

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY
LOG

<div>HALLIBURTON</div>										<div>DUAL SPACED NEUTRON SPECTRAL DENSITY LOG</div>																			
<div>K3 OIL & GAS OPERATING COMPANY</div> <div>CLARK 13-24</div> <div>WILDCAT</div> <div>LINCOLN</div> <div>COLORADO</div>										<div>COMPANY</div> <div>K3 OIL & GAS OPERATING COMPANY</div> <div>WELL</div> <div>CLARK 13-24</div> <div>FIELD/BLOCK</div> <div>WILDCAT</div> <div>COUNTY</div> <div>LINCOLN</div> <div>STATE</div> <div>COLORADO</div>																			
<div>COMPANY</div> <div>WELL</div> <div>FIELD/BLOCK</div> <div>COUNTY</div> <div>STATE</div>										<div>API No.</div> <div>05-073-06726-00-00</div> <div>Location</div> <div>(SHL) 650' FNL & 650' FWL SW SW</div> <div>Other Services:</div> <div>DSNT/SDLT</div> <div>MICROLOG</div> <div>BSAT</div> <div>ACRT</div>																			
<div>Permanent Datum</div> <div>Log measured from</div> <div>Drilling measured from</div>										<div>GL</div> <div>KB</div> <div>KB</div> <div>Elev. 5062.0 ft</div> <div>18.0 ft above perm. Datum</div> <div>G.L.</div>										<div>Elev. 5080.0 ft</div> <div>5080.0 ft</div> <div>5062.0 ft</div>									
<div>Date</div>										<div>20-Oct-17</div>																			
<div>Run No.</div>										<div>ONE</div>																			
<div>Depth - Driller</div>										<div>7500.0 ft</div>																			
<div>Depth - Logger</div>										<div>7510.0 ft</div>																			
<div>Bottom - Logged Interval</div>										<div>7466.00 ft</div>																			
<div>Top - Logged Interval</div>										<div>2750.00 ft</div>																			
<div>Casing - Driller</div>										<div>13.375 in</div>										<div>@</div>									
<div>Casing - Logger</div>										<div>464.0 ft</div>																			
<div>Bit Size</div>										<div>7.875 in</div>										<div>12.250 in</div>									
<div>Type Fluid in Hole</div>										<div>Vassa LP-120</div>										<div>@ 2500.0 ft</div>									
<div>Density</div>										<div>9.4 ppg</div>										<div>65.00 s/qt</div>									
<div>PH</div>										<div>9.00 pH</div>										<div>8.0 cpm</div>									
<div>Source of Sample</div>										<div>MUD PIT</div>																			
<div>Rm @ Meas. Temperature</div>										<div>1.41 ohmm</div>										<div>@ 75.00 degF</div>									
<div>Rmf @ Meas. Temperature</div>										<div>1.29 ohmm</div>										<div>@ 75.00 degF</div>									
<div>Rmc @ Meas. Temperature</div>										<div>1.55 ohmm</div>										<div>@ 75.00 degF</div>									
<div>Source Rmf</div>										<div>MEAS</div>										<div>MEAS</div>									
<div>Rm @ BHT</div>										<div>0.72 ohmm</div>										<div>@ 153.0 degF</div>									
<div>Time Since Circulation</div>										<div>10.0 hr</div>																			
<div>Time on Bottom</div>										<div>20-Oct-17 17:30</div>																			
<div>Max. Rec. Temperature</div>										<div>153.00 degF</div>										<div>@ 7510.0 ft</div>									
<div>Equipment</div>										<div>12147634</div>										<div>EL RENO, OK</div>									
<div>Recorded By</div>										<div>JORGE ORLANDO PEREZ</div>																			
<div>Witnessed By</div>										<div>JOHN MARVIN</div>										<div>SUSAN RAINBOLT</div>									
																				<div>RANDY SAY</div>									

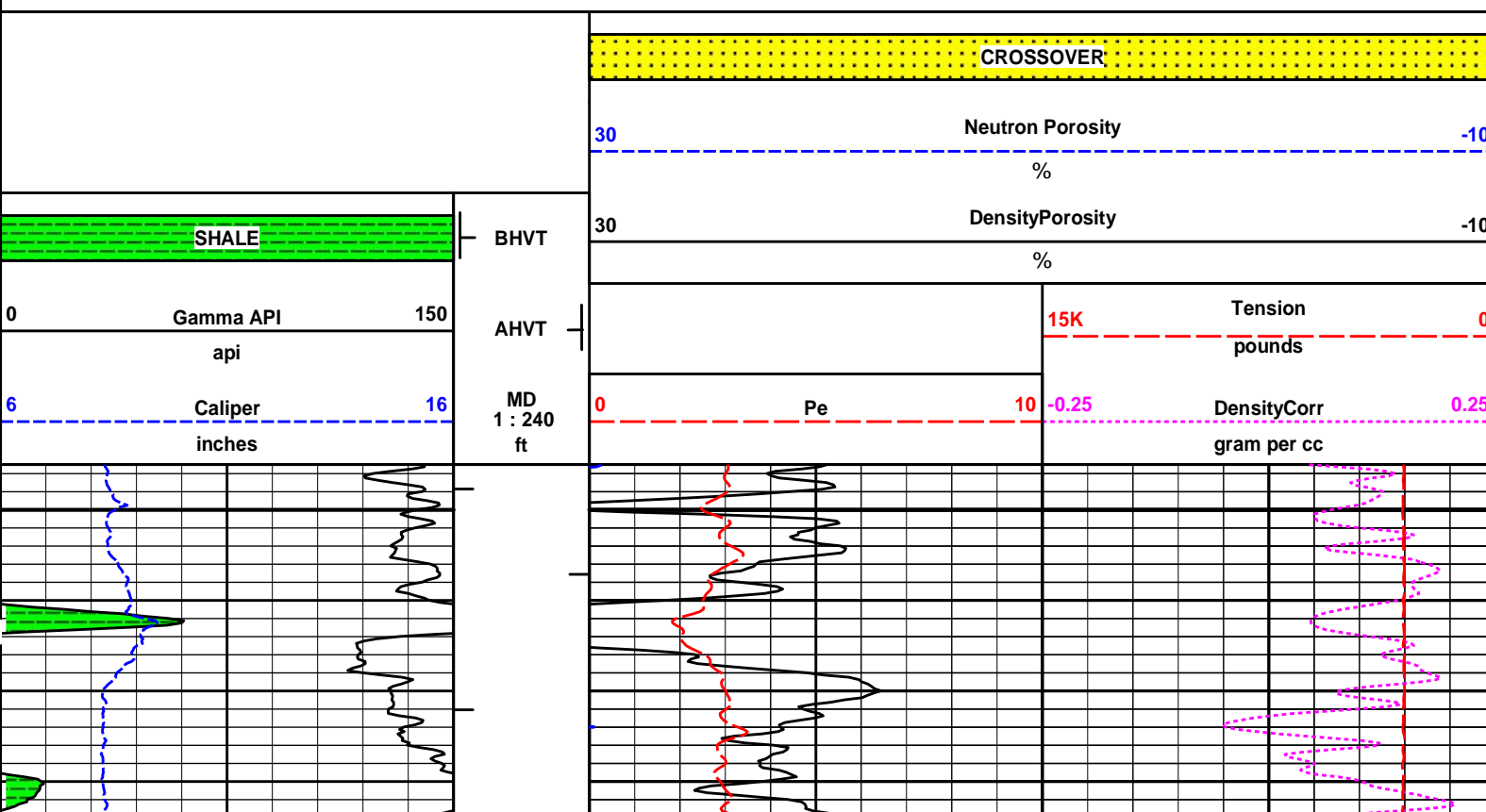
Service Ticket No.: 904382733						API No.: 05-073-06726-00-00						PGM Version: WL INSITE R5.0.5 (Build 8)																	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE												RESISTIVITY SCALE CHANGES																	
Date		Sample No.										Type Log		Depth		Scale Up Hole				Scale Down Hole									
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.				@				@				ONE		ACRT		N/A		CENT		N/A									
Rmc @ Meas. Temp.				@				@						I-11022962															
Source Rmf		Rmc										S-11005909																	
Rm @ BHT				@				@																					
Rmf @ BHT				@				@																					
Rmc @ BHT				@				@																					
EQUIPMENT DATA																													
GAMMA						ACOUSTIC						DENSITY						NEUTRON											
Run No.		ONE				Run No.		ONE				Run No.		ONE				Run No.		ONE									
Serial No.		11048327				Serial No.		10747683				Serial No.		10960494				Serial No.		11055304									
Model No.		GTET				Model No.		BSAT				Model No.		SDLT				Model No.		DSNT									
Diameter		3,625"				No. of Cent.		2				Diameter		5,5"				Diameter		3.625"									
Detector Model No.		T-102				Spacing		EVEN				Log Type		GAM-GAM				Log Type		NEU-NEU									
Type		SCINT										Source Type		CS137				Source Type		AM241BE									
Length		8"				LSA [Y/N]						Serial No.		5168GW				Serial No.		DSN-424									
Distance to Source		N/A				FWDA [Y/N]						Strength		1.5 Ci				Strength		15.0 Ci									
LOGGING DATA																													
GENERAL						GAMMA				ACOUSTIC				DENSITY						NEUTRON									
Run		Depth		Speed		Scale		Scale		Matrix		Scale		Matrix		Scale		Matrix											
No.		From To		ft/min		L R		L R				L R				L R													
ONE		TD		CSG		REC		0		150		30		10		47.6 uSec/ft		30		10		2.71 gr/cc		30		10		LIME	

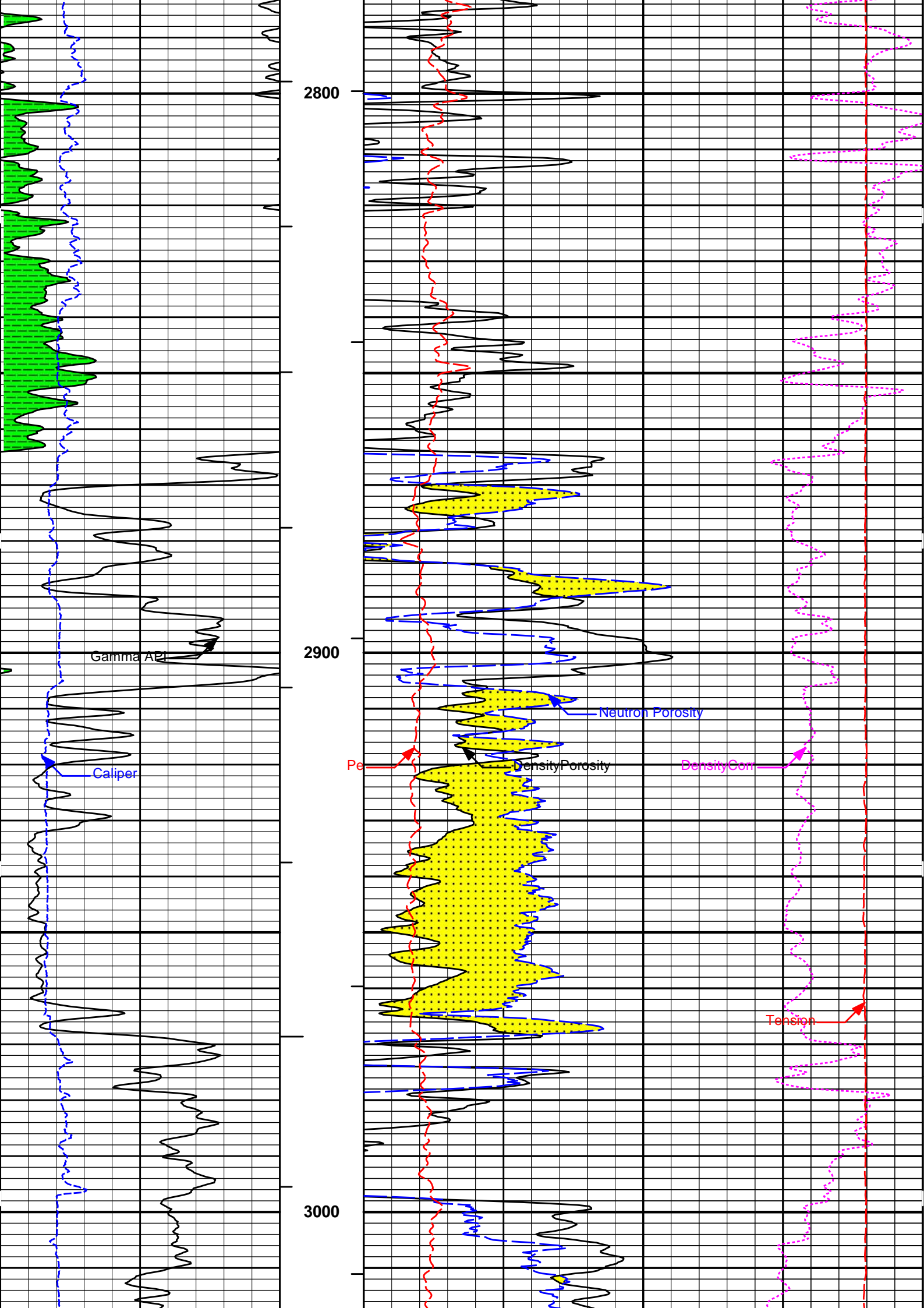
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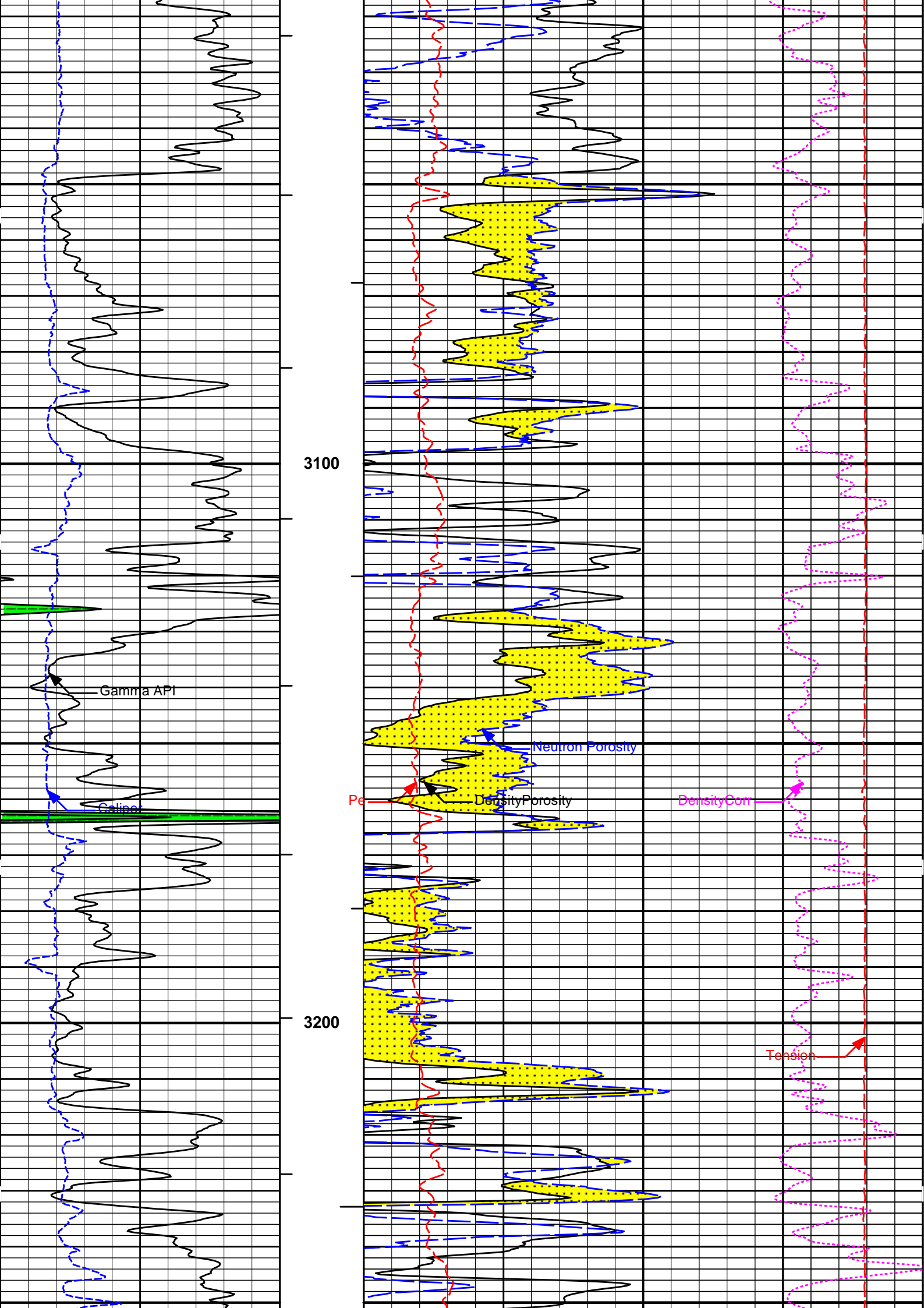
Plot Time: 20-Oct-17 20:27:30
Plot Range: 2745 ft to 7522.58 ft
Data: CLARK_13-24\Well Based\DETAILS\
Plot File: \\POROSITY\Porosity IQ 5 MAIN LIB

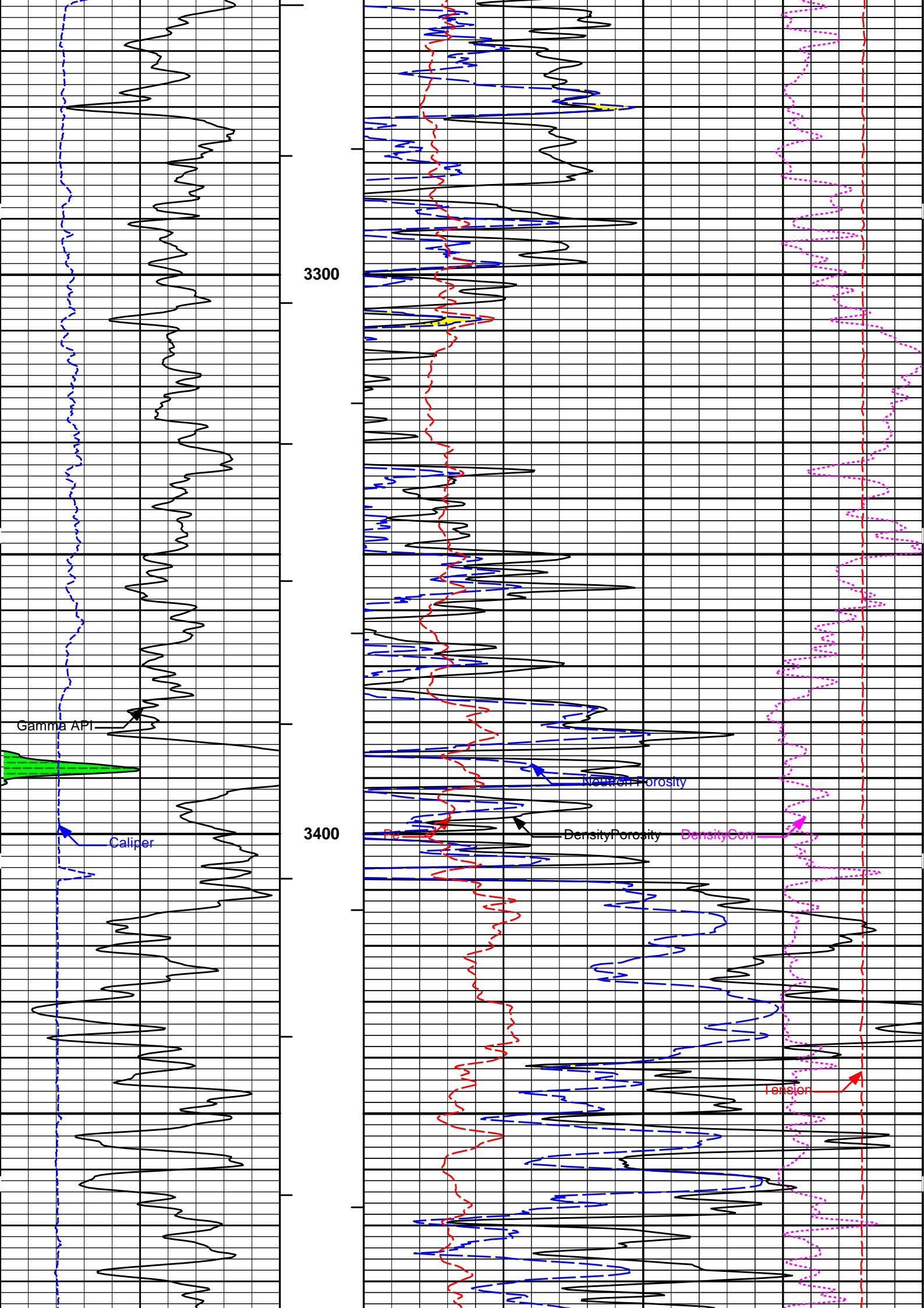
5 INCH MAIN LOG

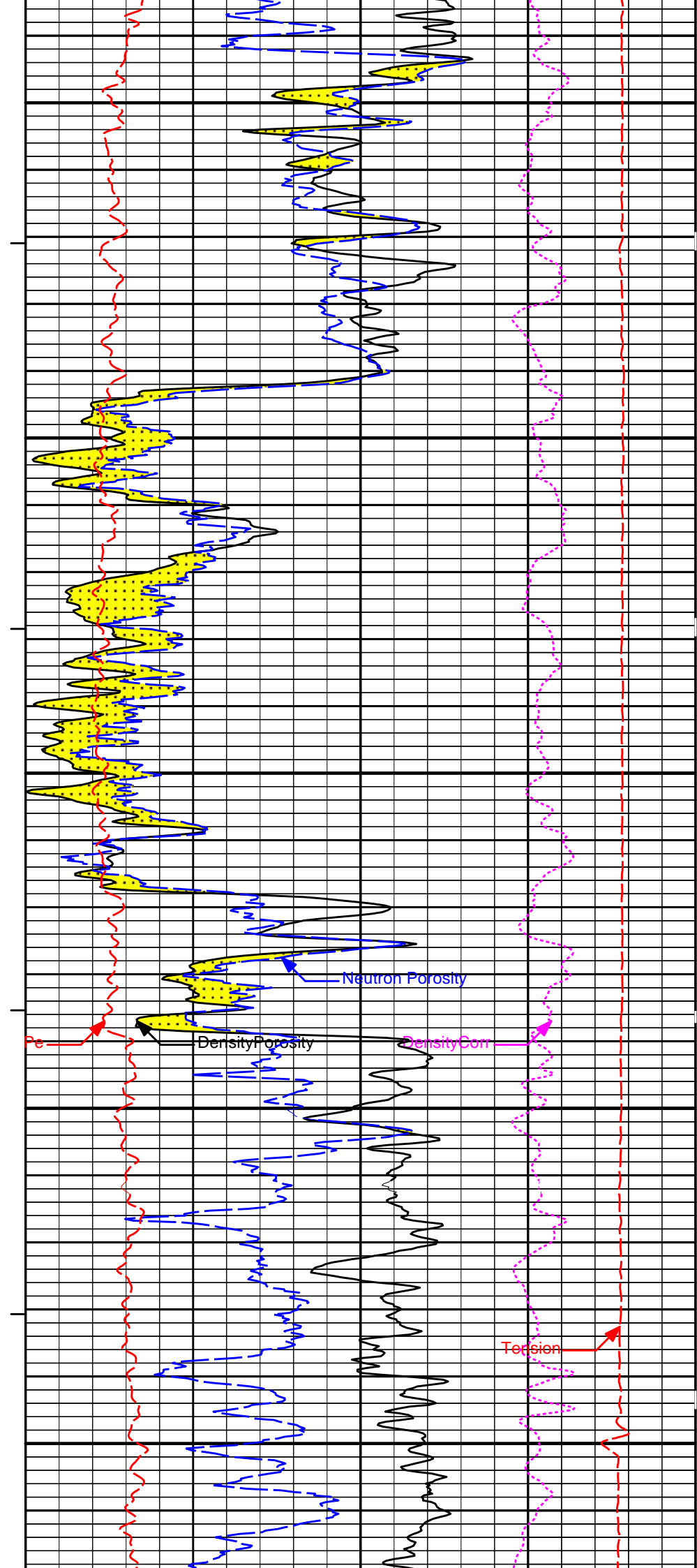
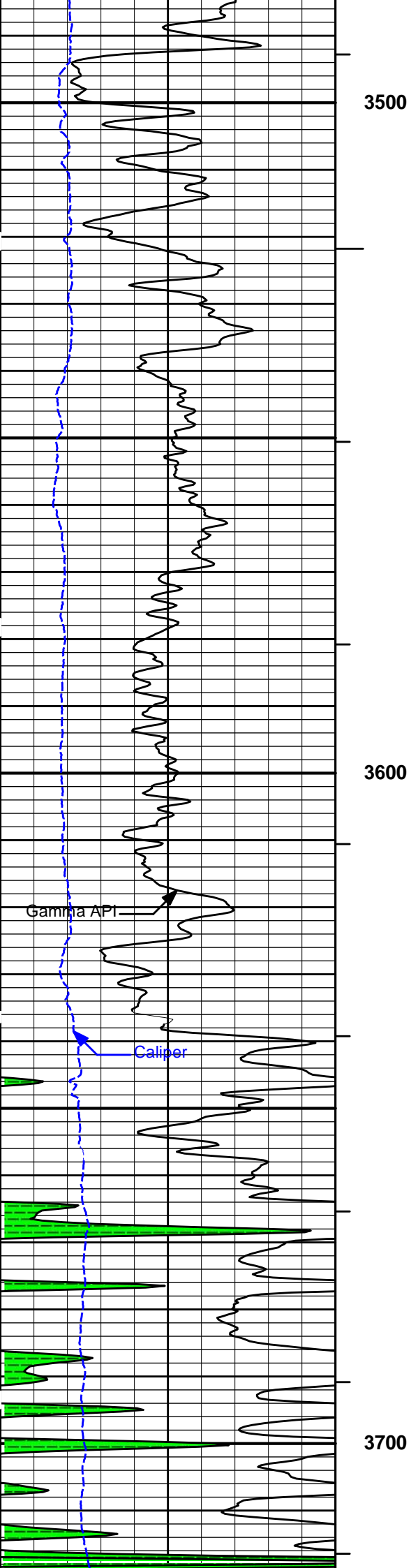
MEASURED DEPTH
MAIN SECTION 5" PER 100'

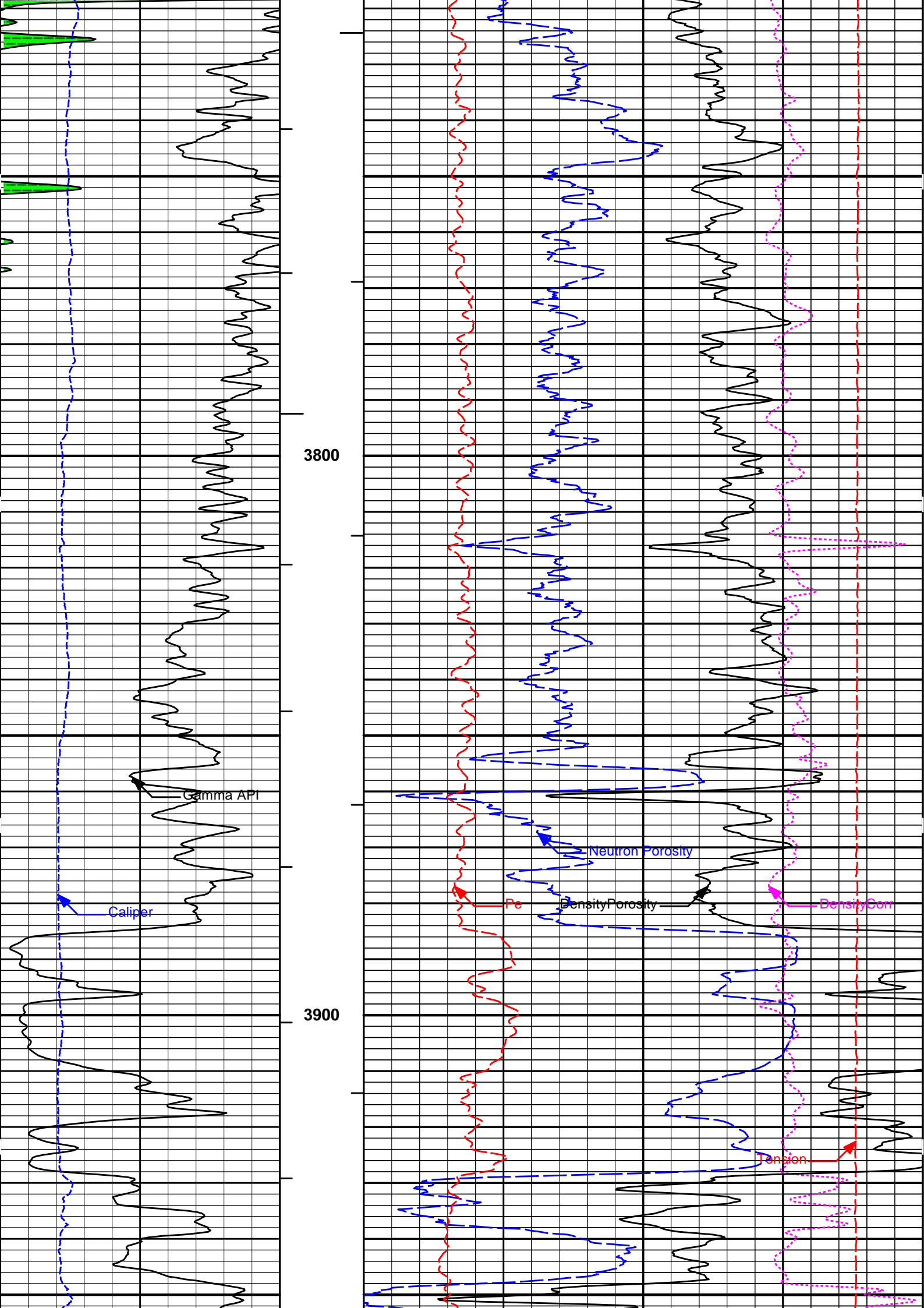


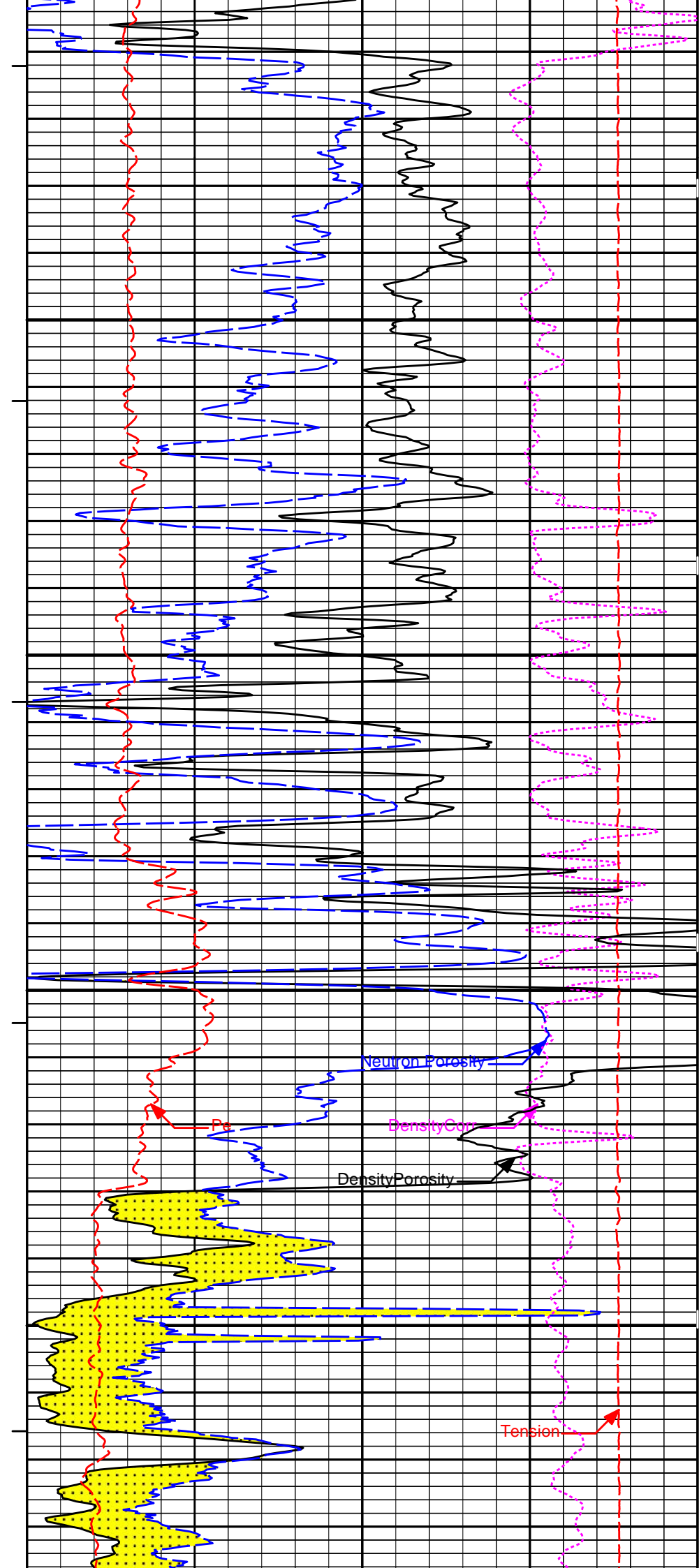
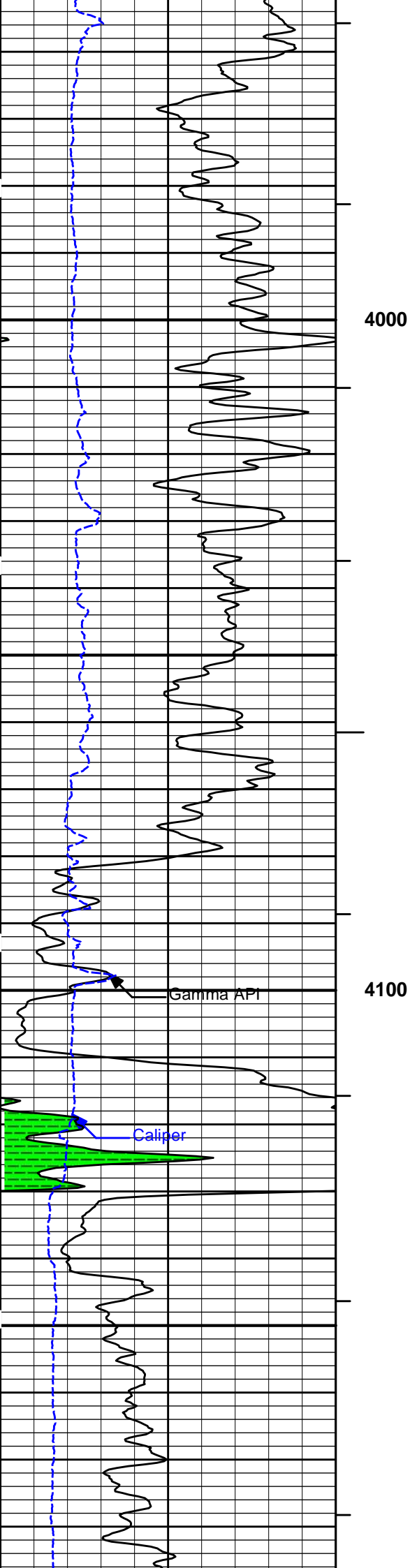


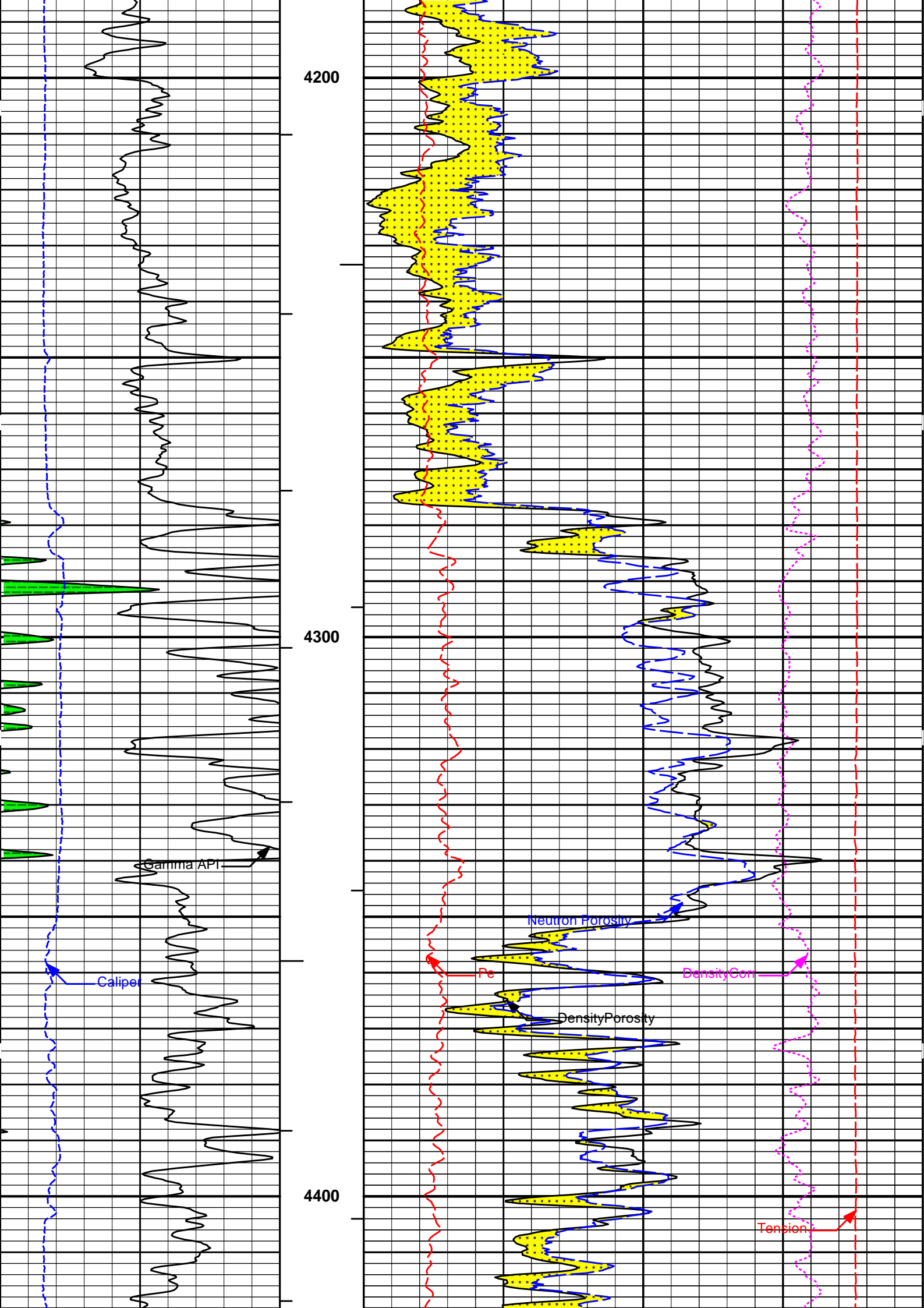


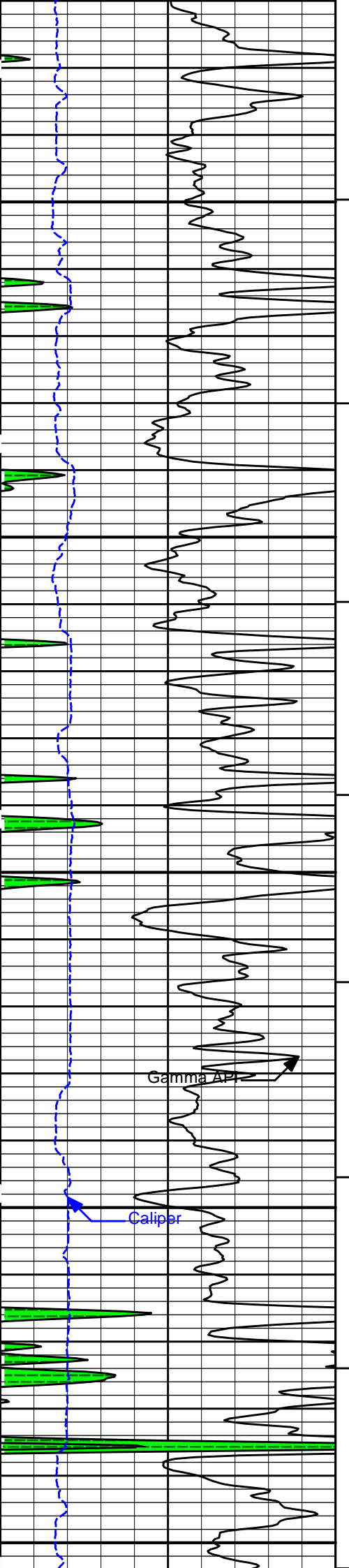






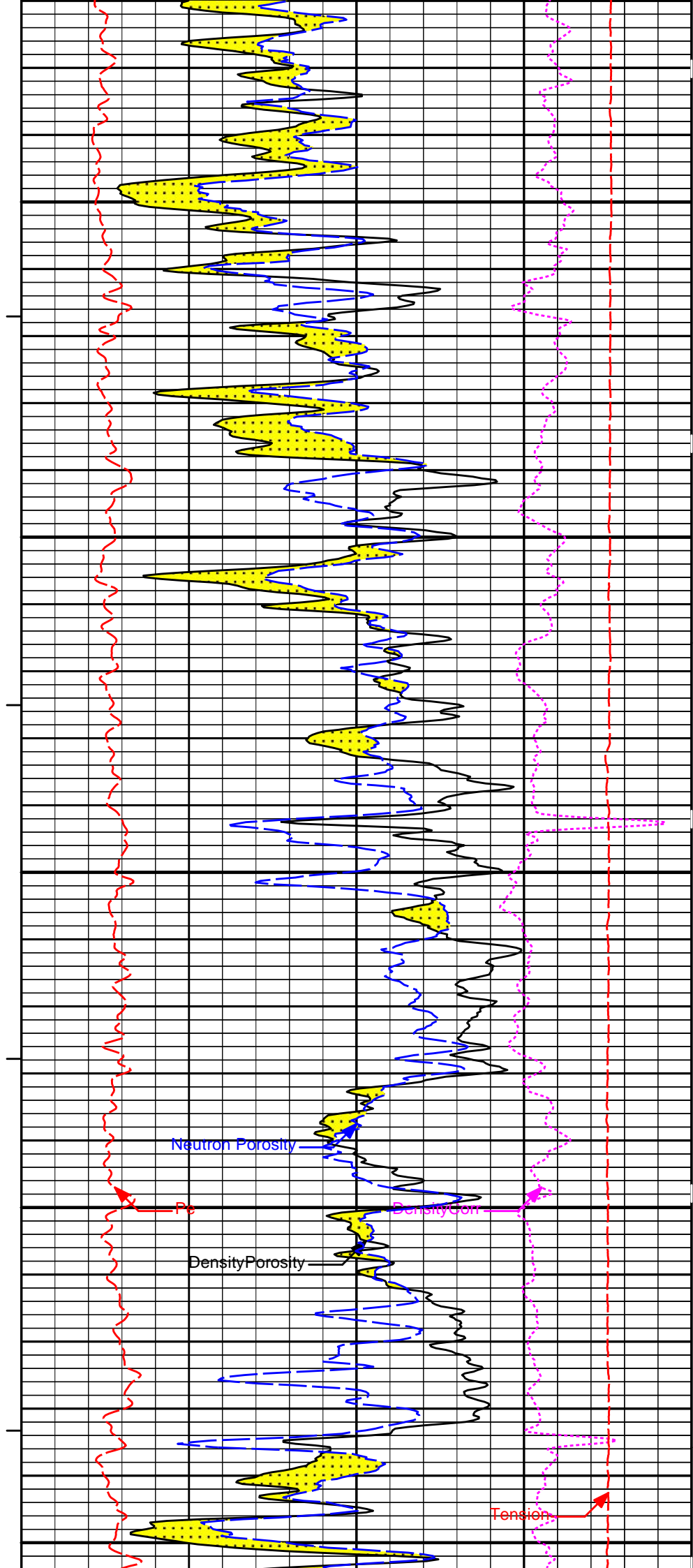


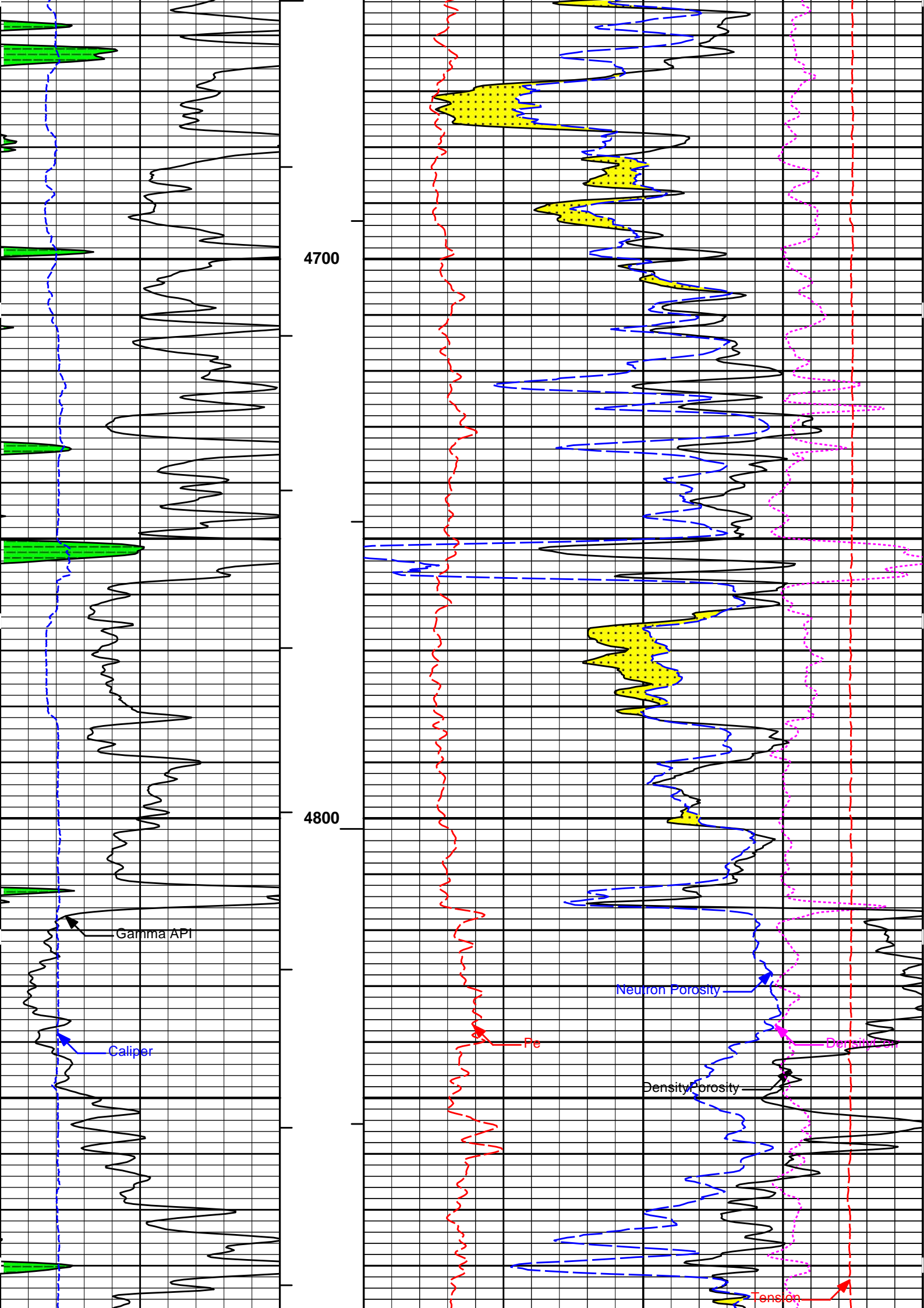


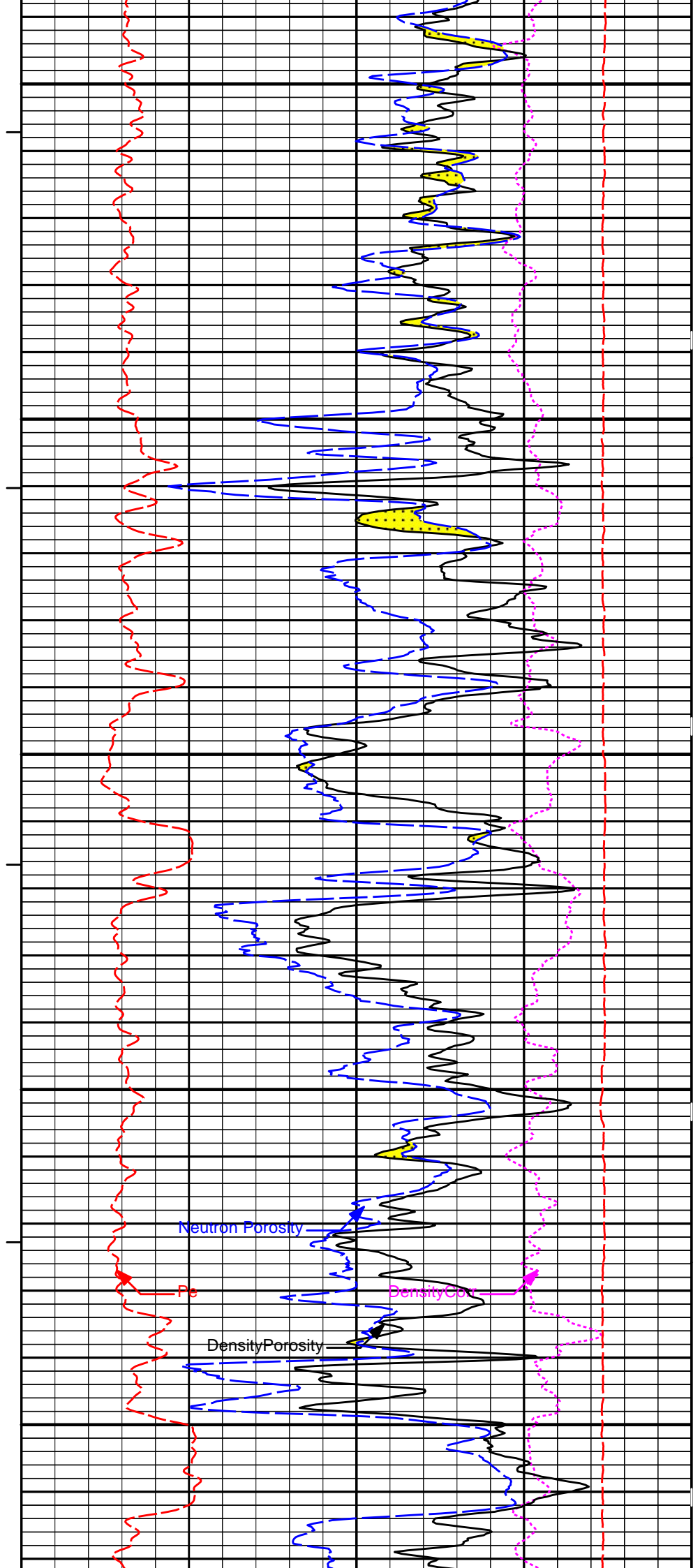
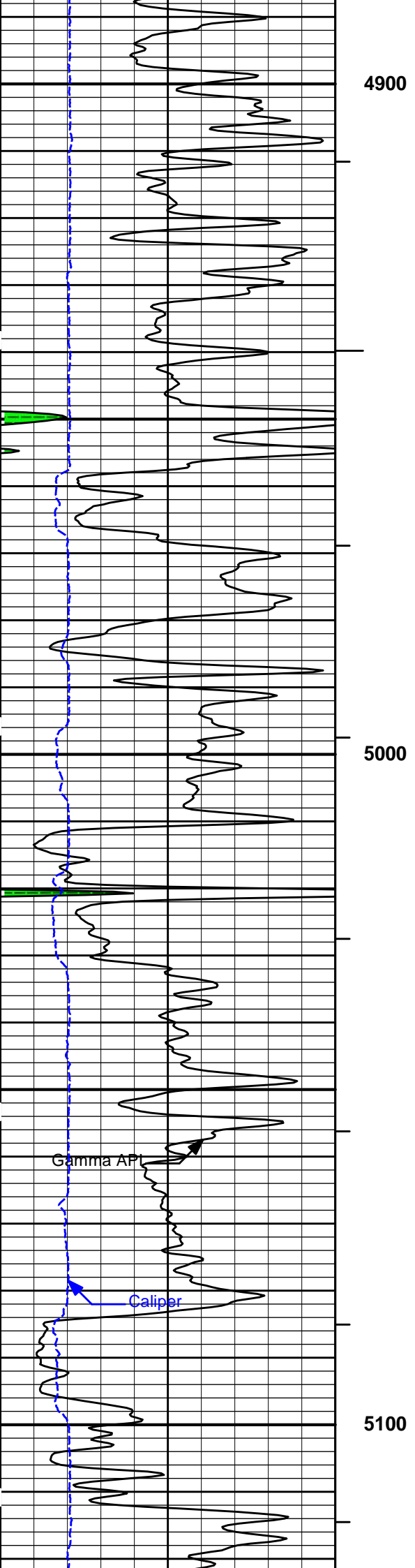


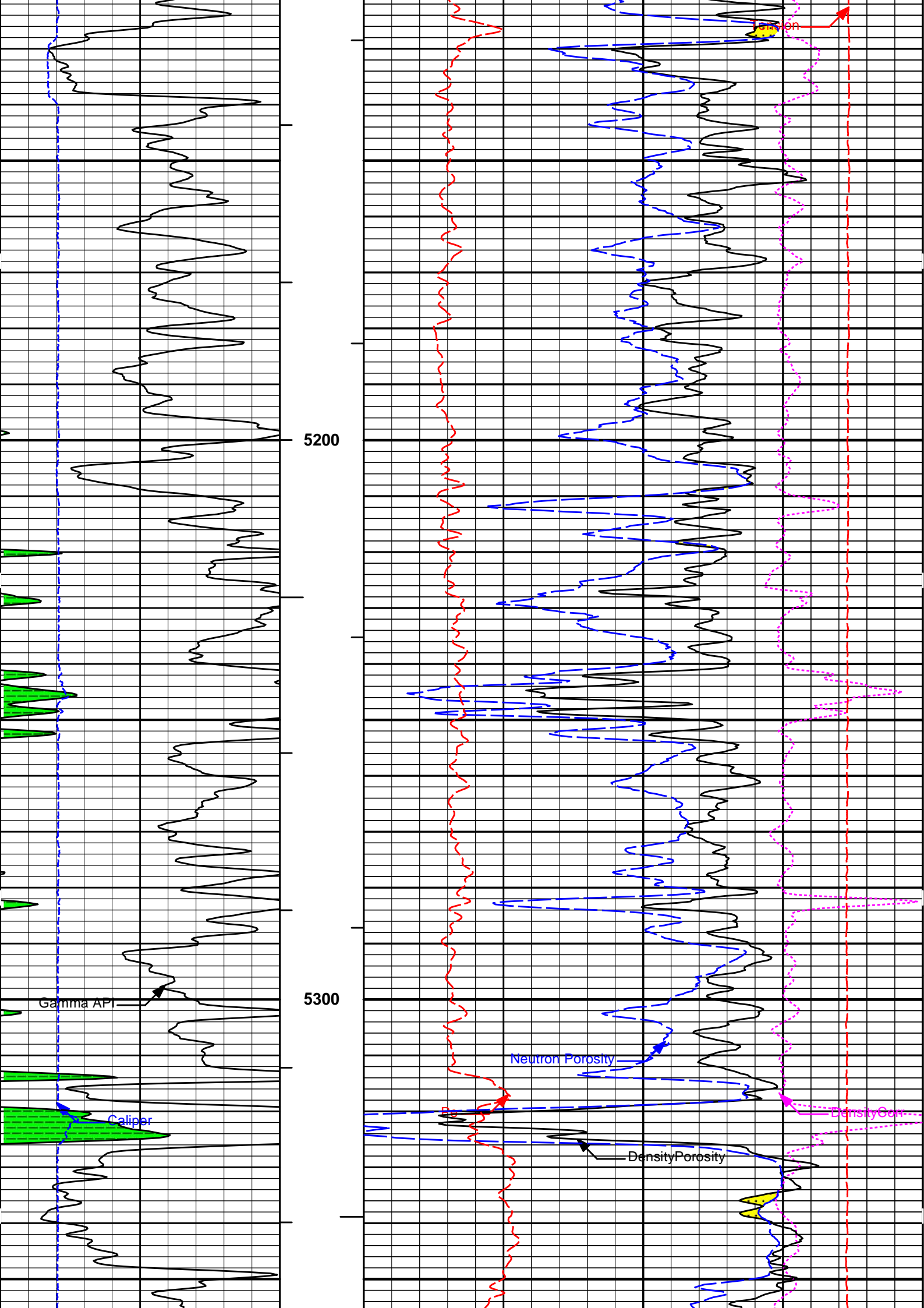
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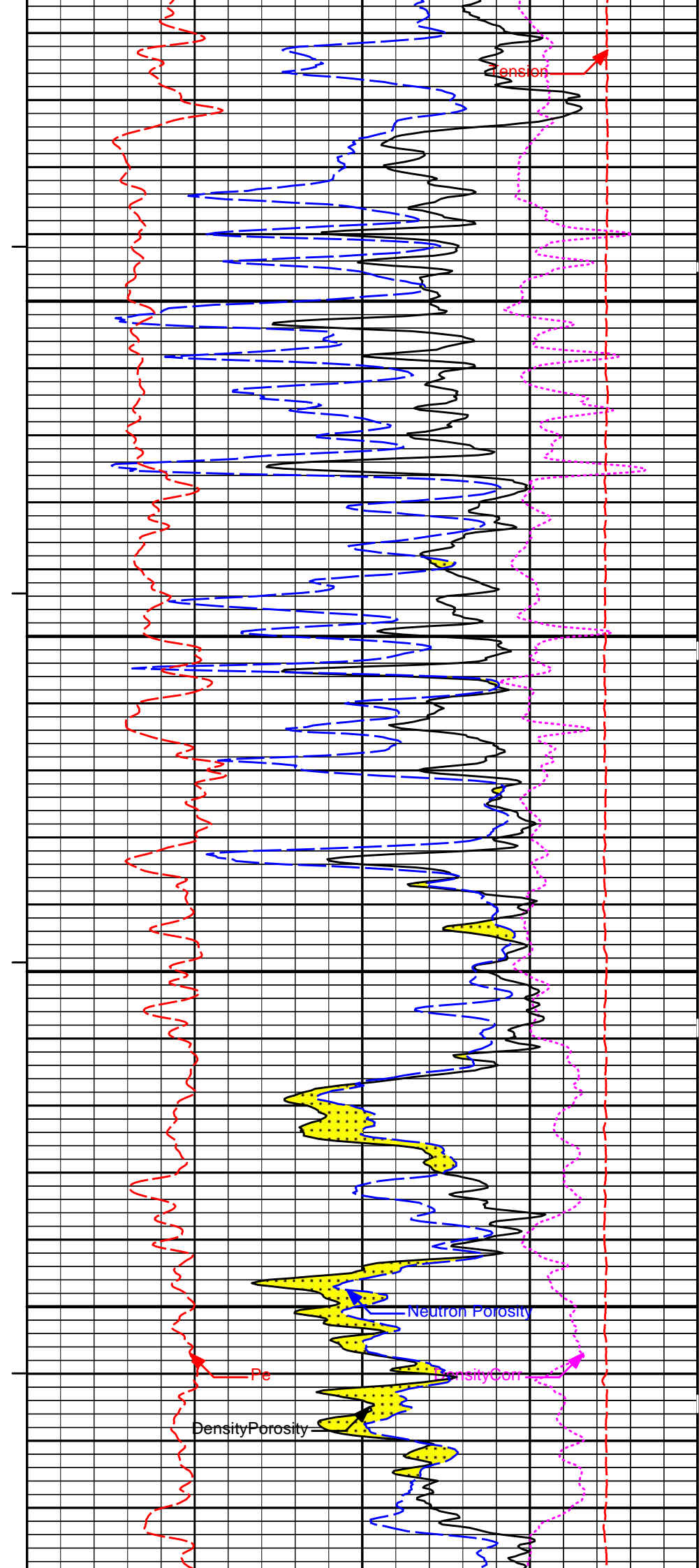
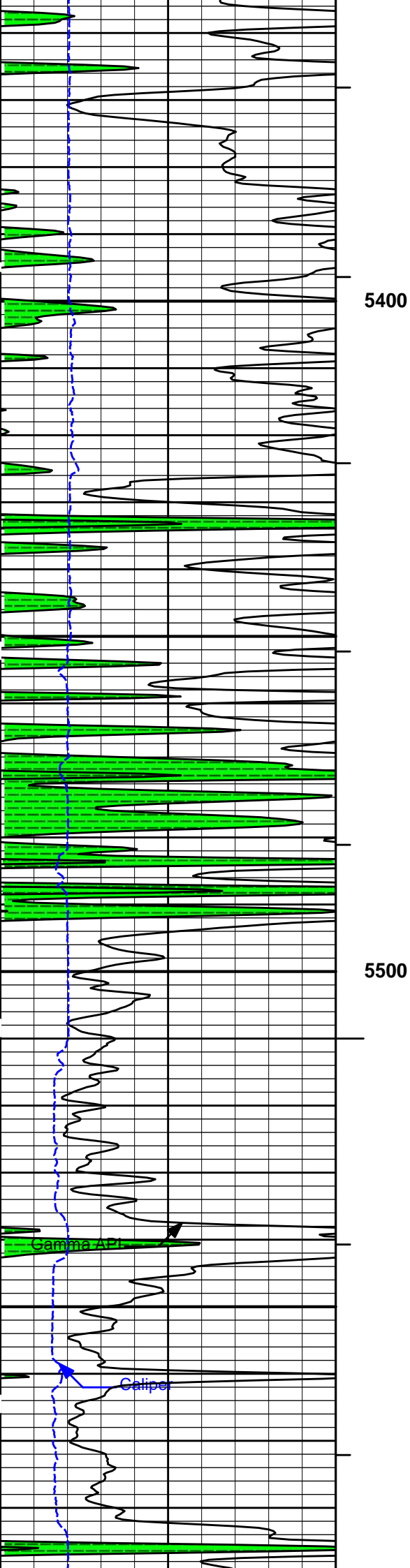
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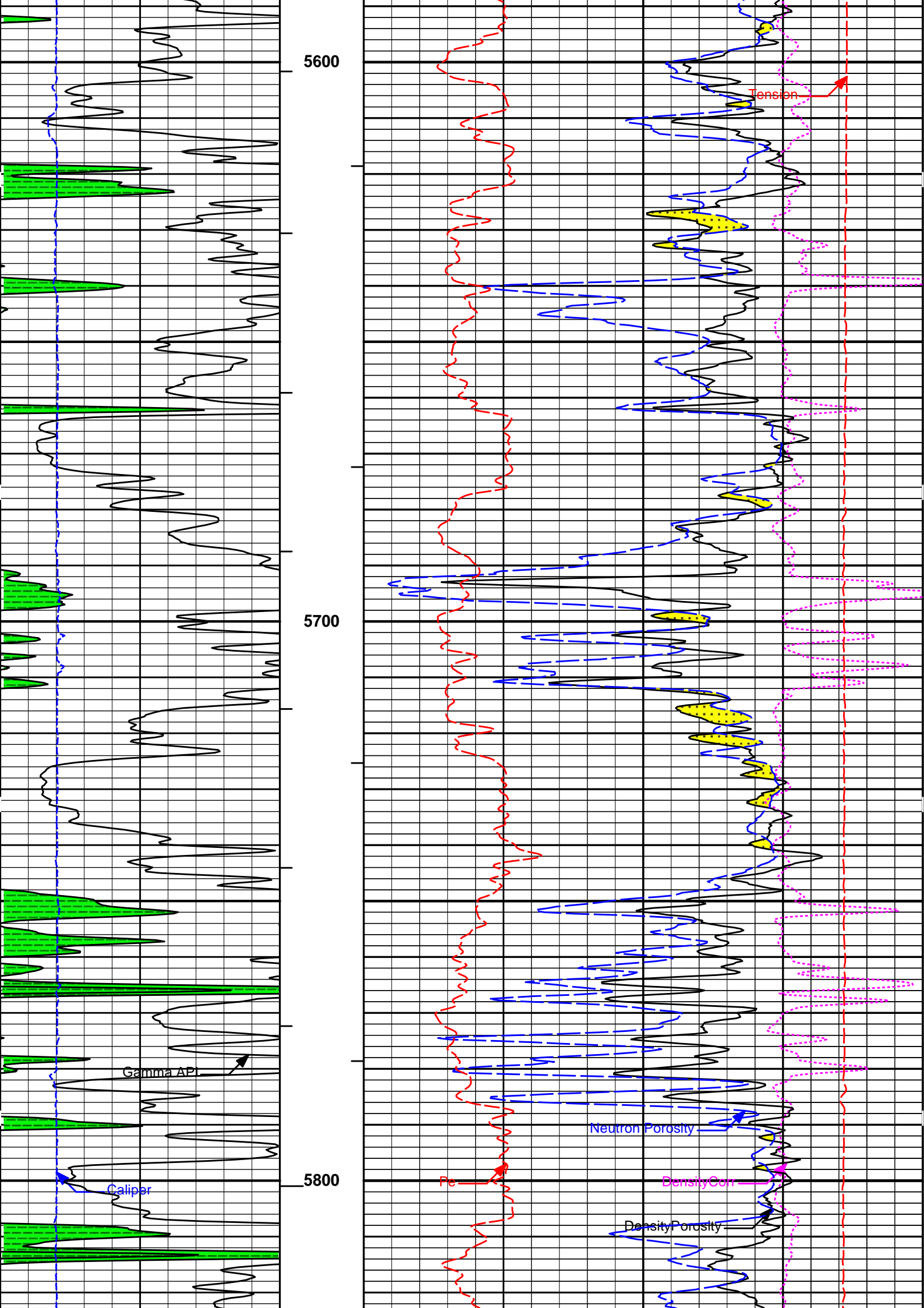


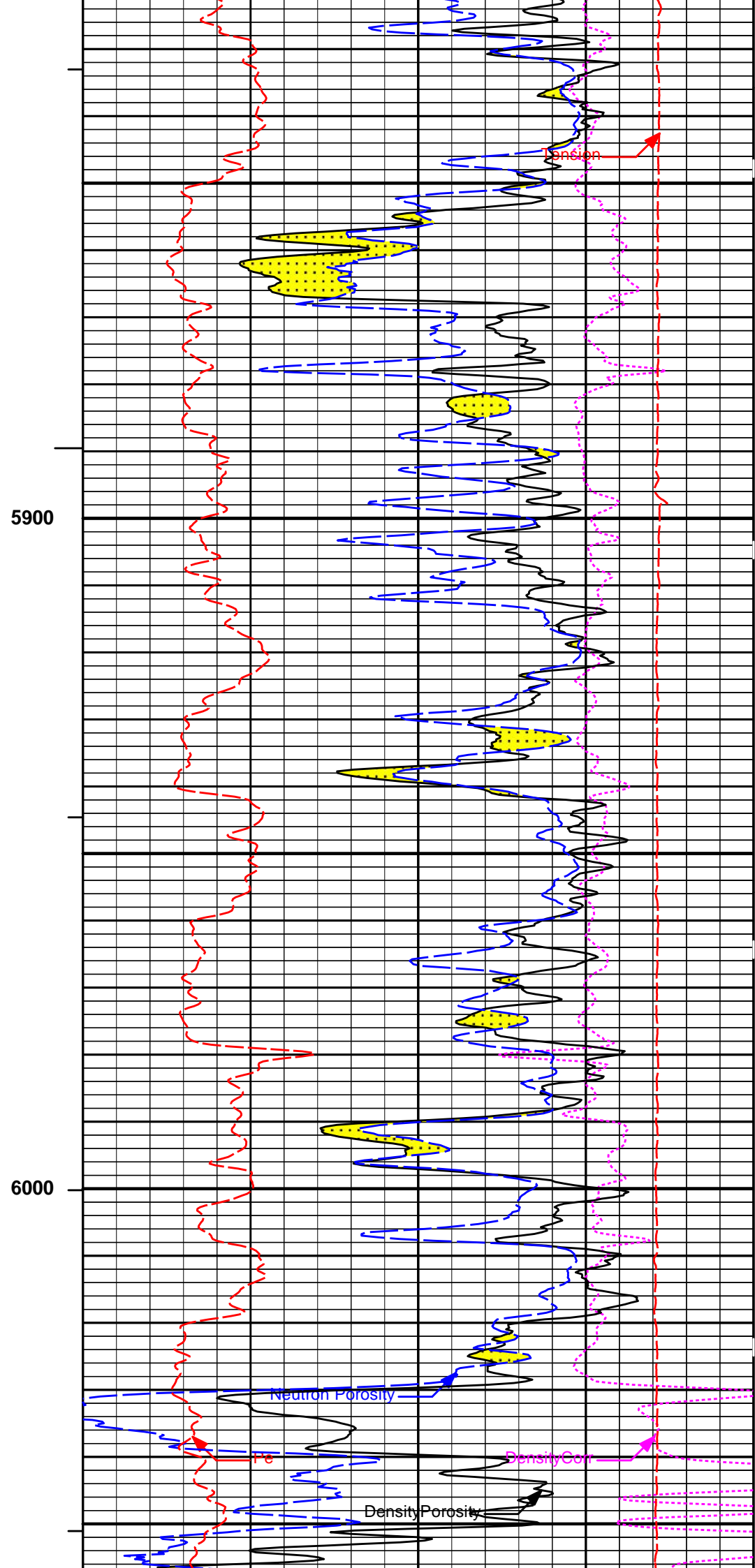
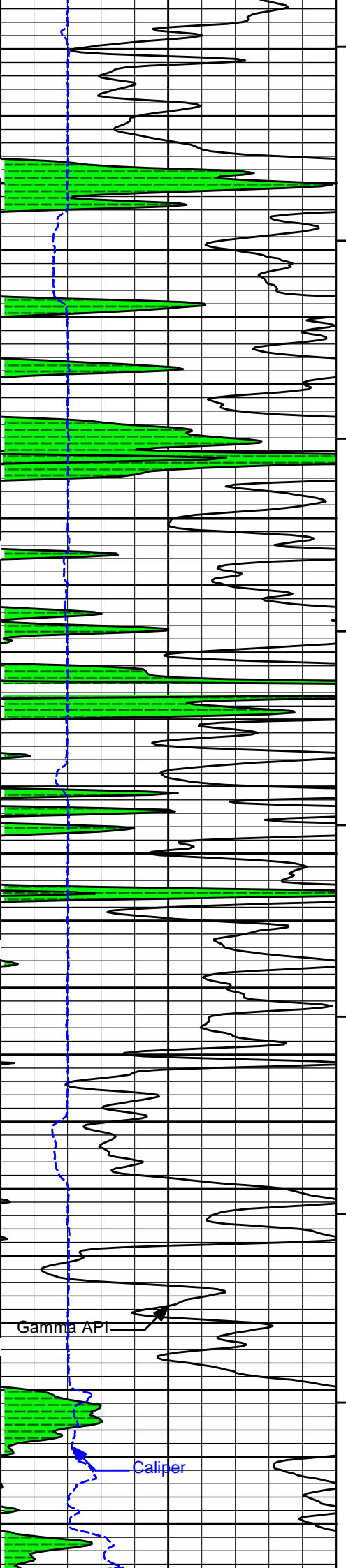


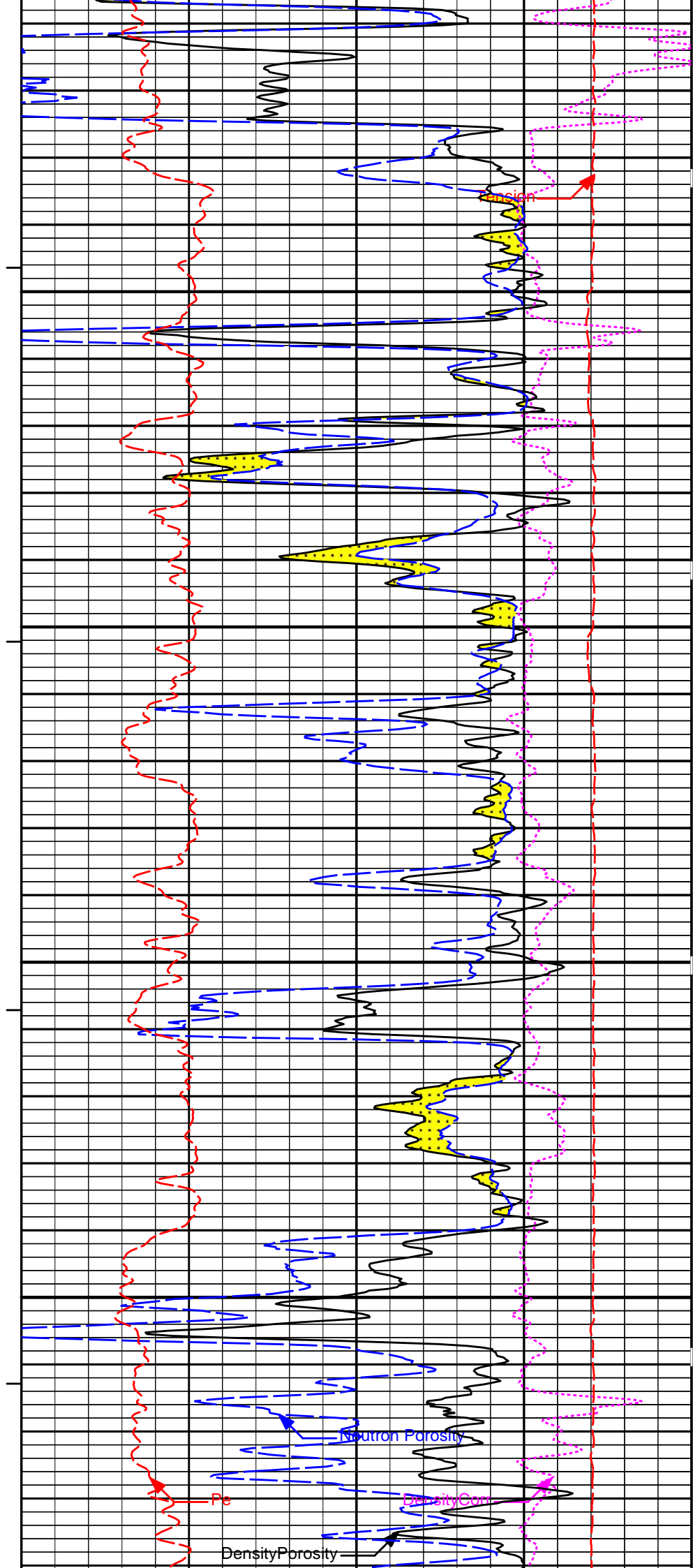
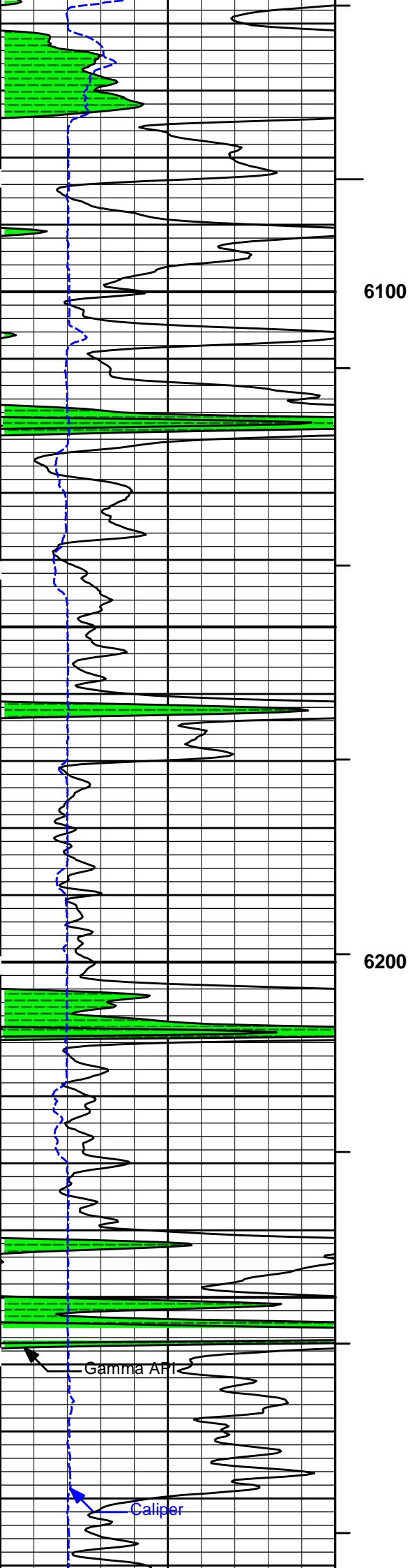


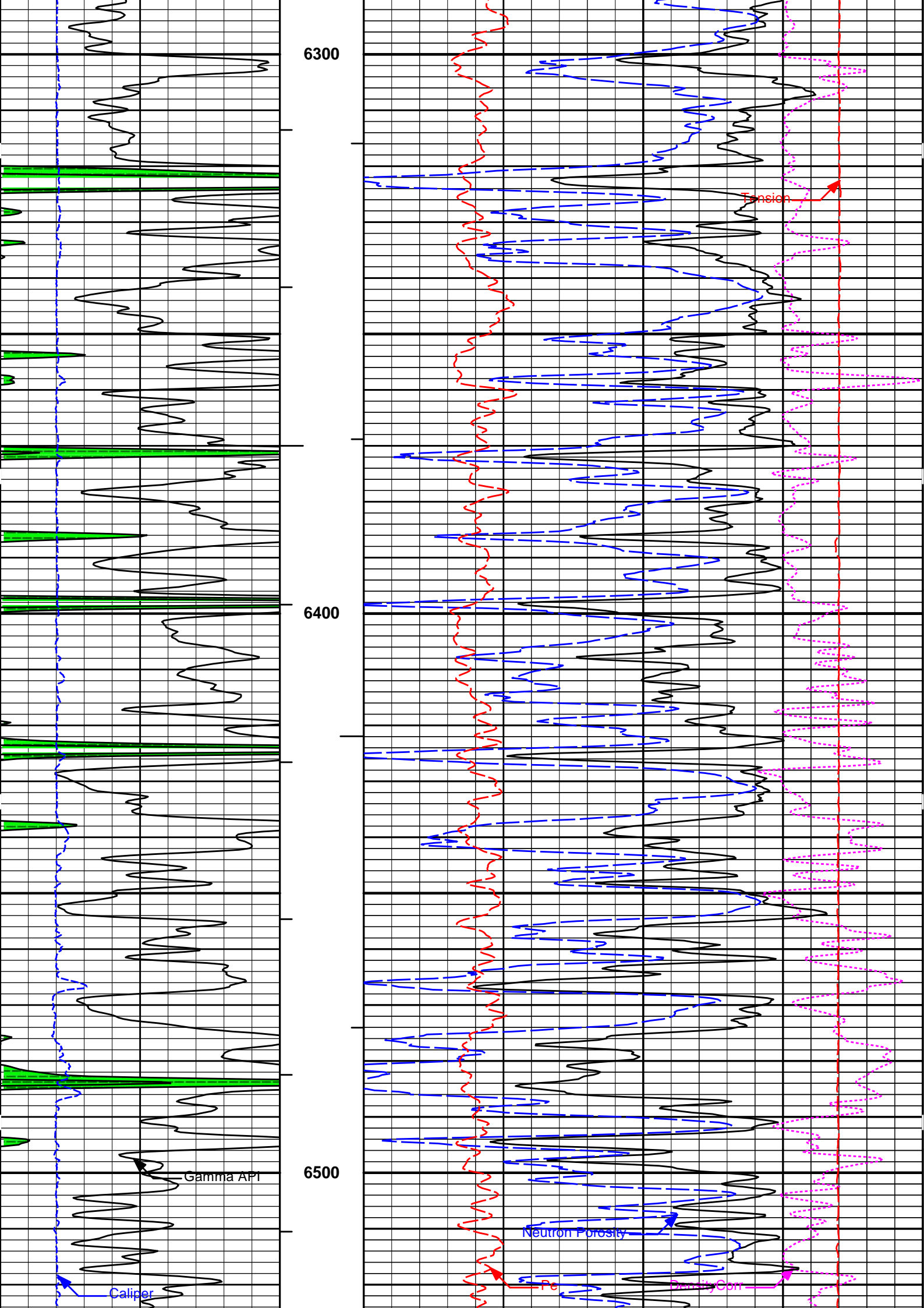


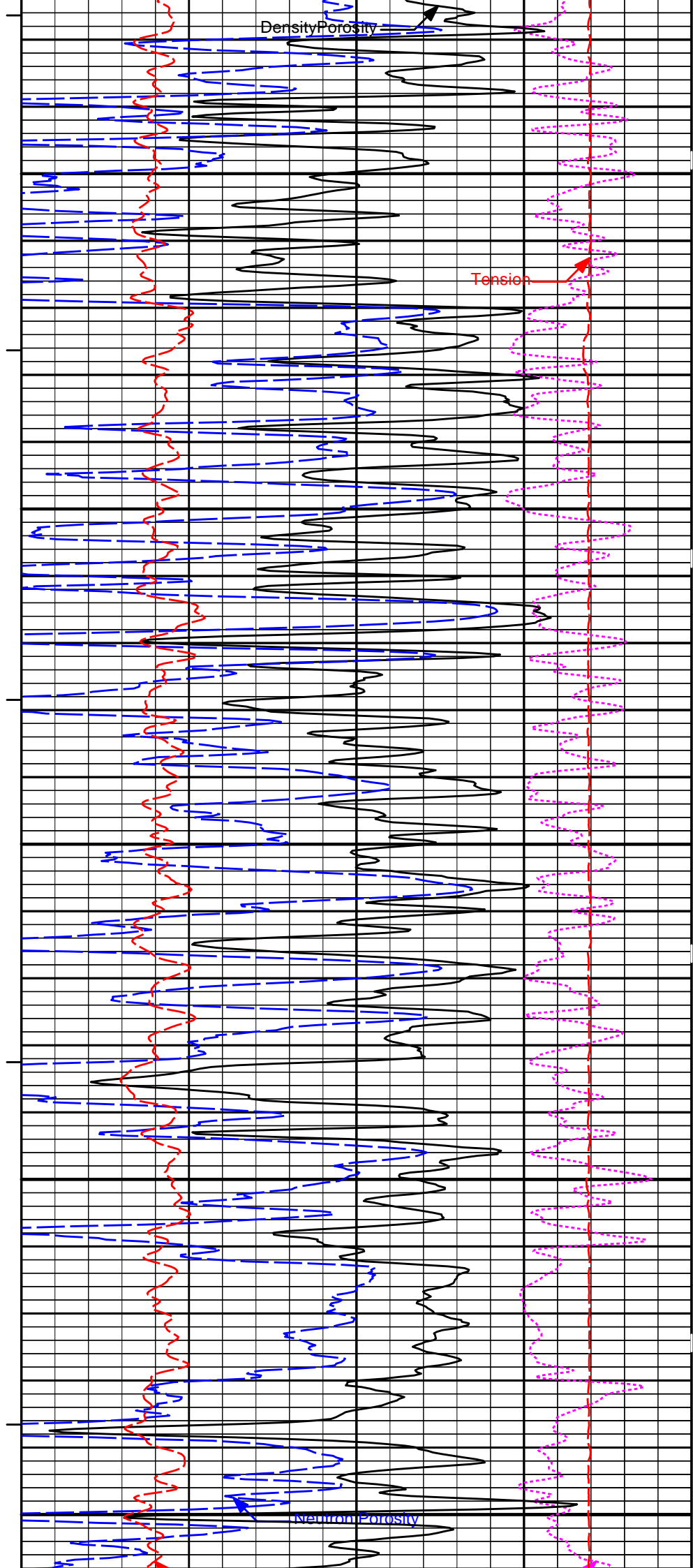
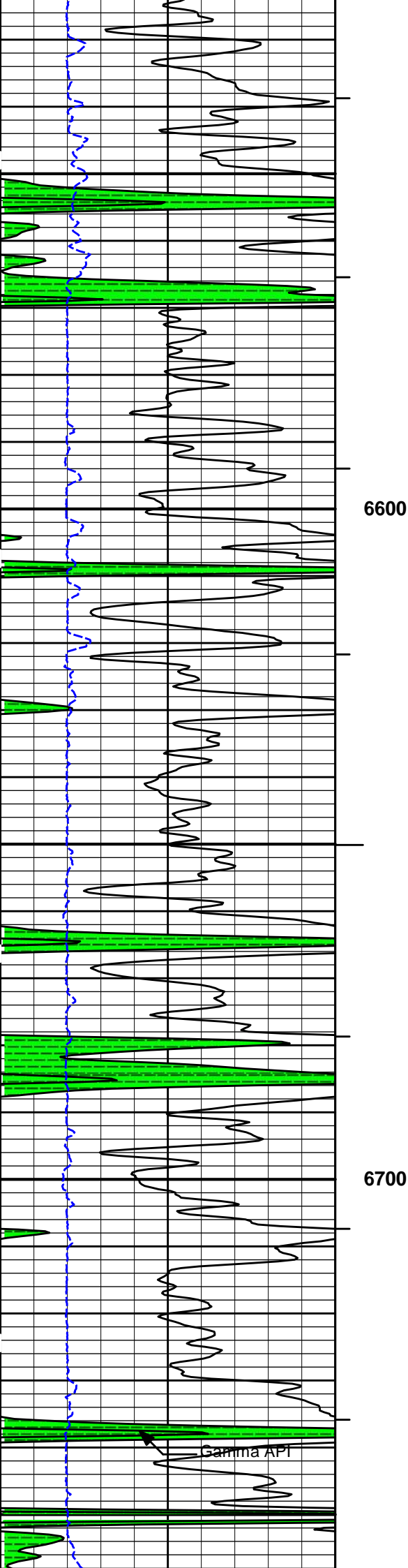


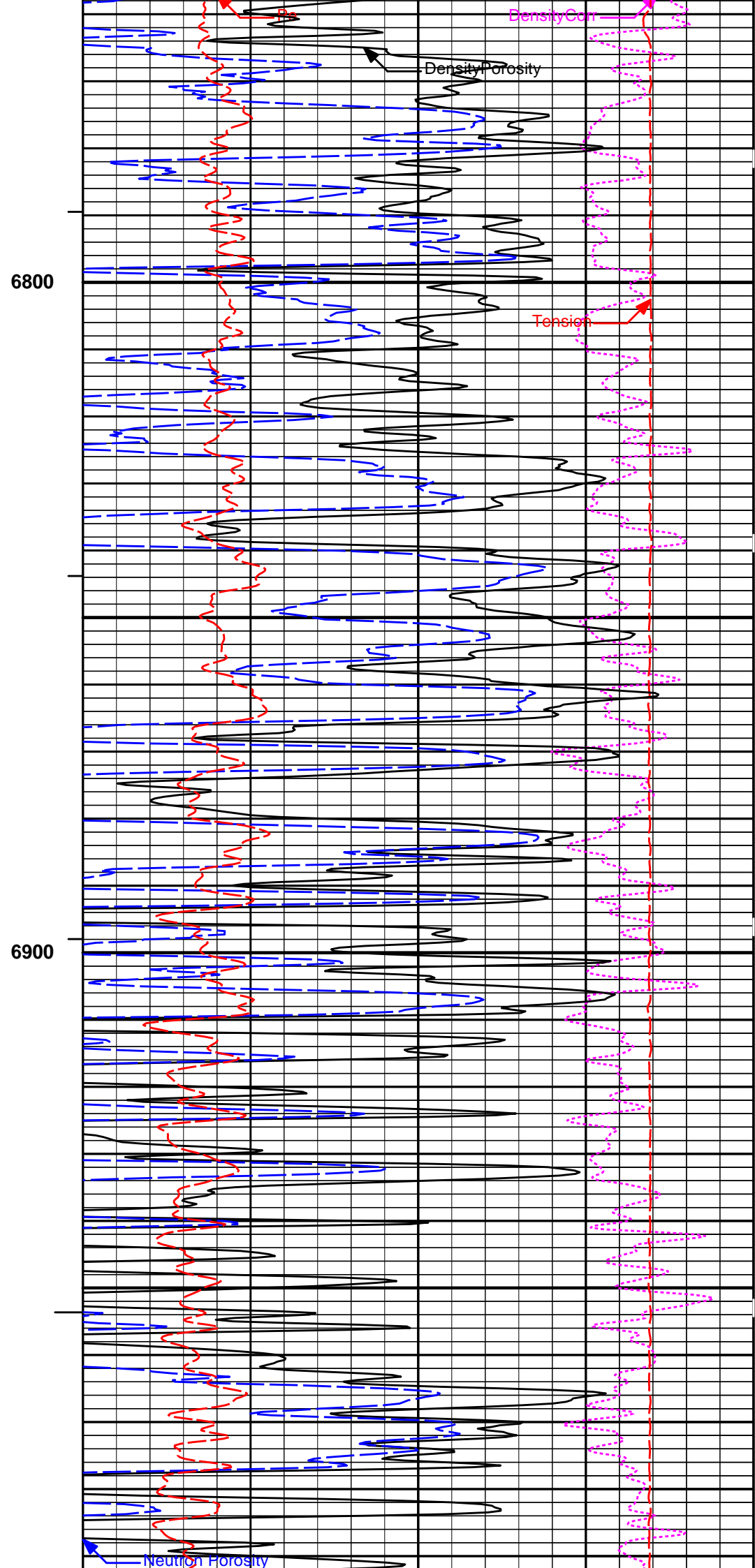
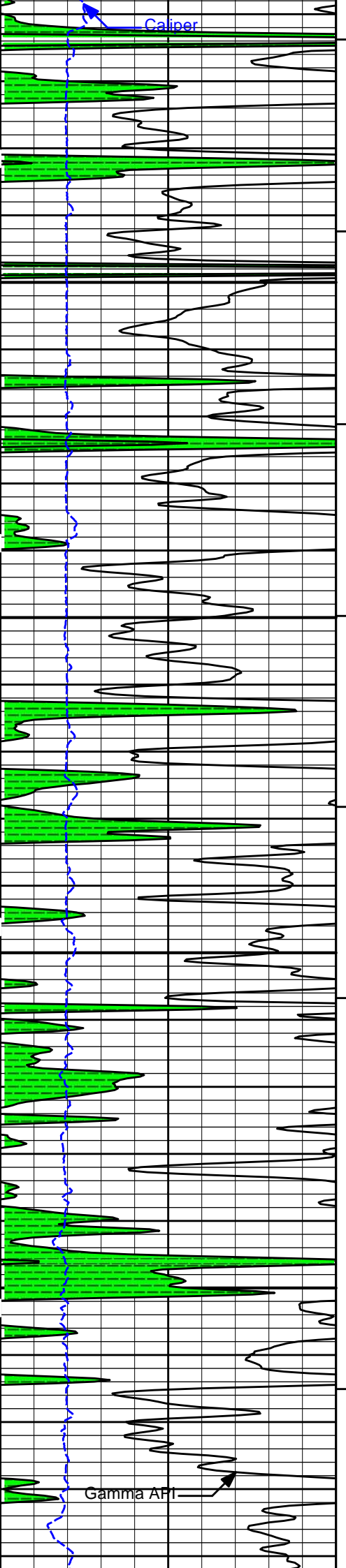


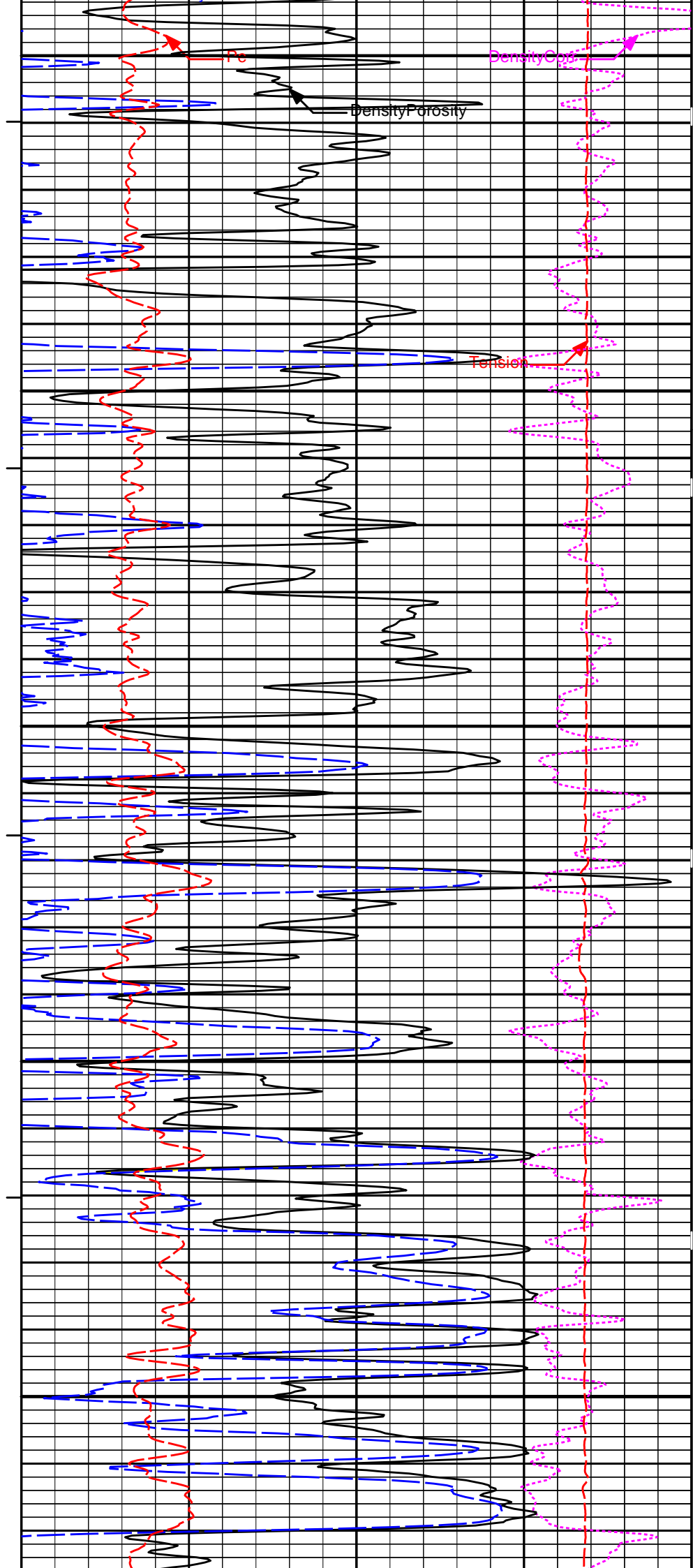
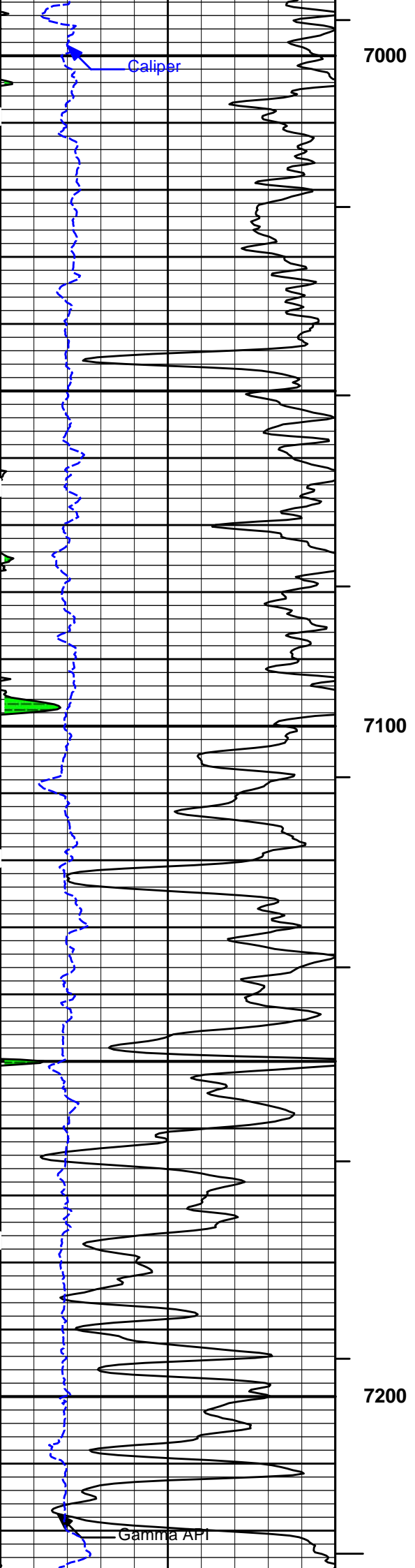


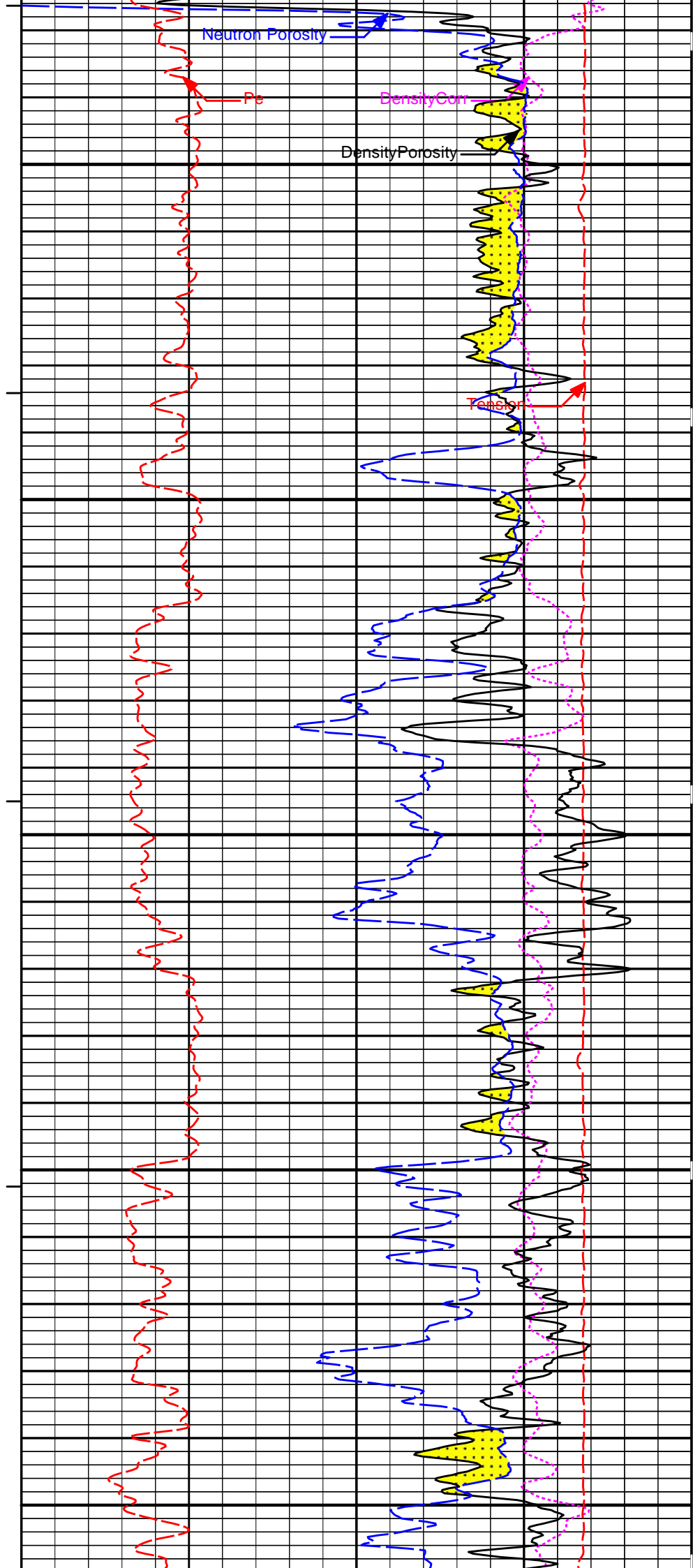
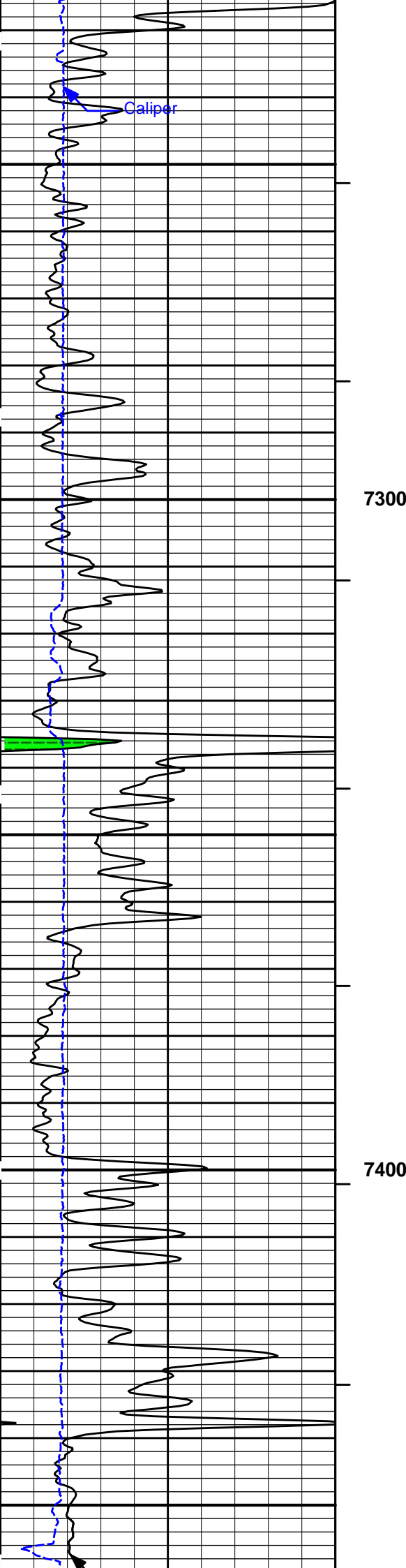


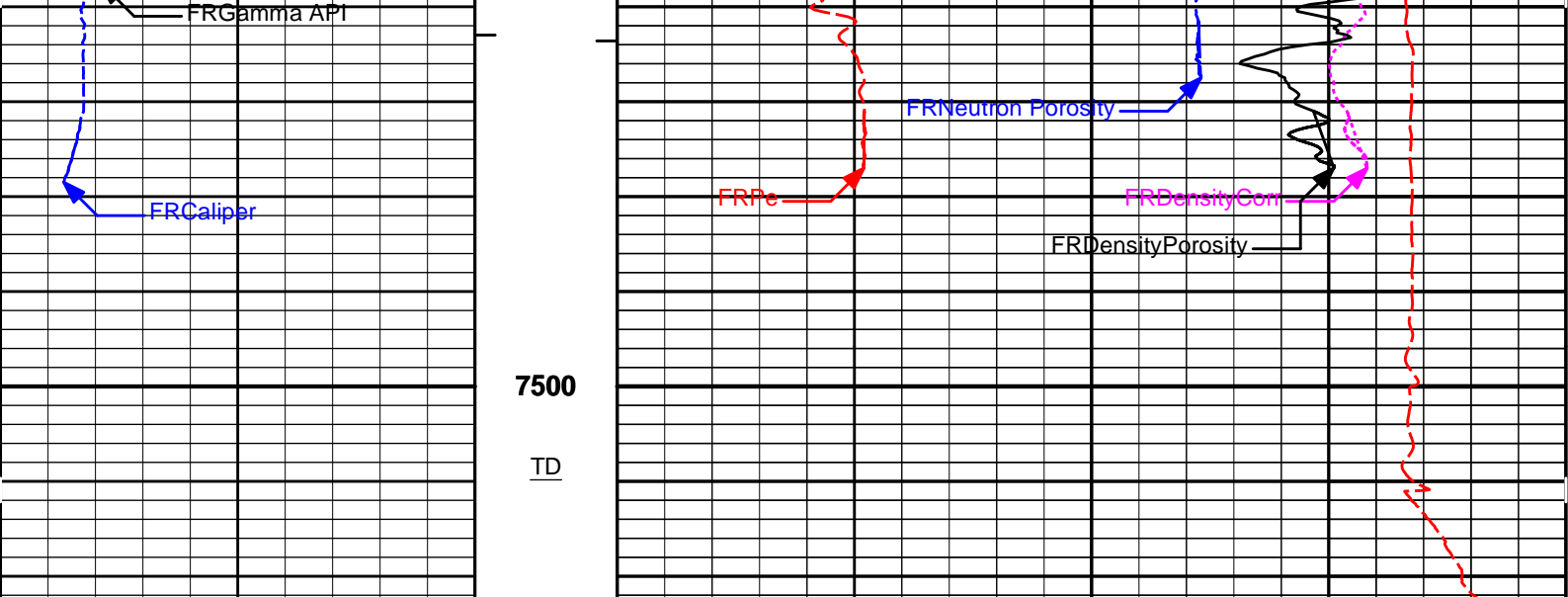












6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	ft						
	api		AHVT				15K	Tension	0
								pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

HALLIBURTON

Plot Time: 20-Oct-17 20:27:39
Plot Range: 2745 ft to 7522.58 ft
Data: CLARK_13-24\Well Based\DETAILS\
Plot File: \\POROSITY\Poro_IQ_5_MAIN_LIB

5 INCH MAIN LOG

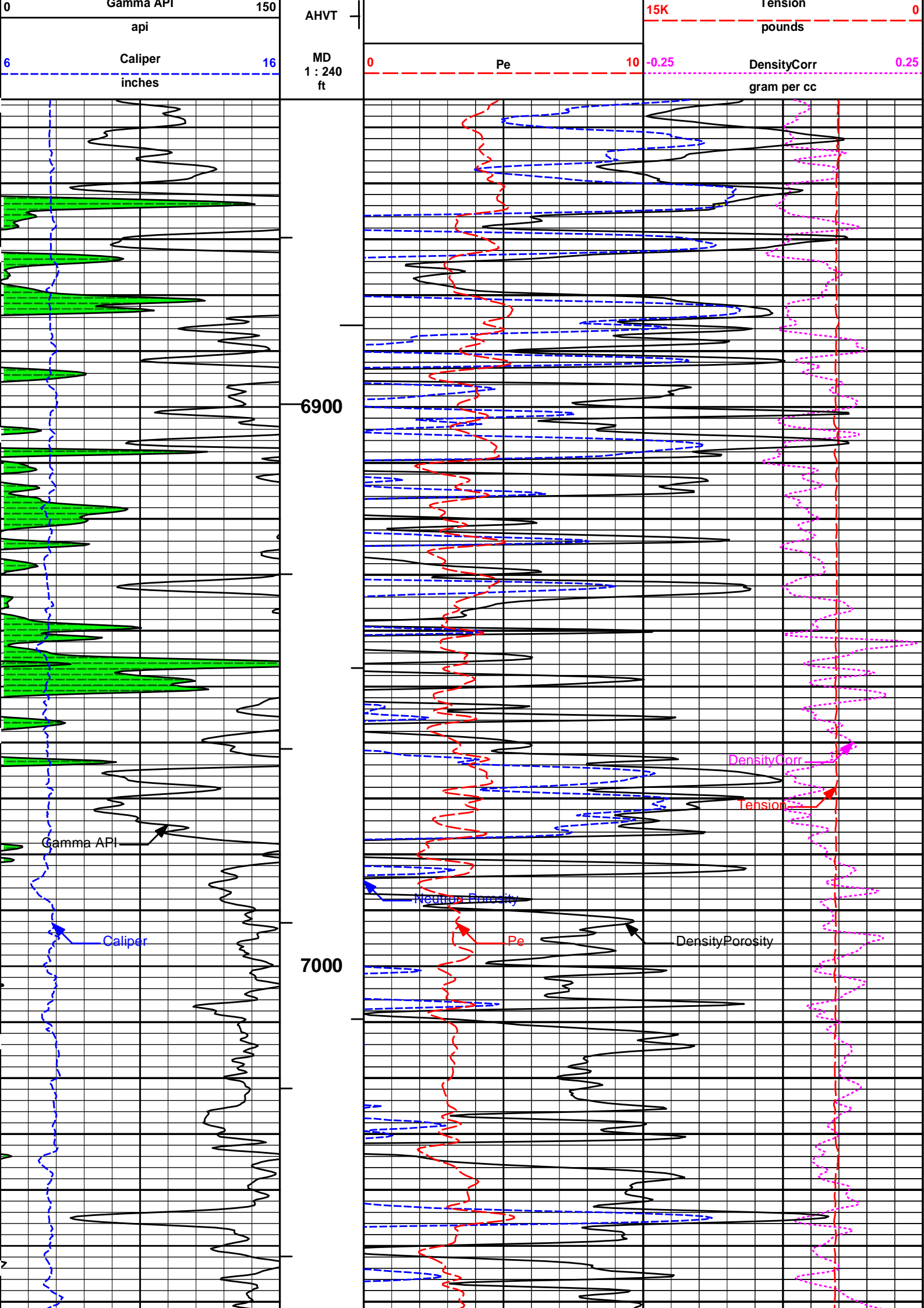
MEASURED DEPTH
MAIN SECTION 5" PER 100'

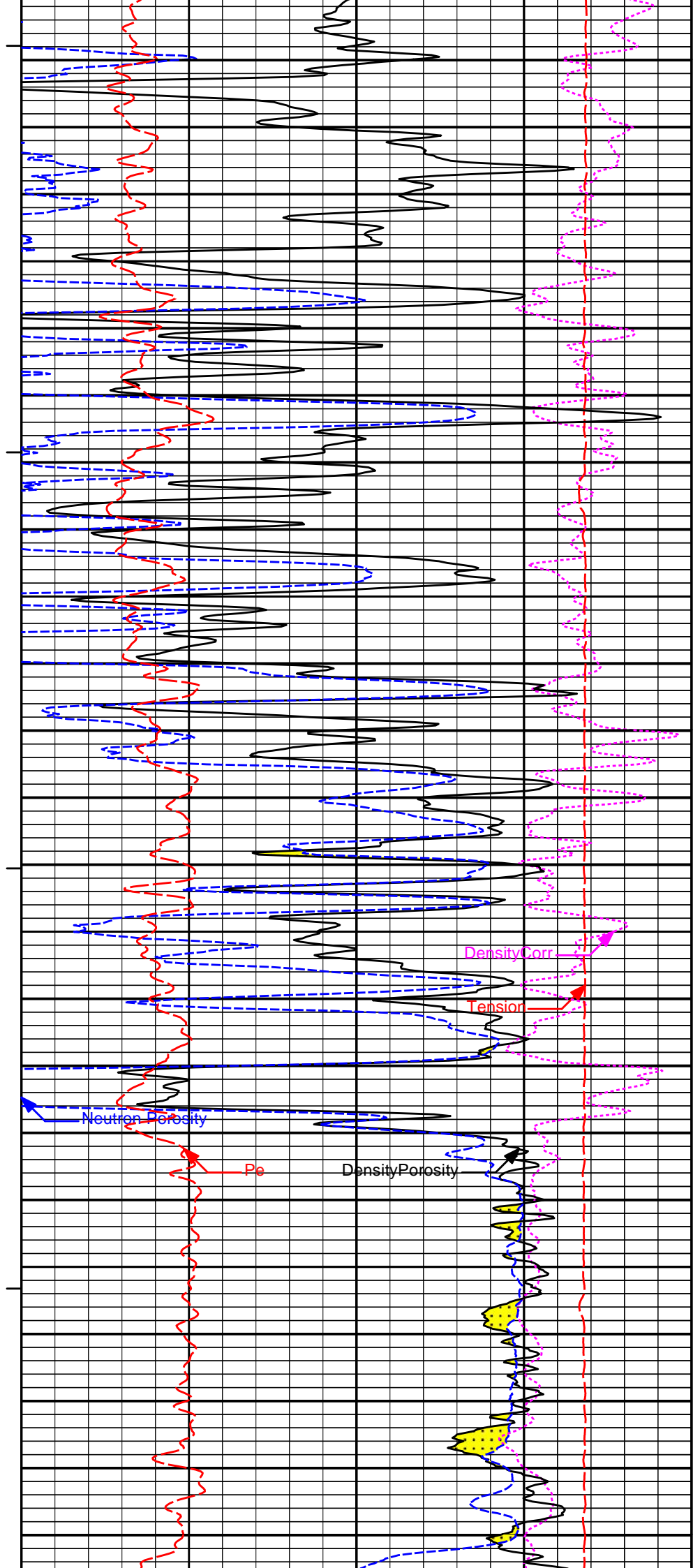
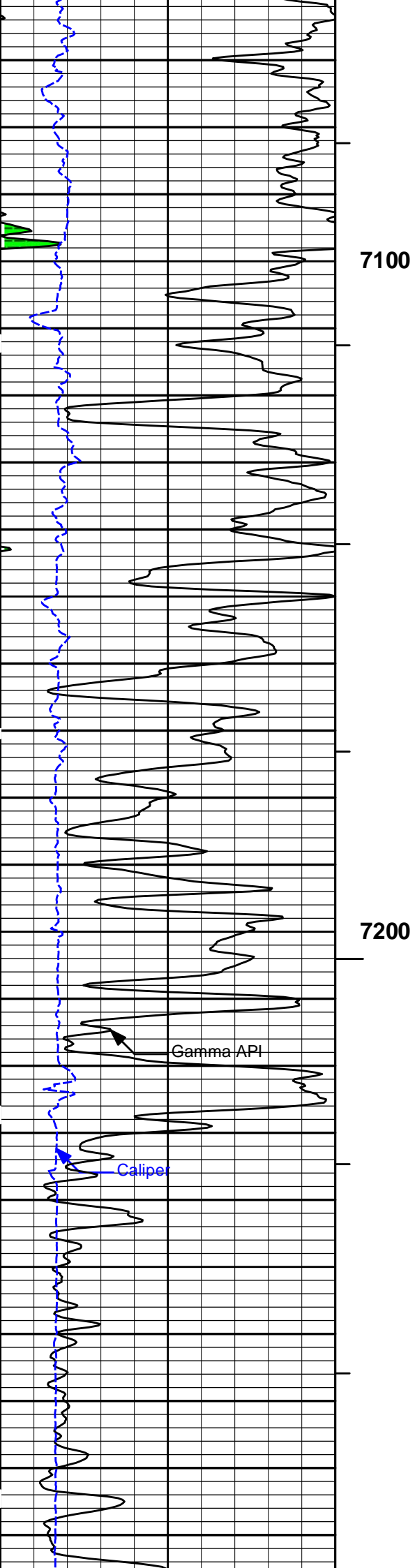
HALLIBURTON

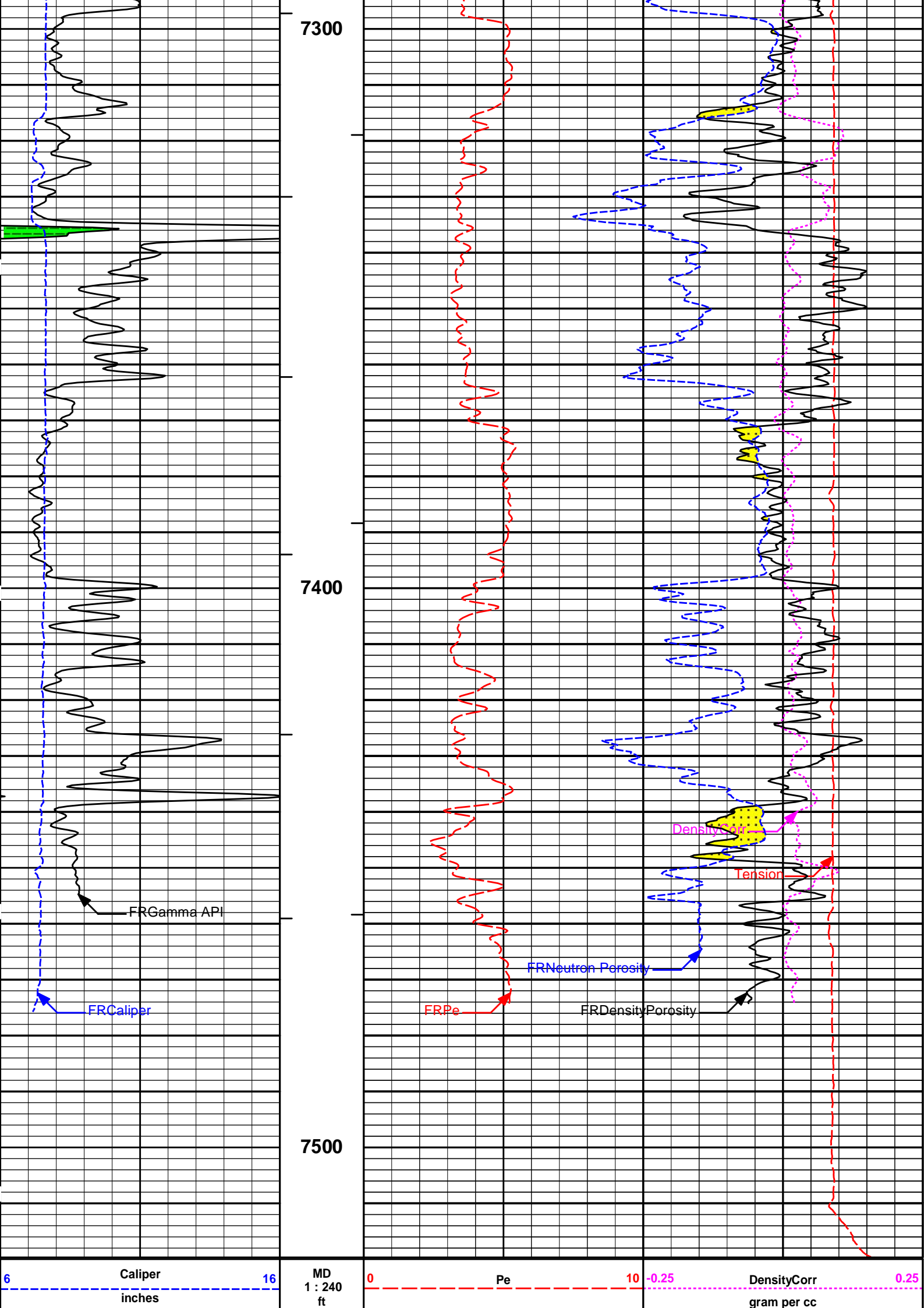
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Data: CLARK_13-24\Well Based\REPEAT\
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REPEAT SECTION

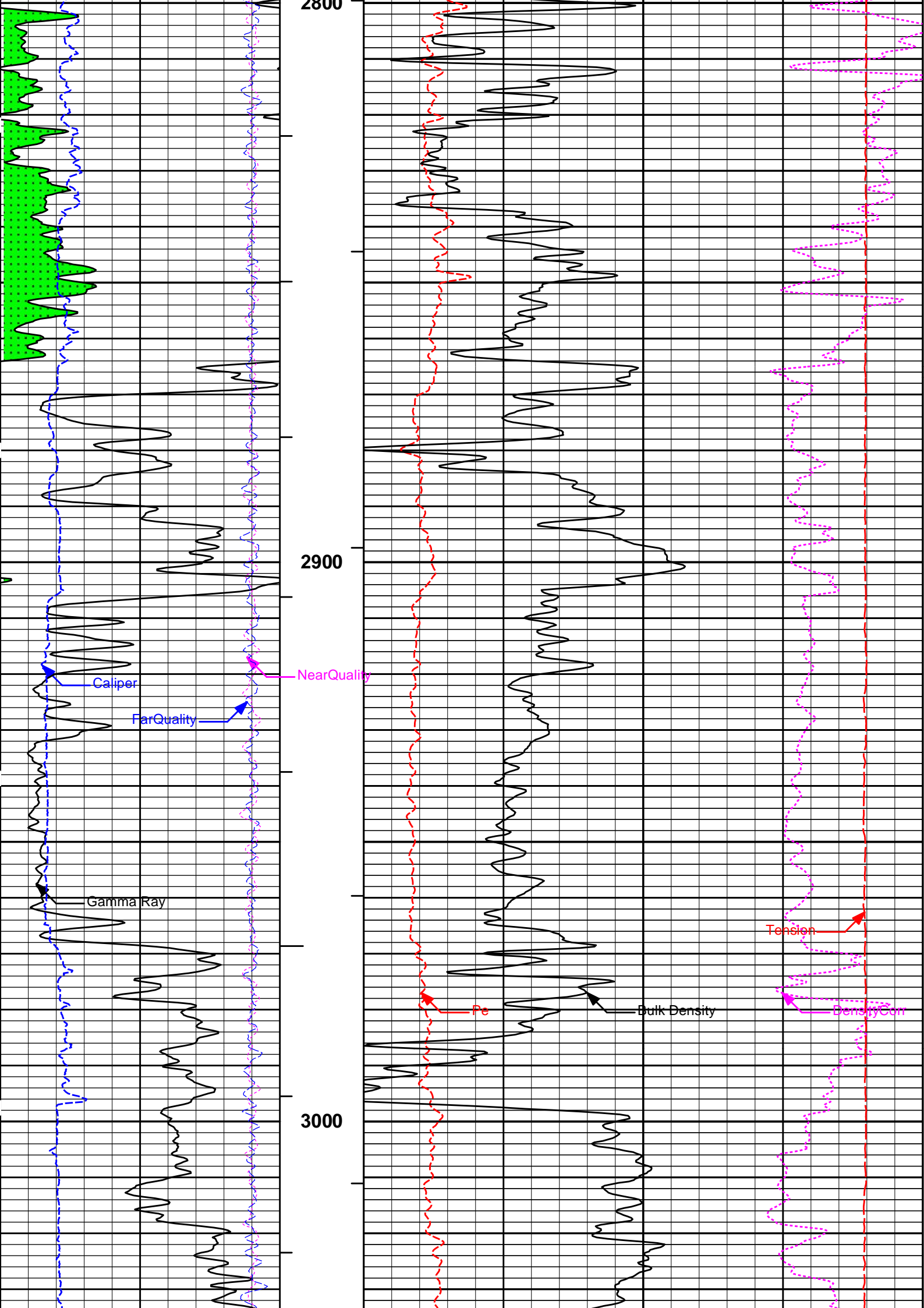
					CROSSOVER				
				30	Neutron Porosity				-10
					%				
	SHALE		BHVT	30	DensityPorosity				-10
					%				

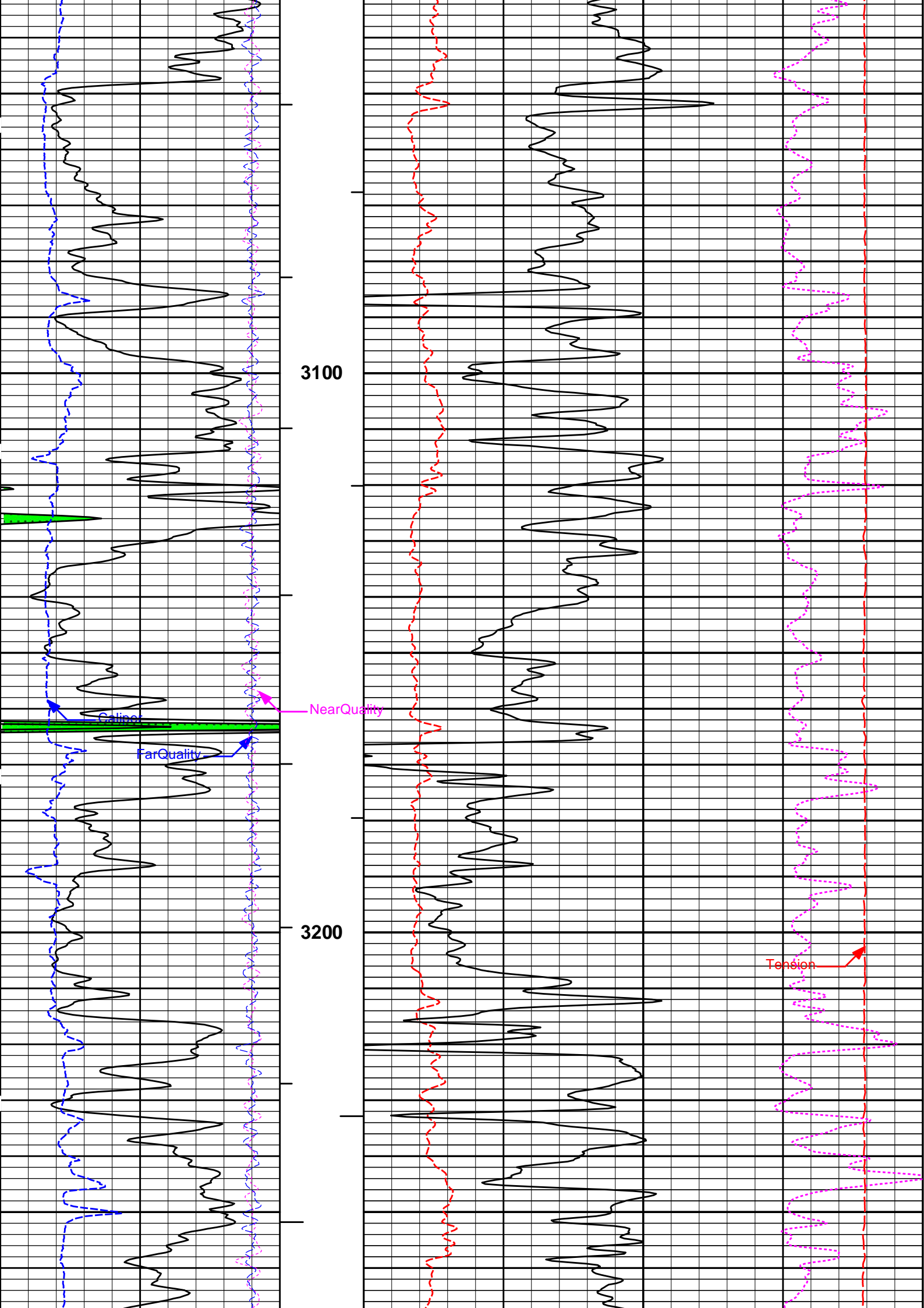


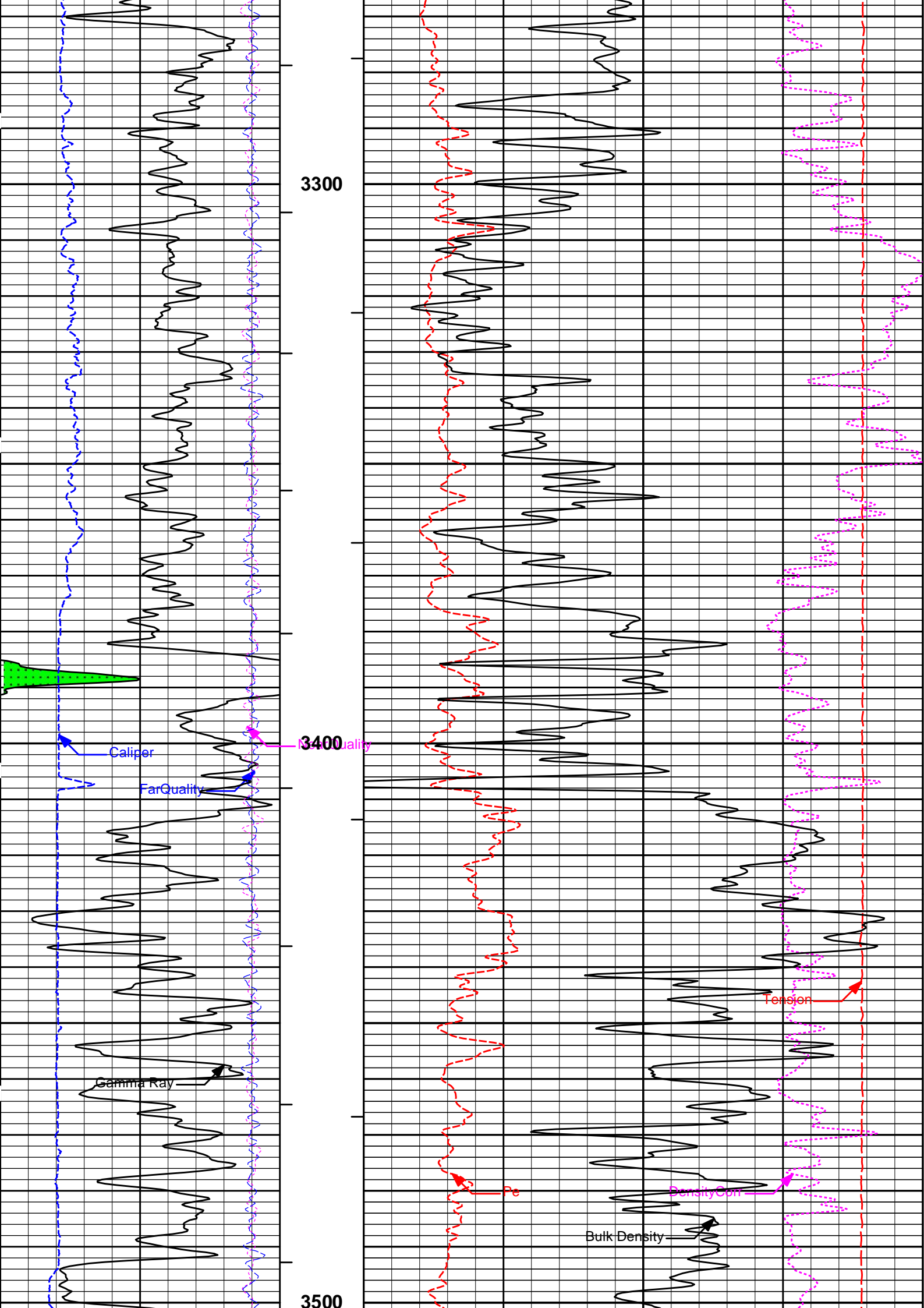


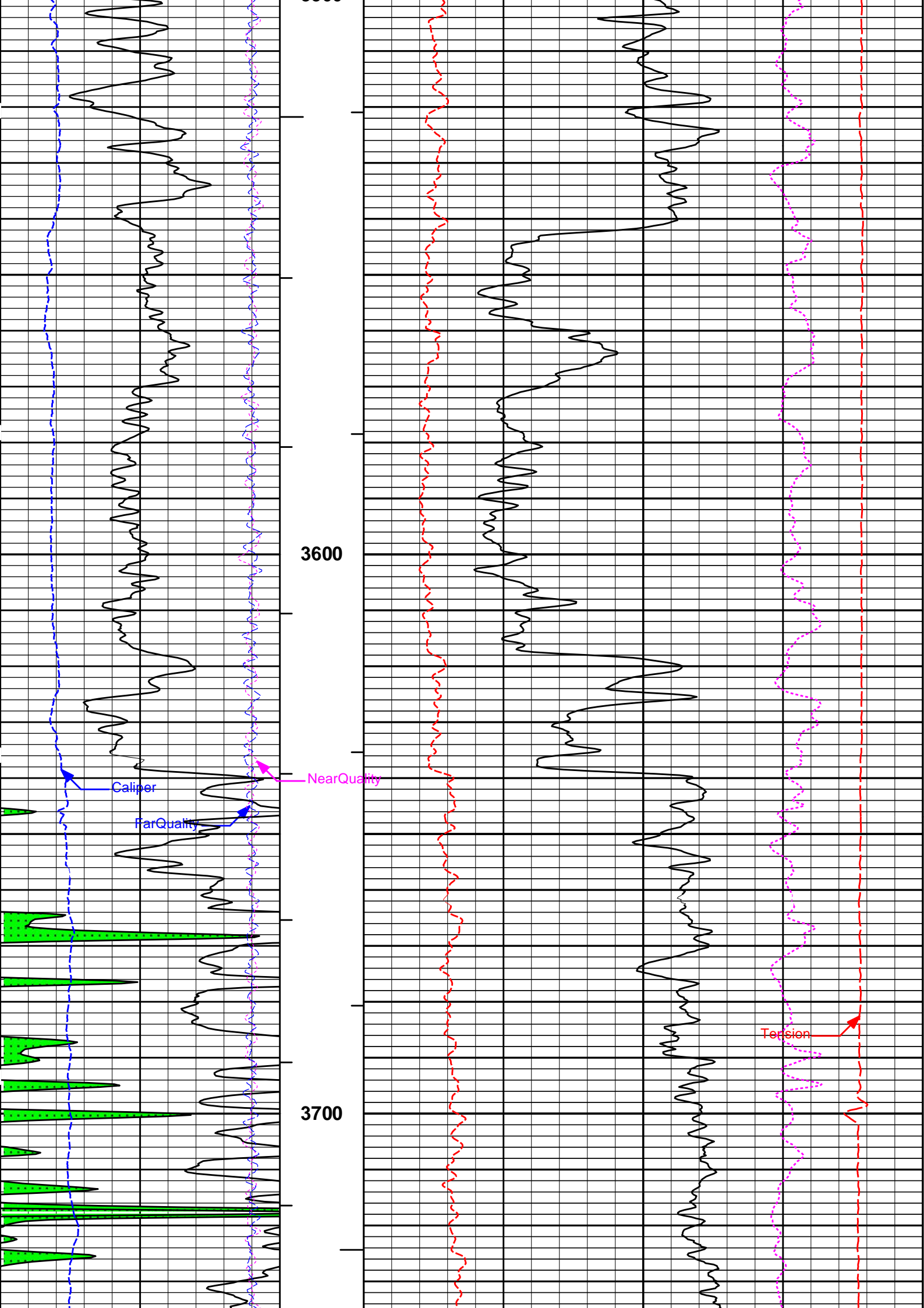


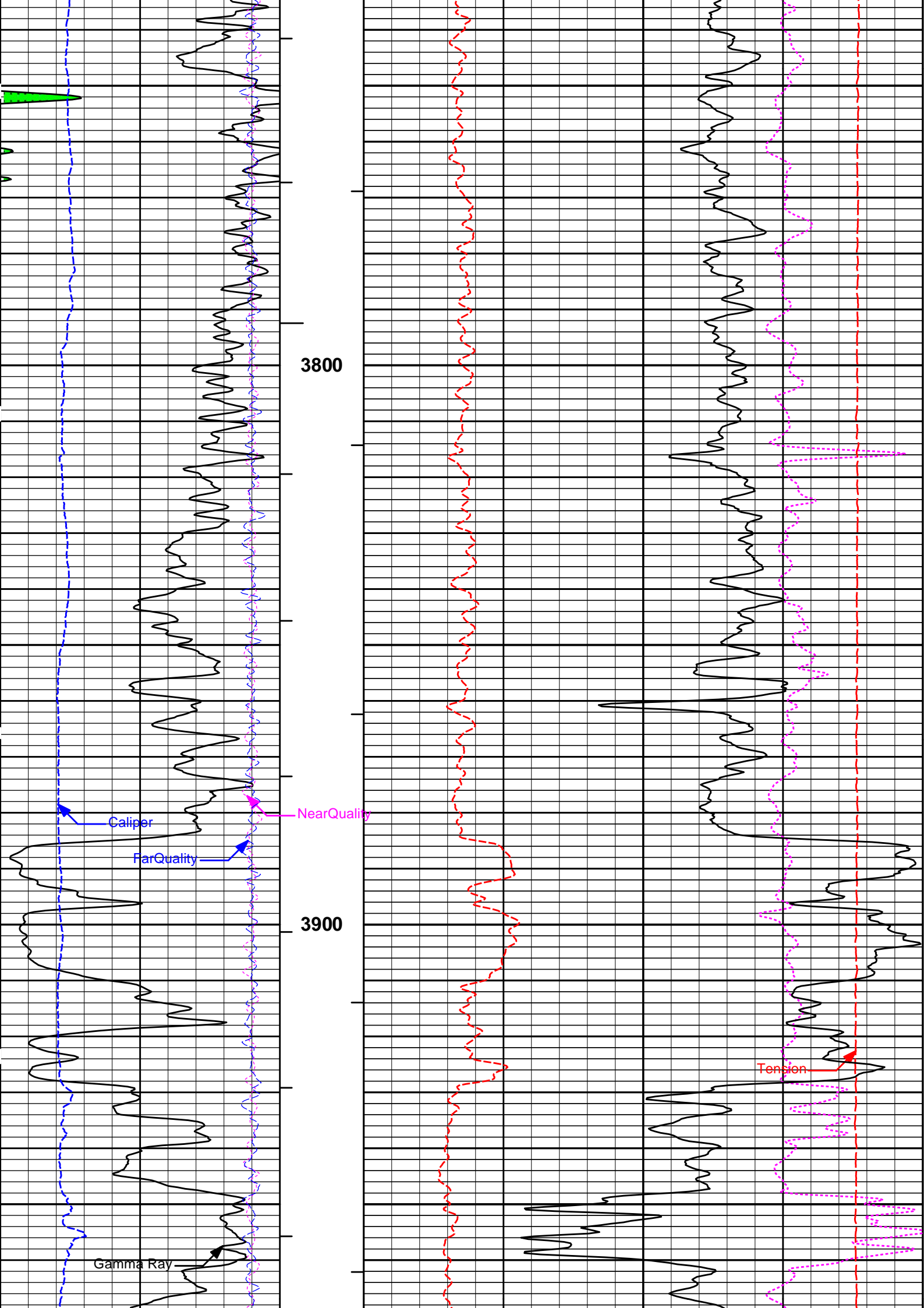
SHALE			
0	Gamma Ray	150	
api			
18	FarQuality	-2	
NearQuality		2	
-18			
6	Caliper	16	
inches			
BHV ft3	Bulk Density		
AHV ft3	g/cc		
MD 1 : 240 ft	0	Pe	10
	Tension		0
	pounds		
	DensityCorr		0.25
	g/cc		

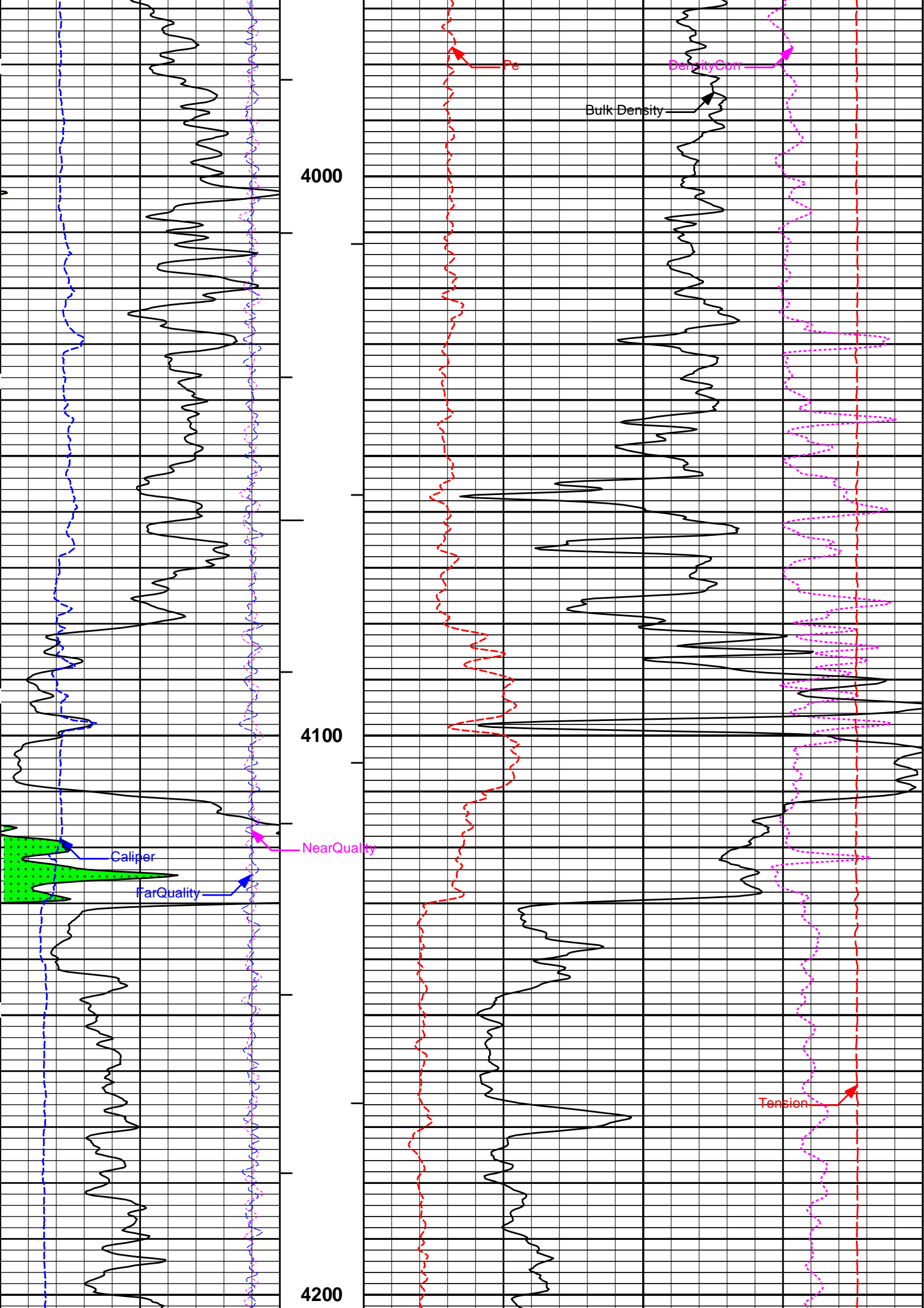


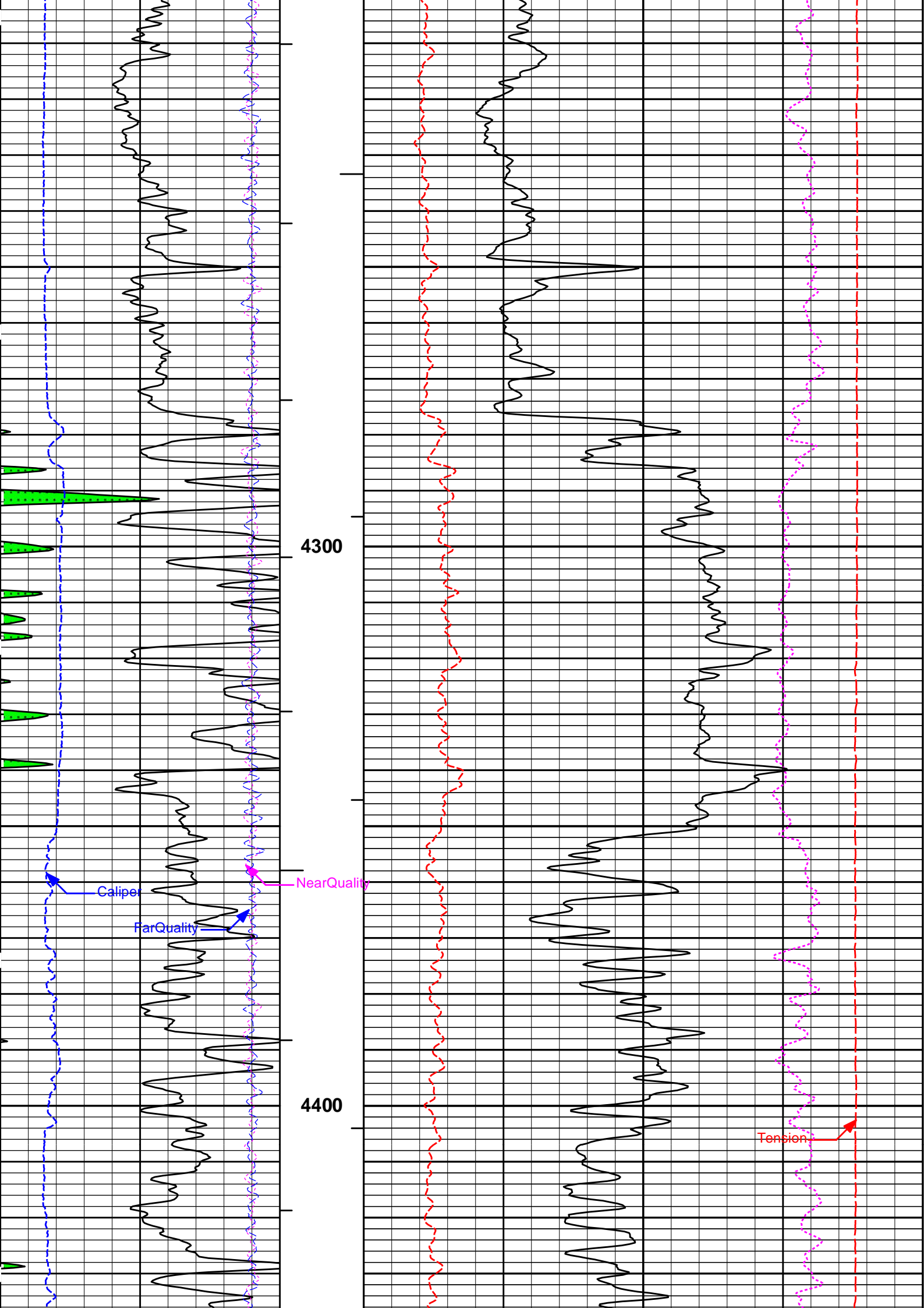


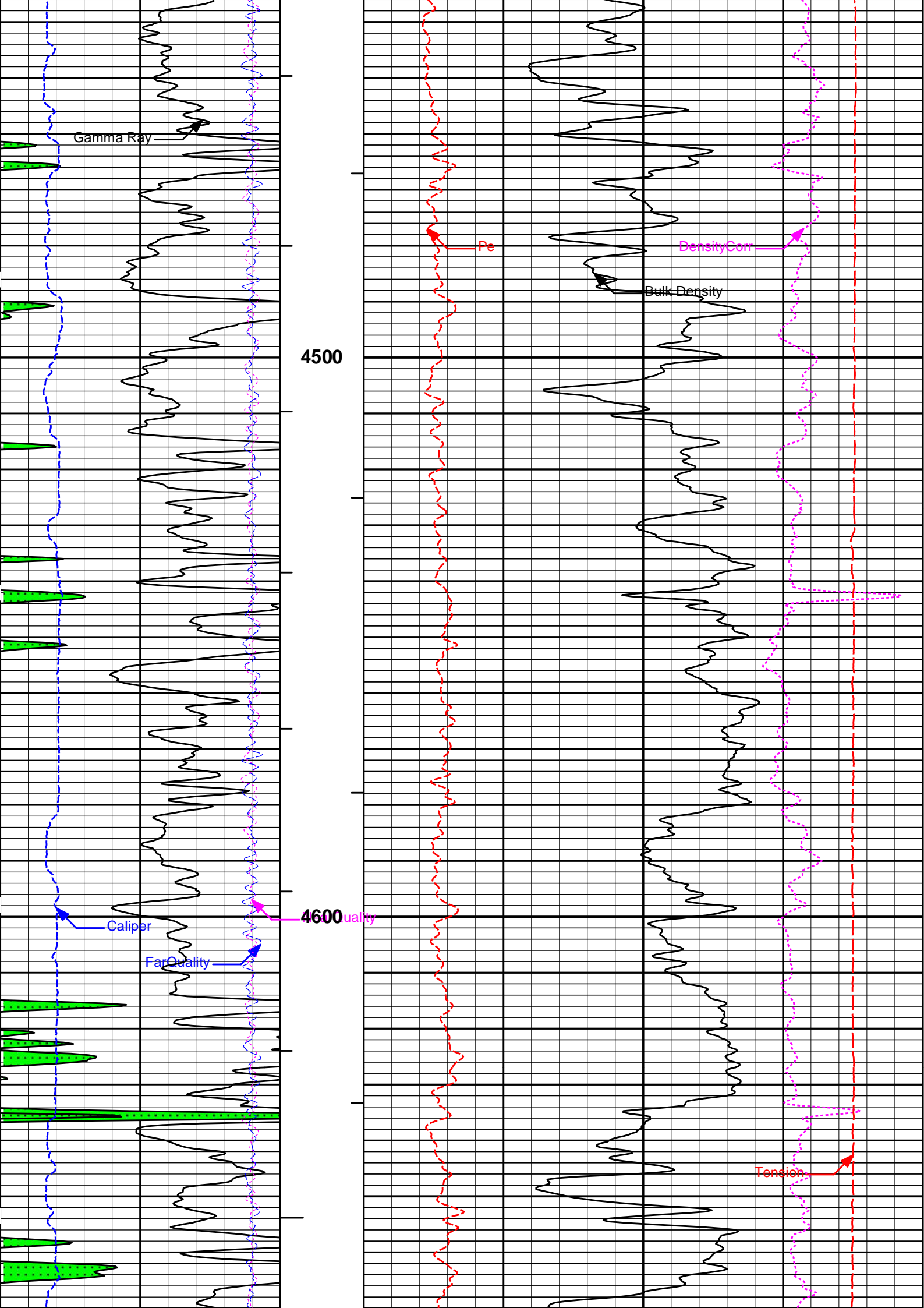


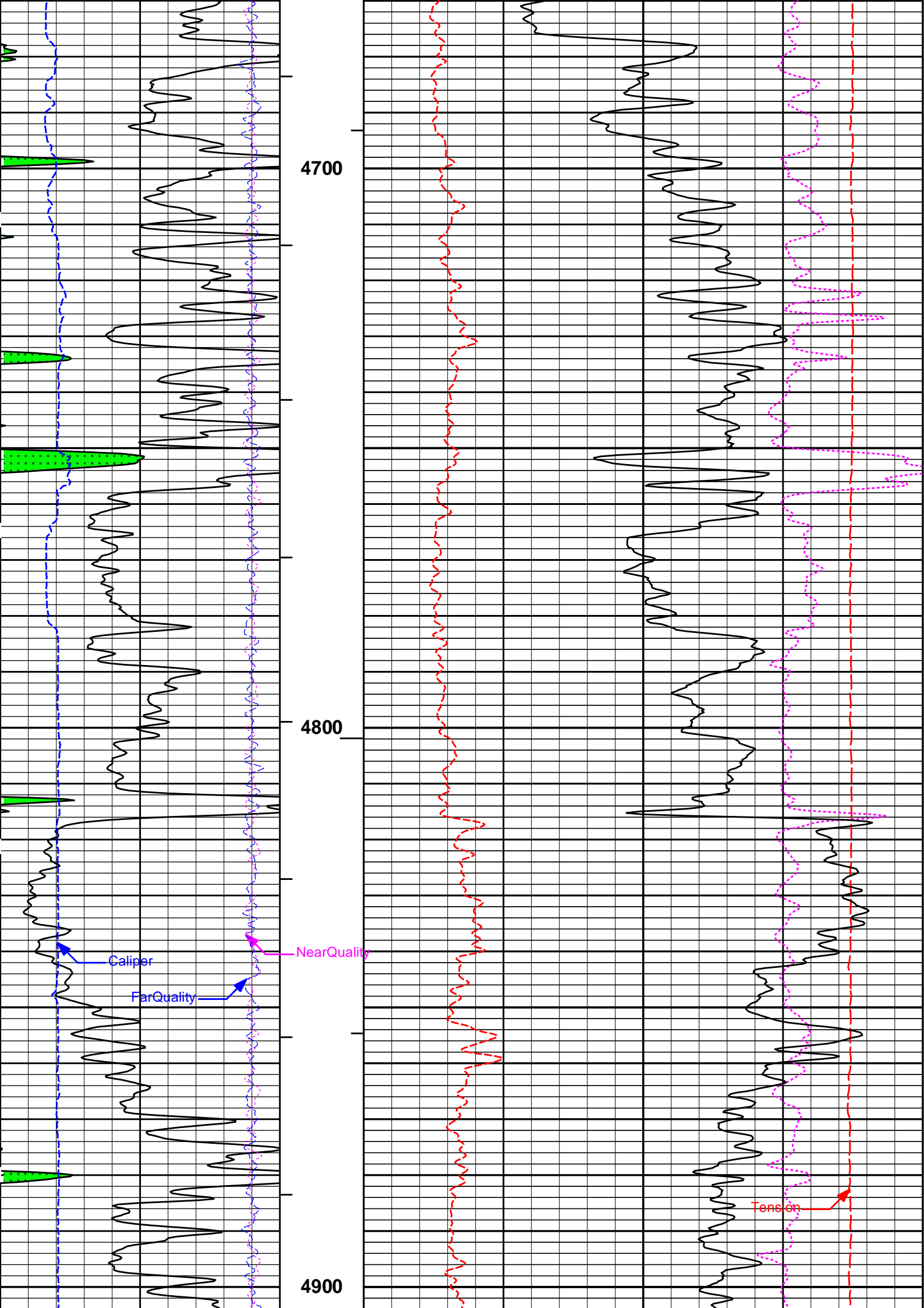


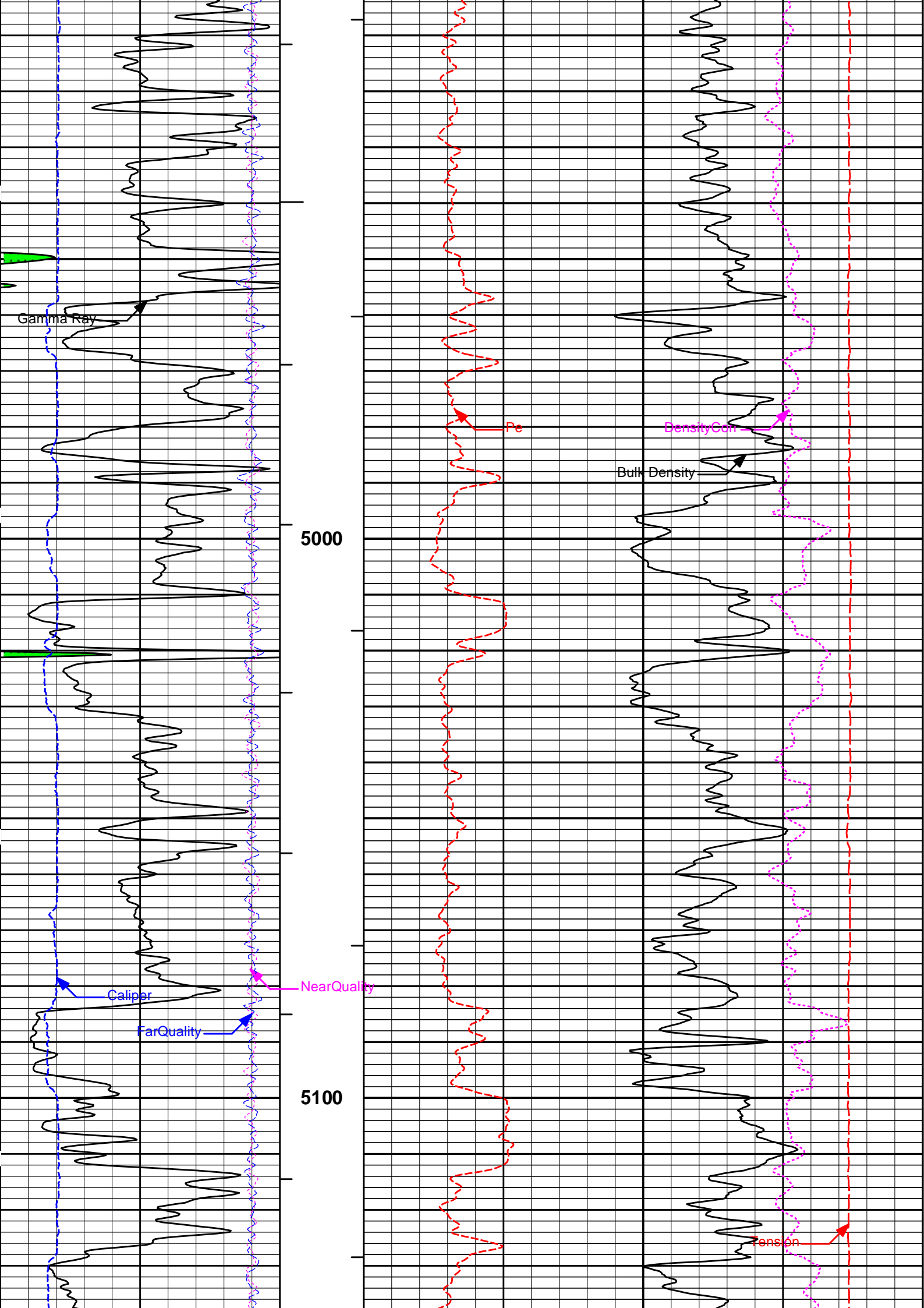


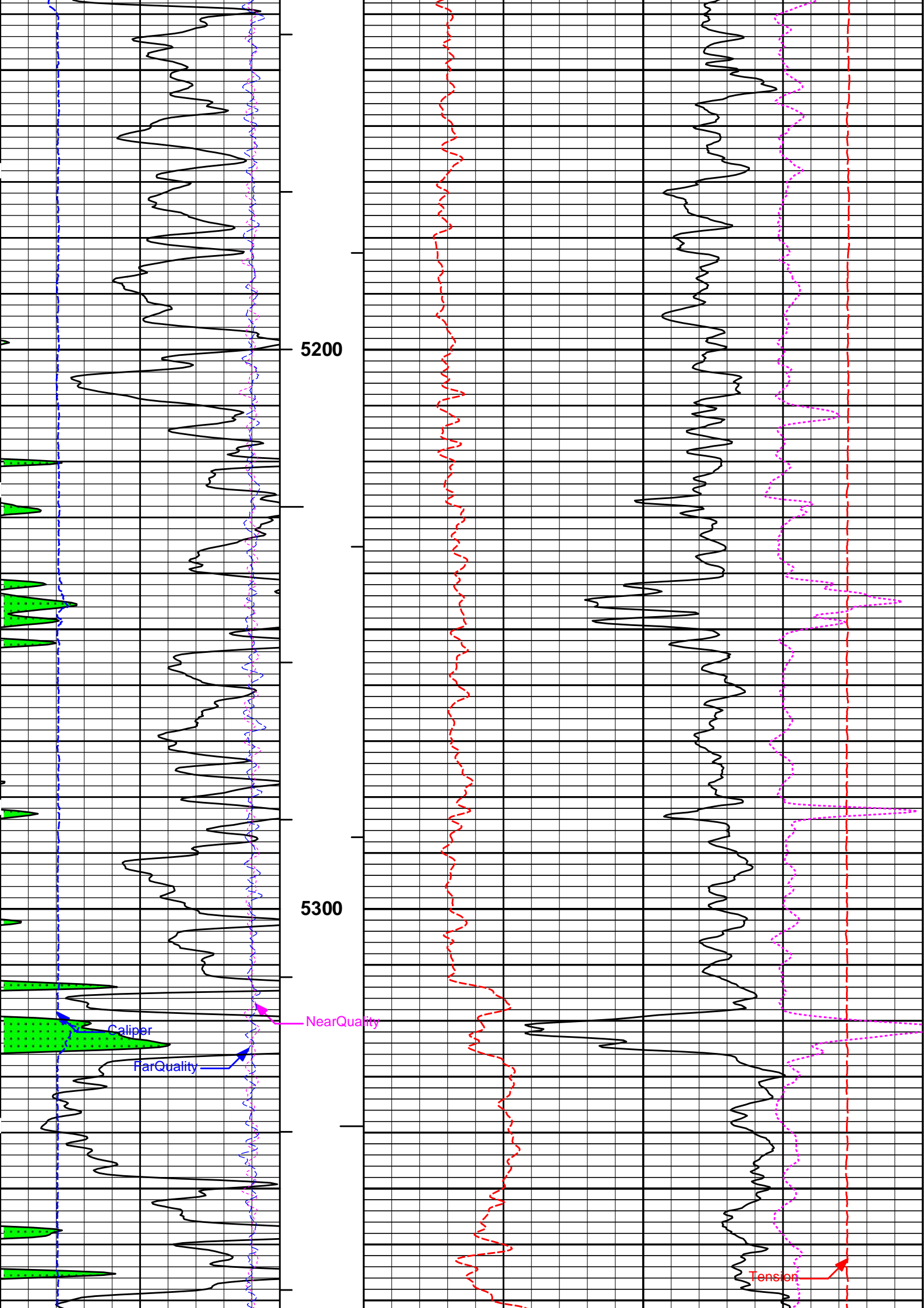


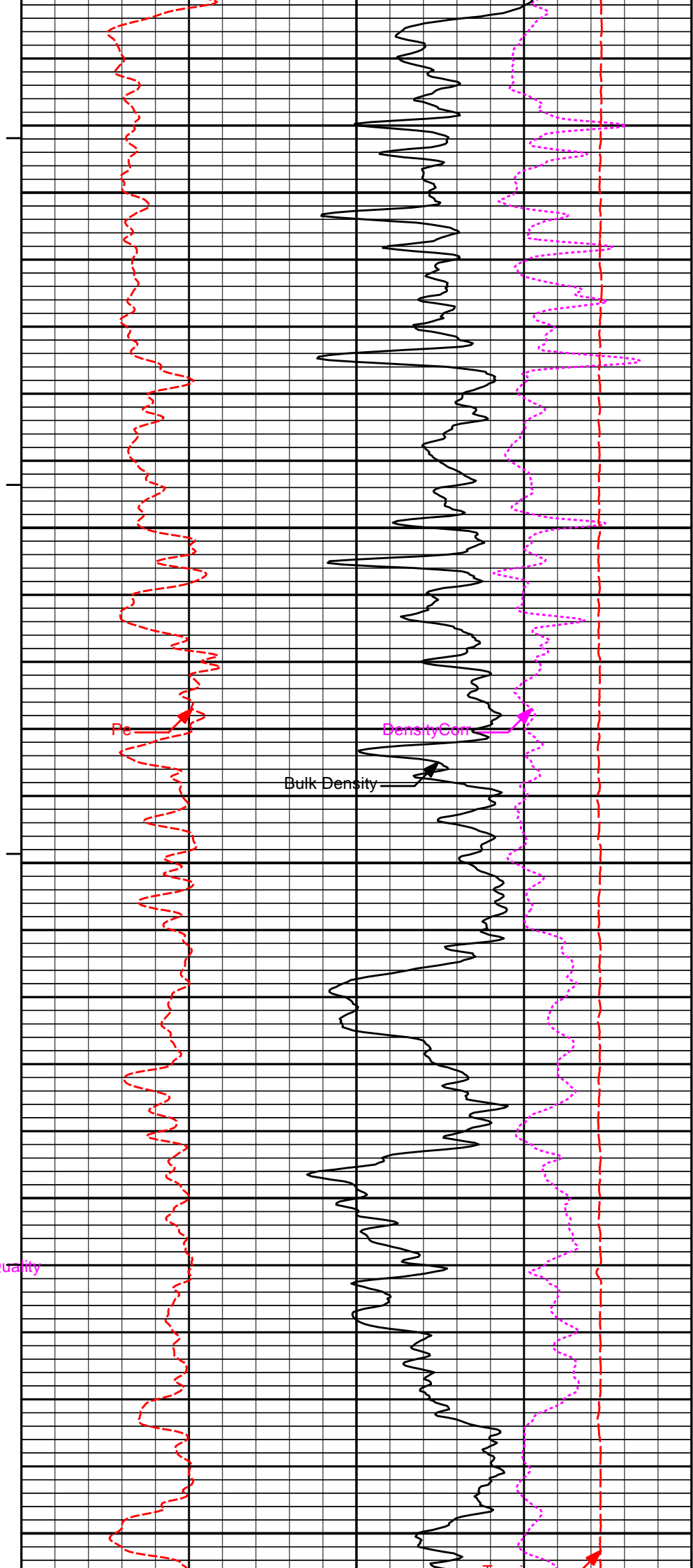
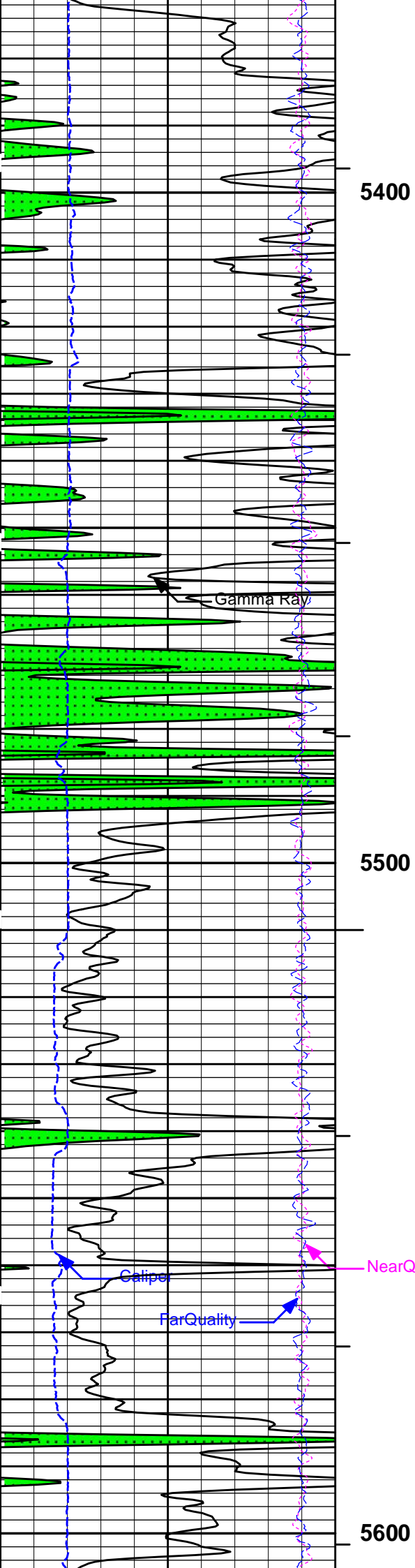


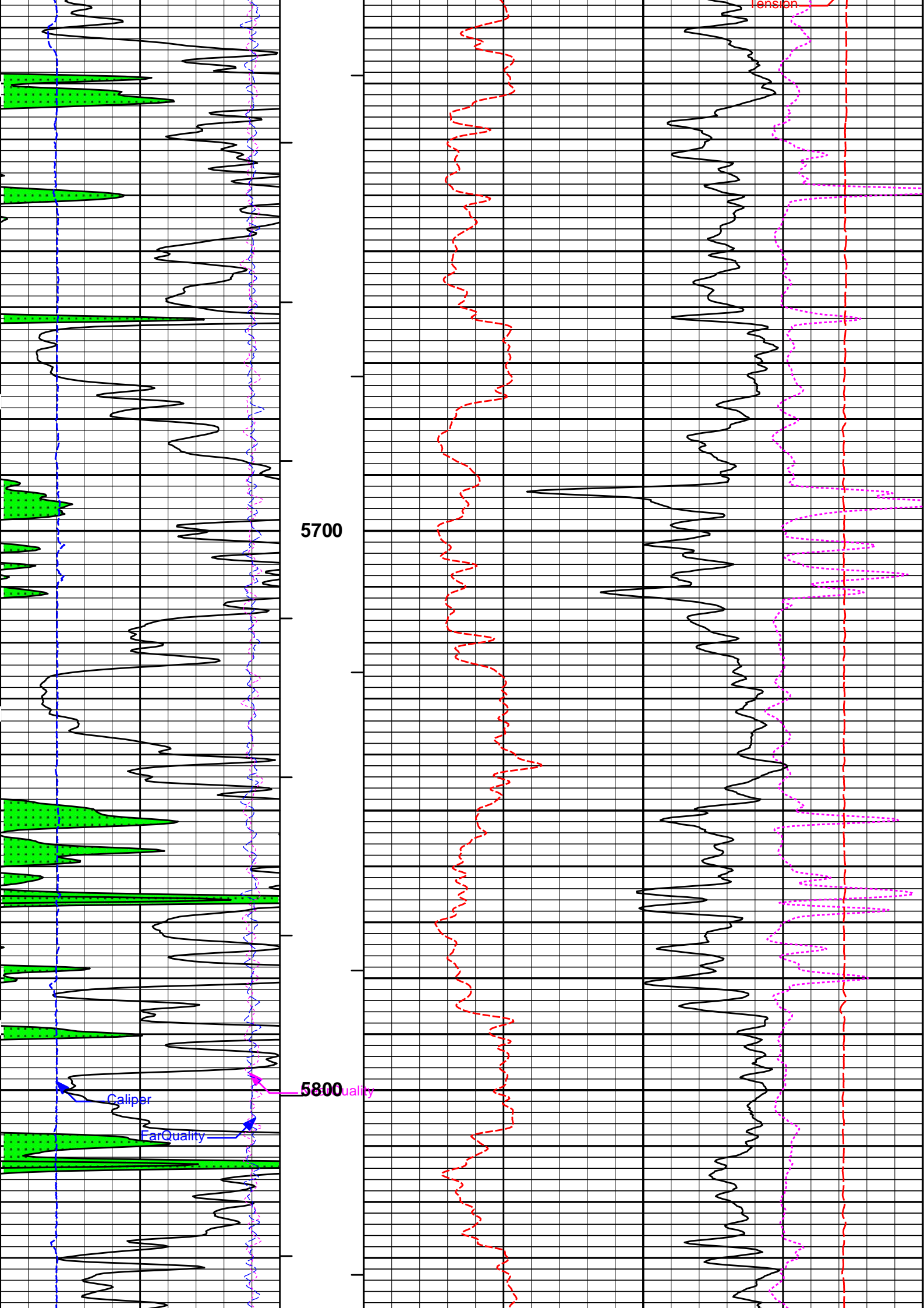


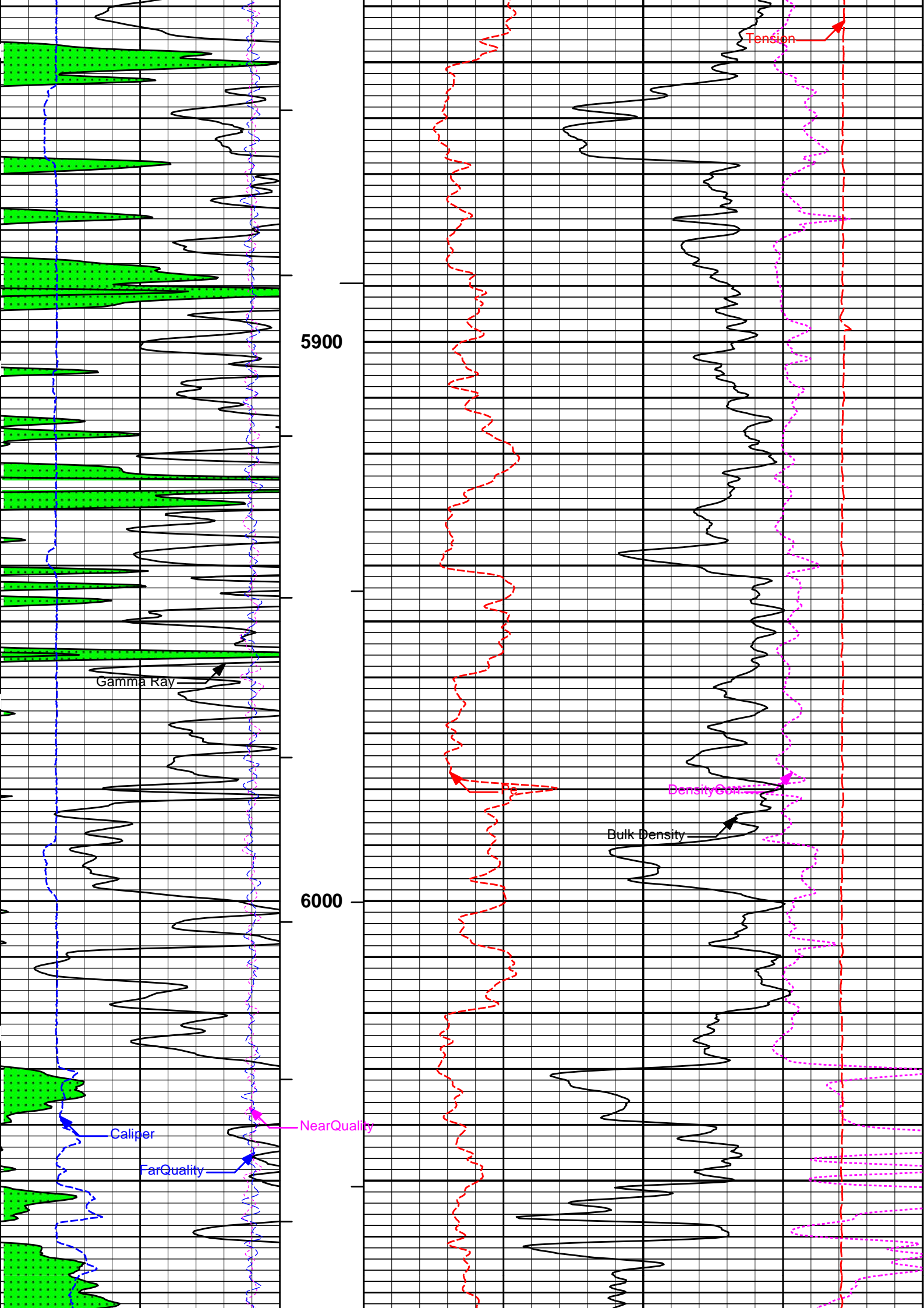


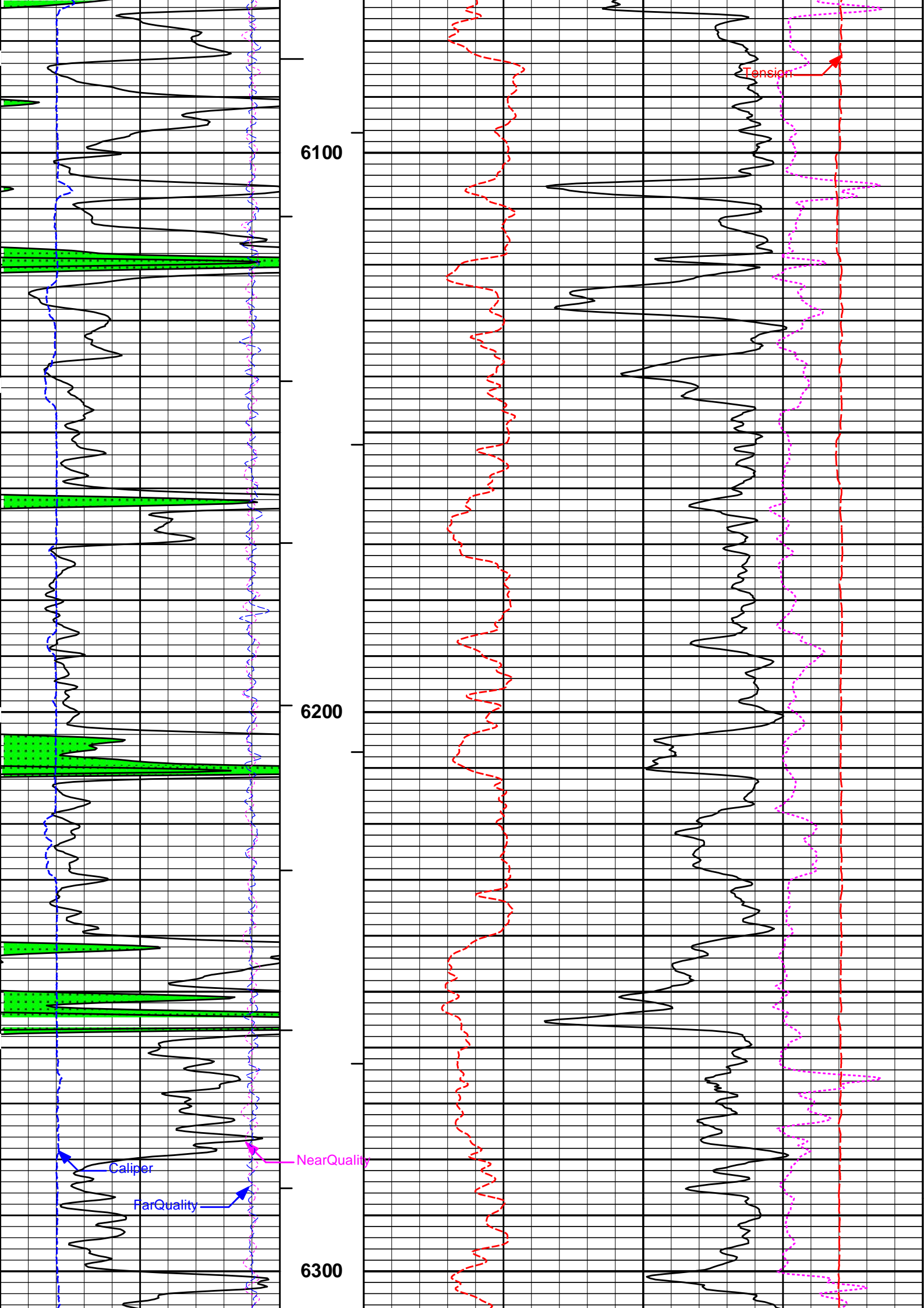


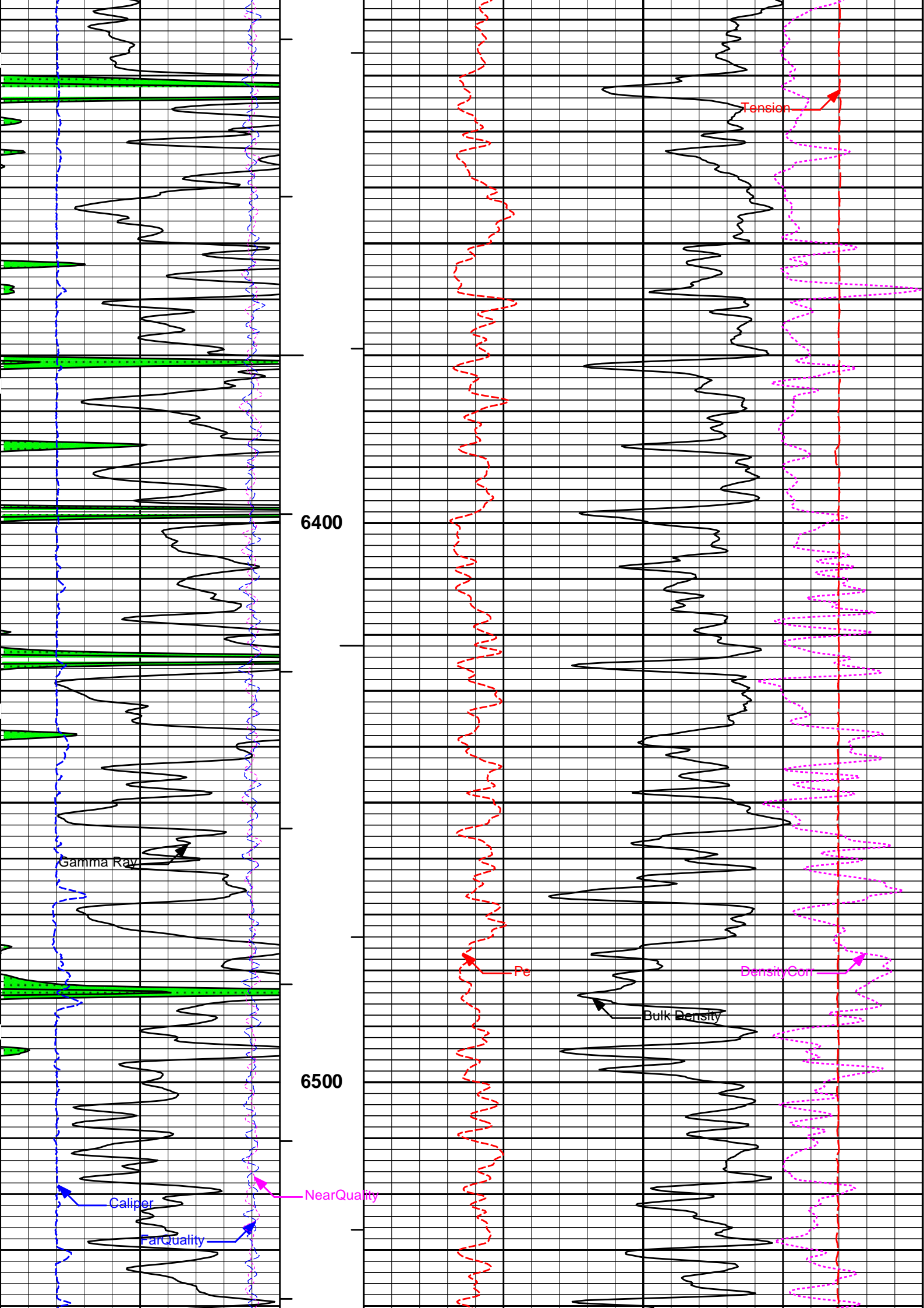


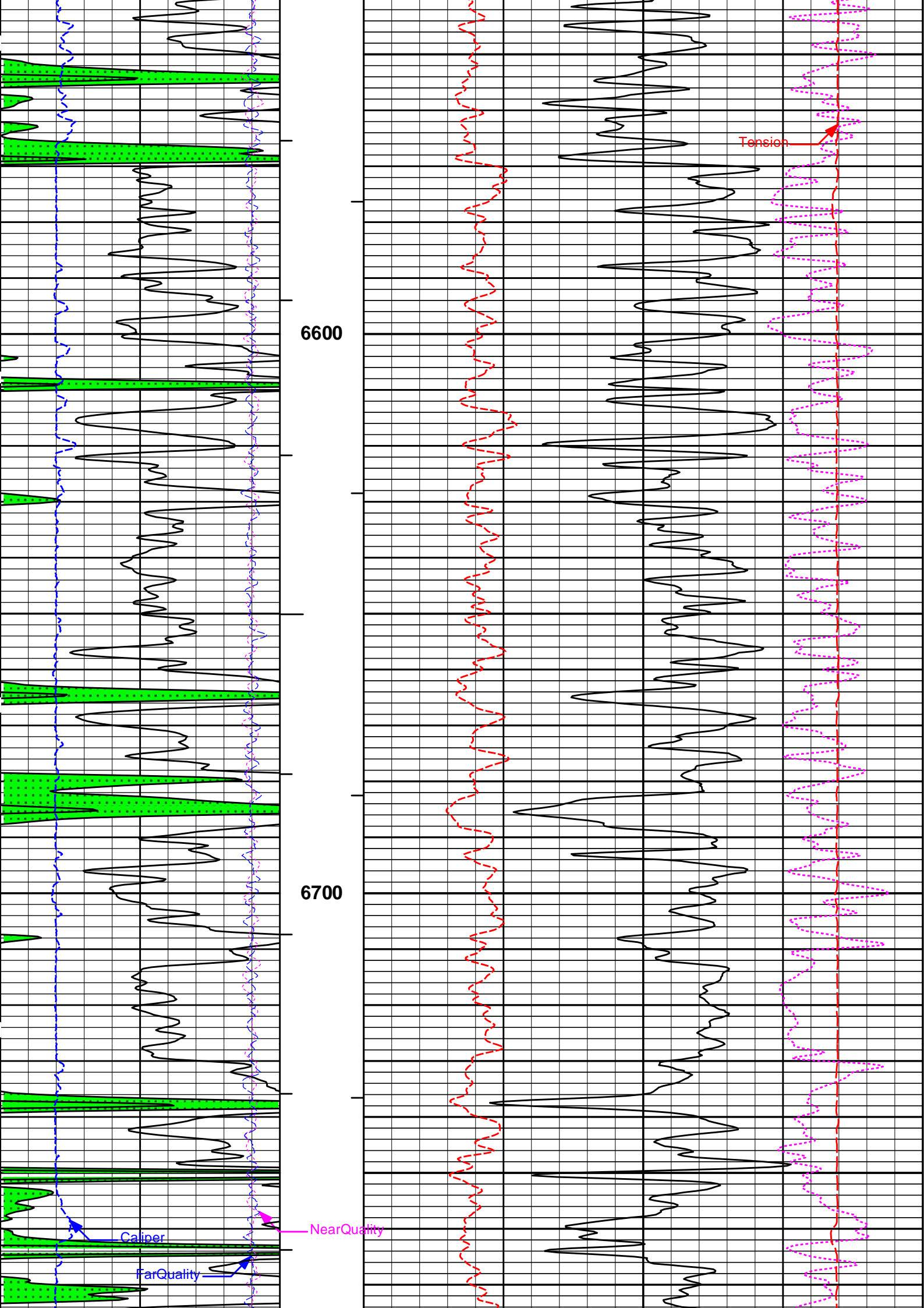


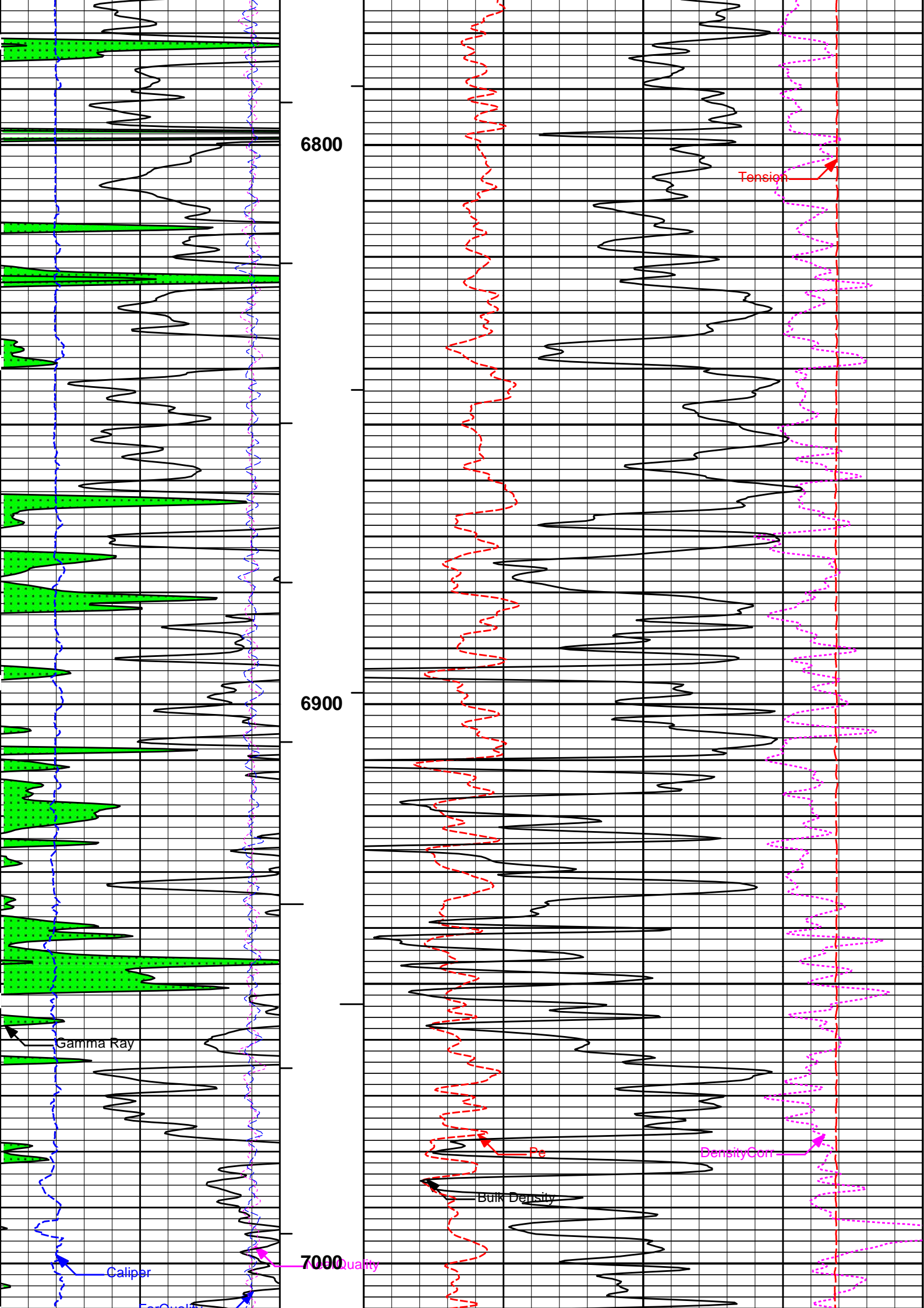


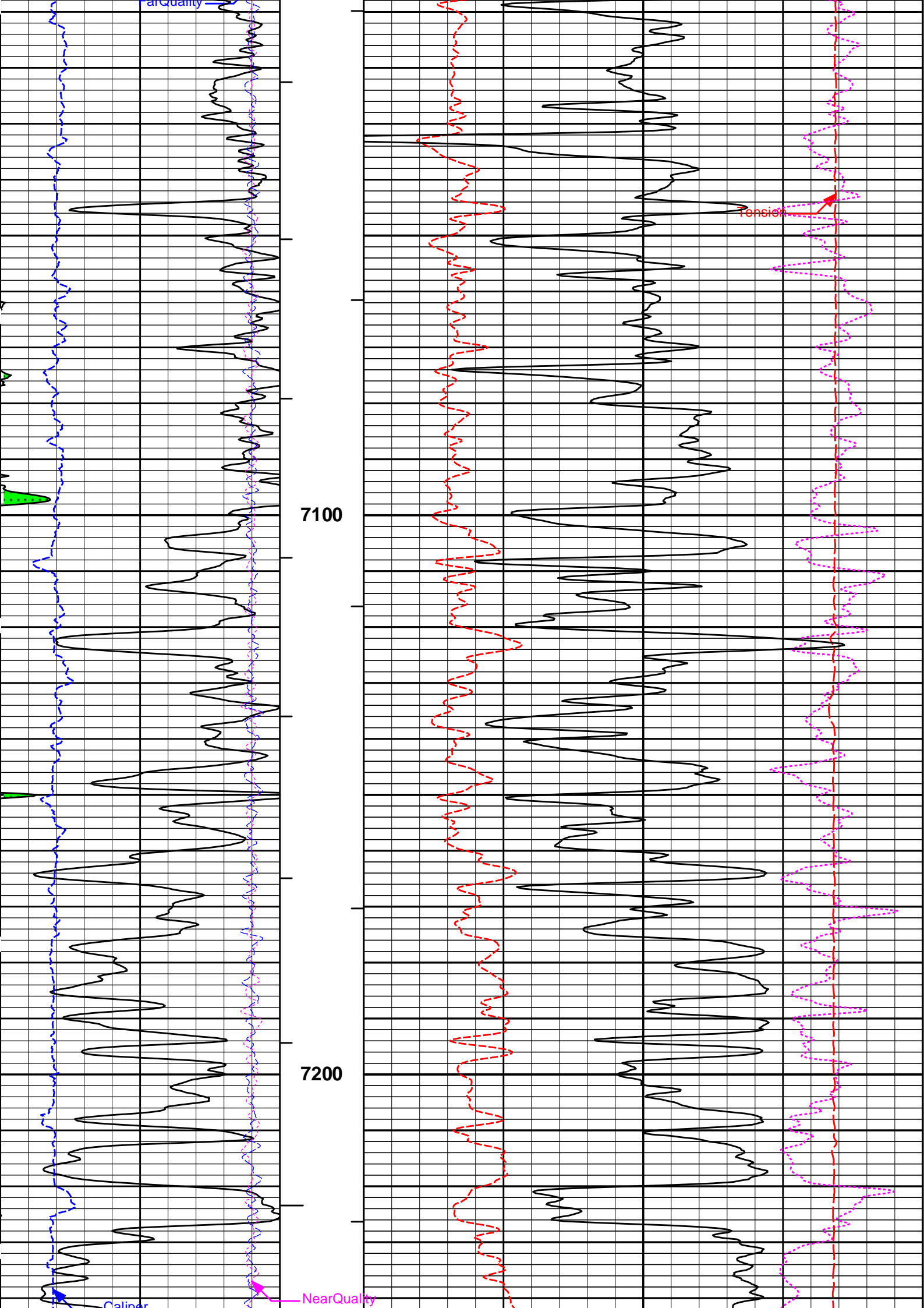


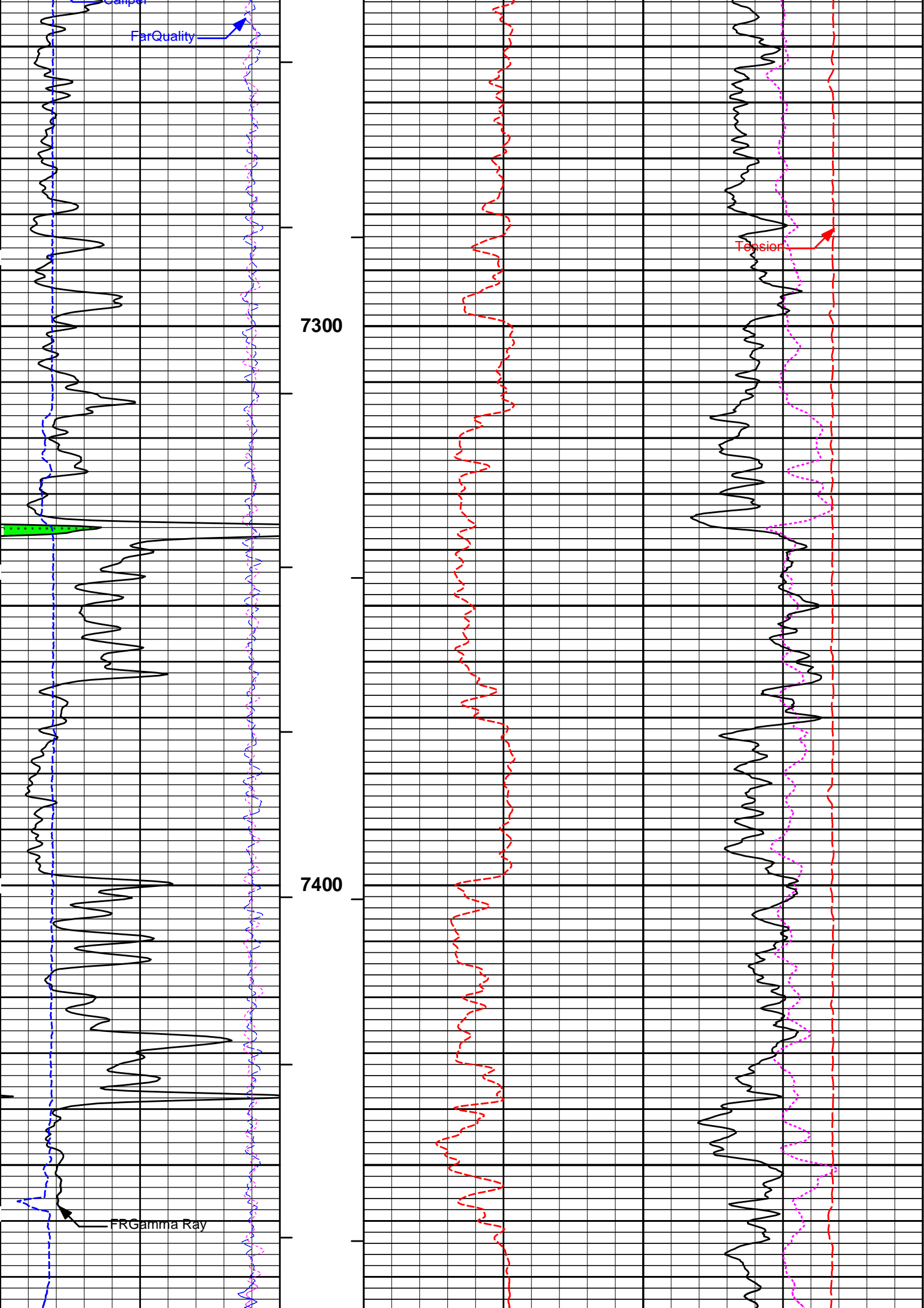


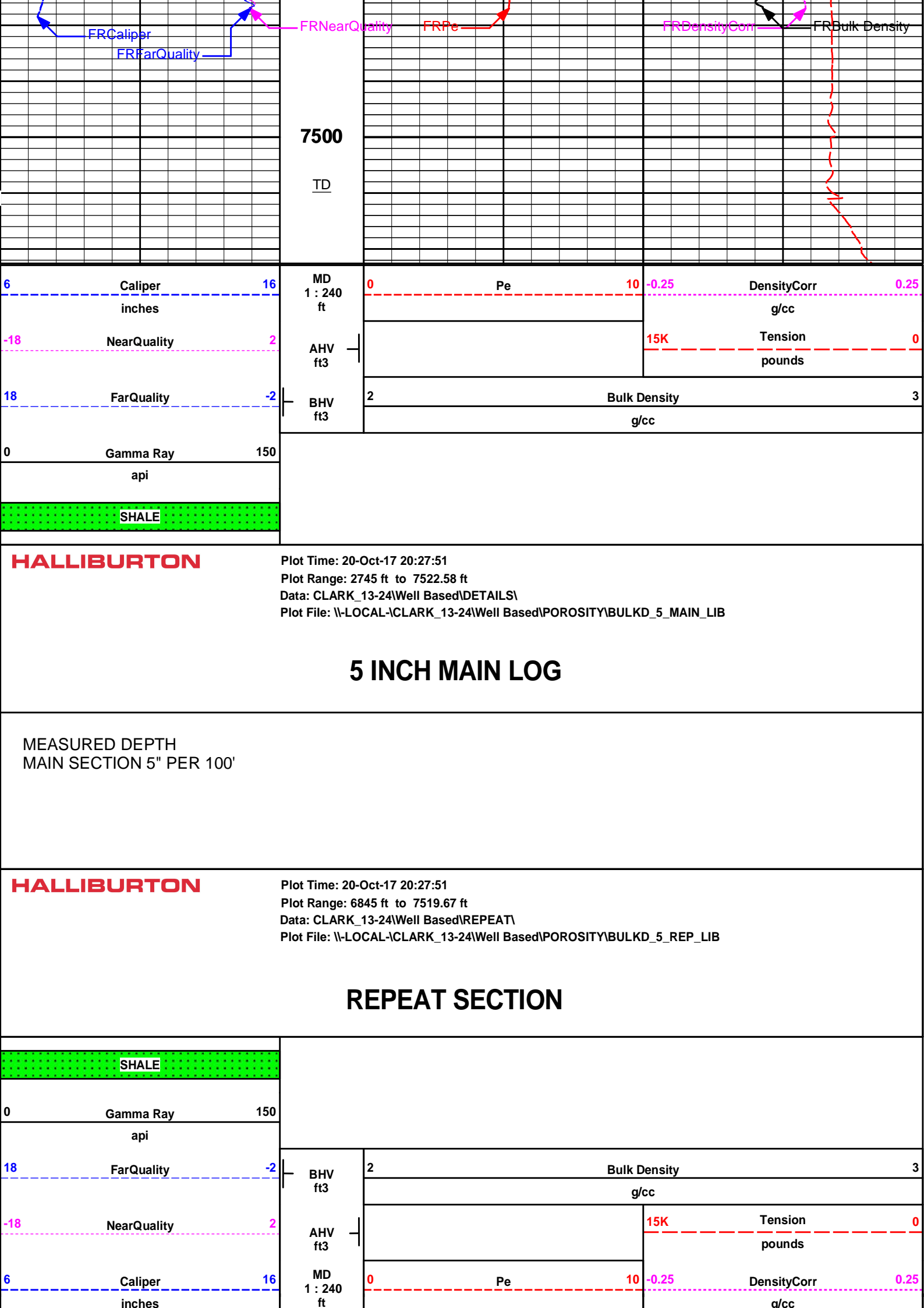


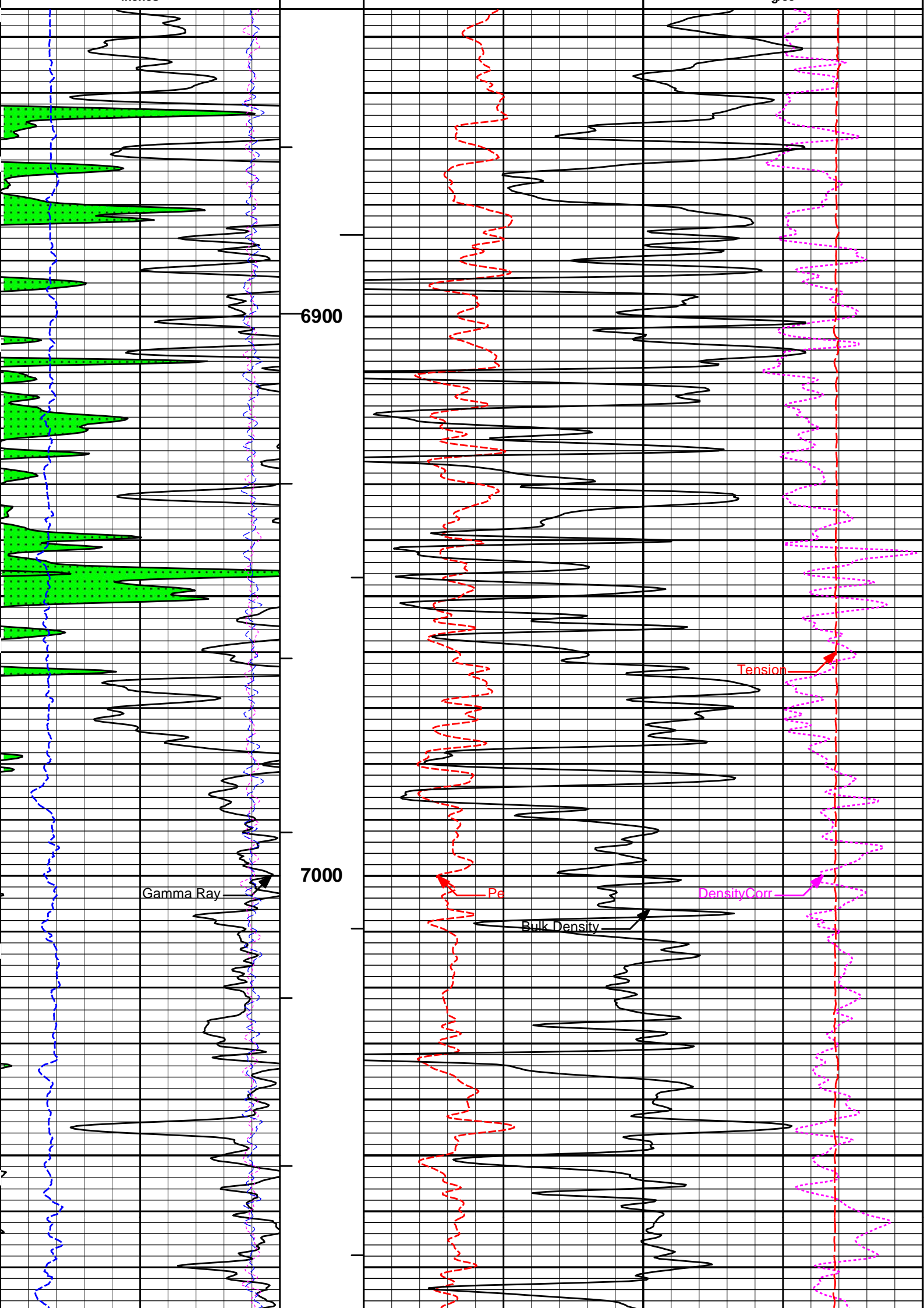


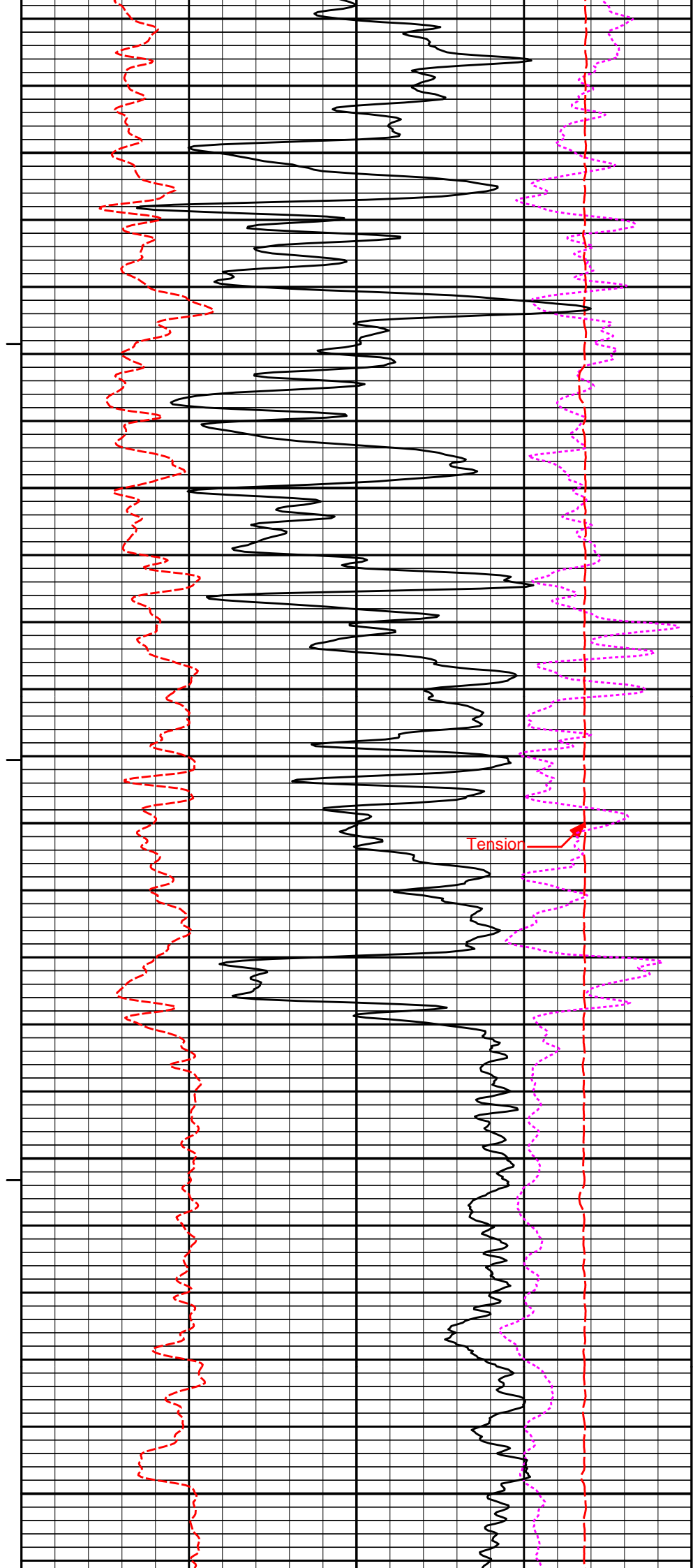
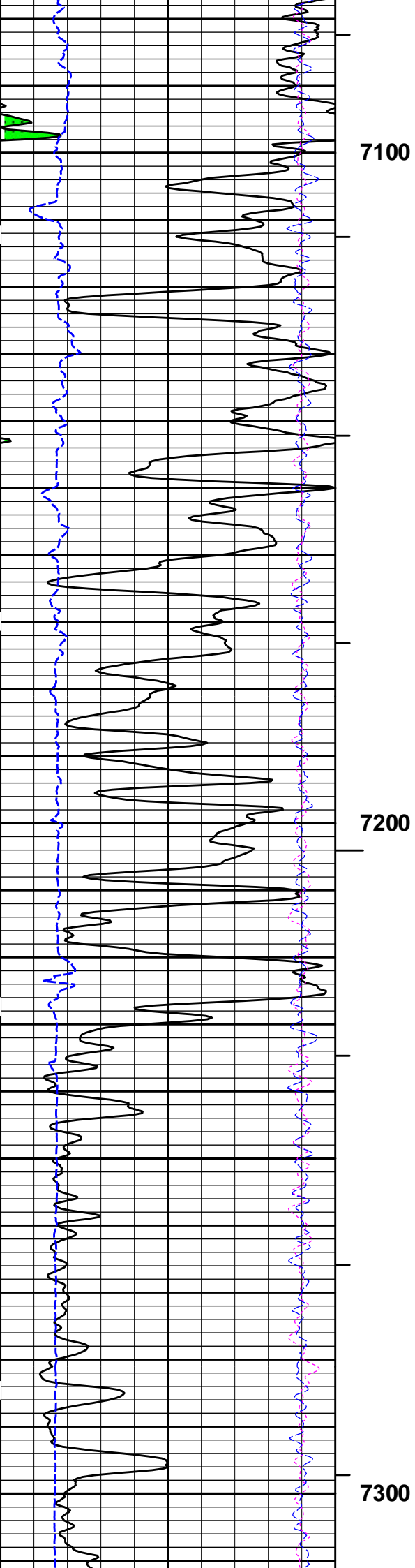


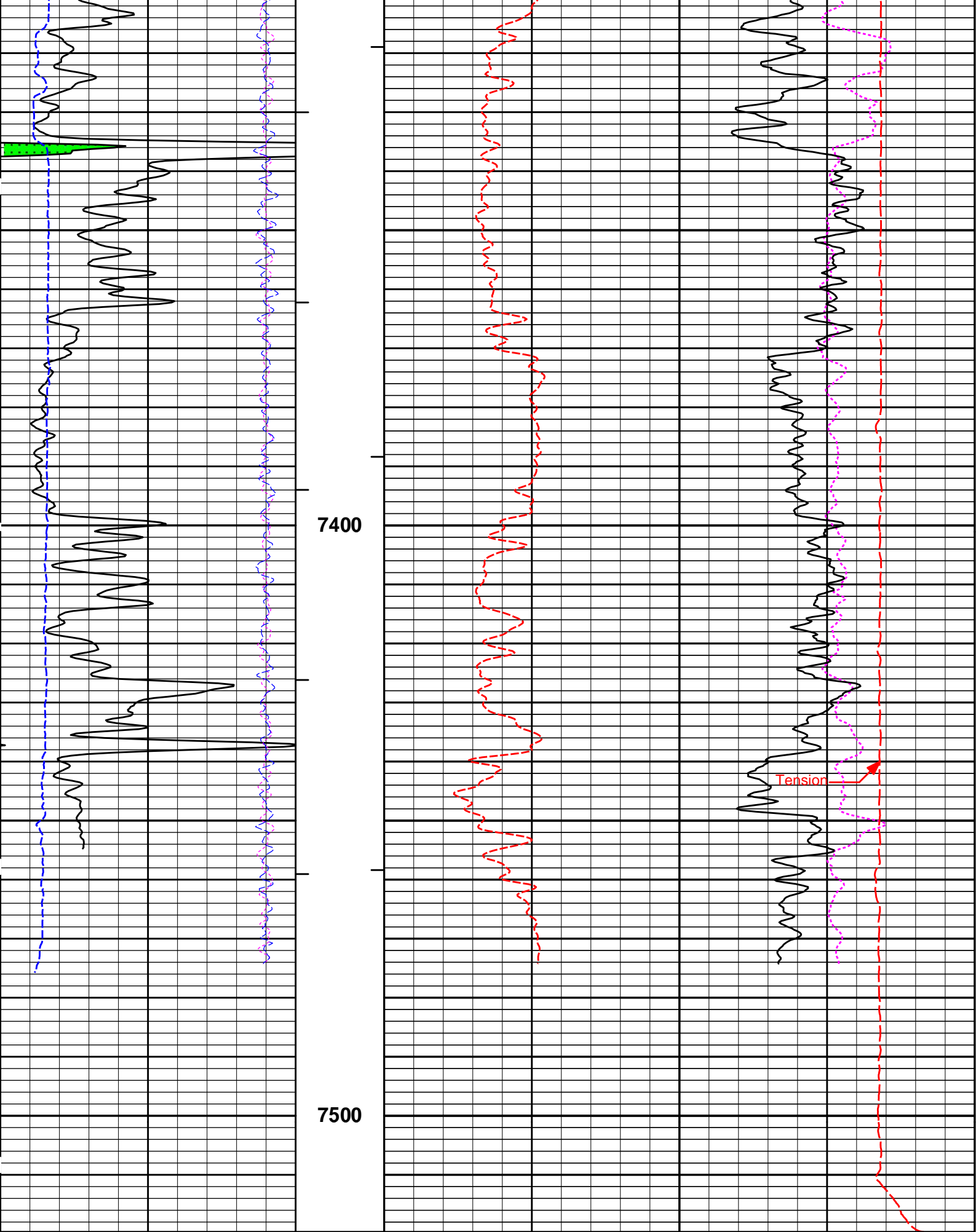




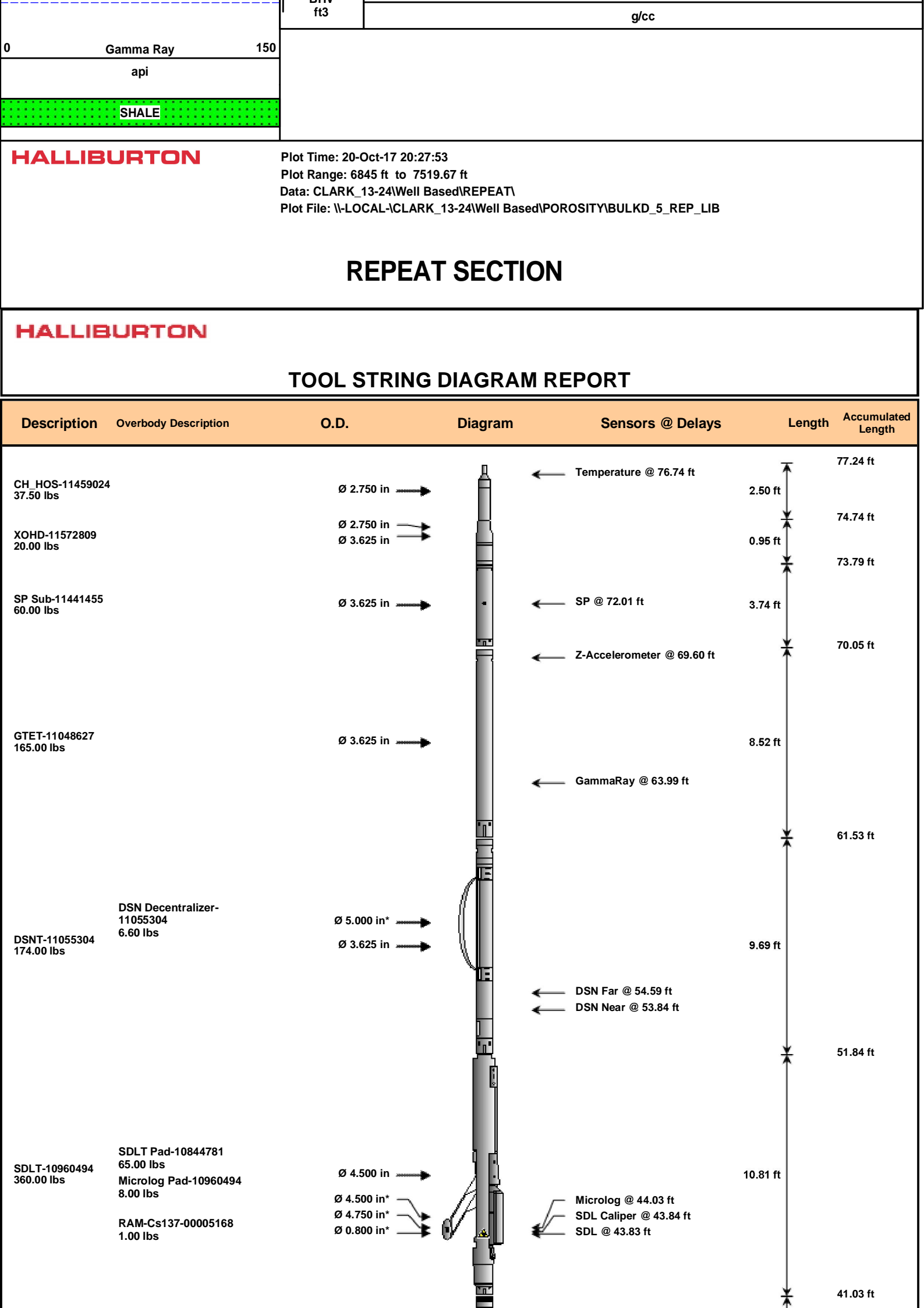








6	Caliper	16	MD 1 : 240 ft	0	Pe	10	-0.25	DensityCorr	0.25
	inches								g/cc
-18	NearQuality	2	AHV ft3				15K	Tension	0
18	FarQuality	-2	BHV		2	Bulk Density		3	



IQ Flex-11021611
140.00 lbs

Ø 3.625 in →

5.67 ft

Centralizer 25-12345678
8.00 lbs

Ø 4.000 in* →

35.36 ft

BSAT-10747683
300.00 lbs

Ø 3.625 in →

Receiver Array @ 26.84 ft
Sonic Receivers @ 26.84 ft

15.77 ft

ACRt Instrument-
11022962
50.00 lbs

Centralizer 25-12345679
8.00 lbs

Ø 4.000 in*
Ø 3.625 in →

19.58 ft

5.03 ft

UnivWearRing3.6-
10965402
5.00 lbs

Ø 4.200 in* →

Mud Resistivity @ 13.19 ft

14.55 ft

ACRt Sonde-
11005909
200.00 lbs

Ø 3.625 in →

ACRt @ 9.21 ft

14.22 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		11459024	37.50	2.50	74.74	300.00
XOHD	Hostile to Dits Cross Over		11572809	20.00	0.95	73.79	300.00
SP	SP Sub		11441455	60.00	3.74	70.05	300.00
GTET	Gamma Telemetry Tool		11048627	165.00	8.52	61.53	60.00
DSNT	Dual Spaced Neutron		11055304	174.00	9.69	51.84	60.00
DCNT	DSN Decentralizer		11055304	6.60	5.13	* 55.17	300.00
SDLT	Spectral Density Tool		10960494	360.00	10.81	41.03	60.00
SDLP	Density Insite Pad		10844781	65.00	2.55	* 43.24	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137		00005168	1.00	0.80	* 43.47	300.00
MICP	Microlog Pad		10960494	8.00	1.00	* 43.53	60.00
IQF	IQ Flex tool		11021611	140.00	5.67	35.36	300.00
BSAT	Borehole Sonic Array Tool		10747683	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody		12345678	8.00	2.08	* 32.79	300.00
ACRt	Array Compensated True Resistivity Instrument Section		11022962	50.00	5.03	14.55	120.00
OBCEN	Centralizer - 25 in. Overbody		12345679	8.00	2.08	* 16.42	300.00
ACRt	Array Compensated True Resistivity Sonde Section		11005909	200.00	14.22	0.33	120.00
UWR3P6	Universal Wear Ring 3 5-8 inch		10965402	5.00	0.35	* 13.40	300.00

BLNS	Bull Nose	12345678	5.00	0.33	0.00	300.00
Total			1,613.10	77.24		
Data: CLARK_13-24\0002 GTET-DSNT-SDLT-BSAT-ACRT\002 20-Oct-17 18:29 Up @7520.0f				Date: 20-Oct-17 18:37:17		

<div> <div>HALLIBURTON</div> <div>PARAMETERS REPORT</div> </div>					
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	12.250	in
2500.00					
	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	1.408	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	7500.00	ft
	SHARED	BHT	Bottom Hole Temperature	152.0	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	
	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	1.29	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	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: CLARK_13-24\0002 GTET-DSNT-SDLT-BSAT-ACRTIDLE			Date: 20-Oct-17 18:46:55	

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:GTET - 11048627

Engineer:WHITLOCK

Software Version:WL INSITE R5.0.5 (Build 8)

Reference Calibration Date:20-Aug-17 14:02:22

Calibration Date:21-Sep-17 09:43:40

Calibration Version:1

Calibrator Source S/N: TB-146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Measurement	Measured	Calibrated	Units
Background	29.7	29.3	api
Background + Calibrator	303.0	299.0	api
Calibrator	273.2	269.6	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:GTET - 11048627

Engineer:JORGE ORLANDO PEREZ

Reference Calibration Date:21-Sep-17 09:43:40

Calibration Date:19-Oct-17 09:44:29

Engineer: JORGE ORLANDO PEREZ

Software Version: WL INSITE R5.0.5 (Build 8)

Calibration Version: 1

Calibrator Source S/N: TB-146

Calibrator API Reference:265.00 api

Equivalent Calibrator API Reference:269.6 api

Field Verification	Shop	Field	Units
Background	29.3	26.5	api
Background + Calibrator	299.0	298.4	api
Calibrator	269.6	271.9	api

Shop	Field	Difference	Tolerance
269.6	271.9	-2.3	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11055304

Reference Calibration Date: 20-Aug-17 11:51:57

Engineer: T. HARRIS

Calibration Date: 20-Aug-17 12:13:57

Software Version: WL INSITE R5.0.5 (Build 8)

Calibration Version: 1

Logging Source S/N: DSN-424

Tank Serial Number: 12345678

Reference value assigned to Tank: 56.100

Snow Block S/N: 12345678

Calibration Tank Water Temperature: 73 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.04773	1.05081	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):	0.2348	0.2358	0.0009	+/- 0.0020
Calibrated Ratio:	10.5287	10.5596	0.031	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0846	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 - 11055304

Reference Calibration Date: 20-Aug-17 12:13:57

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 19-Oct-17 12:18:06

Software Version: WL INSITE R5.0.5 (Build 8)

Calibration Version: 1

Logging Source S/N: DSN-424

Snow Block S/N: 12345678

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0846	0.0836	-0.0010	+/- 0.0150

PASS/FAIL SUMMARY	
-------------------	--

Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	SDLT - 10960494	Reference Calibration Date:	20-Aug-17 12:41:21
Engineer:	T. HARRIS	Calibration Date:	20-Aug-17 12:48:22
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1
Host Tool Name:	DSNT - 11055304		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-2993.12	-3003.48	-7000.00 - -1000.00
Pad Gain	0.0003799	0.0003806	0.0002000 - 0.0006000
Arm Offset	-746.82	-1647.28	-5000.00 - 3000.00
Arm Gain	0.0004486	0.0005279	0.000300 - 0.000700
Arm Power	-0.000001023	-0.000005848	-0.000010000 - 0.000010000

The ring diameter is computed from: $\text{DIAMETER} = \text{PAD EXTENSION} + \text{ARM EXTENSION} + \text{TOOL DIAMETER}$

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)	6.64	6.50	-0.14	+/- 0.20
Medium Ring (in)	8.21	8.25	0.04	+/- 0.20
Large Ring (in)	14.95	15.00	0.05	+/- 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 - 10960494	Reference Calibration Date:	20-Aug-17 12:48:22
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	19-Oct-17 12:50:40
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

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

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	SDLT Pad - 10844781	Reference Calibration Date:	13-Mar-17 10:24:03
Engineer:	T. HARRIS	Calibration Date:	20-Aug-17 11:03:23
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Logging Source S/N: 5168GW

Aluminum Block S/N: EL RENO STD ALUMINUM

Density: 2.581g/cc

Pe: 3.170

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0364	1.0186	0.90 - 1.10
Near Dens Gain	1.0238	1.0069	0.90 - 1.10
Near Peak Gain	1.0221	1.0079	0.90 - 1.10
Near Lith Gain	1.0552	1.0294	0.90 - 1.10
Far Bar Gain	1.0145	1.0123	0.90 - 1.10
Far Dens Gain	1.0038	0.9989	0.90 - 1.10
Far Peak Gain	1.0000	0.9971	0.90 - 1.10
Far Lith Gain	0.9816	0.9753	0.90 - 1.10
Near Bar Offset	-0.0376	0.1365	NONE
Near Dens Offset	0.0482	0.2065	NONE
Near Peak Offset	0.0495	0.1754	NONE
Near Lith Offset	-0.2247	-0.0123	NONE
Far Bar Offset	0.1095	0.1369	NONE
Far Dens Offset	0.1904	0.2360	NONE
Far Peak Offset	0.2182	0.2309	NONE
Far Lith Offset	0.3442	0.3659	NONE
Near Bar Background	733.33	732.60	700 - 1450
Near Dens Background	239.77	241.62	230 - 480
Near Peak Background	105.24	104.56	100 - 210
Near Lith Background	129.58	128.06	125 - 260
Far Bar Background	478.31	473.96	450 - 900
Far Dens Background	188.83	186.91	175 - 345
Far Peak Background	74.80	74.19	70 - 140
Far Lith Background	77.92	76.67	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.675	1.687	0.012	+/- 0.015
Pe	2.474	2.559	0.085	+/- 0.150
ALUMINUM				
Density (g/cc)	2.566	2.581	0.015	+/- 0.01500
Pe	3.051	3.132	0.081	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0007	+/- 0.0110	-0.0009	+/- 0.0140
Magnesium Block	-0.0007	+/- 0.0110	-0.0029	+/- 0.0140
Aluminum Block	-0.0007	+/- 0.0110	0.0006	+/- 0.0140
Resolution	9.59	6.00 - 11.50	8.79	6.00 - 11.50
Internal Verifier(B+D+P+L)	1207	1200 - 2700	812	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 - 10844781	Reference Calibration Date:	20-Aug-17 11:03:23
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	19-Oct-17 10:00:46
Software Version:	WL INSITE R5.0.5 (Build 8)	Calibration Version:	1

Pad Temperature: 75.2 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1206.834	1194.703	-12.131	14.101
Far (B+D+P+L) cps	811.738	808.372	-3.366	15.745
Near Resolution	9.59	9.61	0.020	0.50
Far Resolution	8.79	8.78	-0.010	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
GTET-11048627						
Gamma Ray Calibrator	269.6	271.9	-----	-2.3	+/- 9.00	api
DSNT-11055304						
Snow-Block Porosity	0.0846	0.0836	-----	0.0010	+/- 0.0150	decP
SDLT-10960494						
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
SDLT Pad-10844781						
Near(B+D+P+L)	1206.834	1194.703	-----	12.131	+/-14.101	cps
Far(B+D+P+L)	811.738	808.372	-----	3.366	+/-15.745	cps
Data: CLARK_13-24\0001 GTET-DSNT-SDLT-BSAT-ACRTIDLE					Date: 20-Oct-17 13:48:43	

HALLIBURTON	
INPUTS, DELAYS AND FILTERS TABLE	

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
Rwa / CrossPlot				
TPUL	Tension Pull	77.24	NO	
BS	Bit Size	77.24	NO	
HDIA	Measured Hole Diameter	0.00	NO	
CH_HOS				
DHTN	DownholeTension	0.00	BLK	0.000
SP Sub				
PLTC	Plot Control Mask	72.01	NO	
SP	Spontaneous Potential	72.01	BLK	1.250
SPR	Raw Spontaneous Potential	72.01	NO	

SPO	Spontaneous Potential Offset	72.01	NO	
GTET				
TPUL	Tension Pull	63.99	NO	
GR	Natural Gamma Ray API	63.99	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	63.99	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	63.99	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	53.74	NO	
RNDS	Near Detector Telemetry Counts	53.84	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.59	TRI	0.583
DNTT	DSN Tool Temperature	53.84	NO	
DSNS	DSN Tool Status	53.74	NO	
ERND	Near Detector Telemetry Counts EVR	53.84	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.59	BLK	0.000
ENTM	DSN Tool Temperature EVR	53.84	NO	
HDIA	Measured Hole Diameter	0.00	NO	
SDLT				
TPUL	Tension Pull	43.84	NO	
PCAL	Pad Caliper	43.84	TRI	0.250
ACAL	Arm Caliper	43.84	TRI	0.250
BSAT				
TPUL	Tension Pull	26.84	NO	
STAT	Status	26.84	NO	
DLYT	Delay Time	26.84	NO	
SI	Sample Interval	26.84	NO	
TXRX	Raw Telemetry 10 Receivers	26.84	NO	
FRMC	Tool Frame Count	26.84	NO	
GMOD	Gain processing mode	19.58	NO	
ACRt Sonde				
TPUL	Tension Pull	2.73	NO	
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000

F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000
RMUD	Mud Resistivity	12.52	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	2.73	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000
ITMP	Instrument Temperature	2.73	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.73	NO	
TIDV	Instrument Temperature Derivative	2.73	NO	
TUDV	Upper Temperature Derivative	2.73	NO	
TLDV	Lower Temperature Derivative	2.73	NO	
TRBD	Receiver Board Temperature	2.73	NO	
HDIA	Measured Hole Diameter	0.00	NO	
Microlog Pad				
TPUL	Tension Pull	44.03	NO	
MINV	Microlog Lateral	44.03	BLK	0.750
MNOR	Microlog Normal	44.03	BLK	0.750
SDLT Pad				
TPUL	Tension Pull	43.83	NO	
NAB	Near Above	43.66	BLK	0.920
NHI	Near Cesium High	43.66	BLK	0.920
NLO	Near Cesium Low	43.66	BLK	0.920
NVA	Near Valley	43.66	BLK	0.920
NBA	Near Barite	43.66	BLK	0.920
NDE	Near Density	43.66	BLK	0.920
NPK	Near Peak	43.66	BLK	0.920
NLI	Near Lithology	43.66	BLK	0.920
NBAU	Near Barite Unfiltered	43.66	BLK	0.250
NLIU	Near Lithology Unfiltered	43.66	BLK	0.250
FAB	Far Above	44.01	BLK	0.250
FHI	Far Cesium High	44.01	BLK	0.250
FLO	Far Cesium Low	44.01	BLK	0.250
FVA	Far Valley	44.01	BLK	0.250
FBA	Far Barite	44.01	BLK	0.250
FDE	Far Density	44.01	BLK	0.250
FPK	Far Peak	44.01	BLK	0.250
FLI	Far Lithology	44.01	BLK	0.250
PTMP	Pad Temperature	43.84	BLK	0.920
NHV	Near Detector High Voltage	43.24	NO	
FHV	Far Detector High Voltage	43.24	NO	

ITMP	Instrument Temperature	43.24	NO
DDHV	Detector High Voltage	43.24	NO
HDIA	Measured Hole Diameter	0.00	NO
Data: CLARK_13-24\0001 GTET-DSNT-SDLT-BSAT-ACRTVDLE			Date: 20-Oct-17 18:47:19

COMPANY	K3 OIL & GAS OPERATING COMPANY		
WELL	CLARK 13-24		
FIELD	WILDCAT		
COUNTY	LINCOLN	STATE	COLORADO
HALLIBURTON		DUAL SPACED NEUTRON SPECTRAL DENSITY LOG	