HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY

COMPANY **NOBLE ENERGY**

WELL **TIMM PC GK04-12**

FIELD **WATTENBERG**

COUNTY **WELD** STATE **CO**

COMPANY	WELL	FIELD	COUNTY	STATE
NOBLE ENERGY	TIMM PC GK04-12	WATTENBERG	WELD	CO

API No. 05123317420000

Location SHL: 1980' FSL & 660' FWL NWSW
LAT: 40.94889°
LONG: -104.21745°

Sect. 4 Twp. 11N Rge. 61W

Other Services:
RWCH
GTET
CSNG
IDT
ICT
BSAT

Permanent Datum	GL	Elev. 5255.0 ft	Elev.: K.B. 5267.0 ft
Log measured from	KB	, 12.0 ft above perm. Datum	D.F. 5267.0 ft
Drilling measured from	KB		G.L. 5255.0 ft

Date		25-Jul-10					
Run No.		ONE					
Depth - Driller		7945.00 ft					
Depth - Logger		7941.0 ft					
Bottom - Logged Interval		7932 ft					
Top - Logged Interval		1207 ft					
Casing - Driller		8.625 in @ 1209.0 ft		@		@	
Casing - Logger		1207.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		WBM					
Density	Viscosity	9.2 ppg	35.00 s/qt				
PH	Fluid Loss	9.00 pH	10.4 cptm				
Source of Sample		FLOW LINE					
Rm @ Meas. Temperature		1.650 ohmm @ 110.80 degF		@		@	
Rmf @ Meas. Temperature		2.13 ohmm @ 75.00 degF		@		@	
Rmc @ Meas. Temperature		1.948 ohmm @ 75.00 degF		@		@	
Source Rmf	Rmc	CHART	CHART				
Rm @ BHT		0.84 ohmm @ 225.0 degF		@		@	
Time Since Circulation		6.0 hr					
Time on Bottom		25-Jul-10 14:28					
Max. Rec. Temperature		225.0 degF @ 7941.0 ft		@		@	
Equipment	Location	11454566	BRIGHTON				
Recorded By		C. BLUE					
Witnessed By		S. HEARD		M. SCANNIELLO			

Fold here

Service Ticket No.: 7522372 API Serial No.: 05123317420000 PGM Version: WL INSITE R3.0.4 (Build 6)

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
Rm @ Meas. Temp	@				
Rmf @ Meas. Temp.	ONE	ACRT 817-353	N/A	1.5" S.O.	N/A
Rmc @ Meas. Temp.	@				
Source Rmf / Rmc	@				
Rm @ BHT	@				
Rmf @ BHT	@				
Rmc @ BHT	@				

	Date	Sample No.	Depth-Driller	Type Fluid in Hole	Density	Viscosity	Ph	Fluid Loss	Source of Sample

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	11277436	Serial No.	1105780	Serial No.	I132M275	Serial No.	11301132
Model No.	GTET	Model No.	BSAT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	4.5"	Diameter	3.625"
Detector Model No.	102A	Spacing	0.5'	Log Type	GAM/GAM	Log Type	NEU/NEU
Type	SCINT			Source Type	Cs137	Source Type	Am241Be
Length	8"	LSA [Y/N]	N	Serial No.	2770 GW	Serial No.	DSN 434
Distance to Source	18'	FWDA [Y/N]	N	Strength	1.5 Ci	Strength	15 Ci

LOGGING DATA

GENERAL				GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	7941	7509	REC	0	250	30%	-10%	55.5 us/ft	20%	0%	2.65 g/cc	20%	0%	SAND
ONE	7509	7150	REC	0	250	30%	-10%	55.5 us/ft	20%	0%	2.68 g/cc	20%	0%	SAND
ONE	7150	6650	REC	0	250	30%	-10%	47.5 us/ft	20%	0%	2.71 g/cc	20%	0%	LIME
ONE	6650	1207	REC	0	250	30%	-10%	55.5 us/ft	20%	0%	2.68 g/cc	20%	0%	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks:

RWCH/GTET/CSNG/DSNT/SDLT/IDT/ICT/BSAT/ACRT RAN IN COMBINATION

ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH PRODUCTION CASING

TENSION PULLS AFFECT TOOL RESPONSE

CREW: J. WALKER, T. BINEAU, M. BURNETT RIG: FORT 5

THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES -- BRIGHTON, CO -- (303) 825-4346

HALLIBURTON

PARAMETERS REPORT

Depth (ft)	Tool Name	Description	Value	Units
TOP				
	DSNT	Neutron Lithology	Sandstone	
	SDLT	Formation Density Matrix	2.680	g/cc
	BSAT	Delta -T Matrix Type	Sandstone 55.5	
6650.00				
	DSNT	Neutron Lithology	Limestone	
	SDLT	Formation Density Matrix	2.710	g/cc
	BSAT	Delta -T Matrix Type	Limestone 47.5	
7150.00				
	SDLT	Formation Density Matrix	2.680	g/cc
7509.00				
	SHARED	Bit Size	7.875	in
	SHARED	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	Borehole Fluid Weight	9.200	ppg
	SHARED	Oil Based Mud System?	No	
	SHARED	Mud Resistivity	1.650	ohmm
	SHARED	Temperature of Mud	110.8	degF
	SHARED	Logging Interval is Cased?	No	
	SHARED	AHV Casing OD	5.500	in
	SHARED	Surface Temperature	70.0	degF
	SHARED	Total Well Depth	7941.00	ft
	SHARED	Bottom Hole Temperature	225.0	degF
	SHARED	Navigation and Survey Master Tool	IDT	
	SHARED	High Res Z Accelerometer Master Tool	IDT	

SHARED	High Res Z Accelerometer Master Tool	IDT	
SHARED	Temperature Master Tool	NONE	
SHARED	Borehole Size Master Tool	NONE	
GTET	Process Gamma Ray?	Yes	
GTET	Gamma Tool Standoff	0.000	in
GTET	Process Gamma Ray EVR?	No	
GTET	Potassium	0.00	%
GTET	Mud Type	Natural	
GTET	Tool Position	Standoff	
CSNG	Process CSNG Data?	Yes	
CSNG	Is Tool Centralized?	No	
CSNG	Mud Type?	Natural	
CSNG	Percent K in Mud by Weight?	0.00	%
CSNG	Gamma Enviromental Corrections?	Yes	
CSNG	Barite Correction Factor	1.00	
DSNT	Process DSN?	Yes	
DSNT	Process DSN EVR?	No	
DSNT	Neutron Lithology	Sandstone	
DSNT	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.000	in
DSNT	Temperature Correction Type	None	
DSNT	DSN Pressure Correction Type	None	
DSNT	View More Correction Options	No	
DSNT	Use TVD for Gradient Corrections?	No	
DSNT	Logging Horizontal Water Tank?	No	
SDLT	Process Density?	Yes	
SDLT	Process Density EVR?	No	
SDLT	Is Hole Air Drilled?	No	
SDLT	Logging Calibration Blocks?	No	
SDLT	SDLT Pad Temperature Valid?	Yes	
SDLT	Disable temperature warning	No	
SDLT	Weighted Mud Correction Type?	None	
SDLT	Formation Density Matrix	2.650	g/cc
SDLT	Formation Density Fluid	1.000	g/cc
SDLT	Process Caliper Outputs?	Yes	
SDLT	Process MicroLog Outputs?	Yes	
IDT	Survey Writing Interval	30	ft
IDT	Smoothing Option	None	
ICT	Process Caliper Outputs?	Yes	
ICT	Navigation Source Tool	IDT	
BSAT	Compute BCAS Results?	Yes	
BSAT	Semblance Filter Low Pass Value?	5000	Hz
BSAT	Semblance Filter High Pass Value?	27000	Hz
BSAT	Delta -T Fluid	189.00	uspf
BSAT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	Delta -T Shale	100.00	uspf
BSAT	Acoustic Porosity Equation	Wylie	
ACRt	Process ACRt?	Yes	
ACRt	Minimum Tool Standoff	1.50	in
ACRt	Temperature Correction Source	FP Lwr & FP Upr	
ACRt	Tool Position	Free Hanging	
ACRt	Rmud Source	Mud Cell	
ACRt	Minimum Resistivity for MAP	0.20	ohmm
ACRt	Maximum Resistivity for MAP	200.00	ohmm
ACRt	Threshold Quality	0.50	

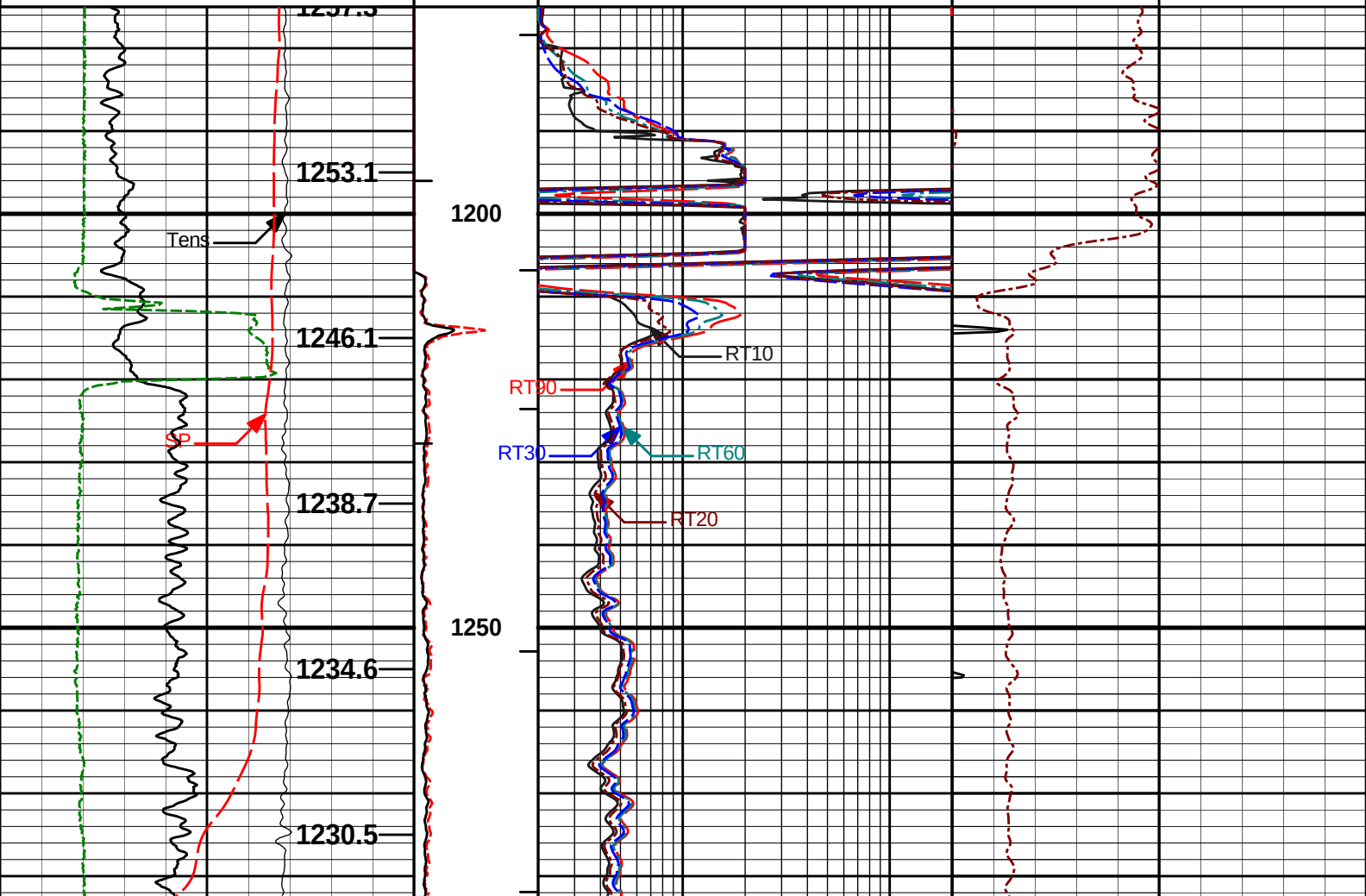
BOTTOM

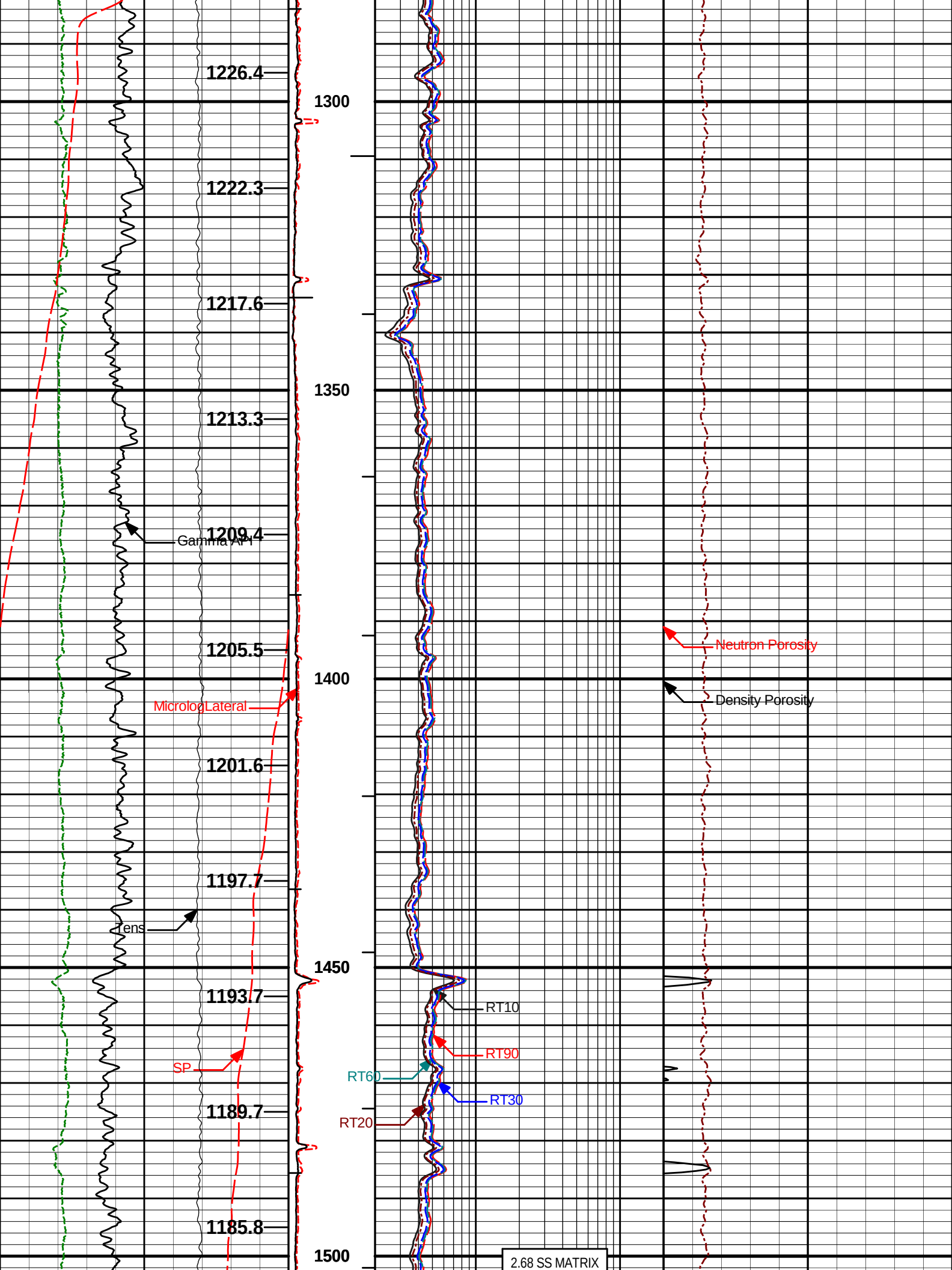
HALLIBURTON

Plot Time: 25-Jul-10 22:52:51
Plot Range: 1175 ft to 7947 ft
Data: TIMM_PC_GK04_12\Well Based\MAIN*
Plot File: \\COMP\MAIN

MAIN PASS 5" = 100'

Track 1	Depth Track	Track 2	Track 5	Track 3
Annular Volume Total	MicrologNormal 0 30 ohm-metre	2 **RT10** 200 Ohm-m		
10K Tens 0 pounds	MicrologLateral 0 30 ohm-metre	2 **RT20** 200 Ohm-m		
6 **Caliper** 16 inches	**AHVT**	2 **RT30** 200 Ohm-m	20 **Neutron Porosity** 0 percent	
0 **Gamma API** 250 api	**BHVT**	2 **RT60** 200 Ohm-m	20 **Density Porosity** 0 percent	
50 **SP** 150 millivolts	1 : 240	2 **RT90** 200 Ohm-m	0 **Pe** 10	

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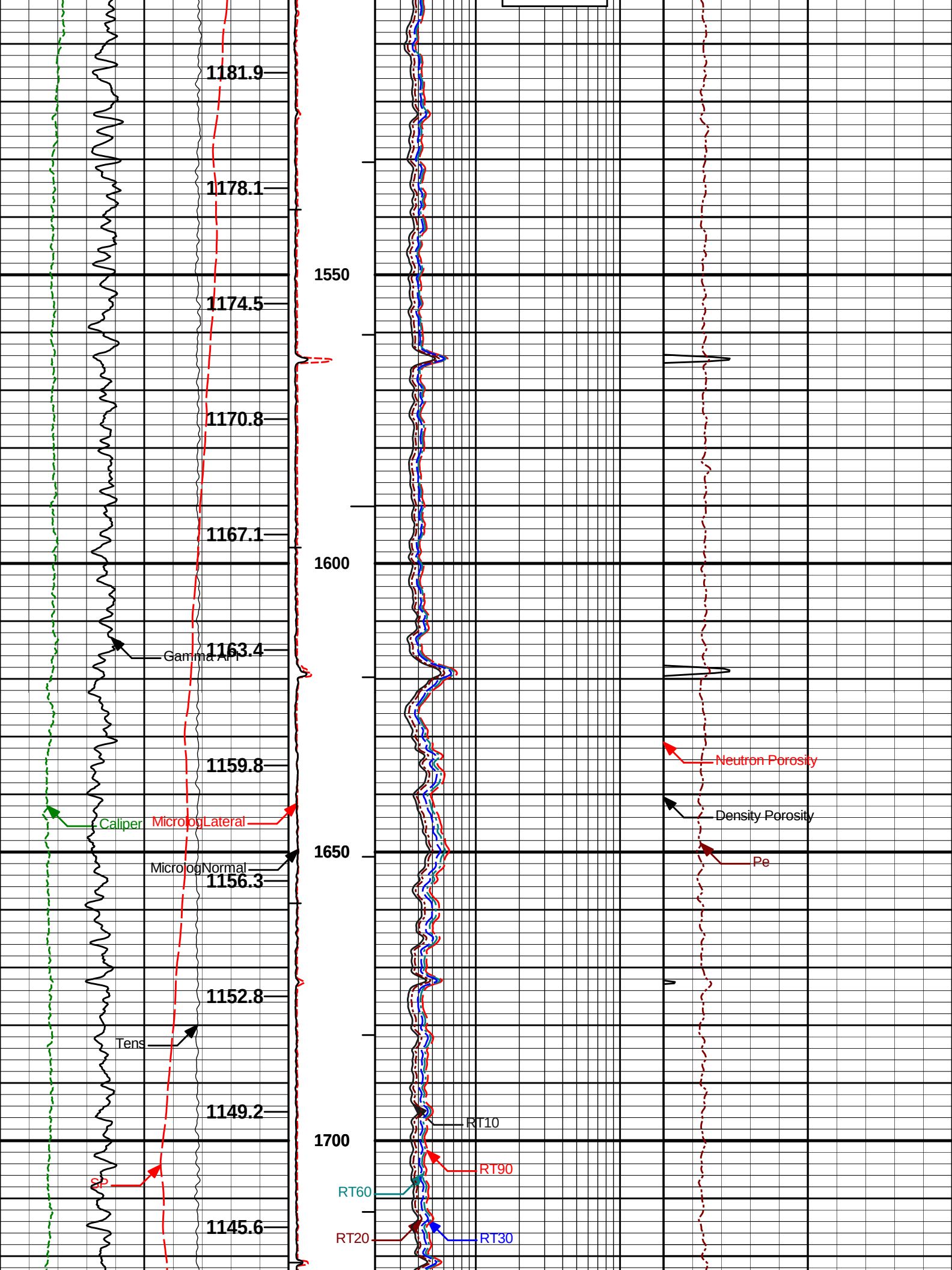
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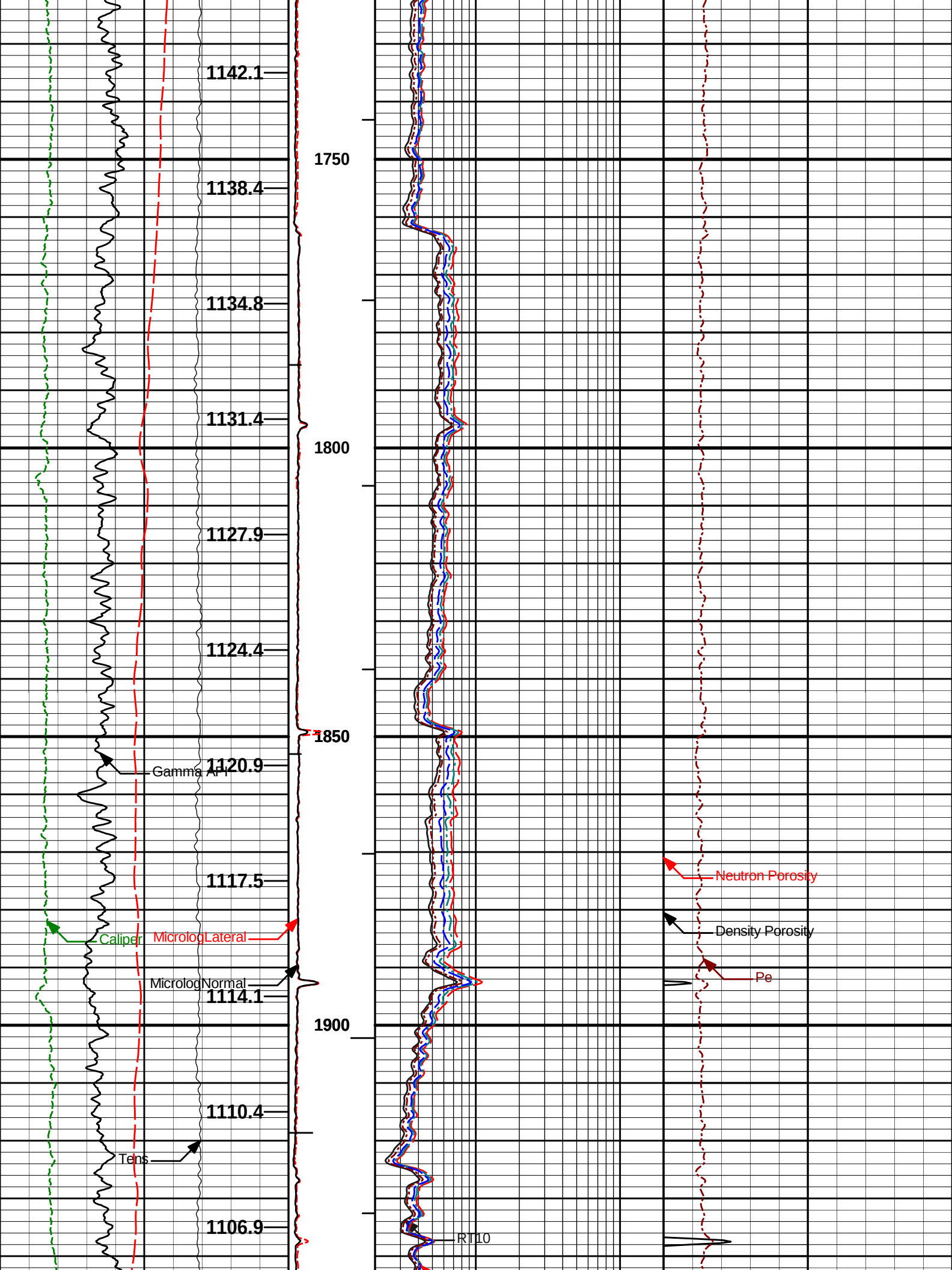
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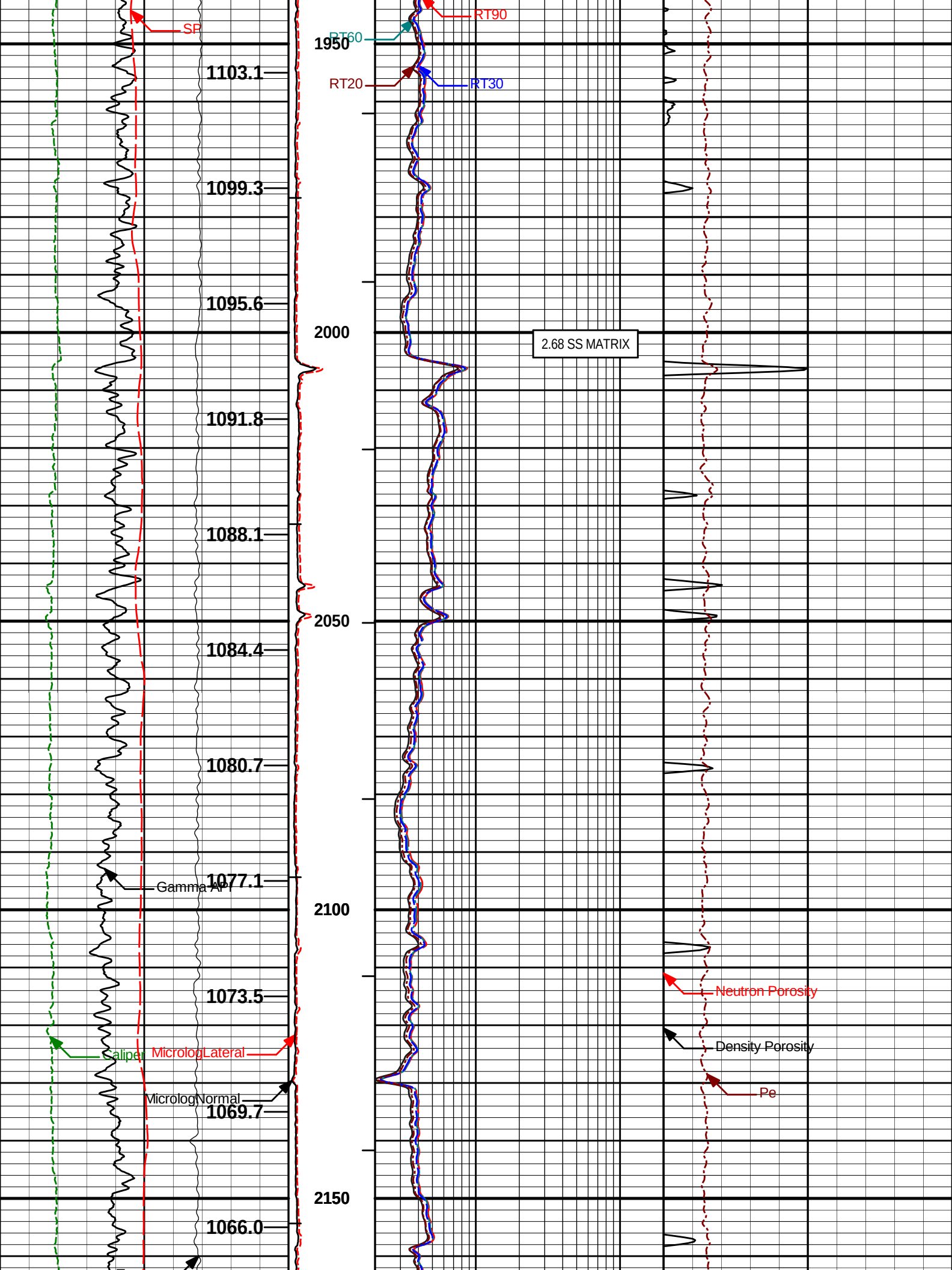
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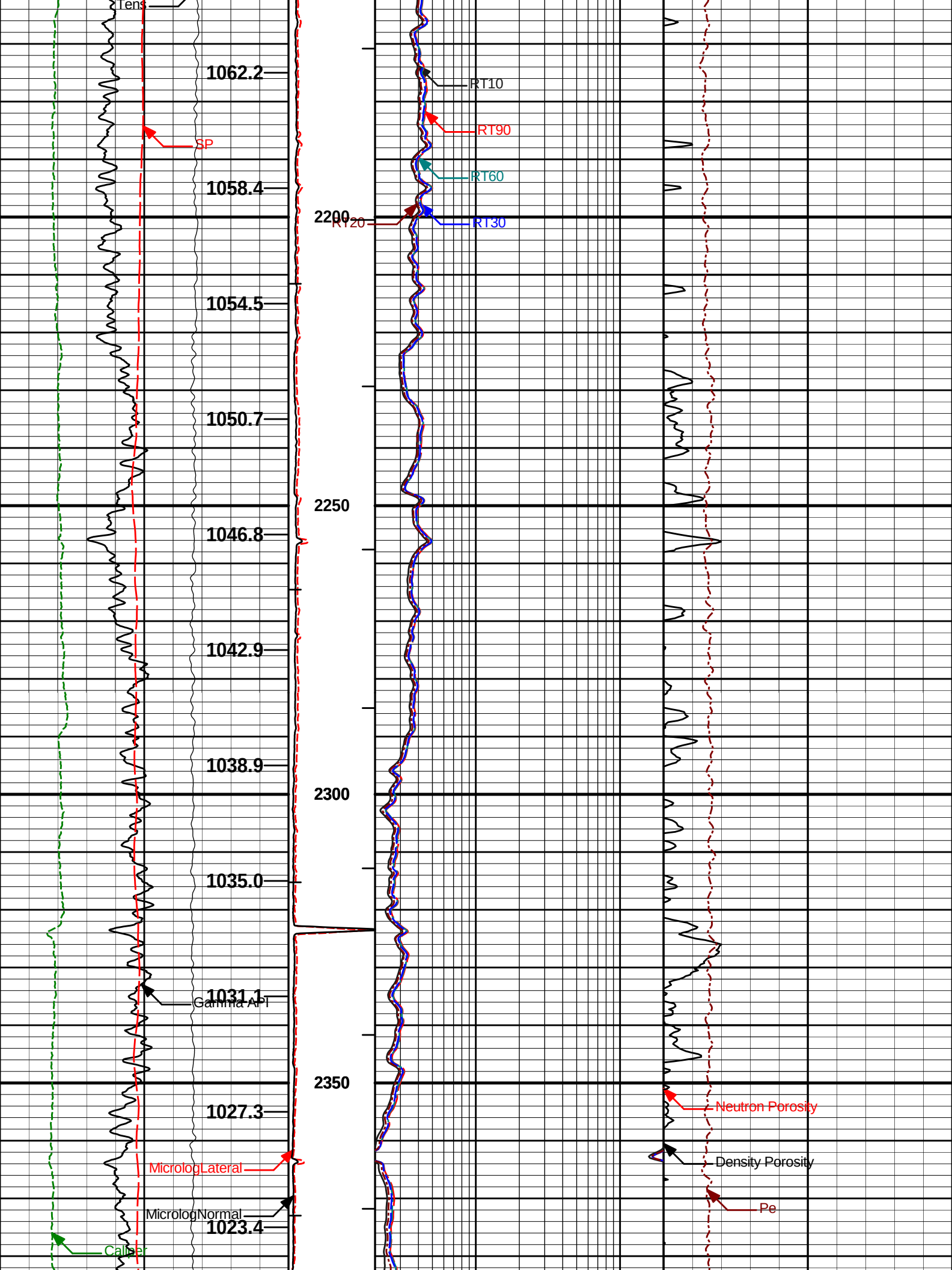
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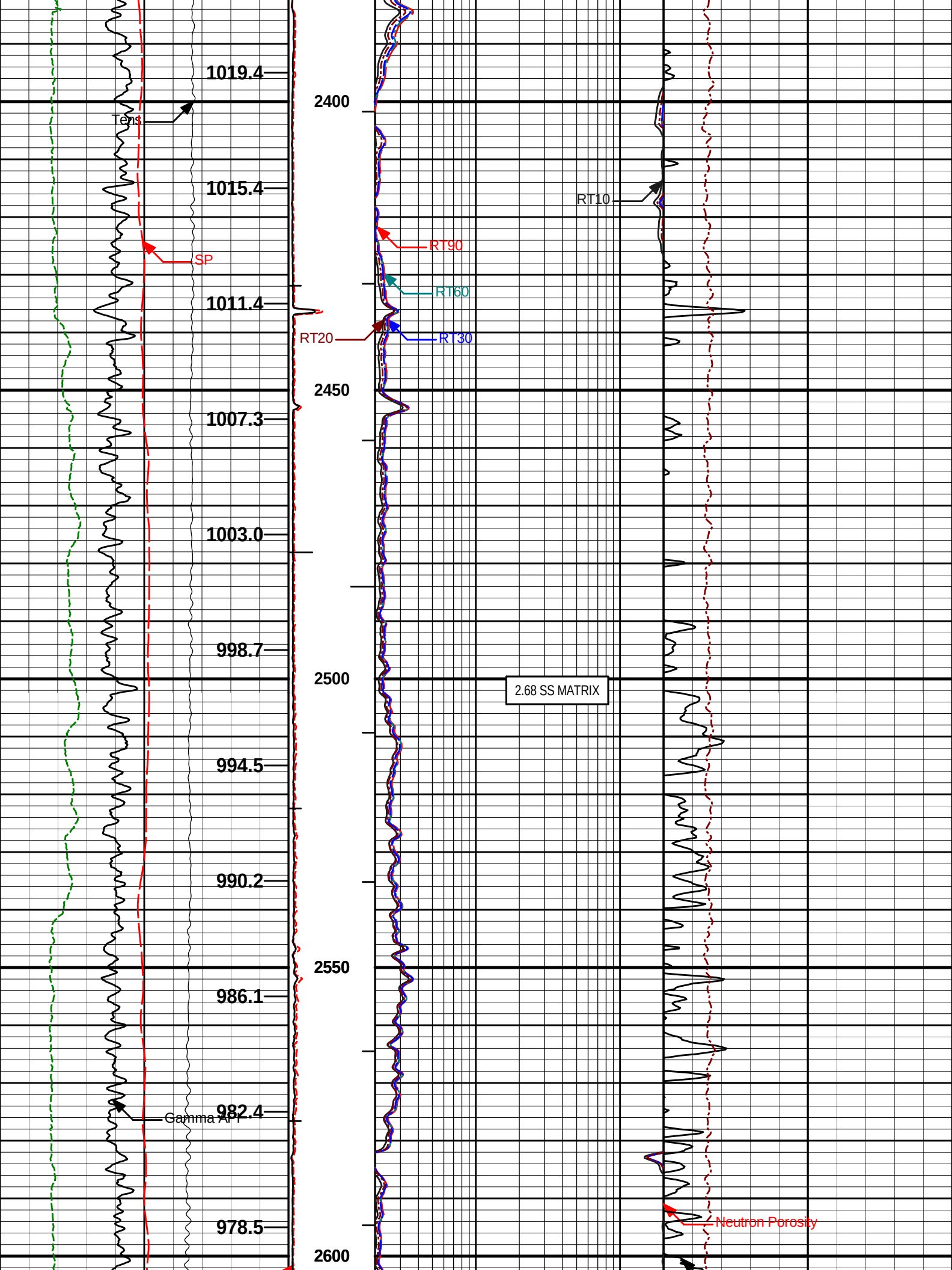
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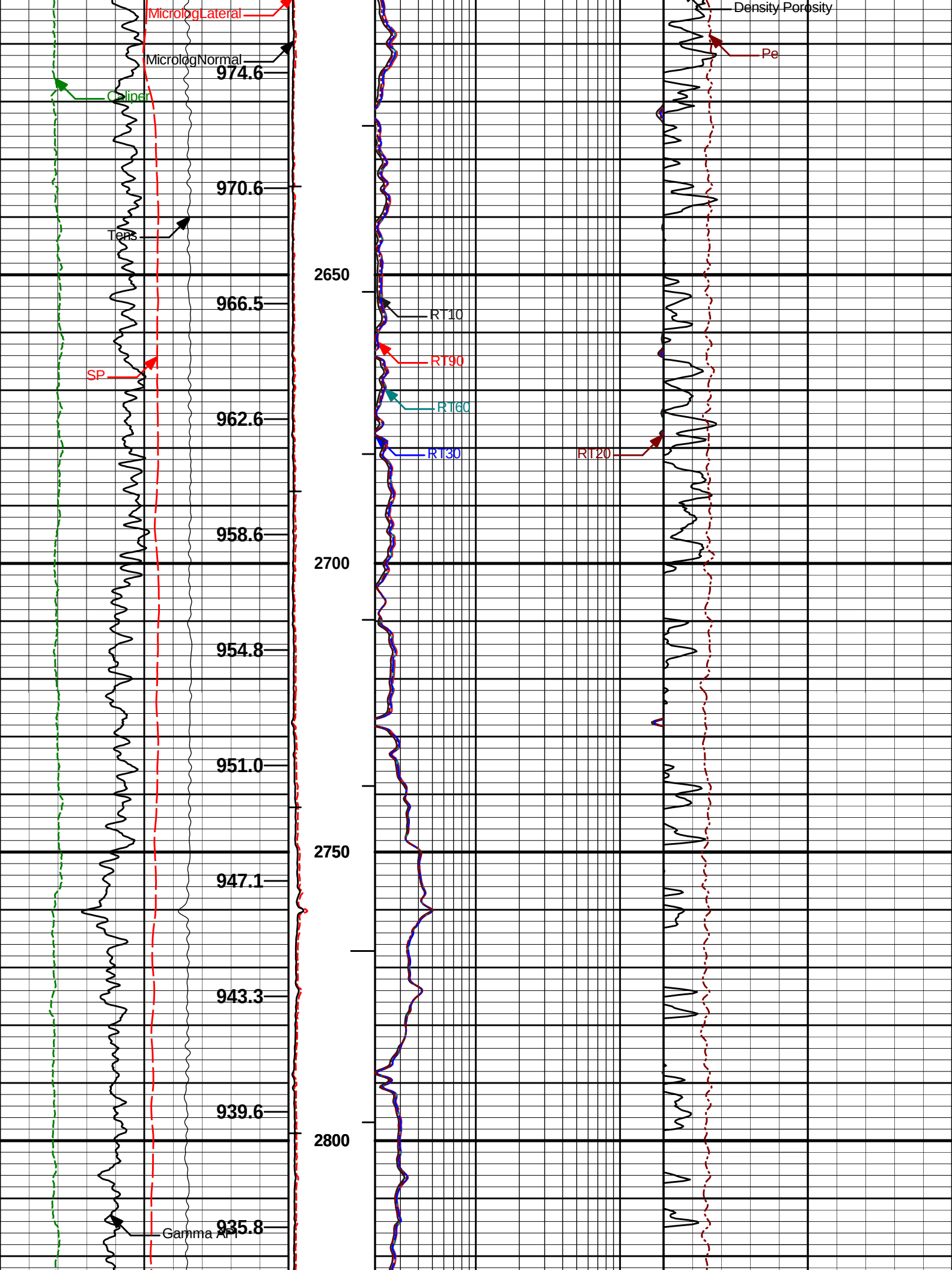
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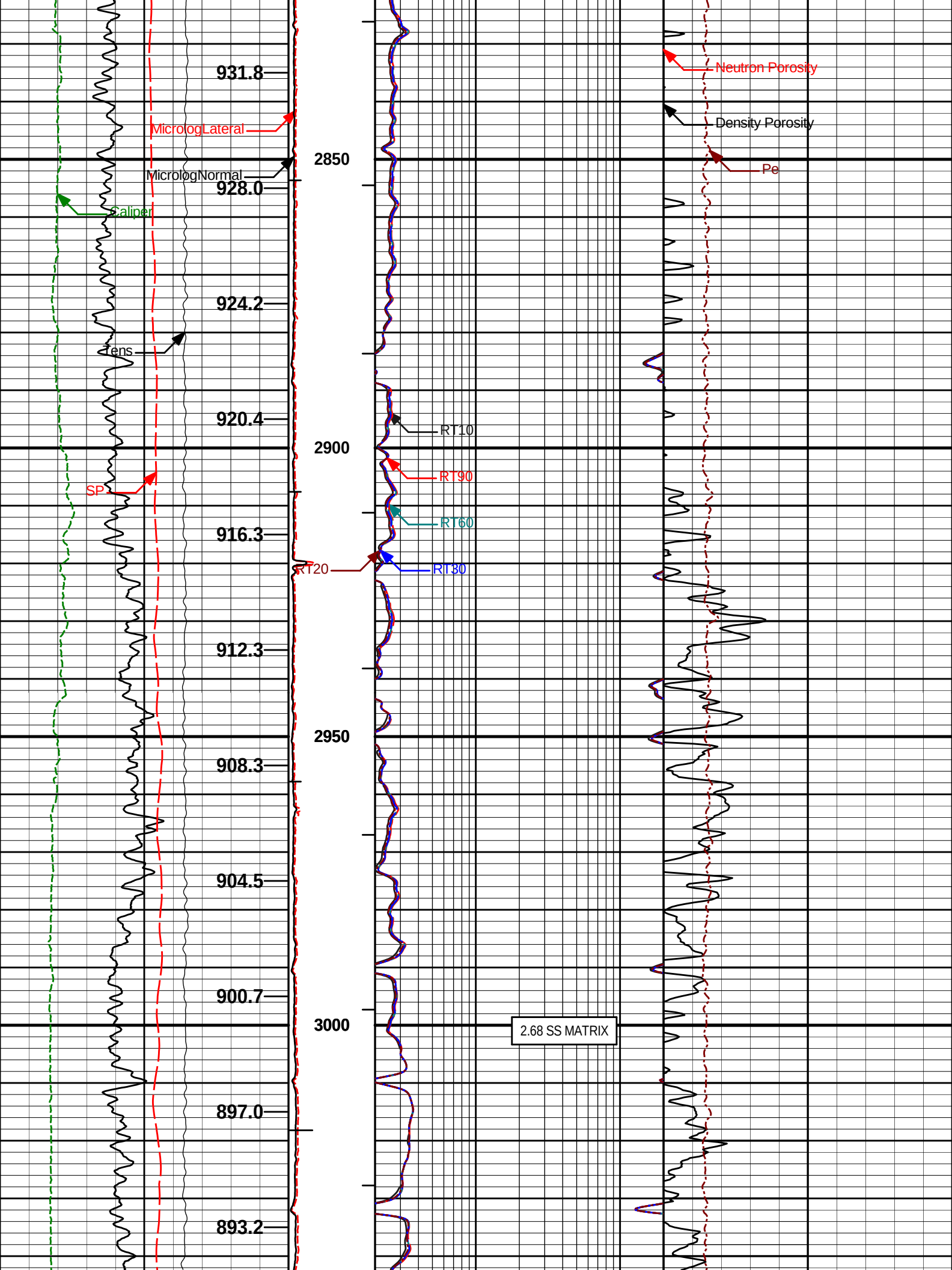
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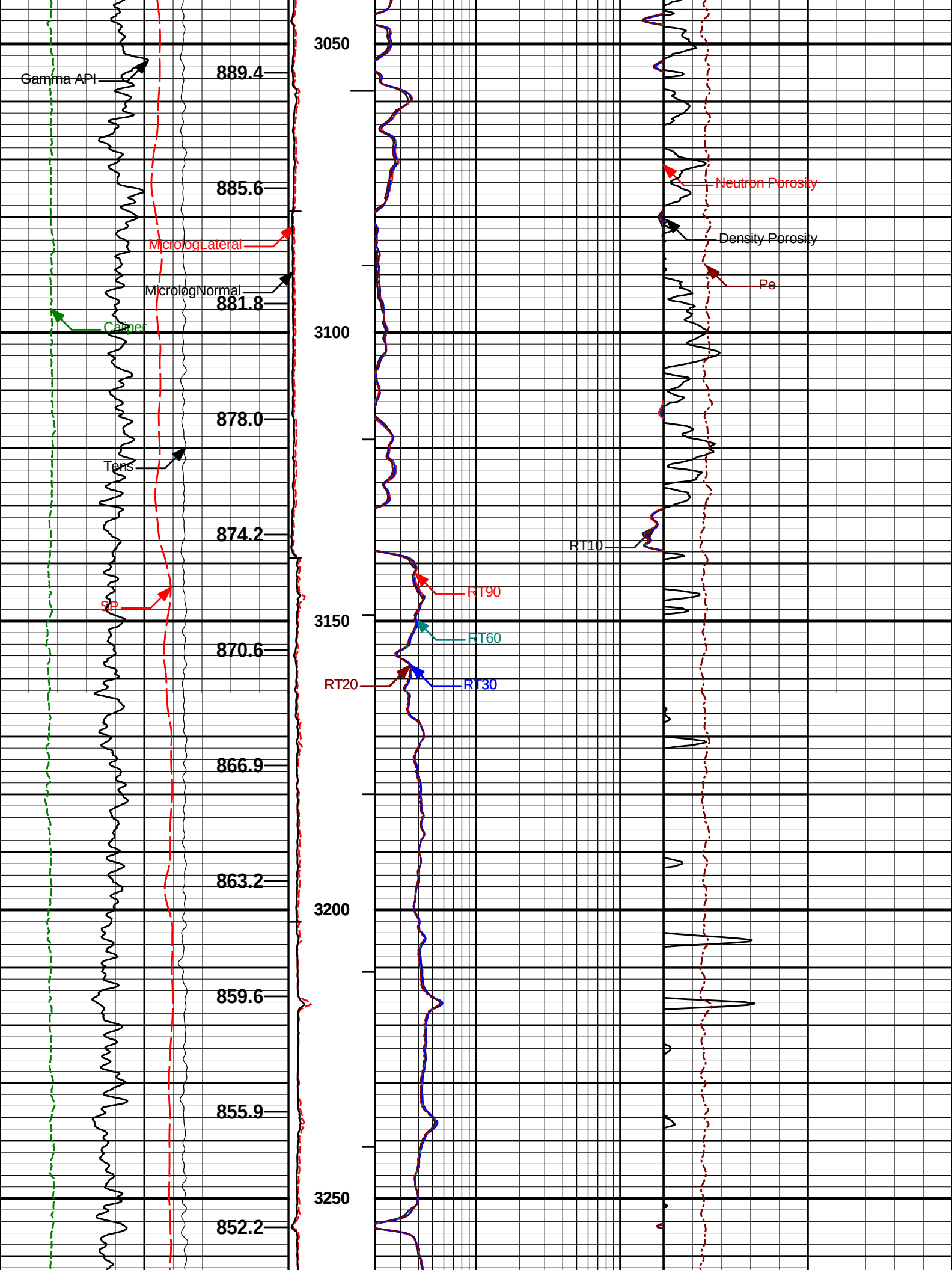
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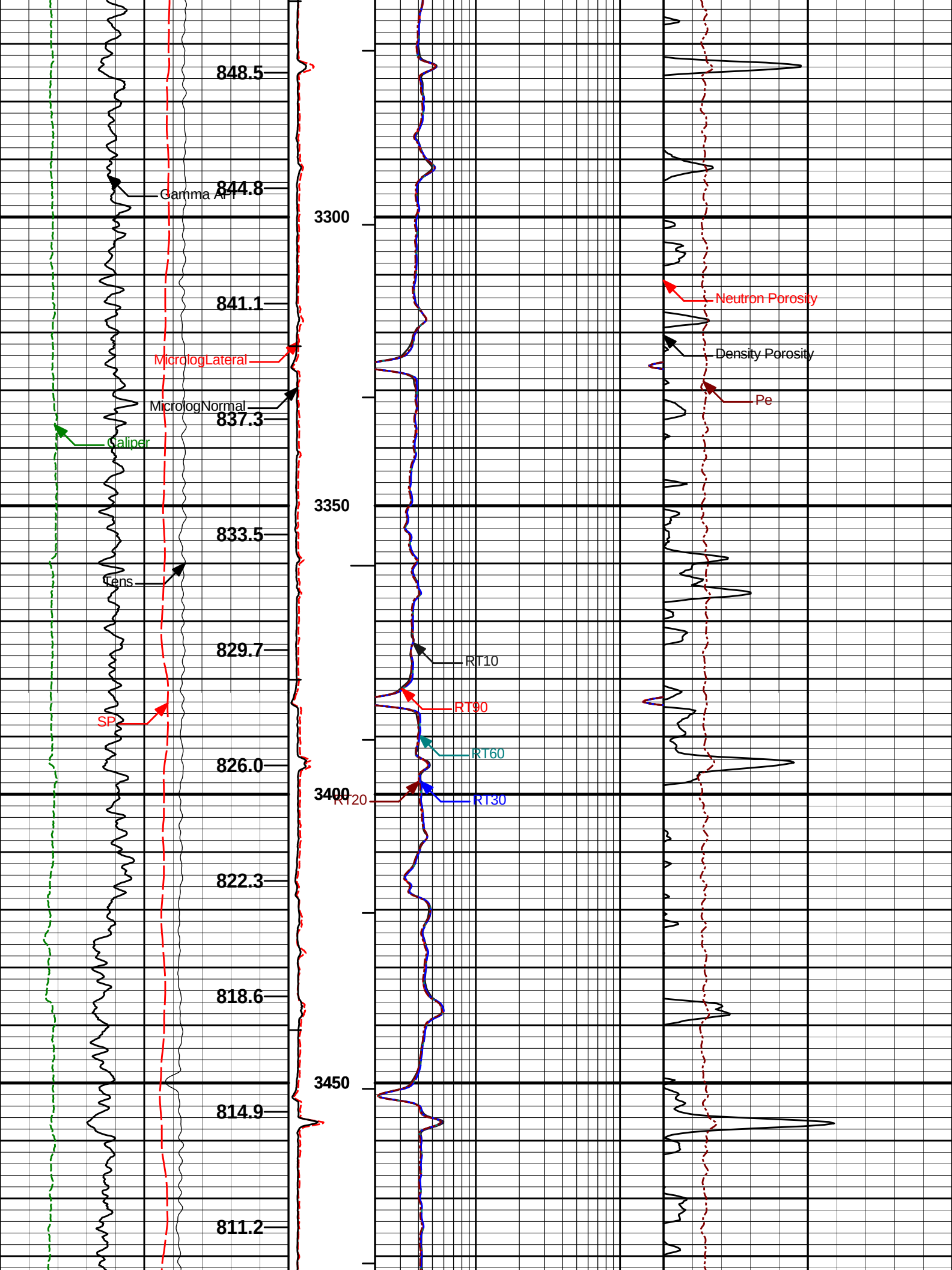
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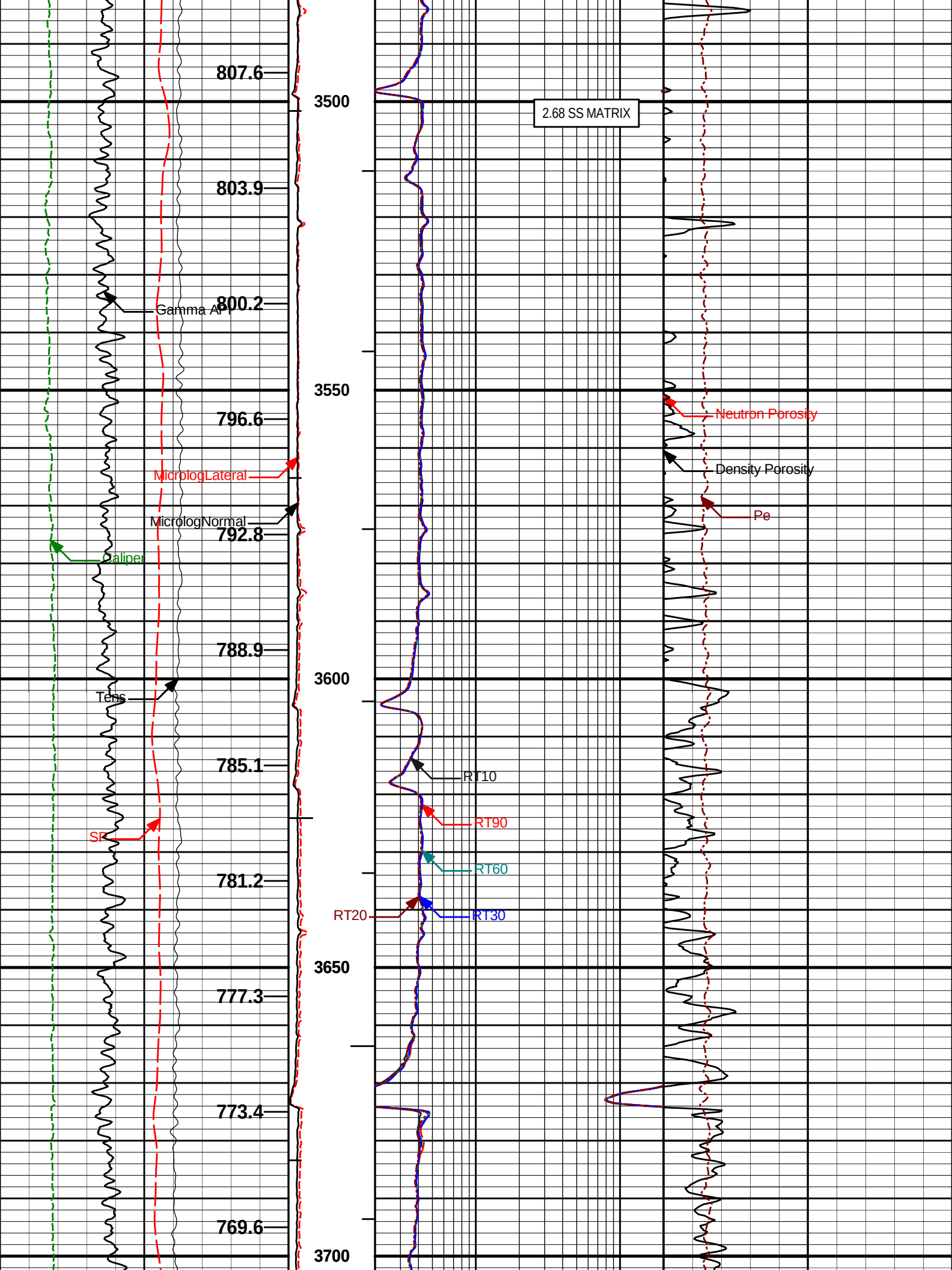
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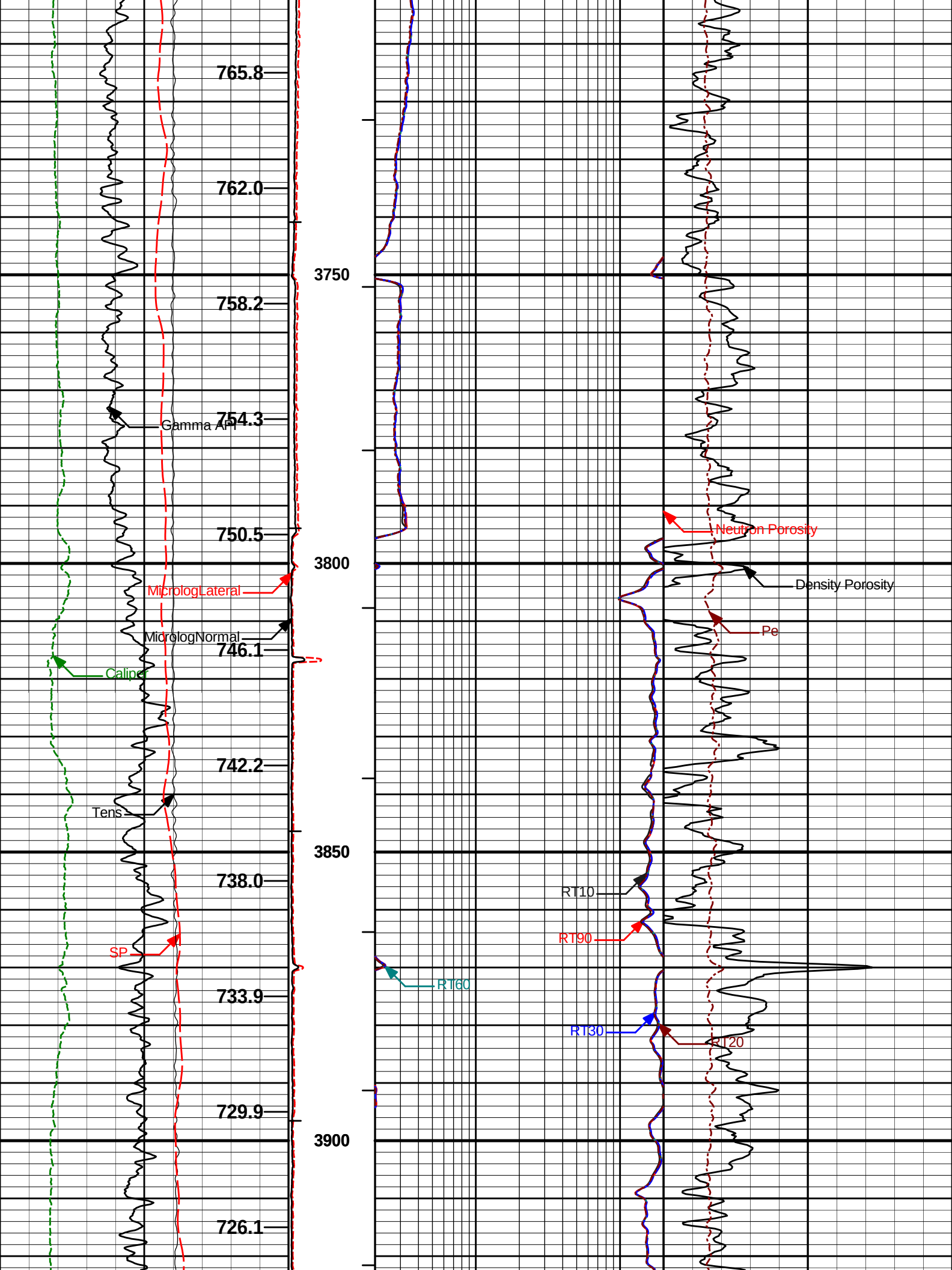
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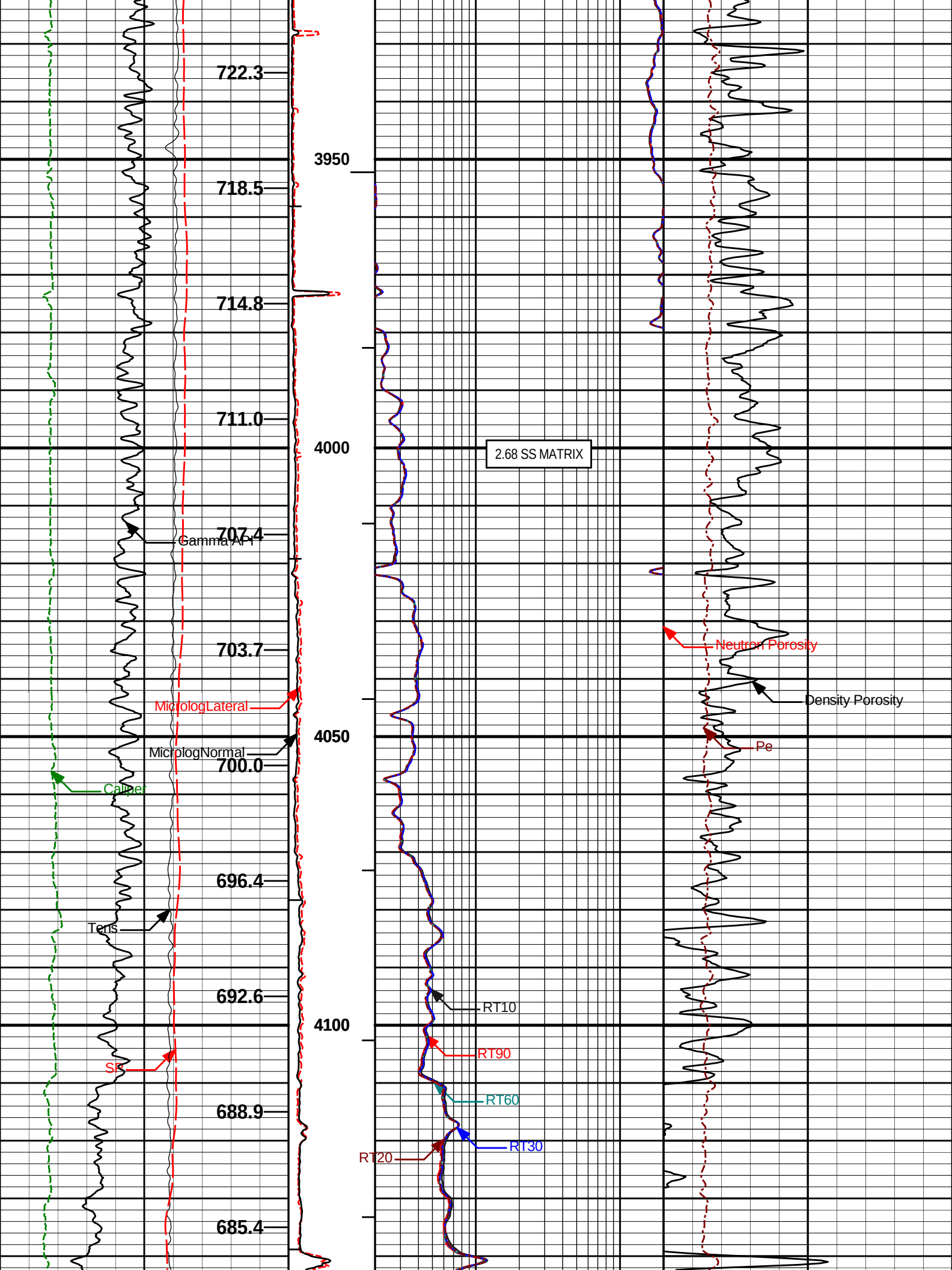
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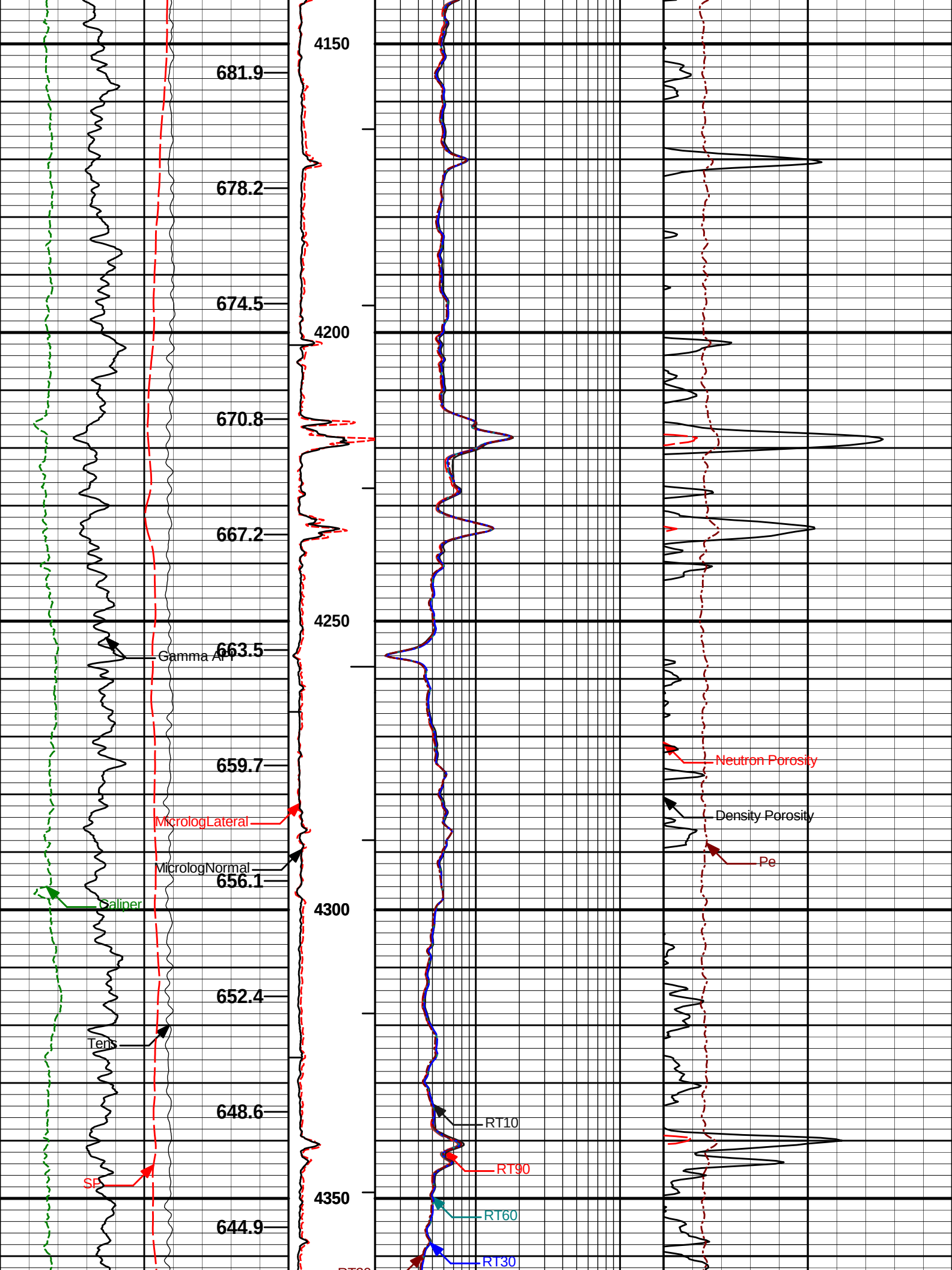
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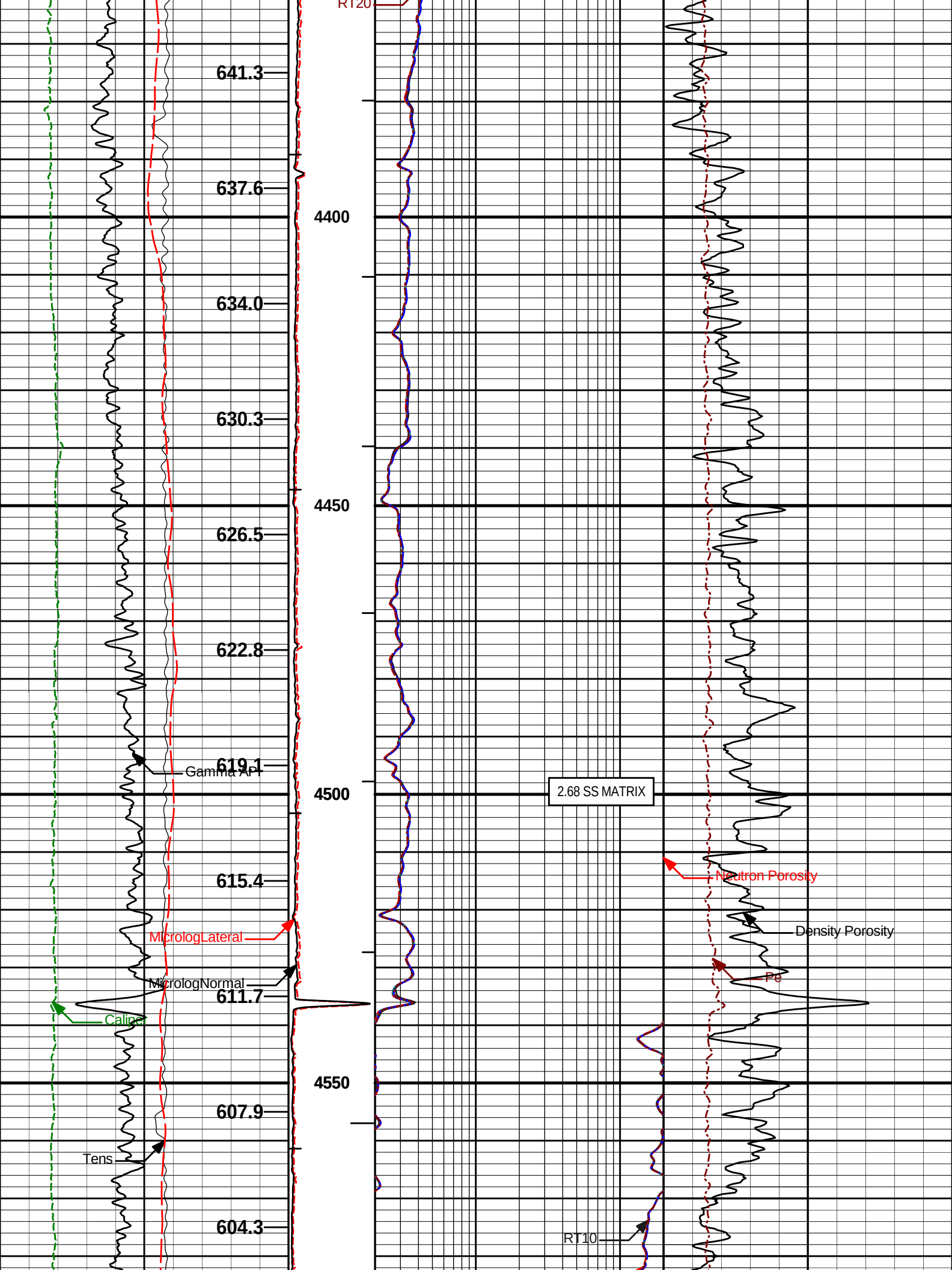
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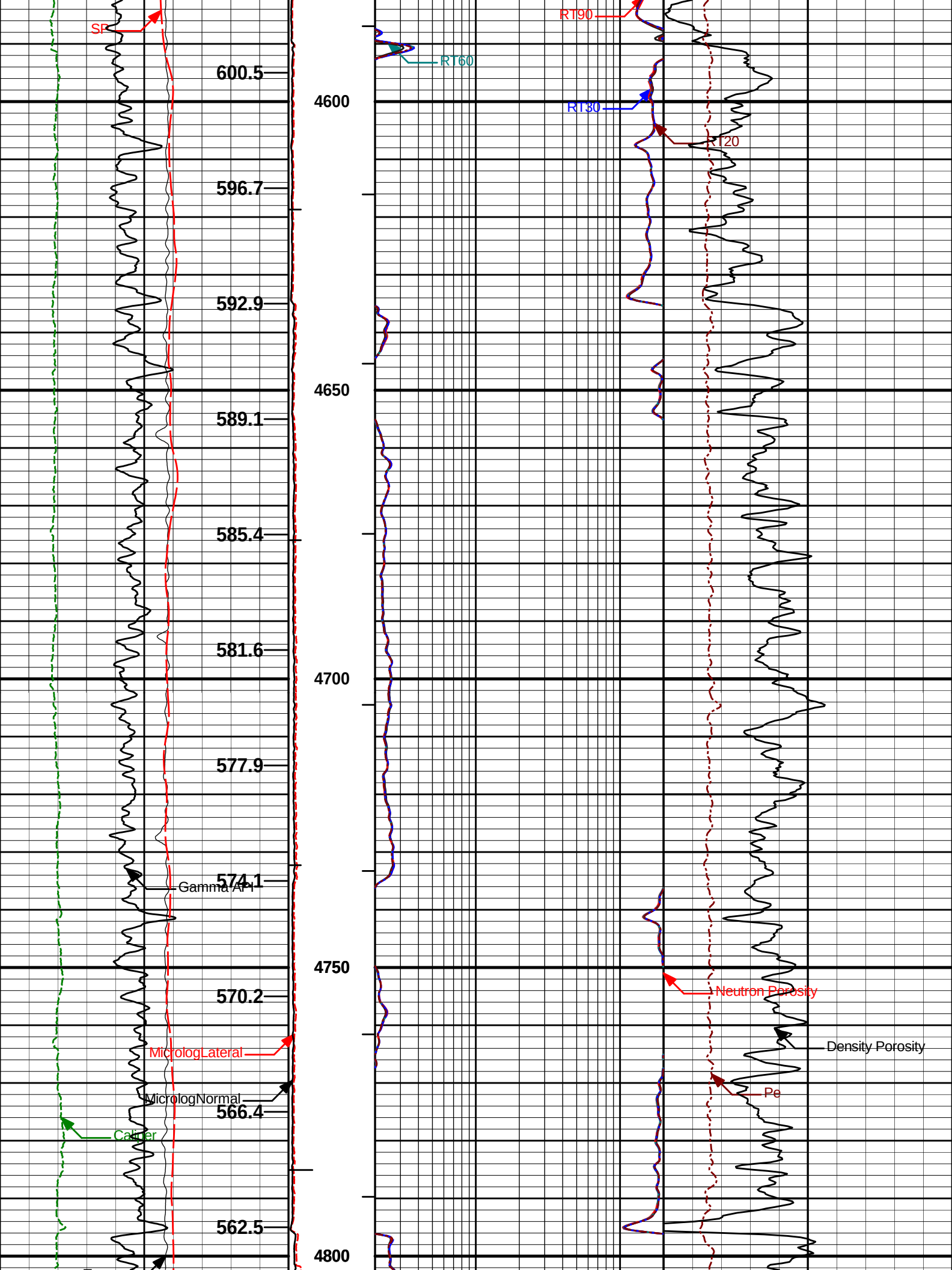
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Density Porosity
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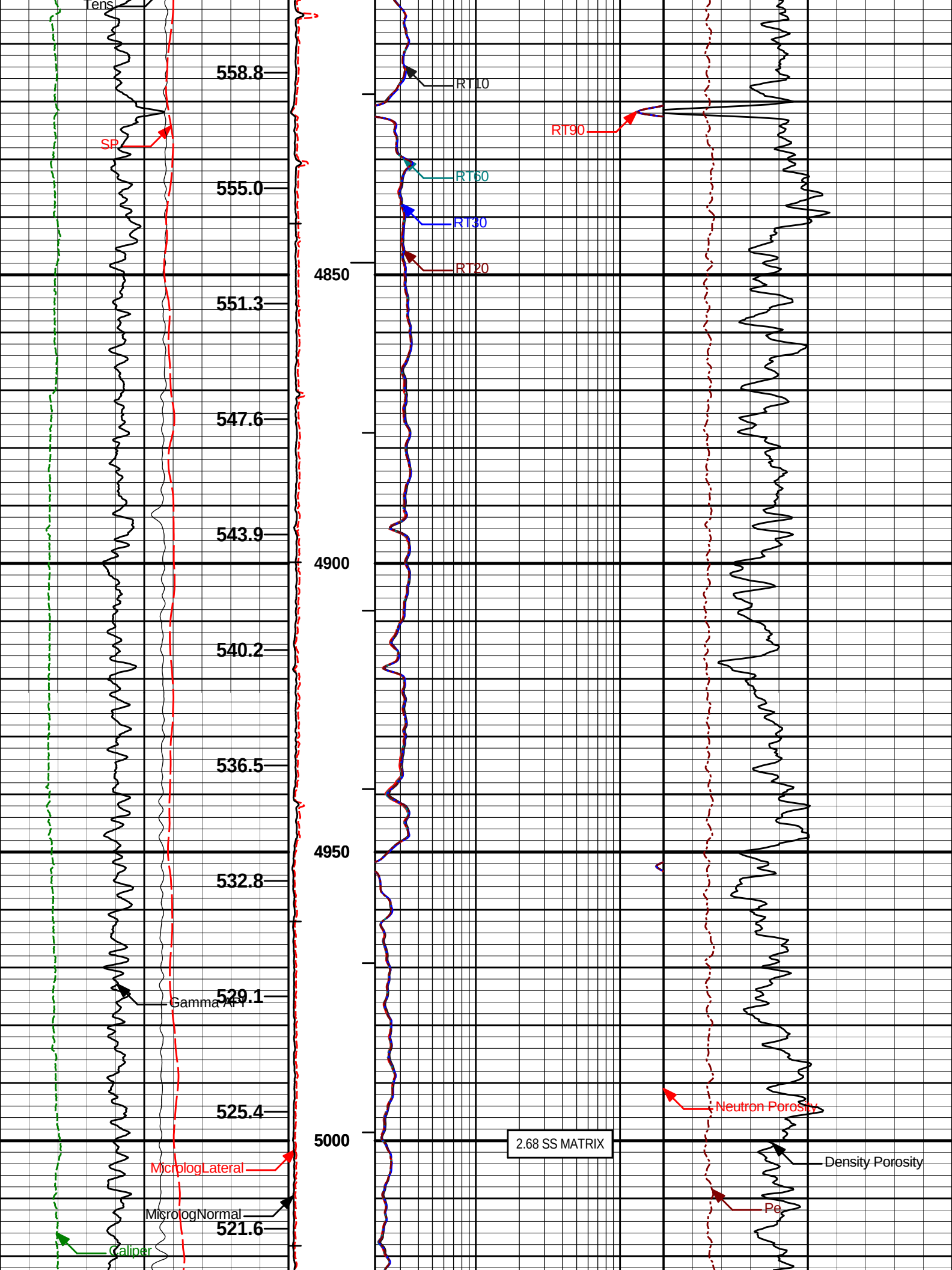
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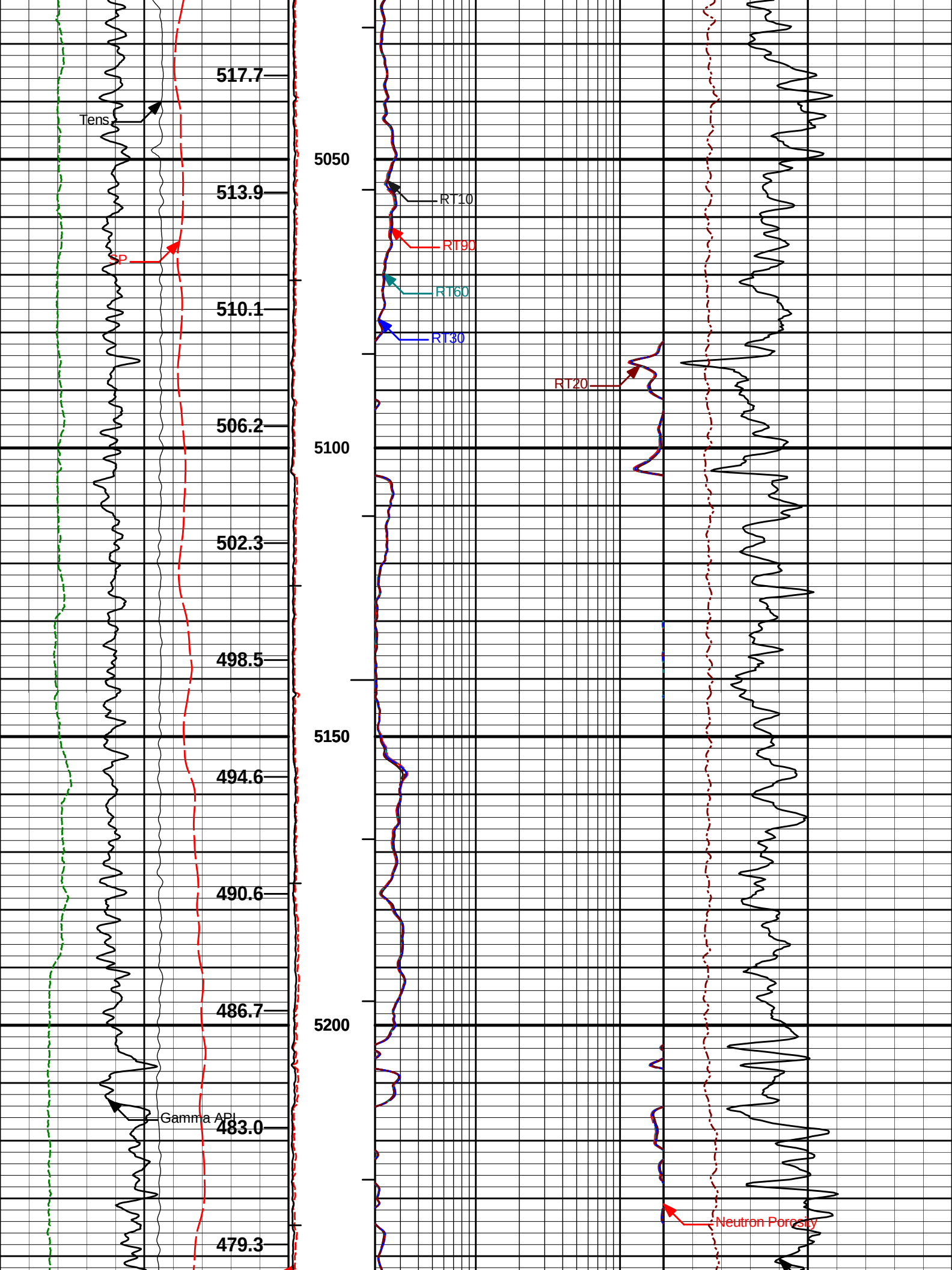
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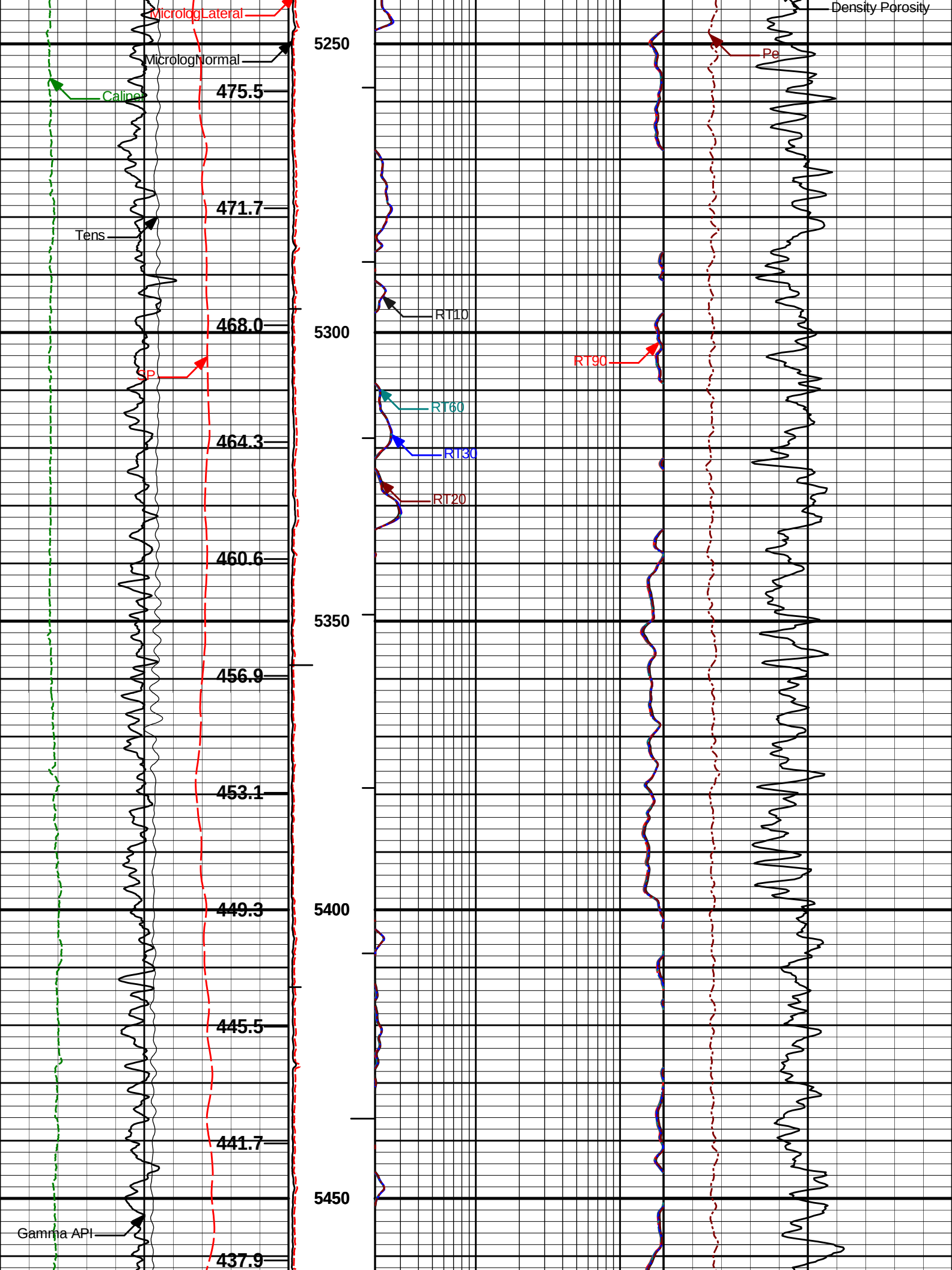
5200
Neutron Porosity


MicrologLateral
MicrologNormal
Caliper
Tens
SP
Gamma API
Density Porosity
Pe
RT10
RT90
RT60
RT30
RT20
475.5
471.7
468.0
464.3
460.6
456.9
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445.5
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437.9
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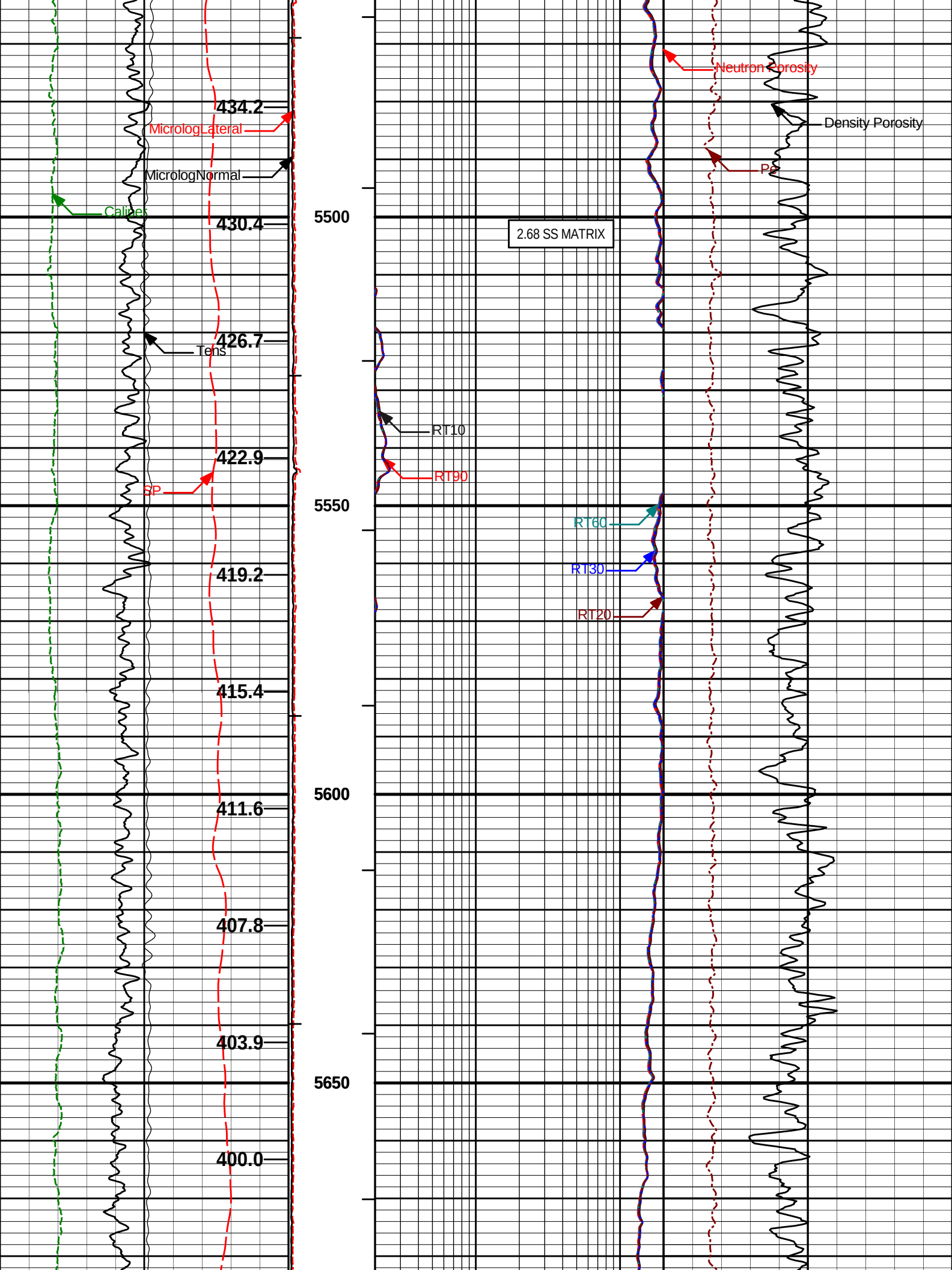
5350
5400
5450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Caliper
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Tens
422.9
SP
419.2
415.4
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407.8
403.9
400.0
5500
5550
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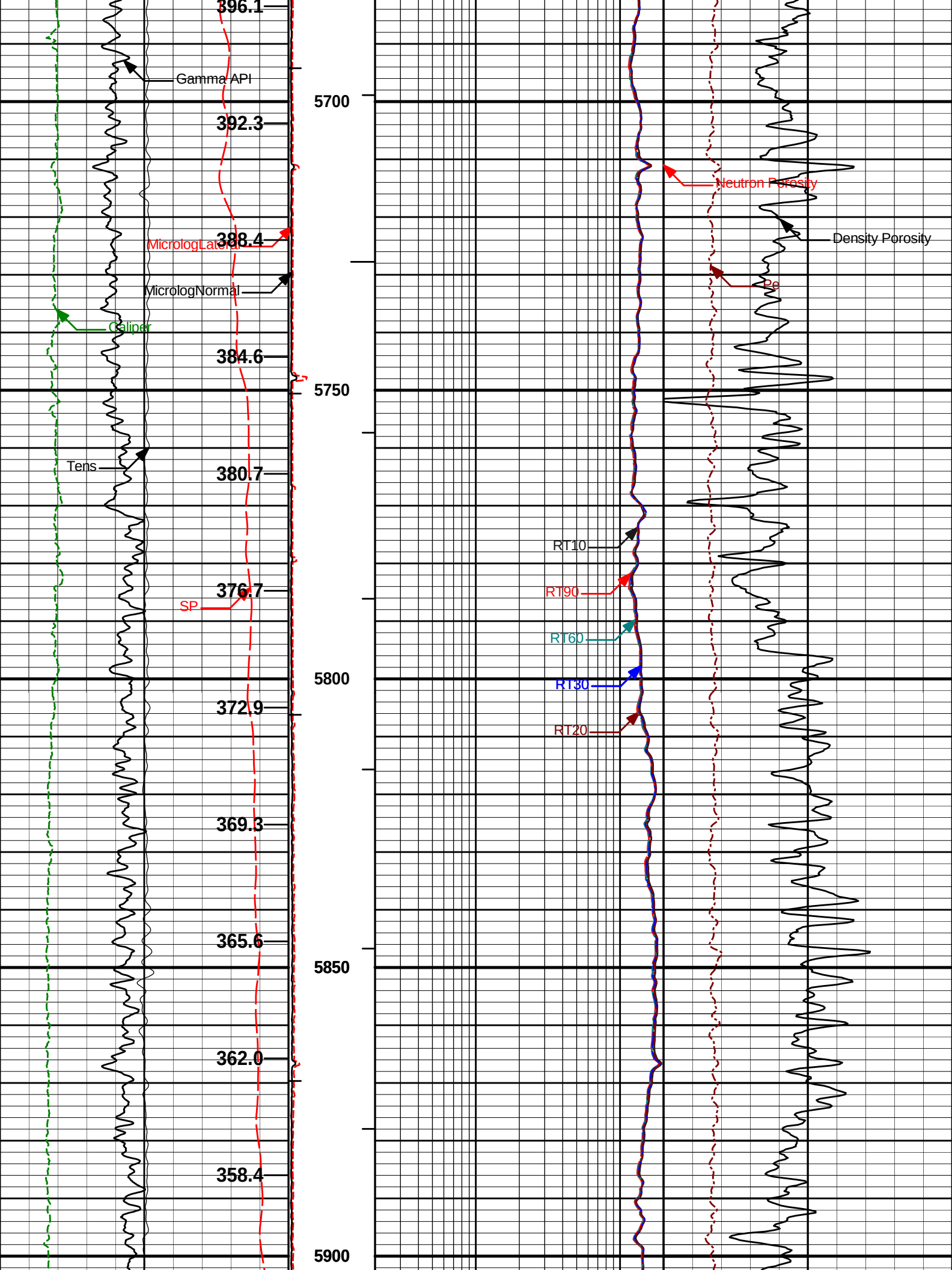
5650
RT10
RT90
2.68 SS MATRIX
Neutron Porosity
Density Porosity
PE
RT60
RT30
RT20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5700
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388.4
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Density Porosity
MicrologNormal
Pe
Caliper
384.6
5750
Tens
380.7
RT10
376.7
SP
RT90
RT60
5800
RT30
372.9
RT20
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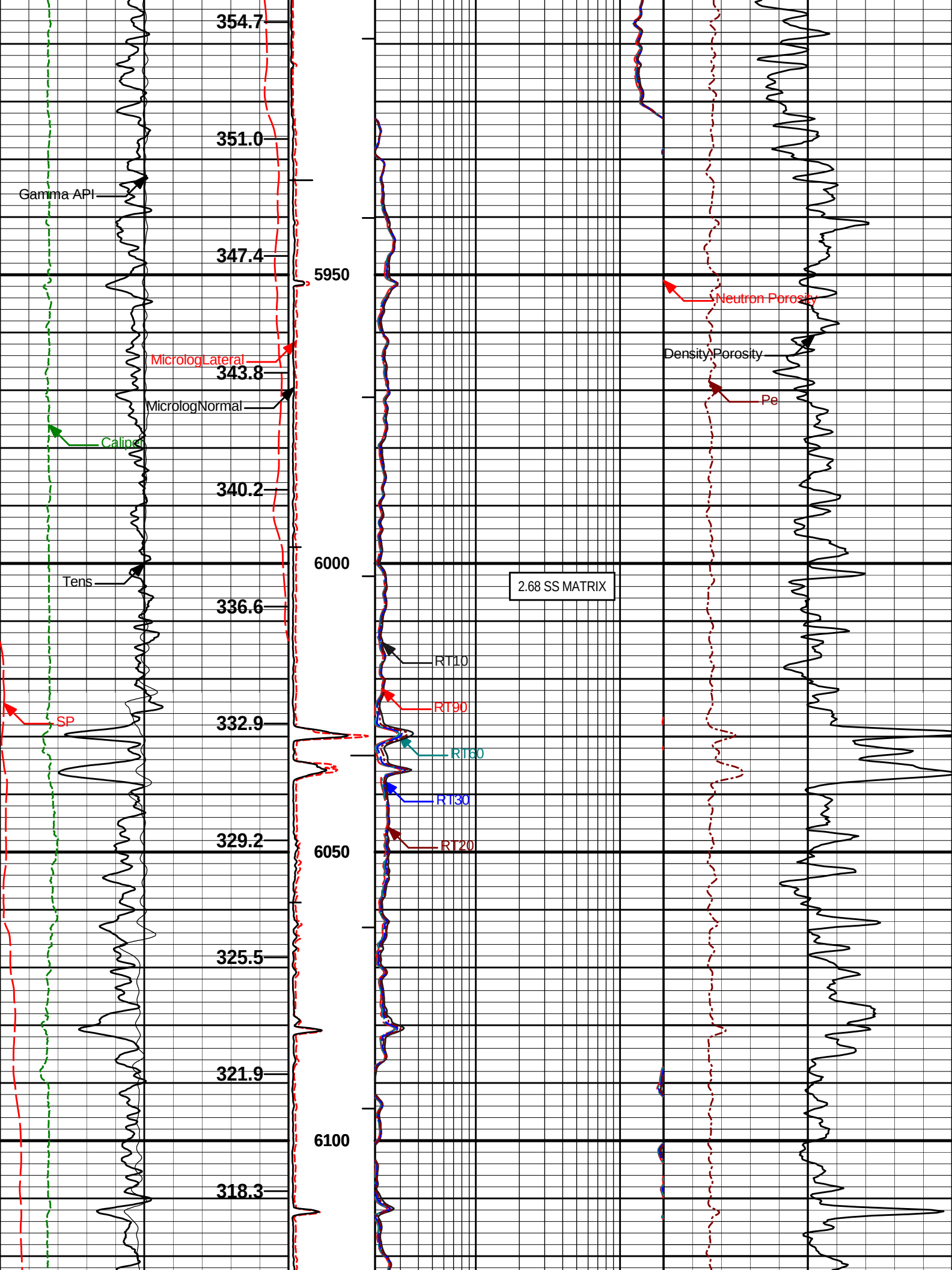
365.6
5850
362.0
358.4
5900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332.9
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325.5
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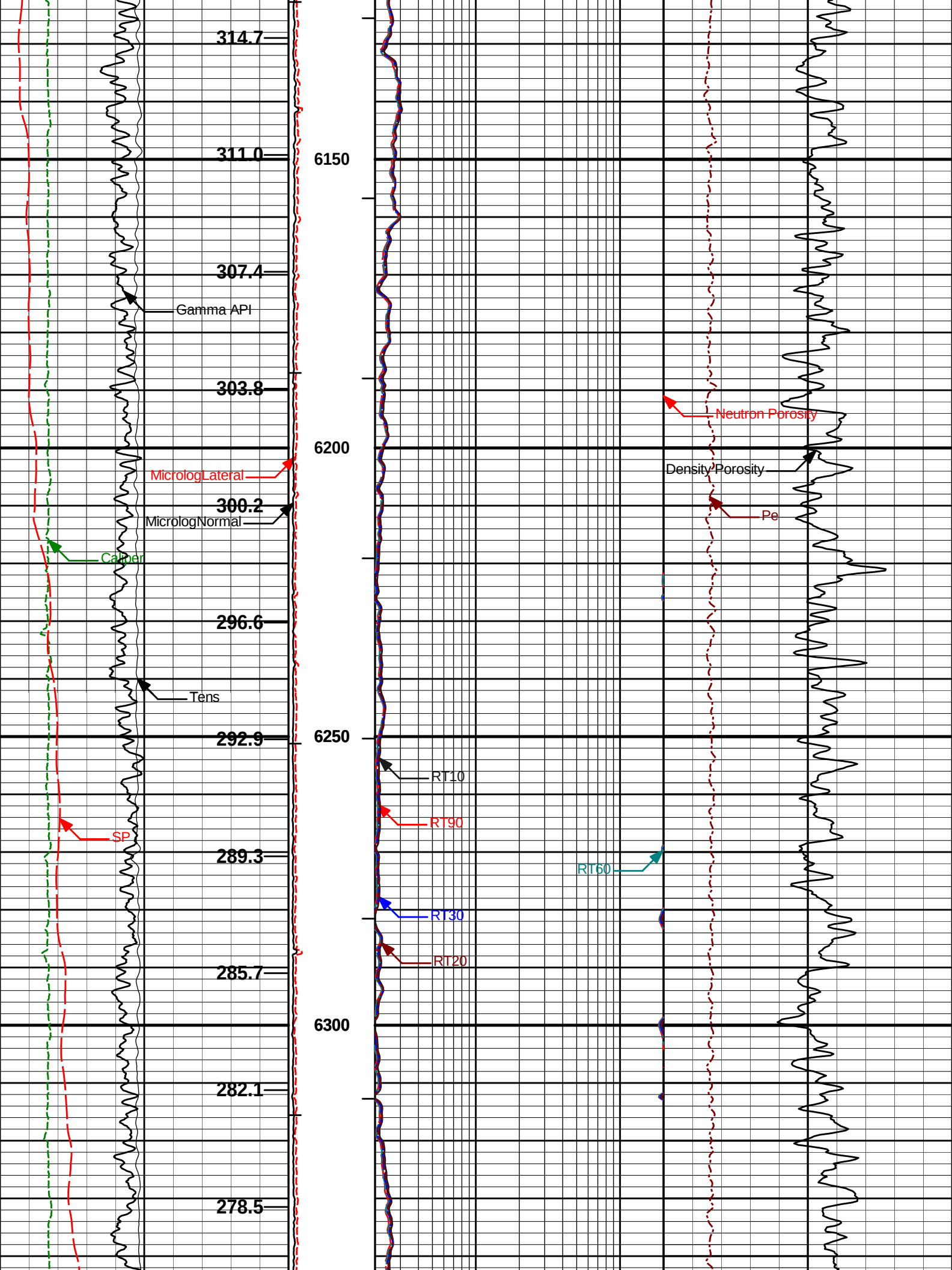
6100
318.3
Gamma API
MicrologLateral
MicrologNormal
Caliper
Tens
SP
Neutron Porosity
Density Porosity
Pe
2.68 SS MATRIX
RT10
RT90
RT60
RT30
RT20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303.8
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292.9
289.3
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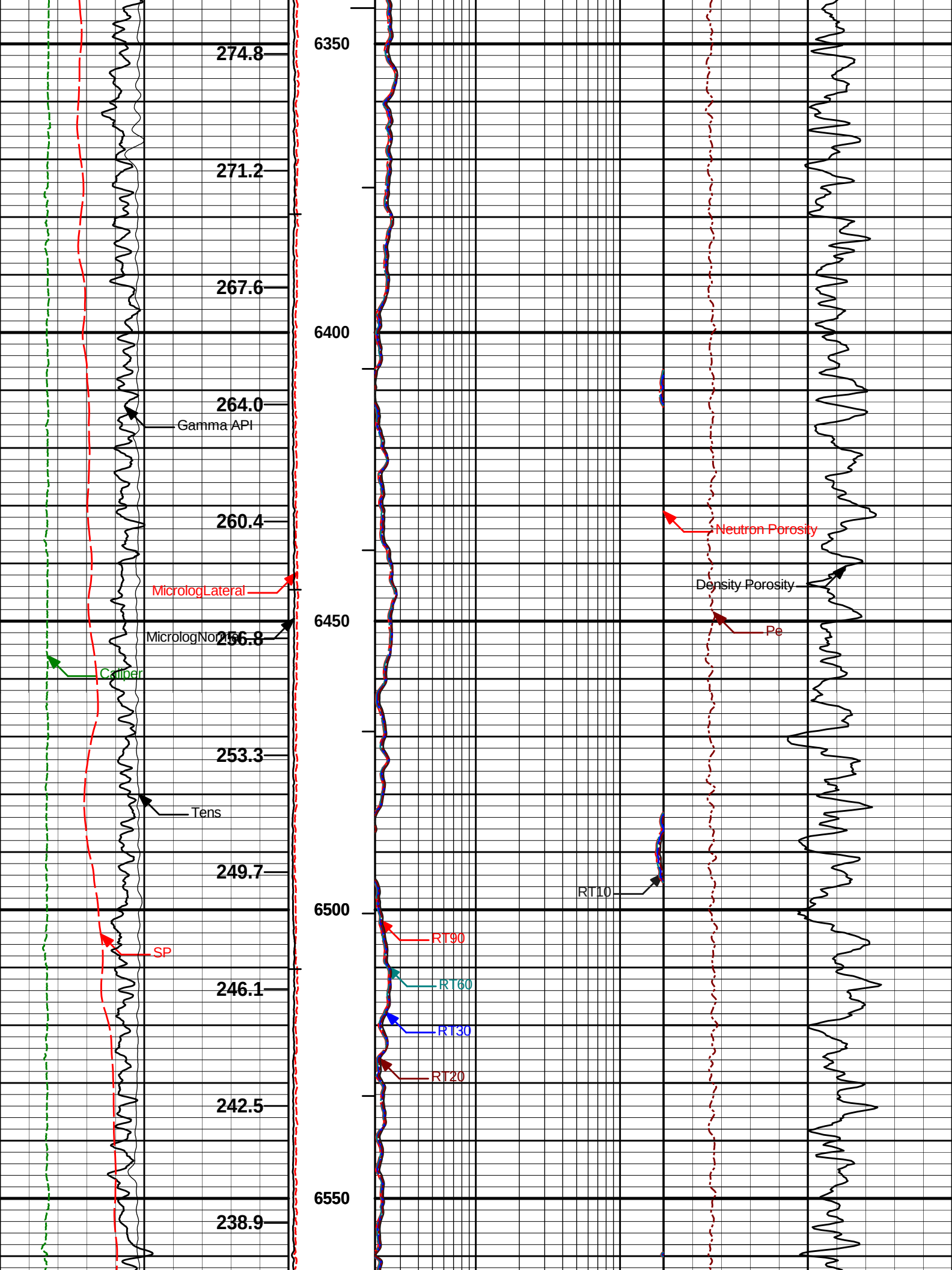
282.1
278.5
6150
6200
6250
6300
Gamma API
MicrologLateral
MicrologNormal
Caliper
Tens
SP
RT10
RT90
RT60
RT30
RT20
Neutron Porosity
Density Porosity
Pe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242.5
238.9
6350
6400
6450
6500
6550
Gamma API
MicrologLateral
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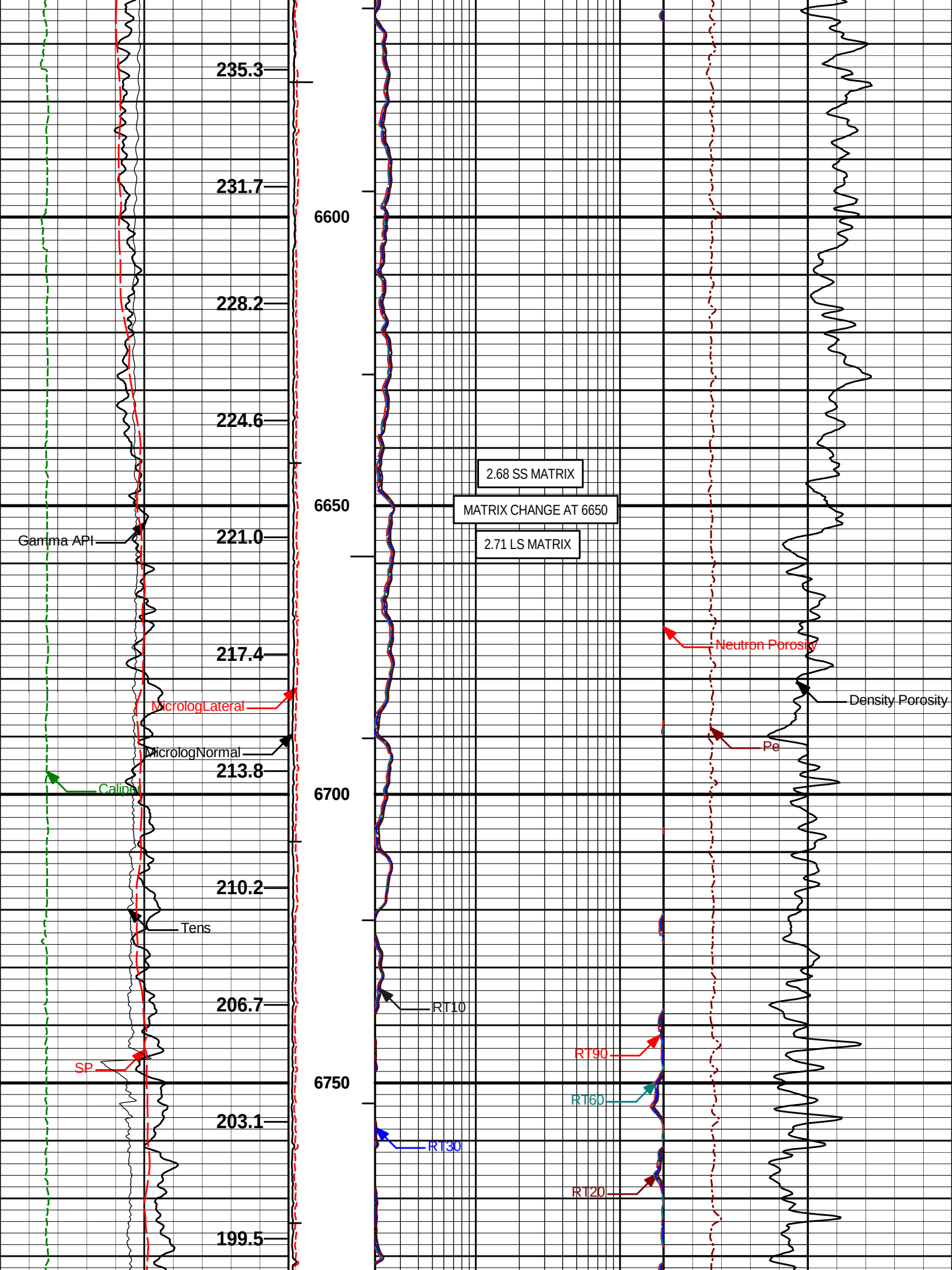
Caliper
Tens
SP
RT90
RT60
RT30
RT20
RT10
Neutron Porosity
Density Porosity
Pe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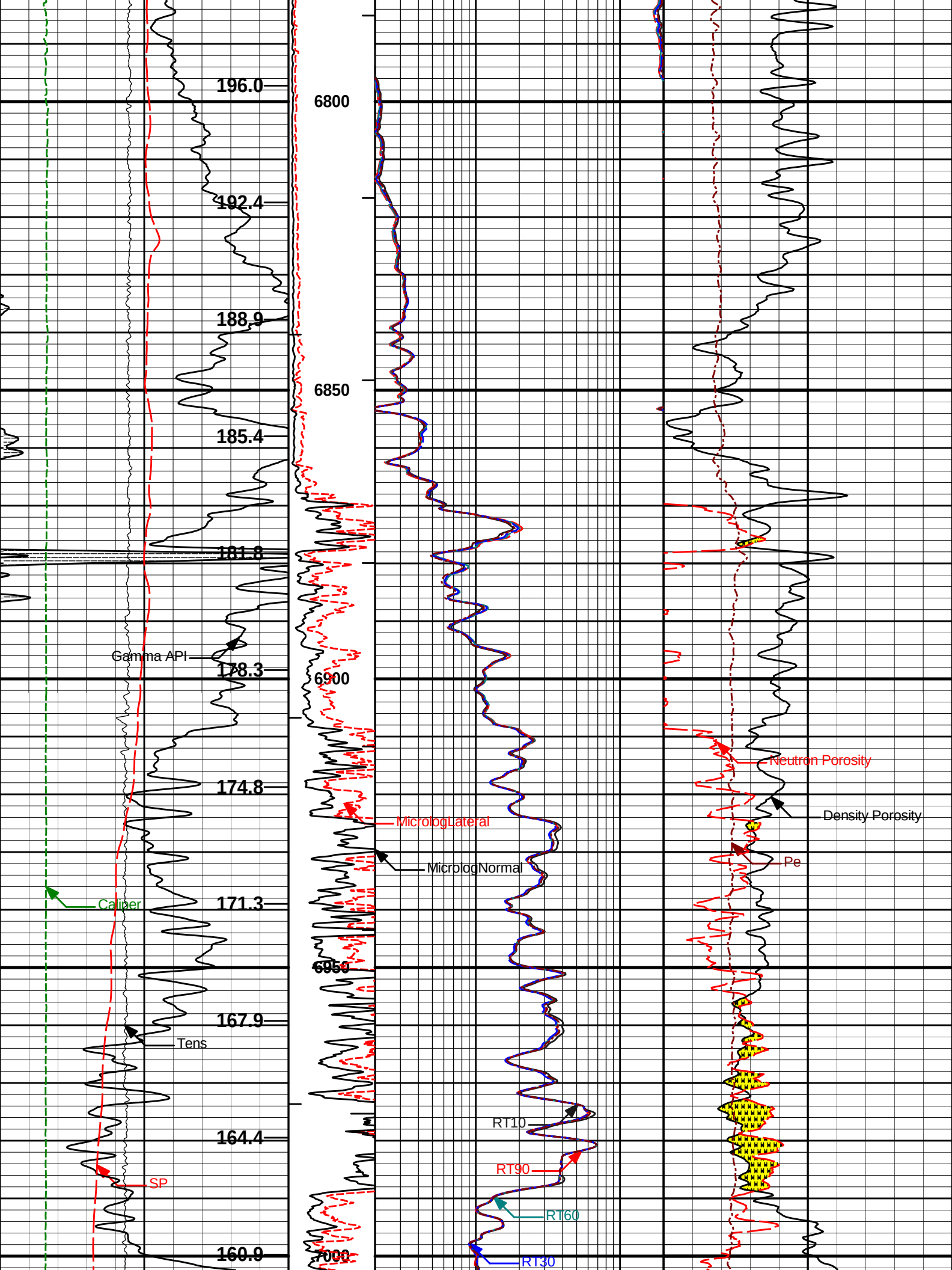
MATRIX CHANGE AT 6650
6650
2.71 LS MATRIX
Gamma API
221.0
Neutron Porosity
217.4
MicrologLateral
Density Porosity
MicrologNormal
Pe
213.8
Caliper
6700
210.2
Tens
206.7
RT10
RT90
SP
6750
RT60
203.1
RT30
RT20
199.5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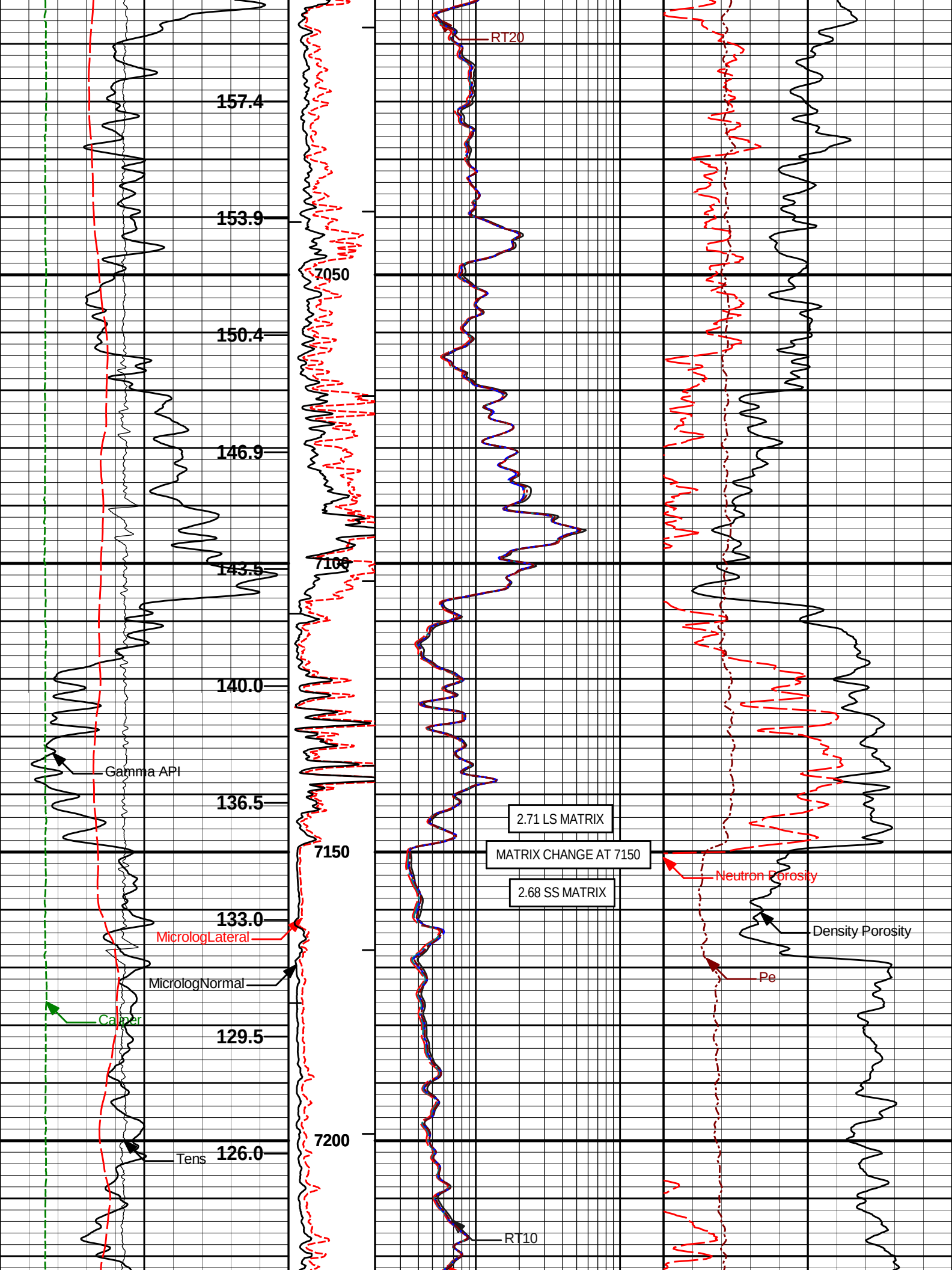
181.8
178.3
174.8
171.3
167.9
164.4
160.9
6800
6850
6900
6950
7000
Gamma API
Caliber
Tens
SP
MicrologLateral
MicrologNormal
RT10
RT90
RT60
RT30
Neutron Porosity
Density Porosity
Pe


RT20
157.4
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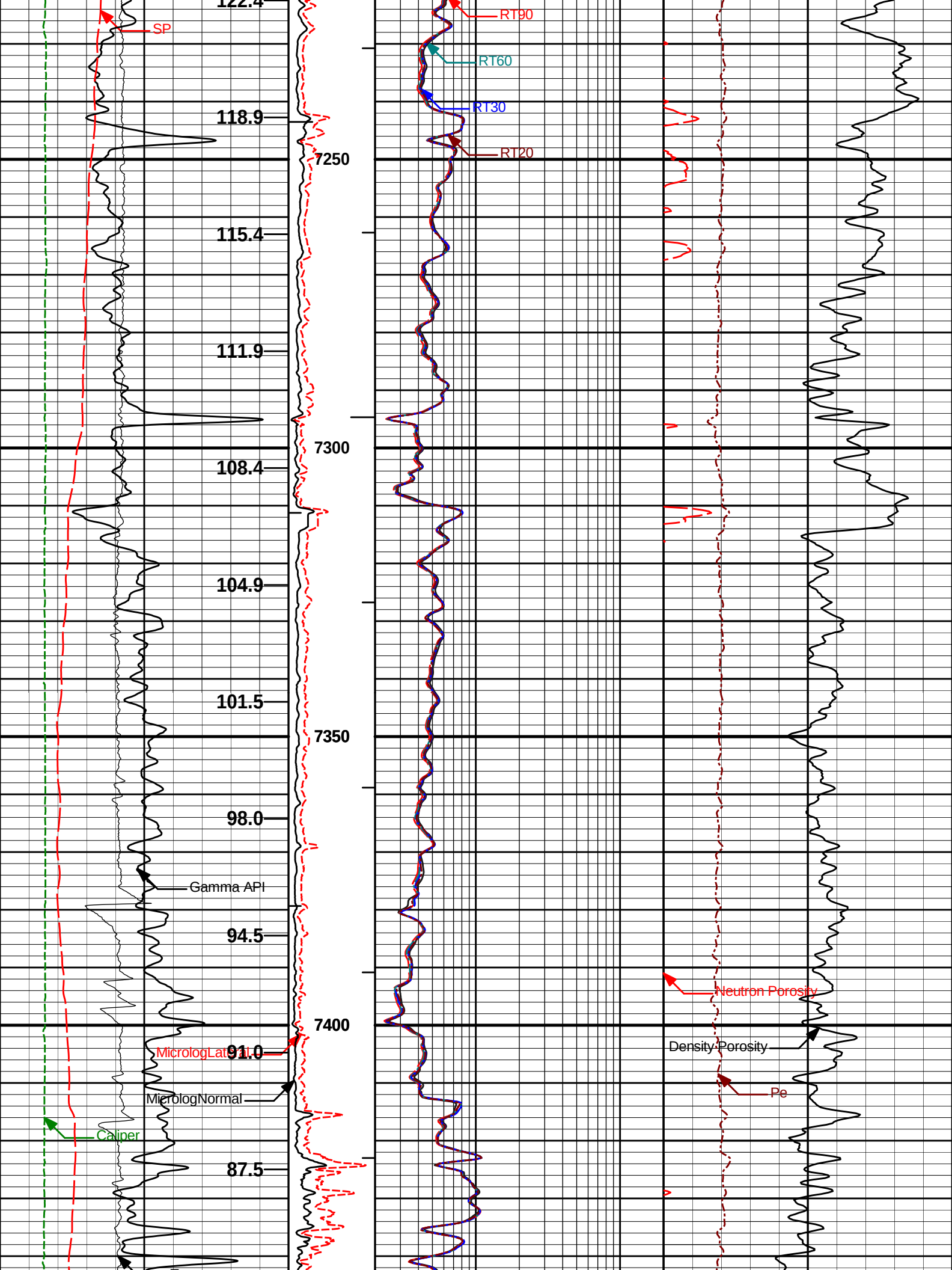
150.4
146.9
143.5
7100
140.0
Gamma API
136.5
2.71 LS MATRIX
MATRIX CHANGE AT 7150
2.68 SS MATRIX
7150
Neutron Porosity
133.0
MicrologLateral
Density Porosity
MicrologNormal
Pe
Caliper
129.5
7200
126.0
Tens
RT10


SP
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111.9
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101.5
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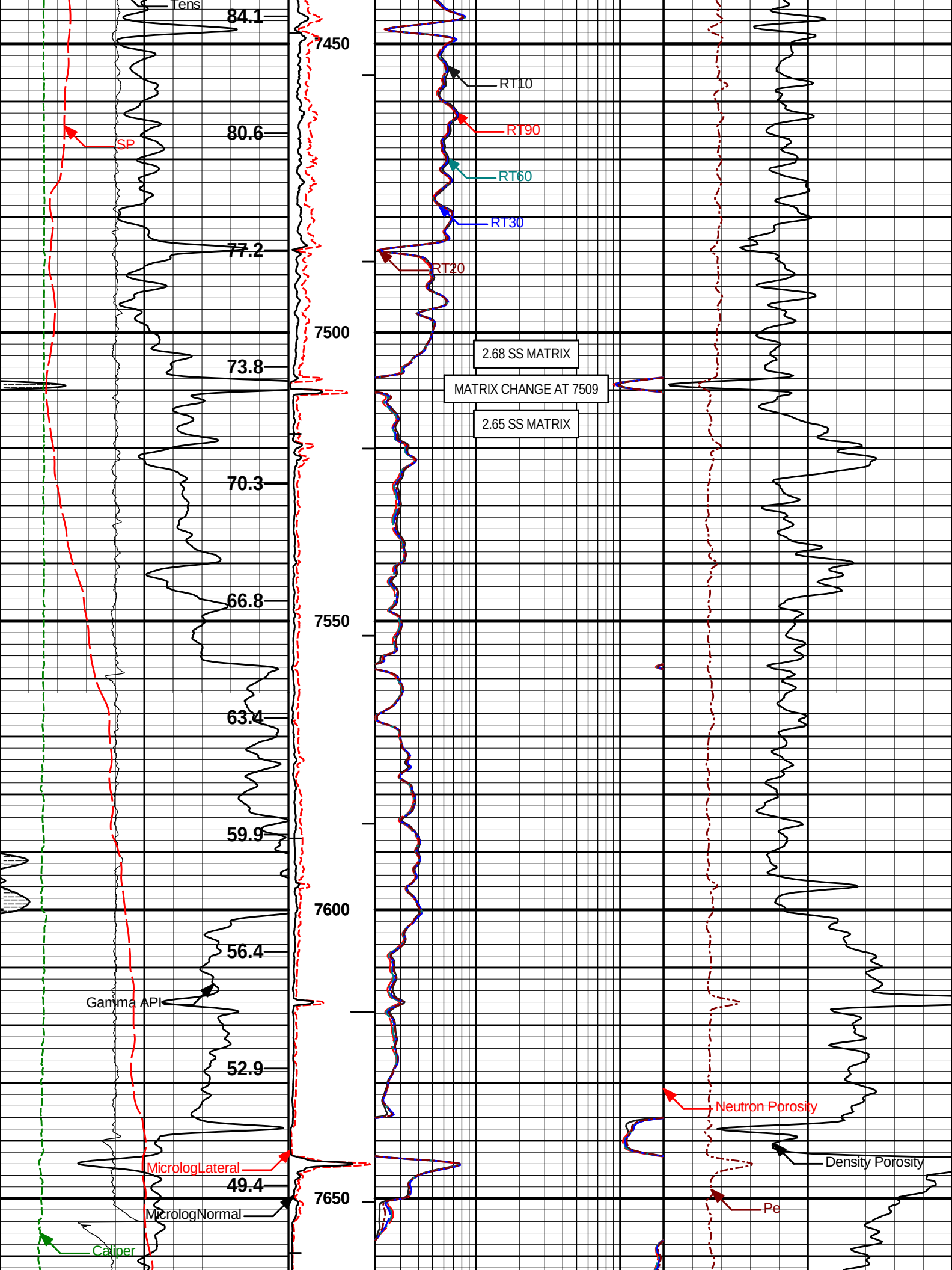
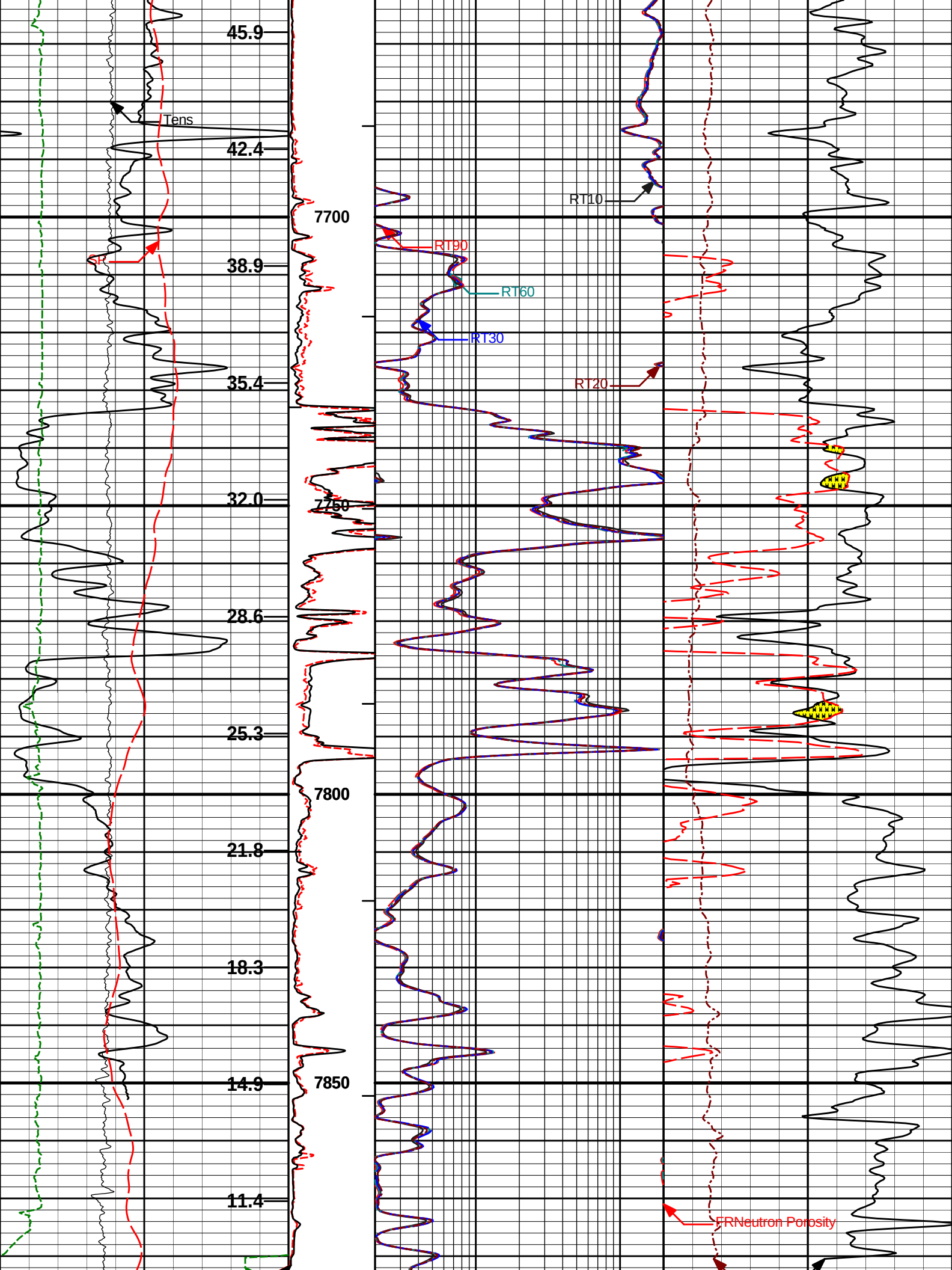
94.5
91.0
87.5
7250
7300
7350
7400
RT90
RT60
RT30
RT20
Gamma API
MicrologLateral
MicrologNormal
Caliper
Neutron Porosity
Density Porosity
Pe


Tens
84.1
7450
RT10
RT90
80.6
SP
RT60
RT30
77.2
RT20
7500
2.68 SS MATRIX
73.8
MATRIX CHANGE AT 7509
2.65 SS MATRIX
70.3
66.8
7550
63.4
59.9
7600
56.4
Gamma API
52.9
Neutron Porosity
Density Porosity
MicrologLateral
49.4
7650
MicrologNormal
Pe
Caliper


45.9
Tens
42.4
7700
RT10
RT90
38.9
RT60
RT30
35.4
RT20
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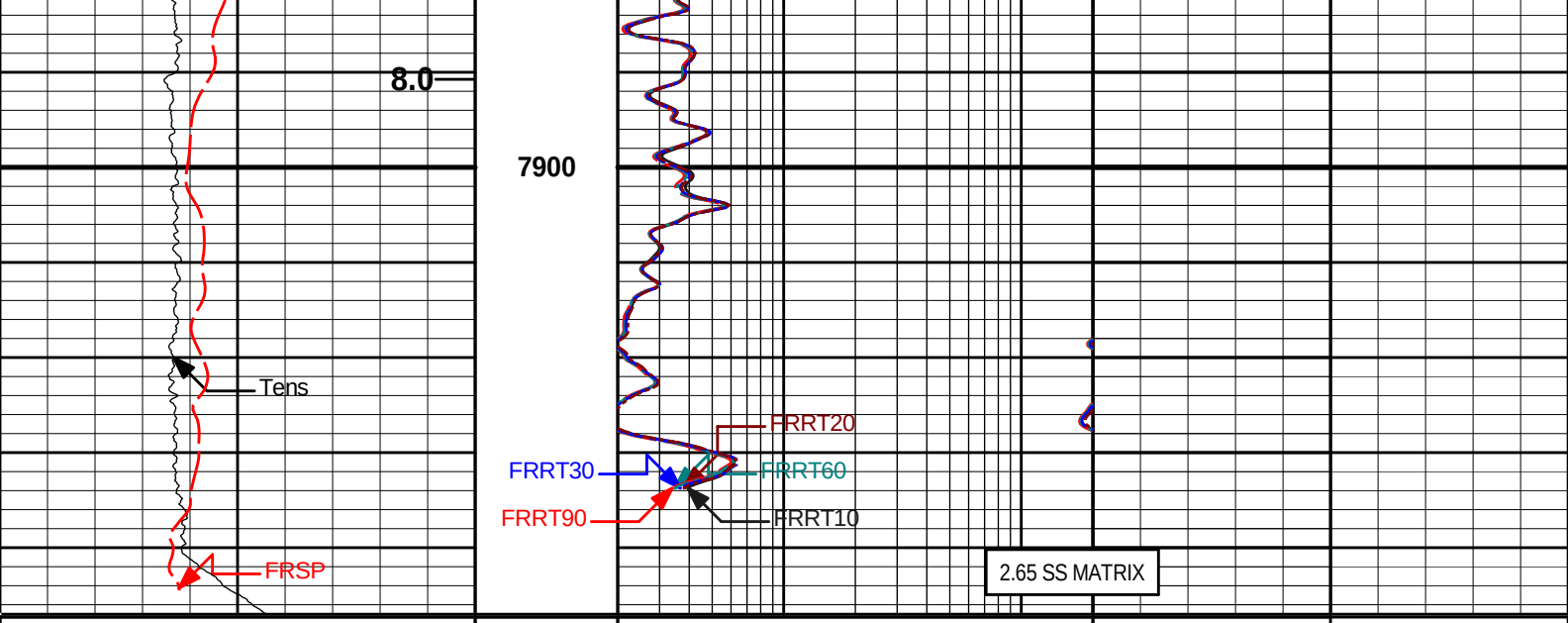
7750
28.6
25.3
7800
21.8
18.3
14.9
7850
11.4
FRNeutron Porosity



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		MicrologLateral 0 30 ohm-metre	2 **RT20** 200 Ohm-m	
Annular Volume Total		MicrologNormal 0 30 ohm-metre	2 **RT10** 200 Ohm-m	

HALLIBURTON

Plot Time: 25-Jul-10 22:53:49
Plot Range: 1175 ft to 7947 ft
Data: TIMM_PC_GK04_12\Well Based\MAIN*
Plot File: \\COMP\MAIN

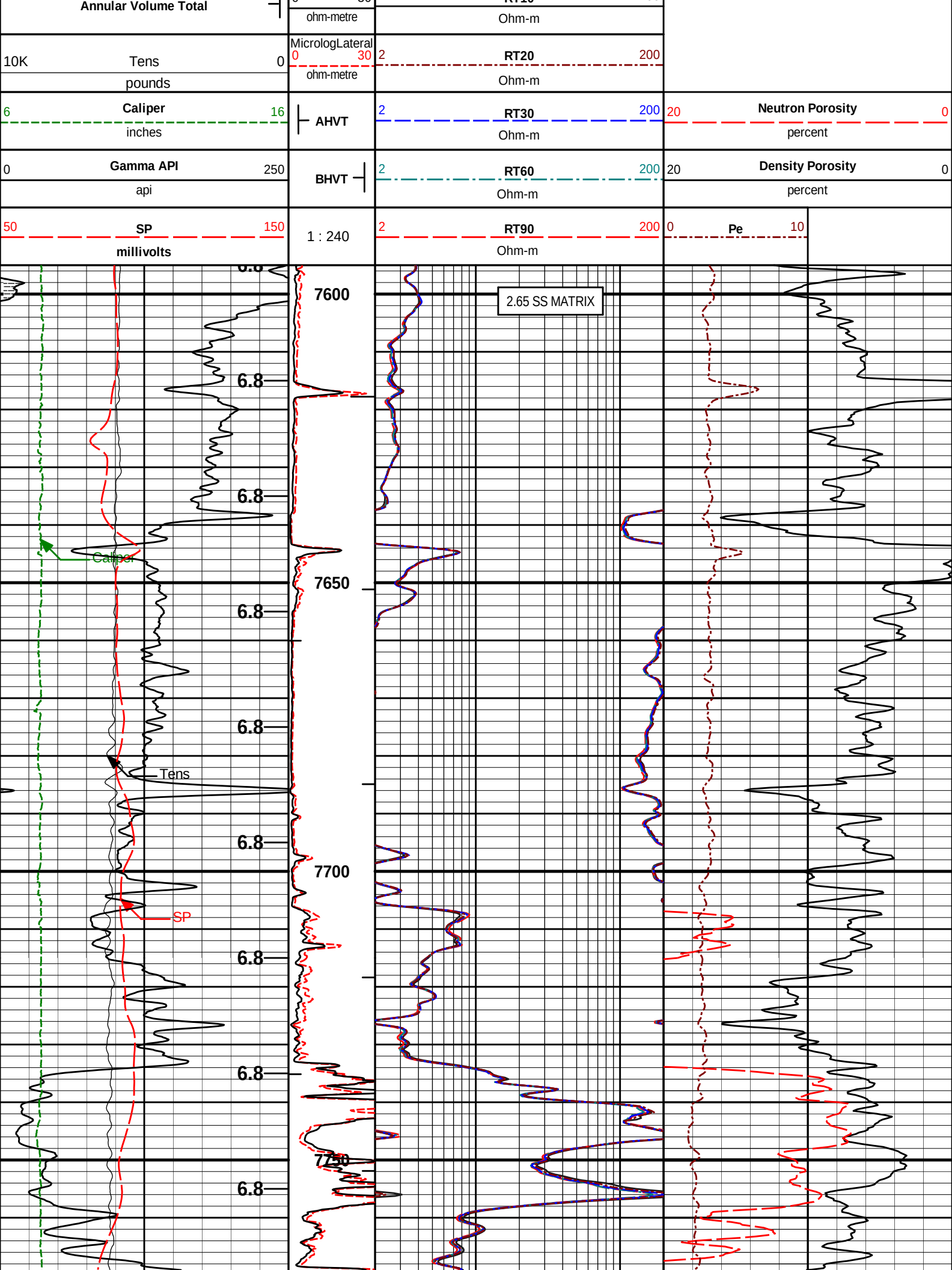
MAIN PASS 5" = 100'

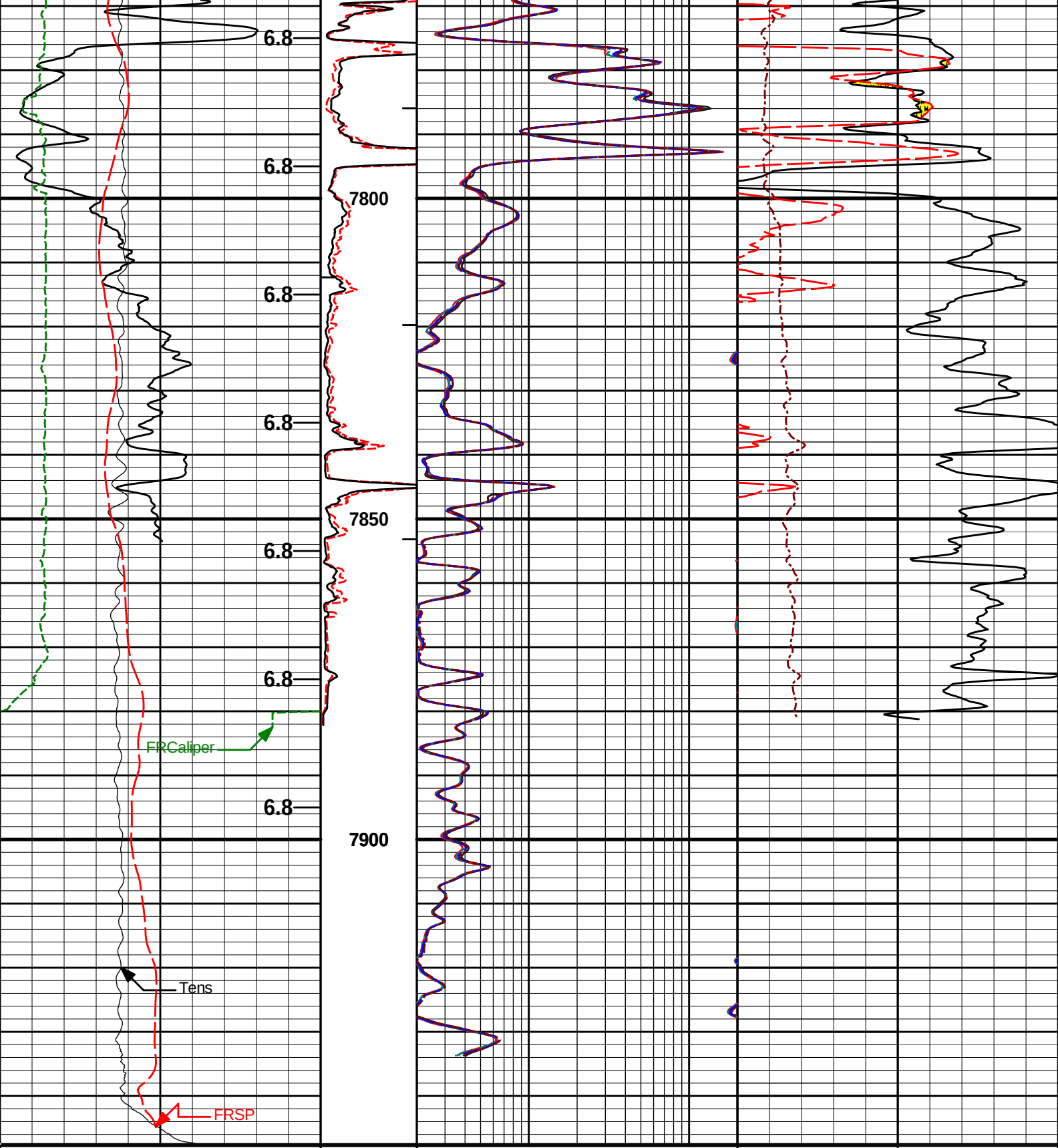
HALLIBURTON

Plot Time: 25-Jul-10 22:53:49
Plot Range: 7595 ft to 7947.5 ft
Data: TIMM_PC_GK04_12\Well Based\REPEAT*
Plot File: \\COMP\REPEAT

REPEAT SECTION 5" = 100'

Track 1	Depth Track	Track 2	Track 5 Track 3
	MicrologNormal 0 30 ohm-metre	2 **RT10** 200 Ohm-m	


Annular Volume Total
ohm-metre
Ohm-m
10K
Tens
0
pounds
MicrologLateral
0
30
ohm-metre
2
RT20
200
Ohm-m
6
Caliper
16
inches
AHVT
2
RT30
200
Ohm-m
20
Neutron Porosity
0
percent
0
Gamma API
250
api
BHVT
2
RT60
200
Ohm-m
20
Density Porosity
0
percent
50
SP
150
millivolts
1 : 240
2
RT90
200
Ohm-m
0
Pe
10
2.65 SS MATRIX
7600
6.8
7650
7700
7750
Caliper
Tens
SP



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	MicrologLateral 0 30 ohm-metre	2 **RT20** 200 Ohm-m	
	MicrologNormal		

Annular Volume Total	MicrologNormal 0 30 ohm-metre	2 RT10 200 Ohm-m	

HALLIBURTON

Plot Time: 25-Jul-10 22:53:54
Plot Range: 7595 ft to 7947.5 ft
Data: TIMM_PC_GK04_12\Well Based\REPEAT*
Plot File: \\COMP\REPEAT

REPEAT SECTION 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11277436**	**Reference Calibration Date:**	**23-Jun-10 16:51:35**
Engineer:	**F. LODER**	**Calibration Date:**	**20-Jul-10 12:44:32**
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	74.8	74.9	api
Background + Calibrator	308.6	308.9	api
Calibrator	234.1	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11277436**	**Reference Calibration Date:**	**20-Jul-10 12:44:32**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 08:29:10**
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	74.9	73.1	api
Background + Calibrator	308.9	309.1	api
Calibrator	234.0	236.0	api

Shop	Field	Difference	Tolerance
234.0	236.0	-2.0	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**21-Jun-10 16:17:35**
Engineer:	**W. MATSON**	**Calibration Date:**	**20-Jul-10 12:11:34**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**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 #	51.2	51.1	Channel #

2614 KEV Peak Channel #	210.3	209.6	Channel #
Calibrate Temperature	110.9	124.3	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	1635.1	CPS	328.8	321.8	API
Background	307.9	CPS	67.6	60.6	API

Gamma Ray Gain: 0.99
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**20-Jul-10 12:11:34**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 09:01:52**
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 #	51.1	51.1	Channel #
2614 KEV Peak Channel #	209.6	210.3	Channel #
Calibrate Temperature	124.3	113.2	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	1828.9	CPS	321.8	352.1	API
Background	472.0	CPS	60.6	90.9	API

Gamma Ray Gain: 0.97
Gamma Gain Check: Passed

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: C. BLUE **Calibration Date:** 25-Jul-10 08:38:32
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	0.0796	-0.0016	+/- 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 13:03:40
Engineer: F. LODER **Calibration Date:** 20-Jul-10 15:11:00
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	1.0646	1.0642	0.90 - 1.10

Near Dens Gain	1.0263	1.0244	0.90 - 1.10
Near Peak Gain	1.0385	1.0404	0.90 - 1.10
Near Lith Gain	1.0161	1.0149	0.90 - 1.10
Far Bar Gain	1.0229	1.0194	0.90 - 1.10
Far Dens Gain	1.0076	1.0054	0.90 - 1.10
Far Peak Gain	1.0002	0.9965	0.90 - 1.10
Far Lith Gain	0.9722	0.9661	0.90 - 1.10
Near Bar Offset	-0.3448	-0.3458	NONE
Near Dens Offset	-0.0119	0.0006	NONE
Near Peak Offset	-0.1195	-0.1399	NONE
Near Lith Offset	0.0440	0.0515	NONE
Far Bar Offset	-0.0002	0.0262	NONE
Far Dens Offset	0.1163	0.1296	NONE
Far Peak Offset	0.1507	0.1721	NONE
Far Lith Offset	0.2987	0.3386	NONE
Near Bar Background	956.86	956.41	700 - 1450
Near Dens Background	316.67	316.89	230 - 480
Near Peak Background	136.92	137.59	100 - 210
Near Lith Background	166.23	167.00	125 - 260
Far Bar Background	502.62	505.28	450 - 900
Far Dens Background	201.83	199.86	175 - 345
Far Peak Background	78.15	78.21	70 - 140
Far Lith Background	81.94	81.91	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.678	1.680	0.002	+/- 0.015
Pe	2.589	2.593	0.004	+/- 0.150
ALUMINUM				
Density (g/cc)	2.600	2.600	-0.000	+/- 0.01500
Pe	3.102	3.099	-0.003	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0017	+/- 0.0110	-0.0024	+/- 0.0140
Magnesium Block	0.0001	+/- 0.0110	-0.0014	+/- 0.0140
Aluminum Block	-0.0009	+/- 0.0110	-0.0005	+/- 0.0140
Resolution	8.78	6.00 - 11.50	9.76	6.00 - 11.50
Internal Verifier(B+D+P+L)	1578	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

Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**20-Jul-10 15:11:00**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 08:27:54**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Pad Temperature: 75.2 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1577.897	1576.983	-0.914	15.980
Far (B+D+P+L) cps	865.263	869.193	3.930	16.093
Near Resolution	8.78	8.81	0.030	0.50
Far Resolution	9.76	9.98	0.220	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:**	**27-Jun-10 00:43:21**
Engineer:	**C. BLUE**	**Calibration Date:**	**19-Jul-10 17:23:27**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		
	Measured	Calibrated	Measured	Calibrated	Units
Tool Zero	-0.12	-0.14	-0.00	0.00	ohmm
Calibration Point #1	0.02	0.00	-0.01	0.00	ohmm
Calibration Point #2	20.00	20.00	20.02	20.00	ohmm
Internal Reference	19.91	19.91	20.01	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-4.78	0.38	V
Calibration Point #1	30.39	-1.32	V
Calibration Point #2	5217.25	6809.09	V
Internal Reference	5192.91	6805.36	V

MICRO LOG FIELD CHECK

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**19-Jul-10 17:23:27**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 08:32:25**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Measurement	Micro Log Normal		Micro Log Lateral		
	Shop	Field	Shop	Field	Units
Tool Zero	-0.14	-0.12	0.00	0.01	ohmm
Internal Reference	19.91	19.85	19.99	19.93	ohmm

Summary

Signal	Shop	Field	Difference	Tolerence
Microlog Normal	19.91	19.85	0.06	+/- 0.80

Microlog Lateral	19.99	19.93	0.06	+/- 0.80

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**19-Jul-10 17:28:45**
Engineer:	**C. BLUE**	**Calibration Date:**	**19-Jul-10 17:32:59**
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	-1983.99	-2491.80	-7000.00 - -1000.00
Pad Gain	0.0003813	0.0004029	0.000200 - 0.000600
Arm Offset	-1491.95	-1080.04	-5000.00 - 3000.00
Arm Gain	0.0005423	0.0005258	0.000300 - 0.000700
Arm Power	-0.000006832	-0.000005542	-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)	2.09	2.00	-0.09	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.53	6.50	-0.03	+/- 0.20
Medium Ring (in)	8.32	8.25	-0.07	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 0.20

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:	Passed

SDLT CALIPER FIELD CALIBRATION

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**19-Jul-10 17:32:59**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 08:31:52**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.83	0.08	+/- 0.10
Ring Diameter	8.25	8.22	-0.03	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check:	Passed
Diameter Check:	Passed

ACCELEROMETER AND MAGNETOMETER SHOP CALIBRATION

Tool Name:	**IDT - 11277453**	**Reference Calibration Date:**	**01-Jan-70 00:00:00**
Engineer:	**Lito**	**Calibration Date:**	**18-Dec-08 10:33:15**
Software Version:	**WL INSITE R2.2 (Build 9)**	**Calibration Version:**	**1**

Reference Gravity Field: 1.0000 g

Reference Magnetic Field: 42252.1719 nT

* QF : value of 0 is shown for bad quality if | data - reference | > (2 * standard deviation) and > (0.5% of reference value)

ACCELEROMETER CALIBRATION RAW DATA VALUE					
Raw Acc X	Raw Acc Y	Raw Acc Z	Quality(Gravity)	Quality Error(%)	QF
0.5639	0.4499	-0.0254	0.9979	0.0021	1
0.0241	-0.7097	-0.0183	0.9995	0.0005	1
-0.7264	0.1572	-0.0198	0.9986	0.0014	1
0.0321	0.7394	-0.0273	1.0008	0.0008	1
0.0087	0.7385	-0.0409	0.9997	0.0003	1
-0.0193	0.7287	0.0487	1.0002	0.0002	1
-0.0188	0.7411	-0.0166	1.0006	0.0006	1
0.7038	-0.0854	0.0044	1.0015	0.0015	1
-0.0222	-0.7110	-0.0119	1.0000	0.0000	1
-0.7419	-0.0072	-0.0271	1.0012	0.0012	1
-0.0052	0.0177	0.3463	0.9999	0.0001	1
-0.1420	0.1556	-0.3685	1.0001	0.0001	1

ACCELEROMETER QUALITY SUMMARY		
Average Calculated Gravity Field	1.0000	g
Standard Deviation Calculated Gravity Field	0.0010	g

ACCELEROMETER GAIN AND OFFSET		
	GAIN	OFFSET
ACC X	1.3768593073	0.0210890602
ACC Y	1.3775787354	-0.0203358047
ACC Z	2.7496292591	0.0477359891

* QF : value of 0 is shown for bad quality if | data - reference | > (3 * standard deviation) and > (1% of reference value)

MAGNETOMETER CALIBRATION RAW DATA VALUE					
Raw Mag X	Raw Mag Y	Raw Mag Z	Quality(Magnetic)	Quality Error(%)	QF
-0.4154	1.0229	-0.0950	42024.7539	0.0054	1
1.0528	-0.2167	0.2776	42074.7891	0.0042	1
-0.4415	-1.0055	0.2475	42539.5195	0.0068	1
-1.0086	0.3168	0.2225	41896.5000	0.0084	1
0.1035	0.2138	1.1679	42187.0156	0.0015	1
-0.2684	0.0751	-1.1534	43752.5820	0.0355	1
0.0233	0.2698	-1.1548	43518.4336	0.0300	1
0.2384	0.1877	-1.0735	40961.8242	0.0305	1
0.2729	-0.2633	-1.0552	41254.2813	0.0236	1
-0.2686	-0.2420	-1.0537	41232.5859	0.0241	1
1.0859	-0.1058	-0.2452	42784.8086	0.0126	1
-0.4976	-0.9440	0.3454	42315.6367	0.0015	1

MAGNETOMETER QUALITY SUMMARY		
Average Calculated Magnetic Field	42211.8945	nT
Standard Deviation Calculated Magnetic Field	859.1619	nT

MAGNETOMETER GAIN AND OFFSET		
	GAIN	OFFSET
MAG X	38687.1679687500	-510.5658569336
MAG Y	37591.9726562500	-65.9105224609
MAG Z	35998.0312500000	-764.1088867188

Noise Level Value: 0.000000 cnts

Noise Level Cal Value: 0.0000 g

ICT SHOP CALIBRATION

Tool Name:	**ICT - 111294351**	**Reference Calibration Date:**	**21-Jun-10 16:02:52**
Engineer:	**F. LODER**	**Calibration Date:**	**20-Jul-10 13:23:34**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

CALIPERS AND RINGS

Ring	Measured	Calibrated	Units
CALIPER 1:			
Small Ring	3.66	3.63	in
Medium Ring	8.07	8.00	in
Large Ring	15.11	15.00	in
X-Large Ring	21.09	21.00	in
CALIPER 2:			
Small Ring	3.62	3.63	in
Medium Ring	7.94	8.00	in
Large Ring	14.96	15.00	in
X-Large Ring	21.01	21.00	in
CALIPER 3:			
Small Ring	3.61	3.63	in
Medium Ring	7.99	8.00	in
Large Ring	14.93	15.00	in
X-Large Ring	20.95	21.00	in
CALIPER 4:			
Small Ring	3.66	3.63	in
Medium Ring	8.00	8.00	in
Large Ring	14.93	15.00	in
X-Large Ring	20.96	21.00	in
CALIPER 5:			
Small Ring	3.63	3.63	in
Medium Ring	8.01	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.03	21.00	in
CALIPER 6:			
Small Ring	3.74	3.63	in
Medium Ring	8.03	8.00	in
Large Ring	15.06	15.00	in
X-Large Ring	21.01	21.00	in

ICT FIELD CALIBRATION

Tool Name:	**ICT - 111294351**	**Reference Calibration Date:**	**20-Jul-10 13:23:34**
Engineer:	**C. BLUE**	**Calibration Date:**	**25-Jul-10 08:51:10**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

CALIPERS

Caliper	Shop	Field	Units
Caliper 1	8.00	7.85	in
Caliper 2	8.00	7.99	in
Caliper 3	8.00	8.07	in
Caliper 4	8.00	8.10	in
Caliper 5	8.00	8.02	in
Caliper 6	8.00	7.91	in

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	**ACRt - 90199477-E2817-S4353**	**Reference Calibration Date:**	**14-Apr-10 10:59:55**
Engineer:	**W. MATSON**	**Calibration Date:**	**04-Jun-10 17:05:07**
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	1.0017	1.05	0.95	1.0075	1.05	0.95	1.0077	1.05
A2 (50")	0.95	1.0056	1.05	0.95	1.0121	1.05	0.95	1.0134	1.05
A3 (29")	0.95	1.0003	1.05	0.95	1.0061	1.05	0.95	1.0049	1.05
A4 (17")	0.95	1.0228	1.05	0.95	1.0252	1.05	0.95	1.0278	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0104	1.05	0.95	1.0113	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9896	1.05	0.95	0.9889	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	-1.159	2	-6	-4.394	-2	-8	-4.637	-2
A2 (50")	-7	-1.871	-1	-6	-2.975	-2	-7	-4.478	-2
A3 (29")	-27	-12.971	-9	-9	-3.596	-3	-7	-3.348	-1
A4 (17")	-180	-90.575	-60	-45	-29.095	-15	-39	-25.215	-13
A5 (10")	N/A	N/A	N/A	-150	-85.702	-50	-80	-42.372	-10
A6 (6")	N/A	N/A	N/A	175	320.120	525	90	160.446	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.9239	1.3
36K	1.0	1.8347	2.0
72K	1.0	1.1631	2.0

R-MUD VERIFICATION

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

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11277436						
Gamma Ray Calibrator	234.0	236.0	----------	-2.0	+/- 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 #	51.1	51.1	----------	0.0	----------	Channel #
2614 KEV Peak Channel #	209.6	210.3	----------	-0.7	----------	Channel #
DSNT-11301132						
Snow-Block Porosity	0.0812	0.0796	----------	0.0016	+/- 0.0150	decp
SDLT-I132M275						
Near(B+D+P+L)	1577.897	1576.983	----------	0.914	+/-15.980	cps
Far(B+D+P+L)	865.263	869.193	----------	-3.930	+/-16.093	cps
MicroLog Normal	19.91	19.85	----------	0.06	+/-0.80	ohmm
MicroLog Lateral	19.99	19.93	----------	0.06	+/-0.80	ohmm
Pad Extension	3.75	3.83	----------	-0.08	+/-0.10	in
Ring Diameter	8.25	8.22	----------	0.030	+/-0.15	in
ICT-111294351						
Caliper 1	8.00	7.85	----------	0.15	+/-0.25	in
Caliper 2	8.00	7.99	----------	0.01	+/-0.25	in
Caliper 3	8.00	8.07	----------	-0.07	+/-0.25	in

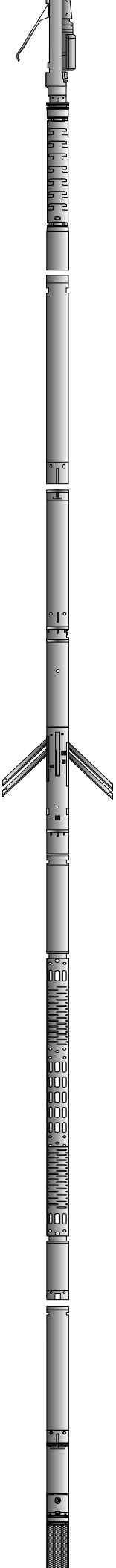
Caliper 4	8.00	8.10	----------	-0.10	+/-0.25	in
Caliper 5	8.00	8.02	----------	-0.02	+/-0.25	in
Caliper 6	8.00	7.91	----------	0.09	+/-0.25	in
ACRt-90199477-E2817-S4353						
Mud Cell	0.997	----------	----------	0.000	----------	ohm-m

Data: TIMM_PC_GK04_12\0001 NOBLE_BLACK_BSAT\IDLE **Date: 25-Jul-10 13:45:23**

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						105.42 ft
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-I132M275 360.00 lbs		Ø 4.500 in		SDL Microlog @ 64.99 ft	10.81 ft	



Ø 4.750 in

SDL Caliper @ 64.80 ft

SDL @ 64.79 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

48.43 ft

ICT-111294351
330.00 lbs

Ø 3.625 in

12.83 ft

ICT Caliper @ 38.39 ft

35.60 ft

BSAT-1105780
300.00 lbs

Ø 3.625 in

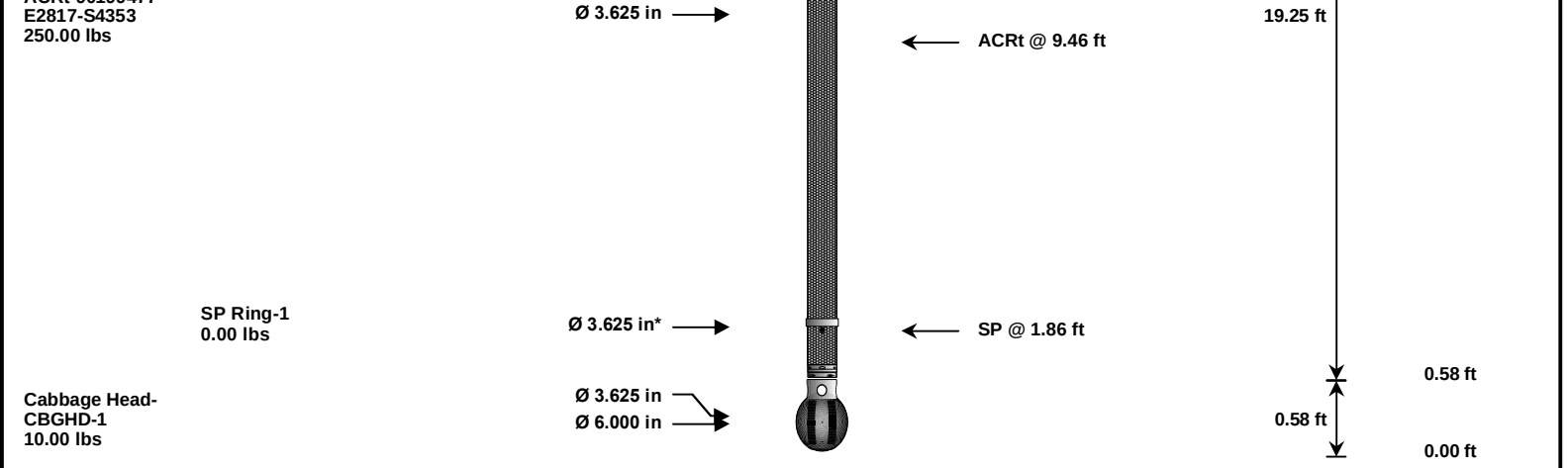
15.77 ft

Sonic Receivers @ 27.09 ft

19.83 ft

Mud Resistivity @ 13.44 ft

ACRt-90199477-



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		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	111294351	330.00	12.83		35.60	60.00
BCAS	Borehole Sonic Array Tool	1105780	300.00	15.77		19.83	60.00
ACRt	Array Compensated True Resistivity	90199477-E2817-S4353	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			**2,134.60**	**105.42**			

* Not included in Total Length and Length Accumulation.

Data: TIMM_PC_GK04_12\0001 NOBLE_BLACK_BSAT\IDLE **Date: 25-Jul-10 13:00:35**

COMPANY	**NOBLE ENERGY**		
WELL	**TIMM PC GK04-12**		
FIELD	**WATTENBERG**		
COUNTY	**WELD**	STATE	**CO**

HALLIBURTON

SPECTRAL DENSITY
DUAL SPACED NEUTRON
ARRAY COMPENSATED
TRUE RESISTIVITY