

HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON MICROLOG

COMPANY		EOG RESOURCES	
WELL		BROOKOVER 4 #4	
FIELD		BROOKOVER	
COUNTY		FINNEY	
STATE		KANSAS	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date	10-Jun-11	Elev. 2867.0 ft	
Run No.	1	D.F. 2878.0 ft	
Depth - Driller	5050.00 ft	G.L. 2867.0 ft	
Depth - Logger	5051.0 ft		
Bottom - Logged Interval	5013.0 ft		
Top - Logged Interval	2350.0 ft		
Casing - Driller	8.625 in @ 1726.0 ft		
Casing - Logger	1724.0 ft		
Bit Size	7.875 in		
Type Fluid in Hole	WATER BASED MUD		
Density	8.9 ppq		
PH	10.00 pH		
Source of Sample	FLOW LINE		
Rm @ Meas. Temperature	1.400 ohmm @ 95.00 degF		
Rmf @ Meas. Temperature	1.117 ohmm @ 90.00 degF		
Rmc @ Meas. Temperature	1.660 ohmm @ 90.00 degF		
Source Rmf	MEAS		
Rm @ BHT	1.23 ohmm @ 130.0 degF		
Time Since Circulation	4.0 hr		
Time on Bottom	10-Jun-11 19:25		
Max. Rec. Temperature	130.0 degF @ 5051.0 ft		
Equipment	10546696 LIBERAL		
Recorded By	J. BOSH		
Witnessed By	W. SHAFFER		

Fold here

Service Ticket No.: 8233460				API Serial No.: 15-055-221050000				PGM Version: WL INSITE R3.2.0 (Build 7)											
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE						RESISTIVITY SCALE CHANGES													
Date		Sample No.				Type Log	Depth	Scale Up Hole		Scale Down Hole									
Depth-Driller																			
Type Fluid in Hole																			
Density		Viscosity																	
Ph		Fluid Loss																	
Source of Sample						RESISTIVITY EQUIPMENT DATA													
Rm @ Meas. Temp		@		@		Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other									
Rmf @ Meas. Temp.		@		@		ONE	MICRO P84	RUBBER	ADJ.	N/A									
Rmc @ Meas. Temp.		@		@															
Source Rmf		Rmc																	
Rm @ BHT		@		@															
Rmf @ BHT		@		@															
Rmc @ BHT		@		@															
EQUIPMENT DATA																			
GAMMA				ACOUSTIC				DENSITY				NEUTRON							
Run No.		ONE		Run No.				Run No.		ONE		Run No.		ONE					
Serial No.		11050378		Serial No.				Serial No.		I04_P84		Serial No.		11055304					
Model No.		GTET		Model No.				Model No.		SDLT		Model No.		DSNT					
Diameter		3.625		No. of Cent.				Diameter		4.5		Diameter		3.625					
Detector Model No.		T-102		Spacing				Log Type		GAM-GAM		Log Type		NEU-NEU					
Type		SCINT						Source Type		CS137		Source Type		AM241BE					
Length		8"		LSA [Y/N]				Serial No.		5168 GW		Serial No.		DSN-424					
Distance to Source		10'		FWDA [Y/N]				Strength		1.5 CI		Strength		15 CI					
LOGGING DATA																			
GENERAL				GAMMA				ACOUSTIC				DENSITY				NEUTRON			

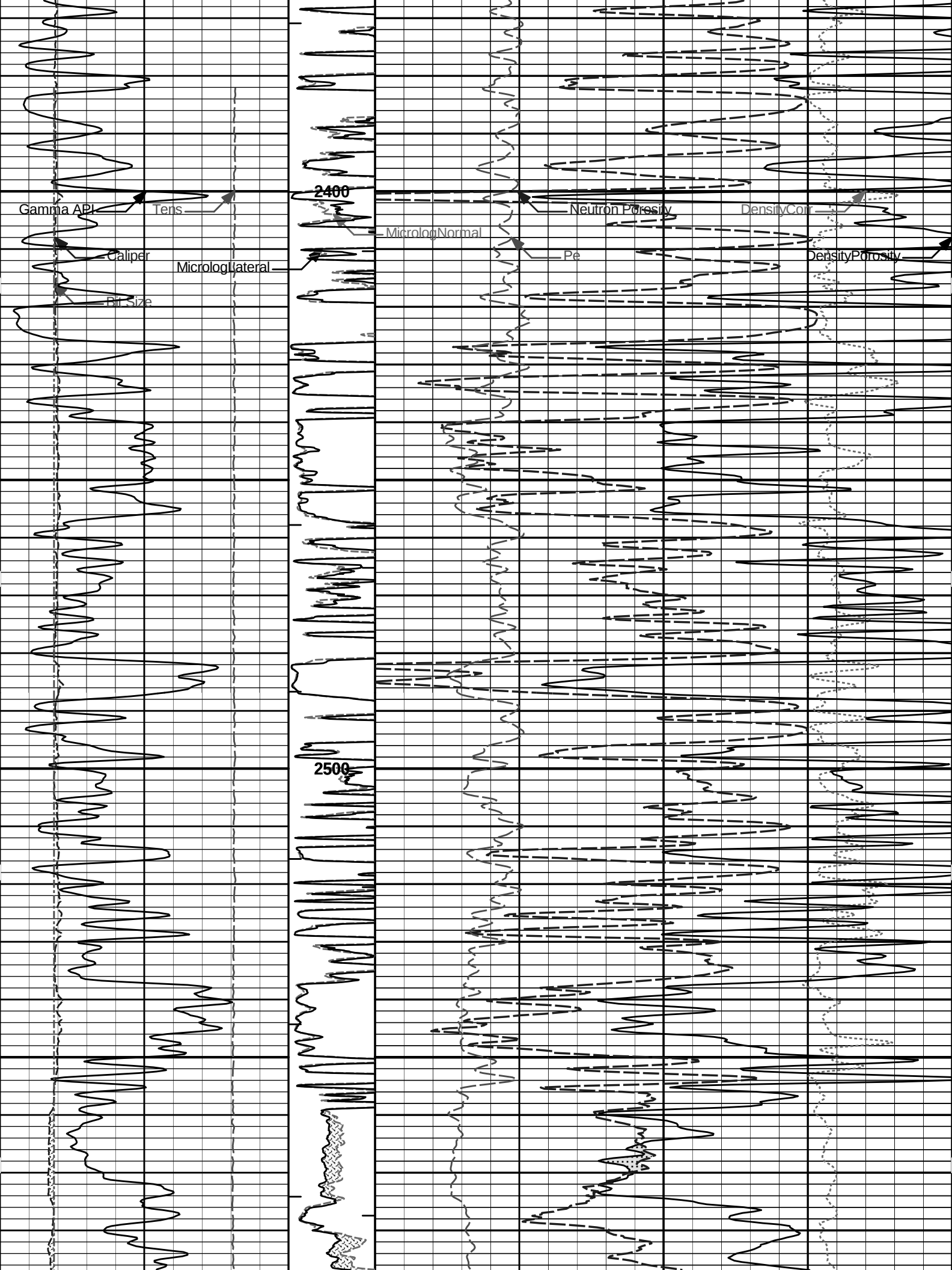
GENERAL			GAMMA		ACOUSTIC		DENSITY		NEUTRON					
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	TD	2400	REC	0	150				30	-10	2.71	30	-10	LIME
DIRECTIONAL INFORMATION														
Maximum Deviation @									KOP @					
Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 4.5 AND 5.5 INCH CASING														
CHLORIDES: 1000 MG/L LCM: 10 LB/BBL														
GPS COORDINATES: LAT: 37.54 N LONG: 100.50 W														
TODAY'S CREW: K. KING, V. JAIME														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES, LIBERAL, KS 620-624-8123														
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.														
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Plot Time: 11-Jun-11 02:30:56
Plot Range: 2350 ft to 5055.58 ft
Data: BROOKOVER_4_4\Well Based*1
Plot File: \\POROML\EOG_POROML_5_MAIN_IQ

5 INCH MAIN LOG

	MicrologLateral 020	
	ohm-metre	
	MicrologNormal 020	
	ohm-metre	
	Tension Pull	
616	Bit Size inches	
	BHVT	
	AHVT	
616	Caliper inches	30Neutron Porosity %
0150	Gamma API	30DensityPorosity %
15K0	Tens pounds	Pe10-0.25DensityCorr gram per cc



2600

2700

2800

Gamma API

Caliper

Bit Size

Microlog Lateral

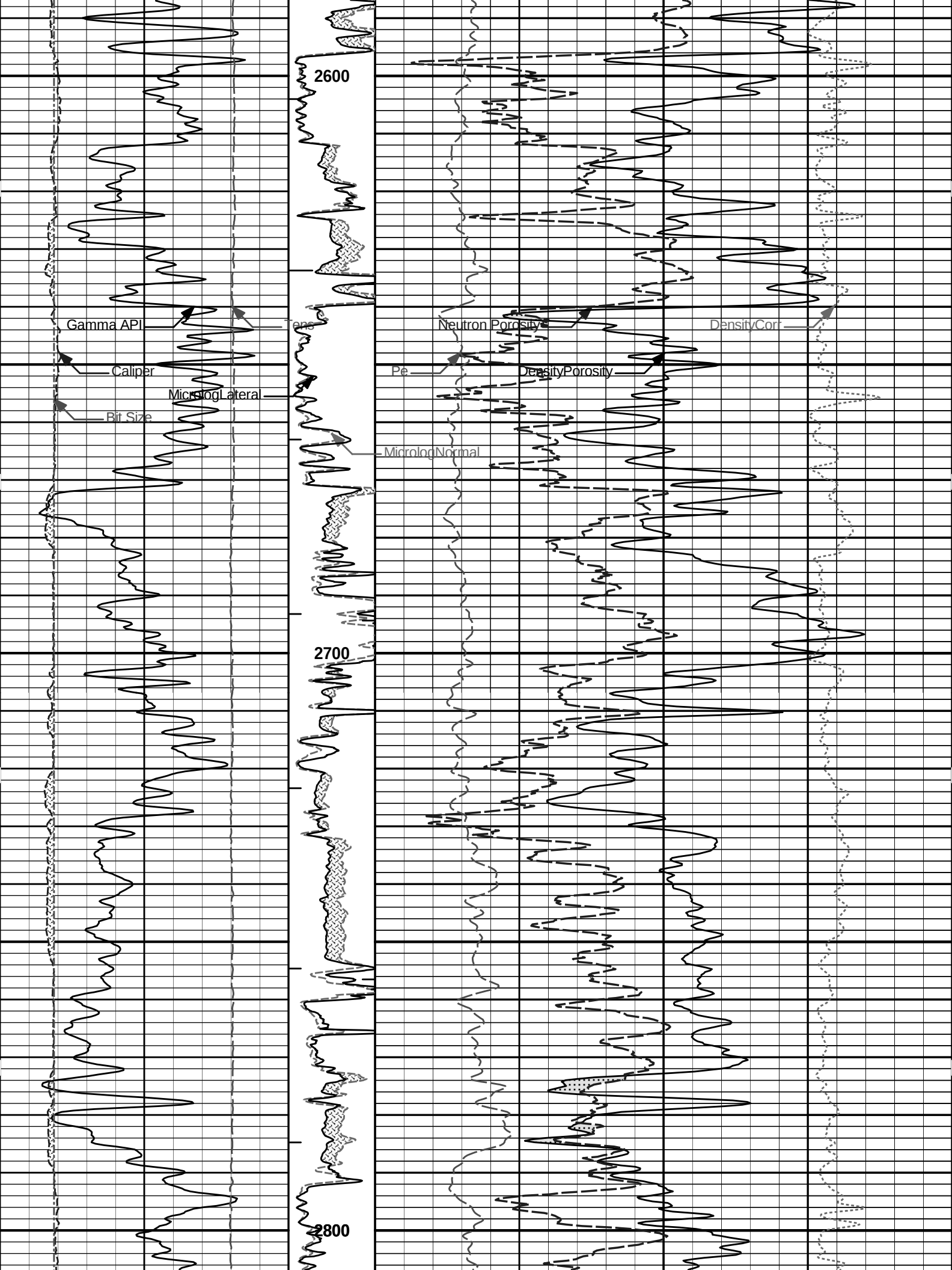
Neutron Porosity

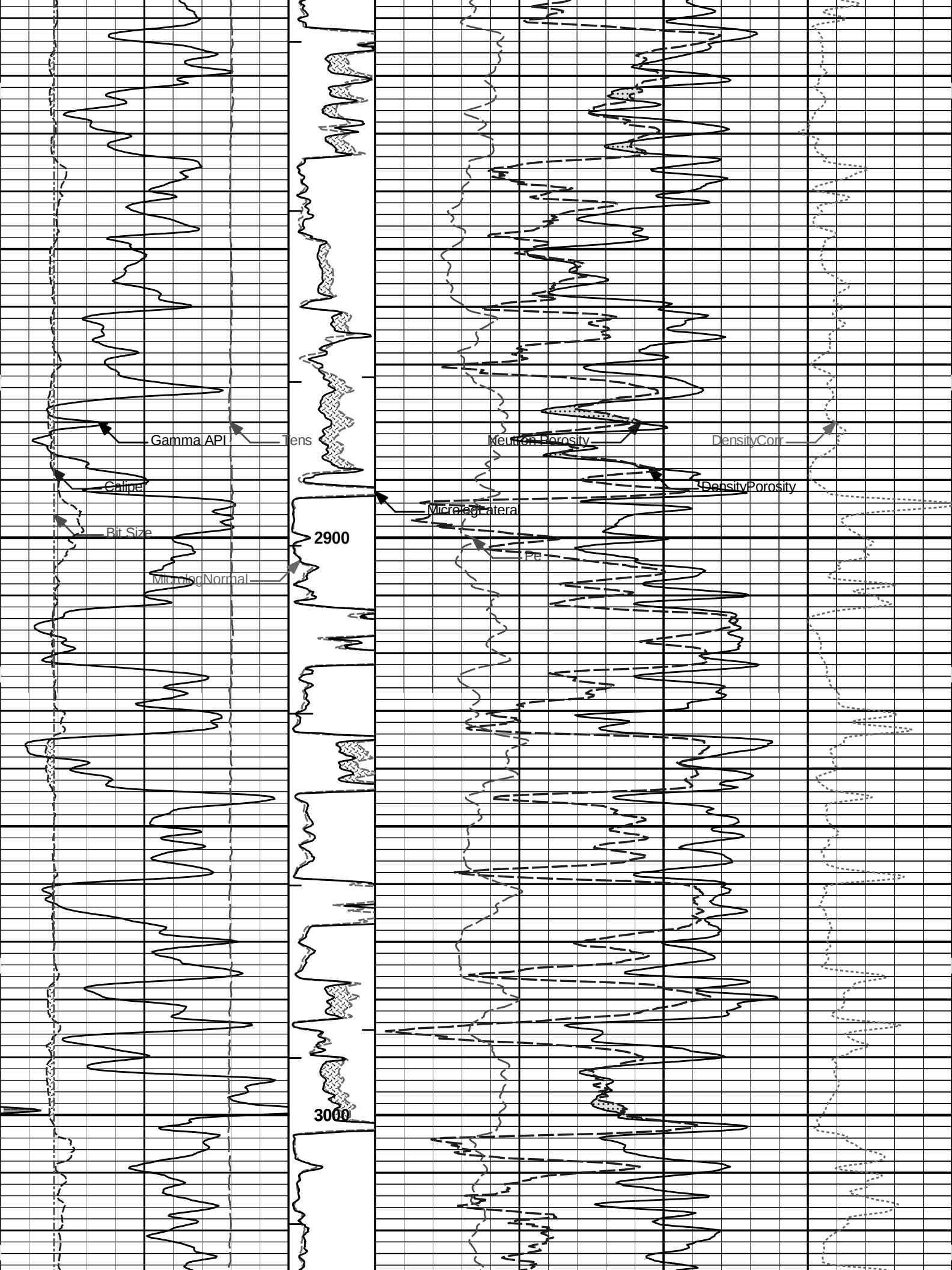
Pe

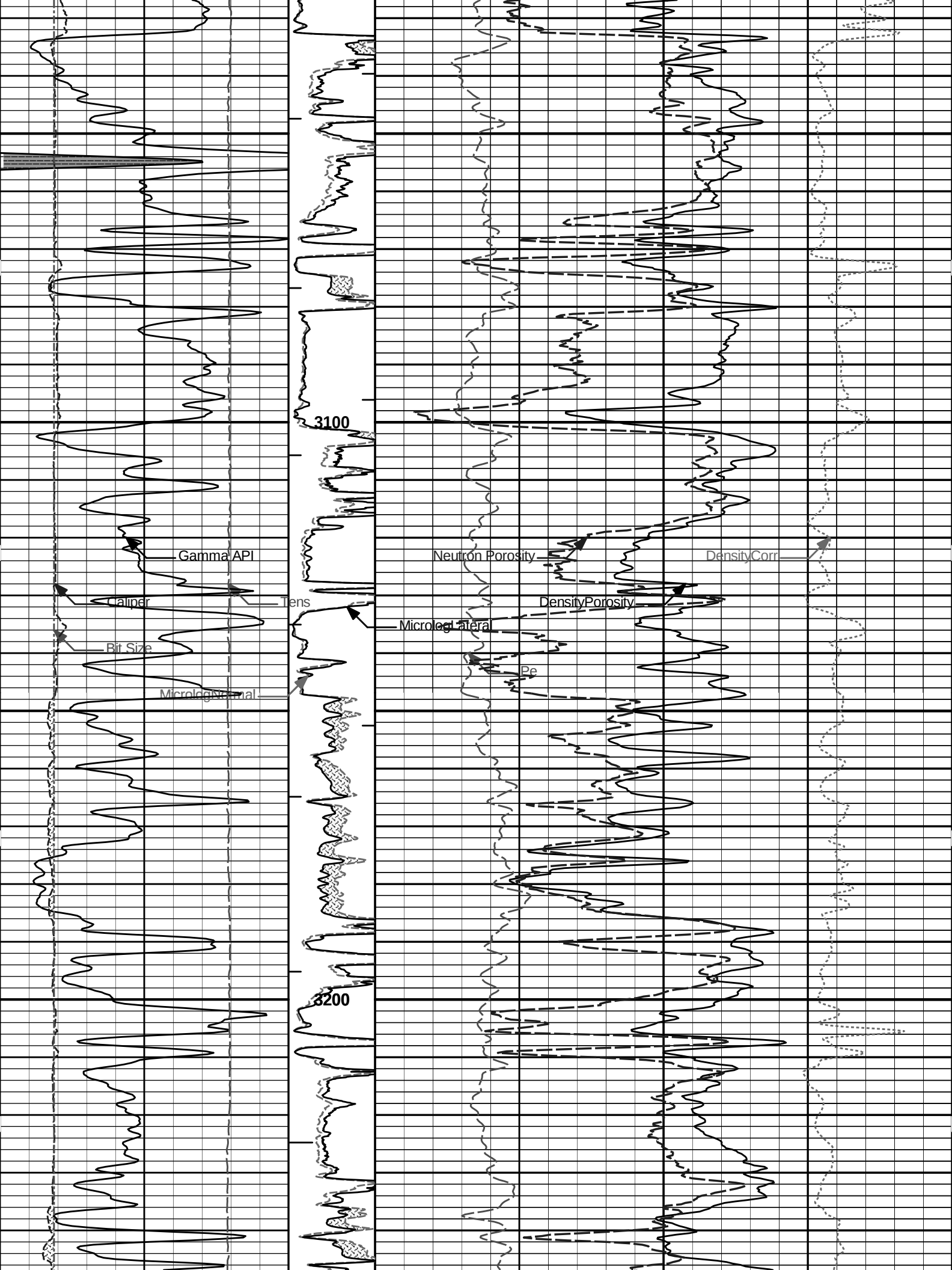
Density Porosity

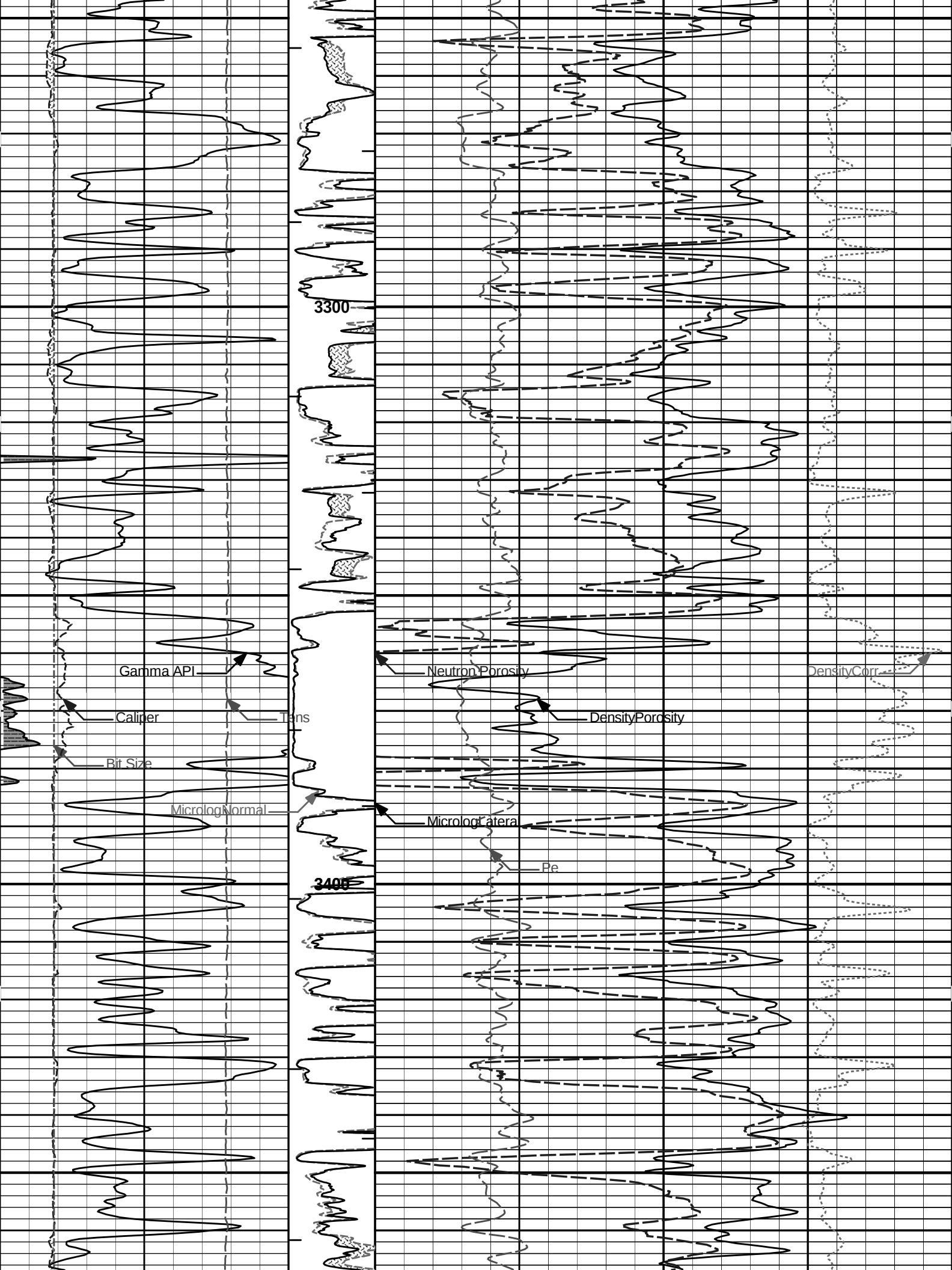
Density Corr

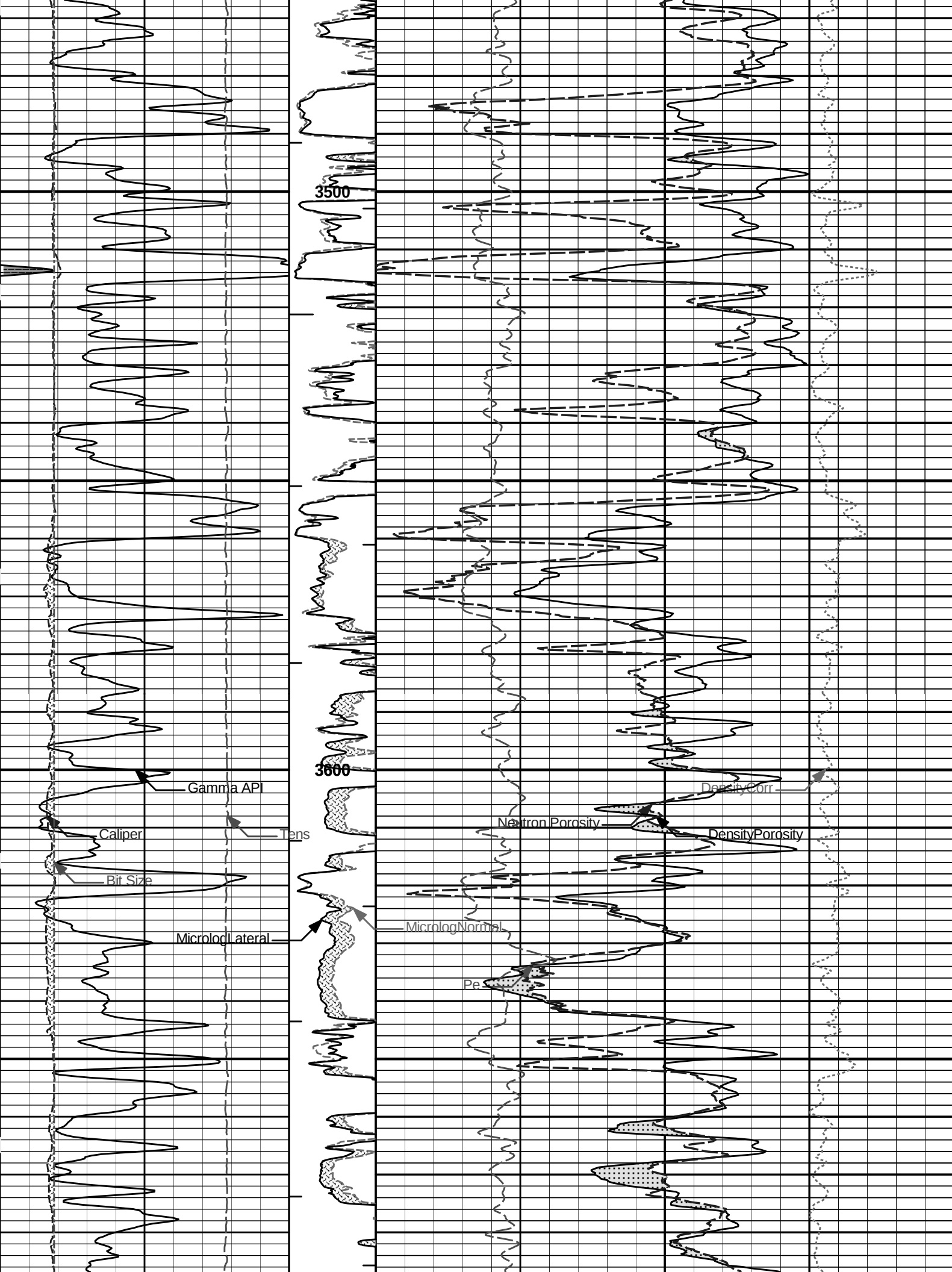
Microlog Normal

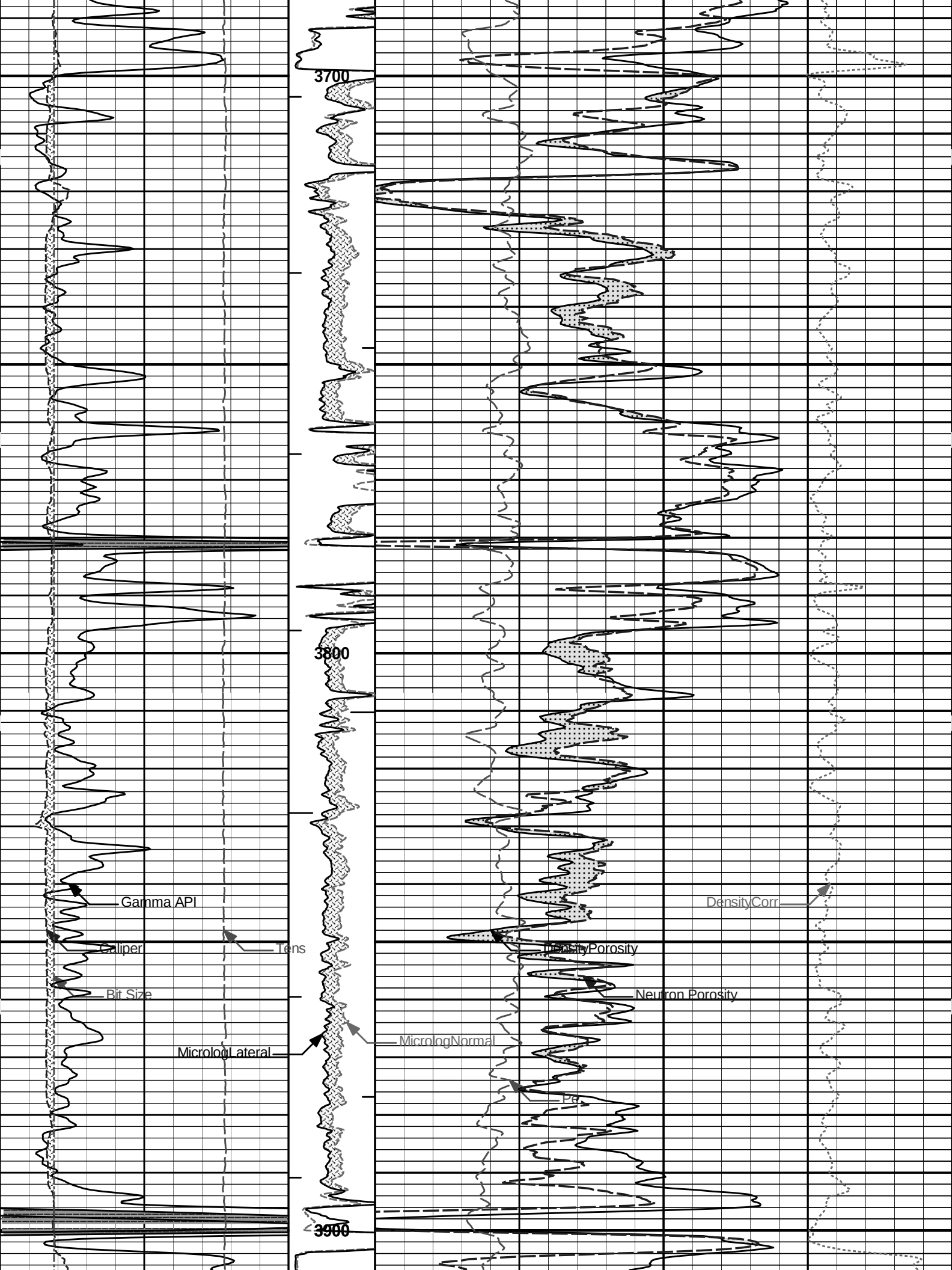


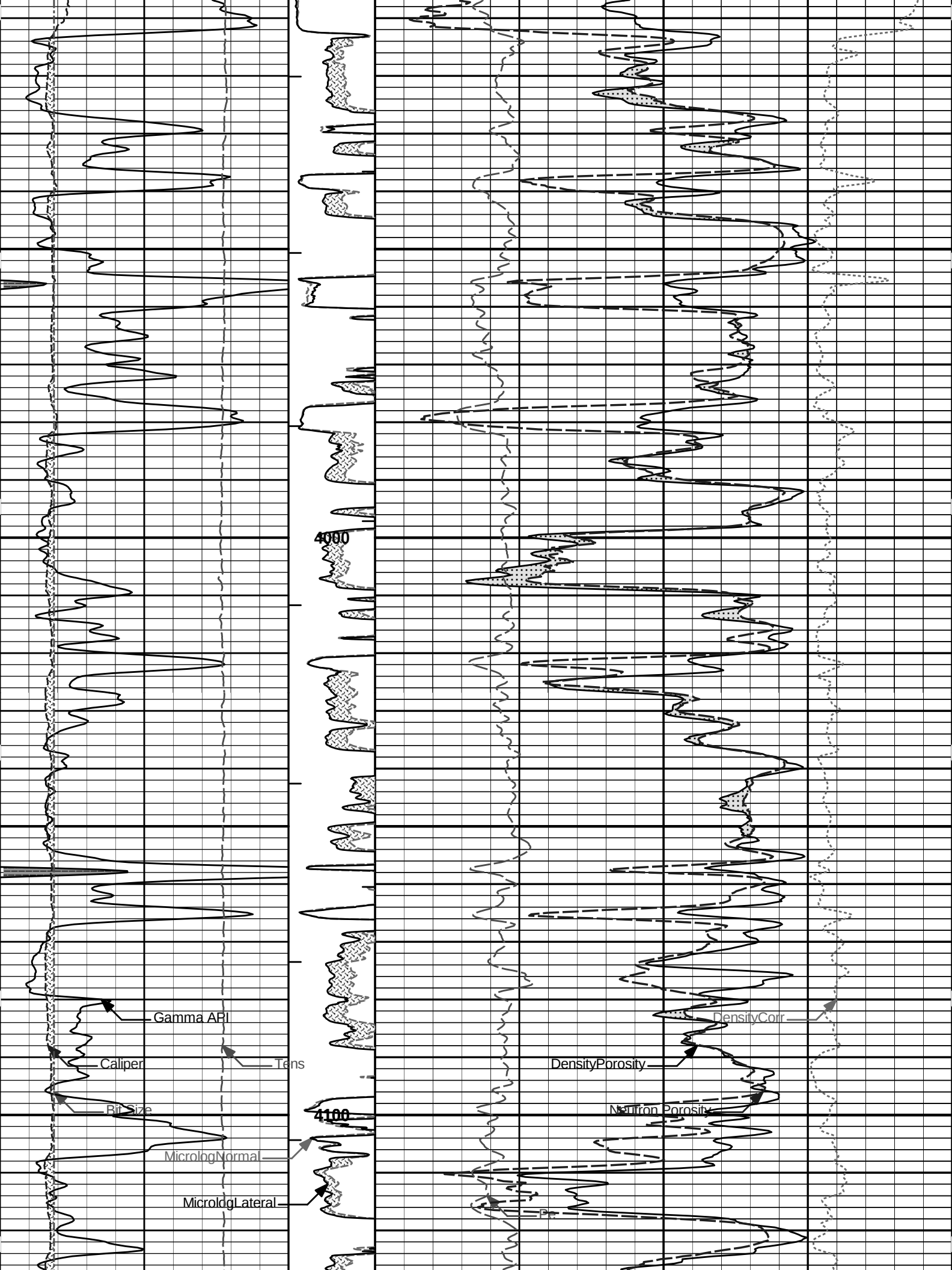


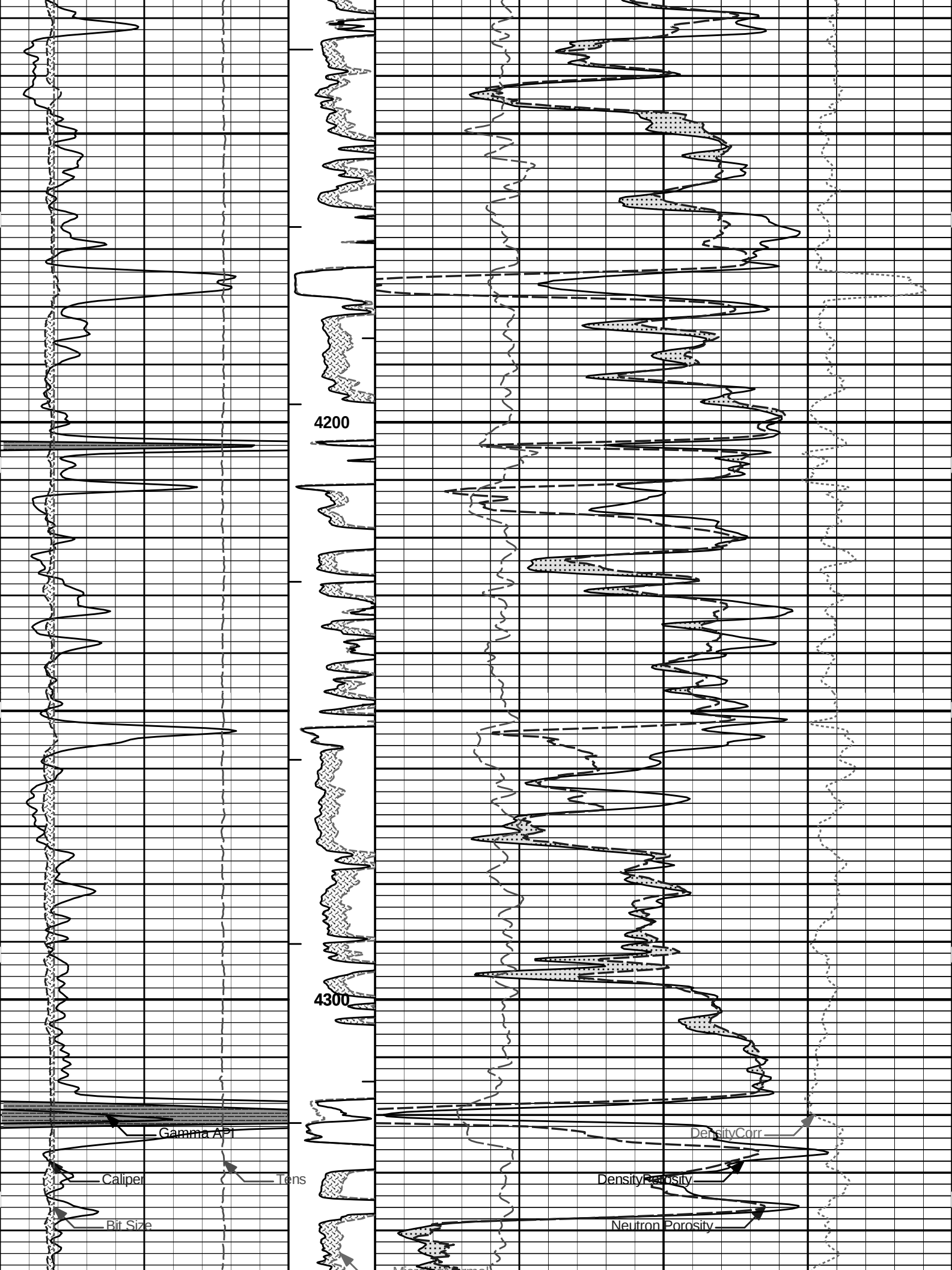


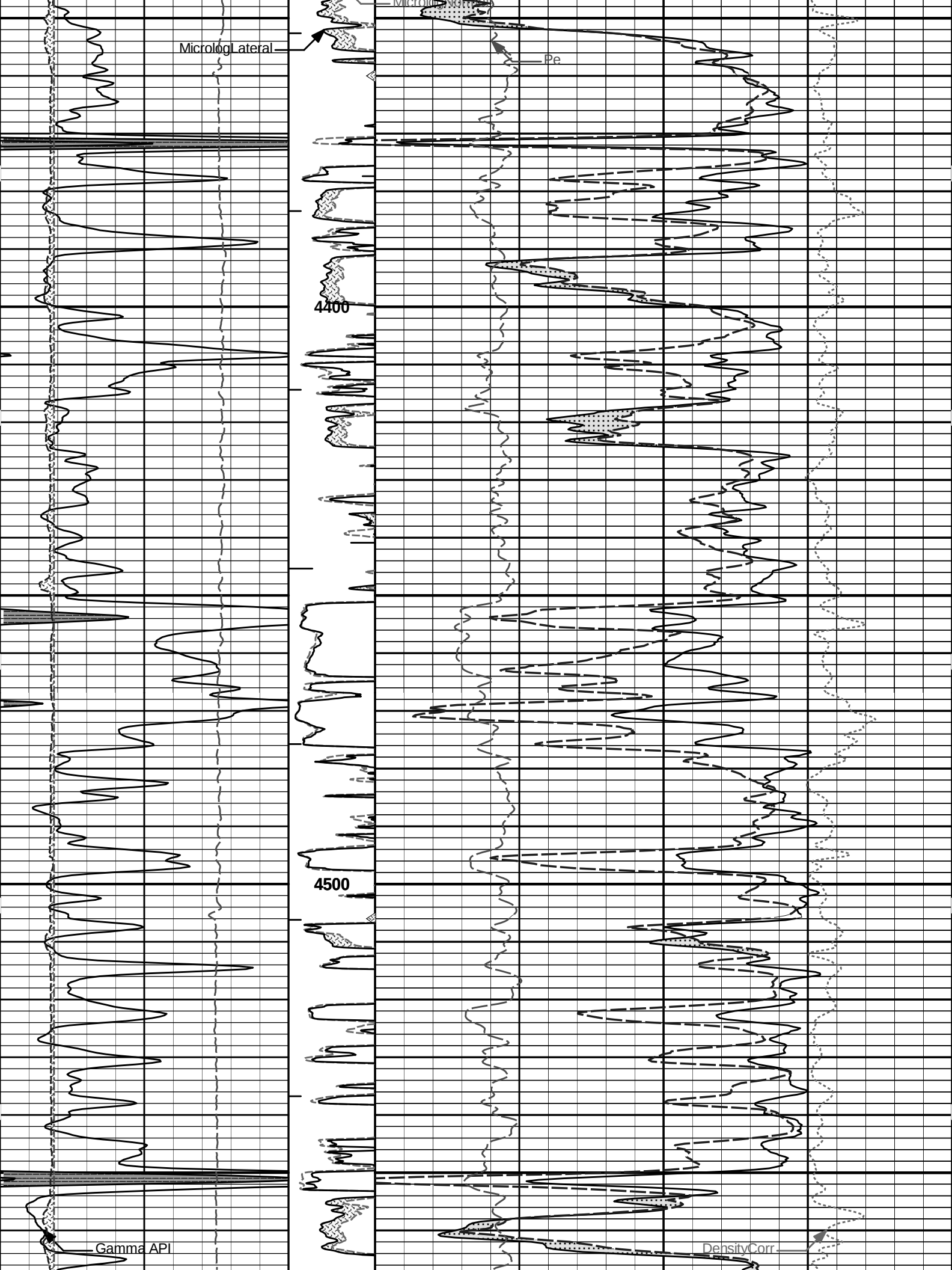


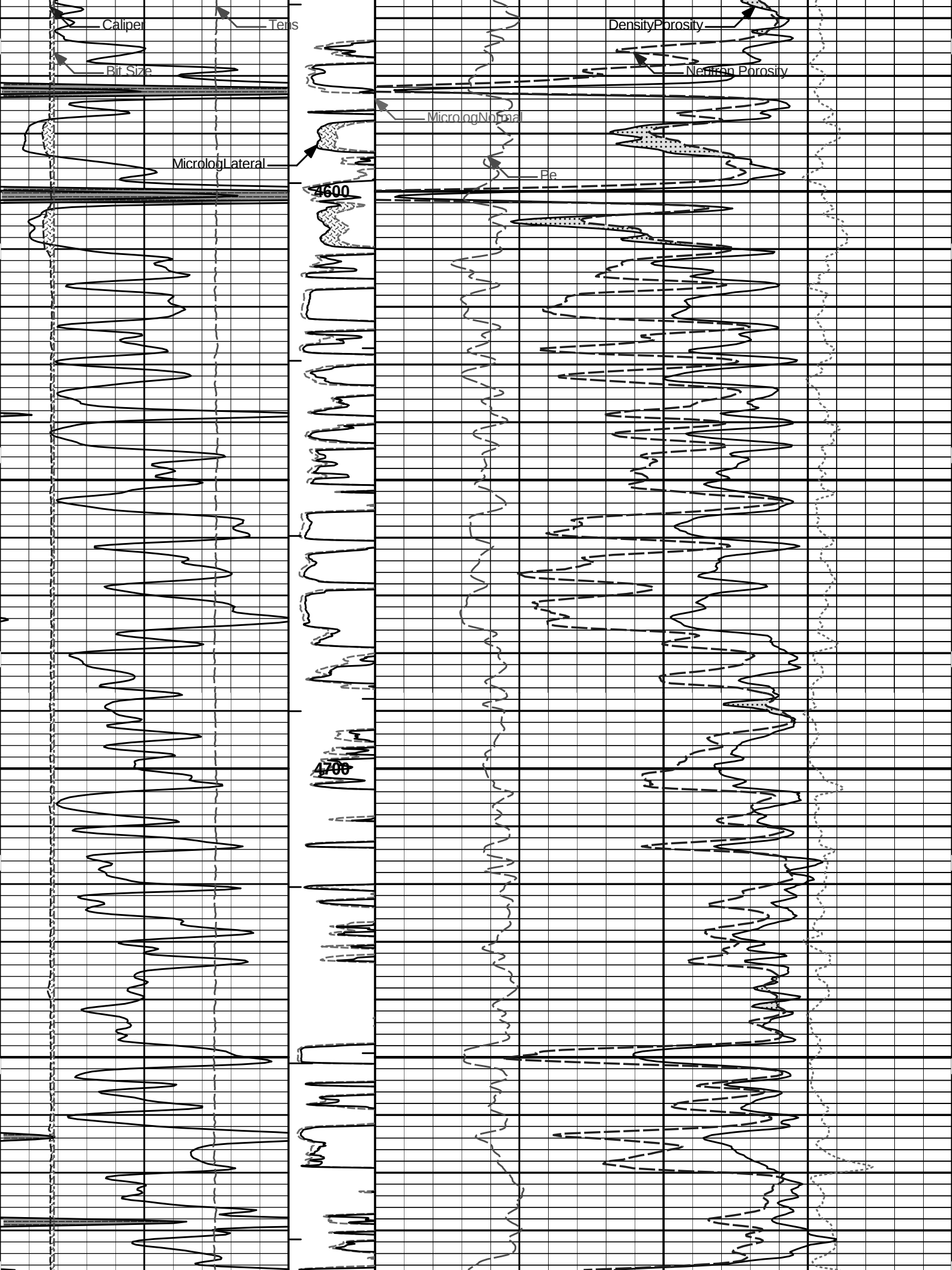


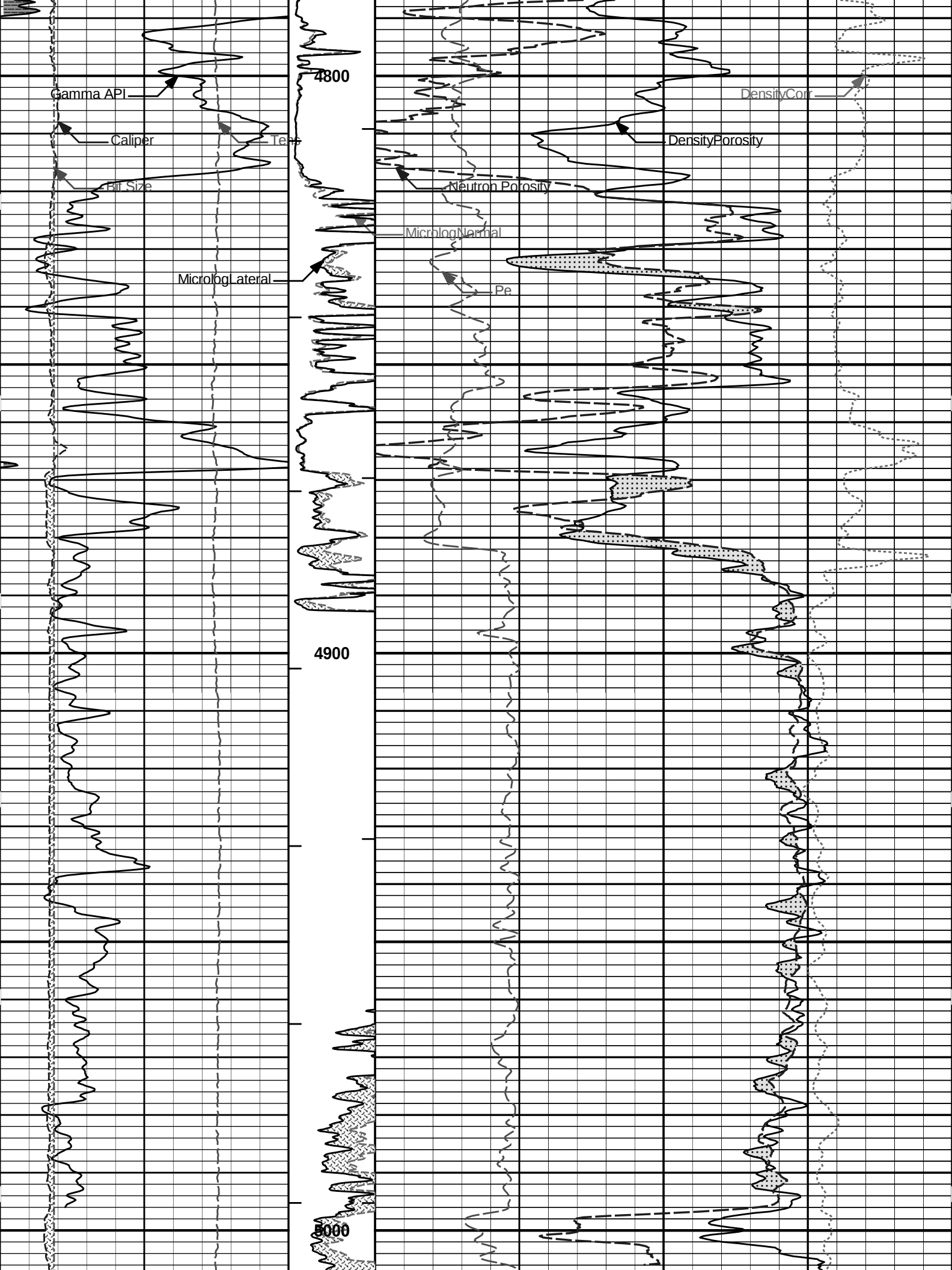


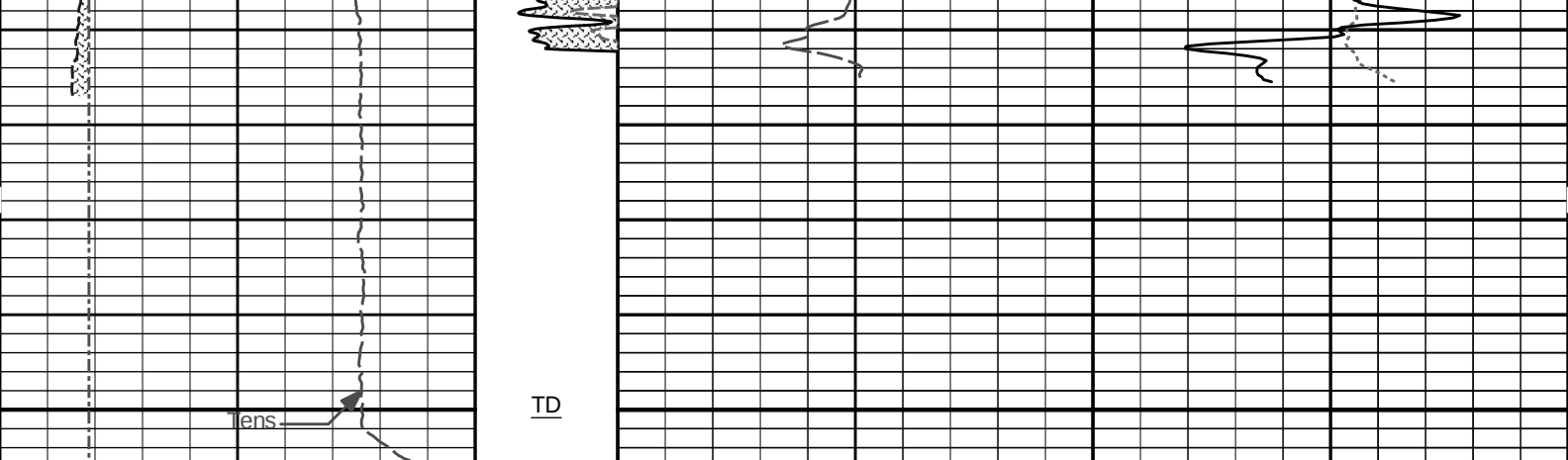












15K	Tens	0		0	Pe	10	-0.25	DensityCorr	0.25
	pounds		PERMEABLE					gram per cc	
0	Gamma API	150		30	DensityPorosity				-10
	api		1 : 240		%				
6	Caliper	16	ft	30	Neutron Porosity				-10
	inches		AHVT		%				
	SHALE		BHVT		CROSSOVER				
6	Bit Size	16	Tension Pull						
	inches		MicrologNormal						
	MUDCAKE		0 20						
			ohm-metre						
			MicrologLateral						
			0 20						
			ohm-metre						

HALLIBURTON

Plot Time: 11-Jun-11 02:31:36
Plot Range: 2350 ft to 5055.58 ft
Data: BROOKOVER_4_4IWELL Based*
Plot File: \\POROMLIEOG_POROML_5_MAIN_IQ

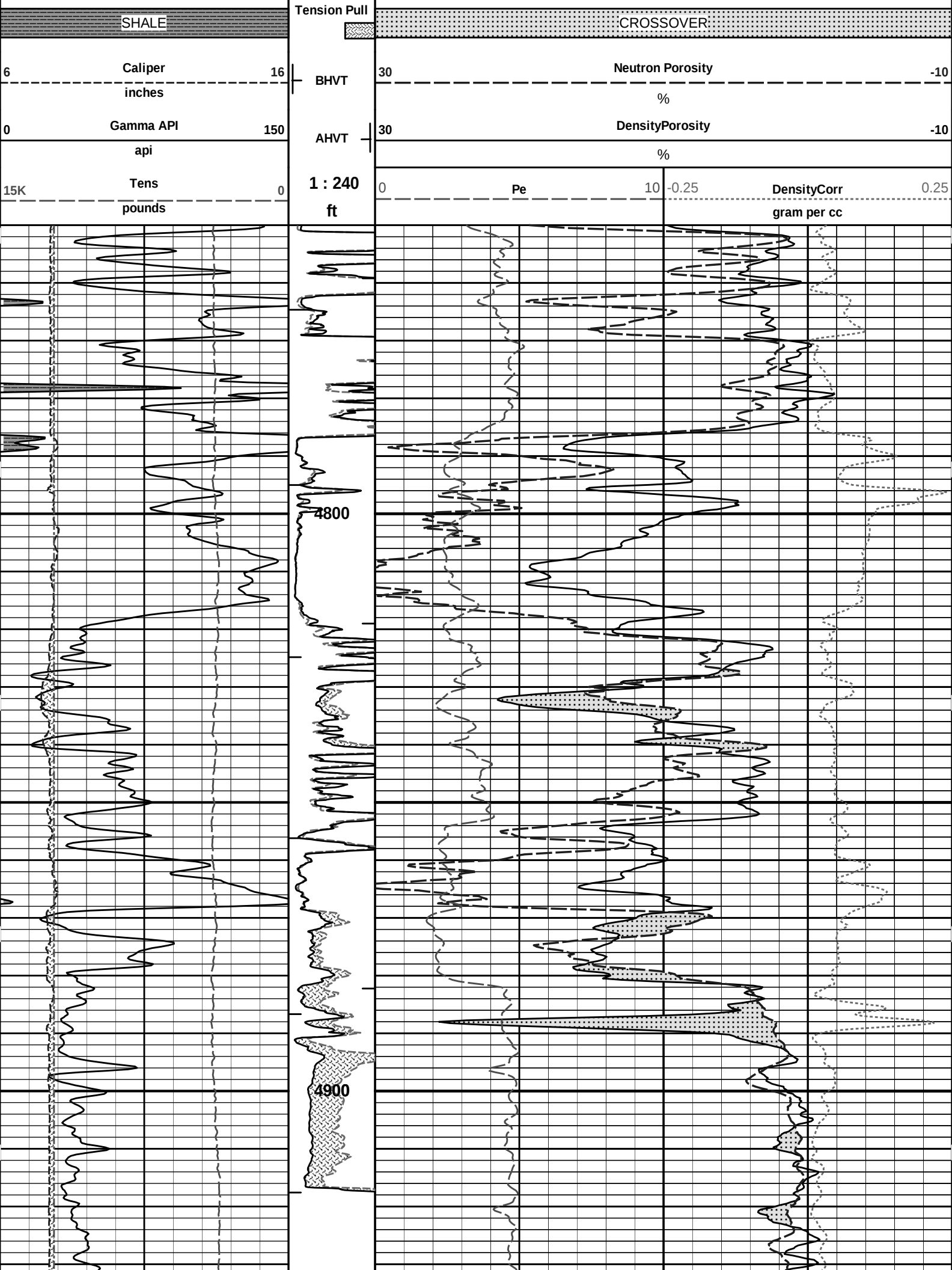
5 INCH MAIN LOG

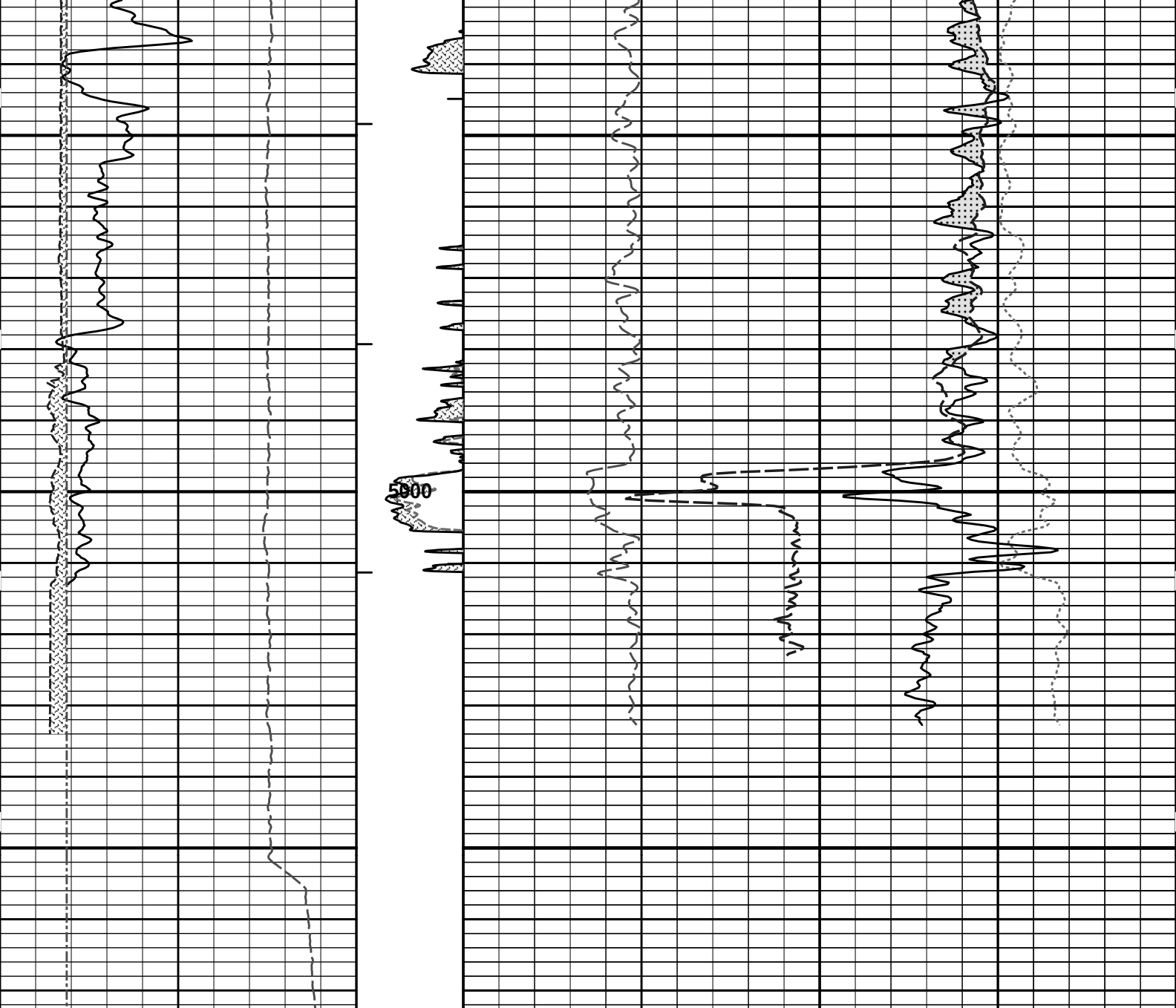
HALLIBURTON

Plot Time: 11-Jun-11 02:31:36
Plot Range: 4750 ft to 5072.75 ft
Data: BROOKOVER_4_4IWELL Based*
Plot File: \\POROMLIEOG_POROML_5_REPEAT_IQ

5 INCH REPEAT

			PERMEABLE	
	MUDCAKE		MicrologLateral	
			0 20	
			ohm-metre	
6	Bit Size	16	MicrologNormal	
	inches		0 20	
			ohm-metre	





15K	Tens	0	1 : 240	0	Pe	10	-0.25	DensityCorr	0.25
	pounds		ft					gram per cc	
0	Gamma API	150	AHVT	30	DensityPorosity				
	api				%				
6	Caliper	16	BHVT	30	Neutron Porosity				
	inches				%				
	SHALE		Tension Pull		CROSSOVER				
6	Bit Size	16	MicrologNormal	0					
	inches		ohm-metre	20					
	MUDCAKE		MicrologLateral	0					
			ohm-metre	20					
			PERMEABLE						

5 INCH REPEAT

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS-CH_696 37.50 lbs		Ø 2.750 in →		← Temperature @ 71.31 ft	3.03 ft	72.34 ft
XOHD-TRK696 20.00 lbs		Ø 2.750 in → Ø 3.625 in →			0.95 ft	69.31 ft
SP Sub-PROT01 60.00 lbs		Ø 3.625 in →		← SP @ 66.59 ft	3.74 ft	68.36 ft
GTET-11050378 165.00 lbs		Ø 3.625 in →			8.52 ft	64.63 ft
				← GammaRay @ 58.56 ft		
						56.10 ft
DSN Decentralizer- 10755066 6.60 lbs	DSN Decentralizer- 10755066 6.60 lbs	Ø 3.625 in* → Ø 3.625 in →			9.69 ft	
DSNT-11055304 174.00 lbs				← DSN Far @ 49.17 ft ← DSN Near @ 48.42 ft		46.42 ft
SDLT-I04_P84 360.00 lbs		Ø 4.500 in → Ø 4.750 in →		SDL Microlog @ 38.60 ft SDL Caliper @ 38.42 ft SDL @ 38.41 ft	10.81 ft	
						35.60 ft

BSAT-10747684
300.00 lbs

Ø 3.625 in →

← Sonic Receivers @ 27.09 ft

15.77 ft

19.83 ft

ACRt-I962_S909
250.00 lbs

Ø 3.625 in →

← Mud Resistivity @ 13.44 ft

19.25 ft

← ACRt @ 9.46 ft

Cabbage Head-
TRK696
5.00 lbs

Ø 3.625 in →
Ø 6.000 in →

0.58 ft

0.58 ft

0.00 ft

Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell		CH_696	37.50	3.03	69.31	300.00
XOHD	Hostile to Dits Cross Over		TRK696	20.00	0.95	68.36	300.00
SP	SP Sub		PROT01	60.00	3.74	64.63	300.00
GTET	Gamma Telemetry Tool		11050378	165.00	8.52	56.10	60.00
DSNT	Dual Spaced Neutron		11055304	174.00	9.69	46.42	60.00
DCNT	DSN Decentralizer		10755066	6.60	5.13	* 49.75	300.00
SDLT	Spectral Density Tool		I04 P84	360.00	10.81	35.60	60.00
BSAT	Borehole Sonic Array Tool		10747684	300.00	15.77	19.83	60.00
ACRt	Array Compensated True Resistivity		I962 S909	250.00	19.25	0.58	300.00
CBHD	Cabbage Head		TRK696	5.00	0.58	0.00	300.00

Total 1,378.10 72.34

* Not included in Total Length and Length Accumulation.

Data: BROOKOVER_4_4I0001 SP-GTET-DSN-SDL-BSAT-ACRT-CHIDLE

Date: 10-Jun-11 19:47:46

HALLIBURTON

PARAMETERS REPORT

Depth	Tool Name	Mnemonic	Description	Weight (lbs)	Length (ft)
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(ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	DSNT	DNOK	Process DSN?	No	
	SDLT	DNOK	Process Density?	No	
	SDLT	MLOK	Process MicroLog Outputs?	No	
2340.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	8.900	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	1.400	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5050.00	ft
	SHARED	BHT	Bottom Hole Temperature	130.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GRSO	Gamma Tool Standoff	0.000	in
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position	Centered	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
	DSNT	DNTP	Temperature Correction Type	None	
	DSNT	DPRS	DSN Pressure Correction Type	None	
	DSNT	SHCO	View More Correction Options	No	
	DSNT	UTVD	Use TVD for Gradient Corrections?	No	
	DSNT	LHWT	Logging Horizontal Water Tank?	No	
	SDLT	DNOK	Process Density?	Yes	
	SDLT	DNOK	Process Density EVR?	No	
	SDLT	CB	Logging Calibration Blocks?	No	
	SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
	SDLT	DTWN	Disable temperature warning	No	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
	SDLT	DFL	Formation Density Fluid	1.000	g/cc
	SDLT	CLOK	Process Caliper Outputs?	Yes	
	SDLT	MLOK	Process MicroLog Outputs?	Yes	
	BSAT	MBOK	Compute BCAS Results?	Yes	
	BSAT	FLLO	Frequency Filter Low Pass Value?	7000	Hz
	BSAT	FLHI	Frequency Filter High Pass Value?	27000	Hz
	BSAT	DTFL	Delta -T Fluid	189.00	uspf
	BSAT	DTMT	Delta -T Matrix Type	User define	
	BSAT	DTMA	Delta -T Matrix	47.60	uspf
	BSAT	DTSH	Delta -T Shale	100.00	uspf
	BSAT	SPEQ	Acoustic Porosity Equation	Wylie	

ACRt	RTOK	Process ACRt?	Yes	
ACRt	MNSO	Minimum Tool Standoff	1.50	in
ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt	TPOS	Tool Position	Free Hanging	
ACRt	RMOP	Rmud Source	Mud Cell	
ACRt	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt	THQY	Threshold Quality	0.50	
BOTTOM				
Data: BROOKOVER_4_40001 SP-GTET-DSN-SDL-BSAT-ACRT-CHIDLE				Date: 10-Jun-11 21:47:15

HALLIBURTON				
INPUTS, DELAYS AND FILTERS TABLE				
Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
CH_HOS				
DHTN	DownholeTension	0.00	BLK	0.000
SP Sub				
PLTC	Plot Control Mask	66.58	NO	
SP	Spontaneous Potential	66.58	BLK	1.250
SPR	Raw Spontaneous Potential	66.58	NO	
SPO	Spontaneous Potential Offset	66.58	NO	
GTET				
TPUL	Tension Pull	58.56	NO	
GR	Natural Gamma Ray API	58.56	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	58.56	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	58.56	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
DSNT				
TPUL	Tension Pull	48.32	NO	
RNDS	Near Detector Telemetry Counts	48.42	BLK	1.417
RFDS	Far Detector Telemetry Counts	49.17	TRI	0.583
DNTT	DSN Tool Temperature	48.42	NO	
DSNS	DSN Tool Status	48.32	NO	
ERND	Near Detector Telemetry Counts EVR	48.42	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	49.17	BLK	0.000
ENTM	DSN Tool Temperature EVR	48.42	NO	
SDLT				
TPUL	Tension Pull	38.41	NO	
NAB	Near Above	38.24	BLK	0.920
NHI	Near Cesium High	38.24	BLK	0.920
NLO	Near Cesium Low	38.24	BLK	0.920
NVA	Near Valley	38.24	BLK	0.920
NBA	Near Barite	38.24	BLK	0.920
NDE	Near Density	38.24	BLK	0.920
NPK	Near Peak	38.24	BLK	0.920

NLI	Near Lithology	38.24	BLK	0.920
NBAU	Near Barite Unfiltered	38.24	BLK	0.250
NLIU	Near Lithology Unfiltered	38.24	BLK	0.250
FAB	Far Above	38.58	BLK	0.250
FHI	Far Cesium High	38.58	BLK	0.250
FLO	Far Cesium Low	38.58	BLK	0.250
FVA	Far Valley	38.58	BLK	0.250
FBA	Far Barite	38.58	BLK	0.250
FDE	Far Density	38.58	BLK	0.250
FPK	Far Peak	38.58	BLK	0.250
FLI	Far Lithology	38.58	BLK	0.250
PTMP	Pad Temperature	38.42	BLK	0.920
NHV	Near Detector High Voltage	35.60	NO	
FHV	Far Detector High Voltage	35.60	NO	
ITMP	Instrument Temperature	35.60	NO	
DDHV	Detector High Voltage	35.60	NO	
TPUL	Tension Pull	38.42	NO	
PCAL	Pad Caliper	38.42	TRI	0.250
ACAL	Arm Caliper	38.42	TRI	0.250
TPUL	Tension Pull	38.60	NO	
MINV	Microlog Lateral	38.60	BLK	0.750
MNOR	Microlog Normal	38.60	BLK	0.750
BSAT				
TPUL	Tension Pull	27.09	NO	
STAT	Status	27.09	NO	
DLYT	Delay Time	27.09	NO	
SI	Sample Interval	27.09	NO	
TXRX	Raw Telemetry 10 Receivers	27.09	NO	
FRMC	Tool Frame Count	27.09	NO	
ACRt				
TPUL	Tension Pull	2.97	NO	
F1R1	ACRT 12KHz - 80in R value	9.22	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	9.22	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.72	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.72	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	5.22	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	5.22	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	4.22	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	4.22	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.72	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.72	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.47	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.47	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	9.22	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	9.22	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.72	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.72	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	5.22	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	5.22	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	4.22	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	4.22	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.72	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.72	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.47	BLK	0.000

F2X6	ACRT 36KHz - 6in X value	3.47	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	9.22	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	9.22	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.72	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.72	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	5.22	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	5.22	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	4.22	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	4.22	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.72	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.72	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.47	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.47	BLK	0.000
RMUD	Mud Resistivity	12.76	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	2.97	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.97	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.97	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.97	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.97	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.97	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.97	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.97	BLK	0.000
ITMP	Instrument Temperature	2.97	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.97	NO	
TIDV	Instrument Temperature Derivative	2.97	NO	
TUDV	Upper Temperature Derivative	2.97	NO	
TLDV	Lower Temperature Derivative	2.97	NO	
TRBD	Receiver Board Temperature	2.97	NO	
Data: BROOKOVER_4_4I0001 SP-GTET-DSN-SDL-BSAT-ACRT-CHIDLE				Date: 10-Jun-11 19:50:05

COMPANY	EOG RESOURCES		
WELL	BROOKOVER 4 #4		
FIELD	BROOKOVER		
COUNTY	FINNEY	STATE	KANSAS
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON MICROLOG	