HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY SANDRIDGE EXPLORATION
WELL RUTH 3504 1-9
FIELD/BLOCK WILDCAT
COUNTY SUMMER
STATE KANSAS

COMPANY **SANDRIDGE EXPLORATION**

WELL **RUTH 3504 1-9**

FIELD/BLOCK **WILDCAT**

COUNTY **SUMMER** STATE **KANSAS**

API No. 15-191-227-13-00-00

Location SW SW SE SE
200' FSL & 1000' FEL

Sect. 9 Twp. 35S Rge. 4W

Other Services:
SDLT
DSNT
MICROLOG
ACRT
CSNT
MRIL
IDT/ICT / WSTT

Permanent Datum	GL	Elev. 1312.0 ft	Elev.: K.B. 1329.0 ft
Log measured from	KB	, 17.0 ft above perm. Datum	D.F. 1329.0 ft
Drilling measured from	KB		G.L. 1312.0 ft

Date		02-Dec-13					
Run No.		ONE					
Depth - Driller		5132.00 ft					
Depth - Logger		5100.0 ft					
Bottom - Logged Interval		5100 ft					
Top - Logged Interval		2500 ft					
Casing - Driller		9.625 in @ 596.0 ft		@		@	
Casing - Logger		561.0 ft					
Bit Size		8.750 in		@		@	
Type Fluid in Hole		WBM					
Density	Viscosity	8.8 ppg	42.00 s/qt				
PH	Fluid Loss	10.70 pH	5.2 cptm				
Source of Sample		FLOWLINE					
Rm @ Meas. Temperature		0.200 ohmm @ 85.00 degF		@		@	
Rmf @ Meas. Temperature		0.17 ohmm @ 70.00 degF		@		@	
Rmc @ Meas. Temperature		0.250 ohmm @ 70.00 degF		@		@	
Source Rmf	Rmc	MEASURED	MEASURED				
Rm @ BHT		0.17 ohmm @ 102.0 degF		@		@	
Time Since Circulation		10.0 hr					
Time on Bottom		02-Dec-13 19:24					
Max. Rec. Temperature		102.0 degF @ 5100.0 ft		@		@	
Equipment	Location	10549592	PVOK				
Recorded By		J.COTHREN					
Witnessed By		HANNA THORNBERG					

Fold here

Service Ticket No.: 900915833 API Serial No.: 15-191-227-13-00-00 PGM Version: WL INSITE R3.8.12 (Build 3)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

RESISTIVITY SCALE CHANGES

	Sample No.			Type Log	Depth	Scale Up Hole	Scale Down Hole
Date							
Depth-Driller							
Type Fluid in Hole							
Density	Viscosity						
Ph	Fluid Loss						
Source of Sample							
Rm @ Meas. Temp		@		@			
Rmf @ Meas. Temp.		@		@			
Rmc @ Meas. Temp.		@		@			
Source Rmf	Rmc						
Rm @ BHT		@		@			
Rmf @ BHT		@		@			
Rmc @ BHT		@		@			

RESISTIVITY EQUIPMENT DATA

	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
	@				
	@	ONE	ACRT 908	N/A	1.5" STANDOFF	N/A
	@				
	@				
	@				
	@				

EQUIPMENT DATA

	GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	138	Serial No.		Serial No.	230	Serial No.	487
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.		Diameter	3.625"	Diameter	3.625"
Detector Model No.	A-102	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT.			Source Type	CS 137	Source Type	AM 241 Be
Length	8"	LSA [Y/N]		Serial No.	20791B	Serial No.	DSN 382
Distance to Source	10'	FWDA [Y/N]		Strength	1.5 Ci	Strength	15 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	2500	REC	0	150	30	-10	LIME	30	-10	2.71	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks:

THANKS FOR USING HALLIBURTON ENERGY SERVICES.

CHLORIDES REPORTED AT 5800 ppm.

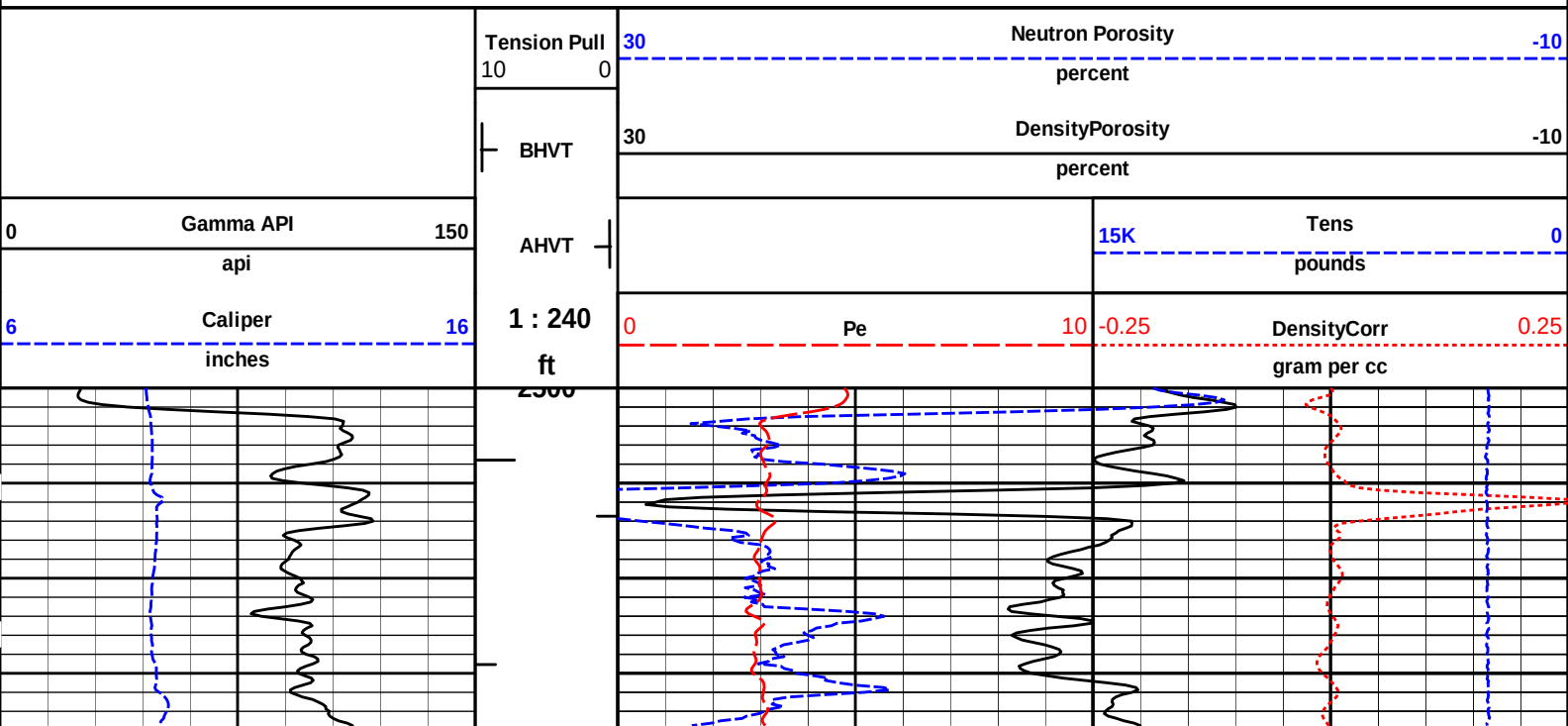
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

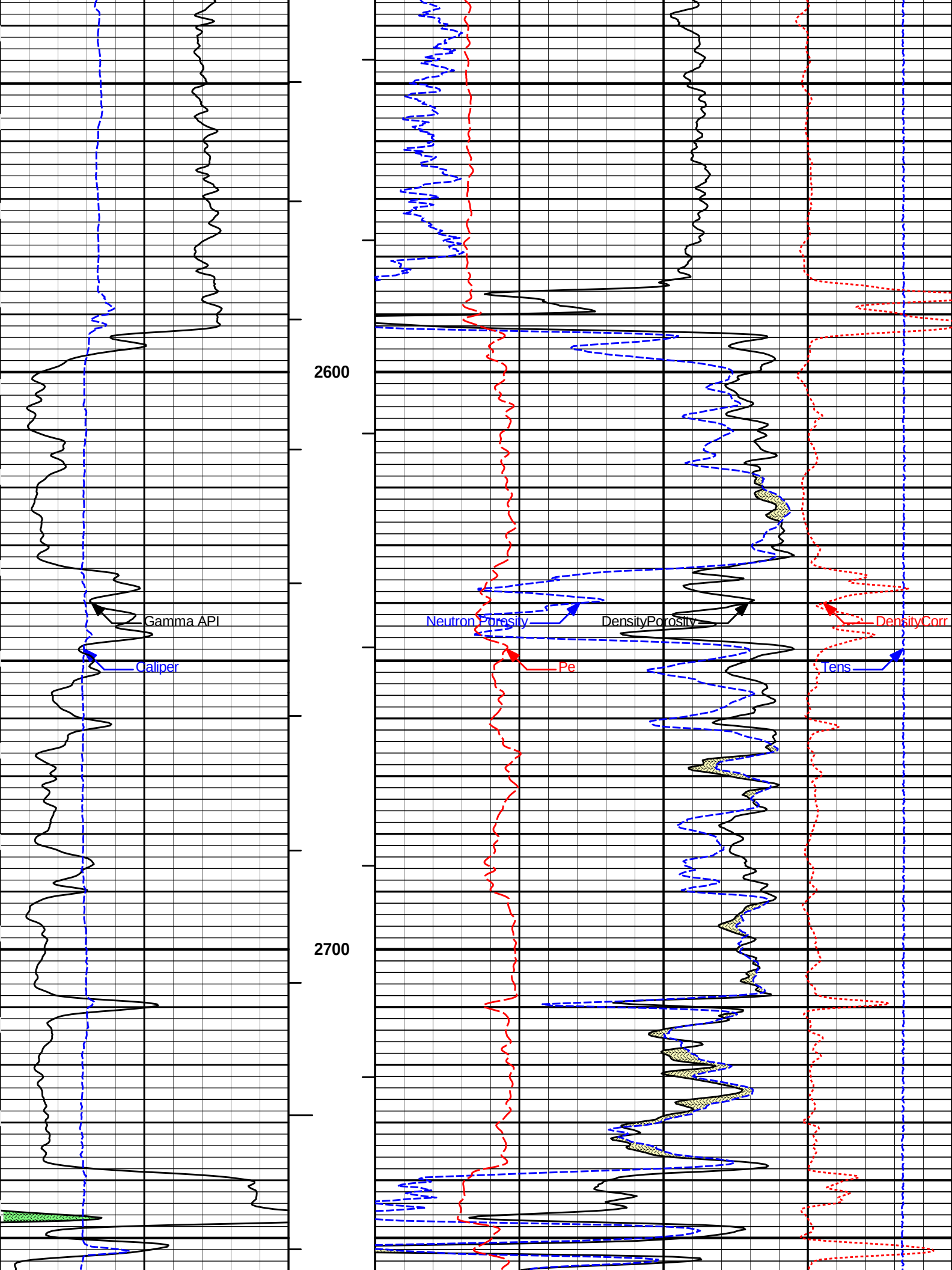
HALLIBURTON

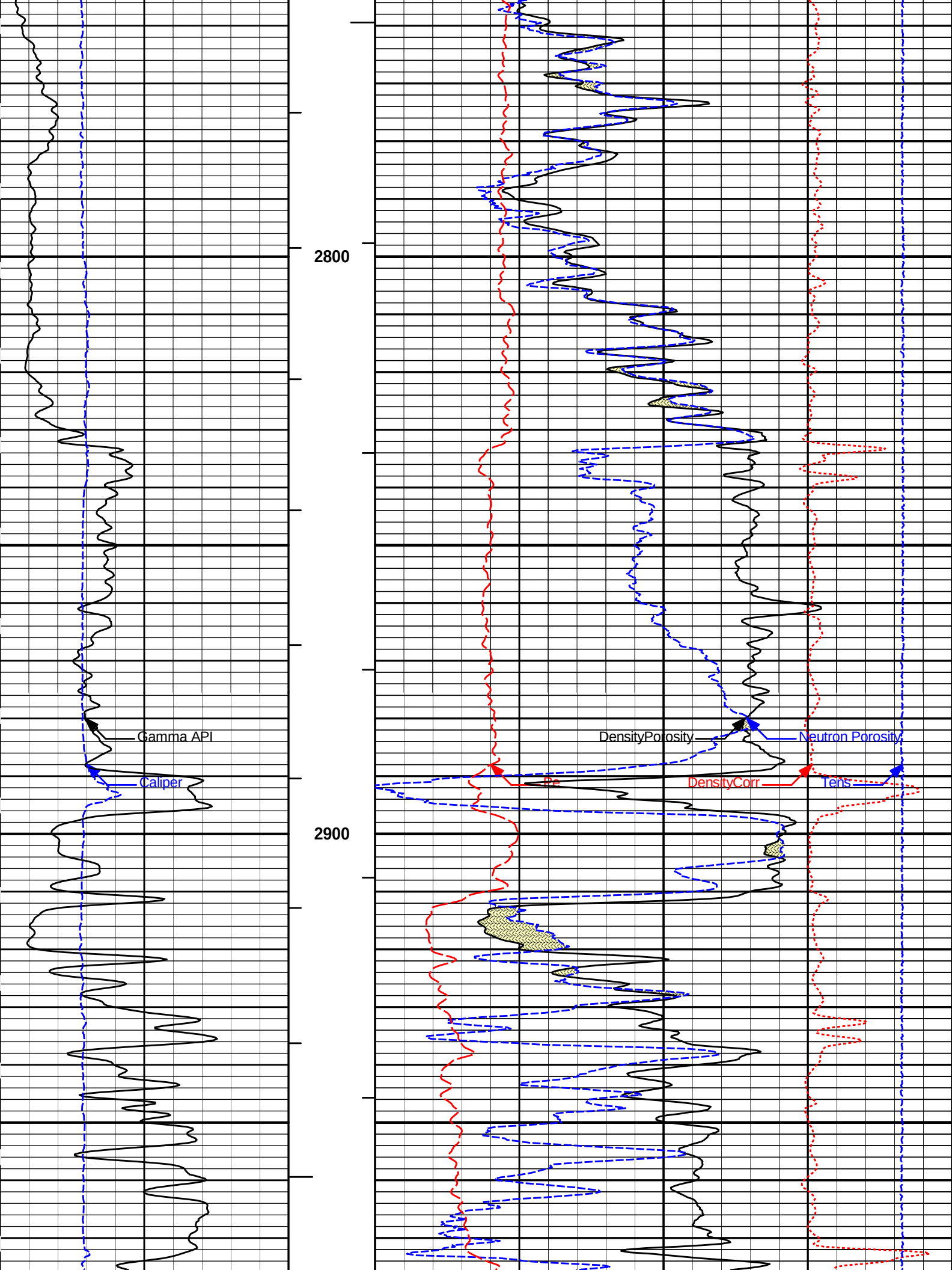
HALLIBURTON

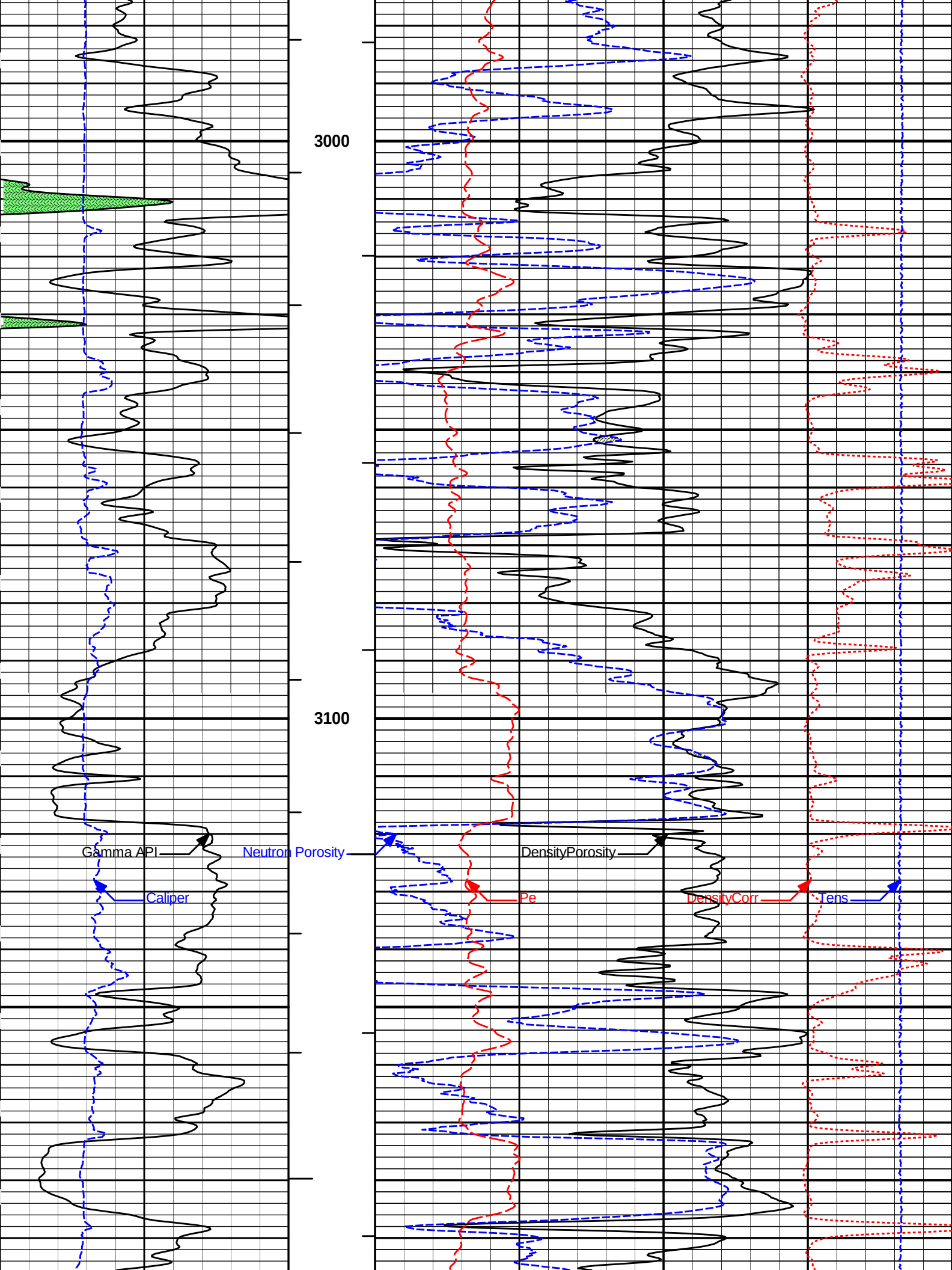
Plot Time: 02-Dec-13 22:12:25
Plot Range: 2500 ft to 5103.17 ft
Data: {ActiveWell}\Well Based\DAQ-0001-003
Plot File: \\PORO\1_Poro_5_mainx

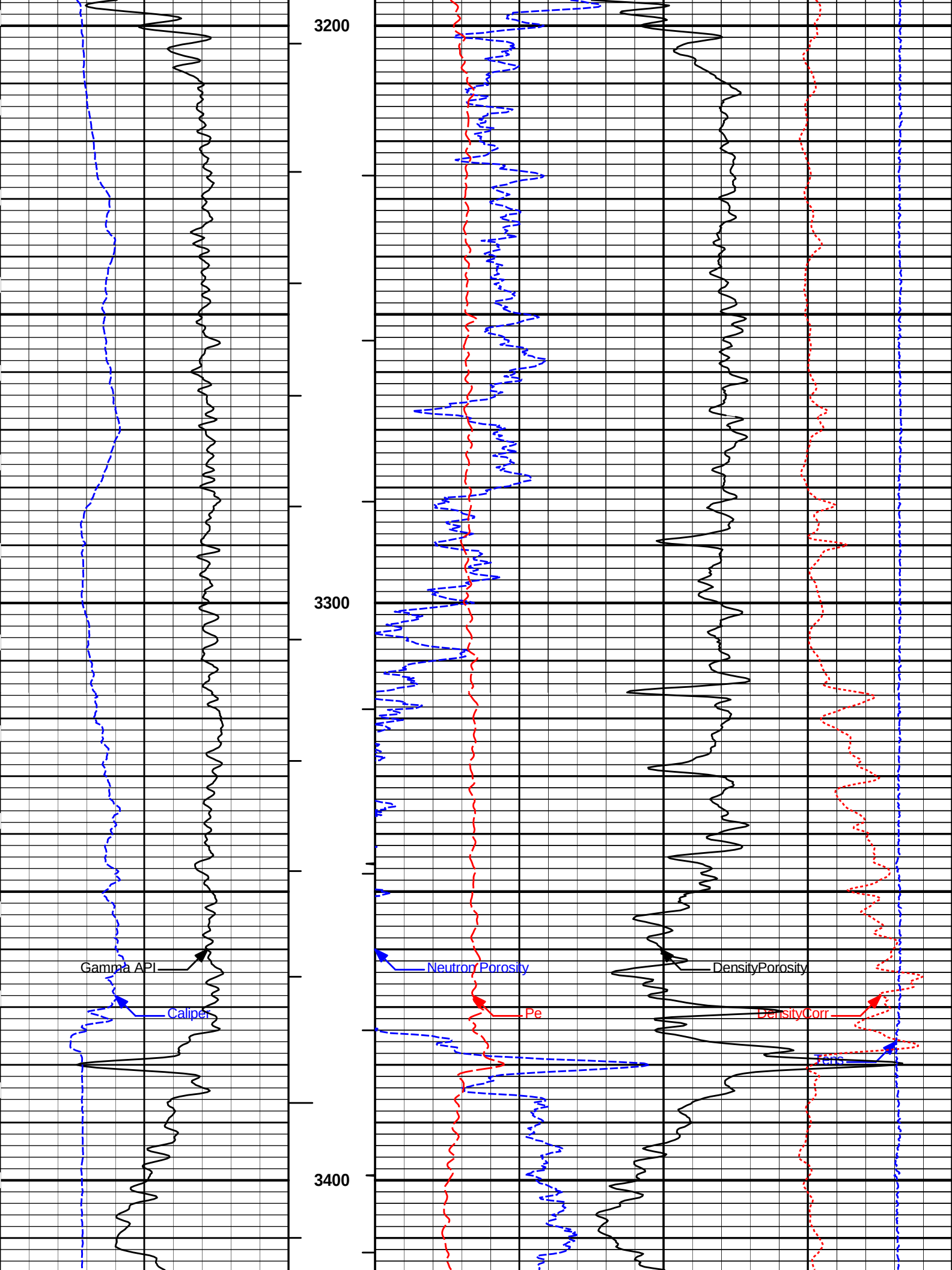
5 INCH MAIN LOG

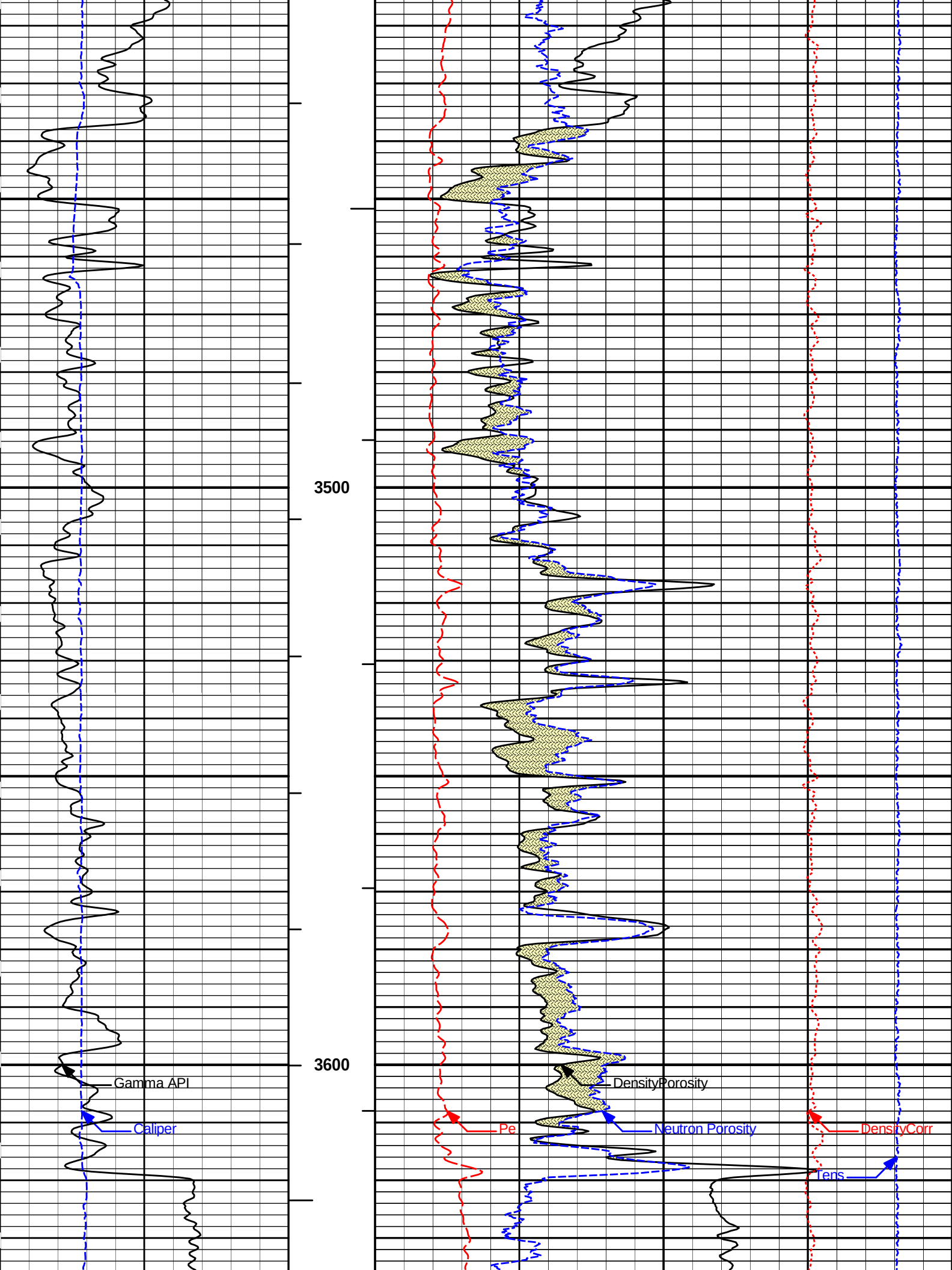


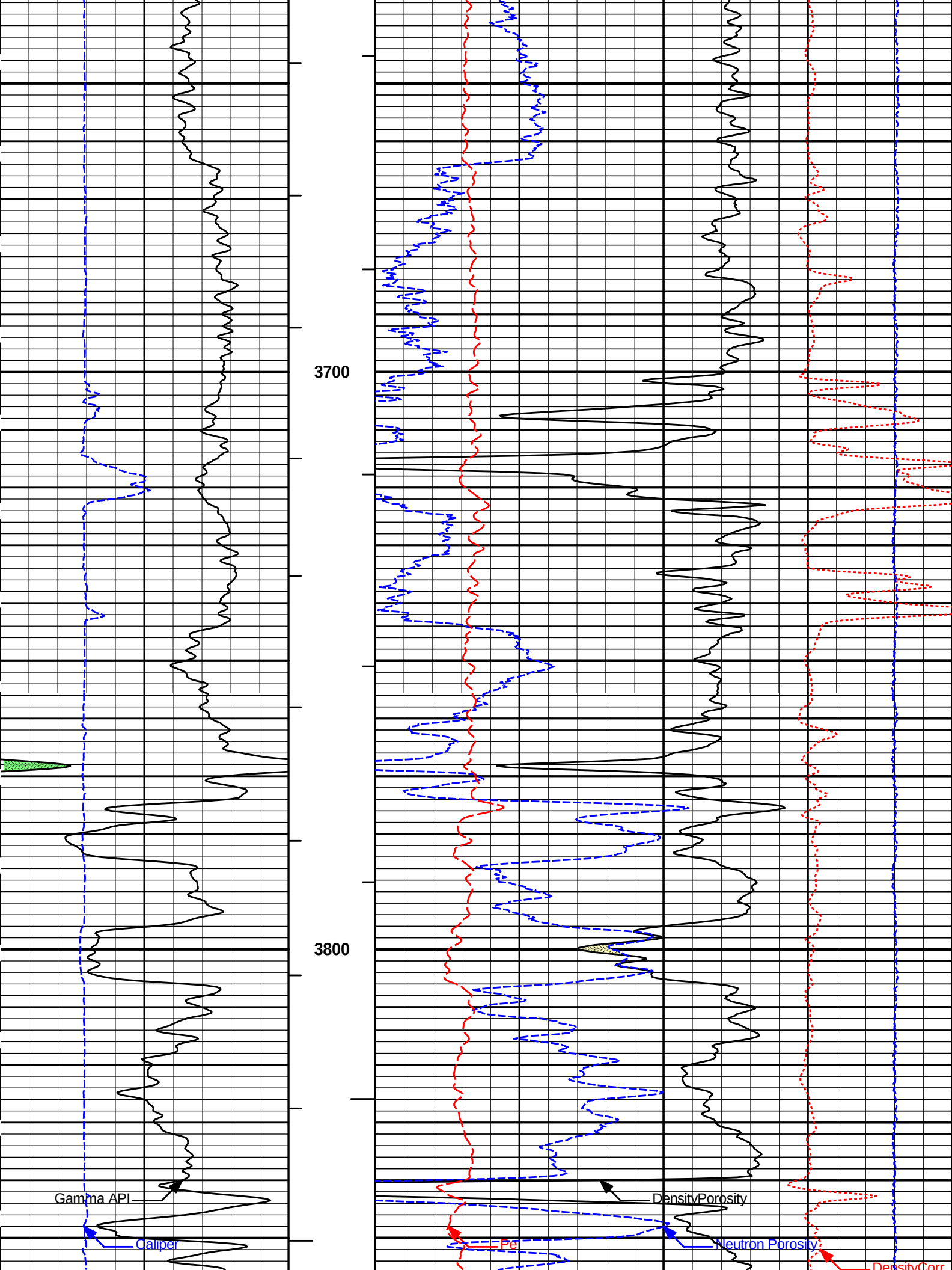

2600
2700
Gamma API
Caliper
Neutron Porosity
DensityPorosity
DensityCorr
Pe
Tens

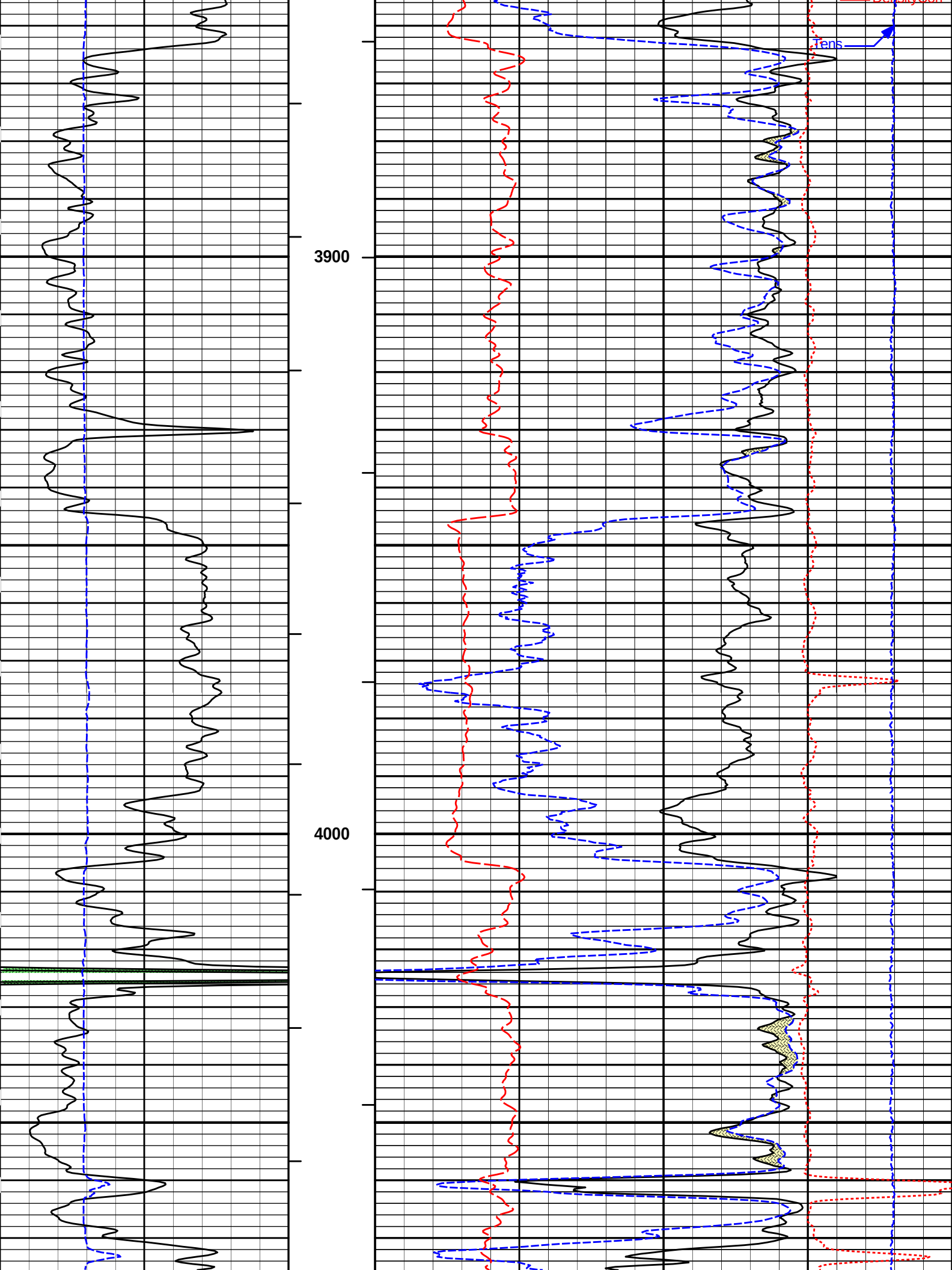

2800
2900
Gamma API
Caliper
DensityPorosity
Neutron Porosity
Pe
DensityCorr
Tens

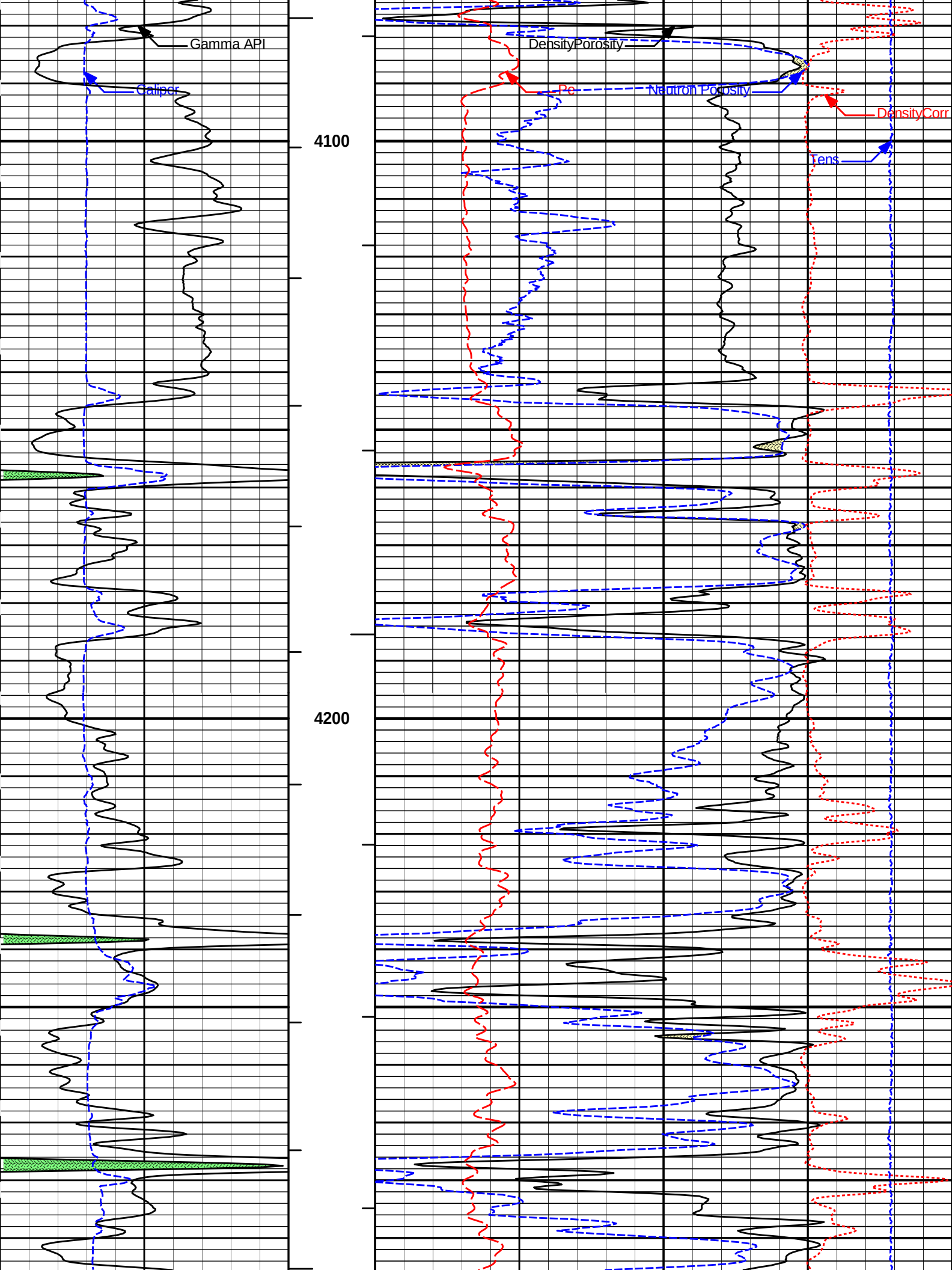

3000
3100
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity
DensityCorr
Tens

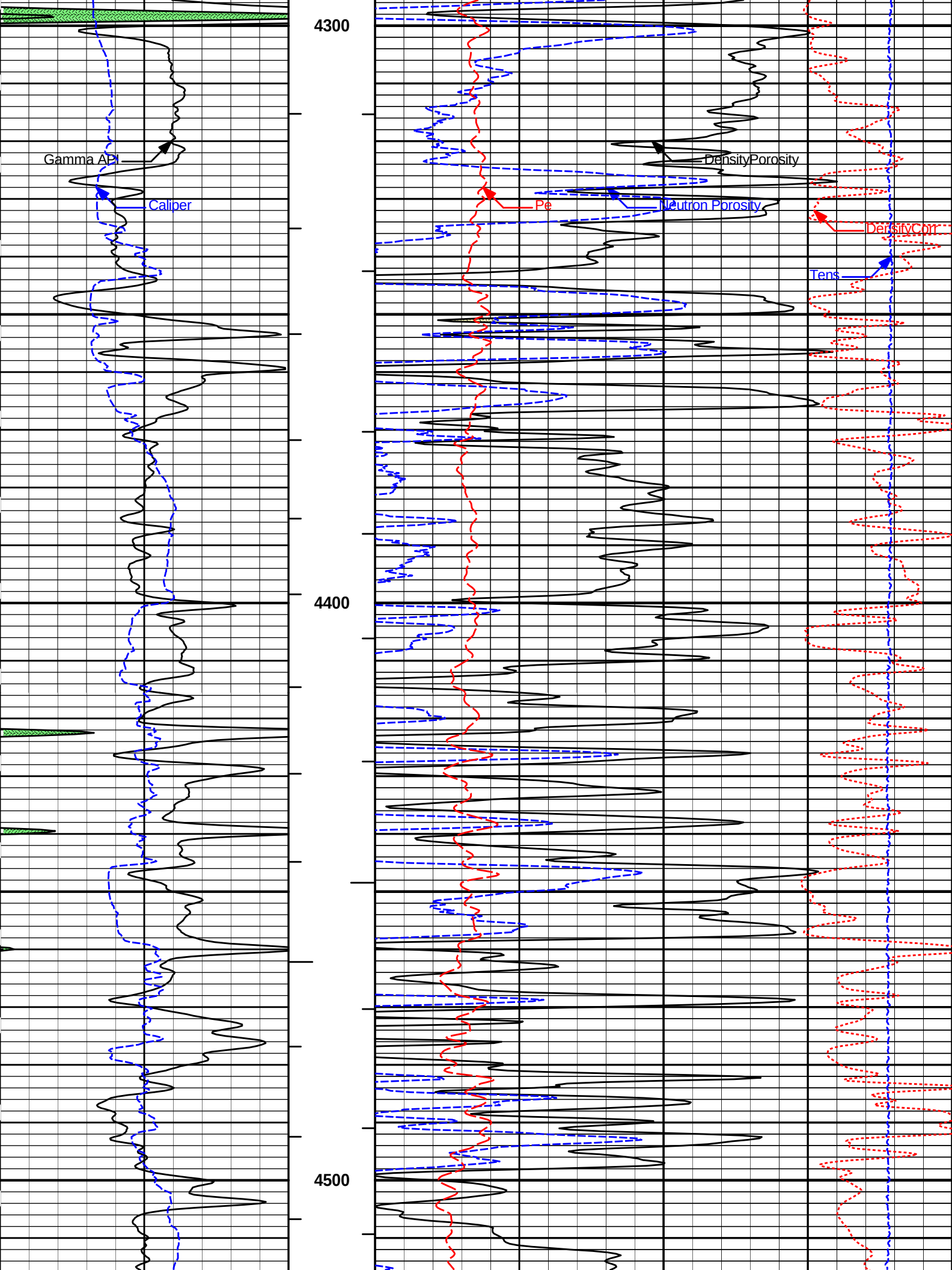

3200
3300
3400
Gamma API
Caliper
Neutron Porosity
Pe
DensityPorosity
DensityCorr
Tens

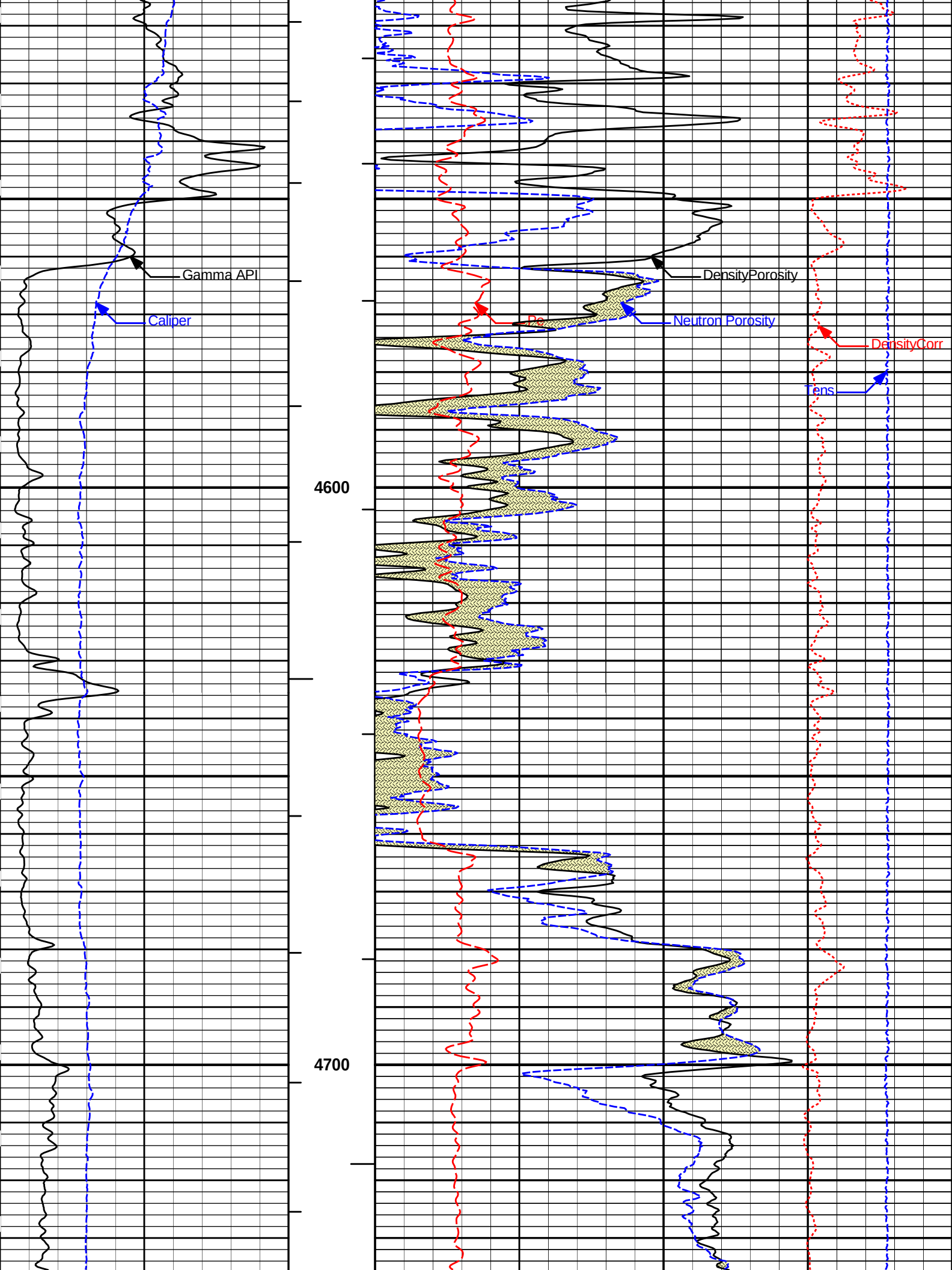

3500
3600
Gamma API
Caliper
Pe
DensityPorosity
Neutron Porosity
DensityCorr
Tens

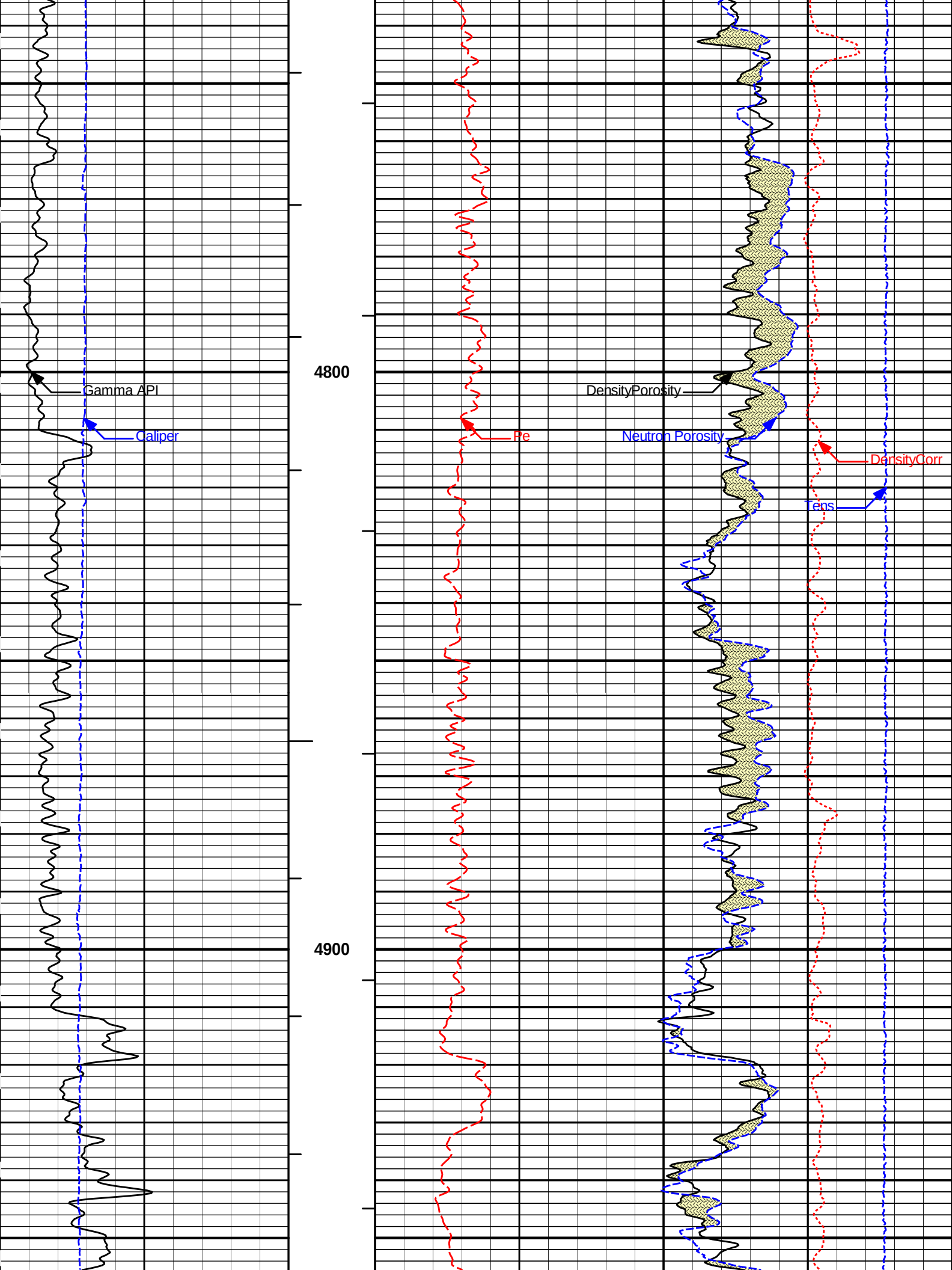

3700
3800
Gamma API
Caliper
Pe
DensityPorosity
Neutron Porosity
DensityCorr

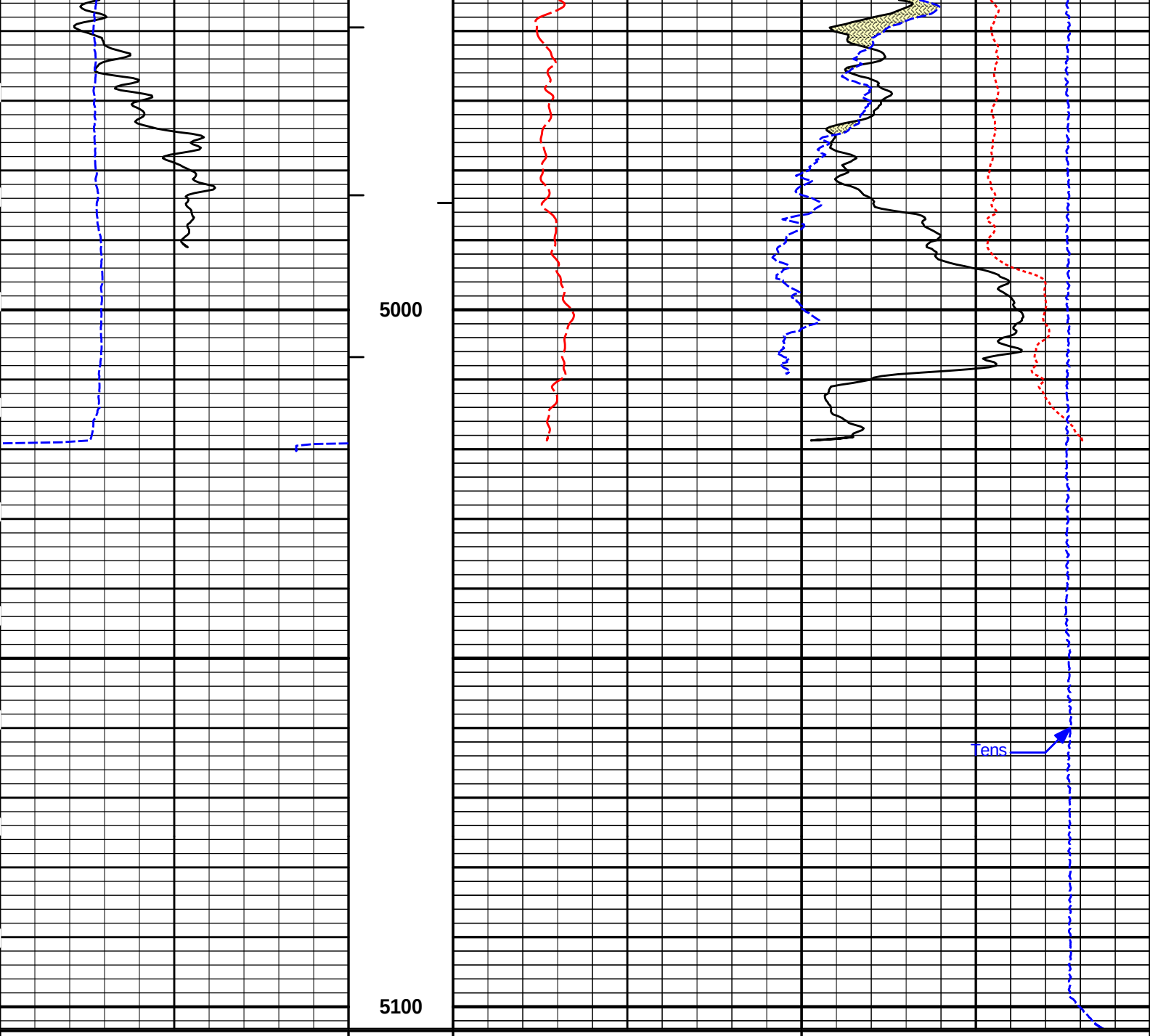

Tens
3900
4000


Gamma API
Caliper
DensityPorosity
Pe
Neutron Porosity
DensityCorr
Tens
4100
4200


4300
4400
4500
Gamma API
Caliber
DensityPorosity
Pe
Neutron Porosity
DensityCorr
Tens


Gamma API
Caliper
DensityPorosity
Pe
Neutron Porosity
DensityCorr
Tens
4600
4700


4800
4900
Gamma API
Caliper
Pe
DensityPorosity
Neutron Porosity
DensityCorr
Tens



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

HALLIBURTON

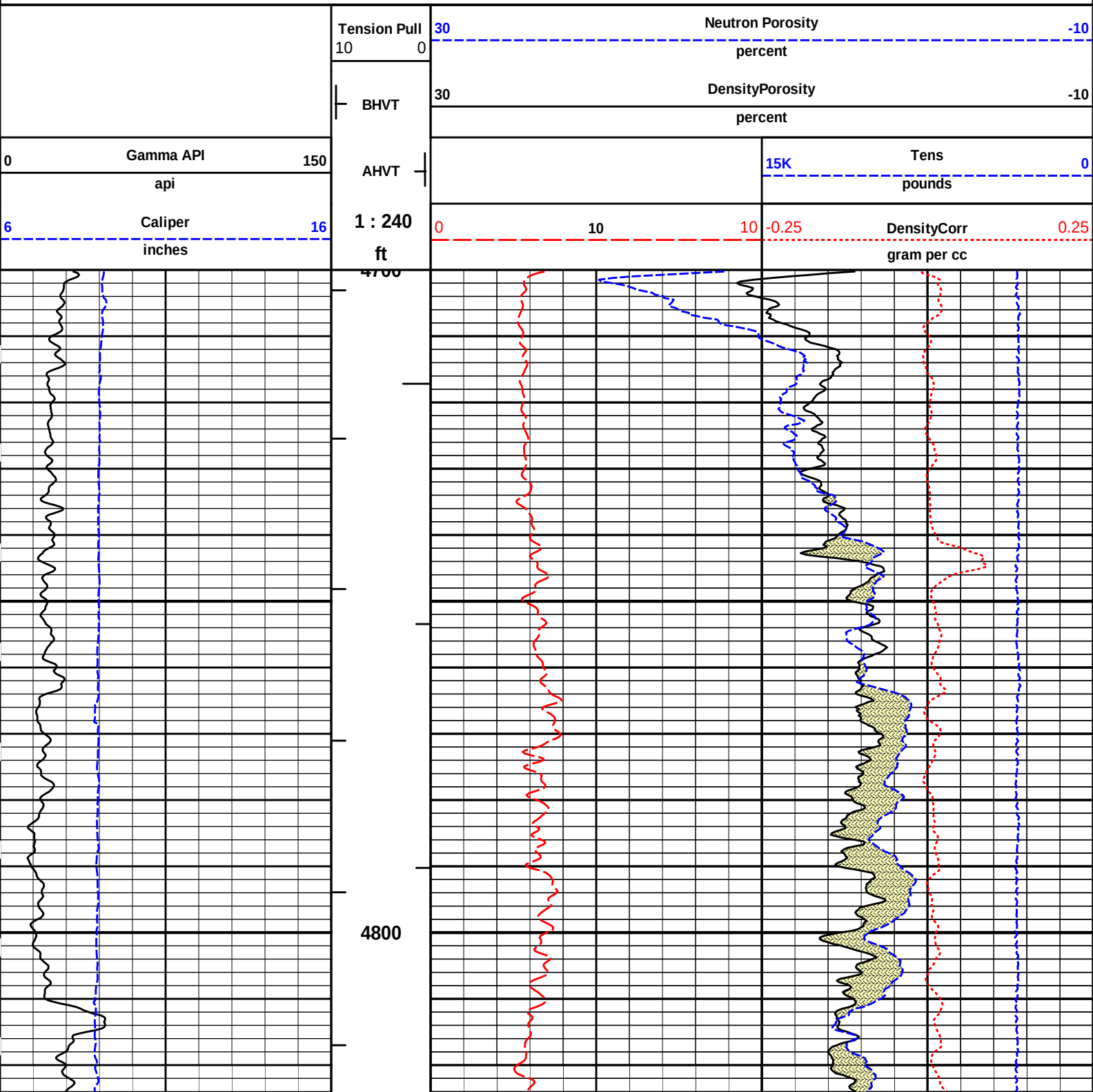
Plot Time: 02-Dec-13 22:12:28
Plot Range: 2500 ft to 5103.17 ft
Data: {ActiveWell}\Well Based\DAQ-0001-003\
Plot File: \\PORO\1_Poro_5_mainx

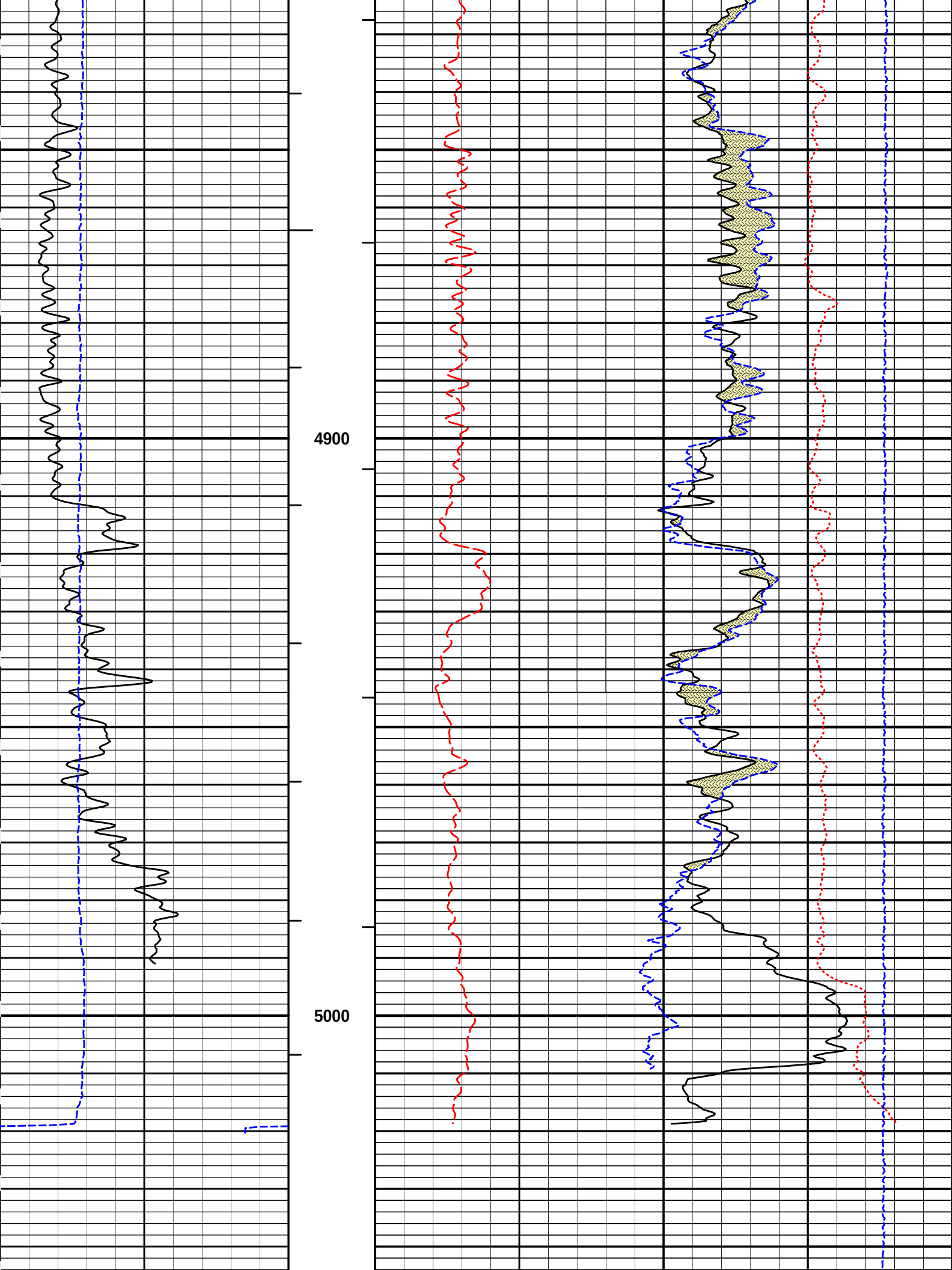
5 INCH MAIN LOG

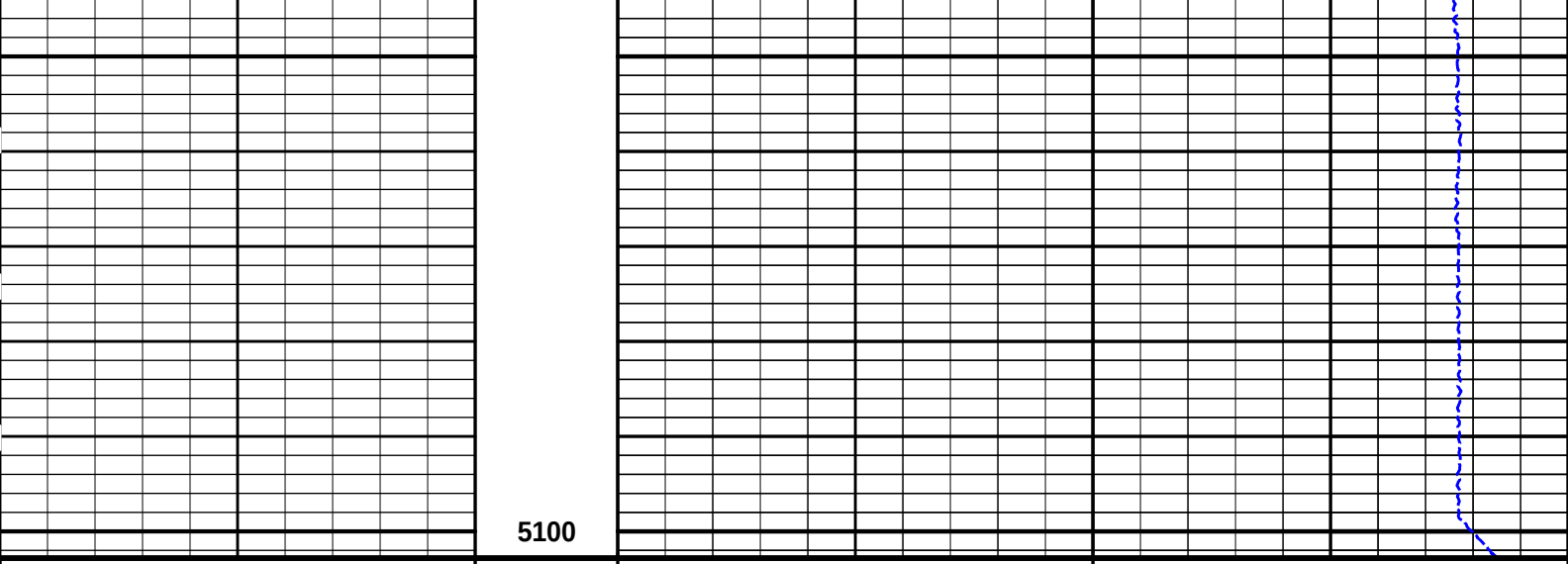
HALLIBURTON

Plot Time: 02-Dec-13 22:12:28
Plot Range: 4700 ft to 5102.67 ft
Data: {ActiveWell}\Well Based\REPEAT\
Plot File: \\PORO\1_Poro_5_rptx

REPEAT SECTION




4900
5000



HALLIBURTON

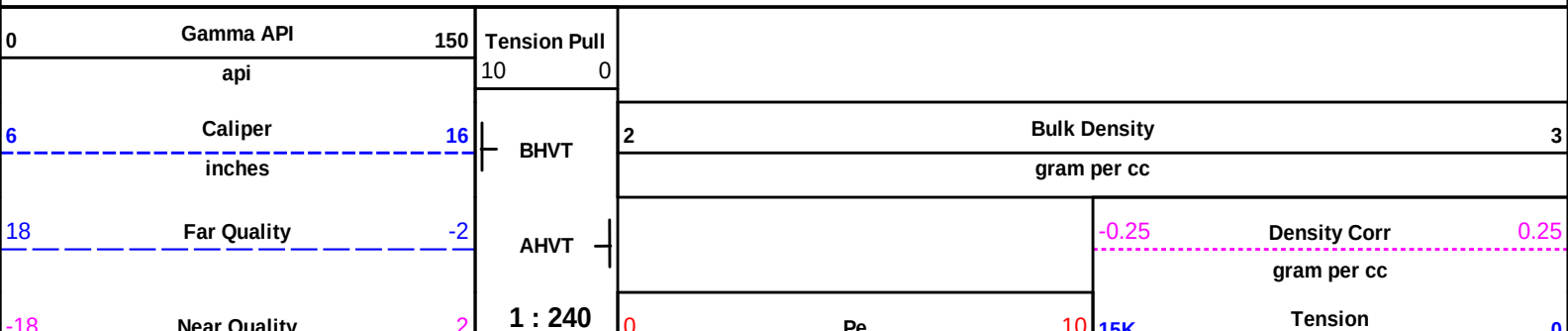
Plot Time: 02-Dec-13 22:12:30
Plot Range: 4700 ft to 5102.67 ft
Data: {ActiveWell}\Well Based\REPEAT\
Plot File: \\PORO\1_Poro_5_rptx

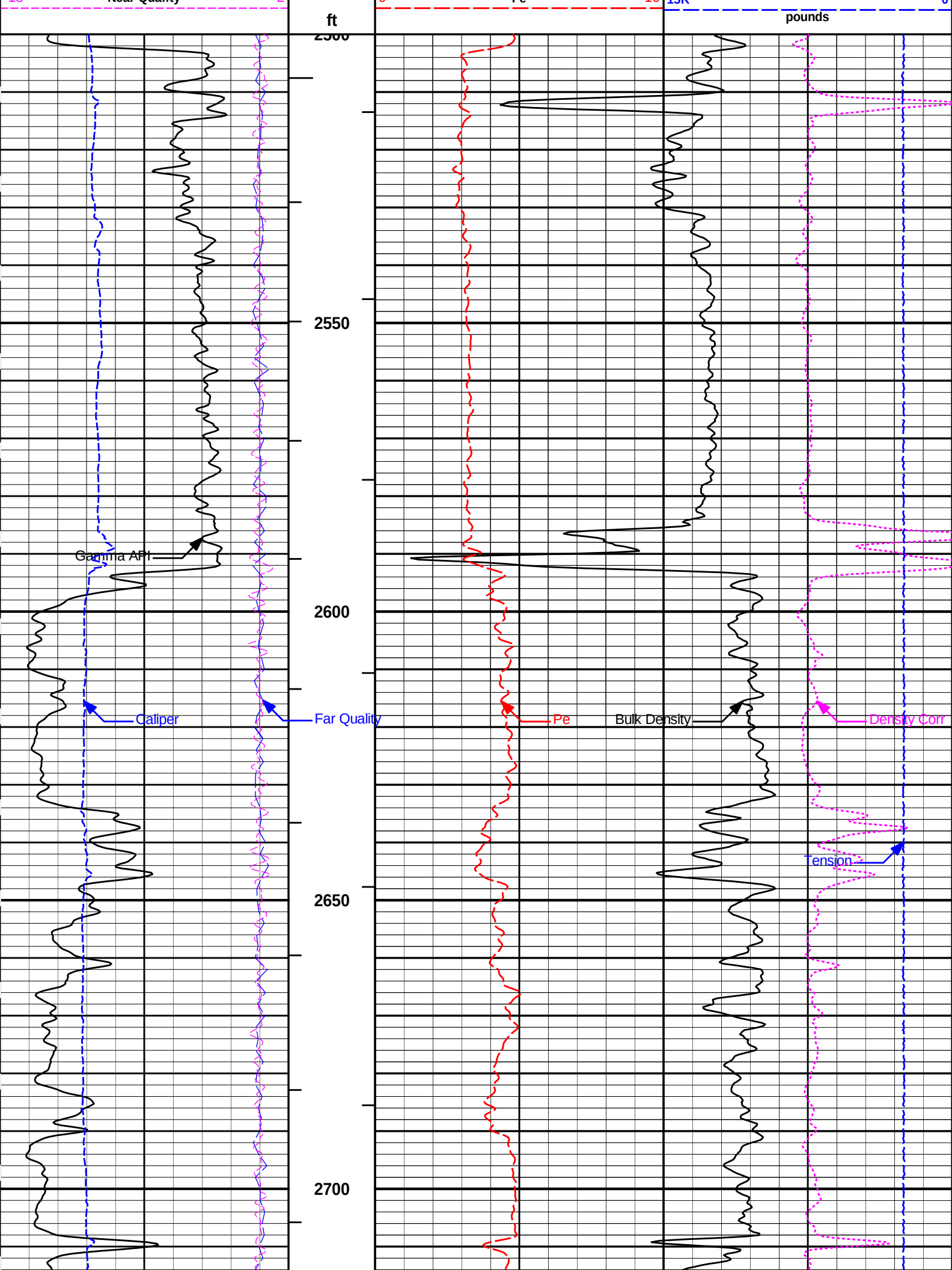
REPEAT SECTION

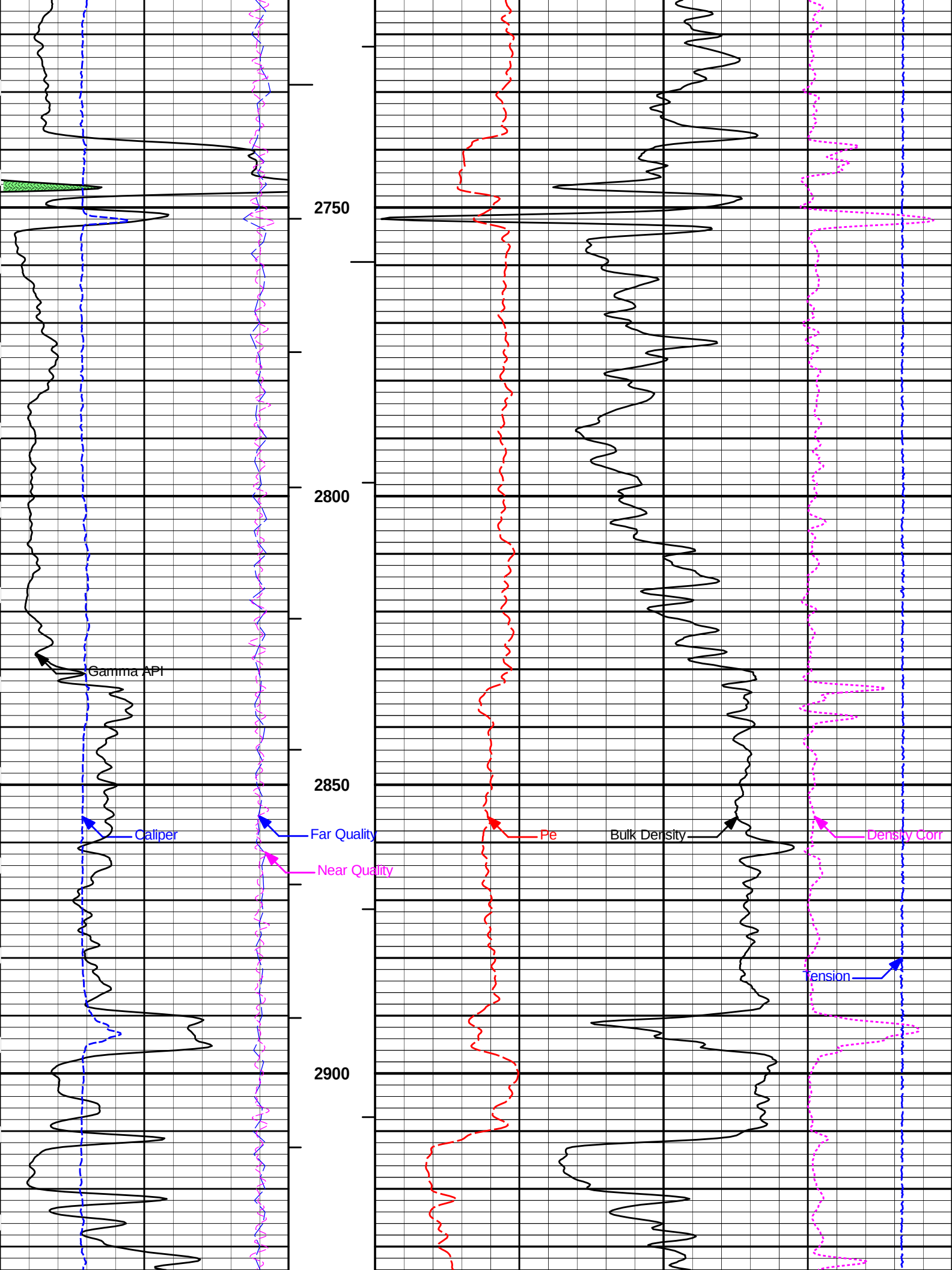
HALLIBURTON

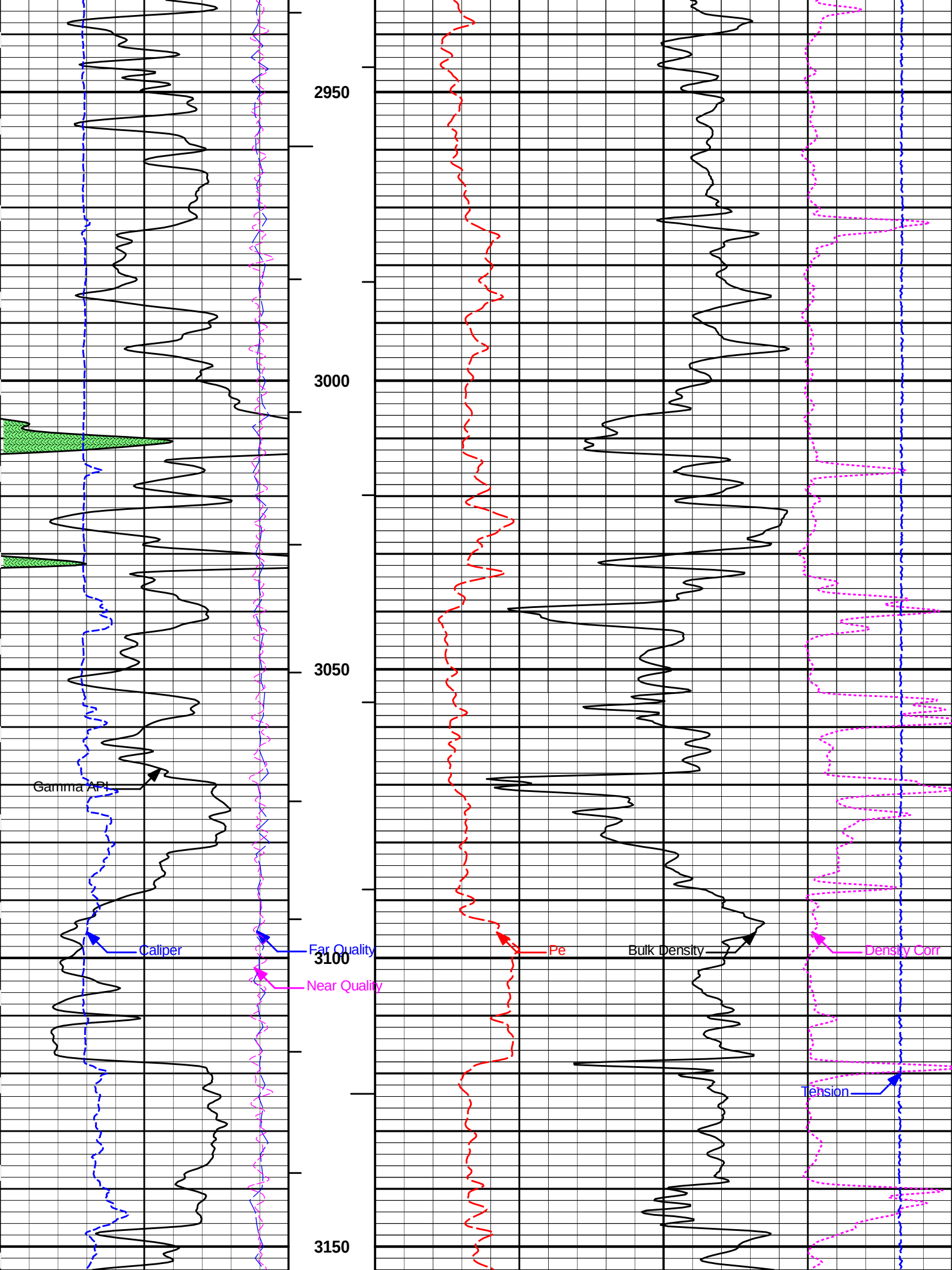
Plot Time: 02-Dec-13 22:12:30
Plot Range: 2500 ft to 5103.17 ft
Data: {ActiveWell}\Well Based\DAQ-0001-003\
Plot File: \\PORO\1_Bulk_5_mainx

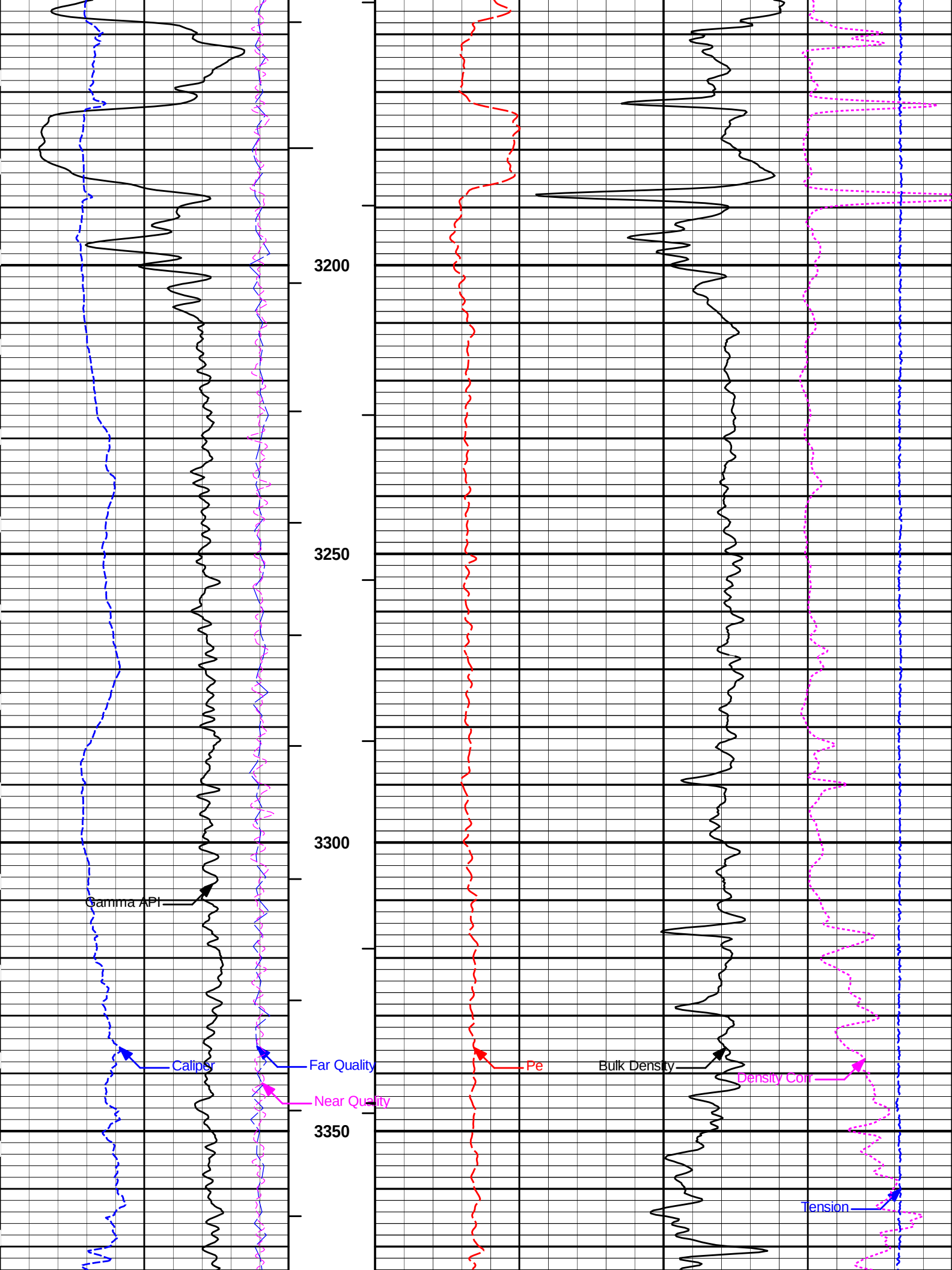
5 INCH MAIN LOG

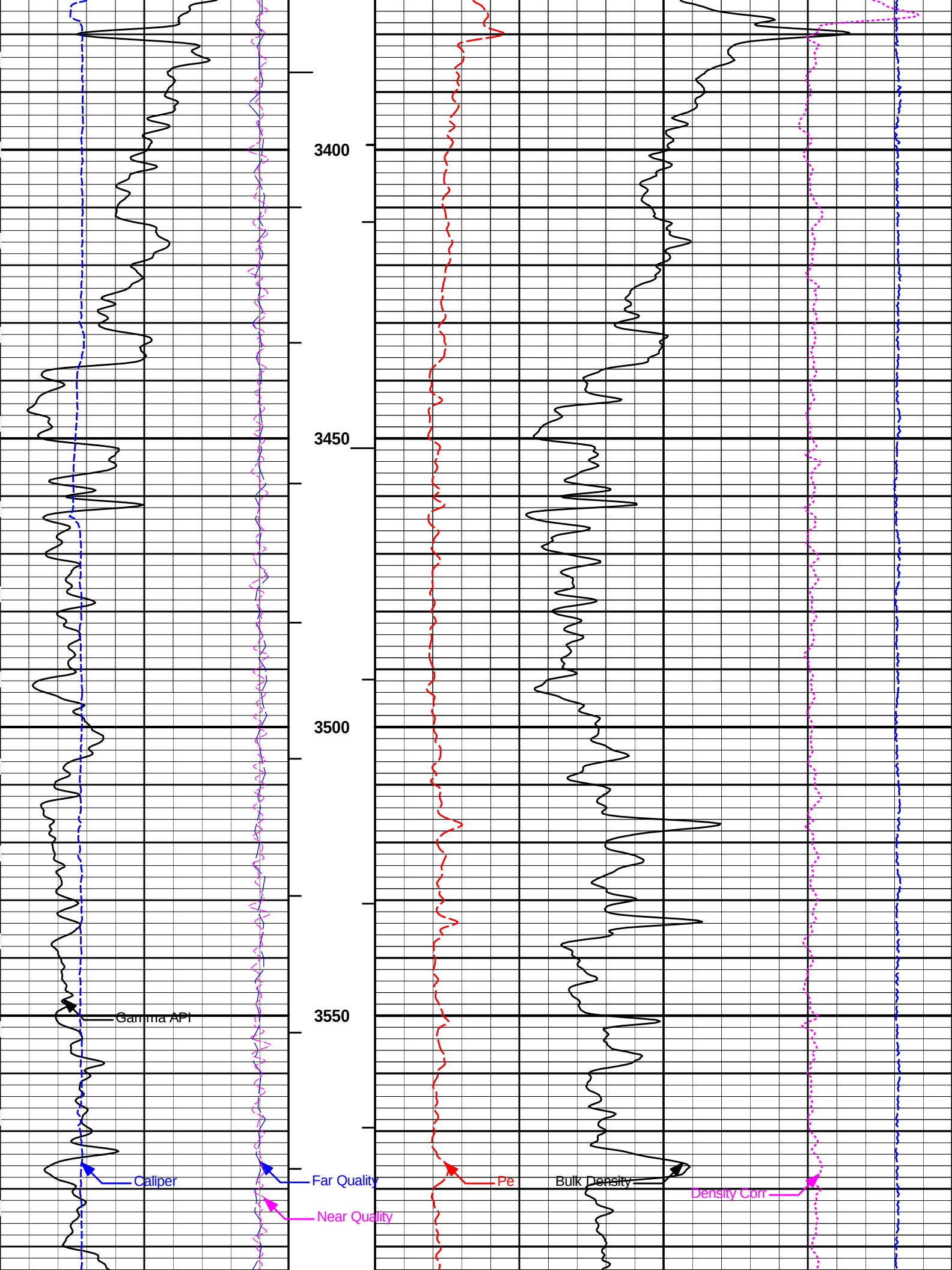


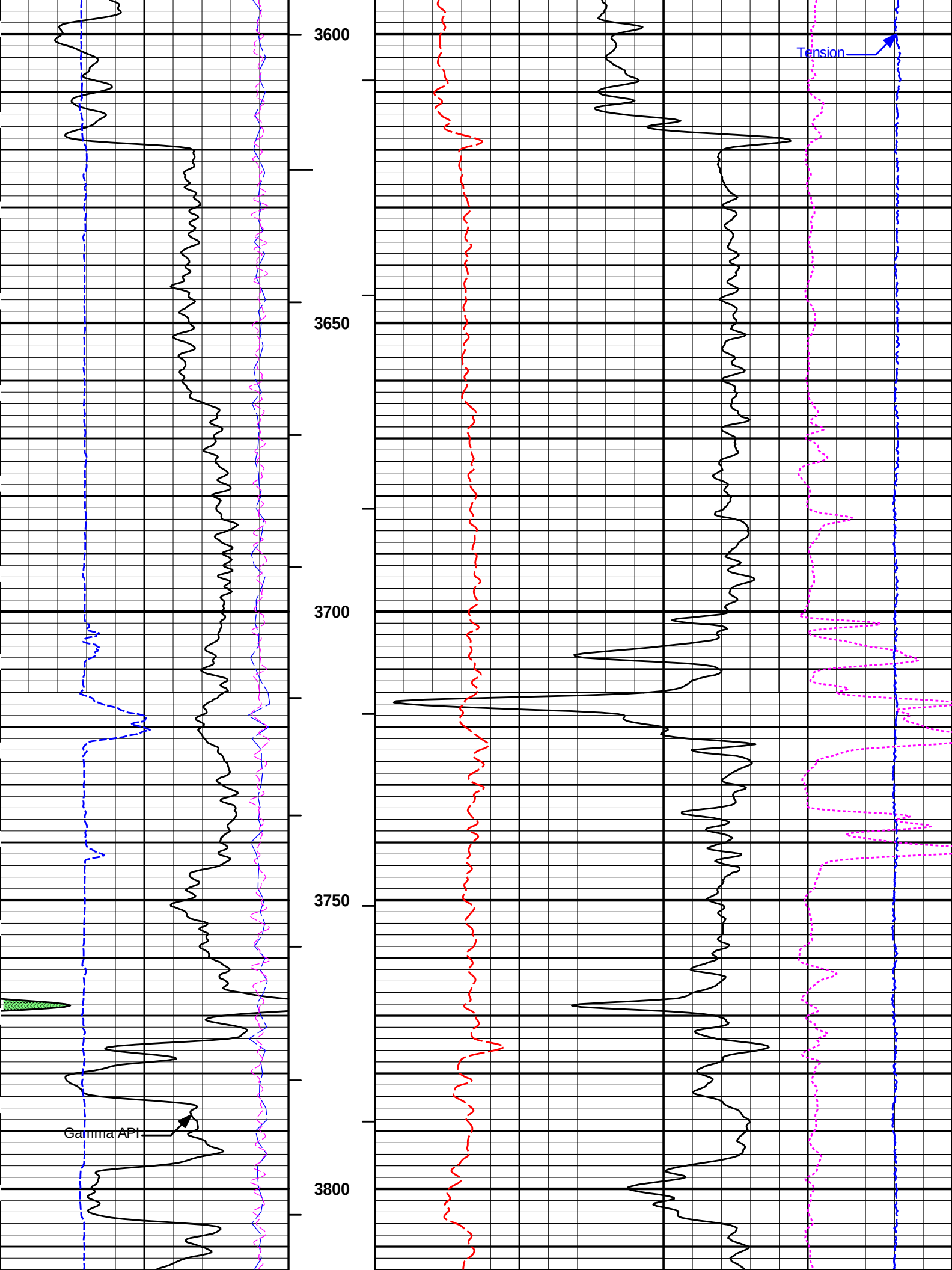

Near Quality
ft
Pe
15K
pounds
2500
2550
2600
2650
2700
Gamma API
Caliper
Far Quality
Pe
Bulk Density
Density Corr
Tension

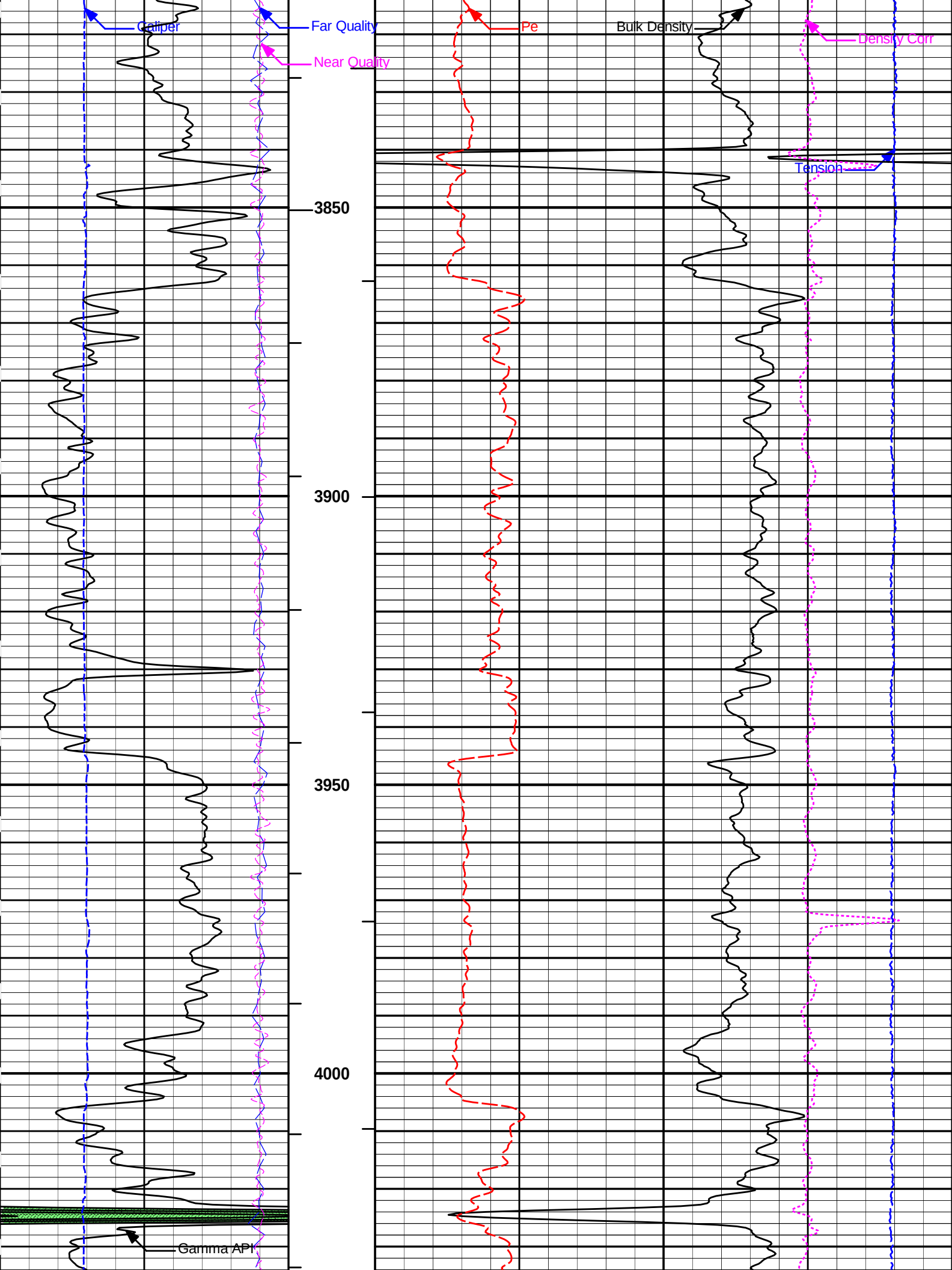

2750
2800
2850
2900
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension

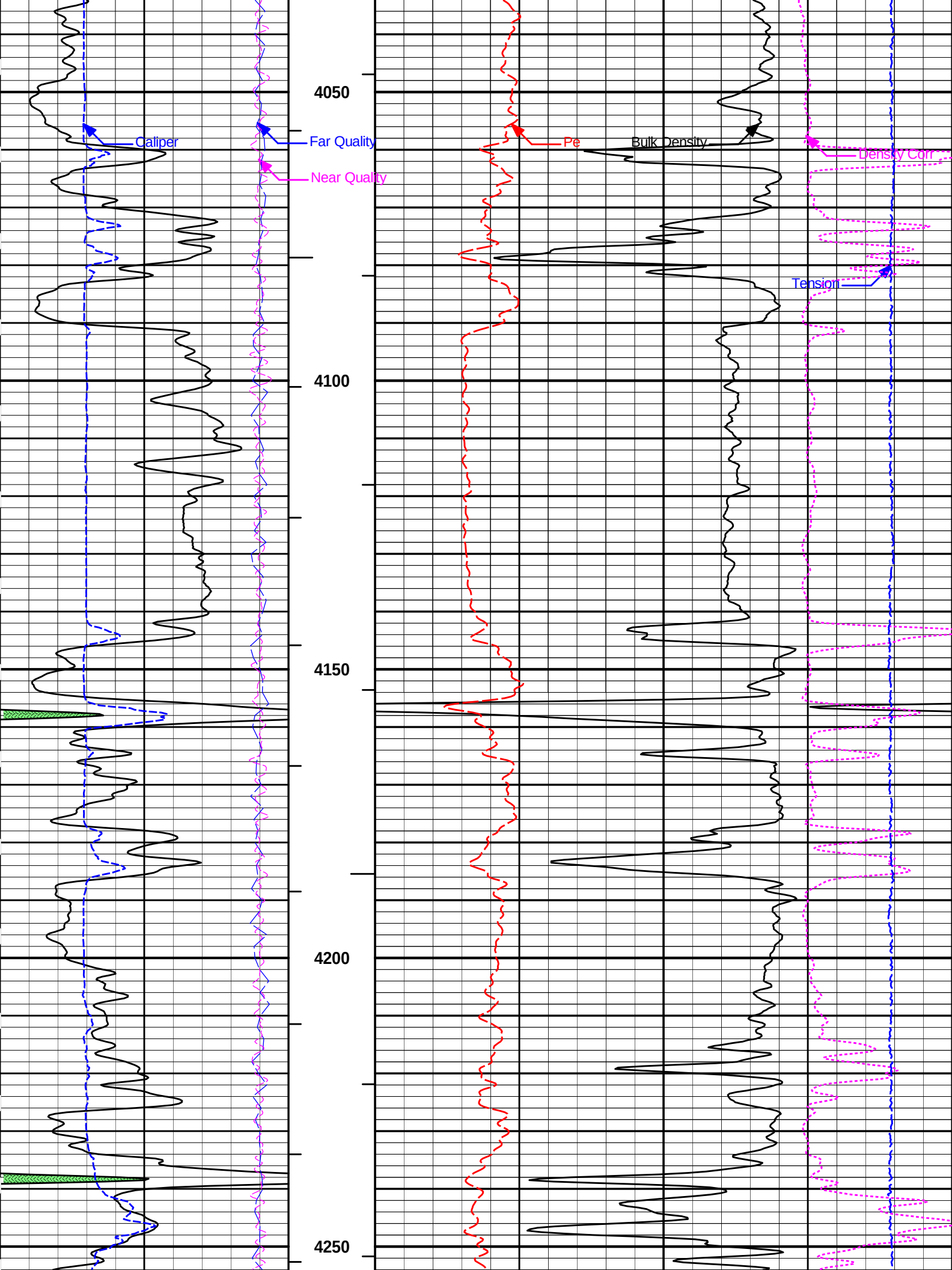

2950
3000
3050
3100
3150
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension

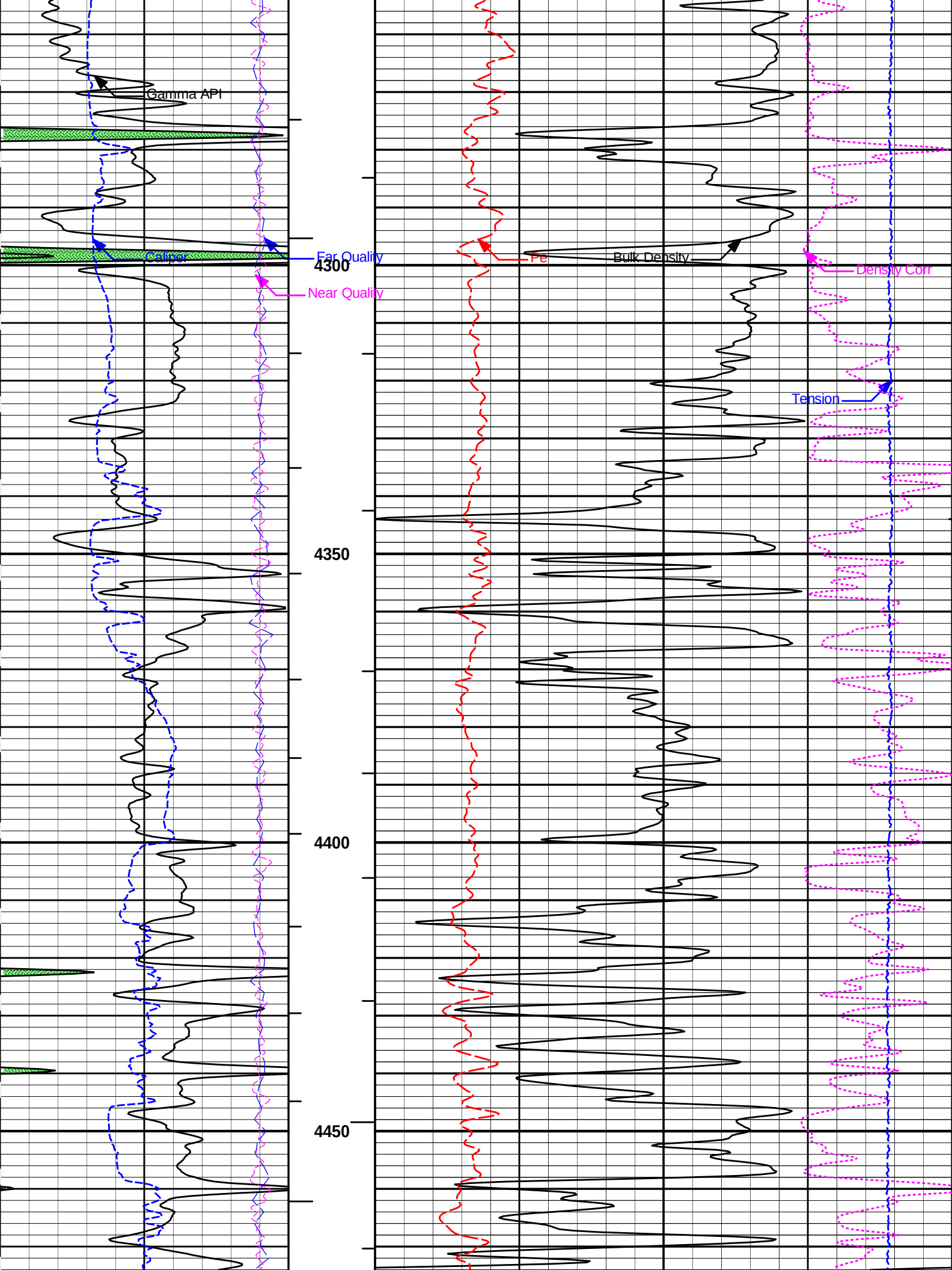

3200
3250
3300
3350
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension

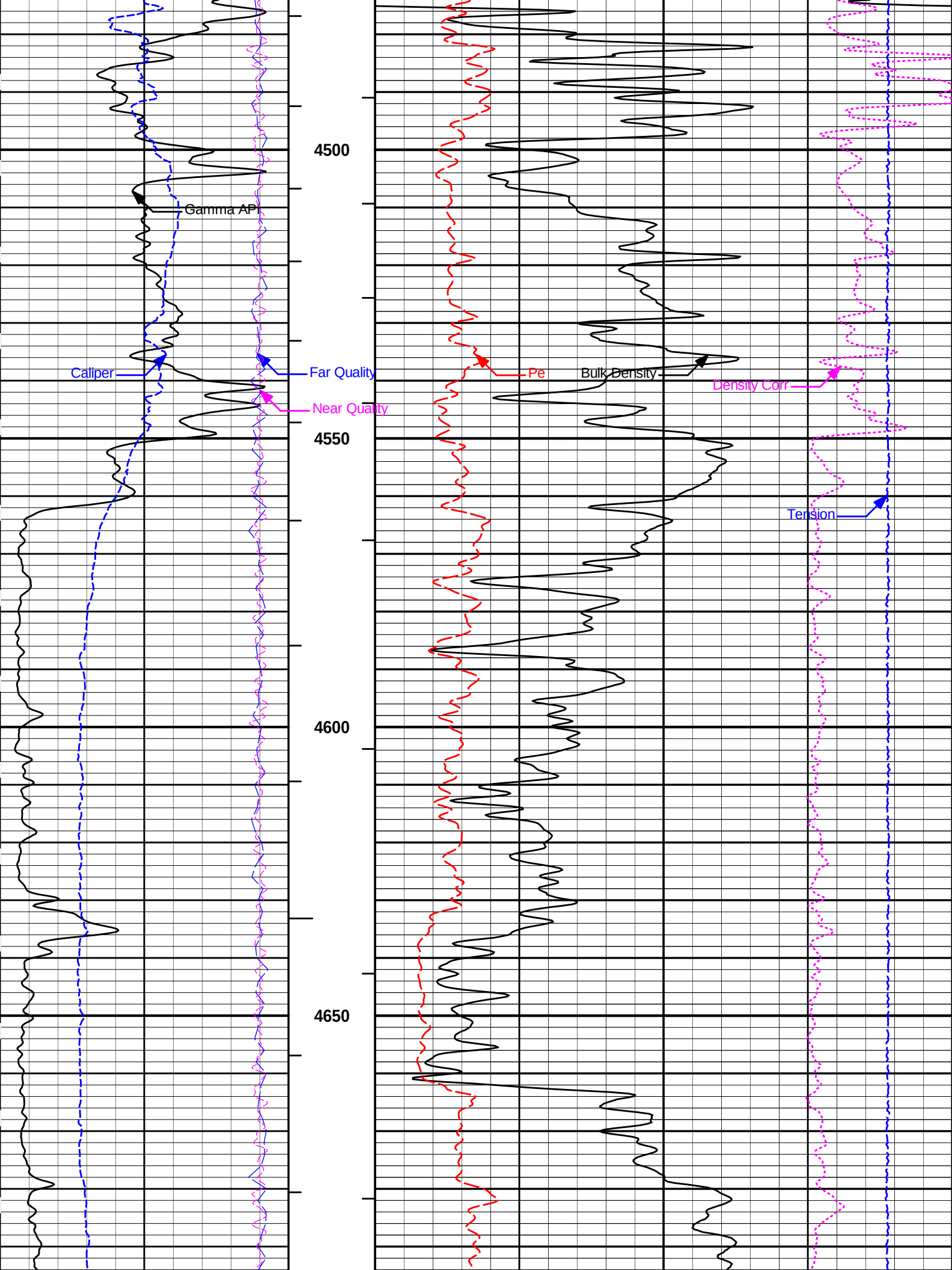

3400
3450
3500
3550
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr

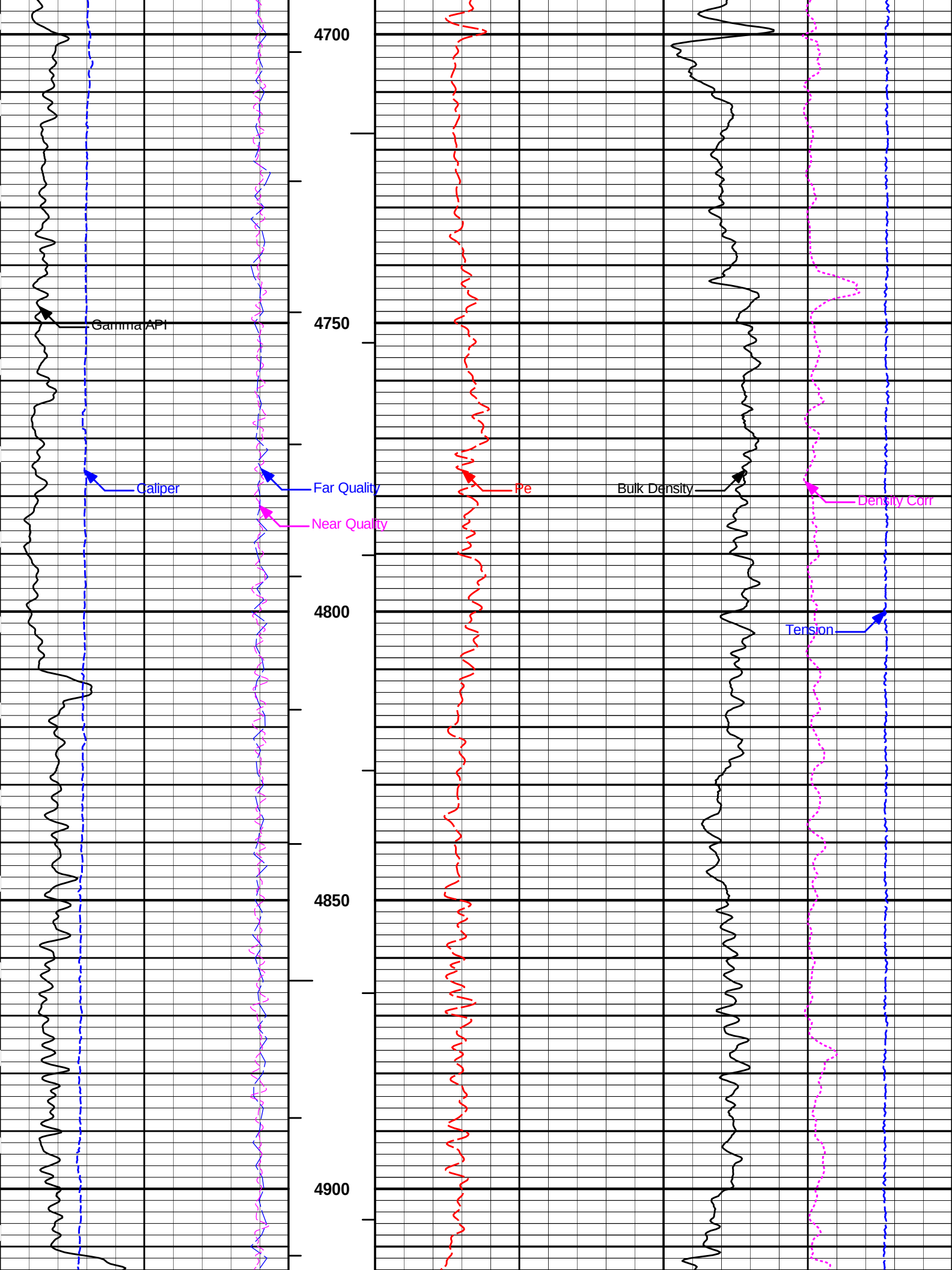

3600
3650
3700
3750
3800
Tension
Gamma API

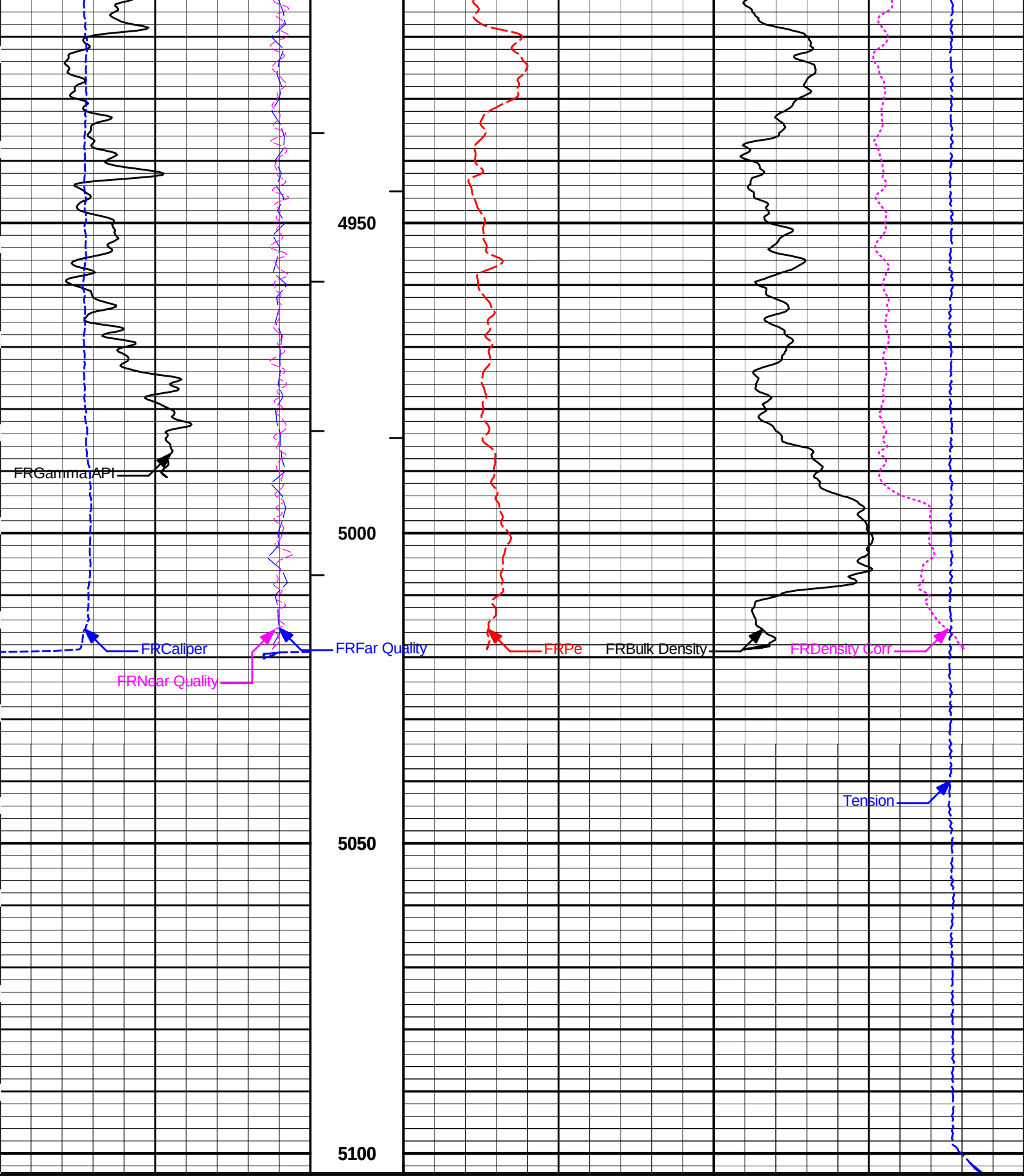

Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension
3850
3900
3950
4000
Gamma API


4050
4100
4150
4200
4250
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension


Gamma API
Caliper
Far Quality
Near Quality
4300
4350
4400
4450
Pe
Bulk Density
Density Corr
Tension


4500
4550
4600
4650
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension


4700
4750
4800
4850
4900
Gamma API
Caliper
Far Quality
Near Quality
Pe
Bulk Density
Density Corr
Tension



-18 Near Quality 2	1 : 240 ft	0 Pe 10	15K Tension 0	
			pounds	
18 Far Quality -2	AHVT		-0.25 Density Corr 0.25	
			gram per cc	
6 Caliper 16	BHVT	2 Bulk Density 3		
inches		gram per cc		

0 Gamma API 150

api

Tension Pull

10 0

HALLIBURTON

Plot Time: 02-Dec-13 22:12:33

Plot Range: 2500 ft to 5103.17 ft

Data: {ActiveWell}\Well Based\DAQ-0001-003\

Plot File: \\PORO\1_Bulk_5_mainx

5 INCH MAIN LOG

HALLIBURTON

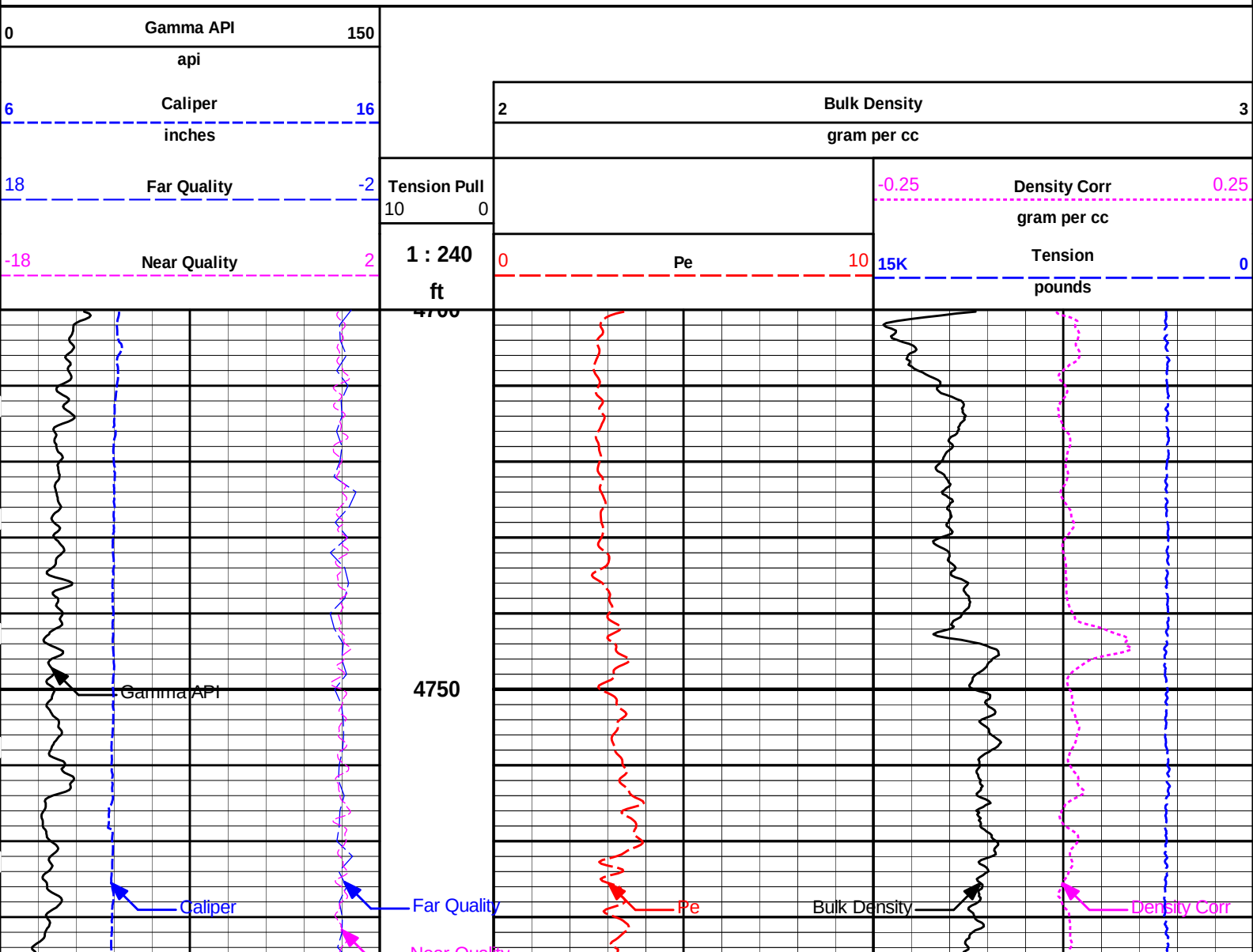
Plot Time: 02-Dec-13 22:12:34

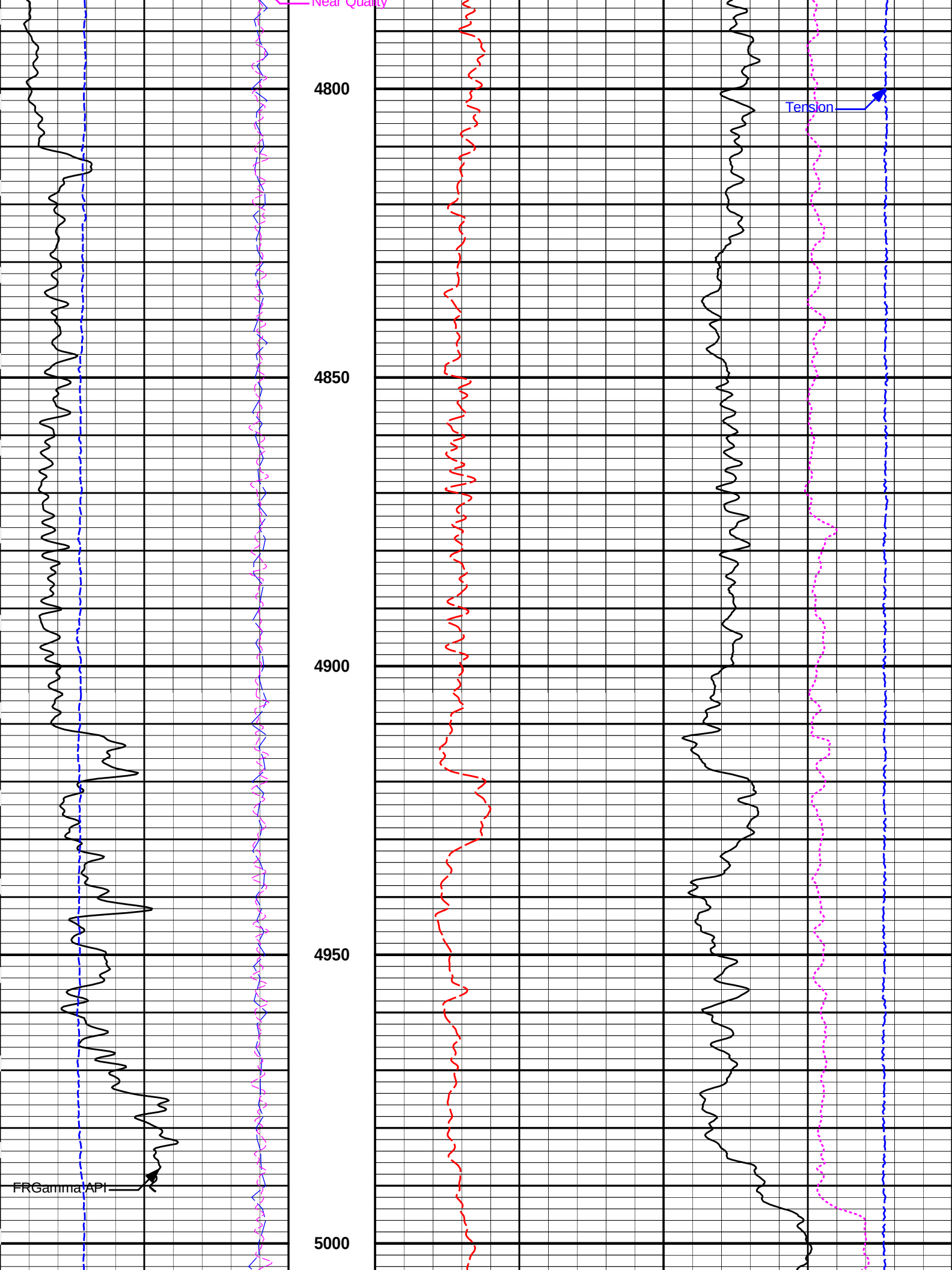
Plot Range: 4700 ft to 5102.67 ft

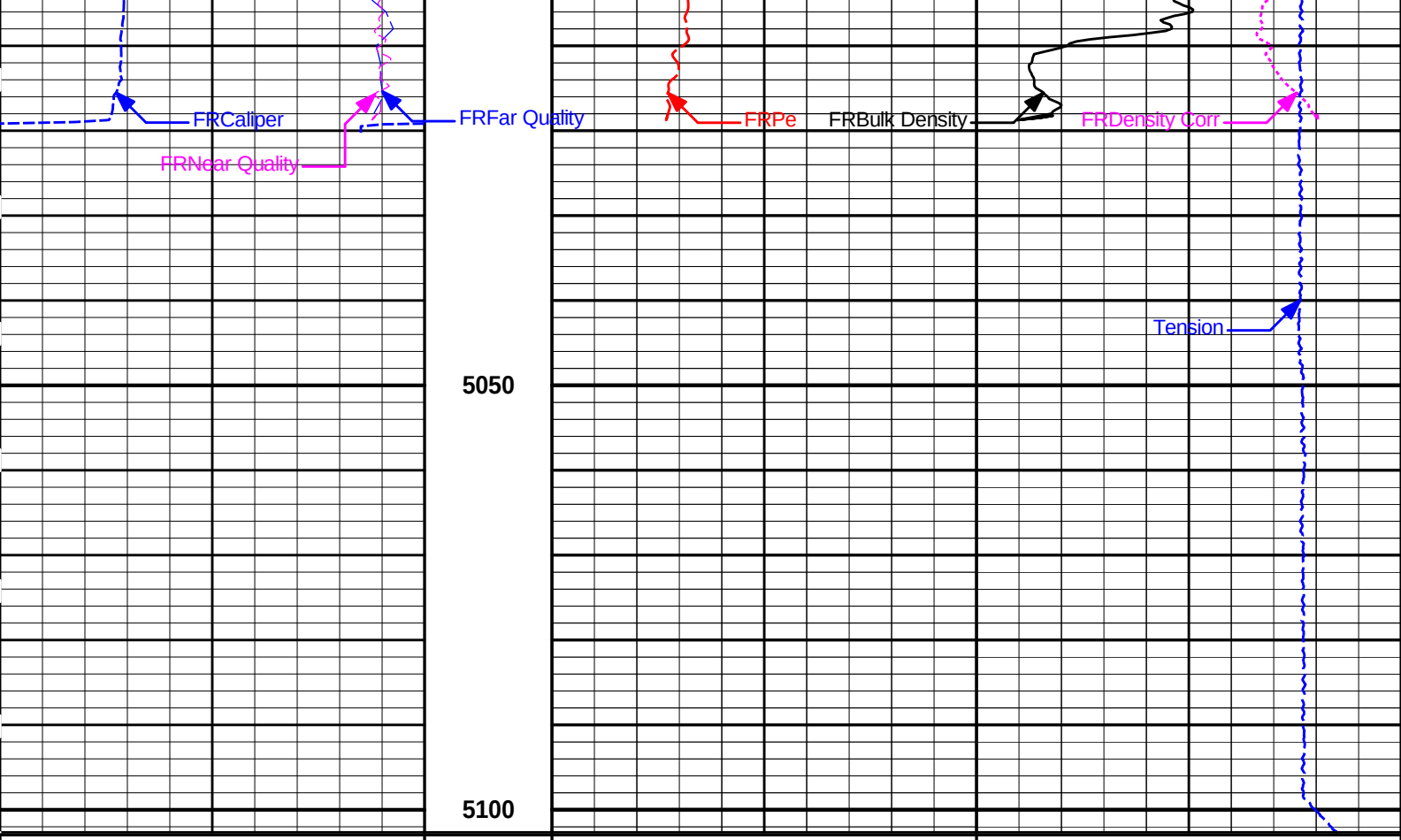
Data: {ActiveWell}\Well Based\REPEAT\

Plot File: \\PORO\1_Bulk_5_rptx

REPEAT SECTION




Near Quality
4800
Tension
4850
4900
4950
FRGamma API
5000



HALLIBURTON

Plot Time: 02-Dec-13 22:12:36
Plot Range: 4700 ft to 5102.67 ft
Data: {ActiveWell}\Well Based\REPEAT\
Plot File: \\PORO\1_Bulk_5_rptx

REPEAT SECTION

HALLIBURTON

PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	8.750	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	

SHARED	MDBS	Mud Base	Water	
SHARED	MDWT	Borehole Fluid Weight	8.800	ppg
SHARED	WAGT	Weighting Agent	Natural	
SHARED	BSAL	Borehole salinity	5800.00	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	ST	Surface Temperature	75.0	degF
SHARED	TD	Total Well Depth	5132.00	ft
SHARED	BHT	Bottom Hole Temperature	100.0	degF
SHARED	SVTM	Navigation and Survey Master Tool	IDT	
SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	ICT	
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	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool Centralized?	No	
CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
CSNG	BARF	Barite Correction Factor	1.00	
CSNG	ORDG	Use Fixed Gain	No	
CSNG	ORDO	Use Fixed Offset	No	
CSNG	ORDR	Use Fixed Resolution Degradation Factor	No	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	

SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
IDT	WRTI	Survey Writing Interval	30	ft
IDT	SOPT	Smoothing Option	None	
ICT	CLOK	Process Caliper Outputs?	Yes	
ICT	DARM	Disable Caliper Arm	No	
ICT	ATDS	Arm To Disable	0	
ICT	REPM	Method to replace arm?	Caliper Average	
ICT	ARMV	Diameter to use for disabled arm	0.00	in
ICT	DARM	Disable Second Caliper Arm	No	
ICT	ATDS	Second Arm To Disable	0	
ICT	REPM	Method to replace second arm?	Caliper Average	
ICT	ARMV	Diameter to use for second disabled arm	0.00	in
ICT	NAVS	Navigation Source Tool	IDT	
ICT	CL1O	Radius 1 Offset	0.0	in
ICT	CL2O	Radius 2 Offset	0.0	in
ICT	CL3O	Radius 3 Offset	0.0	in
ICT	CL4O	Radius 4 Offset	0.0	in
ICT	CL5O	Radius 5 Offset	0.0	in
ICT	CL6O	Radius 6 Offset	0.0	in
ICT	BHVC	Radius type for borehole volume calcuations	Elliptical	
Wavesonic-I	WSOK	Process WSTT?	Yes	
Wavesonic-I	AFIL	Adaptive Filtering?	No	
Wavesonic-I	PINT	Process 1 Sample and Skip	0	
Wavesonic-I	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
Wavesonic-I	DTSH	Delta -T Shale	100.00	uspf
Wavesonic-I	DTMT	Delta -T Matrix Type	Limestone 47.5	
Wavesonic-I	DTMA	Delta -T Matrix	57.00	uspf
Wavesonic-I	DTFL	Delta -T Fluid	189.00	uspf
Wavesonic-I	RHOM	Matrix Density	2.7100	g/cc
Wavesonic-I	RHOF	Fluid Density	1.0000	g/cc
Wavesonic-I	SMTH	Semblance Threshold	0.25	
Wavesonic-I	VPVS	VPVS Ratio for Porosity	1.40	
Wavesonic-I	APEQ	Acoustic Porosity Equation	Wylie	
Wavesonic-I	NAVS	Navigation Source Tool	IDT	
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	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm

BOTTOM

Data: RUTH_3504_1_9\0001 TRIPLE\IDLE **Date: 02-Dec-13 19:46:32**

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: **GTET - 11021138** **Reference Calibration Date:** **28-Nov-13 05:35:09**

Engineer:	**J.COTHREN**	**Calibration Date:**	**02-Dec-13 17:27:28**
Software Version:	**WL INSITE R3.8.12 (Build 3)**	**Calibration Version:**	**1**

Calibrator Source S/N: 150

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Measurement	Measured	Calibrated	Units
Background	12.5	11.6	api
Background + Calibrator	259.3	240.6	api
Calibrator	246.8	228.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11021138**	**Reference Calibration Date:**	**02-Dec-13 17:27:28**
Engineer:	**J.COTHREN**	**Calibration Date:**	**02-Dec-13 17:30:05**
Software Version:	**WL INSITE R3.8.12 (Build 3)**	**Calibration Version:**	**1**

Calibrator Source S/N: 150

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Field Verification	Shop	Field	Units
Background	11.6	11.6	api
Background + Calibrator	240.6	240.9	api
Calibrator	228.9	229.3	api

Shop	Field	Difference	Tolerance
228.9	229.3	-0.4	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11020487**	**Reference Calibration Date:**	**18-Sep-13 11:28:36**
Engineer:	**J.COTHREN**	**Calibration Date:**	**20-Nov-13 14:33:02**
Software Version:	**WL INSITE R3.8.12 (Build 3)**	**Calibration Version:**	**1**

Logging Source S/N: DSN 382

Tank Serial Number: pv

Reference value assigned to Tank: 56.100

Snow Block S/N: PV

Calibration Tank Water Temperature: 75 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	**Prev. Value**	**New Value**	**Control Limit On New Value**
Gain:	1.001	1.002	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):	0.2354	0.2358	0.0004	+/- 0.0020
Calibrated Ratio:	10.55	10.56	0.013	+/- 0.050

VERIFIER		
Measurement	**Value**	**Control Limit**
Snow-Block Porosity (decp):	0.0752	0.02000 - 0.09000

PASS/FAIL SUMMARY

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

DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name:	**DSNT - 11020487**	**Reference Calibration Date:**	**20-Nov-13 14:33:02**
Engineer:	**J.COTHREN**	**Calibration Date:**	**02-Dec-13 17:37:35**
Software Version:	**WL INSITE R3.8.12 (Build 3)**	**Calibration Version:**	**1**

Logging Source S/N: DSN 382

Snow Block S/N: PV

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0752	0.0750	-0.0002	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - 10951306**	**Reference Calibration Date:**	**10-Aug-13 10:16:09**
Engineer:	**CORY HANSON**	**Calibration Date:**	**10-Aug-13 10:19:06**
Software Version:	**WL INSITE R3.8.11 (Build 5)**	**Calibration Version:**	**1**
Host Tool Name:	**DSNT - 11020487**		

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-2601.96	-2600.42	-7000.00 - -1000.00
Pad Gain	0.0003905	0.0003904	0.000200 - 0.000600
Arm Offset	13.85	18.33	-5000.00 - 3000.00
Arm Gain	0.0004928	0.0004922	0.000300 - 0.000700
Arm Power	-0.000004797	-0.000004764	-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

SDLT CALIPER FIELD CALIBRATION

Tool Name:	**SDLT - 10951306**	**Reference Calibration Date:**	**10-Aug-13 10:19:06**
Engineer:	**CHRIS MARLOWE**	**Calibration Date:**	**15-Sep-13 06:07:17**
Software Version:	**WL INSITE R3.8.11 (Build 5)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.78	0.03	+/- 0.10
Ring Diameter	8.25	8.18	-0.07	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check:	Passed
Diameter Check:	Passed

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	**SDLT Pad - 101291230**	**Reference Calibration Date:**	**20-Nov-13 15:09:25**
Engineer:	**J.COTHREN**	**Calibration Date:**	**20-Nov-13 15:28:36**
Software Version:	**WL INSITE R3.8.12 (Build 3)**	**Calibration Version:**	**1**

Logging Source S/N: 20791B

Aluminum Block S/N: pv — Density: 2.589g/cc — Pe: 3.140

Magnesium Block S/N: PV — Density: 1.683g/cc — Pe: 2.589

DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0201	1.0225	0.90 - 1.10
Near Dens Gain	1.0036	0.9922	0.90 - 1.10
Near Peak Gain	0.9933	0.9796	0.90 - 1.10
Near Lith Gain	0.9787	0.9673	0.90 - 1.10
Far Bar Gain	1.0051	1.0047	0.90 - 1.10
Far Dens Gain	0.9909	0.9924	0.90 - 1.10
Far Peak Gain	0.9868	0.9889	0.90 - 1.10
Far Lith Gain	0.9643	0.9674	0.90 - 1.10
Near Bar Offset	0.0501	0.0278	NONE
Near Dens Offset	0.1793	0.2769	NONE
Near Peak Offset	0.2513	0.3632	NONE
Near Lith Offset	0.3638	0.4554	NONE
Far Bar Offset	0.1386	0.1447	NONE
Far Dens Offset	0.2424	0.2285	NONE
Far Peak Offset	0.2431	0.2273	NONE
Far Lith Offset	0.3813	0.3595	NONE
Near Bar Background	1038.74	1039.49	700 - 1450
Near Dens Background	338.89	339.26	230 - 480
Near Peak Background	148.13	148.94	100 - 210
Near Lith Background	182.95	184.58	125 - 260
Far Bar Background	500.50	501.16	450 - 900
Far Dens Background	193.68	193.86	175 - 345
Far Peak Background	76.73	76.08	70 - 140
Far Lith Background	81.42	80.67	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading	Calibrated	Change	Control Limit

Measurement	Reading (Previous Coef)	(New Coef)	Change	On Change
MAGNESIUM				
Density (g/cc)	1.686	1.683	-0.003	+/- 0.015
Pe	2.514	2.546	0.032	+/- 0.150
ALUMINUM				
Density (g/cc)	2.590	2.589	-0.001	+/- 0.01500
Pe	3.089	3.095	0.006	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0006	+/- 0.0110	-0.0004	+/- 0.0140
Magnesium Block	-0.0009	+/- 0.0110	0.0002	+/- 0.0140
Aluminum Block	0.0007	+/- 0.0110	0.0001	+/- 0.0140
Resolution	8.94	6.00 - 11.50	9.10	6.00 - 11.50
Internal Verifier(B+D+P+L)	1712	1200 - 2700	852	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 - 101291230 **Reference Calibration Date:** 20-Nov-13 15:28:36

Engineer: CORY HANSON **Calibration Date:** 28-Nov-13 04:49:55

Software Version: WL INSITE R3.8.12 (Build 3) **Calibration Version:** 1

Pad Temperature: 64.7 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1712.270	1710.251	-2.019	16.605
Far (B+D+P+L) cps	851.762	851.678	-0.084	16.006
Near Resolution	8.94	8.94	0.000	0.50
Far Resolution	9.10	9.09	-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-11021138						
Gamma Ray Calibrator	228.9	229.3	----------	-0.4	+/- 9.00	api
DSNT-11020487						

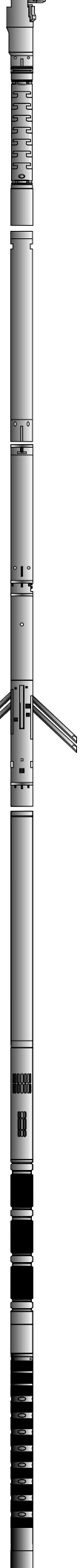
Snow-Block Porosity	0.0752	0.0750	----------	0.0002	+/- 0.0150	decp
SDLT-10951306						
Pad Extension	3.75	3.78	----------	-0.03	+/-0.10	in
Ring Diameter	8.25	8.18	----------	0.07	+/-0.15	in
SDLT Pad-101291230						
Near(B+D+P+L)	1712.270	1710.251	----------	2.019	+/-16.605	cps
Far(B+D+P+L)	851.762	851.678	----------	0.084	+/-16.006	cps

Data: RUTH_3504_1_9\0001 TRIPLE\IDLE Date: 02-Dec-13 19:47:43

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						121.15 ft
CH_HOS-590_RED 37.50 lbs		Ø 2.750 in		Temperature @ 120.12 ft	3.03 ft	
						118.12 ft
XOHD-00000000 20.00 lbs		Ø 2.750 in Ø 3.625 in			0.95 ft	
						117.17 ft
GTET-11021138 165.00 lbs		Ø 3.625 in			8.52 ft	
				GammaRay @ 111.11 ft		
						108.65 ft
CSNG-10736164 114.00 lbs	UnivWearRing3.6-10736164 5.00 lbs	Ø 4.200 in* Ø 3.625 in		CSNG @ 103.02 ft	8.17 ft	
						100.48 ft
DSNT-11020487 174.00 lbs	DSN Decentralizer-10735144 6.60 lbs	Ø 5.000 in* Ø 3.625 in		DSN Far @ 93.55 ft DSN Near @ 92.80 ft	9.69 ft	
						90.80 ft
SDLT-10951306 360.00 lbs		Ø 4.500 in			10.81 ft	
	SDLT Pad-101291230 65.00 lbs					
	Microlog Pad-I15M94P73 8.00 lbs	Ø 4.750 in* Ø 4.750 in*		Microlog @ 82.98 ft SDL Caliper @ 82.80 ft SDL @ 82.79 ft		



79.98 ft

IQ Flex-11111111
140.00 lbs

Ø 3.625 in

5.67 ft

74.31 ft

IDT-10967514
150.00 lbs

Ø 3.625 in

7.58 ft

66.73 ft

ICT-11204020
330.00 lbs

Ø 3.625 in

12.83 ft

ICT Caliper @ 56.69 ft

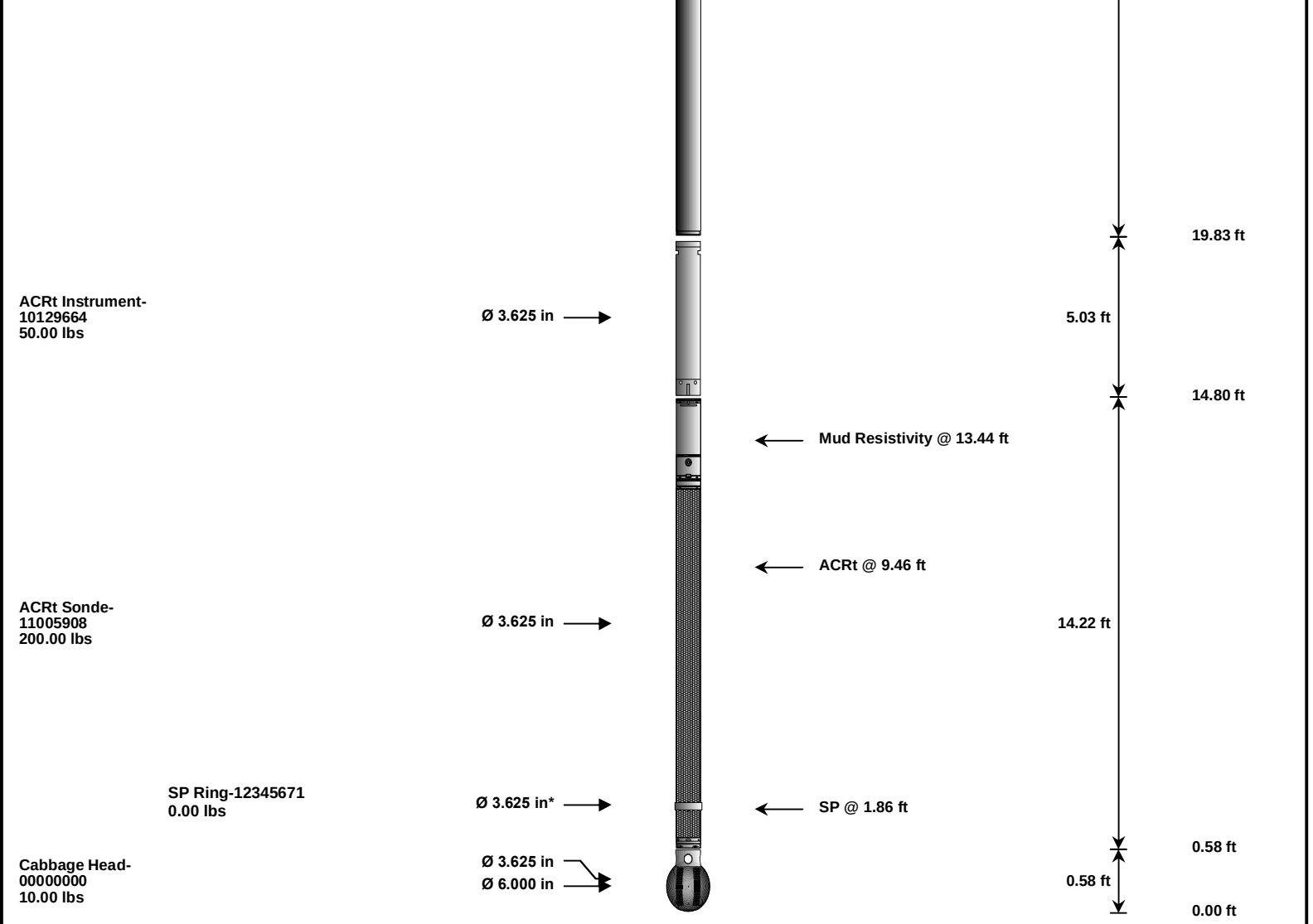
53.90 ft

Wavesonic-I-
90116914
520.00 lbs

Ø 3.625 in

34.07 ft

Wavesonic Delay @ 31.33 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	590_RED	37.50	3.03		118.12	300.00
XOHD	Hostile to Dits Cross Over	00000000	20.00	0.95		117.17	300.00
GTET	Gamma Telemetry Tool	11021138	165.00	8.52		108.65	60.00
CSNG	Compensated Spectral Natural Gamma	10736164	114.00	8.17		100.48	15.00
UWR3P6	Universal Wear Ring 3 5-8 inch	10736164	5.00	0.35	*	104.56	300.00
DSNT	Dual Spaced Neutron	11020487	174.00	9.69		90.80	60.00
DCNT	DSN Decentralizer	10735144	6.60	5.13	*	94.13	300.00
SDLT	Spectral Density Tool	10951306	360.00	10.81		79.98	60.00
MICP	Microlog Pad	I15M94P73	8.00	1.00	*	82.48	60.00
SDLP	Density Insite Pad	101291230	65.00	2.55	*	82.19	60.00
IQF	IQ Flex tool	11111111	140.00	5.67		74.31	300.00
IDT	Insite Directional Tool	10967514	150.00	7.58		66.73	30.00
ICT	Six Independent Arm Caliper	11204020	330.00	12.83		53.90	30.00
WSTT	WaveSonic Insite	90116914	520.00	34.07		19.83	30.00
ACRt	Array Compensated True Resistivity Instrument Section	10129664	50.00	5.03		14.80	300.00
ACRt	Array Compensated True Resistivity Sonde Section	11005908	200.00	14.22		0.58	300.00
SP	SP Ring	12345671	0.00	0.25	*	1.86	300.00
CBHD	Cabbage Head	00000000	10.00	0.58		0.00	300.00
Total			**2,355.10**	**121.15**			

* Not included in Total Length and Length Accumulation.

Data: RUTH_3504_1_9\0001 TRIPLE\003 02-Dec-13 19:12 Up @5103.5f

Date: 02-Dec-13 22:09:15

COMPANY **SANDRIDGE EXPLORATION**

WELL	**RUTH 3504 1-9**		
FIELD	**WILDCAT**		
COUNTY	**SUMMER**	STATE	**KANSAS**

HALLIBURTON

SPECTRAL DENSITY
DUAL SPACED NEUTRON
LOG