

HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	NOBLE ENERGY
WELL	WILSON 1160-29-22'
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO
COMPANY	NOBLE ENERGY
WELL	WILSON 1160-29-22'
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO
API No.	05123310360000
Location	SHL: 660.0' FNL & 660.0' FWL NWNW LAT: 40.897580° LONG: -104.122890°
Other Services:	RWCH IDT ICT CSNG BSAT
Sec. 29	Twp. 11N Rge. 60W
Permanent Datum	Elev. 5280.0 ft
Log measured from	KB 12.0 ft above perm. Datum
Drilling measured from	KB G.L. 5280.0 ft

Date	21-Jun-10
Run No.	ONE
Depth - Driller	7725.00 ft
Depth - Logger	7712.0 ft
Bottom - Logged Interval	7701 ft
Top - Logged Interval	1059 ft
Casing - Driller	8.625 in @ 1058.0 ft
Casing - Logger	1059.0 ft @
Bit Size	7.875 in @
Type Fluid in Hole	WBM @
Density	9.3 ppg 37.00 s/qt
PH	9.00 pH 8.0 cp/m
Source of Sample	FLOW LINE
Rm @ Meas. Temperature	1.580 ohmm @ 75.00 degF @
Rmf @ Meas. Temperature	1.38 ohmm @ 75.00 degF @
Rmc @ Meas. Temperature	1.360 ohmm @ 75.00 degF @
Source Rmf	CHART Rmc CHART @
Rm @ BHT	0.57 ohmm @ 221.0 degF @
Time Since Circulation	6.0 hr
Time on Bottom	22-Jun-10 00:49
Max. Rec. Temperature	221.0 degF @ 7712.0 ft @
Equipment	11454566 BRIGHTON
Recorded By	F. LODER
Witnessed By	S. HEARD
	M. SCANNIELLO

Fold here

Service Ticket No.: 7452600 API Serial No.: 05123310360000 PGM Version: WL INSITE R3.0.4 (Build 6)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES			
Date	Sample No.			Type Log	Depth	Scale Up Hole	Scale Down Hole
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.
Rmf @ Meas. Temp.	@	@		ONE	ACRt-758-352	N/A	1.5" S.O.
Rmc @ Meas. Temp.	@	@					
Source Rmf	Rmc						
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.	11277436	Serial No.	1105781	Serial No.	I132M275	Serial No.	11301132
Model No.	GTET-I	Model No.	BSAT-I	Model No.	SDLT-I	Model No.	DSNT-I
Diameter	3.625"	No. of Cent.	2	Diameter	4.5"	Diameter	3.625"
Detector Model No.	T102-A	Spacing	0.5'	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs-137	Source Type	Am241Be
Length	8"	LSA [Y/N]	N	Serial No.	2770 GW	Serial No.	DSN-434
Distance to Source	20'	FWDA [Y/N]	N	Strength	1.5 Ci	Strength	15 Ci

LOGGING DATA

GENERAL GAMMA ACOUSTIC DENSITY NEUTRON

Run	GENERAL		Speed ft/min	GAMMA		ACOUSTIC		Matrix	DENSITY		NEUTRON		Matrix	
	Depth			Scale		Scale			Scale		Scale			
	No.	From		To	L	R	L		R	L	R	L		R
ONE	7712'	7314'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.65 g/cc	20 %	0 %	SAND
ONE	7314"	6967"	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.68 g/cc	20 %	0 %	SAND
ONE	6967"	6500'	REC	0 API	250 API	30 %	-10 %	47.5 us/ft	20 %	0 %	2.71 g/cc	20 %	0 %	LIME
ONE	6500'	1059'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.68 g/cc	20 %	0 %	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@
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Remarks: RWCH-GTET-CSNG-DSNT-SDLT-FLEX-IDT-ICT-BSAT-ACRT RAN IN COMBINATION
 ANNULAR HOLE VOLUME CALCULATED USING 5.5 INCH PRODUCTION CASING
 TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE
 CHLORIDES REPORTED AT 700 PPM

CREW: A. LEWIS, J. WALKER, M. BURNETTE RIG: FORT DRILLING 5

THANK YOU FOR USING HALLIBURTON ENERGY SERVICES: BRIGHTON, CO ***303.825.4346***

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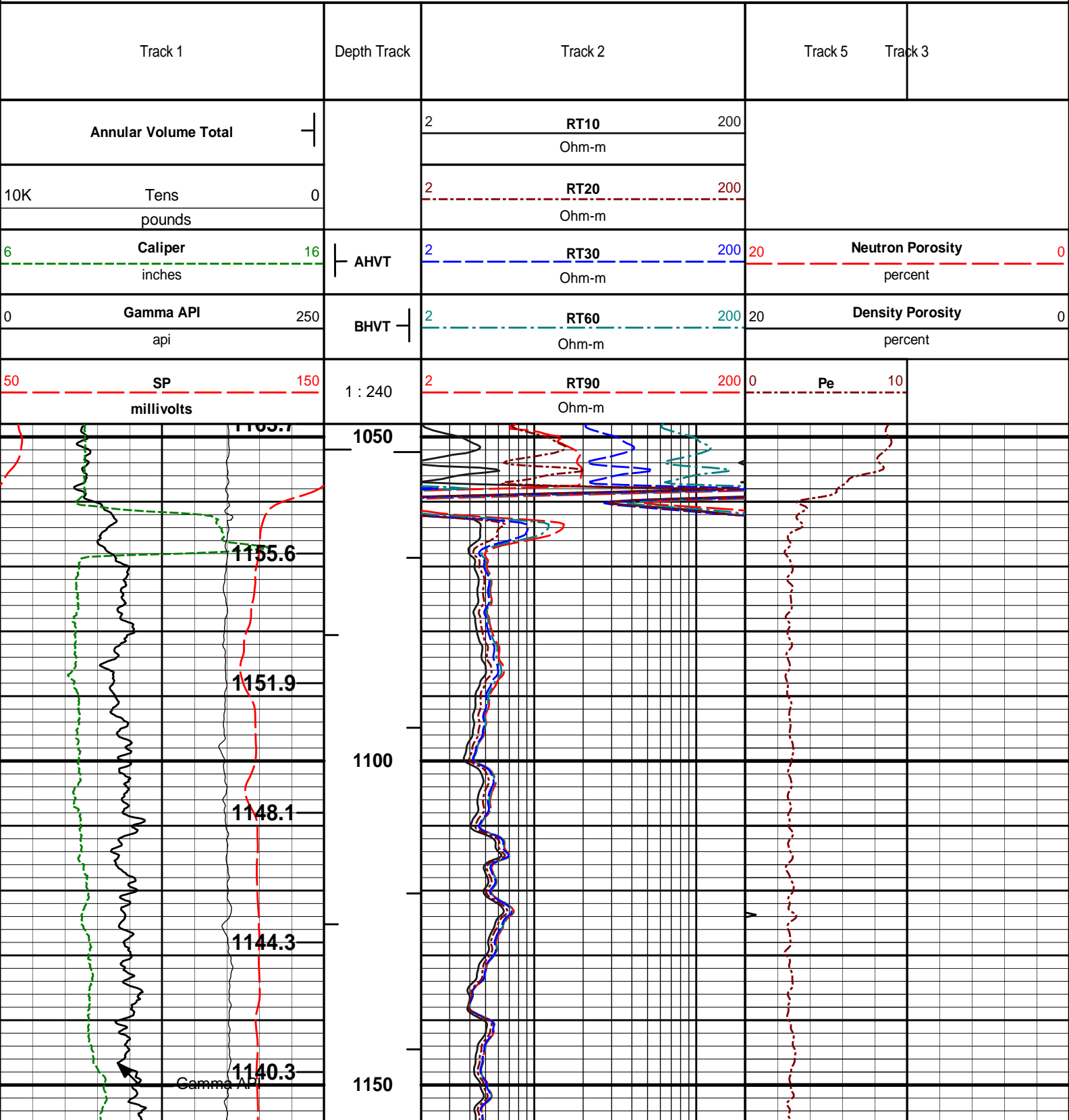
PARAMETERS REPORT

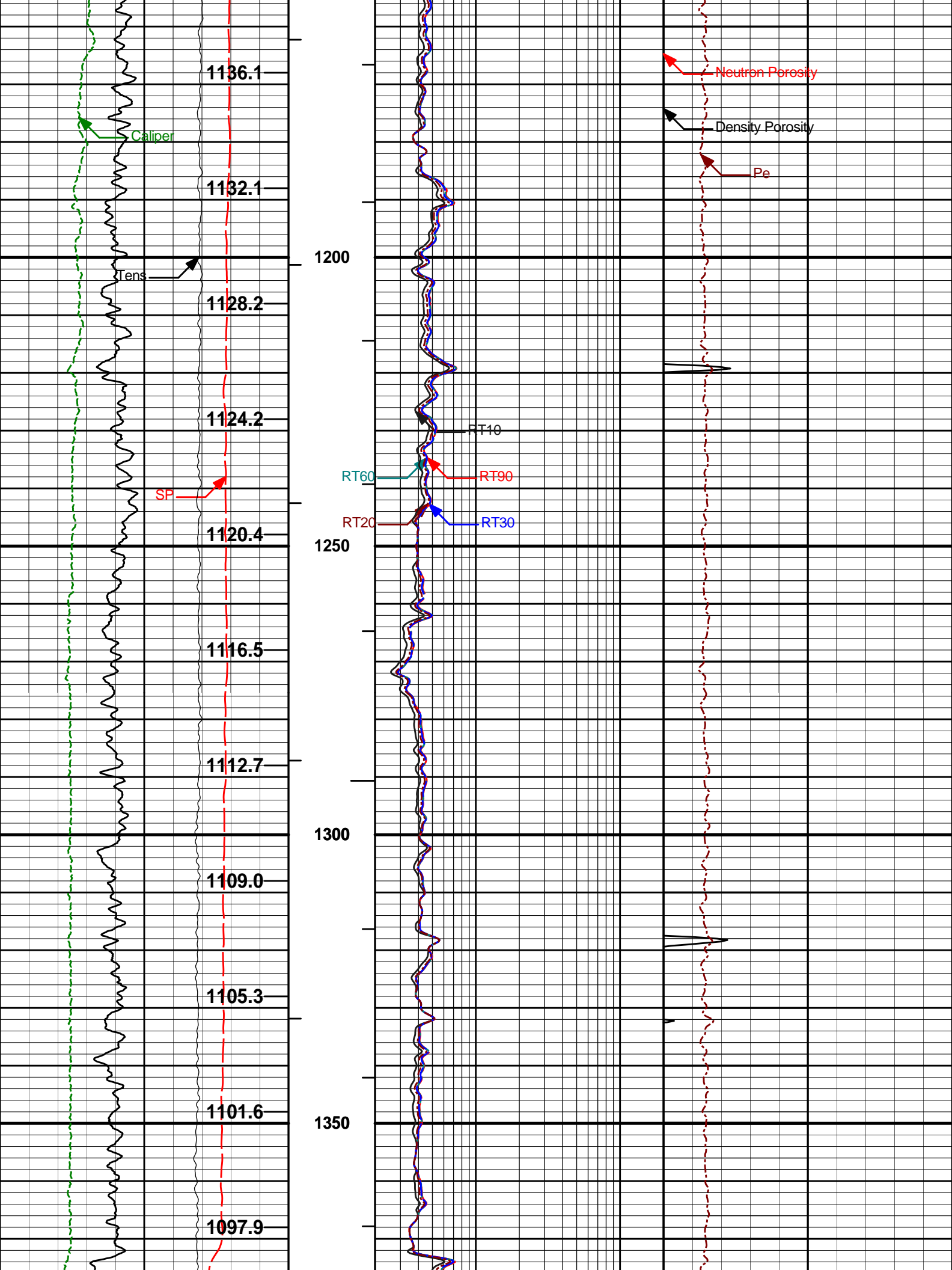
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	DSNT	NLIT	Neutron Lithology	Sandstone	
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
	BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
6500.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
	BSAT	DTMT	Delta -T Matrix Type	Limestone 47.5	
6967.00					
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
7314.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	9.300	ppg
	SHARED	OBM	Oil Based Mud System?	No	
	SHARED	RMUD	Mud Resistivity	1.580	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	60.0	degF
	SHARED	TD	Total Well Depth	7725.00	ft
	SHARED	BHT	Bottom Hole Temperature	221.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	IDT	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	

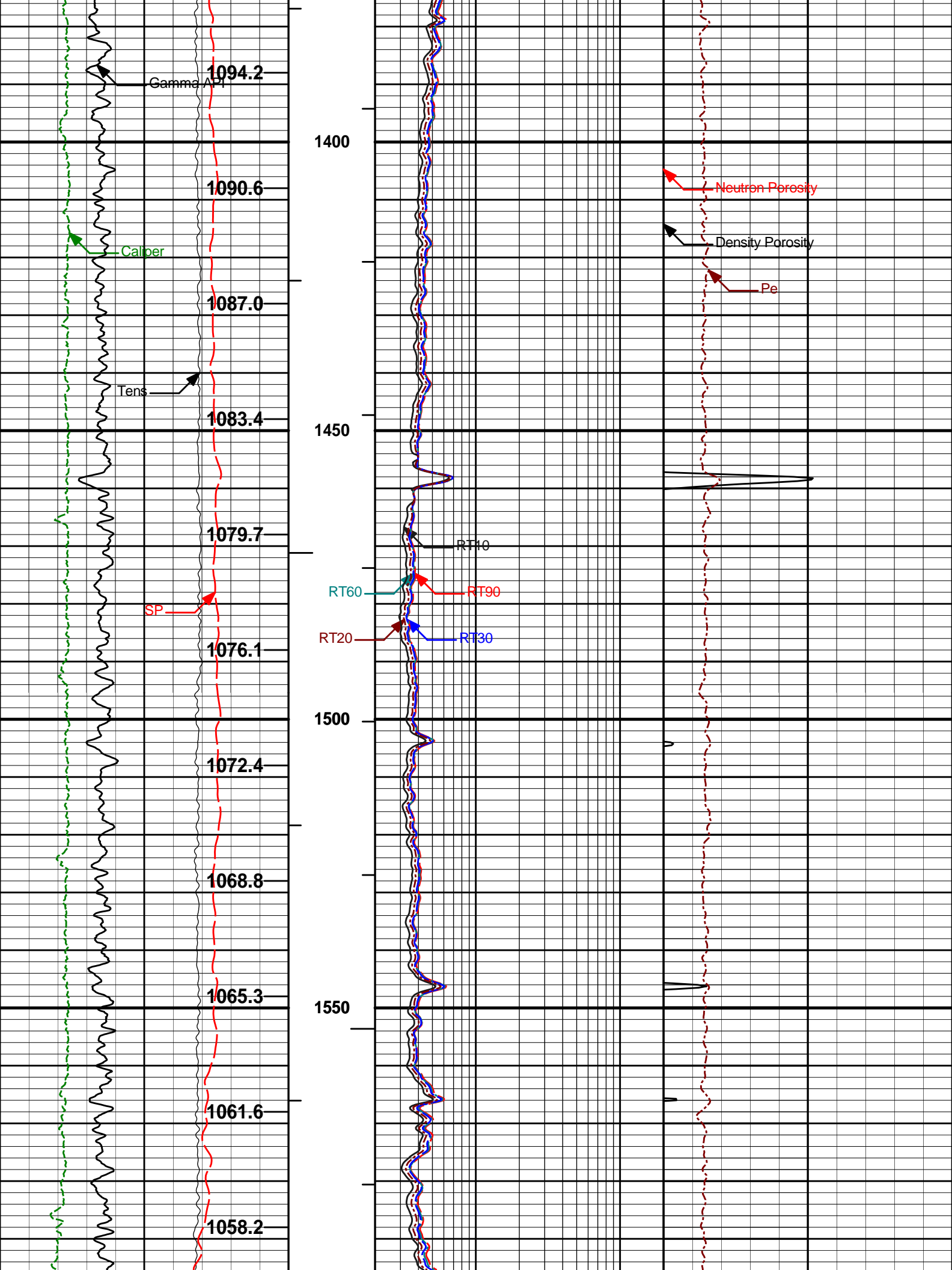
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	POTA	Potassium	0.00	%
GTET	MDTP	Mud Type	Natural	
GTET	TPOS	Tool Position	Standoff	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool Centralized?	No	
CSNG	MUDT	Mud Type?	Natural	
CSNG	KPCT	Percent K in Mud by Weight?	0.00	%
CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
CSNG	BARF	Barite Correction Factor	1.00	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Sandstone	
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	AD	Is Hole Air Drilled?	No	
SDLT	CB	Logging Calibration Blocks?	No	
SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT	DTWN	Disable temperature warning	No	
SDLT	MDTP	Weighted Mud Correction Type?	None	
SDLT	DMA	Formation Density Matrix	2.650	g/cc
SDLT	DFL	Formation Density Fluid	1.000	g/cc
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT	MLOK	Process MicroLog Outputs?	Yes	
IDT	WRTI	Survey Writing Interval	30	ft
IDT	SOPT	Smoothing Option	None	
ICT	CLOK	Process Caliper Outputs?	Yes	
ICT	NAVS	Navigation Source Tool	IDT	
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Semblance Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Semblance Filter High Pass Value?	27000	Hz
BSAT	DTFL	Delta -T Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	DTSH	Delta -T Shale	100.00	uspf
BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
ACRt	RTOK	Process ACRt?	Yes	
ACRt	MNSO	Minimum Tool Standoff	1.50	in
ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
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	

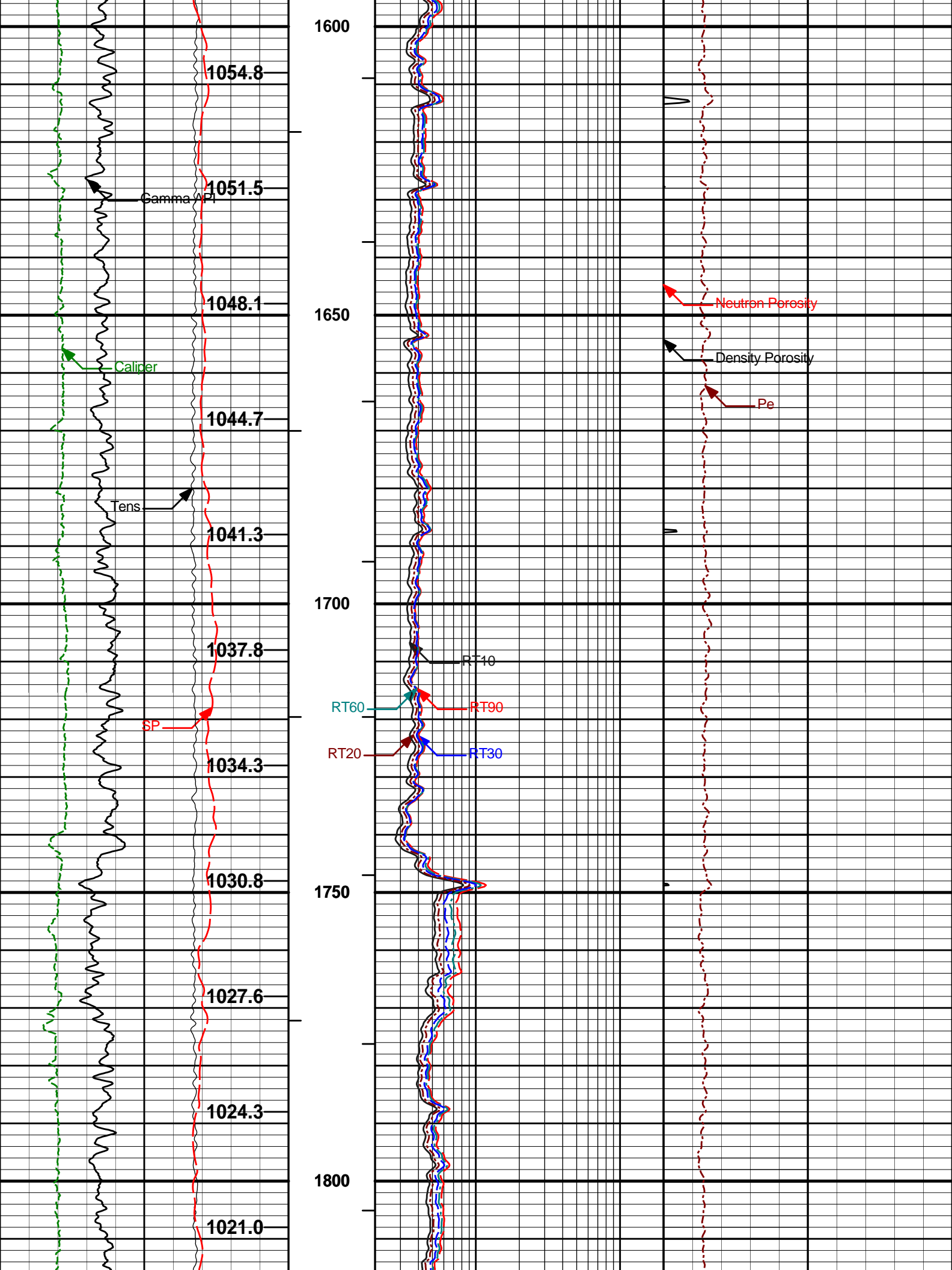
BOTTOM

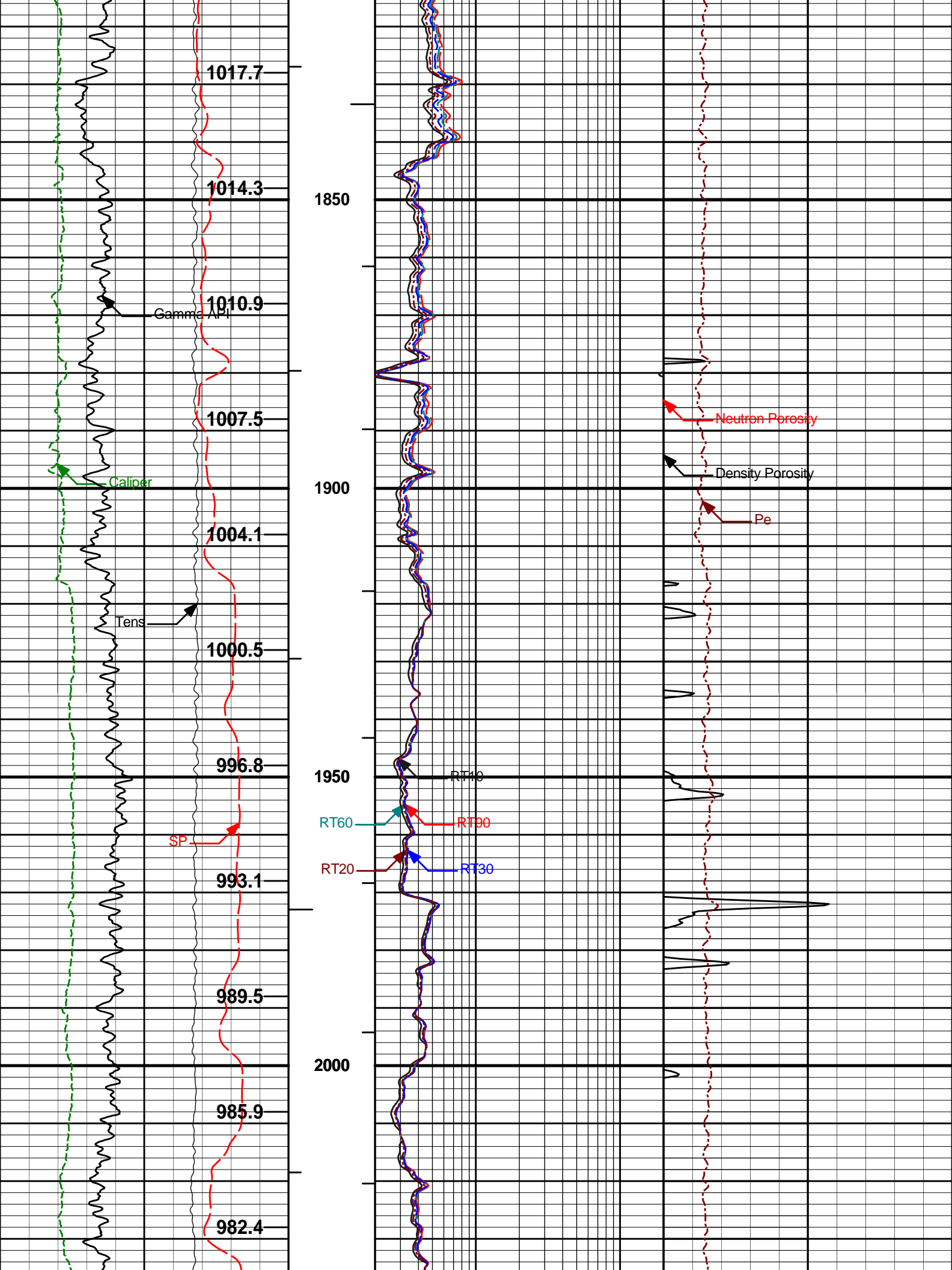
MAIN PASS 5" = 100'

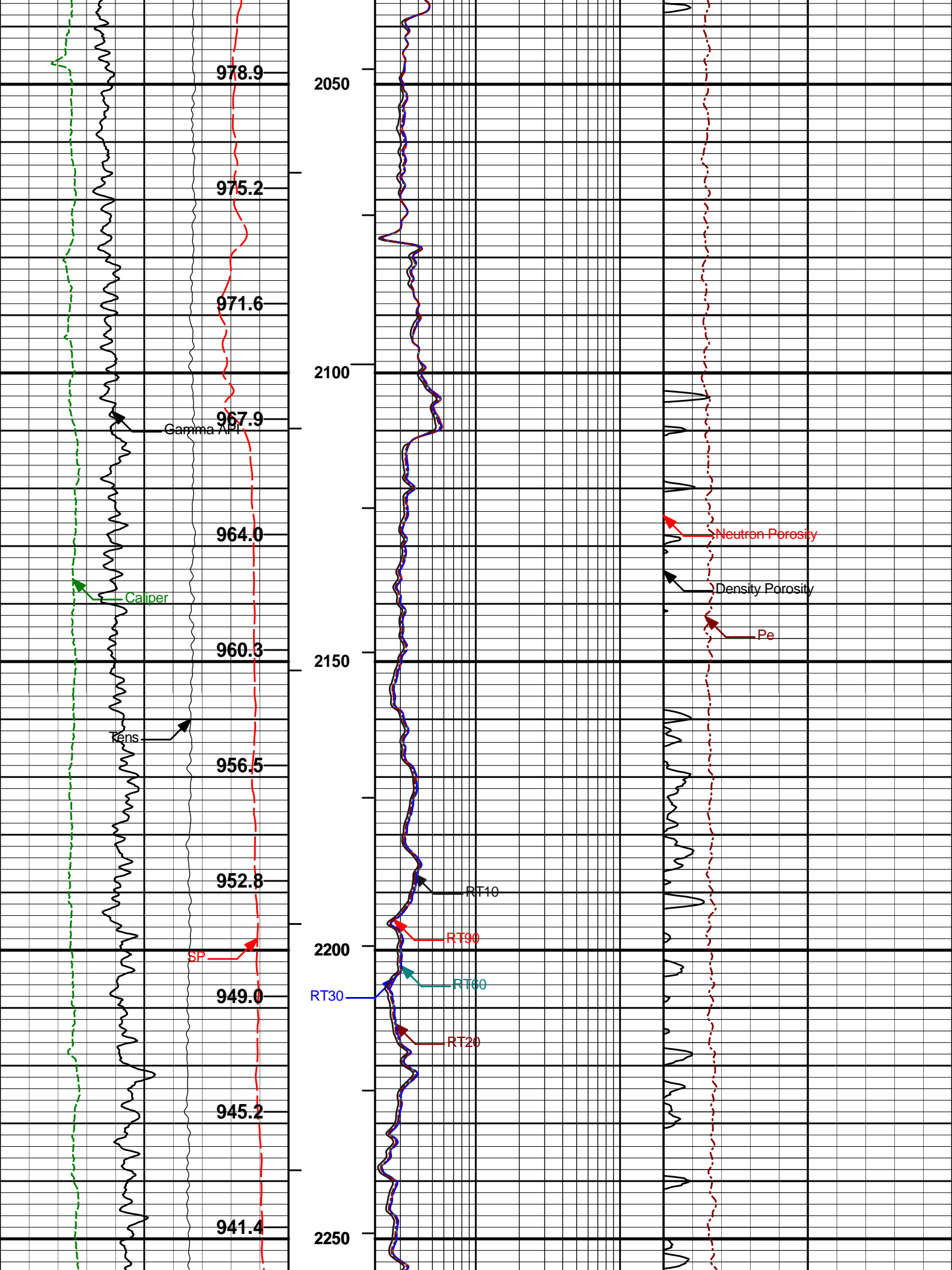


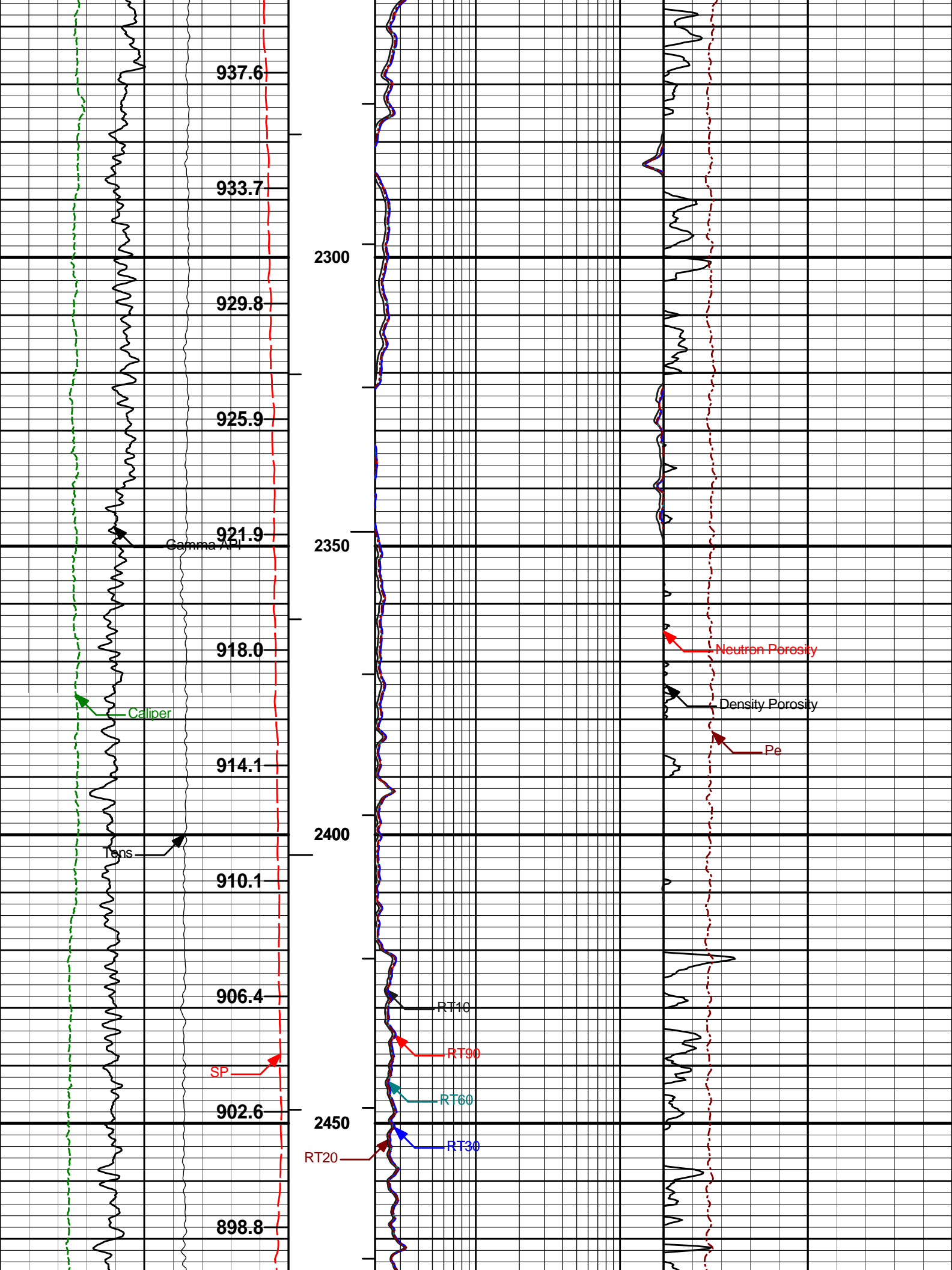


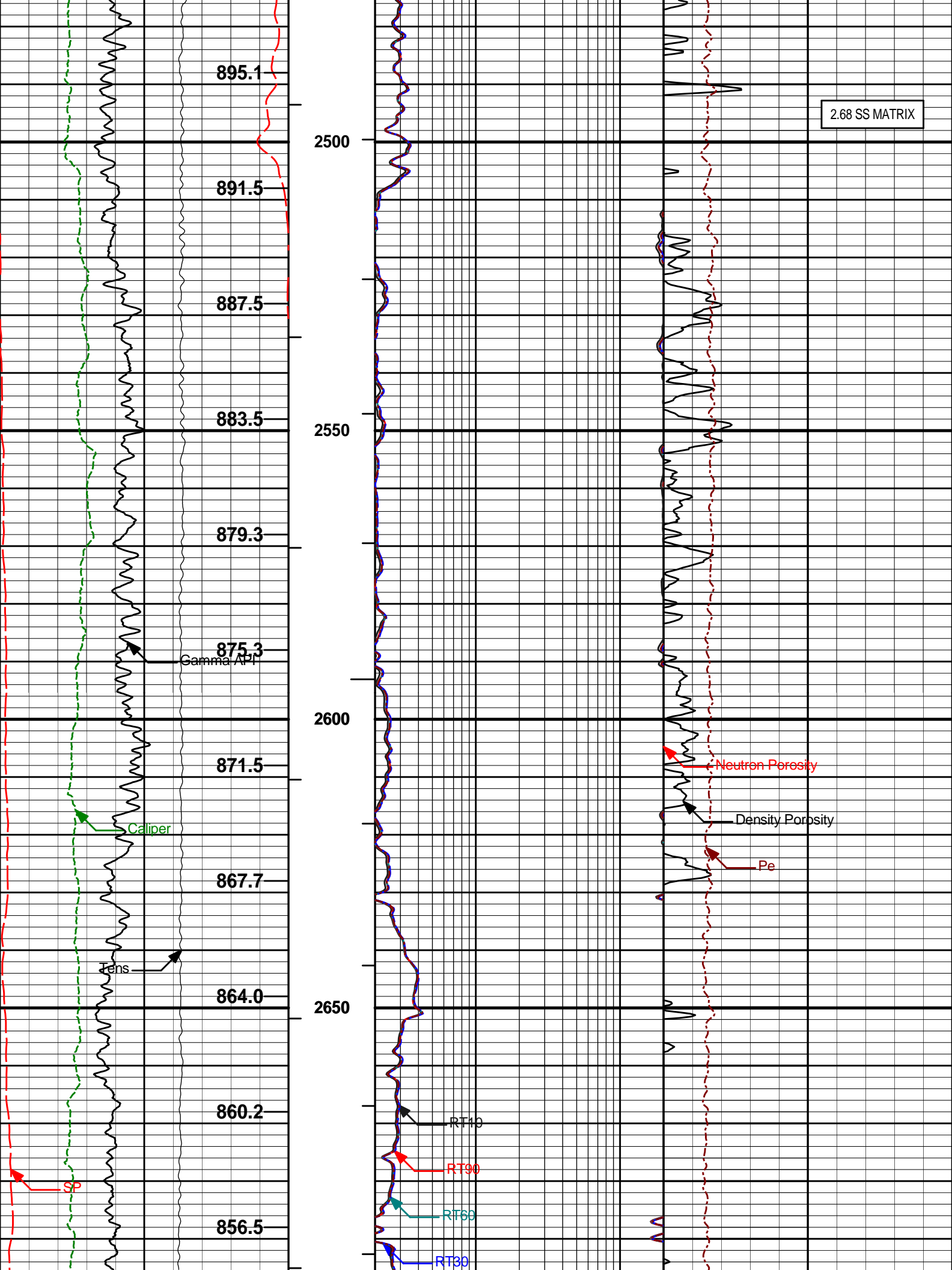


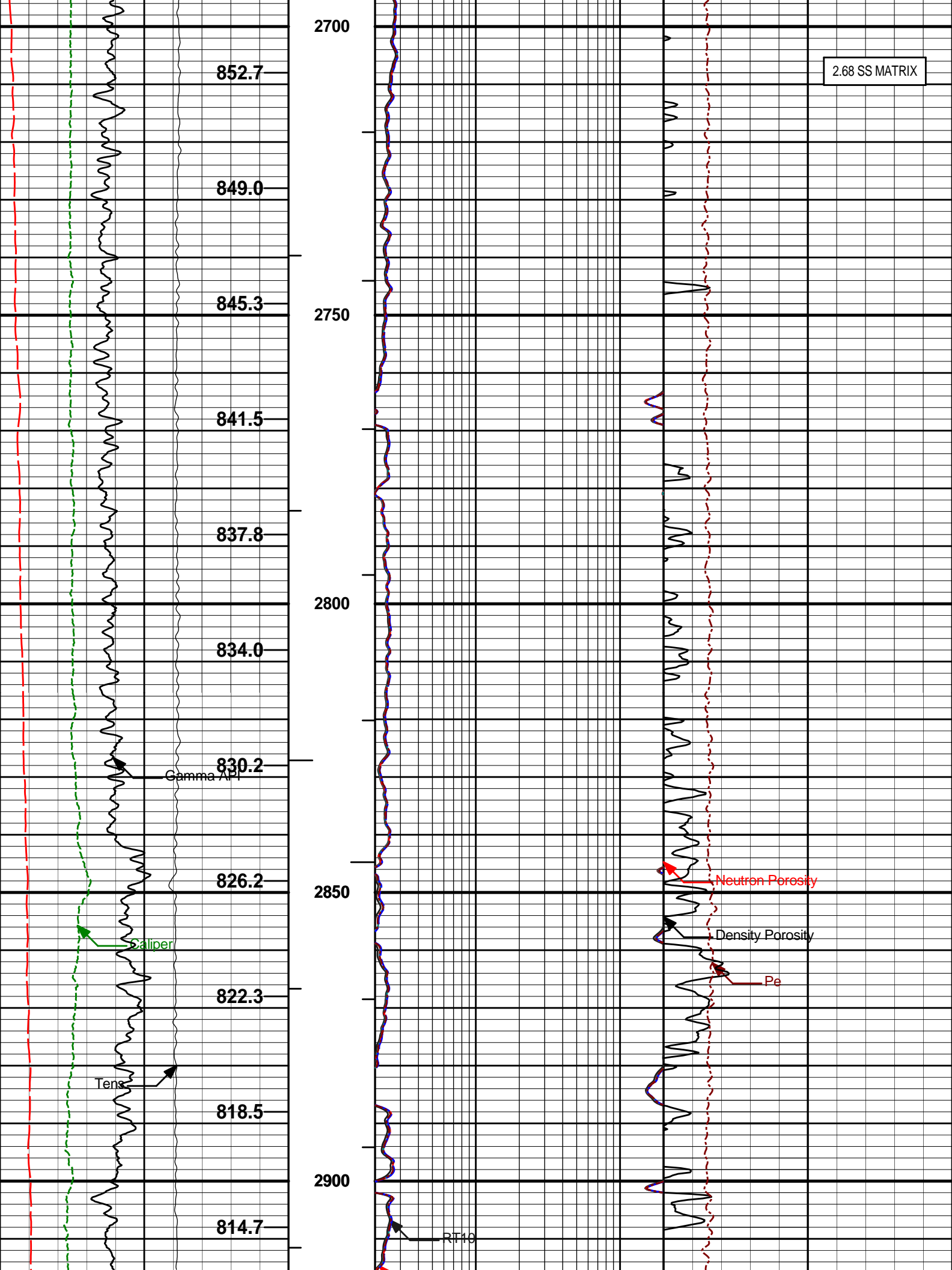


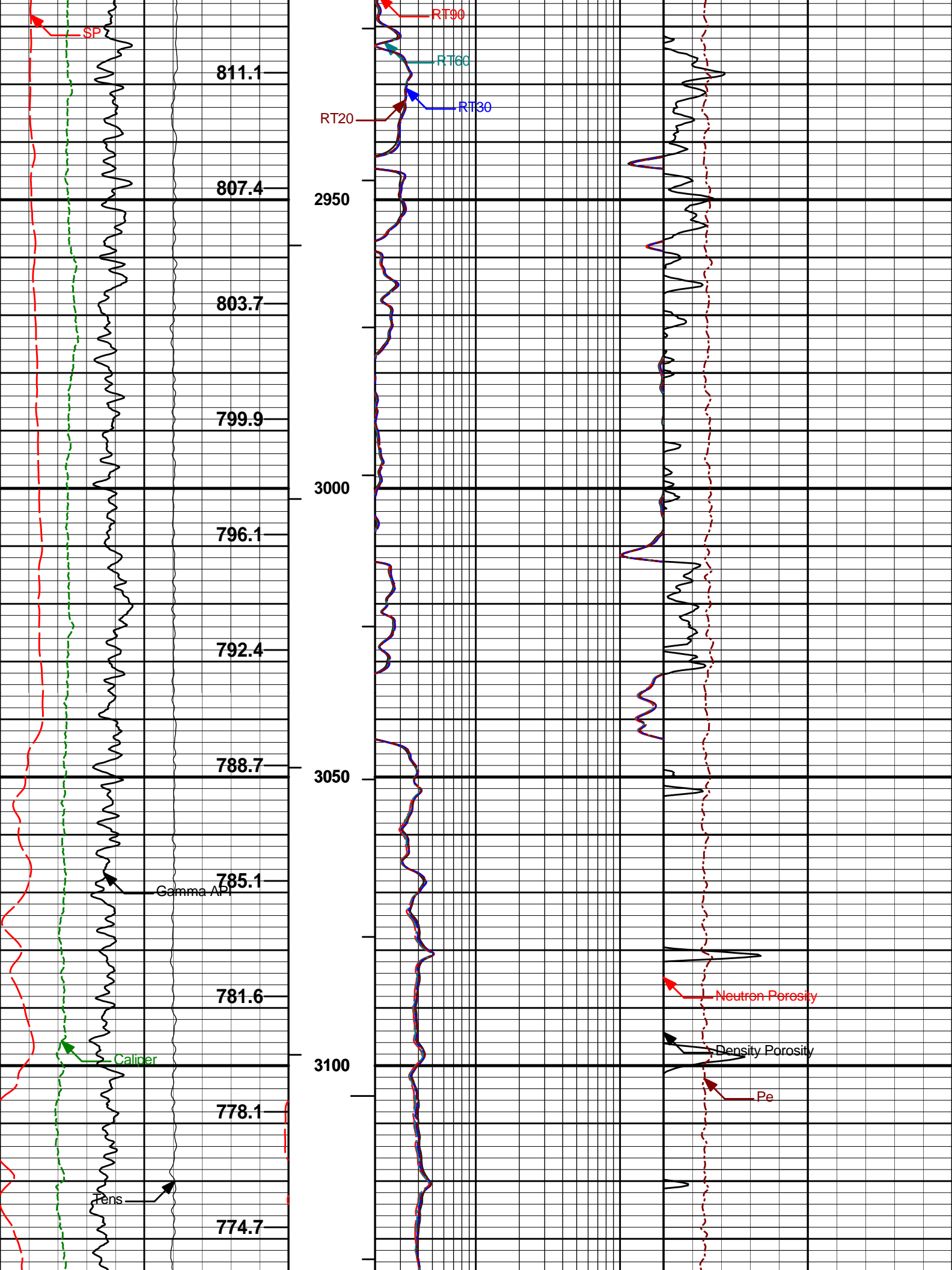


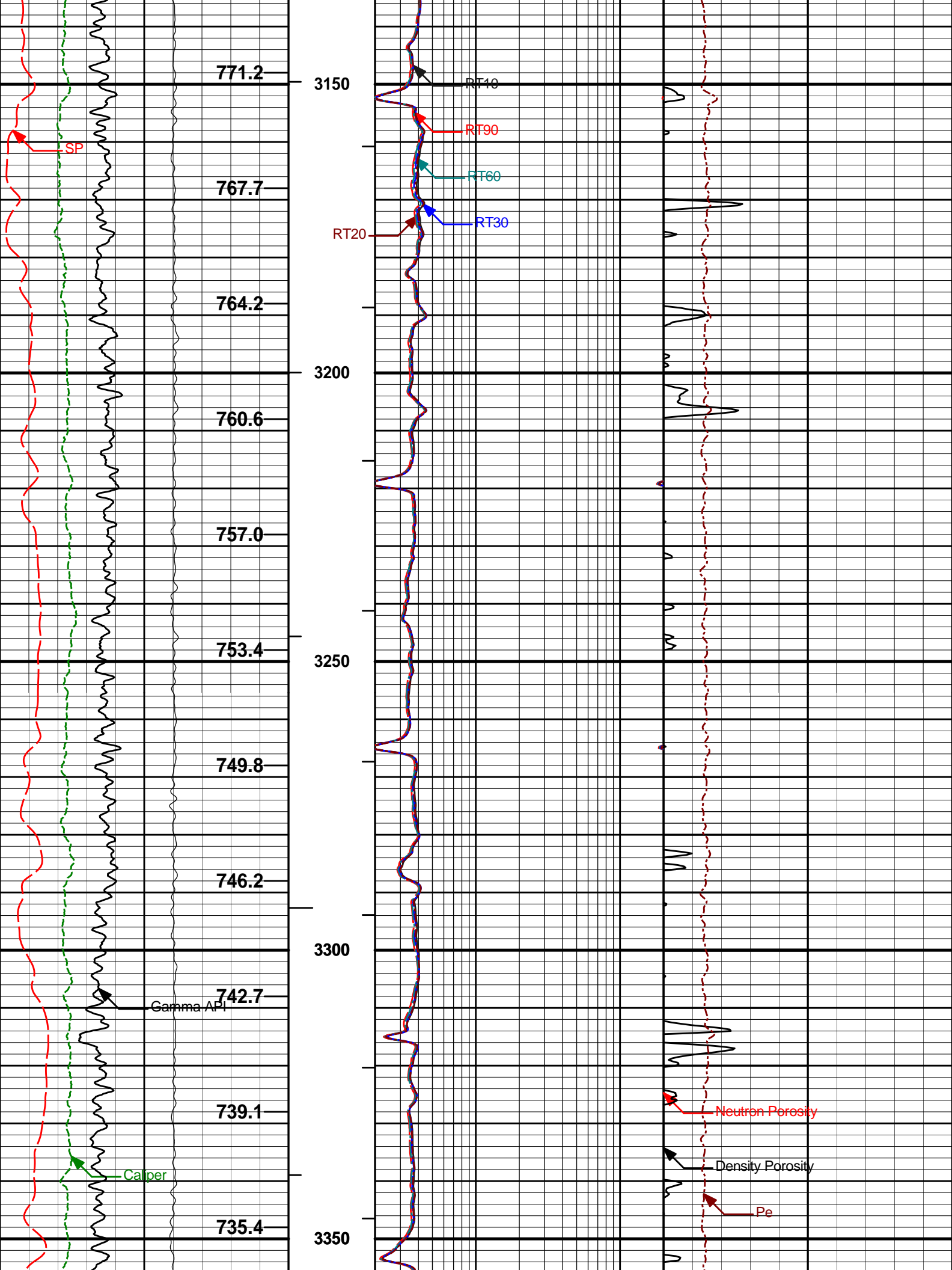


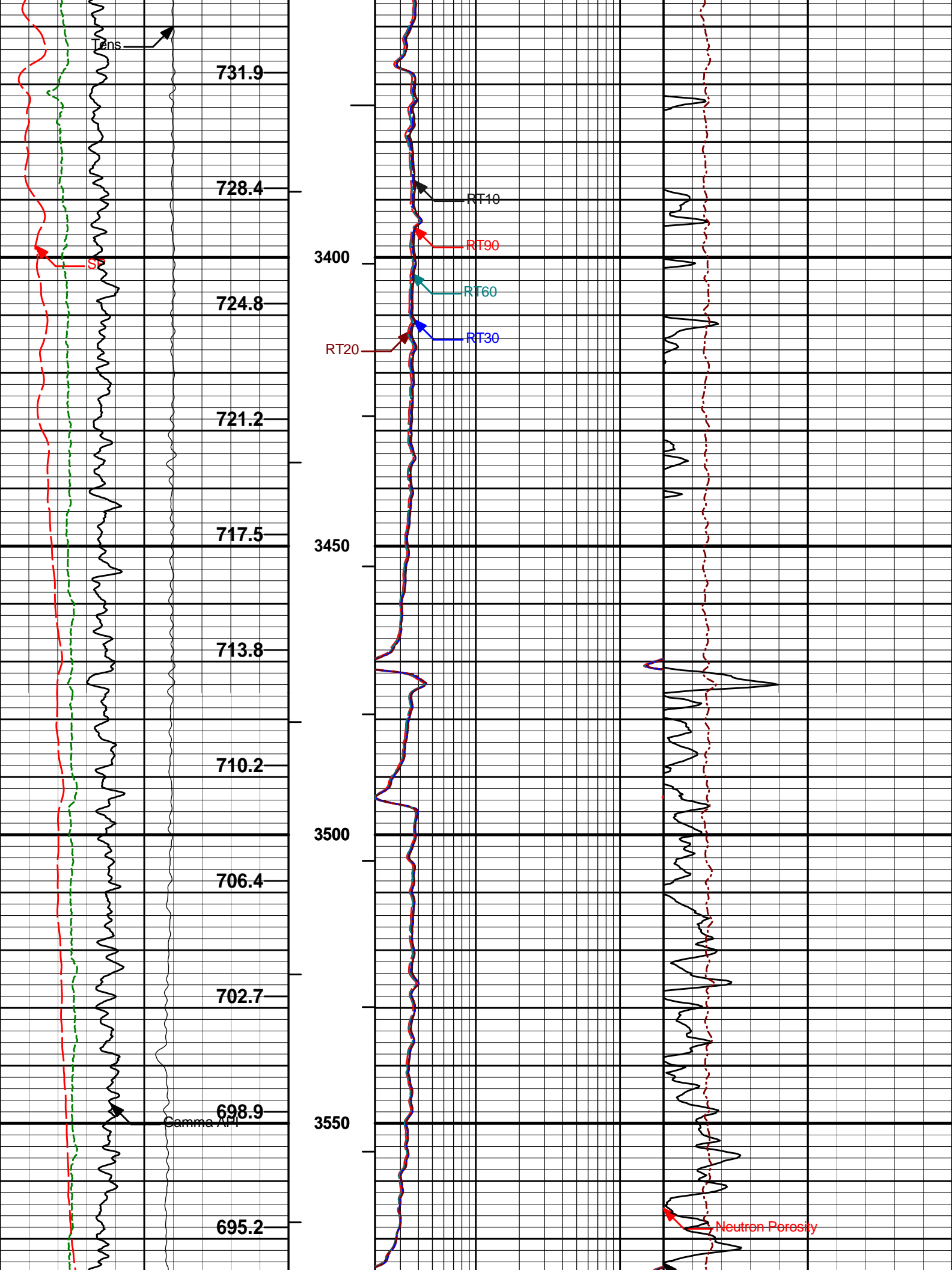


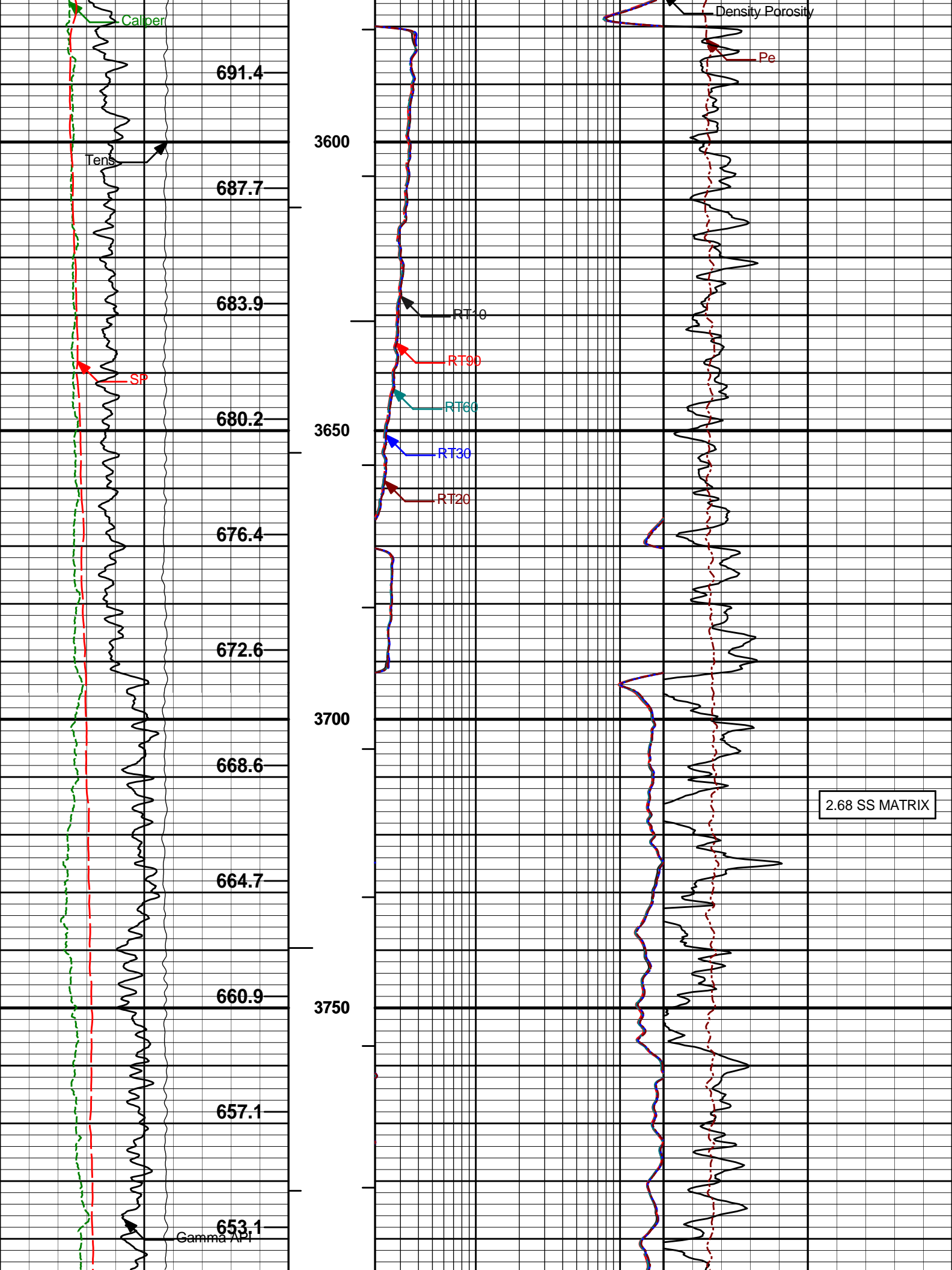












Caliper

691.4

Tens

687.7

683.9

SP

680.2

676.4

672.6

668.6

664.7

660.9

657.1

653.1

Gamma API

3600

3650

3700

3750

RT10

RT90

RT60

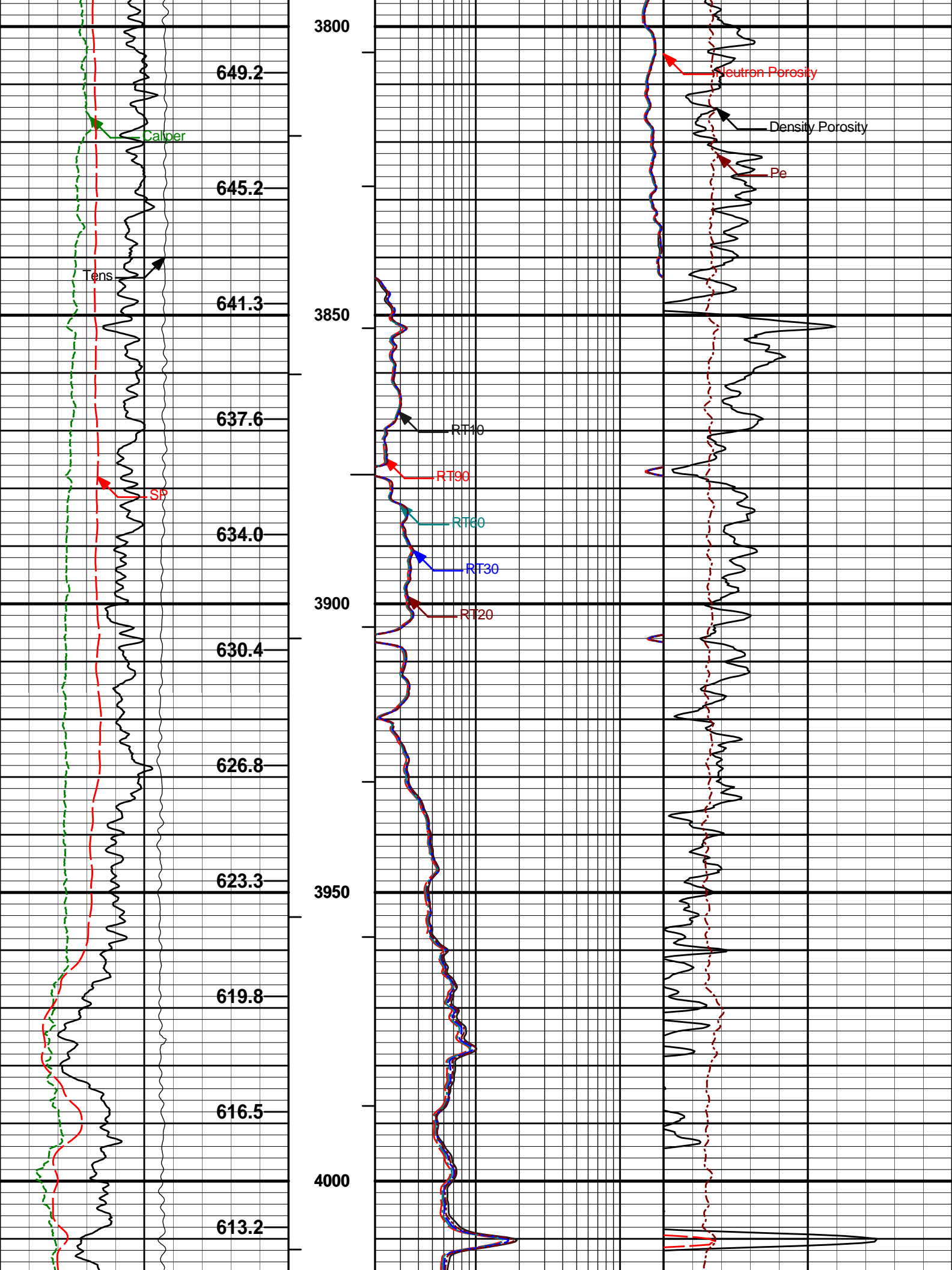
RT30

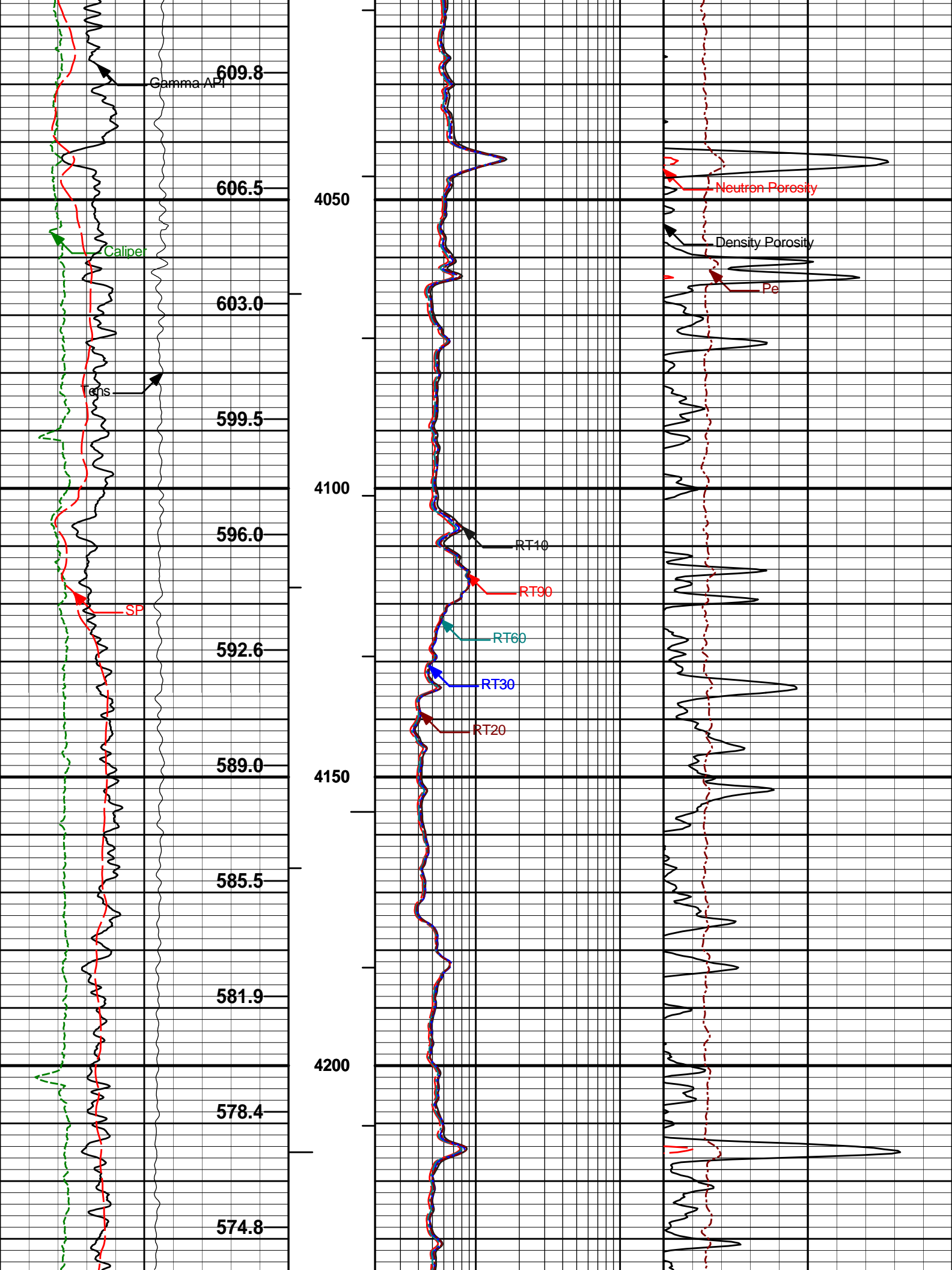
RT20

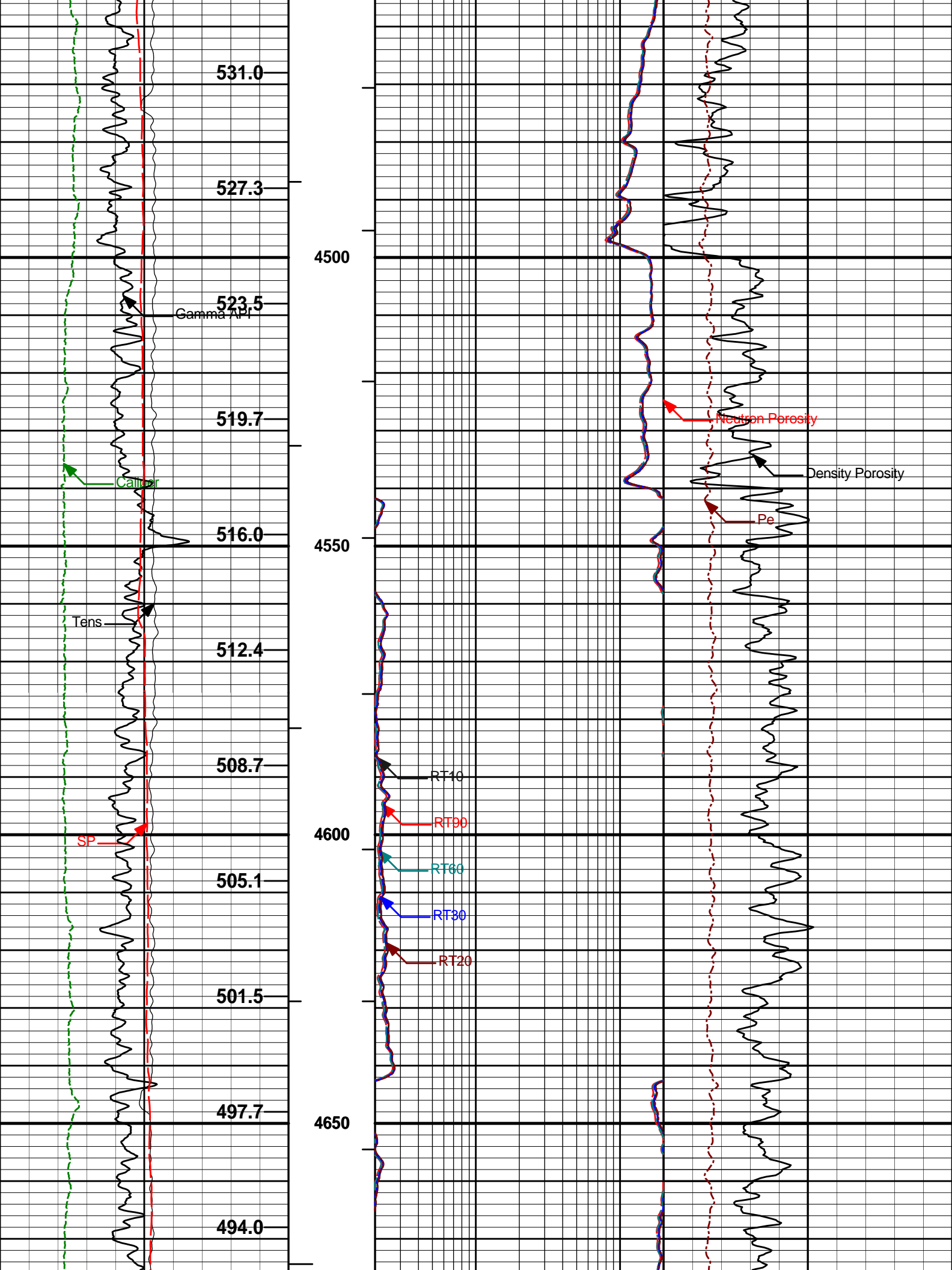
Density Porosity

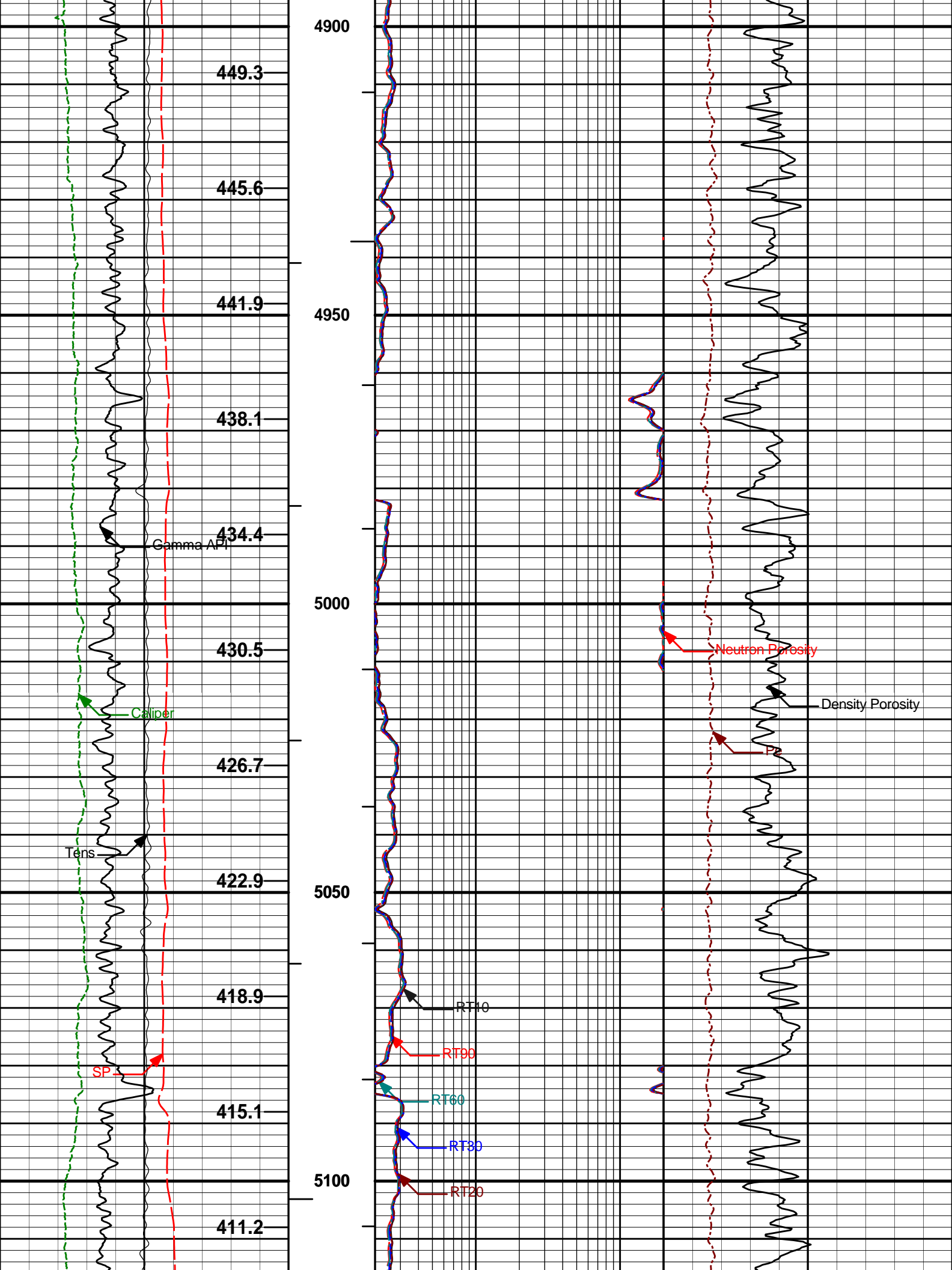
Pe

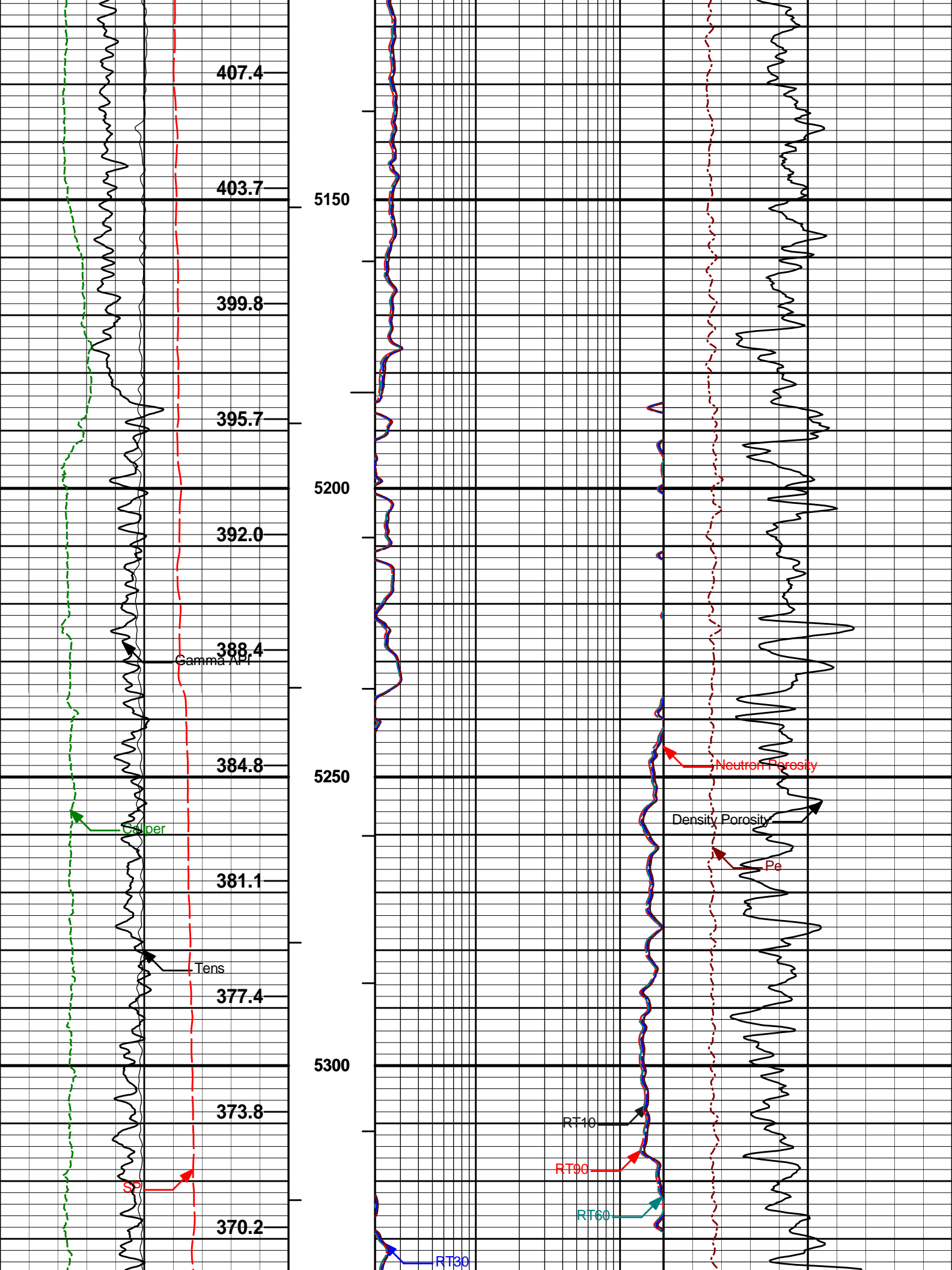
2.68 SS MATRIX

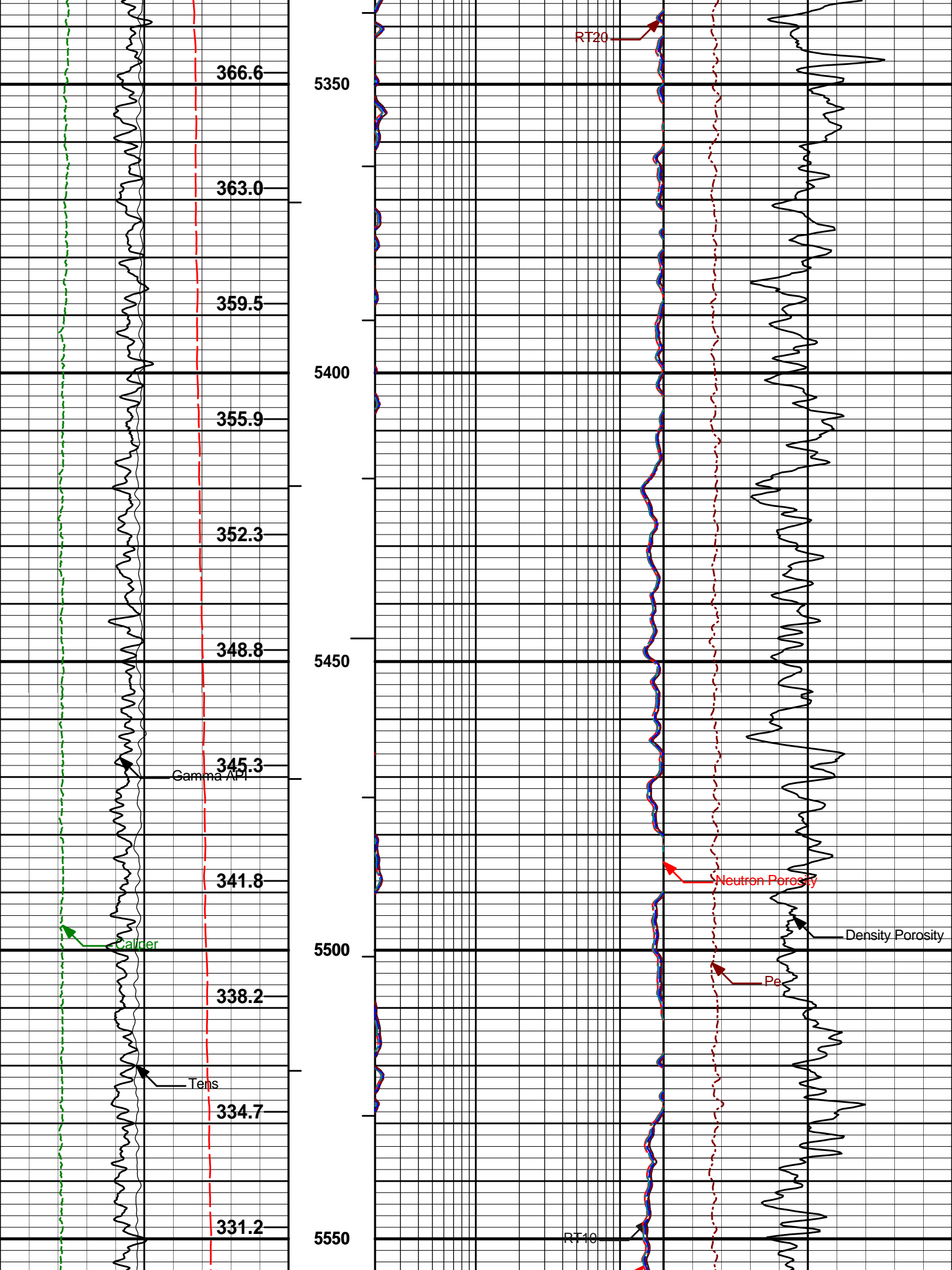


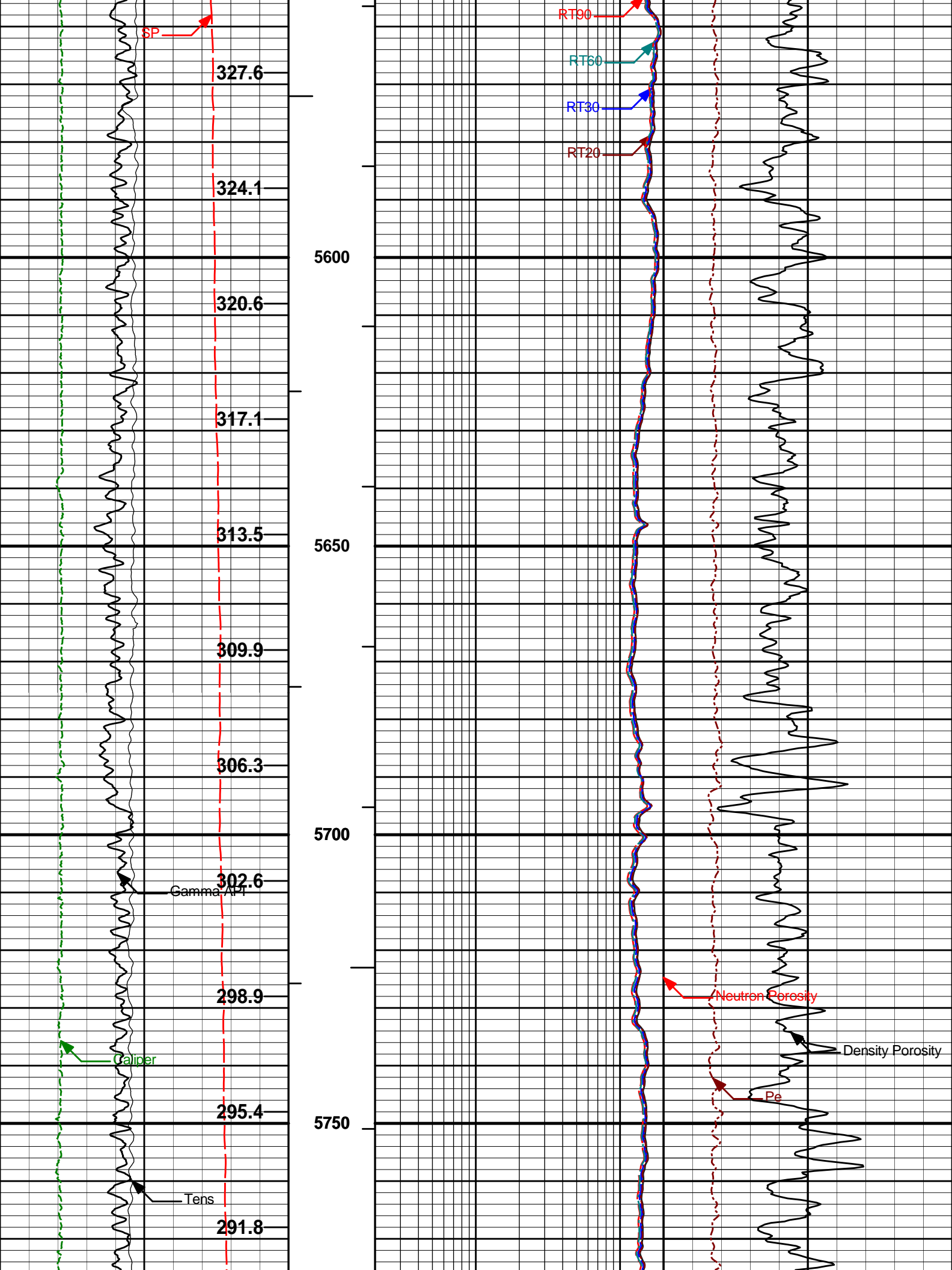


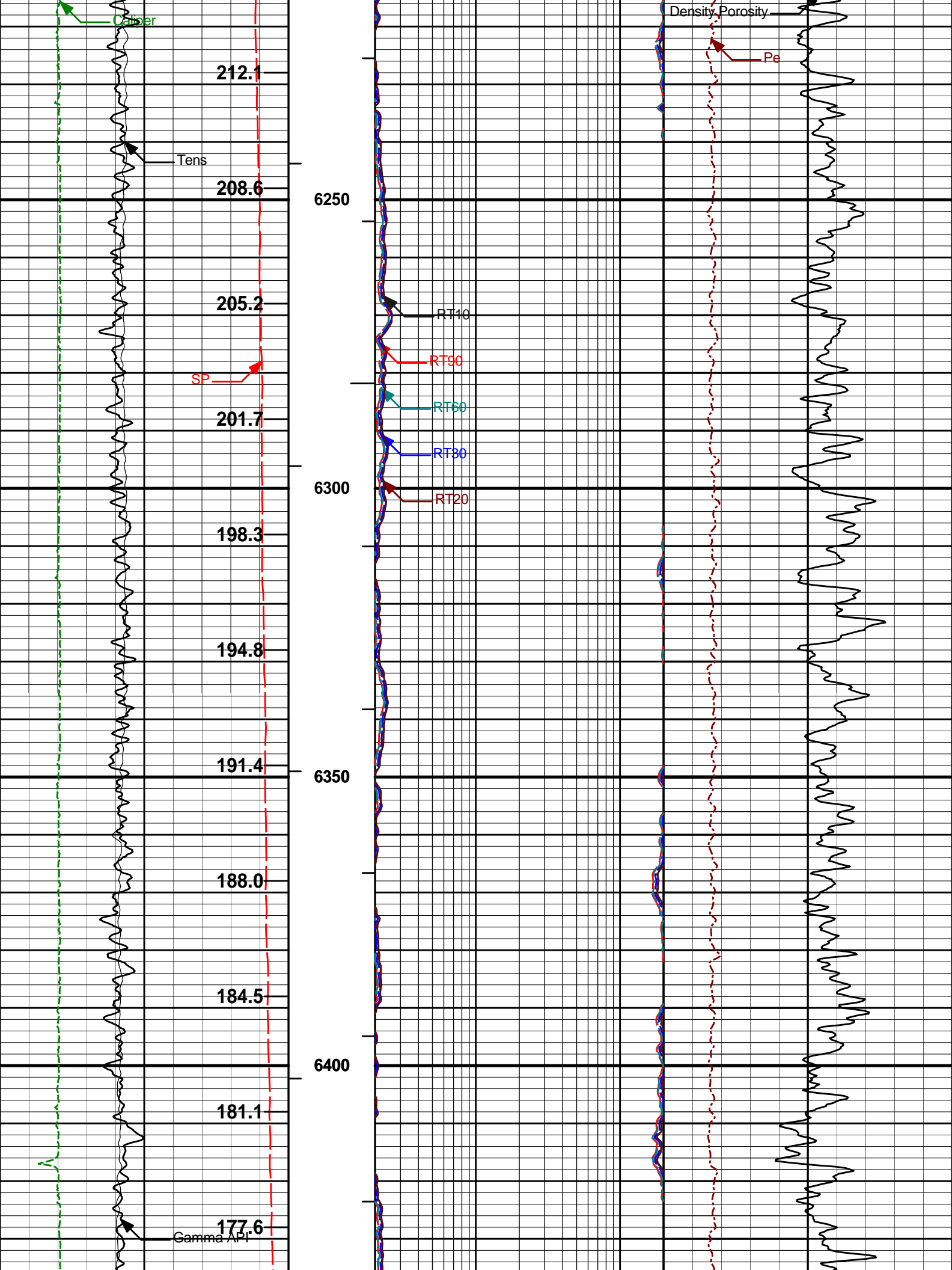


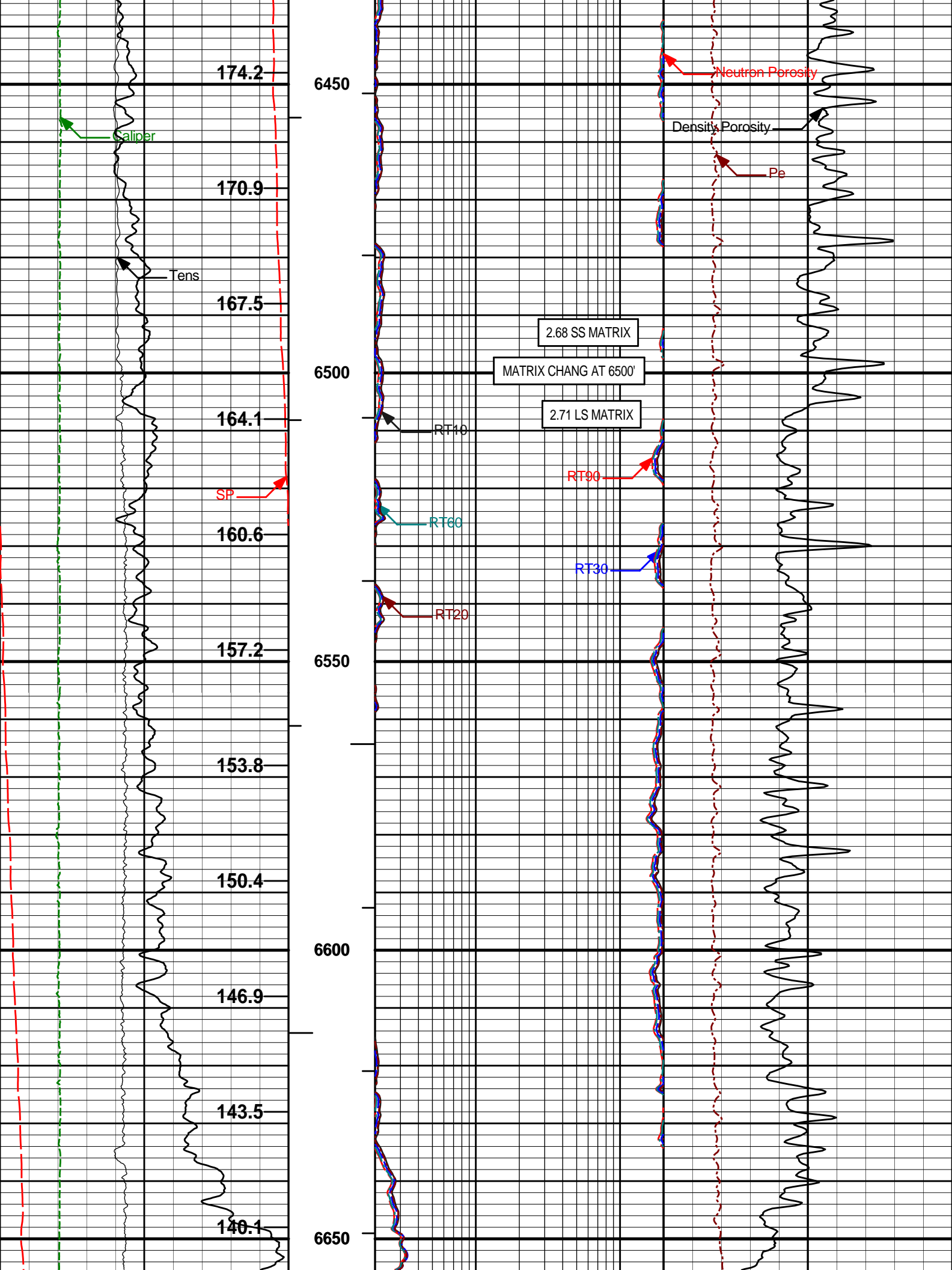


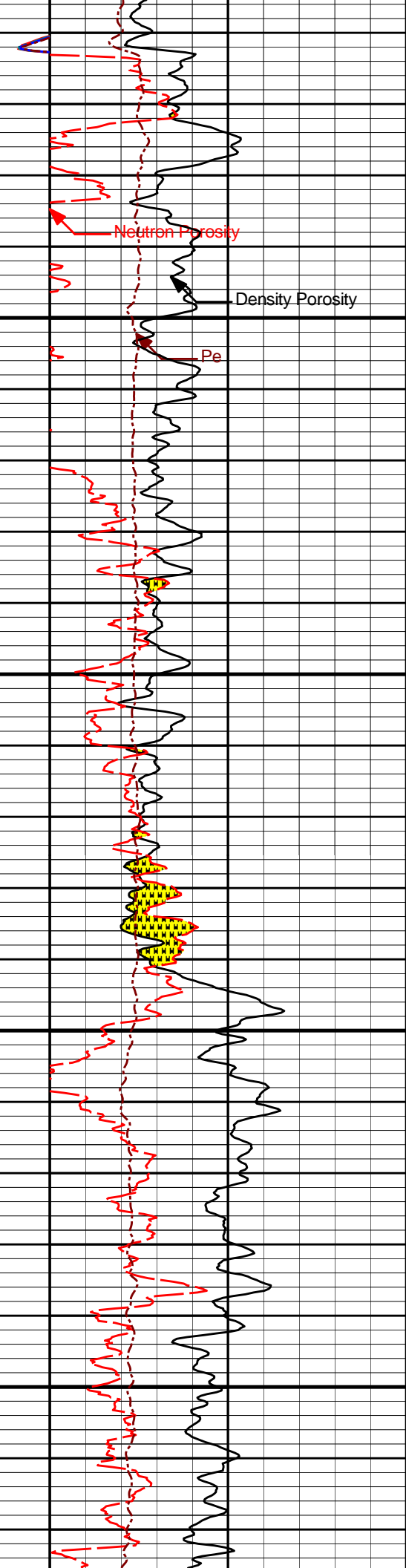
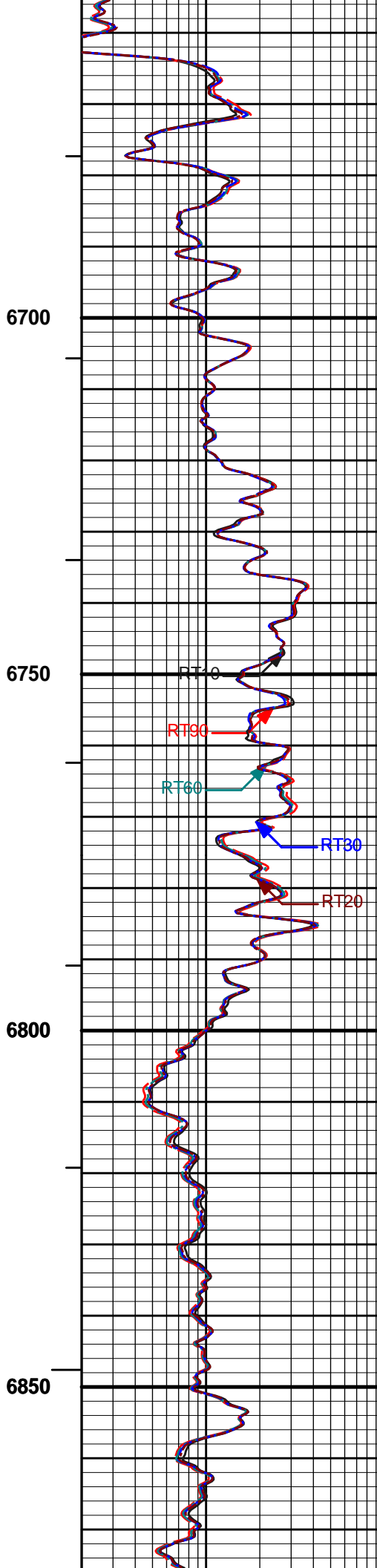
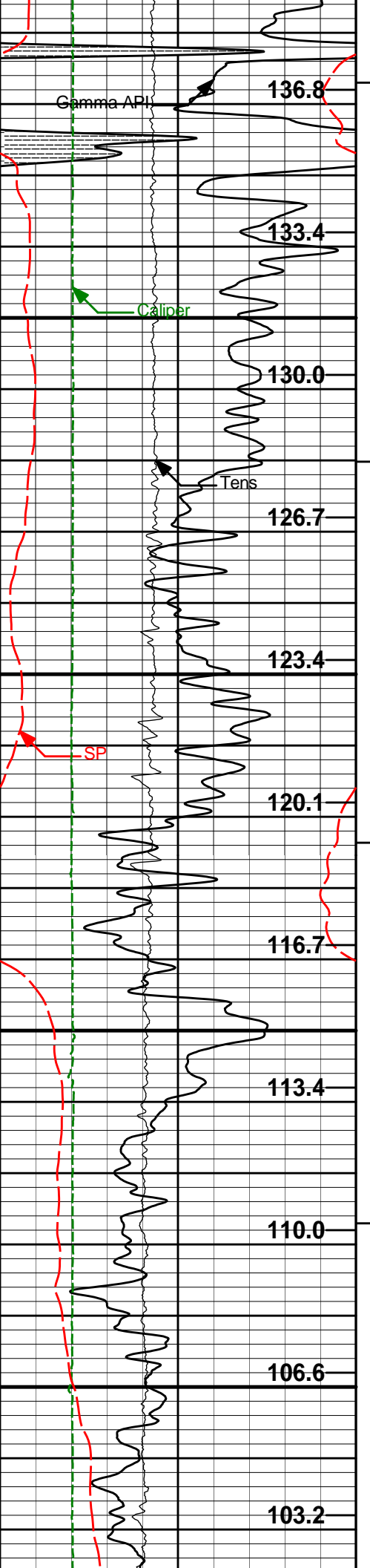


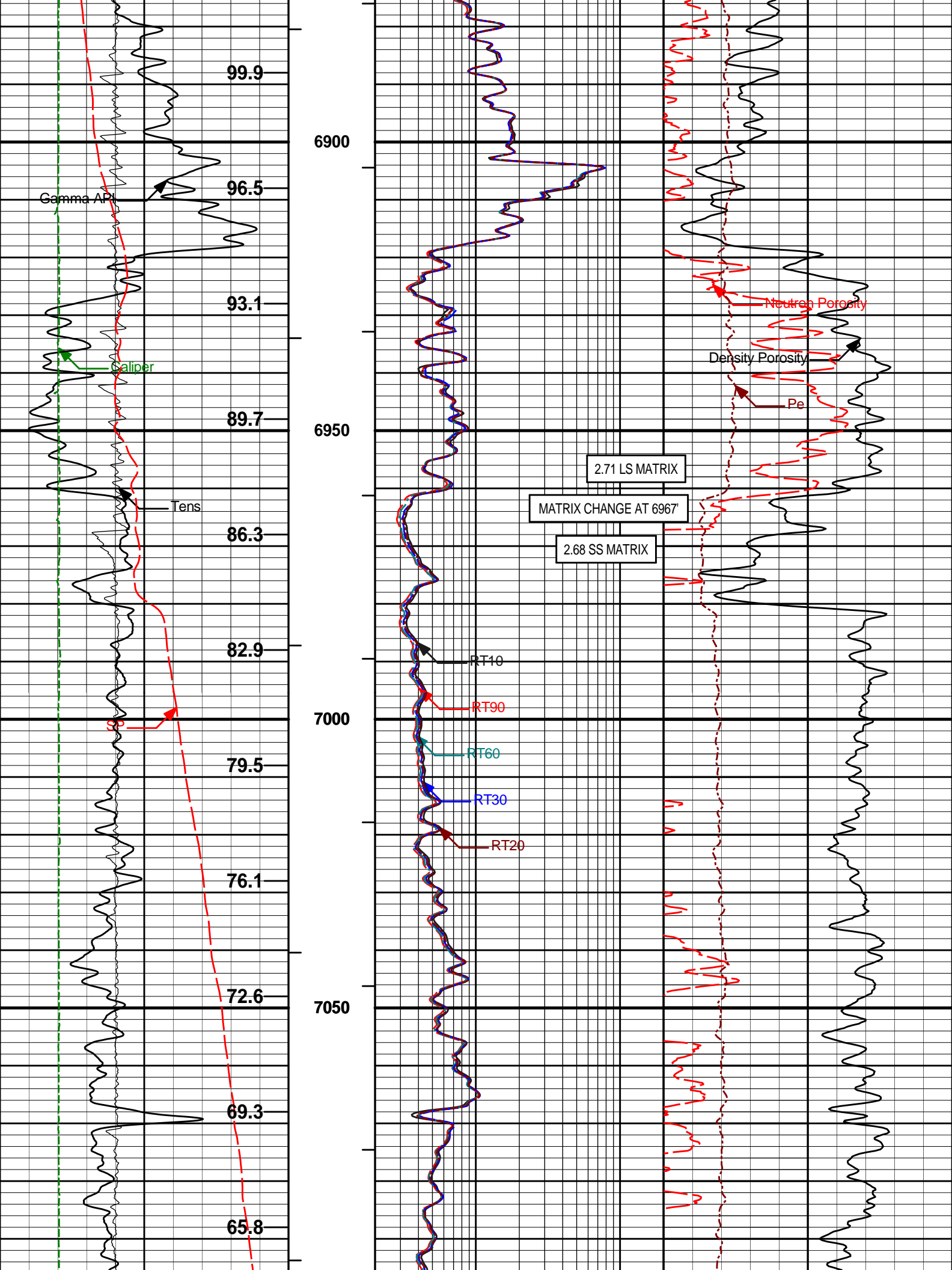


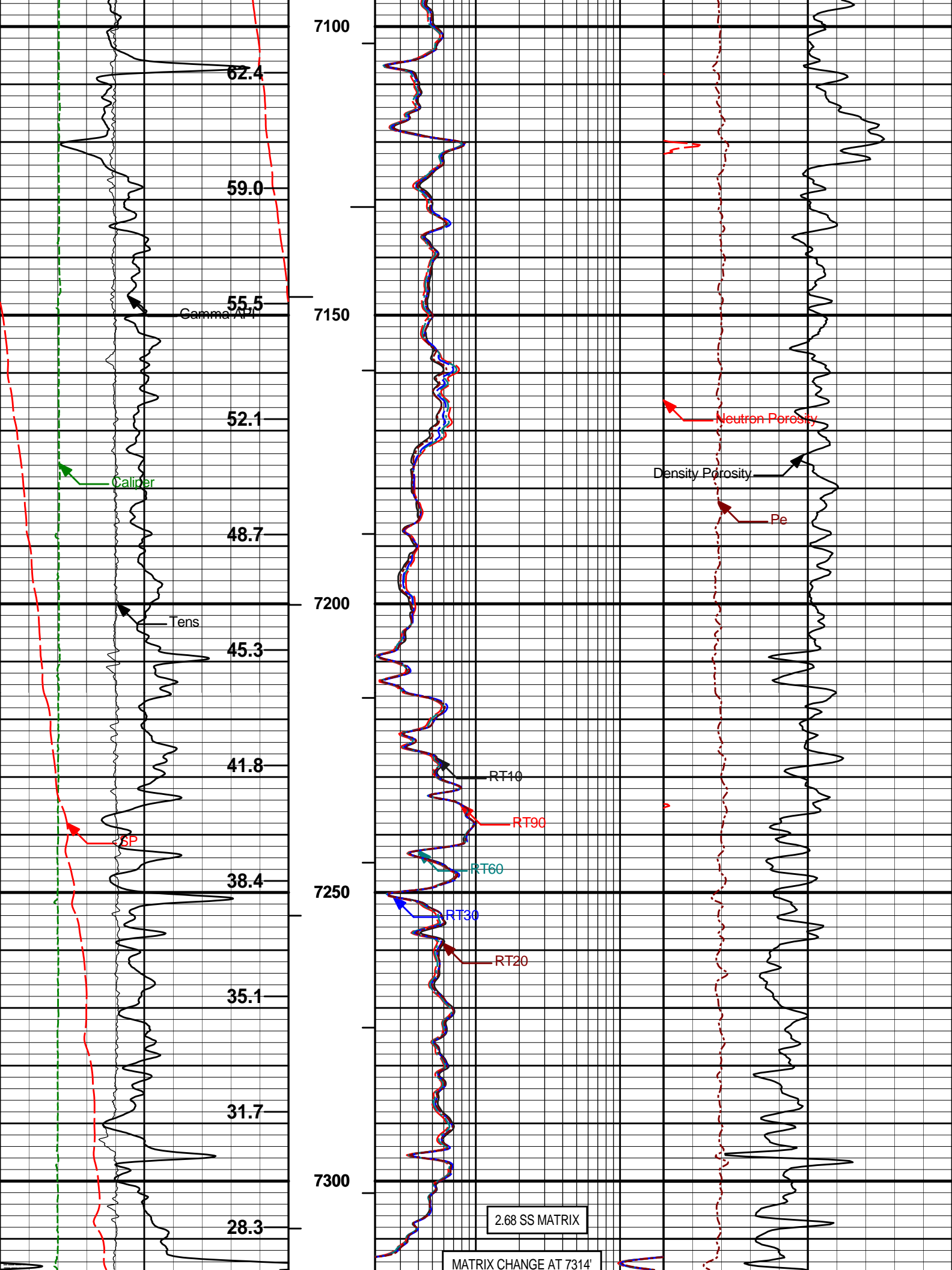


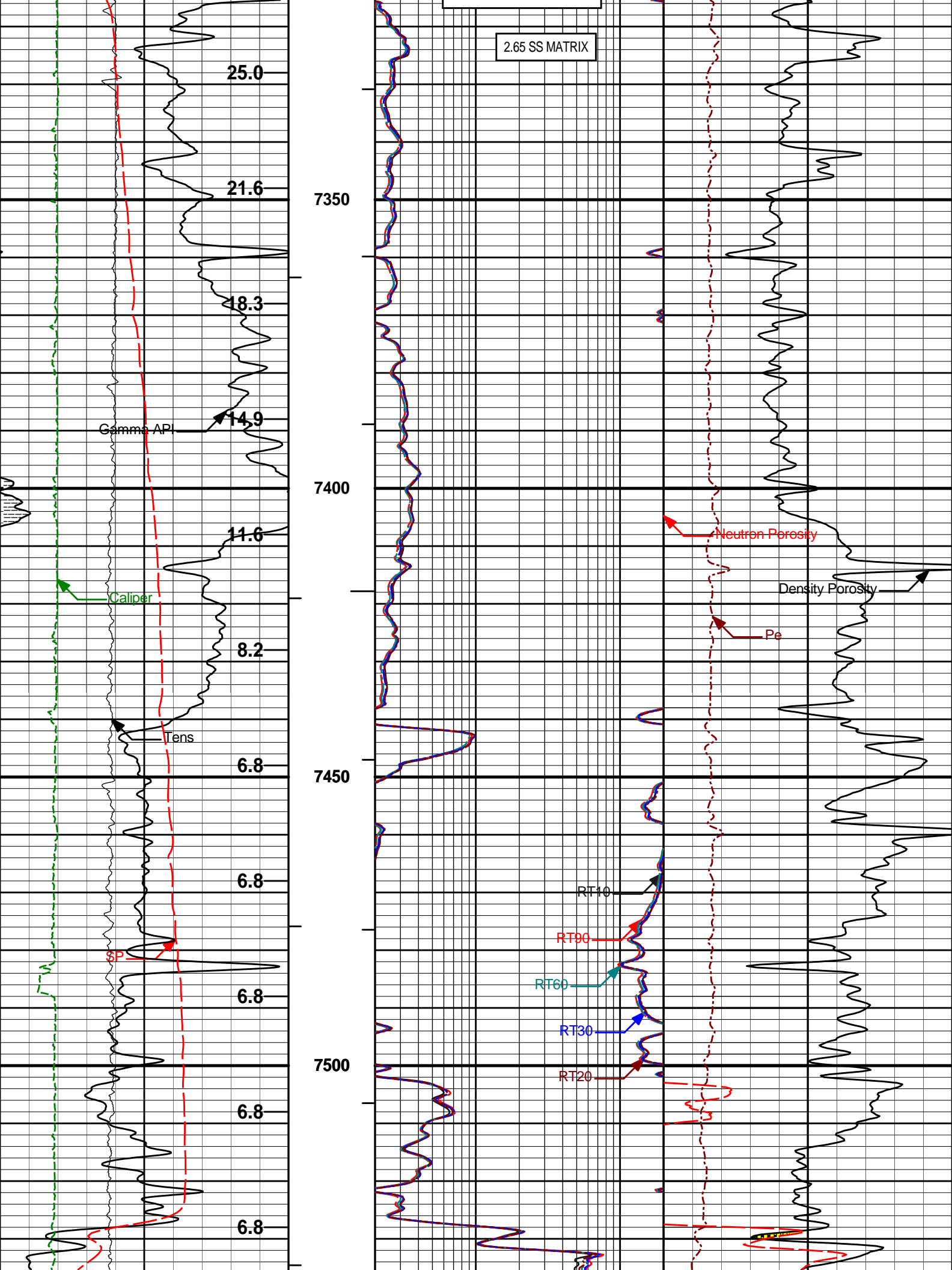












10K	Tens	0			
	pounds				Ohm-m
	Annular Volume Total		2	RT10	200
					Ohm-m

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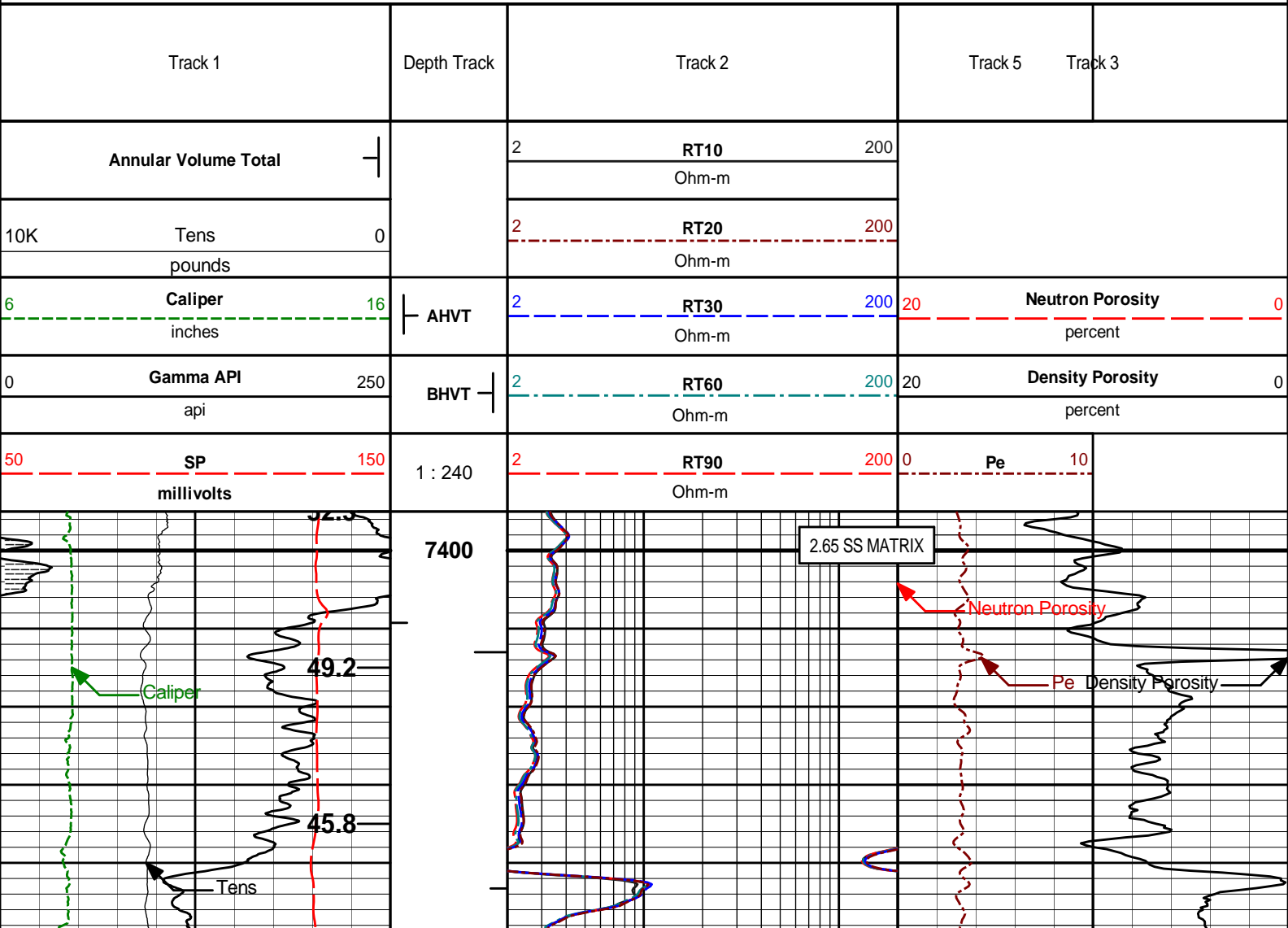
Plot Time: 22-Jun-10 03:49:23
 Plot Range: 1048 ft to 7720.75 ft
 Data: {ActiveWell}\Well Based\MAIN*
 Plot File: \\COMP\NIO_COD_J

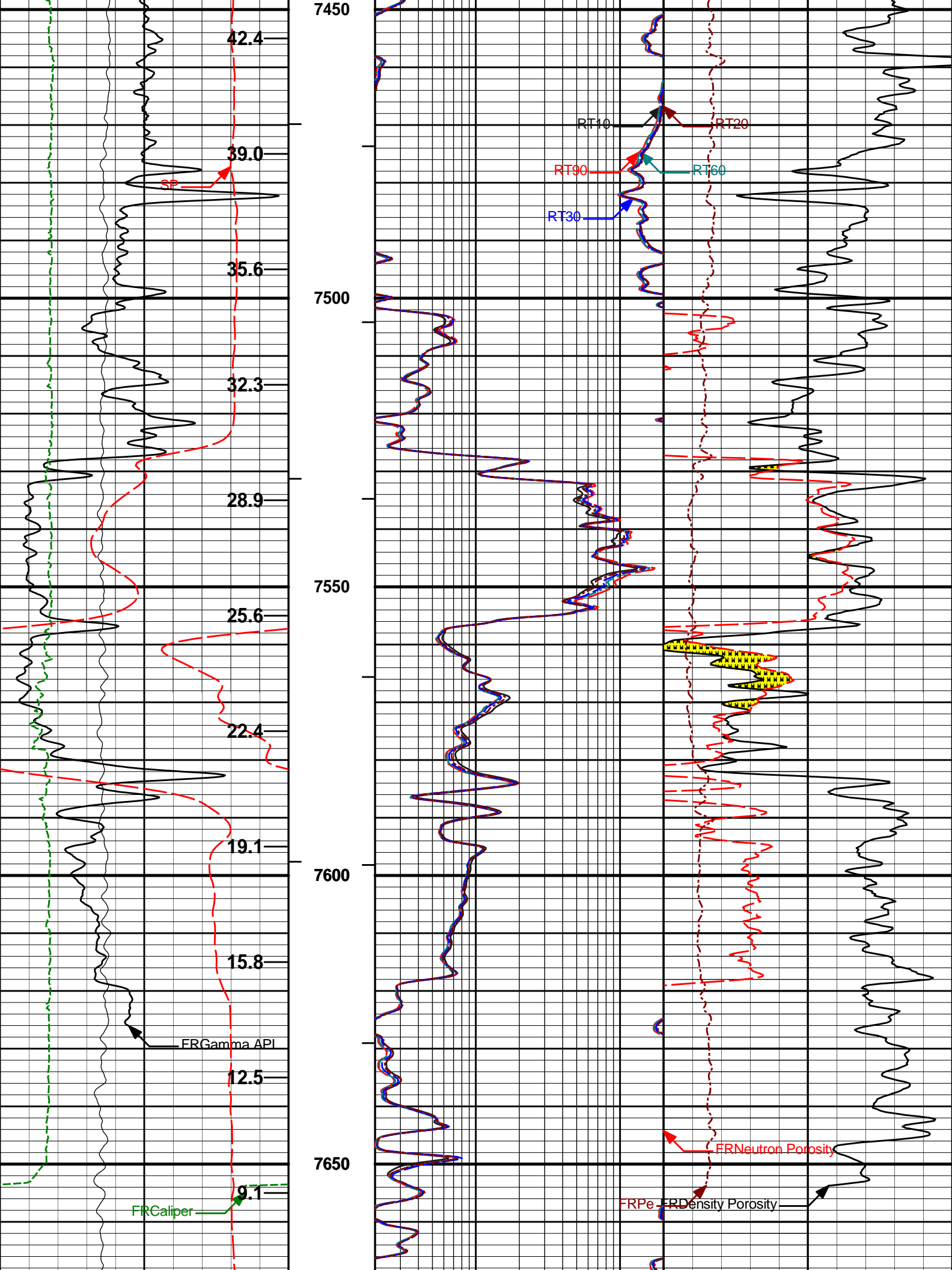
MAIN PASS 5" = 100'

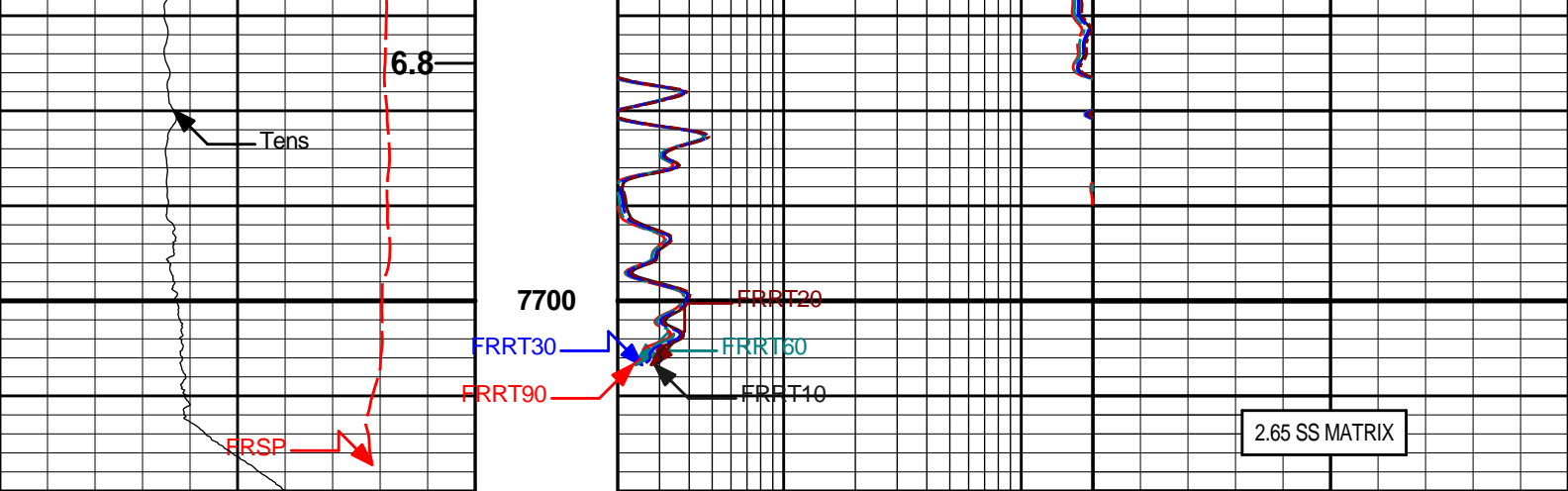
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Plot Time: 22-Jun-10 03:49:24
 Plot Range: 7395 ft to 7720.17 ft
 Data: WILSON_11602922\Well Based\DAQ-0001-003.01*
 Plot File: \\COMP\REPEAT

REPEAT PASS 5" = 100'







50	SP	150	1 : 240	2	RT90	200	0	Pe	10
	millivolts				Ohm-m				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0		2	RT20	200			
	pounds				Ohm-m				
	Annular Volume Total			2	RT10	200			
					Ohm-m				

HALLIBURTON Plot Time: 22-Jun-10 03:49:26
 Plot Range: 7395 ft to 7720.17 ft
 Data: WILSON_11602922\Well Based\DAQ-0001-003.01\
 Plot File: \COMP\REPEAT

REPEAT PASS 5" = 100'

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CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	GTET - 11277436	Reference Calibration Date:	23-May-10 17:48:58
Engineer:	W. MATSON	Calibration Date:	21-Jun-10 11:41:00
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

Calibrator Source S/N: KW-290
 Calibrator API Reference: 230.00 api

Measurement	Measured	Calibrated	Units
Background	64.5	61.1	api
Background + Calibrator	311.4	295.2	api
Calibrator	230.7	234.0	api

GAMMA RAY FIELD CALIBRATION

Tool Name:	GTET - 11277436	Reference Calibration Date:	21-Jun-10 11:41:00
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Engineer: W. MATSON

Calibration Date: 21-Jun-10 16:09:40

Software Version: WL INSITE R3.0.4 (Build 6)

Calibration Version: 1

Calibrator Source S/N: KW-290

Field Verification	Shop	Field	Units
Background	61.1	NaN	api
Background + Calibrator	295.2	294.9	api
Calibrator	234.0	NaN	api

Shop	Field	Difference	Tolerance
234.0	----	----	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11301132

Reference Calibration Date: 23-May-10 16:50:08

Engineer: F. LODER

Calibration Date: 23-May-10 17:02:37

Software Version: WL INSITE R2.4 (Build 20)

Calibration Version: 1

Logging Source S/N: CASPER 434

Tank Serial Number: 11068236

Reference value assigned to Tank: 53.720

Snow Block S/N: CASPER IQ

Calibration Tank Water Temperature: 68 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.999	0.998	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):	0.2226	0.2224	0.0002	+/- 0.0020
Calibrated Ratio:	10.12	10.11	0.008	+/- 0.050

VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0812	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 - 11301132

Reference Calibration Date: 23-May-10 17:02:37

Engineer: W. MATSON

Calibration Date: 21-Jun-10 15:30:16

Software Version: WL INSITE R3.0.4 (Build 6)

Calibration Version: 1

Logging Source S/N: CASPER 434

Snow Block S/N: CASPER IQ

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0812	0.0807	-0.0006	+/- 0.0150

PASS/FAIL SUMMARY

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT - I132M275	Reference Calibration Date: 21-Jun-10 12:41:39
Engineer: W. MATSON	Calibration Date: 21-Jun-10 13:03:40
Software Version: WL INSITE R3.0.4 (Build 6)	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	1.0525	1.0646	0.90 - 1.10
Near Dens Gain	1.0226	1.0263	0.90 - 1.10
Near Peak Gain	1.0023	1.0385	0.90 - 1.10
Near Lith Gain	0.9839	1.0161	0.90 - 1.10
Far Bar Gain	1.0208	1.0229	0.90 - 1.10
Far Dens Gain	1.0054	1.0076	0.90 - 1.10
Far Peak Gain	0.9955	1.0002	0.90 - 1.10
Far Lith Gain	0.9685	0.9722	0.90 - 1.10
Near Bar Offset	-0.2341	-0.3448	NONE
Near Dens Offset	0.0237	-0.0119	NONE
Near Peak Offset	0.1850	-0.1195	NONE
Near Lith Offset	0.3160	0.0440	NONE
Far Bar Offset	0.0168	-0.0002	NONE
Far Dens Offset	0.1355	0.1163	NONE
Far Peak Offset	0.1893	0.1507	NONE
Far Lith Offset	0.3258	0.2987	NONE
Near Bar Background	954.88	956.86	700 - 1450
Near Dens Background	316.47	316.67	230 - 480
Near Peak Background	136.75	136.92	100 - 210
Near Lith Background	167.43	166.23	125 - 260
Far Bar Background	502.29	502.62	450 - 900
Far Dens Background	201.56	201.83	175 - 345
Far Peak Background	78.75	78.15	70 - 140
Far Lith Background	82.19	81.94	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.683	1.680	-0.003	+/- 0.015
Pe	2.595	2.596	0.001	+/- 0.150
ALUMINUM				
Density (g/cc)	2.601	2.600	-0.001	+/- 0.01500
Pe	3.065	3.102	0.037	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0001	+/- 0.0110	0.0006	+/- 0.0140
Magnesium Block	-0.0000	+/- 0.0110	0.0014	+/- 0.0140
Aluminum Block	0.0001	+/- 0.0110	0.0006	+/- 0.0140
Resolution	8.79	6.00 - 11.50	9.85	6.00 - 11.50
Internal Verifier(B+D+P+L)	1577	1200 - 2700	865	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 - I132M275	Reference Calibration Date:	21-Jun-10 13:03:40
Engineer:	W. MATSON	Calibration Date:	21-Jun-10 15:26:50
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

Pad Temperature: 73.4 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1576.682	1575.260	-1.422	15.975
Far (B+D+P+L) cps	864.539	867.602	3.063	16.089
Near Resolution	8.79	8.85	0.060	0.50
Far Resolution	9.85	9.90	0.050	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

MICRO LOG SHOP CALIBRATION			
Tool Name:	SDLT - I132M275	Reference Calibration Date:	23-May-10 13:26:14
Engineer:	F. LODER	Calibration Date:	11-Jun-10 13:14:03
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

CALIBRATION COEFFICIENT SUMMARY					
Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.08	-0.05	0.01	0.00	ohmm
Calibration Point #1	-0.03	0.00	0.00	0.00	ohmm
Calibration Point #2	20.11	20.00	20.13	20.00	ohmm
Internal Reference	20.06	19.95	20.14	20.01	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
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Tool Zero	-0.18	3.55	V
Calibration Point #1	12.67	1.84	V
Calibration Point #2	5232.13	6838.88	V
Internal Reference	5220.00	6842.14	V

MICRO LOG FIELD CHECK

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 11-Jun-10 13:14:03
Engineer: F. LODER **Calibration Date:** 11-Jun-10 13:14:35
Software Version: WL INSITE R3.0.4 (Build 6) **Calibration Version:** 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.05	-0.05	0.00	0.01	ohmm
Internal Reference	19.95	19.95	20.01	20.01	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.95	19.95	0.00	+/- 0.80
Microlog Lateral	20.01	20.01	0.00	+/- 0.80

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 13-Feb-10 12:46:38
Engineer: F. LODER **Calibration Date:** 23-May-10 13:32:45
Software Version: WL INSITE R2.4 (Build 20) **Calibration Version:** 1

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-1641.40	-1866.95	-7000.00 - -1000.00
Pad Gain	0.0003728	0.0003790	0.000200 - 0.000600
Arm Offset	-1071.69	-890.58	-5000.00 - 3000.00
Arm Gain	0.0005221	0.0005428	0.000300 - 0.000700
Arm Power	-0.000005891	-0.000006915	-0.000010 - 0.000010

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)	2.05	2.00	-0.05	+/- 0.20
Medium Ring (in)	3.77	3.75	-0.02	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.43	6.50	0.07	+/- 0.20
Medium Ring (in)	8.13	8.25	0.12	+/- 0.20
Large Ring (in)	14.90	15.00	0.10	+/- 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 - 90199007-E6758-S4352 **Reference Calibration Date:** 14-Apr-10 12:04:15
Engineer: W. MATSON **Calibration Date:** 04-Jun-10 17:35:57

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0024	1.05	0.95	1.0046	1.05	0.95	1.0010	1.05
A2 (50")	0.95	1.0183	1.05	0.95	1.0217	1.05	0.95	1.0188	1.05
A3 (29")	0.95	0.9951	1.05	0.95	0.9963	1.05	0.95	0.9928	1.05
A4 (17")	0.95	1.0011	1.05	0.95	1.0007	1.05	0.95	0.9985	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9975	1.05	0.95	0.9952	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9826	1.05	0.95	0.9790	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	-1.190	2	-6	-4.087	-2	-8	-4.712	-2
A2 (50")	-7	-3.214	-1	-6	-4.084	-2	-7	-4.441	-2
A3 (29")	-27	-13.712	-9	-9	-4.012	-3	-7	-3.100	-1
A4 (17")	-180	-98.916	-60	-45	-32.247	-15	-39	-25.618	-13
A5 (10")	N/A	N/A	N/A	-150	-87.784	-50	-80	-43.455	-10
A6 (6")	N/A	N/A	N/A	175	295.461	525	90	150.962	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.8983	1.3
36K	1.0	1.8810	2.0
72K	1.0	1.1348	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.009	1.05

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11277436						
Gamma Ray Calibrator	234.0	NaN	-----	234.0	+/- 9.00	api
DSNT-11301132						
Snow-Block Porosity	0.0812	0.0807	-----	0.0005	+/- 0.0150	decp
SDLT-I132M275						
Near(B+D+P+L)	1576.682	1575.260	-----	1.422	+/-15.975	cps
Far(B+D+P+L)	864.539	867.602	-----	-3.063	+/-16.089	cps
MicroLog Normal	19.95	19.95	-----	0.00	+/-0.80	ohmm
MicroLog Lateral	20.01	20.01	-----	0.00	+/-0.80	ohmm
Pad Extension	3.75	-----	-----	0.00	+/-0.20	in
Ring Diameter	8.25	-----	-----	0.00	+/-0.20	in
ACRt-90199007-E6758-S4352						
Mud Cell	1.009	-----	-----	0.000	-----	ohm-m

Data: WILSON_11602922\0001 NOBLE_RED_BSATIDLE Date: 22-Jun-10 02:42:02



TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
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RWCH-A094
135.00 lbs

Ø 3.625 in →

← Load Cell @ 101.74 ft
← BH Temperature @ 101.17 ft

6.25 ft

99.17 ft

GTET-11277436
165.00 lbs

Ø 3.625 in →

← GammaRay @ 93.11 ft

8.52 ft

90.65 ft

CSNG-10965402
114.00 lbs

Ø 3.625 in →

← CSNG @ 85.03 ft

8.17 ft

82.49 ft

DSNT-11301132
174.00 lbs

DSN Decentralizer-
10860047
6.60 lbs

Ø 3.625 in* →

Ø 3.625 in →

← DSN Far @ 75.55 ft
← DSN Near @ 74.80 ft

9.69 ft

72.80 ft

SDLT-1132M275
360.00 lbs

Ø 4.500 in →

Ø 4.750 in →

← SDL Microlog @ 64.99 ft
← SDL Caliper @ 64.80 ft
← SDL @ 64.79 ft

10.81 ft

61.99 ft

Flex Joint -
Pressure Comp-
FLEX-BLACK
140.00 lbs

Ø 3.625 in →

5.97 ft

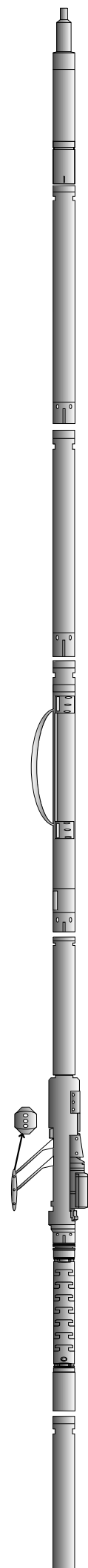
56.02 ft

IDT-11277453
150.00 lbs

Ø 3.625 in →

7.58 ft

105.42 ft



ICT-11294350
330.00 lbs

Ø 3.625 in →

12.83 ft

48.43 ft

Centralizer 29-CENT-2
12.00 lbs

Ø 4.000 in* →

35.60 ft

BSAT-1105781
300.00 lbs

Ø 3.625 in →

15.77 ft

← Sonic Receivers @ 27.09 ft

Centralizer 29-CENT-1
12.00 lbs

Ø 4.000 in* →

19.83 ft

← Mud Resistivity @ 13.44 ft

ACRt-90199007-
E6758-S4352
250.00 lbs

Ø 3.625 in →

19.25 ft

← ACRt @ 9.46 ft

SP Ring-1
0.00 lbs

Ø 3.625 in* →

← SP @ 1.86 ft

Cabbage Head-
CBGHD-1
10.00 lbs

Ø 3.625 in →
Ø 6.000 in →

0.58 ft

0.58 ft

0.00 ft

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
ICT-11294350			330.00	12.83	12.83	
Centralizer 29-CENT-2			12.00		35.60	
BSAT-1105781			300.00	15.77	51.37	
Centralizer 29-CENT-1			12.00		63.37	
ACRt-90199007-E6758-S4352			250.00	19.25	82.62	
SP Ring-1			0.00		84.48	
Cabbage Head-CBGHD-1			10.00	0.58	85.06	

RWCH	Releasable Wireline Cable Head	A094	135.00	6.25	99.17	300.00
GTET	Gamma Telemetry Tool	11277436	165.00	8.52	90.65	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17	82.49	15.00
DSNT	Dual Spaced Neutron	11301132	174.00	9.69	72.80	60.00
DCNT	DSN Decentralizer	10860047	6.60	5.13 *	76.13	300.00
SDLT	Spectral Density Tool	I132M275	360.00	10.81	61.99	60.00
FLEX	Flex Joint - Pressure Compensated	FLEX-BLACK	140.00	5.97	56.02	300.00
IDT	Insite Directional Tool	11277453	150.00	7.58	48.43	30.00
ICT	Six Independent Arm Caliper	11294350	330.00	12.83	35.60	60.00
BCAS	Borehole Sonic Array Tool	1105781	300.00	15.77	19.83	60.00
OBCEN	Centralizer - 29 in.Overbody	CENT-2	12.00	2.42 *	32.82	300.00
OBCEN	Centralizer - 29 in.Overbody	CENT-1	12.00	2.42 *	19.93	300.00
ACRt	Array Compensated True Resistivity	90199007-E6758-S4352	250.00	19.25	0.58	300.00
SP	SP Ring	1	0.00	0.25 *	1.86	300.00
CBHD	Cabbage Head	CBGHD-1	10.00	0.58	0.00	300.00

Total			2,158.60	105.42		
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* Not included in Total Length and Length Accumulation.

Data: WILSON_11602922\0001 NOBLE_RED_BSATIDLE

Date: 21-Jun-10 23:40:23

COMPANY	NOBLE ENERGY		
WELL	WILSON 1160-29-22`		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY LOG	