

HALLIBURTON

BOREHOLE COMPENSATED SONIC ARRAY LOG

COMPANY	OXY USA INC		
WELL	GRIFFIN C-1		
FIELD	HUGOTON GAS AREA		
COUNTY	HASKELL		
STATE	KANSAS		
COMPANY	OXY USA INC	WELL	GRIFFIN C-1
FIELD	HUGOTON GAS AREA	COUNTY	HASKELL
STATE	KANSAS	Location	1816' FNL & 2120' FWL SW/NE SE NW
API No.	15-081-22005-00-00	Other Services:	MICROLOG DSNT, SDLT ACRT
Location	1816' FNL & 2120' FWL SW/NE SE NW	Drilling measured from	KB
Sec. 11	Twp. 28S	Rge. 33W	Elev. 2979.6 ft
			Elev.: K.B. 2983.6 ft
			D.F. 2982.6 ft
			G.L. 2979.6 ft

Permanent Datum	GL	Elev. 2979.6 ft
Log measured from	KB	14.0 ft above perm. Datum
Drilling measured from	KB	G.L. 2979.6 ft

Date	02-Dec-12
Run No.	ONE
Depth - Driller	5796.00 ft
Depth - Logger	5765.0 ft
Bottom - Logged Interval	5738.0 ft
Top - Logged Interval	1804.0 ft
Casing - Driller	8.625 in @ 1806.0 ft
Casing - Logger	1804.0 ft @
Bit Size	7.875 in @
Type Fluid in Hole	WATER BASED MUD
Density	9.2 ppg 48.00 s/qt
PH	9.70 pH 9.2 cp/m
Source of Sample	FLOW LINE
Rm @ Meas. Temperature	1.050 ohmm @ 75.00 degF @
Rmf @ Meas. Temperature	0.88 ohmm @ 75.00 degF @
Rmc @ Meas. Temperature	1.250 ohmm @ 75.00 degF @
Source Rmf	MEASURED MEASURED
Rm @ BHT	0.57 ohmm @ 143.0 degF @
Time Since Circulation	9.0 hr
Time on Bottom	02-Dec-12 16:34
Max. Rec. Temperature	143.0 degF @ 5765.0 ft @
Equipment	10546696 LIBERAL
Recorded By	J. BOLLOW
Witnessed By	C. WYLLIE
	E. ZION

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Service Ticket No.: 900041481 API Serial No.: 15-081-22005-00-00 PGM Version: WL INSITE R3.6.0 (Build 3)

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.
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.	11039640	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.	GTET	Spacing	6"	Log Type		Log Type	
Type	SCINT			Source Type		Source Type	
Length	8'	LSA [Y/N]	NO	Serial No.		Serial No.	
Distance to Source	10'	FWDA [Y/N]	NO	Strength		Strength	
LOGGING DATA							
GENERAL		GAMMA		ACOUSTIC		DENSITY	

Run No.	GENERAL		Speed ft/min	GAMMA		ACOUSTIC		Matrix	DENSITY		Matrix	NEUTRON			
	Depth			L	R	L	R		Scale			L	R	Scale	
	From	To							REC	L				R	L
ONE	5765	1804	REC	0	150	30	-10	47.6							

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5-INCH CASING

CHLORIDES REPORTED AT 2,000 MG/L

LCM REPORTED AT 6 LB/BBL

GTET-DSNT-SDLT-BSAT-ACRT RUN IN COMBINATION

TODAY'S CREW: M. GRAHAM & V. JAIME

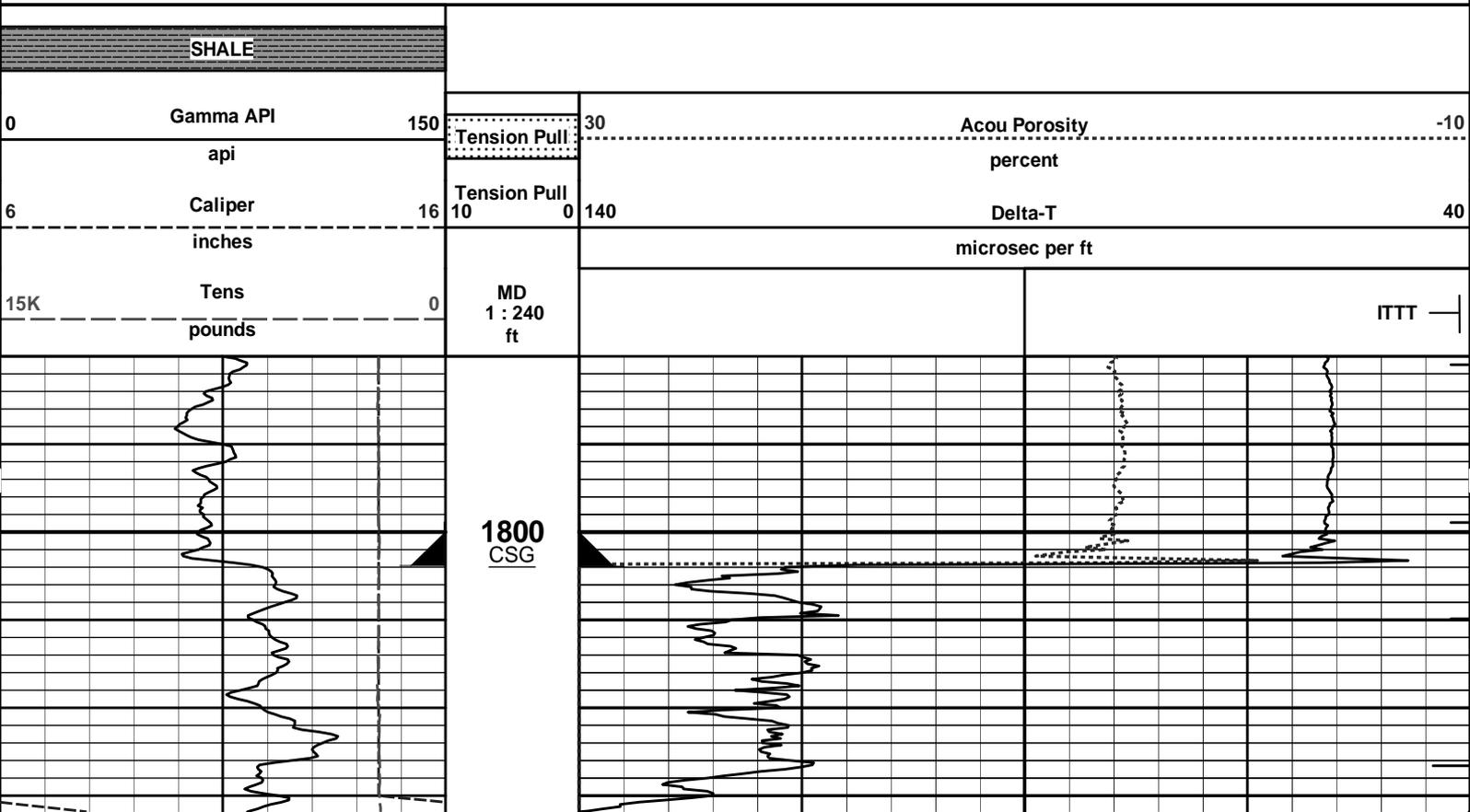
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES

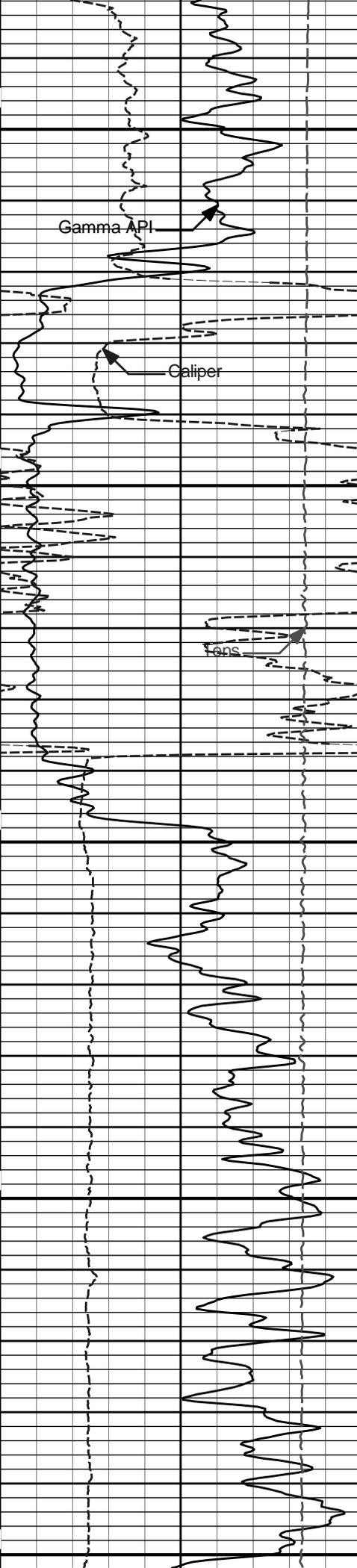
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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: 02-Dec-12 20:29:54
 Plot Range: 1780 ft to 5767.92 ft
 Data: GRIFFIN_C_1\Well Based\CASING\
 Plot File: \BSAT\BSAT_5_MAIN_LIB

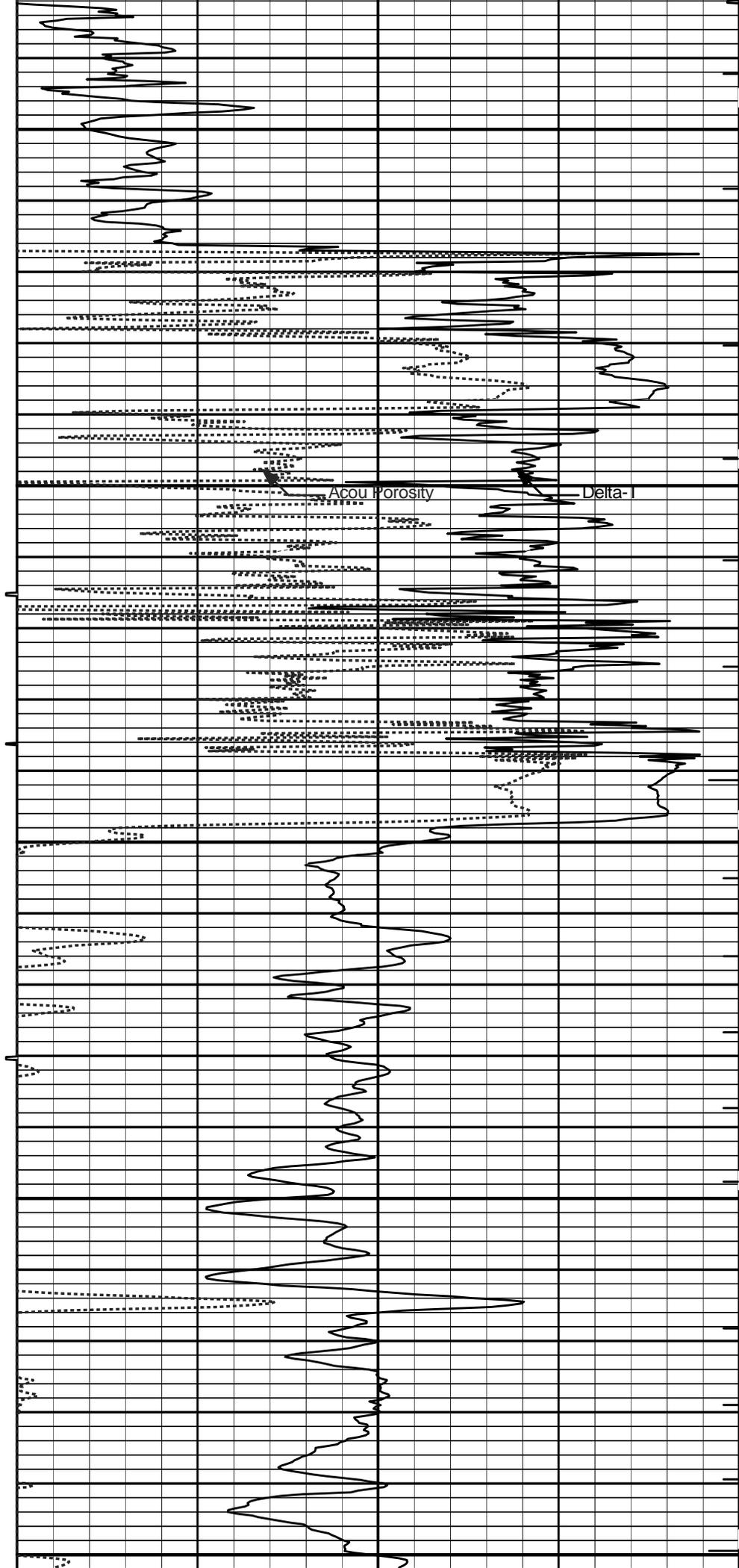
5 INCH MAIN LOG

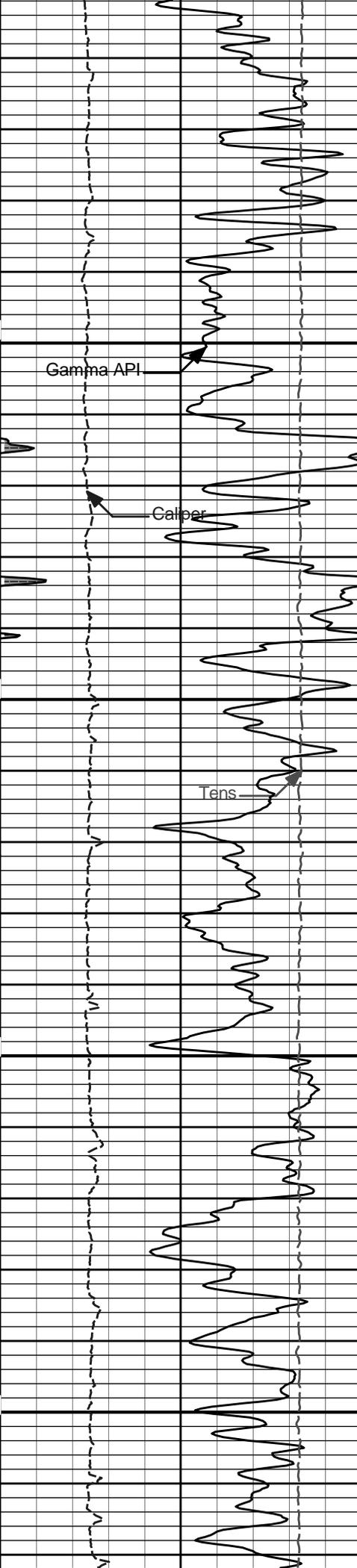




1900

2000





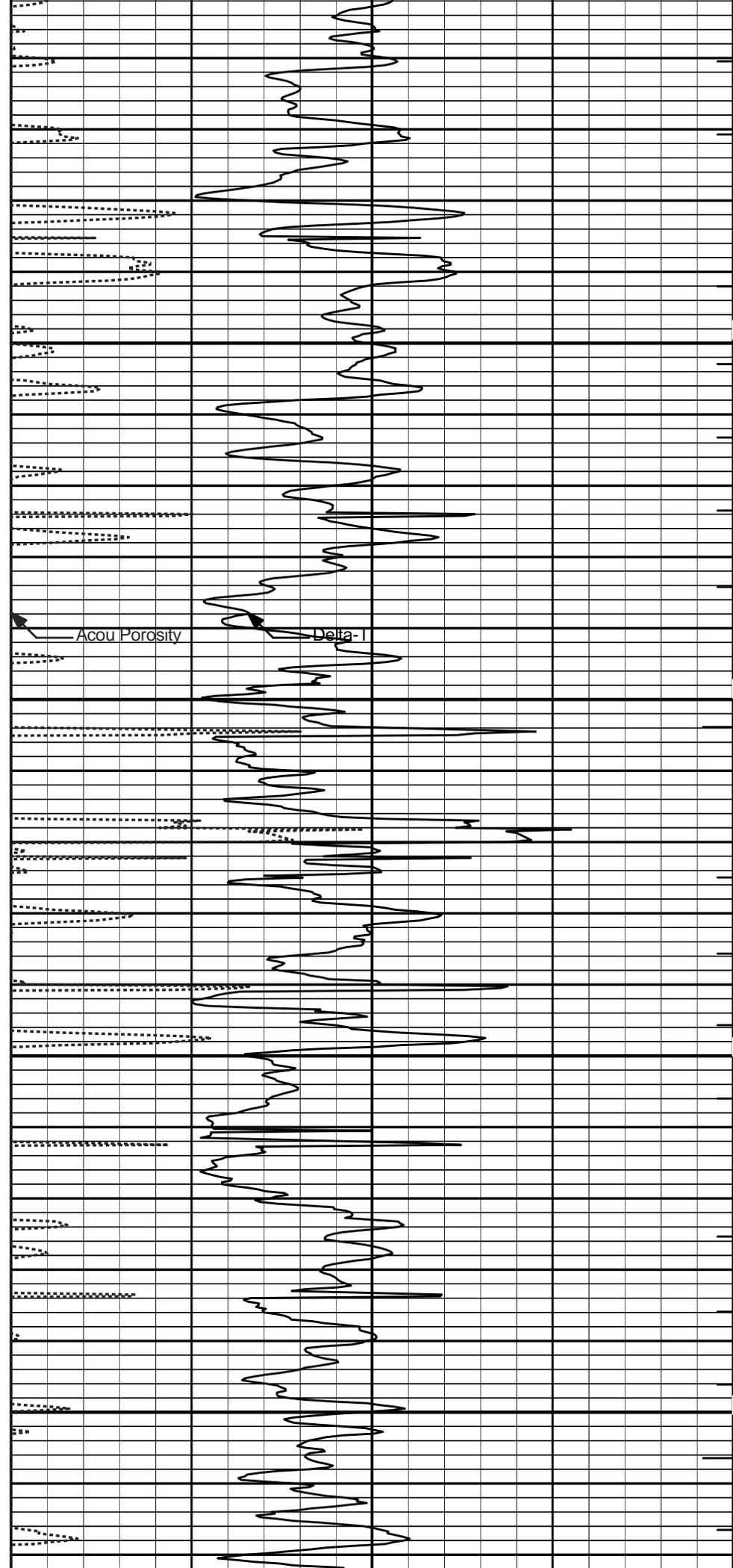
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2200

Gamma API

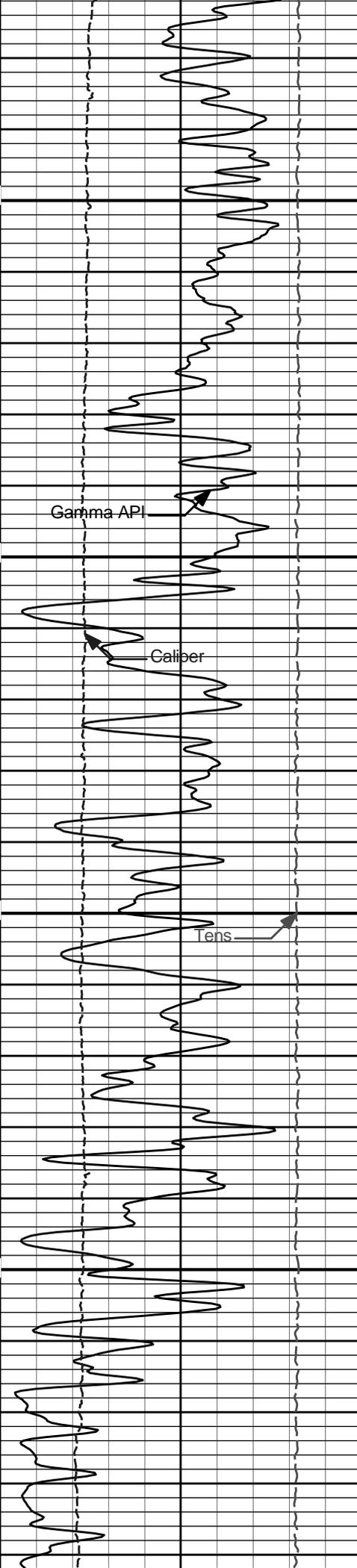
Caliper

Tens



Acou Porosity

Delta-I



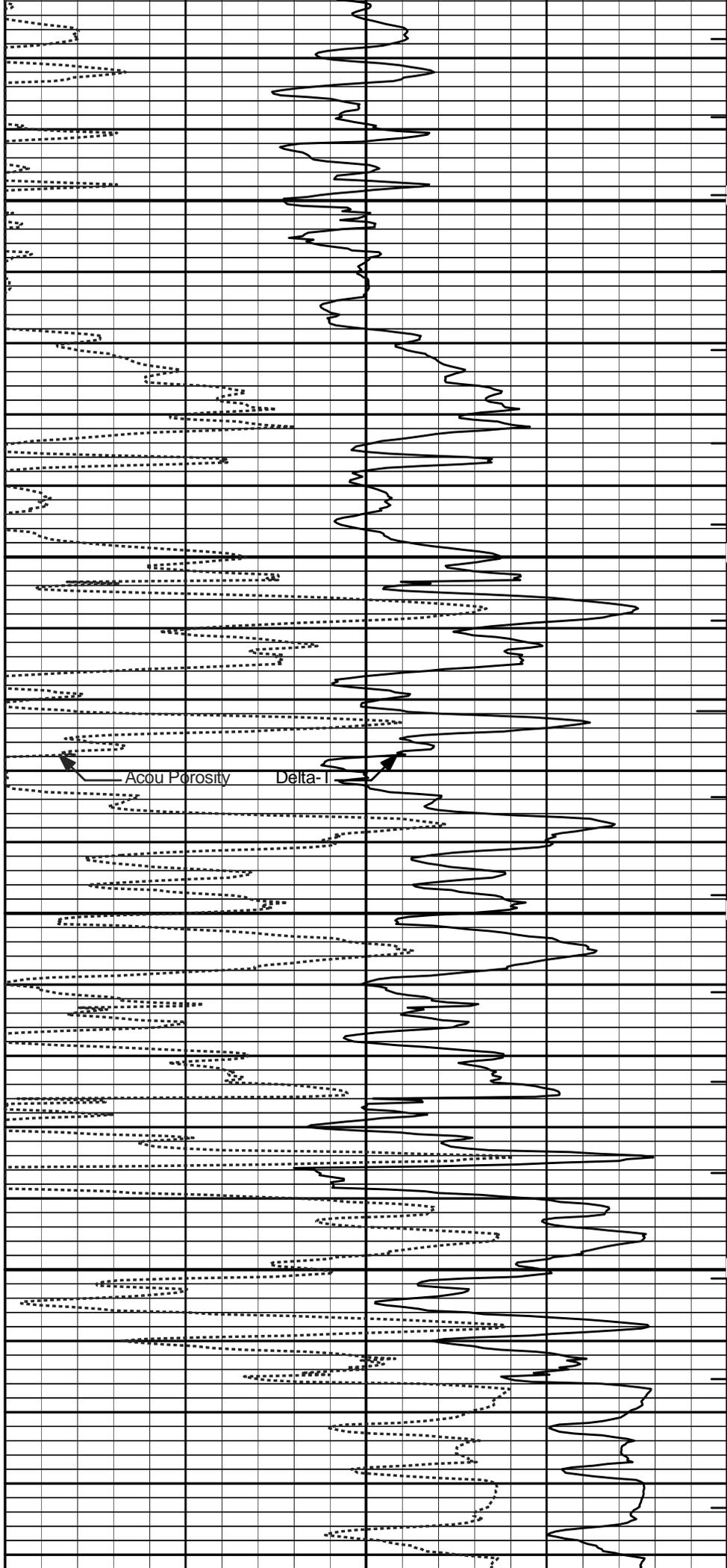
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2400

Gamma API

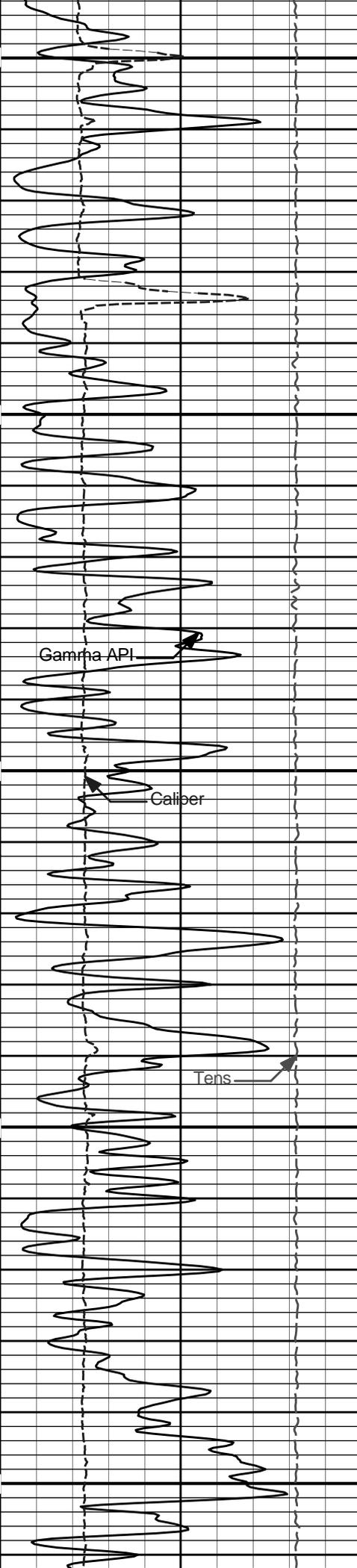
Caliper

Tens



Acou Porosity

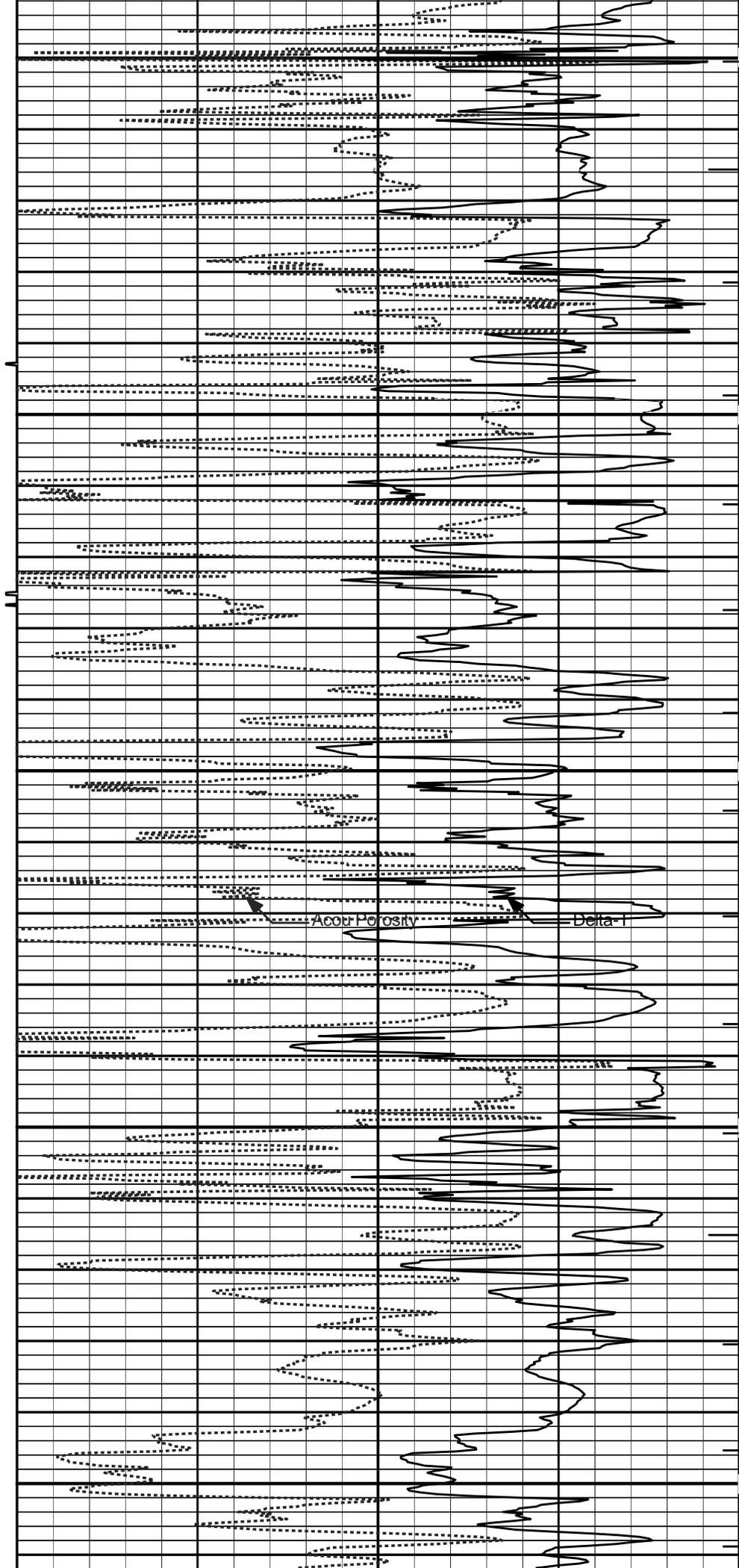
Delta-T



2500

2600

2700



Acorr Porosity

Delta T

2800

2900

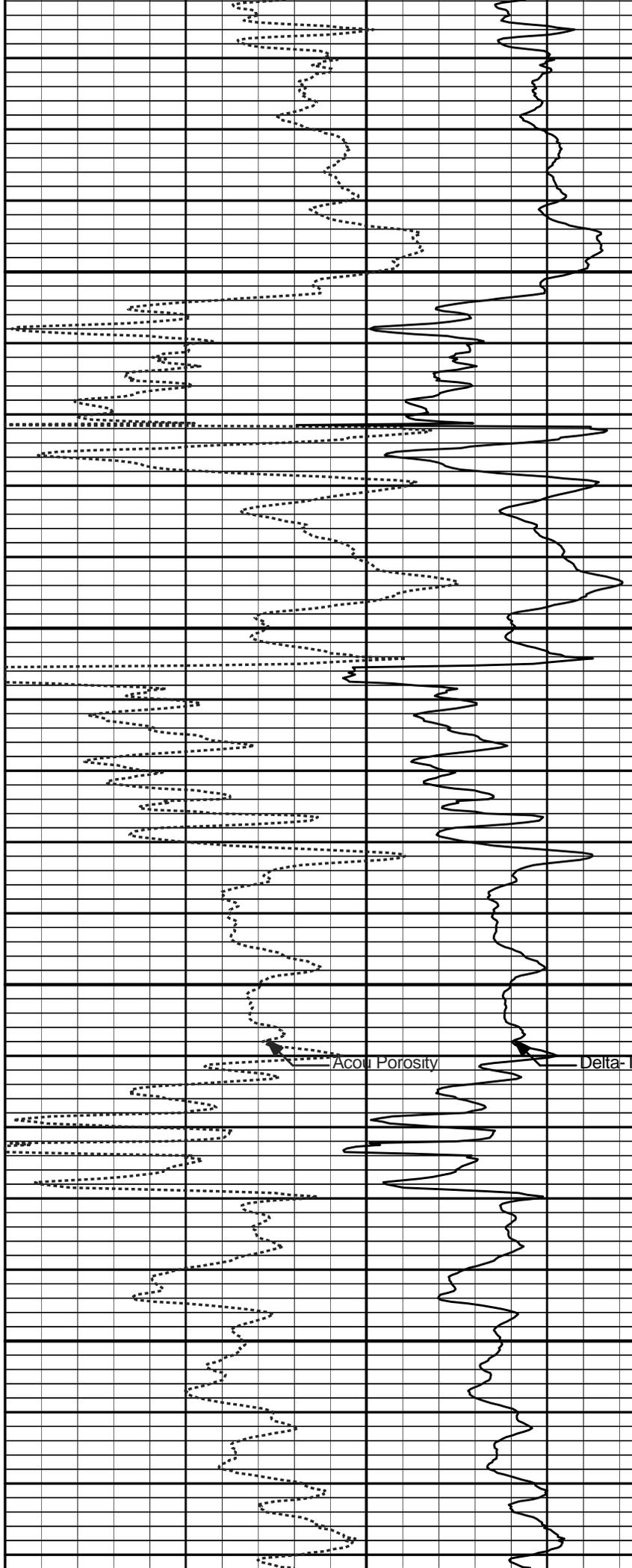
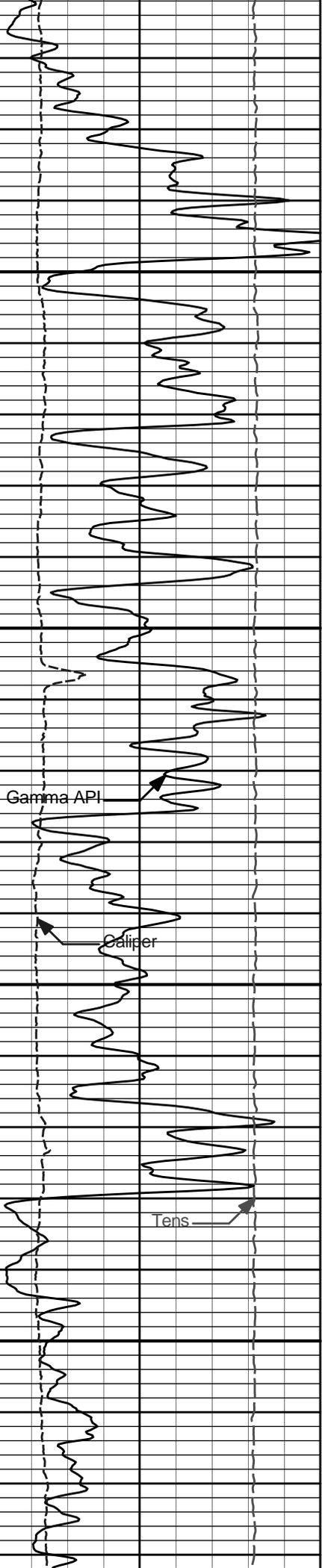
Gamma API

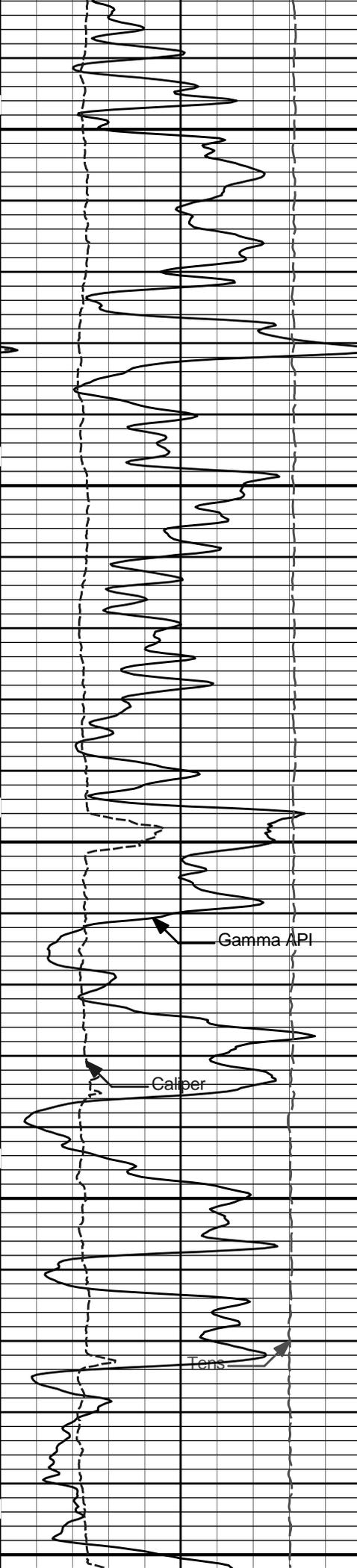
Caliper

Tens

Acou Porosity

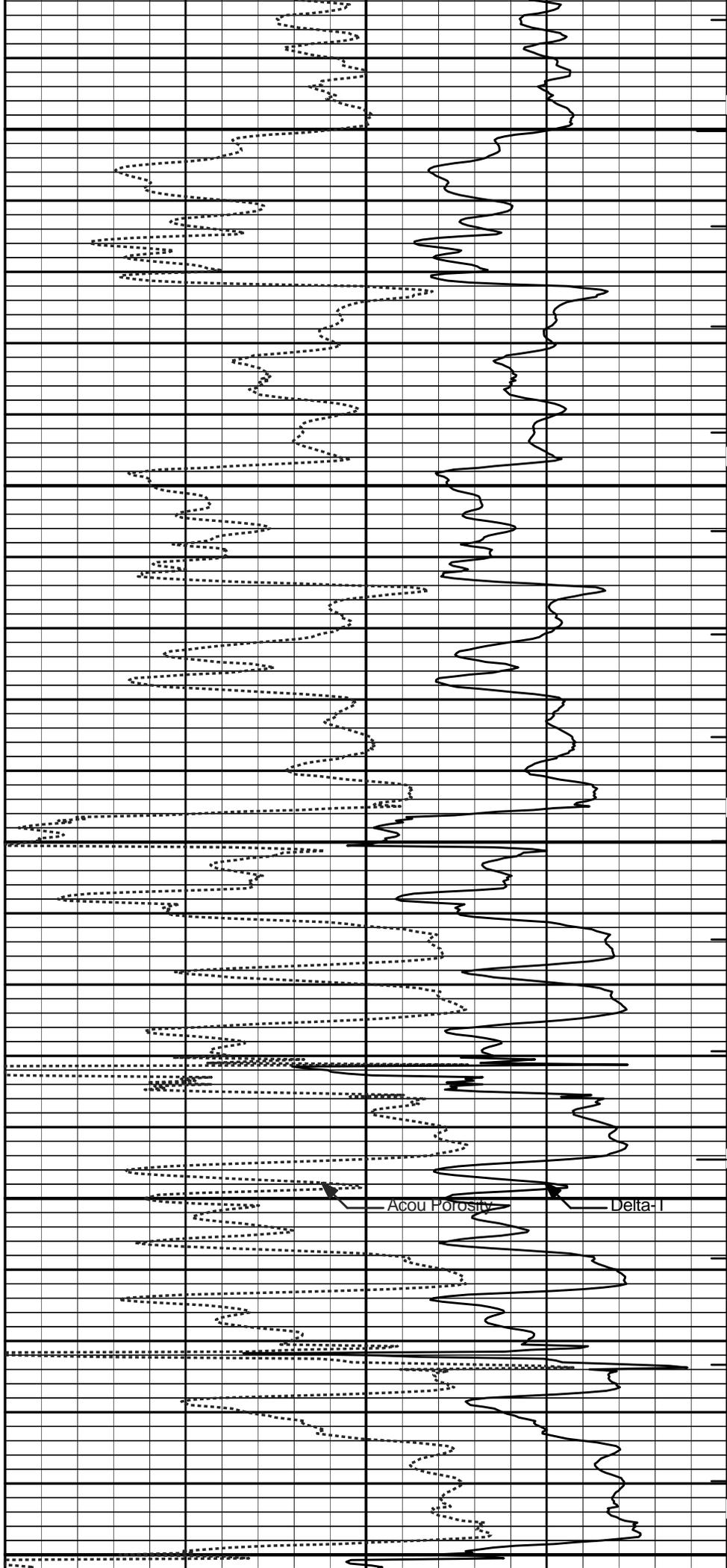
Delta-I





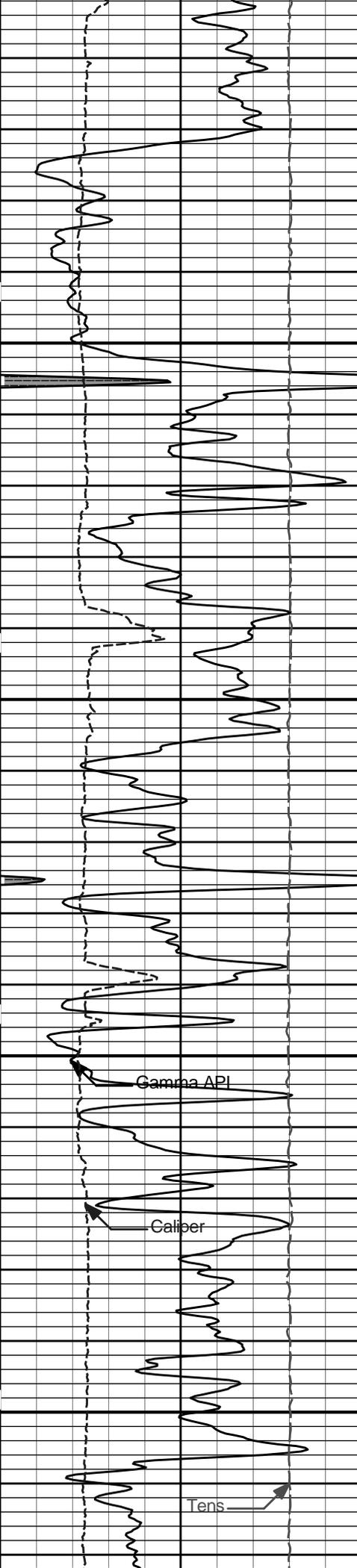
3000

3100



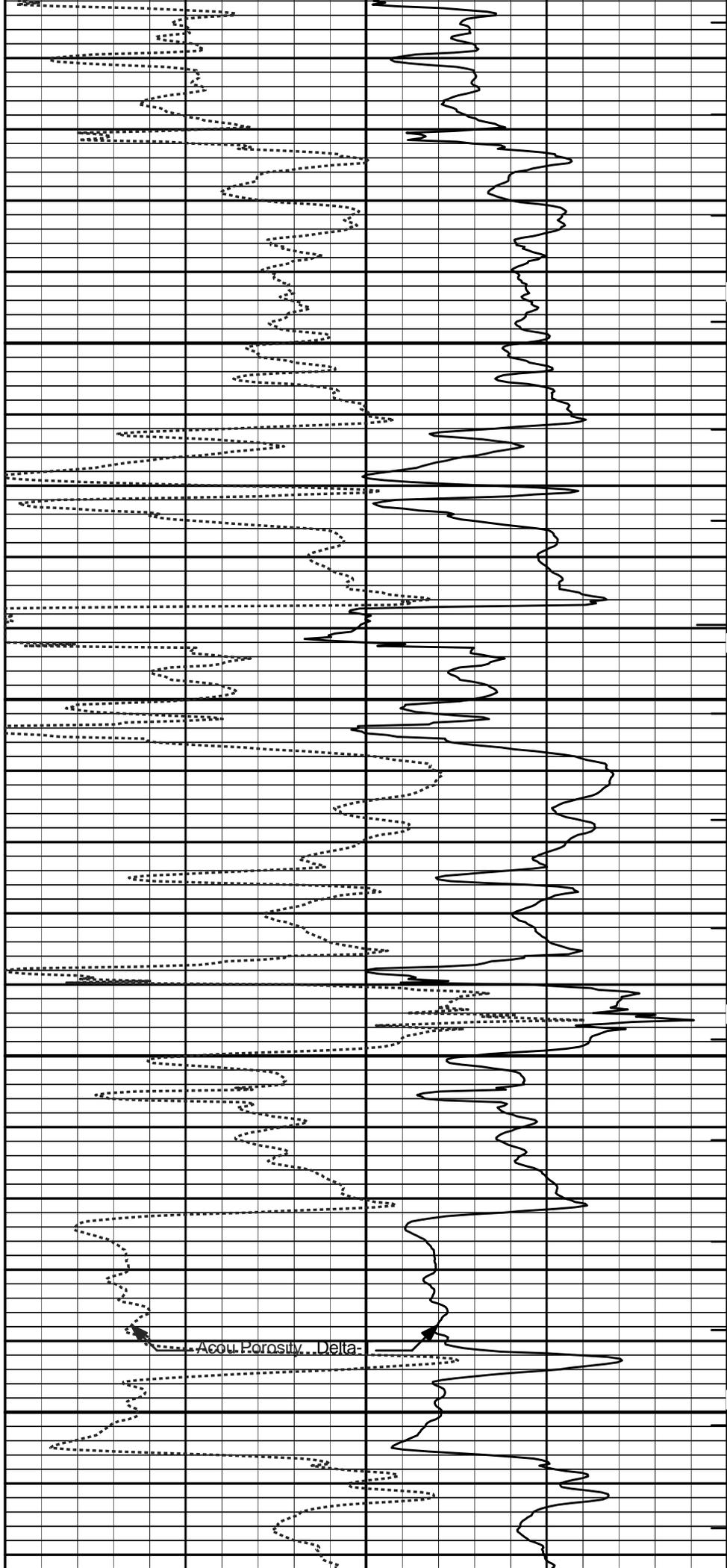
Acou Porosity

Delta-I



3200

3300

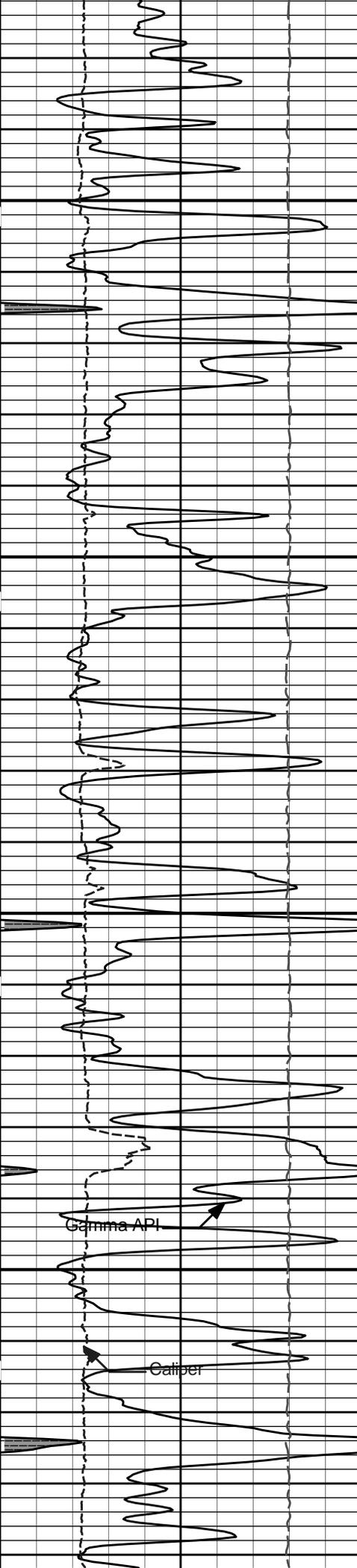


Gamma API

Caliper

Tens

Acou. Porosity . Delta

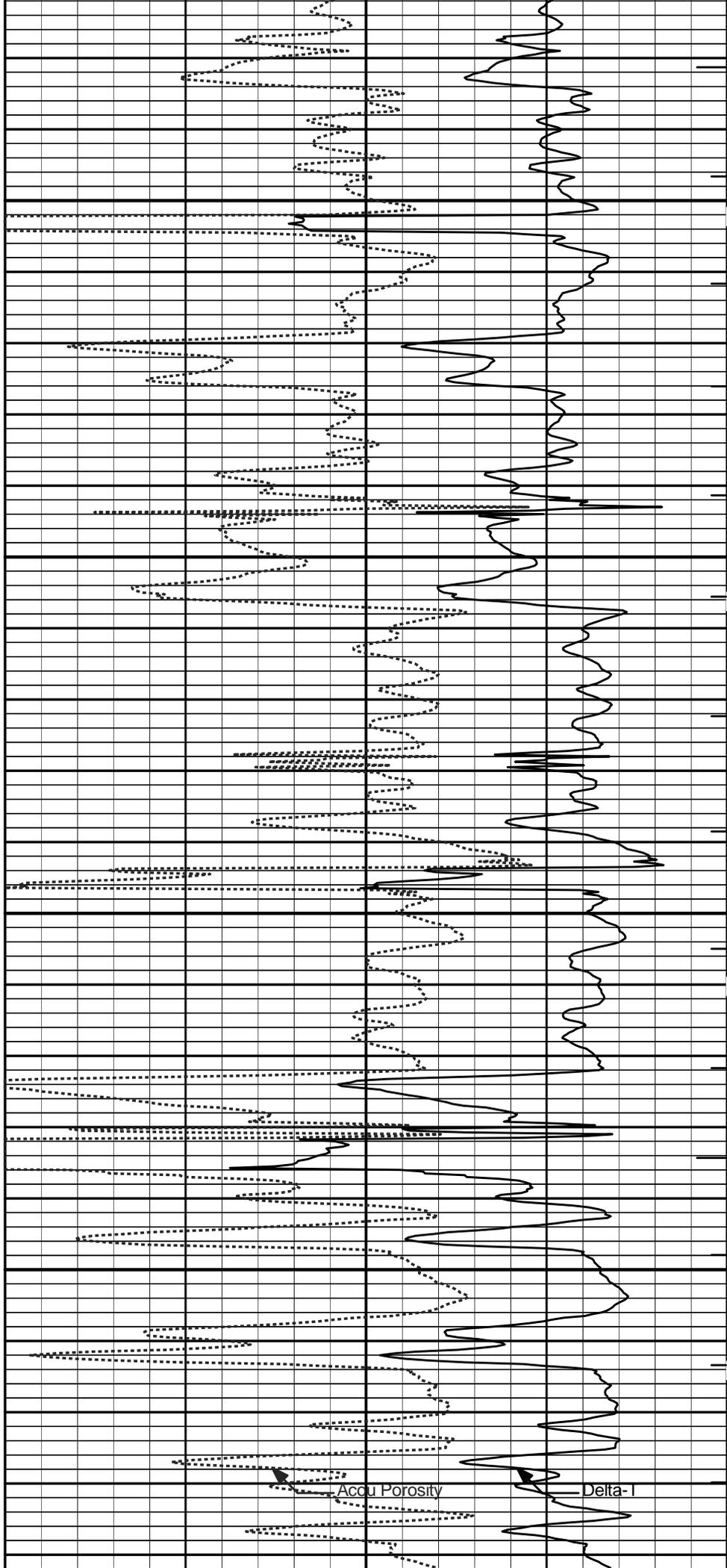


3400

3500

Gamma API

Caliper



Accu Porosity

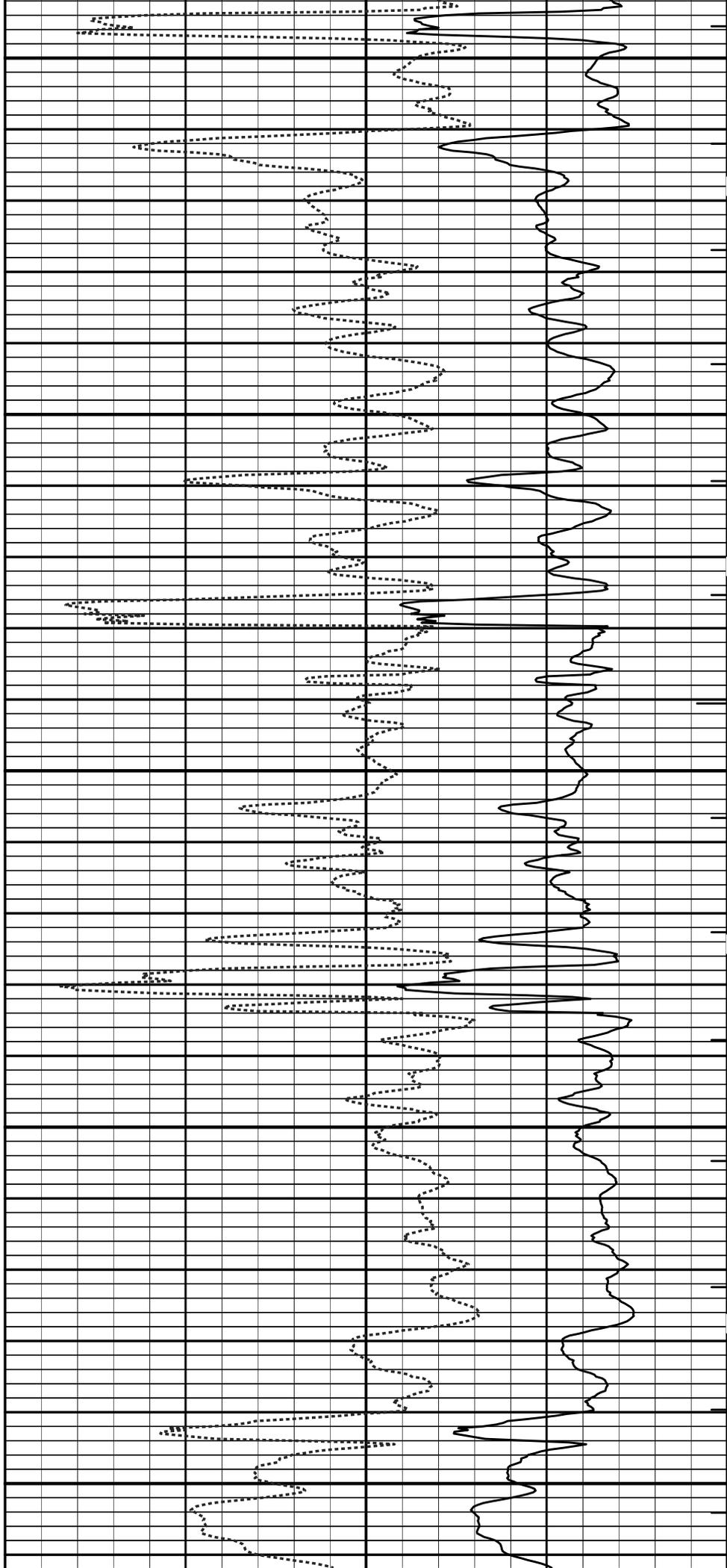
Delta-I

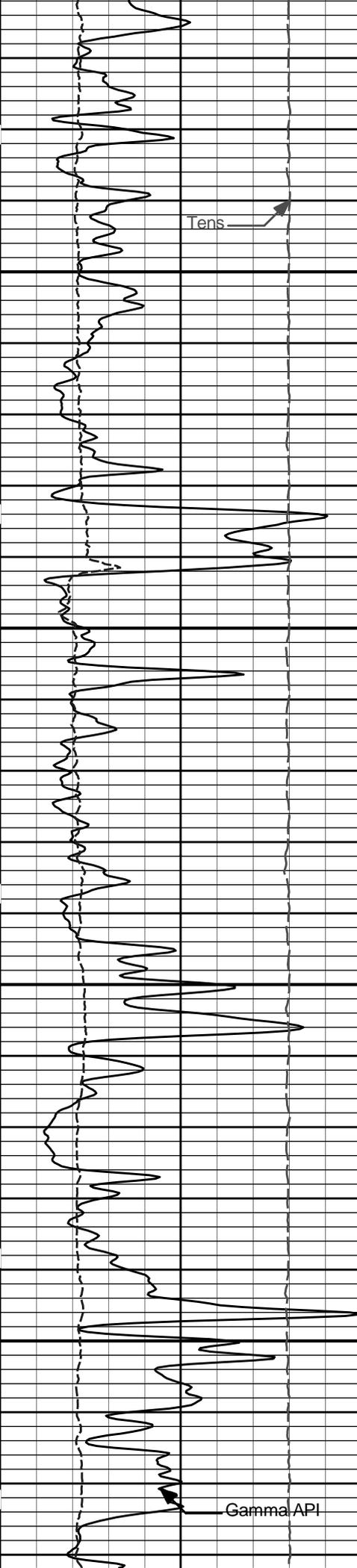


3600

3700

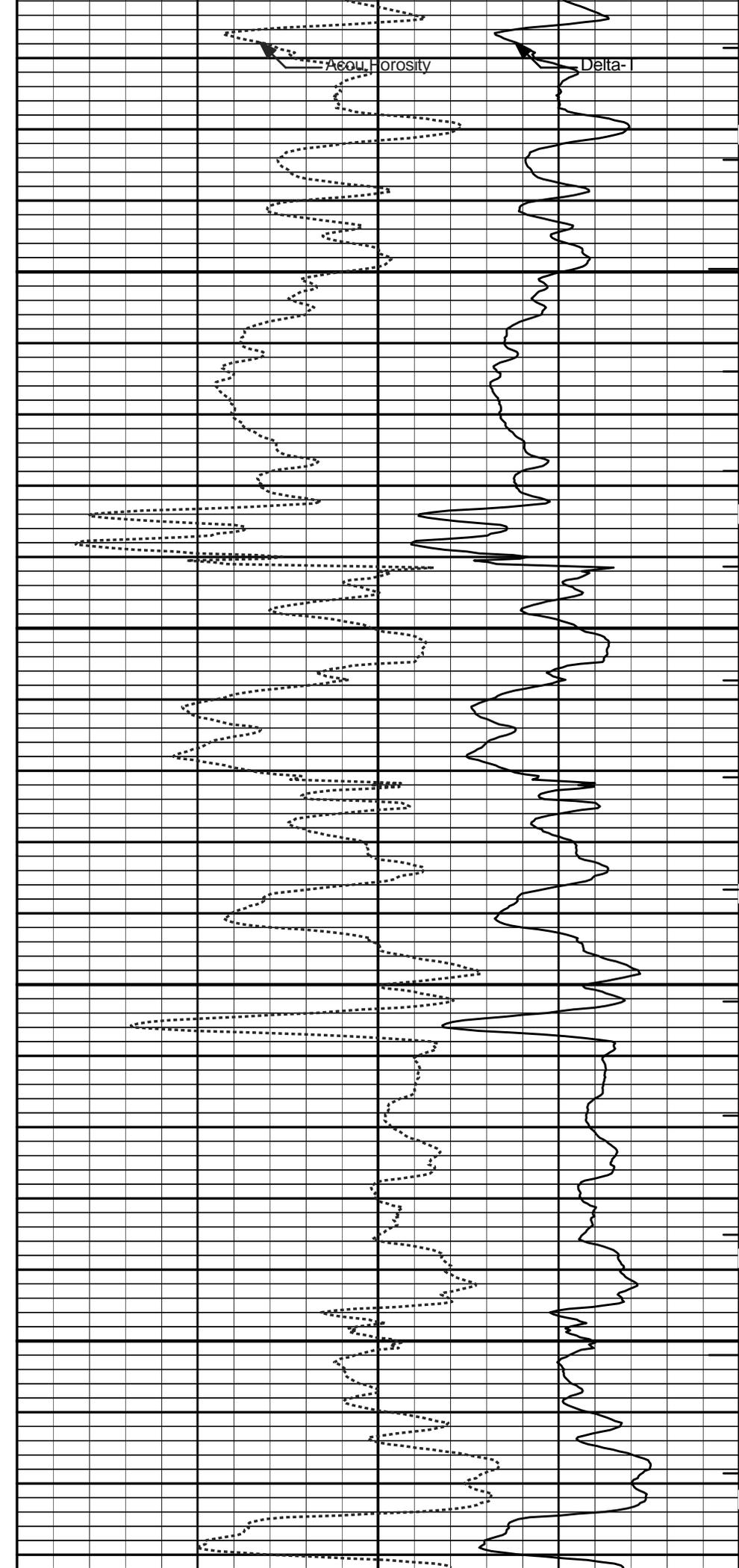
3800





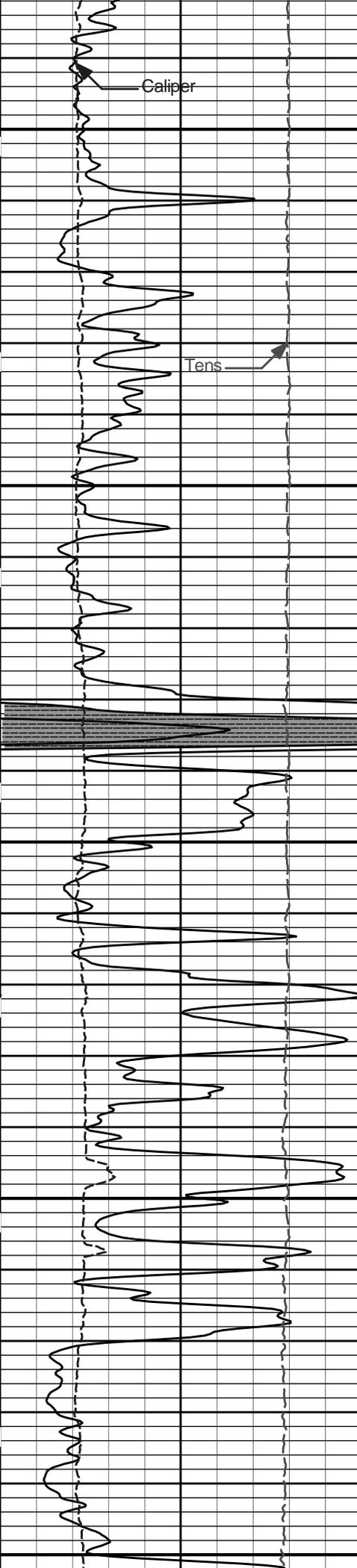
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4000



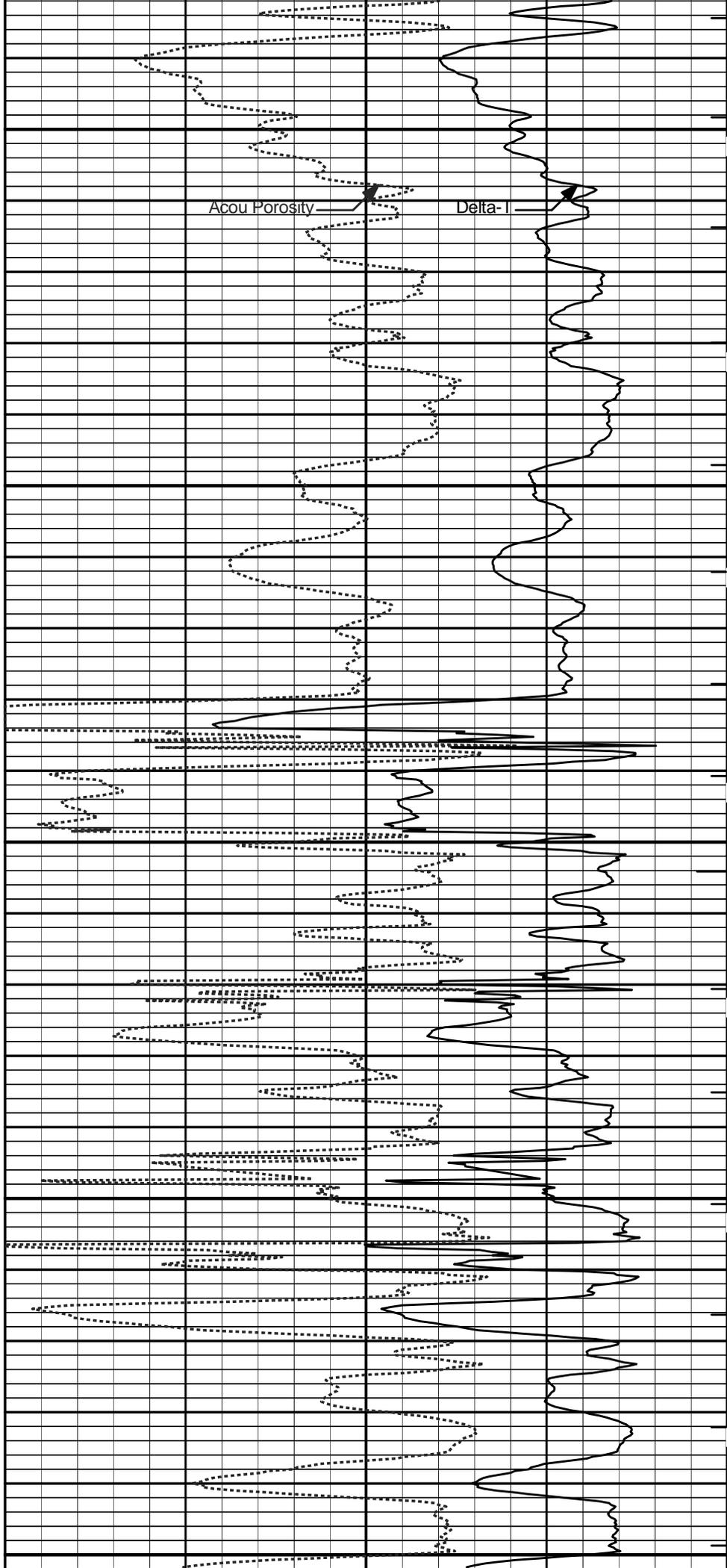
Acou Porosity

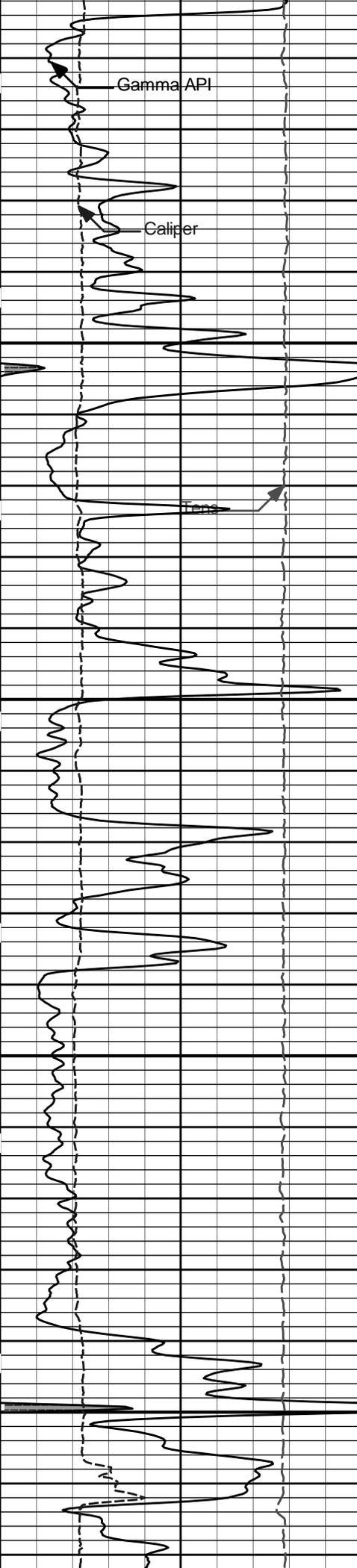
Delta-1



4100

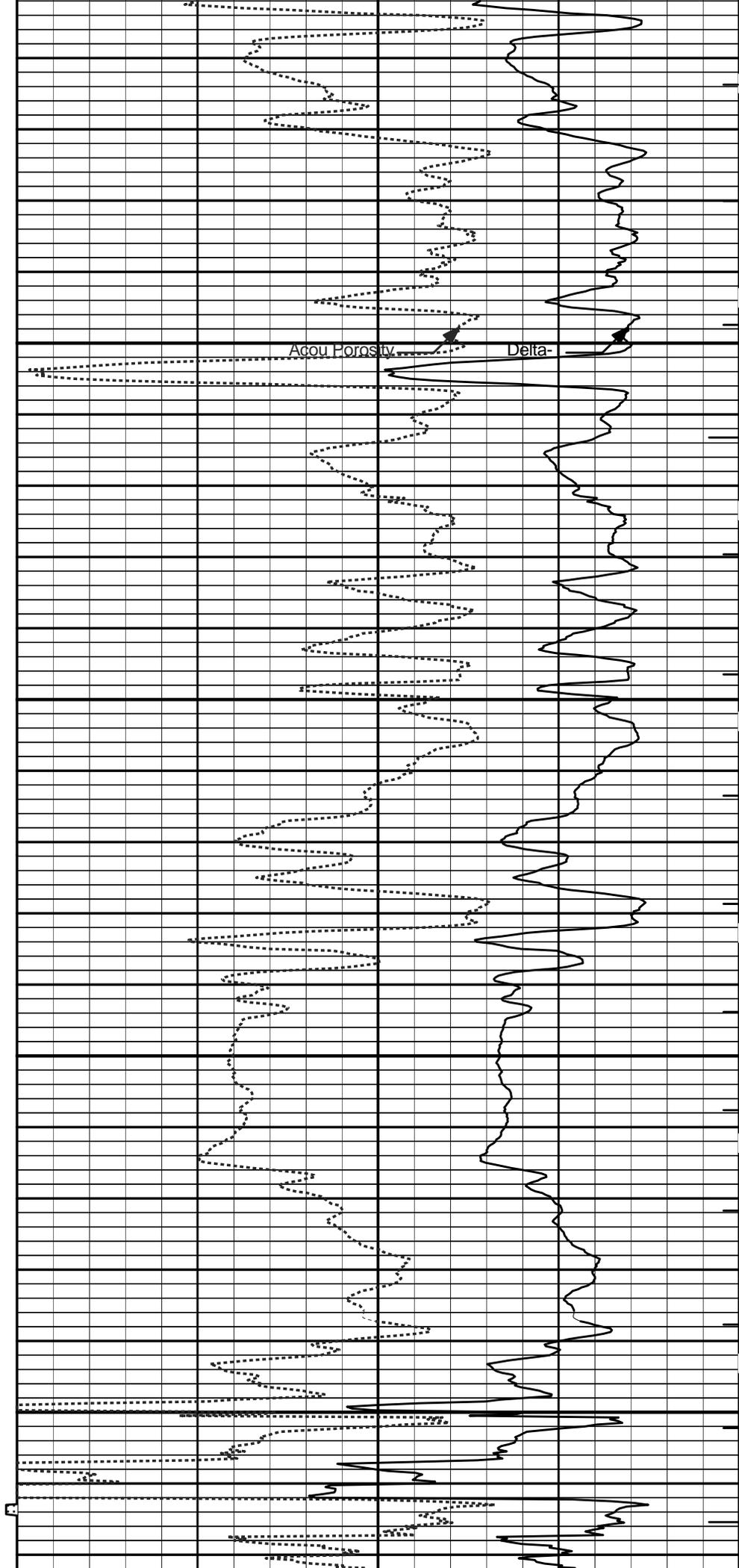
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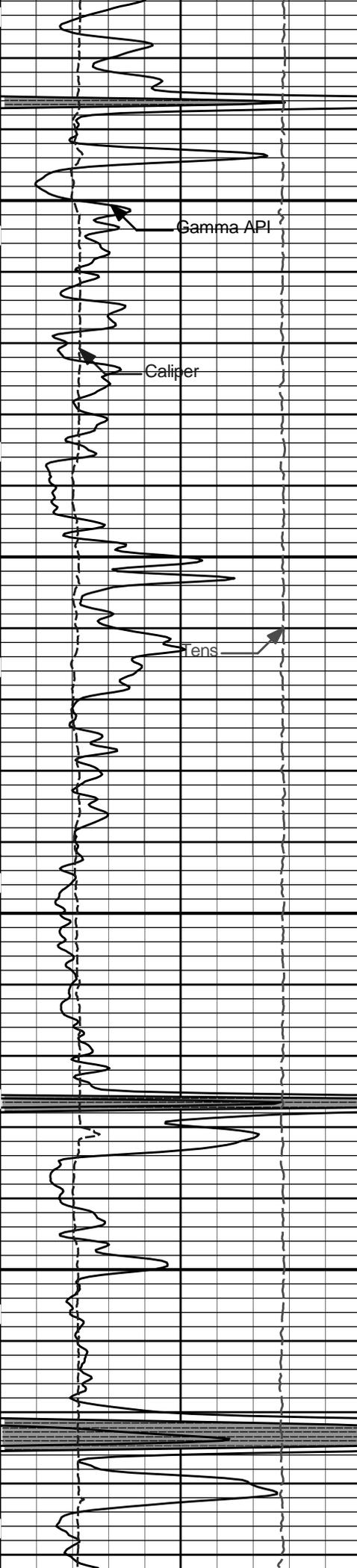




4300

4400





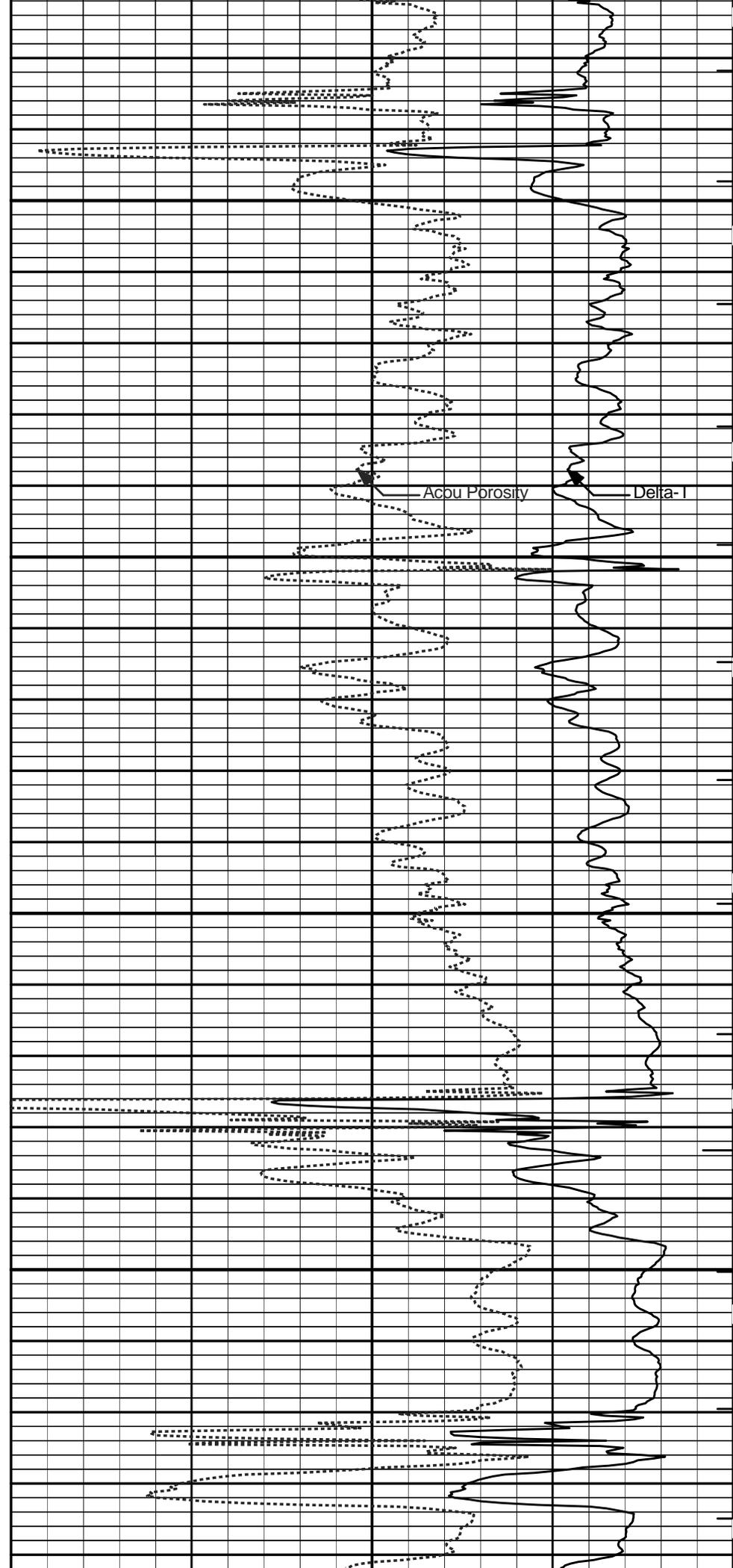
4500

Gamma API

Caliper

Density

4600



Acbu Porosity

Delta-I



4700

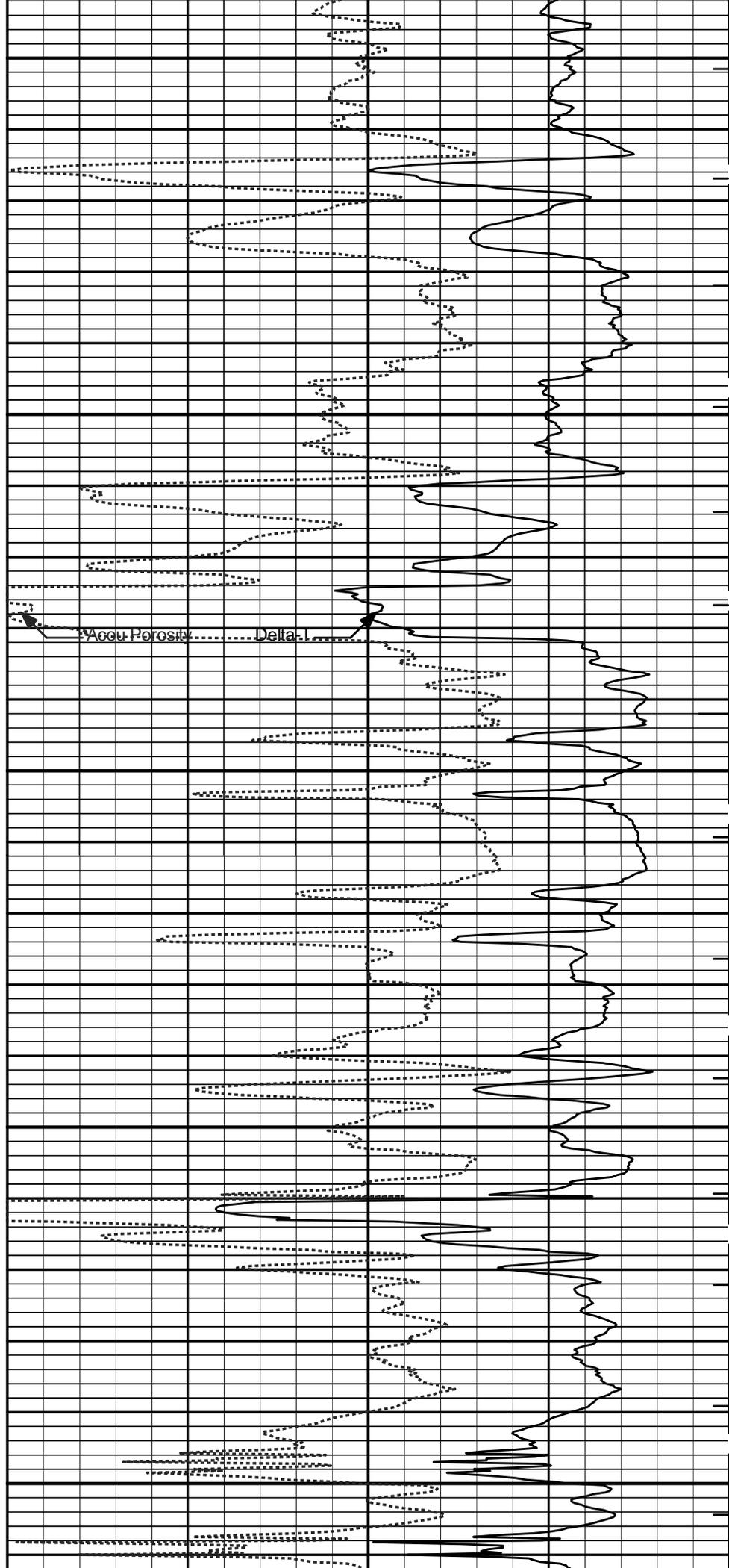
Gamma API

Caliper

GPR

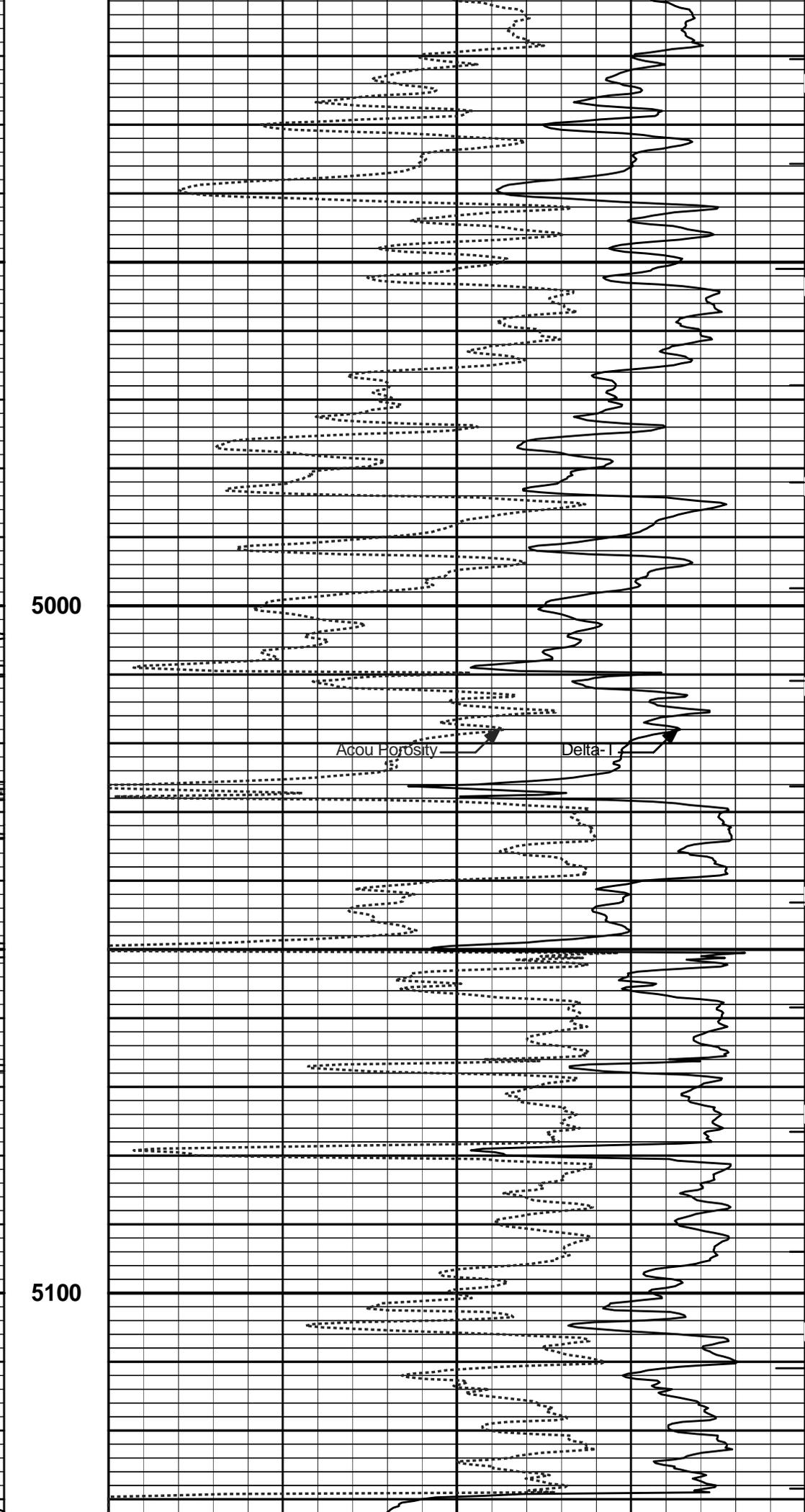
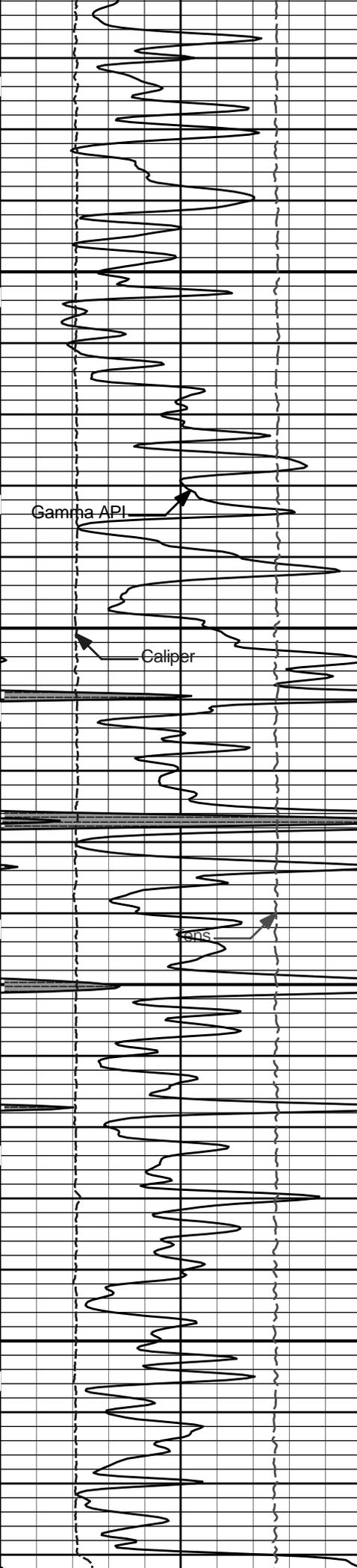
4800

4900



Accu-Positivity

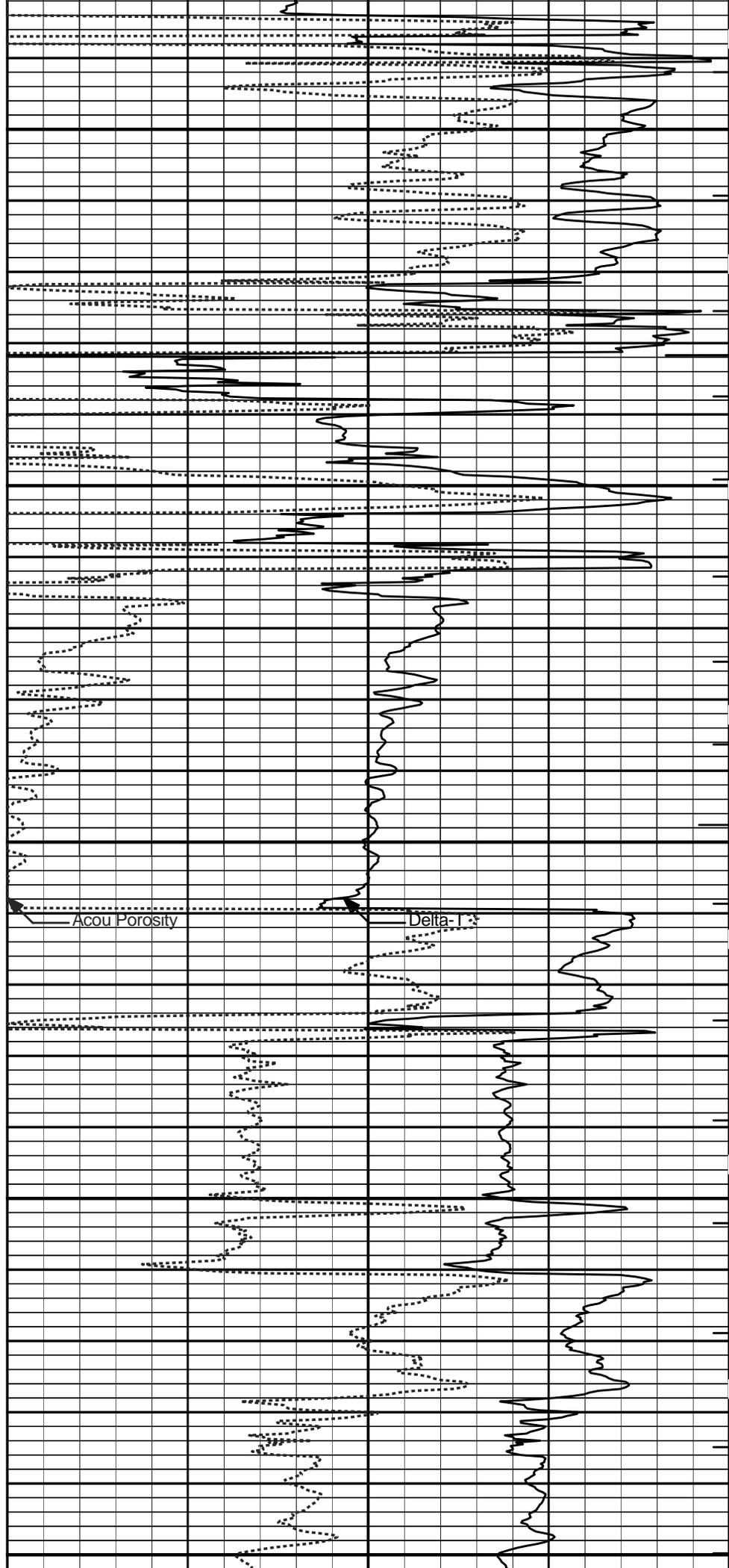
Delta-1

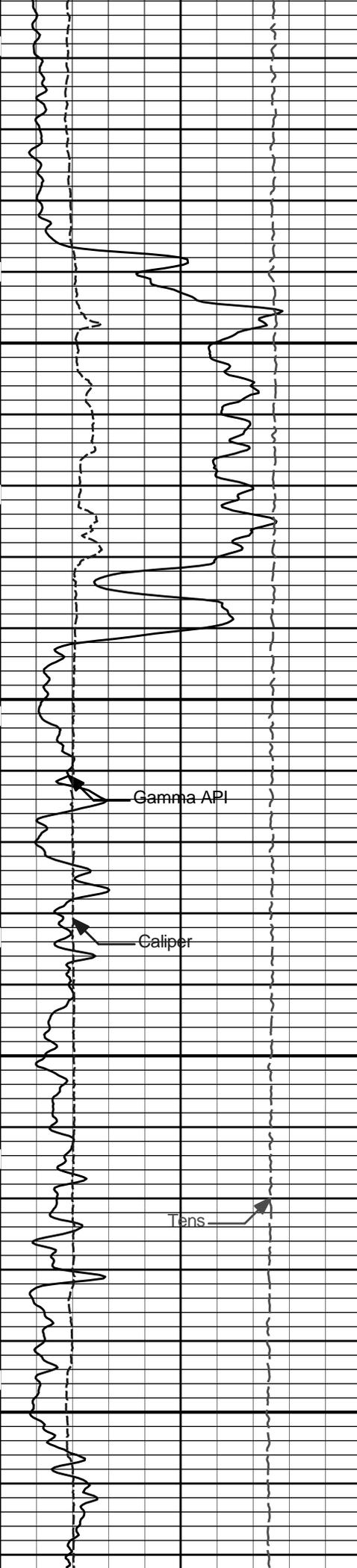




5200

5300





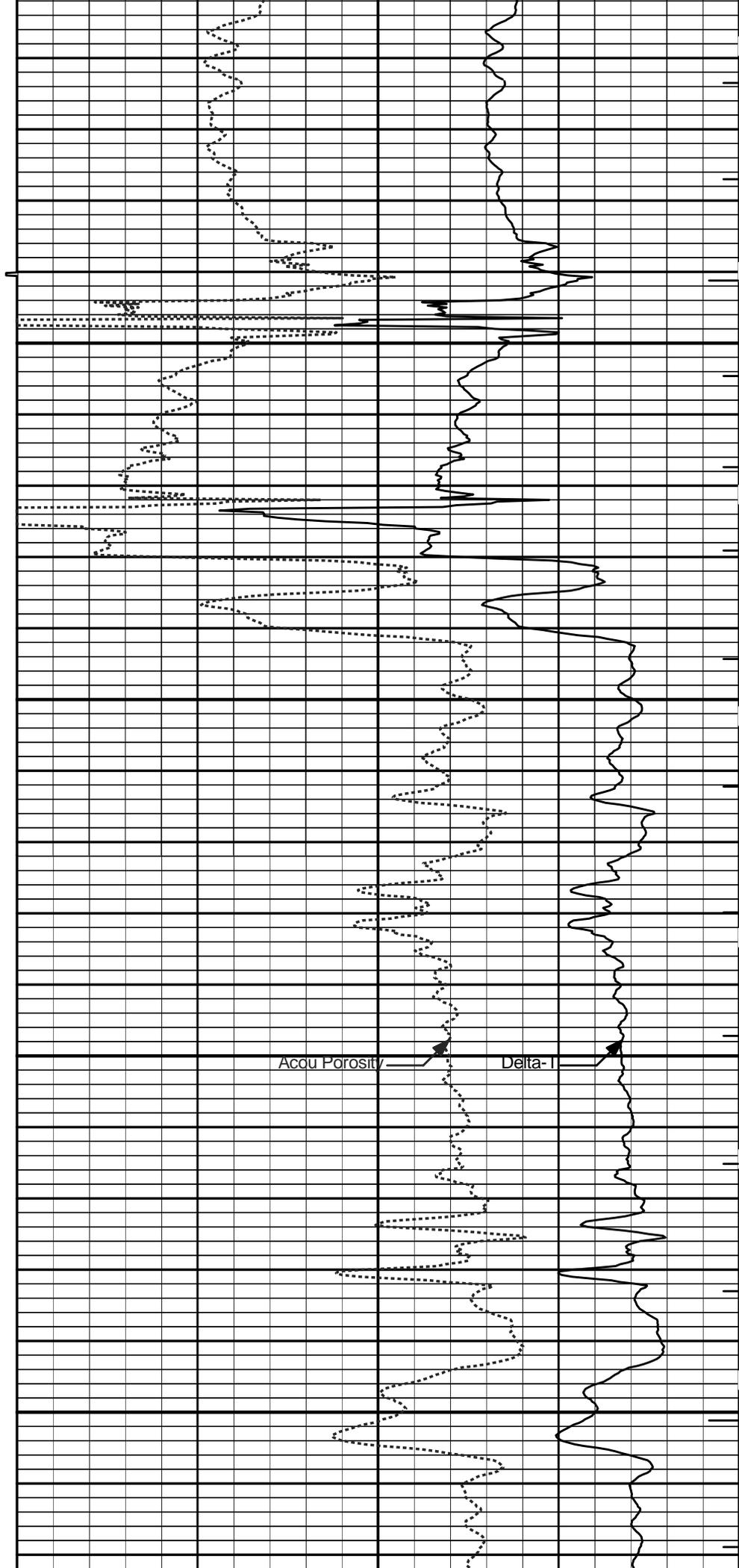
5400

5500

Gamma API

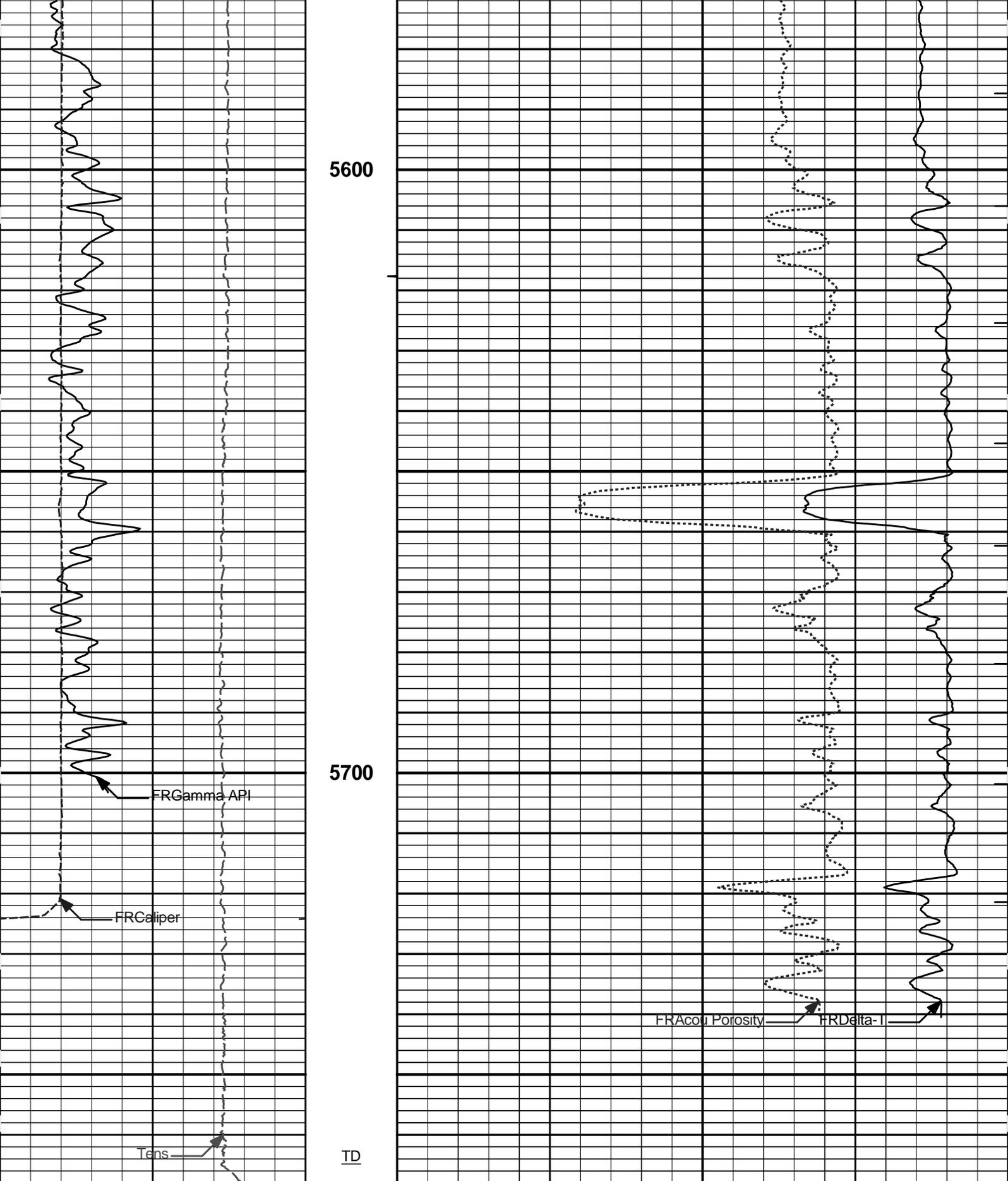
Caliper

Tens



Accu Porosity

Delta-I

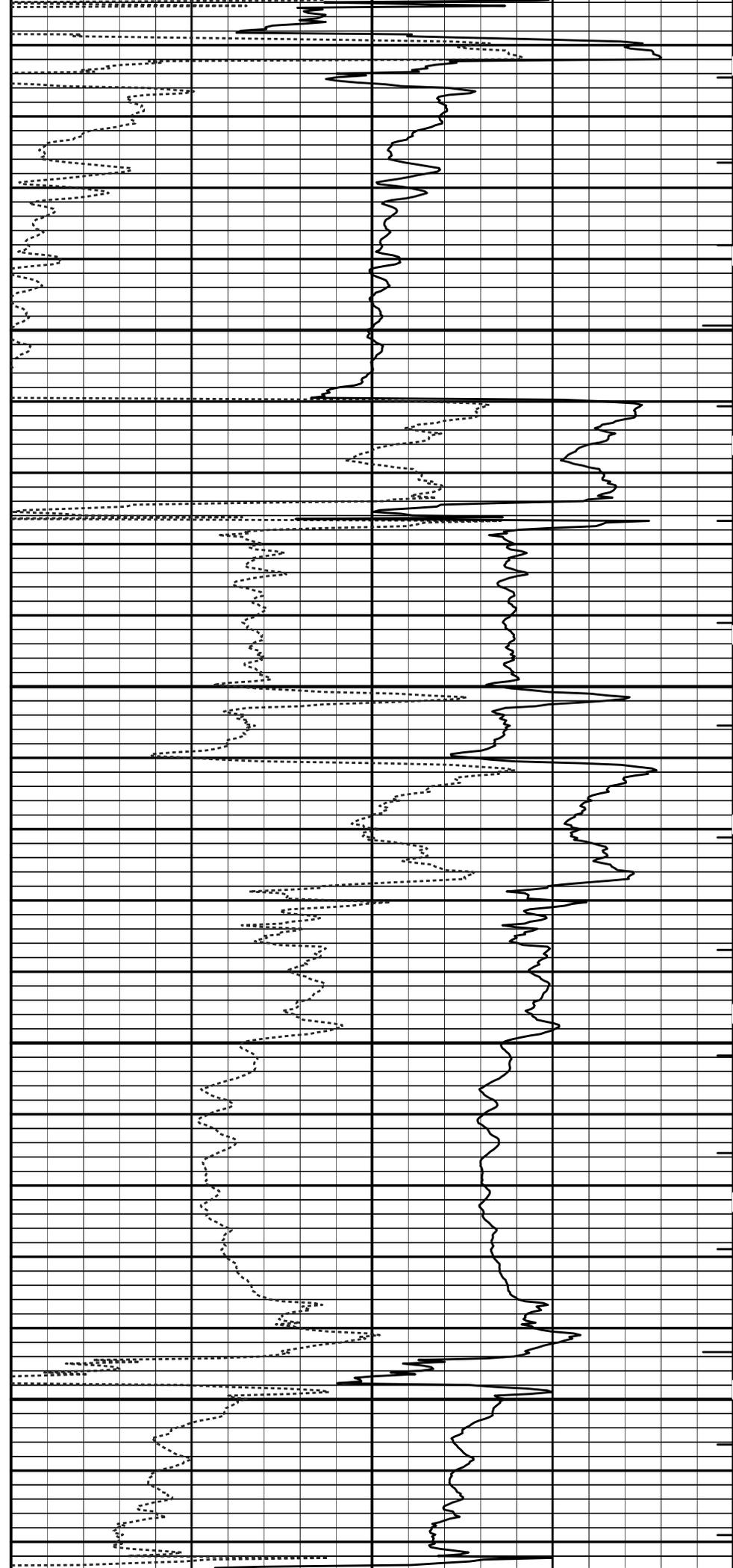


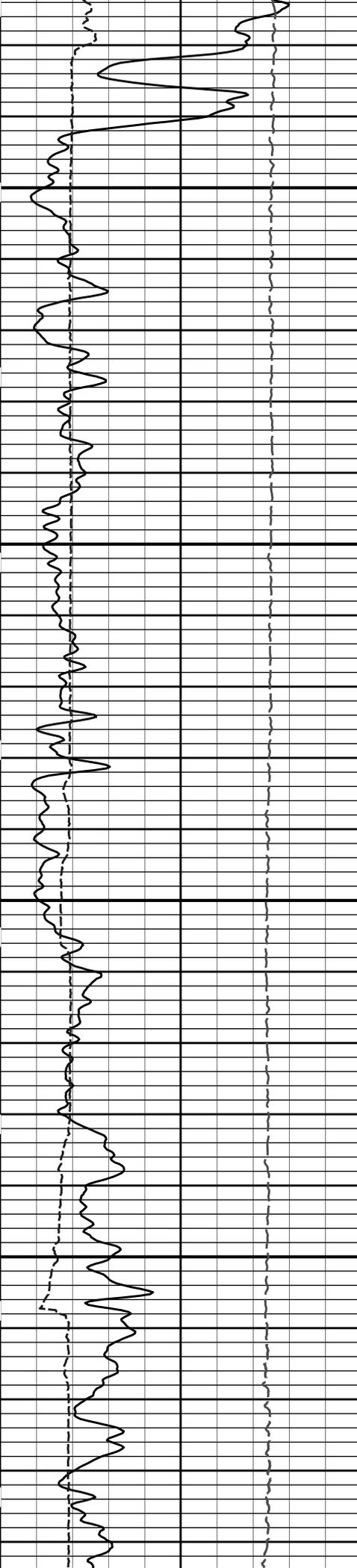
15K	Tens	0	MD	ITTT
	pounds		1 : 240	
			ft	
6	Caliper	16	Tension Pull	Delta-T
	inches		10 0 140	microsec per ft
0	Gamma API	150		Acou Porosity
				-10



5300

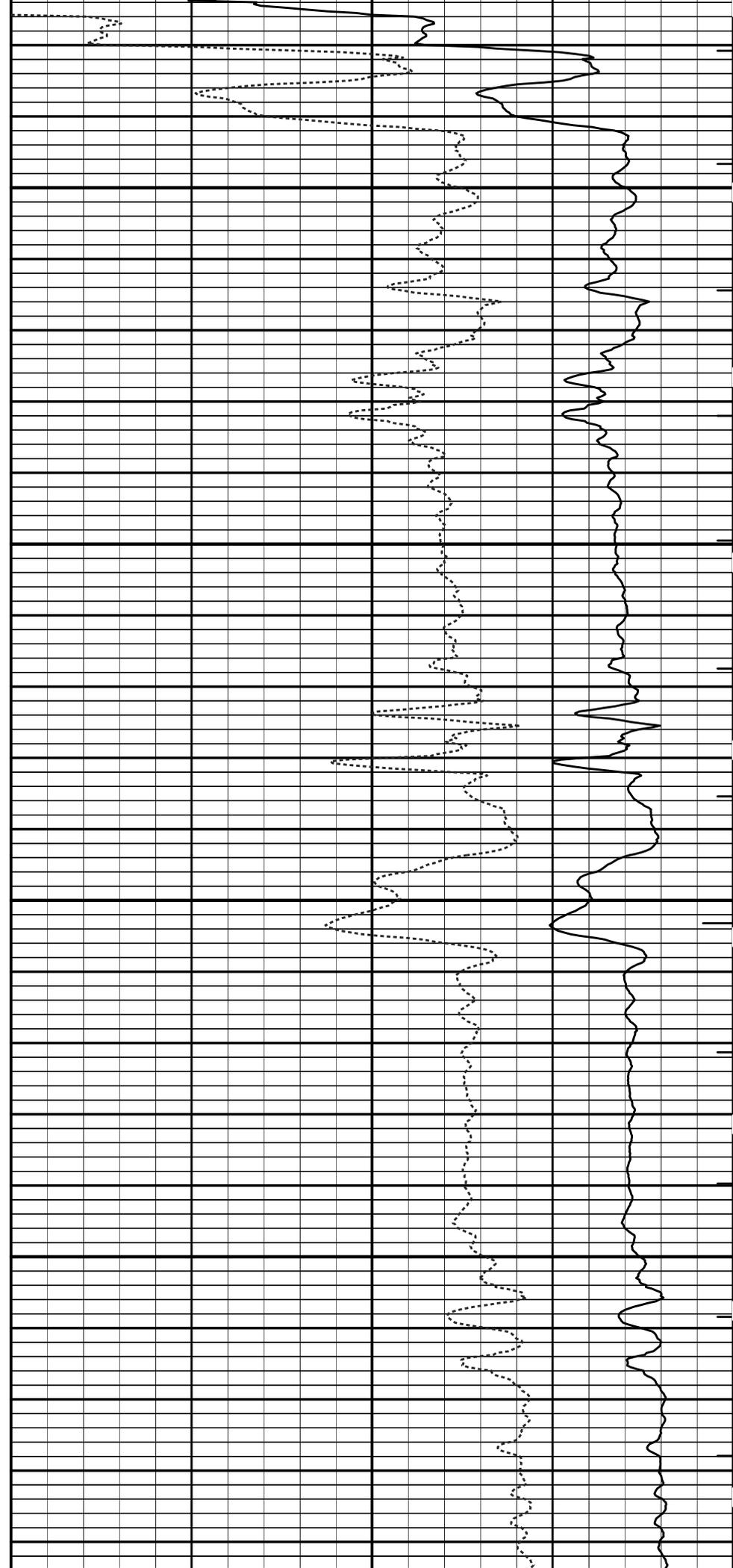
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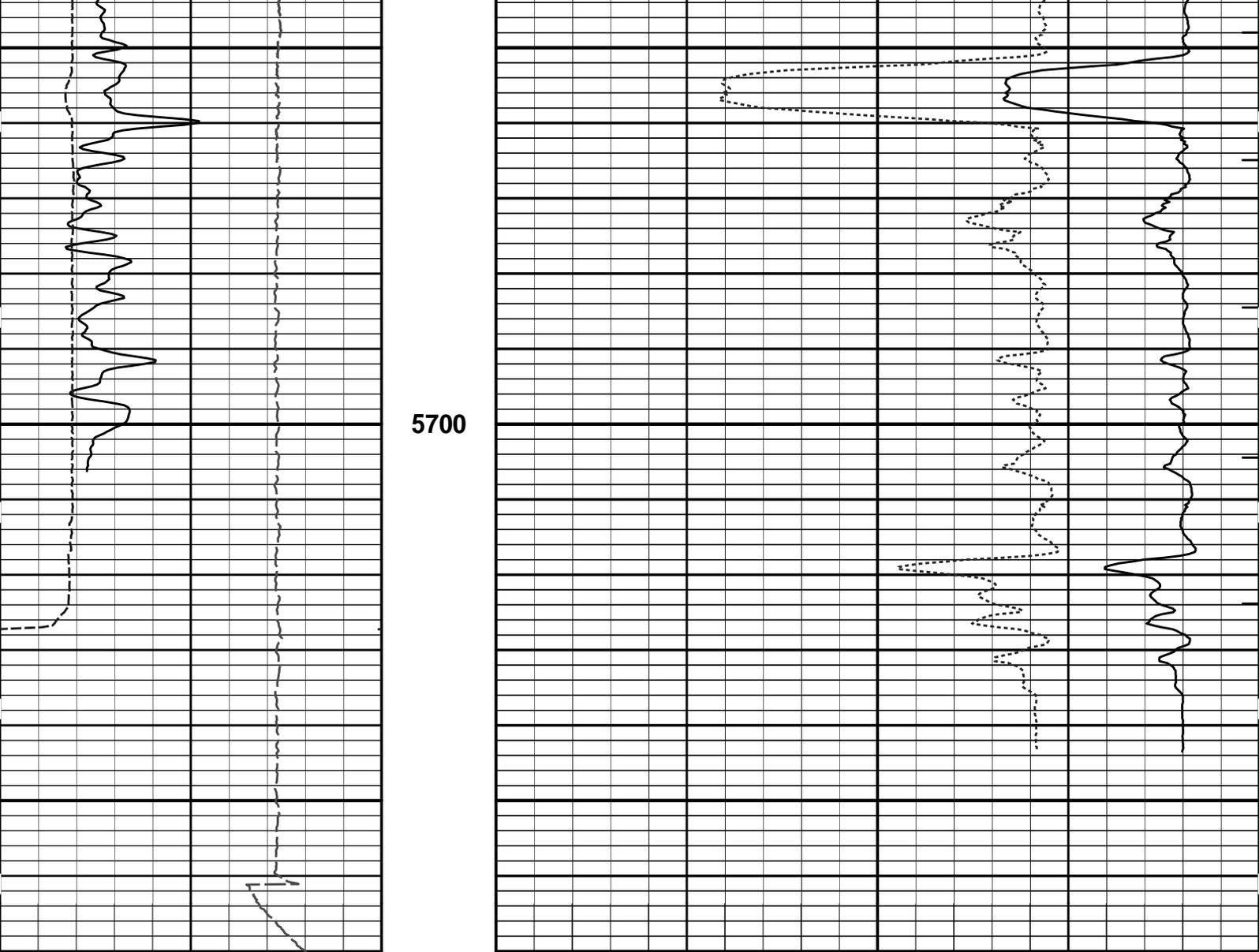




5500

5600





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

HALLIBURTON

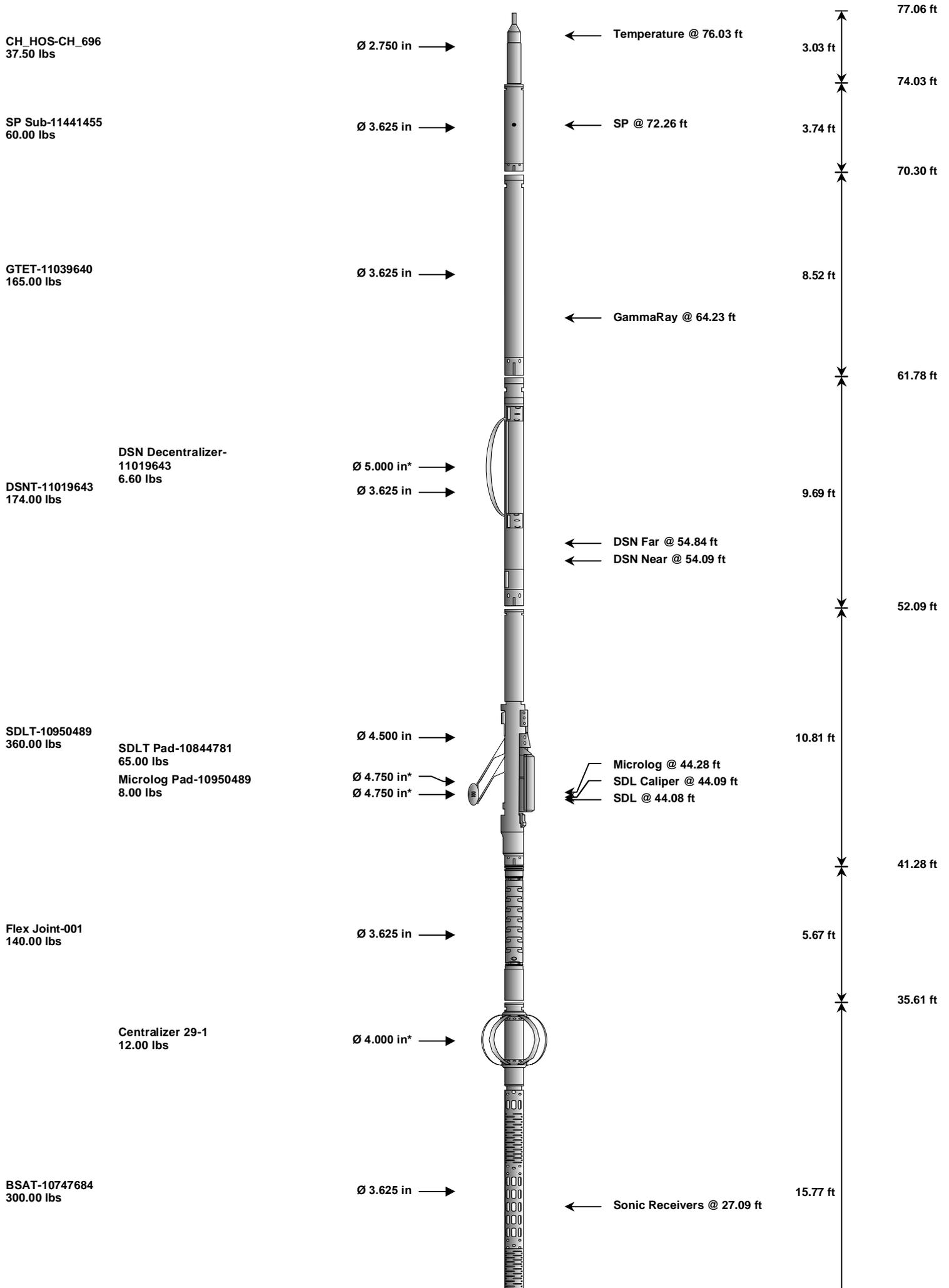
Plot Time: 02-Dec-12 20:30:17
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 Data: GRIFFIN_C_1\Well Based\REPEAT\
 Plot File: \\BSAT\BSAT_5_REP_LIB

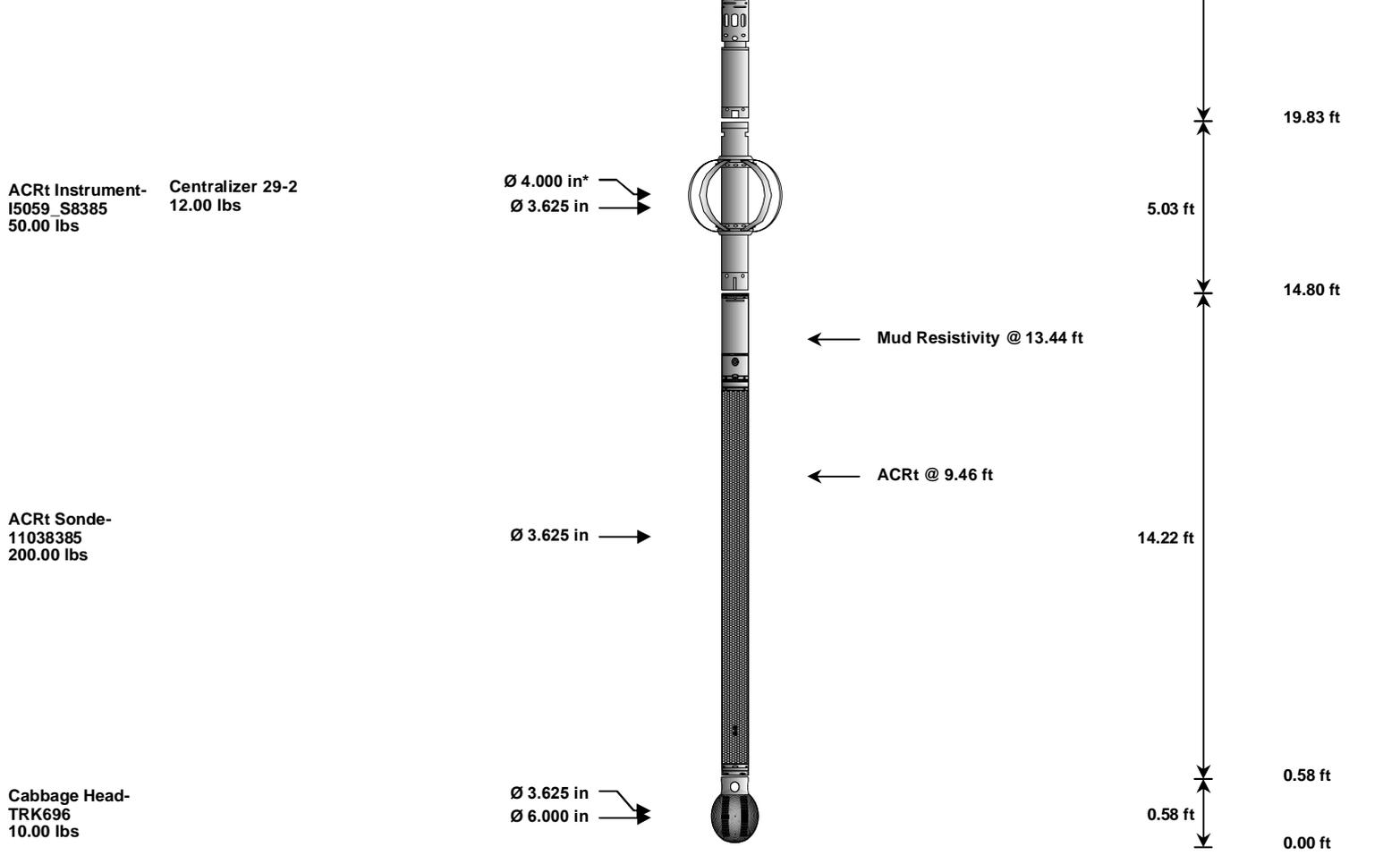
REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
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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	74.03	300.00
SP	SP Sub	11441455	60.00	3.74	70.30	300.00
GTET	Gamma Telemetry Tool	11039640	165.00	8.52	61.78	60.00
DSNT	Dual Spaced Neutron	11019643	174.00	9.69	52.09	60.00
DCNT	DSN Decentralizer	11019643	6.60	5.13	* 55.42	300.00
SDLT	Spectral Density Tool	10950489	360.00	10.81	41.28	60.00
MICP	Microlog Pad	10950489	8.00	1.00	* 43.78	60.00
SDLP	Density Insite Pad	10844781	65.00	2.55	* 43.49	60.00
FLEX	Flex Joint	001	140.00	5.67	35.61	300.00
BSAT	Borehole Sonic Array Tool	10747684	300.00	15.77	19.83	60.00
OBCEN	Centralizer - 29 in.Overbody	1	12.00	2.42	* 32.77	300.00
ACRt	Array Compensated True Resistivity Instrument Section	I5059_S8385	50.00	5.03	14.80	300.00
OBCEN	Centralizer - 29 in.Overbody	2	12.00	2.42	* 16.39	300.00
ACRt	Array Compensated True Resistivity Sonde Section	11038385	200.00	14.22	0.58	300.00
CBHD	Cabbage Head	TRK696	10.00	0.58	0.00	300.00

Total			1,600.10	77.06		
* Not included in Total Length and Length Accumulation.						
Data: GRIFFIN_C_1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHNDLE						Date: 02-Dec-12 16:58:15

HALLIBURTON

PARAMETERS REPORT

Depth ((ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	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	9.200	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	2.000	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	5796.00	ft
SHARED	BHT	Bottom Hole Temperature	200.0	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	
Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
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 for Gamma Ray Tools.	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	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Frequency Filter Low Pass Value?	5000	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 Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
BOTTOM				
Data: GRIFFIN_C_110001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHNDLE				Date: 02-Dec-12 16:59:27

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	72.25	NO	
SP	Spontaneous Potential	72.25	BLK	1.250
SPR	Raw Spontaneous Potential	72.25	NO	
SPO	Spontaneous Potential Offset	72.25	NO	
GTET				
TPUL	Tension Pull	64.23	NO	
GR	Natural Gamma Ray API	64.23	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	64.23	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	64.23	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
DSNT				
TPUL	Tension Pull	53.99	NO	
RNDS	Near Detector Telemetry Counts	54.09	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.84	TRI	0.583
DNTT	DSN Tool Temperature	54.09	NO	
DSNS	DSN Tool Status	53.99	NO	
ERND	Near Detector Telemetry Counts EVR	54.09	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.84	BLK	0.000
ENTM	DSN Tool Temperature EVR	54.09	NO	
SDLT				
TPUL	Tension Pull	44.09	NO	
PCAL	Pad Caliper	44.09	TRI	0.250
ACAL	Arm Caliper	44.09	TRI	0.250

ACAL	Ann Caliper	44.09	TRI	0.230
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	
GMOD	Gain processing mode	19.83	NO	
ACRt Sonde				
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
TEMP	Upper Encasing Temperature Calculated	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	

SDLT Pad

TPUL	Tension Pull	44.08	NO	
NAB	Near Above	43.90	BLK	0.920
NHI	Near Cesium High	43.90	BLK	0.920
NLO	Near Cesium Low	43.90	BLK	0.920
NVA	Near Valley	43.90	BLK	0.920
NBA	Near Barite	43.90	BLK	0.920
NDE	Near Density	43.90	BLK	0.920
NPK	Near Peak	43.90	BLK	0.920
NLI	Near Lithology	43.90	BLK	0.920
NBAU	Near Barite Unfiltered	43.90	BLK	0.250
NLIU	Near Lithology Unfiltered	43.90	BLK	0.250
FAB	Far Above	44.26	BLK	0.250
FHI	Far Cesium High	44.26	BLK	0.250
FLO	Far Cesium Low	44.26	BLK	0.250
FVA	Far Valley	44.26	BLK	0.250
FBA	Far Barite	44.26	BLK	0.250
FDE	Far Density	44.26	BLK	0.250
FPK	Far Peak	44.26	BLK	0.250
FLI	Far Lithology	44.26	BLK	0.250
PTMP	Pad Temperature	44.09	BLK	0.920
NHV	Near Detector High Voltage	43.49	NO	
FHV	Far Detector High Voltage	43.49	NO	
ITMP	Instrument Temperature	43.49	NO	
DDHV	Detector High Voltage	43.49	NO	

Microlog Pad

TPUL	Tension Pull	44.28	NO	
MINV	Microlog Lateral	44.28	BLK	0.750
MNOR	Microlog Normal	44.28	BLK	0.750

Data: GRIFFIN_C_1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-CHIDLE

Date: 02-Dec-12 16:59:39

COMPANY	OXY USA INC		
WELL	GRIFFIN C-1		
FIELD	HUGOTON GAS AREA		
COUNTY	HASKELL	STATE	KANSAS

HALLIBURTON

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