



Weatherford

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY

O'BRIEN RESOURCES, LLC.

WELL

BESPERAT #33-1

FIELD

WILDCAT

PROVINCE/COUNTY

RUSH

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1250' FNL & 1391' FEL

SEC 33

TWP 18S

RGE 17W

Other Services
MAI/MFE

Latitude

MAI/MFE

MSS

Longitude

API Number

15-165-22139

Permanent Datum GL, Elevation 2057 feet

Log Measured From KB, 8 feet above Permanent Datum

Drilling Measured From KB @ 8 FEET

Date

22-DEC-2016

Run Number

ONE

Service Order

4558-169594456

Depth Driller

3836.00 feet

Depth Logger

3834.00 feet

First Reading

3802.00 feet

Last Reading

2300.00 feet

Casing Driller

264.00 feet

Casing Logger

265.00 feet

Bit Size

7.875 inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.30 lb/USg 56.00 CP

PH / Fluid Loss

10.50 12.00 ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

0.29 @ 75.0 ohm-m

Rmf @ Measured Temp

0.23 @ 75.0 ohm-m

Rmc @ Measured Temp

0.35 @ 75.0 ohm-m

Source Rmf / Rmc

CALC CALC

Rm @ BHT

0.23 @ 96.0 ohm-m

Time Since Circulation

4 HOURS

Max Recorded Temp

96.00 deg F

Equipment / Base

13096 OKC

Recorded By

ADAM SILL

Witnessed By

JIM MUSGROVE

Elevations:
KB 2065.00 feet
DF 2063.00
GL 2057.00

BOREHOLE RECORD

Last Edited: 22-DEC-2016 12:25

Bit Size
inches

7.875

Depth From
feet

264.00

Depth To
feet

3836.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

264.00

Weight
pounds/ft

24.00

REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS USED ON MSS.
 - 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 SURFACE CASING: 1792 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 2300: 392 CU.FT.

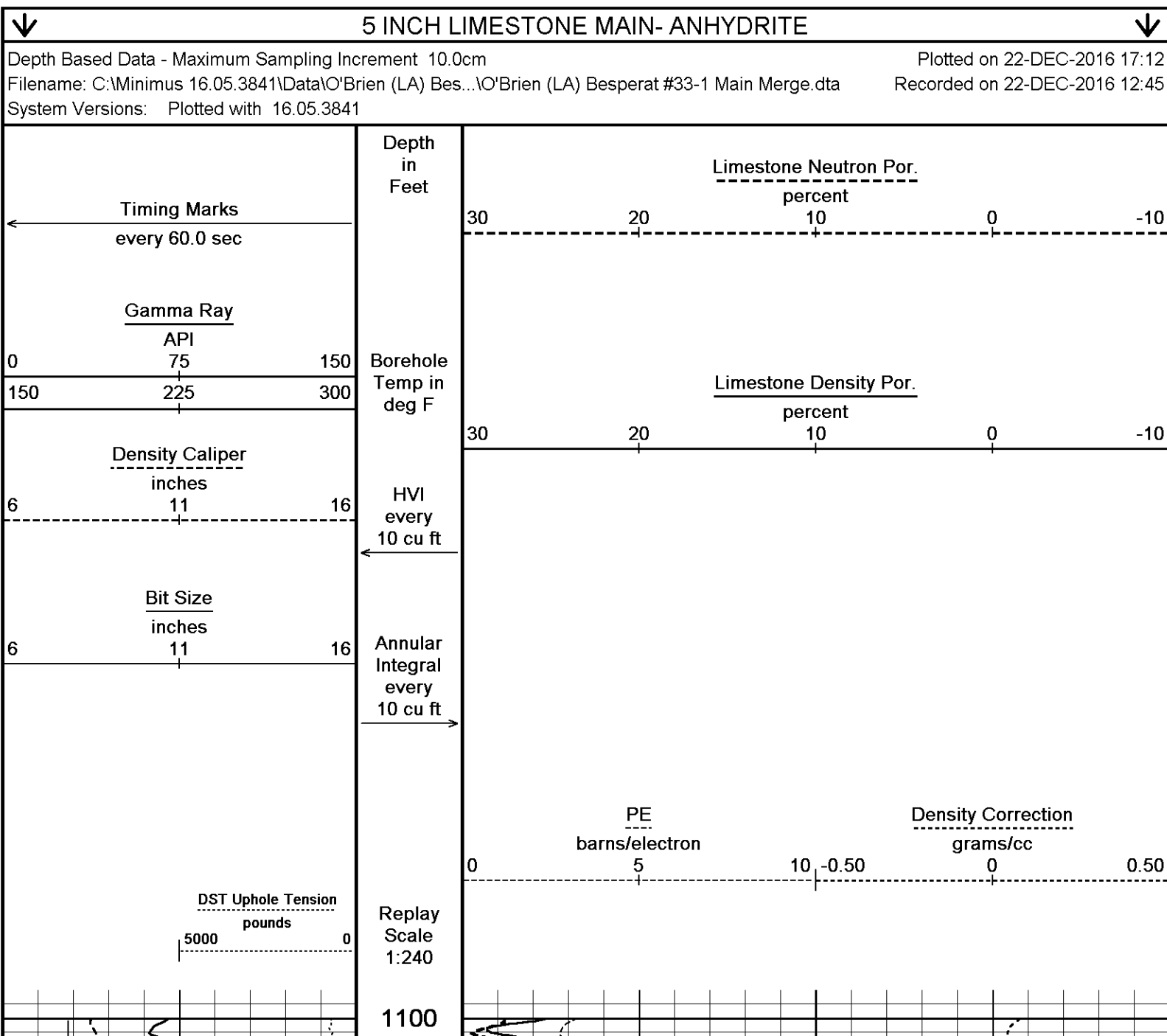
- RIG: DUKE #2.

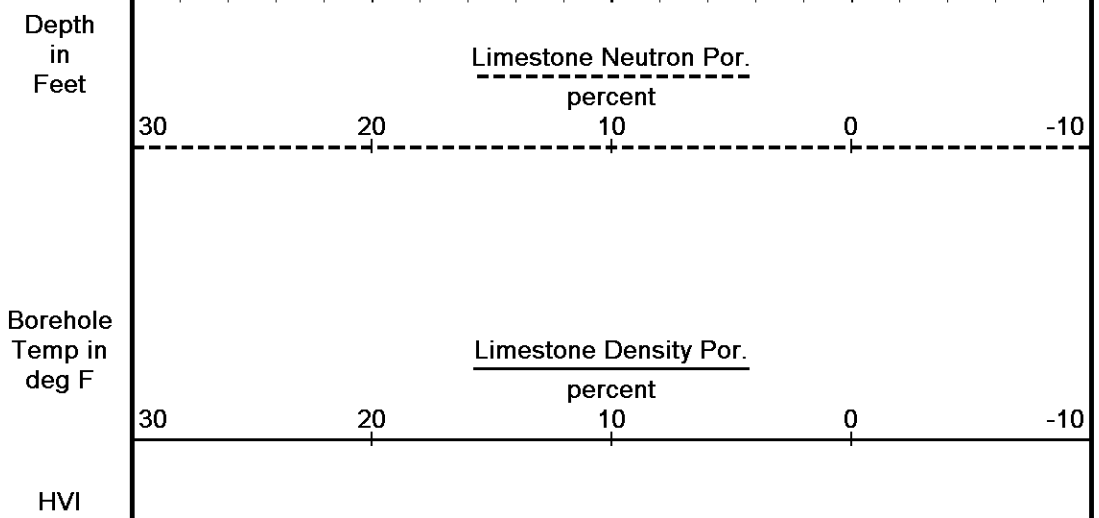
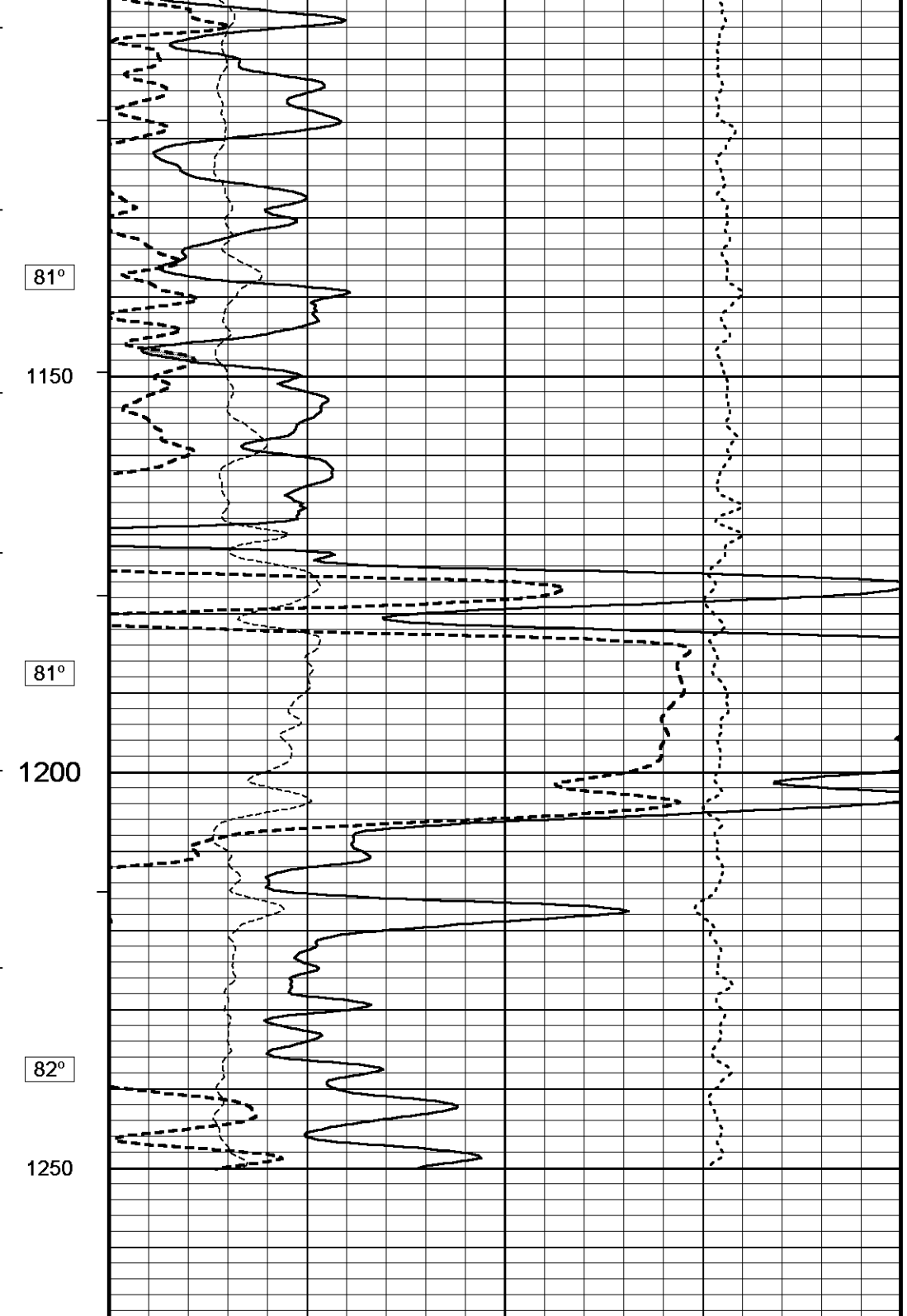
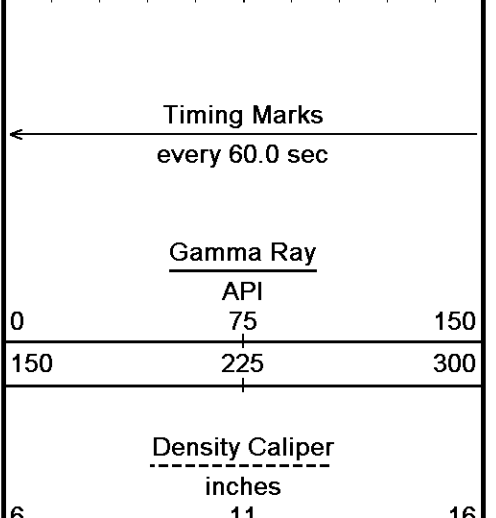
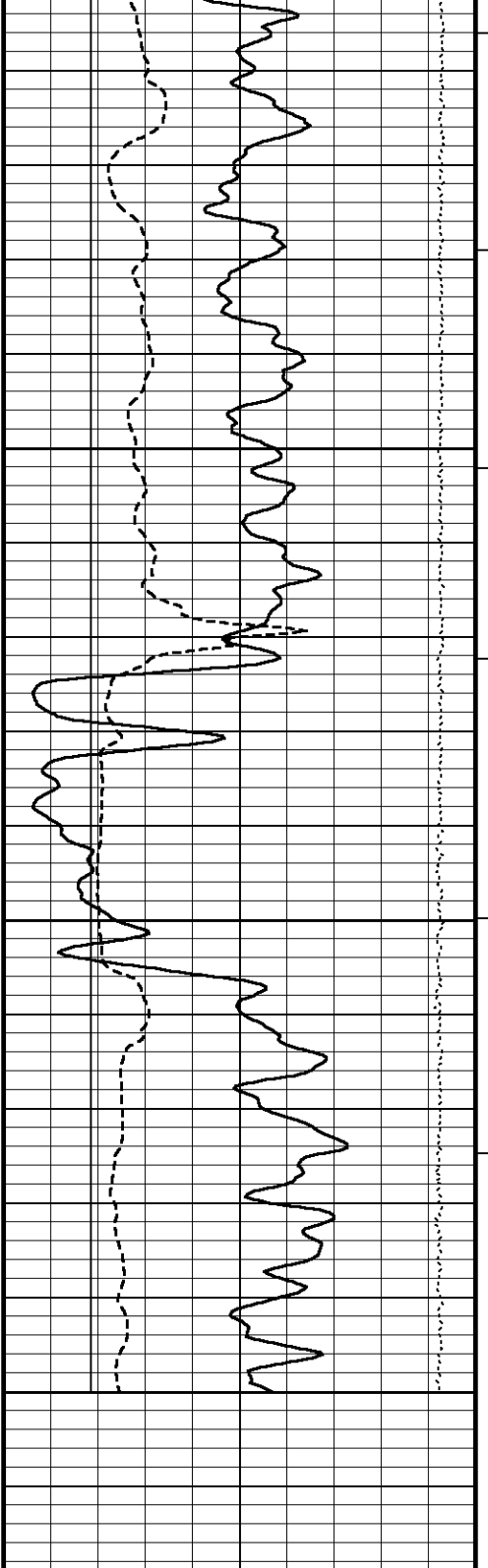
- ENGINEER: A. SILL.

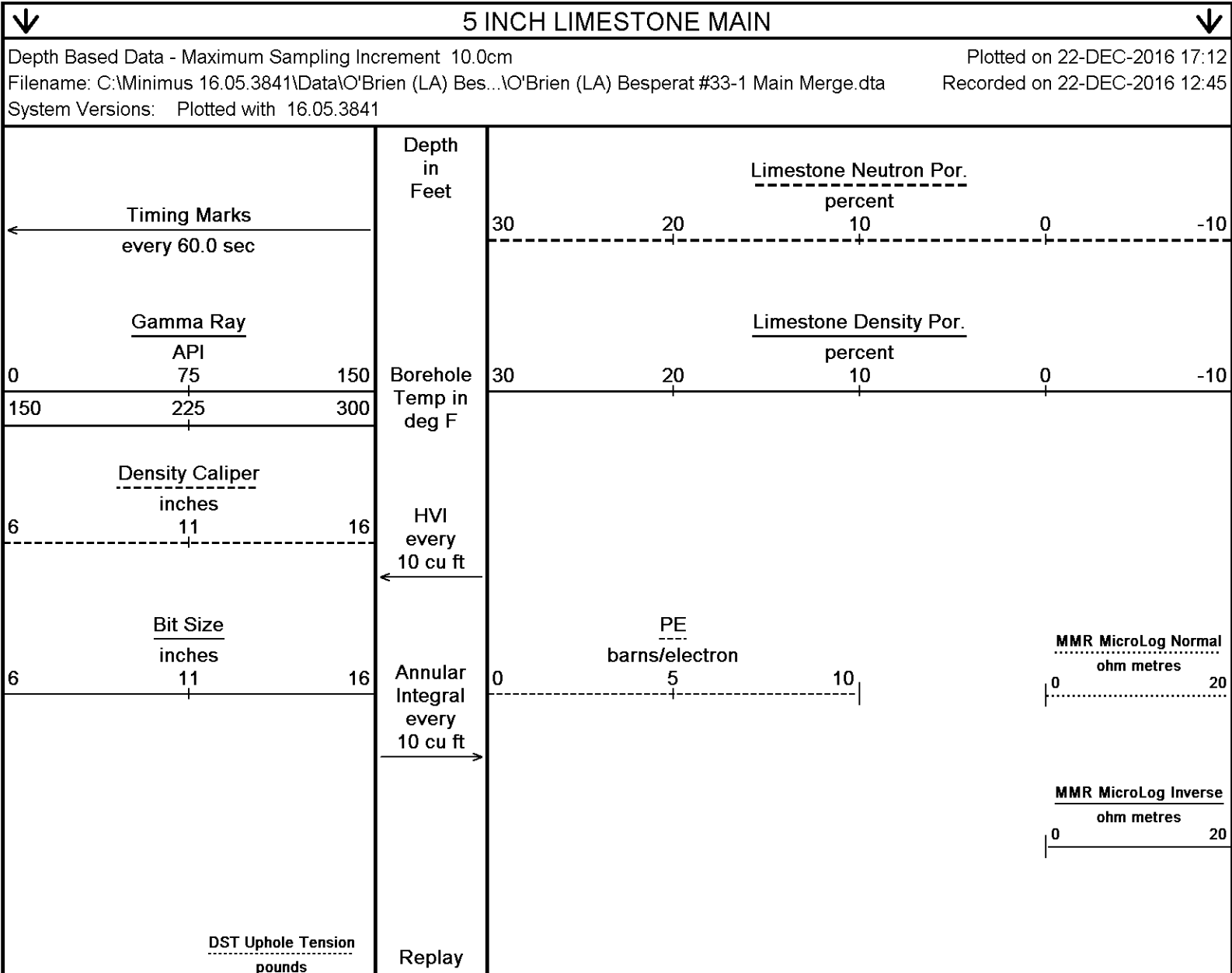
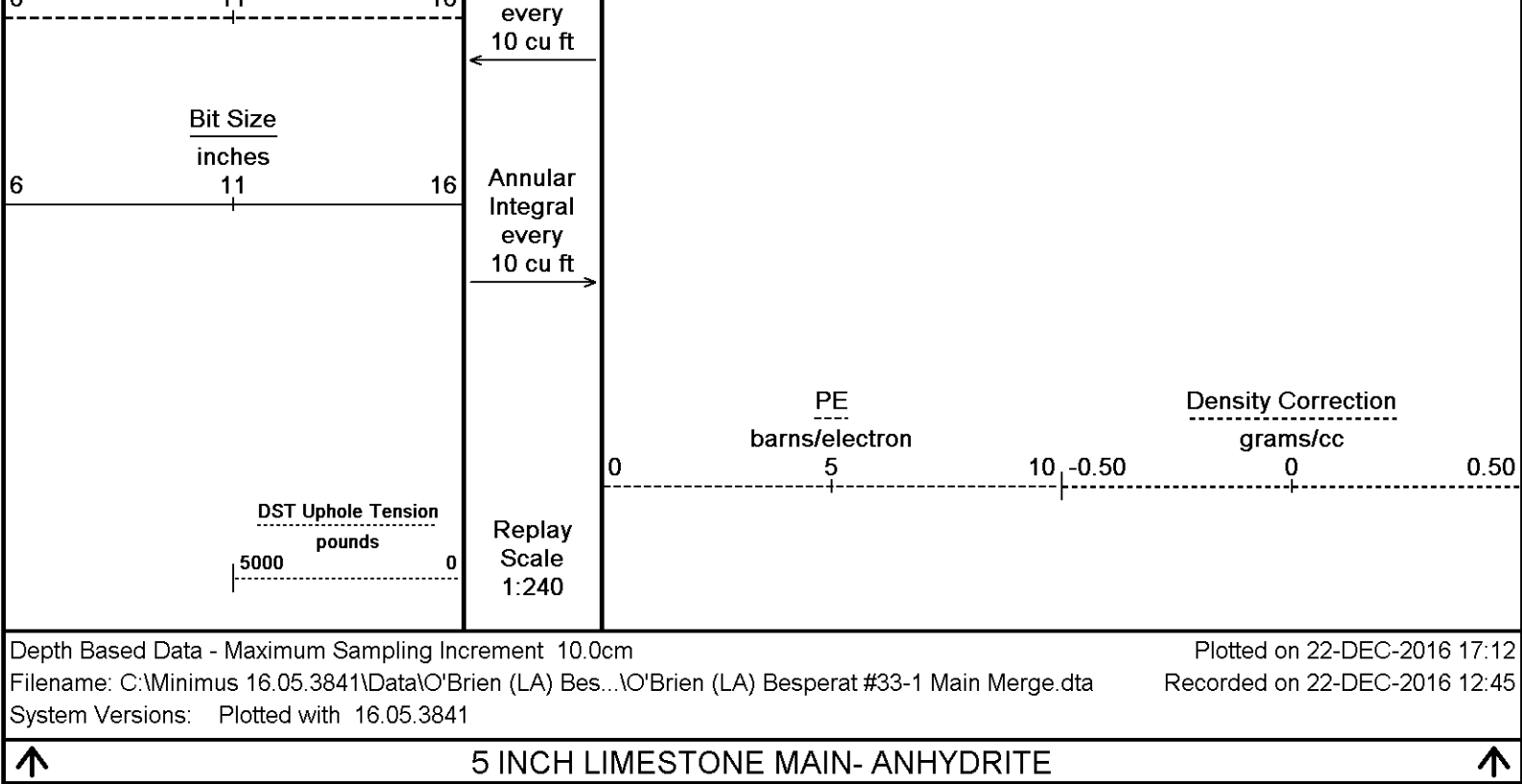
- OPERATOR: B. TOVAR.

**** GAMMA RAY FROM RUN TWO WAS SPLICE INTO RUN ONE TO ALLOW FOR A DEEPER GAMMA RAY FIRST READ. ****

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.







5000

0

Scale
1:240

2300

88°

2350

88°

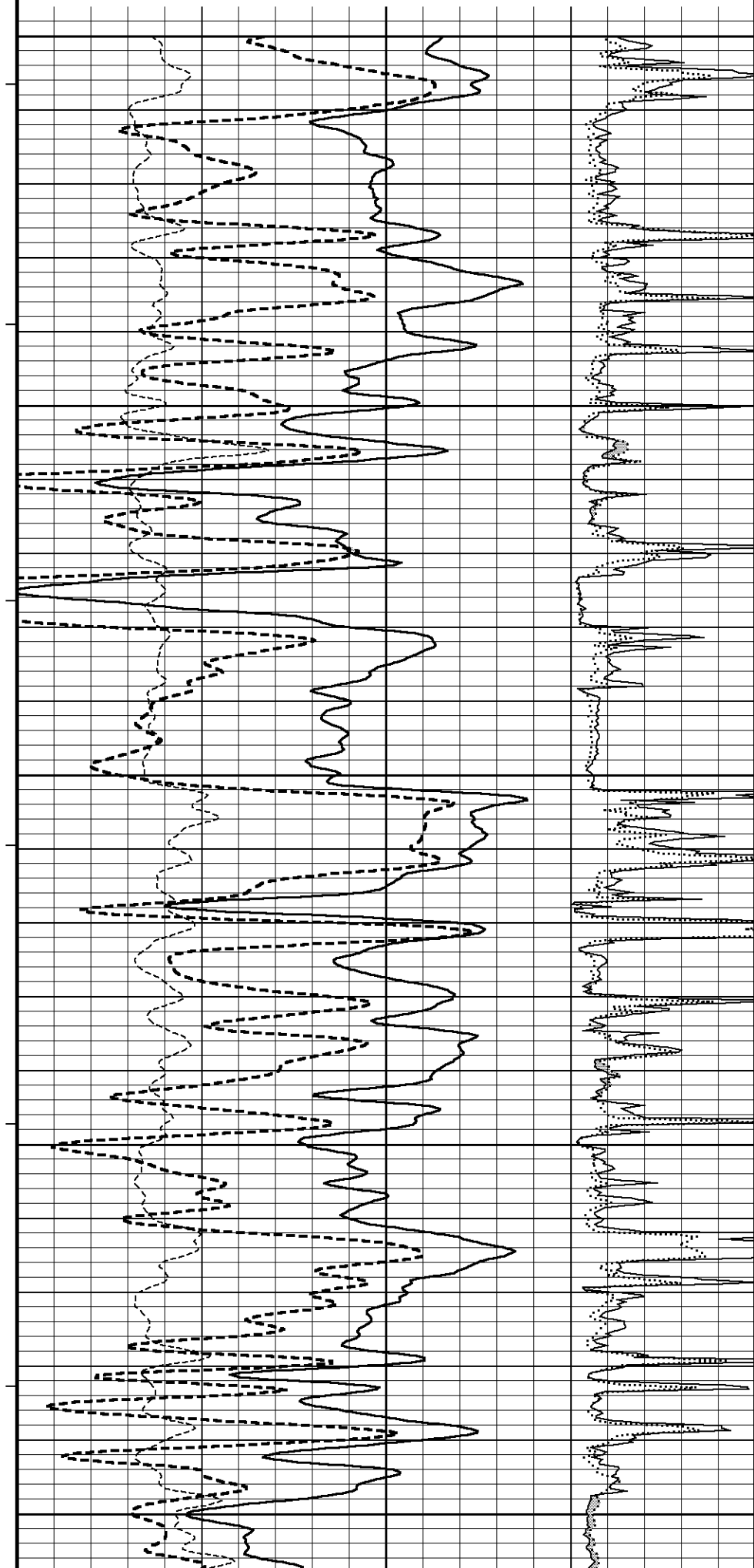
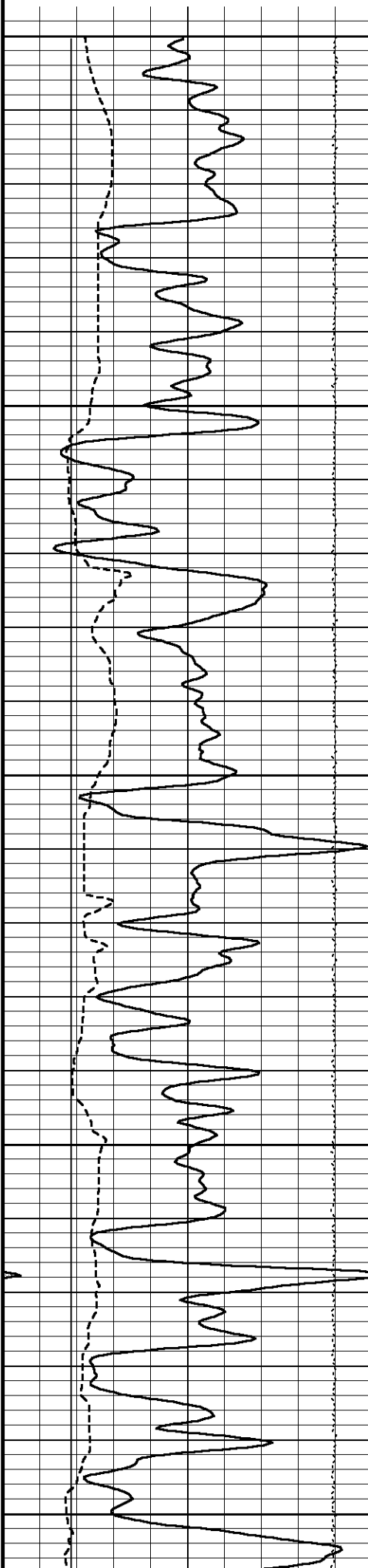
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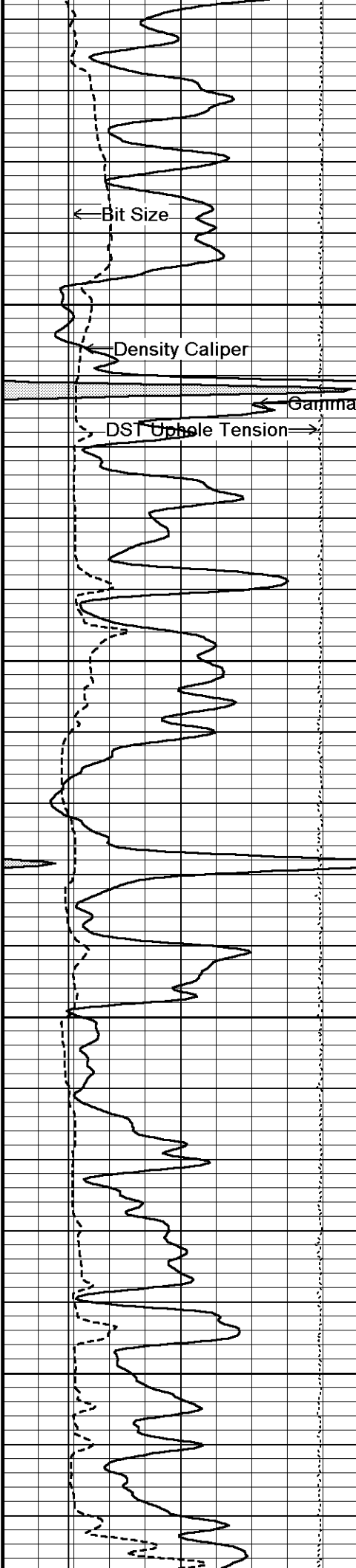
89°

500 2450

89°

2500





89°

2550

90°

2600

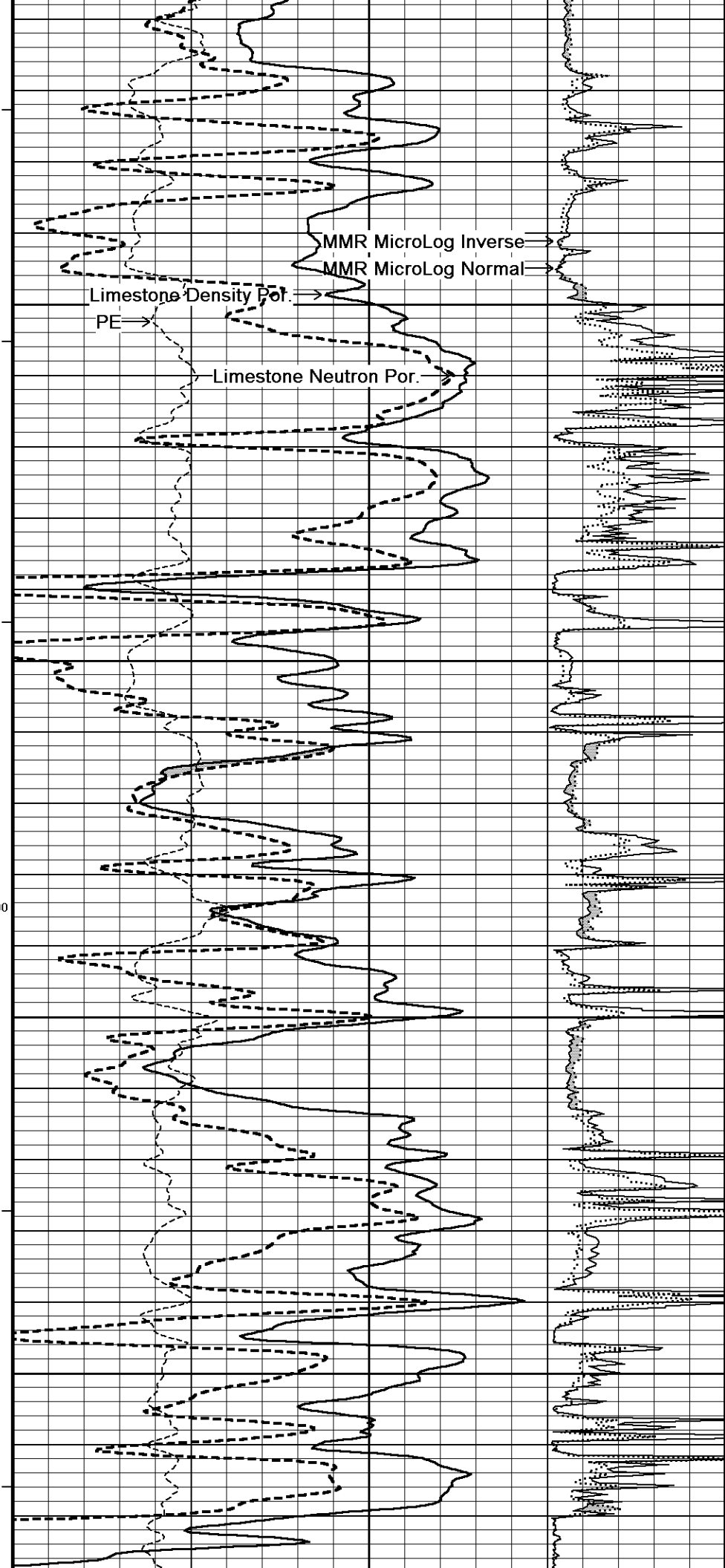
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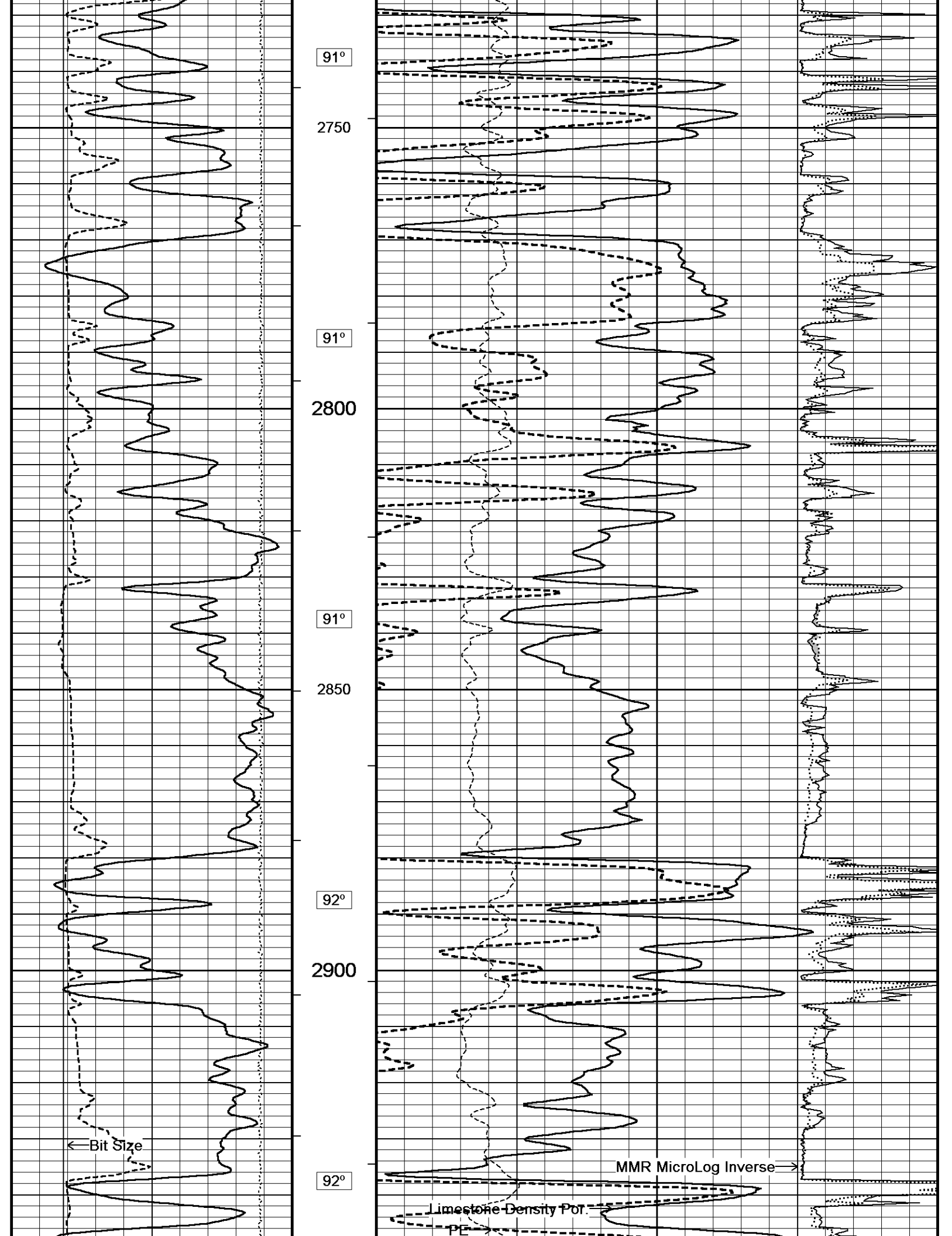
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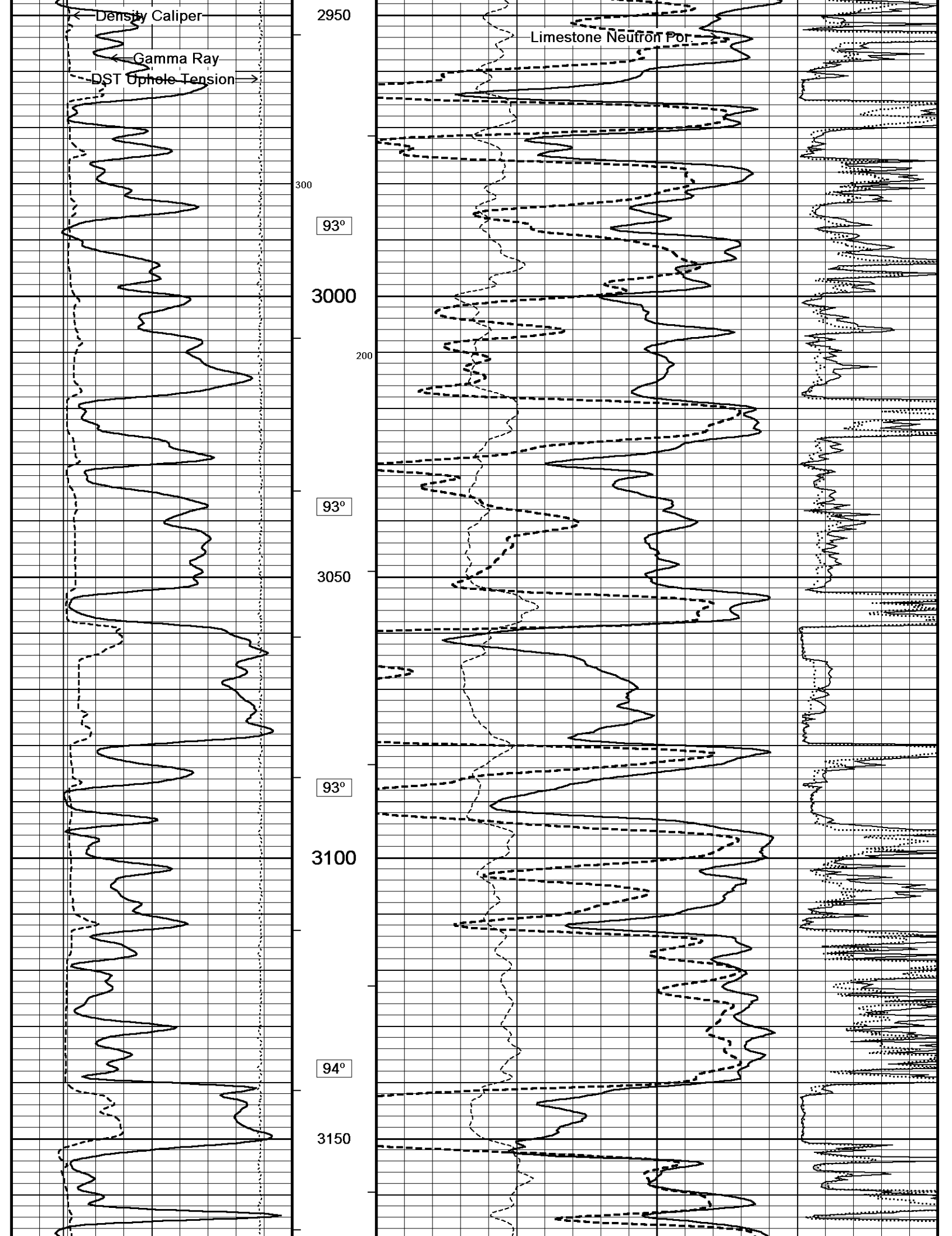
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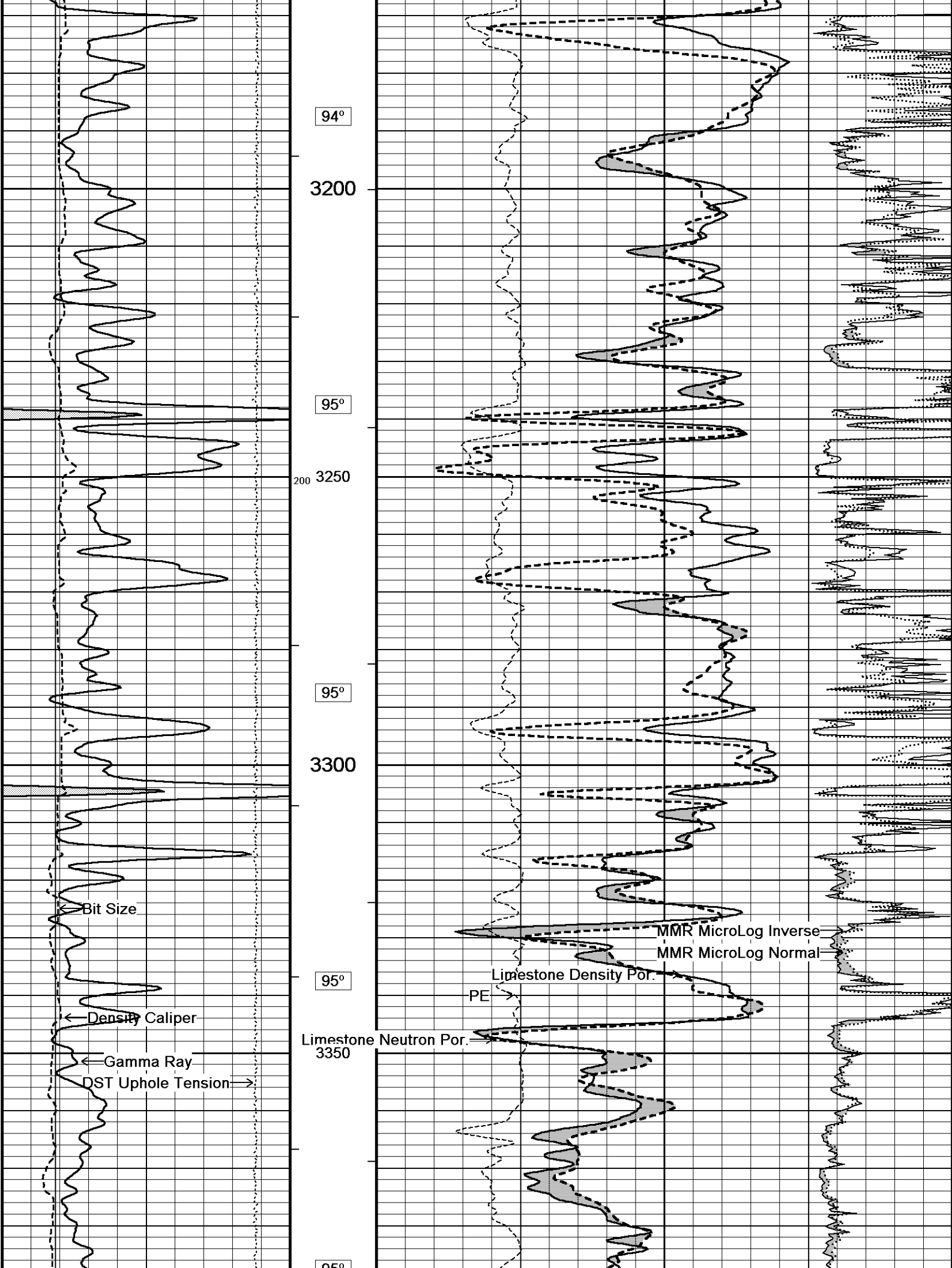
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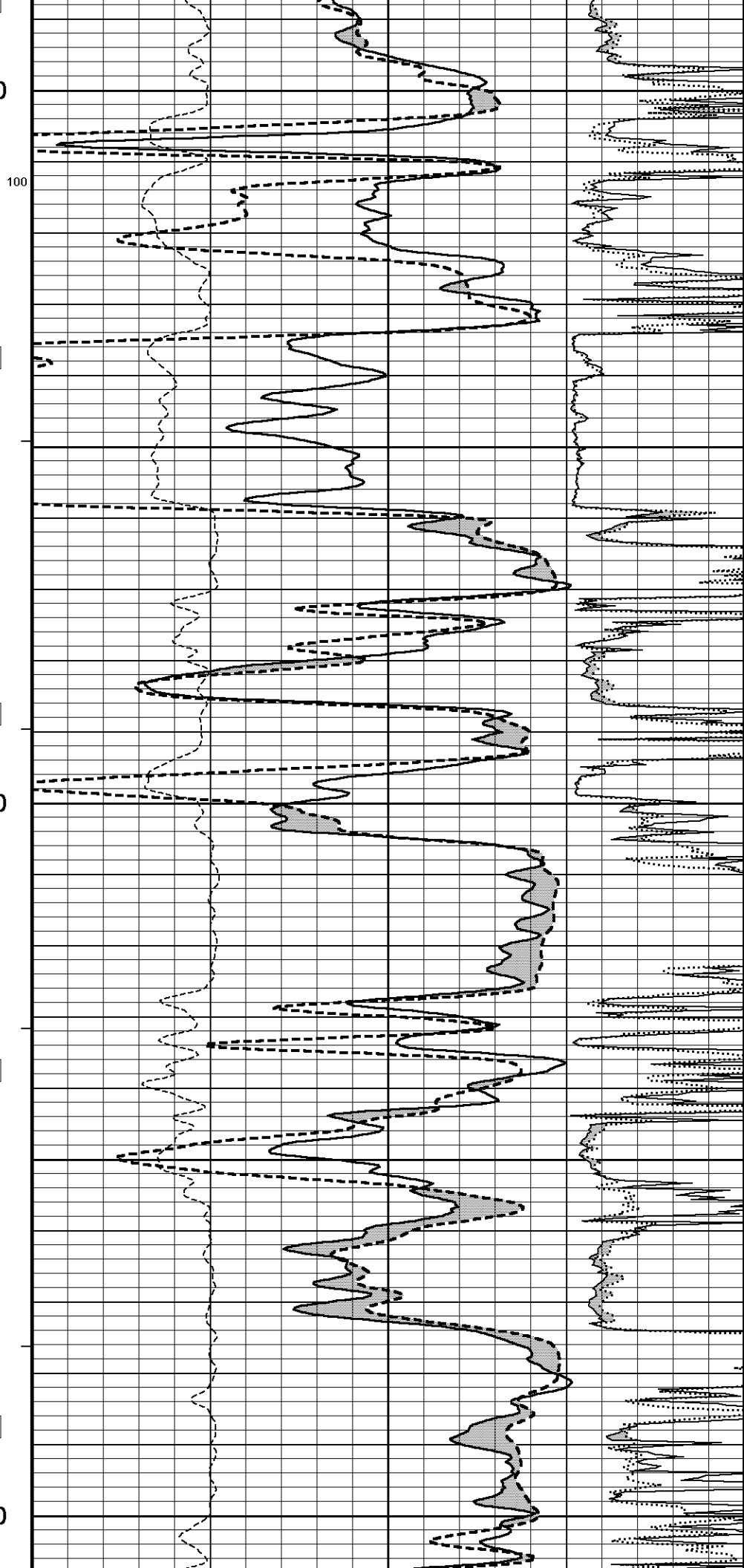
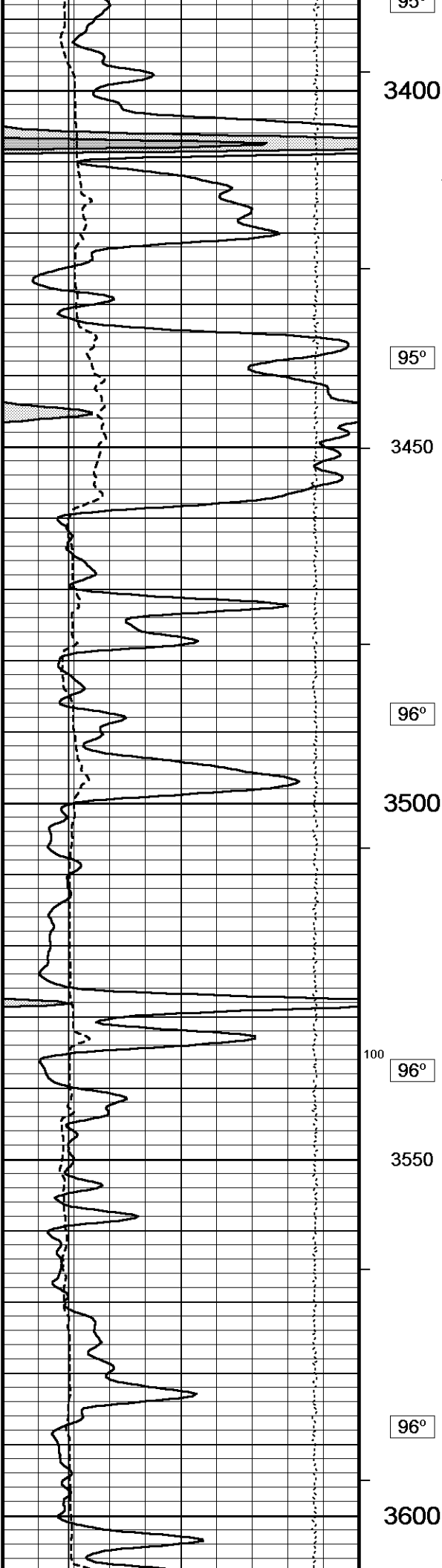
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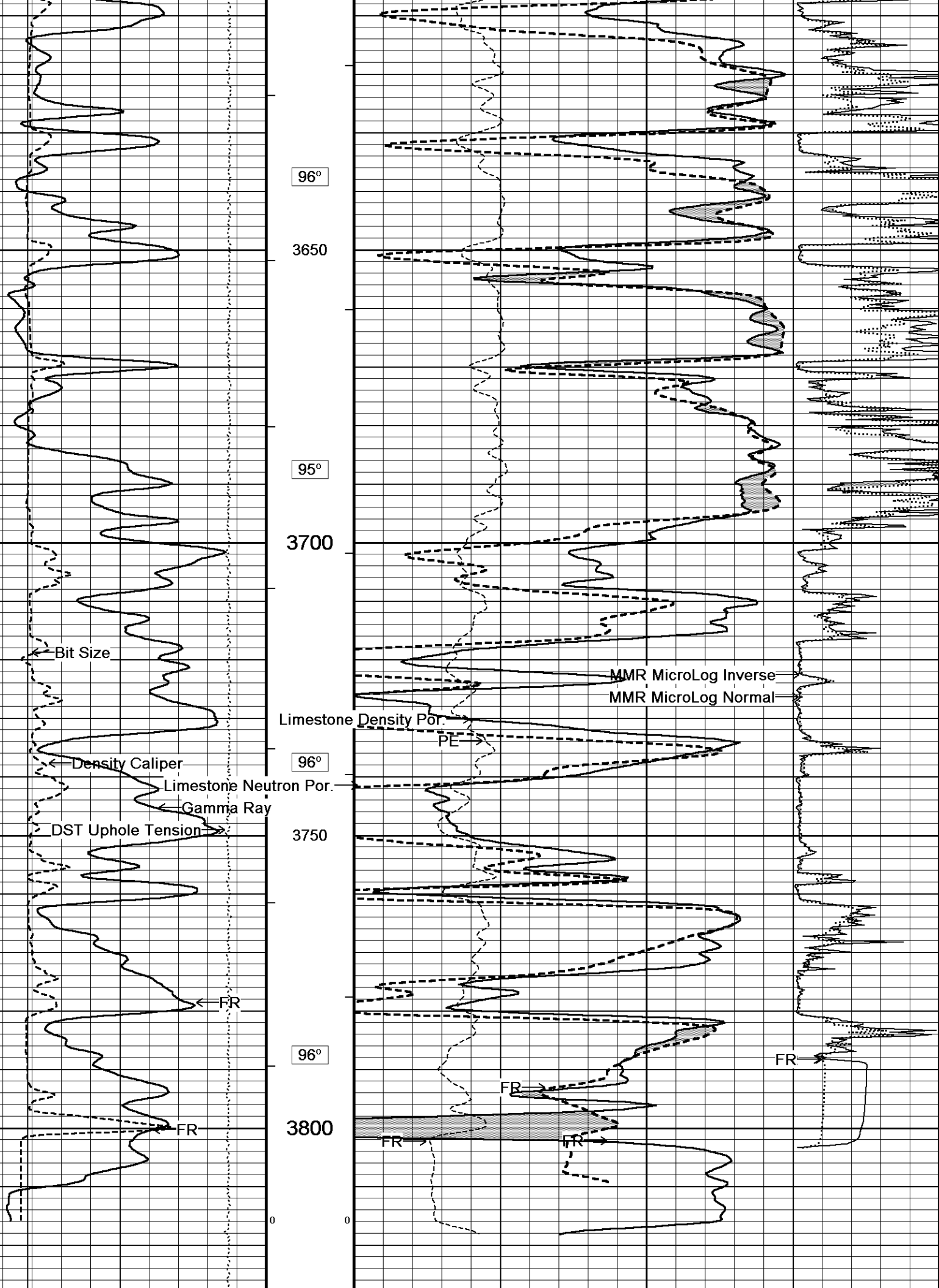


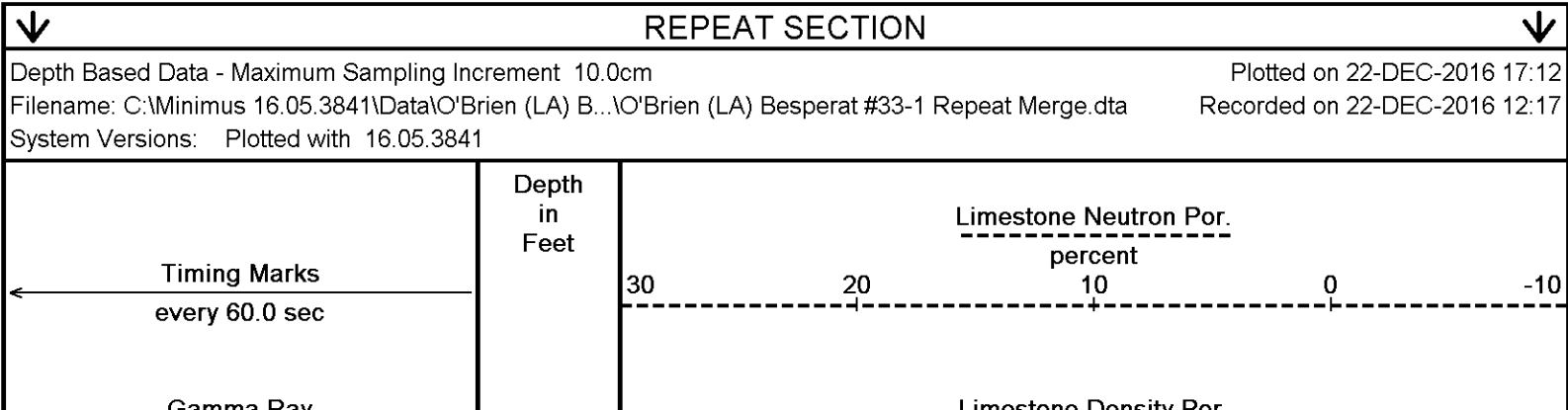
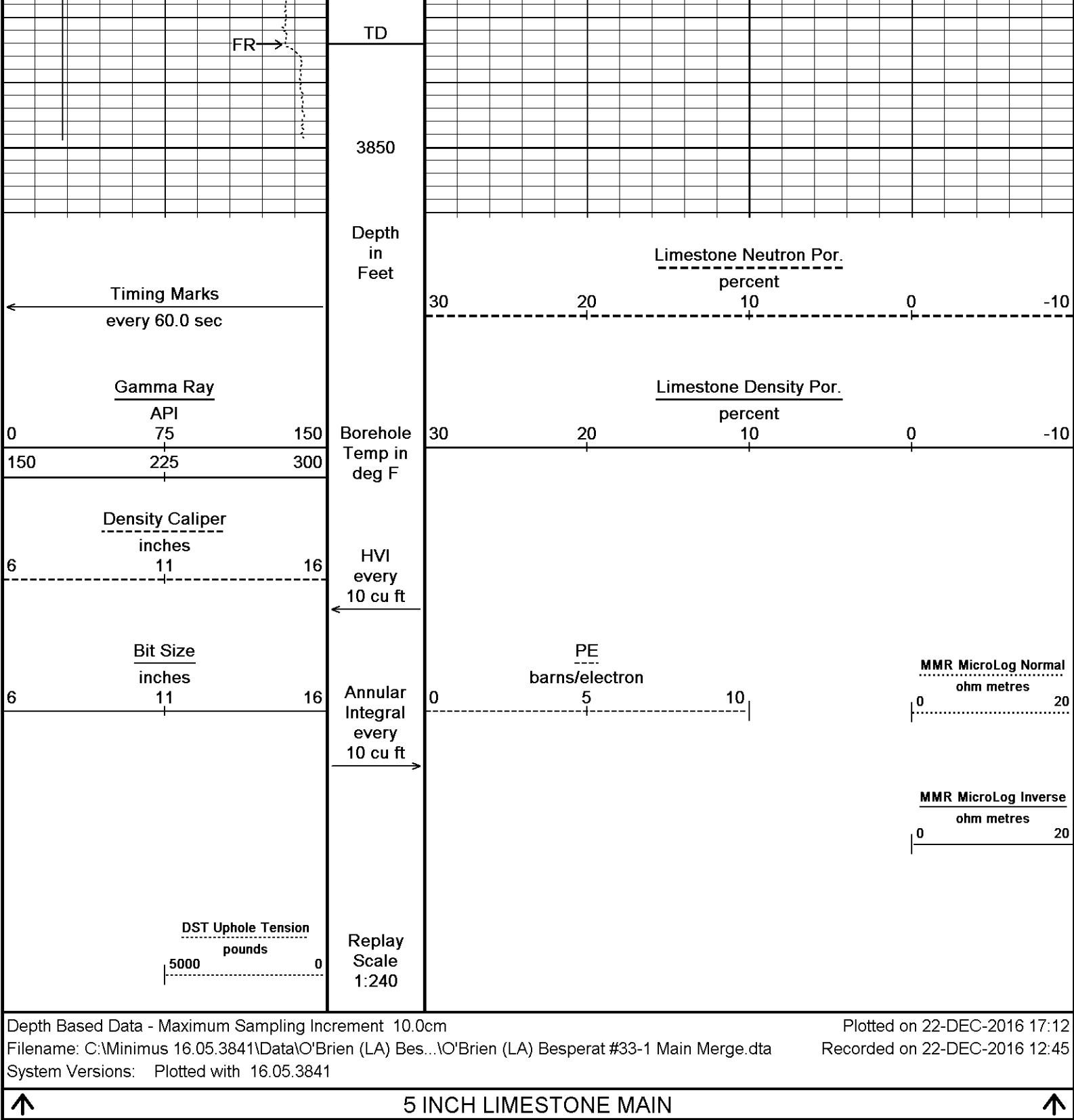


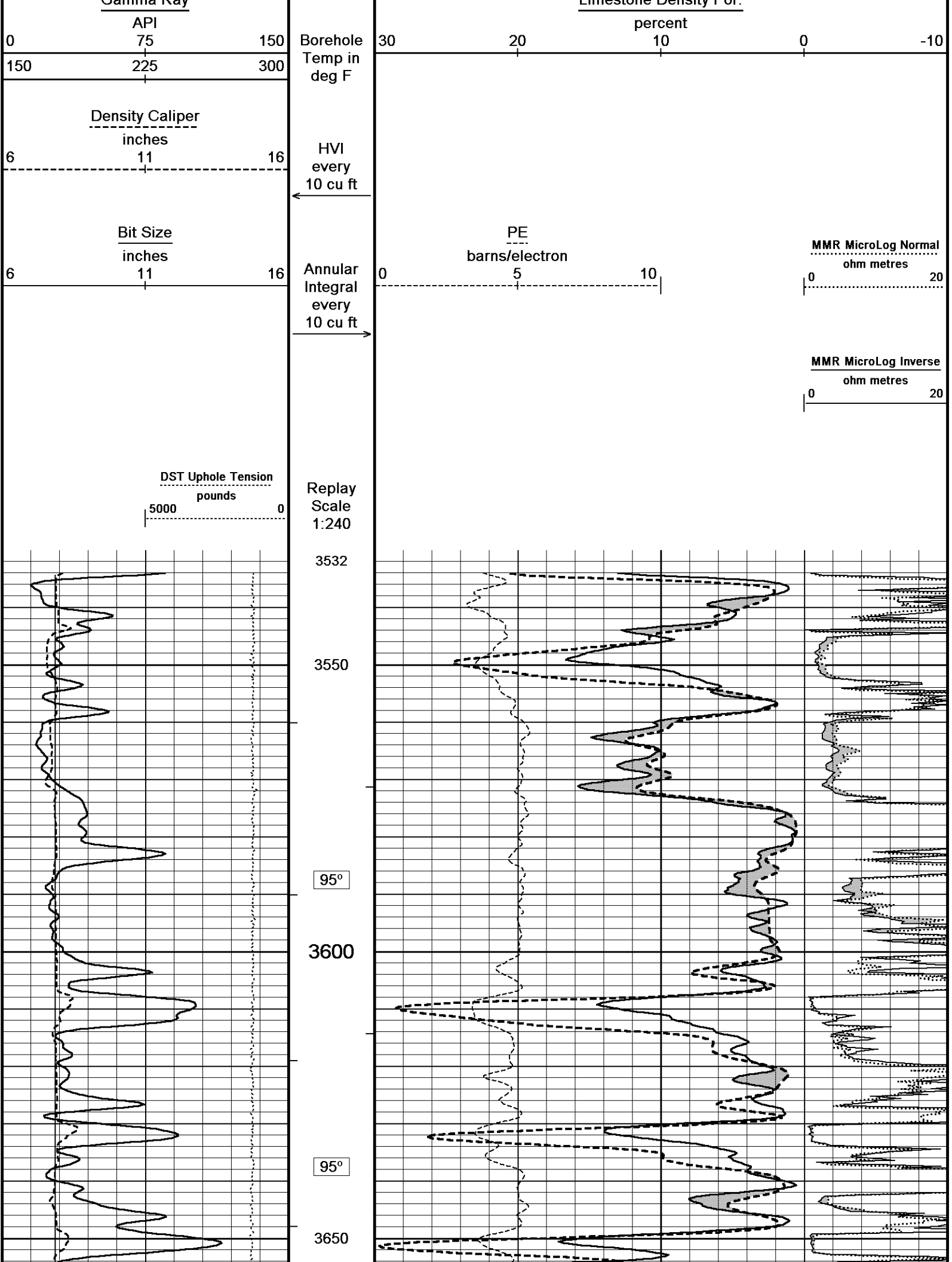


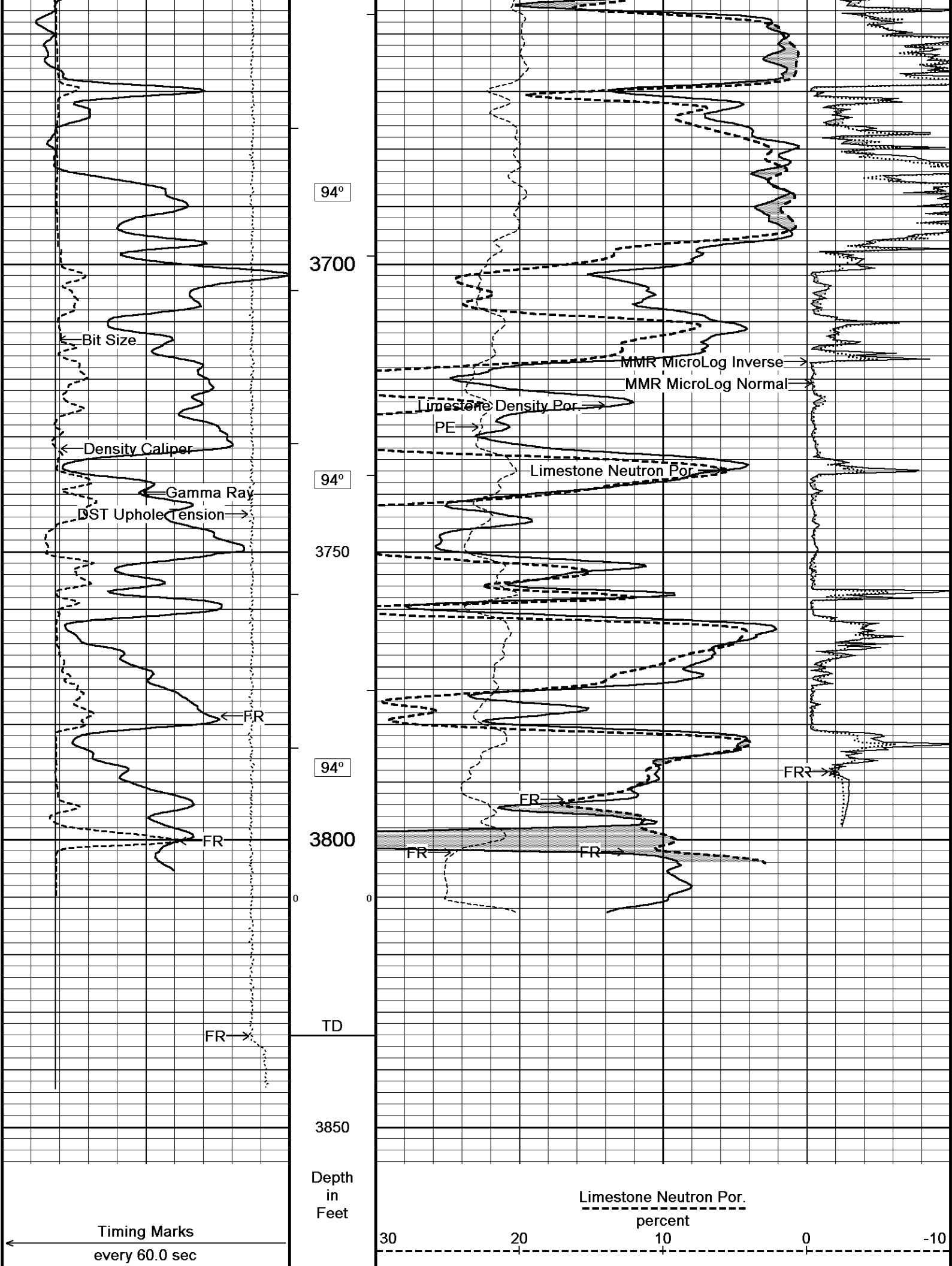












every
10 cu ft

PE
barns/electron

Density Correction
grams/cc

0 5 10 -0.50 0 0.50

DST Uphole Tension
pounds

5000 0

Replay
Scale
1:240

2300

88°

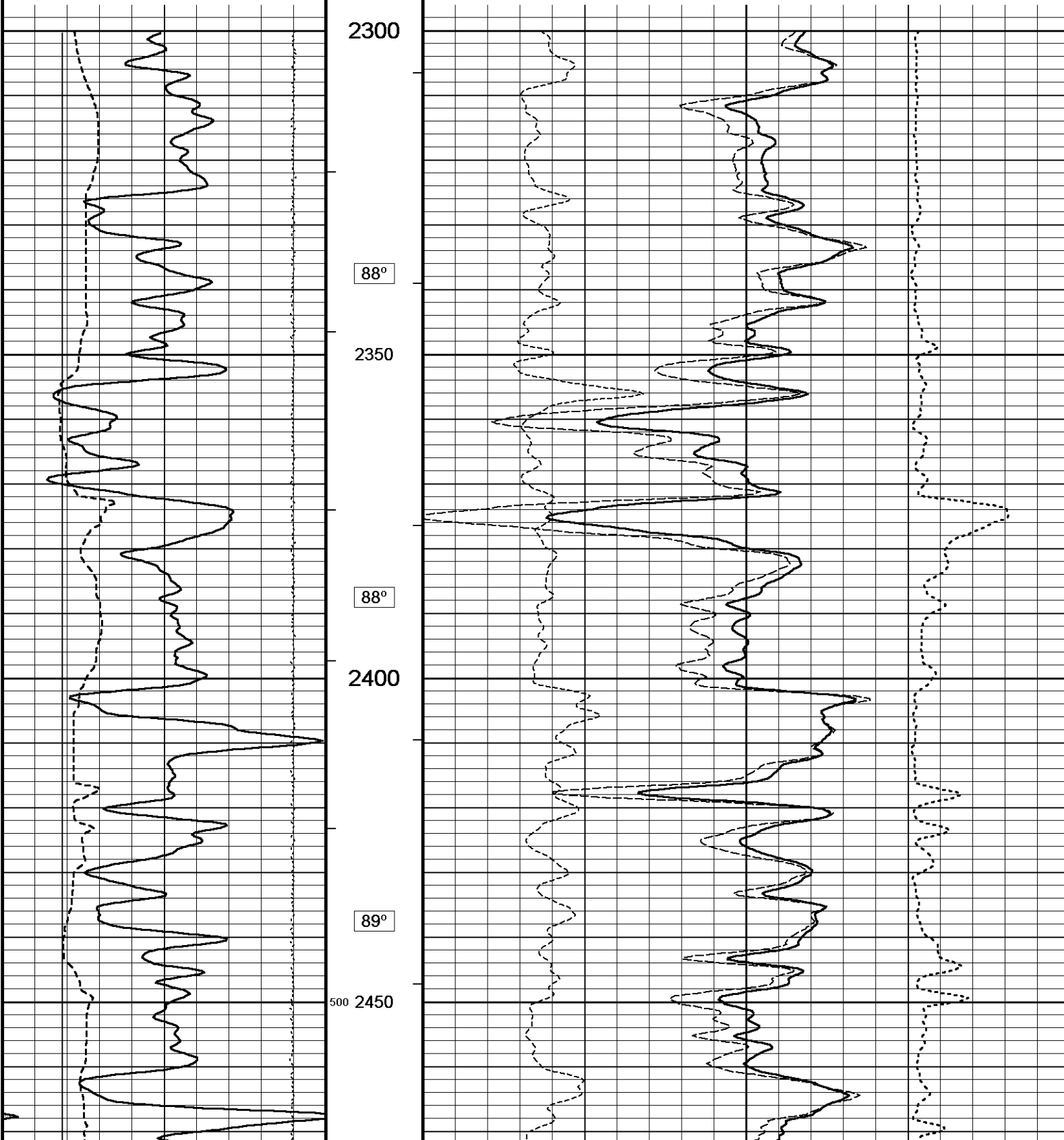
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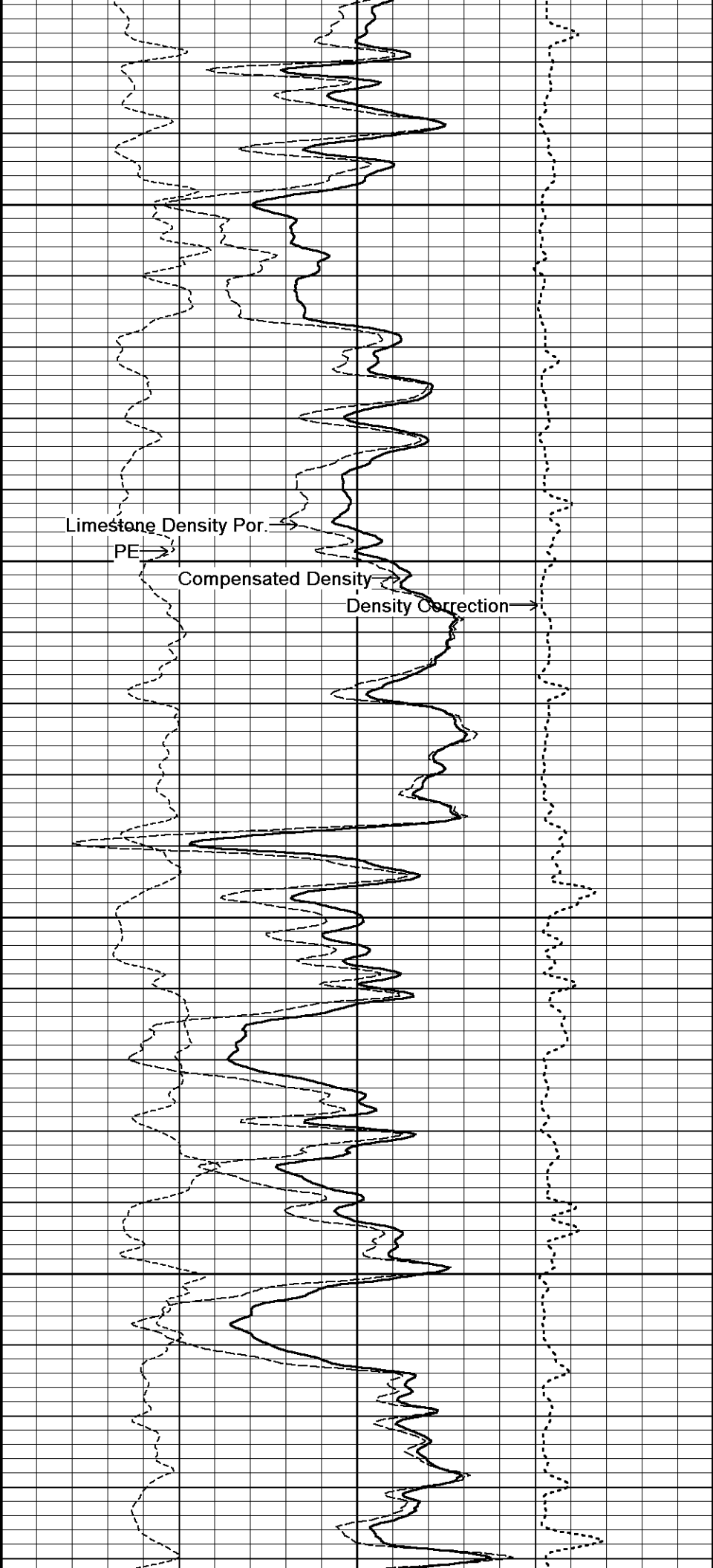
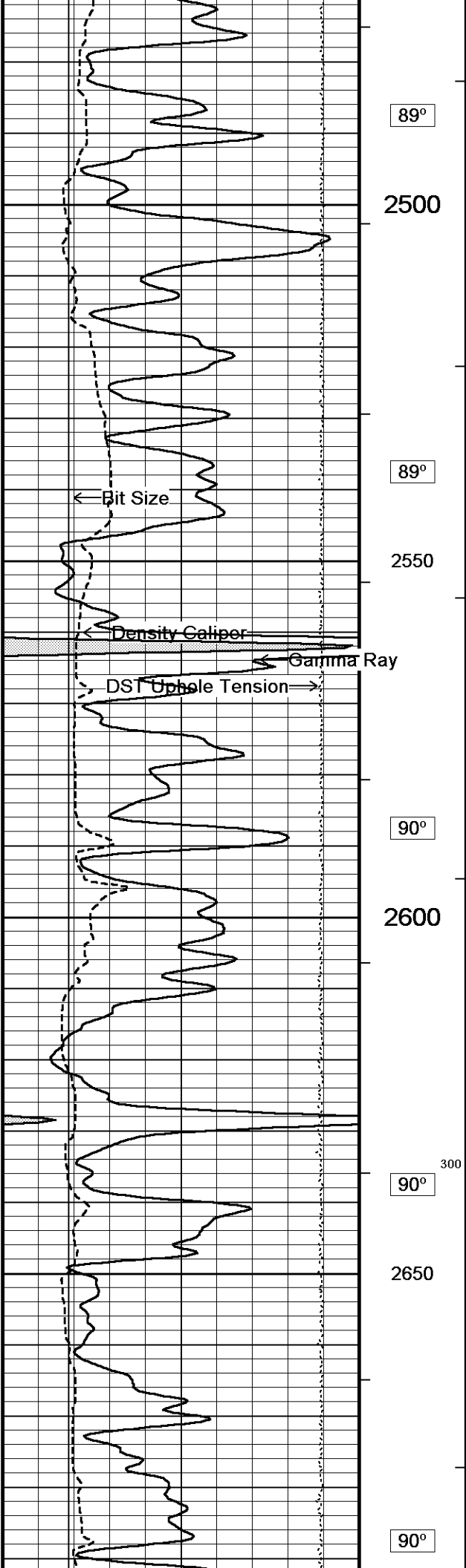
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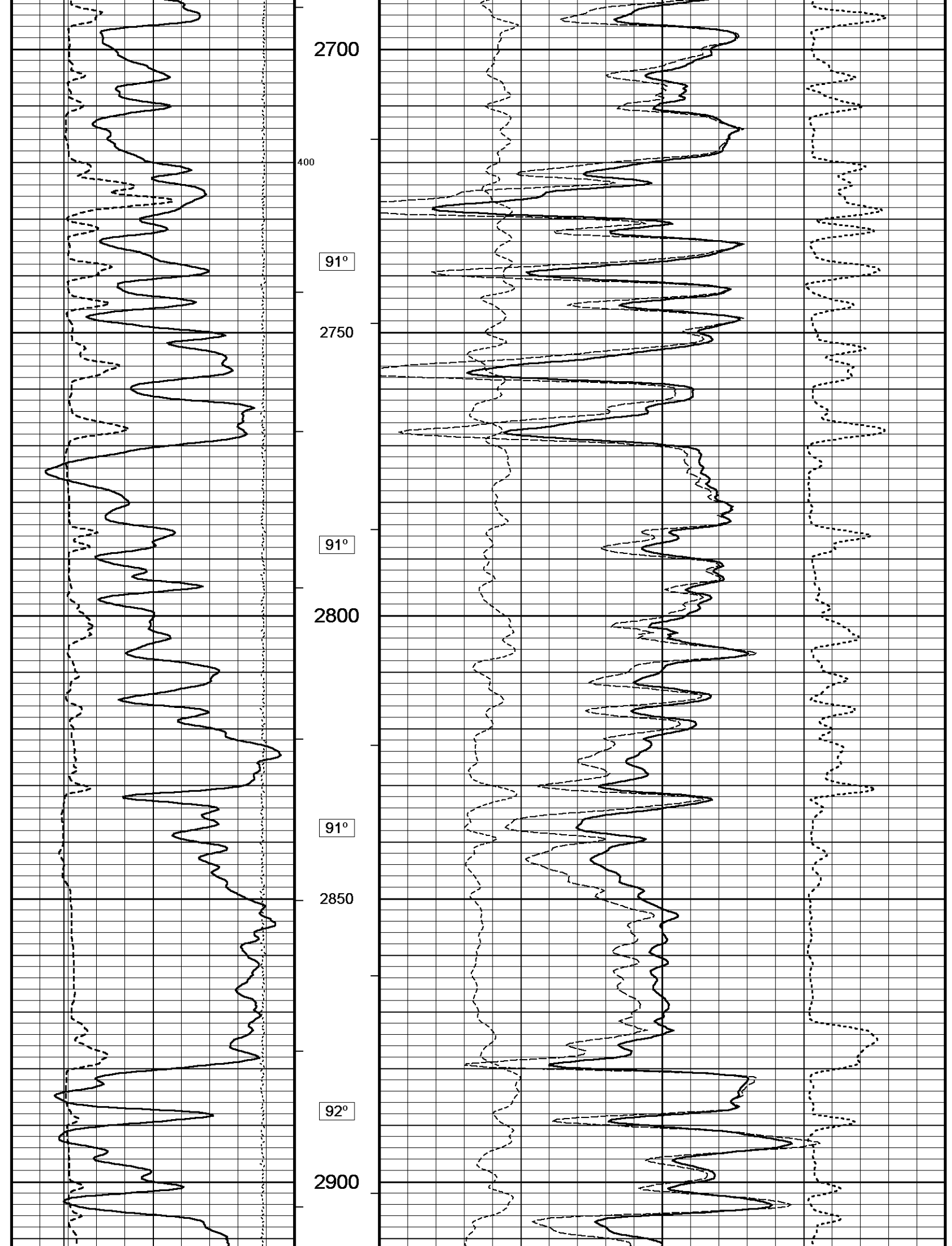
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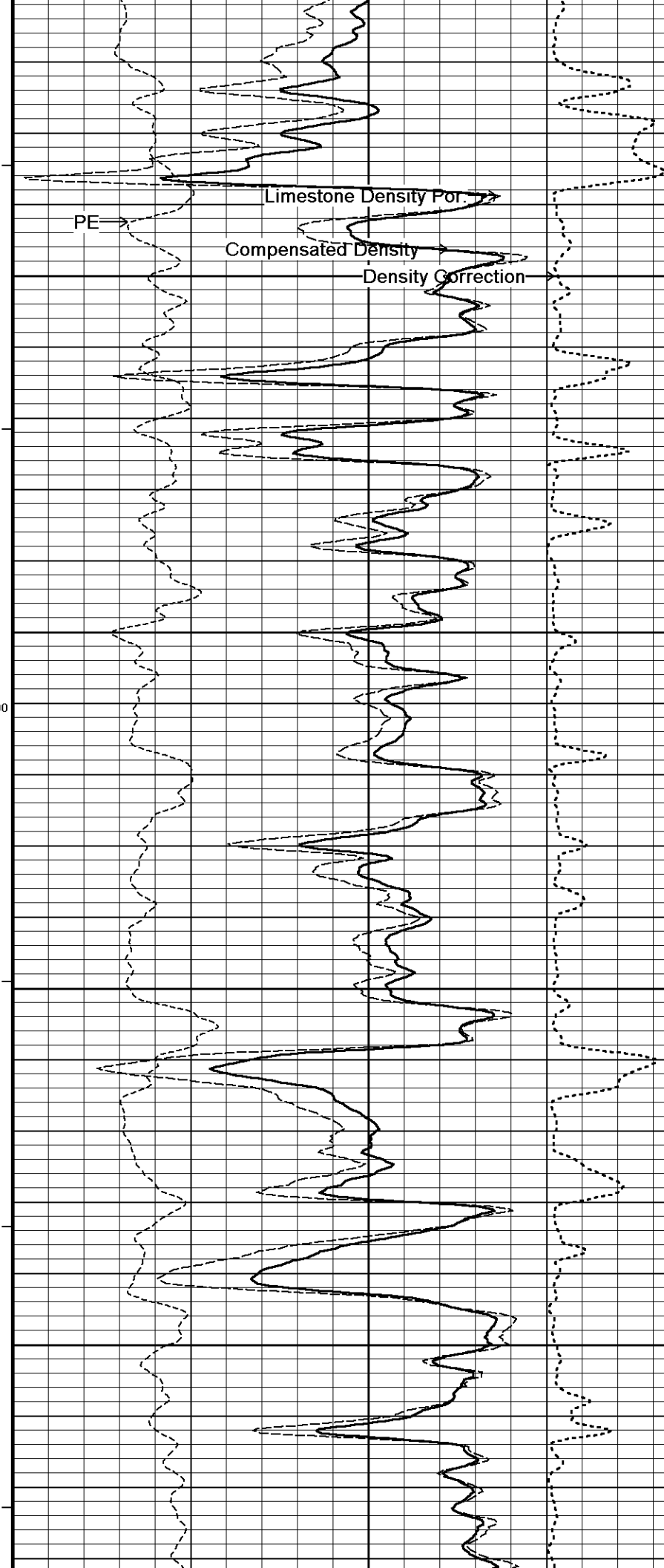
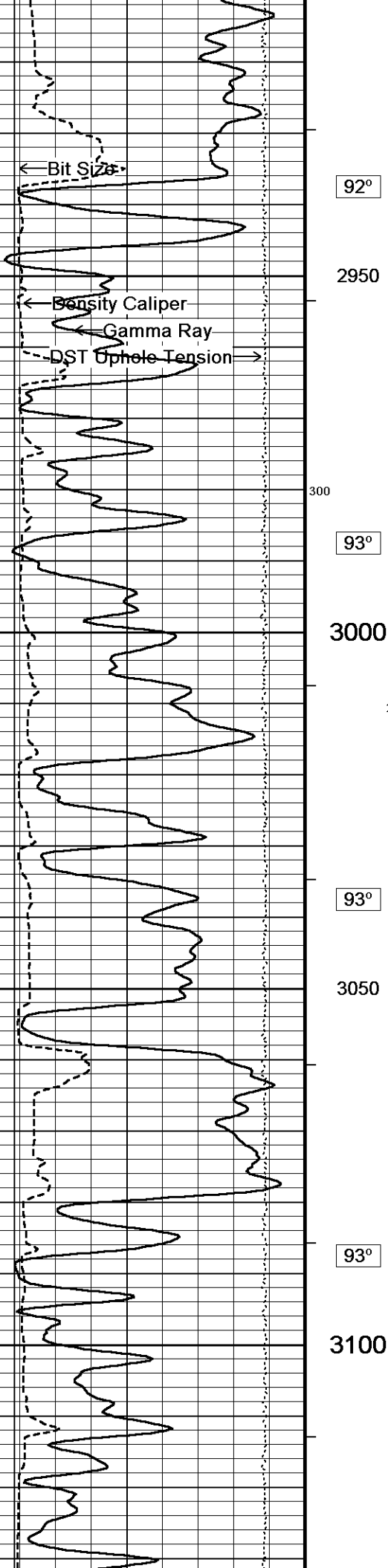
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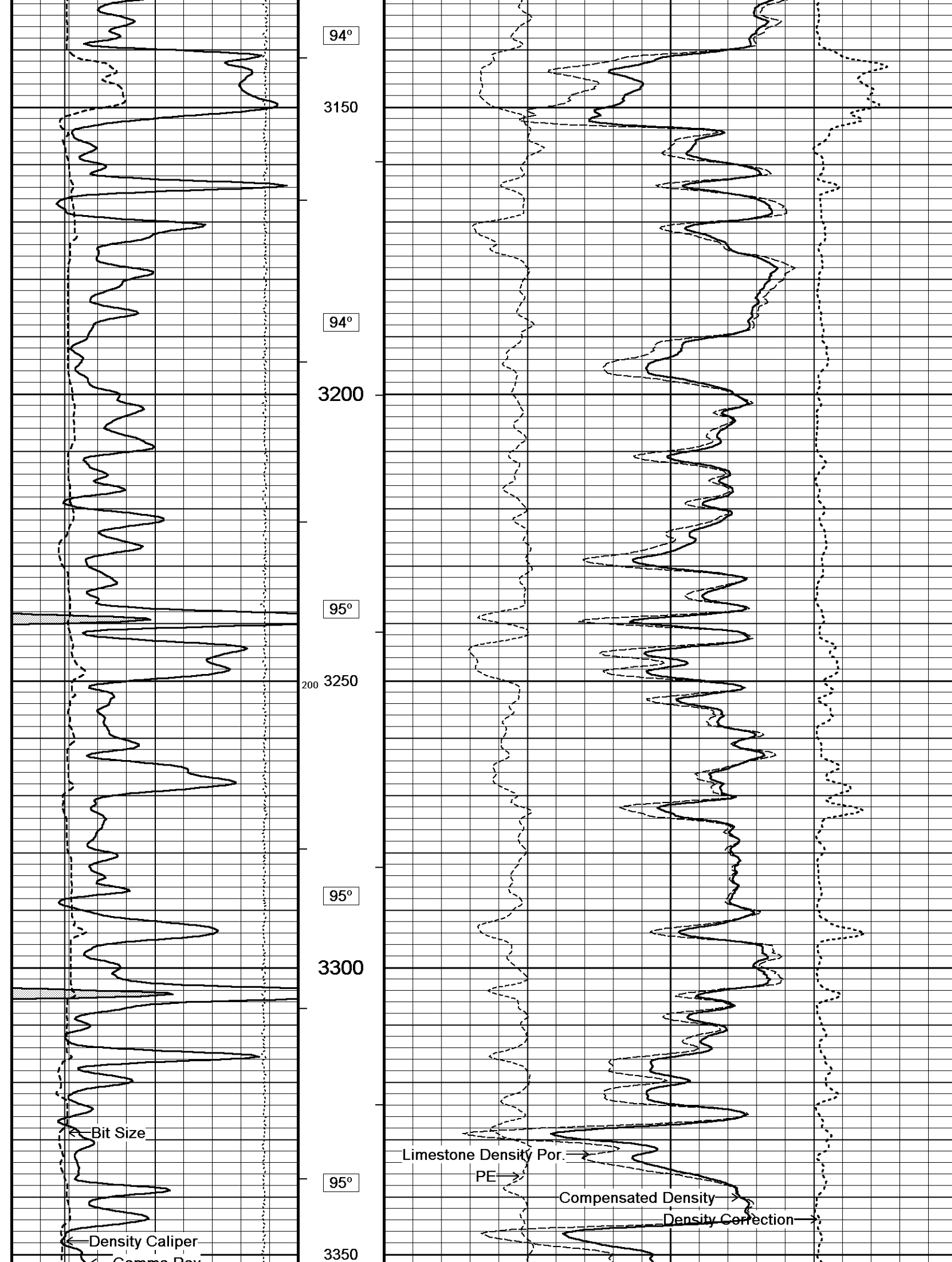
500 2450

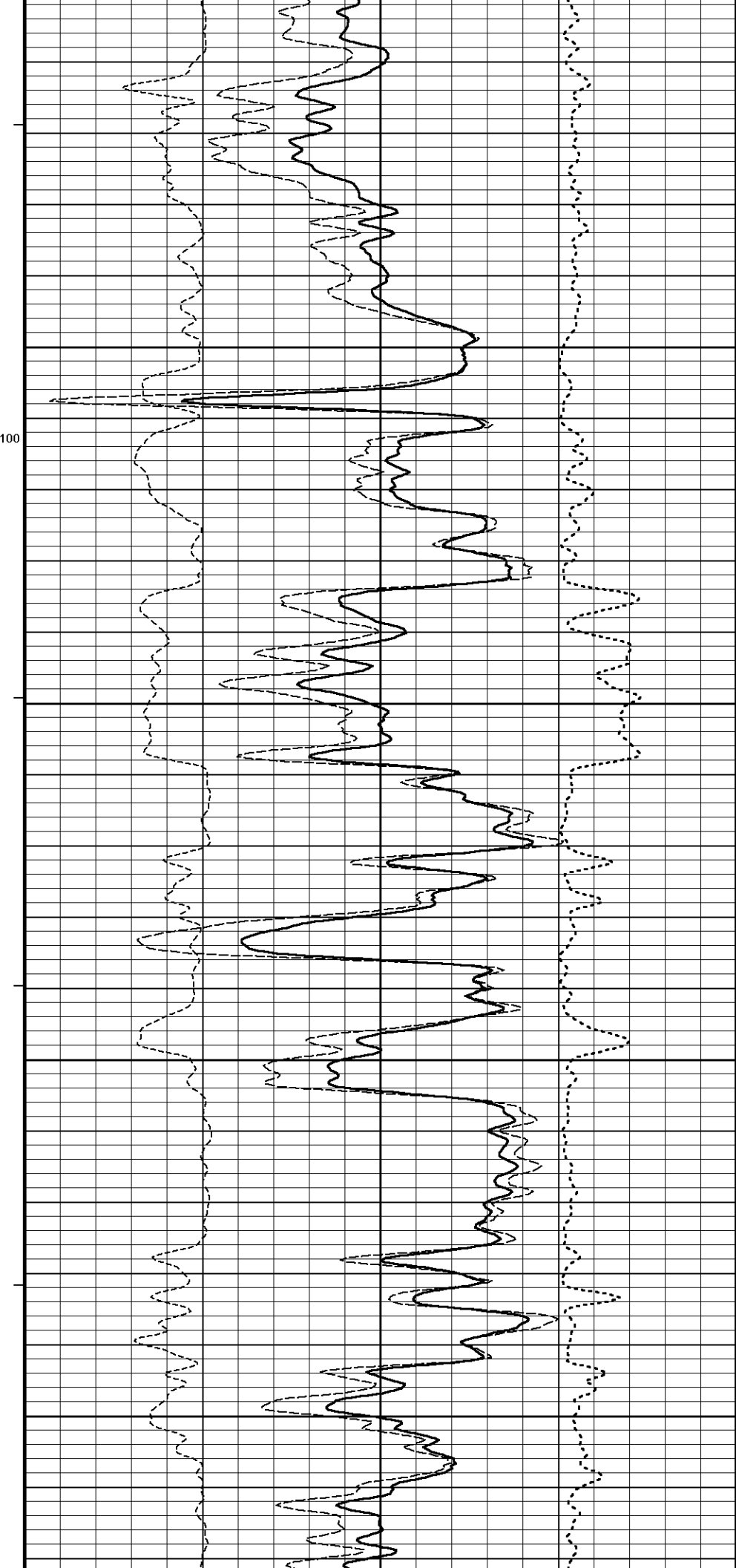
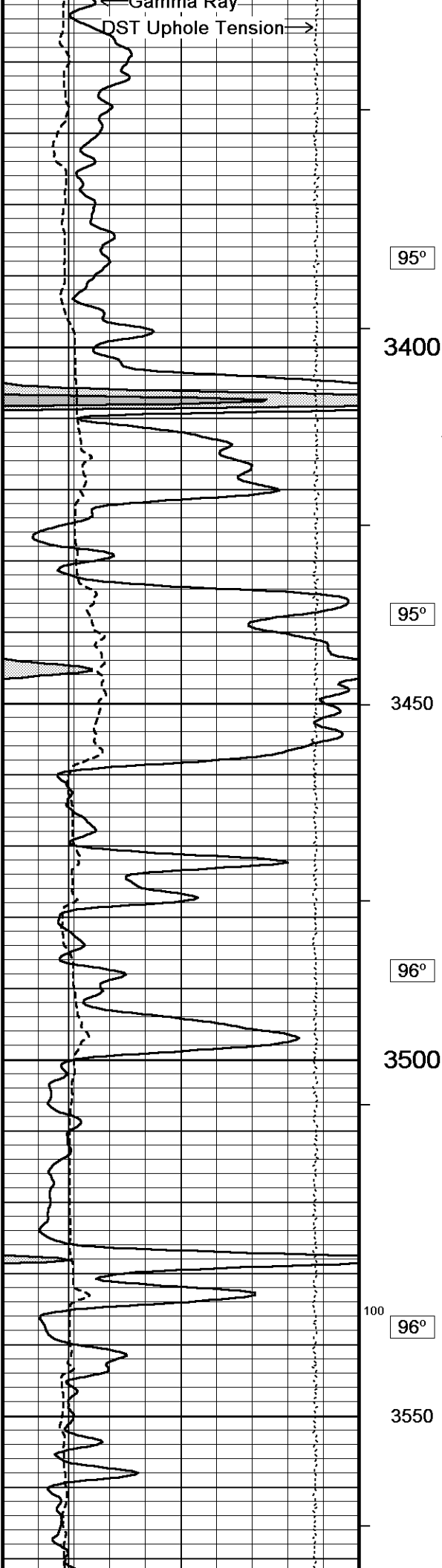


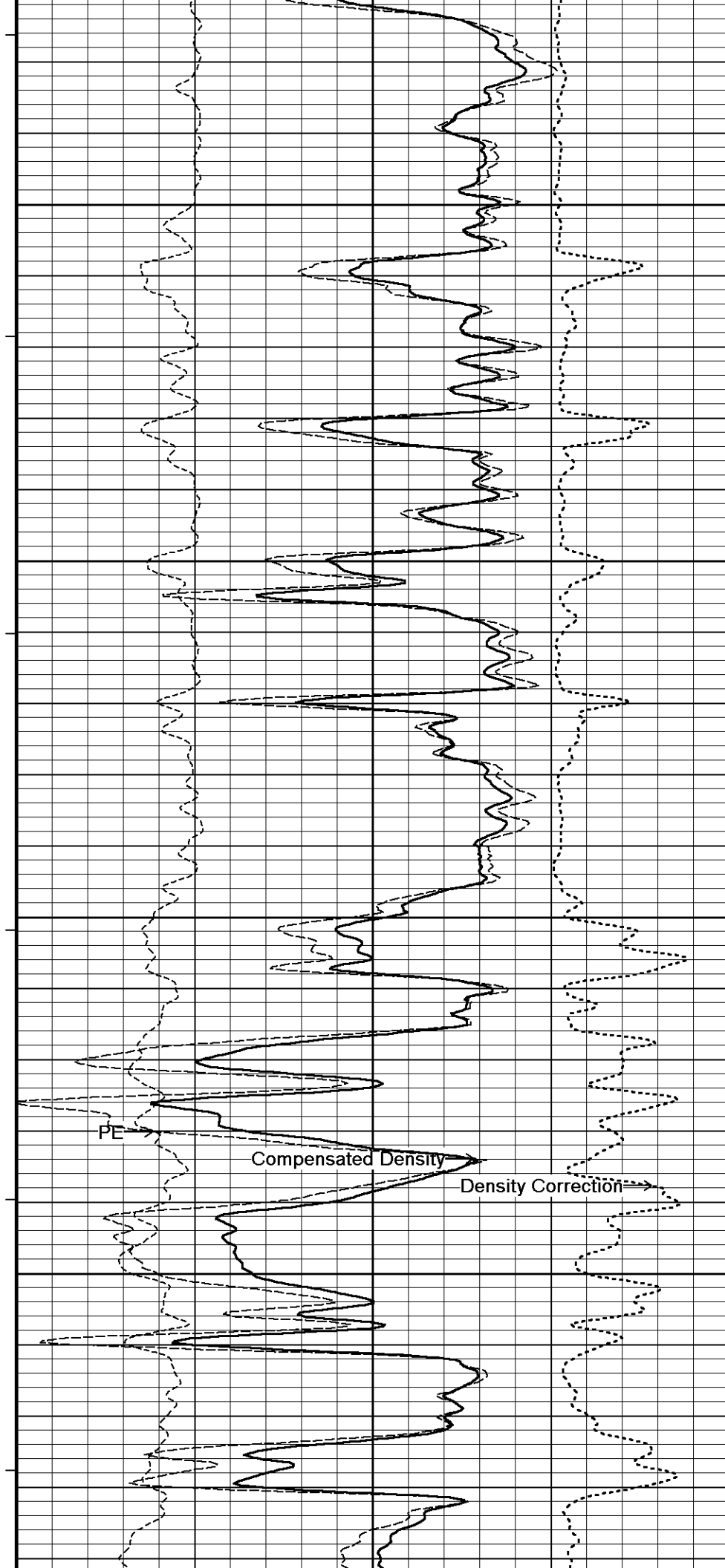
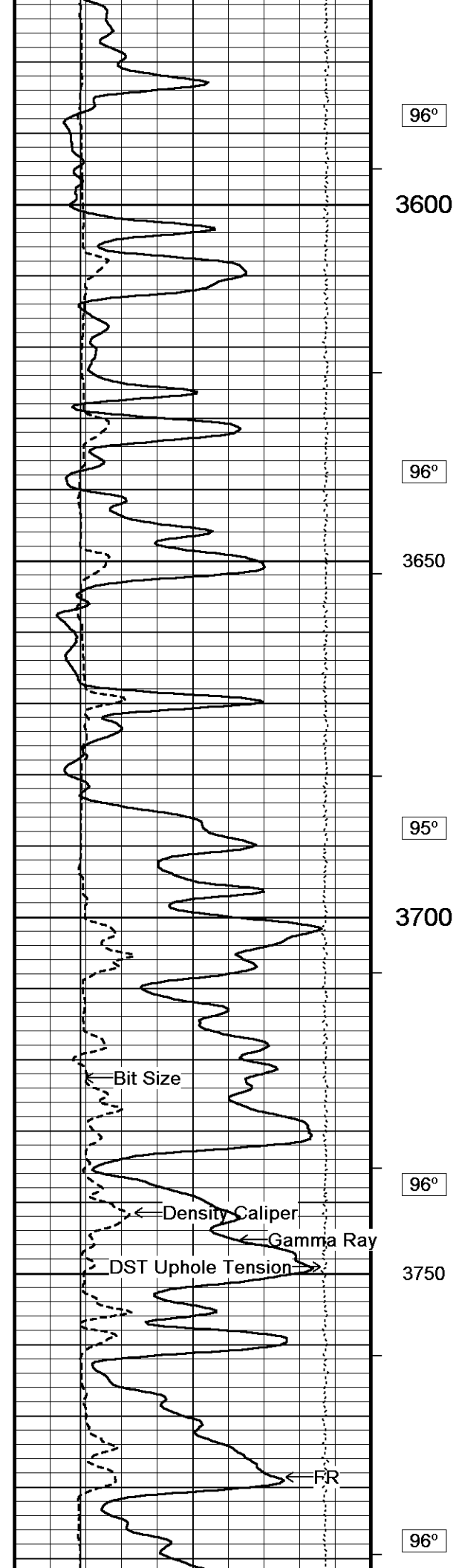


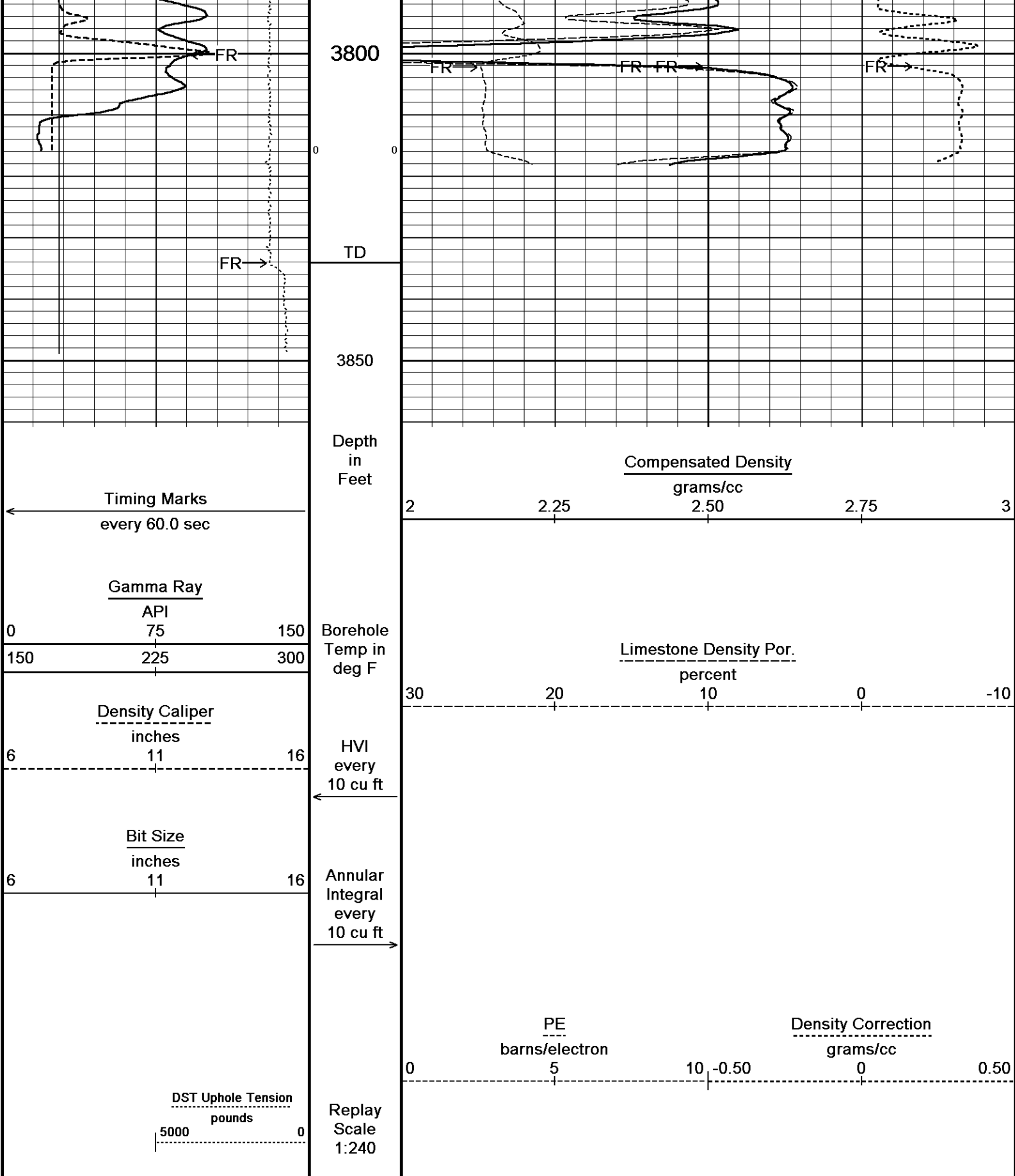






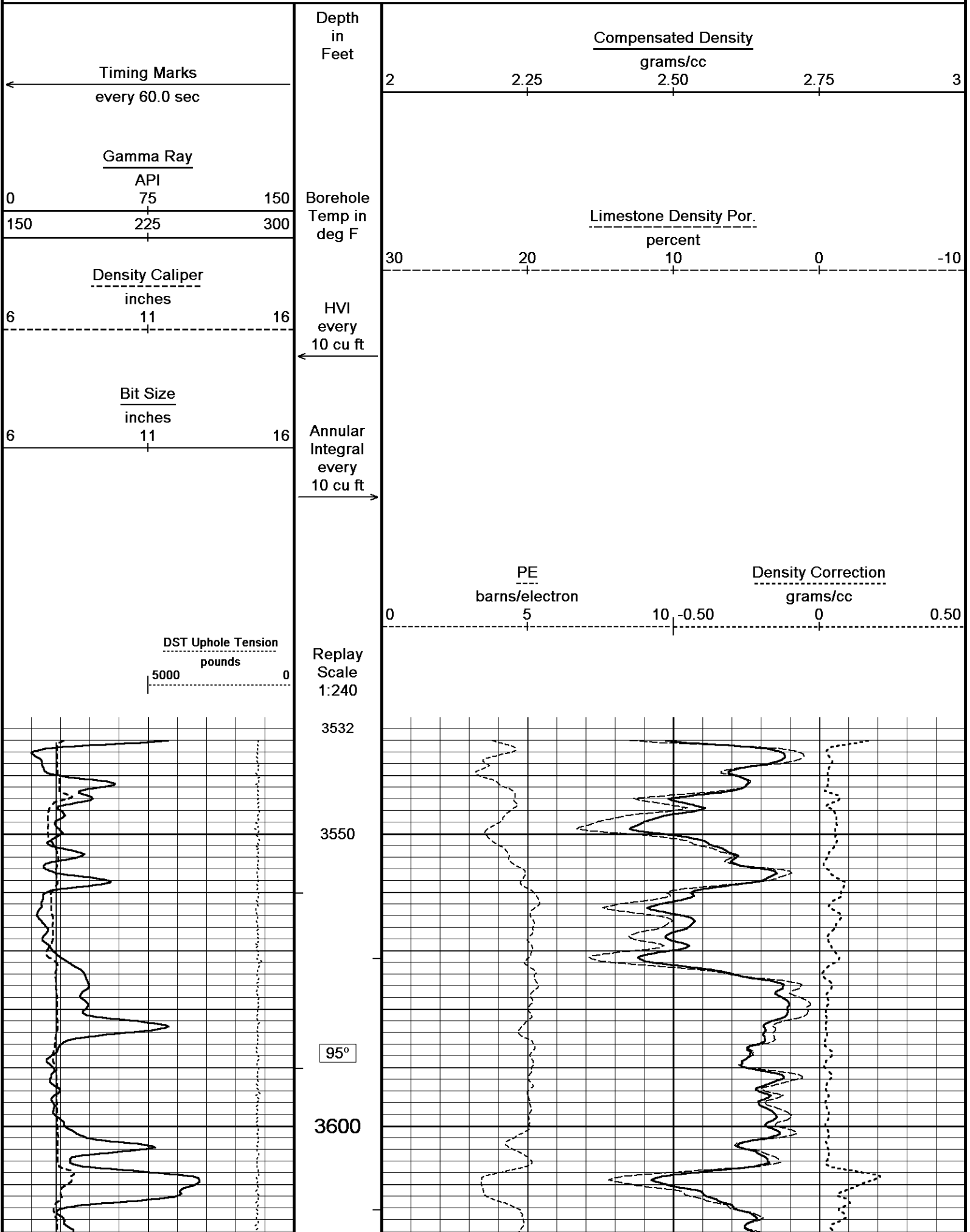


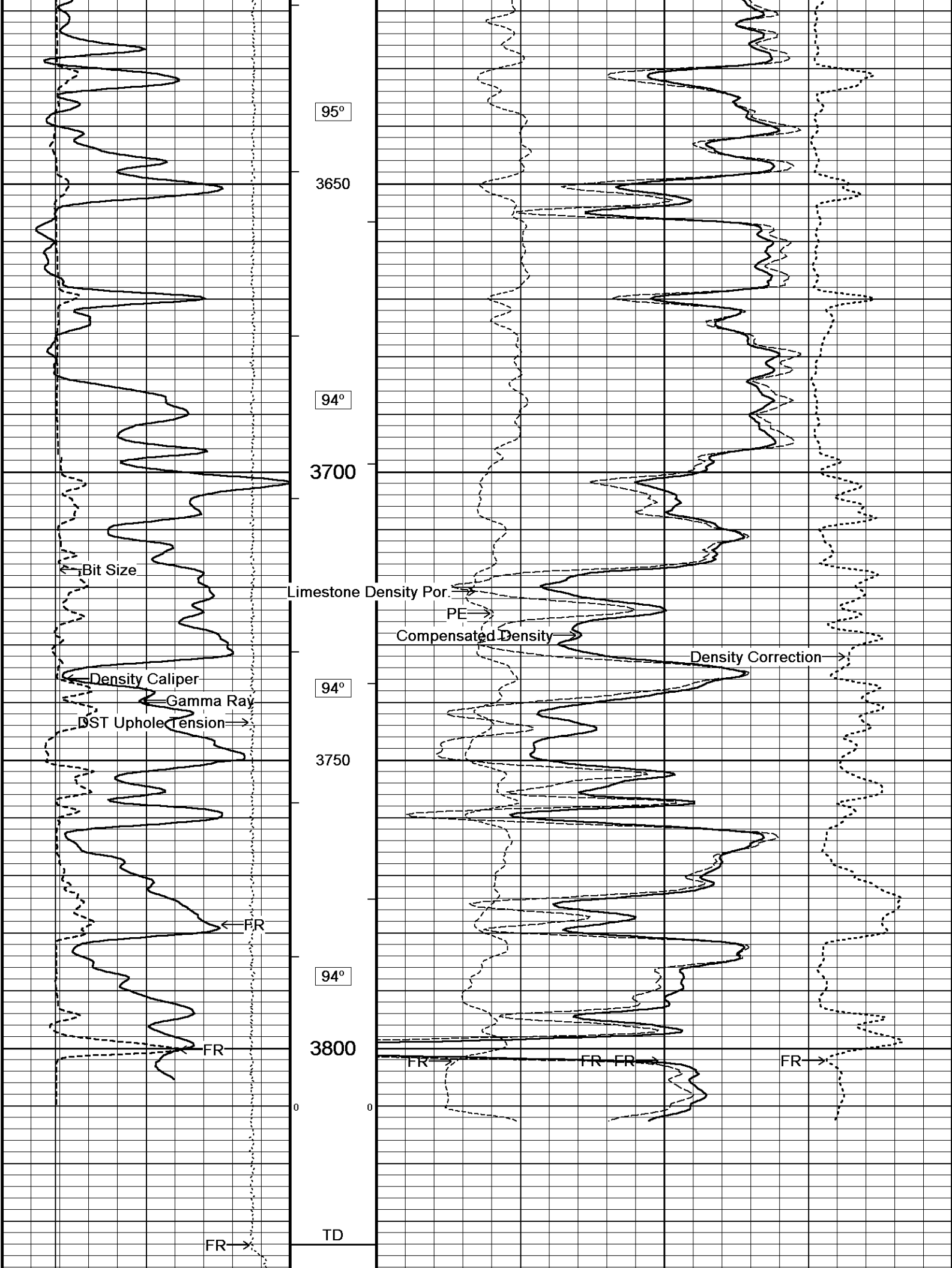


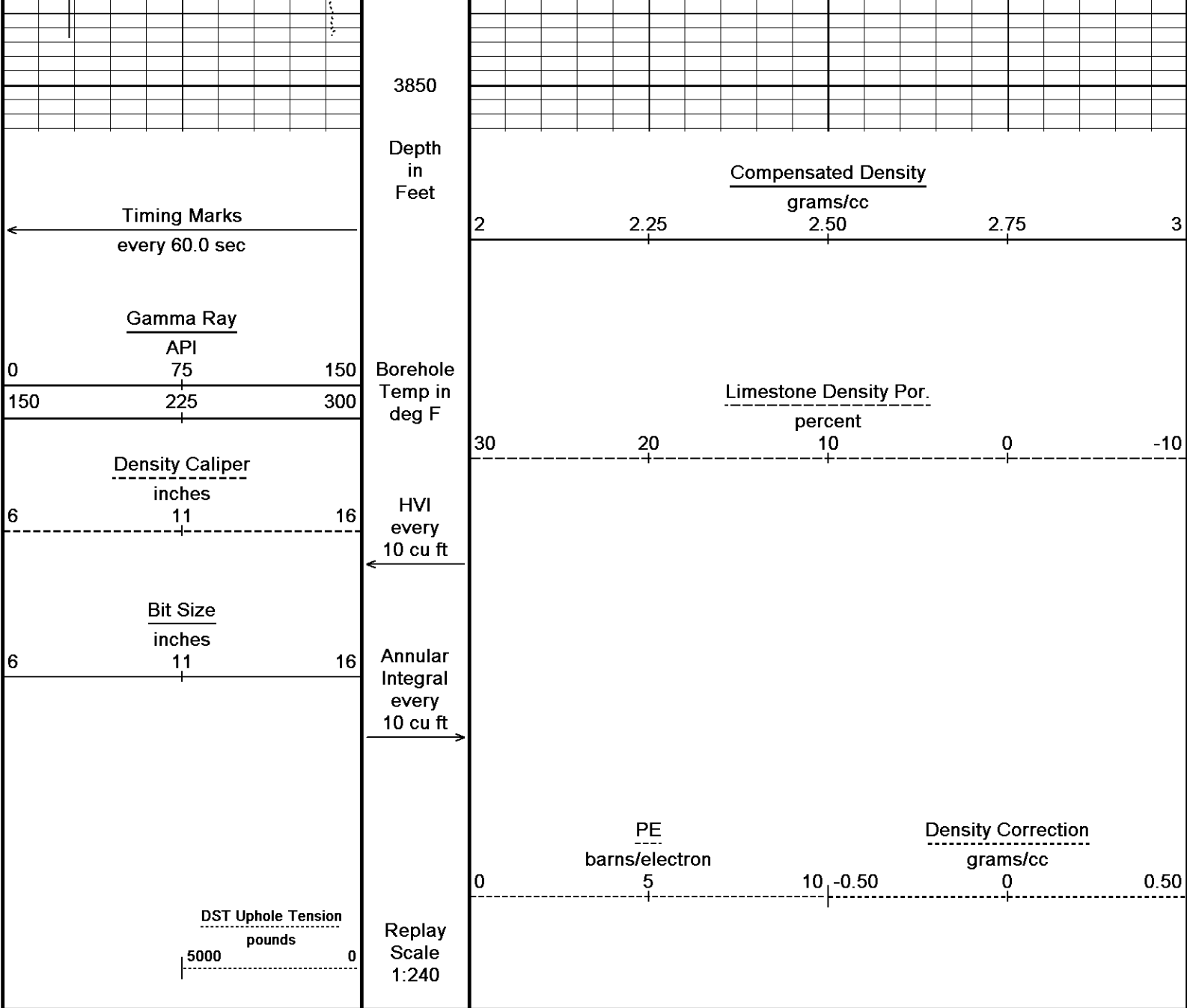


↑ 5 INCH BULK DENSITY MAIN ↑

↓ REPEAT SECTION ↓







Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 22-DEC-2016 17:12

Filename: C:\Minimus 16.05.3841\Data\O'Brien (LA) B...O'Brien (LA) Besperat #33-1 Repeat Merge.dta

Recorded on 22-DEC-2016 12:17

System Versions: Plotted with 16.05.3841

↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 16.05.3841\Data\O'Brien (LA) Besperat #33-1\O'Brien (LA) Besperat #33-1_001.dta		
General Constants All 000		Last Edited on 22-DEC-2016,11:53
General Parameters		
Mud Resistivity	0.290	ohm-metres
Mud Resistivity Temperature	75.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters		Base Density Porosity	
Porosity used		Array Ind. Two Res Rt	
Resistivity used			
RWA Constant A		1.000	
RWA Constant M		2.000	
SW/APOR Tool Source		0.000	
Down-hole Tension Calibration SMS 0			
Reading No		Measured	Calibrated (lbs)
1		16023.38	0.00
2		17442.64	490.00
Field Calibration on 17-DEC-2016 05:43			
Gamma Calibration MCG-C 123			
		Measured	Calibrated (API)
Background		73	50
Calibrator (Gross)		733	506
Calibrator (Net)		661	456
Field Calibration on 20-DEC-2016 17:24			
Gamma Calibration Tolerances MCG-C 123			
Ratio		1.449	Counts/API
Gamma Constants MCG-C 123			
Gamma Calibrator Number		MCGGRCC141	
GRC-M Calibrator Jig in Use?		NO	
Inactive Background Jig in Use?		NO	
Mud Density		1.12	gm/cc
Caliper Source for Processing		Density Caliper	
Tool Position		Eccentred	
Potassium Equivalence		Chloride	
K Mud Concentration		0.00	%
High Resolution Temperature Calibration MCG-C 123			
		Measured	Calibrated(Deg F)
Lower		50.00	50.00
Upper		100.00	100.00
Field Calibration on 03-DEC-2016,14:52			
High Resolution Temperature Constants MCG-C 123			
Pre-filter Length		11	
Last Edited on 22-SEP-2015,11:43			
SP Calibration MCG-C 123			
		Measured	Calibrated (mV)
Reference 1		100.9	100.0
Reference 2		-99.4	-99.9
Field Calibration on 03-DEC-2016 14:58			
Caliper Calibration MML-A 7			
Base Calibration		Base Calibration on 16-DEC-2016 17:16	
Field Calibration		Field Calibration on 21-DEC-2016 16:47	
Reading No		Measured	Calibrator Size (in)
1		14052	5.97
2		17400	7.98
3		20637	9.86
4		24492	11.88
5		0	0.00
6		N/A	N/A
Field Calibration		Measured Caliper (in)	Actual Caliper (in)
		7.95	7.97
Caliper Calibration Tolerances MML-A 7			
Short Arm Field Cal.		7.95	in
Micro Normal and Micro Inverse Calibration MML-A 7			
Base Calibration		Base Calibration on 16-DEC-2016 17:25	
		Field Check on 21-DEC-2016 16:46	
		Measured	Calibrated (ohm-m)

Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.0	49.9	5.1	25.6
Micro Inverse	10.0	49.8	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.4	77.4
Micro Inverse	51.3	51.3

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1	10.0		ohm	Micro Normal Res. 2	49.9		ohm
Micro Inverse Res. 1	10.0		ohm	Micro Inverse Res. 2	49.8		ohm
Micro Normal Base Check	77.4		ohm-m				
Micro Inverse Base Check	51.3		ohm-m				
Micro Normal Field Check	77.4		ohm-m				
Micro Inverse Field Check	51.3		ohm-m				

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 22-DEC-2016,10:24

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 66

Base Calibration on 03-DEC-2016,15:38

Field Check on 20-DEC-2016 17:31

Base Calibration				
	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3116	97	3714	110
Ratio	32.277		33.764	
Field Calibrator at Base			Calibrated (cps)	
			2061	3028
Ratio			0.681	
Field Check			Calibrated (cps)	
			2149	3082
Ratio			0.697	

Neutron Calibration Tolerances MDN-A.B 66

Ratio	32.277	
Base Check	0.681	
Field Check	0.697	

Neutron Constants MDN-A.B 66

Last Edited on 22-DEC-2016,10:24

Neutron Source Id	P0204NN
Neutron Jig Number	NJ5736
Air Hole Processing	Legacy
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
Salinity Correction	Not Applied
Formation Fluid Salinity Source	None

Formation Fluid Salinity Source	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 352		Base Calibration on 01-DEC-2016 15:21 Field Check on 20-DEC-2016 16:56	
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	963.5	126.8	
Base Check		281.3	
Field Check		281.5	

FE Calibration Tolerances MFE-B.J 352			
Reference 2	963.5	-3% 980.0 +3%	ohm
Base Check	281.3	-2% 277.0 +2%	ohm-m
Field Check	281.5	-2% 281.3 +2%	ohm-m

FE Constants MFE-B.J 352		Last Edited on 22-DEC-2016,10:23	
Running Mode	No Sleeve		
MFE K Factor	0.1268		
Borehole Correction Constants			
Sonde Position	0.5	inches	
Hole Size Source	Density Caliper		
Hole Size Constant Value	N/A	inches	
Rm Source	Global Value: Temperature Corrected		
Temp. for Rm Corr.	MCG External Temperature		

Sonic Constants MSS-A.A 55			Last Edited on 22-DEC-2016,10:23		
Maximum Boundary Contrast	100.00	micro-sec/ft			
Fluid Transit Time	189.00	micro-sec/ft			
Limestone Transit Time	47.50	micro-sec/ft			
Sandstone Transit Time	55.50	micro-sec/ft			
Dolomite Transit Time	43.50	micro-sec/ft			
Sonic used for Porosities	3-5' Compensated Sonic				
Correction for Sonde Skew	Applied				
Cycle Stretch Algorithm	Applied				
MN3FT	N/A	micro-sec			
MX3FT	N/A	micro-sec			
Hunt-Raymer Constant	83.13	micro-sec/ft			
Sonde Mode	Compensated				
Hole Type	Open Hole				
Sonde Parameters					
	Measured	Calibrated			
Offset	N/A	0.0000			
Free Pipe	N/A	N/A			
Peak Amplitude Source	N/A				
Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A
Processed Fixed Gate Parameters					
Waveform Used For Processing	N/A				
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A		
N/A	N/A	N/A			
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	

N/A
N/AN/A
N/AN/A
N/AN/A
N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
Waveform Discriminator Filter	N/A	
Semblance Window Width	N/A	micro-sec
Sonic Despiker	N/A	N/A

Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 20-DEC-2016 16:48

Base Calibration

Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel		Low	High	Low	High
1		17.6	473.6	9.3	966.2
2		6.4	385.9	7.6	821.4
3		3.2	264.0	5.2	566.0
4		2.1	135.5	2.6	279.2
Array Temperature		23.0		Deg F	

Test Loop Calibration Verified 03-DEC-2016,14:48

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	12.1	3873.0	9.5	3868.2
2	29.8	3528.1	27.7	3523.7
3	29.1	3021.3	27.3	3017.3
4	19.1	2058.5	18.0	2055.4
Deep	17.7	1962.1	16.5	1959.0
Medium	43.1	3976.4	40.8	3971.5
Shallow	44.4	5232.7	41.4	5226.9
Array Temperature		65.8	58.5	Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6		mmho/m	High Conductivity 1	473.6		mmho/m
Low Conductivity 2	6.4		mmho/m	High Conductivity 2	385.9		mmho/m
Low Conductivity 3	3.2		mmho/m	High Conductivity 3	264.0		mmho/m
Low Conductivity 4	2.1		mmho/m	High Conductivity 4	135.5		mmho/m
Background Vx 1	0.0		mmho/m	Phase Check Loop 1	0.0		%
Background Vx 2	0.0		mmho/m	Phase Check Loop 2	0.0		%
Background Vx 3	0.0		mmho/m	Phase Check Loop 3	0.0		%
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%

Induction Constants MAI-A.A 111

Last Edited on 22-DEC-2016,10:23

Induction Model	RtAP-WBM	
Borehole Correction Constants		
Tool Centred	No	
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
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

Rm Source Global Value: Temperature Corrected
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

Symmetrised Receiver Gains		
Receiver 1		1.00
Receiver 2		1.00
Receiver 3		1.00
Receiver 4		1.00

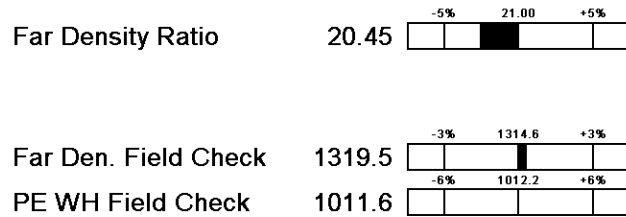
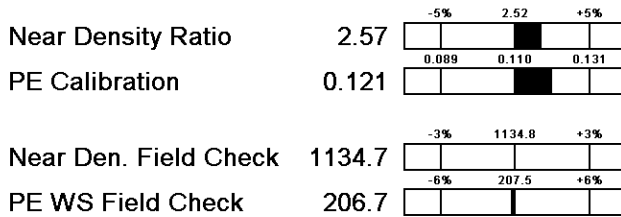
Apparent Porosity and Water Saturation Constants			
Archie Constant (A)		1.00	
Cementation Exponent (M)		2.00	
Saturation Exponent (N)		2.00	
Saturation of Water for Apor	100.00		percent
Resistivity of Water for Apor and Sw	0.05		ohm-m
Resistivity of Mud Filtrate for Sw	0.00		ohm-m
Source for Rt	0.00		
Source for Rxo	0.00		

High Resolution Temperature Calibration MAI-A.A 111			Field Calibration on 03-DEC-2016,14:51
	Measured	Calibrated(Deg F)	
Lower	10.00	10.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MAI-A.A 111		Last Edited on 26-JUN-2014,15:06
Pre-filter Length	11	

Photo Density Calibration MPD-B 104				Base Calibration on 03-DEC-2016 14:06
				Field Check on 20-DEC-2016 17:04
Density Calibration				
Base Calibration		Measured	Calibrated (sdu)	
	Near	Far	Near	Far
Background	1135	1315		
Reference 1	50307	24205	59556	30836
Reference 2	20296	2434	24941	2541
Field Check at Base				
	1134.8	1314.6		
Field Check				
	1134.7	1319.5		
PE Calibration				
Base Calibration		Measured	Calibrated	
	WS	WH	Ratio	Ratio
Background	208	1012		
Reference 1	21183	50127	0.427	0.371
Reference 2	5908	20162	0.298	0.272
Field Check at Base				
	207.5	1012.2		

Photo Density Calibration Tolerances MPD-B 104



Density Constants MPD-B 104

Last Edited on 22-DEC-2016,10:24

Density Source Id	P50557B	
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	1.12	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	
Precision Enhanced Density Processing	Not Applied	
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	

Caliper Calibration MPD-B 104

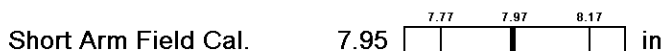
Base Calibration on 01-DEC-2016 17:42

Field Calibration on 20-DEC-2016 16:58

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14257	3.99
2	23231	5.98
3	32062	7.97
4	40288	9.86
5	49313	11.92
6	N/A	N/A

Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.95	7.97

Caliper Calibration Tolerances MPD-B 104



DOWNHOLE EQUIPMENT

C:\Minimus 16.05.3841\Data\O'Brien (LA) Besperat #33-1\O'Brien (LA) Besperat #33-1_002.dta

Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in



55.39 ft GRGC - MCG Gamma Ray

52.48 ft CGXT - MCG External Temperature

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

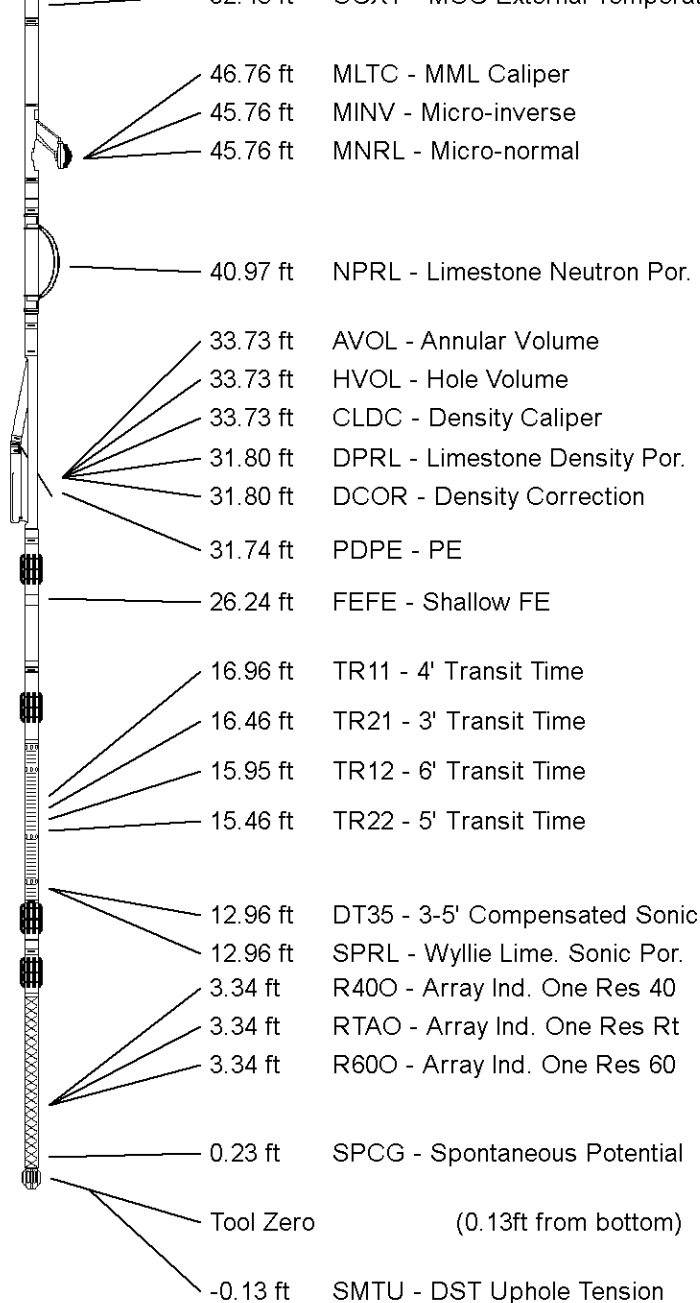
Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.07 ft Weight: 480.6 lb



All measurements relative to tool zero.

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	BESPERAT #33-1
FIELD	WILDCAT
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2065	feet	First Reading	3802.00	feet
Elevation Drill Floor	2063	feet	Depth Driller	3836.00	feet
Elevation Ground Level	2057	feet	Depth Logger	3834.00	feet



Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG

