Weatherford®

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY	GRAND MESA OPERATING COMPANY
WELL	GLENNIS #2-27
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1931' FSL & 1945' FEL

SEC	TWP	RGE	Other Services
27	13S	31W	MAI/MFE

API Number 15-063-22041
Permit Number

Permanent Datum GL, Elevation 2834 feet
Log Measured From KB
Drilling Measured From KB

Elevations:	feet
KB	2839.00
DF	2837.00
GL	2834.00

Date	05-OCT-2012				
Run Number	ONE				
Depth Driller	4622.00	feet			
Depth Logger	4622.00	feet			
First Reading	4603.00	feet			
Last Reading	3622.00	feet			
Casing Driller	222.00	feet			
Casing Logger	219.00	feet			
Bit Size	7.875	inches			
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.20 g/c3		62.00 CP		
PH / Fluid Loss	10.50		7.20 ml/30Min		
Sample Source	MUDPIT				
Rm @ Measured Temp	0.63 @ 84.0	ohm-m			
Rmf @ Measured Temp	0.50 @ 84.0	ohm-m			
Rmc @ Measured Temp	0.76 @ 84.0	ohm-m			
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.46 @117.0	ohm-m			
Time Since Circulation	5 HOURS				
Max Recorded Temp	117.00	deg F			
Equipment Name	COMPACT				
Equipment / Base	13025		LIB		
Recorded By	ADAM SILL				
Witnessed By	MENT MATSON				
S.O. # / JOB #	3534666		LB12-266		

BOREHOLE RECORD

Last Edited: 01-JAN-2003 00:06

Bit Size inches	Depth From feet	Depth To feet
7.875	222.00	4622.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	222.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.02.6600.
- MCG, MML, MDN, MPD, MFE, MAI RAN 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: 1862 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3622 FEET: 205 CU. FT.
- SERVICE ORDER # 3534666

- SERVICE ORDER # [illegible].

- RIG: MURFIN #24.

- ENGINEER: A. SILL.

- OPERATOR(S): R. VENEGAS.

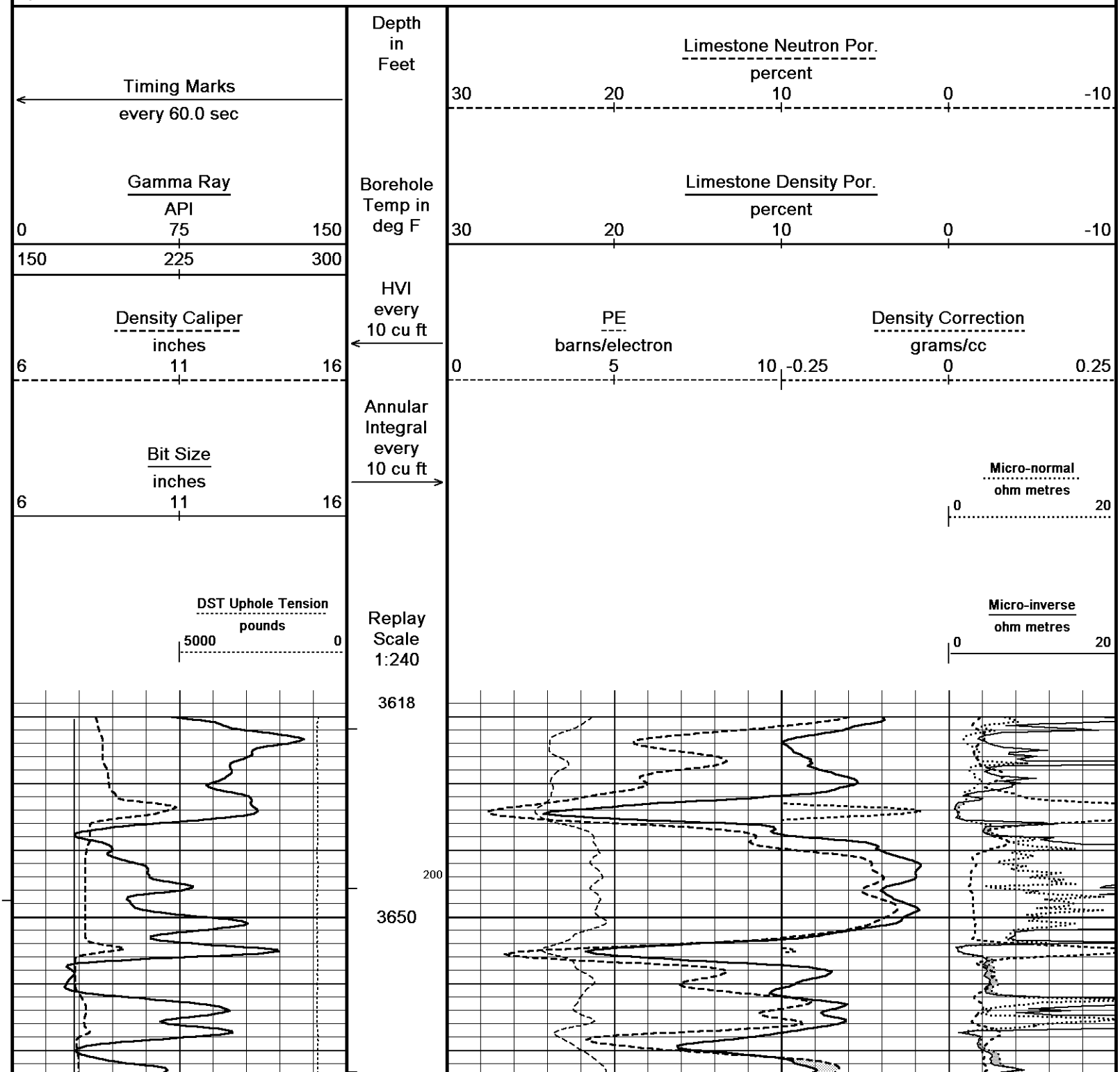
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.

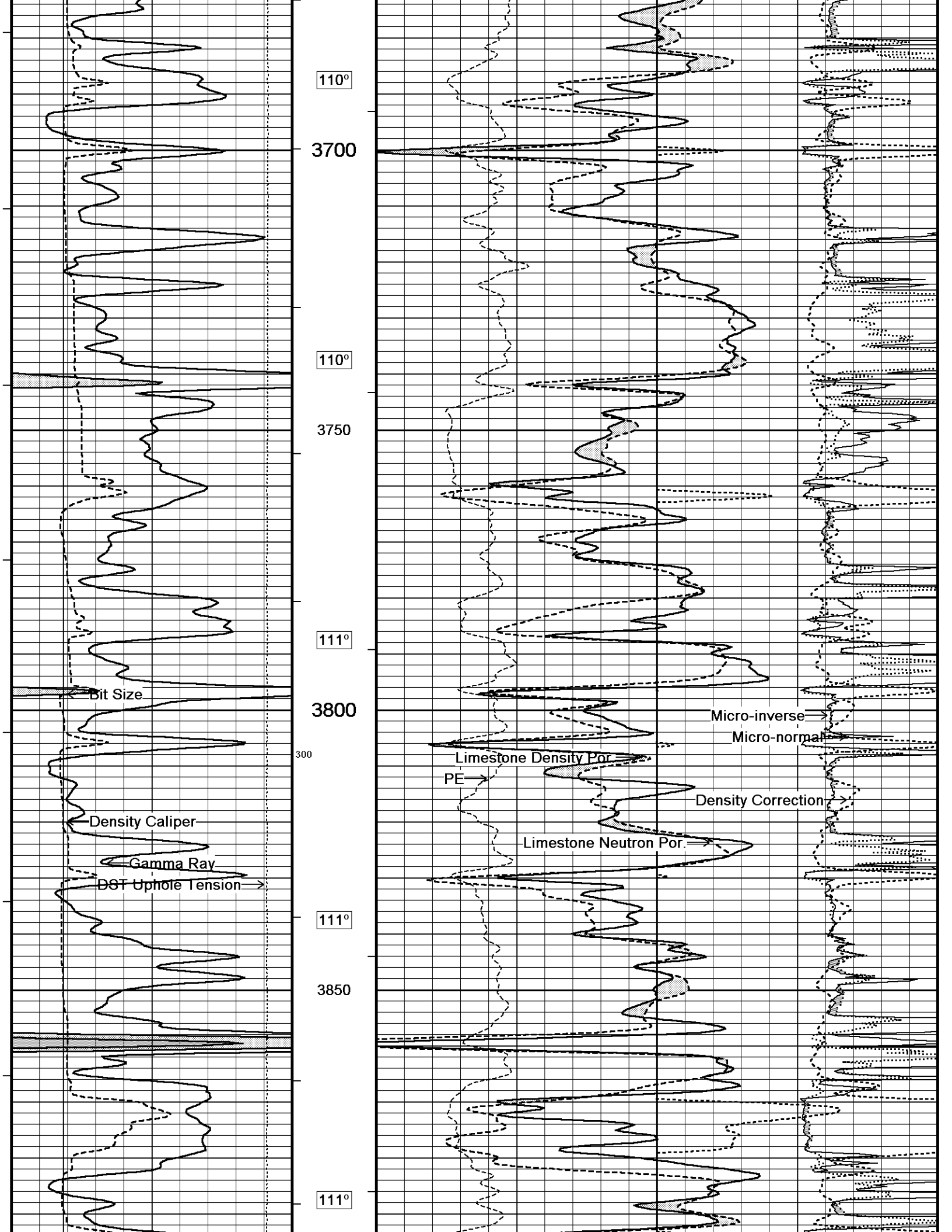
5 INCH MAIN

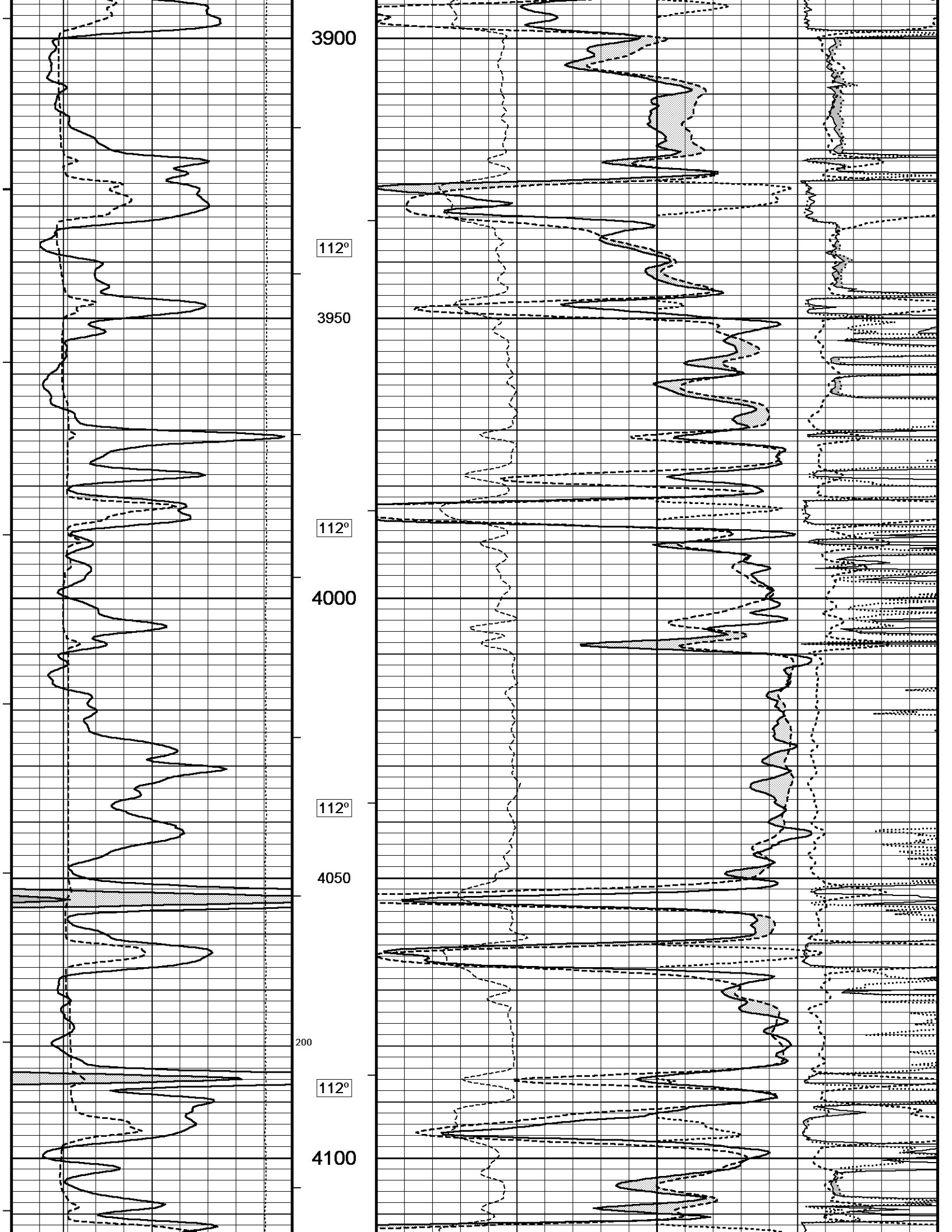
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-OCT-2012 23:15

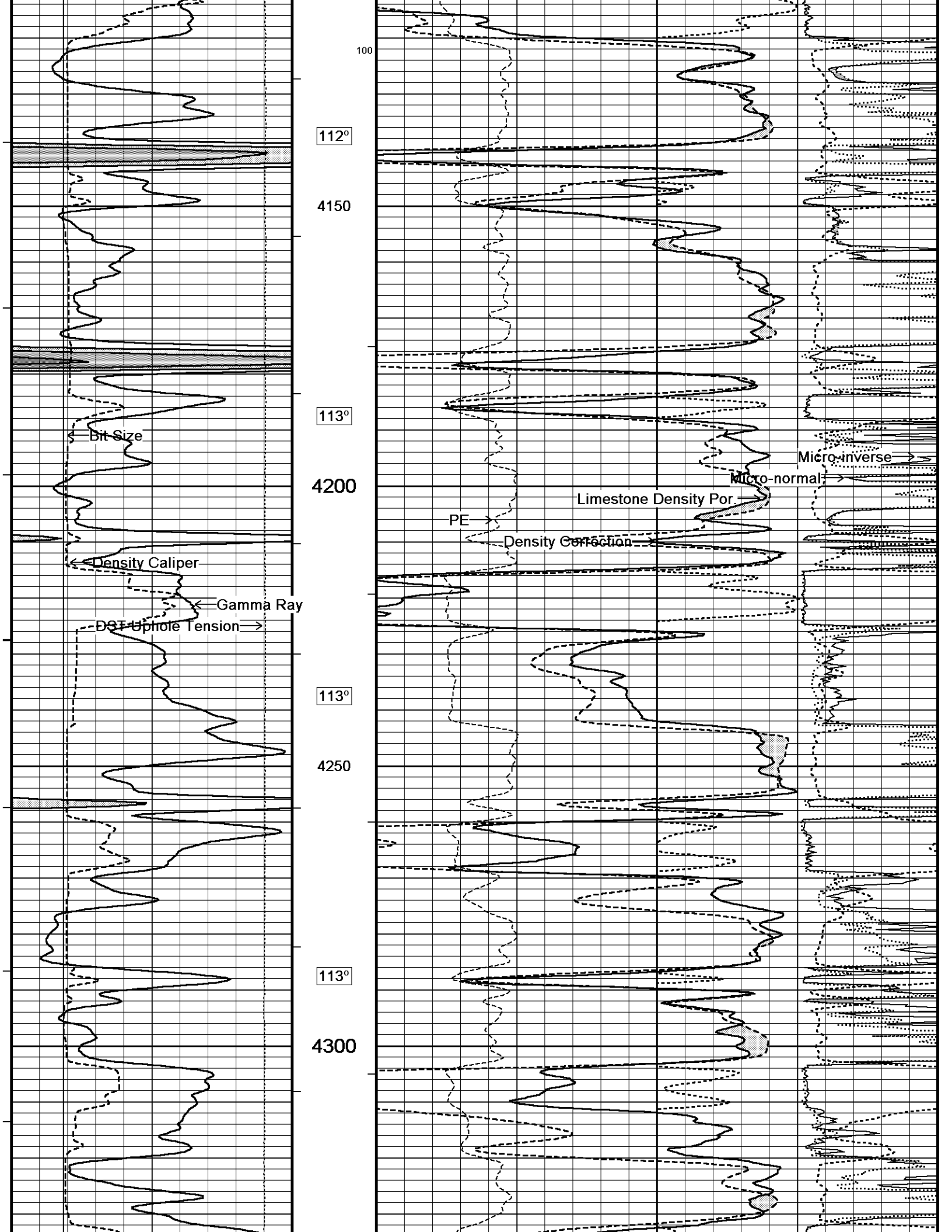
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2...\Grand Mesa Glennis #2-27 Splice.dta — Recorded on 05-OCT-2012 20:00

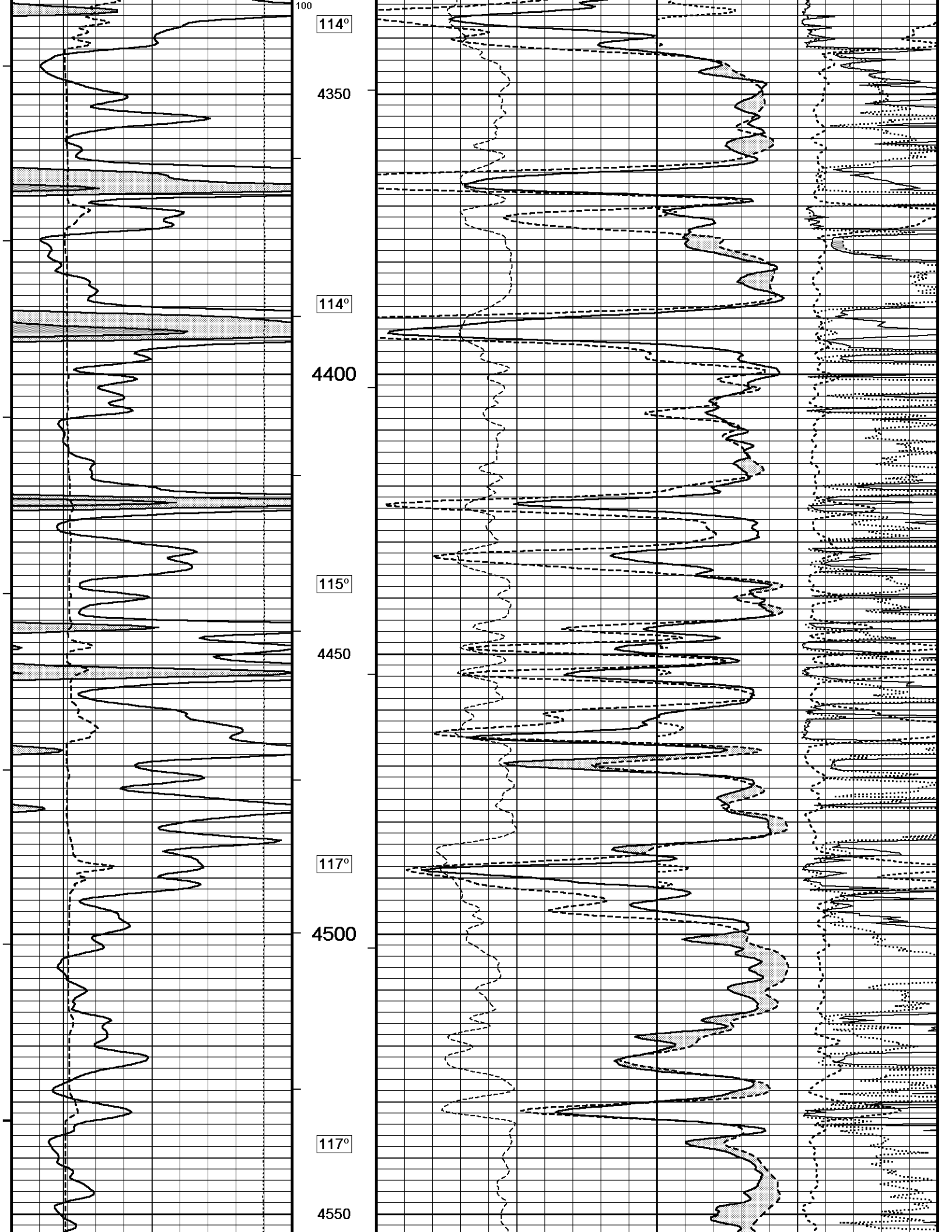
System Versions: Plotted with 13.02.6600

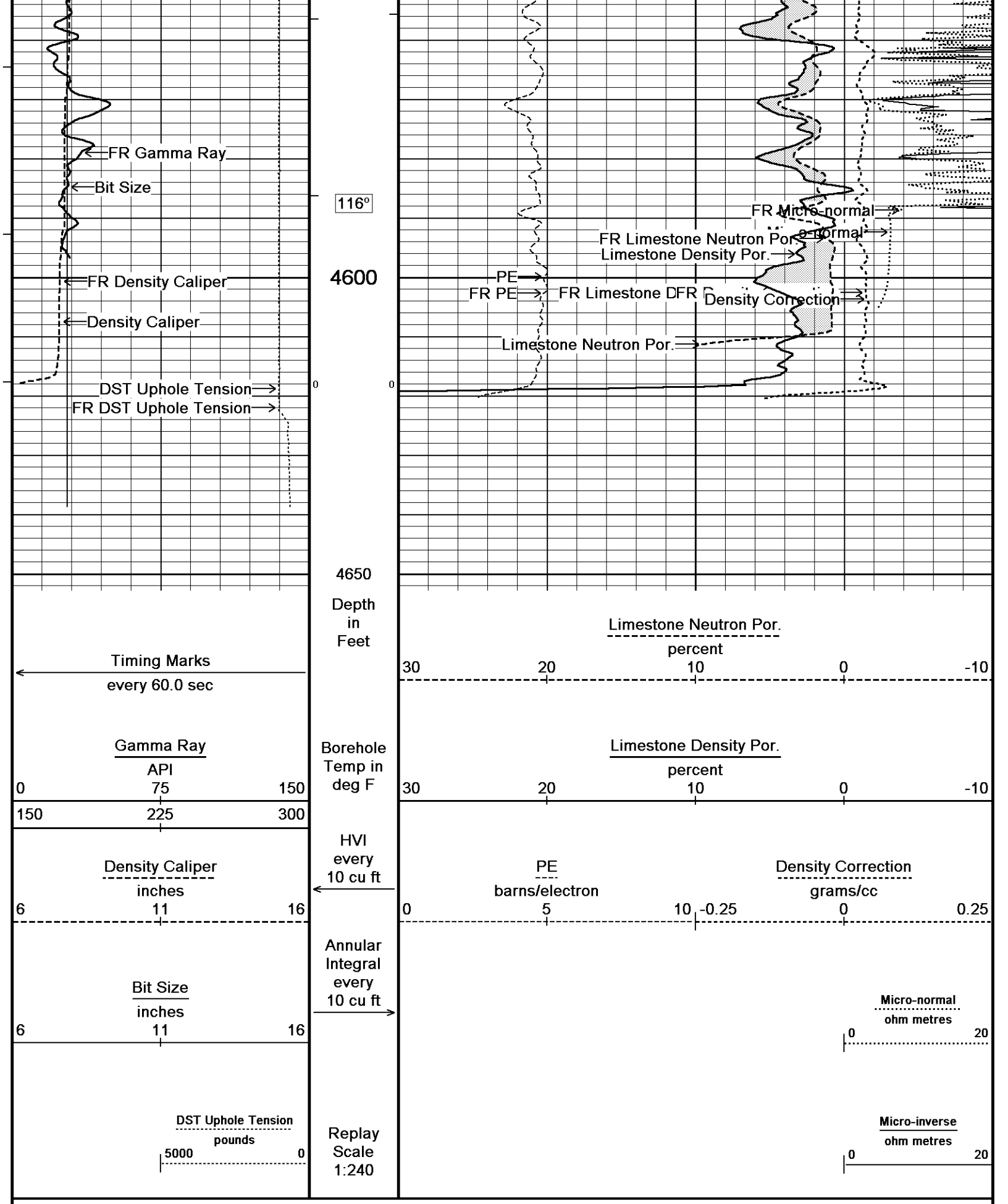



110°
3700
110°
3750
111°
3800
300
111°
3850
111°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.


3900
112°
3950
112°
4000
112°
4050
200
112°
4100


100
112°
4150
113°
Bit Size
4200
Micro-inverse
Micro-normal
Limestone Density Por
PE
Density Correction
Density Caliper
Gamma Ray
DGT Uphole Tension
113°
4250
113°
4300


100
114°
4350
114°
4400
115°
4450
117°
4500
117°
4550

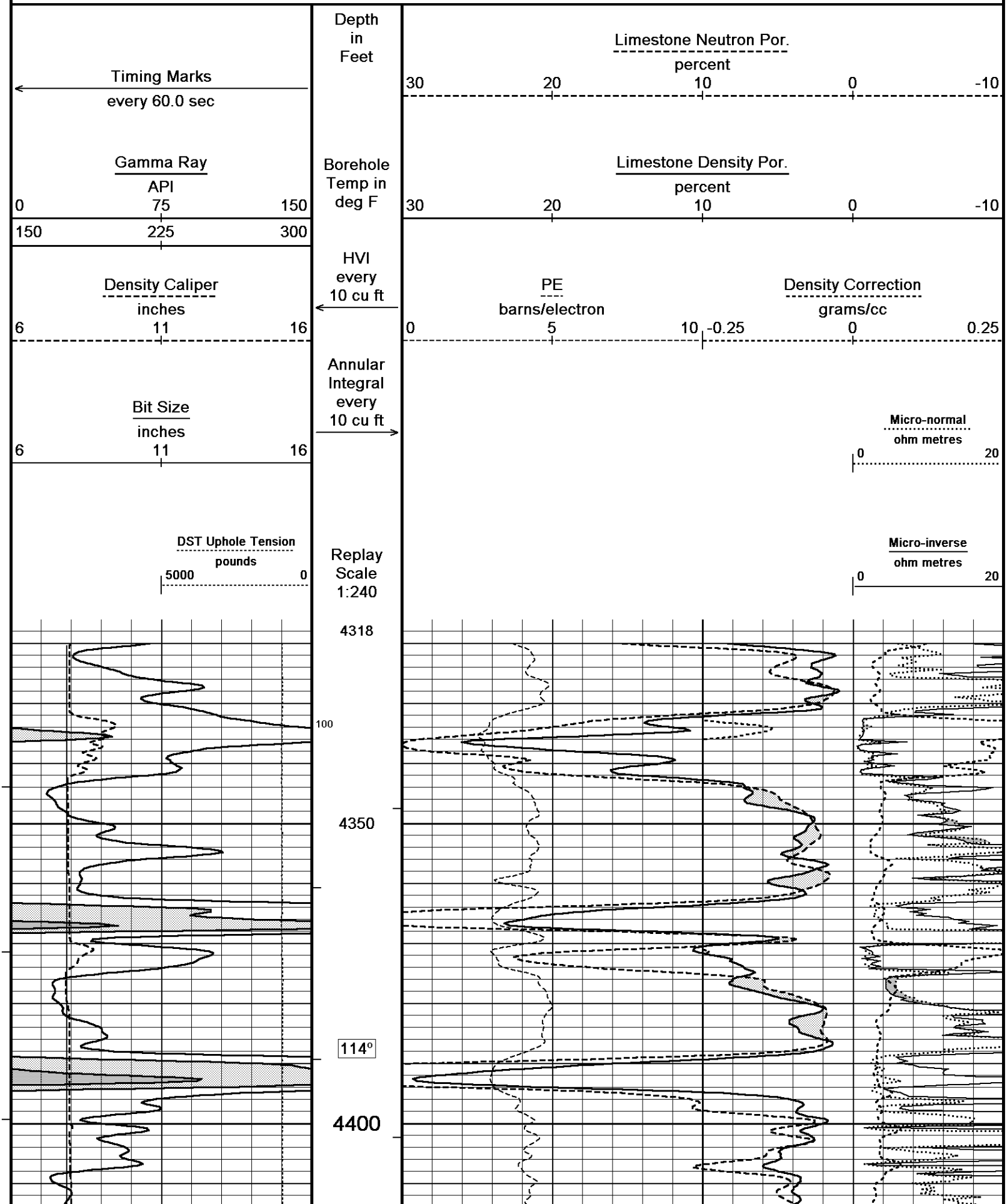


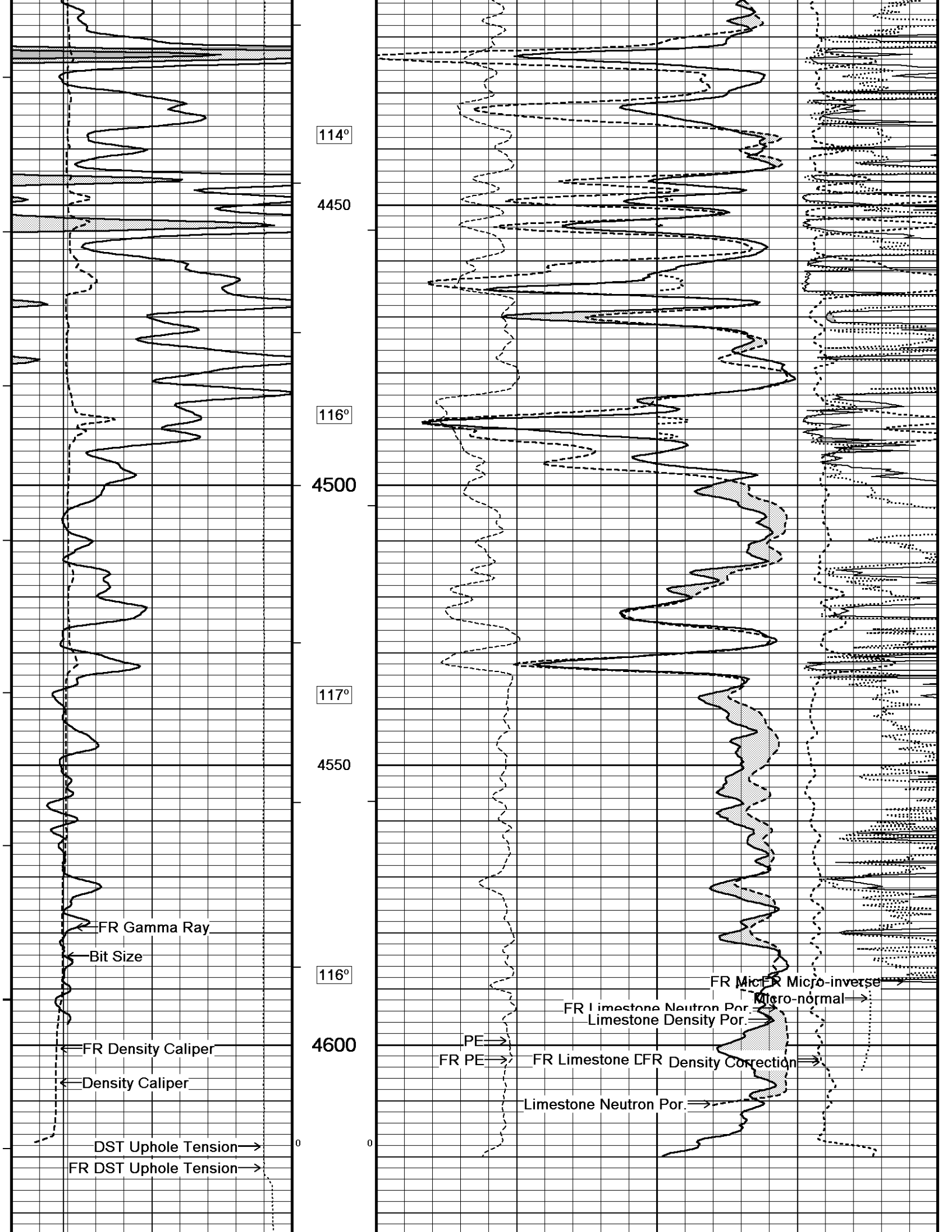
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2...\Grand Mesa Glennis #2-27 Splice.dta
Recorded on 05-OCT-2012 20:00
System Versions: Plotted with 13.02.6600

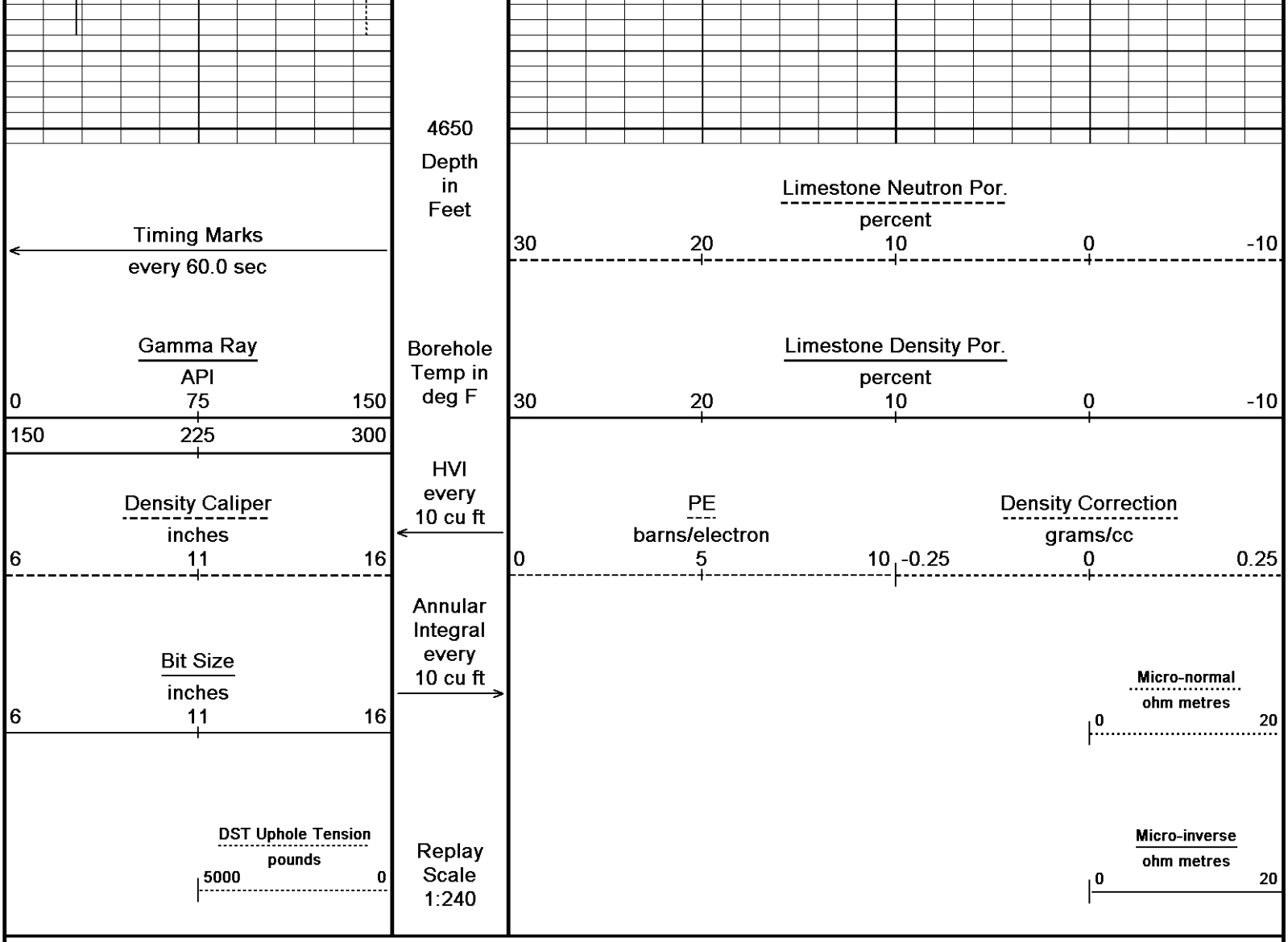
5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2-27\Grand Mesa Glennis #2-27_002.dta
Recorded on 05-OCT-2012 19:39
System Versions: Logged with 13.02.6600 Processed with 13.02.6600 Plotted with 13.02.6600




114°
4450
116°
4500
117°
4550
116°
4600
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
DST Uphole Tension
FR DST Uphole Tension
0
0
PE
FR PE
FR Micro-inverse
Micro-normal
Limestone Density Por.
FR Limestone Density Correction
Limestone Neutron Por.

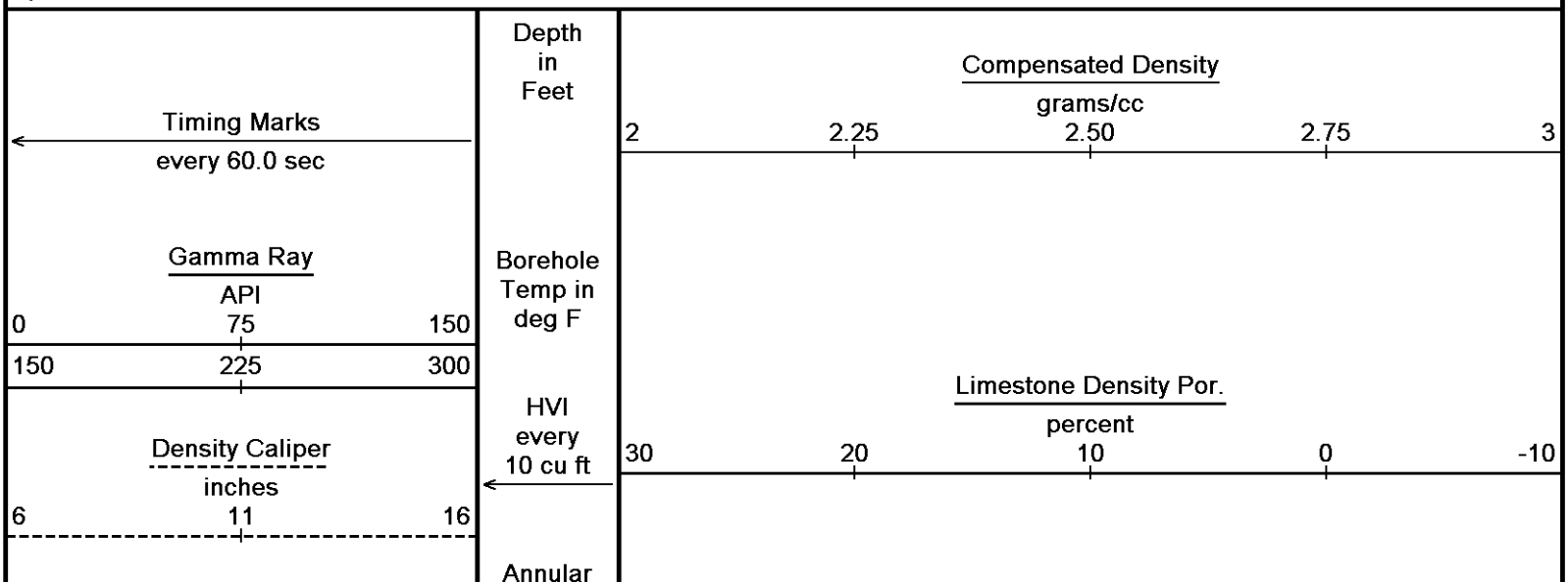


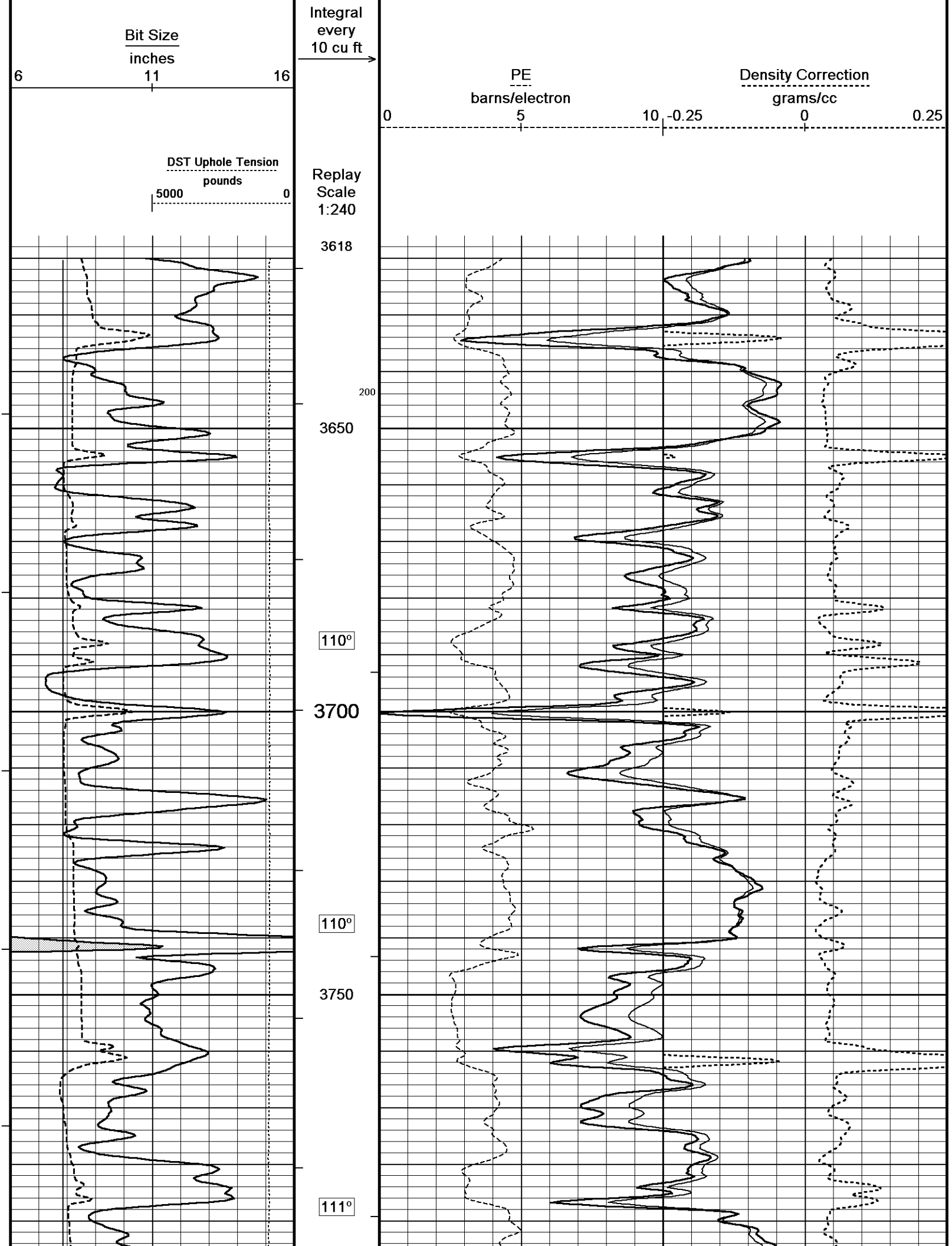
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2-27\Grand Mesa Glennis #2-27_002.dta — Recorded on 05-OCT-2012 19:39
System Versions: Logged with 13.02.6600 Processed with 13.02.6600 Plotted with 13.02.6600

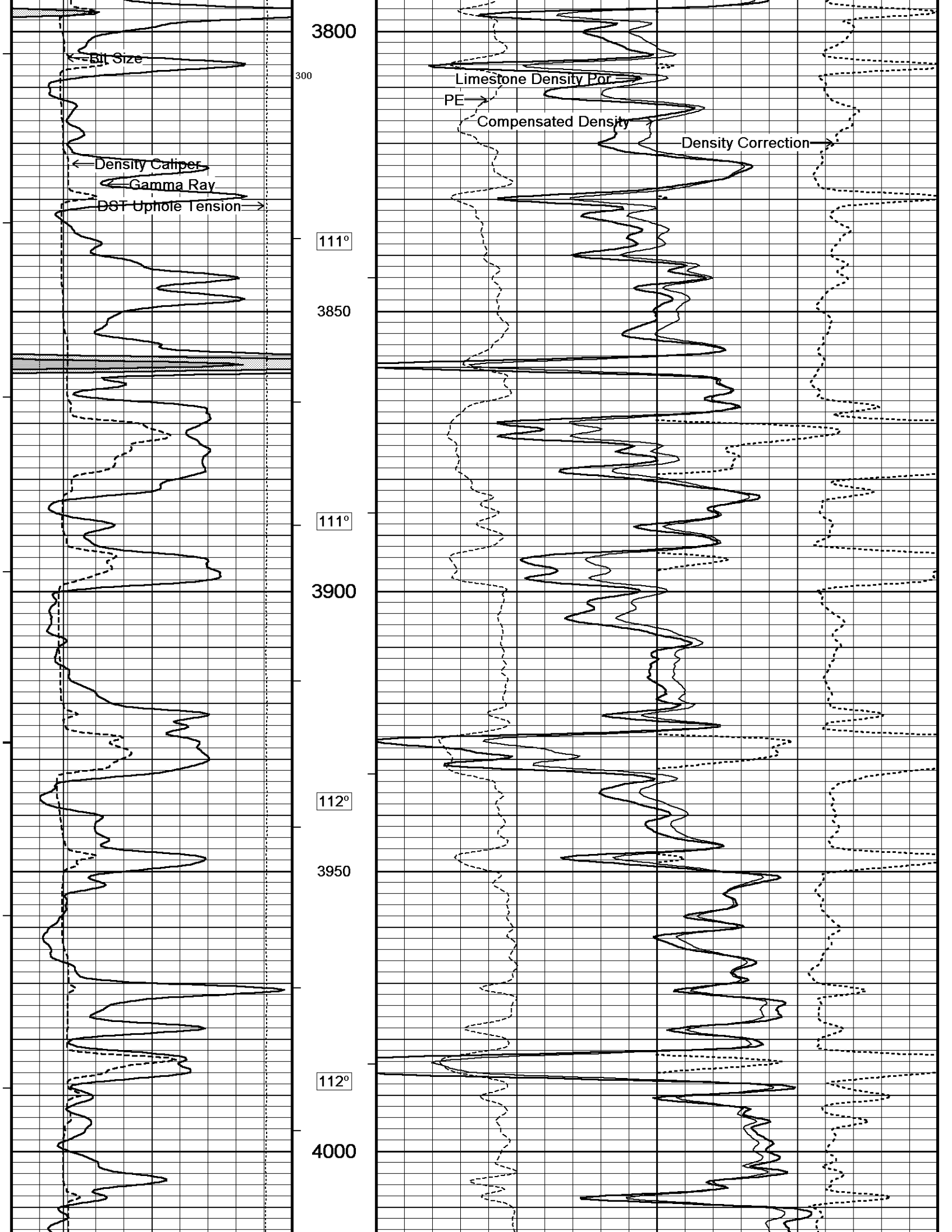
REPEAT SECTION

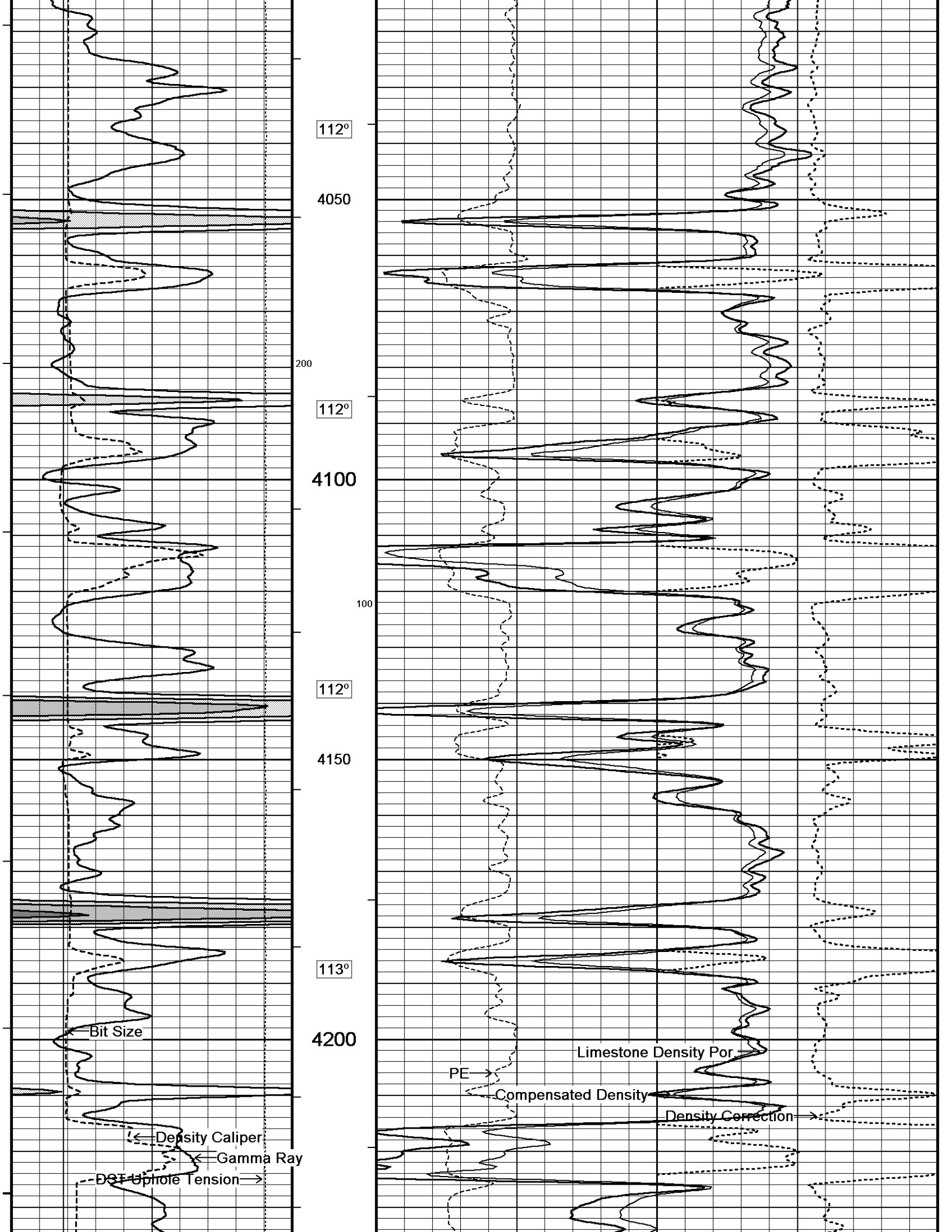
5 INCH MAIN

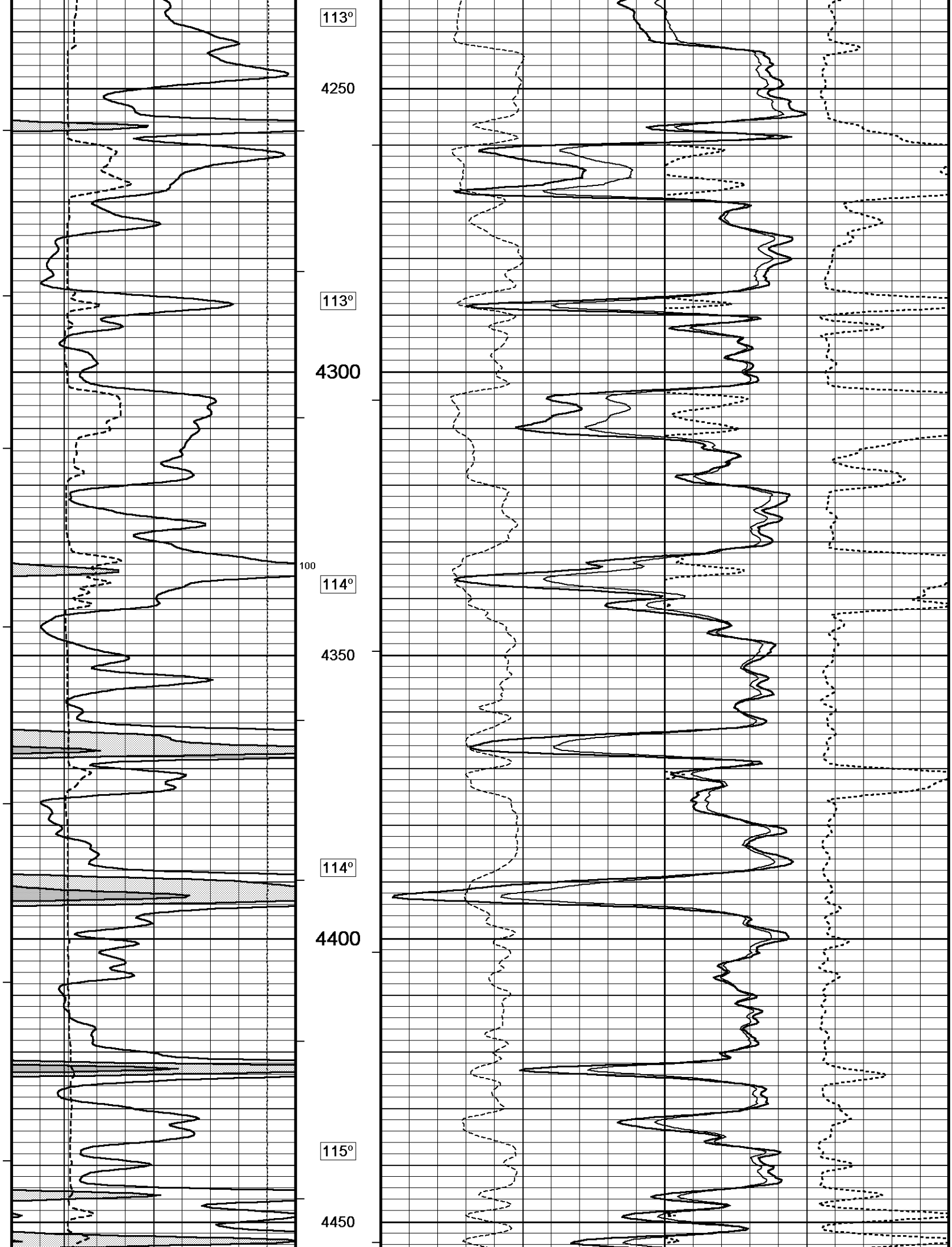
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2...\Grand Mesa Glennis #2-27 Splice.dta — Recorded on 05-OCT-2012 20:00
System Versions: Plotted with 13.02.6600

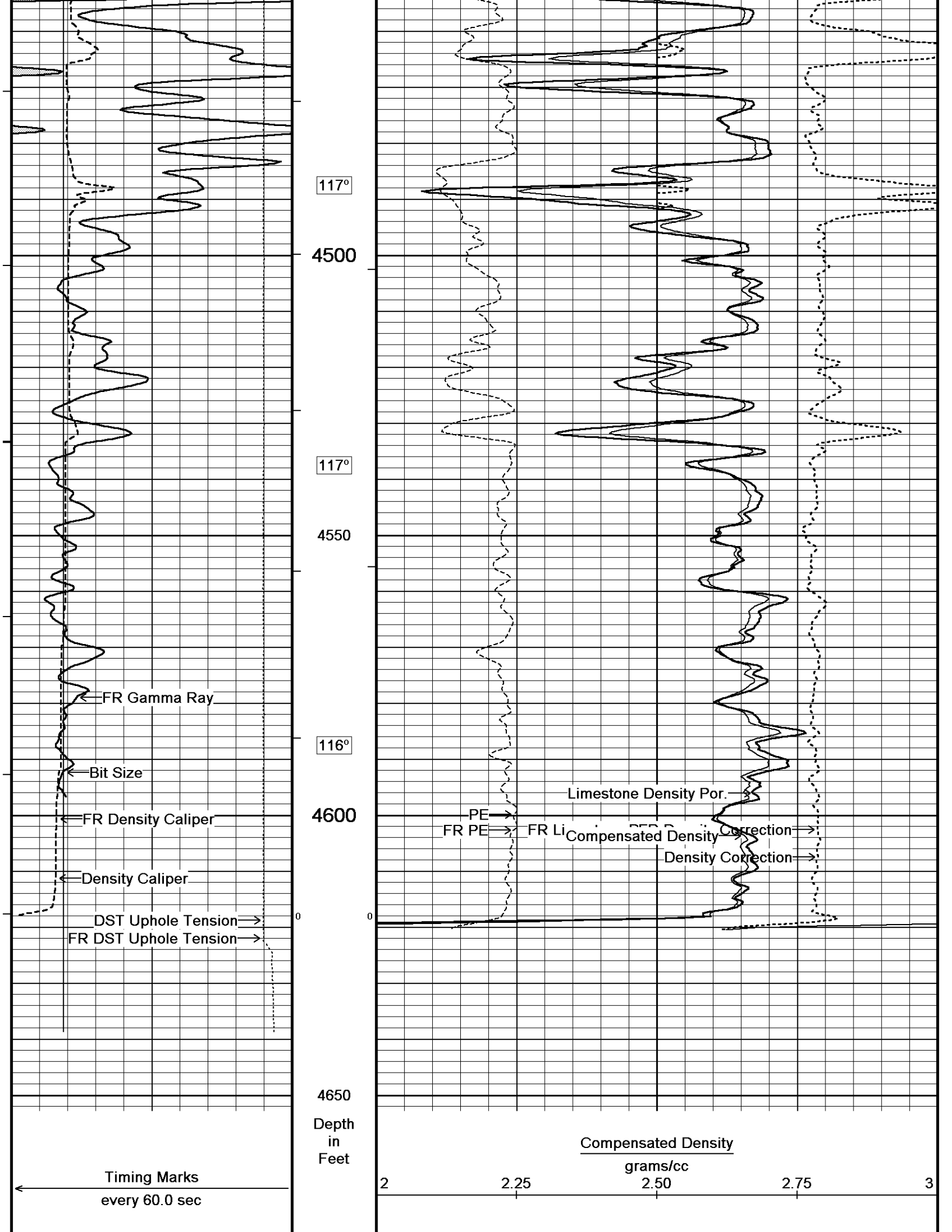


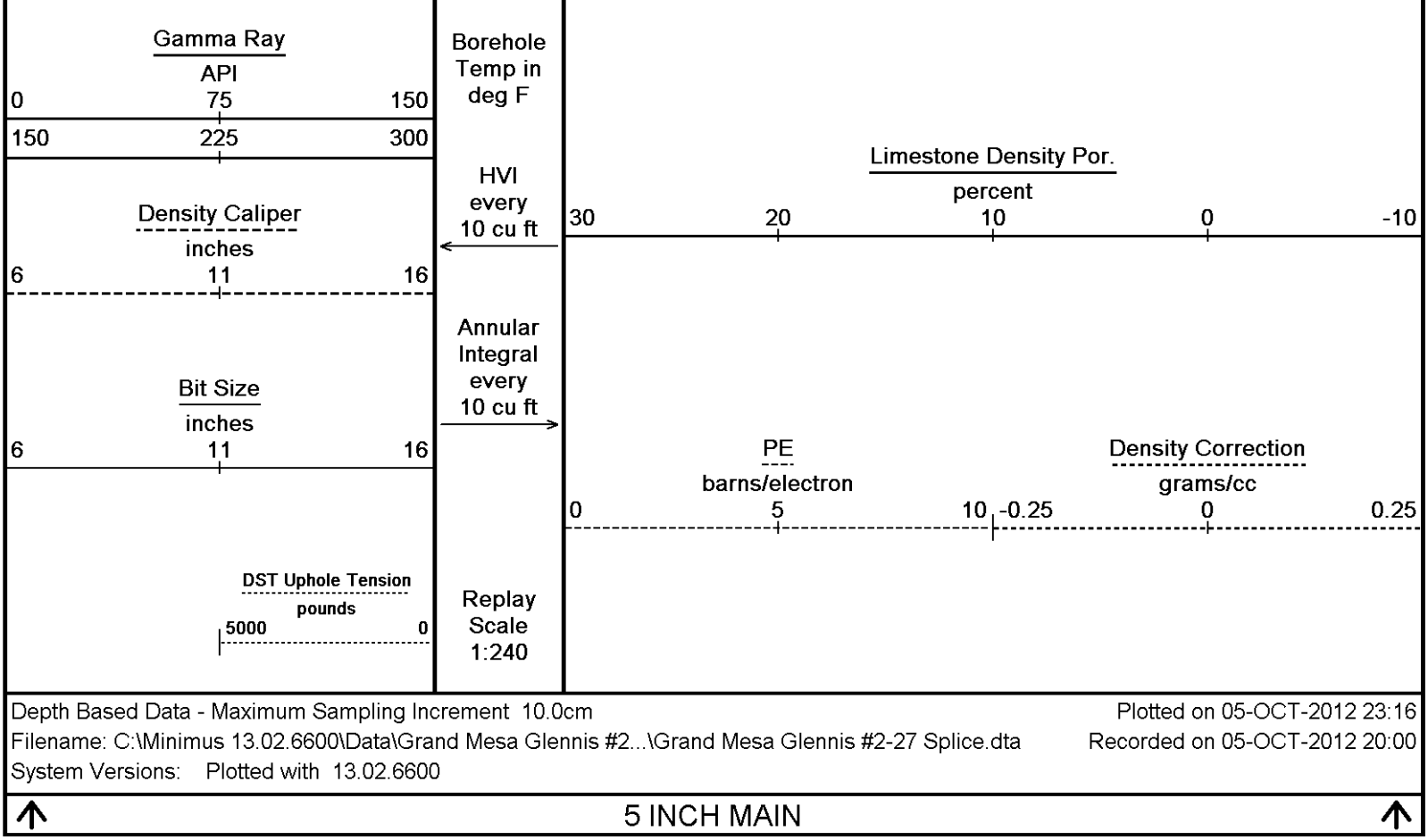

Bit Size
inches
6
11
16
Integral
every
10 cu ft
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
3618
200
3650
110°
3700
110°
3750
111°


3800
Bit Size
300
Limestone Density Por
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
111°
3850
111°
3900
112°
3950
112°
4000


112°
4050
200
112°
4100
100
112°
4150
113°
4200
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
PE
Limestone Density Por
Compensated Density
Density Correction


113°
4250
113°
4300
100
114°
4350
114°
4400
115°
4450


117°
4500
117°
4550
116°
4600
4650
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
DST Uphole Tension
FR DST Uphole Tension
0
0
PE
FR PE
Limestone Density Por.
Compensated Density
Density Correction
Depth
in
Feet
Timing Marks
every 60.0 sec
Compensated Density
grams/cc
2
2.25
2.50
2.75
3

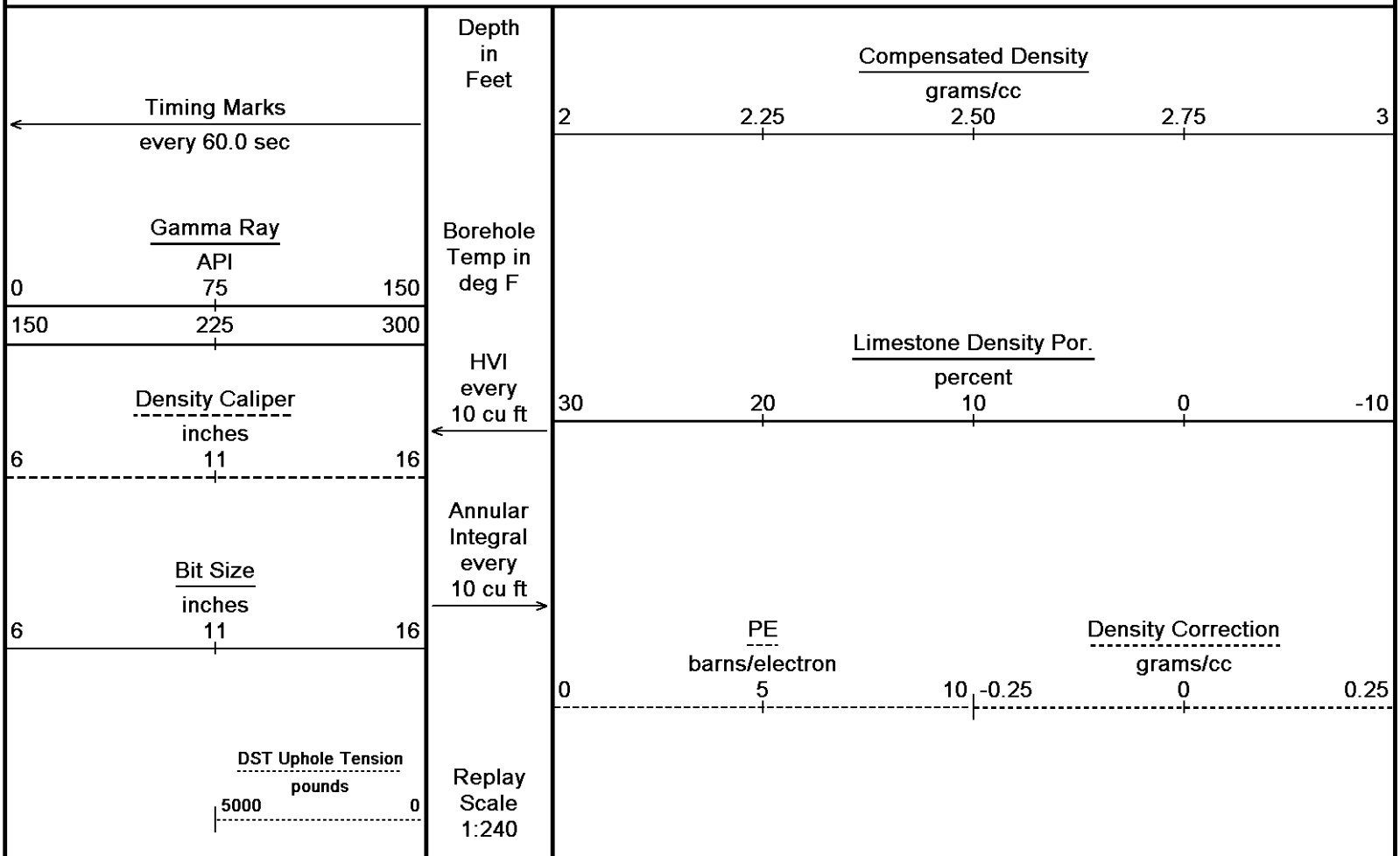


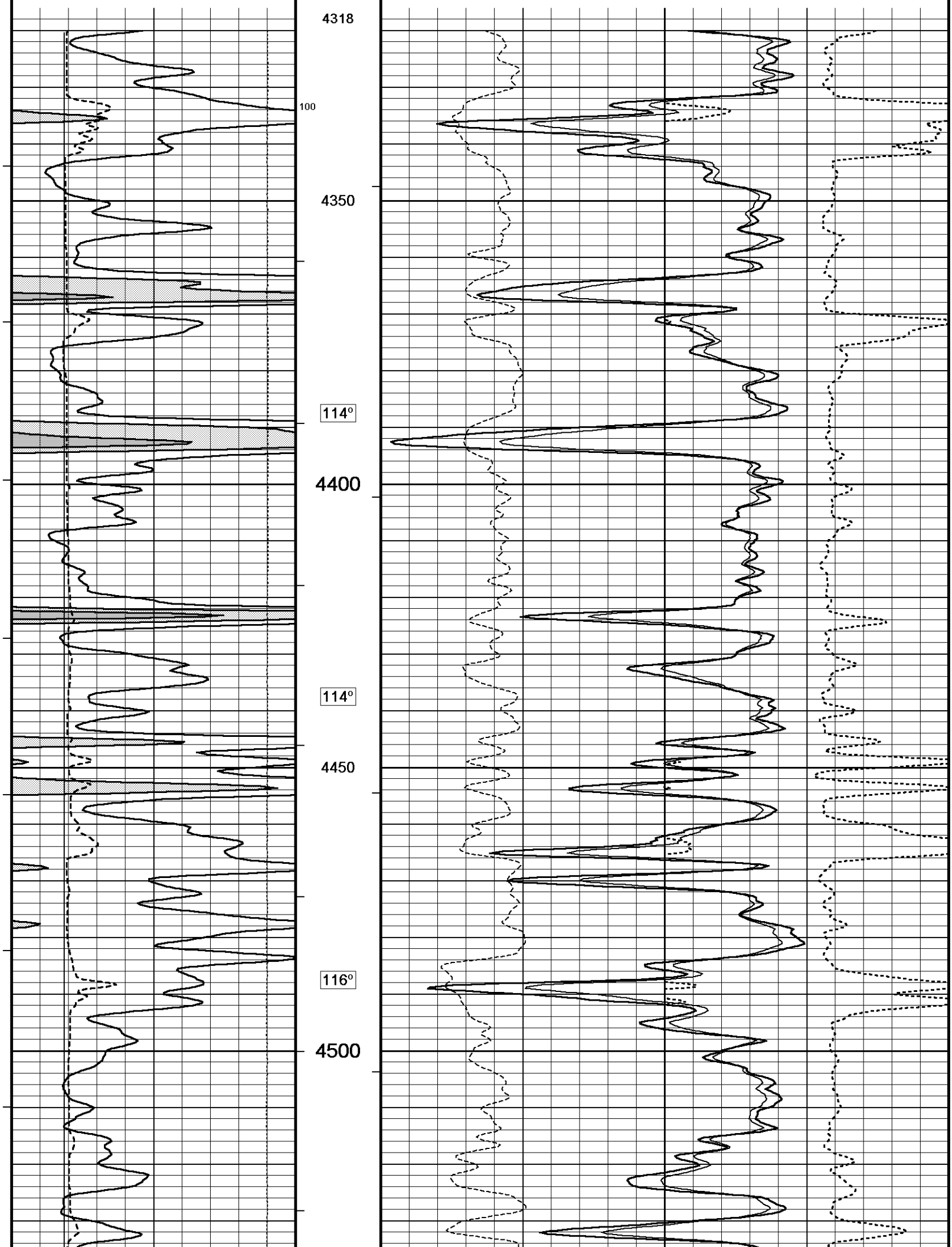
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2...\Grand Mesa Glennis #2-27 Splice.dta — Recorded on 05-OCT-2012 20:00
System Versions: Plotted with 13.02.6600

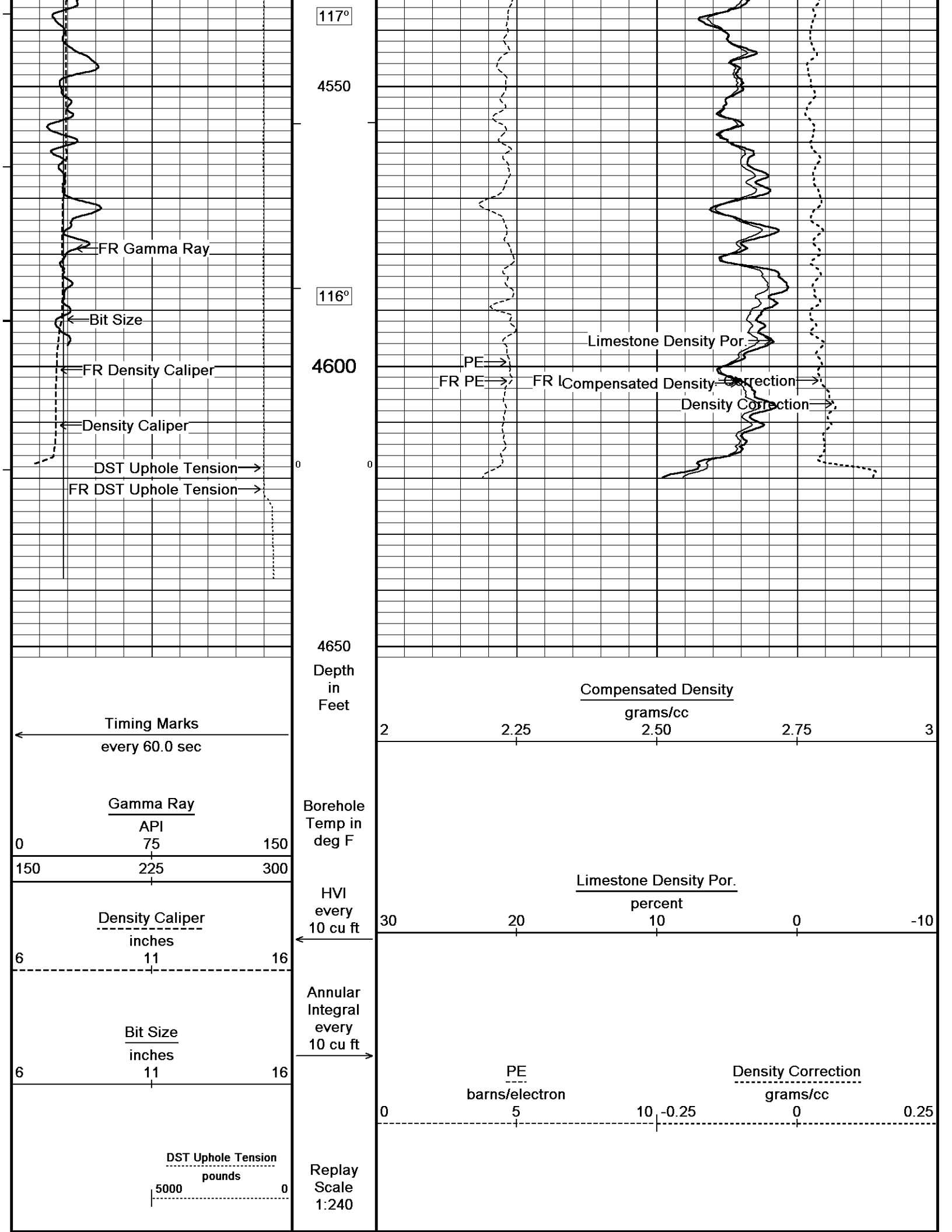
5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 05-OCT-2012 23:16
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2-27\Grand Mesa Glennis #2-27_002.dta — Recorded on 05-OCT-2012 19:39
System Versions: Logged with 13.02.6600 Processed with 13.02.6600 Plotted with 13.02.6600




4318
100
4350
114°
4400
114°
4450
116°
4500


117°
4550
FR Gamma Ray
116°
Bit Size
FR Density Caliper
4600
Density Caliper
DST Uphole Tension
FR DST Uphole Tension
0
0
PE
FR PE
FR
Limestone Density Por.
Compensated Density
Correction
Density Correction
4650
Depth
in
Feet
Timing Marks
every 60.0 sec
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Gamma Ray
API
0
75
150
150
225
300
Borehole
Temp in
deg F
HVI
every
10 cu ft
Limestone Density Por.
percent
30
20
10
0
-10
Density Caliper
inches
6
11
16
Annular
Integral
every
10 cu ft
Bit Size
inches
6
11
16
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.02.6600\Data\Grand Mesa Glennis #2-27\Grand Mesa Glennis #2-27 Splice.dta

General Constants All 000

Last Edited on 05-OCT-2012,19:15

General Parameters		
Mud Resistivity	0.630	ohm-metres
Mud Resistivity Temperature	84.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	Base Density Porosity	
Resistivity used	Array Ind. Four Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 05-OCT-2012 18:53

Reading No	Measured	Calibrated (lbs)
1	-2307.27	0.00
2	-2305.09	400.00

Gamma Calibration MCG-C 84

Field Calibration on 02-OCT-2012 14:55

	Measured	Calibrated (API)
Background	71	49
Calibrator (Gross)	1136	774
Calibrator (Net)	1064	725

Gamma Constants MCG-C 84

Last Edited on 01-JAN-2003,00:09

Gamma Calibrator Number	GRC38	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-C 84

Field Calibration on 01-OCT-2012,10:14

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

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 01-OCT-2012,10:14

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-C 84

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 16

Base Calibration on 07-SEP-2012 10:01
Field Calibration on 20-SEP-2012 14:10

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13823	5.98

2	16876	7.97
3	20058	9.86
4	23883	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.93	5.98

Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 07-SEP-2012 10:10
Field Check on 20-SEP-2012 14:11

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	78.3	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 01-JAN-2003,00:09

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-B.J 387

Base Calibration on 03-OCT-2012 16:16
Field Check on 03-OCT-2012 16:32

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2923	89	3714	110
Ratio	32.740		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1702	2509
Ratio	0.678	

Field Check

	Calibrated (cps)	
	1694	2505
Ratio	0.676	

Neutron Constants MDN-B.J 387

Last Edited on 01-JAN-2003,00:09

Neutron Source Id	P58125B	
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-A.A 55

Base Calibration on 01-OCT-2012 09:28
Field Check on 01-OCT-2012 09:33

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	953.9	126.8

Base Check	280.7
Field Check	280.8

FE Constants MFE-A.A 55

Last Edited on 01-JAN-2003,00:08

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

Induction Calibration MAI-A.A 178

Base Calibration on 18-APR-2011,13:49
Field Check on 03-OCT-2012 15:31

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.6	484.7	9.3	966.2
2	6.2	391.4	7.6	821.4
3	4.0	264.5	5.2	566.0
4	2.3	135.1	2.6	279.2

Array Temperature 77.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	13.7	3764.4	13.7	3764.2	
2	30.0	3467.5	30.0	3467.3	
3	27.4	3013.9	27.4	3013.8	
4	18.8	2064.8	18.8	2064.8	
Deep	16.0	1995.0	16.0	1995.2	
Medium	40.3	3954.7	40.3	3954.5	
Shallow	46.0	5083.0	46.0	5082.4	
Array Temperature		94.4		94.8	Deg F

Induction Constants MAI-A.A 178

Last Edited on 01-JAN-2003,00:08

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.	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	

High Resolution Temperature Calibration MAI-A.A 178

Field Calibration on 03-MAR-2011,09:58

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

High Resolution Temperature Constants MAI-A.A 178

Last Edited on

Pre-filter Length	11

Caliper Calibration MPD-B 59

Base Calibration on 31-DEC-2002 23:12
Field Calibration on 31-DEC-2002 23:13

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17177	3.99
2	25648	5.98
3	34313	7.97
4	42560	9.86
5	51728	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.04	5.98

Photo Density Calibration MPD-B 59

Base Calibration on 31-DEC-2002 23:33
Field Check on 31-DEC-2002 23:40

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	56697	27917	59556	30836
Reference 2	23013	2513	24941	2541

Field Check at Base

1200.6	1281.4

Field Check

1199.8	1279.8

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	220	1079		
Reference 1	21366	56515	0.381	0.371
Reference 2	6125	22879	0.271	0.272

Field Check at Base

220.5	1078.6

Field Check

218.4	1074.7

Density Constants MPD-B 59

Last Edited on 01-JAN-2003,00:09

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	1.10	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 13.02.6600\Data\Grand Mesa Glennis #2-27\Grand Mesa Glennis #2-27 Splice.dta

Compact Comms Gamma
MCG-C 84 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

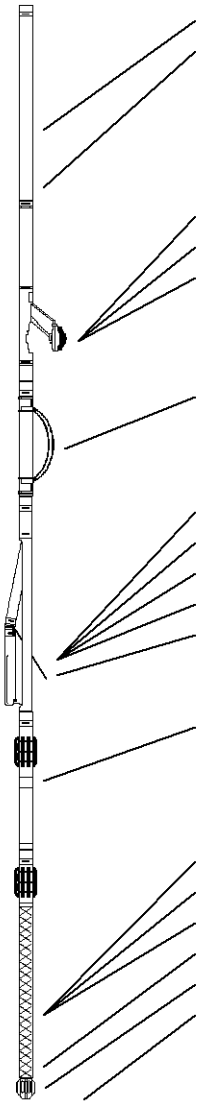
Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.16 ft Weight: 383.6 lb



42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
34.24 ft	MLTC - MML Caliper
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	CLDC - Density Caliper
19.28 ft	DPRL - Limestone Density Por.
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
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	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	GLENNIS #2-27
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2839.00	feet	First Reading	4603.00	feet
Elevation Drill Floor	2837.00	feet	Depth Driller	4622.00	feet
Elevation Ground Level	2834.00	feet	Depth Logger	4622.00	feet

Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG