

BOREHOLE SONIC ARRAY LOG

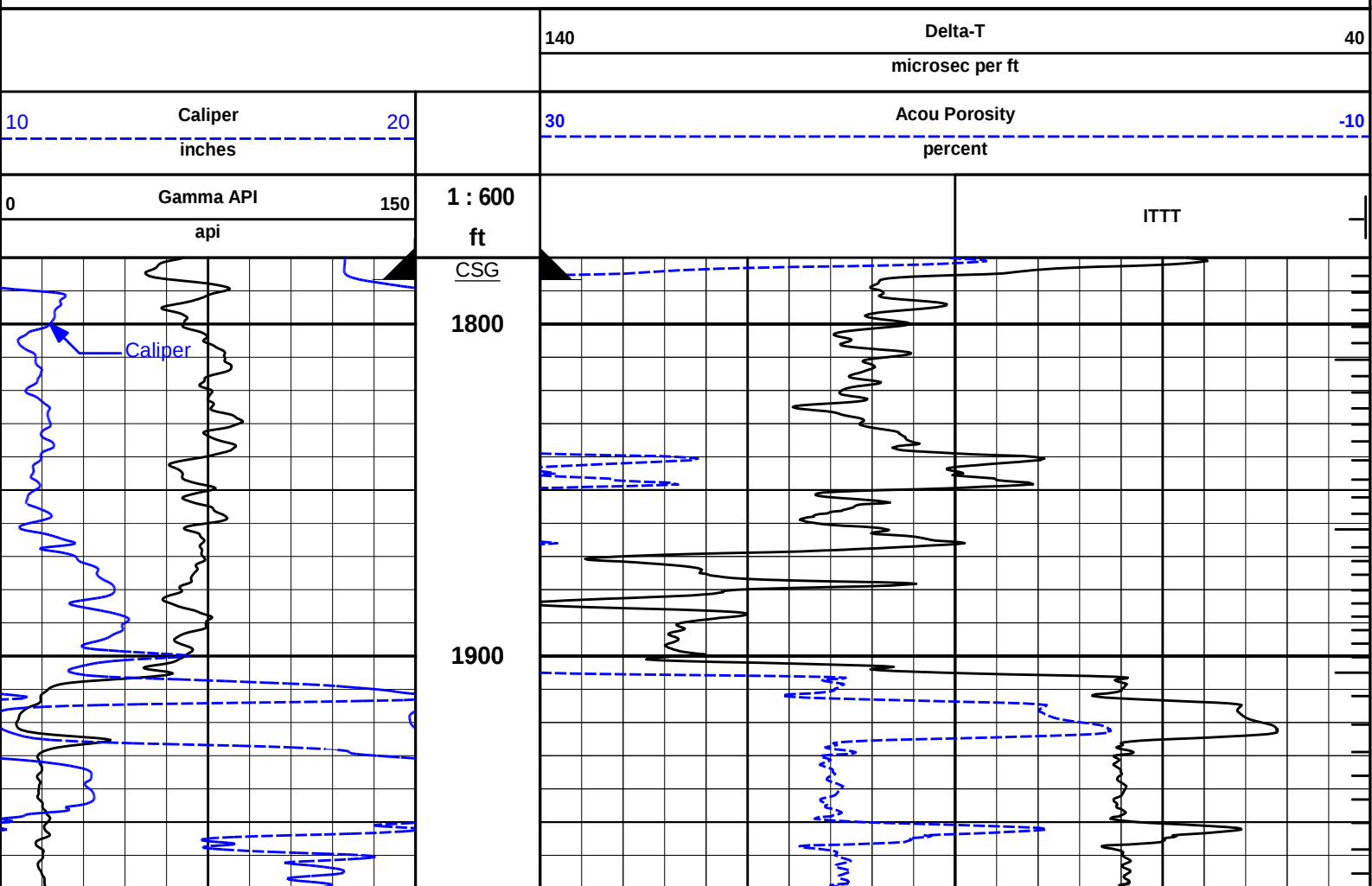
Fold here

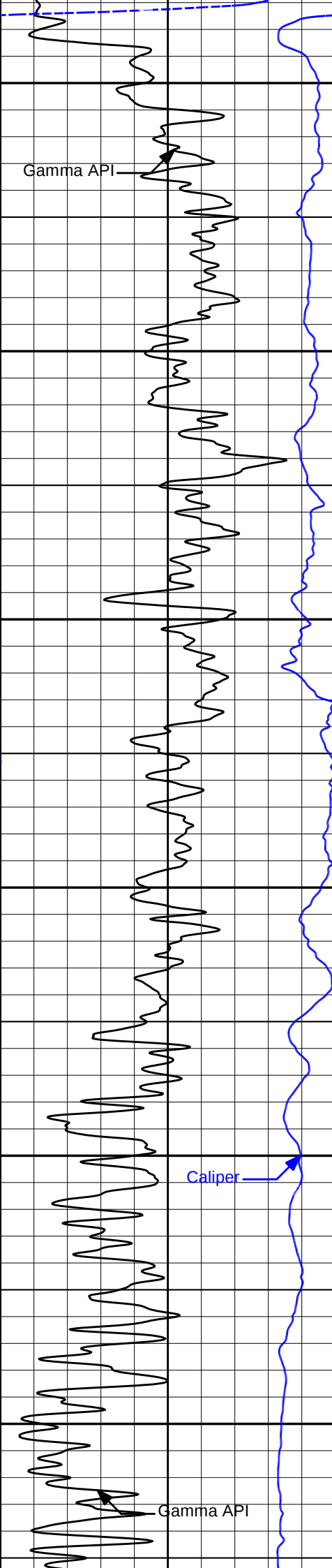
Service Ticket No.: DUAL904334094						API No.: 15081221640000						PGM Version: WL INSITE R5.0.5 (Build 8)					
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE								RESISTIVITY SCALE CHANGES									
Date	Sample No.						Type Log	Depth		Scale Up Hole		Scale Down Hole					
Depth-Driller																	
Type 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	ACRT		NONE		CENT		N/A	
Rmc @ Meas. Temp.			@			@				I-11055059							
Source Rmf	Rmc							S-11038385									
Rm @ BHT			@			@											
Rmf @ BHT			@			@											
Rmc @ BHT			@			@											
EQUIPMENT DATA																	
GAMMA				ACOUSTIC				DENSITY				NEUTRON					
Run No.		ONE		Run No.		ONE		Run No.		ONE		Run No.		ONE			
Serial No.		11021139		Serial No.		10939049		Serial No.		10809130		Serial No.		11020487			
Model No.		GTET		Model No.		BSAT		Model No.		SDLT		Model No.		DSNT			
Diameter		3.625"		No. of Cent.		2		Diameter		6.1"		Diameter		3.625"			
Detector Model No.		GTET		Spacing		0.5"		Log Type		GAM-GAM		Log Type		NEU-NEU			
Type		SCINT						Source Type		Cs-137		Source Type		DSN-436			
Length		8"		LSA [Y/N]				Serial No.		5155GW		Serial No.		DSN-436			
Distance to Source		N/A		FWDA [Y/N]				Strength		1.5 Ci		Strength		15 Ci			
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	TD	CSG	REC	0	150	30	-10	47.6 us/ft	30	-10	2.71 g/cc	30	-10	LIME			

DIRECTIONAL INFORMATION														
Maximum Deviation @										KOP @				
CLIENT REPORTED VERTICAL WELL														
Remarks: GTET-DSNT-SDLT-FLEX-BSAT-ACRT RUN IN COMBINATION														
ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING														
POROSITY & MICROLOG LOGGED TO 4000' AS PER CLIENT REQUEST														
CHLORIDES REPORTED AT 1200 PPM														
NO POST-CALS COMPLETED AS PER CLIENT REQUEST														
RIG: DUKE DRILLING RIG 9														
CREW: J. WOOD, K. GATLIN														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES -- EL RENO, OK -- 405.278.9685														
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														

	Plot Time: 01-Oct-17 16:59:27
	Plot Range: 1780 ft to 5561.75 ft
	Data: MERIT_KELLS I-1\Well Based\MAIN\
	Plot File: \BSAT\1 BSAT 2inx

2 INCH MAIN LOG





2000

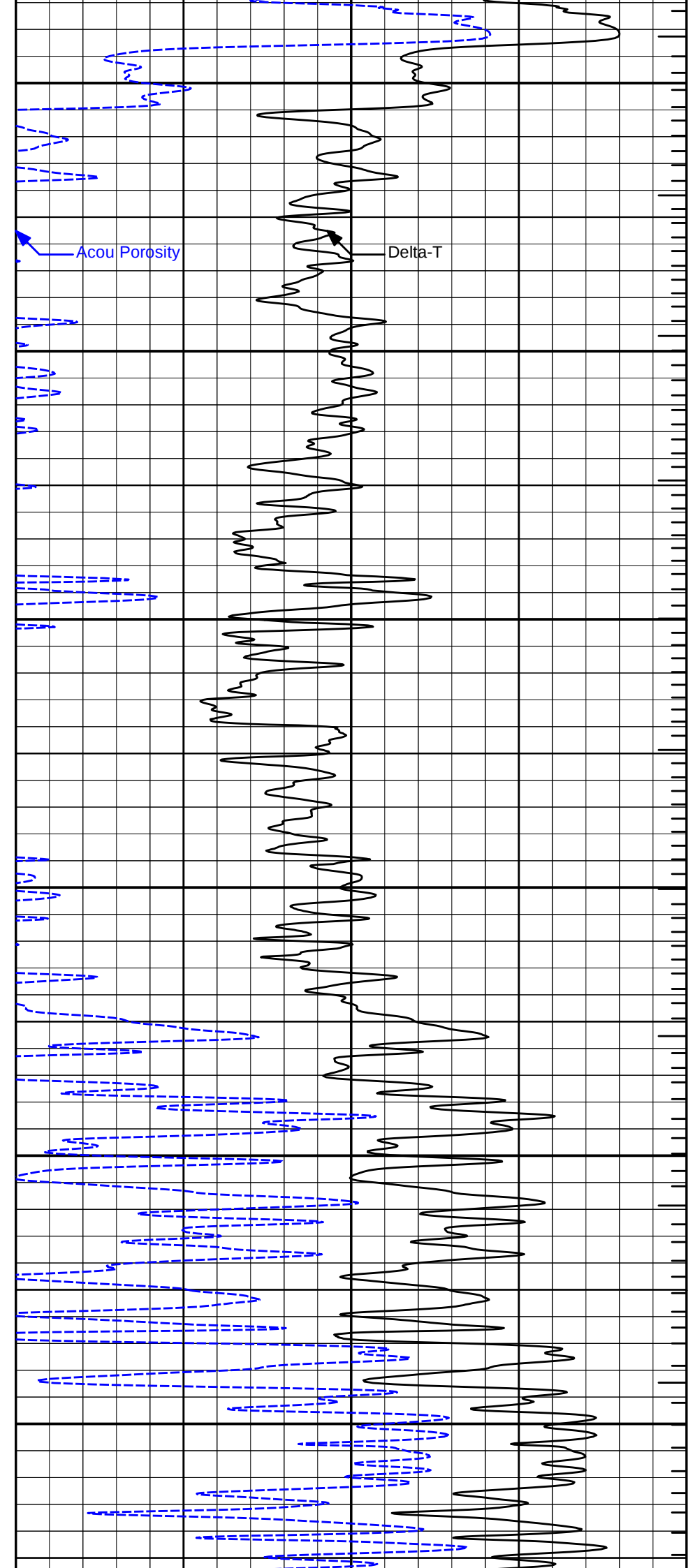
2100

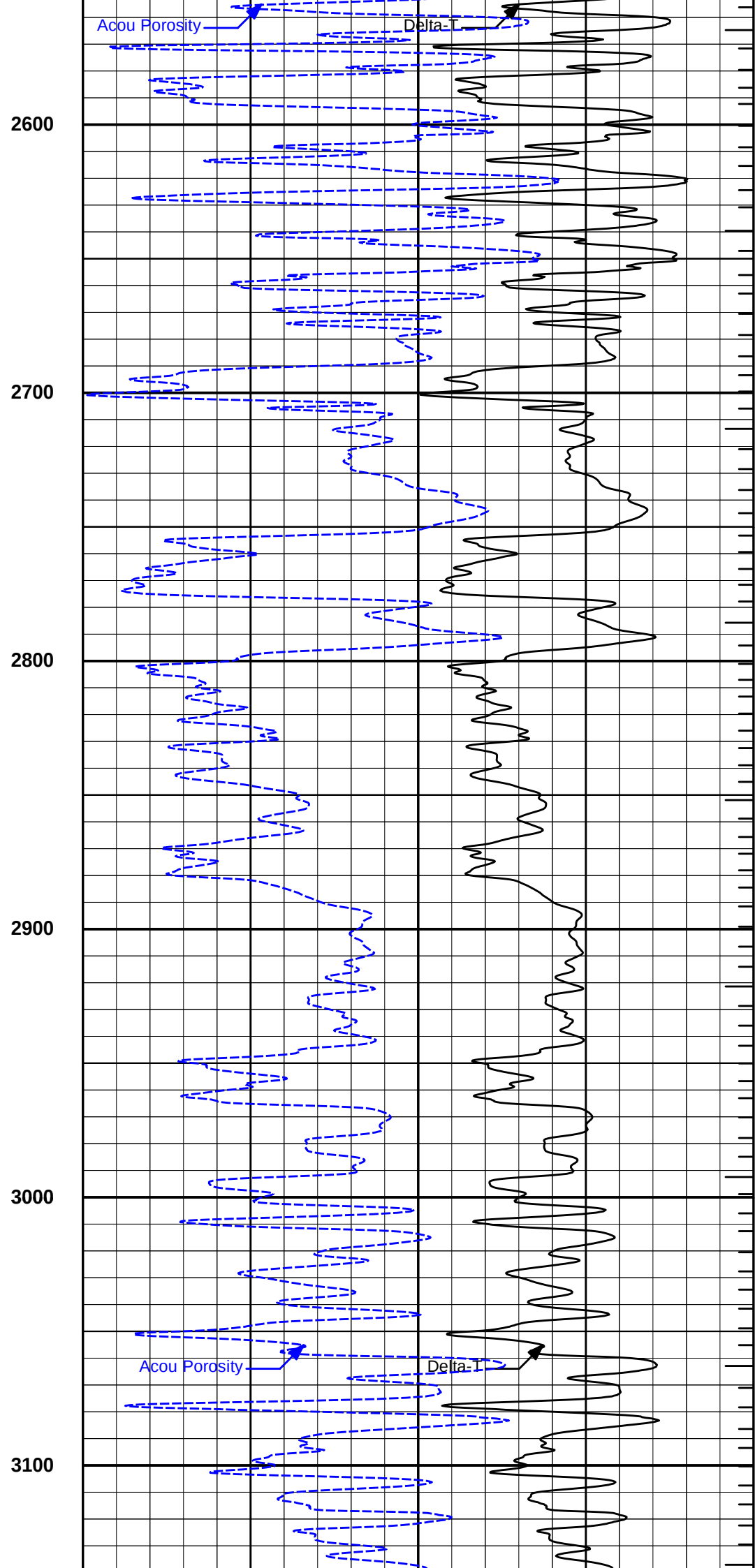
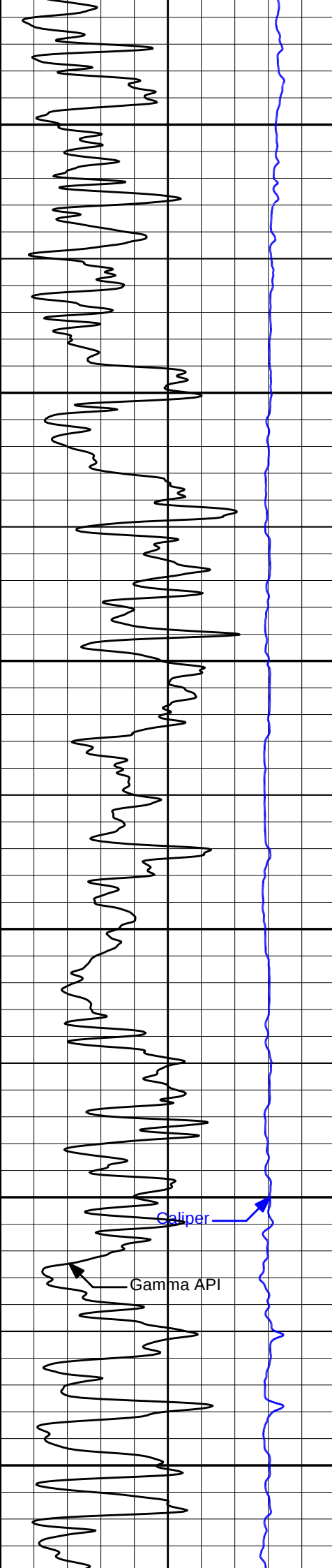
2200

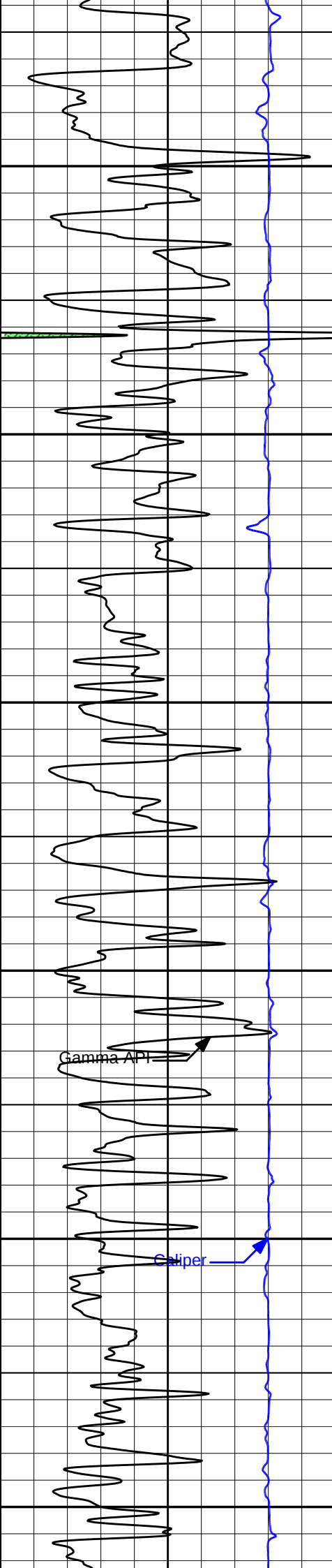
2300

2400

2500







3200

3300

3400

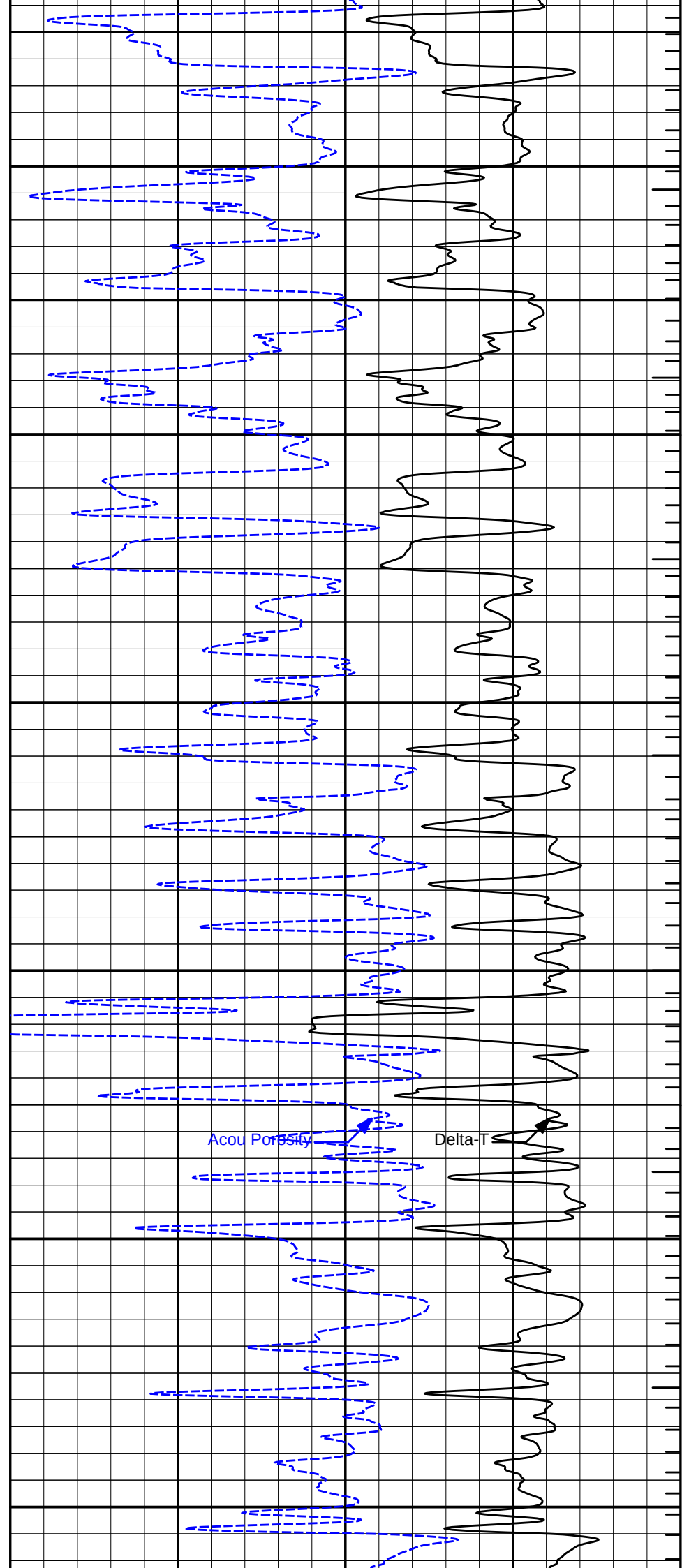
3500

3600

3700

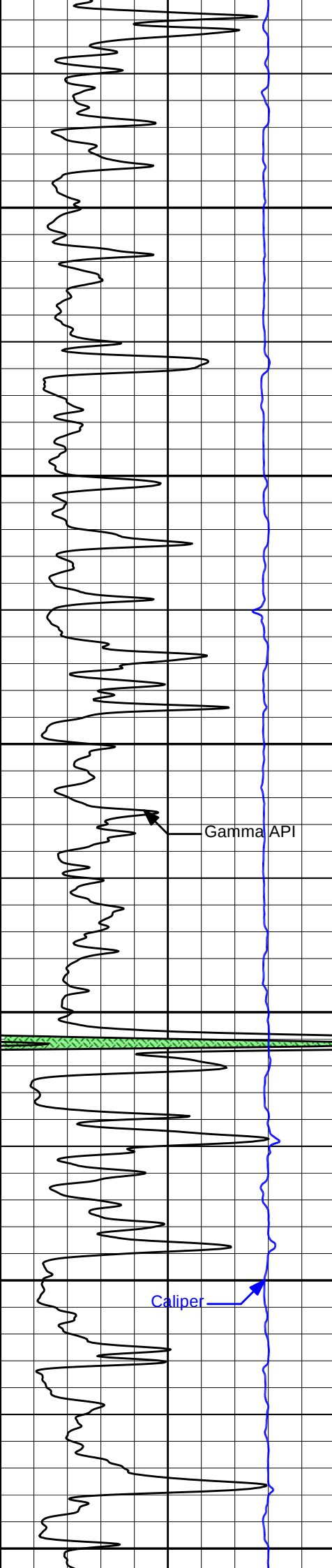
Gamma API

Caliper



Acou Porosity

Delta-T



3800

3900

4000

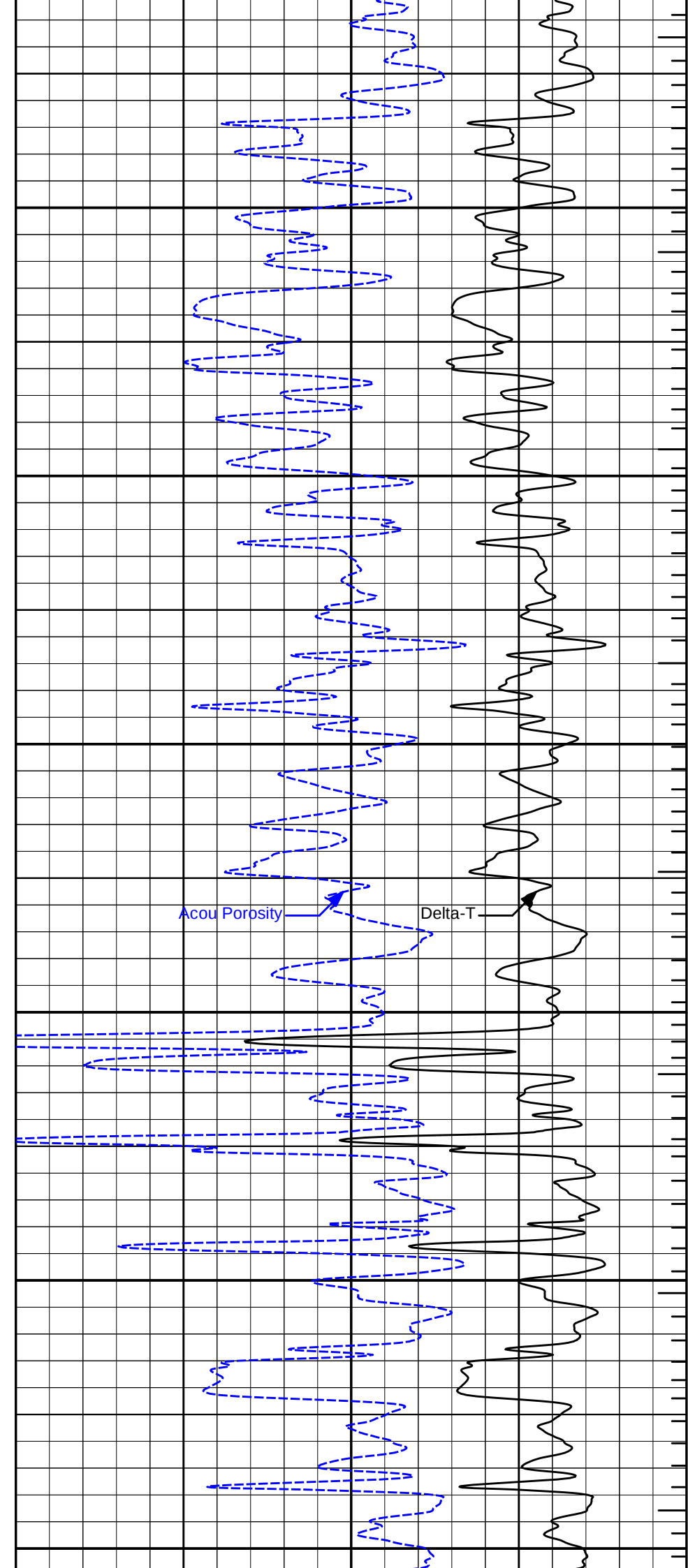
4100

4200

4300

Gamma API

Caliper



Acou Porosity

Delta-T



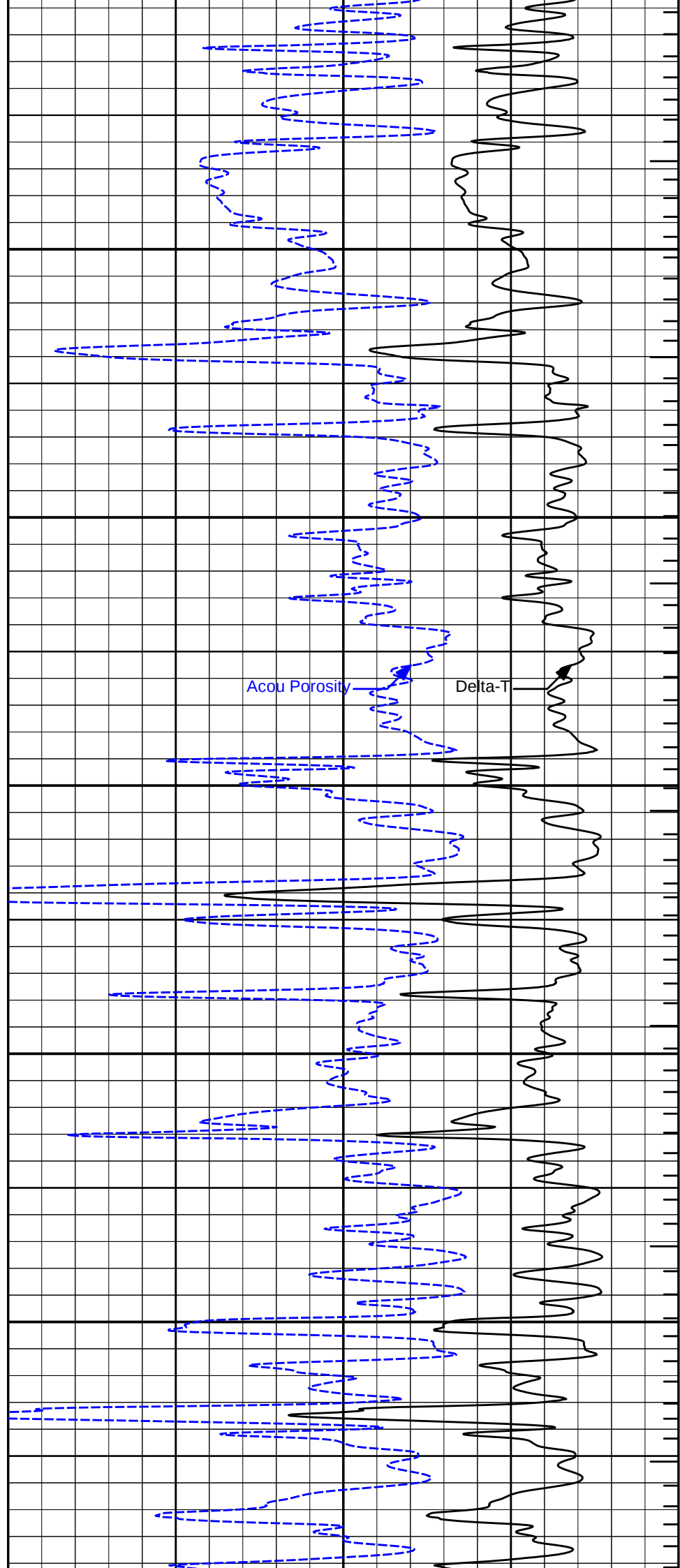
4400

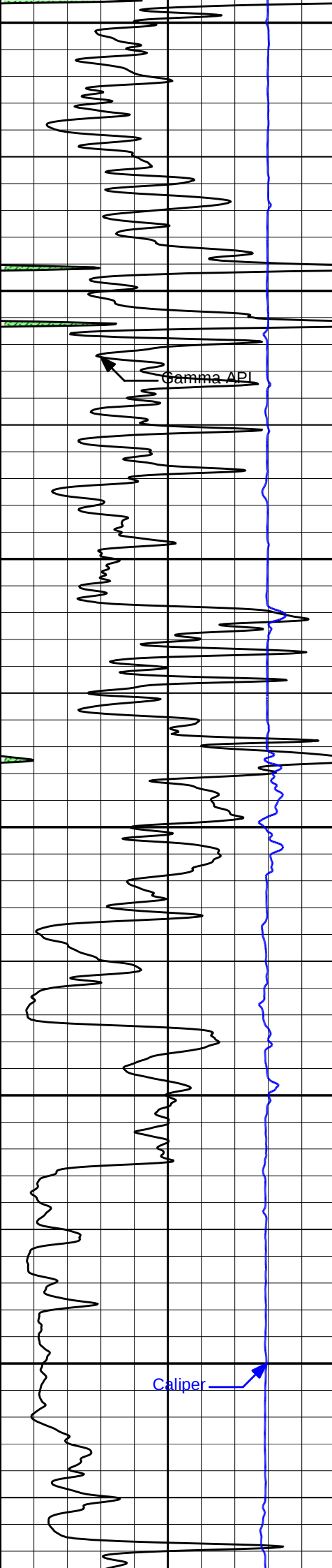
4500

4600

4700

4800





4900

5000

5100

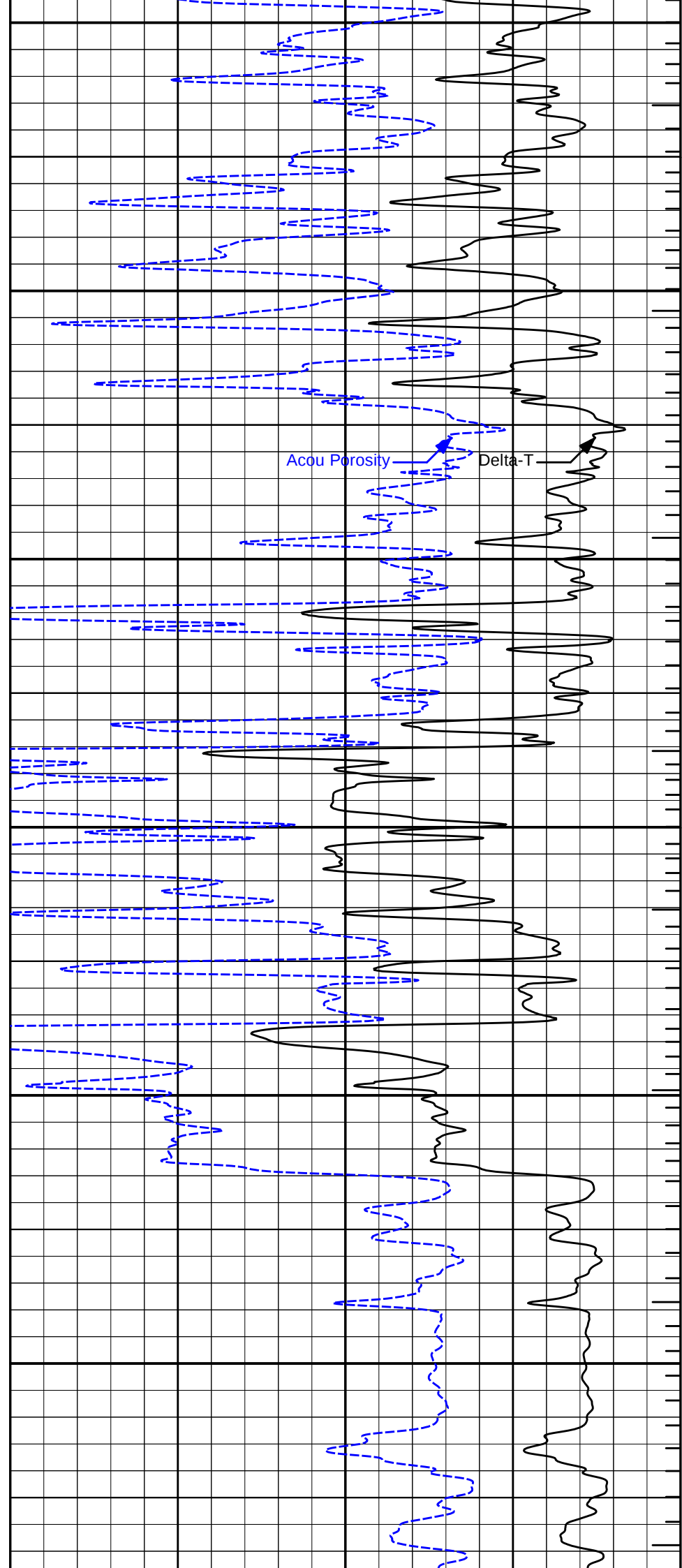
5200

5300

5400

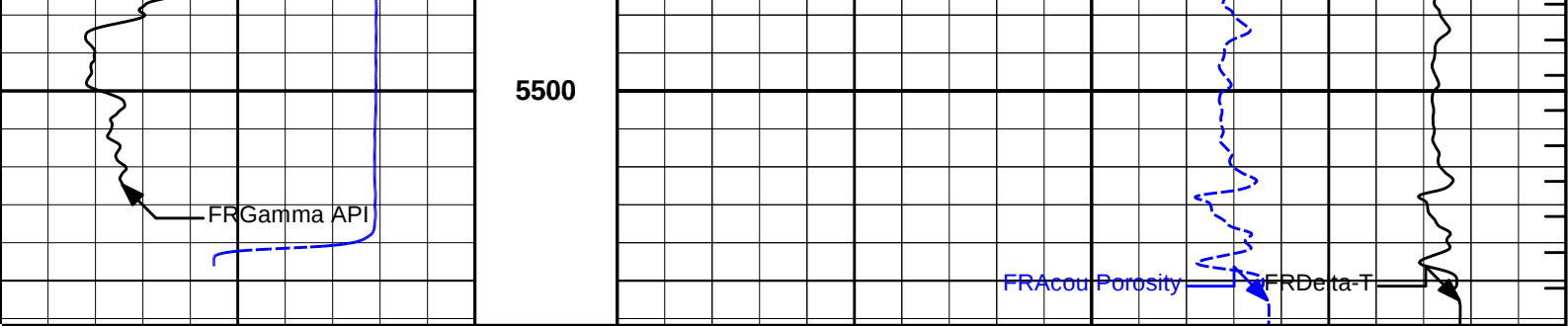
Gamma API

Caliper



Acou Porosity

Delta-T



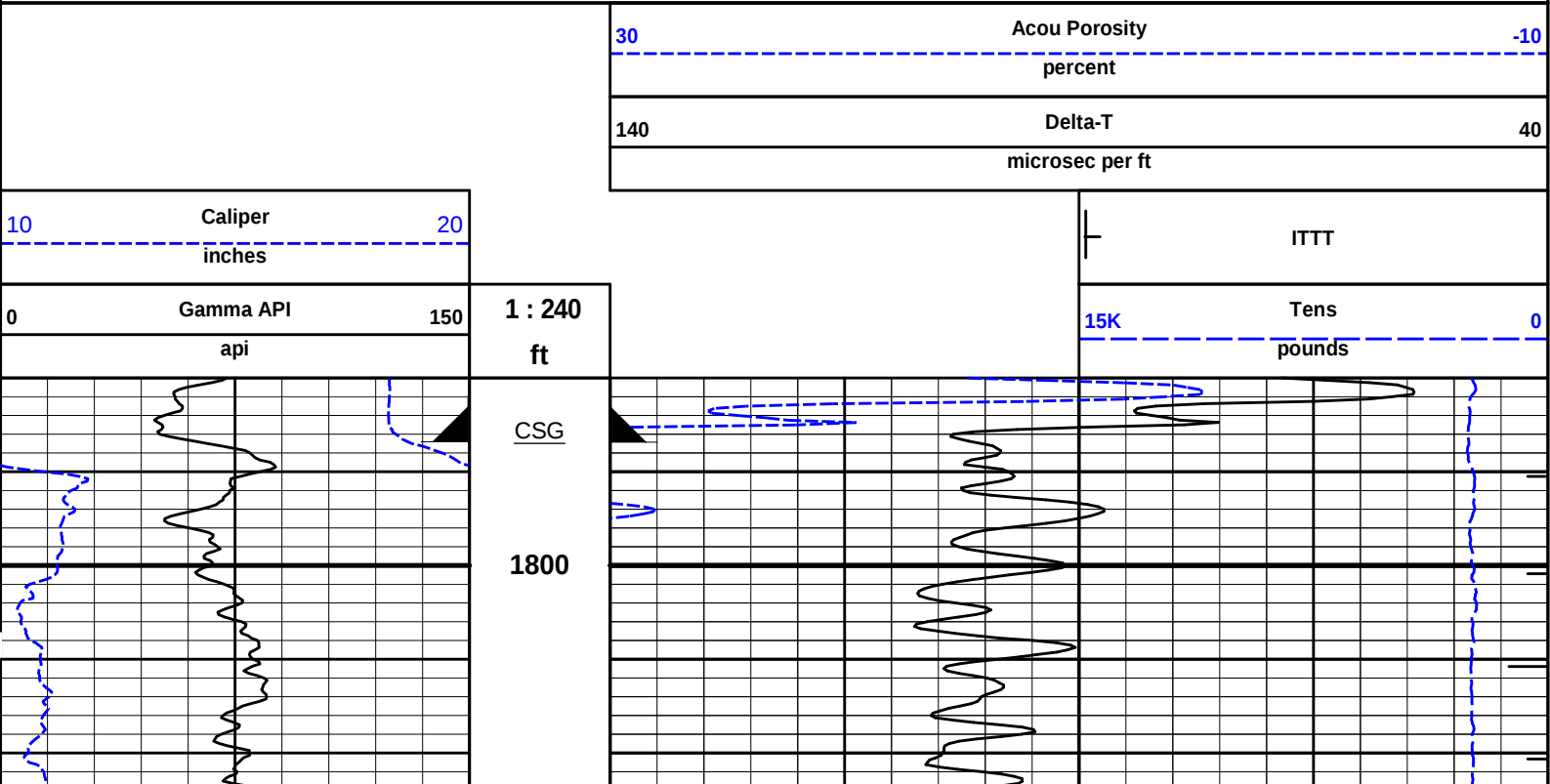
0	Gamma API	150	1 : 600 ft		ITTT	
	api					
10	Caliper	20		30	Acou Porosity	-10
	inches					percent
				140	Delta-T	40
				microsec per ft		

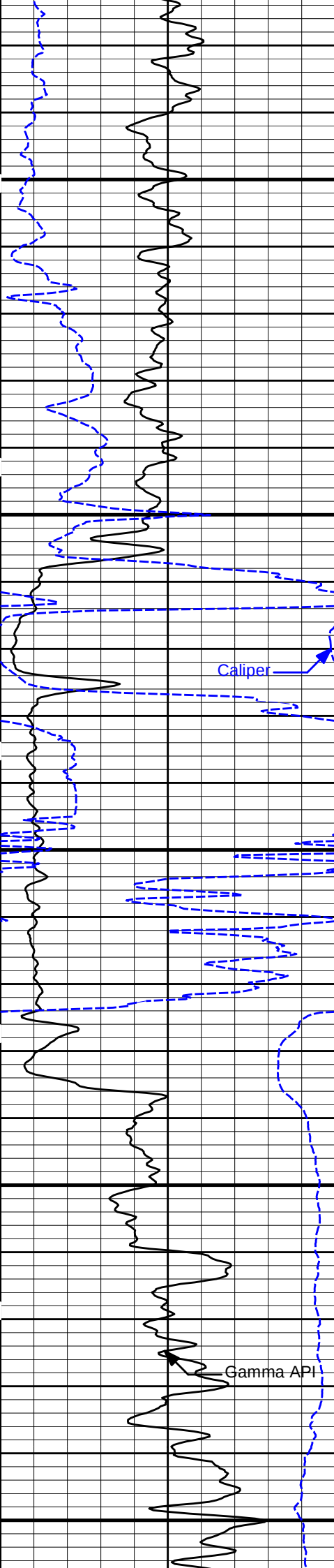
HALLIBURTON Plot Time: 01-Oct-17 16:59:29
Plot Range: 1780 ft to 5561.75 ft
Data: MERIT_KELLS I-1\Well Based\MAIN\
Plot File: \\BSAT1\BSAT_2inx

2 INCH MAIN LOG

HALLIBURTON Plot Time: 01-Oct-17 16:59:30
Plot Range: 1780 ft to 5589.17 ft
Data: MERIT_KELLS I-1\Well Based\MAIN\
Plot File: \\BSAT1\BSAT_5_mainx

5 INCH MAIN LOG



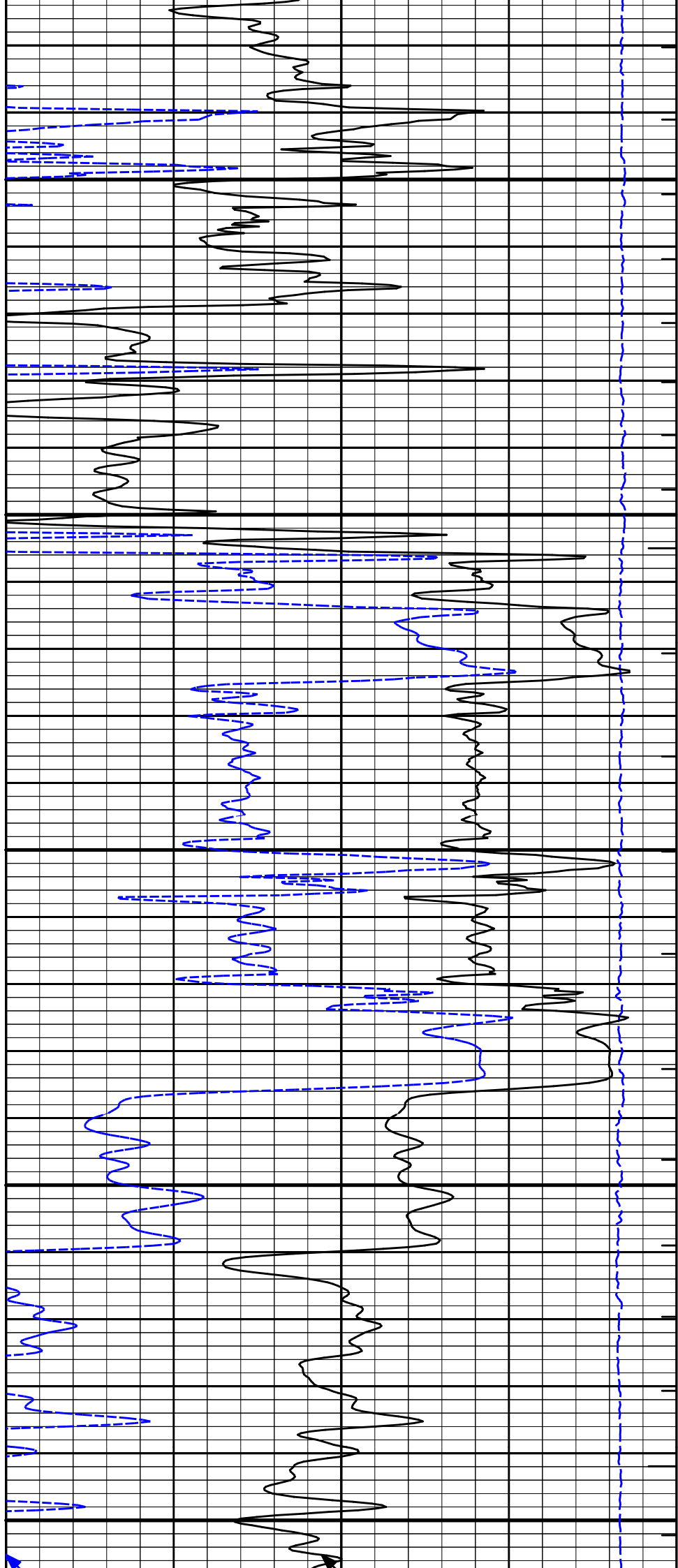


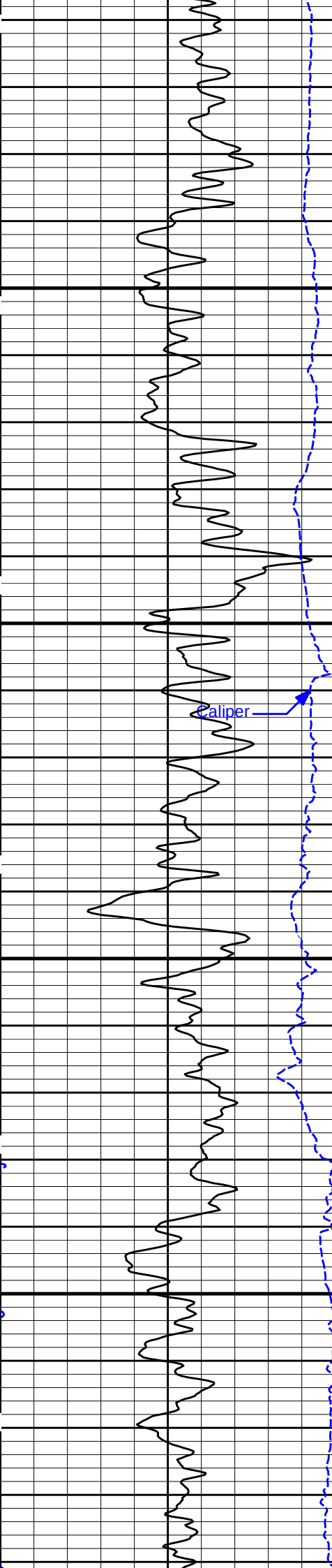
1900

2000

Caliper

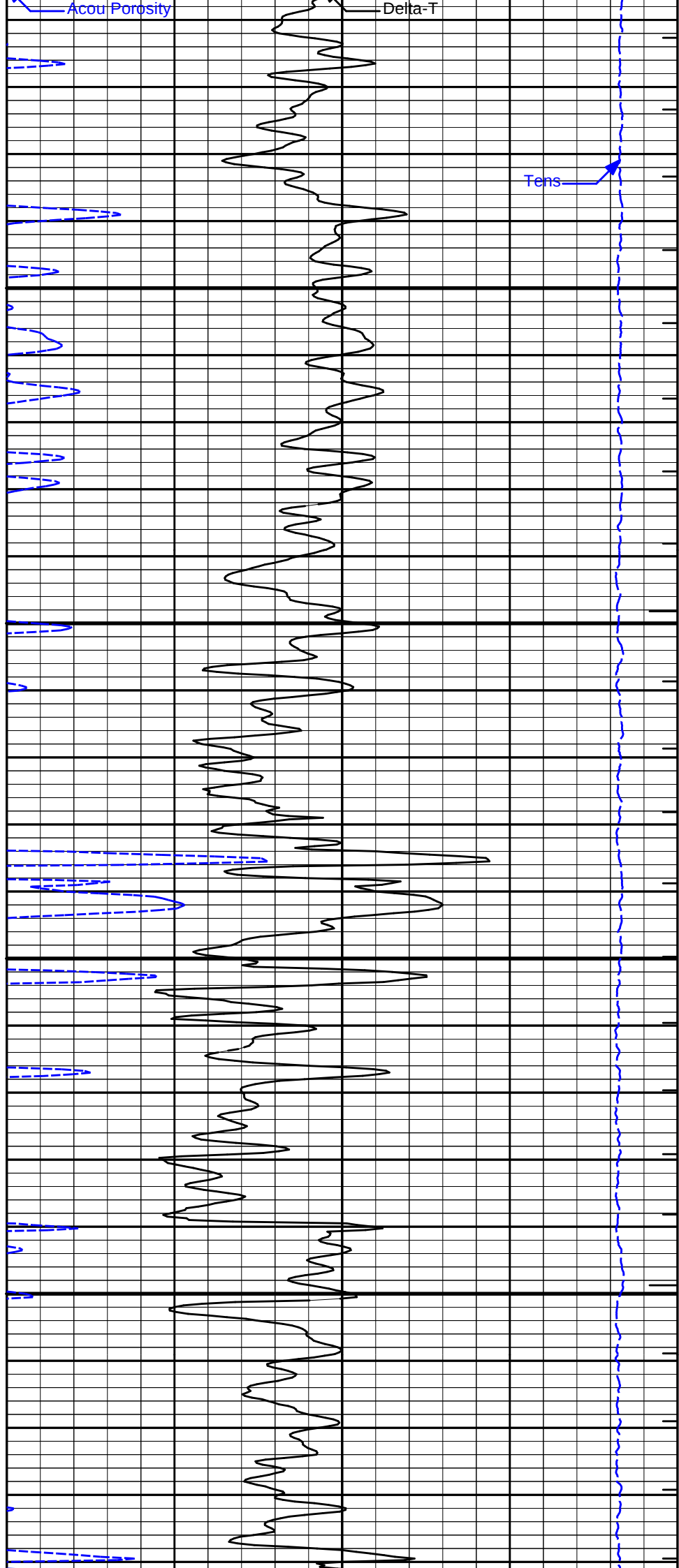
Gamma API

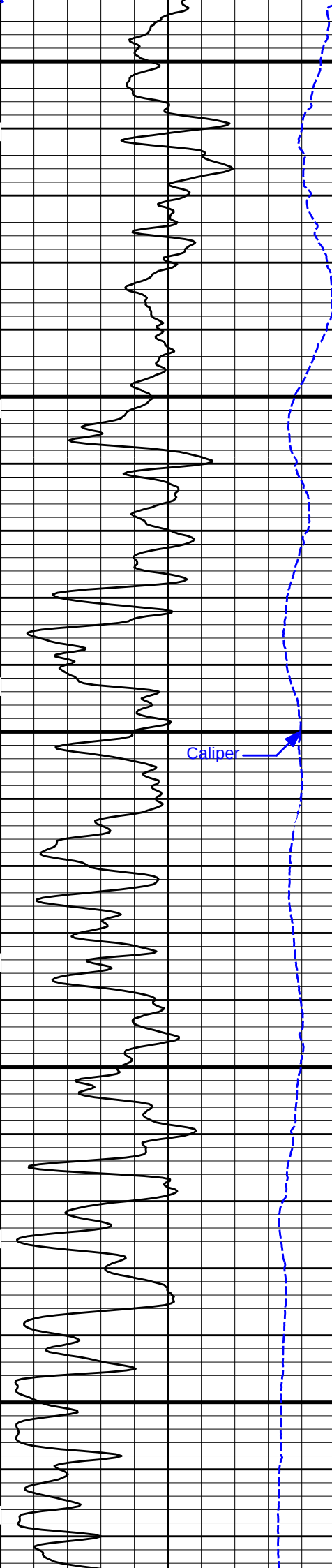




2100

2200

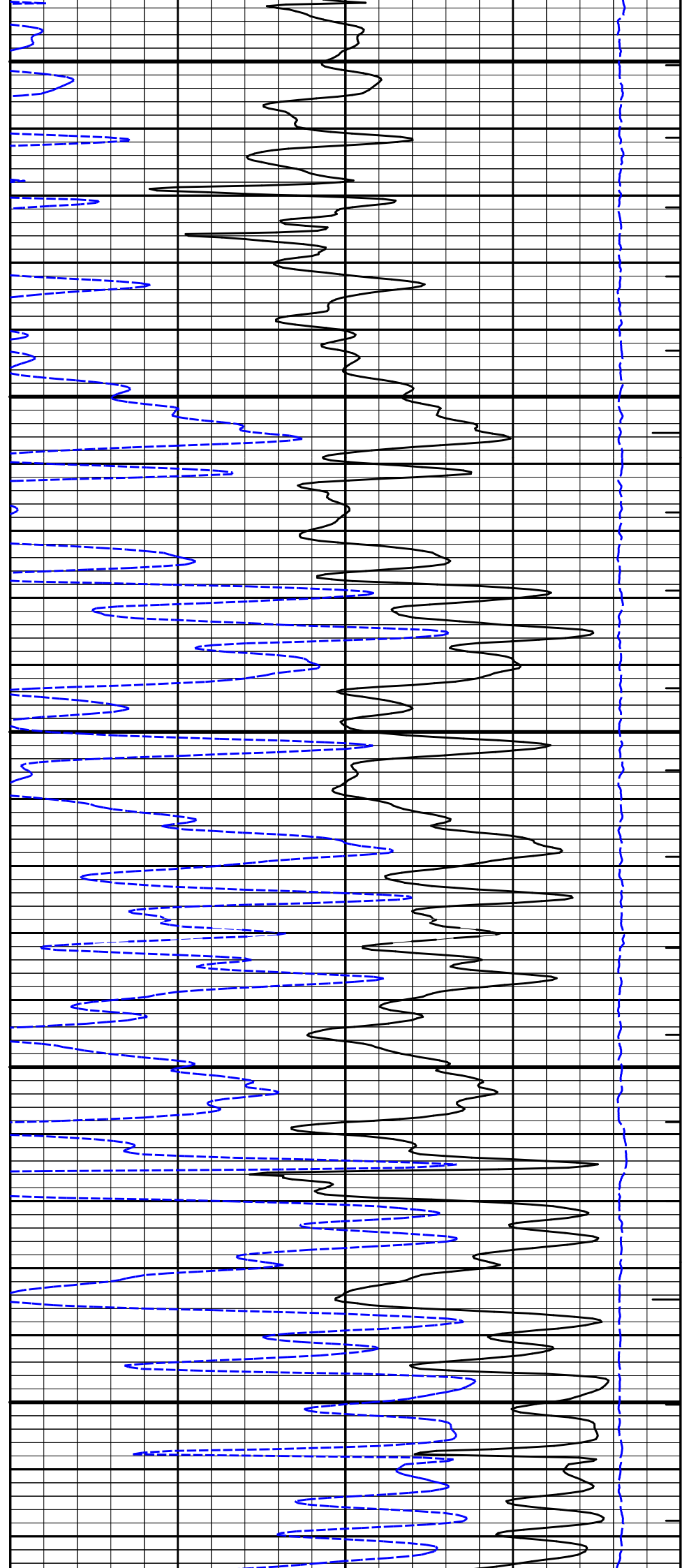


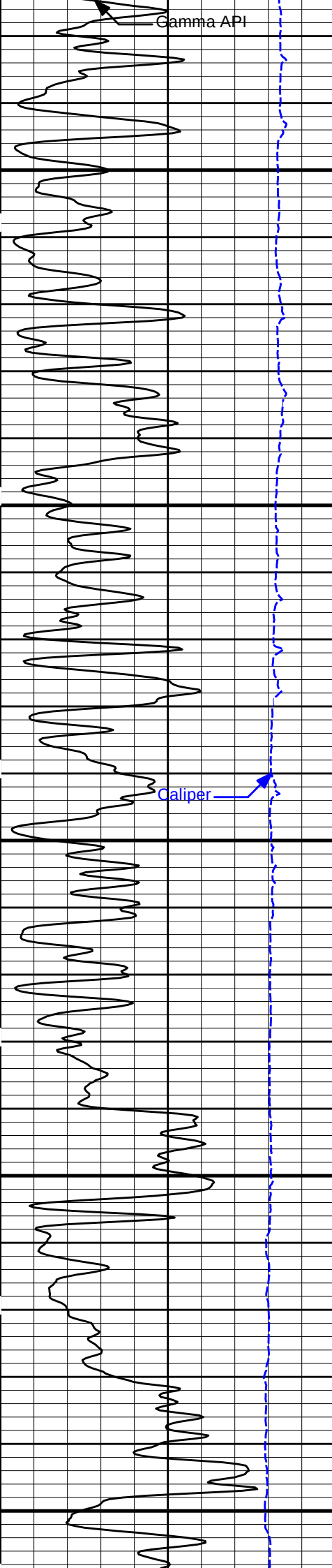


2300

2400

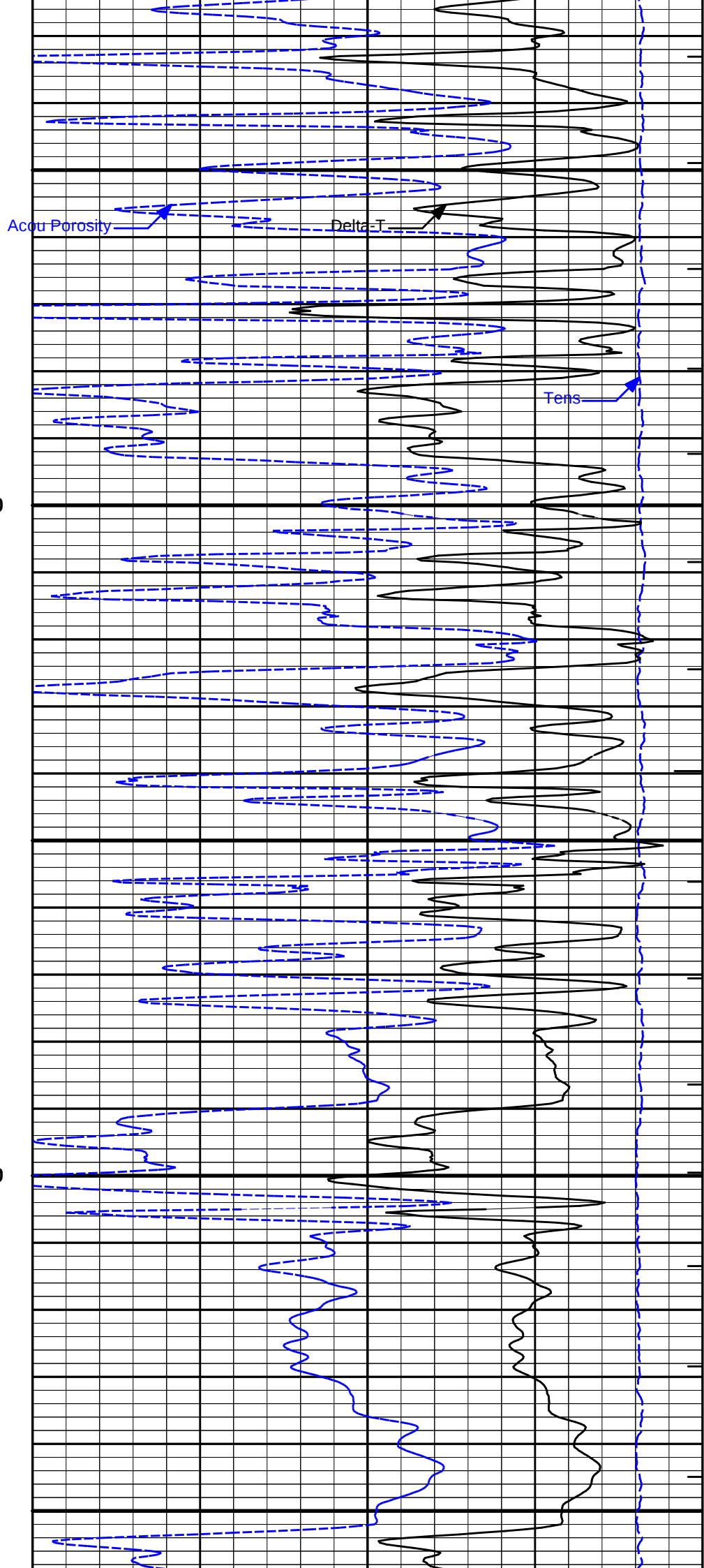
2500

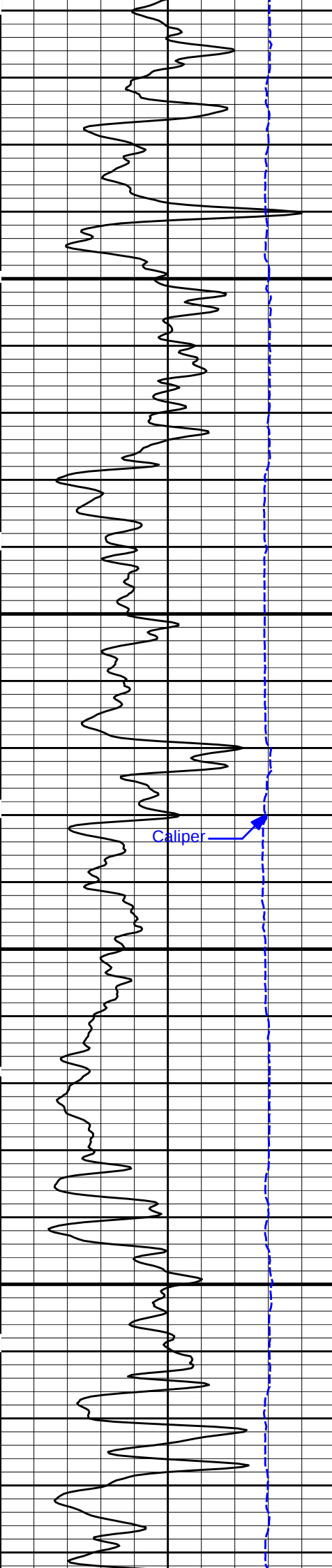




2600

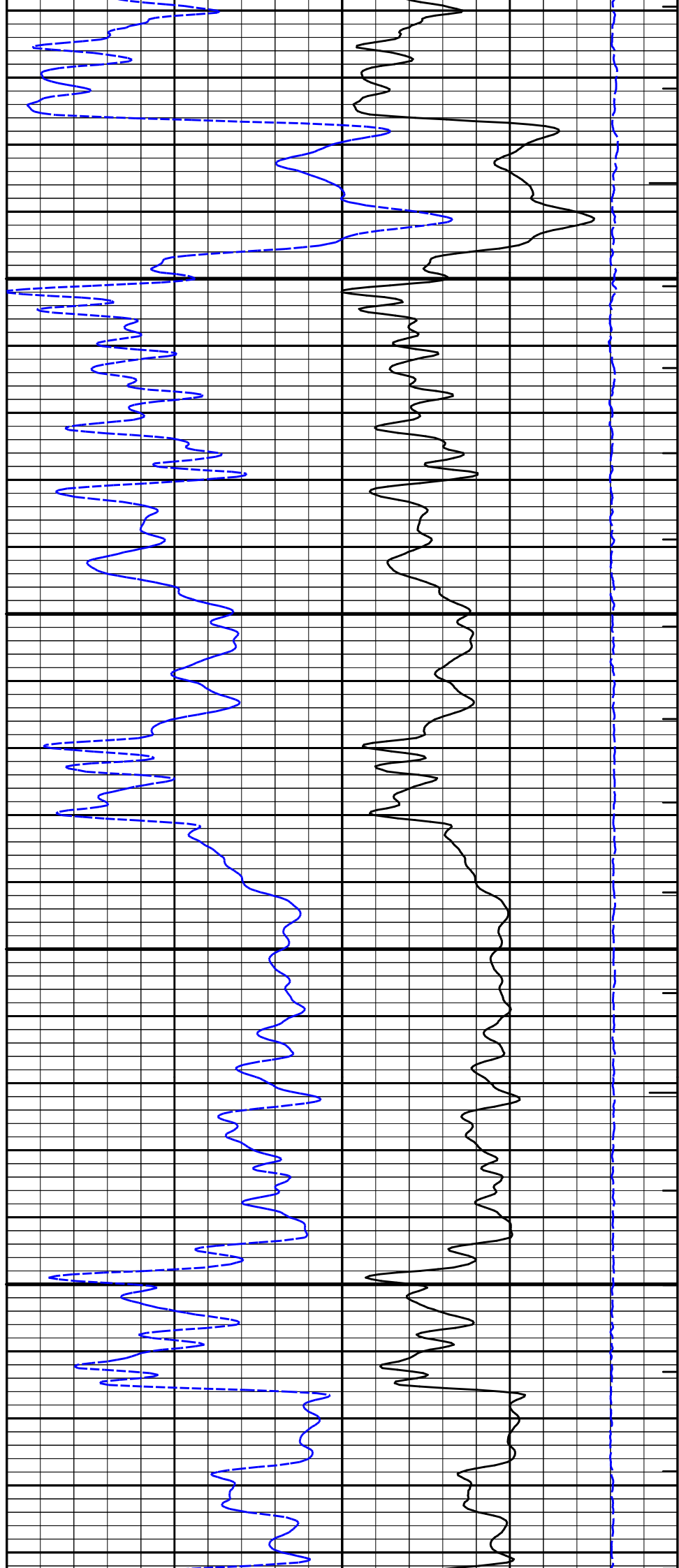
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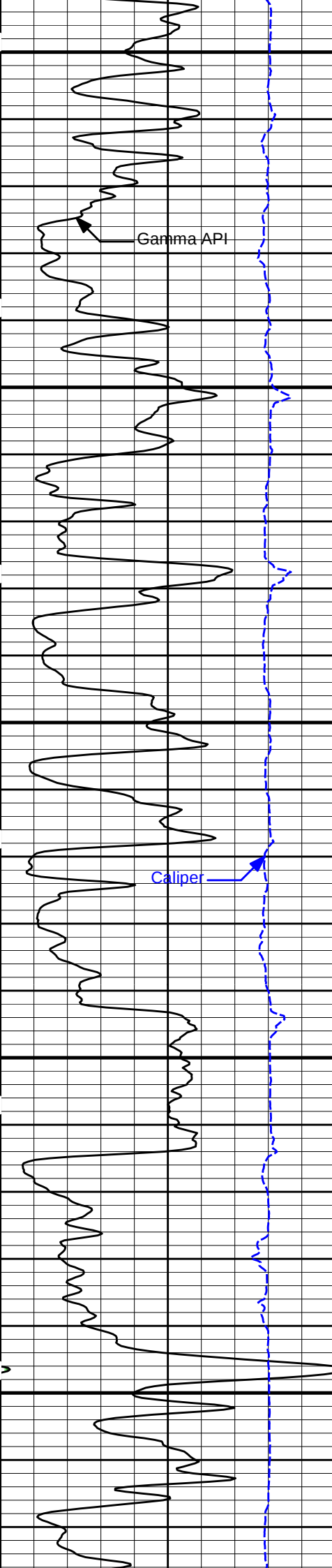




2800

2900

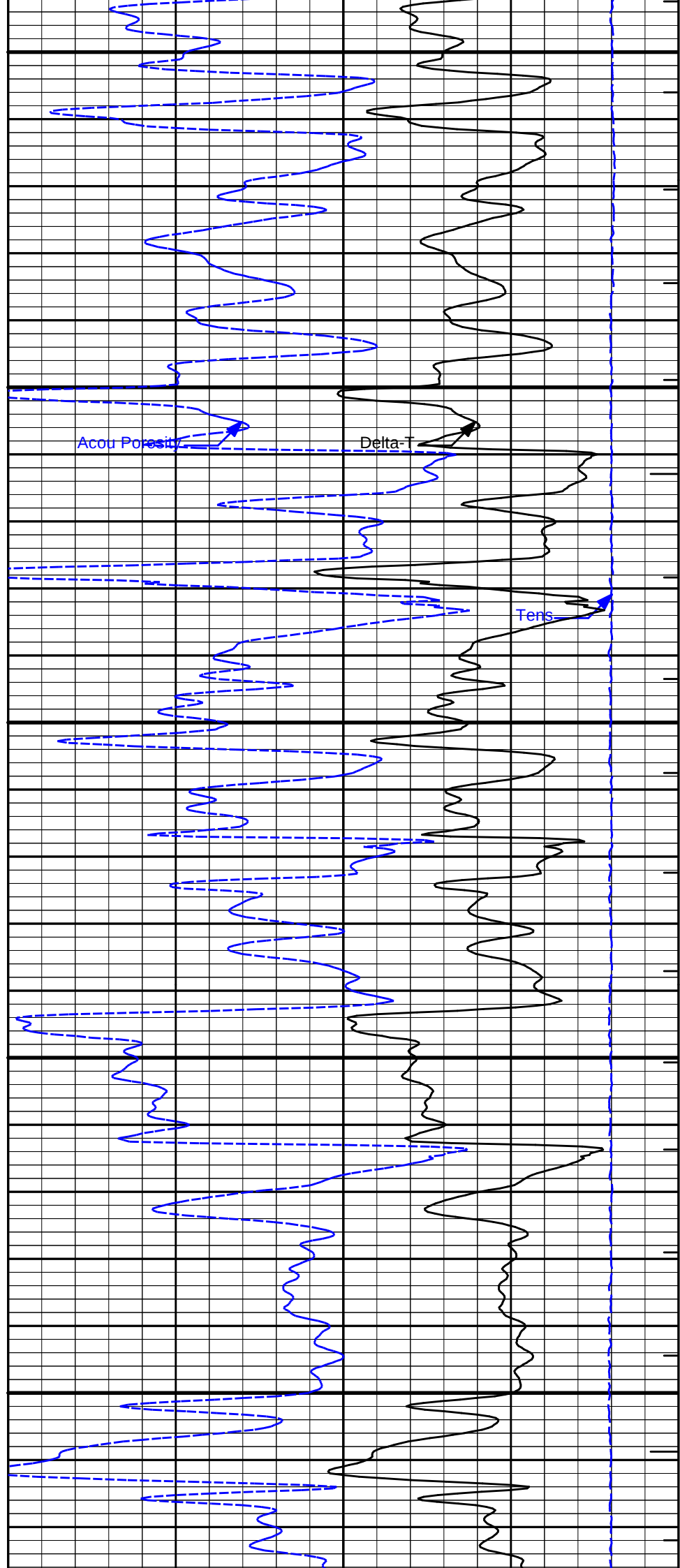


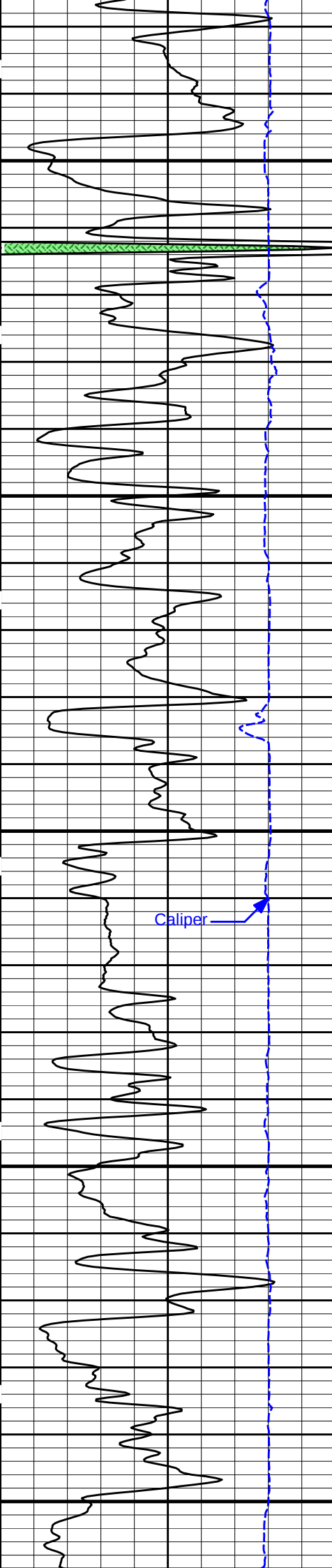


3000

3100

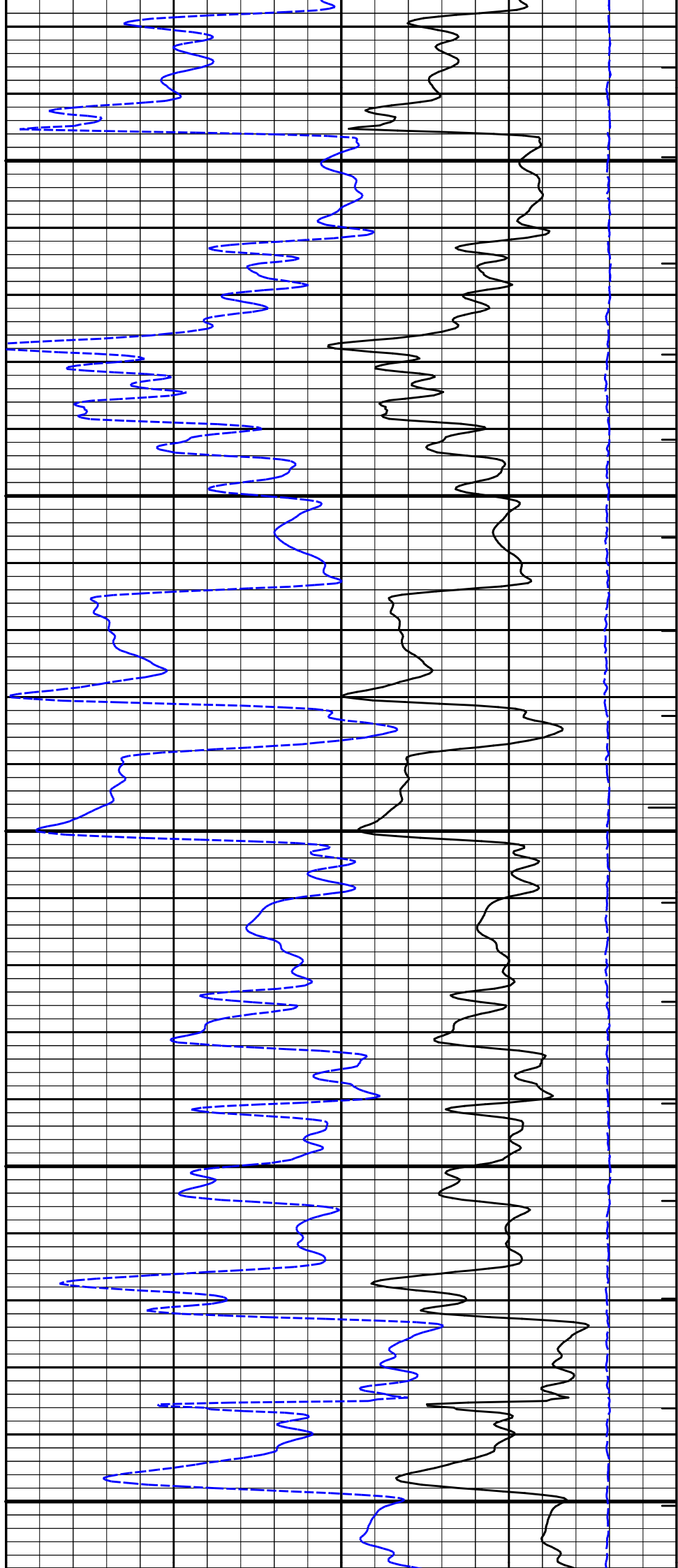
3200

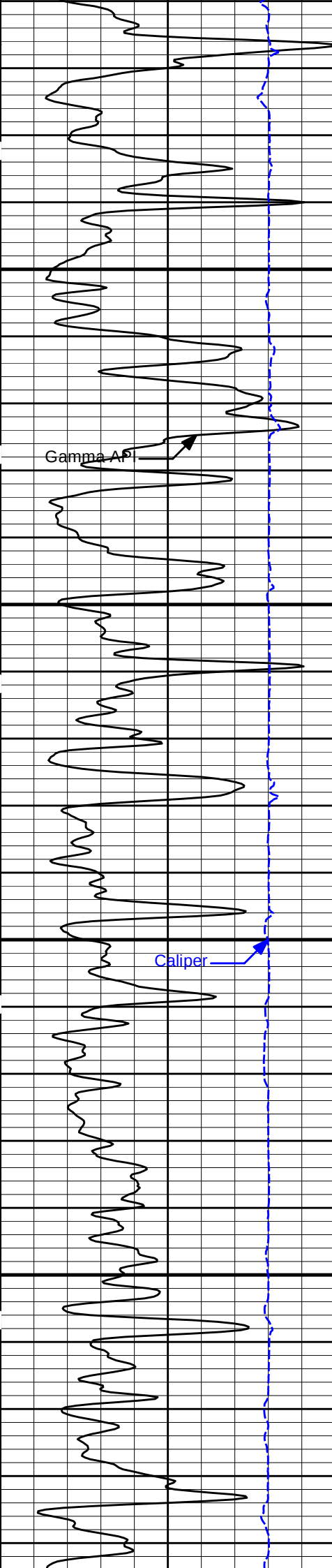




3300

3400



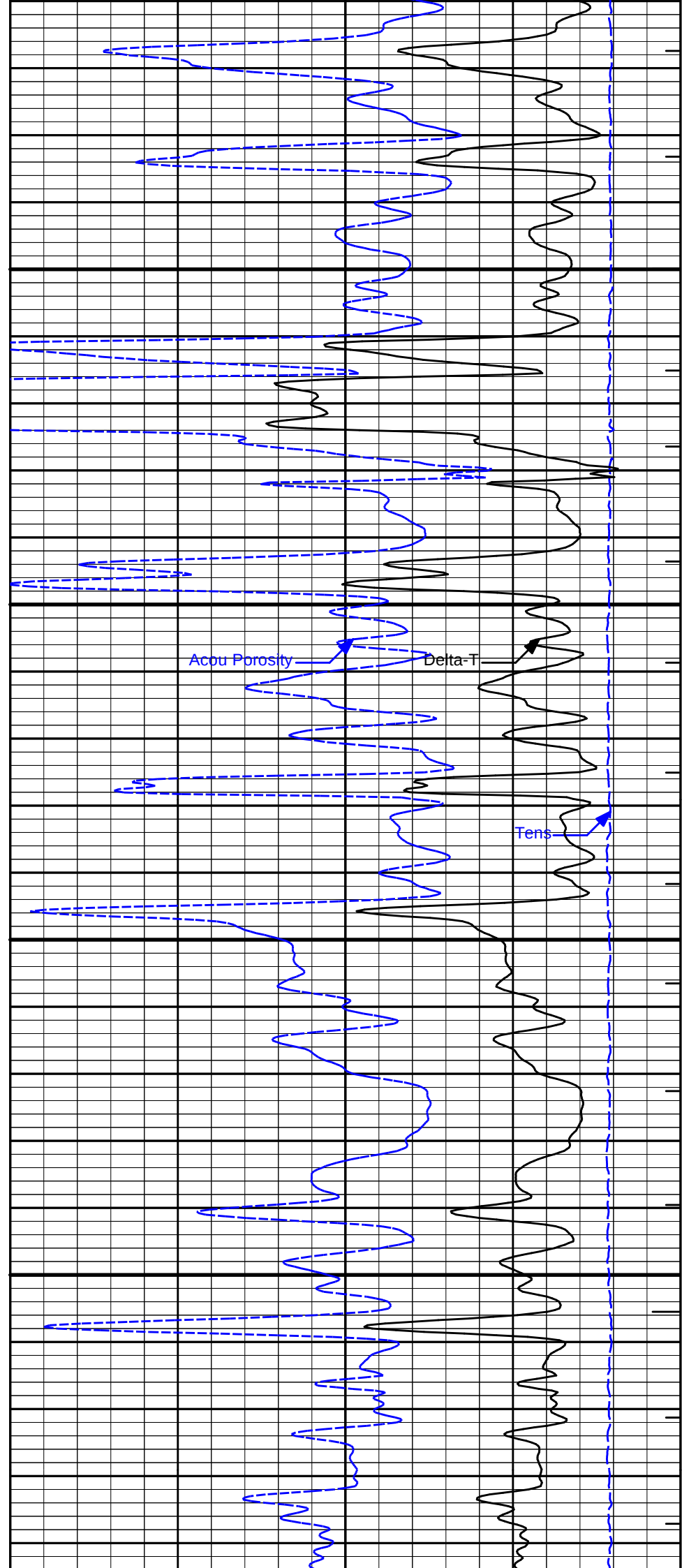


3500

3600

Gamma API

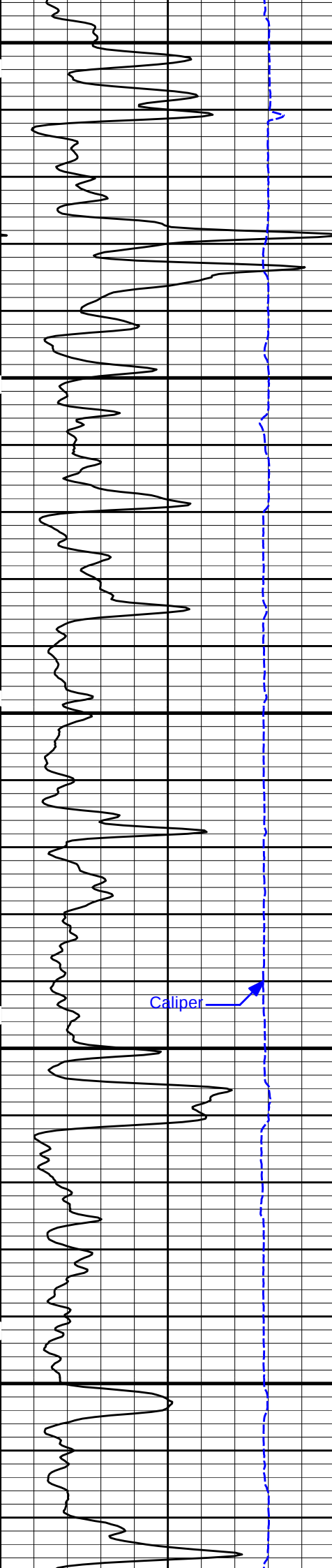
Caliper



Acou Porosity

Delta-T

Tens

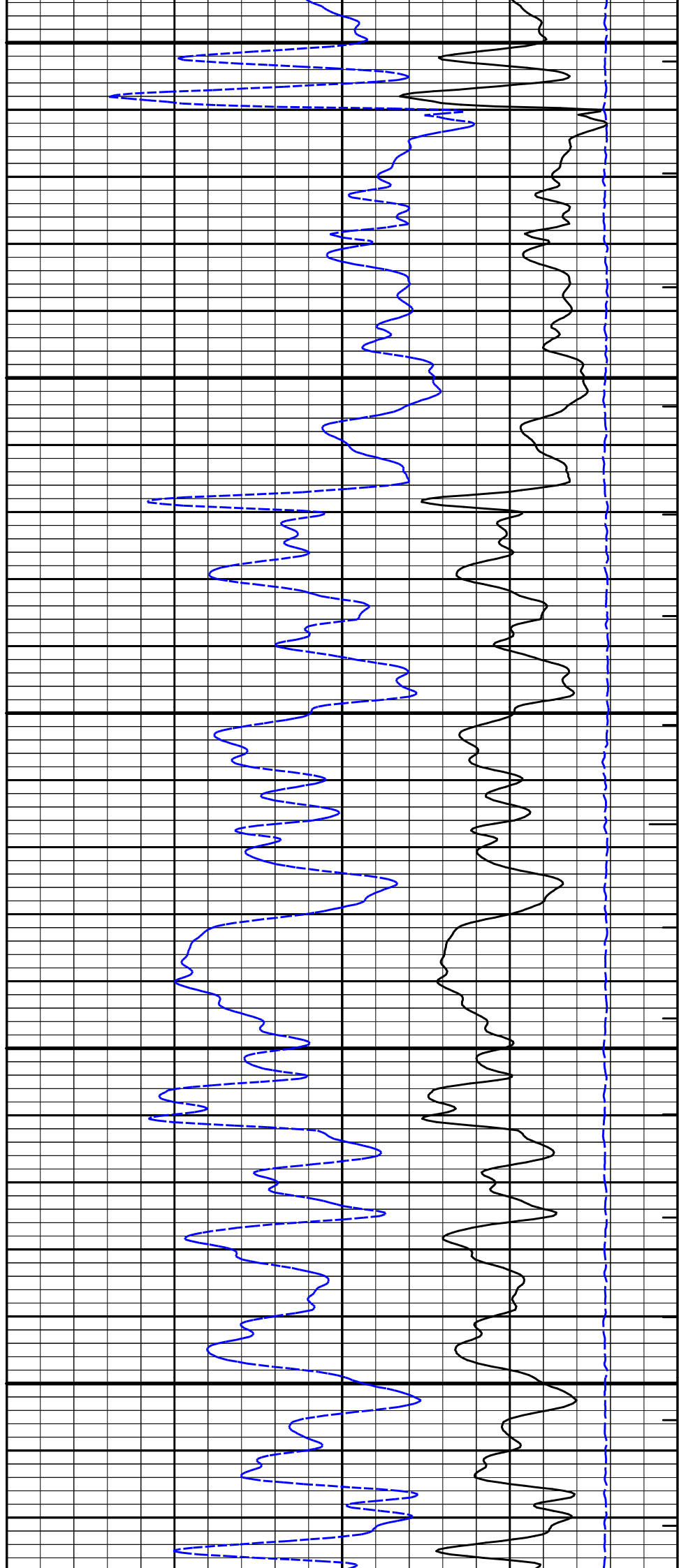


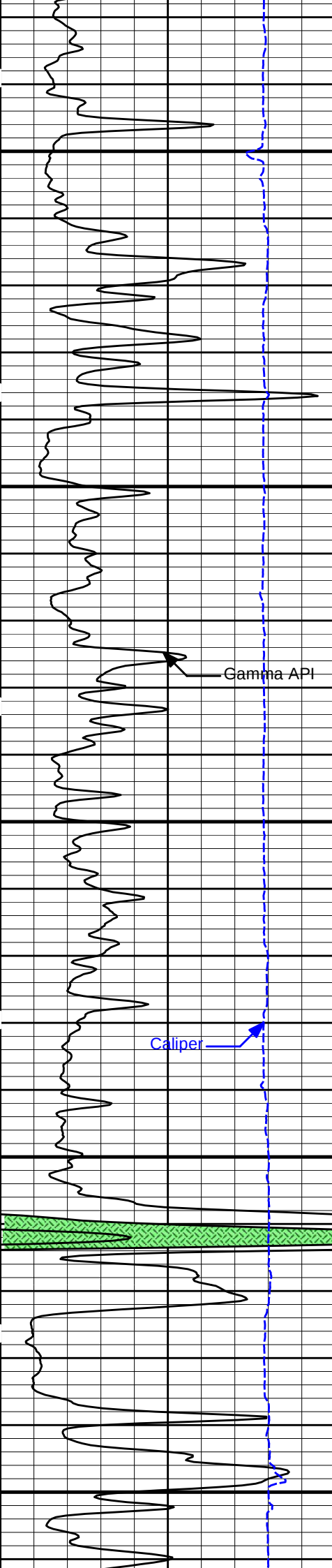
3700

3800

3900

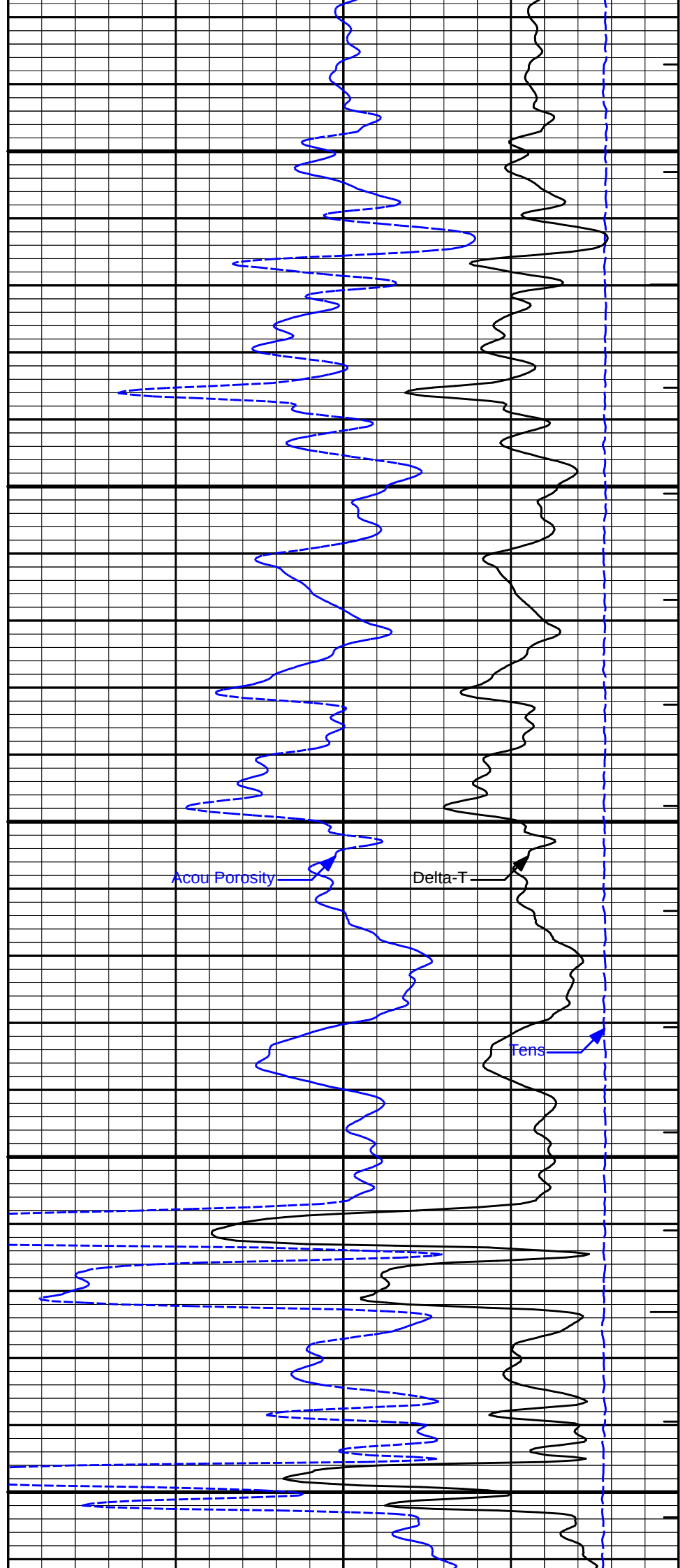
Caliper





4000

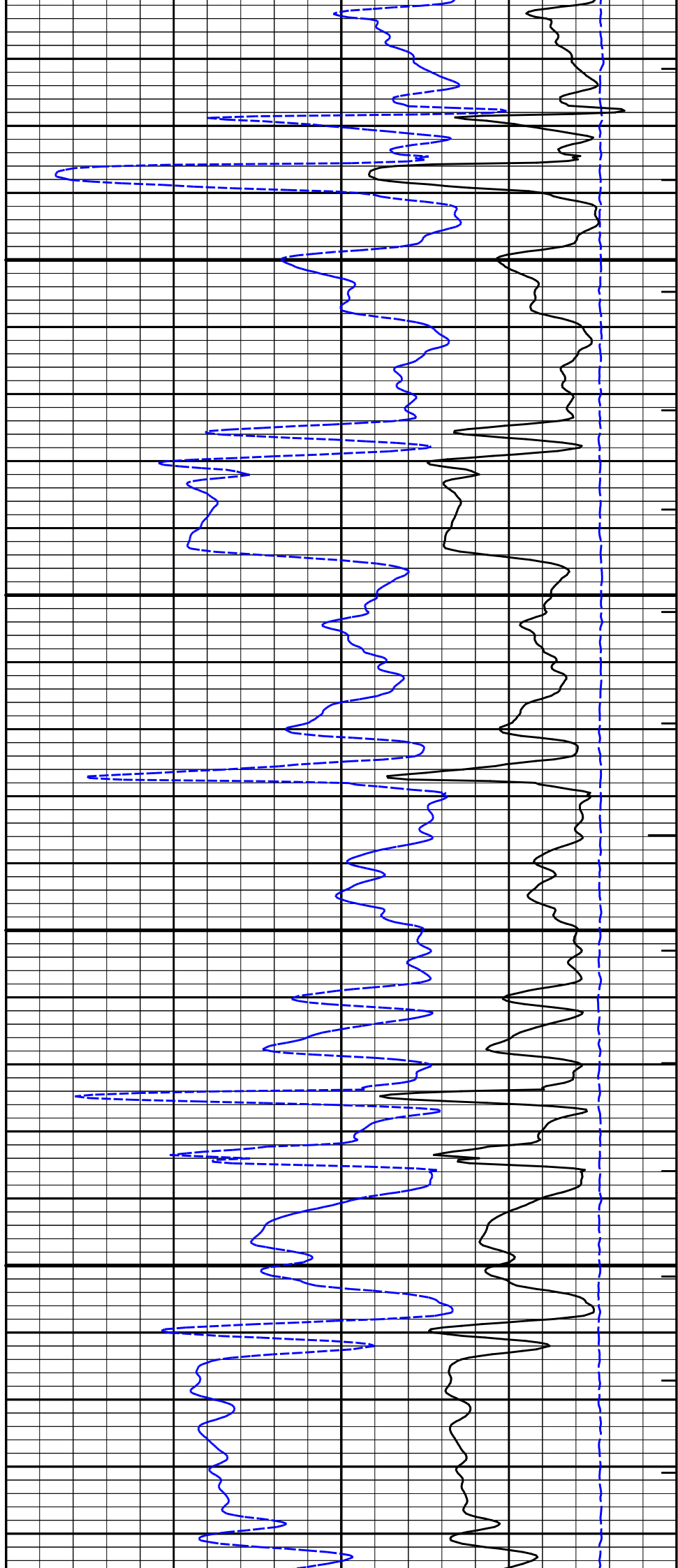
4100

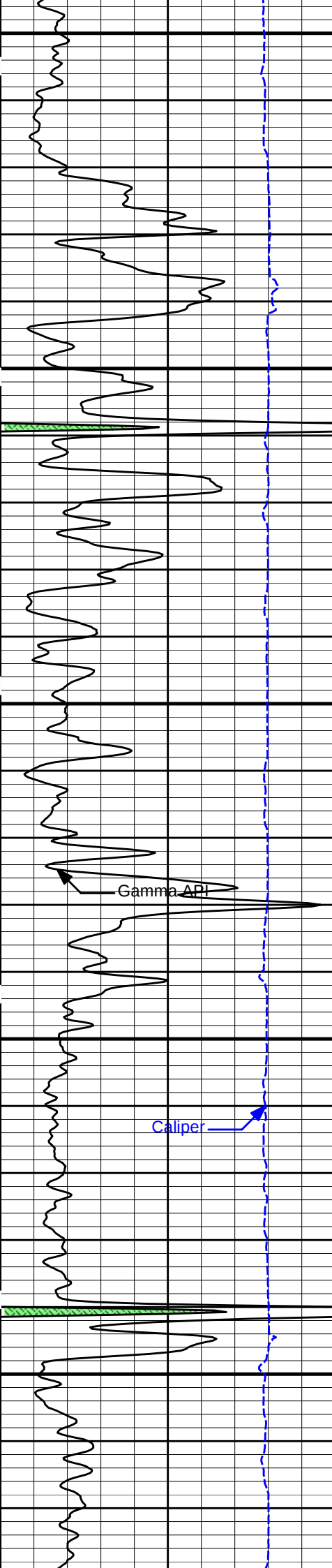




4200

4300





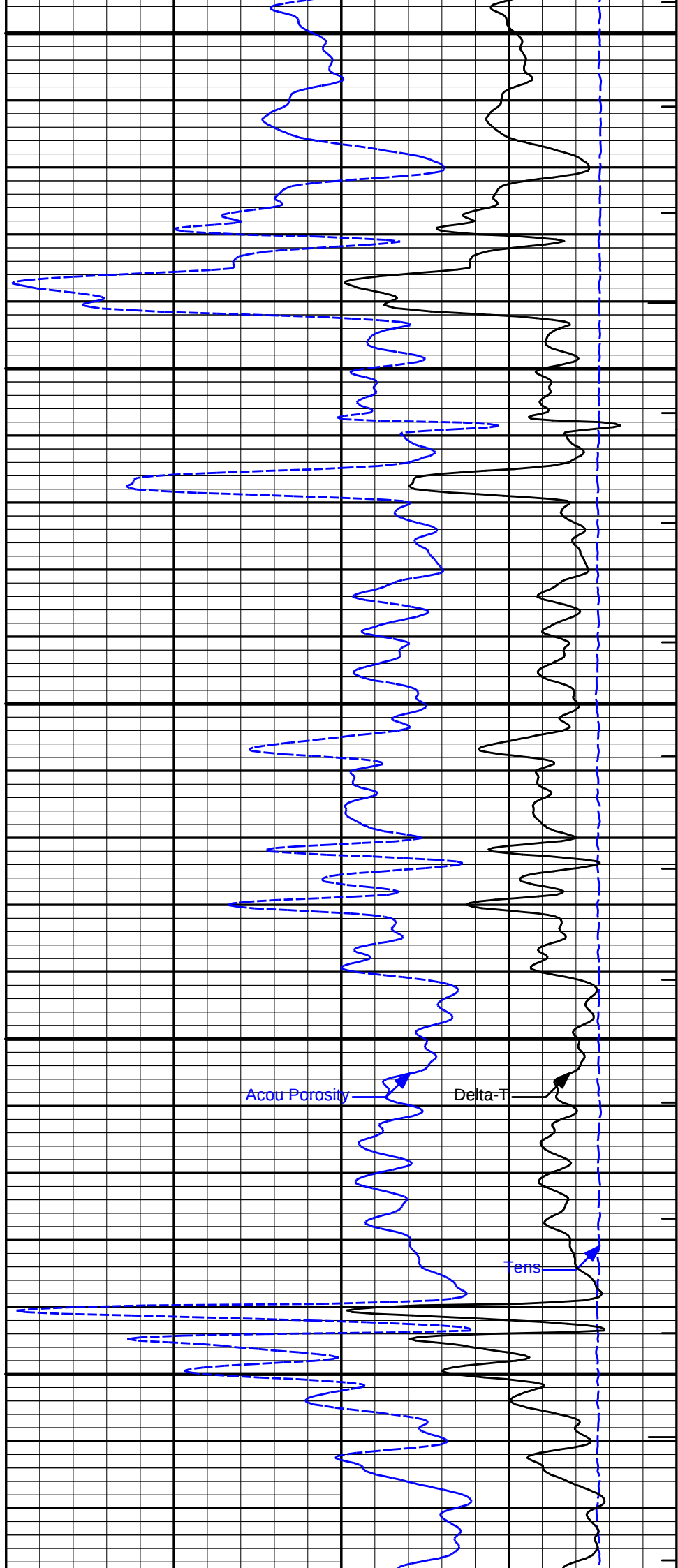
4400

4500

4600

Gamma API

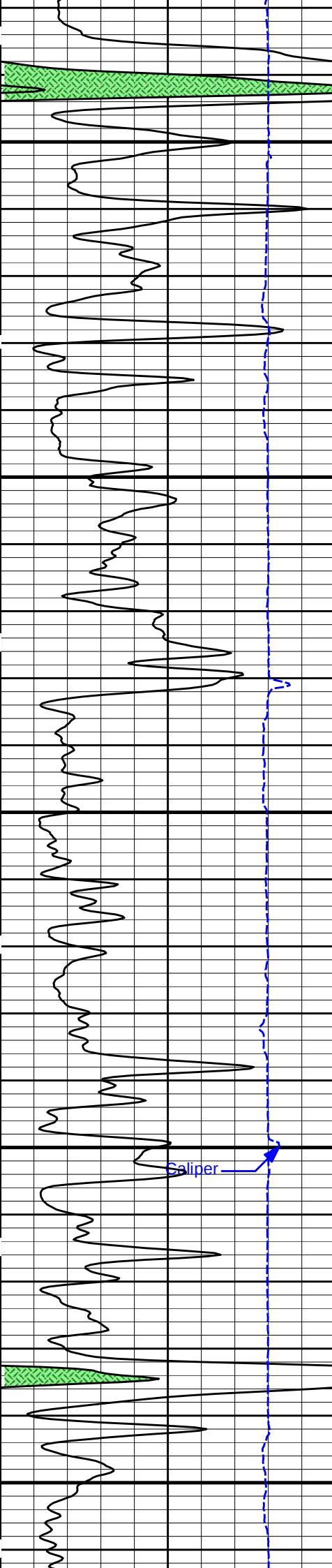
Caliper



Acou Porosity

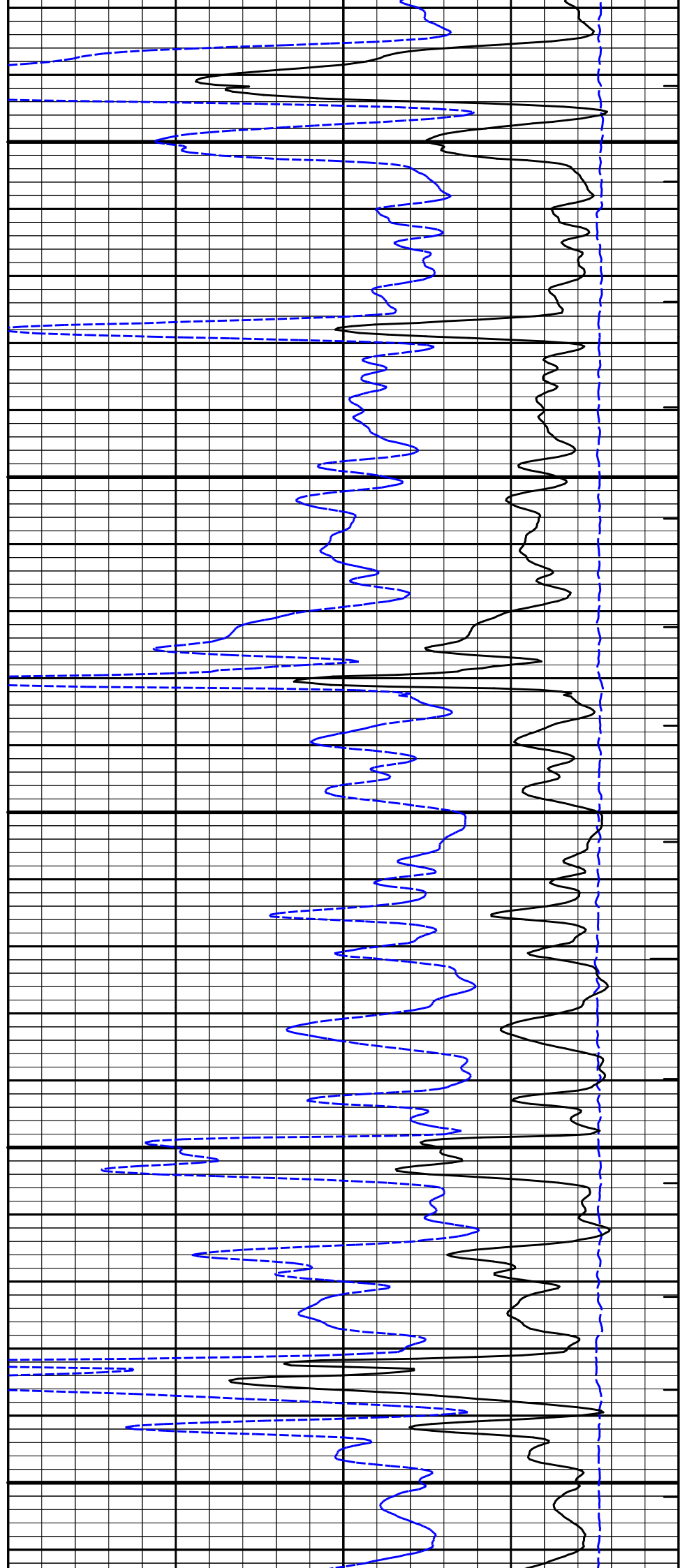
Delta-T

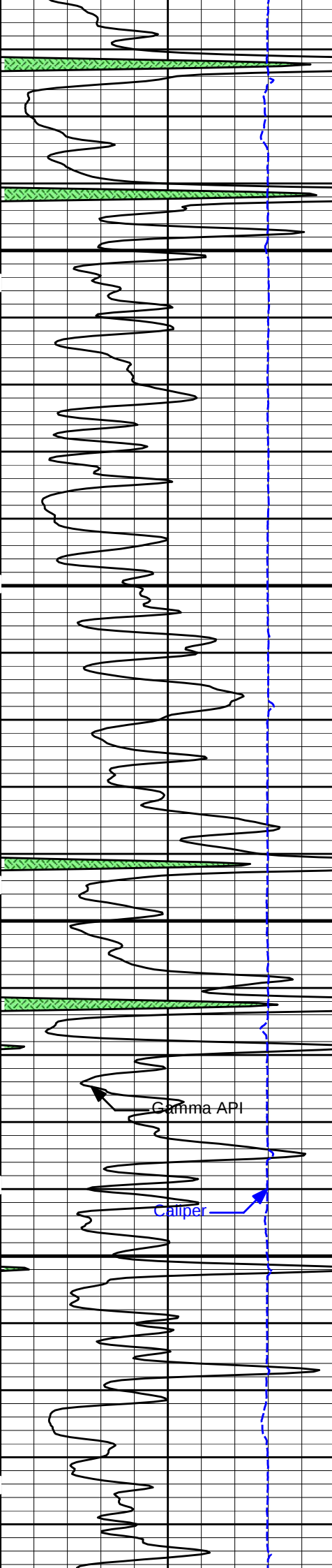
Tens



4700

4800



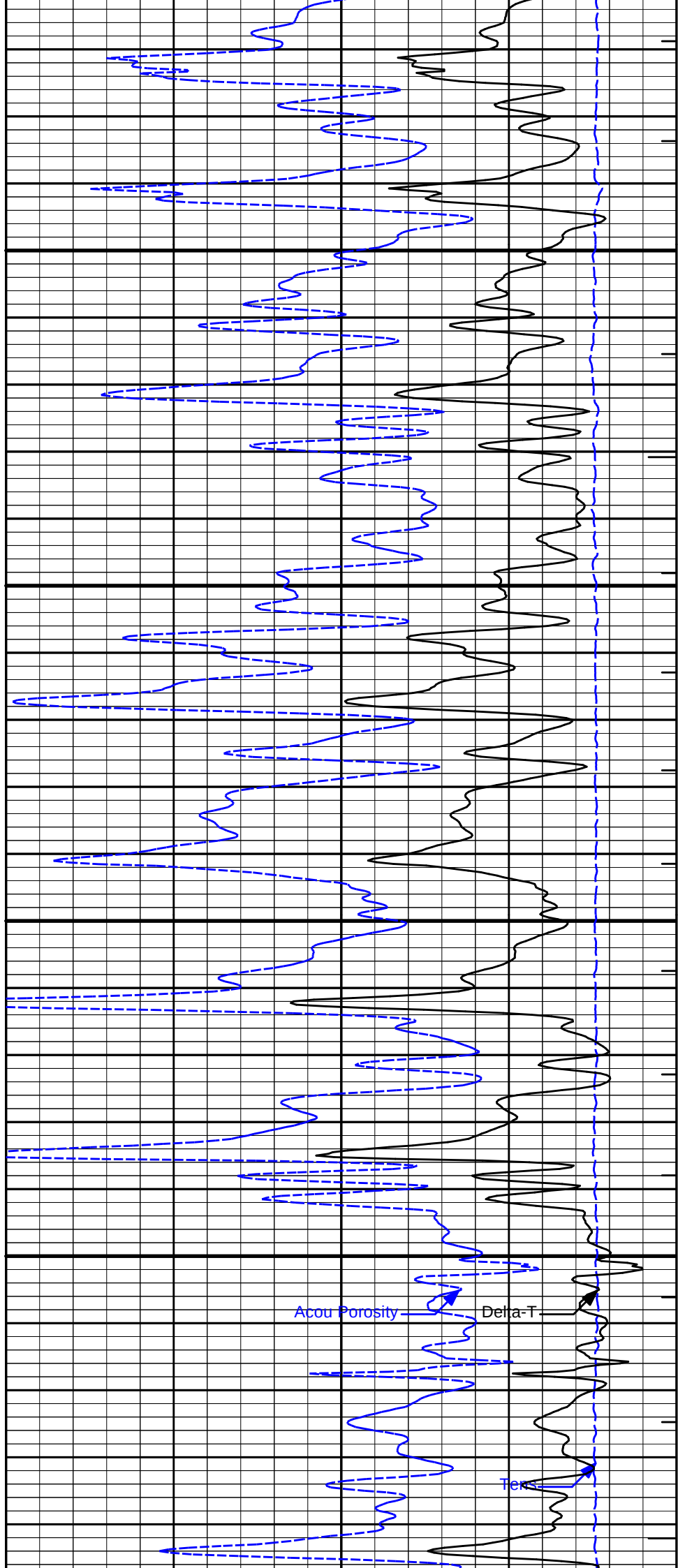


4900

5000

Gamma API

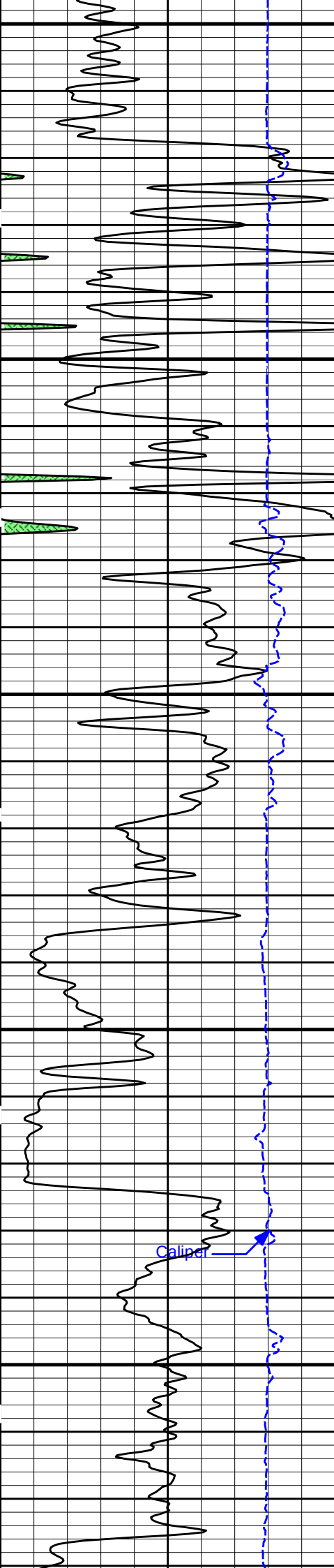
Caliper



Acou Porosity

Delta-T

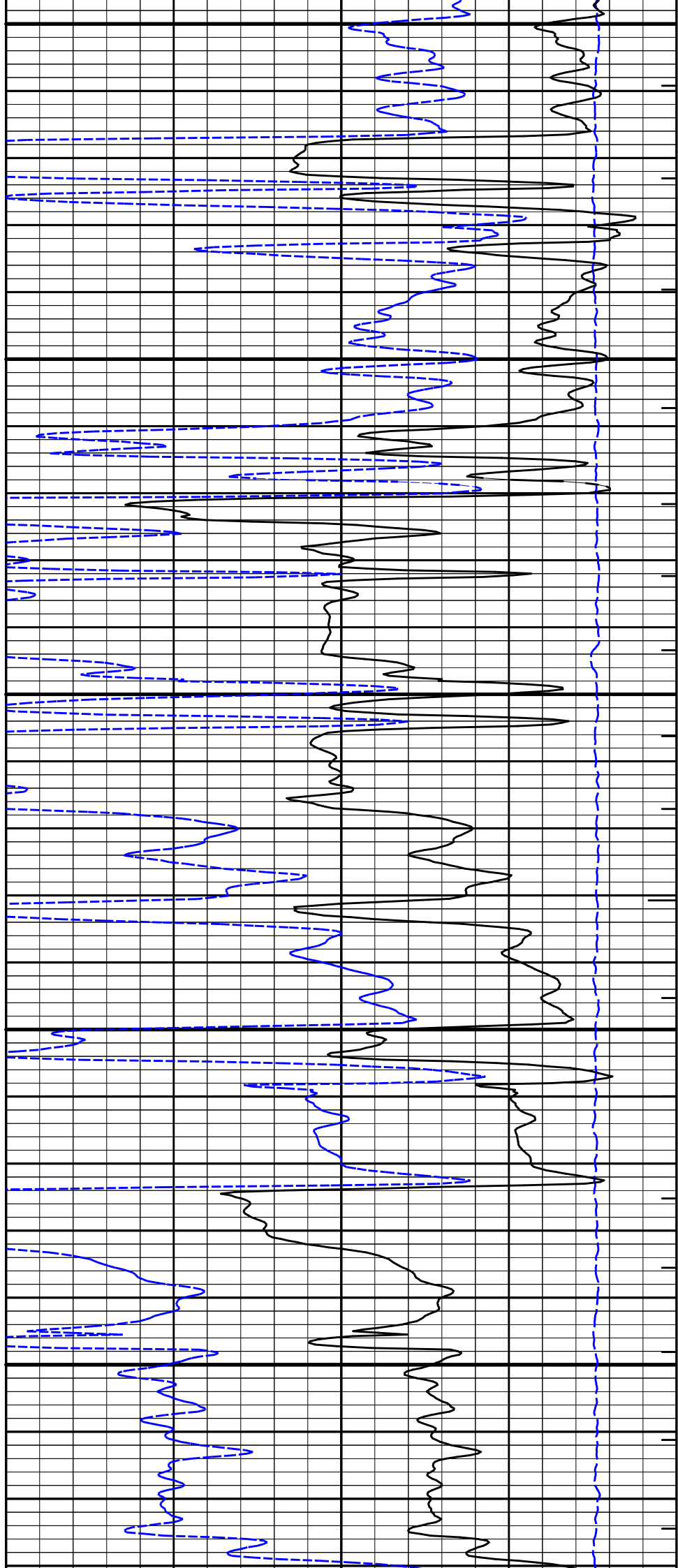
Tex

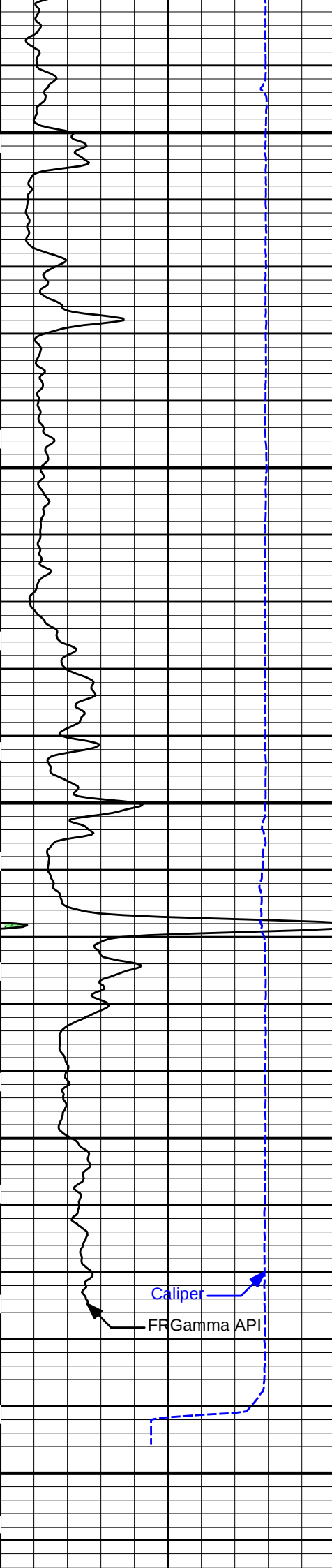


5100

5200

5300



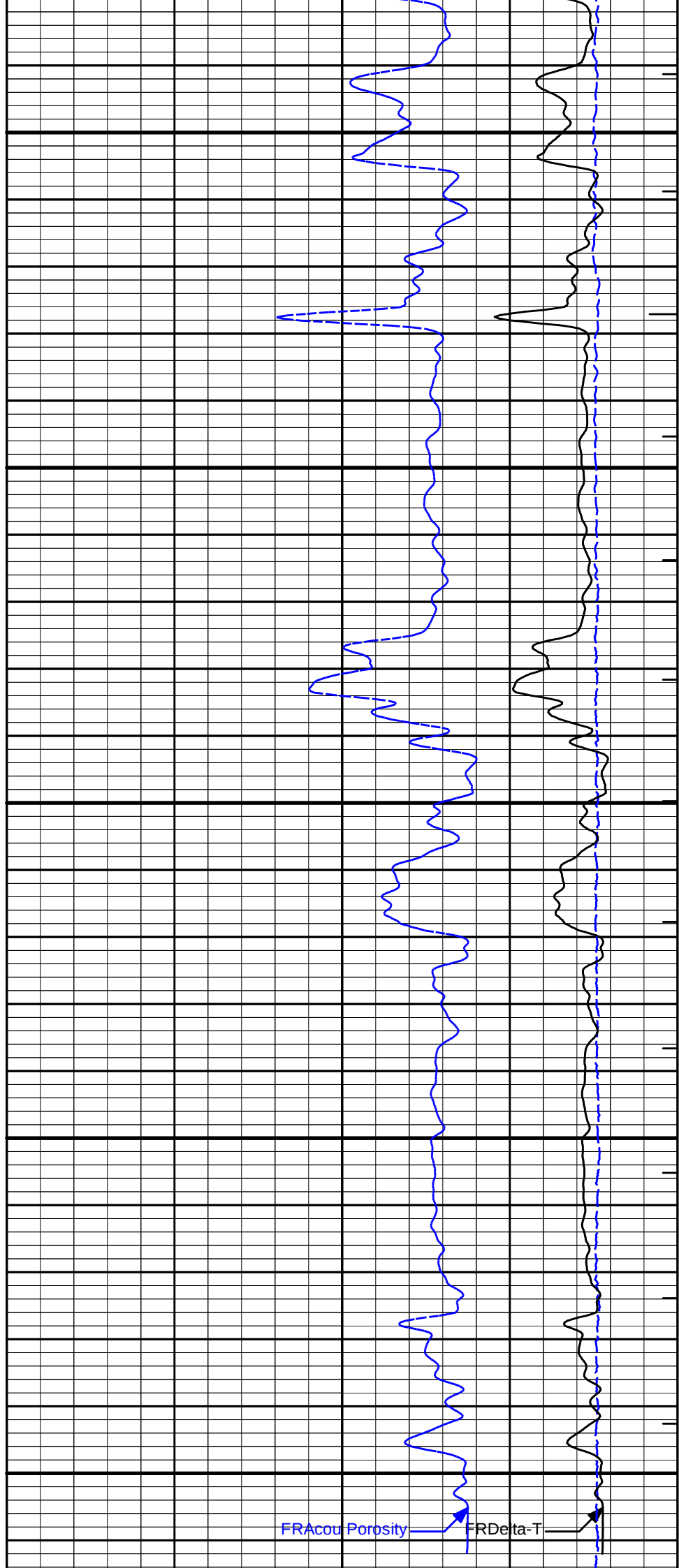


5400

5500

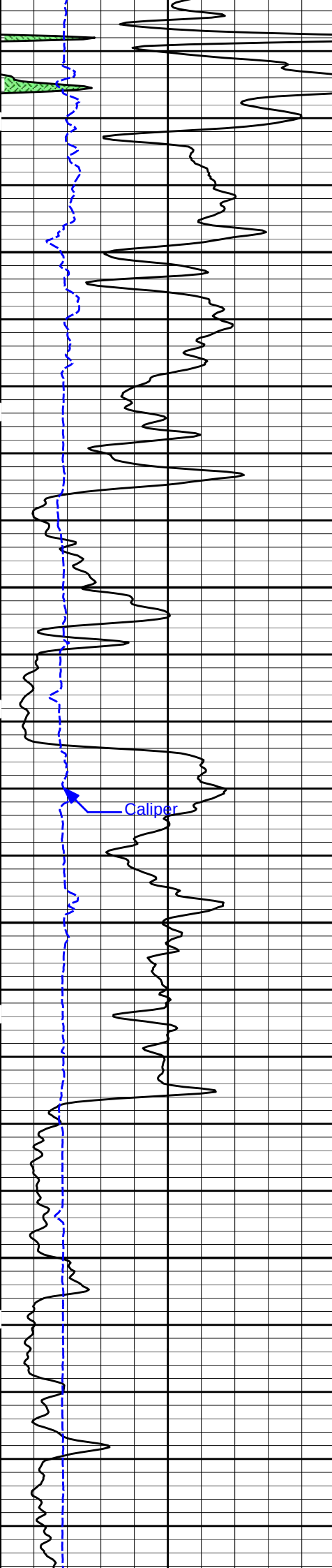
Caliper

FRGamma API



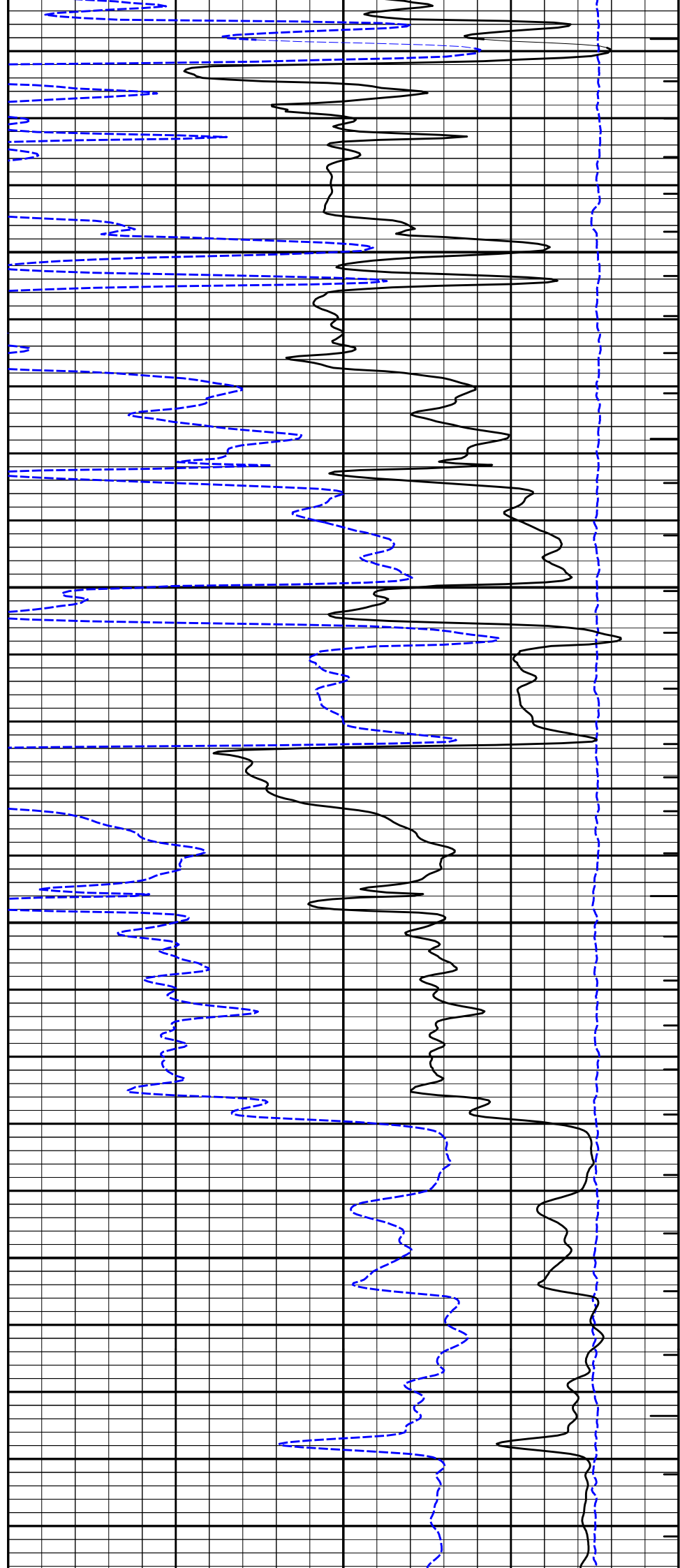
FRAcou Porosity

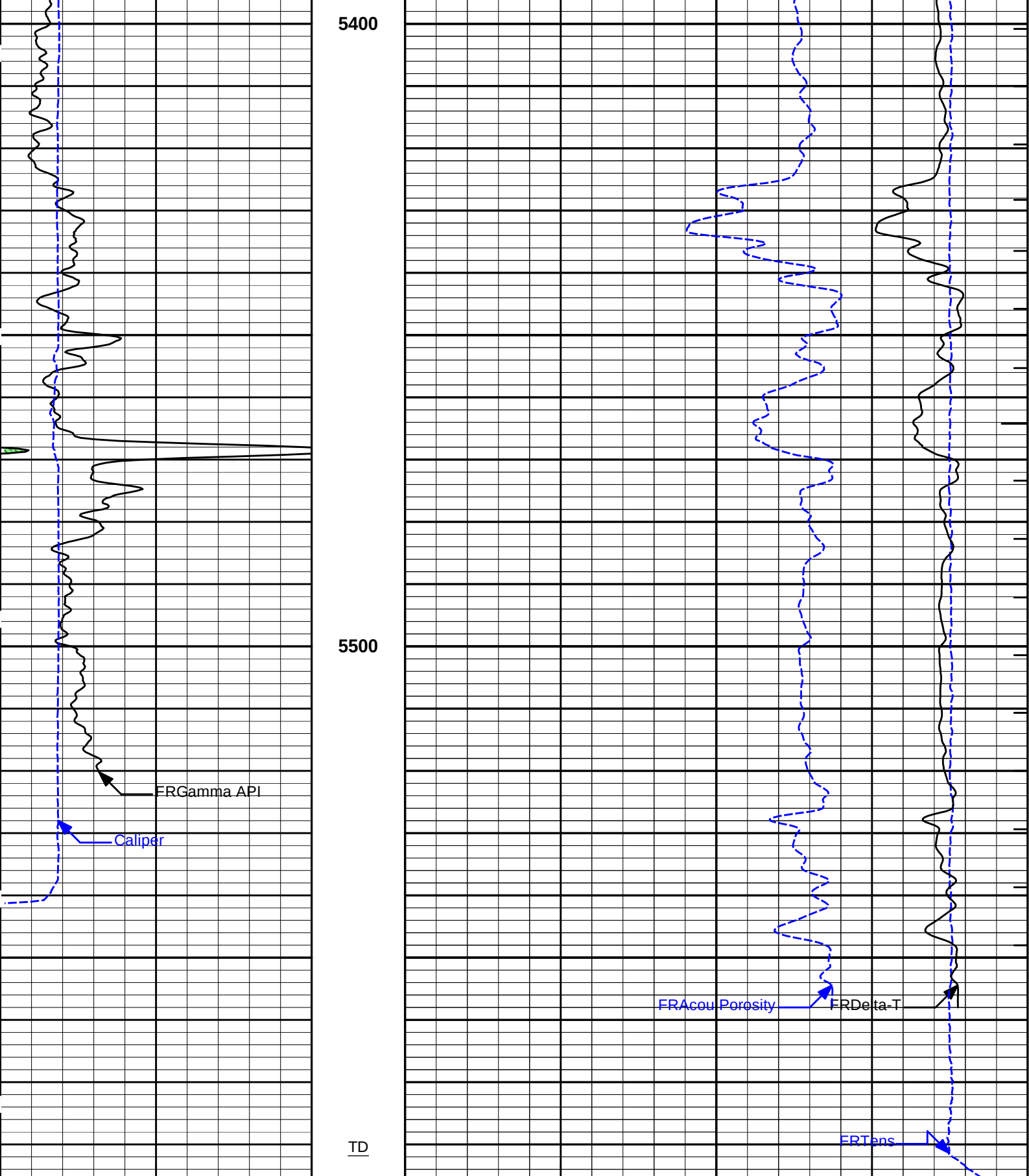
FRDelta-T



5200

5300





0	Gamma API	150
	api	
6	Caliper	16
	inches	

1 : 240
ft

15K	Tens	0
	pounds	
	ITTT	

140	Delta-T	40
	microsec per ft	
30	Acou Porosity	-10
	percent	

REPEAT SECTION

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	9.100	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	1.200	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	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5578.00	ft
	SHARED	BHT	Bottom Hole Temperature	142.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Density	
	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	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	DSNT	DNST	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in

DSNT	DNST	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTT	Temperature Correction Type	Gradient	
DSNT	DNTT	Top Zone Temperature Value	75.0	degF
DSNT	DNBT	DSN Bottom Zone Temperature Value	142.0	degF
DSNT	DTDT	Top Depth for Temperature Gradient Calculation (Measured Depth)	0	ft
DSNT	DBDT	Bottom Zone Temperature Depth (Measured Depth)	5578	ft
DSNT	DPRS	DSN Pressure Correction Type	Gradient	
DSNT	DNTP	DSN Top Zone Pressure Value	14.70	psia
DSNT	DNBP	DSN Bottom Zone Pressure Value	2640.00	psia
DSNT	DTDP	Top Depth for Pressure Gradient Calculation (Measured Depth)	0	ft
DSNT	DNDP	Bottom Zone Pressure Depth (Measured Depth)	5578	ft
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
SDLT	CLOK	Process Caliper Outputs?	Yes	
Microlog Pad	MLOK	Process MicroLog 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
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
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 Pore 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	1.19	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Centered	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	
BOTTOM				
Data: MERIT_KELLS I-110001 GTET-DSN-SDL-FLX-BSAT-ACRTIDLE			Date: 01-Oct-17 14:58:14	

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	GTET - 11021139	Reference Calibration Date:	03-Aug-17 01:40:19
Engineer:	WHITLOCK	Calibration Date:	23-Sep-17 12:22:06
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Calibrator Source S/N: TB79
Calibrator API Reference:222.00 api
Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	18.8	18.6	api
Background + Calibrator	247.0	244.5	api
Calibrator	228.2	225.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	GTET - 11021139	Reference Calibration Date:	23-Sep-17 12:22:06
Engineer:	WHITLOCK	Calibration Date:	27-Sep-17 10:26:06
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Calibrator Source S/N: TB79
Calibrator API Reference:222.00 api
Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	18.6	20.9	api
Background + Calibrator	244.5	245.7	api
Calibrator	225.9	224.8	api

Shop	Field	Difference	Tolerance
225.9	224.8	1.1	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	DSNT - 11020487	Reference Calibration Date:	05-Jun-17 14:14:28
Engineer:	MICHAEL RICHTER	Calibration Date:	03-Aug-17 01:56:12
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Logging Source S/N: DSN-436
Tank Serial Number: EL RENO
Reference value assigned to Tank: 56.100
Snow Block S/N: 12156883
Calibration Tank Water Temperature: 72 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.99837	0.99685	0.900 - 1.100

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2363	0.2358	0.0005	+/- 0.0020
Calibrated Ratio:	10.5757	10.5596	0.016	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0746	0.02000 - 0.09000

PASS/FAIL SUMMARY	
Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name:	DSNT - 11020487	Reference Calibration Date:	03-Aug-17 01:56:12
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Engineer:WHITLOCK

Software Version:WL INSITE R5.0.5 (Build 8)

Calibration Date:27-Sep-17 10:36:11

Calibration Version:1

Logging Source S/N: DSN-436

Snow Block S/N: 12156883

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0746	0.0691	-0.0054	+/- 0.0150

PASS/FAIL SUMMARY

Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name:SDLT - 11014296

Reference Calibration Date:06-Nov-16 12:09:13

Engineer:MICHAEL RICHTER

Calibration Date:15-Mar-17 09:33:53

Software Version:WL INSITE R5.0.5 (Build 8)

Calibration Version:1

Host Tool Name:DSNT - 11020487

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4335.63	-4512.85	-7000.00 - -1000.00
Pad Gain	0.0003910	0.0004190	0.0002000 - 0.0006000
Arm Offset	-3121.03	-2559.45	-5000.00 - 3000.00
Arm Gain	0.0005117	0.0005078	0.000300 - 0.000700
Arm Power	-0.000003980	-0.000003959	-0.000010000 - 0.000010000

The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER

Tool Diameter: 4.50 in

CALIBRATION RINGS

Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				
Small Ring (in)	1.94	2.00	0.06	+/- 0.20
Medium Ring (in)	3.57	3.75	0.18	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.31	6.50	0.19	+/- 0.20
Medium Ring (in)	8.08	8.25	0.17	+/- 0.20
Large Ring (in)	14.92	15.00	0.08	+/- 0.20

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed
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SDLT CALIPER FIELD CALIBRATION

Tool Name:SDLT - 11014296

Reference Calibration Date:15-Mar-17 09:33:53

Engineer:WHITLOCK

Calibration Date:27-Sep-17 10:11:22

Software Version:WL INSITE R5.0.5 (Build 8)

Calibration Version:1

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.84	0.09	+/- 0.10
Ring Diameter	8.25	8.31	0.06	+/- 0.15

PASS/FAIL SUMMARY		
Pad Extension Check:		Passed
Diameter Check:		Passed

MICRO LOG SHOP CALIBRATION			
Tool Name:	Microlog Pad - 11014296	Reference Calibration Date:	06-Jun-17 12:12:34
Engineer:	MICHAEL RICHTER	Calibration Date:	03-Aug-17 02:26:45
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1
Host Tool Name:	DSNT - 11020487		

	CALIBRATION COEFFICIENT SUMMARY					
	Measurement	Micro Log Normal		Micro Log Lateral		
		Measured	Calibrated	Measured	Calibrated	Units
	Tool Zero	-0.21	-0.43	-0.01	0.00	ohmm
	Calibration Point #1	0.23	0.00	-0.01	0.00	ohmm
	Calibration Point #2	20.26	20.00	20.00	20.00	ohmm
	Internal Reference	19.85	19.59	20.01	20.01	ohmm
	Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
	Tool Zero	-0.14		-1.30		V
	Calibration Point #1	115.47		-2.05		V
	Calibration Point #2	5448.88		6908.76		V
	Internal Reference	5338.32		6913.91		V

MICRO LOG FIELD CHECK			
Tool Name:	Microlog Pad - 11014296	Reference Calibration Date:	03-Aug-17 02:26:45
Engineer:	WHITLOCK	Calibration Date:	27-Sep-17 10:56:14
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.43	-0.44	0.00	0.01	ohmm
Internal Reference	19.59	19.46	20.01	19.88	ohmm
Summary					
Signal	Shop	Field	Difference		Tolerance
Microlog Normal	19.59	19.46	0.13		+/- 0.80
Microlog Lateral	20.01	19.88	0.13		+/- 0.80

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - 10809130	Reference Calibration Date:	25-May-17 12:11:12
Engineer:	MICHAEL RICHTER	Calibration Date:	03-Aug-17 02:19:19
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Logging Source S/N: 5155GW			
Aluminum Block S/N: EL RENO		Density: 2.581g/cc	Pe: 3.170
Magnesium Block S/N: EL RENO MG		Density: 1.687g/cc	Pe: 2.594
DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0466	0.9648	0.90 - 1.10
Near Dens Gain	1.0202	0.9664	0.90 - 1.10
Near Peak Gain	1.0587	0.9808	0.90 - 1.10
Near Lith Gain	1.0474	0.9899	0.90 - 1.10
Far Bar Gain	1.0144	1.0063	0.90 - 1.10
Far Dens Gain	1.0018	0.9910	0.90 - 1.10
Far Peak Gain	0.9968	0.9885	0.90 - 1.10
Far Lith Gain	0.9750	0.9705	0.90 - 1.10

Far Lith Gain	0.9703	0.9595	0.90 - 1.10
Near Bar Offset	-0.1512	0.5881	NONE
Near Dens Offset	0.0840	0.5517	NONE
Near Peak Offset	-0.2272	0.4091	NONE
Near Lith Offset	-0.1986	0.2702	NONE
Far Bar Offset	0.0686	0.1331	NONE
Far Dens Offset	0.1508	0.2380	NONE
Far Peak Offset	0.1449	0.2044	NONE
Far Lith Offset	0.2786	0.3450	NONE
Near Bar Background	815.93	813.79	700 - 1450
Near Dens Background	269.20	265.74	230 - 480
Near Peak Background	115.80	115.36	100 - 210
Near Lith Background	146.10	144.32	125 - 260
Far Bar Background	479.68	477.53	450 - 900
Far Dens Background	184.50	185.37	175 - 345
Far Peak Background	72.51	72.20	70 - 140
Far Lith Background	76.60	75.50	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.689	1.687	-0.002	+/- 0.015
Pe	2.521	2.561	0.040	+/- 0.150
ALUMINUM				
Density (g/cc)	2.574	2.580	0.006	+/- 0.01500
Pe	3.085	3.134	0.049	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0002	+/- 0.0110	-0.0029	+/- 0.0140
Magnesium Block	-0.0013	+/- 0.0110	-0.0010	+/- 0.0140
Aluminum Block	-0.0009	+/- 0.0110	-0.0014	+/- 0.0140
Resolution	8.91	6.00 - 11.50	9.49	6.00 - 11.50
Internal Verifier(B+D+P+L)	1339	1200 - 2700	811	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK

Tool Name:	SDLT Pad - 10809130	Reference Calibration Date:	03-Aug-17 02:19:19
Engineer:	WHITLOCK	Calibration Date:	27-Sep-17 11:00:05
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Pad Temperature: 70.0 degF

DENSITY FIELD CALIBRATION SUMMARY

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION			
Tool Name:	ACRt Sonde - 11038385	Reference Calibration Date:	12-Sep-17 13:48:00
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	12-Sep-17 13:58:19
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1
Host Tool Name:	ACRt Instrument - 11055059		

TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0395	1.05	0.95	1.0229	1.05	0.95	1.0146	1.05
A2 (50")	0.95	1.0409	1.05	0.95	1.0225	1.05	0.95	1.0165	1.05
A3 (29")	0.95	1.0384	1.05	0.95	1.0194	1.05	0.95	1.0115	1.05
A4 (17")	0.95	1.0343	1.05	0.95	1.0133	1.05	0.95	1.0069	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0083	1.05	0.95	0.9989	1.05
A6 (6")	N/A	N/A	N/A	0.95	1.0000	1.05	0.95	0.9929	1.05

SONDE OFFSET			
Subarray	R12KHz	R36KHz	R72KHz
	(mmho/m)	(mmho/m)	(mmho/m)
A1 (80")	0.702	-4.637	-5.501
A2 (50")	-0.771	-4.034	-5.172
A3 (29")	-13.230	-3.699	-3.350
A4 (17")	-110.240	-33.969	-26.356
A5 (10")	N/A	-83.665	-41.621
A6 (6")	N/A	333.771	173.557

TRANSMITTER CURRENT GAIN			
Signal	Lower	R	Upper
12K	0.6	0.90	1.3
36K	1.0	1.36	2.0
72K	1.0	1.62	2.0

R-MUD VERIFICATION			
Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.00	1.05

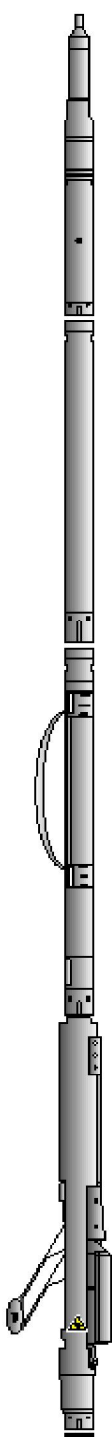
PASS/FAIL SUMMARY	
GAIN RANGE CHK	PASS
SONDE OFFSET CHK	PASS
TOOL OK TO LOG	

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11021139						
Gamma Ray Calibrator	225.9	224.8	-----	1.1	+/- 9.00	api
DSNT-11020487						

Snow-Block Porosity	0.0746	0.0691	-----	0.0055	+/- 0.0150	decP
SDLT-11014296						
Pad Extension	3.75	3.84	-----	-0.09	+/-0.10	in
Ring Diameter	8.25	8.31	-----	-0.06	+/-0.15	in
Microlog Pad-11014296						
MicroLog Normal	19.59	19.46	-----	0.13	+/-0.80	ohmm
MicroLog Lateral	20.01	19.88	-----	0.13	+/-0.80	ohmm
SDLT Pad-10809130						
Near(B+D+P+L)	1339.219	1341.398	-----	-2.179	+/-14.801	cps
Far(B+D+P+L)	810.608	809.039	-----	1.569	+/-15.737	cps
ACRt Sonde-11038385						
Mud Cell	1.00	-----	-----	0	-----	ohm-m
Data: MERIT_KELLS I-110001 GTET-DSN-SDL-FLX-BSAT-ACRTIDLE						
Date: 01-Oct-17 14:58:39						

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS_I 37.50 lbs		Ø 2.750 in →		← Temperature @ 76.74 ft	2.25 ft	76.99 ft
XOHD-11021555 20.00 lbs		Ø 2.750 in → Ø 3.625 in →			0.95 ft	74.74 ft
						73.79 ft
SP Sub-10904995 60.00 lbs		Ø 3.625 in →		← SP @ 72.01 ft	3.74 ft	
				← Z-Accelerometer @ 69.60 ft		70.05 ft
GTET-11021139 165.00 lbs		Ø 3.625 in →		← GammaRay @ 63.99 ft	8.52 ft	
						61.53 ft
DSNT-11020487 174.00 lbs	DSN Decentralizer- 11023947 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 54.59 ft ← DSN Near @ 53.84 ft	9.69 ft	
						51.84 ft
SDLT-11014296 360.00 lbs	SDLT Pad-10809130 65.00 lbs Microlog Pad-11014296 8.00 lbs RAM-Cs137-10948154 1.00 lbs	Ø 4.500 in → Ø 4.500 in* → Ø 4.750 in* → Ø 0.800 in* →		Microlog @ 44.03 ft SDL Caliper @ 43.84 ft SDL @ 43.83 ft	10.81 ft	
						41.03 ft

IQ Flex-10973274
140.00 lbs

Ø 3.625 in →

5.67 ft

Centralizer 25-00000002
8.00 lbs

Ø 3.750 in* →

35.36 ft

BSAT-10939049
300.00 lbs

Ø 3.625 in →

Receiver Array @ 26.84 ft
Sonic Receivers @ 26.84 ft

15.77 ft

ACRt Instrument-
11055059
50.00 lbs

Centralizer 25-00000001
8.00 lbs

Ø 3.625 in
Ø 3.750 in* →

5.03 ft

ALAT Standoff OD 6-
12345678
11.60 lbs

Ø 6.000 in* →

Mud Resistivity @ 13.19 ft

14.55 ft

ACRt Sonde-
11038385
200.00 lbs

Ø 3.625 in →

ACRt @ 9.21 ft

14.22 ft

Bull Nose-12345678
5.00 lbs

Ø 2.750 in →

0.33 ft

0.33 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_HOS_I	37.50	2.25	74.74	300.00
XOHD	Hostile to Dits Cross Over		11021555	20.00	0.95	73.79	300.00
SP	SP Sub		10904995	60.00	3.74	70.05	300.00
GTET	Gamma Telemetry Tool		11021139	165.00	8.52	61.53	60.00
DSNT	Dual Spaced Neutron		11020487	174.00	9.69	51.84	60.00
DCNT	DSN Decentralizer		11023947	6.60	5.13	* 55.17	300.00
SDLT	Spectral Density Tool		11014296	360.00	10.81	41.03	60.00
SDLP	Density Insite Pad		10809130	65.00	2.55	* 43.24	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137		10948154	1.00	0.80	* 43.47	300.00
MICP	Microlog Pad		11014296	8.00	1.00	* 43.53	60.00
IQF	IQ Flex tool		10973274	140.00	5.67	35.36	300.00
BSAT	Borehole Sonic Array Tool		10939049	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody		00000002	8.00	2.08	* 32.44	300.00
ACRt	Array Compensated True Resistivity Instrument Section		11055059	50.00	5.03	14.55	120.00
OBCEN	Centralizer - 25 in. Overbody		00000001	8.00	2.08	* 15.70	300.00
ACRt	Array Compensated True Resistivity Sonde Section		11038385	200.00	14.22	0.33	120.00
ALATS	Array Laterolog Tool OD 6 Standoff		12345678	11.60	1.00	* 13.19	60.00

ALAYS	Array Laterallog Tool CD V Standoff	12345678	11.00	1.00	13.19	00.00
BLNS	Bull Nose	12345678	5.00	0.33	0.00	300.00
Total			1,619.70	76.99		
* Not included in Total Length and Length Accumulation.						
Data: MERIT_KELLS I-1\0001 GTET-DSN-SDL-FLX-BSAT-ACRT\IDLE					Date: 01-Oct-17 13:37:57	

COMPANY	MERIT ENERGY COMPANY, LLC					
WELL	KELLS I-1					
FIELD	WILDCAT					
COUNTY	HASKELL	STATE	KANSAS			
HALLIBURTON			BOREHOLE SONIC ARRAY LOG			