

HALLIBURTON

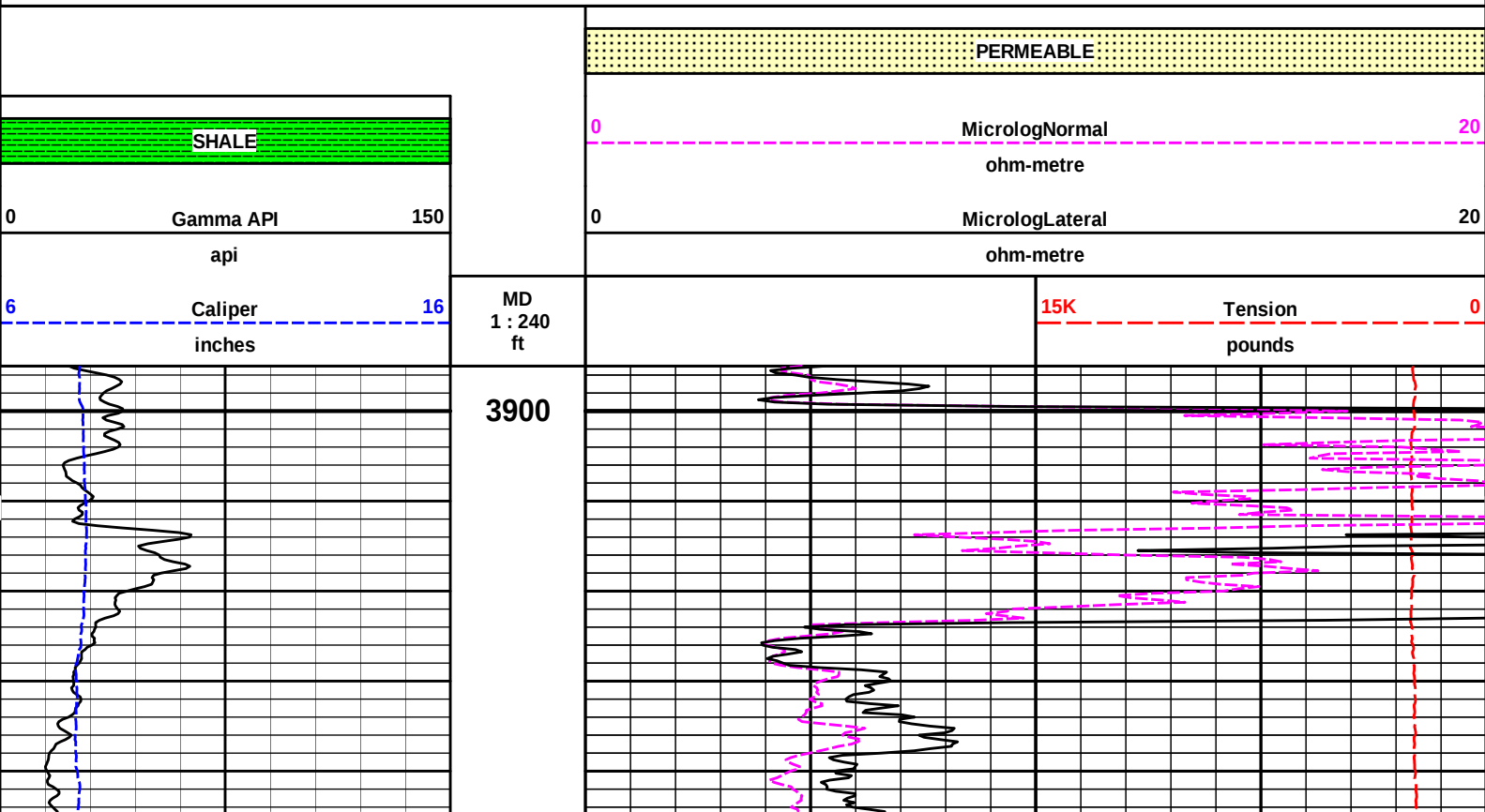
MICROLOG

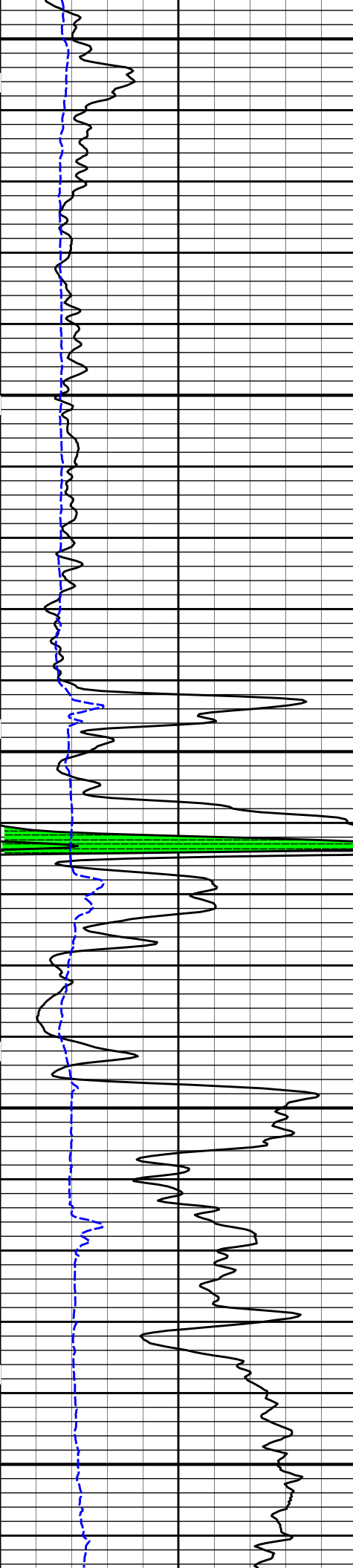
COMPANY		HERMAN L. LOEB, LLC.	
WELL		HEFT #4-5	
FIELD/BLOCK		EINSEL	
COUNTY		KIOWA	
STATE		KANSAS	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		06-Apr-14	
Run No.		ONE	
Depth - Driller		4875.00 ft	
Depth - Logger		4872.0 ft	
Bottom - Logged Interval		4868	
Top - Logged Interval		3900	
Casing - Driller		8.625 in @ 622.0 ft	
Casing - Logger		622.0 ft	
Bit Size		7.875 in @	
Type Fluid in Hole		Water Based Mud	
Density		9.4 ppg	
Viscosity		63.00 s/qt	
PH		11.00 pH	
Fluid Loss		8.8 cpm	
Source of Sample		MUD PIT	
Rm @ Meas. Temperature		0.515 ohmm @ 72.00 degF	
Rmf @ Meas. Temperature		0.44 ohmm @ 72.00 degF	
Rmc @ Meas. Temperature		0.590 ohmm @ 72.00 degF	
Source Rmf		CALCULATED	
Rmc		CALCULATED	
Rm @ BHT		0.34 ohmm @ 111.0 degF	
Time Since Circulation		5.0000 hr	
Time on Bottom		06-Apr-14 19:34	
Max. Rec. Temperature		111.0 degF @ 4872.0 ft	
Equipment		11230668 LIBERAL	
Recorded By		SHELDON INGERSOLL	
Witnessed By		J. CHRISTENSEN	

COMPANY		HERMAN L. LOEB, LLC.	
WELL		HEFT #4-5	
FIELD/BLOCK		EINSEL	
COUNTY		KIOWA	
STATE		KANSAS	
API No.		15-097-21790-00-00	
Location		(SHL) 660' FNL & 1925' FEL W2-E2-NW-NE	
Sect. 5		Twp. 28S	
Rge. 18W		Elev. 2219.0 ft	
Other Services:		DSN / SDL MICROLOG ACRT MRIL	
Elev.: K.B.		2232.0 ft	
D.F.		2231.0 ft	
G.L.		2219.0 ft	

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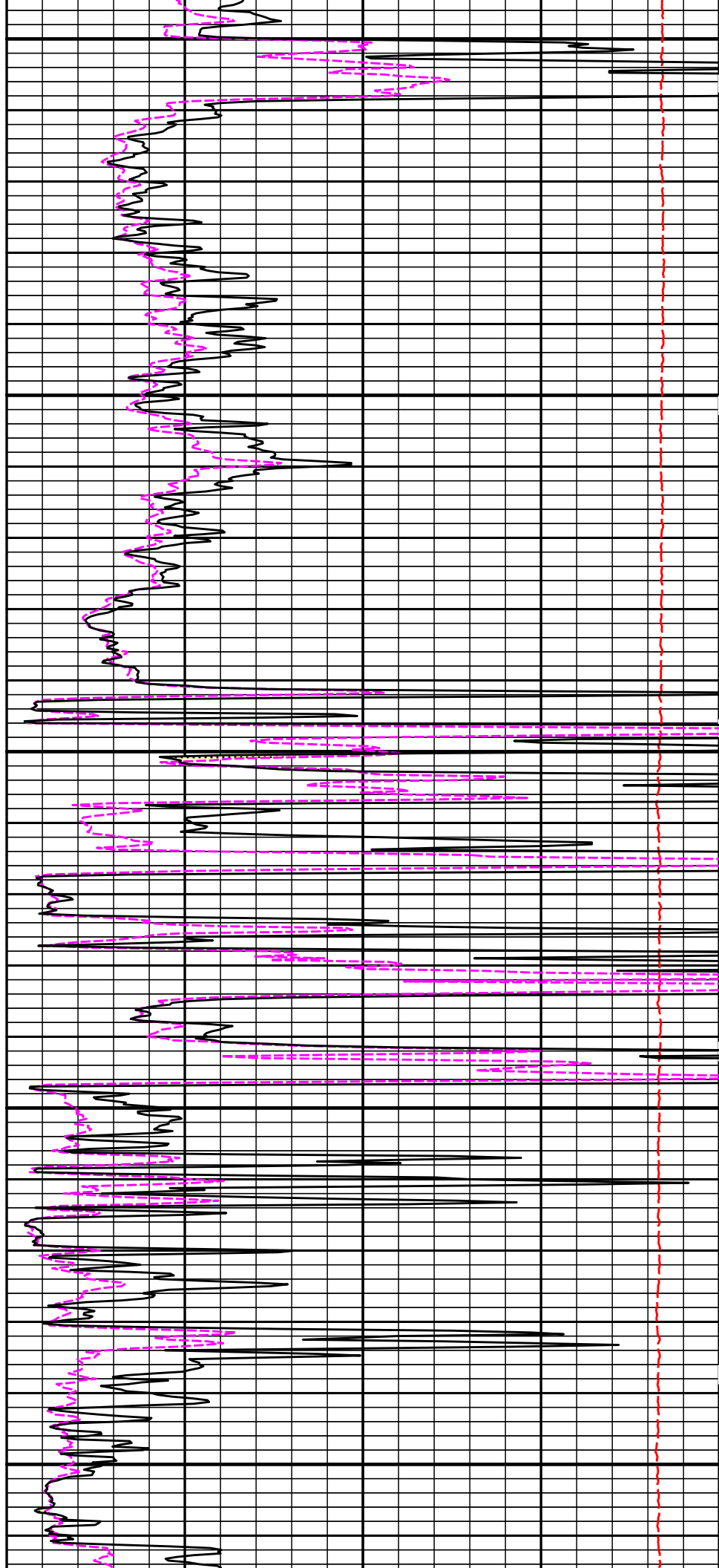
Service Ticket No.: 901250639				API Serial No.: 15-097-21790-00-00				PGM Version: WL INSITE R4.2.0 (Build 2)							
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE						RESISTIVITY SCALE CHANGES									
Date		Sample No.				Type Log		Depth		Scale Up Hole		Scale Down Hole			
Depth-Driller															
Type 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.		@		@											
Rmc @ Meas. Temp.		@		@											
Source Rmf		Rmc													
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.		11039640		Serial No.				Serial No.		10673790		Serial No.		10735145	
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		CS-137		Source Type		AM-241BE	
Length		8"		LSA [Y/N]				Serial No.		5073GW		Serial No.		DSN-436	
Distance to Source		N/A		FWDA [Y/N]				Strength		1.5 CI		Strength		15 CI	
LOGGING DATA															

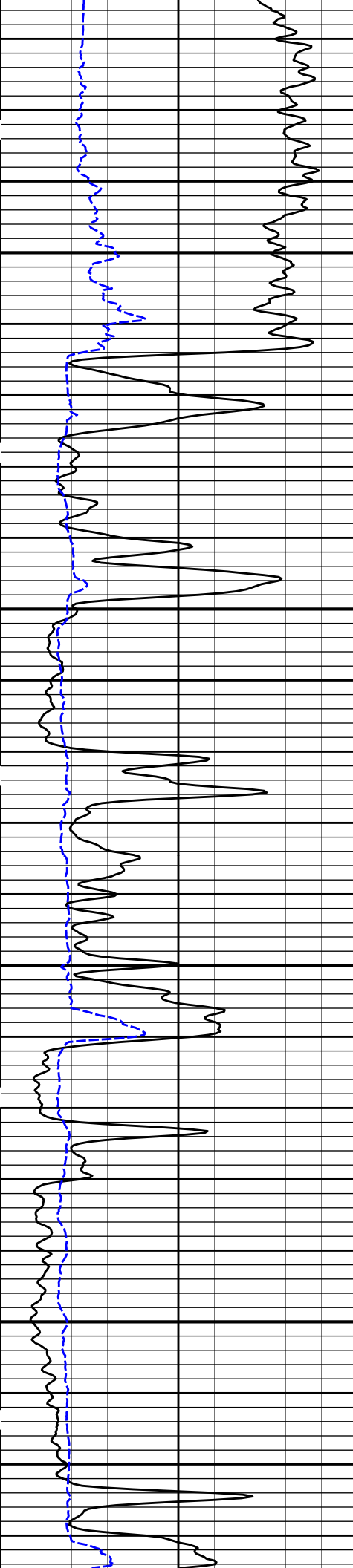
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4000

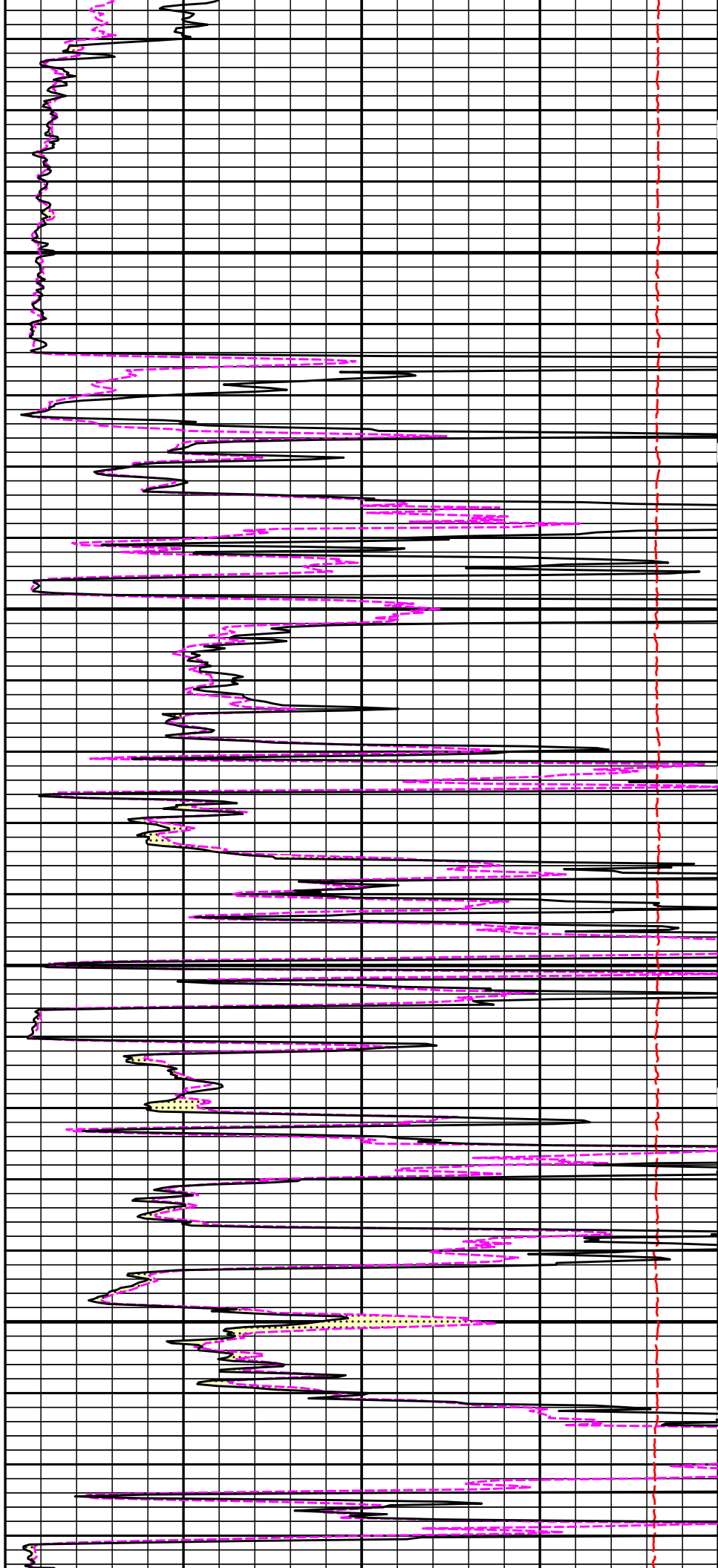
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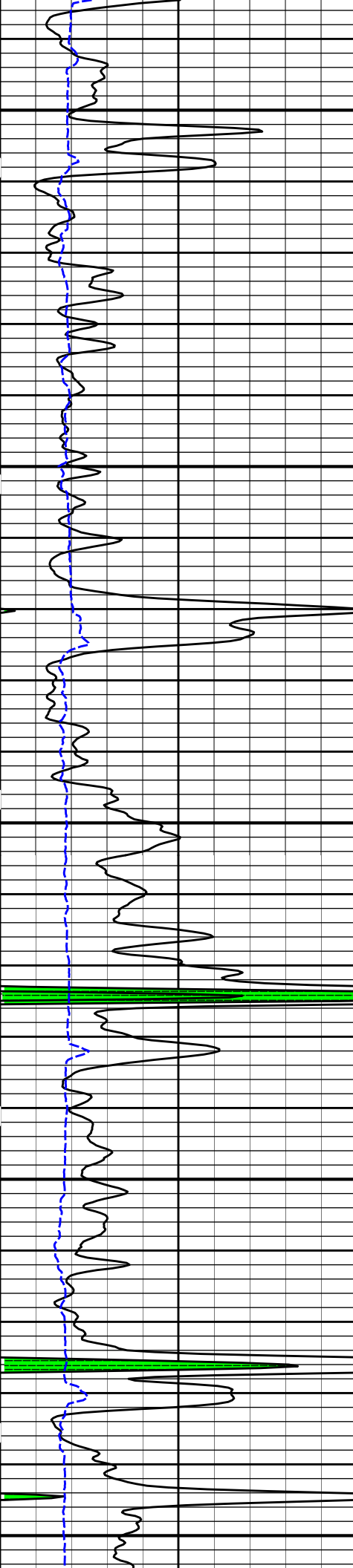




4200

4300

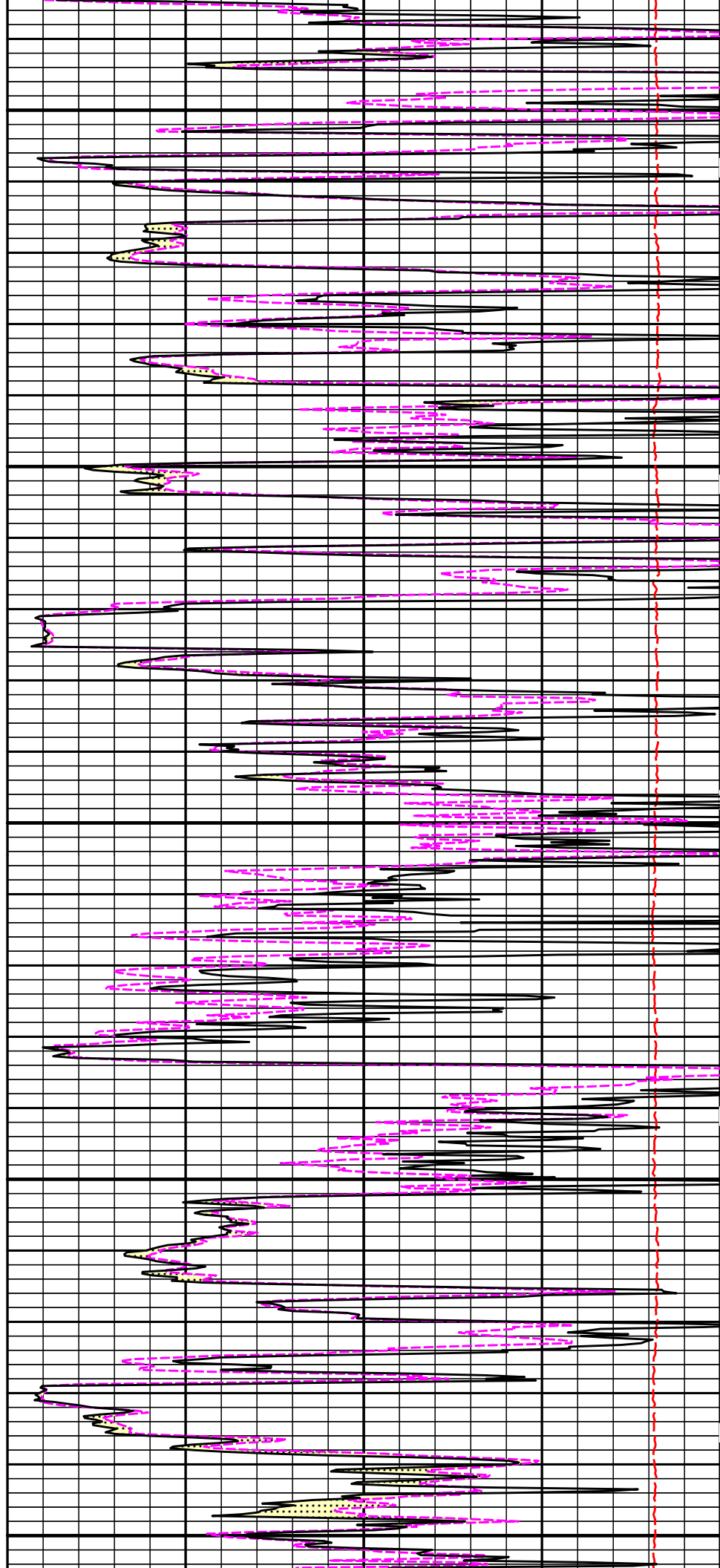


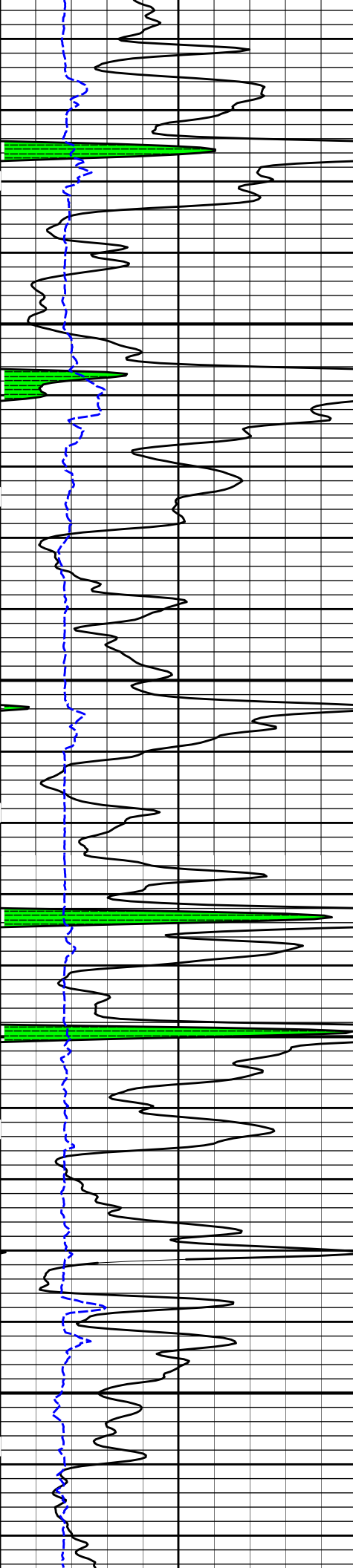


4400

4500

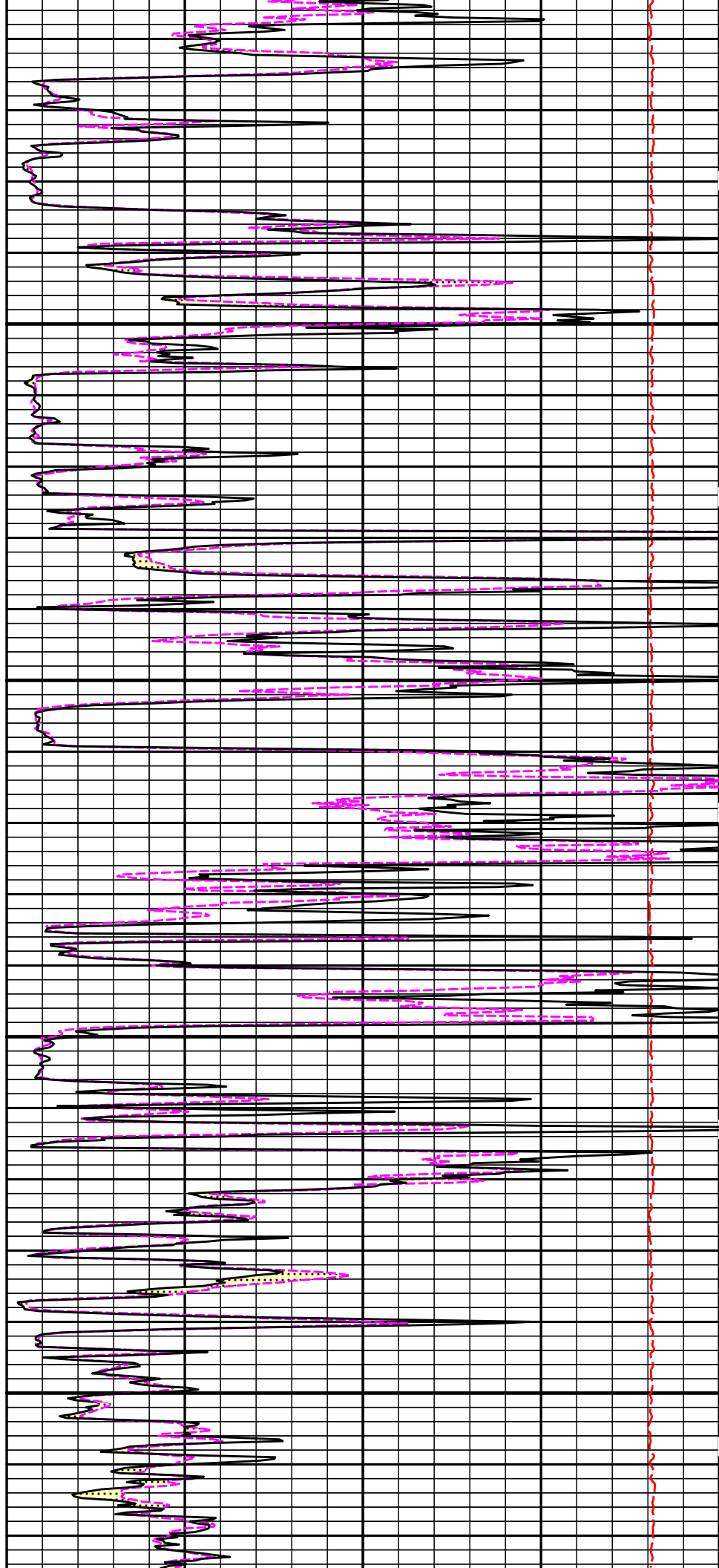
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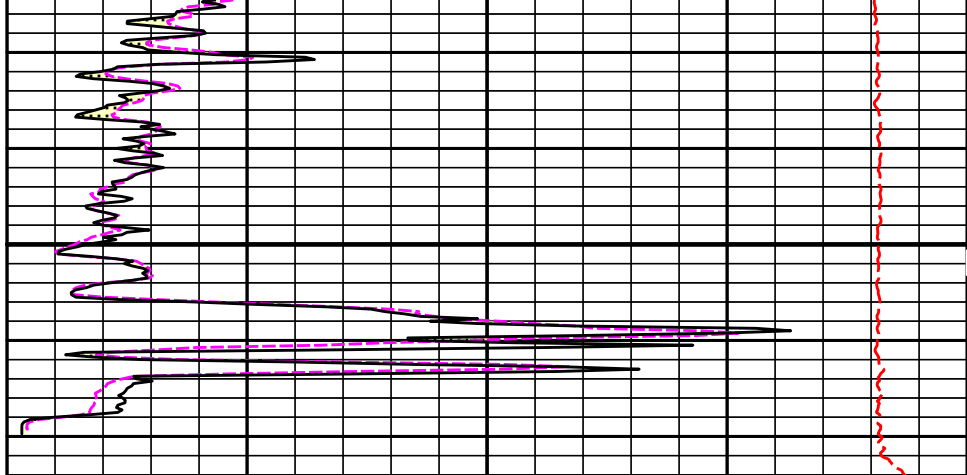
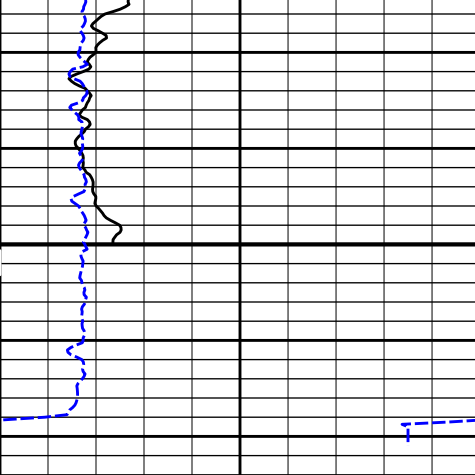




4700

4800





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: 06-Apr-14 21:21:14
Plot Range: 3895 ft to 4874.25 ft
Data: HEFT_#4-5\Well Based\IR1 POROSITY\
Plot File: \\-LOCAL-HEFT_#4-5\Well Based\MICROLOG\Microlog_IQ_5_main_lib

5 INCH MAIN LOG

HALLIBURTON

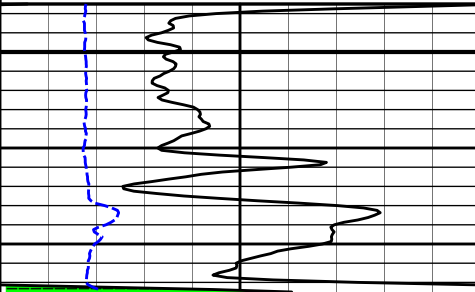
Plot Time: 06-Apr-14 21:21:15
Plot Range: 4595 ft to 4875.08 ft
Data: HEFT_#4-5\Well Based\IR1 REPEAT\
Plot File: \\-LOCAL-HEFT_#4-5\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION

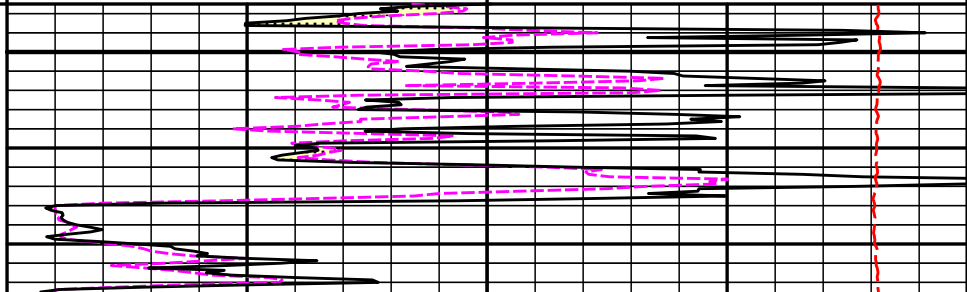
	SHALE	
0	Gamma API	150
	api	
6	Caliper	16
	inches	

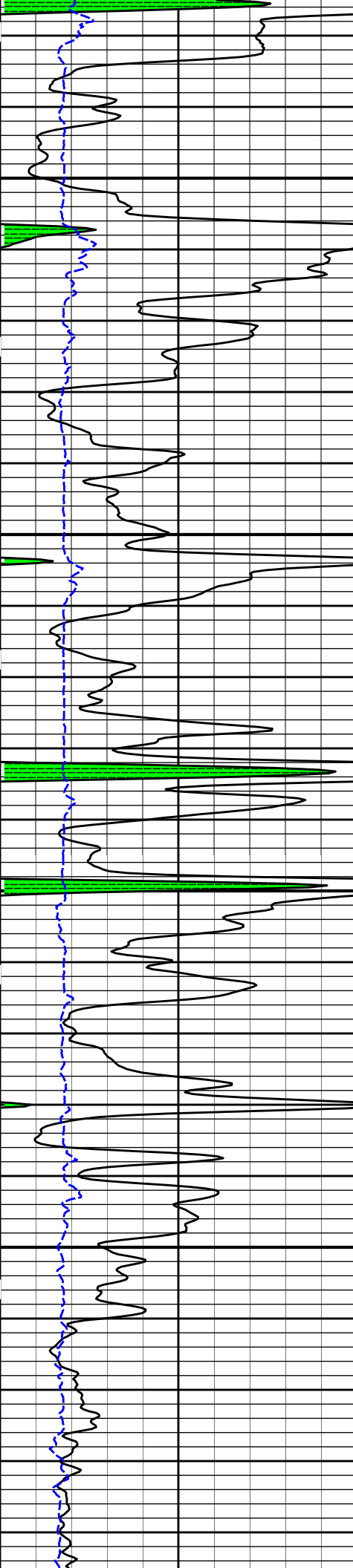
MD
1 : 240
ft

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



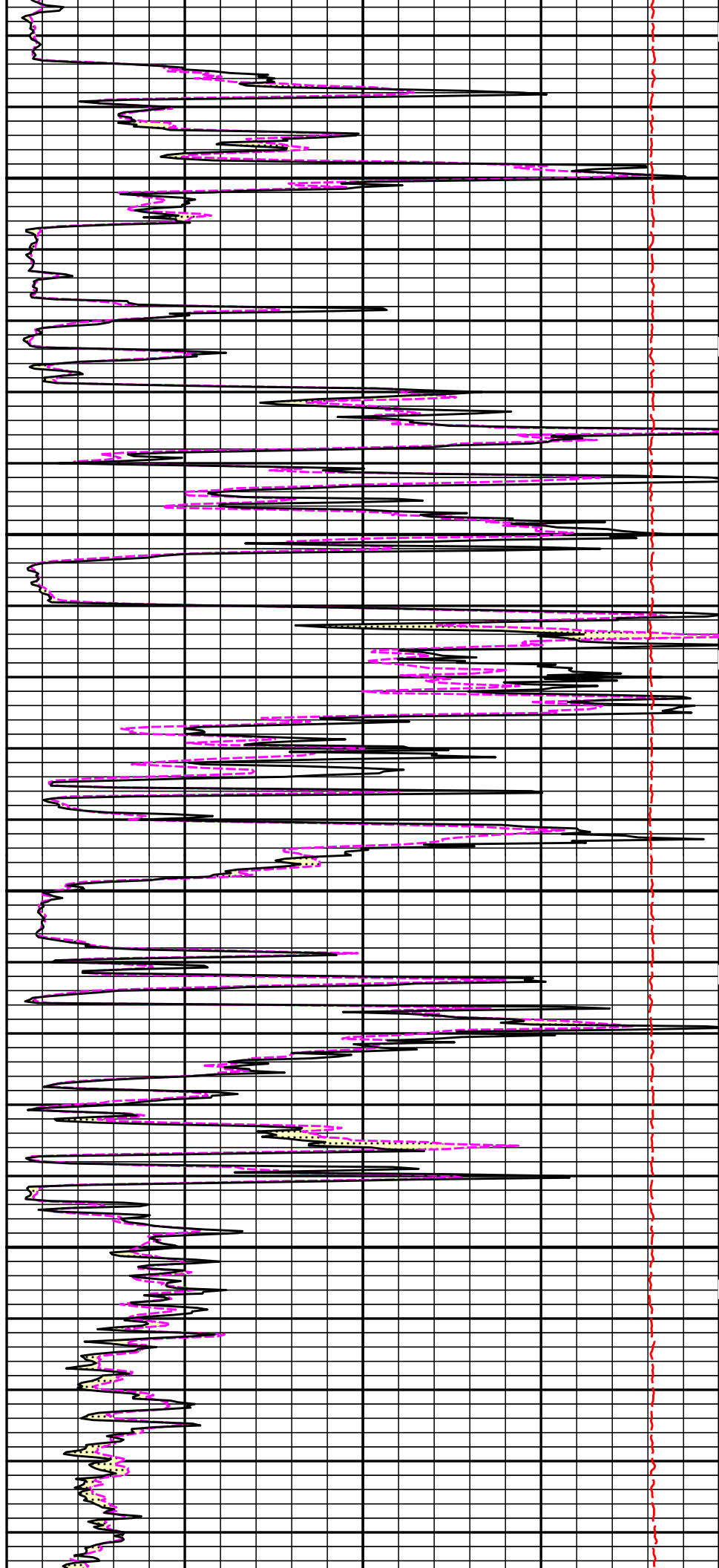
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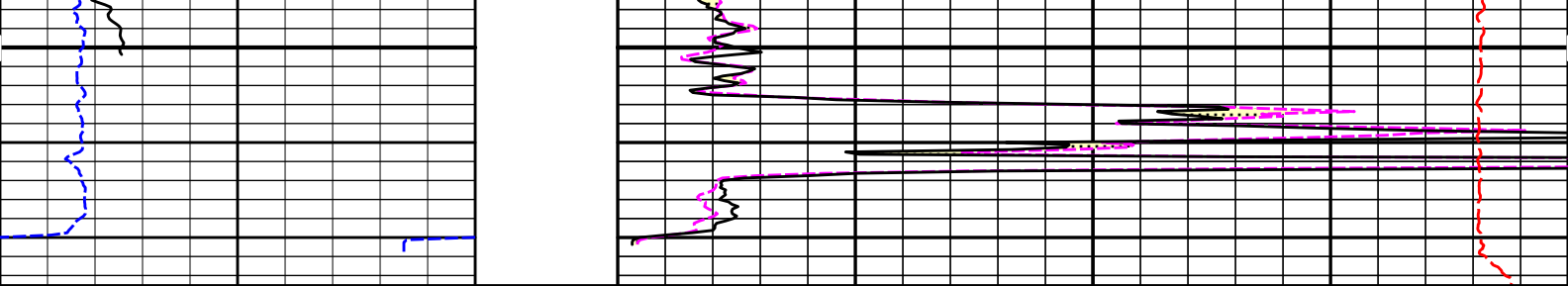




4700

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

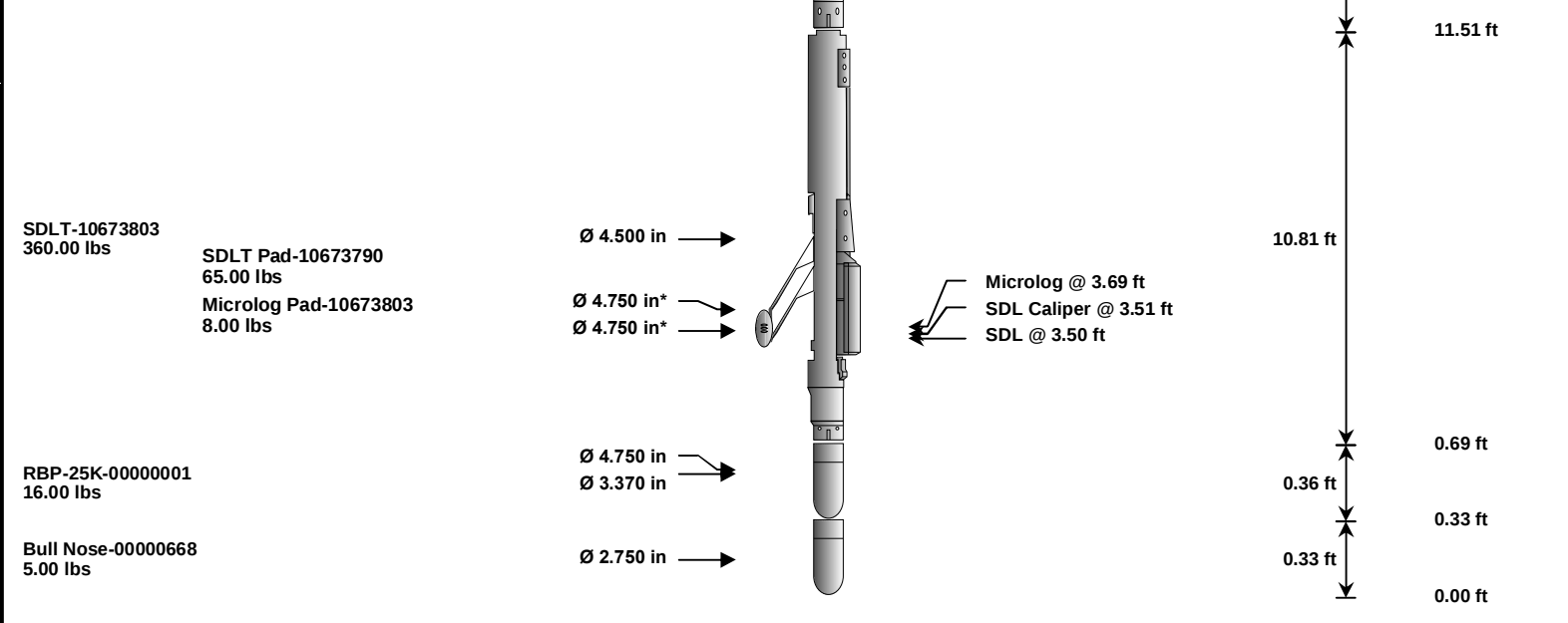
Plot Time: 06-Apr-14 21:21:16
Plot Range: 4595 ft to 4875.08 ft
Data: HEFT_#4-5\Well Based\IR1 REPEAT\
Plot File: \\LOCAL-HEFT_#4-5\Well Based\MICROLOG\Microlog_IQ_5_rep_lib

REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
Cable Head-12345678 30.00 lbs		Ø 3.625 in →			1.92 ft	35.37 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in →		← SP @ 31.67 ft	3.74 ft	33.45 ft
						29.71 ft
GTET-11039640 165.00 lbs		Ø 3.625 in →		← GammaRay @ 23.65 ft	8.52 ft	
						21.19 ft
DSN Decentralizer-10735145 6.60 lbs		Ø 5.000 in* →				
DSNT-10735145 174.00 lbs		Ø 3.625 in →		← DSN Far @ 14.26 ft ← DSN Near @ 13.51 ft	9.69 ft	



Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH	Standard OH Cable Head		12345678	30.00	1.92	33.45	300.00
SP	SP Sub		12345678	60.00	3.74	29.71	300.00
GTET	Gamma Telemetry Tool		11039640	165.00	8.52	21.19	60.00
DSNT	Dual Spaced Neutron		10735145	174.00	9.69	11.51	60.00
DCNT	DSN Decentralizer		10735145	6.60	5.13	* 14.84	300.00
SDLT	Spectral Density Tool		10673803	360.00	10.81	0.69	60.00
SDLP	Density Insite Pad		10673790	65.00	2.55	* 2.90	60.00
MICP	Microlog Pad		10673803	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				889.60	35.37		
* Not included in Total Length and Length Accumulation.							
Data: HEFT_#4-5\0001 GTET-DSN-SDL-BP\IDLE						Date: 06-Apr-14 19:29:58	

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	9.400	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	4875.00	ft
	SHARED	BHT	Bottom Hole Temperature	130.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	

SHARED	SVHM	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: HEFT_#4-5I0001 GTET-DSN-SDL-BPI005 06-Apr-14 20:52 Up @4875.3f				Date: 06-Apr-14 21:08:16

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	GTET - 11039640	Reference Calibration Date:	02-Apr-14 11:18:23
Engineer:	SHELDON INGERSOLL	Calibration Date:	02-Apr-14 11:22:33
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	47.4	47.6	api
Background + Calibrator	278.1	279.6	api
Calibrator	230.7	232.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11039640

Reference Calibration Date: 02-Apr-14 11:22:33

Engineer: SHELDON INGERSOLL

Calibration Date: 06-Apr-14 16:41:36

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	47.6	43.8	api
Background + Calibrator	279.6	276.8	api
Calibrator	232.0	233.0	api

Shop	Field	Difference	Tolerance
232.0	233.0	-1.0	+/- 9.00

MICRO LOG SHOP CALIBRATION

Tool Name: Microlog Pad - 10673803

Reference Calibration Date: 18-Mar-14 11:11:30

Engineer: SHELDON INGERSOLL

Calibration Date: 02-Apr-14 11:14:22

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

Calibration Version: 1

Host Tool Name: DSNT - 10735145

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.06	-0.05	-0.01	-0.01	ohmm
Calibration Point #1	-0.00	0.00	-0.00	0.00	ohmm
Calibration Point #2	19.34	20.00	20.39	20.00	ohmm
Internal Reference	20.06	20.75	20.13	19.74	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	3.42	-4.16	V
Calibration Point #1	17.47	-0.52	V
Calibration Point #2	5197.77	7113.00	V
Internal Reference	5391.55	7020.51	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 10673803

Reference Calibration Date: 02-Apr-14 11:14:22

Engineer: SHELDON INGERSOLL

Calibration Date: 06-Apr-14 16:39:57

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

Calibration Version: 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.05	-0.07	-0.01	0.00	ohmm
Internal Reference	20.75	20.70	19.74	19.70	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	20.75	20.70	0.05	+/- 0.80
Microlog Lateral	19.74	19.70	0.04	+/- 0.80

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11039640						
Gamma Ray Calibrator	232.0	233.0	-----	-1.0	+/- 9.00	api
Microlog Pad-10673803						
MicroLog Normal	20.75	20.70	-----	0.05	+/-0.80	ohmm
MicroLog Lateral	19.74	19.70	-----	0.04	+/-0.80	ohmm

Data: HEFT_#4-5\0001 GTET-DSN-SDL-BP\005 06-Apr-14 20:52 Up @4875.3f Date: 06-Apr-14 21:09:00

Date: 06-Apr-14 21:09:00

HALLIBURTON

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	35.37	NO	
BS	Bit Size	35.37	NO	
HDIA	Measured Hole Diameter	0.00	NO	
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	

SDI T

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: HEFT_#4-5\0001 GTET-DSN-SDL-BP\005 06-Apr-14 20:52 Up @4875.3f			Date: 06-Apr-14 21:05:28	

COMPANY	HERMAN L. LOEB, LLC.		
WELL	HEFT #4-5		
FIELD	EINSEL		
COUNTY	KIOWA	STATE	KANSAS
HALLIBURTON		MICROLOG	