Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG

COMPANY	REDLAND RESOURCES, INC.
WELL	CHERYL #31-15
FIELD	MCVICKER SE
PROVINCE/COUNTY	NESS
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	610' FSL & 2080' FEL
	SE/4

SEC	TWP	RGE	Other Services
31	20S	25W	MAI/MFE

API Number 15-135-25364
Permit Number

Permanent Datum G.L., Elevation 2399 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2407.00
DF	2405.00
GL	2399.00

Date	22-MAR-2012			
Run Number	ONE			
Depth Driller	4500.00	feet		
Depth Logger	4497.00	feet		
First Reading	4475.00	feet		
Last Reading	3500.00	feet		
Casing Driller	213.00	feet		
Casing Logger	214.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.50 lb/USg	48.00 CP		
PH / Fluid Loss	9.50	8.00 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.87 @ 77.0	ohm-m		
Rmf @ Measured Temp	0.70 @ 77.0	ohm-m		
Rmc @ Measured Temp	1.04 @ 77.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.61 @110.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	110.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13096	LIB		
Recorded By	L. SCOTT			
Witnessed By	CHASE THOMAS			
S.O.# / JOB#	3534694		LB12-072	

BOREHOLE RECORD

Last Edited: 22-MAR-2012 11:54

Bit Size inches	Depth From feet	Depth To feet
7.875	214.00	4497.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	214.00	24.00

REMARKS

Tools Used: MPD, MCG, MDN, MFE, MAI, MML
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.
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.
Annular volume with 4.5 inch production casing = 263 cu. ft
Total hole volume from TD to Surface Casing= 2037 cu. ft.
Service order #3534694
Rig: Duke # 2
Engineer: L. Scott
Operator(s): K. Rinehart

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11_03_4044\Data\Redland Cheryl 31-15\Redland Cheryl 31-15_002.dta
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

Plotted on 22-MAR-2012 15:02
Recorded on 22-MAR-2012 12:07

Timing Marks
every 60.0 sec

Depth in Feet

Limestone Neutron Por.
percent
30 20 10 0 -10

Gamma Ray
API
0 75 150

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

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.25 0 0.25

Bit Size
inches
6 11 16

Annular Integral every 10 cu ft

Micro-normal
ohm metres
0 10

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

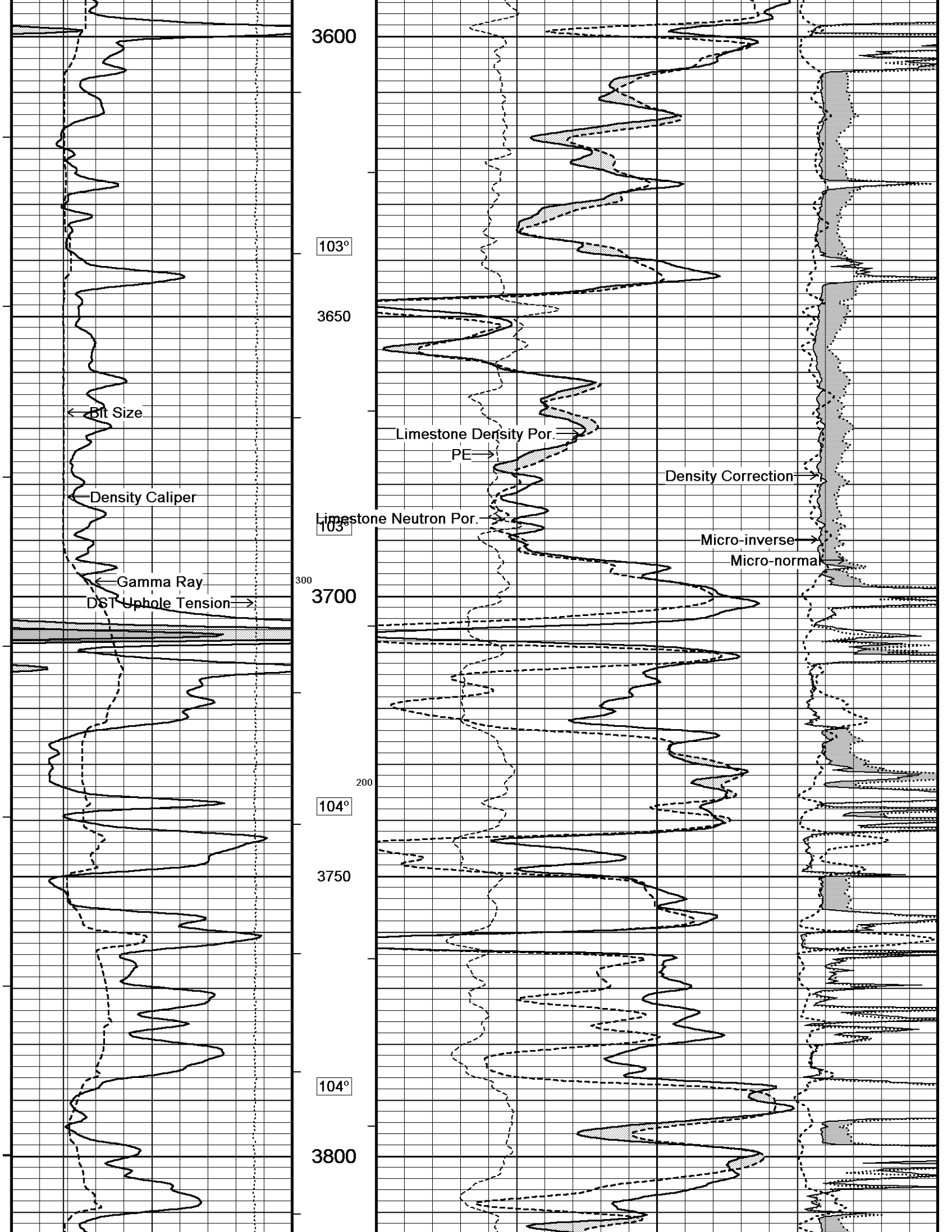
Micro-inverse
ohm metres
0 10

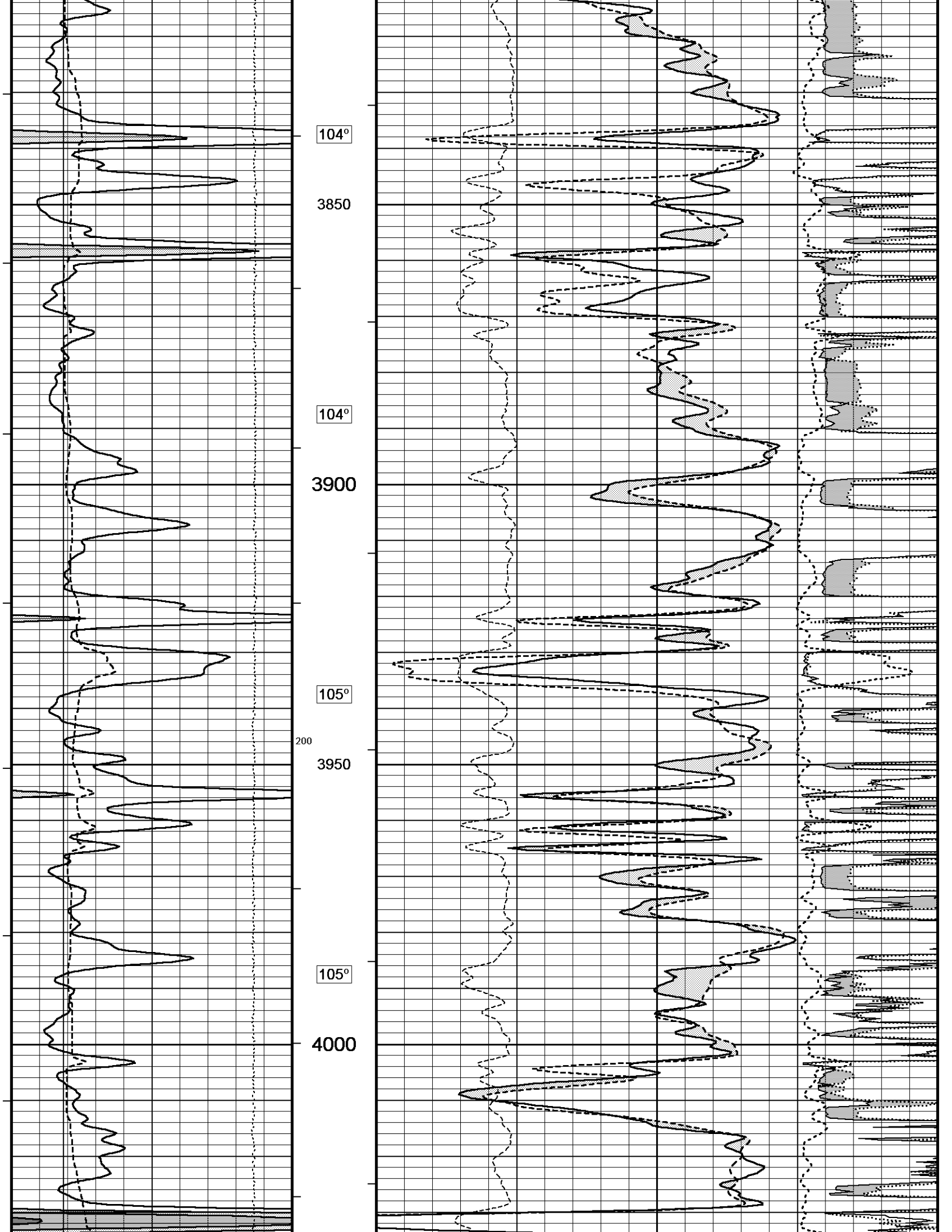
3500

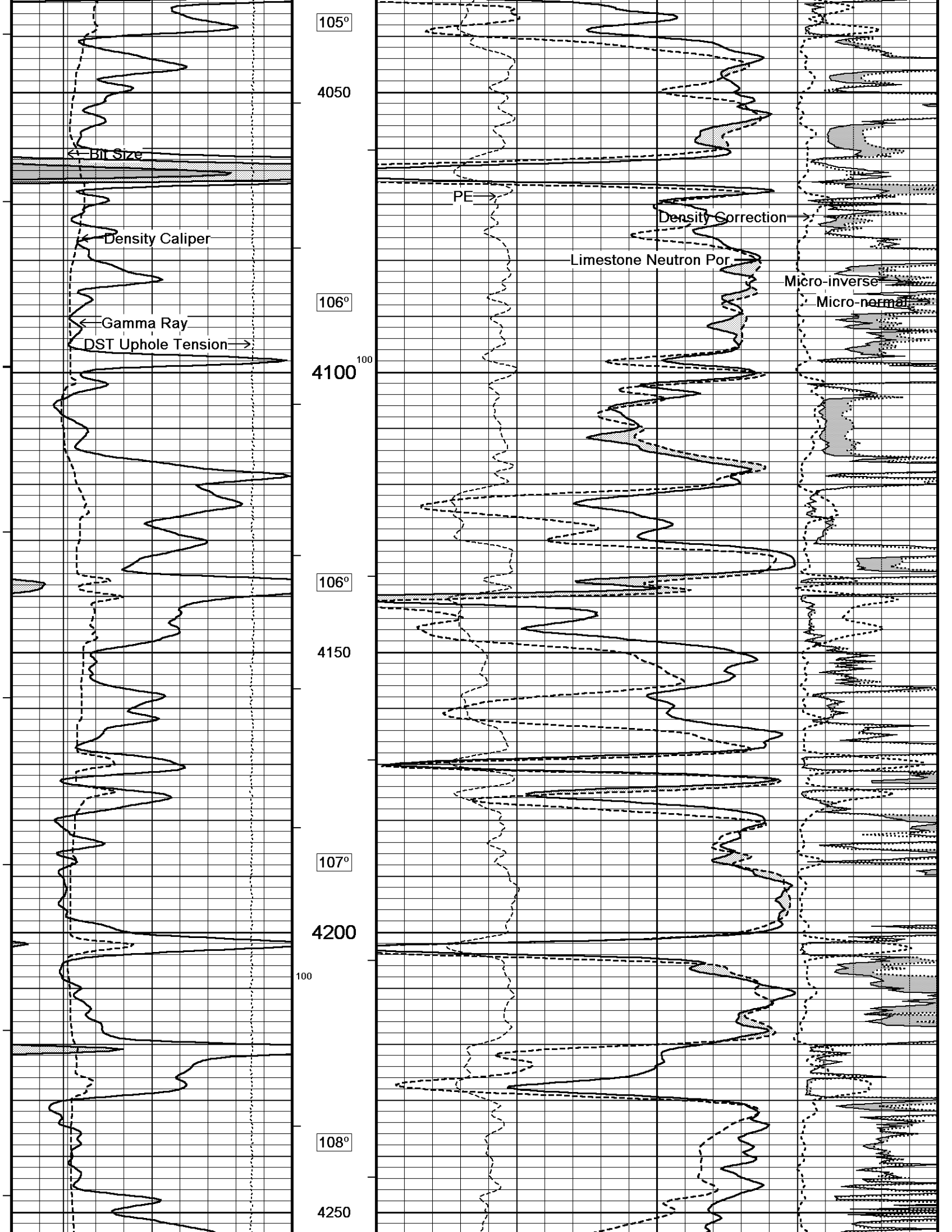
102°

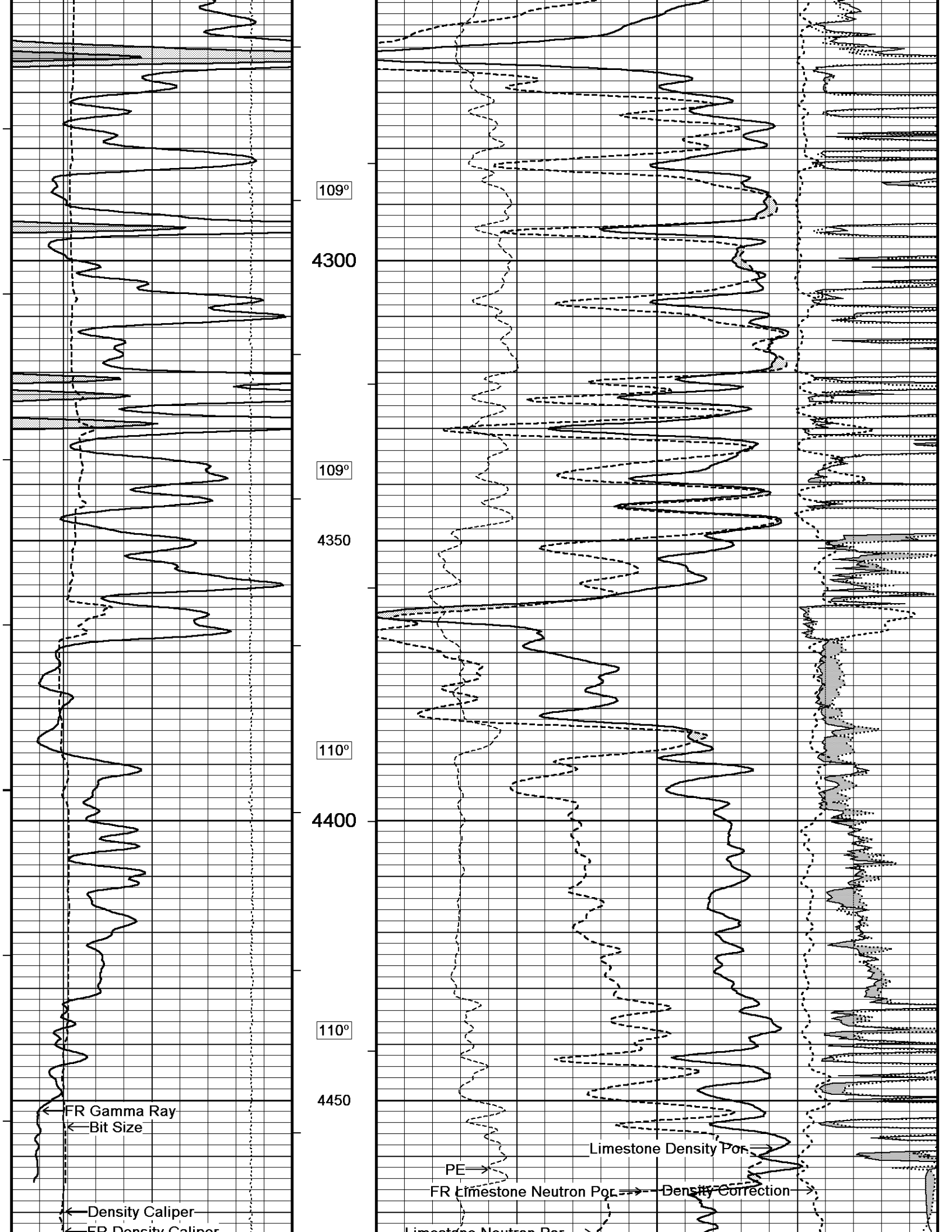
3550

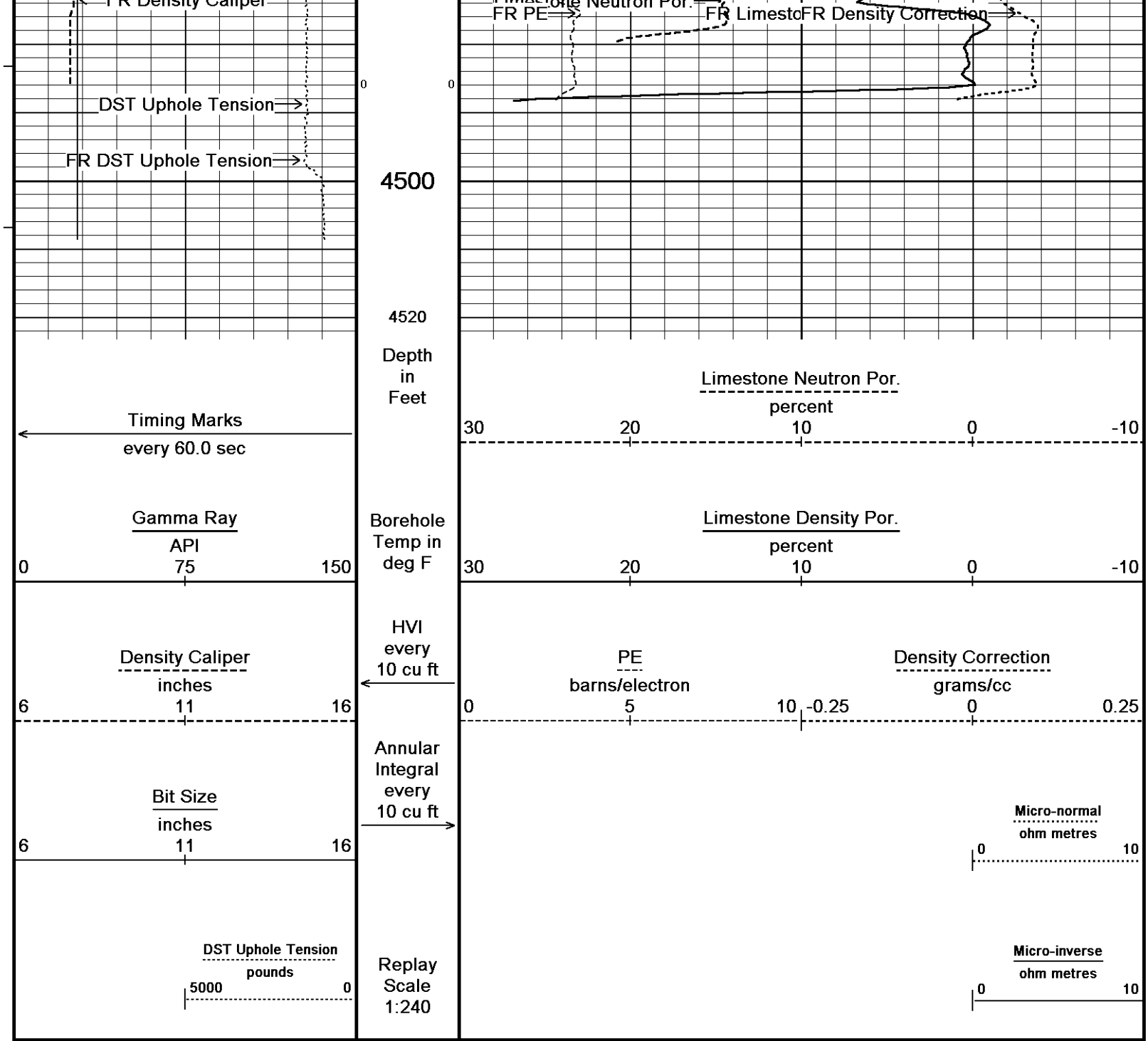
103°


3600
103°
3650
Bit Size
Limestone Density Por.
PE
Density Correction
Density Caliper
Limestone Neutron Por.
103°
Micro-inverse
Micro-normal
300
Gamma Ray
DST Uphole Tension
3700
200
104°
3750
104°
3800


104°
3850
104°
3900
105°
200
3950
105°
4000


105°
4050
Bit Size
PE
Density Correction
Density Caliper
Limestone Neutron Por
Micro-inverse
Micro-normal
106°
Gamma Ray
DST Uphole Tension
4100
100
106°
4150
107°
4200
100
108°
4250


109°
4300
109°
4350
110°
4400
110°
4450
FR Gamma Ray
Bit Size
Density Caliper
PE
Limestone Density Por.
FR Limestone Neutron Por.
Density Correction



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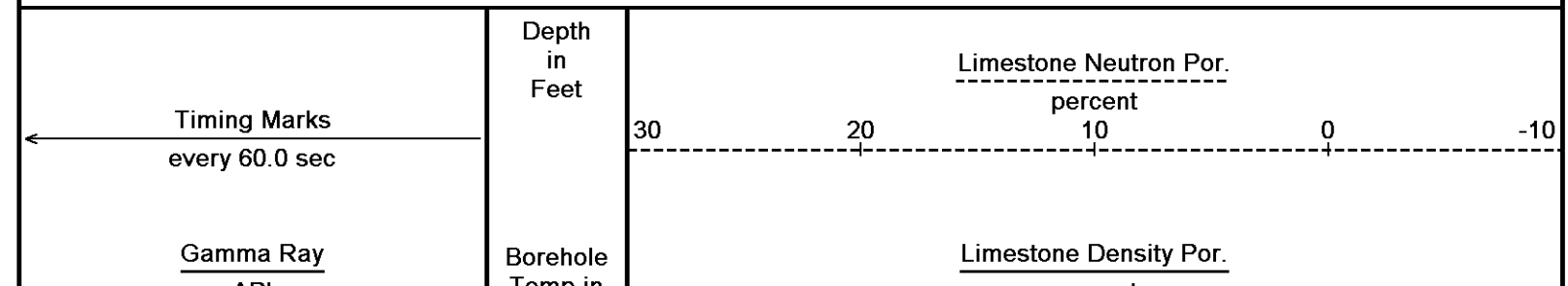
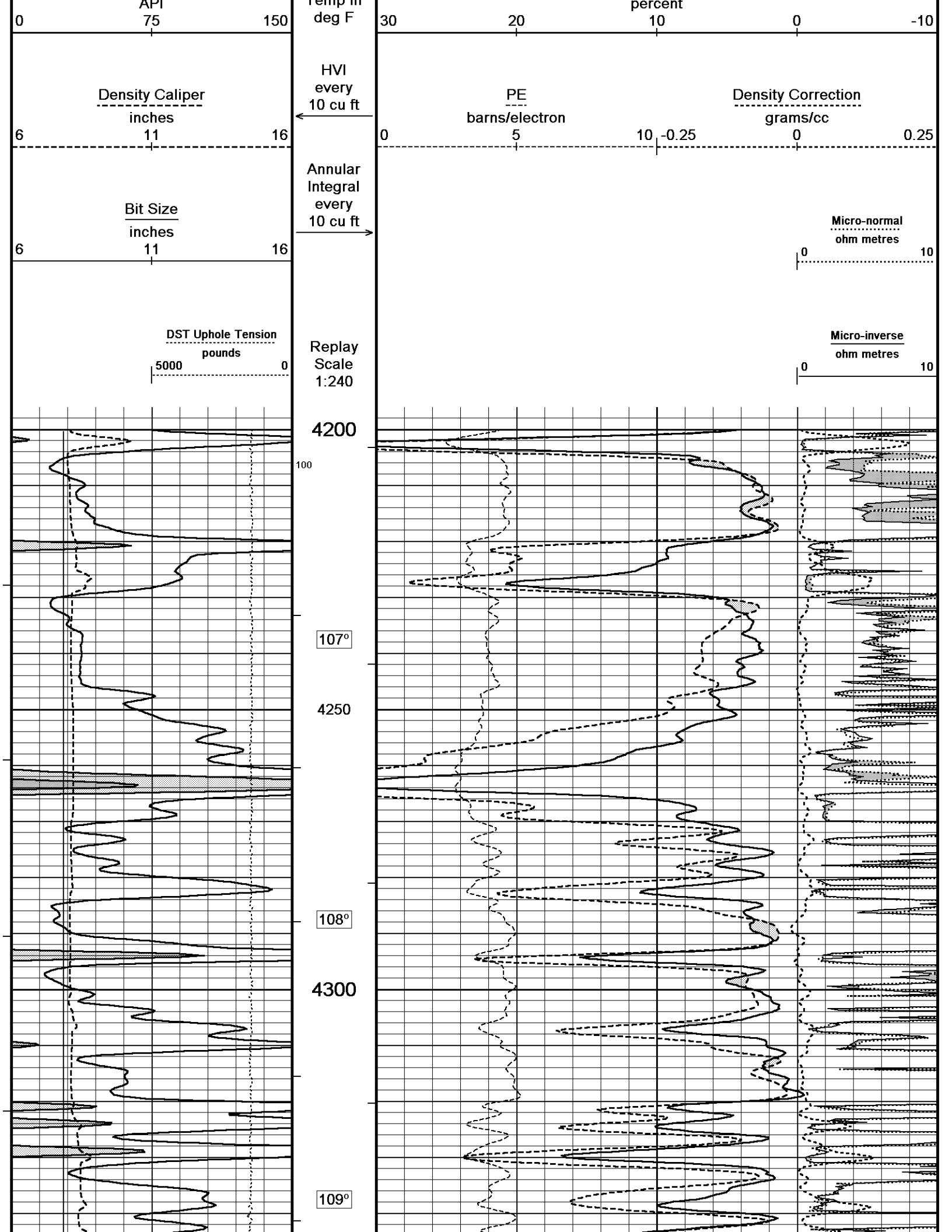
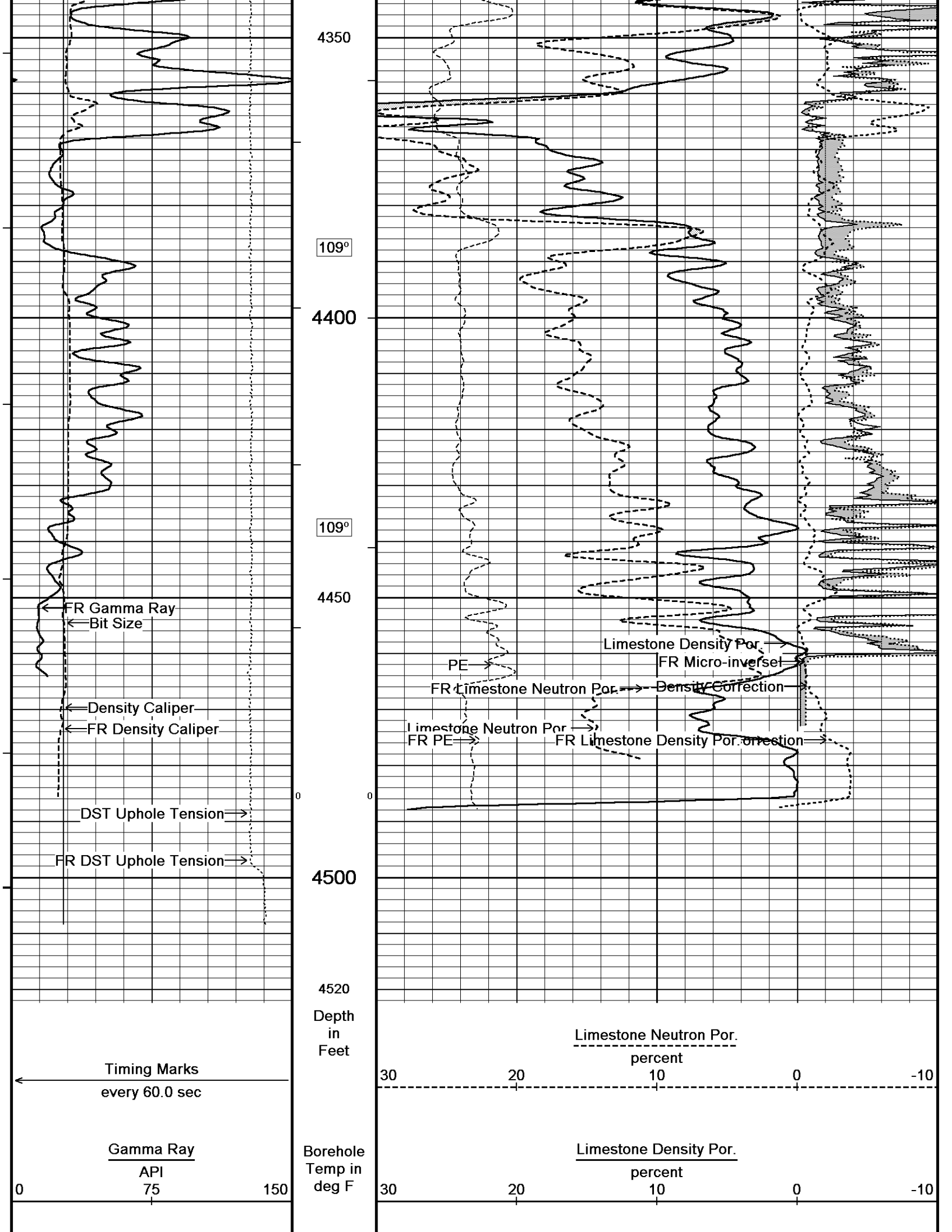
5 INCH MAIN

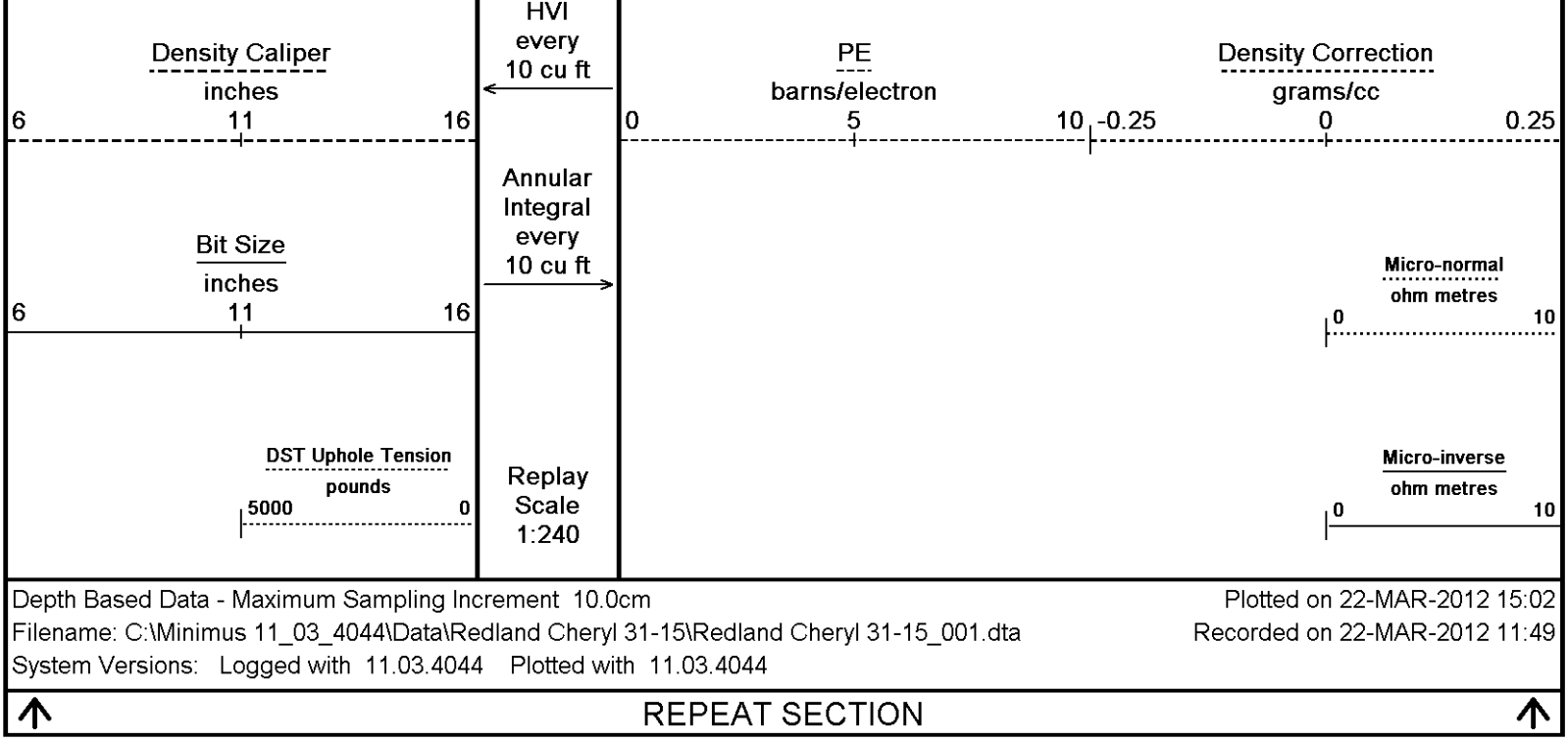
REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 22-MAR-2012 15:02
Filename: C:\Minimus 11_03_4044\Data\Redland Cheryl 31-15\Redland Cheryl 31-15_001.dta
Recorded on 22-MAR-2012 11:49
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044




API
0
75
150
Temp in
deg F
percent
30
20
10
0
-10
HVI
every
10 cu ft
Density Caliper
inches
6
11
16
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
Annular
Integral
every
10 cu ft
Bit Size
inches
6
11
16
Micro-normal
ohm metres
0
10
DST Uphole Tension
pounds
5000
0
Micro-inverse
ohm metres
0
10
Replay
Scale
1:240
4200
100
107°
4250
108°
4300
109°


4350
109°
4400
109°
4450
4500
4520
FR Gamma Ray
Bit Size
Density Caliper
FR Density Caliper
DST Uphole Tension
FR DST Uphole Tension
PE
FR Limestone Neutron Por.
Limestone Neutron Por.
FR PE
Limestone Density Por.
FR Micro-inverse
Density Correction
FR Limestone Density Por. correction
0
0
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Borehole
Temp in
deg F
Limestone Neutron Por.
percent
30
20
10
0
-10
Limestone Density Por.
percent
30
20
10
0
-10



Depth Based Data - Maximum Sampling Increment 10.0cm
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REPEAT SECTION

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
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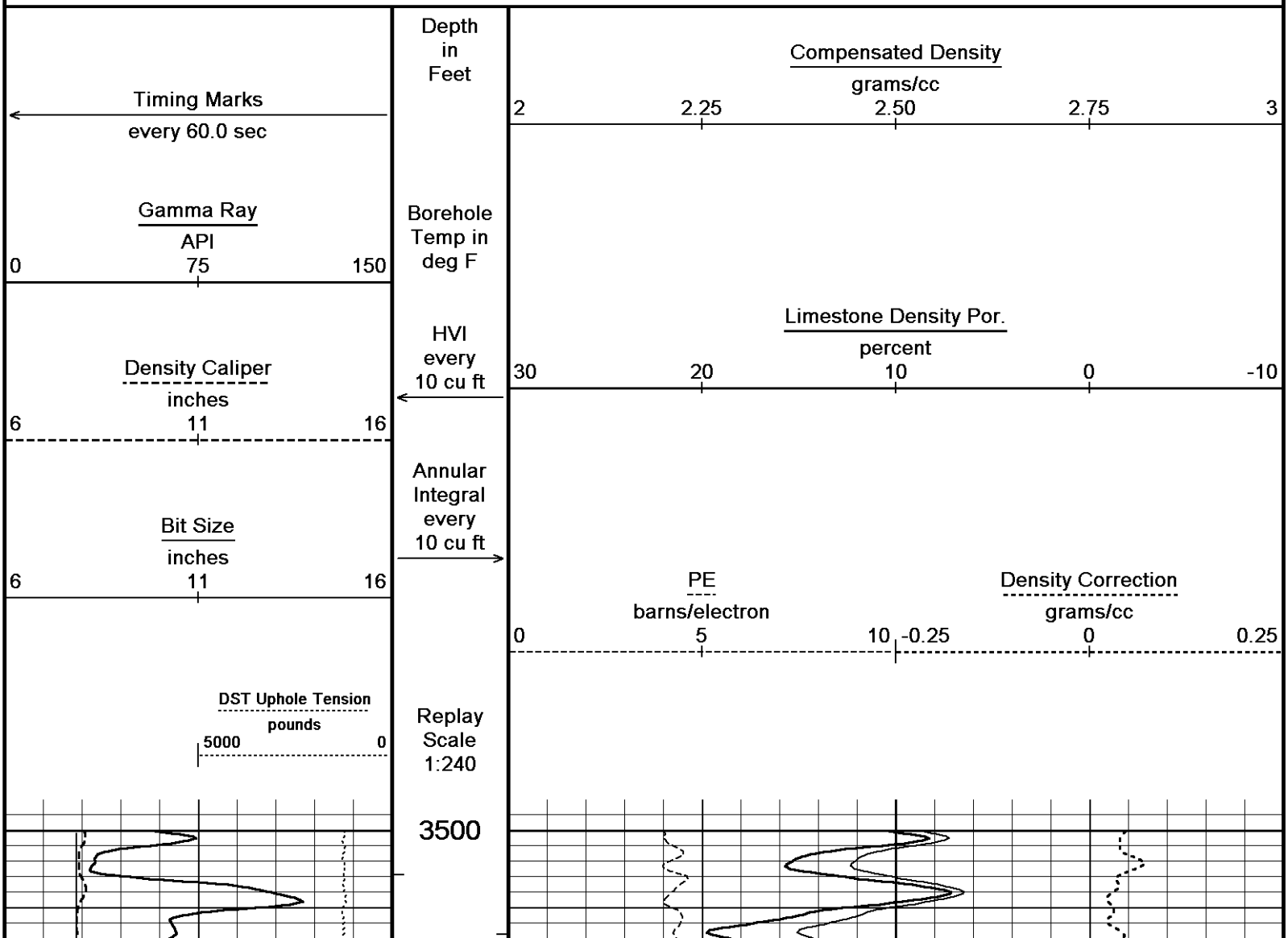
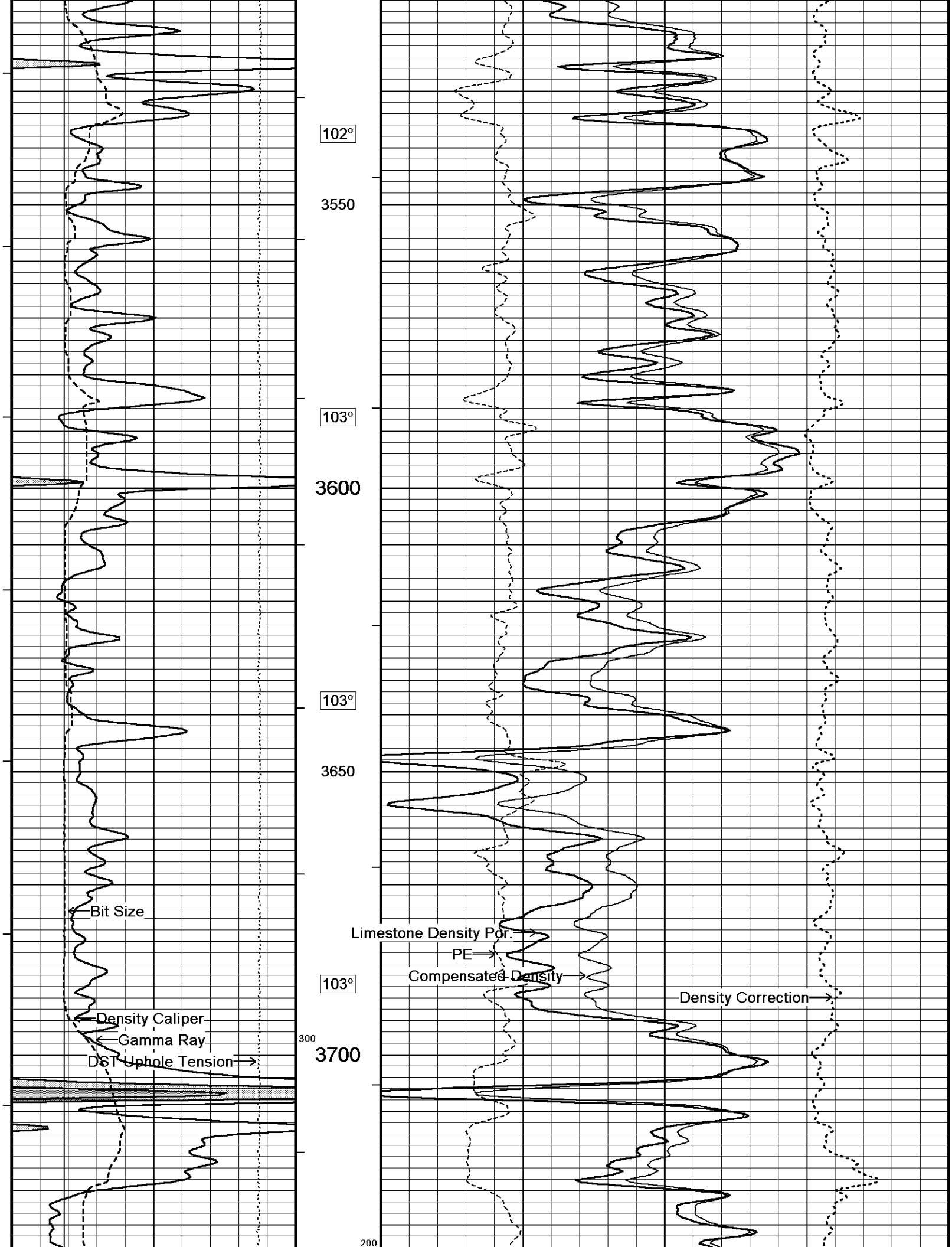
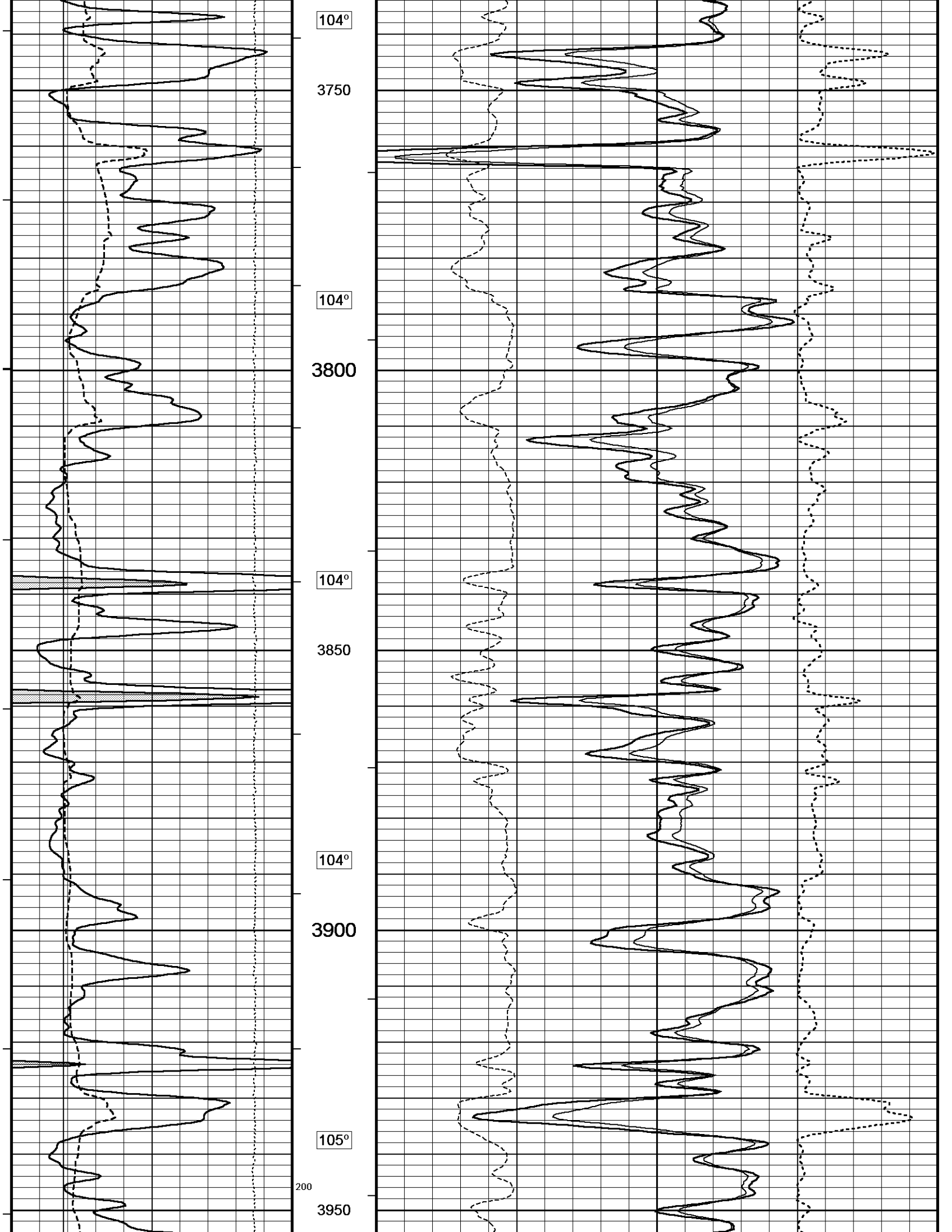
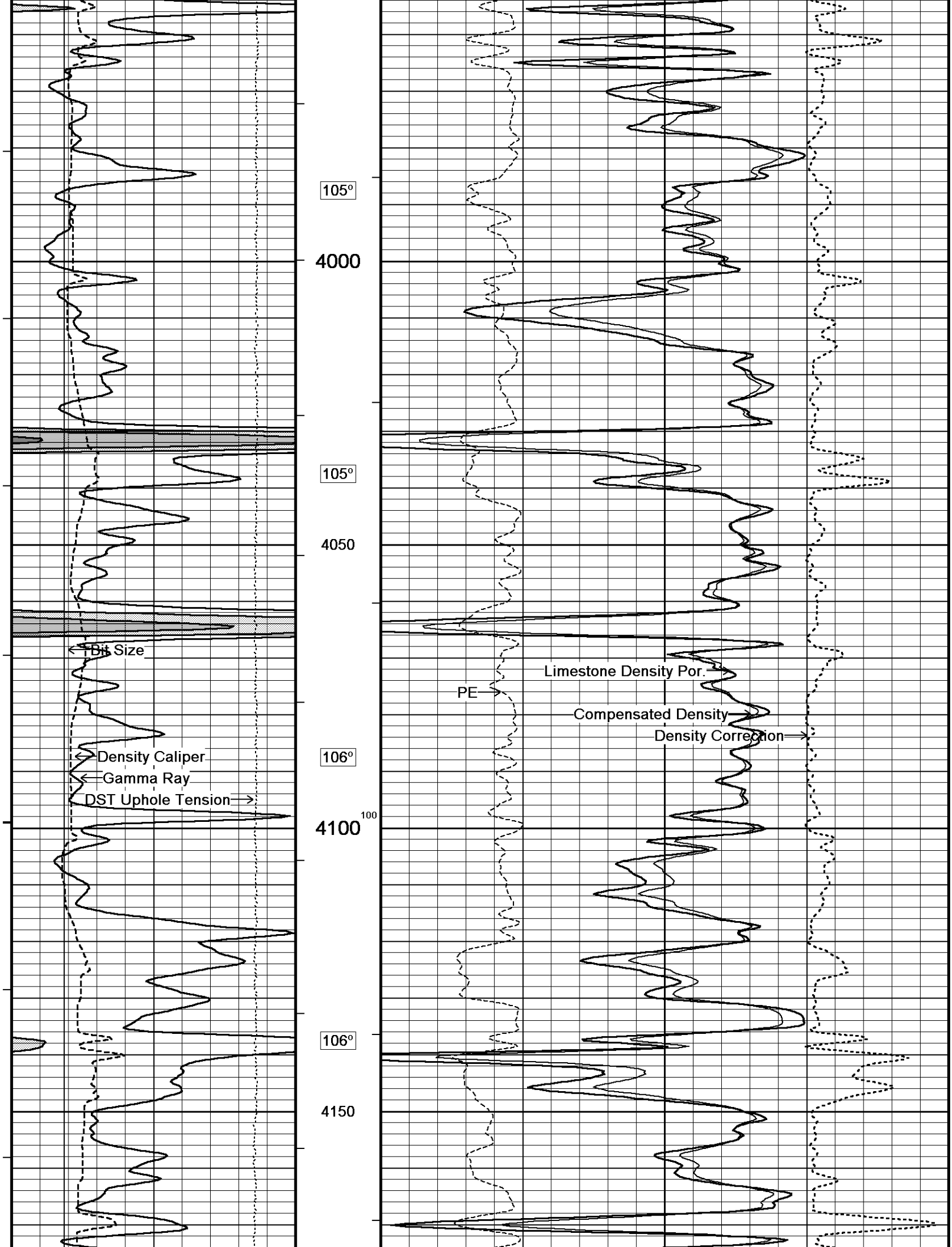
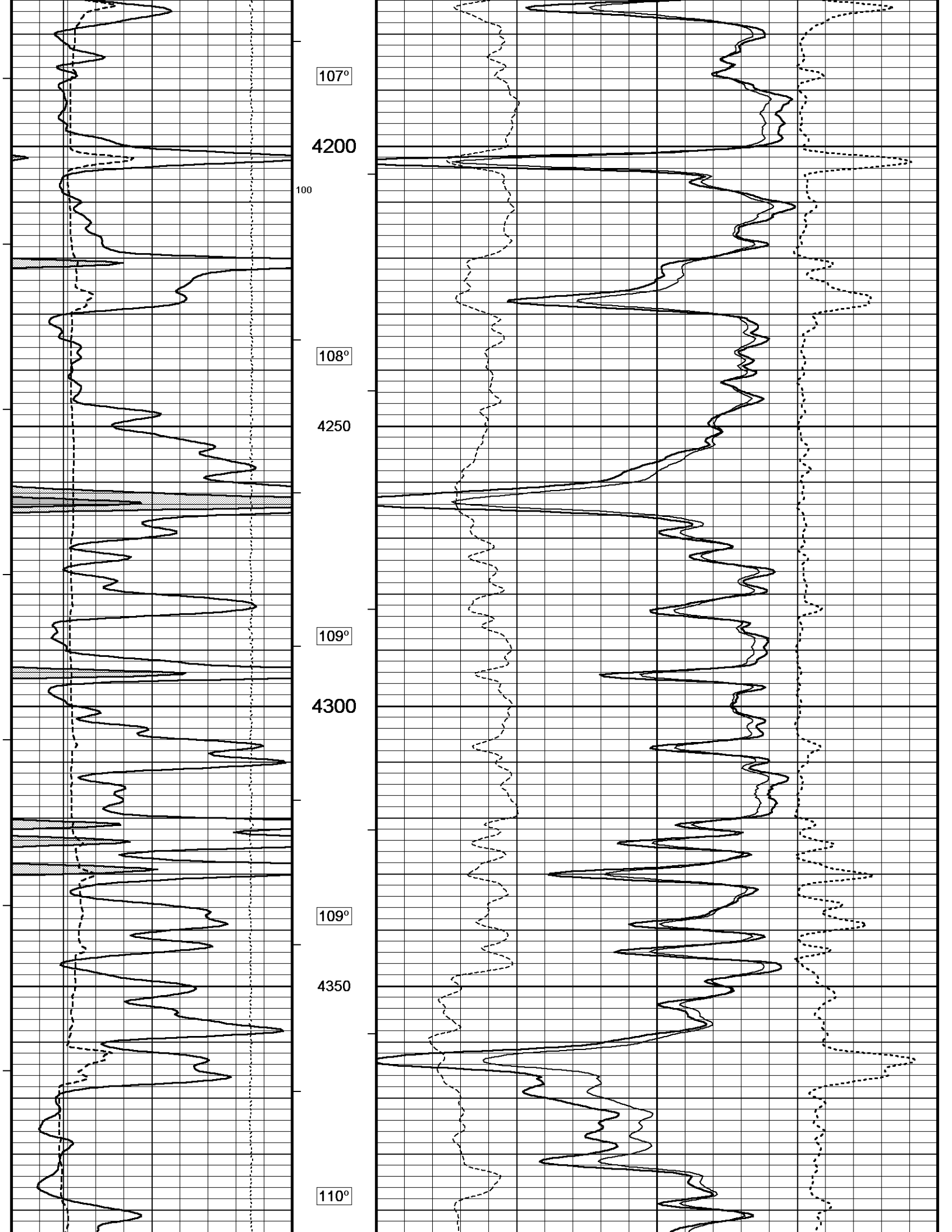
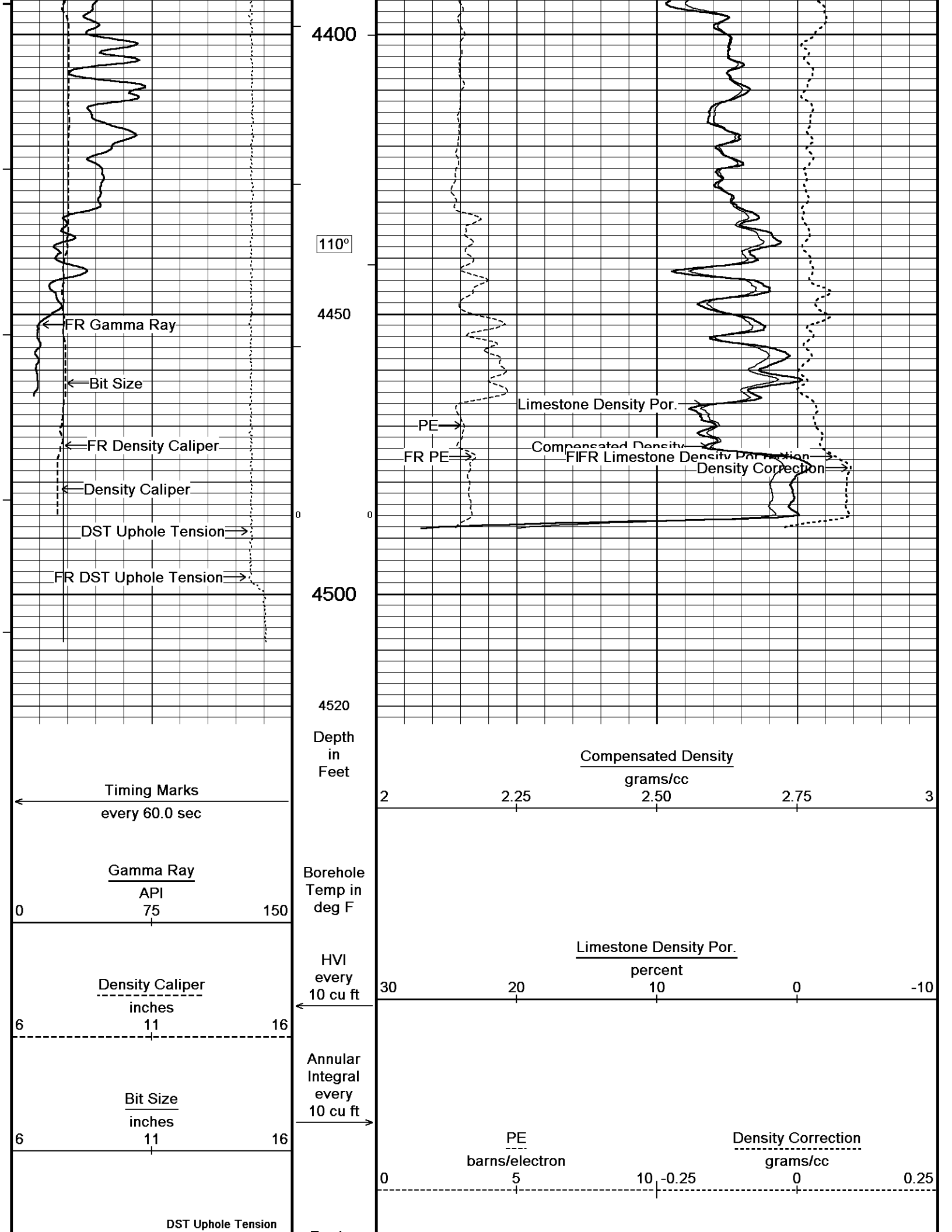



102°
3550
103°
3600
103°
3650
103°
3700
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
300
200


104°
3750
104°
3800
104°
3850
104°
3900
105°
200
3950


105°
4000
105°
4050
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
106°
4100
100
106°
4150
Limestone Density Por.
PE
Compensated Density
Density Correction


107°
4200
100
108°
4250
109°
4300
109°
4350
110°


4400
110°
4450
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
DST Uphole Tension
FR DST Uphole Tension
0
0
4500
4520
Limestone Density Por.
PE
FR PE
Density Correction
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
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

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

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
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System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

Plotted on 22-MAR-2012 15:02
Recorded on 22-MAR-2012 11:49

Depth in Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150

Borehole Temp in deg F

Density Caliper
inches
6 11 16

HVI every 10 cu ft

Bit Size
inches
6 11 16

Annular Integral every 10 cu ft

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

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

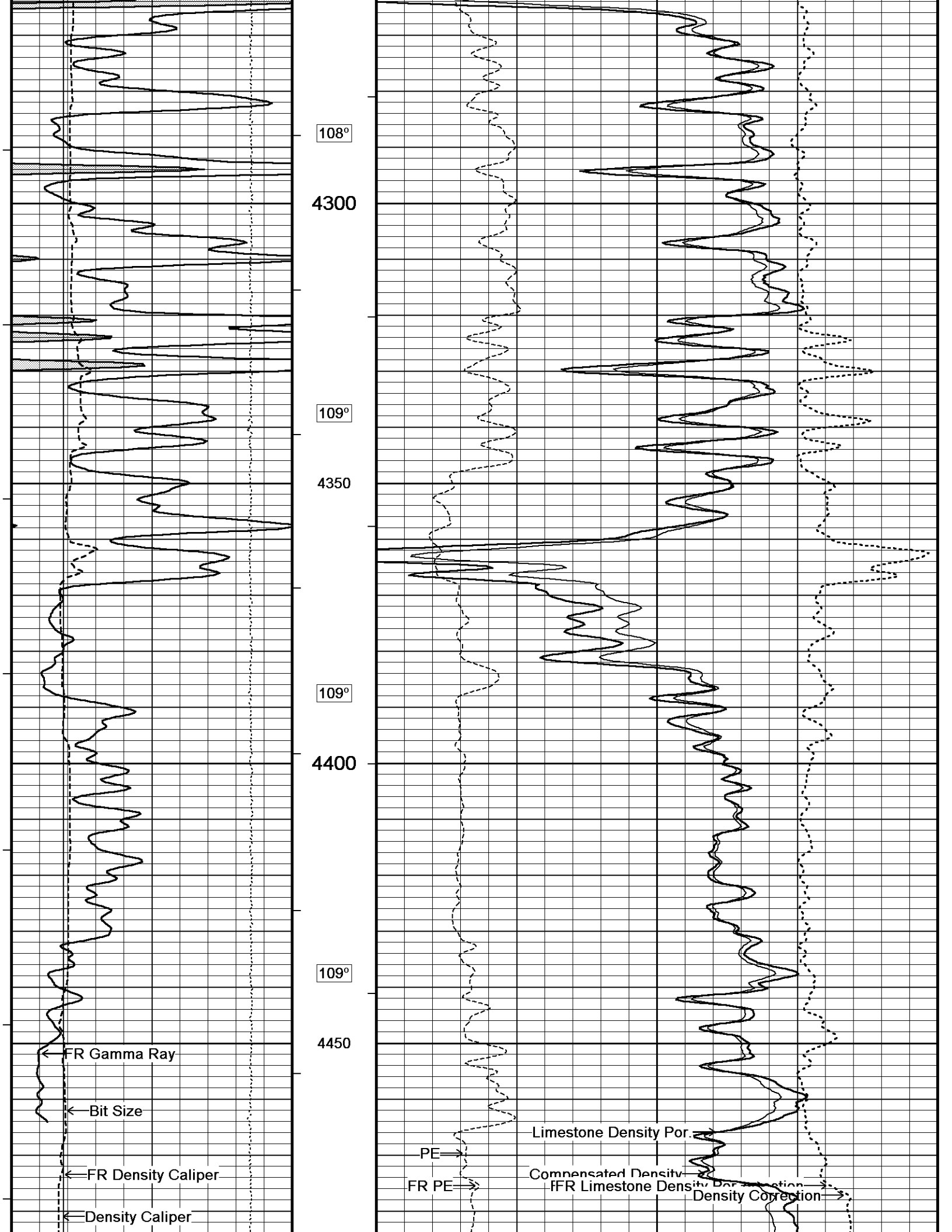
Density Correction
grams/cc
-0.25 0 0.25

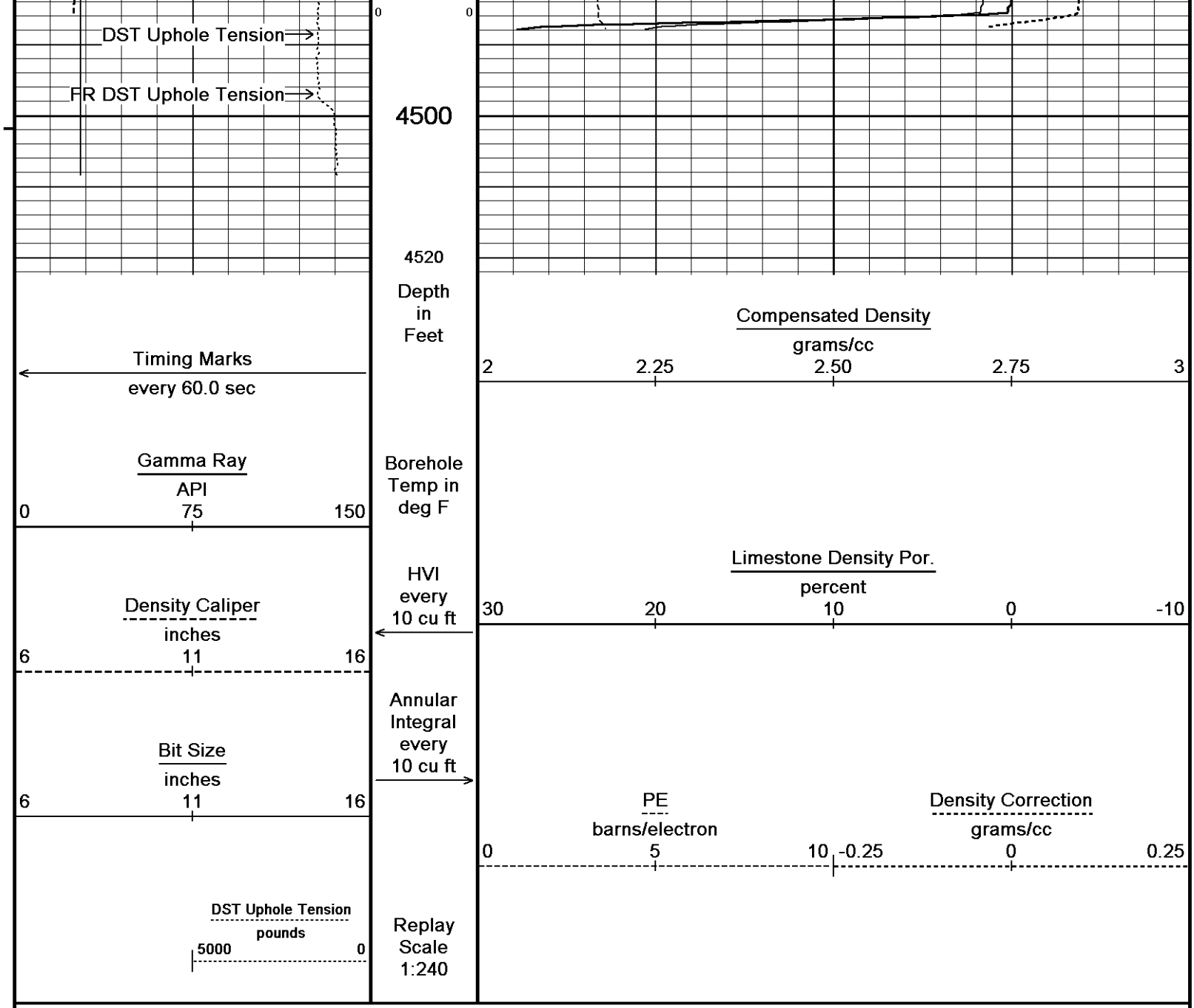
4200

100

107°

4250


108°
4300
109°
4350
109°
4400
109°
4450
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
PE
FR PE
Limestone Density Por.
Compensated Density
FFR Limestone Density Por
Density Correction



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 22-MAR-2012 15:02
Filename: C:\Minimus 11_03_4044\Data\Redland Cheryl 31-15\Redland Cheryl 31-15_001.dta
Recorded on 22-MAR-2012 11:49
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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 11_03_4044\Data\Redland Cheryl 31-15\Redland Cheryl 31-15.dta

General Constants All 000

Last Edited on 22-MAR-2012,11:05

General Parameters		
Mud Resistivity	0.870	ohm-metres
Mud Resistivity Temperature	77.000	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters	
Porosity used	Limestone Density Por.
Resistivity used	Array Ind. One Res Rt
RWA Constant A	1.000
RWA Constant M	2.000

Down-hole Tension Calibration SMS 0

Field Calibration on 23-FEB-2012 23:25

Reading No	Measured	Calibrated (lbs)
1	13693.36	0.00
2	14387.39	407.90

Gamma Calibration MCG-C 84

Field Calibration on 22-MAR-2012 00:55

	Measured	Calibrated (API)
Background	79	54
Calibrator (Gross)	744	510
Calibrator (Net)	665	456

Gamma Constants MCG-C 84

Last Edited on 22-MAR-2012,11:06

Gamma Calibrator Number	grc141	
Mud Density	1.14	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 22-MAR-2012,00:48

	Measured	Calibrated (mV)
Reference 1	100.3	100.0
Reference 2	-99.7	-100.0

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 22-MAR-2012,00:47

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

High Resolution Temperature Constants MCG-C 84

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 9

Base Calibration on 15-MAR-2012 11:46
Field Calibration on 22-MAR-2012 00:37

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15186	5.98
2	18659	7.97
3	21935	9.86
4	25881	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MML-A 9

Base Calibration on 15-MAR-2012 14:42
Field Check on 22-MAR-2012 00:35

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.0	59.5	2.6	12.8
Micro Inverse	15.5	77.7	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.5	32.5
Micro Inverse	16.4	16.5

Micro Normal and Micro Inverse Constants MML-A 9

Last Edited on 20-MAR-2012,03:51

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 39

Base Calibration on 12-MAR-2012 14:56
Field Check on 22-MAR-2012 01:02

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2762	87	3714	110
Ratio	31.770		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2387	3366
Ratio	0.709	

Field Check

	Calibrated (cps)	
	2368	3400
Ratio	0.696	

Neutron Constants MDN-A.B 39

Last Edited on 22-MAR-2012,01:02

Neutron Source Id	N1095	
Neutron Jig Number	NECD117	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 67

Base Calibration on 15-MAR-2012 15:00
Field Check on 22-MAR-2012 00:32

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	958.8	126.8
Base Check		281.1
Field Check		281.0

FE Constants MFE-A.A 67

Last Edited on 21-MAR-2012,06:58

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 188

Field Calibration on 12-AUG-2011,21:41

	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	68.00	68.00

High Resolution Temperature Constants MAI-A.A 188

Last Edited on 21-JUN-2011,19:05

Pre-filter Length	11

Induction Calibration MAI-A.A 188

Base Calibration on 04-JAN-2012,13:31
Field Check on 22-MAR-2012 00:31

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	16.9	470.2	9.3	966.2
2	6.4	377.1	7.6	821.4
3	3.9	257.8	5.2	566.0
4	1.7	135.1	2.6	279.2

Array Temperature	66.3	Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	13.3	3867.7
2	0.0	0.0	30.0	3585.1
3	0.0	0.0	28.0	3079.1
4	0.0	0.0	19.9	2047.1
Deep	0.0	0.0	17.3	1955.2
Medium	0.0	0.0	40.5	4115.4
Shallow	0.0	0.0	44.8	5370.2
Array Temperature	0.0		60.7	Deg F

Induction Constants MAI-A.A 188

Last Edited on 22-MAR-2012,00:28

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	

Caliper Calibration MPD-B 65

Base Calibration on 06-FEB-2012 15:42
Field Calibration on 22-MAR-2012 00:33

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14246	3.99
2	22911	5.98
3	31473	7.97
4	39776	9.86
5	48992	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-B 65

Base Calibration on 06-FEB-2012 16:03
Field Check on 22-MAR-2012 00:47

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	58421	27705	59556	30836
Reference 2	23654	2410	24941	2541
Field Check at Base	1233.9	1179.6		
Field Check	1230.9	1175.8		

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	226	1097		
Reference 1	21385	58213	0.370	0.371
Reference 2	6241	23505	0.268	0.272
Field Check at Base	225.7	1097.3		
Field Check	223.6	1093.0		

Density Constants MPD-B 65

Last Edited on 22-MAR-2012,11:07

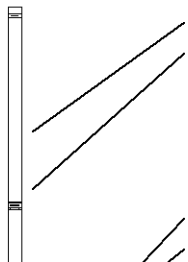
Density Source Id	P57072B	
Nylon Calibrator Number	DNCE695	
Aluminium Calibrator Number	DACD698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.14	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry 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 11_03_4044\Data\Redland Cheryl 31-15\Redland Cheryl 31-15.dta

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in



45.04 ft GRGC - Gamma Ray
42.13 ft CGXT - MCG External Temperature

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

35.41 ft MINV - Micro-inverse
35.41 ft MNRL - Micro-normal

Compact Neutron
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

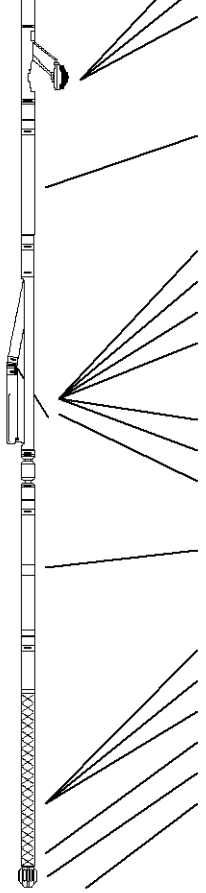
Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.32 ft Weight: 407.9 lb



36.40 ft	MLTC - MML Caliper
30.61 ft	NPRL - Limestone Neutron Por.
23.37 ft	AVOL - Annular Volume
23.37 ft	HVOL - Hole Volume
23.37 ft	CLDC - Density Caliper
21.44 ft	DEN - Compensated Density
21.44 ft	DCOR - Density Correction
21.44 ft	DPRL - Limestone Density Por.
21.38 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	REDLAND RESOURCES, INC.
WELL	CHERYL #31-15
FIELD	MCVICKER SE
PROVINCE/COUNTY	NESS
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2407.00	feet	First Reading	4475.00	feet
Elevation Drill Floor	2405.00	feet	Depth Driller	4500.00	feet
Elevation Ground Level	2399.00	feet	Depth Logger	4497.00	feet

Weatherford®

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

40 Years of Wireline 1970 2010