

HALLIBURTON

BOREHOLE COMPENSATED SONIC LOG

RAYDON EXPLORATION, INC.

ROCK #2-27

KISMET

SEWARD

KANSAS

COMPANY
WELL
FIELD/BLOCK
COUNTY
STATE

COMPANY
WELL
FIELD/BLOCK
COUNTY
STATE

Other Services:

ACRT
SDL-DSN
MICROLOG
SONIC

API No. 15-175-22271-00-00
Location (SHL) NE SE SE SW 425' FSL & 2490' FWL
Sect. 27 Twp. 33S Rge. 31W
Elev. 2733.0 ft
11.0 ft above perm. Datum

Permanent Datum GL
Log measured from KB
Drilling measured from KB
Date 01-Oct-19
Run No. 1
Depth - Driller 5830.0 ft
Depth - Logger 5828.0 ft
Bottom - Logged Interval 5818
Top - Logged Interval 1640
Casing - Driller 8.625 in @ 1641.0 ft
Casing - Logger 1640.0 ft
Bit Size 7.875 in @
Type Fluid in Hole Water Based Mud
Density 8.80 g/cc 53.00 sl/qt
PH 10.00 pH 6.2 cphm
Source of Sample MUDPIT

Elev.: K.B. 2744.0 ft
D.F. 2742.0 ft
G.L. 2733.0 ft

Fold here

Service Ticket No.: 905981124 API No.: 15-175-22271-00-00 PGM Version: WL INSITE R6.2.7 (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.		
Rmf @ Meas. Temp.	@	@							
Rmc @ Meas. Temp.	@	@							
Source Rmf	Rmc								
Rm @ BHT	@	@							
Rmf @ BHT	@	@							
Rmc @ BHT	@	@							
EQUIPMENT DATA									
GAMMA		ACOUSTIC		DENSITY		NEUTRON			
Run No.		Run No.		Run No.		Run No.			
Serial No.		Serial No.		Serial No.		Serial No.			
Model No.		Model No.		Model No.		Model No.			
Diameter		No. of Cent.		Diameter		Diameter			
Detector Model No.		Spacing		Log Type		Log Type			
Type				Source Type		Source Type			
Length		LSA [Y/N]		Serial No.		Serial No.			
Distance to Source		FWDA [Y/N]		Strength		Strength			
LOGGING DATA									
GENERAL		GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run	Depth	Speed	Scale	Scale	Matrix	Scale	Matrix	Scale	Matrix
No.	From	To	L	R	L	R	L	R	L

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: 5 1/2" CASING USED FOR ANNULAR HOLE VOLUME

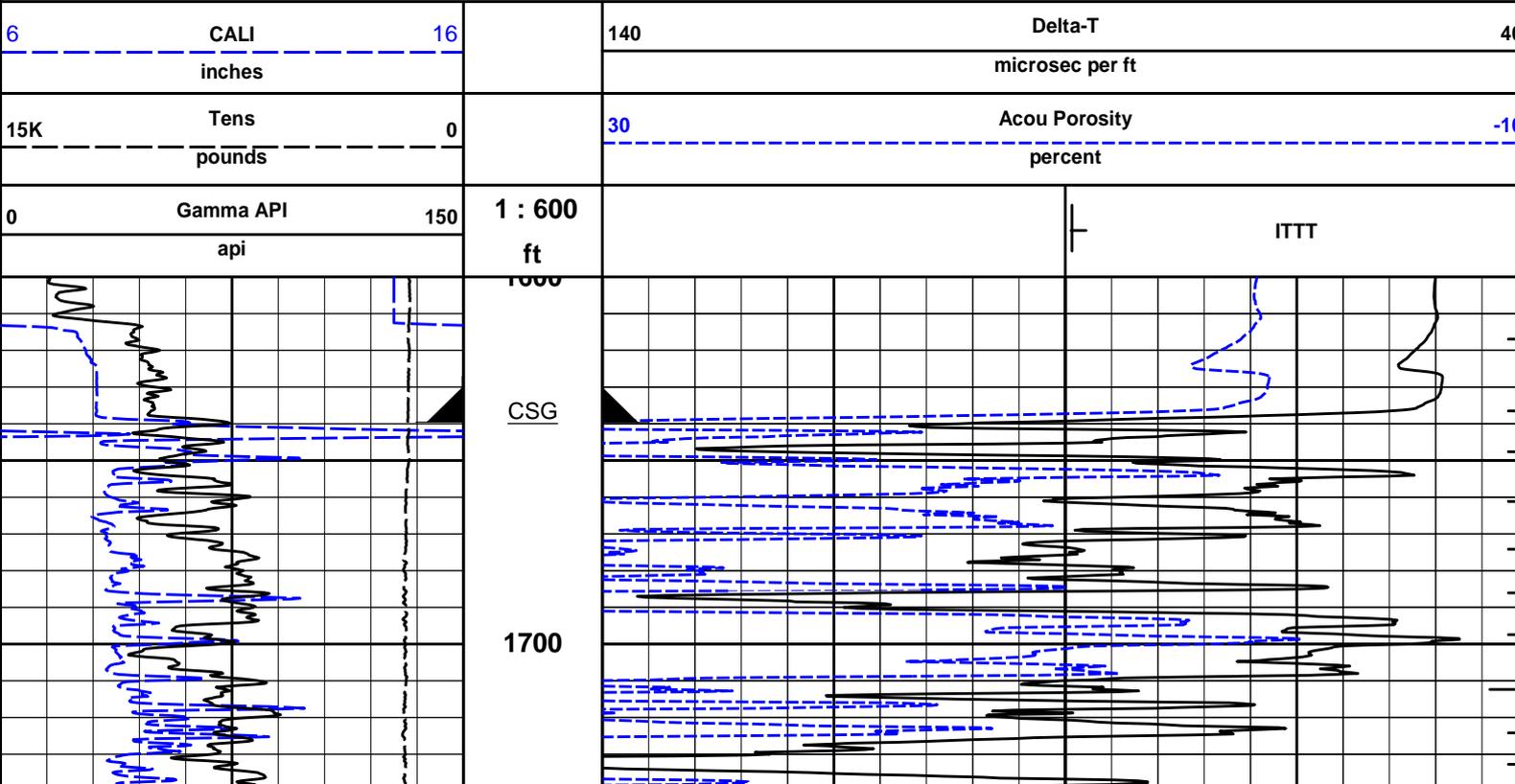
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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.

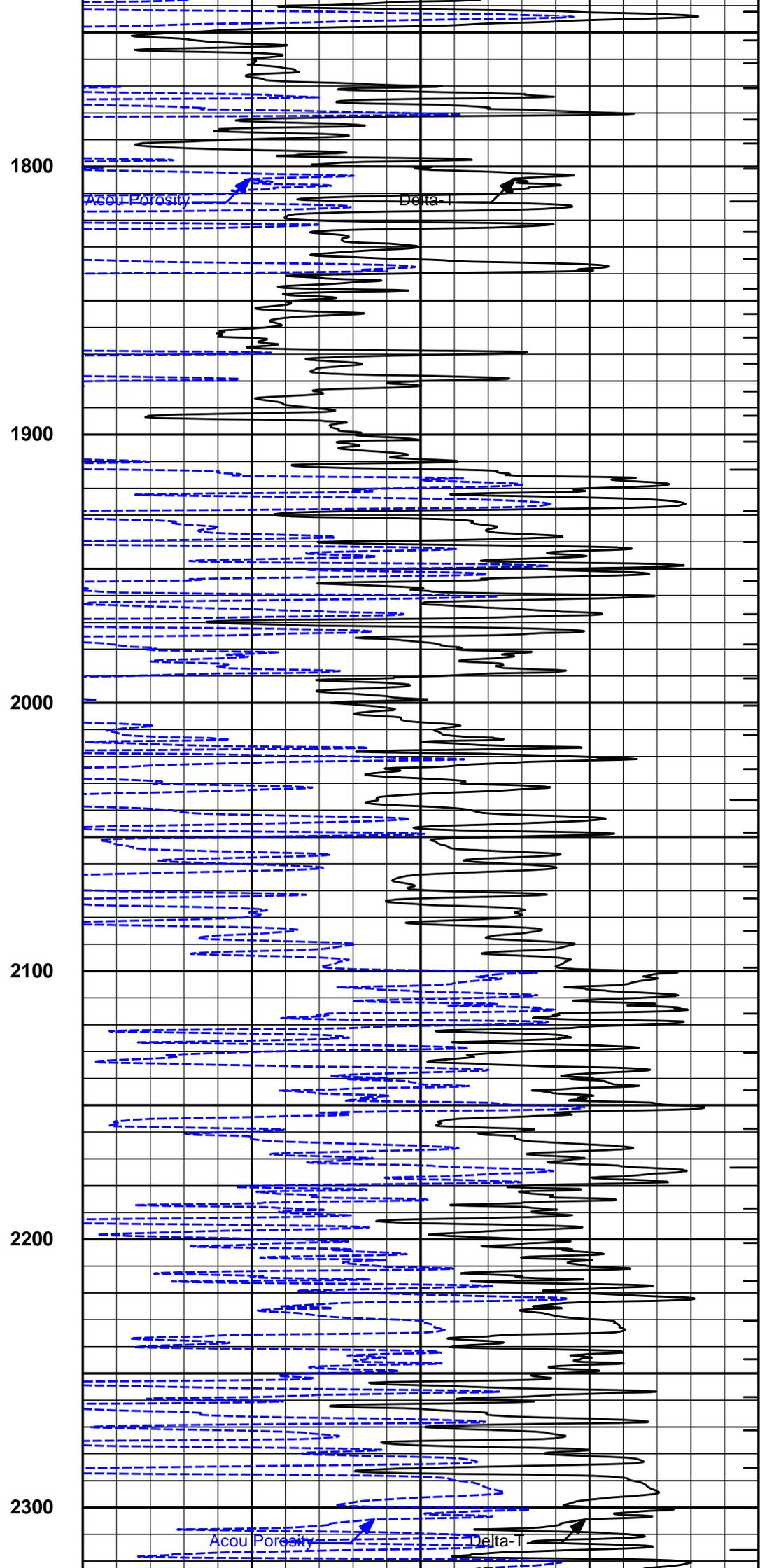
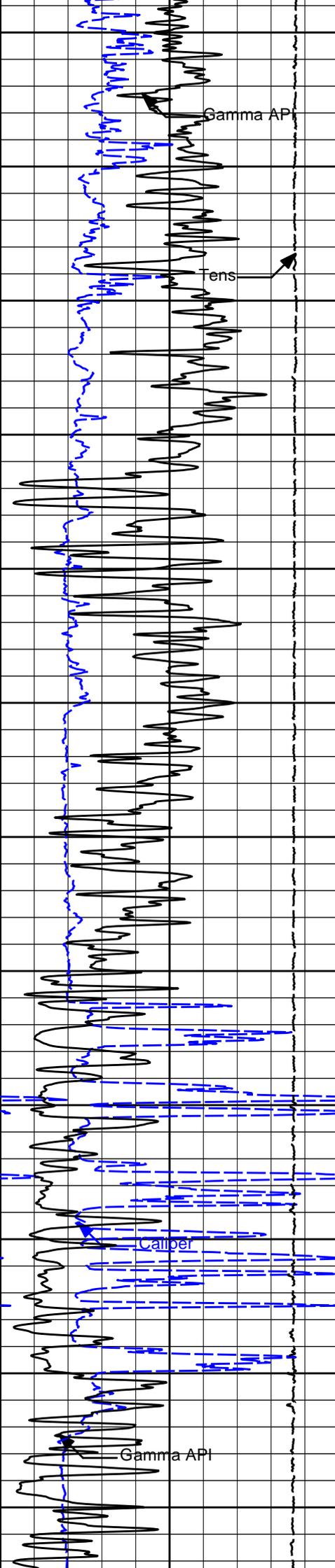
HALLIBURTON

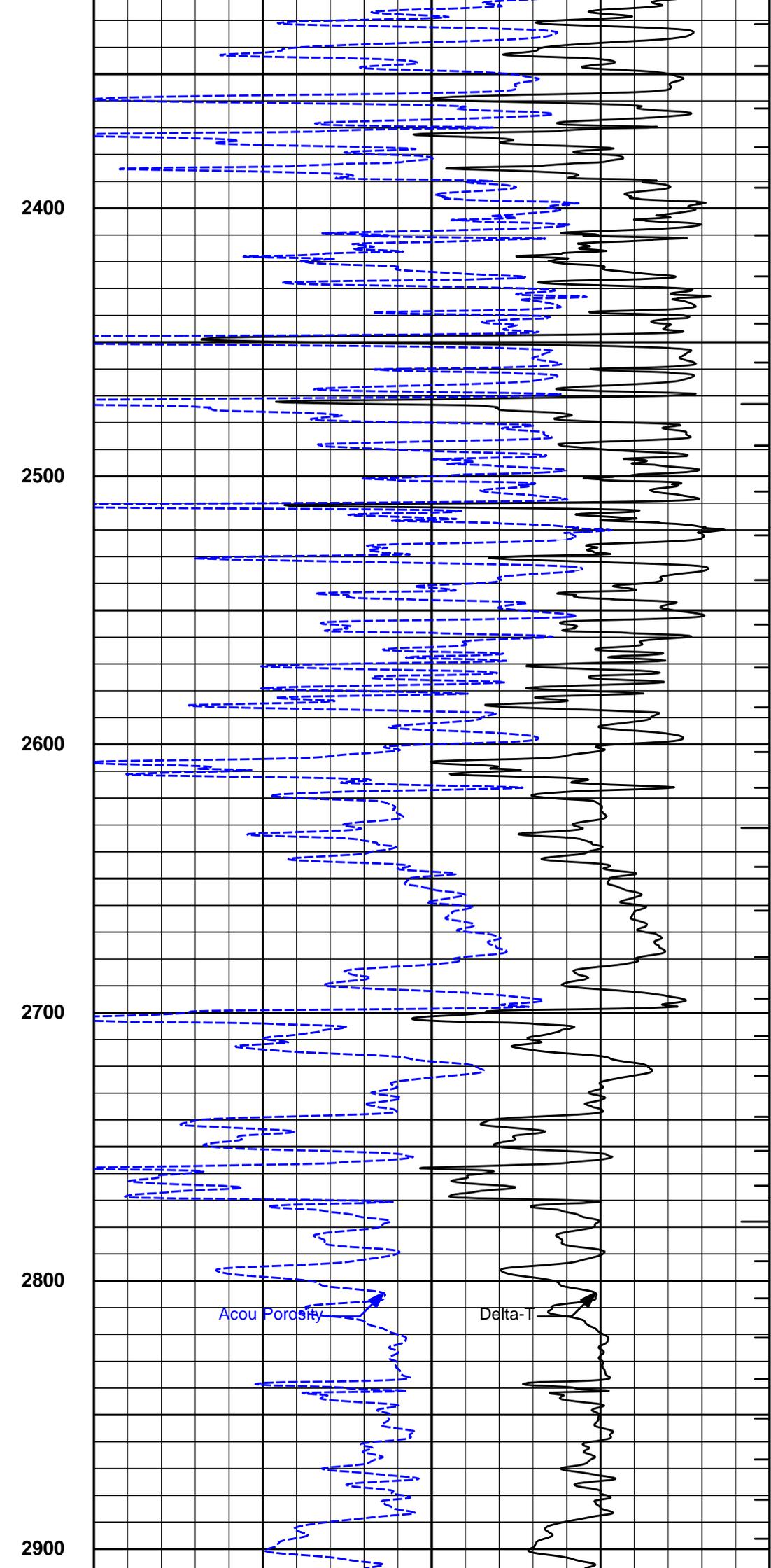
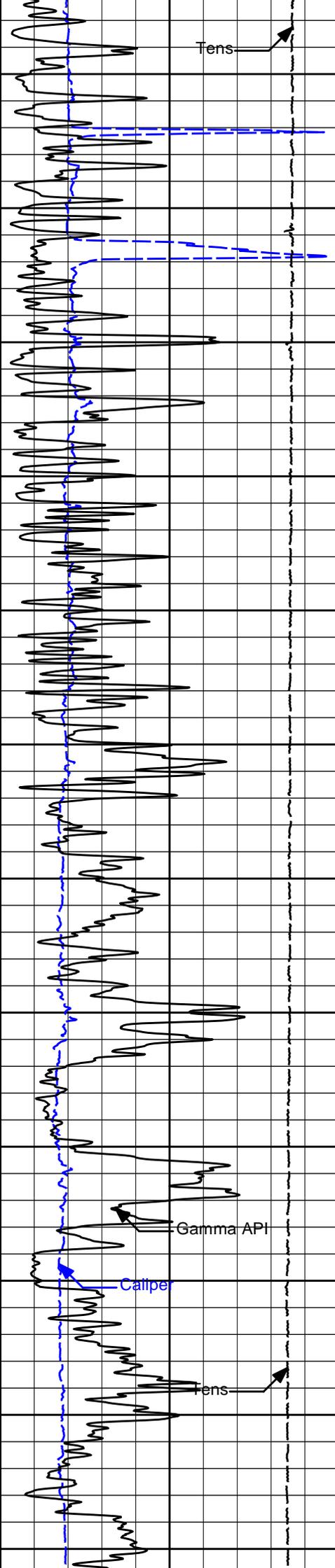
HALLIBURTON Plot Time: 01-Oct-19 23:21:17
 Plot Range: 1600 ft to 5832.5 ft
 Data: RAYDON_ROCK\Well Based\DAQ-0001-003\
 Plot File: \BSAT\BSAT_2inch

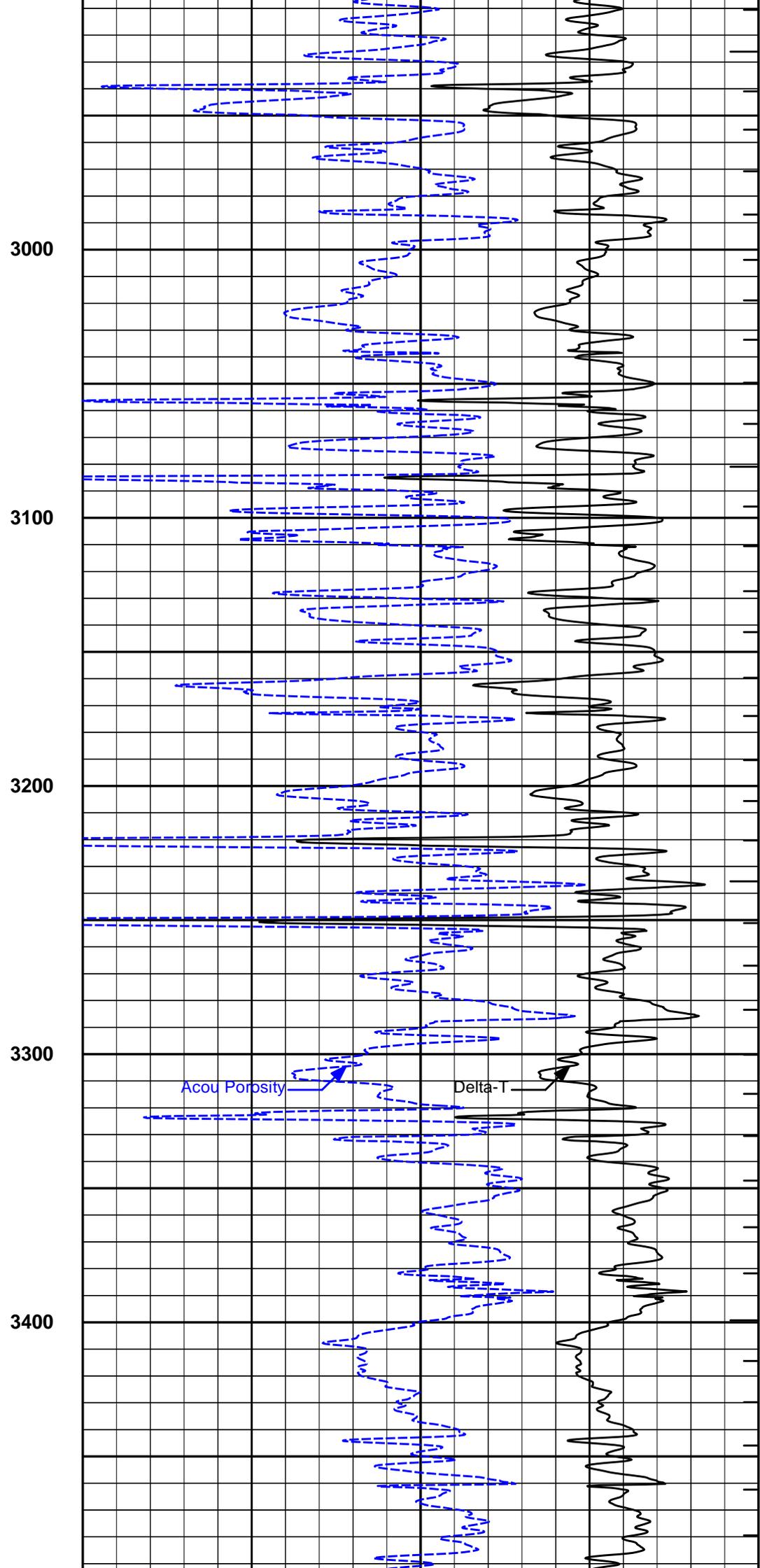
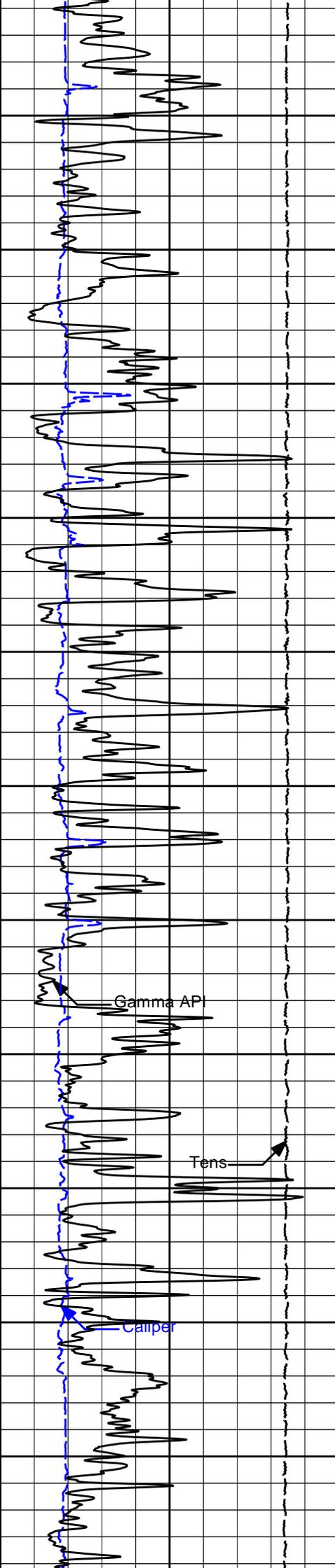
2 INCH MAIN LOG

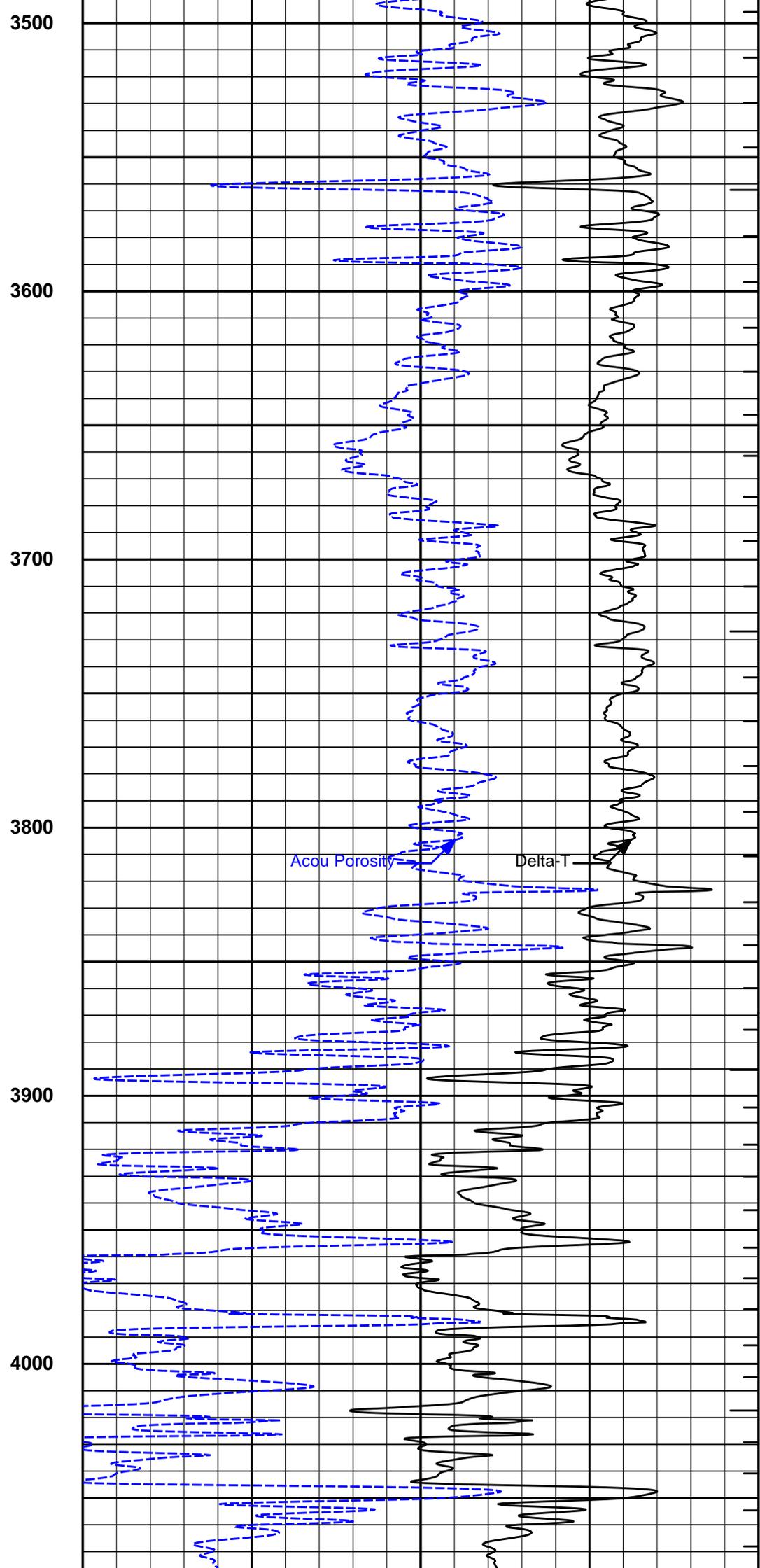
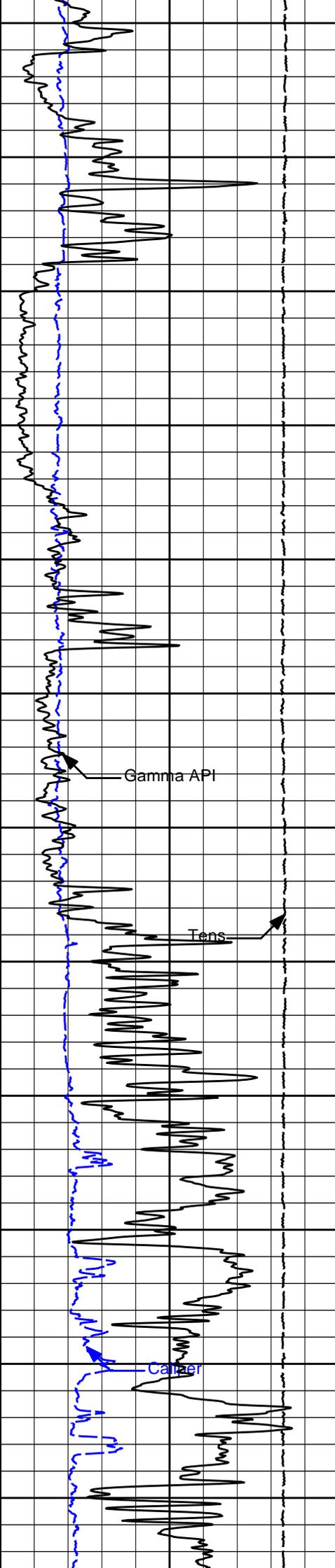
2" MAIN LOG SECTION

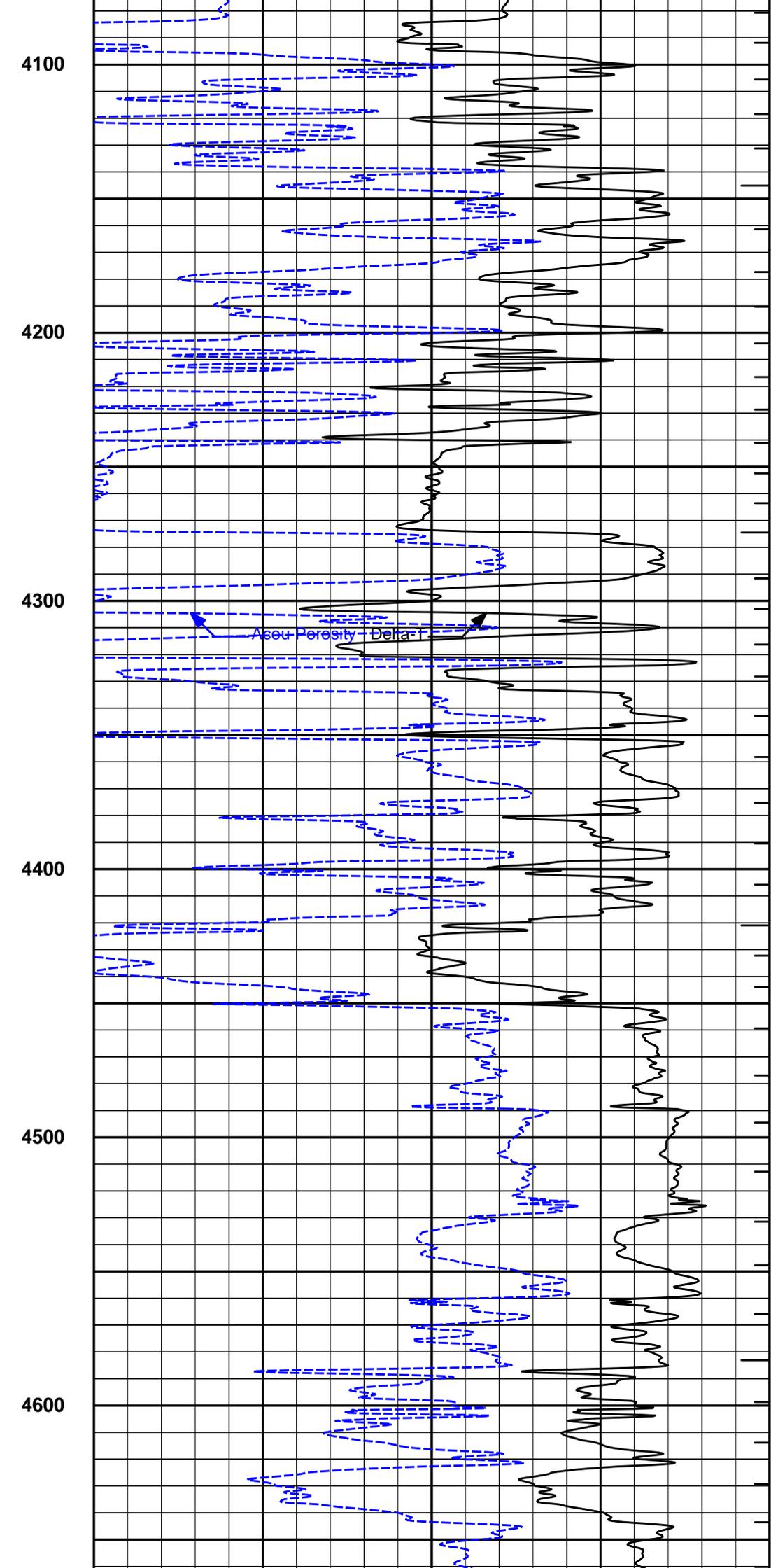
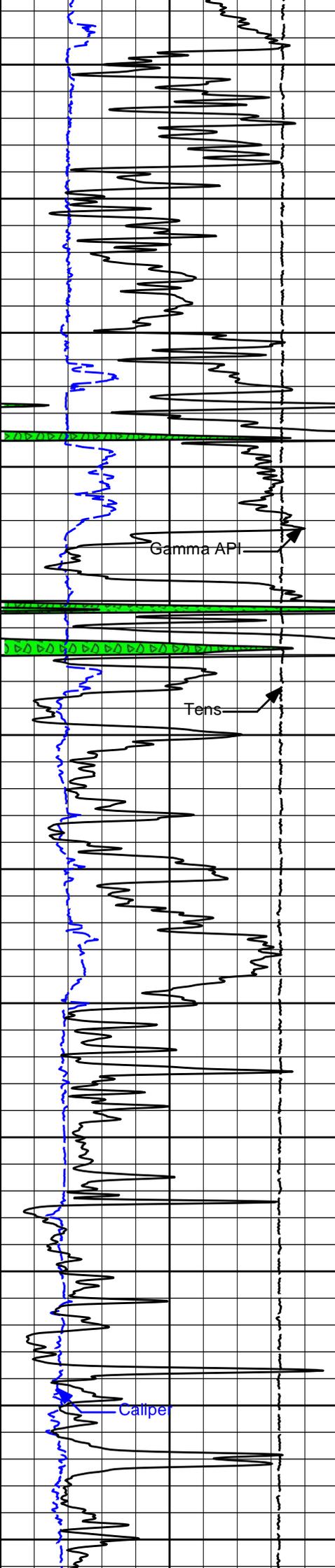


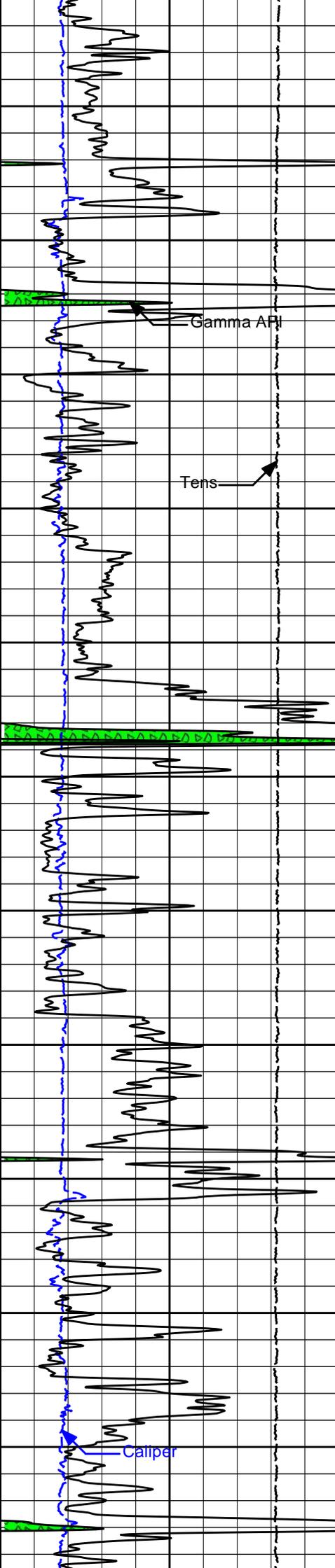




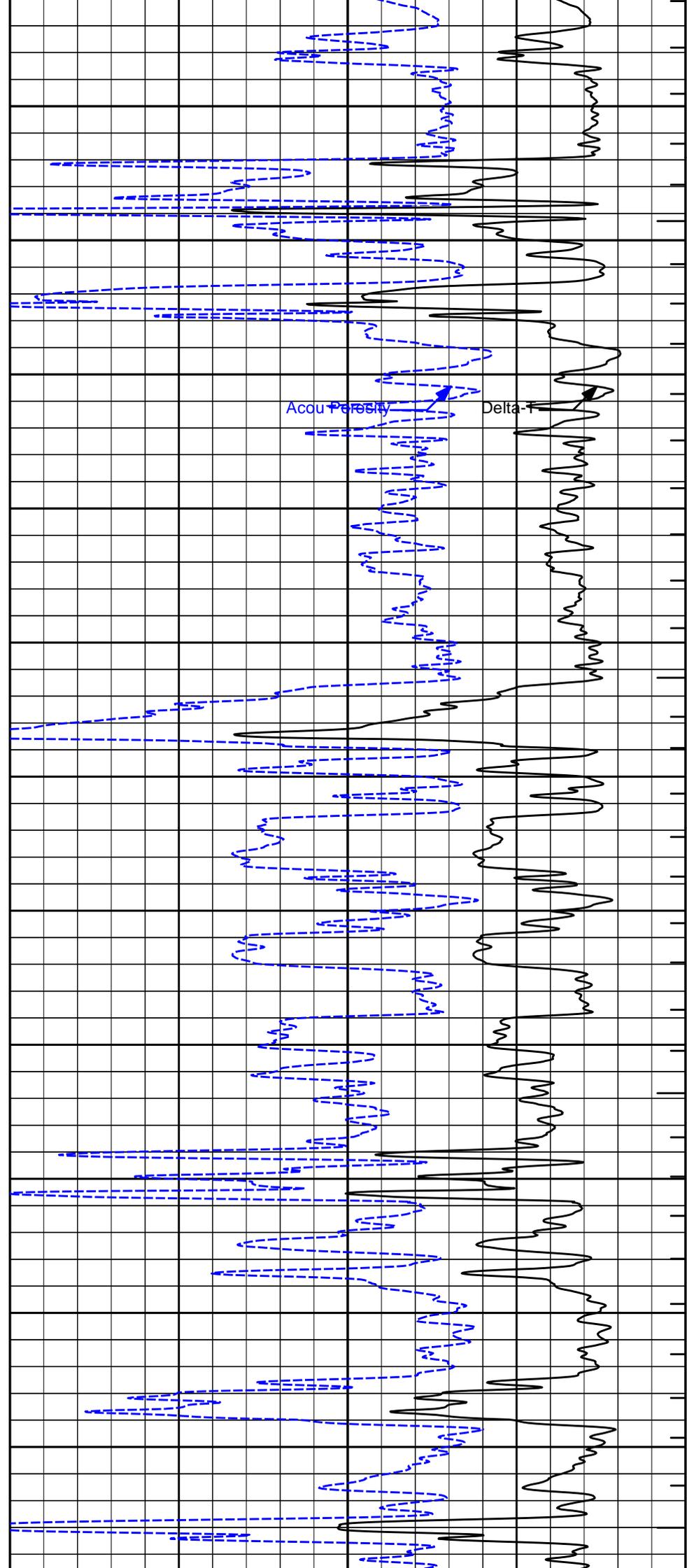


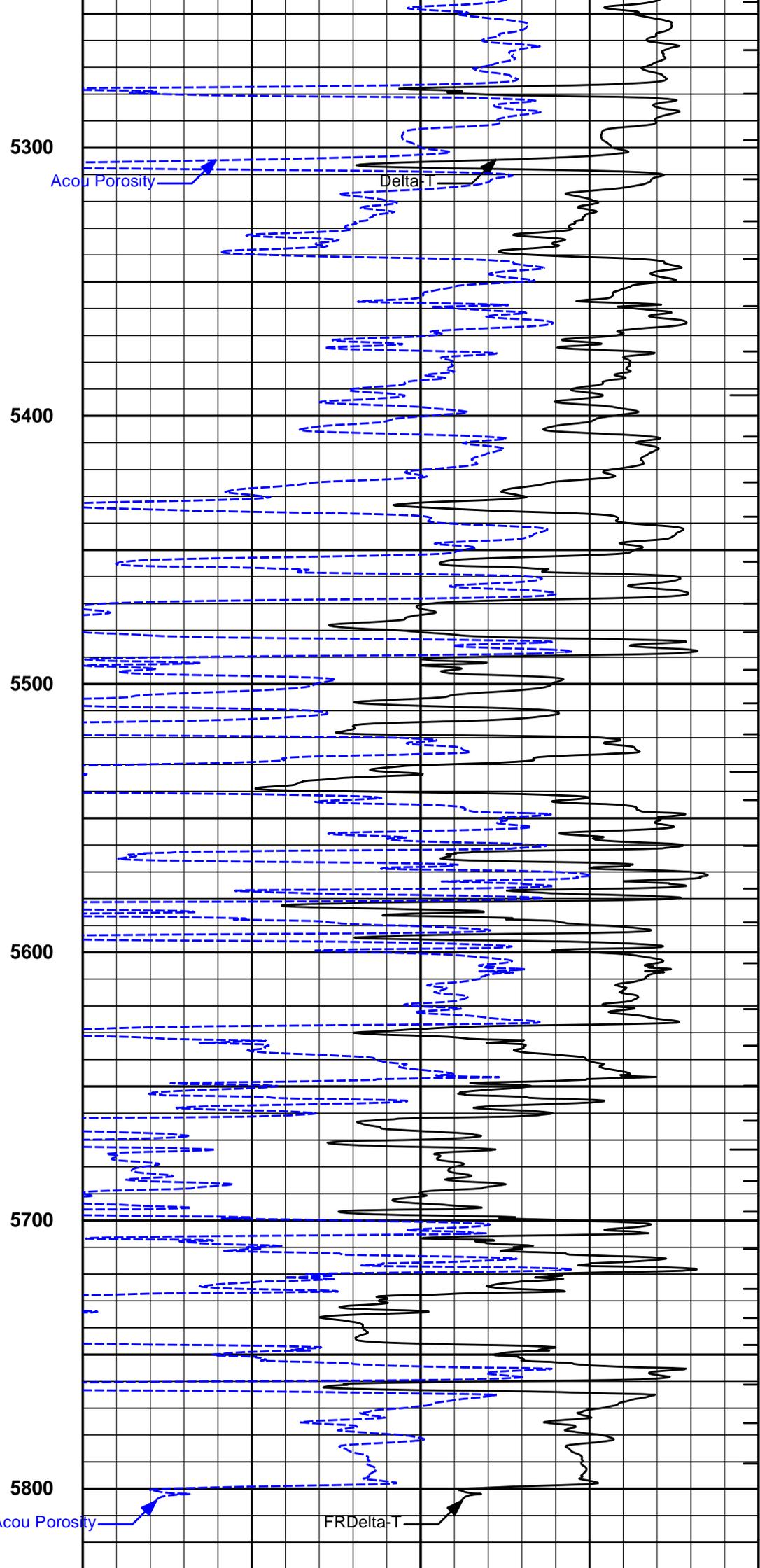
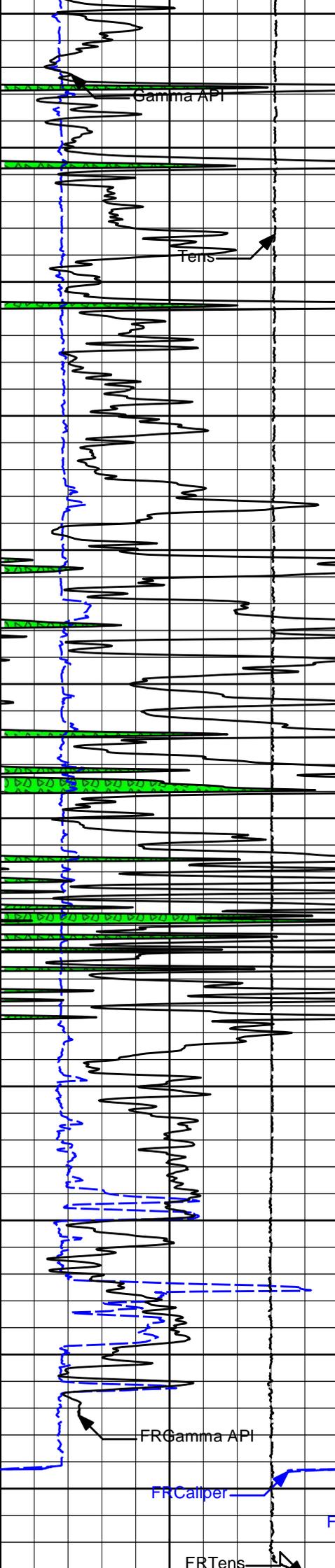






4700
4800
4900
5000
5100
5200





0	Gamma API	150	1 : 600		ITTT
	api		ft		
15K	Tens	0		30	Acou Porosity -10
	pounds				percent
6	CALI	16		140	Delta-T 40
	inches				microsec per ft

HALLIBURTON

Plot Time: 01-Oct-19 23:21:21
 Plot Range: 1600 ft to 5832.5 ft
 Data: RAYDON_ROCK\Well Based\DAQ-0001-003\
 Plot File: \BSAT\BSAT_2inch

2 INCH MAIN LOG

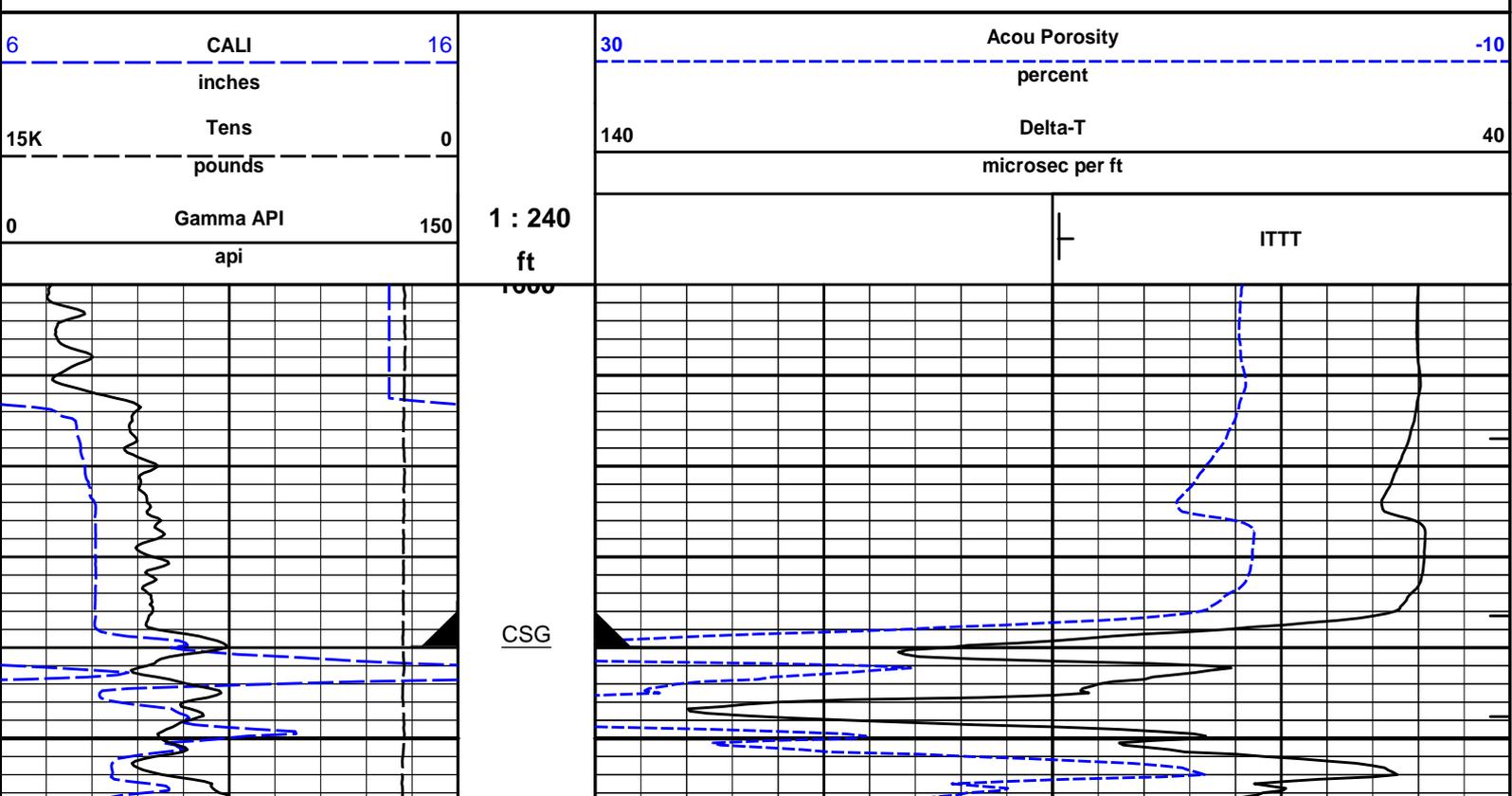
2" MAIN LOG SECTION

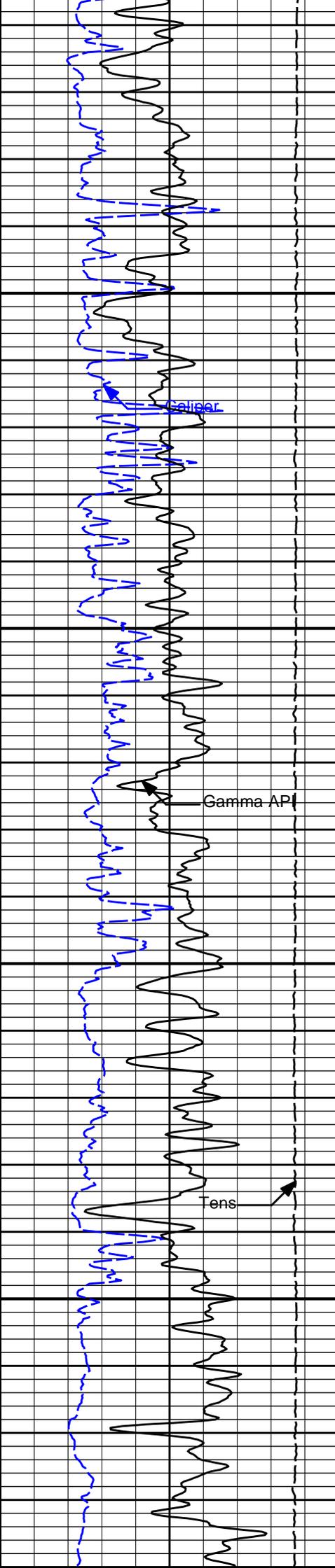
HALLIBURTON

Plot Time: 01-Oct-19 23:21:21
 Plot Range: 1600 ft to 5832.5 ft
 Data: RAYDON_ROCK\Well Based\DAQ-0001-003\
 Plot File: \BSAT\BSAT_5inch

5 INCH MAIN LOG

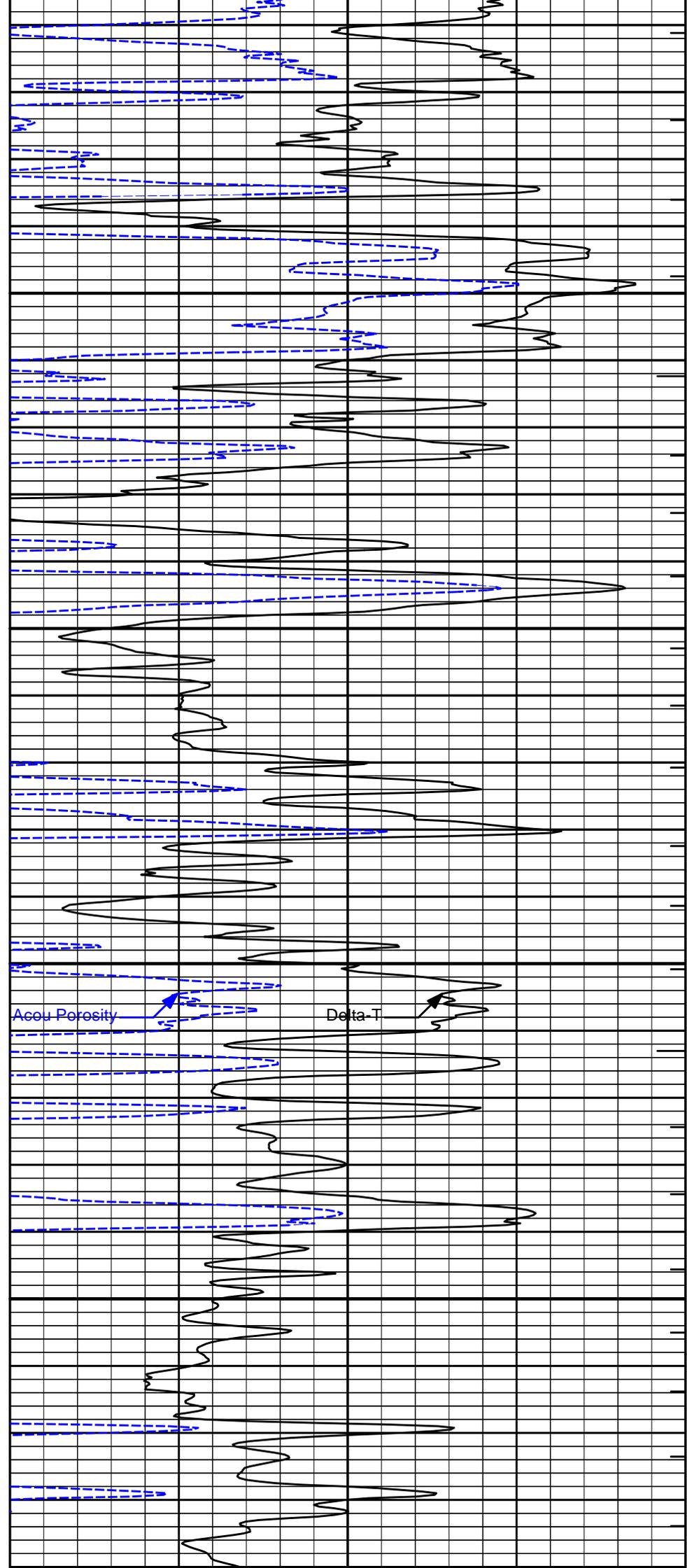
MAIN LOG SECTION

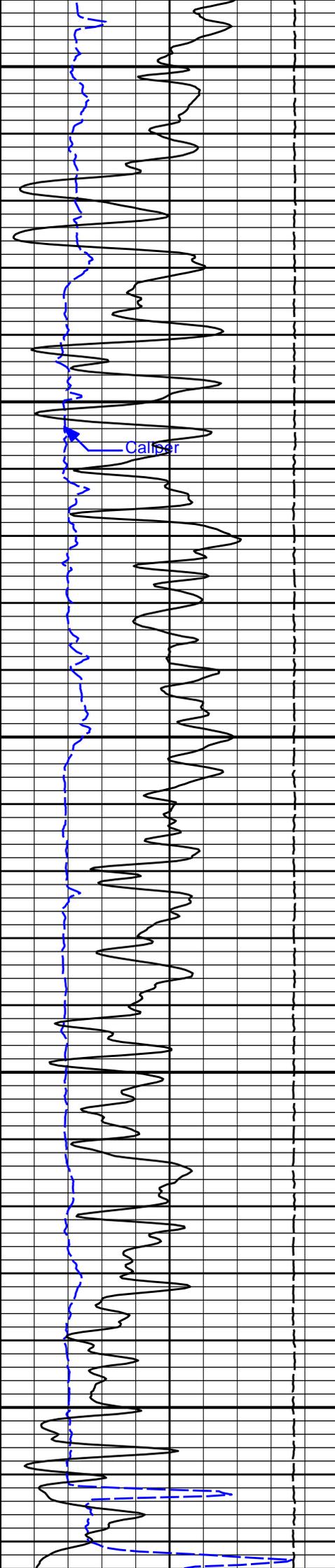




1700

1800



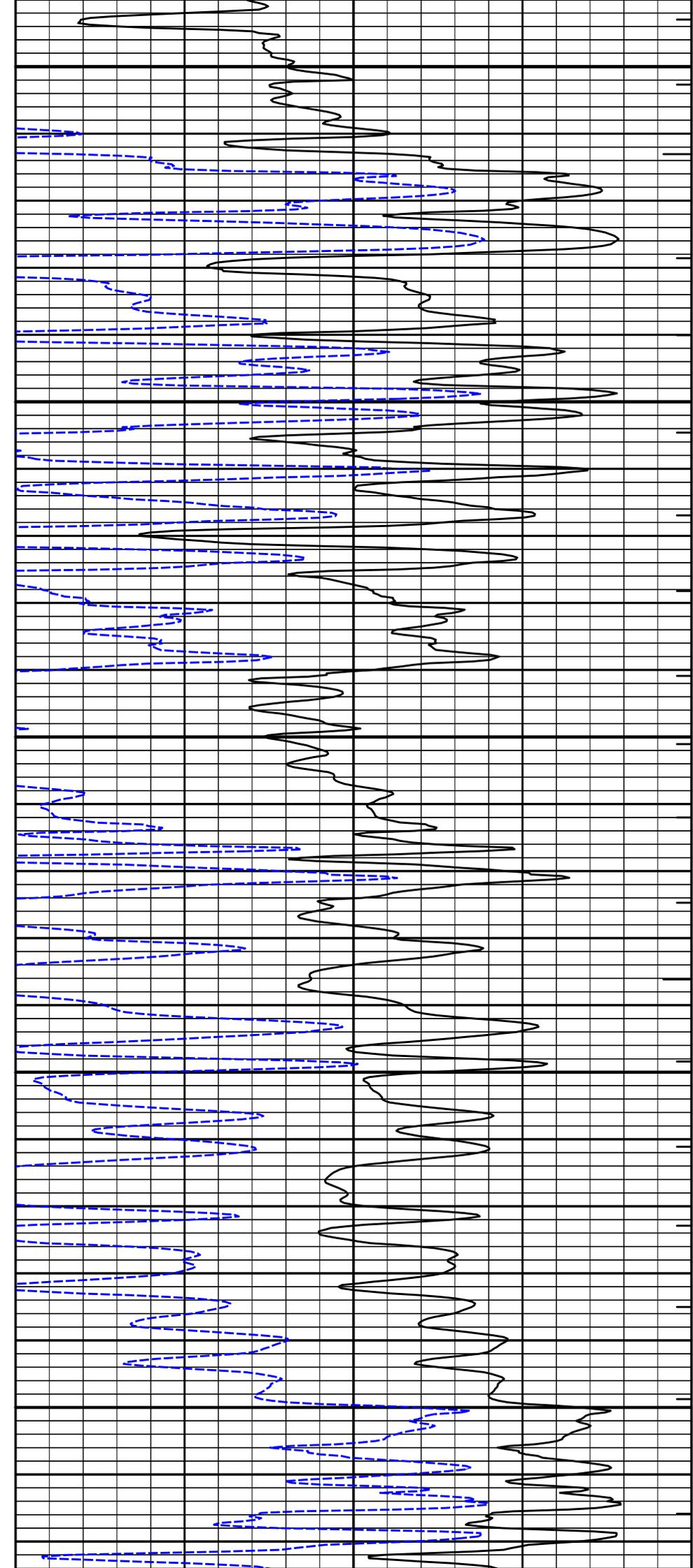


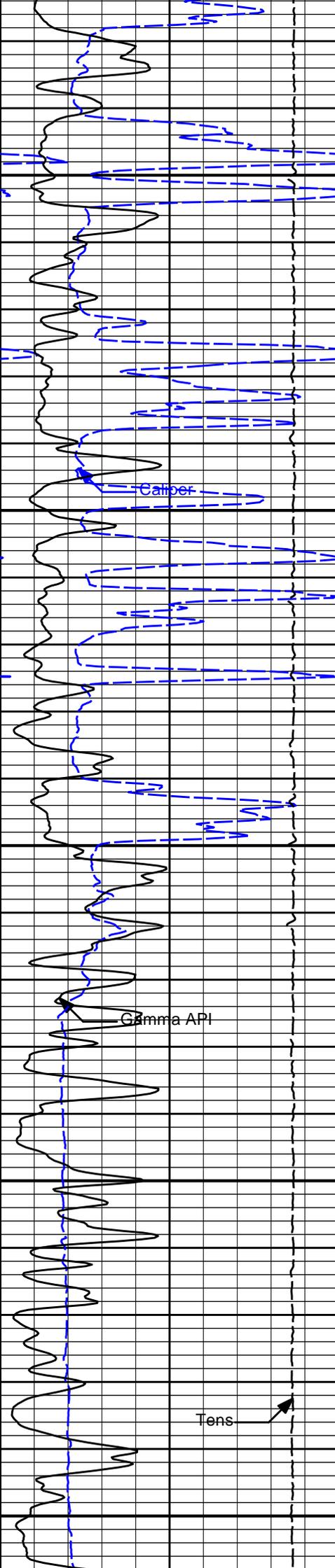
1900

2000

2100

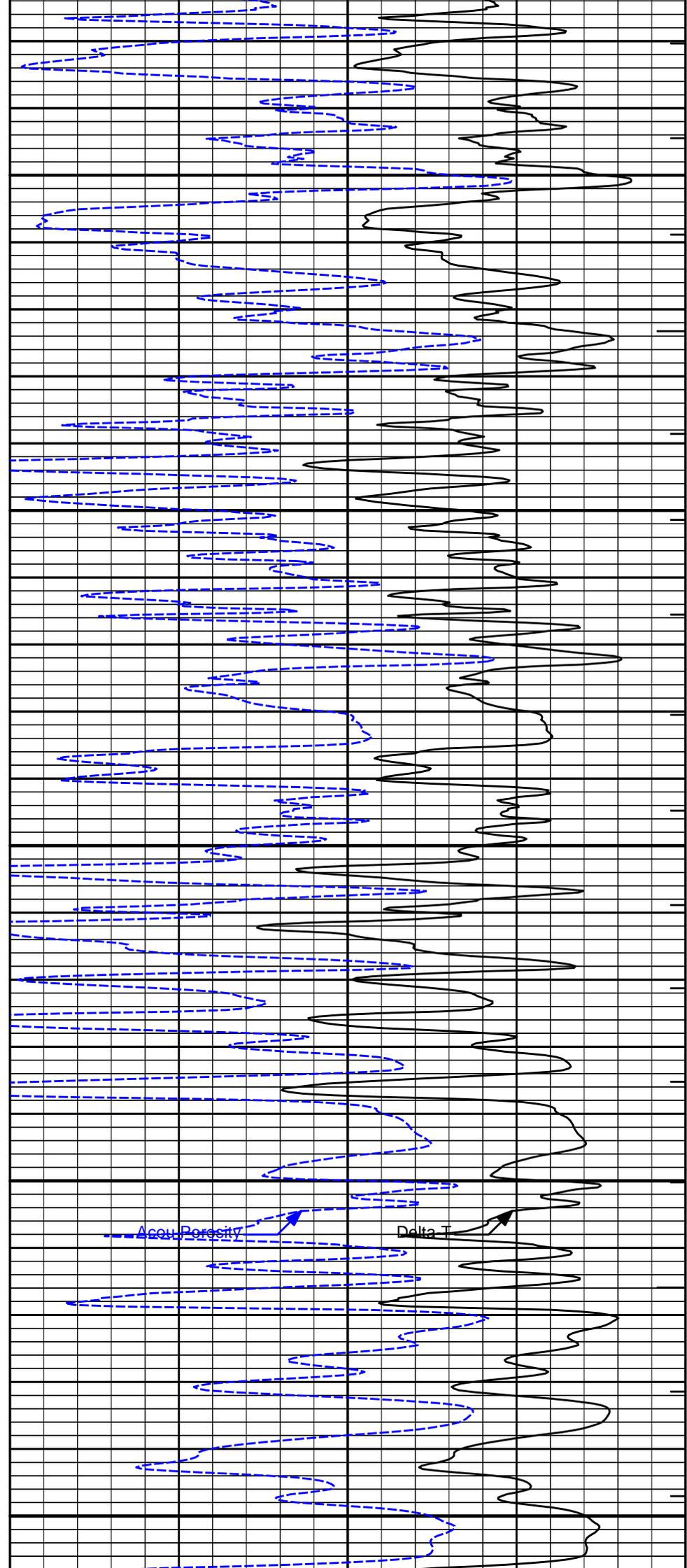
Caliper

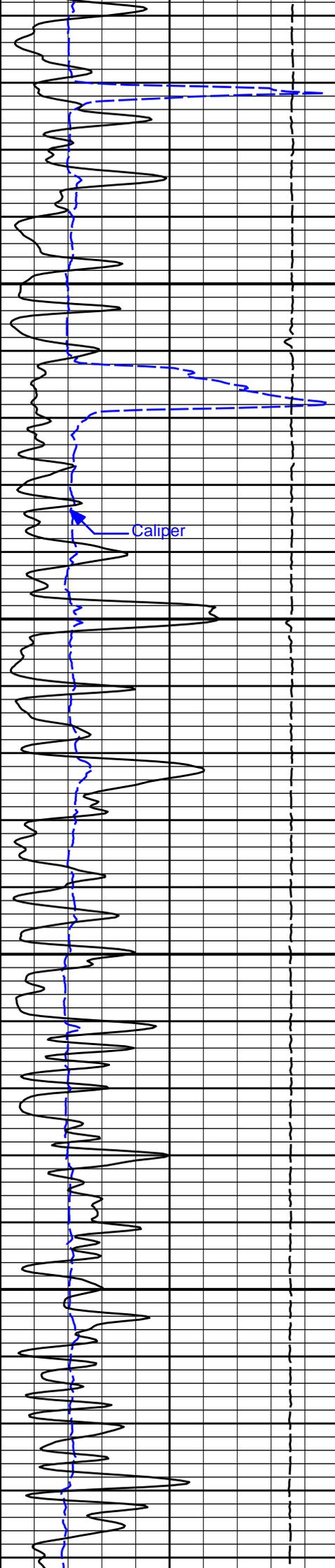




2200

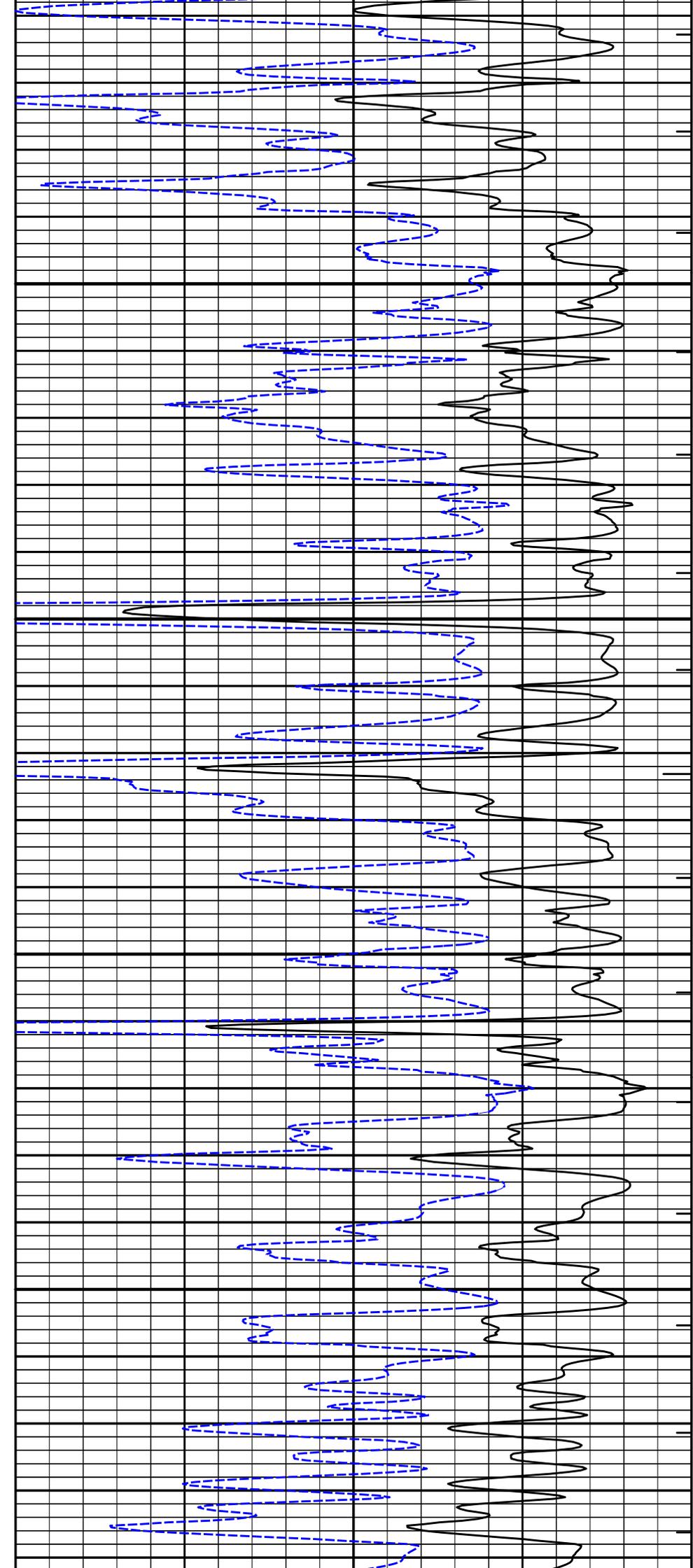
2300

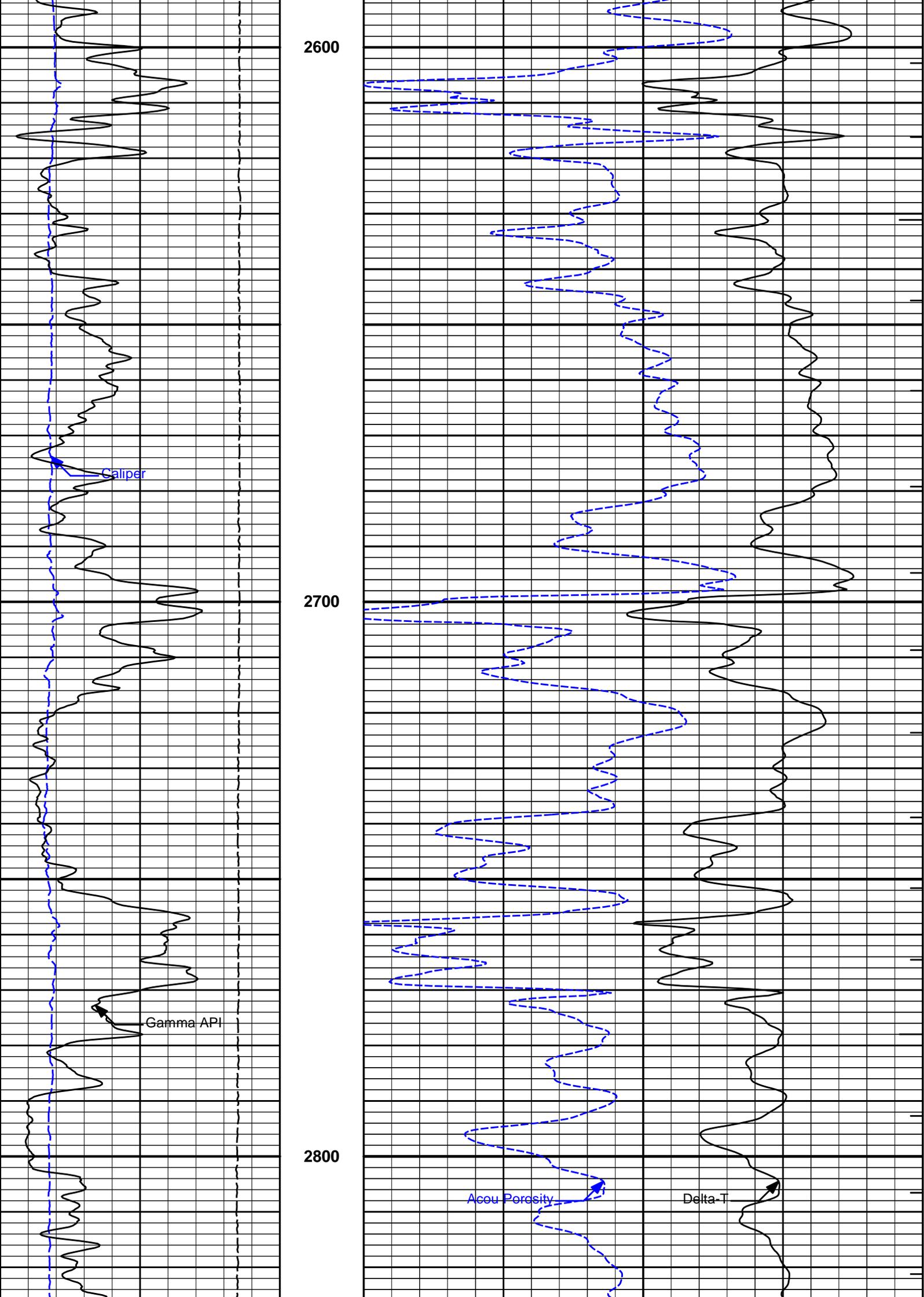




2400

2500





2600

Caliper

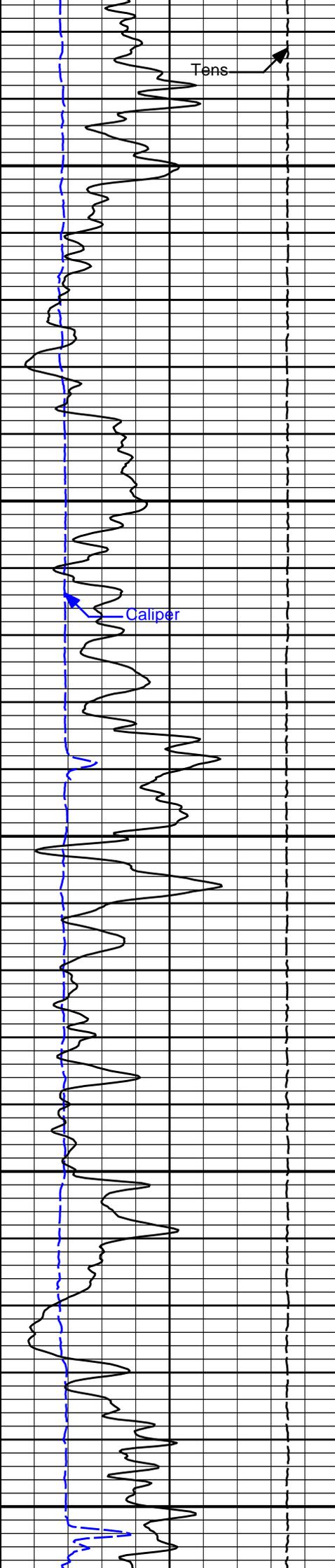
2700

Gamma API

2800

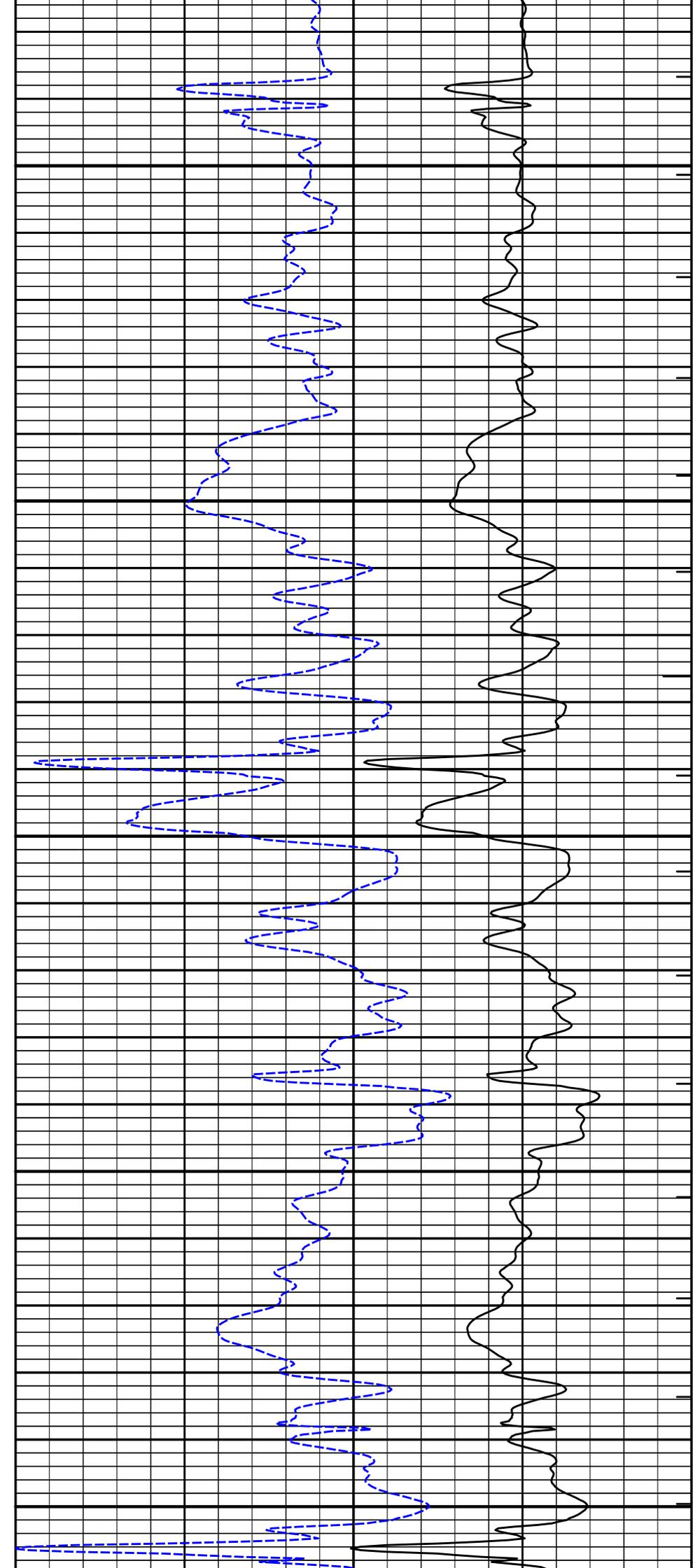
Acou Porosity

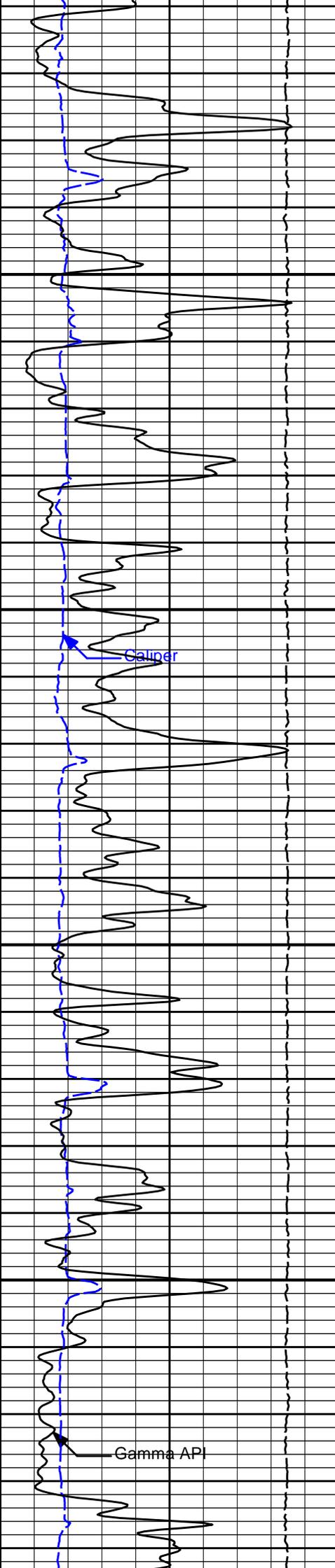
Delta-T



2900

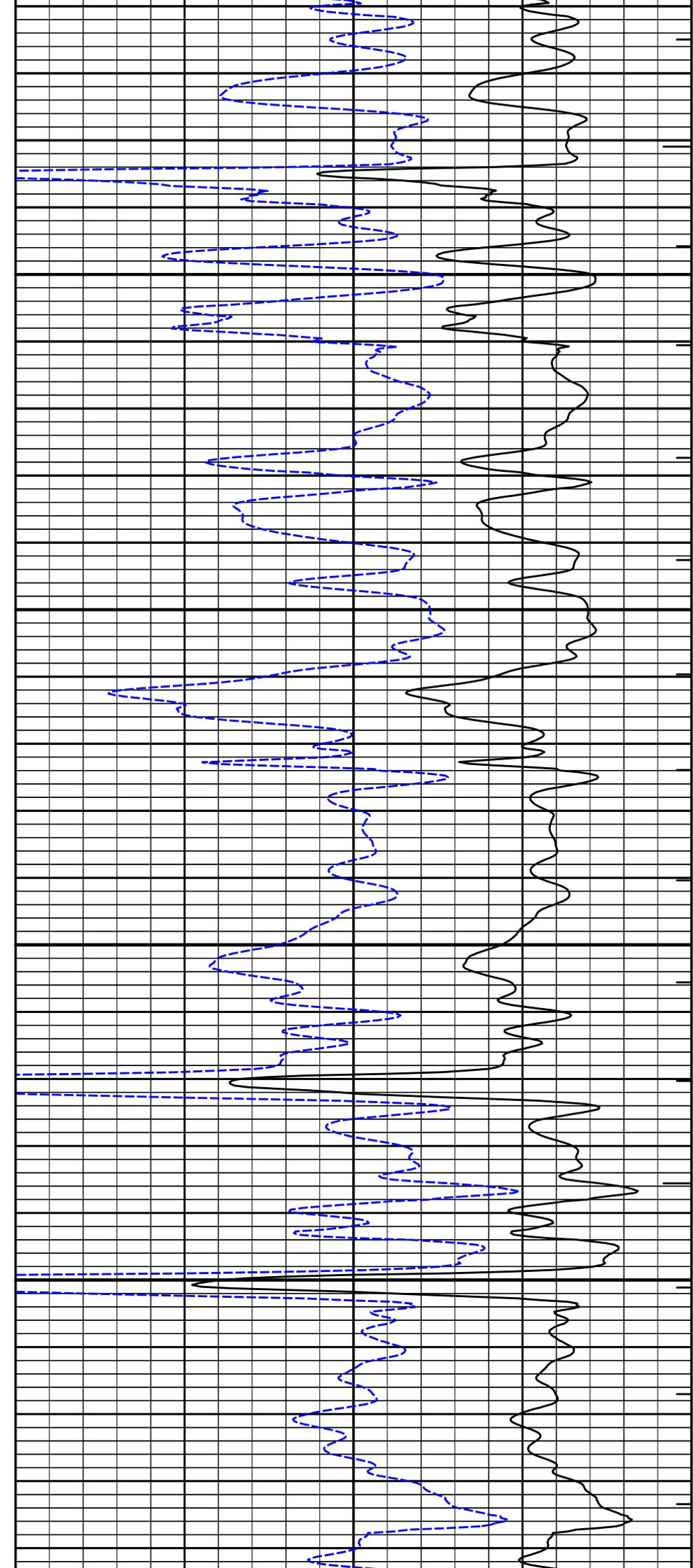
3000

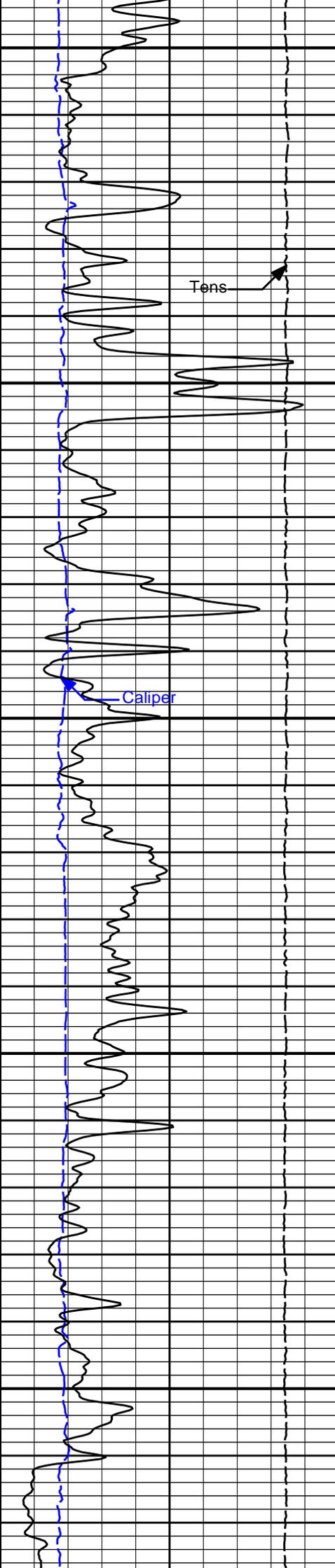




3100

3200





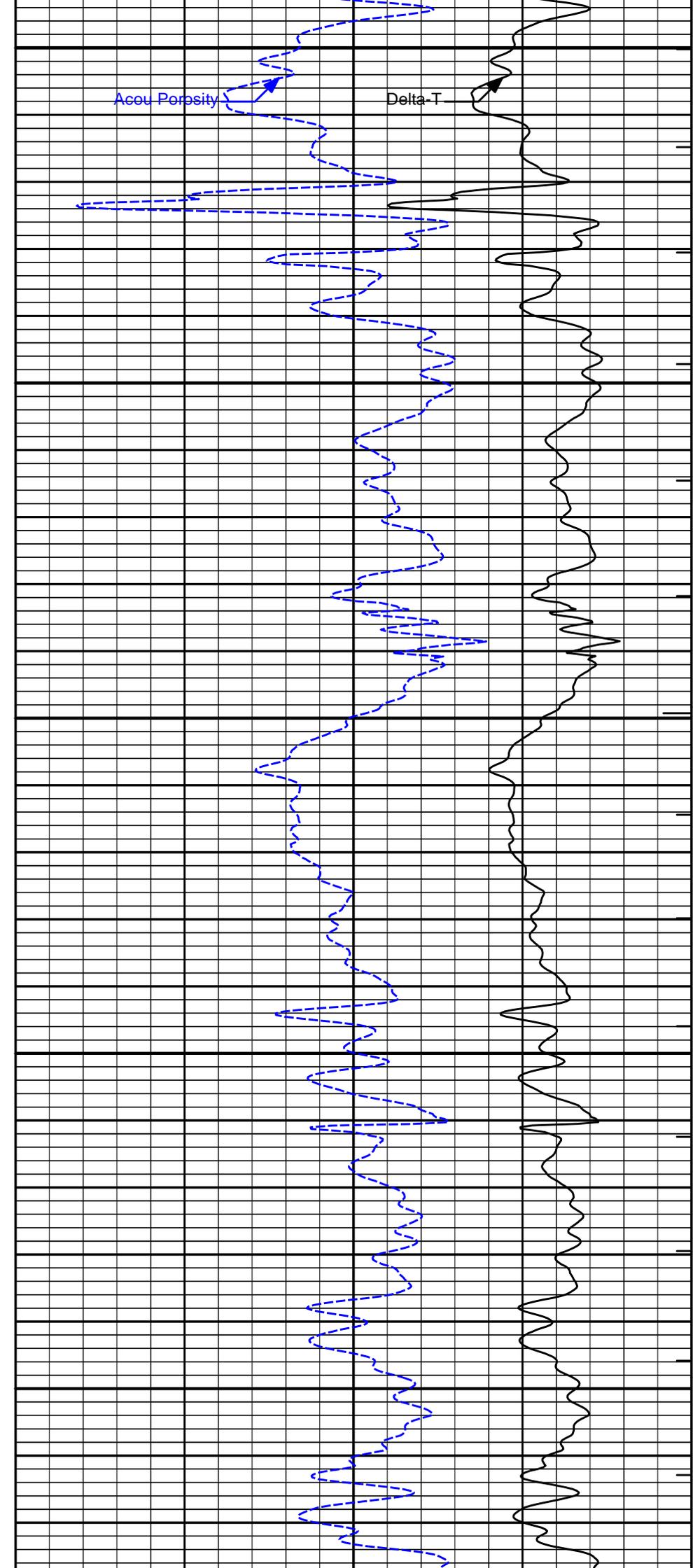
3300

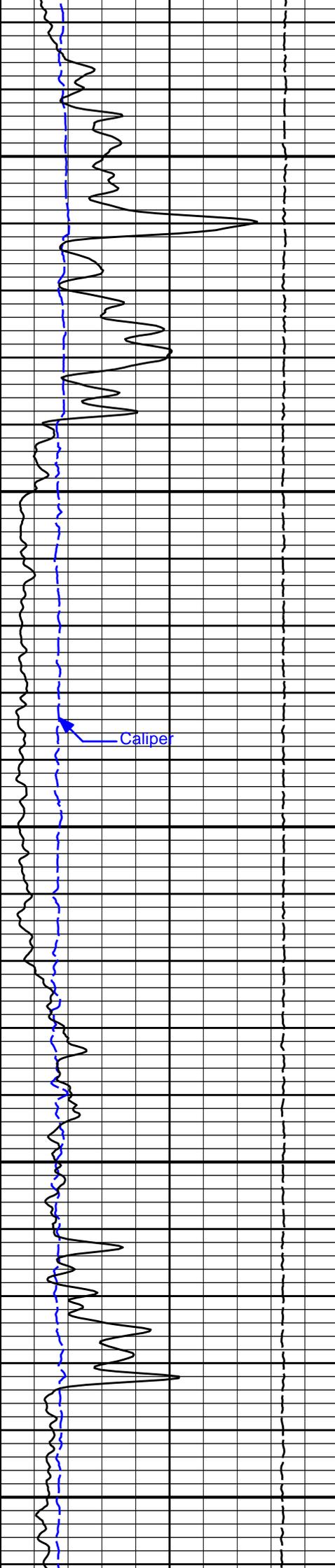
Acou Porosity

Delta-T

3400

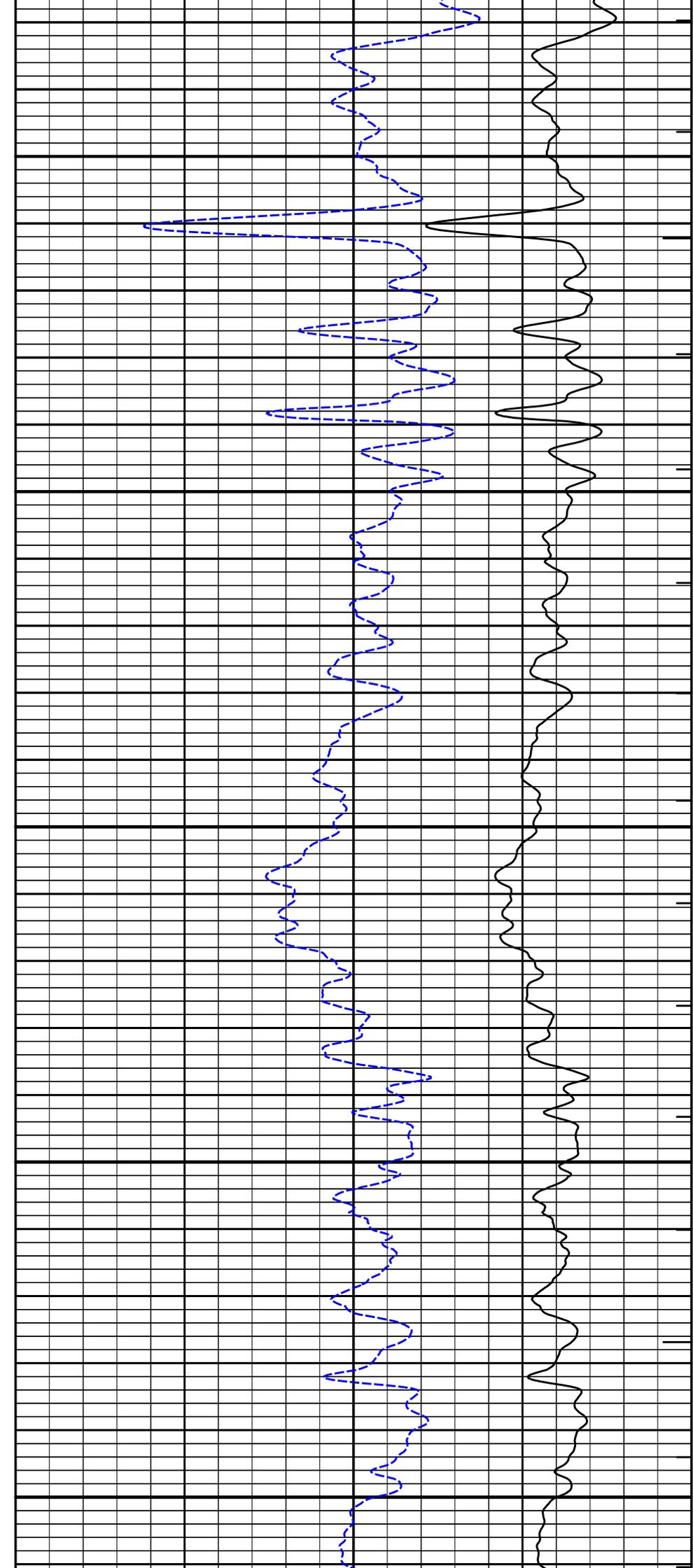
3500

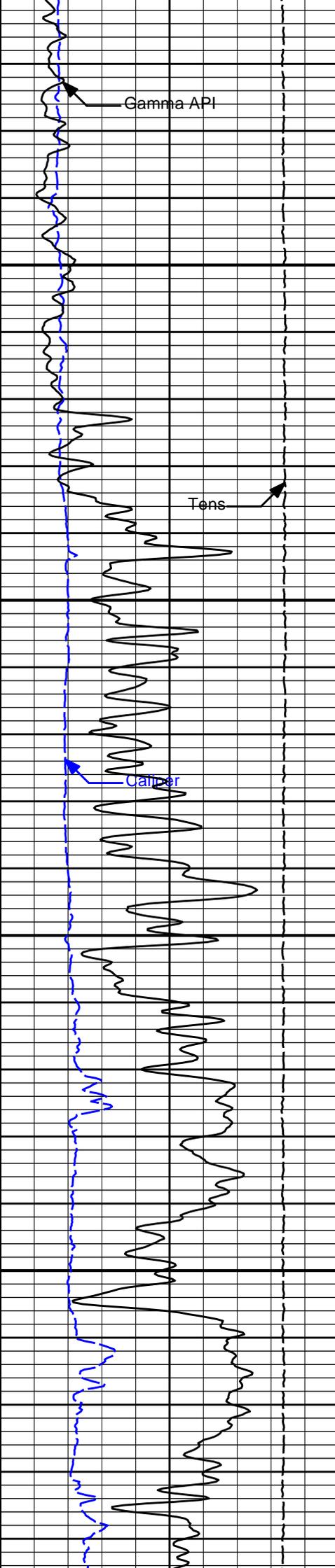




3600

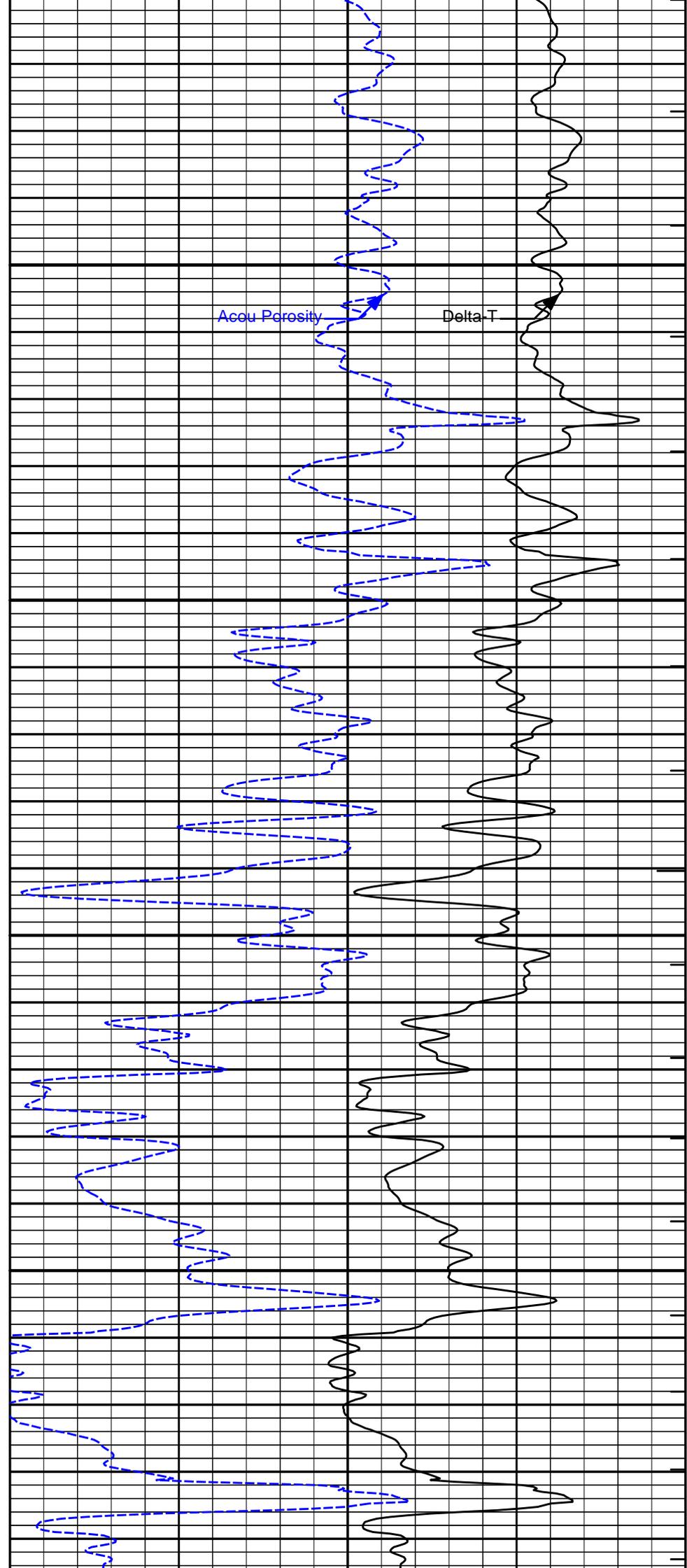
3700

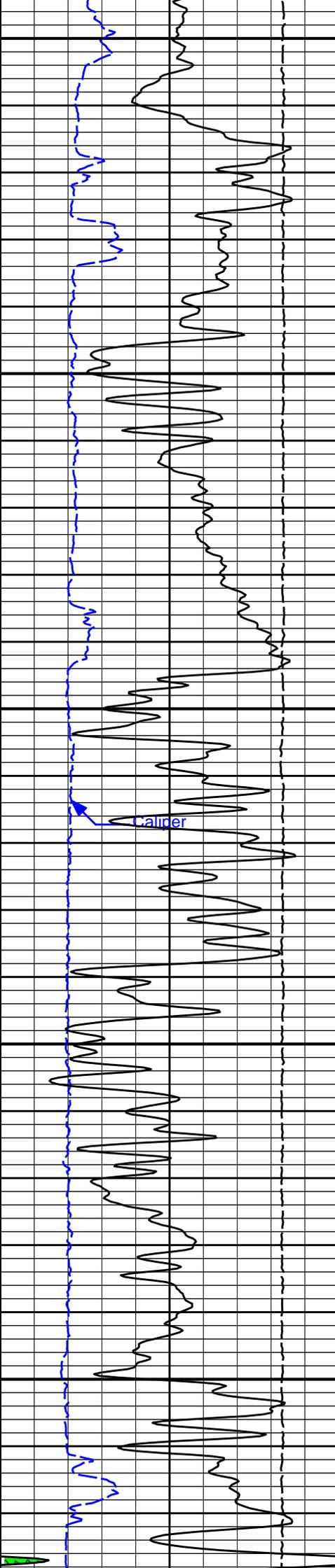




3800

3900

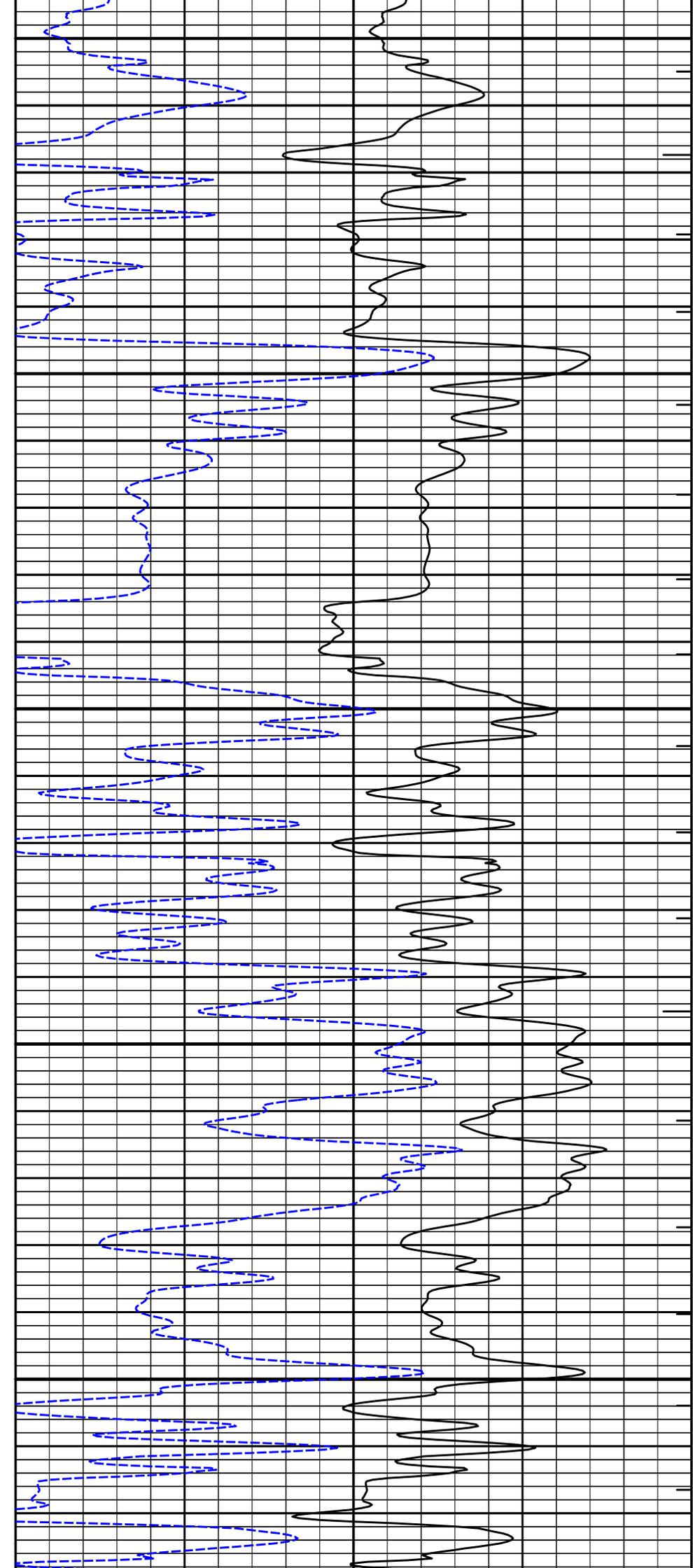


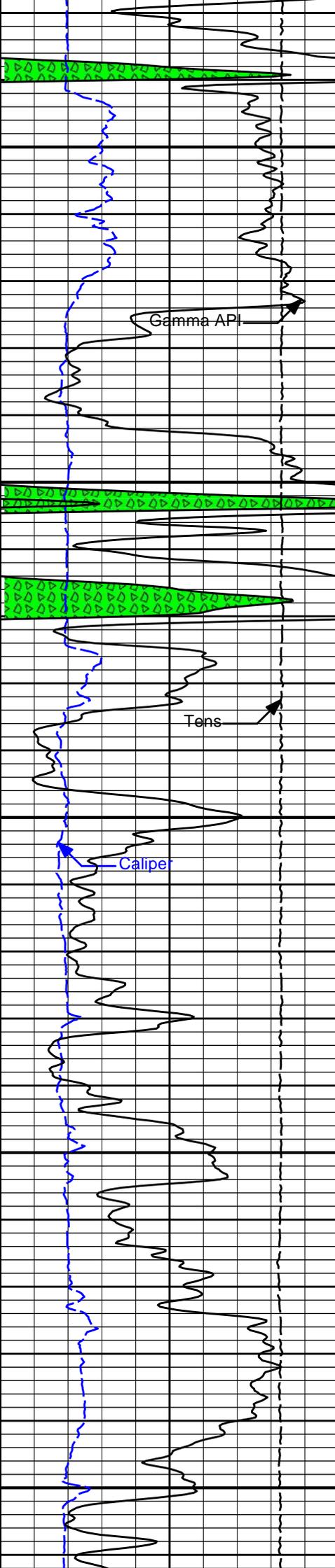


4000

4100

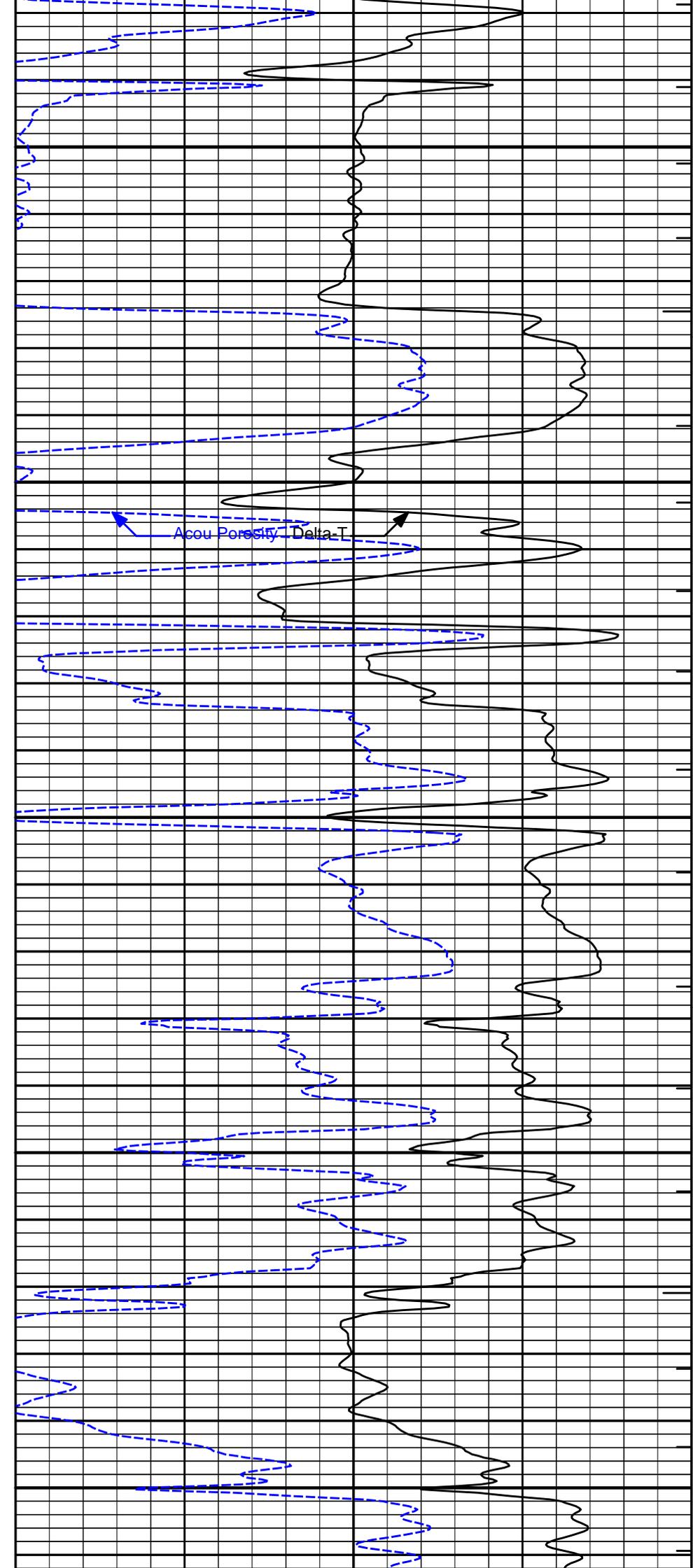
4200

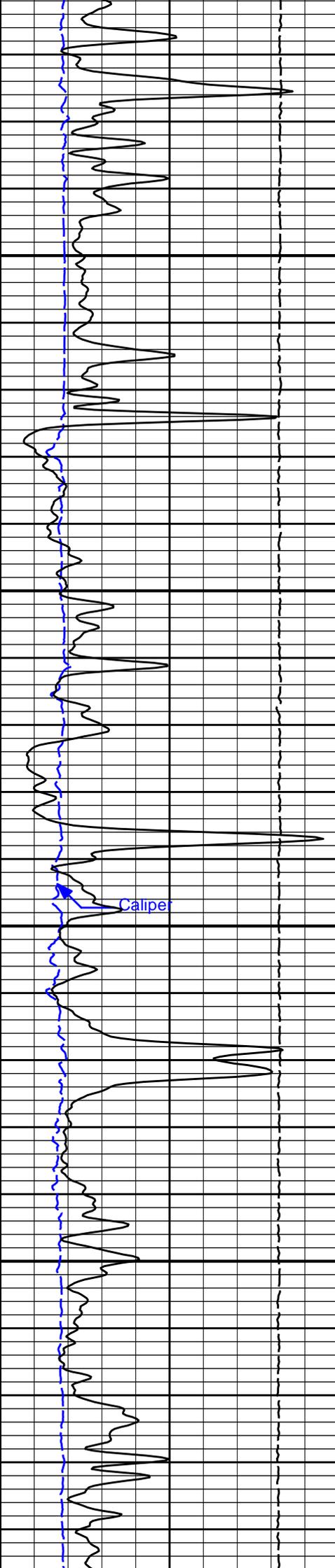




4300

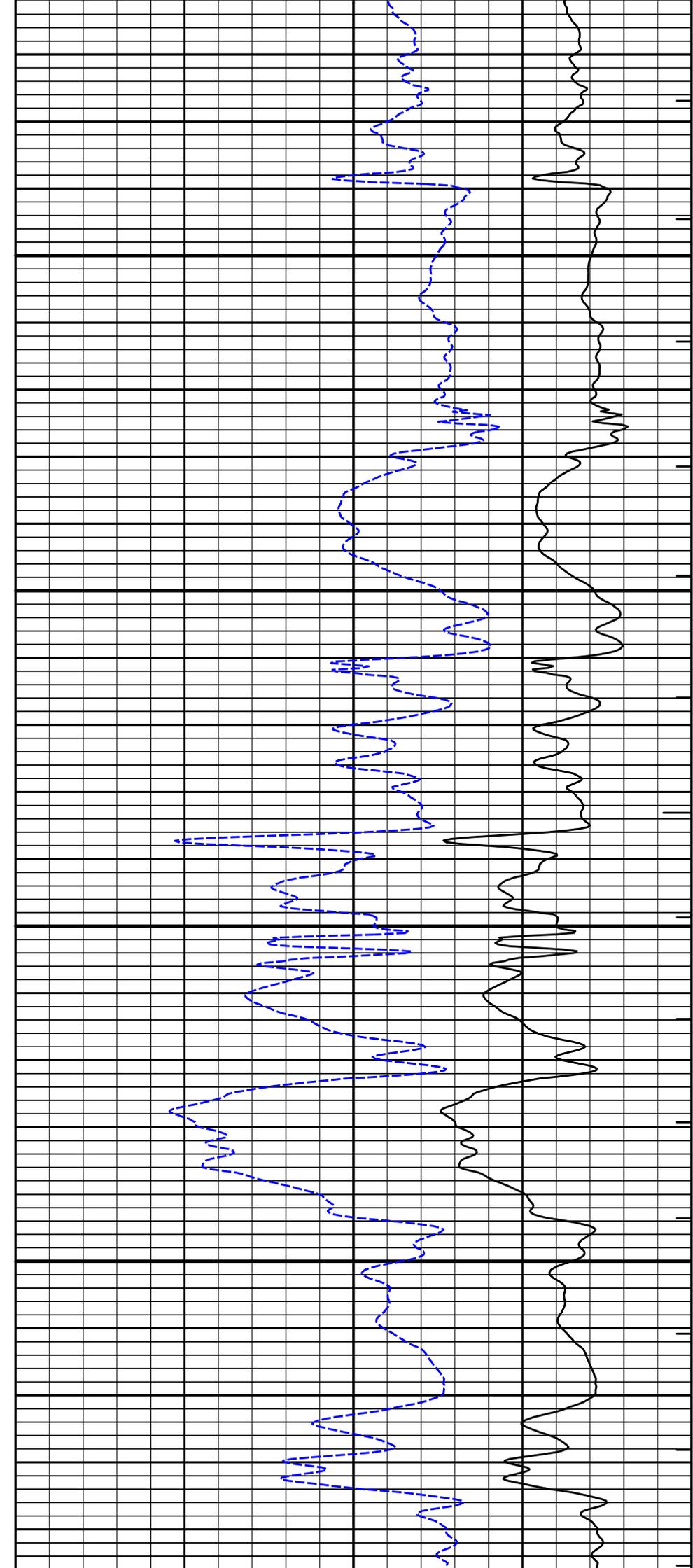
4400

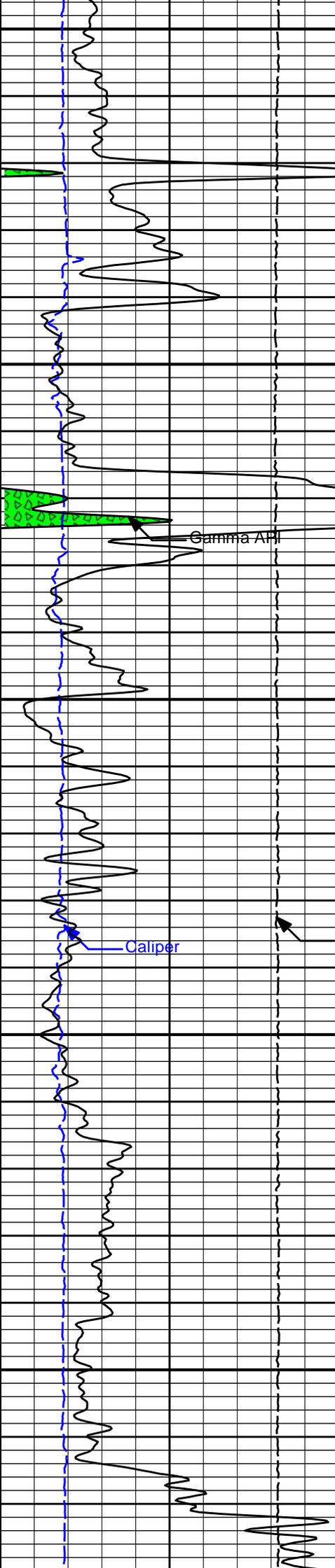




4500

4600





4700

Gamma Ray

Caliper

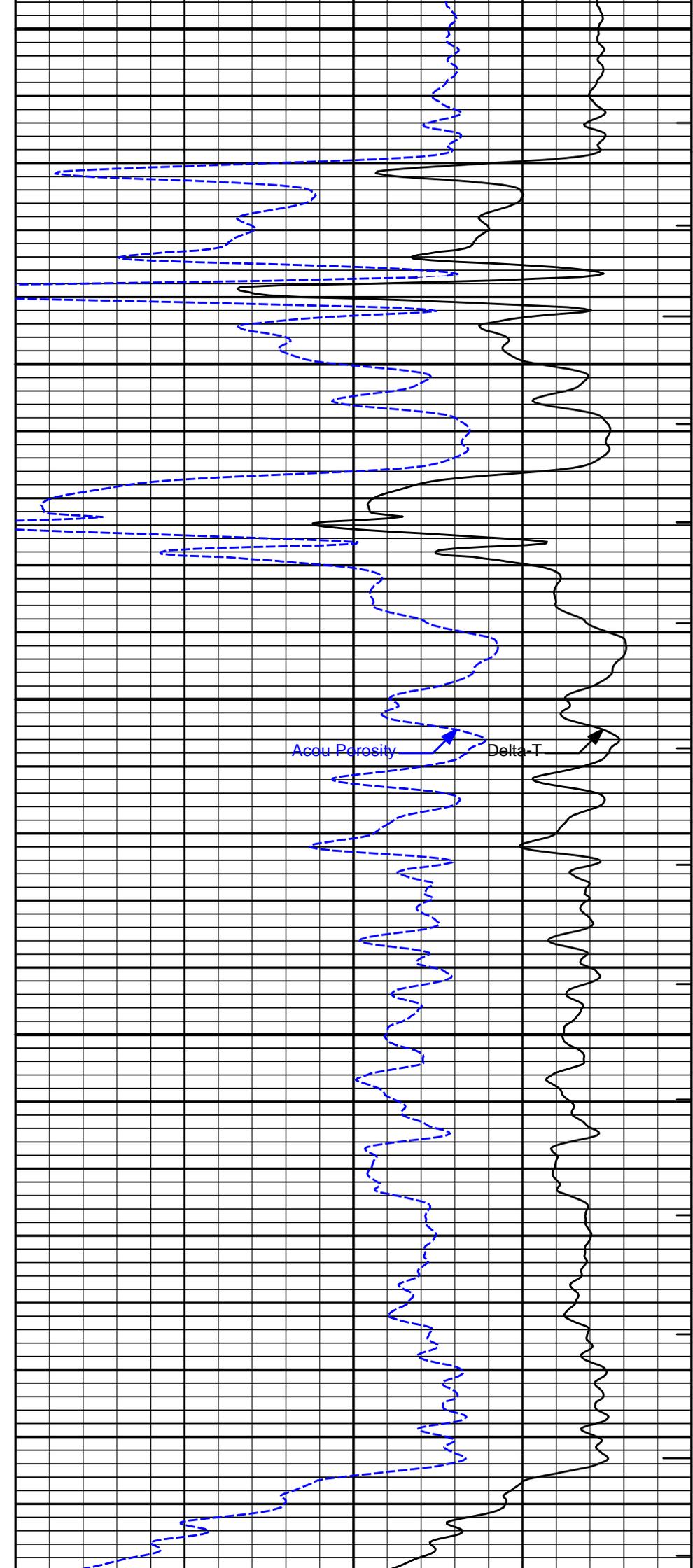
Tens

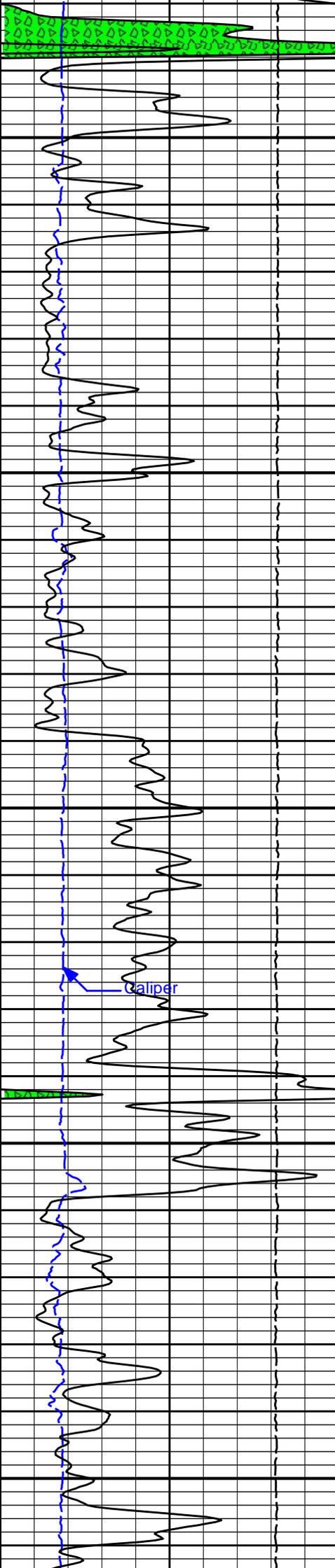
4800

Accu Porosity

Delta-T

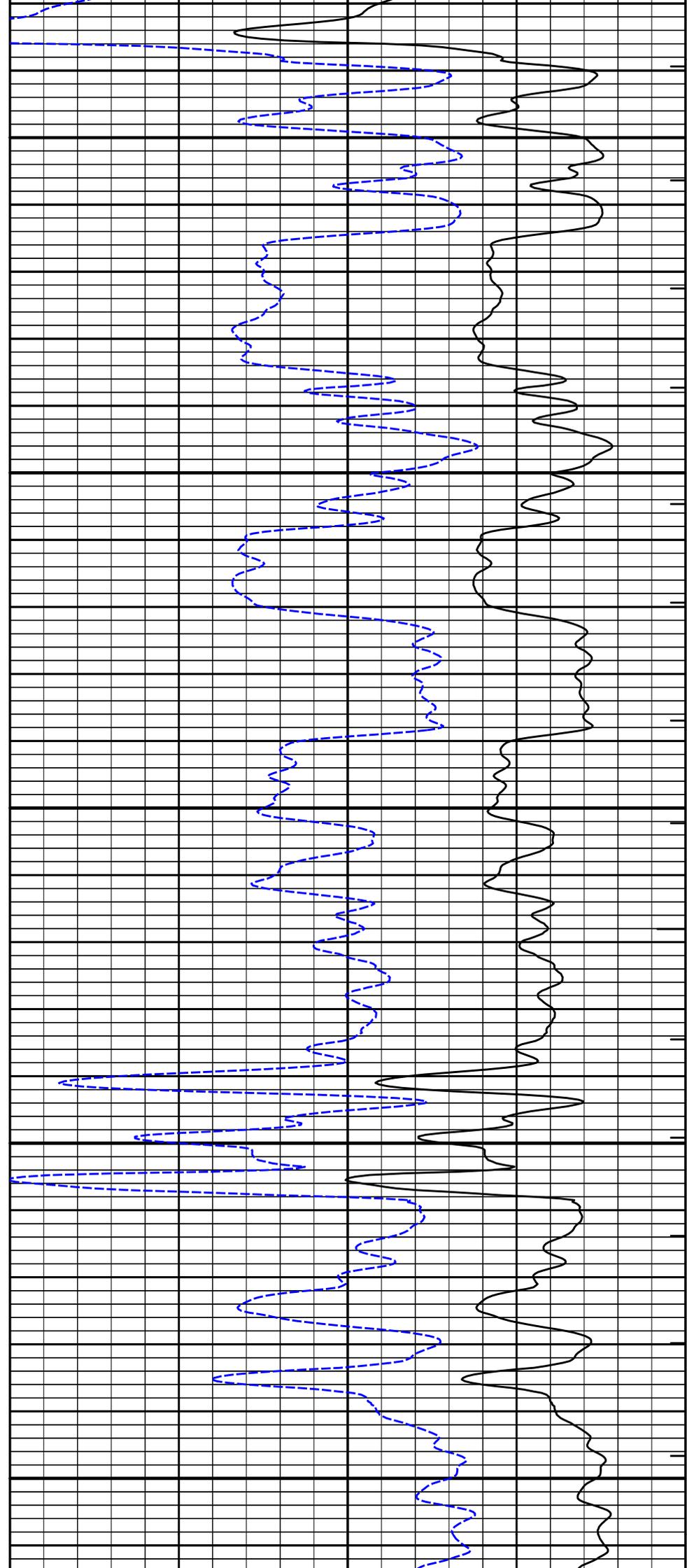
4900

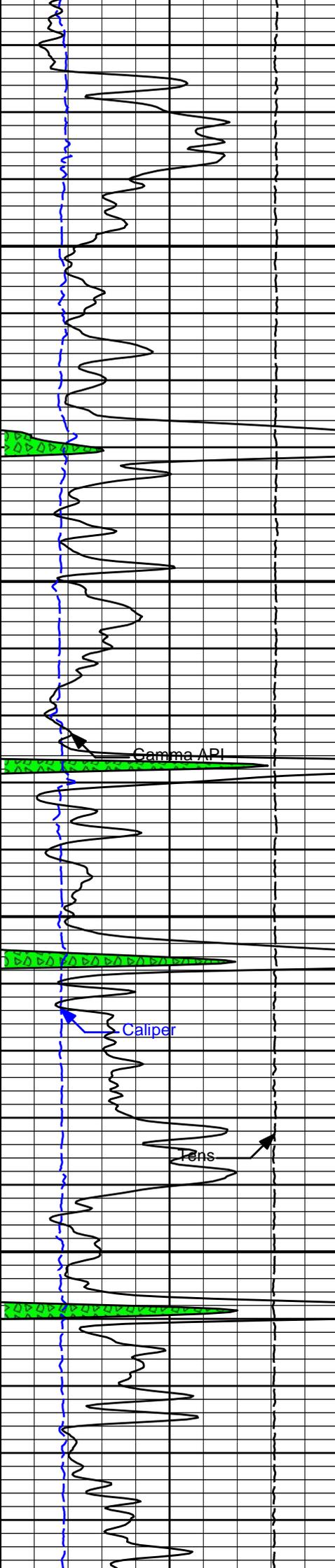




5000

5100



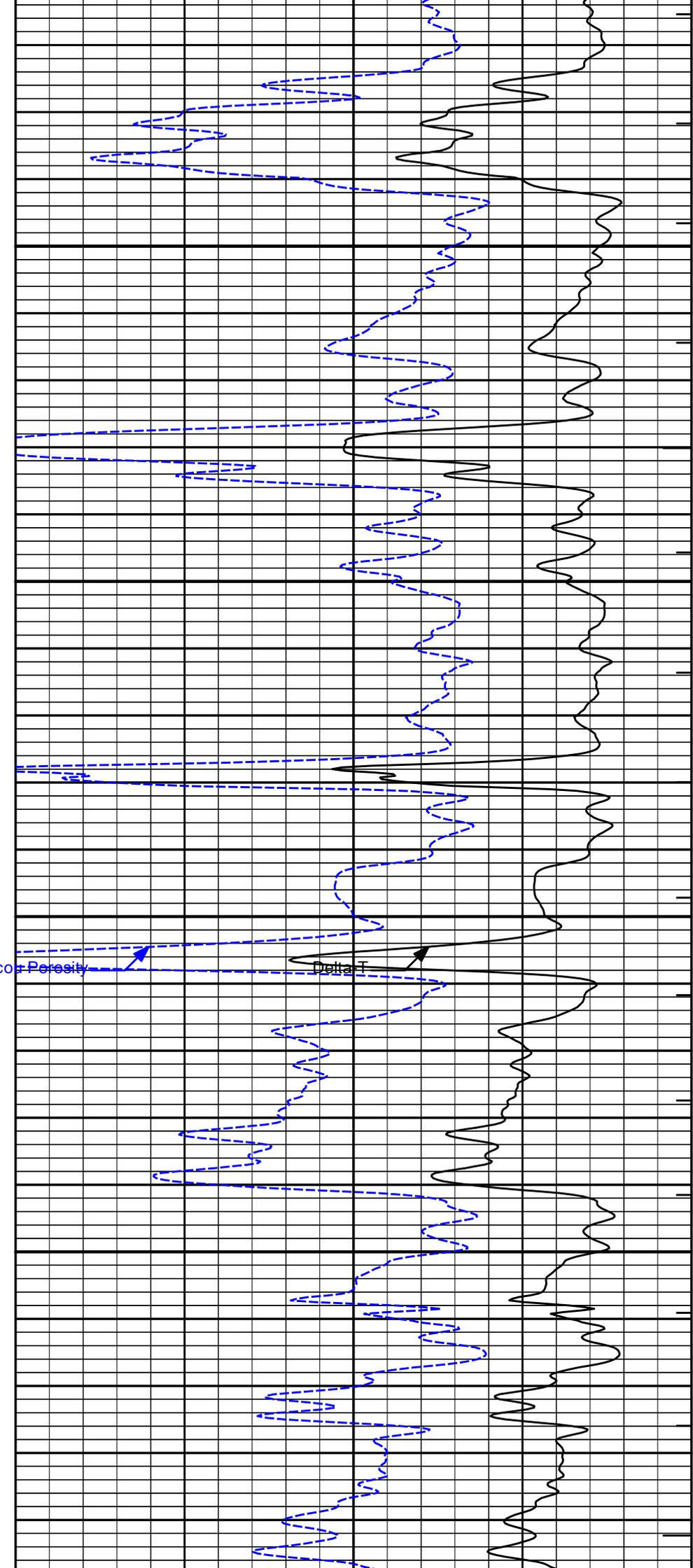


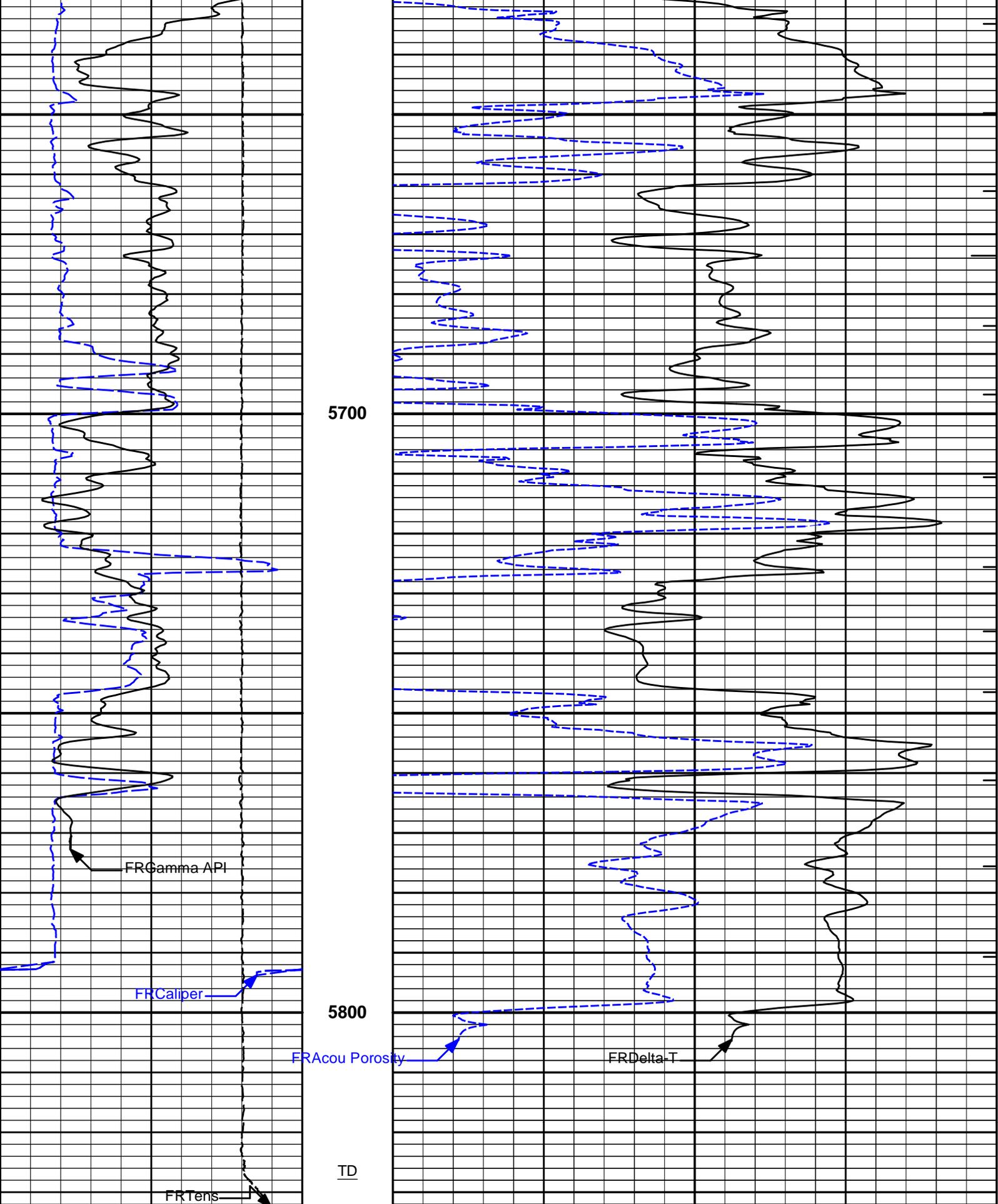
5200

5300

Acoustic Porosity

Delta T





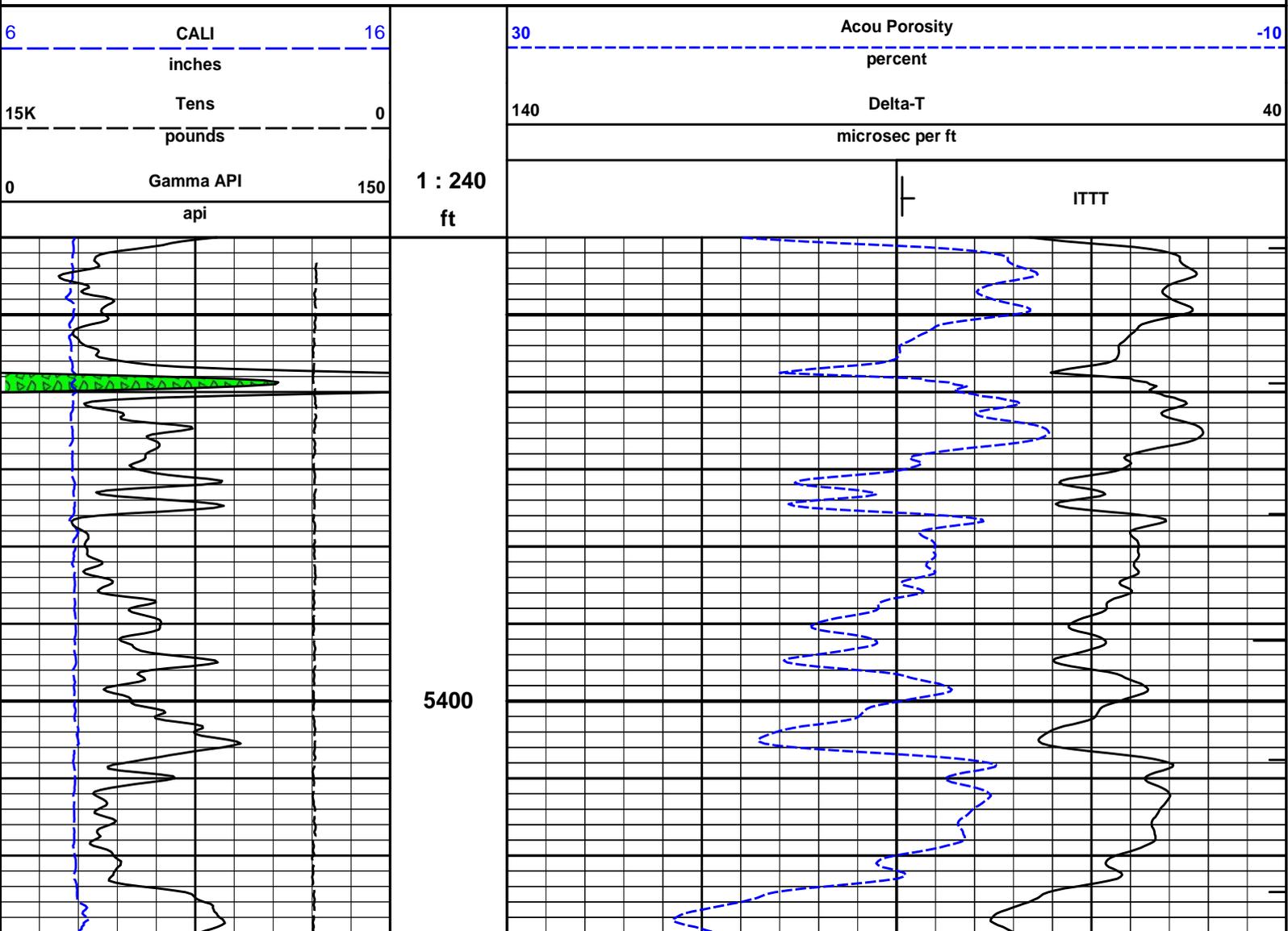
0	Gamma API	150	1 : 240	ITTT
	api			
15K	Tens	0	140	Delta-T
	pounds			microsec per ft
6	CALI	16	30	Acou Porosity
	inches			percent

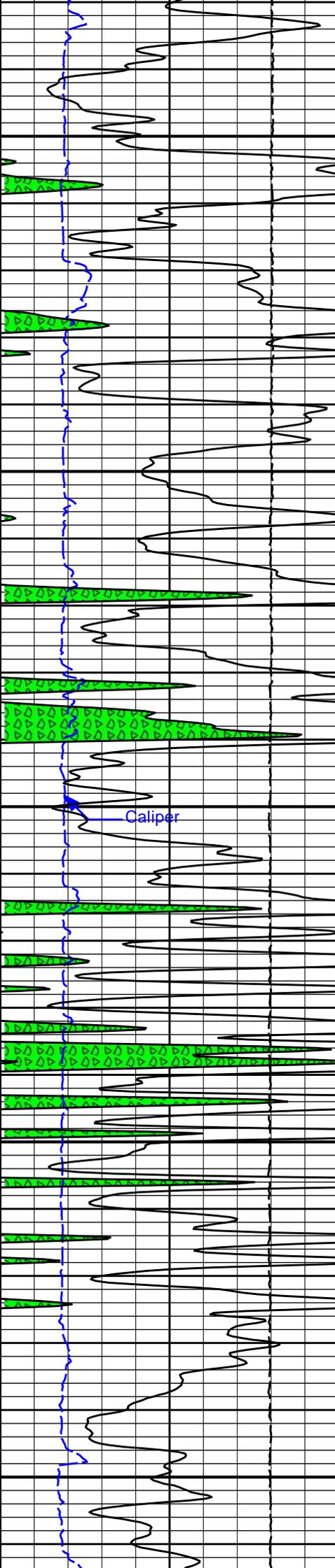
5 INCH MAIN LOG

MAIN LOG SECTION

REPEAT SECTION

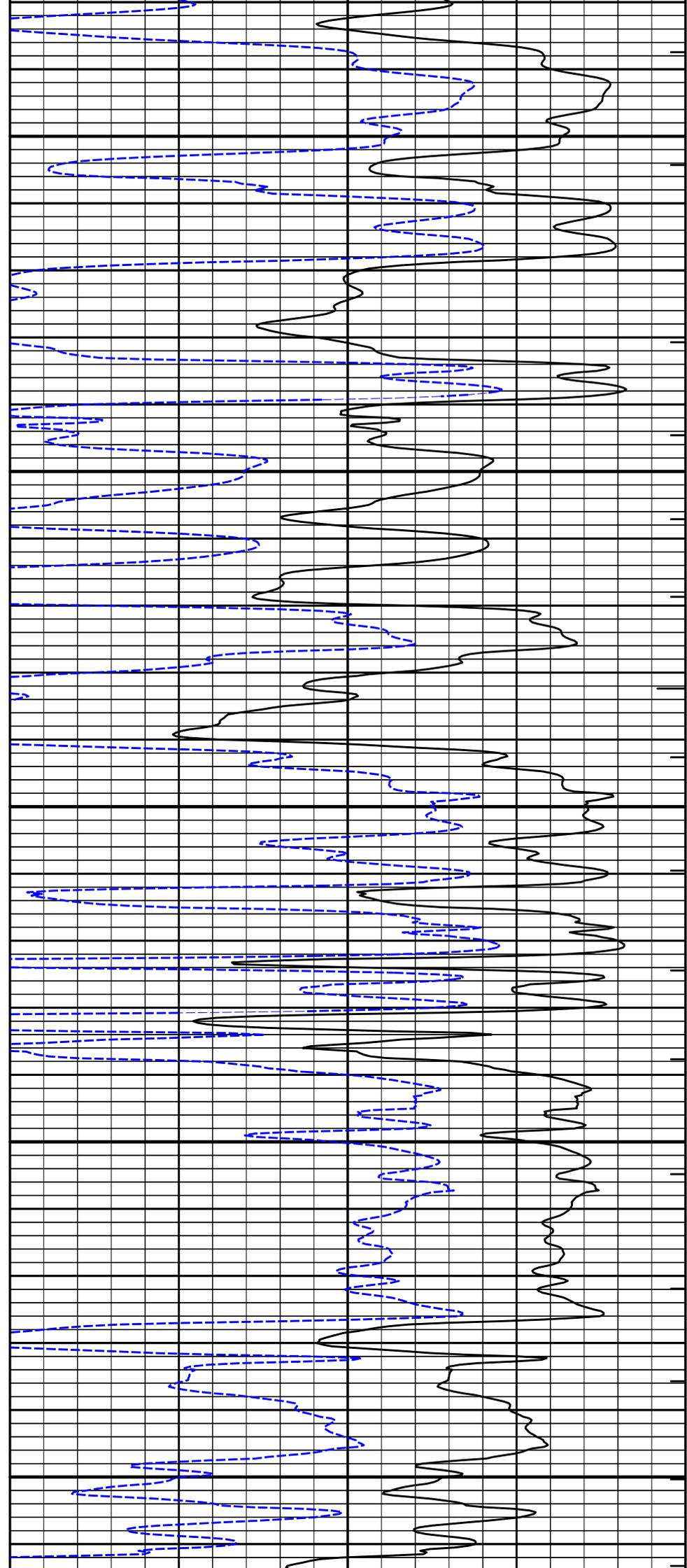
REPEAT SECTION

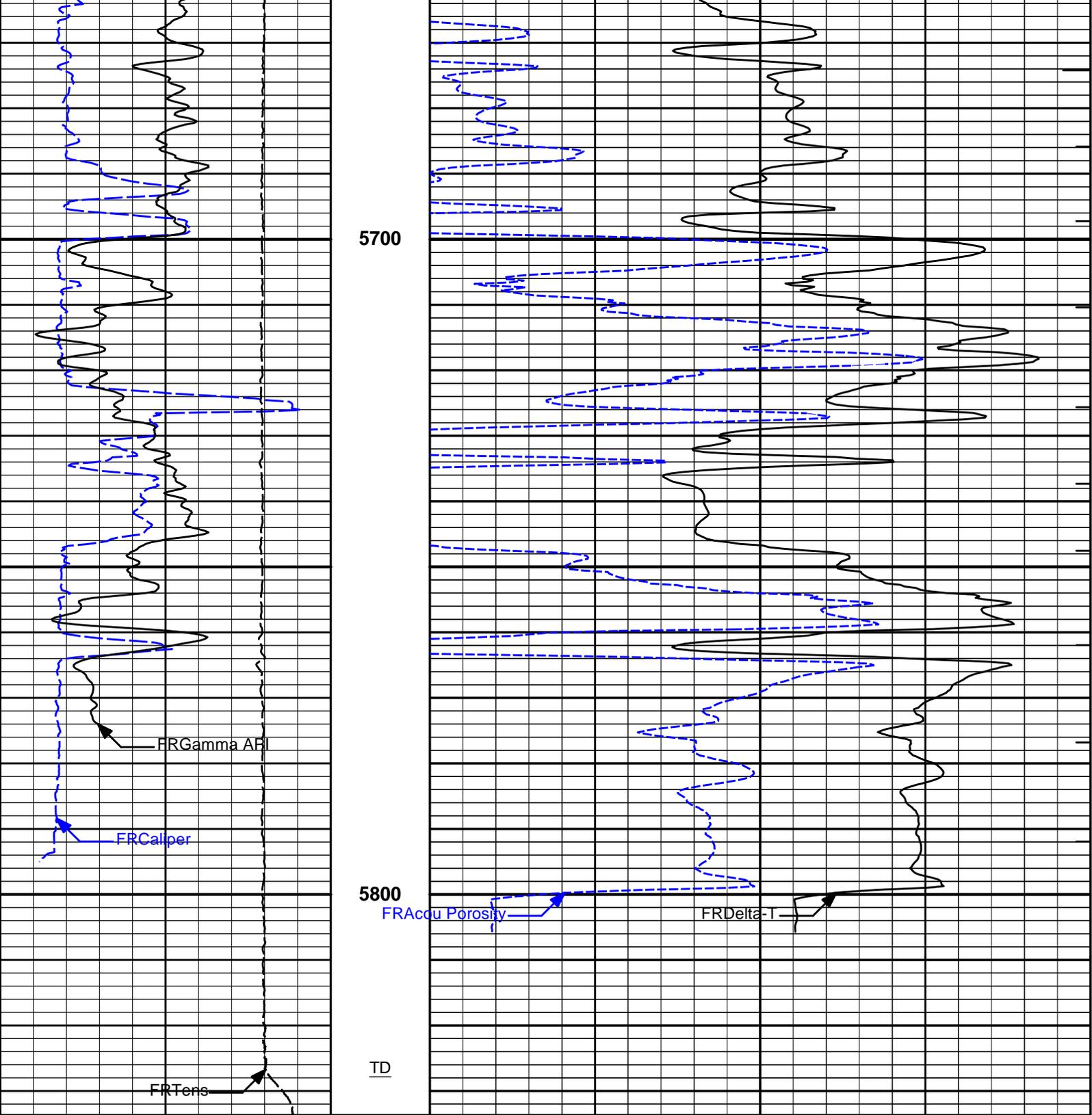




5500

5600





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

HALLIBURTON

Plot Time: 01-Oct-19 23:21:28
 Plot Range: 5340 ft to 5833.67 ft
 Data: RAYDON_ROCK\Well Based\DAQ-0001-002\
 Plot File: \BSAT\BSAT_5inch

REPEAT SECTION

REPEAT SECTION

HALLIBURTON

CALIBRATION REPORT

SURFACE TENSION SHOP CALIBRATION

Tool Name: Depth Panel - 00000032 **Reference Calibration Date:** 07-Sep-19 17:01:41
Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 21-Sep-19 08:46:46
Software Version: WL INSITE R6.2.7 (Build 7) **Calibration Version:** 1

SURFACE TENSION LOAD CELL

Measurement	Load Cell Value	Measurement	Calibrated	Units
Low	11285.25	67.24	0.00	lbs
High	17912.38	7904.98	7830.00	lbs

DOWNHOLE TENSION SHOP CALIBRATION

Tool Name: RWCH - 12027542 **Reference Calibration Date:** 26-Sep-19 11:43:38
Engineer: WHITLOCK **Calibration Date:** 27-Sep-19 22:47:03
Software Version: WL INSITE R6.2.7 (Build 7) **Calibration Version:** 1

DOWNHOLE LOAD CELL

Measurement	Tool Value	Measurement	Calibrated	Units
Low	-1906.82	-151.36	0.00	lbs
High	4059.39	1909.28	1450.00	lbs

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11958947 **Reference Calibration Date:** 15-Jun-19 10:46:40
Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 20-Aug-19 09:32:18
Software Version: WL INSITE R6.2.7 (Build 7) **Calibration Version:** 1

Calibrator Source S/N: TB-146

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Measurement	Measured	Calibrated	Units
Background	23.6	23.3	api
Background + Calibrator	256.4	252.2	api
Calibrator	232.7	228.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11958947 **Reference Calibration Date:** 20-Aug-19 09:32:18
Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 23-Sep-19 09:56:20
Software Version: WL INSITE R6.2.7 (Build 7) **Calibration Version:** 1

Calibrator Source S/N: TB-146

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Field Verification	Shop	Field	Units
Background	23.3	21.5	api
Background + Calibrator	252.2	250.5	api
Calibrator	228.9	229.0	api

Shop	Field	Difference	Tolerance
228.9	229.0	-0.1	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11019643

Reference Calibration Date: 03-Jul-19 12:35:14

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 03-Jul-19 12:51:50

Software Version: WL INSITE R6.2.1 (Build 2)

Calibration Version: 1

Logging Source S/N: DSN-424

Tank Serial Number: 12345678

Reference value assigned to Tank: 56.100

Snow Block S/N: 12345678

Calibration Tank Water Temperature: 68 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.01617	1.01686	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):	0.2355	0.2358	0.0002	+/- 0.0020
Calibrated Ratio:	10.5523	10.5595	0.007	+/- 0.050

VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0724	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 - 11019643

Reference Calibration Date: 03-Jul-19 12:51:50

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 23-Sep-19 11:24:45

Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Version: 1

Logging Source S/N: DSN-424

Snow Block S/N: 12345678

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0724	0.0581	-0.0142	+/- 0.0150

PASS/FAIL SUMMARY

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

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - 12153520

Reference Calibration Date: 03-Jul-19 11:09:41

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 03-Jul-19 11:14:00

Software Version: WL INSITE R6.2.1 (Build 2)

Calibration Version: 1

Host Tool Name: DSNT - 11019643

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
-------------	----------------	-----------	----------------------------

Pad Offset	-4924.00	-5180.12	-7000.00 - -1000.00
Pad Gain	0.0003783	0.0003877	0.0002000 - 0.0006000
Arm Offset	-4124.71	-3912.92	-5000.00 - 3000.00
Arm Gain	0.0004835	0.0004947	0.000300 - 0.000700
Arm Power	-0.000003595	-0.000004486	-0.000010000 - 0.000010000

The ring diameter is computed from: $\text{DIAMETER} = \text{PAD EXTENSION} + \text{ARM EXTENSION} + \text{TOOL DIAMETER}$

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)	2.05	2.00	-0.05	+/- 0.20
Medium Ring (in)	3.76	3.75	-0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.46	6.50	0.04	+/- 0.20
Medium Ring (in)	8.19	8.25	0.06	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 0.20

PASS/FAIL SUMMARY

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

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check: Passed

SDLT CALIPER FIELD CALIBRATION

Tool Name: **SDLT - 12153520** Reference Calibration Date: **03-Jul-19 11:14:00**
 Engineer: **JORGE ORLANDO PEREZ** Calibration Date: **03-Jul-19 11:15:37**
 Software Version: **WL INSITE R6.2.1 (Build 2)** Calibration Version: **1**

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.76	0.01	+/- 0.10
Ring Diameter	8.25	8.18	-0.07	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check: Passed
 Diameter Check: Passed

BSAT FIELD CASING CHECK

Tool Name: **BSAT - 10747686** Calibration Date: **26-Mar-14 12:42:00**
 Engineer: **HOFKAMP**
 Software Version: **WL INSITE R4.2.0 (Build 2)** Calibration Version: **1**

Pre-Log Check	Check Depth	Shop	Field	Difference	Tolerance	Units
Delta-T Compensated	153.78	57.00	56.99	0.0100	1.00	uspf

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: **ACRt Sonde - 12109515** Reference Calibration Date: **22-Oct-18 10:49:55**
 Engineer: **WHITLOCK** Calibration Date: **30-May-19 15:30:22**
 Software Version: **WL INSITE R6.2.1 (Build 2)** Calibration Version: **1**
 Host Tool Name: **ACRt Instrument - 12109517**

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0445	1.05	0.95	1.0220	1.05	0.95	1.0152	1.05
A2 (50")	0.95	1.0411	1.05	0.95	1.0340	1.05	0.95	1.0311	1.05

A2 (50")	0.95	1.0411	1.05	0.95	1.0340	1.05	0.95	1.0311	1.05
A3 (29")	0.95	1.0390	1.05	0.95	1.0188	1.05	0.95	1.0136	1.05
A4 (17")	0.95	1.0372	1.05	0.95	1.0168	1.05	0.95	1.0129	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0165	1.05	0.95	1.0111	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9978	1.05	0.95	0.9930	1.05

SONDE OFFSET

Subarray	R12KHz			R36KHz			R72KHz		
	(mmho/m)			(mmho/m)			(mmho/m)		
A1 (80")	1.339			-4.365			-5.632		
A2 (50")	-0.632			-4.127			-4.876		
A3 (29")	-13.611			-4.650			-3.361		
A4 (17")	-110.831			-34.163			-25.608		
A5 (10")	N/A			-93.889			-41.507		
A6 (6")	N/A			305.702			156.920		

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.95	1.3
36K	1.0	1.92	2.0
72K	1.0	1.19	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

QUALITY CHECK SHOP CALIBRATION

Tool Name:	ACRt Sonde - 12109515	Reference Calibration Date:	22-Oct-18 10:51:40
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	22-Oct-18 10:52:51
Software Version:	WL INSITE R5.6.0 (Build 2)	Calibration Version:	1
Host Tool Name:	ACRt Instrument - 12109517		

STANDARD DEVIATIONS

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A2 (50")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A3 (29")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A4 (17")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A5 (10")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A6 (6")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass

AVERAGES

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.006	> -0.500	Pass
A2 (50")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.005	> -0.500	Pass
A3 (29")	-0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.003	> -0.500	Pass
A4 (17")	-0.003	> -0.500	Pass	-0.008	> -0.500	Pass	-0.026	> -0.500	Pass
A5 (10")	-0.012	> -0.500	Pass	-0.021	> -0.500	Pass	-0.040	> -0.500	Pass
A6 (6")	0.015	< 0.500	Pass	0.067	< 0.500	Pass	0.144	< 0.500	Pass

GAIN TOLERANCE

R12KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-213571760.000	-213557040.000	14720.000	10677852.000	Pass
A2 (50")	-216483264.000	-216468096.000	15168.000	10823404.800	Pass
A3 (29")	-208602304.000	-208589536.000	12768.000	10429476.800	Pass
A4 (17")	-206792240.000	-206770736.000	21504.000	10338536.800	Pass
A5 (10")	-202998704.000	-202978400.000	20304.000	10148920.000	Pass
A6 (6")	-208316864.000	-208294896.000	21968.000	10414744.800	Pass

R36KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	58445244.000	58432960.000	12284.000	2921648.000	Pass
A2 (50")	54700280.000	54687980.000	12300.000	2734399.000	Pass
A3 (29")	47287512.000	47272796.000	14716.000	2363639.800	Pass
A4 (17")	36497232.000	36481916.000	15316.000	1824095.800	Pass
A5 (10")	32014552.000	32001312.000	13240.000	1600065.600	Pass
A6 (6")	37168108.000	37152904.000	15204.000	1857645.200	Pass

R72KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-90832120.000	-90826936.000	5184.000	4541346.800	Pass
A2 (50")	-87633424.000	-87632144.000	1280.000	4381607.200	Pass
A3 (29")	-85509320.000	-85505200.000	4120.000	4275260.000	Pass
A4 (17")	-86394448.000	-86393240.000	1208.000	4319662.000	Pass
A5 (10")	-87099680.000	-87096752.000	2928.000	4354837.600	Pass
A6 (6")	-86173632.000	-86168880.000	4752.000	4308444.000	Pass

PASS/FAIL SUMMARY

Std Deviation Verification	Pass
Average Verification	Pass
Gain Tolerance Verification	Pass

MICRO LOG SHOP CALIBRATION

Tool Name: Microlog Pad - 12153520	Reference Calibration Date: 03-Jul-19 11:50:06
Engineer: WHITLOCK	Calibration Date: 12-Sep-19 09:38:48
Software Version: WL INSITE R6.2.7 (Build 7)	Calibration Version: 1
Host Tool Name: DSNT - 11019643	

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.15	-0.18	0.00	-0.00	ohmm
Calibration Point #1	0.02	0.00	0.00	0.00	ohmm
Calibration Point #2	20.14	20.00	19.99	20.00	ohmm
Internal Reference	19.98	19.84	19.98	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.16	0.42	V
Calibration Point #1	46.79	0.48	V
Calibration Point #2	5332.76	6950.58	V
Internal Reference	5290.54	6946.40	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 12153520	Reference Calibration Date: 12-Sep-19 09:38:48
---	---

Engineer: WHITLOCK
 Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Date: 30-Sep-19 15:13:43
 Calibration Version: 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.18	-0.17	-0.00	-0.00	ohmm
Internal Reference	19.84	19.84	19.99	19.99	ohmm
Summary					
Signal	Shop	Field	Difference	Tolerance	
Microlog Normal	19.84	19.84	0.00	+/- 0.80	
Microlog Lateral	19.99	19.99	0.00	+/- 0.80	

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 10844781
 Engineer: JORGE ORLANDO PEREZ
 Software Version: WL INSITE R6.2.1 (Build 2)

Reference Calibration Date: 03-Jul-19 10:27:49
 Calibration Date: 03-Jul-19 10:47:36
 Calibration Version: 1

Logging Source S/N: 5471GW

Aluminum Block S/N: EL RENO STD ALUMINUM

Density: 2.581g/cc

Pe: 3.170

Magnesium Block S/N: EL RENO

Density: 1.687g/cc

Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	0.9935	1.0210	0.90 - 1.10
Near Dens Gain	0.9974	1.0023	0.90 - 1.10
Near Peak Gain	1.0148	1.0153	0.90 - 1.10
Near Lith Gain	1.0205	1.0205	0.90 - 1.10
Far Bar Gain	1.0074	1.0103	0.90 - 1.10
Far Dens Gain	0.9966	0.9984	0.90 - 1.10
Far Peak Gain	0.9948	0.9952	0.90 - 1.10
Far Lith Gain	0.9746	0.9795	0.90 - 1.10
Near Bar Offset	0.1648	-0.0889	NONE
Near Dens Offset	0.0958	0.0523	NONE
Near Peak Offset	-0.0751	-0.0757	NONE
Near Lith Offset	-0.1330	-0.1304	NONE
Far Bar Offset	-0.0073	-0.0324	NONE
Far Dens Offset	0.0749	0.0600	NONE
Far Peak Offset	0.0667	0.0632	NONE
Far Lith Offset	0.1925	0.1523	NONE
Near Bar Background	839.23	835.22	700 - 1450
Near Dens Background	273.43	272.01	230 - 480
Near Peak Background	119.51	119.25	100 - 210
Near Lith Background	146.81	146.64	125 - 260
Far Bar Background	657.45	656.19	450 - 900
Far Dens Background	259.37	258.53	175 - 345
Far Peak Background	103.14	103.80	70 - 140
Far Lith Background	106.24	106.22	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.685	1.687	0.002	+/- 0.015
Pe	2.562	2.561	-0.001	+/- 0.150
ALUMINUM				

Density (g/cc)	2.580	2.580	0.000	+/- 0.01500
Pe	3.164	3.134	-0.030	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0022	+/- 0.0110	0.0018	+/- 0.0140
Magnesium Block	0.0004	+/- 0.0110	-0.0007	+/- 0.0140
Aluminum Block	-0.0005	+/- 0.0110	0.0013	+/- 0.0140
Resolution	9.63	6.00 - 11.50	8.72	6.00 - 11.50
Internal Verifier(B+D+P+L)	1373	1200 - 2700	1125	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 - 10844781	Reference Calibration Date: 03-Jul-19 10:47:36
Engineer: WHITLOCK	Calibration Date: 30-Sep-19 15:16:12
Software Version: WL INSITE R6.2.7 (Build 7)	Calibration Version: 1

Pad Temperature: 89.3 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1373.120	1369.409	-3.711	14.975
Far (B+D+P+L) cps	1124.751	1117.884	-6.867	17.648
Near Resolution	9.63	9.75	0.120	0.50
Far Resolution	8.72	8.74	0.020	1.00

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

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
Depth Panel-00000032						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
RWCH-12027542						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1450.00	-----	-----	0.00	-----	lbs
GTET-11958947						
Gamma Ray Calibrator	228.9	229.0	-----	-0.1	+/- 9.00	api
DSNT-11019643						
Snow-Block Porosity	0.0724	0.0581	-----	0.0143	+/- 0.0150	decp
SDLT-12153520						
Pad Extension	3.75	3.76	-----	-0.01	+/-0.10	in

Ring Diameter	8.25	8.18	-----	0.07	+/-0.15	in
ACRt Sonde-12109515						
Mud Cell	1.00	-----	-----	0	-----	ohm-m
Microlog Pad-12153520						
MicroLog Normal	19.84	19.84	-----	0.00	+/-0.80	ohmm
MicroLog Lateral	19.99	19.99	-----	0.00	+/-0.80	ohmm
SDLT Pad-10844781						
Near(B+D+P+L)	1373.120	1369.409	-----	3.711	+/-14.975	cps
Far(B+D+P+L)	1124.751	1117.884	-----	6.867	+/-17.648	cps
Data: RAYDON_ROCK0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTIDLE					Date: 01-Oct-19 18:22:39	

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	8.800	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	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	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5830.00	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	CBM Temperature Master Tool	GTET	
	SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
	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	
	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	

GTET	BHSM	Borehole Size Source Tool	SDLT		
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	DNTT	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		
DSNT	UCLA	Classic Neutron Parameter utilized?	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	Limestone	47.6	
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	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: RAYDON_ROCK0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTIDLE

Date: 01-Oct-19 18:23:37

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-12027542 135.00 lbs	Weak Point Solid-12027542 0.01 lbs	Ø 2.310 in → Ø 3.625 in → Ø 0.010 in* →		← Fishing Neck @ 73.73 ft ← Load Cell @ 70.93 ft ← BH Temperature @ 70.36 ft	74.61 ft 6.25 ft 68.36 ft	

SP Sub-11441455
60.00 lbs

Ø 3.625 in →

← SP @ 66.59 ft

3.74 ft

← Z-Accelerometer @ 64.17 ft

↕ 64.63 ft

GTET-11958947
165.00 lbs

Ø 3.625 in →

8.52 ft

← GammaRay @ 58.56 ft

↕ 56.11 ft

DSN Decentralizer-
11019643
6.60 lbs
DSNT-11019643
174.00 lbs

Ø 5.000 in* →

Ø 3.625 in →

9.69 ft

← DSN Far @ 49.17 ft

← DSN Near @ 48.42 ft

↕ 46.42 ft

SDLT-12153520
360.00 lbs

SDLT Pad-10844781
65.00 lbs
Microlog Pad-12153520
8.00 lbs

Ø 4.500 in →

Ø 4.500 in* →

Ø 4.750 in* →

10.81 ft

← Microlog @ 38.61 ft

← SDL Caliper @ 38.42 ft

← SDL @ 38.41 ft

↕ 35.61 ft

BSAT-10747686
300.00 lbs

Ø 3.625 in →

← Receiver Array @ 27.09 ft

← Sonic Receivers @ 27.09 ft

15.77 ft

↕ 19.83 ft

ACRt Instrument-
12109517
50.00 lbs

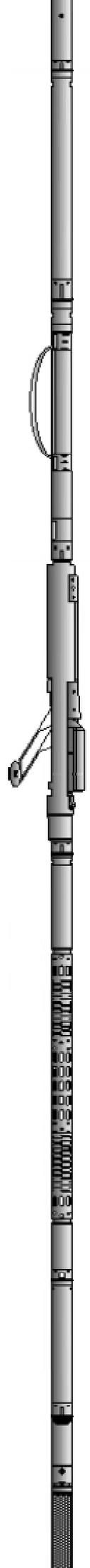
Ø 3.625 in →

5.03 ft

← Mud Resistivity @ 13.44 ft

↕ 14.80 ft

← ACRt @ 9.46 ft



ACRt Sonde-
12109515
200.00 lbs

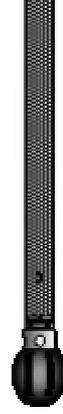
∅ 3.625 in →

14.22 ft

Cabbage Head-
11111111
10.00 lbs

∅ 3.625 in →
∅ 6.000 in →

0.58 ft
0.58 ft
0.00 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	12027542	135.00	6.25	68.36	300.00
WPSS	Weak Point Solid	12027542	0.01	0.01	* 68.36	300.00
SP	SP Sub	11441455	60.00	3.74	64.63	300.00
GTET	Gamma Telemetry Tool	11958947	165.00	8.52	56.11	60.00
DSNT	Dual Spaced Neutron	11019643	174.00	9.69	46.42	60.00
DCNT	DSN Decentralizer	11019643	6.60	5.13	* 49.75	300.00
SDLT	Spectral Density Tool	12153520	360.00	10.81	35.61	60.00
SDLP	Density Insite Pad	10844781	65.00	2.55	* 37.82	60.00
MICP	Microlog Pad	12153520	8.00	1.00	* 38.11	60.00
BSAT	Borehole Sonic Array Tool	10747686	300.00	15.77	19.83	60.00
ACRt	Array Compensated True Resistivity Instrument Section	12109517	50.00	5.03	14.80	120.00
ACRt	Array Compensated True Resistivity Sonde Section	12109515	200.00	14.22	0.58	120.00
CBHD	Cabbage Head	11111111	10.00	0.58	0.00	300.00

Total **1,533.61** **74.61**

* Not included in Total Length and Length Accumulation.

Data: RAYDON_ROCK\0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTIDLE

Date: 01-Oct-19 18:23:48