

HALLIBURTON

MICRO LOG

COMPANY WELL FIELD/BLOCK COUNTY STATE				HERMAN L. LOEB UNRUH 'D' 1-21 WILDCAT KIOWA KANSAS			
COMPANY WELL FIELD/BLOCK COUNTY				HERMAN L. LOEB UNRUH 'D' 1-21 WILDCAT KIOWA STATE KANSAS			
API No. 15-097-21750-00-00 Location 1100' FSL 2290' FWL				Other Services: DSNT/SDLT ACRT BSAT			
Permanent Datum GL Log measured from KB Drilling measured from KB				Elev. 2191.0 ft D.F. 2200.0 ft 2191.0 ft			
Date 28-Feb-13							
Run No. ONE							
Depth - Driller							
Depth - Logger							
Bottom - Logged Interval							
Top - Logged Interval							
Casing - Driller							
Casing - Logger							
Bit Size							
Type Fluid in Hole							
Density							
PH							
Source of Sample							
Rm @ Meas. Temperature							
Rmf @ Meas. Temperature							
Rmc @ Meas. Temperature							
Source Rmf							
Rm @ BHT							
Time Since Circulation							
Time on Bottom							
Max. Rec. Temperature							
Equipment							
Recorded By							
Witnessed By							

Fold here

Service Ticket No.: 900256448				API Serial No.: 15-097-21750-00-00				PGM Version: WL INSITE R3.8.0 (Build 2)							
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	

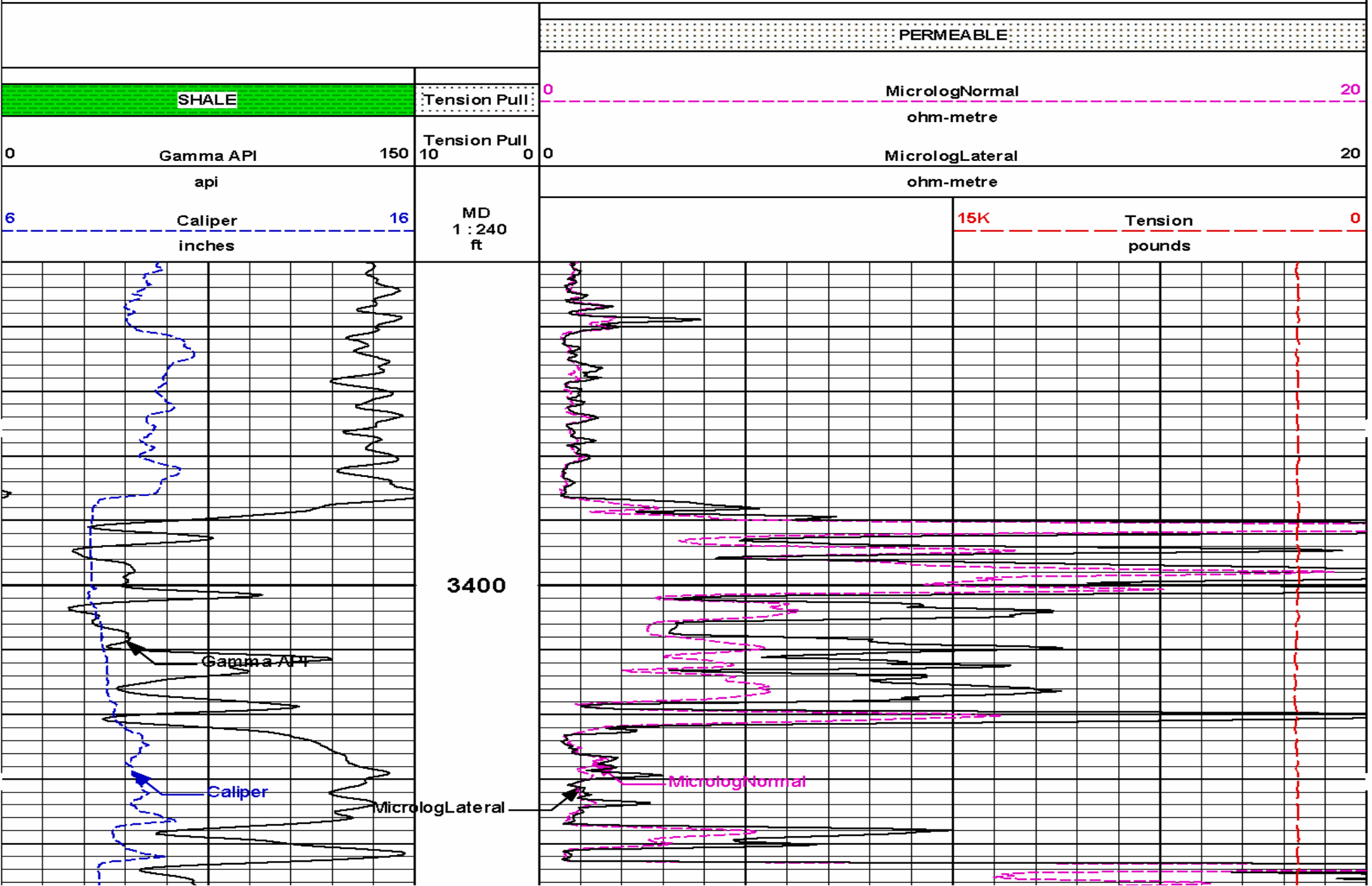
Rmf @ Meas. Temp.	@	@	ONE	MICRO	RUBBER	ADJ.	N/A
Rmc @ Meas. Temp.	@	@		11014296			
Source Rmf	Rmc						
Rm @ BHT	@	@					
Rmf @ BHT	@	@					
Rmc @ BHT	@	@					

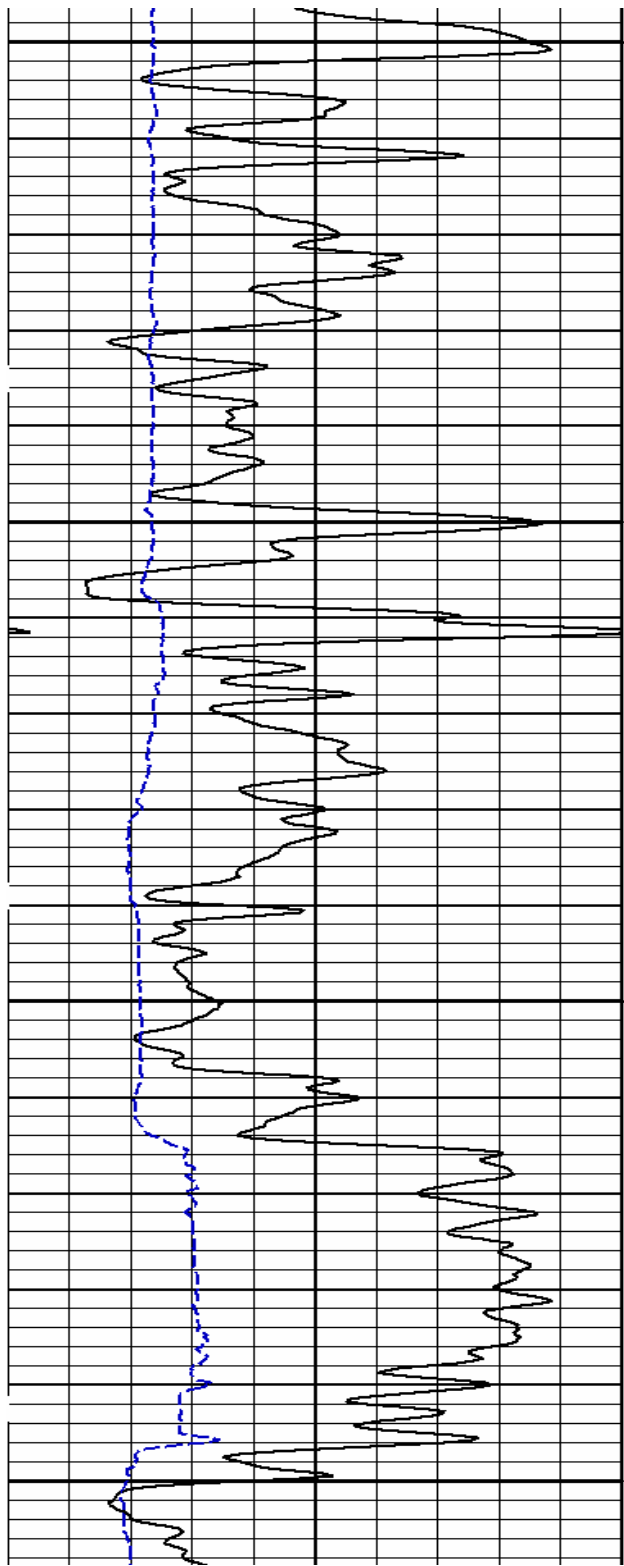
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TODAY'S CREW M. GRAHAM B. TERRELL

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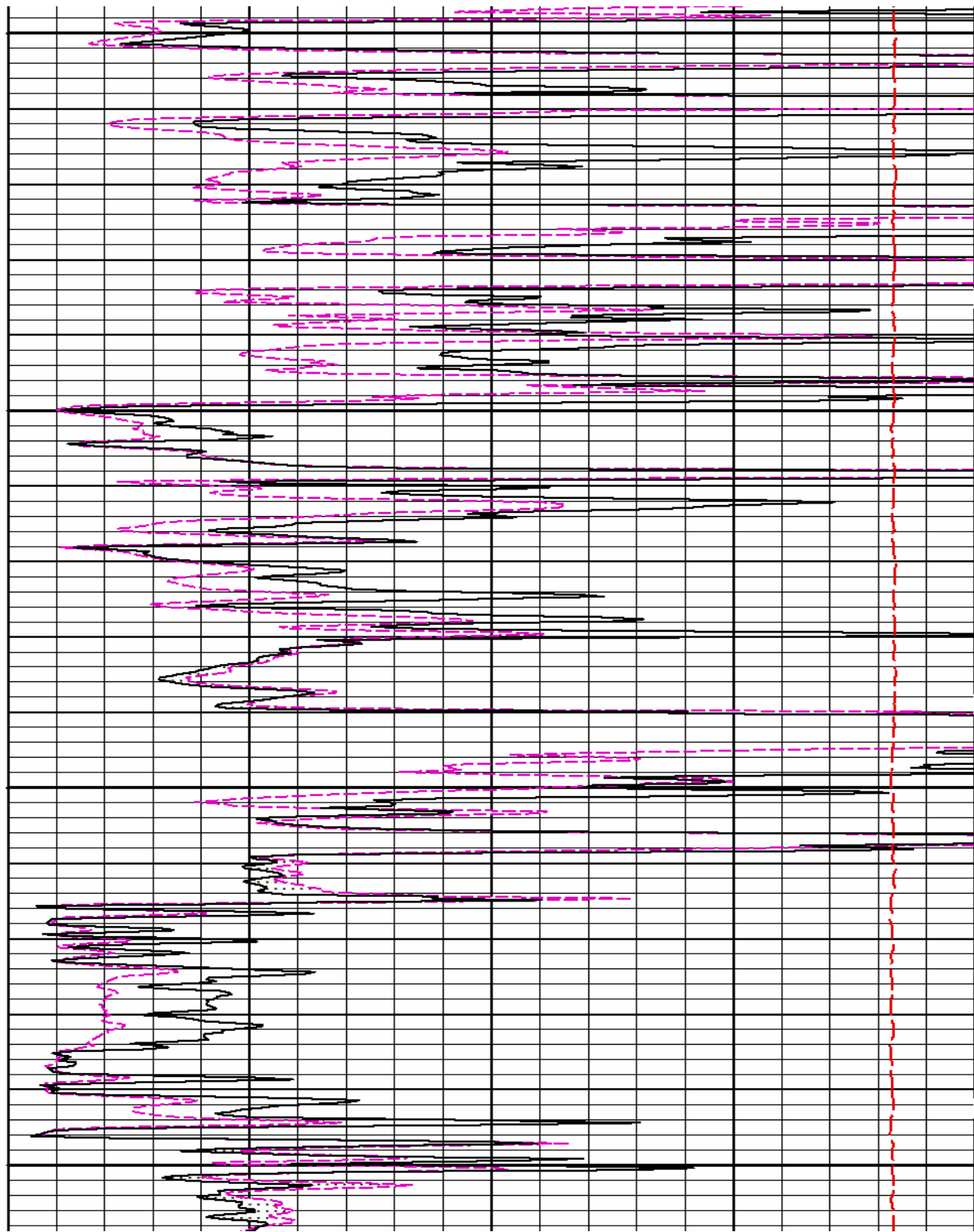
5 INCH MAIN LOG

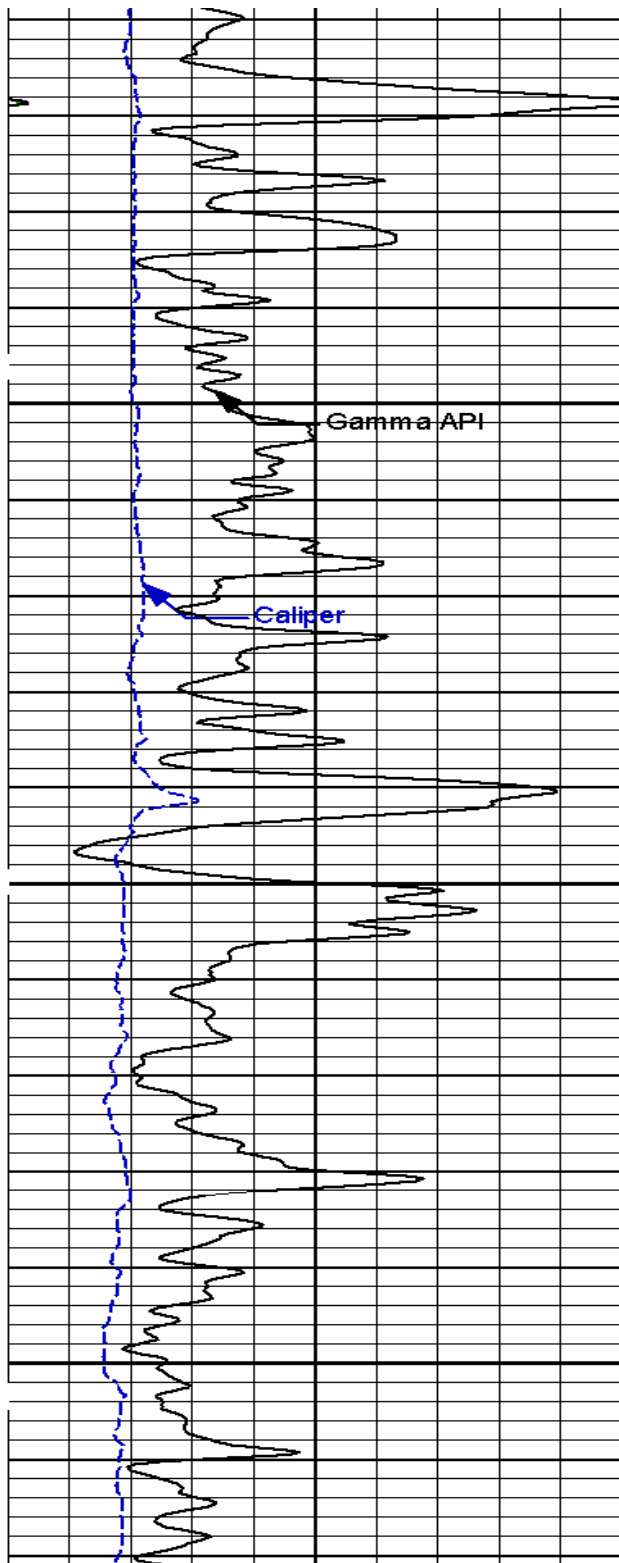




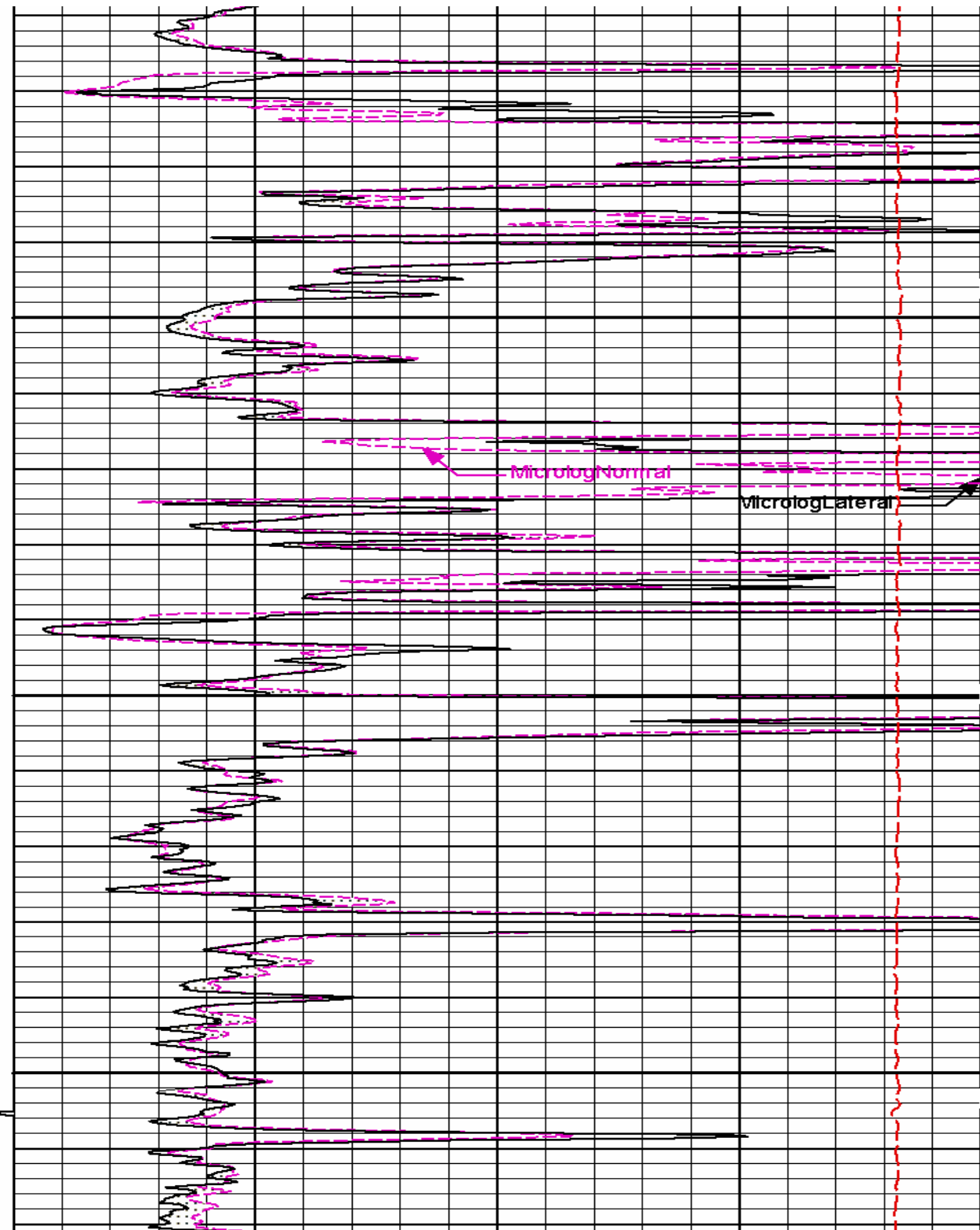
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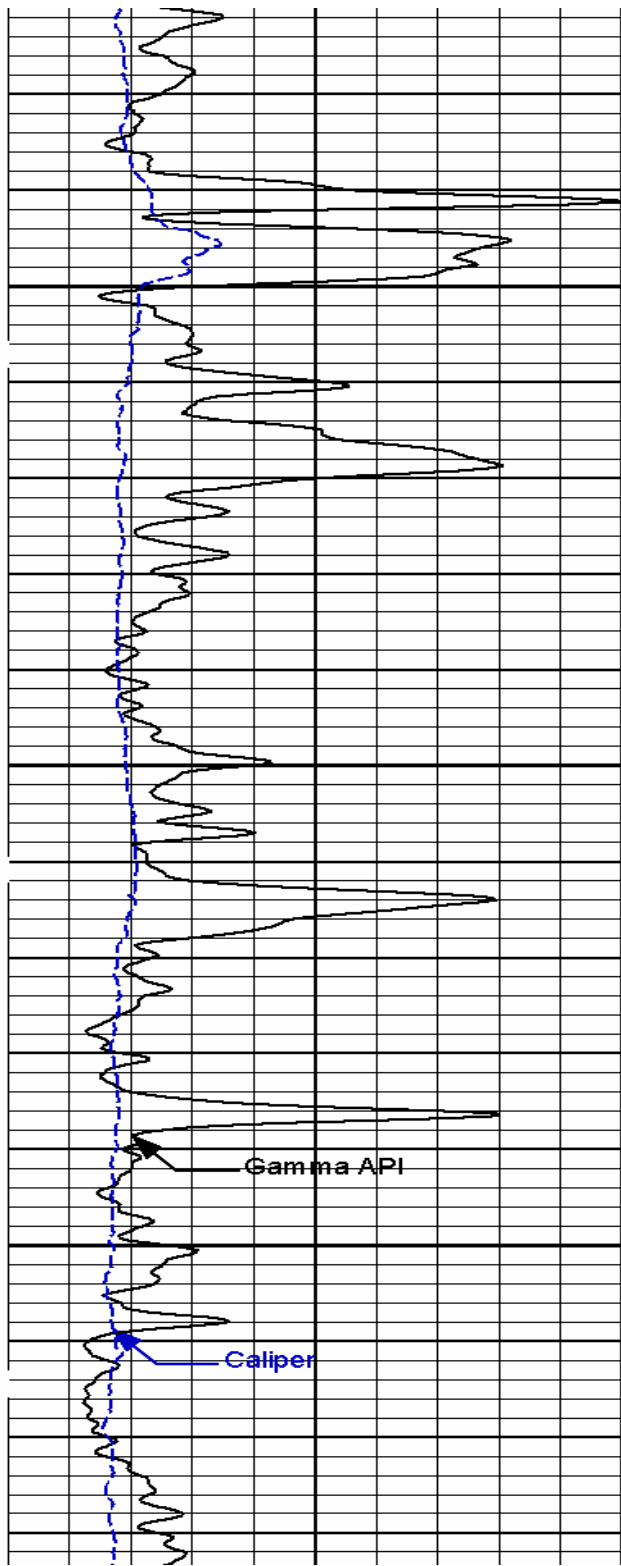
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3700

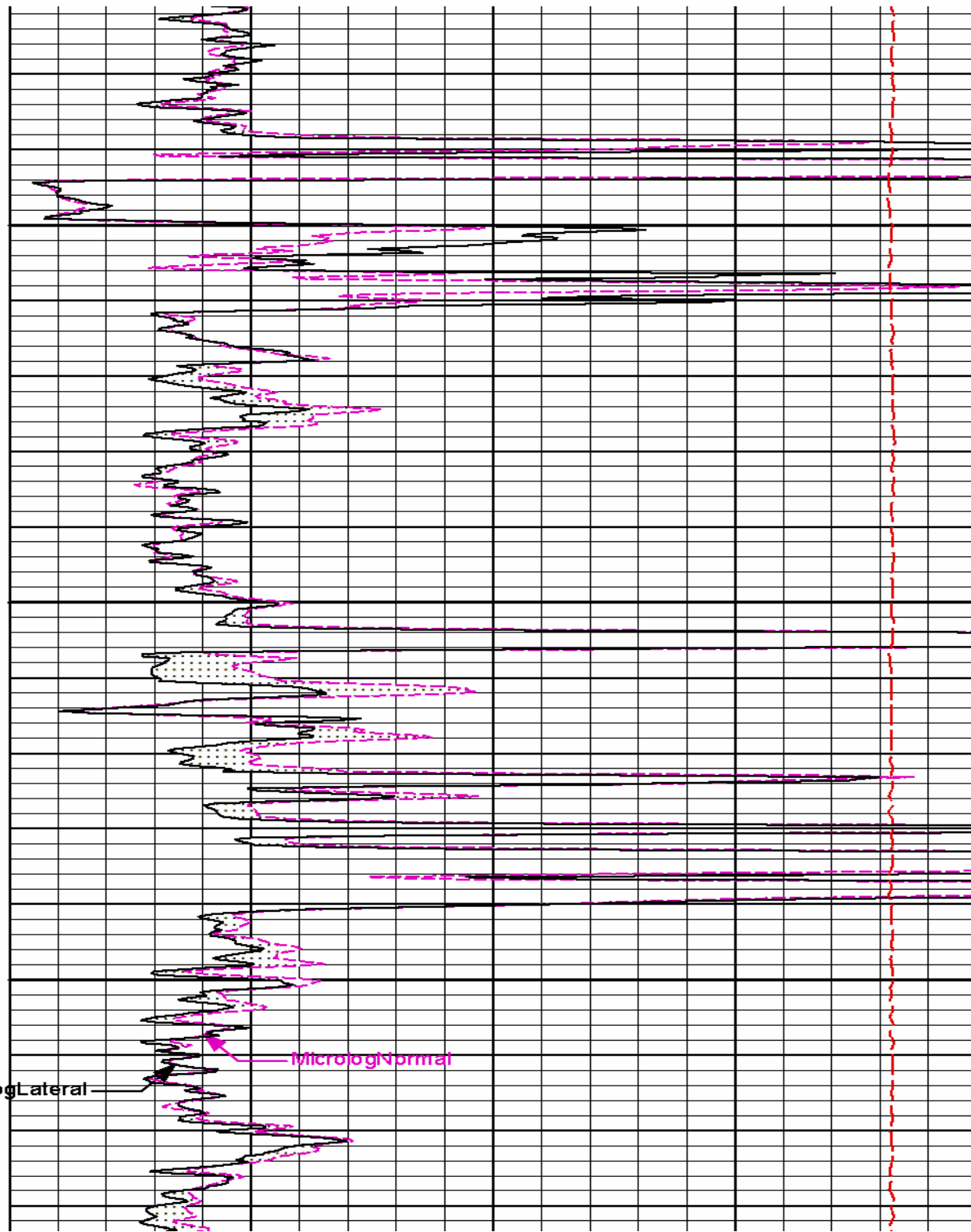


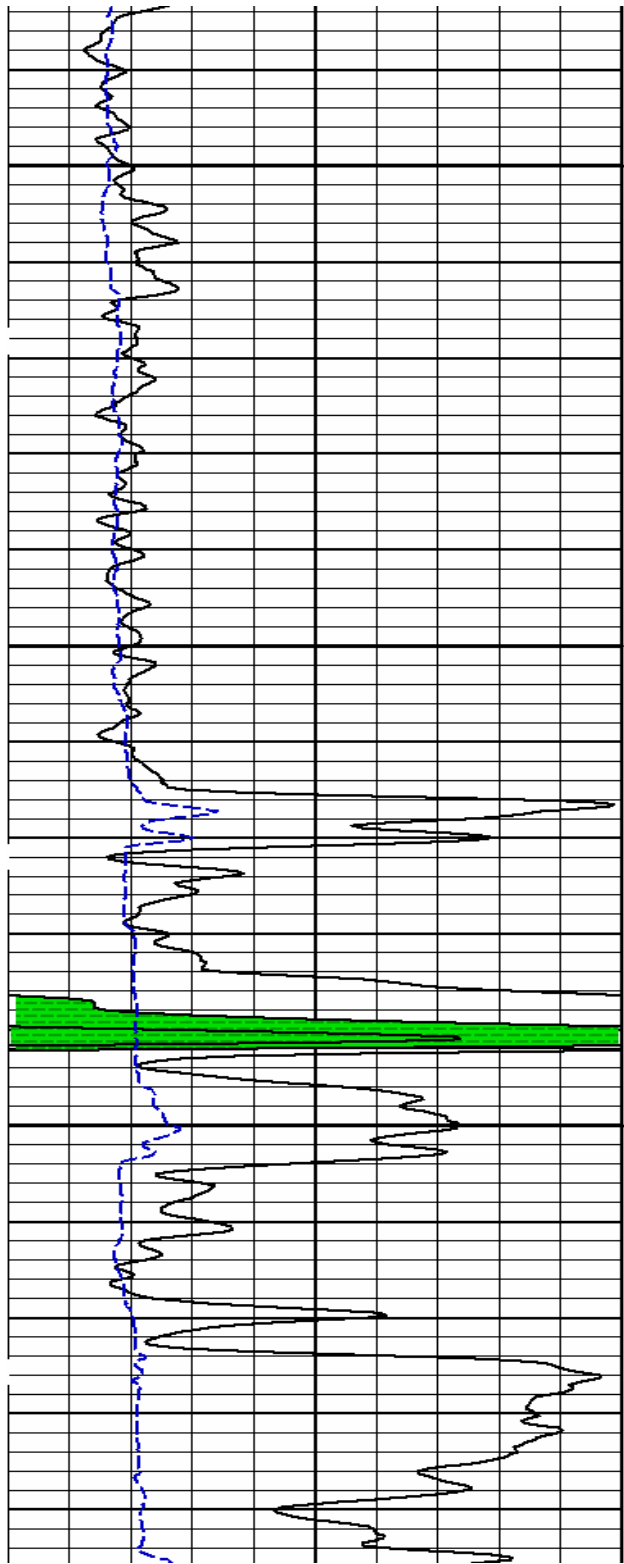


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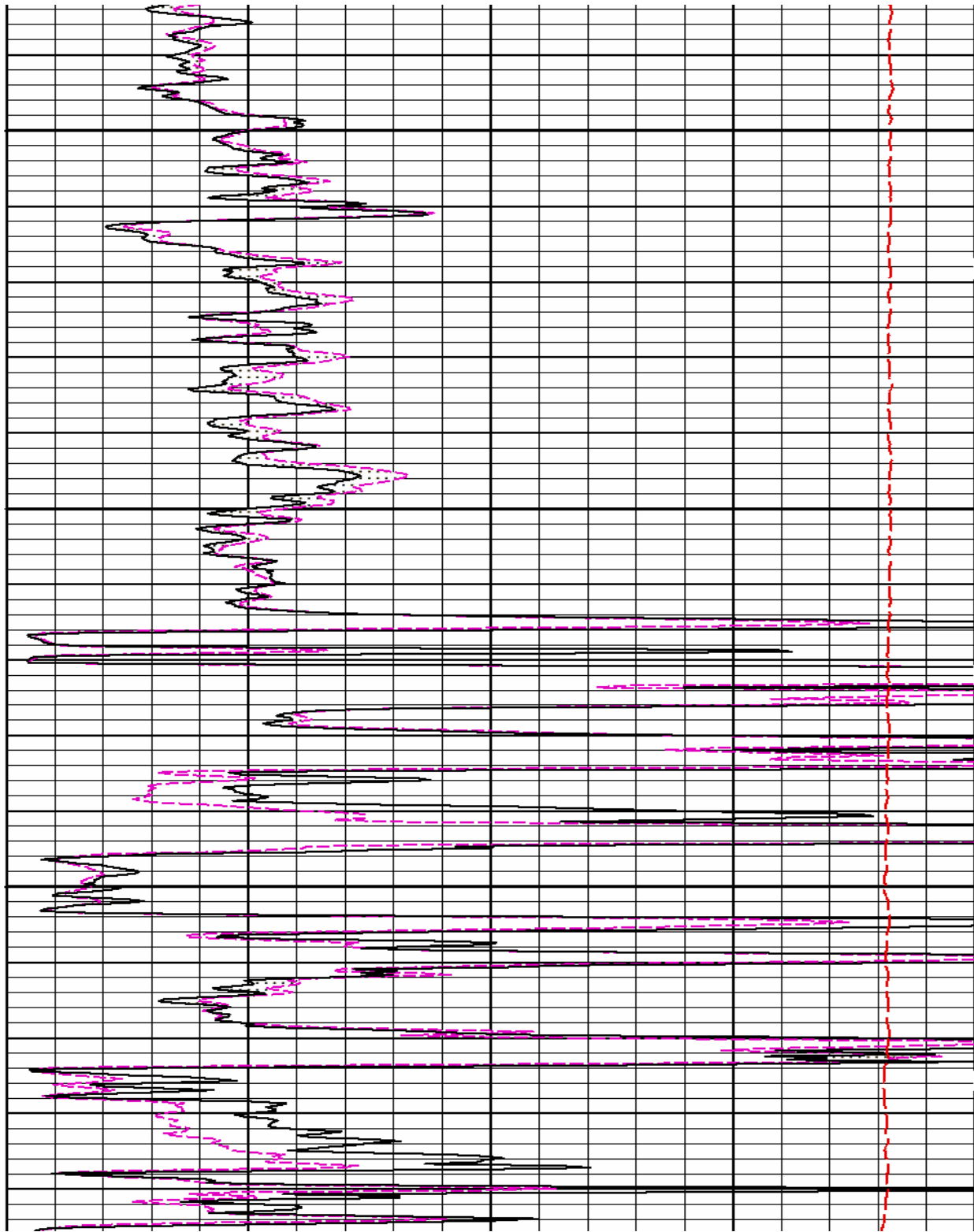
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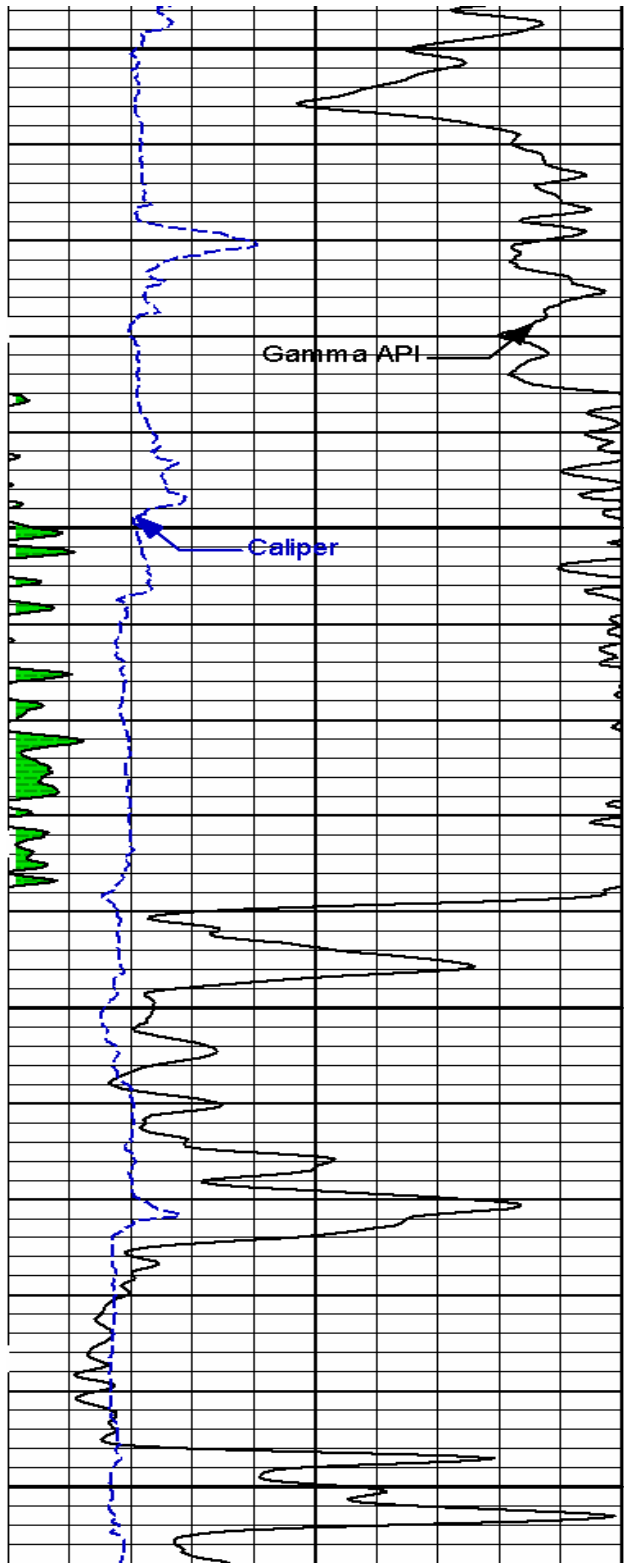
Microlog Lateral



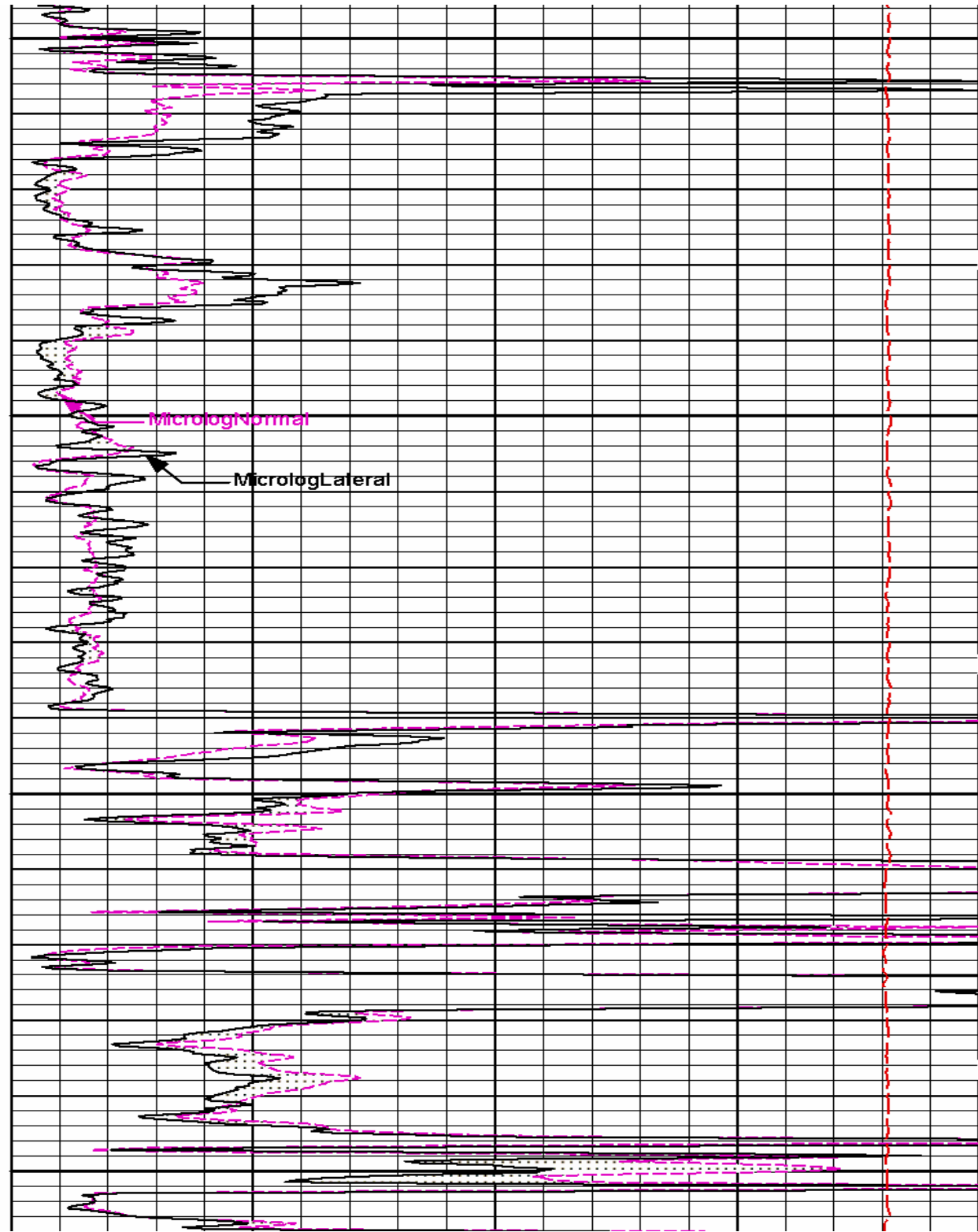


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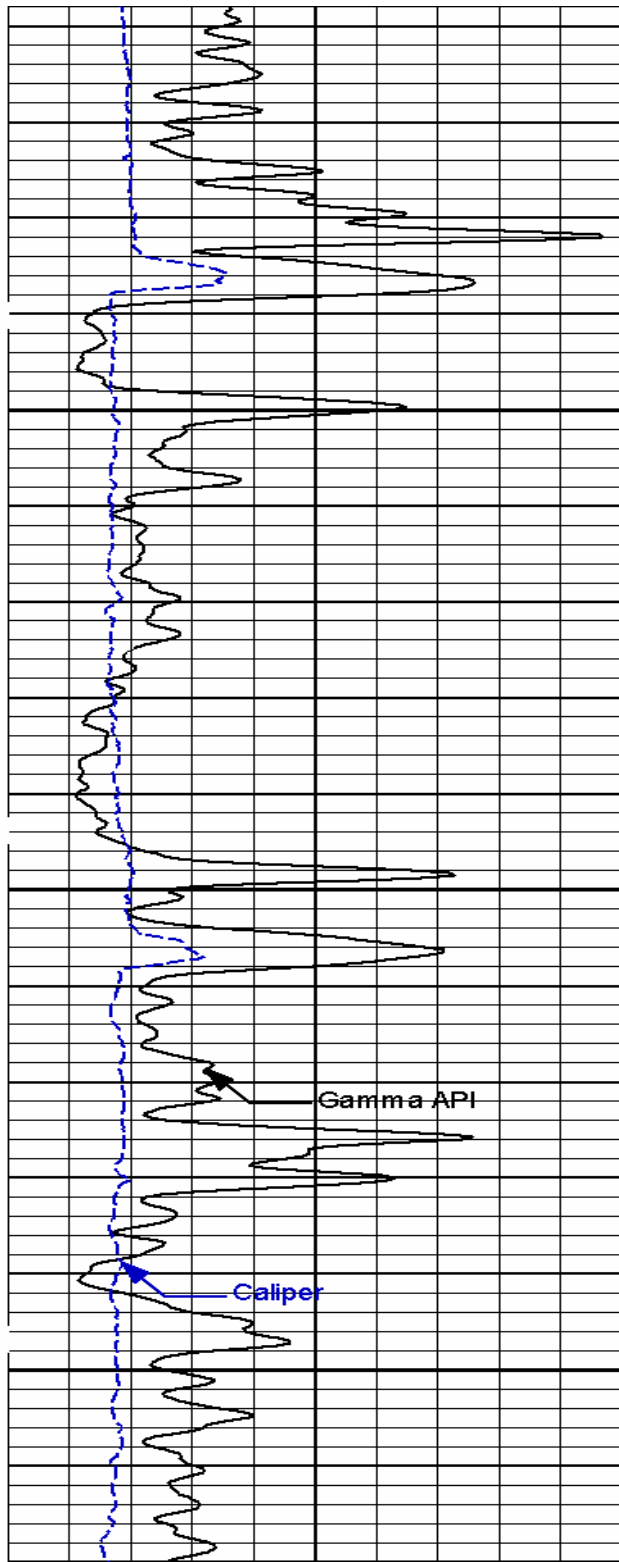




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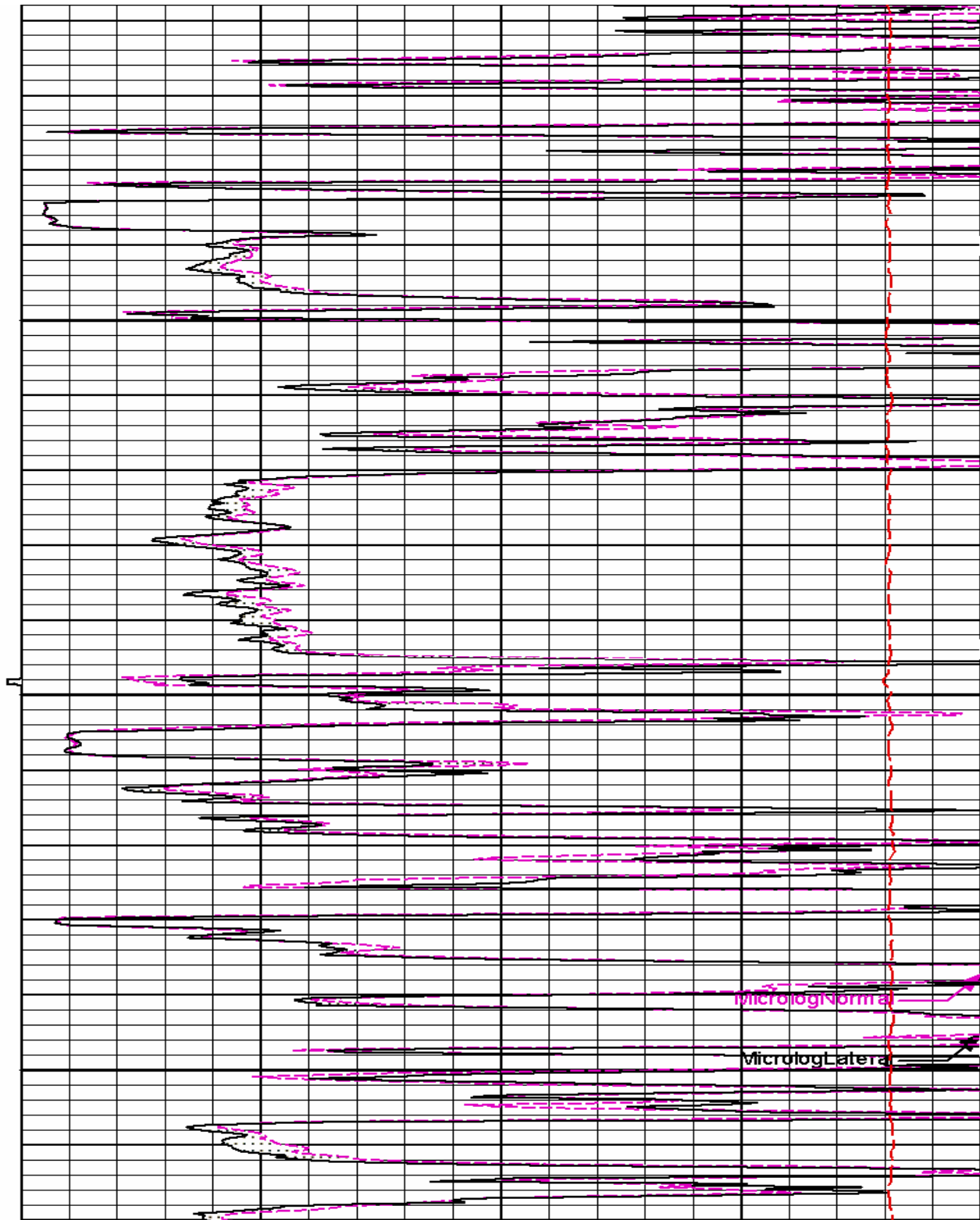


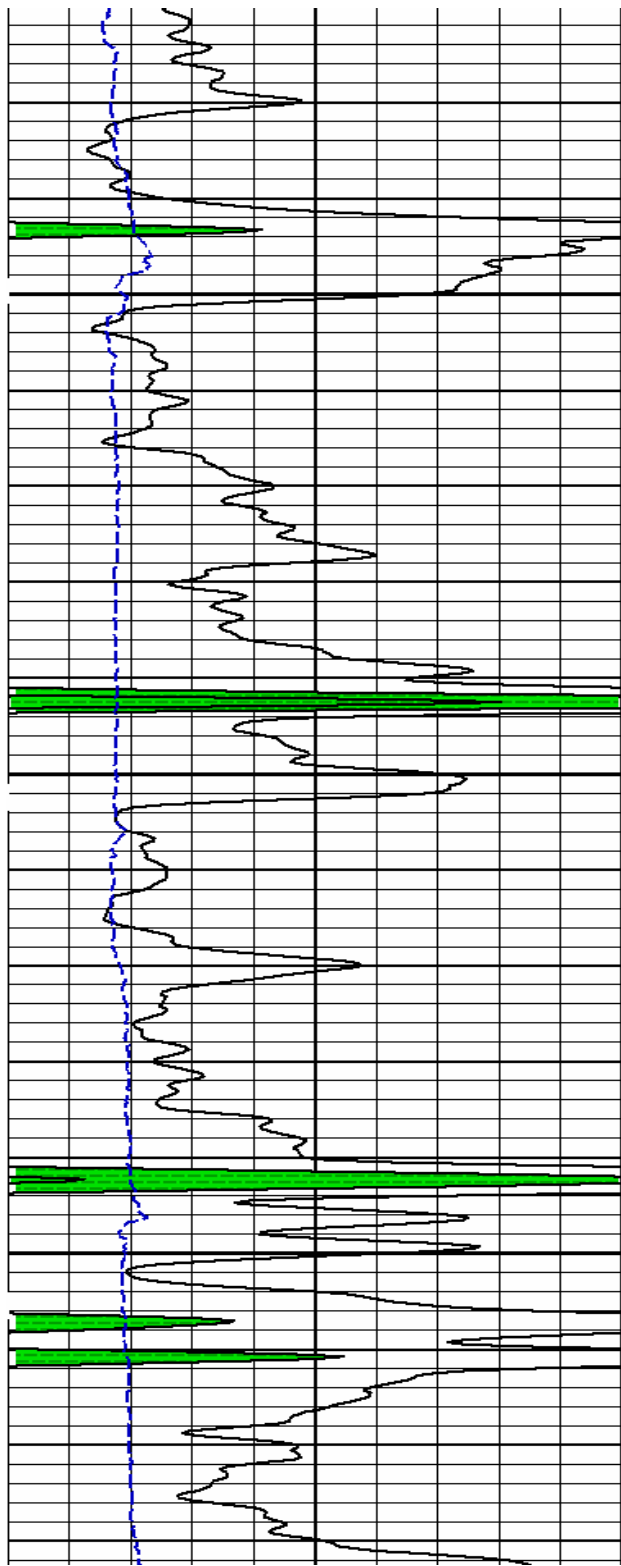
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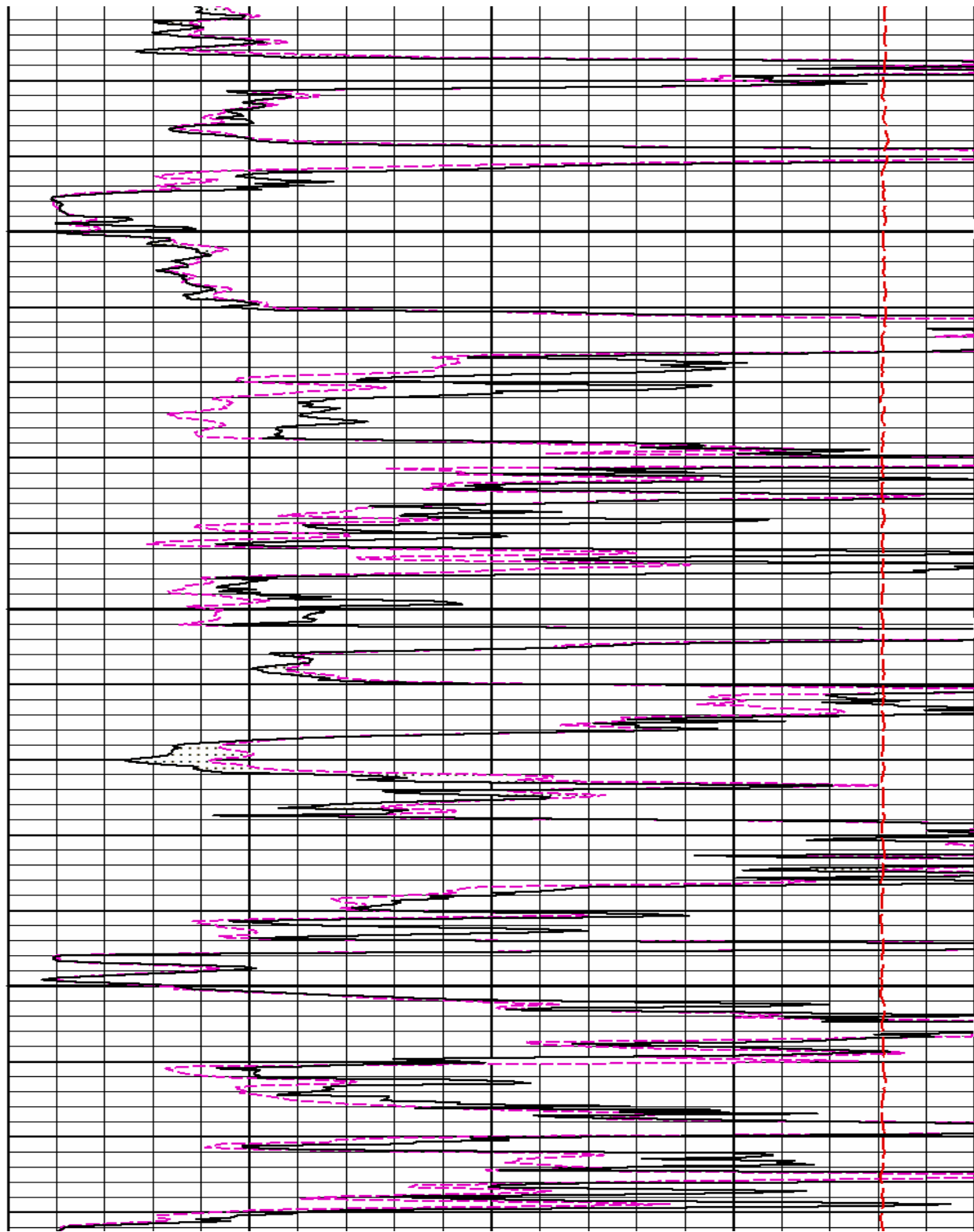
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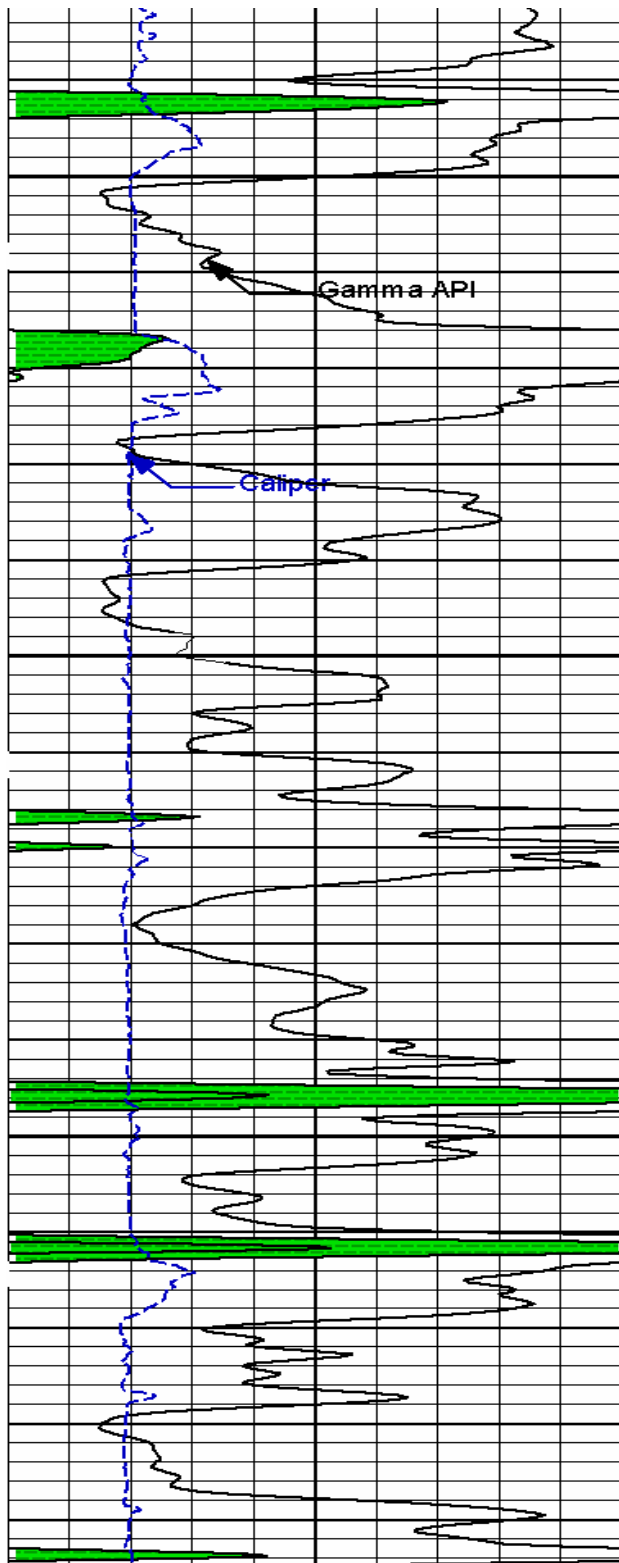
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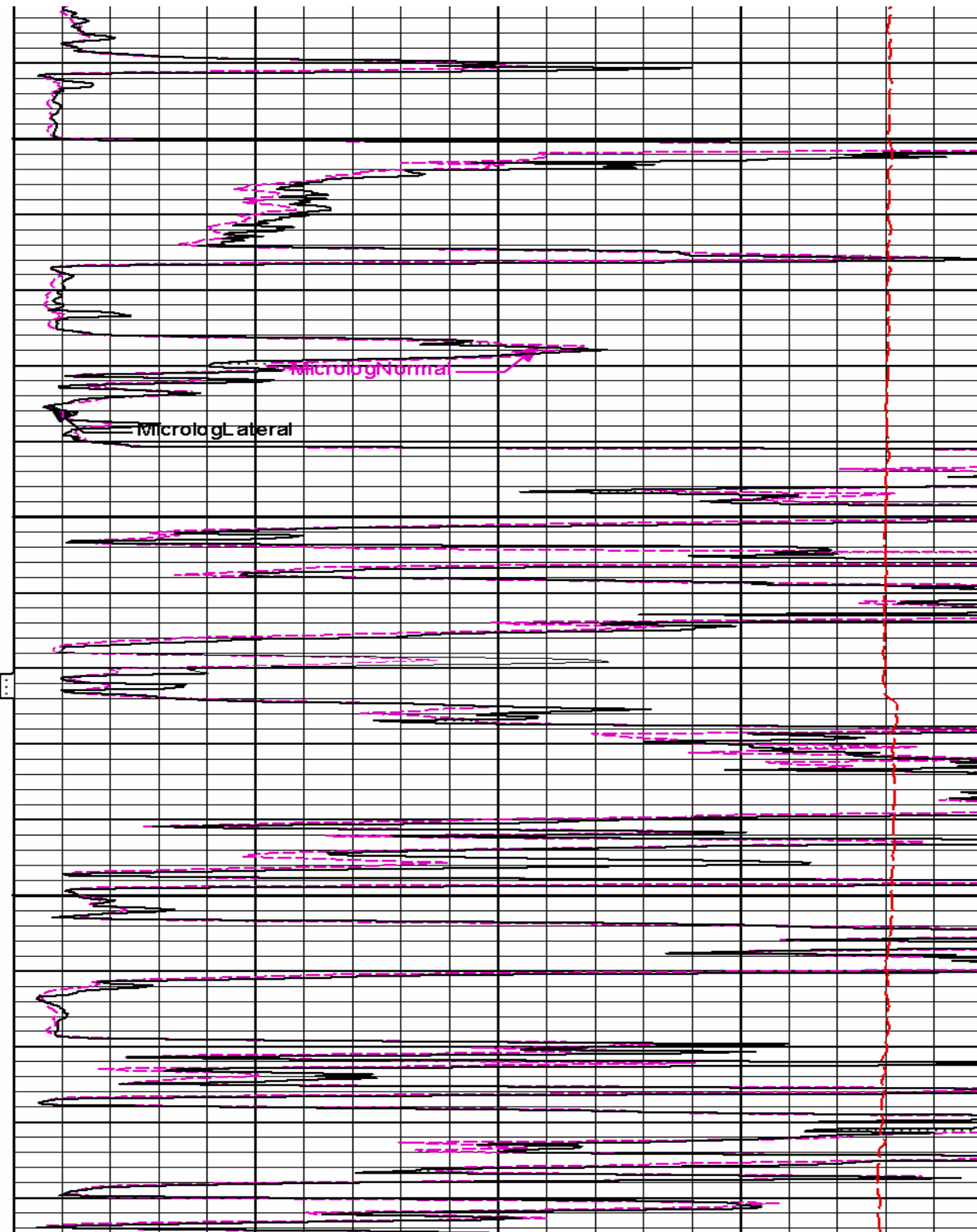
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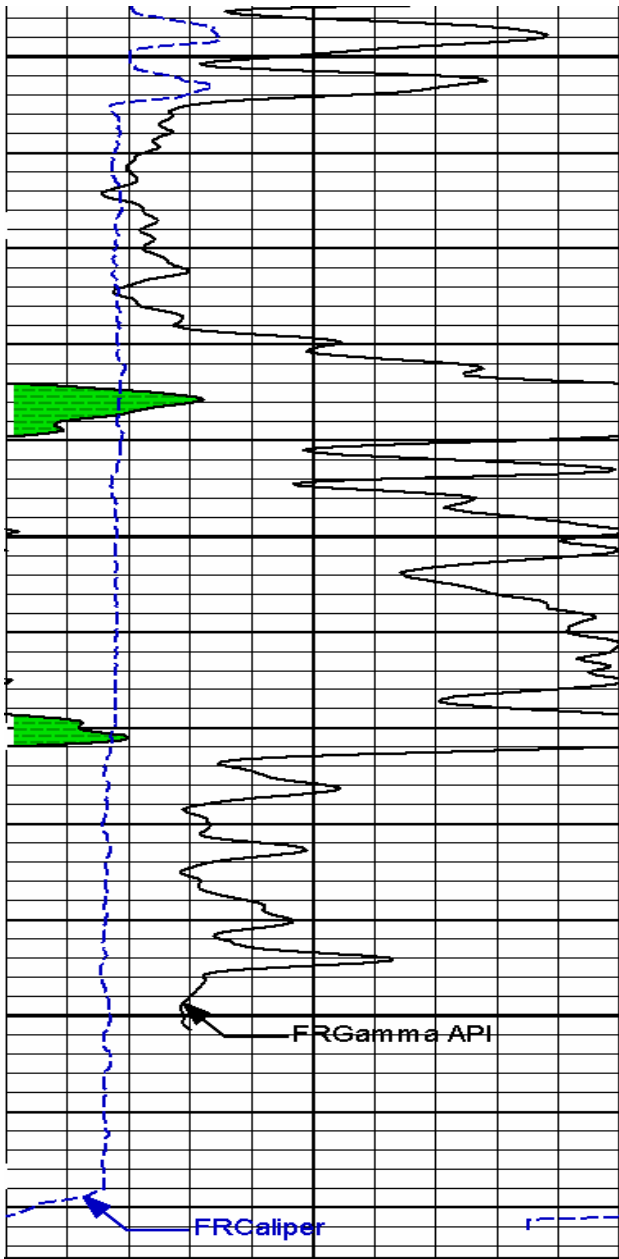




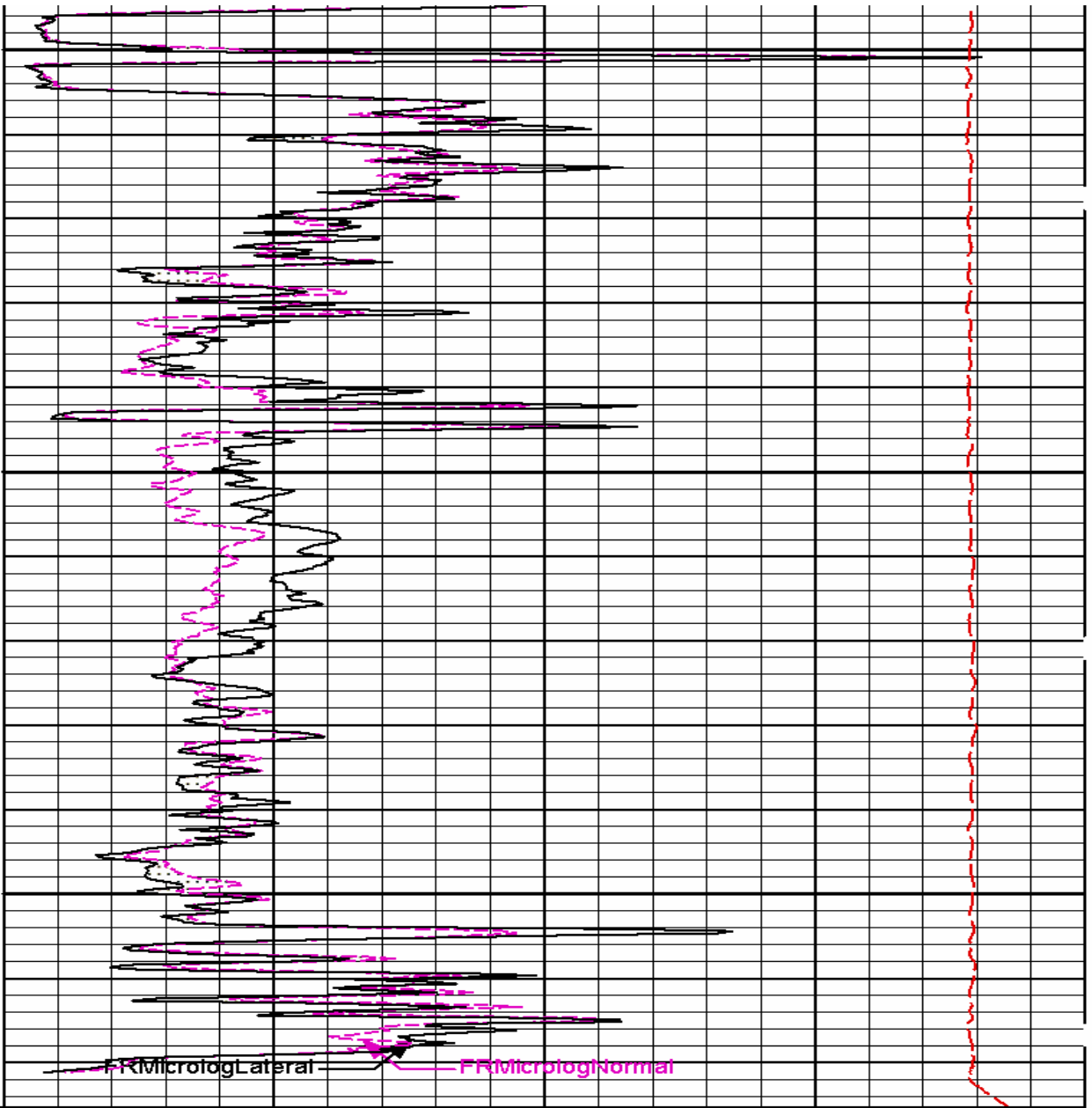
4600

4700





4800



6	Caliper	16
	inches	
0	Gamma API	150
	api	
	SHALE	

MD	1 : 240	ft
Tension Pull	10	0
Tension Pull	0	

15K	Tension	0
	pounds	
0	MicrologLateral	20
	ohm-metre	
0	MicrologNormal	20
	ohm-metre	

PERMEABLE

HALLIBURTON

Plot Time: 28-Feb-13 21:09:01
 Plot Range: 3350 ft to 4875.25 ft
 Data: UNRUH 'D' 1-21\Well Based\DAQ-0002-003\
 Plot File: \\-LOCAL-UNRUH 'D' 1-21\0002 SP-GTET-DSN-SDL-BN\MICRO\Microlog_IQ_5_main.lib

5 INCH MAIN LOG

HALLIBURTON

Plot Time: 28-Feb-13 21:09:01
 Plot Range: 4612 ft to 4877.5 ft
 Data: UNRUH 'D' 1-21\Well Based\DAQ-0002-002\
 Plot File: \\-LOCAL-UNRUH 'D' 1-21\0002 SP-GTET-DSN-SDL-BN\MICRO\Microlog_IQ_5_rep.lib

REPEAT SECTION

SHALE

0 Gamma API 150

api

6 Caliper 16

inches

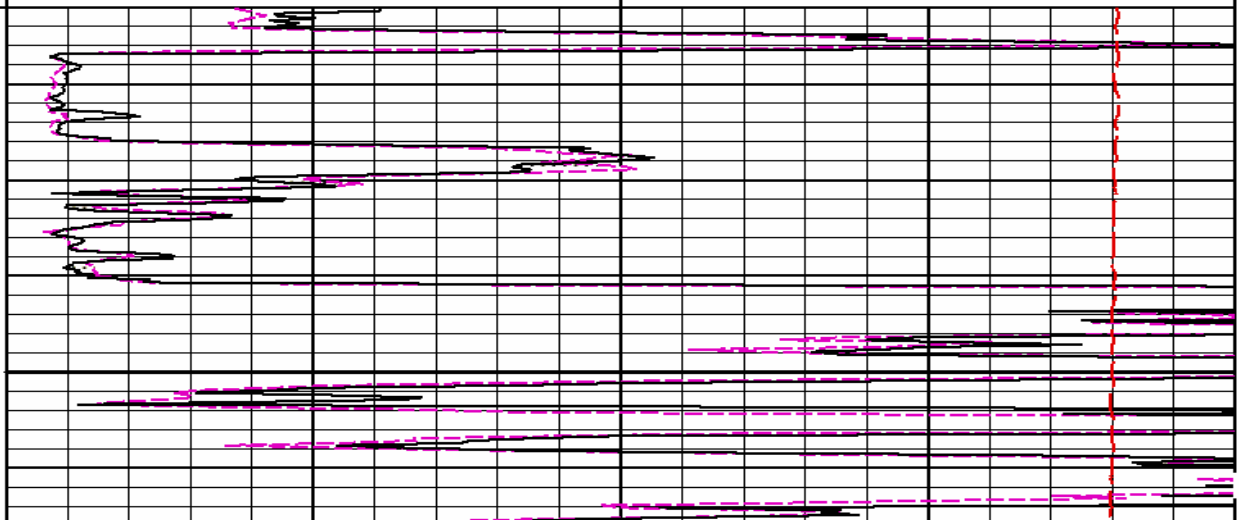
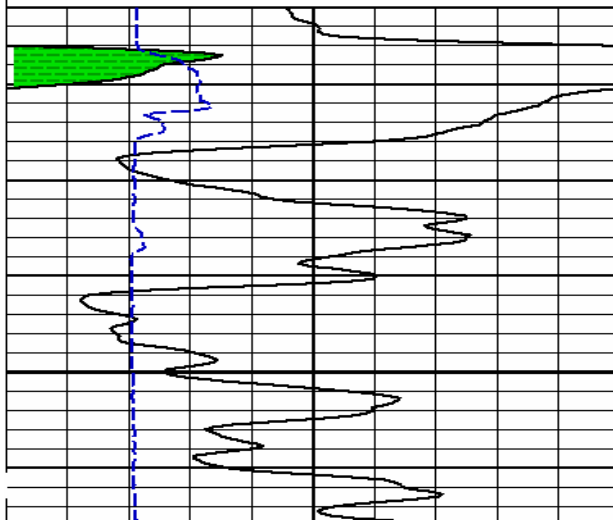
MD
1 : 240
ft

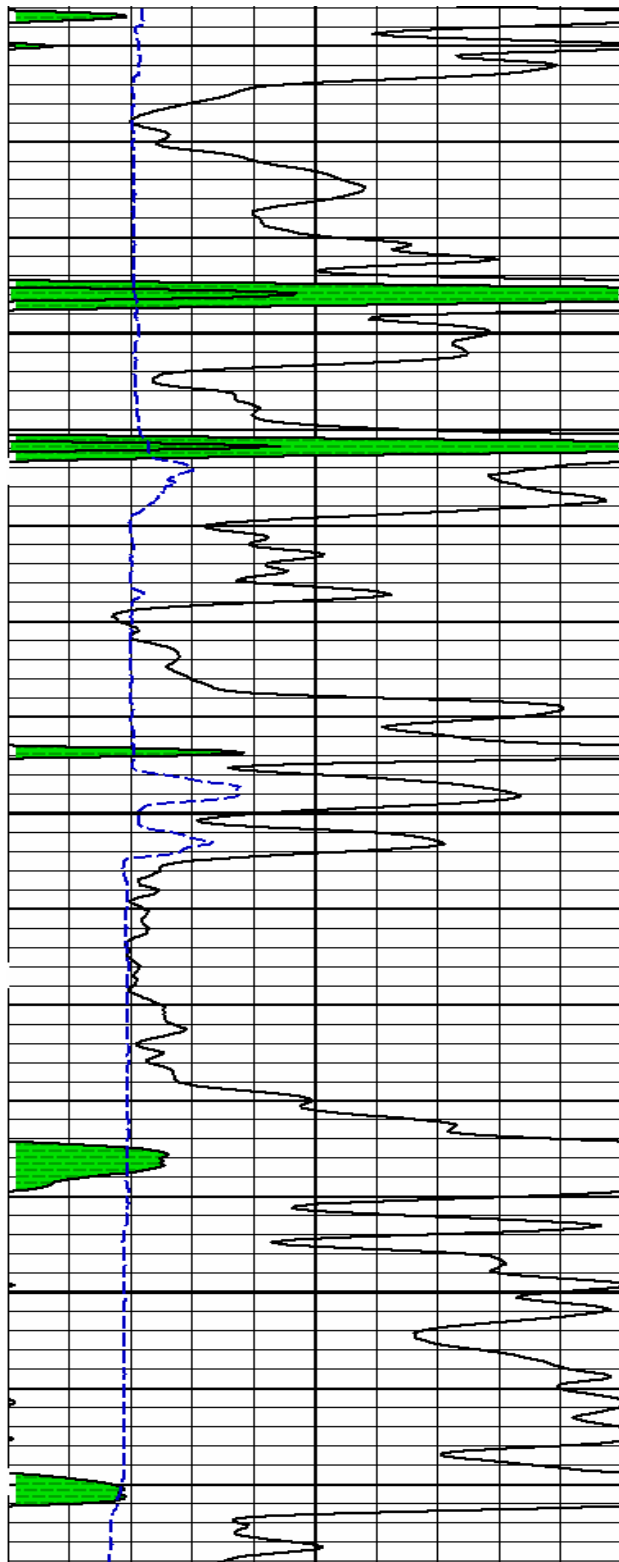
PERMEABLE

0 MicrologNormal 20
ohm-metre

0 MicrologLateral 20
ohm-metre

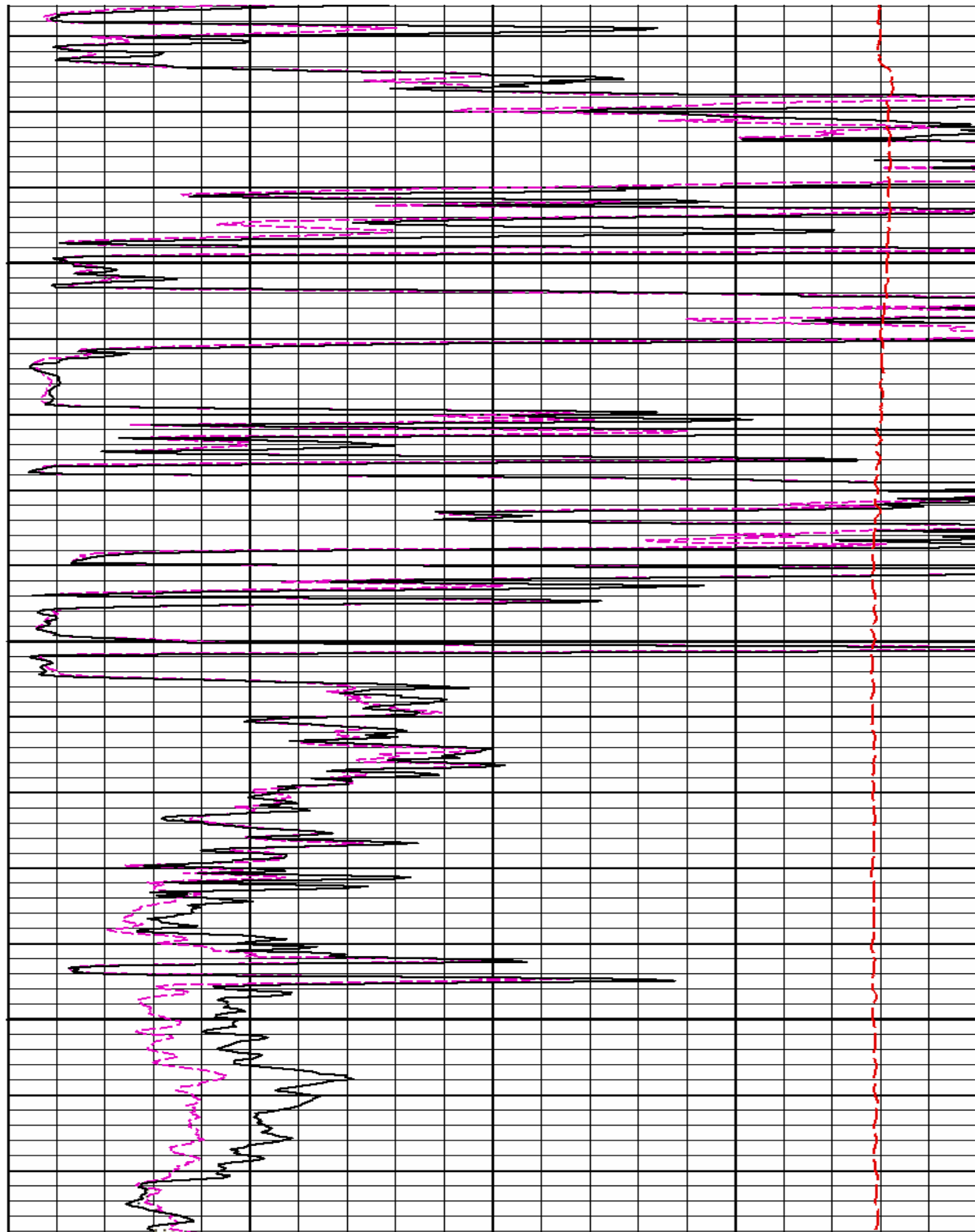
15K Tension 0
pounds

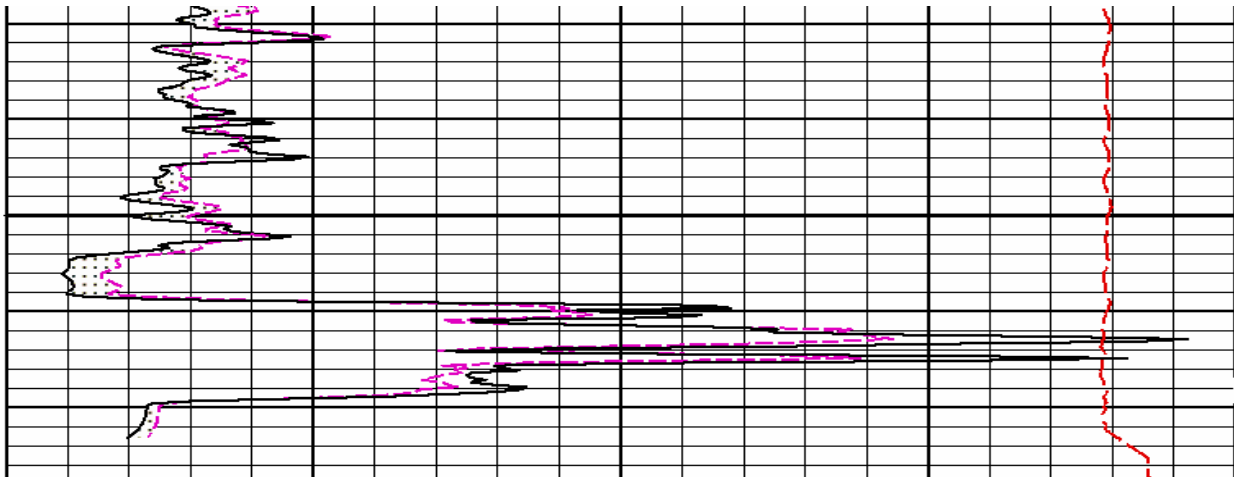
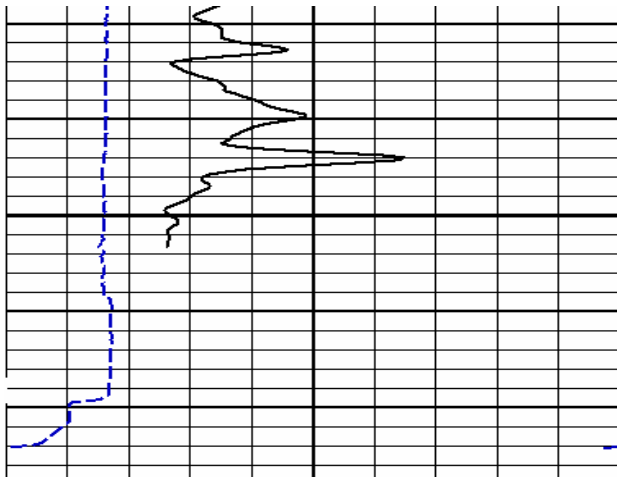




4700

4800





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

HALLIBURTON

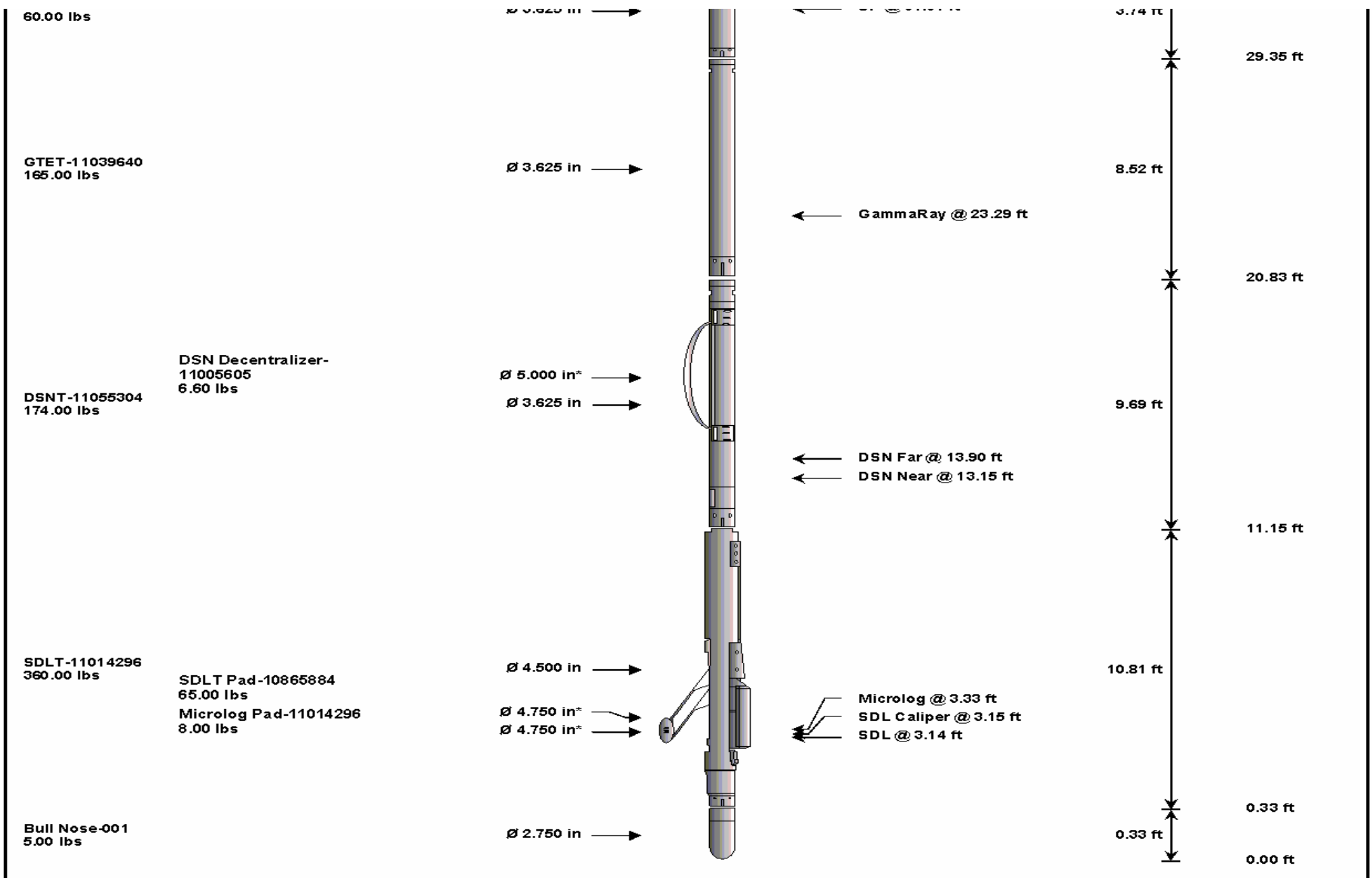
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 Plot Range: 4612 ft to 4877.5 ft
 Data: UNRUH 'D' 1-21\Well Based\DAQ-0002-002\
 Plot File: \\-LOCAL-UNRUH 'D' 1-21\0002 SP-GTET-DSN-SDL-BNMMICRO\Microlog_IQ_5_rep.lib

REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
Cable Head- PROT01 30.00 lbs		Ø 3.625 in →			1.92 ft	35.01 ft
SP Sub-11441455		Ø 3.625 in →		SP @ 31.31 ft		33.09 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)	
CH	Standard OH Cable Head	PROT01	30.00	1.92	33.09	300.00	
SP	SP Sub	11441455	60.00	3.74	29.35	300.00	
GTET	Gamma Telemetry Tool	11039640	165.00	8.52	20.83	60.00	
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	11.15	60.00	
DCNT	DSN Decentralizer	11005605	6.60	5.13	*	14.48	300.00
SDLT	Spectral Density Tool	11014296	360.00	10.81	0.33	60.00	

MICP	Microlog Pad	11014296	8.00	1.00	*	2.83	60.00
SDLP	Density Insite Pad	10865884	65.00	2.55	*	2.54	60.00
BLNS	Bull Nose	001	5.00	0.33		0.00	300.00

Total

873.60

35.01

* Not included in Total Length and Length Accumulation.

Data: UNRUH 'D' 1-2110002 SP-GTET-DSN-SDL-BNIDLE

Date: 28-Feb-13 19:43:58

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 14-Jan-13 11:39:27

Engineer: J. BOLLUM

Calibration Date: 13-Feb-13 13:51:32

Software Version: WL INSITE R3.8.0 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Measurement	Measured	Calibrated	Units
Background	77.6	79.8	api
Background + Calibrator	339.7	349.5	api
Calibrator	262.1	269.6	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 13-Feb-13 13:51:32

Engineer: THOMAS HYDE

Calibration Date: 28-Feb-13 16:56:33

Software Version: WL INSITE R3.8.0 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Field Verification	Shop	Field	Units
Background	79.8	51.9	api
Background + Calibrator	349.5	326.6	api
Calibrator	269.6	274.7	api

Shop	Field	Difference	Tolerance
269.6	274.7	-5.1	+/- 9.00

MICRO LOG SHOP CALIBRATION

Tool Name: Microlog Pad - 11014296	Reference Calibration Date: 04-Jan-13 10:49:34
Engineer: J. BOLLUM	Calibration Date: 13-Feb-13 09:47:22
Software Version: WL INSITE R3.8.0 (Build 2)	Calibration Version: 1
Host Tool Name: DSNT - 11055304	

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.07	-0.14	-0.01	-0.01	ohmm
Calibration Point #1	0.07	0.00	0.00	0.00	ohmm
Calibration Point #2	20.02	20.00	19.95	20.00	ohmm
Internal Reference	19.89	19.88	19.94	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.64	-0.16	V
Calibration Point #1	36.40	3.51	V
Calibration Point #2	5296.44	6860.84	V
Internal Reference	5263.67	6856.12	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 11014296	Reference Calibration Date: 13-Feb-13 09:47:22
Engineer: THOMAS HYDE	Calibration Date: 28-Feb-13 17:05:57
Software Version: WL INSITE R3.8.0 (Build 2)	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	19.88	19.88	19.99	19.99	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.88	19.88	0.00	+/- 0.80
Microlog Lateral	19.99	19.99	0.00	+/- 0.80

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
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CTEST 11000540

Gamma Ray Calibrator	269.6	274.7	-----	-5.1	+/- 9.00	api
Microlog Pad-11014296						
MicroLog Normal	19.88	19.88	-----	0.00	+/-0.80	ohmm
MicroLog Lateral	19.99	19.99	-----	0.00	+/-0.80	ohmm
Data: UNRUH 'D' 1-210002 SP-GTET-DSN-SDL-BNIDLE				Date: 28-Feb-13 20:12:50		

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	9.300	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	0.420	ohmm
	SHARED	TRM	Temperature of Mud	70.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	ST	Surface Temperature	70.0	degF
	SHARED	TD	Total Well Depth	4872.00	ft
	SHARED	BHT	Bottom Hole Temperature	103.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	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	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
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	DNTP	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	
SDLT	CLOK	Process Caliper 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
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	

BOTTOM

Data: UNRUH 'D' 1-210002 SP-GTET-DSN-SDL-BNIDLE

Date: 28-Feb-13 20:14:03

HALLIBURTON

INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
SP Sub				

PLTC	Plot Control Mask	31.31	NO	
SP	Spontaneous Potential	31.31	BLK	1.250
SPR	Raw Spontaneous Potential	31.31	NO	
SPO	Spontaneous Potential Offset	31.31	NO	
GTET				
TPUL	Tension Pull	23.29	NO	
GR	Natural Gamma Ray API	23.29	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	23.29	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	23.29	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
DSNT				
TPUL	Tension Pull	13.05	NO	
RNDS	Near Detector Telemetry Counts	13.15	BLK	1.417
RFDS	Far Detector Telemetry Counts	13.90	TRI	0.583
DNTT	DSN Tool Temperature	13.15	NO	
DSNS	DSN Tool Status	13.05	NO	
ERND	Near Detector Telemetry Counts EVR	13.15	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	13.90	BLK	0.000
ENTM	DSN Tool Temperature EVR	13.15	NO	
SDLT				
TPUL	Tension Pull	3.15	NO	
PCAL	Pad Caliper	3.15	TRI	0.250
ACAL	Arm Caliper	3.15	TRI	0.250
SDLT Pad				
TPUL	Tension Pull	3.14	NO	
NAB	Near Above	2.96	BLK	0.920
NHI	Near Cesium High	2.96	BLK	0.920
NLO	Near Cesium Low	2.96	BLK	0.920
NVA	Near Valley	2.96	BLK	0.920
NBA	Near Barite	2.96	BLK	0.920
NDE	Near Density	2.96	BLK	0.920
NPK	Near Peak	2.96	BLK	0.920
NLI	Near Lithology	2.96	BLK	0.920
NBAU	Near Barite Unfiltered	2.96	BLK	0.250
NLIU	Near Lithology Unfiltered	2.96	BLK	0.250
FAB	Far Above	3.31	BLK	0.250
FHI	Far Cesium High	3.31	BLK	0.250

FHI	Far Cesium High	3.31	BLK	0.250
FLO	Far Cesium Low	3.31	BLK	0.250
FVA	Far Valley	3.31	BLK	0.250
FBA	Far Barite	3.31	BLK	0.250
FDE	Far Density	3.31	BLK	0.250
FPK	Far Peak	3.31	BLK	0.250
FLI	Far Lithology	3.31	BLK	0.250
PTMP	Pad Temperature	3.15	BLK	0.920
NHV	Near Detector High Voltage	2.54	NO	
FHV	Far Detector High Voltage	2.54	NO	
ITMP	Instrument Temperature	2.54	NO	
DDHV	Detector High Voltage	2.54	NO	
Microlog Pad				
TPUL	Tension Pull	3.33	NO	
MINV	Microlog Lateral	3.33	BLK	0.750
MNOR	Microlog Normal	3.33	BLK	0.750
Data: UNRUH 'D' 1-21\0002 SP-GTET-DSN-SDL-BNIDLE			Date: 28-Feb-13 20:14:15	

COMPANY	HERMAN L. LOEB		
WELL	UNRUH 'D' 1-21		
FIELD	WILDCAT		
COUNTY	KIOWA	STATE	KANSAS
HALLIBURTON		MICRO LOG	