Weatherford

COMPENSATED NEUTRON
COMPACT PHOTO DENSITY
MICRORESISTIVITY LOG

COMPANY	M & M EXPLORATION, INC.
WELL	STUTZMAN #1
FIELD	KISIWA
PROVINCE/COUNTY	HARVEY
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1381' FNL & 2350' FEL

SEC	TWP	RGE	Other Services
15	24S	2W	MAI/MFE

Latitude
Longitude
API Number 15-079-20715

Permanent Datum GL, Elevation 1402 feet
Log Measured From KB, 8.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	1410.00
DF	1408.00
GL	1402.00

Date	30-OCT-2017			
Run Number	ONE			
Service Order	4558-196549519			
Depth Driller	4000.00	feet		
Depth Logger	4000.00	feet		
First Reading	3981.00	feet		
Last Reading	2500.00	feet		
Casing Driller	266.00	feet		
Casing Logger	267.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg		52.00 CP	
PH / Fluid Loss	9.50		8.00 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.89 @ 75.0	ohm-m		
Rmf @ Measured Temp	0.71 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.07 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.59 @114.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	114.00	deg F		
Equipment / Base	13096		LIB	
Recorded By	ADAM SILL			
Witnessed By	JUSTIN CARTER			

BOREHOLE RECORD

Last Edited: 30-OCT-2017 12:40

Bit Size inches	Depth From feet	Depth To feet
7.875	266.00	4000.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	266.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 17.03.9700.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING 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 SURFACE CASING: 1685 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3000 FEET: 179 CU.FT.
- RIG: DISCOVERY #2

- RIG: DISCOVERY #2.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR.

5 INCH MAIN - ANHYDRITE

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 30-OCT-2017 16:27
Filename: C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_002.dta — Recorded on 30-OCT-2017 13:39
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

700

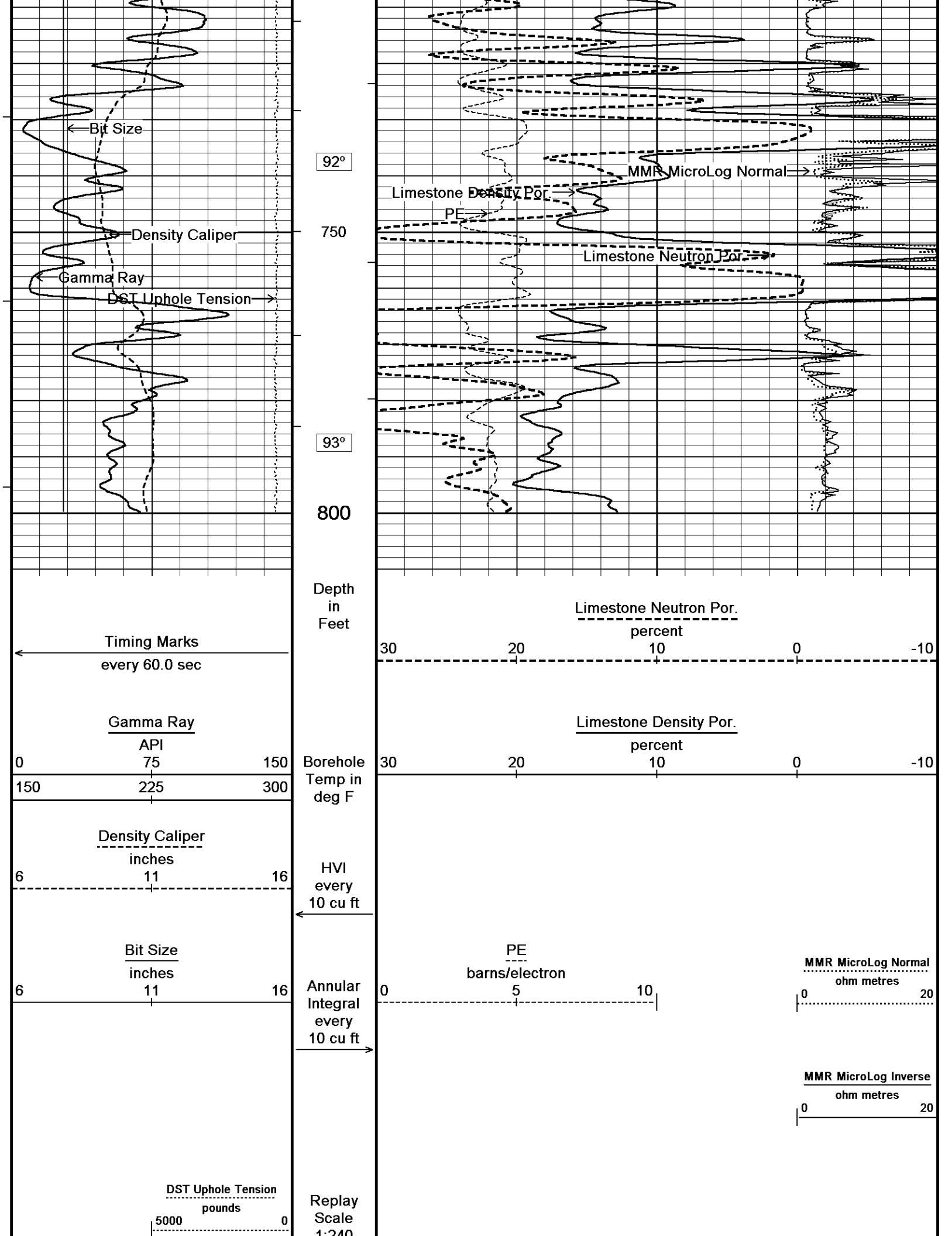
Limestone Neutron Por.
percent
30 20 10 0 -10

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

MMR MicroLog Normal
ohm metres
0 20

MMR MicroLog Inverse
ohm metres
0 20


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
92°
750
93°
800
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.
Depth in Feet
Timing Marks
every 60.0 sec
Limestone Neutron Por.
percent
30 20 10 0 -10
Gamma Ray
API
0 75 150
150 225 300
Borehole Temp in deg F
Limestone Density Por.
percent
30 20 10 0 -10
Density Caliper
inches
6 11 16
HVI every 10 cu ft
Bit Size
inches
6 11 16
Annular Integral every 10 cu ft
PE
barns/electron
0 5 10
MMR MicroLog Normal
ohm metres
0 20
MMR MicroLog Inverse
ohm metres
0 20
DST Uphole Tension
pounds
5000 0
Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
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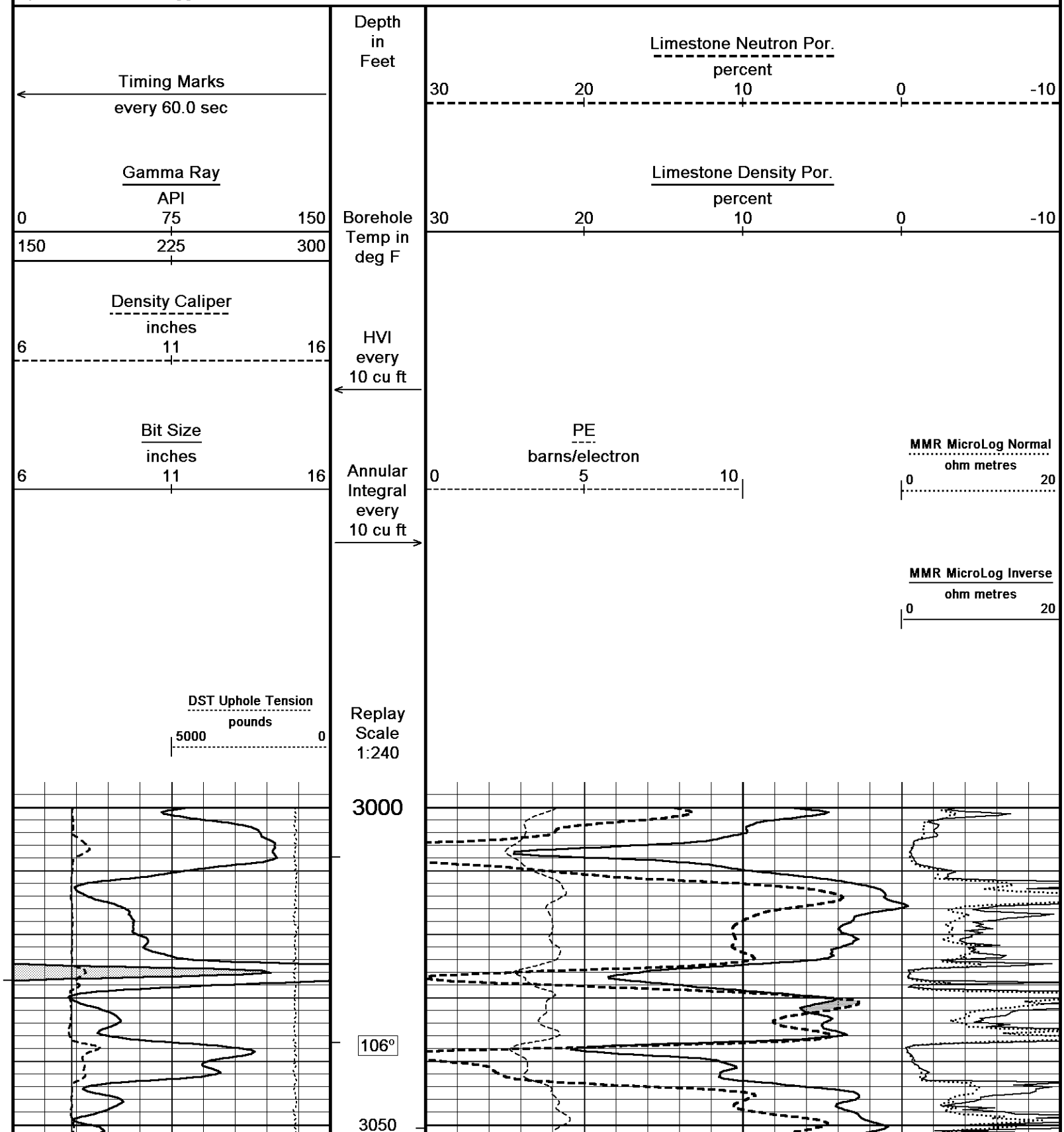
Plotted on 30-OCT-2017 16:27
Recorded on 30-OCT-2017 13:39

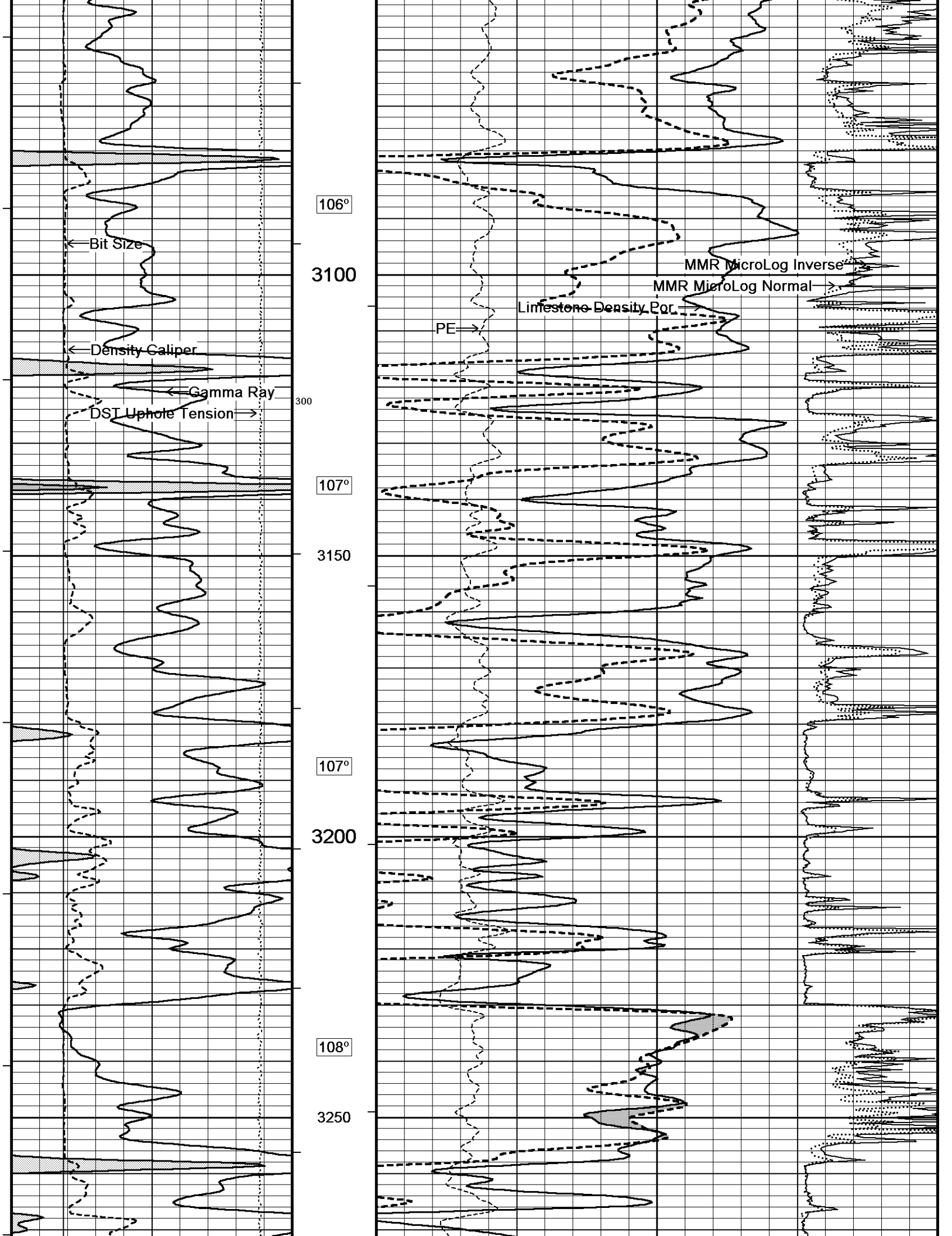
5 INCH MAIN - ANHYDRITE

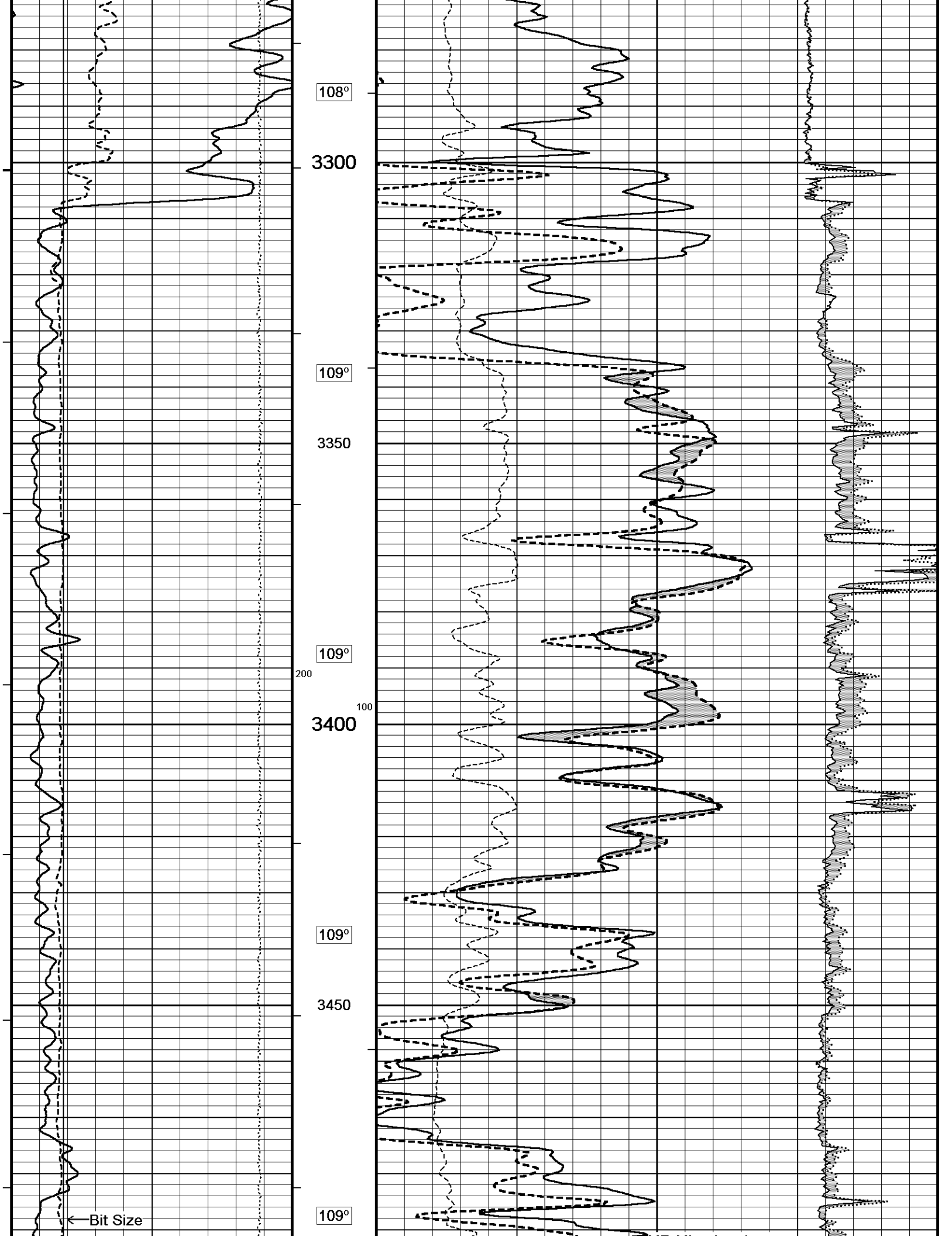
5 INCH LIMESTONE MAIN

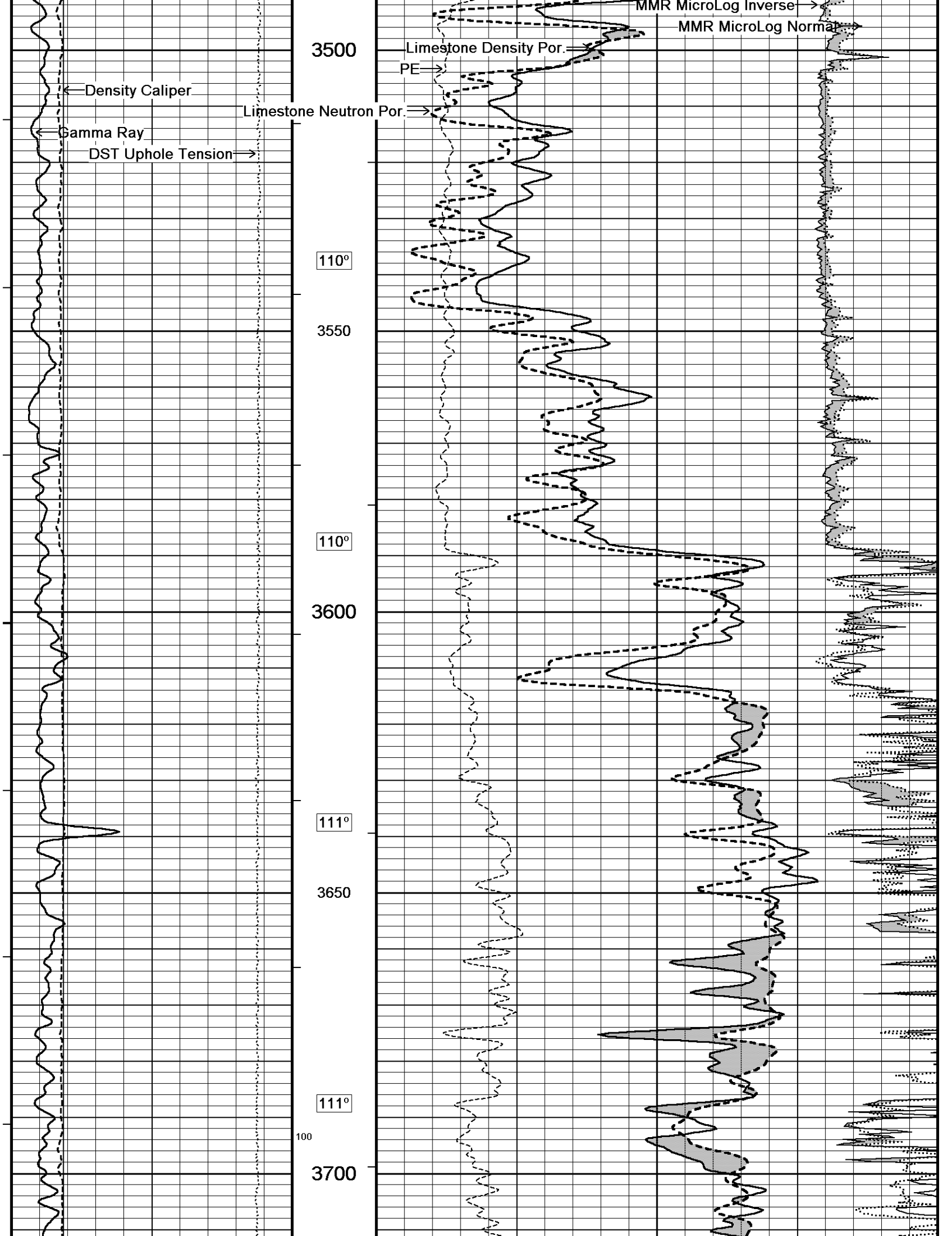
Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_002.dta
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

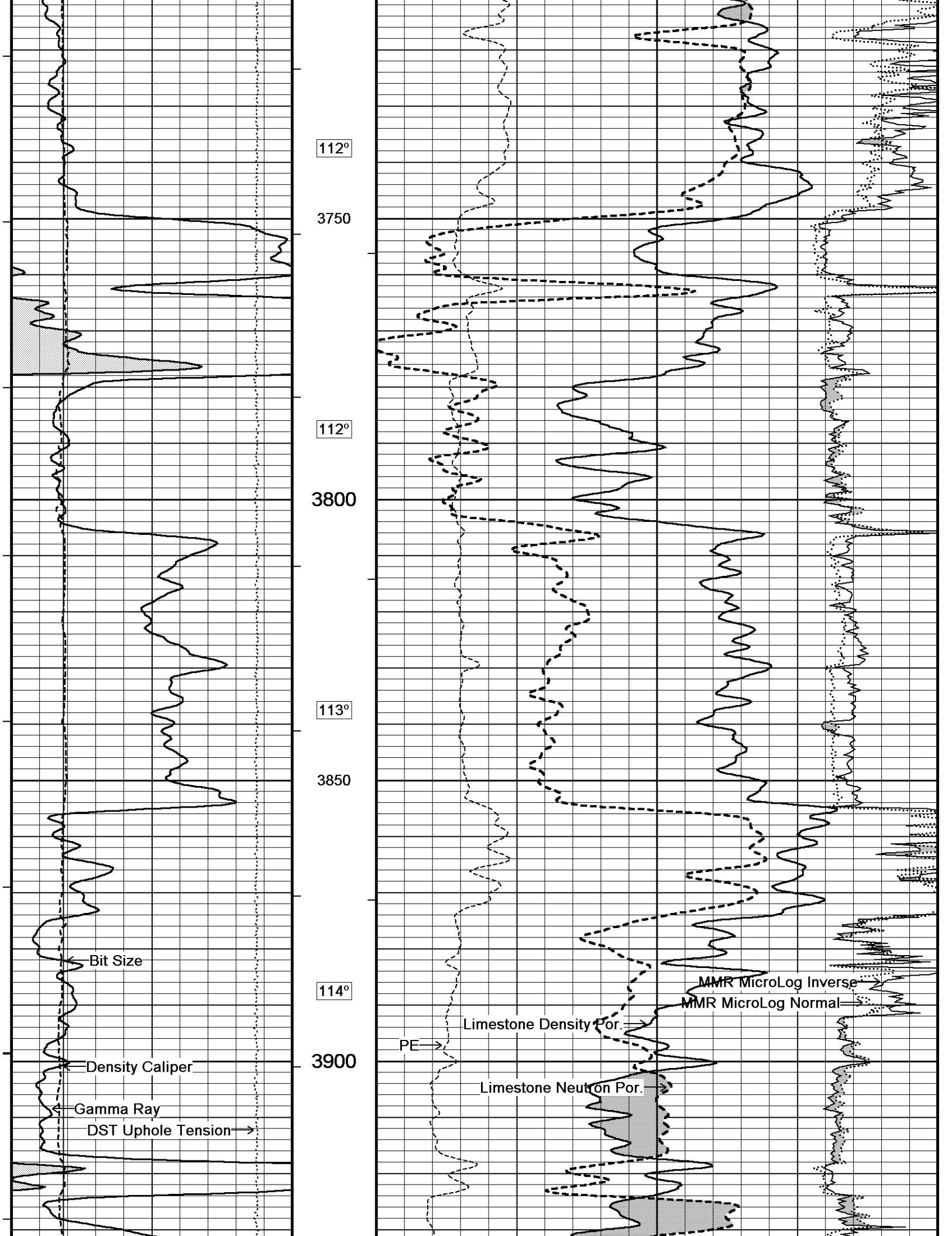
Plotted on 30-OCT-2017 16:27
Recorded on 30-OCT-2017 13:39

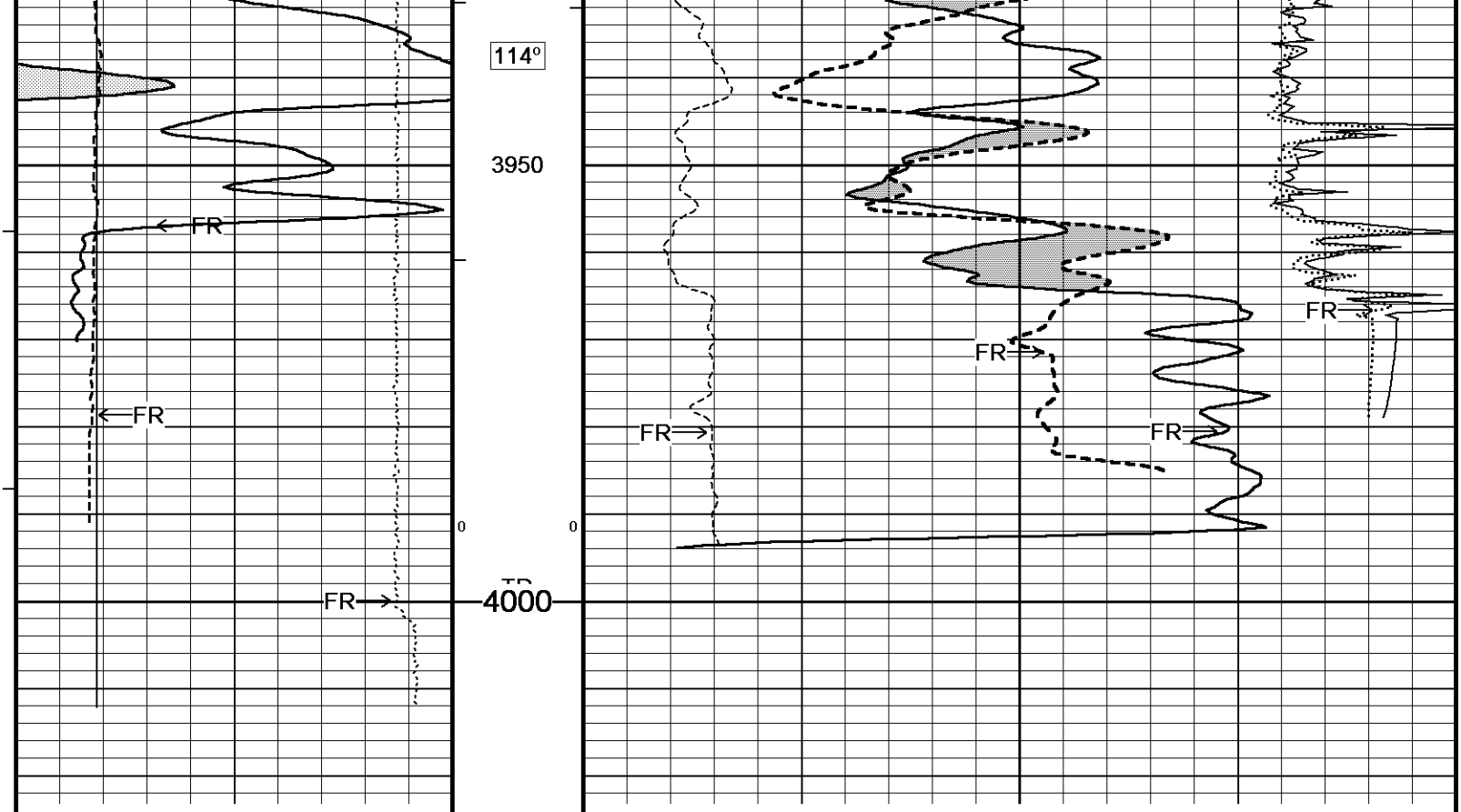



106°
Bit Size
3100
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por
PE
Density Caliper
Gamma Ray
DSI Uphole Tension
300
107°
3150
107°
3200
108°
3250


108°
3300
109°
3350
109°
200
100
3400
109°
3450
109°
Bit Size


MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Density Caliper
Limestone Neutron Por.
Gamma Ray
DST Uphole Tension
3500
110°
3550
110°
3600
111°
3650
111°
100
3700


112°
3750
112°
3800
113°
3850
114°
3900
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.



Depth in Feet

Timing Marks
every 60.0 sec

Limestone Neutron Por.
percent
30 20 10 0 -10

Gamma Ray
API
0 75 150
150 225 300

Limestone Density Por.
percent
30 20 10 0 -10

Borehole Temp in deg F

Density Caliper
inches
6 11 16

HVI every 10 cu ft

Bit Size
inches
6 11 16

PE
barns/electron
0 5 10

MMR MicroLog Normal
ohm metres
0 20

Annular Integral every 10 cu ft

MMR MicroLog Inverse
ohm metres
0 20

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 30-OCT-2017 16:27

Filename: C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_002.dta

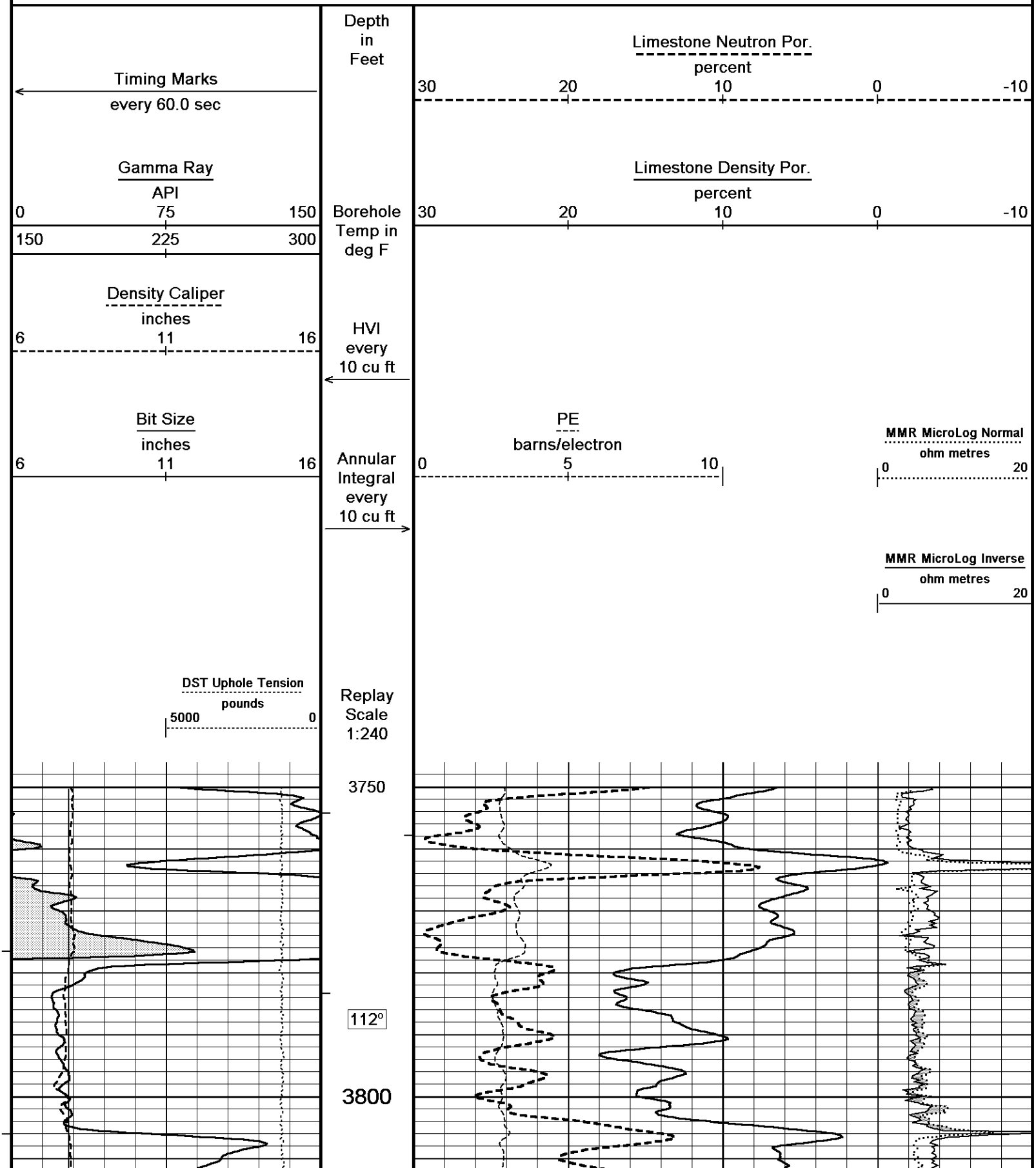
Recorded on 30-OCT-2017 13:39

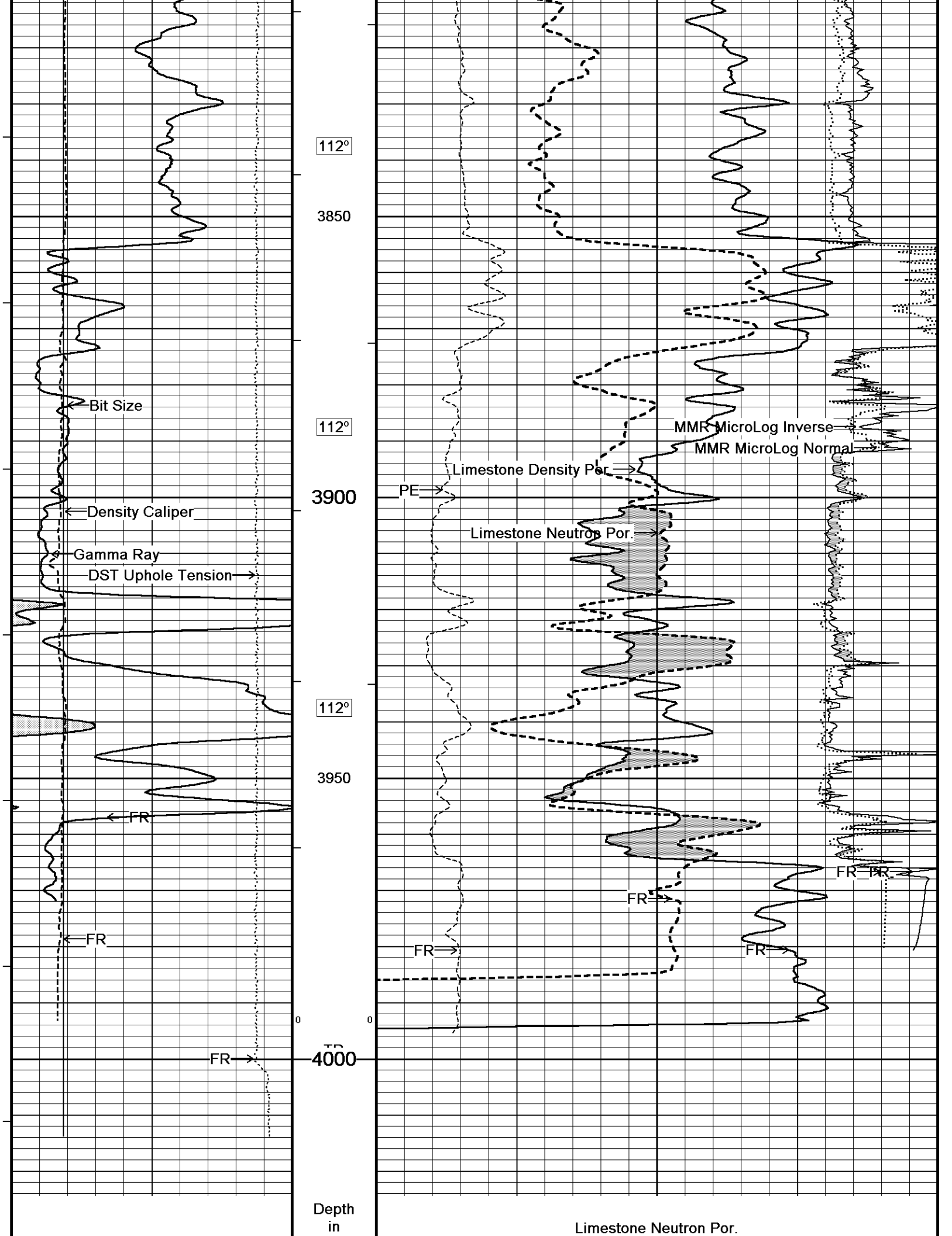
Filename: C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_002.dta Recorded on 30-OCT-2017 15:39
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

5 INCH LIMESTONE MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 30-OCT-2017 16:27
Filename: C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_001.dta Recorded on 30-OCT-2017 13:19
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700




112°
3850
112°
3900
112°
3950
4000
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
FR
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.
FR
FR
FR
FR
0
0
Depth
in
Limestone Neutron Por.

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

percent
30 20 10 0 -10

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

MMR MicroLog Normal
ohm metres
0 20

MMR MicroLog Inverse
ohm metres
0 20

Depth Based Data - Maximum Sampling Increment 10.0cm
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Plotted on 30-OCT-2017 16:27
Recorded on 30-OCT-2017 13:19

REPEAT SECTION

5 INCH BULK DENSITY MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
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System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

Plotted on 30-OCT-2017 16:27
Recorded on 30-OCT-2017 13:39

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

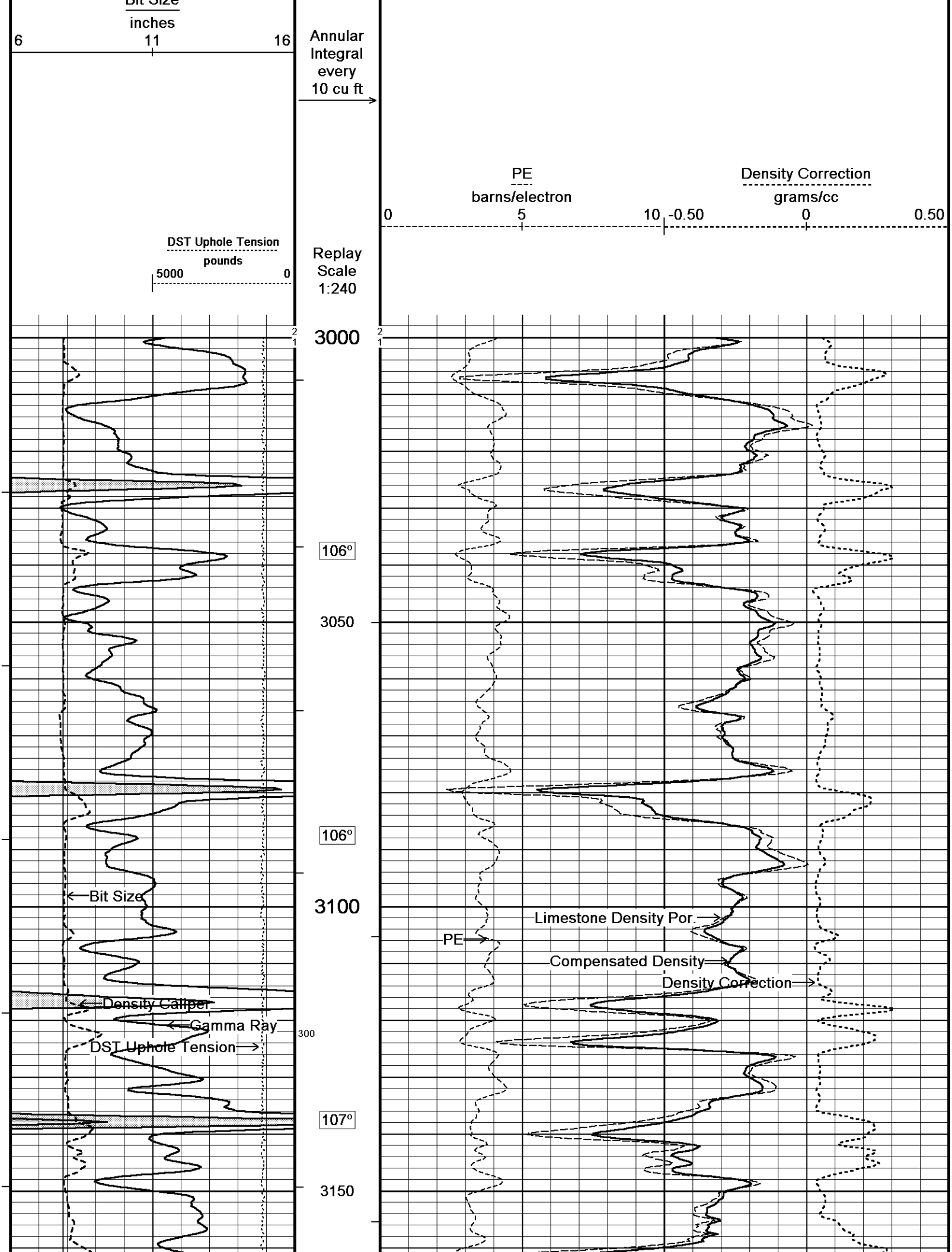
Depth in Feet

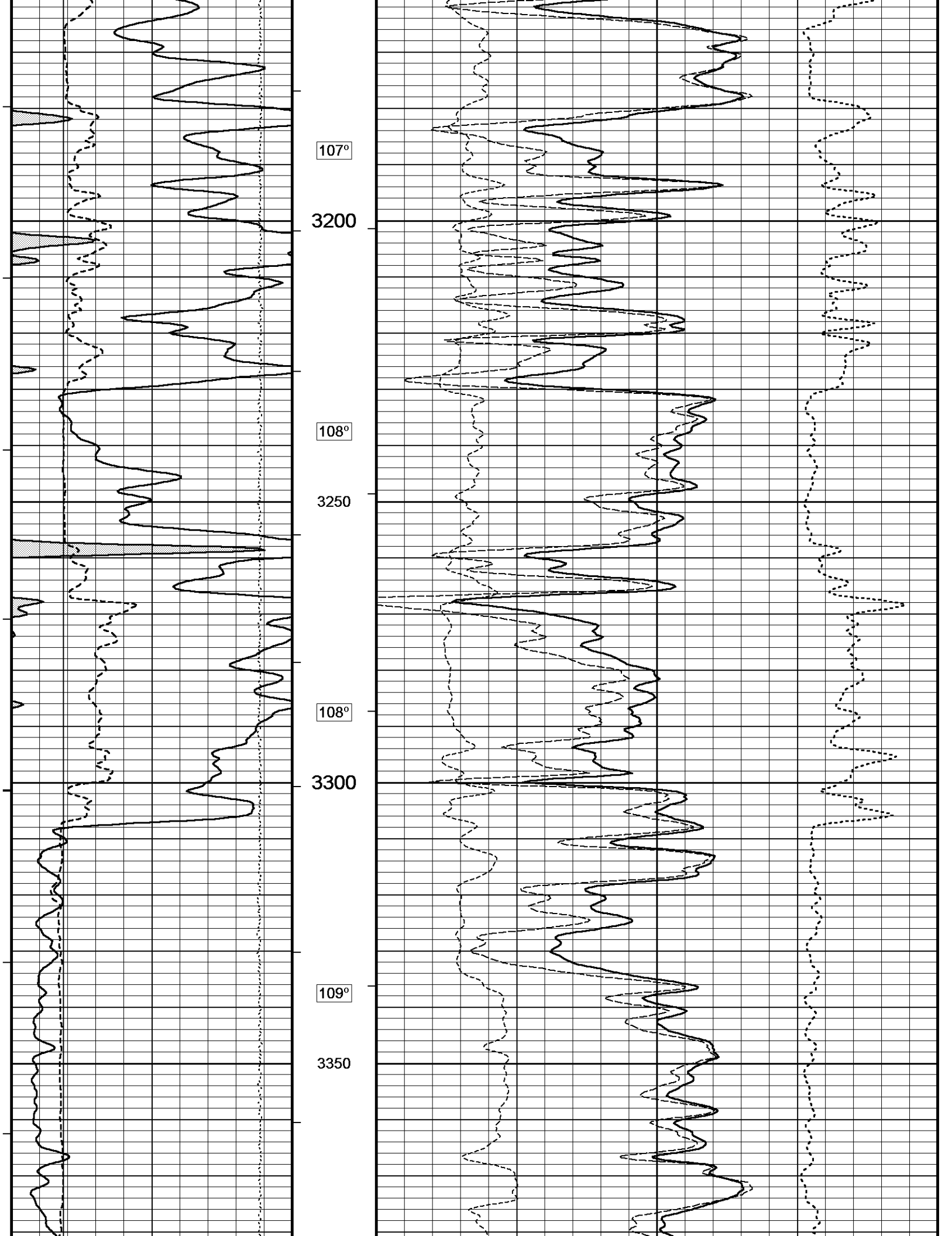
Borehole Temp in deg F

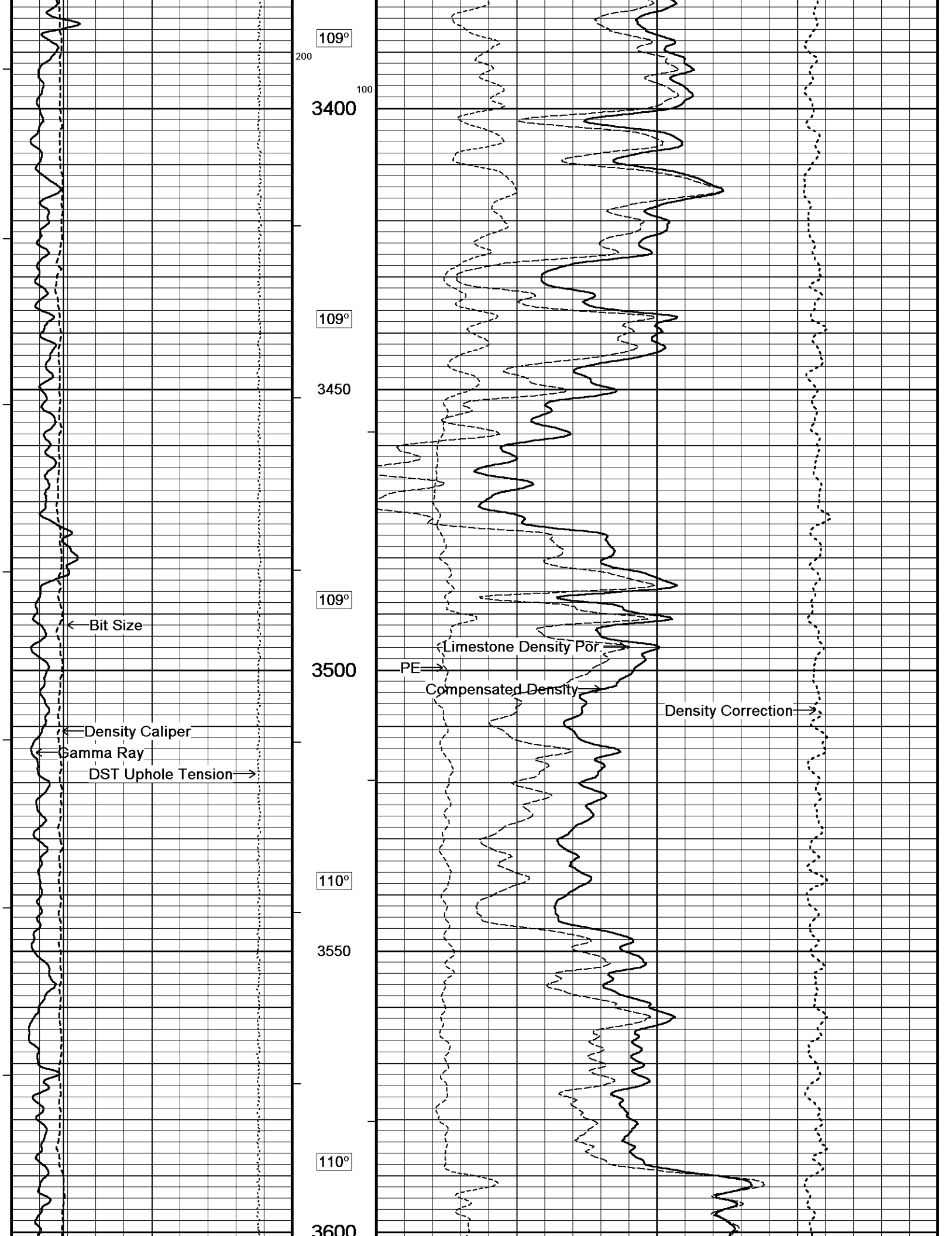
HVI every 10 cu ft

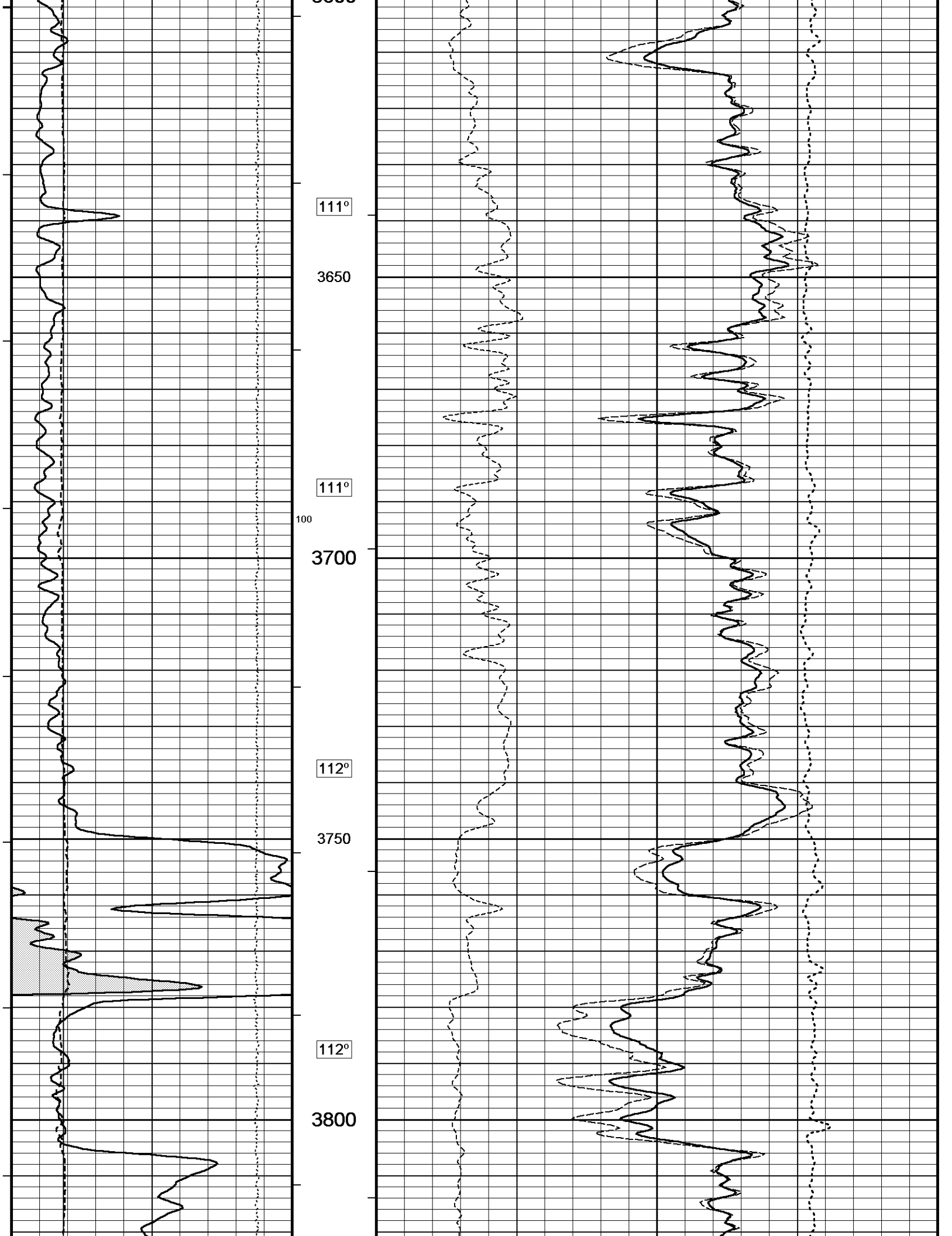
Compensated Density
grams/cc
2 2.25 2.50 2.75 3

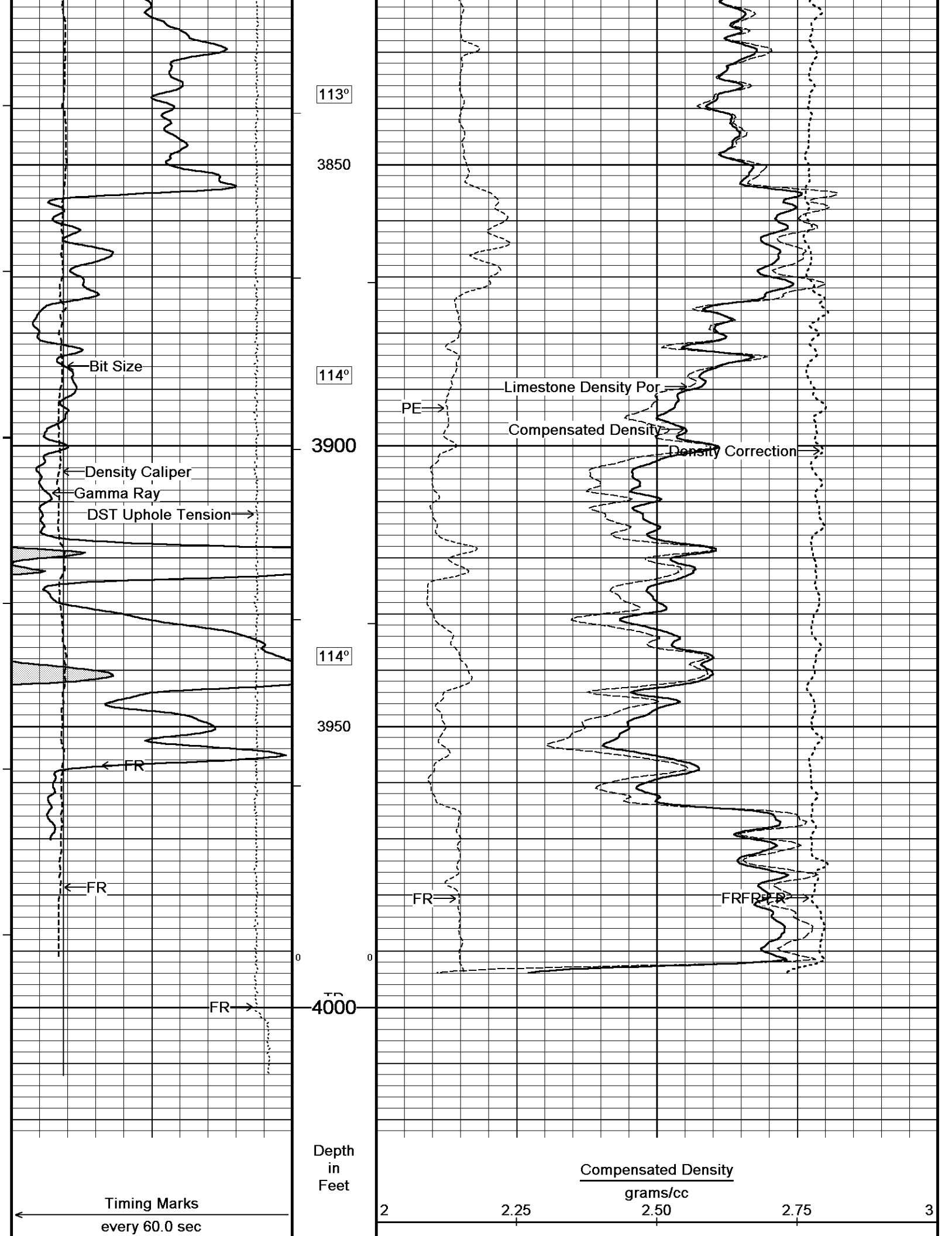
Limestone Density Por.
percent
30 20 10 0 -10

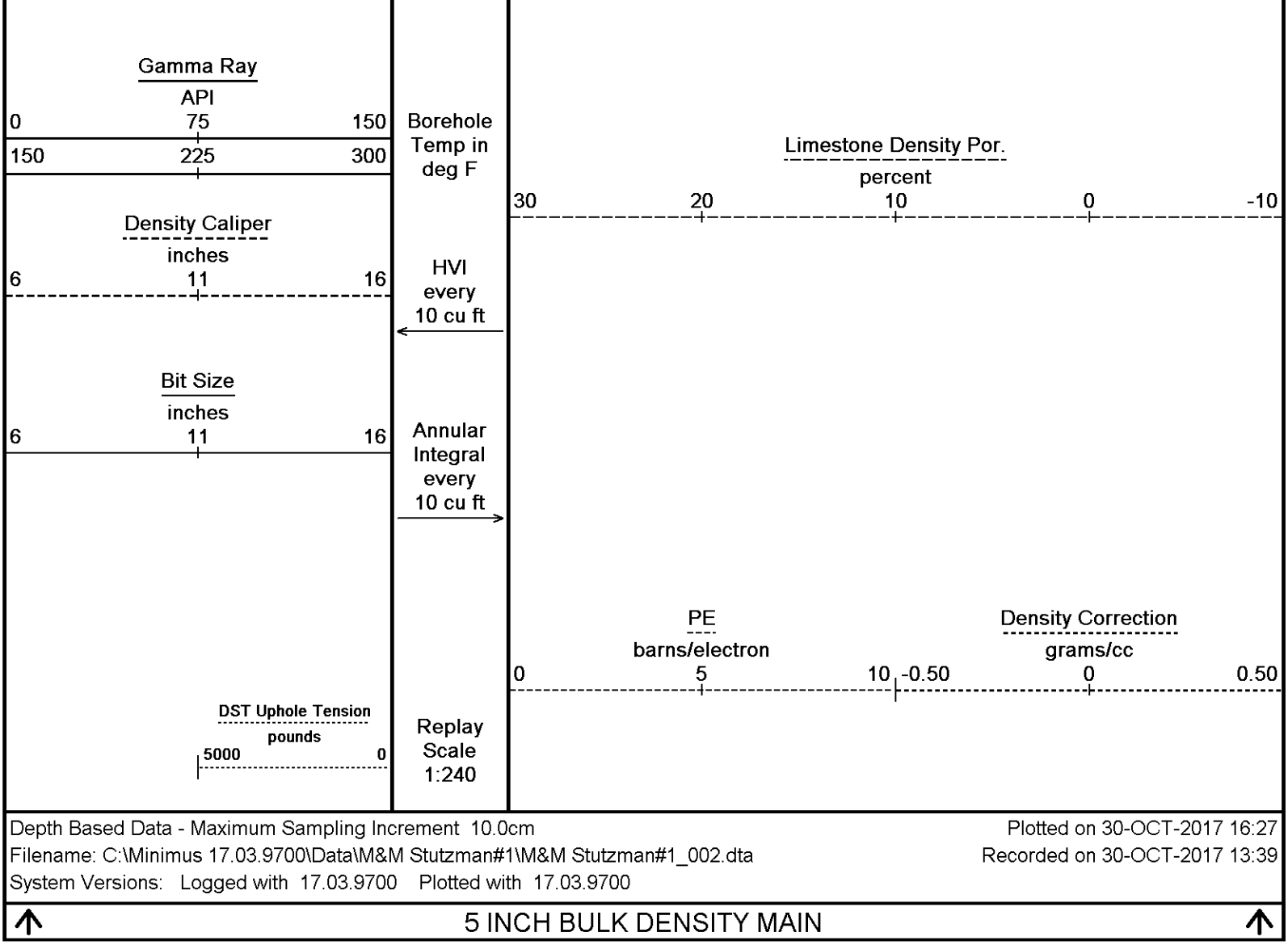

Bit Size
inches
6
11
16
Annular Integral every 10 cu ft
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
DST Uphole Tension
pounds
5000
0
Replay Scale 1:240
3000
106°
3050
106°
3100
3150
107°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction


107°
3200
108°
3250
108°
3300
109°
3350


109°
200
100
3400
109°
3450
109°
Bit Size
Limestone Density Por.
PE
3500
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
110°
3550
110°
3600


111°
3650
111°
100
3700
112°
3750
112°
3800


113°
3850
114°
3900
114°
3950
4000
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
FR
PE
Limestone Density Por
Compensated Density
Density Correction
FR
FRFRFR
0
0
Depth
in
Feet
Timing Marks
every 60.0 sec
Compensated Density
grams/cc
2
2.25
2.50
2.75
3



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 30-OCT-2017 16:27
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5 INCH BULK DENSITY MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 30-OCT-2017 16:27
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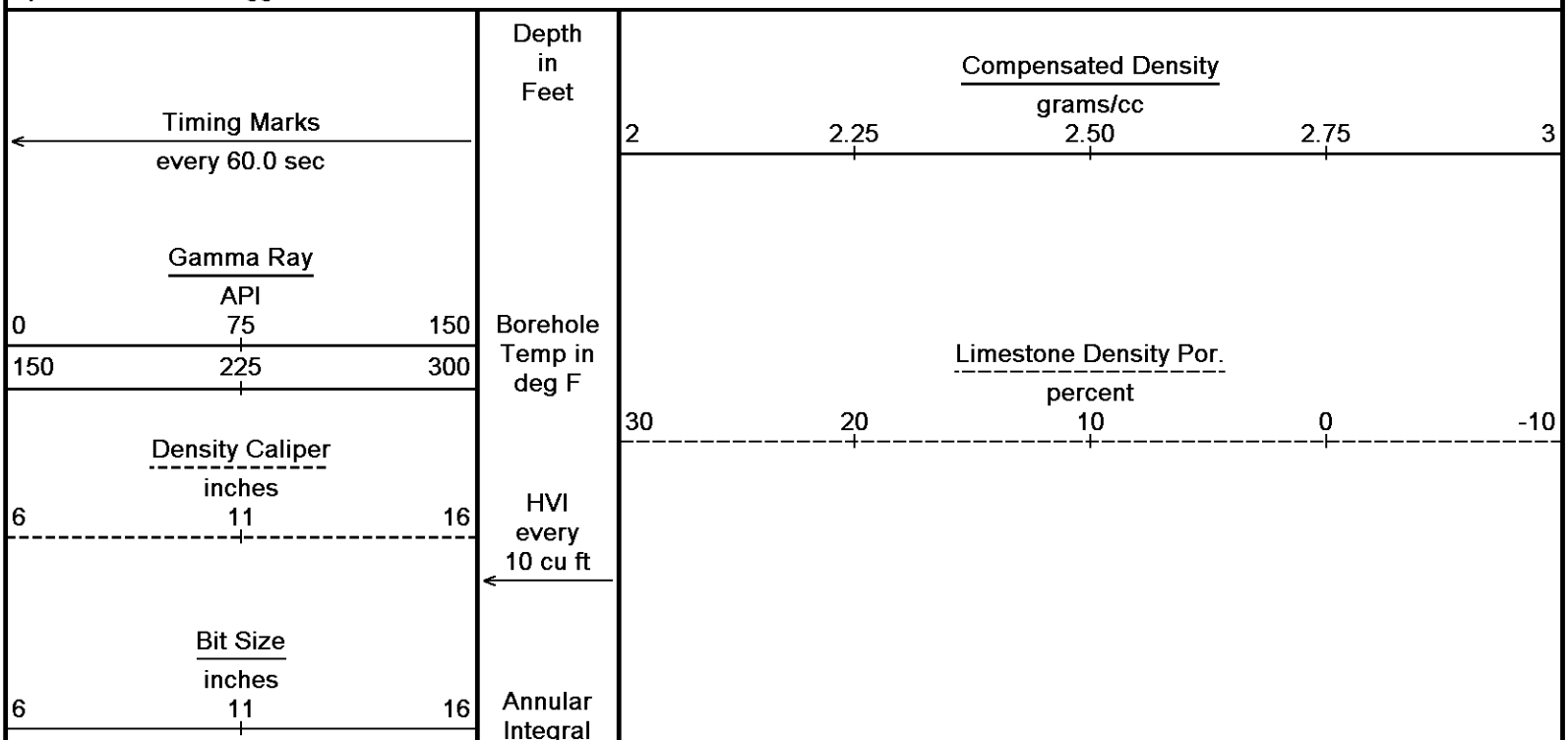
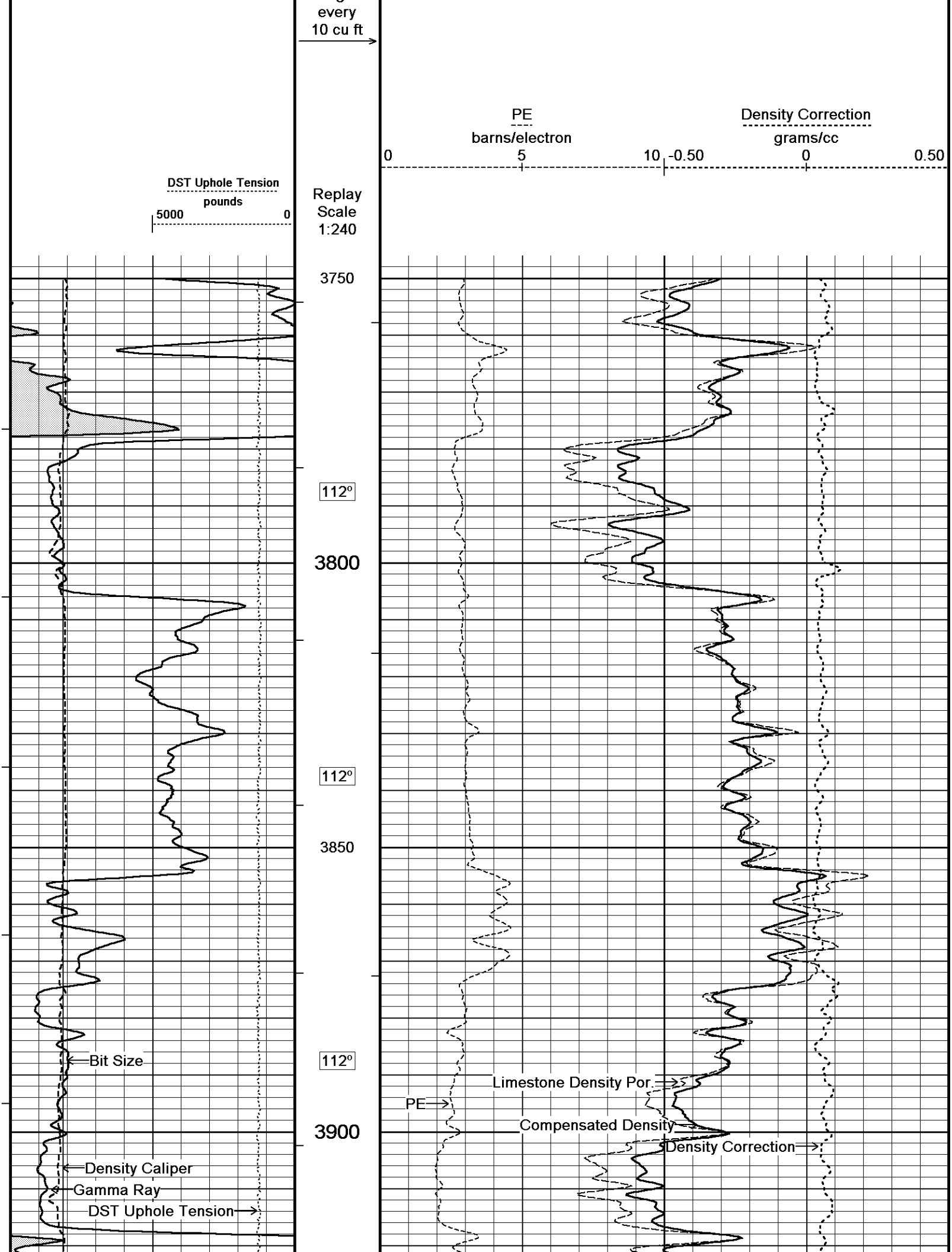
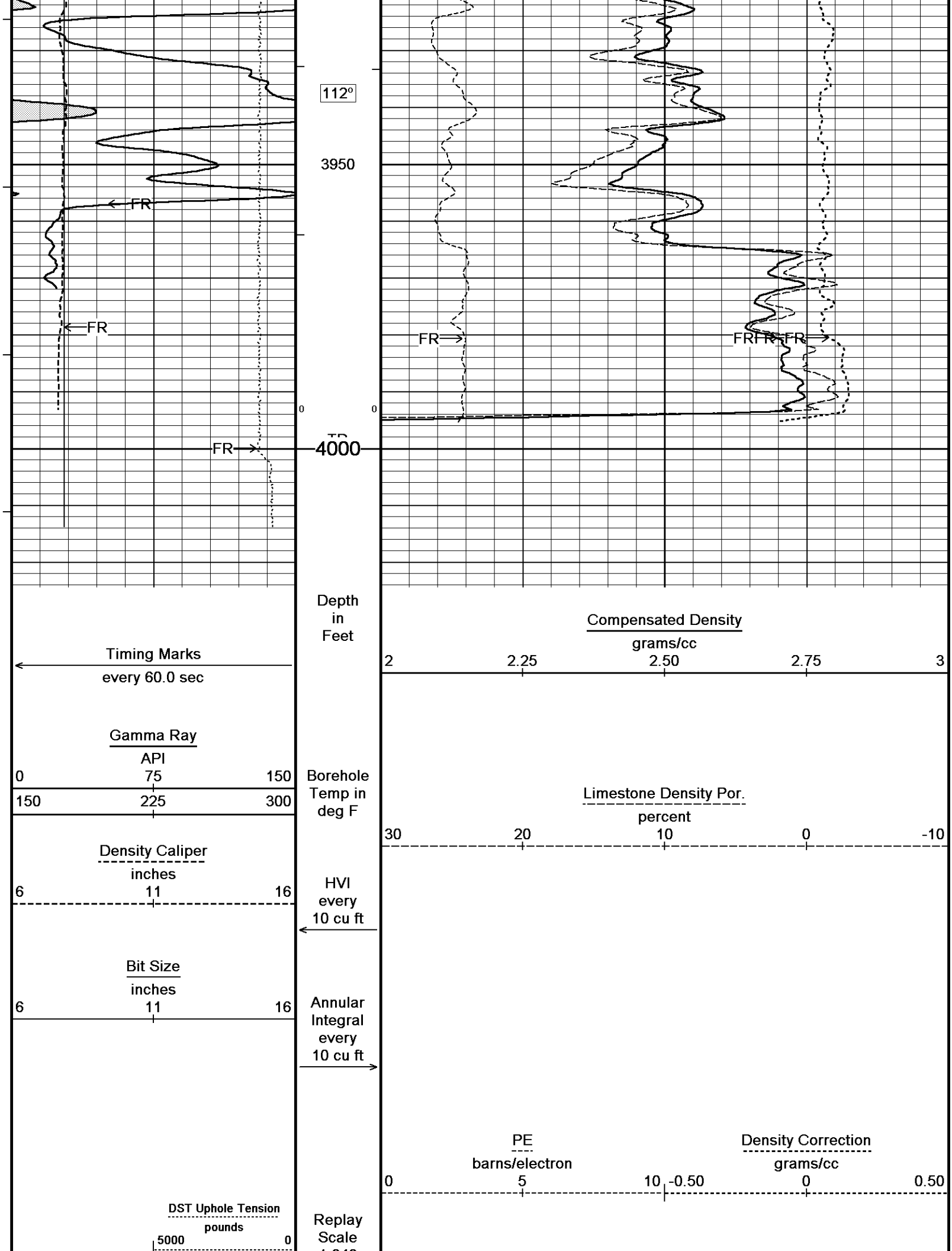



every
10 cu ft
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
3750
112°
3800
112°
3850
112°
3900
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction


112°
3950
FR
FR
FR
FR
FR FR FR
0
0
4000
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
inches
6
11
16
Bit Size
inches
6
11
16
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
DST Uphole Tension
pounds
5000
0
Replay Scale
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

1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
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Plotted on 30-OCT-2017 16:27
Recorded on 30-OCT-2017 13:19

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_001.dta

General Constants All 000

Last Edited on 30-OCT-2017,12:50

General Parameters		
Mud Resistivity	0.890	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	5.500	inches
Caliper for Differential Caliper	None	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 08-OCT-2017 14:52

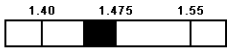
Reading No	Measured	Calibrated (lbs)
1	459.59	0.00
2	-1870.04	220.00

Gamma Calibration MCG-C 84

Field Calibration on 27-OCT-2017 07:35

	Measured	Calibrated (API)
Background	105	73
Calibrator (Gross)	762	529
Calibrator (Net)	657	456

Gamma Calibration Tolerances MCG-C 84

Ratio 1.442 

Counts/API

Gamma Constants MCG-C 84

Last Edited on 30-OCT-2017,11:37

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-C 84

Field Calibration on 27-OCT-2017,07:20

	Measured	Calibrated (mV)
Reference 1	104.4	100.1
Reference 2	-95.8	-100.1

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 27-OCT-2017,07:21

	Measured	Calibrated(Deg F)
Lower	50.00	50.00

Upper	212.00	212.00

High Resolution Temperature Constants MCG-C 84

Last Edited on 30-AUG-2017,13:52

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 23-OCT-2017 14:05
Field Check on 30-OCT-2017 12:39

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0

Base Calibration

	Measured		Calibrated (ohm-m)	
Micro Normal	10.1	50.4	5.1	25.6
Micro Inverse	10.0	50.1	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.7	76.7
Micro Inverse	51.0	51.0

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1 10.1 ohm (-5% 10.0 +5%)
Micro Normal Res. 2 50.4 ohm (-5% 50.0 +5%)
Micro Inverse Res. 1 10.0 ohm (-5% 10.0 +5%)
Micro Inverse Res. 2 50.1 ohm (-5% 50.0 +5%)

Micro Normal Base Check 76.7 ohm-m (-2% 76.57 +2%)
Micro Inverse Base Check 51.0 ohm-m (-2% 50.98 +2%)

Micro Normal Field Check 76.7 ohm-m (-2% 76.7 +2%)
Micro Inverse Field Check 51.0 ohm-m (-2% 51.0 +2%)

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 30-OCT-2017,12:39

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

Caliper Calibration MML-A 7

Base Calibration on 23-OCT-2017 13:59
Field Calibration on 30-OCT-2017 12:38

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14085	5.98
2	17580	7.97
3	20846	9.86
4	24750	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.00	8.10

Caliper Calibration Tolerances MML-A 7

Short Arm Field Cal. 8.00 in (7.90 8.10 8.30)

Neutron Calibration MDN-A.B 114

Base Calibration on 25-OCT-2017 16:20
Field Check on 27-OCT-2017 07:40

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3039	94	3714	110
Ratio	32.458		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2150	3142
Ratio	0.684	

Field Check

	Calibrated (cps)	
	2143	3109

Ratio	0.689

Neutron Calibration Tolerances MDN-A.B 114

		-5%	33	+5%
Ratio	32.458			

		0.65	0.7	0.75
Base Check	0.684			

		0.664	0.684	0.704
Field Check	0.689			

Neutron Constants MDN-A.B 114

Last Edited on 30-OCT-2017,11:37

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Modified Ratio	
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	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 352

Base Calibration on 23-OCT-2017 13:20
Field Check on 30-OCT-2017 12:25

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.8	126.8
Base Check		281.3
Field Check		281.4

FE Calibration Tolerances MFE-B.J 352

		-3%	980.0	+3%	
Reference 2	963.8				ohm

		-2%	277.0	+2%	
Base Check	281.3				ohm-m

		-2%	281.3	+2%	
Field Check	281.4				ohm-m

FE Constants MFE-B.J 352

Last Edited on 30-OCT-2017,12:24

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	

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 01-OCT-2017,14:58

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length	11

Induction Calibration MAI-A.A 111

Factory Loop Calibration 25-OCT-2017 15:40
Field Check on 30-OCT-2017 12:35

Factory Loop Calibration

Low Conductivity Reference Resistor	3.3	ohm
High Conductivity Reference Resistor	333.3	ohm

	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
Array	Low	High	Low	High	Gain	Offset
1 (near)	17.6	473.6	9.3	966.2	0.0	0.0
2	6.4	385.9	7.6	821.4	0.0	0.0
3	3.2	264.0	5.2	566.0	0.0	0.0
4 (far)	2.1	135.5	2.6	279.2	0.0	0.0

Array Temperature	23.0	Deg F

Tool Checks

	Factory Reference (mmho/m)		Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	11.4	3842.3	13.8	3843.4	
2	29.3	3499.9	31.5	3501.6	
3	28.7	2997.0	30.6	2998.7	
4 (far)	18.9	2041.5	20.1	2043.1	
Array Temperature	90.7		69.6		Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	13.8	9.9 / 11.4 / 12.9	mmho/m	High Array 1	3843.4	3840.8 / 3842.3 / 3843.8 mmho/m
Low Array 2	31.5	27.8 / 29.3 / 30.8	mmho/m	High Array 2	3501.6	3498.4 / 3499.9 / 3501.4 mmho/m
Low Array 3	30.6	27.2 / 28.7 / 30.2	mmho/m	High Array 3	2998.7	2995.5 / 2997.0 / 2998.5 mmho/m
Low Array 4	20.1	17.4 / 18.9 / 20.4	mmho/m	High Array 4	2043.1	2040.0 / 2041.5 / 2043.0 mmho/m

Induction Constants MAI-A.A 111

Last Edited on 30-OCT-2017,12:33

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	
Borehole Correction Method	Default	
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	

Photo Density Calibration MPD-C.A 216

Base Calibration on 23-OCT-2017 14:37
Field Check on 30-OCT-2017 12:24

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1025	1218		
Reference 1	51146	24580	59556	30836
Reference 2	20383	2310	24941	2541
Field Check at Base	1024.7	1217.9		
Field Check	1024.3	1212.0		

PE Calibration

Base Calibration	Measured WS	Measured WH	Ratio	Calibrated Ratio
Background	187	916		
Reference 1	21227	50978	0.420	0.371
Reference 2	5863	20269	0.293	0.272
Field Check at Base	187.1	916.4		
Field Check	186.0	916.1		

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.59	-5% 2.52 +5%	Far Density Ratio	21.38	-5% 21.00 +5%
PE Calibration	0.118	0.089 0.110 0.131			
Near Den. Field Check	1024.3	-3% 1024.7 +3%	Far Den. Field Check	1212.0	-3% 1217.9 +3%
PE WS Field Check	186.0	-6% 187.1 +6%	PE WH Field Check	916.1	-6% 916.4 +6%

Density Constants MPD-C.A 216

Last Edited on 30-OCT-2017,12:24

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	1.09	gm/cc
Mud Density Type		
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-C.A 216

Base Calibration on 23-OCT-2017 14:16
Field Calibration on 30-OCT-2017 12:36

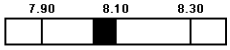
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16832	3.99
2	27040	5.98
3	37135	7.97
4	46864	9.86
5	58032	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.03	8.10

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 8.03 

in

DOWNHOLE EQUIPMENT

C:\Minimus 17.03.9700\Data\M&M Stutzman#1\M&M Stutzman#1_001.dta

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

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

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

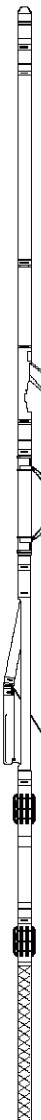
Compact Neutron
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

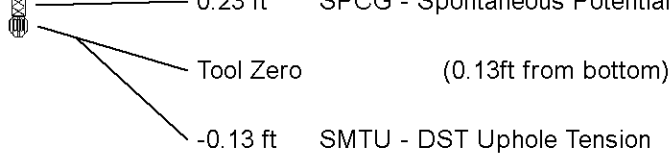
Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

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

Total Length: 50.55 ft Weight: 407.9 lb



42.87 ft	GRGC - MCG Gamma Ray
39.96 ft	CGXT - MCG External Temperature
34.24 ft	MLTC - MML Caliper
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
28.45 ft	NPRL - Limestone Neutron Por.
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	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
0.23 ft	SPGC - Spontaneous Potential



All measurements relative to tool zero.

COMPANY	M & M EXPLORATION, INC.
WELL	STUTZMAN #1
FIELD	KISIWA
PROVINCE/COUNTY	HARVEY
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	1410	feet	First Reading	3981.00	feet
Elevation Drill Floor	1408	feet	Depth Driller	4000.00	feet
Elevation Ground Level	1402	feet	Depth Logger	4000.00	feet

Weatherford®

COMPENSATED NEUTRON
COMPACT PHOTO DENSITY
MICRORESISTIVITY LOG