



Weatherford[®]

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY GRAND MESA OPERATING COMPANY

WELL J A NOVA #2-27

FIELD WILDCAT

PROVINCE/COUNTY LOGAN

COUNTRY/STATE U.S.A. / KANSAS

LOCATION 2420' FNL & 753 FEL

SEC 27 TWP 12S RGE 32W Other Services MA/IMFE

API Number 15-109-21183

Permit Number

Permanent Datum G.L., Elevation 3015 feet

Log Measured From KB Elevations: KB 3024.00

Drilling Measured From K.B. @ 9 FEET DF 3023.00

Date 30-MAY-2013 GL 3015.00

Run Number ONE

Service Order 3539060

Depth Driller 4715.00 feet

Depth Logger 4710.00 feet

First Reading 4688.00 feet

Last Reading 3600.00 feet

Casing Driller 216.00 feet

Casing Logger 216.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.50 lb/USg 54.00 CP

PH / Fluid Loss 9.50 8.80 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 1.52 @ 85.0 ohm-m

Rmf @ Measured Temp 1.22 @ 85.0 ohm-m

Rmc @ Measured Temp 1.82 @ 85.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 1.08 @ 120.0 ohm-m

Time Since Circulation 4 HOURS

Max Recorded Temp 120.00 deg F

Equipment / Base 13057 LIB

Recorded By W STAMBAUGH

Witnessed By JOHN GOLDSMITH

JOB # LB13-157

BOREHOLE RECORD

Last Edited: 30-MAY-2013 23:04

Bit Size inches	Depth From feet	Depth To feet
7.875	216.00	4710.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	216.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- RUN 1: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL ECCENTRALISER USED ON MDN
 - 0.5 INCH STANDOFF USED ON MFE.
 - 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 216 FEET: 1870 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3750 FEET: 1130 CU. FT.
- RIG: DUKE DRILLING #4

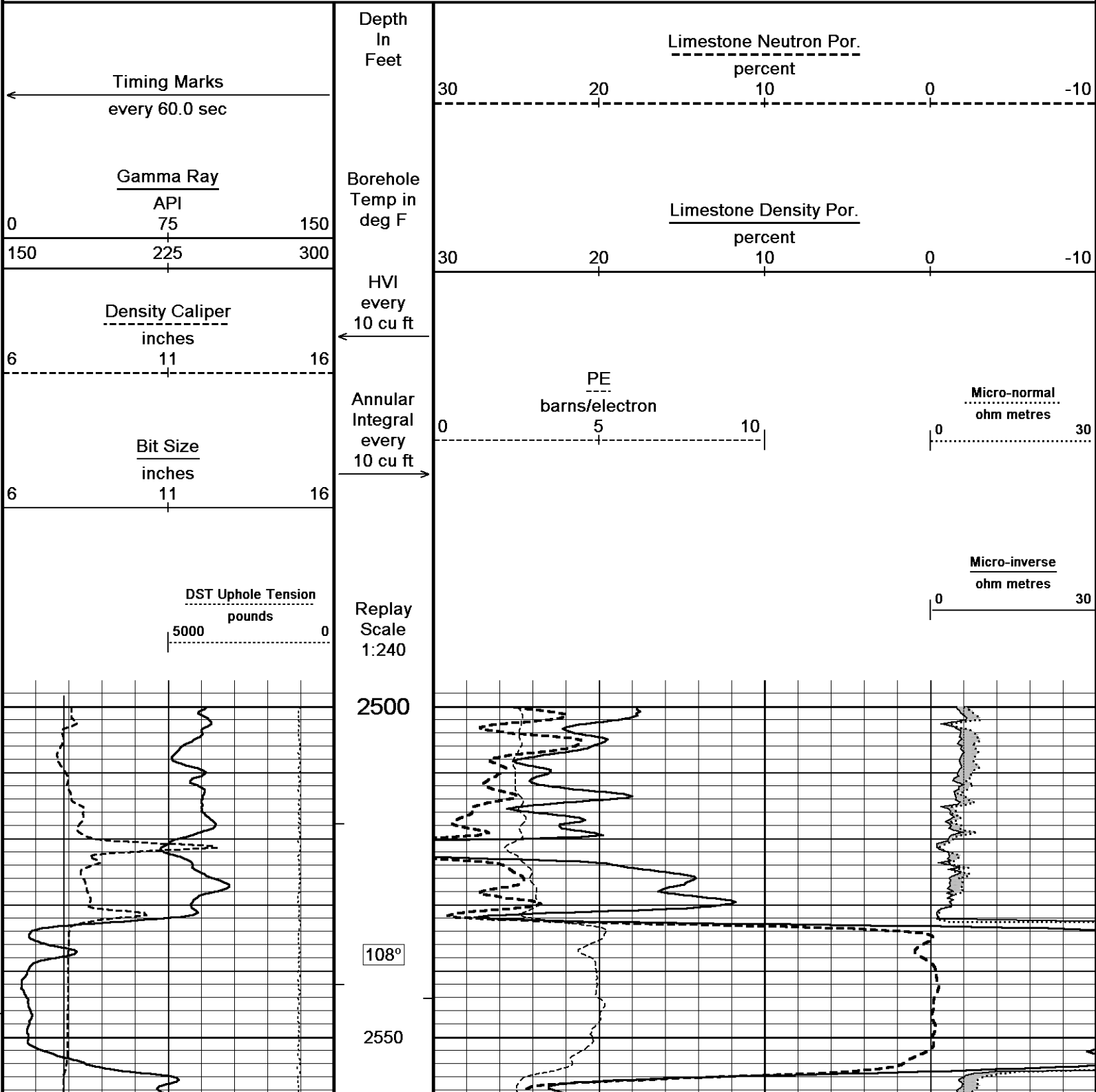
- ENGINEER: WILLIAM STAMBAUGH,

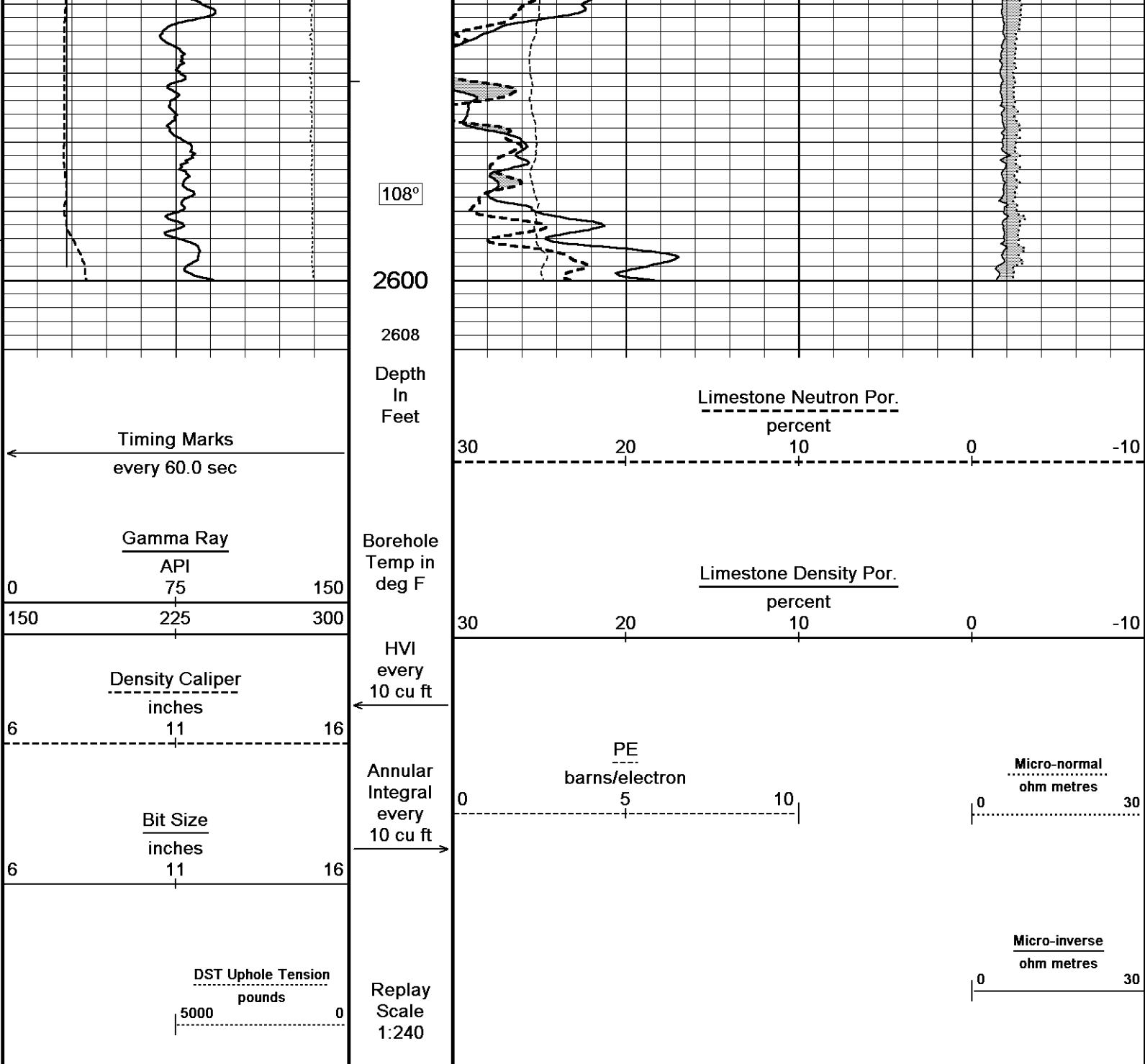
- OPERATOR(S): NICOLAS ADAME, MANUEL HERNANDEZ

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 31-MAY-2013 14:06
Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Janova #2-27\Grand Mesa Janova #2-27_002.dta
Recorded on 30-MAY-2013 19:40
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583



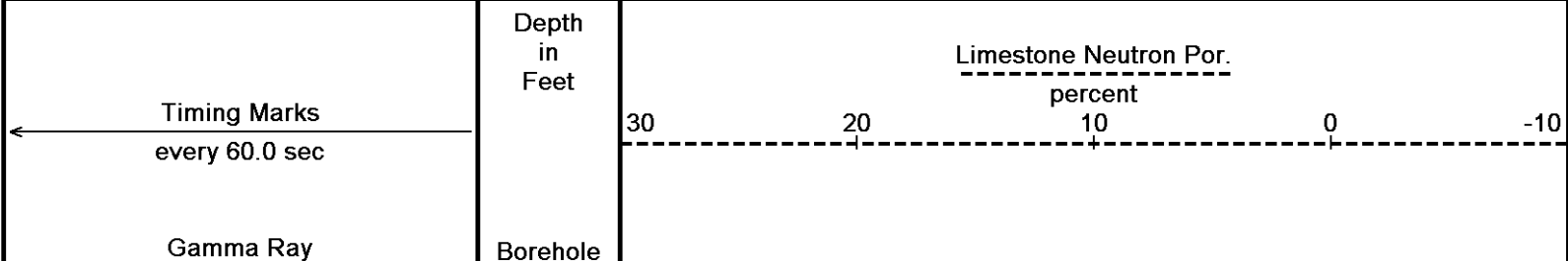


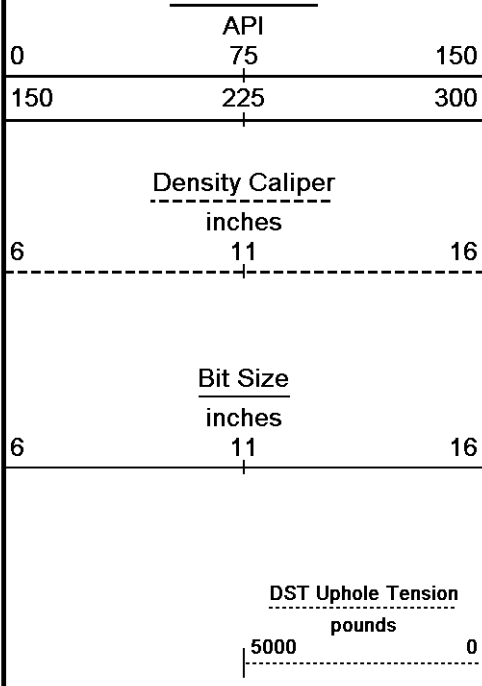
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↑ 5 INCH MAIN ↑

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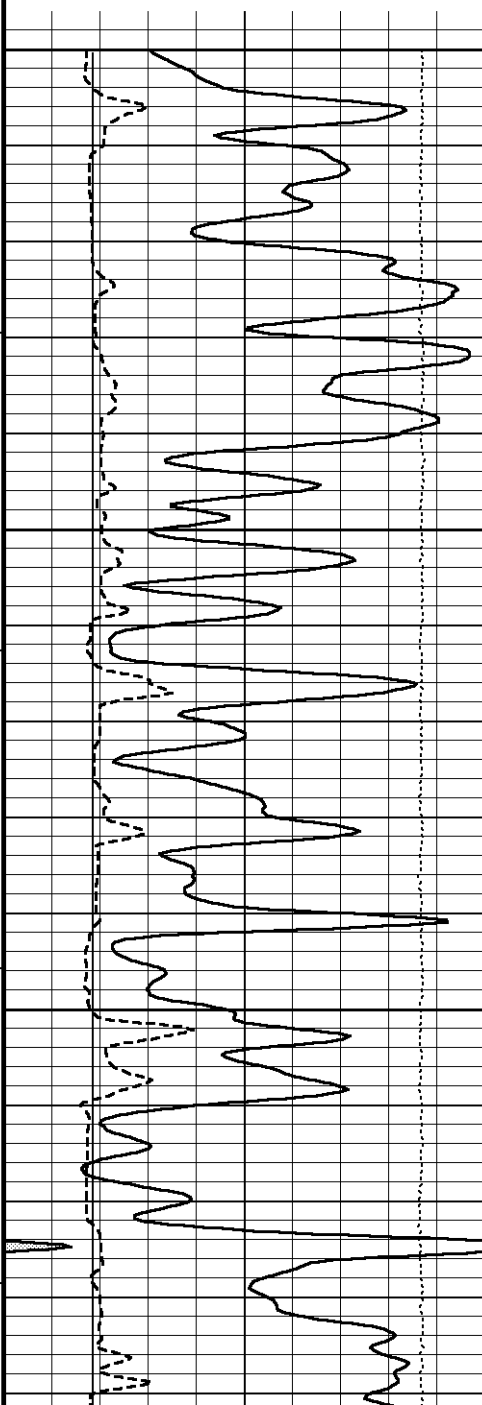
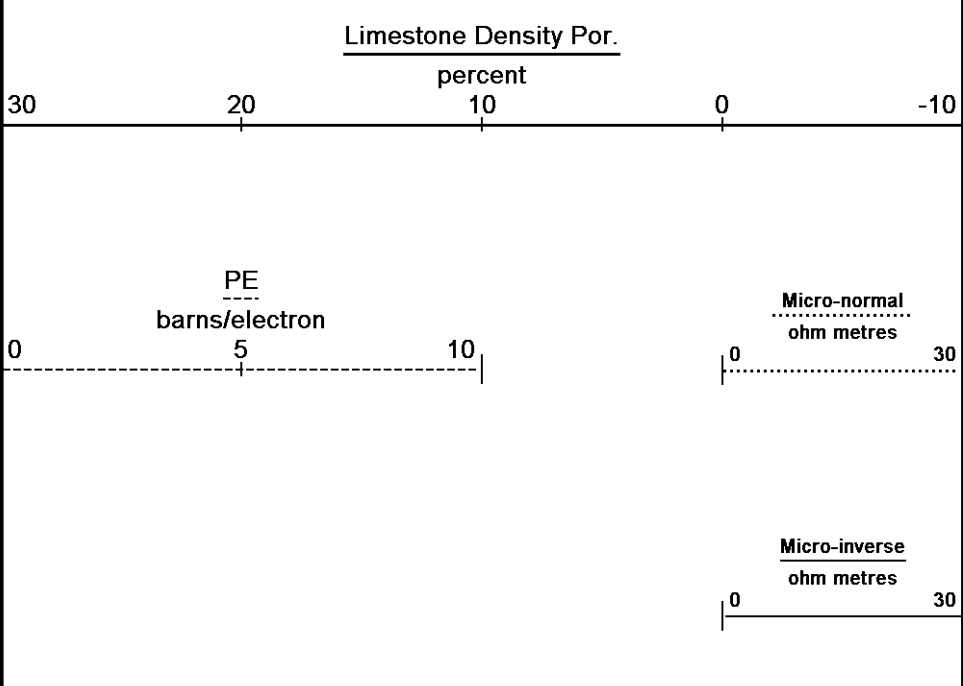


Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240



3600

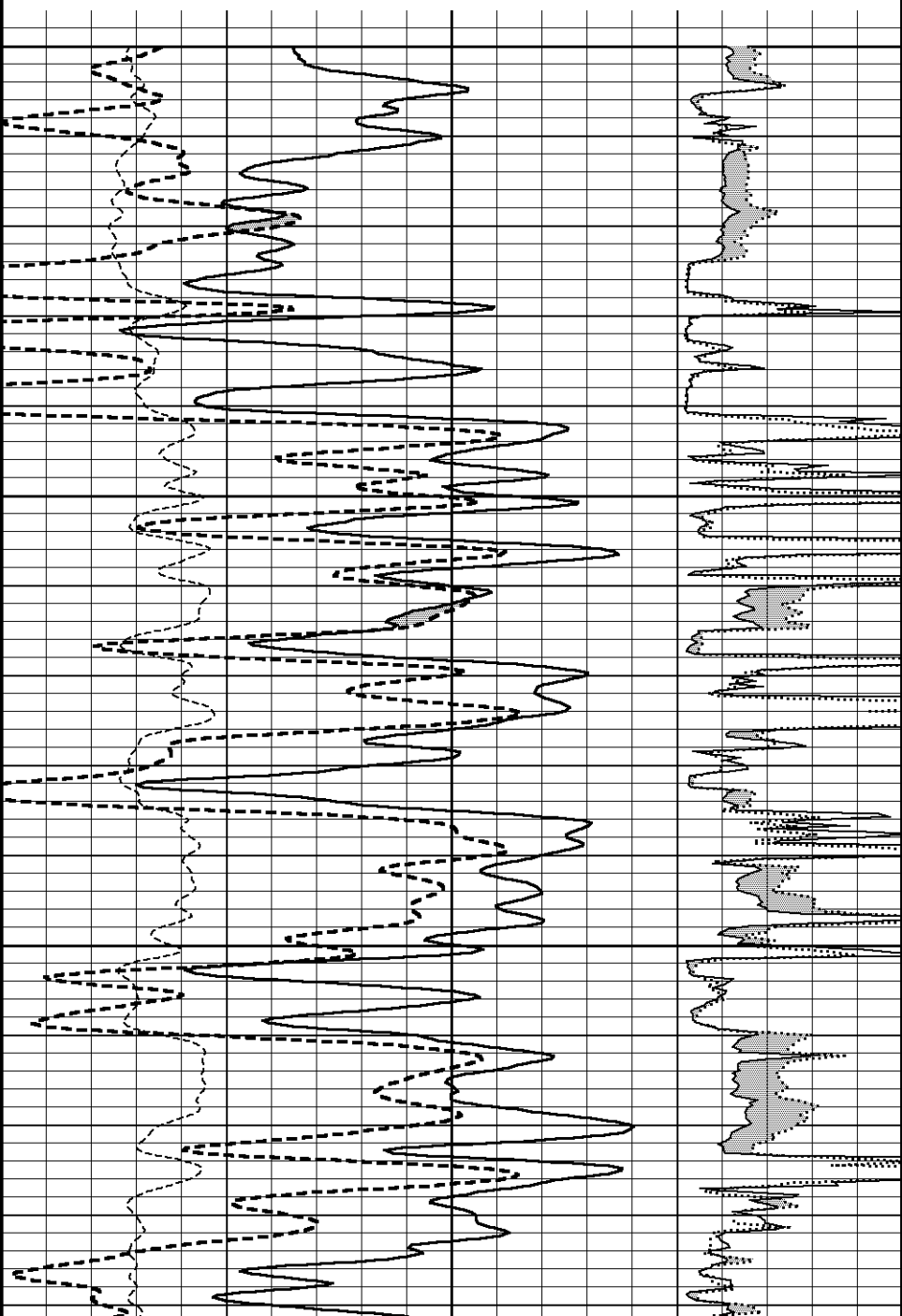
114° 200

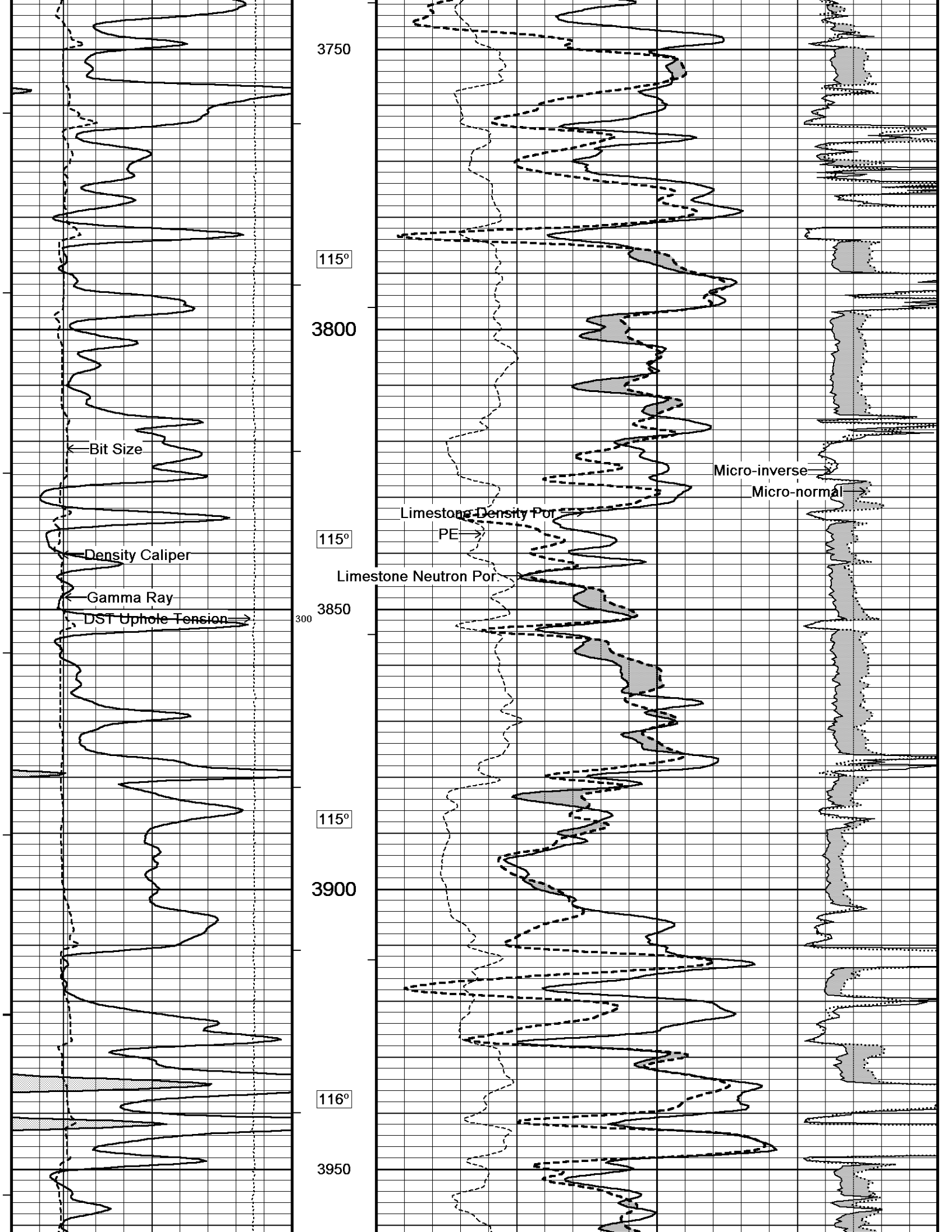
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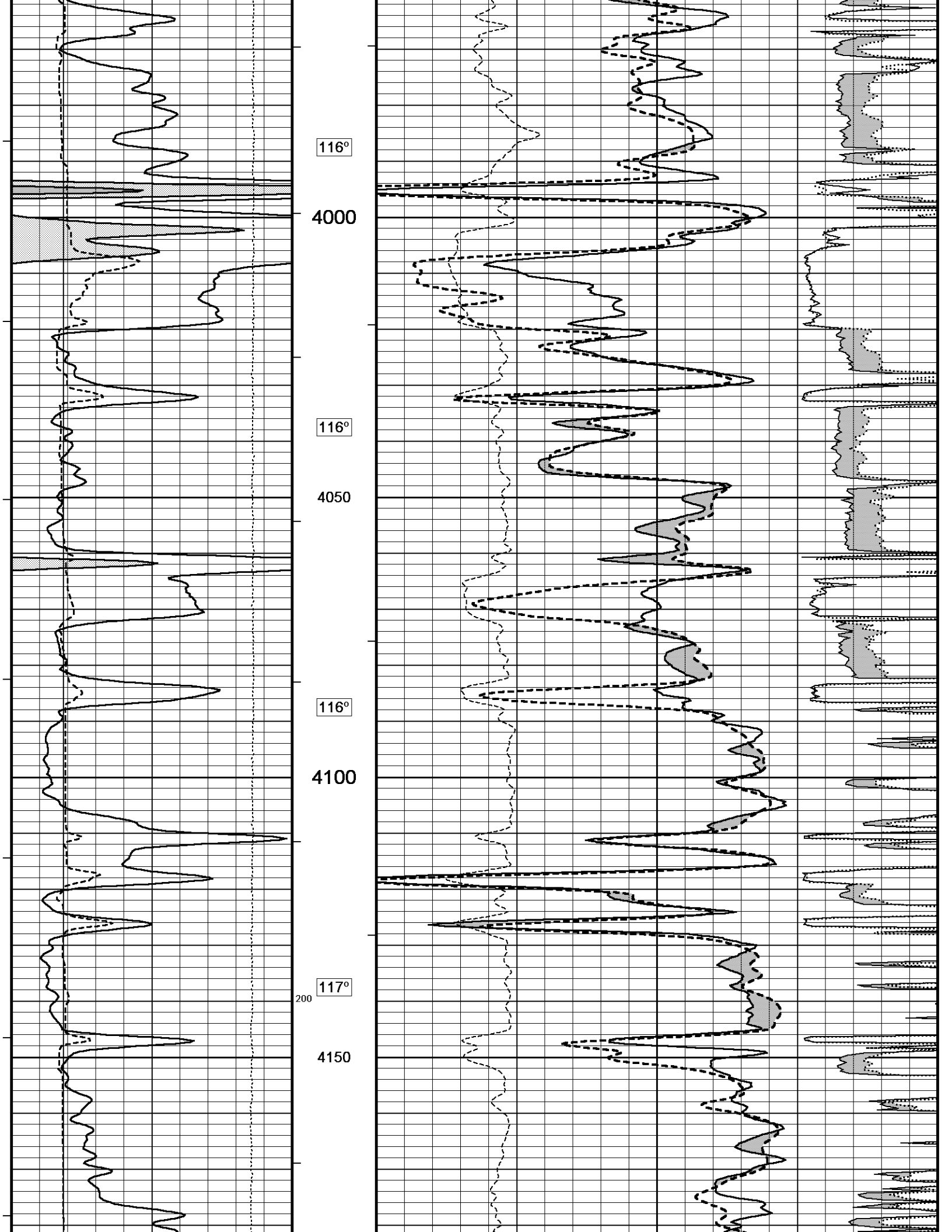
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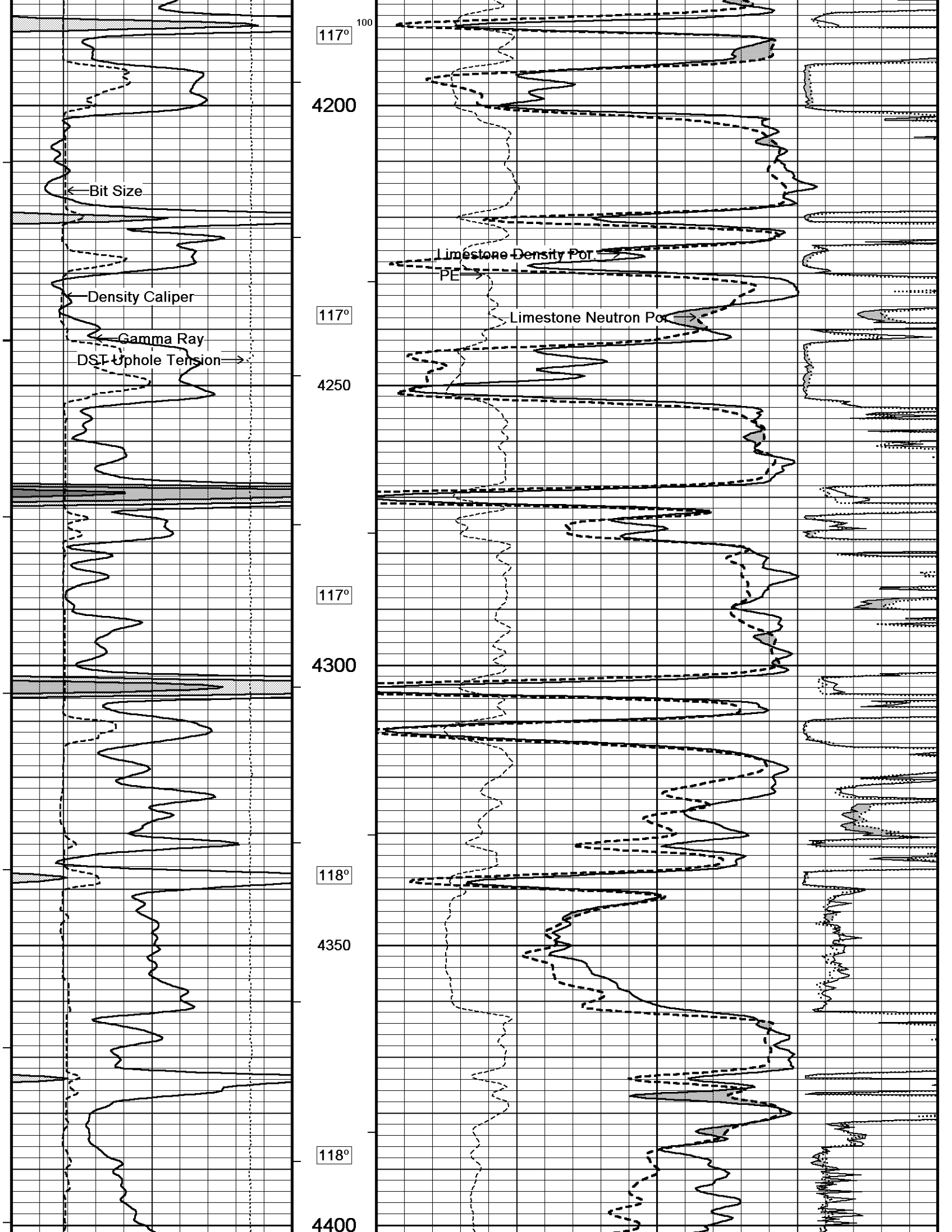
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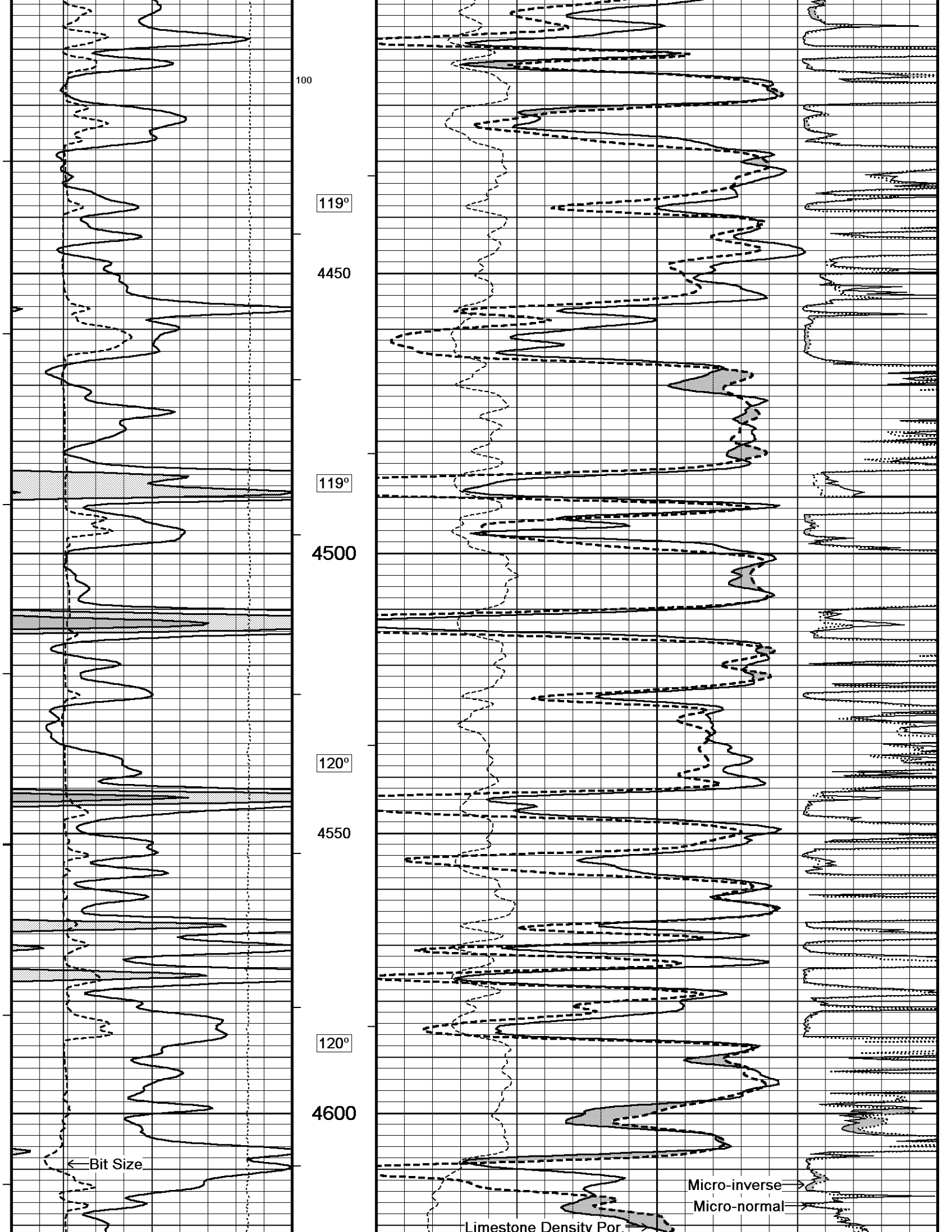
114°











100

119°

4450

119°

4500

120°

4550

120°

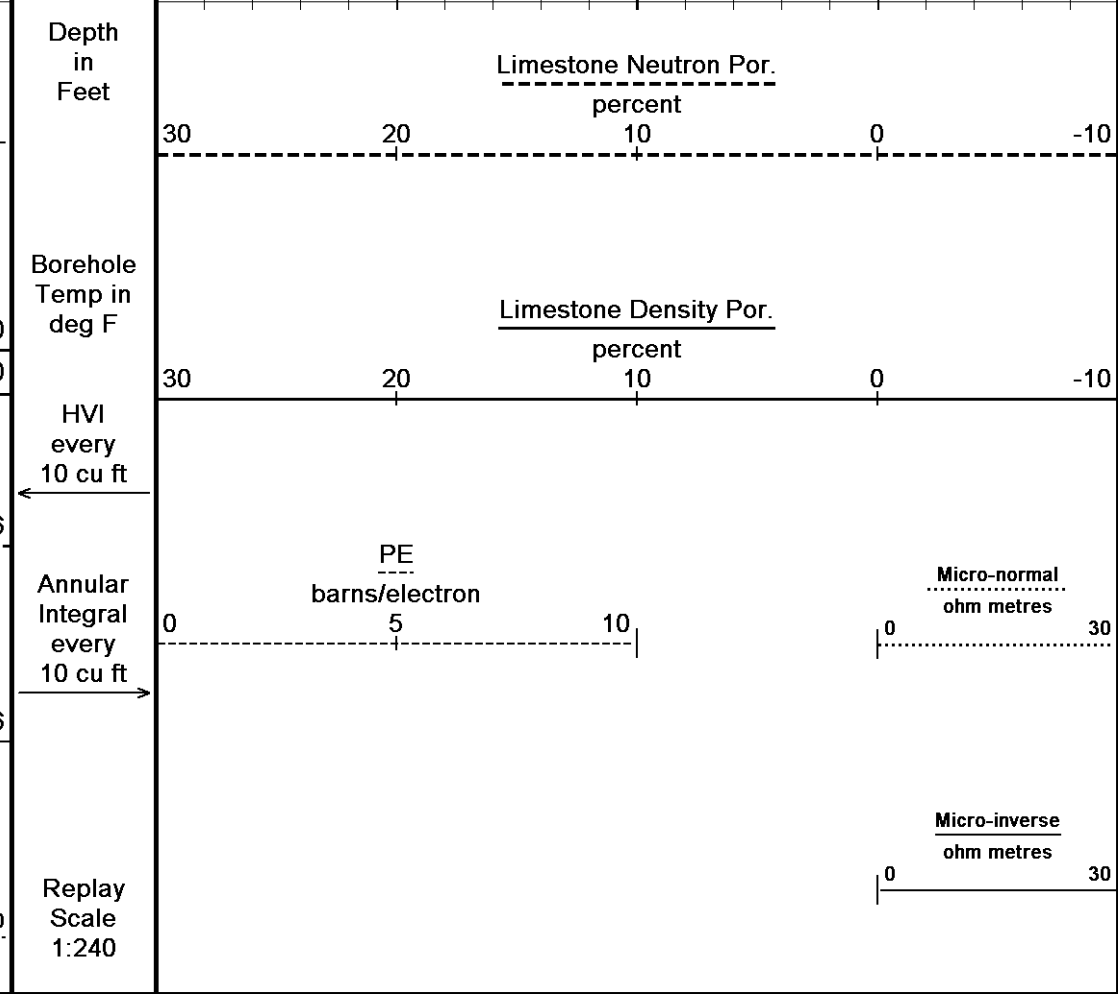
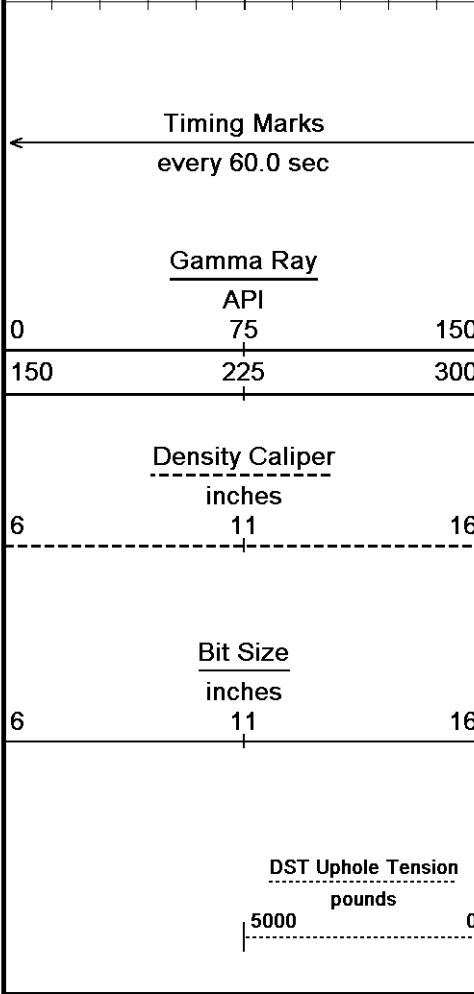
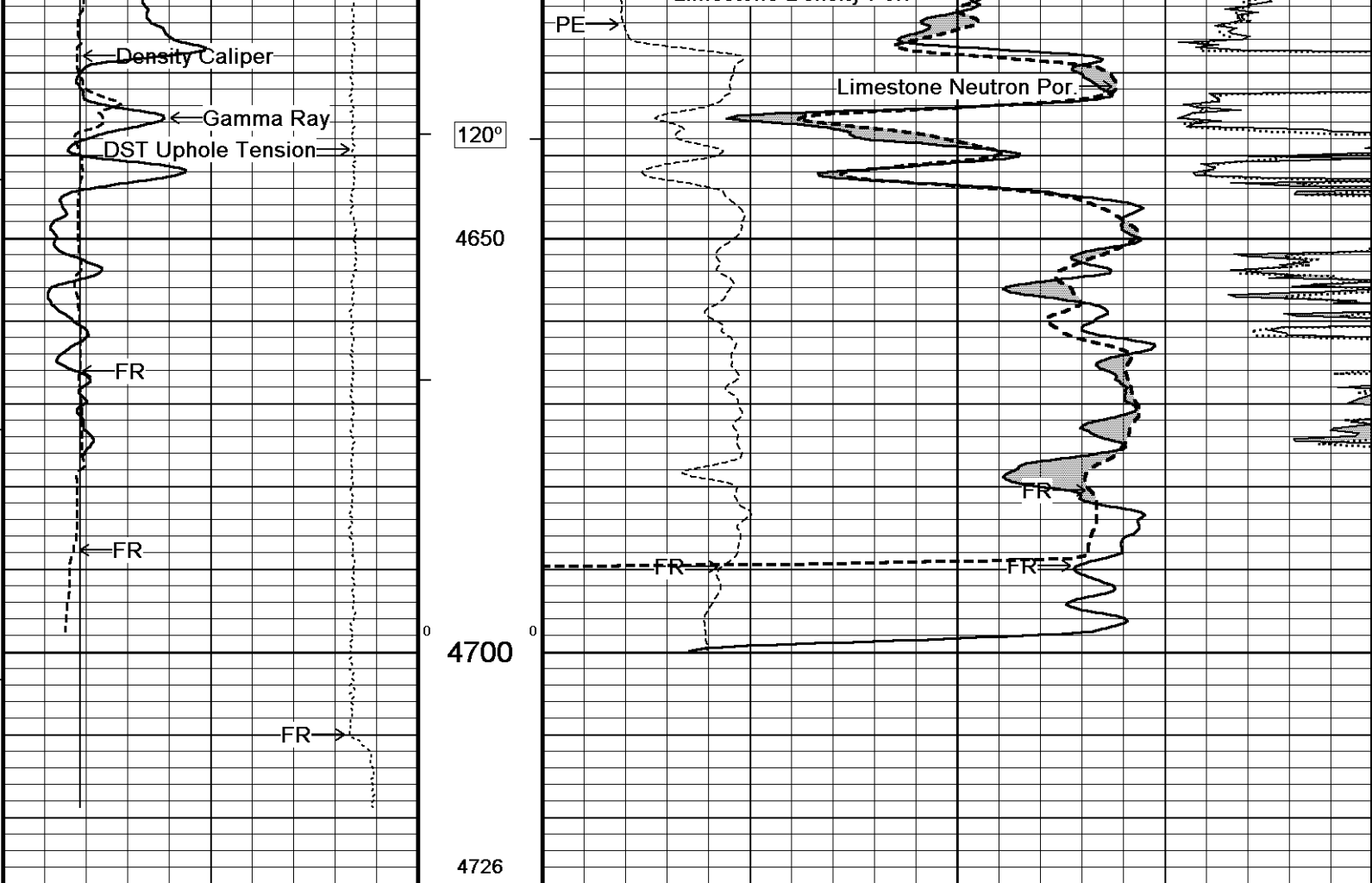
4600

← Bit Size

Micro-inverse →

Micro-normal →

Limestone Density Por.



REPEAT SECTION

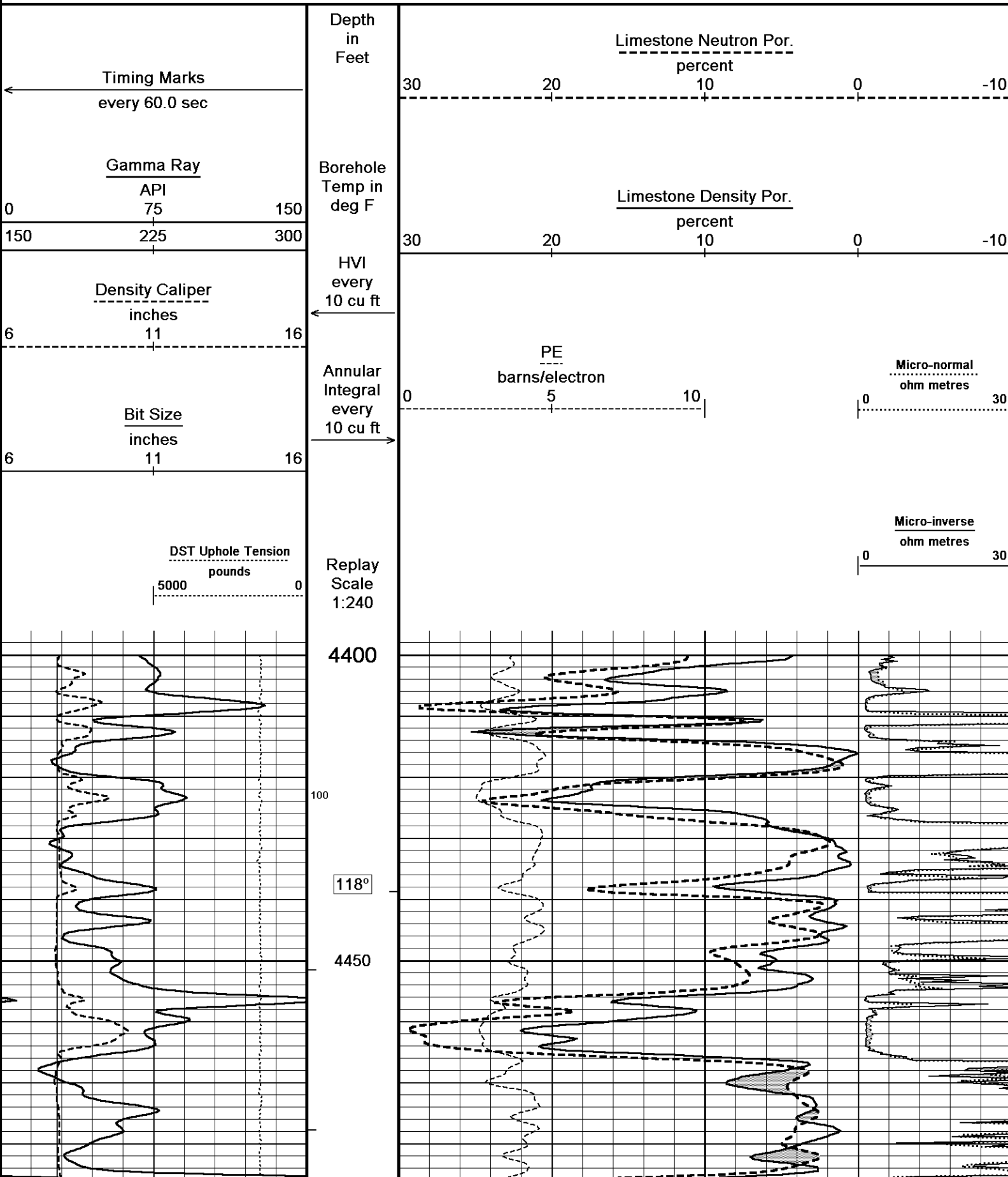
Depth Based Data - Maximum Sampling Increment 10.0cm

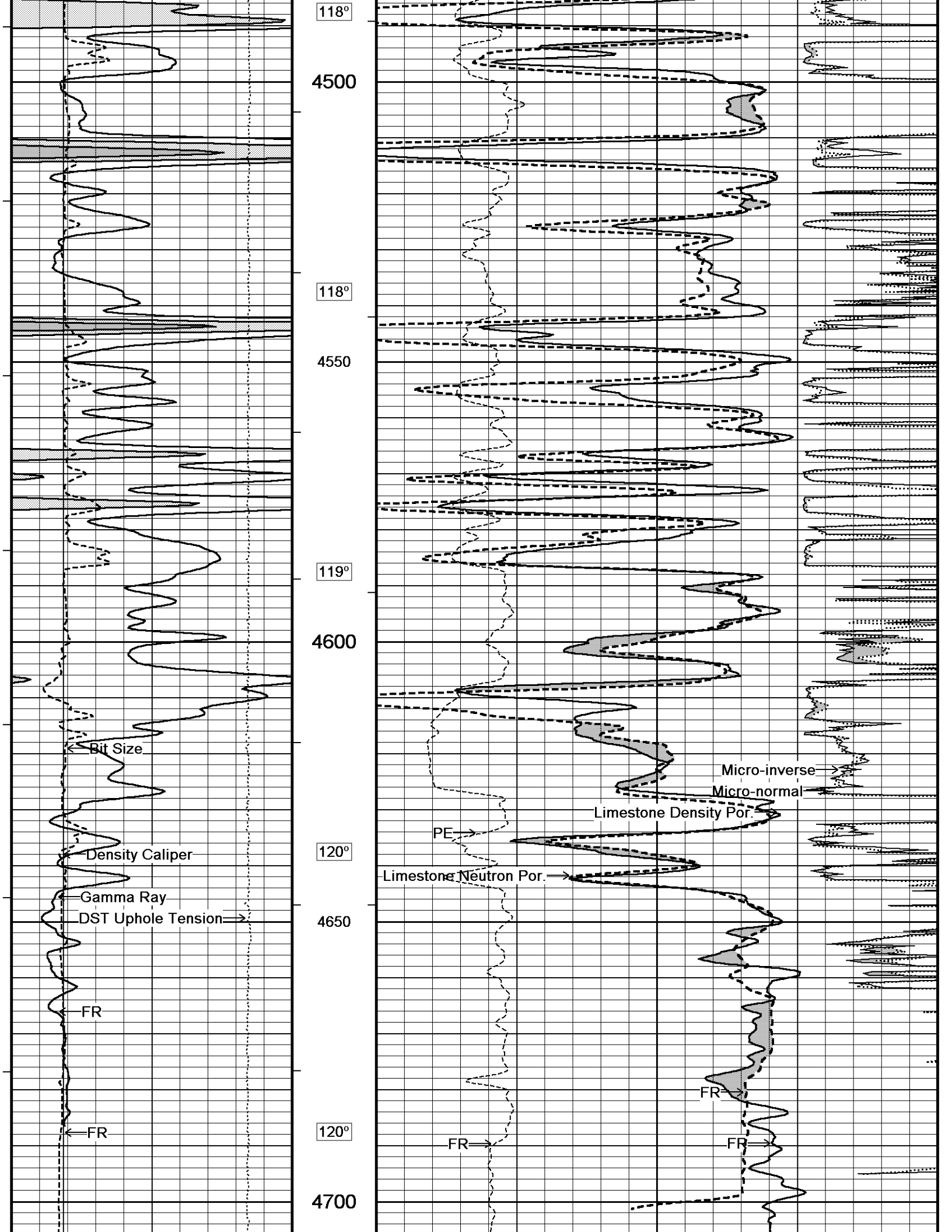
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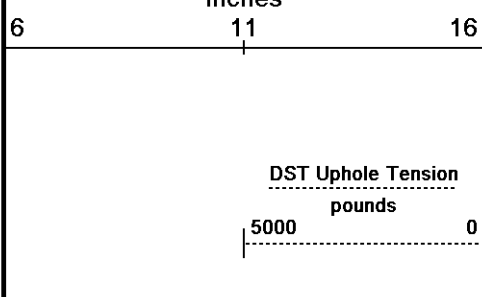
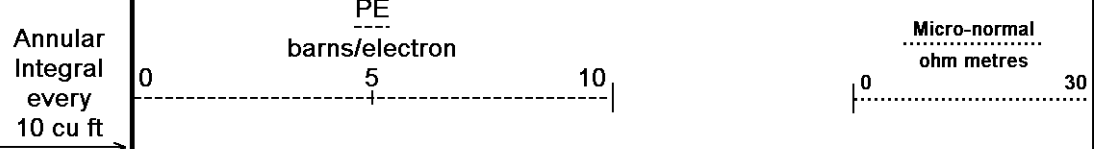
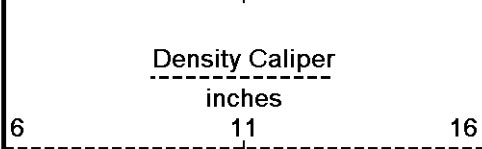
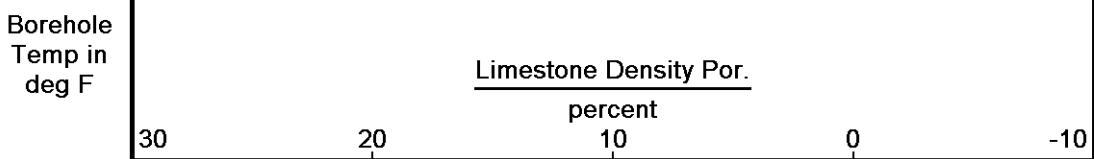
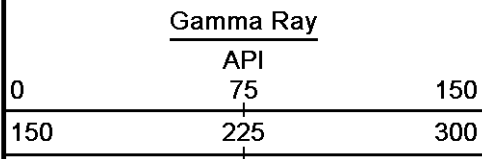
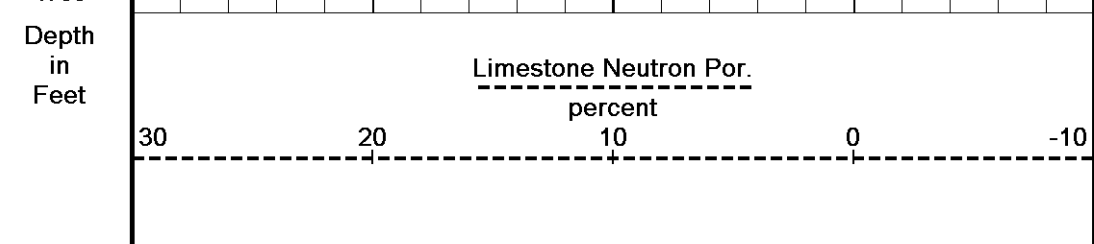
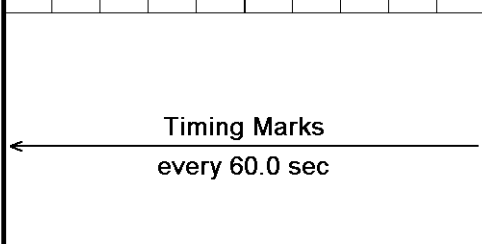
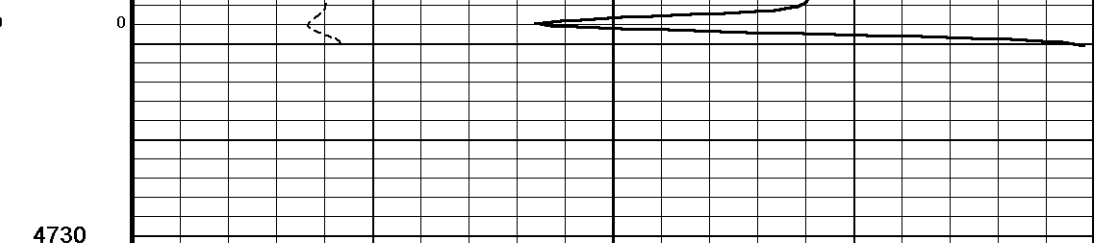
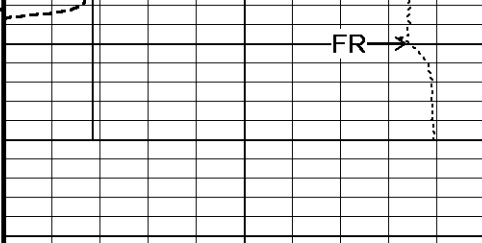
Filename: C:\Minimus 13.05.9583\Logs\Grand Mesa Janova #2-27\Grand Mesa Janova #2-27_001.dta

Recorded on 30-MAY-2013 19:05

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583



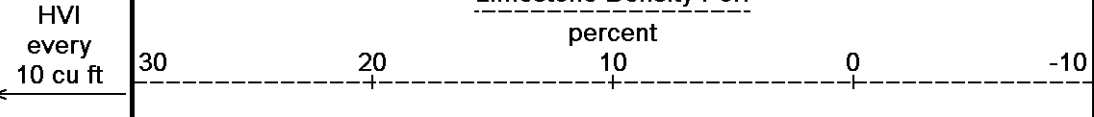
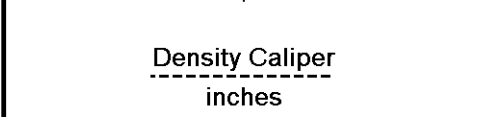
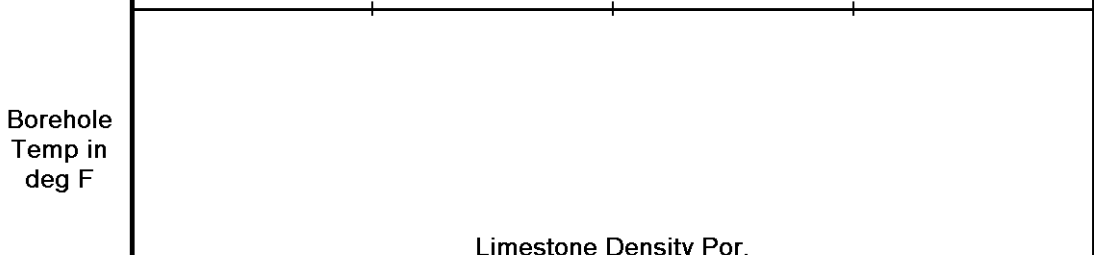
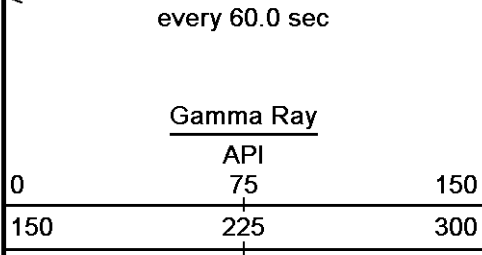
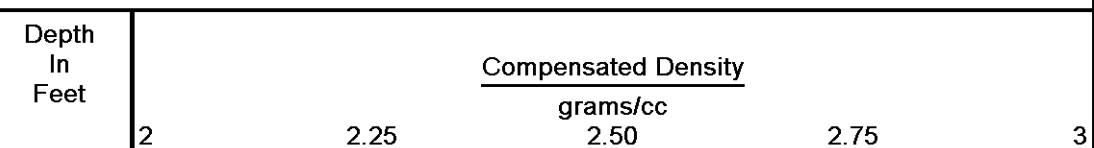
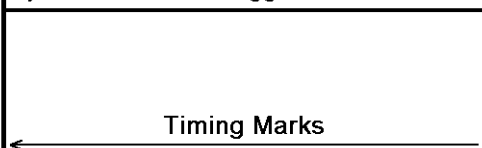


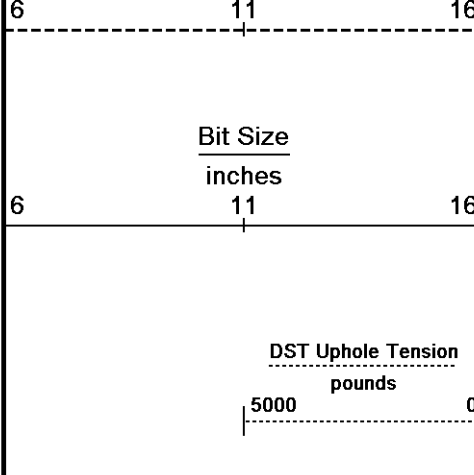


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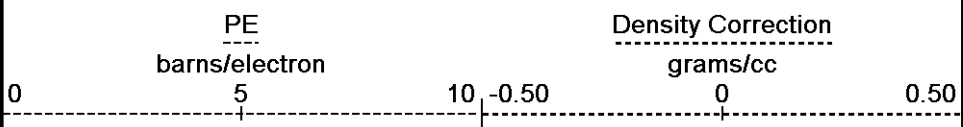
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↓ 5 INCH MAIN ↓
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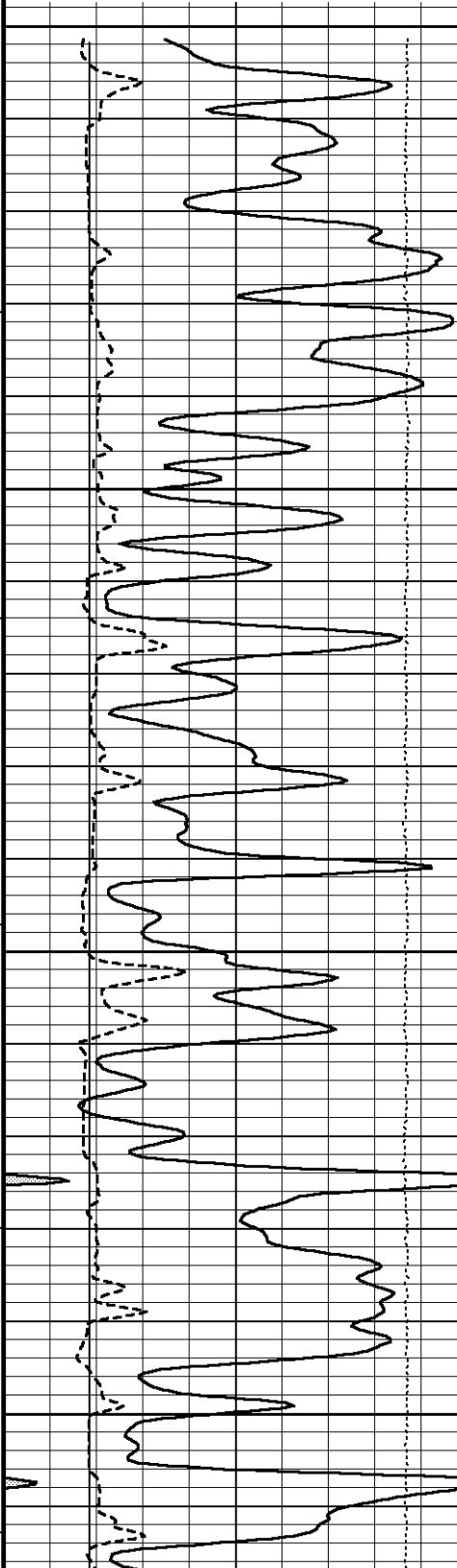




Annular
Integral
every
10 cu ft



Replay
Scale
1:240



3600

114° 200

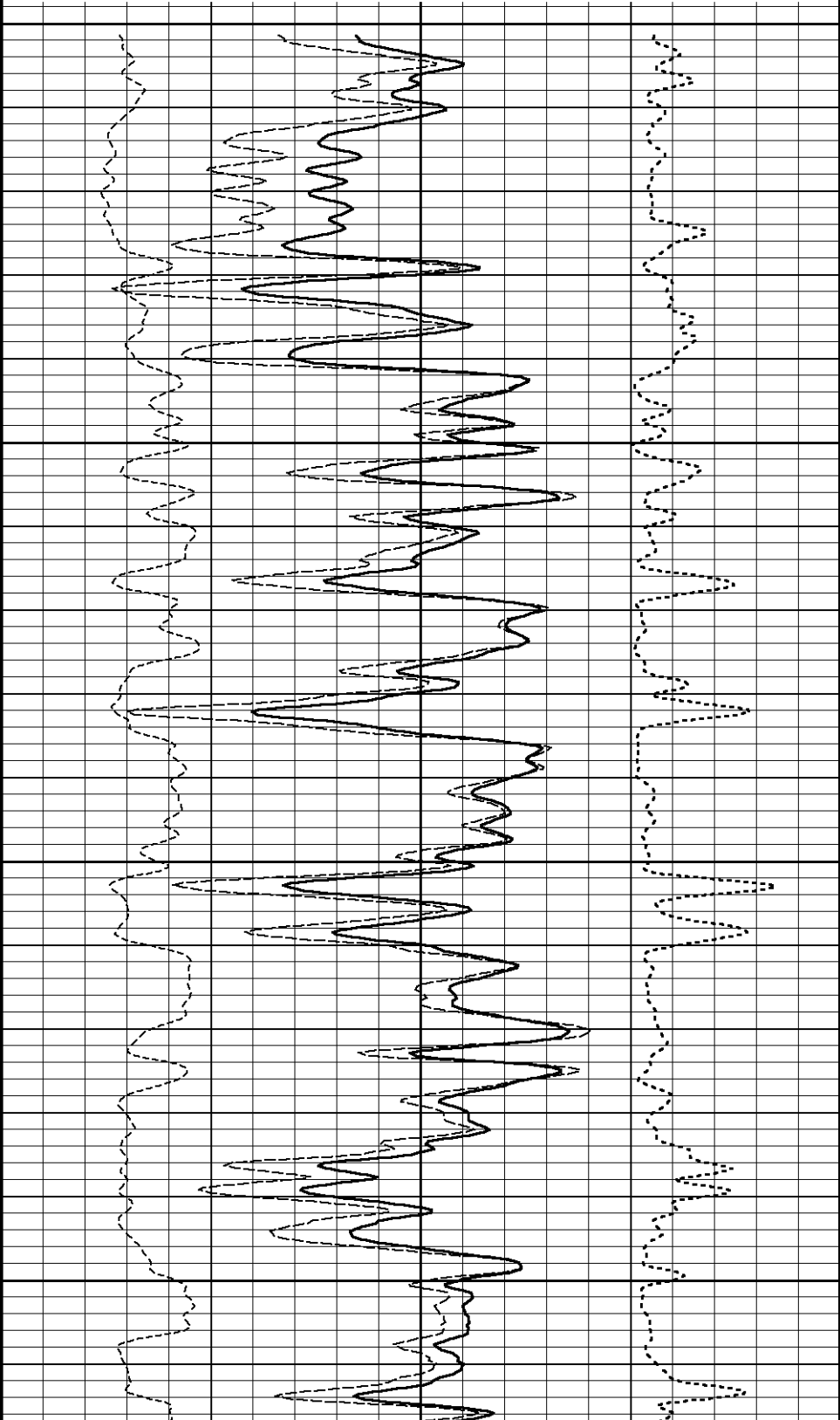
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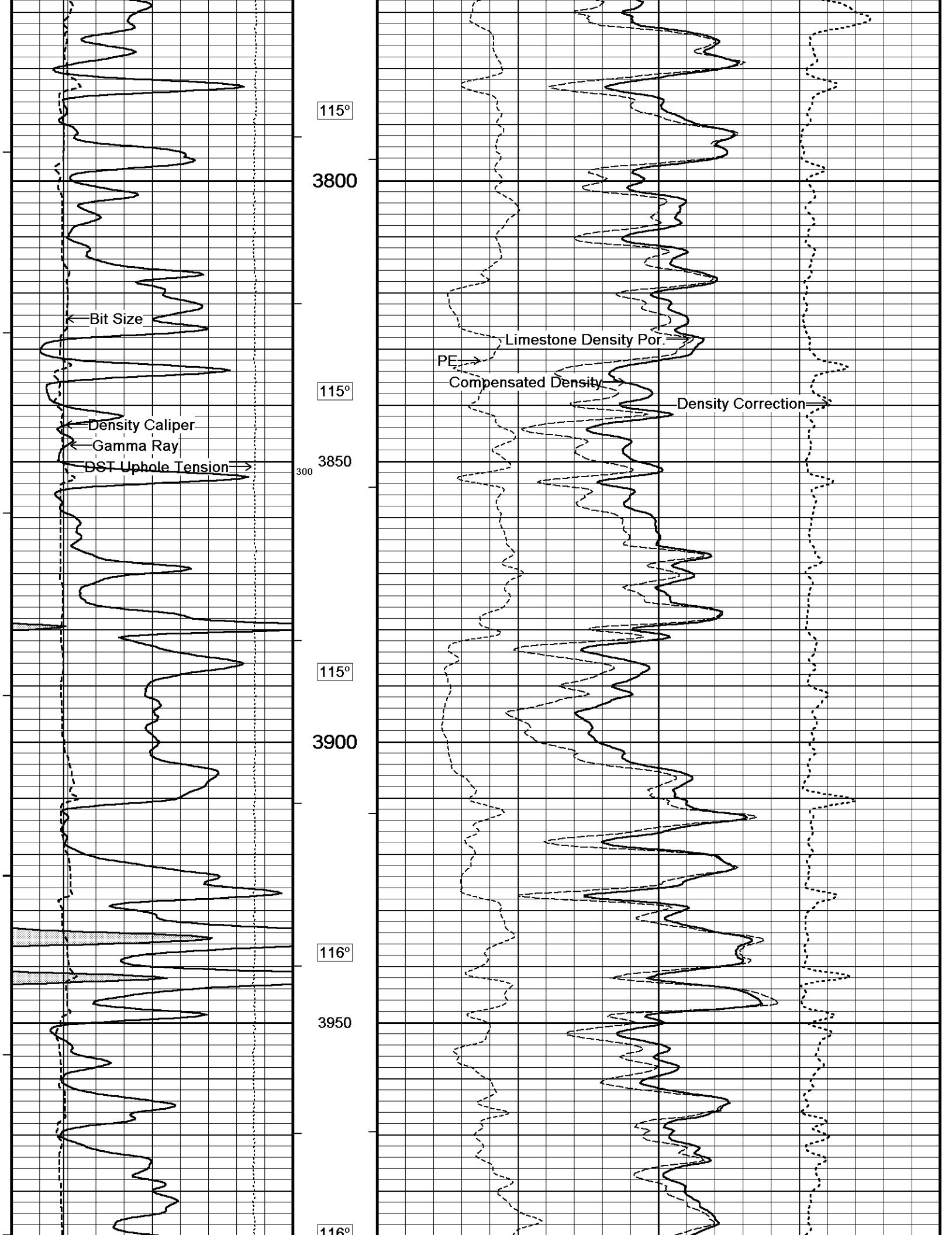
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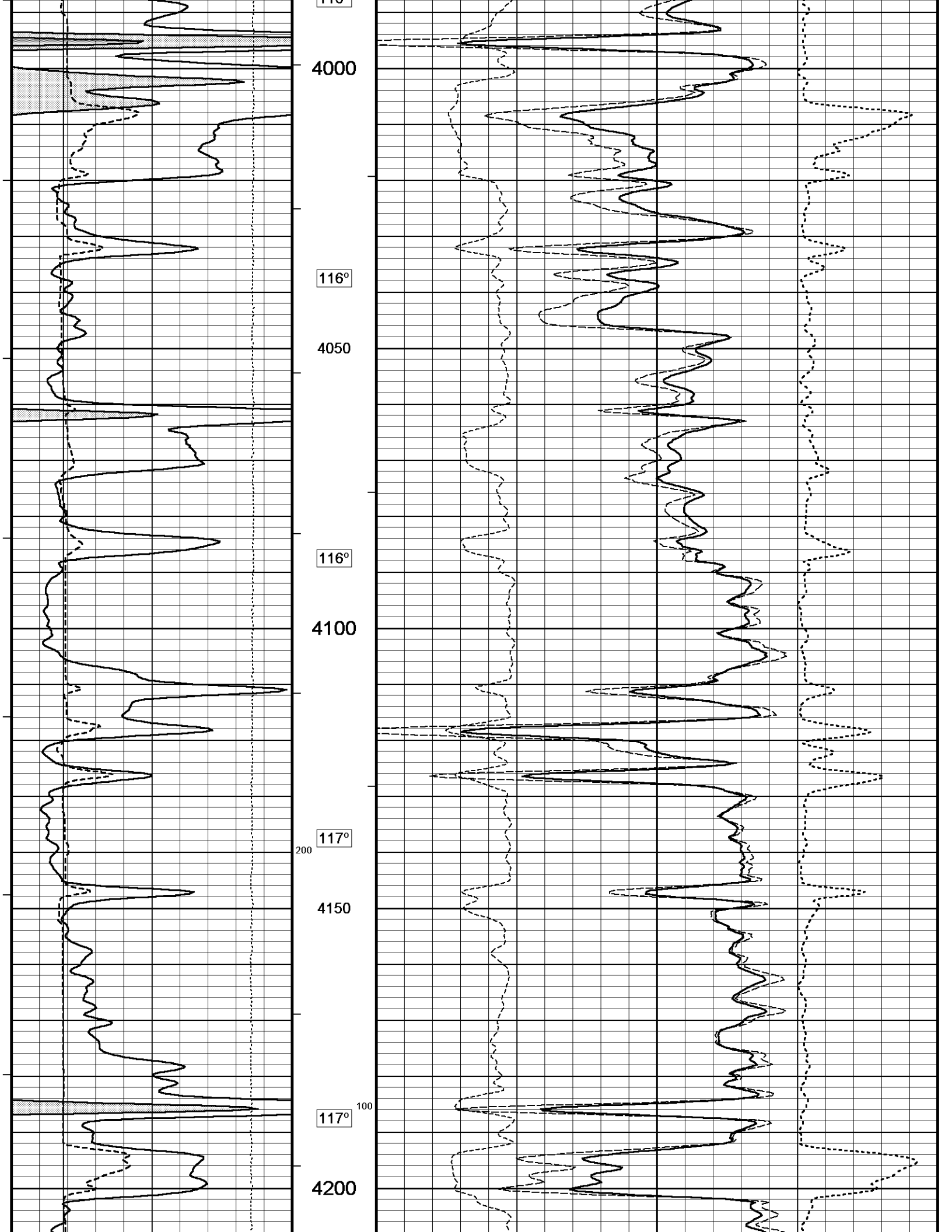
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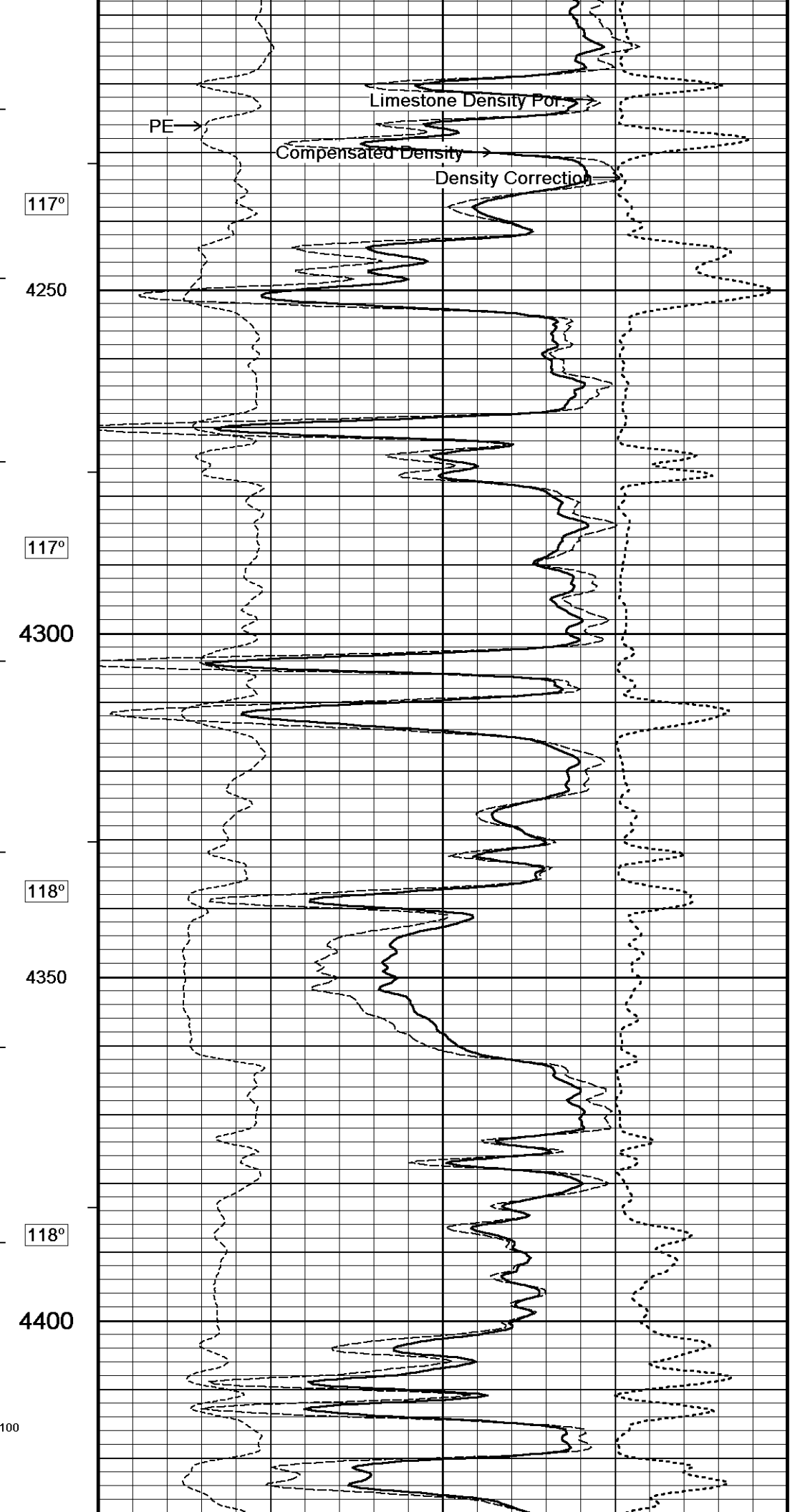
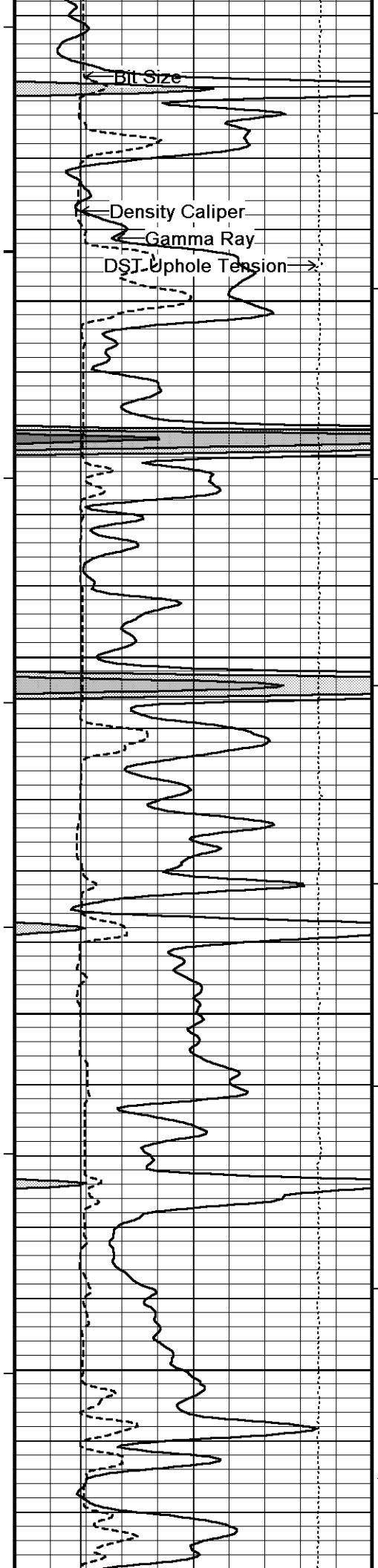
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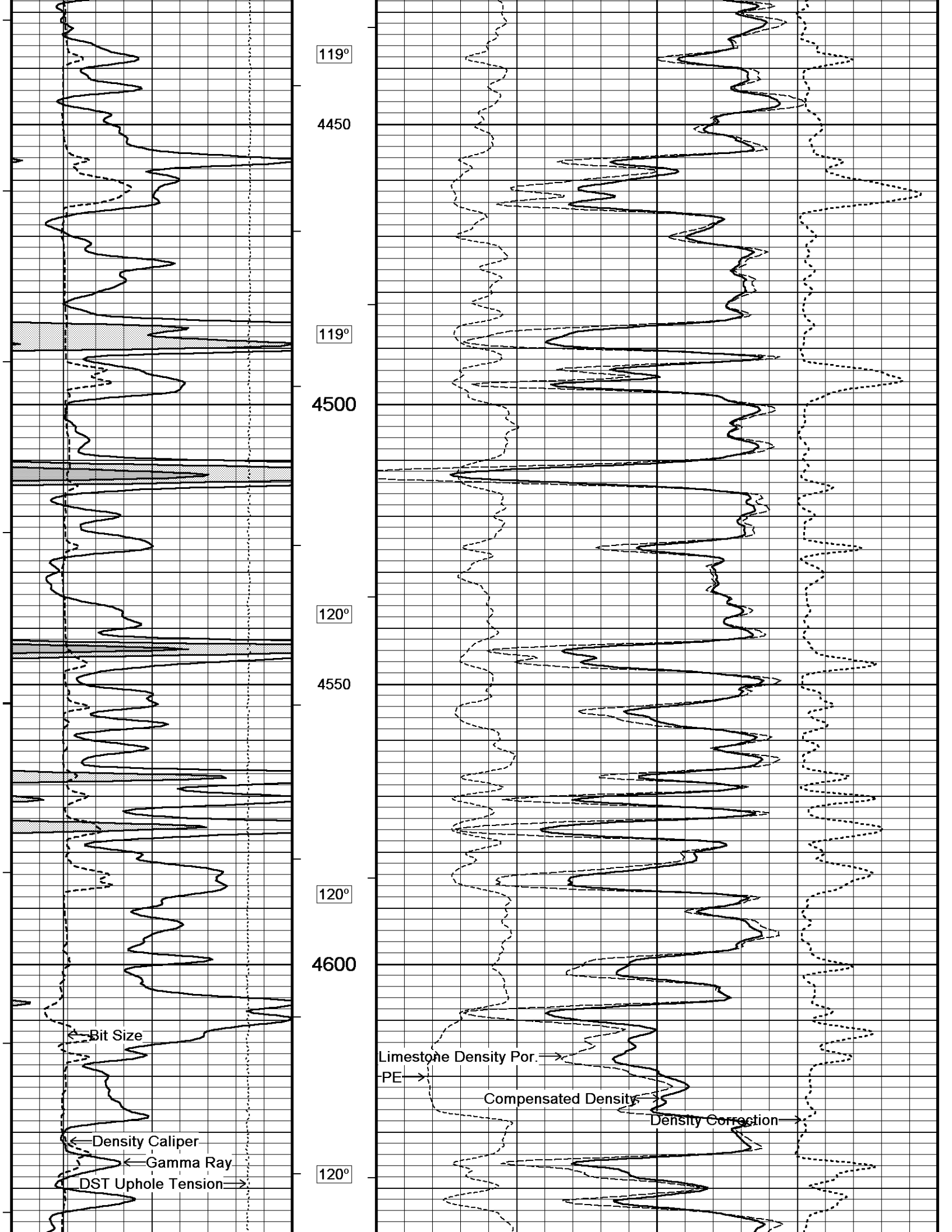
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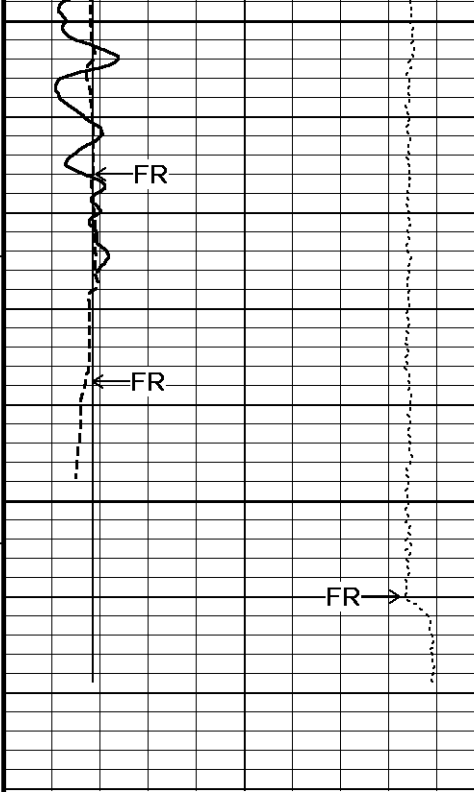




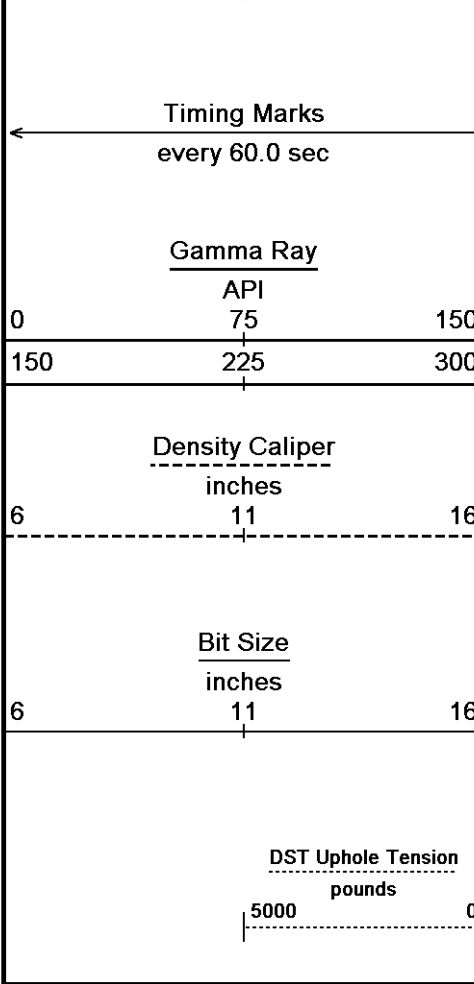
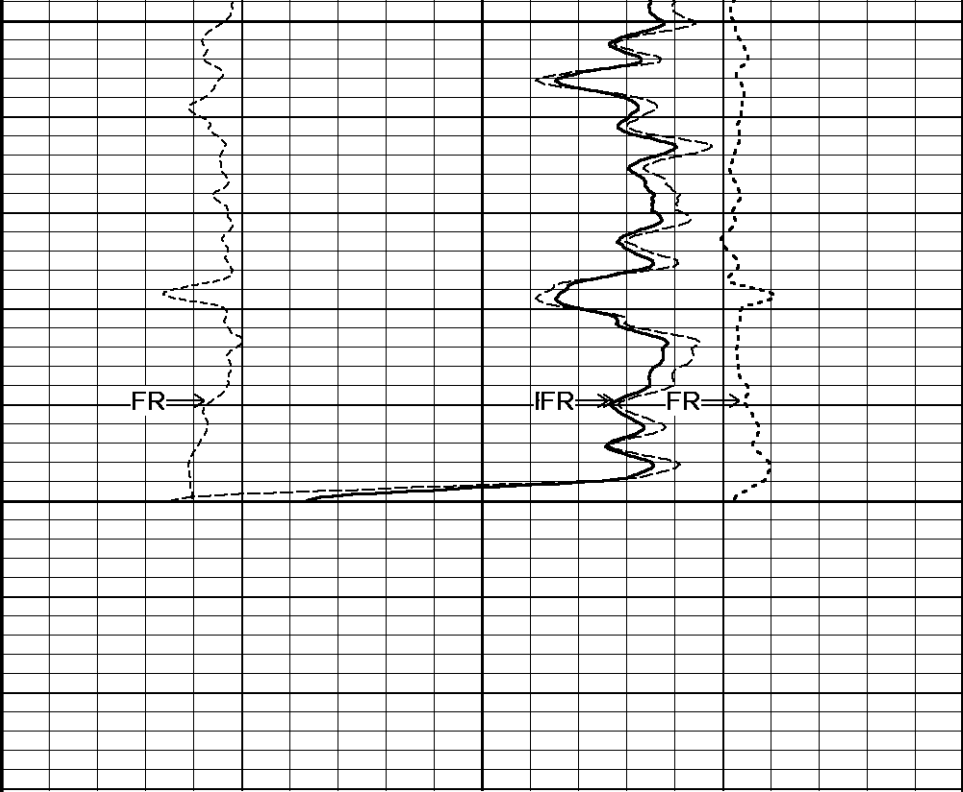




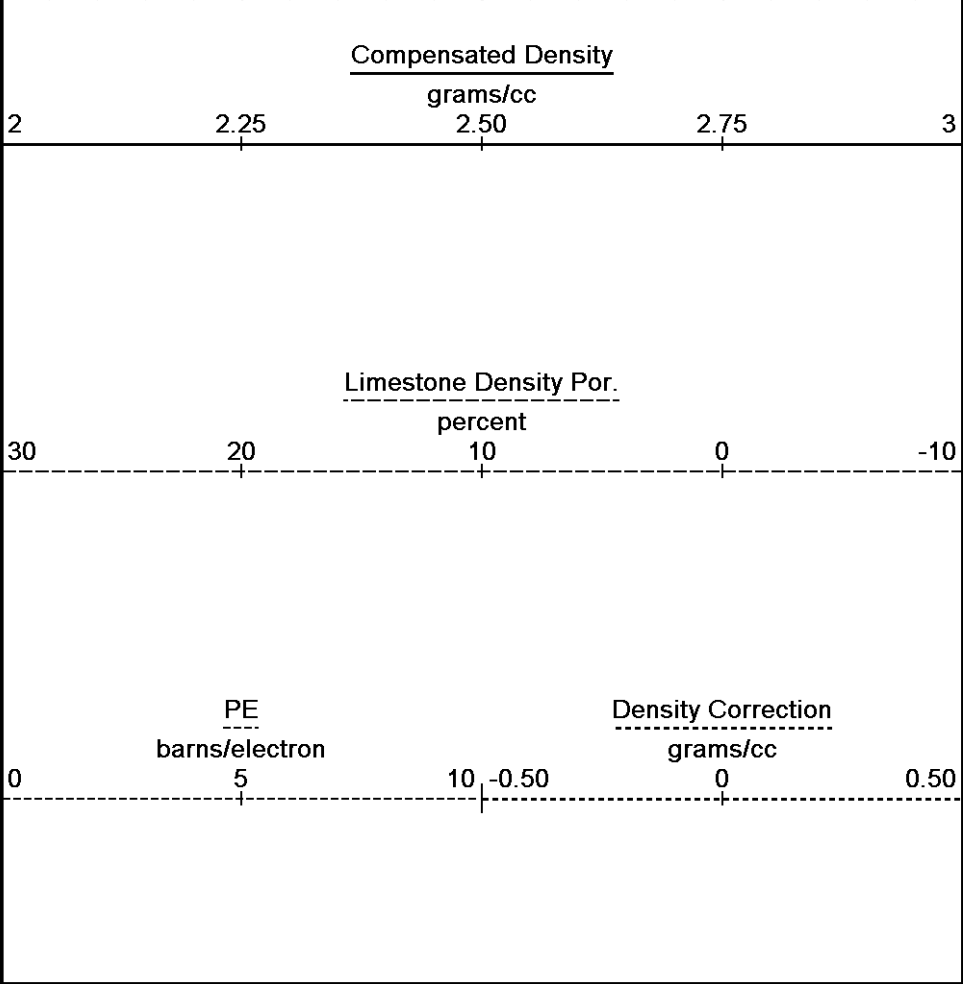




4650
0
4700



4728
Depth In Feet
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
Replay Scale 1:240

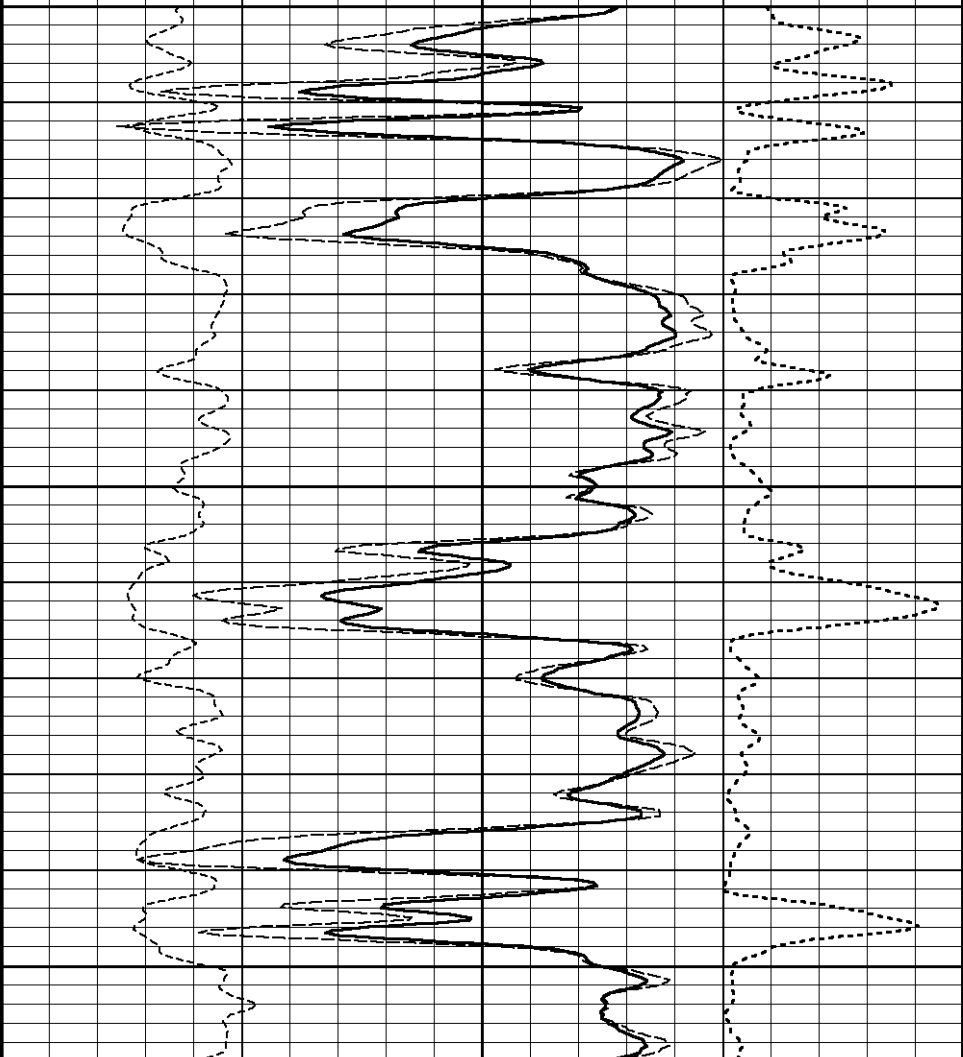
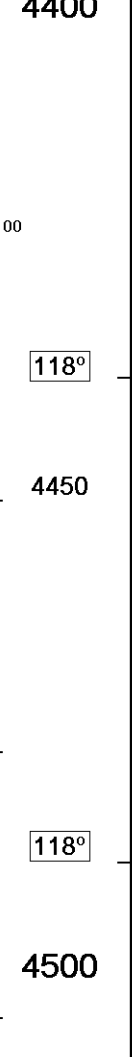
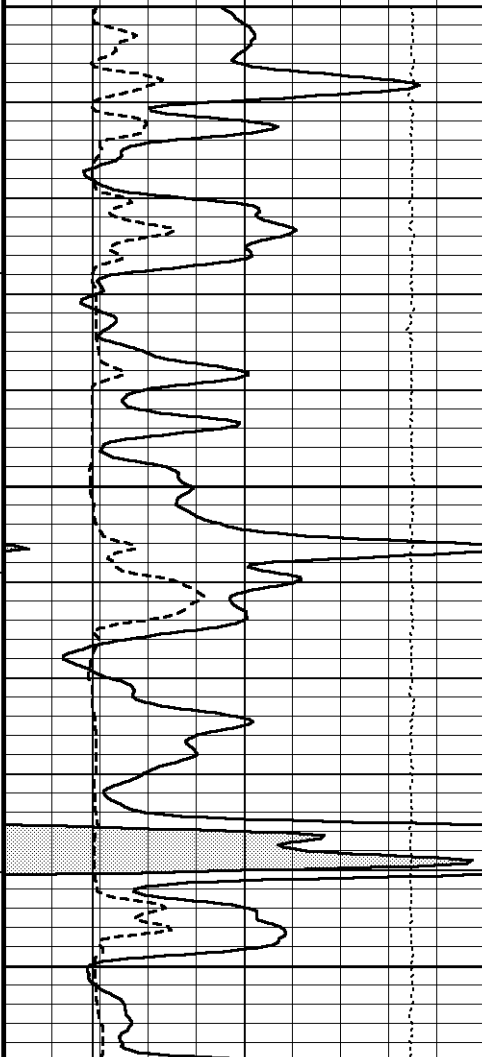
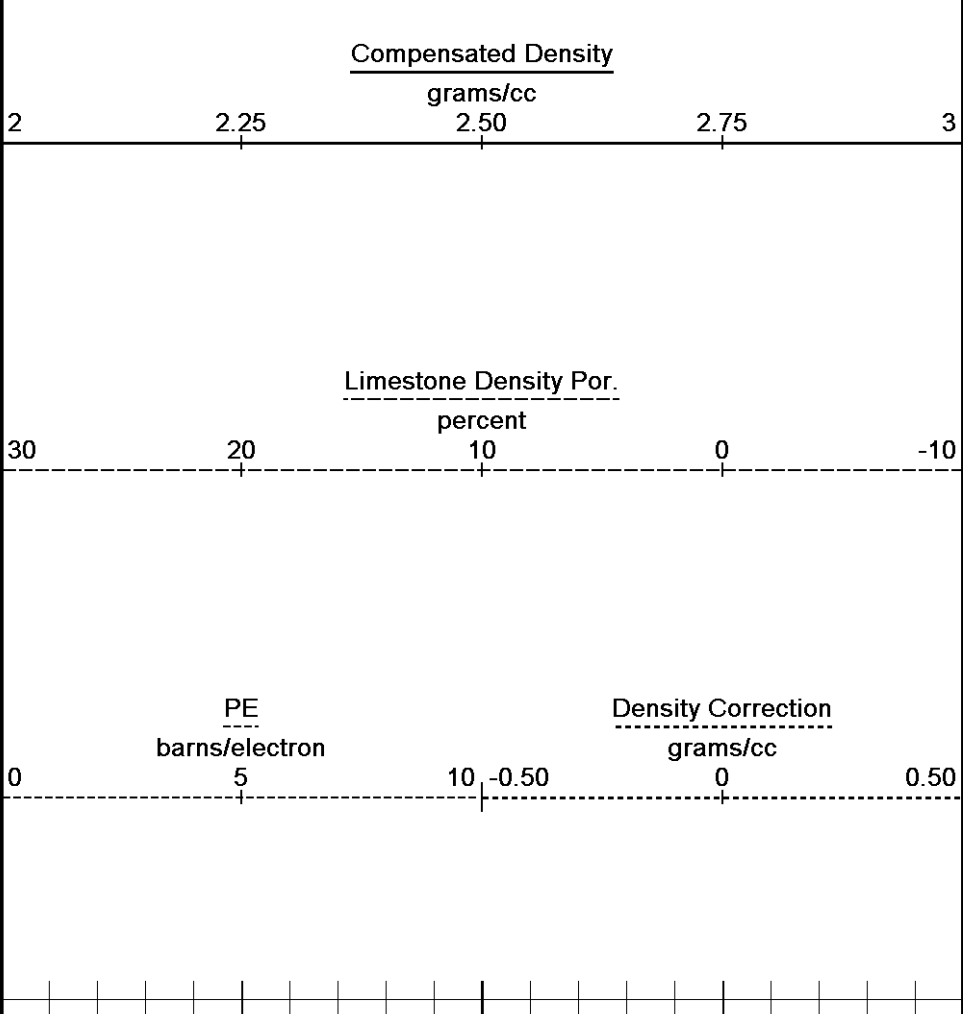
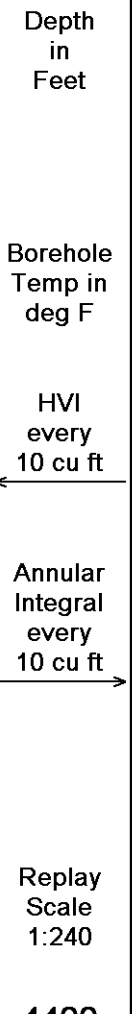
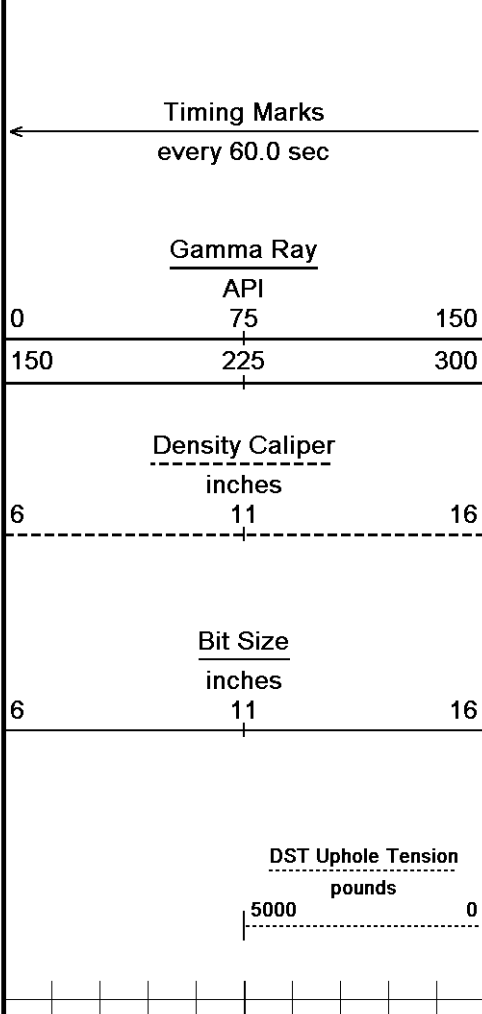


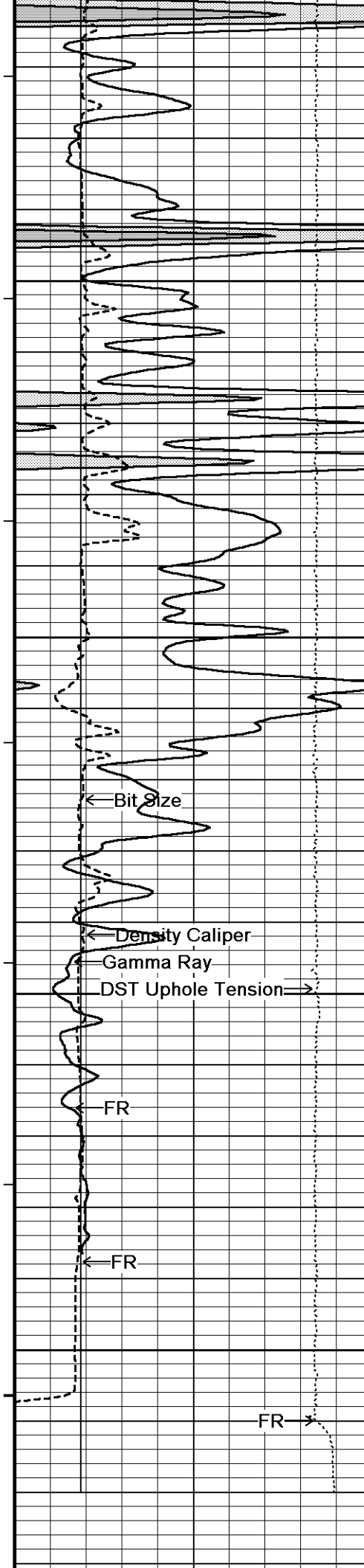
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↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

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118°

4550

119°

4600

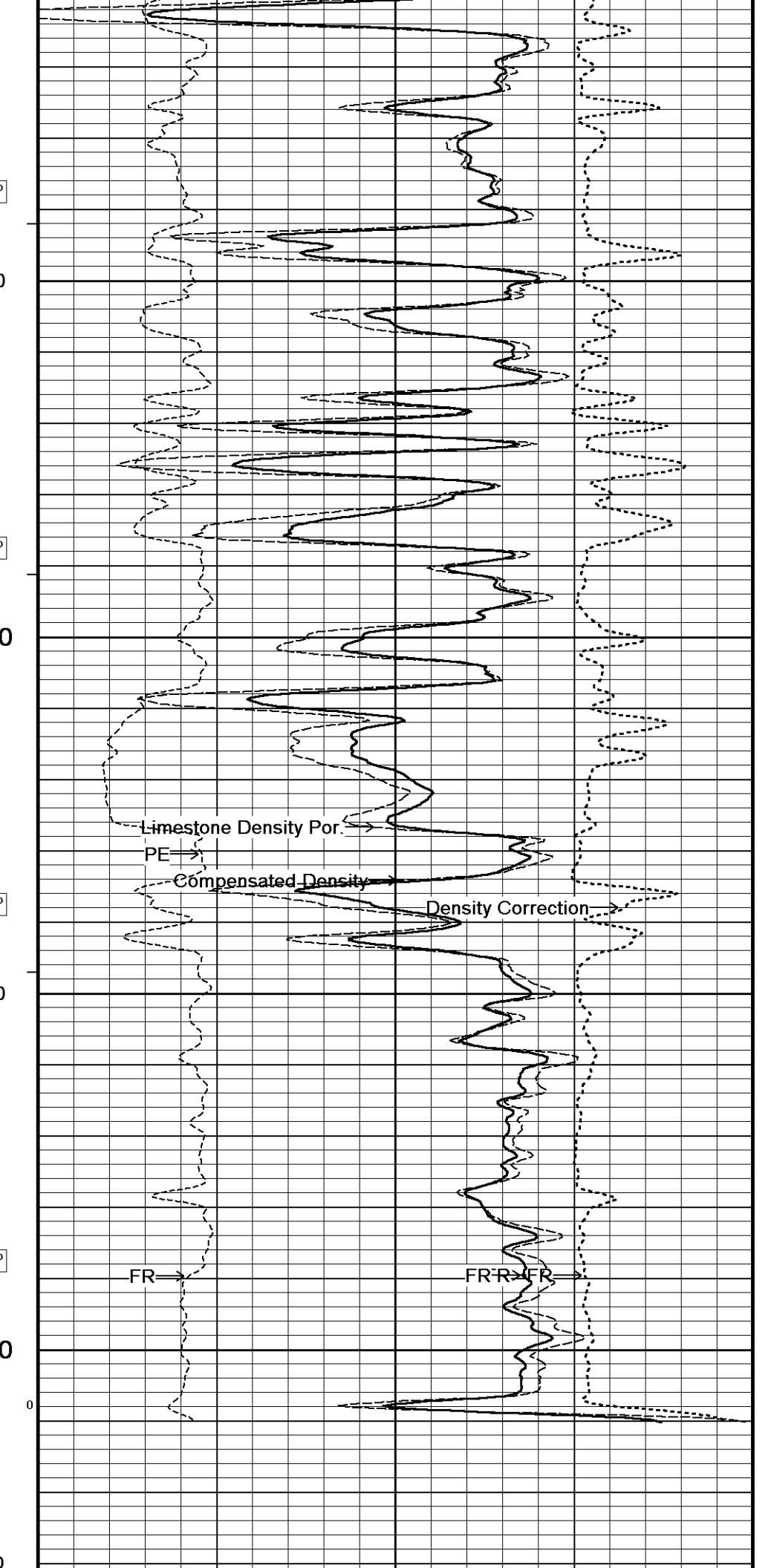
120°

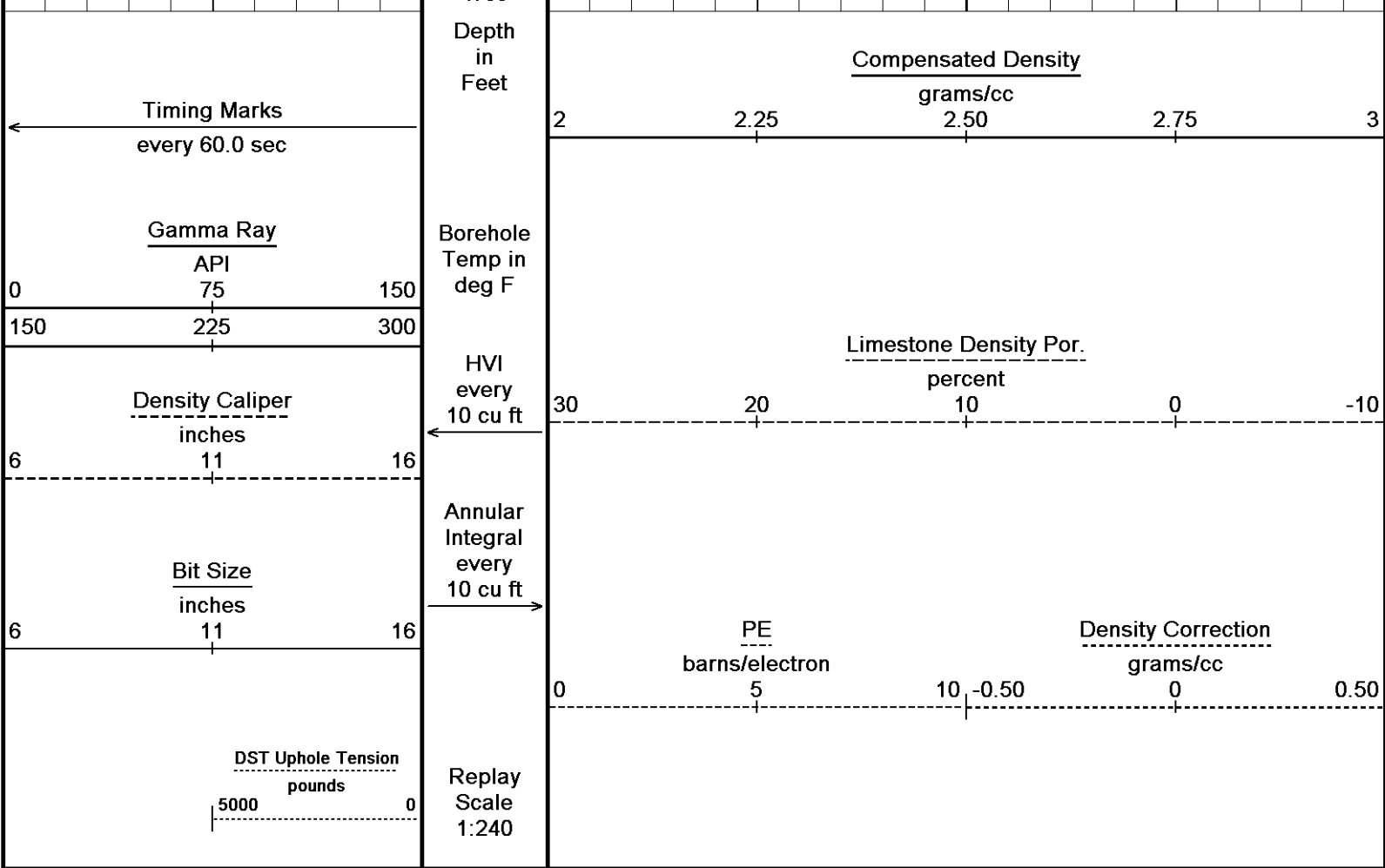
4650

120°

4700

4730





Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 31-MAY-2013 14:06
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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.05.9583\Logs\Grand Mesa Janova #2-27\Grand Mesa Janova #2-27_002.dta

General Constants All 000 Last Edited on 30-MAY-2013,18:40

General Parameters

Mud Resistivity	1.520	ohm-metres
Mud Resistivity Temperature	85.000	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. Six Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0 Field Calibration on 30-MAY-2013 18:09

Reading No	Measured	Calibrated (lbs)
1	14947.71	0.00
2	15585.25	399.00

Gamma Calibration MCG-B 34

Field Calibration on 29-MAY-2013 15:06

	Measured	Calibrated (API)
Background	65	44
Calibrator (Gross)	1145	769
Calibrator (Net)	1080	725

Gamma Constants MCG-B 34

Last Edited on 30-MAY-2013,18:41

Gamma Calibrator Number	GRC38	
Mud Density	1.13	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-B 34

Field Calibration on 29-MAY-2013,14:59

	Measured	Calibrated (mV)
Reference 1	106.4	100.0
Reference 2	-95.3	-100.0

High Resolution Temperature Calibration MCG-B 34

Field Calibration on 29-MAY-2013,14:59

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

High Resolution Temperature Constants MCG-B 34

Last Edited on 29-MAY-2013,14:59

Pre-filter Length	11
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Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 16-MAY-2013 12:07
Field Check on 29-MAY-2013 14:58

Base Calibration		Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2	
Micro Normal	12.1	60.2	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 16

Last Edited on 29-MAY-2013,14:57

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 16

Base Calibration on 16-MAY-2013 11:56
Field Calibration on 29-MAY-2013 14:58

Base Calibration		Measured	Calibrator Size (in)
Reading No			
1		14258	5.98
2		17442	7.97
3		20671	9.86
4		24432	11.92
5		0	0.00
6		N/A	N/A
Field Calibration		Measured Caliper (in)	Actual Caliper (in)
		6.09	5.98

Neutron Calibration MDN-A.B 65

Base Calibration on 22-MAY-2013 14:17
Field Check on 29-MAY-2013 15:12

Base Calibration		Measured		Calibrated (cps)	
	Near	Far	Near	Far	
	3104	96	3714	110	

32.242

33.764

Field Calibrator at Base

Calibrated (cps)
1657 2415
Ratio 0.686

Field Check

Calibrated (cps)
1660 2408
Ratio 0.698

Neutron Constants MDN-A.B 65

Last Edited on 29-MAY-2013,15:07

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-B.J 352

Base Calibration on 16-MAY-2013 15:06
Field Check on 29-MAY-2013 14:44

Base Calibration
Measured Calibrated (ohm-m)
Reference 1 0.0 0.0
Reference 2 963.9 126.8
Base Check 281.3
Field Check 281.3

FE Constants MFE-B.J 352

Last Edited on 29-MAY-2013,14:42

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 45

Field Calibration on 29-MAY-2013,14:59

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 29-MAY-2013,14:59

Pre-filter Length 11

Induction Calibration MAI-A.A 45

Base Calibration on 21-MAY-2013,16:47
Field Check on 29-MAY-2013 14:41

Base Calibration
Test Loop Calibration
Channel Measured Calibrated (mmho/m)
Low High Low High
1 14.4 472.6 9.3 966.2
2 5.7 374.0 7.6 821.4
3 3.4 261.2 5.2 566.0
4 2.5 133.9 2.6 279.2
Array Temperature 0.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			19.8	3853.7
2			32.1	3630.5
3			28.9	3050.2
4			18.4	2079.4
Deep			16.2	1911.5
Medium			42.7	4061.7
Shallow			50.1	5485.2
Array Temperature			82.8	Deg F

Induction Constants MAI-A.A 45

Last Edited on 30-MAY-2013,08:26

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 31

Base Calibration on 19-MAY-2013 17:48
Field Calibration on 29-MAY-2013 14:51

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	17088	3.99
2	25888	5.98
3	34607	7.97
4	42944	9.86
5	52301	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	5.92	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 19-MAY-2013 18:09
Field Check on 29-MAY-2013 14:49

Density Calibration		
Base Calibration	Measured	Calibrated (sdu)

	Near	Far	Near	Far
Reference 1	45338	23124	59556	30836
Reference 2	18546	1915	24941	2541

Field Check at Base
677.6 838.3

Field Check
680.4 836.2

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	125	601		
Reference 1	19261	45226	0.429	0.371
Reference 2	5568	18464	0.305	0.272

Field Check at Base
125.4 601.0

Field Check
124.8 603.7

Density Constants MPD-B 31

Last Edited on 30-MAY-2013,18:41

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	1.13	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	

DOWNHOLE EQUIPMENT

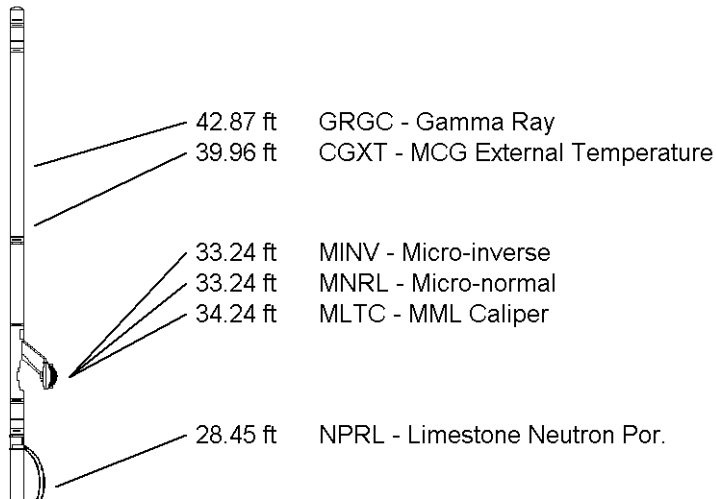
C:\Minimus 13.05.9583\Logs\Grand Mesa Janova #2-27\Grand Mesa Janova #2-27_002.dta

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-B 34 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

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

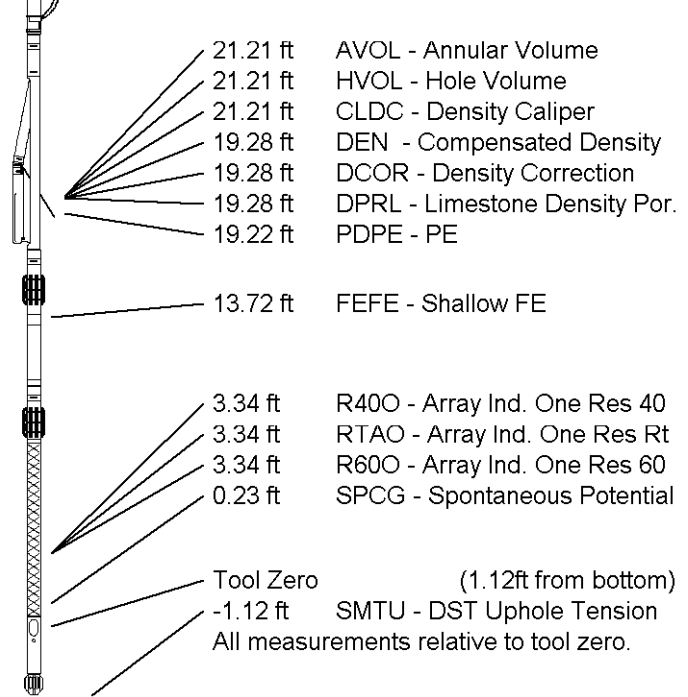


Compact Density/Caliper
 MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focused Electric
 MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
 MAI-A.A 45 LG: 11.79 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.72 ft Weight: 399.0 lb



21.21 ft AVOL - Annular Volume
 21.21 ft HVOL - Hole Volume
 21.21 ft CLDC - Density Caliper
 19.28 ft DEN - Compensated Density
 19.28 ft DCOR - Density Correction
 19.28 ft DPRL - Limestone Density Por.
 19.22 ft PDPE - PE

13.72 ft FEFE - Shallow FE

3.34 ft R400 - Array Ind. One Res 40
 3.34 ft RTAO - Array Ind. One Res Rt
 3.34 ft R600 - Array Ind. One Res 60
 0.23 ft SPCG - Spontaneous Potential

Tool Zero (1.12ft from bottom)
 -1.12 ft SMTU - DST Uphole Tension
 All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY				
WELL	J A NOVA #2-27				
FIELD	WILDCAT				
PROVINCE/COUNTY	LOGAN				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	3024.00	feet	First Reading	4688.00	feet
Elevation Drill Floor	3023.00	feet	Depth Driller	4715.00	feet
Elevation Ground Level	3015.00	feet	Depth Logger	4710.00	feet



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COMPACT PHOTO DENSITY
 COMPENSATED NEUTRON
 MICRORESISTIVITY LOG