

HALLIBURTON

BOREHOLE COMPENSATED SONIC ARRAY LOG

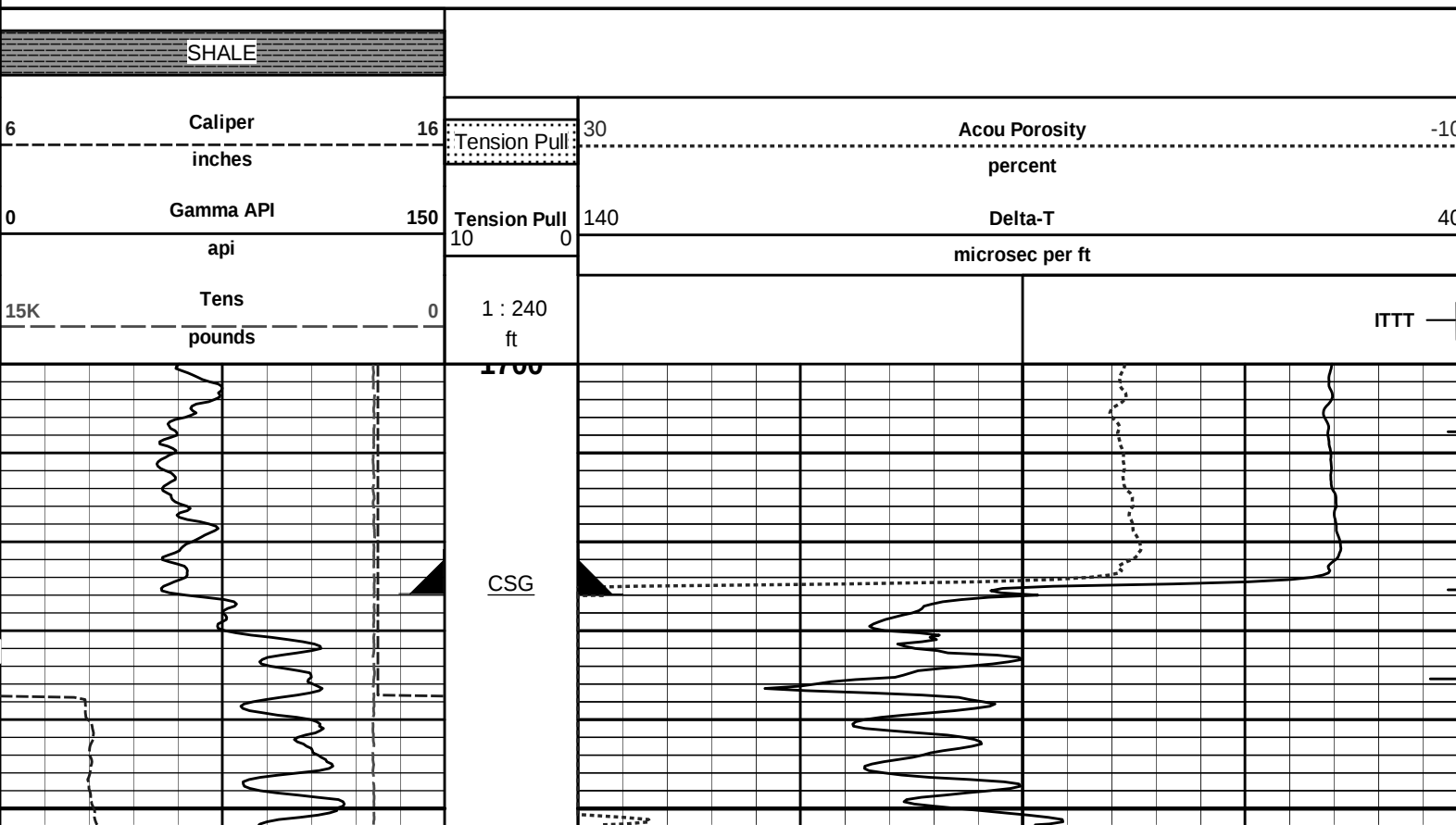
HALLIBURTON										BOREHOLE COMPENSATED SONIC ARRAY LOG				
COMPANY					EOG RESOURCES									
WELL					OBRATE 33 #1									
FIELD					NW SUBLETTE									
COUNTY					HASKELL									
STATE					KANSAS									
Permanent Datum					GL					Elev. 2986.0 ft				
Log measured from					KB					D.F. 2997.0 ft				
Drilling measured from					KB					G.L. 2986.0 ft				
Date					24-May-11									
Run No.					1									
Depth - Driller					5756.00 ft									
Depth - Logger					5756.0 ft									
Bottom - Logged Interval					5729.0 ft									
Top - Logged Interval					1726.0 ft									
Casing - Driller					8.625 in @ 1729.0 ft					@				
Casing - Logger					1726.0 ft									
Bit Size					7.875 in					@				
Type Fluid in Hole					WATER BASED MUD									
Density					8.9 ppg					60.00 s/qt				
PH					10.00 pH					8.0 cp/m				
Source of Sample					FLOW LINE									
Rm @ Meas. Temperature					1.310 ohmm @ 85.00 degF					@				
Rmf @ Meas. Temperature					1.11 ohmm @ 82.00 degF					@				
Rmc @ Meas. Temperature					1.590 ohmm @ 82.00 degF					@				
Source Rmf					MEAS					MEAS				
Rm @ BHT					0.82 ohmm @ 140.0 degF					@				
Time Since Circulation					5.0 hr									
Time on Bottom					24-May-11 10:33									
Max. Rec. Temperature					130.0 degF @ 5756.0 ft					@				
Equipment					1054696					LIBERAL				
Recorded By					J. BOSH									
Witnessed By					W. SHAFFER					M. KNOX				

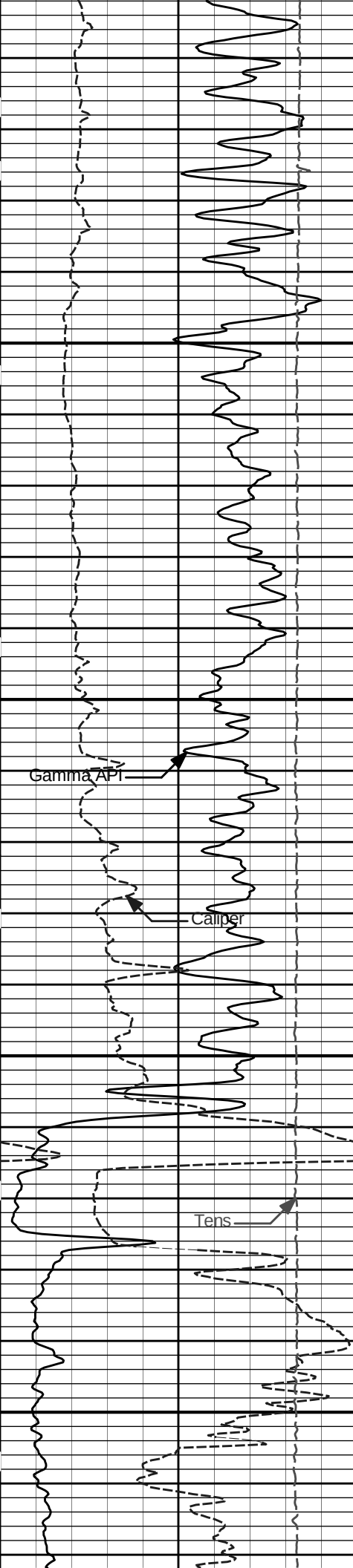
Service Ticket No.: 8167669						API Serial No.: 15-081-219360000						PGM Version: WL INSITE R3.2.0 (Build 7)																	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE												RESISTIVITY SCALE CHANGES																	
Date		Sample No.										Type Log		Depth		Scale Up Hole				Scale Down Hole									
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.				@				@																					
Rmc @ Meas. Temp.				@				@																					
Source Rmf		Rmc																											
Rm @ BHT				@				@																					
Rmf @ BHT				@				@																					
Rmc @ BHT				@				@																					
EQUIPMENT DATA																													
GAMMA						ACOUSTIC						DENSITY						NEUTRON											
Run No.		ONE				Run No.		ONE				Run No.						Run No.											
Serial No.		11050378				Serial No.		10747684				Serial No.						Serial No.											
Model No.		GTET				Model No.		BSAT				Model No.						Model No.											
Diameter		3.625				No. of Cent.		2				Diameter						Diameter											
Detector Model No.		T-102				Spacing		.5'				Log Type						Log Type											
Type		SCINT.										Source Type						Source Type											
Length		8"				LSA [Y/N]		Y				Serial No.						Serial No.											
Distance to Source		10'				FWDA [Y/N]		Y				Strength						Strength											

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	CSG	REC	0	150	30	-10	47.6											
DIRECTIONAL INFORMATION																			
Maximum Deviation @									KOP @										
Remarks: ANNULAR HOLE VOLUME 5.5 INCH CASING																			
CHLORIDES: 700 MG/L																			
GPS COORDINATES: LAT: 37.39 N LONG: 100.55 W																			
TODAY'S CREW: V. JAIME, K. KELLY																			
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.																			
HALLIBURTON																			

HALLIBURTON Plot Time: 24-May-11 14:53:13
 Plot Range: 1700 ft to 5761.67 ft
 Data: OBRATE_33_1\Well Based\DAQ-0001-003\
 Plot File: \\SONIC\IBSAT_5_MAIN_LIB

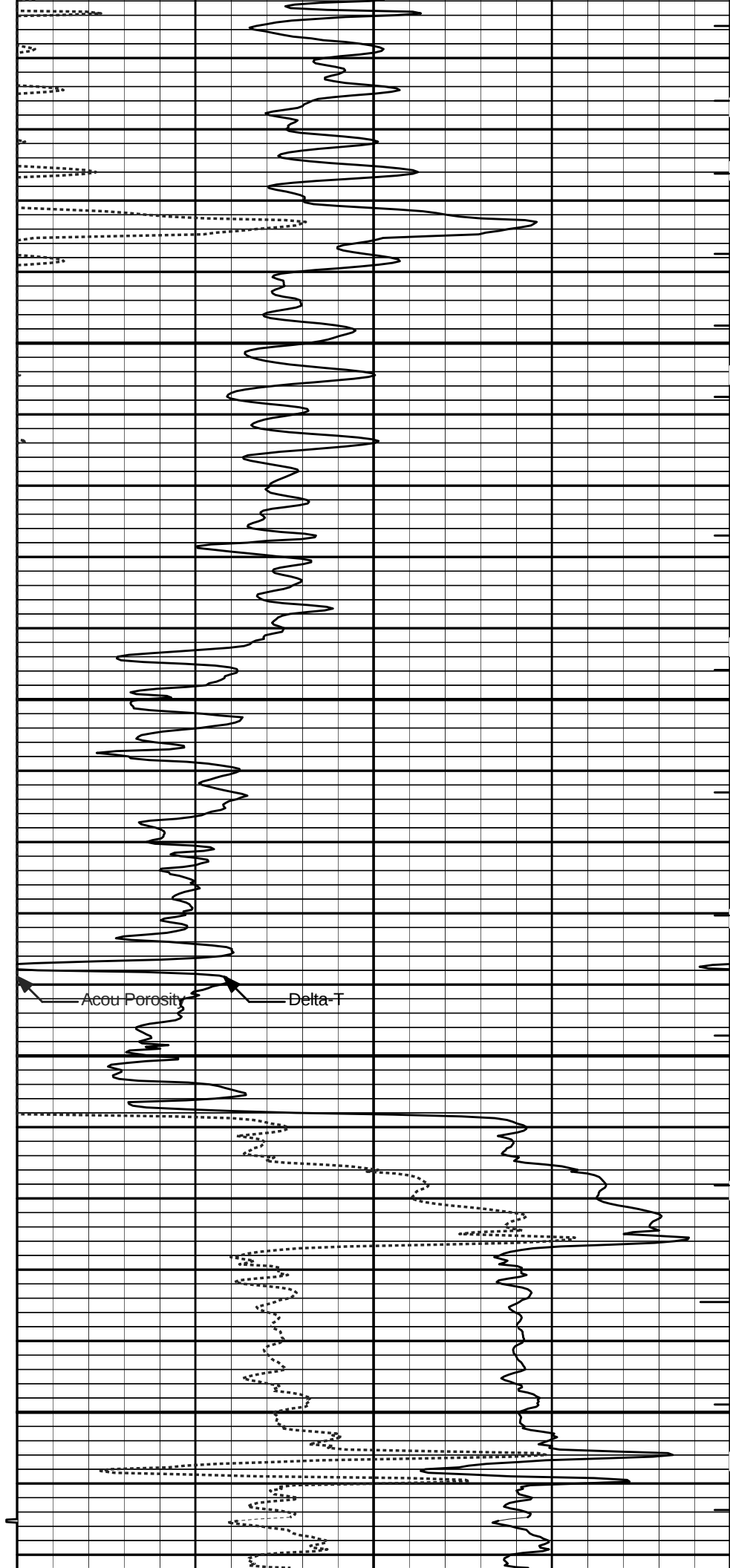
5 INCH MAIN LOG

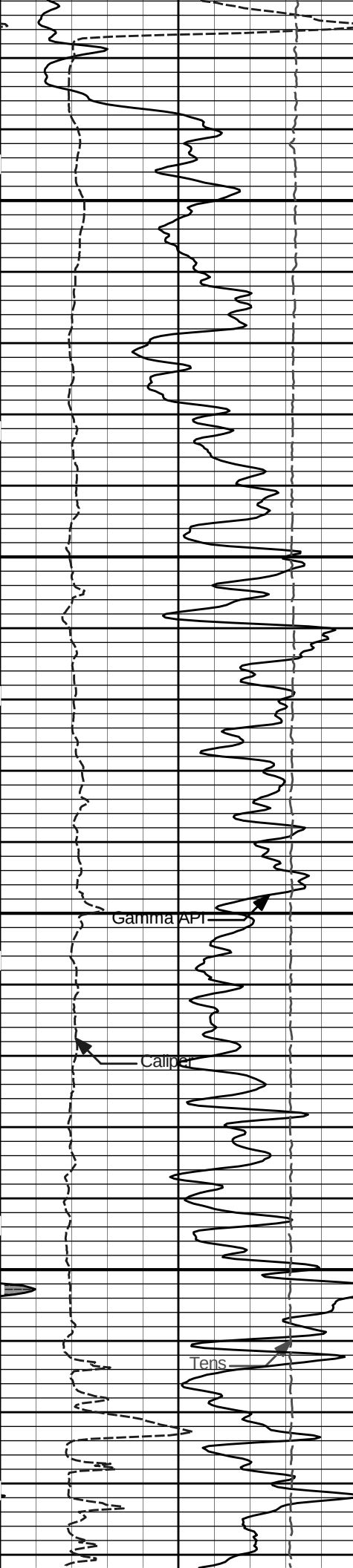




1800

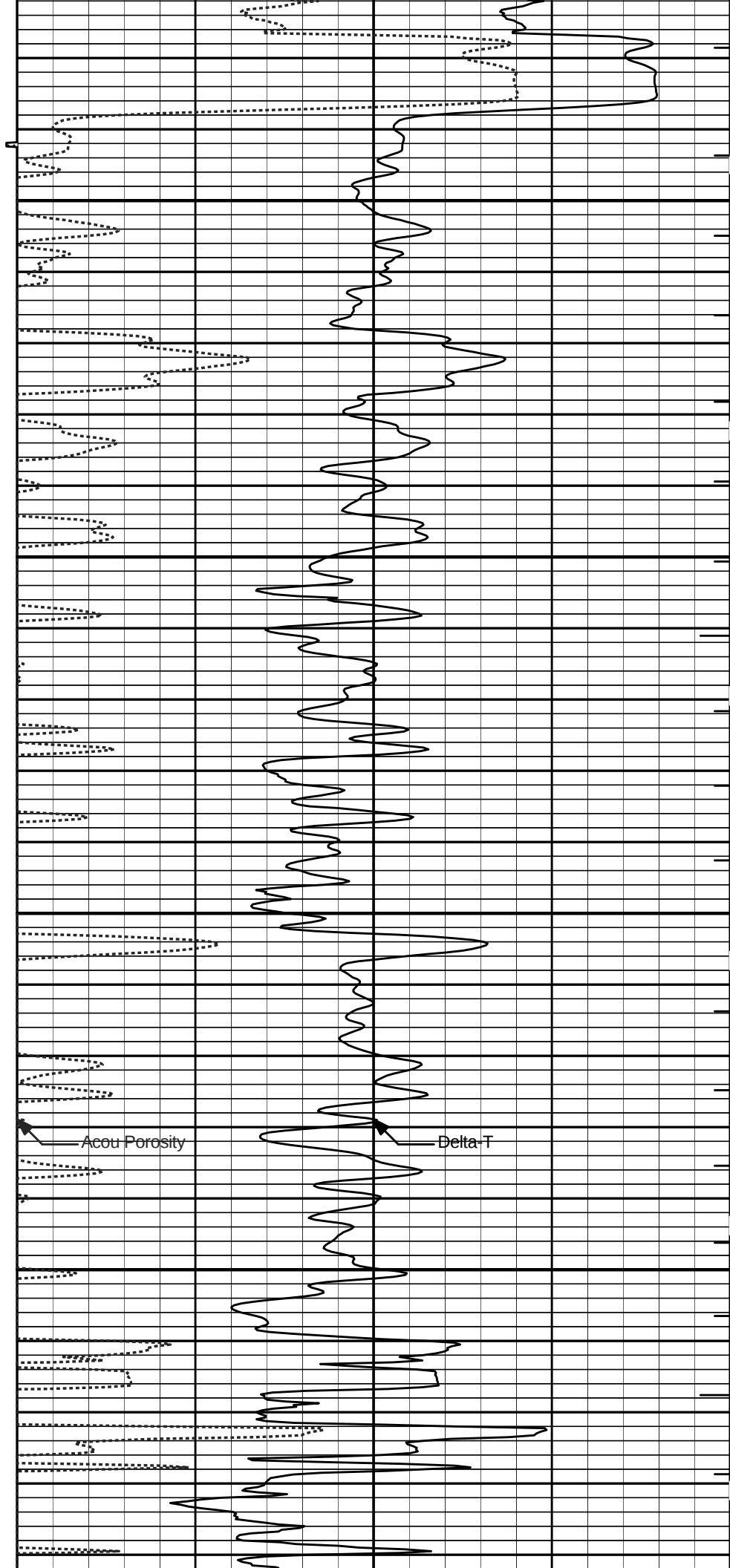
1900





2000

2100





2200

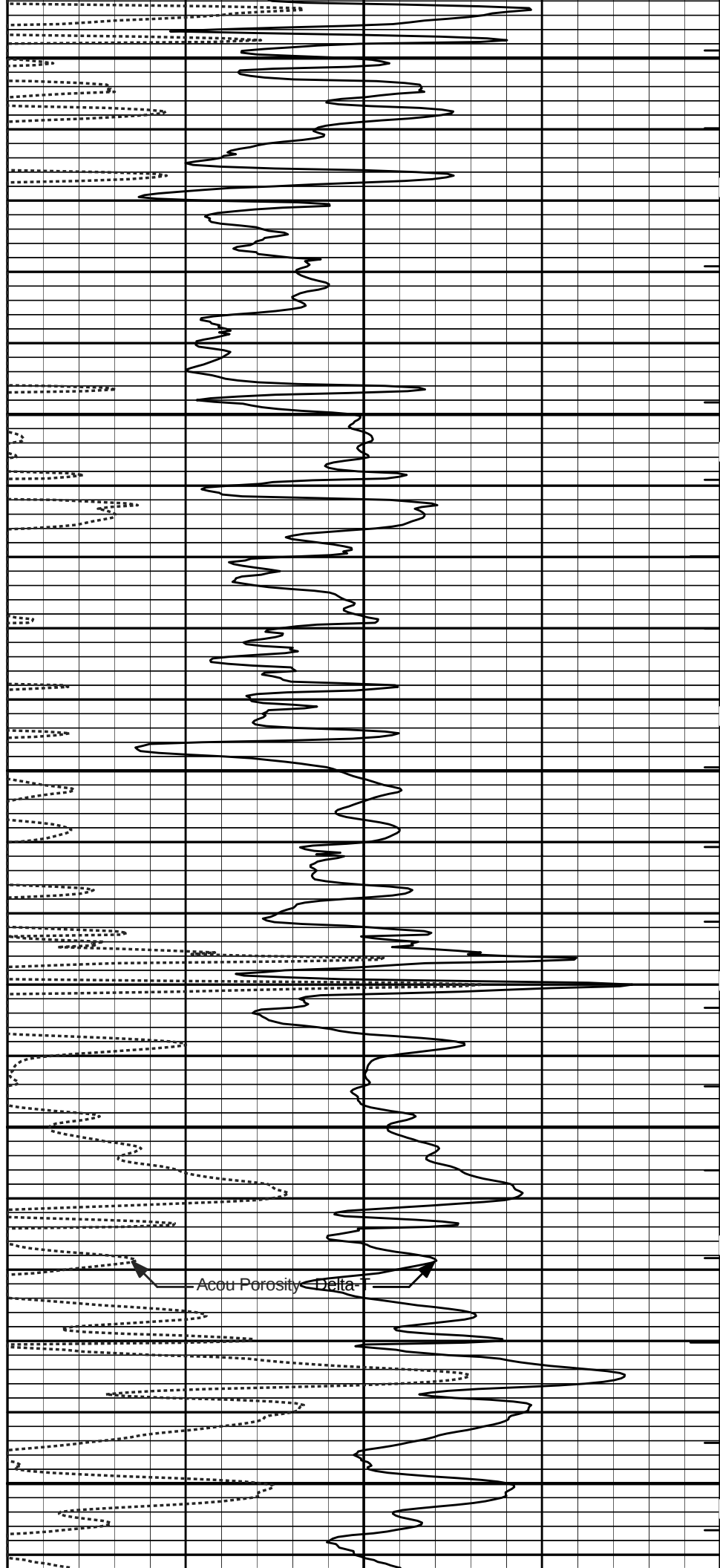
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2400

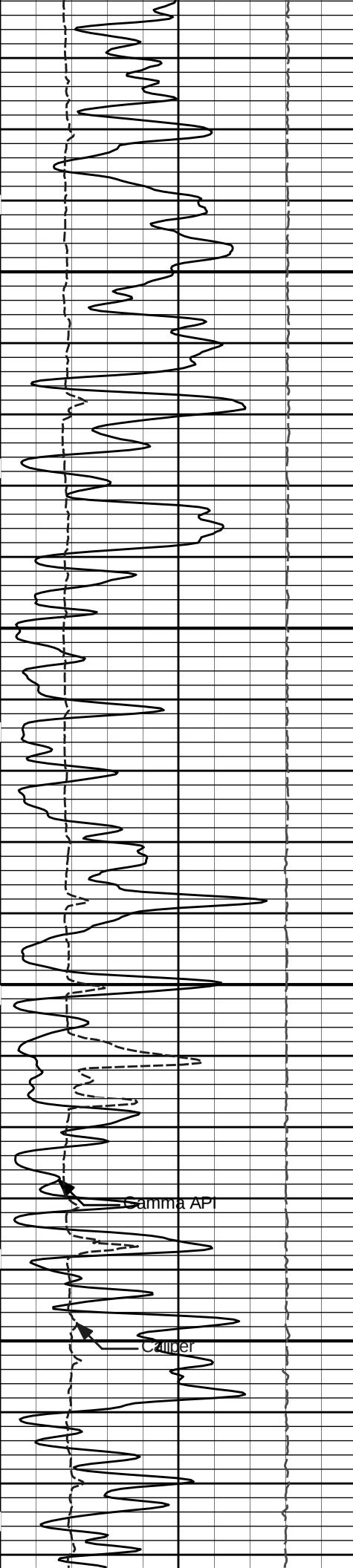
Gamma API

Caliper

Tens

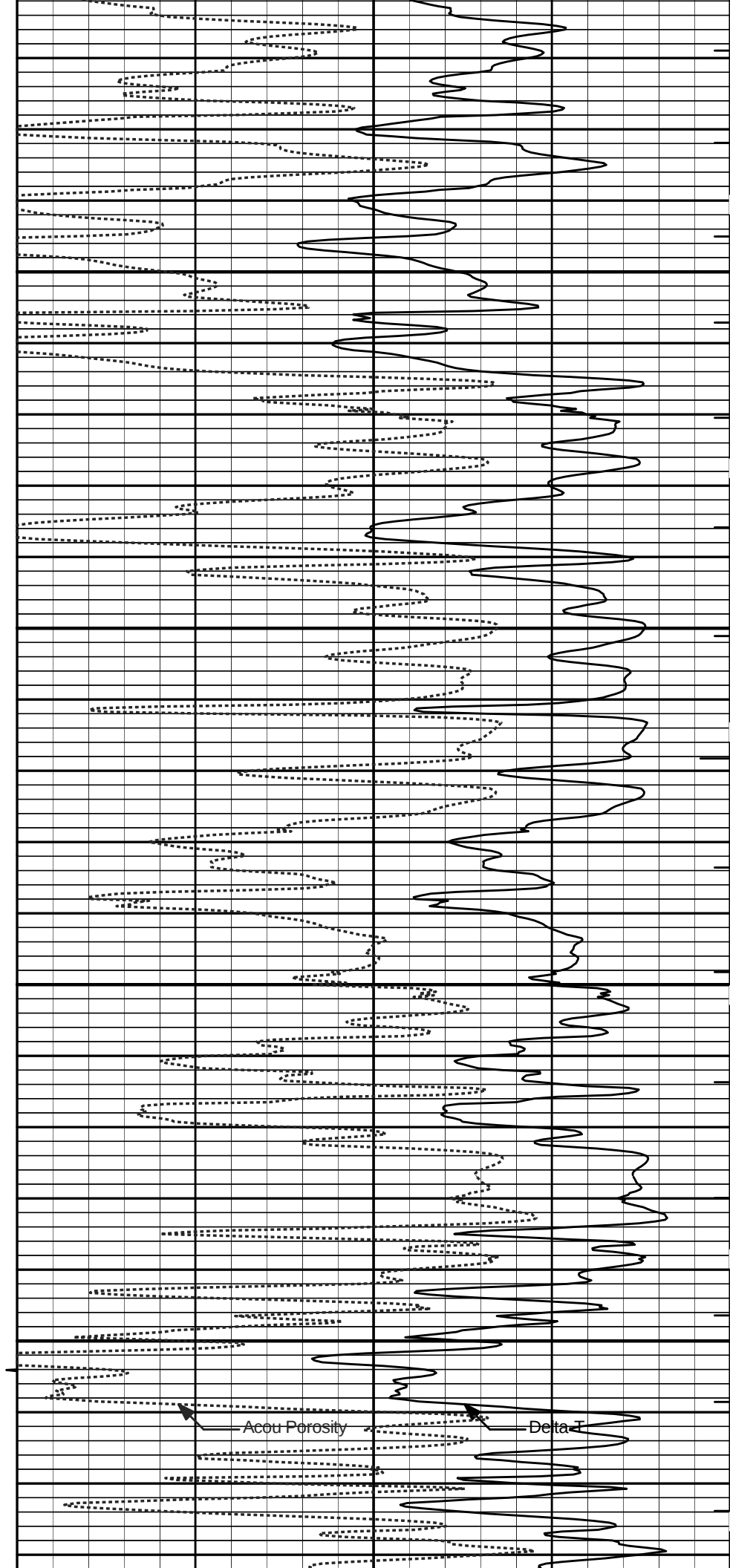


Acou Porosity Delta F



2500

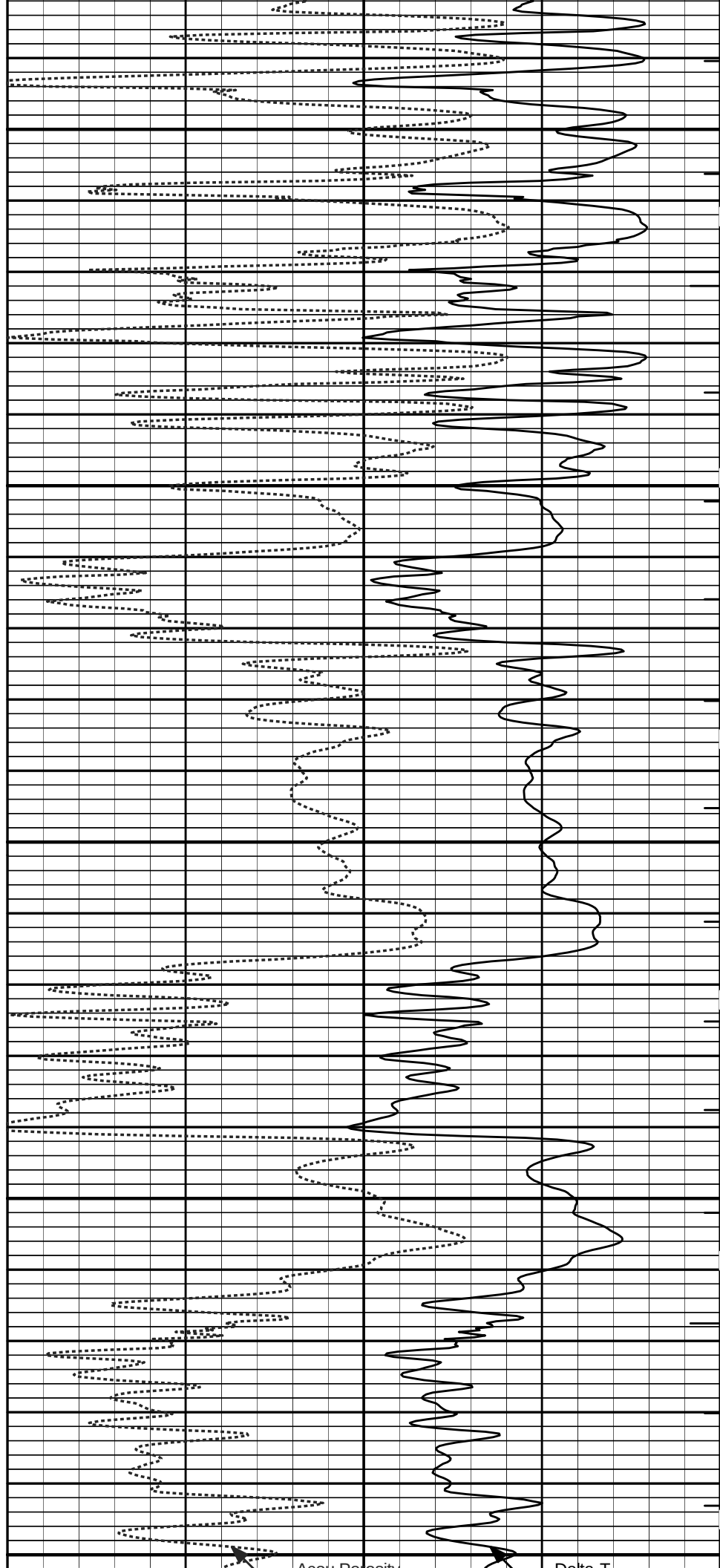
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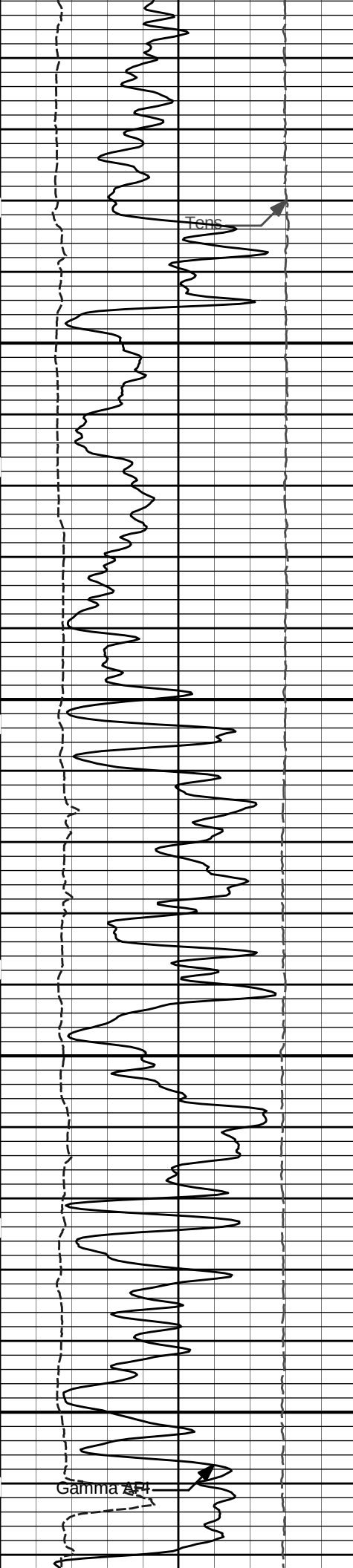




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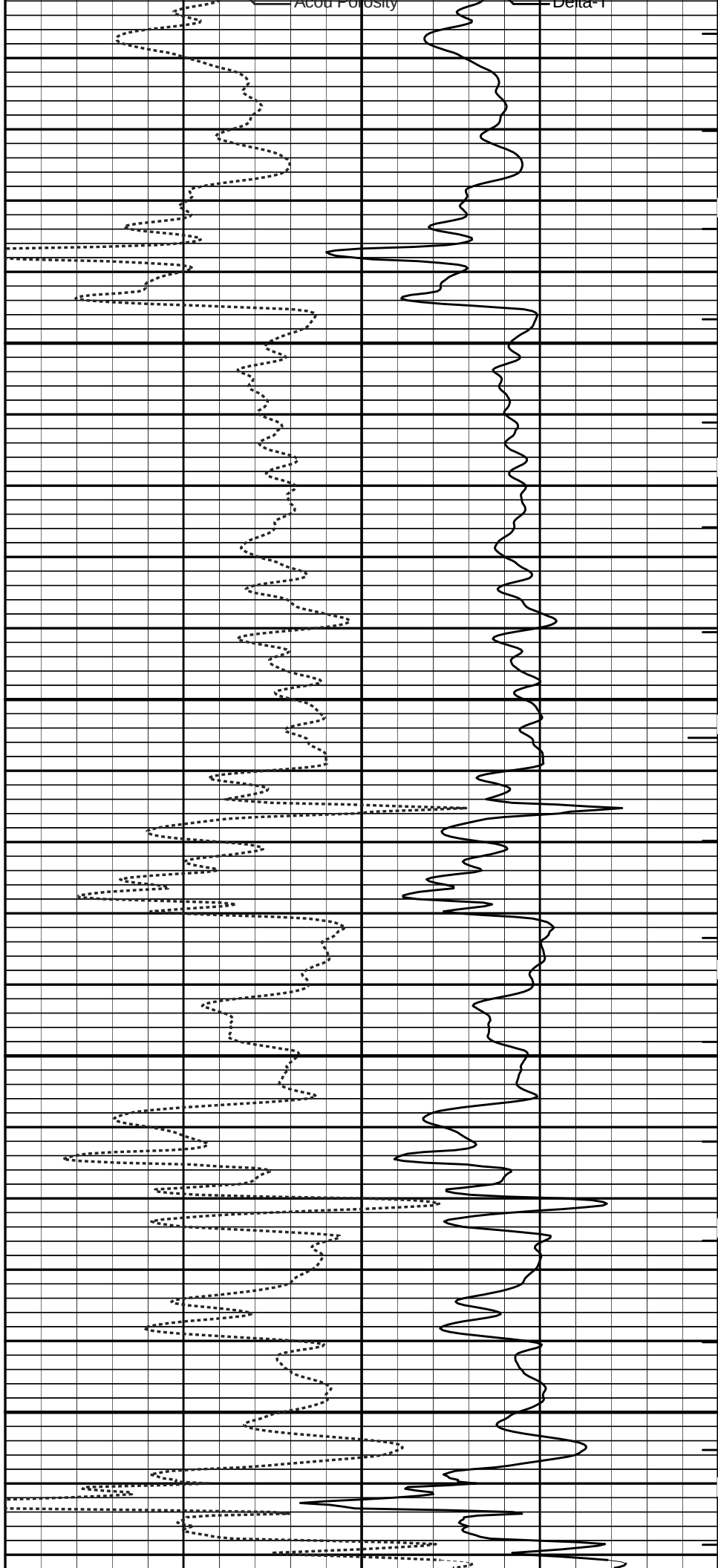
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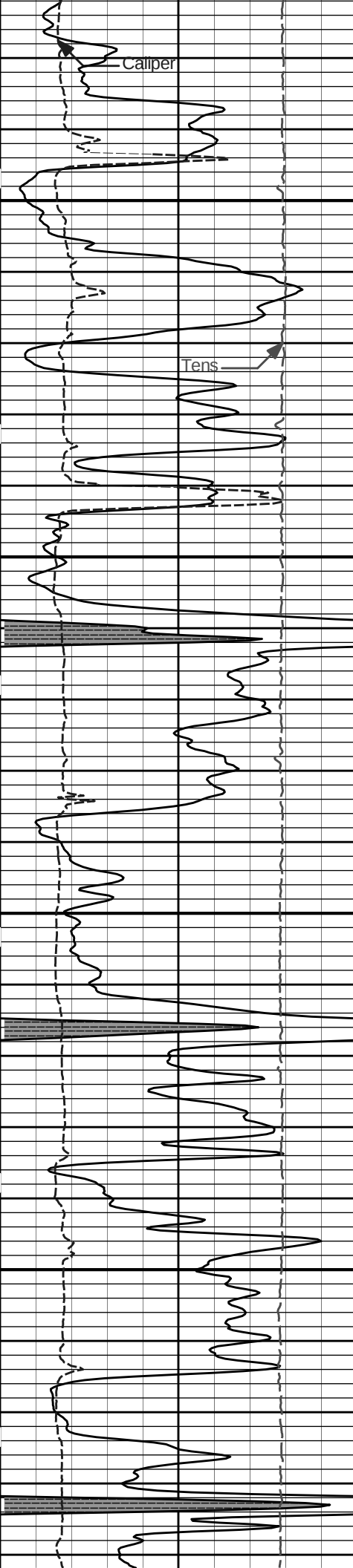




2900

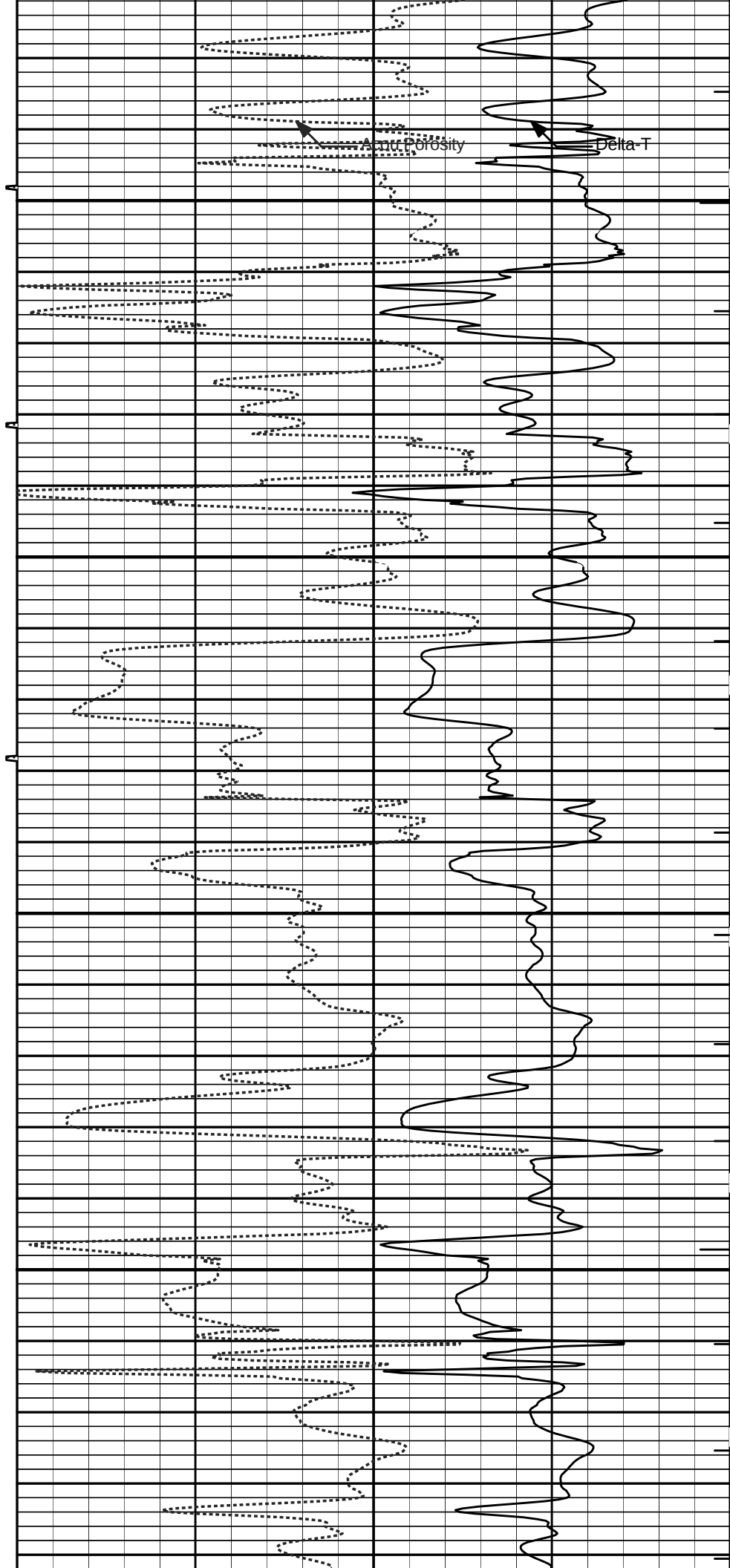
3000





3100

3200



3300

3400

3500

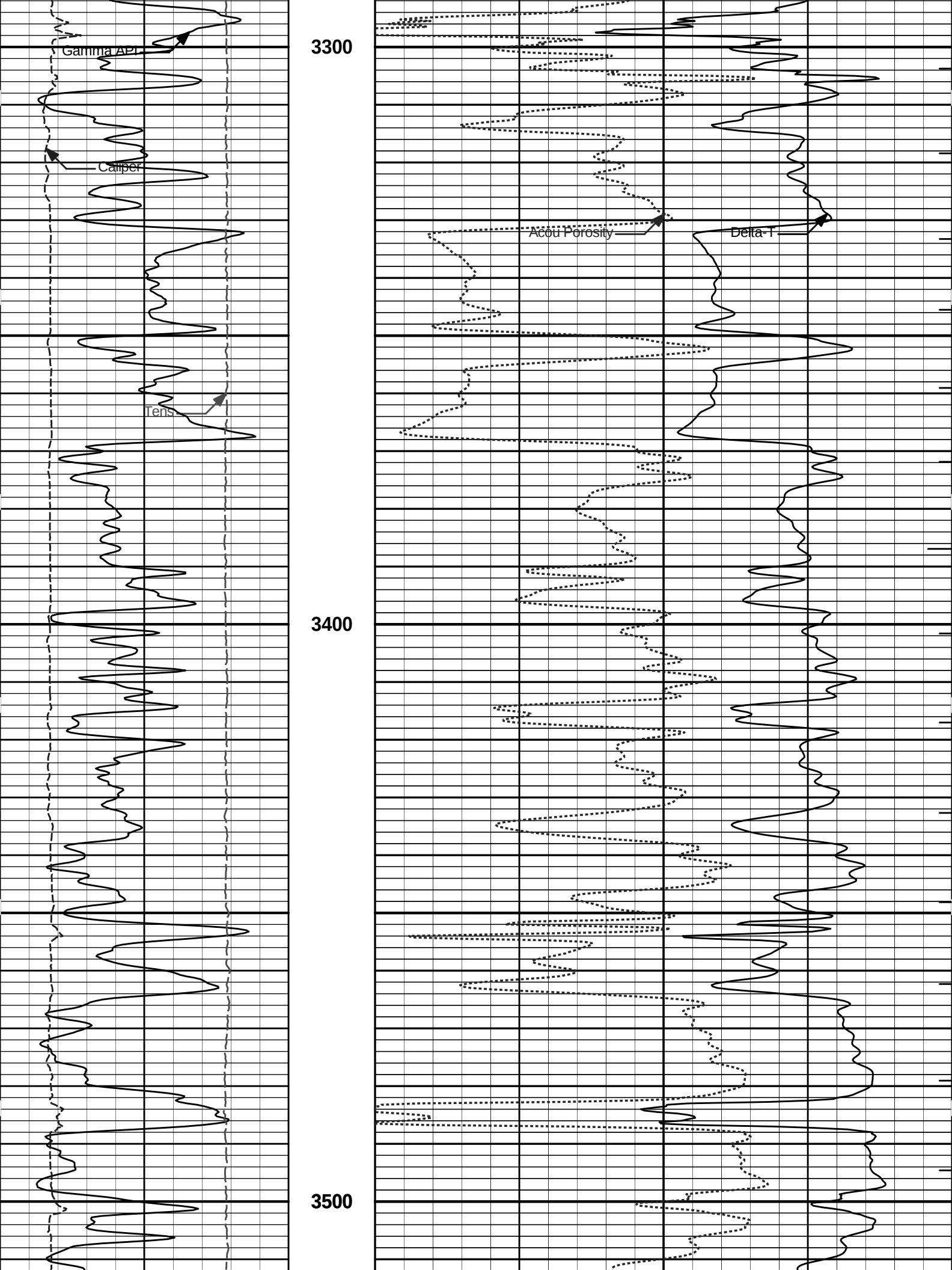
Gamma API

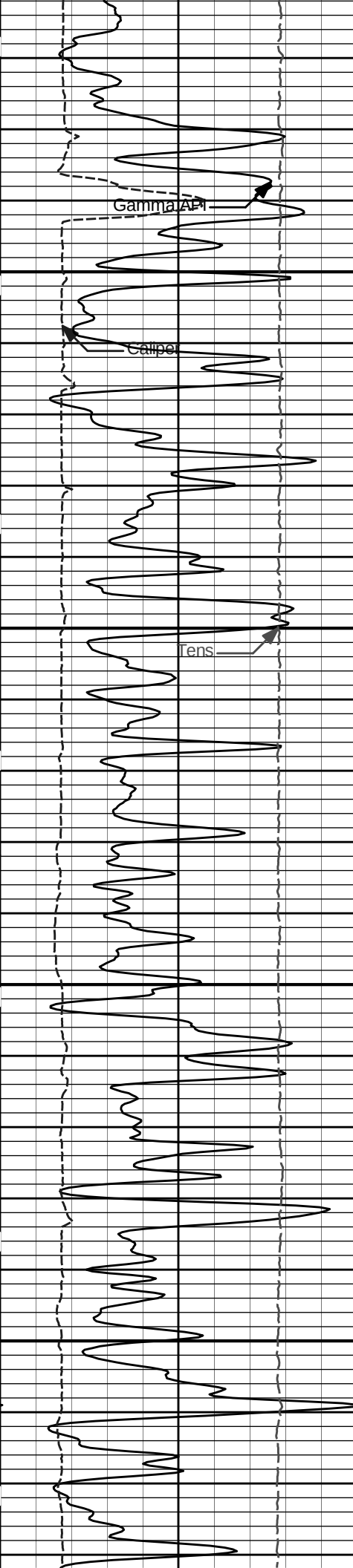
Caliper

Tens

Acou Porosity

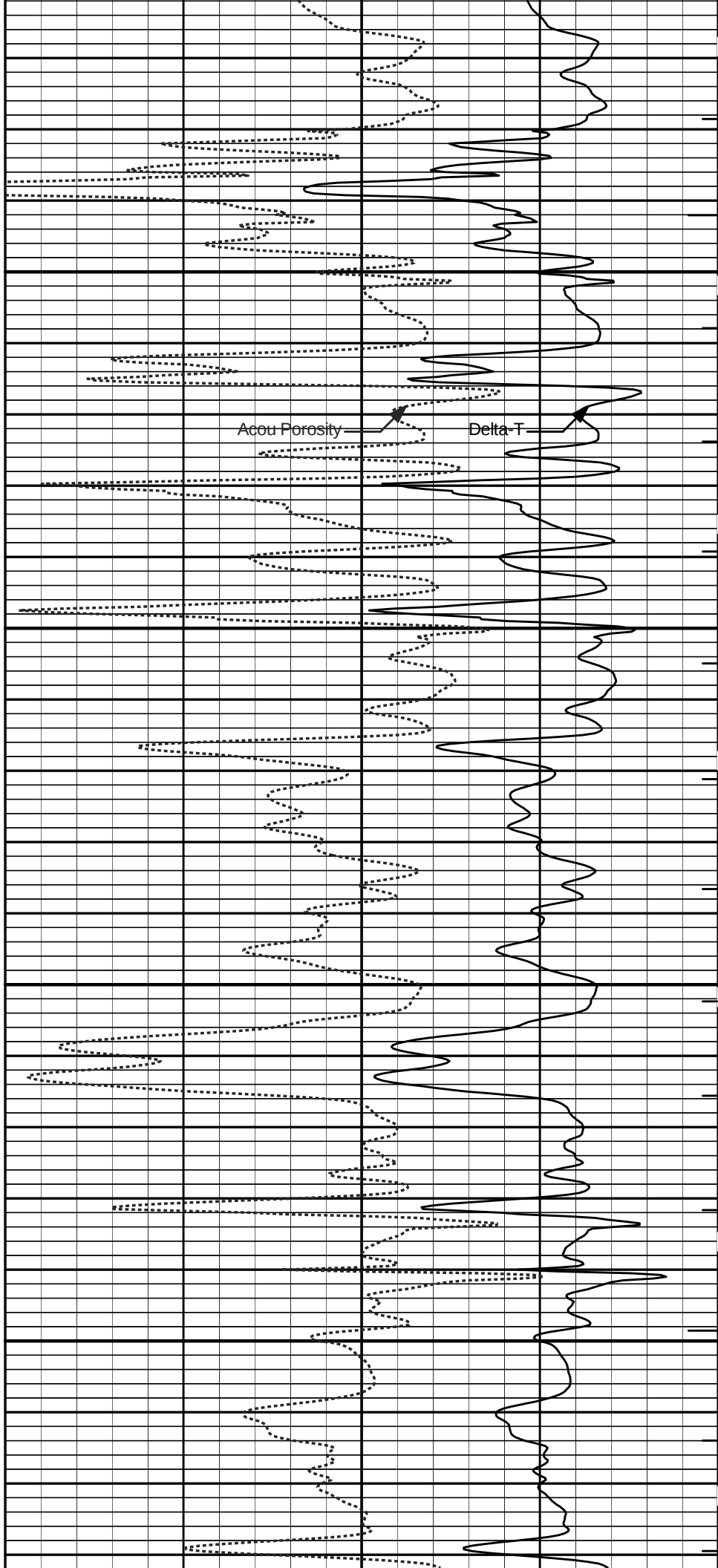
Delta T

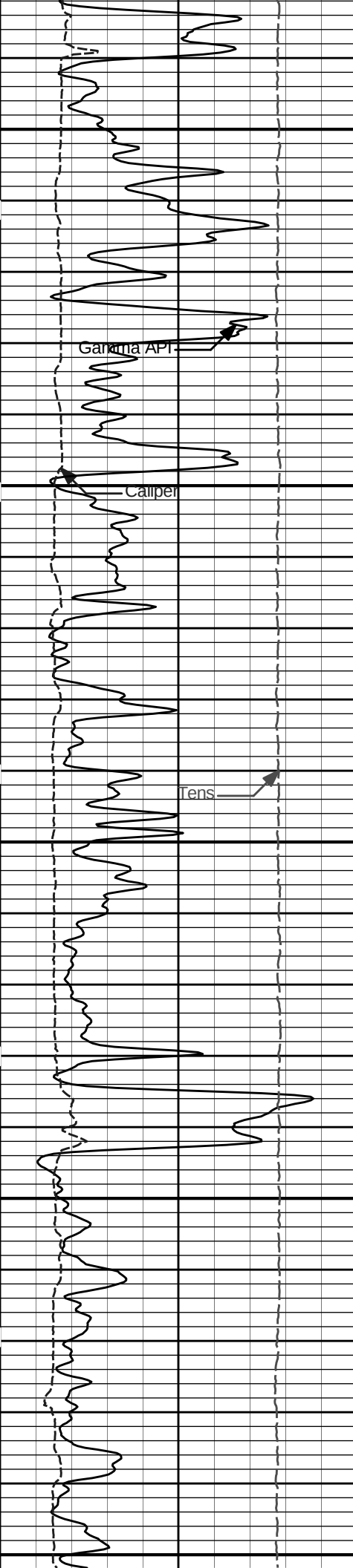




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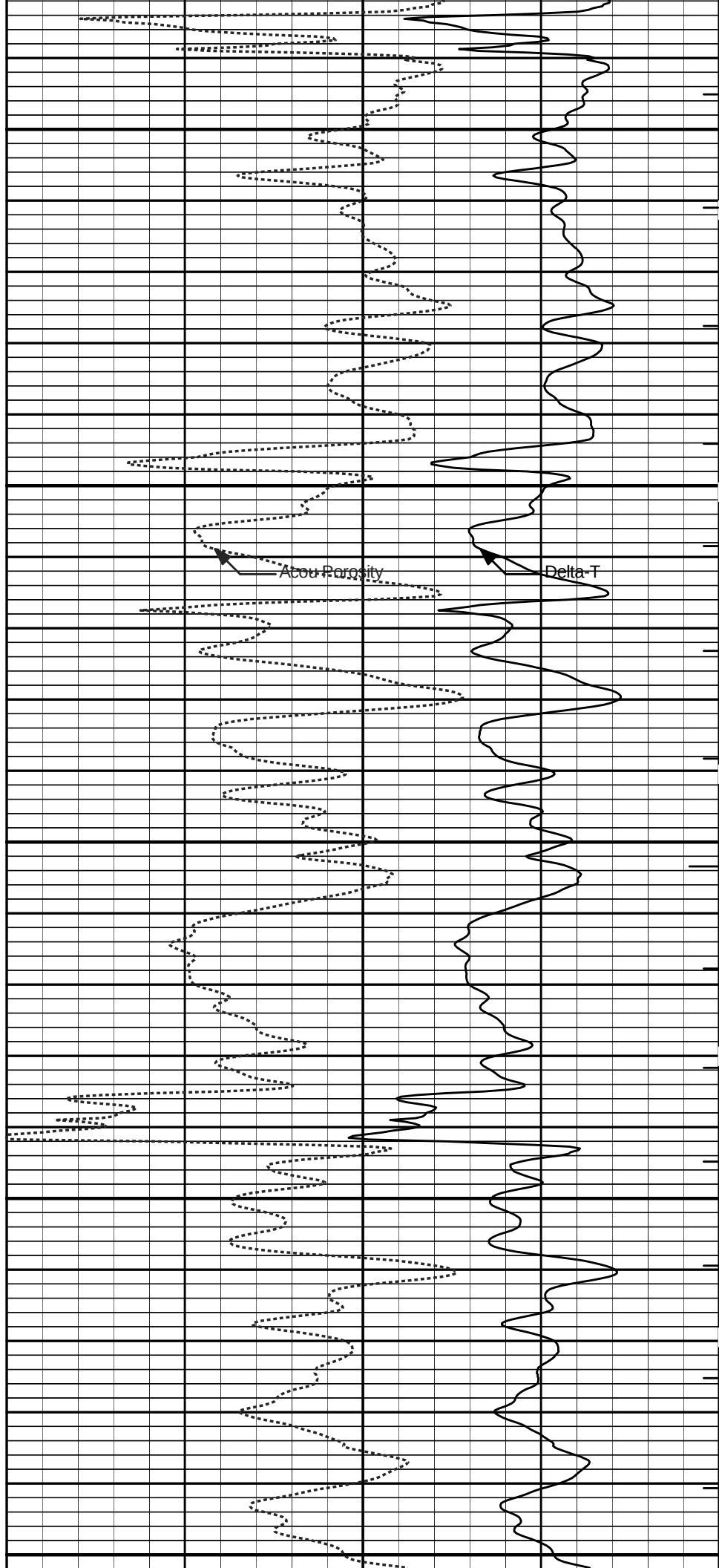
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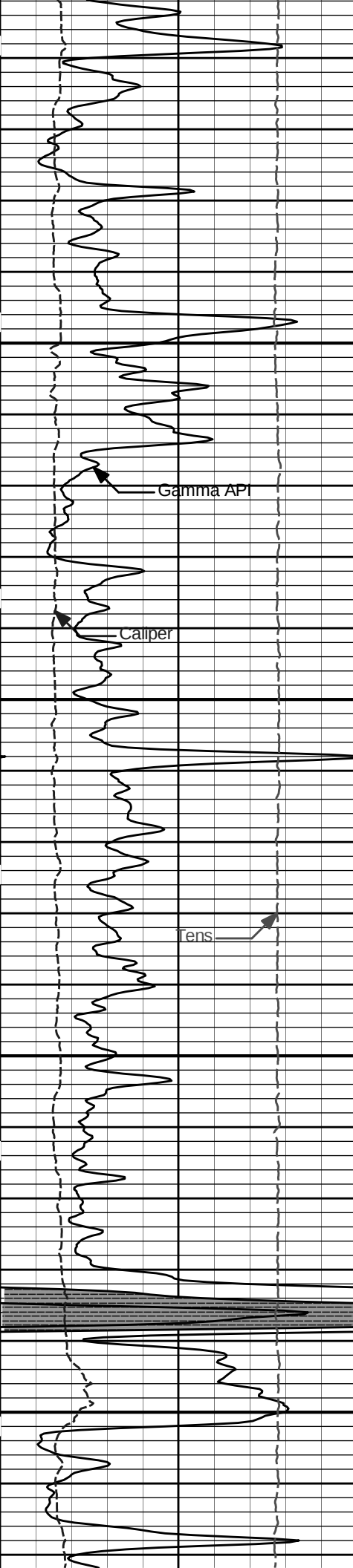




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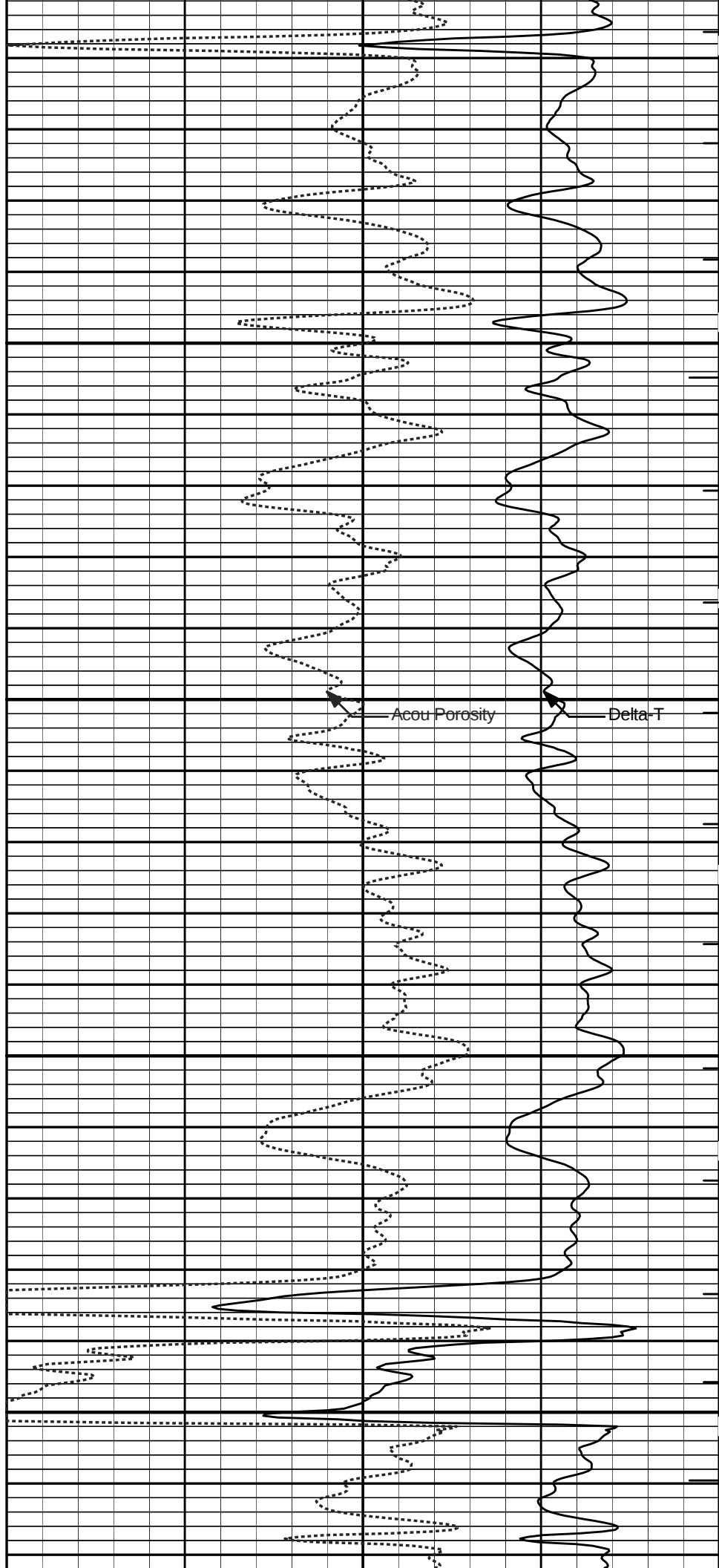
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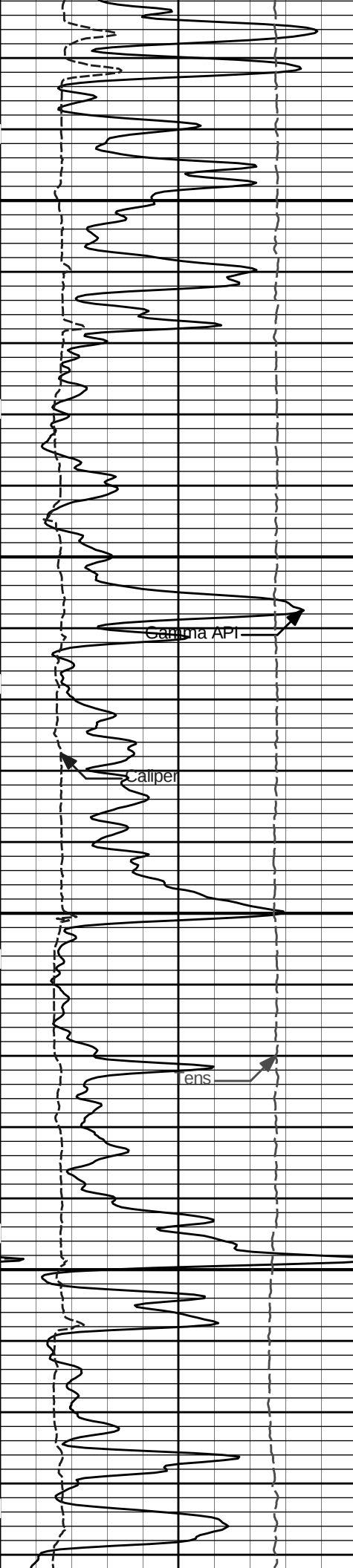




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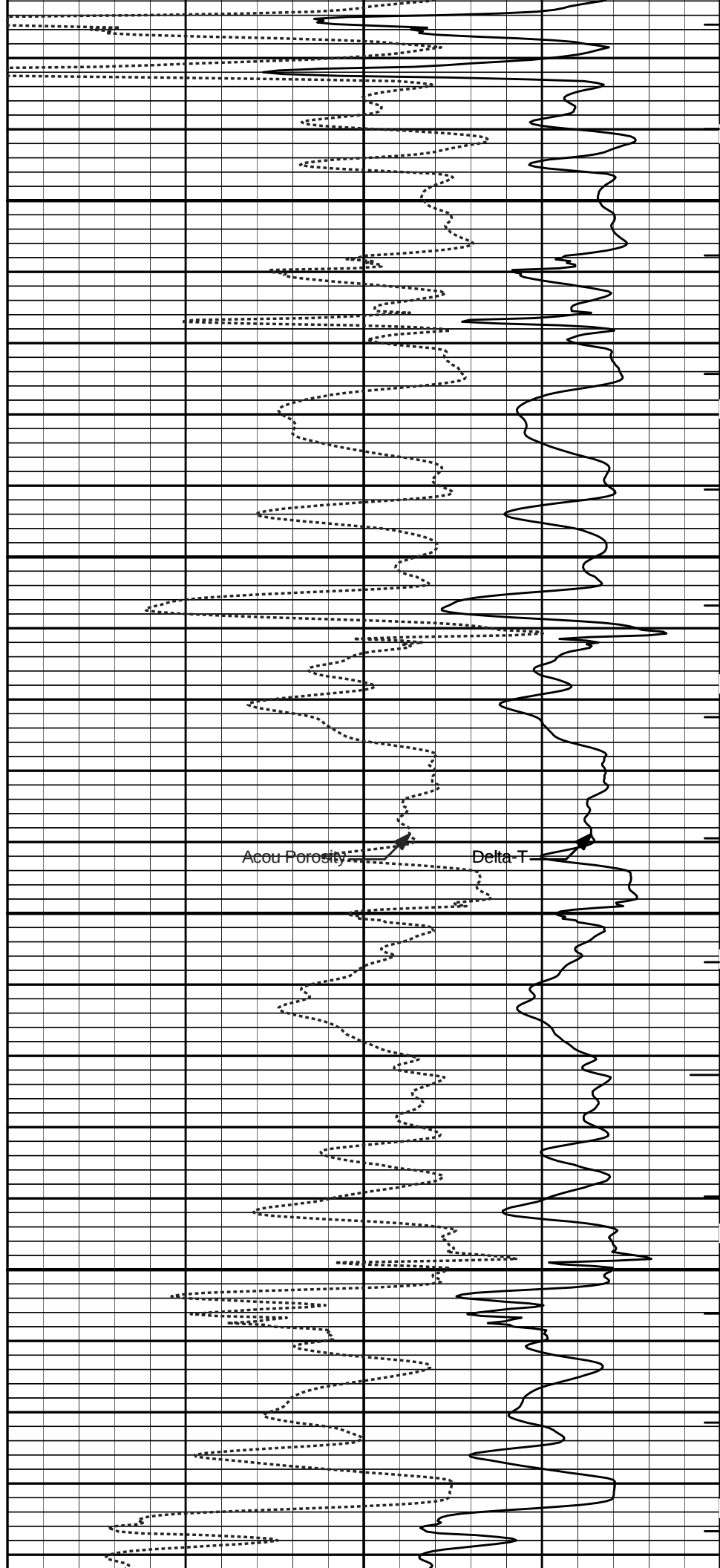
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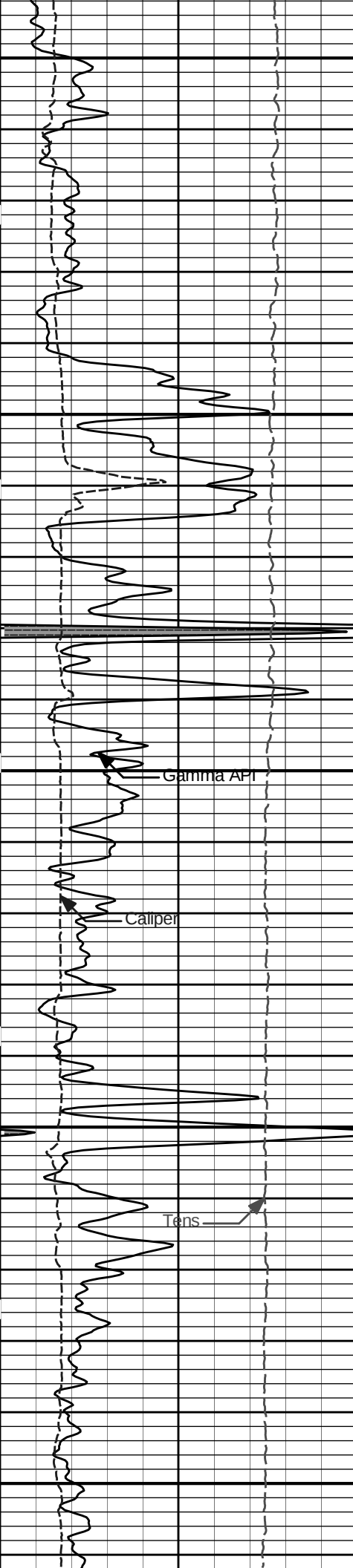
4200

4300



Acoustic Porosity

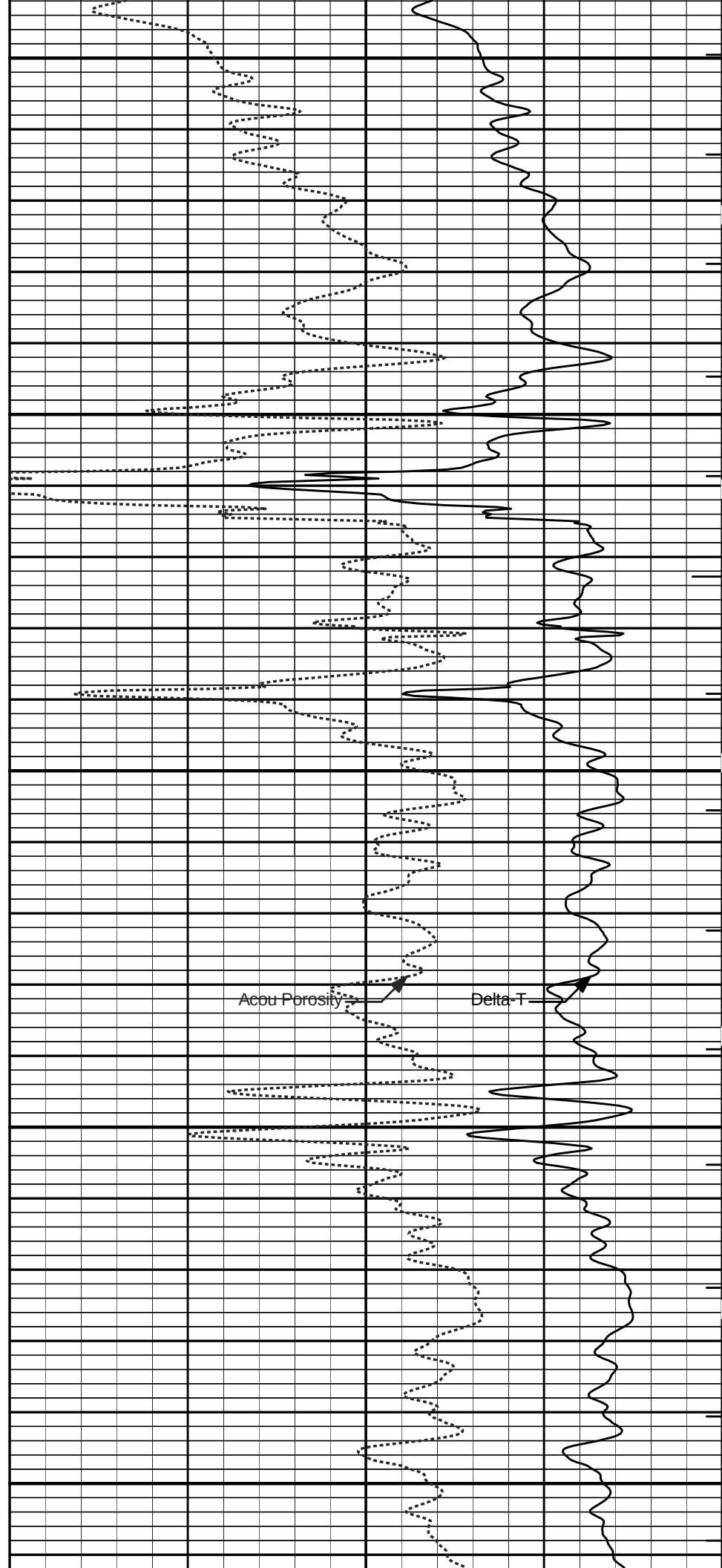
Delta-T

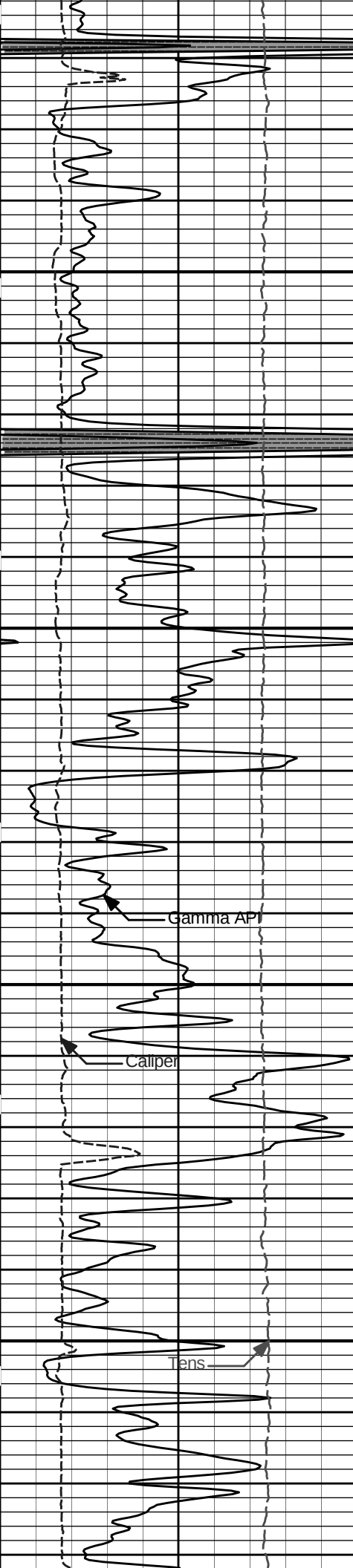


4400

4500

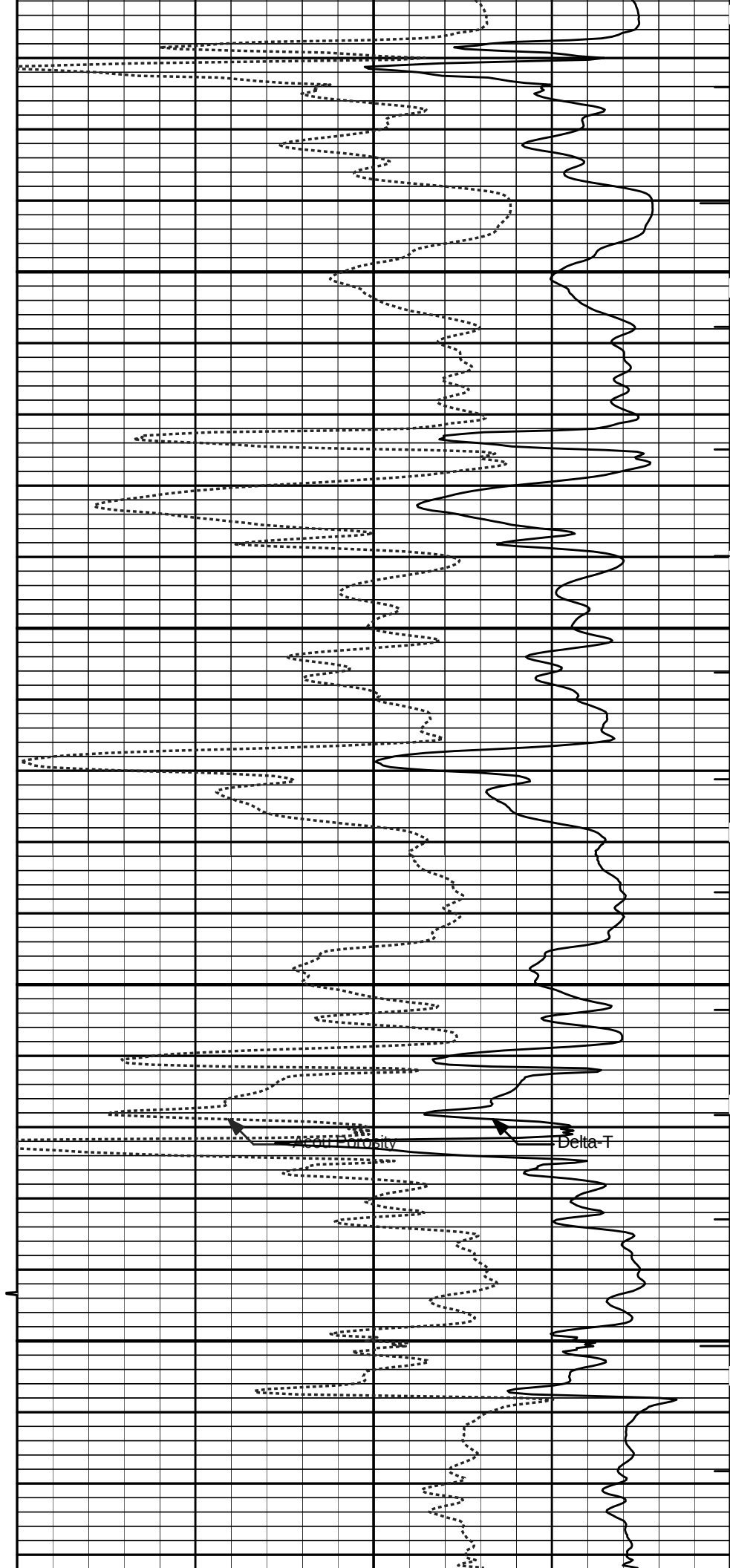
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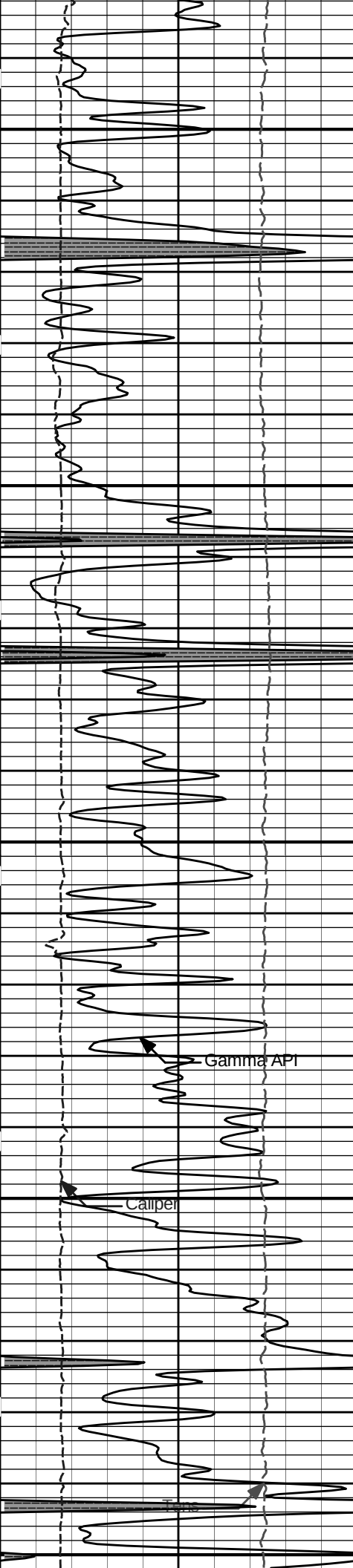




4700

4800



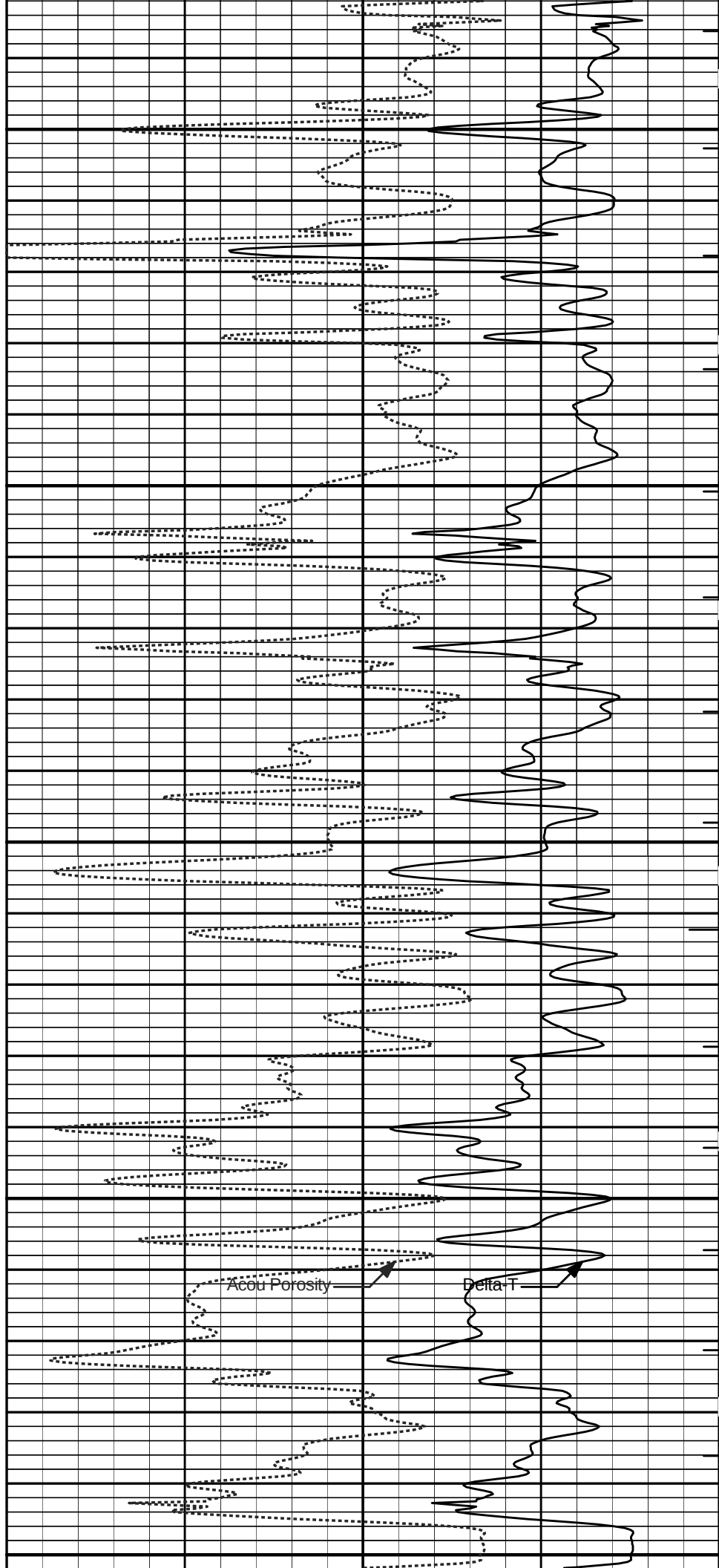


4900

5000

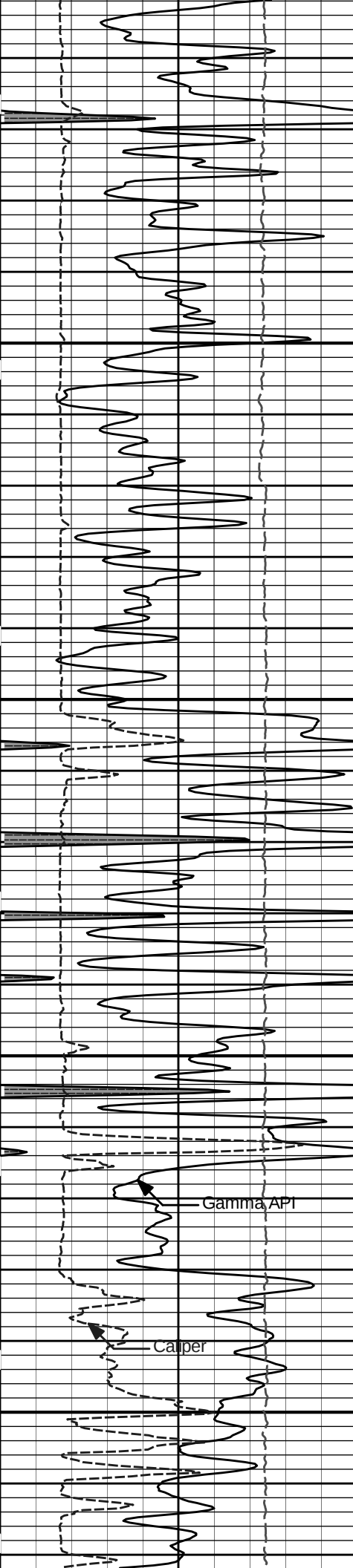
Gamma API

Caliper



Acoustic Porosity

Delta T



5100

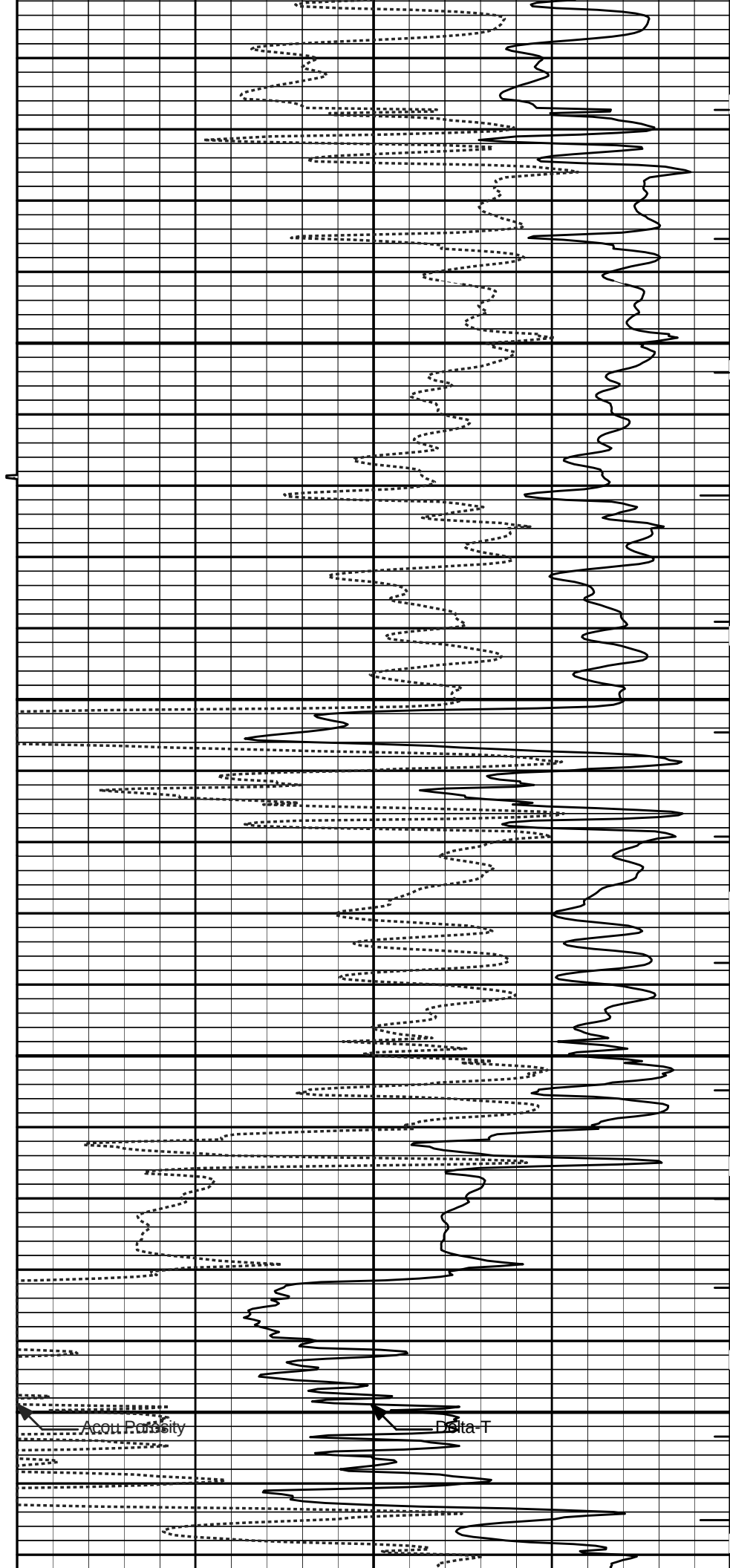
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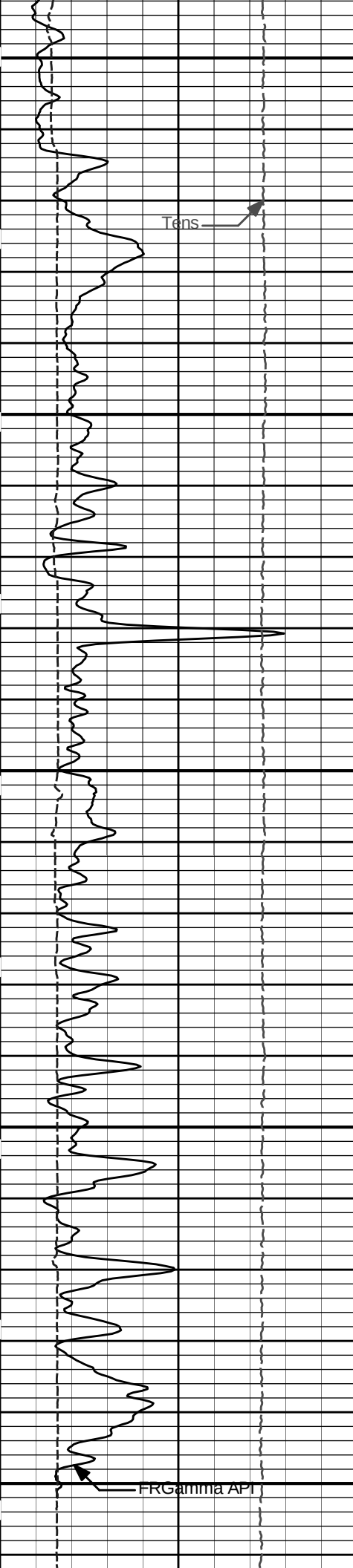
Gamma API

Caliper

Acoustic Density

Delta T

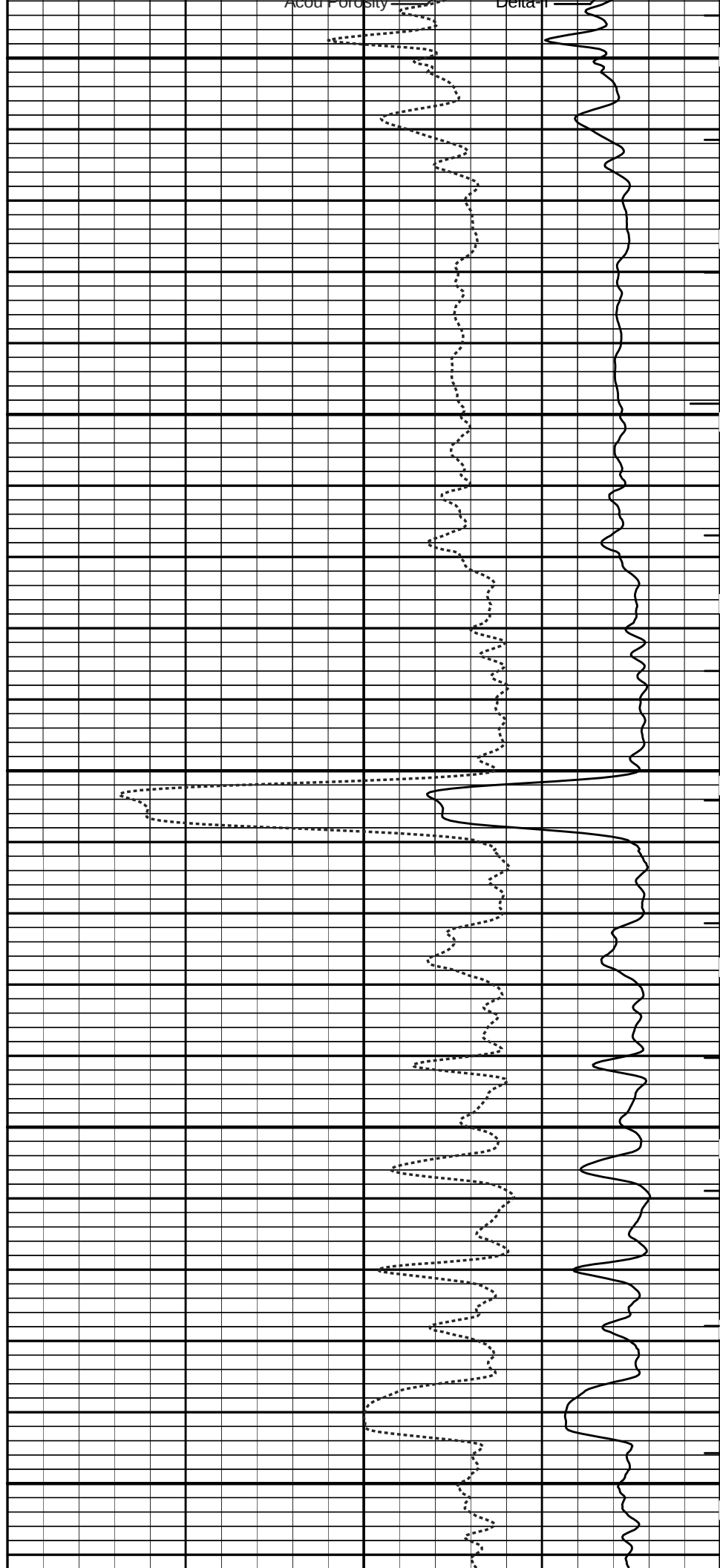




5500

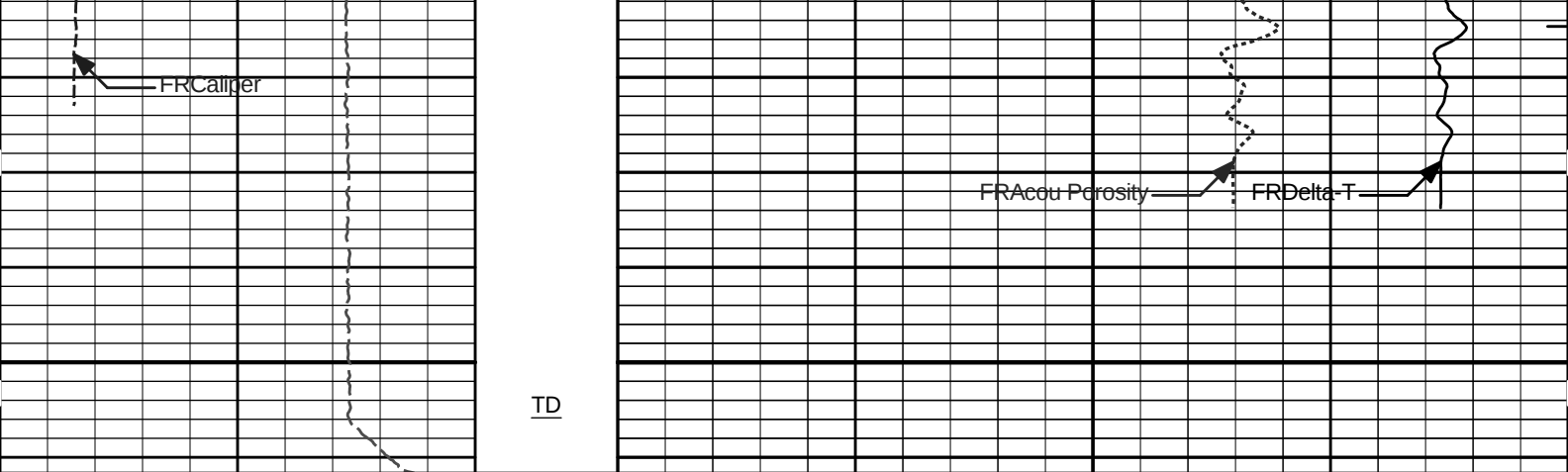
5600

5700



Acoustic Porosity

Delta T



15K	Tens pounds	0	1 : 240 ft		ITTT
0	Gamma API api	150	Tension Pull 10 0	140	Delta-T microsec per ft
6	Caliper inches	16	Tension Pull	30	Acou Porosity percent
SHALE					

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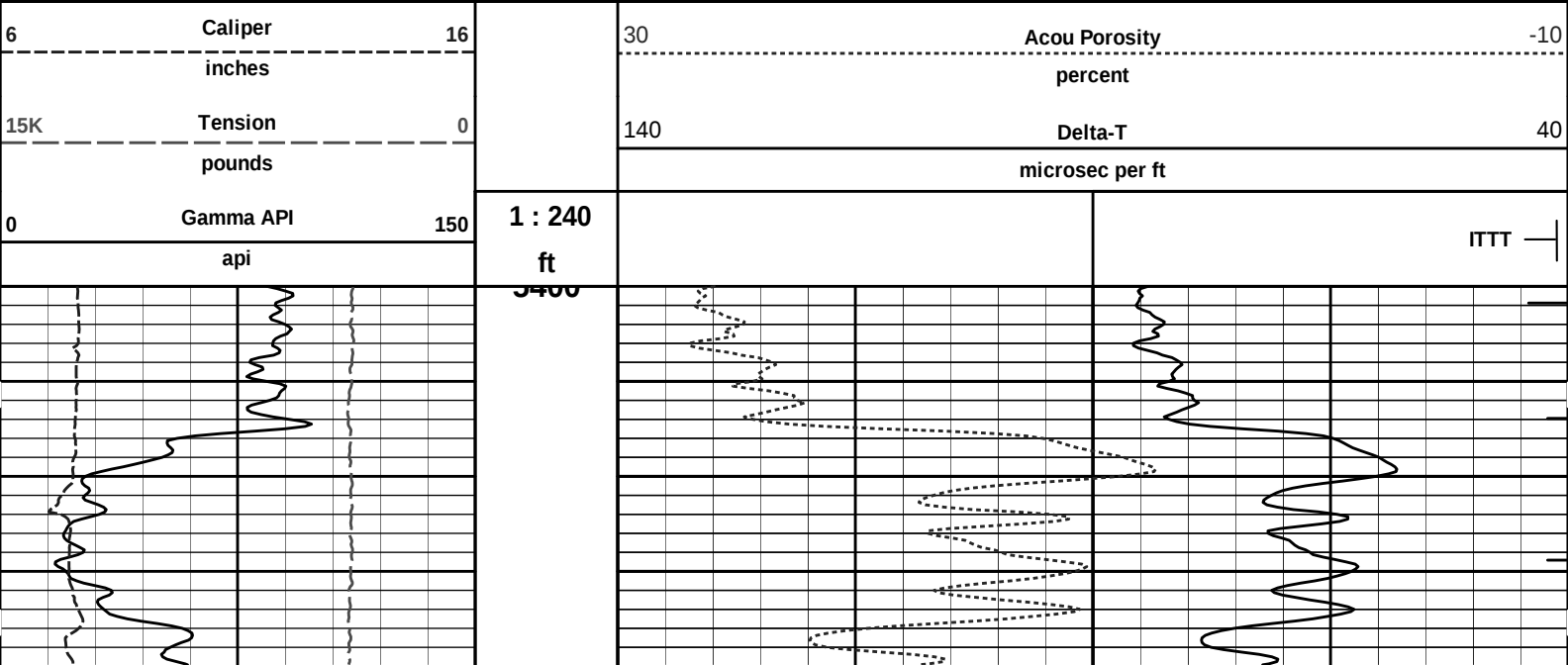
Plot Time: 24-May-11 14:53:57
Plot Range: 1700 ft to 5761.67 ft
Data: OBRATE_33_1\Well Based\DAQ-0001-003\
Plot File: \\SONIC\BSAT_5_MAIN_LIB

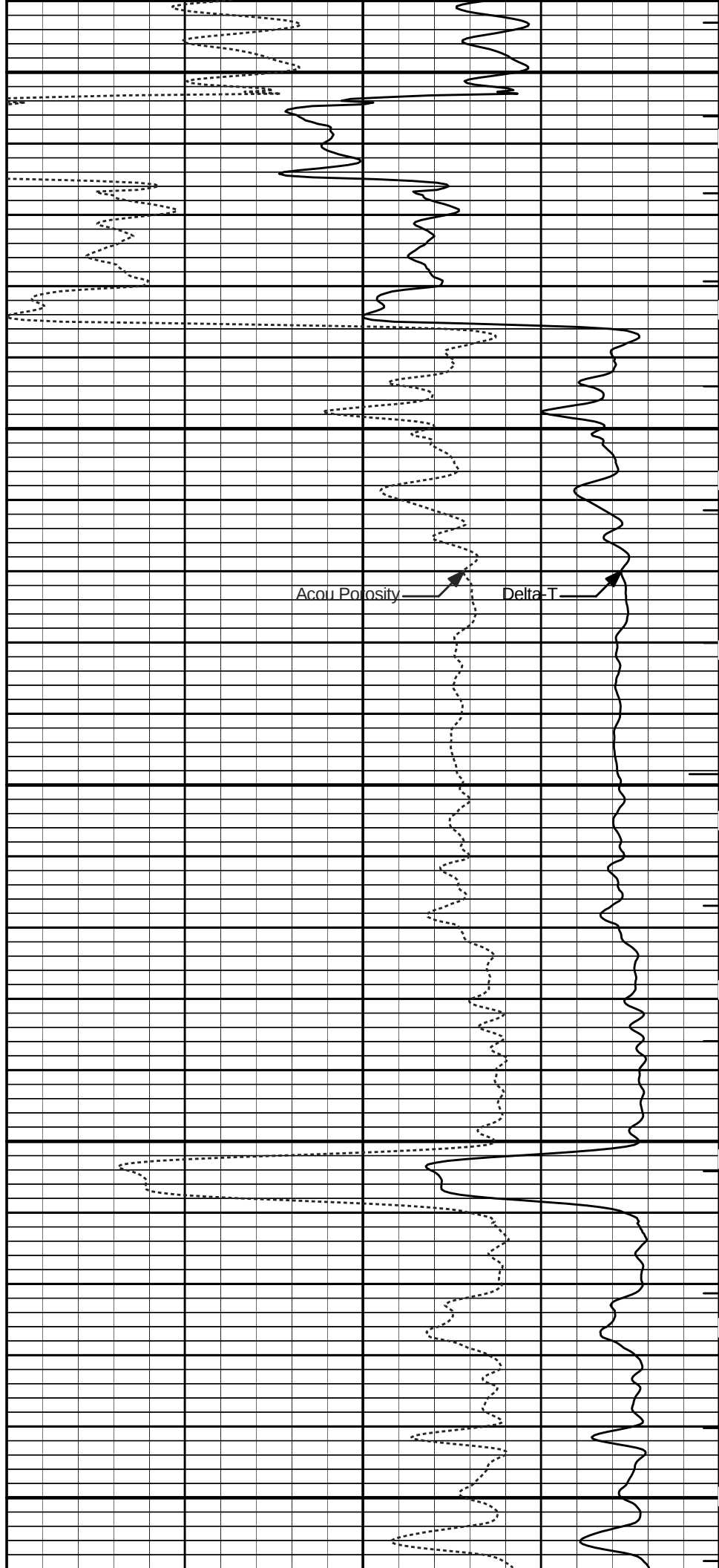
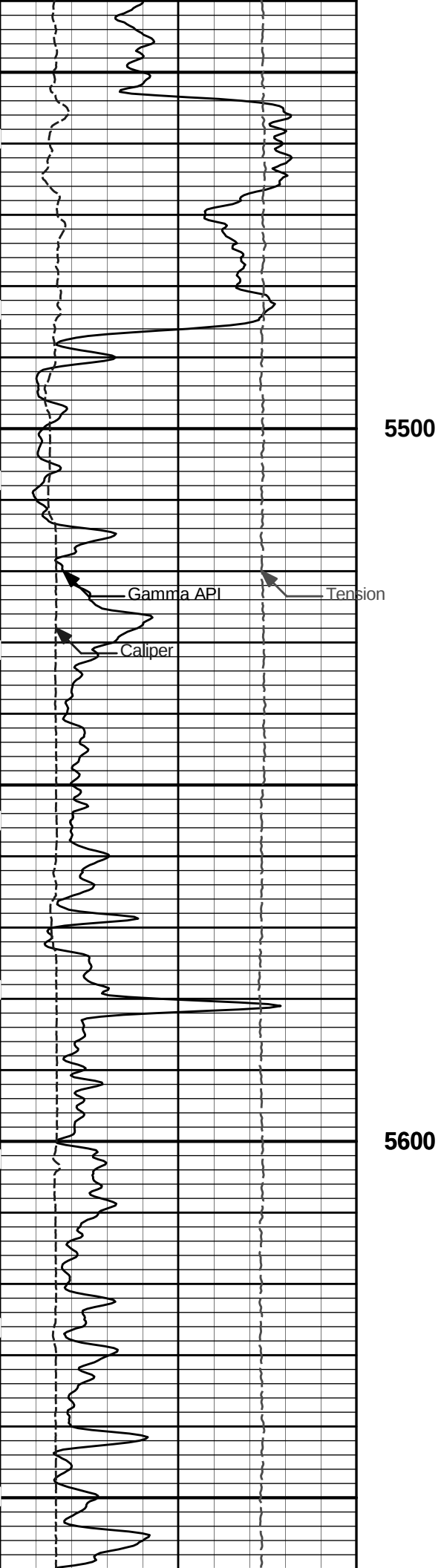
5 INCH MAIN LOG

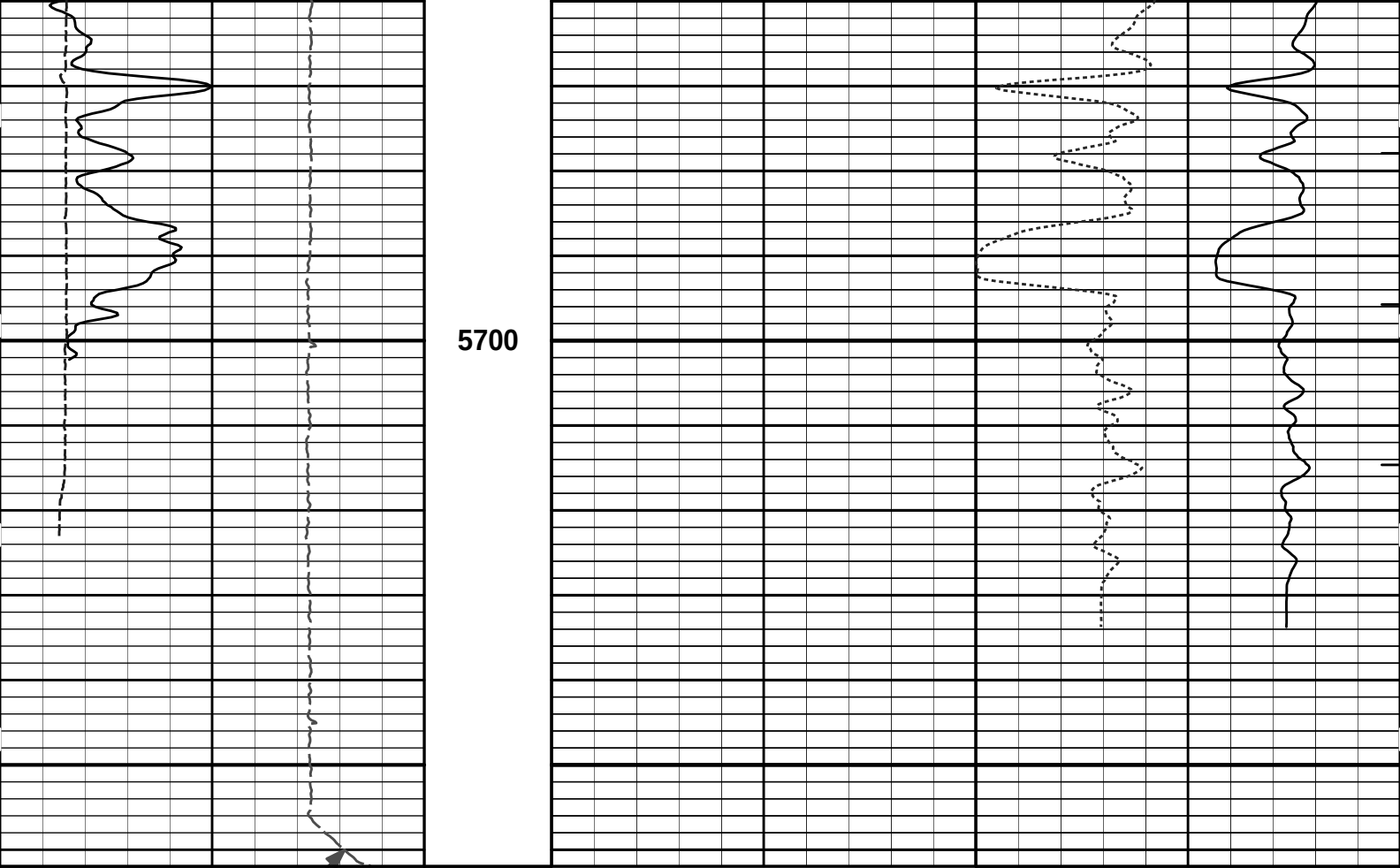
HALLIBURTON

Plot Time: 24-May-11 14:53:58
Plot Range: 5400 ft to 5761.92 ft
Data: OBRATE_33_1\Well Based\DAQ-0001-002\
Plot File: \\SONIC\BSAT_5_REP_LIB

REPEAT SECTION







0	Gamma API	150	1 : 240		ITTT
	api		ft		
15K	Tension	0		140	Delta-T
	pounds				microsec per ft
6	Caliper	16		30	Acou Porosity
	inches				percent

HALLIBURTON

Plot Time: 24-May-11 14:54:04
Plot Range: 5400 ft to 5761.92 ft
Data: OBRATE_33_1\Well Based\DAQ-0001-002\
Plot File: \\SONIC\BSAT_5_REP_LIB

REPEAT SECTION

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

DSN Decentralizer-
10755066
6.60 lbs

Ø 3.625 in* →

Ø 3.625 in →

9.69 ft

56.10 ft

← DSN Far @ 49.17 ft

← DSN Near @ 48.42 ft

DSNT-11055304
174.00 lbs

46.42 ft

SDLT-I04_P84
360.00 lbs

Ø 4.500 in →

Ø 4.750 in →

10.81 ft

35.60 ft

SDL Microlog @ 38.60 ft
SDL Caliper @ 38.42 ft
SDL @ 38.41 ft

BSAT-10747684
300.00 lbs

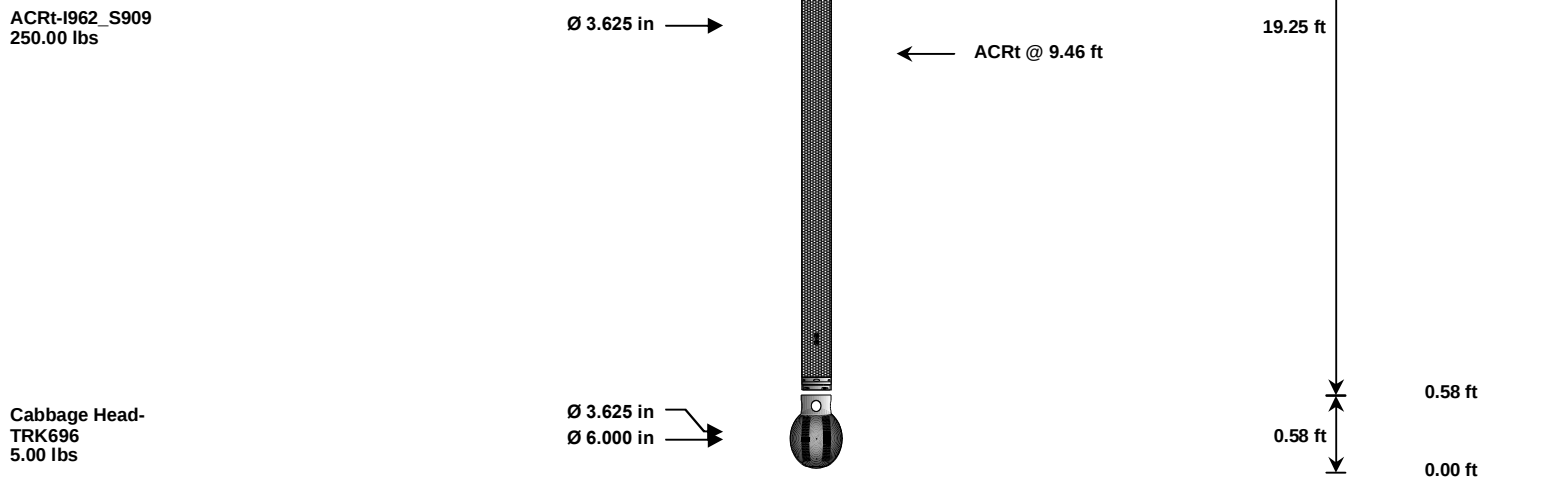
Ø 3.625 in →

15.77 ft

19.83 ft

← Sonic Receivers @ 27.09 ft

← Mud Resistivity @ 13.44 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: OBRATE_33_110001 SP-GTET-DSN-SDL-BSAT-ACRT-CHIDLE						Date: 24-May-11 10:50:38

HALLIBURTON

PARAMETERS REPORT

Depth (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	Natural	
	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	1.310	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	5756.00	ft
	SHARED	BHT	Bottom Hole Temperature	140.0	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	Eccentered	
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 Upr	
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: OBRATE_33_1i0001 SP-GTET-DSN-SDL-BSAT-ACRT-CHIDLE			Date: 24-May-11 12:54:40	

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
MINOR	Microlog Normal	38.60	BLK	0.750

MINOR	Microlog Normal	36.60	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

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: OBRATE_33_1\0001 SP-GTET-DSN-SDL-BSAT-ACRT-CH\IDLE				Date: 24-May-11 10:52:43

COMPANY	EOG RESOURCES		
WELL	OBRATE 33 #1		
FIELD	NW SUBLETTE		
COUNTY	HASKELL	STATE	KANSAS
HALLIBURTON		BOREHOLE COMPENSATED SONIC ARRAY LOG	