

HALLIBURTON

MICROLOG

COMPANY		HERMAN L. LOEB, LLC	
WELL		BRENSING 1-10	
FIELD/BLOCK		FRALICK WEST	
COUNTY		KIOWA	
STATE		KANSAS	
Permanent Datum	GL	Elev: 2301.0 ft	Elev.: K.B. 2312.0 ft
Log measured from	KB	11.0 ft above perm. Datum	D.F. 2310.0 ft
Drilling measured from	KB		G.L. 2301.0 ft
Date	30-Jan-19		
Run No.	ONE		
Depth - Driller	5000.0 ft		
Depth - Logger	5000.0 ft		
Bottom - Logged Interval	4990		
Top - Logged Interval	4000		
Casing - Driller	8.625 in @ 478.0 ft		
Casing - Logger	485.0 ft		
Bit Size	7.875 in		
Type Fluid in Hole	Water Based Mud		
Density	9.0 ppg	60.00 sl/qt	
PH	10.50 pH	8.8 cphm	
Source of Sample	FLOWLINE		
Rm @ Meas. Temperature	0.53 ohmm @ 68.00 degF		
Rmf @ Meas. Temperature	0.45 ohmm @ 64.00 degF		
Rmc @ Meas. Temperature	0.64 ohmm @ 64.00 degF		
Source Rmf	Rmc		
Rm @ BHT	0.31 ohmm @ 120.0 degF		
Time Since Circulation	11:00 hr		
Time on Bottom	30-Jan-19 13:57		
Max. Rec. Temperature	120.00 degF @ 5000.0 ft		
Equipment	12156883 EL RENO, OK		
Recorded By	WHITLOCK		
Witnessed By	JON CHRISTENSEN		

Fold here

Service Ticket No.: 905440007		API No.: 15-097-21848-00-00		PGM Version: WL INSITE R5.8.9 (Build 6)	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE			RESISTIVITY SCALE CHANGES		
Date	Sample No.		Type Log	Depth	Scale Up Hole
Depth-Driller					Scale Down Hole
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
Rmf @ Meas. Temp.	@	@			Tool Pos.
Rmc @ Meas. Temp.	@	@			Other
Source Rmf	Rmc				
Rm @ BHT	@	@			
Rmf @ BHT	@	@			
Rmc @ BHT	@	@			
EQUIPMENT DATA					
GAMMA		ACOUSTIC		DENSITY	
Run No.		Run No.		Run No.	NEUTRON
Serial No.		Serial No.		Serial No.	
Model No.		Model No.		Model No.	
Diameter		No. of Cent.		Diameter	
Detector Model No.		Spacing		Log Type	
Type		Source Type		Source Type	
Length		LSA [Y/N]		Serial No.	
Distance to Source		FWDA [Y/N]		Strength	
LOGGING DATA					
GENERAL		GAMMA		ACOUSTIC	
Run	Depth	Speed	Scale	Scale	DENSITY
No.	From	ft/min	L	R	Scale
	To				L
					R
					Matrix
					Matrix
					Scale
					L
					R
					Matrix

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.

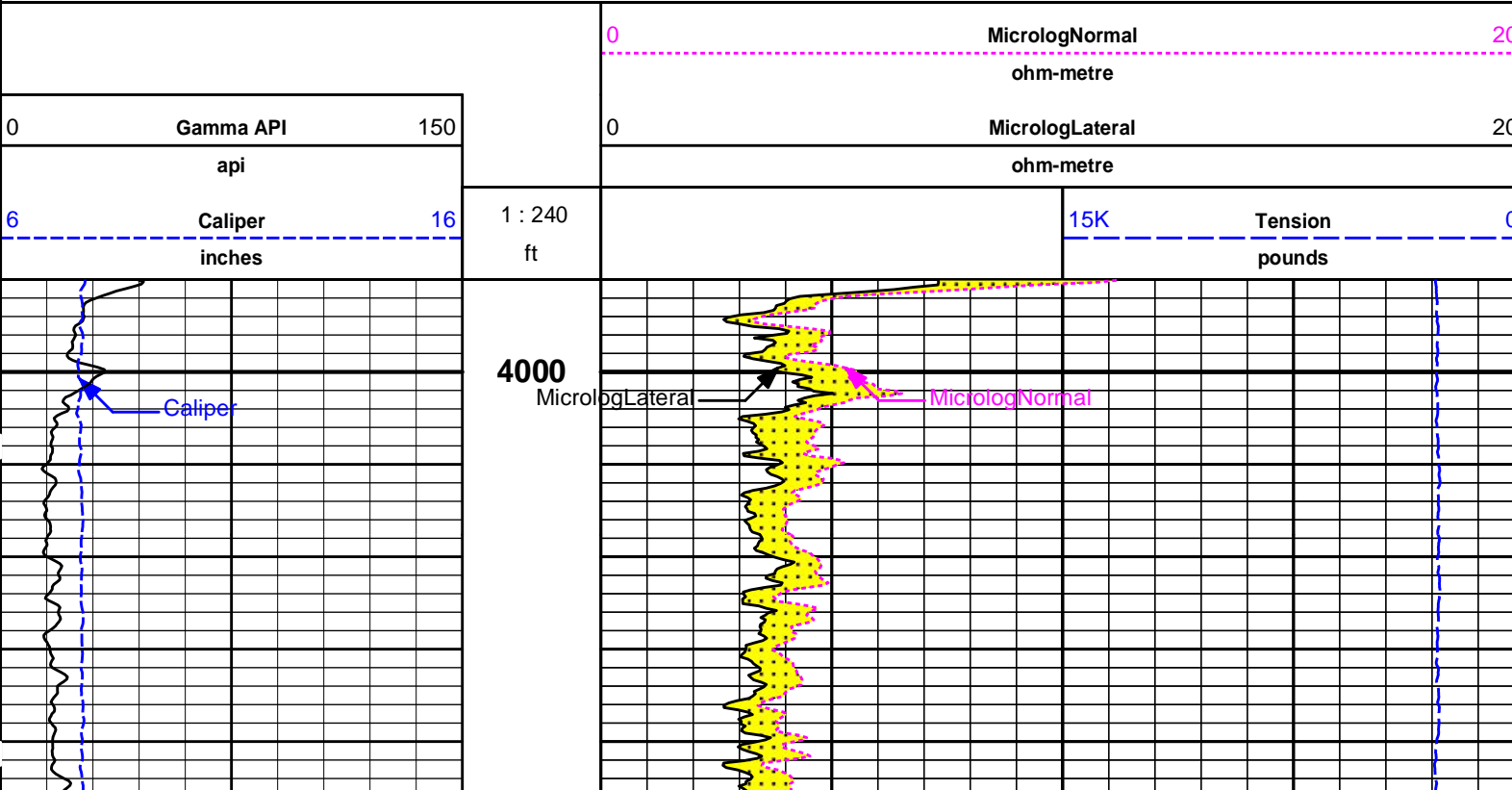
HALLIBURTON

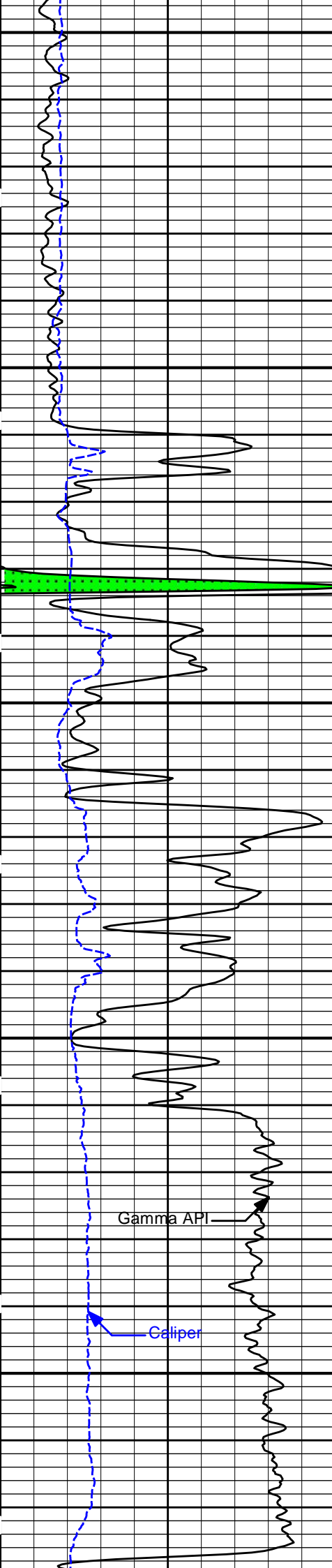
HALLIBURTON

Plot Time: 30-Jan-19 15:55:21
 Plot Range: 3990 ft to 5003.08 ft
 Data: HERMAN_BRENSING\Well Based\DAQ-0002-002\
 Plot File: \\LOCAL-HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRT\MLOG\Microlog_IQ_5_main

5 INCH MAIN LOG

MAIN LOG 5" PER 100'



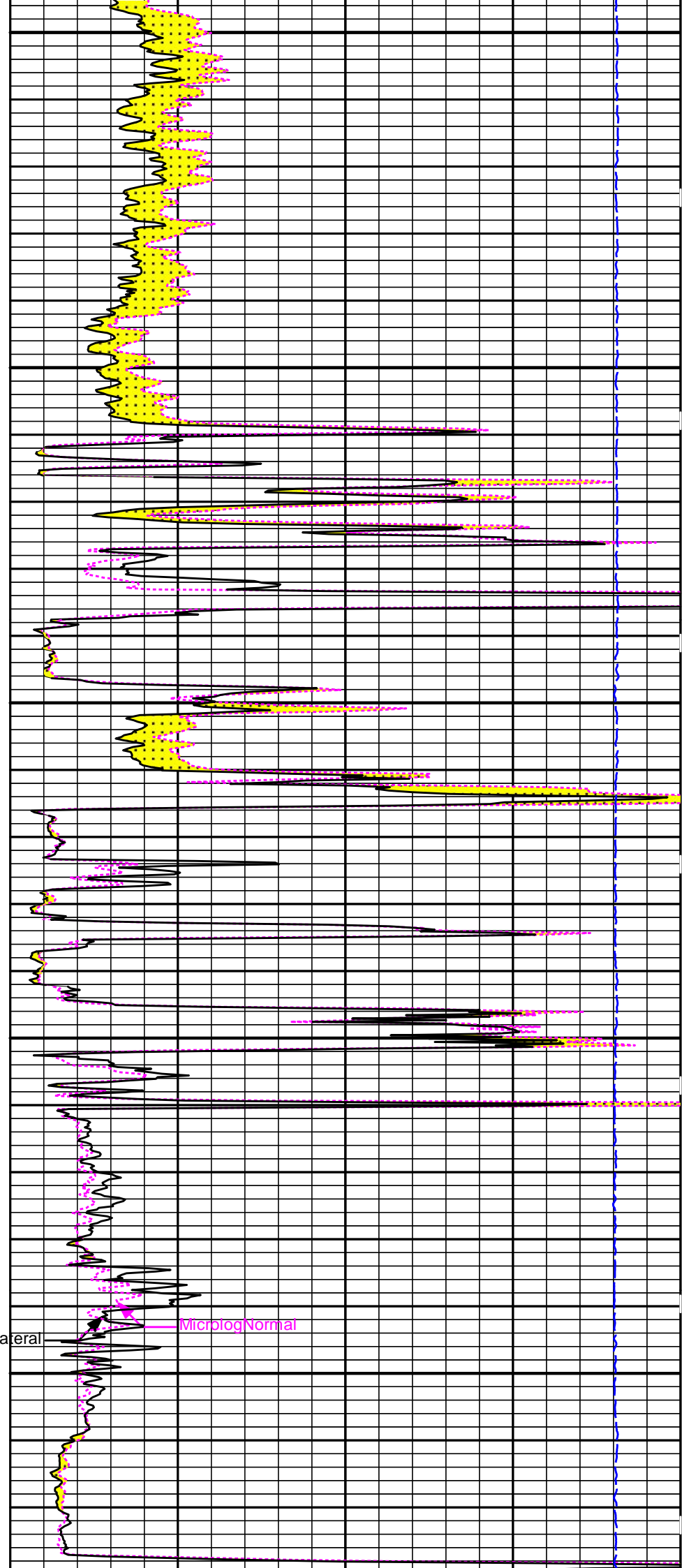


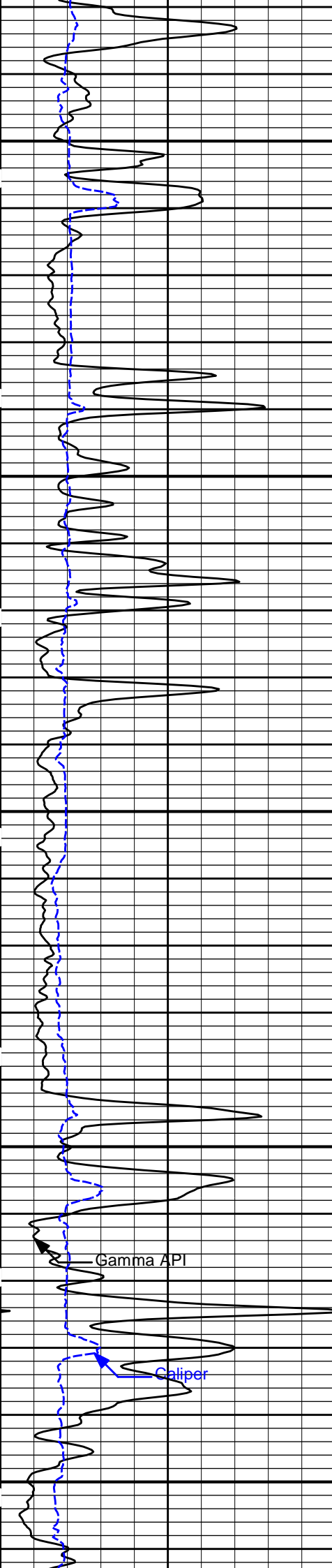
4100

4200

MicrologLateral

MicrologNormal

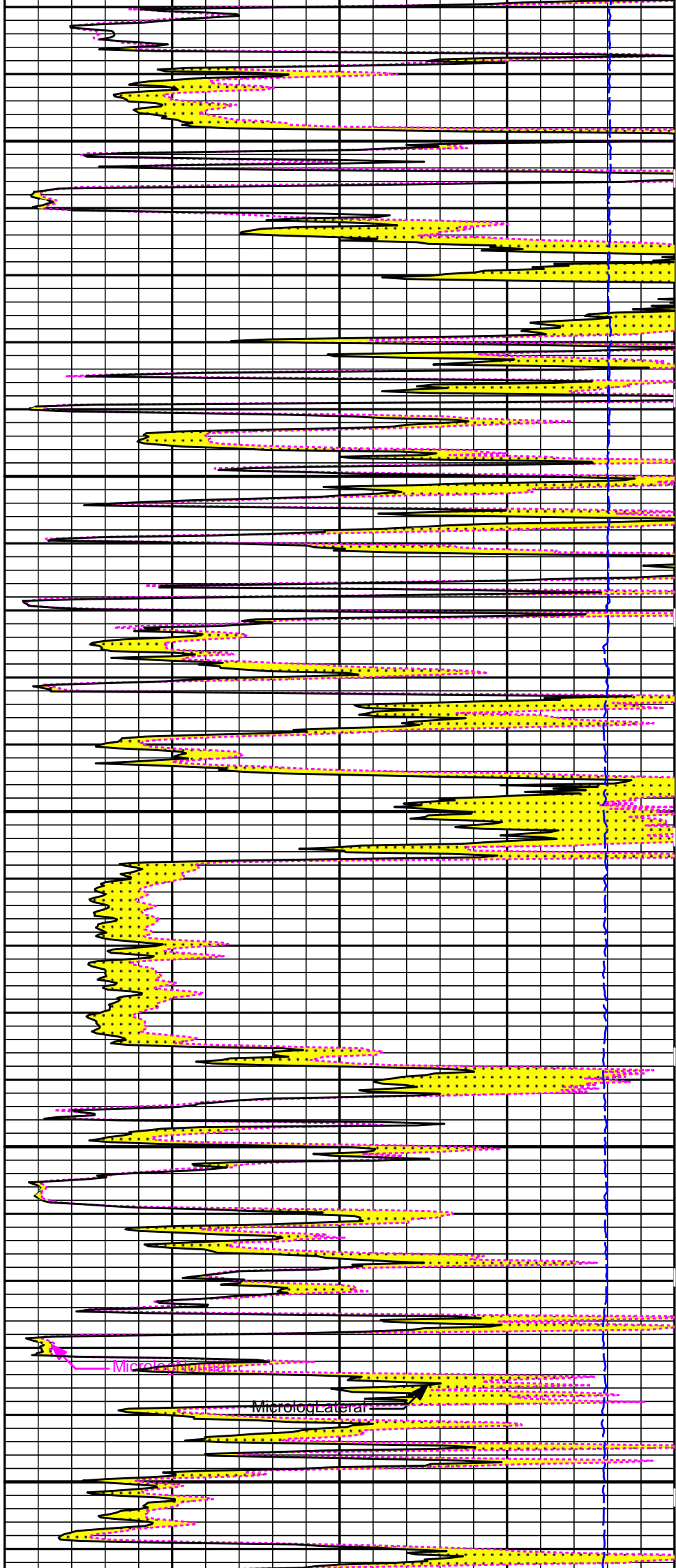




4300

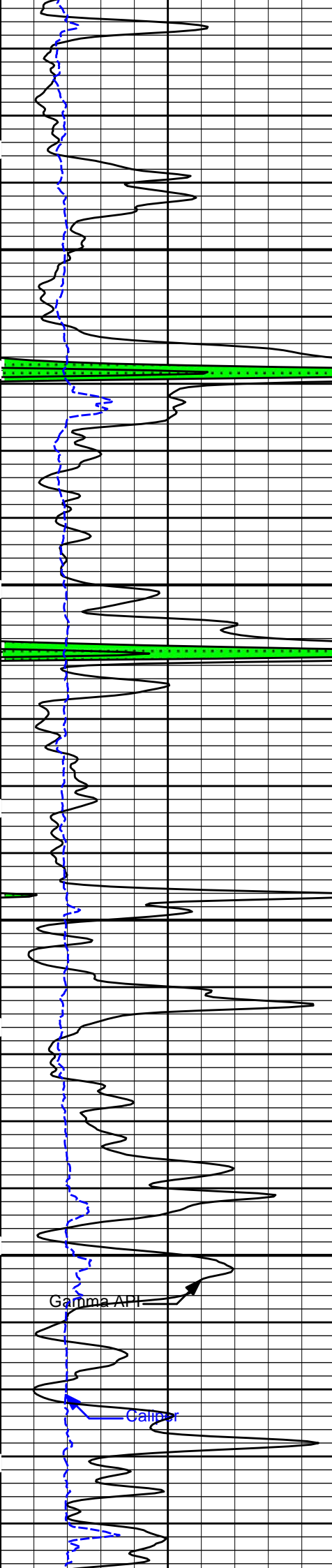
4400

4500



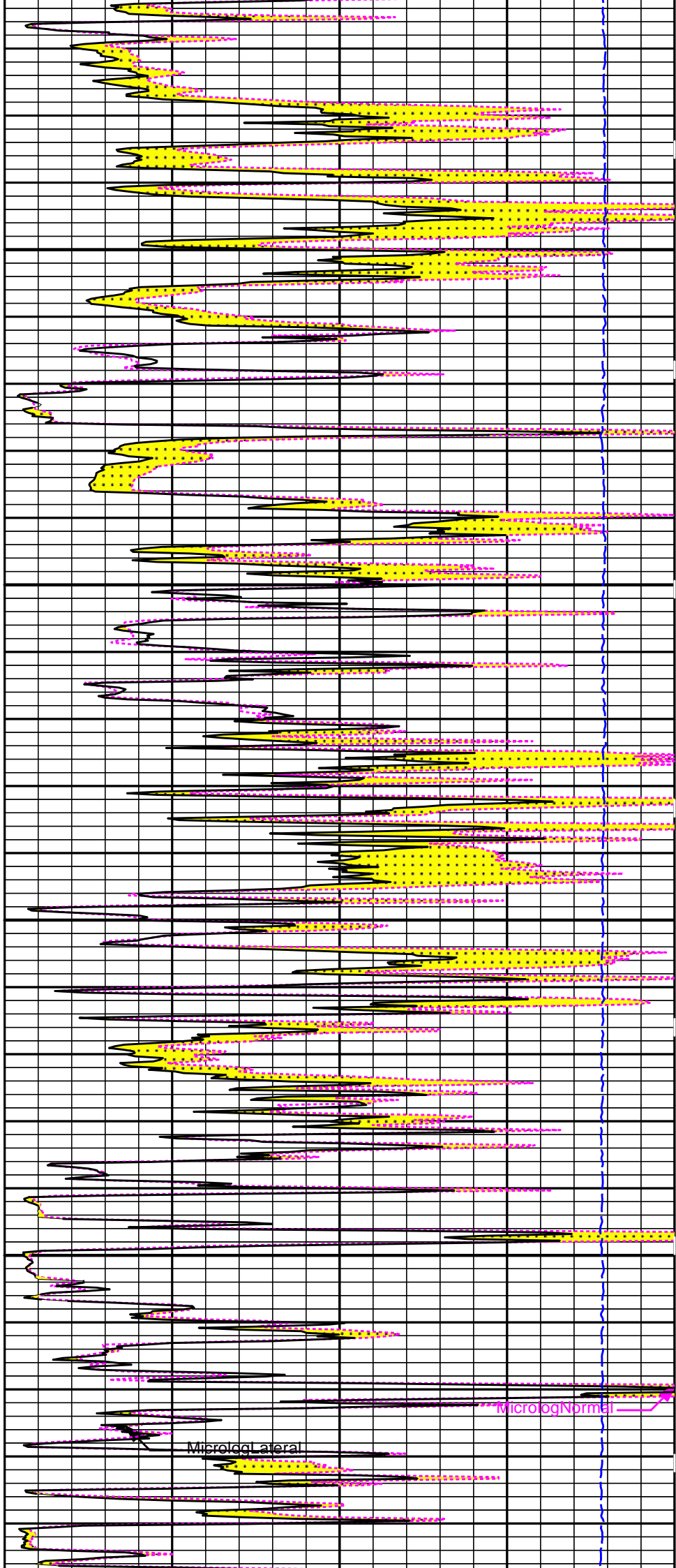
Microlog

Microlog Lateral



4600

4700

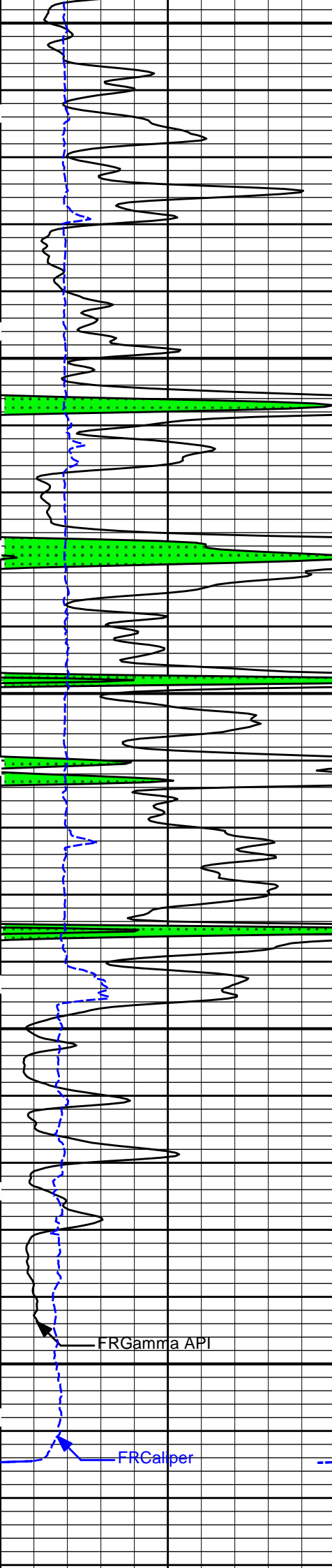


Gamma API

Gamma

MicrologLateral

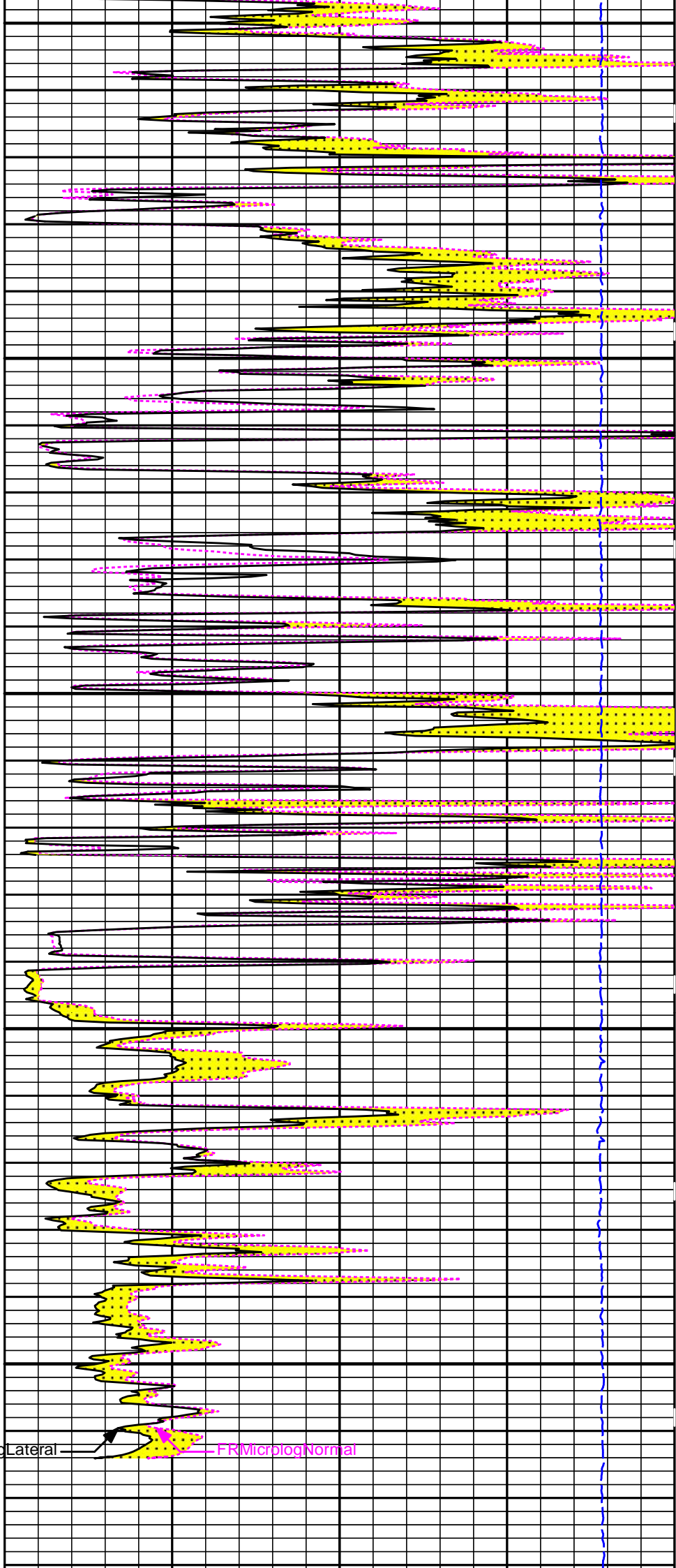
MicrologNormal



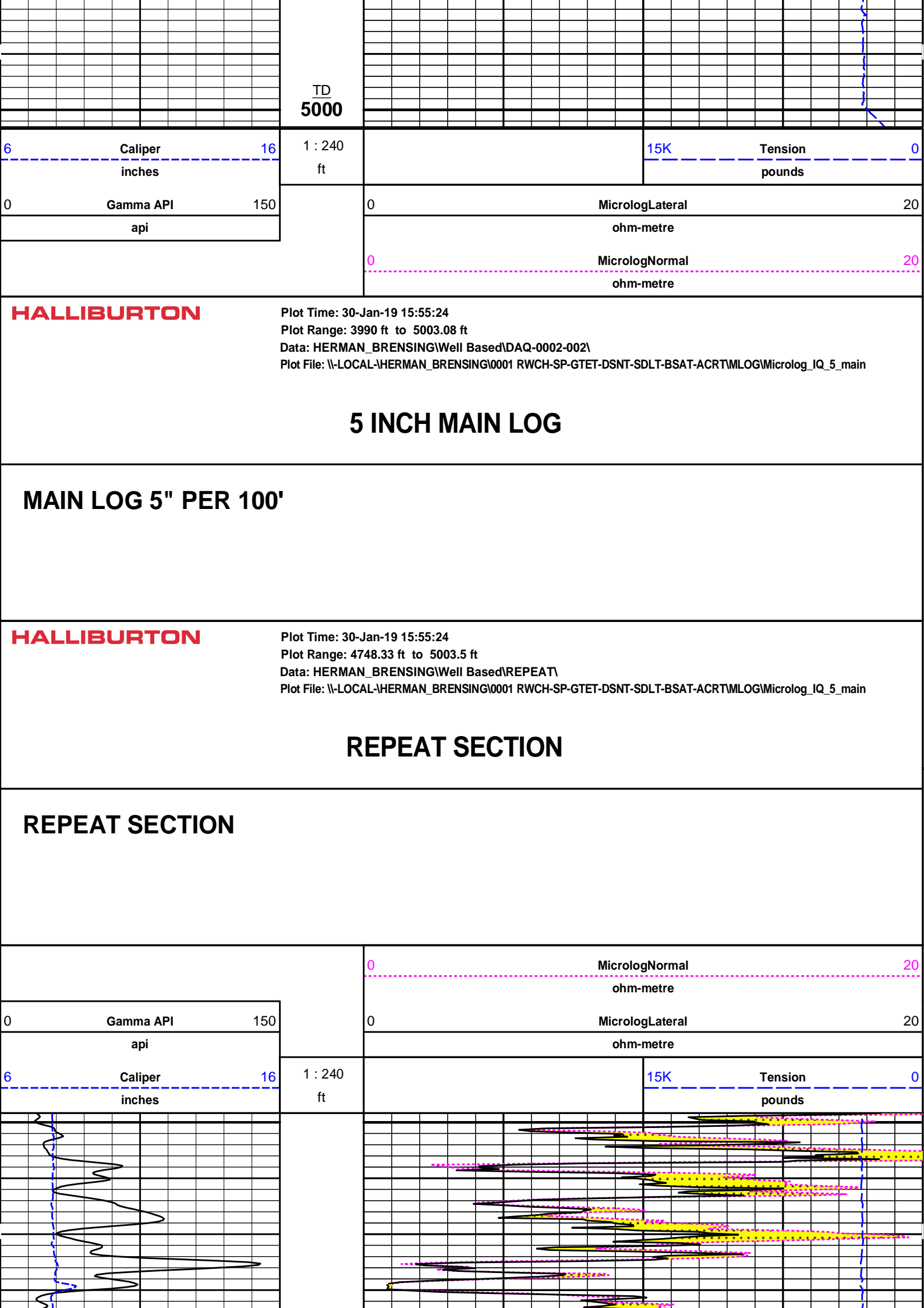
4800

4900

FRMicrologLateral



FRMicrologNormal



TD
5000

6	Caliper	16
	inches	
0	Gamma API	150
	api	

1 : 240
ft

15K Tension
pounds 0

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

HALLIBURTON

Plot Time: 30-Jan-19 15:55:24
 Plot Range: 3990 ft to 5003.08 ft
 Data: HERMAN_BRENSING\Well Based\DAQ-0002-002\
 Plot File: \\-LOCAL-HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRT\MLOG\Microlog_IQ_5_main

5 INCH MAIN LOG

MAIN LOG 5" PER 100'

HALLIBURTON

Plot Time: 30-Jan-19 15:55:24
 Plot Range: 4748.33 ft to 5003.5 ft
 Data: HERMAN_BRENSING\Well Based\REPEAT\
 Plot File: \\-LOCAL-HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRT\MLOG\Microlog_IQ_5_main

REPEAT SECTION

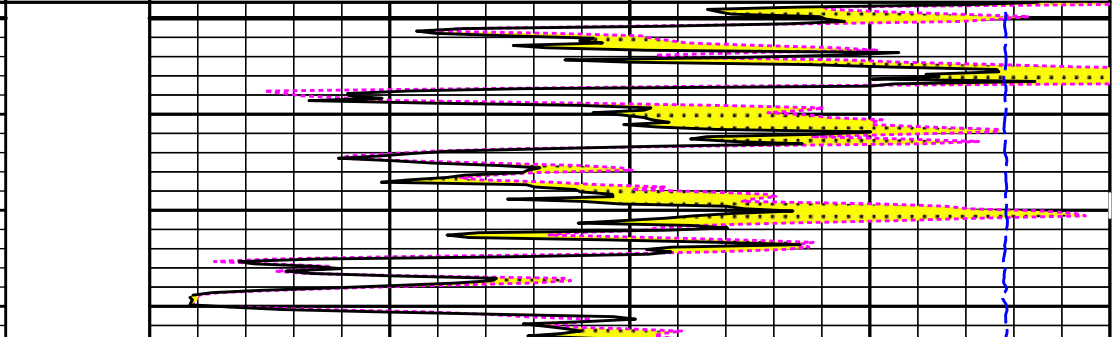
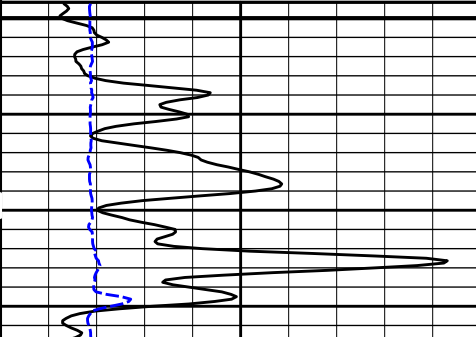
REPEAT SECTION

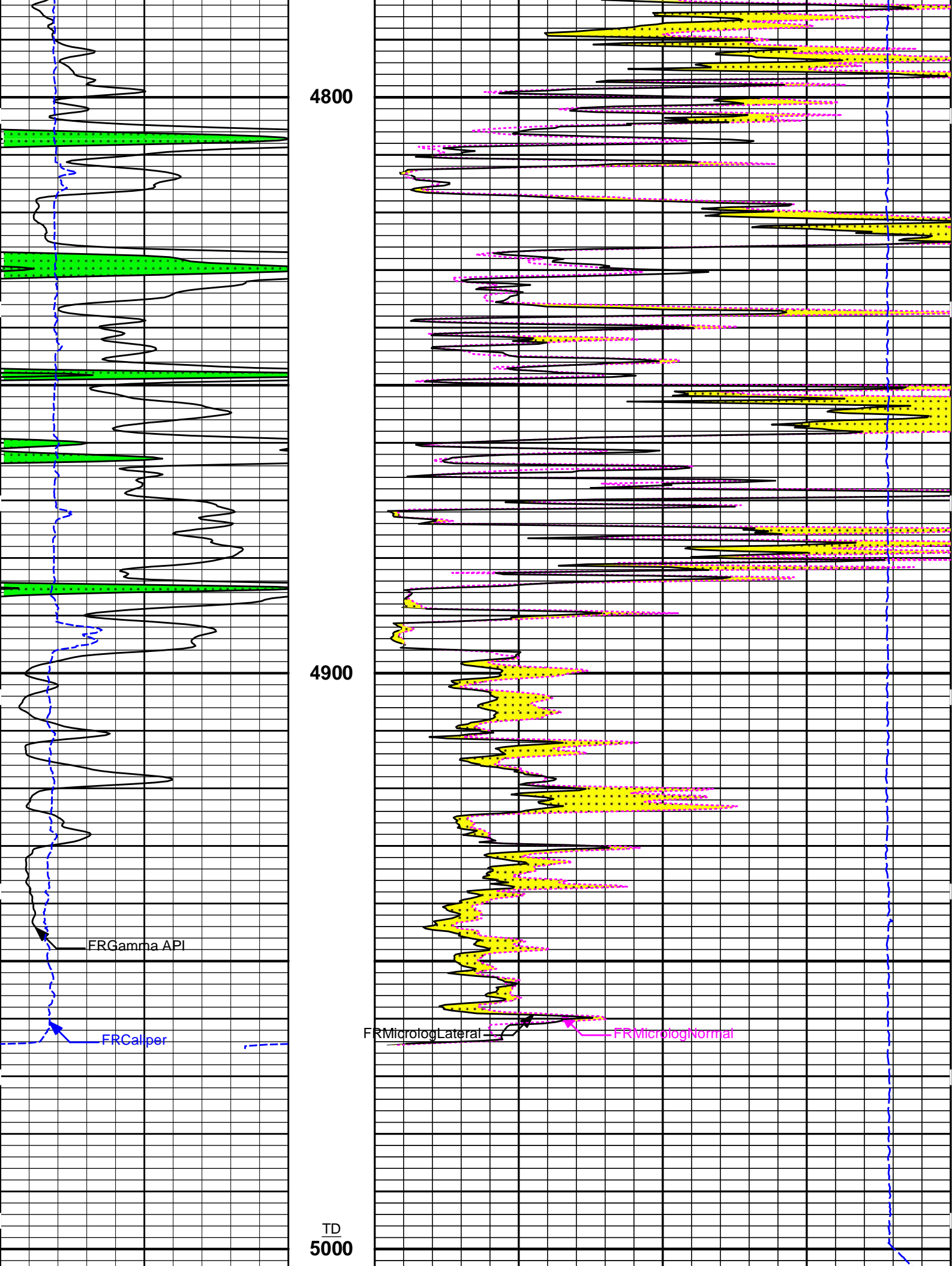
0	Gamma API	150
	api	
6	Caliper	16
	inches	

1 : 240
ft

15K Tension
pounds 0

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





6	Caliper inches	16	1 : 240 ft	15K	Tension pounds	0
---	-------------------	----	---------------	-----	-------------------	---

Gamma API	150	0	MicrologLateral	20
api			ohm-metre	
		0	MicrologNormal	20
			ohm-metre	

HALLIBURTON

Plot Time: 30-Jan-19 15:55:26
 Plot Range: 4748.33 ft to 5003.5 ft
 Data: HERMAN_BRENSING\Well Based\REPEAT\
 Plot File: \\-LOCAL-HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRT\MLOG\Microlog_IQ_5_main

REPEAT SECTION

REPEAT SECTION

HALLIBURTON

CALIBRATION REPORT

SURFACE TENSION SHOP CALIBRATION

Tool Name: Depth Panel - 12345678 Reference Calibration Date: 07-Jan-19 16:27:03
 Engineer: SEAN WOLTEMATH Calibration Date: 09-Jan-19 20:45:16
 Software Version: WL INSITE R5.8.9 (Build 6) Calibration Version: 1

SURFACE TENSION LOAD CELL					
Measurement	Load Cell Value	Measurement	Calibrated	Units	
Low	10261.13	56.05	0.00	lbs	
High	17547.65	7892.32	7830.00	lbs	

DOWNHOLE TENSION SHOP CALIBRATION

Tool Name: RWCH - 12345678 Reference Calibration Date: 09-Jan-19 20:48:08
 Engineer: WHITLOCK Calibration Date: 20-Jan-19 09:15:27
 Software Version: WL INSITE R5.8.9 (Build 6) Calibration Version: 1

DOWNHOLE LOAD CELL					
Measurement	Tool Value	Measurement	Calibrated	Units	
Low	-105.48	98.98	0.00	lbs	
High	20090.40	5035.86	2420.00	lbs	

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11013113 Reference Calibration Date: 27-Nov-18 10:49:38
 Engineer: WHITLOCK Calibration Date: 14-Dec-18 10:17:09
 Software Version: WL INSITE R5.8.9 (Build 6) Calibration Version: 1

Calibrator Source S/N: TB-79
 Calibrator API Reference:222.00 api
 Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	19.9	19.6	api
Background + Calibrator	249.5	245.5	api
Calibrator	229.5	225.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11013113 Reference Calibration Date: 14-Dec-18 10:17:09
 Engineer: WHITLOCK Calibration Date: 09-Jan-19 10:10:50

Calibrator Source S/N: TB-79
 Calibrator API Reference:222.00 api
 Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	19.6	21.5	api
Background + Calibrator	245.5	243.3	api
Calibrator	225.9	221.8	api

Shop	Field	Difference	Tolerance
225.9	221.8	4.1	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11019641 Reference Calibration Date: 04-Aug-18 12:26:27
 Engineer: SEAN WOLTEMATH Calibration Date: 07-Nov-18 10:07:09
 Software Version: WL INSITE R5.8.9 (Build 6) Calibration Version: 1

Logging Source S/N: DSN-436
 Tank Serial Number: EL RENO HWT
 Reference value assigned to Tank: 56.100
 Snow Block S/N: 12156883
 Calibration Tank Water Temperature: 66 degF
 Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.97742	0.98053	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):	0.2348	0.2358	0.0010	+/- 0.0020
Calibrated Ratio:	10.5259	10.5595	0.034	+/- 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 - 11019641 Reference Calibration Date: 07-Nov-18 10:07:09
 Engineer: WHITLOCK Calibration Date: 29-Jan-19 18:55:12
 Software Version: WL INSITE R5.8.9 (Build 6) 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):	0.0724	0.0771	0.0047	+/- 0.0150

PASS/FAIL SUMMARY	
-------------------	--

Block Change Check:

Passed

Snow Block Stat Check:

Passed

Temperature Check:

Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - 10960494

Reference Calibration Date: 01-Jan-70 00:00:00

Engineer: SEAN WOLTEMATH

Calibration Date: 28-Dec-18 10:43:24

Software Version: WL INSITE R5.6.3 (Build 4)

Calibration Version: 1

Host Tool Name: DSNT - 11019641

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3977.11	-3977.11	-7000.00 - -1000.00
Pad Gain	0.0003897	0.0003897	0.0002000 - 0.0006000
Arm Offset	-3073.13	-3073.13	-5000.00 - 3000.00
Arm Gain	0.0005210	0.0005210	0.000300 - 0.000700
Arm Power	-0.000005094	-0.000005094	-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)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.75	3.75	0.00	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.50	6.50	0.00	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 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 - 10960494

Reference Calibration Date: 28-Dec-18 10:43:24

Engineer: WHITLOCK

Calibration Date: 29-Jan-19 18:52:29

Software Version: WL INSITE R5.6.3 (Build 4)

Calibration Version: 1

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.79	0.04	+/- 0.10
Ring Diameter	8.25	8.25	-0.00	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check: Passed

Diameter Check: Passed

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 11830728

Reference Calibration Date: 06-Jul-18 13:24:46

Engineer: WHITLOCK

Calibration Date: 31-Oct-18 14:22:50

Software Version: WL INSITE R5.8.9 (Build 6)

Calibration Version: 1

Host Tool Name: ACRt Instrument - 11830684

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0279	1.05	0.95	1.0076	1.05	0.95	0.9997	1.05
A2 (50")	0.95	1.0334	1.05	0.95	1.0139	1.05	0.95	1.0097	1.05
A3 (29")	0.95	1.0346	1.05	0.95	1.0146	1.05	0.95	1.0081	1.05
A4 (17")	0.95	1.0279	1.05	0.95	1.0063	1.05	0.95	1.0018	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0001	1.05	0.95	0.9950	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9869	1.05	0.95	0.9818	1.05

SONDE OFFSET

Subarray	R12KHz			R36KHz			R72KHz		
	(mmho/m)			(mmho/m)			(mmho/m)		
A1 (80")	0.315			-4.964			-5.711		
A2 (50")	0.409			-3.450			-5.485		
A3 (29")	-11.648			-3.720			-3.783		
A4 (17")	-90.980			-28.724			-23.707		
A5 (10")	N/A			-76.200			-37.537		
A6 (6")	N/A			280.488			149.005		

TRANSMITTER CURRENT GAIN

R-MUD VERIFICATION

Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.82	1.3	Mud Cell	0.95	0.99	1.05
36K	1.0	1.80	2.0				
72K	1.0	1.05	2.0				

PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET CHK	PASS

TOOL OK TO LOG

QUALITY CHECK SHOP CALIBRATION

Tool Name:	ACRt Sonde - 11830728	Reference Calibration Date:	06-Jun-18 14:01:20
Engineer:	WHITLOCK	Calibration Date:	31-Oct-18 14:33:20
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1
Host Tool Name:	ACRt Instrument - 11830684		

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")	-0.002	> -0.500	Pass	-0.006	> -0.500	Pass	-0.022	> -0.500	Pass
A5 (10")	-0.010	> -0.500	Pass	-0.017	> -0.500	Pass	-0.036	> -0.500	Pass
A6 (6")	0.014	< 0.500	Pass	0.063	< 0.500	Pass	0.138	< 0.500	Pass

GAIN TOLERANCE

R12KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-213173456.000	-213653808.000	480352.000	10682690.400	Pass
A2 (50")	-205651744.000	-206143280.000	491536.000	10307164.000	Pass
A3 (29")	-200817664.000	-201197776.000	380112.000	10059888.800	Pass
A4 (17")	-200193568.000	-200629872.000	436304.000	10031493.600	Pass
A5 (10")	-200252336.000	-200678960.000	426624.000	10033948.000	Pass
A6 (6")	-199820688.000	-200219344.000	398656.000	10010967.200	Pass

R36KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	48114080.000	48477272.000	363192.000	2423863.600	Pass
A2 (50")	33966292.000	34324412.000	358120.000	1716220.600	Pass
A3 (29")	28032378.000	28346680.000	314302.000	1417334.000	Pass
A4 (17")	27853682.000	28207516.000	353834.000	1410375.800	Pass
A5 (10")	27373208.000	27716930.000	343722.000	1385846.500	Pass
A6 (6")	26035236.000	26360300.000	325064.000	1318015.000	Pass

R72KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-92927656.000	-93022904.000	95248.000	4651145.200	Pass
A2 (50")	-90501024.000	-90617752.000	116728.000	4530887.600	Pass
A3 (29")	-88192472.000	-88292832.000	100360.000	4414641.600	Pass
A4 (17")	-88397088.000	-88515880.000	118792.000	4425794.000	Pass
A5 (10")	-86957704.000	-87076952.000	119248.000	4353847.600	Pass
A6 (6")	-87976216.000	-88080696.000	104480.000	4404034.800	Pass

PASS/FAIL SUMMARY

Std Deviation Verification	Pass
Average Verification	Pass
Gain Tolerance Verification	Pass

MICRO LOG SHOP CALIBRATION

Tool Name:	Microlog Pad - 10960494	Reference Calibration Date:	30-Sep-18 13:47:51
Engineer:	WHITLOCK	Calibration Date:	14-Dec-18 13:35:14
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1
Host Tool Name:	DSNT - 11019641		

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.14	-0.07	-0.01	-0.01	ohmm
Calibration Point #1	-0.07	0.00	-0.00	0.00	ohmm
Calibration Point #2	19.86	20.00	19.94	20.00	ohmm
Internal Reference	19.80	19.93	19.94	20.00	ohmm

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.06	0.13	V
Calibration Point #1	19.86	19.94	V

Calibration Point #1	18.08	2.07	V
Calibration Point #2	5320.00	6936.65	V
Internal Reference	5302.63	6935.59	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 10960494 **Reference Calibration Date:** 14-Dec-18 13:35:14
Engineer: WHITLOCK **Calibration Date:** 29-Jan-19 19:11:49
Software Version: WL INSITE R5.8.9 (Build 6) **Calibration Version:** 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.07	-0.07	-0.01	-0.01	ohmm
Internal Reference	19.93	19.94	20.00	20.00	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.93	19.94	-0.01	+/- 0.80
Microlog Lateral	20.00	20.00	0.00	+/- 0.80

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 11213308 **Reference Calibration Date:** 14-Dec-18 10:49:18
Engineer: WHITLOCK **Calibration Date:** 14-Dec-18 11:15:00
Software Version: WL INSITE R5.8.9 (Build 6) **Calibration Version:** 1

Logging Source S/N: 5475GW
 Aluminum Block S/N: El Reno Aluminum Block Density: 2.581g/cc Pe: 3.170
 Magnesium Block S/N: El Reno Magnesium Block Density: 1.687g/cc Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	0.9935	0.9902	0.90 - 1.10
Near Dens Gain	0.9891	0.9881	0.90 - 1.10
Near Peak Gain	1.0020	1.0148	0.90 - 1.10
Near Lith Gain	1.0071	1.0175	0.90 - 1.10
Far Bar Gain	1.0015	1.0048	0.90 - 1.10
Far Dens Gain	0.9919	0.9938	0.90 - 1.10
Far Peak Gain	0.9878	0.9921	0.90 - 1.10
Far Lith Gain	0.9743	0.9808	0.90 - 1.10
Near Bar Offset	0.1918	0.2246	NONE
Near Dens Offset	0.2308	0.2401	NONE
Near Peak Offset	0.0959	-0.0122	NONE
Near Lith Offset	0.0296	-0.0574	NONE
Far Bar Offset	0.0411	0.0135	NONE
Far Dens Offset	0.1442	0.1314	NONE
Far Peak Offset	0.1660	0.1305	NONE
Far Lith Offset	0.2364	0.1860	NONE
Near Bar Background	937.48	939.15	700 - 1450
Near Dens Background	311.57	312.43	230 - 480
Near Peak Background	135.23	136.70	100 - 210
Near Lith Background	166.58	166.31	125 - 260
Far Bar Background	479.15	478.16	450 - 900
Far Dens Background	191.75	190.12	175 - 345
Far Peak Background	77.50	76.92	70 - 140
Far Lith Background	79.00	78.81	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading	Calibrated	Change	Control Limit
-------------	-----------------	------------	--------	---------------

Measurement	(Previous Coef)	(New Coef)	Change	On Change
MAGNESIUM				
Density (g/cc)	1.689	1.687	-0.002	+/- 0.015
Pe	2.556	2.551	-0.005	+/- 0.150
ALUMINUM				
Density (g/cc)	2.580	2.581	0.001	+/- 0.01500
Pe	3.107	3.123	0.016	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0000	+/- 0.0110	-0.0004	+/- 0.0140
Magnesium Block	-0.0005	+/- 0.0110	-0.0010	+/- 0.0140
Aluminum Block	-0.0013	+/- 0.0110	0.0004	+/- 0.0140
Resolution	9.27	6.00 - 11.50	9.45	6.00 - 11.50
Internal Verifier(B+D+P+L)	1555	1200 - 2700	824	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 - 11213308	Reference Calibration Date:	14-Dec-18 11:15:00
Engineer:	WHITLOCK	Calibration Date:	29-Jan-19 19:18:47
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Pad Temperature: 68.2 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1554.595	1556.967	2.372	15.869
Far (B+D+P+L) cps	824.007	819.972	-4.035	15.826
Near Resolution	9.27	9.20	-0.070	0.50
Far Resolution	9.45	9.37	-0.080	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-12345678						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
RWCH-12345678						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	2420.00	-----	-----	0.00	-----	lbs
GTET-11013113						

Gamma Ray Calibrator	225.9	221.8	-----	4.1	+/- 9.00	api
DSNT-11019641						
Snow-Block Porosity	0.0724	0.0771	-----	-0.0047	+/- 0.0150	decp
SDLT-10960494						
Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
ACRt Sonde-11830728						
Mud Cell	0.99	-----	-----	0	-----	ohm-m
Microlog Pad-10960494						
MicroLog Normal	19.93	19.94	-----	-0.01	+/-0.80	ohmm
MicroLog Lateral	20.00	20.00	-----	0.00	+/-0.80	ohmm
SDLT Pad-11213308						
Near(B+D+P+L)	1554.595	1556.967	-----	-2.372	+/-15.869	cps
Far(B+D+P+L)	824.007	819.972	-----	4.035	+/-15.826	cps
Data: HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRTVIDLE					Date: 30-Jan-19 12:26:04	

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	9.000	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	1.000	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	5000.00	ft
	SHARED	BHT	Bottom Hole Temperature	125.0	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	SOCI	Source of Casing Information	Parameters	
	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 /				

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	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: HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRTIDLE

Date: 30-Jan-19 12:27:38

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		Ø 2.310 in				74.37 ft

RWCH-12345678
135.00 lbs

Ø 3.625 in →

← Load Cell @ 70.68 ft
← BH Temperature @ 70.12 ft

6.25 ft

Weak Point Solid-
00000025
0.01 lbs

Ø 0.010 in* →

68.12 ft

SP Sub-11812437
60.00 lbs

Ø 3.625 in →

← SP @ 66.34 ft

3.74 ft

← Z-Accelerometer @ 63.93 ft

64.38 ft

GTET-11013113
165.00 lbs

Ø 3.625 in →

← GammaRay @ 58.32 ft

8.52 ft

55.86 ft

DSN Decentralizer-
11660709
6.60 lbs

Ø 5.000 in* →

Ø 3.625 in →

← DSN Far @ 48.92 ft
← DSN Near @ 48.17 ft

9.69 ft

46.17 ft

DSNT-11019641
174.00 lbs

SDLT Pad-11213308
65.00 lbs
Microlog Pad-10960494
8.00 lbs

Ø 4.500 in →

Ø 4.500 in* →

Ø 4.750 in* →

Ø 0.800 in* →

← Microlog @ 38.36 ft
← SDL Caliper @ 38.17 ft
← SDL @ 38.16 ft

10.81 ft

35.36 ft

SDLT-10960494
360.00 lbs

RAM-Cs137-00005475
1.00 lbs

BSAT-12173982
300.00 lbs

Ø 3.625 in →

← Receiver Array @ 26.84 ft
← Sonic Receivers @ 26.84 ft

15.77 ft

19.58 ft

ACRt Instrument-
11830684
50.00 lbs

Ø 3.625 in →

5.03 ft



ACRt Sonde-
11830728
200.00 lbs

Ø 3.625 in →

← Mud Resistivity @ 13.19 ft

← ACRt @ 9.21 ft

14.22 ft

14.55 ft

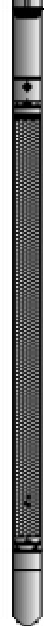
0.33 ft

0.33 ft

0.00 ft

Bull Nose-00000001
5.00 lbs

Ø 2.750 in →



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	12345678	135.00	6.25	68.12	300.00
WPSS	Weak Point Solid	00000025	0.01	0.01	* 68.12	300.00
SP	SP Sub	11812437	60.00	3.74	64.38	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	55.86	60.00
DSNT	Dual Spaced Neutron	11019641	174.00	9.69	46.17	60.00
DCNT	DSN Decentralizer	11660709	6.60	5.13	* 49.50	300.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	35.36	60.00
SDLP	Density Insite Pad	11213308	65.00	2.55	* 37.57	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	00005475	1.00	0.80	* 37.80	300.00
MICP	Microlog Pad	10960494	8.00	1.00	* 37.86	60.00
BSAT	Borehole Sonic Array Tool	12173982	300.00	15.77	19.58	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11830684	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11830728	200.00	14.22	0.33	120.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00
Total			1,529.61	74.37		

* Not included in Total Length and Length Accumulation.

Data: HERMAN_BRENSING\0001 RWCH-SP-GTET-DSNT-SDLT-BSAT-ACRT\IDLE

Date: 30-Jan-19 12:29:10