

HALLIBURTON

MICRO LOG

COMPANY		OXY USA INC		
WELL		GARDEN CITY V-3		
FIELD		GARDEN CITY		
COUNTY		FINNEY		
STATE		KANSAS		
Permanent Datum		GL		Elev. 2961.0 ft
Log measured from		KB		D.F. 2975.0 ft
Drilling measured from		KB		G.L. 2961.0 ft
Date		20-Dec-12		
Run No.		ONE		
Depth - Driller		5133.00 ft		
Depth - Logger		5130.0 ft		
Bottom - Logged Interval		5086.0 ft		
Top - Logged Interval		3650.0 ft		
Casing - Driller		8.625 in @ 1812.0 ft		
Casing - Logger		1811.0 ft		
Bit Size		7.875 in	@	
Type Fluid in Hole		WATER BASED MUD		
Density		8.8 ppq	45.00 s/qt	
PH		9.20 pH	12.4 cp/m	
Source of Sample		FLOWLINE		
Rm @ Meas. Temperature		1.200 ohmm @ 65.00 degF	@	
Rmf @ Meas. Temperature		1.05 ohmm @ 65.00 degF	@	
Rmc @ Meas. Temperature		1.400 ohmm @ 65.00 degF	@	
Source Rmf		MEASURED	MEASURED	
Rm @ BHT		0.72 ohmm @ 113.0 degF	@	
Time Since Circulation		8.0 hr		
Time on Bottom		20-Dec-12 21:32		
Max. Rec. Temperature		113.0 degF @ 5130.0 ft	@	
Equipment		10782954	LIBERAL	
Recorded By		T. HYDE		
Witnessed By		J. GILL		

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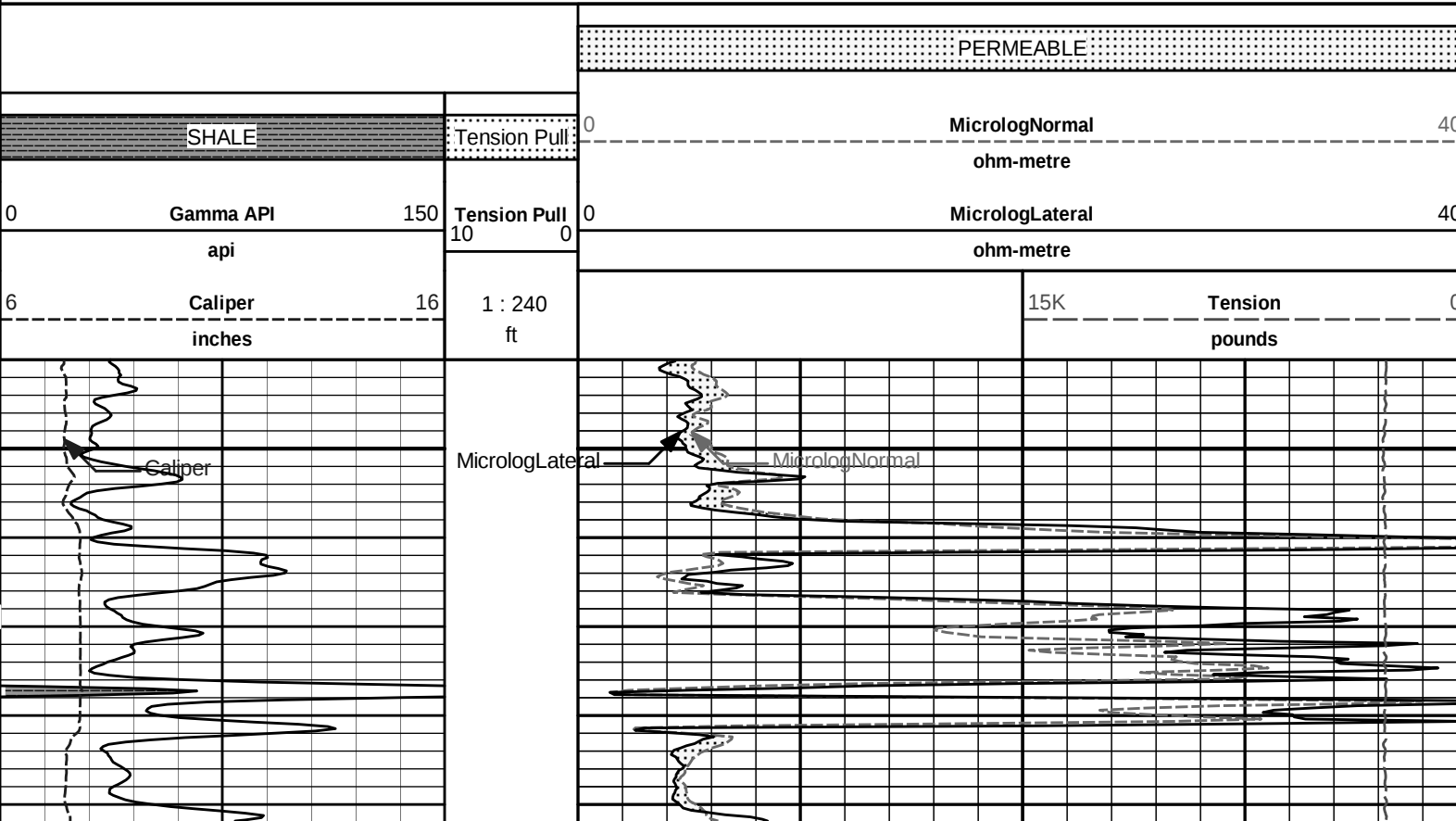
Service Ticket No.: 900078355				API Serial No.: 15-055-22175-00-00				PGM Version: WL INSITE R3.6.0 (Build 3)							
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE								RESISTIVITY SCALE CHANGES							
Date		Sample No.						Type Log		Depth		Scale Up Hole		Scale Down Hole	
Depth-Driller															
Type 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.		@		@				ONE		MICRO		RUBBER		ADJ.	
Rmc @ Meas. Temp.		@		@						10673803					
Source Rmf		Rmc													
Rm @ BHT		@		@											
Rmf @ BHT		@		@											
Rmc @ BHT		@		@											
EQUIPMENT DATA															
GAMMA				ACOUSTIC				DENSITY				NEUTRON			
Run No.		ONE		Run No.				Run No.				Run No.			
Serial No.		10811258		Serial No.				Serial No.				Serial No.			
Model No.		GTET		Model No.				Model No.				Model No.			
Diameter		3.625"		No. of Cent.				Diameter				Diameter			
Detector Model No.		T-102		Spacing				Log Type				Log Type			
Type		SCINT						Source Type				Source Type			
Length		8"		LSA [Y/N]				Serial No.				Serial No.			
Distance to Source		10'		FWDA [Y/N]				Strength				Strength			
LOGGING DATA															
GENERAL				GAMMA				ACOUSTIC				DENSITY			

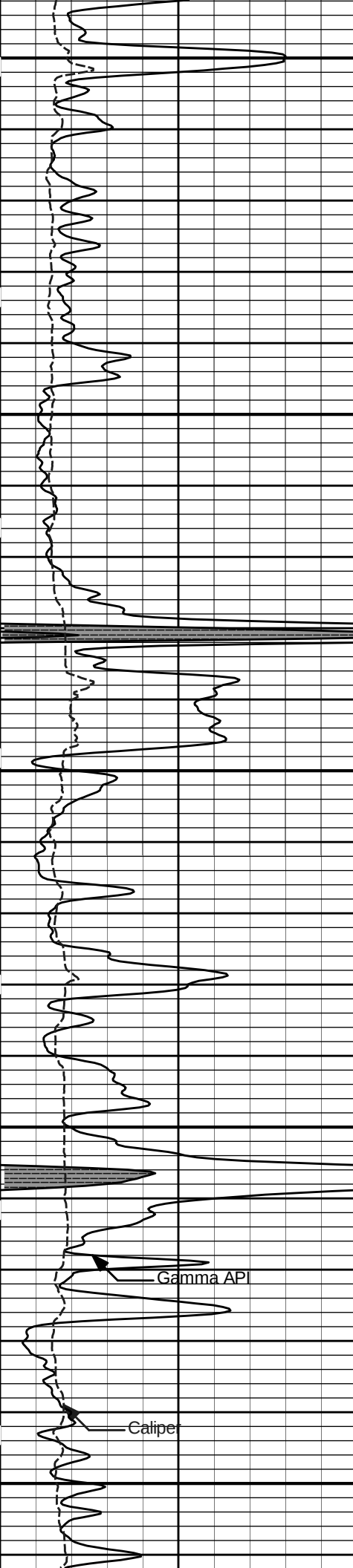
GENERAL			GAMMA	ACOUSTIC				DENSITY		NEUTRON				
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	5130	3650	REC	0	150									
DIRECTIONAL INFORMATION														
Maximum Deviation @								KOP @						
Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING														
CHLORIDES REPORTED AT 3800 MG/L														
TODAY'S CREW V. JAIME M. GRAHAM														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES LIBERAL, KANSAS 620-624-8123														
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.														
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Plot Time: 20-Dec-12 22:43:47
Plot Range: 3640 ft to 5133.25 ft
Data: GARDEN_CTY_V3\Well Based\MAIN\
Plot File: \\LOCAL-IGARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CHIMICRO\Microlog_IQ_5_main.lib

5 INCH MAIN LOG





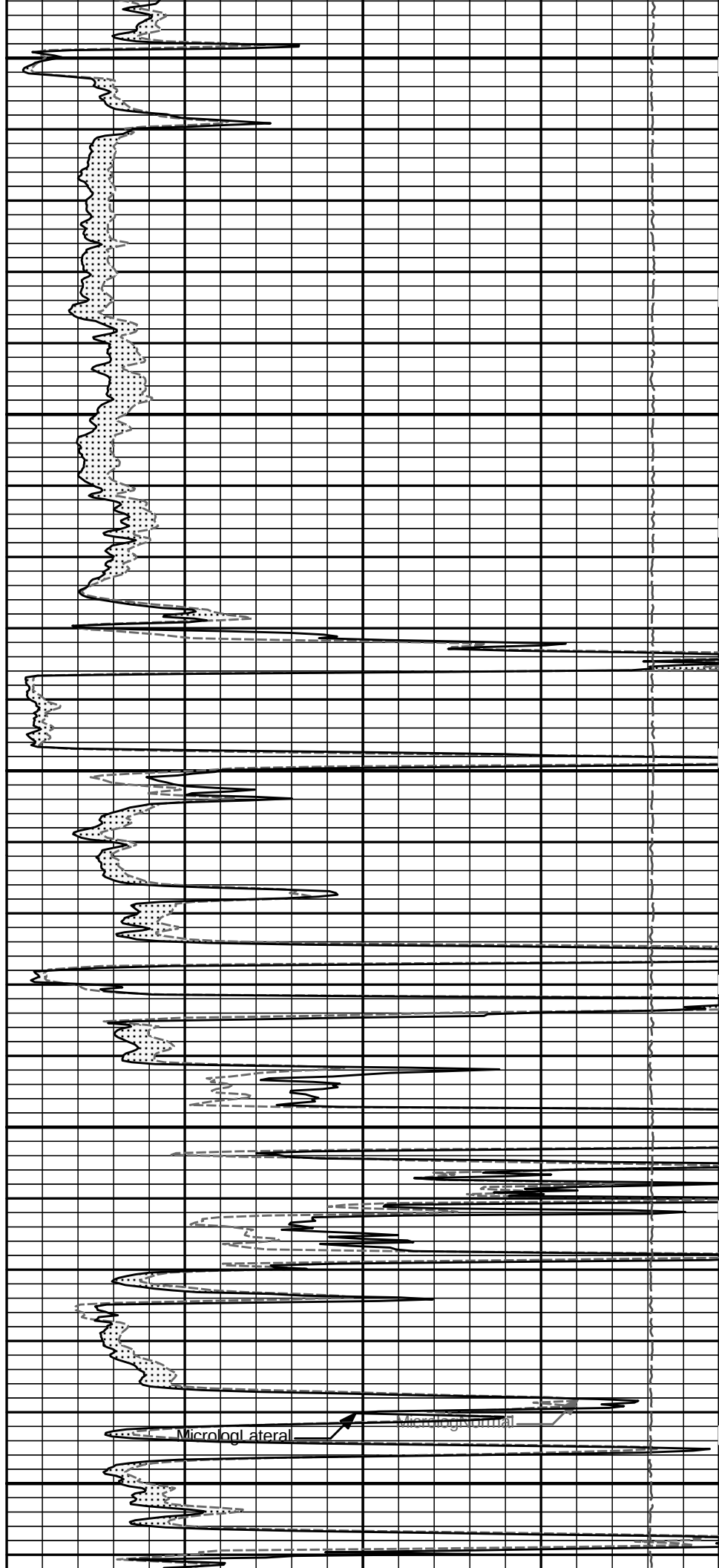
3700

3800

3900

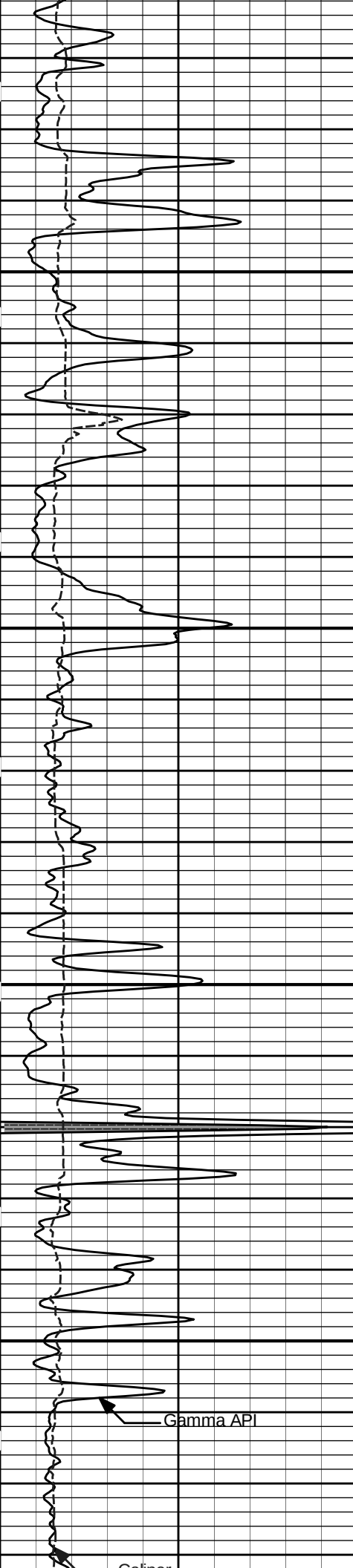
Gamma API

Caliper



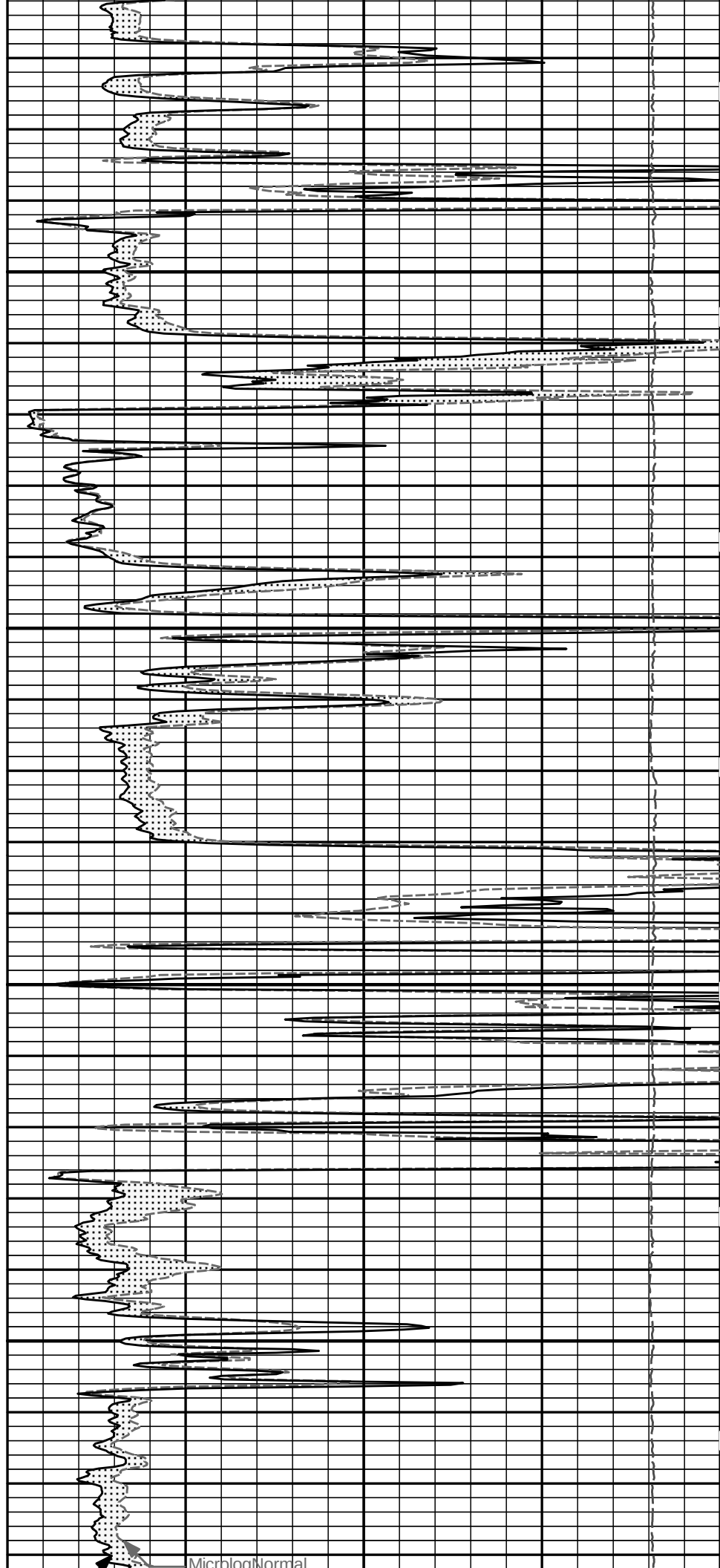
Microlog lateral

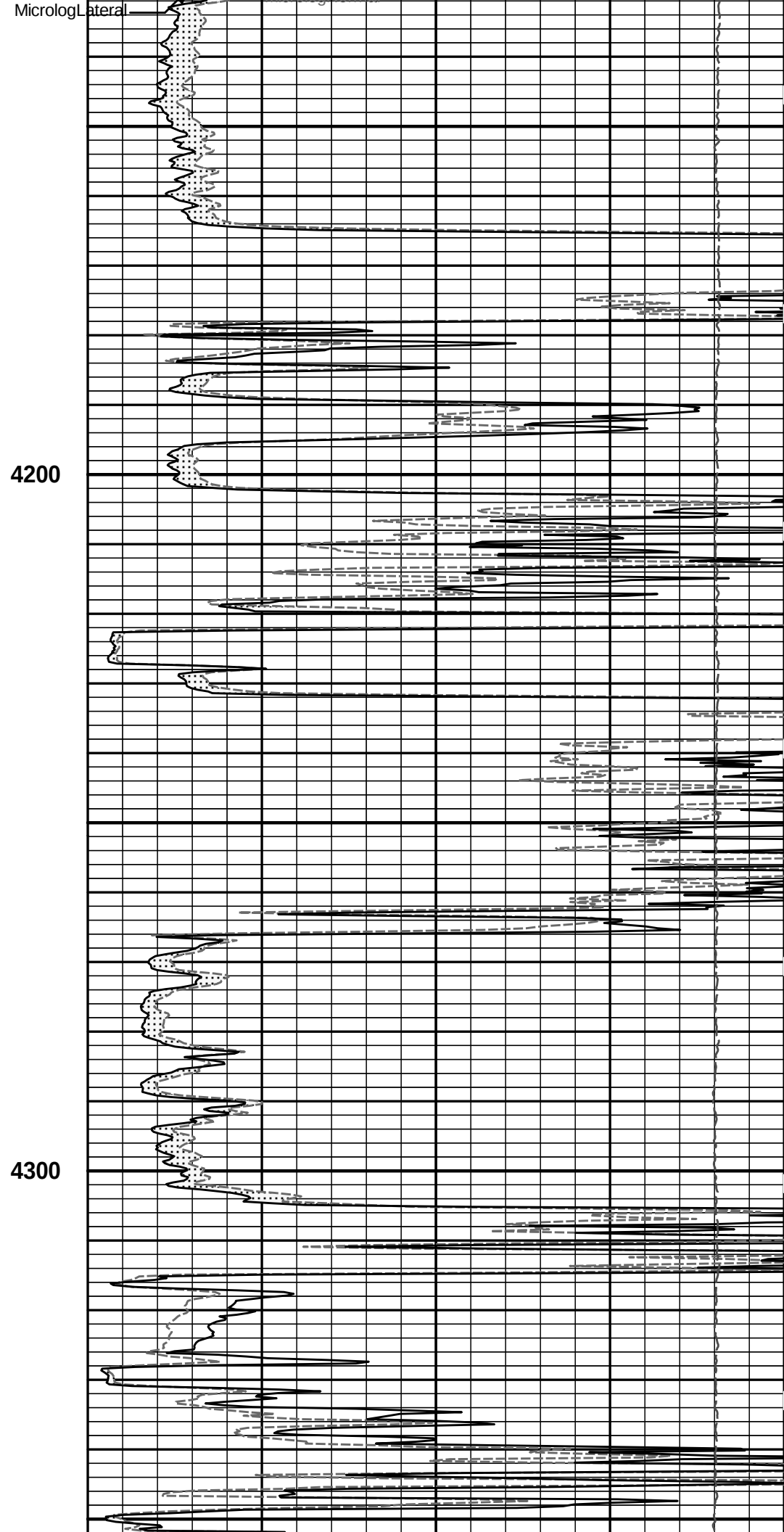
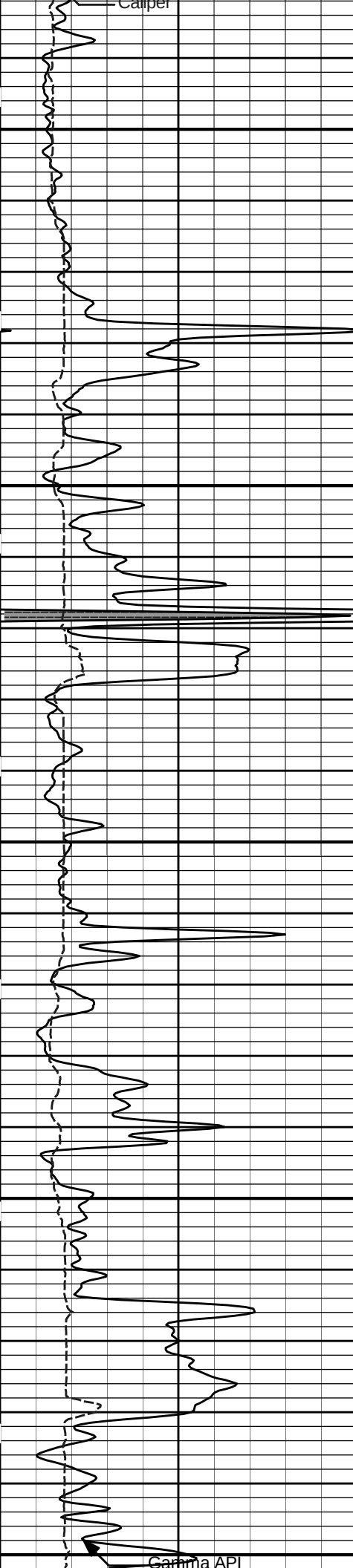
Microlog normal

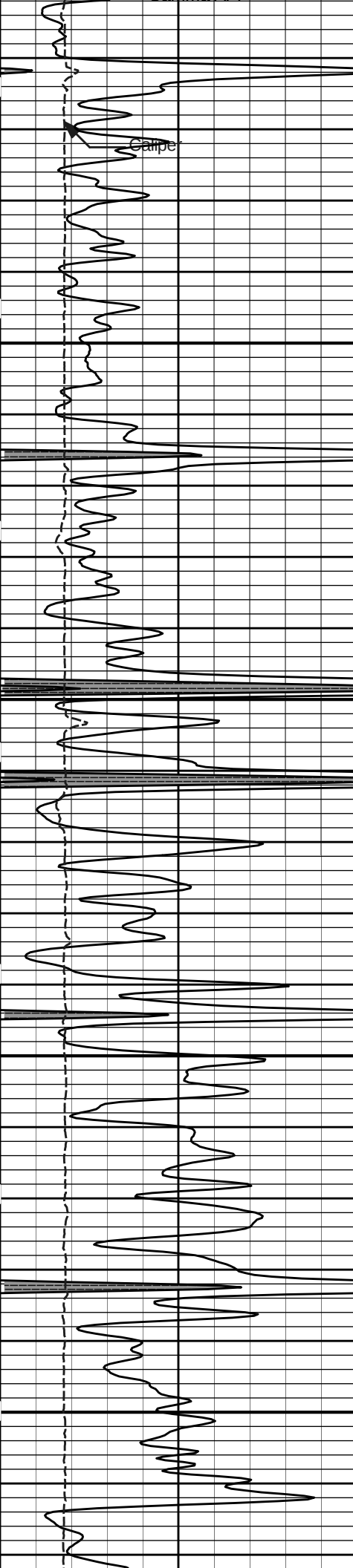


4000

4100

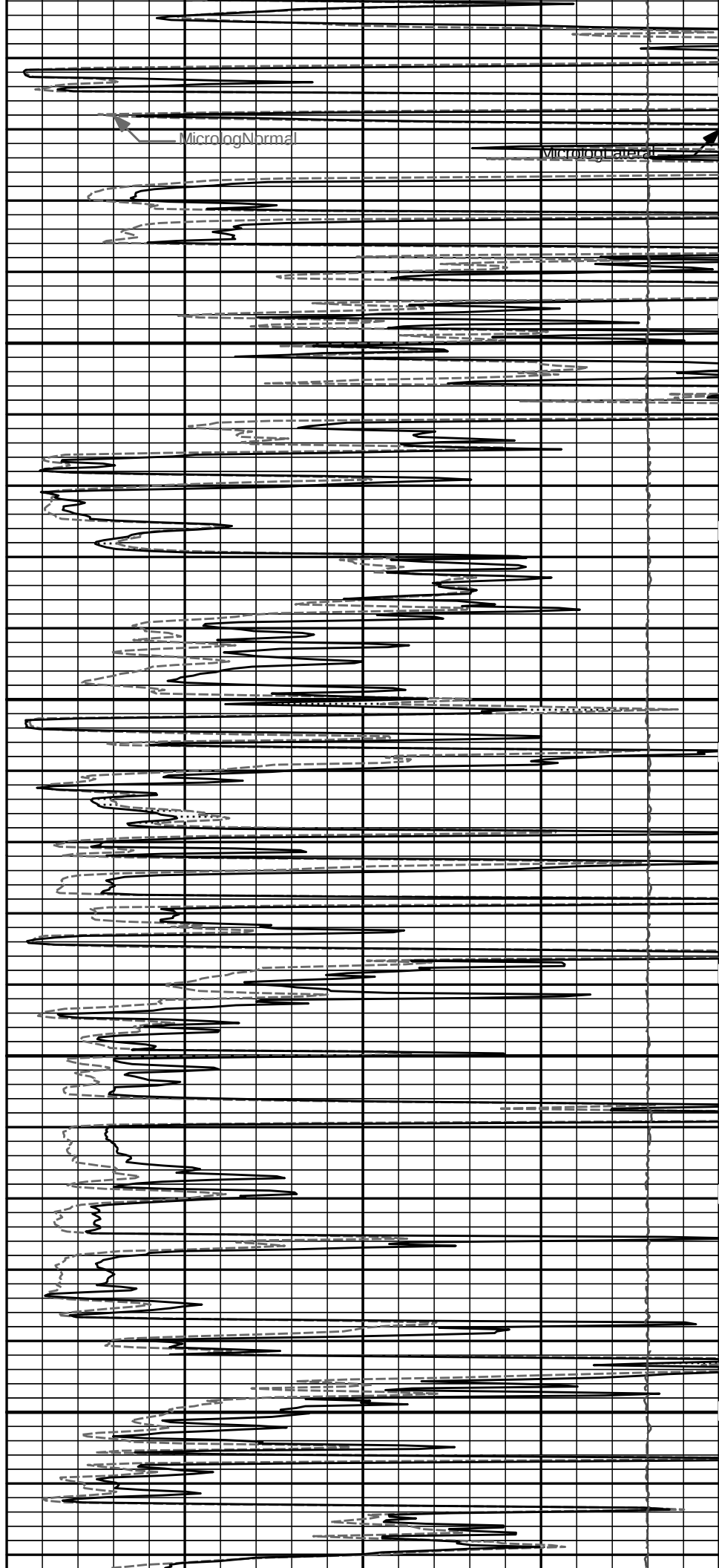


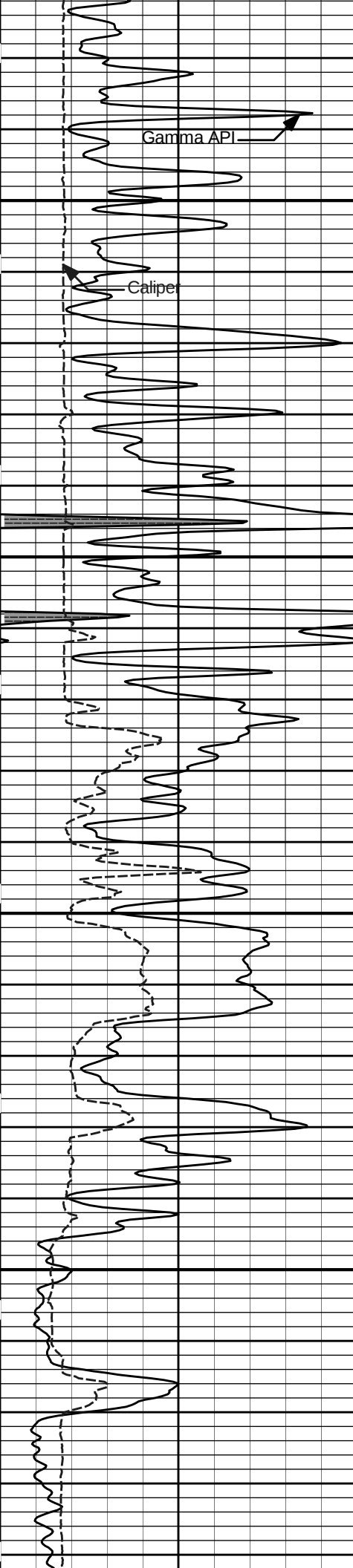




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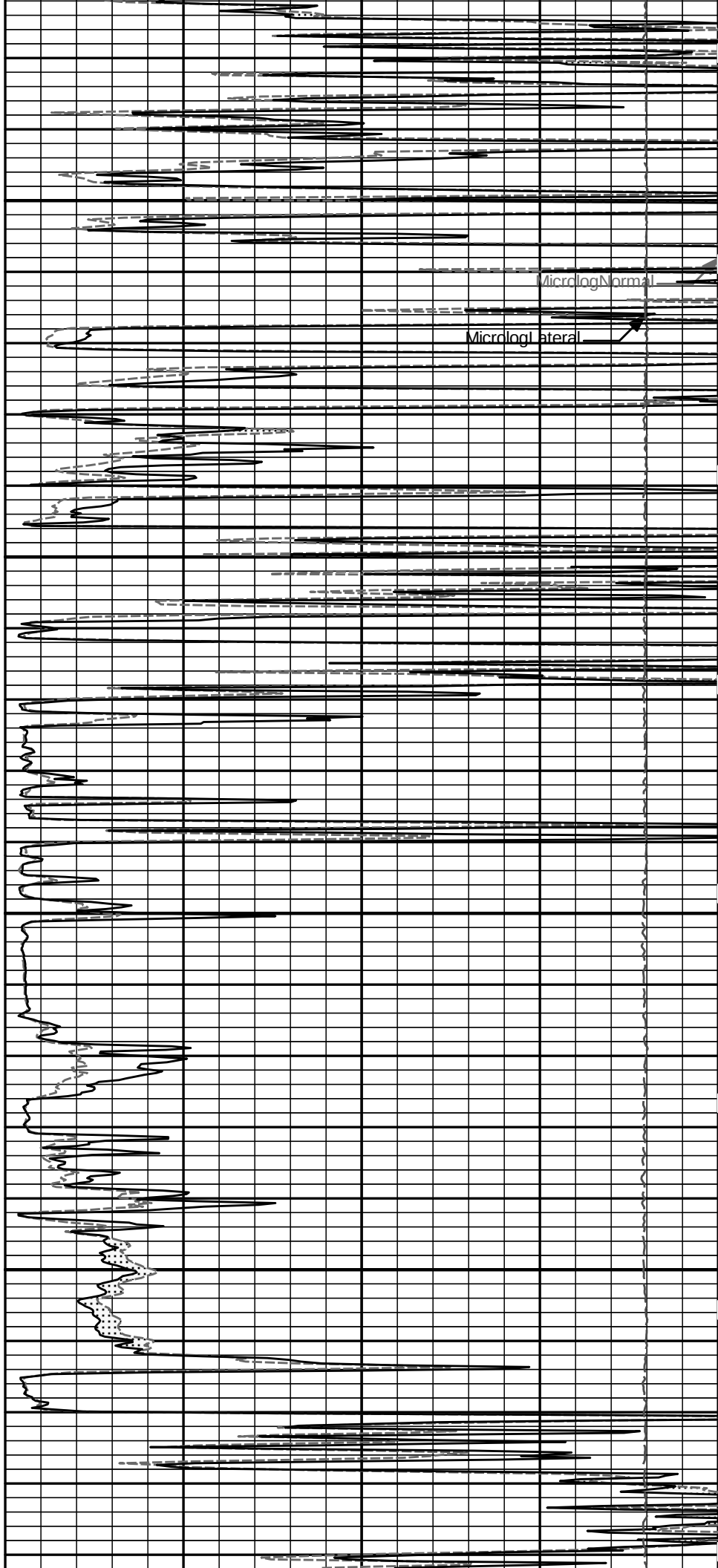
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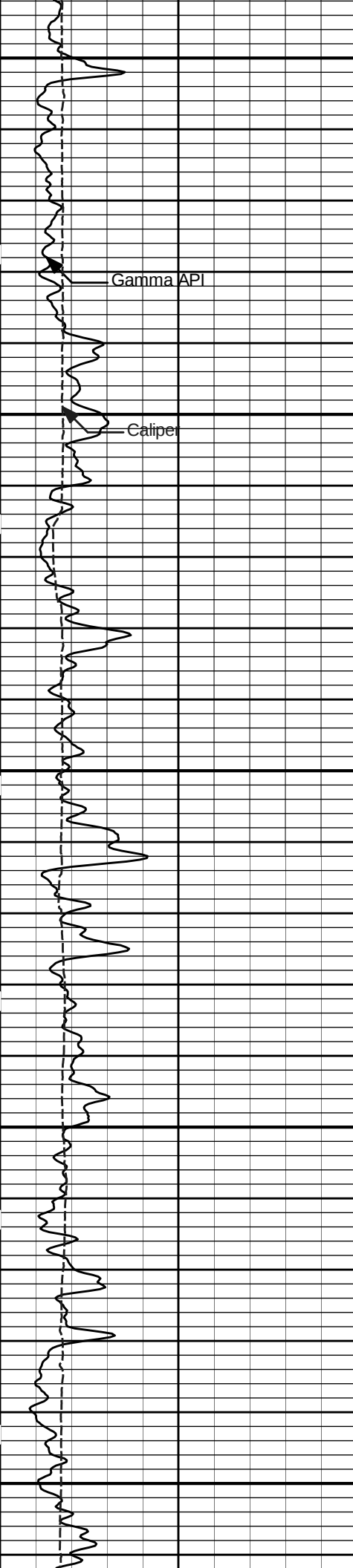




4600

4700





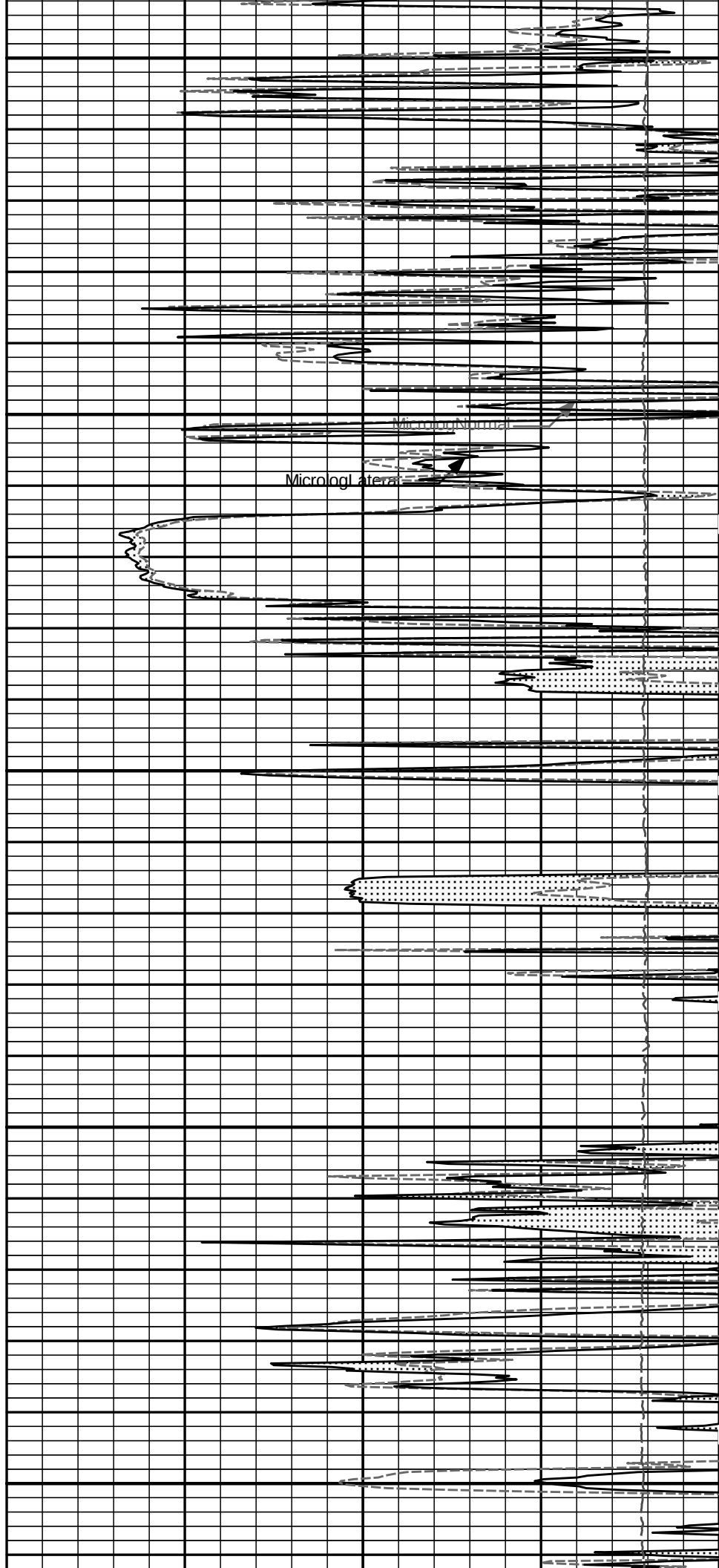
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Gamma API

Caliper

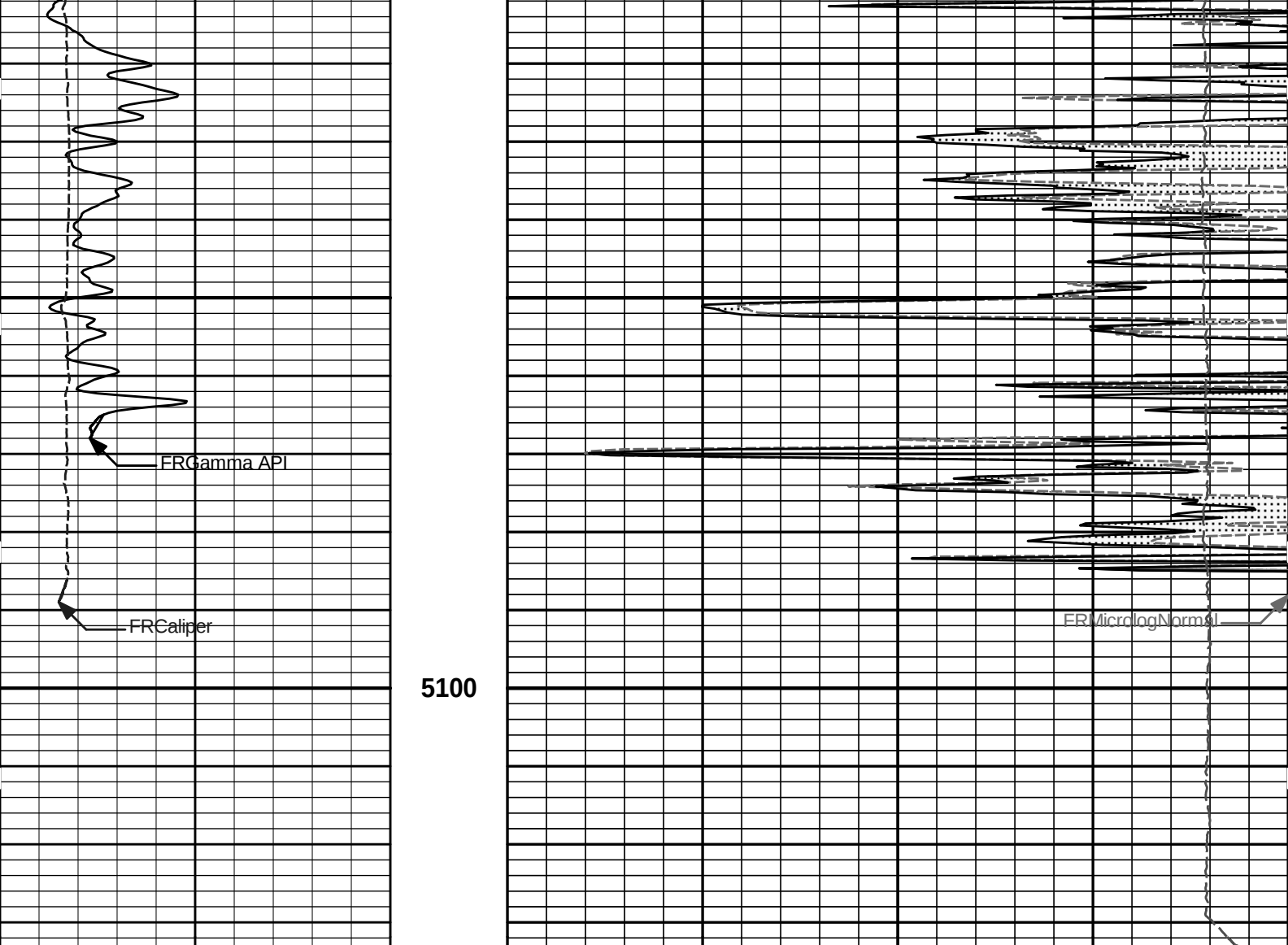
4900

5000



Microlog Normal

Microlog Lateral



6	Caliper	16	1 : 240	15K	Tension	0
	inches		ft		pounds	
0	Gamma API	150	Tension Pull	0	MicrologLateral	40
	api		10 0		ohm-metre	
	SHALE		Tension Pull	0	MicrologNormal	40
					ohm-metre	
					PERMEABLE	

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Plot Time: 20-Dec-12 22:43:55

Plot Range: 3640 ft to 5133.25 ft

Data: GARDEN_CTY_V3\Well Based\MAIN\

Plot File: \\LOCAL-IGARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CH\MICRO\Microlog_IQ_5_main.lib

5 INCH MAIN LOG

HALLIBURTON

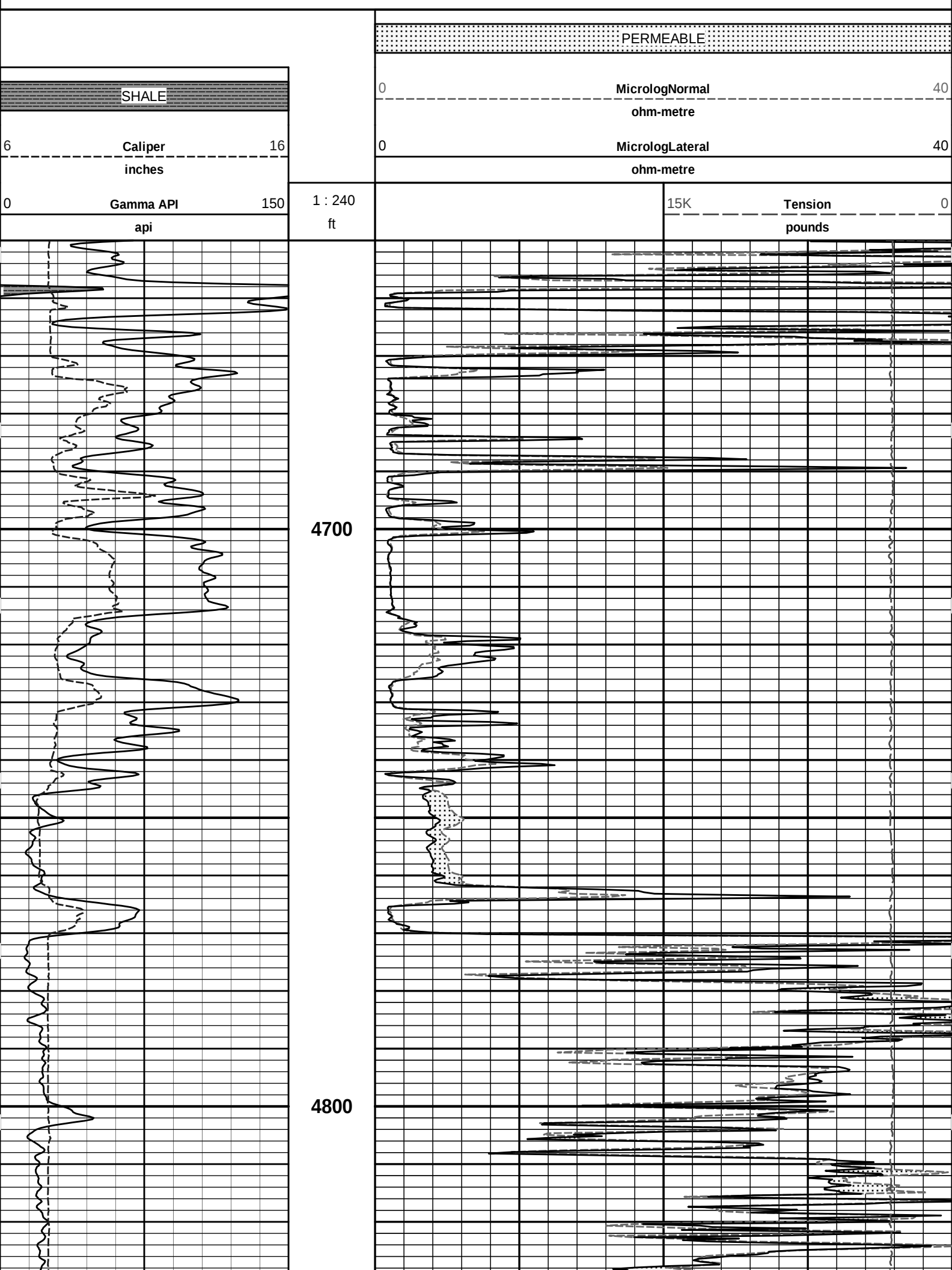
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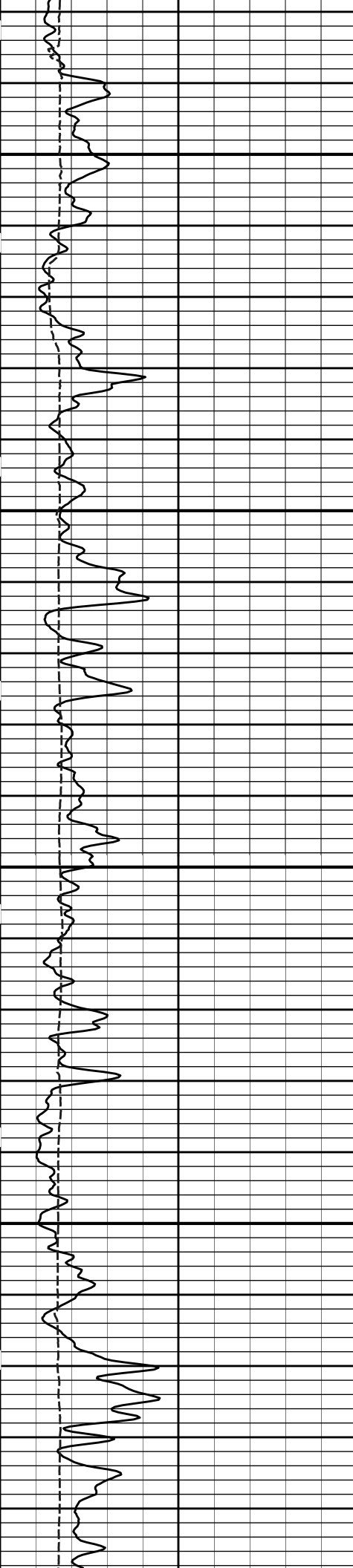
Plot Range: 4650 ft to 5132.42 ft

Data: GARDEN_CTY_V3\Well Based\RPT\

Plot File: \\LOCAL-IGARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CH\MICRO\Microlog_IQ_5_rep.lib

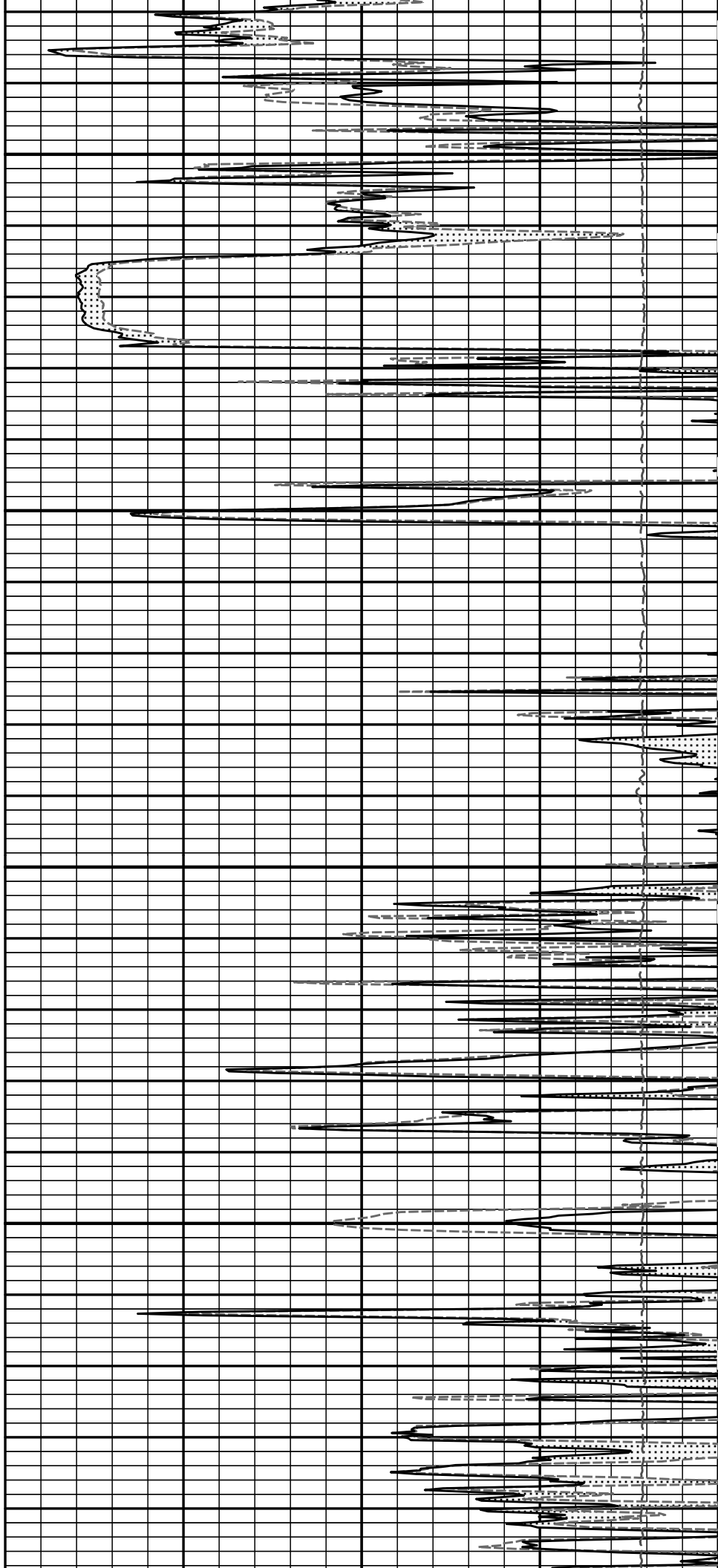
REPEAT SECTION

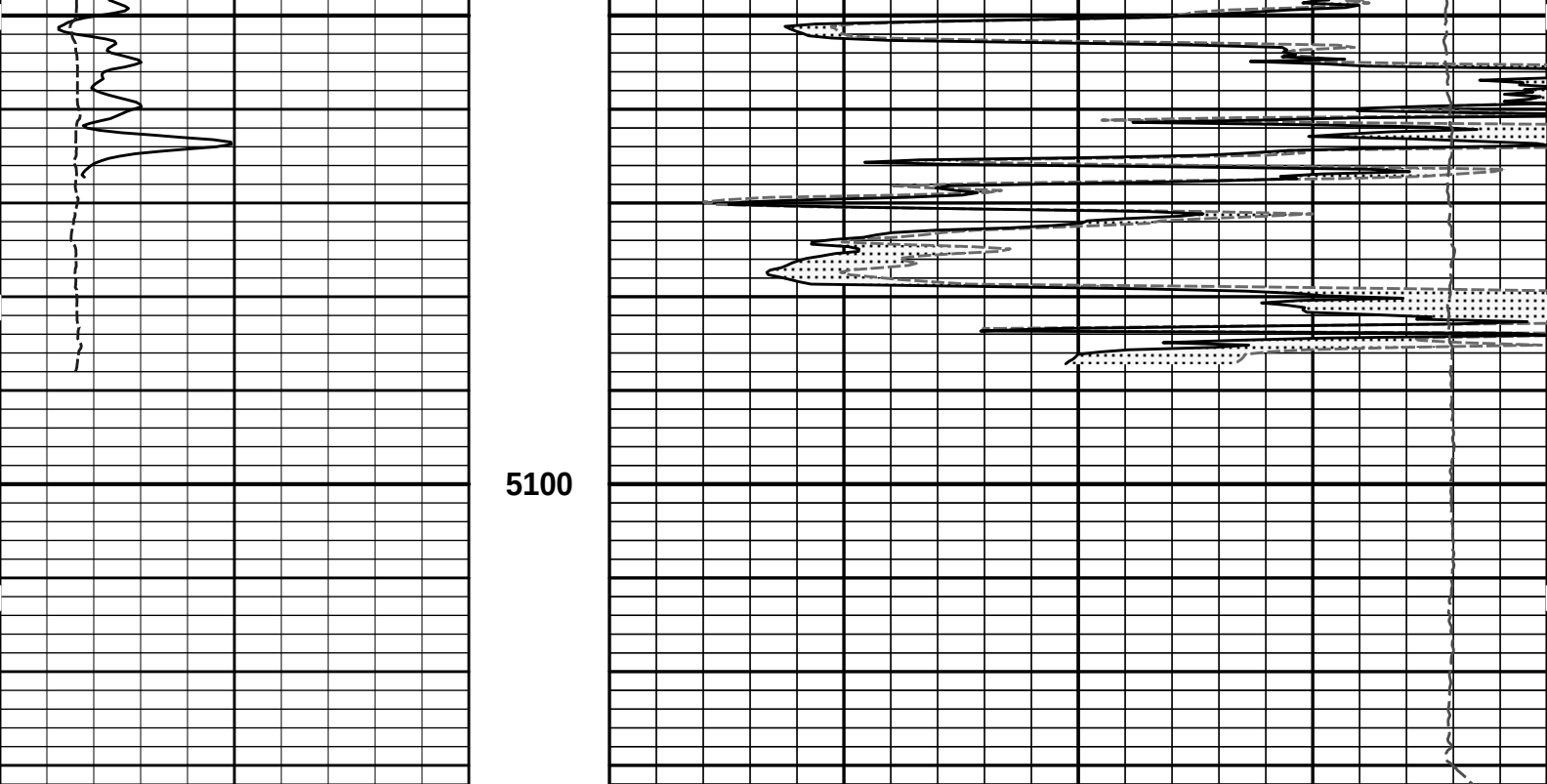




4900

5000





5100

0	Gamma API	150	1 : 240		15K	Tension	0
	api		ft			pounds	
6	Caliper	16		0	MicrologLateral		40
	inches				ohm-metre		
	SHALE			0	MicrologNormal		40
					ohm-metre		
					PERMEABLE		

HALLIBURTON

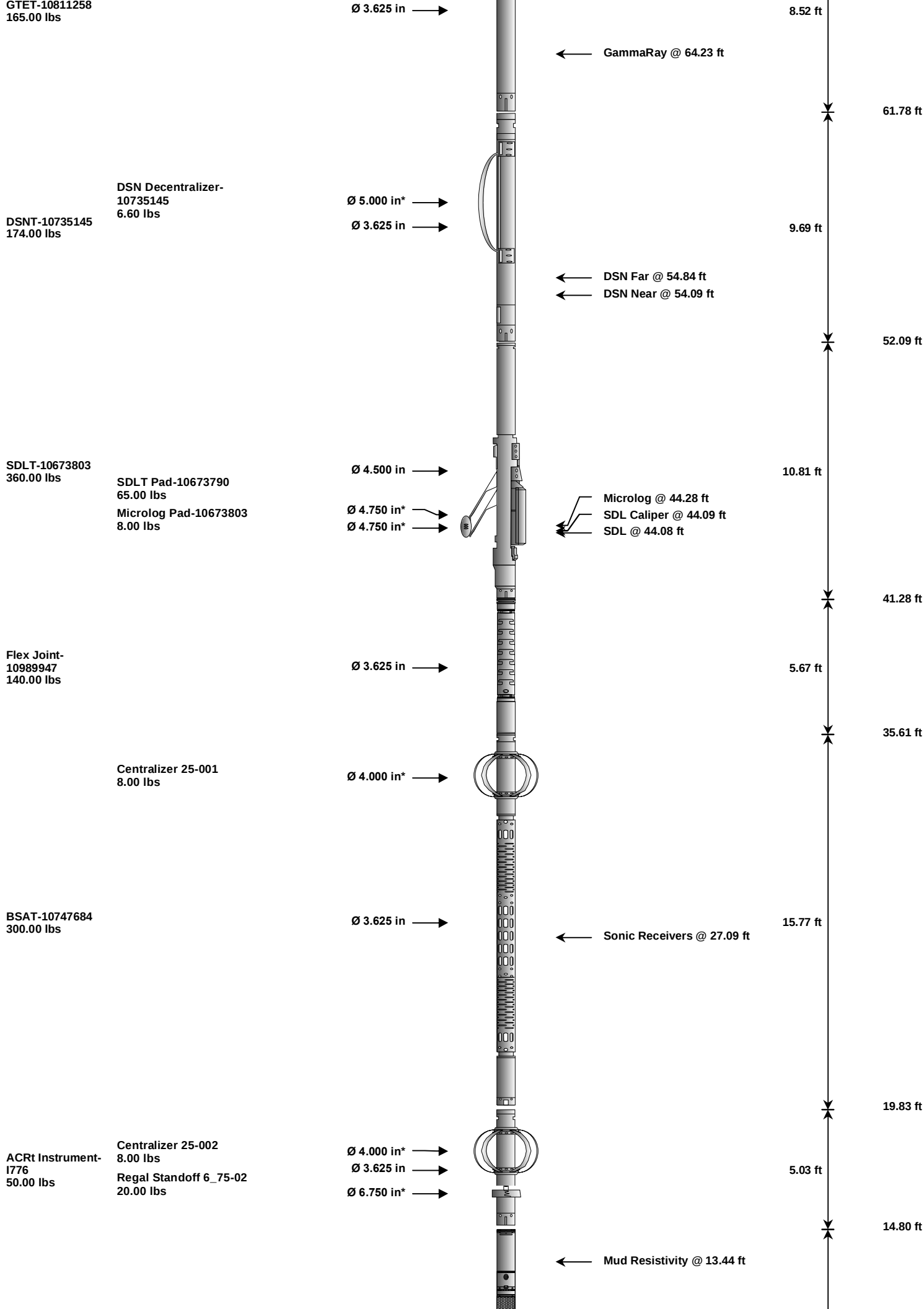
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Plot File: \\-LOCAL-IGARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CHMICRO\Microlog_IQ_5_rep_lib

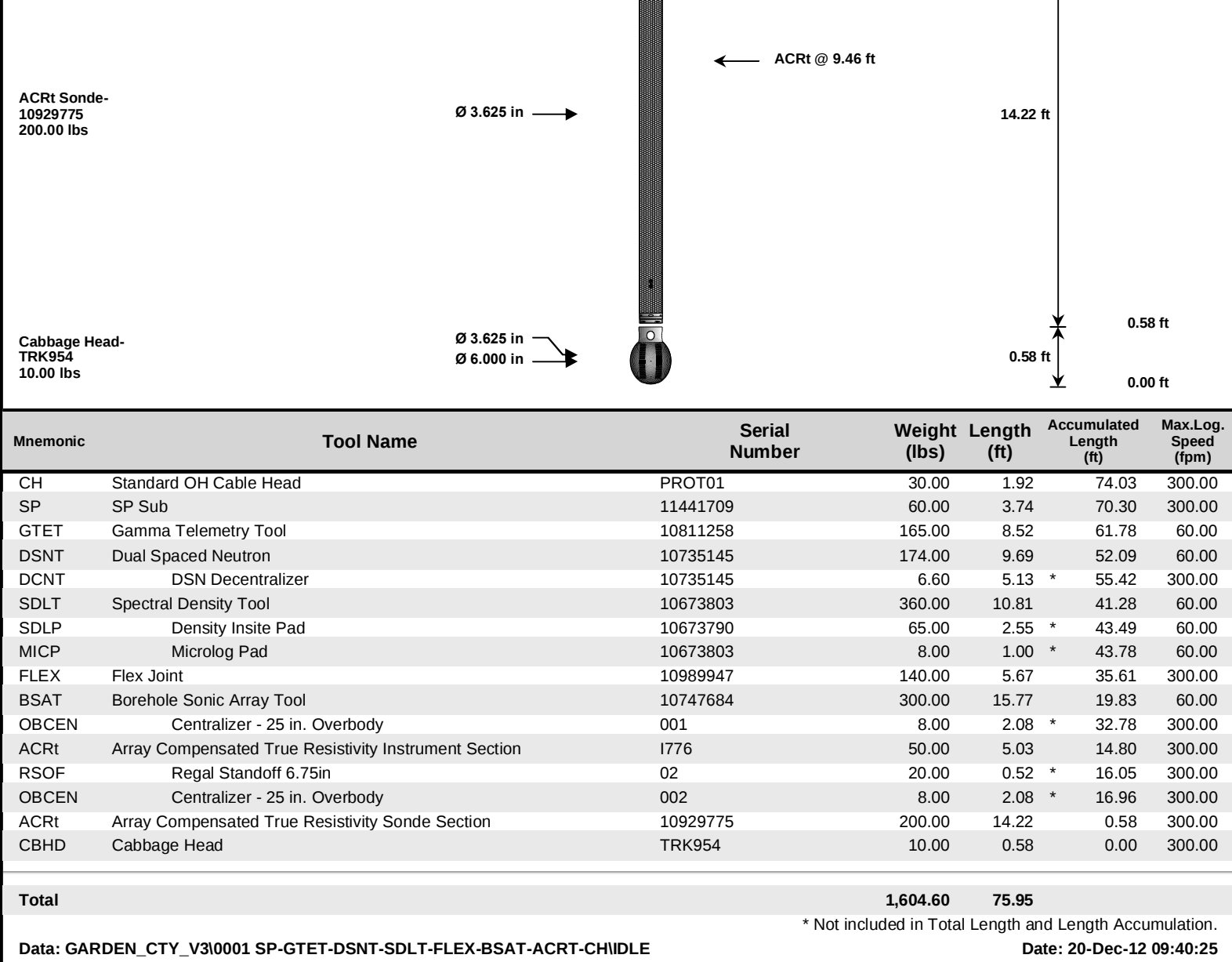
REPEAT SECTION

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	75.95 ft	
							74.03 ft
SP Sub-11441709 60.00 lbs		Ø 3.625 in →		← SP @ 72.26 ft	3.74 ft	70.30 ft	





HALLIBURTON			
CALIBRATION REPORT			
NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 10811258	Reference Calibration Date:	30-Sep-12 14:49:28
Engineer:	S. INGERSOLL	Calibration Date:	01-Dec-12 15:51:34
Software Version:	WL INSITE R3.6.0 (Build 3)	Calibration Version:	1
Calibrator Source S/N: TB-185			
Calibrator API Reference:228.00 api			
Equivalent Calibrator API Reference:232.0 api			
Measurement	Measured	Calibrated	Units
Background	34.5	34.4	api
Background + Calibrator	267.1	266.4	api
Calibrator	232.6	232.0	api
NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 10811258	Reference Calibration Date:	01-Dec-12 15:51:34
Engineer:	T. HYDE	Calibration Date:	20-Dec-12 08:50:30

MicroLog Normal	19.93	19.91	-----	0.02	+/-0.80	ohmm
MicroLog Lateral	19.99	19.96	-----	0.03	+/-0.80	ohmm
Data: GARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CH\IDLE					Date: 20-Dec-12 10:00:48	

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	9.500	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	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	10000.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	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	DSNO	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	LUWT	Logging Horizontal Water Tool?	No	

DSNT	LHW	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	
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 Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	User define	
BSAT	DTMA	Delta -T Matrix	47.60	uspf
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 Up	
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	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
BOTTOM				
Data: GARDEN_CTY_V3\0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CH\IDLE				Date: 20-Dec-12 10:01:32

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		72.25	NO	
SP	Spontaneous Potential		72.25	BLK	1.250
SPR	Raw Spontaneous Potential		72.25	NO	
SPO	Spontaneous Potential Offset		72.25	NO	
GTET					
TPUL	Tension Pull		64.23	NO	
GR	Natural Gamma Ray API		64.23	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API		64.23	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution		64.23	W	1.416 , 0.750
ACCZ	Accelerometer Z		0.00	BLK	0.083
DEVI	Inclination		0.00	NO	
DSNT					
TPUL	Tension Pull		53.99	NO	

RNDS	Near Detector Telemetry Counts	54.09	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.84	TRI	0.583
DNTT	DSN Tool Temperature	54.09	NO	
DSNS	DSN Tool Status	53.99	NO	
ERND	Near Detector Telemetry Counts EVR	54.09	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.84	BLK	0.000
ENTM	DSN Tool Temperature EVR	54.09	NO	
SDLT				
TPUL	Tension Pull	44.09	NO	
PCAL	Pad Caliper	44.09	TRI	0.250
ACAL	Arm Caliper	44.09	TRI	0.250
BSAT				
TPUL	Tension Pull	27.09	NO	
STAT	Status	27.09	NO	
DLYT	Delay Time	27.09	NO	
SI	Sample Interval	27.09	NO	
TXRX	Raw Telemetry 10 Receivers	27.09	NO	
FRMC	Tool Frame Count	27.09	NO	
GMOD	Gain processing mode	19.83	NO	
ACRt Sonde				
TPUL	Tension Pull	2.97	NO	
F1R1	ACRT 12KHz - 80in R value	9.22	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	9.22	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.72	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.72	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	5.22	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	5.22	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	4.22	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	4.22	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.72	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.72	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.47	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.47	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	9.22	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	9.22	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.72	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.72	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	5.22	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	5.22	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	4.22	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	4.22	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.72	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.72	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.47	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.47	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	9.22	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	9.22	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.72	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.72	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	5.22	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	5.22	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	4.22	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	4.22	BLK	0.000

F3R5	ACRT 72KHz - 10in R value	3.72	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.72	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.47	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.47	BLK	0.000
RMUD	Mud Resistivity	12.76	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	2.97	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.97	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.97	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.97	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.97	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.97	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.97	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.97	BLK	0.000
ITMP	Instrument Temperature	2.97	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.97	NO	
TIDV	Instrument Temperature Derivative	2.97	NO	
TUDV	Upper Temperature Derivative	2.97	NO	
TLDV	Lower Temperature Derivative	2.97	NO	
TRBD	Receiver Board Temperature	2.97	NO	
SDLT Pad				
TPUL	Tension Pull	44.08	NO	
NAB	Near Above	43.90	BLK	0.920
NHI	Near Cesium High	43.90	BLK	0.920
NLO	Near Cesium Low	43.90	BLK	0.920
NVA	Near Valley	43.90	BLK	0.920
NBA	Near Barite	43.90	BLK	0.920
NDE	Near Density	43.90	BLK	0.920
NPK	Near Peak	43.90	BLK	0.920
NLI	Near Lithology	43.90	BLK	0.920
NBAU	Near Barite Unfiltered	43.90	BLK	0.250
NLIU	Near Lithology Unfiltered	43.90	BLK	0.250
FAB	Far Above	44.26	BLK	0.250
FHI	Far Cesium High	44.26	BLK	0.250
FLO	Far Cesium Low	44.26	BLK	0.250
FVA	Far Valley	44.26	BLK	0.250
FBA	Far Barite	44.26	BLK	0.250
FDE	Far Density	44.26	BLK	0.250
FPK	Far Peak	44.26	BLK	0.250
FLI	Far Lithology	44.26	BLK	0.250
PTMP	Pad Temperature	44.09	BLK	0.920
NHV	Near Detector High Voltage	43.49	NO	
FHV	Far Detector High Voltage	43.49	NO	
ITMP	Instrument Temperature	43.49	NO	
DDHV	Detector High Voltage	43.49	NO	
Microlog Pad				
TPUL	Tension Pull	44.28	NO	
MINV	Microlog Lateral	44.28	BLK	0.750
MNOR	Microlog Normal	44.28	BLK	0.750
Data: GARDEN_CTY_V3I0001 SP-GTET-DSNT-SDLT-FLEX-BSAT-ACRT-CHIDLE			Date: 20-Dec-12 10:01:40	

WELL	GARDEN CITY IV-3		
FIELD	GARDEN CITY		
COUNTY	FINNEY	STATE	KANSAS
HALLIBURTON		MICRO LOG	