

# HALLIBURTON

## MICROLOG

RAYDON EXPLORATION, INC.

ROCK #2-27

KISMET

SEWARD

KANSAS

COMPANY  
WELL  
FIELD/BLOCK  
COUNTY  
STATE

COMPANY  
WELL  
FIELD/BLOCK  
COUNTY  
STATE

RAYDON EXPLORATION, INC.  
ROCK #2-27  
KISMET  
SEWARD  
KANSAS

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  
Other Services: ACRT, SDL-DSN, MICROLOG, SONIC

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 3450  
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  
Viscosity 53.00 s/qt  
PH 10.00 pH  
Fluid Loss 6.2 cpm

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.

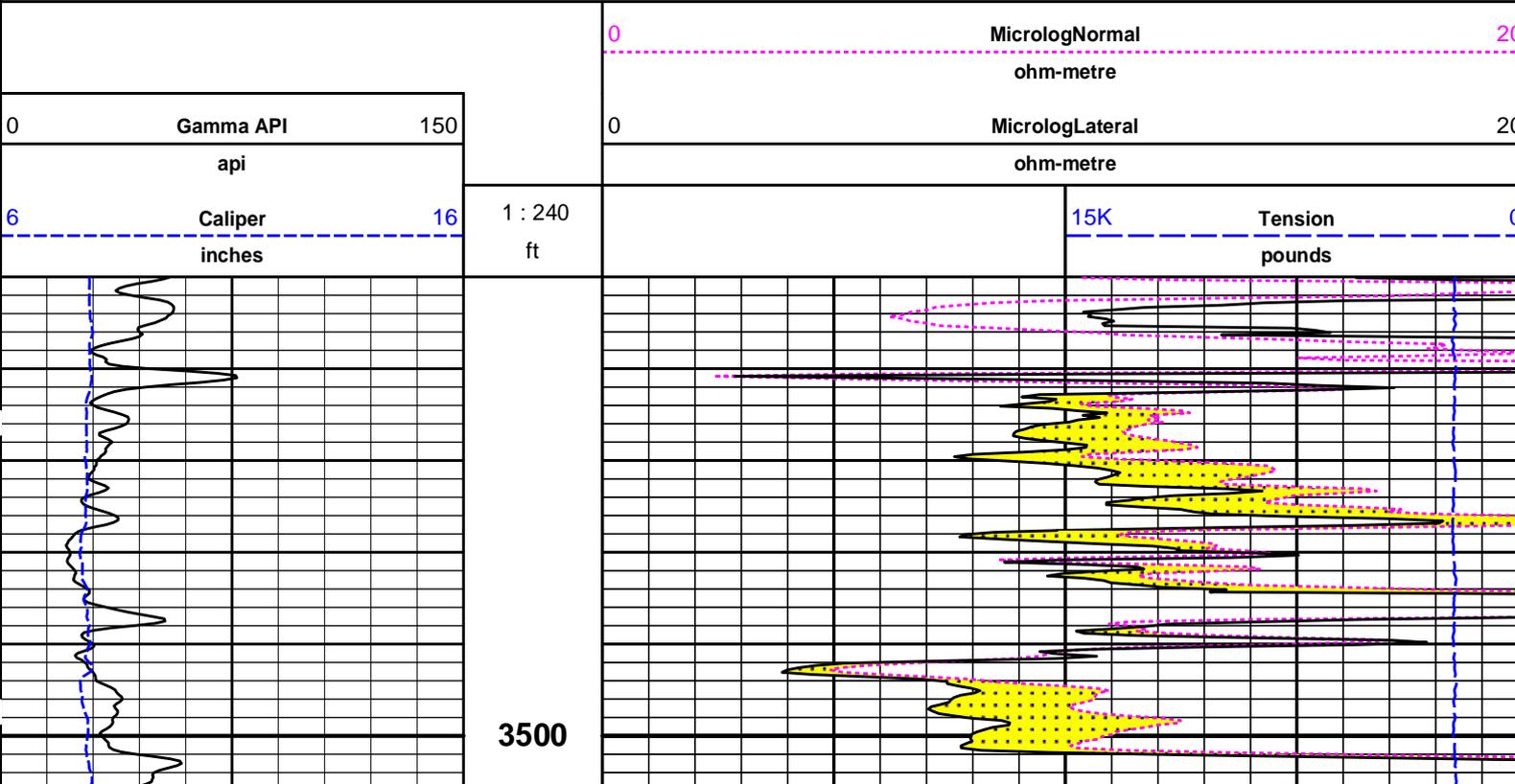
HALLIBURTON

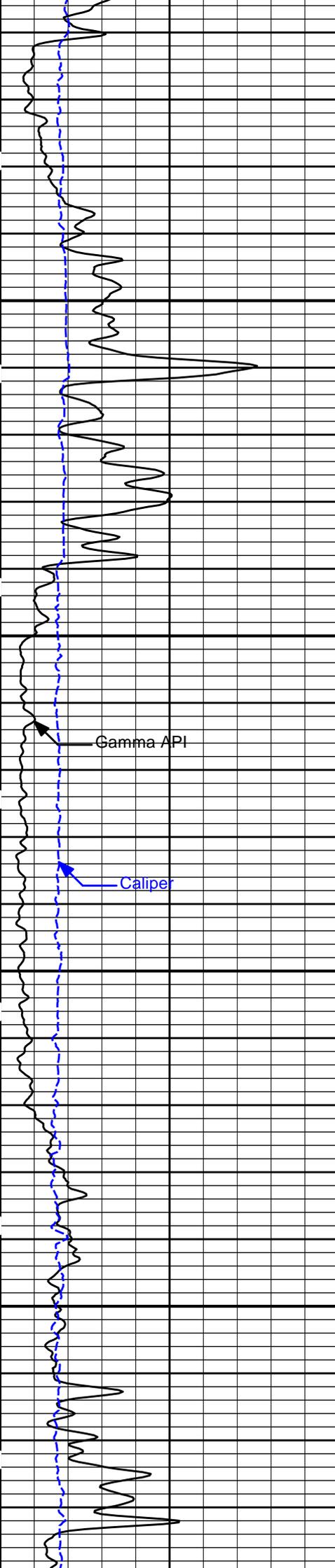
**HALLIBURTON**

Plot Time: 01-Oct-19 22:44:41  
 Plot Range: 3450 ft to 5832.5 ft  
 Data: RAYDON\_ROCK\Well Based\DAQ-0001-003\  
 Plot File: \\-LOCAL-\\RAYDON\_ROCK\0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTM\LOG\Microlog\_IQ\_5\_main

## 5 INCH MAIN LOG

### MAIN LOG 5" PER 100'



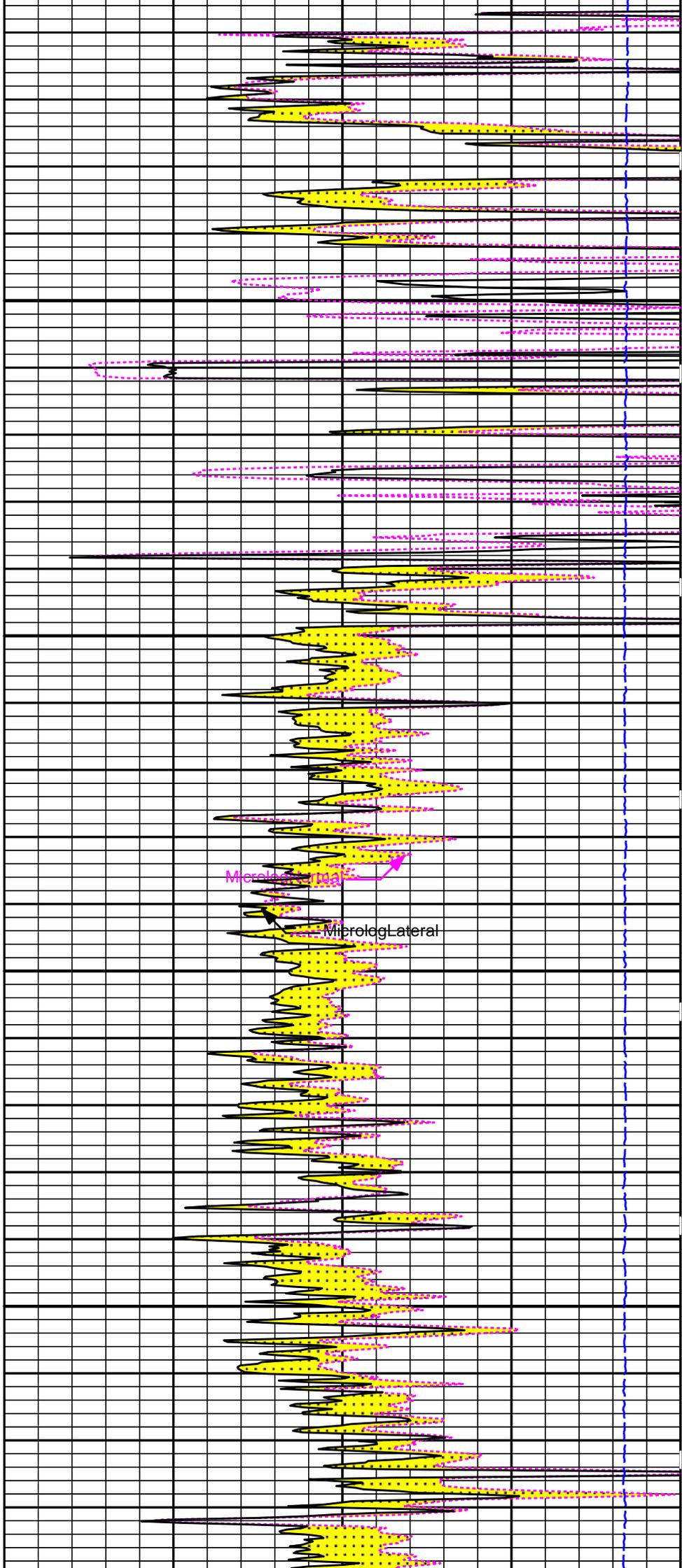


3600

3700

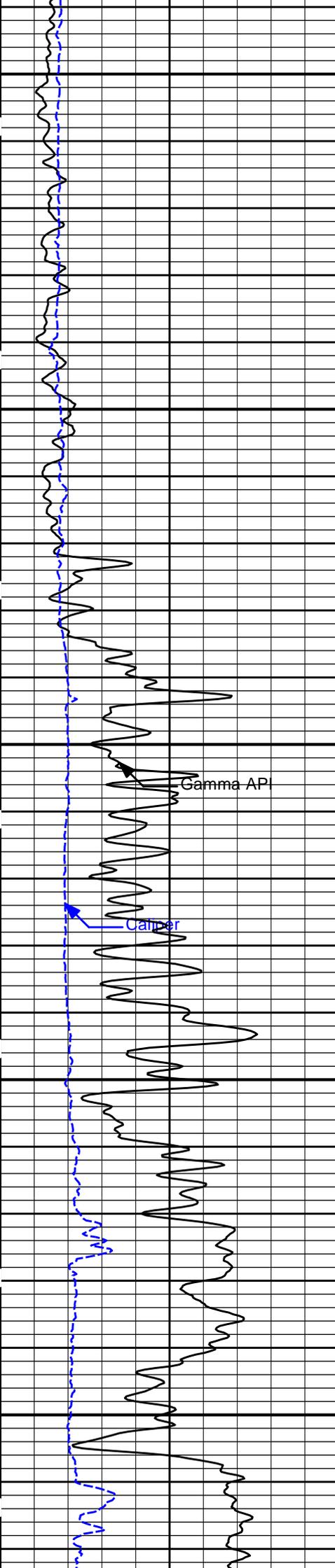
Gamma API

Caliper



Microlog

MicrologLateral

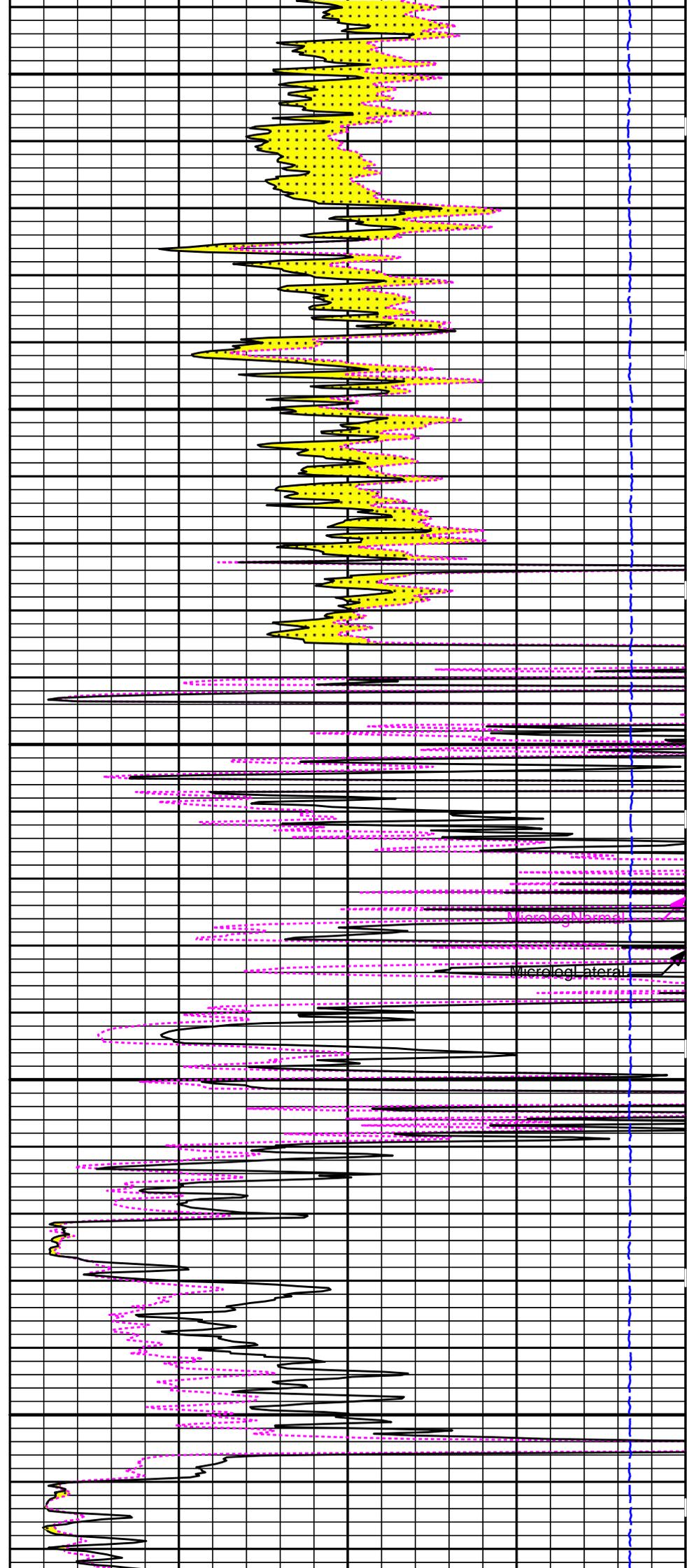


3800

Gamma API

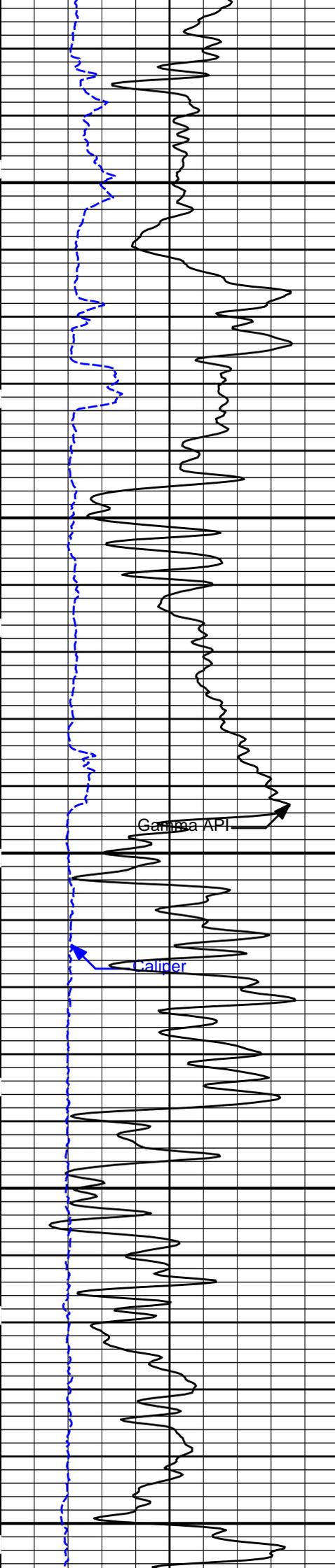
Gamma

3900



Microlog

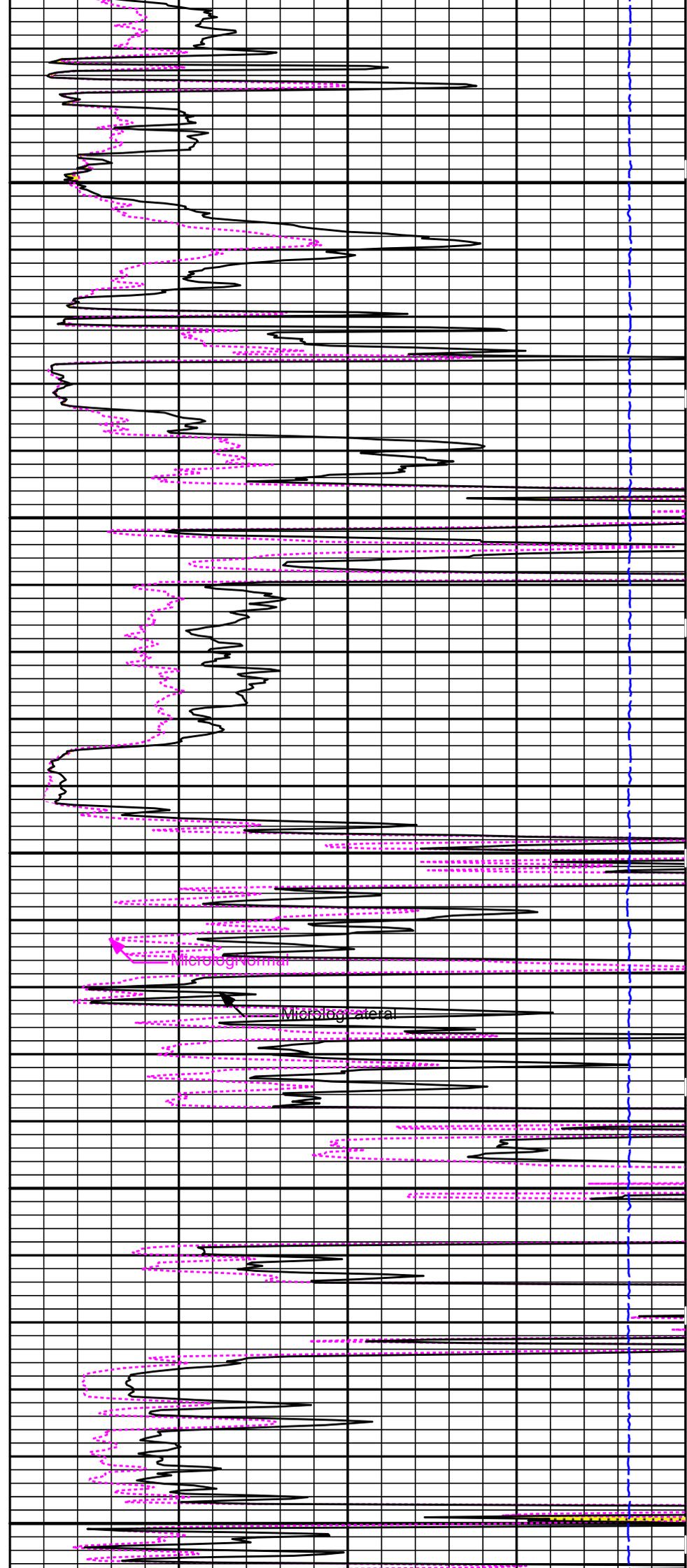
Microlog Lateral

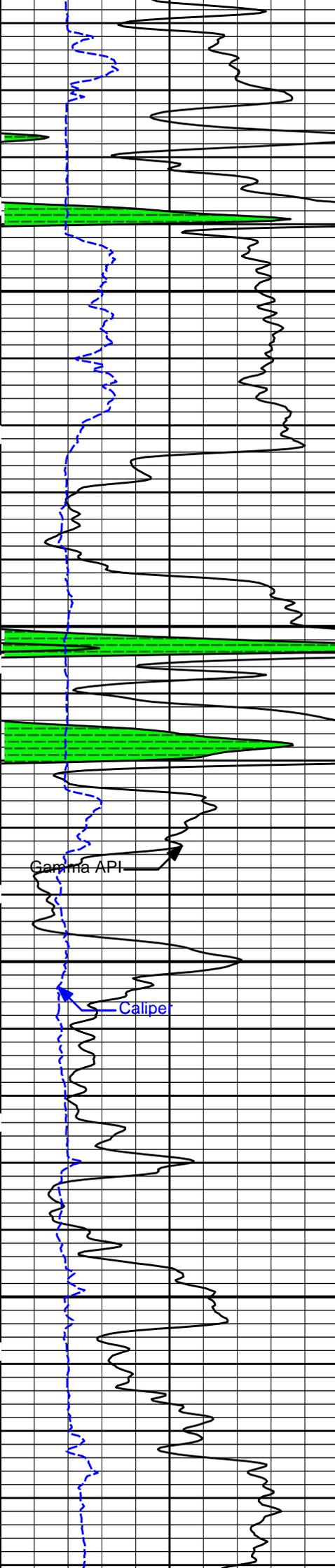


4000

4100

4200



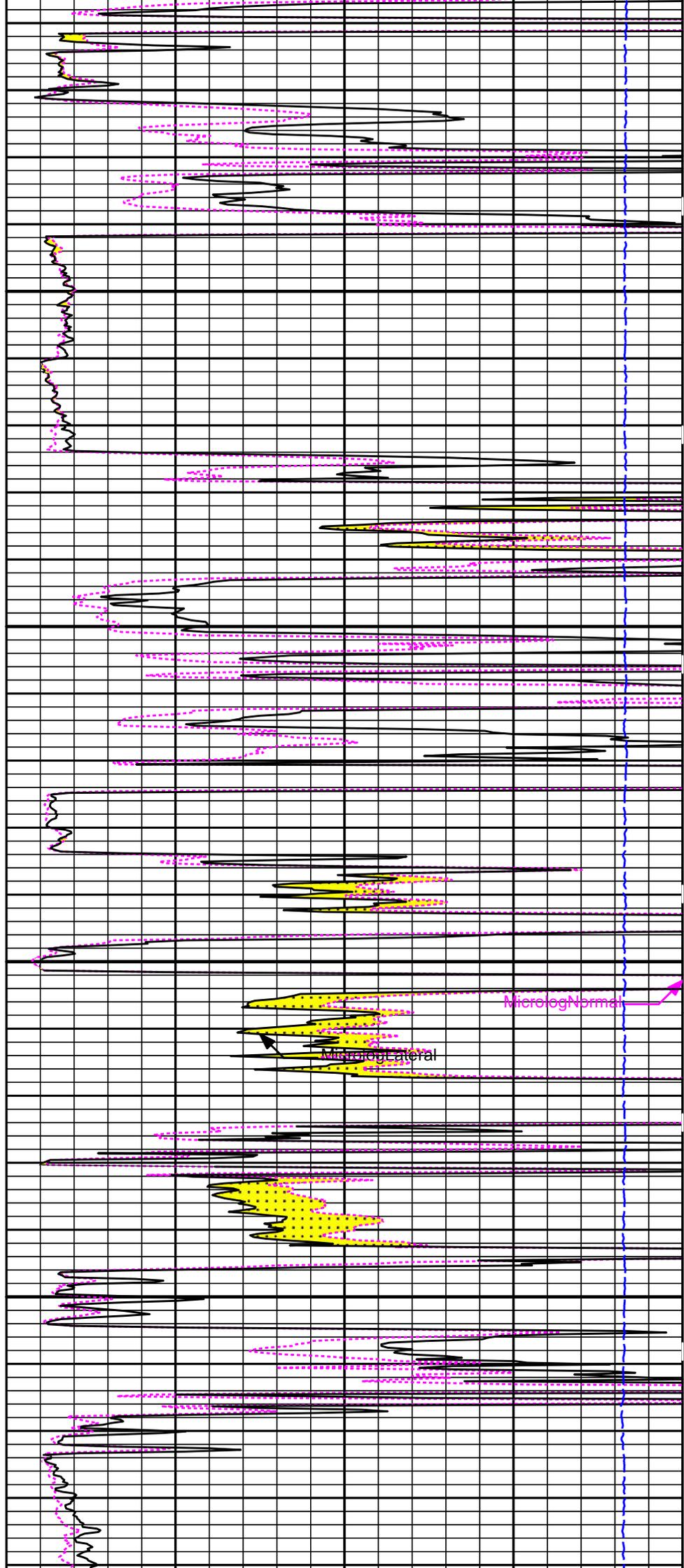


4300

Gamma API

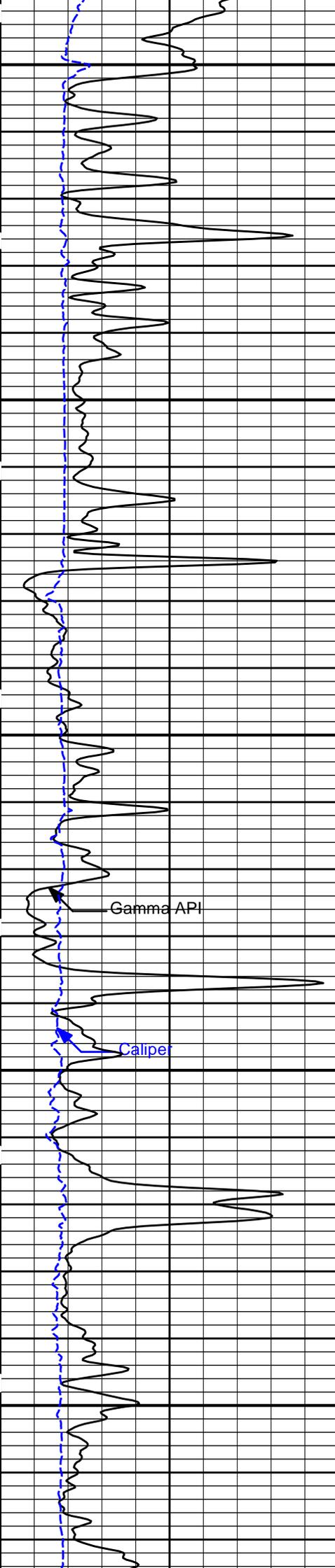
Caliper

4400



MicrologNormal

MicrologLateral

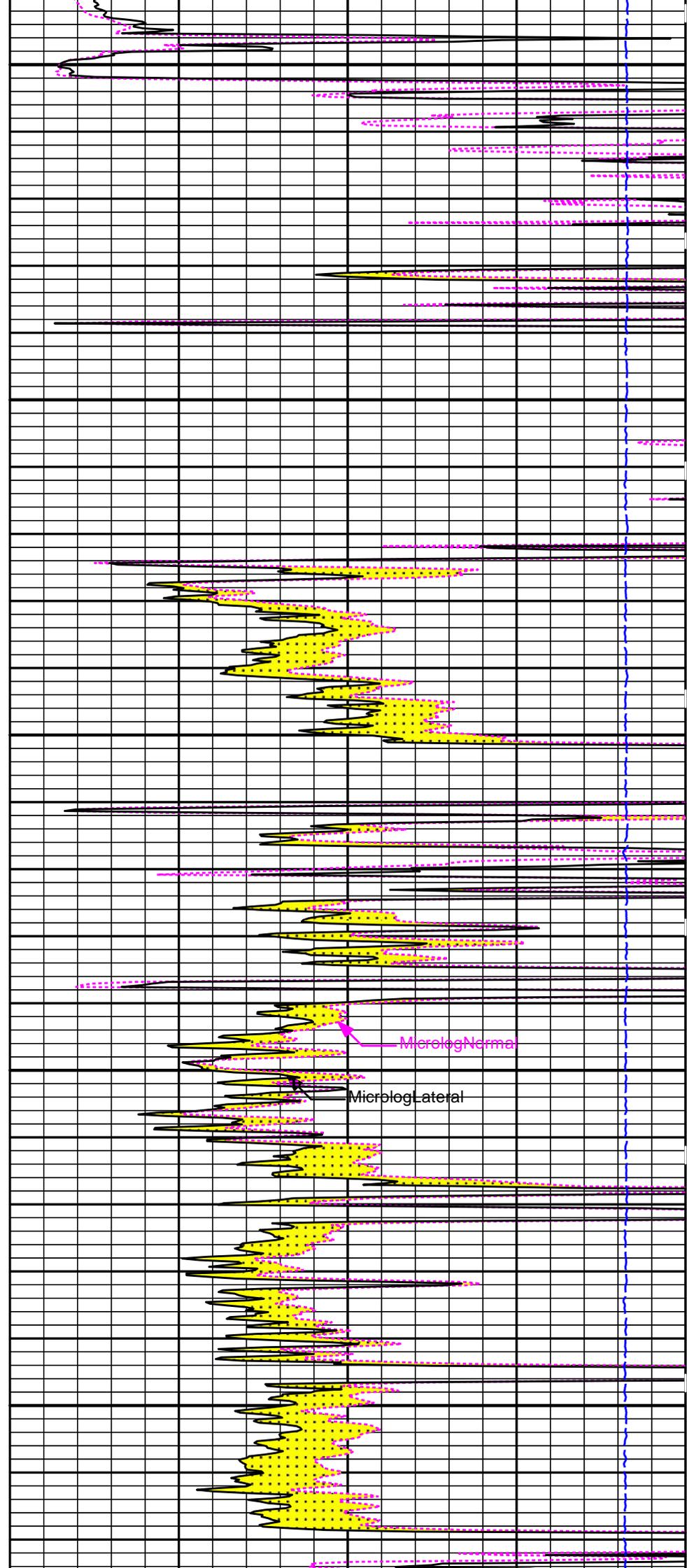


4500

4600

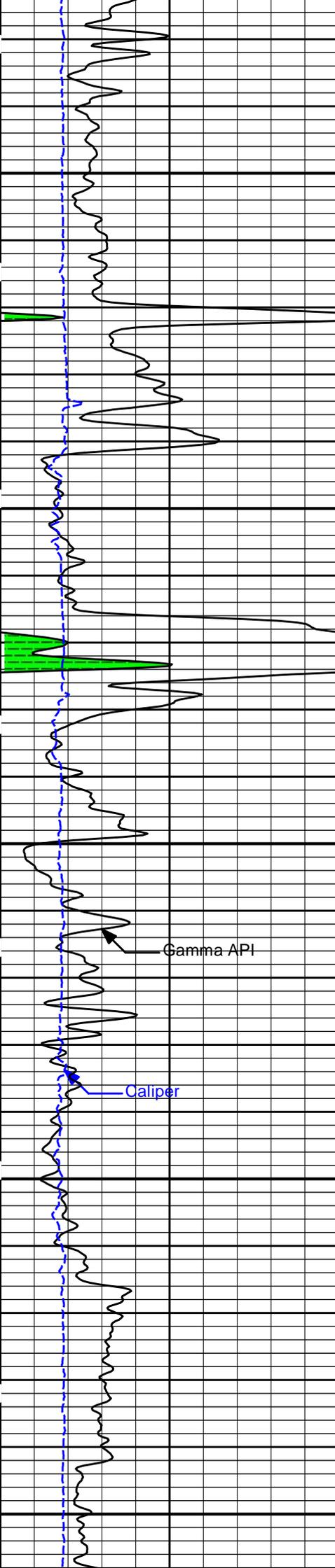
Gamma API

Caliper



MicrologNormal

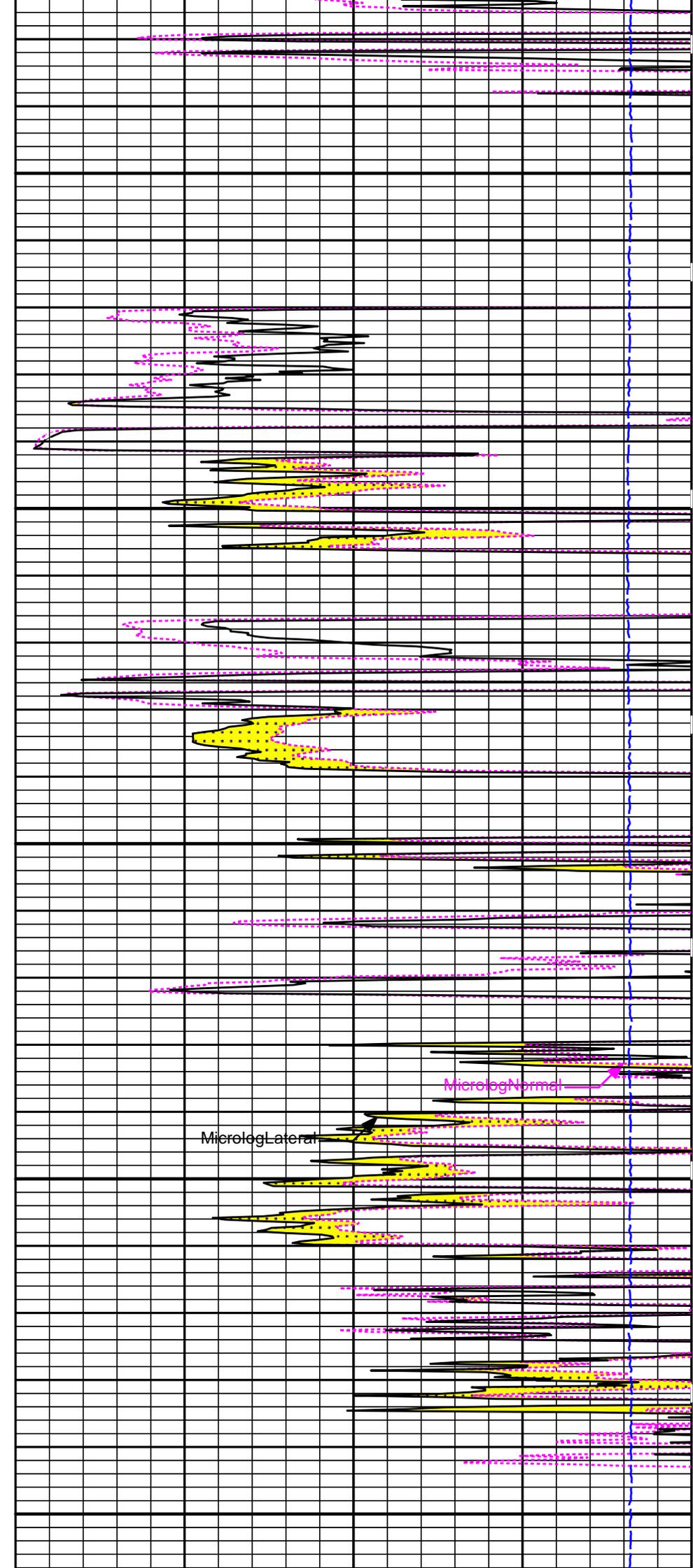
MicrologLateral

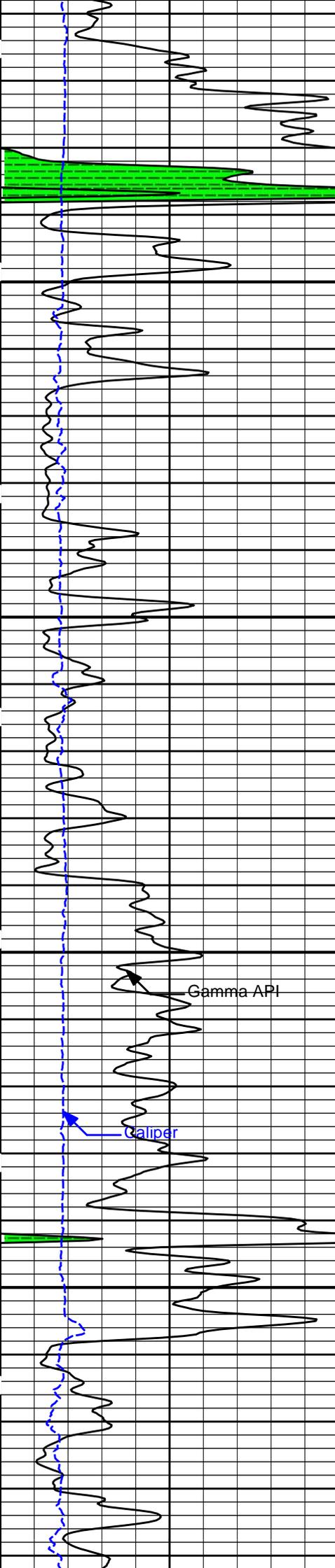


4700

4800

4900



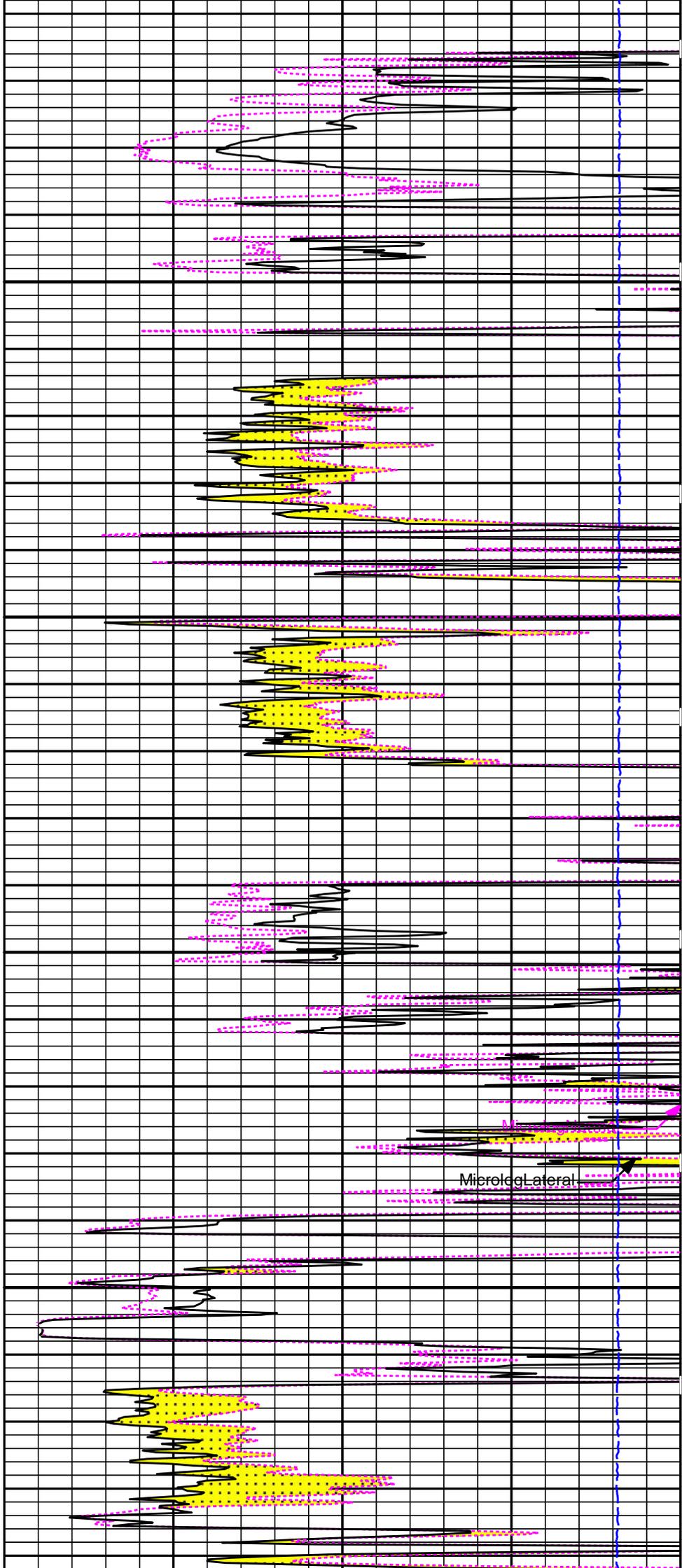


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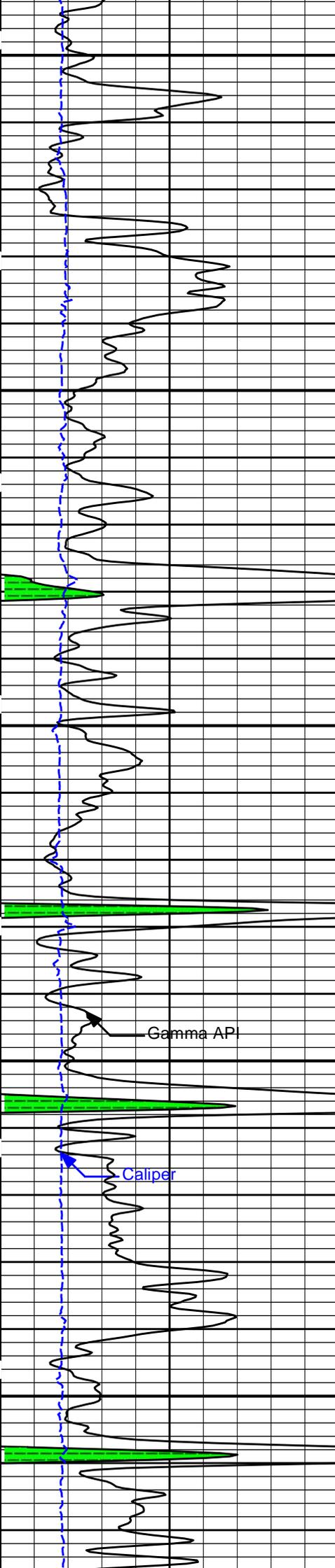
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Gamma API

Caliper



MicrologLateral

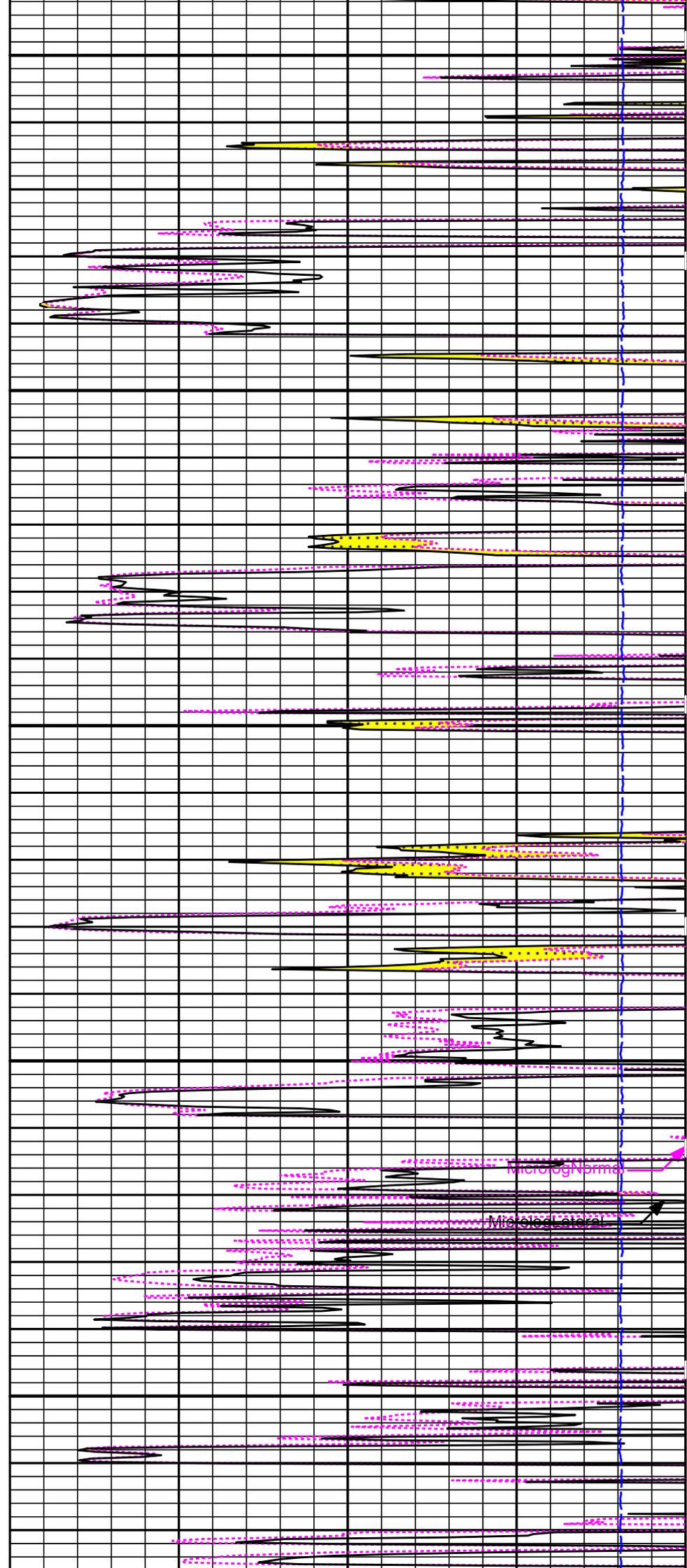


5200

5300

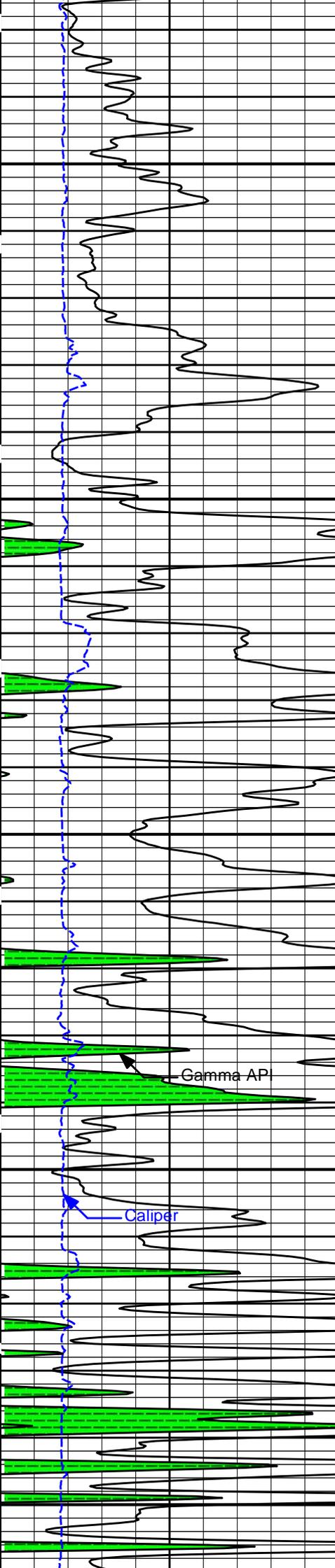
Gamma API

Caliper



Microlog Normal

Microlog Lateral



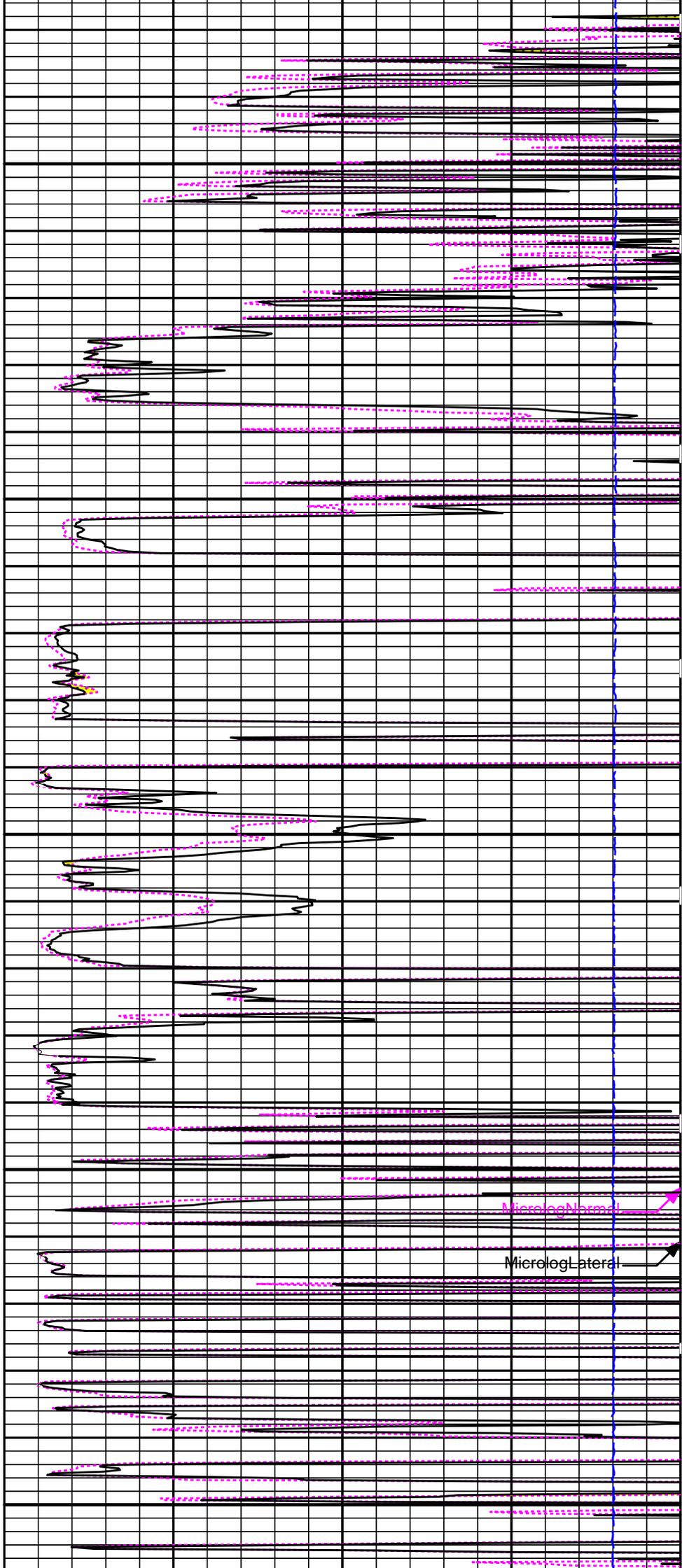
5400

5500

5600

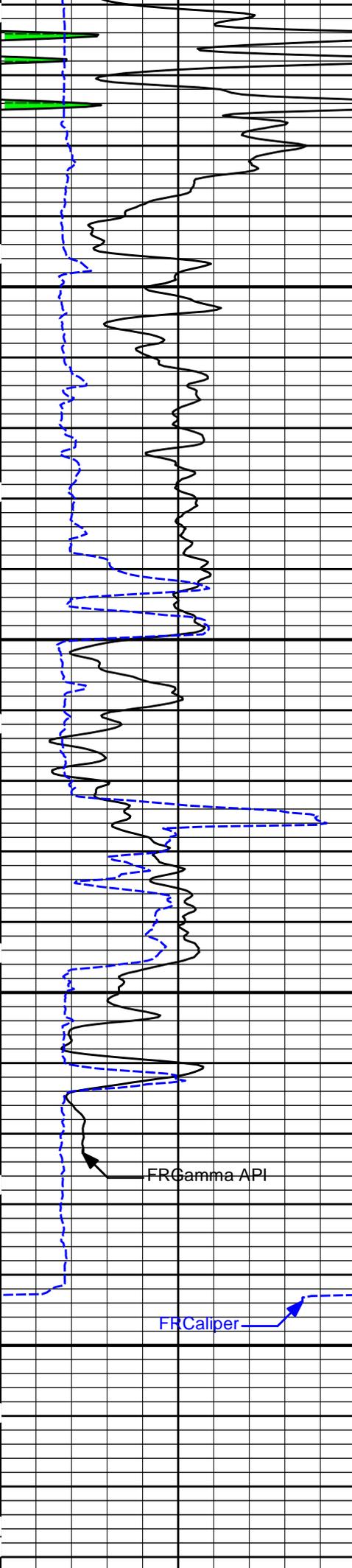
Gamma API

Caliper



MicrologNormal

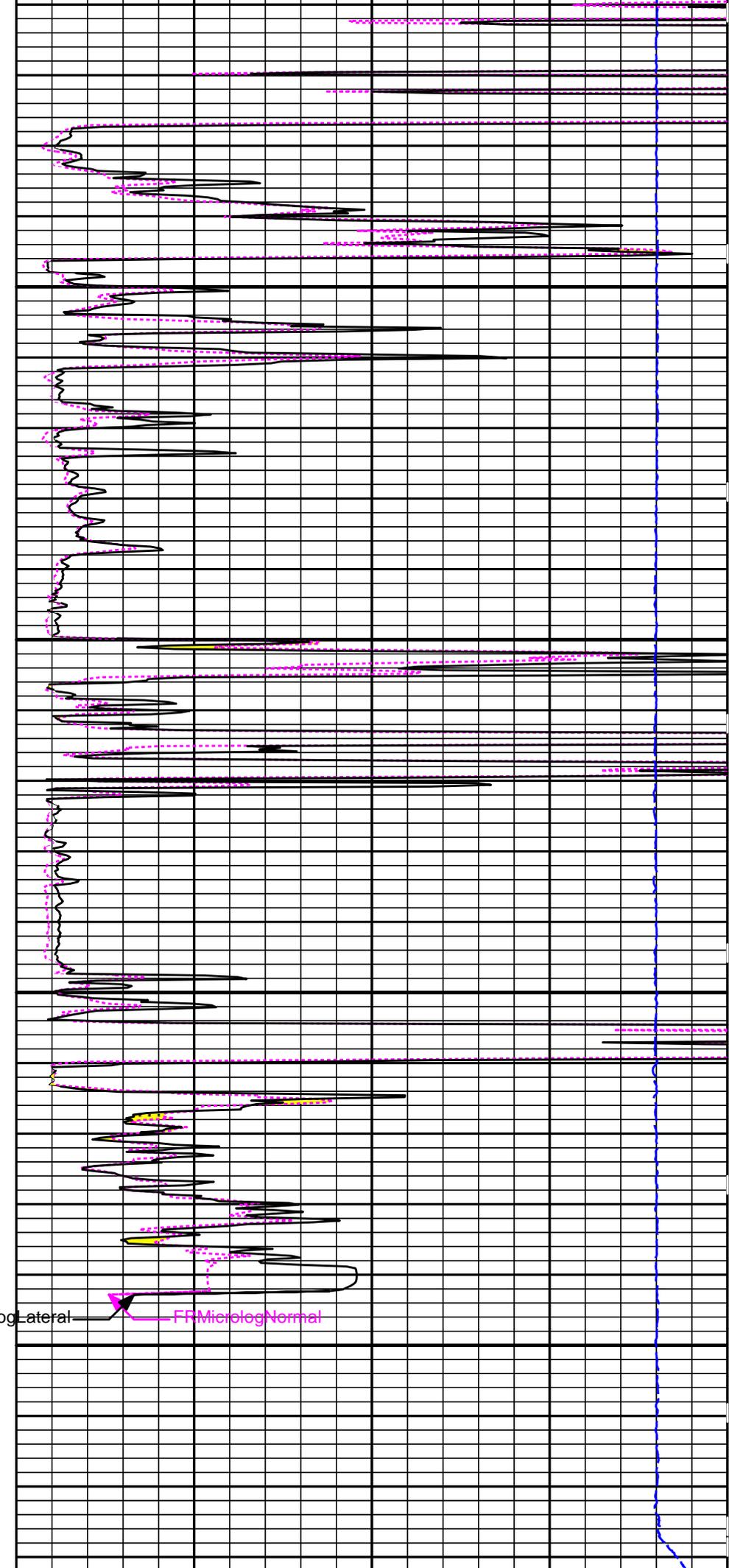
MicrologLateral



5700

5800

TD



6 Caliper inches 16

1 : 240 ft

15K Tension pounds 0

0	Gamma API	150
	api	

0	MicrologLateral	20
	ohm-metre	
0	MicrologNormal	20
	ohm-metre	

**HALLIBURTON**

Plot Time: 01-Oct-19 22:44:44  
 Plot Range: 3450 ft to 5832.5 ft  
 Data: RAYDON\_ROCK\Well Based\DAQ-0001-003\  
 Plot File: \\-LOCAL-\\RAYDON\_ROCK\0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTMLOG\Microlog\_IQ\_5\_main

## 5 INCH MAIN LOG

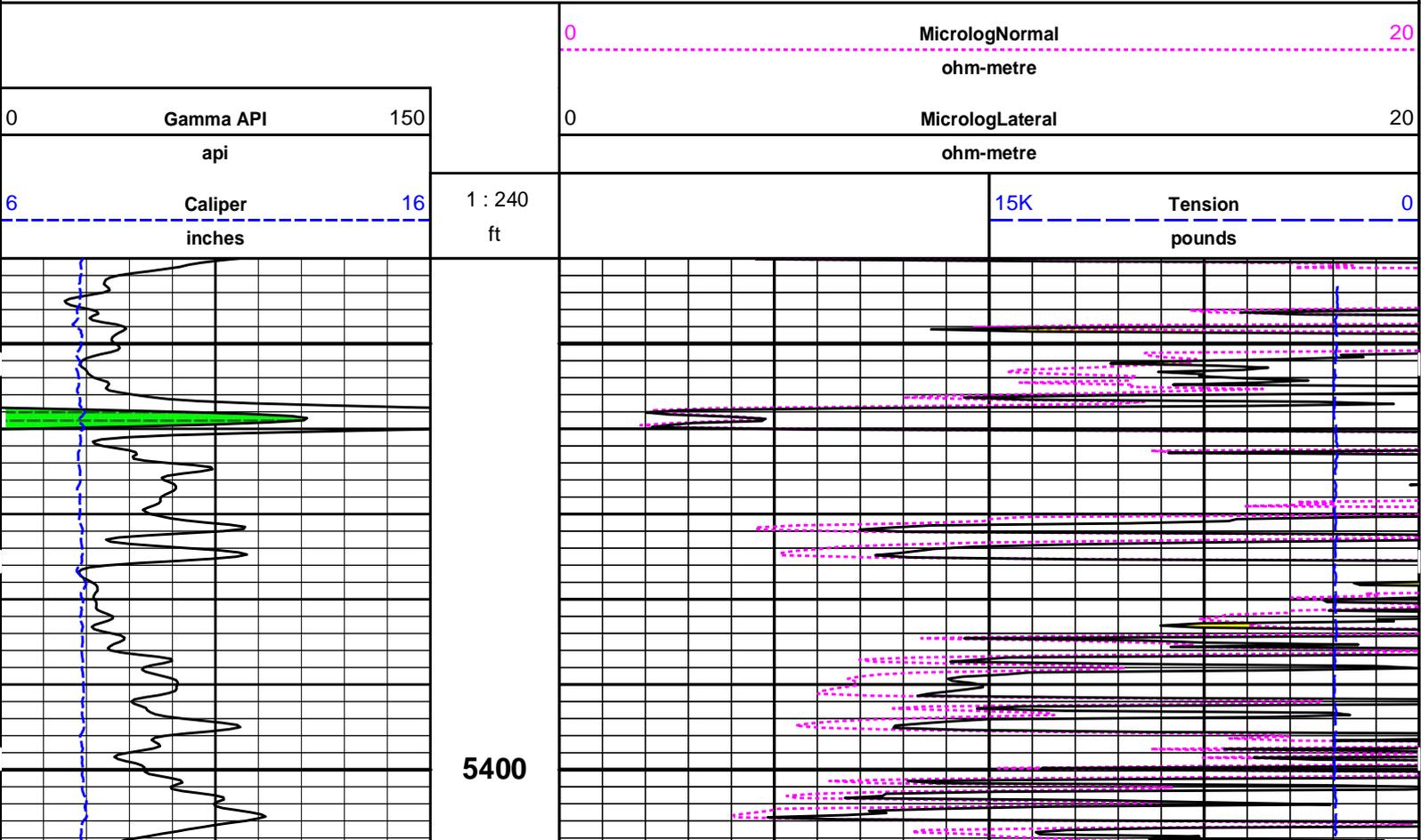
### MAIN LOG 5" PER 100'

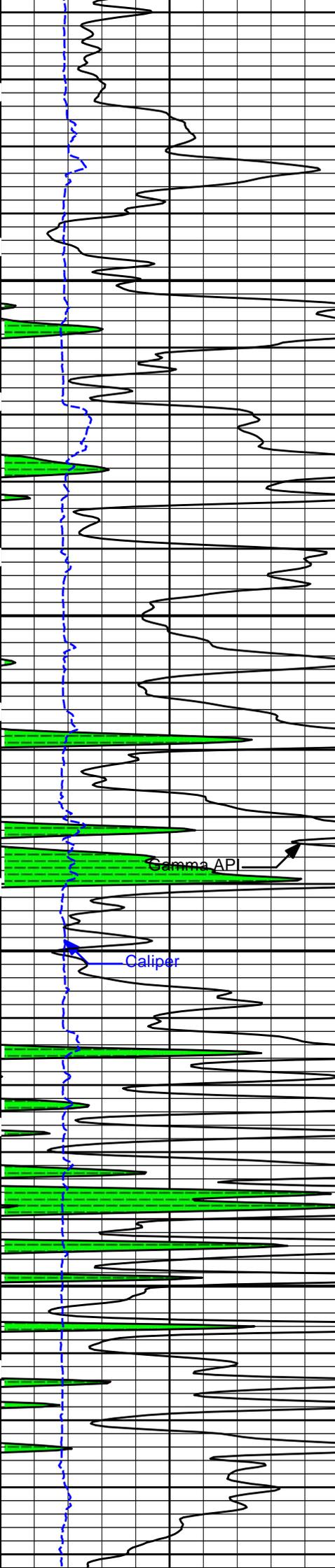
**HALLIBURTON**

Plot Time: 01-Oct-19 22:44:44  
 Plot Range: 5340 ft to 5833.67 ft  
 Data: RAYDON\_ROCK\Well Based\DAQ-0001-002\  
 Plot File: \\-LOCAL-\\RAYDON\_ROCK\0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRTMLOG\Microlog\_IQ\_5\_main

## REPEAT SECTION

### REPEAT SECTION



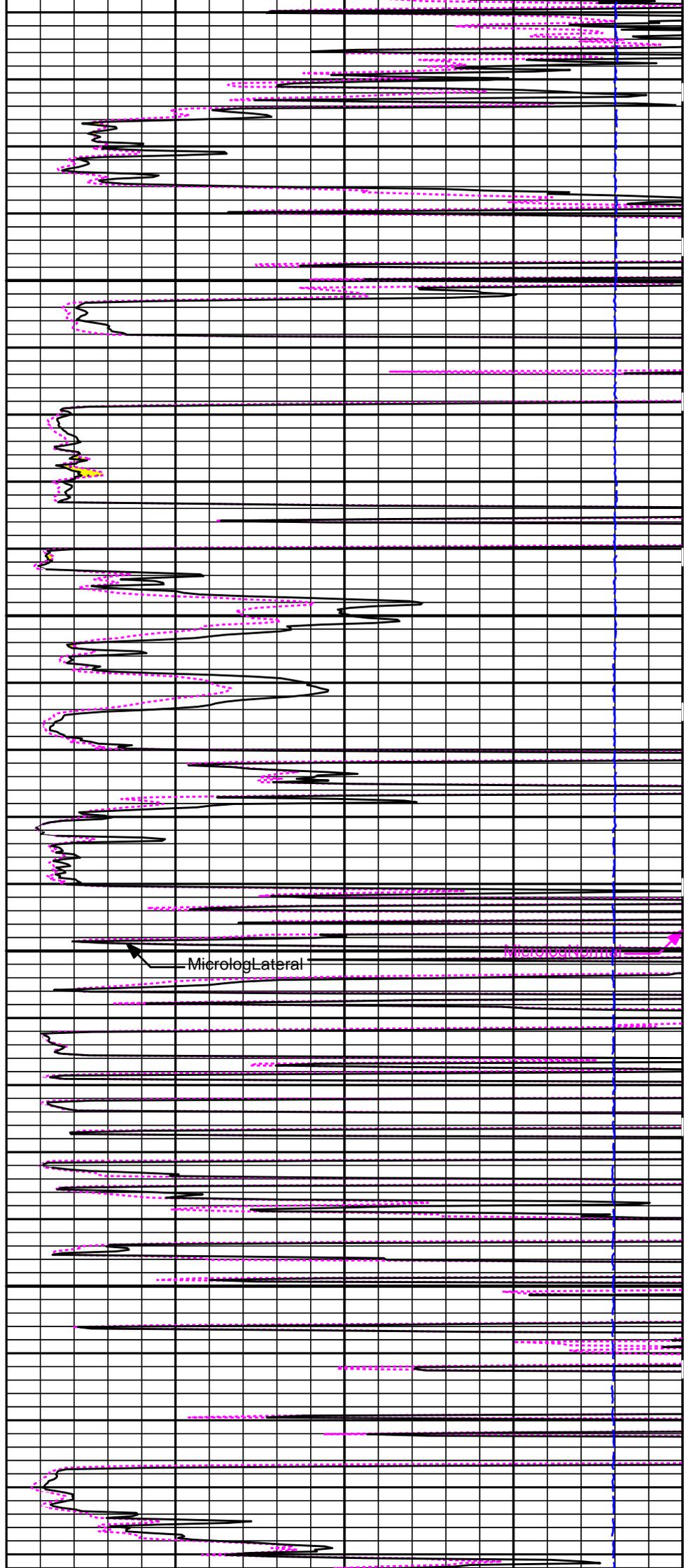


5500

Gamma API

Caliper

5600



Microlog Lateral

Microlog Vertical



# REPEAT SECTION

## REPEAT SECTION



### 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
<b>Shop</b>	<b>Field</b>	<b>Difference</b>	<b>Tolerance</b>
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: 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
<b>PAD EXTENSION:</b>				
Small Ring (in)	2.05	2.00	-0.05	+/- 0.20
Medium Ring (in)	3.76	3.75	-0.01	+/- 0.20
<b>RING DIAMETER:</b>				
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
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**

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

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

**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      **Calibration Date:** 30-Sep-19 15:13:43  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **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      **Reference Calibration Date:** 03-Jul-19 10:27:49  
**Engineer:** JORGE ORLANDO PEREZ      **Calibration Date:** 03-Jul-19 10:47:36  
**Software Version:** WL INSITE R6.2.1 (Build 2)      **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
<b>MAGNESIUM</b>				
Density (g/cc)	1.685	1.687	0.002	+/- 0.015
Pe	2.562	2.561	-0.001	+/- 0.150
<b>ALUMINUM</b>				
Density (g/cc)	2.580	2.580	0.000	+/- 0.01500
Pe	3.164	3.134	-0.030	+/- 0.150

<b>TOOL SUMMARY</b>				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
<b>QUALITY</b>				
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

<b>PASS/FAIL SUMMARY</b>	
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

<b>SPECTRAL DENSITY FIELD CHECK</b>			
<b>Tool Name:</b>	<b>SDLT Pad - 10844781</b>	<b>Reference Calibration Date:</b>	<b>03-Jul-19 10:47:36</b>
<b>Engineer:</b>	<b>WHITLOCK</b>	<b>Calibration Date:</b>	<b>30-Sep-19 15:16:12</b>
<b>Software Version:</b>	<b>WL INSITE R6.2.7 (Build 7)</b>	<b>Calibration Version:</b>	<b>1</b>

Pad Temperature: 89.3 degF

<b>DENSITY FIELD CALIBRATION SUMMARY</b>				
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

<b>PASS/FAIL SUMMARY</b>	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

<b>CALIBRATION SUMMARY</b>						
Sensor	Shop	Field	Post	Difference	Tolerance	Units

<b>Depth Panel-00000032</b>						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
<b>RWCH-12027542</b>						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1450.00	-----	-----	0.00	-----	lbs

Gamma Ray Calibrator	228.9	229.0	-----	-0.1	+/- 9.00	api
<b>DSNT-11019643</b>						
Snow-Block Porosity	0.0724	0.0581	-----	0.0143	+/- 0.0150	decp
<b>SDLT-12153520</b>						
Pad Extension	3.75	3.76	-----	-0.01	+/-0.10	in
Ring Diameter	8.25	8.18	-----	0.07	+/-0.15	in
<b>ACRt Sonde-12109515</b>						
Mud Cell	1.00	-----	-----	0	-----	ohm-m
<b>Microlog Pad-12153520</b>						
MicroLog Normal	19.84	19.84	-----	0.00	+/-0.80	ohmm
MicroLog Lateral	19.99	19.99	-----	0.00	+/-0.80	ohmm
<b>SDLT Pad-10844781</b>						
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-ACRT\IDLE				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	

CrossPlot	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	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	

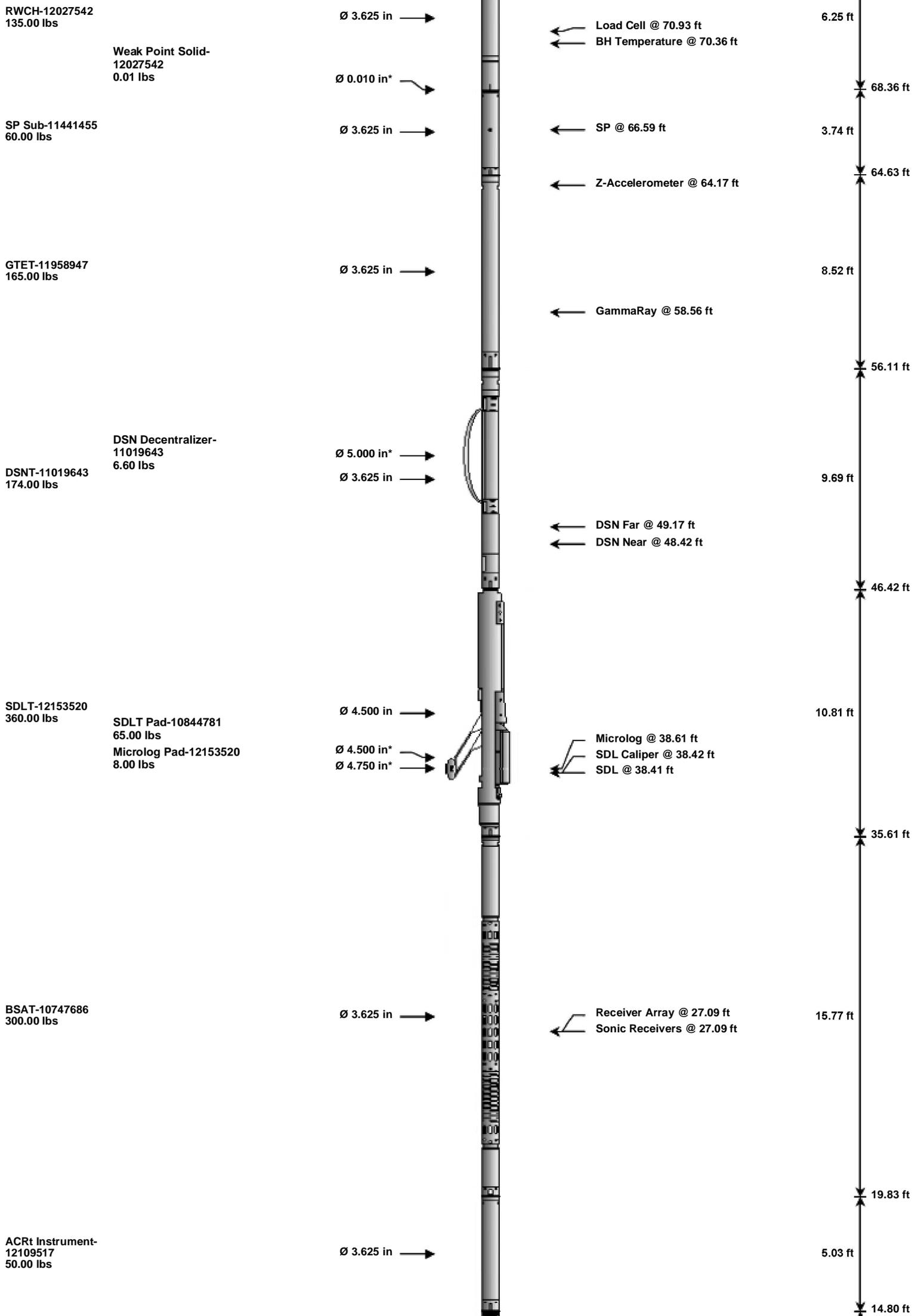
BOTTOM \_\_\_\_\_

Data: RAYDON\_ROCK\0001 RWCH-GTET-DSNT-SDLT-BSAT-ACRT\IDLE Date: 01-Oct-19 18:23:37

**HALLIBURTON**

**TOOL STRING DIAGRAM REPORT**

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		Ø 2.310 in				74.61 ft



ACRt Sonde-  
12109515  
200.00 lbs

Ø 3.625 in →

← Mud Resistivity @ 13.44 ft

← ACRt @ 9.46 ft

14.22 ft

Cabbage Head-  
11111111  
10.00 lbs

Ø 3.625 in  
Ø 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

<b>Total</b>			<b>1,533.61</b>	<b>74.61</b>		
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\* 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