

**SPECTRAL DENSITY  
DUAL SPACED NEUTRON  
ARRAY COMPENSATED  
TRUE RESISTIVITY**

Fold here

## GENERAL

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ACQUISITIONDENJOITNEUTRO

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	8.400	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	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	8031.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	

Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
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	Centered	
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	0.000	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	DNOK	Process Density?	Yes	
SDLT	DNOK	Process Density EVR?	No	
SDLT	CB	Logging Calibration Blocks?	No	
SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT	DTWN	Disable temperature warning	No	
SDLT	DMA	Formation Density Matrix	2.710	g/cc
SDLT	DFL	Formation Density Fluid	1.000	g/cc
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT	MLOK	Process MicroLog Outputs?	Yes	
ACRt	RTOK	Process ACRt?	Yes	
ACRt	MNSO	Minimum Tool Standoff	1.50	in
ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt	TPOS	Tool Position	Free Hanging	
ACRt	RMOP	Rmud Source	Mud Cell	
ACRt	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt	THQY	Threshold Quality	0.50	

BOTTOM\_\_\_\_\_

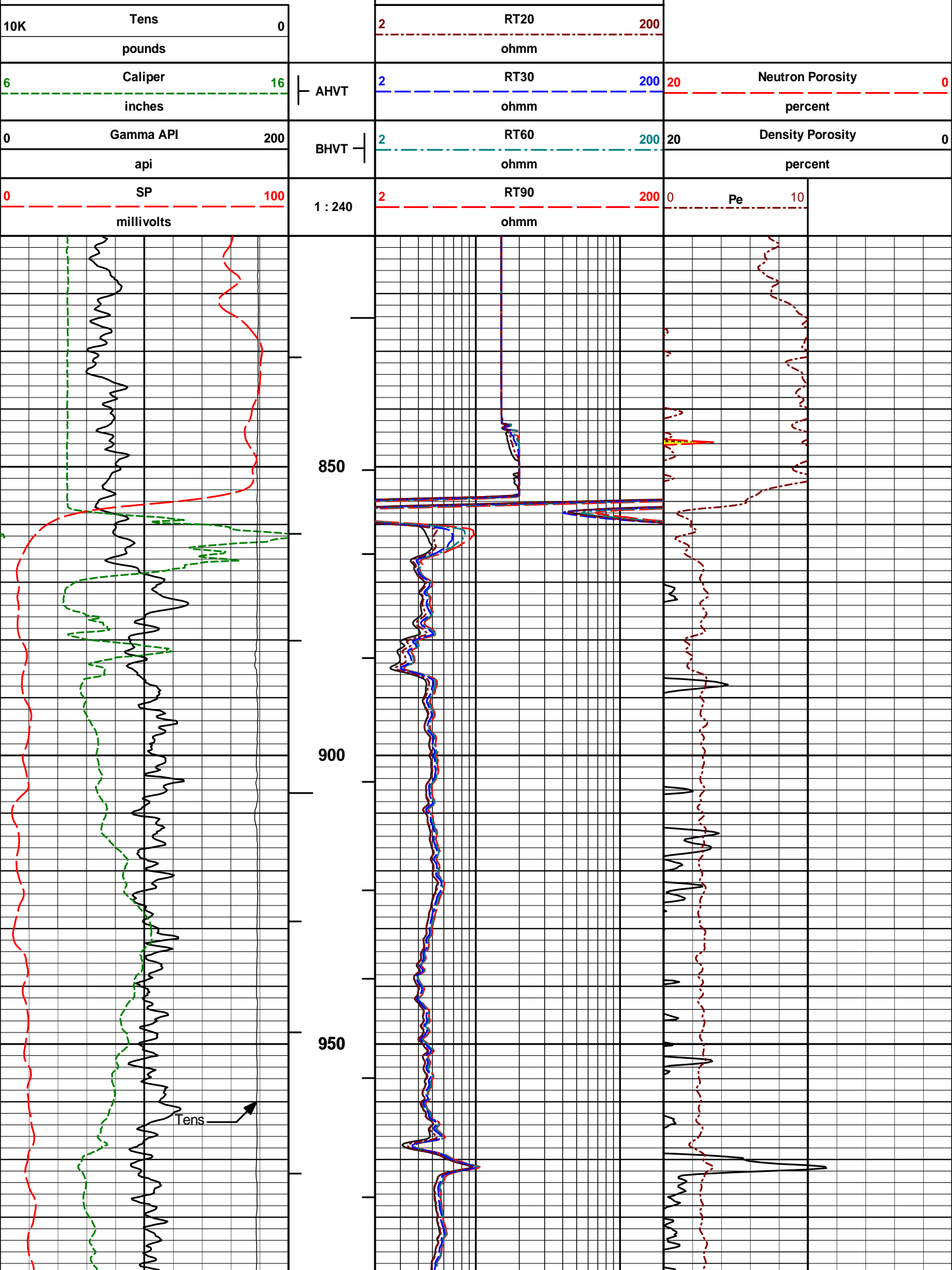
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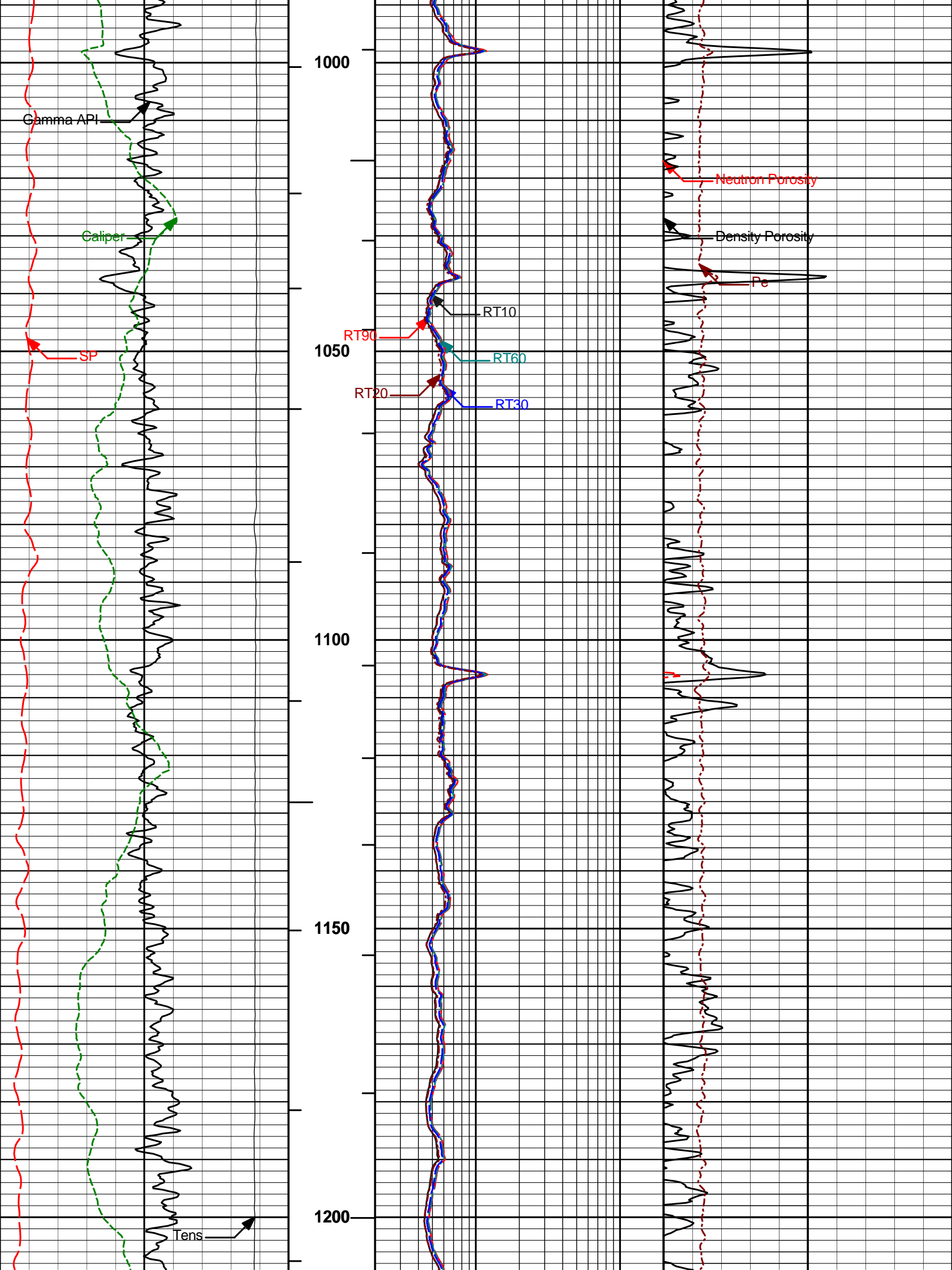
HALLIBURTON

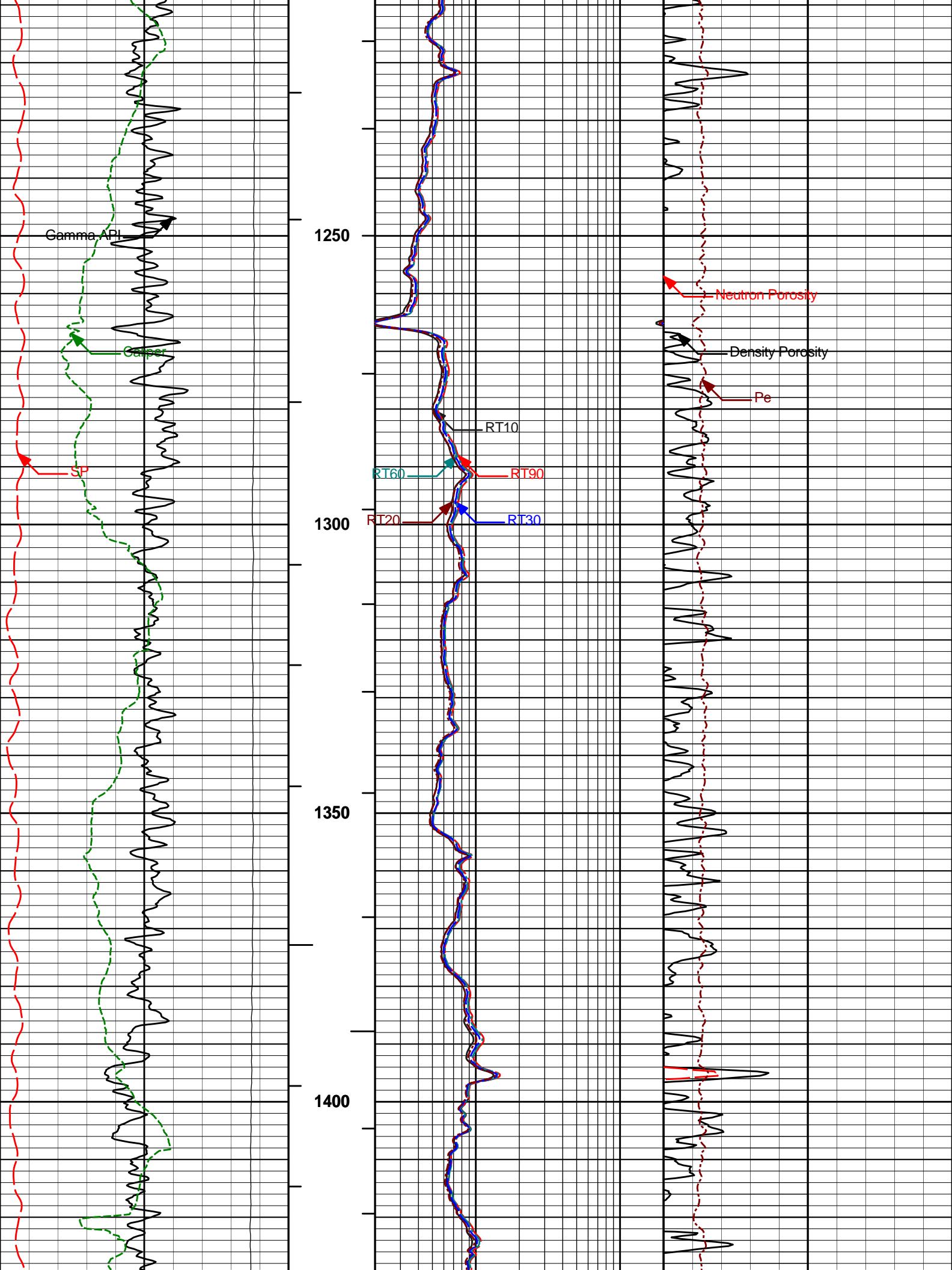
Plot Time: 11-May-11 01:27:25  
Plot Range: 810 ft to 7779.08 ft  
Data: {ActiveWell}\Well Based\MAIN\*  
Plot File: \COMP\MAIN

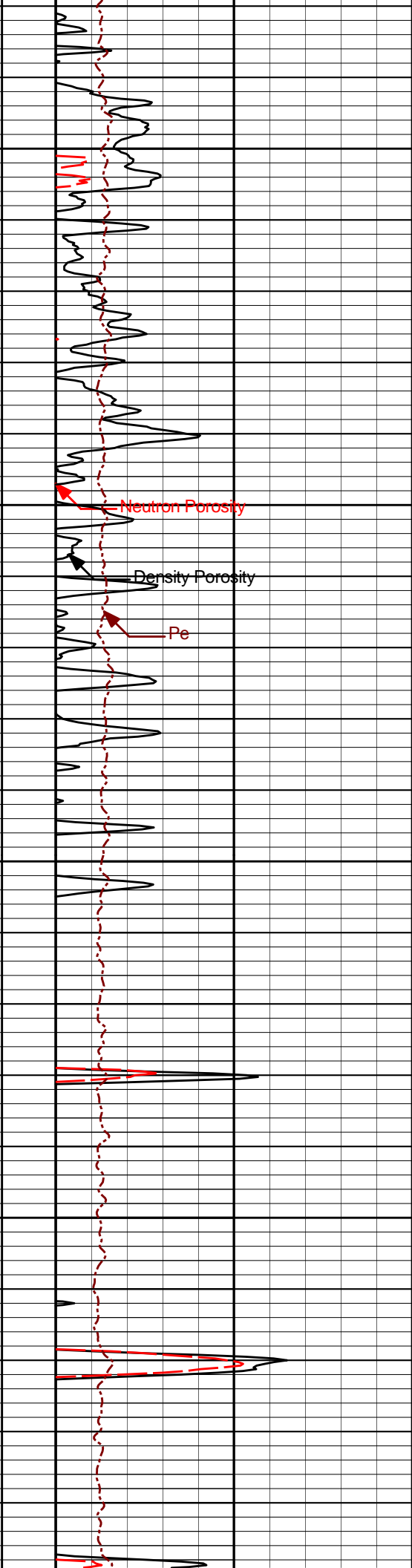
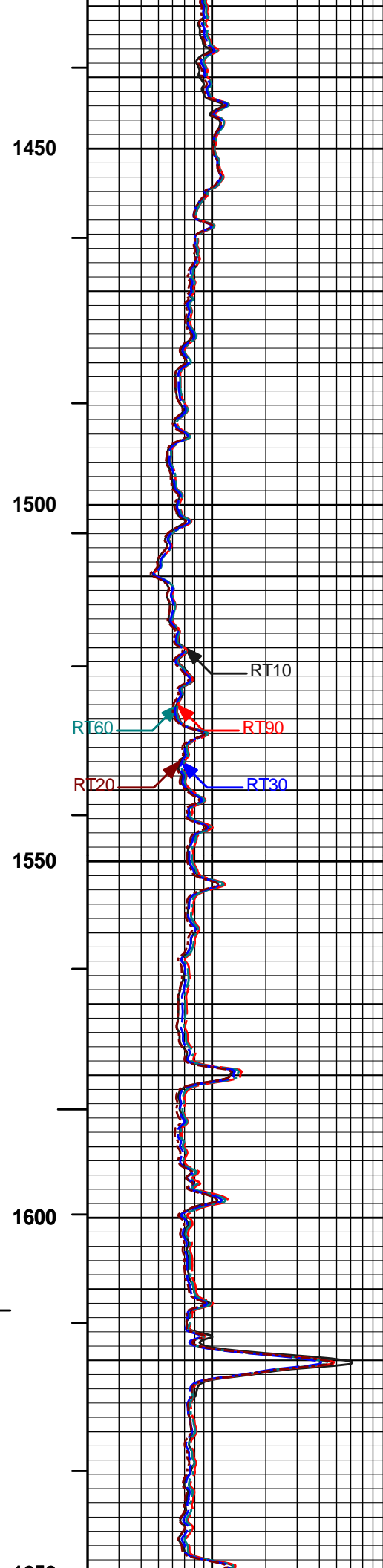
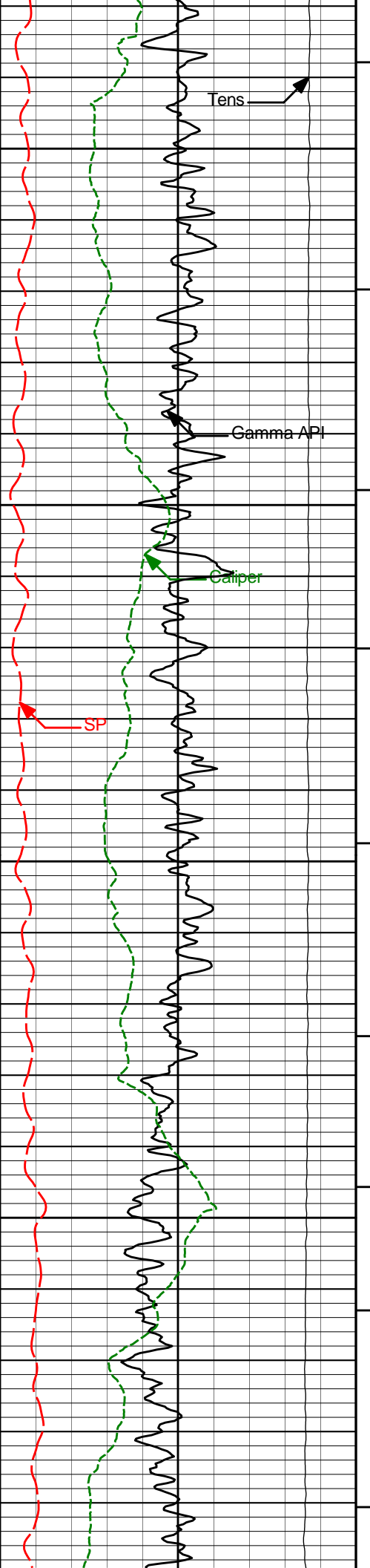
MAIN PASS 5" = 100'

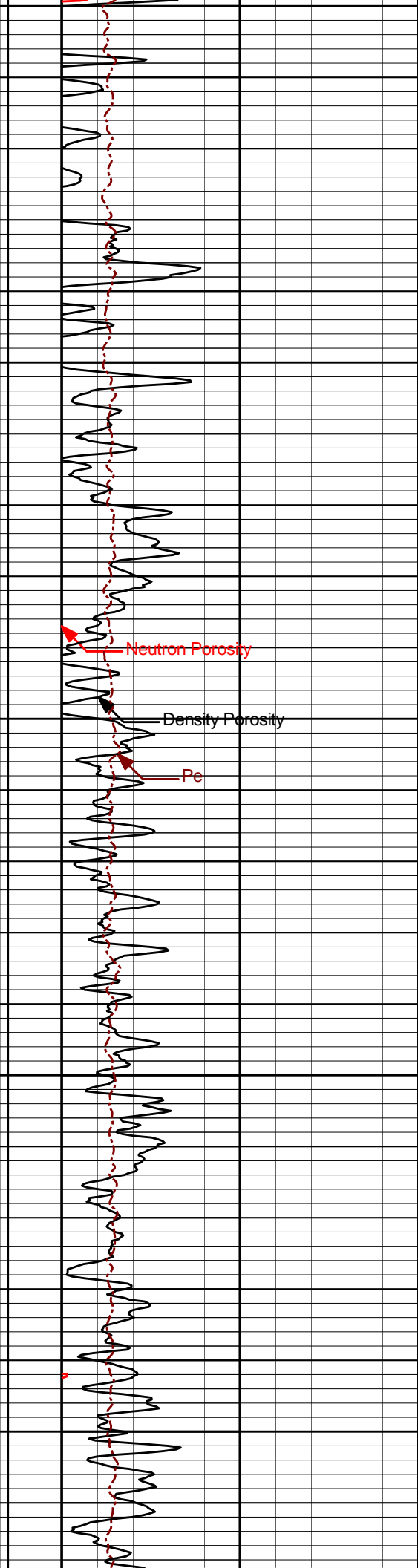
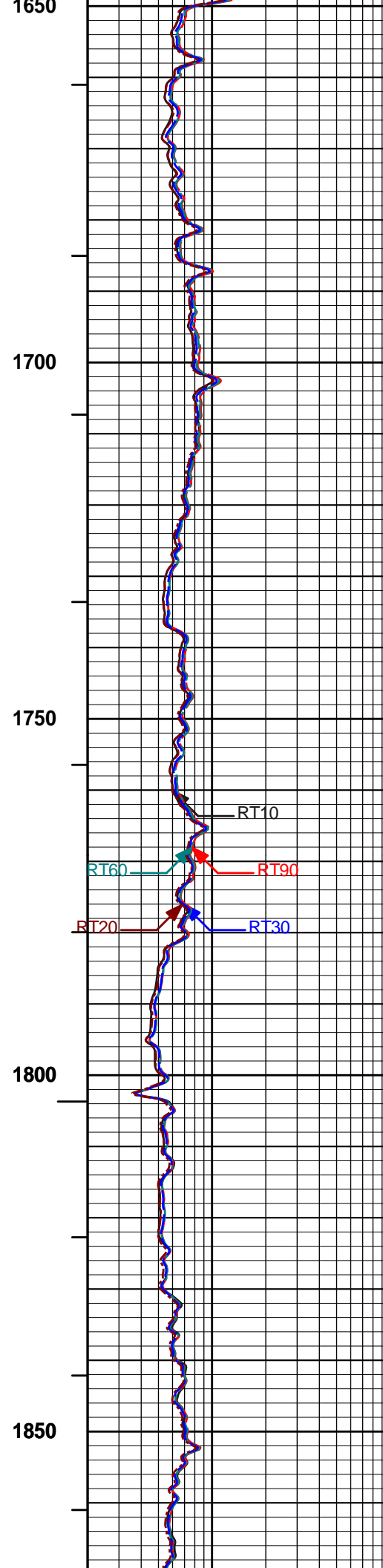
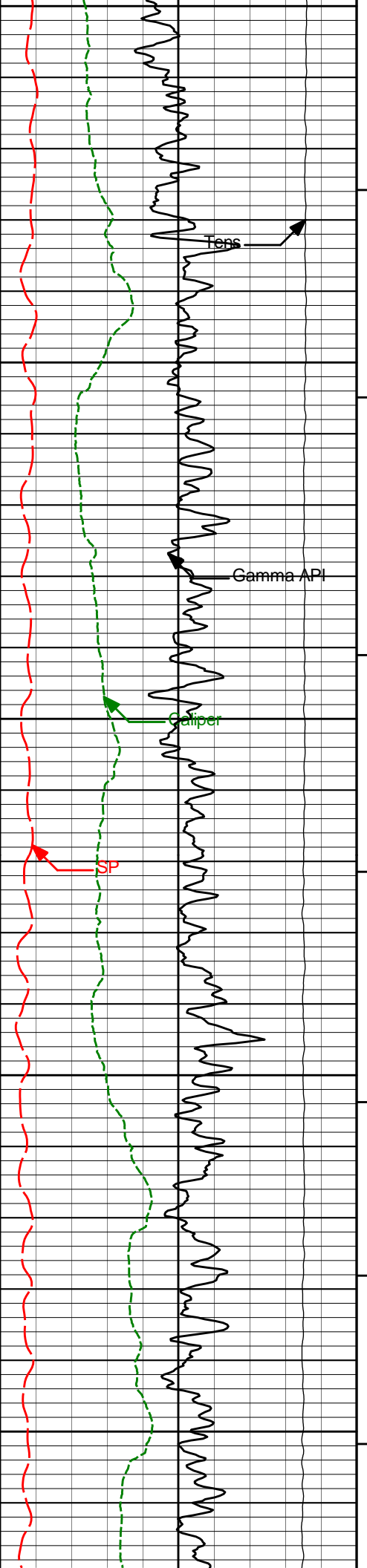
	2	RT10	200	
		ohmm		



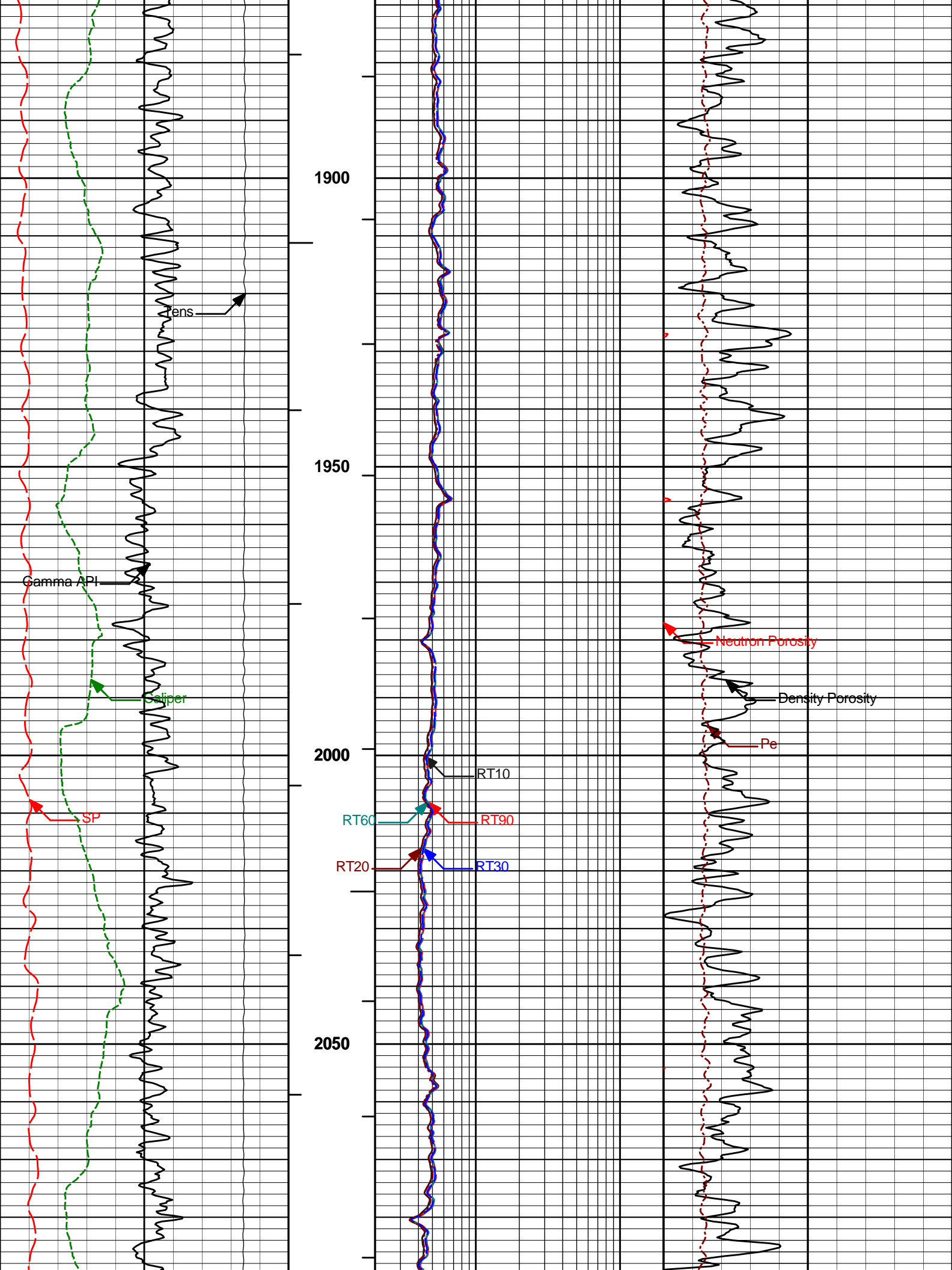


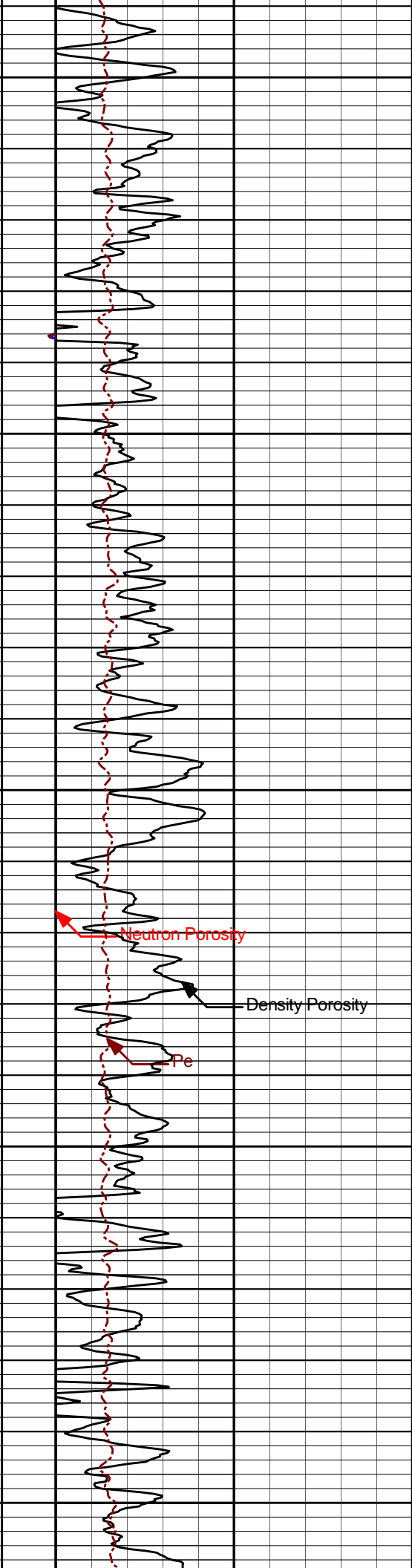
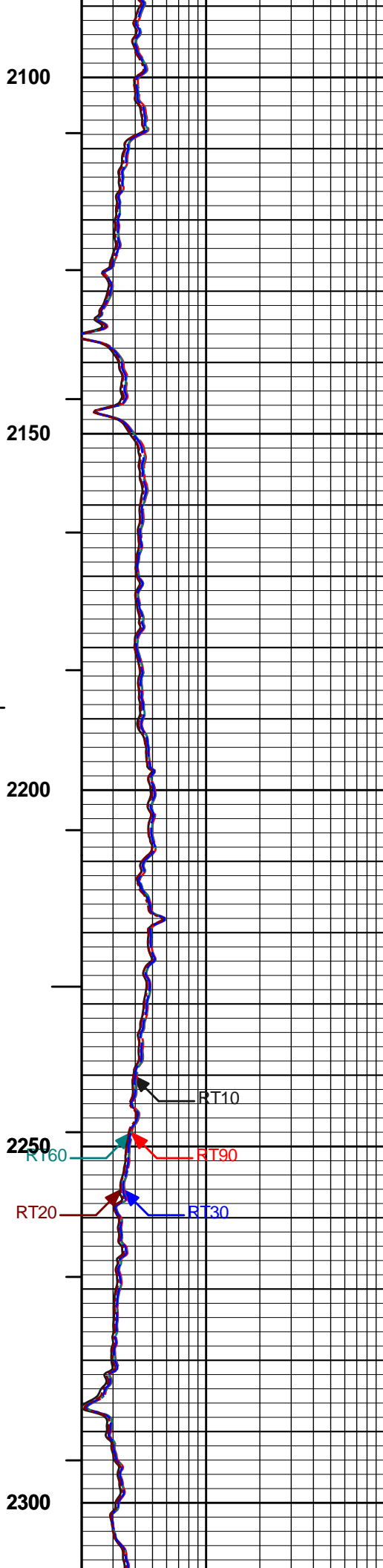
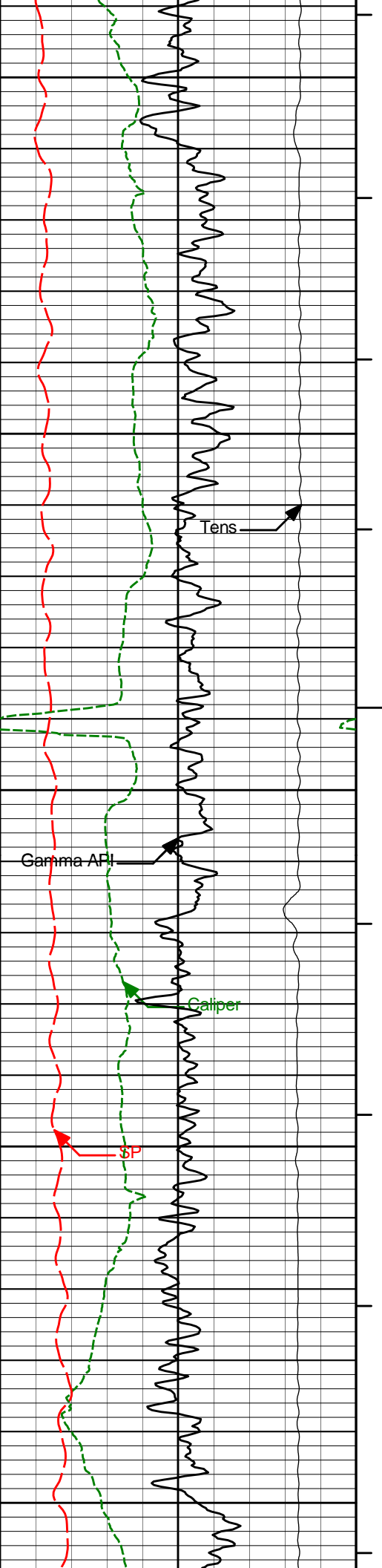


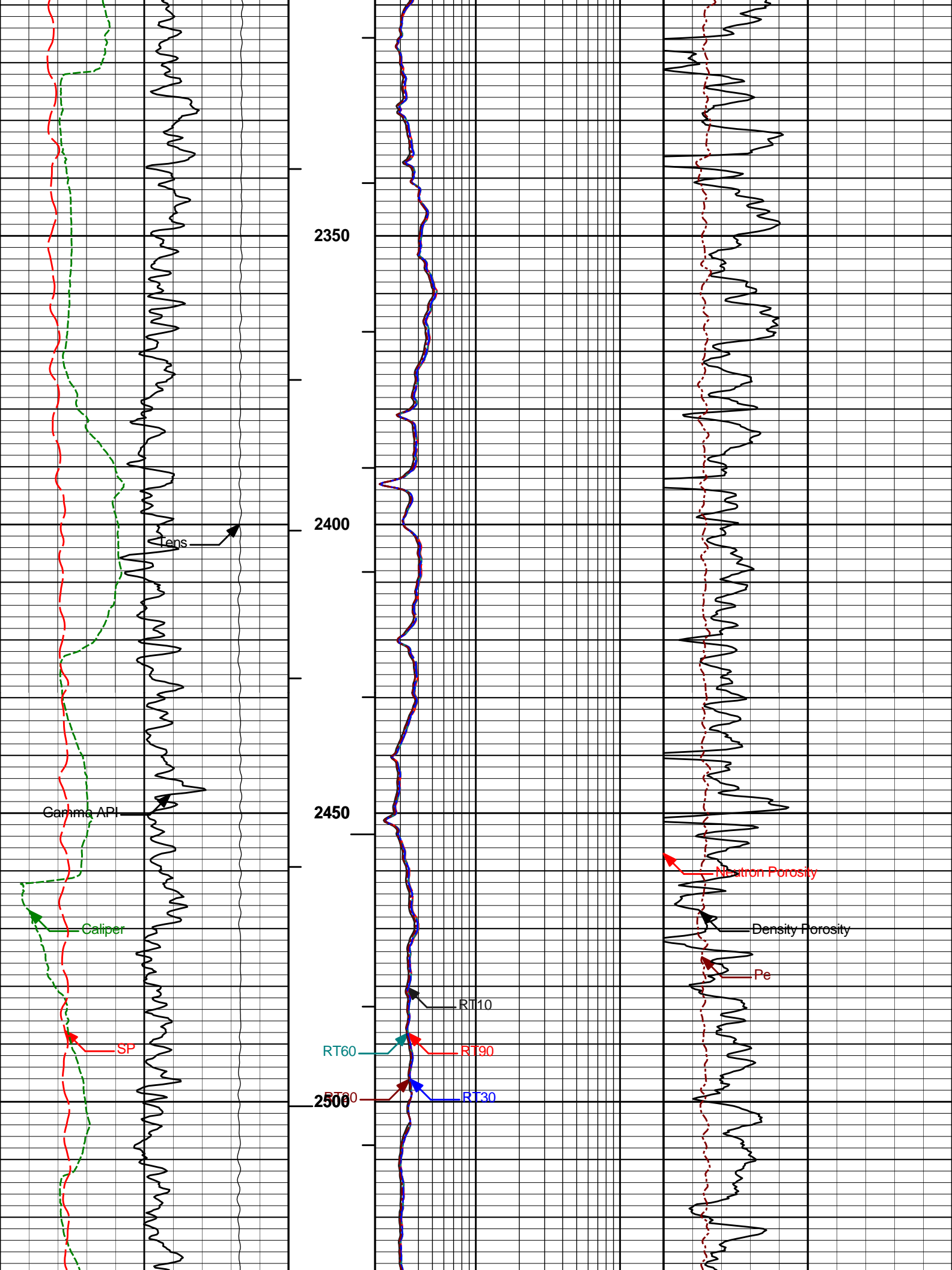


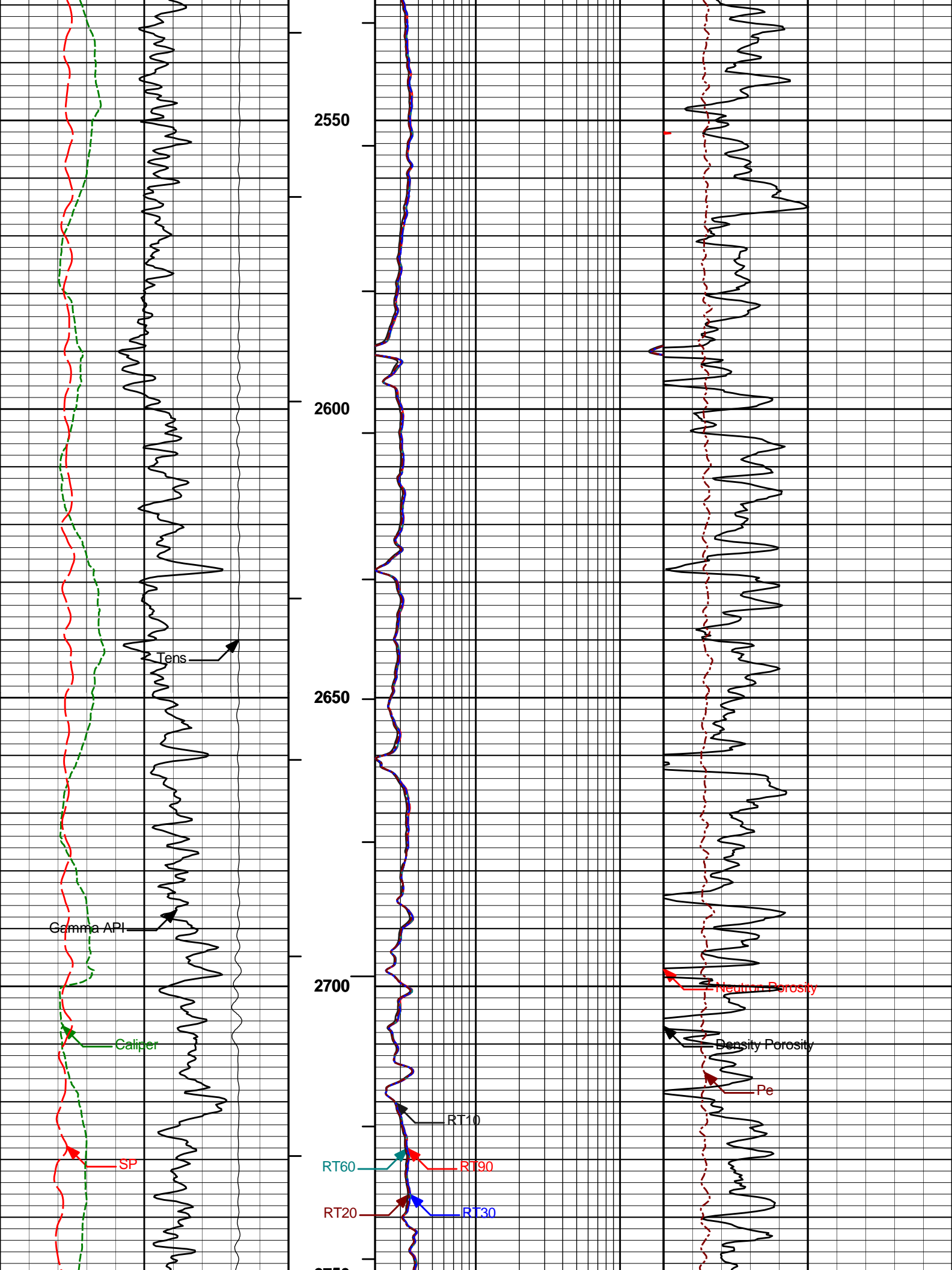


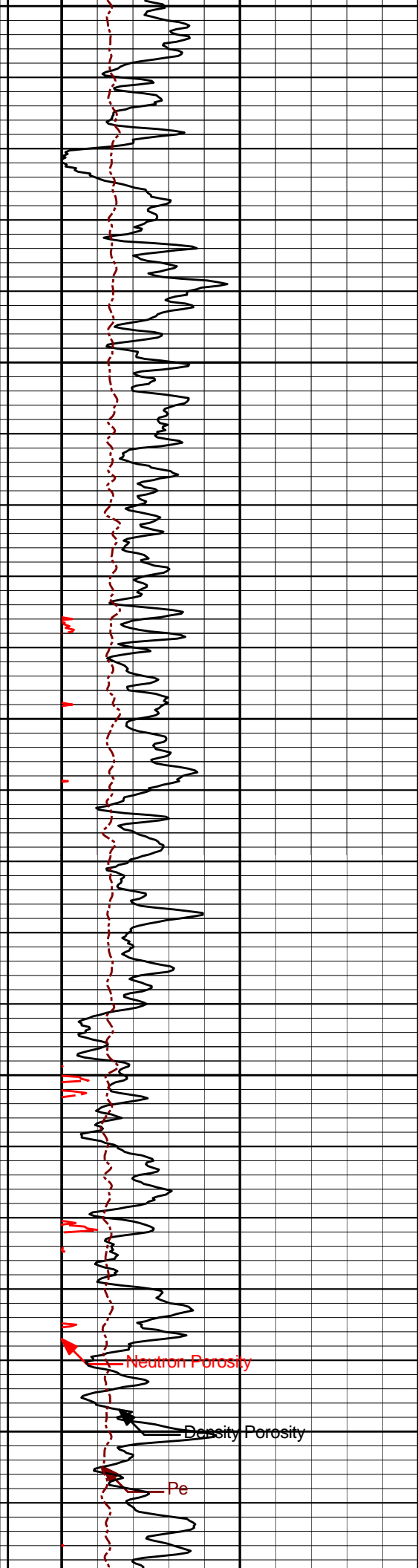
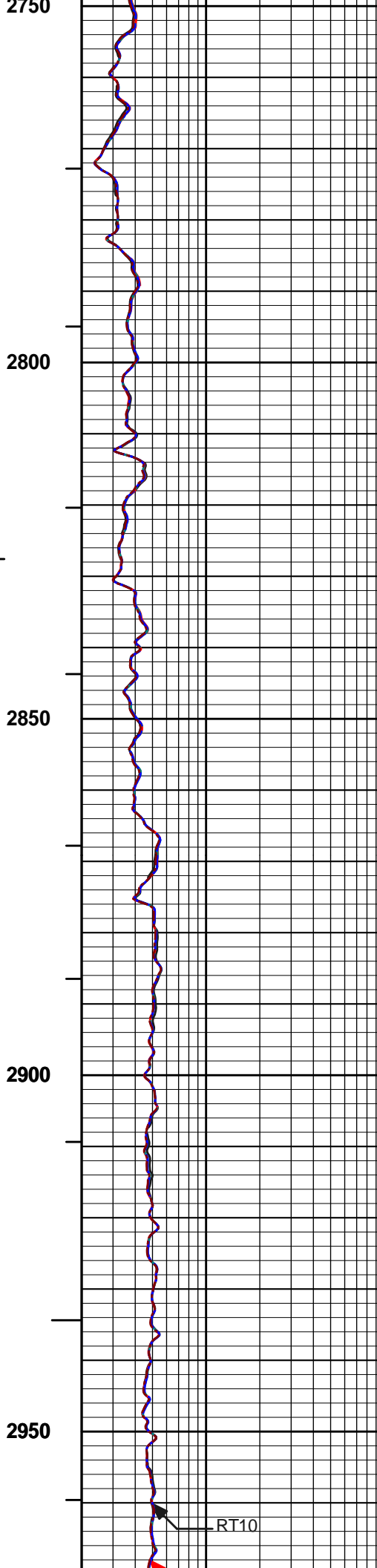
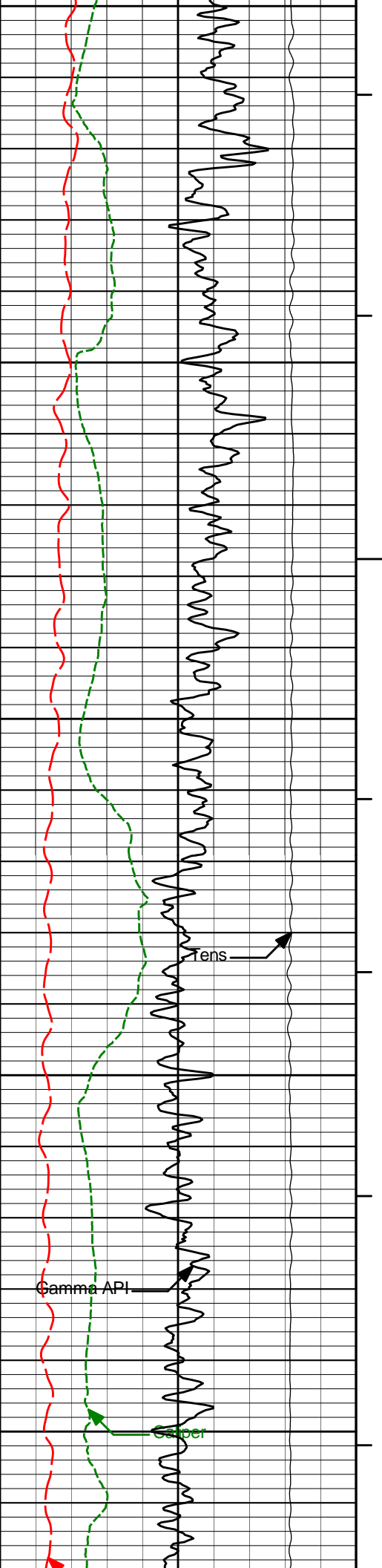


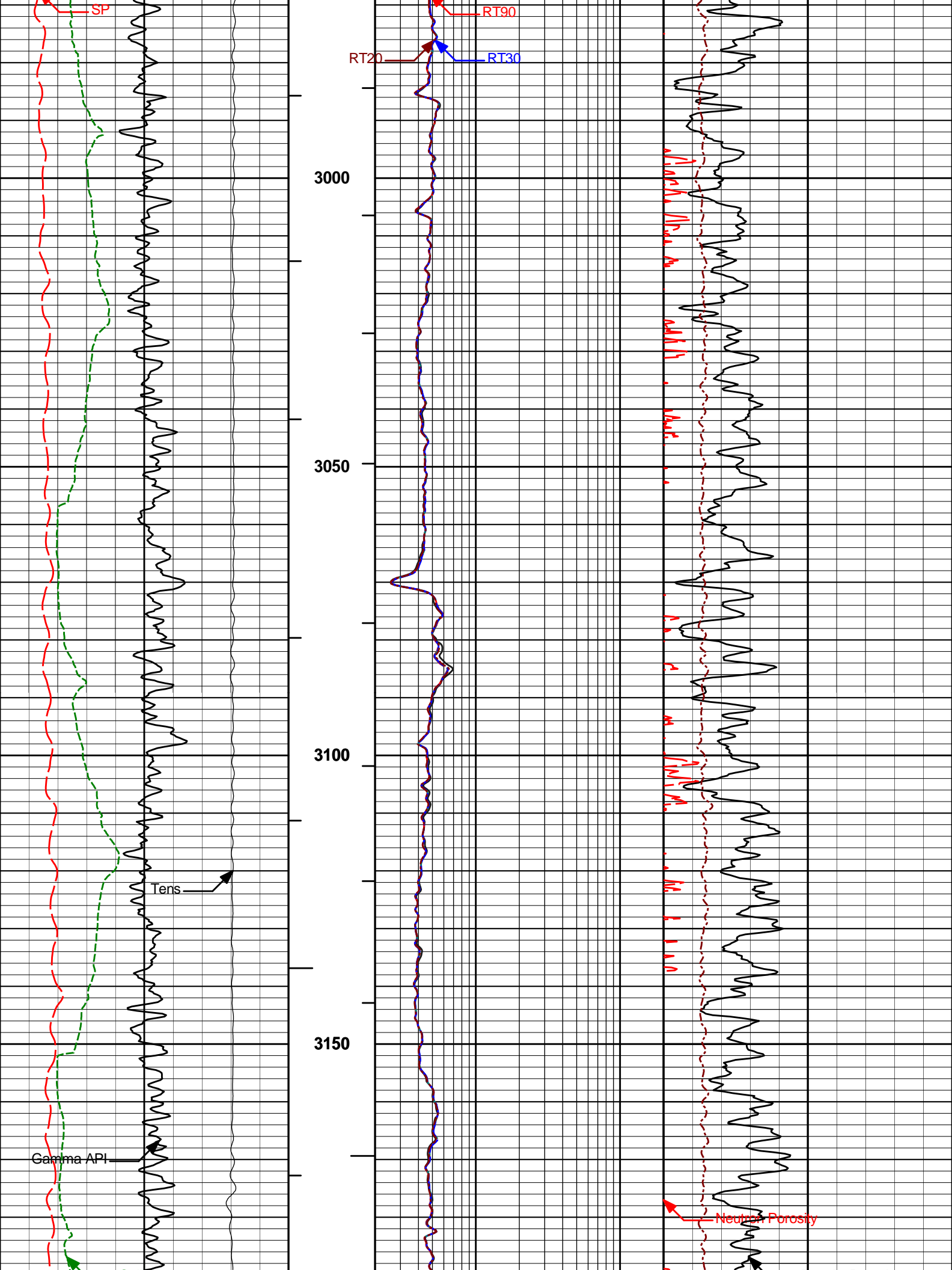


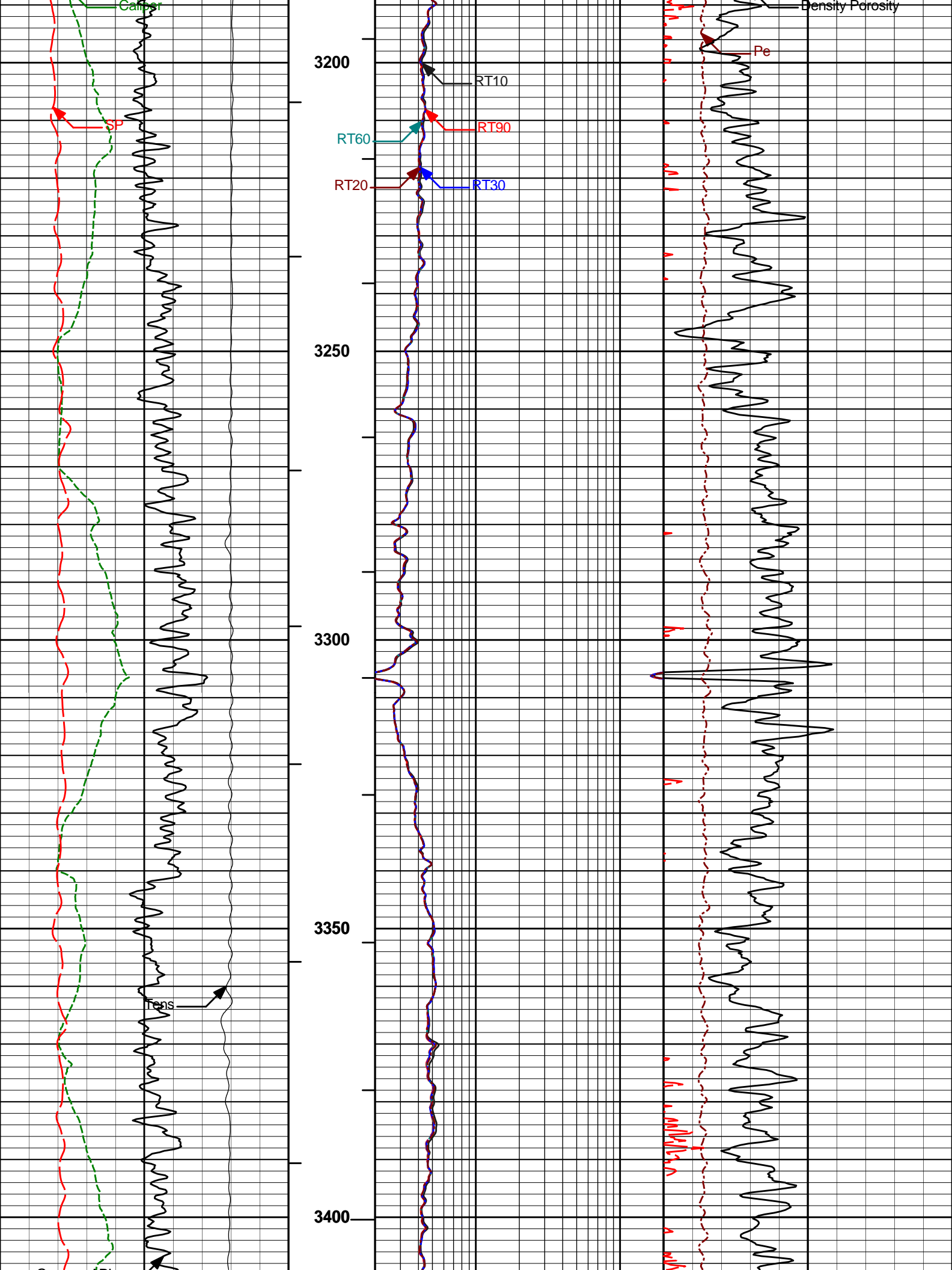


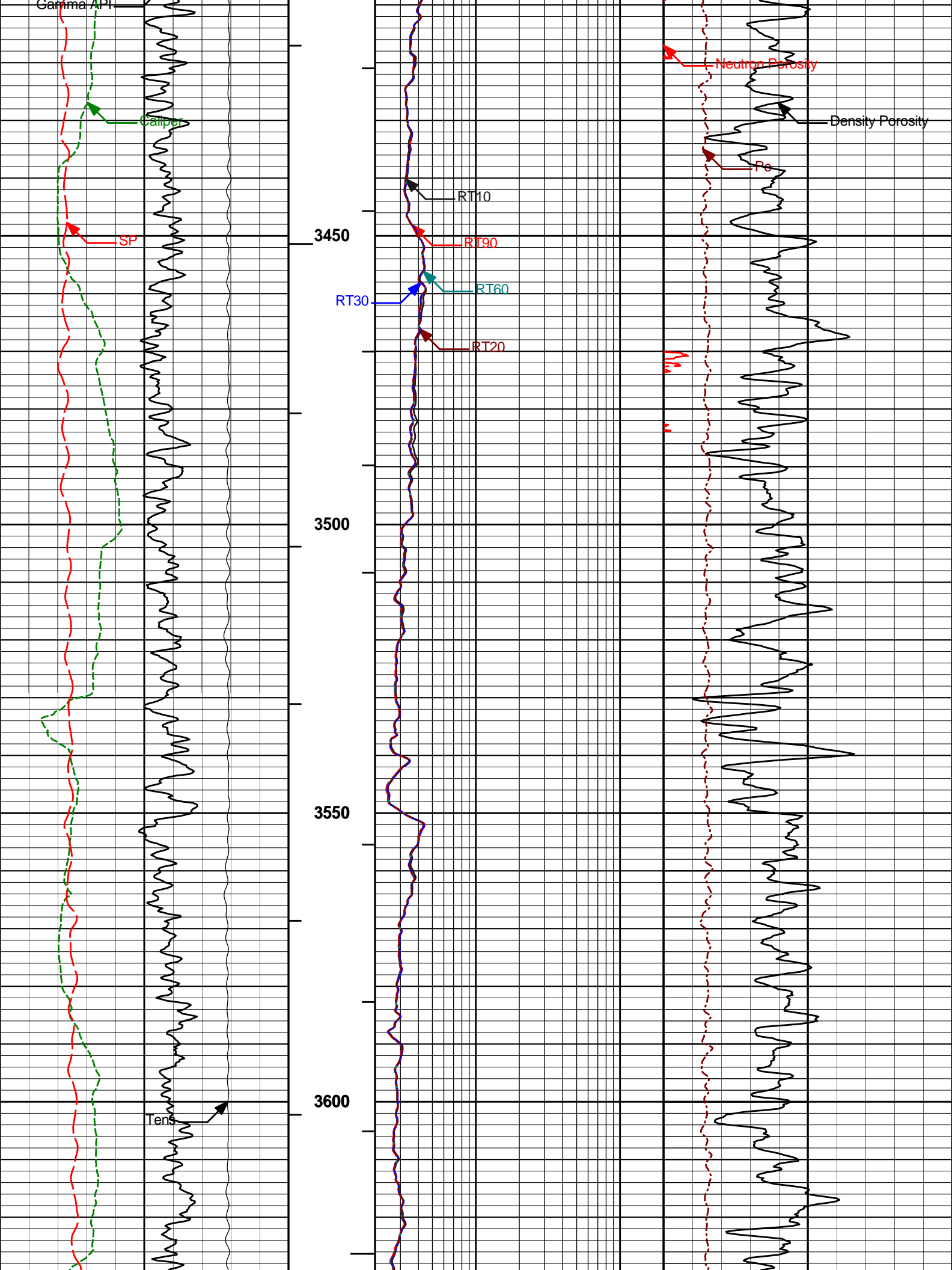




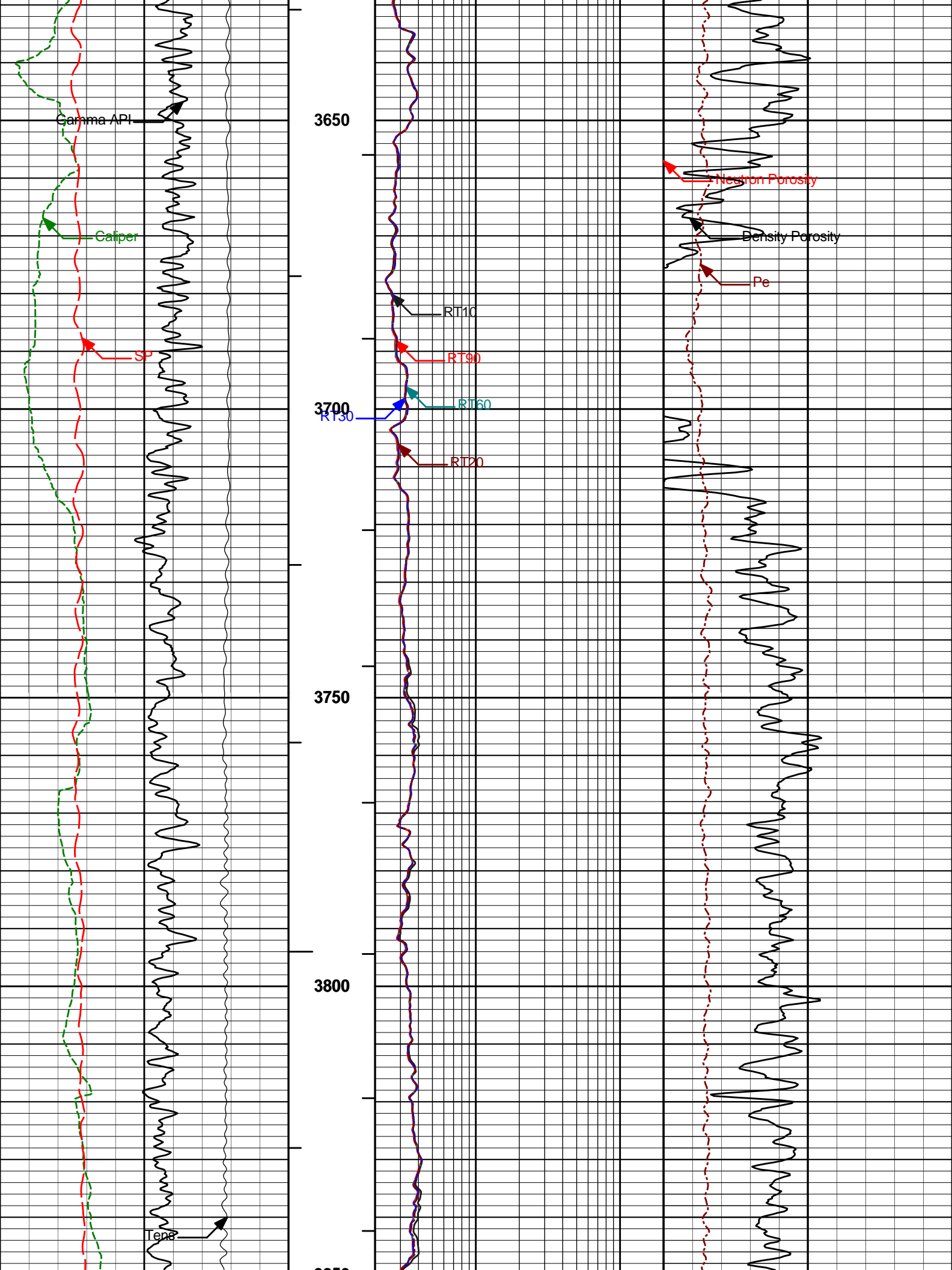


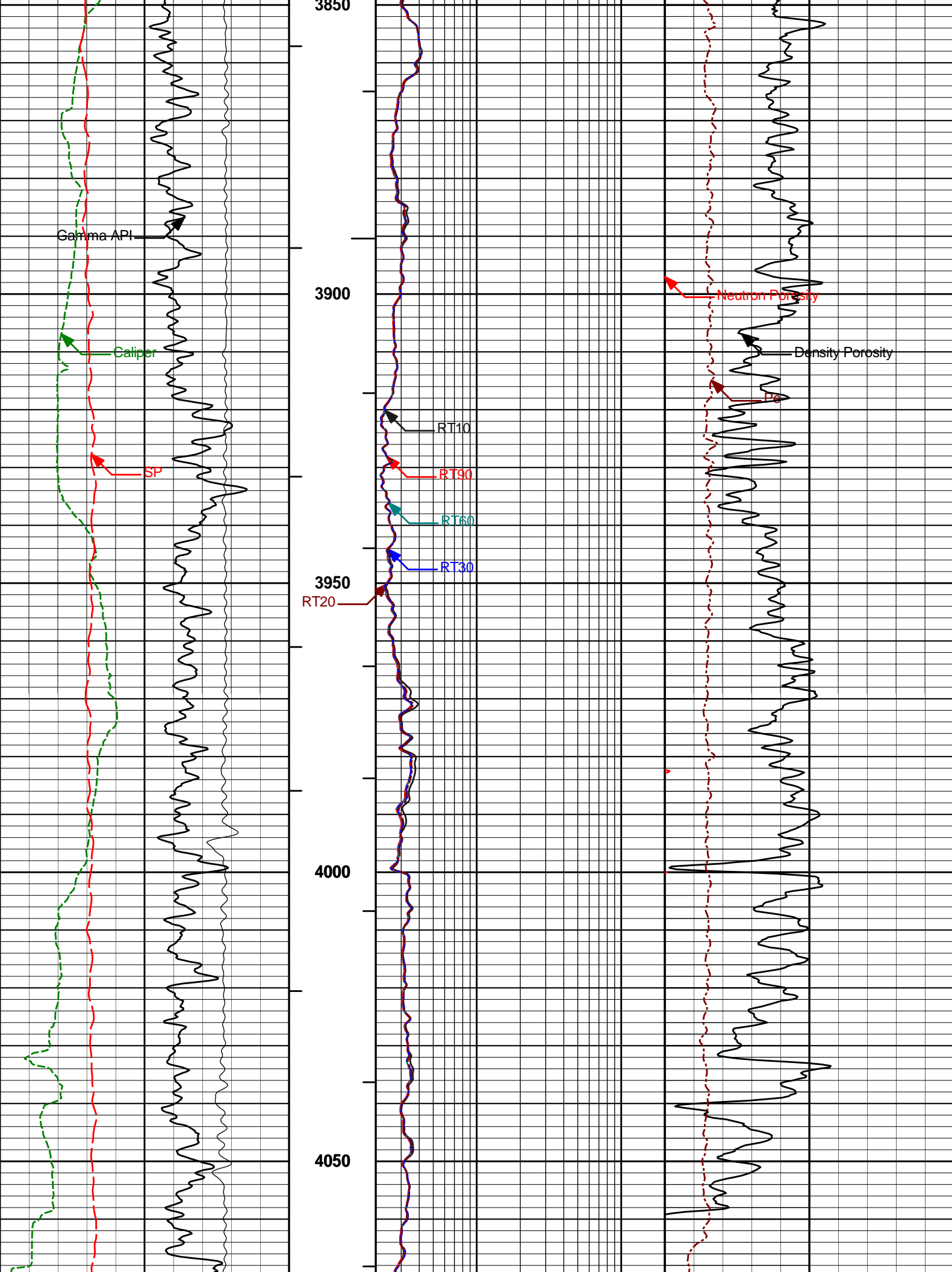


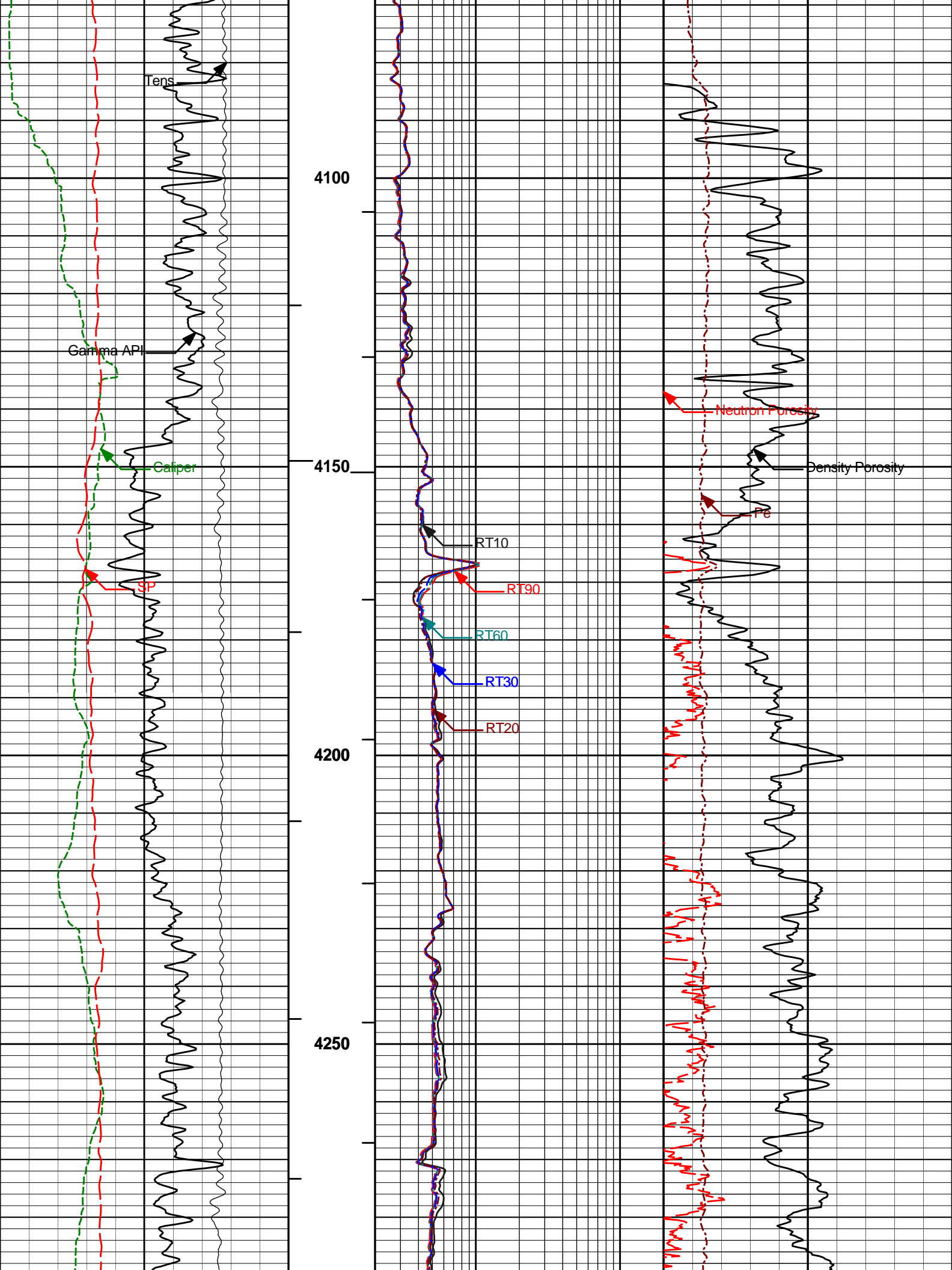


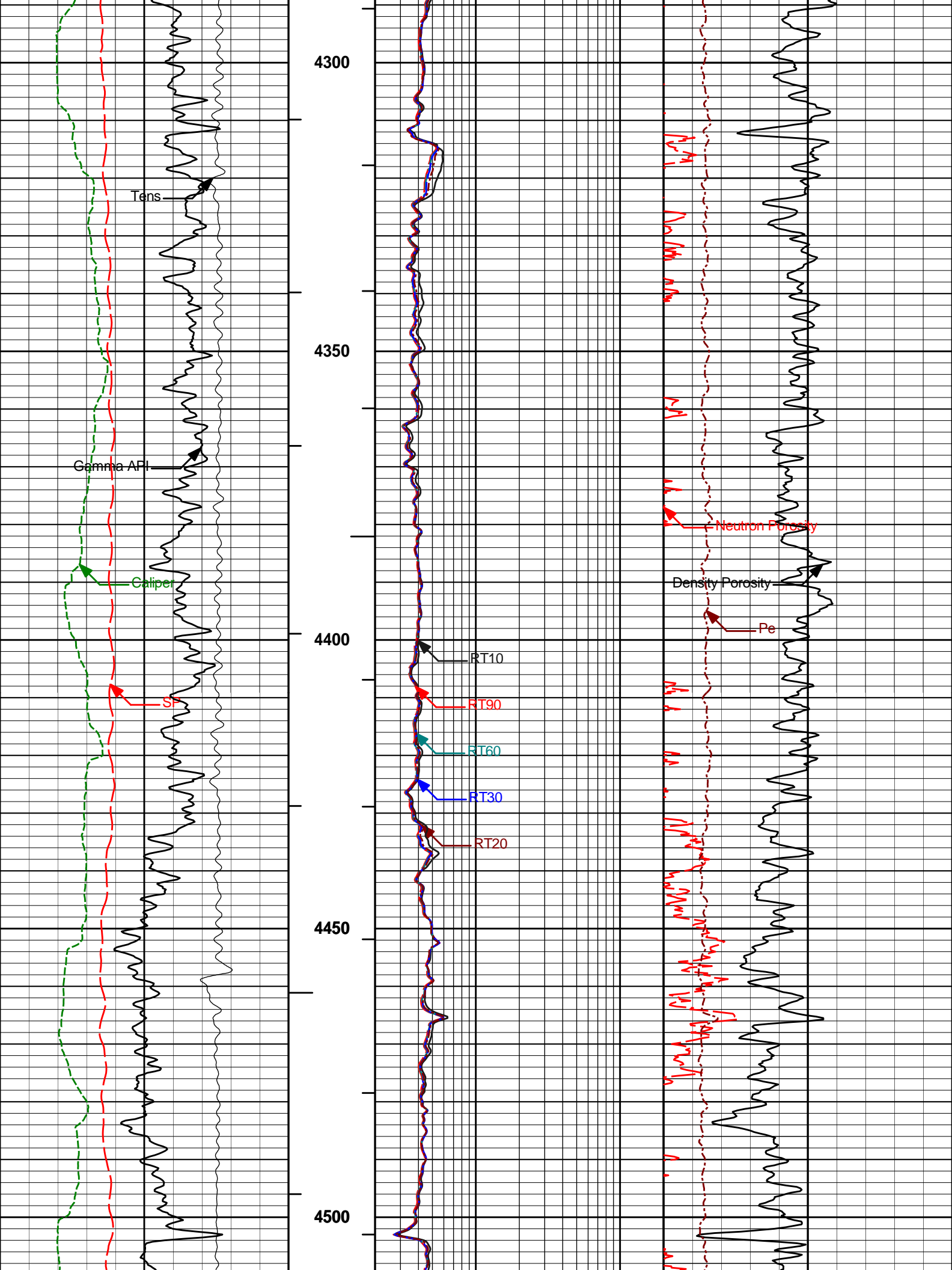


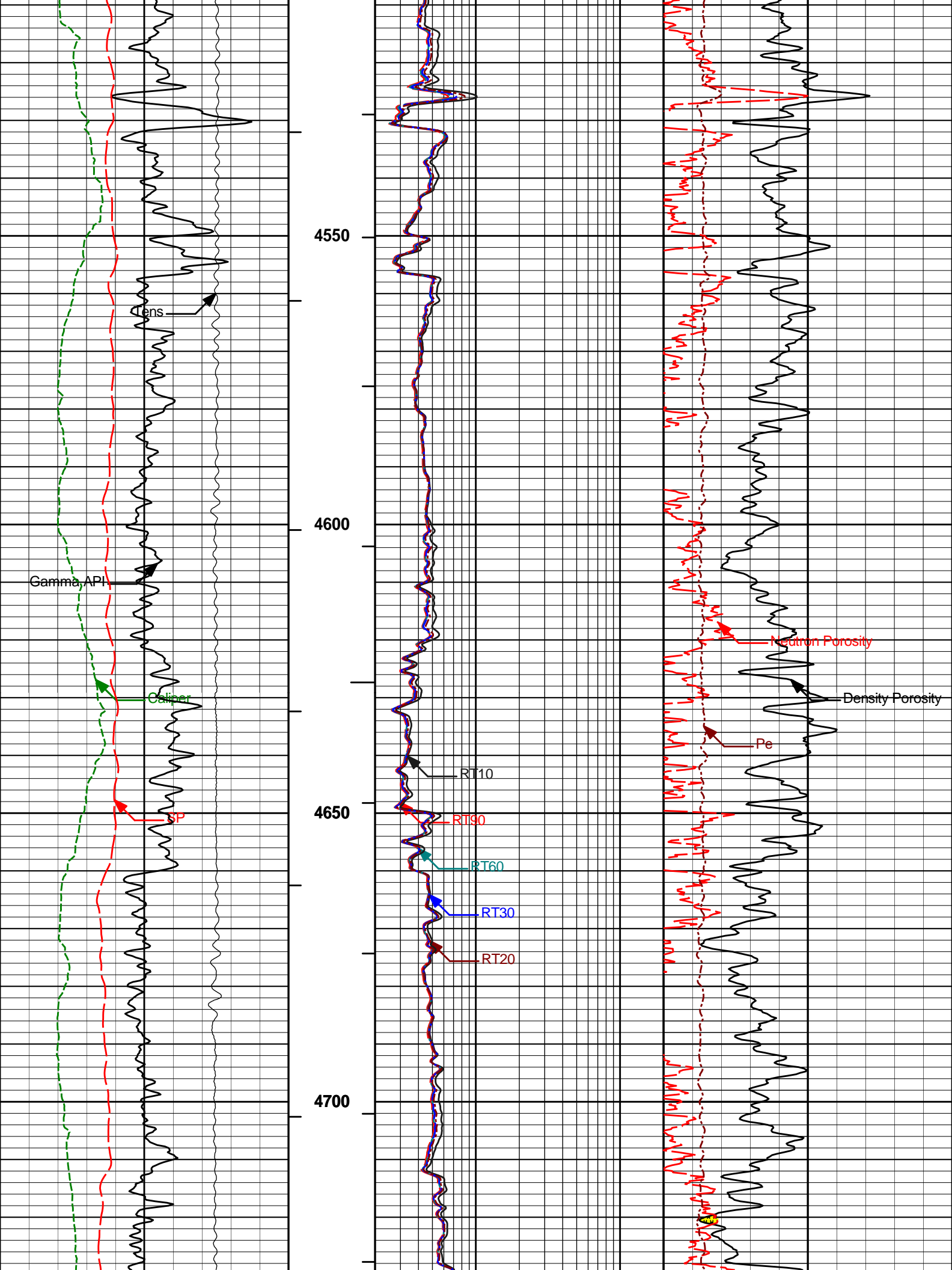


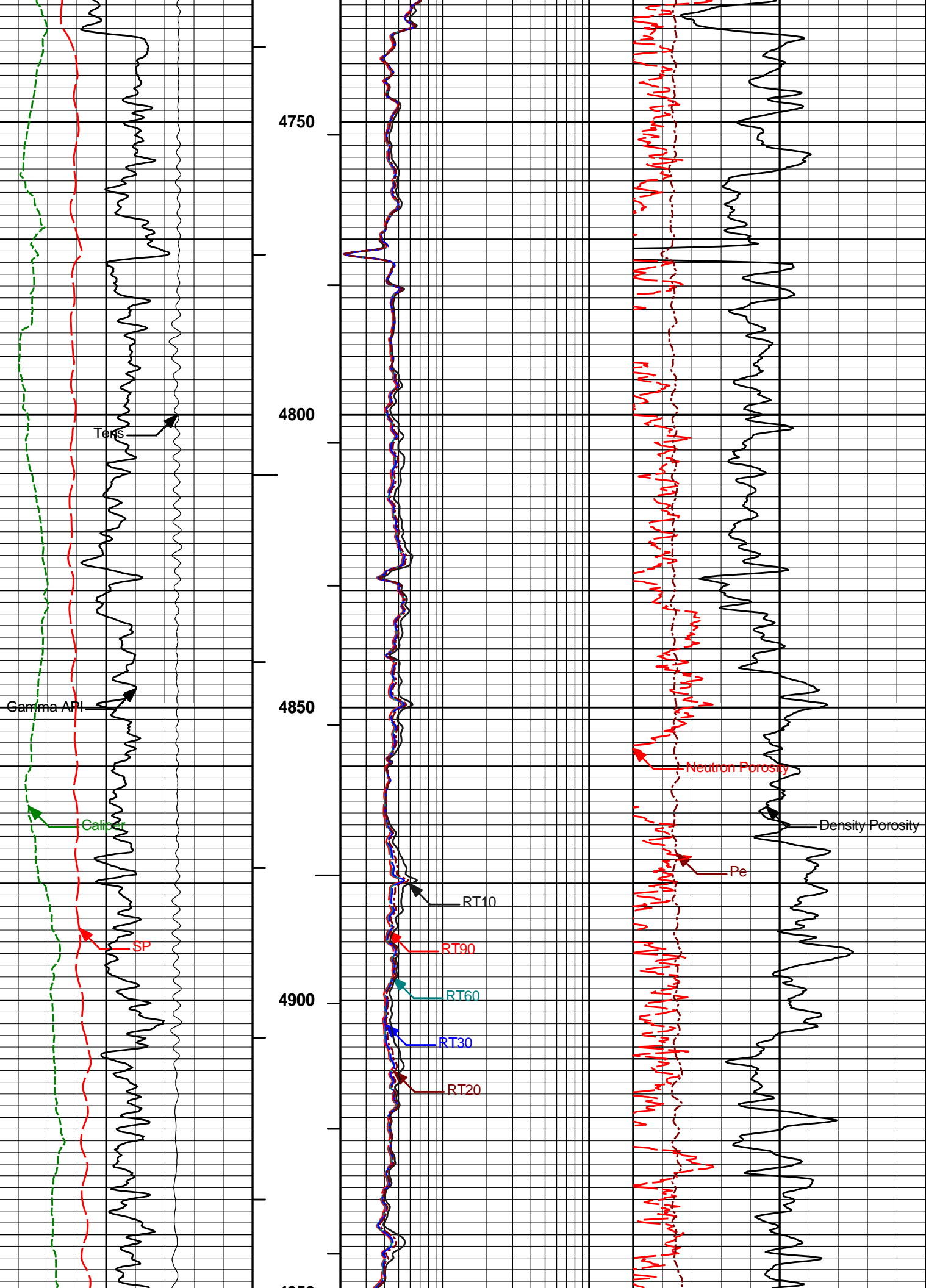


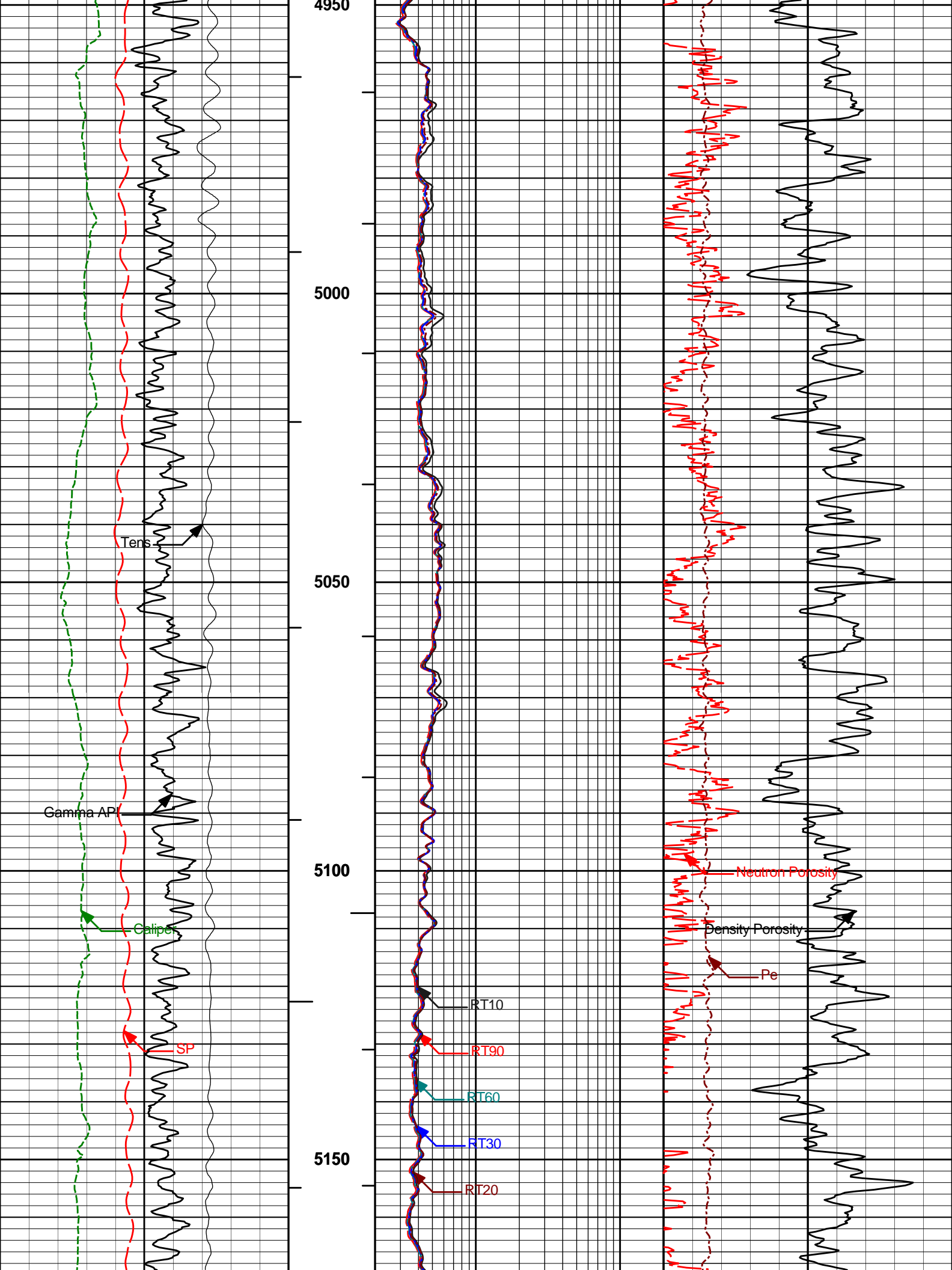


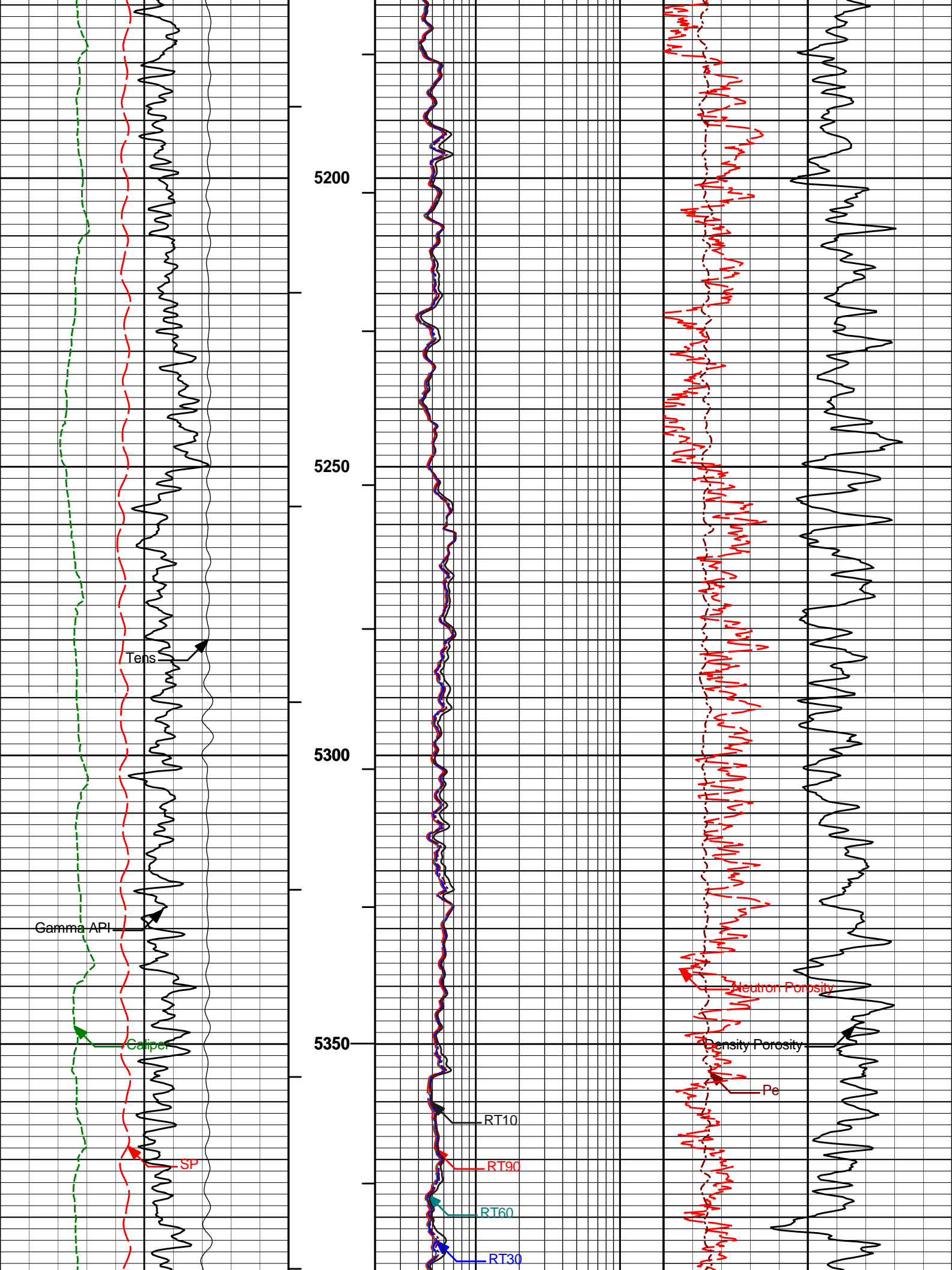




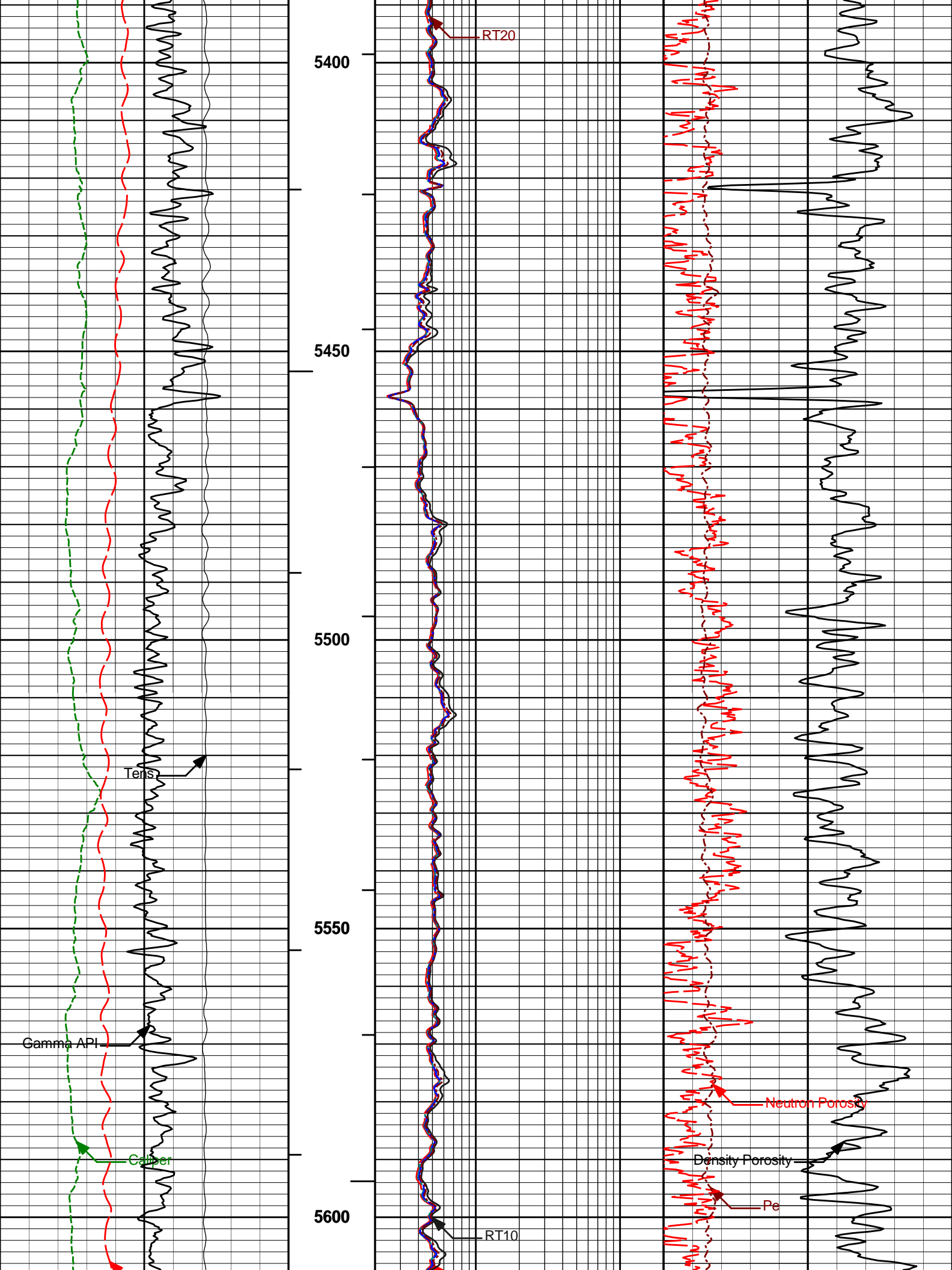


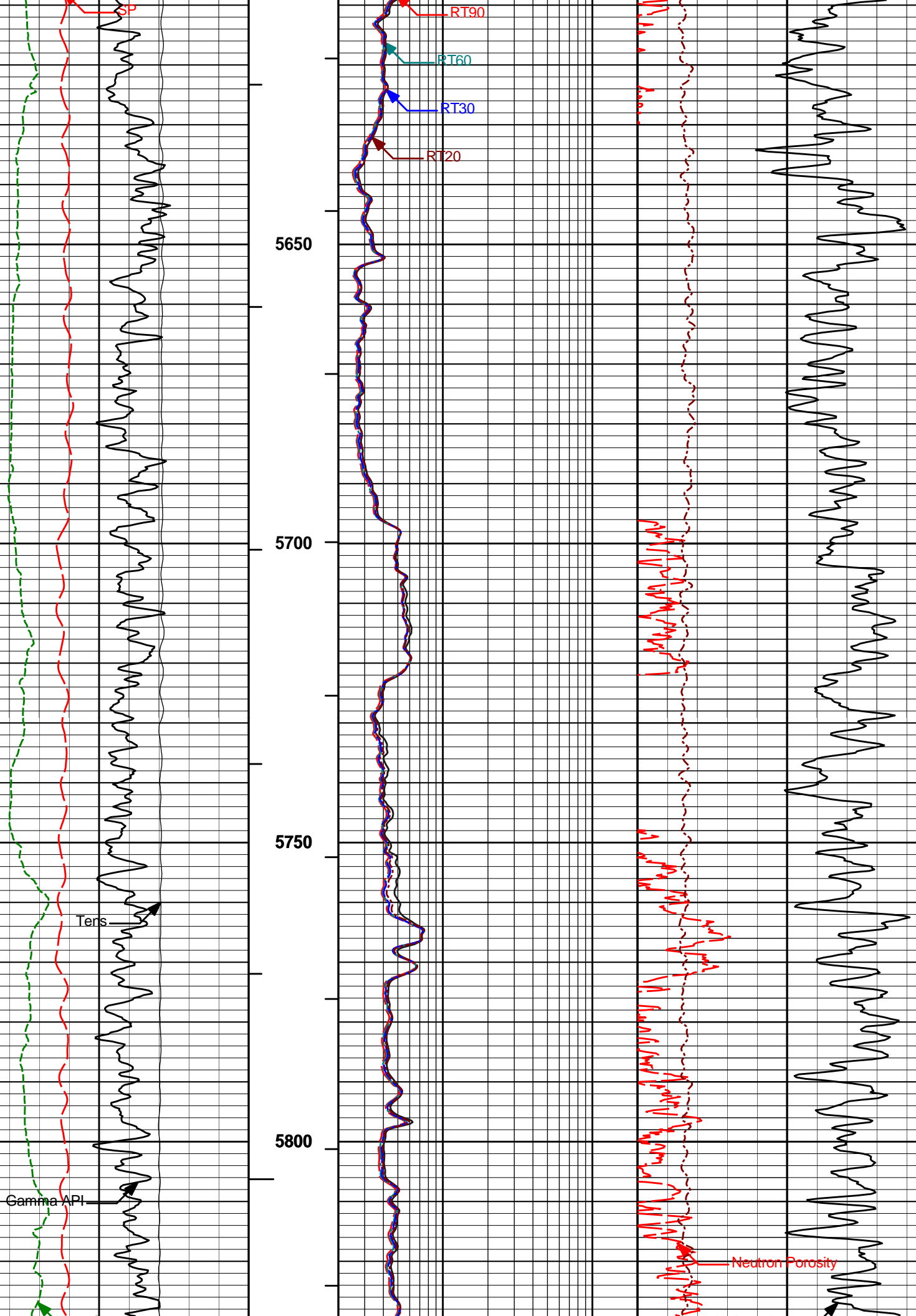


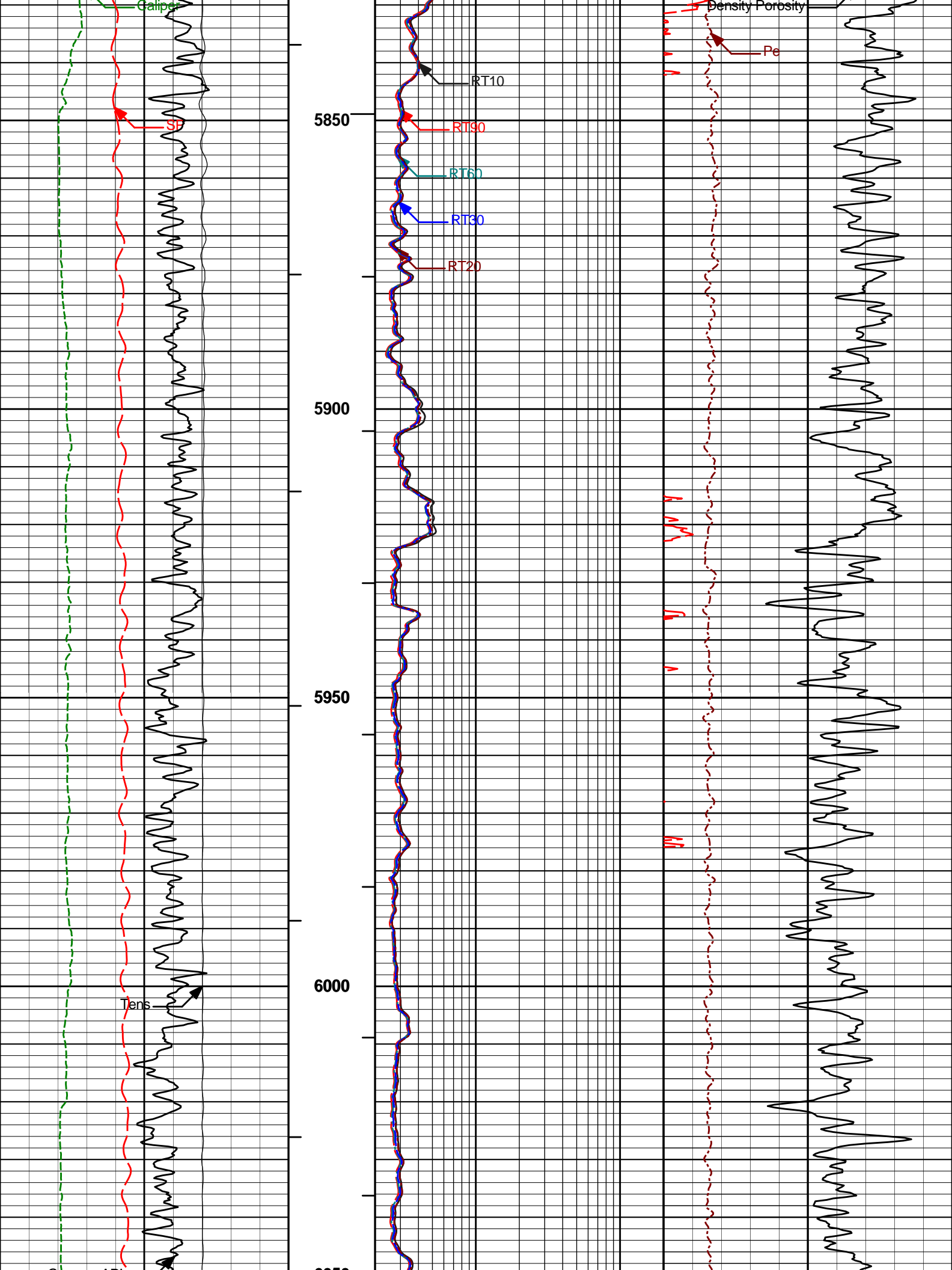


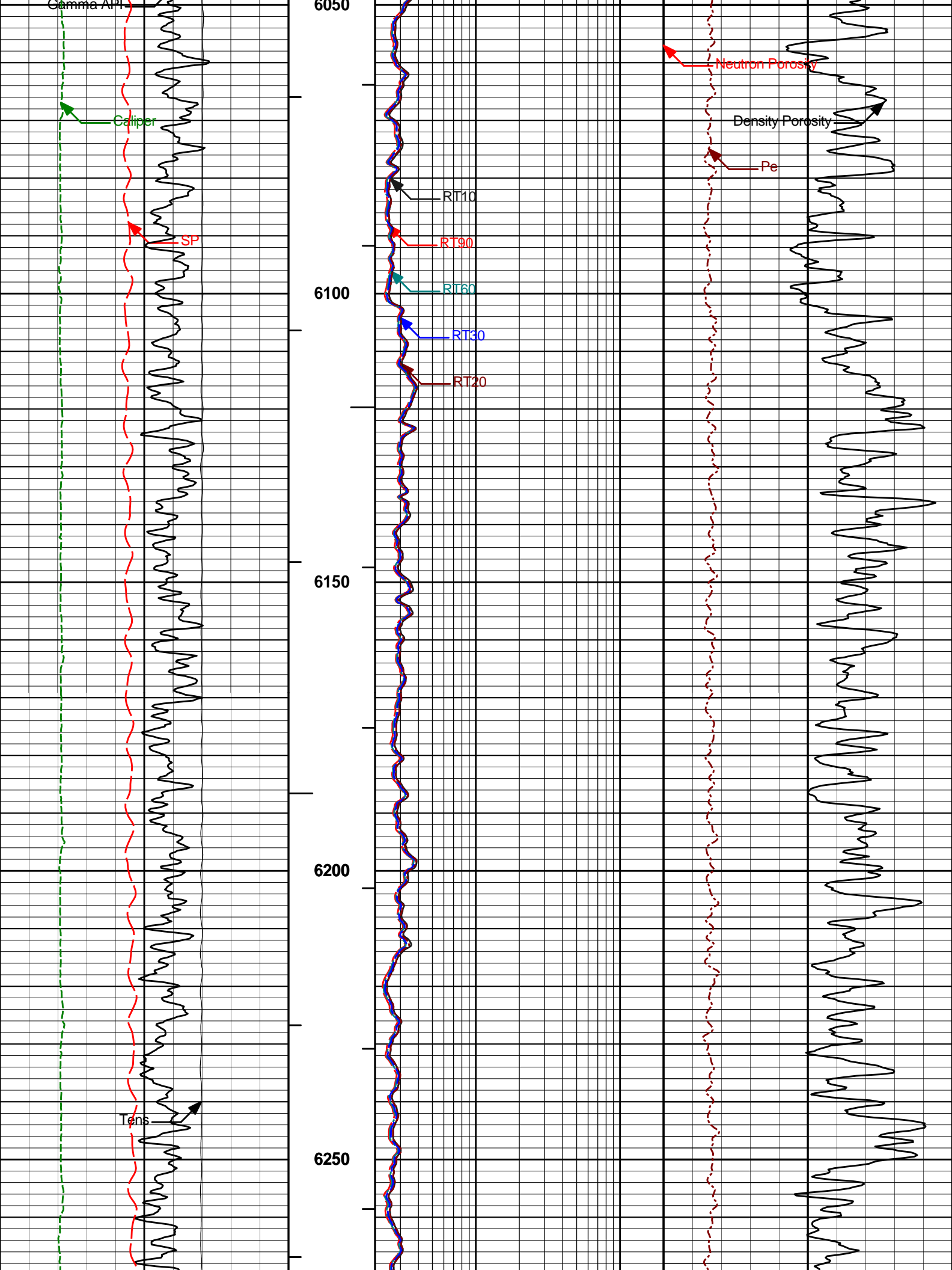


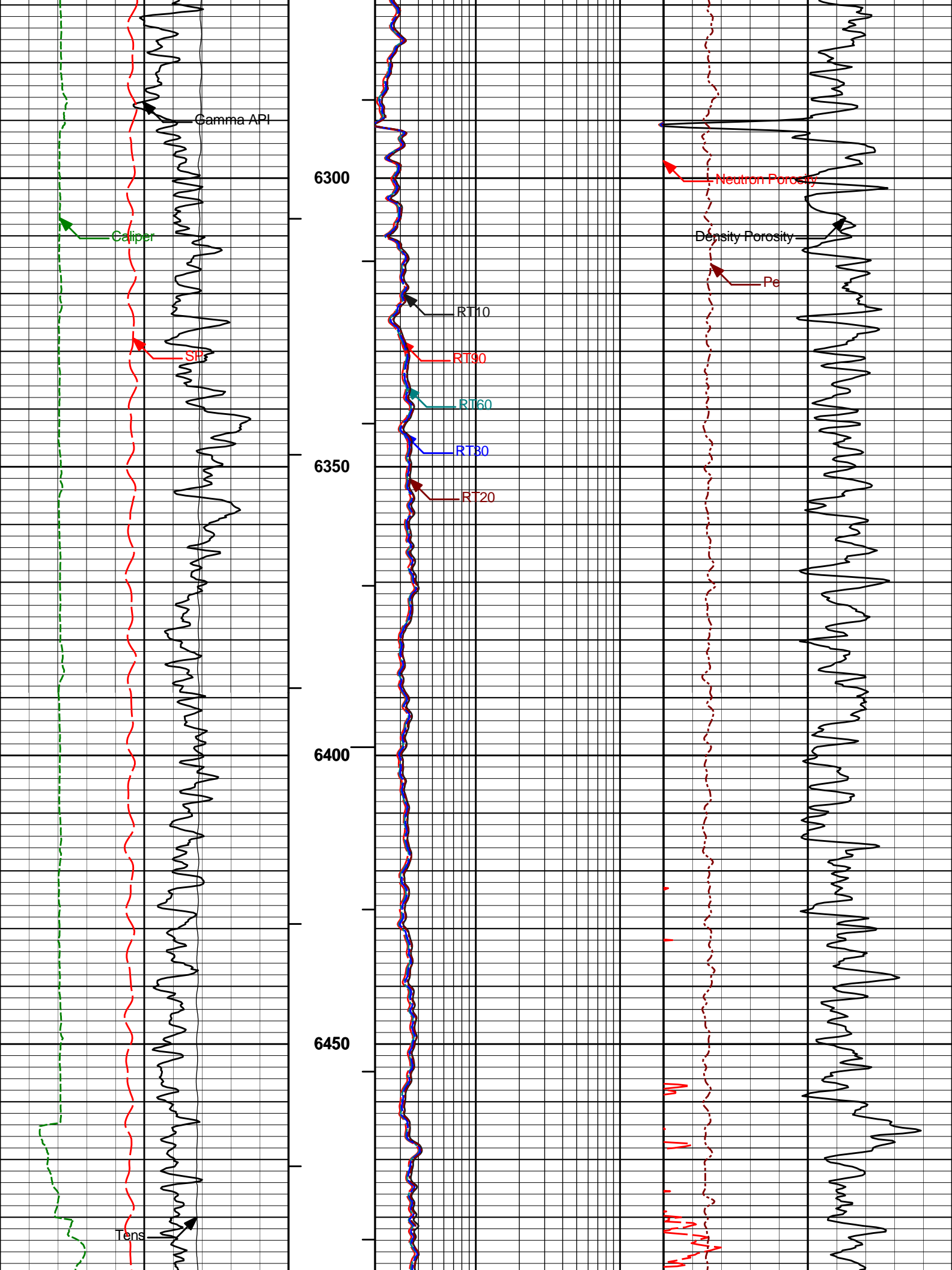


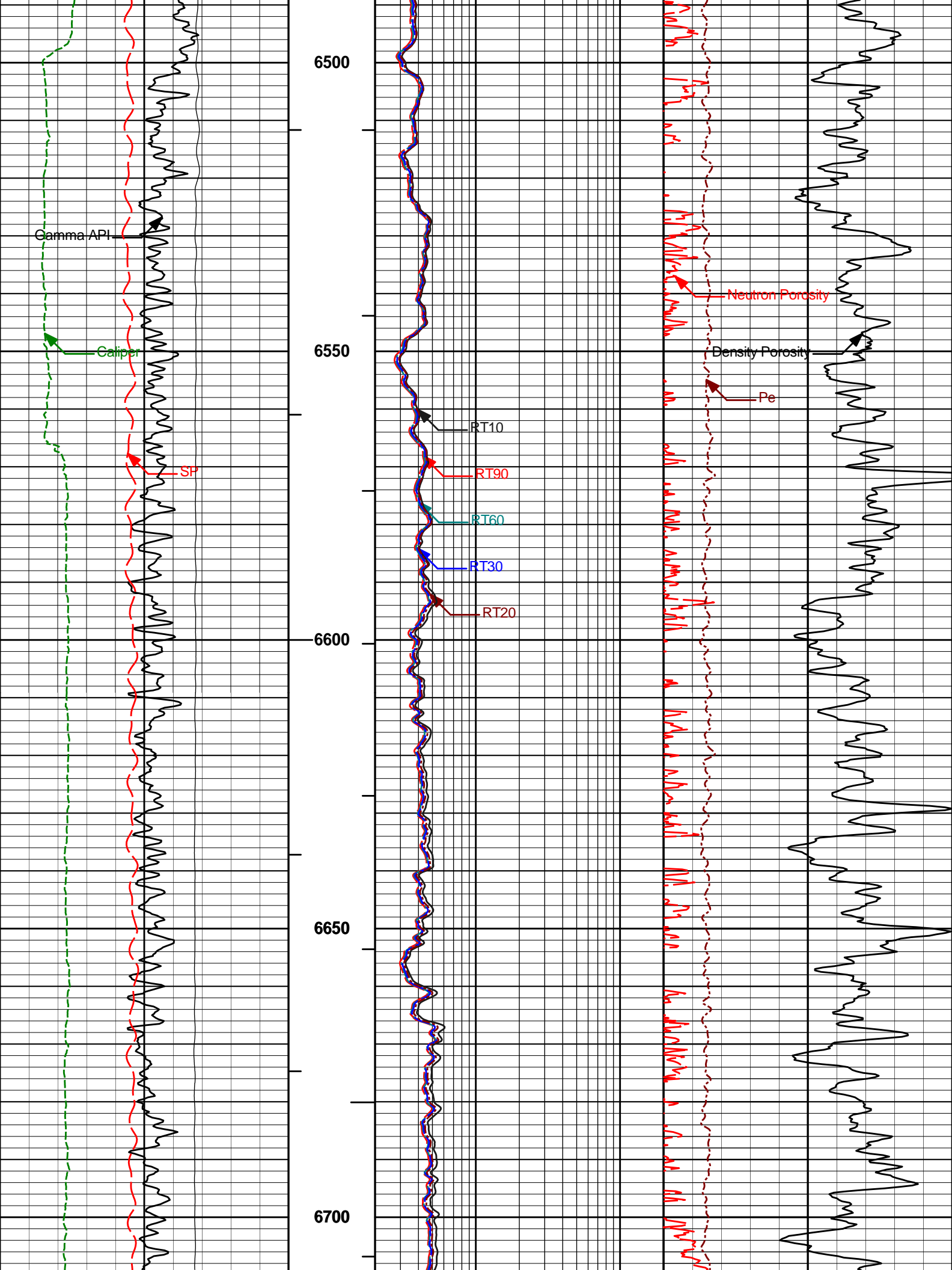


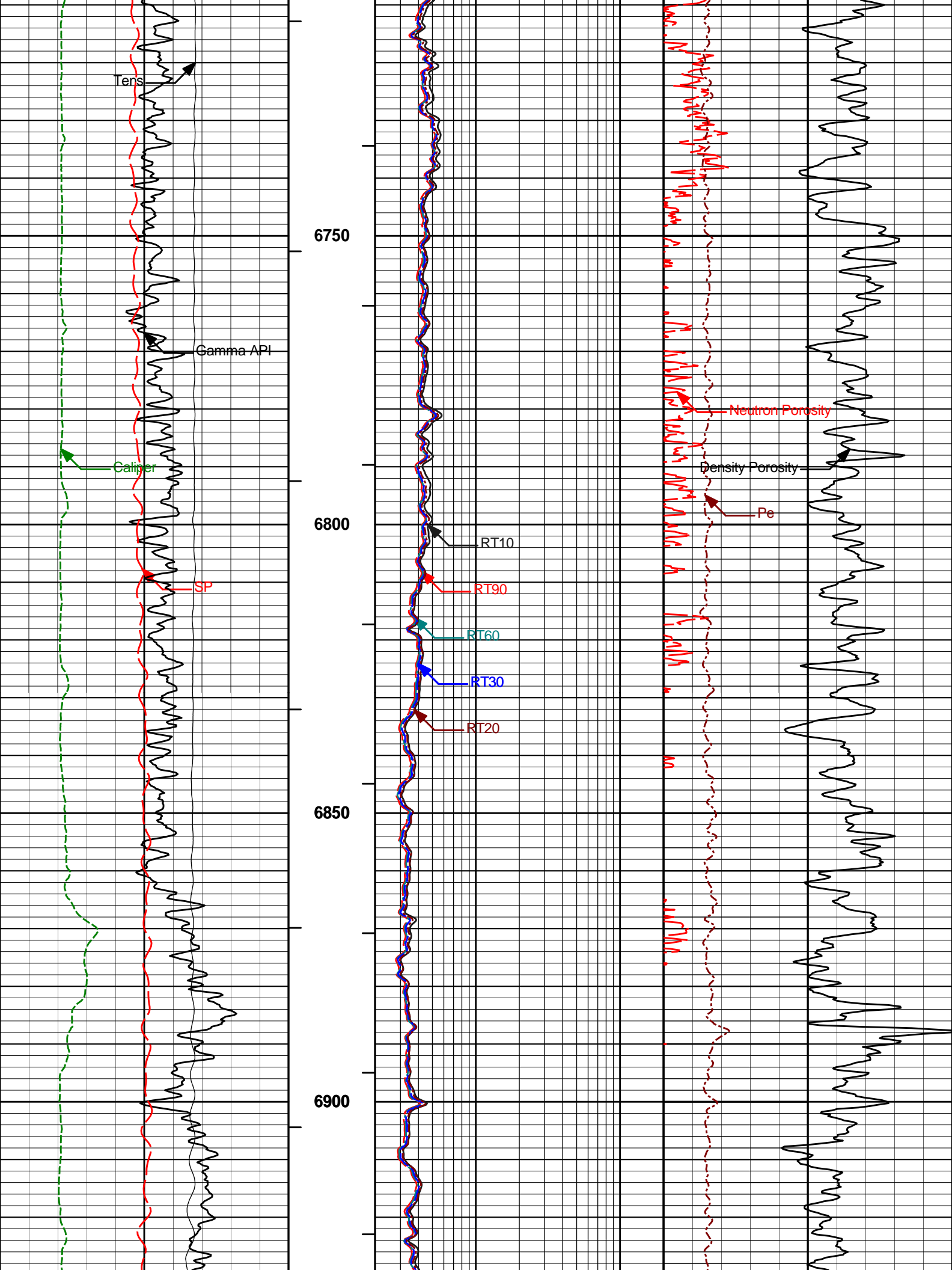


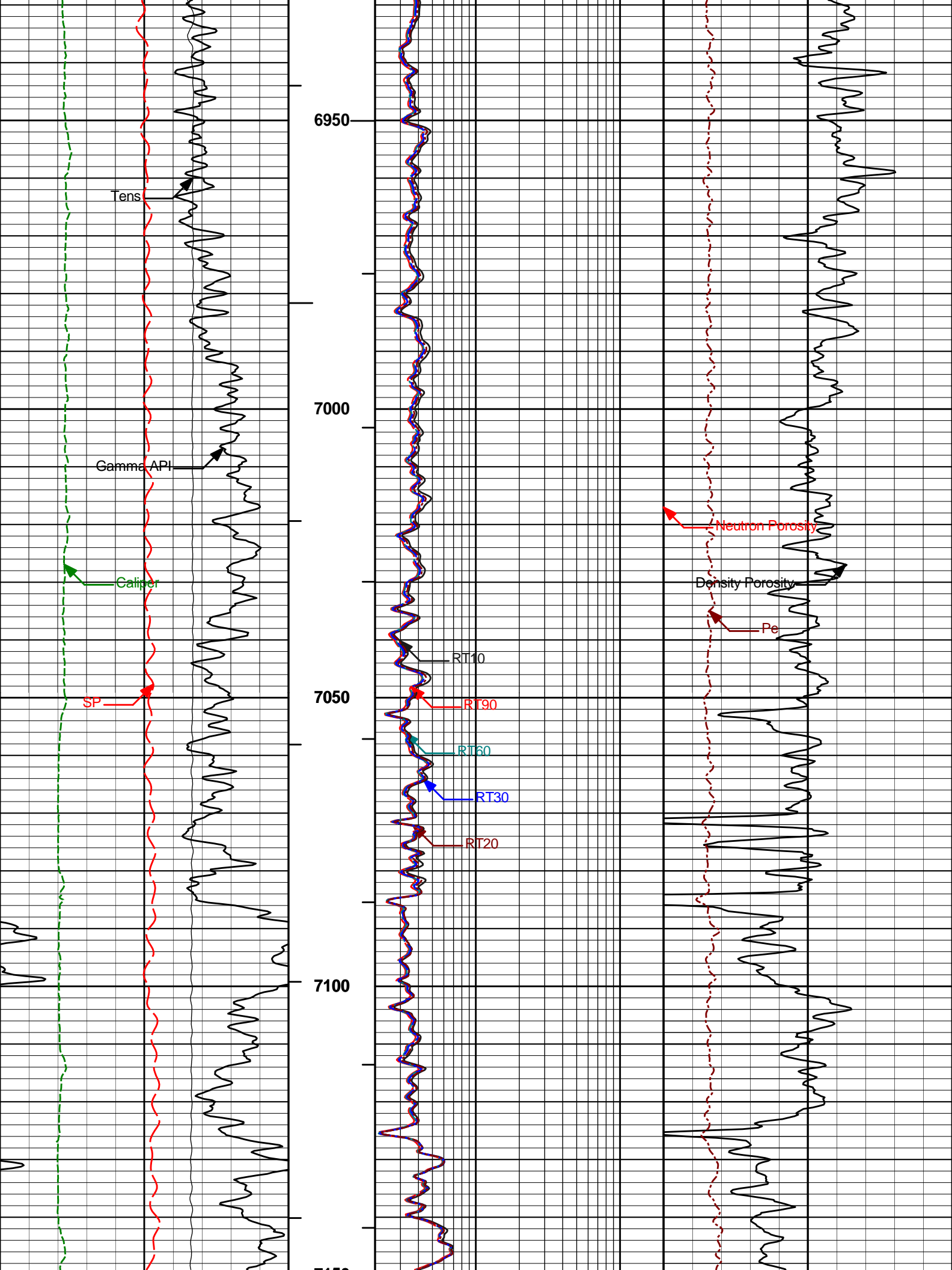




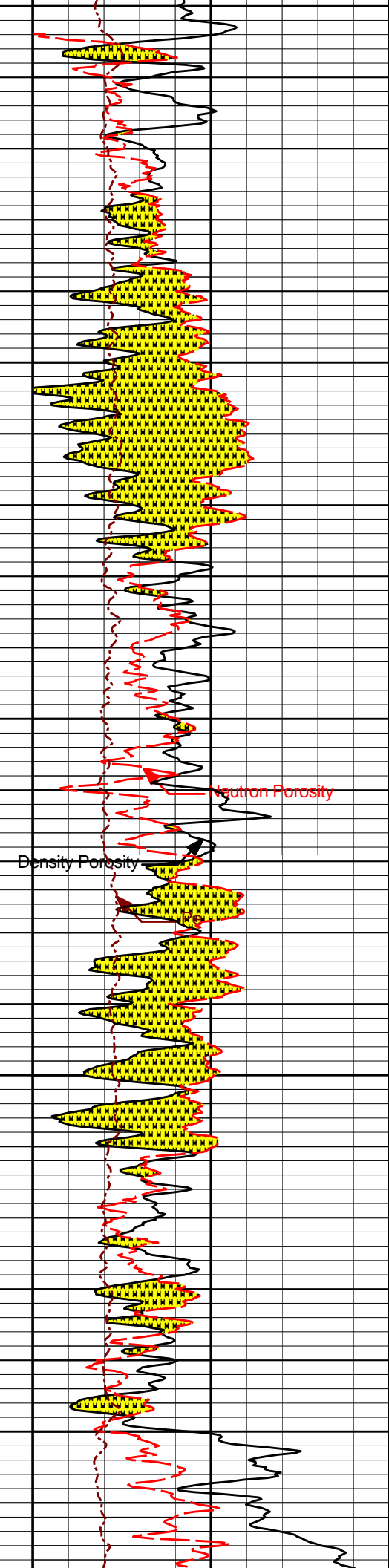
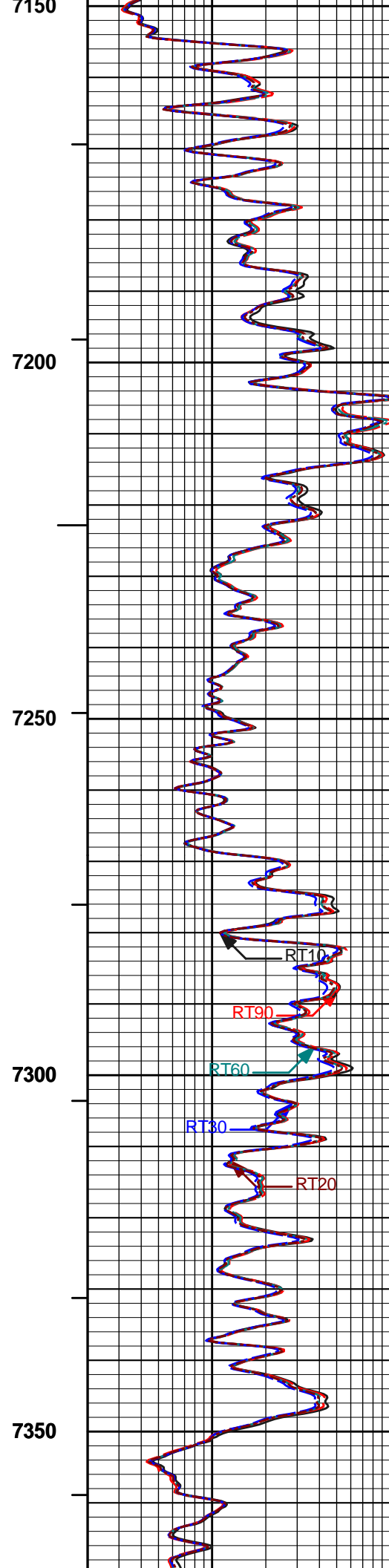
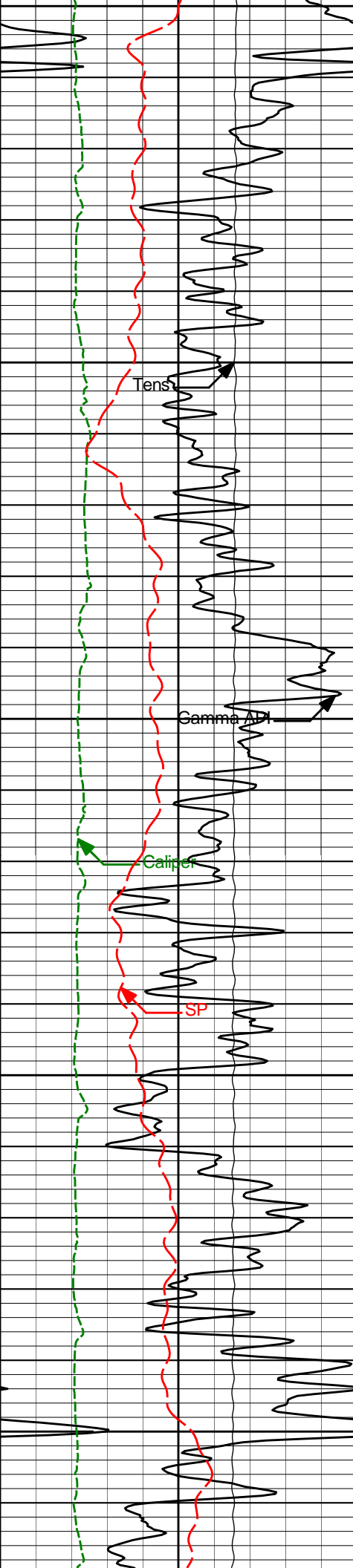


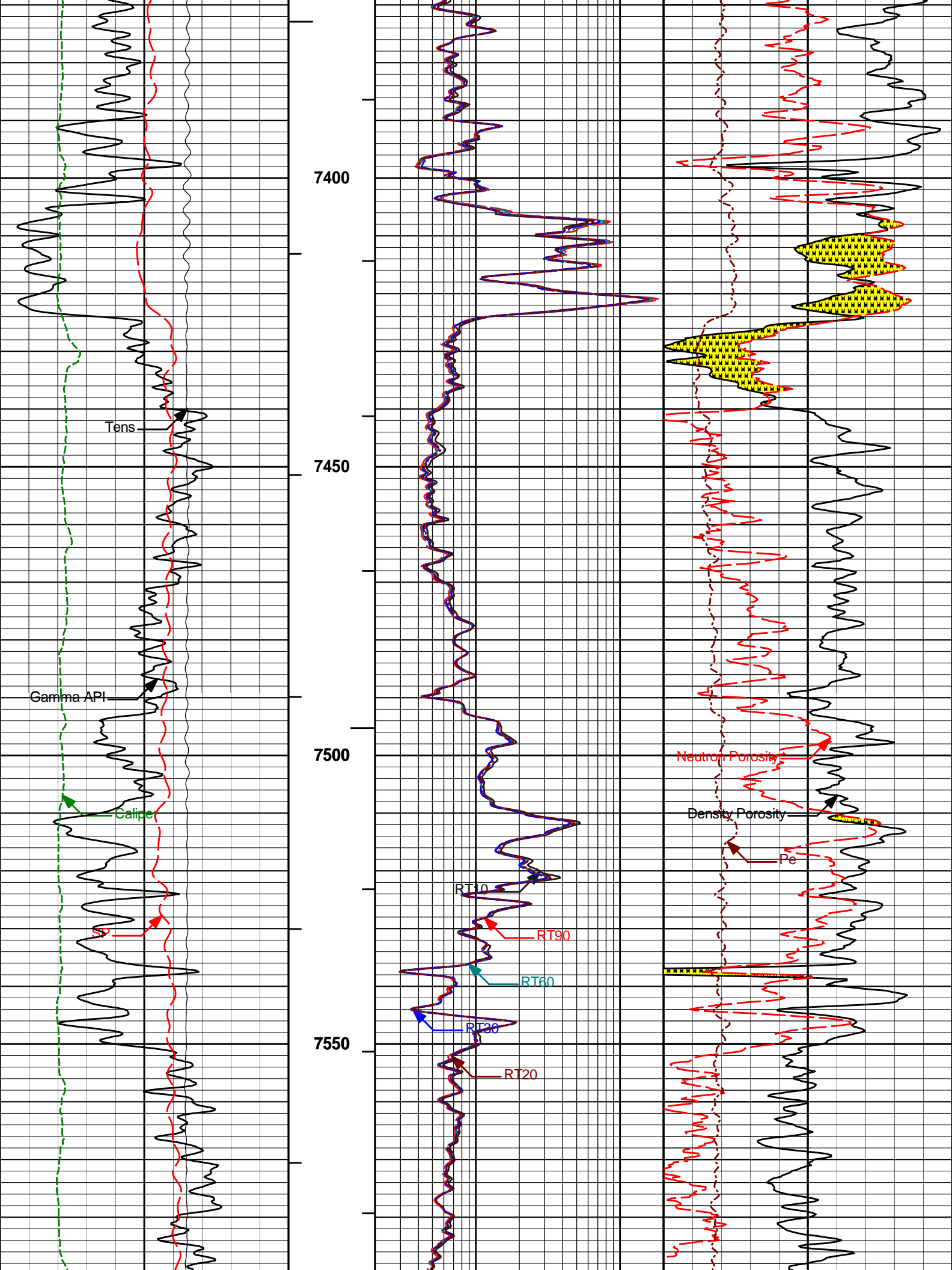


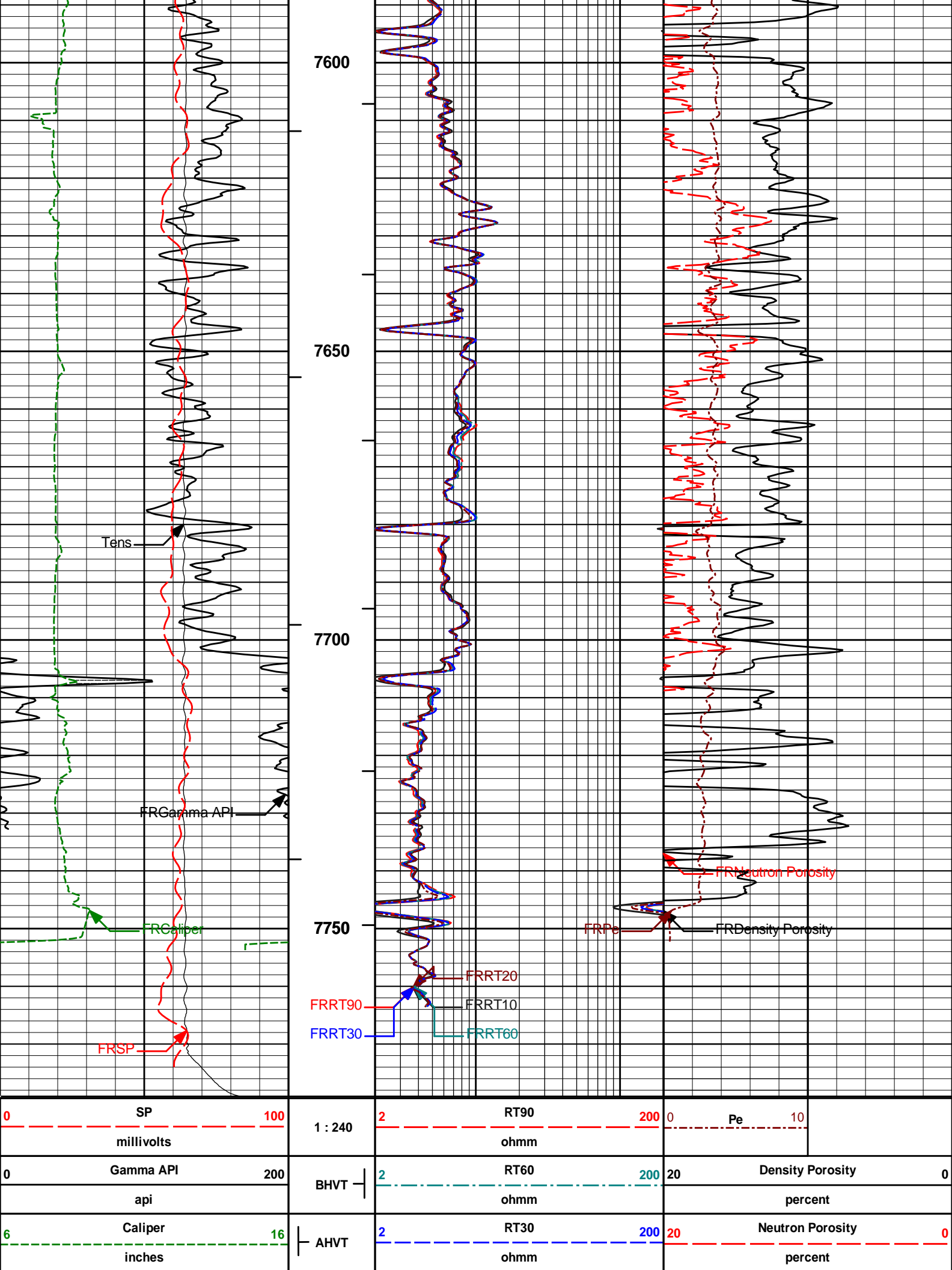












10K	Tens	0	2	RT20	200
	pounds			ohmm	
			2	RT10	200
				ohmm	

<b>HALLIBURTON</b>	Plot Time: 11-May-11 01:27:33 Plot Range: 810 ft to 7779.08 ft Data: {ActiveWell}\Well Based\MAIN* Plot File: \COMP\MAIN
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MAIN PASS 5" = 100'
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<b>HALLIBURTON</b>
<b>CALIBRATION REPORT</b>

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11294346_RED	Reference Calibration Date:	10-Mar-11 16:03:18
Engineer:	R. TWEETEN	Calibration Date:	21-Apr-11 09:03:17
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1
Calibrator Source S/N: TB 289 Calibrator API Reference:264.00 api Equivalent Calibrator API Reference:268.6 api			
Measurement	Measured	Calibrated	Units
Background	76.3	75.4	api
Background + Calibrator	347.9	344.0	api
Calibrator	267.8	268.6	api

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - PROT01	Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	F. LODER	Calibration Date:	18-Mar-11 16:18:56
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1
Logging Source S/N: DSN-434 Tank Serial Number: 11068236 Reference value assigned to Tank: 53.720 Snow Block S/N: BRIGHTON Calibration Tank Water Temperature: 60 degF Min. Tool Housing Outside Diameter: 3.625 in			

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.967	0.967	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):	0.2223	0.2223	0.0000	+/- 0.0020
Calibrated Ratio:	10.11	10.11	0.000	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0723	0.02000 - 0.09000

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	SDLT - M271_P123_RED	Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	C. GULLETT	Calibration Date:	07-Apr-11 11:14:21
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

Logging Source S/N: 2770GW		
Aluminum Block S/N: BRIGHTON_AL	Density: 2.600g/cc	Pe: 3.100
Magnesium Block S/N: BRIGHTON_MG	Density: 1.680g/cc	Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0184	1.0184	0.90 - 1.10
Near Dens Gain	1.0043	1.0043	0.90 - 1.10
Near Peak Gain	0.9977	0.9977	0.90 - 1.10
Near Lith Gain	0.9868	0.9868	0.90 - 1.10
Far Bar Gain	1.0167	1.0167	0.90 - 1.10
Far Dens Gain	1.0041	1.0041	0.90 - 1.10
Far Peak Gain	0.9981	0.9981	0.90 - 1.10
Far Lith Gain	0.9686	0.9686	0.90 - 1.10
Near Bar Offset	0.1167	0.1167	NONE
Near Dens Offset	0.2263	0.2263	NONE
Near Peak Offset	0.3095	0.3095	NONE
Near Lith Offset	0.3948	0.3948	NONE
Far Bar Offset	0.0527	0.0527	NONE
Far Dens Offset	0.1347	0.1347	NONE
Far Peak Offset	0.1644	0.1644	NONE
Far Lith Offset	0.3614	0.3614	NONE
Near Bar Background	851.77	851.77	700 - 1450
Near Dens Background	281.54	281.54	230 - 480
Near Peak Background	120.33	120.33	100 - 210
Near Lith Background	150.02	150.02	125 - 260
Far Bar Background	540.70	540.70	450 - 900
Far Dens Background	207.93	207.93	175 - 345
Far Peak Background	81.00	81.00	70 - 140
Far Lith Background	85.36	85.36	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.680	1.680	0.000	+/- 0.015
Pe	2.553	2.553	0.000	+/- 0.150

ALUMINUM				
Density (g/cc)	2.600	2.600	0.000	+/- 0.01500
Pe	3.061	3.061	0.000	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0012	+/- 0.0110	-0.0003	+/- 0.0140
Magnesium Block	-0.0006	+/- 0.0110	-0.0022	+/- 0.0140
Aluminum Block	-0.0002	+/- 0.0110	-0.0010	+/- 0.0140
Resolution	9.45	6.00 - 11.50	9.74	6.00 - 11.50
Internal Verifier(B+D+P+L)	1404	1200 - 2700	915	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

MICRO LOG SHOP CALIBRATION			
Tool Name:	SDLT - M271_P123_RED	Reference Calibration Date:	07-Apr-11 11:38:32
Engineer:	C. GULLETT	Calibration Date:	11-Apr-11 14:13:57
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

CALIBRATION COEFFICIENT SUMMARY					
Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.07	-0.06	-0.00	-0.01	ohmm
Calibration Point #1	-0.02	0.00	0.00	0.00	ohmm
Calibration Point #2	18.53	20.00	18.55	20.00	ohmm
Internal Reference	20.01	21.60	20.09	21.65	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.03	0.17	V
Calibration Point #1	14.09	1.76	V
Calibration Point #2	4867.77	6343.72	V
Internal Reference	5256.56	6867.82	V

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - M271_P123_RED	Reference Calibration Date:	10-Mar-11 14:28:07
Engineer:	C. GULLETT	Calibration Date:	07-Apr-11 11:34:36
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-1137.93	-1312.99	-7000.00 - -1000.00

Pad Gain	0.0003737	0.0003906	0.000200 - 0.000600
Arm Offset	-342.28	-182.14	-5000.00 - 3000.00
Arm Gain	0.0004999	0.0005088	0.000300 - 0.000700
Arm Power	-0.000003798	-0.000004888	-0.000010 - 0.000010

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)	1.98	2.00	0.02	+/- 0.20
Medium Ring (in)	3.65	3.75	0.10	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.46	6.50	0.04	+/- 0.20
Medium Ring (in)	8.20	8.25	0.05	+/- 0.20
Large Ring (in)	15.11	15.00	-0.11	+/- 0.20

PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed
PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed

### ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	ACRt - E2817-S4353_RED	Reference Calibration Date:	13-Aug-10 20:06:47
Engineer:	F. LODER	Calibration Date:	30-Mar-11 18:36:19
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

### TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0059	1.05	0.95	1.0075	1.05	0.95	1.0051	1.05
A2 (50")	0.95	1.0076	1.05	0.95	1.0107	1.05	0.95	1.0110	1.05
A3 (29")	0.95	1.0065	1.05	0.95	1.0088	1.05	0.95	1.0066	1.05
A4 (17")	0.95	1.0010	1.05	0.95	1.0019	1.05	0.95	1.0026	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9944	1.05	0.95	0.9930	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9793	1.05	0.95	0.9785	1.05

### TYPICAL SONDE OFFSET RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-1.036	2	-6	-4.390	-2	-8	-4.791	-2
A2 (50")	-7	-1.751	-1	-6	-2.896	-2	-7	-4.731	-2
A3 (29")	-27	-12.778	-9	-9	-3.452	-3	-7	-3.636	-1
A4 (17")	-180	-88.705	-60	-45	-28.593	-15	-39	-24.648	-13
A5 (10")	N/A	N/A	N/A	-150	-91.844	-50	-80	-44.230	-10
A6 (6")	N/A	N/A	N/A	175	331.191	525	90	166.676	270

### TRANSMITTER CURRENT GAIN


Signal	Lower	R	Upper
12K	0.6	0.8814	1.3
36K	1.0	1.8411	2.0
72K	1.0	1.1239	2.0

### R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	0.997	1.05

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11294346_RED						
Gamma Ray Calibrator	268.6	-----	-----	0.0	+/- 9.00	api
DSNT-PROT01						
Snow-Block Porosity	0.0723	-----	-----	0.0000	+/- .--	decg
SDLT-M271_P123_RED						
Near(B+D+P+L)	1403.665	-----	-----	0.000	+/-13.236	cps
Far(B+D+P+L)	914.985	-----	-----	0.000	+/-14.879	cps
MicroLog Normal	21.60	-----	-----	0.00	-----	ohmm
MicroLog Lateral	21.65	-----	-----	0.00	-----	ohmm
Pad Extension	3.75	-----	-----	0.00	+/-0.20	in
Ring Diameter	8.25	-----	-----	0.00	+/-0.20	in
ACRt-E2817-S4353_RED						
Mud Cell	0.997	-----	-----	0.000	-----	ohm-m
Data: NICHOLS_23_6\0001 TRIPLENDLE				Date: 11-May-11 00:31:24		

# TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-10347226 135.00 lbs		Ø 3.625 in →		← Load Cell @ 53.84 ft ← BH Temperature @ 53.27 ft	6.25 ft	57.52 ft
GTET-11294346_RED 165.00 lbs		Ø 3.625 in →		← GammaRay @ 45.21 ft	8.52 ft	51.27 ft
DSNT-PROT01 174.00 lbs		Ø 3.625 in →		← DSN Far @ 35.81 ft ← DSN Near @ 35.06 ft	9.69 ft	42.75 ft
						33.06 ft



SDLT-  
M271\_P123\_RED  
360.00 lbs

Ø 4.500 in →

Ø 4.750 in →

10.81 ft

SDL Microlog @ 25.25 ft  
SDL Caliper @ 25.07 ft  
SDL @ 25.06 ft

22.25 ft

Regal Standoff 6\_75-01  
5.00 lbs

Ø 6.750 in\* →

← Mud Resistivity @ 15.86 ft

ACRt-E2817-  
S4353\_RED  
250.00 lbs

Ø 3.625 in →

← ACRt @ 11.88 ft

19.25 ft

SP Ring-1  
0.00 lbs

Ø 3.625 in\* →

← SP @ 4.28 ft

Regal Standoff 6\_75-02  
5.00 lbs

Ø 6.750 in\* →

3.00 ft

MULE SHOE-01  
30.00 lbs

Ø 3.625 in →

3.00 ft

0.00 ft

Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head		10347226	135.00	6.25	51.27	300.00
GTET	Gamma Telemetry Tool		11294346_RED	165.00	8.52	42.75	60.00
DSNT	Dual Spaced Neutron		PROT01	174.00	9.69	33.06	60.00
SDLT	Spectral Density Tool		M271_P123_RED	360.00	10.81	22.25	60.00
ACRt	Array Compensated True Resistivity		E2817-S4353_RED	250.00	19.25	3.00	300.00
SP	SP Ring		1	0.00	0.25 *	4.28	300.00
RSOF	Regal Standoff 6.75in		01	5.00	0.75 *	16.28	300.00
M S	MULE SHOE		01	30.00	3.00	0.00	100.00
RSOF	Regal Standoff 6.75in		02	5.00	0.75 *	2.14	300.00
Total				1,124.00	57.52		
* Not included in Total Length and Length Accumulation.							
Data: NICHOLS_23_6\0001 TRIPLE\IDLE							
Date: 10-May-11 22:39:40							

COMPANY	KERR-MCGEE OIL & GAS ONSHORE LP		
WELL	NICHOLS 23-6		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO

HALLIBURTON

SPECTRAL DENSITY  
DUAL SPACED NEUTRON  
ARRAY COMPENSATED  
TRUE RESISTIVITY

