

HALLIBURTON

MICROLOG

COMPANY				HERMAN L. LOEB, LLC			
WELL				YOST 4-28			
FIELD/BLOCK				EINSEL			
COUNTY				KIOWA			
STATE				KANSAS			
Permanent Datum		GL		Elev. 2199.0 ft		Other Services:	
Log measured from		KB		D.F.		DSNT	
Drilling measured from		KB		G.L.		ACRT	
Date		12-Oct-18					
Run No.		ONE					
Depth - Driller		4840.0 ft					
Depth - Logger		4838.0 ft					
Bottom - Logged Interval		4816.0 ft					
Top - Logged Interval		3800.0 ft					
Casing - Driller		8.625 in		@ 609.0 ft		@	
Casing - Logger		607.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		Water Based Mud					
Density		9.1 ppg		65.00 s/qt			
PH		10.50 pH		10.0 cpm			
Source of Sample		FLOWLINE					
Rm @ Meas. Temperature		0.56 ohmm		@ 75.00 degF		@	
Rmf @ Meas. Temperature		0.45 ohmm		@ 75.00 degF		@	
Rmc @ Meas. Temperature		0.67 ohmm		@ 75.00 degF		@	
Source Rmf		MEAS		MEAS			
Rm @ BHT		0.36 ohmm		@ 121.0 degF		@	
Time Since Circulation		04:21 hr					
Time on Bottom		12-Oct-18 22:56					
Max. Rec. Temperature		121.00 degF		@ 4838.0 ft		@	
Equipment		12156883		EL RENO, OK			
Recorded By		SEAN WOLTEMATH					
Witnessed By		JON CHRISTENSEN		GEORGE PAYNE			

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Service Ticket No.: 905191351				API No.: 15-097-21845-00-00				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		Scale Down Hole					
Depth-Driller																	
Type Fluid in Hole																	
Density		Viscosity															
Ph		Fluid Loss															
Source of Sample						RESISTIVITY EQUIPMENT DATA											
Rm @ Meas. Temp		@		@		Run No.		Tool Type & No.		Pad Type		Tool Pos.		Other			
Rmf @ Meas. Temp.		@		@		ONE		ACRT		N/A		ECEN.		N/A			
Rmc @ Meas. Temp.		@		@				I-11830684									
Source Rmf		Rmc						S-11830728									
Rm @ BHT		@		@													
Rmf @ BHT		@		@													
Rmc @ BHT		@		@													
EQUIPMENT DATA																	
GAMMA				ACOUSTIC				DENSITY				NEUTRON					
Run No.		ONE		Run No.				Run No.		ONE		Run No.		ONE			
Serial No.		11013113		Serial No.				Serial No.		11213308		Serial No.		11019641			
Model No.		GTET		Model No.				Model No.		SDLT		Model No.		DSNT			
Diameter		3.625"		No. of Cent.				Diameter		5.5"		Diameter		3.625"			
Detector Model No.		GTET		Spacing				Log Type		GAM-GAM		Log Type		NEU-NEU			
Type		SCINT						Source Type		Cs-137		Source Type		Am241Be			
Length		8"		LSA [Y/N]				Serial No.		5475GW		Serial No.		DSN-436			
Distance to Source		10'		FWDA [Y/N]				Strength		1.78 Ci		Strength		15.0 Ci			
LOGGING DATA																	
GENERAL				GAMMA		ACOUSTIC		DENSITY				NEUTRON					
Run		Depth		Speed		Scale		Scale		Scale		Matrix		Scale		Matrix	
No.		From To		ft/min		L R		L R		L R		Matrix		L R		Matrix	
ONE		TD		2800		BEC		0		150		20		10		2.71 g/cc	

ONE	ID	3800	REC	0	150					30	-10	2.71 g/cc	30	-10	LIME		
DIRECTIONAL INFORMATION																	
Maximum Deviation										@	KOP						@
Remarks:																	
GTET-DSNT-SDLT-ACRT RUN IN COMBINATION																	
ANNULAR HOLE VOLUME CALCULATED USING 5.5 INCH CASING																	
CHLORIDES REPORTED AT 6000 ppm																	



Plot Time: 13-Oct-18 00:42:40

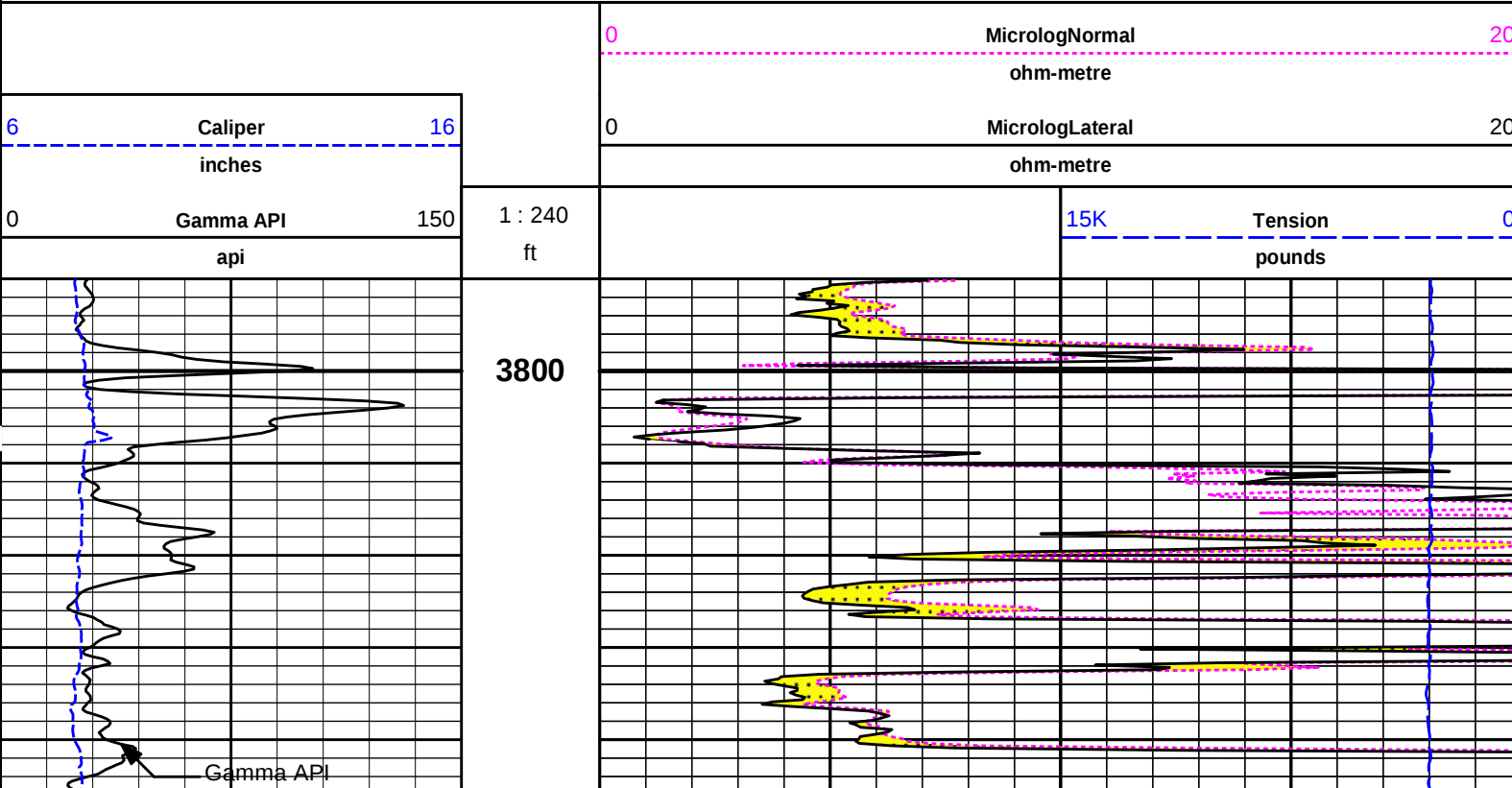
Plot Range: 3790 ft to 4843.83 ft

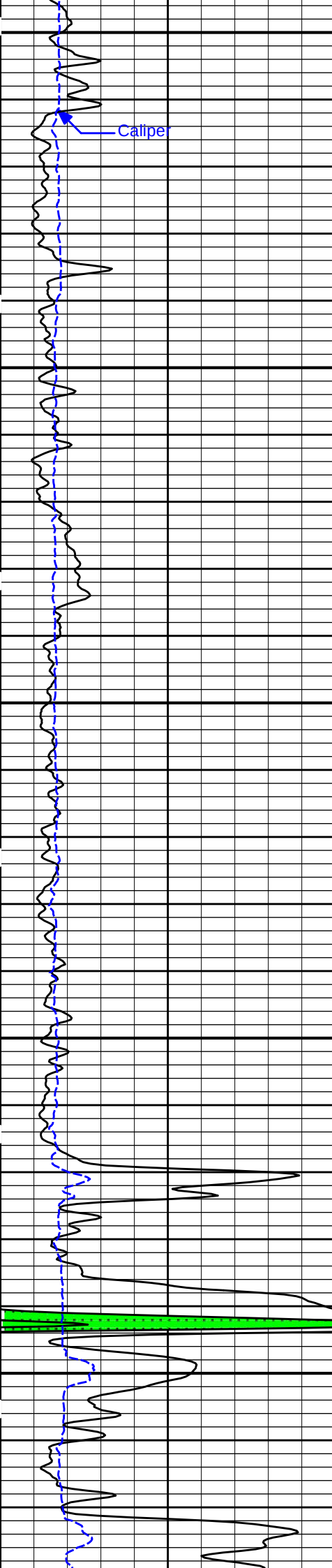
Data: HERMAN_YOST4-28\Well Based\DETAILS\

Plot File: \\LOCAL-HERMAN_YOST4-28\Well Based\ML\Microlog_IQ_5_main

5 INCH MAIN LOG

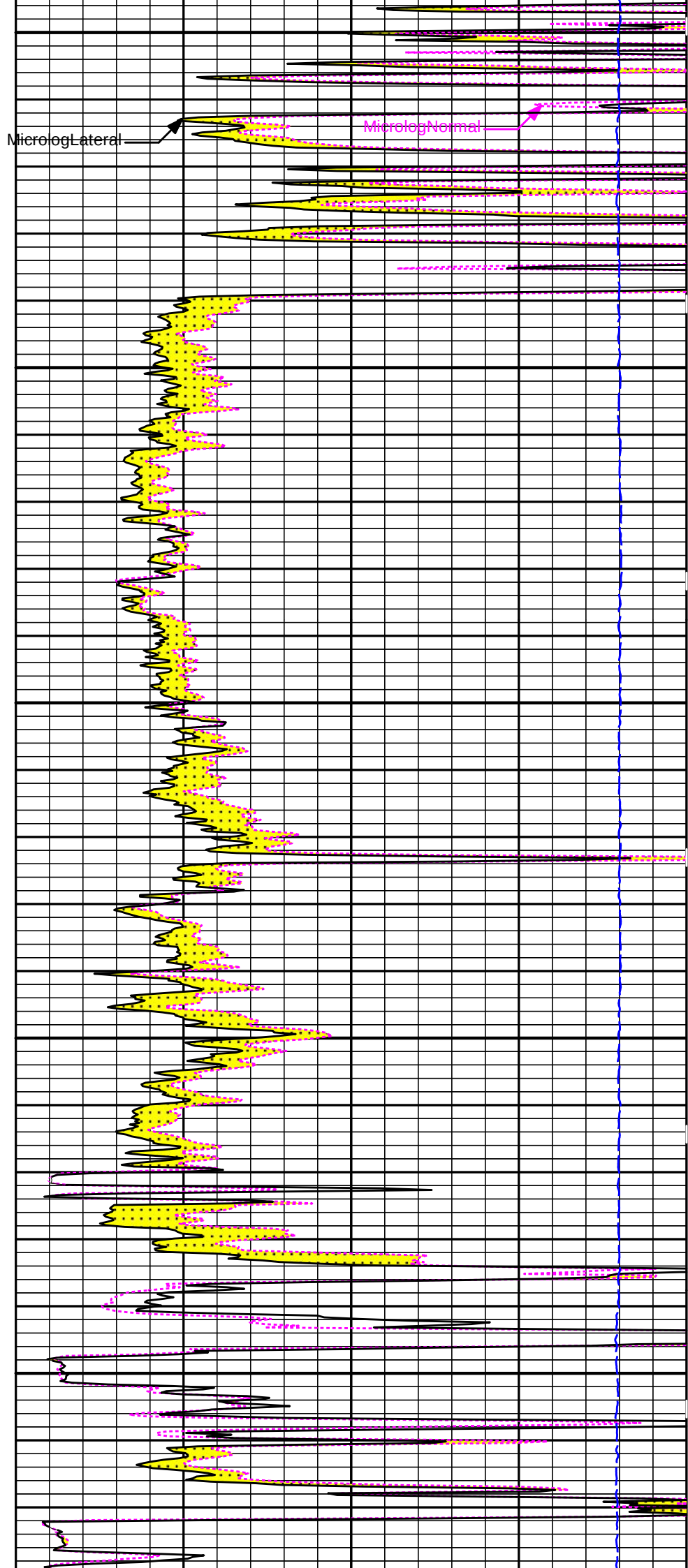
MAIN LOG 5" PER 100'

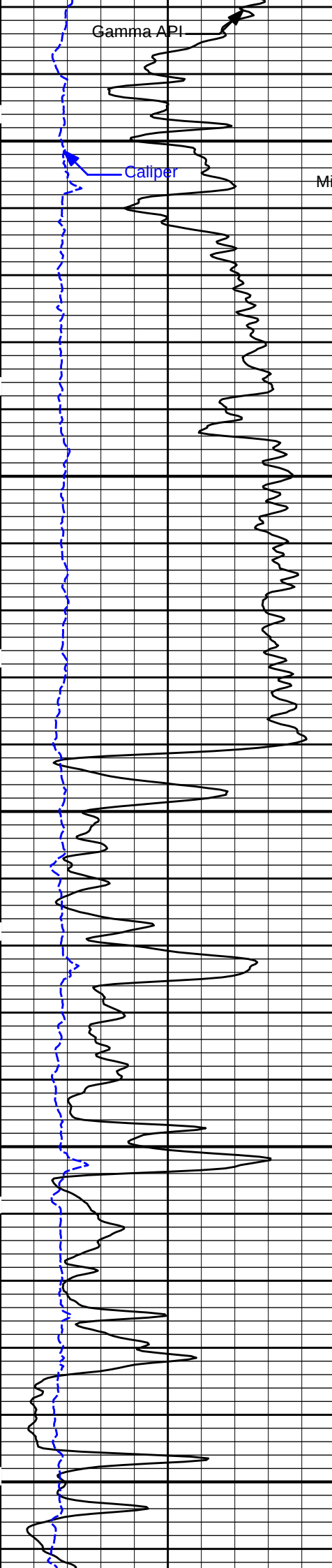




3900

4000



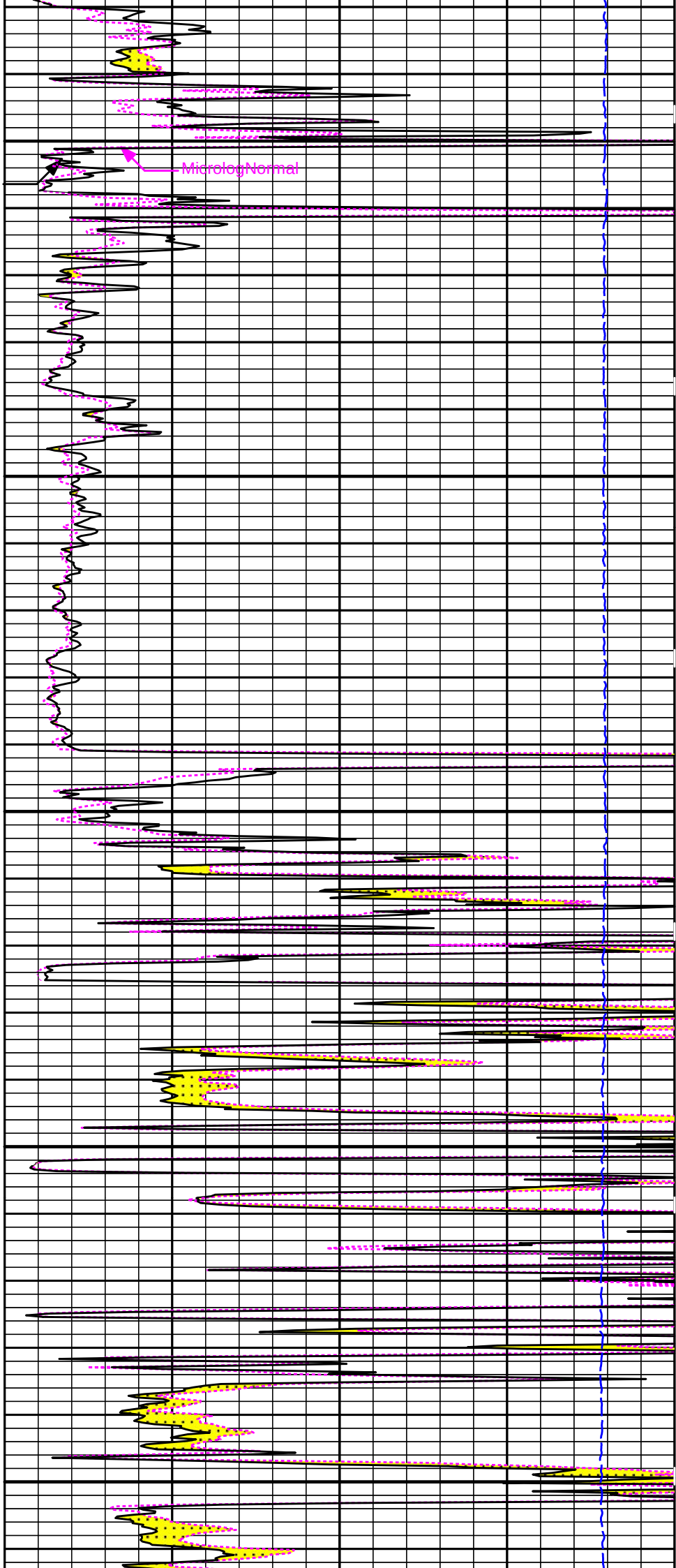


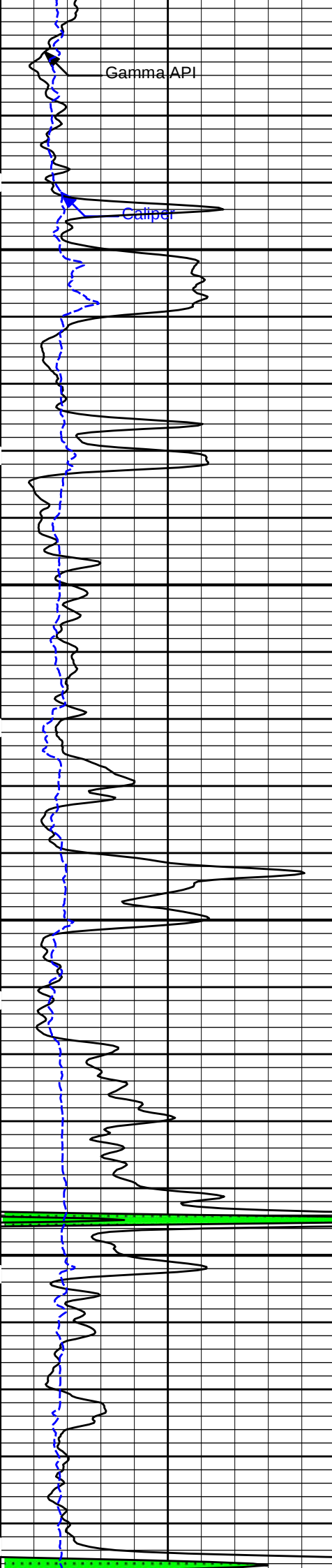
4100

MicrologLateral

4200

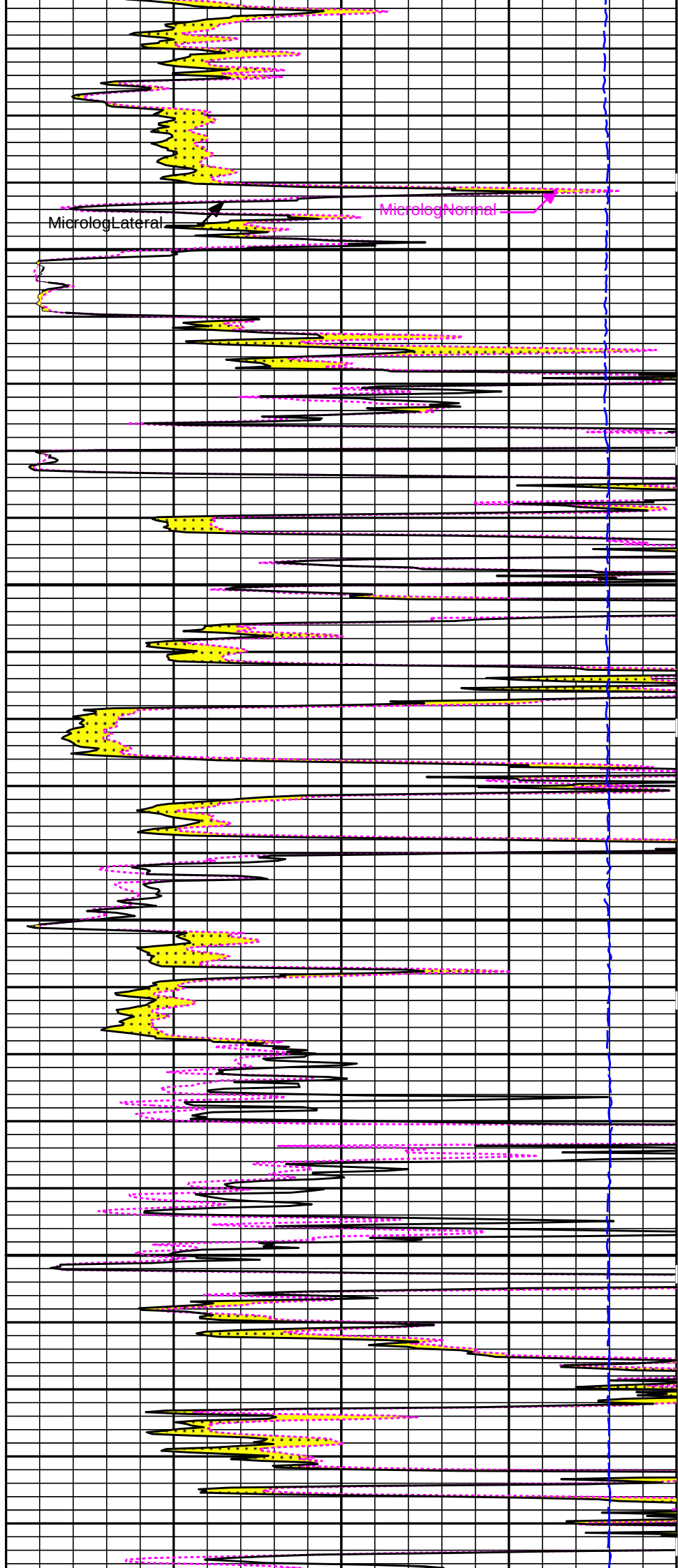
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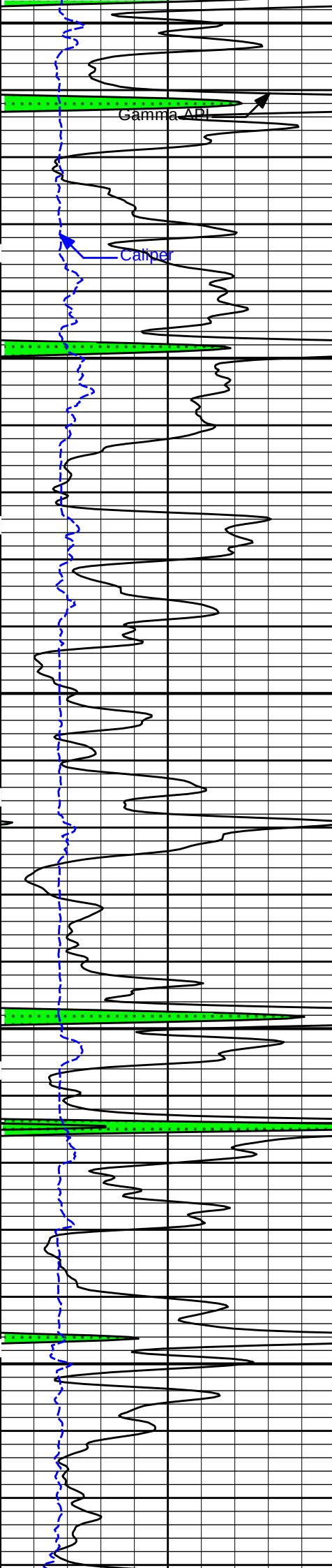




4400

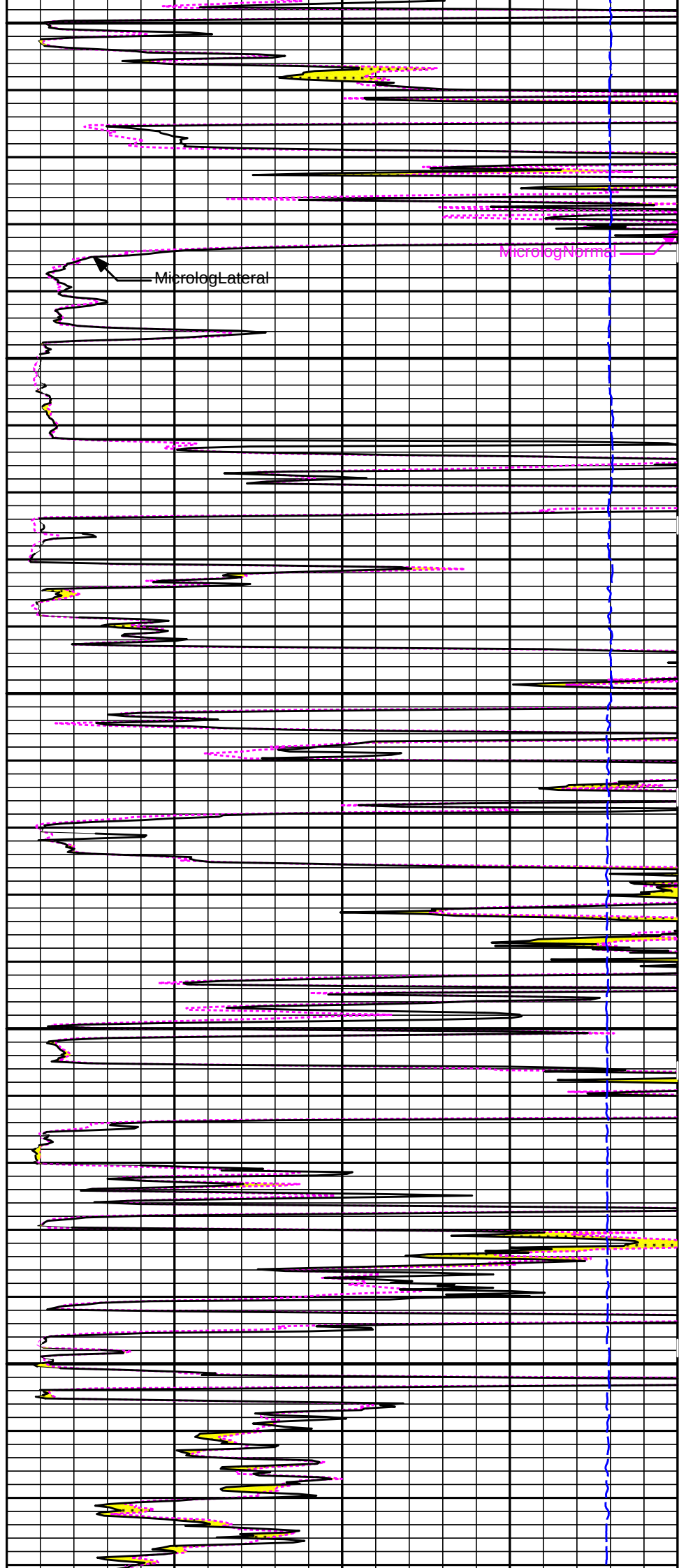
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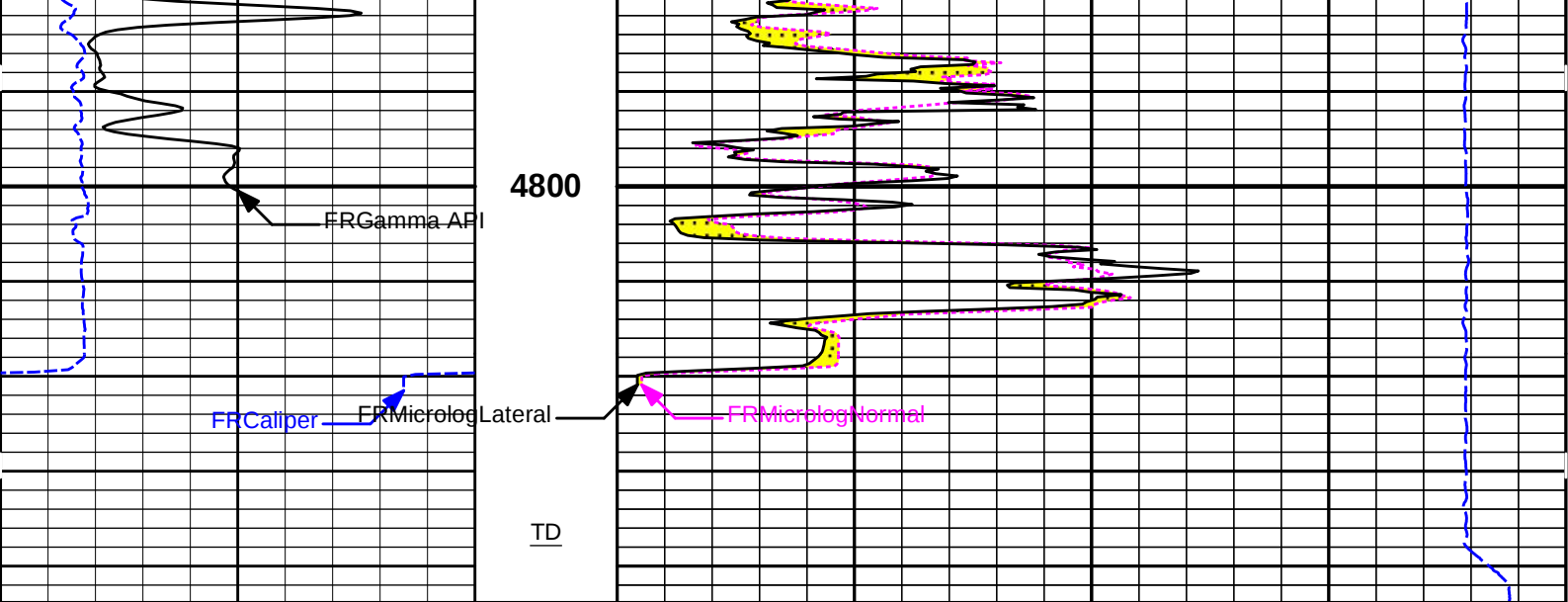




4600

4700





0	Gamma API	150	1 : 240		15K	Tension	0
	api		ft			pounds	
6	Caliper	16		0	MicrologLateral		20
	inches				ohm-metre		
				0	MicrologNormal		20
					ohm-metre		

HALLIBURTON

Plot Time: 13-Oct-18 00:42:42
Plot Range: 3790 ft to 4843.83 ft
Data: HERMAN_YOST4-28\Well Based\DETAILS\
Plot File: \\-LOCAL-\\HERMAN_YOST4-28\Well Based\ML\Microlog_IQ_5_main

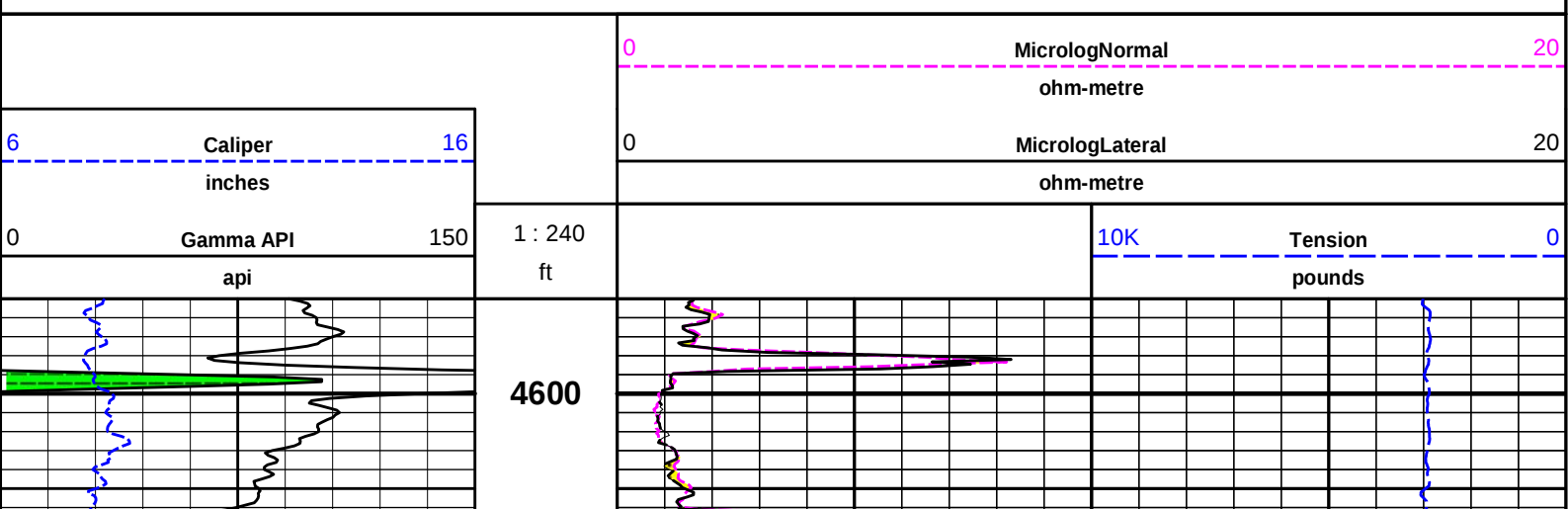
5 INCH MAIN LOG

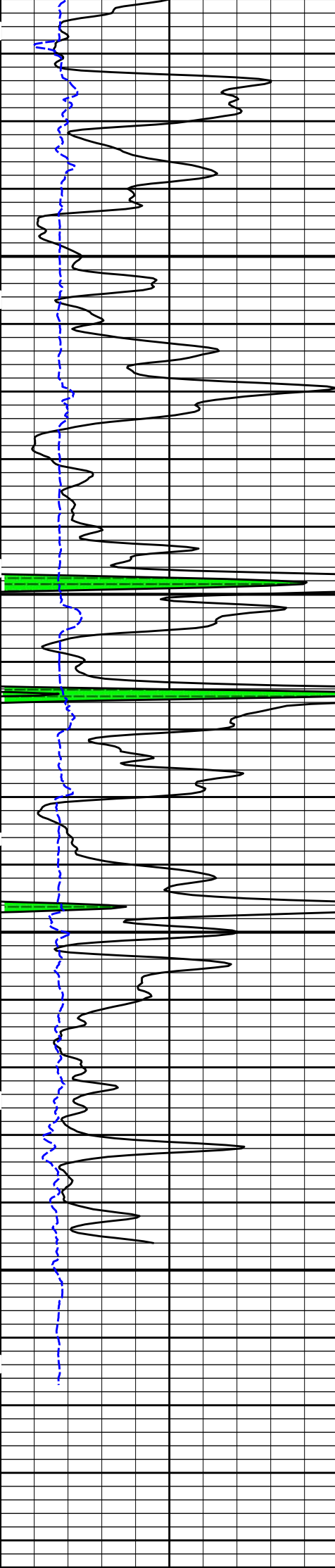
MAIN LOG 5" PER 100'

HALLIBURTON

Plot Time: 13-Oct-18 00:42:42
Plot Range: 4590 ft to 4844 ft
Data: HERMAN_YOST4-28\Well Based\REPEAT\
Plot File: \\-LOCAL-\\HERMAN_YOST4-28\Well Based\ML\Microlog_IQ_5_rep

REPEAT SECTION

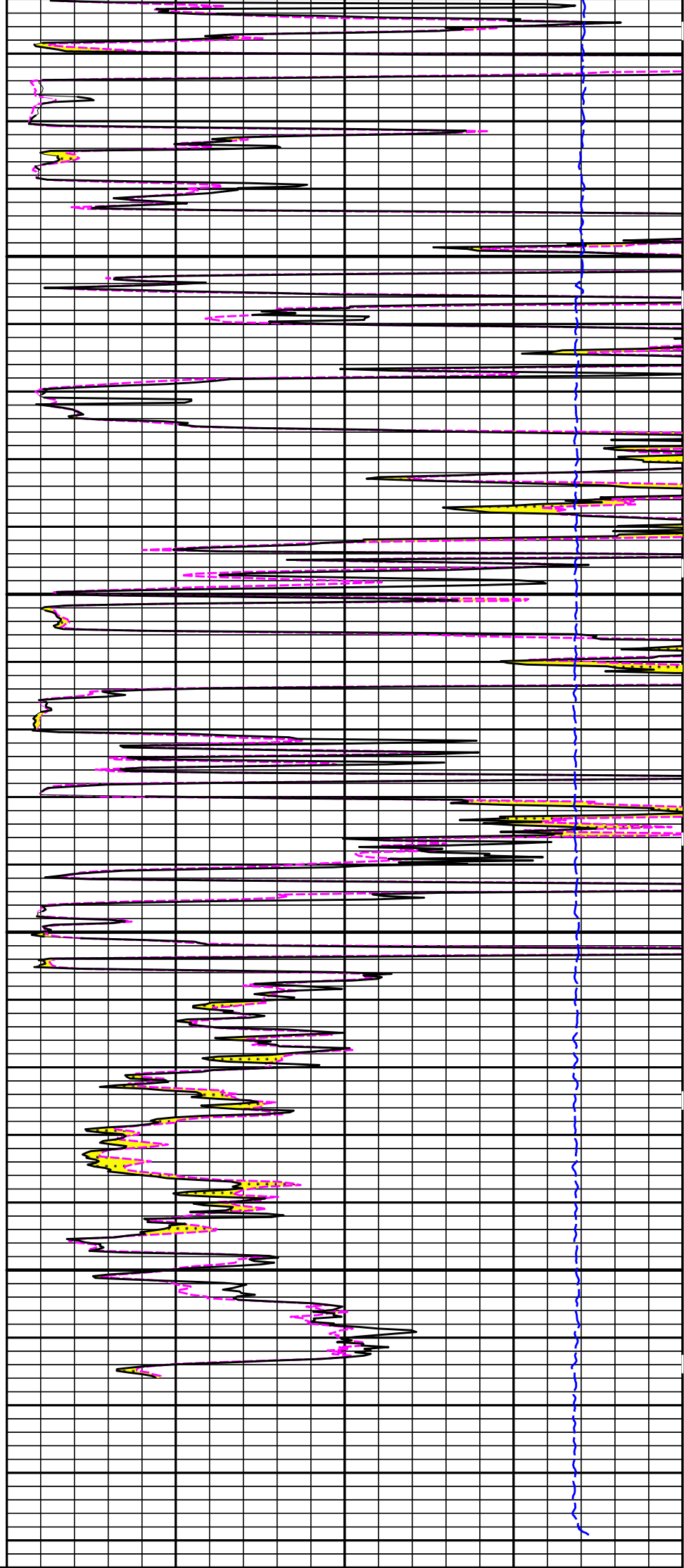




4700

4800

TD



0	Gamma API	150	1 : 240	10K	Tension	0
	api		ft		pounds	
6	Caliper	16		0	MicrologLateral	20
	inches				ohm-metre	
				0	MicrologNormal	20
					ohm-metre	

HALLIBURTON Plot Time: 13-Oct-18 00:42:44 Plot Range: 4590 ft to 4844 ft Data: HERMAN_YOST4-28\Well Based\REPEAT\ Plot File: \\-LOCAL-\\HERMAN_YOST4-28\Well Based\ML\Microlog_IQ_5_rep			REPEAT SECTION		
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HALLIBURTON PARAMETERS REPORT					
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Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.100	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	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	4840.00	ft
	SHARED	BHT	Bottom Hole Temperature	120.0	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 / 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	
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	Eccentered	
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_YOST4-28\0001 RWCH-SP-GTET-DSNT-SDLT-ACRT\004 12-Oct-18 22:56 Up @4844.3f				Date: 12-Oct-18 23:11:01

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:GTET - 11013113Reference Calibration Date:02-May-18 11:20:36

Engineer:WHITLOCKCalibration Date:05-Aug-18 09:58:00

Software Version:WL INSITE R5.6.3 (Build 4)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	26.4	26.2	api
Background + Calibrator	253.6	252.1	api
Calibrator	227.2	225.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	GTET - 11013113	Reference Calibration Date:	05-Aug-18 09:58:00																
Engineer:	SEAN WOLTEMATH	Calibration Date:	10-Oct-18 14:08:40																
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																			
<table><tr><th>Field Verification</th><th>Shop</th><th>Field</th><th>Units</th></tr><tr><td>Background</td><td>26.2</td><td>21.3</td><td>api</td></tr><tr><td>Background + Calibrator</td><td>252.1</td><td>244.5</td><td>api</td></tr><tr><td>Calibrator</td><td>225.9</td><td>223.2</td><td>api</td></tr></table>				Field Verification	Shop	Field	Units	Background	26.2	21.3	api	Background + Calibrator	252.1	244.5	api	Calibrator	225.9	223.2	api
Field Verification	Shop	Field	Units																
Background	26.2	21.3	api																
Background + Calibrator	252.1	244.5	api																
Calibrator	225.9	223.2	api																
<table><tr><th>Shop</th><th>Field</th><th>Difference</th><th>Tolerance</th></tr><tr><td>225.9</td><td>223.2</td><td>2.7</td><td>+/- 9.00</td></tr></table>				Shop	Field	Difference	Tolerance	225.9	223.2	2.7	+/- 9.00								
Shop	Field	Difference	Tolerance																
225.9	223.2	2.7	+/- 9.00																

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11019641	Reference Calibration Date:	04-Aug-18 12:03:14
Engineer:	SCHLIEM	Calibration Date:	04-Aug-18 12:26:27
Software Version:	WL INSITE R5.6.3 (Build 4)	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: 89 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.97922	0.97742	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):	0.2364	0.2358	0.0006	+/- 0.0020
Calibrated Ratio:	10.5794	10.5599	0.019	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0667	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:	04-Aug-18 12:26:27
Engineer:	SEAN WOLTEMATH		Calibration Date:	10-Oct-18 14:28:25
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):	0.0667	0.0766	0.0099	+/- 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:	10-Oct-18 14:49:27
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:	10-Oct-18 14:49:27
Engineer:	SEAN WOLTEMATH	Calibration Date:	10-Oct-18 15:10:30
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

MICRO LOG SHOP CALIBRATION			
Tool Name:	Microlog Pad - 10960494	Reference Calibration Date:	08-Jun-18 16:08:54
Engineer:	WHITLOCK	Calibration Date:	30-Sep-18 13:47:51
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	-0.07	-0.14	-0.00	-0.01	ohmm
Calibration Point #1	0.07	0.00	0.00	0.00	ohmm
Calibration Point #2	20.01	20.00	19.95	20.00	ohmm
Internal Reference	19.84	19.83	19.92	19.97	ohmm
Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
Tool Zero	-0.08		0.35		V
Calibration Point #1	37.72		2.09		V
Calibration Point #2	5356.95		6956.77		V
Internal Reference	5312.51		6945.81		V

MICRO LOG FIELD CHECK

Tool Name:	Microlog Pad - 10960494	Reference Calibration Date:	30-Sep-18 13:47:51
Engineer:	SEAN WOLTEMATH	Calibration Date:	10-Oct-18 14:04:57
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	-0.14	-0.14	-0.01	-0.01	ohmm
Internal Reference	19.83	19.79	19.97	19.93	ohmm
Summary					
Signal	Shop	Field	Difference	Tolerance	
Microlog Normal	19.83	19.79	0.04	+/- 0.80	
Microlog Lateral	19.97	19.93	0.04	+/- 0.80	

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	SDLT Pad - 11213308	Reference Calibration Date:	17-Sep-18 12:07:25
Engineer:	WHITLOCK	Calibration Date:	17-Sep-18 12:30:06
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Logging Source S/N: 5475GW

Aluminum Block S/N: EL RENO

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	1.0089	1.0095	0.90 - 1.10
Near Dens Gain	0.9949	0.9972	0.90 - 1.10
Near Peak Gain	1.0098	1.0259	0.90 - 1.10
Near Lith Gain	1.0052	1.0142	0.90 - 1.10
Far Bar Gain	1.0078	1.0061	0.90 - 1.10
Far Dens Gain	0.9950	0.9953	0.90 - 1.10
Far Peak Gain	0.9901	0.9911	0.90 - 1.10
Far Lith Gain	0.9745	0.9764	0.90 - 1.10
Near Bar Offset	0.0471	0.0438	NONE
Near Dens Offset	0.1758	0.1544	NONE
Near Peak Offset	0.0270	-0.1077	NONE
Near Lith Offset	0.0345	-0.0412	NONE
Far Bar Offset	-0.0195	-0.0036	NONE
Far Dens Offset	0.1103	0.1086	NONE
Far Peak Offset	0.1339	0.1248	NONE

Far Lith Offset	0.2115	0.1964	NONE
Near Bar Background	945.62	947.60	700 - 1450
Near Dens Background	315.82	314.50	230 - 480
Near Peak Background	136.57	137.87	100 - 210
Near Lith Background	168.89	168.30	125 - 260
Far Bar Background	482.51	480.15	450 - 900
Far Dens Background	193.40	193.79	175 - 345
Far Peak Background	78.35	78.65	70 - 140
Far Lith Background	80.88	79.56	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	2.557	2.563	0.006	+/- 0.150
ALUMINUM				
Density (g/cc)	2.580	2.580	-0.000	+/- 0.01500
Pe	3.115	3.136	0.021	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0003	+/- 0.0110	0.0015	+/- 0.0140
Magnesium Block	0.0001	+/- 0.0110	-0.0007	+/- 0.0140
Aluminum Block	-0.0000	+/- 0.0110	-0.0006	+/- 0.0140
Resolution	9.24	6.00 - 11.50	9.28	6.00 - 11.50
Internal Verifier(B+D+P+L)	1568	1200 - 2700	832	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:	17-Sep-18 12:30:06
Engineer:	SEAN WOLTEMATH	Calibration Date:	10-Oct-18 14:13:05
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	1568.269	1563.061	-5.208	15.935
Far (B+D+P+L) cps	832.156	829.464	-2.692	15.879
Near Resolution	9.24	9.27	0.030	0.50
Far Resolution	9.28	9.42	0.140	1.00

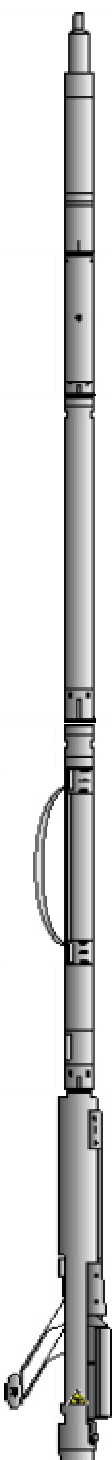
PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed

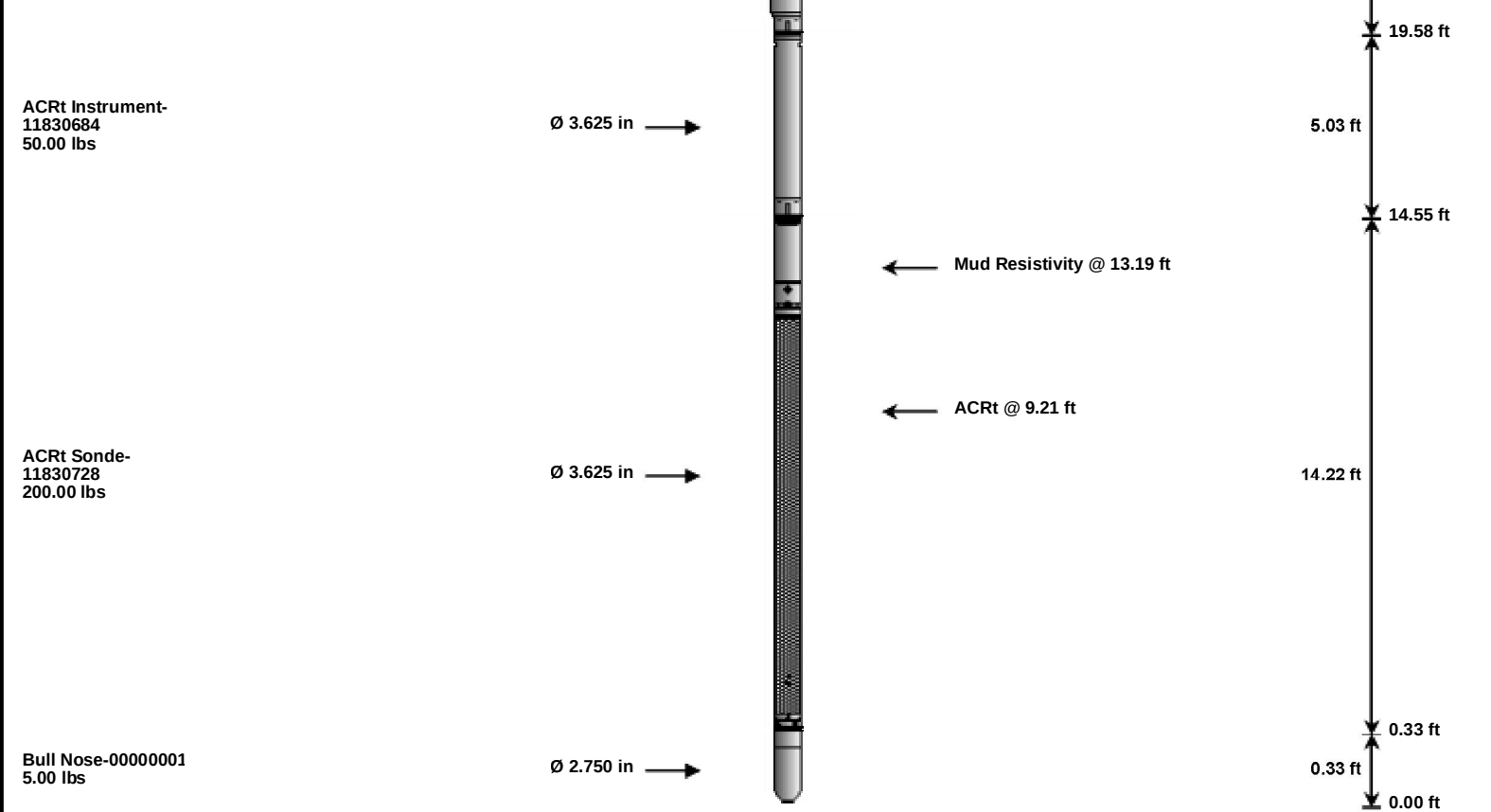
Bkg Quality Check:				Passed					
Bkg Resolution Check:				Passed					
Bkg Verification Check:				Passed					
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION									
Tool Name:		ACRt Sonde - 11830728				Reference Calibration Date:		23-Feb-18 10:15:37	
Engineer:		WHITLOCK				Calibration Date:		06-Jun-18 13:24:46	
Software Version:		WL INSITE R5.6.3 (Build 4)				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:		23-Feb-18 10:21:17	
Engineer:		WHITLOCK				Calibration Date:		06-Jun-18 14:01:20	
Software Version:		WL INSITE R5.6.3 (Build 4)				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

Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
Microlog Pad-10960494						
MicroLog Normal	19.83	19.79	-----	0.04	+/-0.80	ohmm
MicroLog Lateral	19.97	19.93	-----	0.04	+/-0.80	ohmm
SDLT Pad-11213308						
Near(B+D+P+L)	1568.269	1563.061	-----	5.208	+/-15.935	cps
Far(B+D+P+L)	832.156	829.464	-----	2.692	+/-15.879	cps
ACRt Sonde-11830728						
Mud Cell	0.99	-----	-----	0	-----	ohm-m
Data: HERMAN_YOST4-28\0001 RWCH-SP-GTET-DSNT-SDLT-ACRTIDLE						
Date: 12-Oct-18 23:13:27						

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						58.59 ft
RWCH-12345678 135.00 lbs		Ø 2.310 in →		← Fishing Neck @ 57.71 ft		
		Ø 3.625 in →		← Load Cell @ 54.91 ft ← BH Temperature @ 54.34 ft	6.25 ft	
	Weak Point Solid- 00000025 0.01 lbs	Ø 0.010 in* →				52.34 ft
SP Sub-11812437 60.00 lbs		Ø 3.625 in →		← SP @ 50.56 ft	3.74 ft	
				← Z-Accelerometer @ 48.15 ft		48.60 ft
GTET-11013113 165.00 lbs		Ø 3.625 in →			8.52 ft	
				← GammaRay @ 42.54 ft		40.08 ft
DSNT-11019641 174.00 lbs	DSN Decentralizer- 11019641 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 33.15 ft ← DSN Near @ 32.40 ft	9.69 ft	
						30.40 ft
SDLT-10960494 360.00 lbs	SDLT Pad-11213308 65.00 lbs Microlog Pad-10960494 8.00 lbs RAM-Cs137-00005475 1.00 lbs	Ø 4.500 in → Ø 4.500 in* → Ø 4.750 in* → Ø 0.800 in* →		← Microlog @ 22.58 ft ← SDL Caliper @ 22.40 ft ← SDL @ 22.39 ft	10.81 ft	



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	52.34	300.00	
WPSS	Weak Point Solid	00000025	0.01	0.01	*	52.34	300.00
SP	SP Sub	11812437	60.00	3.74	48.60	300.00	
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	40.08	60.00	
DSNT	Dual Spaced Neutron	11019641	174.00	9.69	30.40	60.00	
DCNT	DSN Decentralizer	11019641	6.60	5.13	*	33.73	300.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	19.58	60.00	
SDLP	Density Insite Pad	11213308	65.00	2.55	*	21.79	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	00005475	1.00	0.80	*	22.02	300.00
MICP	Microlog Pad	10960494	8.00	1.00	*	22.08	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			1,229.61	58.59			
* Not included in Total Length and Length Accumulation.							
Data: HERMAN_YOST4-28\0001 RWCH-SP-GTET-DSNT-SDLT-ACRT\004 12-Oct-18 22:56 Up @4844.3f					Date: 12-Oct-18 23:08:40		

COMPANY	HERMAN L. LOEB, LLC		
WELL	YOST 4-28		
FIELD	EINSEL		
COUNTY	KIOWA	STATE	KANSAS
HALLIBURTON		MICROLOG	