HALLIBURTON

MICROLOG

COMPANY HERMAN L. LOEB, LLC
WELL BANTA 'F' 1-21
FIELD/BLOCK EINSEL
COUNTY KIOWA
STATE KANSAS

COMPANY **HERMAN L. LOEB, LLC**

WELL **BANTA 'F' 1-21**

FIELD/BLOCK **EINSEL**

COUNTY **KIOWA** STATE **KANSAS**

API No. 15-097-21822-00-00

Location (SHL) 795' FSL & 790' FWL
SW NE SW SW

Sect. 21 Twp. 27S Rge. 18W

Other Services:
DSNT/SDLT
MICROLOG
ACRT

Permanent Datum	GL	Elev. 2211.0 ft	Elev.: K.B. 2224.0 ft
Log measured from	KB	, 13.0 ft above perm. Datum	D.F. 2224.0 ft
Drilling measured from	KB		G.L. 2211.0 ft

Date		12-Jun-15					
Run No.		ONE					
Depth - Driller		4820.00 ft					
Depth - Logger		4820.0 ft					
Bottom - Logged Interval		4817.00 ft					
Top - Logged Interval		3900.00 ft					
Casing - Driller		8.625 in @ 545.0 ft		@		@	
Casing - Logger							
Bit Size		7.875 in		@		@	
Type Fluid in Hole		Water Based Mud					
Density	Viscosity	9.2 ppg	58.00 s/qt				
PH	Fluid Loss	10.00 pH	10.4 cptm				
Source of Sample		MUDPIT					
Rm @ Meas. Temperature		@		@		@	
Rmf @ Meas. Temperature		@		@		@	
Rmc @ Meas. Temperature		@		@		@	
Source Rmf	Rmc	MEASURED	MEASURED				
Rm @ BHT		0.00 ohmm @ 125.0 degF		@		@	
Time Since Circulation		3.0000 hr					
Time on Bottom		12-Jun-15 16:45:00.000					
Max. Rec. Temperature		125.0 degF @ 4820.0 ft		@		@	
Equipment	Location	11072142	Liberal, KS, US				
Recorded By		JORGE ORLANDO PEREZ					
Witnessed By		JON CHRISTENSEN					

Fold here

Service Ticket No.: 902429270 API Serial No.: 15-097-21822-00-00 PGM Version: WL INSITE R4.6.4 (Build 3)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

Date	Sample No.				
Depth-Driller					
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample					
Rm @ Meas. Temp		@	@	@	@
Rmf @ Meas. Temp.		@	@	@	@
Rmc @ Meas. Temp.		@	@	@	@
Source Rmf	Rmc				
Rm @ BHT		@	@	@	@
Rmf @ BHT		@	@	@	@
Rmc @ BHT		@	@	@	@

RESISTIVITY SCALE CHANGES

	Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA

	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
	@				
	ONE	ACRT	N/A	1.5 S.O.	N/A
		I-11022962			
		S-11005909			
	@				
	@				
	@				

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	11048627	Serial No.		Serial No.	11014296	Serial No.	11055304
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.		Diameter	5.3"	Diameter	3.625"
Detector Model No.	T-102	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	CS137	Source Type	AM241BE
Length	8"	LSA [Y/N]		Serial No.	5168GW	Serial No.	DSN-424
Distance to Source	N/A	FWDA [Y/N]		Strength	1.5 Ci	Strength	15.0 Ci

LOGGING DATA

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	TD	CSG	REC	0	150				30	-10	2.71 gr/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING

CHLORIDES REPORTED AT 8000 ppm

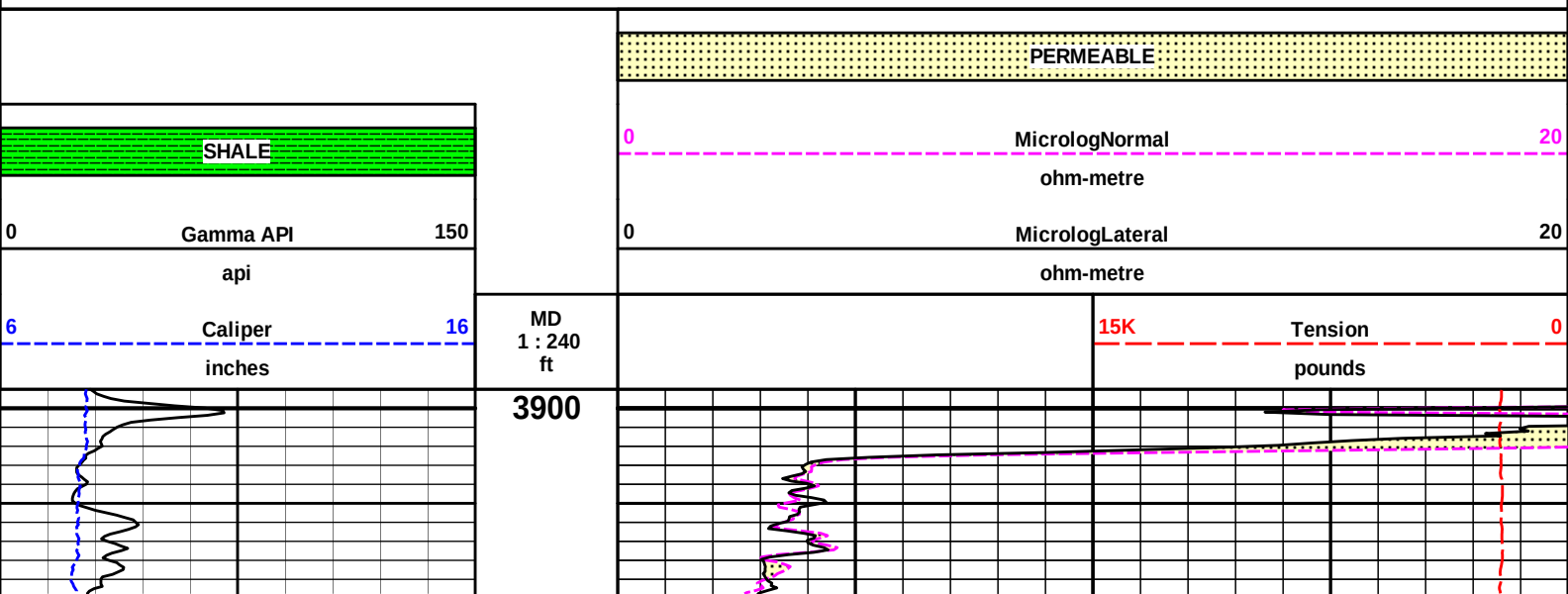
DSNT/SDLT/MICROLOG AND ACRT RAN IN SEPARATE RUNS

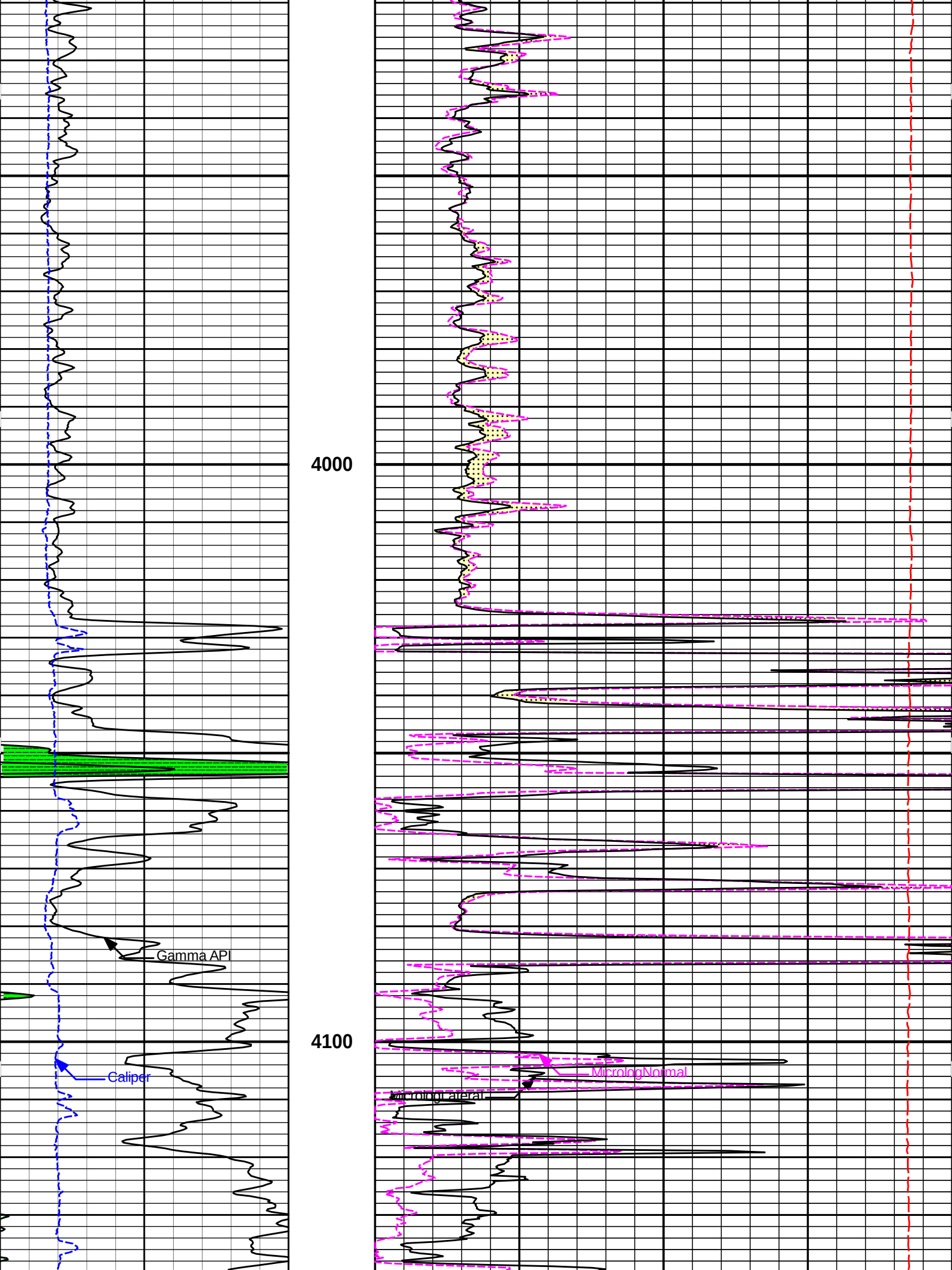
HALLIBURTON

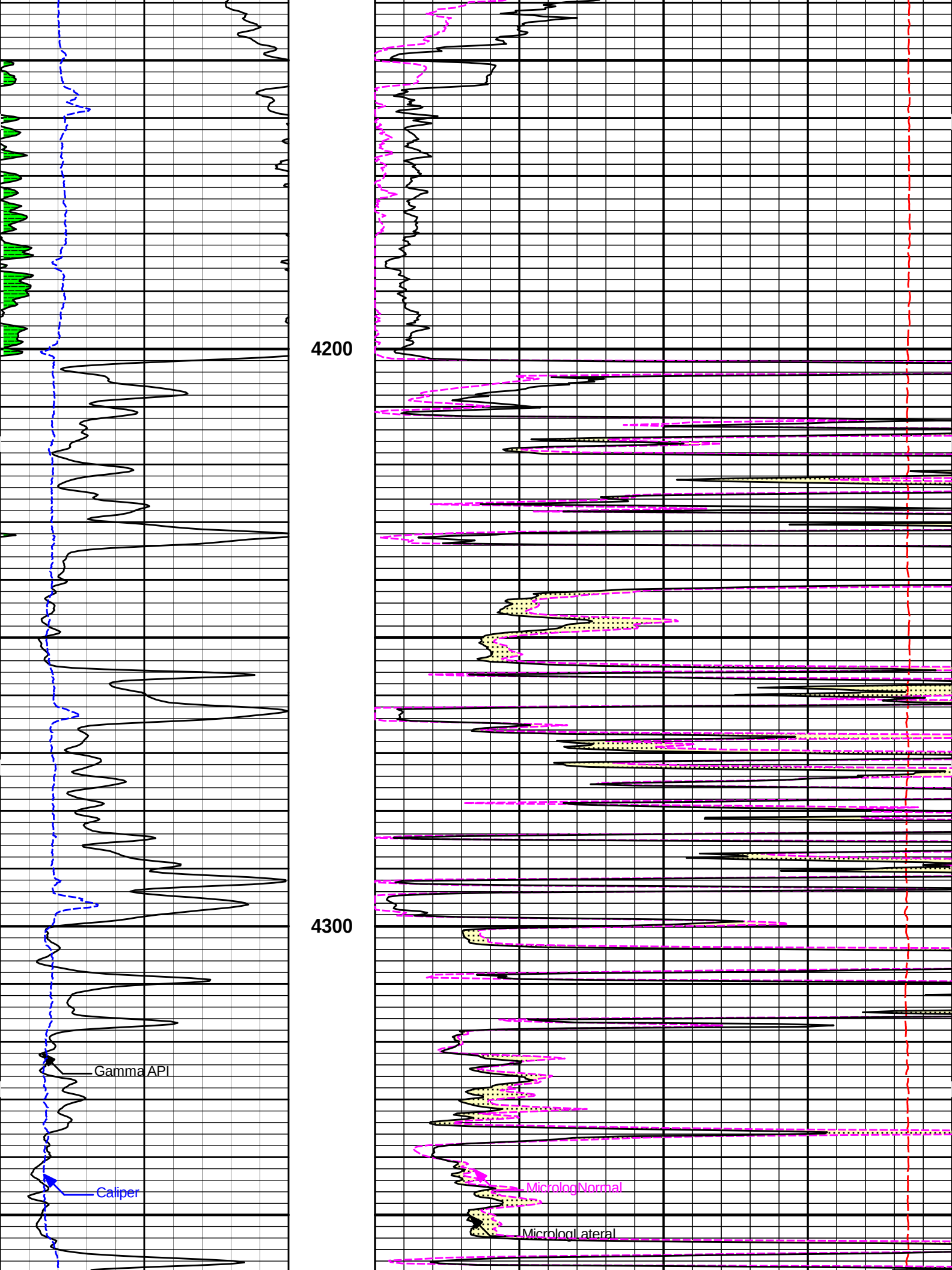
Plot Time: 12-Jun-15 17:13:47
Plot Range: 3898 ft to 4826.25 ft
Data: BANTA-F_1-21\Well Based\DETAILS1
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\MICROLOG\Microlog_IQ_5_main_lib

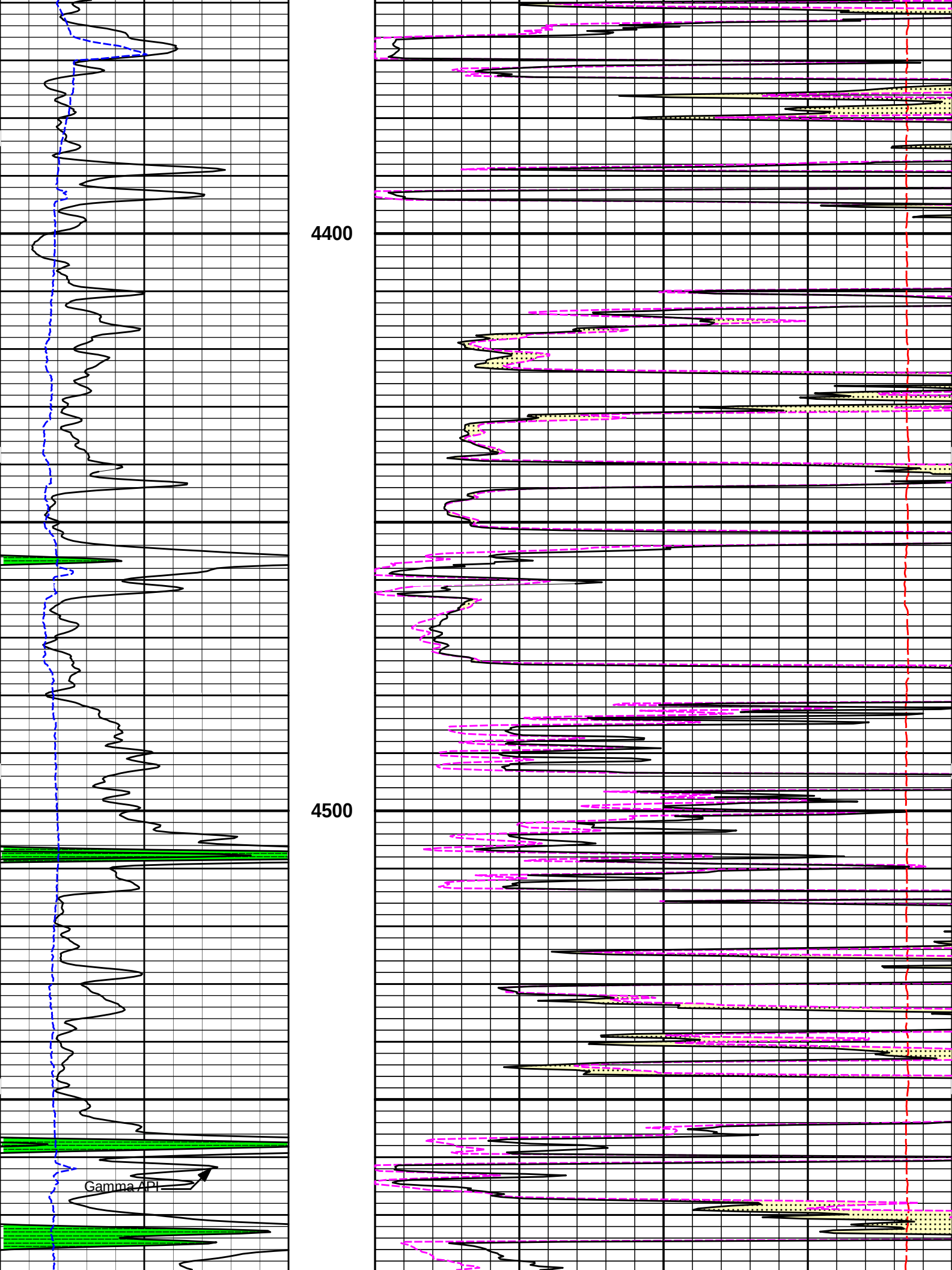
5 INCH MAIN LOG

MEASURED DEPTH
MAIN LOG 5" PER 100'




4000
4100
Gamma API
Caliper
MicrologNormal
Microloglateral


4200
4300
Gamma API
Caliper
MicrologNormal
MicrologLateral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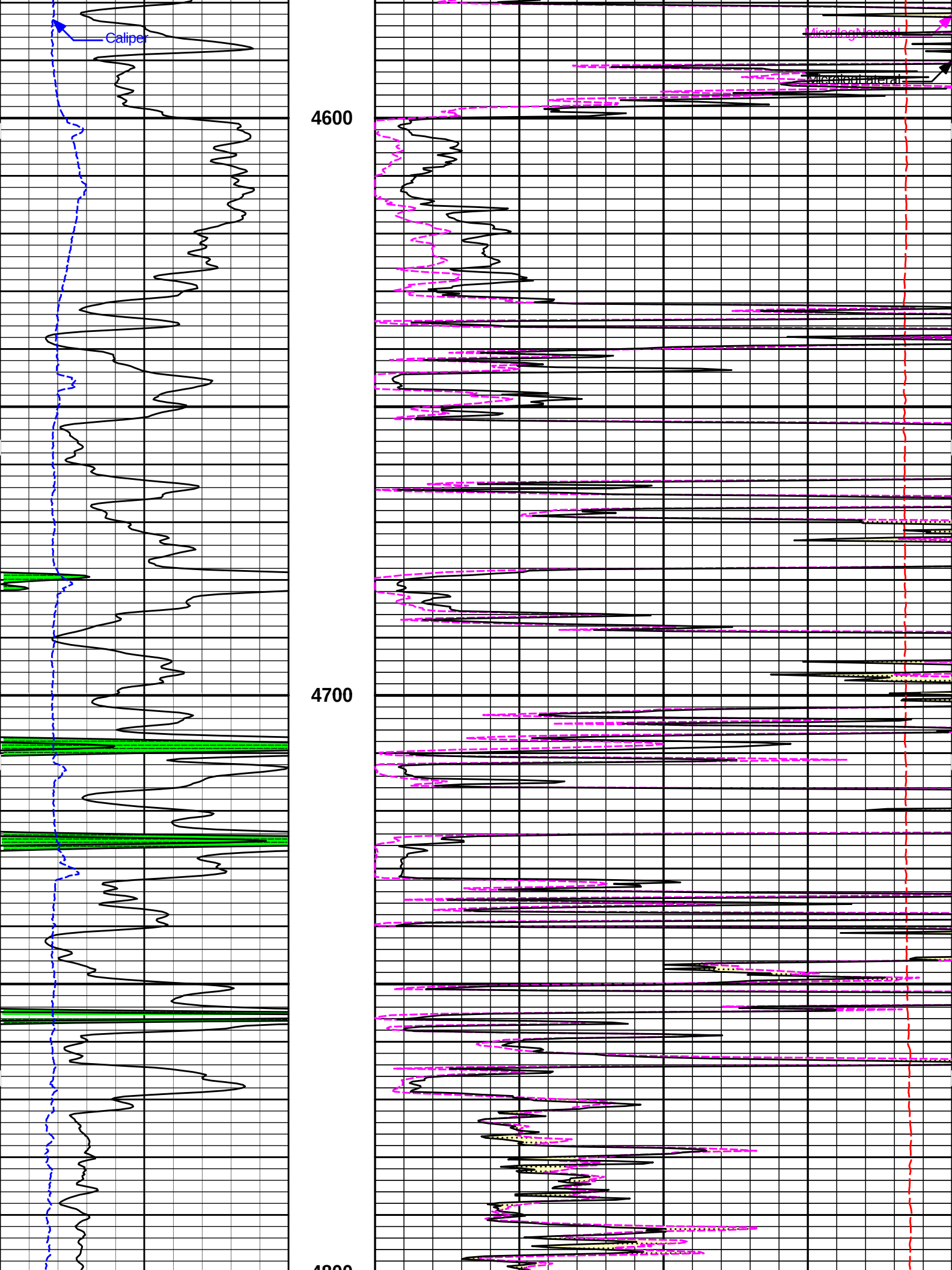
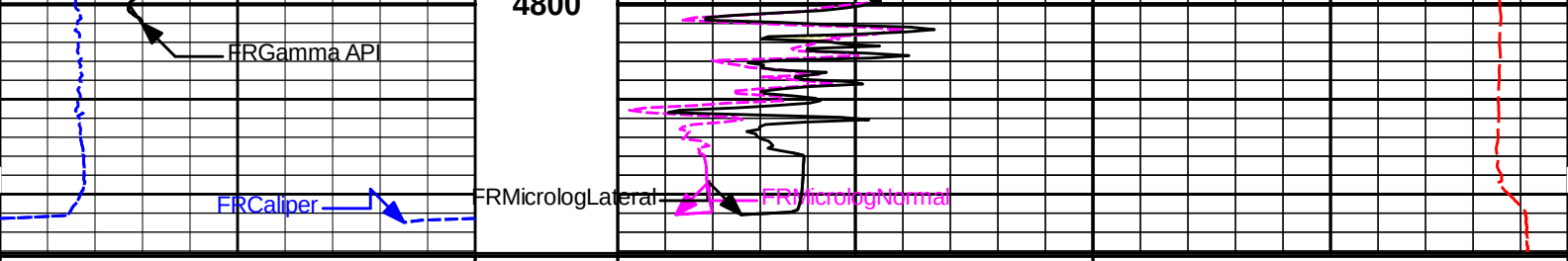
4500
Gamma API


Caliper
MicrologNormal
MicrologLateral
4600
4700



6 Caliper 16
inches

MD
1 : 240
ft

15K Tension 0
pounds

0 Gamma API 150
api

0 MicrologLateral 20
ohm-metre

0 MicrologNormal 20
ohm-metre

SHALE

PERMEABLE

HALLIBURTON

Plot Time: 12-Jun-15 17:13:53
Plot Range: 3898 ft to 4826.25 ft
Data: BANTA-F_1-21\Well Based\DETAILS1\
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\MICROLOG\Microlog_IQ_5_main_lib

5 INCH MAIN LOG

MEASURED DEPTH
MAIN LOG 5" PER 100'

HALLIBURTON

Plot Time: 12-Jun-15 17:13:53
Plot Range: 4548 ft to 4823.67 ft
Data: BANTA-F_1-21\Well Based\REPEAT\
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION

PERMEABLE

0 MicrologNormal 20
ohm-metre

0 MicrologLateral 20
ohm-metre

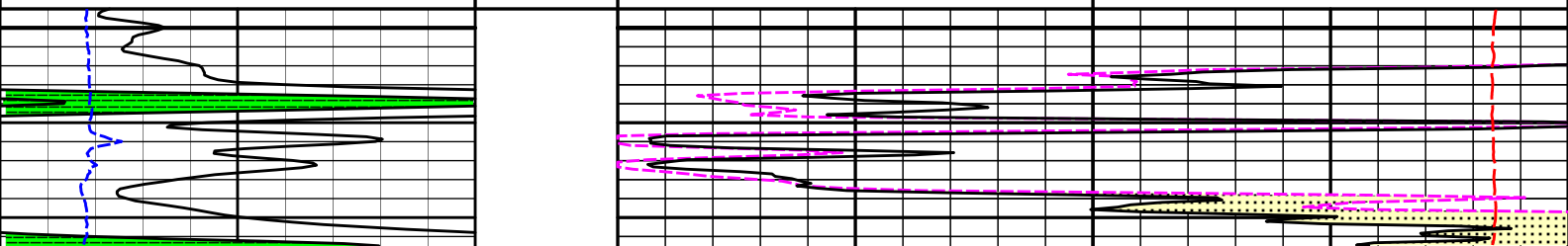
SHALE

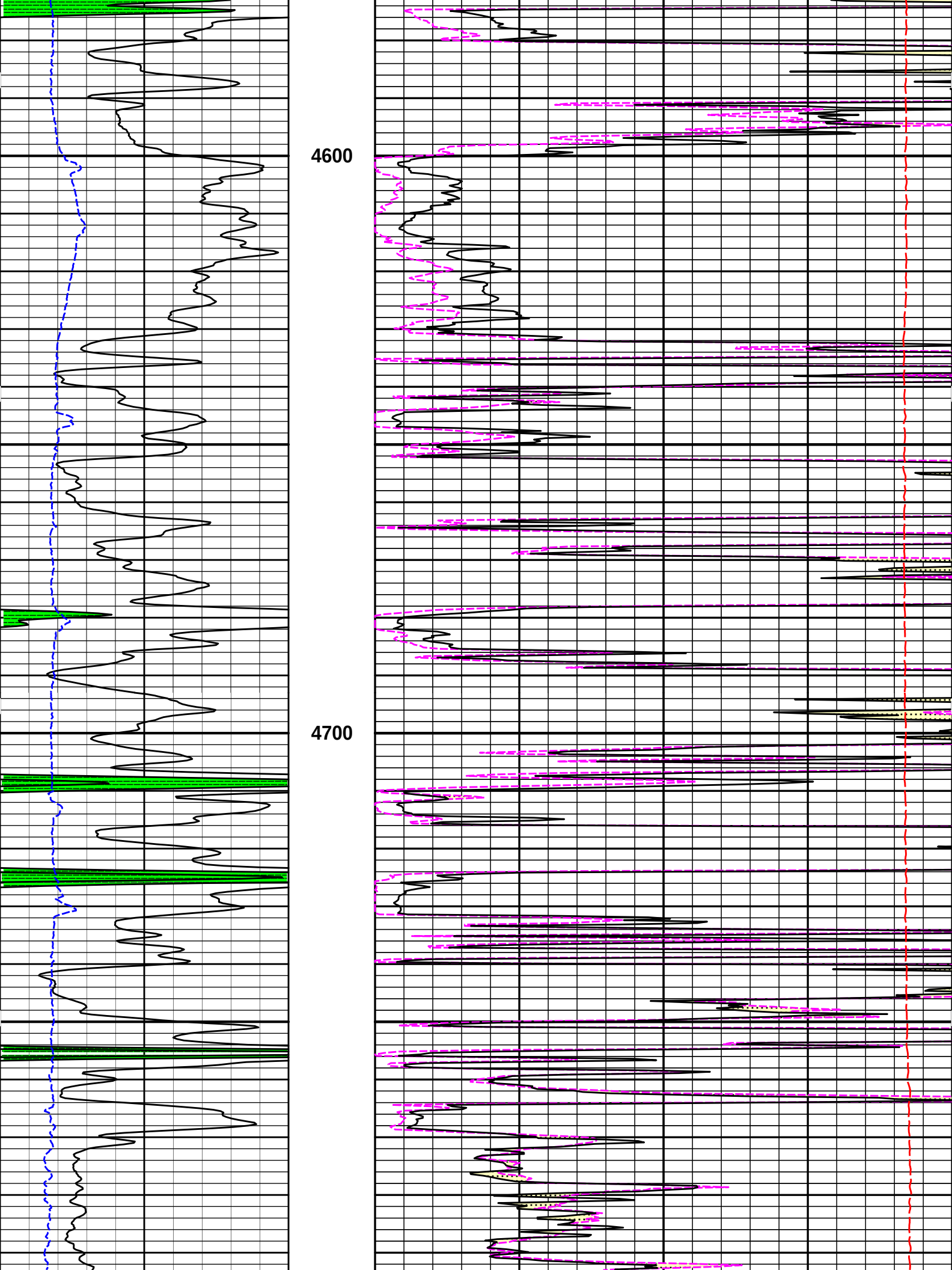
0 Gamma API 150
api

6 Caliper 16
inches

MD
1 : 240
ft

15K Tension 0
pounds

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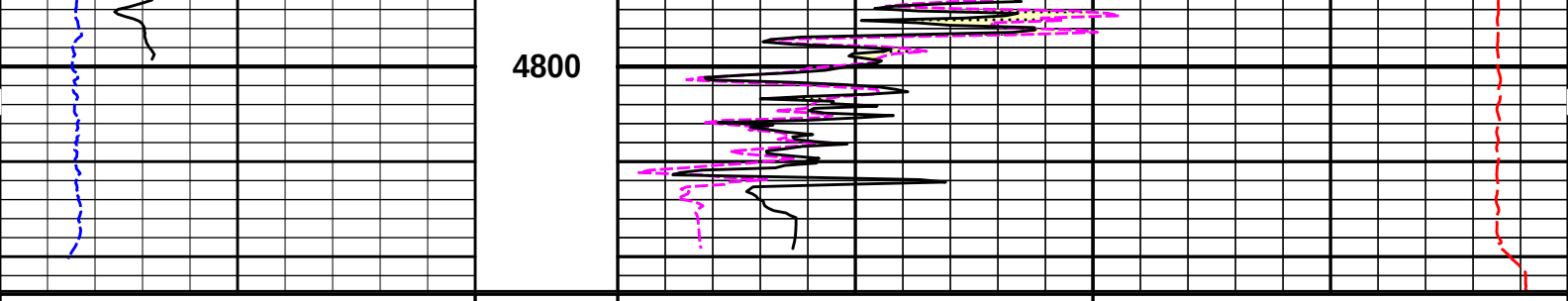
4700



6 Caliper 16
inches

MD
1 : 240
ft

15K Tension 0
pounds

0 Gamma API 150
api

SHALE

0 MicrologLateral 20
ohm-metre

0 MicrologNormal 20
ohm-metre

PERMEABLE

HALLIBURTON

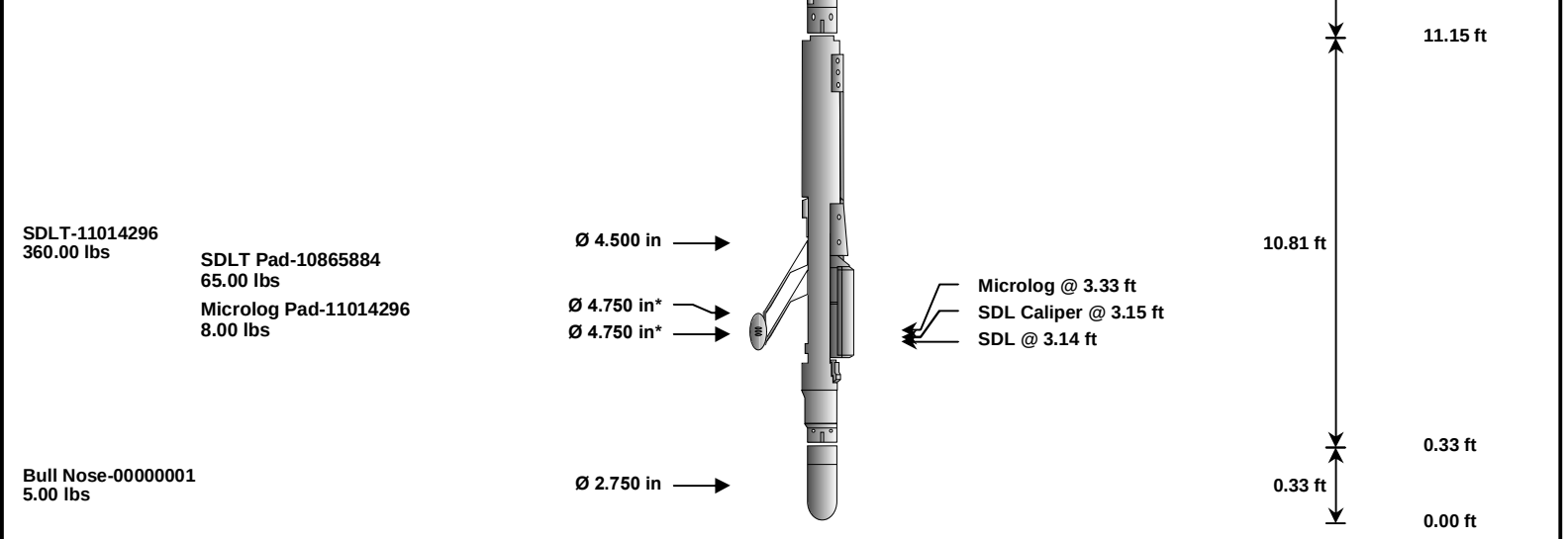
Plot Time: 12-Jun-15 17:13:55
Plot Range: 4548 ft to 4823.67 ft
Data: BANTA-F_1-21\Well Based\REPEAT\
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
Cable Head-12156658 30.00 lbs		Ø 3.625 in →			1.92 ft	35.01 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in →		← SP @ 31.31 ft	3.74 ft	33.09 ft
GTET-11048627 165.00 lbs		Ø 3.625 in →		← GammaRay @ 23.29 ft	8.52 ft	29.35 ft
DSNT-11055304 174.00 lbs	DSN Decentralizer-11055304 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 13.90 ft ← DSN Near @ 13.15 ft	9.69 ft	20.83 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
CH	Standard OH Cable Head	12156658	30.00	1.92		33.09	300.00
SP	SP Sub	12345678	60.00	3.74		29.35	300.00
GTET	Gamma Telemetry Tool	11048627	165.00	8.52		20.83	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69		11.15	60.00
DCNT	DSN Decentralizer	11055304	6.60	5.13	*	14.48	300.00
SDLT	Spectral Density Tool	11014296	360.00	10.81		0.33	60.00
SDLP	Density Insite Pad	10865884	65.00	2.55	*	2.54	60.00
MICP	Microlog Pad	11014296	8.00	1.00	*	2.83	60.00
BLNS	Bull Nose	00000001	5.00	0.33		0.00	300.00
Total			**873.60**	**35.01**			

* Not included in Total Length and Length Accumulation.

Data: BANTA-F_1-21\0001 SP-GTET-DSN-SDL-BN\IDLE **Date: 12-Jun-15 15:25:42**

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	9.200	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	4820.00	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	Temperature 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	
Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
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	
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	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	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
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
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	

BOTTOM

Data: BANTA-F_1-21\0001 SP-GTET-DSN-SDL-BN\IDLE **Date: 12-Jun-15 15:26:32**

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11048627**	**Reference Calibration Date:**	**30-Apr-15 12:33:23**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**28-May-15 11:25:00**
Software Version:	**WL INSITE R4.6.4 (Build 3)**	**Calibration Version:**	**1**

Calibrator Source S/N: Error

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Measurement	Measured	Calibrated	Units
Background	52.3	52.1	api
Background + Calibrator	323.0	321.8	api
Calibrator	270.7	269.6	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11048627 **Reference Calibration Date:** 28-May-15 11:25:00

Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 11-Jun-15 19:58:11

Software Version: WL INSITE R4.6.4 (Build 3) **Calibration Version:** 1

Calibrator Source S/N: Error

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Field Verification	Shop	Field	Units
Background	52.1	52.8	api
Background + Calibrator	321.8	326.1	api
Calibrator	269.6	273.3	api

Shop	Field	Difference	Tolerance
269.6	273.3	-3.7	+/- 9.00

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - 11014296 **Reference Calibration Date:** 30-Apr-15 11:05:11

Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 28-May-15 14:17:58

Software Version: WL INSITE R4.6.4 (Build 3) **Calibration Version:** 1

Host Tool Name: DSNT - 11055304

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4272.56	-4082.46	-7000.00 - -1000.00
Pad Gain	0.0003999	0.0003886	0.000200 - 0.000600
Arm Offset	-3237.10	-3404.84	-5000.00 - 3000.00
Arm Gain	0.0005031	0.0004963	0.000300 - 0.000700
Arm Power	-0.000004135	-0.000003705	-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)	1.98	2.00	0.02	+/- 0.20
Medium Ring (in)	3.78	3.75	-0.03	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.53	6.50	-0.03	+/- 0.20
Medium Ring (in)	8.29	8.25	-0.04	+/- 0.20
Large Ring (in)	15.02	15.00	-0.02	+/- 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 - 11014296**	**Reference Calibration Date:**	**28-May-15 14:17:58**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**11-Jun-15 19:51:28**
Software Version:	**WL INSITE R4.6.4 (Build 3)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.85	0.10	+/- 0.10
Ring Diameter	8.25	8.15	-0.10	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check:	Passed
Diameter Check:	Passed

MICRO LOG SHOP CALIBRATION

Tool Name:	**Microlog Pad - 11014296**	**Reference Calibration Date:**	**30-Apr-15 10:47:47**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**28-May-15 14:10:50**
Software Version:	**WL INSITE R4.6.4 (Build 3)**	**Calibration Version:**	**1**
Host Tool Name:	**DSNT - 11055304**		

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		
	Measured	Calibrated	Measured	Calibrated	Units
Tool Zero	-0.23	-0.08	-0.01	0.00	ohmm
Calibration Point #1	-0.14	0.00	-0.01	0.00	ohmm
Calibration Point #2	19.98	20.00	20.04	20.00	ohmm
Internal Reference	19.88	19.90	20.03	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	0.46	-0.49	V
Calibration Point #1	22.77	-1.42	V
Calibration Point #2	5304.56	6880.76	V
Internal Reference	5279.38	6876.33	V

MICRO LOG FIELD CHECK

Tool Name:	**Microlog Pad - 11014296**	**Reference Calibration Date:**	**28-May-15 14:10:50**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**11-Jun-15 19:53:28**
Software Version:	**WL INSITE R4.6.4 (Build 3)**	**Calibration Version:**	**1**

Measurement	Micro Log Normal		Micro Log Lateral		
	Shop	Field	Shop	Field	Units
Tool Zero	-0.08	-0.09	0.00	0.02	ohmm
Internal Reference	19.90	19.93	19.99	20.02	ohmm

Summary

Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.90	19.93	-0.03	+/- 0.80
Microlog Lateral	19.99	20.02	-0.03	+/- 0.80

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11048627						

Gamma Ray Calibrator	269.6	273.3	----------	-3.7	+/- 9.00	api
SDLT-11014296						
Pad Extension	3.75	3.85	----------	-0.10	+/-0.10	in
Ring Diameter	8.25	8.15	----------	0.10	+/-0.15	in
Microlog Pad-11014296						
MicroLog Normal	19.90	19.93	----------	-0.03	+/-0.80	ohmm
MicroLog Lateral	19.99	20.02	----------	-0.03	+/-0.80	ohmm

Data: BANTA-F_1-21\0001 SP-GTET-DSN-SDL-BN\IDLE **Date: 12-Jun-15 15:26:53**

HALLIBURTON

INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
Rwa / CrossPlot				
TPUL	Tension Pull	35.01	NO	
BS	Bit Size	35.01	NO	
HDIA	Measured Hole Diameter	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
HDIA	Measured Hole Diameter	0.00	NO	
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	
HDIA	Measured Hole Diameter	0.00	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
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	
HDIA	Measured Hole Diameter	0.00	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: BANTA-F_1-21\0001 SP-GTET-DSN-SDL-BN\IDLE **Date: 12-Jun-15 15:27:45**

COMPANY	**HERMAN L. LOEB, LLC**		
WELL	**BANTA 'F' 1-21**		
FIELD	**EINSEL**		
COUNTY	**KIOWA**	STATE	**KANSAS**

HALLIBURTON

MICROLOG