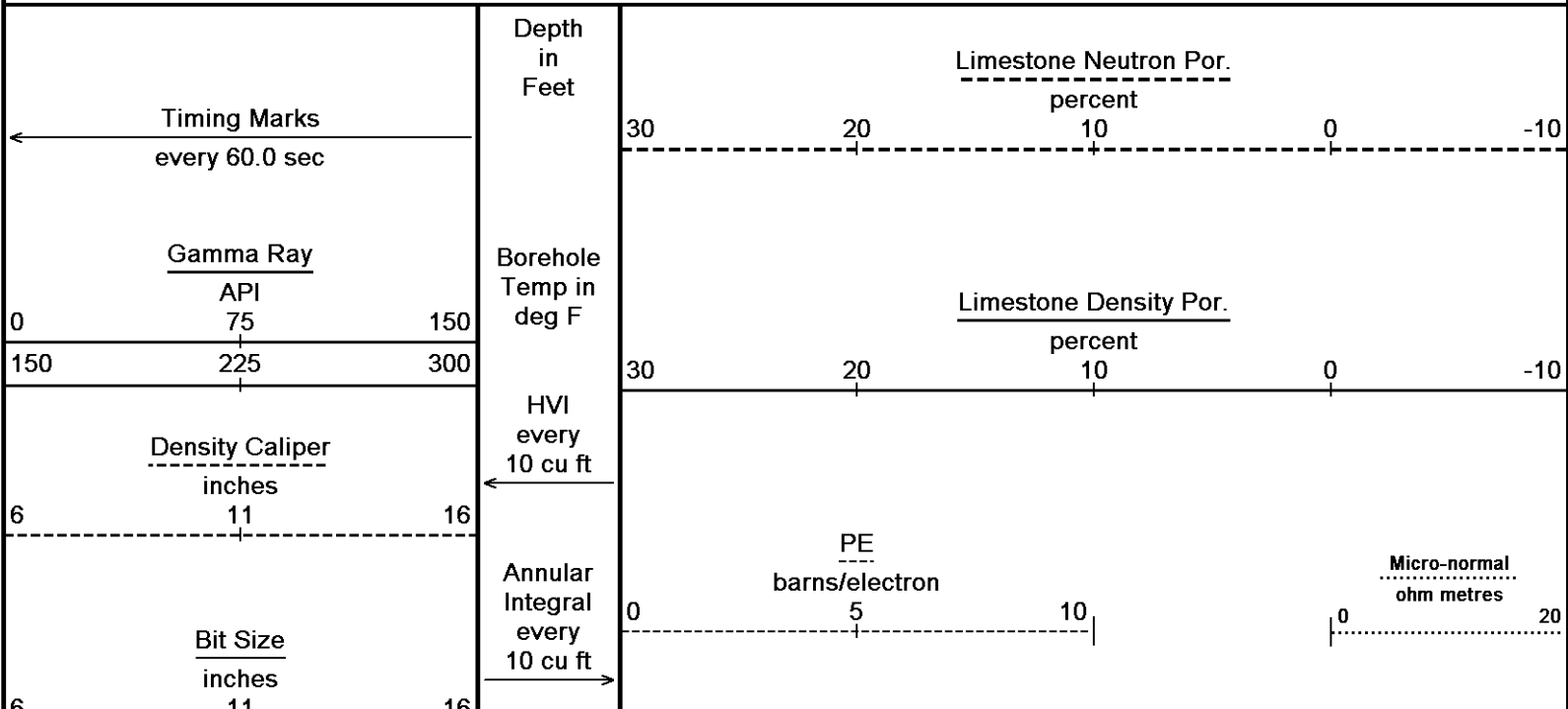


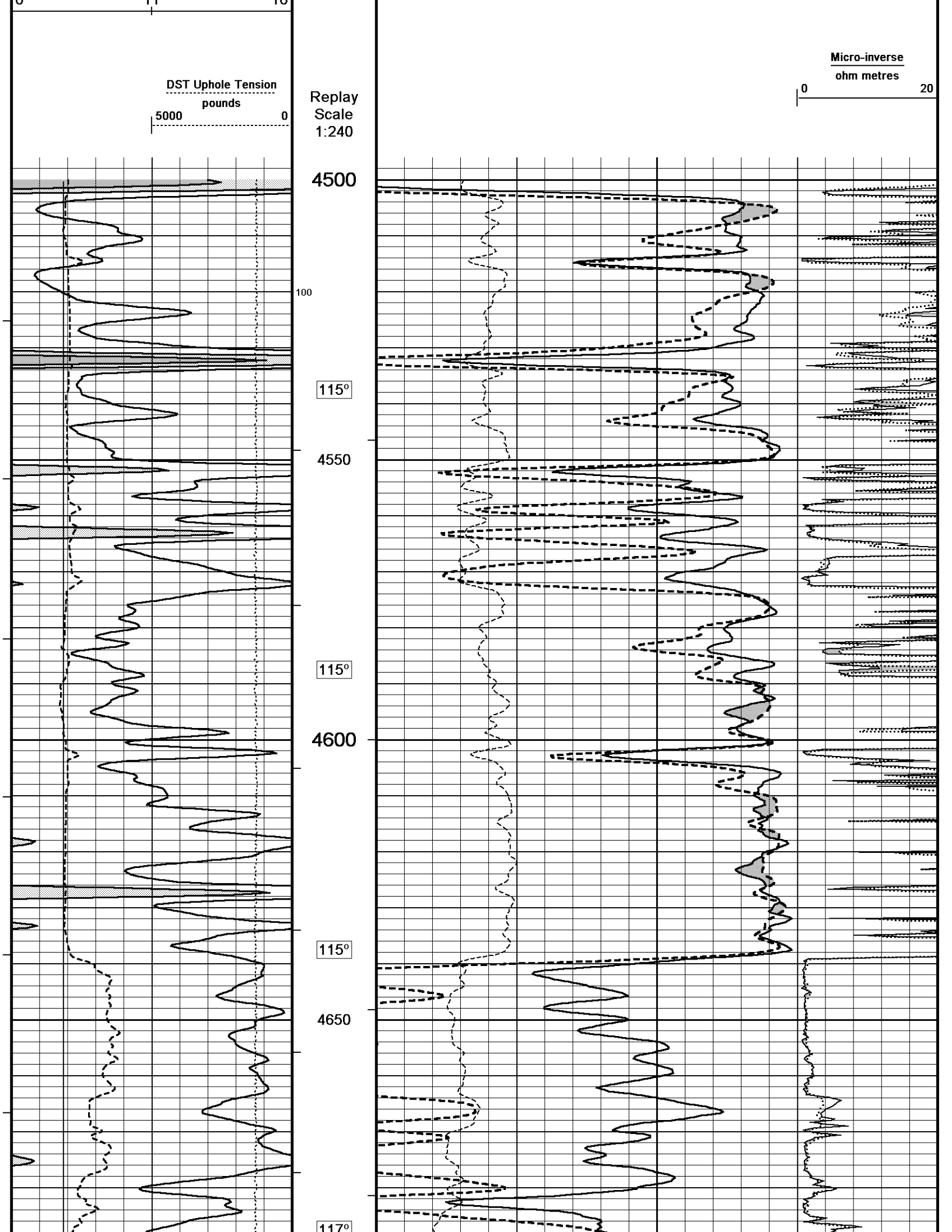
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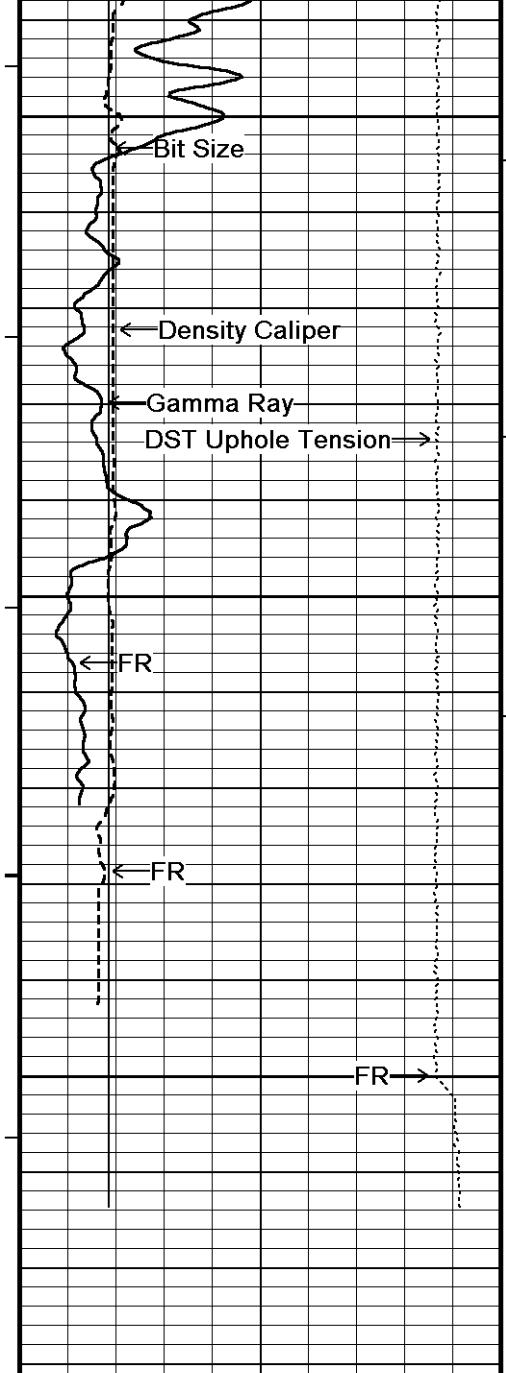
5 INCH LIMESTONE MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 15-JAN-2014 09:01  
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta Recorded on 15-JAN-2014 04:44  
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583







117

4700

116°

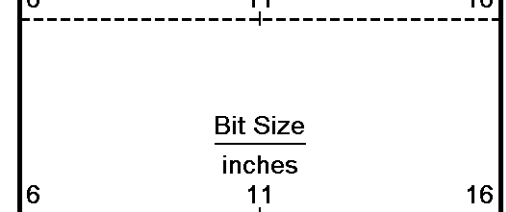
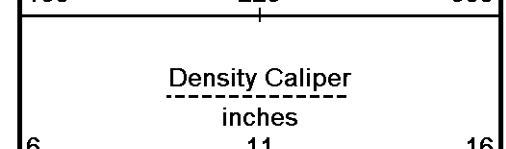
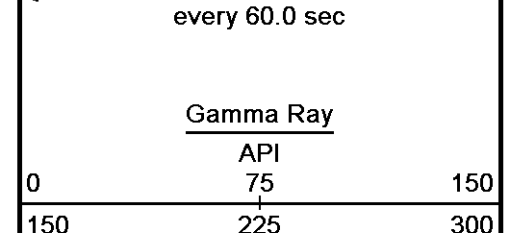
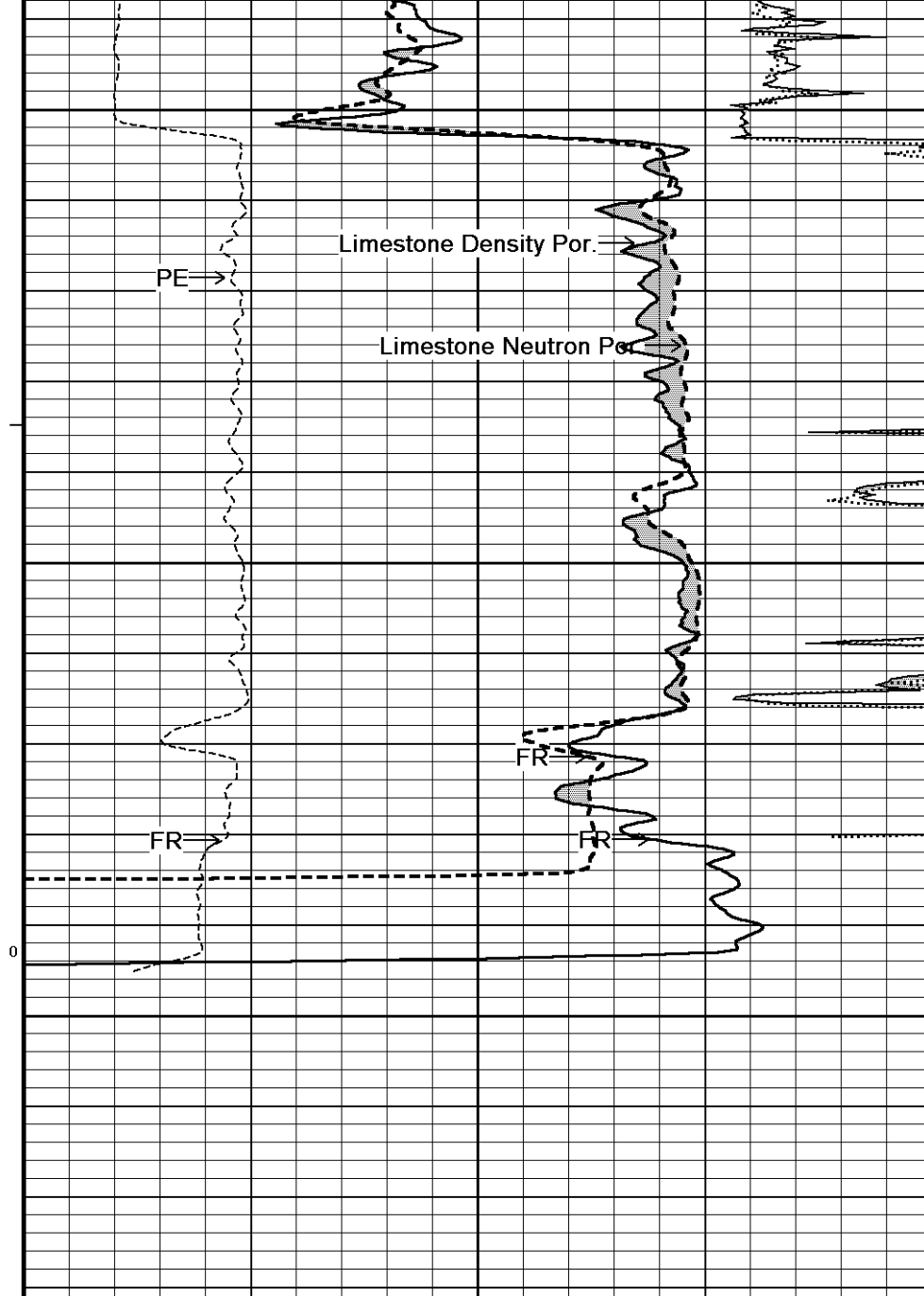
4750

0

4800

4830

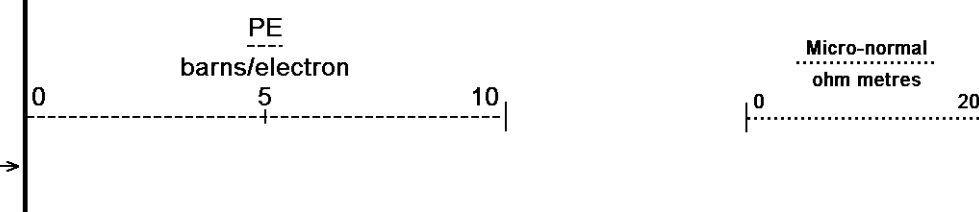
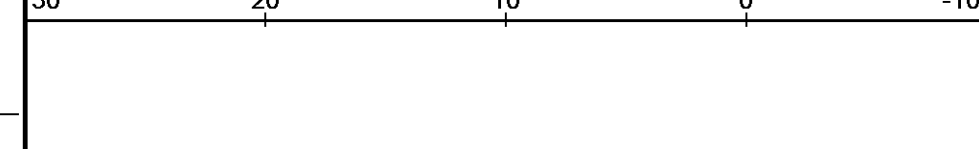
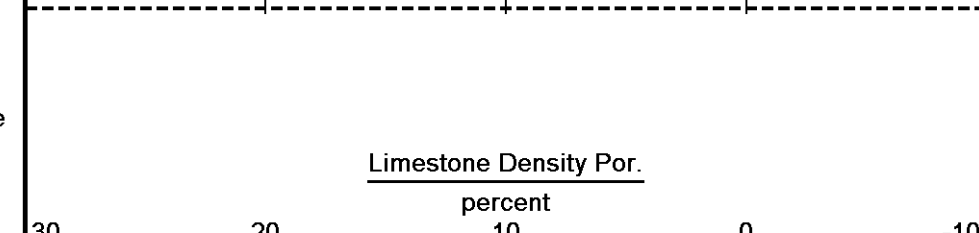
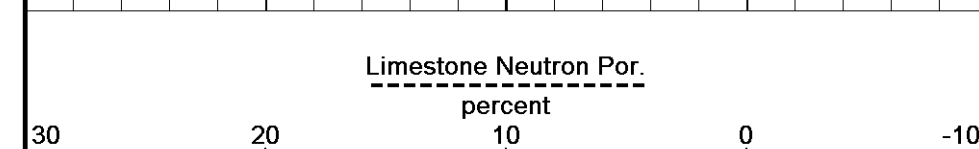
Depth in Feet

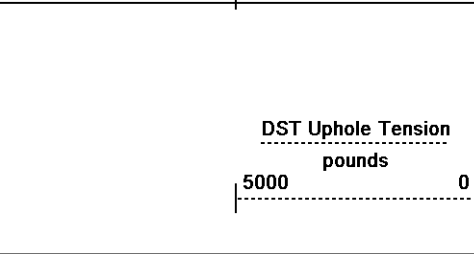


Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft





Replay  
Scale  
1:240

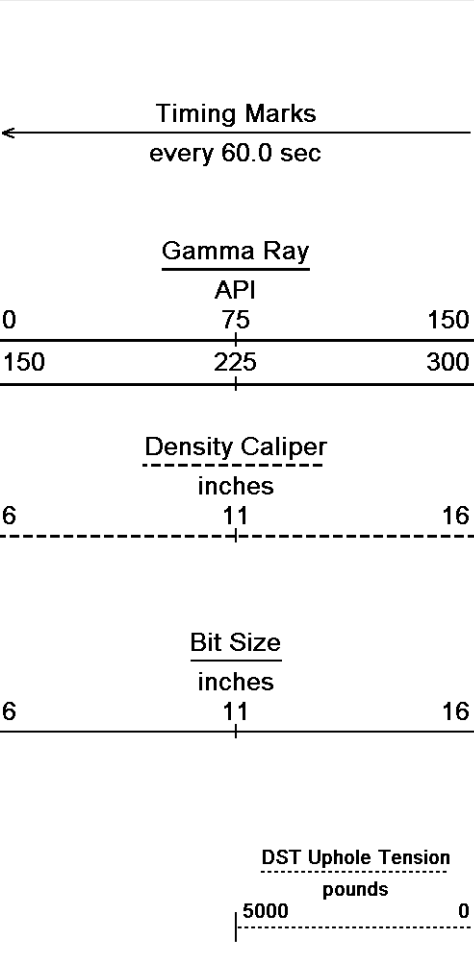


Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 15-JAN-2014 09:01  
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta  
 Recorded on 15-JAN-2014 04:44  
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

↑ REPEAT SECTION ↑

↓ 5 INCH BULK DENSITY MAIN ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 15-JAN-2014 09:01  
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta  
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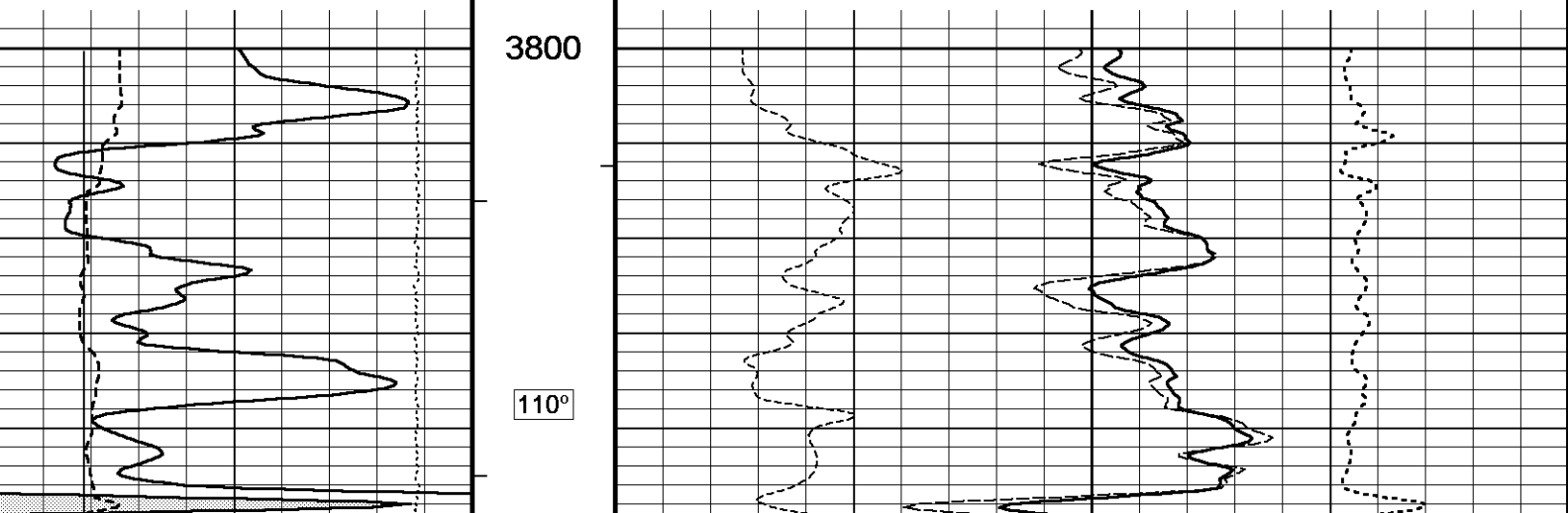
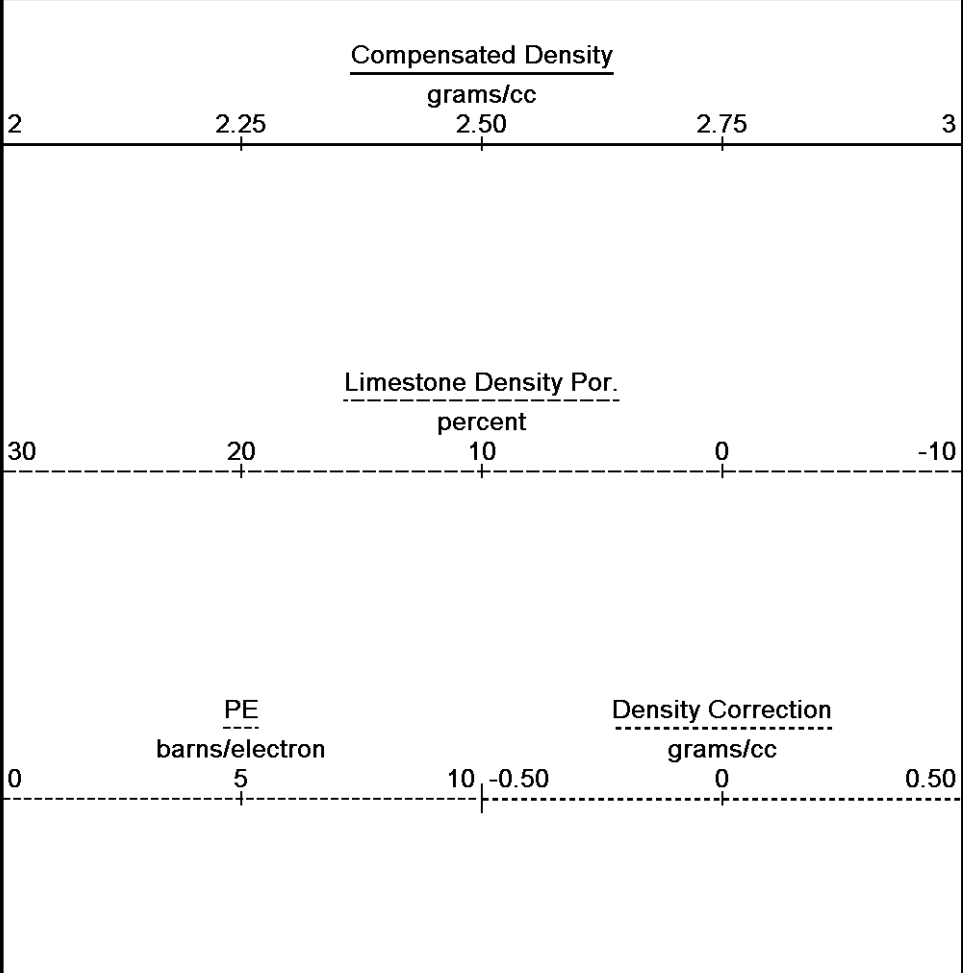
Depth  
In  
Feet

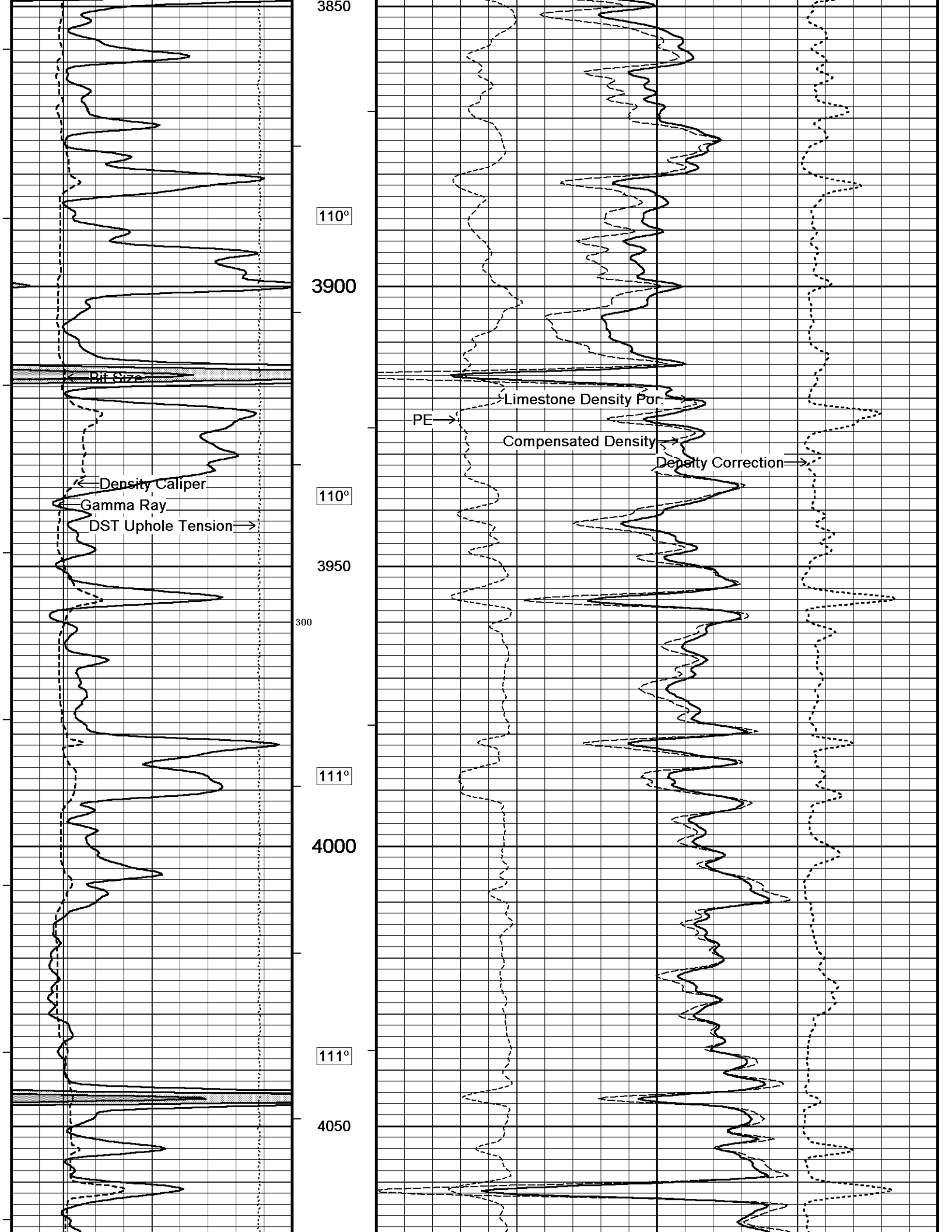
Borehole  
Temp in  
deg F

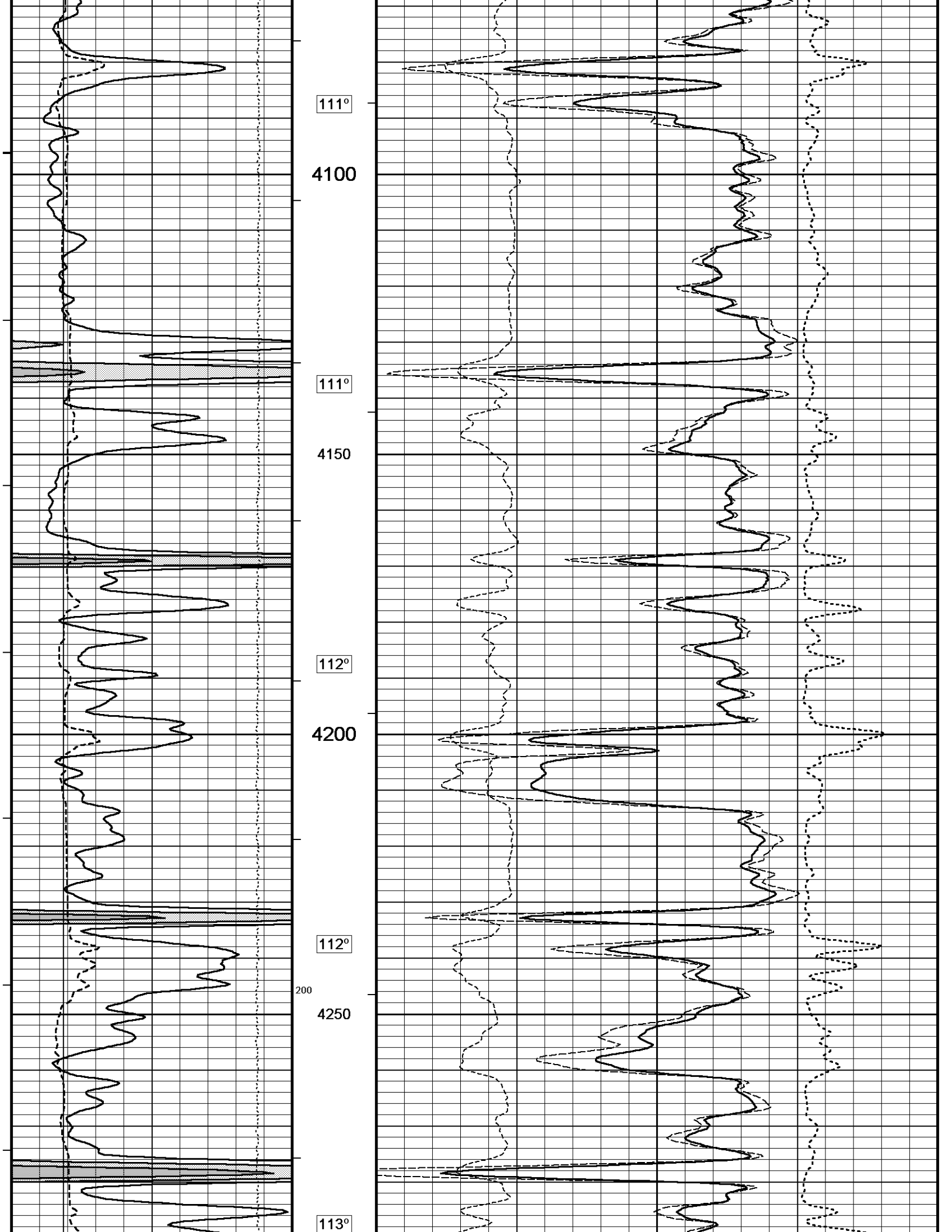
HVI  
every  
10 cu ft

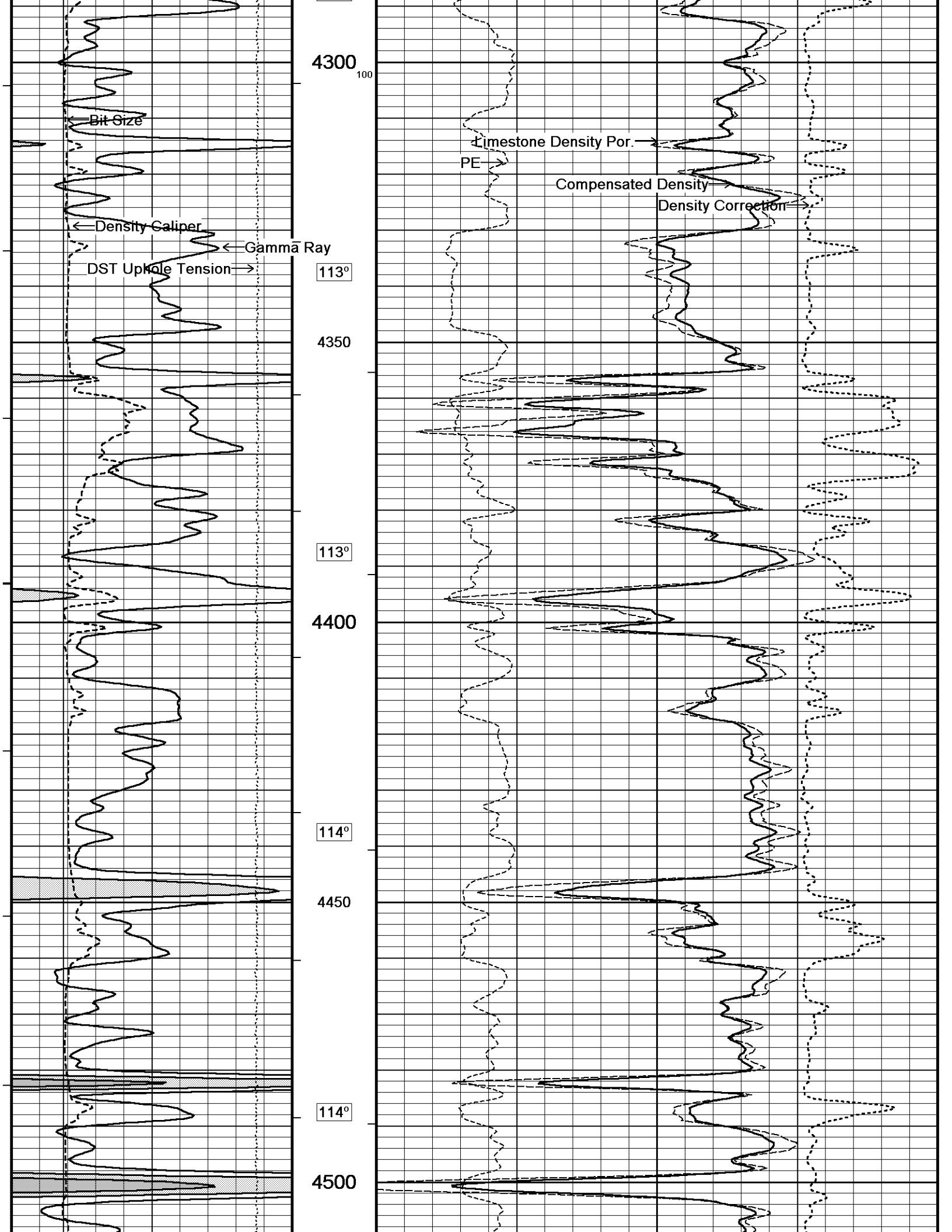
Annular  
Integral  
every  
10 cu ft

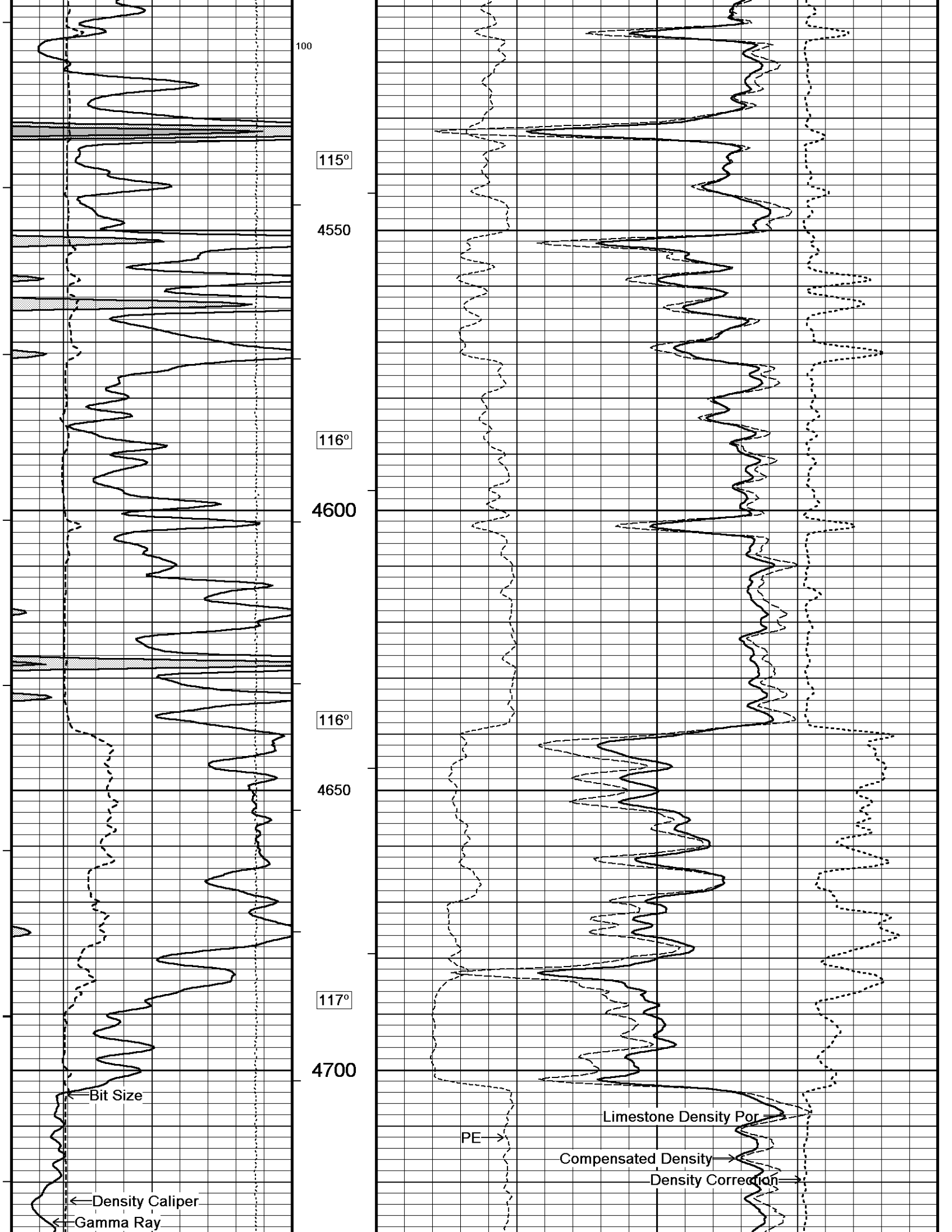
Replay  
Scale  
1:240

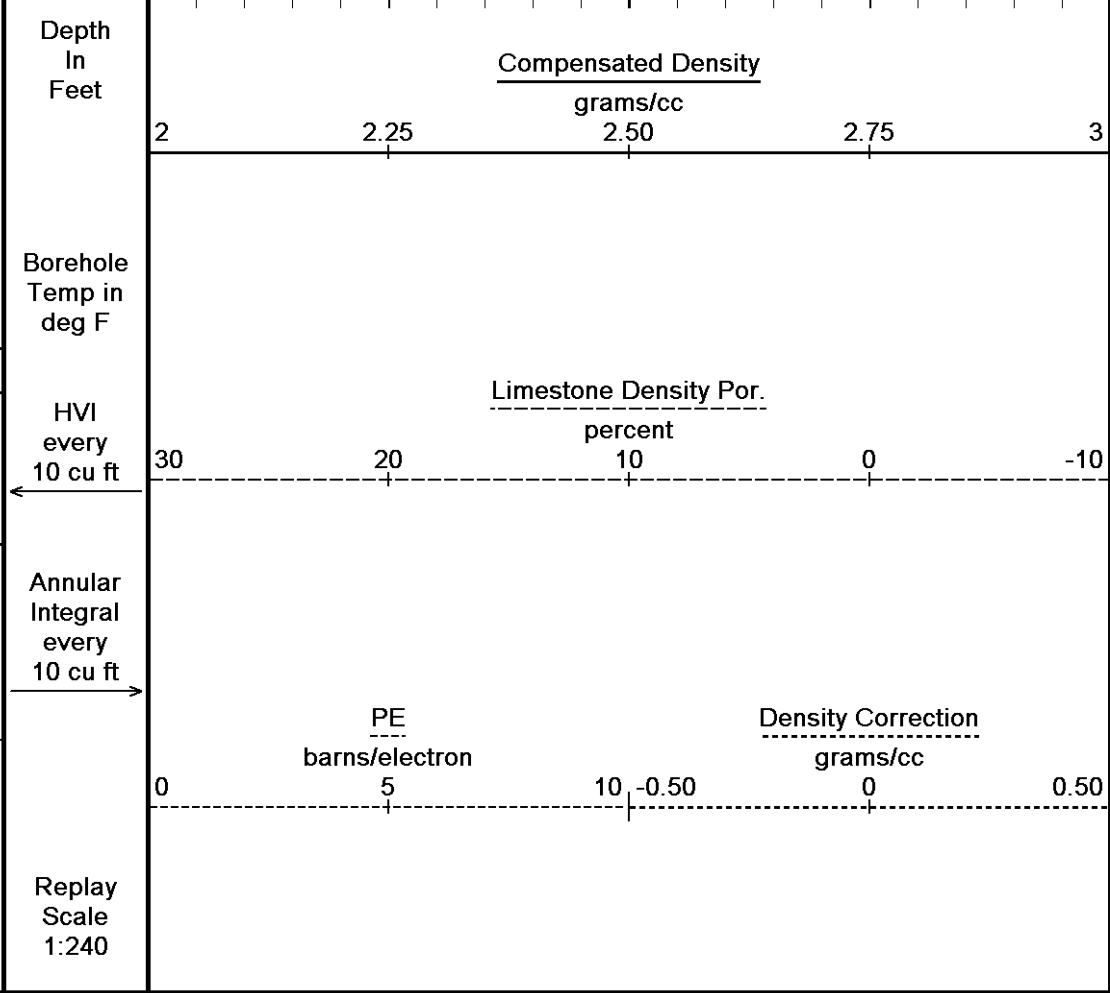
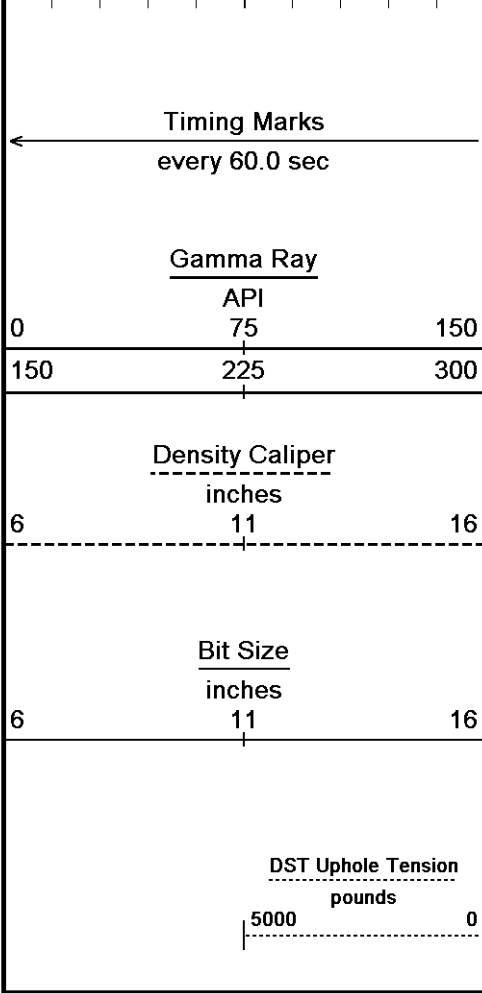
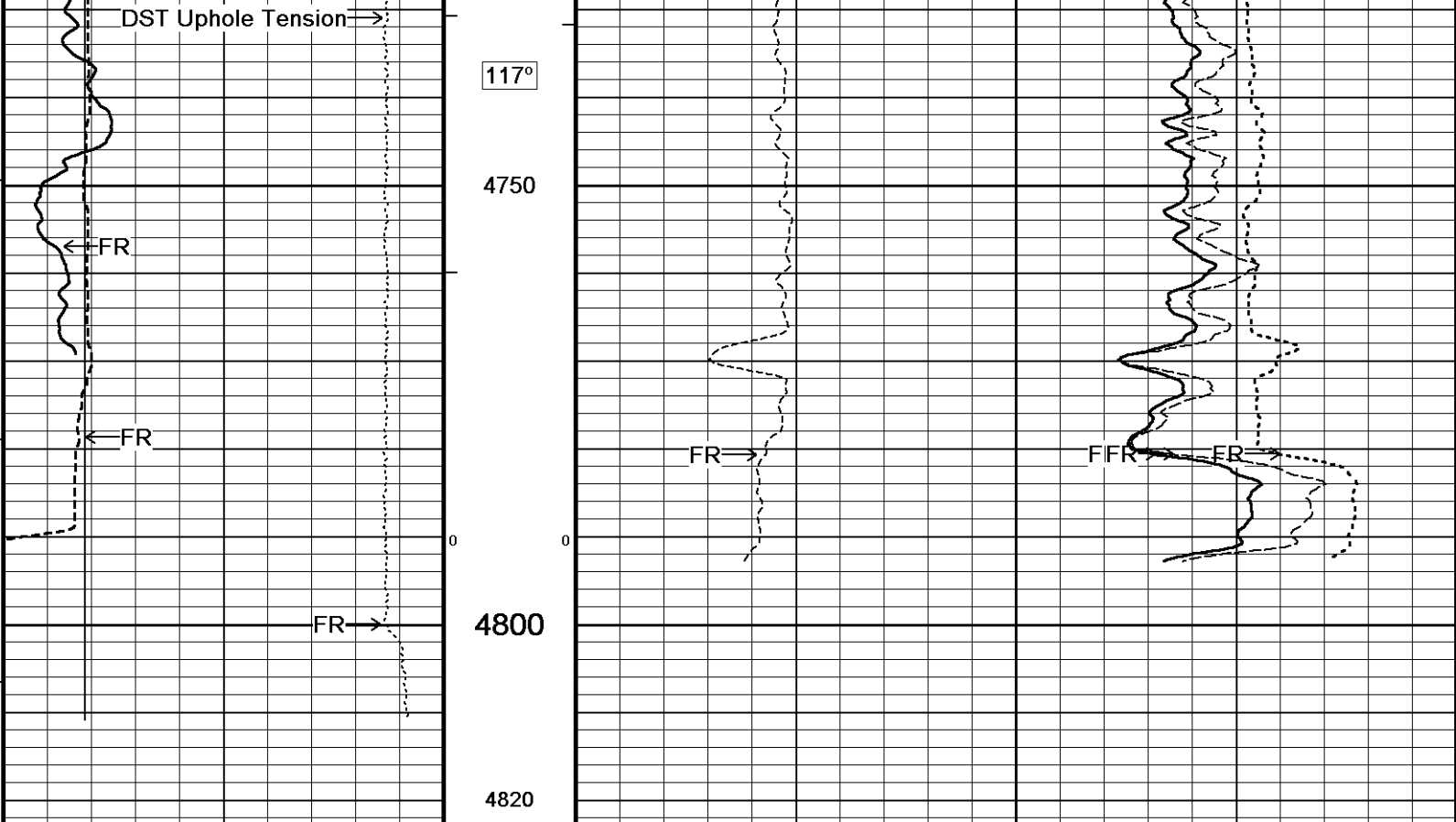












Depth Based Data - Maximum Sampling Increment 10.0cm

Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

Plotted on 15-JAN-2014 09:01

Recorded on 15-JAN-2014 05:07

# REPEAT SECTION

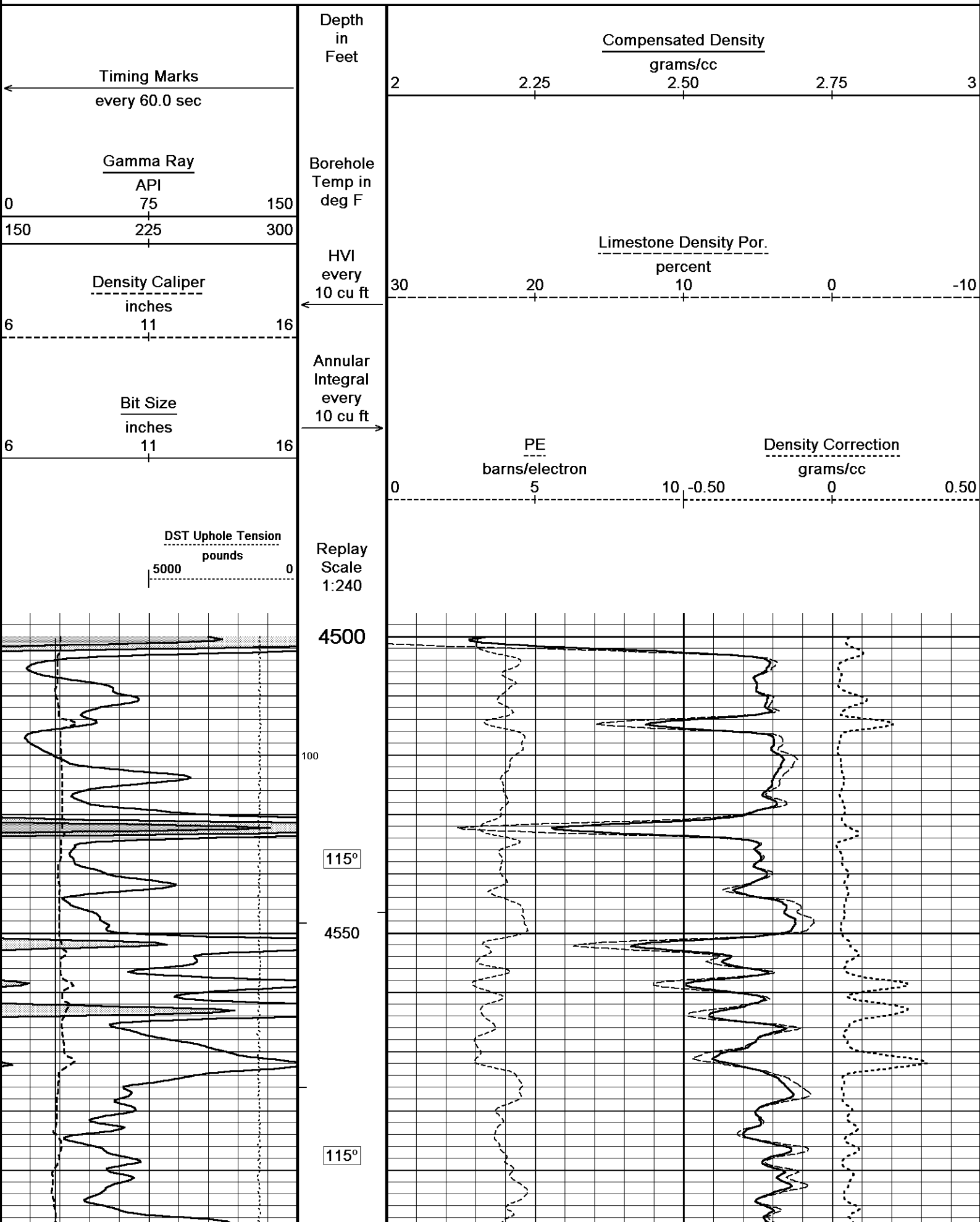
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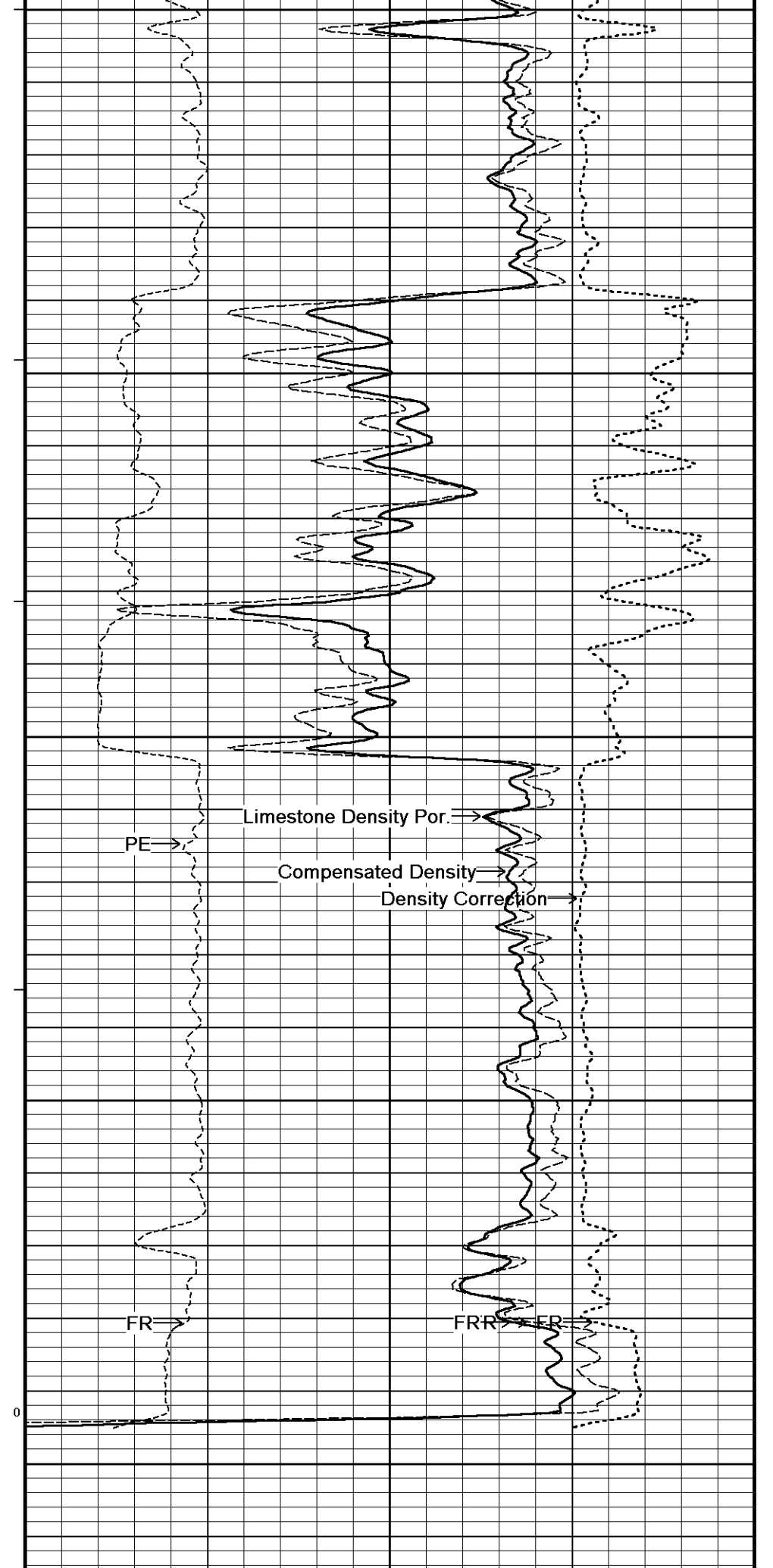
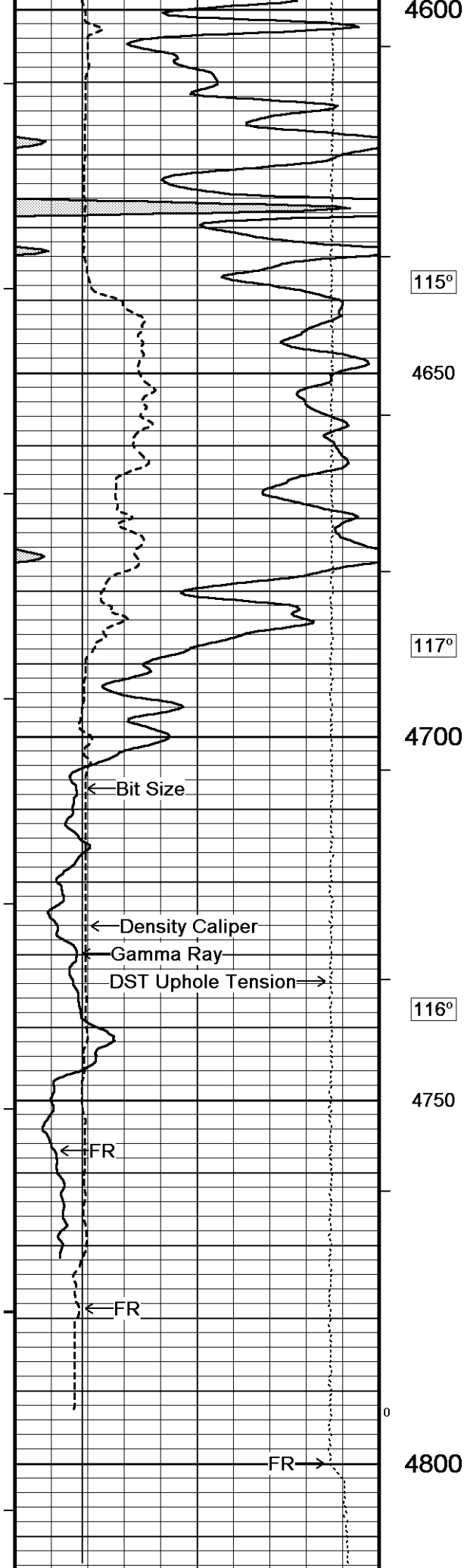
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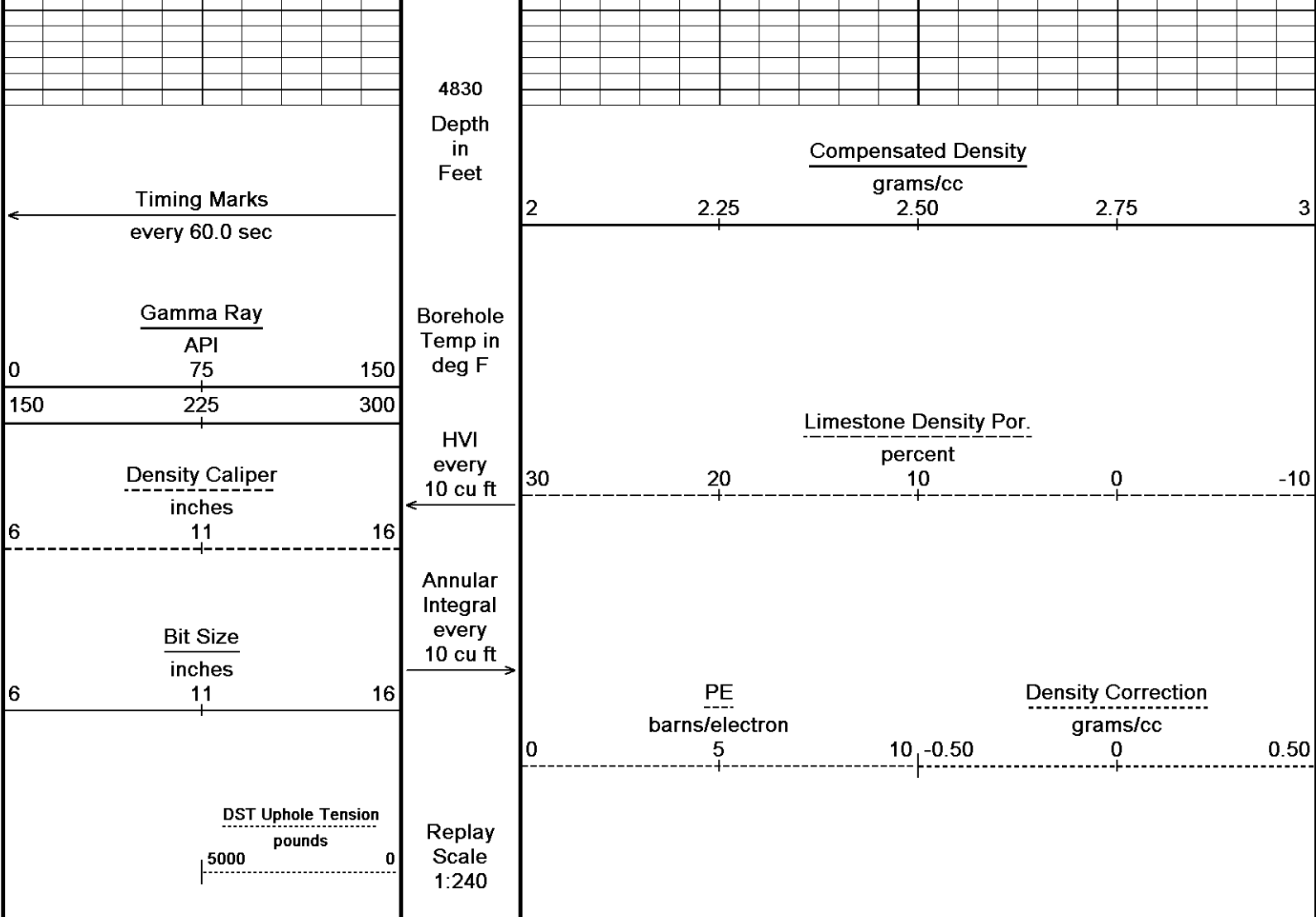
Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta

Recorded on 15-JAN-2014 04:44

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Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 15-JAN-2014 09:01  
 Filename: C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Repeat.dta  
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↑ REPEAT SECTION ↑

**BEFORE SURVEY CALIBRATION**  
 C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta

General Constants All 000 Last Edited on 15-JAN-2014,03:13

<b>General Parameters</b>		
Mud Resistivity	0.880	ohm-metres
Mud Resistivity Temperature	77.800	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
<b>Hole/Annular Volume and Differential Caliper Parameters</b>		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches
Caliper for Differential Caliper	None	
<b>Rwa Parameters</b>		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

	Measured	Calibrated (API)
Background	65	43
Calibrator (Gross)	1158	768
Calibrator (Net)	1093	725

## Gamma Constants MCG-D.K 469

Last Edited on 15-JAN-2014,03:13

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 11-JAN-2014,16:37

	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 11-JAN-2014,16:37

Pre-filter Length	11
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## Photo Density Calibration MPD-C.A 216

Base Calibration on 30-DEC-2013 16:39

Field Check on 13-JAN-2014 14:12

Density Calibration		Measured		Calibrated (sdu)	
Base Calibration		Near	Far	Near	Far
Reference 1		60912	31239	59556	30836
Reference 2		25458	2782	24941	2541
Field Check at Base		1112.0	1316.2		
Field Check		1111.2	1311.3		
PE Calibration		Measured		Calibrated	
Base Calibration		WS	WH	Ratio	Ratio
Background		202	993		
Reference 1	25023	60709	0.416	0.371	
Reference 2	7244	25325	0.289	0.272	
Field Check at Base		202.1	992.6		
Field Check		201.2	991.0		

## Density Constants MPD-C.A 216

Last Edited on 15-JAN-2014,03:13

Density Source Id	18235B	
Nylon Calibrator Number	DNCE528	
Aluminium Calibrator Number	DACD528	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.12	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	0.00

**Caliper Calibration MPD-C.A 216**

Base Calibration on 30-DEC-2013 16:06  
Field Calibration on 13-JAN-2014 14:07

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	16063	3.99
2	26074	5.98
3	36080	7.97
4	45856	9.86
5	57120	11.92
6	N/A	N/A

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

**DOWNHOLE EQUIPMENT**

C:\Minimus 13.05.9583\Log\Grand Mesa BFF #1-35\Grand Mesa BFF #1-35 Main.dta

3/8" Triple Cone Cable Head (MCB C A)  
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma  
MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log  
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

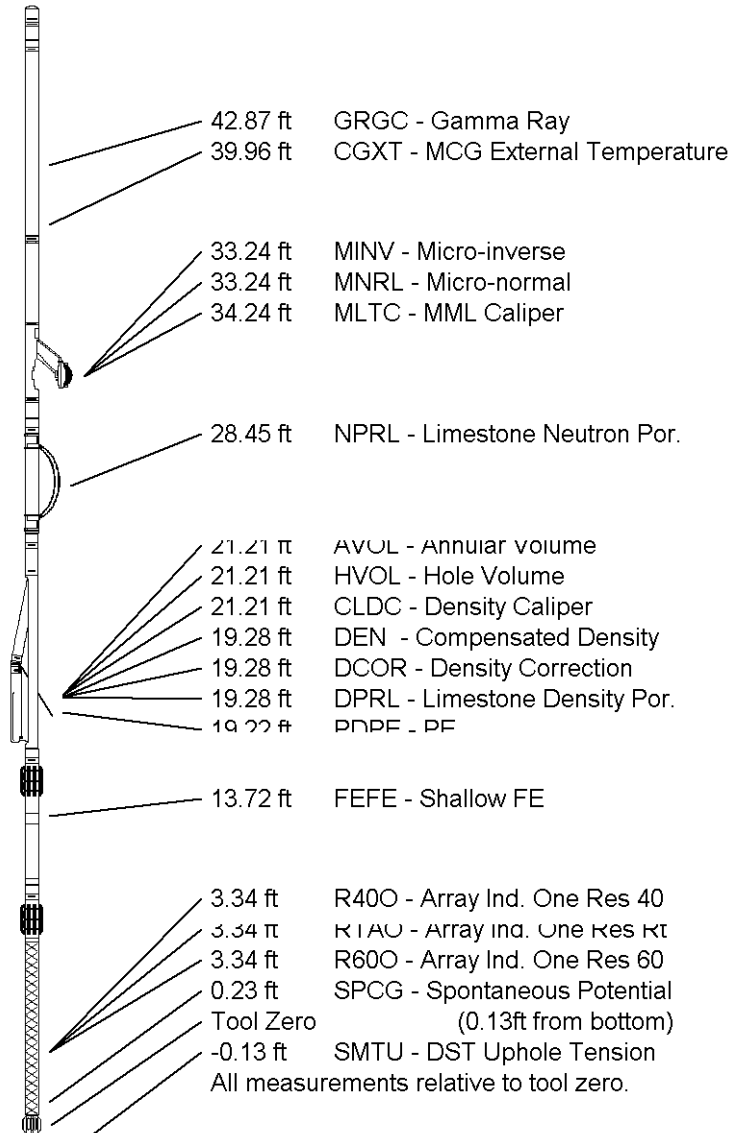
Compact Neutron  
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper  
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric  
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

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

Total Length: 49.73 ft Weight: 399.0 lb



**COMPANY  
WELL**

**GRAND MESA OPERATING  
BFF #1-35**

FIELD WILDCAT  
PROVINCE/COUNTY SCOTT  
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2979.00	feet	First Reading	4780.79	feet
Elevation Drill Floor	2977.00	feet	Depth Driller	4800.00	feet
Elevation Ground Level	2970.00	feet	Depth Logger	4800.00	feet



**Weatherford**<sup>®</sup>

COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON  
MICRORESISTIVITY LOG