SONIC NEUTRON OVERLAY

COMPANY	SHAKESPEARE OIL COMPANY
WELL	RUDOLPH #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1450' FSL & 1350' FEL

SEC	TWP	RGE	Other Services
22	17S	33W	

API Number 15-171-20938
Permit Number

Permanent Datum G.L., Elevation 3025 feet
Log Measured From KB
Drilling Measured From K.B. @ 10 FEET

Elevations:	feet
KB	3035.00
DF	3033.00
GL	3025.00

Date	16-APR-2013			
Run Number	ONE			
Service Order	3539888			
Depth Driller	4940.00	feet		
Depth Logger	4939.00	feet		
First Reading	2380.00	feet		
Last Reading	4939.00	feet		
Casing Driller	267.00	feet		
Casing Logger	264.00	inches		
Bit Size	7.875			
Hole Fluid Type	CHEMICAL	lb/USg		
Density / Viscosity	9.30 lb/USg	55.00 CP		
PH / Fluid Loss	10.50	10.50		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.62 @ 74.0	ohm-m		
Rmf @ Measured Temp	0.50 @ 74.0	ohm-m		
Rmc @ Measured Temp	0.74 @ 74.0	ohm-m		
Source Rmf / Rmc	CALC	CLAC		
Rm @ BHT	0.39 @119.0	ohm-m		
Time Since Circulation	3 HOURS			
Max Recorded Temp	119.00	deg F		
Equipment / Base	13057	LIB		
Recorded By	J. LAPOINT		W. STAMBAUGH	
Witnessed By	TIM PRIEST			
JOB#	LB13-104			

BOREHOLE RECORD

Last Edited: 16-APR-2013 15:06

Bit Size inches	Depth From feet	Depth To feet
7.875	264.00	4939.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	264.00	24.00

REMARKS

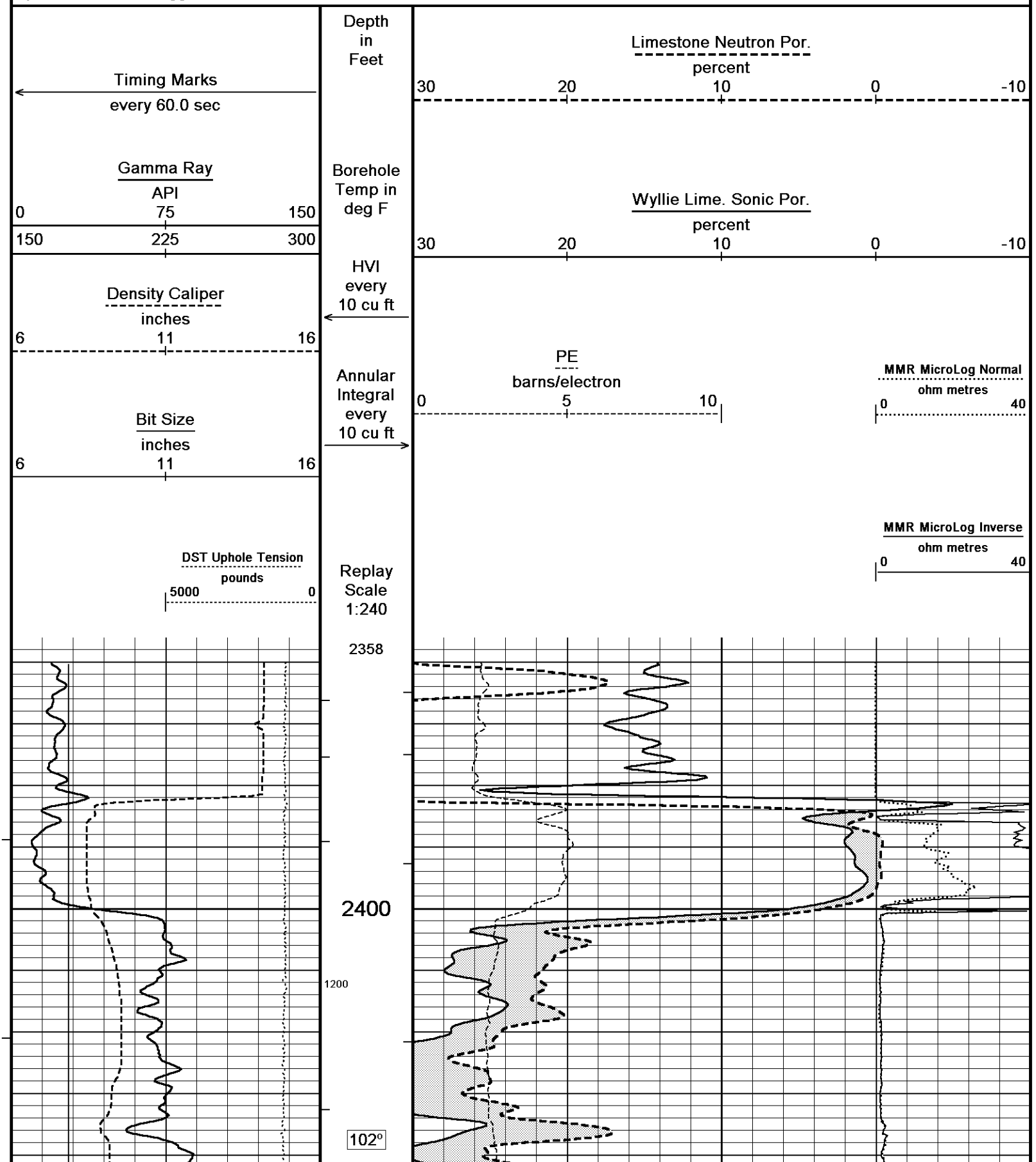
Tools Used: MCG, MML, MDN, MPD, MFE, MSS, MAI ran in combination.
Hardware: MPD: 8 inch profile plate used. MAI, MSS, MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
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= 2325 cubic feet
Annular volume with 4.5 inch production casing TD to 3700ft = 375 cubic feet
Service order #3539888
Rig: H-D Drilling #2
Engineer: W. Stambaugh, J. LaPoint
Operator(s): B. Reeves

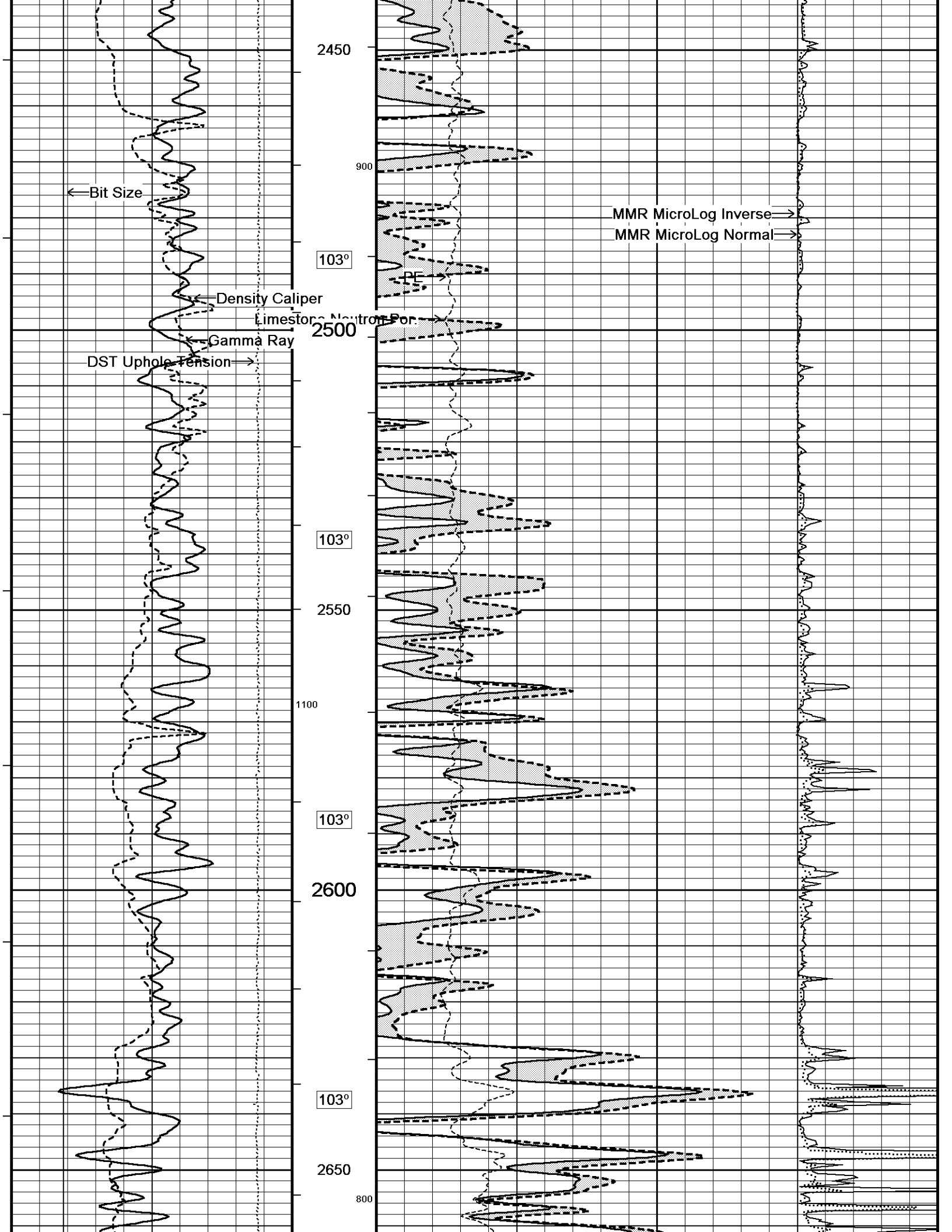
**** Software issue changed fluid loss to match Ph. Fluid Loss should be 8.8 ml/30min.****

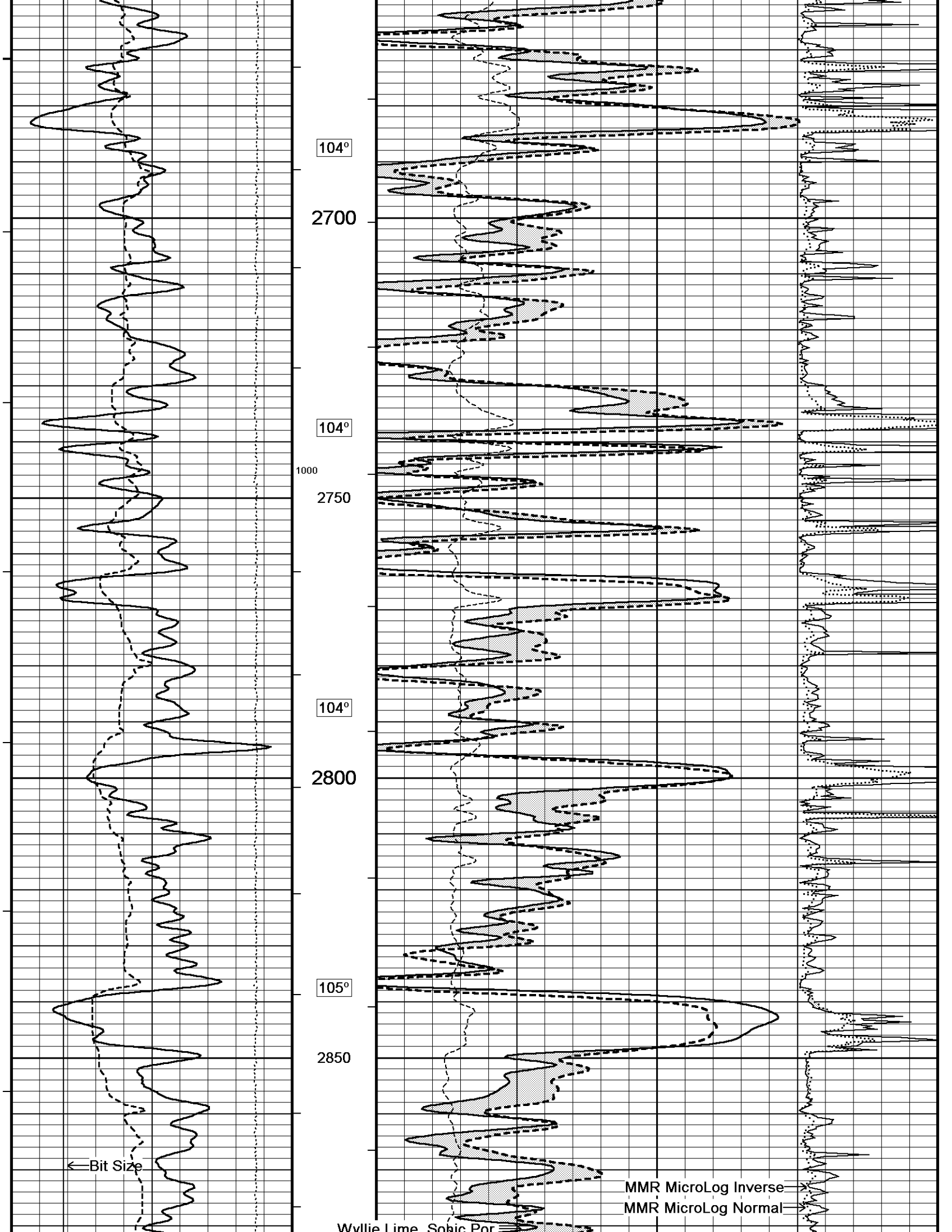
or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

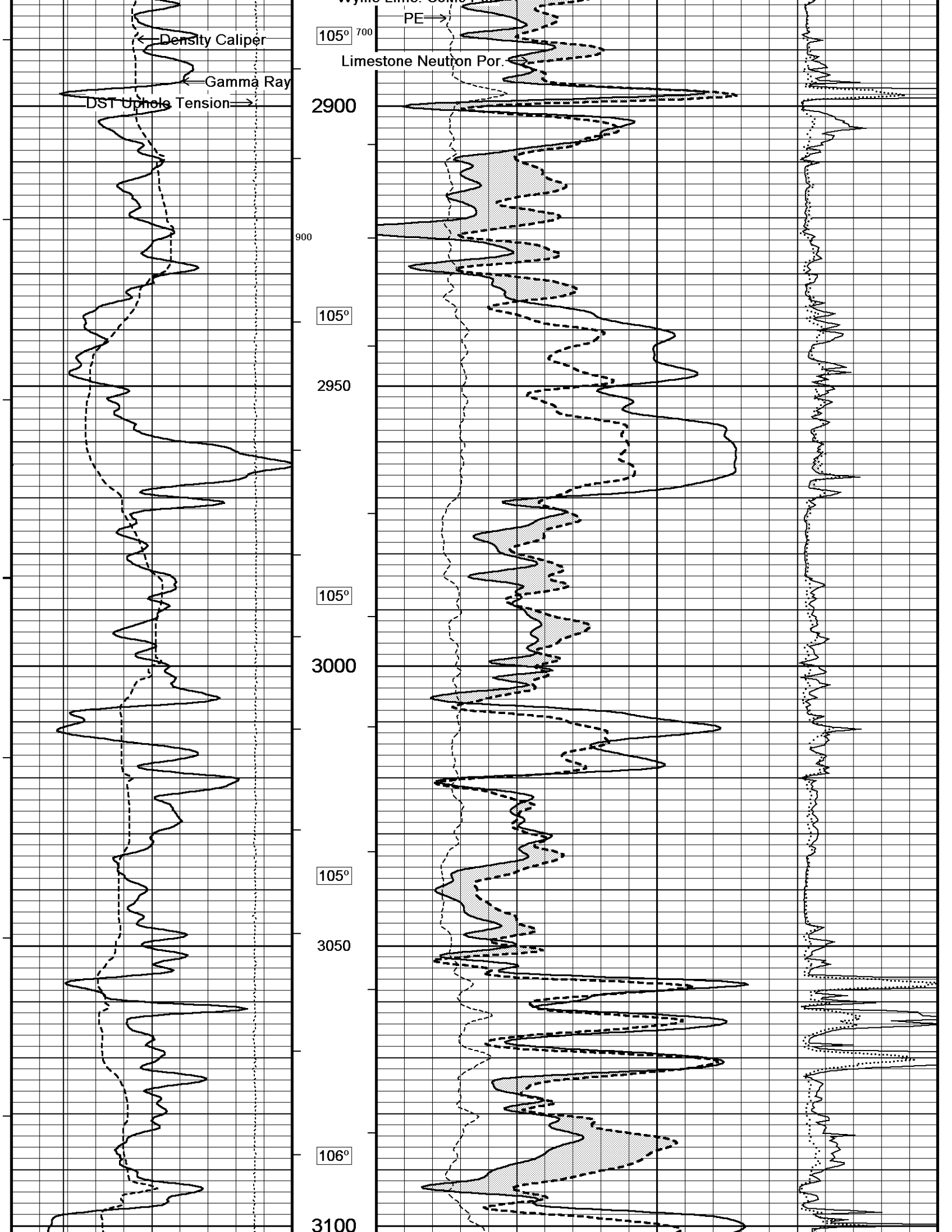
5 INCH MAIN

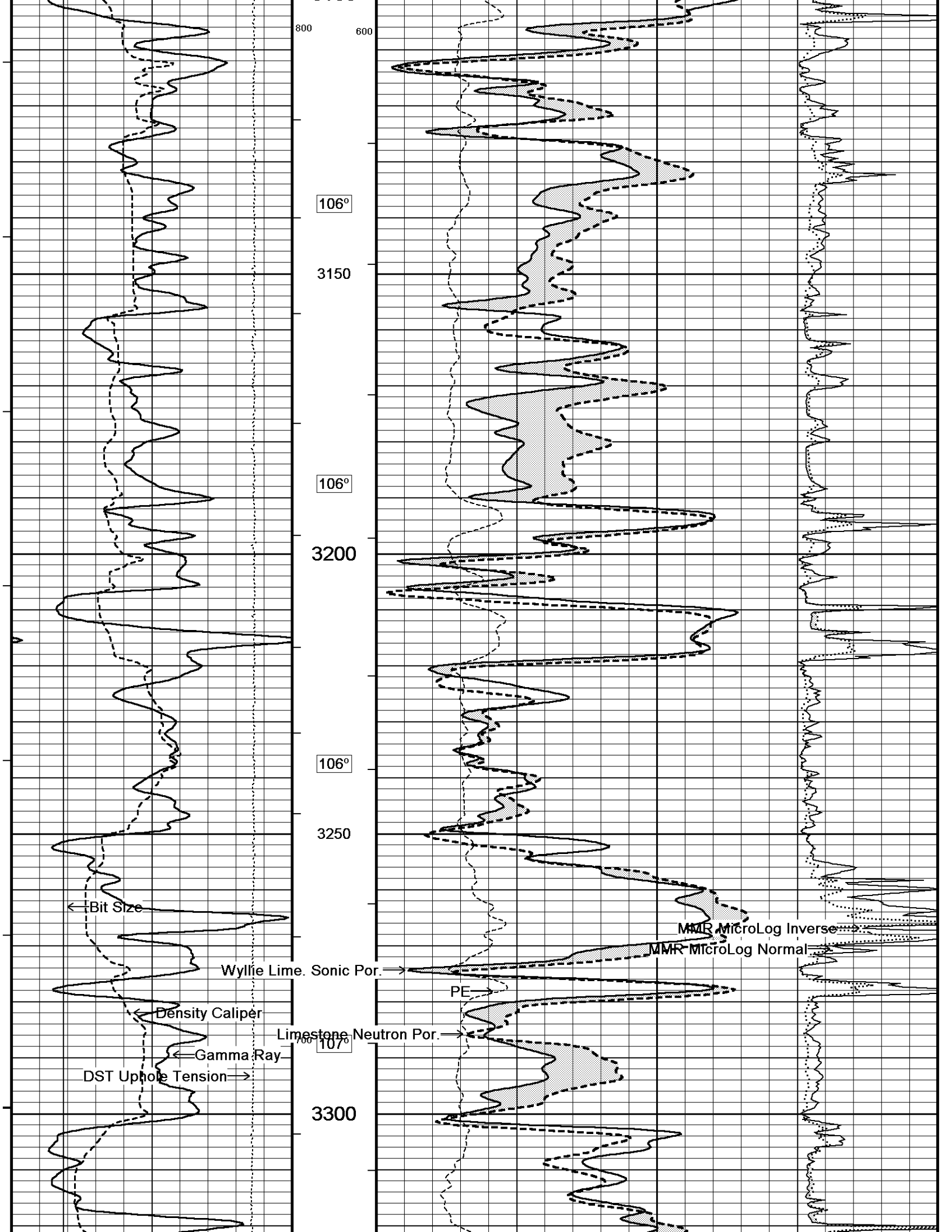
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-APR-2013 15:40
Filename: C:\Minimus\Archive 2013\LB13-104\Minimus 13.04.8...\Shakespeare Rudolph #1-22_002.dta
Recorded on 16-APR-2013 12:30
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

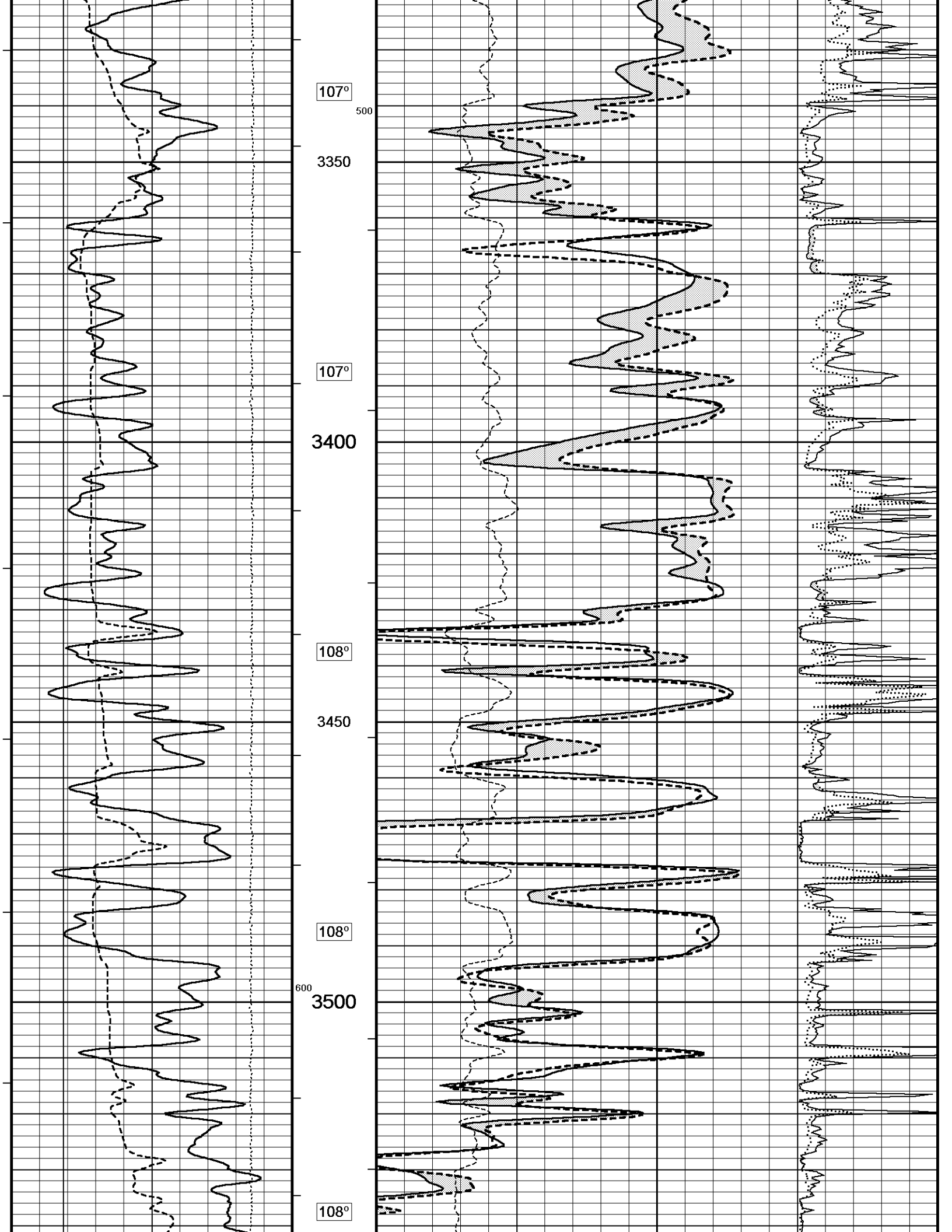


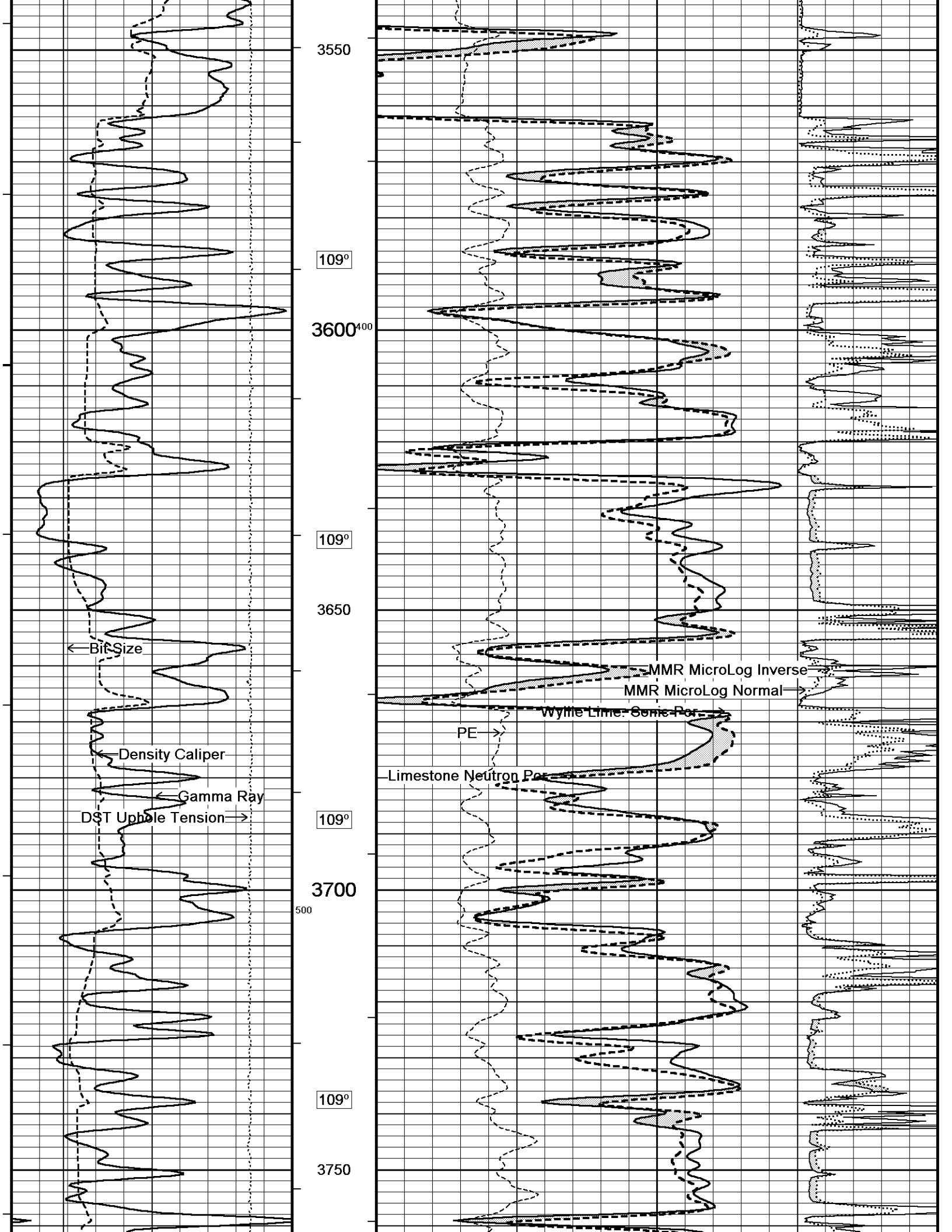

2450
900
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
103°
PE
Density Caliper
Limestone Neutron Por
2500
Gamma Ray
DST Uphole Tension
103°
2550
1100
103°
2600
103°
2650
800

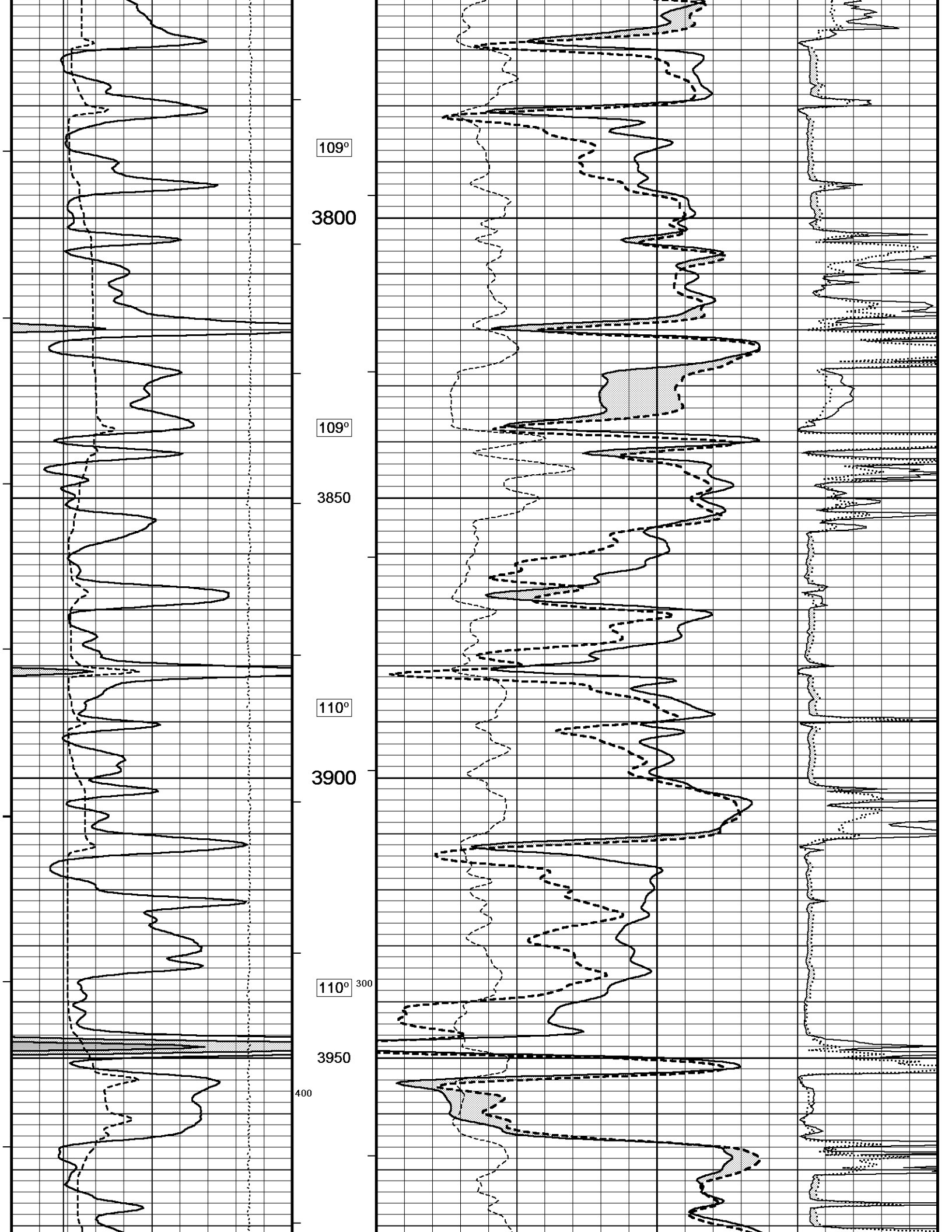

104°
2700
104°
1000
2750
104°
2800
105°
2850
←Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Wyllie Lime, Sohic Por

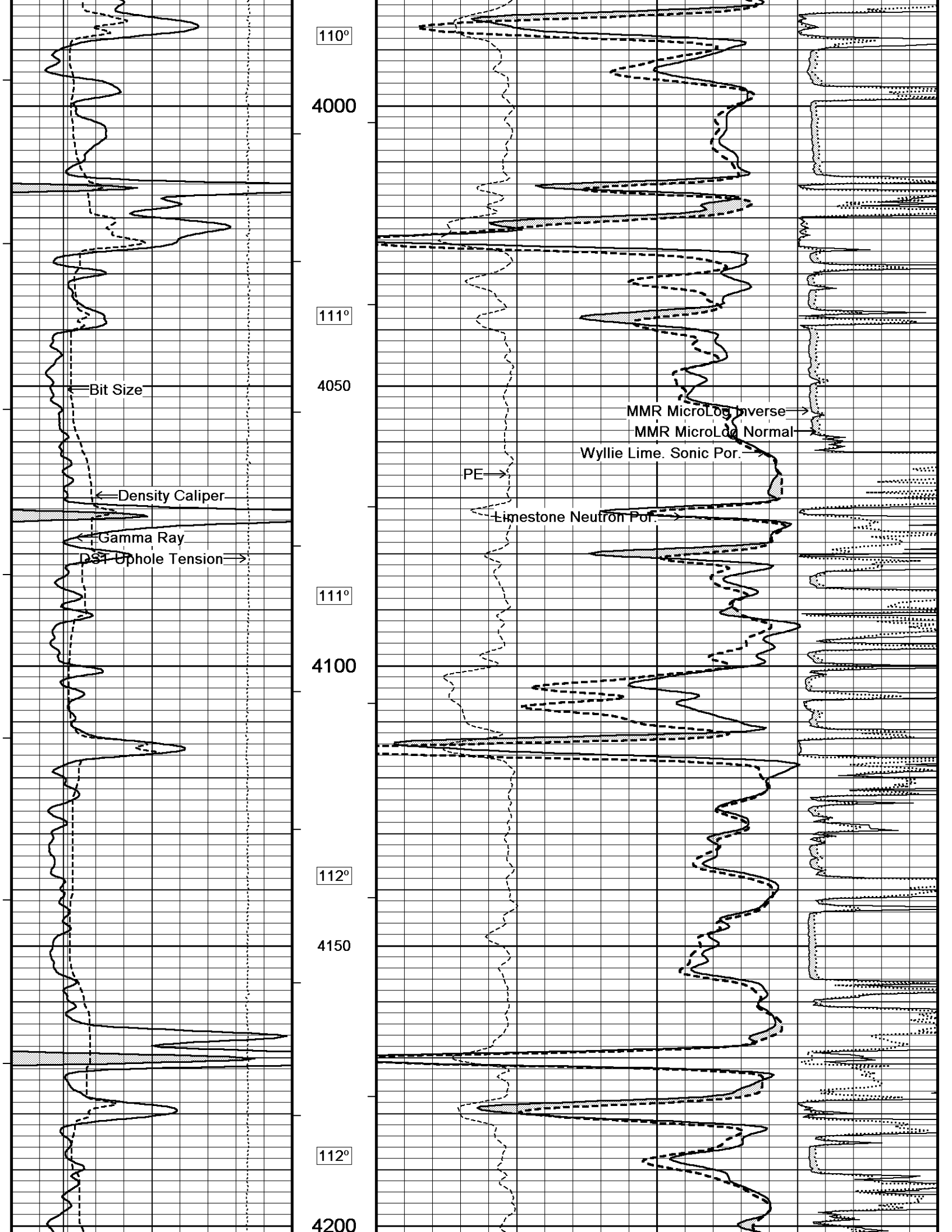

Density Caliper
Gamma Ray
DST Uphole Tension
PE
105° 700
Limestone Neutron Por.
2900
900
105°
2950
105°
3000
105°
3050
106°
3100

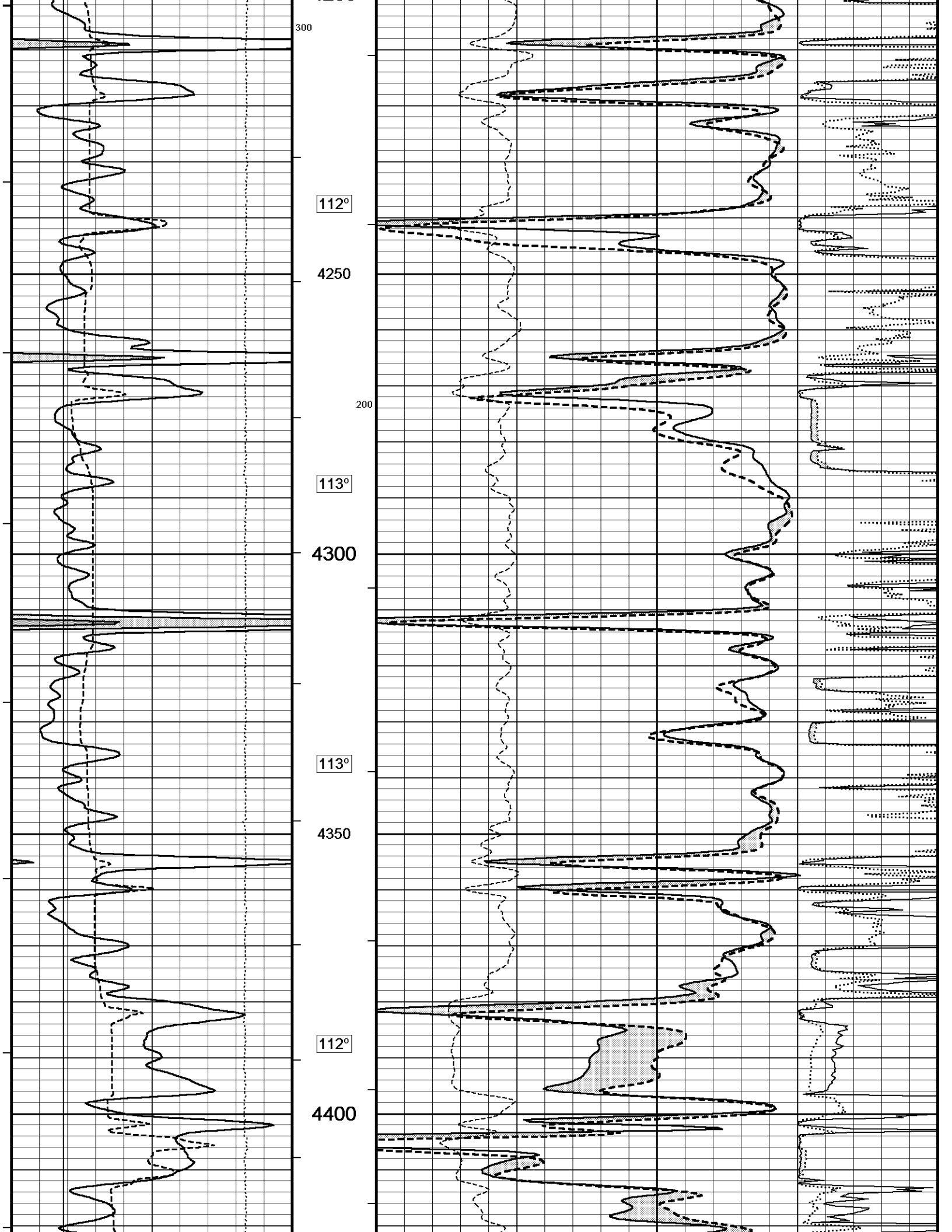

800
600
106°
3150
106°
3200
106°
3250
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Wyllie Lime. Sonic Por.
PE
Density Caliper
Limestone Neutron Por.
700
107°
Gamma Ray
DST Uphole Tension
3300

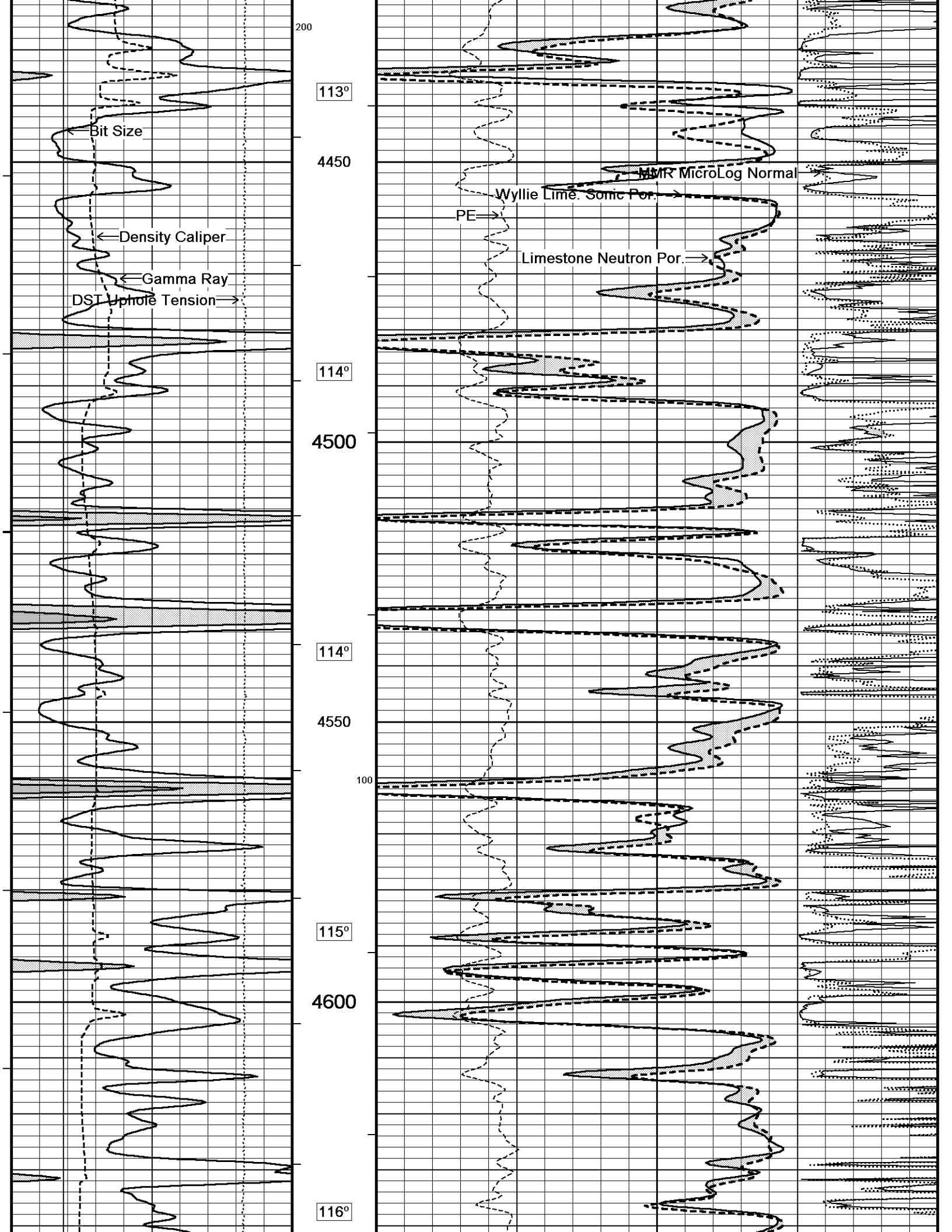

107°
500
3350
107°
3400
108°
3450
108°
600
3500
108°

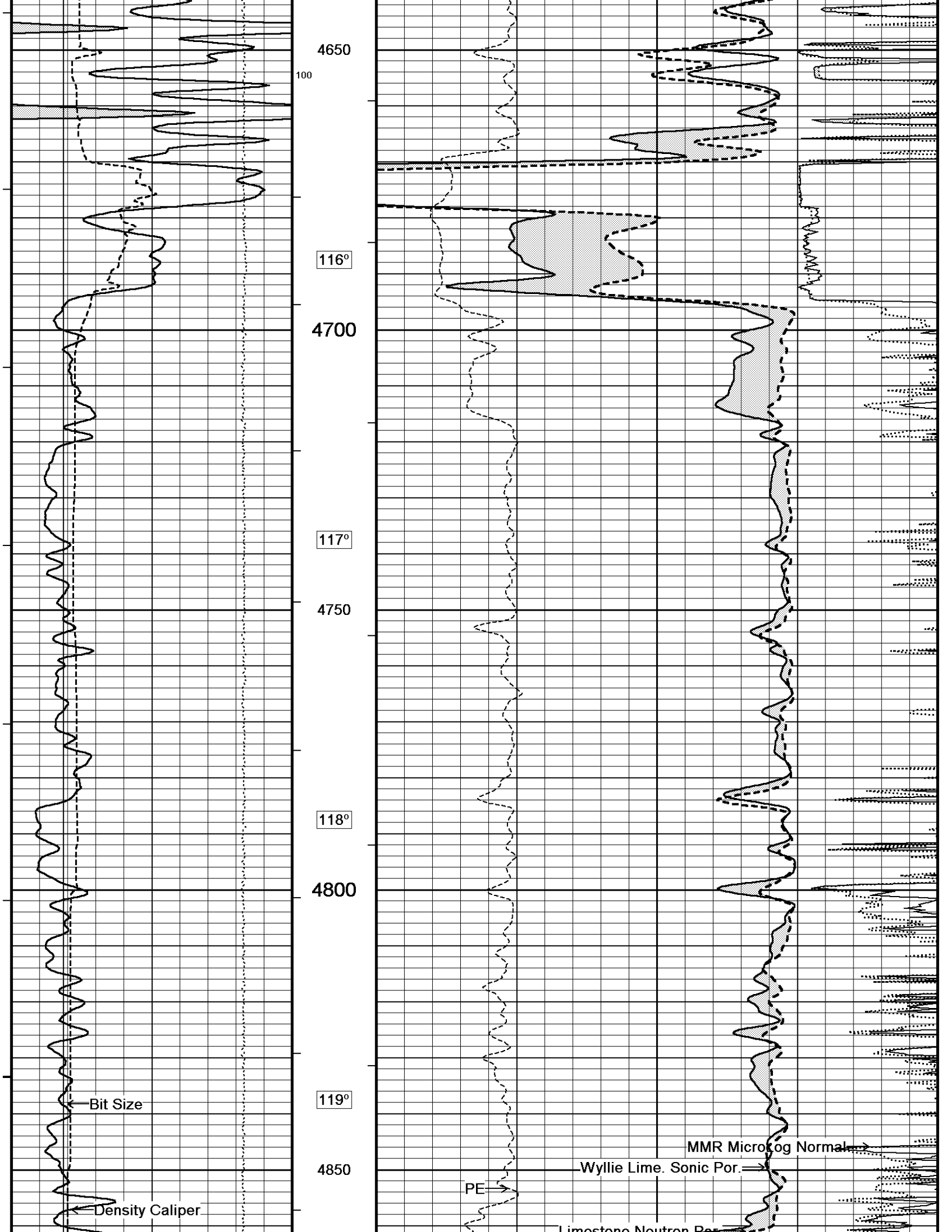

3550
109°
3600
400
109°
3650
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Wyllie Lime. Sonic Por.
PE
Density Caliper
Limestone Neutron Por.
Gamma Ray
DST Uphole Tension
109°
3700
500
109°
3750

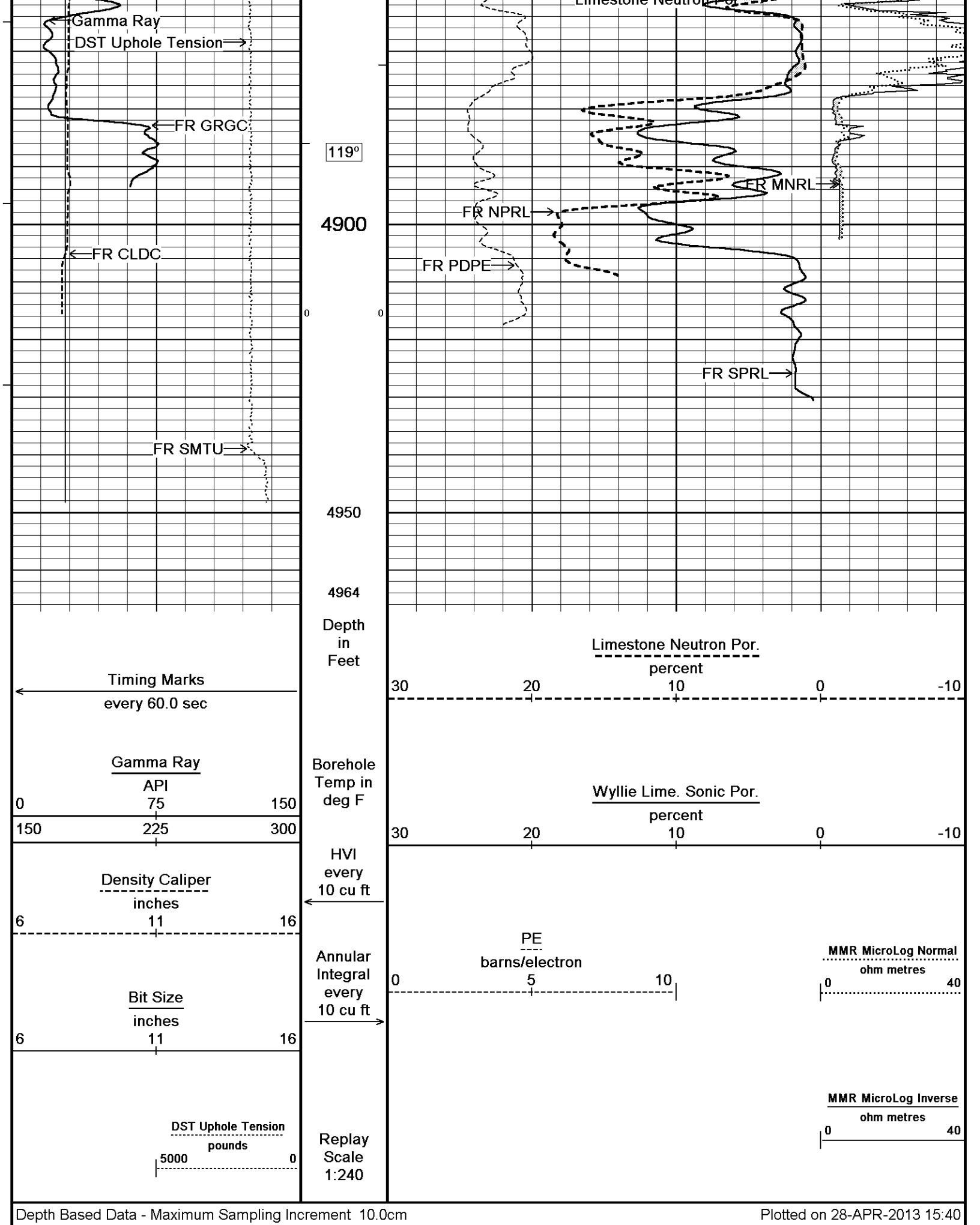

109°
3800
109°
3850
110°
3900
110°
300
3950
400


110°
4000
111°
4050
Bit Size
Density Caliper
Gamma Ray
DS1 Uphole Tension
MMR MicroLog Inverse
MMR MicroLog Normal
Wyllie Lime. Sonic Por.
PE
Limestone Neutron Por.
111°
4100
112°
4150
112°
4200


300
112°
4250
200
113°
4300
113°
4350
112°
4400


200
113°
Bit Size
4450
MMR MicroLog Normal
Wyllie Lime. Sonic Por.
PE
Density Caliper
Limestone Neutron Por.
Gamma Ray
DST Uphole Tension
114°
4500
114°
4550
100
115°
4600
116°


4650
100
116°
4700
117°
4750
118°
4800
119°
4850
Bit Size
Density Caliper
PE
MMR Microlog Normal
Wyllie Lime. Sonic Por.
Limestone Neutron Por.



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-APR-2013 15:40
Filename: C:\Minimus\Archive 2013\LB13-104\Minimus 13.04.8...\Shakespeare Rudolph #1-22_002.dta
Recorded on 16-APR-2013 12:30
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

BEFORE SURVEY CALIBRATION

C:\Minimus\Archive 2013\LB13-104\Minimus 13.04.8492_Data_Shakespeare Rudolph #1-22\Shakespeare Rudolph #1-22_001.dta

General Constants All 000

Last Edited on 16-APR-2013,10:51

General Parameters		
Mud Resistivity	0.620	ohm-metres
Mud Resistivity Temperature	74.000	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		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Gamma Calibration MCG-B 34

Field Calibration on 10-APR-2013 10:25

	Measured	Calibrated (API)
Background	60	40
Calibrator (Gross)	1154	765
Calibrator (Net)	1095	725

Gamma Constants MCG-B 34

Last Edited on 16-APR-2013,10:46

Gamma Calibrator Number	GR38	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

High Resolution Temperature Calibration MCG-B 34

Field Calibration on 29-MAR-2013,12:58

	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-MAR-2013,12:58

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 08-MAR-2013 17:36
Field Check on 10-APR-2013 10:27

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.4	60.0	5.0	25.0
Micro Inverse	15.5	77.5	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.3	76.3
Micro Inverse	58.7	58.7

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 05-NOV-2012,13:54

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	0.0000	inches

Neutron Calibration MDN-A.B 65

Base Calibration on 13-MAR-2013 16:17
Field Check on 10-APR-2013 10:41

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2980	92	3714	110
Ratio	32.499		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1736	2464
Ratio	0.705	

Field Check

	Calibrated (cps)	
	1736	2470
Ratio	0.680	

Neutron Constants MDN-A.B 65

Last Edited on 16-APR-2013,10:46

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	None	
Formation Pressure	N/A	kpsi
Temperature Source	None	
Temperature	N/A	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	

Sonic Constants MSS-C.K 330

Last Edited on 16-APR-2013,10:45

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/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/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
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Caliper Calibration MPD-B 31

Base Calibration on 28-MAR-2013 13:43
Field Calibration on 08-APR-2013 08:48

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16832	3.99
2	24690	5.98
3	33328	7.97
4	41600	9.86
5	50976	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 13-MAR-2013 15:17
Field Check on 10-APR-2013 10:49

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	46119	23502	59556	30836
Reference 2	19149	1933	24941	2541

Field Check at Base

681.1	838.4

Field Check

679.5	834.9

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	125	604		
Reference 1	19219	46004	0.421	0.371
Reference 2	5674	19062	0.301	0.272

Field Check at Base

125.1	603.7

Field Check

124.6	603.1

Density Constants MPD-B 31

Last Edited on 16-APR-2013,10:46

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	1.12	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	

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	

DOWNHOLE EQUIPMENT

C:\Minimus\Archive 2013\LB13-104\Minimus 13.04.8492_Data_Shakespeare Rudolph #1-22\Shakespeare Rudolph #1-22_001.dta

Compact Comms Gamma
MCG-B 34 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

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

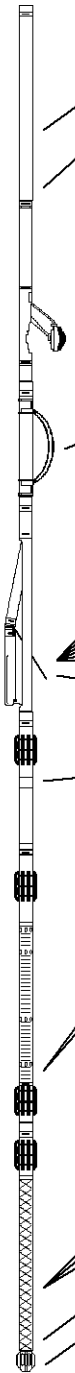
Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

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

Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 61.30 ft Weight: 456.4 lb



56.02 ft	GRGC - Gamma Ray
53.11 ft	CGXT - MCG External Temperature
45.76 ft	MINV - MMR MicroLog Inverse
45.76 ft	MNRL - MMR MicroLog Normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	RTAO - Array Ind. One Res Rt
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	SHAKESPEARE OIL COMPANY
WELL	RUDOLPH #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3035.00	feet	First Reading	2380.00	feet
Elevation Drill Floor	3033.00	feet	Depth Driller	4940.00	feet
Elevation Ground Level	3025.00	feet	Depth Logger	4939.00	feet

Weatherford®

SONIC NEUTRON OVERLAY