HALLIBURTON

MICROLOG

COMPANY HERMAN L. LOEB, LLC.
WELL RANDEL 3-20
FIELD/BLOCK EINSEL NORTH
COUNTY KIOWA
STATE KANSAS

COMPANY **HERMAN L. LOEB, LLC.**
WELL **RANDEL 3-20**
FIELD/BLOCK **EINSEL NORTH**
COUNTY **KIOWA** STATE **KANSAS**

API No. 15-097-21807-00-00
Location (SHL) 2360' FSL & 1930' FEL
NW-NE-NW-SE

Sect. 20 Twp. 27S Rge. 18W

Other Services:
DSN / SDL
MICROLOG
ACRT
MRIL

Permanent Datum	GL	Elev. 2188.0 ft	Elev.: K.B. 2201.0 ft
Log measured from	KB	, 13.0 ft above perm. Datum	D.F. 2200.0 ft
Drilling measured from	KB		G.L. 2188.0 ft

Date		10-Sep-14					
Run No.		ONE					
Depth - Driller		4827.00 ft					
Depth - Logger		4826.0 ft					
Bottom - Logged Interval		4822					
Top - Logged Interval		3900					
Casing - Driller		8.625 in @ 647.0 ft		@		@	
Casing - Logger		647.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		Water Based Mud					
Density	Viscosity	9.1 ppg	54.00 s/qt				
PH	Fluid Loss	10.50 pH	9.6 cptm				
Source of Sample		MUD PIT					
Rm @ Meas. Temperature		0.560 ohmm @ 90.00 degF		@		@	
Rmf @ Meas. Temperature		0.48 ohmm @ 90.00 degF		@		@	
Rmc @ Meas. Temperature		0.644 ohmm @ 90.00 degF		@		@	
Source Rmf	Rmc	CALCULATED	CALCULATED				
Rm @ BHT		0.41 ohmm @ 127.0 degF		@		@	
Time Since Circulation		4.0000 hr					
Time on Bottom		10-Sep-14 17:47					
Max. Rec. Temperature		127.0 degF @ 4826.0 ft		@		@	
Equipment	Location	11230668	LIBERAL				
Recorded By		SHELDON INGERSOLL					
Witnessed By		J. CHRISTENSEN					

Fold here

Service Ticket No.: 901655684 API Serial No.: 15-097-21807-00-00 PGM Version: WL INSITE R4.2.0 (Build 2)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

| | | | | | | |

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 gm/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING.

CHLORIDES REPORTED AT 7000 ppm.

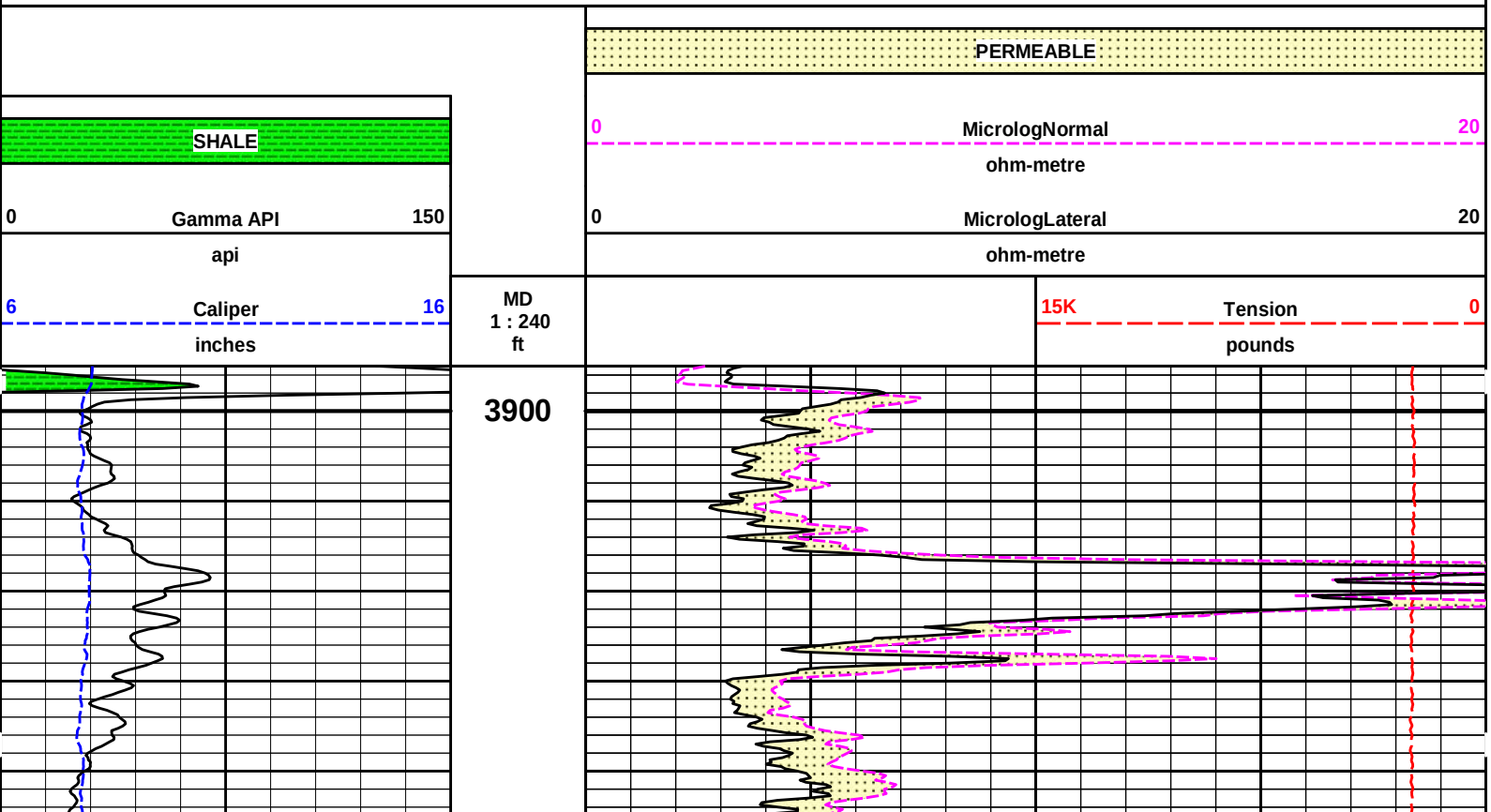
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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.

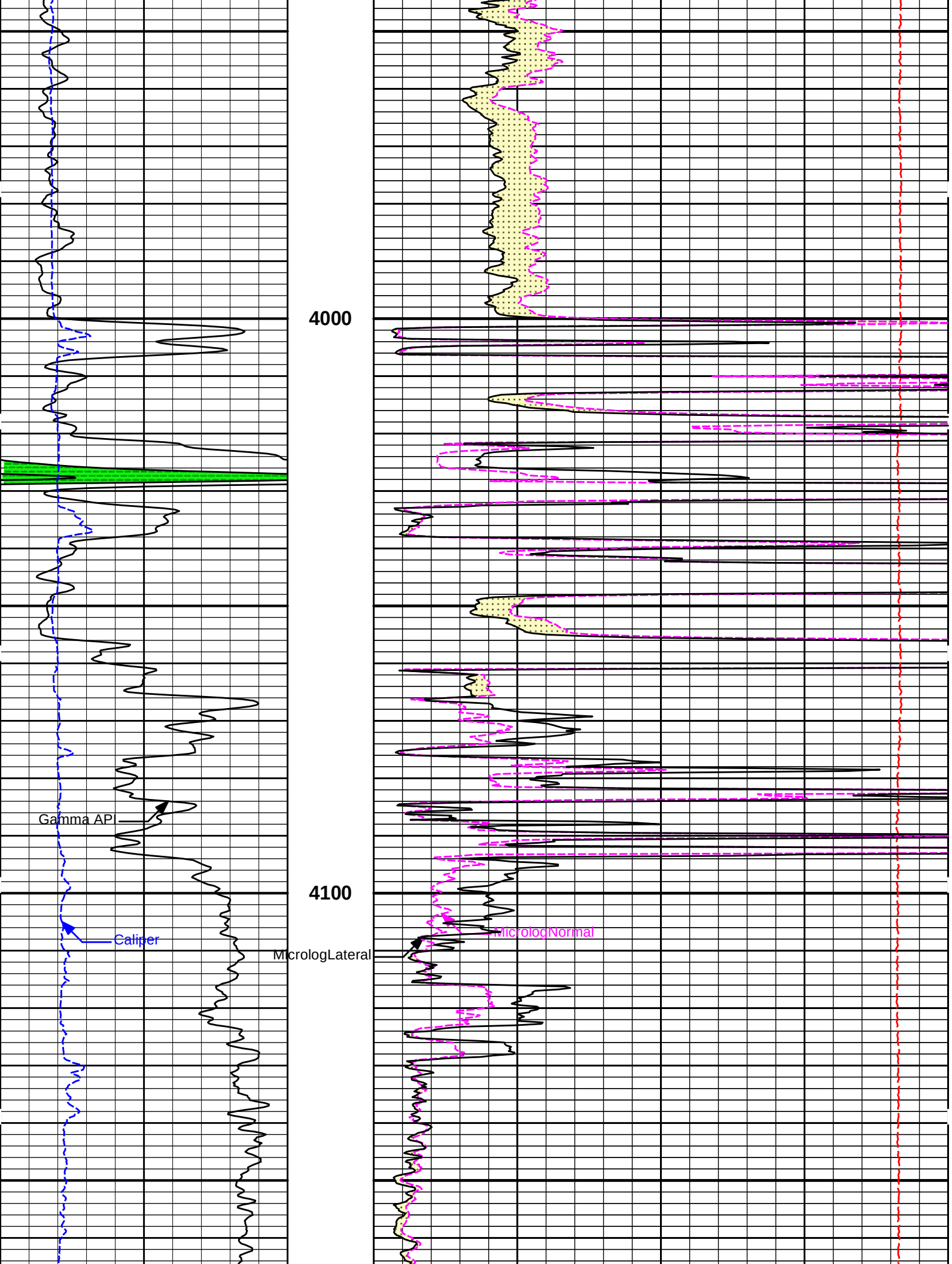
HALLIBURTON

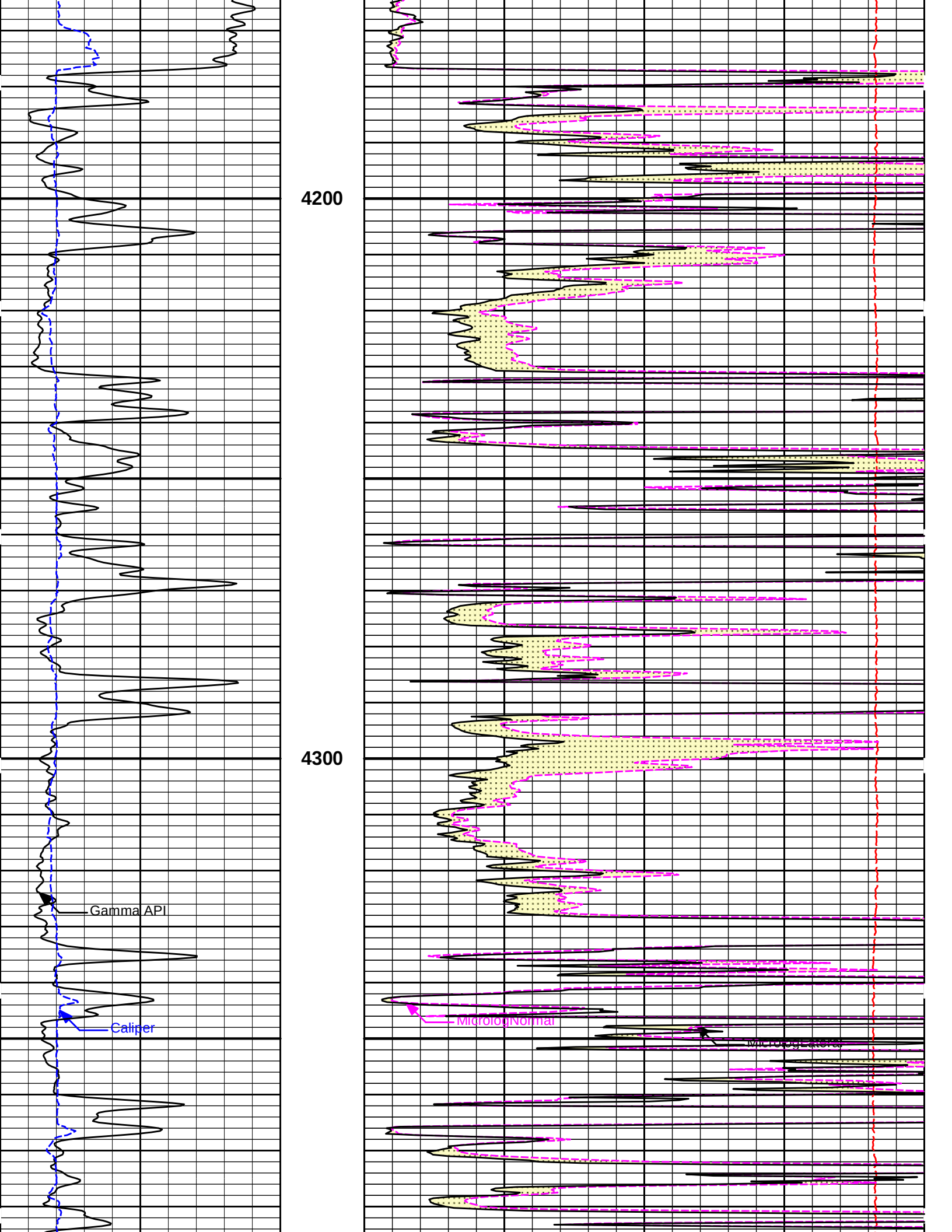
HALLIBURTON

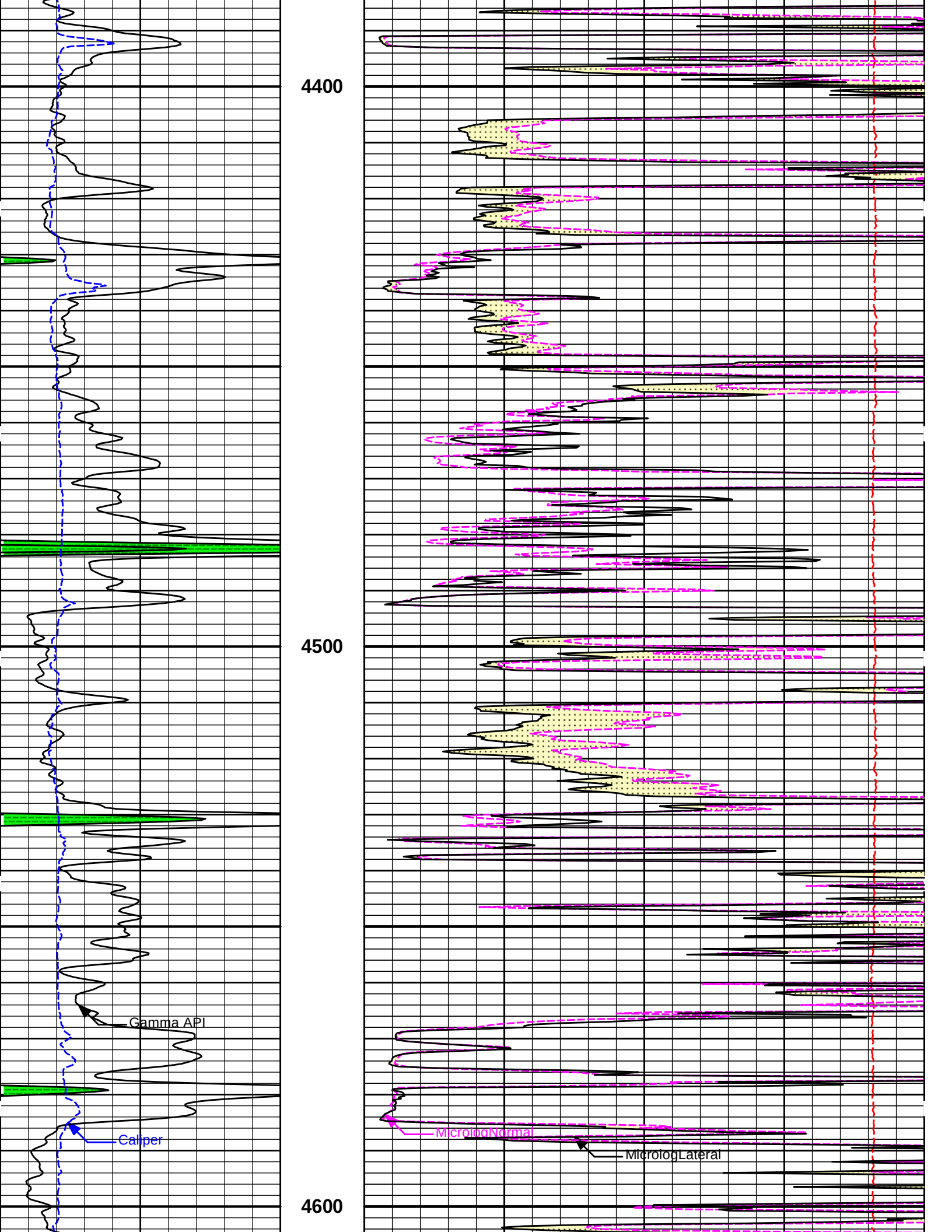
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Data: RANDEL_3-20\Well Based\R1 DETAIL
Plot File: \\-LOCAL-\RANDEL_3-20\Well Based\MICROLOG\Microlog_IQ_5_main_lib

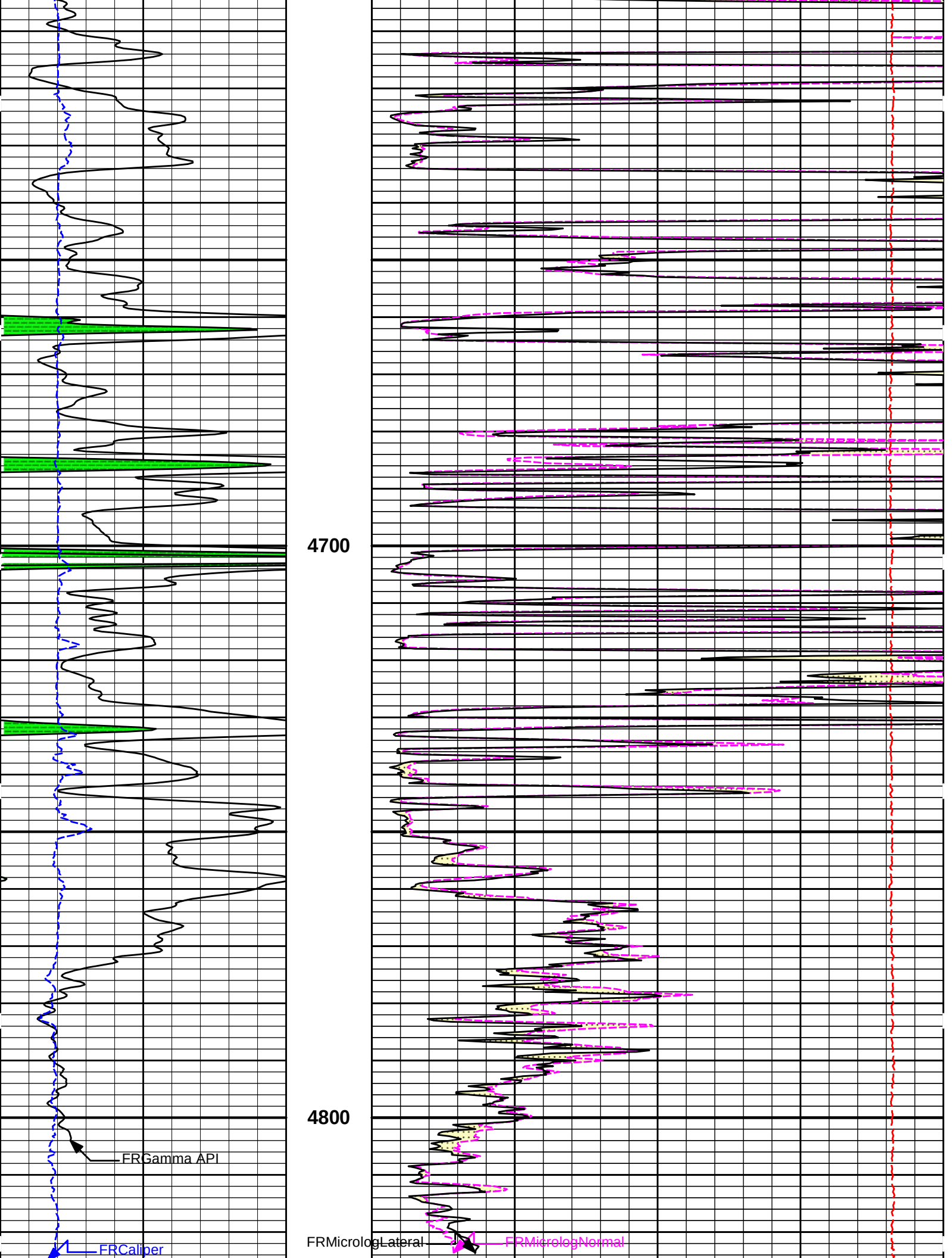
5 INCH MAIN LOG

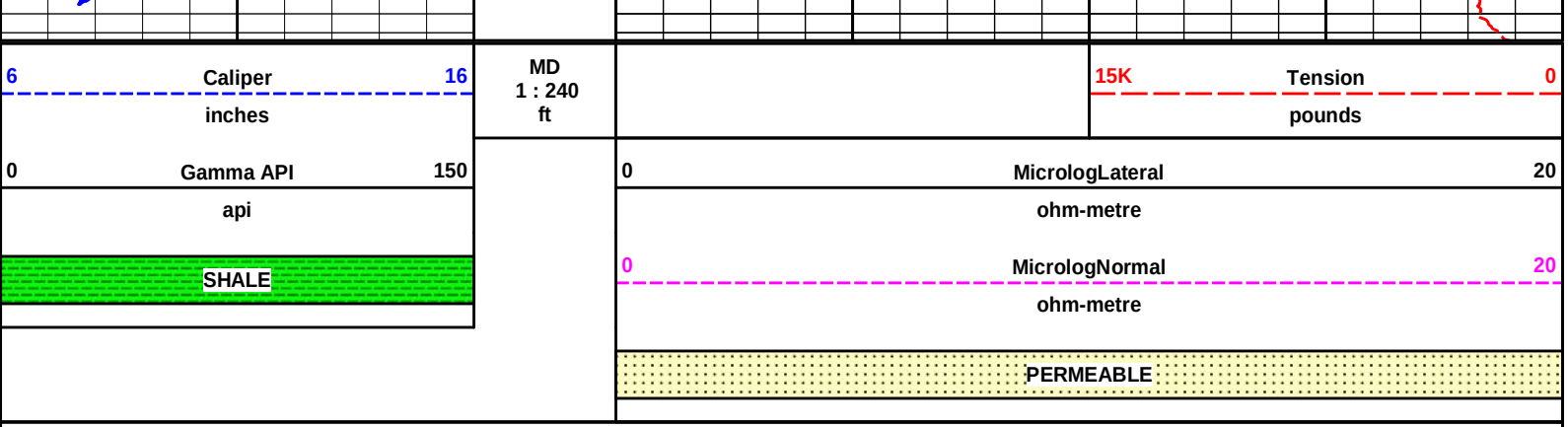



4000
4100
Gamma API
Caliper
MicrologNormal
MicrologLateral


4200
4300
Gamma API
Caliper
MicrologNormal


4400
4500
4600
Gamma API
Caliper
MicrologNormal
MicrologLateral


4700
4800
FRGamma API
FRCaliper
FRMicrologLateral
FRMicrologNormal



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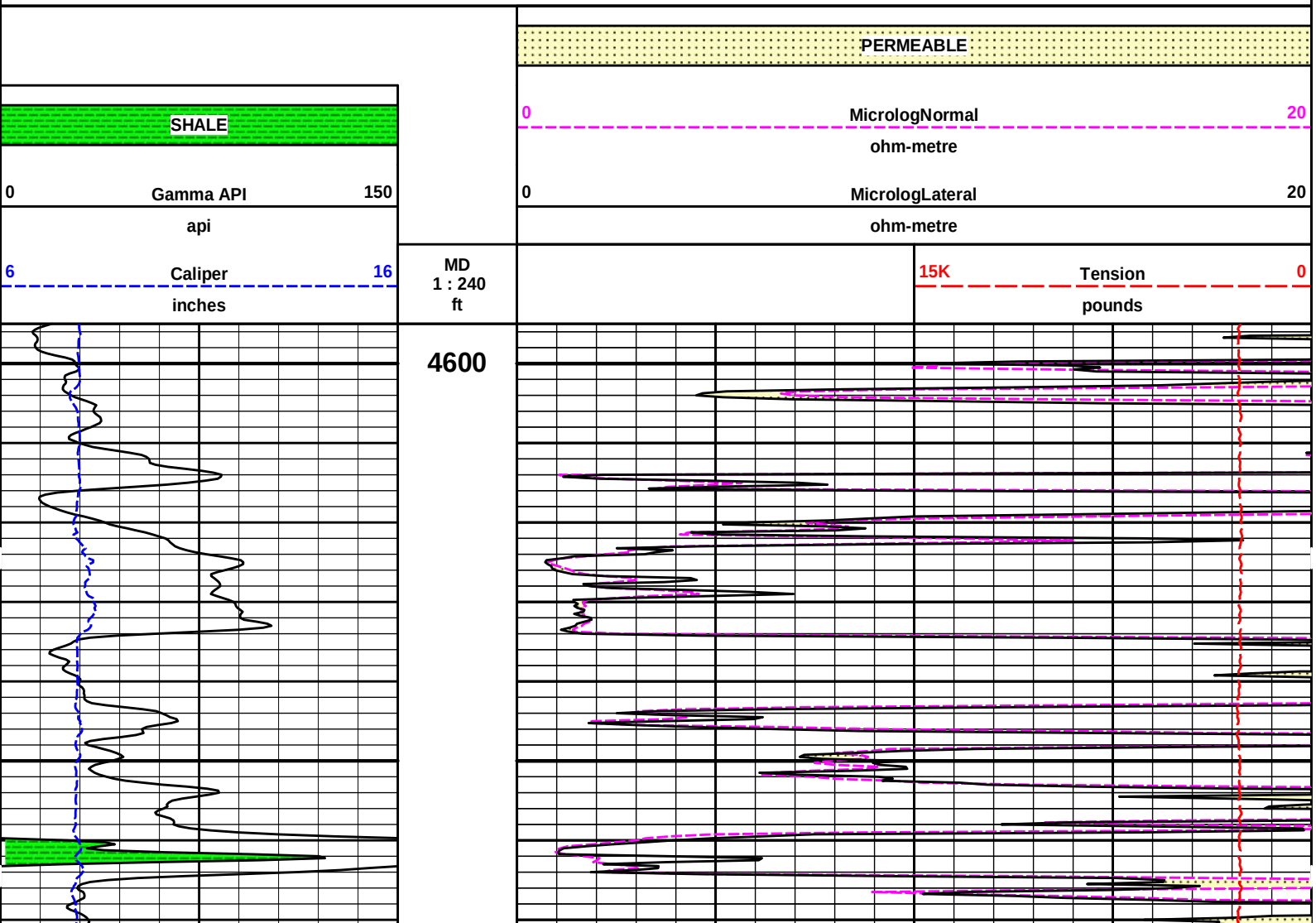
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Data: RANDEL_3-20\Well Based\R1 DETAIL\
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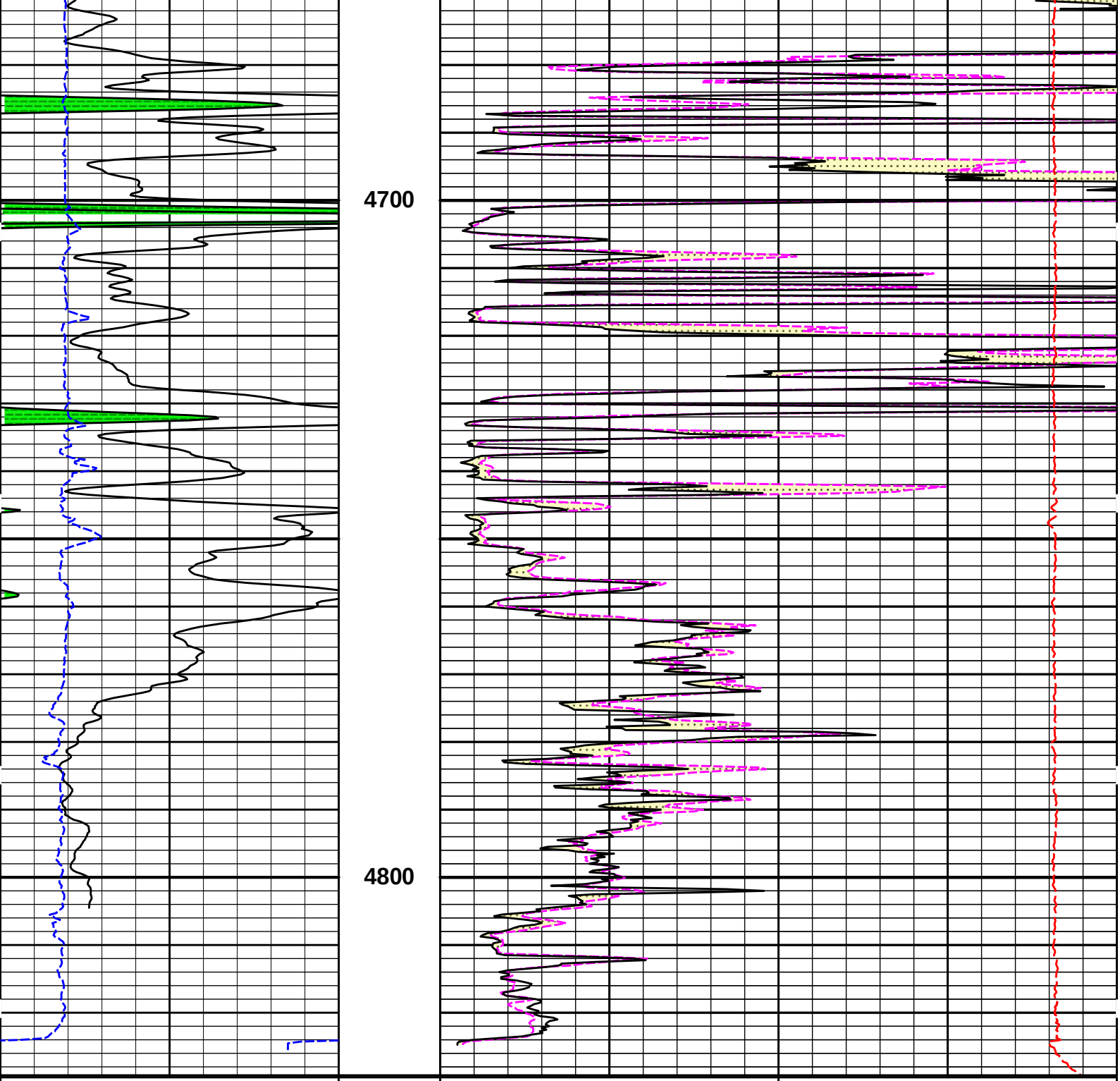
5 INCH MAIN LOG

HALLIBURTON

Plot Time: 10-Sep-14 19:36:31
Plot Range: 4595 ft to 4829.25 ft
Data: RANDEL_3-20\Well Based\R1 REPEAT\
Plot File: \\-LOCAL-\RANDEL_3-20\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION





6 Caliper 16
inches

0 Gamma API 150
api

SHALE

MD
1 : 240
ft

15K Tension 0
pounds

0 MicrologLateral 20
ohm-metre

0 MicrologNormal 20
ohm-metre

PERMEABLE

HALLIBURTON

Plot Time: 10-Sep-14 19:36:32
Plot Range: 4595 ft to 4829.25 ft
Data: RANDEL_3-20\Well Based\R1 REPEAT\
Plot File: \\-LOCAL-\RANDEL_3-20\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION

REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						39.70 ft
RWCH-12156658 135.00 lbs		Ø 3.625 in		Load Cell @ 36.02 ft BH Temperature @ 35.45 ft	6.25 ft	
						33.45 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in		SP @ 31.67 ft	3.74 ft	
						29.71 ft
GTET-10748374 165.00 lbs		Ø 3.625 in		GammaRay @ 23.65 ft	8.52 ft	
						21.19 ft
DSNT-10755066 174.00 lbs	DSN Decentralizer-10735145 6.60 lbs	Ø 5.000 in* Ø 3.625 in		DSN Far @ 14.26 ft DSN Near @ 13.51 ft	9.69 ft	
						11.51 ft
SDLT-10685803 360.00 lbs	SDLT Pad-10714945 65.00 lbs Microlog Pad-10685803 8.00 lbs	Ø 4.500 in Ø 4.750 in* Ø 4.750 in*		Microlog @ 3.69 ft SDL Caliper @ 3.51 ft SDL @ 3.50 ft	10.81 ft	
						0.69 ft
RBP-25K-00000001 16.00 lbs		Ø 4.750 in Ø 3.370 in			0.36 ft	
						0.33 ft
Bull Nose-00000668 5.00 lbs		Ø 2.750 in			0.33 ft	
						0.00 ft

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)

RWCH	Releasable Wireline Cable Head	12156658	135.00	6.25		33.45	300.00
SP	SP Sub	12345678	60.00	3.74		29.71	300.00
GTET	Gamma Telemetry Tool	10748374	165.00	8.52		21.19	60.00
DSNT	Dual Spaced Neutron	10755066	174.00	9.69		11.51	60.00
DCNT	DSN Decentralizer	10735145	6.60	5.13	*	14.84	300.00
SDLT	Spectral Density Tool	10685803	360.00	10.81		0.69	60.00
SDLP	Density Insite Pad	10714945	65.00	2.55	*	2.90	60.00
MICP	Microlog Pad	10685803	8.00	1.00	*	3.19	60.00
BLNS	Bull Plug	00000001	16.00	0.36		0.33	300.00
BLNS	Bull Nose	00000668	5.00	0.33		0.00	300.00
Total			**994.60**	**39.70**			

* Not included in Total Length and Length Accumulation.

Data: RANDEL_3-20\0001 GTET-DSN-SDL-BP\IDLE **Date: 10-Sep-14 17:42:22**

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	9.100	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	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	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	4827.00	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: RANDEL_3-20\0001 GTET-DSN-SDL-BP\004 10-Sep-14 18:38 Up @4829.0f **Date: 10-Sep-14 19:11:06**

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CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 10748374 **Reference Calibration Date:** 02-Jul-14 13:05:19

Engineer: SUHAIL BISHTI **Calibration Date:** 19-Aug-14 17:33:09

Software Version: WL INSITE R4.2.0 (Build 2) **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	45.2	45.3	api
Background + Calibrator	276.7	277.3	api
Calibrator	231.5	232.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 10748374 **Reference Calibration Date:** 19-Aug-14 17:33:09

Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 04-Sep-14 18:28:51

Software Version: WL INSITE R4.2.0 (Build 2) **Calibration Version:** 1

Calibrator Source S/N: TB-185

Calibrator API Reference:228.00 api

Equivalent Calibrator API Reference:232.0 api

Field Verification	Shop	Field	Units
Background	45.3	44.0	api
Background + Calibrator	277.3	276.5	api

Calibrator	232.0	232.4	api

Shop	Field	Difference	Tolerance
232.0	232.4	-0.4	+/- 9.00

MICRO LOG SHOP CALIBRATION

Tool Name: Microlog Pad - 10685803
Reference Calibration Date: 25-Jul-14 11:17:56
Engineer: SUHAIL BISHTI
Calibration Date: 20-Aug-14 15:13:56
Software Version: WL INSITE R4.2.0 (Build 2)
Calibration Version: 1
Host Tool Name: DSNT - 10755066

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		
	Measured	Calibrated	Measured	Calibrated	Units
Tool Zero	-0.08	-0.07	0.00	-0.00	ohmm
Calibration Point #1	-0.00	0.00	0.00	0.00	ohmm
Calibration Point #2	20.03	20.00	20.03	20.00	ohmm
Internal Reference	19.96	19.93	20.03	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	0.23	0.21	V
Calibration Point #1	20.03	1.71	V
Calibration Point #2	5323.53	6907.98	V
Internal Reference	5304.52	6906.01	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 10685803
Reference Calibration Date: 20-Aug-14 15:13:56
Engineer: JORGE ORLANDO PEREZ
Calibration Date: 04-Sep-14 18:27:31
Software Version: WL INSITE R4.2.0 (Build 2)
Calibration Version: 1

Measurement	Micro Log Normal		Micro Log Lateral		
	Shop	Field	Shop	Field	Units
Tool Zero	-0.07	-0.08	-0.00	-0.00	ohmm
Internal Reference	19.93	19.89	19.99	19.96	ohmm

Summary

Signal	Shop	Field	Difference	Tolerence
Microlog Normal	19.93	19.89	0.04	+/- 0.80
Microlog Lateral	19.99	19.96	0.03	+/- 0.80

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-10748374						
Gamma Ray Calibrator	232.0	232.4	----------	-0.4	+/- 9.00	api
Microlog Pad-10685803						
MicroLog Normal	19.93	19.89	----------	0.04	+/-0.80	ohmm
MicroLog Lateral	19.99	19.96	----------	0.03	+/-0.80	ohmm

Data: RANDEL_3-20\0001 GTET-DSN-SDL-BP\004 10-Sep-14 18:38 Up @4829.0f **Date: 10-Sep-14 19:14:08**

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INPUTS, DELAYS AND FILTERS TABLE

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	39.70	NO	
BS	Bit Size	39.70	NO	
HDIA	Measured Hole Diameter	0.00	NO	
	RWCH			
DHTN	DownholeTension	0.00	BLK	0.000
	SP Sub			
PLTC	Plot Control Mask	31.67	NO	
SP	Spontaneous Potential	31.67	BLK	1.250
SPR	Raw Spontaneous Potential	31.67	NO	
SPO	Spontaneous Potential Offset	31.67	NO	
	GTET			
TPUL	Tension Pull	23.65	NO	
GR	Natural Gamma Ray API	23.65	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	23.65	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	23.65	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	13.41	NO	
RNDS	Near Detector Telemetry Counts	13.51	BLK	1.417
RFDS	Far Detector Telemetry Counts	14.26	TRI	0.583
DNTT	DSN Tool Temperature	13.51	NO	
DSNS	DSN Tool Status	13.41	NO	
ERND	Near Detector Telemetry Counts EVR	13.51	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	14.26	BLK	0.000
ENTM	DSN Tool Temperature EVR	13.51	NO	
HDIA	Measured Hole Diameter	0.00	NO	
	SDLT			
TPUL	Tension Pull	3.51	NO	
PCAL	Pad Caliper	3.51	TRI	0.250
ACAL	Arm Caliper	3.51	TRI	0.250
	SDLT Pad			
TPUL	Tension Pull	3.50	NO	
NAB	Near Above	3.32	BLK	0.920
NHI	Near Cesium High	3.32	BLK	0.920
NLO	Near Cesium Low	3.32	BLK	0.920
NVA	Near Valley	3.32	BLK	0.920
NBA	Near Barite	3.32	BLK	0.920
NDE	Near Density	3.32	BLK	0.920
NPK	Near Peak	3.32	BLK	0.920
NLI	Near Lithology	3.32	BLK	0.920
NBAU	Near Barite Unfiltered	3.32	BLK	0.250
NLIU	Near Lithology Unfiltered	3.32	BLK	0.250

FAB	Far Above	3.67	BLK	0.250
FHI	Far Cesium High	3.67	BLK	0.250
FLO	Far Cesium Low	3.67	BLK	0.250
FVA	Far Valley	3.67	BLK	0.250
FBA	Far Barite	3.67	BLK	0.250
FDE	Far Density	3.67	BLK	0.250
FPK	Far Peak	3.67	BLK	0.250
FLI	Far Lithology	3.67	BLK	0.250
PTMP	Pad Temperature	3.51	BLK	0.920
NHV	Near Detector High Voltage	2.90	NO	
FHV	Far Detector High Voltage	2.90	NO	
ITMP	Instrument Temperature	2.90	NO	
DDHV	Detector High Voltage	2.90	NO	
HDIA	Measured Hole Diameter	0.00	NO	

Microlog Pad

TPUL	Tension Pull	3.69	NO	
MINV	Microlog Lateral	3.69	BLK	0.750
MNOR	Microlog Normal	3.69	BLK	0.750

Data: RANDEL_3-20\0001 GTET-DSN-SDL-BP\IDLE **Date: 10-Sep-14 19:10:19**

COMPANY	**HERMAN L. LOEB, LLC.**		
WELL	**RANDEL 3-20**		
FIELD	**EINSEL NORTH**		
COUNTY	**KIOWA**	STATE	**KANSAS**

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