



COMPACT WELL SHUTTLE LQC LOG

COMPANY				EXXON MOBIL CORPORATION			
WELL				FREEDOM RANCH UNIT 197-33B8			
FIELD				PICEANCE CREEK			
PROVINCE/COUNTY				RIO BLANCO			
COUNTRY/STATE				U.S.A. / COLORADO			
LOCATION				SHL: 2397' FNL & 1406' FEL			
LSD	SEC	TWP	RGE	Other Services			
	33	1S	97W				
API Number		05-103-1142100					
Permit Number		05-103-1142100					
Permanent Datum G.L., Elevation 6446 feet				Elevations:			
Log Measured From K.B. @ 30 FEET above Permanent Datum				KB 6476.00			
Drilling Measured From K.B.				DF 6475.00			
				GL 6446.00			
Date	20-FEB-2010						
Run Number	TWO						
Depth Driller	12830.00			feet			
Depth Logger	12796.00			feet			
First Reading	12793.00			feet			
Last Reading	8655.00			feet			
Casing Driller	8657.00			feet			
Casing Logger	8655.00			feet			
Bit Size	6.125			inches			
Hole Fluid Type	LSND						
Density / Viscosity	9.80	lb/USg	48.00	CP			
PH / Fluid Loss	9.40		7.50	ml/30Min			
Sample Source	FLOWLINE						
Rm @ Measured Temp	2.34 @ 78.0			ohm-m			
Rmf @ Measured Temp	1.87 @ 78.0			ohm-m			
Rmc @ Measured Temp	2.80 @ 78.0			ohm-m			
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.775 @242.0			ohm-m			
Time Since Circulation	.5 HOURS						
Max Recorded Temp	242.00			deg F			
Equipment Name	COMPACT						
Equipment / Base	13038		GDUCT				
Recorded By	C. PHILLIPS						
Witnessed By	C. JARVIS						
Last Title	Last Line			Last Line			

BOREHOLE RECORD				Last Edited: 20-FEB-2010 17:56
Bit Size inches	Depth From feet		Depth To feet	
6.125	8657.00		12830.00	
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	8657.00	26.00

REMARKS	
TOOLS: COMPACT WELL SHUTTLE. GAMMA RAY, NEUTRON, DENSITY, FOCUSED ELECTRIC, SONIC, AND INDUCTION RAN IN COMBINATION.	
HARDWARE: DENSITY: 4 INCH PROFILE PLATE USED. FOCUSED ELECTRIC: INLINE CENTRALIZERS USED. SONIC: INLINE CENTRALIZERS USED. INDUCTION: INLINE CENTRALIZERS USED. DUAL BOWSPRINGS USED FOR ECENTRALIZATION OF POROSITY TOOLS.	
2.65 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.	
ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.	
DEPTH CONTROL TAKEN FROM PIPE STRAP AND TIED INTO INTERMEDIATE LOG.	
TOTAL HOLE VOLUME FROM T.D. TO SURFACE CASING = 955 CUBIC FEET	
ANNULAR HOLE VOLUME FROM T.D. TO SURFACE CASING BASED ON 4.5" PRODUCTION CASING = 495 CUBIC FEET	

TIGHT PULLS, BOREHOLE SIZE, AND RIGGING WILL AFFECT REPEATABILITY AND DATA QUALITY.

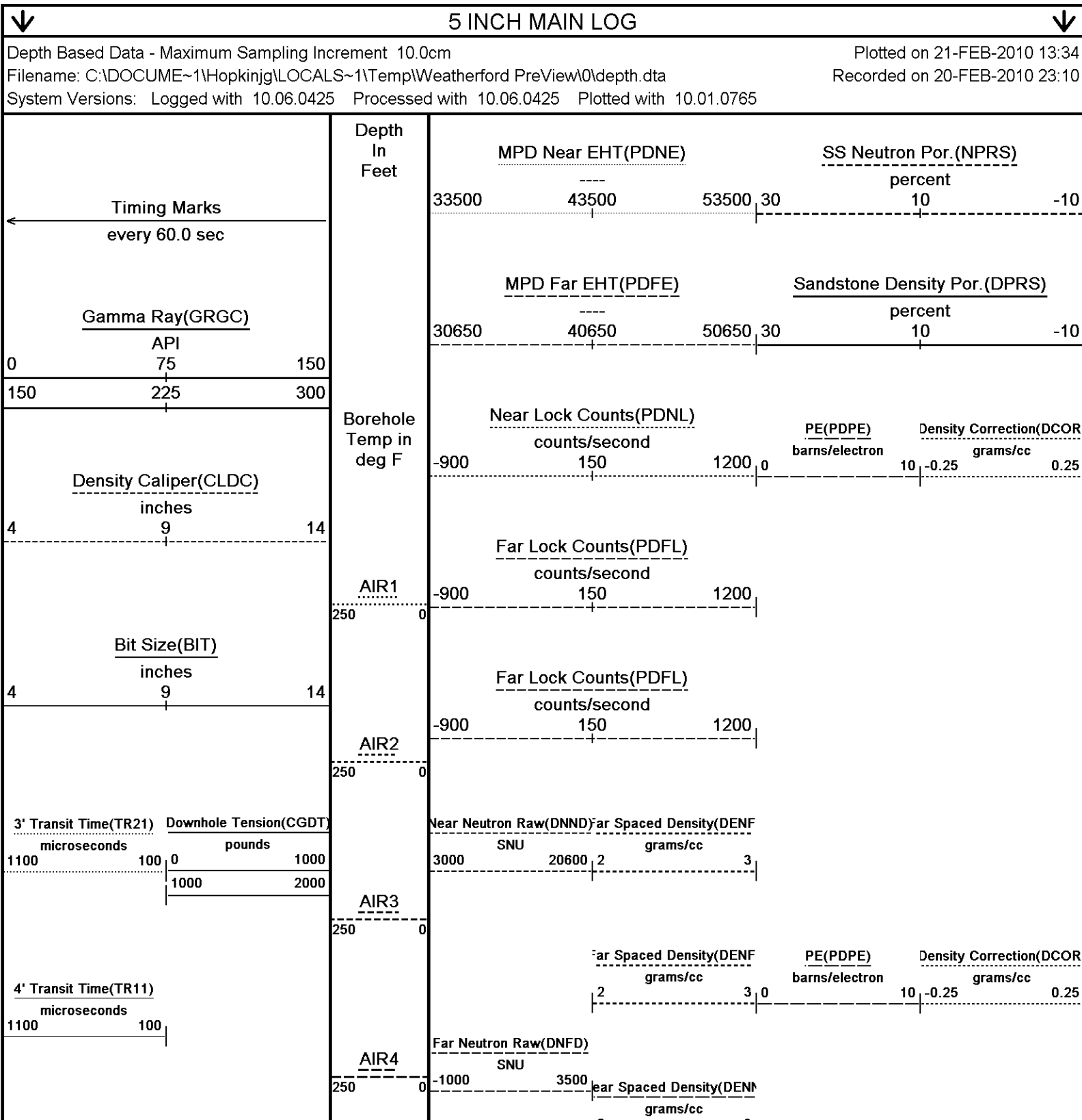
ENGINEER(S): C. PHILLIPS, M. RICHINS

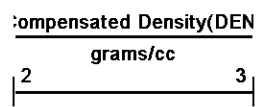
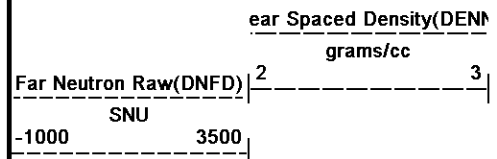
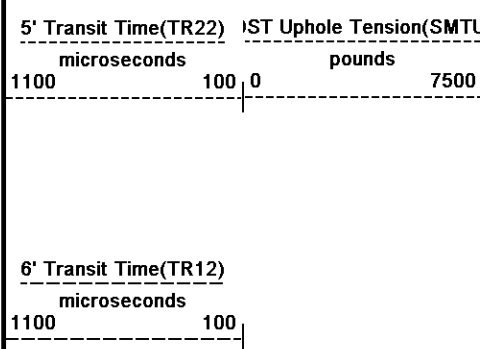
OPERATOR: D. GARVIN

SERVICE ORDER: #3521370

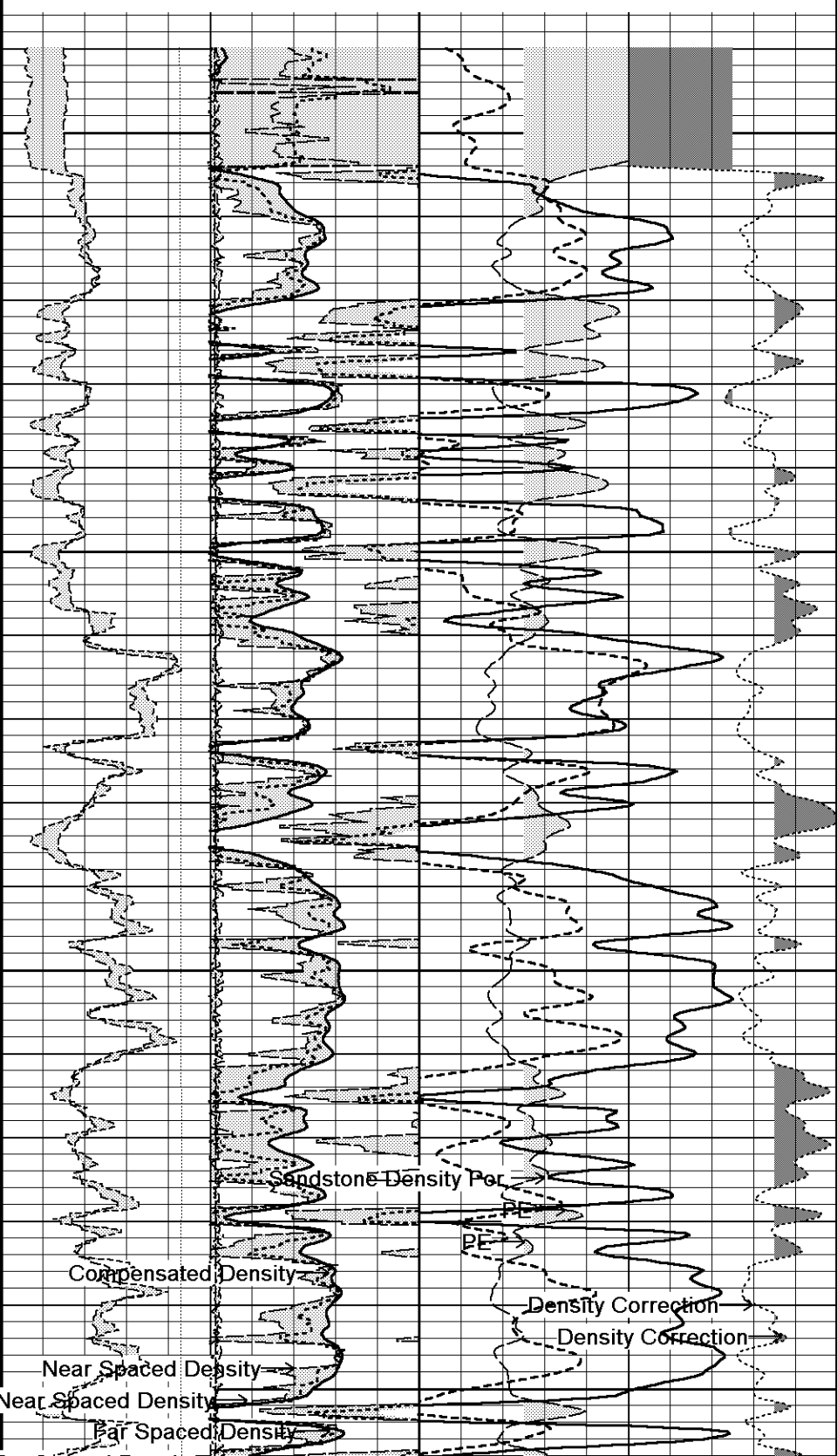
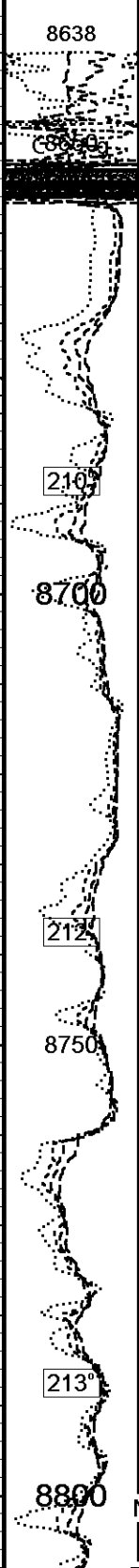
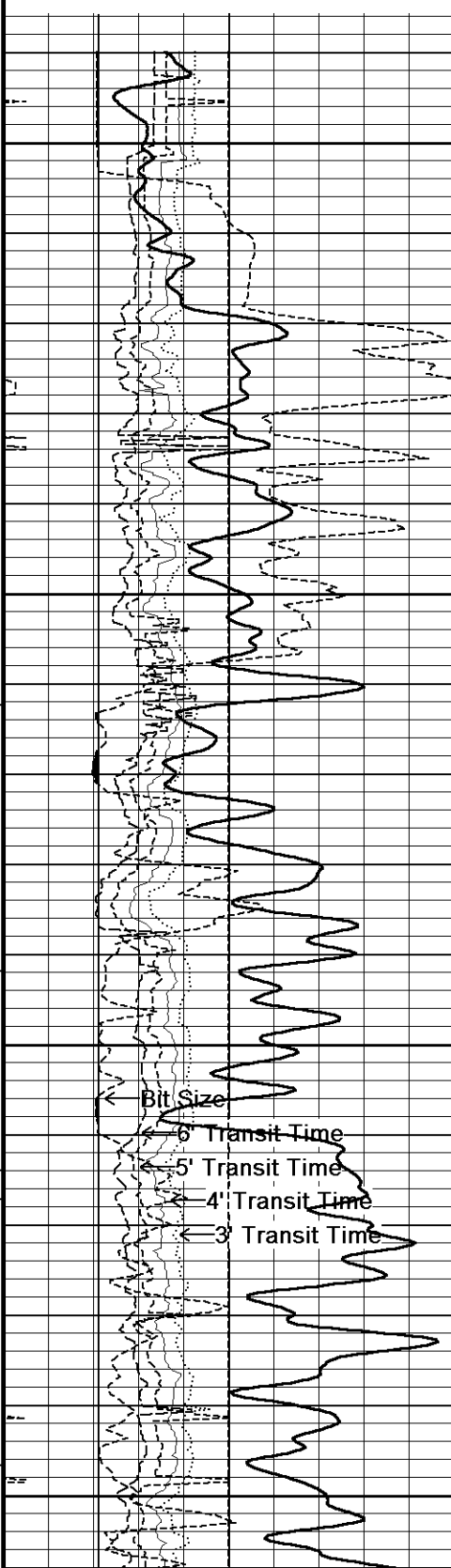
RIG: HP 321

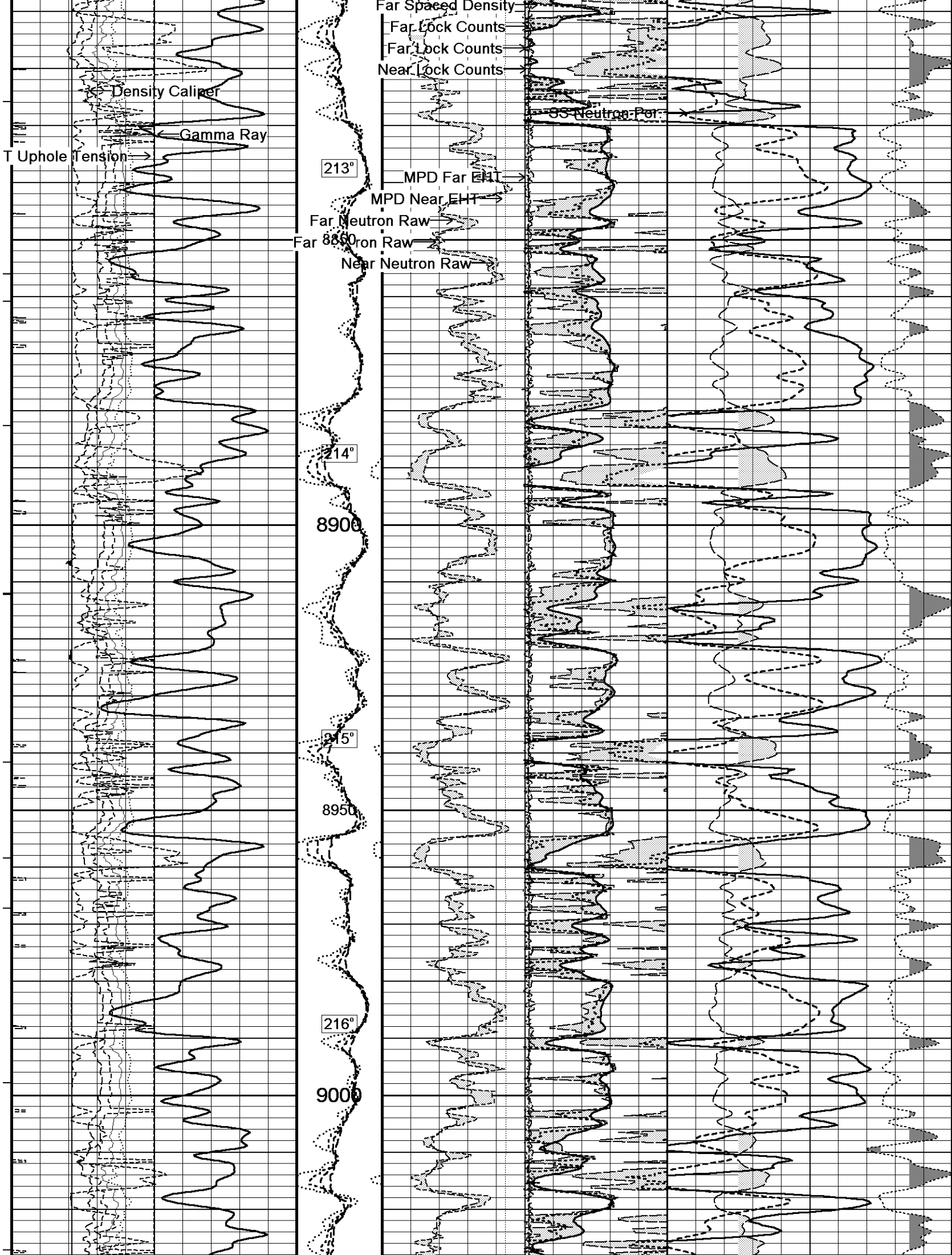
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs,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

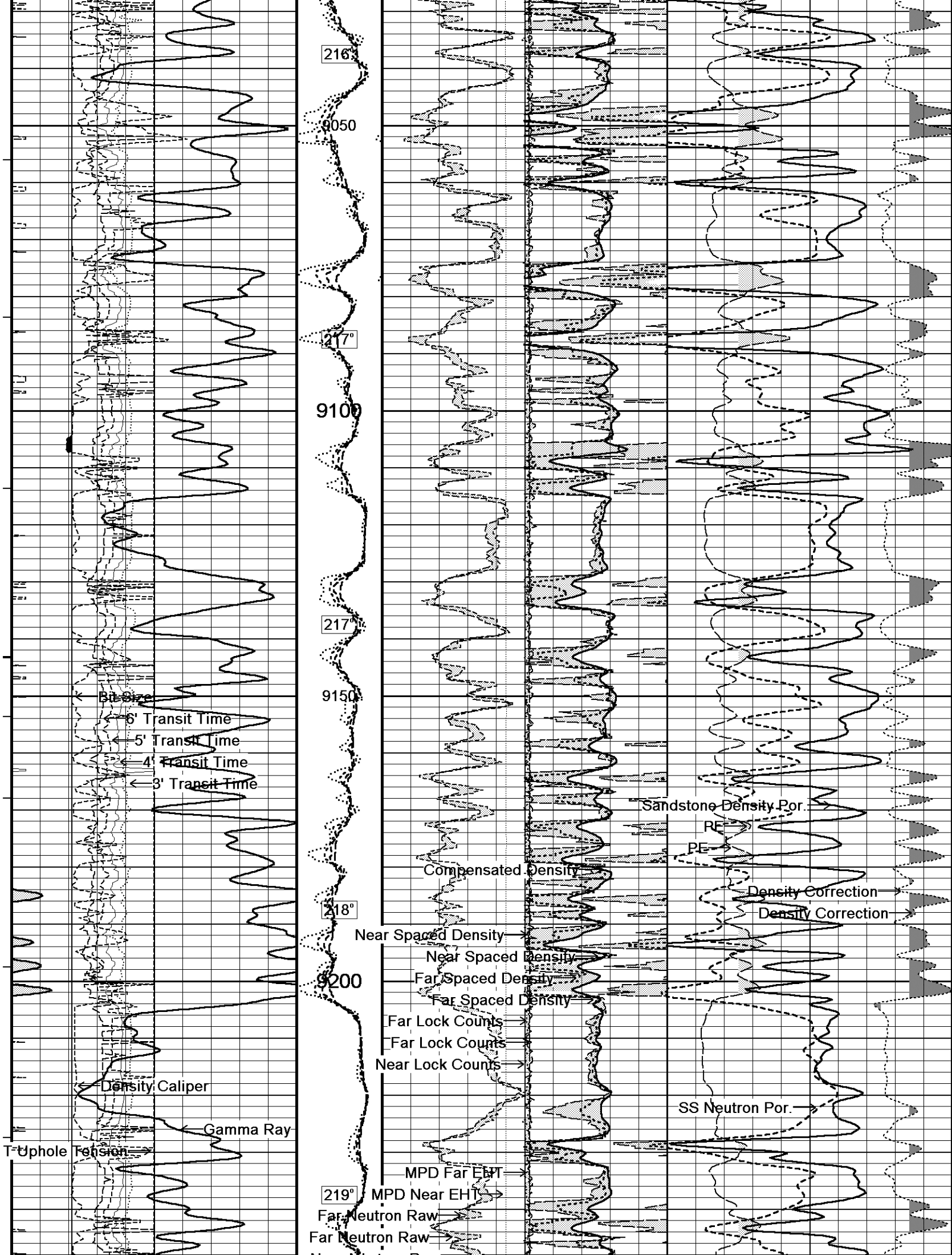


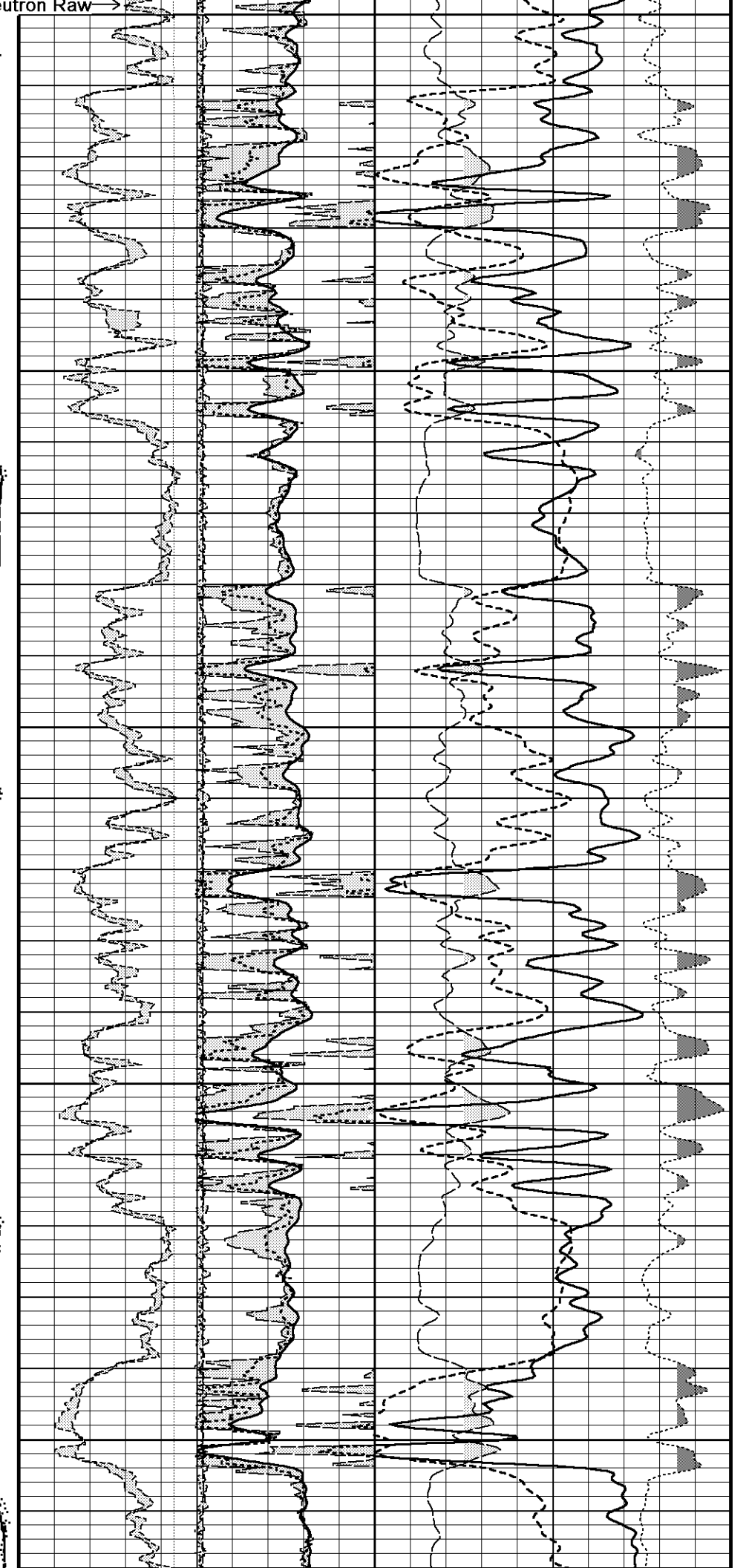
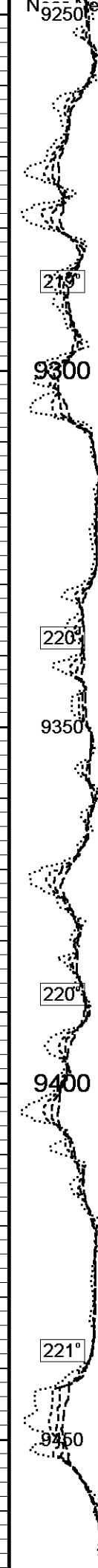
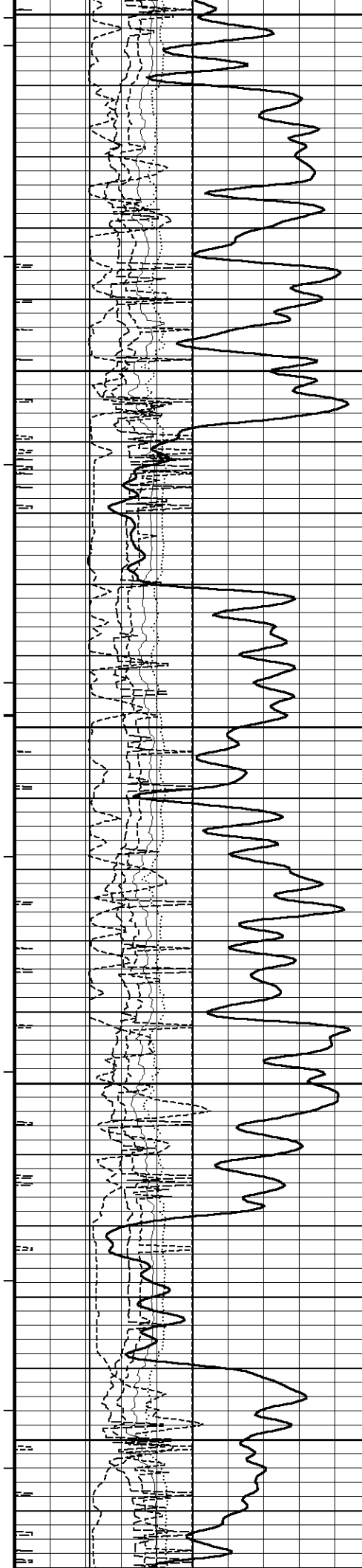


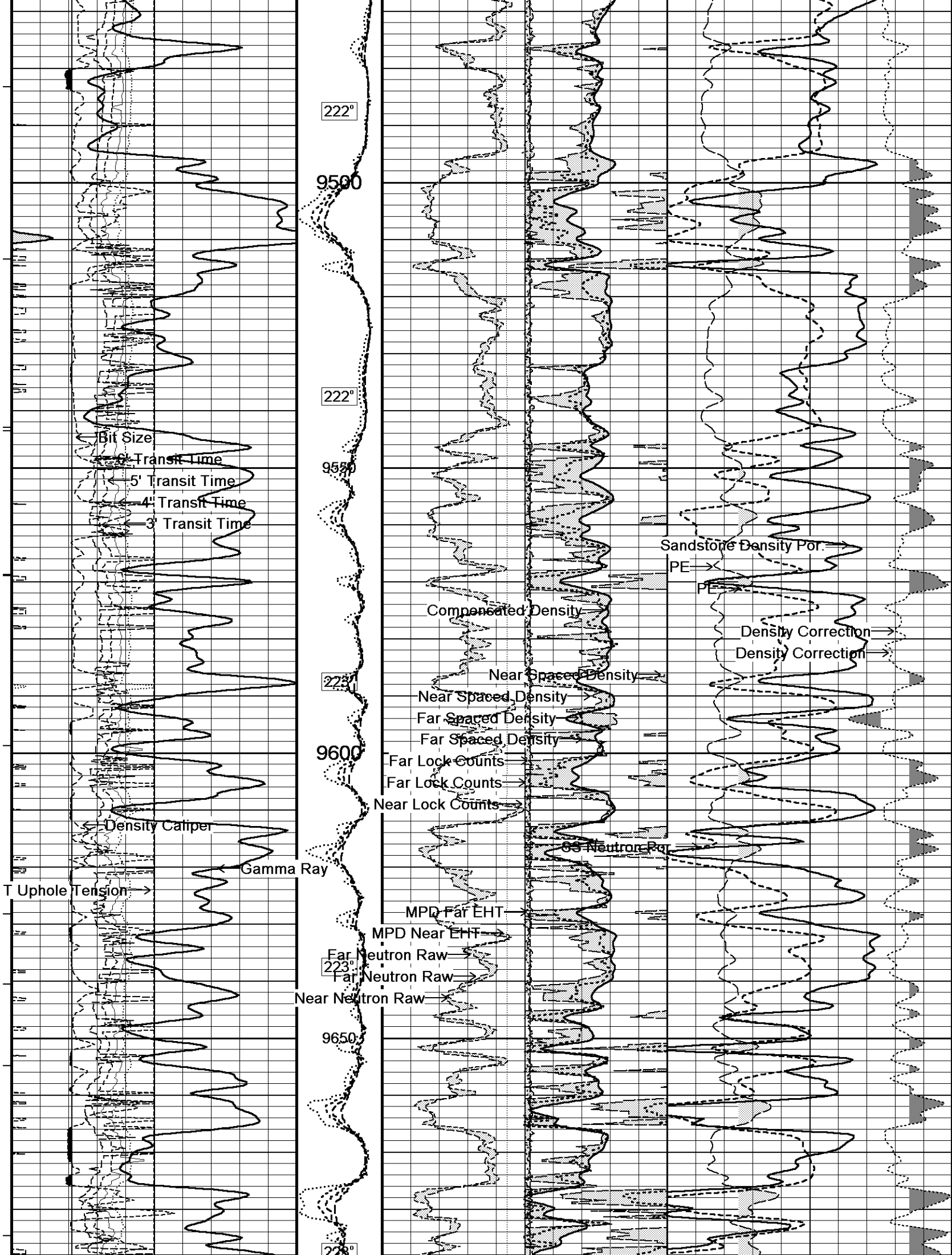
Replay
Scale
1:240

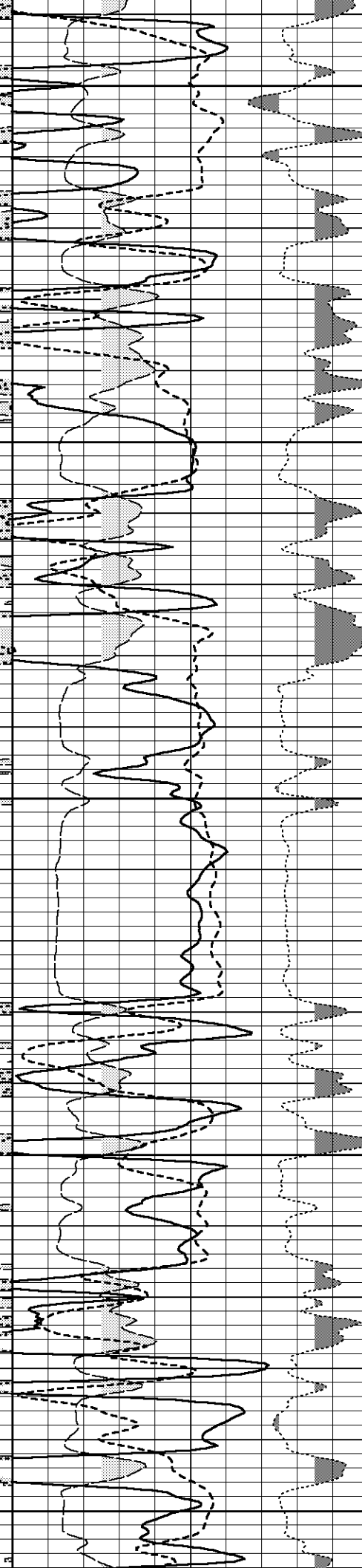
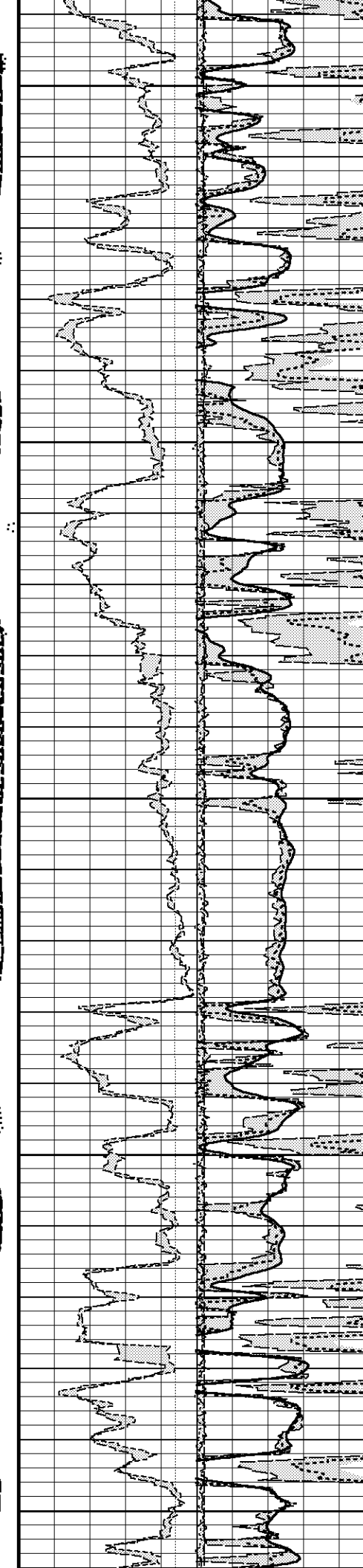
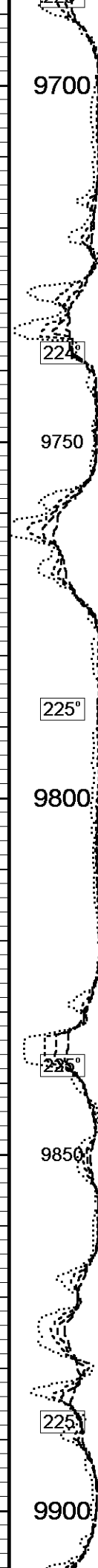
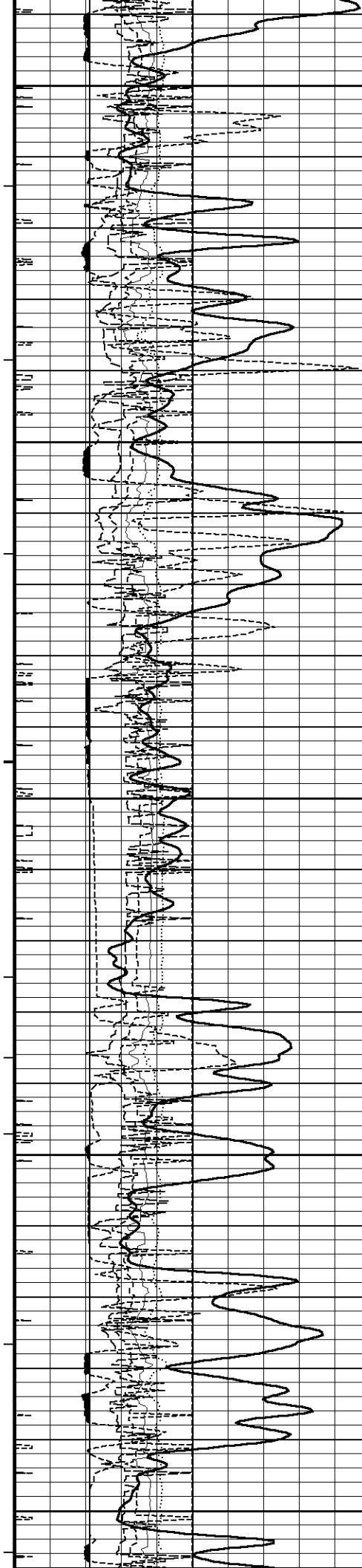












9700

224°

9750

225°

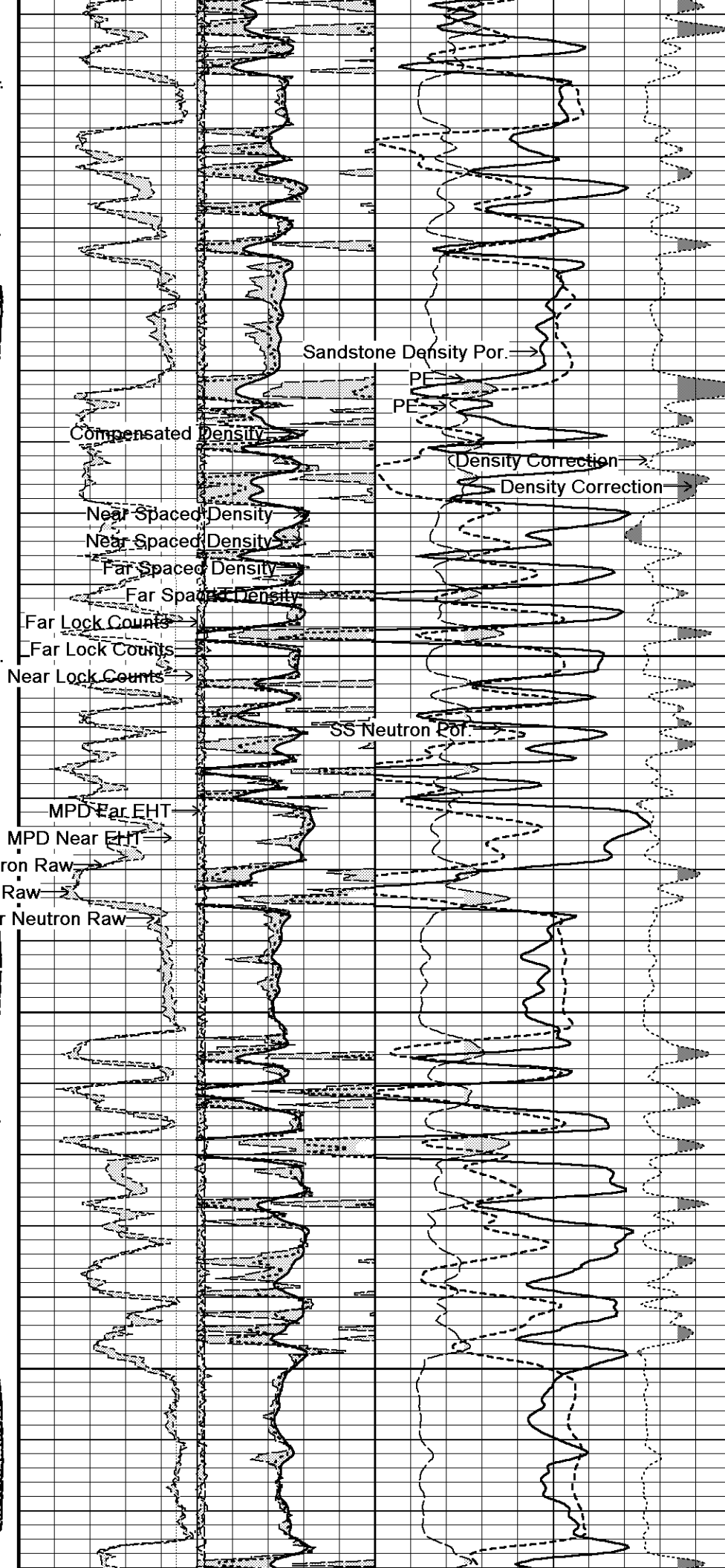
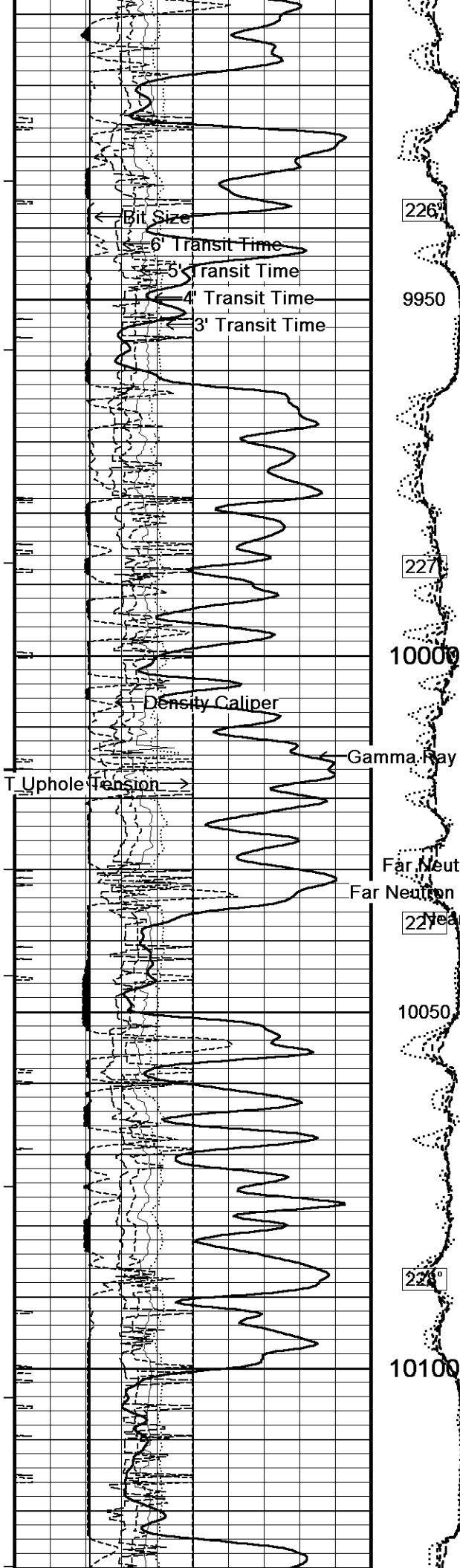
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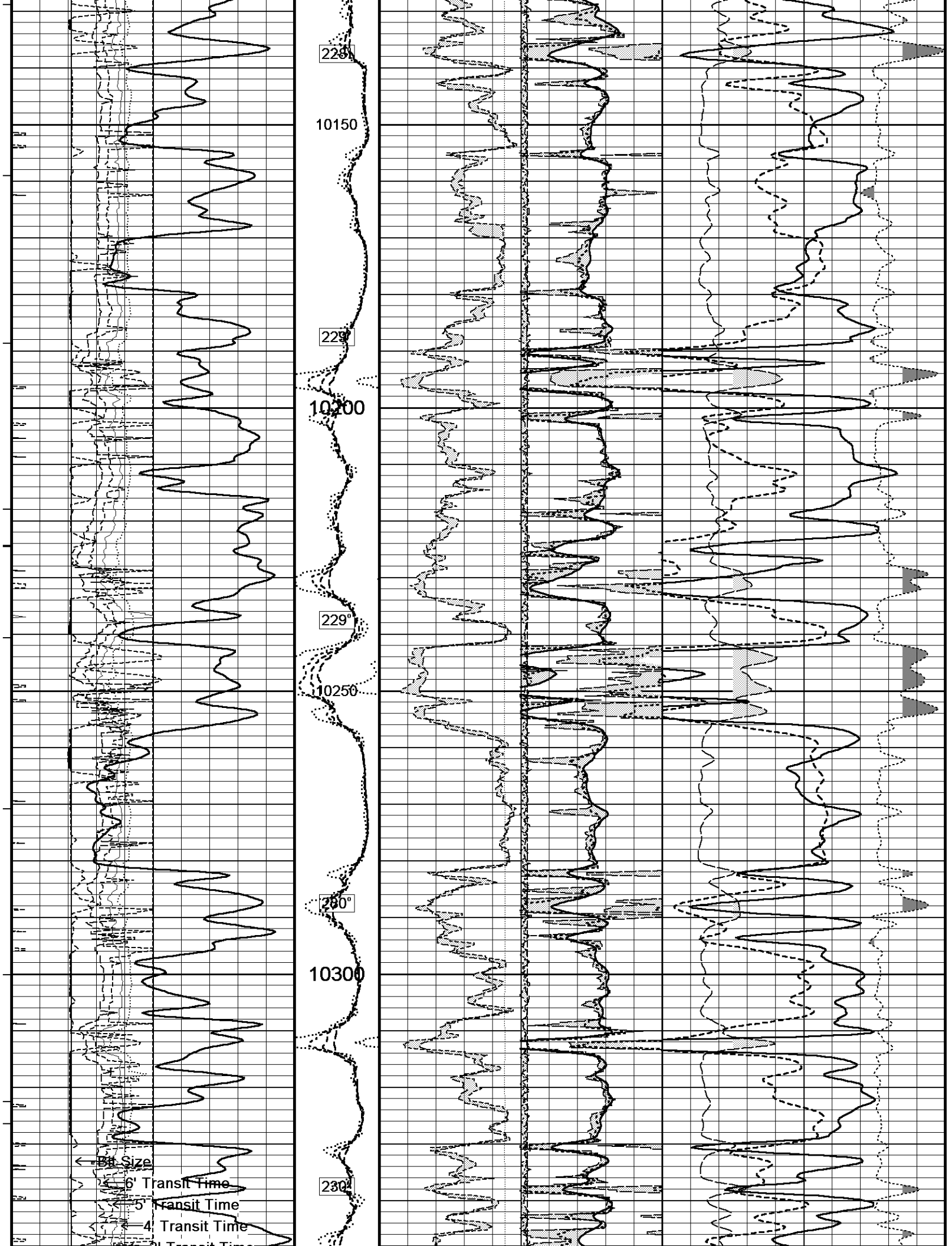
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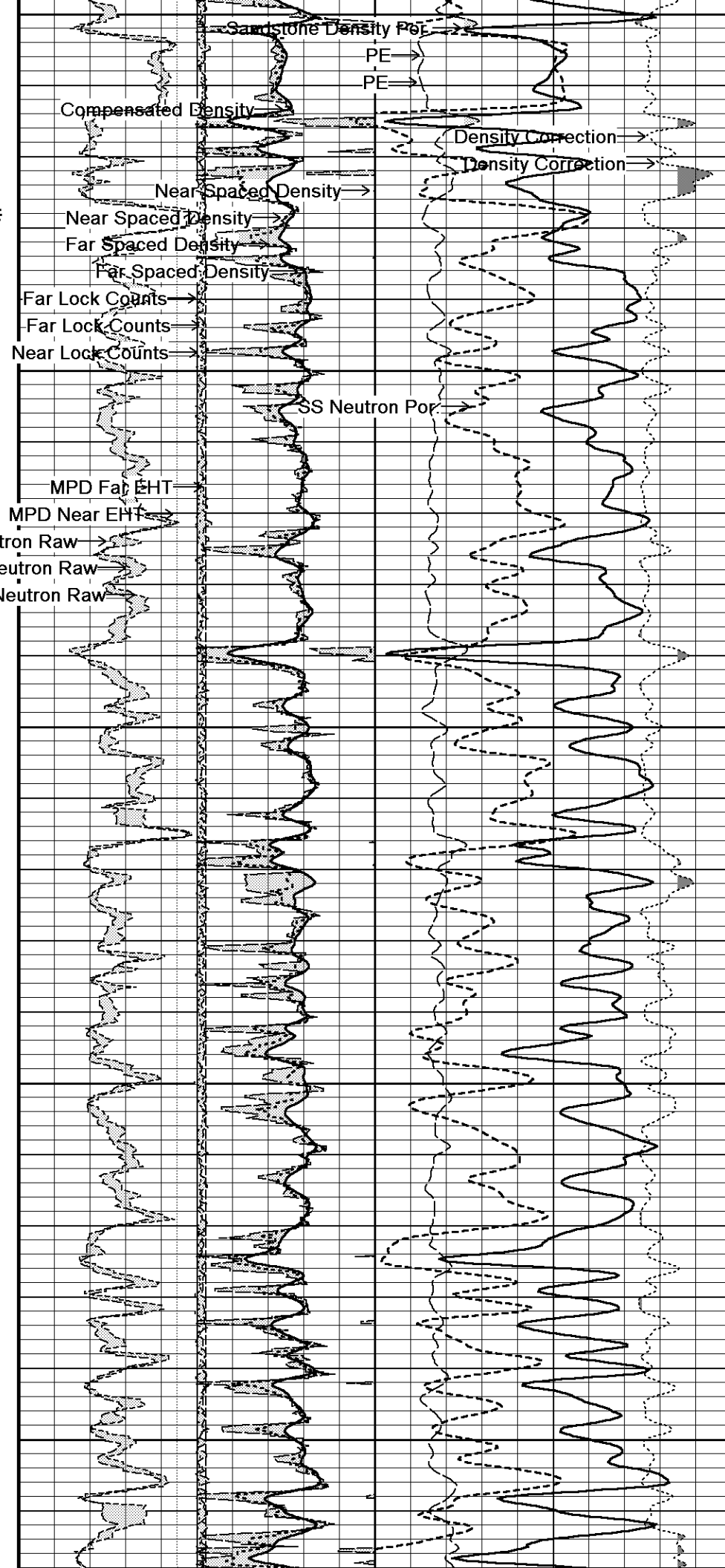
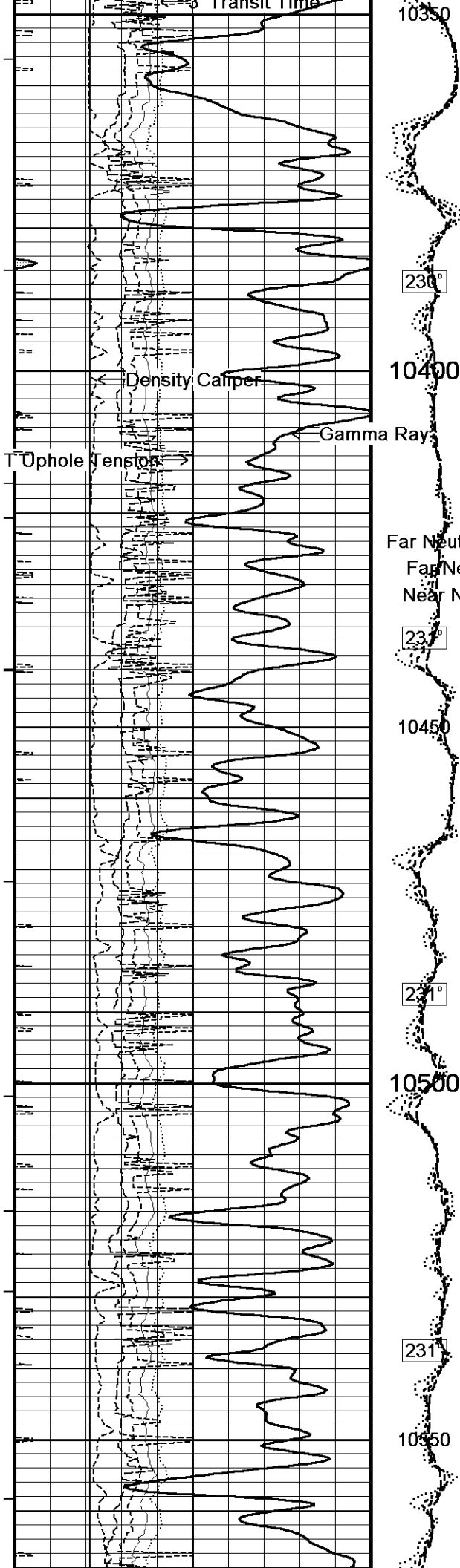
9850

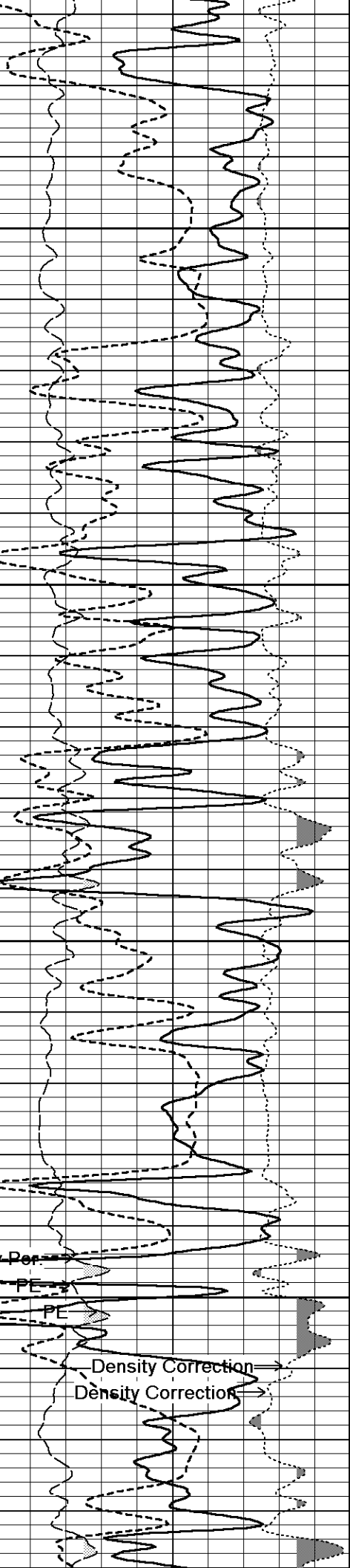
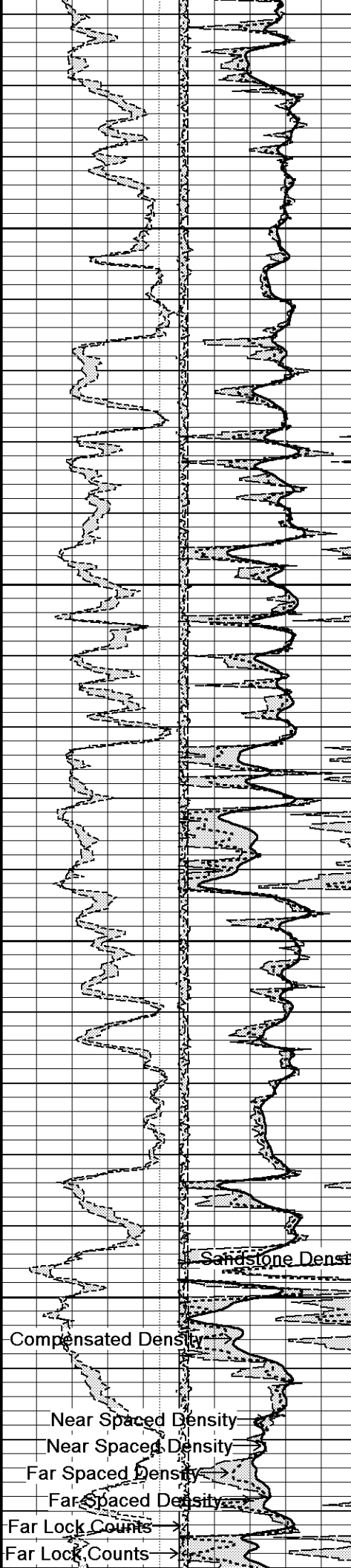
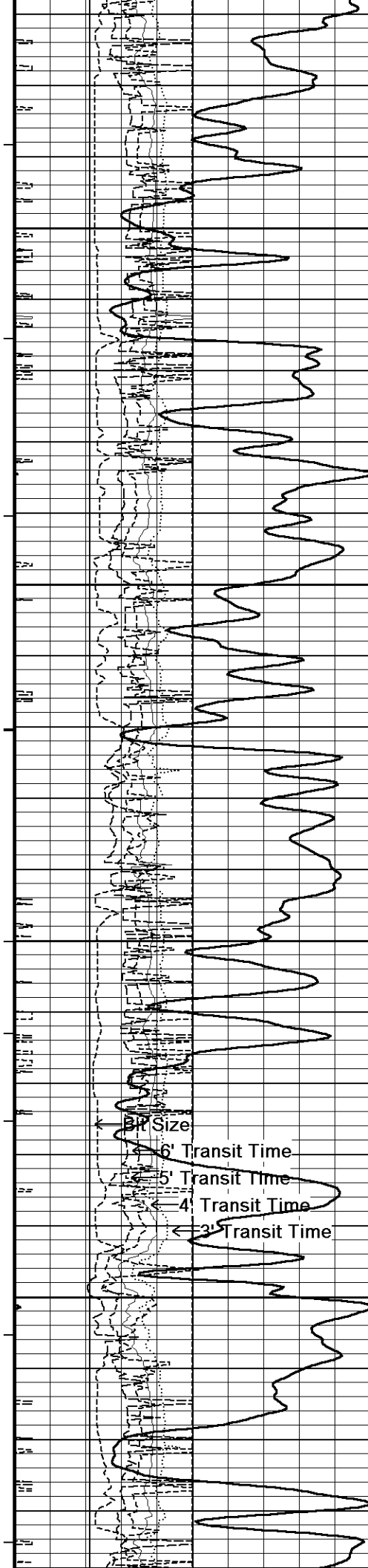
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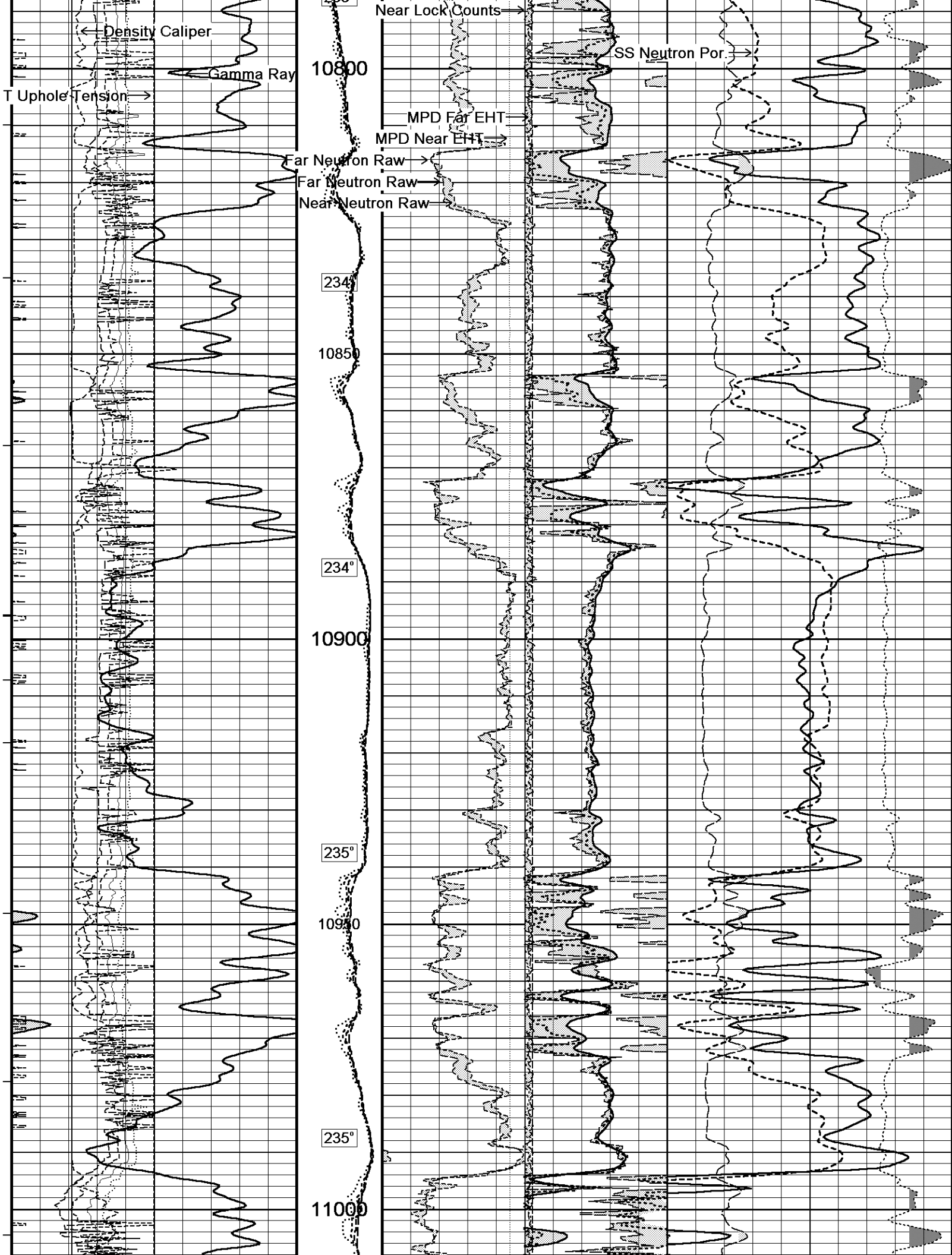
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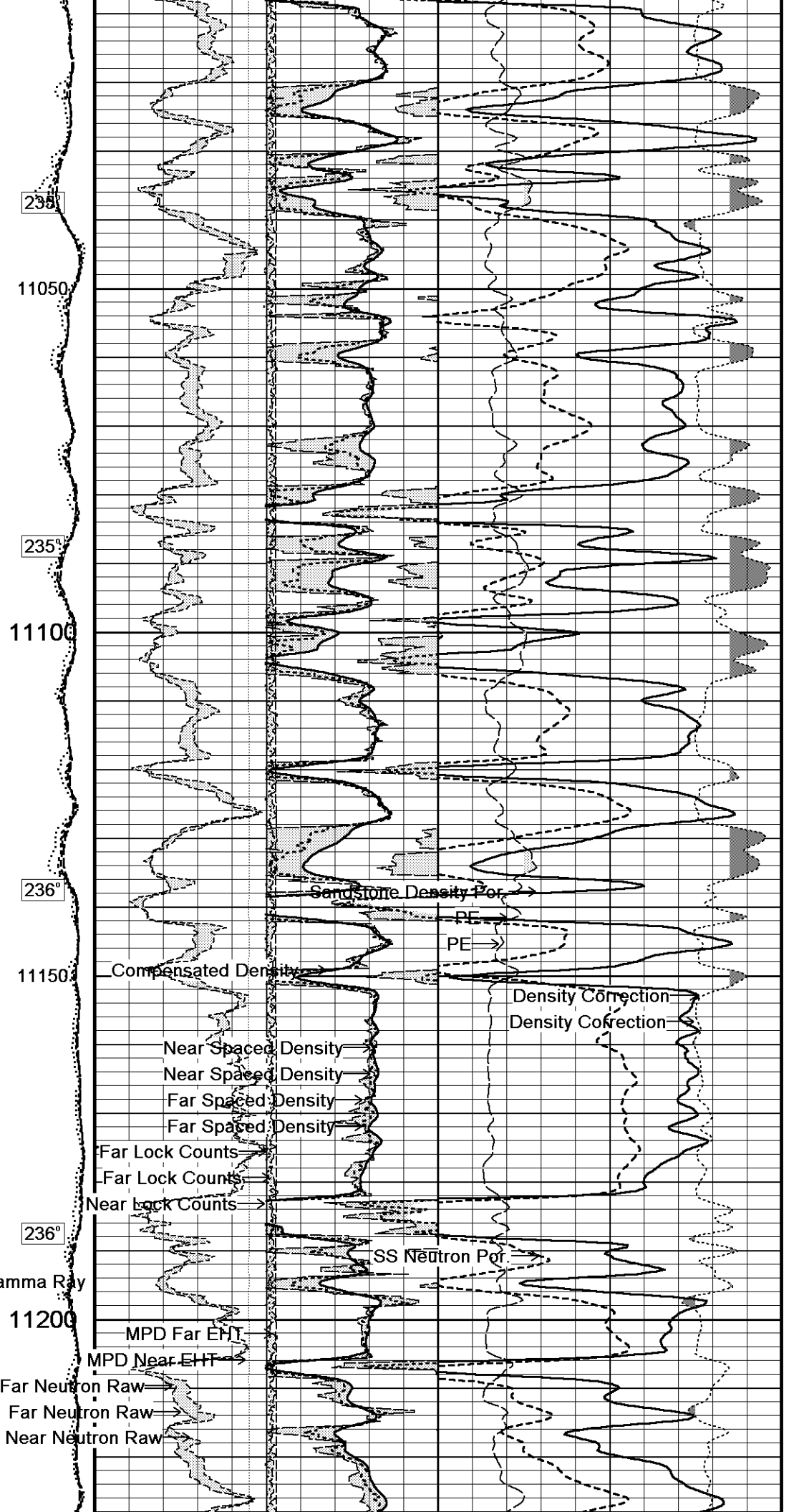
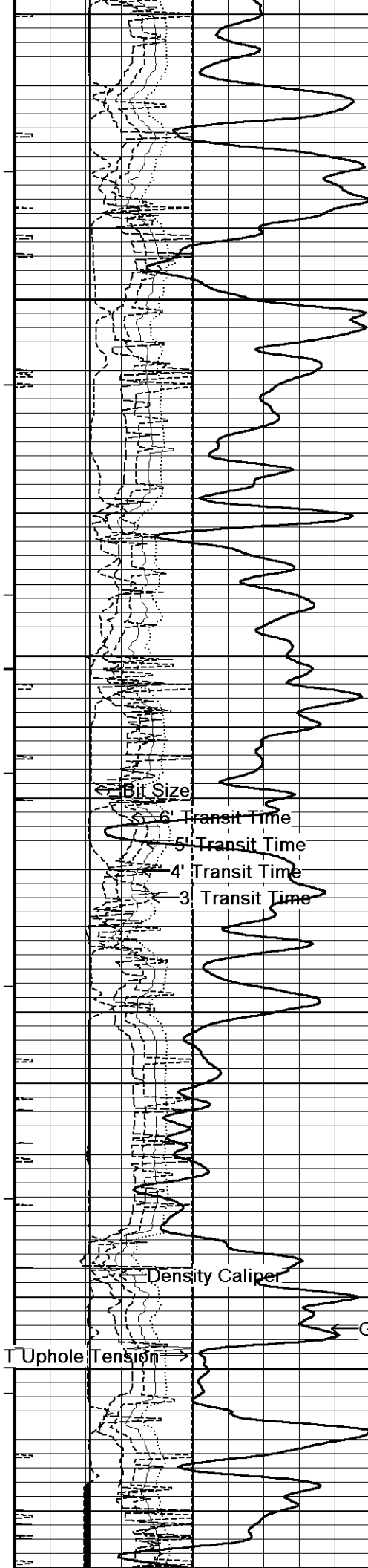


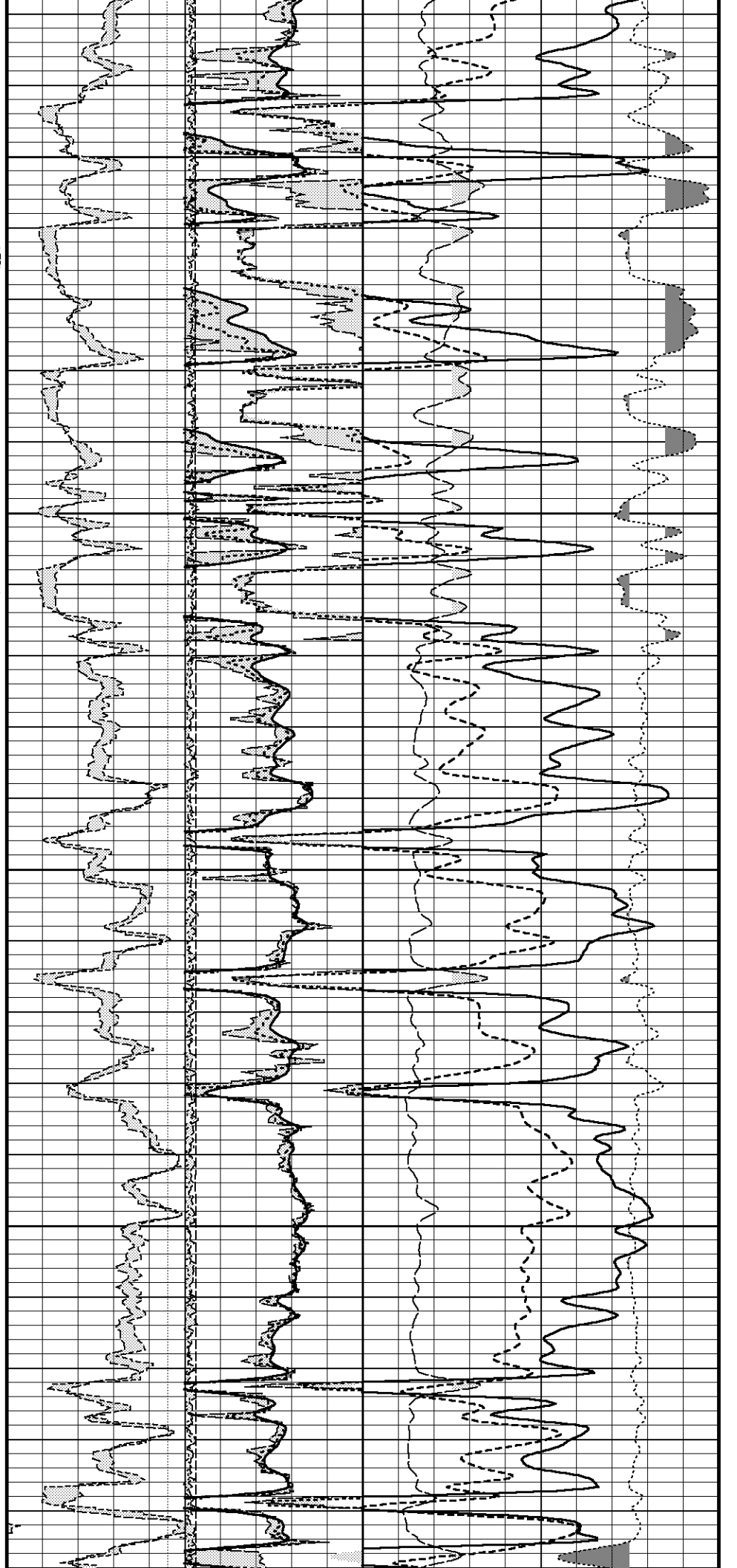
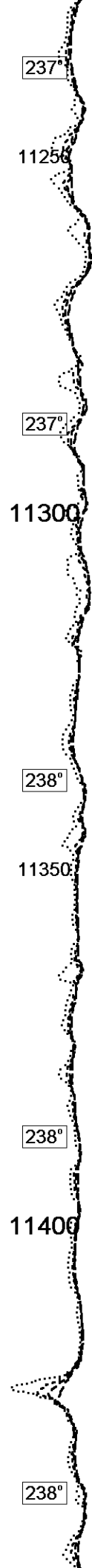
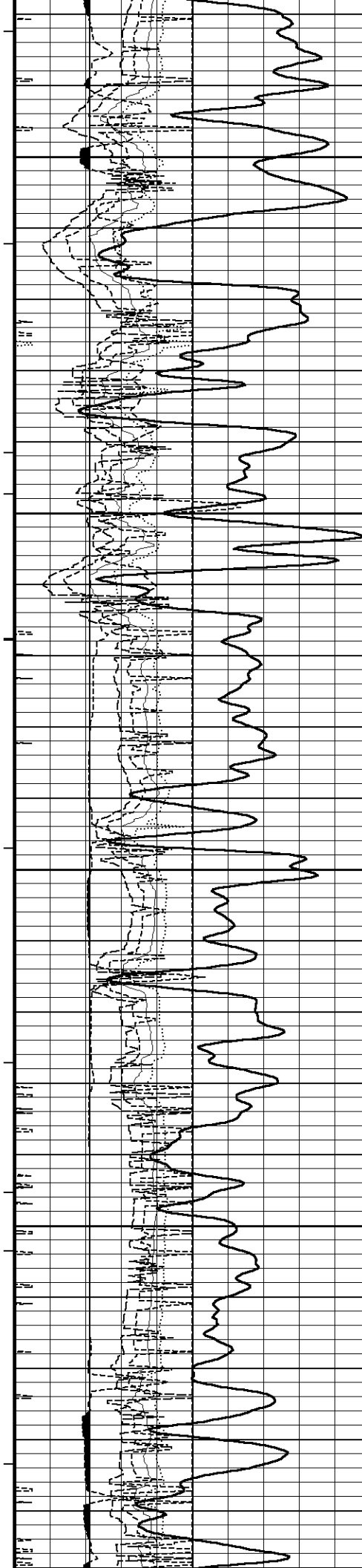


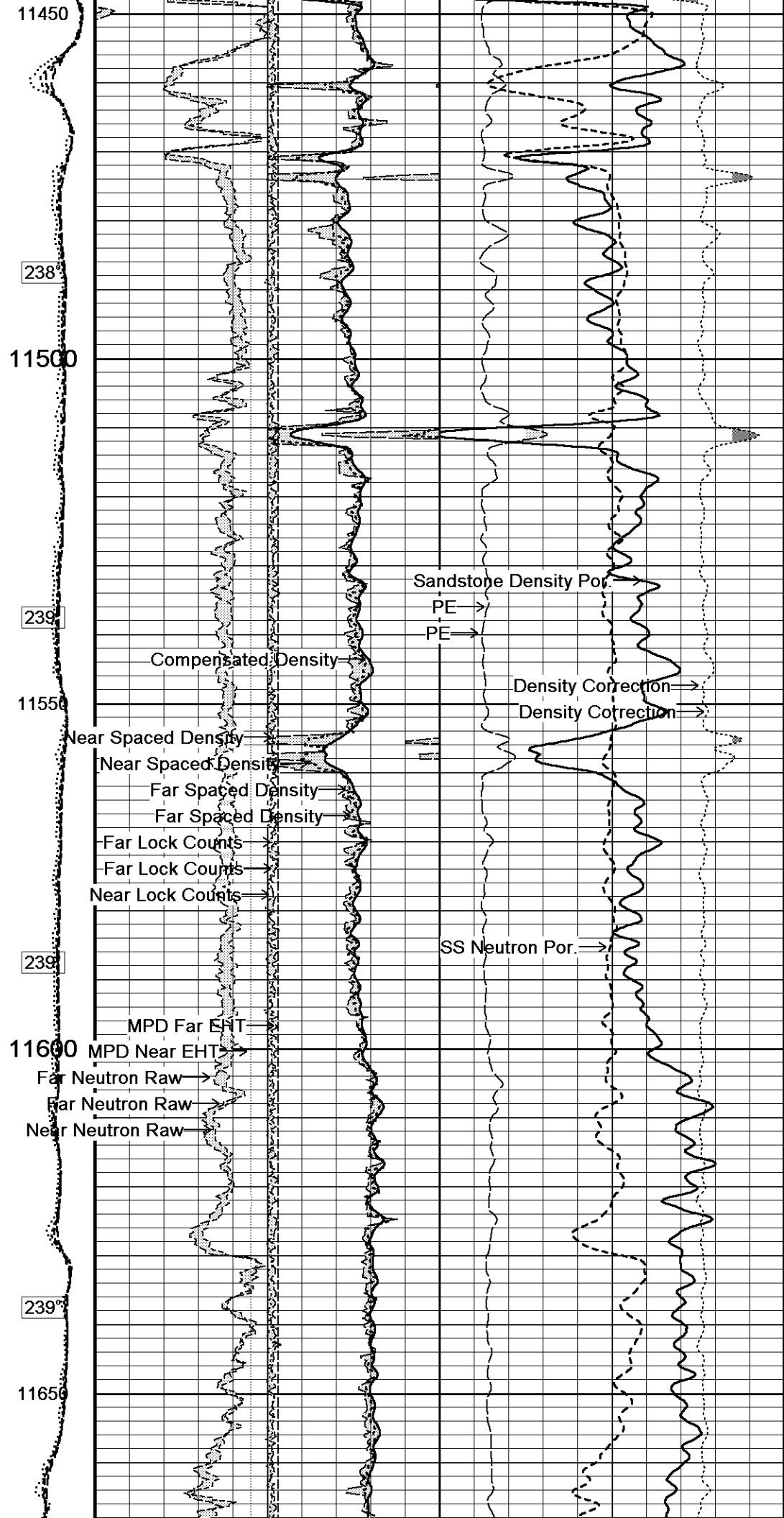
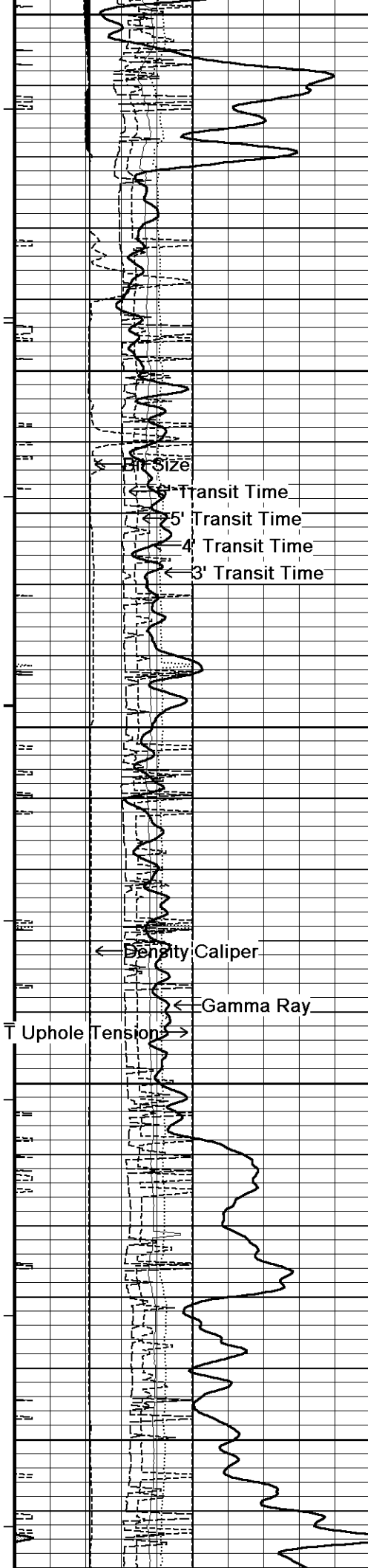


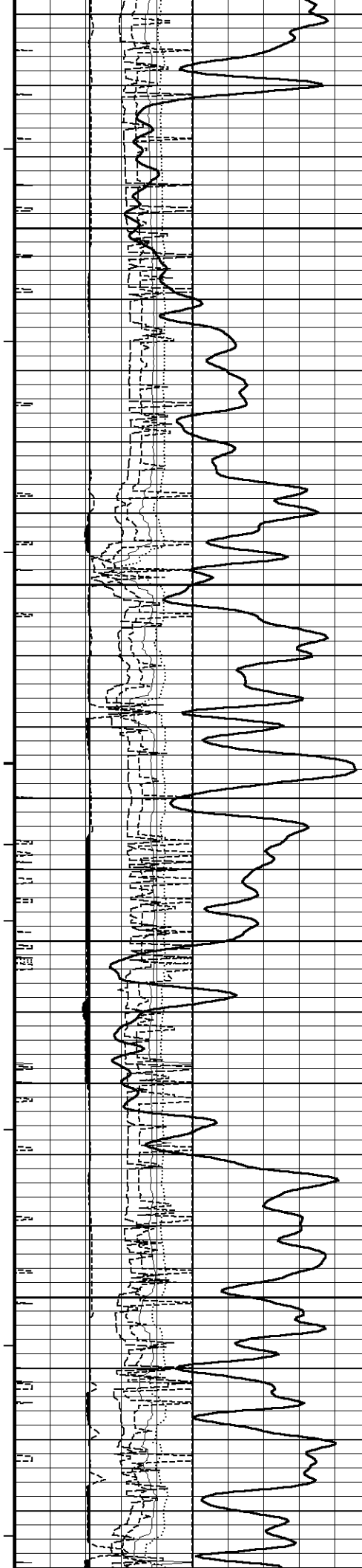




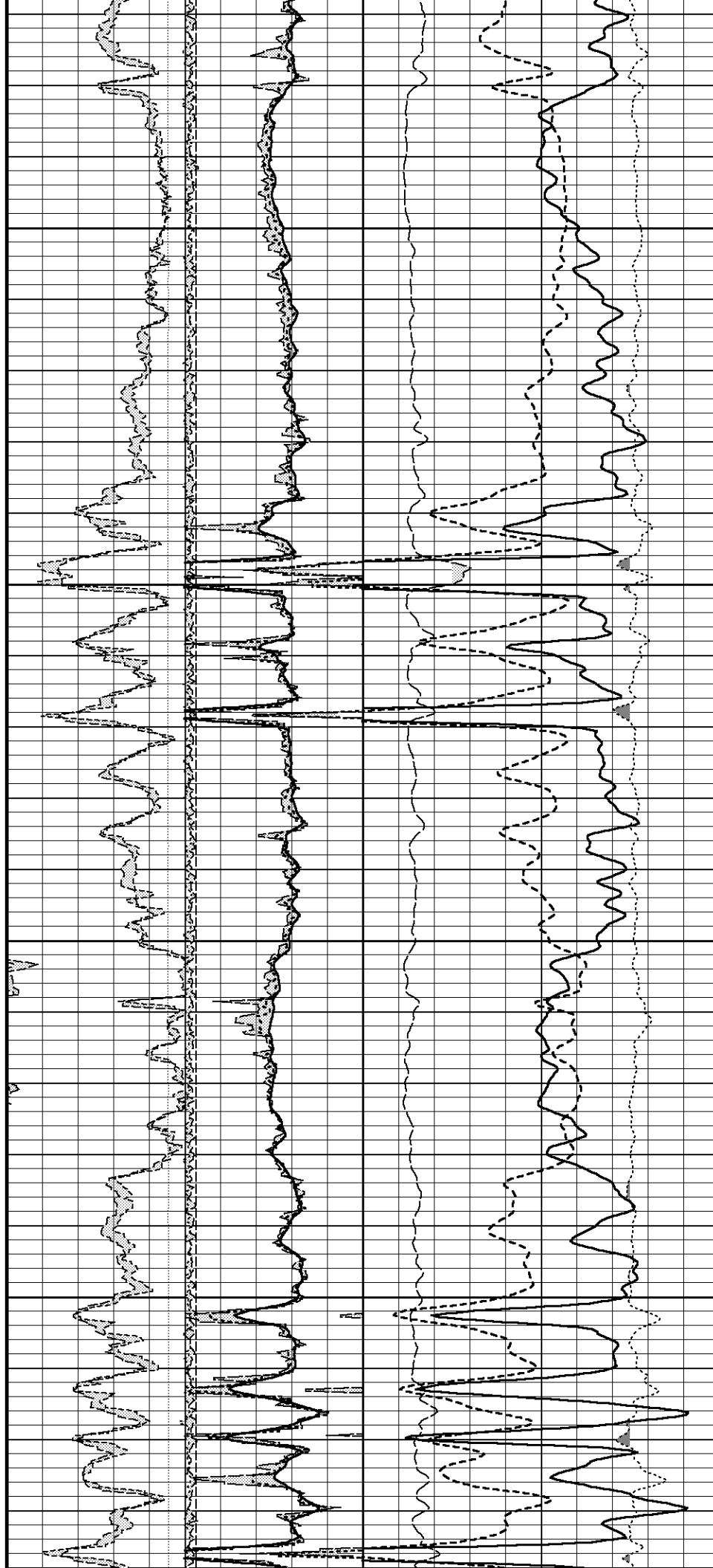


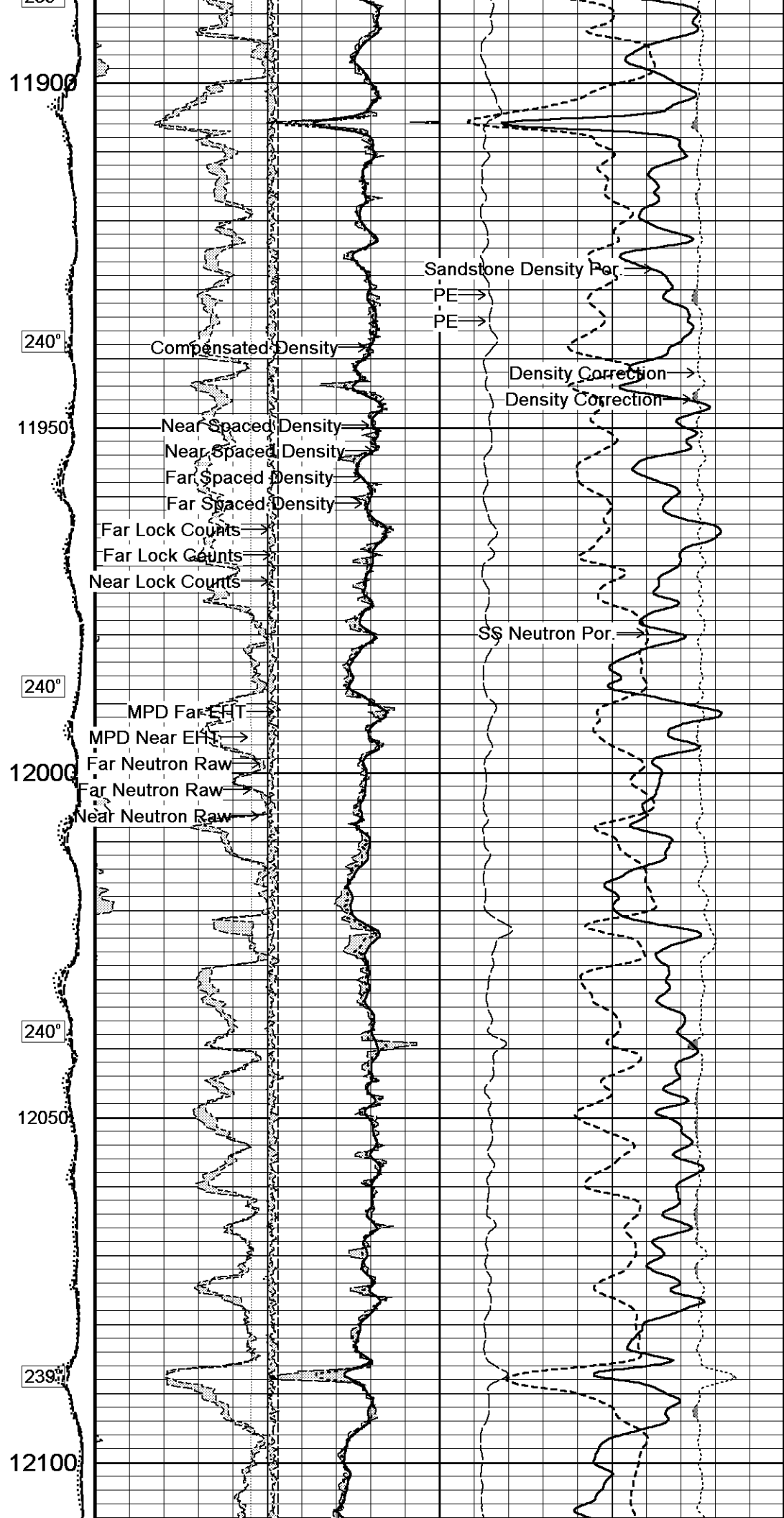
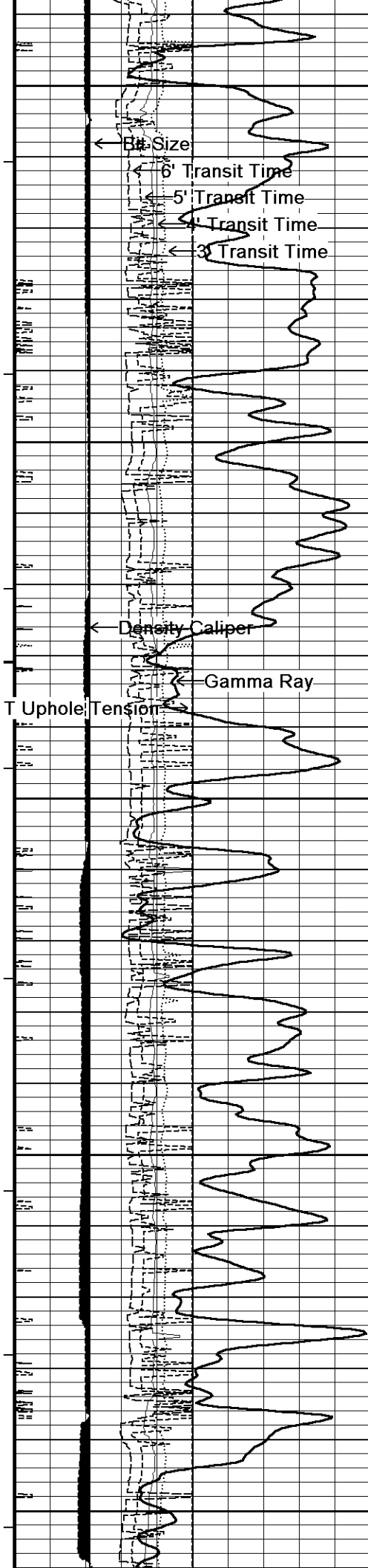


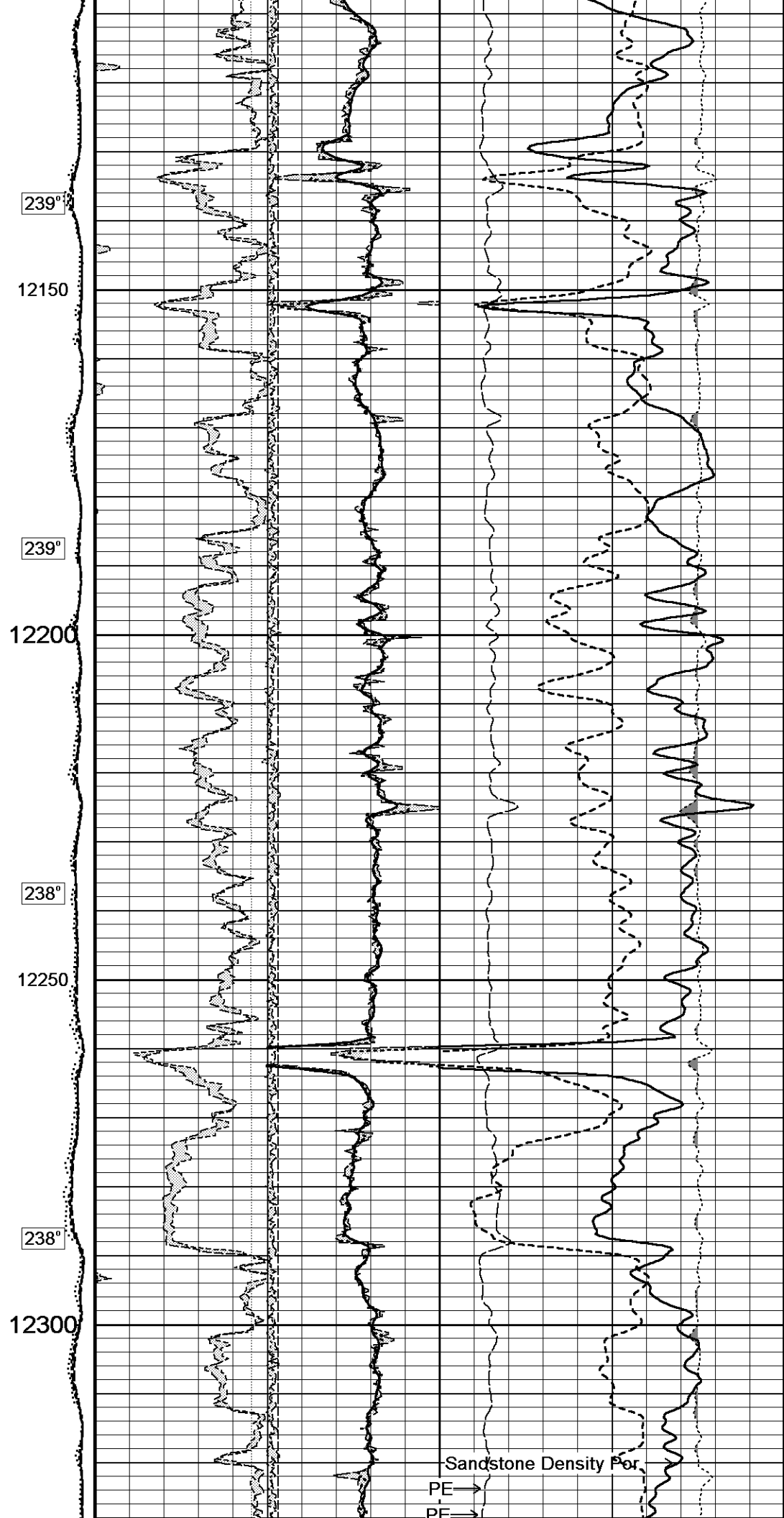
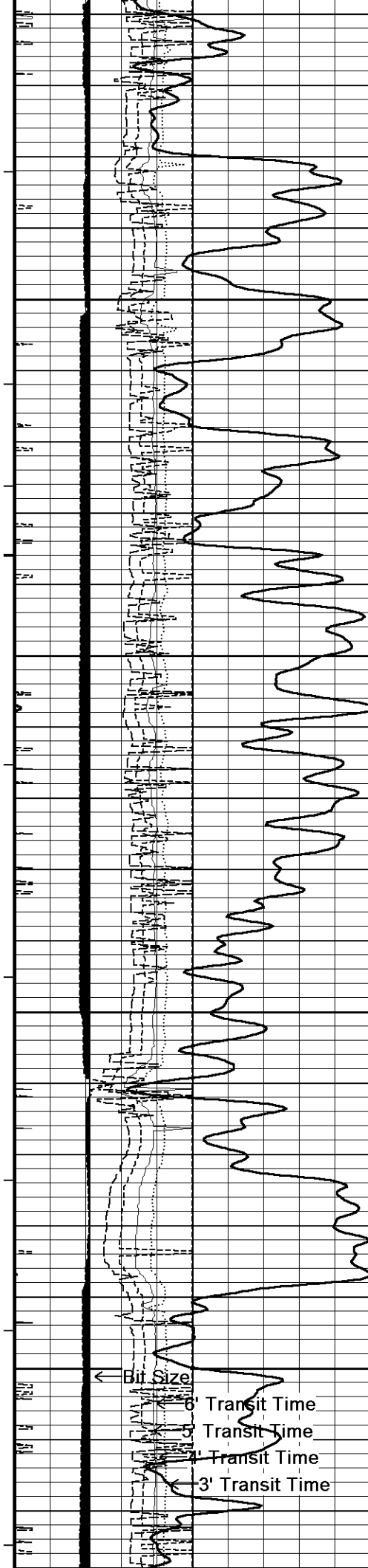




239°
11700
239°
11750
239°
11800
239°
11850
239°







239°

12150

239°

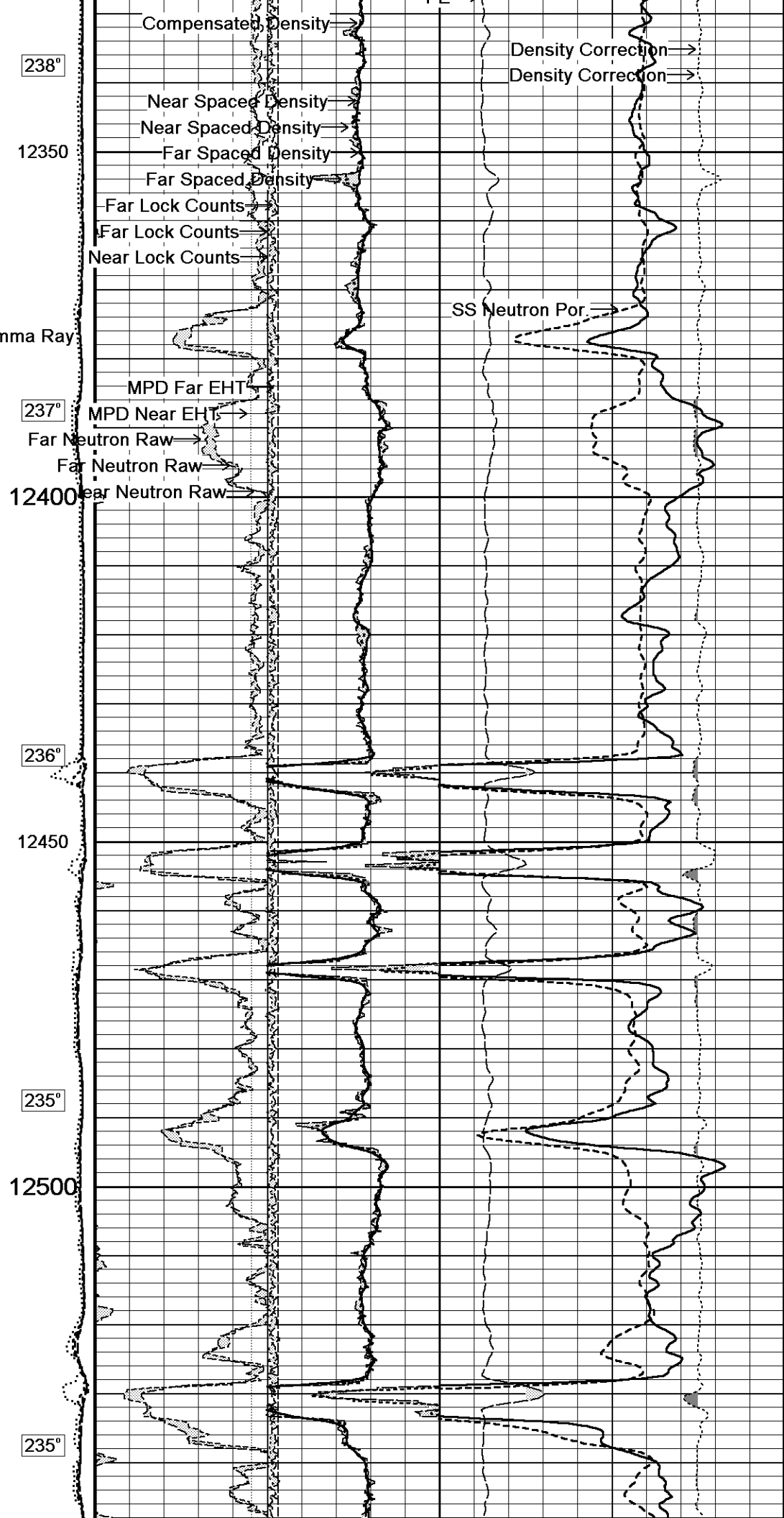
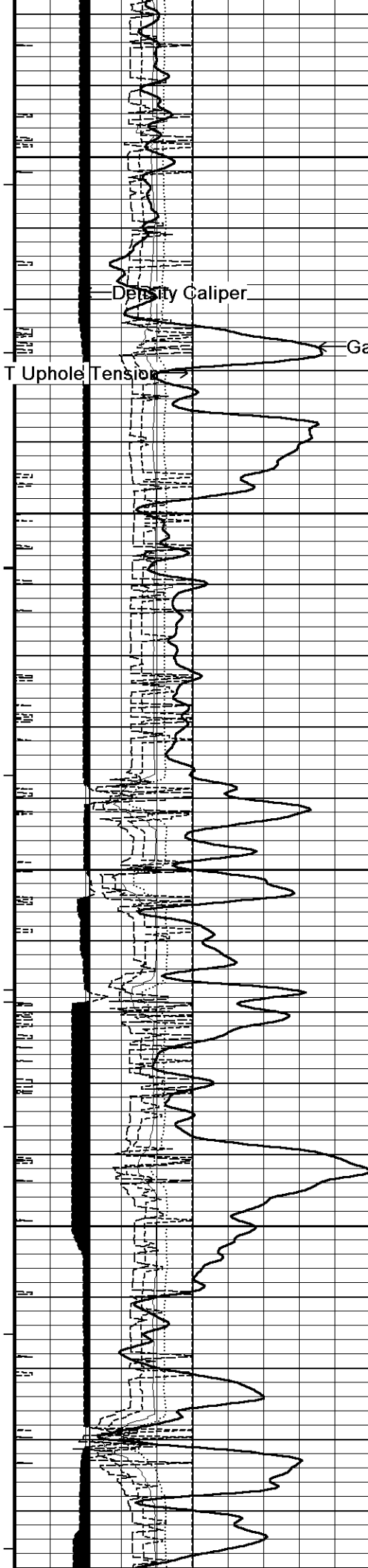
12200

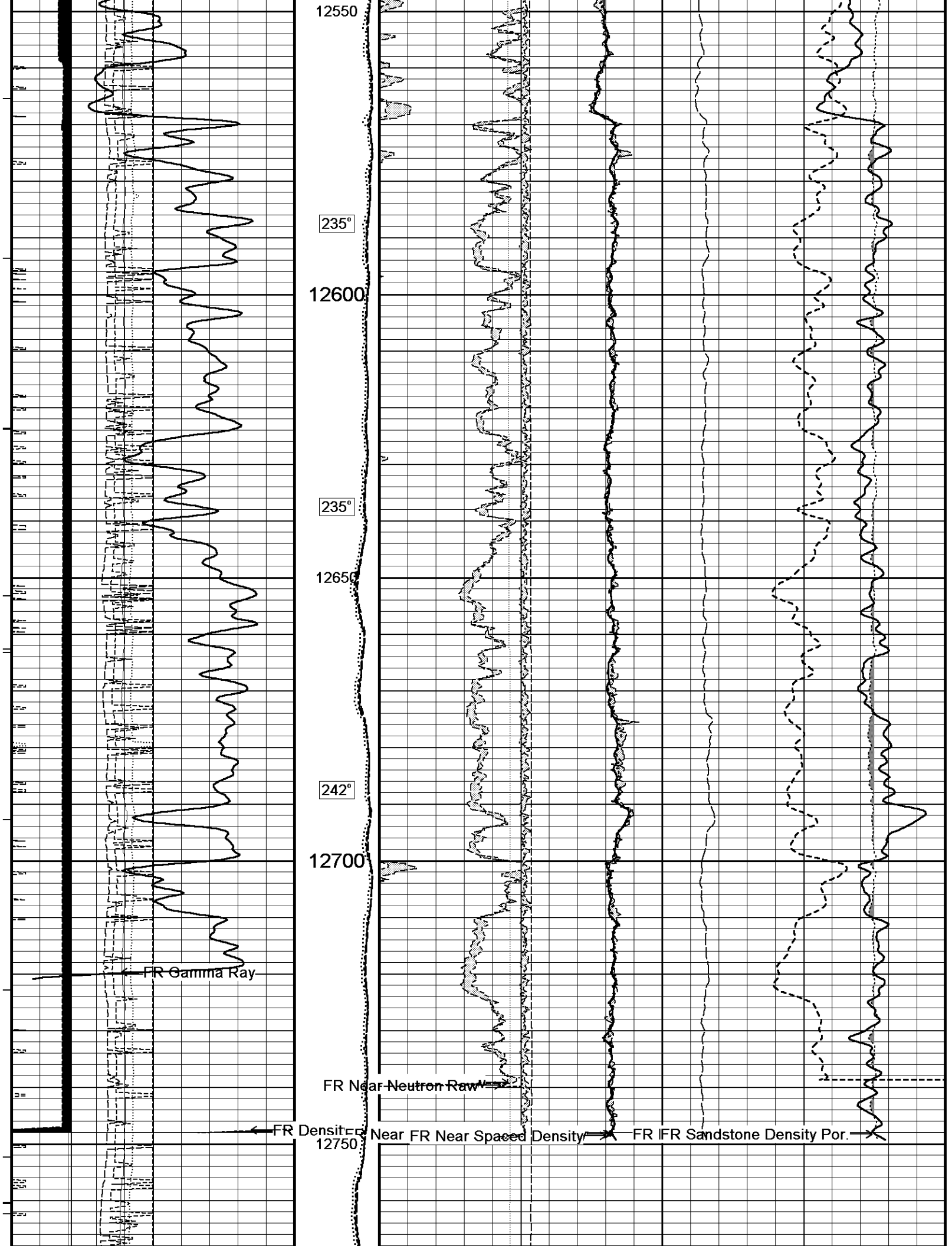
238°

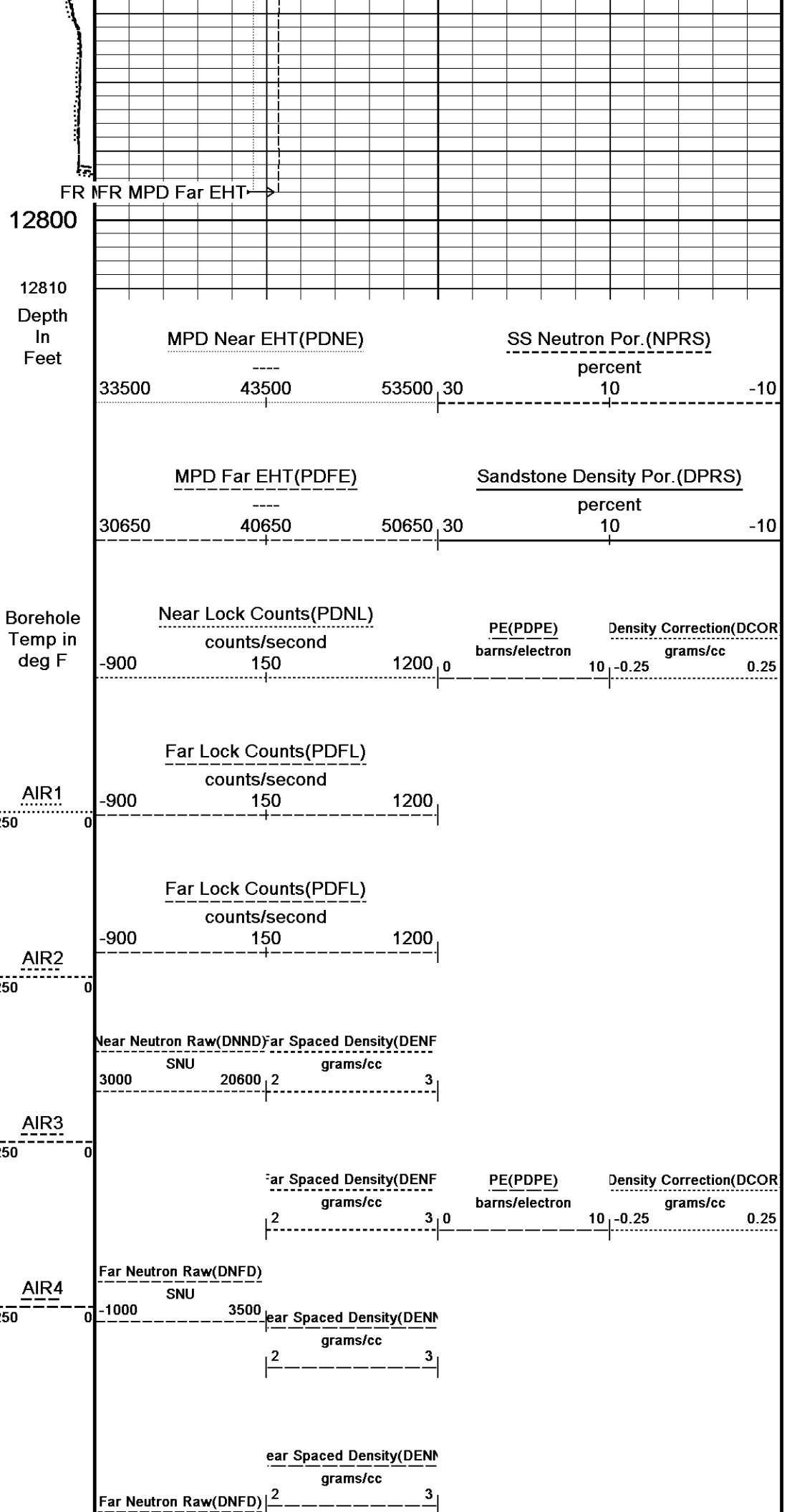
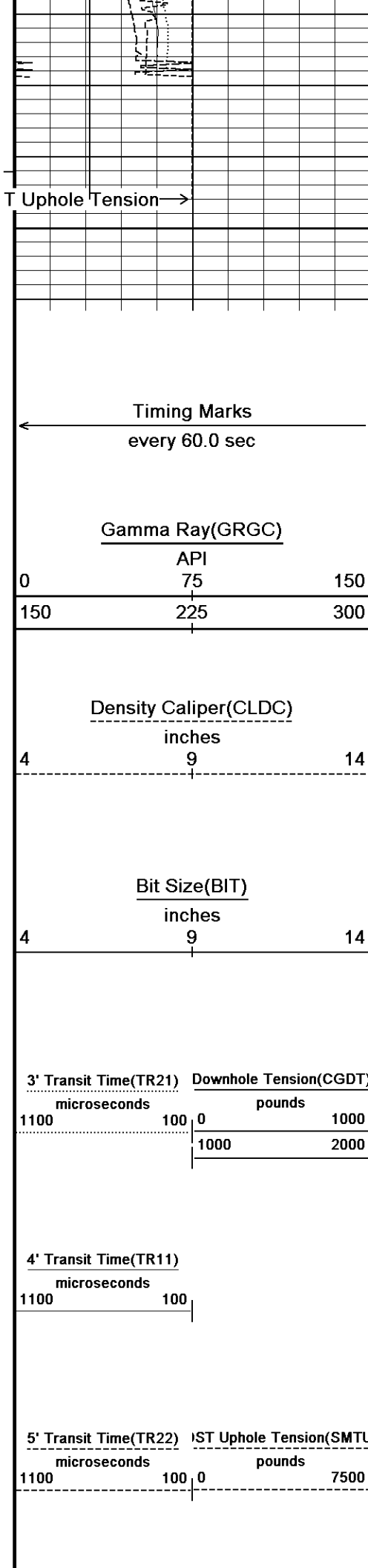
12250

238°

12300







6' Transit Time(TR12) microseconds 1100-----100	SNU -1000-----3500	compensated Density(DEN) grams/cc 2-----3
Depth Based Data - Maximum Sampling Increment 10.0cm Filename: C:\DOCUME~1\Hopkinjg\LOCALS~1\Temp\Weatherford PreView\0\depth.dta System Versions: Logged with 10.06.0425 Processed with 10.06.0425 Plotted with 10.01.0765	Replay Scale 1:240	Plotted on 21-FEB-2010 13:34 Recorded on 20-FEB-2010 23:10
↑	5 INCH MAIN LOG	↑

BEFORE SURVEY CALIBRATION C:\DOCUME~1\Hopkinjg\LOCALS~1\Temp\Weatherford PreView\0\depth.dta		
General Constants All 000		Last Edited on 20-FEB-2010,04:45
General Parameters		
Mud Resistivity	2.340	ohm-metres
Mud Resistivity Temperature	78.000	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	0	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	None	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Deep Induction	
RWA Constant A	0.610	
RWA Constant M	2.150	
Down-hole Tension Calibration SMS 000		Field Calibration on 25-JAN-2010 11:38
Reading No	Measured	Calibrated (lbs)
1	14334.21	0.00
2	15360.88	400.00
Gamma Calibration MCG 342		Field Calibration on 19-FEB-2010,22:21
	Measured	Calibrated (API)
Background	86	58
Calibrator (Gross)	1023	684
Calibrator (Net)	937	626
Gamma Constants MCG 342		Last Edited on 20-FEB-2010,04:45
Gamma Calibrator Number GRC-005		
Mud Density	1.00	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm
SP Calibration MCG 342		Field Calibration on 19-FEB-2010,22:21
	Measured	Calibrated (mV)
Reference 1	100.0	100.0
Reference 2	-100.0	-100.0
High Resolution Temperature Calibration MCG 342		Field Calibration on 19-FEB-2010,22:22
	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

Pre-filter Length 11

Neutron Calibration MDN 250

Base Calibration on 25-AUG-2009 11:29

Field Check on 19-FEB-2010 21:40

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2977	91	3714	110
Ratio	32.702		33.764	

Field Calibrator at Base

	Calibrated (cps)
	1610 2357
Ratio	0.683

Field Check

	Calibrated (cps)
	1694 2474
Ratio	0.684

Neutron Constants MDN 250

Last Edited on 19-FEB-2010,22:22

Neutron Source Id	755	
Neutron Jig Number	6532	
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	7.00	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	20.00	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE 236

Base Calibration on 5-DEC-2009 15:33

Field Check on 19-FEB-2010 21:54

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.9	126.8

Base Check	281.2
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Field Check	281.4
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FE Constants MFE 236

Last Edited on 19-FEB-2010,22:22

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	1.0	inches

Sonic Constants MSS 221

Last Edited on 19-FEB-2010,22:22

Maximum Boundary Contrast	60.00	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 Full Waveform
Hole Type Open Hole

Sonde Parameters

	Measured	Calibrated
Offset	0.0000	0.0000
Free Pipe	0.0000	0.0000

Peak Amplitude Source 0

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	3 foot			
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)	
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	0.00	
0.00	0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	Yes	
Use 4' Waveform to derive TR	Yes	
Use 5' Waveform to derive TR	Yes	
Use 6' Waveform to derive TR	Yes	
3' Waveform Discriminator Level	0.30	mV
4' Waveform Discriminator Level	0.30	mV
5' Waveform Discriminator Level	0.15	mV
6' Waveform Discriminator Level	0.15	mV
3' Waveform Filter	None	
4' Waveform Filter	None	
5' Waveform Filter	None	
6' Waveform Filter	None	

Semblance Level	0.50	
Semblance Window Width	120.00	micro-sec
Sonic 1 Despiker	30.48	micro-sec/ft
Sonic 2 Despiker	30.48	micro-sec/ft

Induction Calibration MAI 287

Base Calibration on 9-FEB-2010,13:46
Field Check on 19-FEB-2010 21:56

Base Calibration

Test Loop Calibration Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	16.6	472.0	9.3	966.2
2	6.0	384.6	7.6	821.4
3	3.3	258.9	5.2	566.0
4	2.2	137.2	2.6	279.2

Array Temperature 77.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	15.0	3831.4	12.3	3832.4
2	31.9	3493.7	29.6	3494.9
3	30.7	3046.7	28.7	3047.8
4	19.7	2010.9	18.4	2011.6
Deep	18.3	1971.3	16.9	1972.0
Medium	45.6	4058.0	43.0	4059.7
Shallow	48.2	5177.1	44.9	5178.9

Array Temperature 44.0 42.0 Deg F

Induction Model	VECTAR		
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	6.0000		
Stand-off Fin Angle	60.00	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	0.0000	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	

High Resolution Temperature Calibration MAI 287

Field Calibration on 19-FEB-2010,21:56

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	50.00	50.00

High Resolution Temperature Constants MAI 287

Last Edited on 9-FEB-2010,13:50

Pre-filter Length	11
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Caliper Calibration MPD 220

Base Calibration on 20-JAN-2010 13:56

Field Calibration on 19-FEB-2010,21:52

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14272	4.00
2	22416	5.96
3	30368	7.98
4	38432	9.86
5	47536	11.88
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	5.97	5.96

Photo Density Calibration MPD 220

Base Calibration on 13-FEB-2010,09:45

Field Check on 19-FEB-2010 21:45

Density Calibration				
Base Calibration		Measured	Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	45083	16661	53115	19186
Reference 2	21601	2751	25020	2536

Field Check at Base

1285.0 1528.4

Field Check

1290.9 1536.3

PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	230	1135		
Reference 1	16270	44889	0.367	0.320
Reference 2	6180	21438	0.293	0.272

Field Check at Base

230.1 1134.6

Field Check

232.7 1138.6

Density Constants MPD 220

Last Edited on 19-FEB-2010,21:45

Density Source Id	271	
Nylon Calibrator Number	507	
Aluminium Calibrator Number	507	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.17	gm/cc
Mud Density Z/A Correction	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	Standard	
Matrix Density (gm/cc)	Depth (ft)	
2.65	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:\DOCUME~1\Hopkinjg\LOCALS~1\Temp\Weatherford PreView\0\depth.dta

Shuttle Running Tool 3.5" (SRT A)

SRT 1 Length: 0.33 ft Weight: 37.5 lb

MBS-A.A 400v Compact Battery Sub

MBS 52 Length: 14.24 ft Weight: 105.8 lb

Compact Gamma

MCG 342 Length: 8.70 ft Weight: 63.9 lb

Compact Memory Sub A.C

MMS 21 Length: 3.12 ft Weight: 30.9 lb

SKJ-D.A Compact Knuckle Joint

SKJ 172 Length: 2.17 ft Weight: 24.3 lb

SHA-J.A Compact Swivel Head Adaptor

SHA 214 Length: 2.30 ft Weight: 22.0 lb

MIS-D.A Compact Inline Bowspring sub

MIS 215 Length: 5.70 ft Weight: 22.1 lb



77.26 ft

GRGC - Gamma Ray

74.36 ft

CGXT - MCG External Temperature

MIS 313 Length: 5.70 ft Weight: 33.1 lb

Compact Neutron
MDN 250 Length: 5.04 ft Weight: 50.7 lb

Compact Density/Caliper
MPD 220 Length: 9.59 ft Weight: 90.4 lb

MIS-D.A Compact Inline Bowspring sub
MIS 442 Length: 5.70 ft Weight: 33.1 lb

SHA-J.A Compact Swivel Head Adaptor
SHA 316 Length: 2.30 ft Weight: 22.0 lb

SKJ-D.A Compact Knuckle Joint
SKJ 154 Length: 2.17 ft Weight: 24.3 lb

MIS-B Compact Inline Standoff sub
MIS 277 Length: 2.14 ft Weight: 15.4 lb

Compact Focussed Electric
MFE 236 Length: 6.03 ft Weight: 48.5 lb

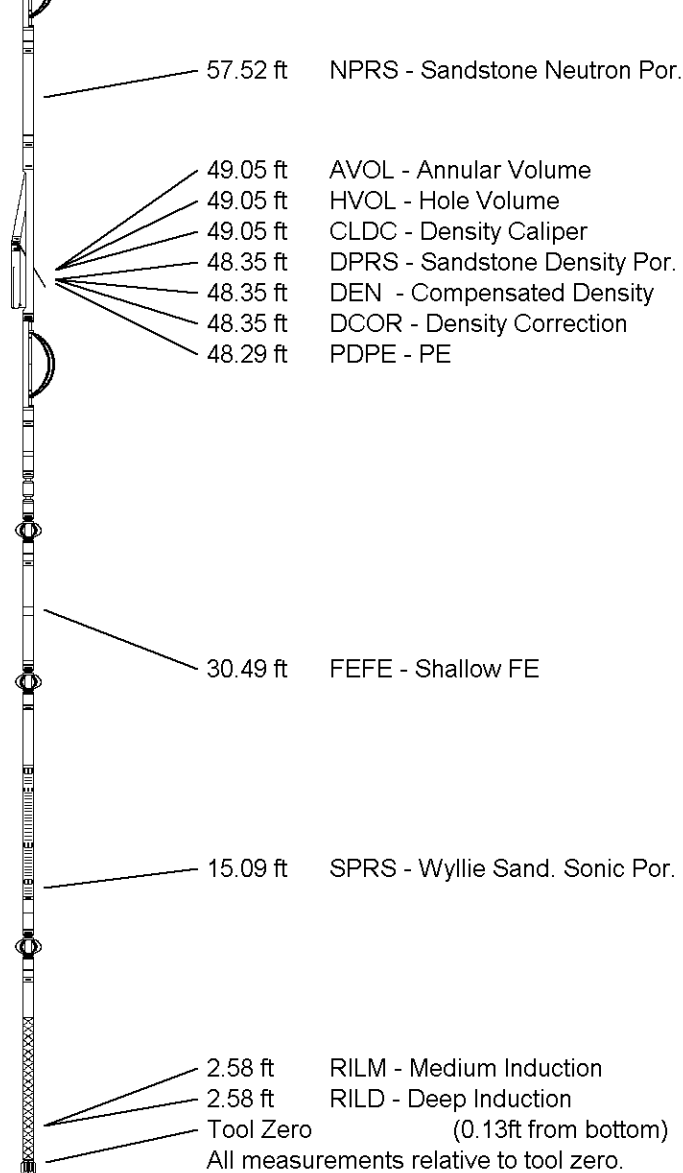
MIS-B Compact Inline Standoff sub
MIS 182 Length: 2.14 ft Weight: 15.4 lb

Compact Sonic
MSS 221 Length: 12.52 ft Weight: 72.8 lb

MIS-B Compact Inline Standoff sub
MIS 365 Length: 2.14 ft Weight: 15.4 lb

Compact Induction
MAI 287 Length: 10.81 ft Weight: 48.5 lb

Total Length: 97.12 ft Weight: 754.0 lb



COMPANY	EXXON MOBIL CORPORATION
WELL	FREEDOM RANCH UNIT 197-33B8
FIELD	PICEANCE CREEK
PROVINCE/COUNTY	RIO BLANCO
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	6476.00	feet	First Reading	12793.00	feet
Elevation Drill Floor	6475.00	feet	Depth Driller	12830.00	feet
Elevation Ground Level	6446.00	feet	Depth Logger	12796.00	feet



Weatherford®

COMPACT WELL SHUTTLE
LQC LOG