

# HALLIBURTON

## SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY		MERIT ENERGY COMPANY	
WELL	HMU 207W	WELL	HMU 207W
FIELD/BLOCK	REDWOOD	FIELD/BLOCK	REDWOOD
COUNTY	FINNEY	COUNTY	FINNEY
STATE	KANSAS	STATE	KANSAS
Permanent Datum	GL	Elev: 2984.0 ft	Elev: K.B. 2996.0 ft
Log measured from	KB	12.0 ft above perm. Datum	D.F. 2994.0 ft
Drilling measured from	KB		G.L. 2984.0 ft
Date	19-Dec-17		
Run No.	1		
Depth - Driller	5000.0 ft		
Depth - Logger	5011.0 ft		
Bottom - Logged Interval	5001		
Top - Logged Interval	3300		
Casing - Driller	8.625 in	@ 1831.0 ft	@
Casing - Logger	1831.0 ft		
Bit Size	7.875 in		@
Type Fluid in Hole	Water Based Mud		
Density	9.10 g/cc	65.00 s/qt	
PH	11.50 pH	6.4 cpm	
Source of Sample	FLOWLINE		
Rm @ Meas. Temperature	0.93 ohmm	@ 78.00 degF	@
Rmf @ Meas. Temperature	0.74 ohmm	@ 75.00 degF	@
Rmc @ Meas. Temperature	1.14 ohmm	@ 75.00 degF	@
Source Rmf	MEAS	MEAS	
Rm @ BHT	0.60 ohmm	@ 125.0 degF	@
Time Since Circulation	09:00 hr		
Time on Bottom	19-Dec-17 11:14		
Max. Rec. Temperature	125.00 degF	@ 5011.0 ft	@
Equipment Location	12156883	EL RENO	
Recorded By	WHITLOCK		
Witnessed By	MARTIN LANGE	AUSTIN GARDNER	

Fold here

Service Ticket No.: 904514721		API No.: 15-055-22474-00-00		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		Matrix	
No.	From	To	L	R	L	R	L	R	L	R

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: 5 1/2" CASING USED FOR ANNULAR HOLE VOLUME

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.

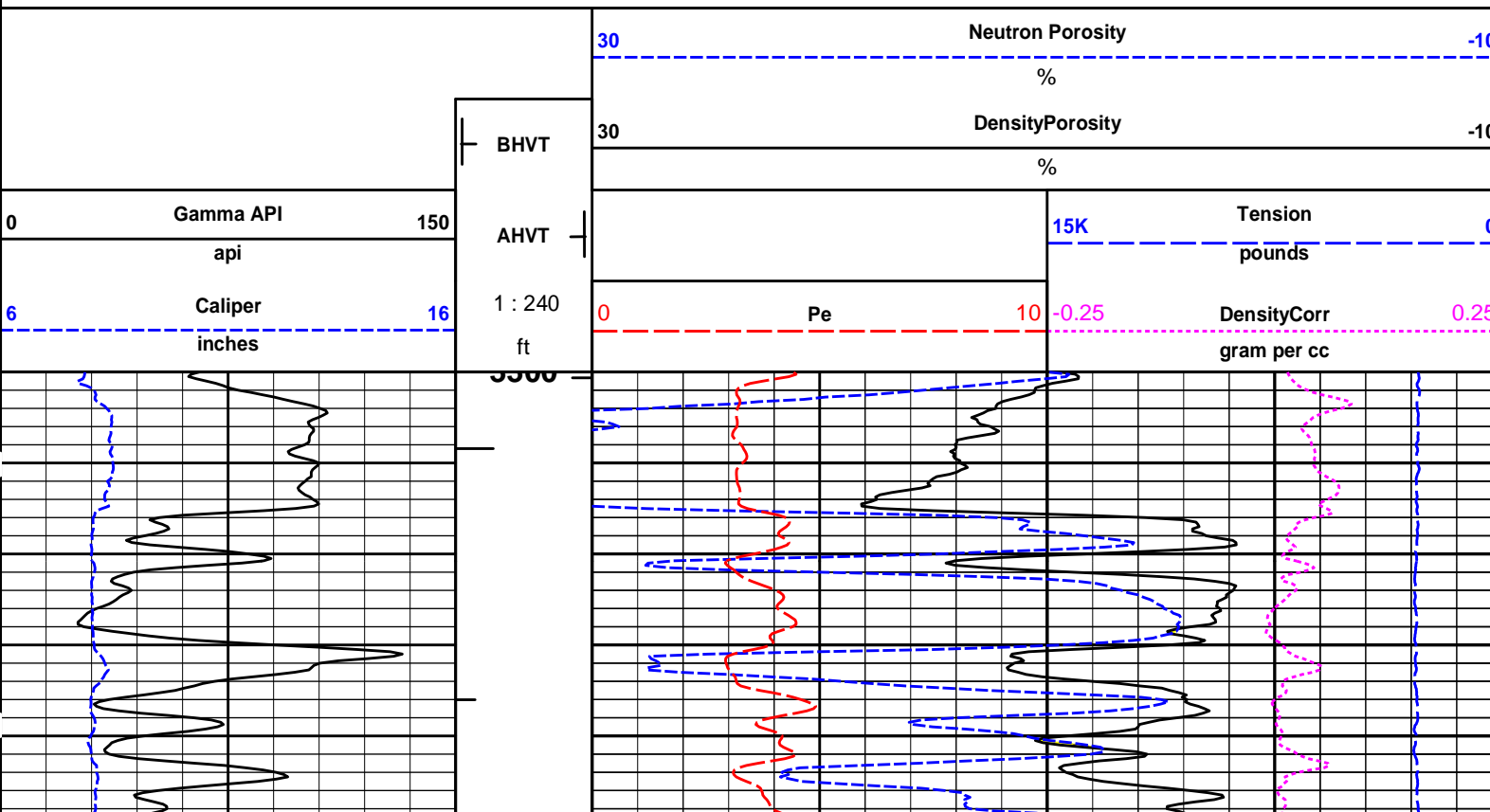
HALLIBURTON

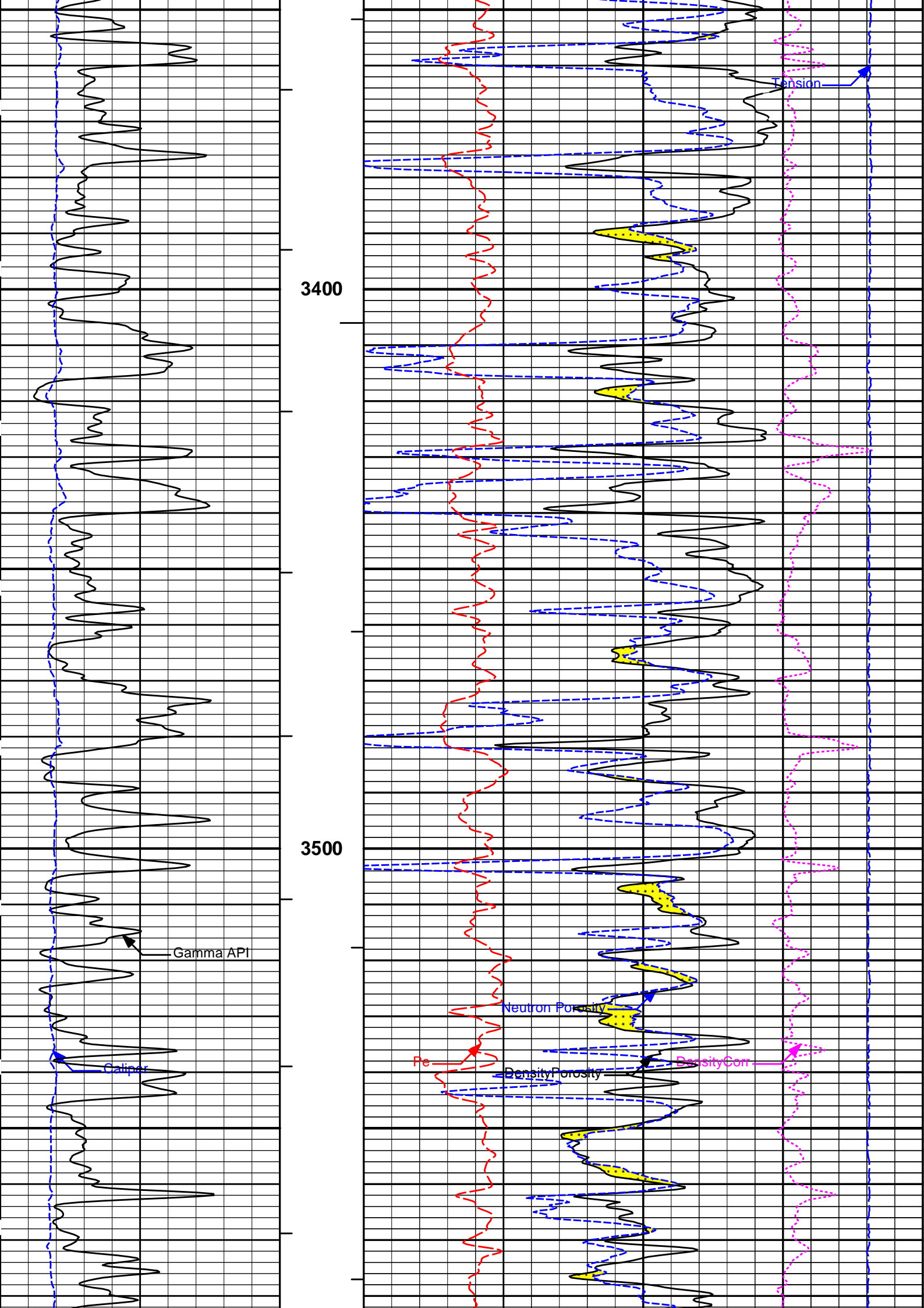


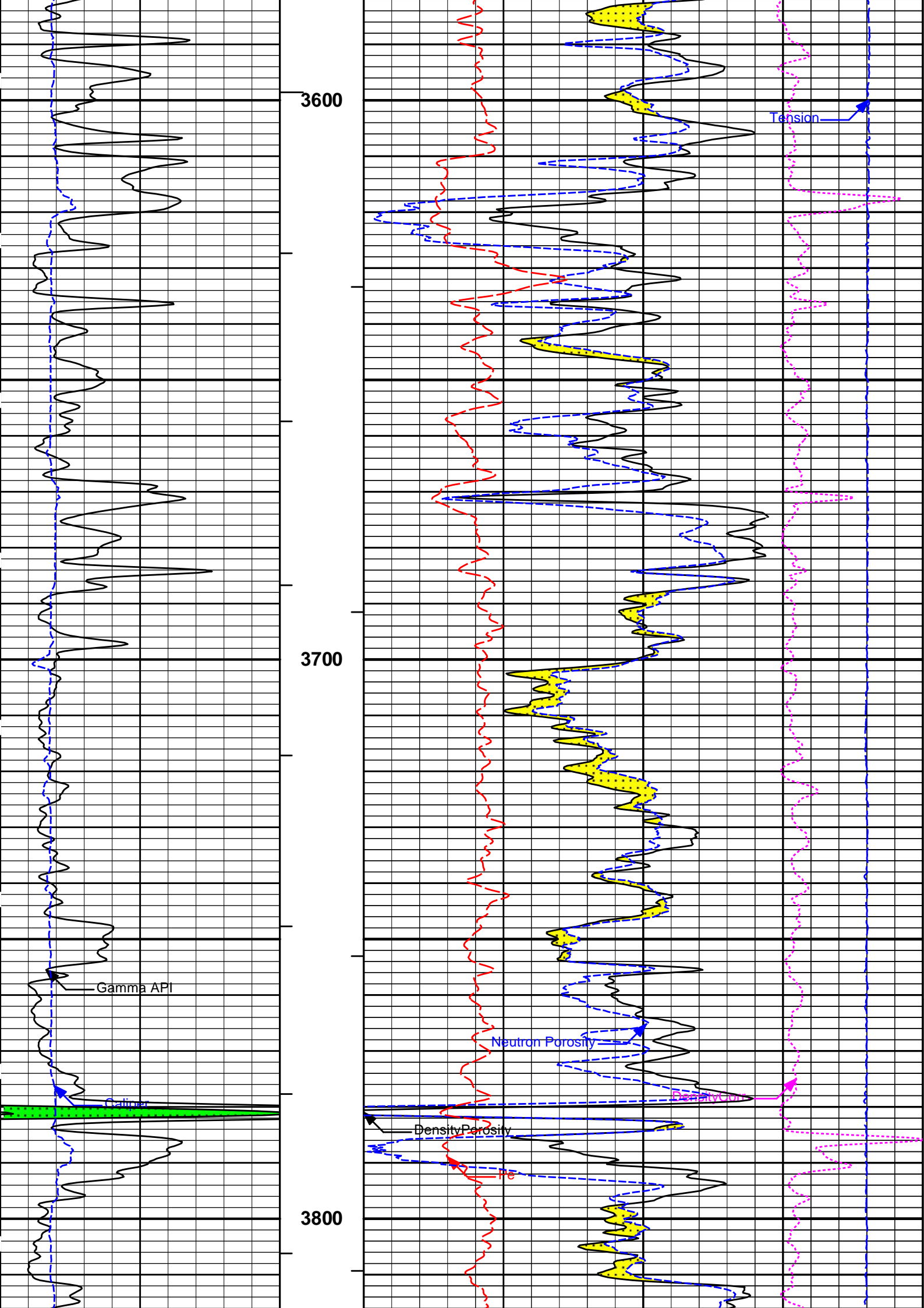
Plot Time: 19-Dec-17 14:56:29  
 Plot Range: 3300 ft to 5014.75 ft  
 Data: MERIT\_HUM\_207WWell Based\DAQ-0001-004\  
 Plot File: \\SDL-DSN\Poro\_IQ\_5\_MAIN

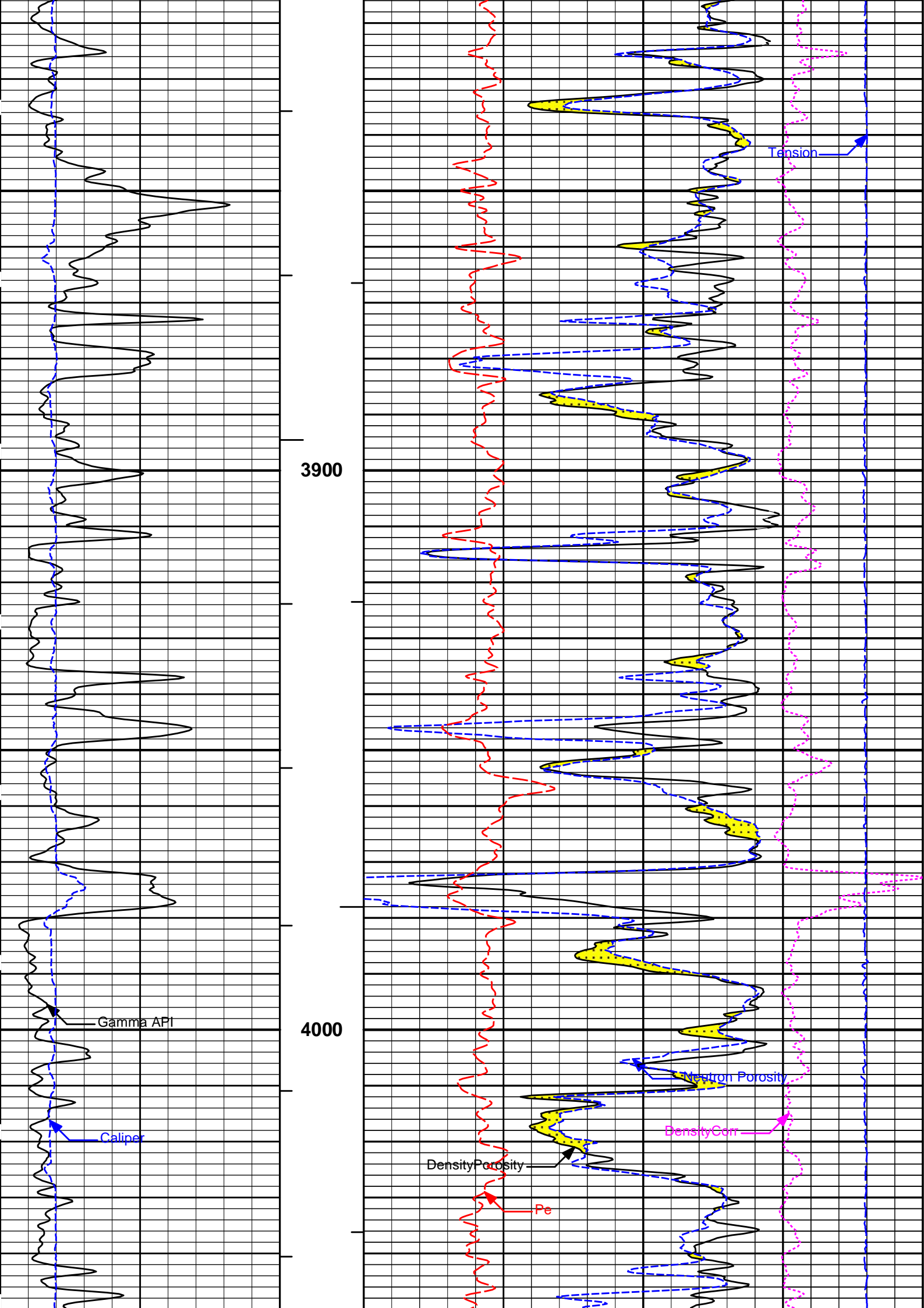
# 5 INCH MAIN LOG

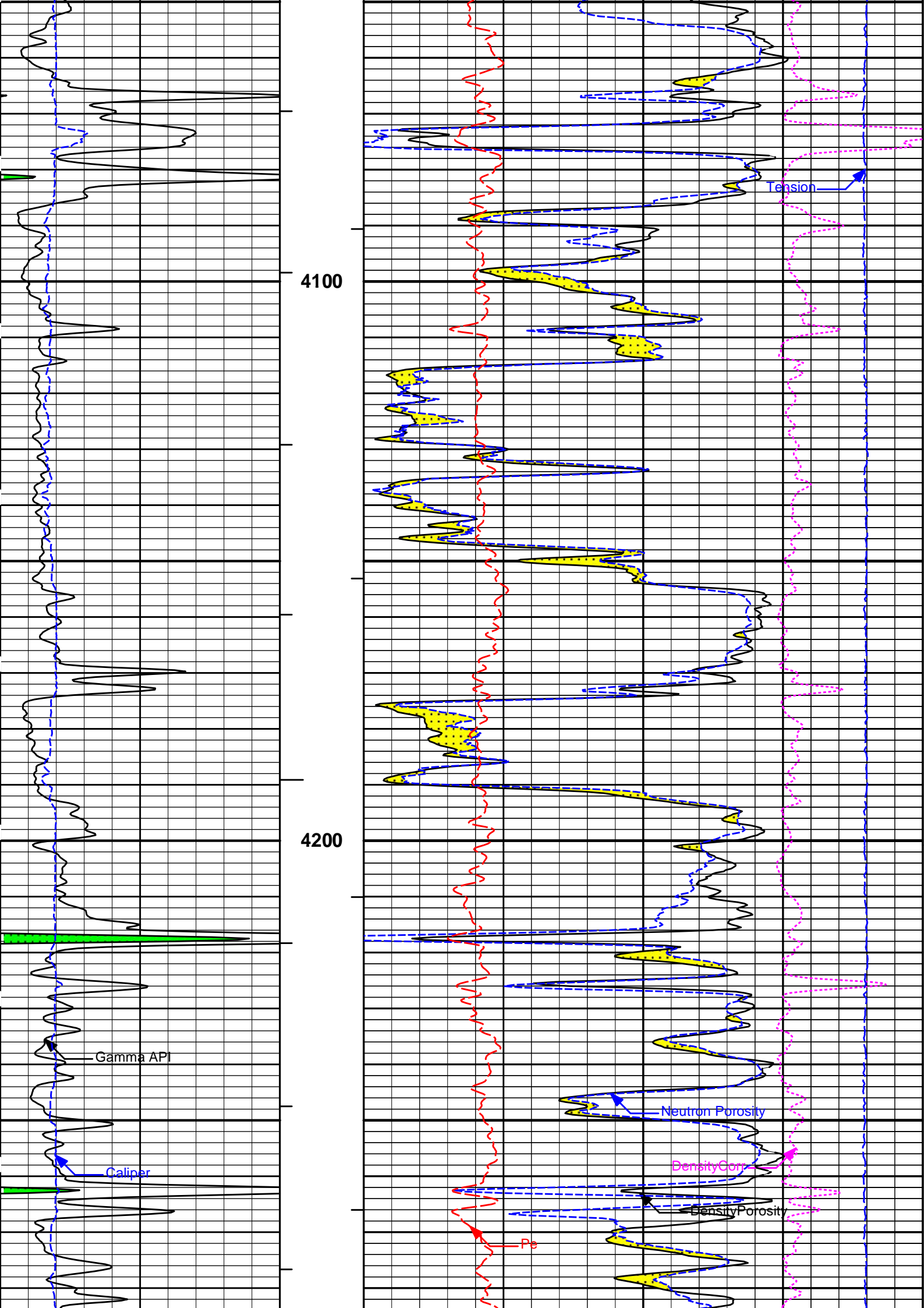
## MAIN SECTION 5" PER 100'

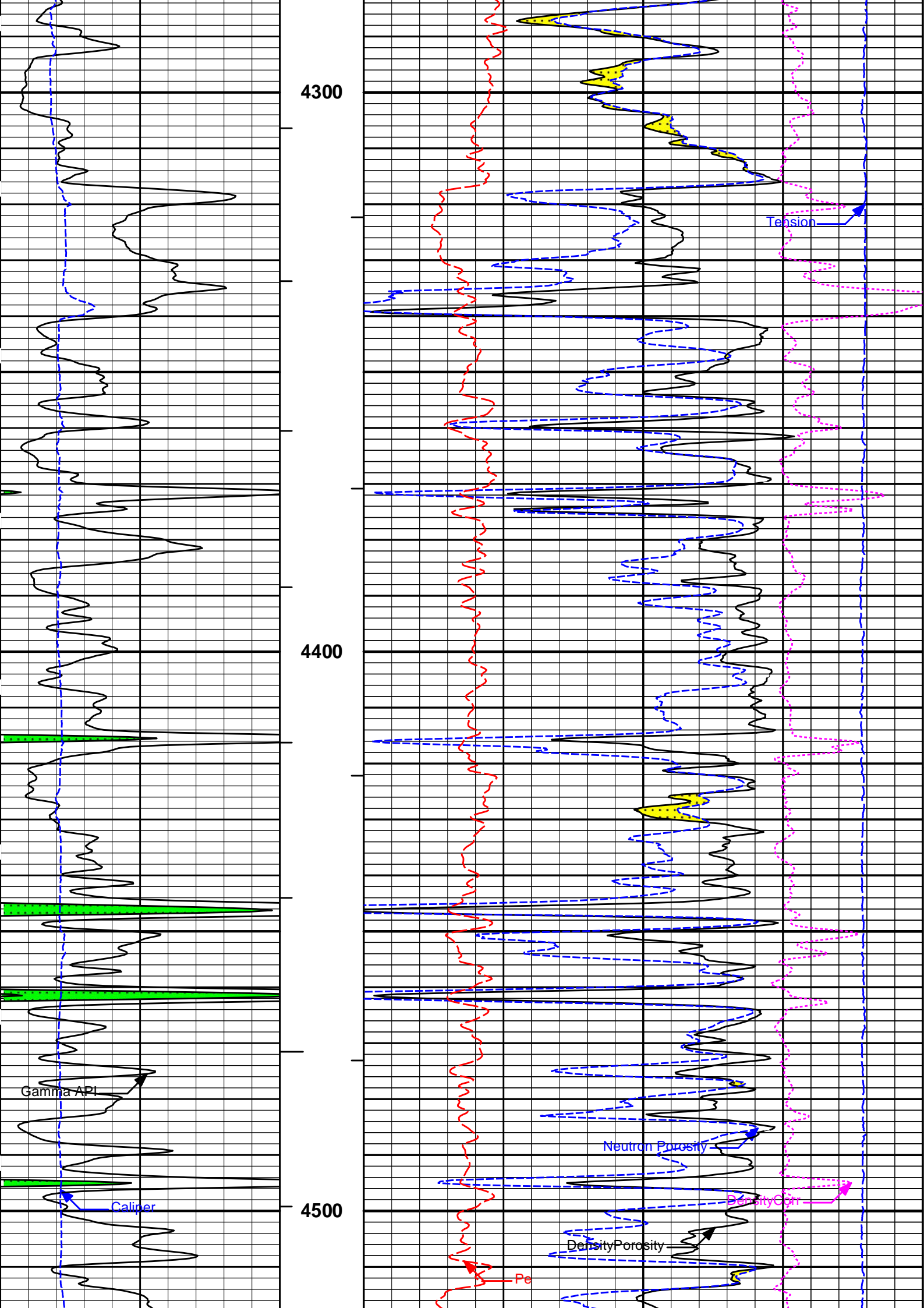


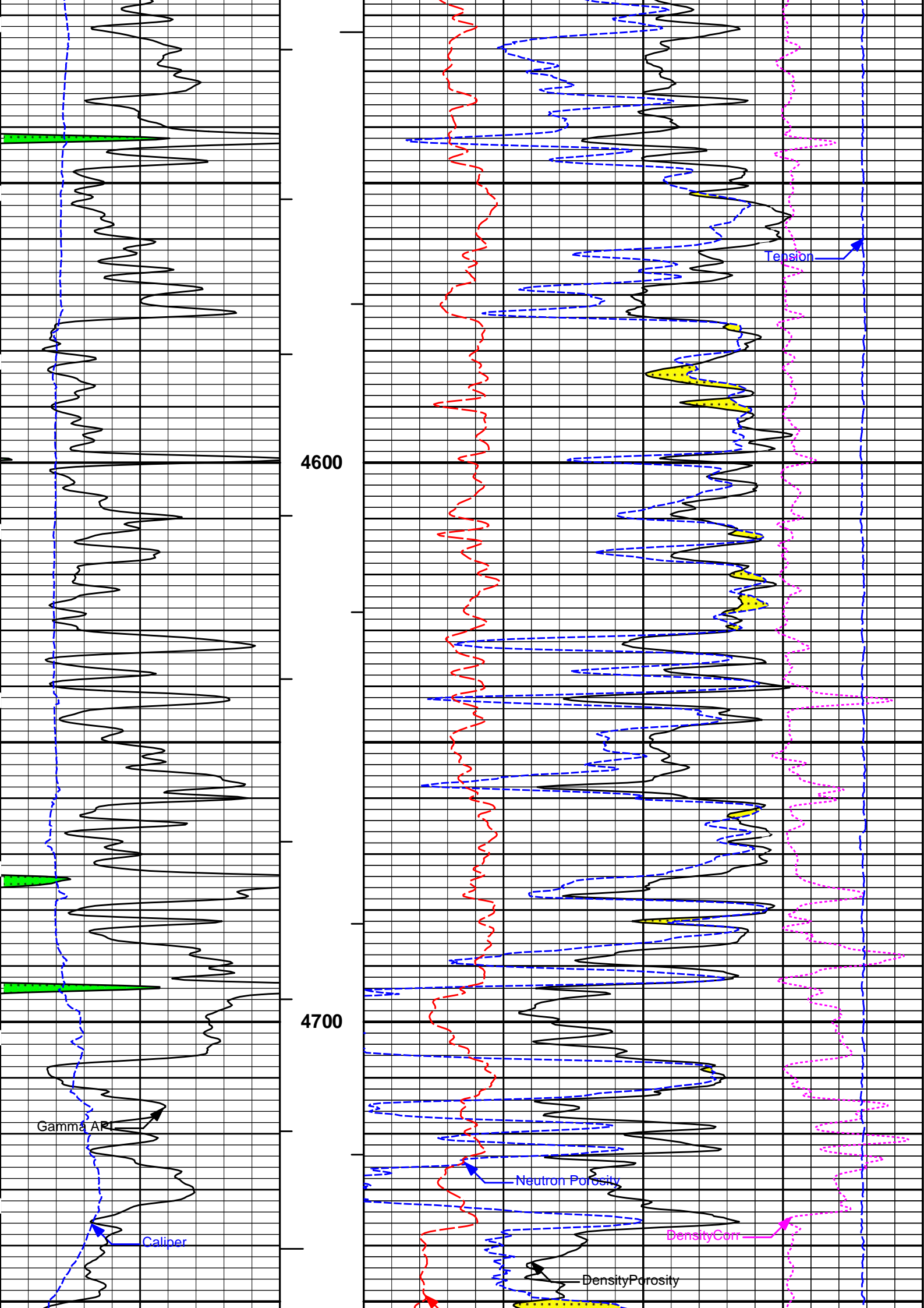


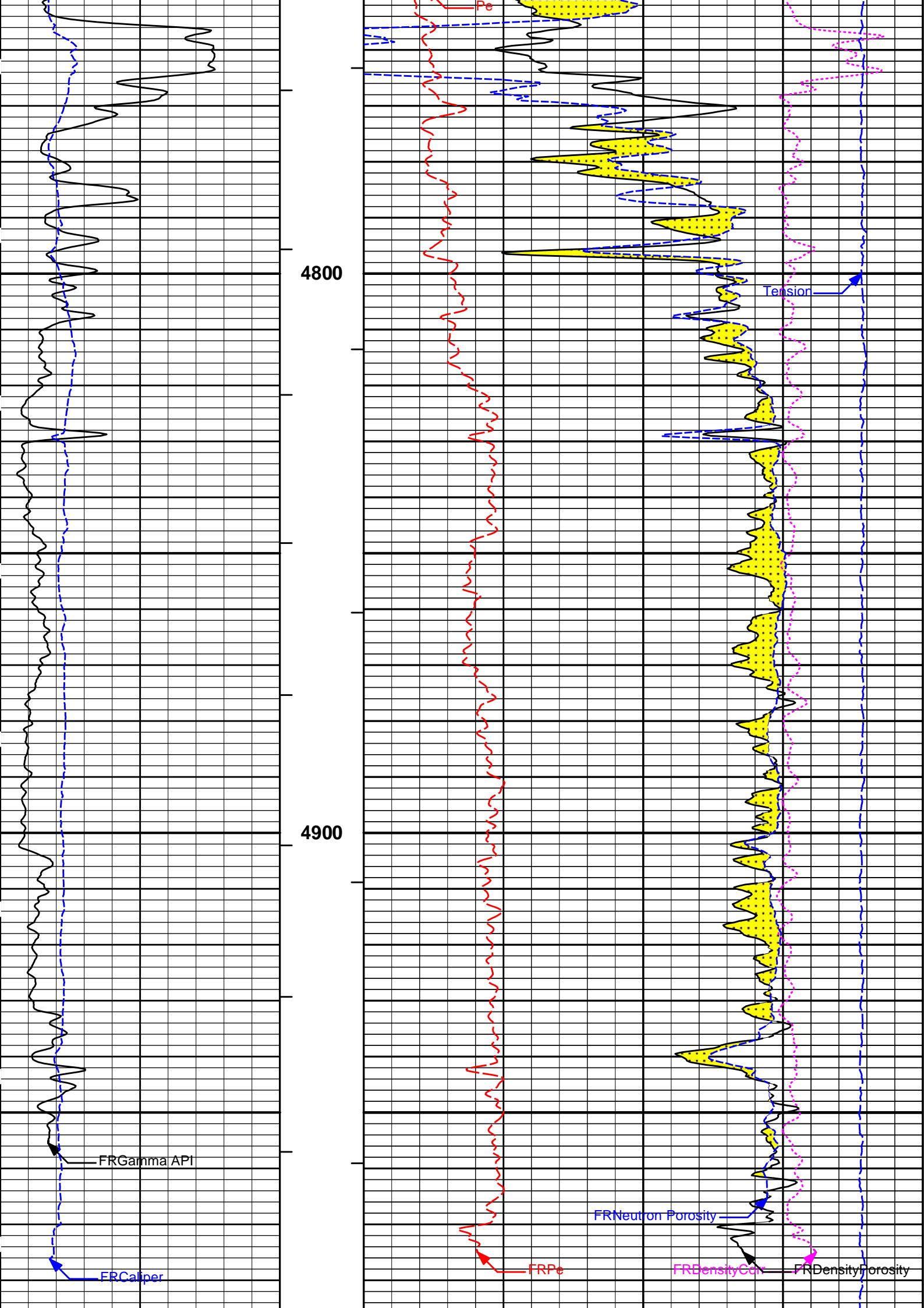


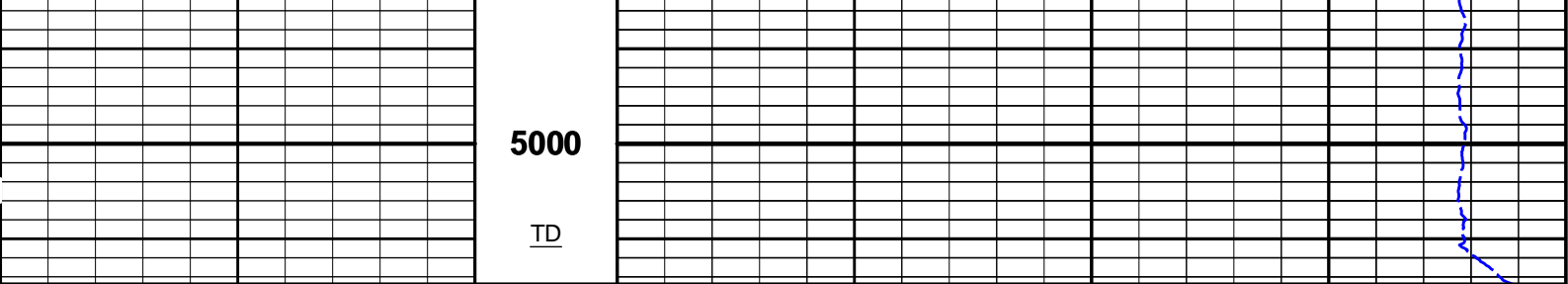












5000

TD

6	Caliper	16	1 : 240	0	Pe	10	-0.25	DensityCorr	0.25
	inches		ft					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
			BHVT	30	DensityPorosity				-10
								%	
				30	Neutron Porosity				-10
								%	

**HALLIBURTON**

Plot Time: 19-Dec-17 14:56:31  
 Plot Range: 3300 ft to 5014.75 ft  
 Data: MERIT\_HUM\_207WWell Based\DAQ-0001-004\  
 Plot File: \\SDL-DSN\Poro\_IQ\_5\_MAIN

### 5 INCH MAIN LOG

### MAIN SECTION 5" PER 100'

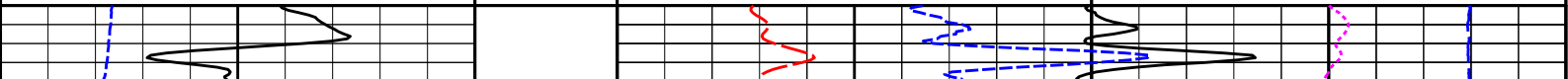
**HALLIBURTON**

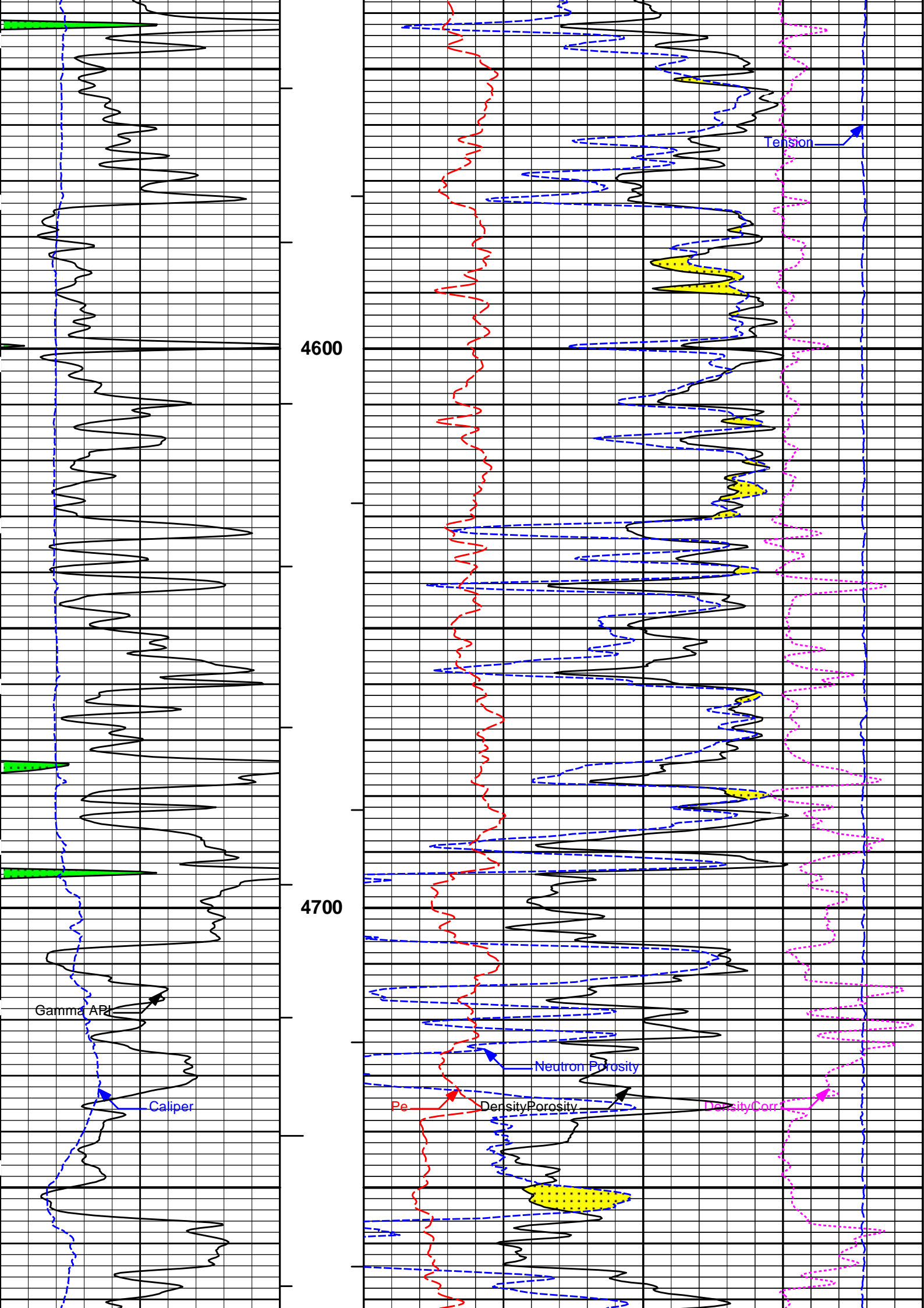
Plot Time: 19-Dec-17 14:56:32  
 Plot Range: 4530 ft to 5014.5 ft  
 Data: MERIT\_HUM\_207WWell Based\DAQ-0001-002\  
 Plot File: \\SDL-DSN\Poro\_IQ\_5\_MAIN

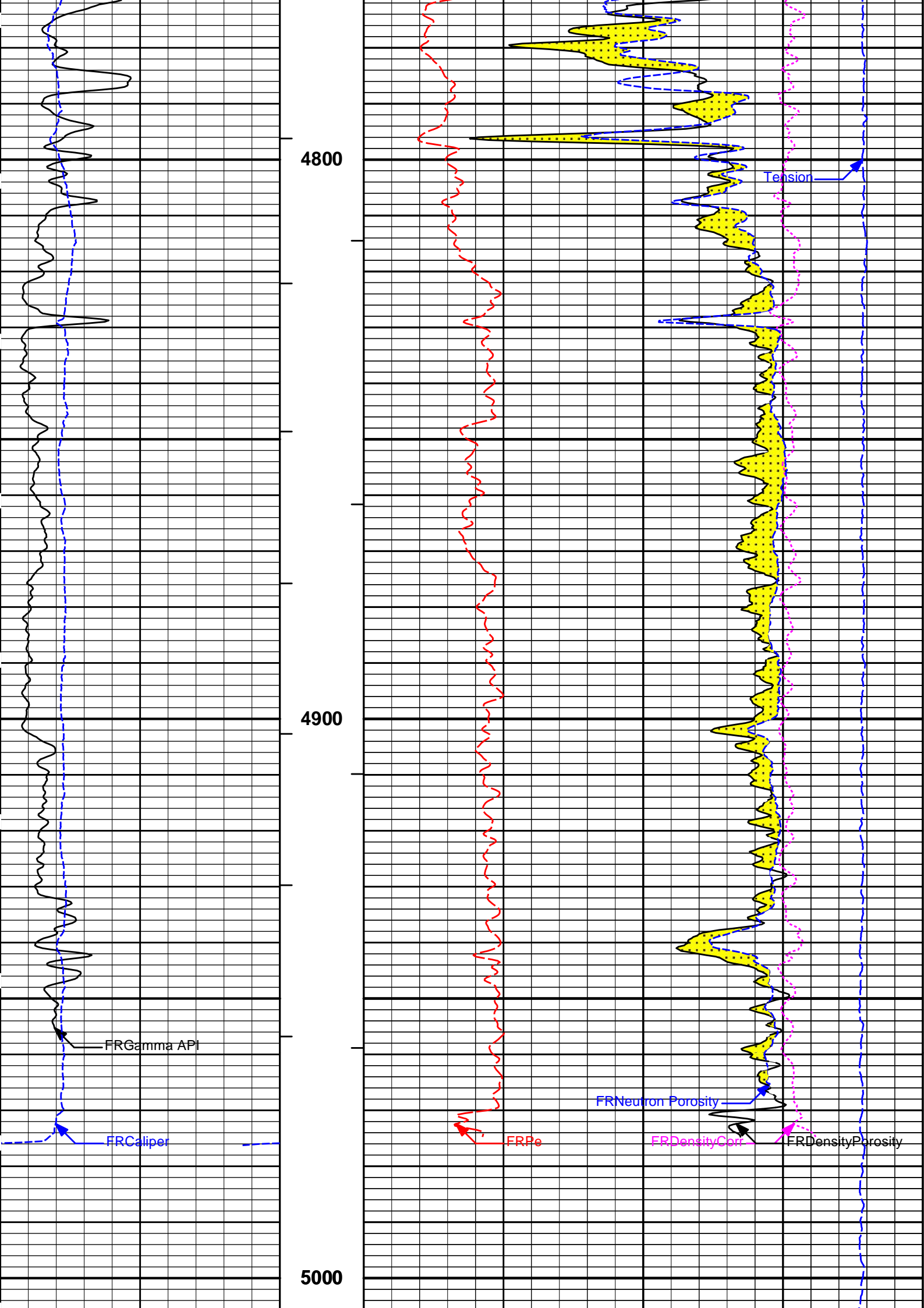
### REPEAT SECTION

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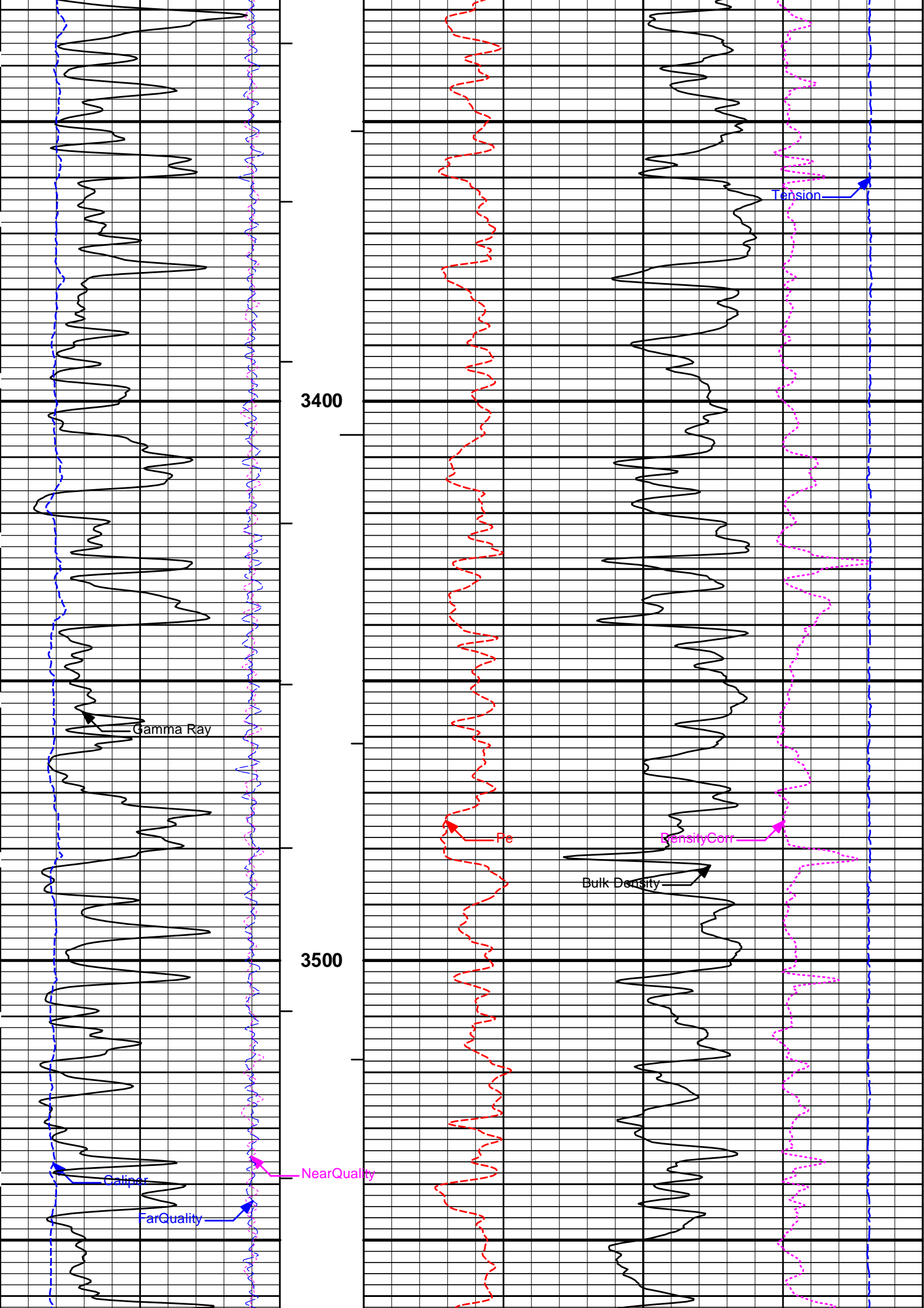
				30	Neutron Porosity				-10
								%	
			BHVT	30	DensityPorosity				-10
								%	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
6	Caliper	16	1 : 240	0	Pe	10	-0.25	DensityCorr	0.25
	inches		ft					gram per cc	

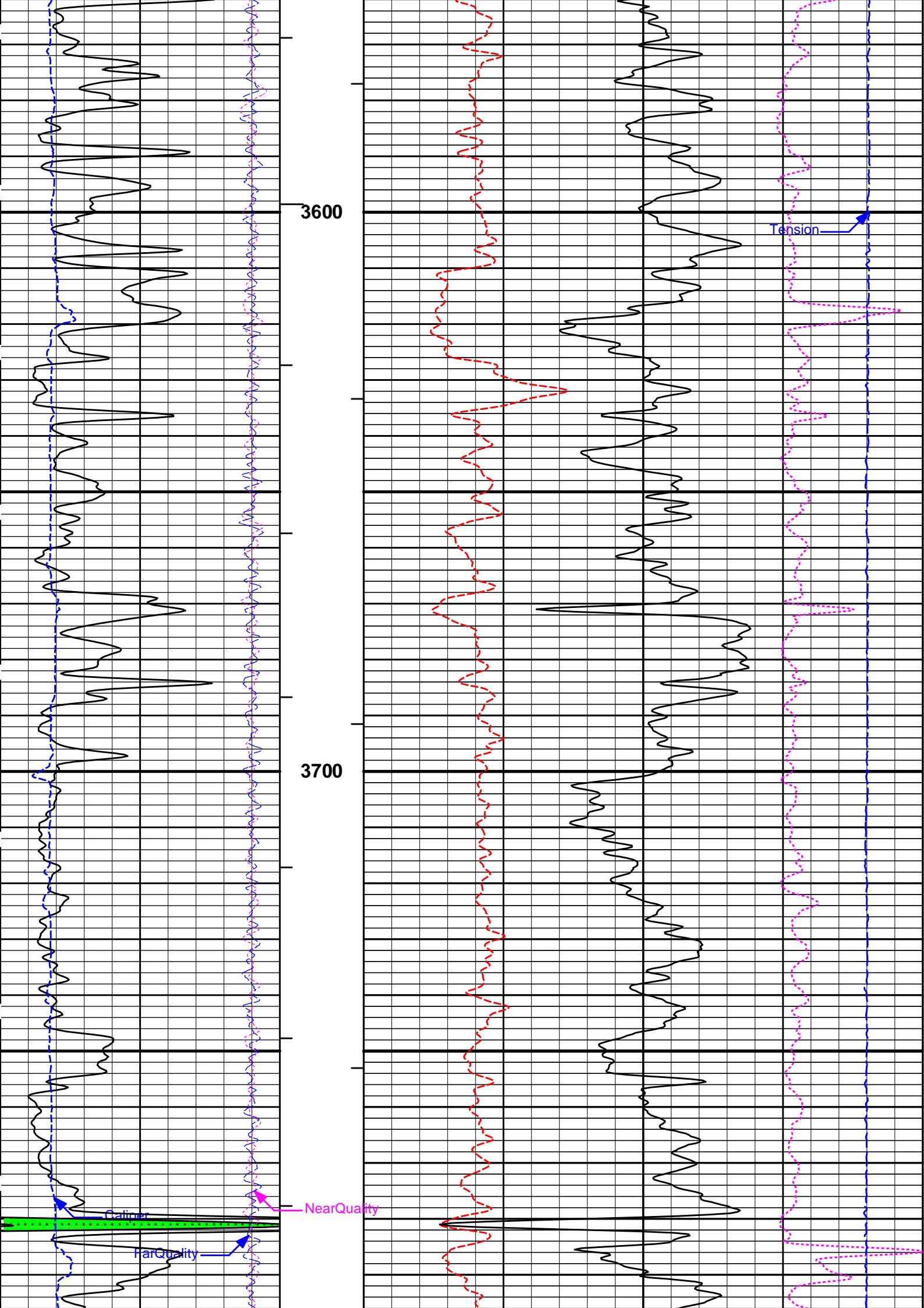


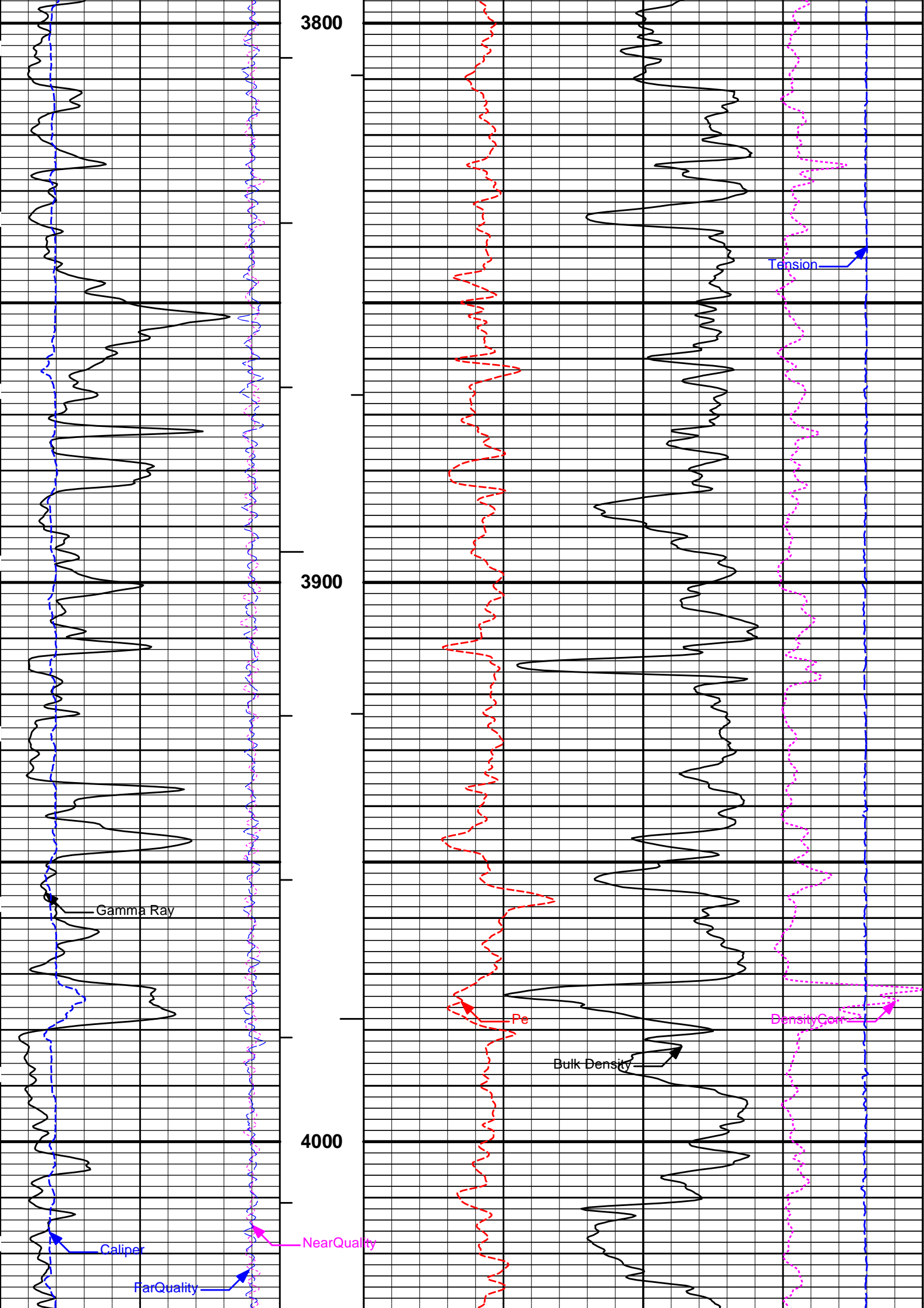




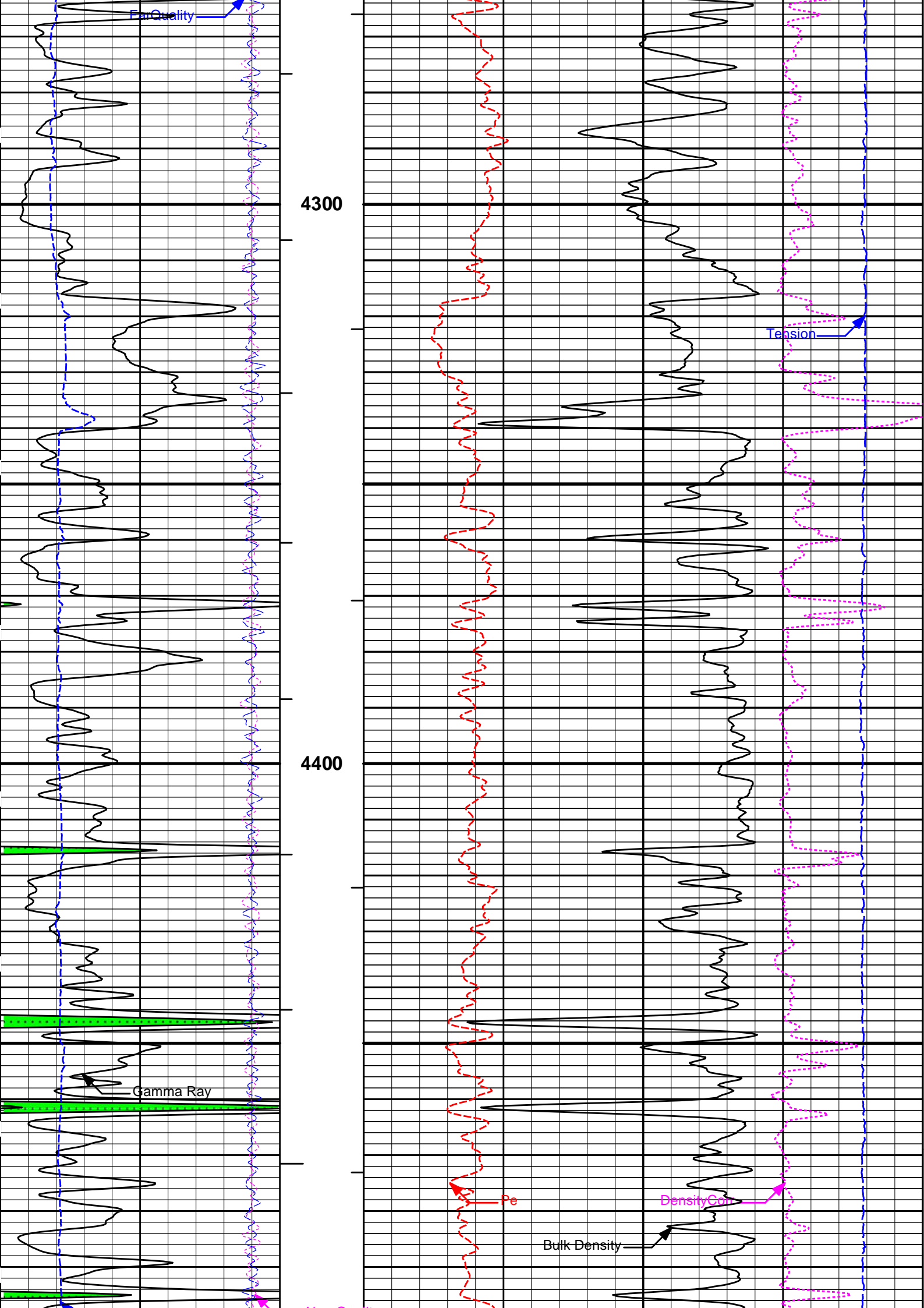


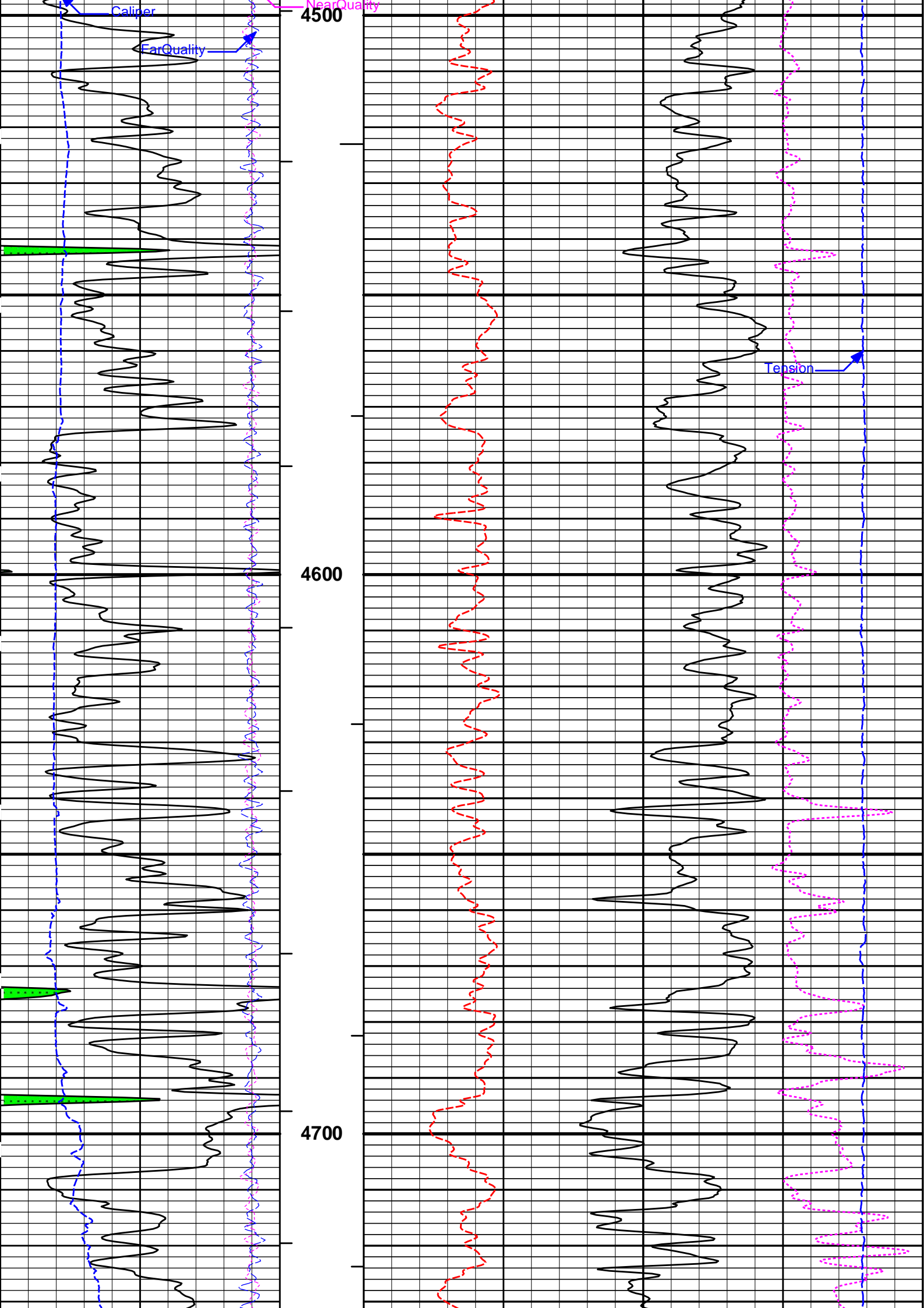


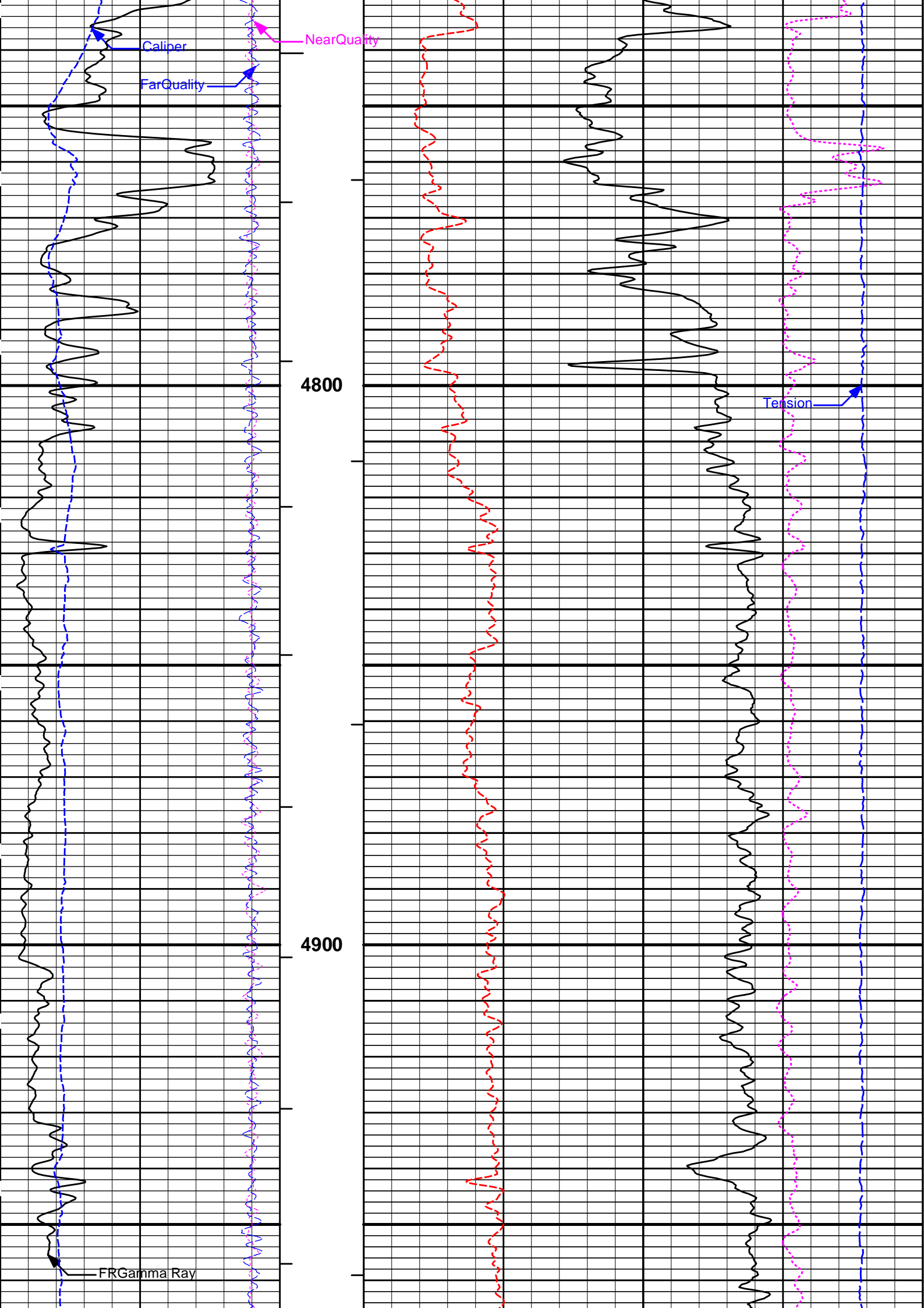


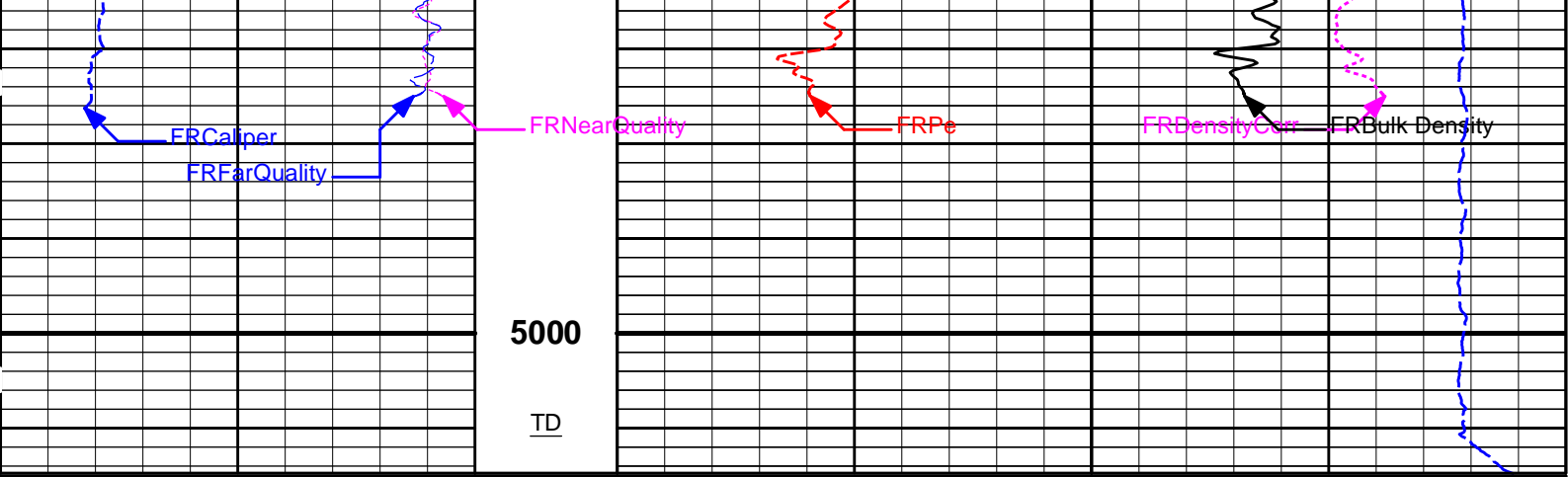












6	Caliper	16	1 : 240	0	Pe	10	-0.25	DensityCorr	0.25
	inches		ft					g/cc	
-18	NearQuality	2	BHV				15K	Tension	0
			ft3					pounds	
18	FarQuality	-2	AHV	2	Bulk Density				3
			ft3		g/cc				
0	Gamma Ray	150							
	api								

**HALLIBURTON**

Plot Time: 19-Dec-17 14:56:36  
 Plot Range: 3300 ft to 5014.75 ft  
 Data: MERIT\_HUM\_207W\Well Based\DAQ-0001-004\  
 Plot File: \\-LOCAL-MERIT\_HUM\_207W\0001 GTET-DSNT-SDLT-BSAT-ACRT\SDL-DSN\BULKD\_5\_MAIN\_IQ

## 5 INCH MAIN LOG

### MAIN SECTION 5" PER 100'

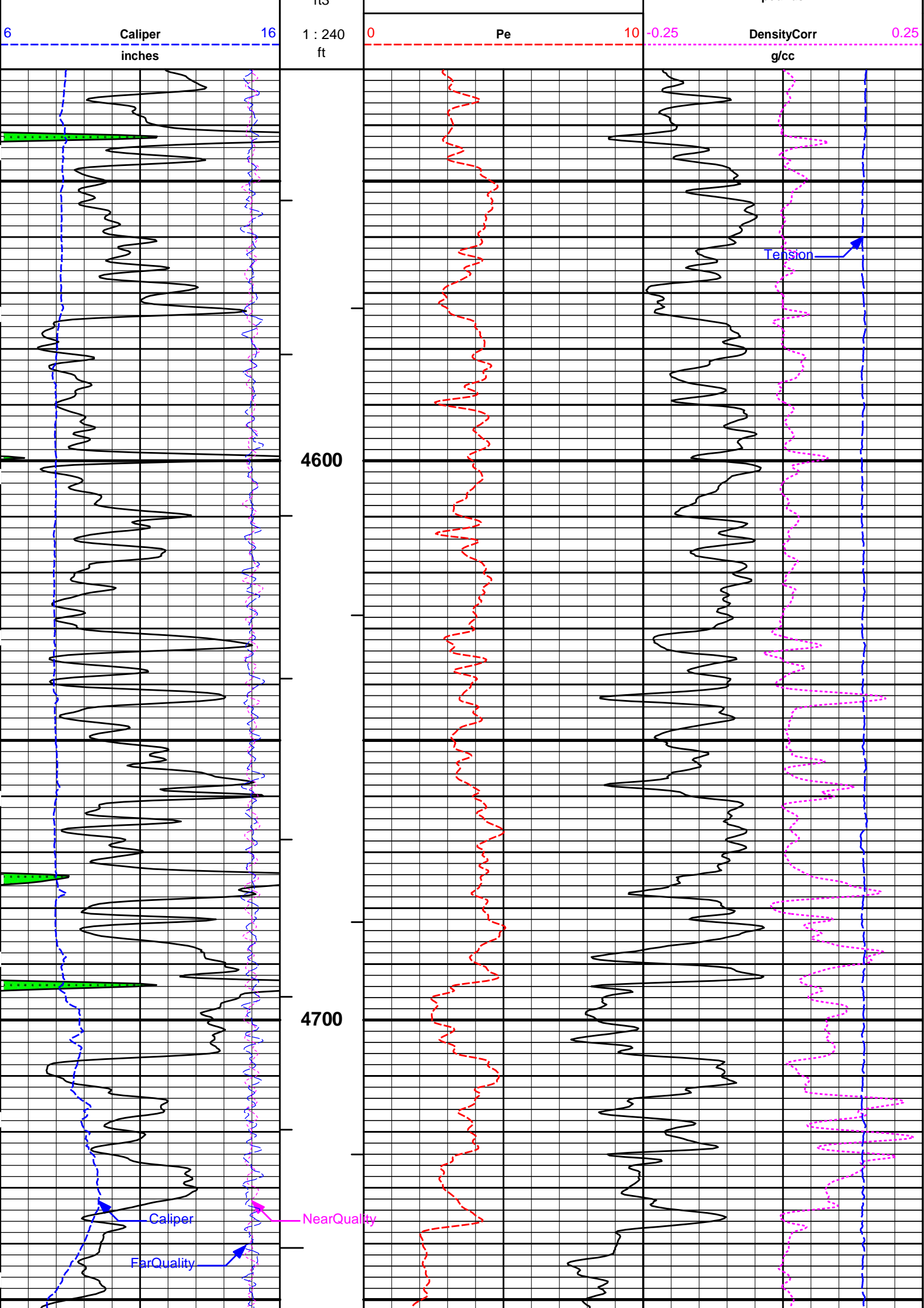
**HALLIBURTON**

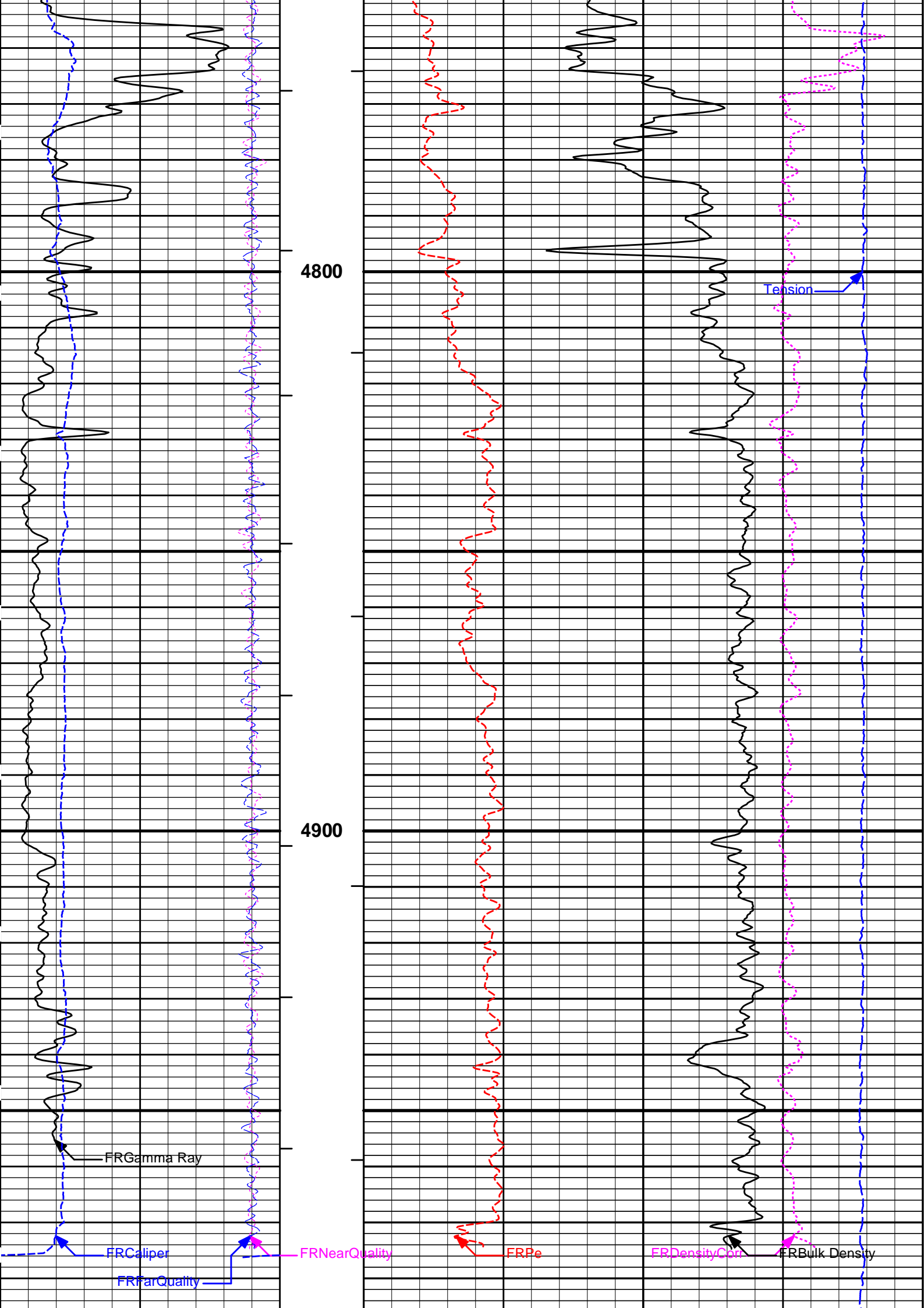
Plot Time: 19-Dec-17 14:56:36  
 Plot Range: 4530 ft to 5014.5 ft  
 Data: MERIT\_HUM\_207W\Well Based\DAQ-0001-002\  
 Plot File: \\-LOCAL-MERIT\_HUM\_207W\0001 GTET-DSNT-SDLT-BSAT-ACRT\SDL-DSN\BULKD\_5\_MAIN\_IQ

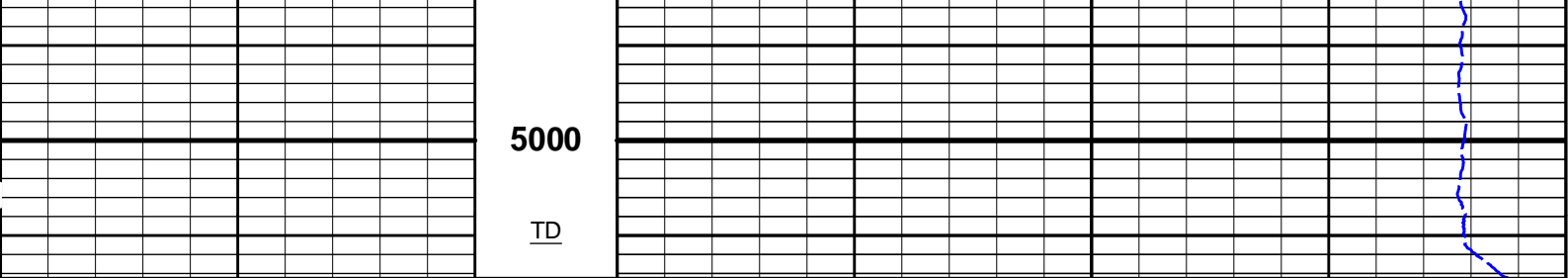
## REPEAT SECTION

### REPEAT SECTION

0	Gamma Ray	150							
	api								
18	FarQuality	-2	AHV	2	Bulk Density				3
			ft3		g/cc				
-18	NearQuality	2	BHV				15K	Tension	0
			ft3					pounds	







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

**HALLIBURTON**

Plot Time: 19-Dec-17 14:56:38  
 Plot Range: 4530 ft to 5014.5 ft  
 Data: MERIT\_HUM\_207WWell Based\DAQ-0001-002\  
 Plot File: \\-LOCAL-MERIT\_HUM\_207W0001 GTET-DSNT-SDLT-BSAT-ACRT\SDL-DSN\BULKD\_5\_MAIN\_IQ

**REPEAT SECTION**

**REPEAT SECTION**

**HALLIBURTON**

**CALIBRATION REPORT**

**SURFACE TENSION SHOP CALIBRATION**

Tool Name: Depth Panel - 12345678      Reference Calibration Date: 23-Apr-17 10:07:58  
 Engineer: MICHAEL RICHTER      Calibration Date: 24-Jun-17 04:21:48  
 Software Version: WL INSITE R5.0.5 (Build 8)      Calibration Version: 1

SURFACE TENSION LOAD CELL					
Measurement	Load Cell Value	Measurement	Calibrated	Units	
Low	10703.64	164.45	0.00	lbs	
High	17362.76	7331.05	7830.00	lbs	

**DOWNHOLE TENSION SHOP CALIBRATION**

Tool Name: CH\_HOS - CH\_HOS\_I      Reference Calibration Date: 13-Dec-17 11:53:03  
 Engineer: JORGE ORLANDO PEREZ      Calibration Date: 17-Dec-17 16:43:38  
 Software Version: WL INSITE R5.6.3 (Build 4)      Calibration Version: 1

DOWNHOLE LOAD CELL					
Measurement	Tool Value	Measurement	Calibrated	Units	
Low	-505.99	-27.96	0.00	lbs	
High	5810.79	1723.35	1950.00	lbs	

**NATURAL GAMMA RAY TOOL SHOP CALIBRATION**

Tool Name: GTET - 11021139      Reference Calibration Date: 19-Nov-17 10:38:47

Engineer: WHITLOCK

Calibration Date: 11-Dec-17 12:34:48

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

Measurement	Measured	Calibrated	Units
Background	29.6	29.0	api
Background + Calibrator	260.3	254.9	api
Calibrator	230.7	225.9	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11021139

Reference Calibration Date: 11-Dec-17 12:34:48

Engineer: WHITLOCK

Calibration Date: 16-Dec-17 15:34:42

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	29.0	22.2	api
Background + Calibrator	254.9	241.7	api
Calibrator	225.9	219.5	api

Shop	Field	Difference	Tolerance
225.9	219.5	6.4	+/- 9.00

### DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11660709

Reference Calibration Date: 14-Jul-17 14:37:56

Engineer: MICHAEL RICHTER

Calibration Date: 21-Oct-17 10:02:19

Software Version: WL INSITE R5.4.5 (Build 2)

Calibration Version: 1

Logging Source S/N: DSN-424

Tank Serial Number: EL RENO

Reference value assigned to Tank: 56.100

Snow Block S/N: 668

Calibration Tank Water Temperature: 79 degF

Min. Tool Housing Outside Diameter: 3.625 in

#### CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.01791	1.01437	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	0.0011	+/- 0.0020
Calibrated Ratio:	10.5966	10.5597	0.037	+/- 0.050

#### VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0811	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:** 21-Oct-17 10:02:19

**Engineer:** WHITLOCK

**Calibration Date:** 16-Dec-17 15:22:58

**Software Version:** WL INSITE R5.6.3 (Build 4)

**Calibration Version:** 1

Logging Source S/N: DSN-424

Snow Block S/N: 668

### NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0811	0.0877	0.0066	+/- 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	0.0003000 - 0.0007000
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
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## SDLT CALIPER FIELD CALIBRATION

**Tool Name:** SDLT - 11014296

**Reference Calibration Date:** 24-Nov-17 12:28:28

**Engineer:** WHITLOCK

**Calibration Date:** 16-Dec-17 16:11:25

**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	0.75	0.78	0.03	+/- 0.10



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
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					

**MICRO LOG SHOP CALIBRATION**

**Tool Name:** Microlog Pad - 11014296      **Reference Calibration Date:** 21-Oct-17 17:40:50  
**Engineer:** MICHAEL RICHTER      **Calibration Date:** 21-Oct-17 17:42:32  
**Software Version:** WL INSITE R5.4.5 (Build 2)      **Calibration Version:** 1  
**Host Tool Name:** DSNT - 11660709

**CALIBRATION COEFFICIENT SUMMARY**

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.11	-0.14	0.01	0.01	ohmm
Calibration Point #1	0.02	0.00	-0.01	0.00	ohmm
Calibration Point #2	20.00	20.00	19.99	20.00	ohmm
Internal Reference	19.95	19.94	20.00	20.01	ohmm

Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
Tool Zero		-10.63		4.50	V
Calibration Point #1		24.92		-0.13	V
Calibration Point #2		5262.56		6875.93	V
Internal Reference		5247.65		6879.76	V

**MICRO LOG FIELD CHECK**

**Tool Name:** Microlog Pad - 11014296      **Reference Calibration Date:** 21-Oct-17 17:42:32  
**Engineer:** WHITLOCK      **Calibration Date:** 16-Dec-17 19:11:09  
**Software Version:** WL INSITE R5.6.3 (Build 4)      **Calibration Version:** 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.14	-0.10	0.01	0.00	ohmm
Internal Reference	19.94	19.89	20.01	19.96	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.94	19.89	0.05	+/- 0.80
Microlog Lateral	20.01	19.96	0.05	+/- 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:	16-Dec-17 19:14:23
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Pad Temperature: 71.7 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shp	Field	Change	Control Limit +/-

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1543.777	1548.009	4.232	15.818
Far (B+D+P+L) cps	1029.100	1023.255	-5.845	17.098
Near Resolution	9.58	9.71	0.130	0.50
Far Resolution	8.95	8.90	-0.050	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
<b>Depth Panel-12345678</b>						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
<b>CH_HOS-CH_HOS_I</b>						
DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1950.00	-----	-----	0.00	-----	lbs
<b>GTET-11021139</b>						
Gamma Ray Calibrator	225.9	219.5	-----	6.4	+/- 9.00	api
<b>DSNT-11660709</b>						
Snow-Block Porosity	0.0811	0.0877	-----	-0.0066	+/- 0.0150	decp
<b>SDLT-11014296</b>						
Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
<b>ACRt Sonde-11038385</b>						
Mud Cell	1.00	-----	-----	0	-----	ohm-m
<b>Microlog Pad-11014296</b>						
MicroLog Normal	19.94	19.89	-----	0.05	+/-0.80	ohmm
MicroLog Lateral	20.01	19.96	-----	0.05	+/-0.80	ohmm
<b>SDLT Pad-10865881</b>						
Near(B+D+P+L)	1543.777	1548.009	-----	-4.232	+/-15.818	cps
Far(B+D+P+L)	1029.100	1023.255	-----	5.845	+/-17.098	cps

Data: MERIT\_HUM\_207W\0001 GTET-DSNT-SDLT-BSAT-ACRT\IDLE Date: 19-Dec-17 10:31:46

## 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	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	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	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF

SHARED	ST	Surface Temperature	75.0	degF
SHARED	TD	Total Well Depth	5000.00	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	CBM Temperature Master Tool	GTET	
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	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	



BSAT-10939049  
300.00 lbs

Ø 3.625 in →

Receiver Array @ 26.84 ft  
Sonic Receivers @ 26.84 ft

15.77 ft

ACRt Instrument-  
11055059  
50.00 lbs

Ø 3.625 in →

5.03 ft

19.58 ft

ACRt Sonde-  
11038385  
200.00 lbs

Ø 3.625 in →

14.22 ft

Mud Resistivity @ 13.19 ft

14.55 ft

ACRt @ 9.21 ft

SP Ring-11038385  
0.00 lbs

Ø 3.625 in\* →

SP @ 1.61 ft

0.33 ft

Bull Nose-12345678  
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)
CH_HOS	Hostile Cable Head with Load Cell	CH_HOS_I	37.50	3.03	65.33	300.00
WP7K	Weak Point 7000 lbs	CH_HOS_I	0.01	0.01	* 66.13	300.00
XOHD	Hostile to Dits Cross Over	12345678	20.00	0.95	64.38	300.00
GTET	Gamma Telemetry Tool	11021139	165.00	8.52	55.86	60.00
DSNT	Dual Spaced Neutron	11660709	174.00	9.69	46.17	60.00
DCNT	DSN Decentralizer	11660709	6.60	5.13	* 49.50	300.00
SDLT	Spectral Density Tool	11014296	360.00	10.81	35.36	60.00
SDLP	Density Insite Pad	10865881	65.00	2.55	* 37.57	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	00005155	1.00	0.80	* 37.80	300.00
MICP	Microlog Pad	11014296	8.00	1.00	* 37.86	60.00
BSAT	Borehole Sonic Array Tool	10939049	300.00	15.77	19.58	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11055059	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11038385	200.00	14.22	0.33	120.00
SP	SP Ring	11038385	0.00	0.25	* 1.61	300.00
BLNS	Bull Nose	12345678	5.00	0.33	0.00	300.00
<b>Total</b>			<b>1,392.11</b>	<b>68.36</b>		

\* Not included in Total Length and Length Accumulation.

Data: MERIT\_HUM\_207W0001 GTET-DSNT-SDLT-BSAT-ACRTIDLE

Date: 19-Dec-17 10:39:59