

HALLIBURTON

BOREHOLE COMPENSATED
SONIC ARRAY
LOG

COMPANY		HARTMAN OIL CO.	
WELL		GARDEN CITY B TWIN #5	
FIELD/BLOCK		DAMME	
COUNTY		FINNEY	
STATE		KANSAS	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		30-Aug-13	
Run No.		ONE	
Depth - Driller		4830.00 ft	
Depth - Logger		4824.0 ft	
Bottom - Logged Interval		4797.0 ft	
Top - Logged Interval		332.0 ft	
Casing - Driller		8.625 in @ 337.0 ft	
Casing - Logger		332.0 ft	
Bit Size		7.875 in @	
Type Fluid in Hole		WATER BASED MUD	
Density		9.5 ppg 53.00 s/qt	
PH		10.50 pH 8.0 cp/m	
Source of Sample		MUD PIT	
Rm @ Meas. Temperature		1.220 ohmm @ 75.00 degF	
Rmf @ Meas. Temperature		1.00 ohmm @ 75.00 degF	
Rmc @ Meas. Temperature		1.900 ohmm @ 75.00 degF	
Source Rmf		MEASURED	
Rm @ BHT		0.73 ohmm @ 130.0 degF	
Time Since Circulation		5.0 hr	
Time on Bottom		30-Aug-13 08:42	
Max. Rec. Temperature		130.0 degF @ 4824.0 ft	
Equipment		11230668 LIBERAL	
Recorded By		J. BOLLOW	
Witnessed By		K. NOAH	

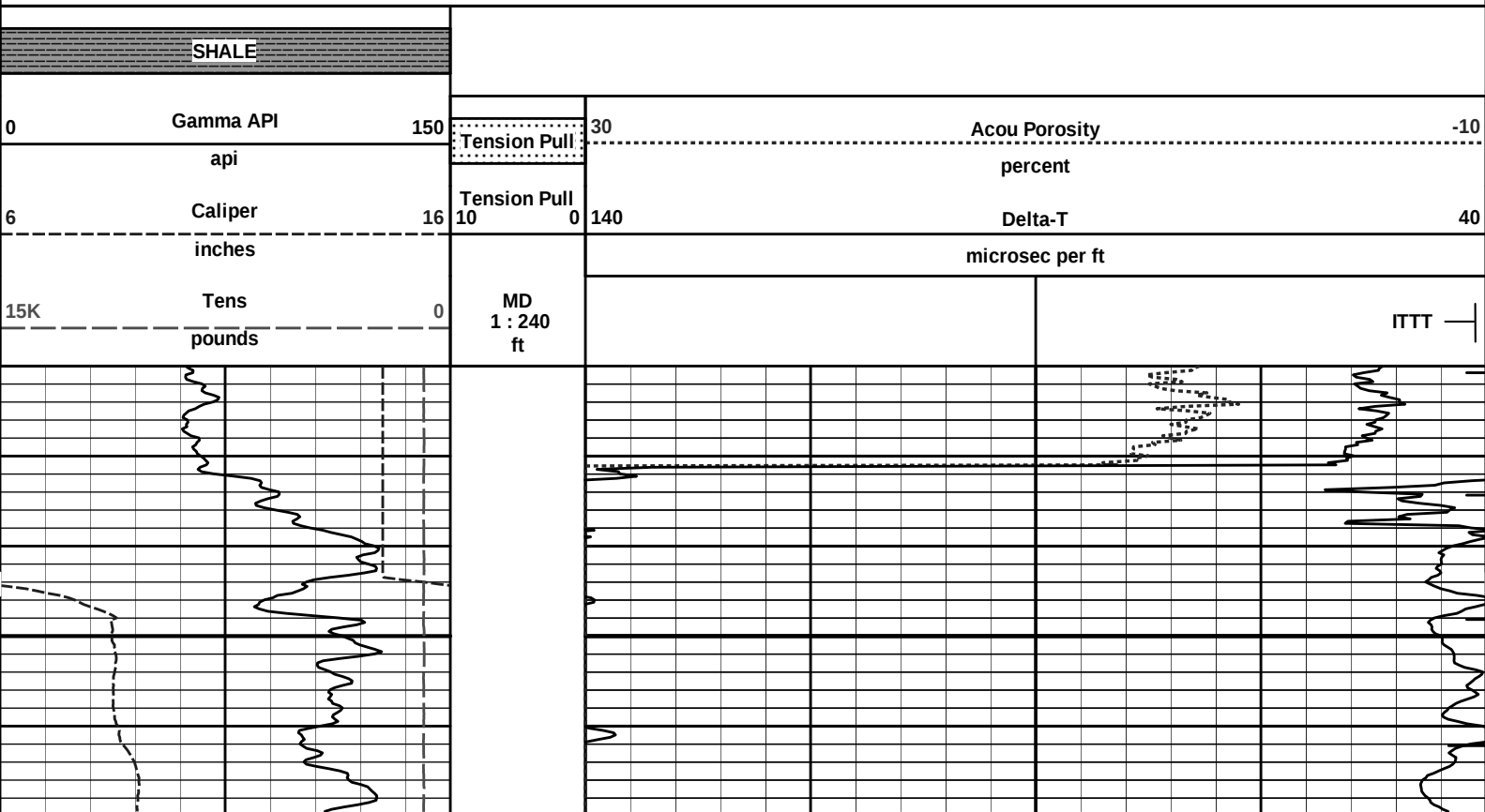
COMPANY	HARTMAN OIL CO.
WELL	GARDEN CITY B TWIN #5
FIELD/BLOCK	DAMME
COUNTY	FINNEY
STATE	KANSAS
API No.	15-055-22234-00-00
Location	(SHL) 1880' FSL & 1980' FEL N2 SE NW SE
Other Services:	MICROLOG DSNT'S DLT ACRT

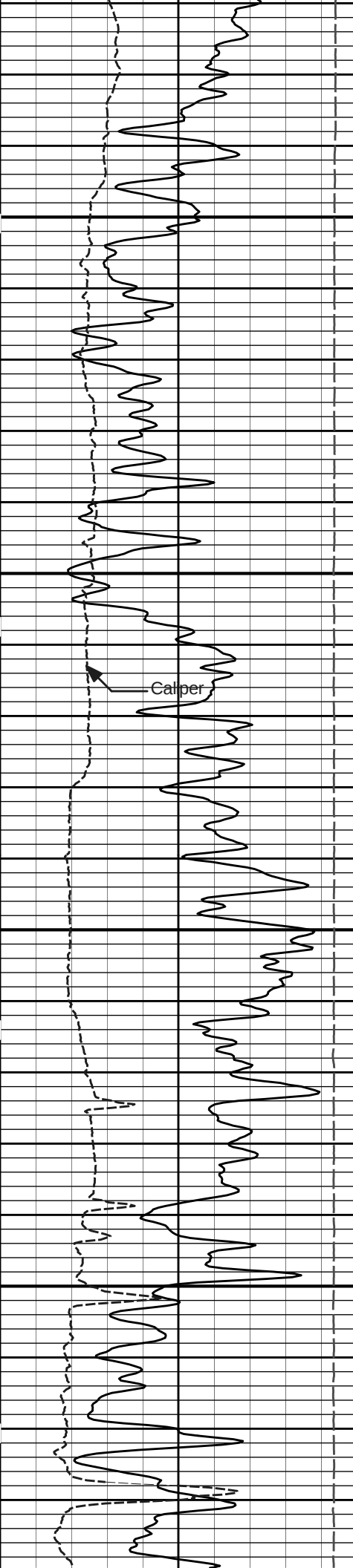
Sect.	5	Twp.	22S	Rge.	33W	Elev.: K.B.	2900.0 ft
						D.F.	2899.0 ft
						G.L.	2888.0 ft

Fold here

Service Ticket No.: 900688933				API Serial No.: 15-055-22234-00-00				PGM Version: WL INSITE R3.8.4 (Build 5)							
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.		10748374		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		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			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	4824	332	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 3,000 PPM														
LCM REPORTED AT 6 LB/BBL														
GTET-DSNT-SDLT-BSAT-ACRT RUN IN COMBINATION														
TODAY'S CREW: F. VILLA & 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.														
HALLIBURTON														

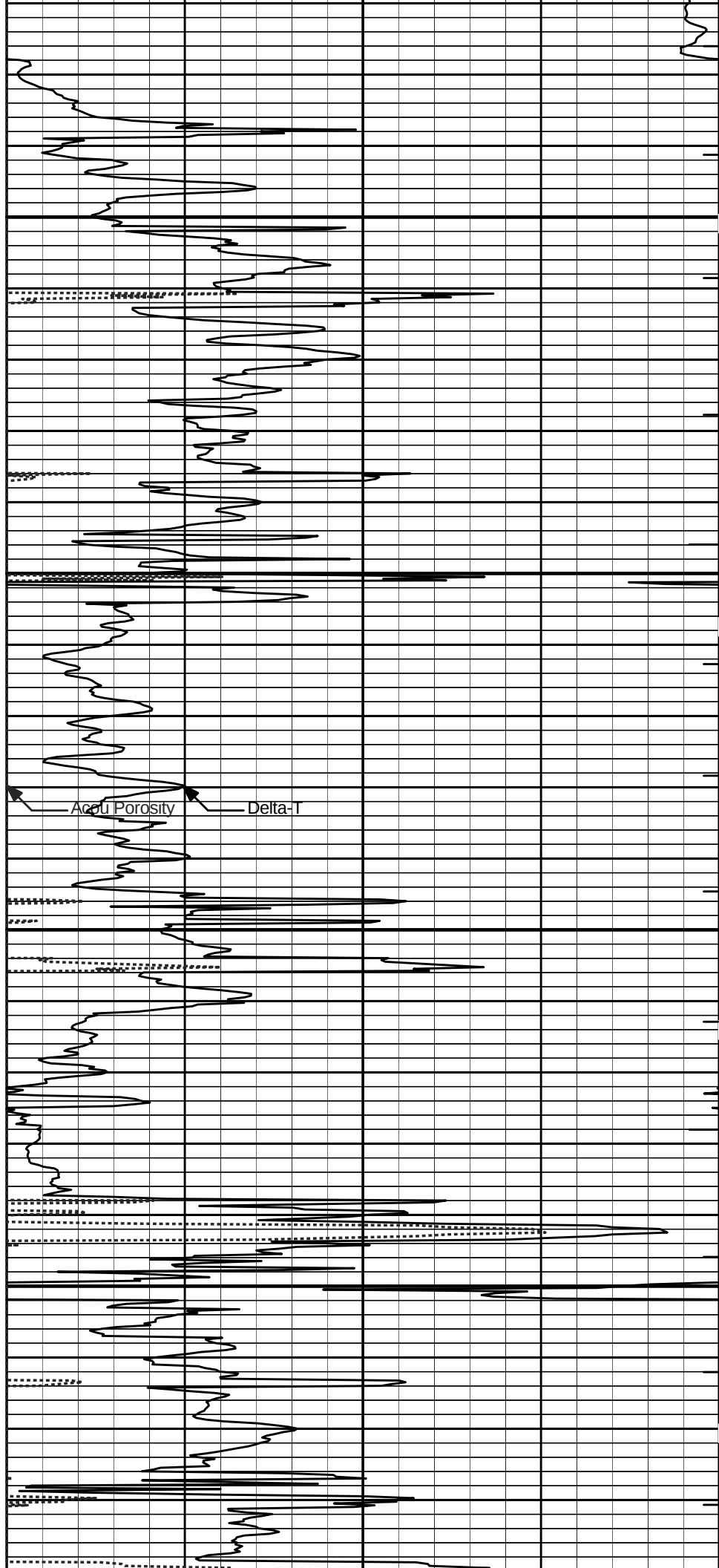




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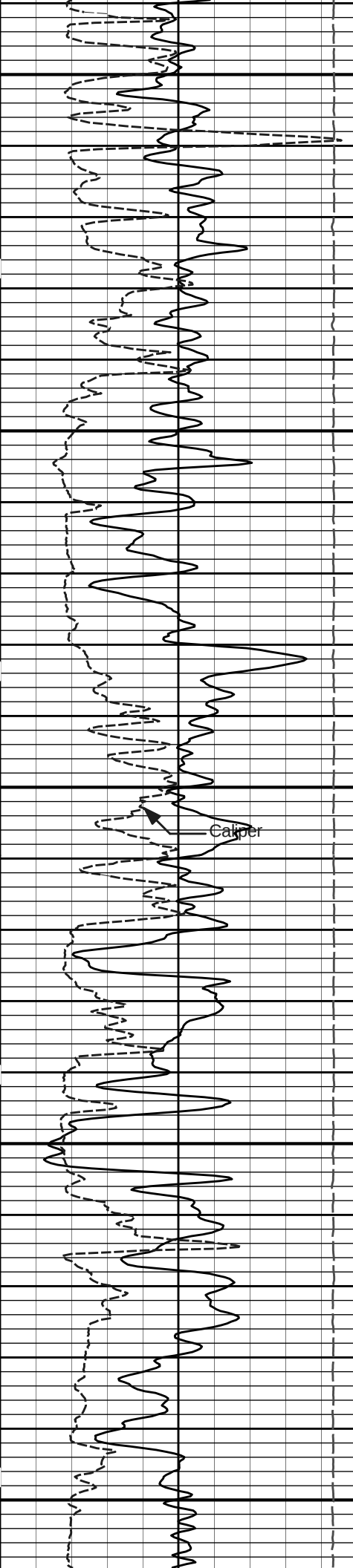
500

Caliper



Acoustic Porosity

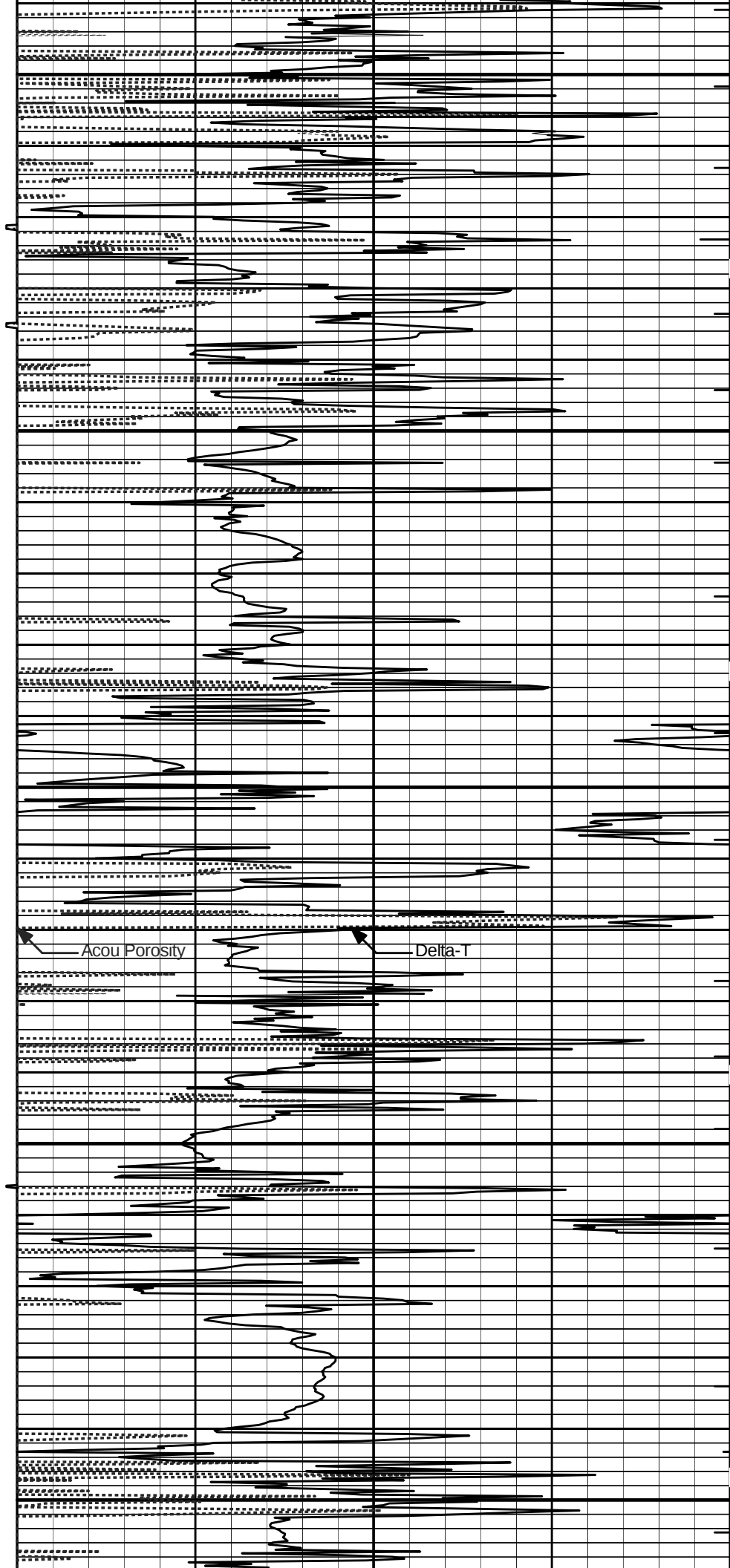
Delta-T

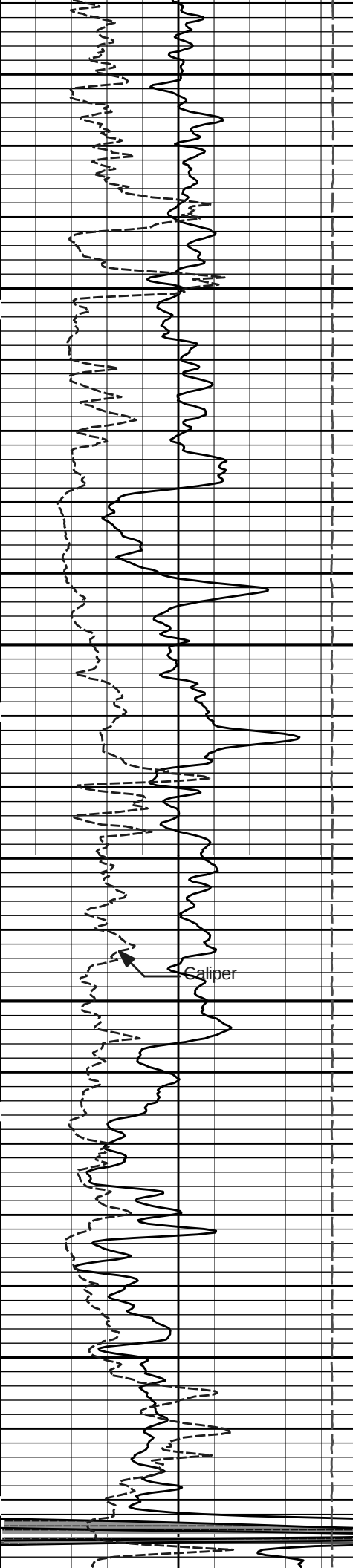


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700

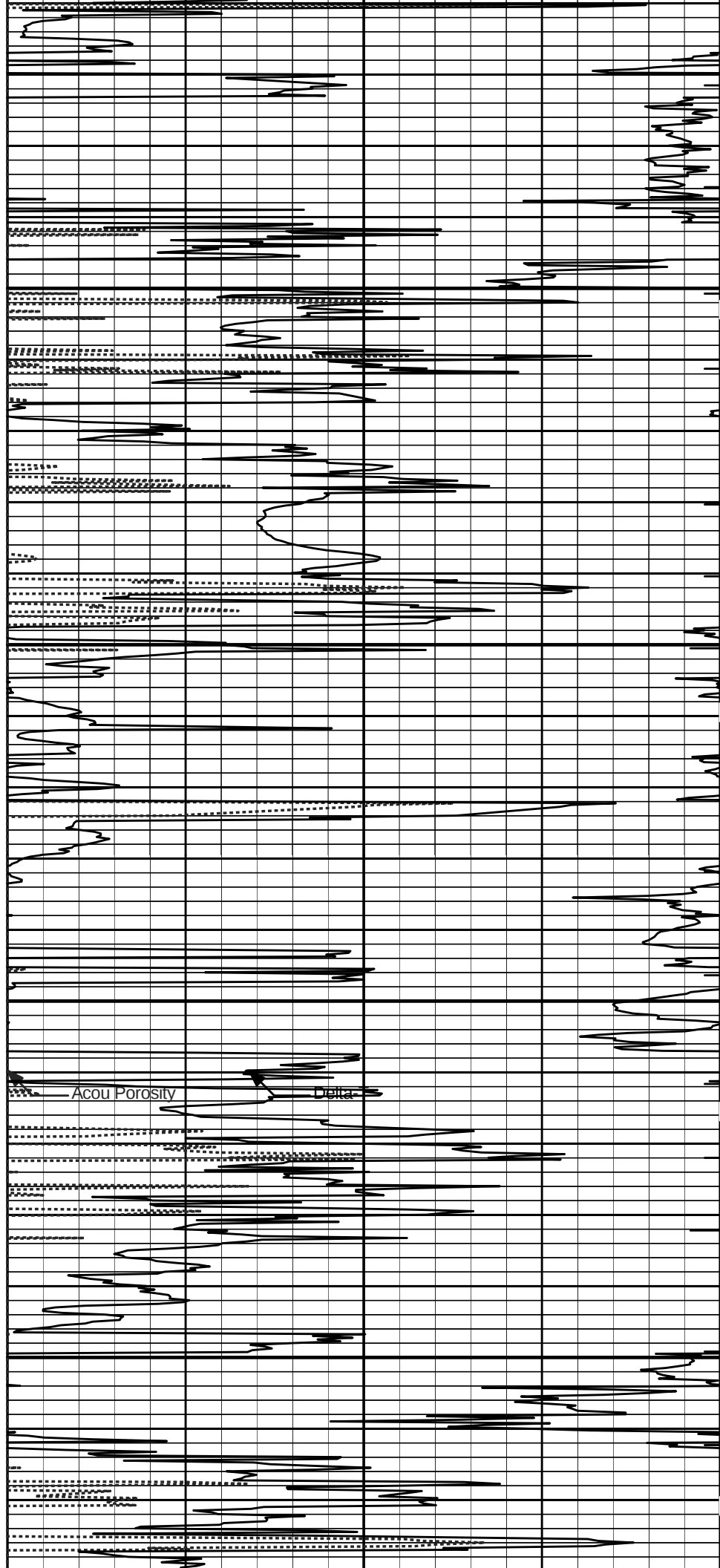
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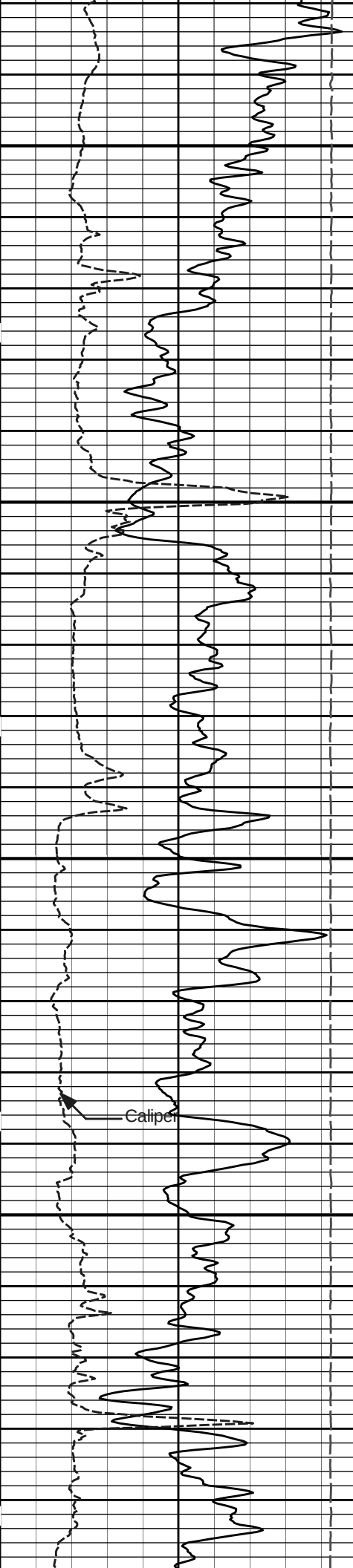




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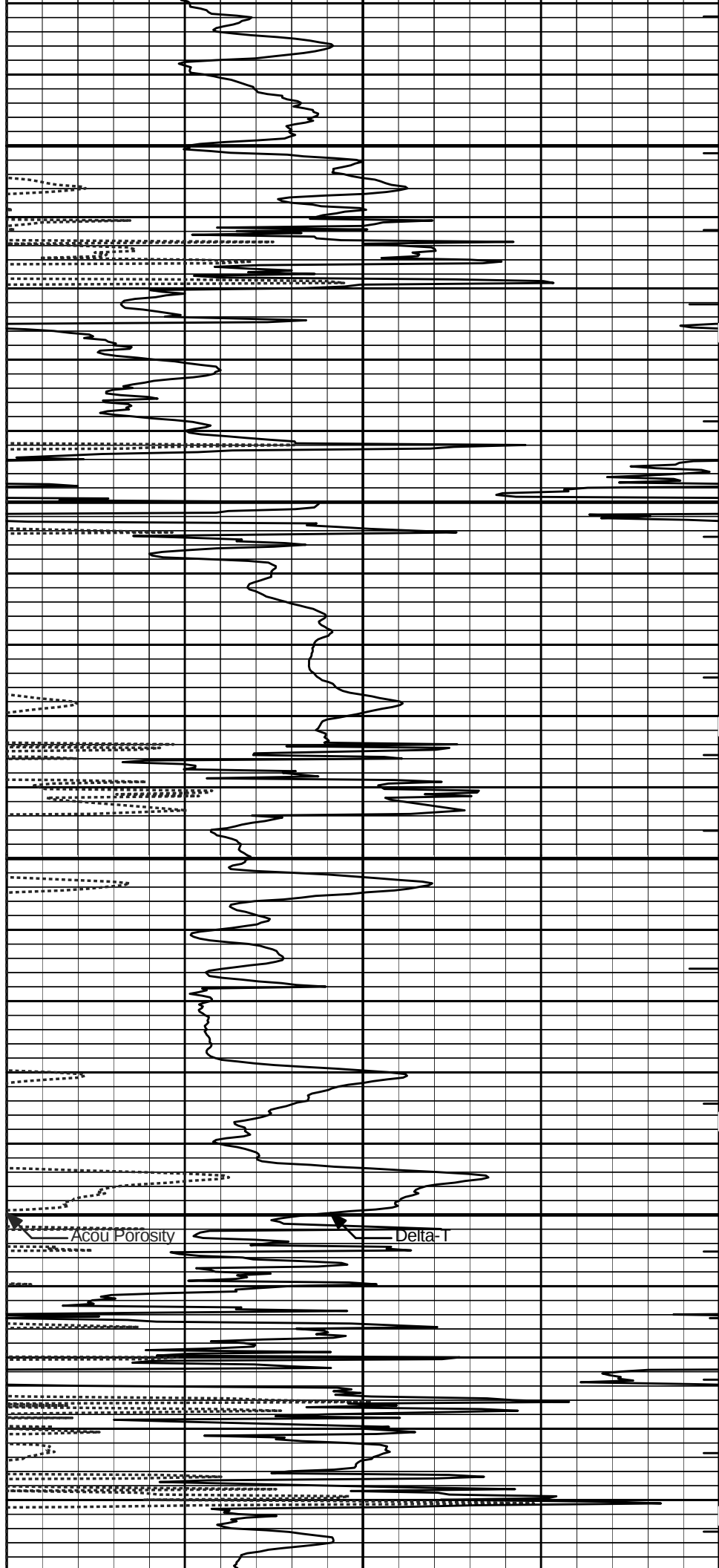
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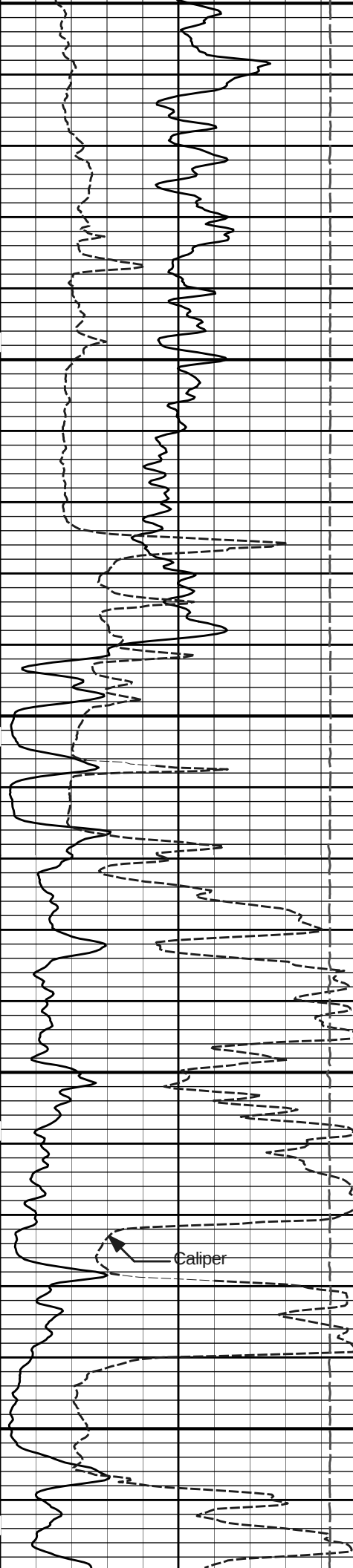




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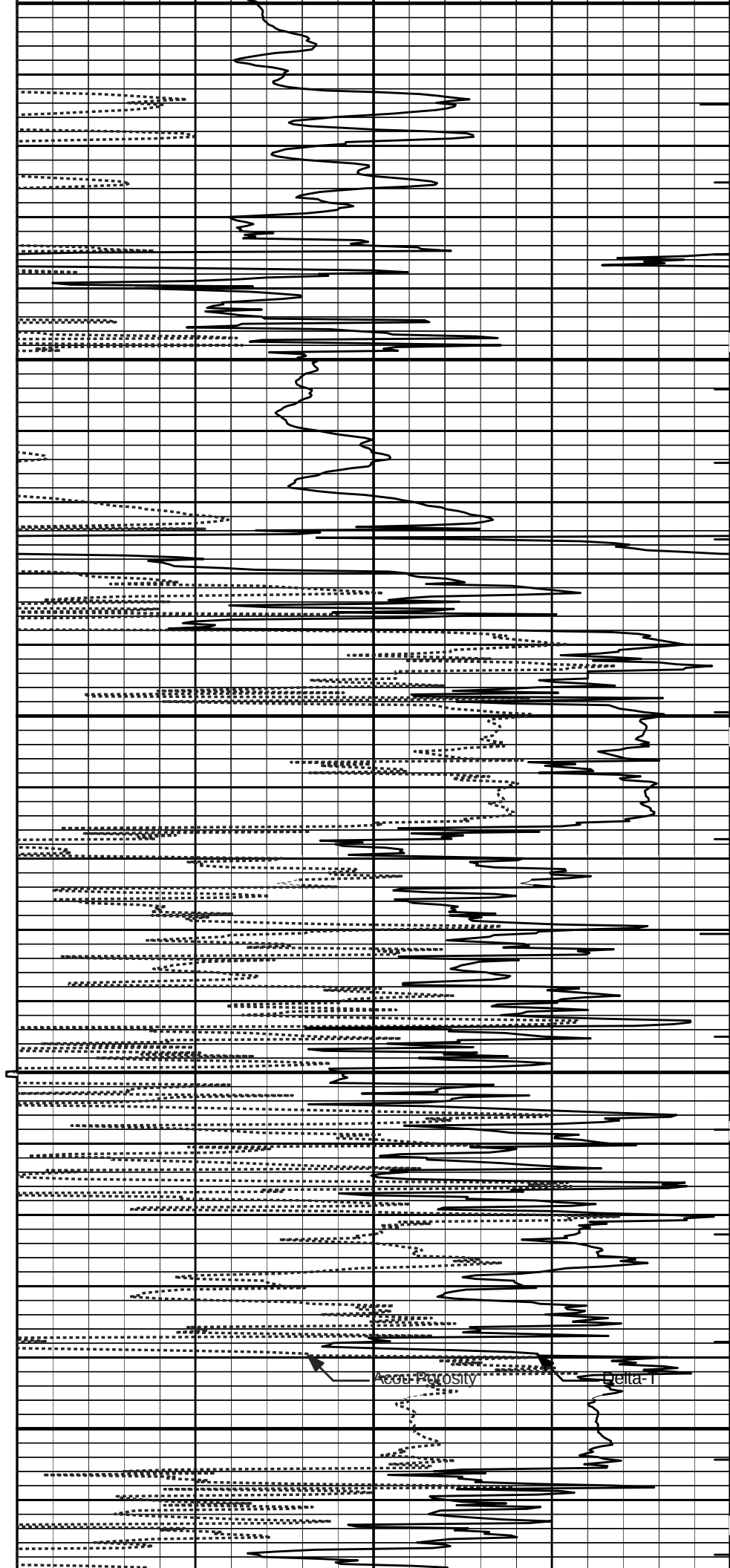
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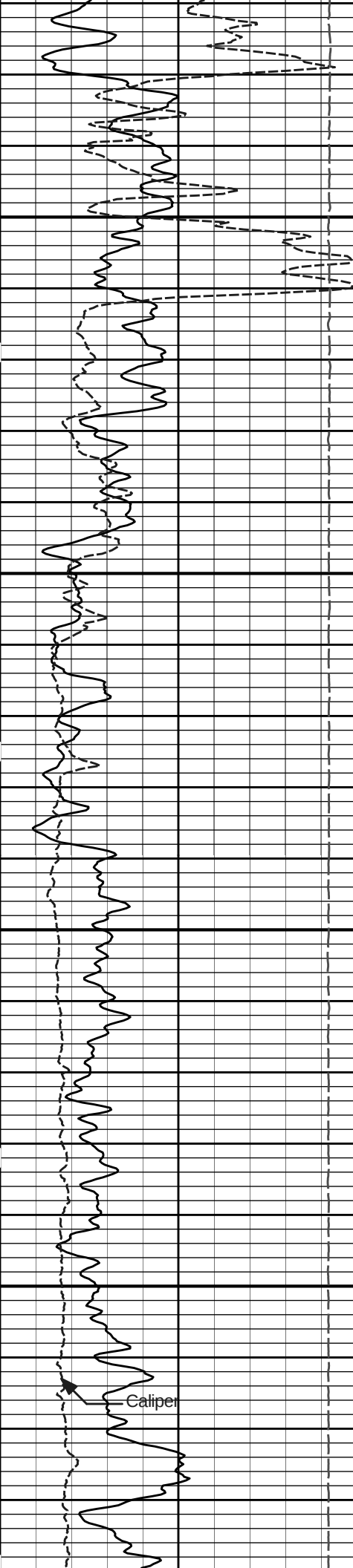




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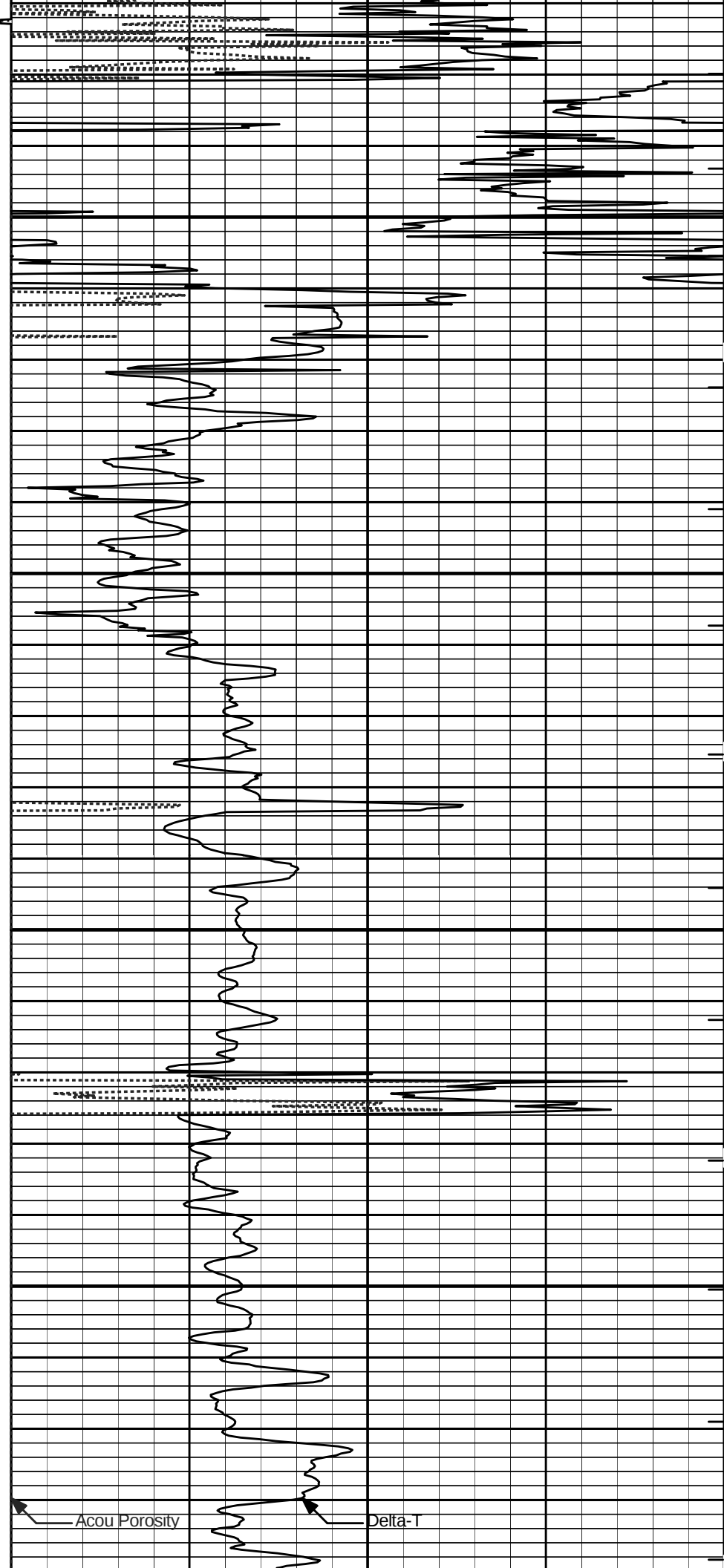
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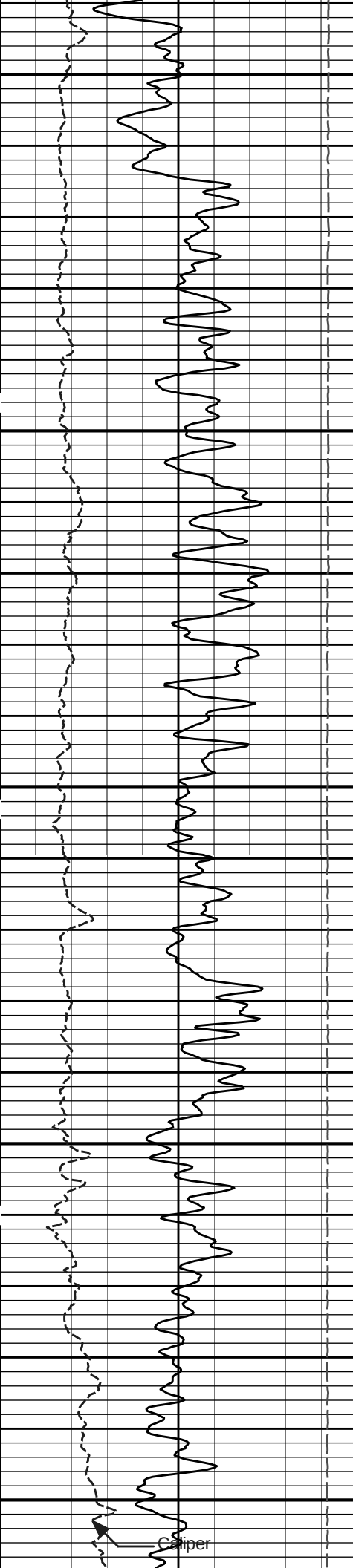




1500

1600

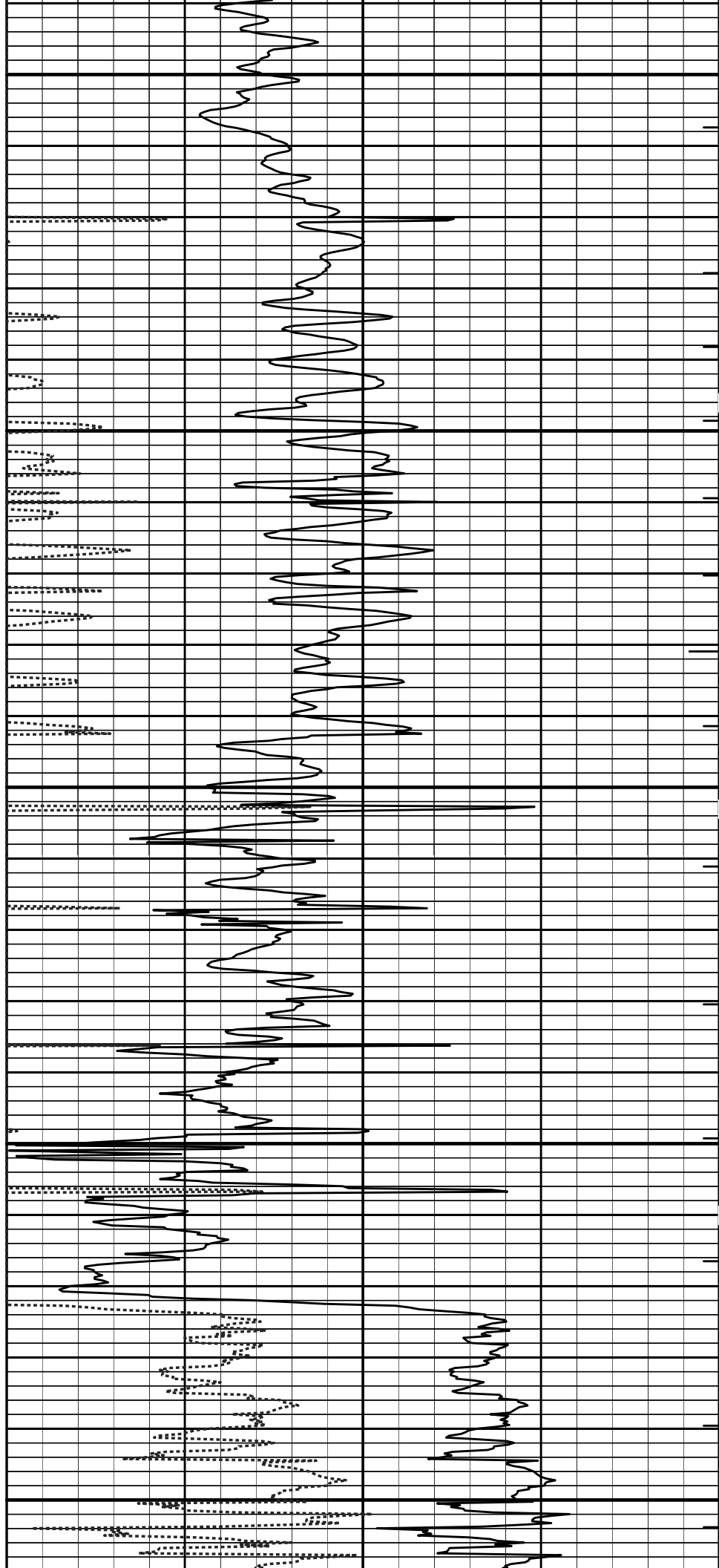


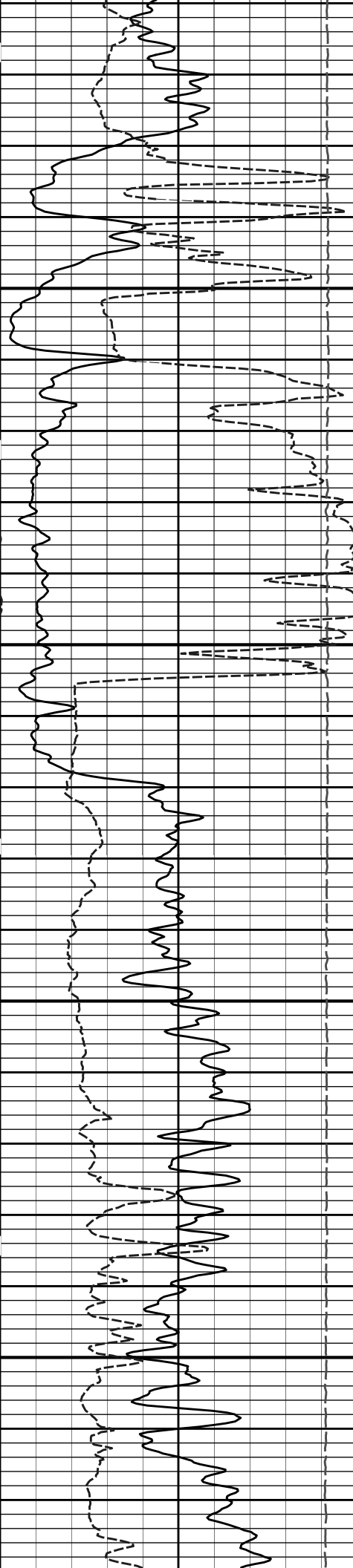


1700

1800

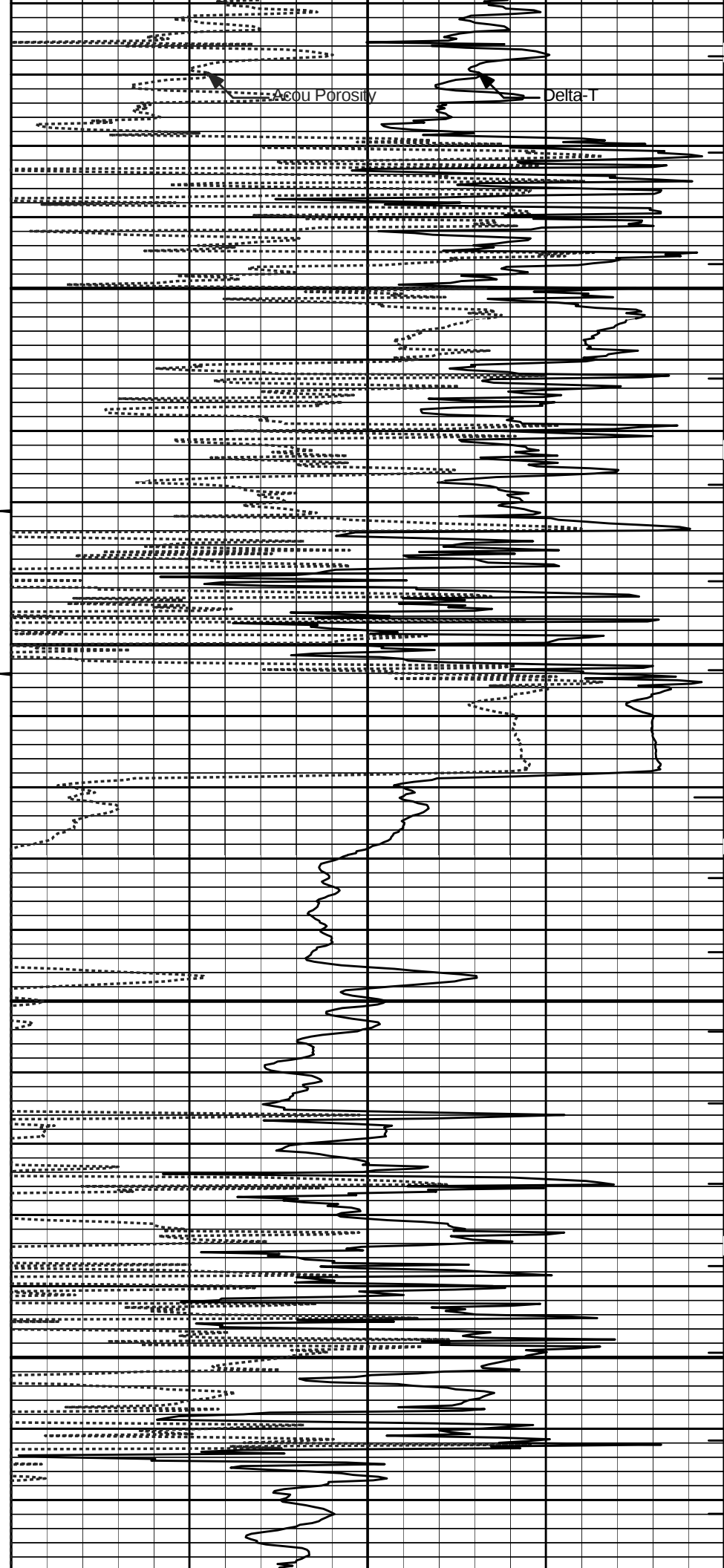
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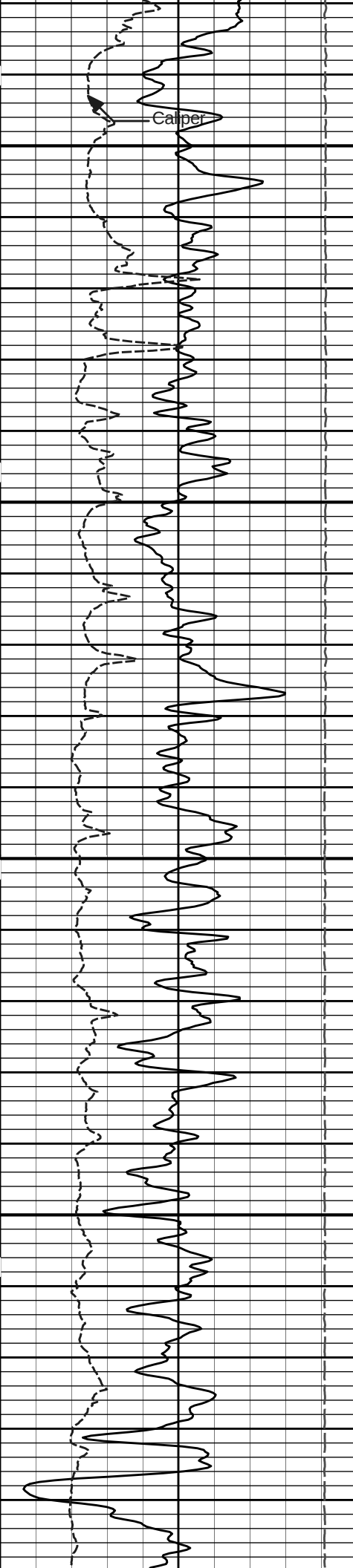




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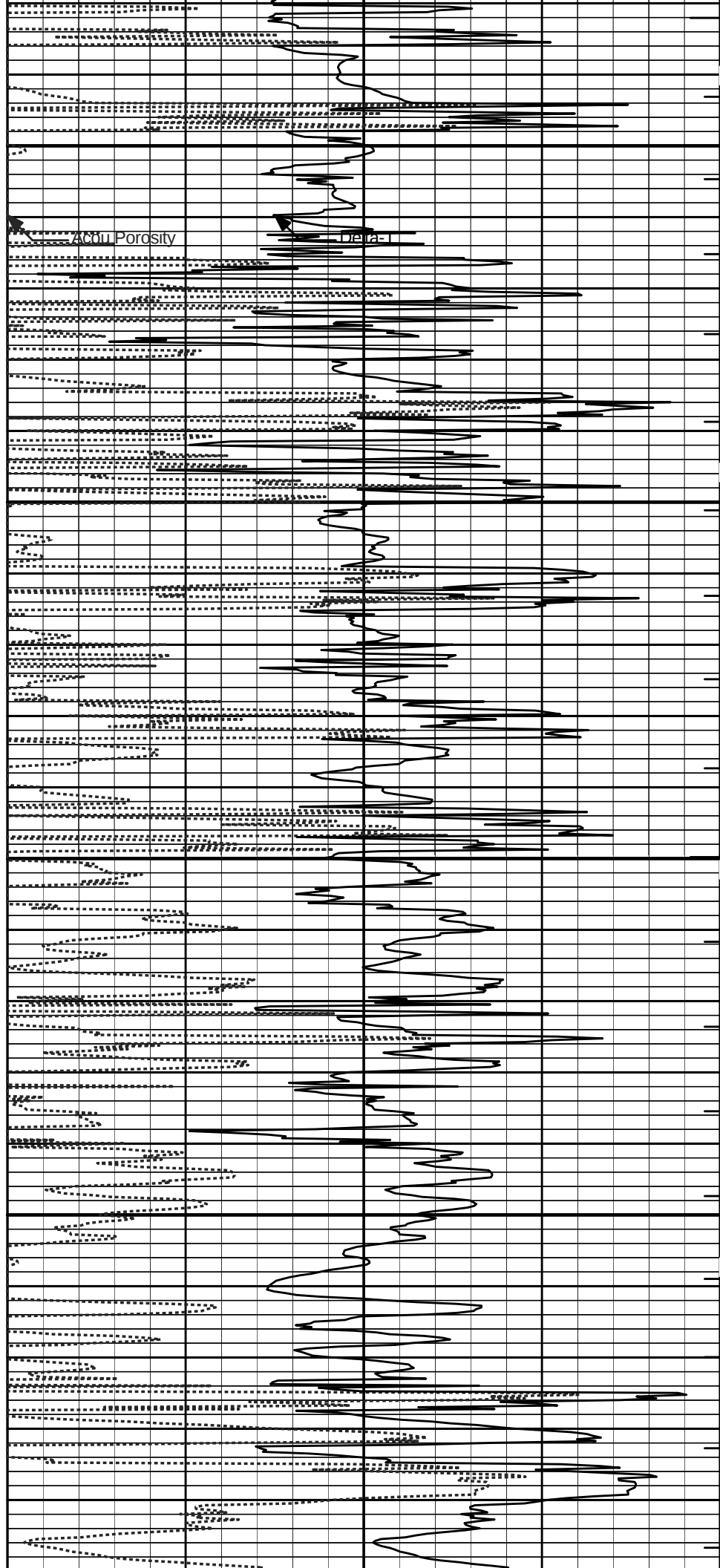
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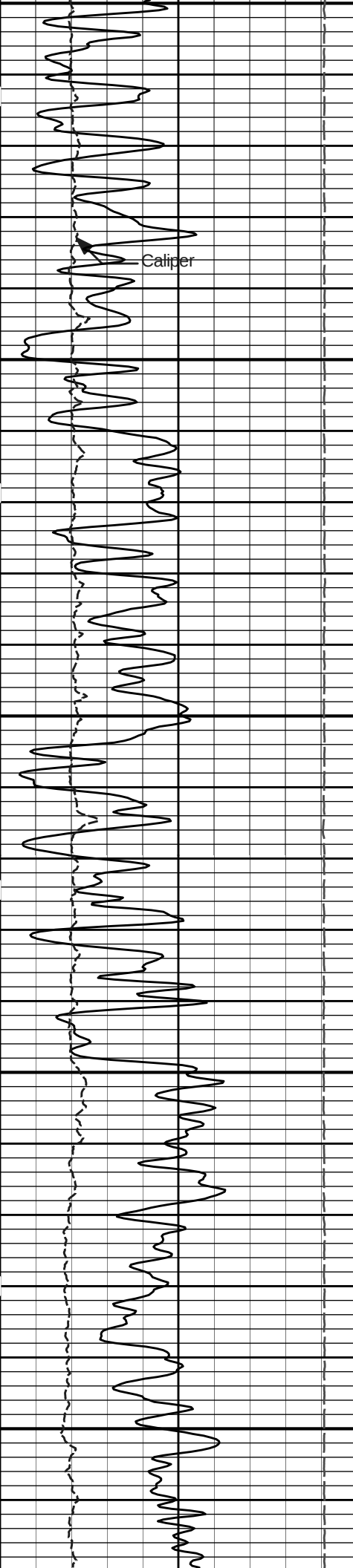




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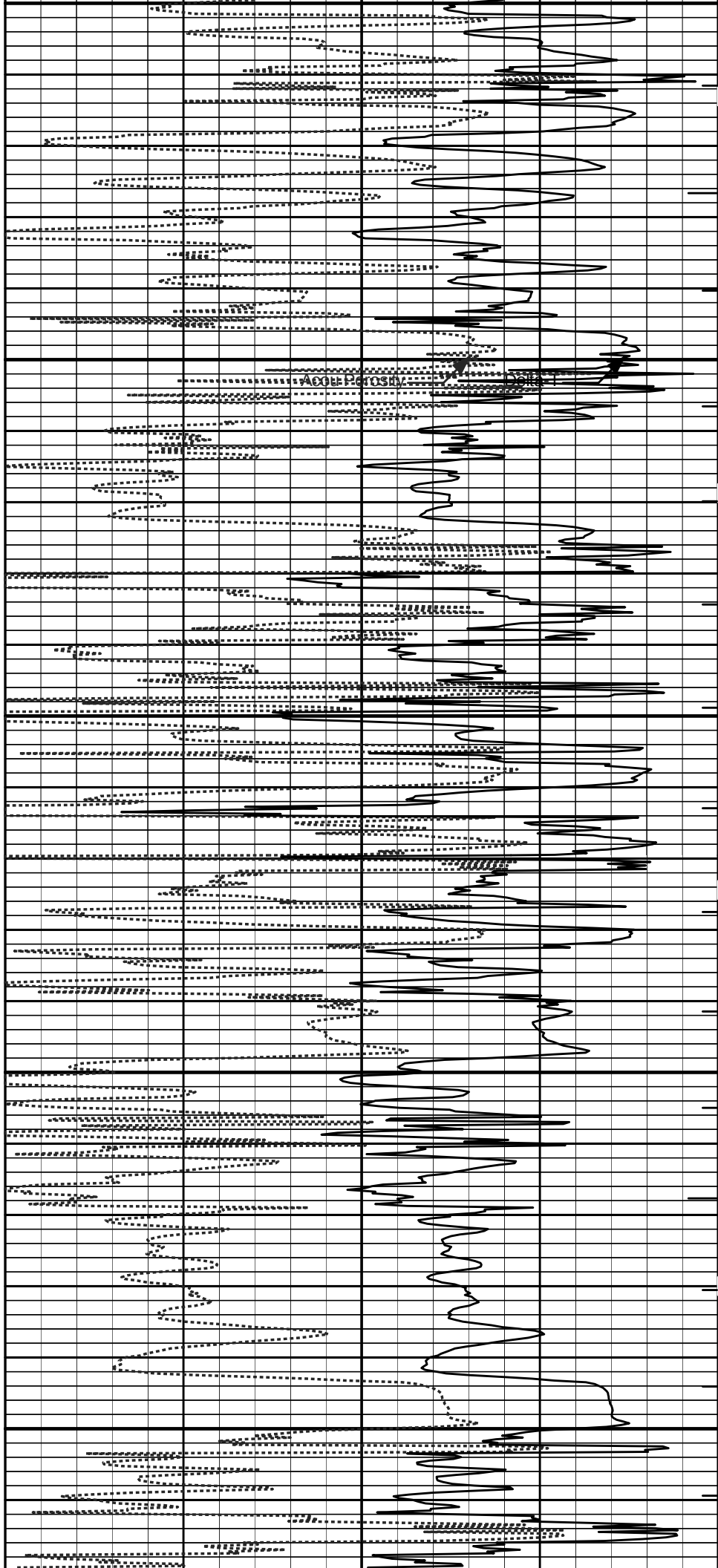
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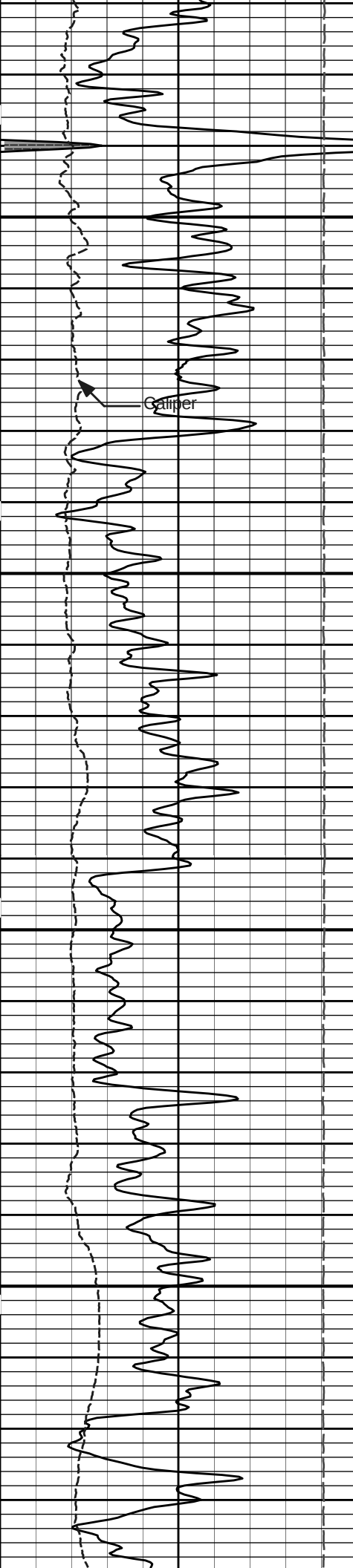




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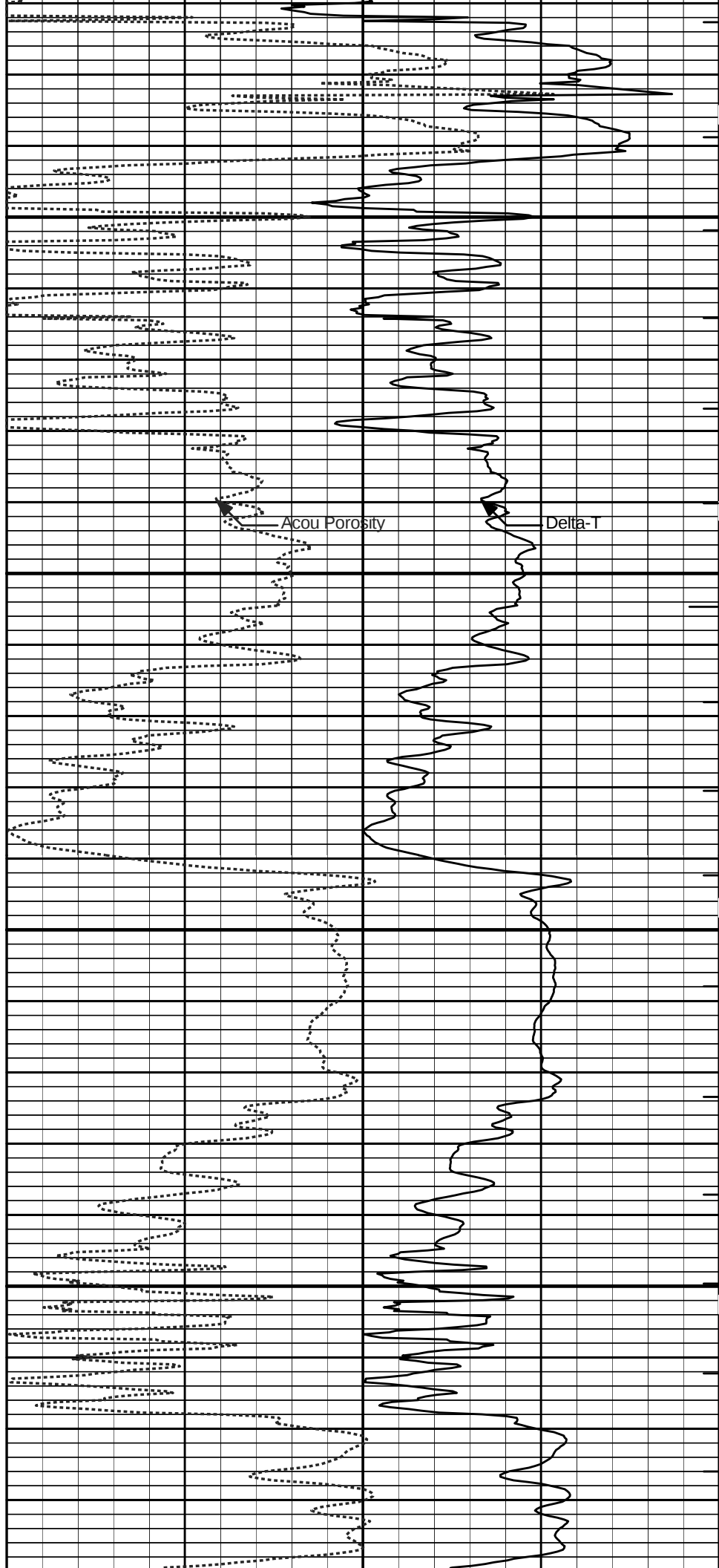




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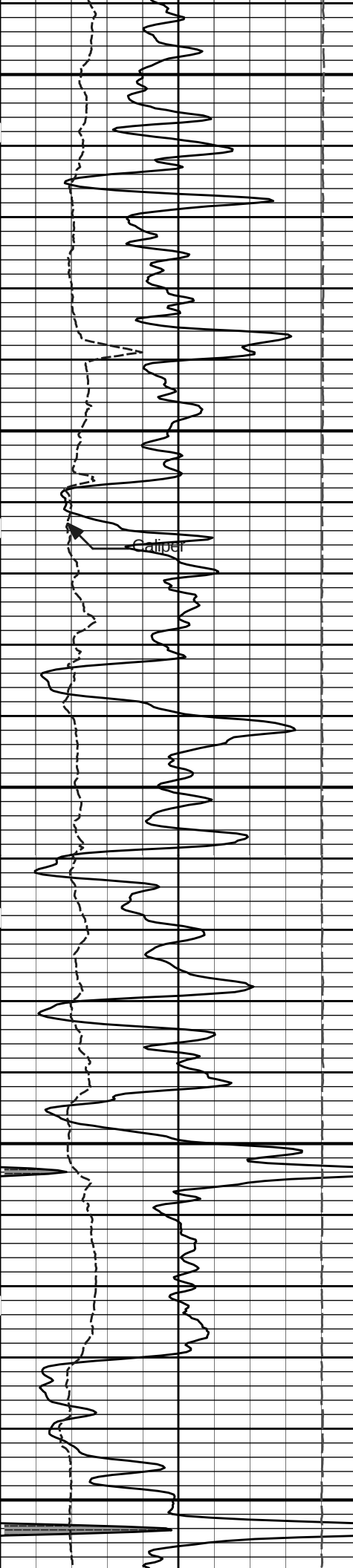
Galper

2700



Acou Porosity

Delta-T

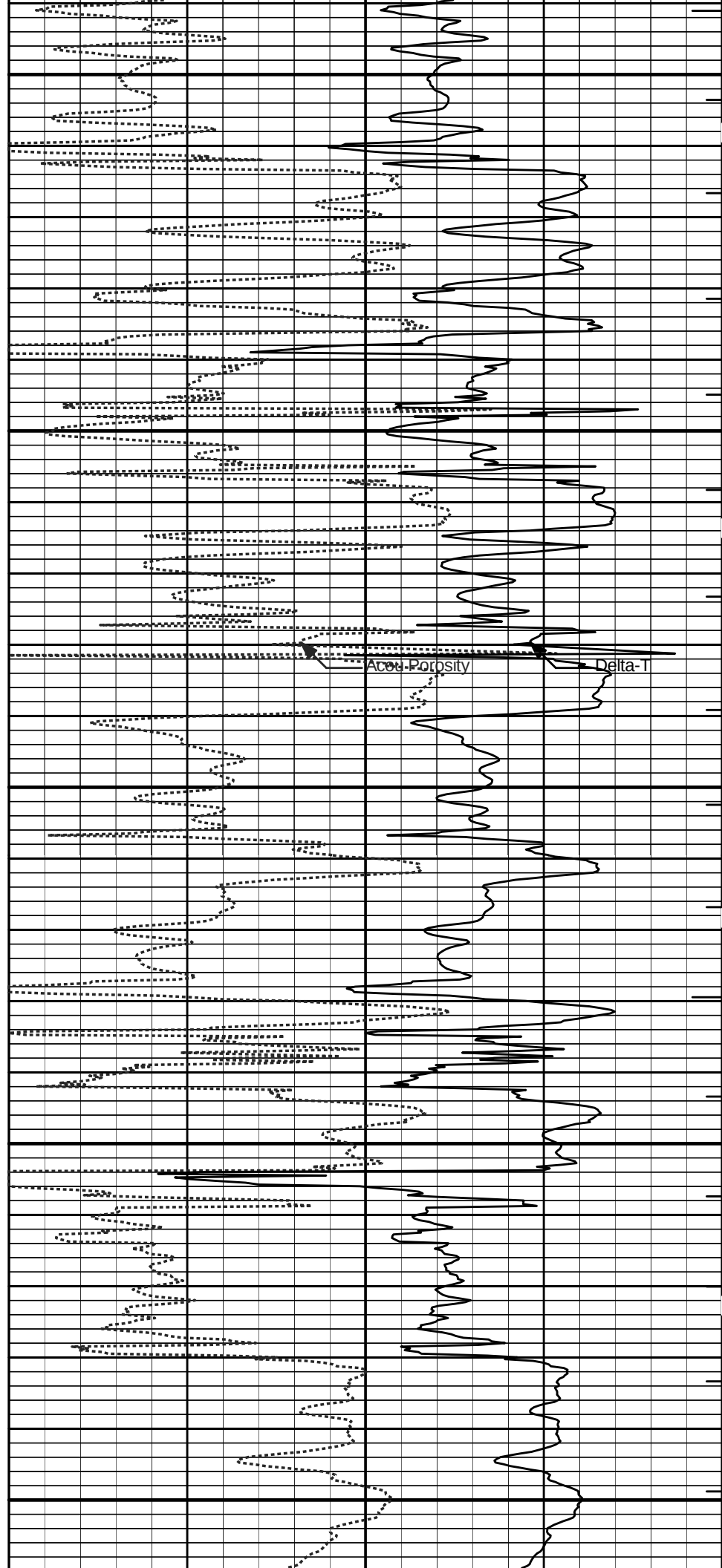


2800

2900

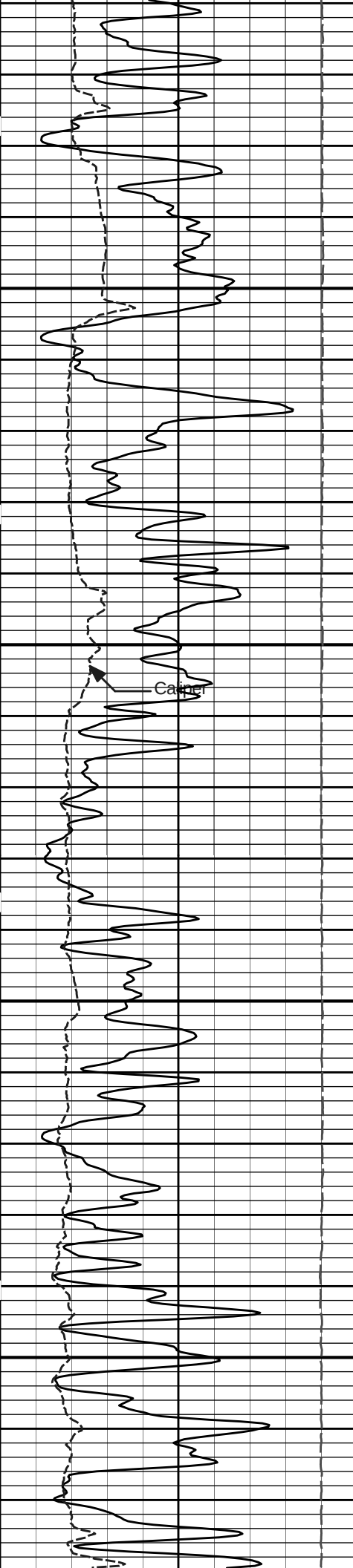
3000

Caliper



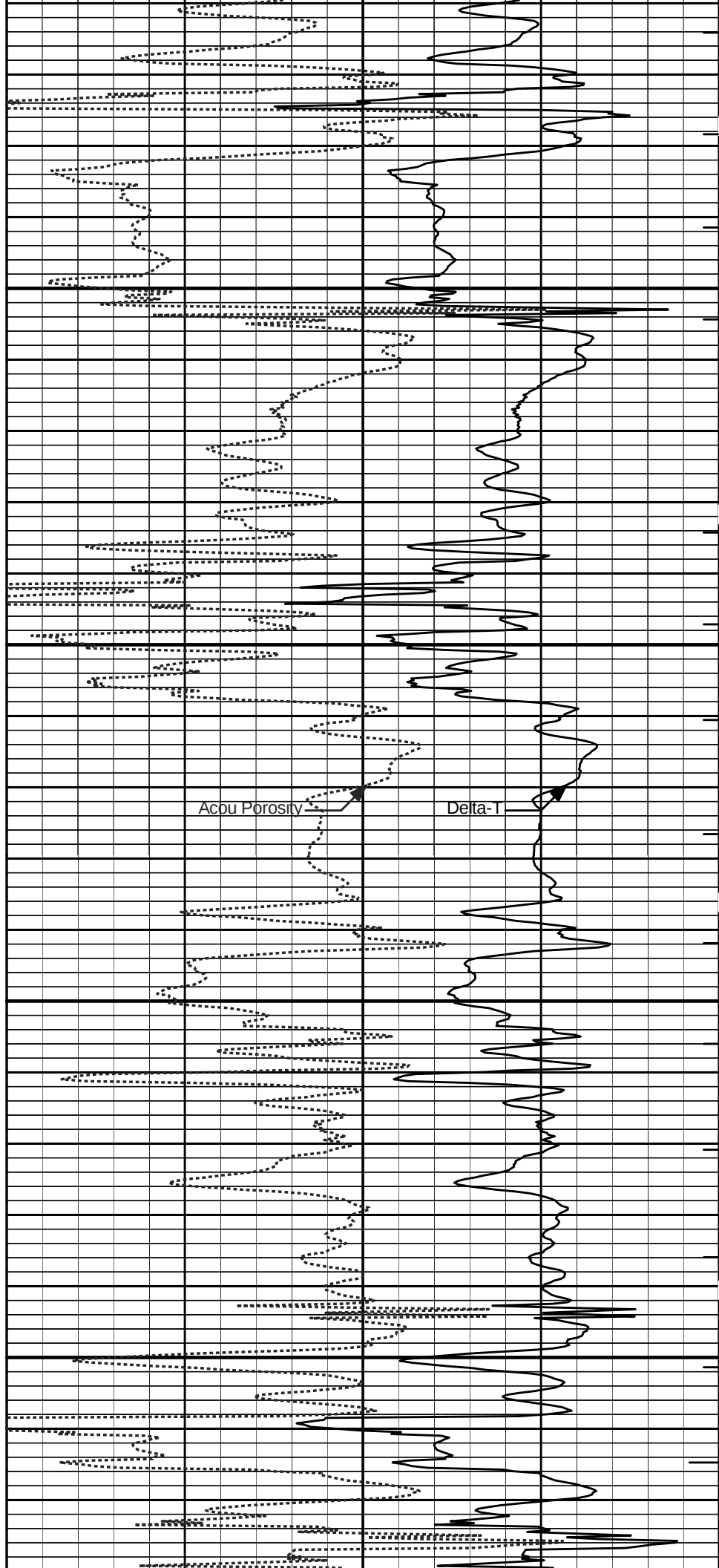
Acoustic Porosity

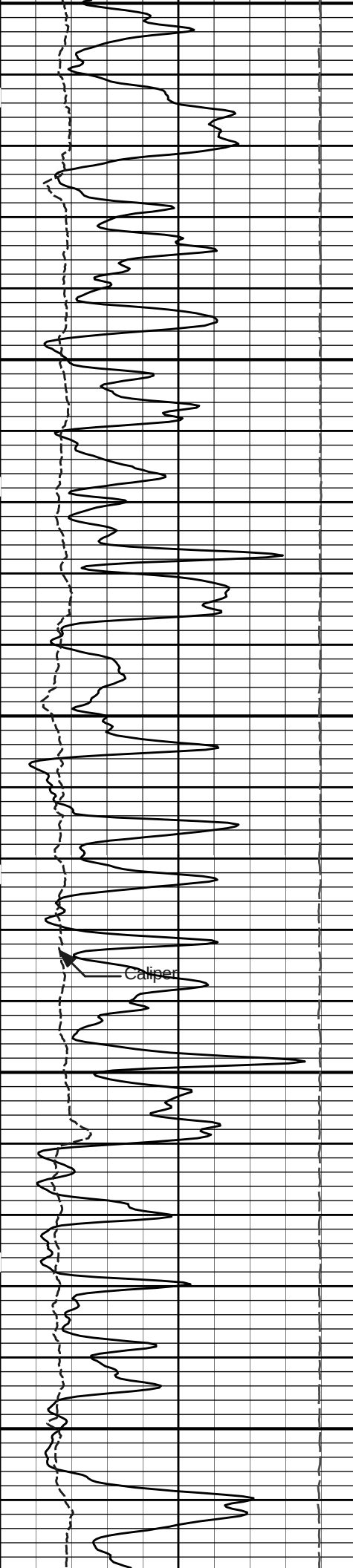
Delta-T



3100

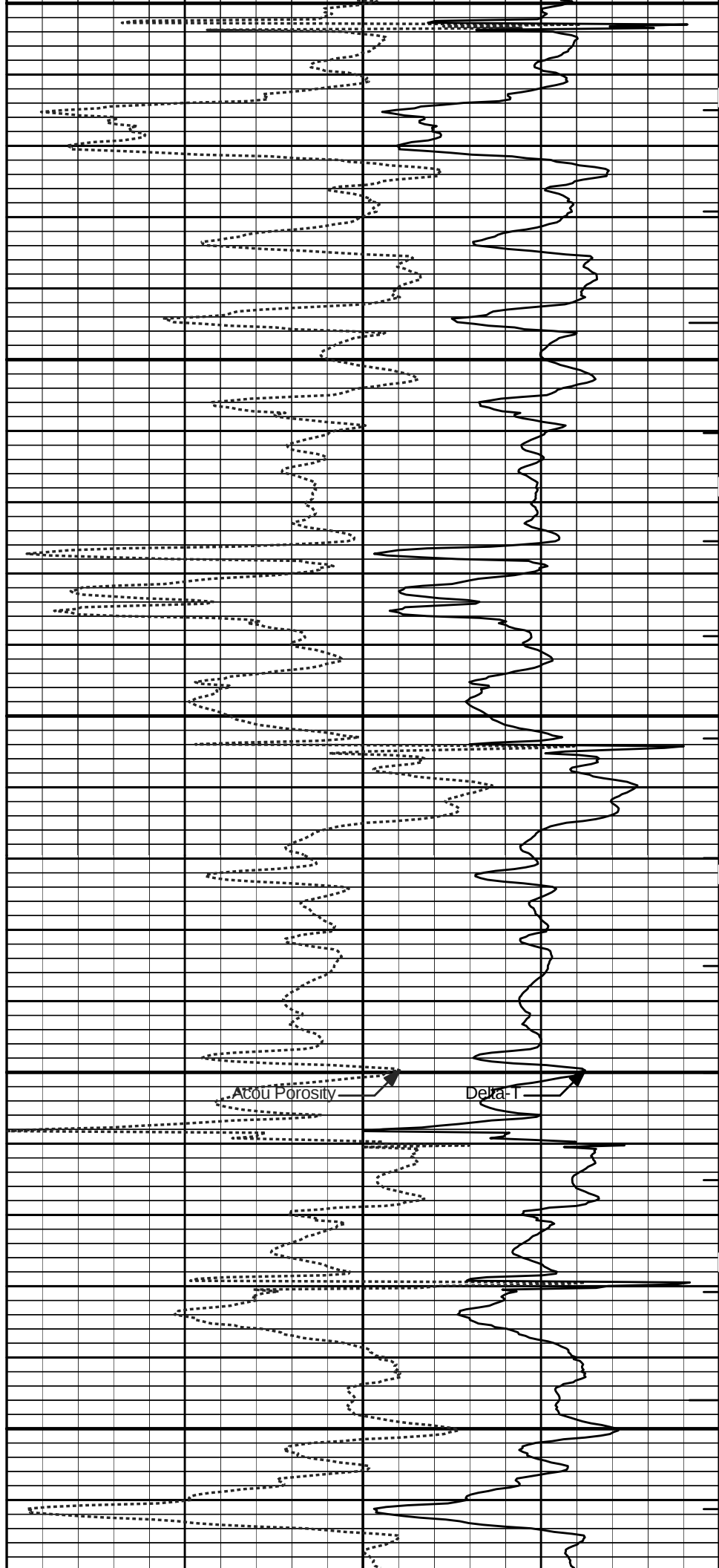
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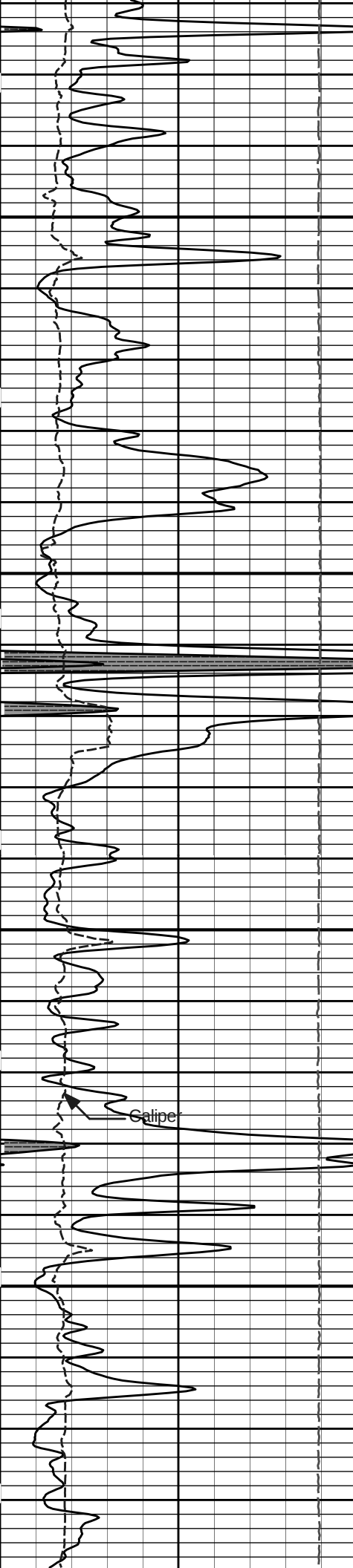




3500

3600





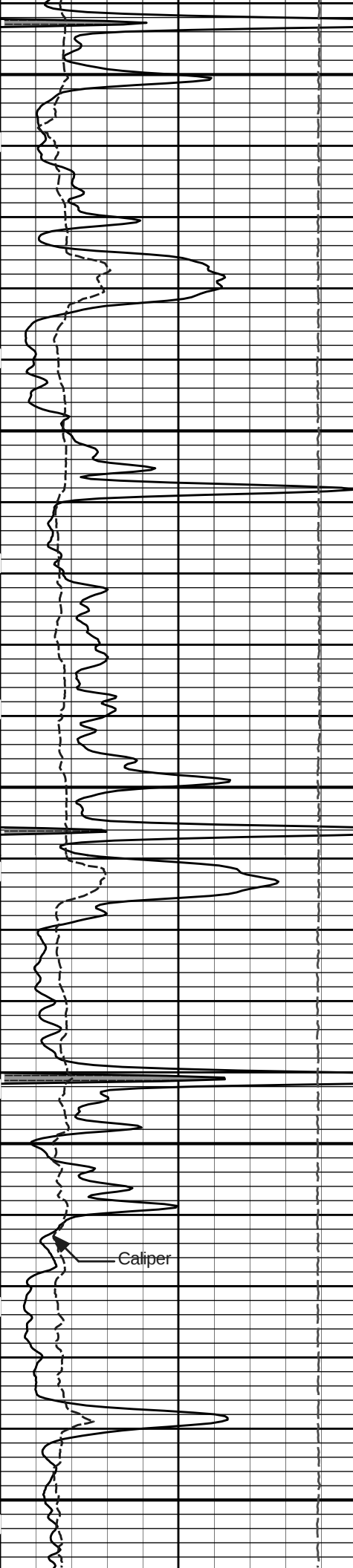
3700

3800

Caliper

Acou. Porosity

Delta-T

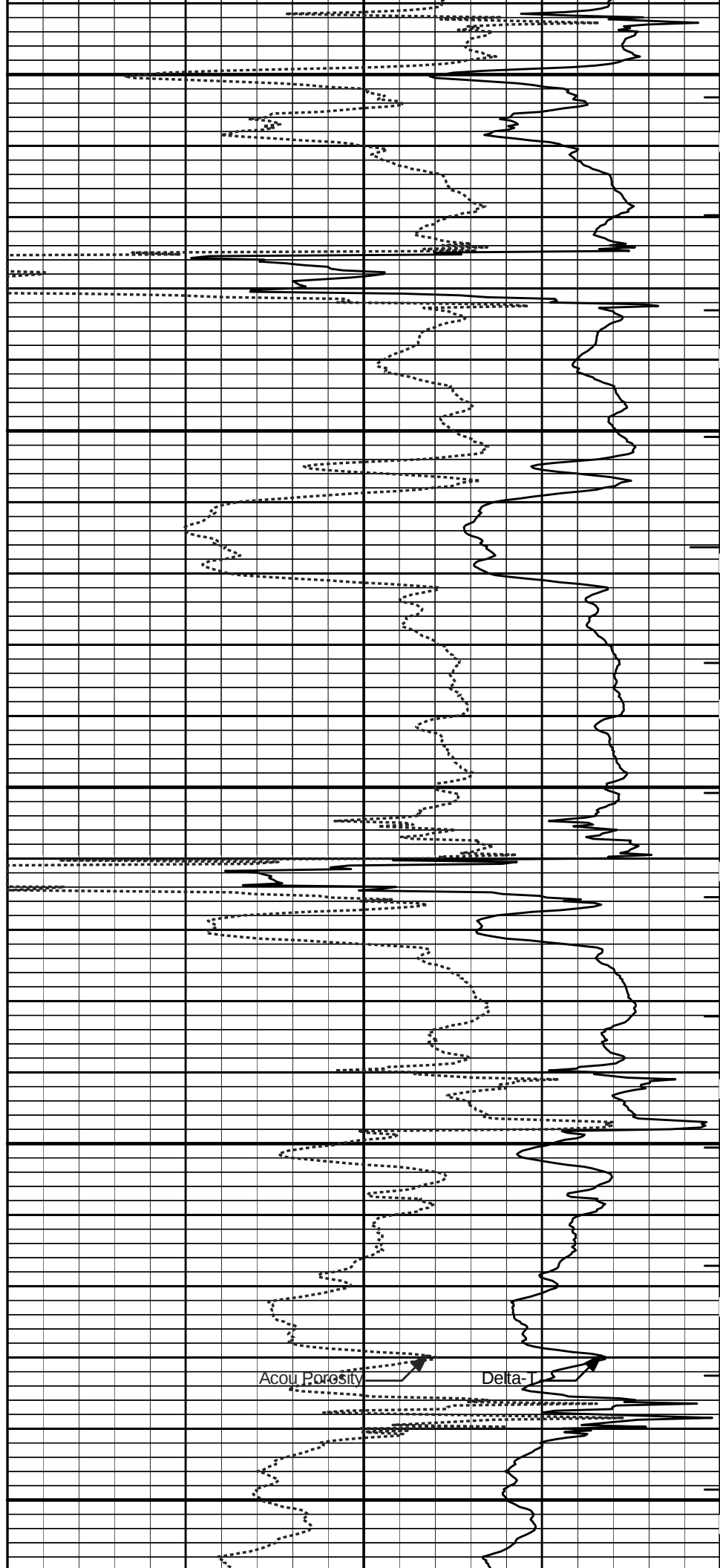


3900

4000

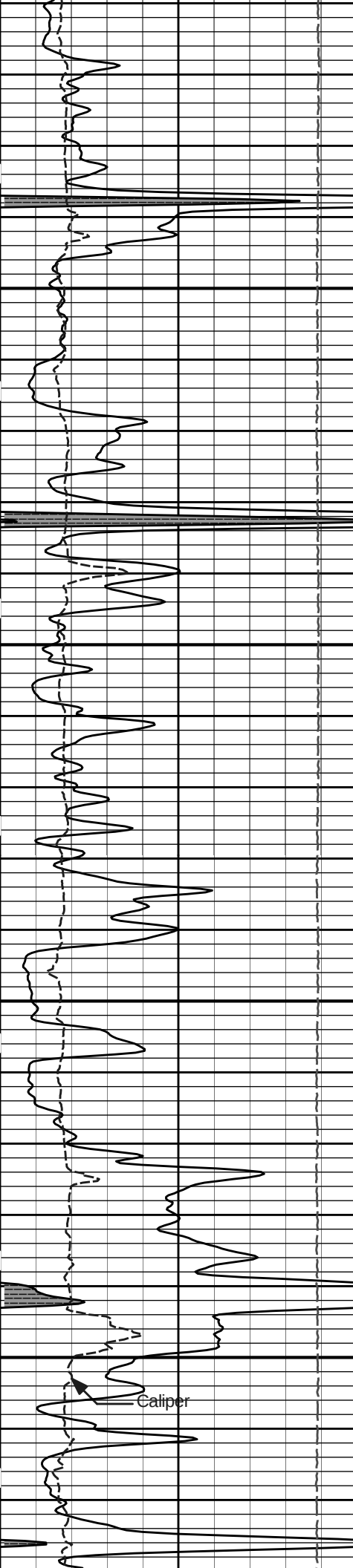
Caliper

4100



Acoustic Porosity

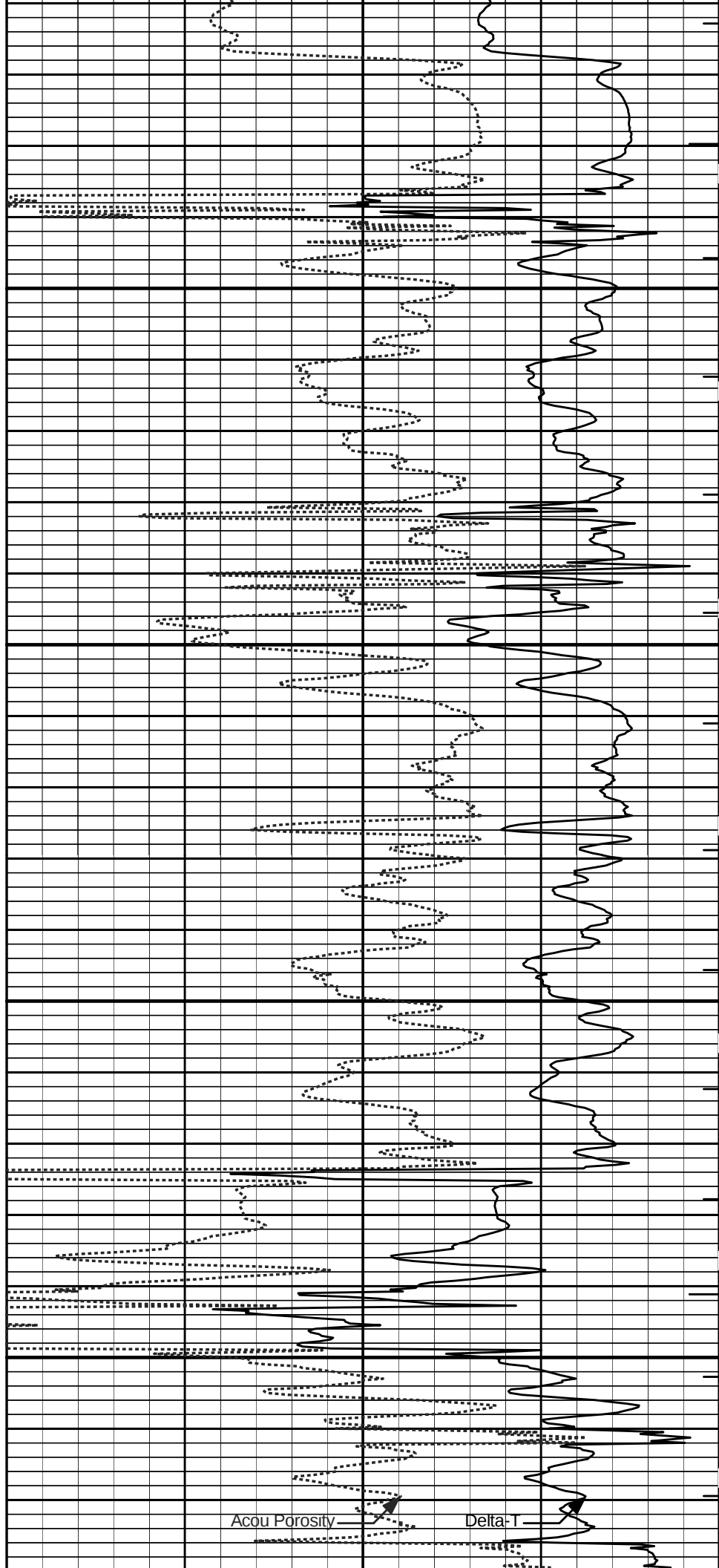
Delta-T



4200

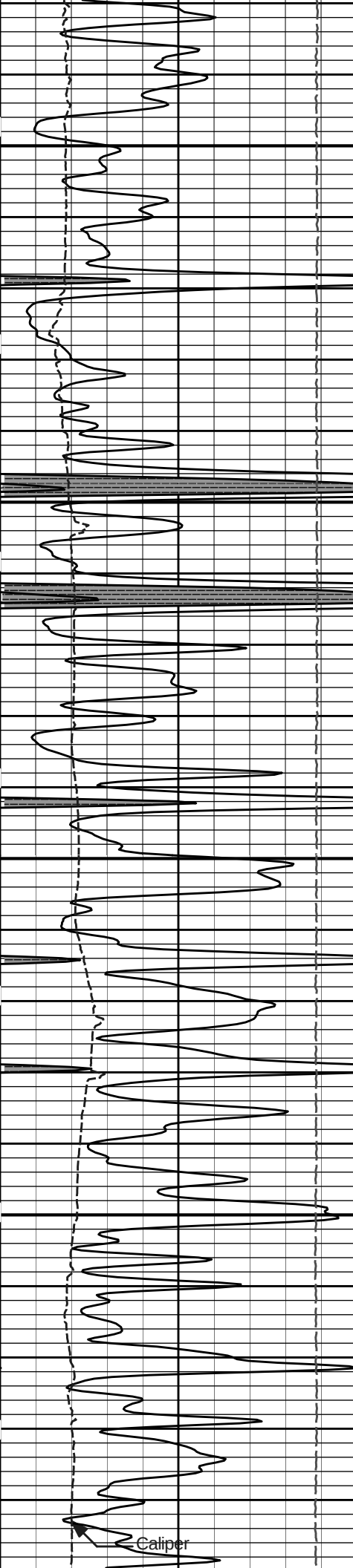
4300

Caliper



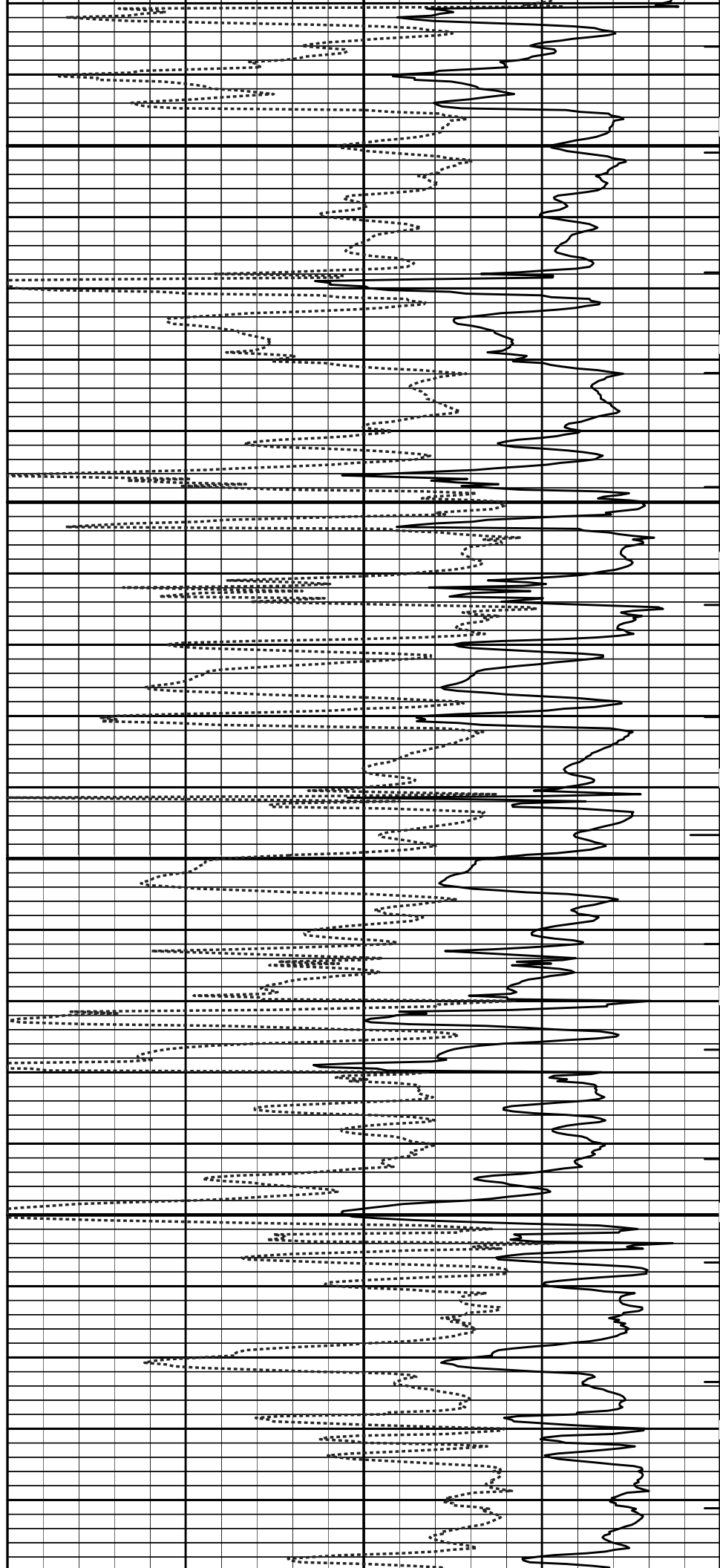
Acou Porosity

Delta-T

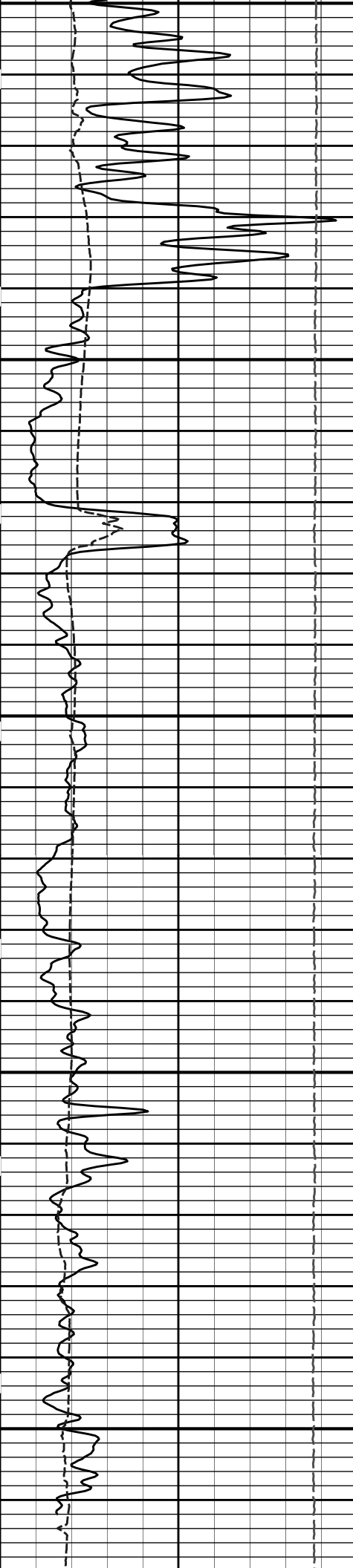


4400

4500

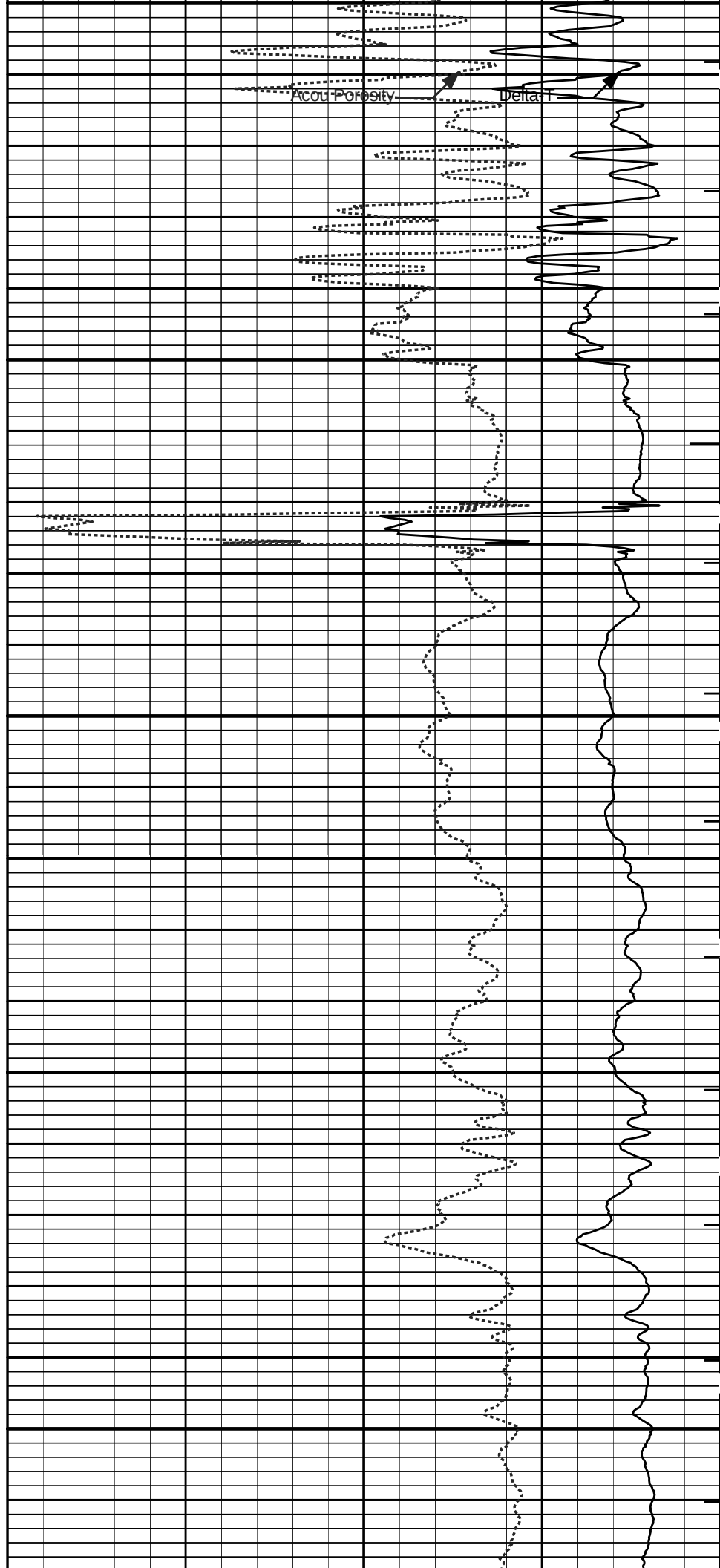


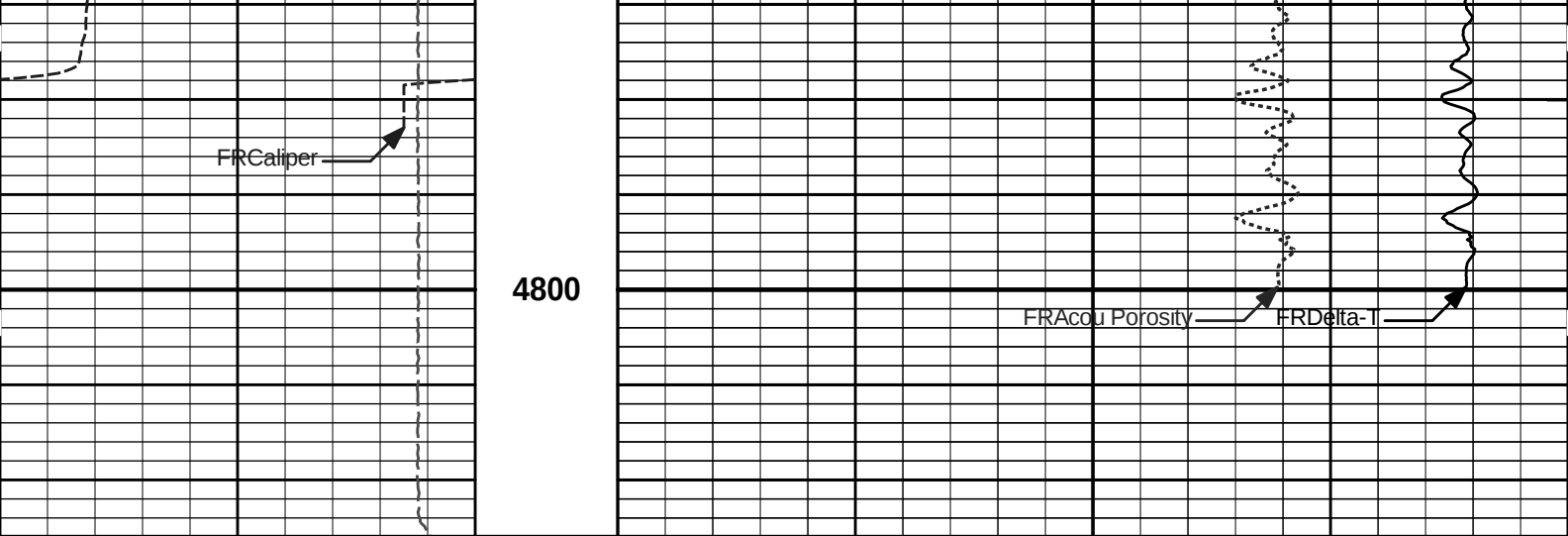
Caliper



4600

4700





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

HALLIBURTON

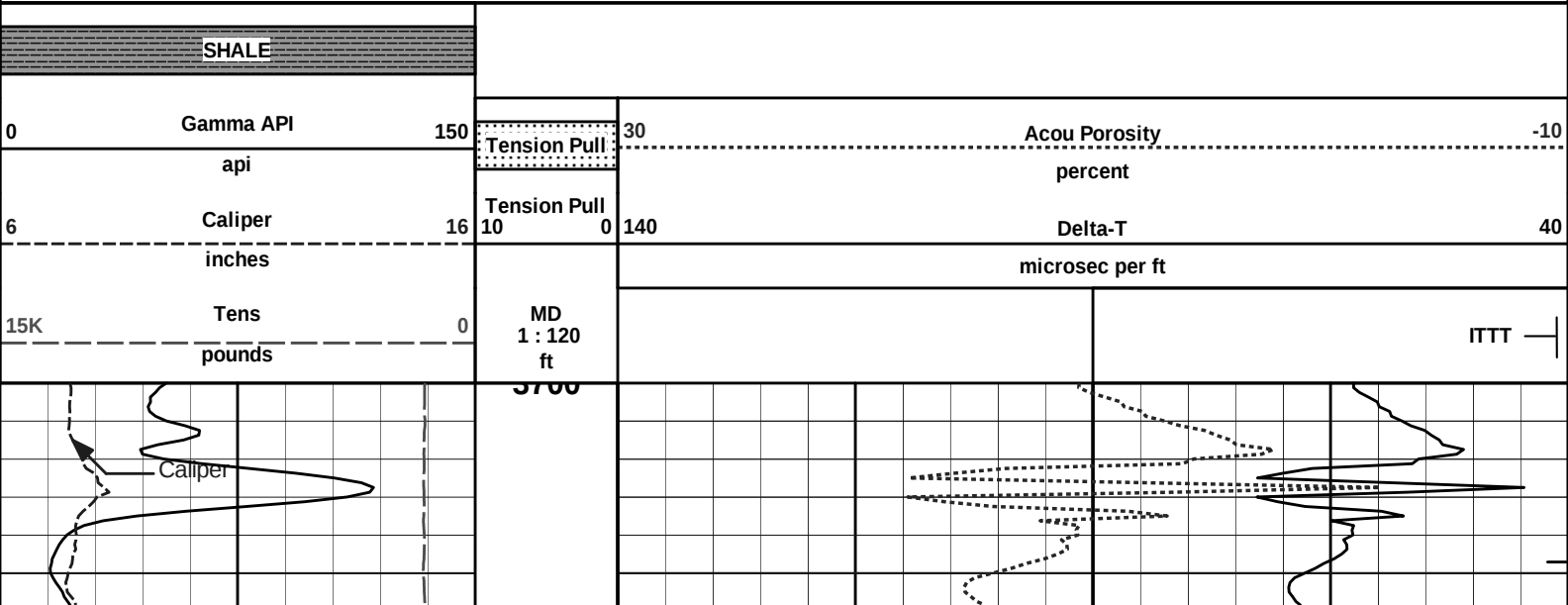
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Plot File: \\BSAT2\BSAT_5_MAIN_LIB

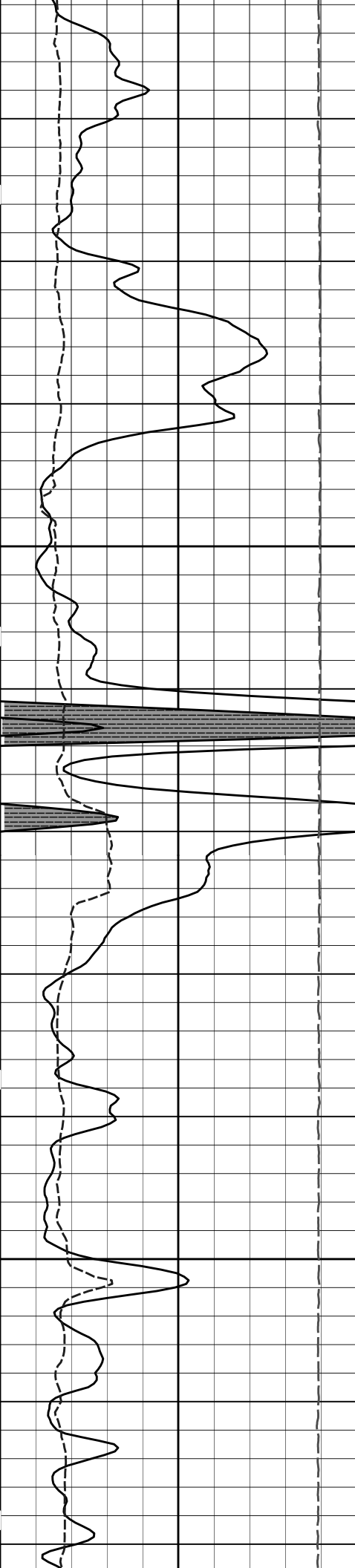
5 INCH MAIN LOG

HALLIBURTON

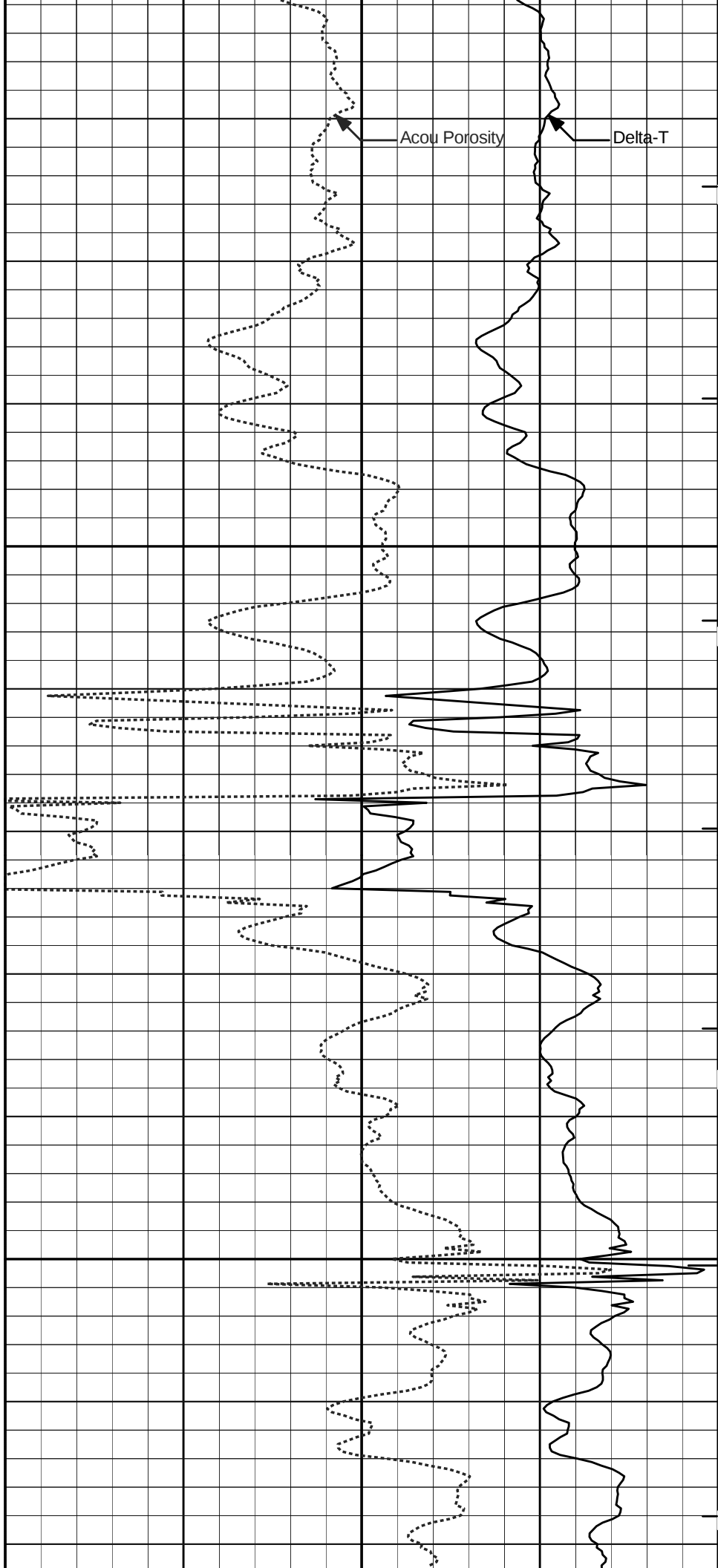
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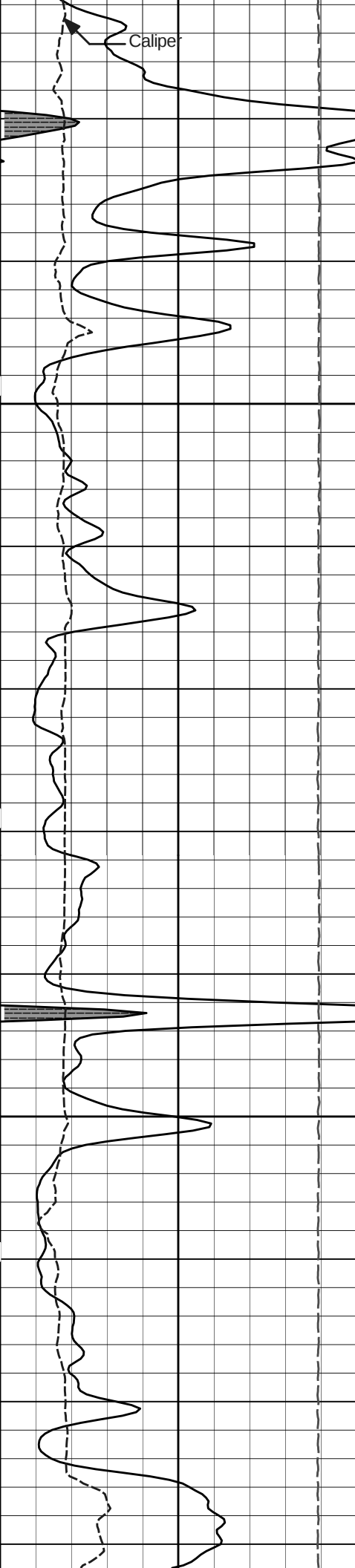
5 INCH MAIN LOG



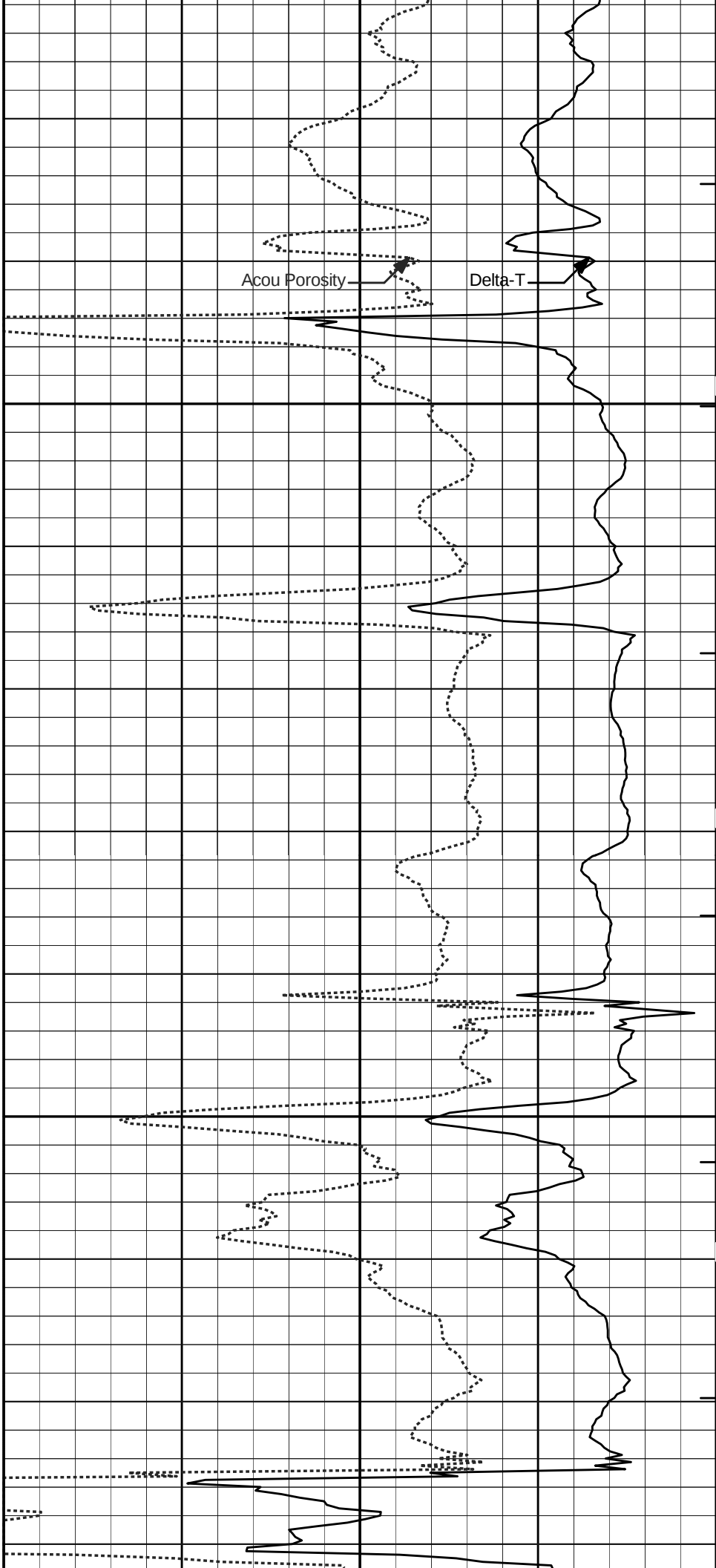


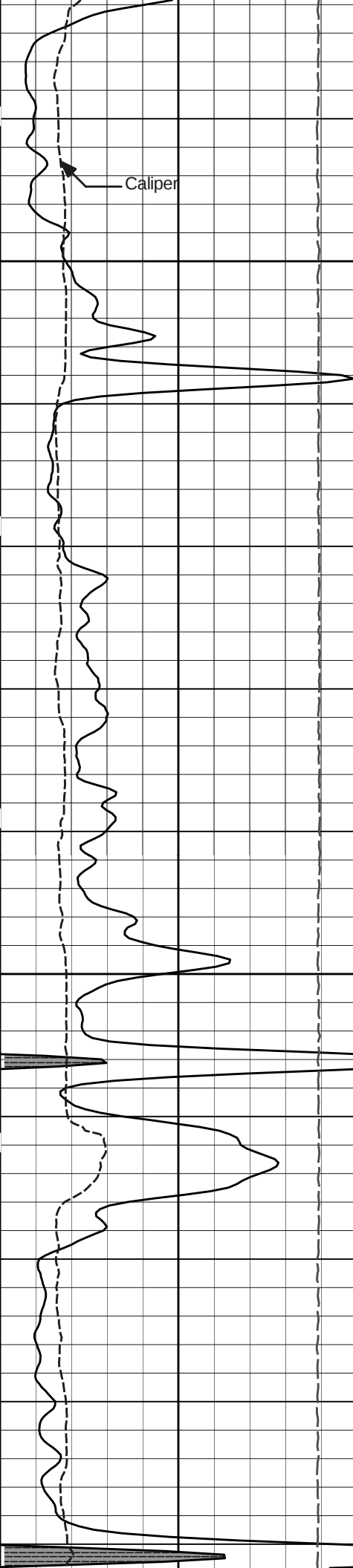
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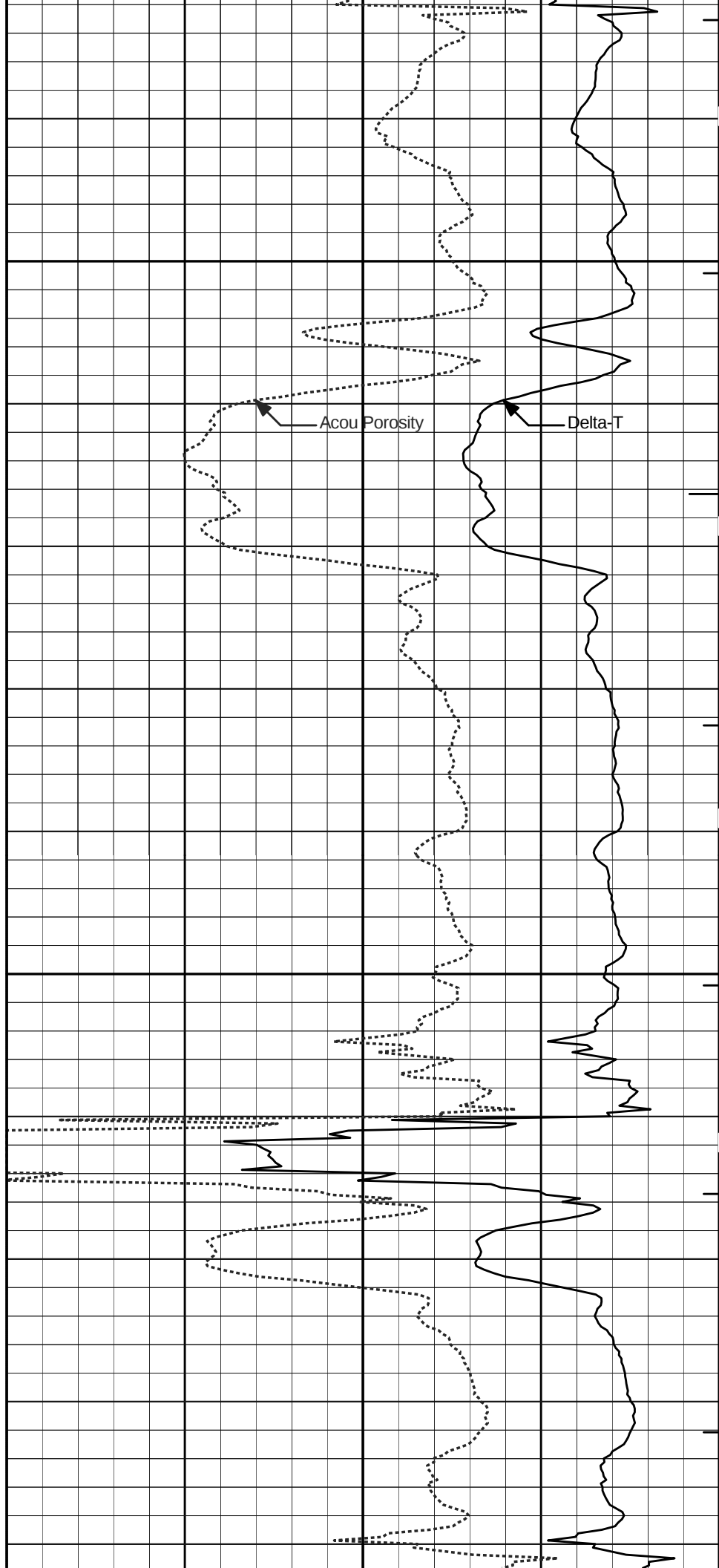


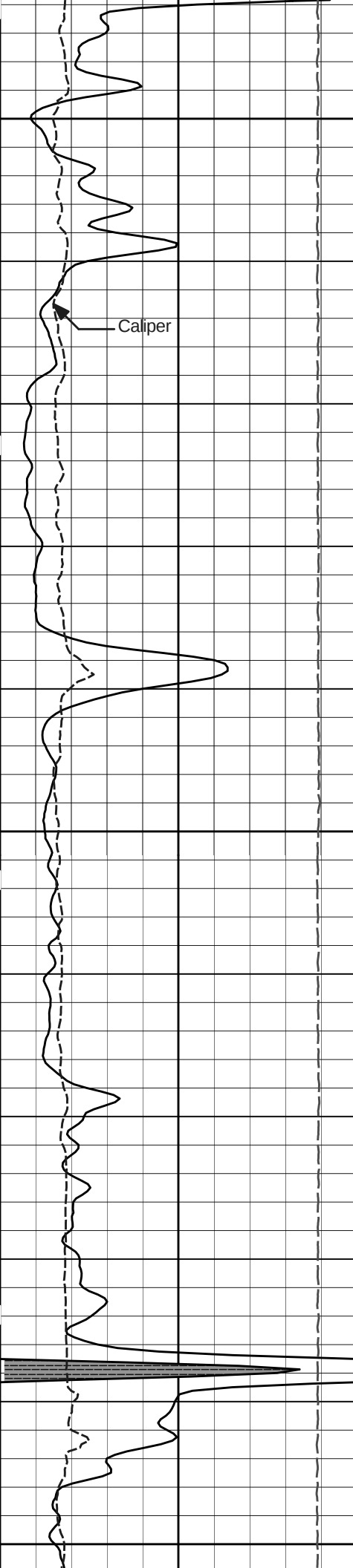
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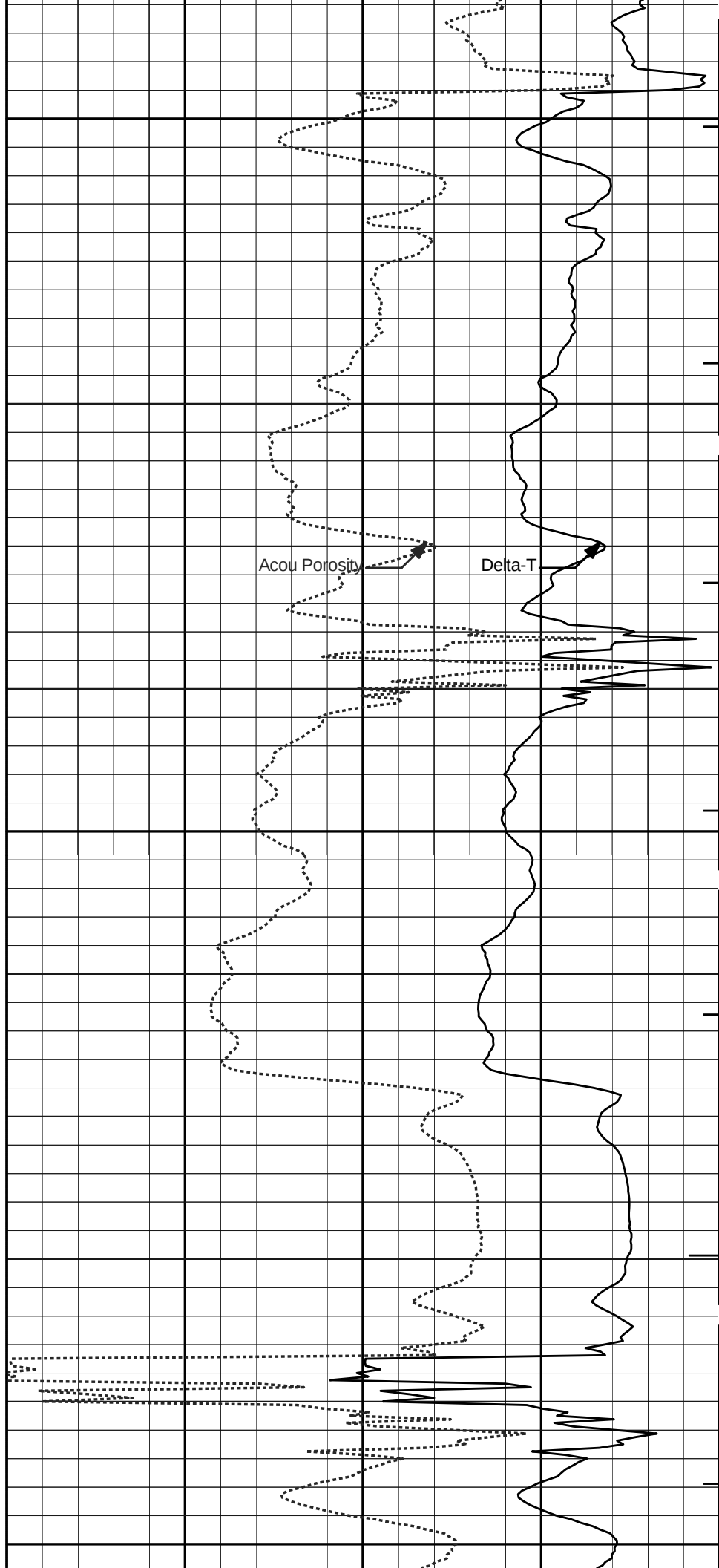
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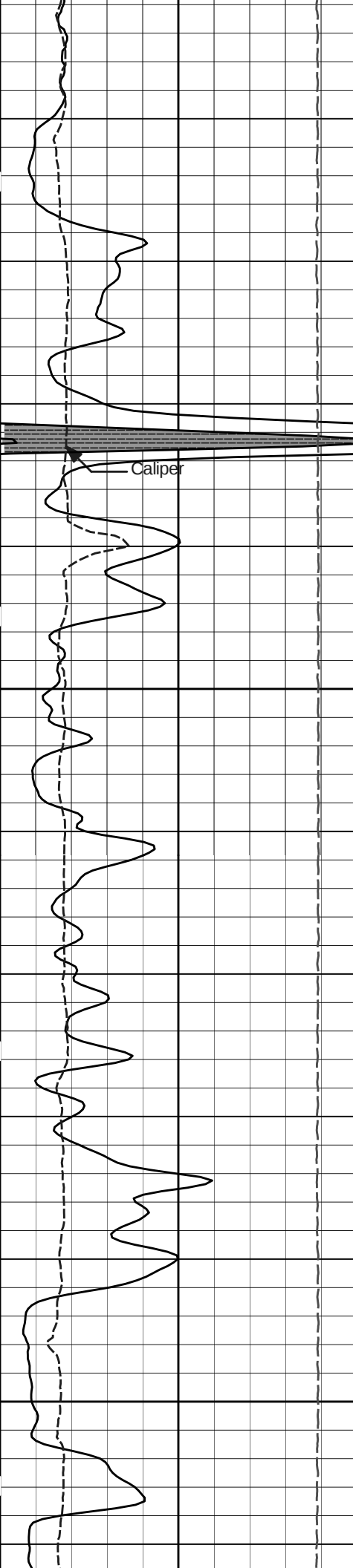
Caliper

4100

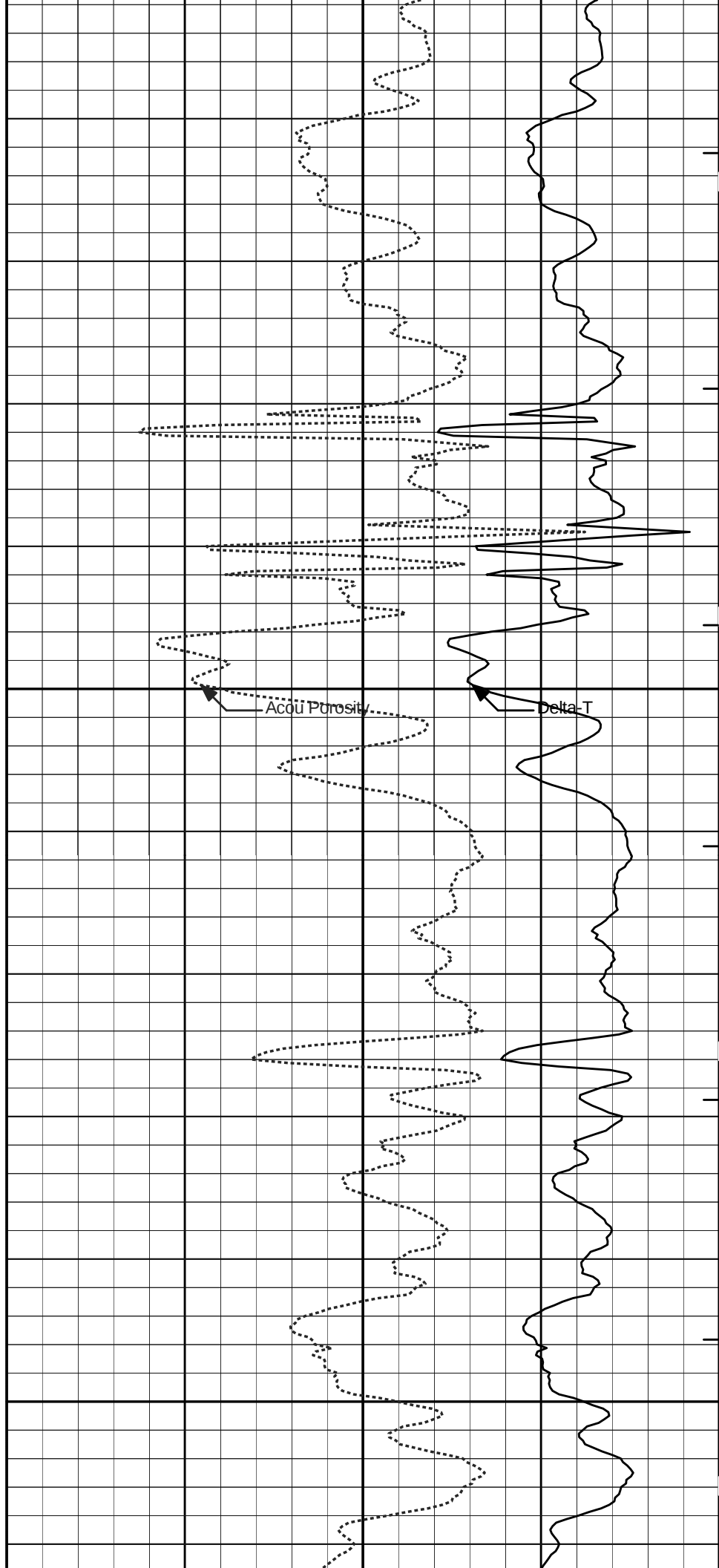


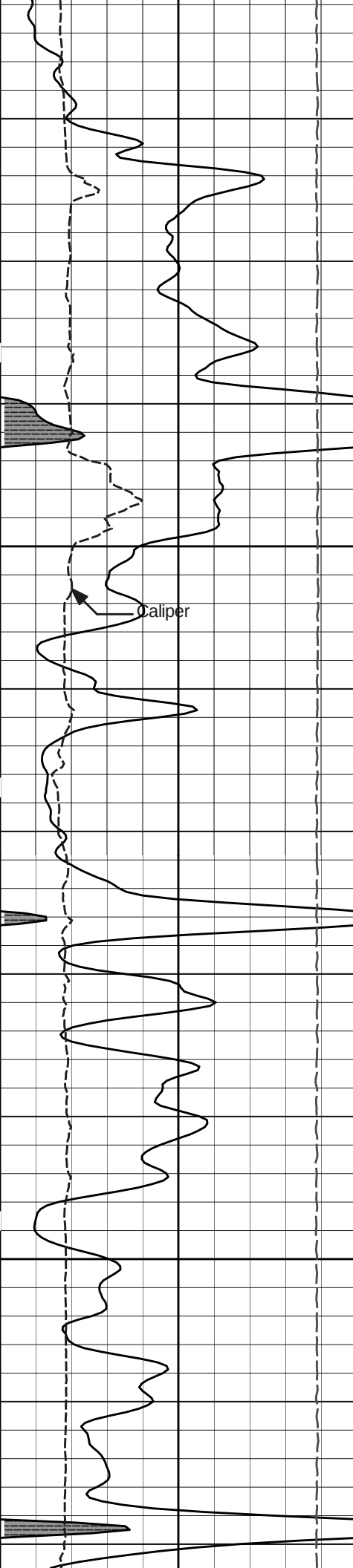
Acou Porosity

Delta-T

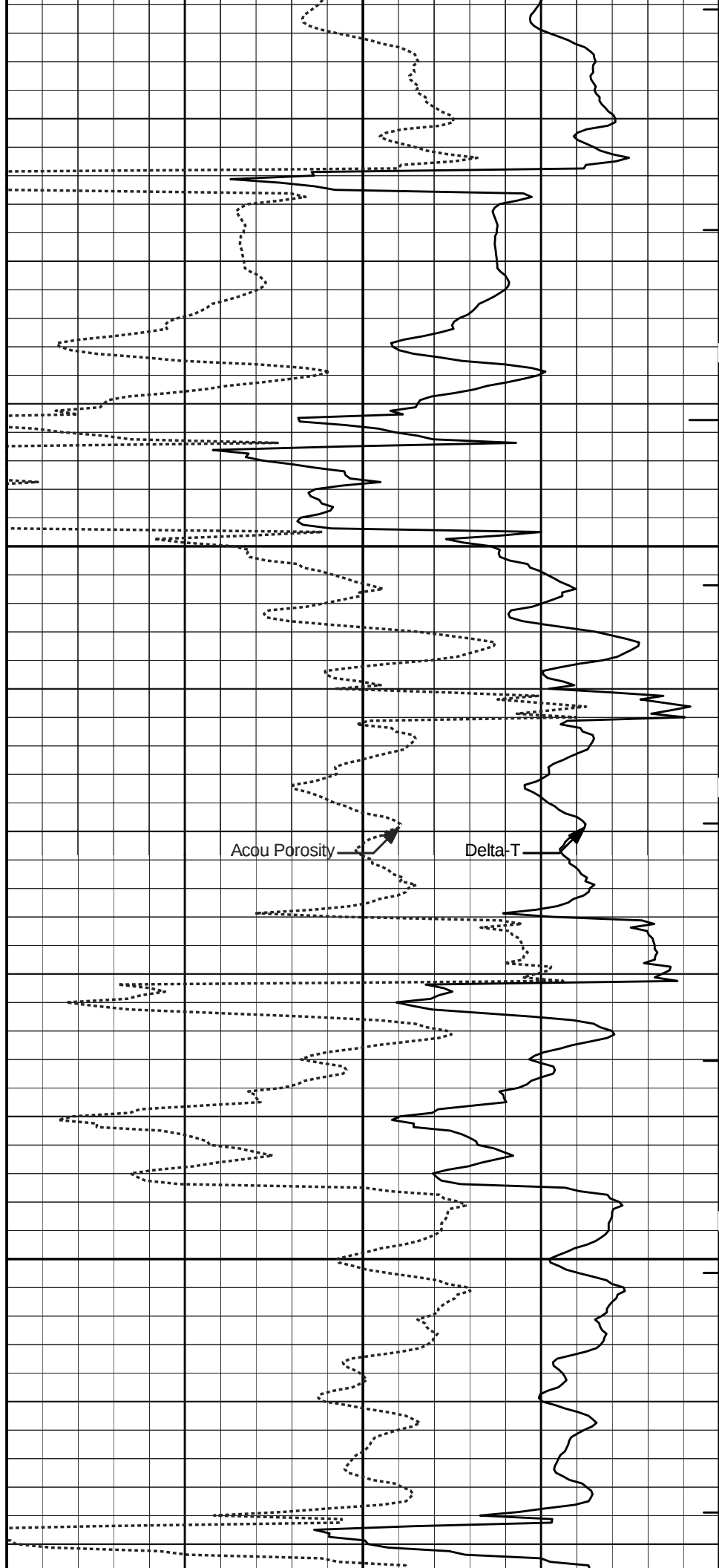


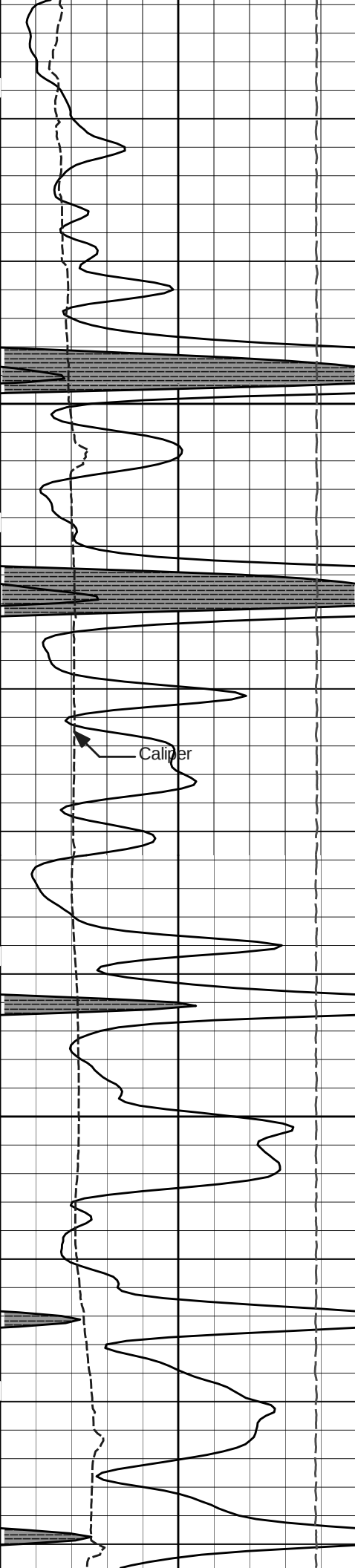
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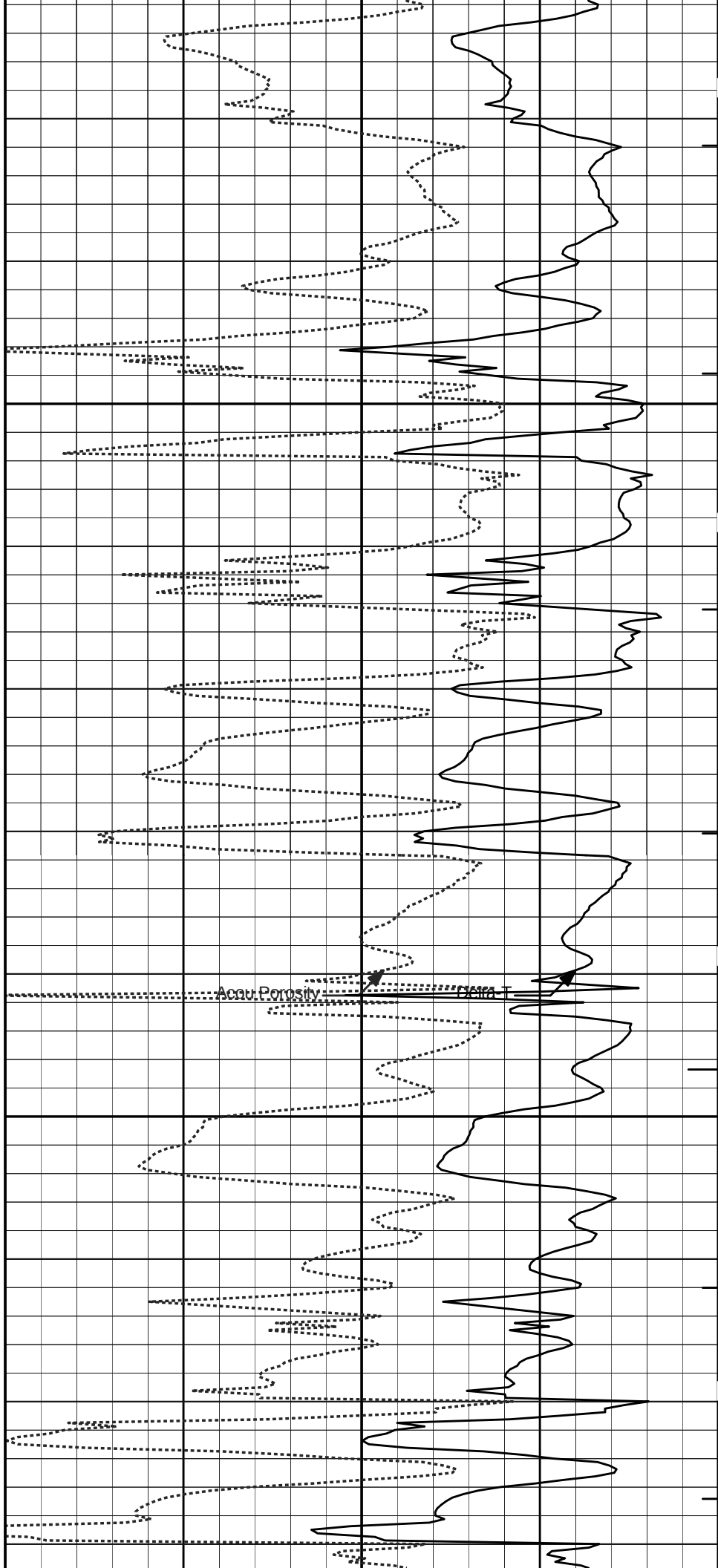


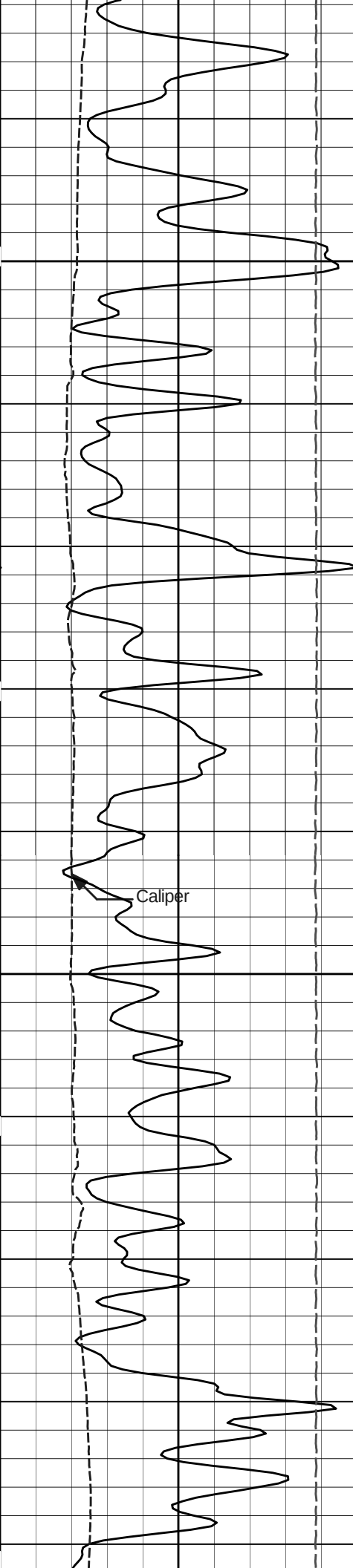
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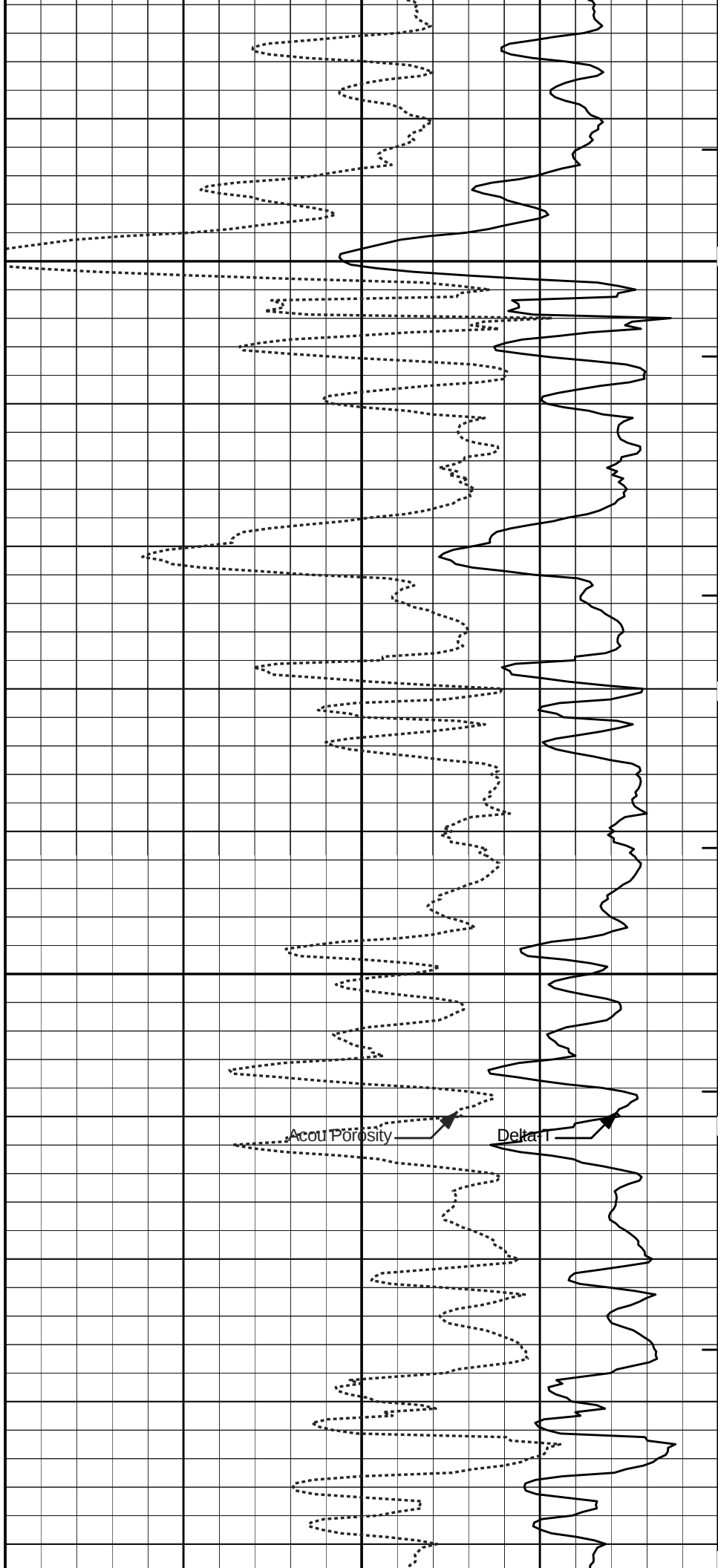


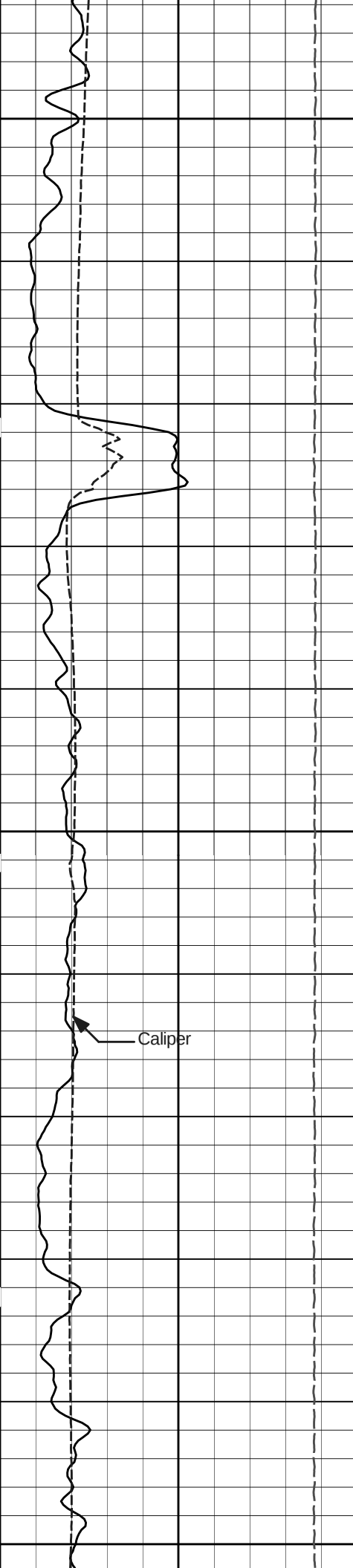
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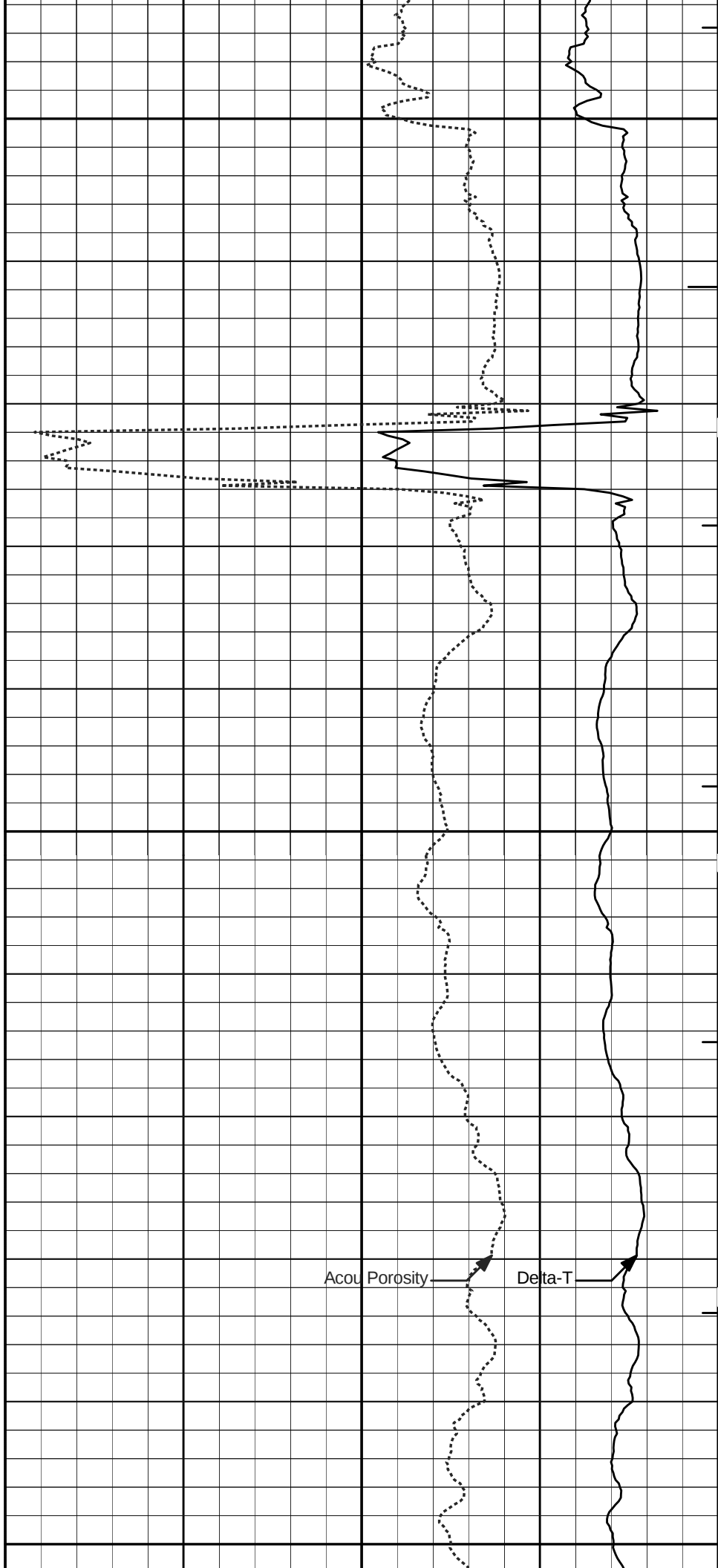
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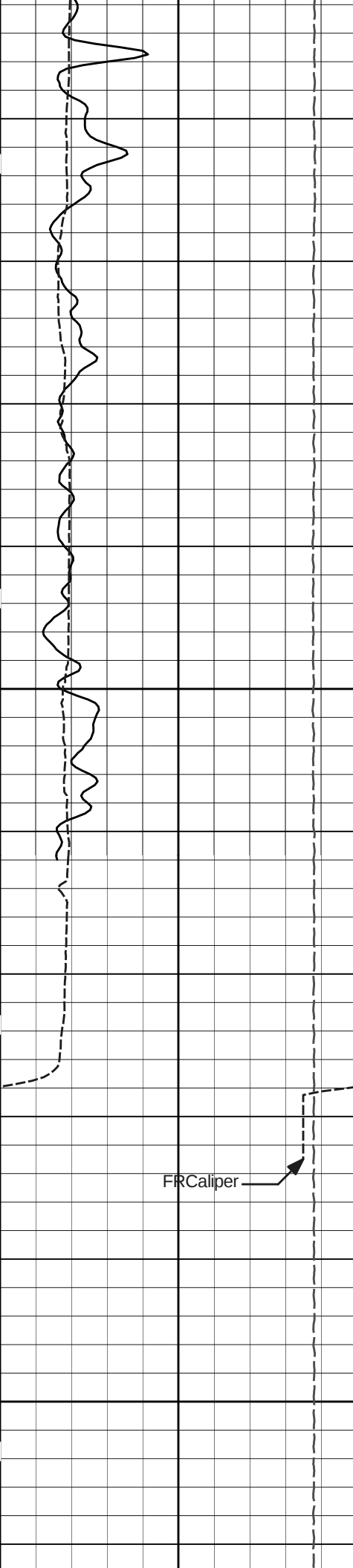
4600

4700



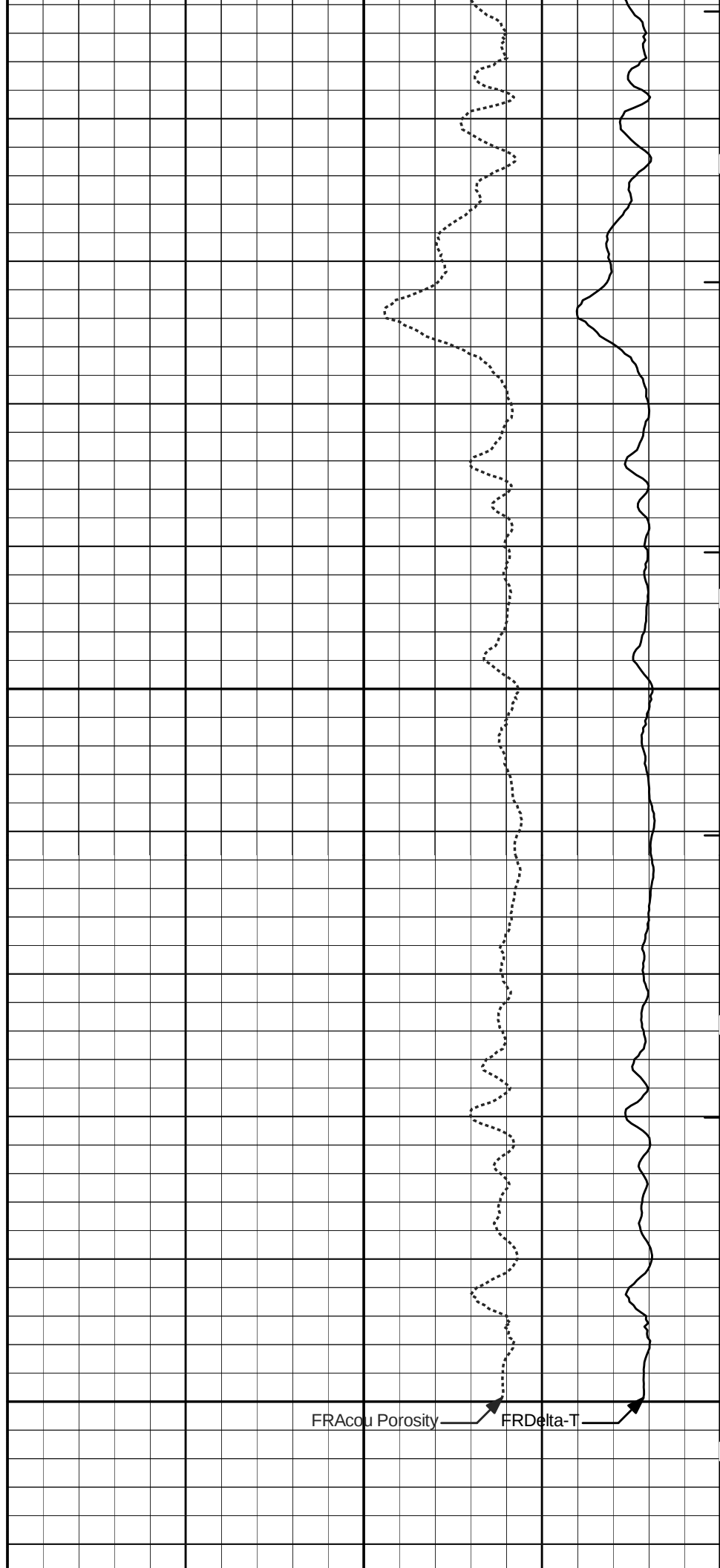
Acou Porosity

Delta-T



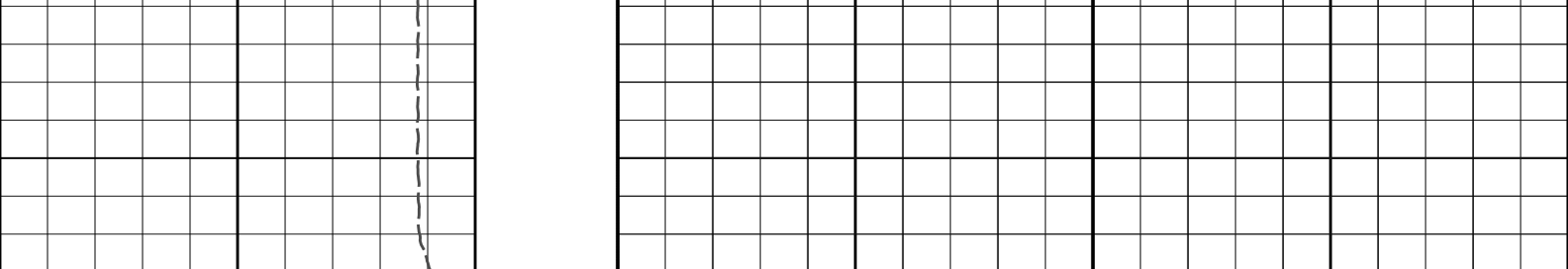
FRCaliper

4800



FRAcou Porosity

FRDelta-T



15K	Tens	0	MD		ITTT
	pounds		1 : 120		
			ft		
6	Caliper	16	Tension Pull	140	Delta-T
	inches		10		40
0	Gamma API	150			microsec per ft
	api		30		Acou Porosity
					-10
					percent
	SHALE				

HALLIBURTON

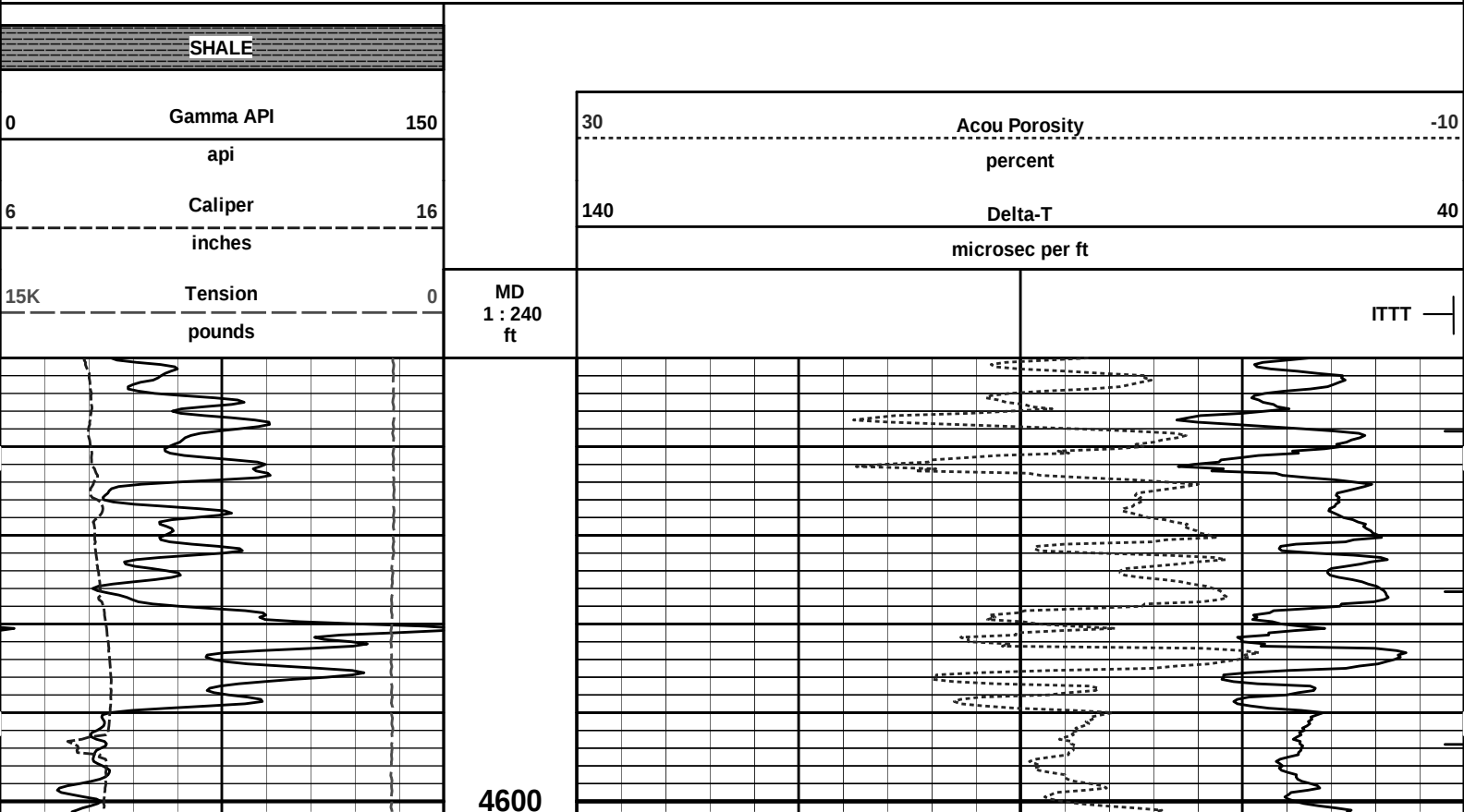
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Plot Range: 3700 ft to 4825.92 ft
Data: GARDEN_CITYTWIN\Well Based\DETAIL\
Plot File: \\BSAT2\BSAT_5_MAIN_LIB

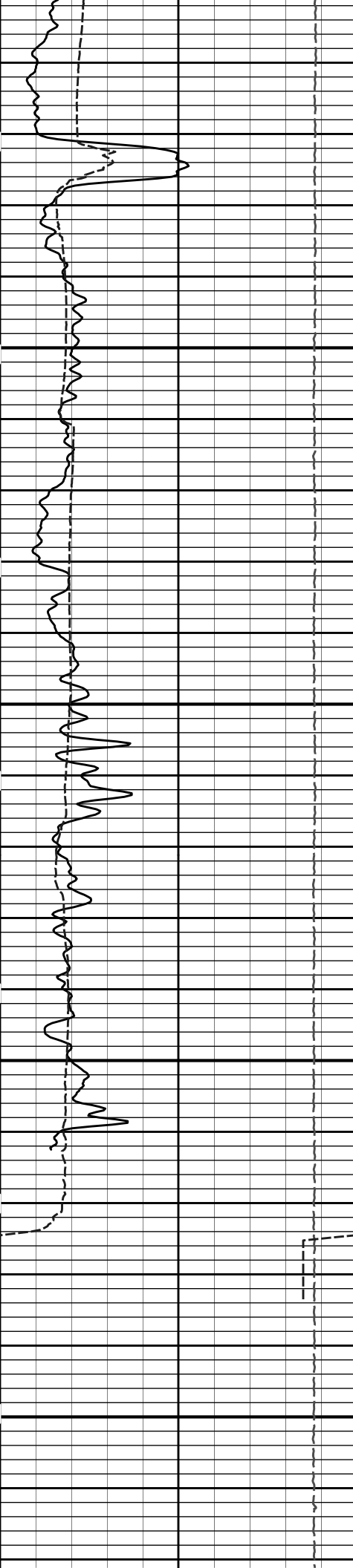
5 INCH MAIN LOG

HALLIBURTON

Plot Time: 30-Aug-13 12:18:40
Plot Range: 4550 ft to 4825.75 ft
Data: GARDEN_CITYTWIN\Well Based\REPEAT\
Plot File: \\BSAT2\BSAT_5_REP_LIB

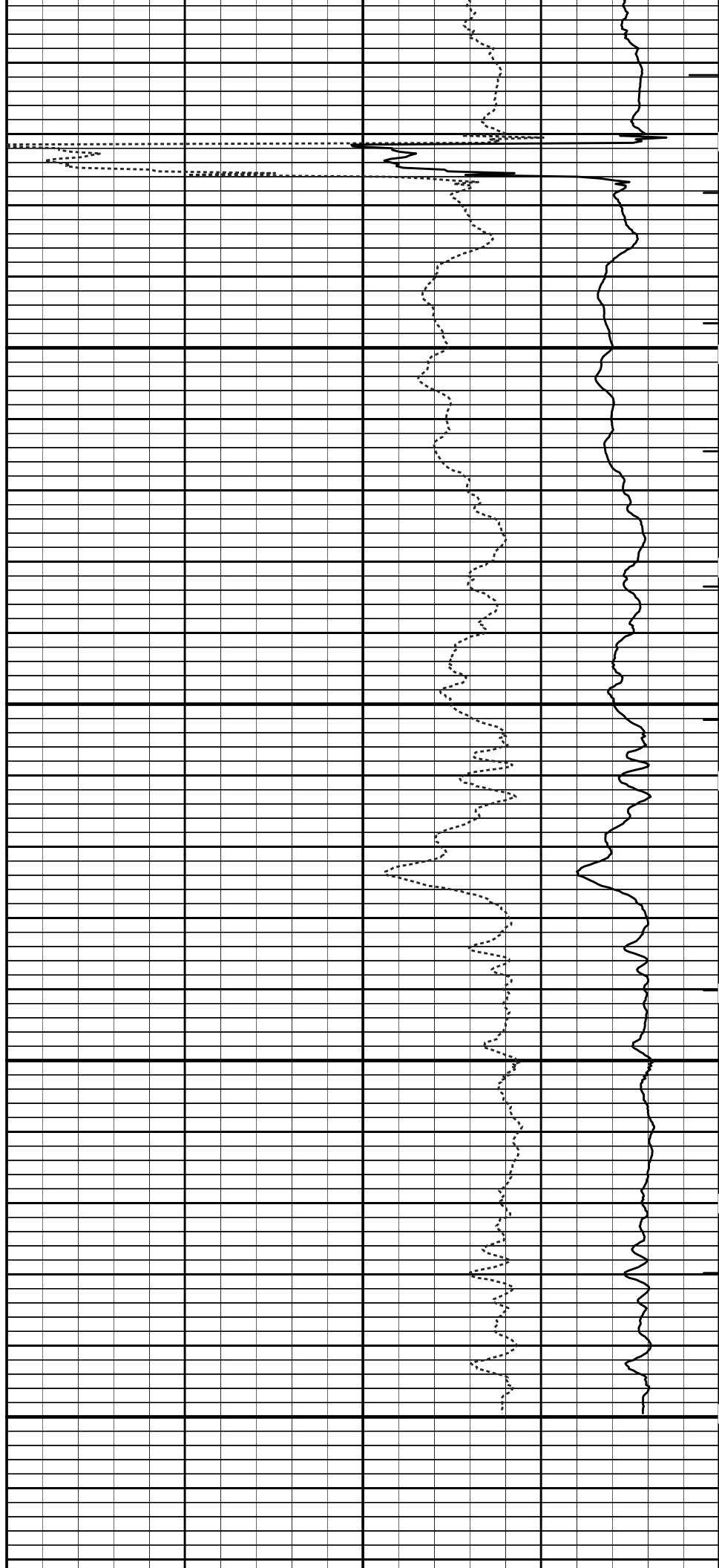
REPEAT SECTION





4700

4800



15K	Tension	0	MD	1 : 240	ft		ITTT
6	Caliper	16		140	Delta-T	40	
	inches				microsec per ft		
0	Gamma API	150		30	Acou Porosity	-10	
	api				percent		
	SHALE						

HALLIBURTON

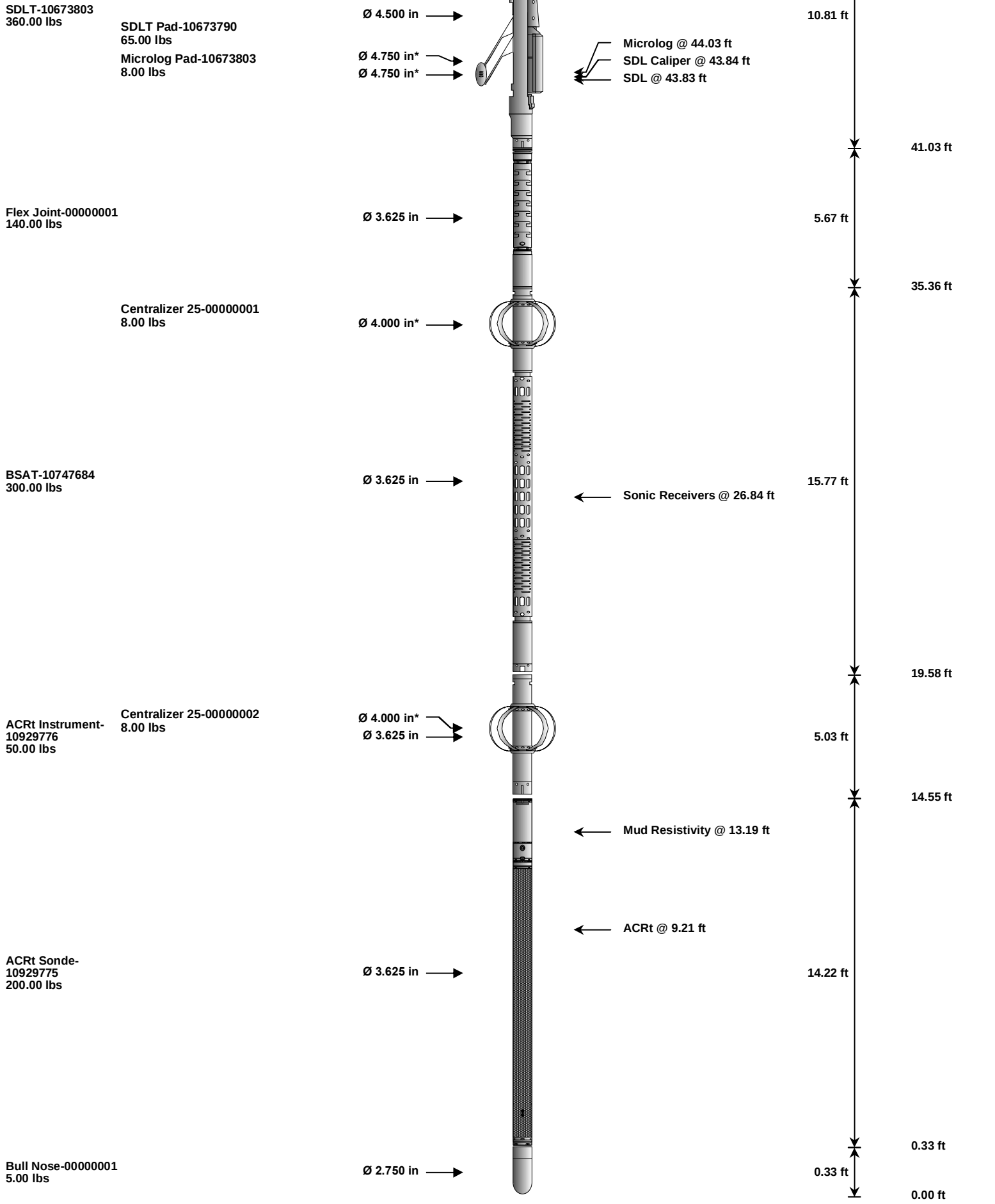
Plot Time: 30-Aug-13 12:18:46
Plot Range: 4550 ft to 4825.75 ft
Data: GARDEN_CITYTWIN\Well Based\REPEAT\
Plot File: \\BSAT2\BSAT_5_REP_LIB

REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-12027542 135.00 lbs		Ø 3.625 in →		← Load Cell @ 76.35 ft ← BH Temperature @ 75.79 ft	6.25 ft	80.04 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in →		← SP @ 72.01 ft	3.74 ft	73.79 ft
GTET-10748374 165.00 lbs		Ø 3.625 in →		← GammaRay @ 63.99 ft	8.52 ft	70.05 ft
DSN Decentralizer-10755066 6.60 lbs		Ø 5.000 in* →				61.53 ft
DSNT-10735145 174.00 lbs		Ø 3.625 in →		← DSN Far @ 54.59 ft ← DSN Near @ 53.84 ft	9.69 ft	51.84 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
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RWCH	Releasable Wireline Cable Head	12027542	135.00	6.25	73.79	300.00
SP	SP Sub	12345678	60.00	3.74	70.05	300.00
GTET	Gamma Telemetry Tool	10748374	165.00	8.52	61.53	60.00
DSNT	Dual Spaced Neutron	10735145	174.00	9.69	51.84	60.00
DCNT	DSN Decentralizer	10755066	6.60	5.13	*	55.17
SDLT	Spectral Density Tool	10673803	360.00	10.81	41.03	60.00
MICP	Microlog Pad	10673803	8.00	1.00	*	43.53
SDLP	Density Insite Pad	10673790	65.00	2.55	*	43.24
FLEX	Flex Joint	00000001	140.00	5.67	35.36	300.00
BSAT	Borehole Sonic Array Tool	10747684	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody	00000001	8.00	2.08	*	32.82
ACRt	Array Compensated True Resistivity Instrument Section	10929776	50.00	5.03	14.55	300.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	*	16.30
ACRt	Array Compensated True Resistivity Sonde Section	10929775	200.00	14.22	0.33	300.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00
Total			1,684.60	80.04		
* Not included in Total Length and Length Accumulation.						
Data: GARDEN_CITYTWIN\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BN\IDLE						
Date: 30-Aug-13 08:46:16						

HALLIBURTON						
PARAMETERS REPORT						
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units	
TOP						
	GTET	GEOK	Process Gamma Ray EVR?	No		
	DSNT	DEOK	Process DSN EVR?	No		
	SDLT Pad	DNOK	Process Density EVR?	No		
3600.00						
	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	9.500	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	4830.00	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 /					

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?	Yes	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	Yes	
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?	Yes	
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: GARDEN_CITYTWIN\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BN\IDLE			Date: 30-Aug-13 09:46:04	

HALLIBURTON

INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Denth Panel				

TENS	Tension	0.00	NO	
RWCH				
DHTN	DownholeTension	0.00	BLK	0.000
SP Sub				
PLTC	Plot Control Mask	72.01	NO	
SP	Spontaneous Potential	72.01	BLK	1.250
SPR	Raw Spontaneous Potential	72.01	NO	
SPO	Spontaneous Potential Offset	72.01	NO	
GTET				
TPUL	Tension Pull	63.99	NO	
GR	Natural Gamma Ray API	63.99	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	63.99	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	63.99	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
DSNT				
TPUL	Tension Pull	53.74	NO	
RNDS	Near Detector Telemetry Counts	53.84	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.59	TRI	0.583
DNTT	DSN Tool Temperature	53.84	NO	
DSNS	DSN Tool Status	53.74	NO	
ERND	Near Detector Telemetry Counts EVR	53.84	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.59	BLK	0.000
ENTM	DSN Tool Temperature EVR	53.84	NO	
SDLT				
TPUL	Tension Pull	43.84	NO	
PCAL	Pad Caliper	43.84	TRI	0.250
ACAL	Arm Caliper	43.84	TRI	0.250
BSAT				
TPUL	Tension Pull	26.84	NO	
STAT	Status	26.84	NO	
DLYT	Delay Time	26.84	NO	
SI	Sample Interval	26.84	NO	
TXRX	Raw Telemetry 10 Receivers	26.84	NO	
FRMC	Tool Frame Count	26.84	NO	
GMOD	Gain processing mode	19.58	NO	
ACRt Sonde				
TPUL	Tension Pull	2.73	NO	
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000

FLO	Far Cesium Low	44.01	BLK	0.250
FVA	Far Valley	44.01	BLK	0.250
FBA	Far Barite	44.01	BLK	0.250
FDE	Far Density	44.01	BLK	0.250
FPK	Far Peak	44.01	BLK	0.250
FLI	Far Lithology	44.01	BLK	0.250
PTMP	Pad Temperature	43.84	BLK	0.920
NHV	Near Detector High Voltage	43.24	NO	
FHV	Far Detector High Voltage	43.24	NO	
ITMP	Instrument Temperature	43.24	NO	
DDHV	Detector High Voltage	43.24	NO	
Microlog Pad				
TPUL	Tension Pull	44.03	NO	
MINV	Microlog Lateral	44.03	BLK	0.750
MNOR	Microlog Normal	44.03	BLK	0.750
Data: GARDEN_CITYTWINI0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BNIDLE			Date: 30-Aug-13 08:46:53	
COMPANY	HARTMAN OIL CO.			
WELL	GARDEN CITY B TWIN #5			
FIELD	DAMME			
COUNTY	FINNEY	STATE	KANSAS	
HALLIBURTON		BOREHOLE COMPENSATED SONIC ARRAY LOG		