



Weatherford[®]

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY GRAND MESA OPERATING COMPANY
WELL BROOKS #1-18
FIELD WILDCAT
PROVINCE/COUNTY GOVE
COUNTRY/STATE UNITED STATES / KANSAS
LOCATION 2219' FNL & 1761' FWL
NE SW SE NW

SEC	TWP	RGE	Other Services
18	11S	16W	MA/MFE
API Number	15-063-22099	MML	
Permit Number			
Permanent Datum G.L., Elevation 2664 feet			
Log Measured From KB			
Drilling Measured From K.B. @ 5 FEET			
Date	27-MAR-2013		Elevations: KB 2669.00 DF 2664.00 GL 2664.00
Run Number	ONE		
Service Order	3538999		
Depth Driller	4568.00	feet	
Depth Logger	4572.00	feet	
First Reading	4553.00	feet	
Last Reading	3500.00	feet	
Casing Driller	269.00	feet	
Casing Logger	270.00	inches	
Bit Size	7.880		
Hole Fluid Type	CHEMICAL	lb/USg	
Density / Viscosity	9.30 lb/USg	63.00 CP	
PH / Fluid Loss	10.50	10.50	
Sample Source	MUDPIT		
Rm @ Measured Temp	1.30 @ 54.0	ohm-m	
Rmf @ Measured Temp	1.04 @ 54.0	ohm-m	
Rmc @ Measured Temp	1.56 @ 54.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.65 @108.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	108.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	W. STAMBAUGH		ADAM SILL
Witnessed By	BOB SCHREIBER		
JOB #	LB13-081		

BOREHOLE RECORD

Last Edited: 27-MAR-2013 14:15

Bit Size inches	Depth From feet	Depth To feet
7.880	270.00	4568.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	270.00	24.00

REMARKS

Tools Ran: MCG,MML,MDN,MPD,MFE,MAI Ran in Combination
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used.
MFE: 0.5 inch Standoff = 1
MAI: 0.5 inch Standoff = 1
2.71 g/cc Limestone Density Matrix used to calculate porosity.
Tight pulls, washouts, and borehole rugosity will affect data quality.
All intervals logged and scaled per customer's request.
Annular volume with 5.5 inch production casing from TD to 3600= 210 cu. ft.
Total hole volume from TD to surface casing= 1430 cu. ft.
Service order: #3538999
Rig: Murfin Drilling #24
Engineers: William Stambaugh, Adam Sill
Operator(s): Nicolas Adame

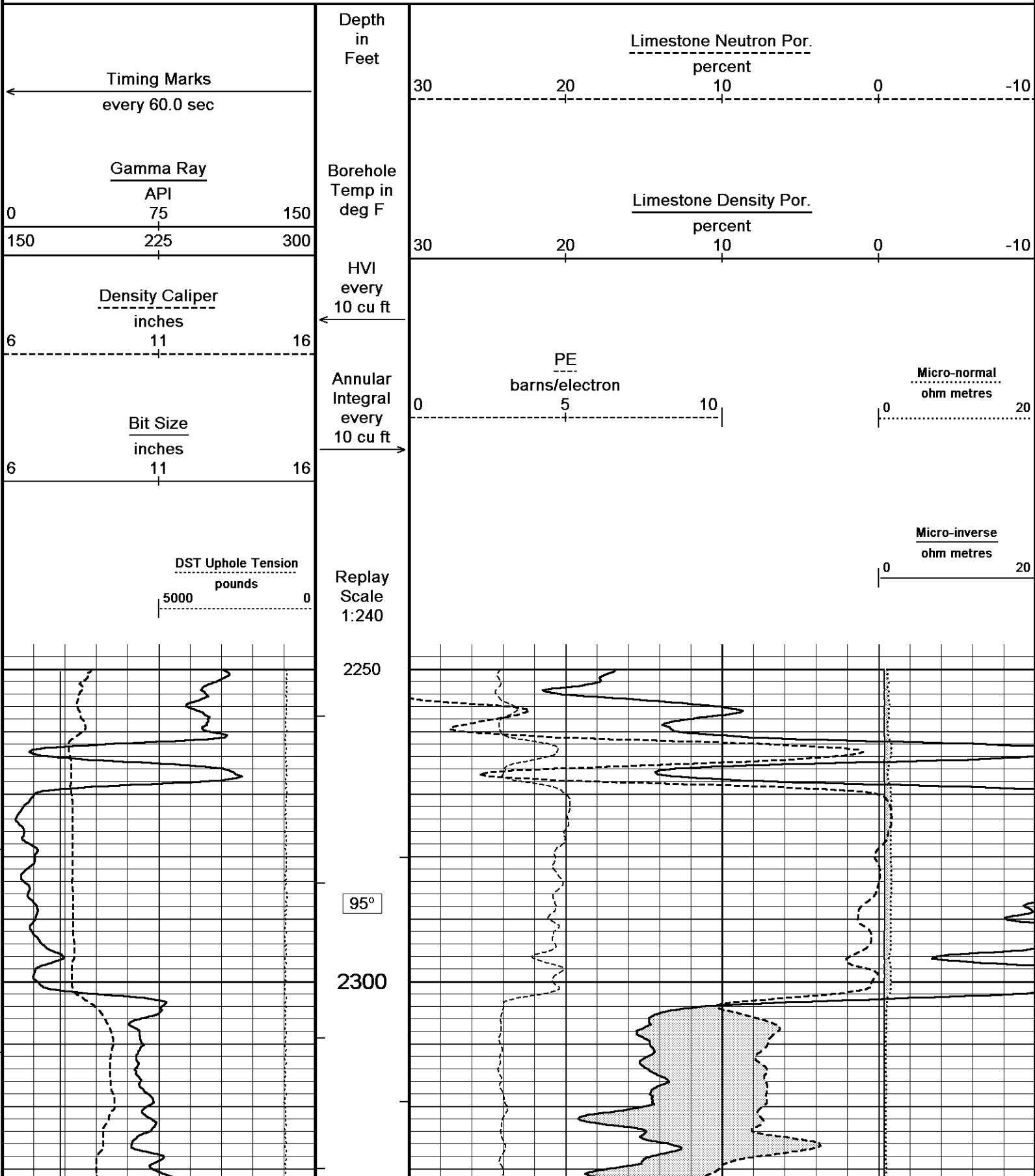
Software duplicates the pH value onto the fluid loss value. The fluid loss is 7.6 ml/30min.

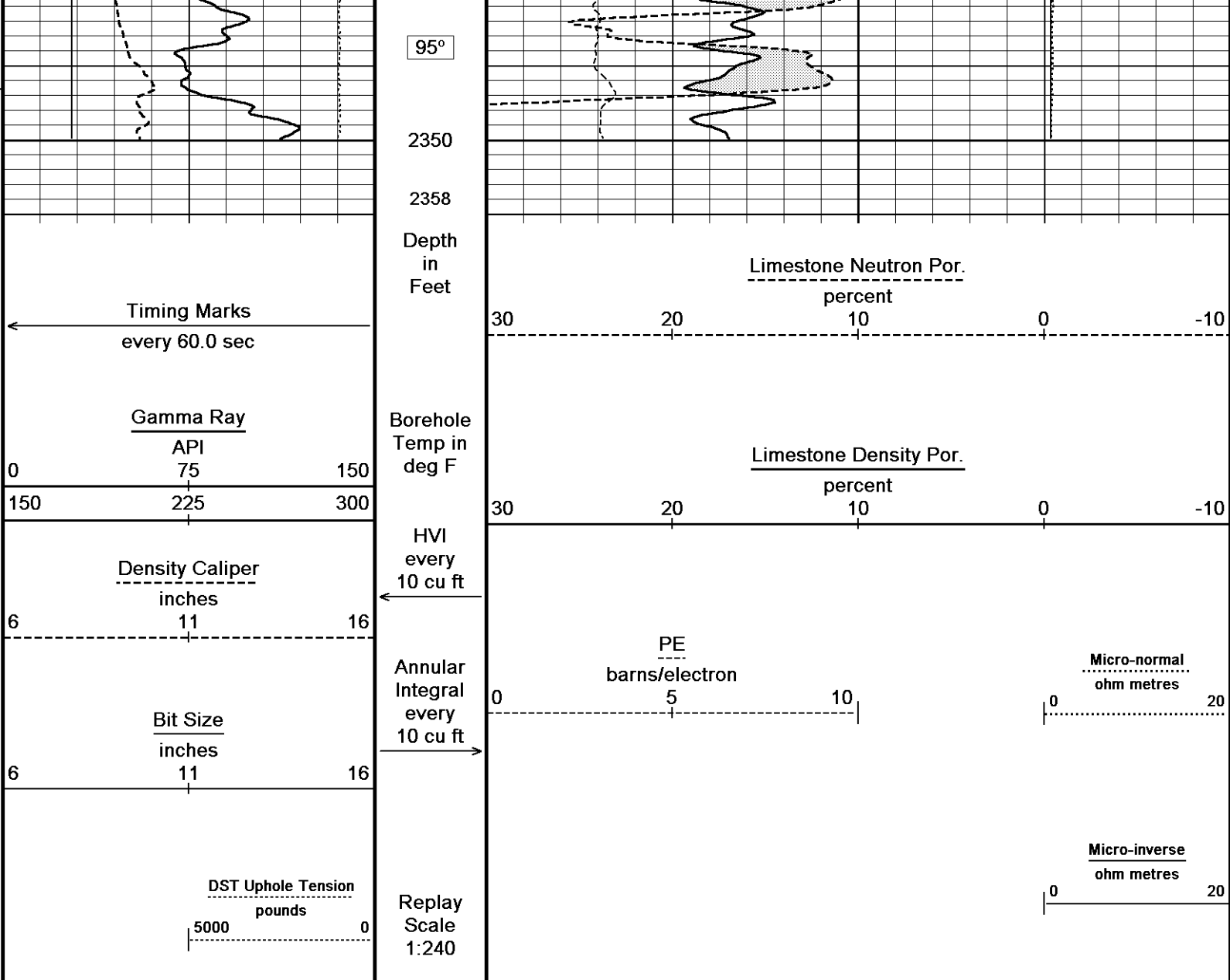
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy

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 MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 27-MAR-2013 15:13
 Filename: C:\Minimus 13.04.8492\Data\Grand Mesa Brooks #1-18\Brooks #1-18_002.dta Recorded on 27-MAR-2013 11:53
 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492



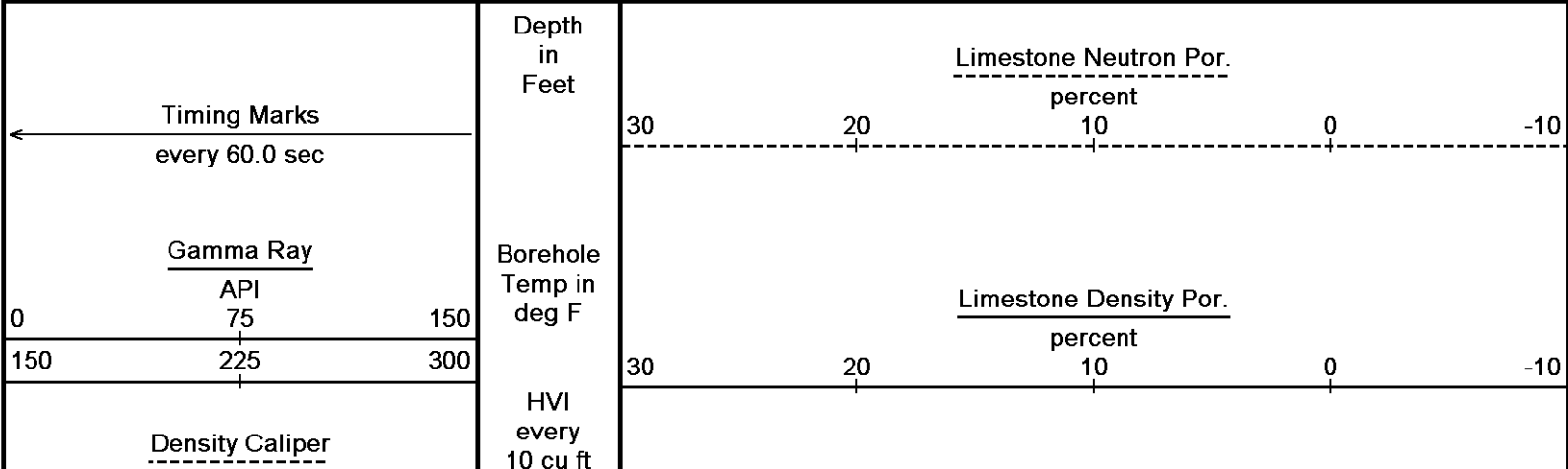


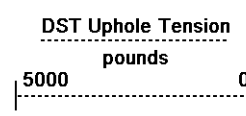
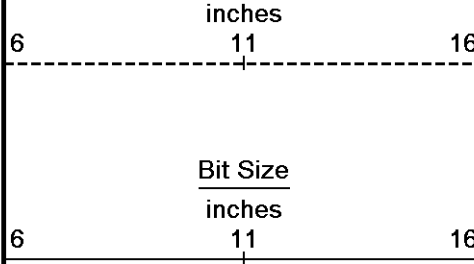
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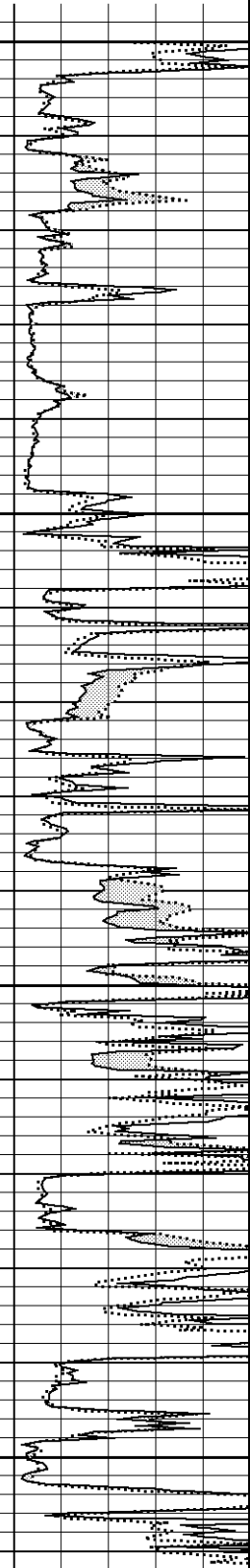
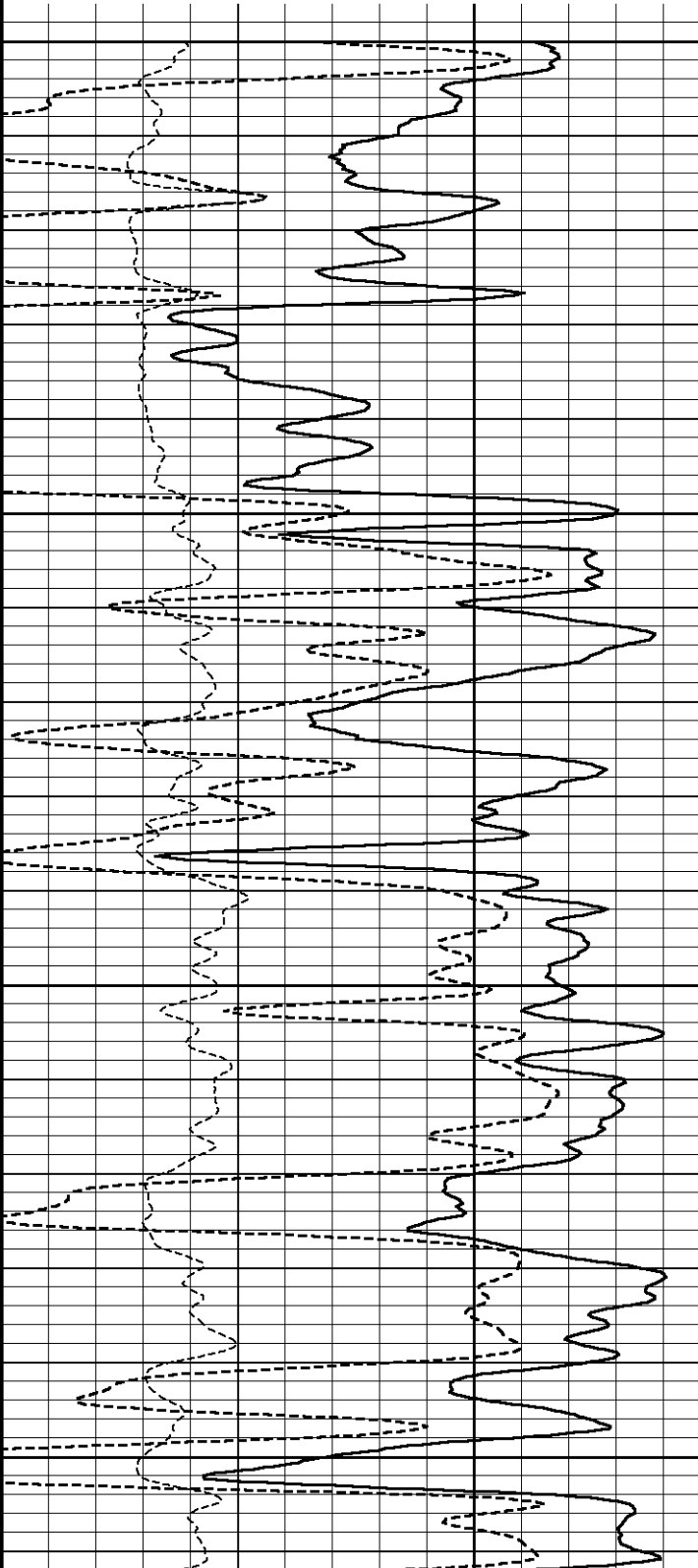
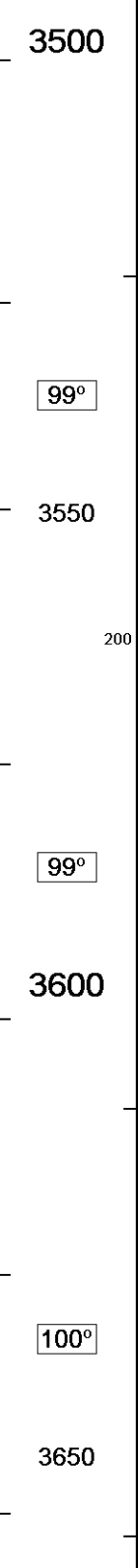
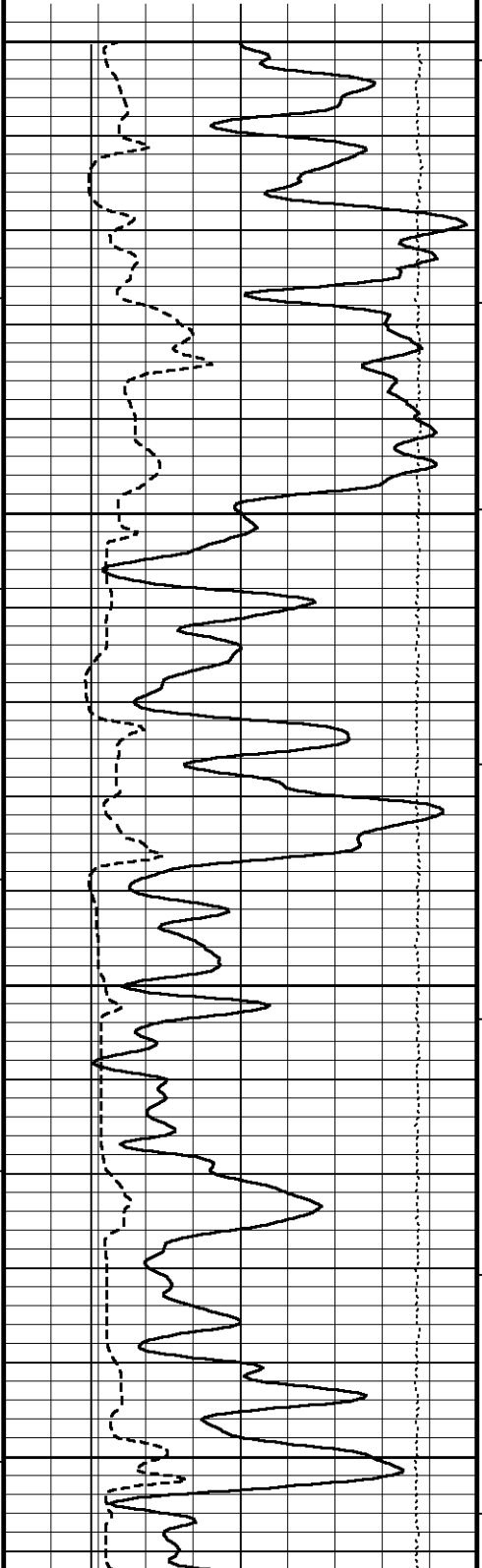
←
Annular
Integral
every
10 cu ft
→

Replay
Scale
1:240

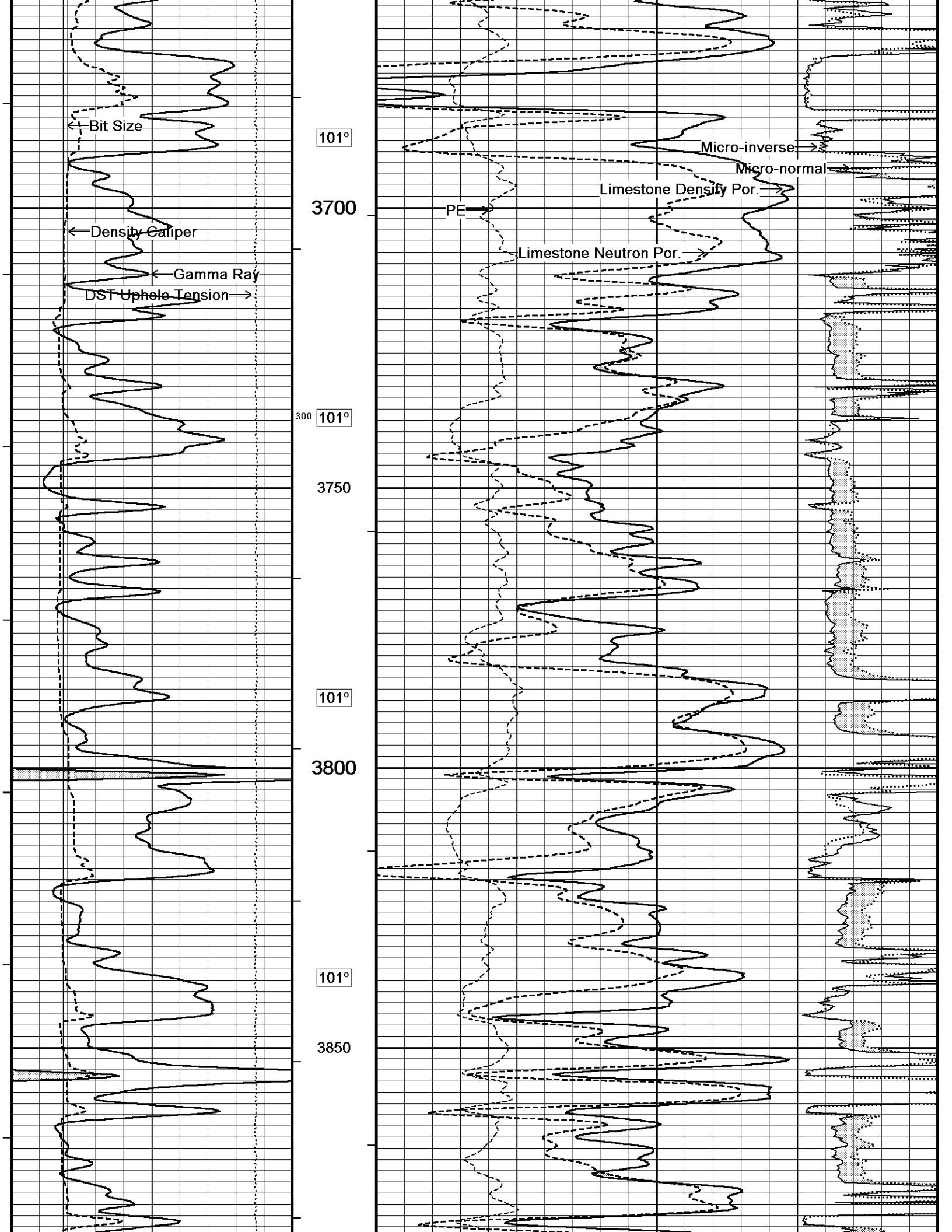
PE
barns/electron
0 5 10

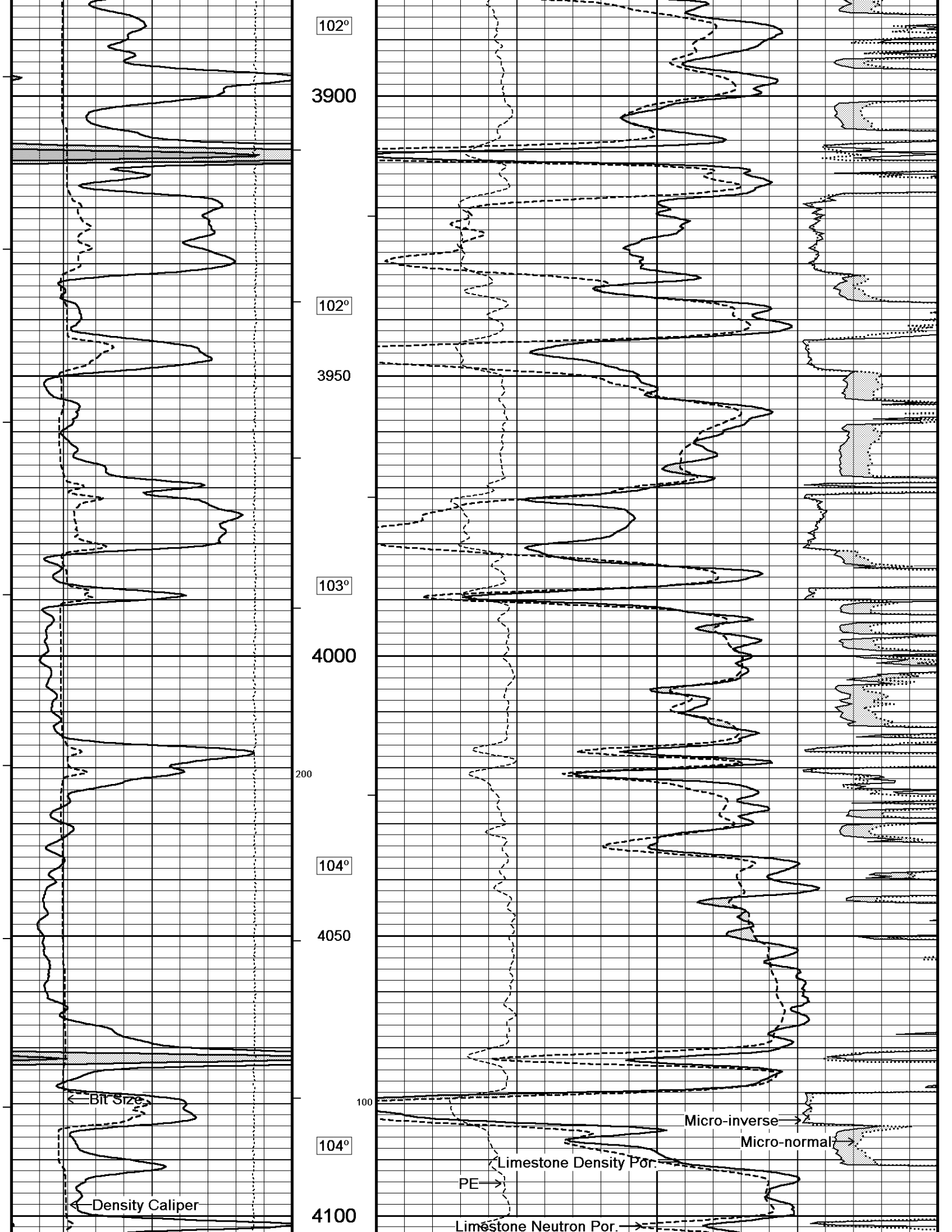
Micro-normal
ohm metres
0 20

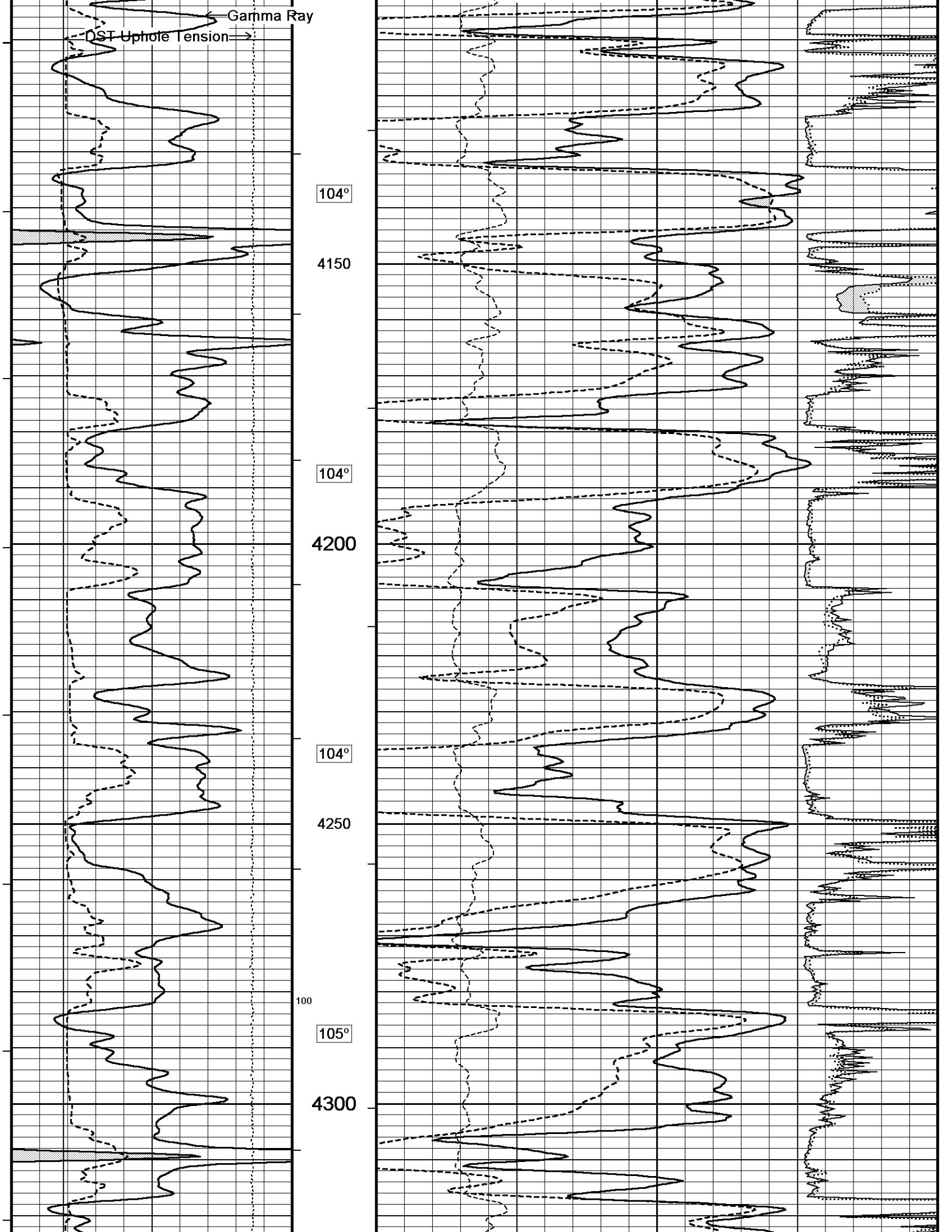
Micro-inverse
ohm metres
0 20

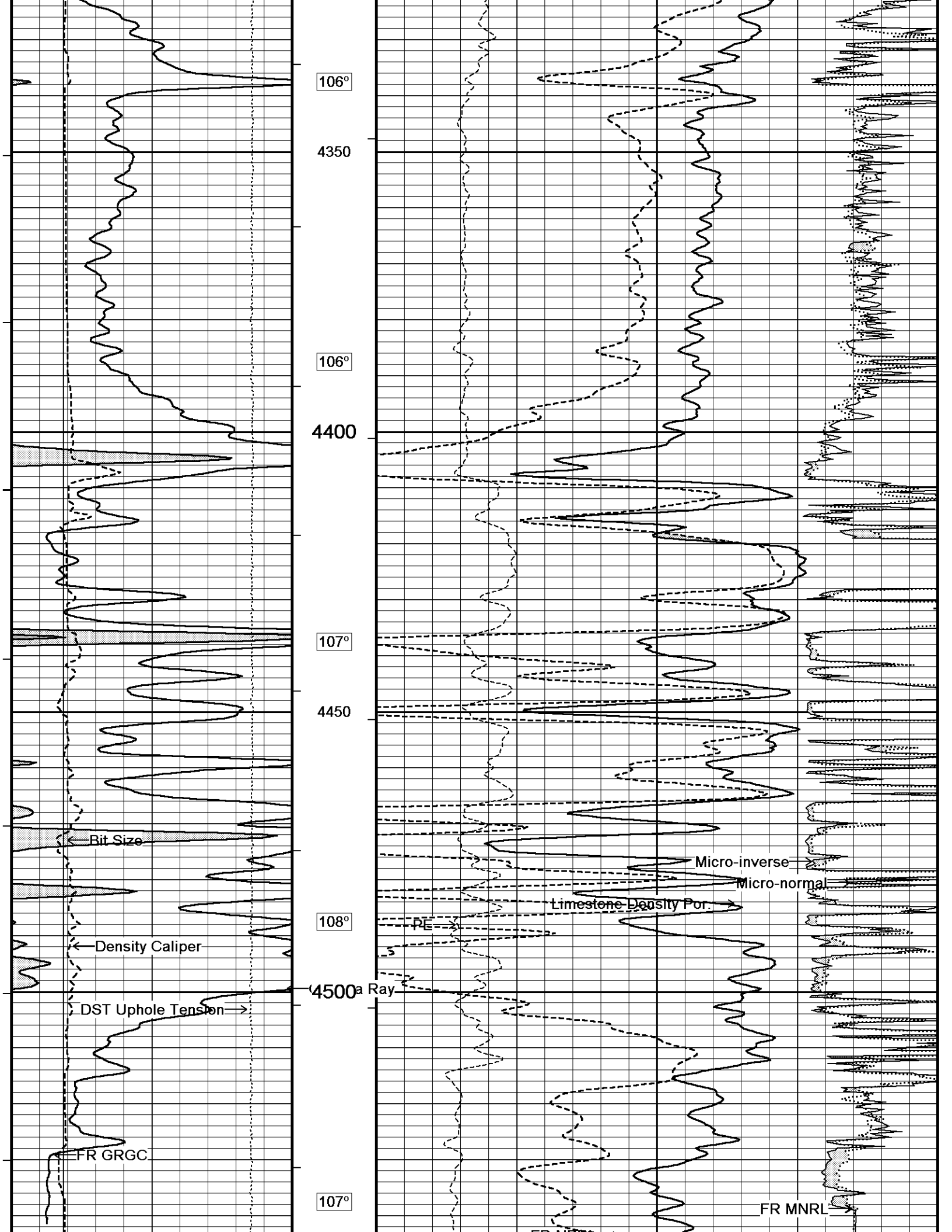


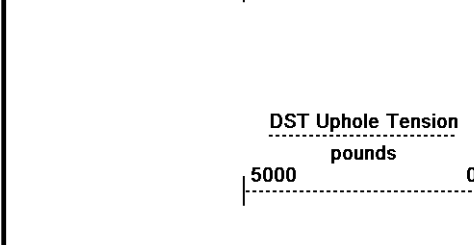
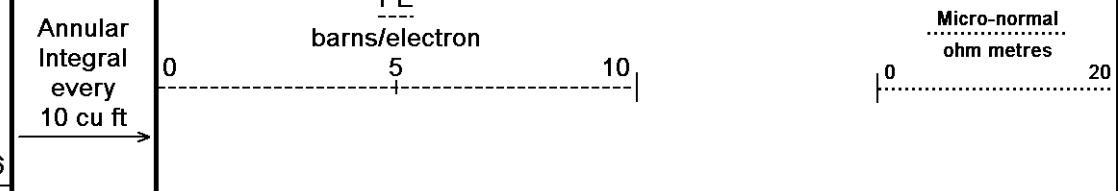
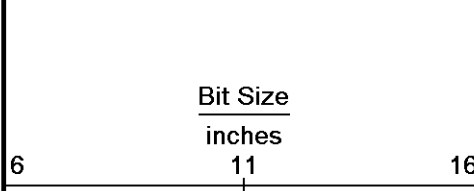
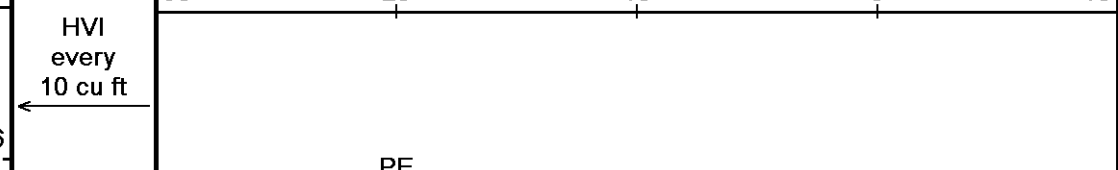
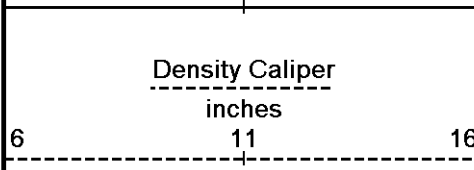
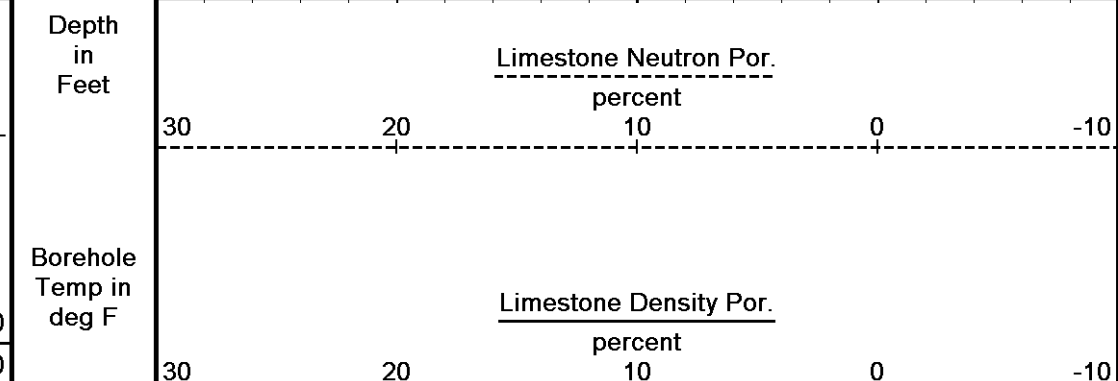
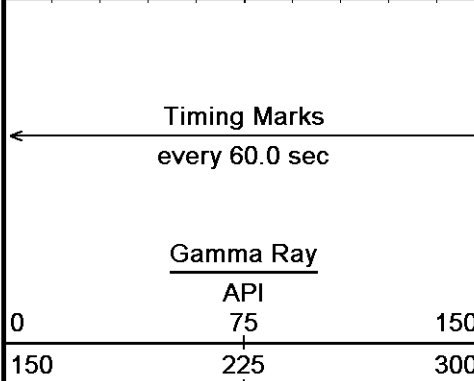
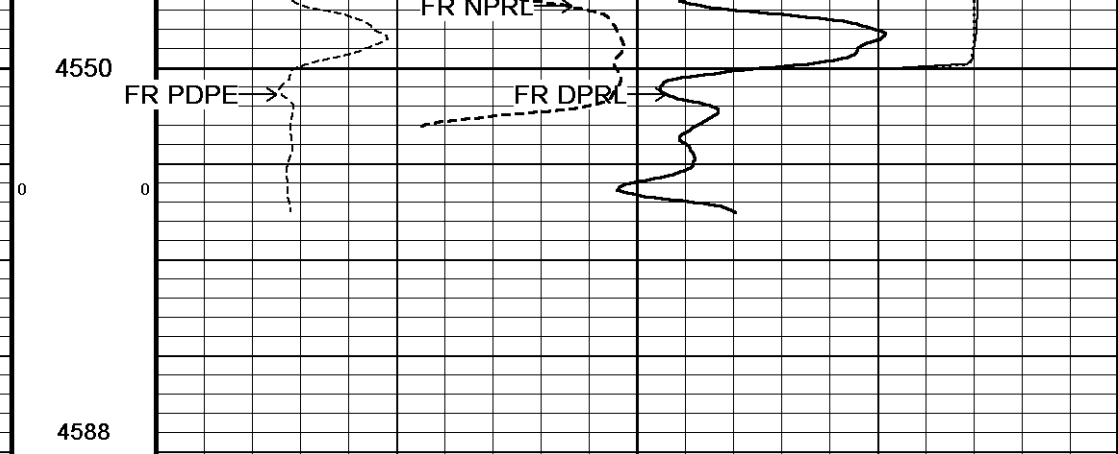
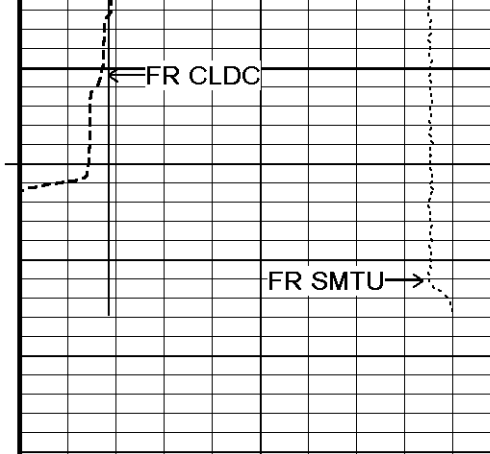
3500
99°
3550
200
99°
3600
100°
3650









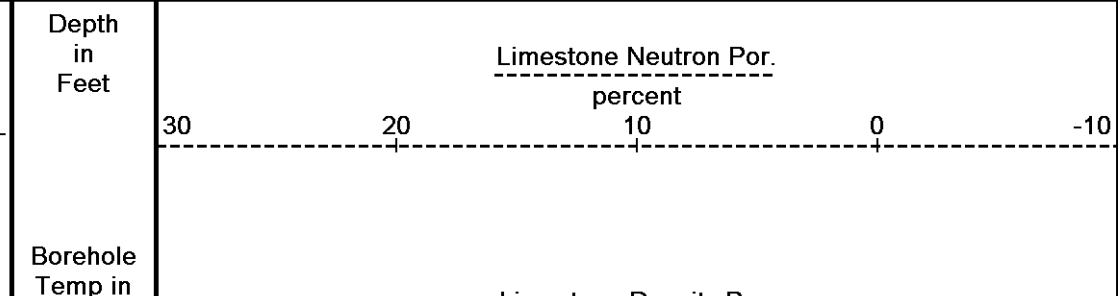
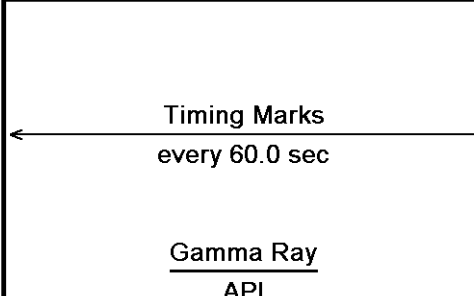


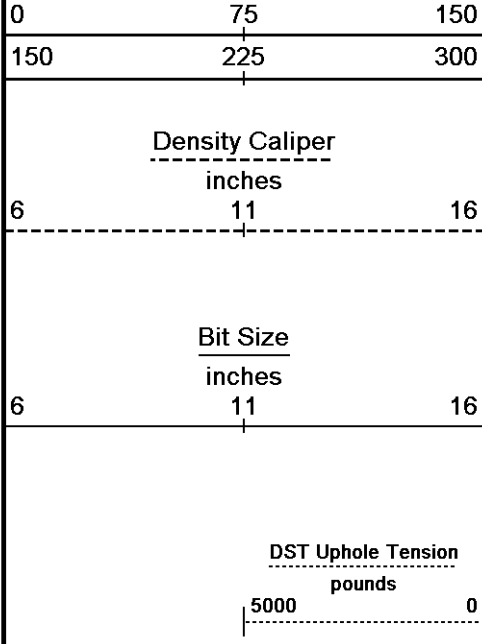
Depth Based Data - Maximum Sampling Increment 10.0cm
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↑ 5 INCH MAIN ↑

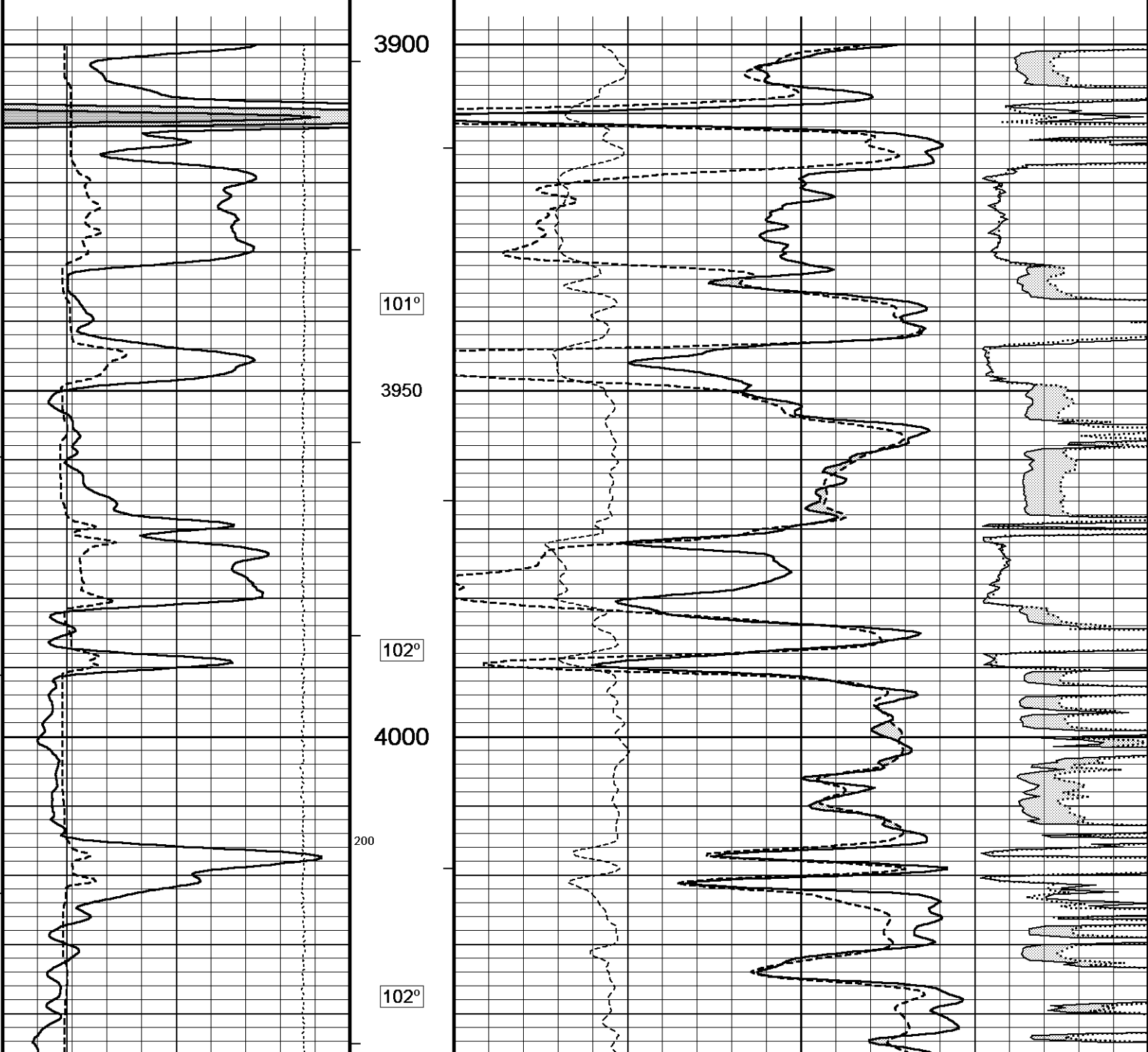
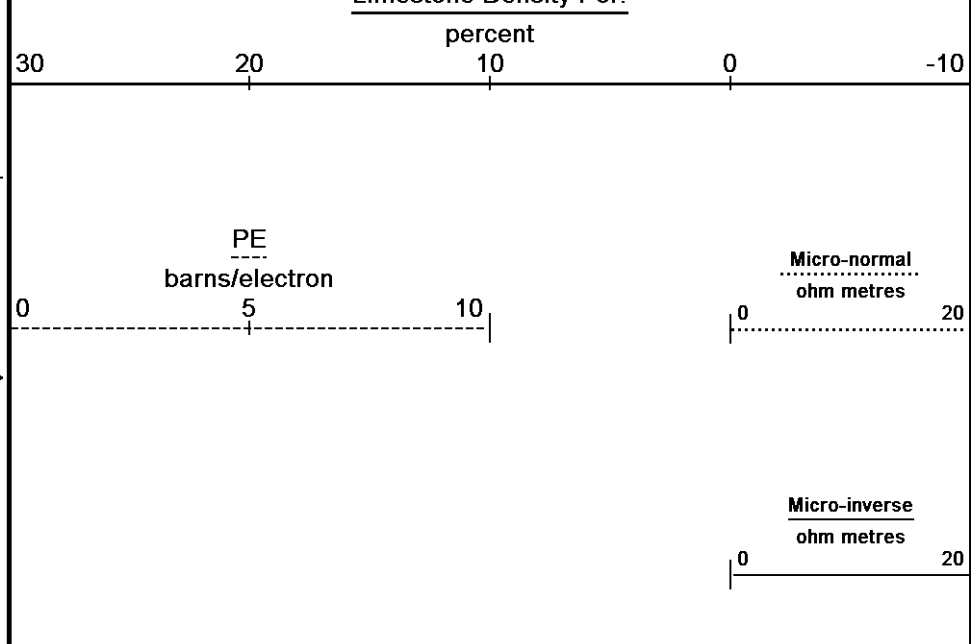
↓ REPEAT SECTION ↓

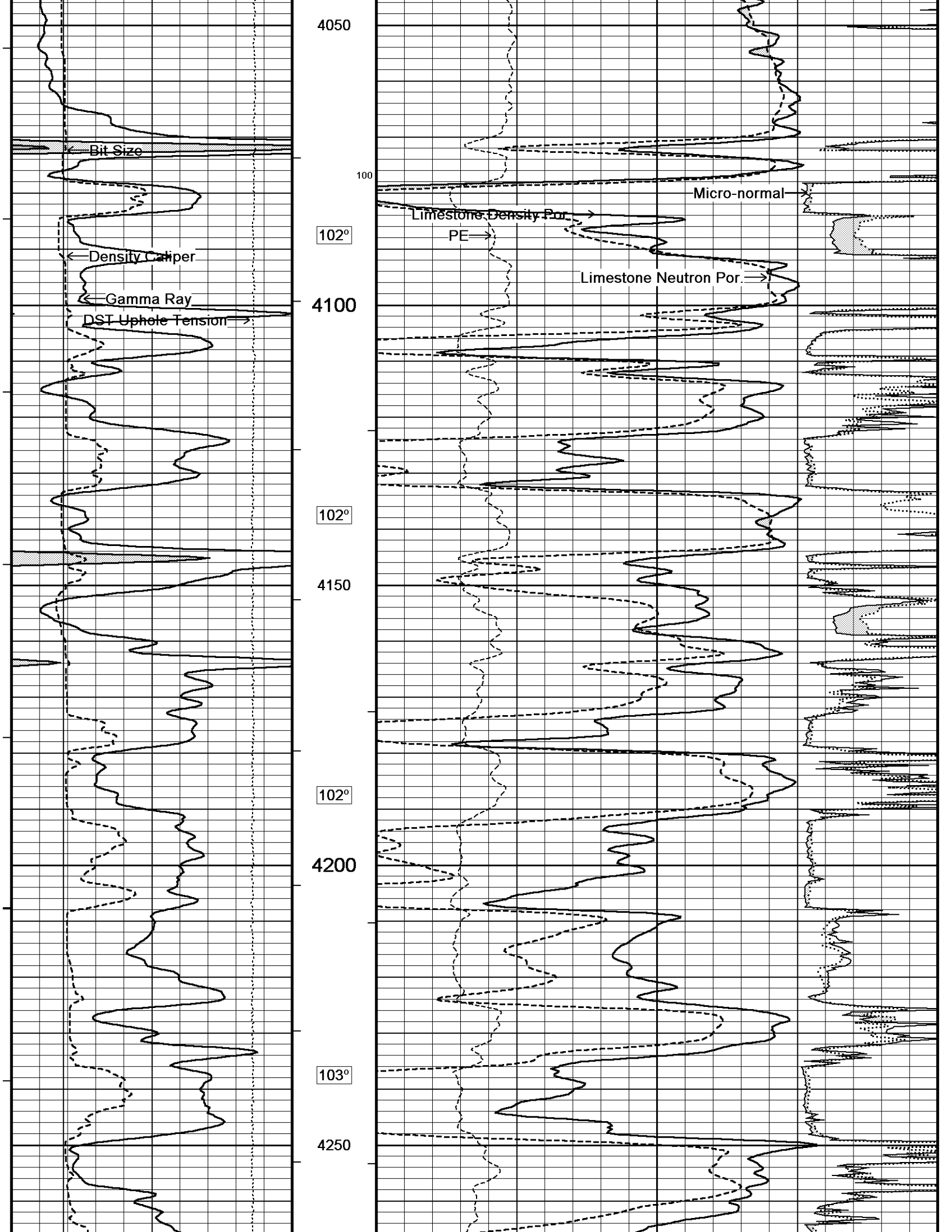
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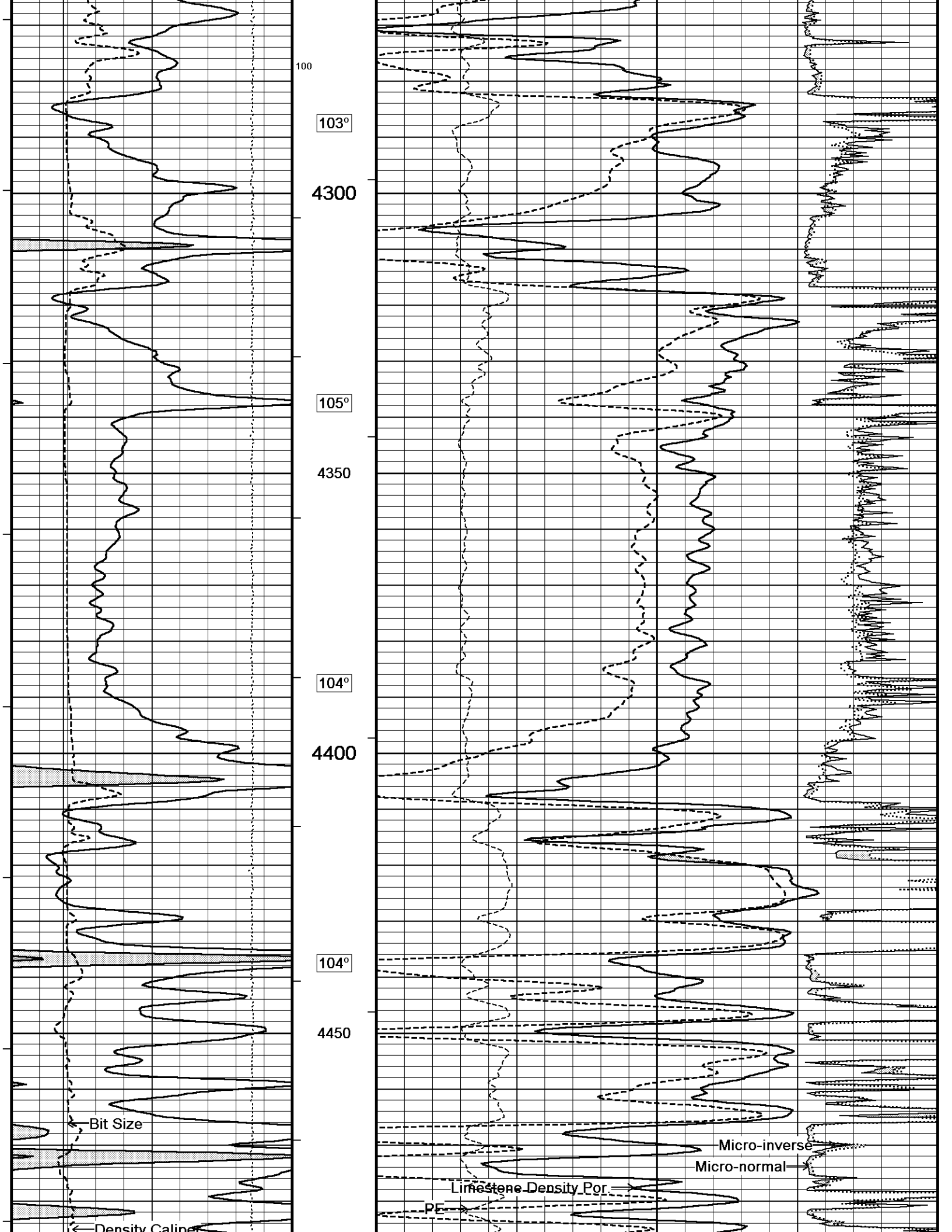


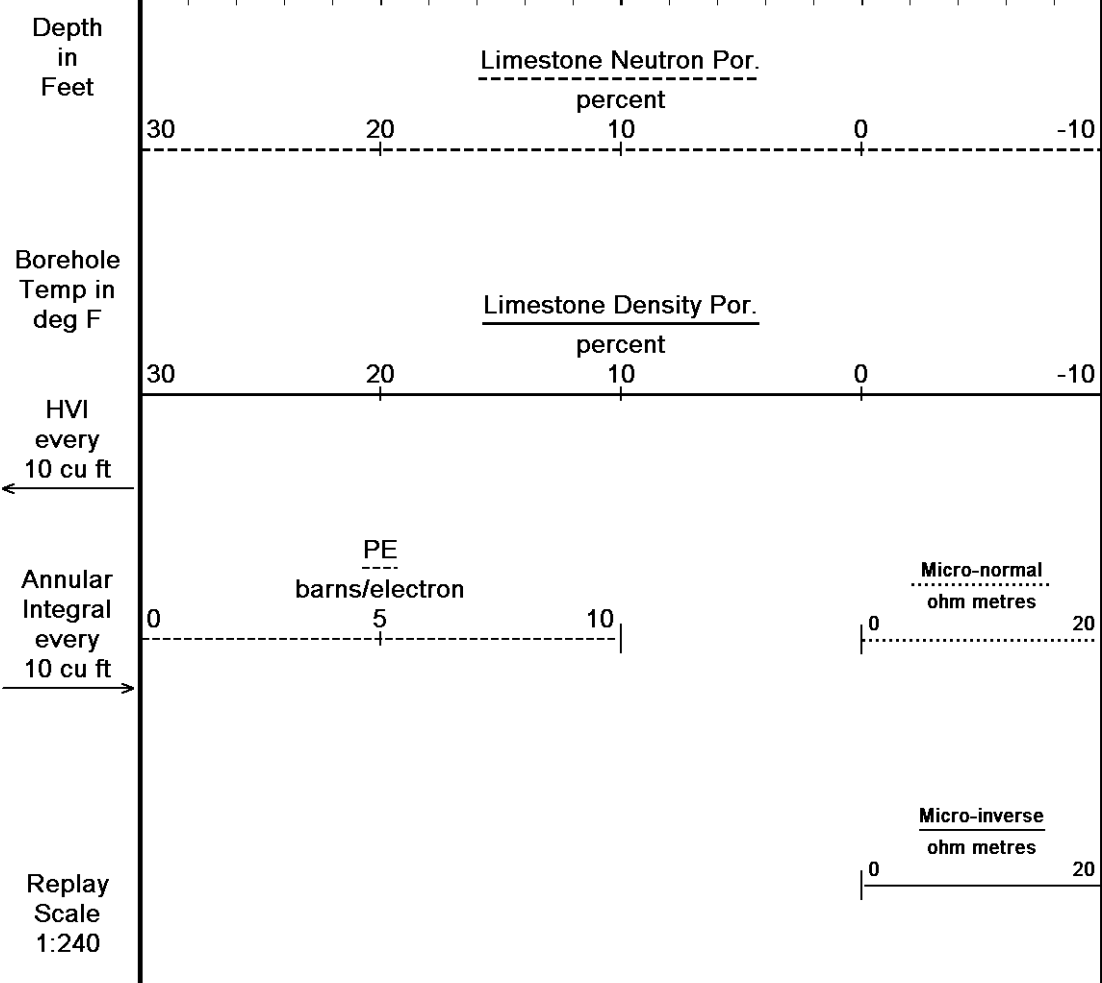
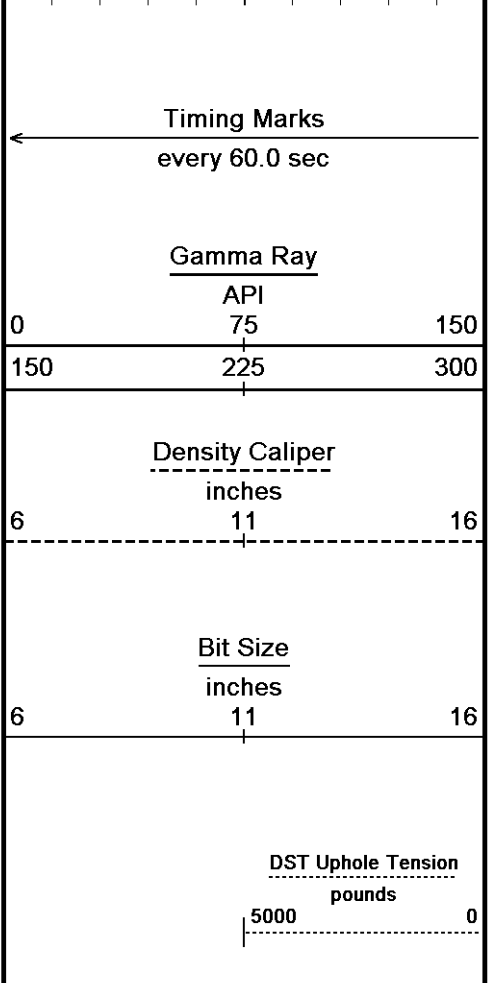
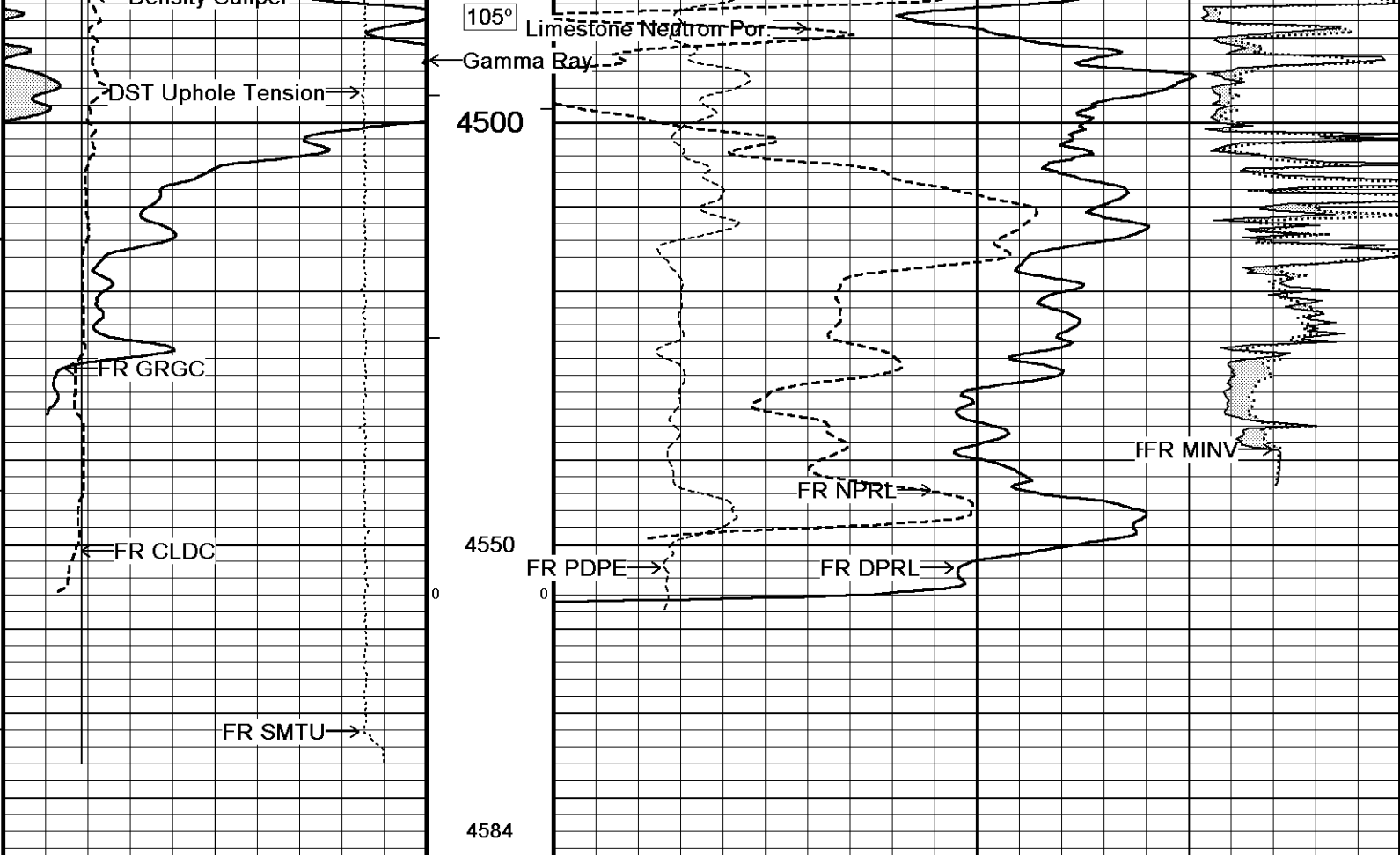


deg F
 HVI
 every
 10 cu ft
 Annular
 Integral
 every
 10 cu ft
 Replay
 Scale
 1:240









5 INCH MAIN

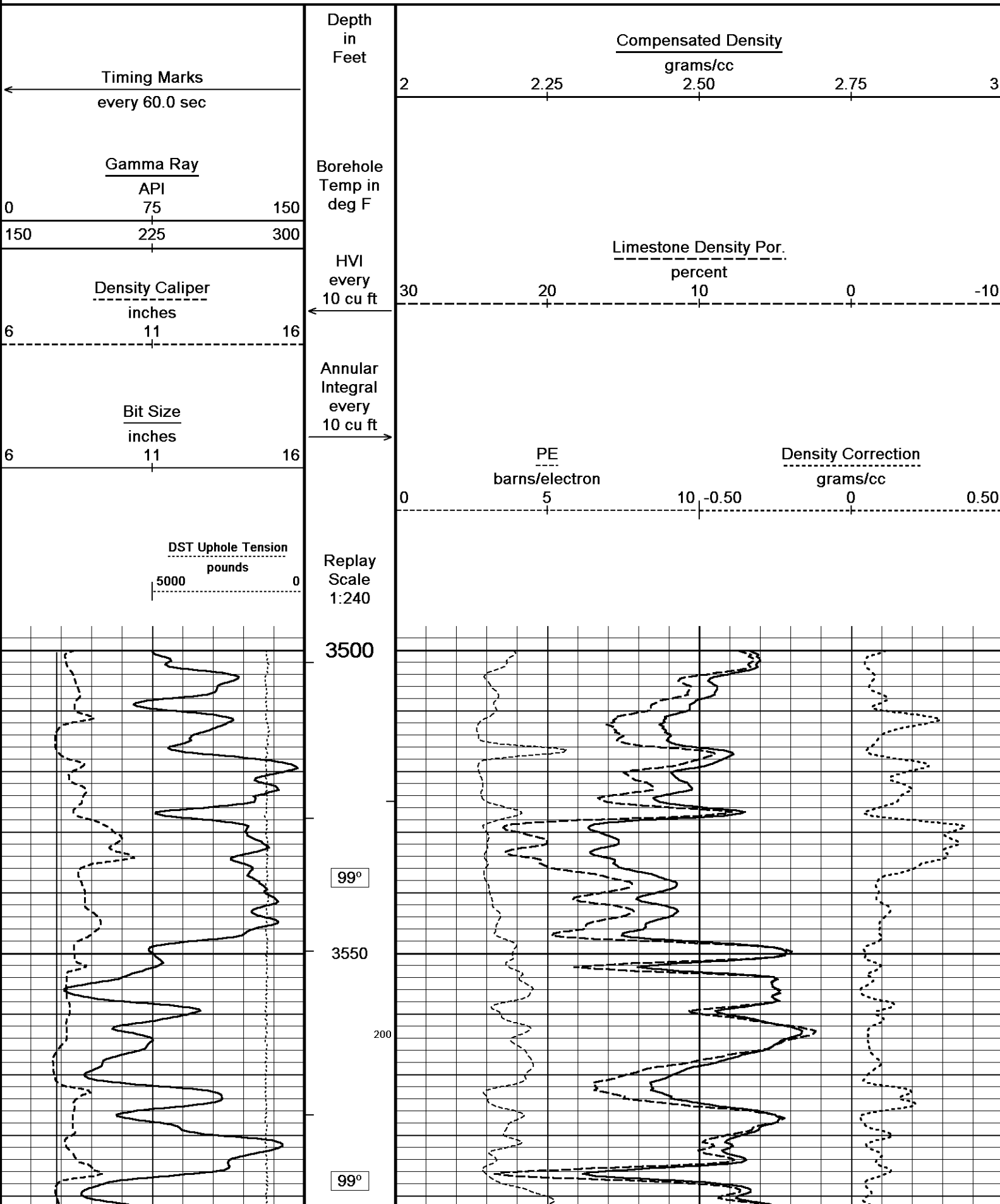
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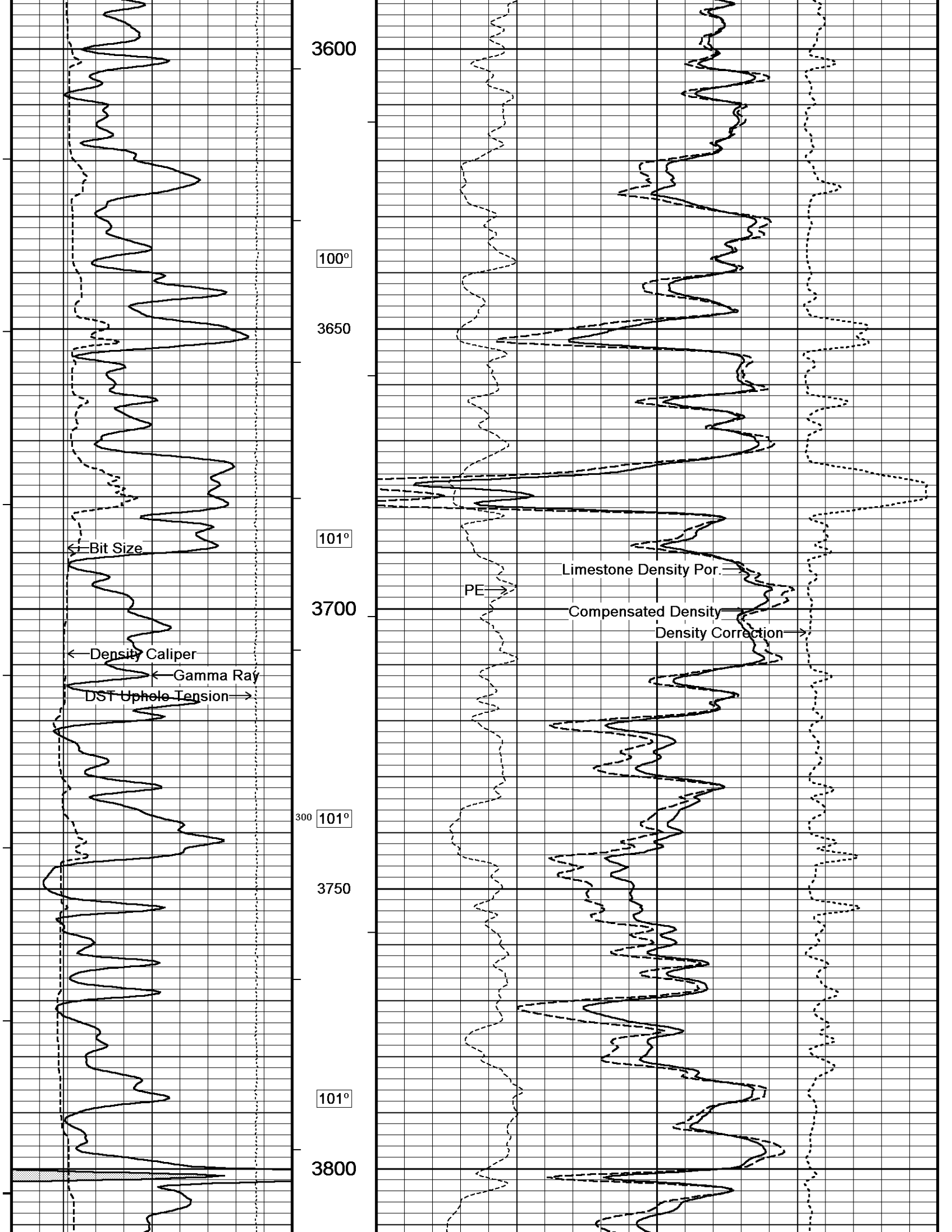
Plotted on 27-MAR-2013 15:13

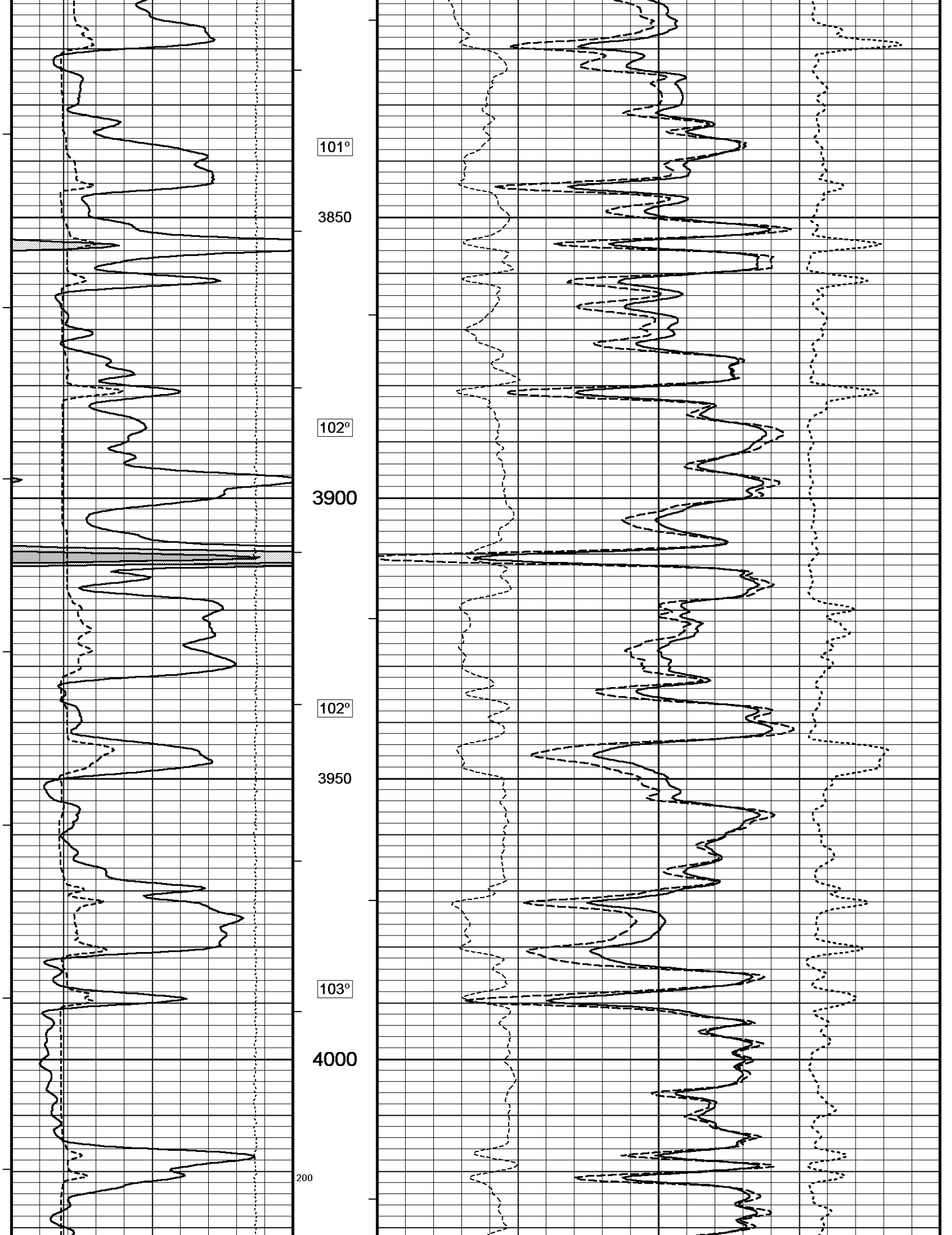
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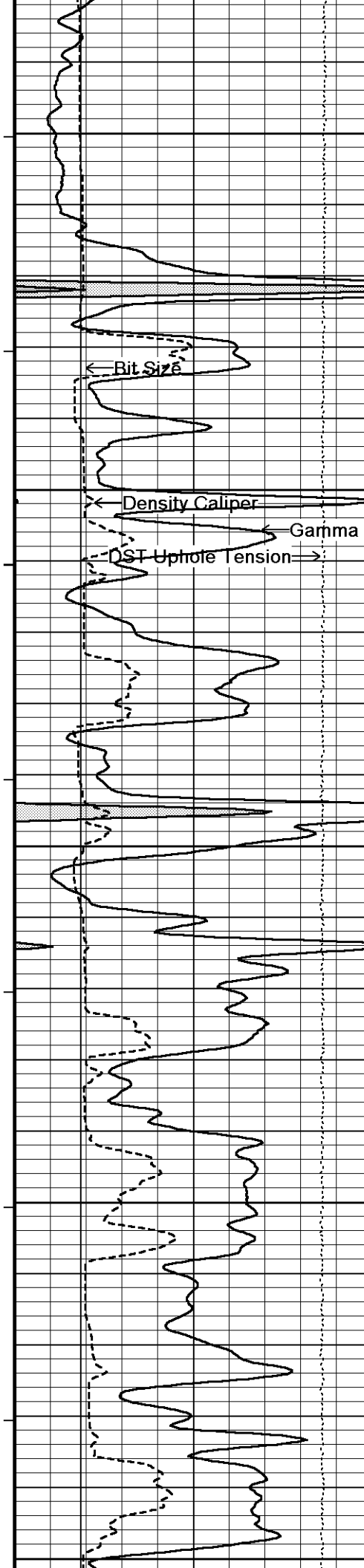
Recorded on 27-MAR-2013 11:53

System Versions: Logged with 13.04.8492 Plotted with 13.04.8492









104°

4050

104°

4100

104°

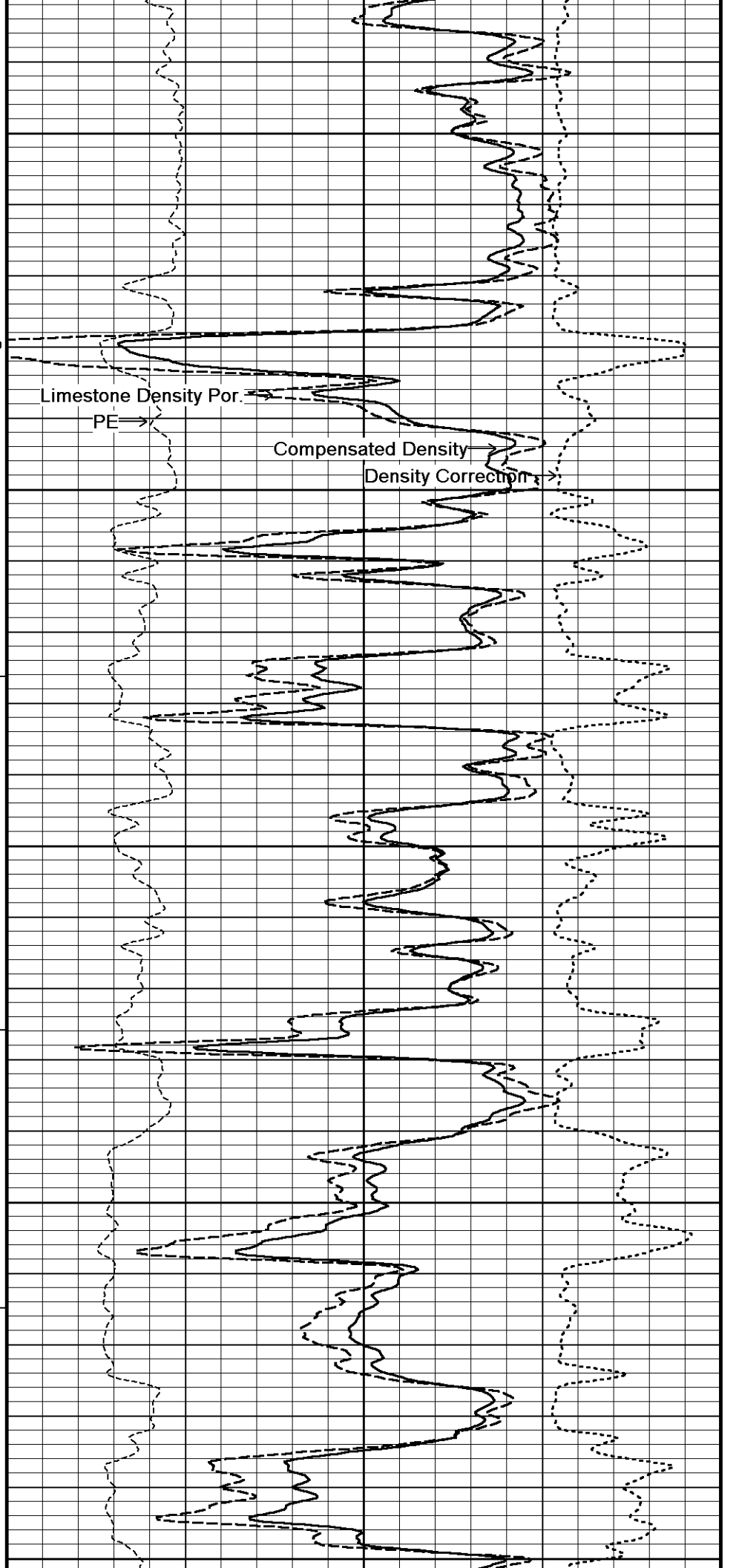
4150

104°

4200

104°

4250



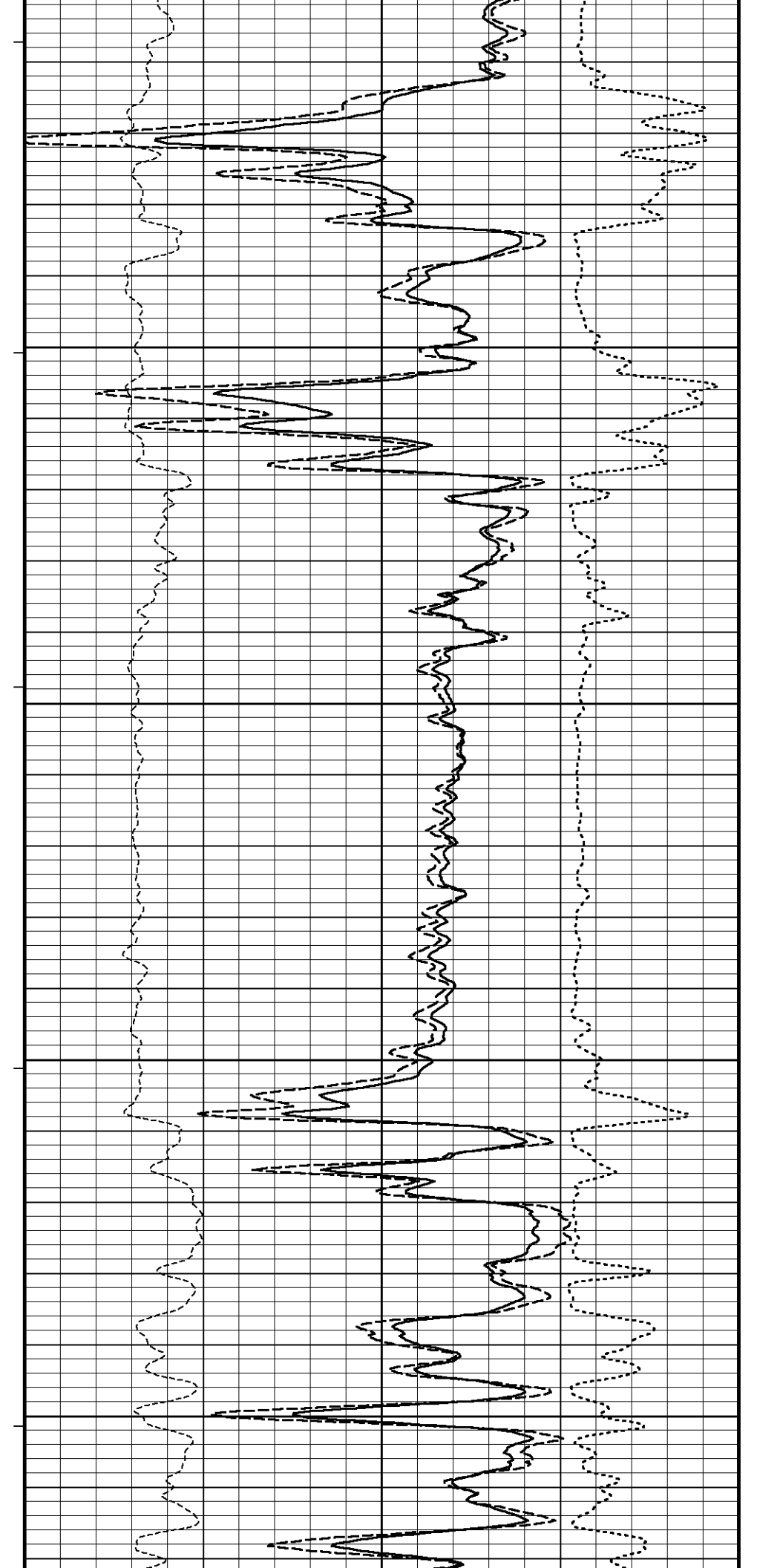
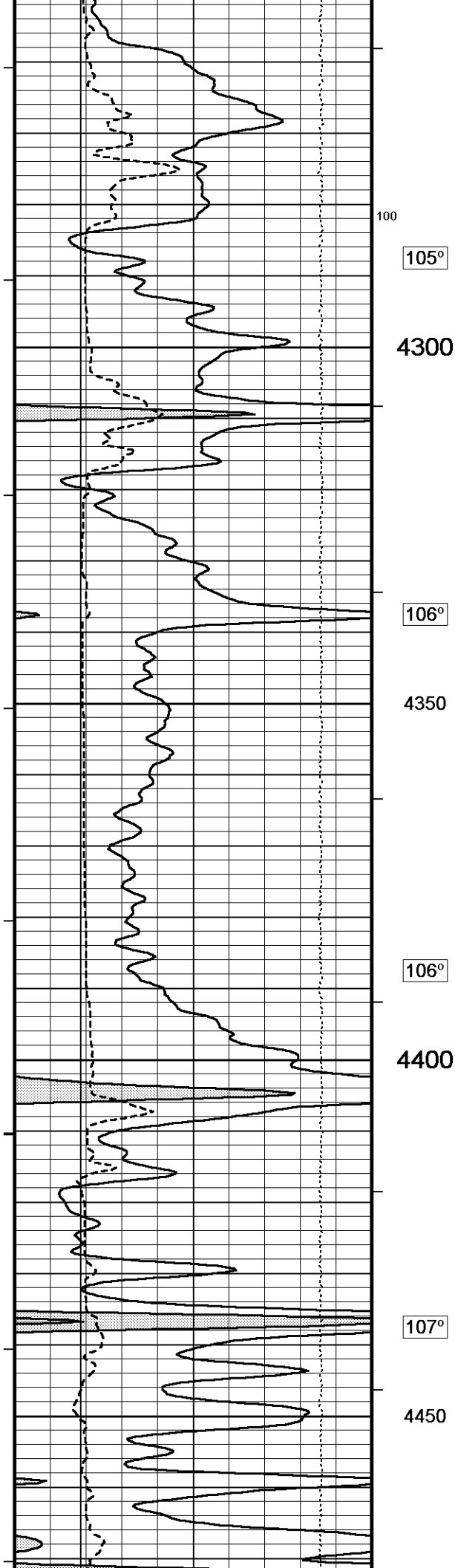
100

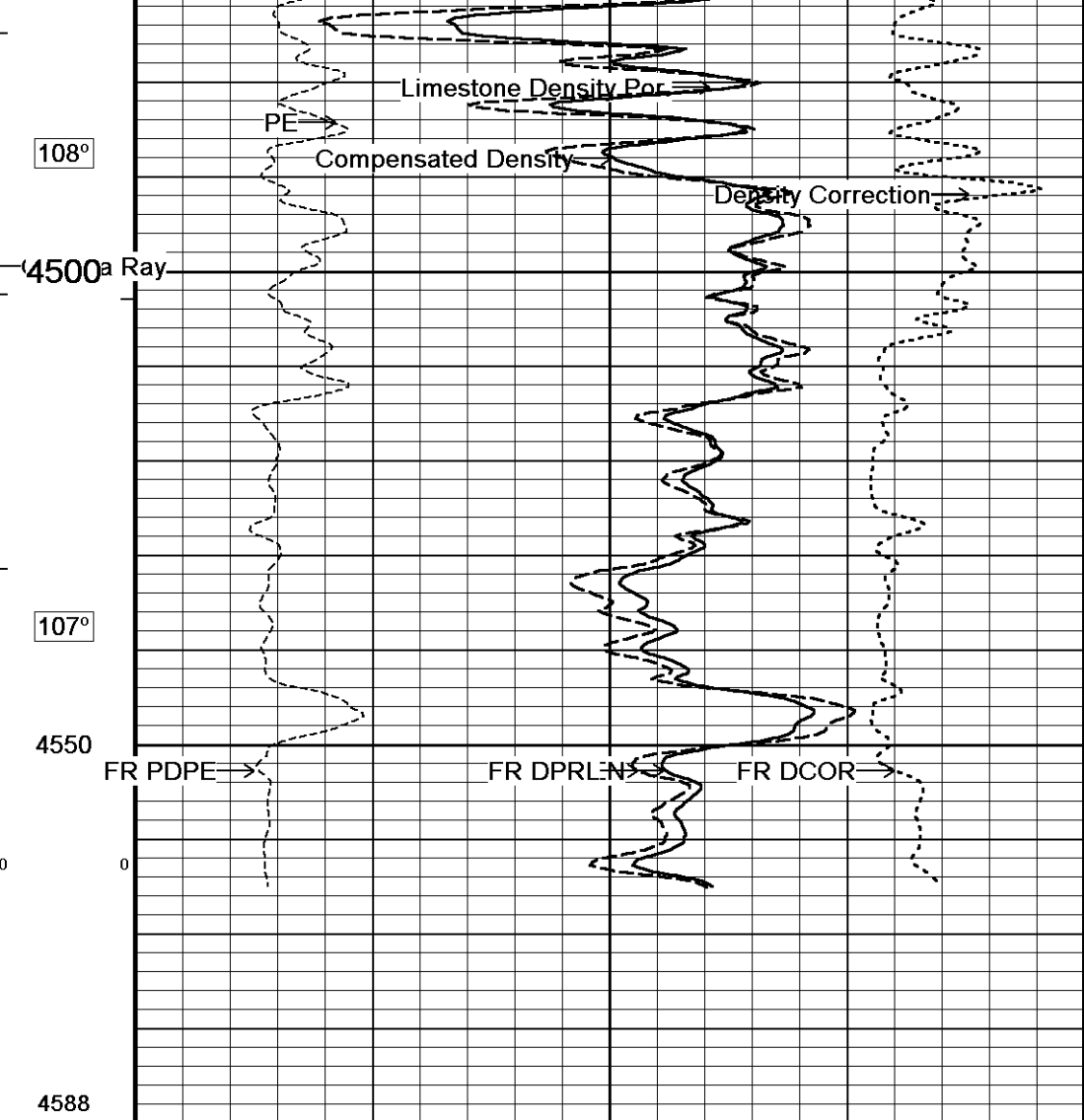
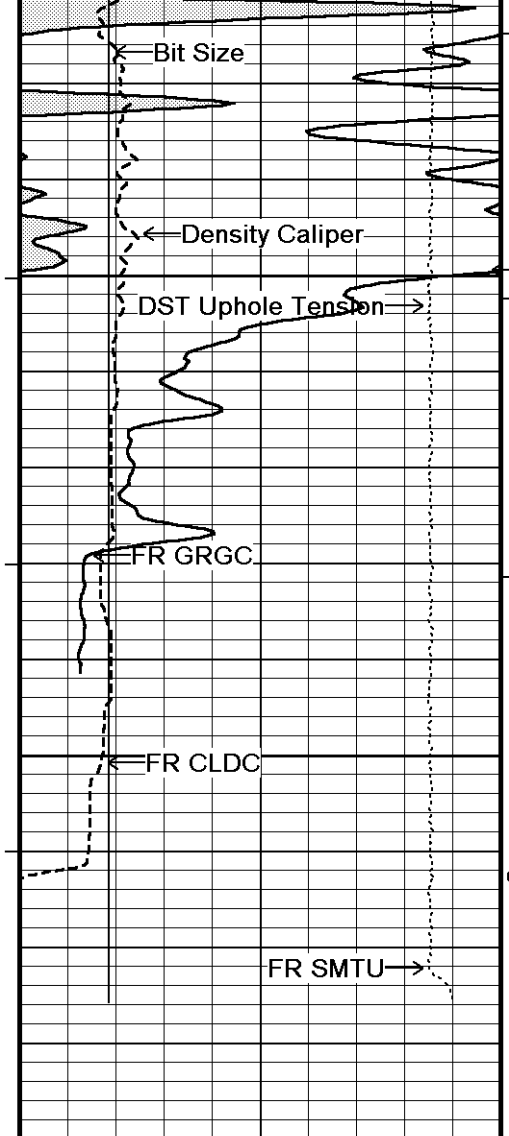
Limestone Density Por.

PE

Compensated Density

Density Correction





108°

4500

107°

4550

0

4588

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Timing Marks every 60.0 sec

Gamma Ray

0	75	150
150	225	300

Density Caliper inches

6	11	16
---	----	----

Bit Size inches

6	11	16
---	----	----

DST Uphole Tension pounds

5000	0
------	---

Compensated Density grams/cc

2	2.25	2.50	2.75	3
---	------	------	------	---

Limestone Density Por. percent

30	20	10	0	-10
----	----	----	---	-----

PE barns/electron

0	5	10
---	---	----

Density Correction grams/cc

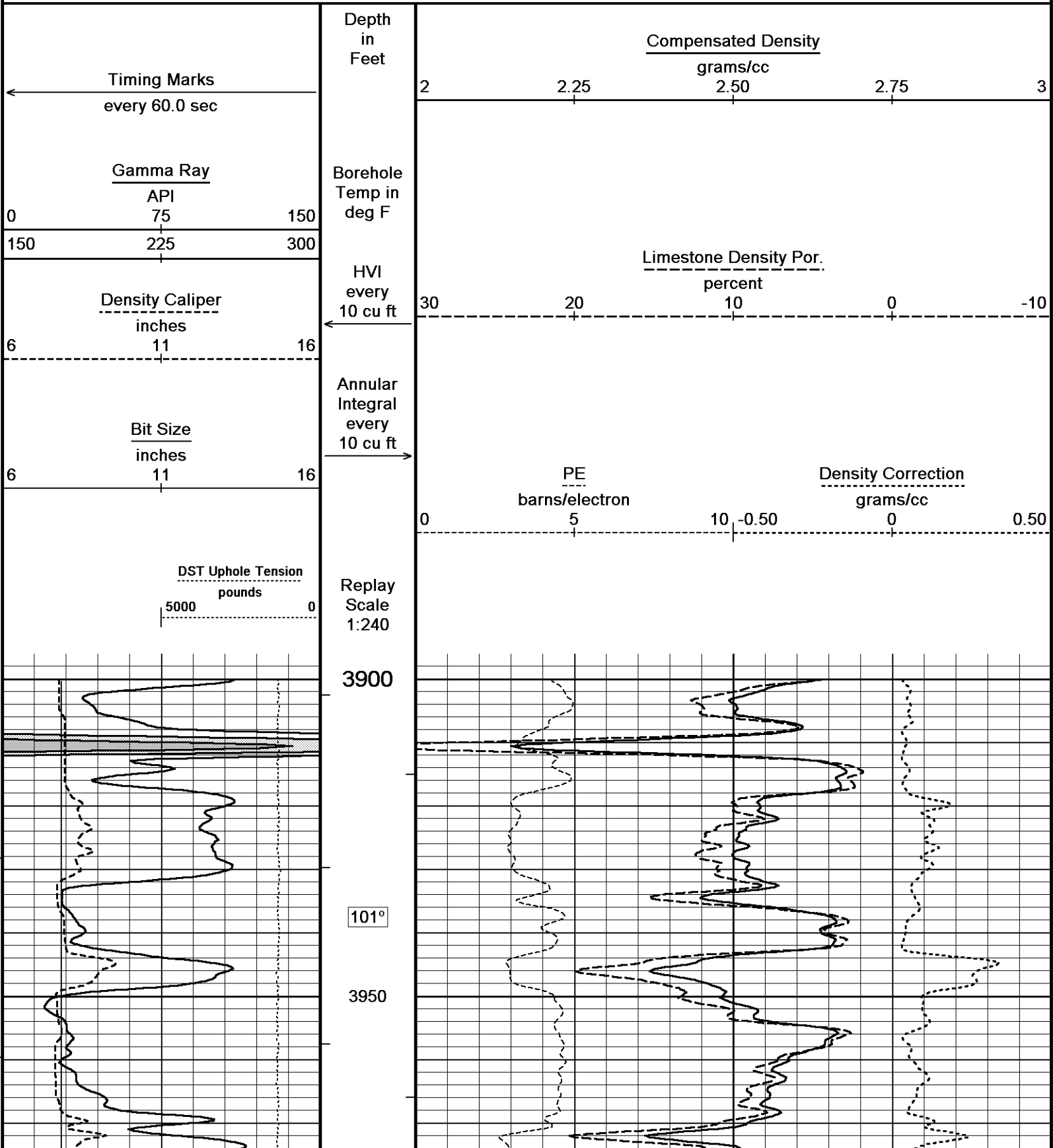
-0.50	0	0.50
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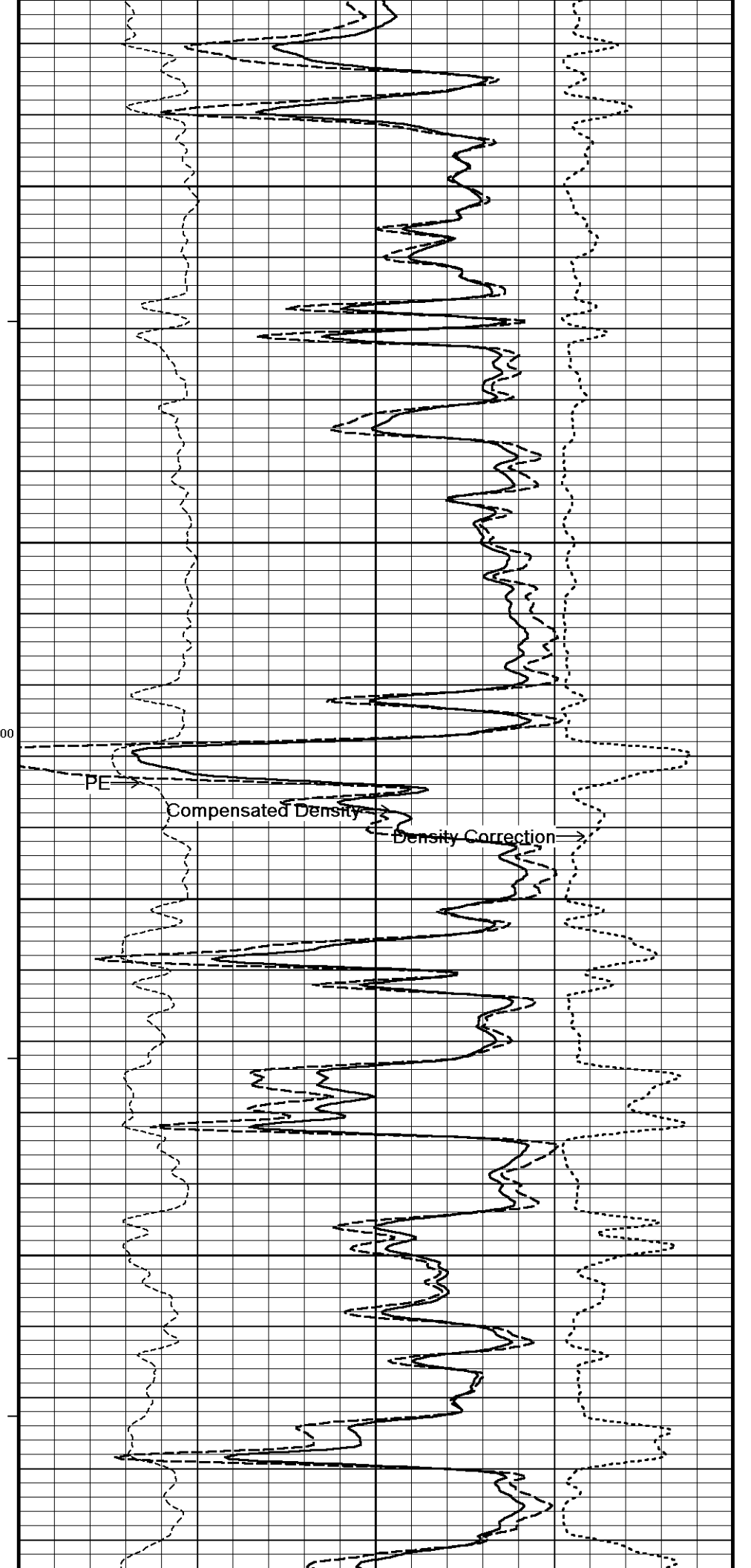
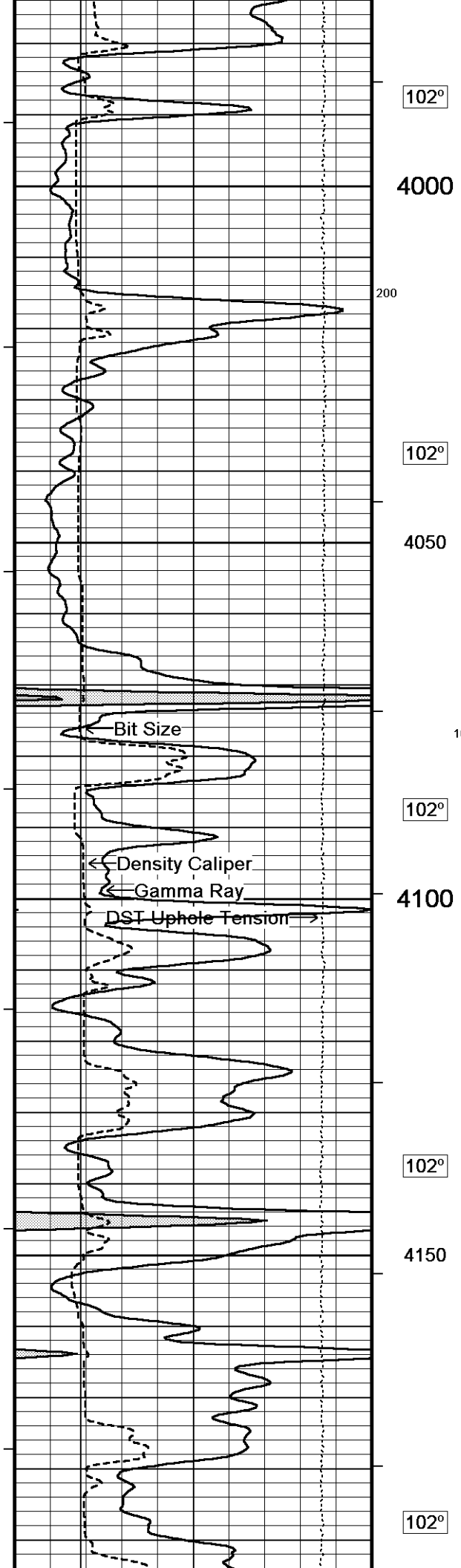


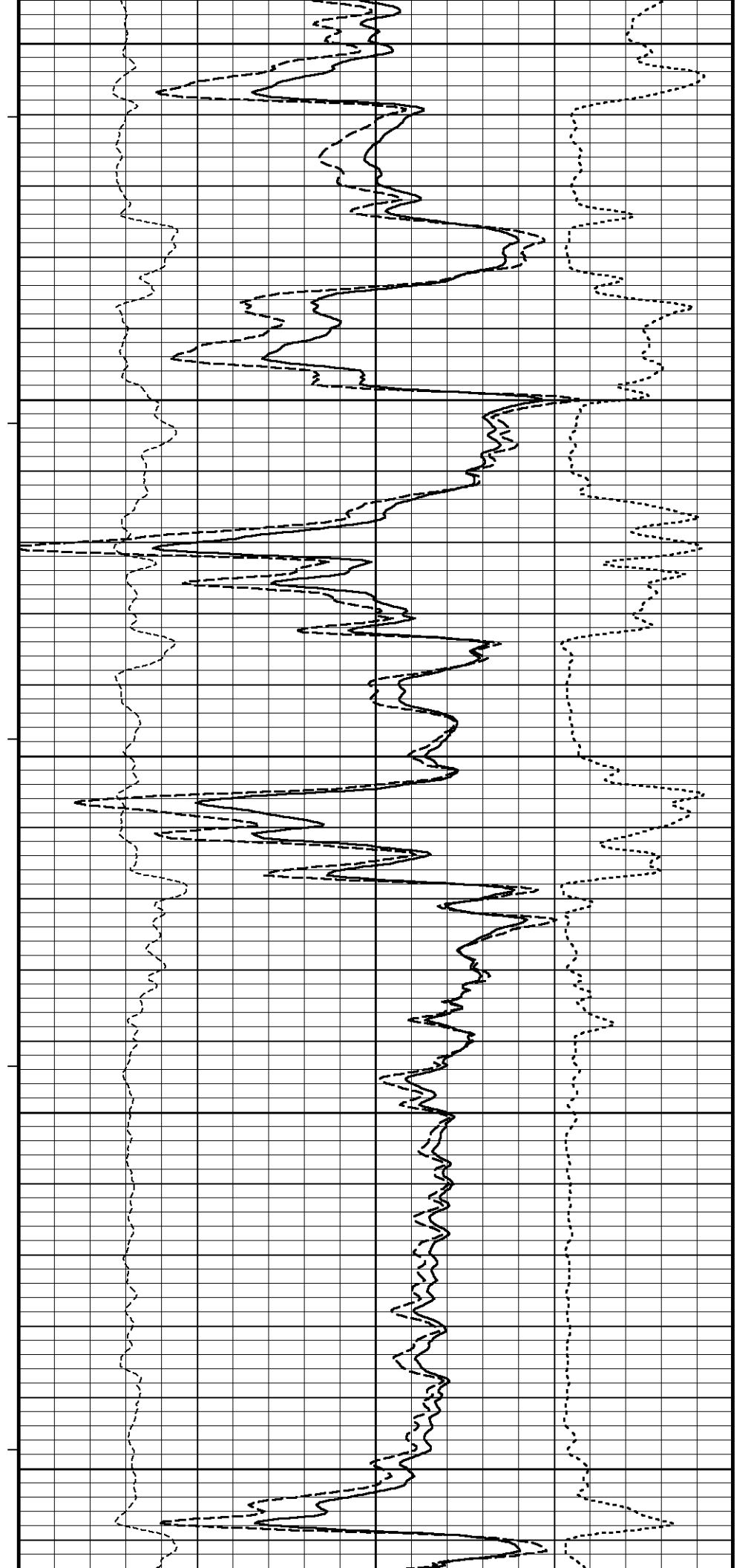
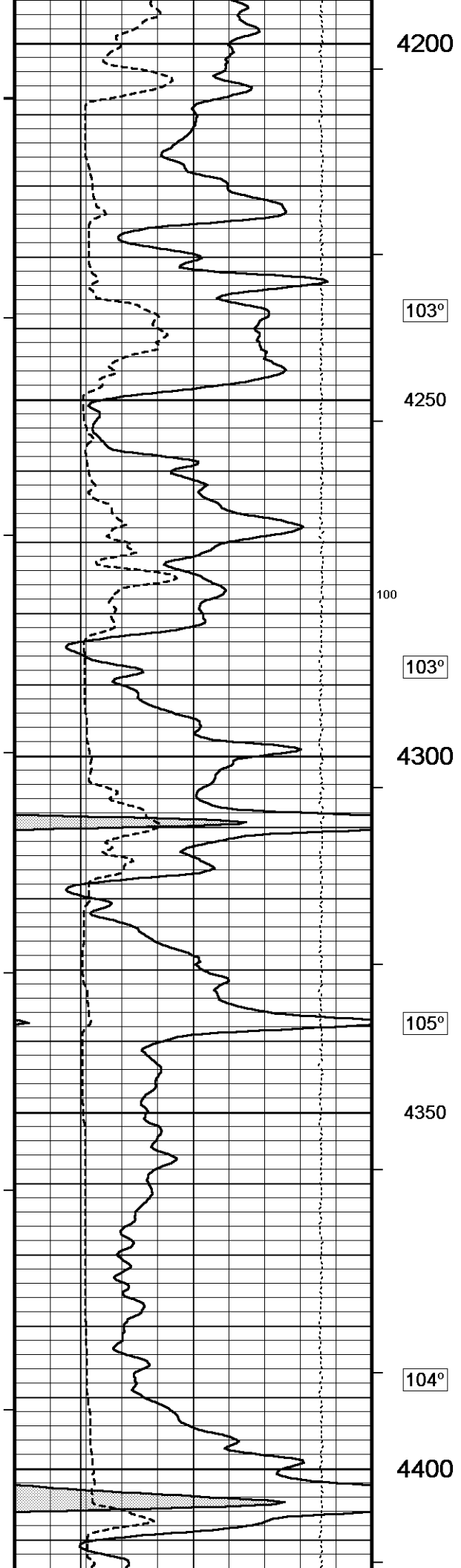
5 INCH MAIN

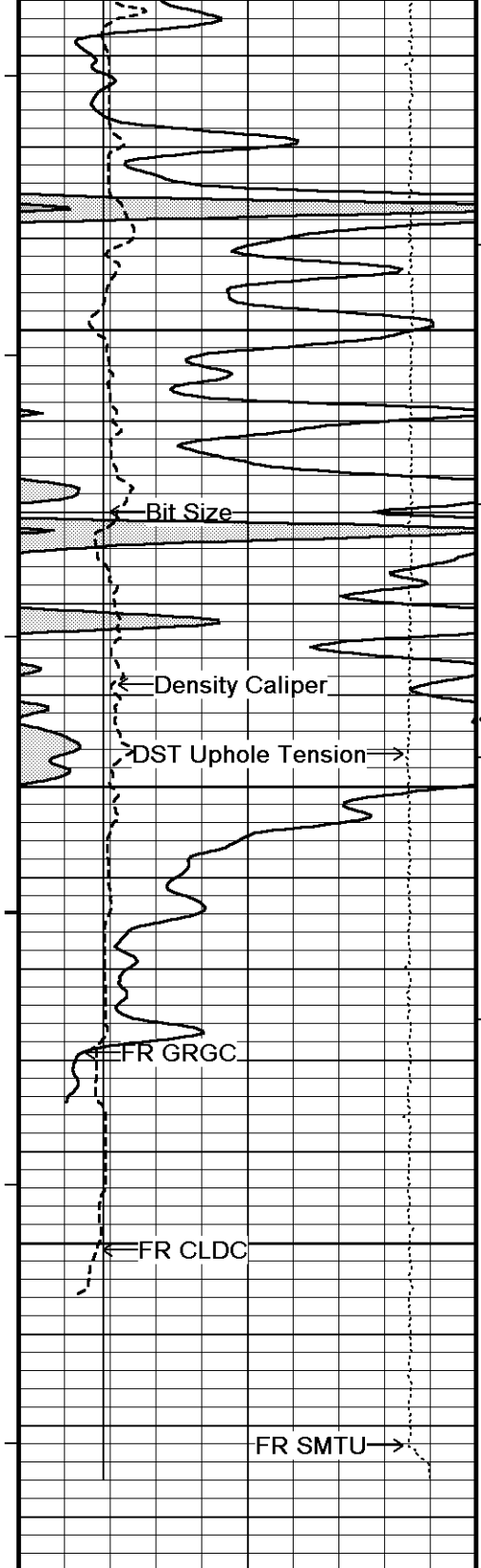


REPEAT SECTION









104°

4450

Limestone Density Por.

PE

105°

Gamma Ray

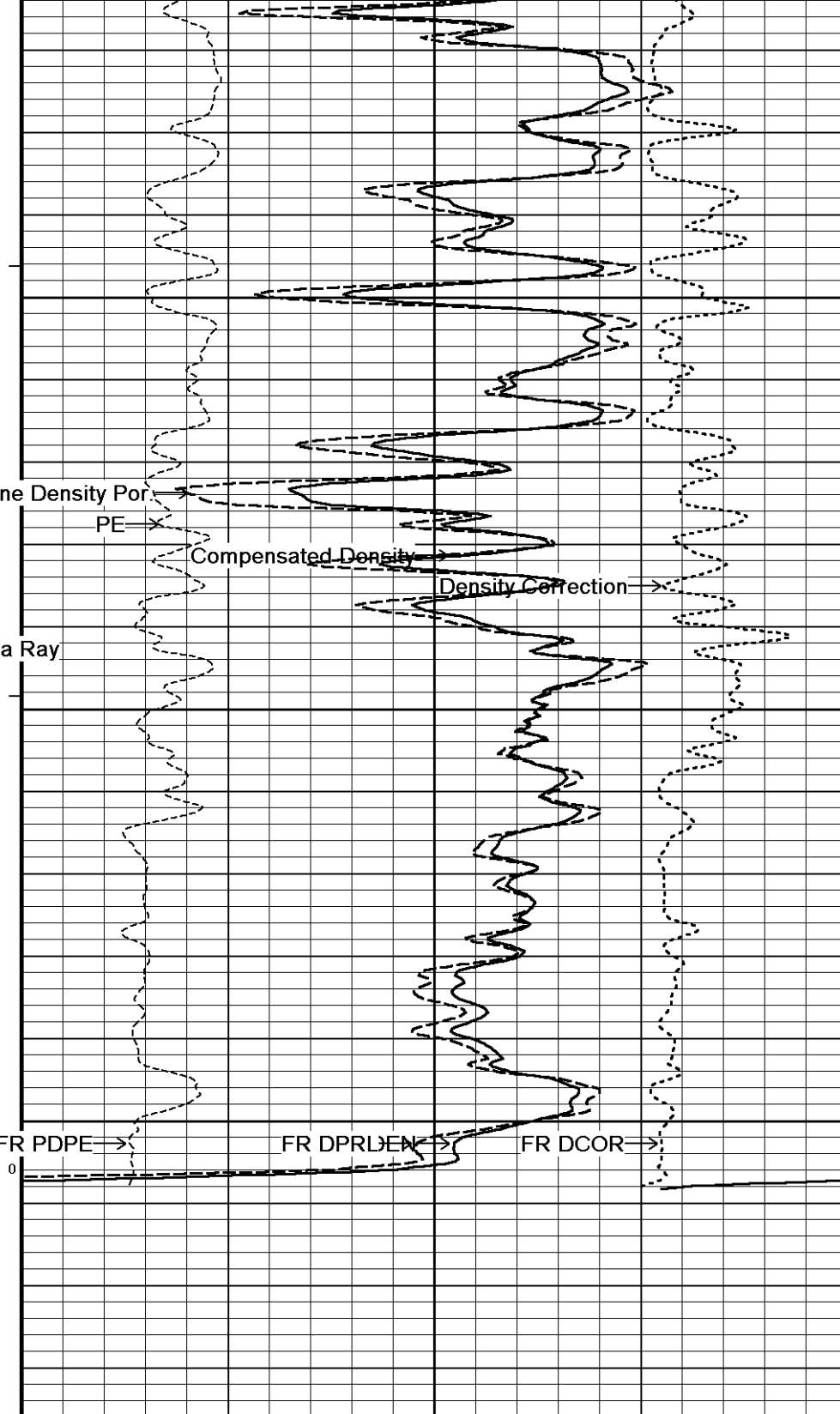
4500

4550

0

4584

Depth in Feet



Timing Marks every 60.0 sec

Gamma Ray

0	75	150
150	225	300

Borehole Temp in deg F

Compensated Density

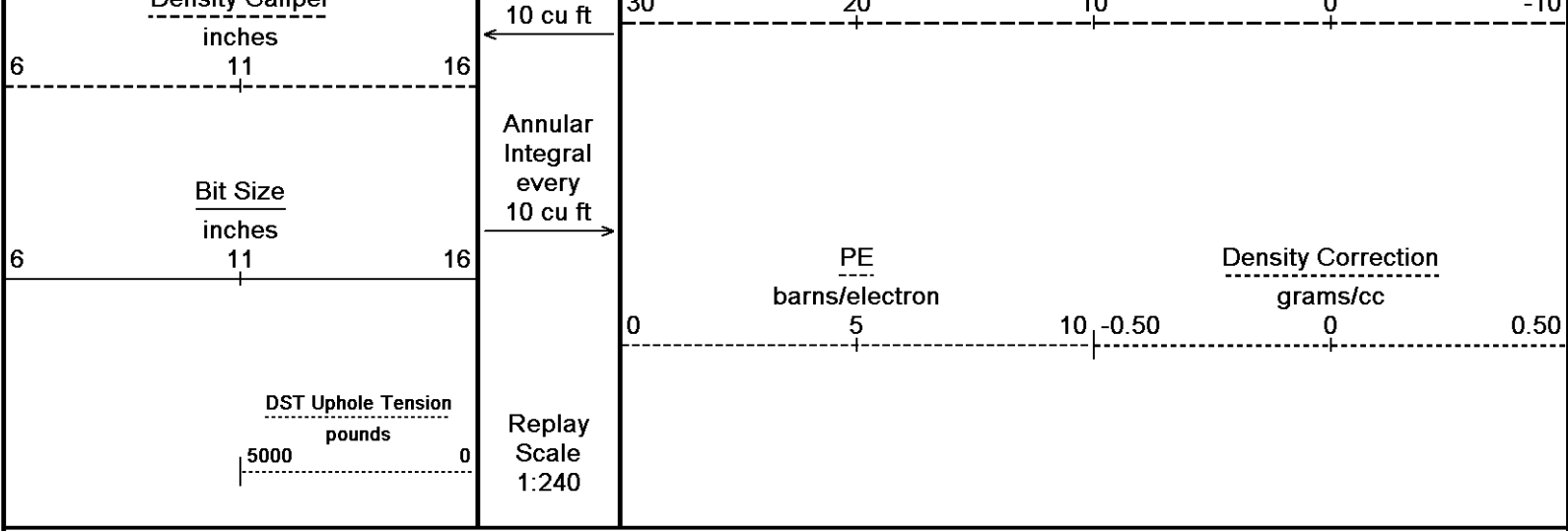
grams/cc

2	2.25	2.50	2.75	3
---	------	------	------	---

Limestone Density Por.

percent

20	20	0	10
----	----	---	----



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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.04.8492\Data\Grand Mesa Brooks #1-18\Brooks #1-18.dta

General Constants All 000		Last Edited on 27-MAR-2013,10:41
General Parameters		
Mud Resistivity	1.300	ohm-metres
Mud Resistivity Temperature	54.000	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	Density Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0		Field Calibration on 26-MAR-2013 22:09
Reading No	Measured	Calibrated (lbs)
1	15789.74	0.00
2	16297.35	399.00

High Resolution Temperature Calibration MCG-B 34		Field Calibration on 14-MAR-2013,12:12
	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-B 34		Last Edited on 14-MAR-2013,12:12
Pre-filter Length	11	

SP Calibration MCG-B 34		Field Calibration on 14-MAR-2013,12:12
	Measured	Calibrated (mV)
Reference 1	105.8	100.0
Reference 2	-94.3	-100.0

Gamma Calibration MCG-B 34

	Measured	Calibrated (API)
Background	70	48
Calibrator (Gross)	1125	773
Calibrator (Net)	1055	725

Gamma Constants MCG-B 34

Last Edited on 27-MAR-2013,10:27

Gamma Calibrator Number	GRC38	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Caliper Calibration MML-A 3

Base Calibration on 14-MAR-2013 12:18

Field Calibration on 25-MAR-2013 17:12

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14700	5.98
2	17863	7.97
3	21143	9.86
4	24990	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.02	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 14-MAR-2013 12:10

Field Check on 25-MAR-2013 17:16

Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated Resistor 1	Resistor 2 (ohm-m)
Micro Normal	12.1	60.1	5.0	25.0
Micro Inverse	15.6	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 3

Last Edited on 25-MAR-2013,17:12

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	

Neutron Calibration MDN-A.B 66

Base Calibration on 14-MAR-2013,12:32

Field Check on 25-MAR-2013 17:27

Base Calibration				
	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2998	94	3714	110
Ratio	31.811		33.764	
Field Calibrator at Base			Calibrated (cps)	
			1692	2389
Ratio			0.708	
Field Check			Calibrated (cps)	
			1718	2418
Ratio			0.697	

Neutron Constants MDN-A.B 66

Last Edited on 25-MAR-2013,17:23

Neutron Source Id	P0204NN		
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	None	
Formation Pressure	0.00	kpsi
Temperature Source	None	
Temperature	20.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 353

Base Calibration on 14-MAR-2013 11:59
Field Check on 25-MAR-2013 17:03

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	966.2	126.8
Base Check		280.5
Field Check		280.6

FE Constants MFE-B.J 353

Last Edited on 26-MAR-2013,20:52

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 167

Field Calibration on 14-MAR-2013,14:23

	Measured	Calibrated(Deg F)
Lower	1.00	33.80
Upper	11.00	51.80

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 15-MAR-2013,23:04

Pre-filter Length	11
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Induction Calibration MAI-A.A 167

Base Calibration on 14-MAR-2013,14:52
Field Check on 25-MAR-2013 17:02

Base Calibration				
Test Loop Calibration				
	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature	76.8	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.1	3840.8
2			29.3	3478.5
3			29.0	3054.5
4			19.8	2082.8
Deep			18.5	2050.1
Medium			42.2	3993.1
Shallow			42.6	5056.2

Array Temperature	58.4	Deg F
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Induction Constants MAI-A.A 167

Last Edited on 26-MAR-2013,20:51

Induction Model	RtAP-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	2.500	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	

Caliper Calibration MPD-B 64

Base Calibration on 15-MAR-2013 14:36
Field Calibration on 25-MAR-2013 17:05

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14127	3.99
2	22526	5.98
3	31088	7.97
4	39424	9.86
5	48752	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.01	5.98

Photo Density Calibration MPD-B 64

Base Calibration on 14-MAR-2013 15:27
Field Check on 25-MAR-2013 17:10

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	59830	33386	59556	30836
Reference 2	25160	2926	24941	2541

Field Check at Base

1174.4	1358.8
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Field Check

1172.5	1356.0
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PE Calibration

Base Calibration	Measured	Calibrated
WS	WH	Ratio
Background	211	1047
Reference 1	22522	59630
Reference 2	6778	25021

Field Check at Base

210.9 1046.6

Field Check

213.0 1042.2

Density Constants MPD-B 64

Last Edited on 27-MAR-2013,10:27

Density Source Id	18235B	
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	1.11	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 (ft)	
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	

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Grand Mesa Brooks #1-18\Brooks #1-18.dta

CBH-C, Cablehead, 11 pin
CBH-C 234 LG: 2.40 ft WT: 24.3 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 34 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

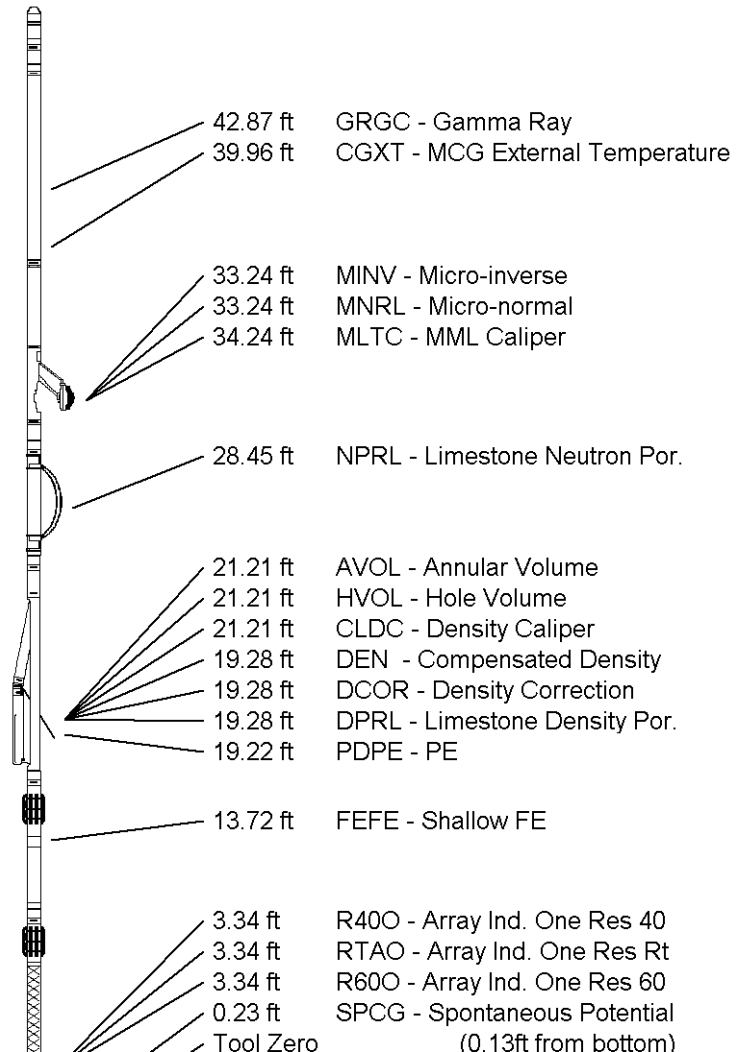
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

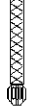
Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

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: 50.55 ft Weight: 407.9 lb





-0.13 ft SMTU - DST Uphole Tension
 All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	BROOKS #1-18
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	UNITED STATES / KANSAS

Elevation Kelly Bushing	2669.00	feet	First Reading	4553.00	feet
Elevation Drill Floor	2664.00	feet	Depth Driller	4568.00	feet
Elevation Ground Level	2664.00	feet	Depth Logger	4572.00	feet



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COMPACT PHOTO DENSITY
 COMPENSATED NEUTRON
 MICRORESISTIVITY LOG