HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISITIVITY

COMPANY EXPEDITION WATER SOLUTIONS COLORADO LLC

WELL EWS #3A

FIELD/BLOCK WATTENBERG

COUNTY WELD STATE CO

API No. 05123438800000

Location SURFACE HOLE LOCATION:
2528' FNL & 1045' FWL
BOTTOM HOLE LOCATION:
2556' FWL & 512' FEL

LATITUDE: 40.297635
LONGITUDE: -104.750237

Sect. 23 Twp. 4N Rge. 66W

Other Services:
RWCH
CAST-M
CBL-M
CCL

Permanent Datum	GL	Elev. 4726.0 ft	Elev.: K.B. 4739.0 ft
Log measured from	KB	13.0 ft above perm. Datum	D.F. 4739.0 ft
Drilling measured from	KB		G.L. 4726.0 ft

Date		08-Jan-17					
Run No.		ONE					
Depth - Driller		12259.0 ft					
Depth - Logger		10745.0 ft					
Bottom - Logged Interval		10743.0 ft					
Top - Logged Interval		100.0 ft					
Casing - Driller		7.000 in @ 10602.0 ft		@		@	
Casing - Logger		10600.0 ft					
Bit Size		6.125 in		@		@	
Type Fluid in Hole		Water Based Mud					
Density	Viscosity	9.7 ppg	31.00 s/qt				
PH	Fluid Loss	8.00 pH	18.0 cptm				
Source of Sample		MUD TANK					
Rm @ Meas. Temperature		0.67 ohmm @ 51.50 degF		@		@	
Rmf @ Meas. Temperature		0.52 ohmm @ 59.80 degF		@		@	
Rmc @ Meas. Temperature		1.16 ohmm @ 59.80 degF		@		@	
Source Rmf	Rmc	MEASURED	MEASURED				
Rm @ BHT		0.14 ohmm @ 270.0 degF		@		@	
Time Since Circulation		09:20 hr					
Time on Bottom		08-Jan-17 08:20					
Max. Rec. Temperature		270.00 degF @ 10745.0 ft		@		@	
Equipment	Location	11392047	R. S. WY				
Recorded By		P. DIMPFL					
Witnessed By		B. STONE					

Fold here

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

Service Ticket No.: 903720475 API No.: 05123438800000

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

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	N/A	ECCENT	N/A
		I: 11219334			
		S: 11231100			

EQUIPMENT DATA

	GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE	LOGGING DATA
Serial No.	10842354	Serial No.		Serial No.	10865871	Serial No.	11013116	
Model No.	GTET	Model No.		Model No.	SDLT-I	Model No.	DSNT-I	
Diameter	3.625"	No. of Cent.		Diameter	4.5"	Diameter	3.625"	
Detector Model No.	GTET	Spacing		Log Type	GAMMA-GAMMA	Log Type	NEU-THERM	
Type	SCINT			Source Type	Cs137	Source Type	Am241Be	
Length	8"	LSA [Y/N]		Serial No.	5549GW	Serial No.	08-040	
Distance to Source	9'	FWDA [Y/N]		Strength	1.78 Ci	Strength	15 Ci	

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	10745	10601	REC	0 API	150 API				30 %	-10 %	2.65 g/cc	30 %	-10 %	SAND
ONE	10601	100	REC	0 API	150 API							30 %	-10 %	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: RWCH-GTET-DSNT-SDLT-ACRT-BN RUN IN COMBINATION

LOGS BRIDGED OUT DUE TO DEVIATION IN OPEN HOLE WELLBORE, LOGGED OUT FROM BRIDGE PER CUSTOMER REQUEST.

DEVIATION, BOREHOLE RUGOSITY, TENSION PULLS, & WASHOUTS MAY AFFECT LOG QUALITY

DSNT BOWSPRING DECENTRALIZER & ACRT STANDOFF REMOVED DUE TO HOLE SIZE

ANNULAR HOLE VOLUME CALCULATED FOR 4.5-IN CASING SDLM S/N: 10950493

TODAY'S CREW: A. FULGHUM, C. SIMONS RIG: ENSIGN 121

THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES, ROCK SPRINGS, WY (307) 352-8600

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PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	6.125	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.700	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	7120.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.673	ohmm
	SHARED	TRM	Temperature of Mud	51.5	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	12259.00	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	CBM Temperature Master Tool	GTET	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa /	AFAC	Archie A factor	0.6200	

	CrossPlot				
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.52	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	52.30	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Sandstone	
	DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
	DSNT	DNTT	Temperature Correction Type	None	
	DSNT	DPRS	DSN Pressure Correction Type	None	
	DSNT	SHCO	View More Correction Options	No	
	DSNT	UTVD	Use TVD for Gradient Corrections?	No	
	DSNT	LHWT	Logging Horizontal Water Tank?	No	
	DSNT	BHSM	Borehole Size Source Tool	SDLT	
	SDLT	CLOK	Process Caliper Outputs?	Yes	
	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	2.650	g/cc
	SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
	SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
	ACRt Sonde	RTOK	Process ACRt?	Yes	
	ACRt Sonde	MNSO	Minimum Tool Standoff	0.25	in
	ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
	ACRt Sonde	TPOS	Tool Position	Eccentered	
	ACRt Sonde	RMOP	Rmud Source	Mud Cell	
	ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
	ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
	ACRt Sonde	THQY	Threshold Quality	0.50	
	ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
	ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
	ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

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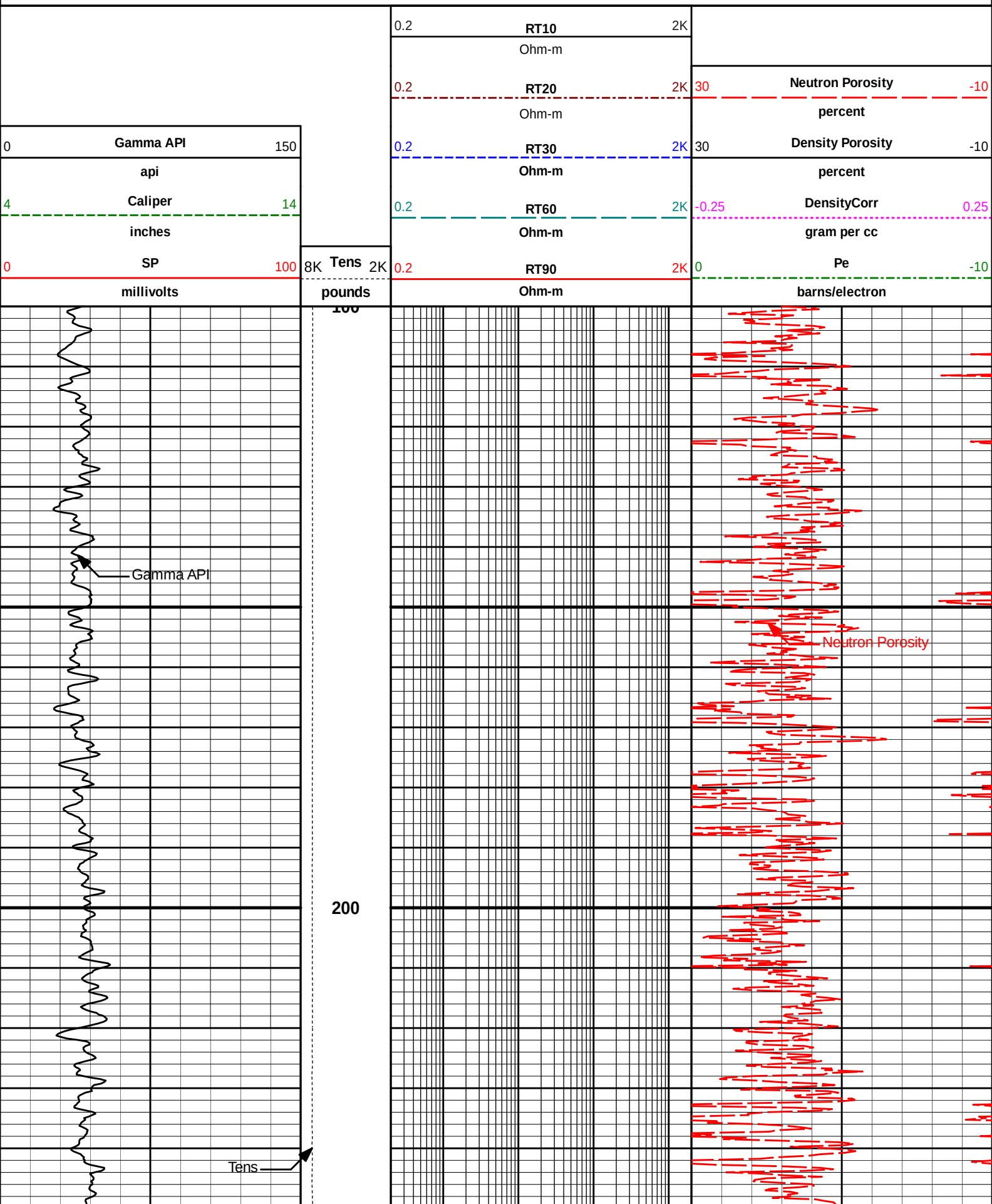
Plot Time: 08-Jan-17 17:41:29
Plot Range: 100 ft to 10766.6 ft
Data: EXPED_EWS_3A\Well Based*
Plot File: \\COMP\ULTRA_COMPOSITE_RUN2

MAIN PASS 5" = 100'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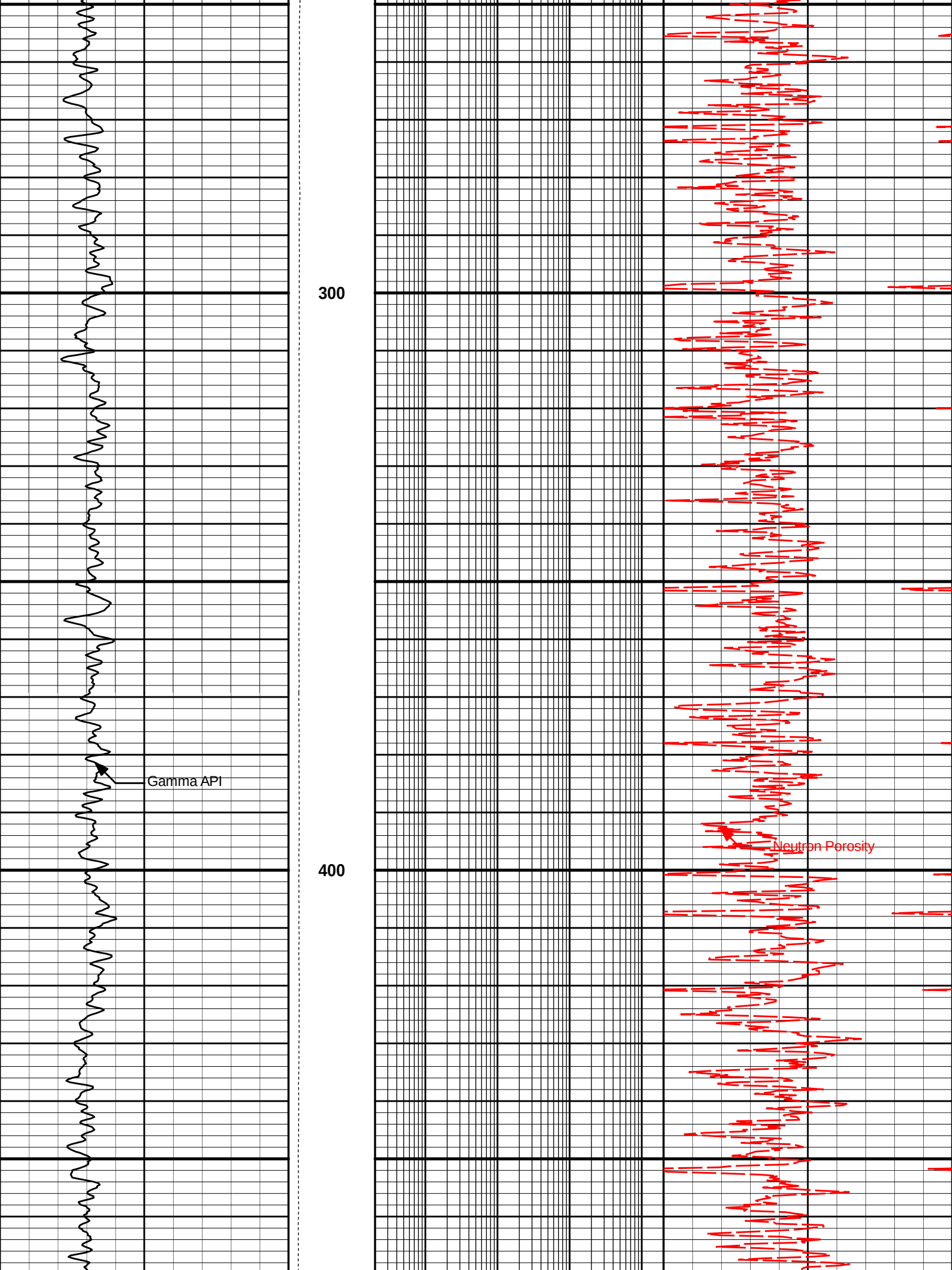
RT10
2K
Ohm-m
0.2
RT20
2K
Ohm-m
0.2
RT30
2K
Ohm-m
0.2
RT60
2K
Ohm-m
0.2
RT90
2K
Ohm-m
30
Neutron Porosity
-10
percent
30
Density Porosity
-10
percent
-0.25
DensityCorr
0.25
gram per cc
0
Pe
-10
barns/electron
0
Gamma API
150
api
4
Caliper
14
inches
0
SP
100
millivolts
8K
Tens
2K
pounds
100
200
Gamma API
Neutron Porosity
Tens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400
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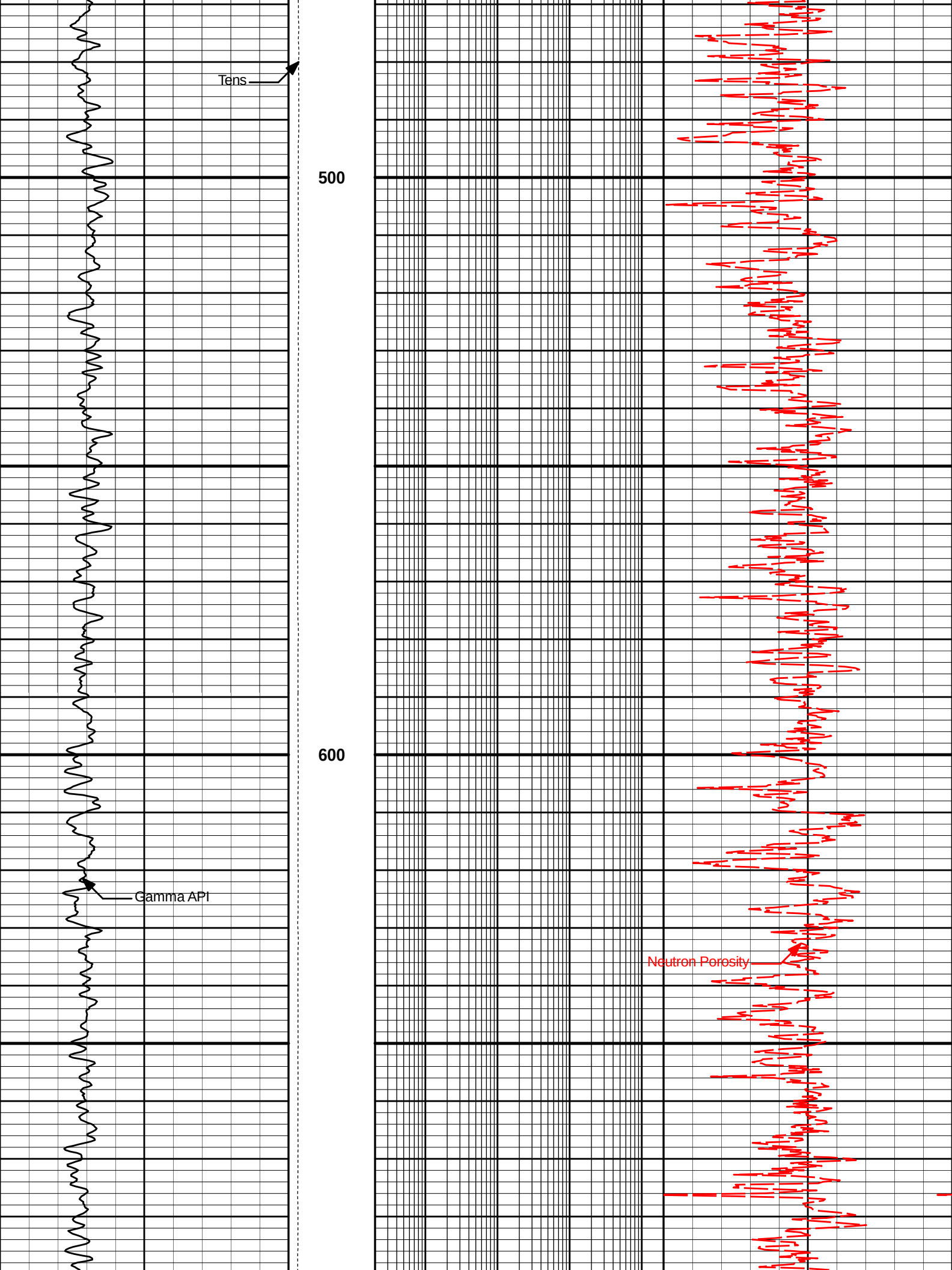
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500
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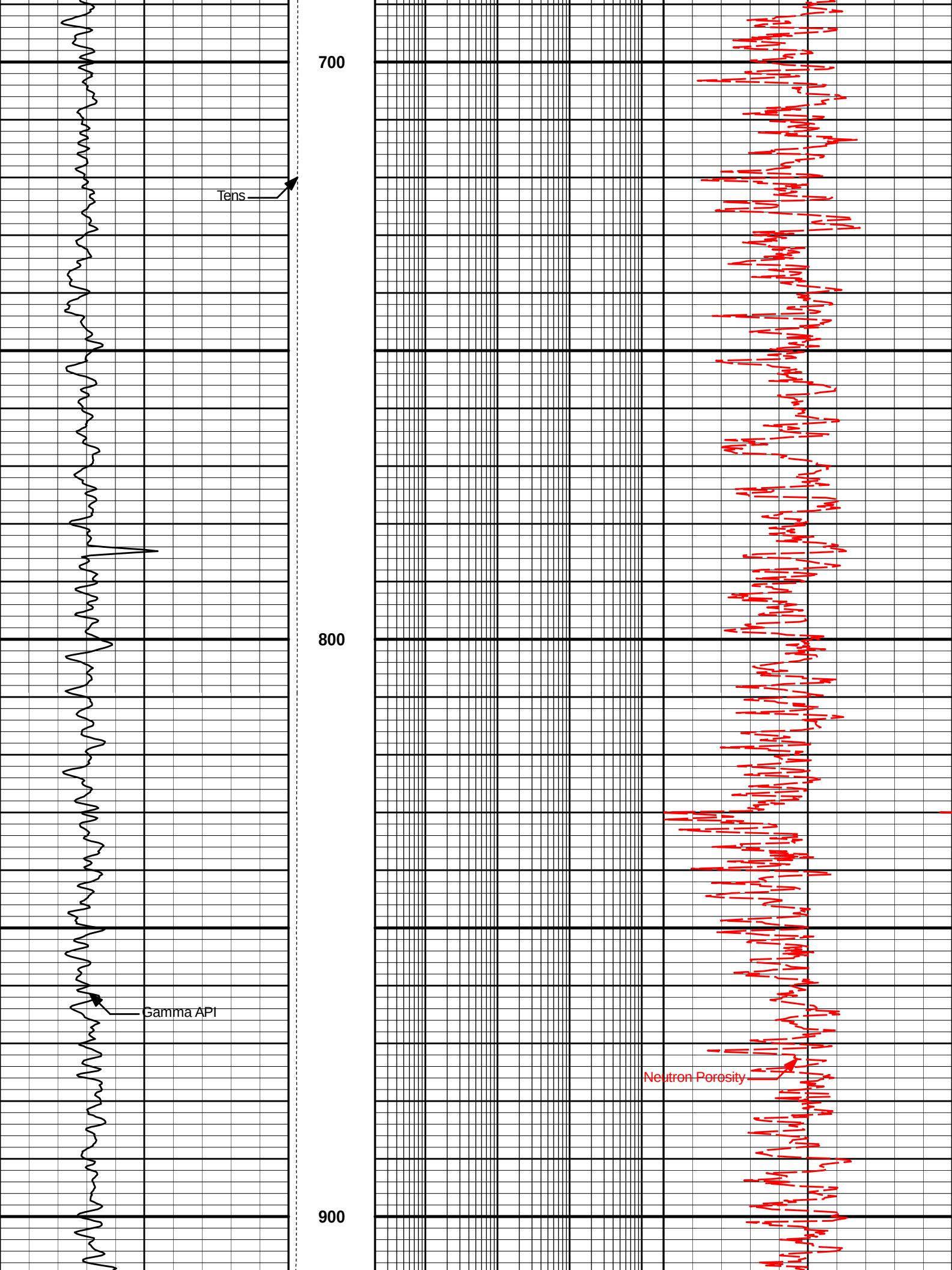
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800
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Tens
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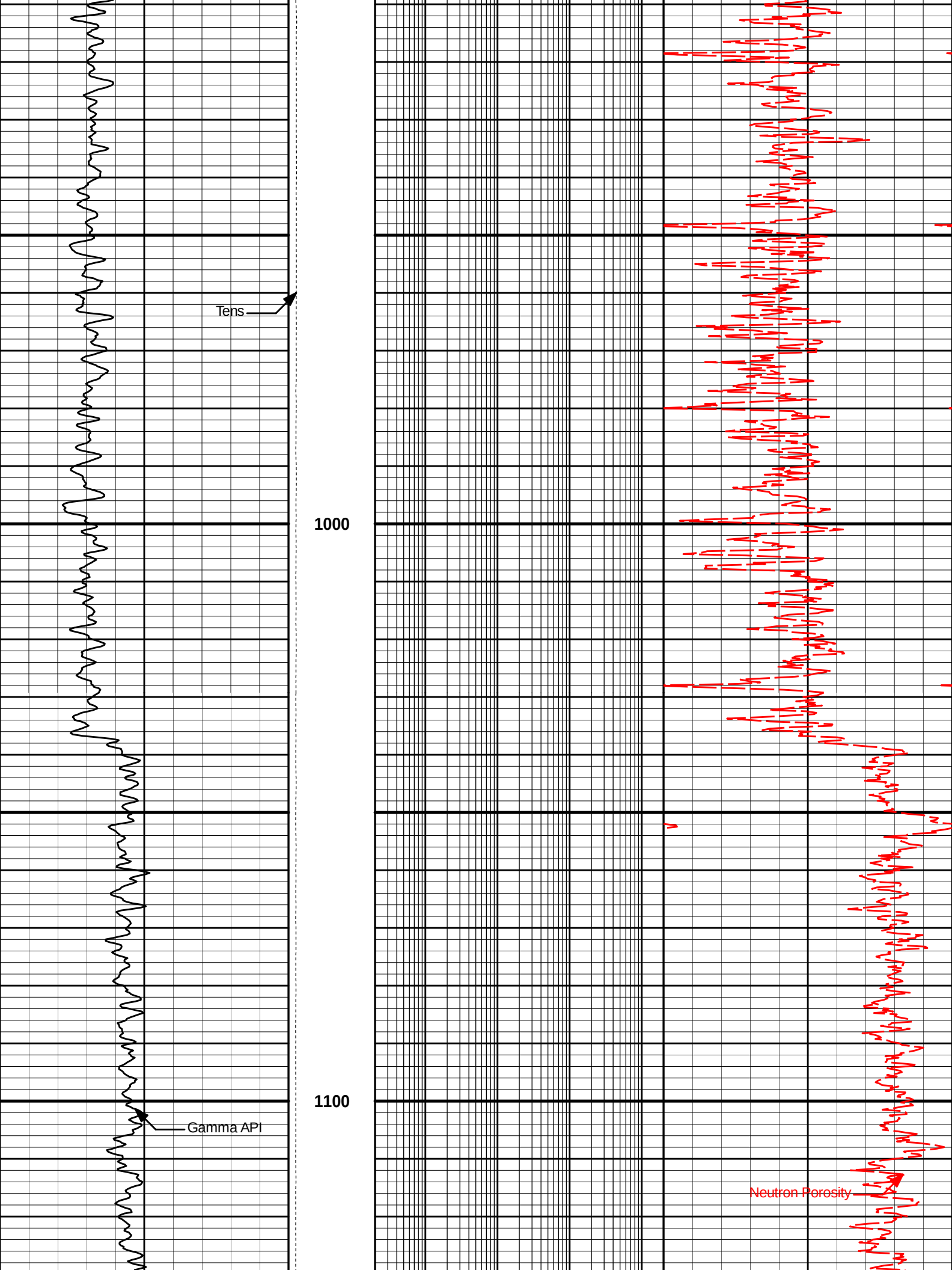
Tens
1000
1100
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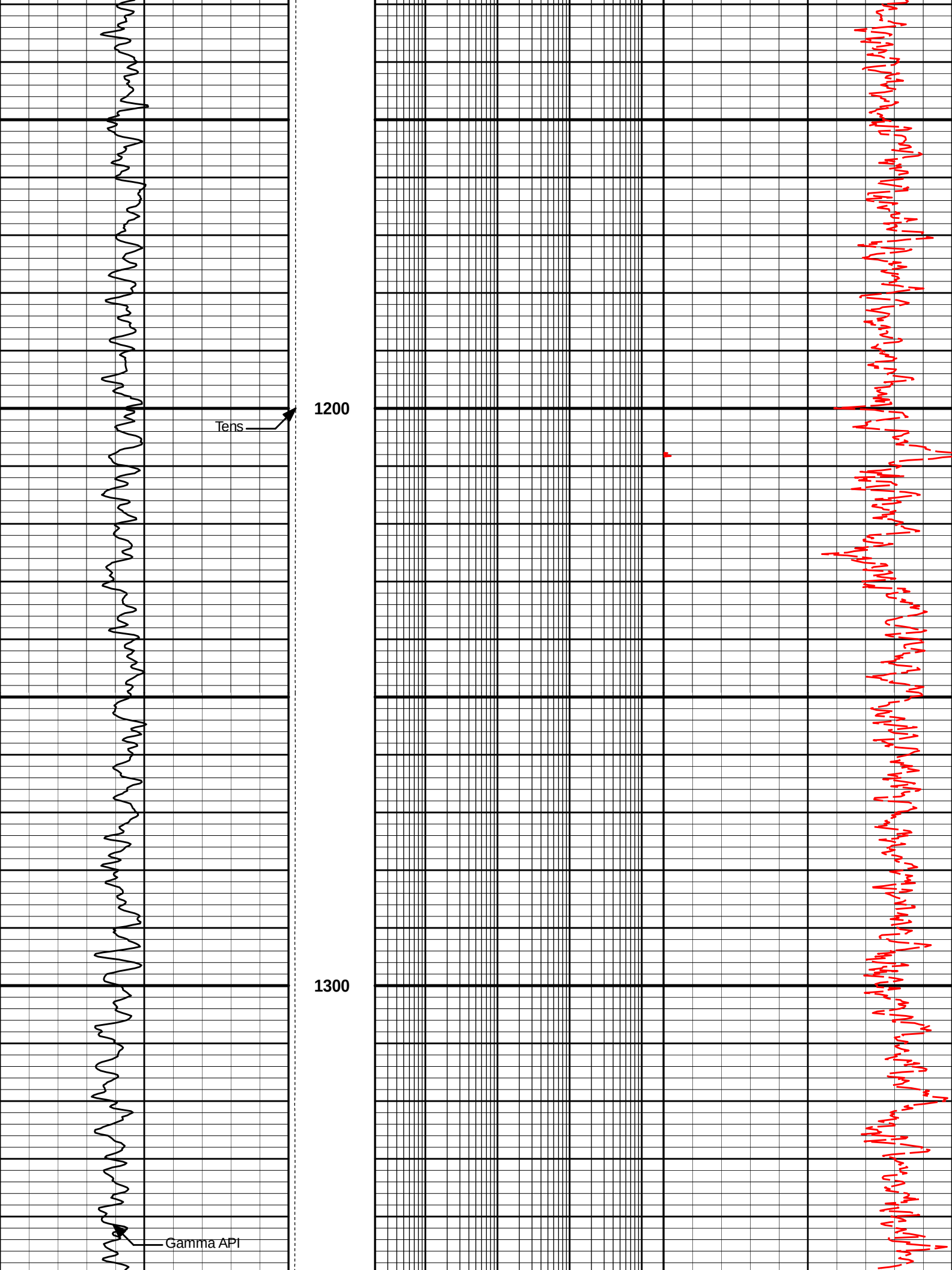
1200
Tens
1300
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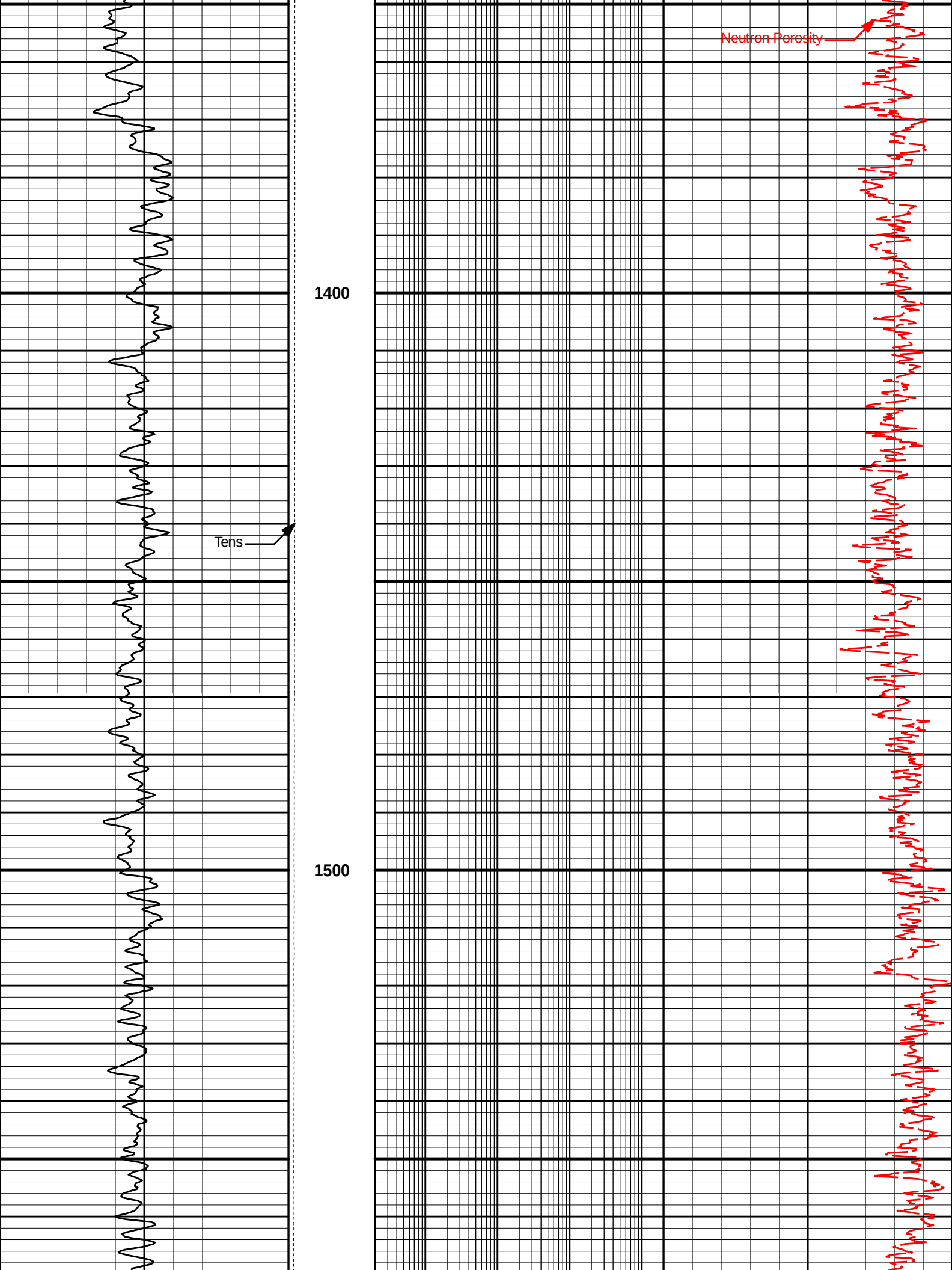
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Tens
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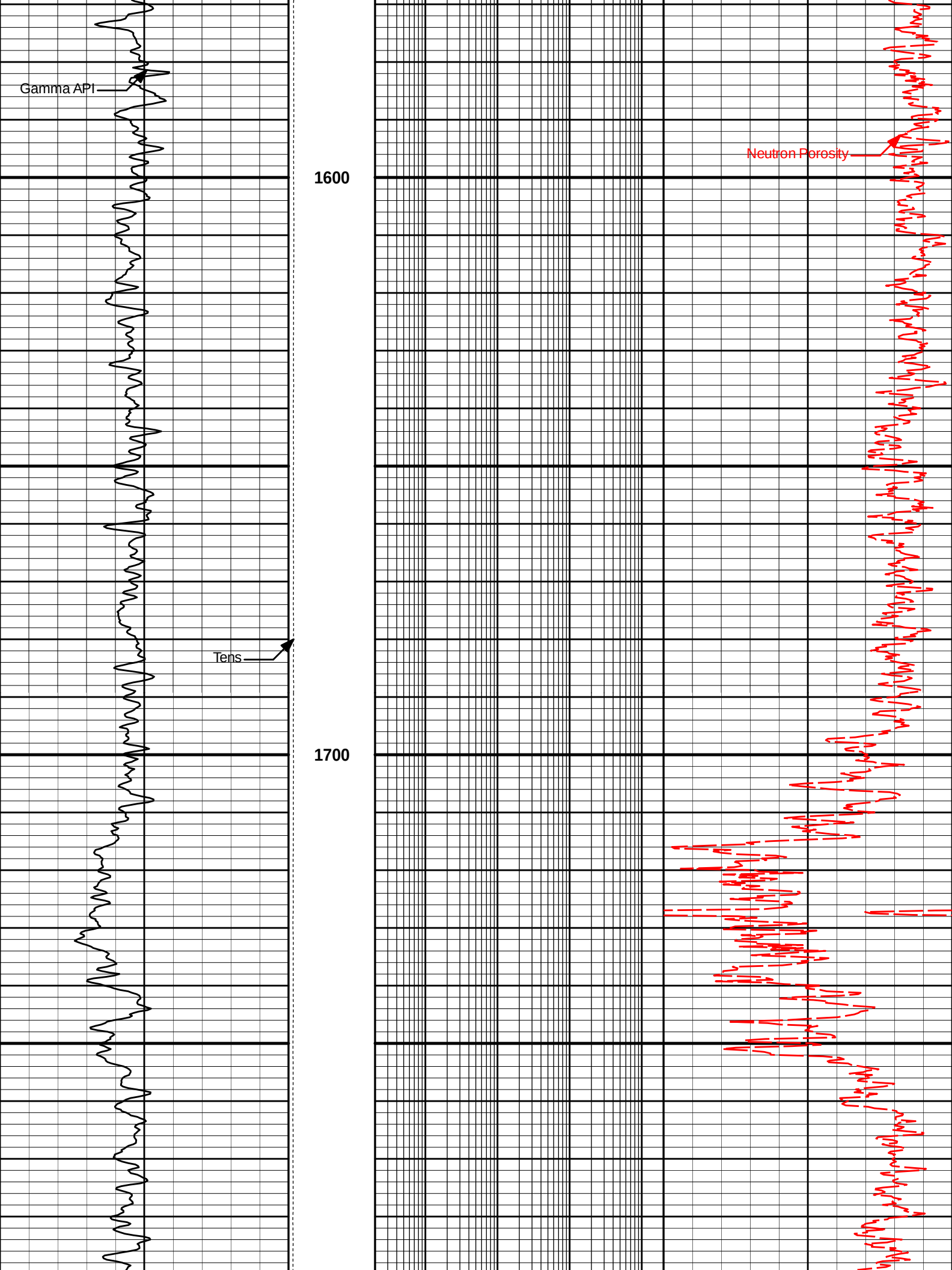
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Tens
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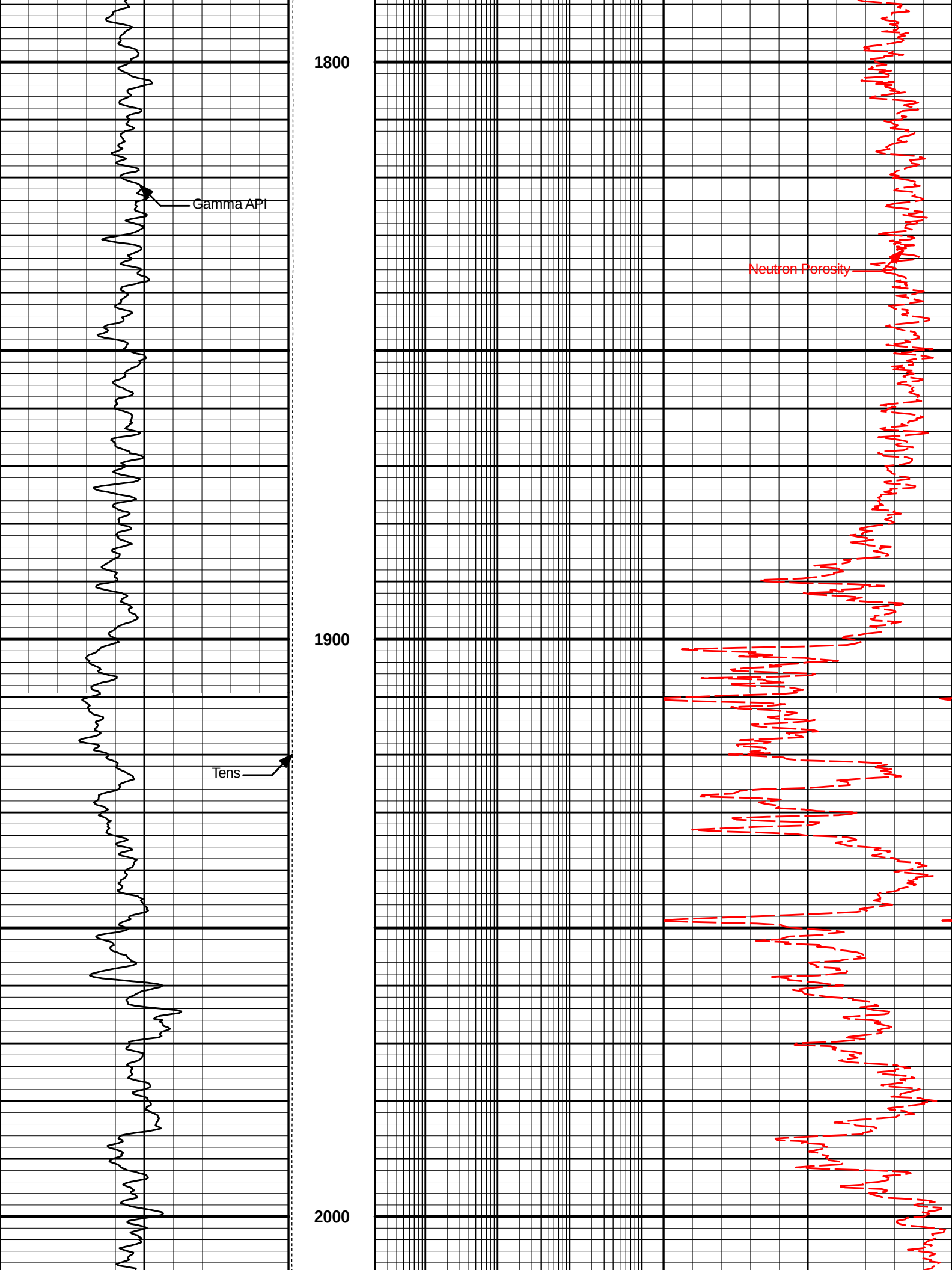
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1900
2000
Gamma API
Tens
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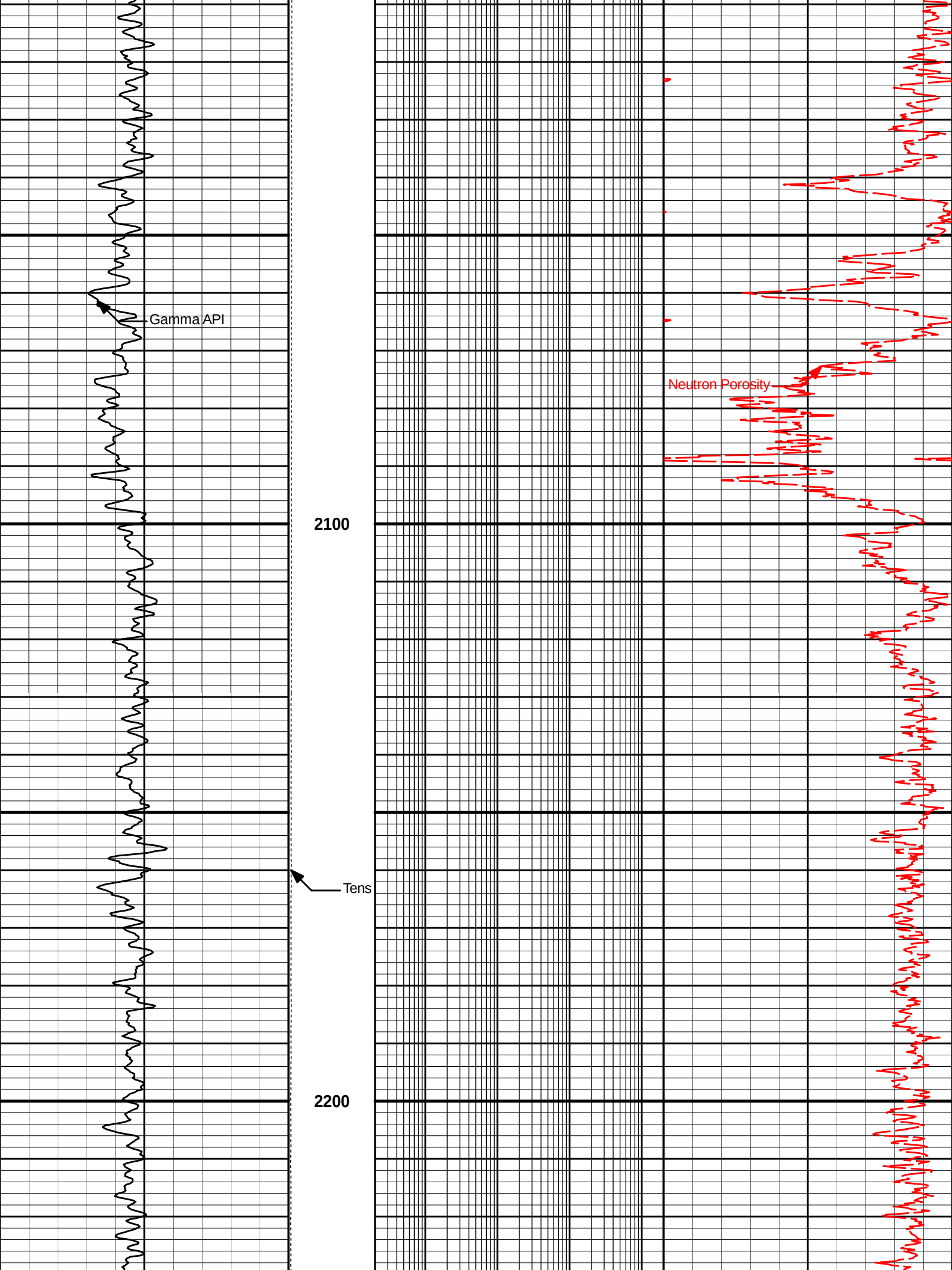
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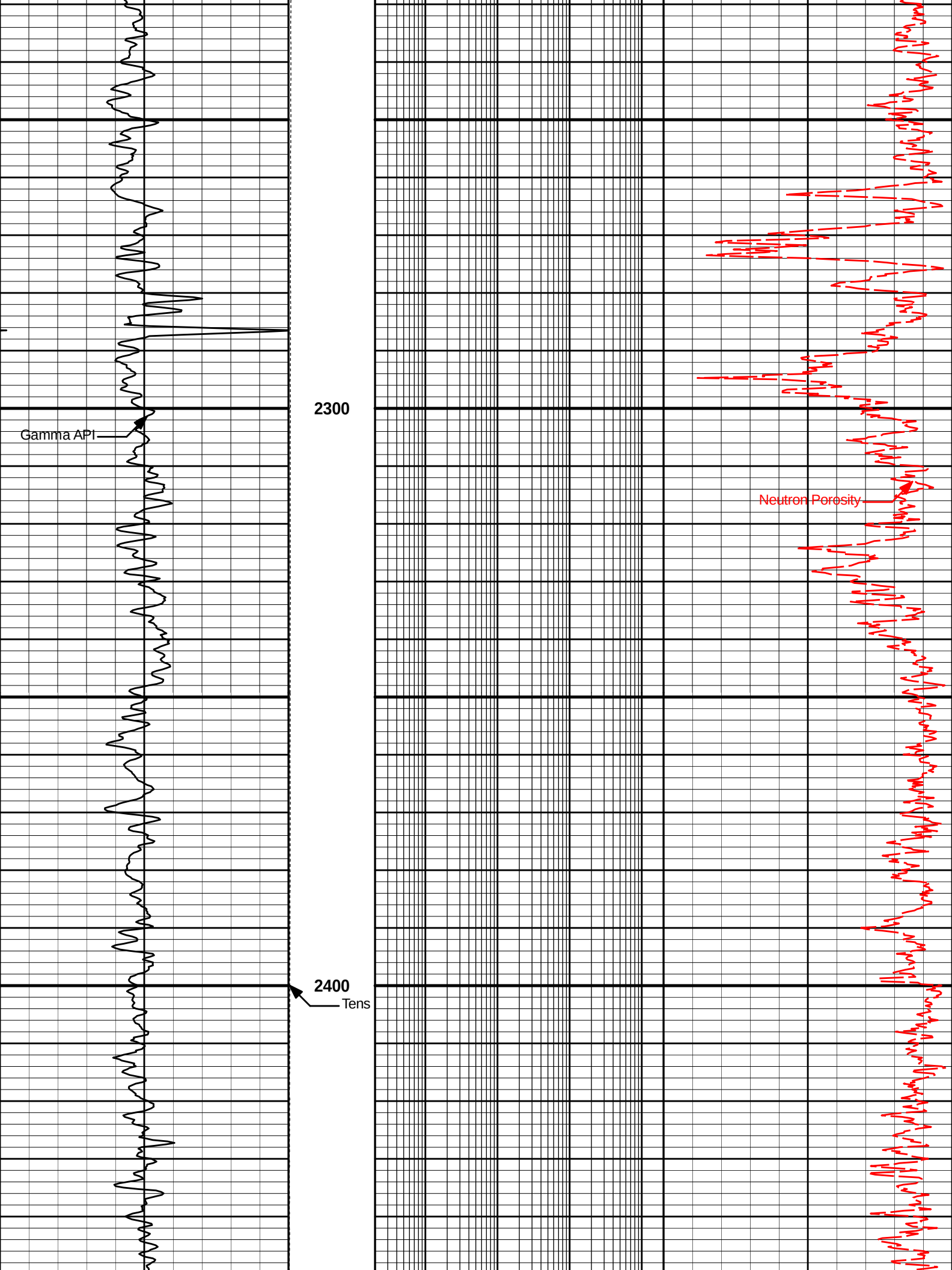
2100
Tens
2200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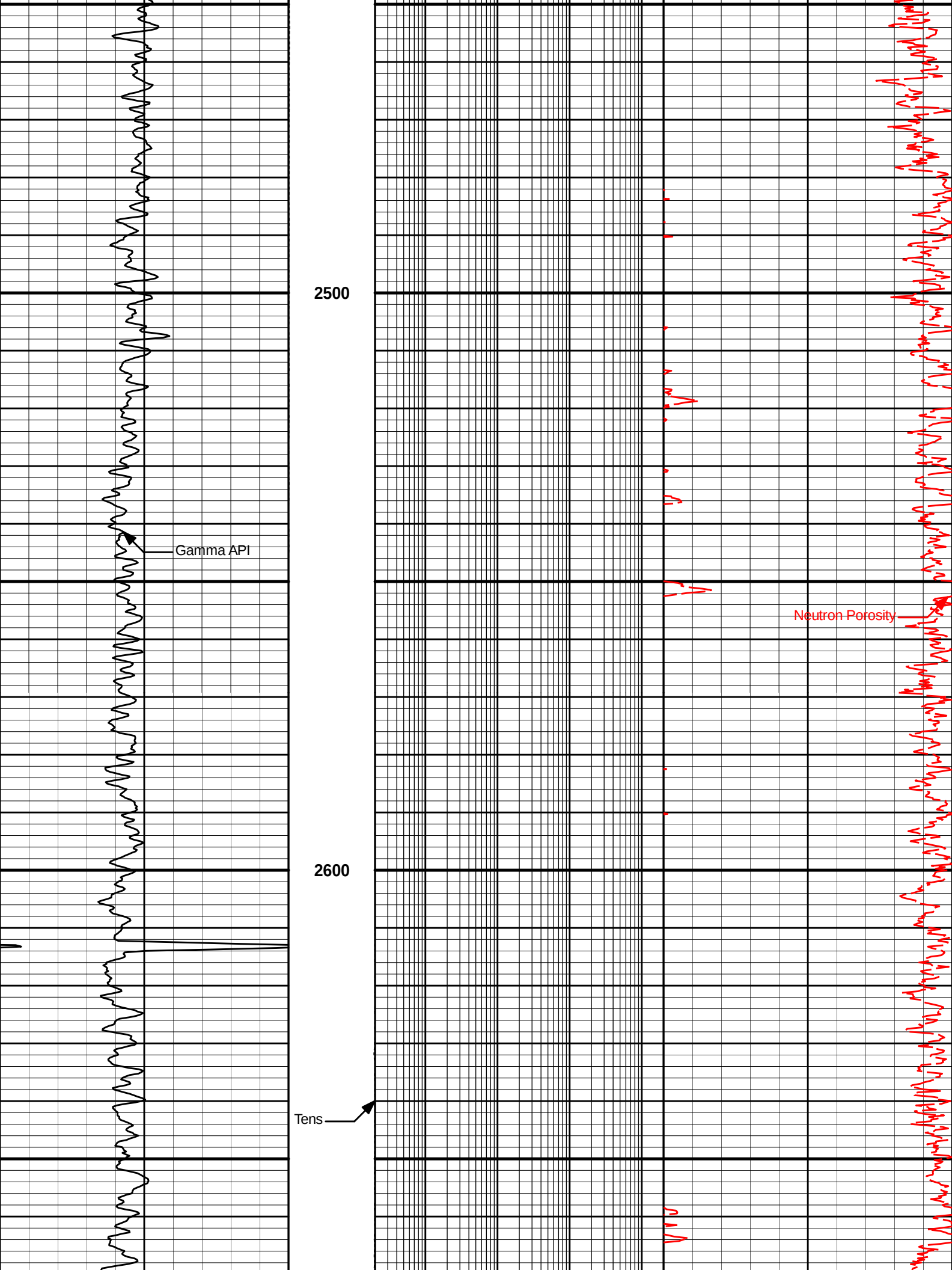
Tens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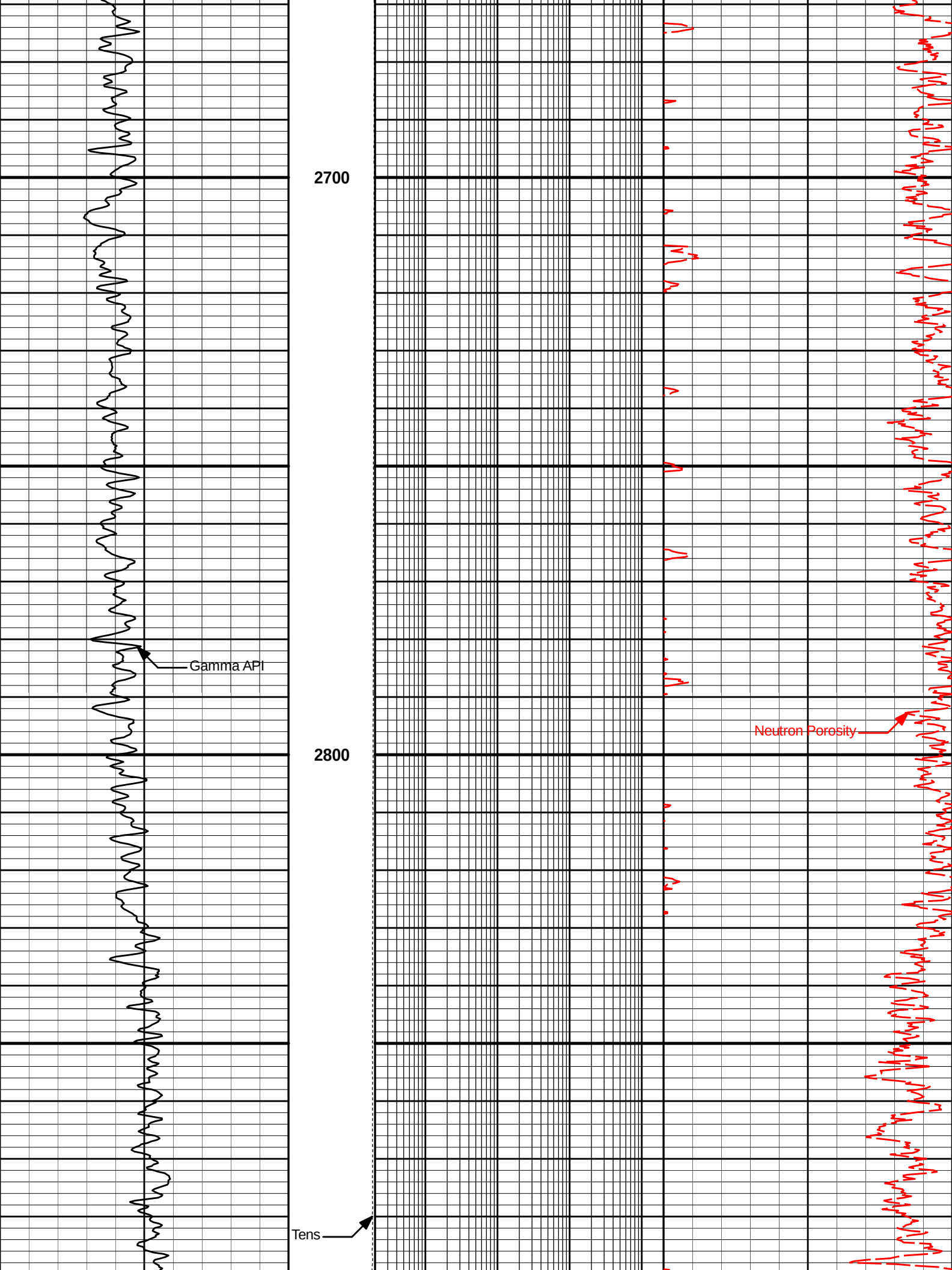
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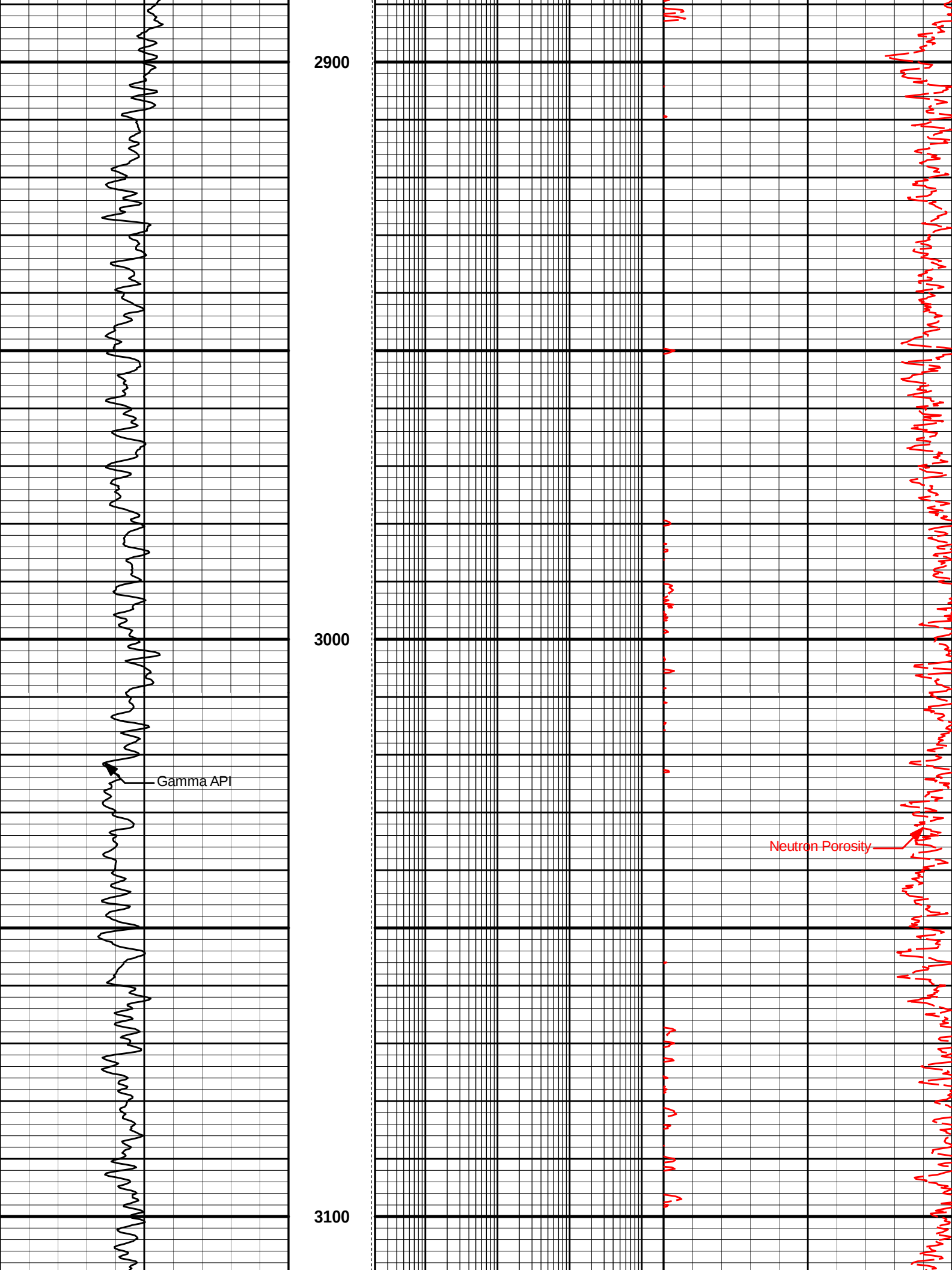
Tens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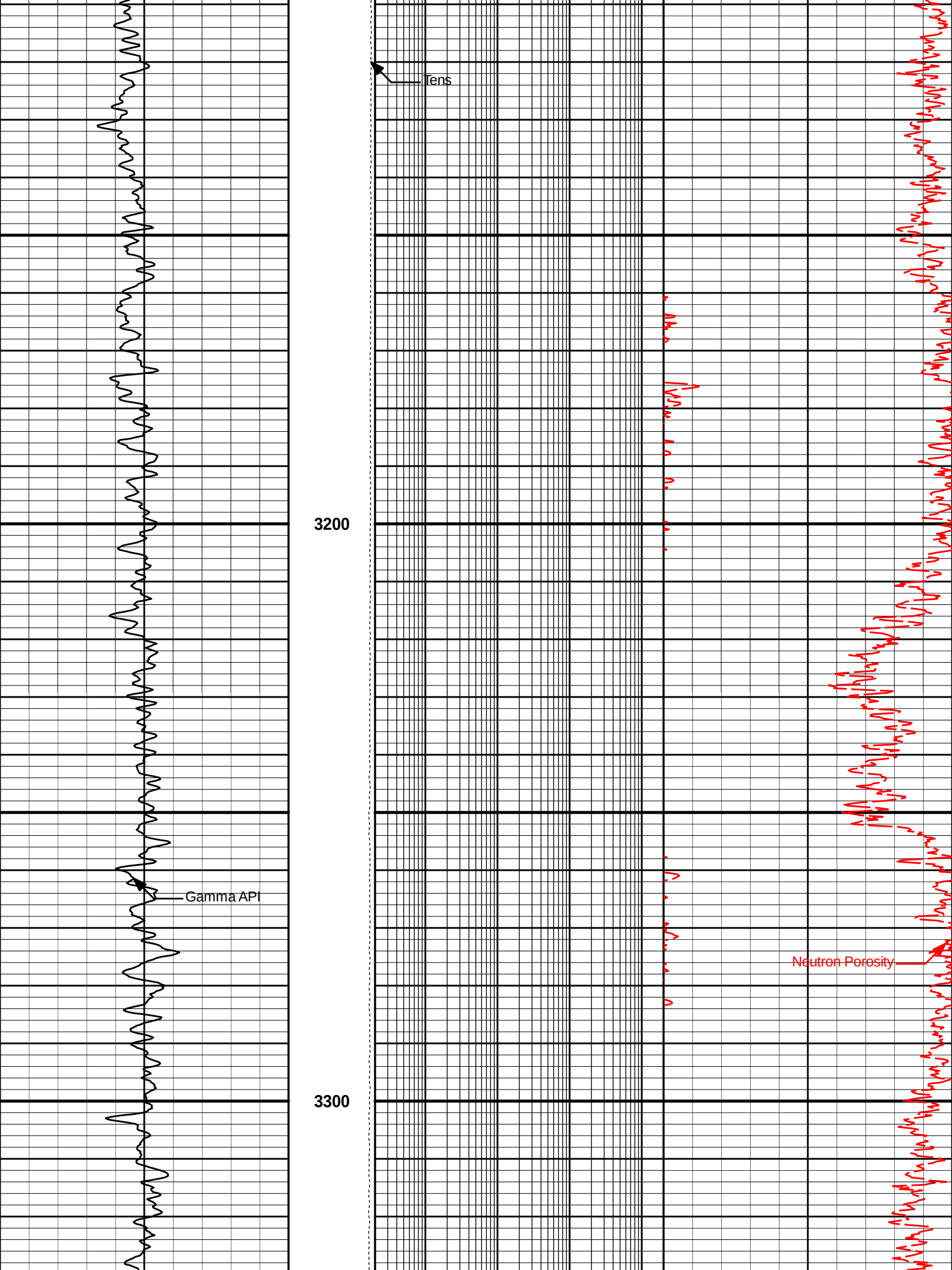
Tens
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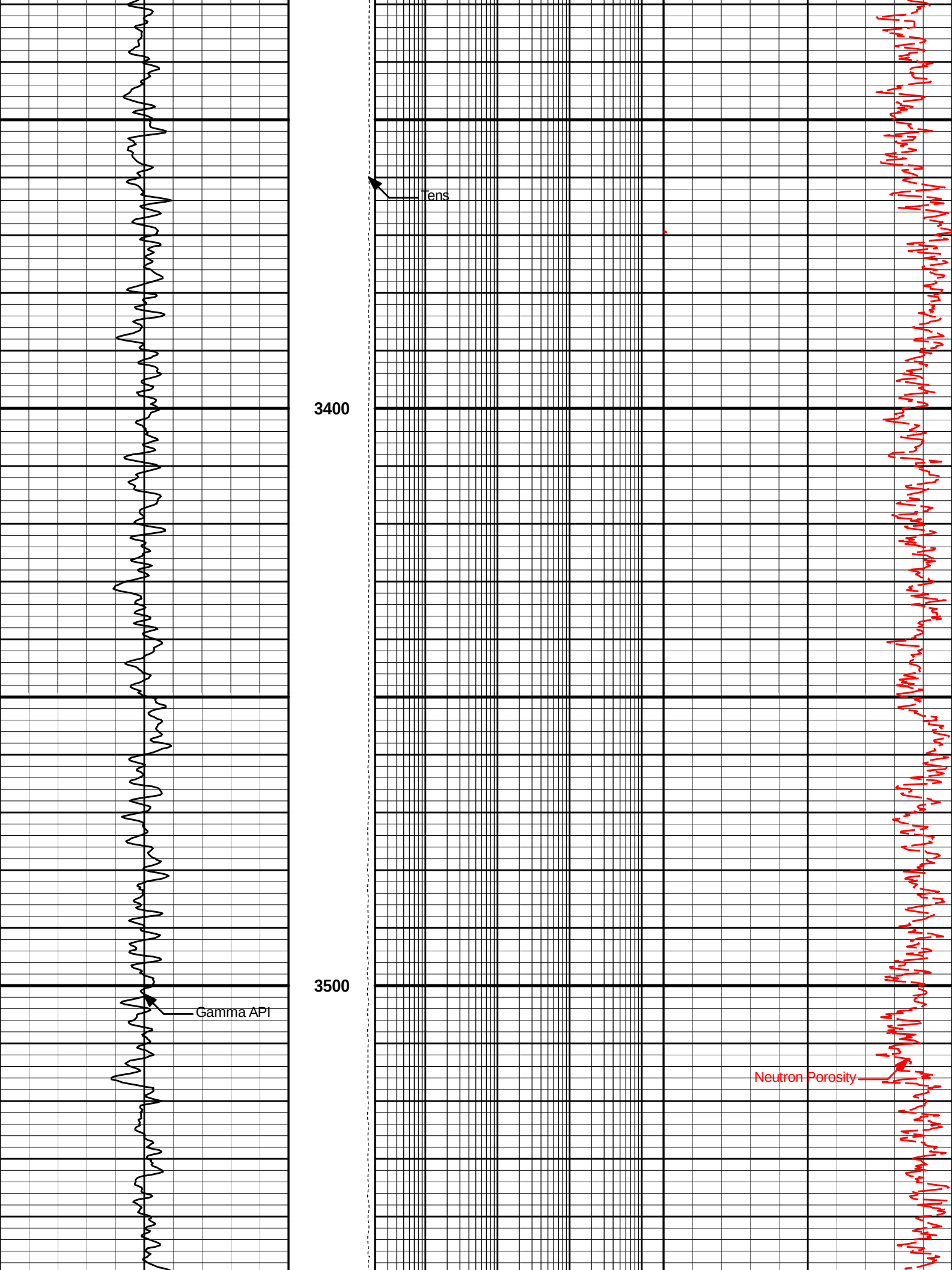
Tens
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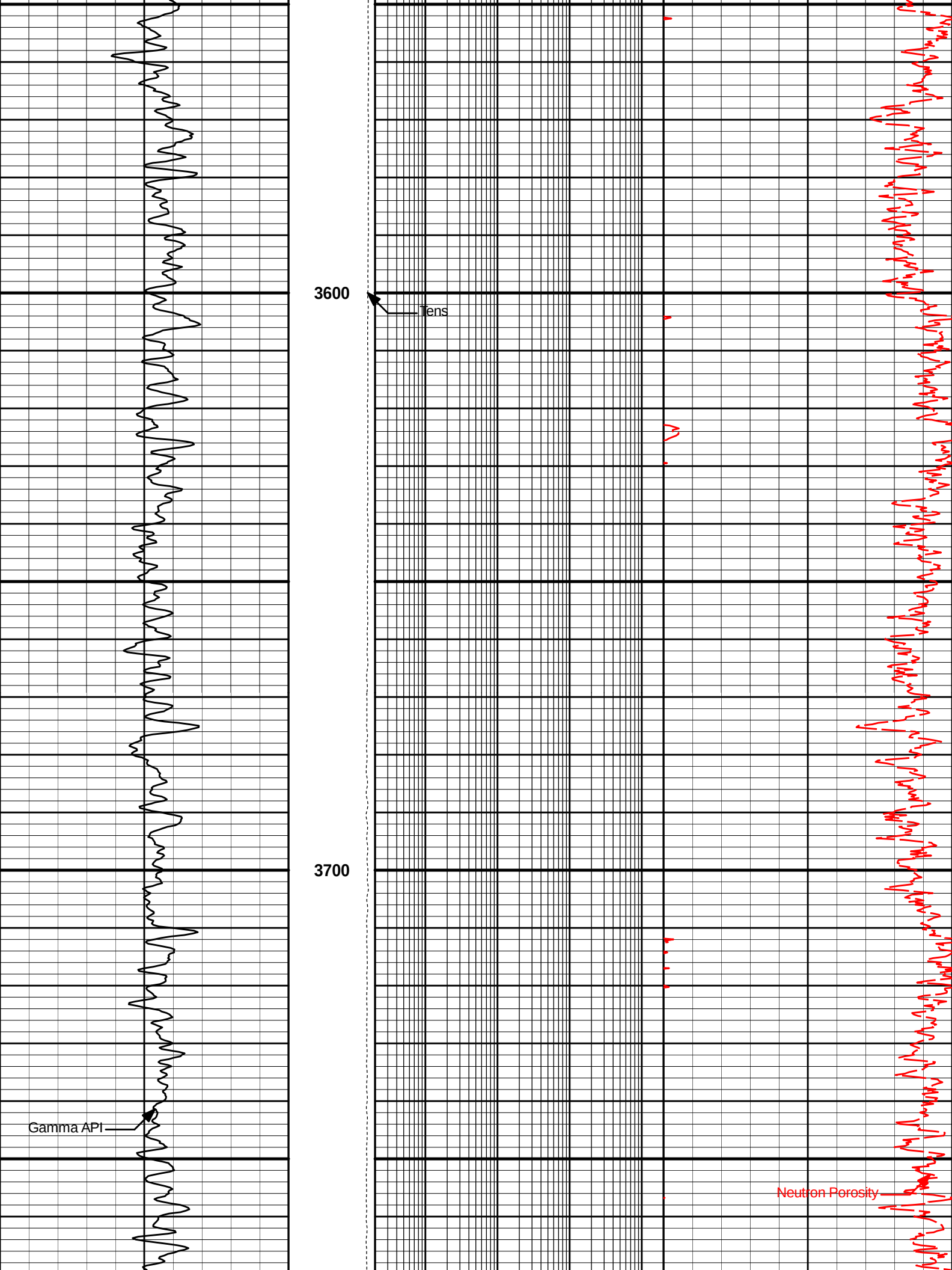
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Tens
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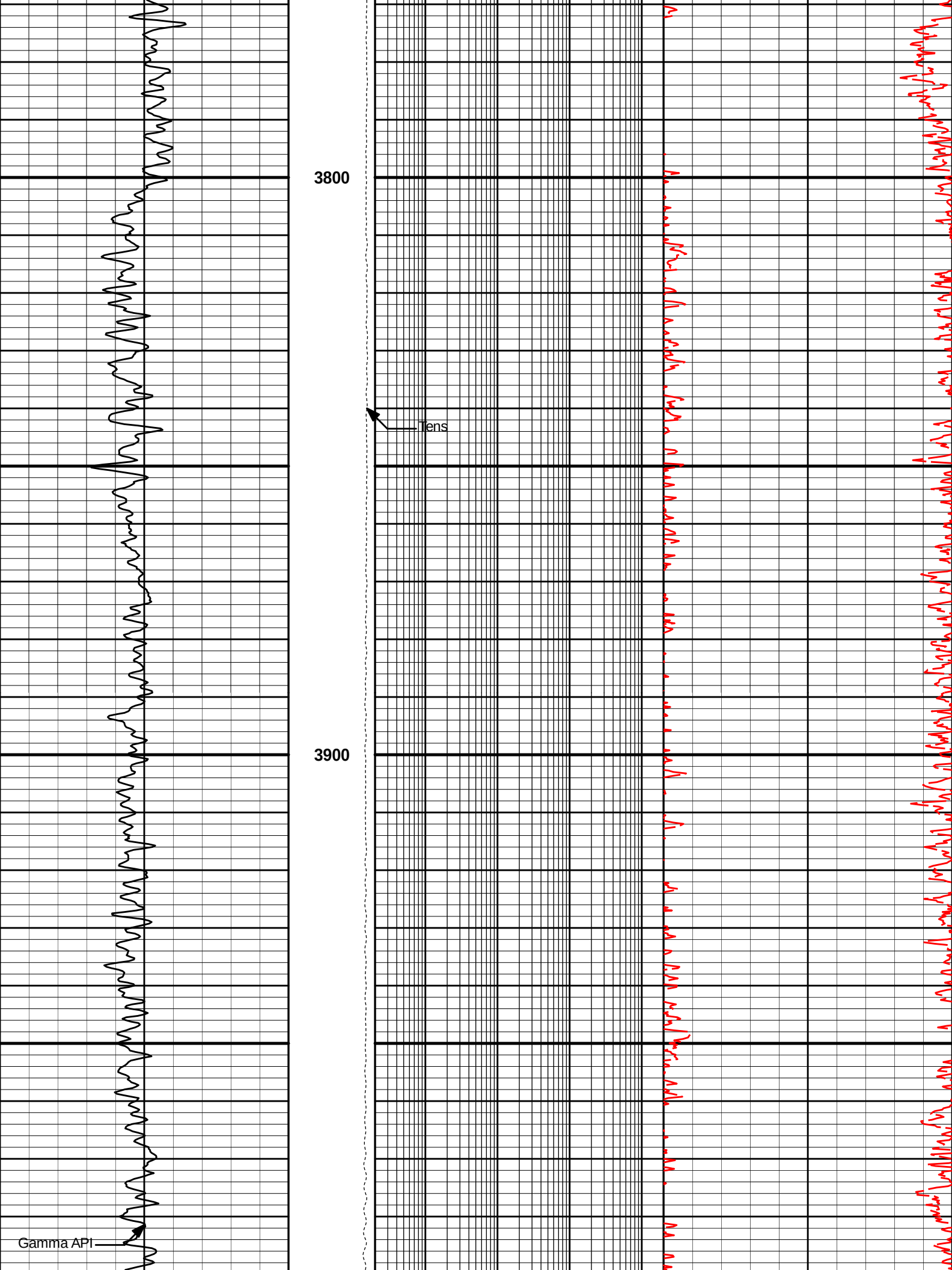
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Tens
3900
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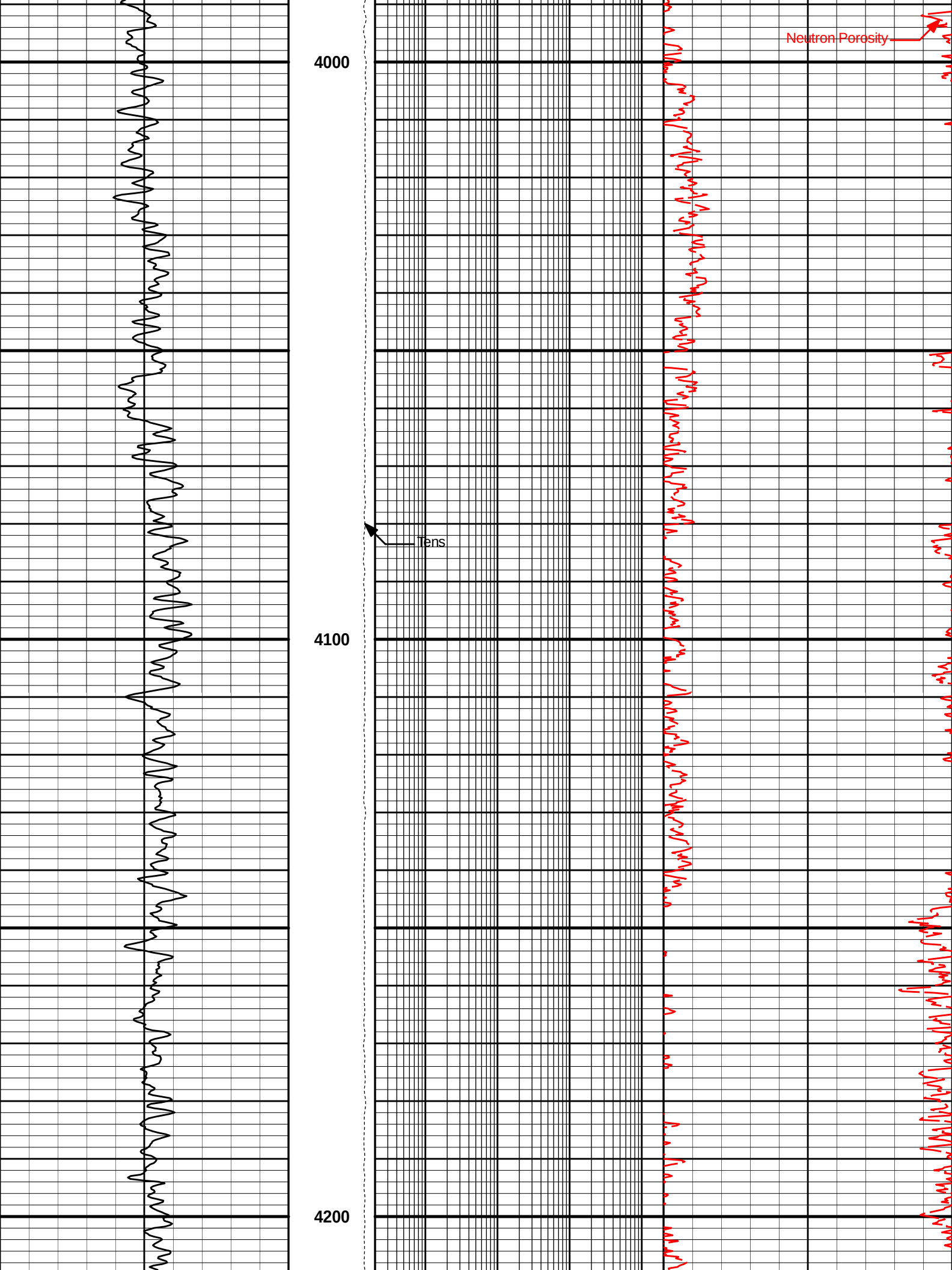
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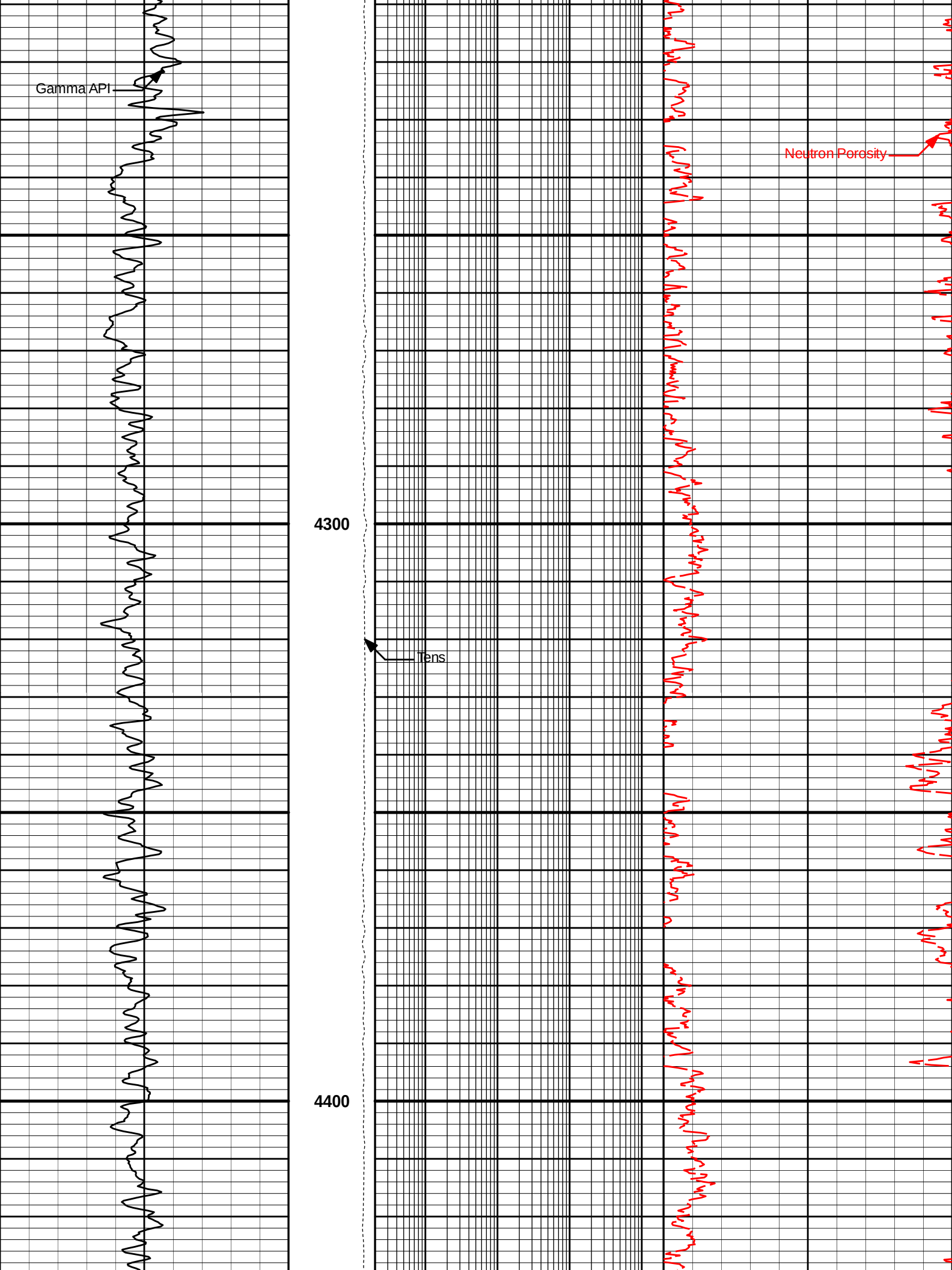
Tens
4100
4200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Tens
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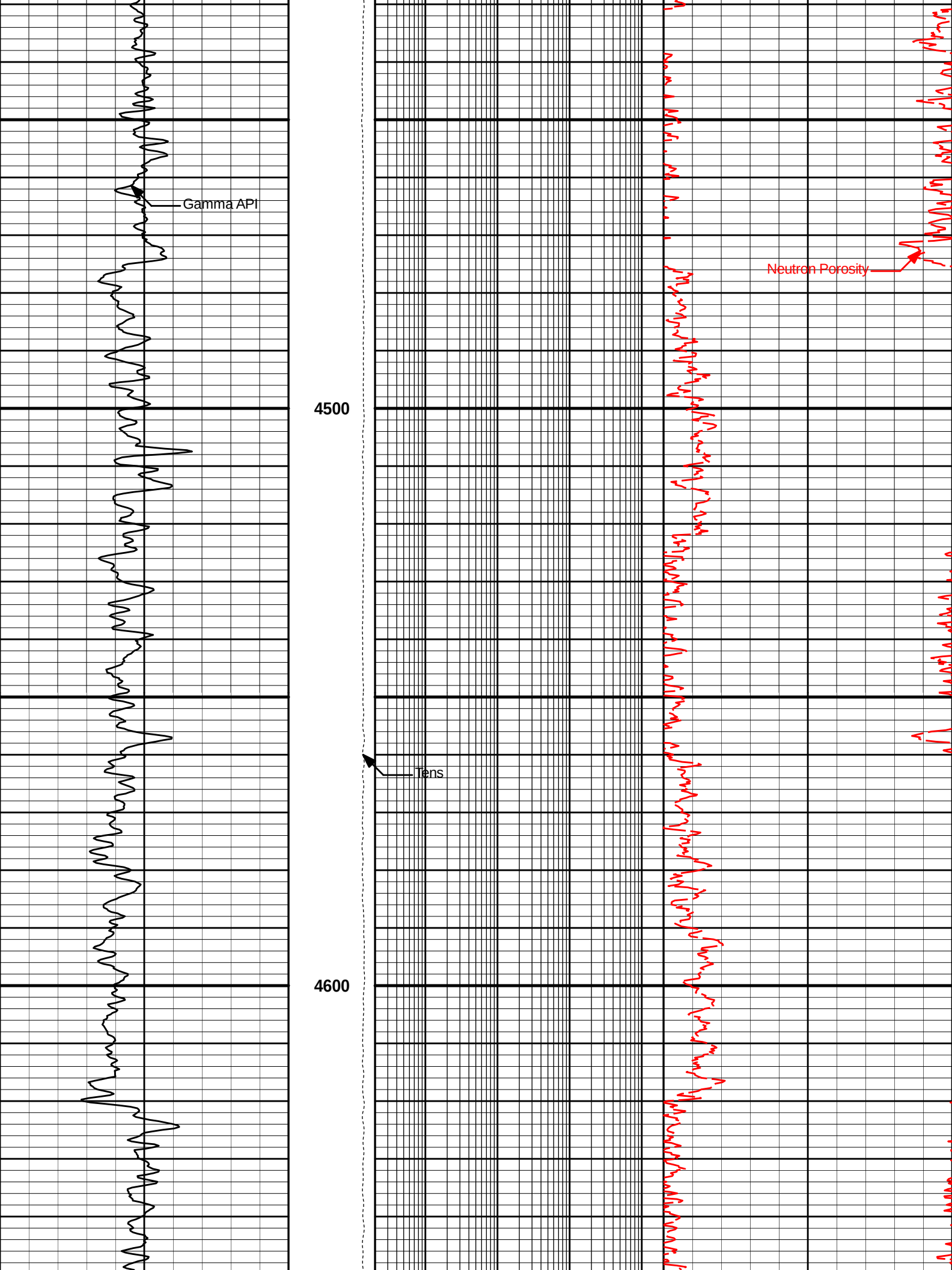
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Tens
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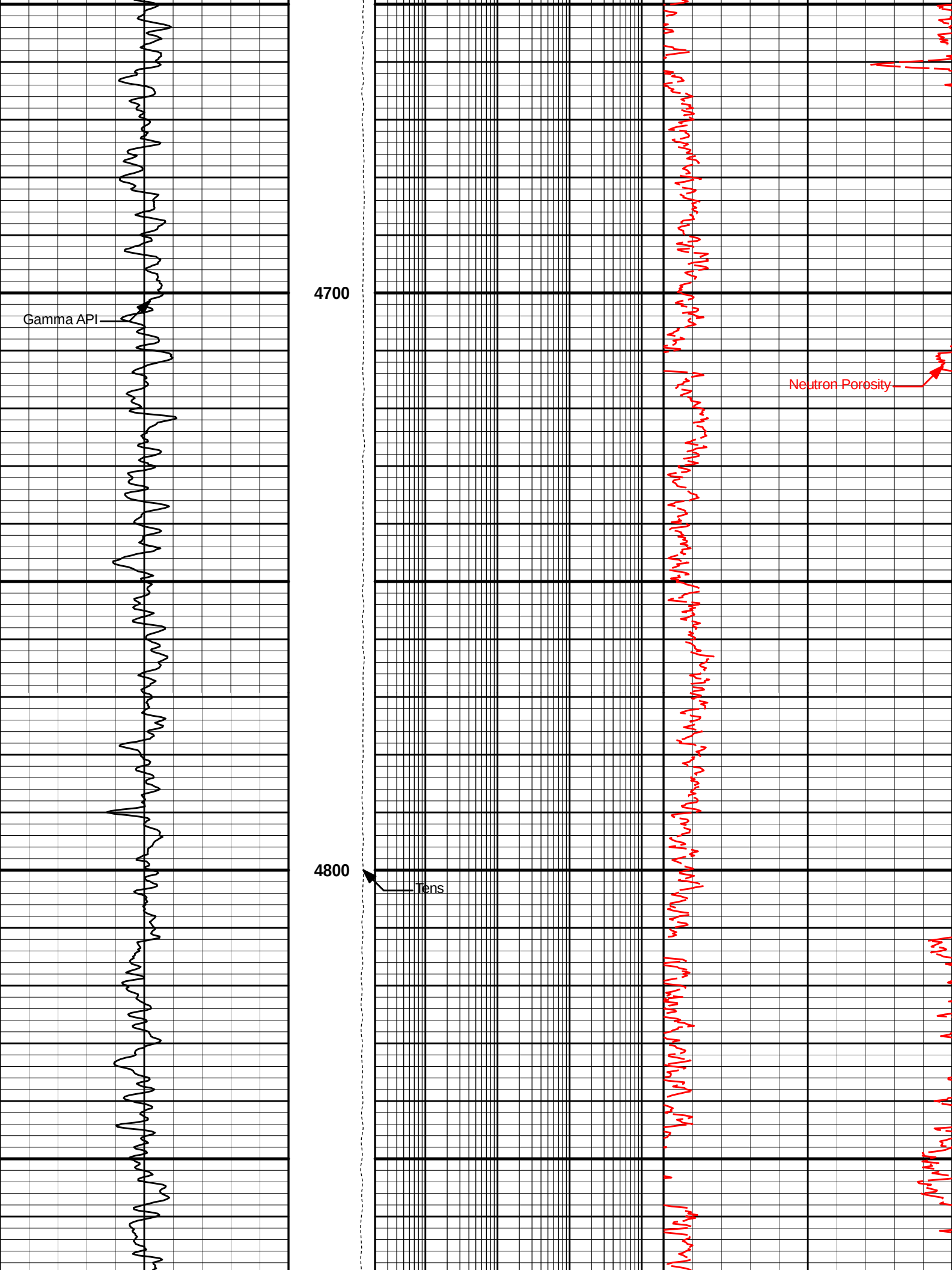
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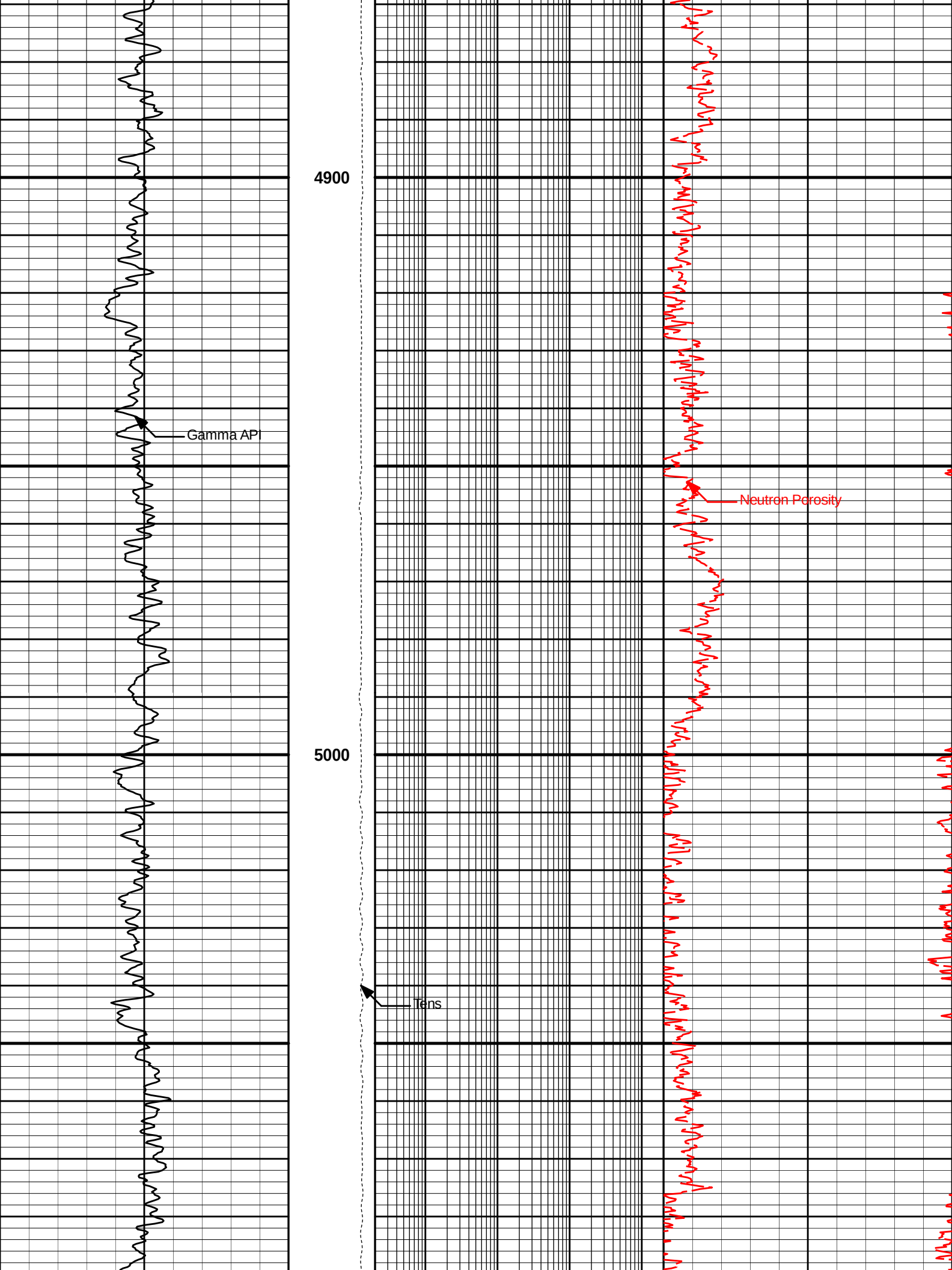
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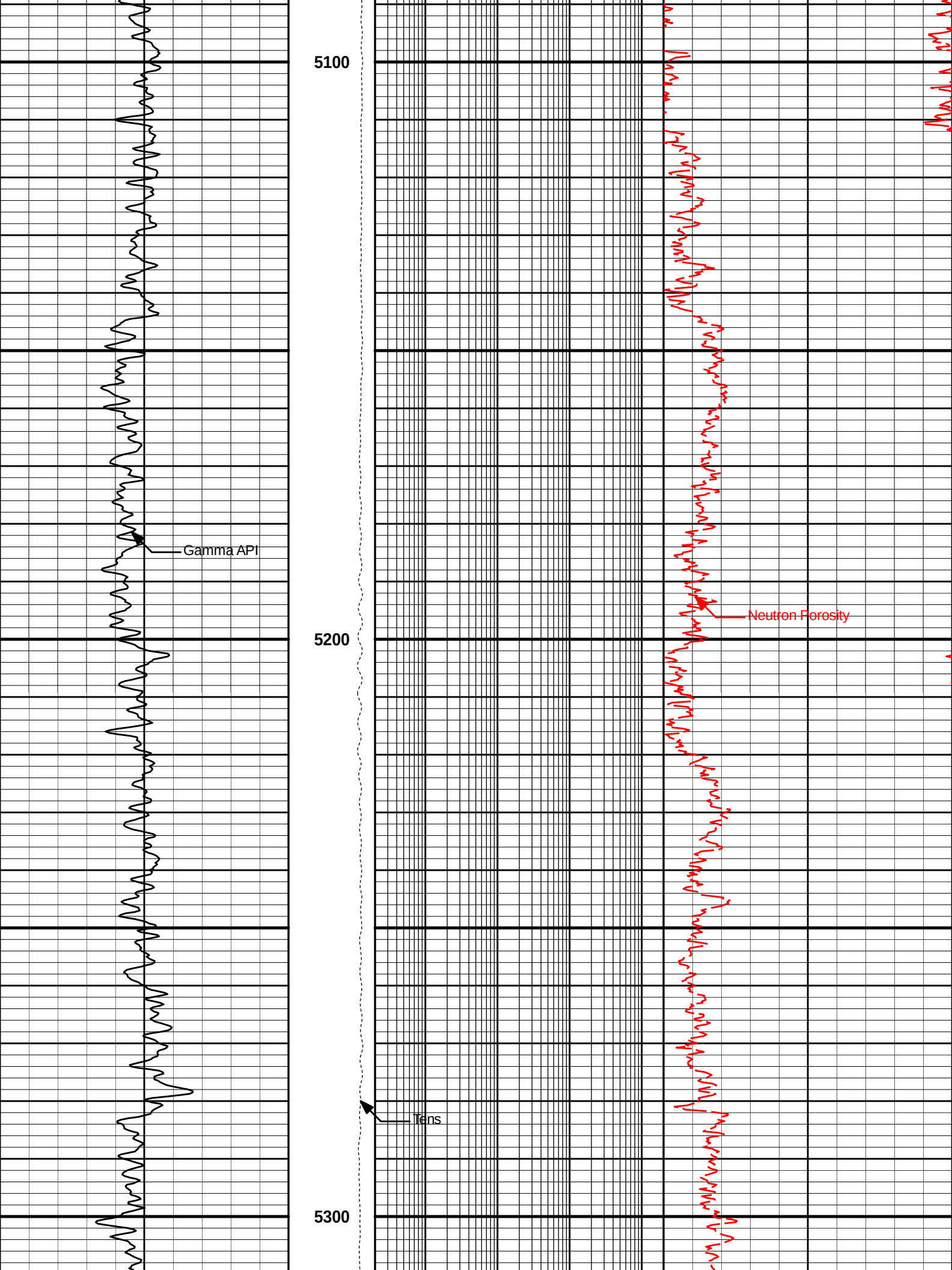
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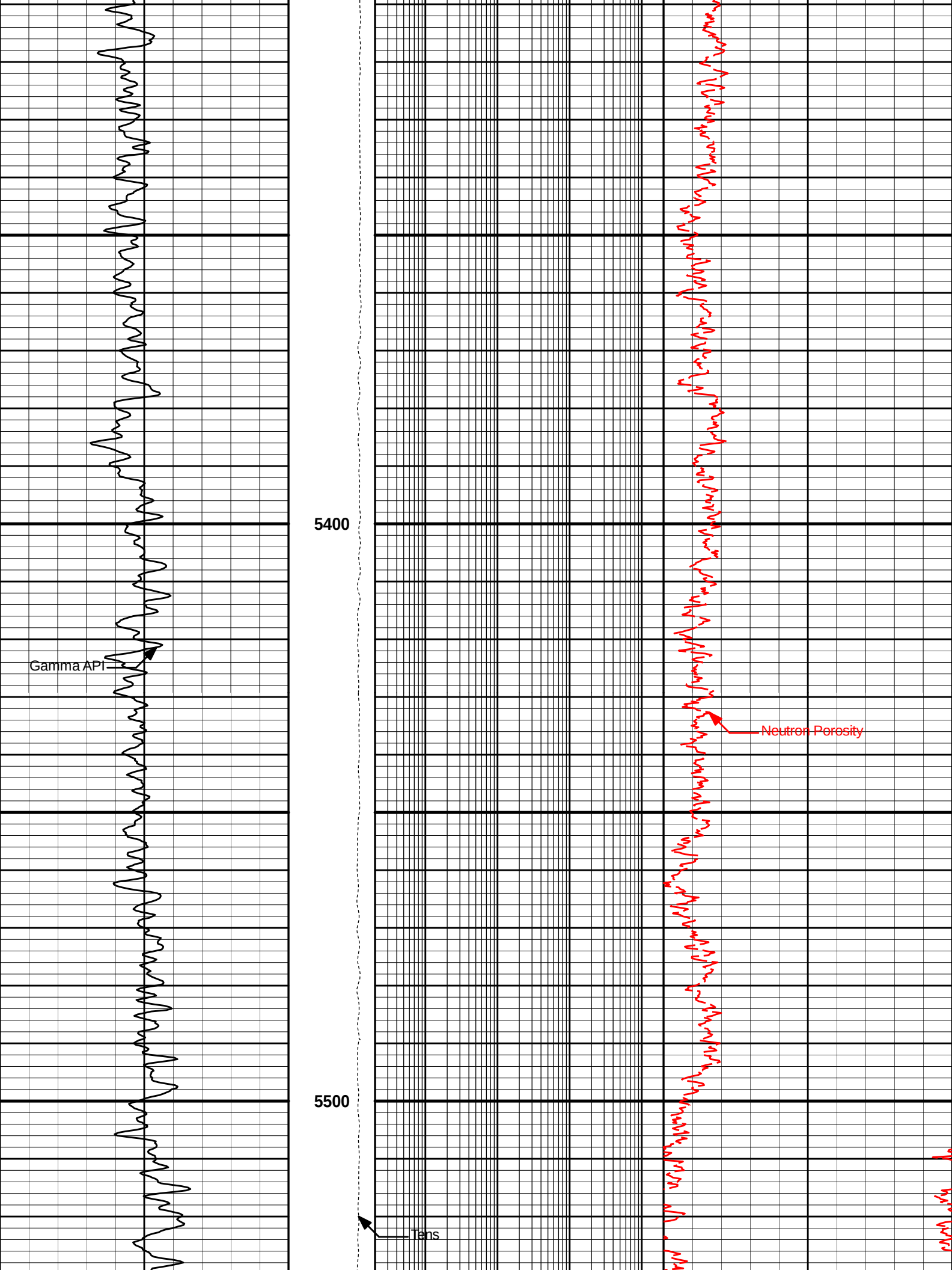
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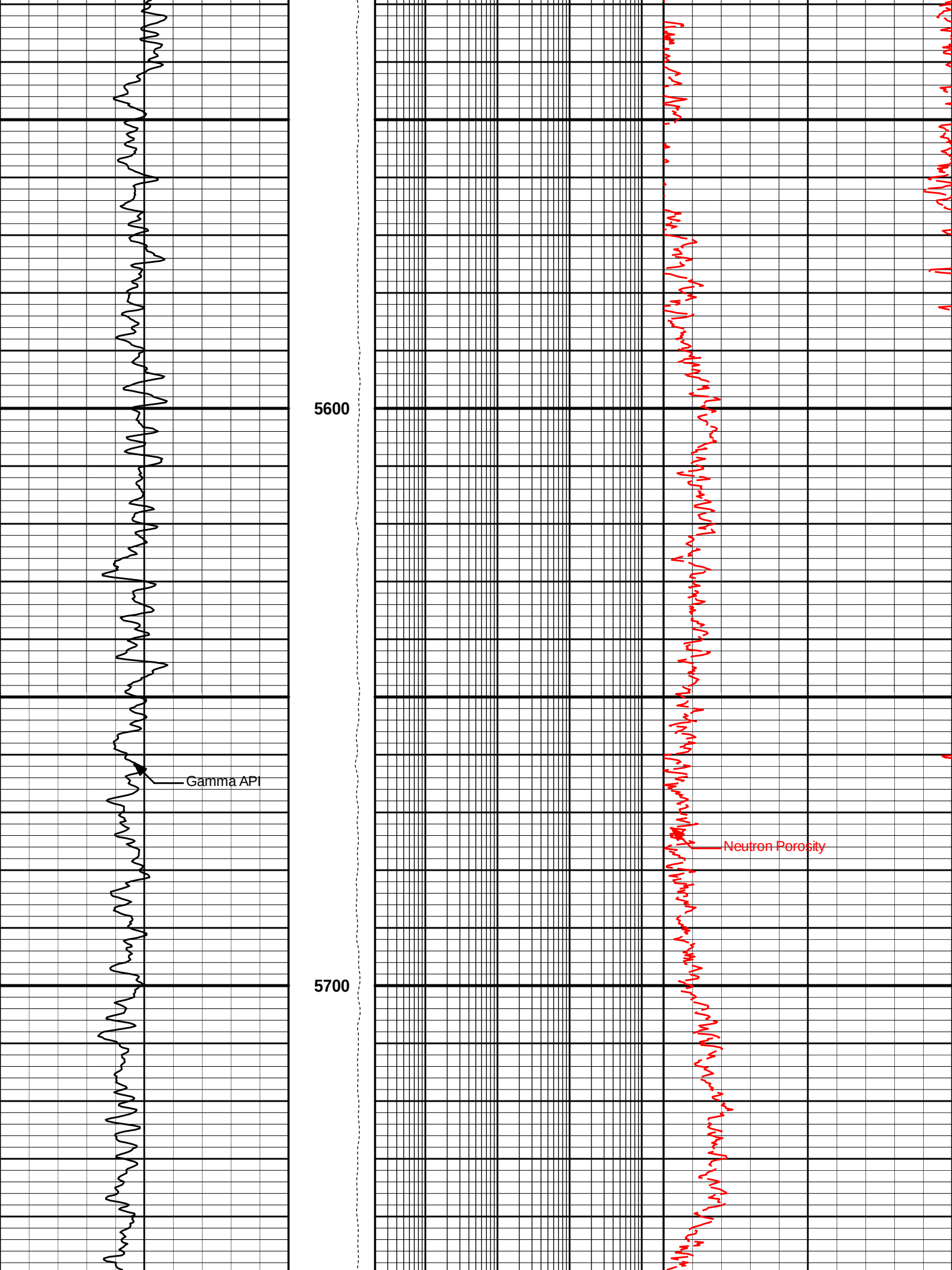
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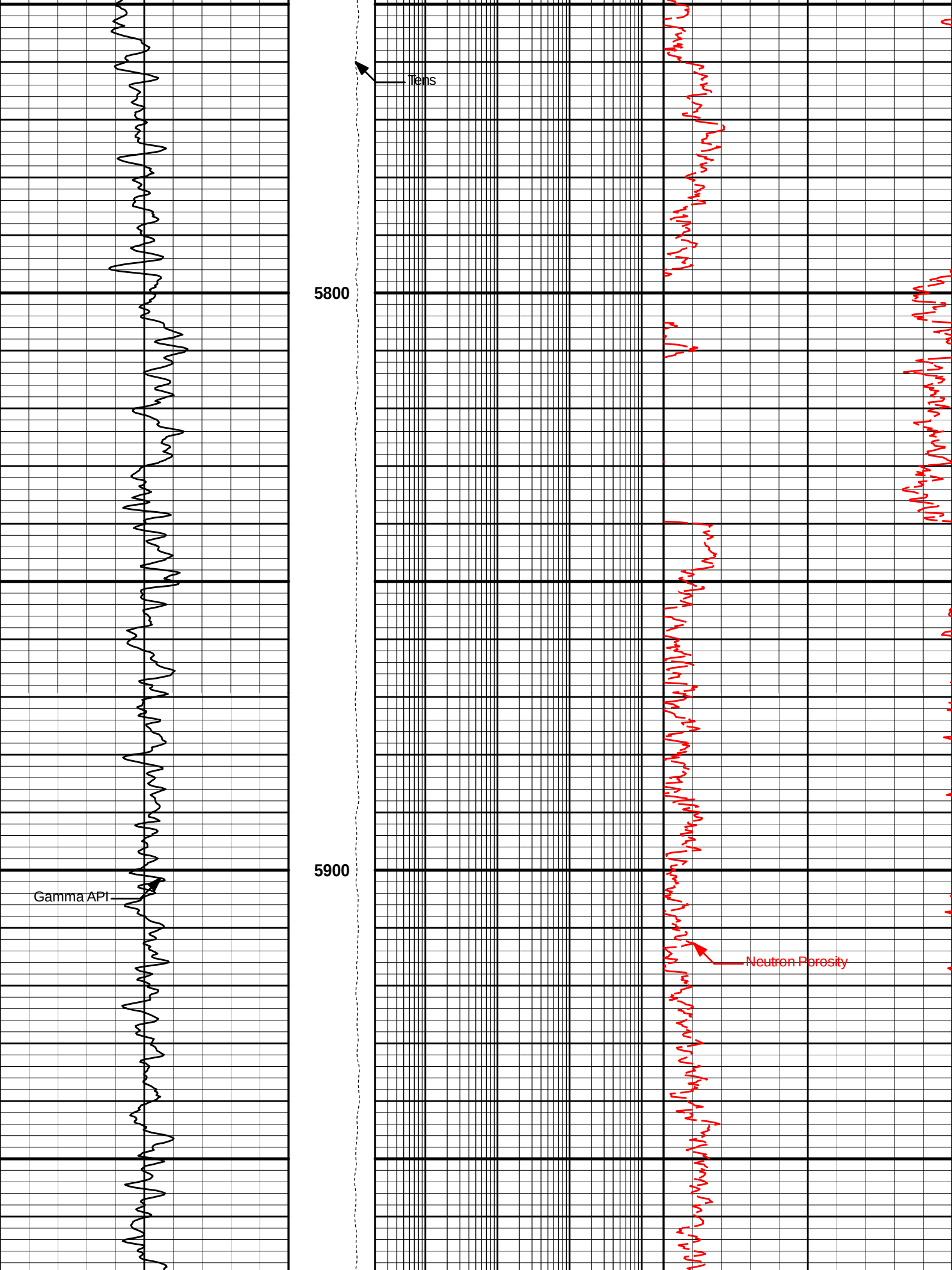
Tens
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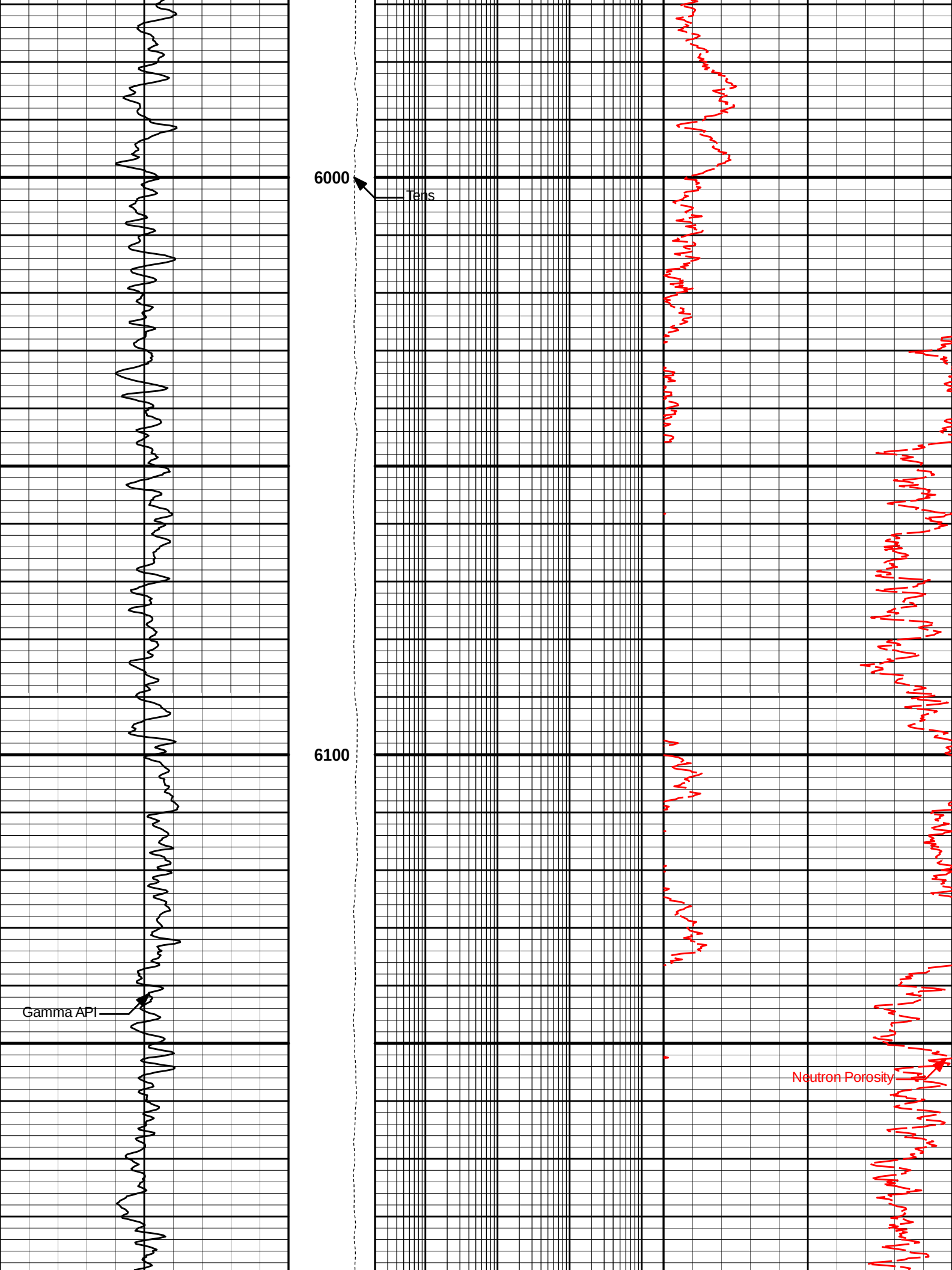
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Tens
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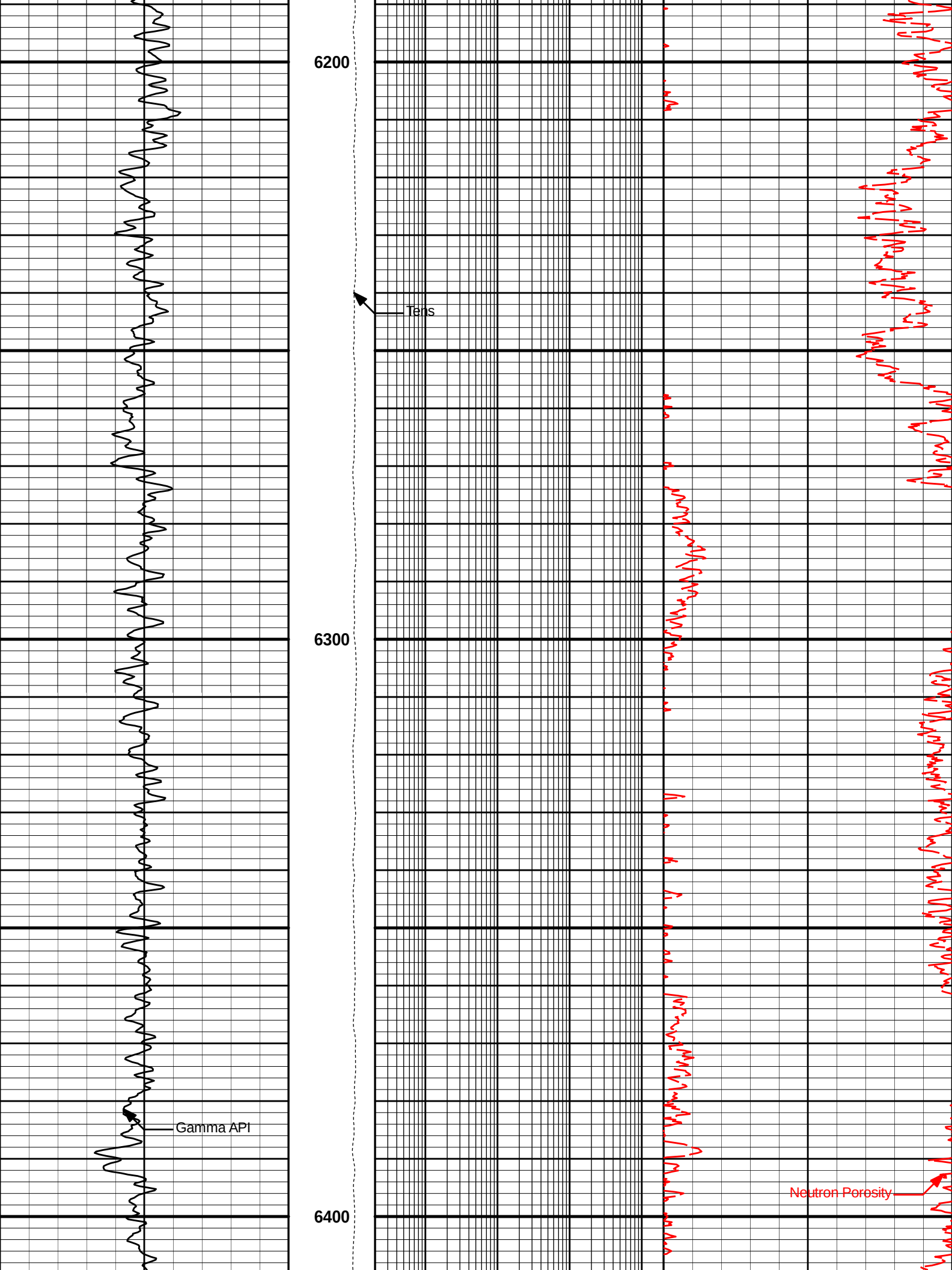
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Tens
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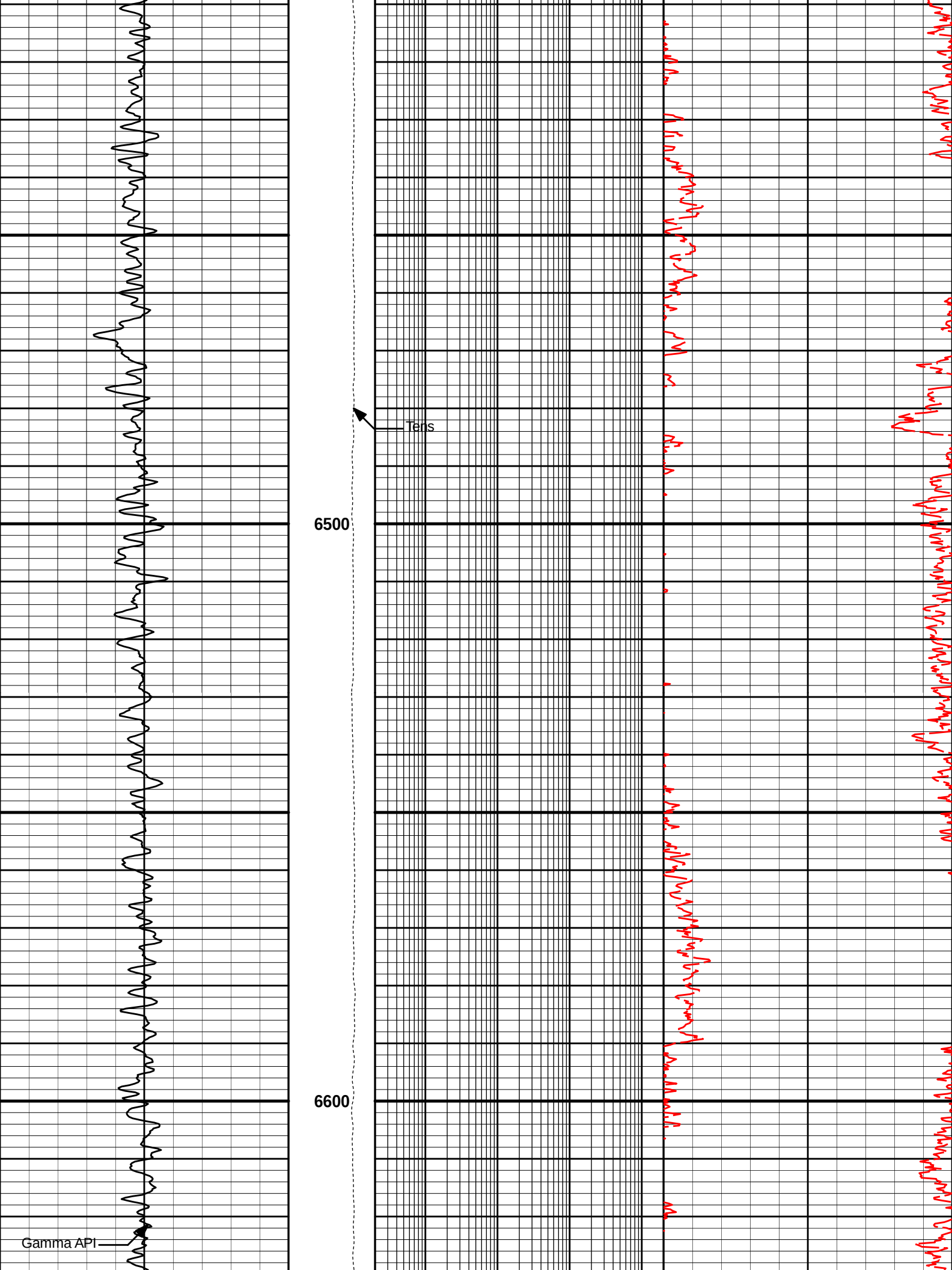
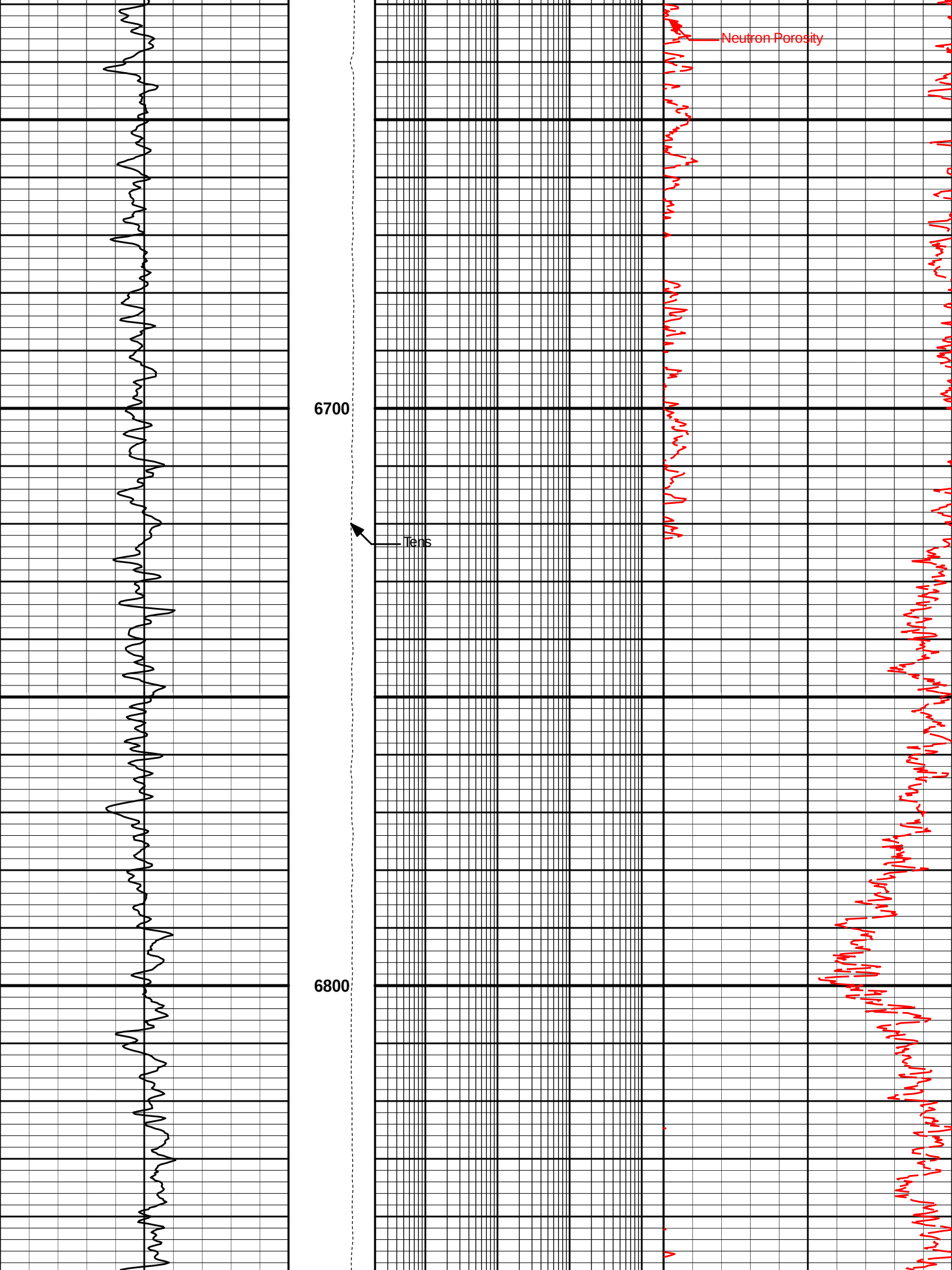

Tens
6500
6600
Gamma API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Tens
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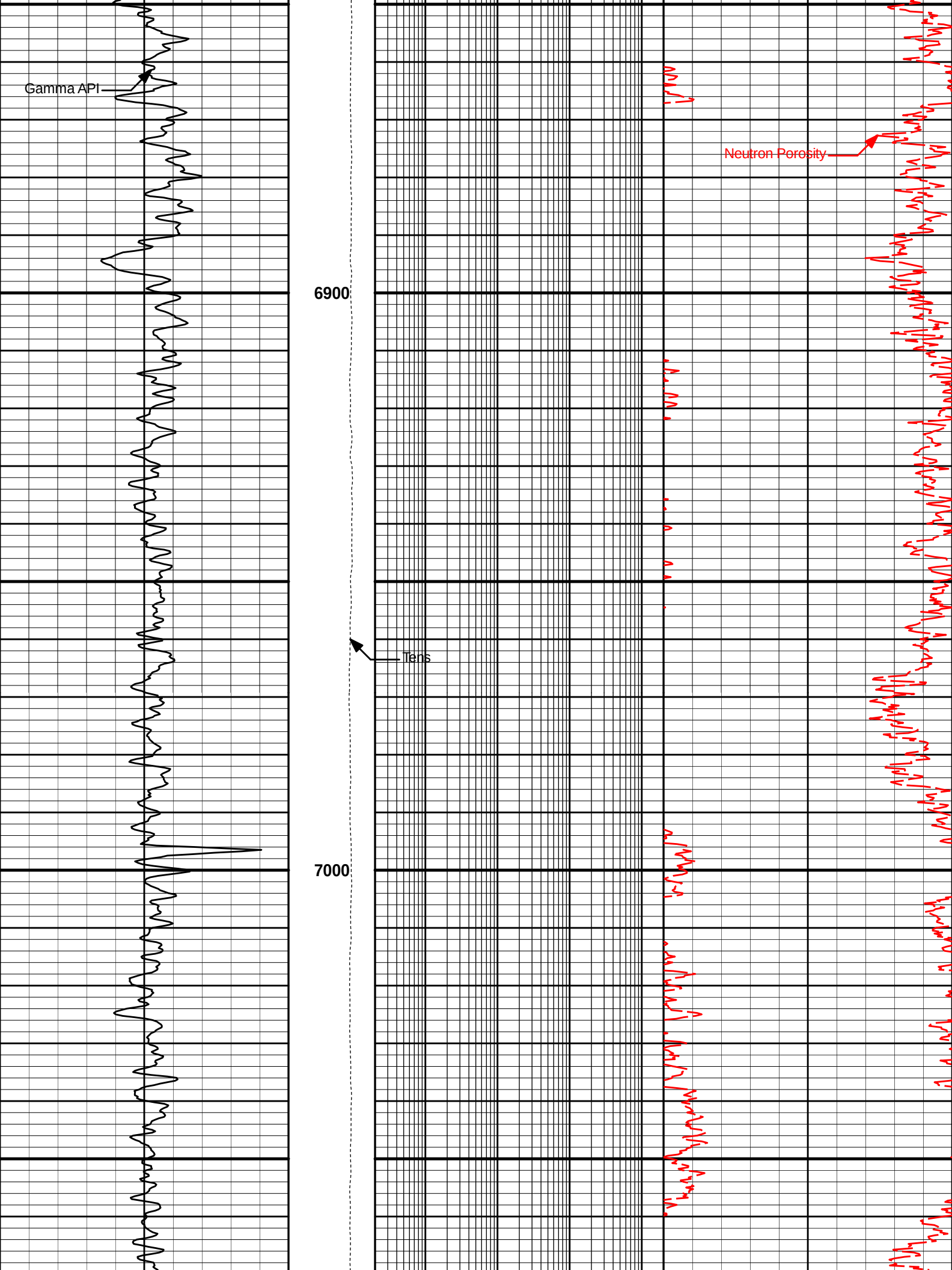
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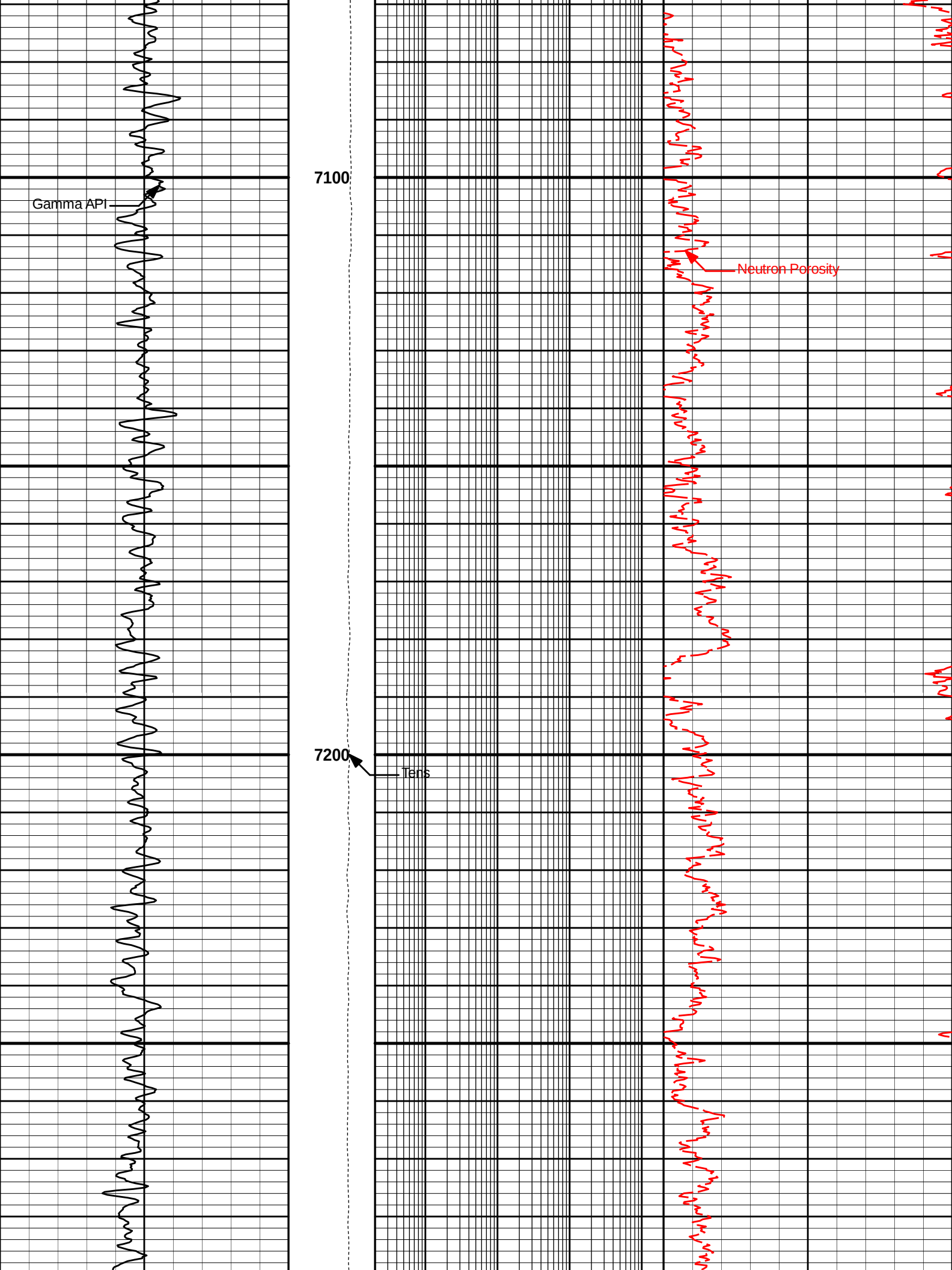
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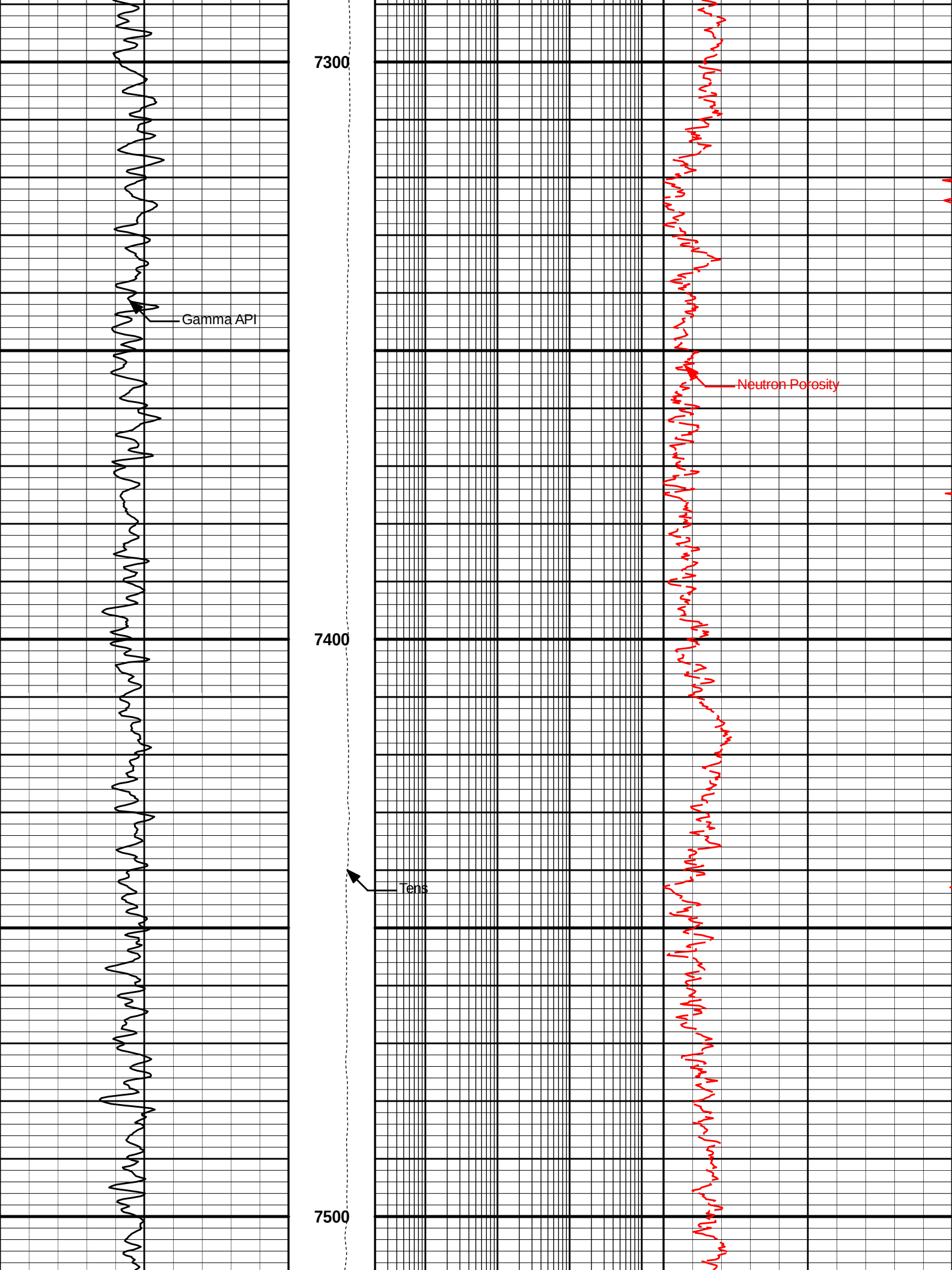
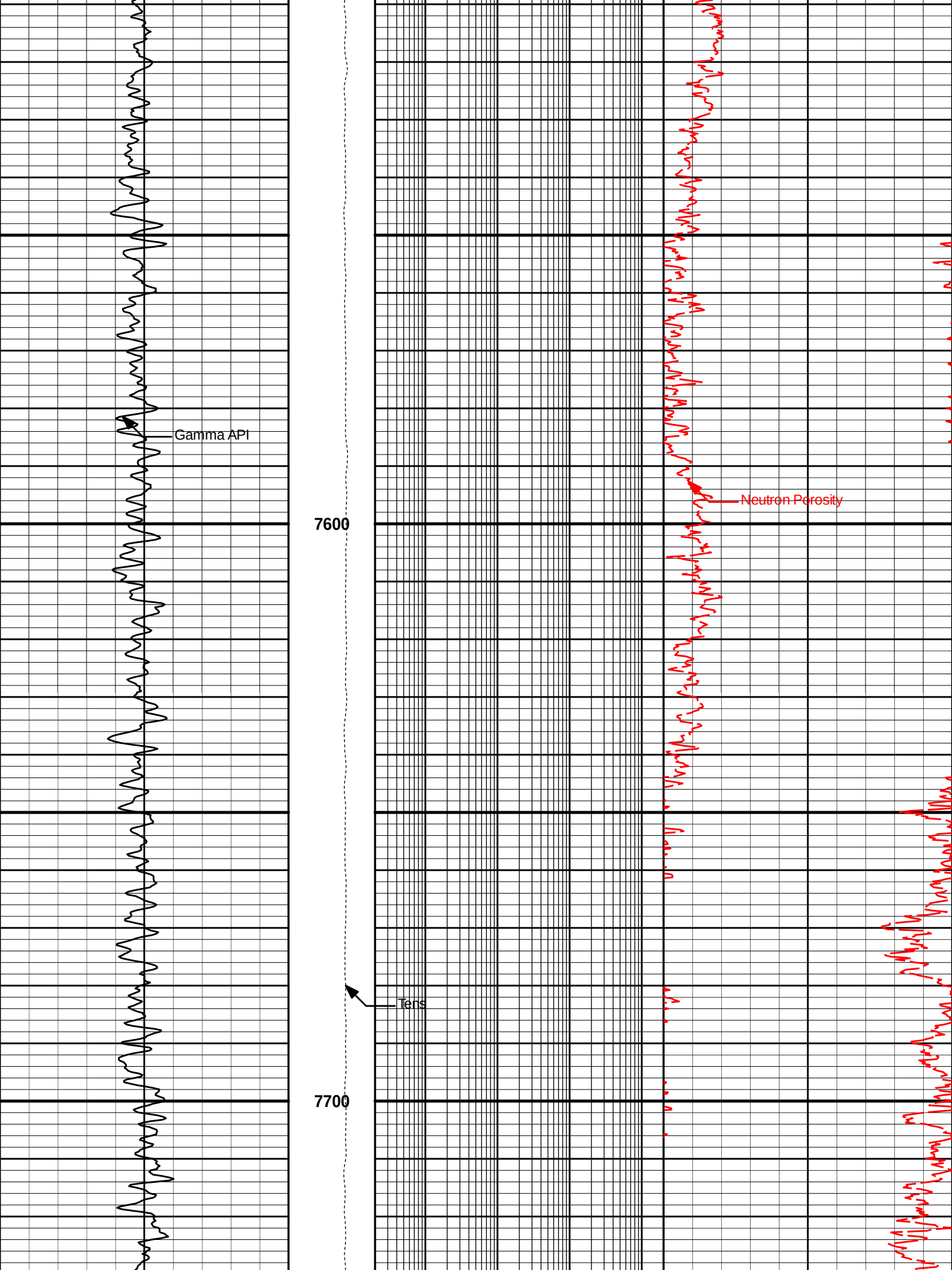
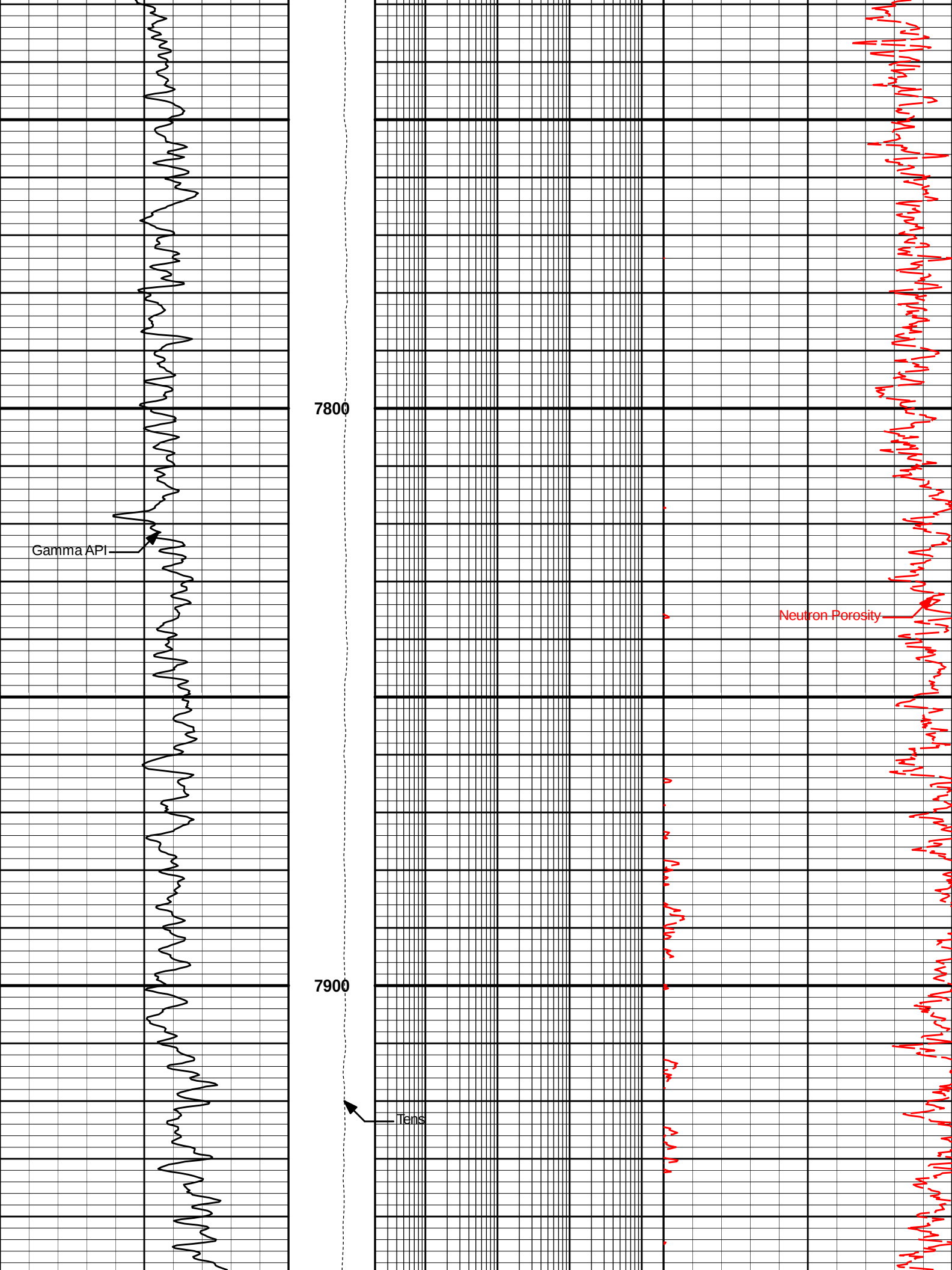
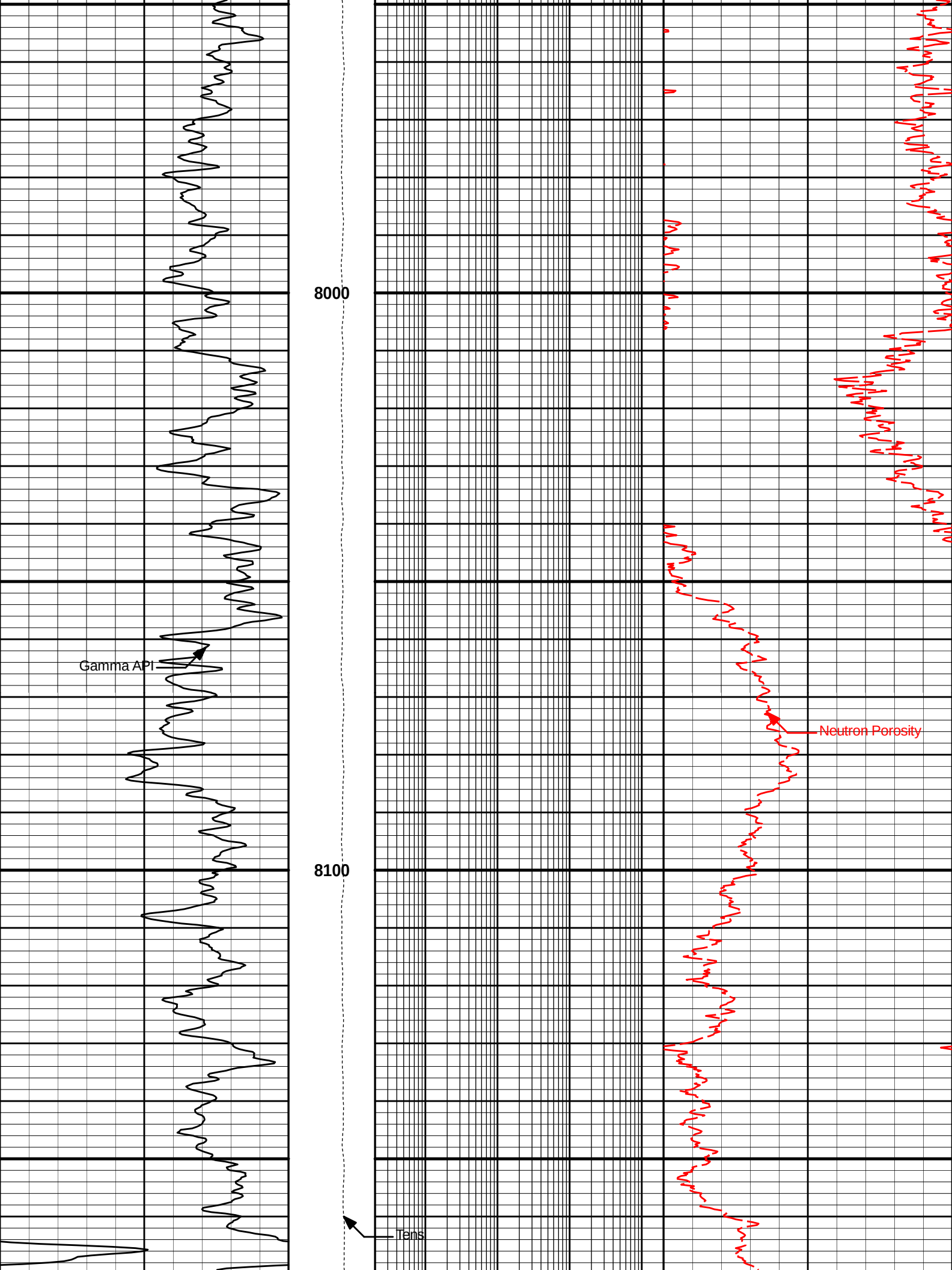
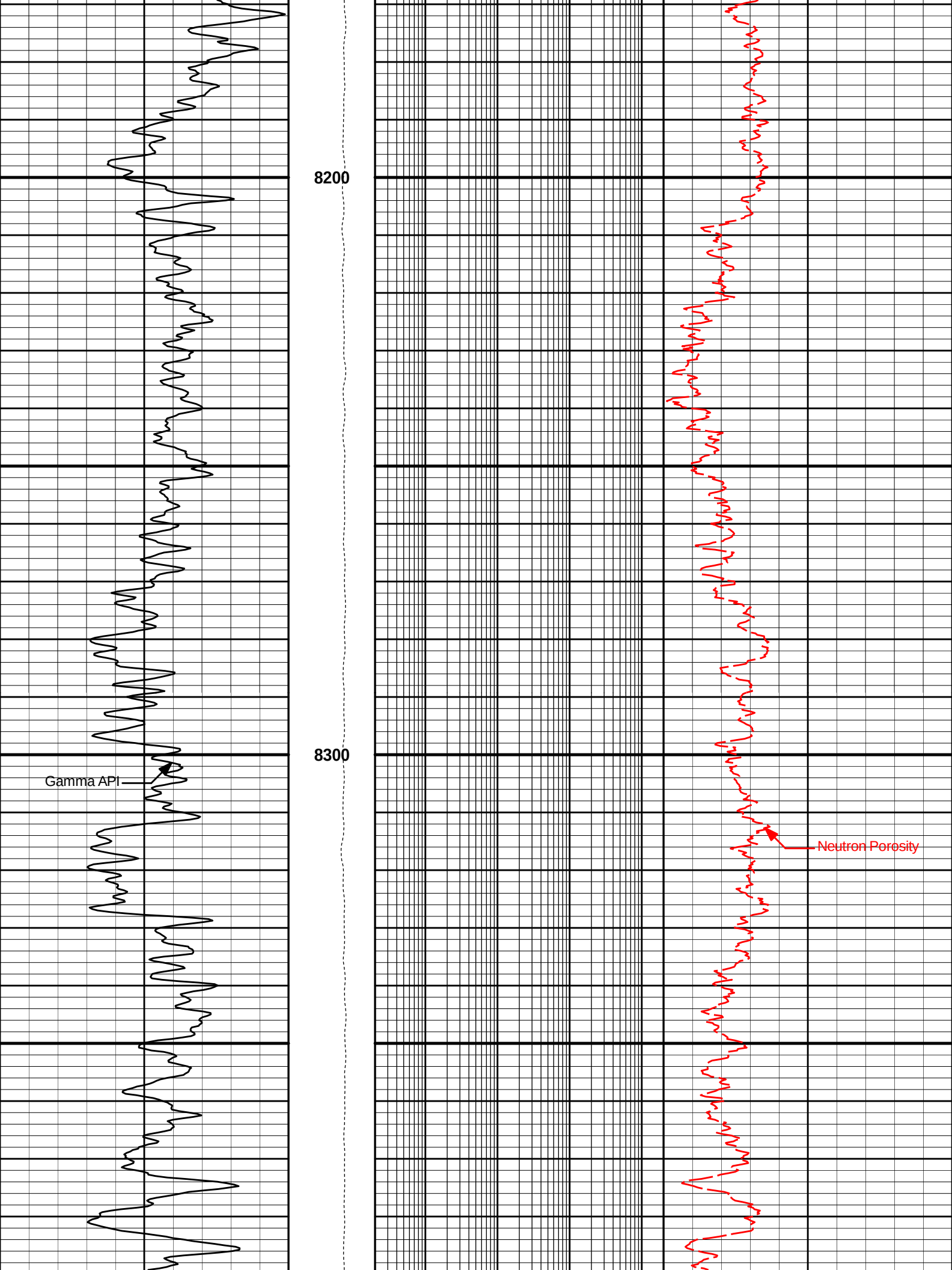
7200
Tens

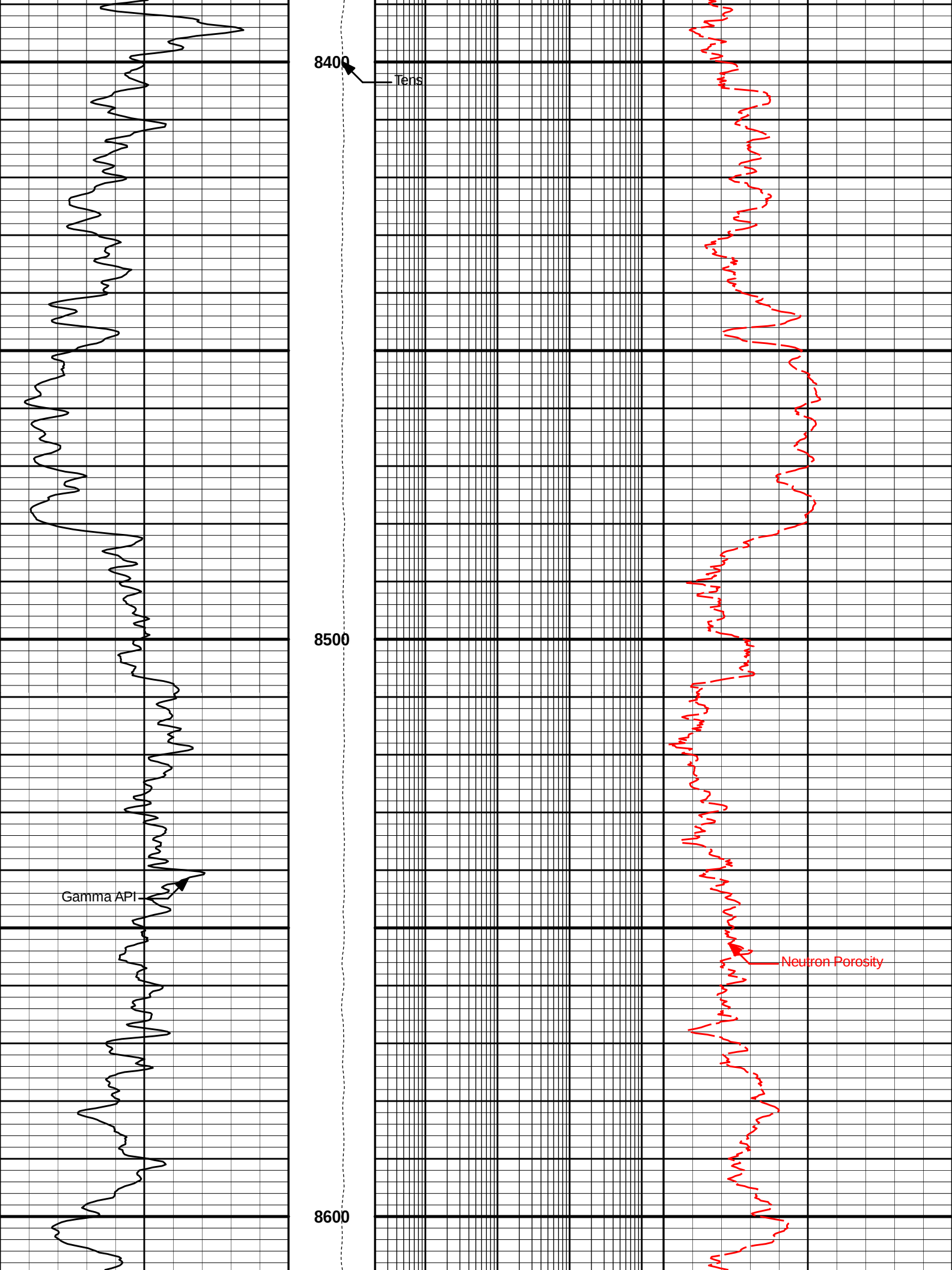

7300
Gamma API
Neutron Porosity
7400
Tens
7500

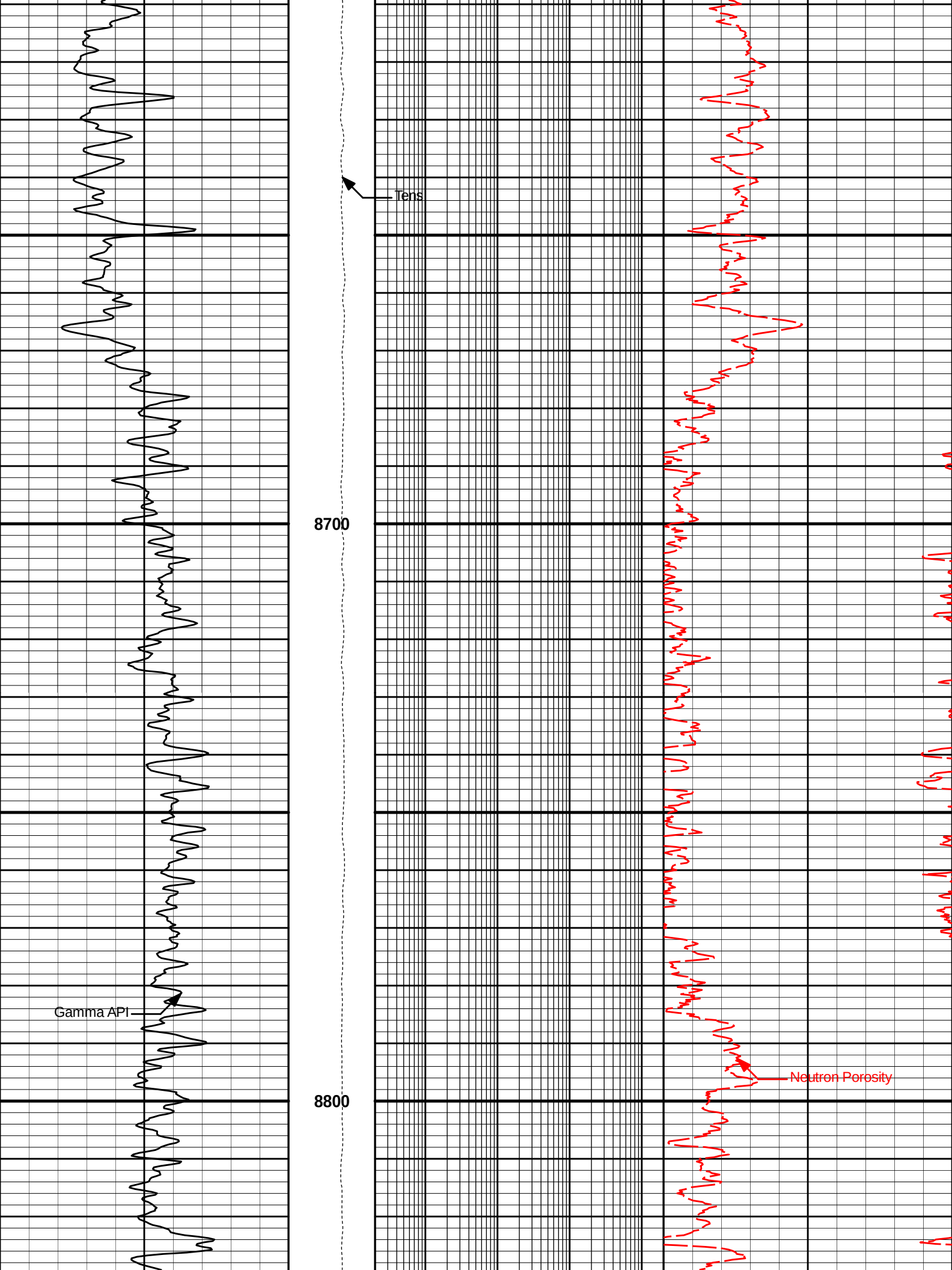

Gamma API
Neutron Porosity
7600
Tens
7700

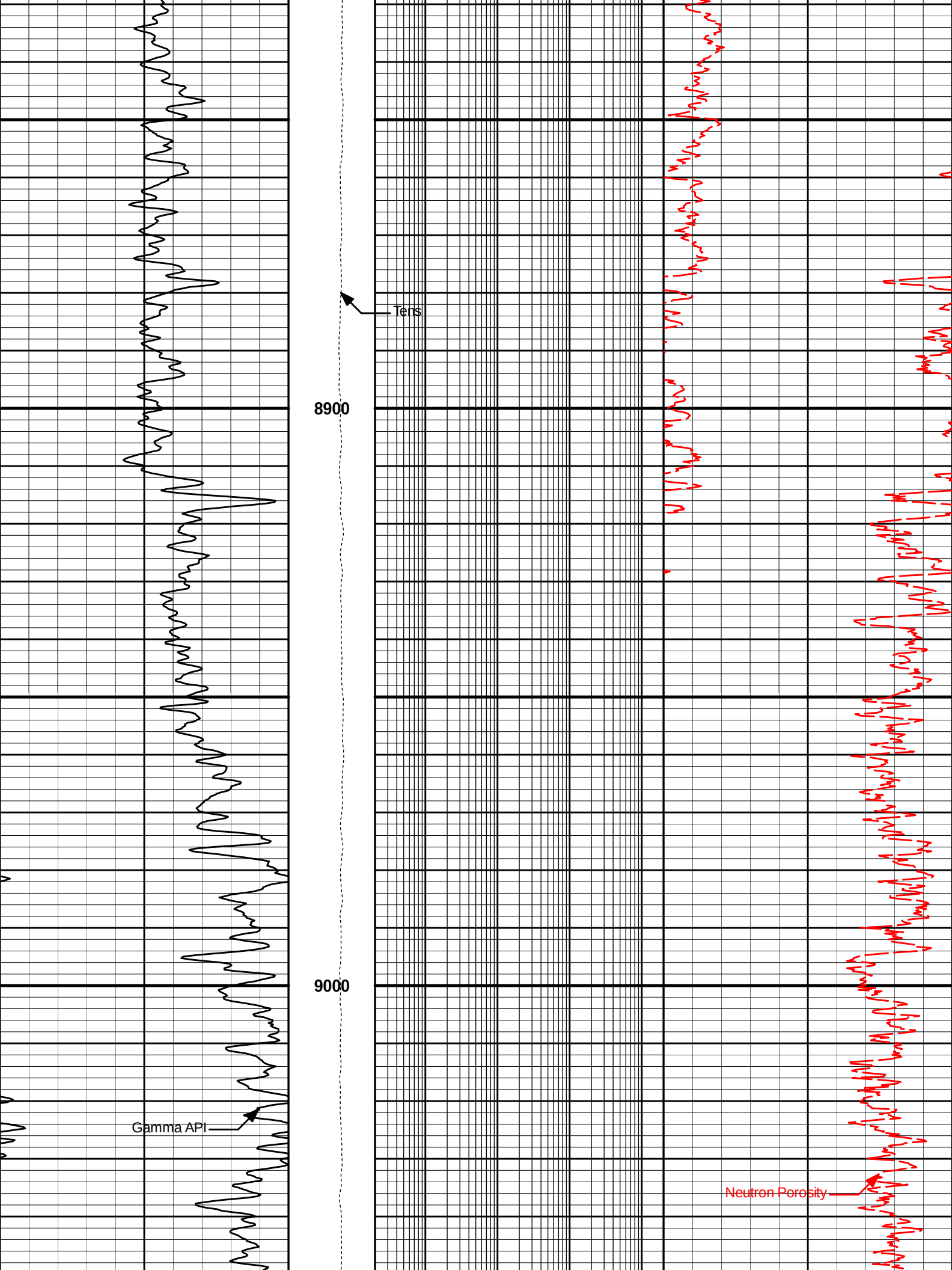

7800
7900
Gamma API
Neutron Porosity
Tens

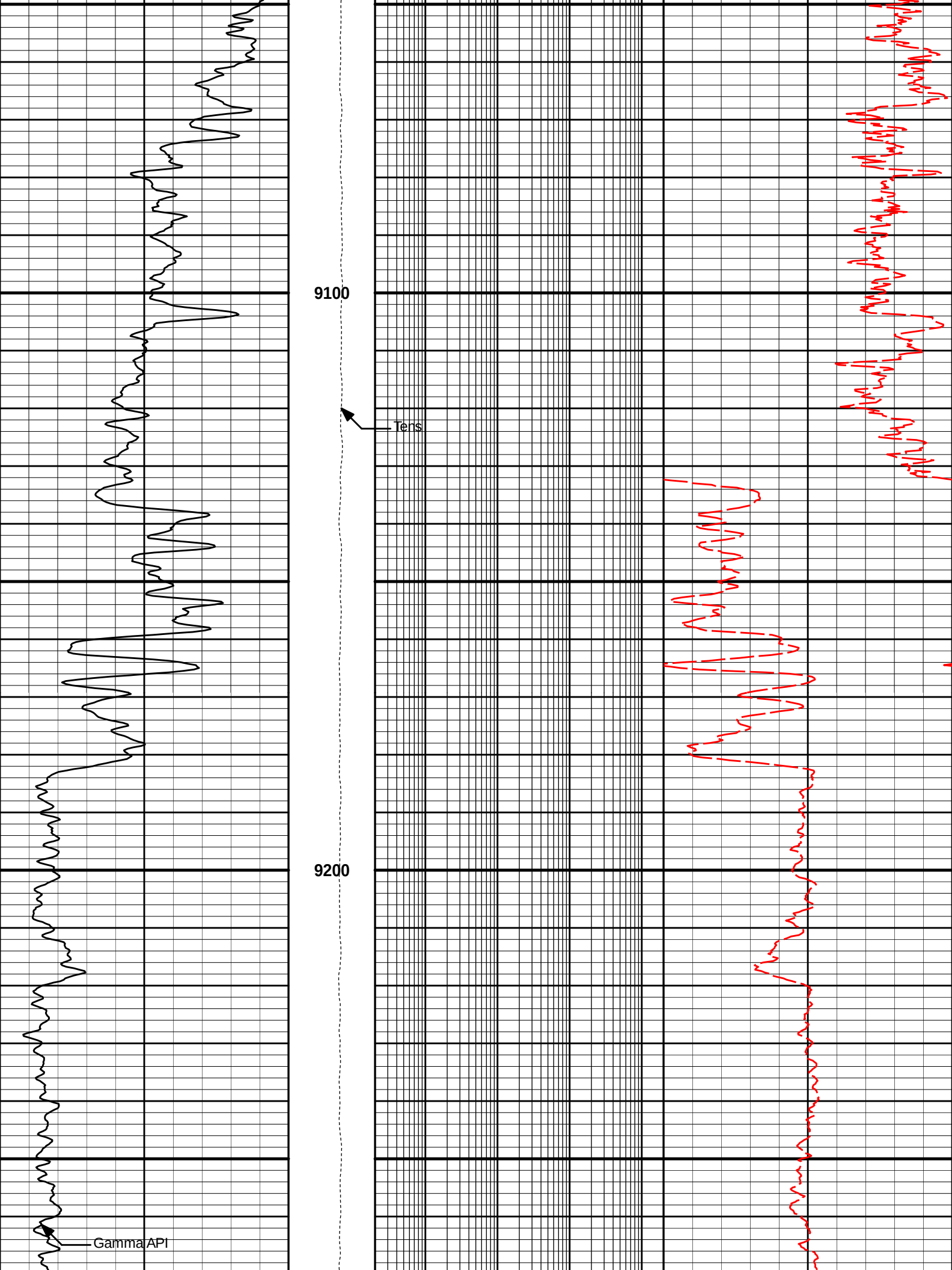

8000
Gamma API
Neutron Porosity
8100
Tens

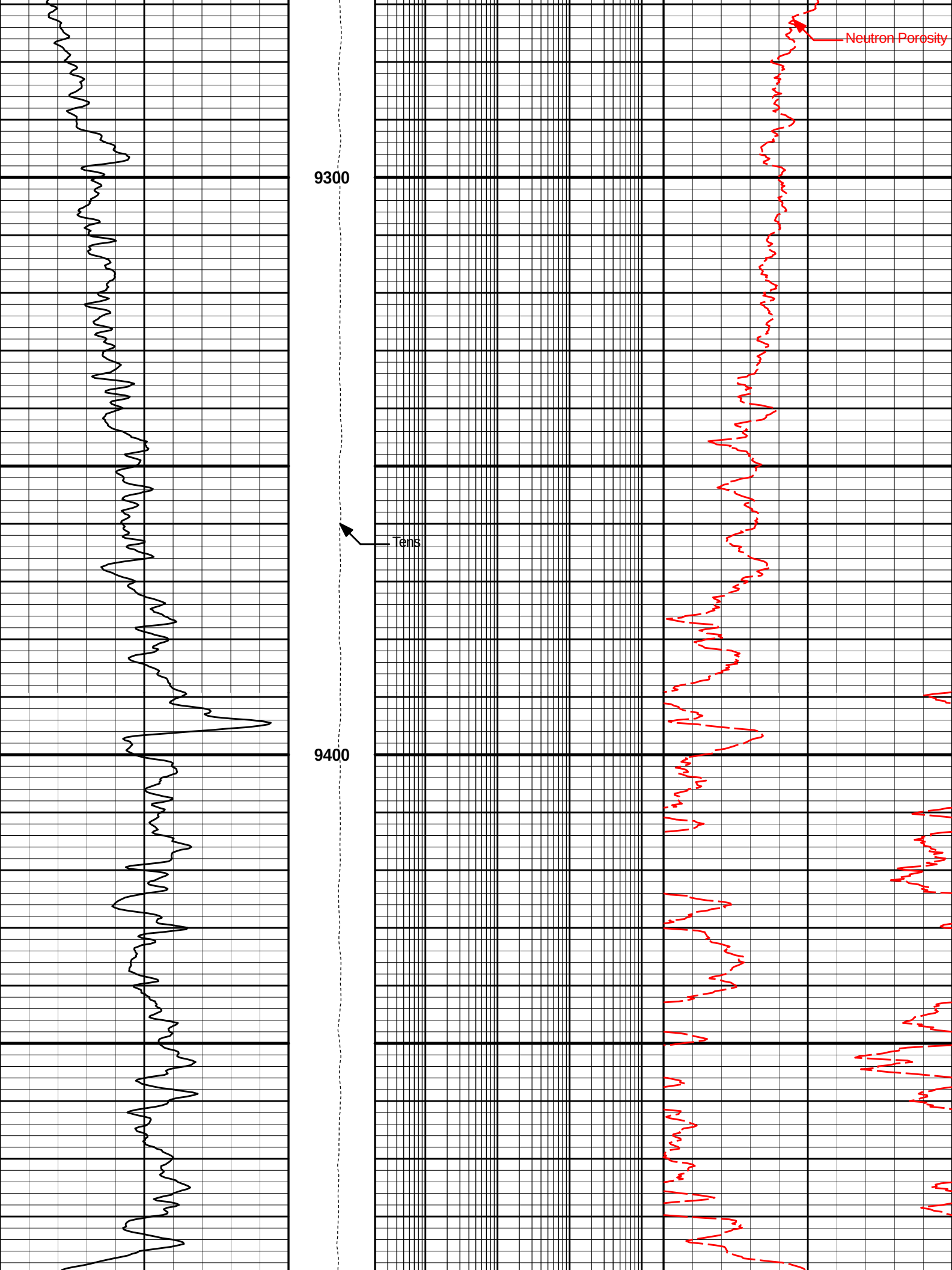

8200
8300
Gamma API
Neutron Porosity

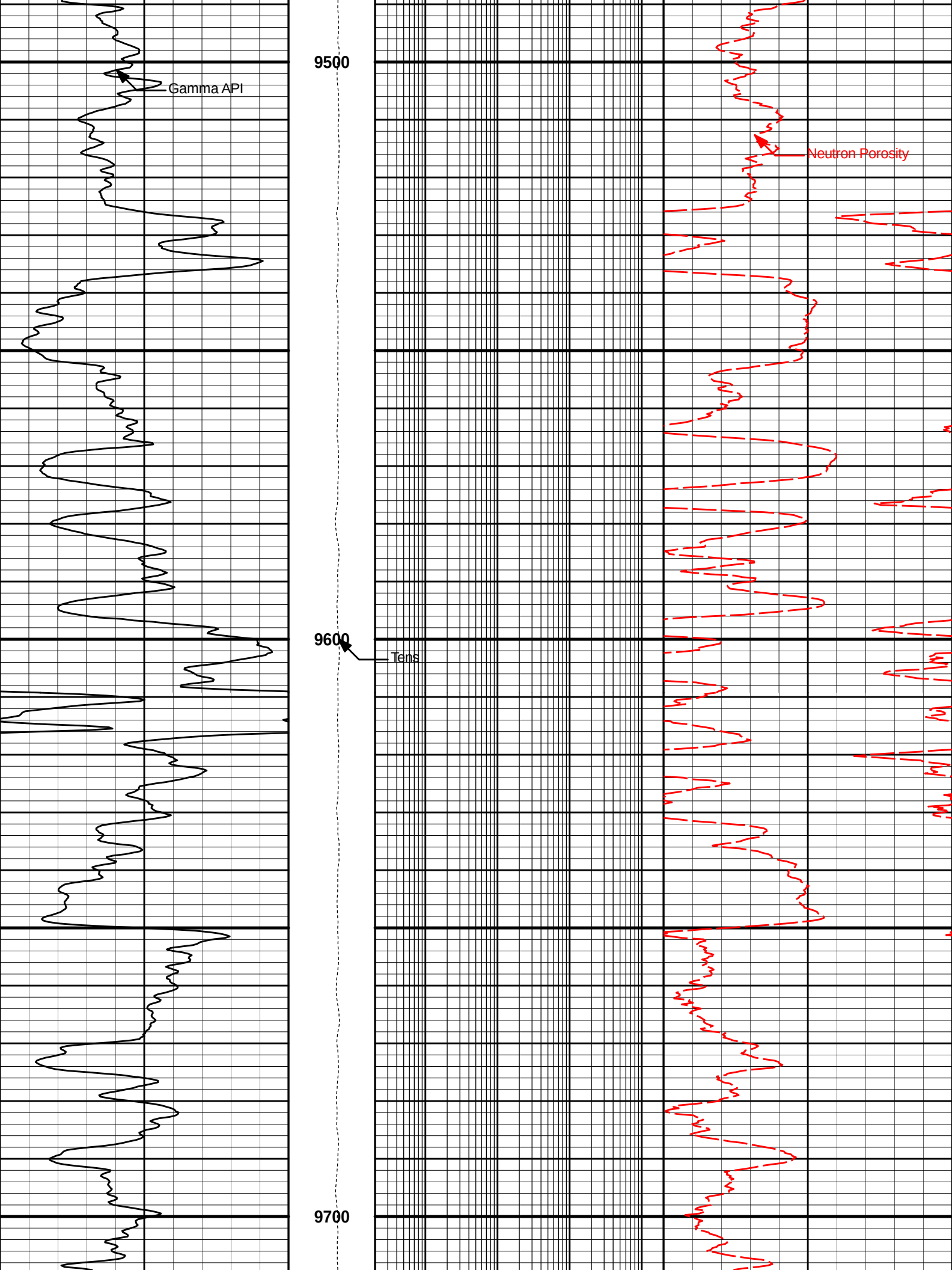

8400
Tens
8500
Gamma API
Neutron Porosity
8600

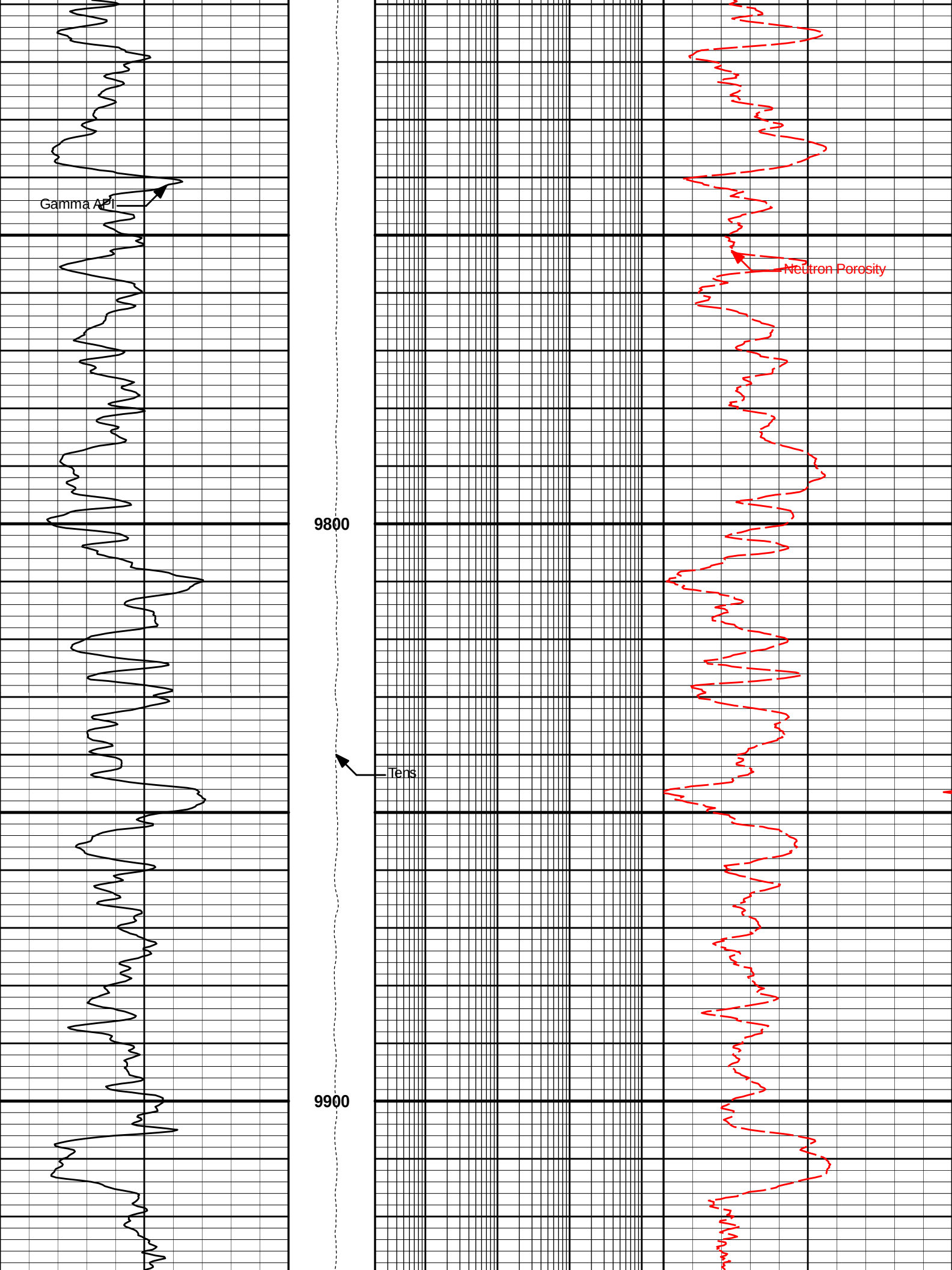

Tens
8700
Gamma API
8800
Neutron Porosity

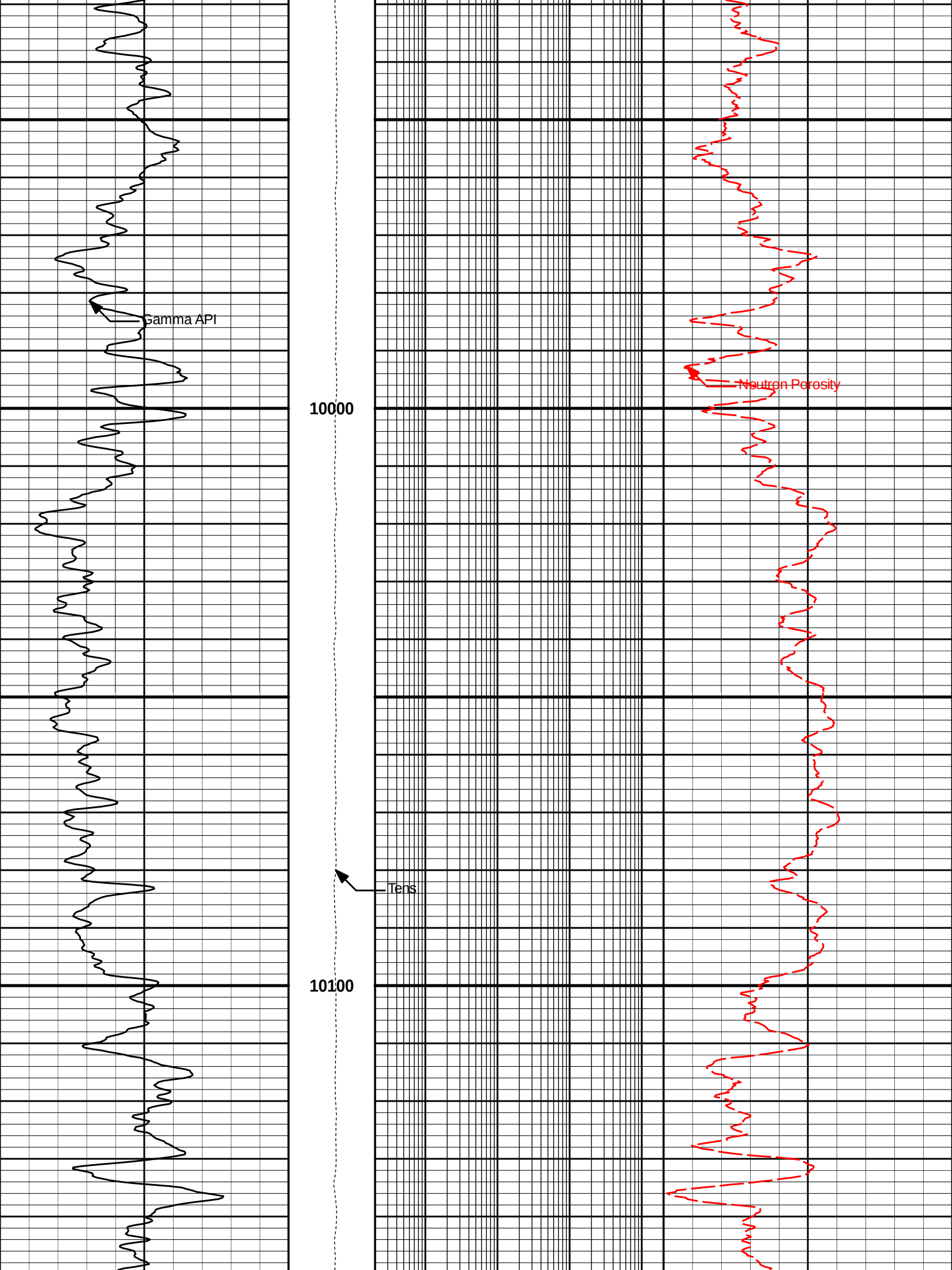

Tens
8900
9000
Gamma API
Neutron Porosity

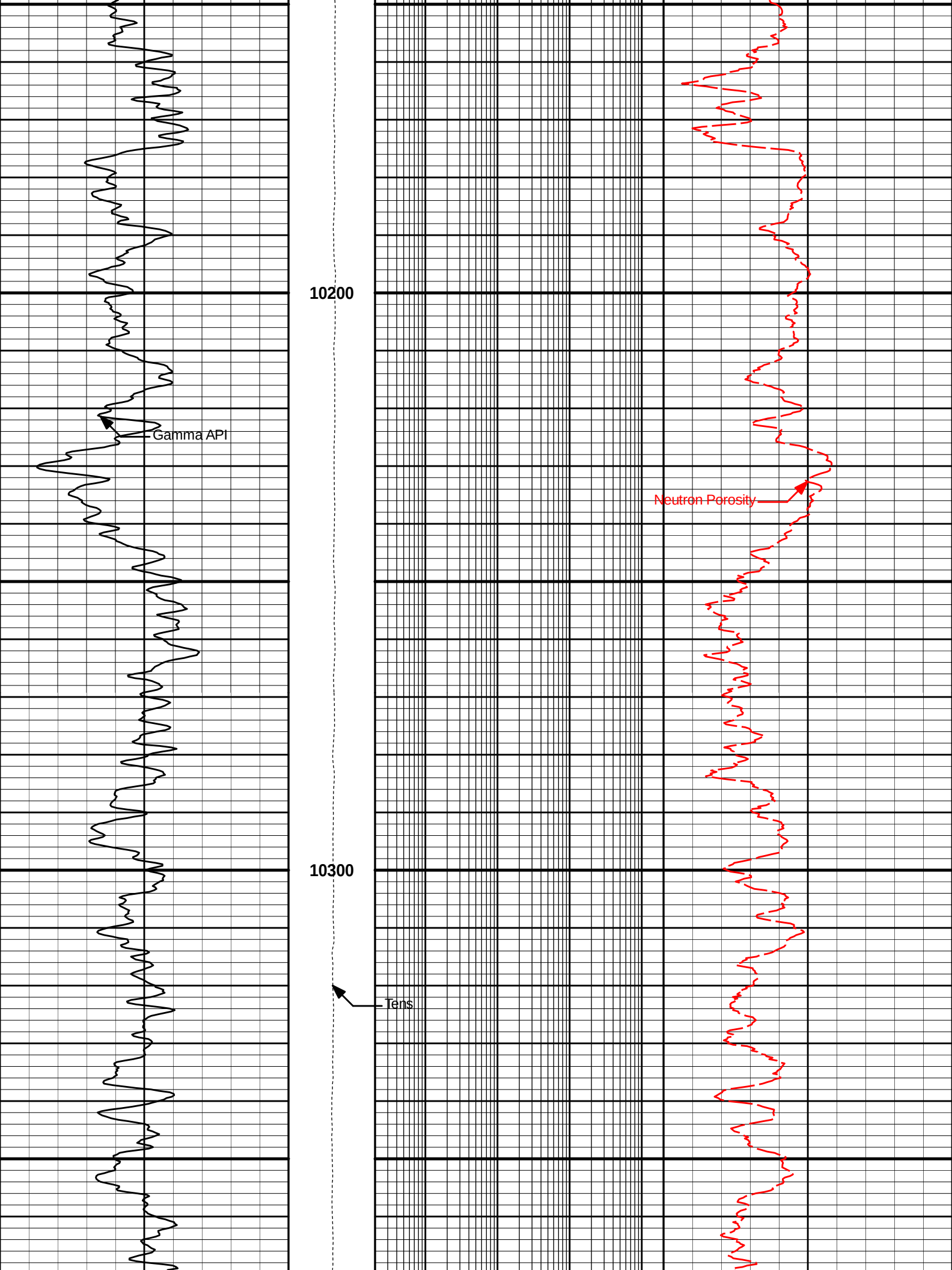

9100
Tens
9200
Gamma API

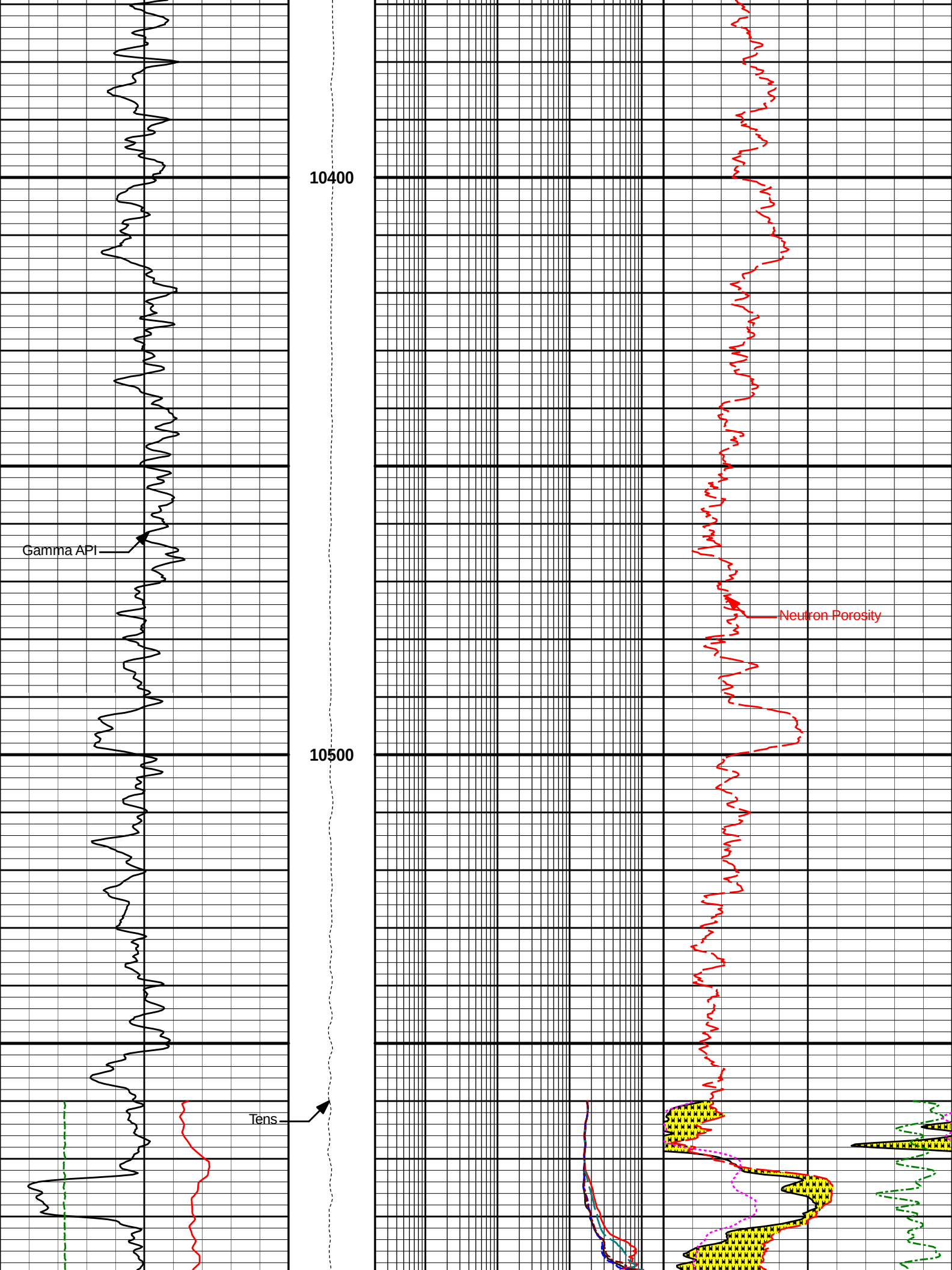

Neutron Porosity
9300
Tens
9400

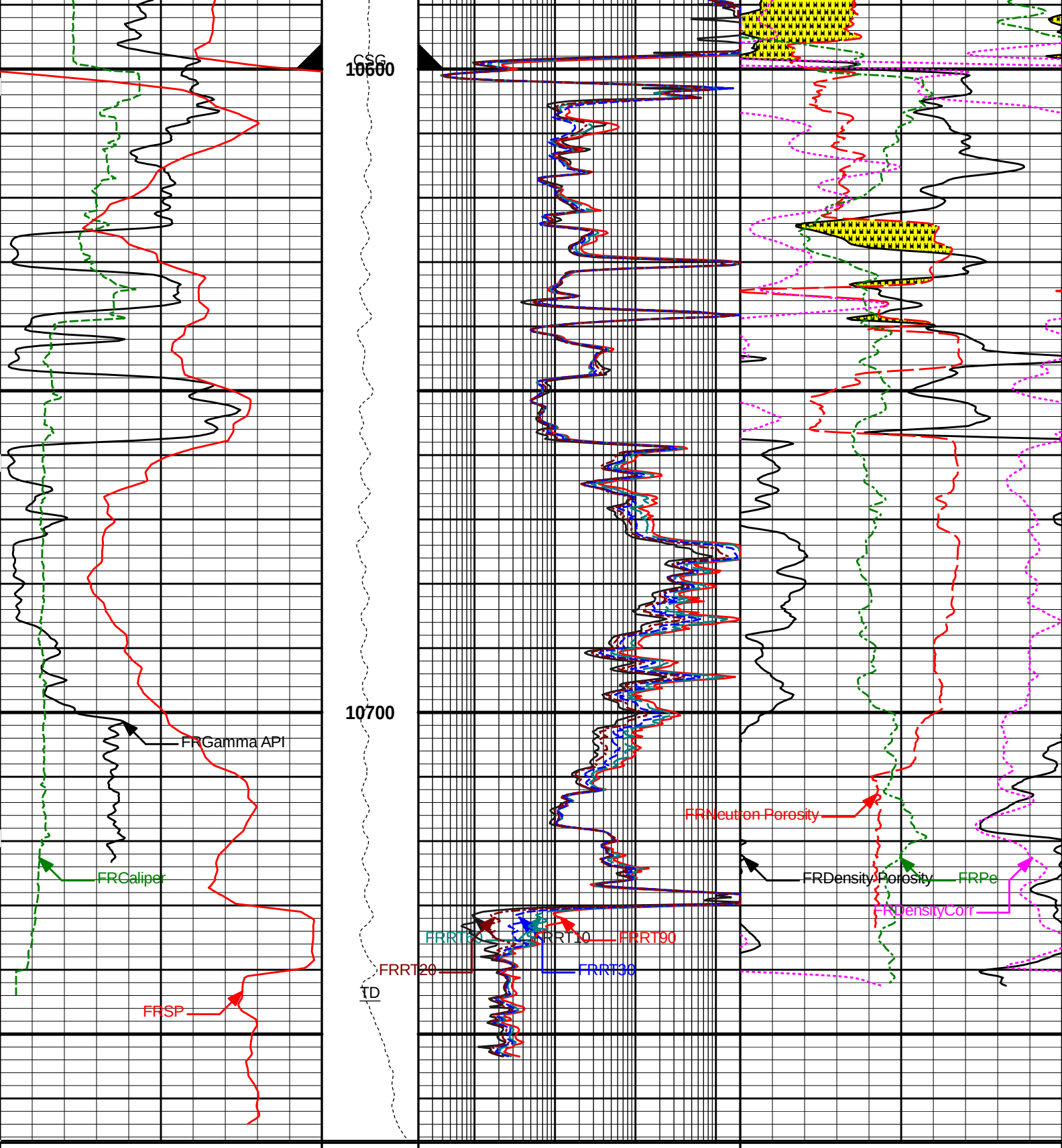

Gamma API
Neutron Porosity
9500
9600
Tens
9700


Gamma API
Neutron Porosity
9800
Tens
9900


Gamma API
Neutron Porosity
10000
Tens
10100


10200
Gamma API
Neutron Porosity
10300
Tens


10400
10500
Gamma API
Neutron Porosity
Tens



0 SP 100	8K Tens 2K	0.2 RT90 2K
millivolts	pounds	Ohm-m
4 Caliper 14		0.2 RT60 2K
inches		Ohm-m
0 Gamma API 150		0.2 RT30 2K
api		Ohm-m
		0.2 RT20 2K
		Ohm-m

0 Pe -10
barns/electron
-0.25 DensityCorr 0.25
gram per cc
30 Density Porosity -10
percent
30 Neutron Porosity -10
percent

0.2 RT10 2K
Ohm-m

HALLIBURTON

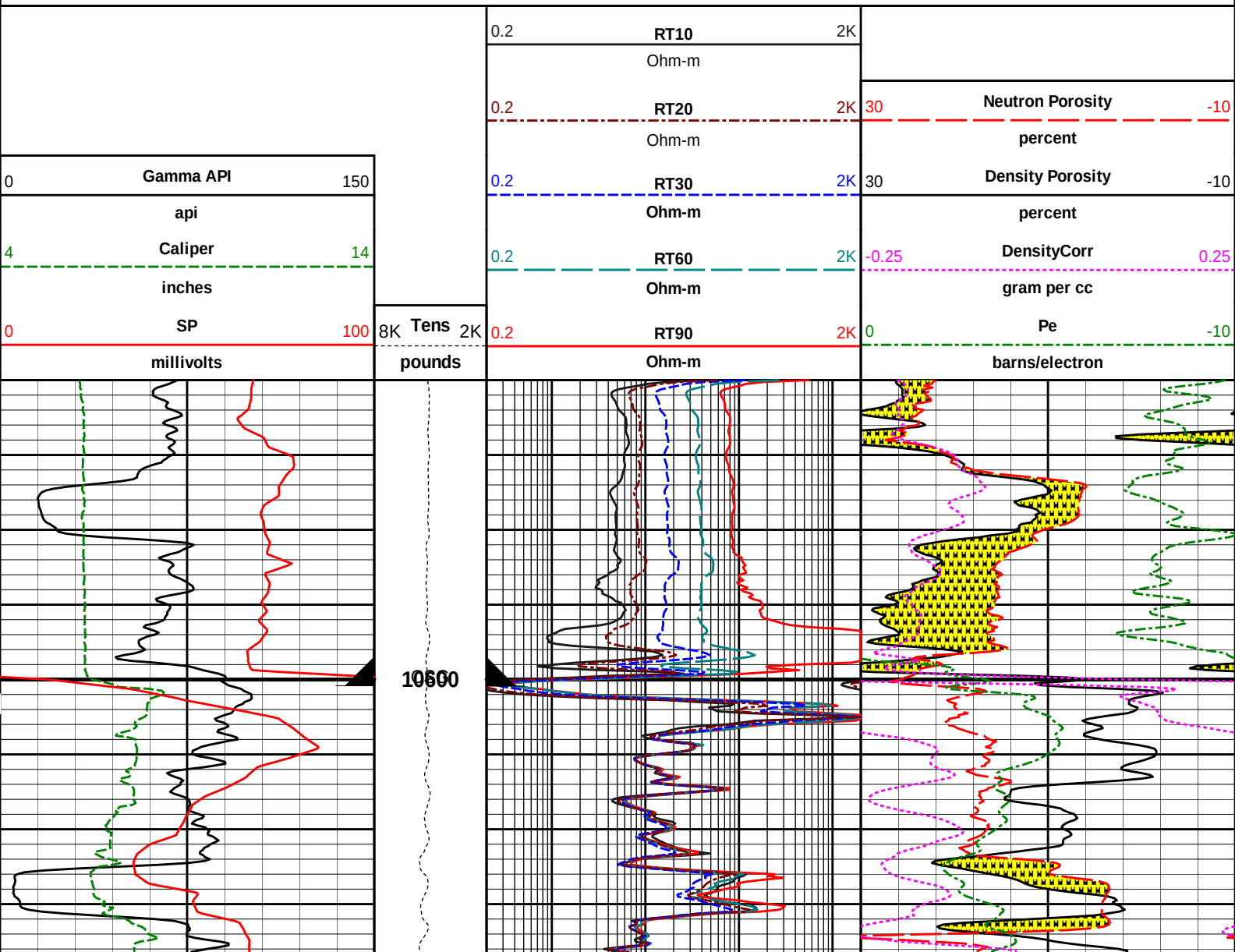
Plot Time: 08-Jan-17 17:41:34
Plot Range: 100 ft to 10766.6 ft
Data: EXPED_EWS_3A\Well Based*\
Plot File: \\COMP\ULTRA_COMPOSITE_RUN2

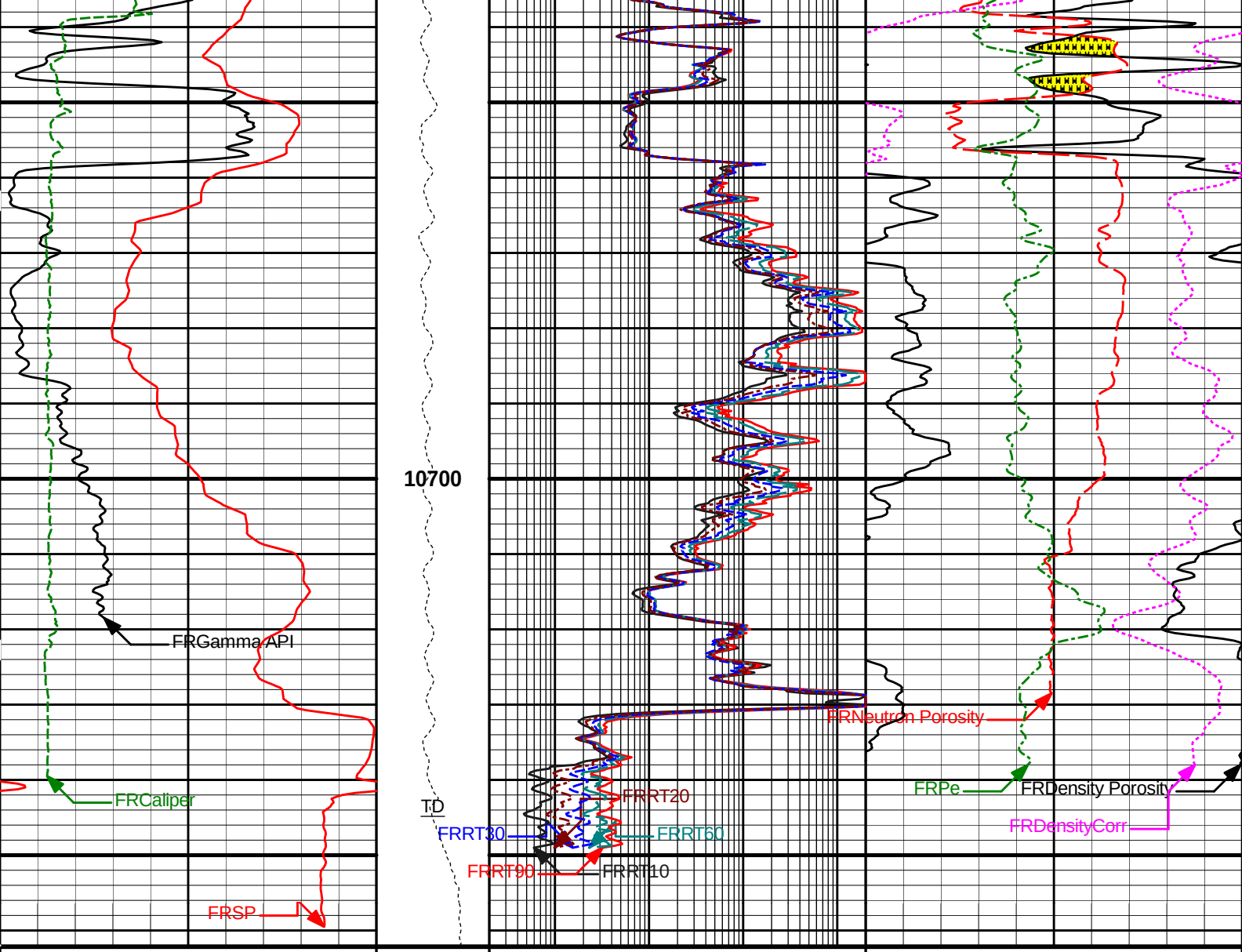
MAIN PASS 5" = 100'

HALLIBURTON

Plot Time: 08-Jan-17 17:41:34
Plot Range: 10560 ft to 10762 ft
Data: EXPED_EWS_3A\Well Based\repeat\
Plot File: \\COMP\ULTRA_COMPOSITE_RUN2

REPEAT PASS 5" = 100'





0 SP 100	8K Tens 2K	0.2 RT90 2K	0 Pe -10	
millivolts	pounds	Ohm-m	barns/electron	
4 Caliper 14		0.2 RT60 2K	-0.25 DensityCorr 0.25	
inches		Ohm-m	gram per cc	
0 Gamma API 150		0.2 RT30 2K	30 Density Porosity -10	
api		Ohm-m	percent	
		0.2 RT20 2K	30 Neutron Porosity -10	
		Ohm-m	percent	
		0.2 RT10 2K		
		Ohm-m		

HALLIBURTON

Plot Time: 08-Jan-17 17:41:35
Plot Range: 10560 ft to 10762 ft
Data: EXPED_EWS_3A\Well Based\repeat\
Plot File: \\COMP\ULTRA_COMPOSITE_RUN2

REPEAT PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 10842354**	**Reference Calibration Date:**	**10-Dec-16 18:17:14**
Engineer:	**P. DIMPFL**	**Calibration Date:**	**07-Jan-17 19:12:55**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-549

Calibrator API Reference:240.00 api

Equivalent Calibrator API Reference:244.2 api

Measurement	Measured	Calibrated	Units
Background	56.4	52.9	api
Background + Calibrator	316.8	297.1	api
Calibrator	260.4	244.2	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 10842354**	**Reference Calibration Date:**	**07-Jan-17 19:12:55**
Engineer:	**P. DIMPFL**	**Calibration Date:**	**07-Jan-17 19:17:02**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-549

Calibrator API Reference:240.00 api

Equivalent Calibrator API Reference:244.2 api

Field Verification	Shop	Field	Units
Background	52.9	55.3	api
Background + Calibrator	297.1	296.0	api
Calibrator	244.2	240.8	api

Shop	Field	Difference	Tolerance
244.2	240.8	3.4	+/- 9.00

ACCELEROMETER SHOP CALIBRATION

Tool Name:	**GTET - 10842354**	**Reference Calibration Date:**	**01-Nov-16 16:47:35**
Engineer:	**T. CASADABAN**	**Calibration Date:**	**06-Dec-16 11:42:02**
Software Version:	**WL INSITE R5.0.3 (Build 7)**	**Calibration Version:**	**1**

Horizontal-1 Telemetry	Horizontal-2 Telemetry	Vertical Telemetry	Units
-133.18	16.09	-16609.54	cnts

Coefficient	Coefficient Value	Tolerance
Gain	-0.000060	-----
Offset	-0.004	-----
Noise	0.0007	0.0000 - 0.0030

Orientation	Measured	Tolerance	Calibrated	Tolerance
Horizontal	-0.01	-0.10 - 0.10	0.00	-0.10 - 0.10
Vertical	1.00	0.90 - 1.10	1.00	0.90 - 1.10

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11013116**	**Reference Calibration Date:**	**16-Nov-16 14:41:33**
Engineer:	**B. ERICKSON**	**Calibration Date:**	**16-Dec-16 14:13:35**
Software Version:	**WL INSITE R5.0.3 (Build 7)**	**Calibration Version:**	**1**

Logging Source S/N: 08-040
Tank Serial Number: ROCK SPRINGS
Reference value assigned to Tank: 49.230
Snow Block S/N: 11392047
Calibration Tank Water Temperature: 69 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	**Prev. Value**	**New Value**	**Control Limit On New Value**
Gain:	0.92639	0.92668	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):	0.1973	0.1974	0.0001	+/- 0.0020
Calibrated Ratio:	9.2635	9.2664	0.003	+/- 0.050

VERIFIER		
Measurement	**Value**	**Control Limit**
Snow-Block Porosity (decp):	0.0817	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 - 11013116
Reference Calibration Date: 16-Dec-16 14:13:35
Engineer: P. DIMPFL
Calibration Date: 07-Jan-17 19:30:52
Software Version: WL INSITE R5.0.5 (Build 8)
Calibration Version: 1

Logging Source S/N: 08-040
Snow Block S/N: 11392047

NEUTRON FIELD-CHECK SUMMARY				
	Shop	**Field**	**Difference**	**Control Limit On Change**
Snow-Block Porosity (decp):	0.0817	0.0702	-0.0116	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - 10950493
Reference Calibration Date: 16-Nov-16 14:13:22
Engineer: B. ERICKSON
Calibration Date: 16-Dec-16 13:46:22
Software Version: WL INSITE R5.0.3 (Build 7)
Calibration Version: 1
Host Tool Name: DSNT - 11013116

CALIBRATION COEFFICIENTS			
Measurement	**Previous Value**	**New Value**	**Control Limit On New Value**
Pad Offset	-4007.19	-3489.40	-7000.00 - -1000.00

Pad Gain	0.0003991	0.0003791	0.0002000 - 0.0006000
Arm Offset	-2077.26	-3509.81	-5000.00 - 3000.00
Arm Gain	0.0004495	0.0005514	0.000300 - 0.000700
Arm Power	0.000003288	-0.000004249	-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)	1.90	2.00	0.10	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.60	6.50	-0.10	+/- 0.20
Medium Ring (in)	8.17	8.25	0.08	+/- 0.20
Large Ring (in)	15.08	15.00	-0.08	+/- 0.20

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

PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed

SDLT CALIPER FIELD CALIBRATION

Tool Name: SDLT - 10950493 **Reference Calibration Date:** 16-Dec-16 13:46:22

Engineer: P. DIMPFL **Calibration Date:** 07-Jan-17 19:24:44

Software Version: WL INSITE R5.0.5 (Build 8) **Calibration Version:** 1

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.66	-0.09	+/- 0.10
Ring Diameter	8.25	8.11	-0.14	+/- 0.15

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 10865871 **Reference Calibration Date:** 16-Nov-16 13:49:31

Engineer: Z. TAYLOR **Calibration Date:** 16-Dec-16 11:27:06

Software Version: WL INSITE R5.0.3 (Build 7) **Calibration Version:** 1

Logging Source S/N: 5549GW

Aluminum Block S/N: ROCK SPRINGS Density: 2.602g/cc Pe: 3.110

Magnesium Block S/N: ROCK SPRINGS Density: 1.690g/cc Pe: 2.610

DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0447	1.0392	0.90 - 1.10
Near Dens Gain	1.0263	1.0082	0.90 - 1.10
Near Peak Gain	1.0294	1.0084	0.90 - 1.10
Near Lith Gain	1.0118	1.0057	0.90 - 1.10
Far Bar Gain	1.0122	1.0112	0.90 - 1.10
Far Dens Gain	1.0038	1.0015	0.90 - 1.10

Far Peak Gain	1.0014	0.9973	0.90 - 1.10
Far Lith Gain	0.9873	0.9825	0.90 - 1.10
Near Bar Offset	-0.3999	-0.3527	NONE
Near Dens Offset	-0.2495	-0.0918	NONE
Near Peak Offset	-0.2691	-0.0994	NONE
Near Lith Offset	-0.1352	-0.1028	NONE
Far Bar Offset	-0.1631	-0.1528	NONE
Far Dens Offset	-0.0918	-0.0747	NONE
Far Peak Offset	-0.0645	-0.0386	NONE
Far Lith Offset	0.0574	0.0770	NONE
Near Bar Background	809.42	809.44	700 - 1450
Near Dens Background	268.32	268.21	230 - 480
Near Peak Background	115.33	115.55	100 - 210
Near Lith Background	142.98	143.43	125 - 260
Far Bar Background	473.13	470.54	450 - 900
Far Dens Background	184.21	182.04	175 - 345
Far Peak Background	72.18	72.10	70 - 140
Far Lith Background	75.73	75.70	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.694	1.690	-0.004	+/- 0.015
Pe	2.464	2.570	0.106	+/- 0.150
ALUMINUM				
Density (g/cc)	2.605	2.602	-0.003	+/- 0.01500
Pe	2.980	3.075	0.095	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0001	+/- 0.0110	-0.0012	+/- 0.0140
Magnesium Block	-0.0005	+/- 0.0110	-0.0028	+/- 0.0140
Aluminum Block	0.0011	+/- 0.0110	0.0006	+/- 0.0140
Resolution	10.17	6.00 - 11.50	10.18	6.00 - 11.50
Internal Verifier(B+D+P+L)	1337	1200 - 2700	800	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 - 10865871 **Reference Calibration Date:** 16-Dec-16 11:27:06

Engineer:	**P. DIMPFL**	**Calibration Date:**	**07-Jan-17 19:13:44**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Pad Temperature: 57.6 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1336.631	1325.901	-10.730	14.788
Far (B+D+P+L) cps	800.385	790.906	-9.479	15.669
Near Resolution	10.17	10.03	-0.140	0.50
Far Resolution	10.18	9.70	-0.480	1.00

PASS/FAIL SUMMARY

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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	**ACRt Sonde - 11231100**	**Reference Calibration Date:**	**28-Oct-16 16:51:54**
Engineer:	**J. Heatherly**	**Calibration Date:**	**06-Dec-16 11:43:03**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**
Host Tool Name:	**ACRt Instrument - 11219334**		

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0114	1.05	0.95	1.0100	1.05	0.95	1.0071	1.05
A2 (50")	0.95	1.0196	1.05	0.95	1.0192	1.05	0.95	1.0158	1.05
A3 (29")	0.95	1.0087	1.05	0.95	1.0086	1.05	0.95	1.0039	1.05
A4 (17")	0.95	1.0083	1.05	0.95	1.0061	1.05	0.95	1.0032	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9970	1.05	0.95	0.9939	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9816	1.05	0.95	0.9774	1.05

SONDE OFFSET

Subarray	R12KHz	R36KHz	R72KHz
	(mmho/m)	(mmho/m)	(mmho/m)
A1 (80")	0.233	-3.451	-5.053
A2 (50")	-2.674	-3.983	-4.089
A3 (29")	-11.490	-3.463	-2.965
A4 (17")	-107.506	-33.686	-26.566
A5 (10")	N/A	-104.687	-49.955
A6 (6")	N/A	358.971	179.279

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.83	1.3
36K	1.0	1.89	2.0
72K	1.0	1.15	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.04	1.05

PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET CHK	PASS

TOOL OK TO LOG

QUALITY CHECK SHOP CALIBRATION

Tool Name:	**ACRt Sonde - 11231100**	**Reference Calibration Date:**	**06-Dec-16 14:59:17**
Engineer:	**J. Heatherly**	**Calibration Date:**	**06-Dec-16 15:00:38**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**
Host Tool Name:	**ACRt Instrument - 11219334**		

STANDARD DEVIATIONS

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A2 (50")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A3 (29")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A4 (17")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A5 (10")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A6 (6")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass

AVERAGES

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.006	> -0.500	Pass
A2 (50")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.004	> -0.500	Pass
A3 (29")	-0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.003	> -0.500	Pass
A4 (17")	-0.003	> -0.500	Pass	-0.007	> -0.500	Pass	-0.024	> -0.500	Pass
A5 (10")	-0.012	> -0.500	Pass	-0.023	> -0.500	Pass	-0.044	> -0.500	Pass
A6 (6")	0.019	< 0.500	Pass	0.082	< 0.500	Pass	0.172	< 0.500	Pass

GAIN TOLERANCE

R12KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-220016624.000	-219990752.000	25872.000	10999537.600	Pass
A2 (50")	-211056784.000	-211038832.000	17952.000	10551941.600	Pass
A3 (29")	-212444224.000	-212431936.000	12288.000	10621596.800	Pass
A4 (17")	-208281312.000	-208252432.000	28880.000	10412621.600	Pass
A5 (10")	-215471696.000	-215450288.000	21408.000	10772514.400	Pass
A6 (6")	-211027184.000	-211006608.000	20576.000	10550330.400	Pass

R36KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	56682132.000	56656628.000	25504.000	2832831.400	Pass
A2 (50")	50064436.000	50041816.000	22620.000	2502090.800	Pass
A3 (29")	42550308.000	42529768.000	20540.000	2126488.400	Pass
A4 (17")	34087560.000	34059716.000	27844.000	1702985.800	Pass
A5 (10")	43112252.000	43086648.000	25604.000	2154332.400	Pass
A6 (6")	32964110.000	32939554.000	24556.000	1646977.700	Pass

R72KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-87801296.000	-87789360.000	11936.000	4389468.000	Pass

A2 (50")	-83854944.000	-83843592.000	11352.000	4192179.600	Pass
A3 (29")	-83655768.000	-83645176.000	10592.000	4182258.800	Pass
A4 (17")	-86944208.000	-86932824.000	11384.000	4346641.200	Pass
A5 (10")	-87819152.000	-87809016.000	10136.000	4390450.800	Pass
A6 (6")	-85951688.000	-85941584.000	10104.000	4297079.200	Pass

PASS/FAIL SUMMARY	
Std Deviation Verification	Pass
Average Verification	Pass
Gain Tolerance Verification	Pass

CALIBRATION SUMMARY

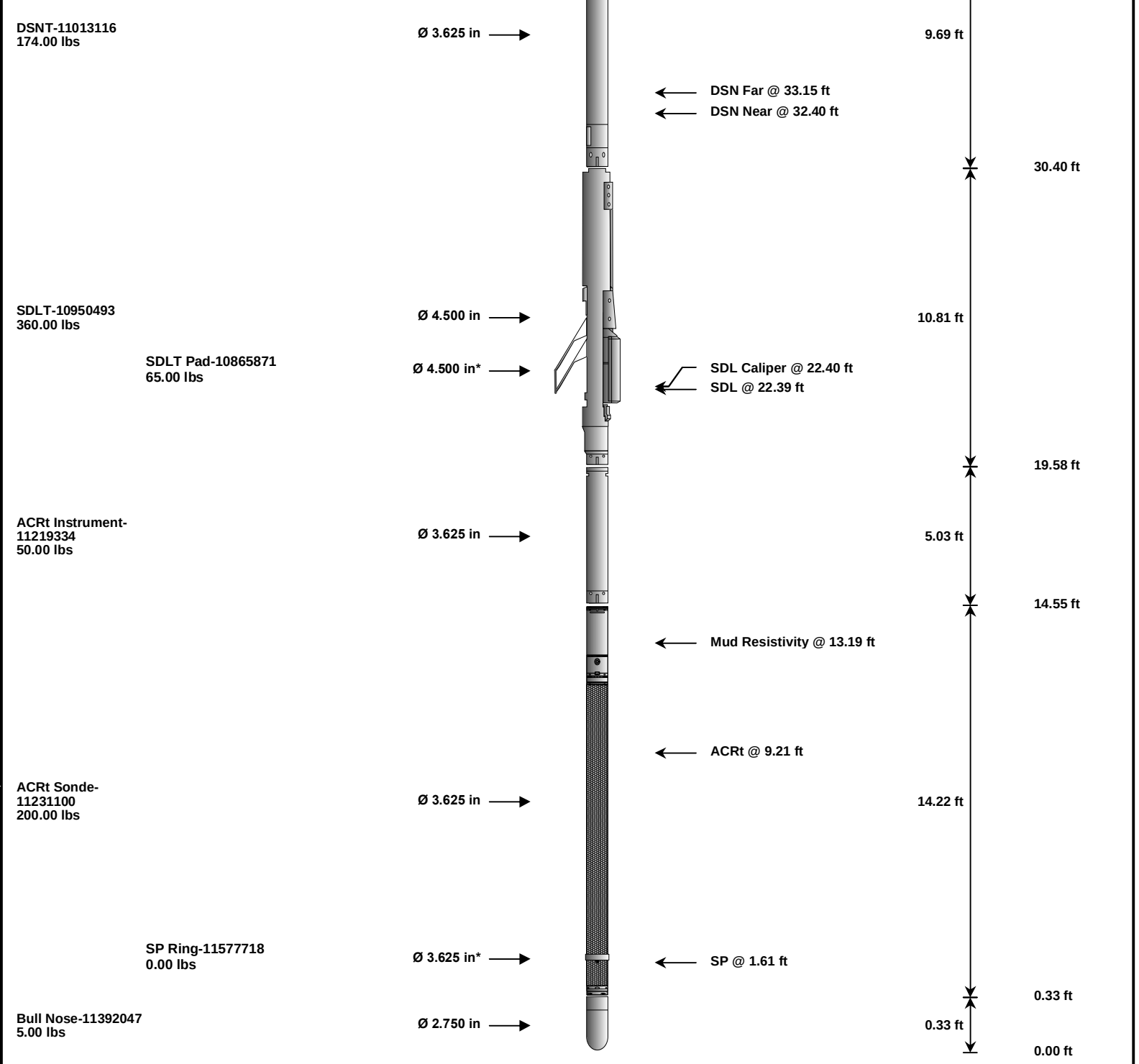
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-10842354						
Gamma Ray Calibrator	244.2	240.8	----------	3.4	+/- 9.00	api
DSNT-11013116						
Snow-Block Porosity	0.0817	0.0702	----------	0.0115	+/- 0.0150	decp
SDLT-10950493						
Pad Extension	3.75	3.66	----------	0.09	+/-0.10	in
Ring Diameter	8.25	8.11	----------	0.14	+/-0.15	in
SDLT Pad-10865871						
Near(B+D+P+L)	1336.631	1325.901	----------	10.730	+/-14.788	cps
Far(B+D+P+L)	800.385	790.906	----------	9.479	+/-15.669	cps
ACRt Sonde-11231100						
Mud Cell	1.04	----------	----------	0	----------	ohm-m

Data: EXPED_EWS_3A\0001 TRIPLE_ACRt\005 08-Jan-17 08:25 Up 10767.3f **Date: 08-Jan-17 11:45:44**

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		Ø 2.310 in		Fishing Neck @ 53.97 ft		54.85 ft
RWCH-11206878 135.00 lbs		Ø 3.625 in		Load Cell @ 51.17 ft BH Temperature @ 50.60 ft	6.25 ft	
				Z-Accelerometer @ 48.15 ft		48.60 ft
GTET-10842354 165.00 lbs		Ø 3.625 in		GammaRay @ 42.54 ft	8.52 ft	
						40.08 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11206878	135.00	6.25		48.60	300.00
GTET	Gamma Telemetry Tool	10842354	165.00	8.52		40.08	60.00
DSNT	Dual Spaced Neutron	11013116	174.00	9.69		30.40	60.00
SDLT	Spectral Density Tool	10950493	360.00	10.81		19.58	60.00
SDLP	Density Insite Pad	10865871	65.00	2.55	*	21.79	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11219334	50.00	5.03		14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11231100	200.00	14.22		0.33	120.00
SP	SP Ring	11577718	0.00	0.25	*	1.61	300.00
BLNS	Bull Nose	11392047	5.00	0.33		0.00	300.00
Total			**1,154.00**	**54.85**			

* Not included in Total Length and Length Accumulation.

Data: EXPED_EWS_3A\0001 TRIPLE_ACRt\IDLE **Date: 08-Jan-17 06:36:55**

COMPANY **EXPEDITION WATER SOLUTIONS COLORADO LLC**

COMPANY	**EXPEDITION WATER SOLUTIONS COLORADO LLC**
WELL	**EWS #3A**
FIELD	**WATTENBERG**
COUNTY	**WELD** STATE **CO**

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY
ARRAY COMPENSATED
TRUE RESISITIVITY