

HALLIBURTON

SPECTRAL DENSITY
DUAL SPACED NEUTRON
MICROLOG

COMPANY				LARIO OIL & GAS COMPANY			
WELL				KNOBBE 2-4			
FIELD/BLOCK				OBI-WAN			
COUNTY				WICHITA			
STATE				KANSAS			
Permanent Datum				GL			
Log measured from				KB			
Drilling measured from				KB			
Date				03-Mar-18			
Run No.				1			
Depth - Driller				5000.0 ft			
Depth - Logger				5000.0 ft			
Bottom - Logged Interval				4990			
Top - Logged Interval				1500			
Casing - Driller				8.625 in @ 348.0 ft			
Casing - Logger				342.0 ft @			
Bit Size				7.875 in @			
Type Fluid in Hole				Water Based Mud @			
Density				9.10 g/cc 65.00 s/qt			
PH				9.50 pH 8.8 cphm			
Source of Sample				MUD PIT			
Rm @ Meas. Temperature				0.44 ohmm @ 76.00 degF @			
Rmf @ Meas. Temperature				0.38 ohmm @ 74.00 degF @			
Rmc @ Meas. Temperature				0.53 ohmm @ 74.00 degF @			
Source Rmf				Rmc MEAS			
Rm @ BHT				0.27 ohmm @ 126.0 degF @			
Time Since Circulation				23.30 hr			
Time on Bottom				03-Mar-18 04:58			
Max. Rec. Temperature				126.00 degF @ 5000.0 ft @			
Equipment				Location 12156883 EL RENO			
Recorded By				WHITLOCK			
Witnessed By				STEVE DAVIS			

Service Ticket No.: 904686784

API No.: 15-203-20327-00-00

PGM Version: WL INSITE R5.6.3 (Build 4)

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.			Run No.			Run No.		Run No.				
Serial No.			Serial No.			Serial No.		Serial No.				
Model No.			Model No.			Model No.		Model No.				
Diameter			No. of Cent.			Diameter		Diameter				
Detector Model No.			Spacing			Log Type		Log Type				
Type						Source Type		Source Type				
Length			LSA [Y/N]			Serial No.		Serial No.				
Distance to Source			FWDA [Y/N]			Strength		Strength				
LOGGING DATA												
GENERAL			GAMMA		ACOUSTIC		DENSITY		NEUTRON			
Run	Depth		Speed	Scale		Scale		Matrix		Scale		Matrix
No.	From	To	ft/min	L	R	L	R	L	R	L	R	

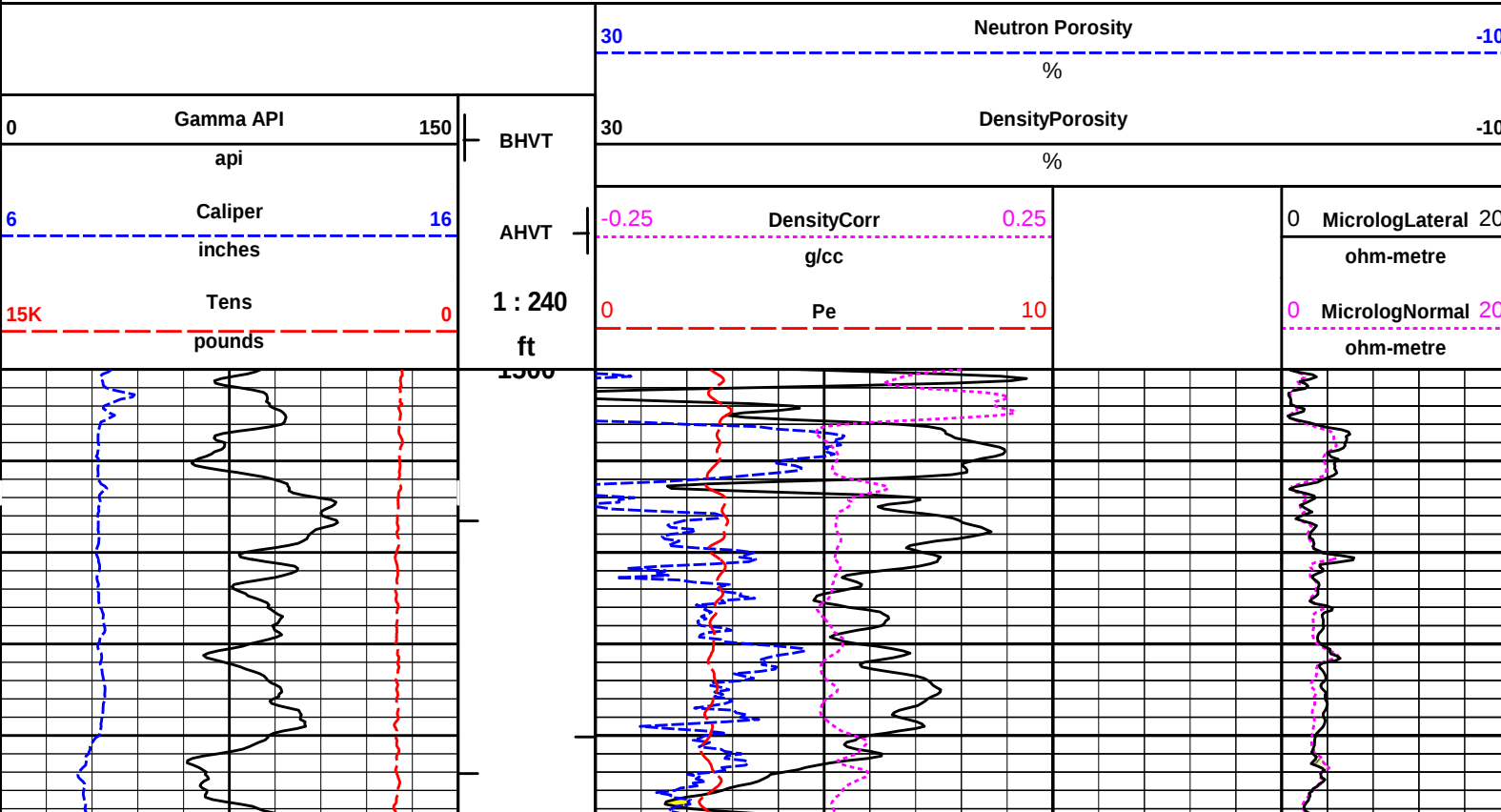
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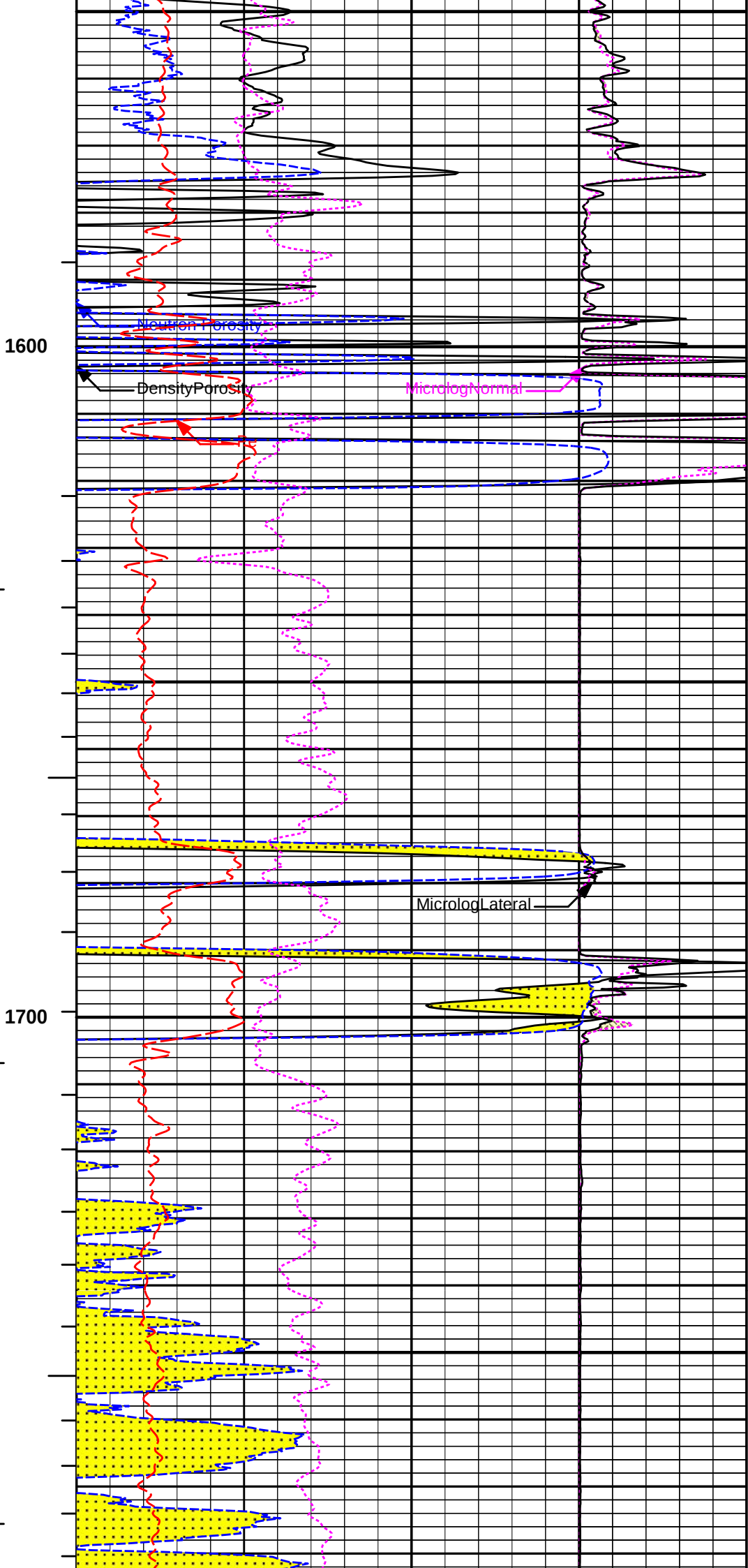
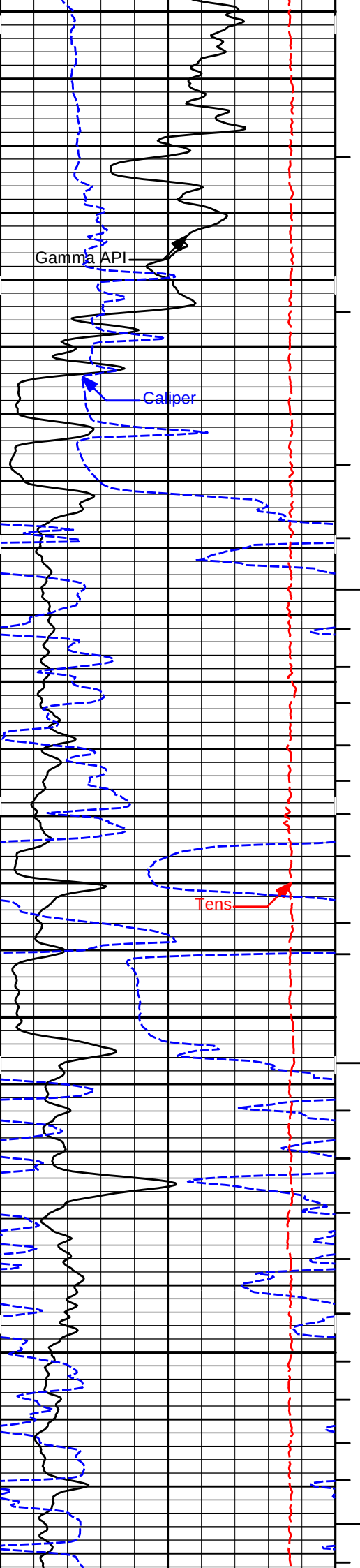
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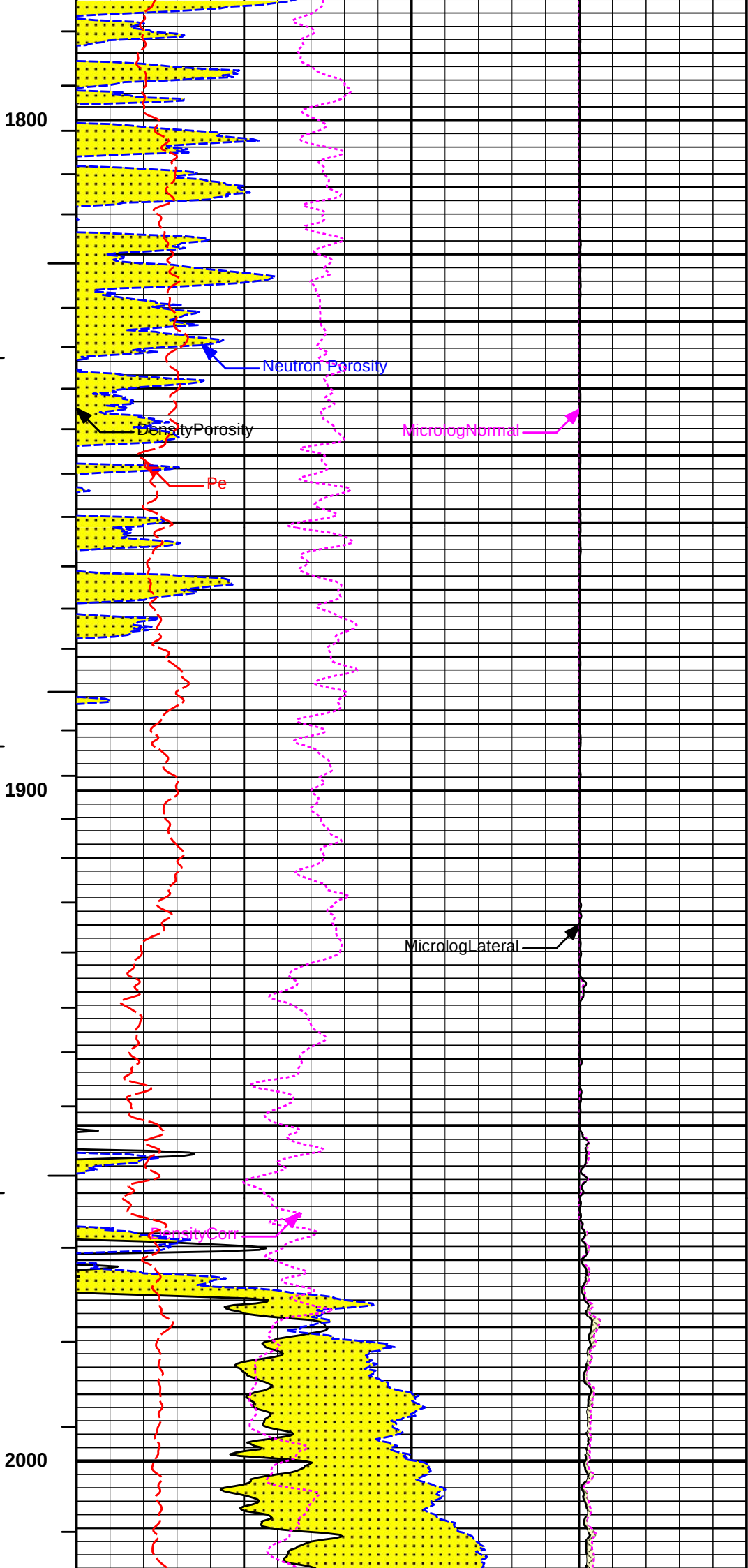
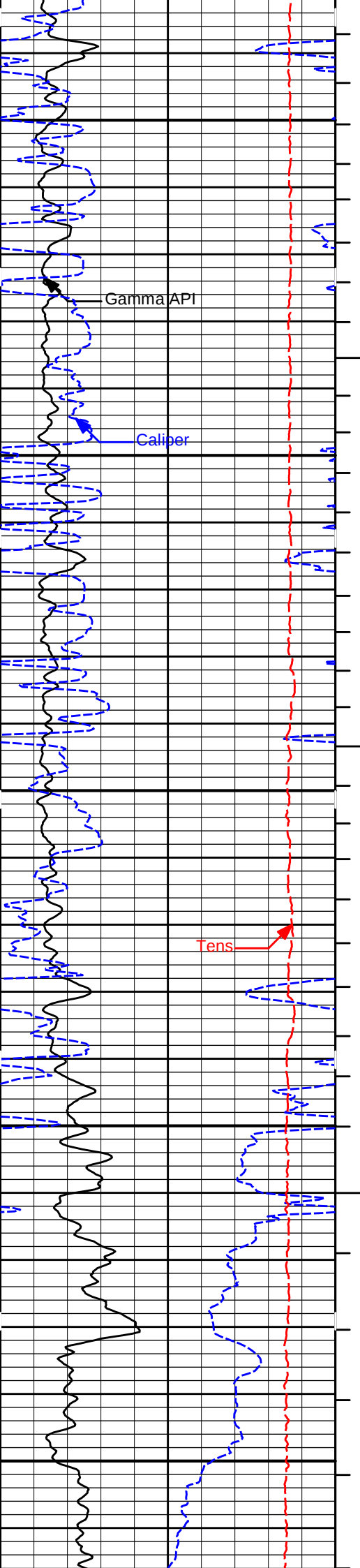
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Plot Range: 1500 ft to 5002.83 ft
Data: LARIO_KNOBBE\Well Based\DAQ-0001-003\
Plot File: \\SDL-DSN-ML\PoromL_5_main_IQ

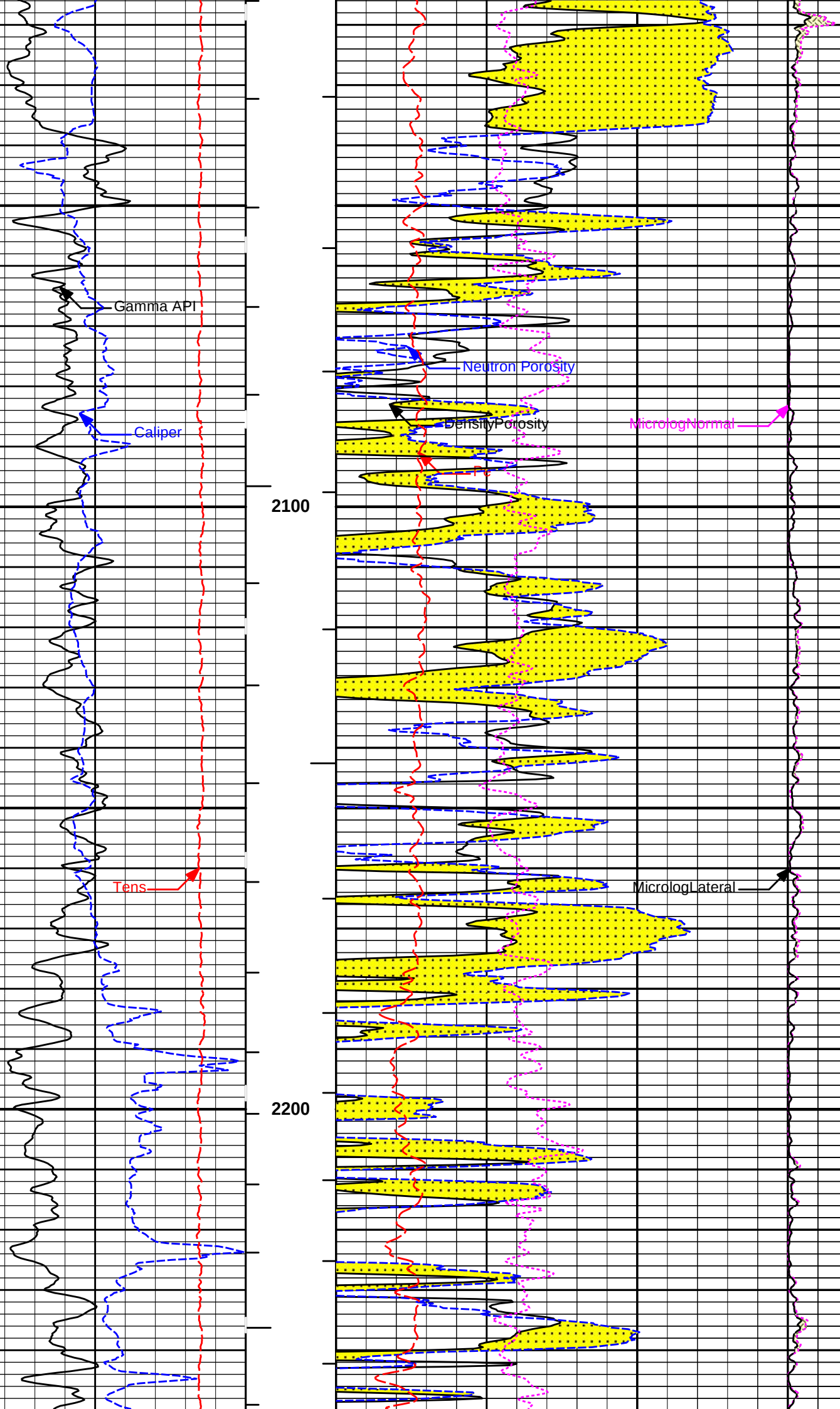
5 INCH MAIN LOG

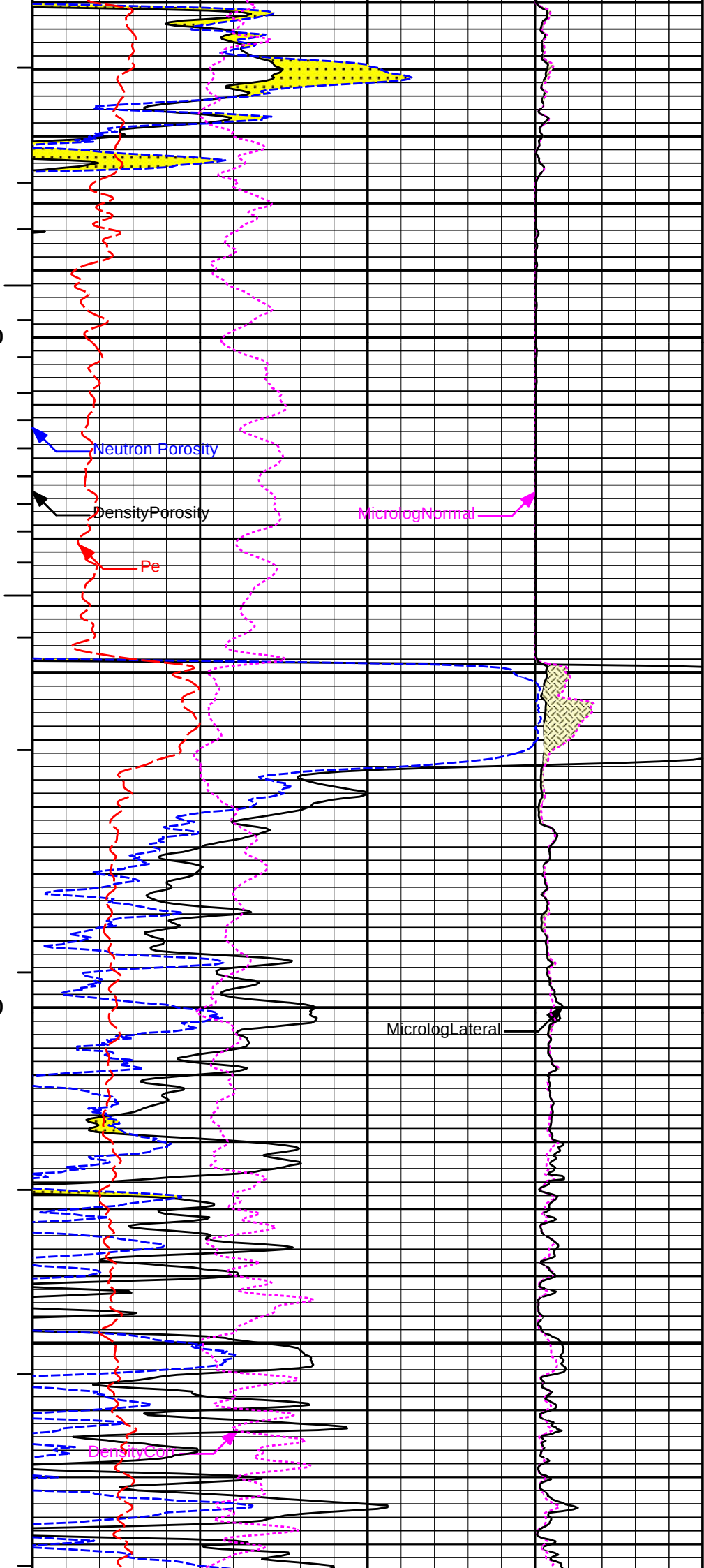
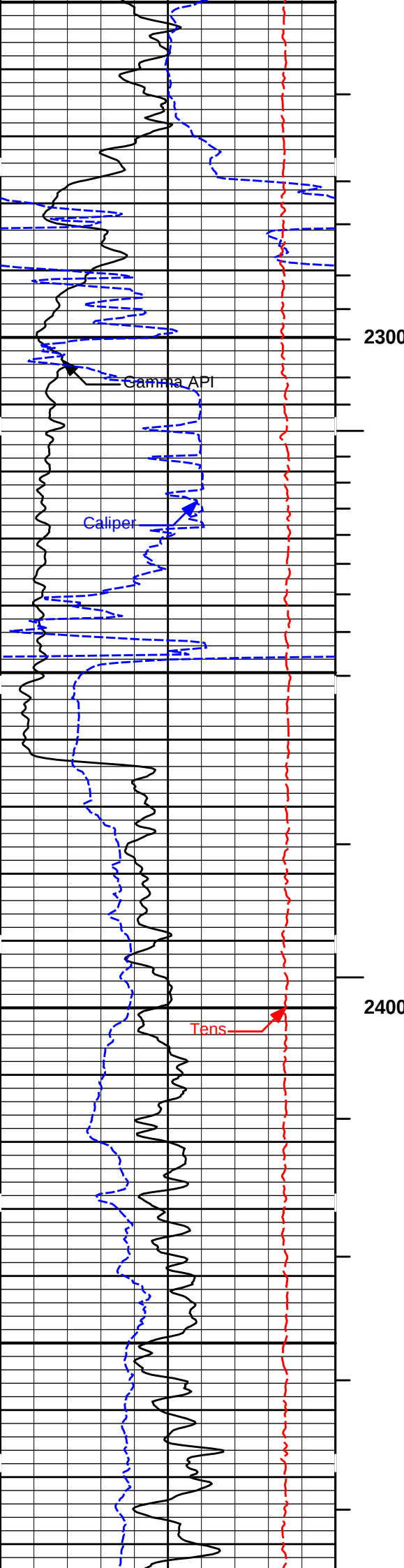
MAIN SECTION 5" PER 100'

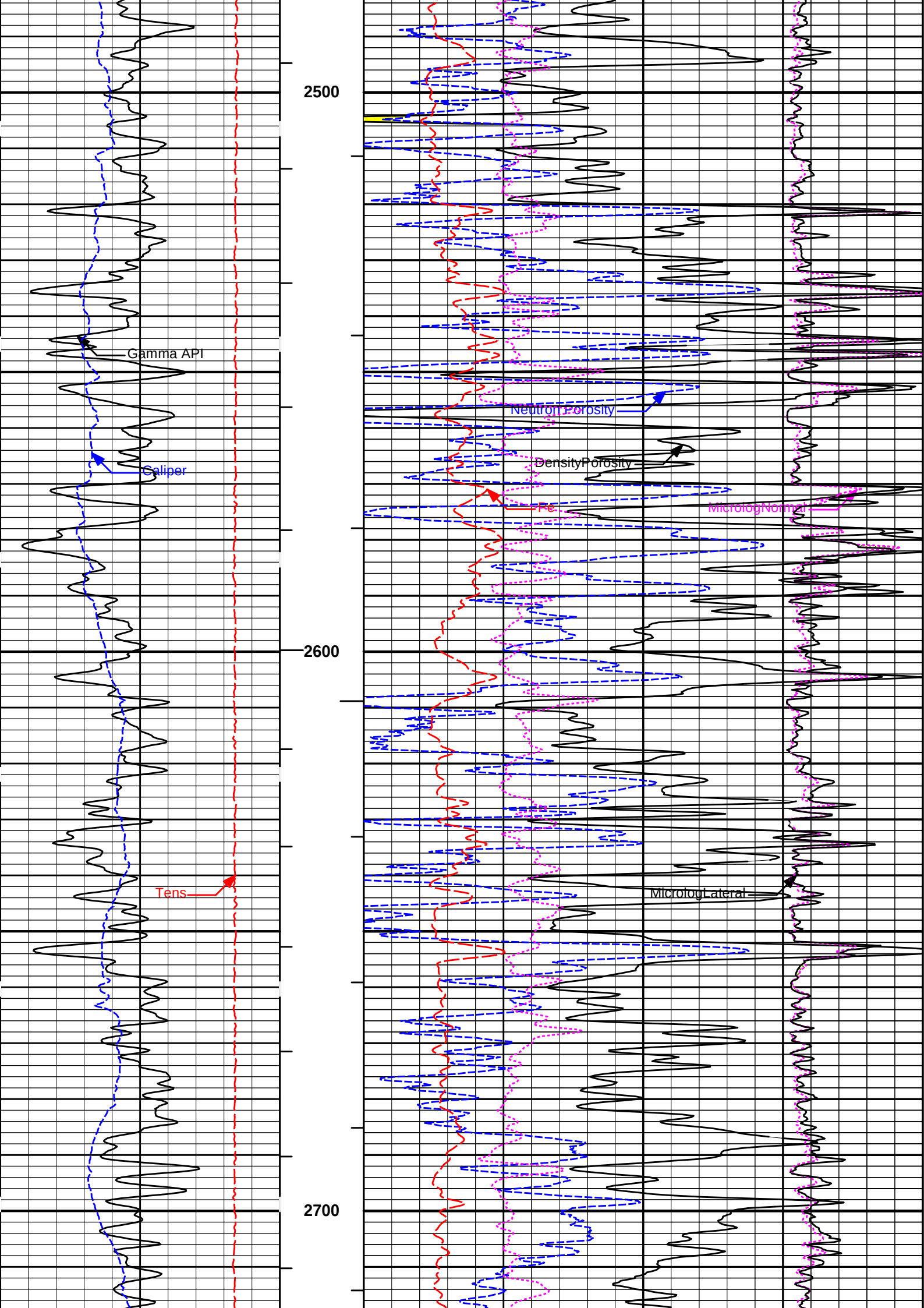


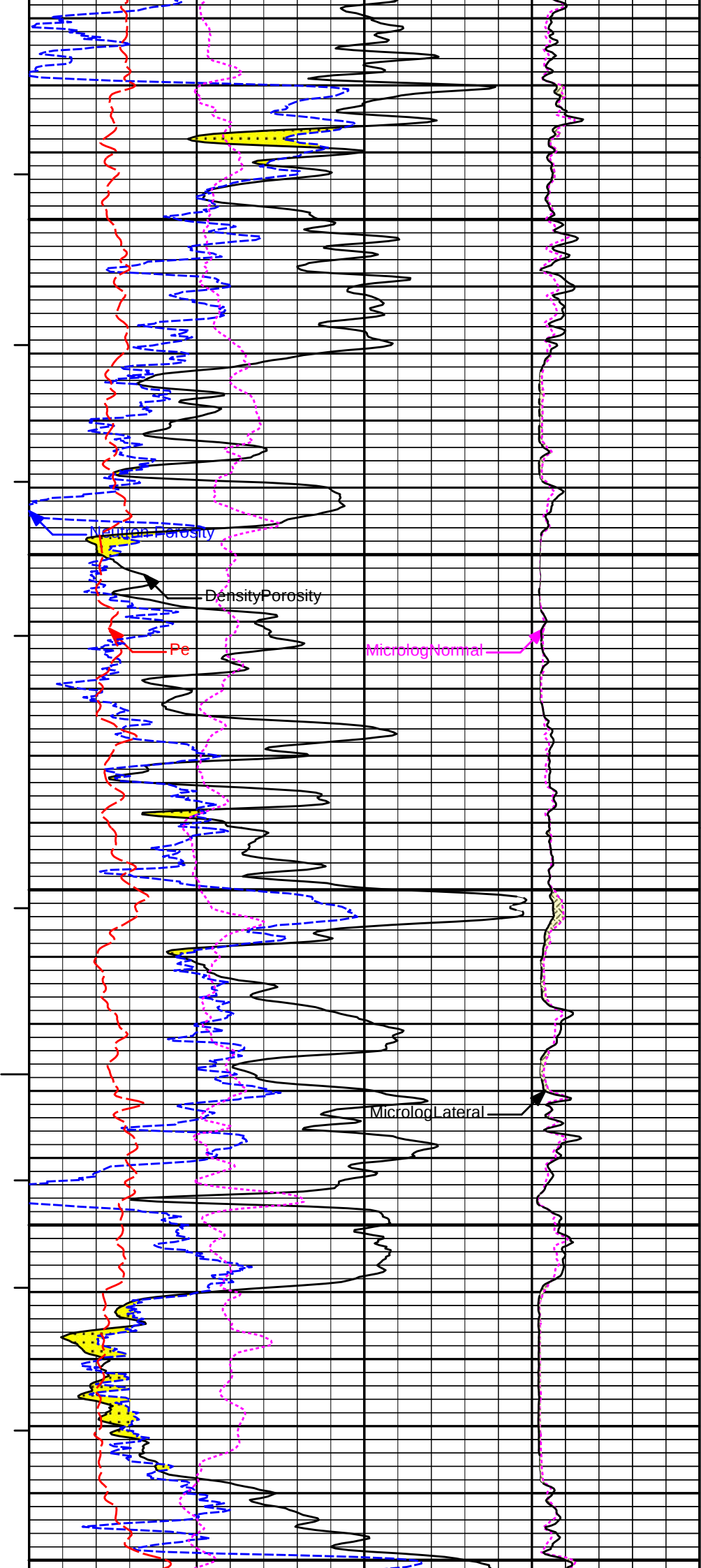
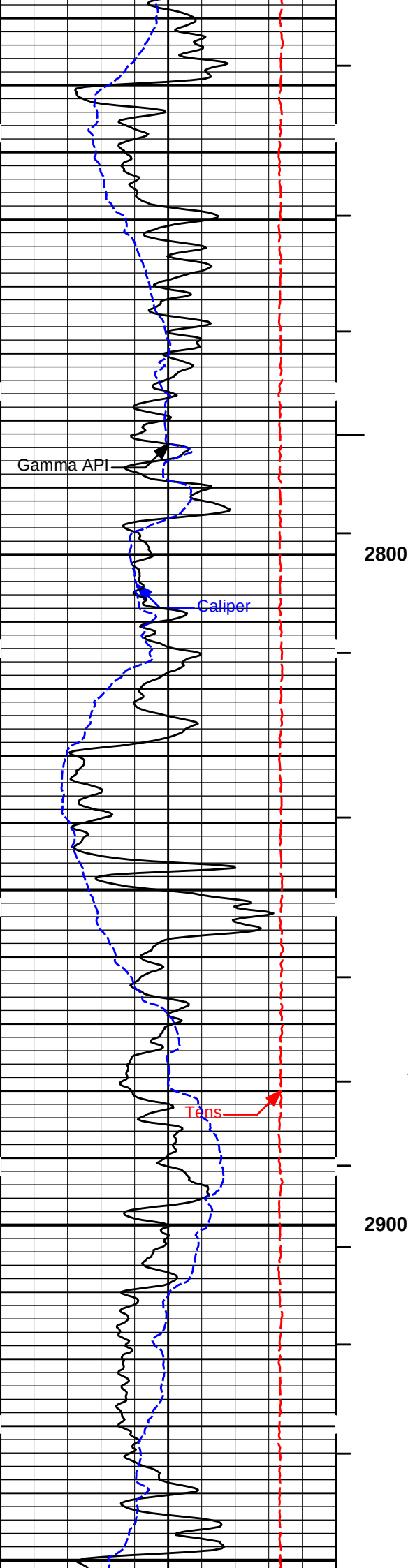


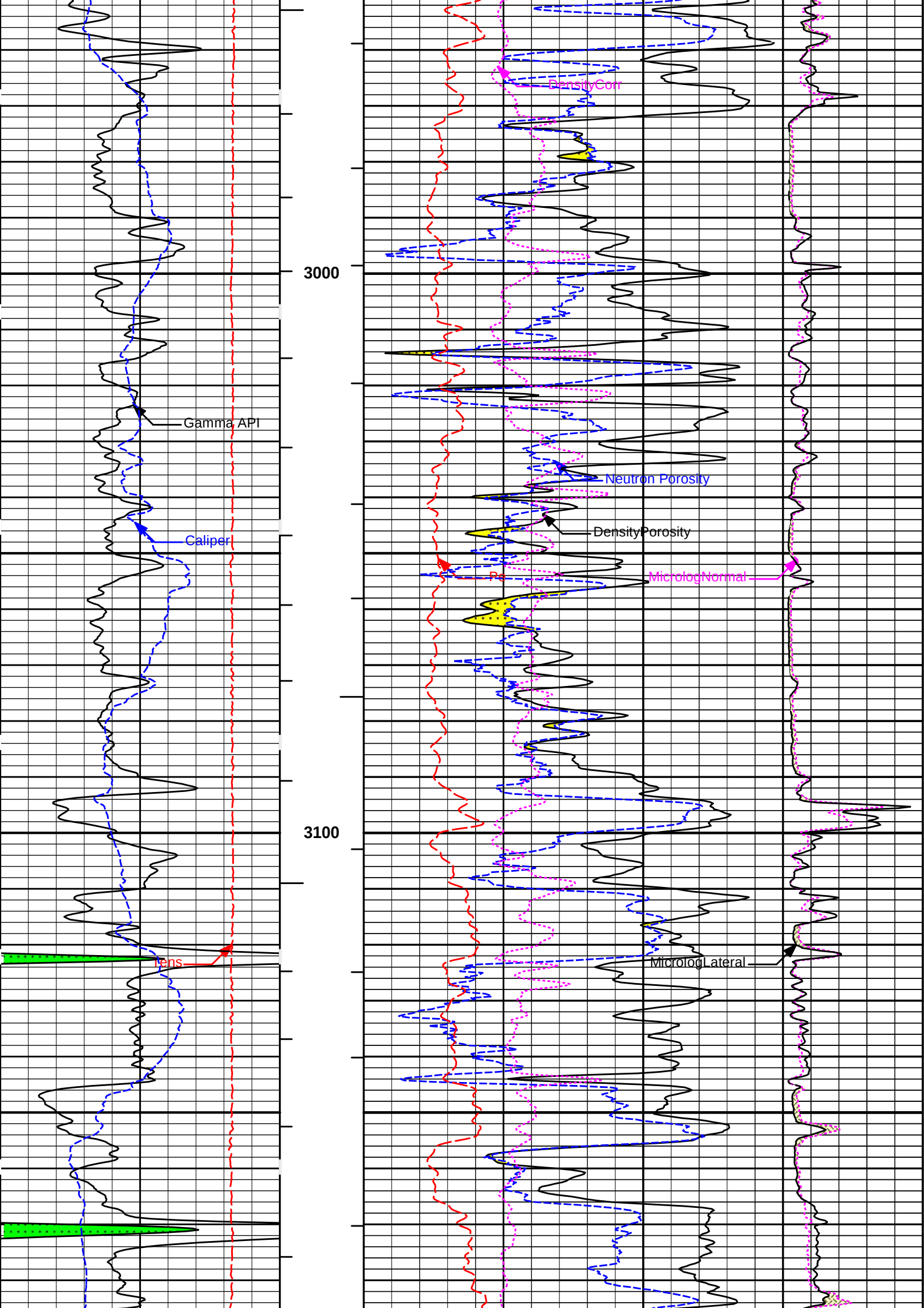


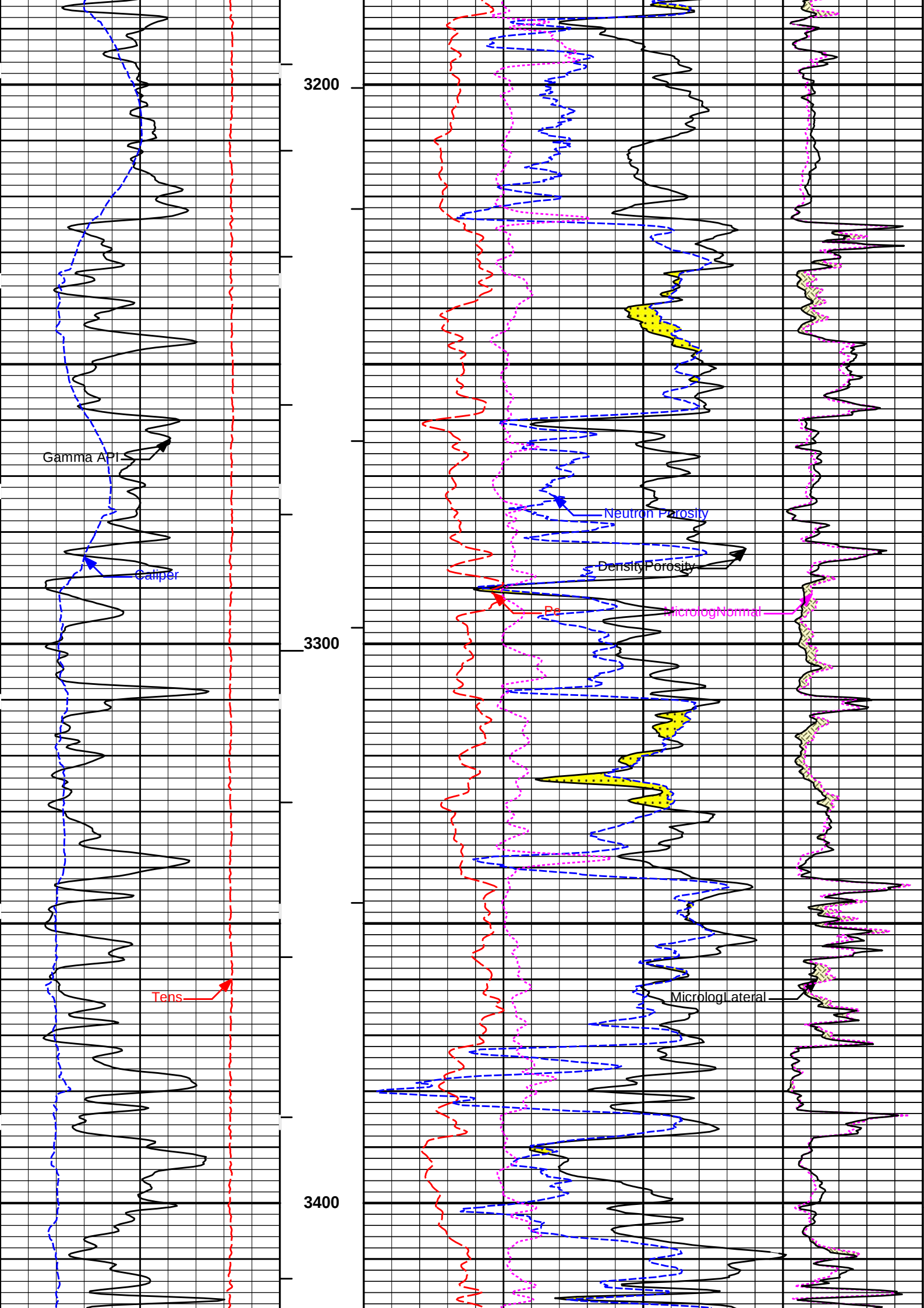


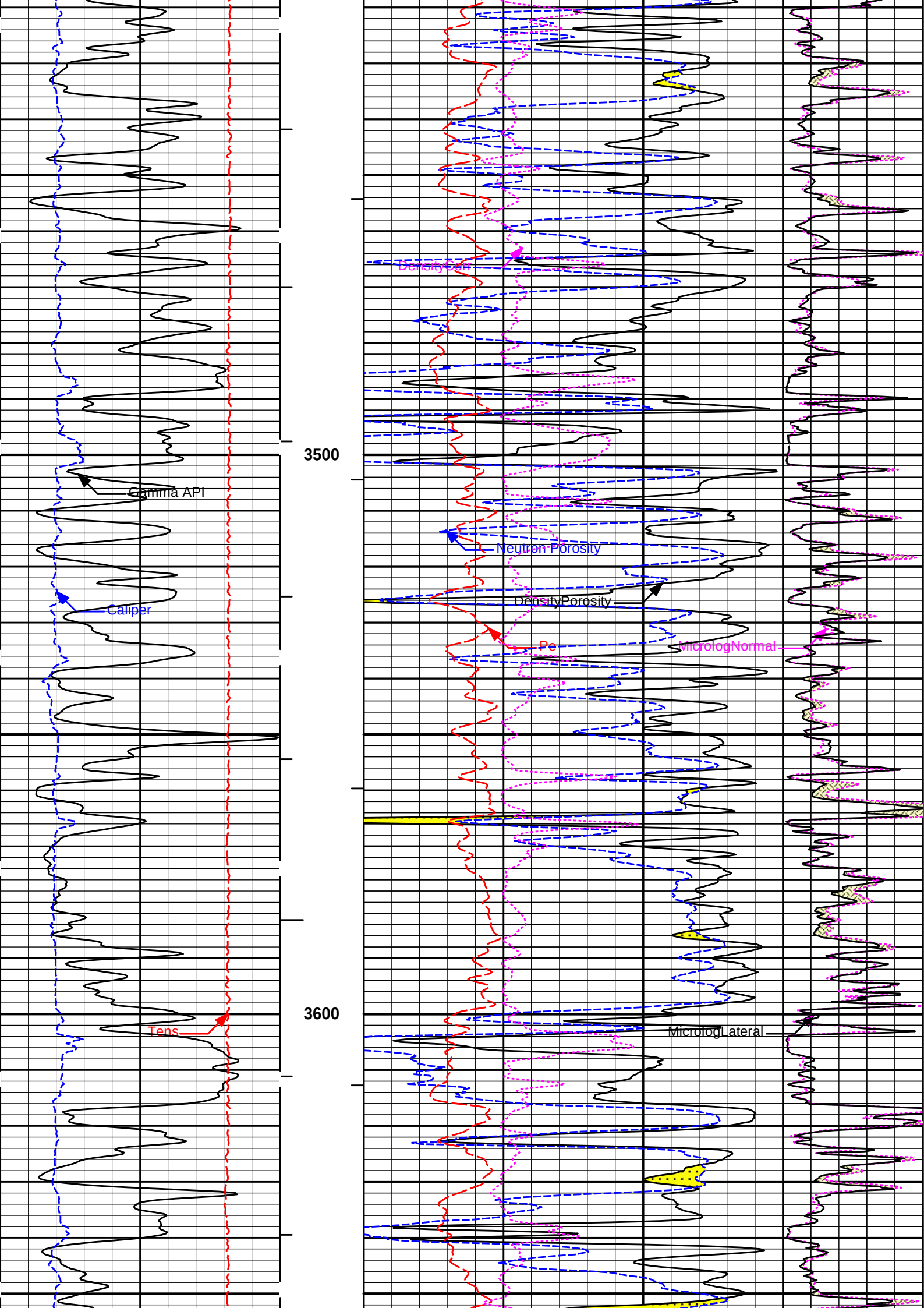


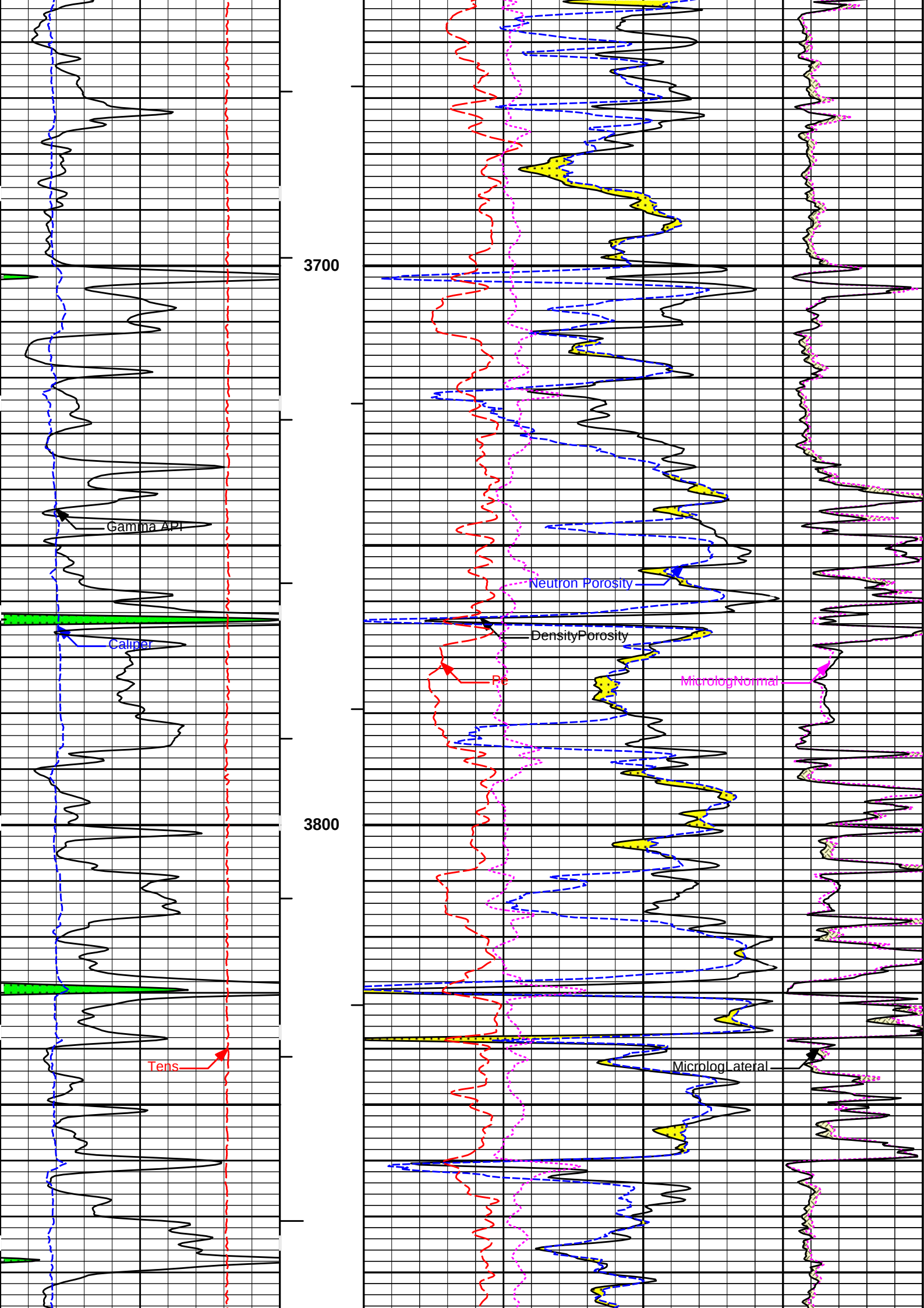


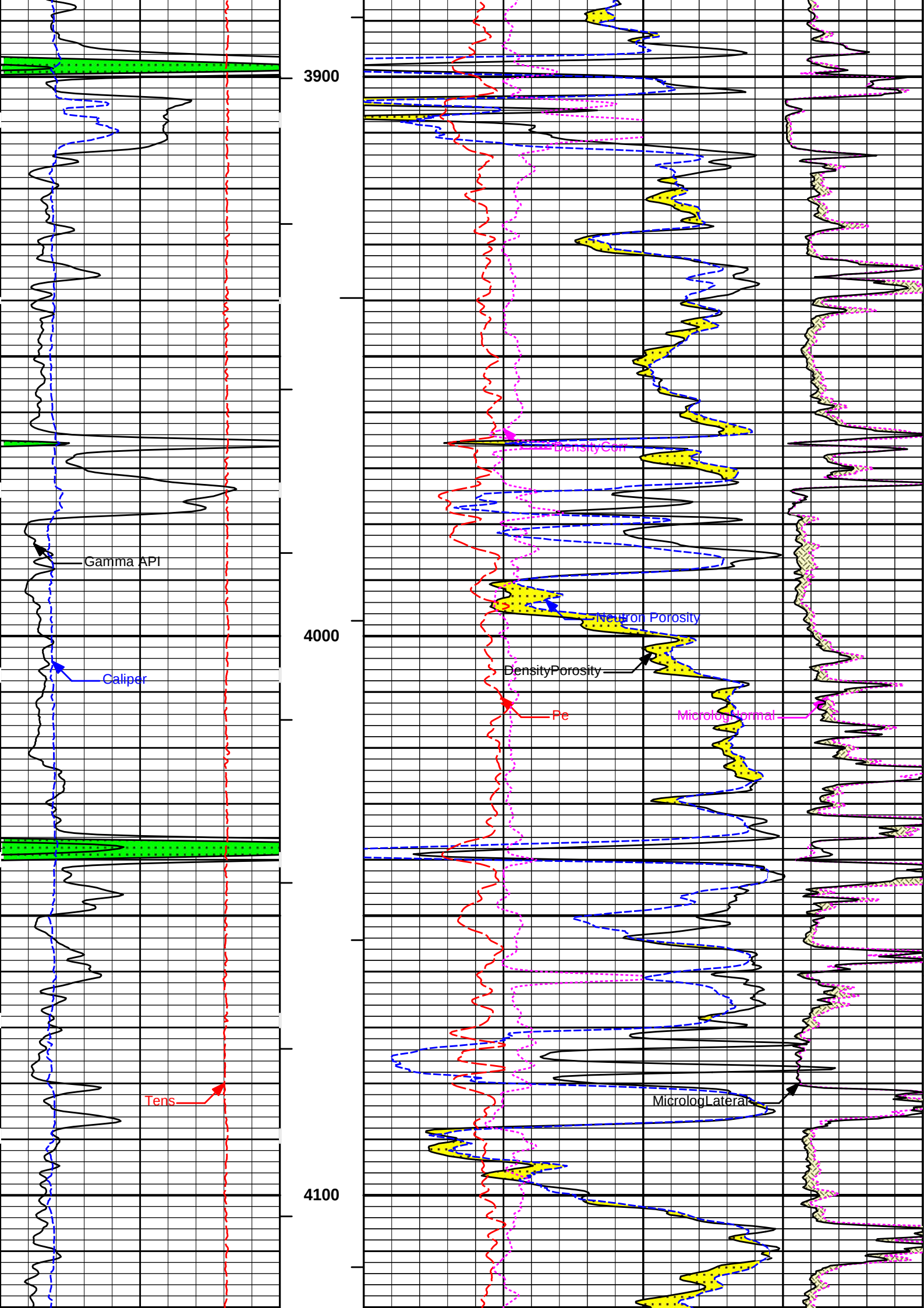


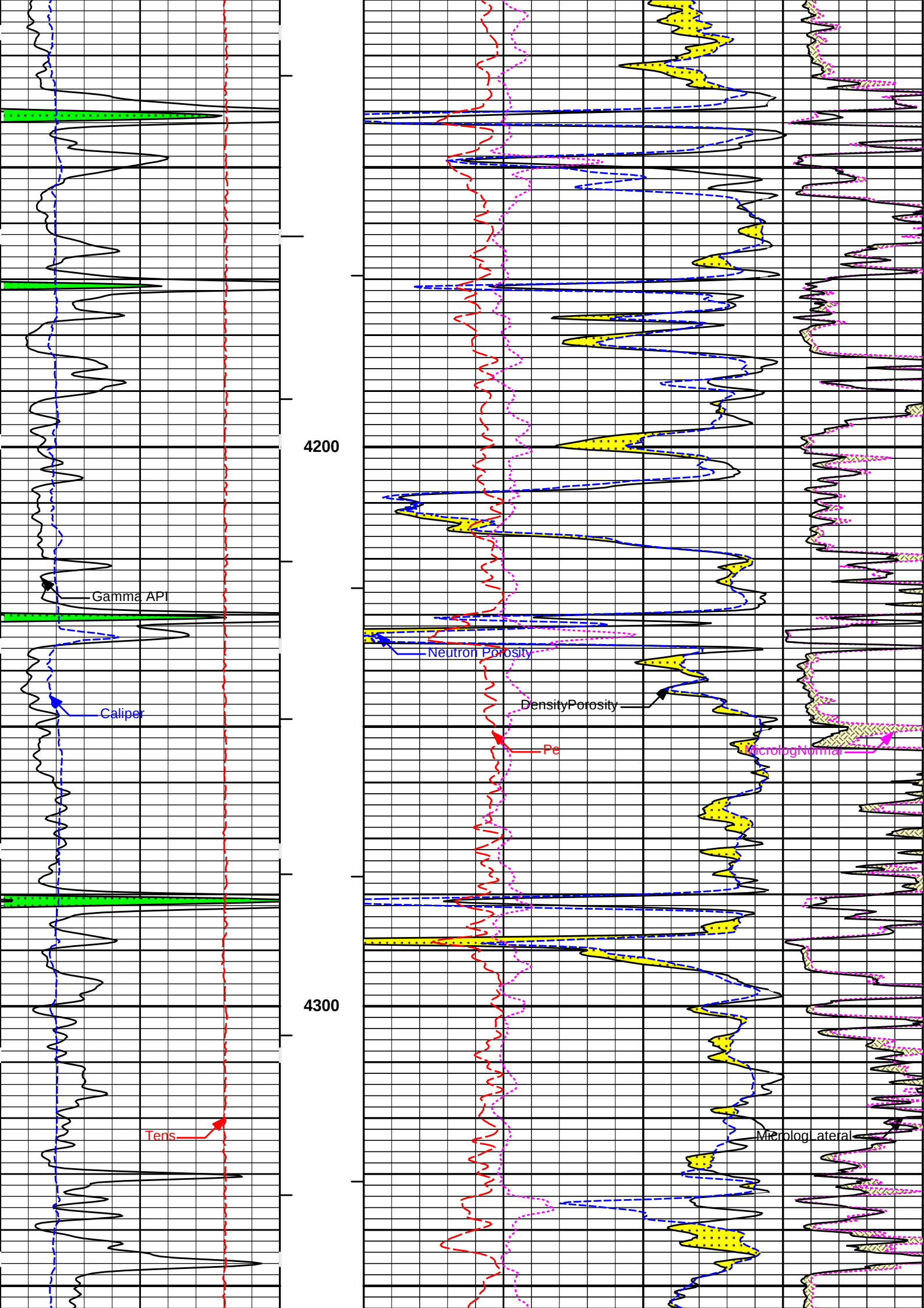


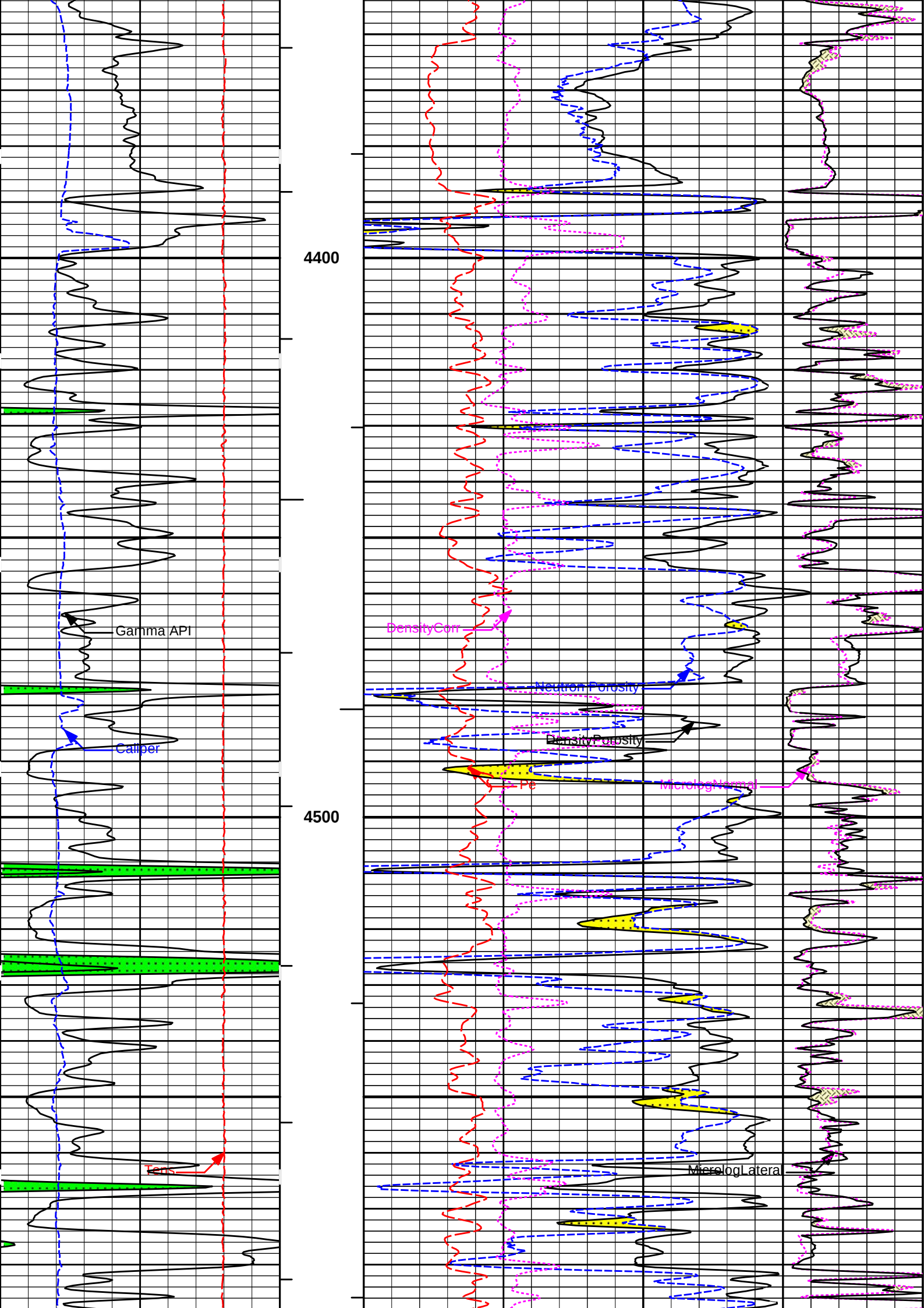


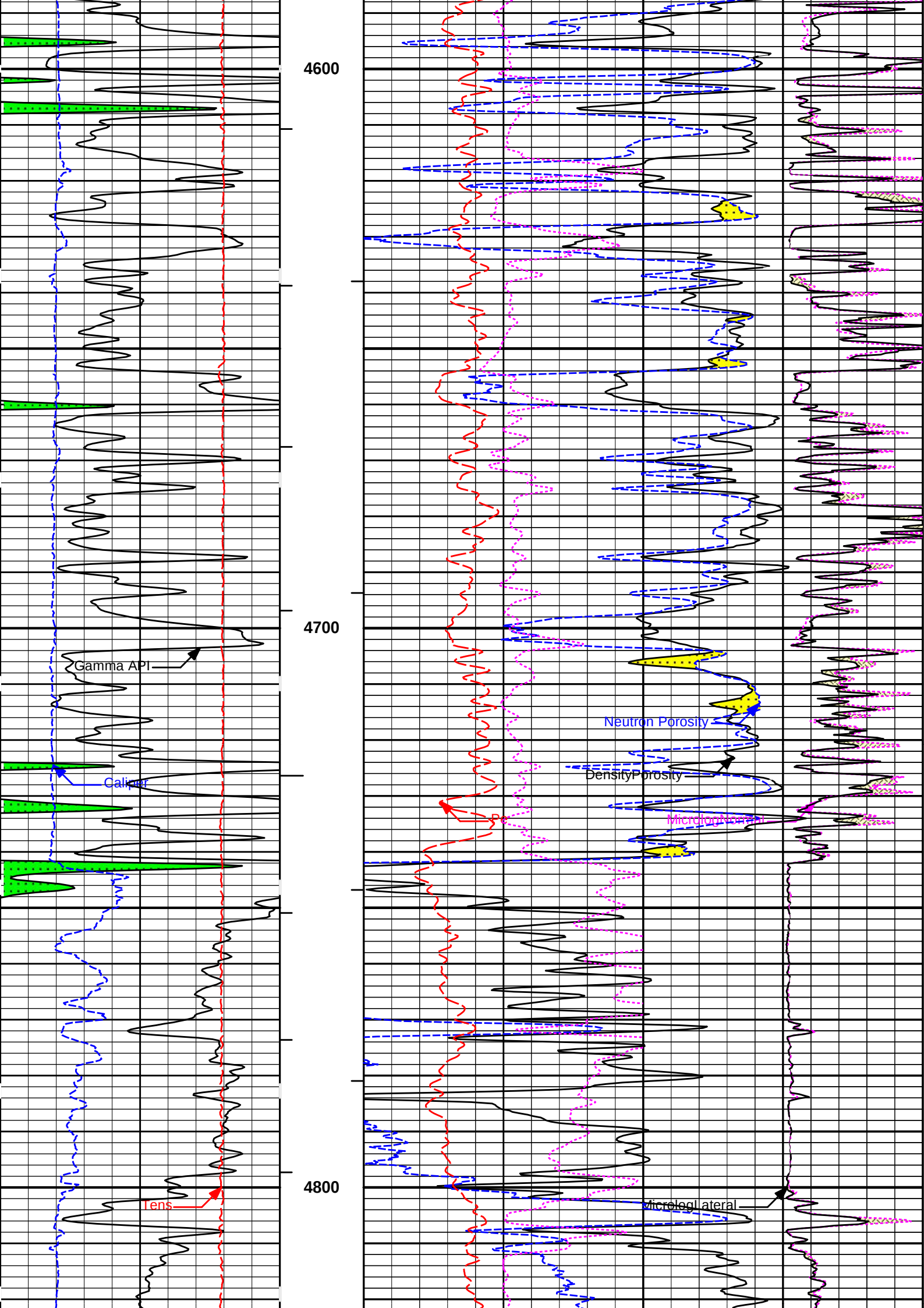


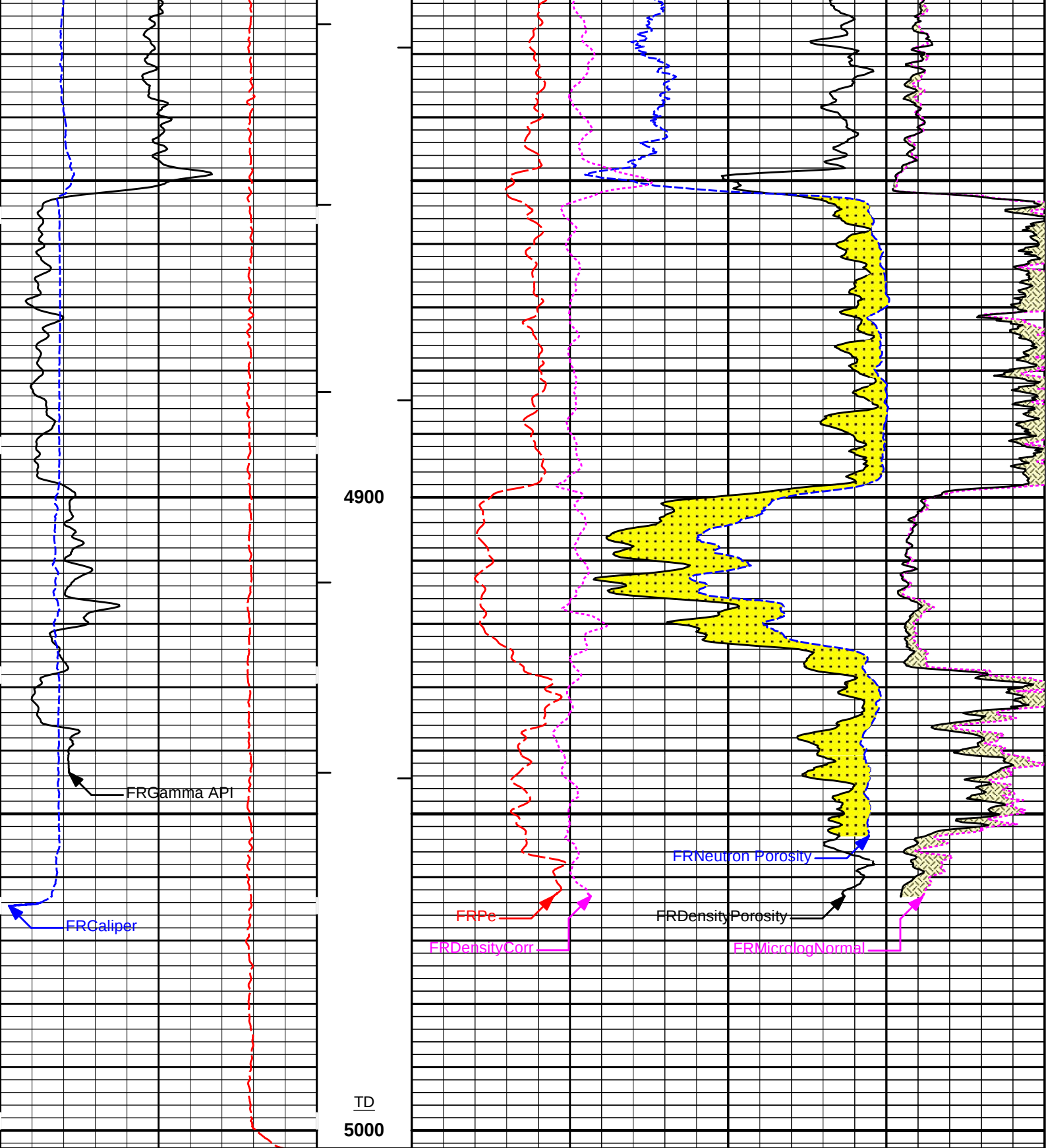












15K	Tens	0	1 : 240	0	Pe	10	0	MicrologNormal	20
	pounds		ft					ohm-metre	
6	Caliper	16	AHVT	-0.25	DensityCorr	0.25	0	MicrologLateral	20
	inches				g/cc			ohm-metre	
0	Gamma API	150	BHVT	30	DensityPorosity	-10			
	api				%				
				30	Neutron Porosity	-10			
					%				

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Plot Time: 03-Mar-18 07:59:22
Plot Range: 1500 ft to 5002.83 ft
Data: LARIO_KNOBBE\Well Based\DAQ-0001-003\
Plot File: \\SDI-DSN-ML\BoreML_5_main IQ

5 INCH MAIN LOG

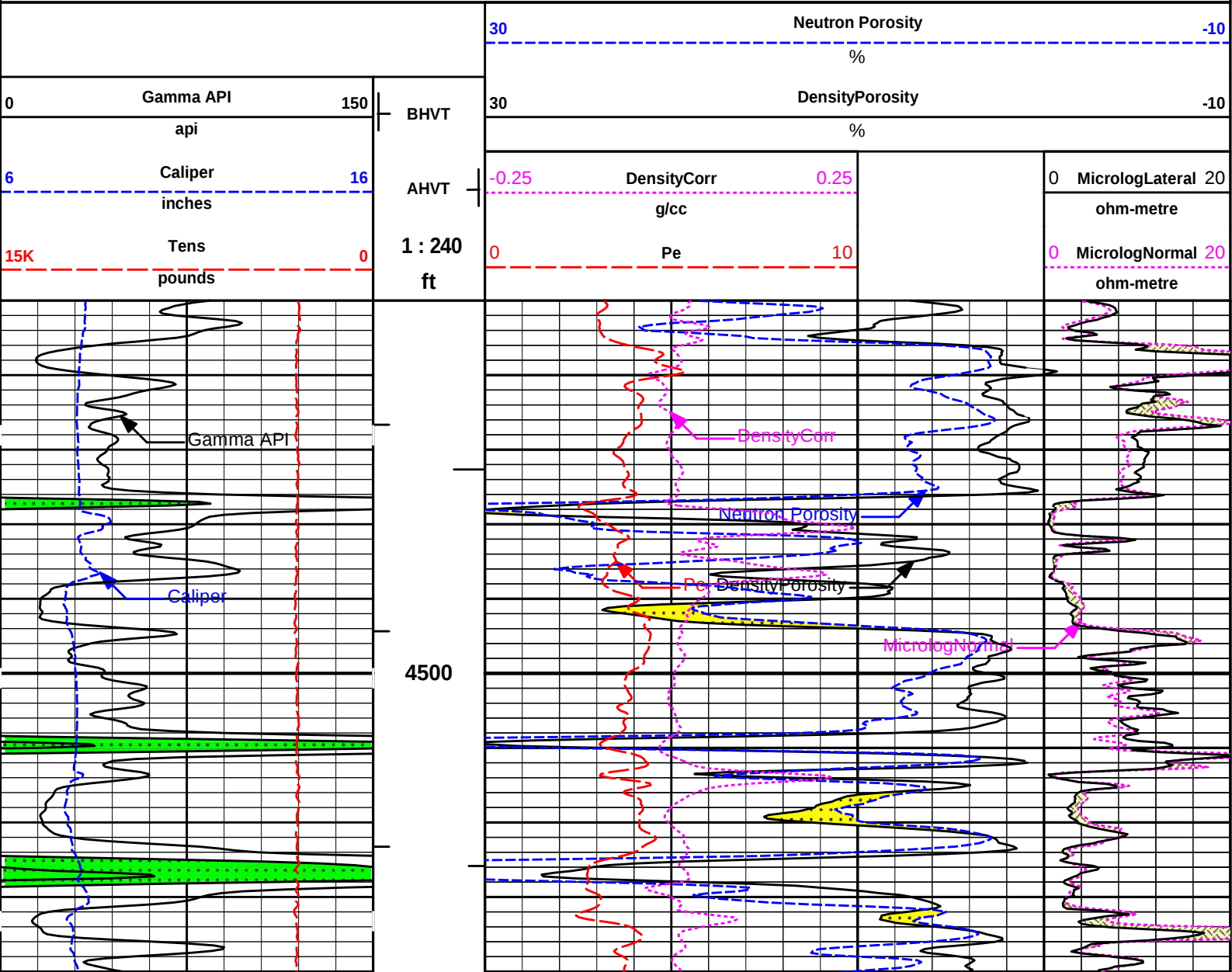
MAIN SECTION 5" PER 100'

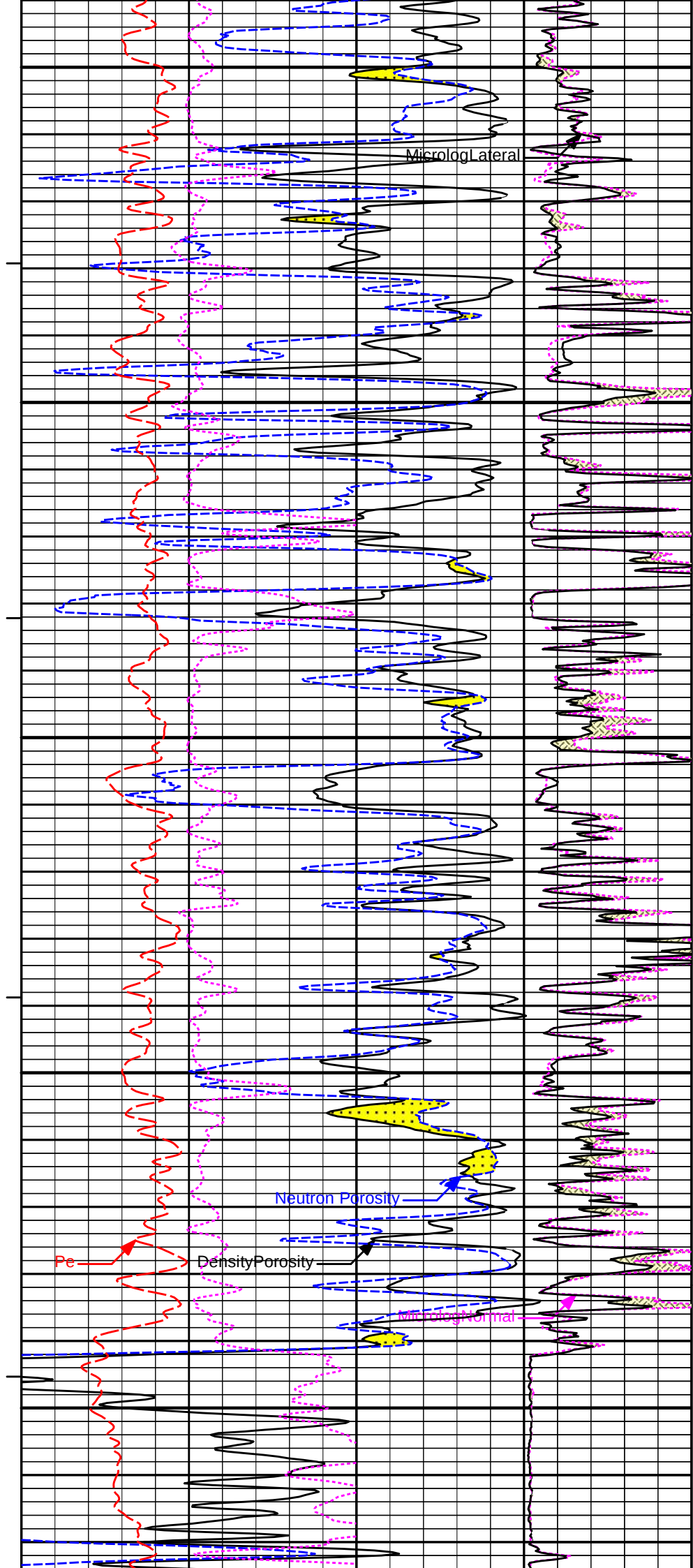
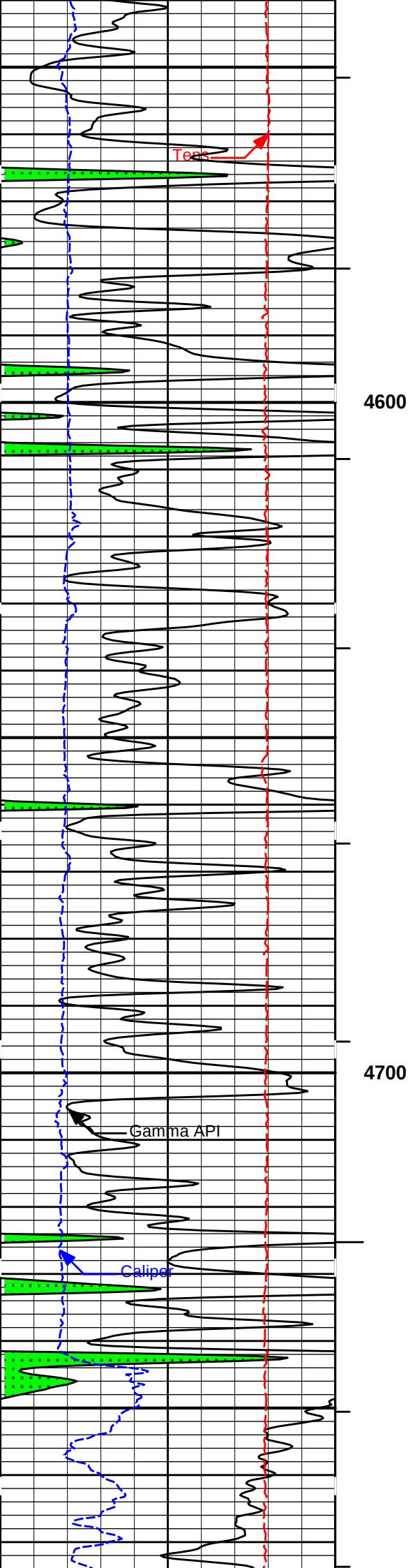
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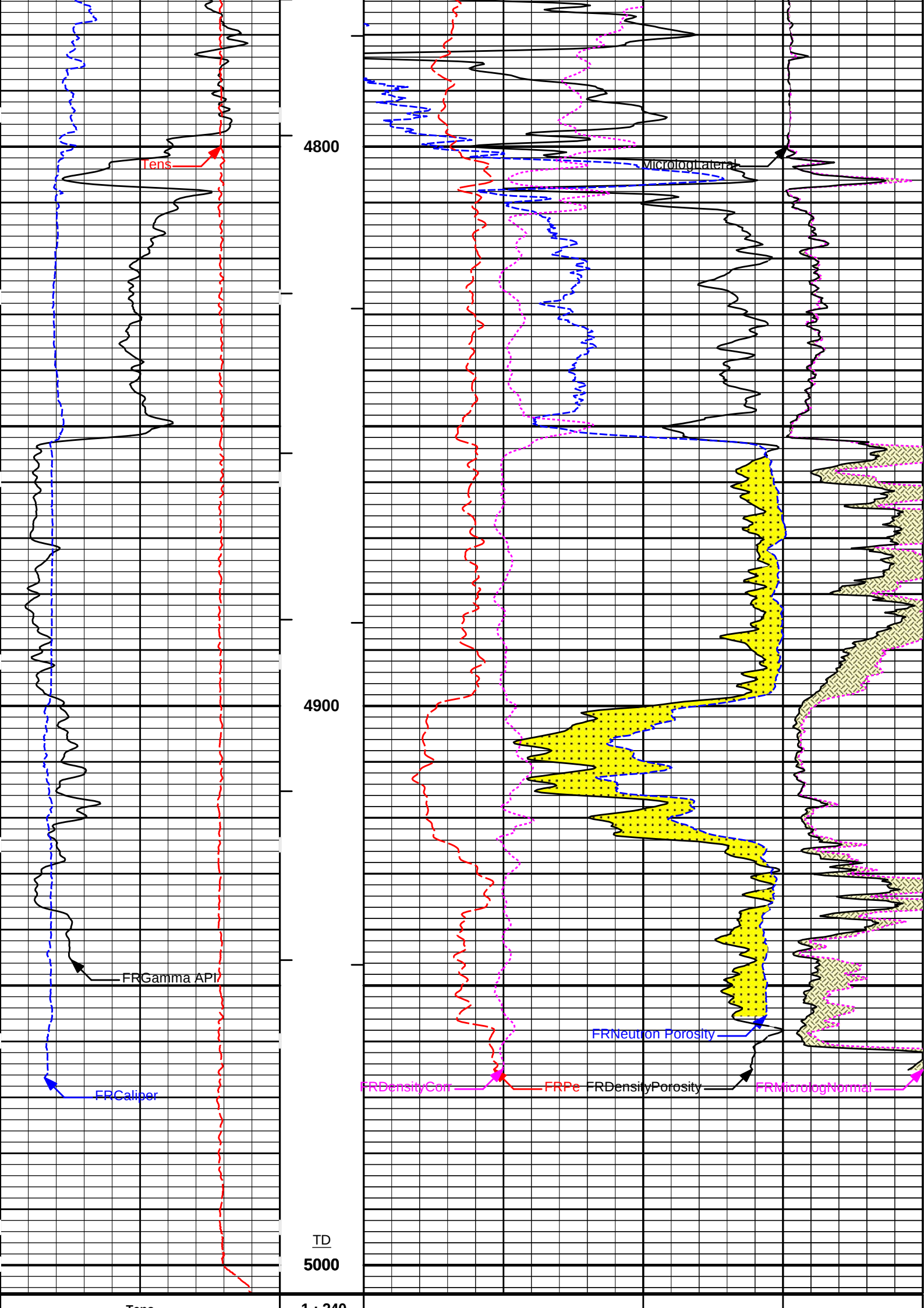
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Plot Range: 4450 ft to 5005 ft
Data: LARIO_KNOBBE\\Well Based\\DAQ-0001-002\\
Plot File: \\SDL-DSN-ML\\PoromL_5_main_IQ

REPEAT SECTION

REPEAT SECTION







15K	tens	0	1 : 240	ft	0	Pe	10	0	MicrologNormal	20
	pounds								ohm-metre	
6	Caliper	16	16	AHVT	-0.25	DensityCorr	0.25	0	MicrologLateral	20
	inches					g/cc			ohm-metre	
0	Gamma API	150		BHVT	30	DensityPorosity				-10
	api					%				
					30	Neutron Porosity				-10
						%				

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Plot Time: 03-Mar-18 07:59:25

Plot Range: 4450 ft to 5005 ft

Data: LARIO_KNOBBE\Well Based\DAQ-0001-002\

Plot File: \\SDL-DSN-ML\PoromL_5_main_IQ

REPEAT SECTION

REPEAT SECTION

HALLIBURTON

Plot Time: 03-Mar-18 07:59:25

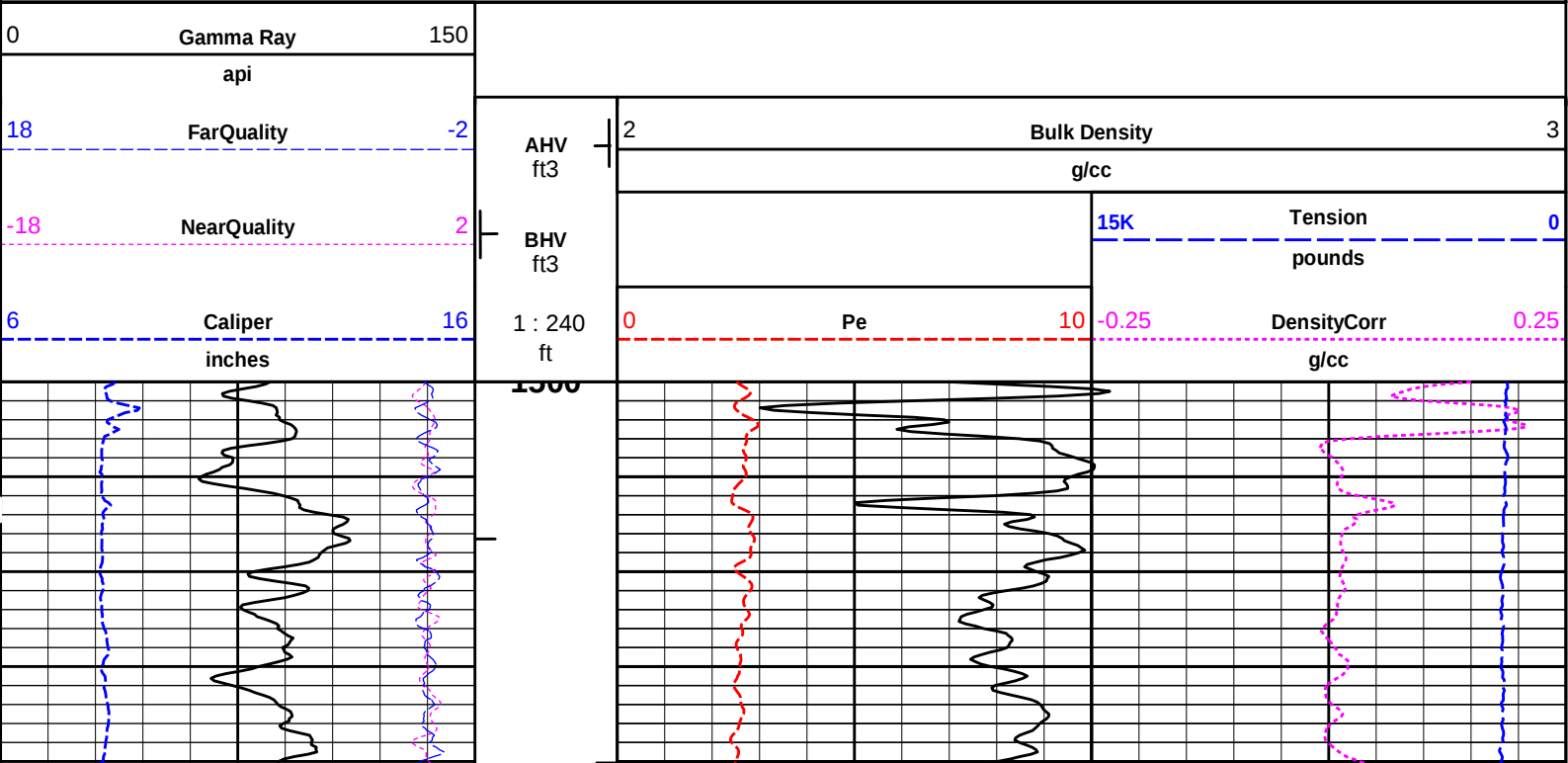
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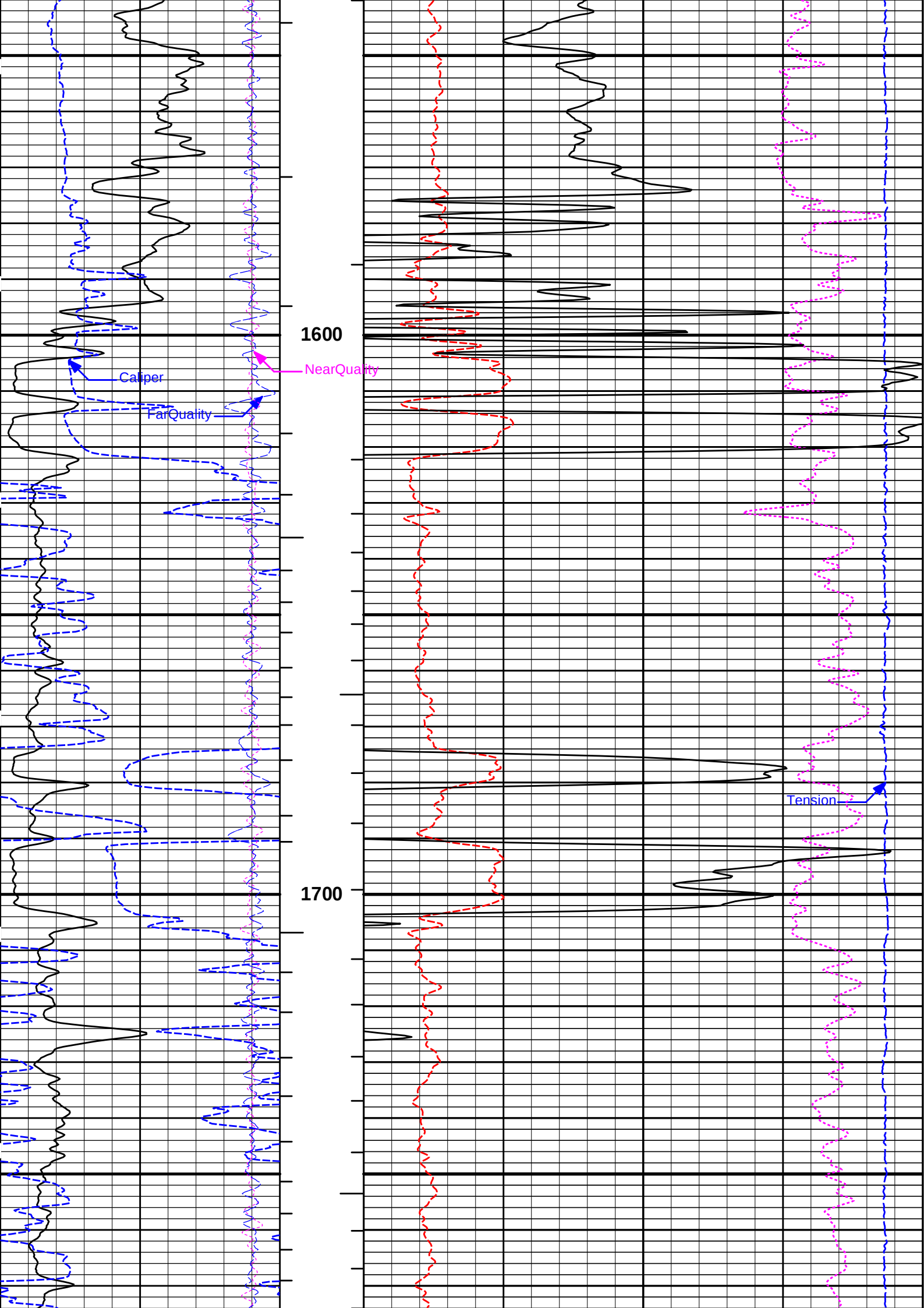
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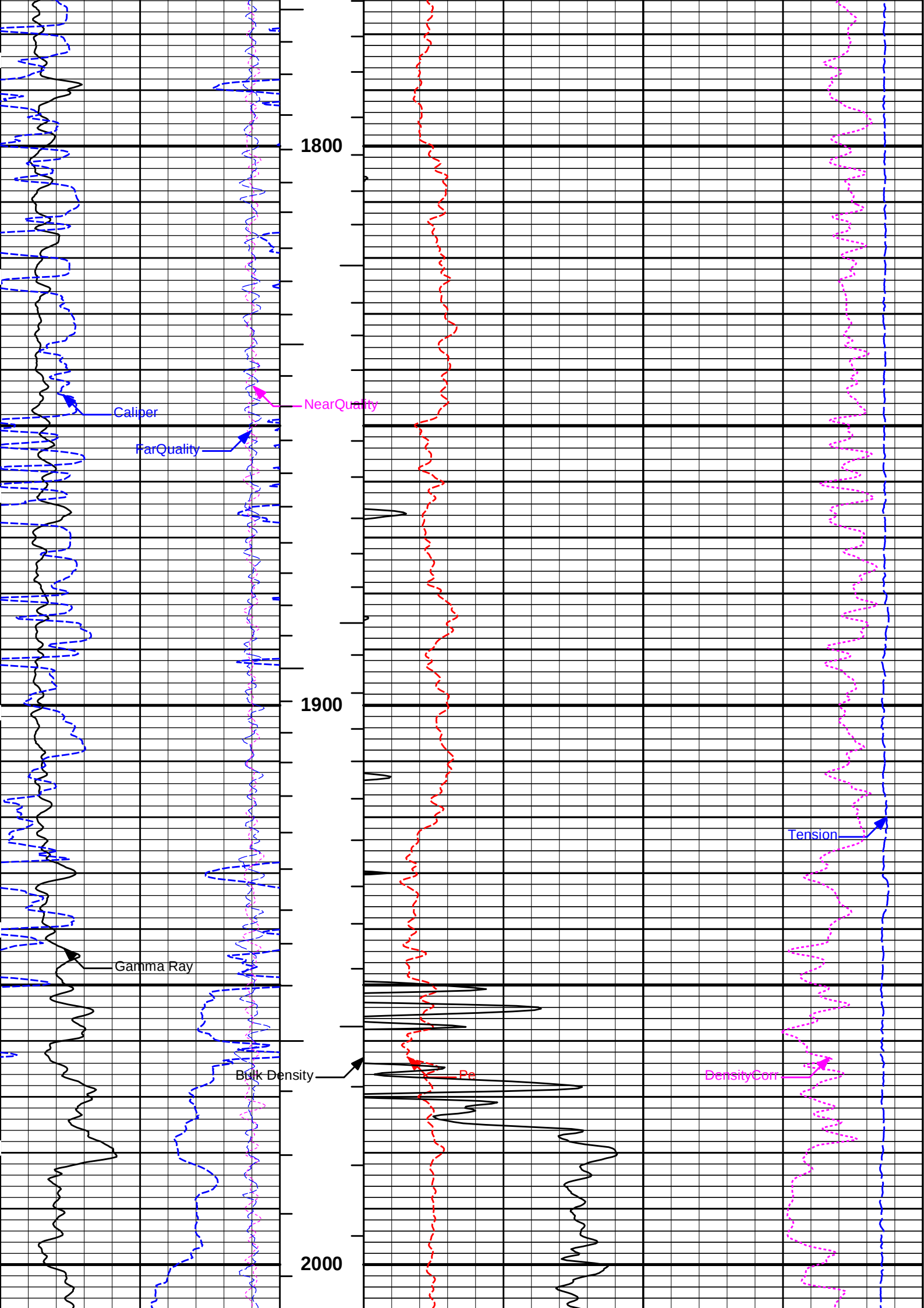
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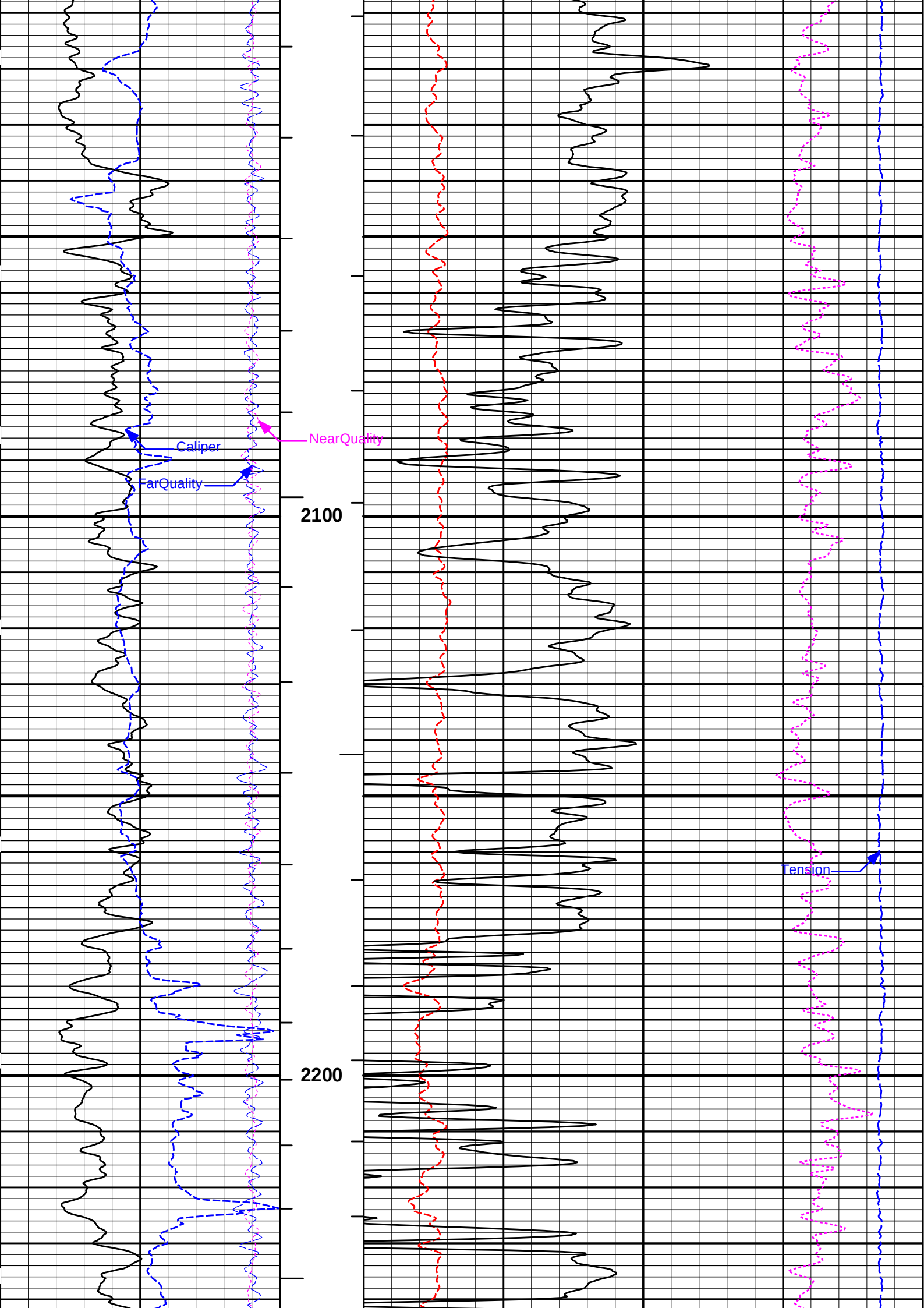
5 INCH MAIN LOG

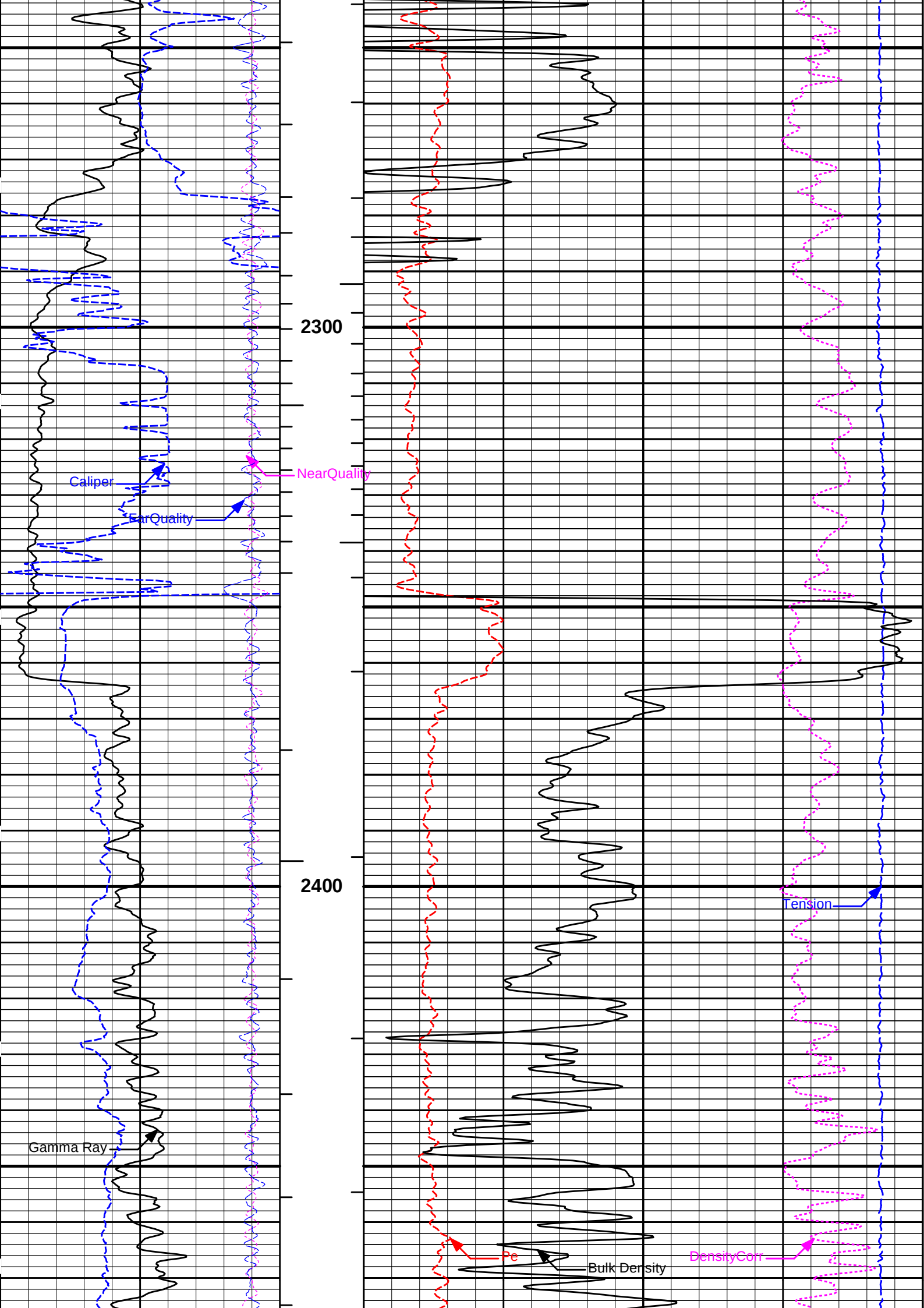
MAIN SECTION 5" PER 100'

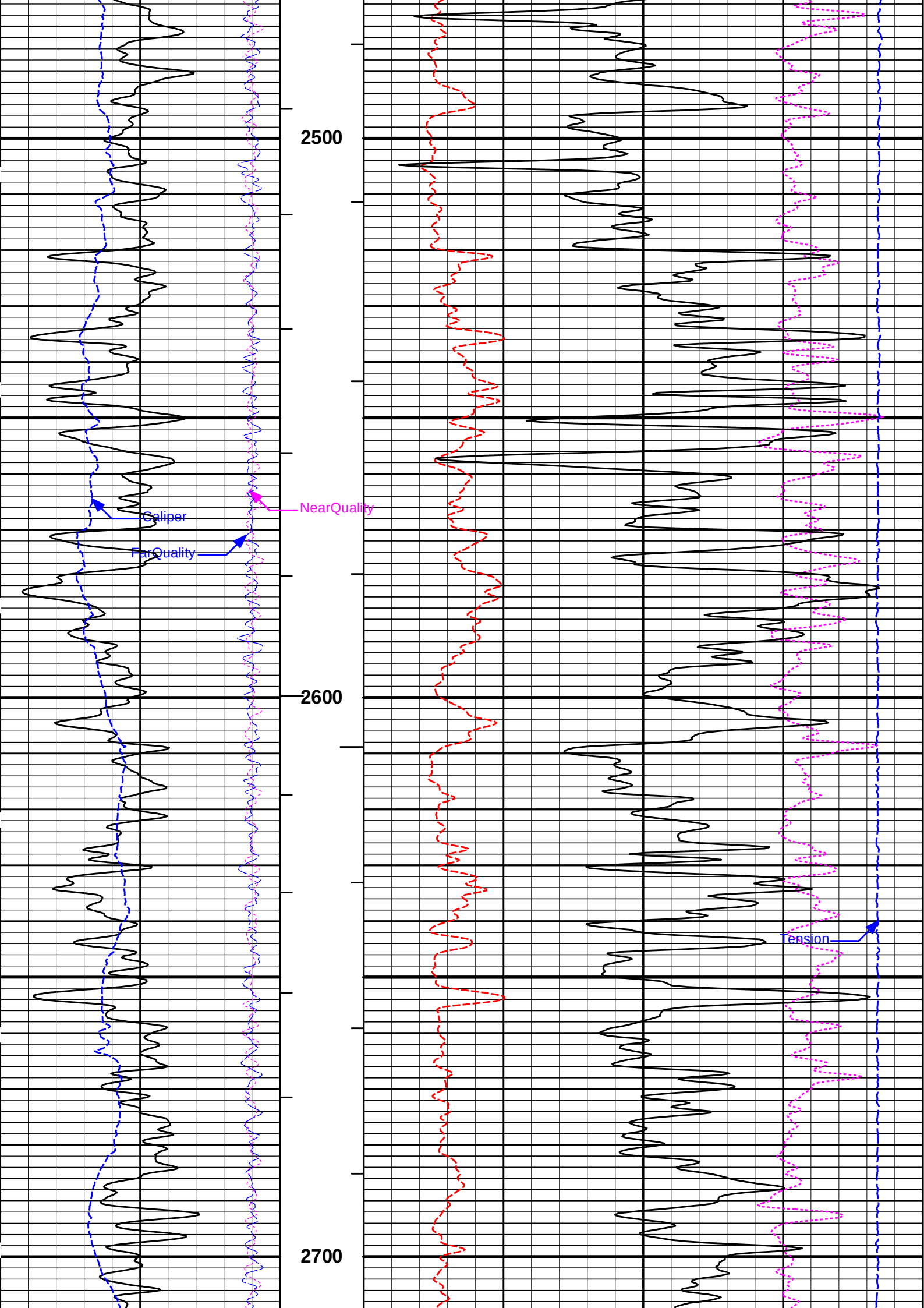


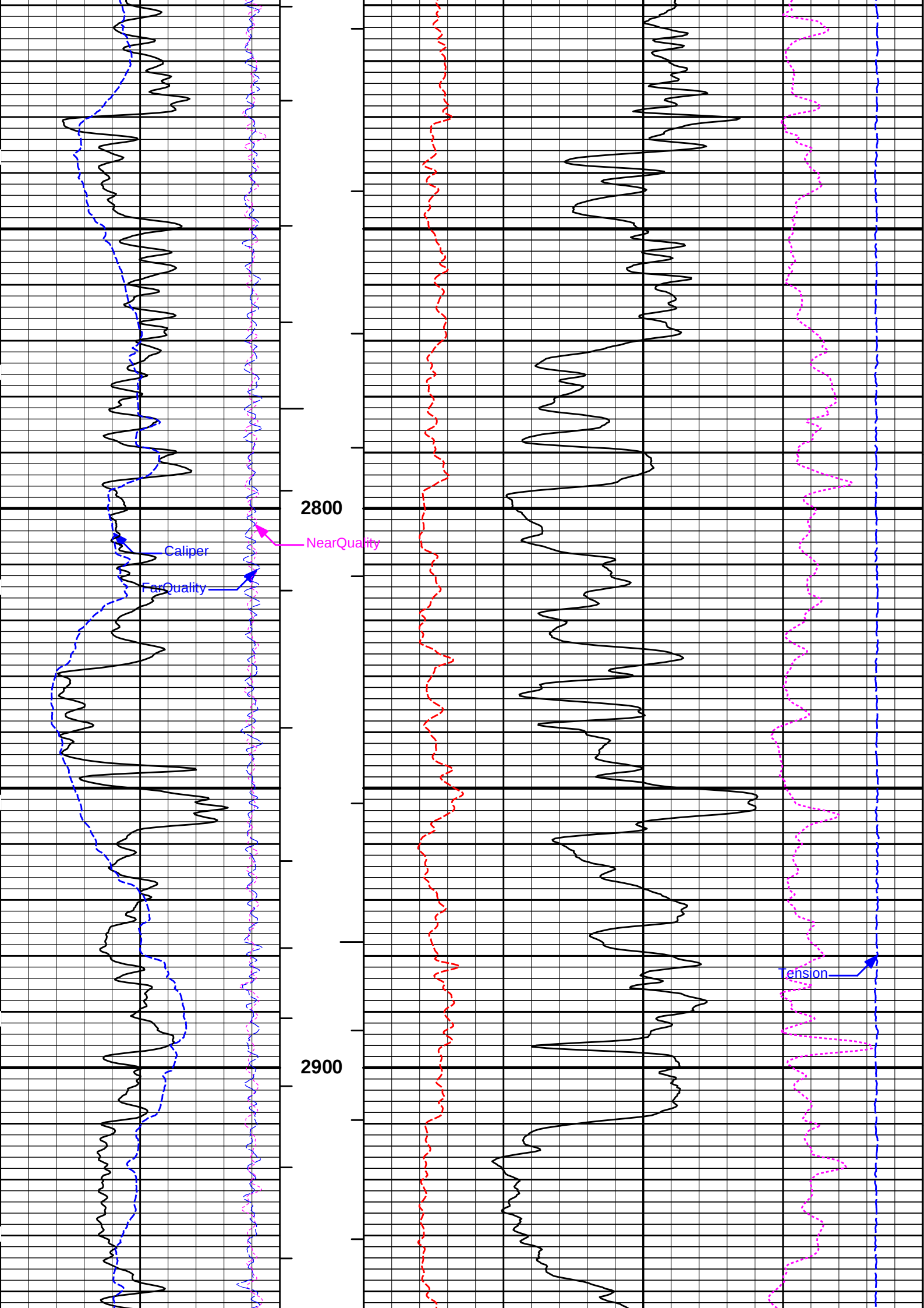


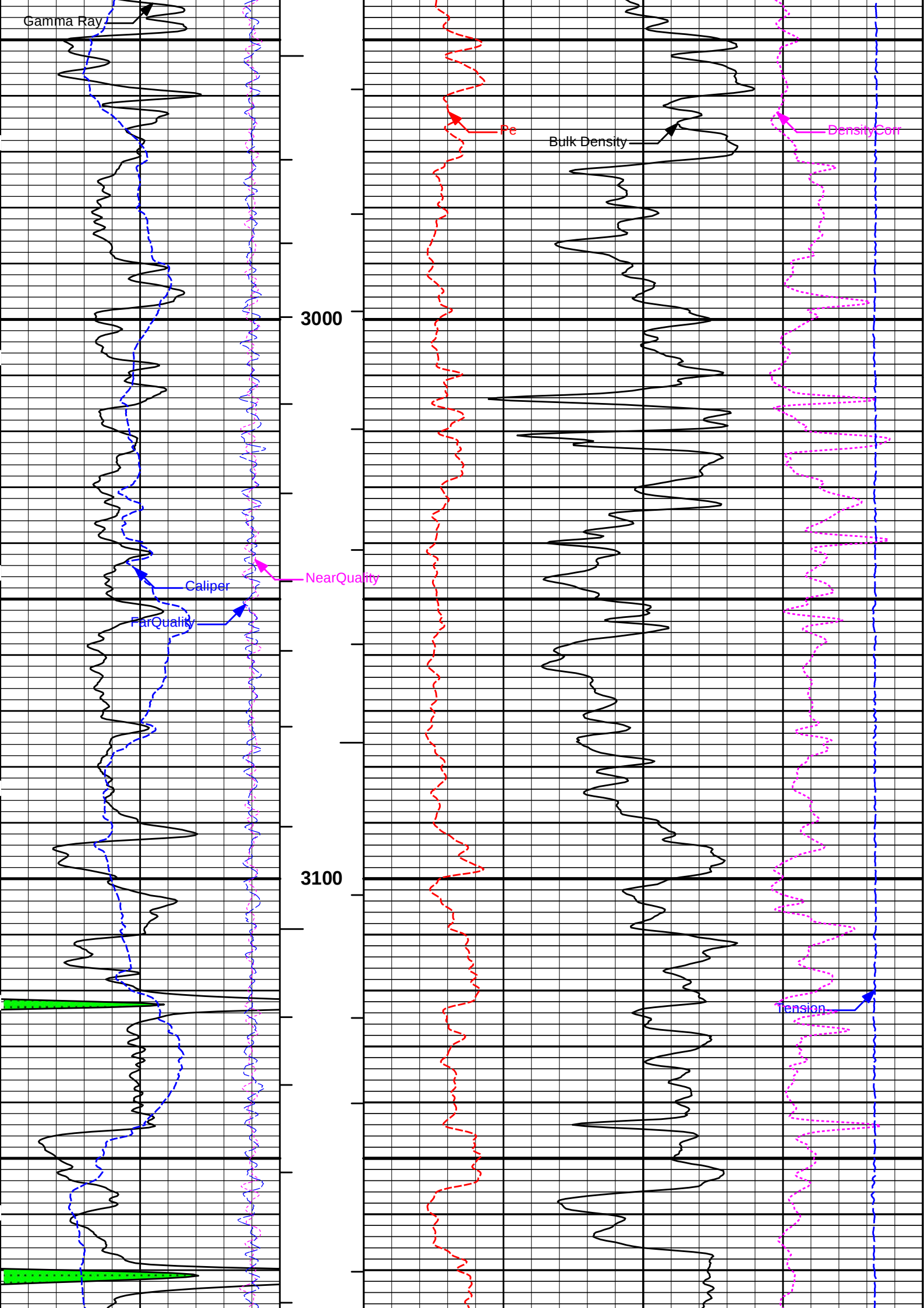


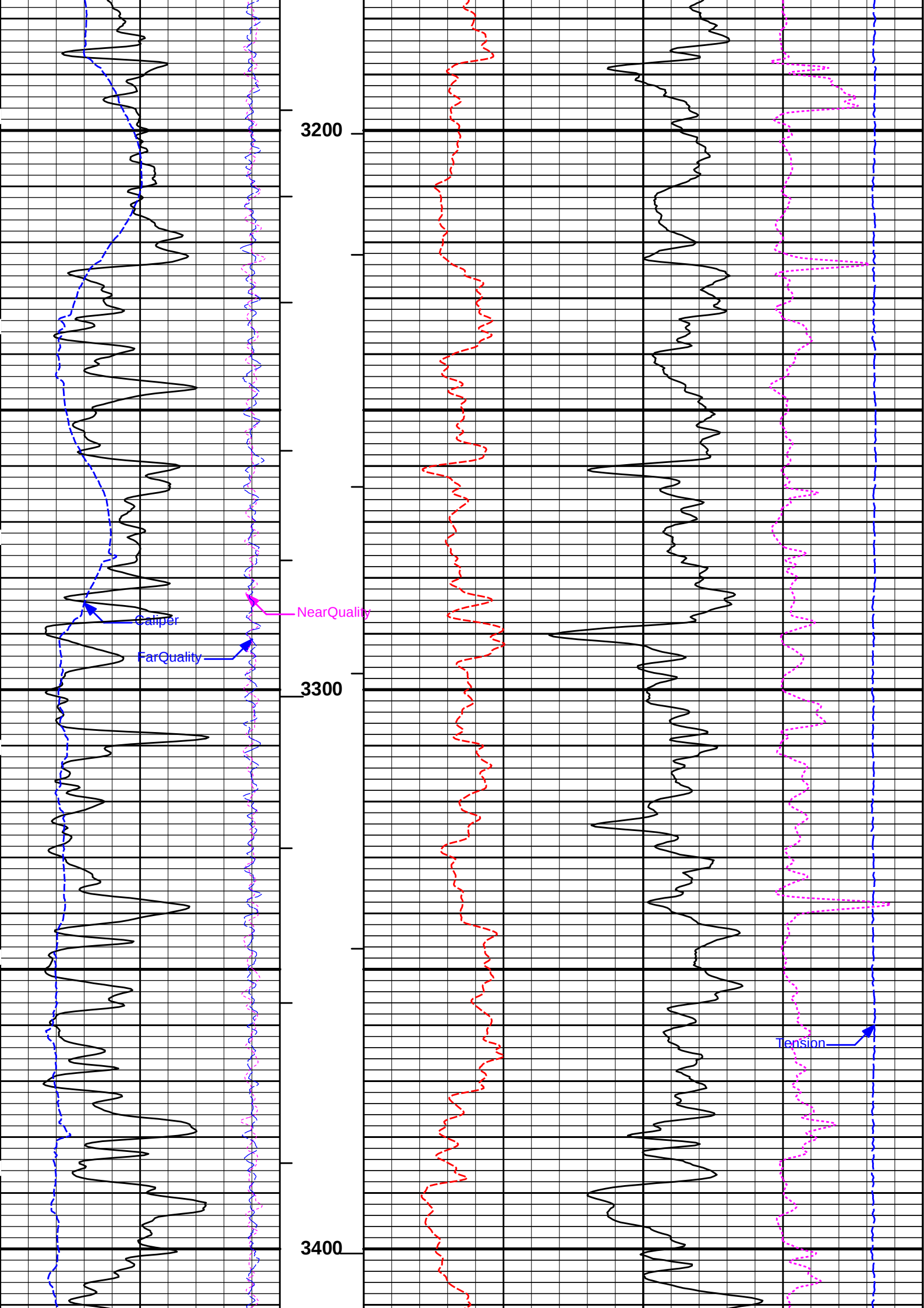


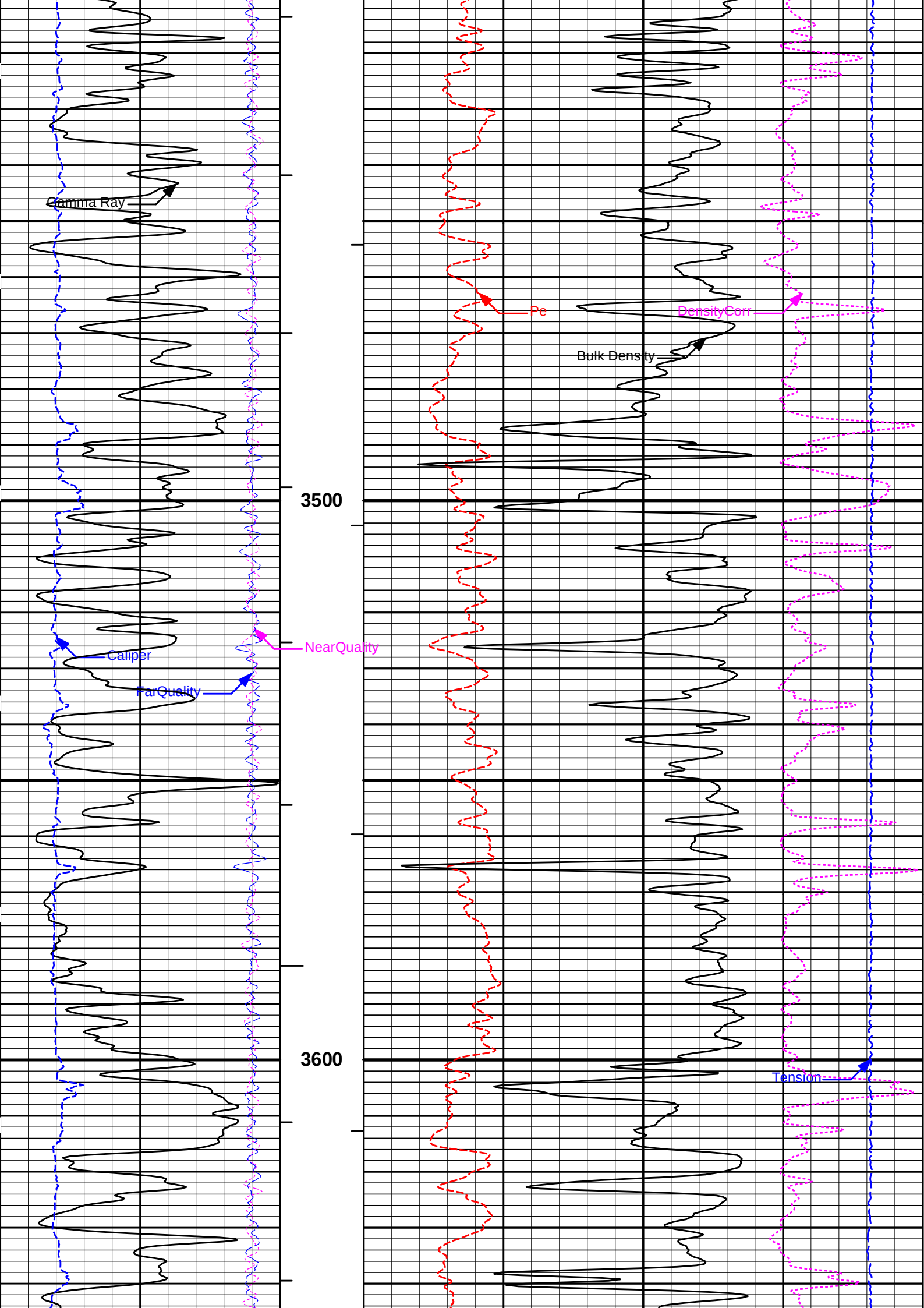


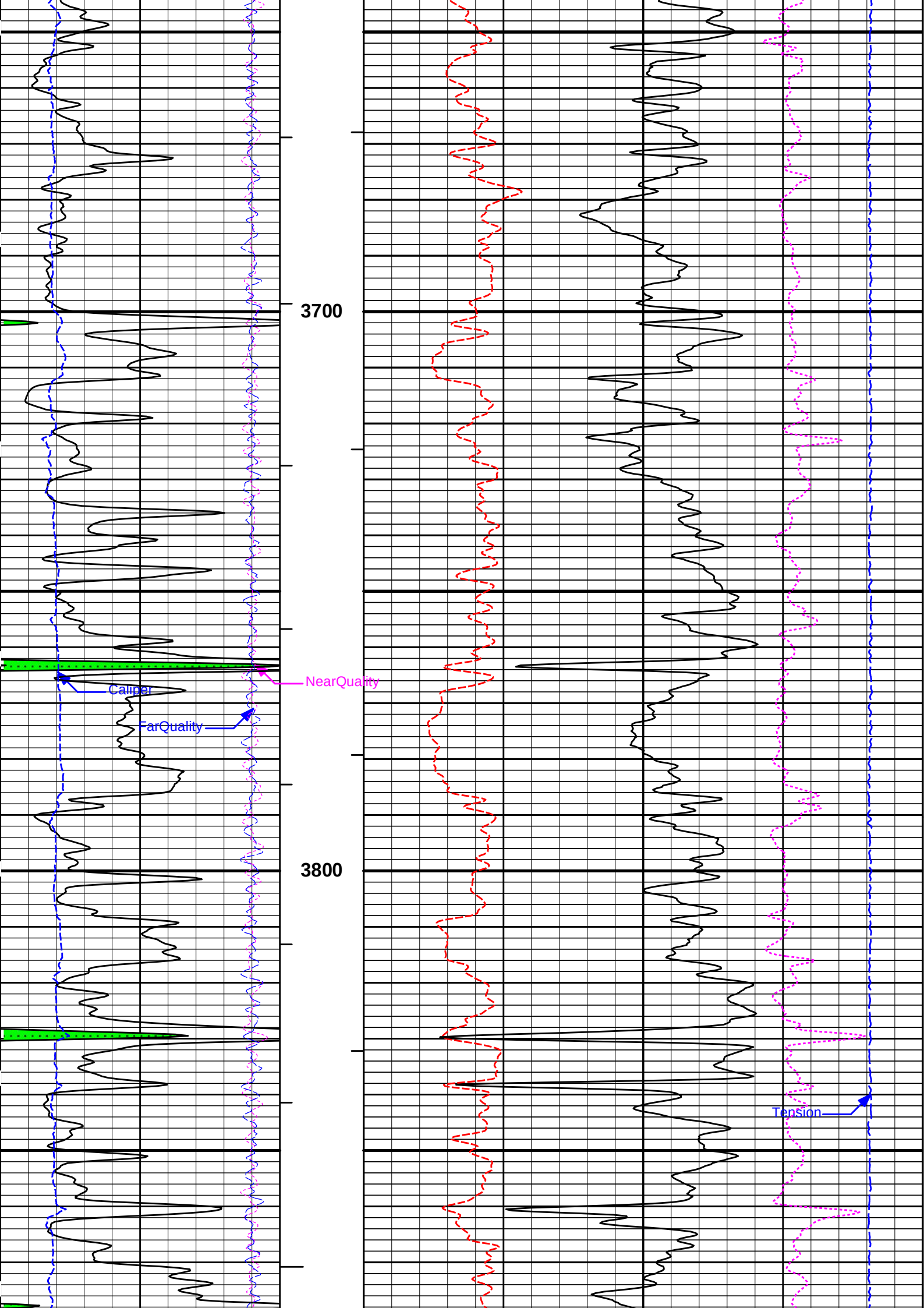


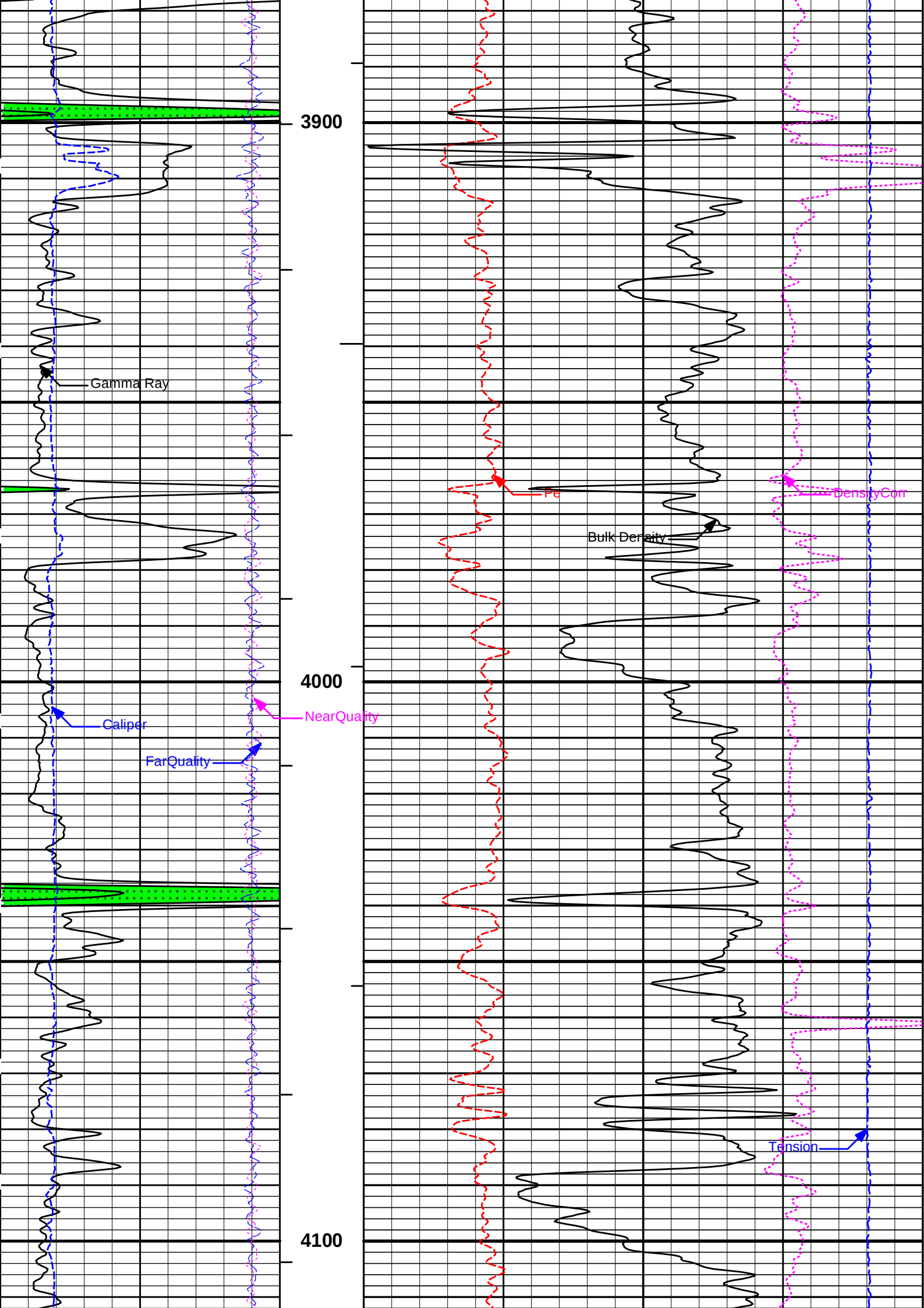


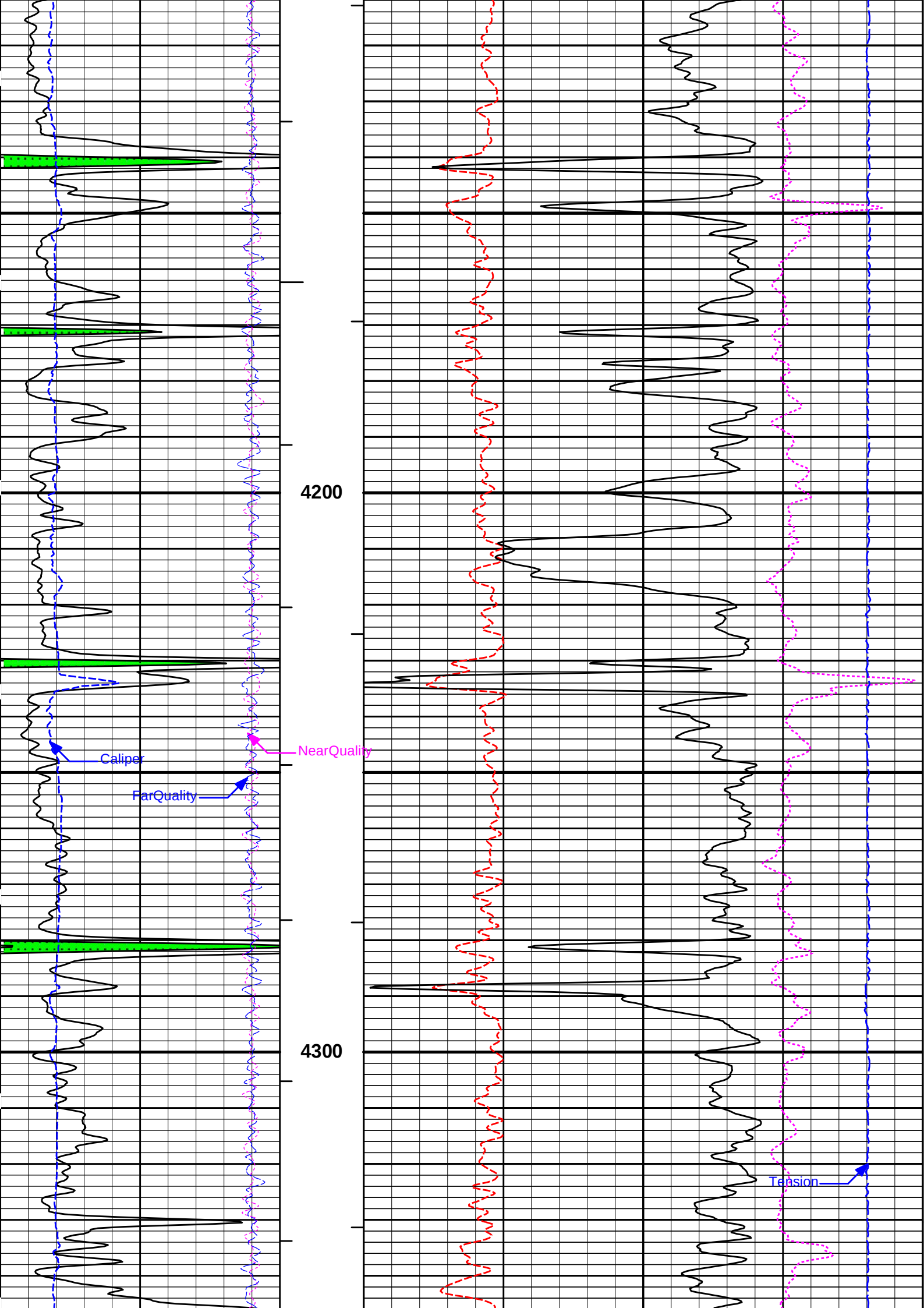


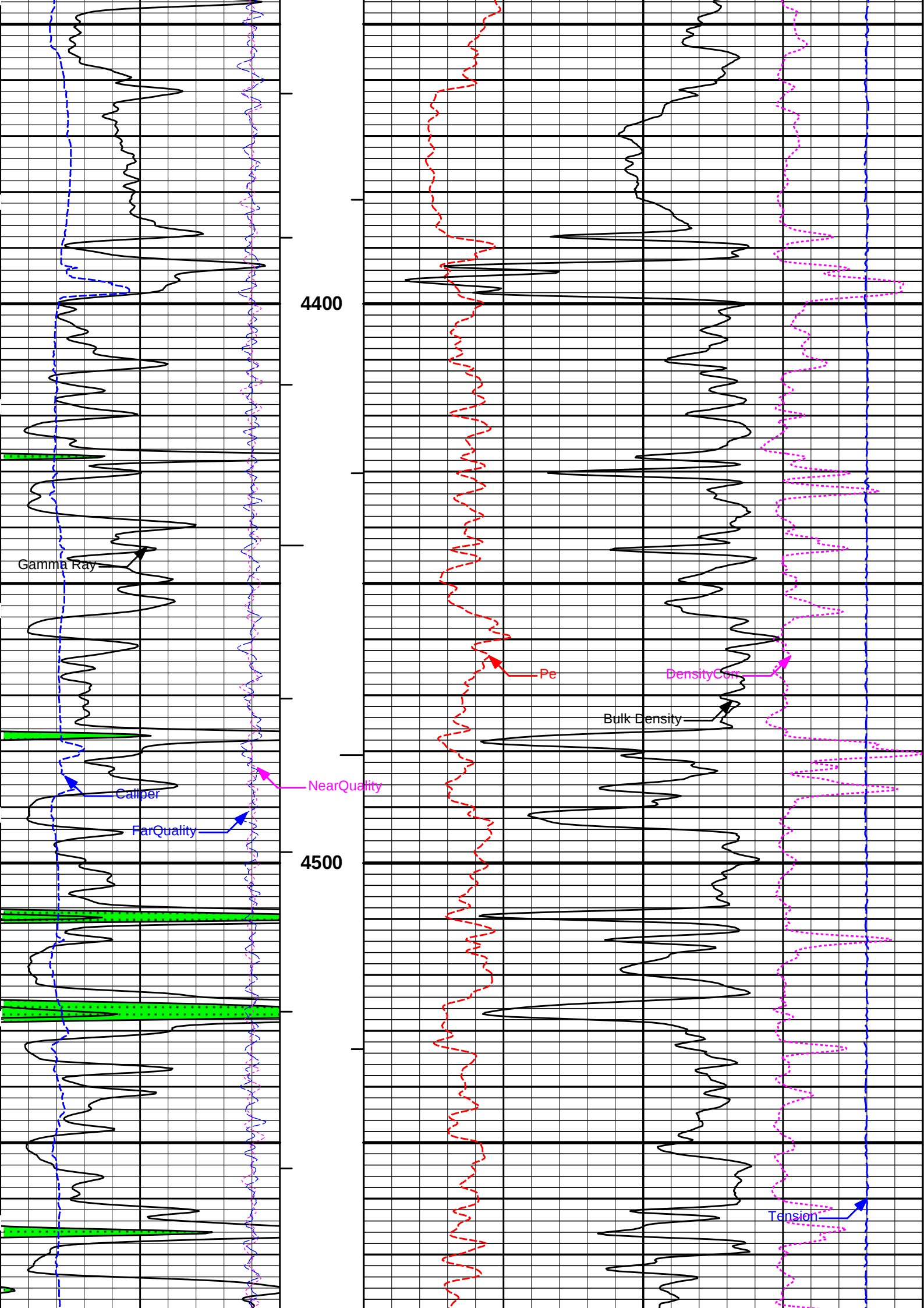


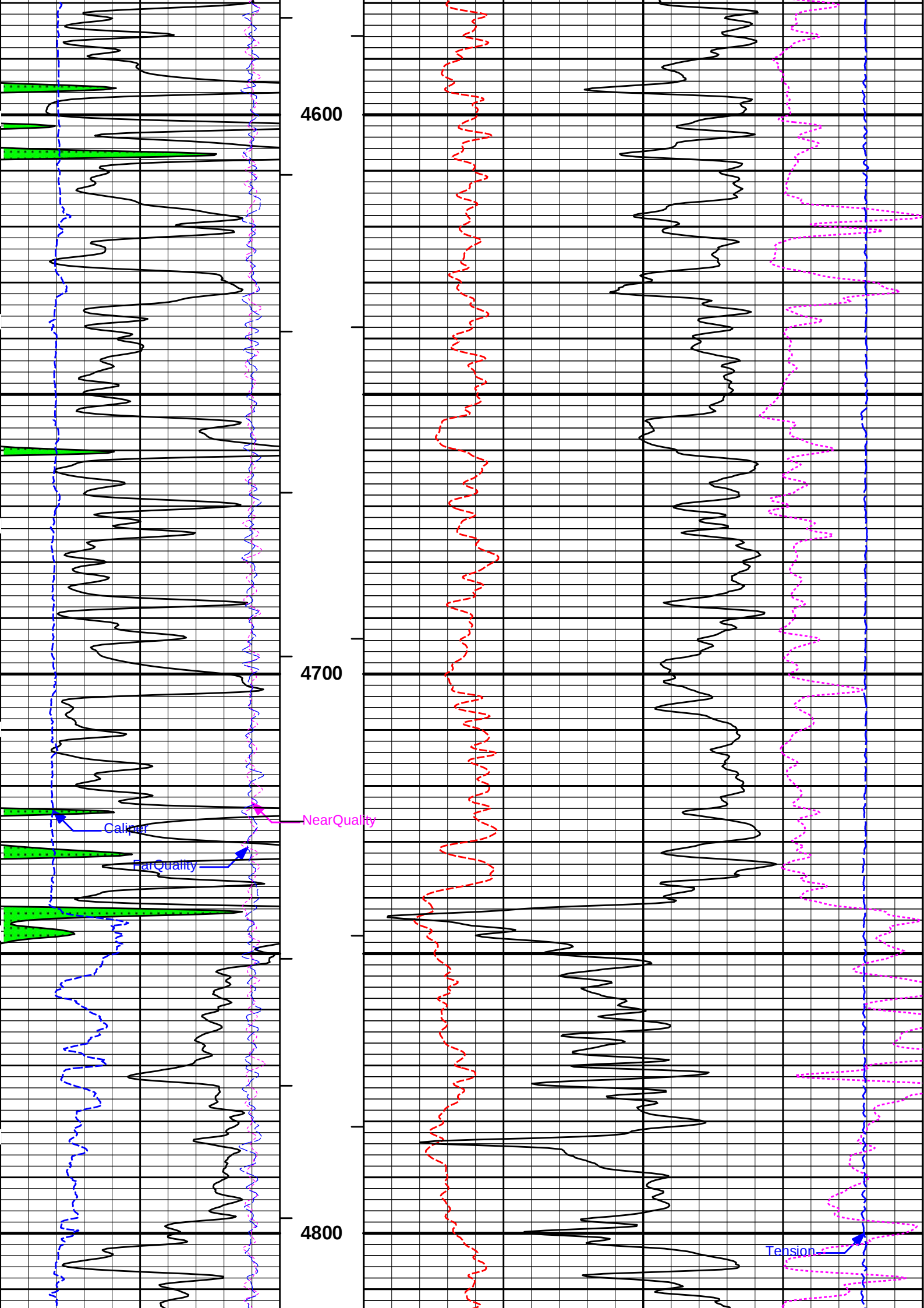


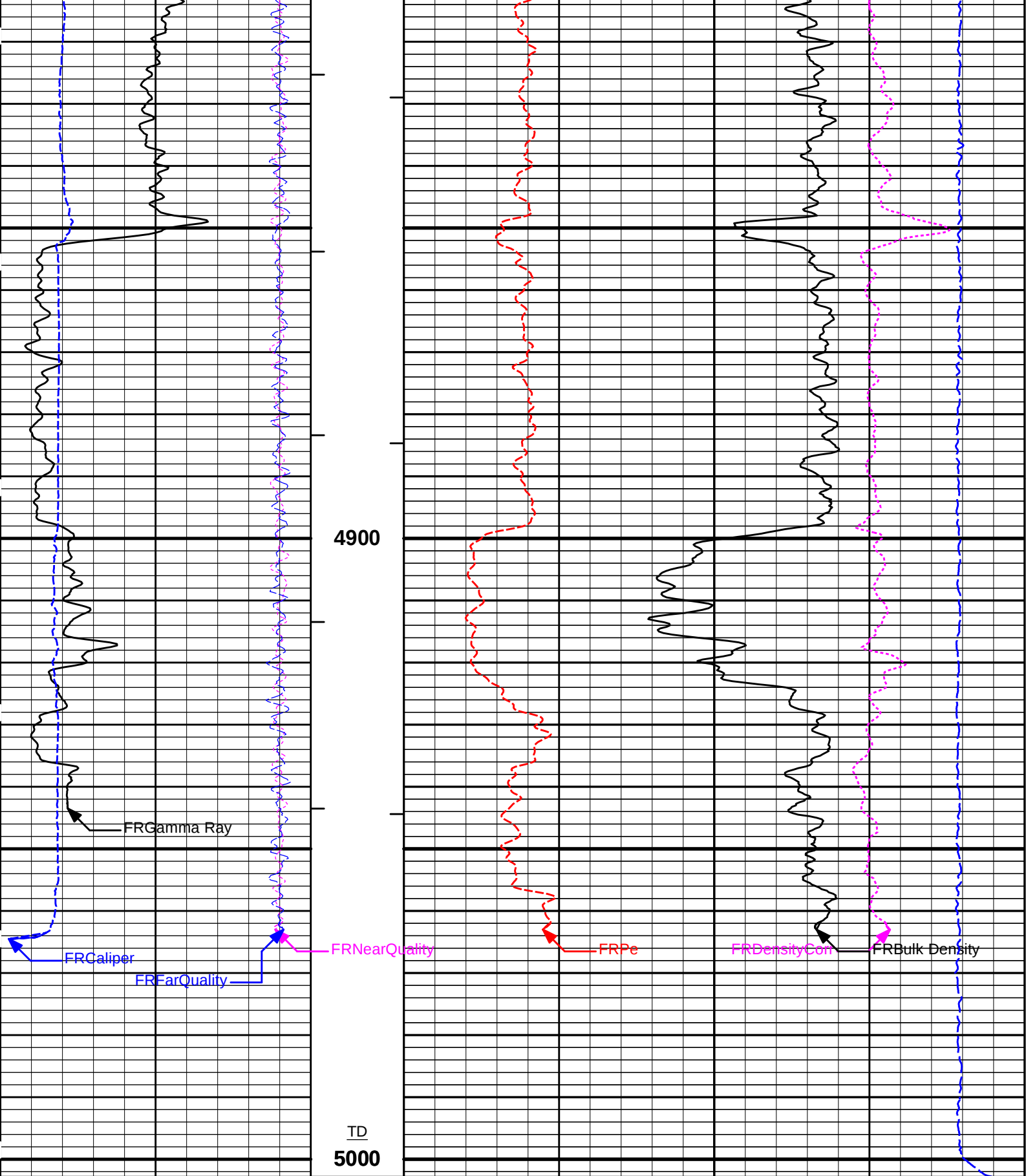






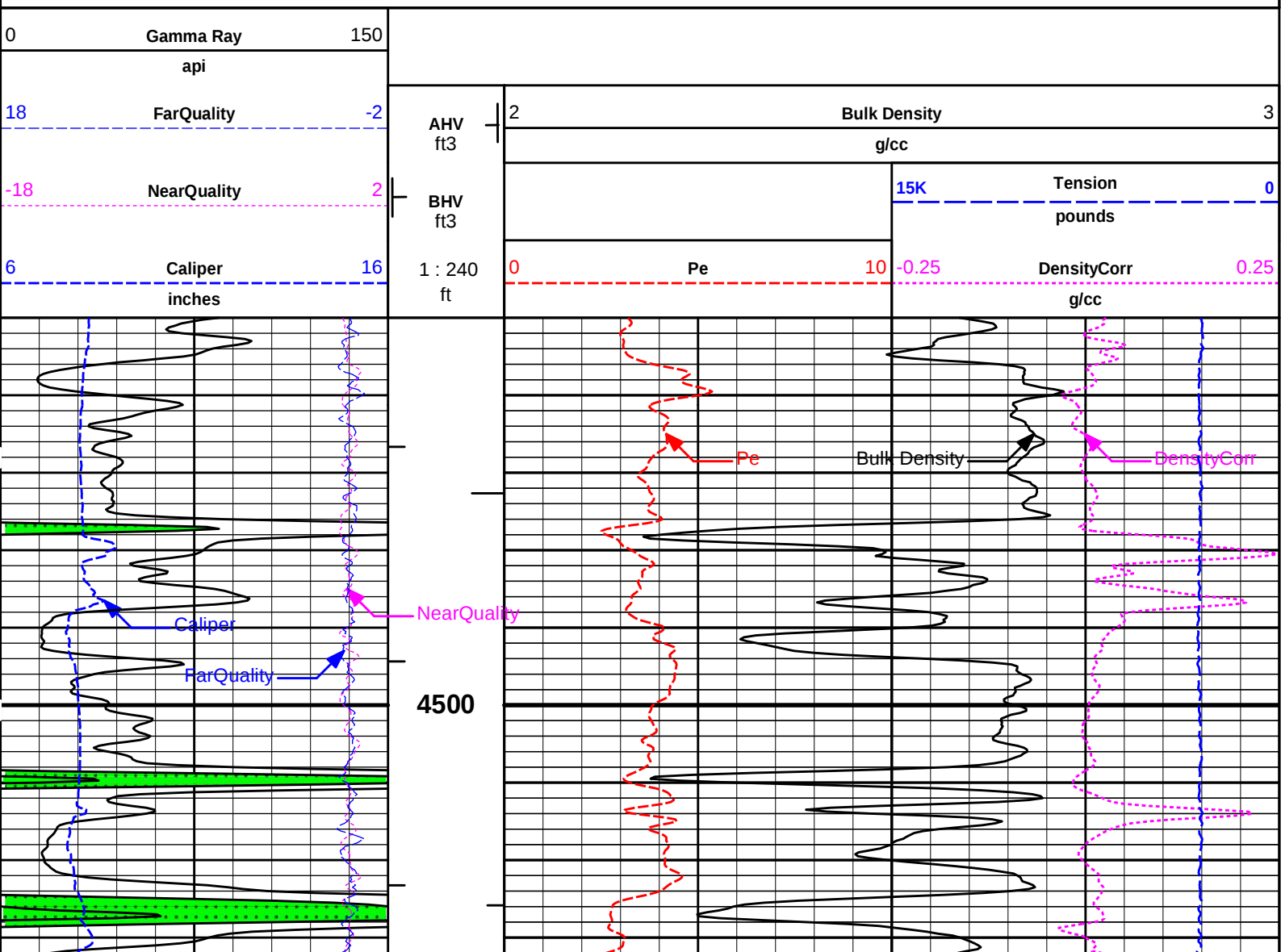


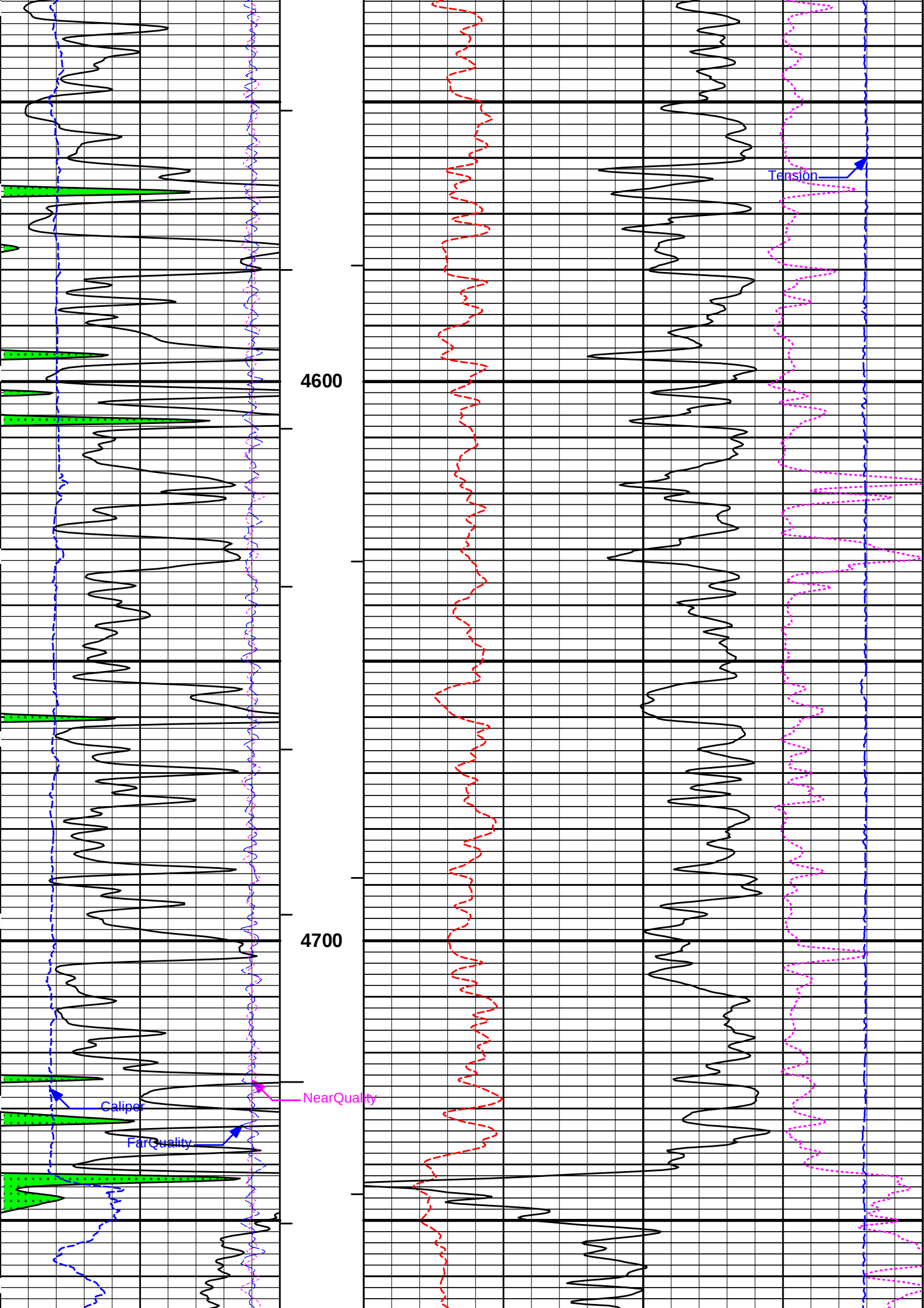


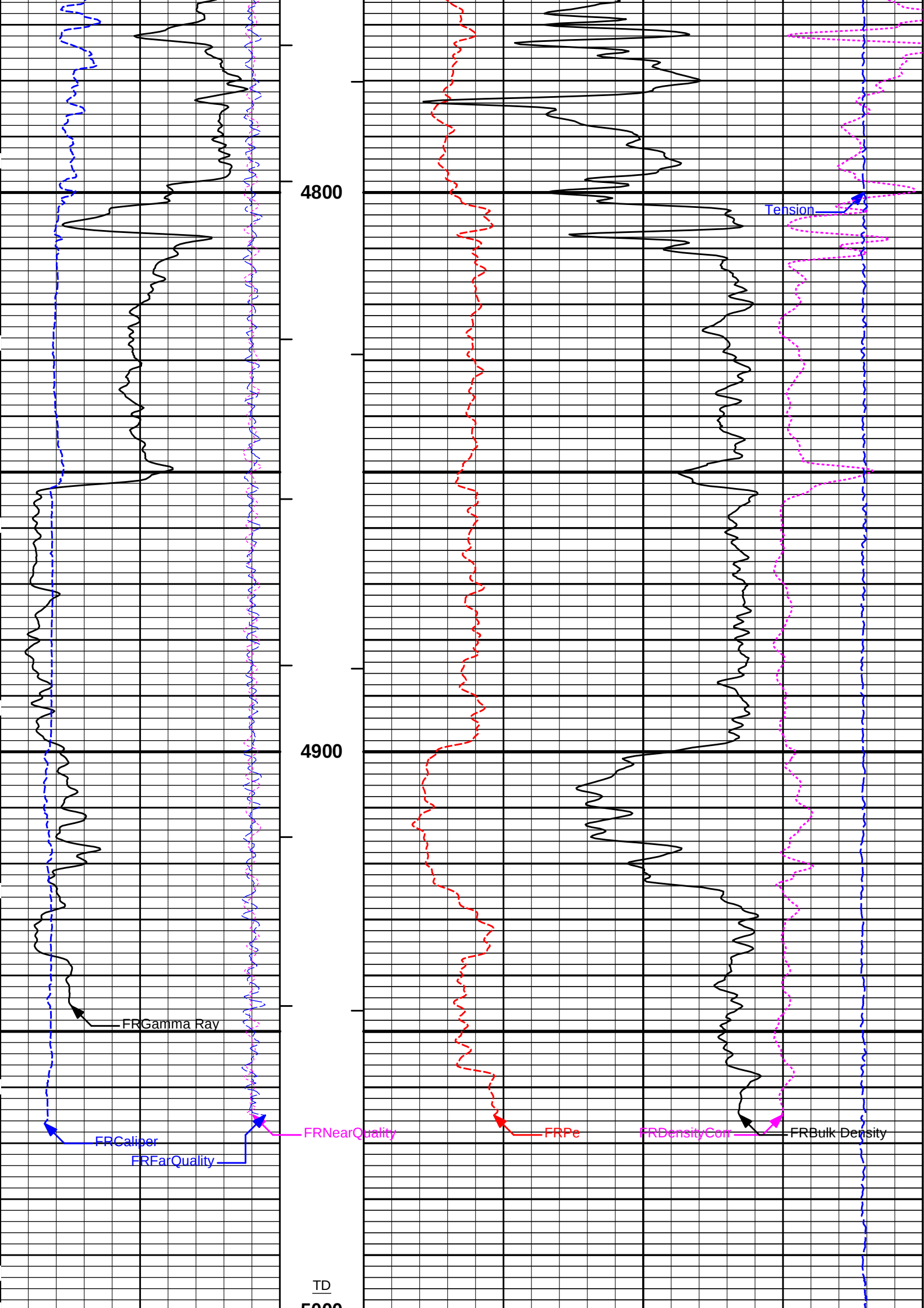


6	Caliper	16	1 : 240 ft	0	Pe	10	-0.25	DensityCorr	0.25	
	inches								g/cc	
-18	NearQuality	2		BHV ft3			15K		Tension	0
									pounds	
18	FarQuality	-2	AHV ft3	2	Bulk Density					3
					g/cc					
0	Gamma Ray	150								
	api									

Plot File: \\-LOCAL-\\LARIO_KNOBBE\\0001 GTET-DSNT-SDLT-BSAT-ACRT\\SDL-DSN-ML\\BULKD_5_MAIN_IQ







Measurement	Measured	Calibrated	Units
Background	23.3	23.8	api
Background + Calibrator	244.0	249.7	api
Calibrator	220.7	225.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 11021139	Reference Calibration Date:	02-Mar-18 09:54:20
Engineer:	WHITLOCK	Calibration Date:	02-Mar-18 09:57:13
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Calibrator Source S/N: TB-79
 Calibrator API Reference:222.00 api
 Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	23.8	23.7	api
Background + Calibrator	249.7	249.1	api
Calibrator	225.9	225.3	api

Shop	Field	Difference	Tolerance
225.9	225.3	0.6	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11660709	Reference Calibration Date:	23-Jan-18 10:26:10
Engineer:	WHITLOCK	Calibration Date:	23-Jan-18 10:51:49
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Logging Source S/N: DSN-436
 Tank Serial Number: EL RENO HWT
 Reference value assigned to Tank: 56.100
 Snow Block S/N: 12156883
 Calibration Tank Water Temperature: 72 degF
 Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.00976	1.00603	0.900 - 1.100

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2369	0.2358	0.0012	+/- 0.0020
Calibrated Ratio:	10.5988	10.5596	0.039	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0699	0.02000 - 0.09000

PASS/FAIL SUMMARY	
Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

DUAL SPACED NEUTRON FIELD CALIBRATION			
Tool Name:	DSNT - 11660709	Reference Calibration Date:	23-Jan-18 10:51:49
Engineer:	WHITLOCK	Calibration Date:	02-Mar-18 10:11:17
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Logging Source S/N: DSN-436

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0699	0.0627	-0.0072	+/- 0.0150

PASS/FAIL SUMMARY	
Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	SDLT - 11014296	Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	WHITLOCK	Calibration Date:	24-Nov-17 12:28:28
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1
Host Tool Name:	DSNT - 11660709		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4006.36	-4006.36	-7000.00 - -1000.00
Pad Gain	0.0003890	0.0003890	0.0002000 - 0.0006000
Arm Offset	-2182.86	-2182.86	-5000.00 - 3000.00
Arm Gain	0.0004129	0.0004129	0.000300 - 0.000700
Arm Power	0.000002297	0.000002297	-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)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.75	3.75	0.00	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.50	6.50	0.00	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 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:	24-Nov-17 12:28:28
Engineer:	WHITLOCK	Calibration Date:	02-Mar-18 09:01:46
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.79	0.04	+/- 0.10
Ring Diameter	8.25	8.25	0.00	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

BSAT FIELD CASING CHECK									
Tool Name:		BSAT - 10939049				Calibration Date:		30-Mar-17 10:01:32	
Engineer:		HARRIS				Calibration Date:		15-Dec-17 10:01:32	
Software Version:		WL INSITE R5.0.5 (Build 8)				Calibration Version:		1	
	Pre-Log Check	Check Depth		Shop	Field	Difference	Tolerance	Units	
	Delta-T Compensated	147.01		57.00	56.56	0.4400	1.00	uspf	
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION									
Tool Name:		ACRt Sonde - 11038385				Reference Calibration Date:		12-Sep-17 13:58:19	
Engineer:		WHITLOCK				Calibration Date:		15-Dec-17 10:45:06	
Software Version:		WL INSITE R5.6.3 (Build 4)				Calibration Version:		1	
Host Tool Name:		ACRt Instrument - 11055059							
TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0500	1.05	0.95	1.0229	1.05	0.95	1.0048	1.05
A2 (50")	0.95	1.0500	1.05	0.95	1.0261	1.05	0.95	1.0131	1.05
A3 (29")	0.95	1.0472	1.05	0.95	1.0179	1.05	0.95	1.0025	1.05
A4 (17")	0.95	1.0401	1.05	0.95	1.0093	1.05	0.95	0.9956	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0012	1.05	0.95	0.9839	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9883	1.05	0.95	0.9739	1.05
SONDE OFFSET									
Subarray	R12KHz			R36KHz			R72KHz		
	(mmho/m)			(mmho/m)			(mmho/m)		
A1 (80")	1.490			-4.736			-6.418		
A2 (50")	-0.183			-4.133			-5.504		
A3 (29")	-12.250			-3.671			-3.367		
A4 (17")	-109.670			-32.737			-24.656		
A5 (10")	N/A			-82.133			-35.124		
A6 (6")	N/A			347.353			195.364		
TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
Signal	Lower	R	Upper		Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)	
12K	0.6	0.86	1.3		Mud Cell	0.95	1.00	1.05	
36K	1.0	1.34	2.0						
72K	1.0	1.61	2.0						
PASS/FAIL SUMMARY									
GAIN RANGE CHK					PASS				
SONDE OFFSET CHK					PASS				
TOOL OK TO LOG									
QUALITY CHECK SHOP CALIBRATION									
Tool Name:		ACRt Sonde - 11038385				Reference Calibration Date:		12-Sep-17 14:00:57	
Engineer:		WHITLOCK				Calibration Date:		15-Dec-17 10:50:30	
Software Version:		WL INSITE R5.6.3 (Build 4)				Calibration Version:		1	
Host Tool Name:		ACRt Instrument - 11055059							
STANDARD DEVIATIONS									
	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail

	(mmho/m)	(mmho/m)	Pass/Fail	(mmho/m)	(mmho/m)	Pass/Fail	(mmho/m)	(mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A2 (50")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A3 (29")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A4 (17")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A5 (10")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A6 (6")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass

AVERAGES									
	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.007	> -0.500	Pass
A2 (50")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.005	> -0.500	Pass
A3 (29")	-0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.003	> -0.500	Pass
A4 (17")	-0.003	> -0.500	Pass	-0.008	> -0.500	Pass	-0.024	> -0.500	Pass
A5 (10")	-0.011	> -0.500	Pass	-0.018	> -0.500	Pass	-0.034	> -0.500	Pass
A6 (6")	0.016	< 0.500	Pass	0.078	< 0.500	Pass	0.183	< 0.500	Pass

GAIN TOLERANCE					
R12KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-220721488.000	-223155904.000	2434416.000	11157795.200	Pass
A2 (50")	-218488224.000	-220713888.000	2225664.000	11035694.400	Pass
A3 (29")	-214911568.000	-216614880.000	1703312.000	10830744.000	Pass
A4 (17")	-211434368.000	-214578320.000	3143952.000	10728916.000	Pass
A5 (10")	-211949376.000	-214986432.000	3037056.000	10749321.600	Pass
A6 (6")	-213895760.000	-214394544.000	498784.000	10719727.200	Pass
R36KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	59105928.000	60628184.000	1522256.000	3031409.200	Pass
A2 (50")	60252356.000	62049960.000	1797604.000	3102498.000	Pass
A3 (29")	52147940.000	53214172.000	1066232.000	2660708.600	Pass
A4 (17")	48569380.000	50561756.000	1992376.000	2528087.800	Pass
A5 (10")	50672468.000	52600244.000	1927776.000	2630012.200	Pass
A6 (6")	49458680.000	50656572.000	1197892.000	2532828.600	Pass
R72KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-92108696.000	-92698504.000	589808.000	4634925.200	Pass
A2 (50")	-89118672.000	-89662344.000	543672.000	4483117.200	Pass
A3 (29")	-88812376.000	-89109216.000	296840.000	4455460.800	Pass
A4 (17")	-83501792.000	-84842648.000	1340856.000	4242132.400	Pass
A5 (10")	-82094160.000	-83337800.000	1243640.000	4166890.000	Pass
A6 (6")	-84269728.000	-84561904.000	292176.000	4228095.200	Pass

PASS/FAIL SUMMARY	
Std Deviation Verification	Pass
Average Verification	Pass
Gain Tolerance Verification	Pass

MICRO LOG SHOP CALIBRATION			
Tool Name:	Microlog Pad - 11014296	Reference Calibration Date:	21-Oct-17 17:42:32
Engineer:	WHITLOCK	Calibration Date:	05-Feb-18 09:59:26

Engineer: WHITLOCK		Calibration Date: 03-Feb-18 09:59:26	
Software Version: WL INSITE R5.6.3 (Build 4)		Calibration Version: 1	
Host Tool Name: DSNT - 11660709			

	CALIBRATION COEFFICIENT SUMMARY					
	Measurement	Micro Log Normal		Micro Log Lateral		
		Measured	Calibrated	Measured	Calibrated	Units
	Tool Zero	-0.09	-0.14	0.00	-0.00	ohmm
	Calibration Point #1	0.04	0.00	0.01	0.00	ohmm
	Calibration Point #2	20.18	20.00	19.94	20.00	ohmm
	Internal Reference	19.86	19.67	19.92	19.98	ohmm
	Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
	Tool Zero		0.66		0.77	V
	Calibration Point #1		36.64		2.18	V
	Calibration Point #2		5310.85		6855.62	V
	Internal Reference		5224.72		6848.83	V

MICRO LOG FIELD CHECK			
Tool Name:	Microlog Pad - 11014296	Reference Calibration Date:	05-Feb-18 09:59:26
Engineer:	WHITLOCK	Calibration Date:	02-Mar-18 09:48:34
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

	Measurement	Micro Log Normal		Micro Log Lateral		
		Shop	Field	Shop	Field	Units
	Tool Zero	-0.14	-0.16	-0.00	-0.01	ohmm
	Internal Reference	19.67	19.62	19.98	19.92	ohmm
	Summary					
	Signal	Shop	Field	Difference	Tolerance	
	Microlog Normal	19.67	19.62	0.05	+/- 0.80	
	Microlog Lateral	19.98	19.92	0.06	+/- 0.80	

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - 10865881	Reference Calibration Date:	16-Dec-17 18:39:59
Engineer:	WHITLOCK	Calibration Date:	16-Dec-17 19:00:32
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Logging Source S/N: 5155GW

Aluminum Block S/N: EL RENO

Magnesium Block S/N: EL RENO

Density: 2.581g/cc

Density: 1.687g/cc

Pe: 3.170

Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0190	1.0130	0.90 - 1.10
Near Dens Gain	1.0005	0.9951	0.90 - 1.10
Near Peak Gain	1.0223	1.0145	0.90 - 1.10
Near Lith Gain	1.0517	1.0503	0.90 - 1.10
Far Bar Gain	1.0054	1.0046	0.90 - 1.10
Far Dens Gain	0.9942	0.9923	0.90 - 1.10
Far Peak Gain	0.9912	0.9917	0.90 - 1.10
Far Lith Gain	0.9770	0.9734	0.90 - 1.10
Near Bar Offset	0.1872	0.2425	NONE
Near Dens Offset	0.3382	0.3842	NONE
Near Peak Offset	0.1850	0.2490	NONE
Near Lith Offset	-0.0438	-0.0306	NONE
Far Bar Offset	0.1527	0.1576	NONE

Far Dens Offset	0.2431	0.2592	NONE
Far Peak Offset	0.2590	0.2565	NONE
Far Lith Offset	0.3383	0.3725	NONE
Near Bar Background	930.24	932.15	700 - 1450
Near Dens Background	311.45	312.35	230 - 480
Near Peak Background	133.79	134.32	100 - 210
Near Lith Background	164.51	164.96	125 - 260
Far Bar Background	601.19	603.41	450 - 900
Far Dens Background	235.51	235.02	175 - 345
Far Peak Background	91.58	93.10	70 - 140
Far Lith Background	95.48	97.57	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.687	1.687	0.000	+/- 0.015
Pe	2.557	2.553	-0.004	+/- 0.150
ALUMINUM				
Density (g/cc)	2.579	2.581	0.002	+/- 0.01500
Pe	3.126	3.125	-0.001	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0001	+/- 0.0110	-0.0014	+/- 0.0140
Magnesium Block	-0.0009	+/- 0.0110	0.0002	+/- 0.0140
Aluminum Block	-0.0006	+/- 0.0110	-0.0004	+/- 0.0140
Resolution	9.58	6.00 - 11.50	8.95	6.00 - 11.50
Internal Verifier(B+D+P+L)	1544	1200 - 2700	1029	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK

Tool Name:	SDLT Pad - 10865881	Reference Calibration Date:	16-Dec-17 19:00:32
Engineer:	WHITLOCK	Calibration Date:	02-Mar-18 09:57:00
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Pad Temperature: 43.5 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1543.777	1531.829	-11.948	15.818
Far (B+D+P+L) cps	1029.100	1016.707	-12.393	17.098
Near Resolution	9.58	9.78	0.200	0.50
Far Resolution	8.95	9.10	0.150	1.00

PASS/FAIL SUMMARY						
Bkg Quality Check:			Passed			
Bkg Resolution Check:			Passed			
Bkg Verification Check:			Passed			
CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
Depth Panel-12345678						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
CH_HOS-CH_HOS_I						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1452.00	-----	-----	0.00	-----	lbs
GTET-11021139						
Gamma Ray Calibrator	225.9	225.3	-----	0.6	+/- 9.00	api
DSNT-11660709						
Snow-Block Porosity	0.0699	0.0627	-----	0.0072	+/- 0.0150	decp
SDLT-11014296						
Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
ACRt Sonde-11038385						
Mud Cell	1.00	-----	-----	0	-----	ohm-m
Microlog Pad-11014296						
MicroLog Normal	19.67	19.62	-----	0.05	+/-0.80	ohmm
MicroLog Lateral	19.98	19.92	-----	0.06	+/-0.80	ohmm
SDLT Pad-10865881						
Near(B+D+P+L)	1543.777	1531.829	-----	11.948	+/-15.818	cps
Far(B+D+P+L)	1029.100	1016.707	-----	12.393	+/-17.098	cps
Data: LARIO_KNOBBE\0001 GTET-DSNT-SDLT-BSAT-ACRT\IDLE				Date: 03-Mar-18 03:41:08		

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	Barite	
	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	0.850	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	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5000.00	ft
	SHARED	BHT	Bottom Hole Temperature	131.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	SHARED	CCCI	Source of Corrosion Information	Parameters	

	SHARED	SOCI	Source of Casing Information	Parameters	
	SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
	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	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	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	DNTT	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	UCLA	Classic Neutron Parameter utilized?	No	
	DSNT	BHSM	Borehole Size Source Tool	SDLT	
	SDLT	CLOK	Process Caliper Outputs?	Yes	
	Microlog Pad	MLOK	Process MicroLog 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	
	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 Pore Fluid	189.00	uspf
	BSAT	DTMT	Delta -T Matrix Type	Limestone 47.6	
	BSAT	DTSH	Delta -T Shale	100.00	uspf
	BSAT	SPEQ	Acoustic Porosity Equation	Wyllie	
	ACRt Sonde	RTOK	Process ACRt?	Yes	
	ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
	ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
	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	RMAX	Maximum Resistivity for MAP	200.00	ohmm
	ACRt Sonde	THQY	Threshold Quality	0.50	
	ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
	ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	

ACRt Sonde

MBFL

Apply Corkscrew Effect?

No

BOTTOM

Data: LARIO_KNOBBE\0001 GTET-DSNT-SDLT-BSAT-ACRTIDLE

Date: 03-Mar-18 03:49:00

HALLIBURTON**TOOL STRING DIAGRAM REPORT**

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS_I 37.50 lbs	Weak Point 7000 lbs- CH_HOS_I 0.01 lbs	Ø 2.750 in → Ø 0.010 in* →		← Temperature @ 71.07 ft	3.03 ft	72.10 ft
XOHD-12345678 20.00 lbs		Ø 2.750 in → Ø 3.625 in →			0.95 ft	69.07 ft
SP Sub-10904995 60.00 lbs		Ø 3.625 in →		← SP @ 66.34 ft	3.74 ft	68.12 ft
				← Z-Accelerometer @ 63.93 ft		64.38 ft
GTET-11021139 165.00 lbs		Ø 3.625 in →		← GammaRay @ 58.32 ft	8.52 ft	55.86 ft
DSNT-11660709 174.00 lbs	DSN Decentralizer- 11660709 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 48.92 ft ← DSN Near @ 48.17 ft	9.69 ft	46.17 ft
SDLT-11014296 360.00 lbs	SDLT Pad-10865881 65.00 lbs Microlog Pad-11014296 8.00 lbs RAM-Cs137-00005155 1.00 lbs	Ø 4.500 in → Ø 4.500 in* → Ø 4.750 in* → Ø 0.800 in* →		Microlog @ 38.36 ft SDL Caliper @ 38.17 ft SDL @ 38.16 ft	10.81 ft	35.36 ft
BSAT-10939049 300.00 lbs		Ø 3.625 in →		Receiver Array @ 26.84 ft	15.77 ft	26.84 ft

