HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	NOBLE ENERGY
WELL	BOULTER G22-32D
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO

COMPANY **NOBLE ENERGY**
WELL **BOULTER G22-32D**
FIELD **WATTENBERG**
COUNTY **WELD** STATE **CO**

API No. 05123308030000

Location SHL: 2079' FNL & 580' FEL
BHL: 2575' FNL & 75' FEL
LAT: 40.299460°
LONG: -104.660840°

Sect. 21 Twp. 4N Rge. 65W

Other Services:
RWCH
CSNG

Permanent Datum	GL	Elev. 4808.0 ft	Elev.: K.B.	4821.0 ft
Log measured from	KB	13.0 ft above perm. Datum	D.F.	4821.0 ft
Drilling measured from	KB		G.L.	4808.0 ft

Date	11-Sep-10		
Run No.	ONE		
Depth - Driller	7453.00 ft		
Depth - Logger	7450.0 ft		
Bottom - Logged Interval	7439 ft		
Top - Logged Interval	608 ft		
Casing - Driller	8.625 in @ 604.0 ft	@	@
Casing - Logger	608.0 ft		
Bit Size	7.875 in	@	@
Type Fluid in Hole	WBM		
Density / Viscosity	9.4 ppg / 40.00 s/qt		
PH / Fluid Loss	8.00 pH / 19.2 cptm		
Source of Sample	FLOW LINE		
Rm @ Meas. Temperature	1.100 ohmm @ 75.00 degF	@	@
Rmf @ Meas. Temperature	0.71 ohmm @ 75.00 degF	@	@
Rmc @ Meas. Temperature	0.786 ohmm @ 75.00 degF	@	@
Source Rmf / Rmc	CHART / CHART		
Rm @ BHT	0.41 ohmm @ 215.0 degF	@	@
Time Since Circulation	8.0 hr		
Time on Bottom	11-Sep-10 08:20		
Max. Rec. Temperature	215.0 degF @ 7453.0 ft	@	@
Equipment / Location	11454566 / BRIGHTON		
Recorded By	F. LODER		
Witnessed By	B. HANSEN		

Fold here

Service Ticket No.: 7629187 API Serial No.: 05123308030000 PGM Version: WL INSITE R3.0.4 (Build 6)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

Date	Sample No.				
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 SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA

Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
ONE	ACRt 758-352	N/A	1.5" S.O.	N/A

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	11294346	Serial No.		Serial No.	I132M275	Serial No.	11301132
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.		Diameter	4.5"	Diameter	3.625"
Detector Model No.	T102-A	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs137	Source Type	Am241Be
Length	8"	LSA [Y/N]		Serial No.	2770 GW	Serial No.	DSN 434
Distance to Source	25'	FWDA [Y/N]		Strength	1.5 Ci	Strength	15 Ci

LOGGING DATA

GENERAL	GAMMA	ACOUSTIC	DENSITY	NEUTRON

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	608'	6942'	REC	0 API	250 API				20%	0%	2.68 g/cc	20%	0%	SAND
ONE	6942'	7259'	REC	0 API	250 API				20%	0%	2.71 g/cc	20%	0%	LIME
ONE	7259'	7453'	REC	0 API	250 API				20%	0%	2.68 g/cc	20%	0%	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: RWCH-GTET-CSNG-DSNT-SDLT-ACRT RAN IN COMBINATION

ANNULAR HOLE VOLUME CALCULATED USING 4.5 INCH PRODUCTION CASING

TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE

INTERMITTENT DATA DUE TO SHORT IN TOOLSTRING: 3600'-4400'

CREW: A. LEWIS, J. WALKER RIG: ENSIGN 136

THANK YOU FOR USING HALLIBURTON ENERGY SERVICES -- BRIGHTON, CO -- 303.825.4346

HALLIBURTON

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
6942.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
7259.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	9.400	ppg
	SHARED	OBM	Oil Based Mud System?	No	
	SHARED	RMUD	Mud Resistivity	1.100	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	50.0	degF
	SHARED	TD	Total Well Depth	7453.00	ft
	SHARED	BHT	Bottom Hole Temperature	215.0	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	
	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	2.680	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 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

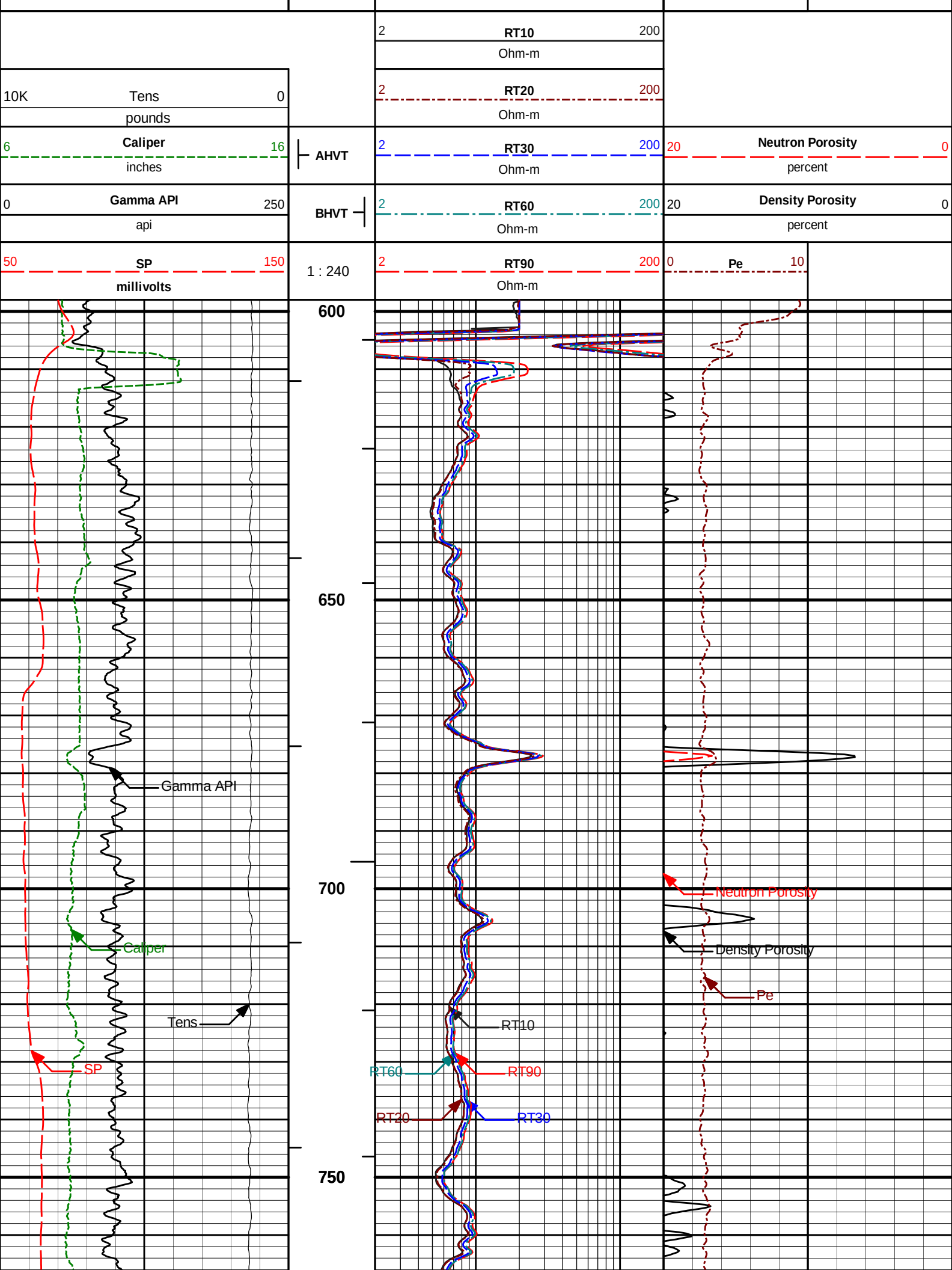
Data: BOULTER_G22_32D\0001 TRIPLE_CSNG_RED\002.02 11-Sep-10 09:19 Up **Date: 11-Sep-10 09:24:09**

HALLIBURTON

Plot Time: 11-Sep-10 10:49:59
Plot Range: 598 ft to 7460.25 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\COMP\MAIN

MAIN PASS 5" = 100'

Track 1	Depth Track	Track 2	Track 5	Track 3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BHVT
2
RT10
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Ohm-m
2
RT20
200
Ohm-m
2
RT30
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Ohm-m
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RT60
200
Ohm-m
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200
Ohm-m
20
Neutron Porosity
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percent
20
Density Porosity
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percent
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Pe
10
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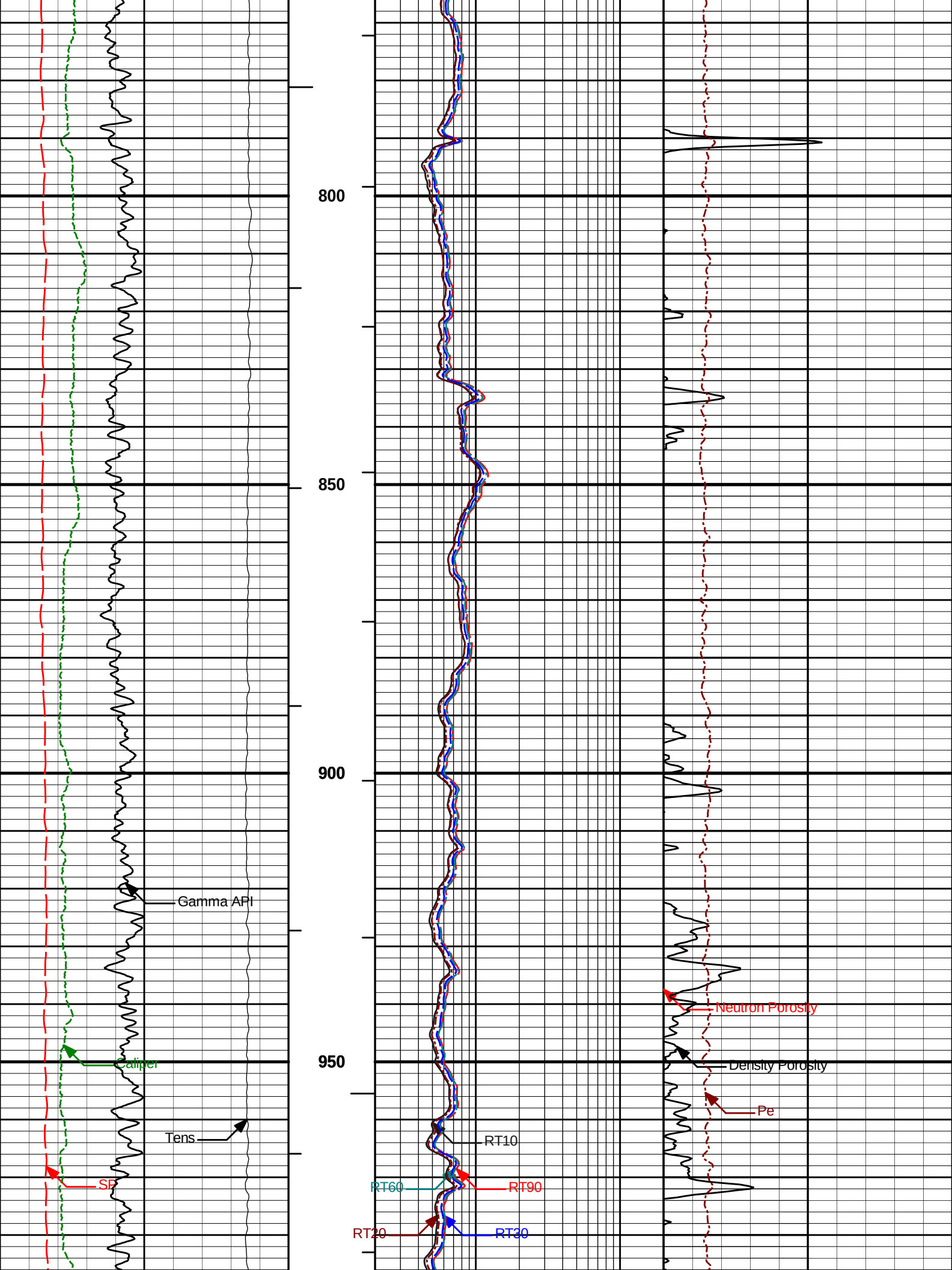
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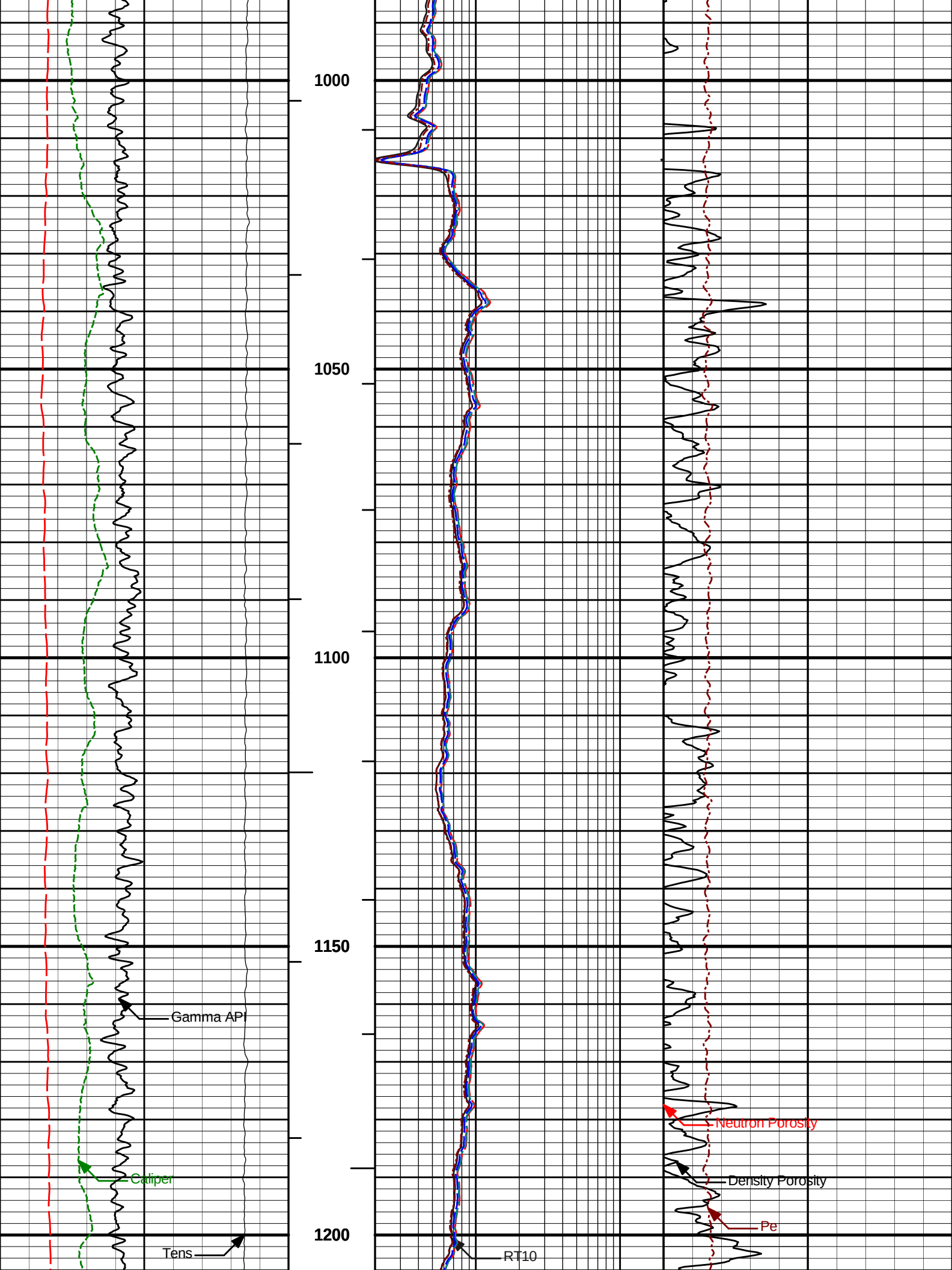
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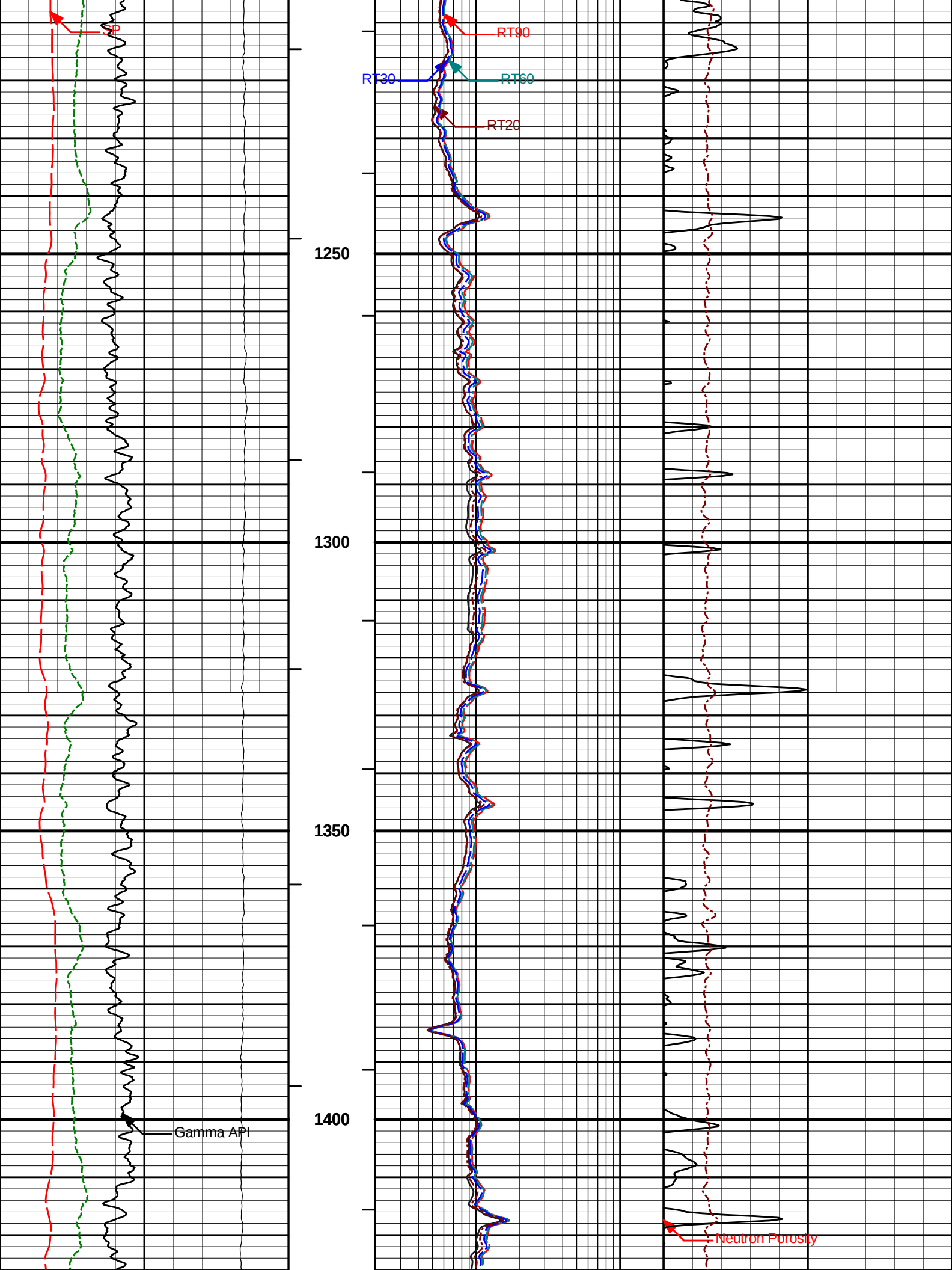
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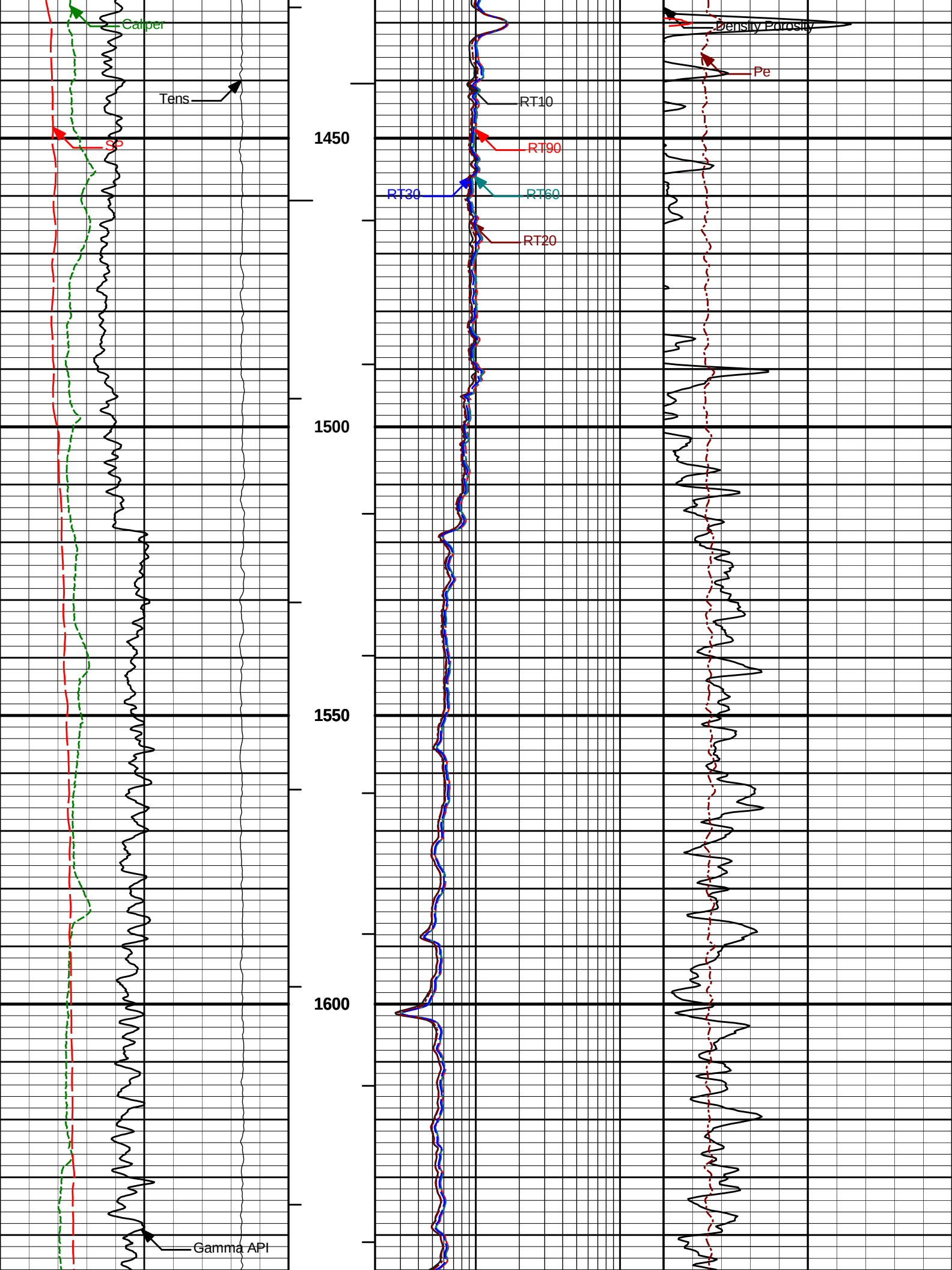
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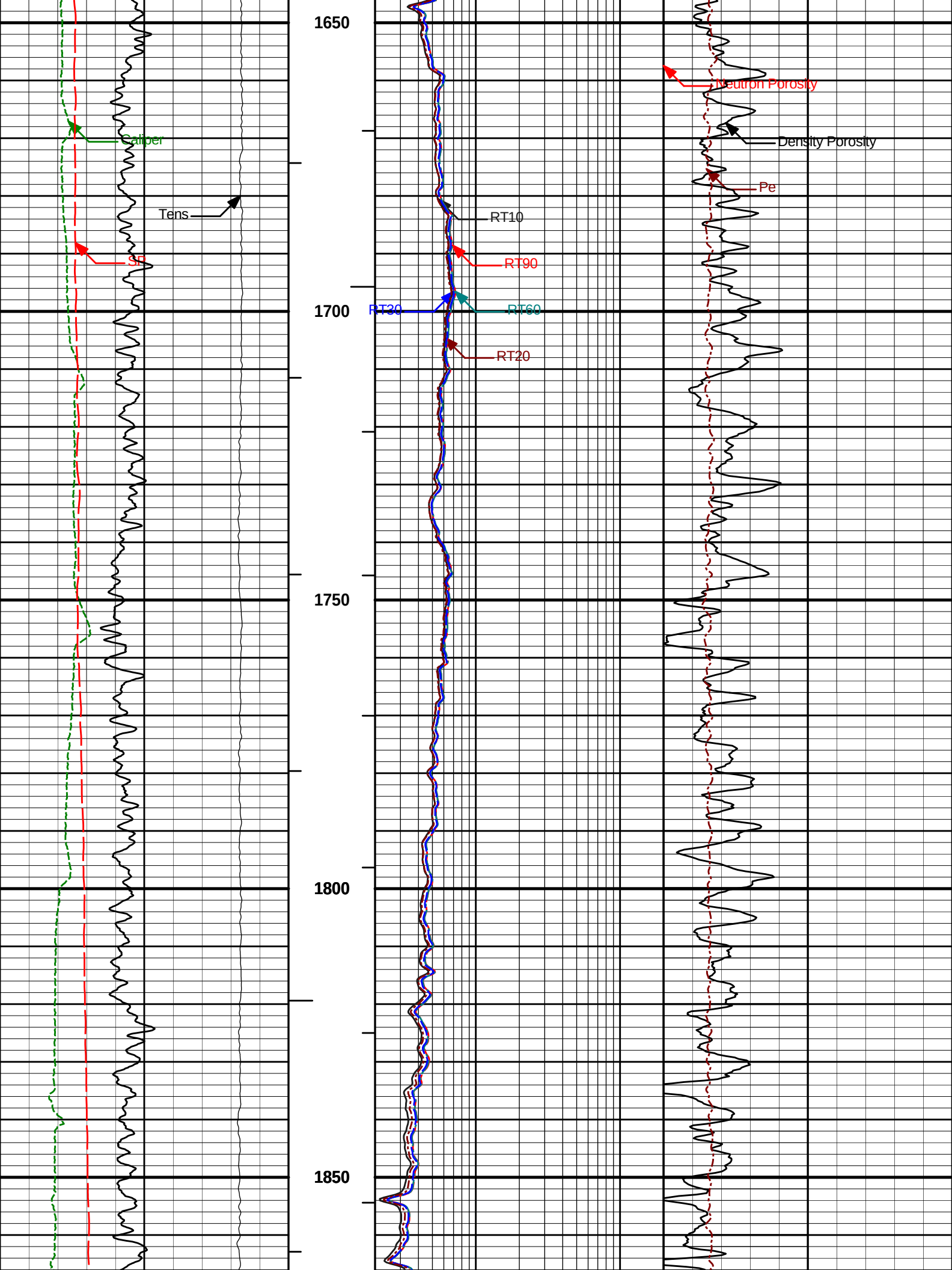
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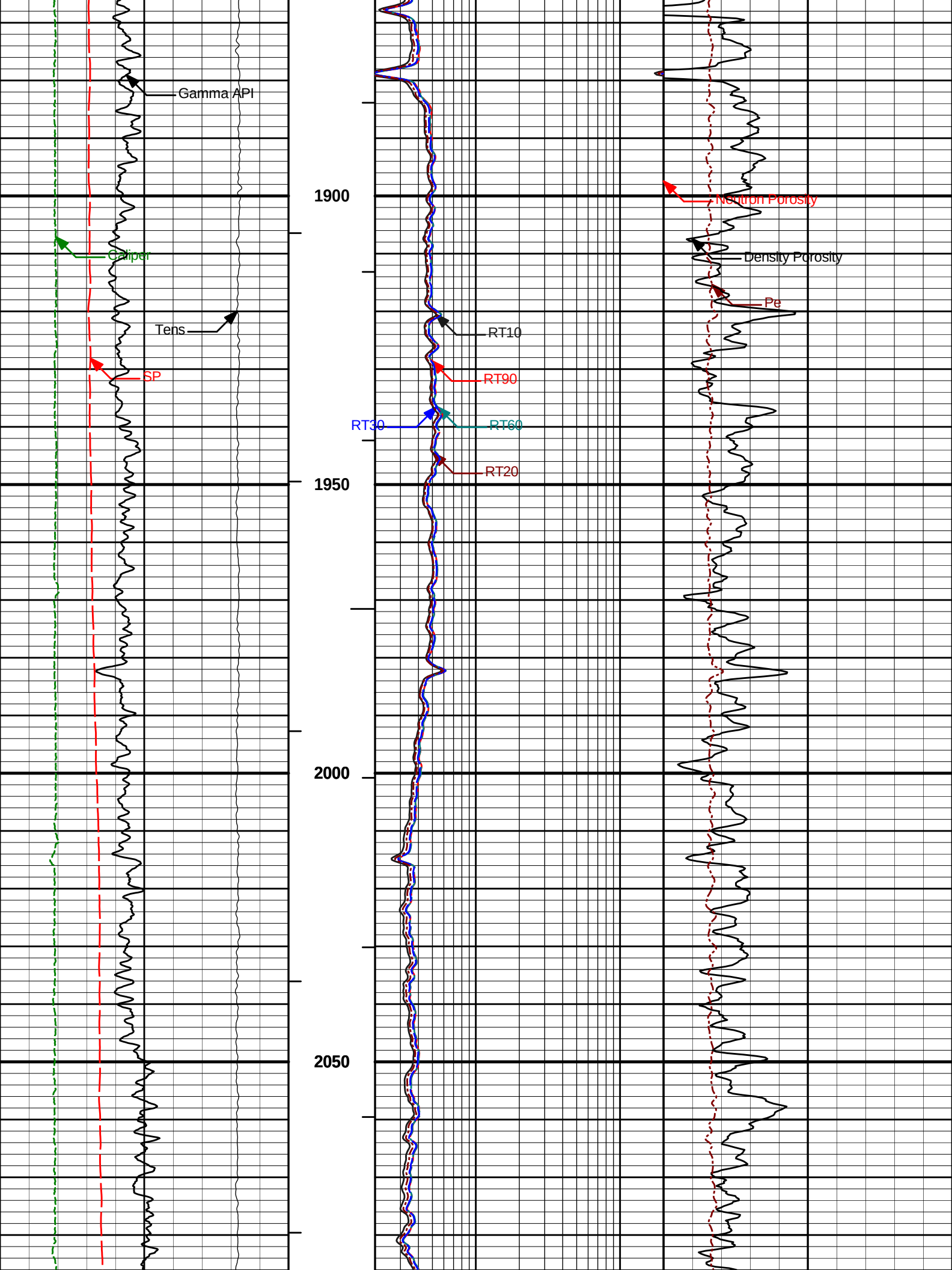
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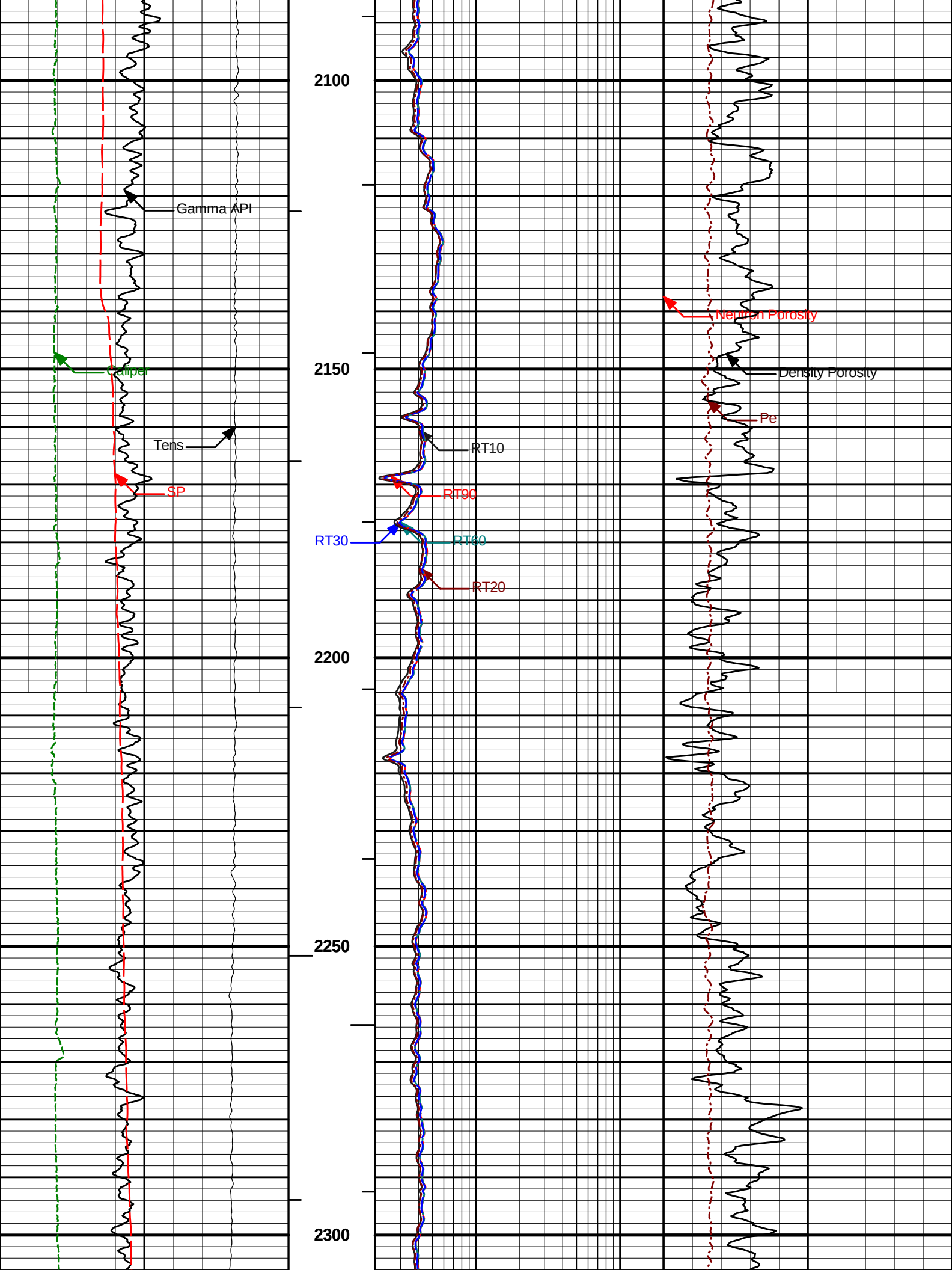
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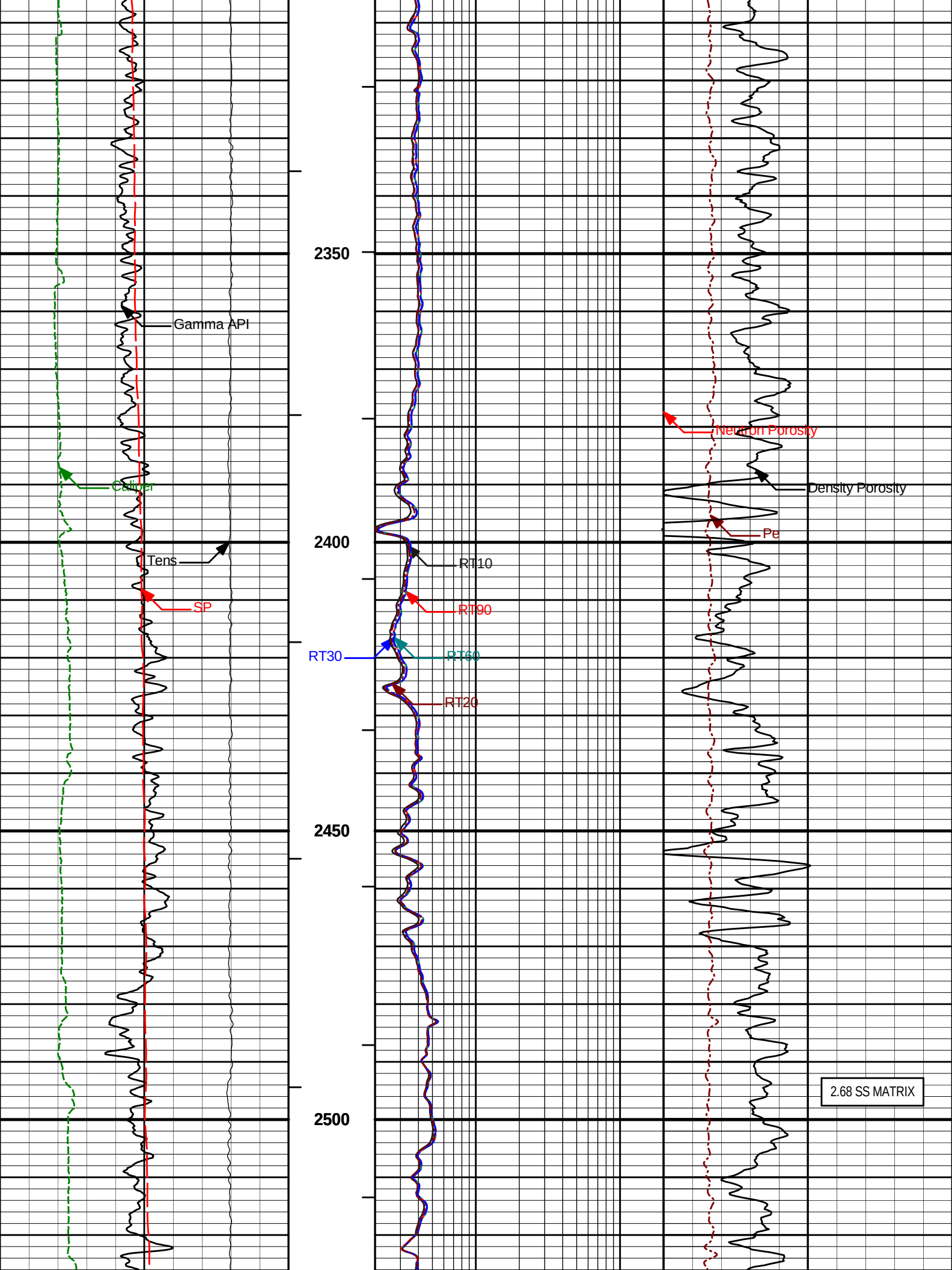
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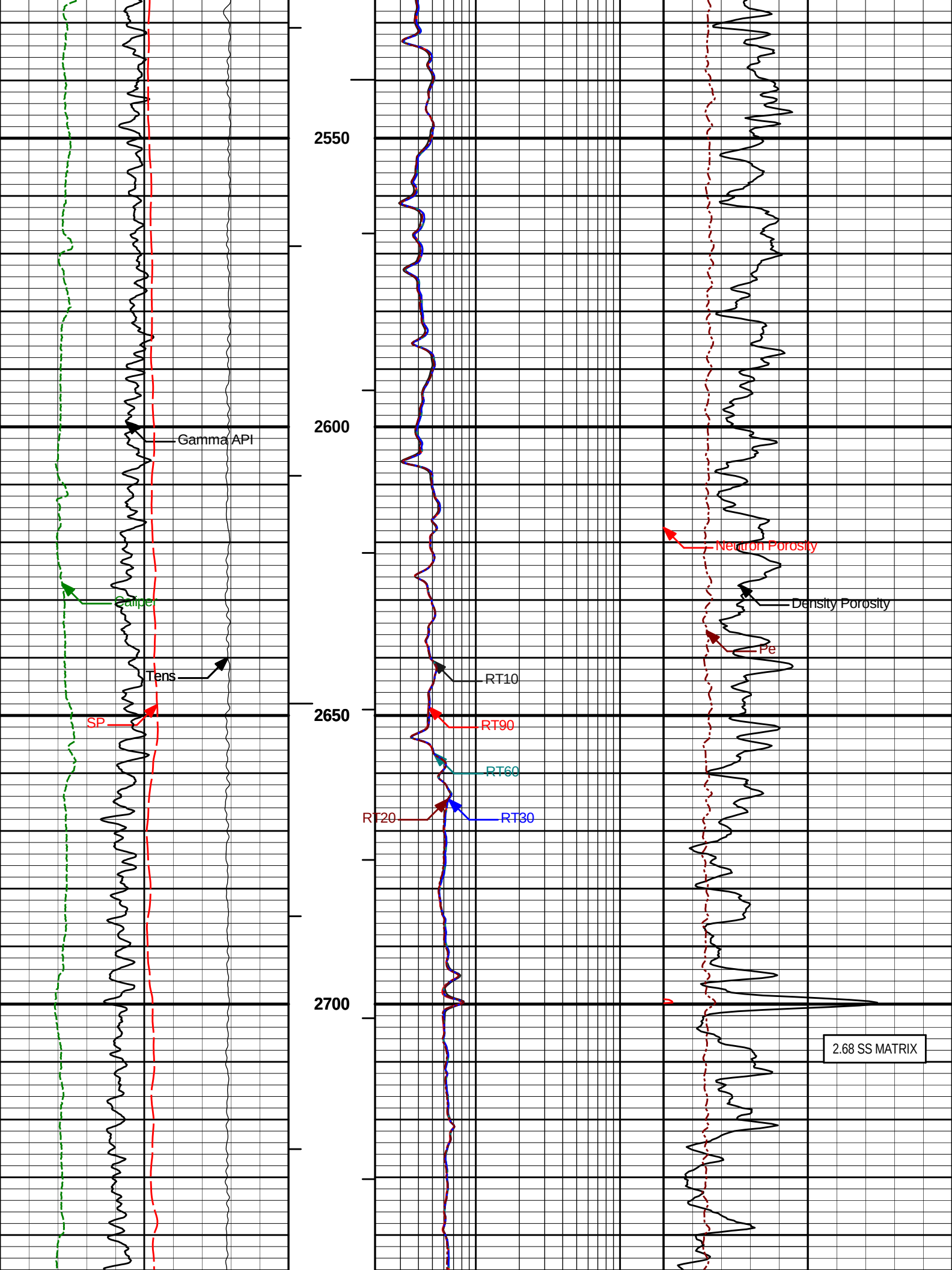
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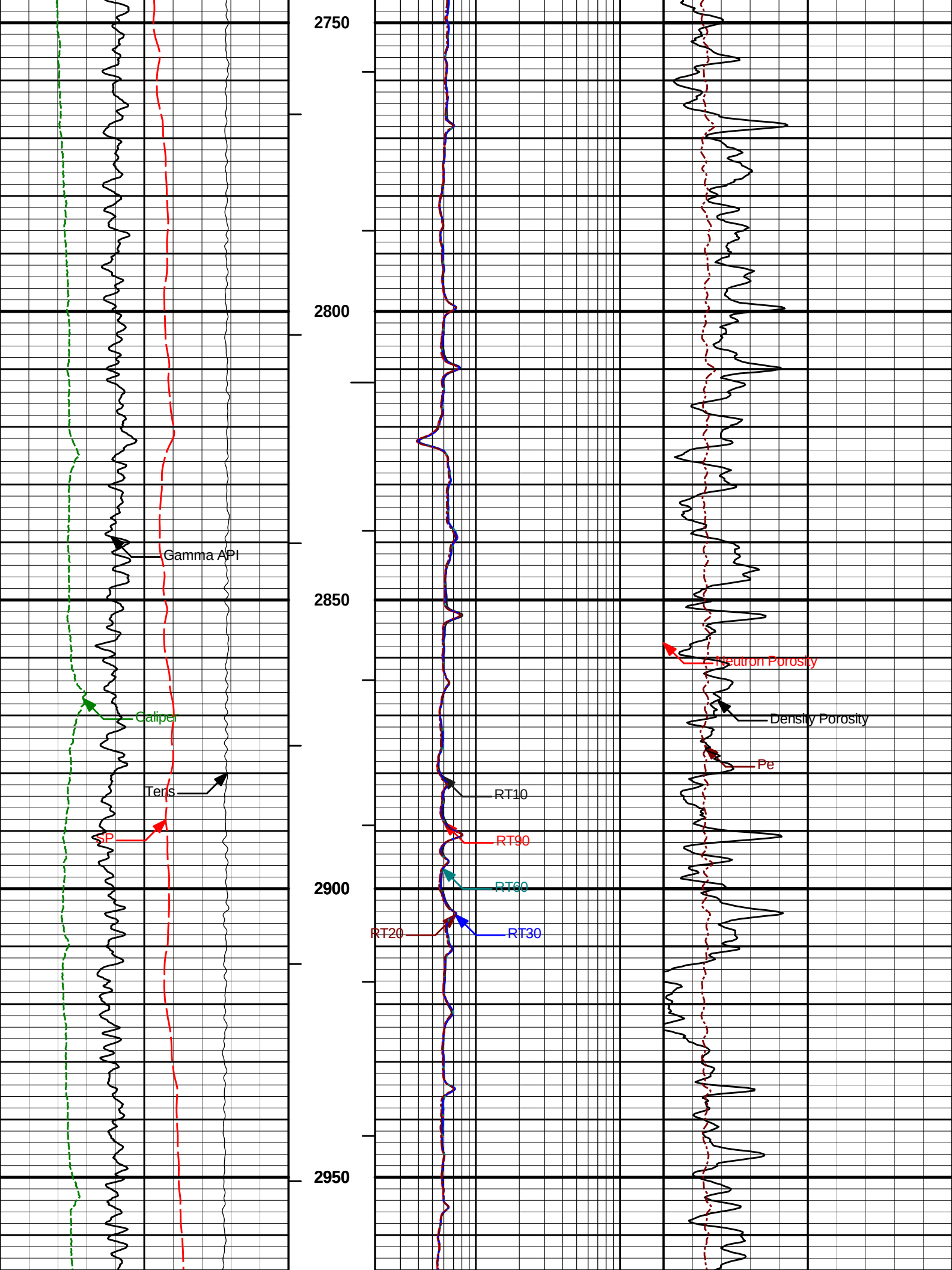
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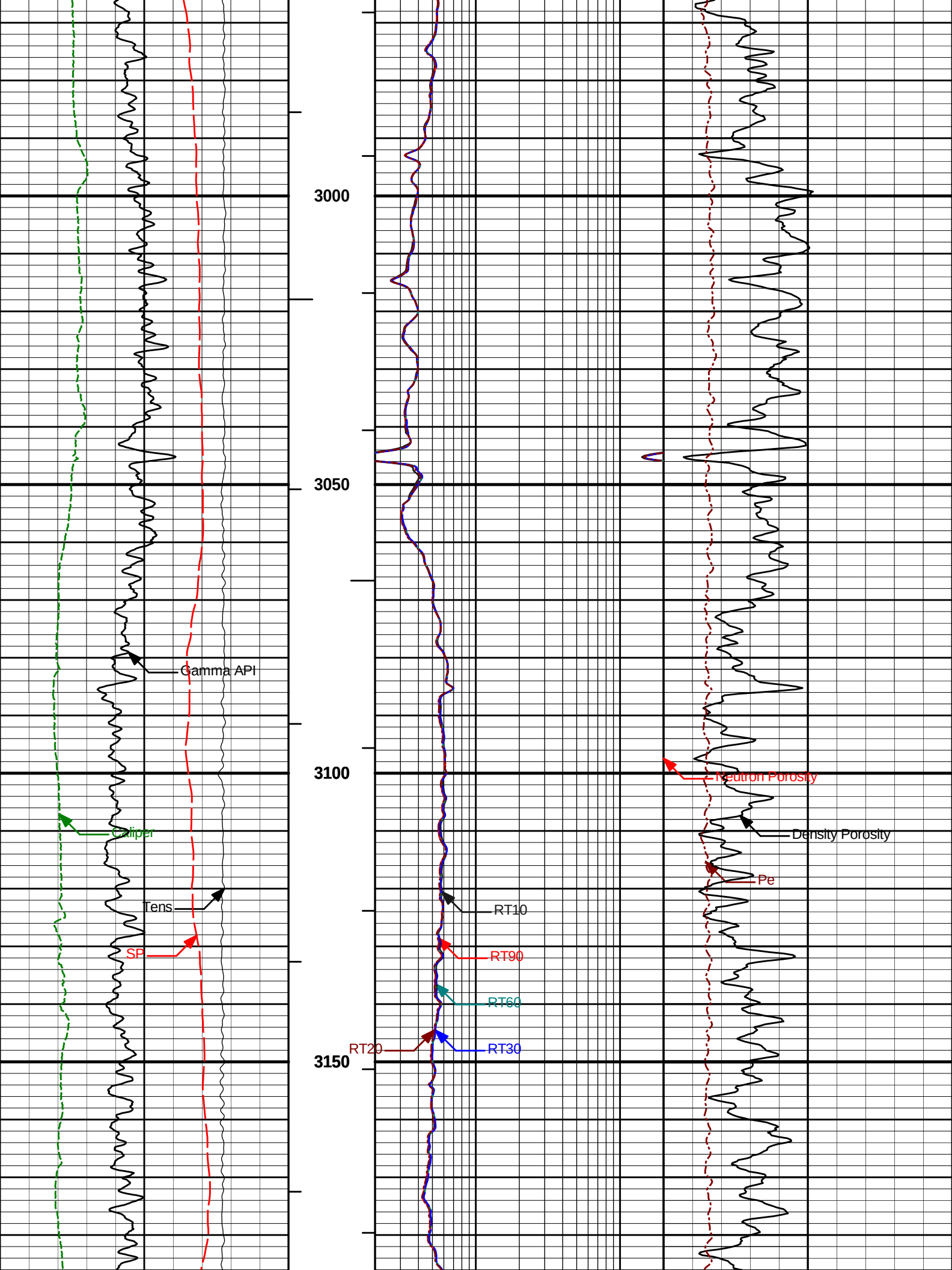
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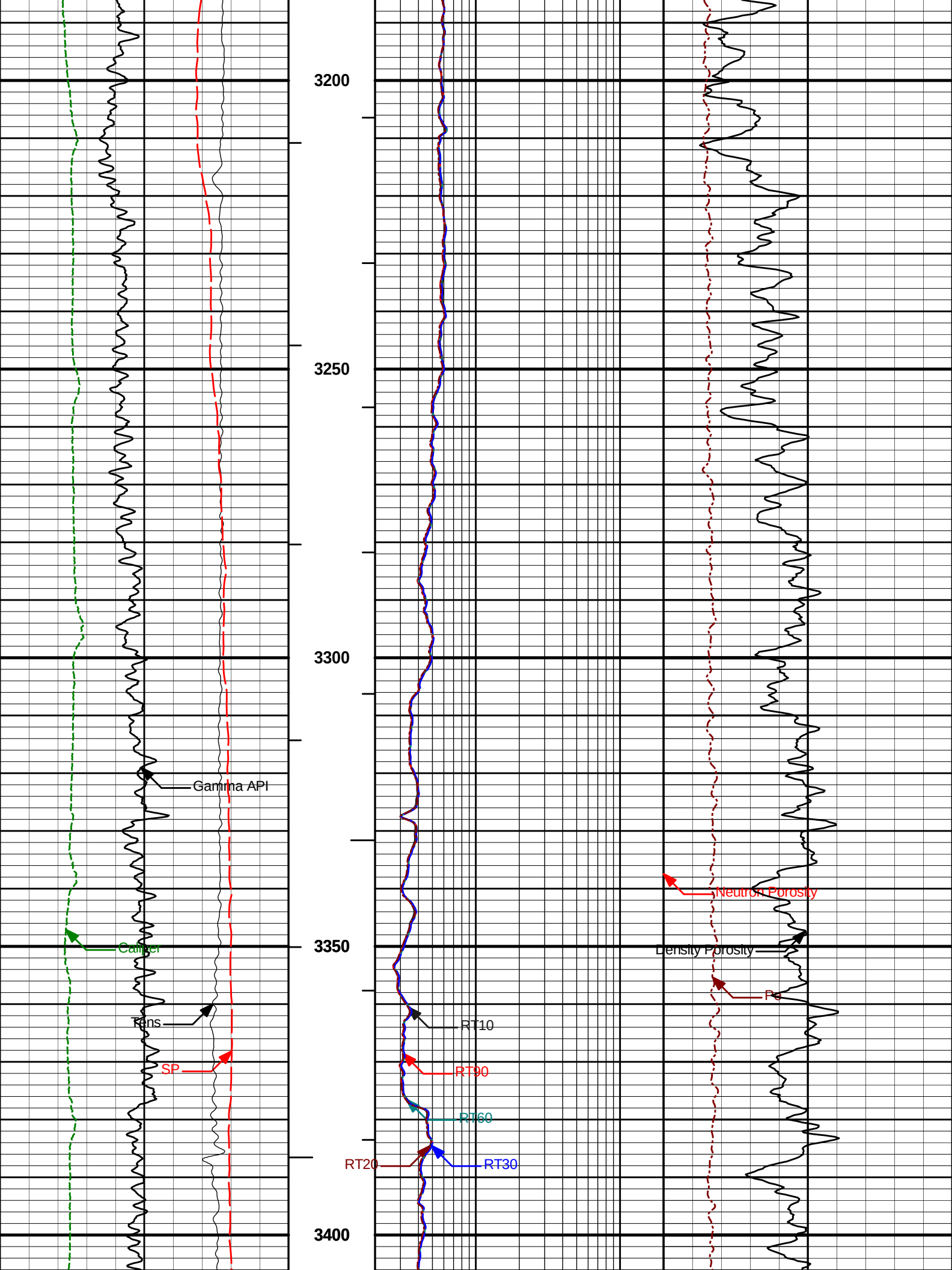
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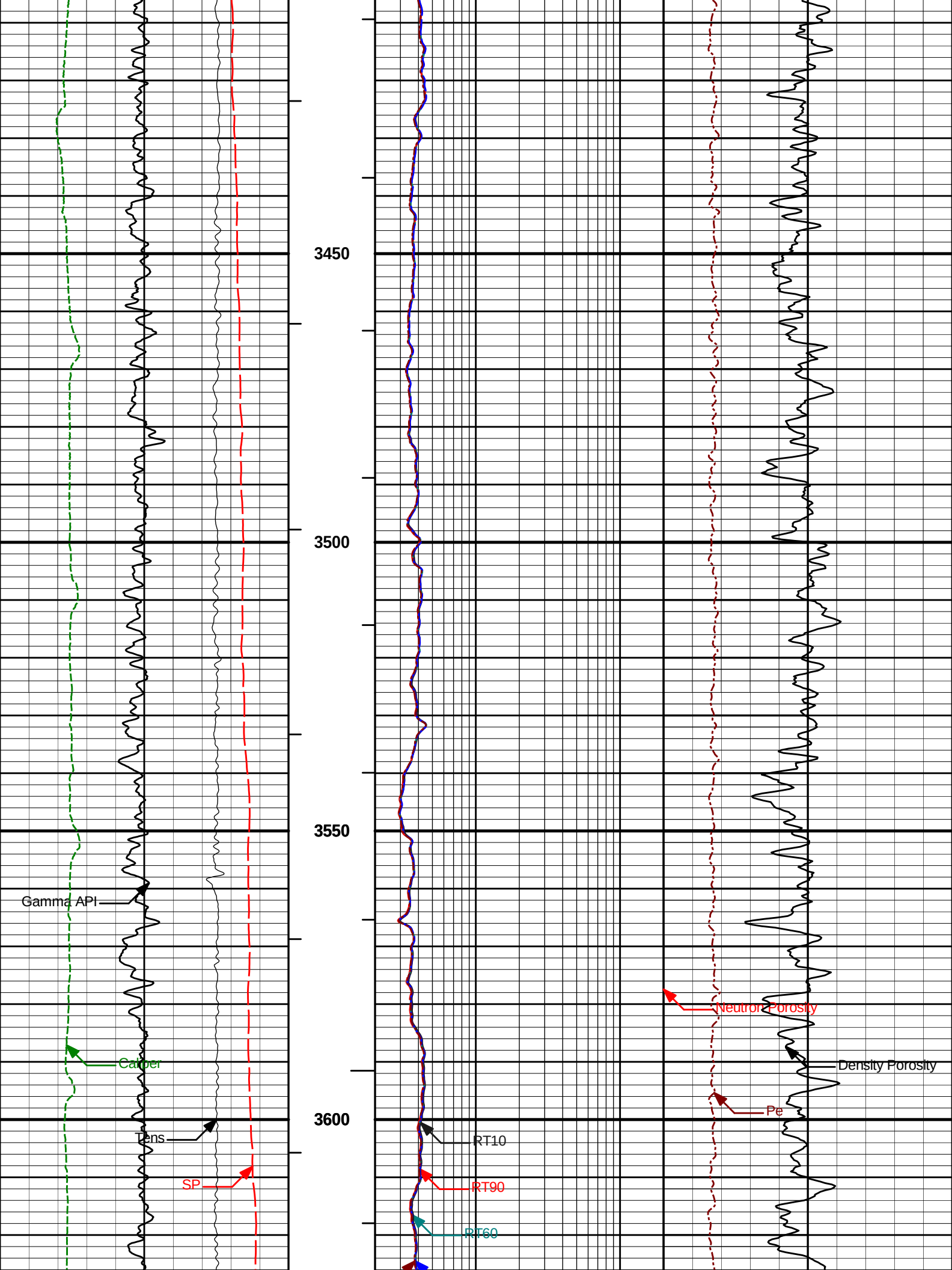
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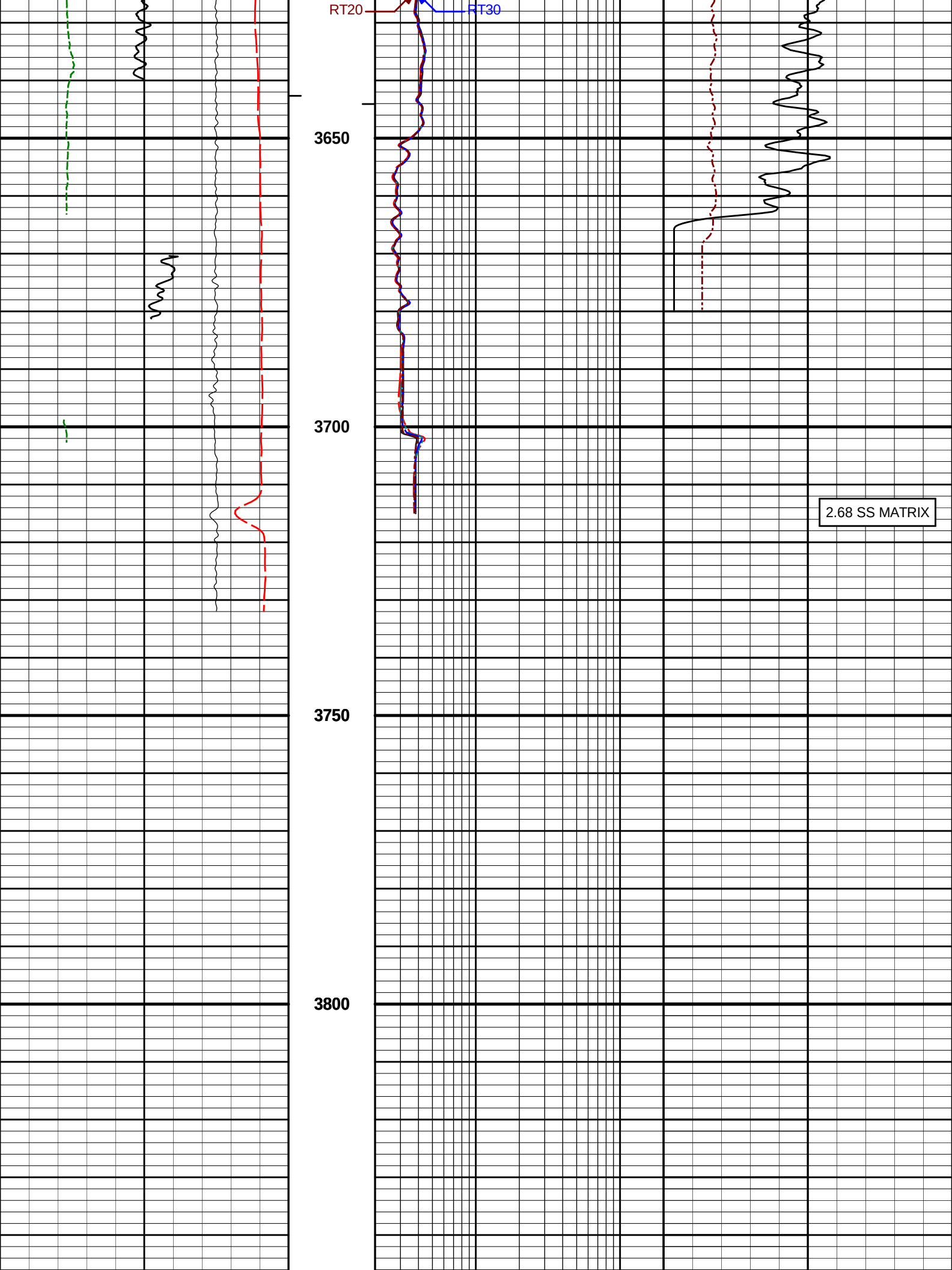
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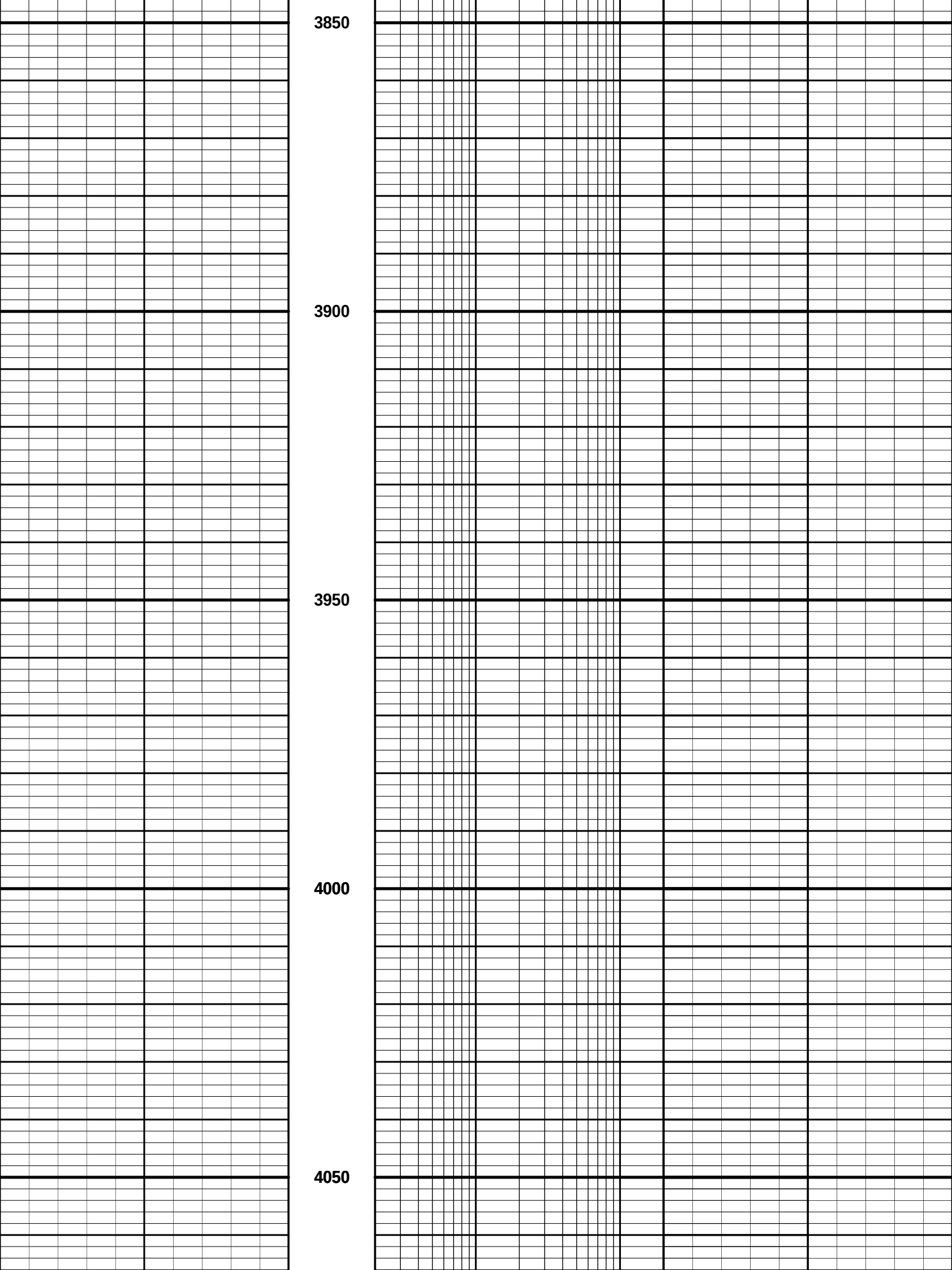
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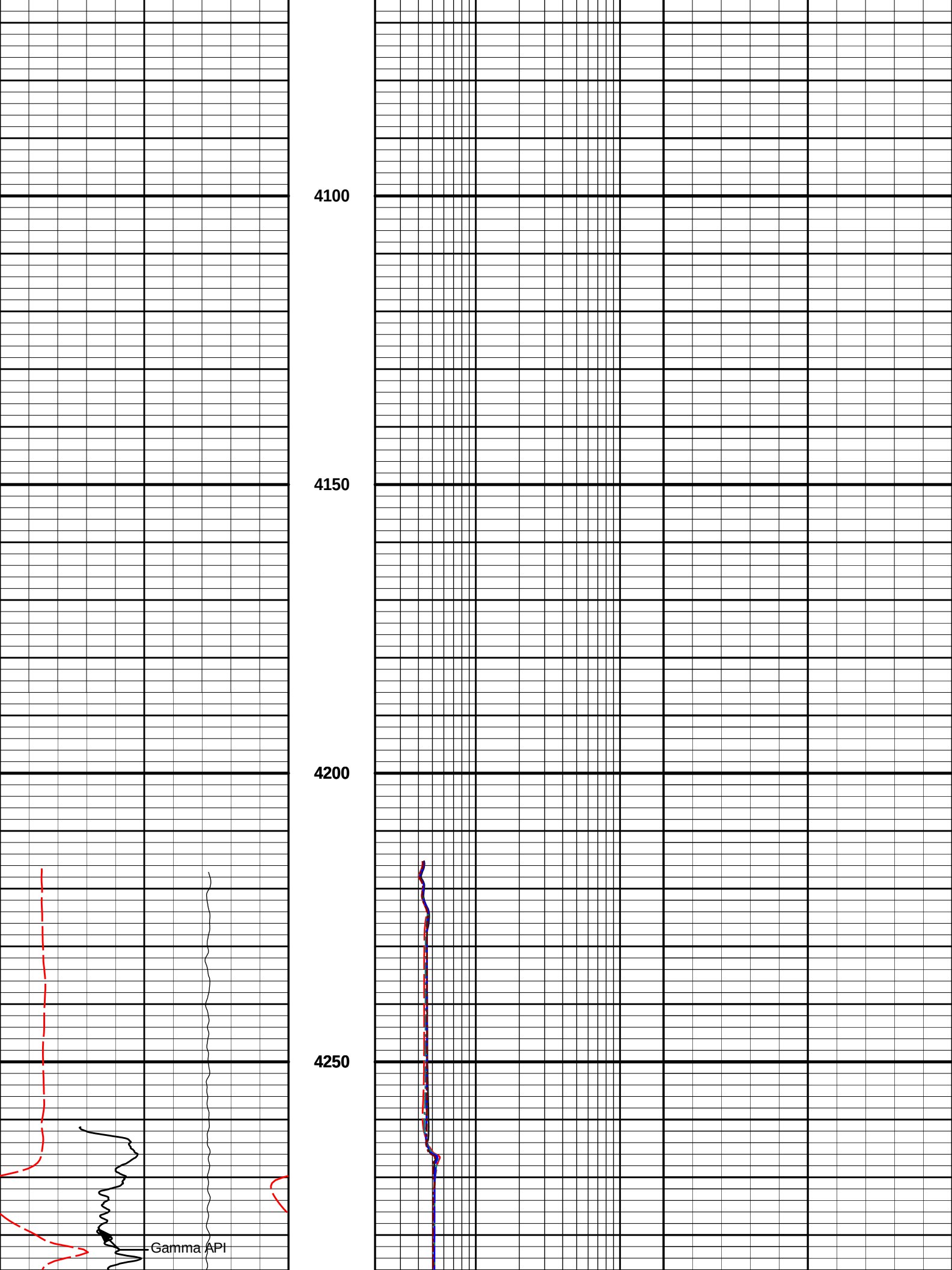
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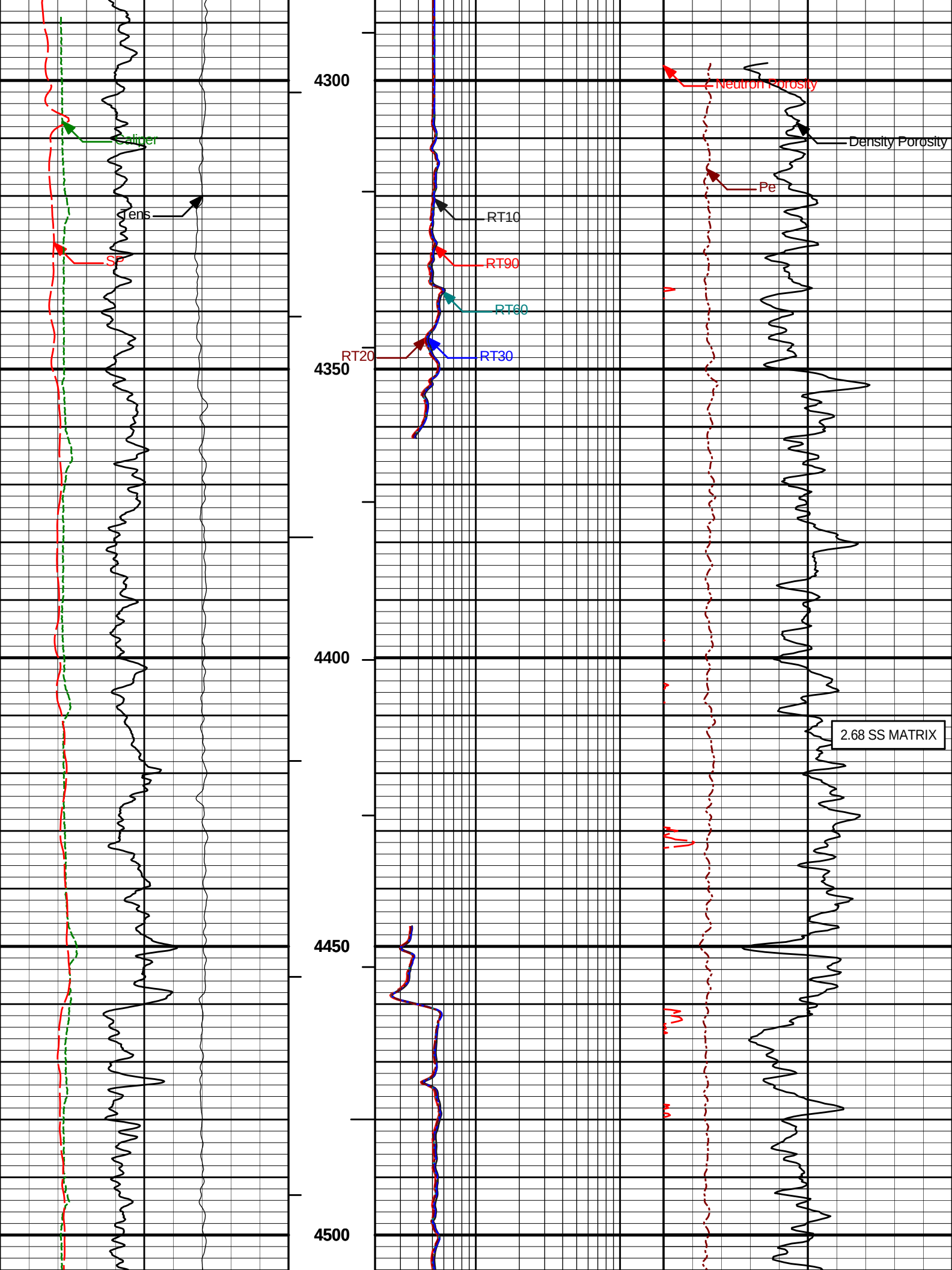
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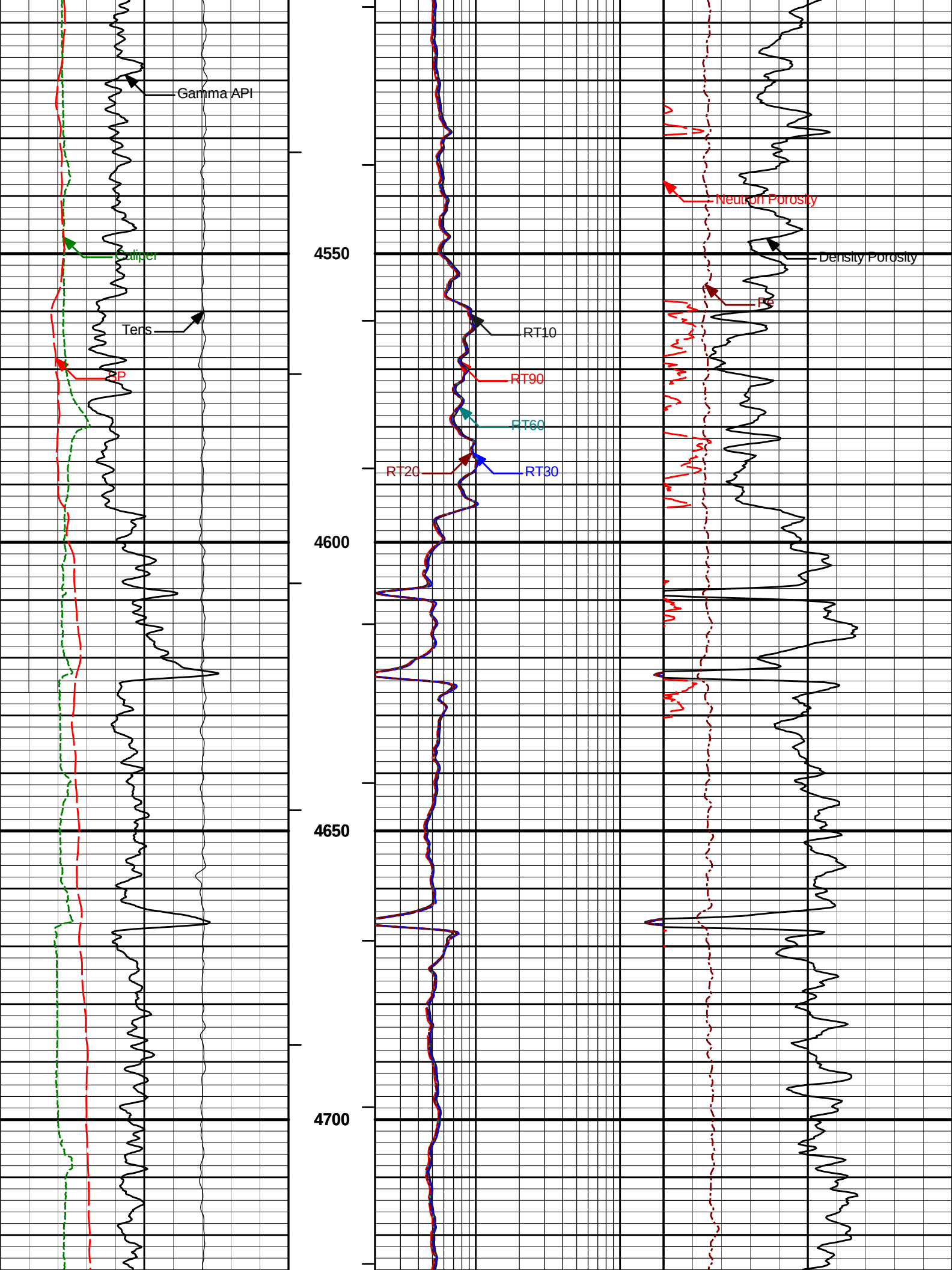
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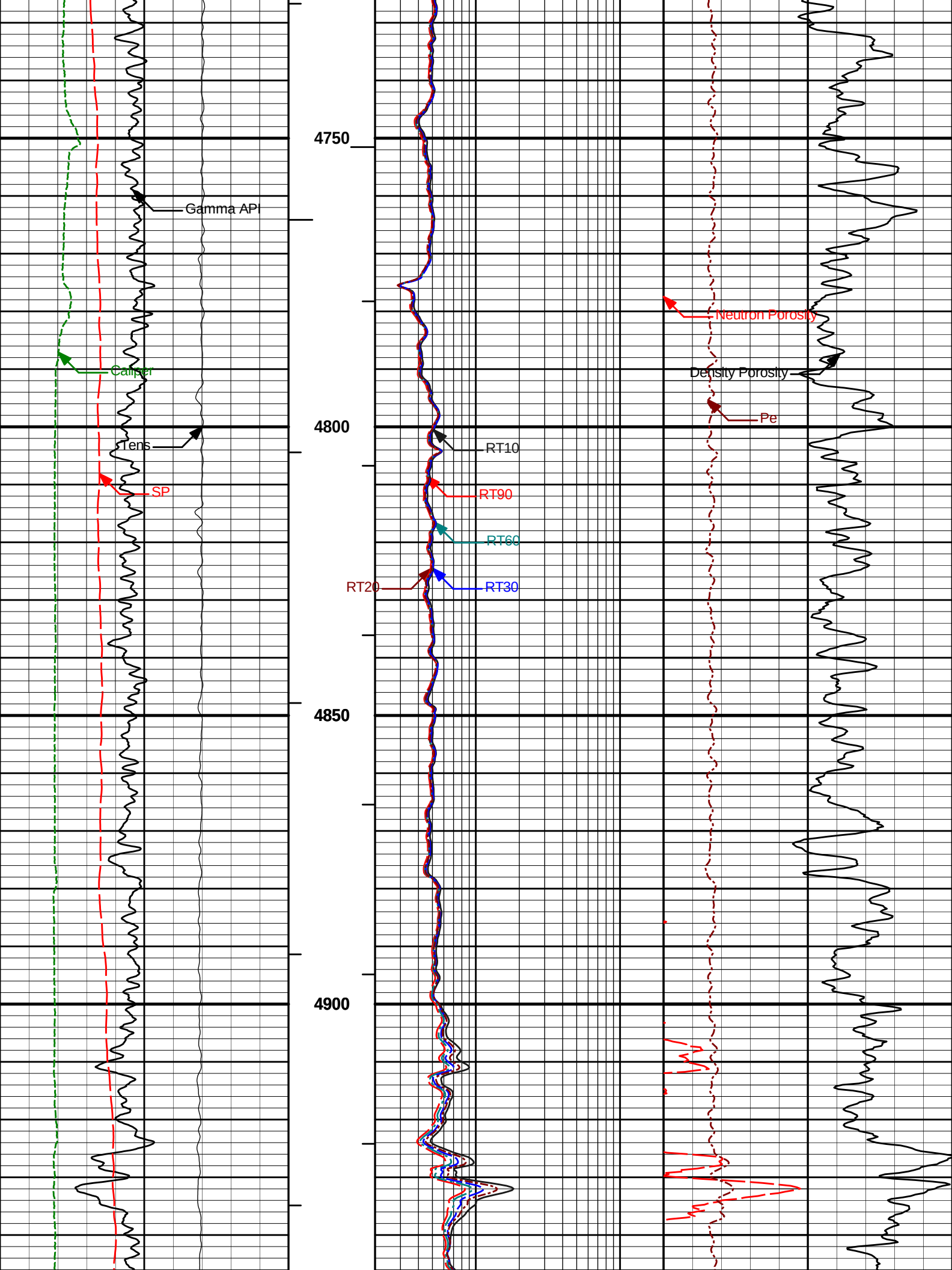
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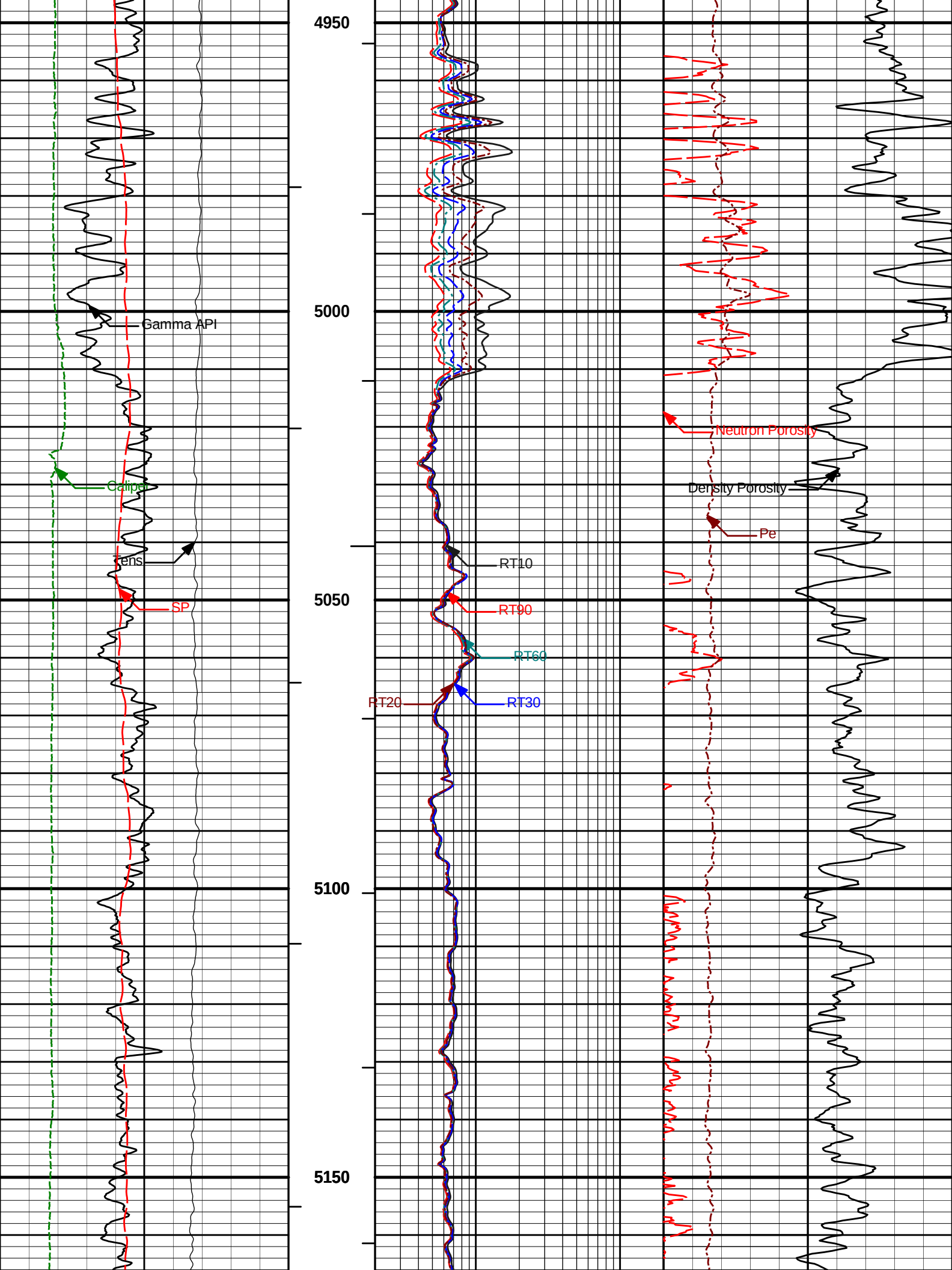
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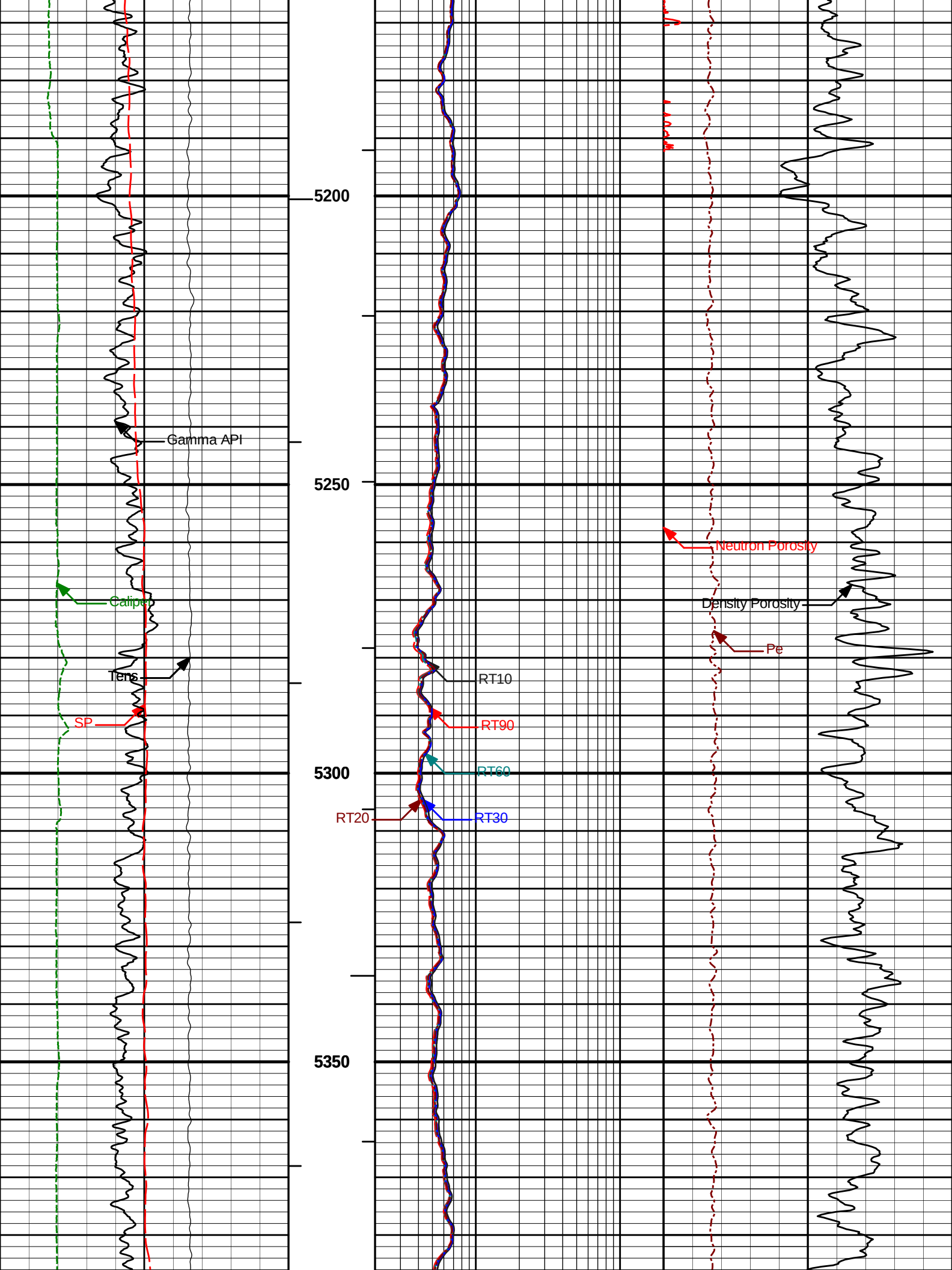
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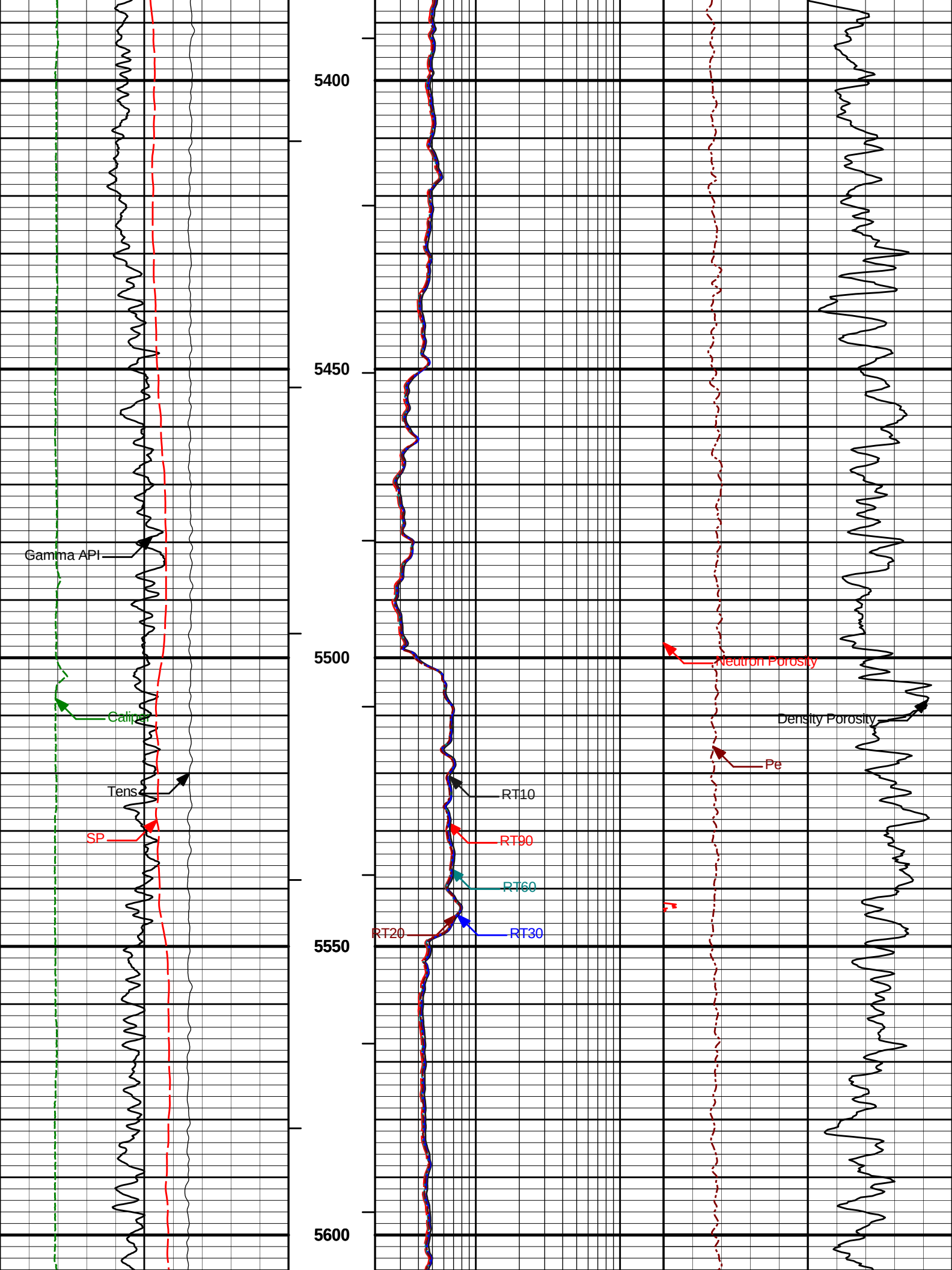
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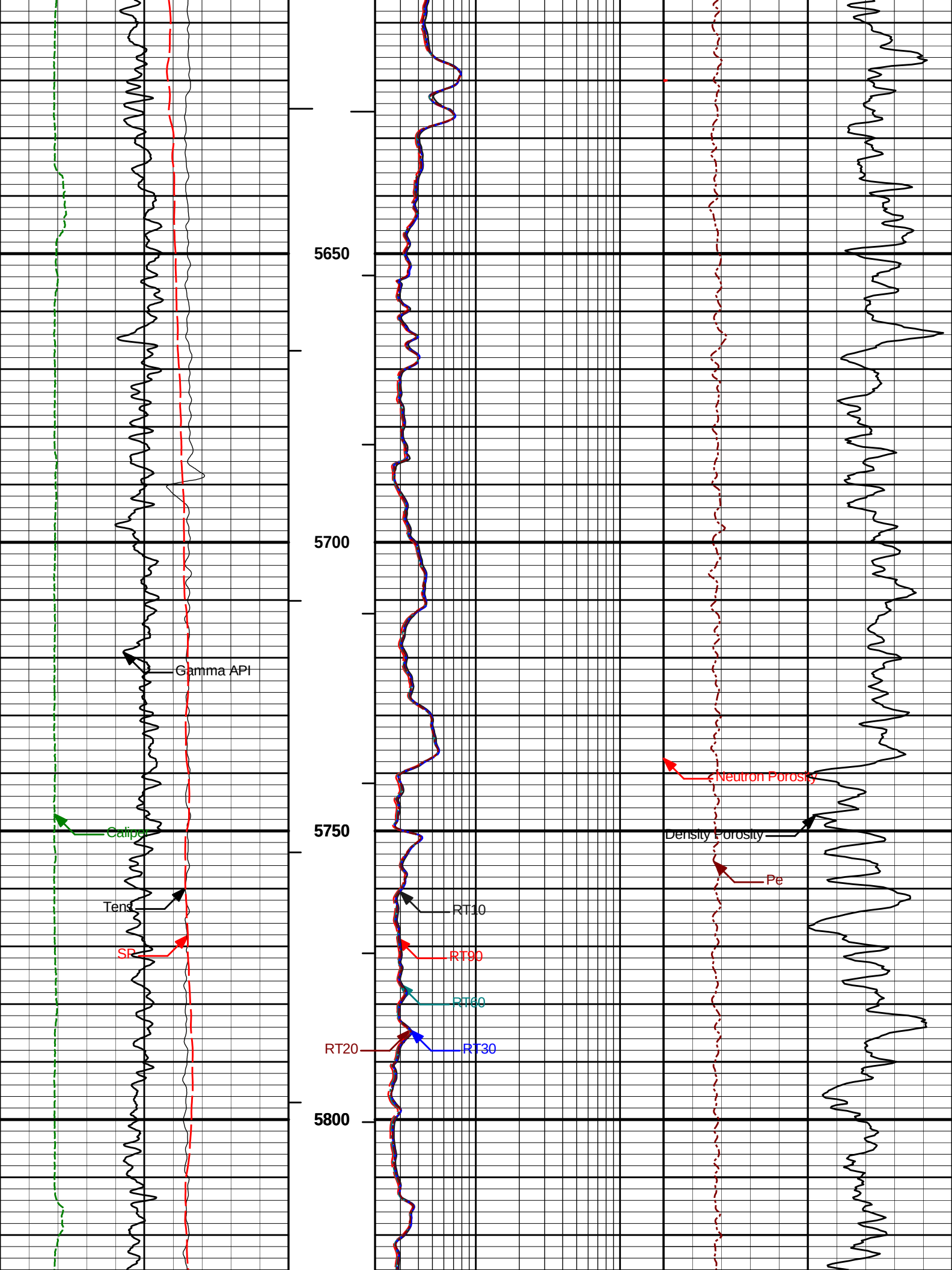
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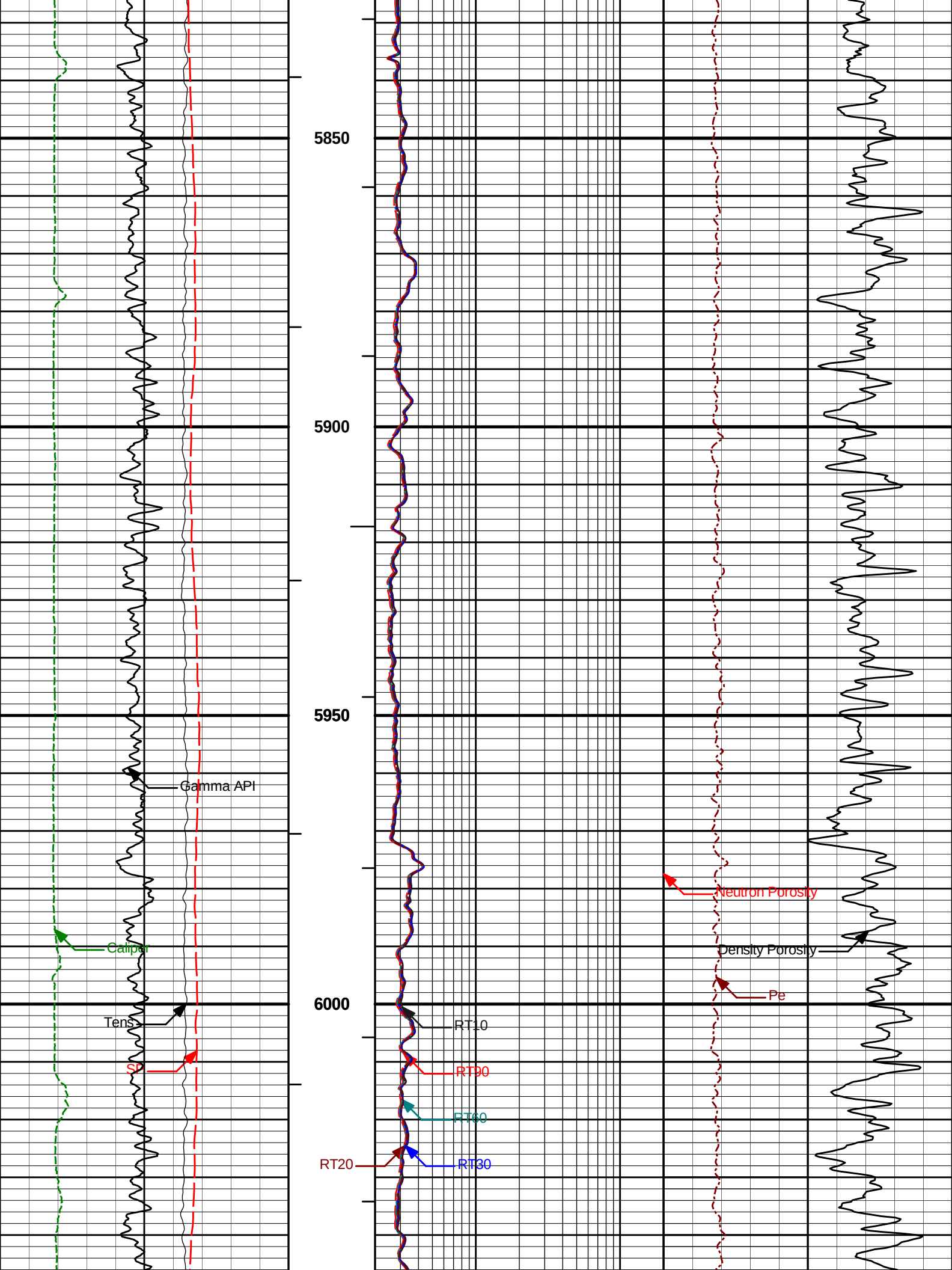
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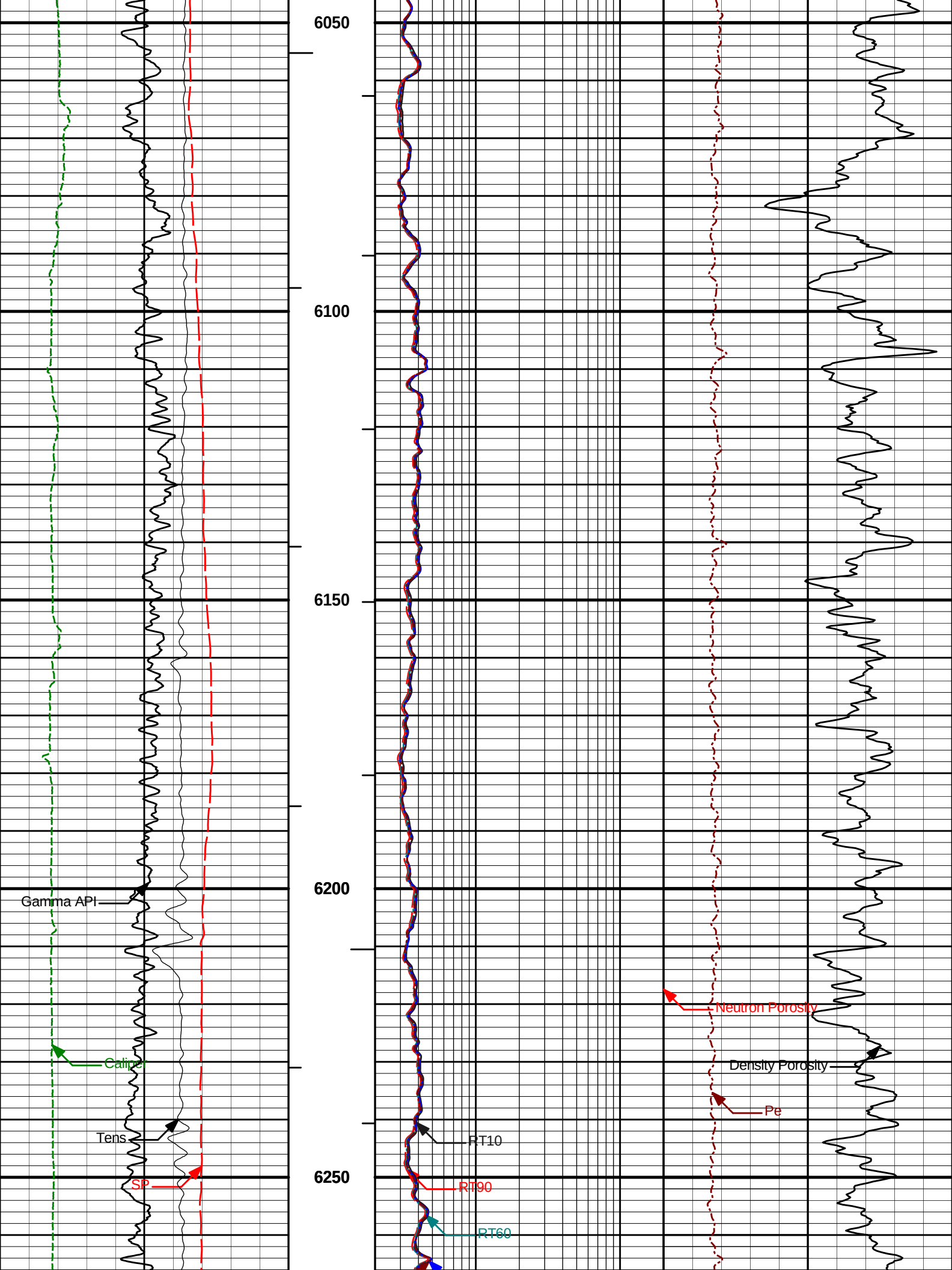
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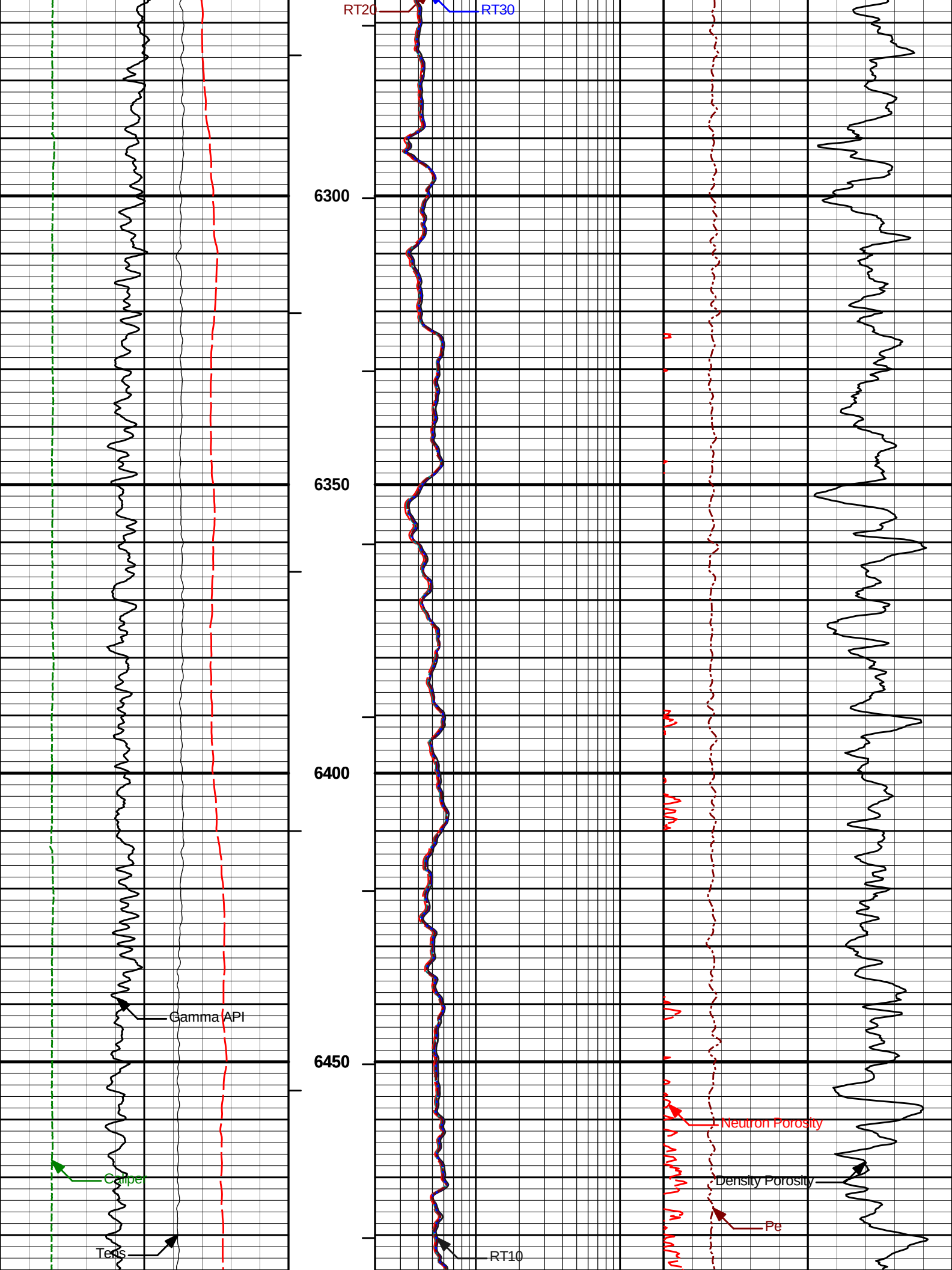
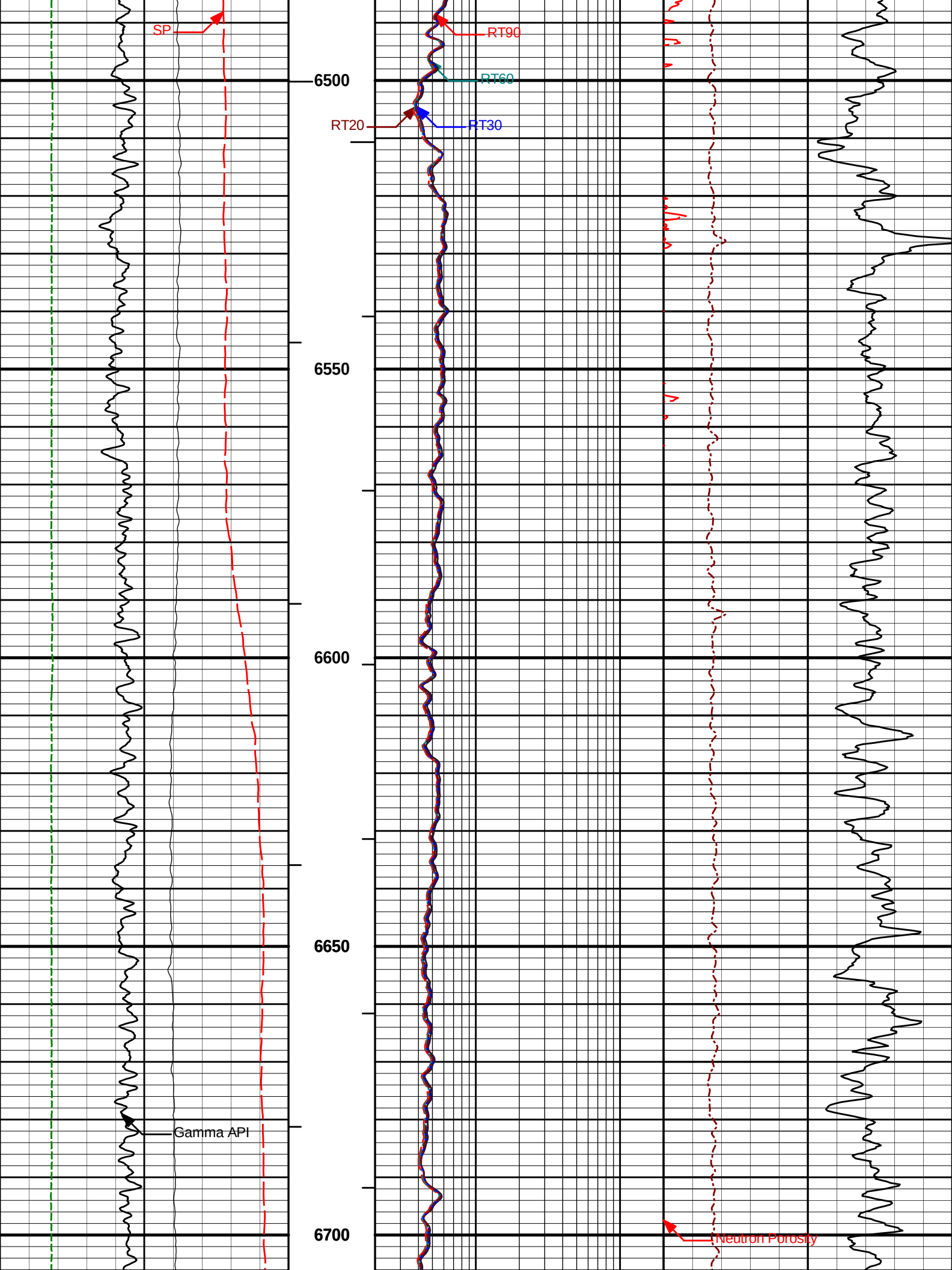
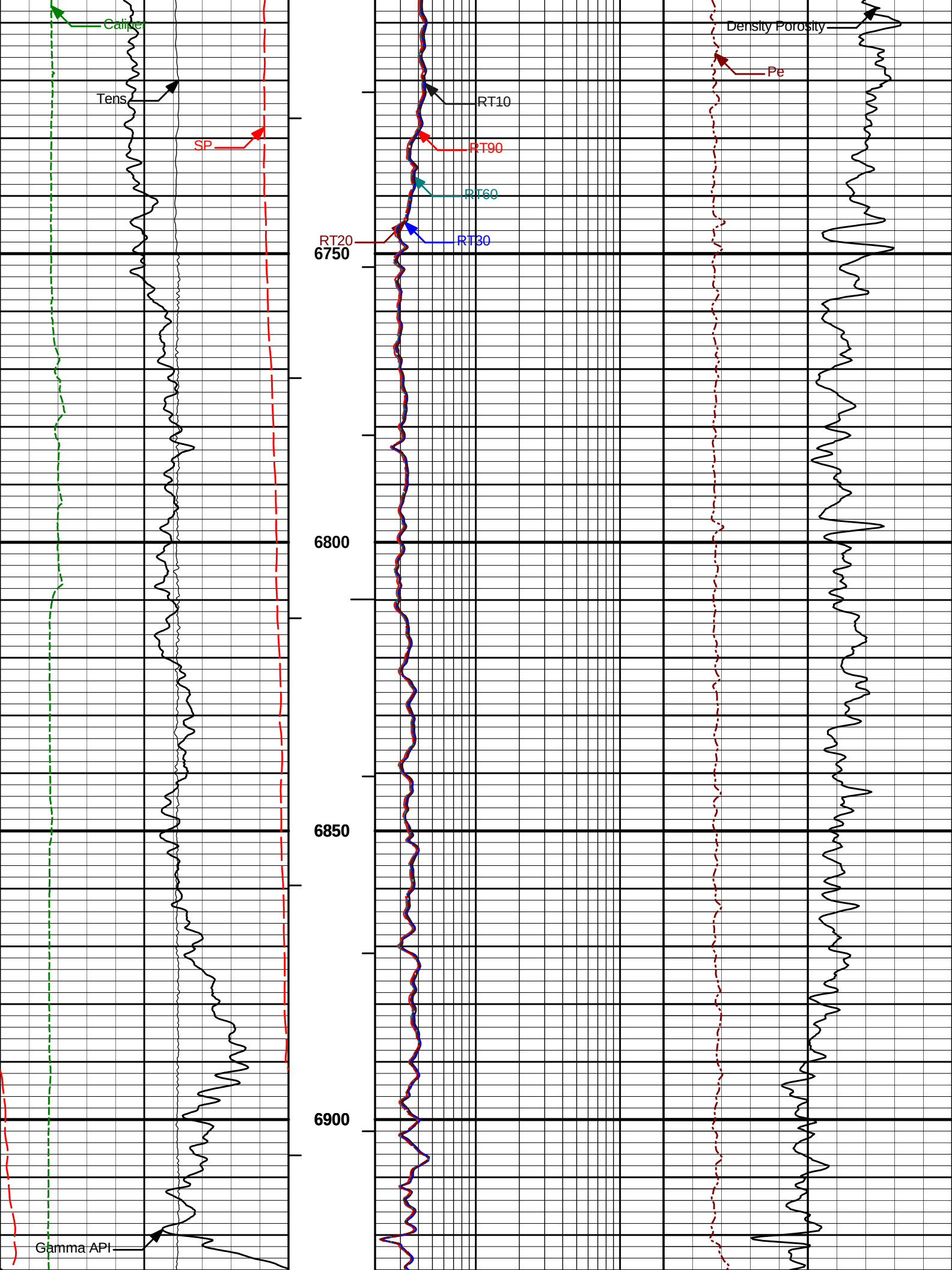
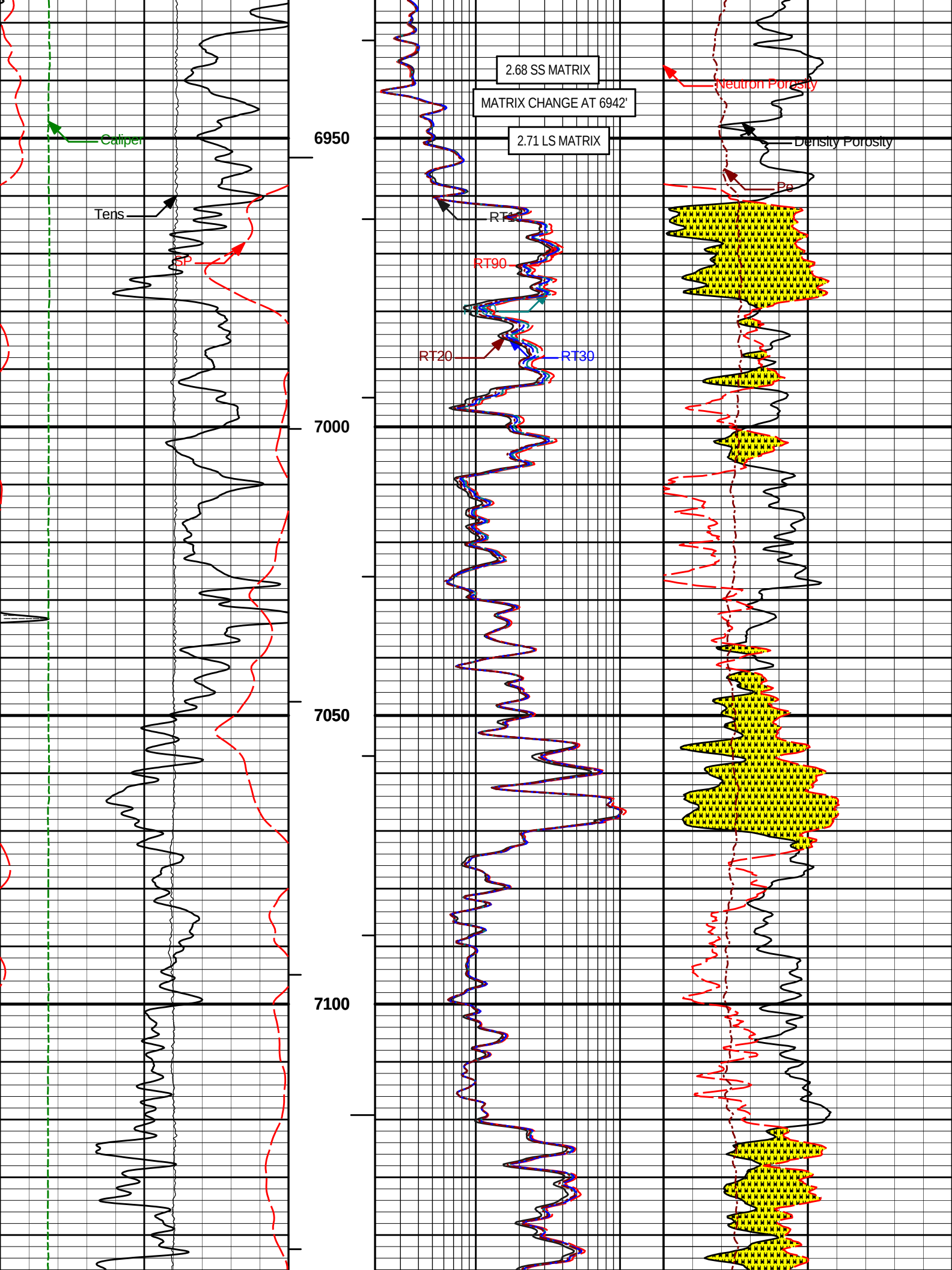
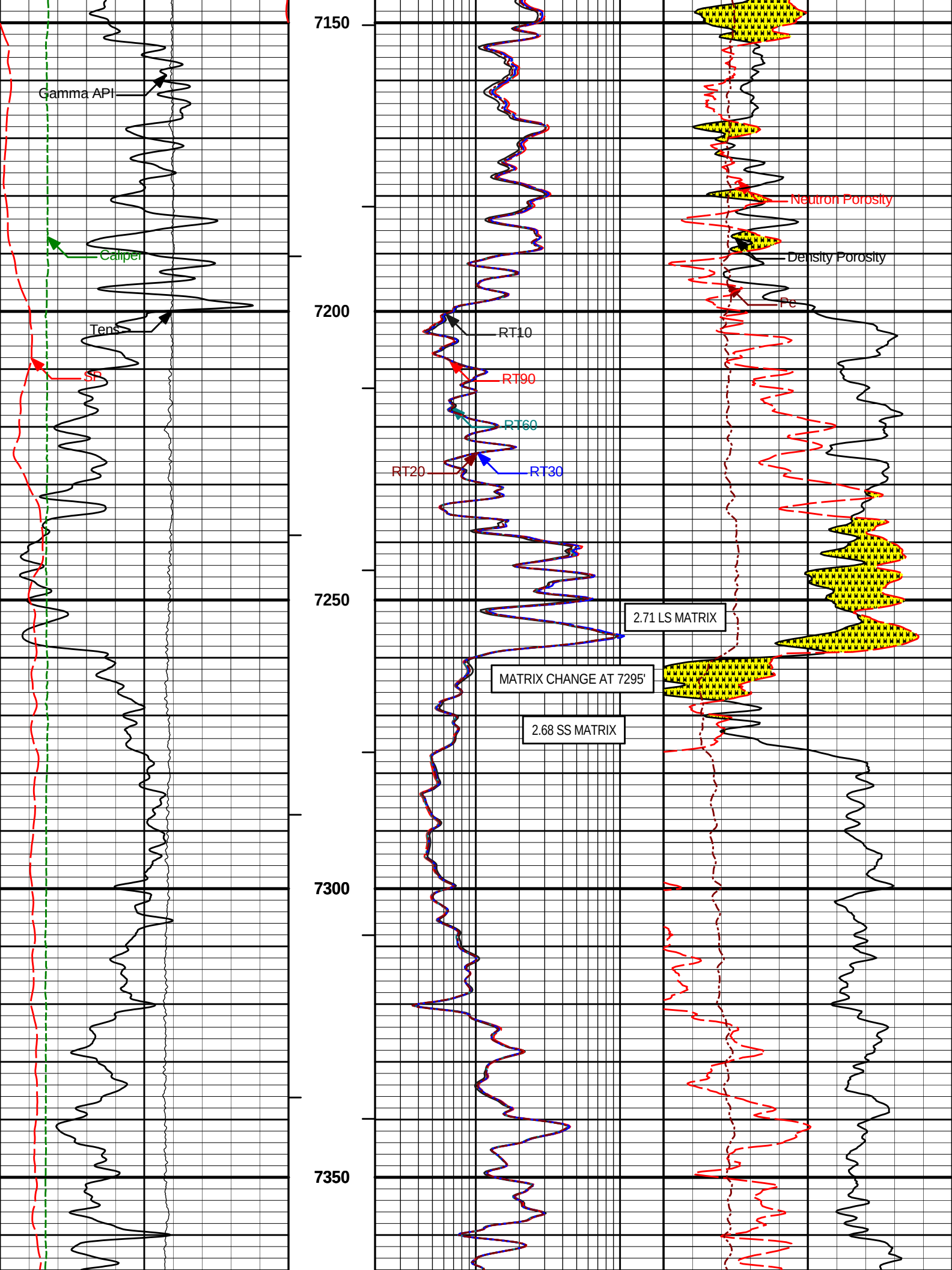
Density Porosity
Pe

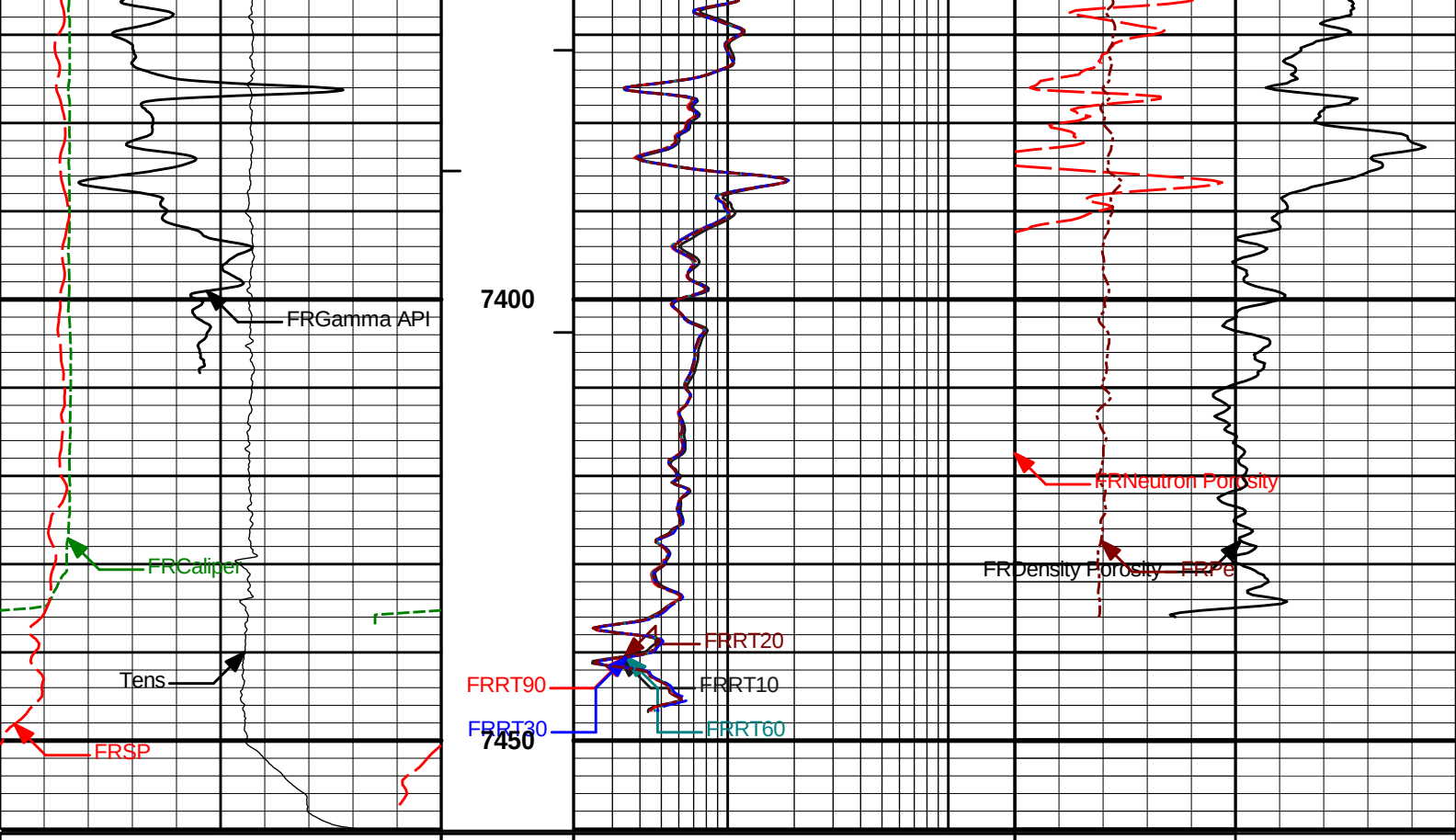

RT20
RT30
6300
6350
6400
6450
Gamma API
Caliper
Tens
RT10
Neutron Porosity
Density Porosity
Pe


SP
RT90
RT60
RT20
RT30
6500
6550
6600
6650
6700
Gamma API
Neutron Porosity


Caliper
Tens
SP
RT10
RT90
RT60
RT30
RT20
6750
6800
6850
6900
Density Porosity
Pe
Gamma API


2.68 SS MATRIX
MATRIX CHANGE AT 6942'
2.71 LS MATRIX
Caliper
Tens
SP
RT1
RT90
RT20
RT30
Neutron Porosity
Density Porosity
Pe
6950
7000
7050
7100


7150
7200
7250
7300
7350
Gamma API
Caliper
Tens
SP
RT10
RT90
RT60
RT20
RT30
Neutron Porosity
Density Porosity
Pe
2.71 LS MATRIX
MATRIX CHANGE AT 7295'
2.68 SS MATRIX



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

HALLIBURTON

Plot Time: 11-Sep-10 10:50:08
Plot Range: 598 ft to 7460.25 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\COMP\MAIN

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11294346**	**Reference Calibration Date:**	**20-Jul-10 12:00:55**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 14:02:30**

Software Version:	**WL INSITE R3.0.7 (Build 3)**	**Calibration Version:**	**1**

Calibrator Source S/N: KW-290

Calibrator API Reference:230.00 api

Measurement	Measured	Calibrated	Units
Background	76.3	76.1	api
Background + Calibrator	310.7	310.1	api
Calibrator	233.9	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11294346**	**Reference Calibration Date:**	**16-Aug-10 14:02:30**
Engineer:	**F. LODER**	**Calibration Date:**	**11-Sep-10 02:31:53**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Calibrator Source S/N: KW-290

Calibrator API Reference:230.00 api

Field Verification	Shop	Field	Units
Background	76.1	78.1	api
Background + Calibrator	310.1	313.5	api
Calibrator	234.0	235.5	api

Shop	Field	Difference	Tolerance
234.0	235.5	-1.5	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**20-Jul-10 12:11:34**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 14:22:25**
Software Version:	**WL INSITE R3.0.7 (Build 3)**	**Calibration Version:**	**1**
Source SN:	**KW-290**		

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.7	22.7	Channel #
583 KEV Peak Channel #	51.1	51.2	Channel #
2614 KEV Peak Channel #	209.6	210.5	Channel #
Calibrate Temperature	124.3	101.6	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 230.00 API

Calibrator Value: 261.2 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1608.4	CPS	321.8	323.3	API
Background	309.0	CPS	60.6	62.1	API

Gamma Ray Gain: 1.01

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**16-Aug-10 14:22:25**

Engineer:	**F. LODER**	**Calibration Date:**	**11-Sep-10 02:45:33**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.7	23.0	Channel #
583 KEV Peak Channel #	51.2	51.6	Channel #
2614 KEV Peak Channel #	210.5	211.3	Channel #
Calibrate Temperature	101.6	96.3	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 230.00 API
Calibrator Value: 261.2 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1607.3	CPS	323.3	324.3	API
Background	312.8	CPS	62.1	63.1	API

Gamma Ray Gain: 1.02
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11301132**	**Reference Calibration Date:**	**16-Aug-10 17:25:59**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 17:38:02**
Software Version:	**WL INSITE R3.0.7 (Build 3)**	**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: 72 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	**Prev. Value**	**New Value**	**Control Limit On New Value**
Gain:	0.988	0.986	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):	0.2228	0.2224	0.0004	+/- 0.0020
Calibrated Ratio:	10.13	10.11	0.014	+/- 0.050

VERIFIER		
Measurement	**Value**	**Control Limit**
Snow-Block Porosity (decp):	0.0803	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:**	**16-Aug-10 17:38:02**
Engineer:	**F. LODER**	**Calibration Date:**	**11-Sep-10 02:47:00**
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):	0.0803	0.0790	-0.0014	+/- 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:**	**20-Jul-10 15:11:00**
Engineer:	**C. BLUE**	**Calibration Date:**	**17-Aug-10 13:55:48**
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	1.0642	1.0833	0.90 - 1.10
Near Dens Gain	1.0244	1.0516	0.90 - 1.10
Near Peak Gain	1.0404	1.0754	0.90 - 1.10
Near Lith Gain	1.0149	1.0475	0.90 - 1.10
Far Bar Gain	1.0194	1.0230	0.90 - 1.10
Far Dens Gain	1.0054	1.0073	0.90 - 1.10
Far Peak Gain	0.9965	1.0021	0.90 - 1.10
Far Lith Gain	0.9661	0.9724	0.90 - 1.10
Near Bar Offset	-0.3458	-0.5266	NONE
Near Dens Offset	0.0006	-0.2427	NONE
Near Peak Offset	-0.1399	-0.4336	NONE
Near Lith Offset	0.0515	-0.2222	NONE
Far Bar Offset	0.0262	-0.0054	NONE
Far Dens Offset	0.1296	0.1174	NONE
Far Peak Offset	0.1721	0.1277	NONE
Far Lith Offset	0.3386	0.2861	NONE
Near Bar Background	956.41	950.28	700 - 1450
Near Dens Background	316.89	315.69	230 - 480
Near Peak Background	137.59	137.20	100 - 210
Near Lith Background	167.00	167.11	125 - 260
Far Bar Background	505.38	503.53	450 - 900

Far Bar Background	505.28	503.52	450 - 900
Far Dens Background	199.86	200.75	175 - 345
Far Peak Background	78.21	78.34	70 - 140
Far Lith Background	81.91	81.60	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.684	1.680	-0.004	+/- 0.015
Pe	2.614	2.593	-0.021	+/- 0.150
ALUMINUM				
Density (g/cc)	2.602	2.600	-0.002	+/- 0.01500
Pe	3.091	3.099	0.008	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0007	+/- 0.0110	-0.0008	+/- 0.0140
Magnesium Block	0.0003	+/- 0.0110	-0.0013	+/- 0.0140
Aluminum Block	-0.0004	+/- 0.0110	-0.0002	+/- 0.0140
Resolution	8.83	6.00 - 11.50	9.83	6.00 - 11.50
Internal Verifier(B+D+P+L)	1570	1200 - 2700	864	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
Engineer: F. LODER
Software Version: WL INSITE R3.0.4 (Build 6)
Reference Calibration Date: 17-Aug-10 13:55:48
Calibration Date: 11-Sep-10 02:32:14
Calibration Version: 1

Pad Temperature: 74.4 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1570.289	1568.204	-2.085	15.944
Far (B+D+P+L) cps	864.213	862.790	-1.423	16.086
Near Resolution	8.83	8.81	-0.020	0.50
Far Resolution	9.83	10.03	0.200	1.00

PASS/FAIL SUMMARY

Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**29-Aug-10 09:41:41**
Engineer:	**C. BLUE**	**Calibration Date:**	**07-Sep-10 10:11:53**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-2415.04	-2227.85	-7000.00 - -1000.00
Pad Gain	0.0003985	0.0003919	0.000200 - 0.000600
Arm Offset	-1545.80	-1070.69	-5000.00 - 3000.00
Arm Gain	0.0005563	0.0004706	0.000300 - 0.000700
Arm Power	-0.000008305	-0.000003452	-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)	1.96	2.00	0.04	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.48	6.50	0.02	+/- 0.20
Medium Ring (in)	8.44	8.25	-0.19	+/- 0.20
Large Ring (in)	15.10	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:**	**04-Jun-10 17:35:57**
Engineer:	**C. BLUE**	**Calibration Date:**	**13-Aug-10 20:36:17**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**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	1.0222	1.05	0.95	1.0229	1.05	0.95	1.0194	1.05
A2 (50")	0.95	0.9997	1.05	0.95	1.0021	1.05	0.95	0.9995	1.05
A3 (29")	0.95	0.9946	1.05	0.95	0.9956	1.05	0.95	0.9917	1.05
A4 (17")	0.95	0.9997	1.05	0.95	0.9975	1.05	0.95	0.9947	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0022	1.05	0.95	0.9988	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9802	1.05	0.95	0.9754	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	-0.767	2	-6	-4.245	-2	-8	-5.212	-2
A2 (50")	-7	-3.191	-1	-6	-4.049	-2	-7	-4.429	-2
A3 (29")	-27	-14.006	-9	-9	-4.120	-3	-7	-3.109	-1

A4 (17")	-180	-96.845	-60	-45	-31.787	-15	-39	-25.716	-13
A5 (10")	N/A	N/A	N/A	-150	-89.499	-50	-80	-43.805	-10
A6 (6")	N/A	N/A	N/A	175	295.504	525	90	152.604	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.8902	1.3
36K	1.0	1.8792	2.0
72K	1.0	1.1270	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.010	1.05

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11294346						
Gamma Ray Calibrator	234.0	235.5	----------	-1.5	+/- 9.00	api
CSNG-10965402						
60 KEV Peak Channel #	48.0	48.0	----------	0.0	----------	Channel #
239 KEV Peak Channel #	22.7	23.0	----------	-0.3	----------	Channel #
583 KEV Peak Channel #	51.2	51.6	----------	-0.4	----------	Channel #
2614 KEV Peak Channel #	210.5	211.3	----------	-0.8	----------	Channel #
DSNT-11301132						
Snow-Block Porosity	0.0803	0.0790	----------	0.0013	+/- 0.0150	decp
SDLT-I132M275						
Near(B+D+P+L)	1570.289	1568.204	----------	2.085	+/-15.944	cps
Far(B+D+P+L)	864.213	862.790	----------	1.423	+/-16.086	cps
Pad Extension	3.75	----------	----------	0.00	+/-0.20	in
Ring Diameter	8.25	----------	----------	0.00	+/-0.20	in
ACRt-90199007-E6758-S4352						
Mud Cell	1.010	----------	----------	0.000	----------	ohm-m

Data: BOULTER_G22_32D\0001 TRIPLE_CSNG_RED\IDLE **Date: 11-Sep-10 08:00:14**

COMPANY	**NOBLE ENERGY**
WELL	**BOULTER G22-32D**
FIELD	**WATTENBERG**
COUNTY	**WELD** STATE **CO**

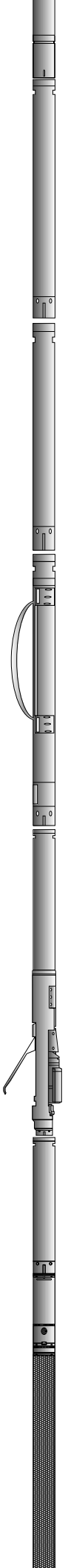
HALLIBURTON

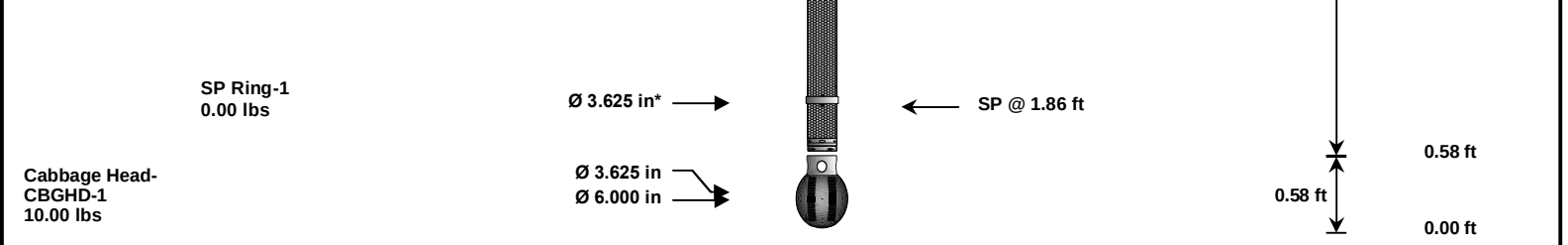
DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY LOG

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-A094 135.00 lbs		Ø 3.625 in	Load Cell @ 59.58 ft		6.25 ft	63.27 ft


Load Cell @ 59.58 ft
BH Temperature @ 59.02 ft
57.02 ft
GTET-11294346
165.00 lbs
Ø 3.625 in
8.52 ft
GammaRay @ 50.95 ft
48.50 ft
CSNG-10965402
114.00 lbs
Ø 3.625 in
8.17 ft
CSNG @ 42.87 ft
40.33 ft
DSN Decentralizer-
10860047
6.60 lbs
Ø 3.625 in*
DSNT-11301132
174.00 lbs
Ø 3.625 in
9.69 ft
DSN Far @ 33.39 ft
DSN Near @ 32.64 ft
30.64 ft
SDLT-I132M275
360.00 lbs
Ø 4.500 in
10.81 ft
SDL Microlog @ 22.83 ft
SDL Caliper @ 22.65 ft
Ø 4.750 in
SDL @ 22.64 ft
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



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	A094	135.00	6.25		57.02	300.00
GTET	Gamma Telemetry Tool	11294346	165.00	8.52		48.50	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17		40.33	15.00
DSNT	Dual Spaced Neutron	11301132	174.00	9.69		30.64	60.00
DCNT	DSN Decentralizer	10860047	6.60	5.13	*	33.97	300.00
SDLT	Spectral Density Tool	I132M275	360.00	10.81		19.83	60.00
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			**1,214.60**	**63.27**			

* Not included in Total Length and Length Accumulation.

Data: BOULTER_G22_32D\0001 TRIPLE_CSNG_RED\IDLE **Date: 11-Sep-10 07:55:17**