HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	NOBLE ENERGY
WELL	SHABLE USX AB11-02
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO

COMPANY NOBLE ENERGY
WELL SHABLE USX AB11-02
FIELD WATTENBERG
COUNTY WELD STATE CO

API No. 05123306160000
Location SHL: 310' FNL & 2085' FEL NWNE
LAT: 40.53280°
LONG: 104.514240°

Sect. 11 Twp. 7N Rge. 64W

Other Services:
RWCH
IDT
ICT
CSNG
BSAT

Permanent Datum	GL	Elev. 4881.0 ft	Elev.: K.B.	4894.0 ft
Log measured from	KB	13.0 ft above perm. Datum	D.F.	4894.0 ft
Drilling measured from	KB		G.L.	4881.0 ft

Date		03-Jul-10				
Run No.		ONE				
Depth - Driller		9187.00 ft				
Depth - Logger		9173.0 ft				
Bottom - Logged Interval		9162 ft				
Top - Logged Interval		834 ft				
Casing - Driller		9.625 in	@ 834.0 ft	@		@
Casing - Logger		831.0 ft				
Bit Size		8.785 in		@		@
Type Fluid in Hole		WBM				
Density	Viscosity	9.6 ppg	41.00 s/qt			
PH	Fluid Loss	12.00 pH	8.8 cptm			
Source of Sample		FLOW LINE				
Rm @ Meas. Temperature		0.350 ohmm	@ 81.00 degF	@		@
Rmf @ Meas. Temperature		0.30 ohmm	@ 75.00 degF	@		@
Rmc @ Meas. Temperature		0.382 ohmm	@ 75.00 degF	@		@
Source Rmf	Rmc	CHART	CHART			
Rm @ BHT		0.14 ohmm	@ 215.0 degF	@		@
Time Since Circulation		8.0 hr				
Time on Bottom		05-Jul-10 04:03				
Max. Rec. Temperature		215.0 degF	@ 9099.0 ft	@		@
Equipment	Location	11454566	BRIGHTON			
Recorded By		F. LODER				
Witnessed By		I. MCWHORTER				

Fold here

Service Ticket No.: 7457878 API Serial No.: 05123306160000 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.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	11277436	Serial No.	1105781	Serial No.	I132M275	Serial No.	11301132
Model No.	GTET-I	Model No.	BSAT-I	Model No.	SDLT-I	Model No.	DSNT-I
Diameter	3.625"	No. of Cent.	2	Diameter	4.75"	Diameter	3.625"`
Detector Model No.	T102-A	Spacing	6.0"	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs137	Source Type	Am241Be
Length	8.0"	LSA [Y/N]	N	Serial No.	2770GW	Serial No.	DSN-434
Distance to Source	14'	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	9173'	7505'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.65 g/cc	20 %	0 %	SAND
ONE	7505'	7037'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.68 g/cc	20 %	0 %	SAND
ONE	7037'	6720'	REC	0 API	250 API	30 %	-10 %	47.5 us/ft	20 %	0 %	2.71 g/cc	20 %	0 %	LIME
ONE	6720'	830'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20 %	0 %	2.68 g/cc	20 %	0 %	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: RWCH-GTET-CSNG-DSNT-SDLT-FLEX-IDT-ICT-BSAT-ACRT RAN IN COMBINATION

ANNULAR HOLE VOLUME CALCULATED USING 4.5 AND 7.0 INCH PRODUCTION CASING

TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE

CREW: A. LEWIS, T. BINEAU RIG: CADE 21

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
	BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
6720.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
	BSAT	DTMT	Delta -T Matrix Type	Limestone 47.5	
7037.00					
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
7505.00					
	SHARED	BS	Bit Size	8.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	9.600	ppg
	SHARED	OBM	Oil Based Mud System?	No	
	SHARED	RMUD	Mud Resistivity	0.350	ohmm
	SHARED	TRM	Temperature of Mud	80.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	9187.00	ft
	SHARED	BHT	Bottom Hole Temperature	235.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	IDT	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	

SHARED	AZTM	High Res 2 Accelerometer Master Tool	IDT	
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	POTA	Potassium	0.00	%
GTET	MDTP	Mud Type	Natural	
GTET	TPOS	Tool Position	Standoff	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool Centralized?	No	
CSNG	MUDT	Mud Type?	Natural	
CSNG	KPCT	Percent K in Mud by Weight?	0.00	%
CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
CSNG	BARF	Barite Correction Factor	1.00	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Sandstone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.000	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	DNOK	Process Density?	Yes	
SDLT	DNOK	Process Density EVR?	No	
SDLT	AD	Is Hole Air Drilled?	No	
SDLT	CB	Logging Calibration Blocks?	No	
SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT	DTWN	Disable temperature warning	No	
SDLT	MDTP	Weighted Mud Correction Type?	None	
SDLT	DMA	Formation Density Matrix	2.650	g/cc
SDLT	DFL	Formation Density Fluid	1.000	g/cc
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT	MLOK	Process MicroLog Outputs?	Yes	
IDT	WRTI	Survey Writing Interval	30	ft
IDT	SOPT	Smoothing Option	None	
ICT	CLOK	Process Caliper Outputs?	Yes	
ICT	NAVS	Navigation Source Tool	IDT	
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Semblance Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Semblance Filter High Pass Value?	27000	Hz
BSAT	DTFL	Delta -T Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	DTSH	Delta -T Shale	100.00	uspf
BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
ACRt	RTOK	Process ACRt?	Yes	
ACRt	MNSO	Minimum Tool Standoff	1.50	in
ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt	TPOS	Tool Position	Free Hanging	
ACRt	RMOP	Rmud Source	Mud Cell	
ACRt	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt	THQY	Threshold Quality	0.50	

BOTTOM

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Plot Time: 05-Jul-10 06:46:24
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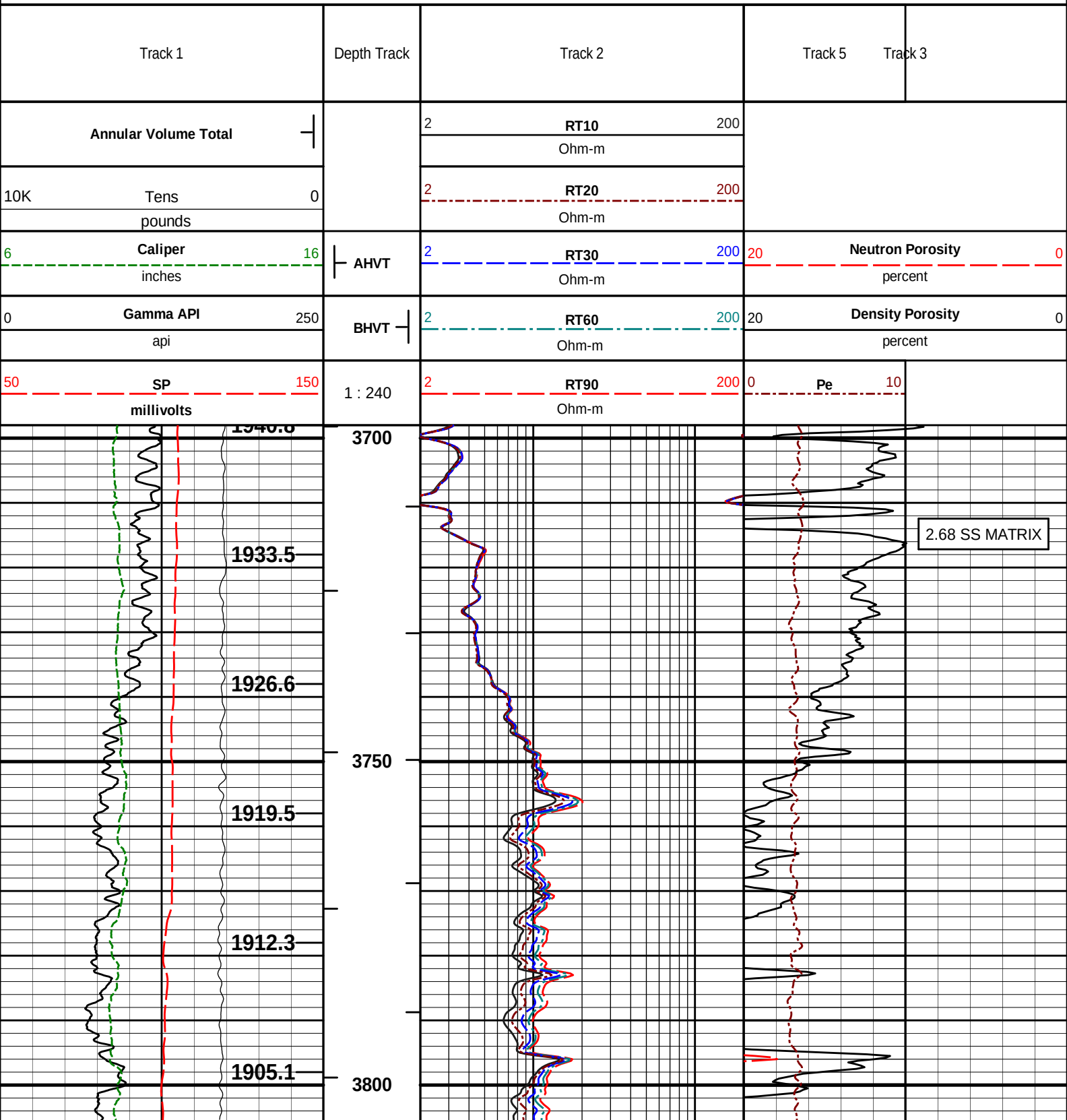
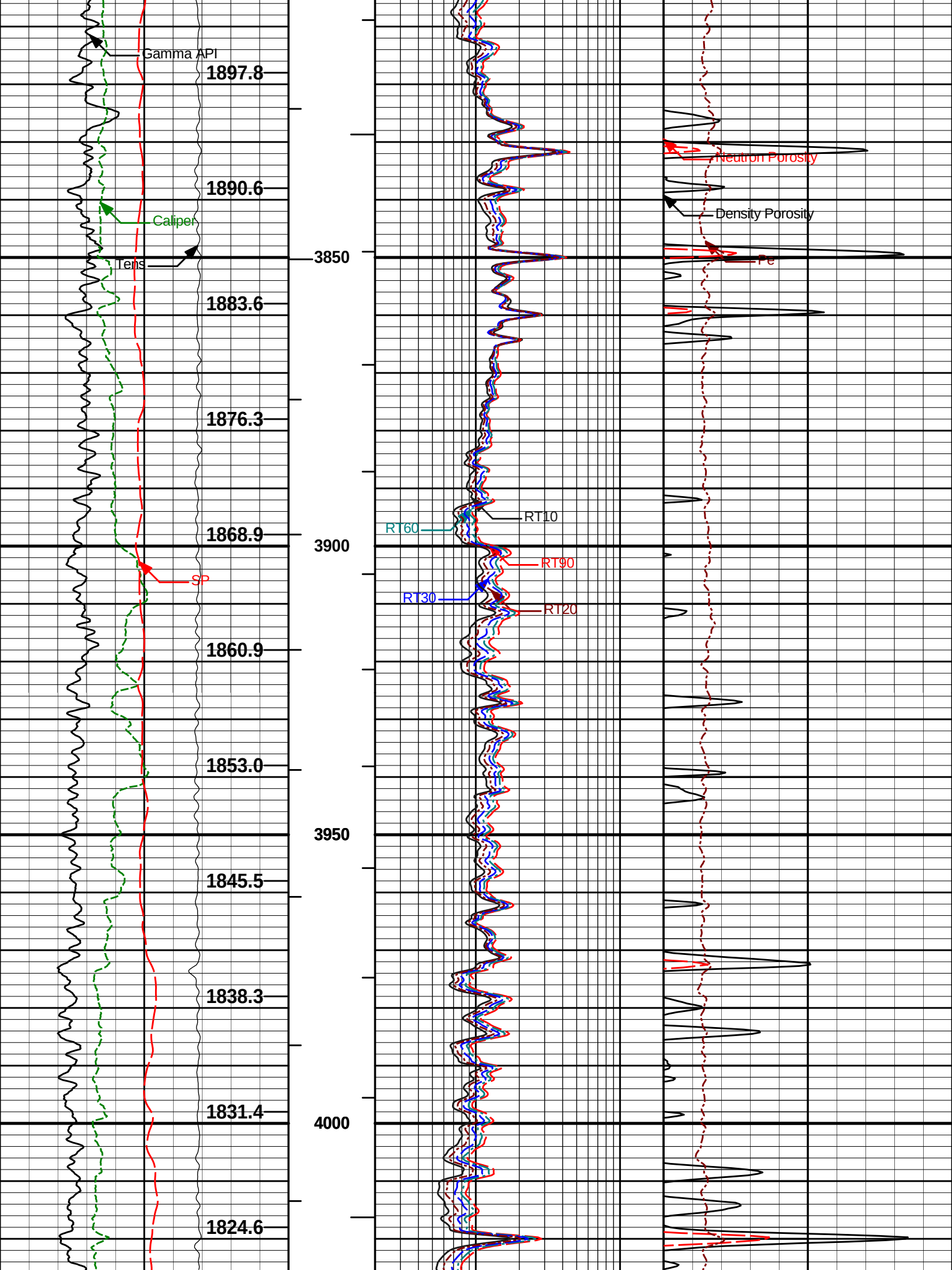
Plot File: \\COMP\PARK_SUS

MAIN PASS 5" = 100'

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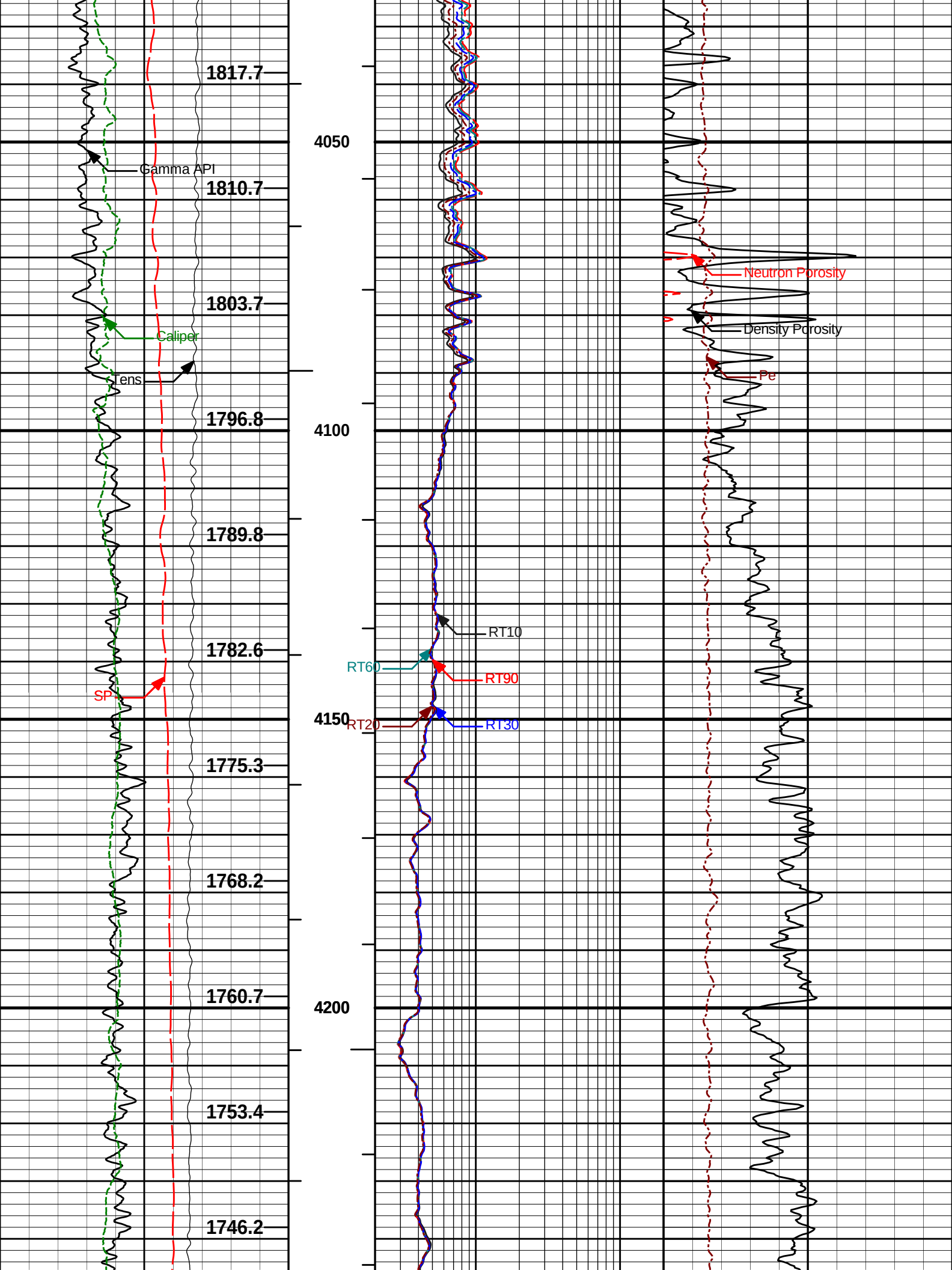
Neutron Porosity
Density Porosity
Pe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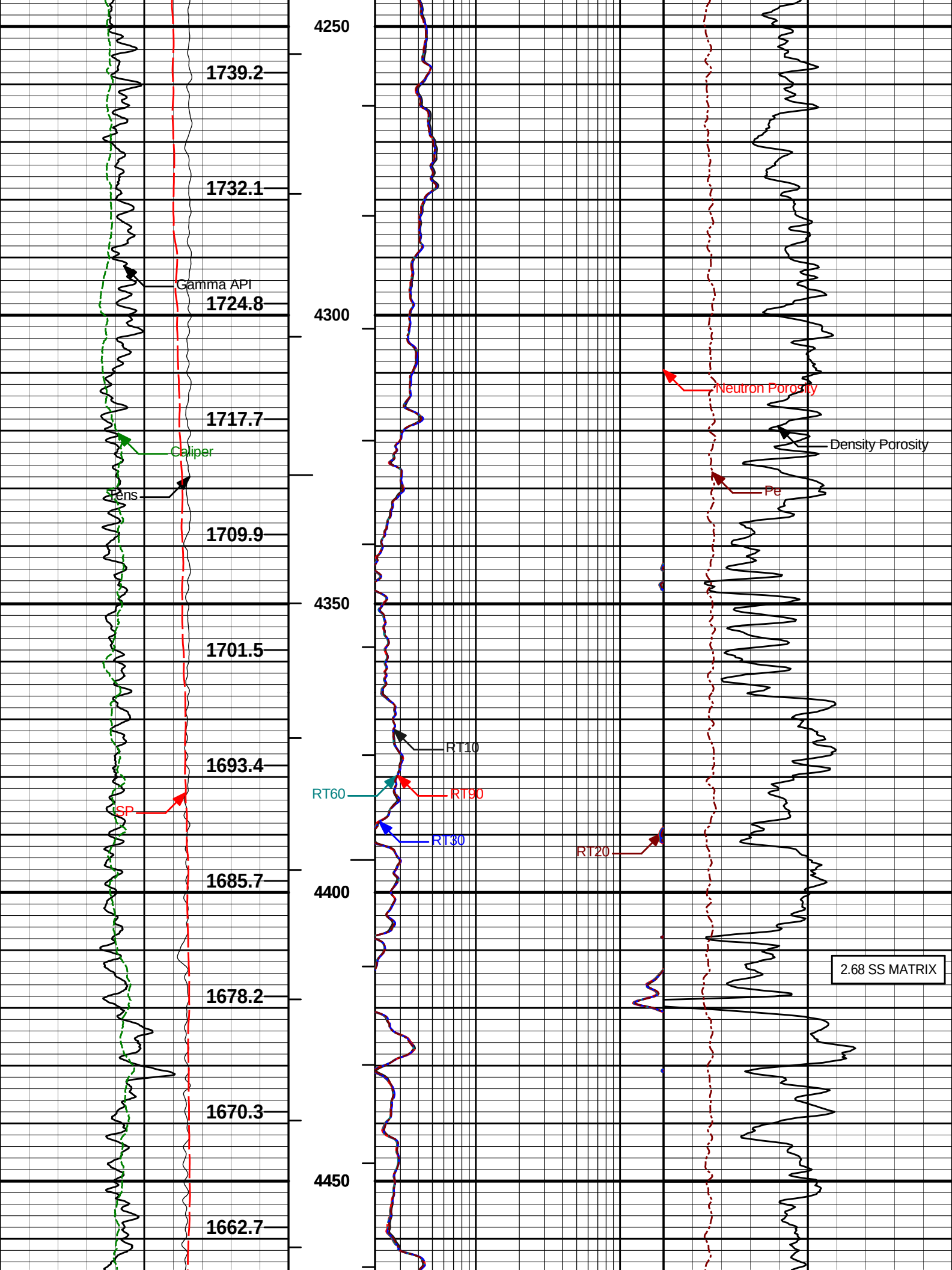
Neutron Porosity
Density Porosity
Pe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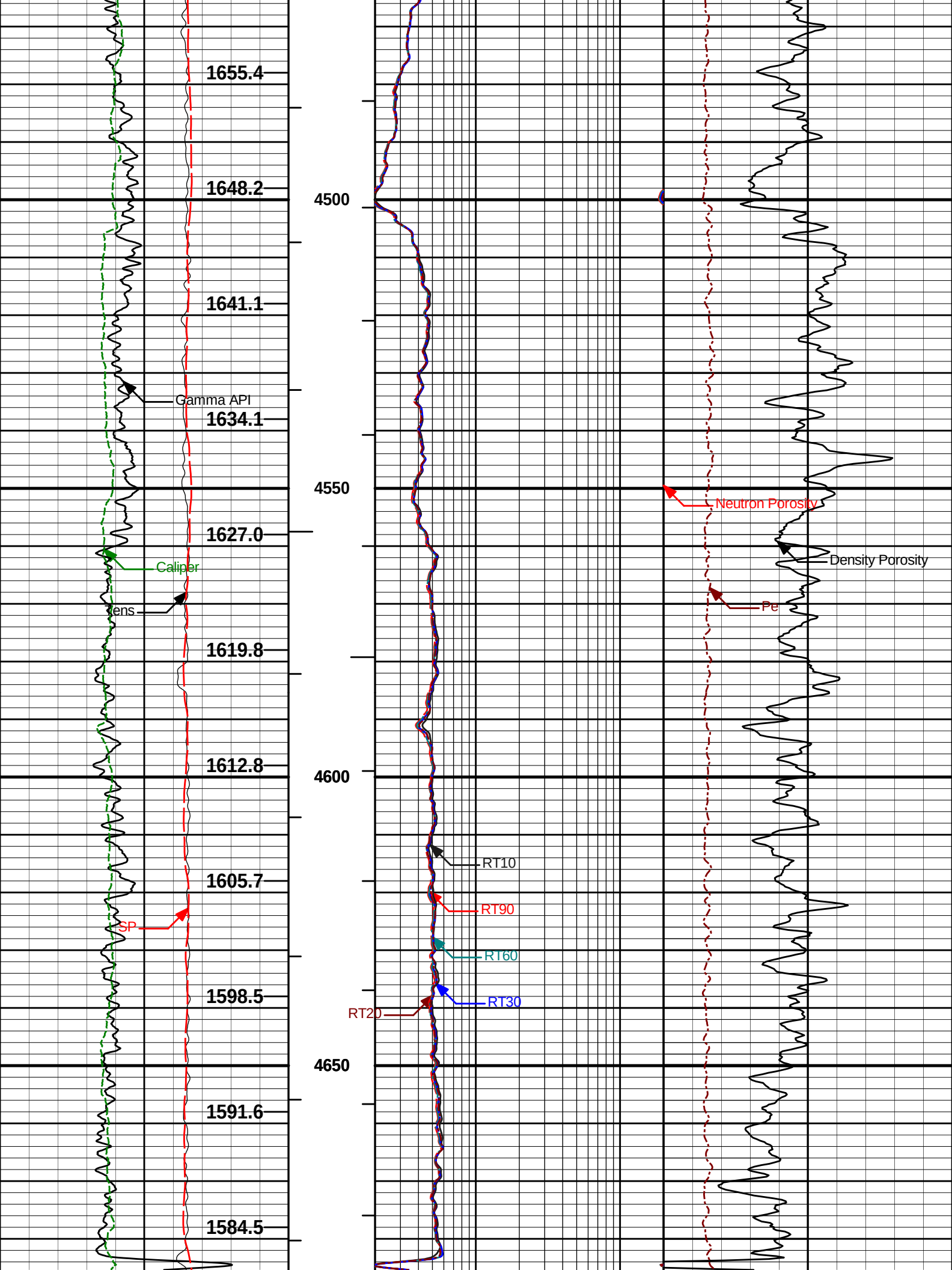
Density Porosity
Pe
2.68 SS MATRIX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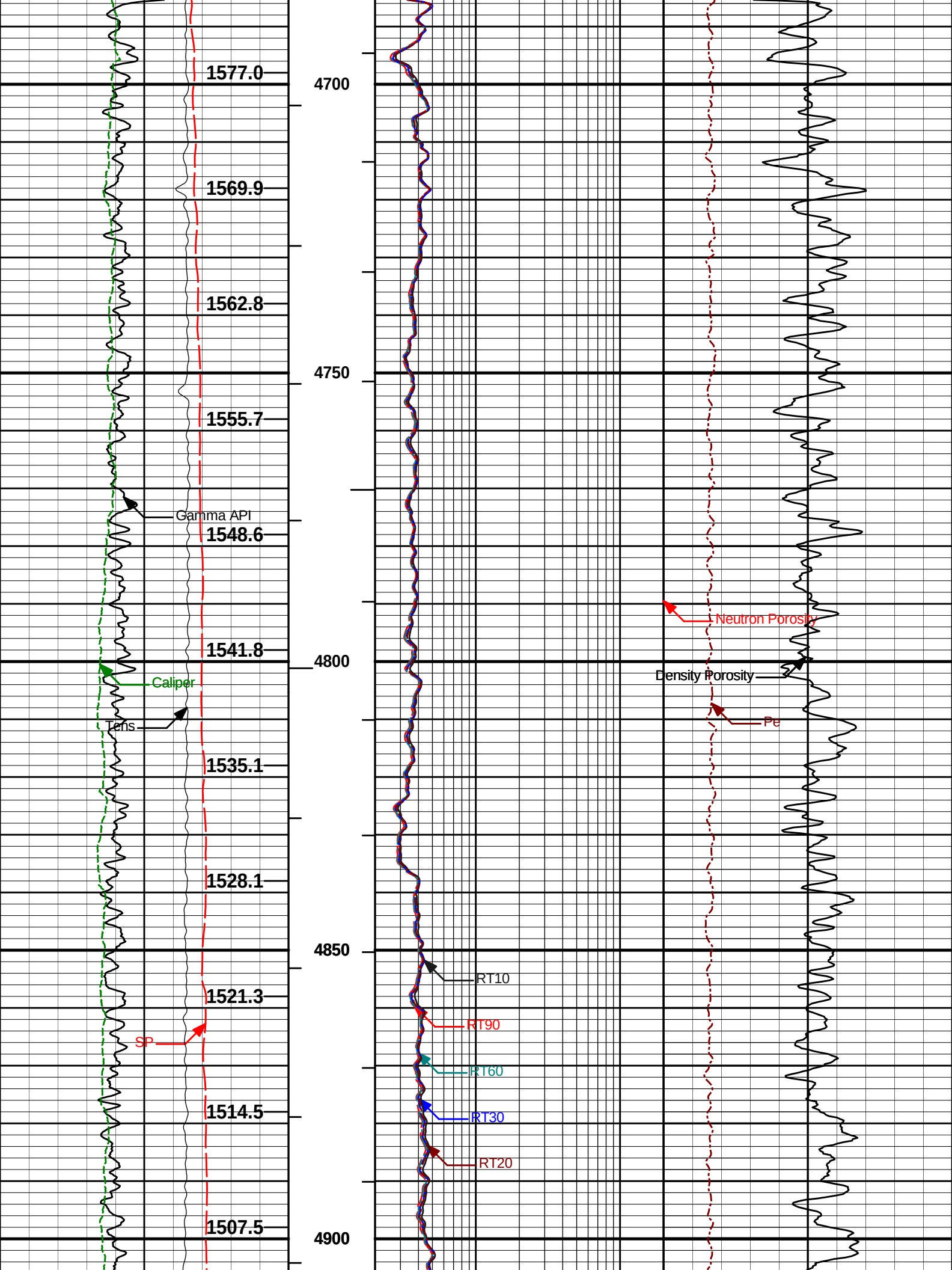
Neutron Porosity
Density Porosity
Pe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Tens
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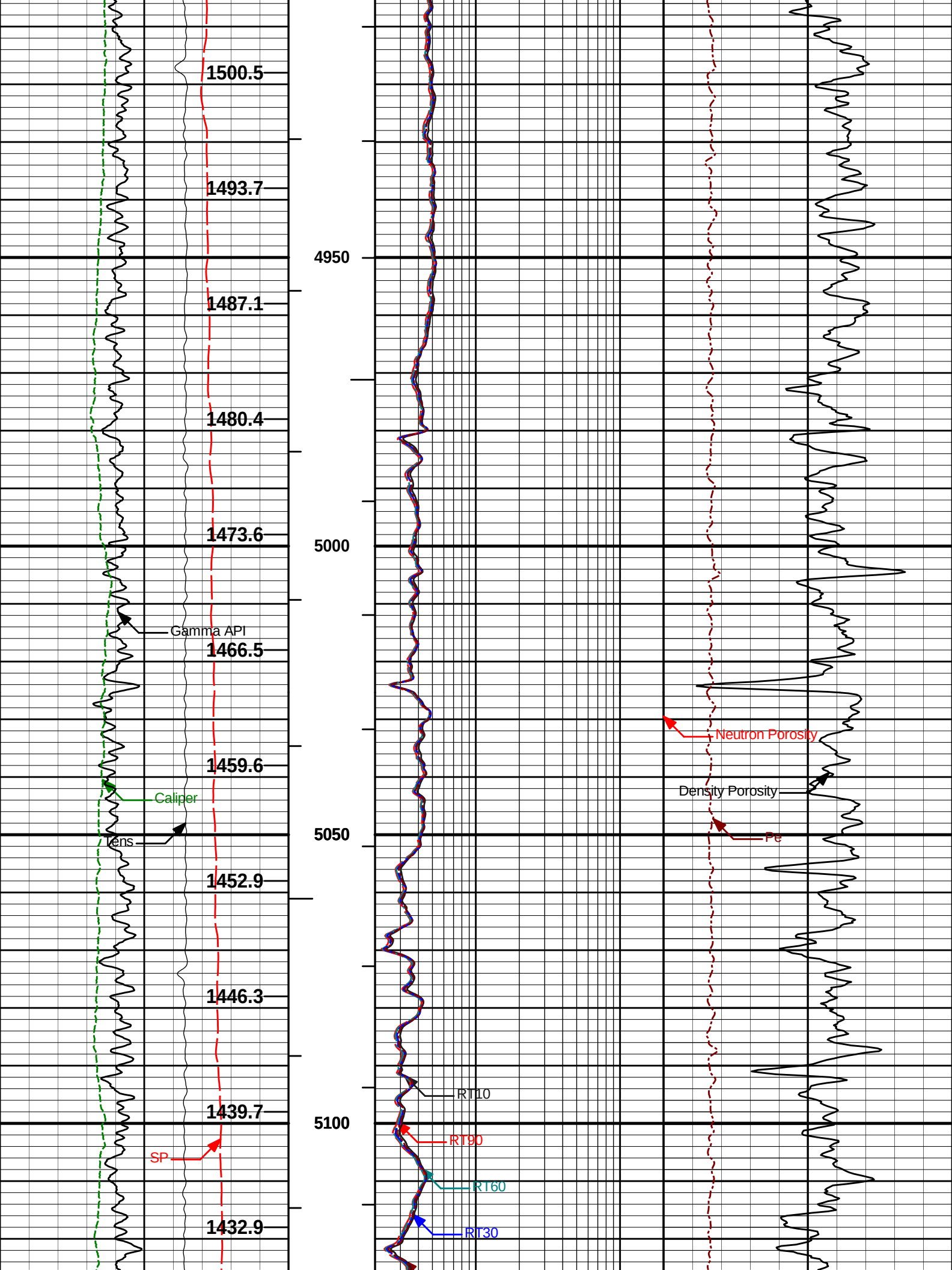
Neutron Porosity
Density Porosity
Pe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Density Porosity
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RT90
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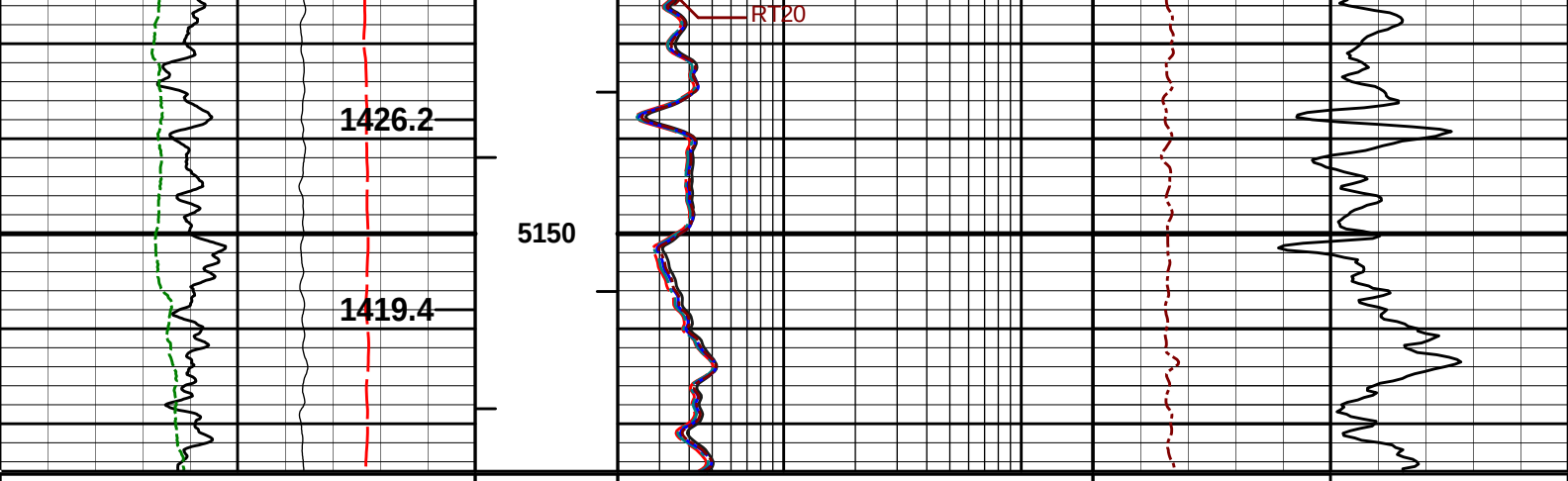

50 **SP** 150 millivolts	1 : 240	2 **RT90** 200 Ohm-m
0 **Gamma API** 250 api	**BHVT**	2 **RT60** 200 Ohm-m
6 **Caliper** 16 inches	**AHVT**	2 **RT30** 200 Ohm-m
10K Tens 0 pounds		2 **RT20** 200 Ohm-m
Annular Volume Total		2 **RT10** 200 Ohm-m

		0 **Pe** 10
		20 **Density Porosity** 0 percent
		20 **Neutron Porosity** 0 percent

HALLIBURTON

Plot Time: 05-Jul-10 06:46:42
Plot Range: 3698 ft to 5175 ft
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Plot File: \\COMP\PARK_SUS

MAIN PASS 5" = 100'

HALLIBURTON

Plot Time: 05-Jul-10 06:46:43
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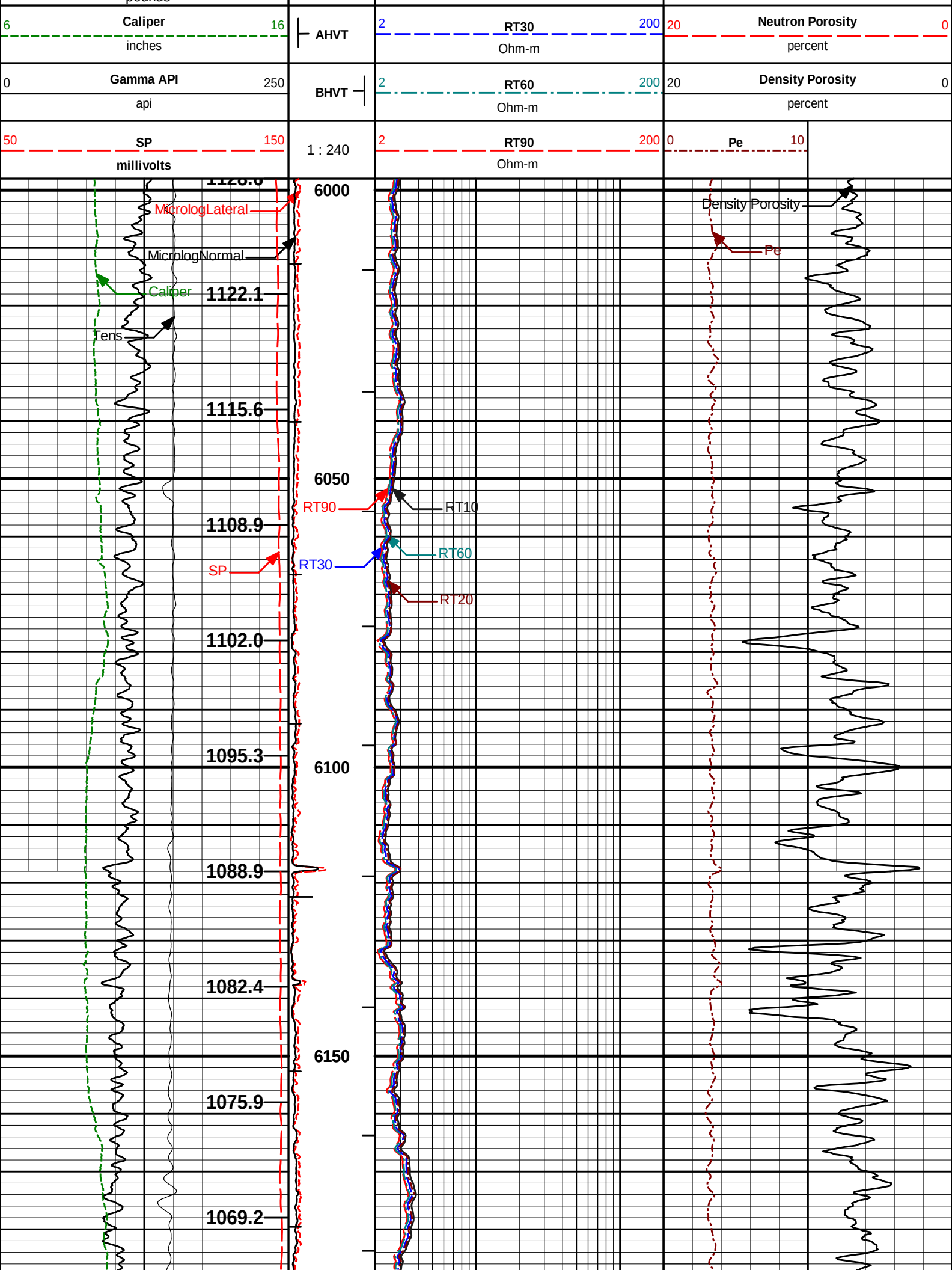
Plot File: \\COMP\NIO_COD_J_LYON

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		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6
16
inches
AHVT
RT30
2
200
Ohm-m
Neutron Porosity
20
0
percent
Gamma API
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250
api
BHVT
RT60
2
200
Ohm-m
Density Porosity
20
0
percent
SP
50
150
millivolts
1 : 240
RT90
2
200
Ohm-m
Pe
0
10
6000
6050
6100
6150
MicrologLateral
MicrologNormal
Caliper
Tens
SP
RT90
RT30
RT10
RT60
RT20
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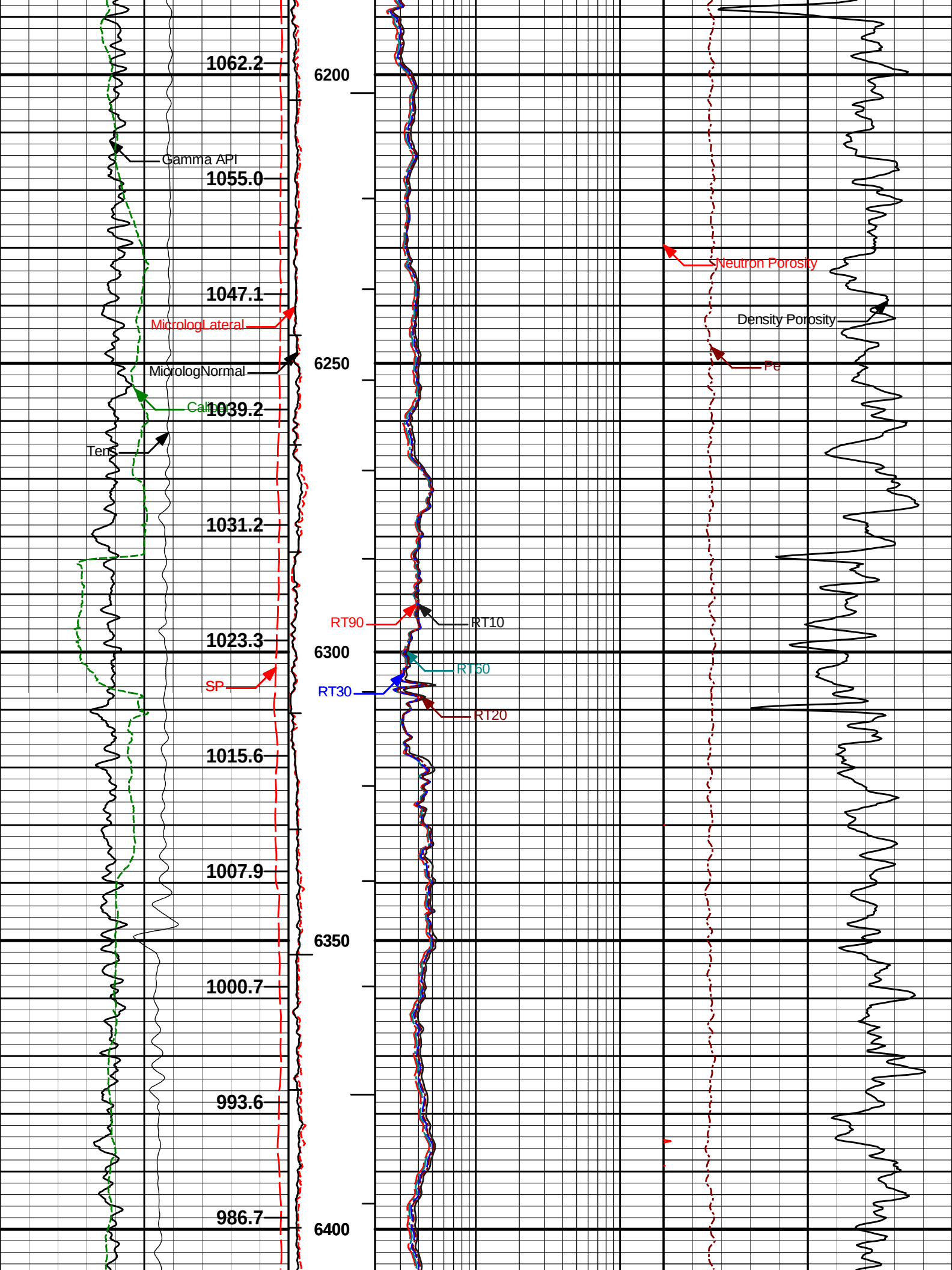
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Tens
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RT90
RT10
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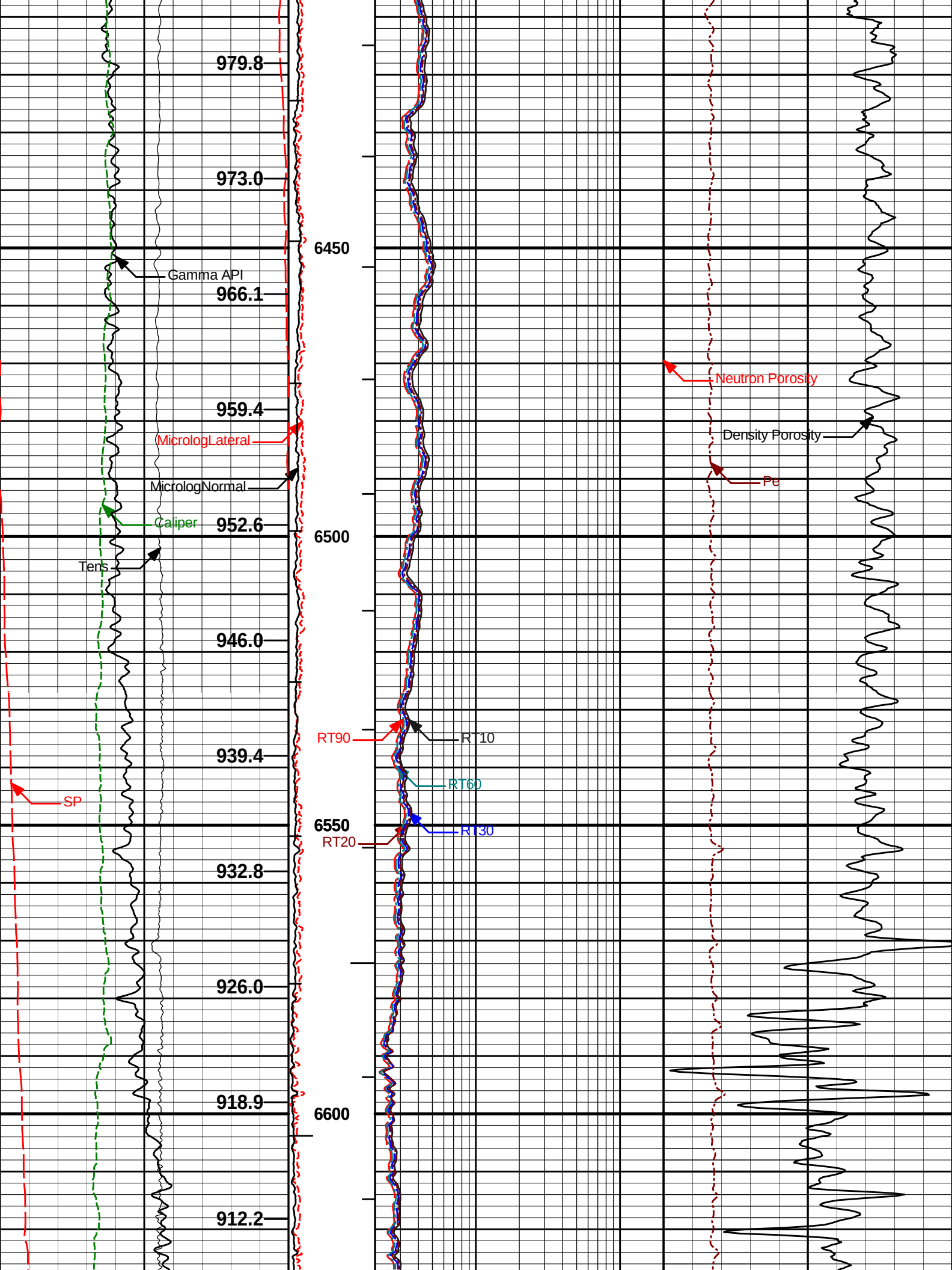
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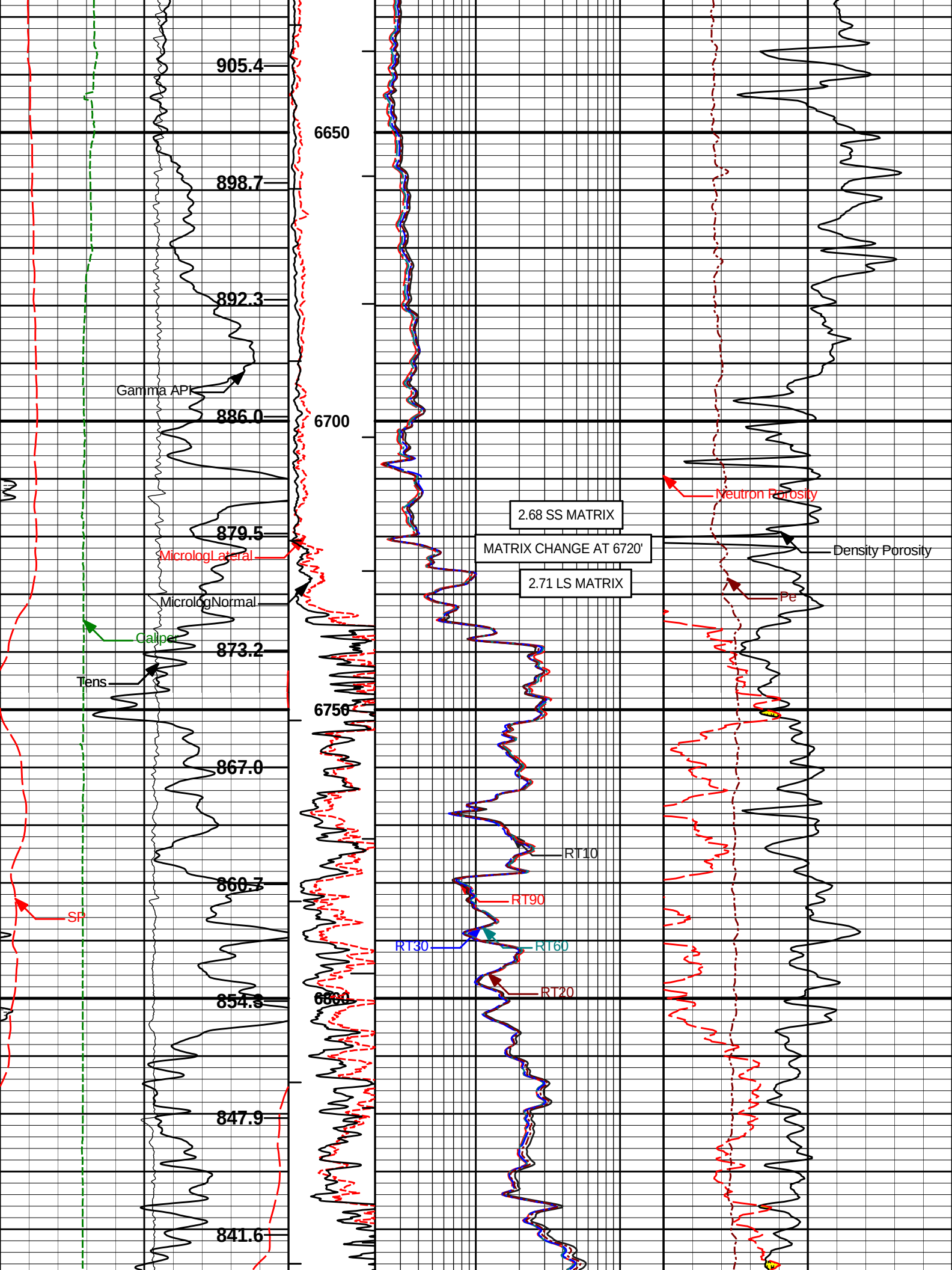
Neutron Porosity
Density Porosity
Pe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847.9
841.6
2.68 SS MATRIX
MATRIX CHANGE AT 6720'
2.71 LS MATRIX
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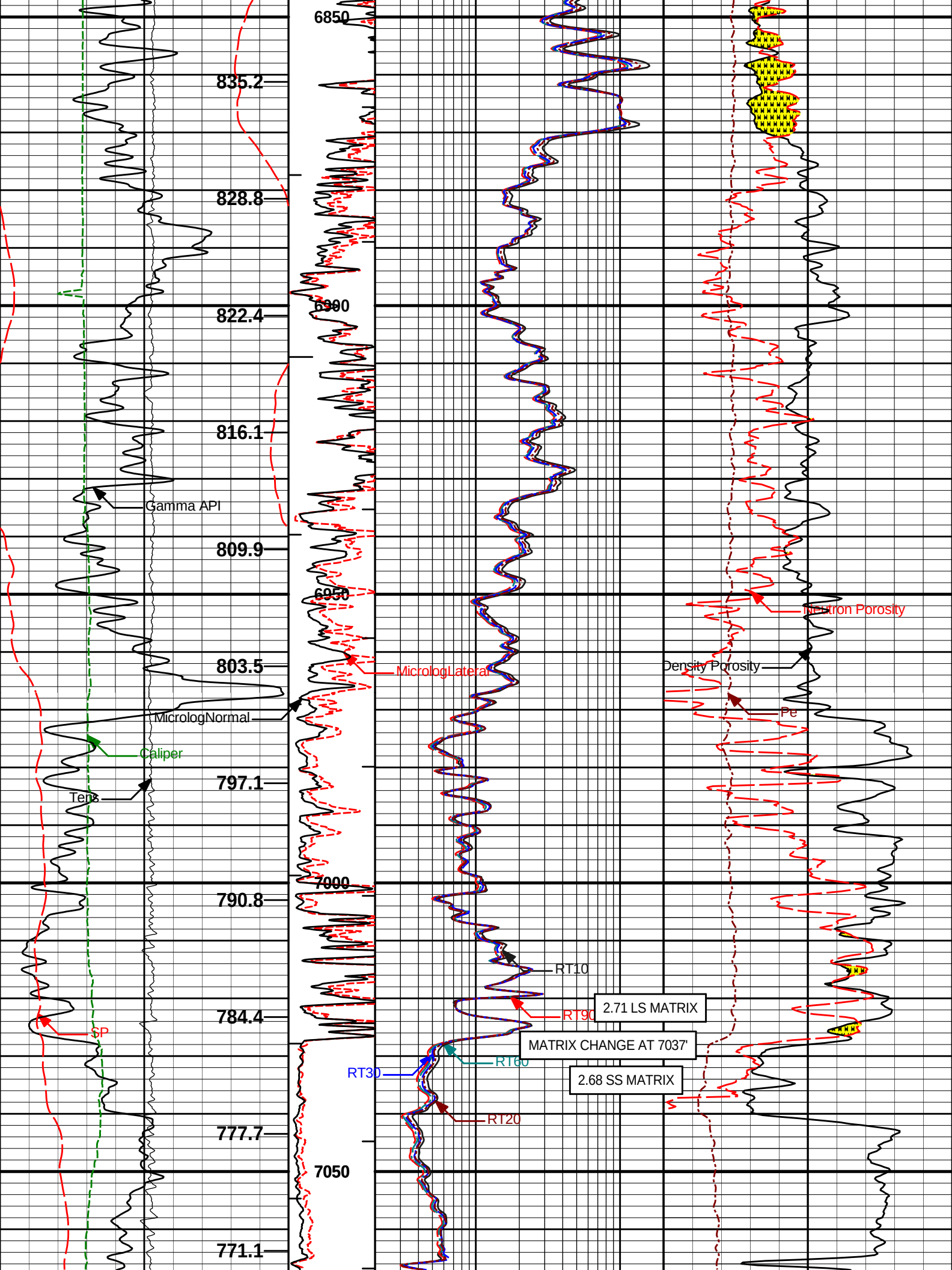
RT60
RT20
Neutron Porosity
Density Porosity
Pe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Tens
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SP
MATRIX CHANGE AT 7037'
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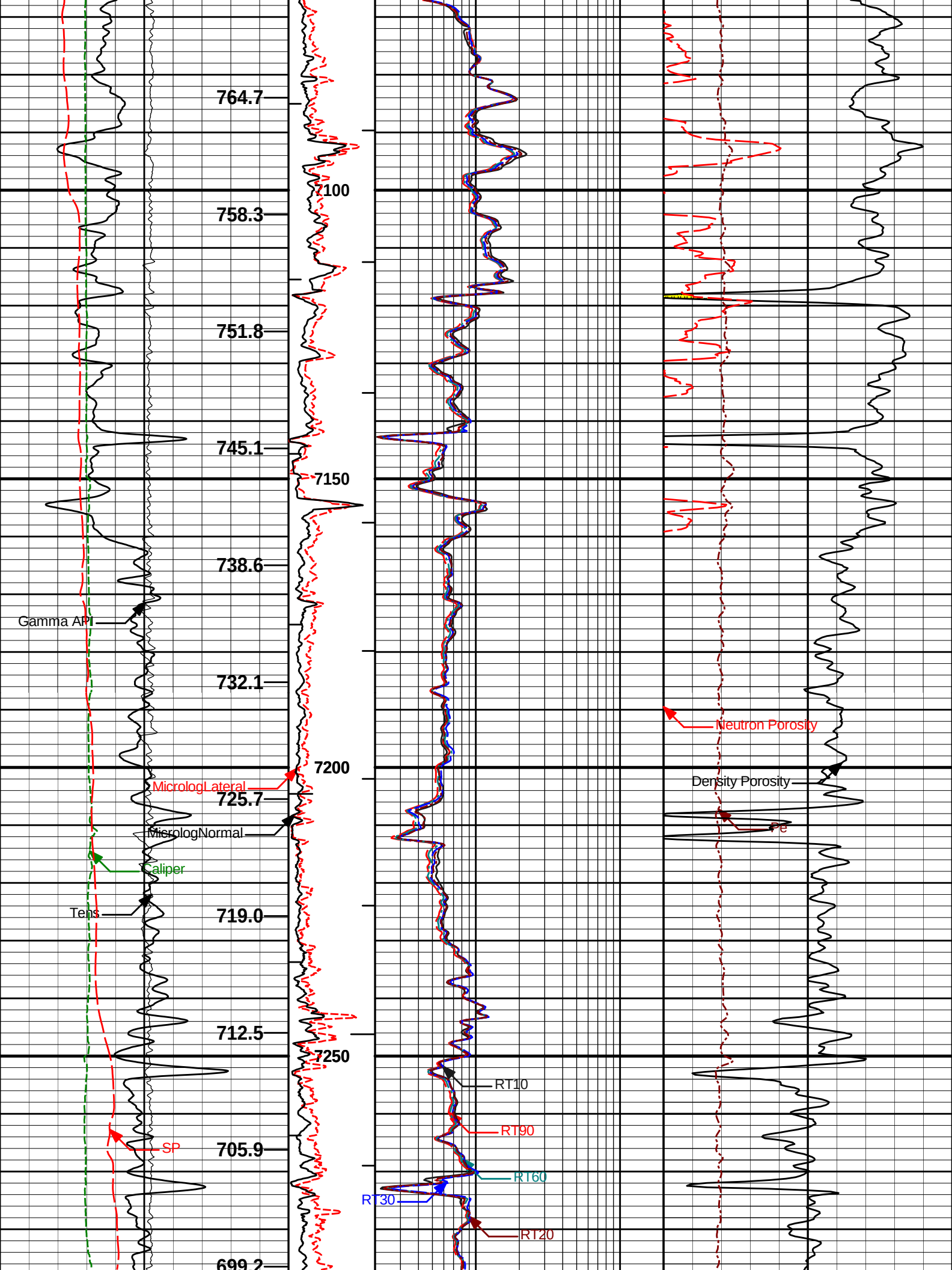
Density Porosity
Pe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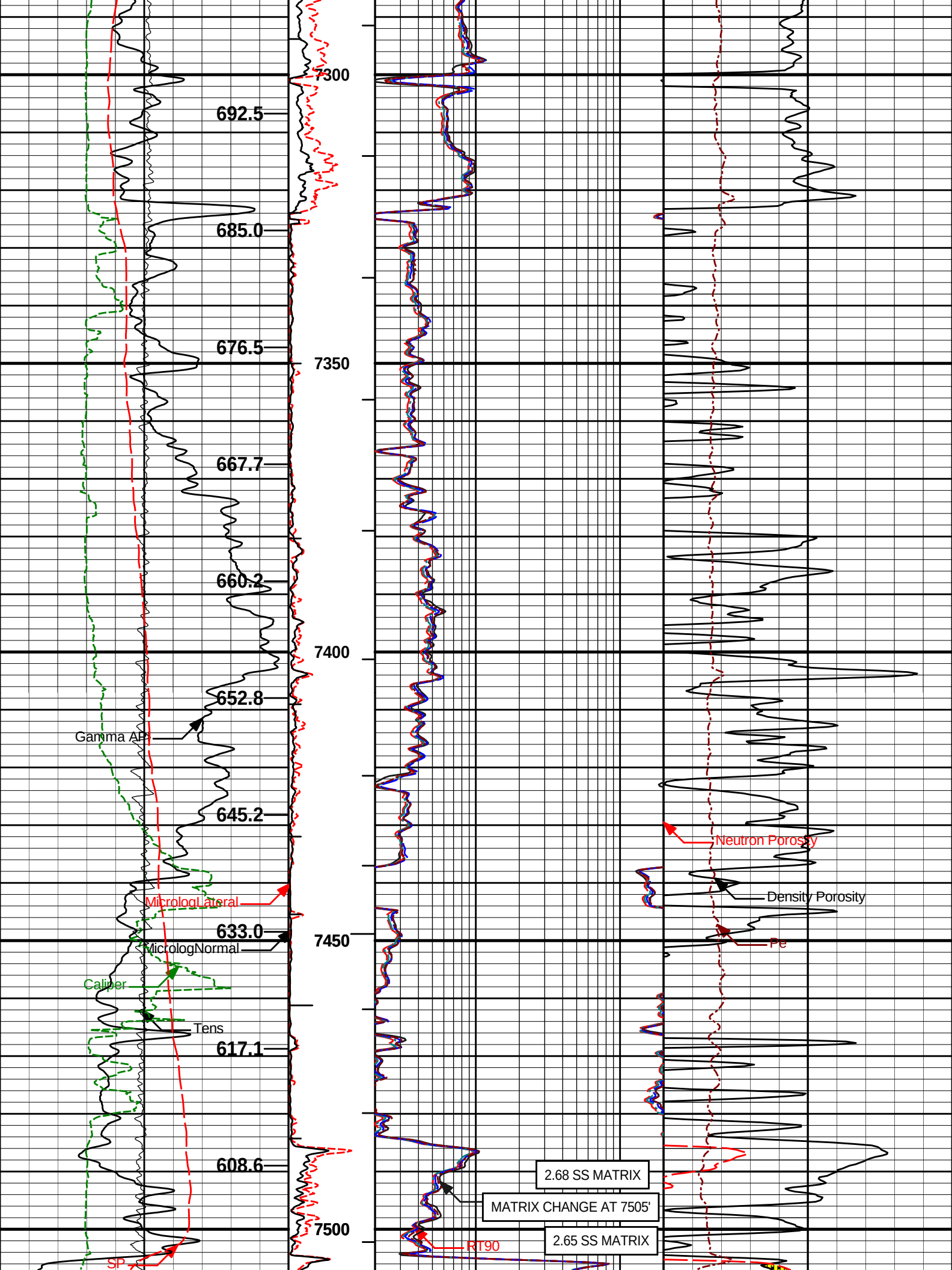
Neutron Porosity
Density Porosity
Pe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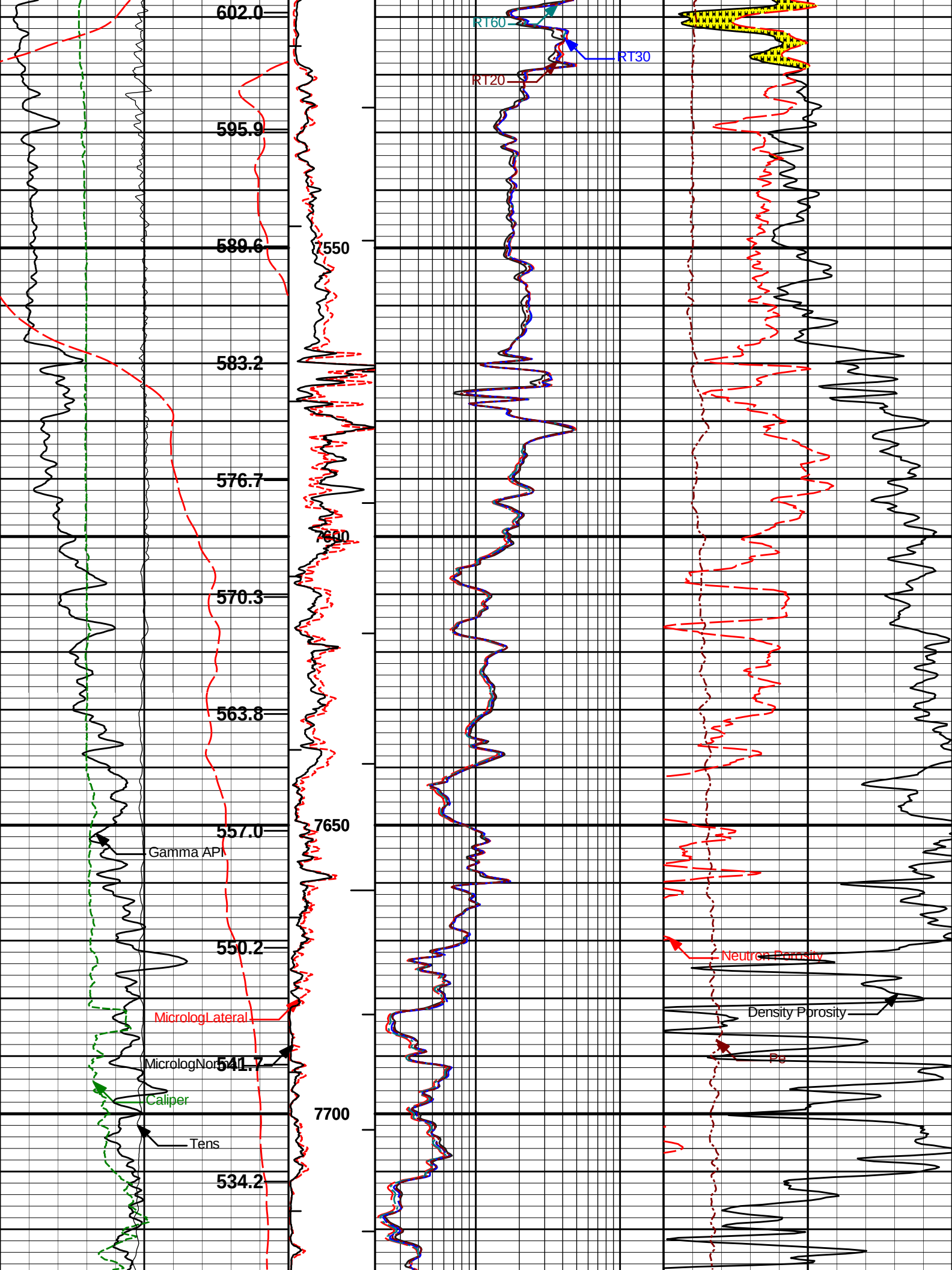
MATRIX CHANGE AT 7505'
2.65 SS MATRIX
Neutron Porosity
Density Porosity
Pe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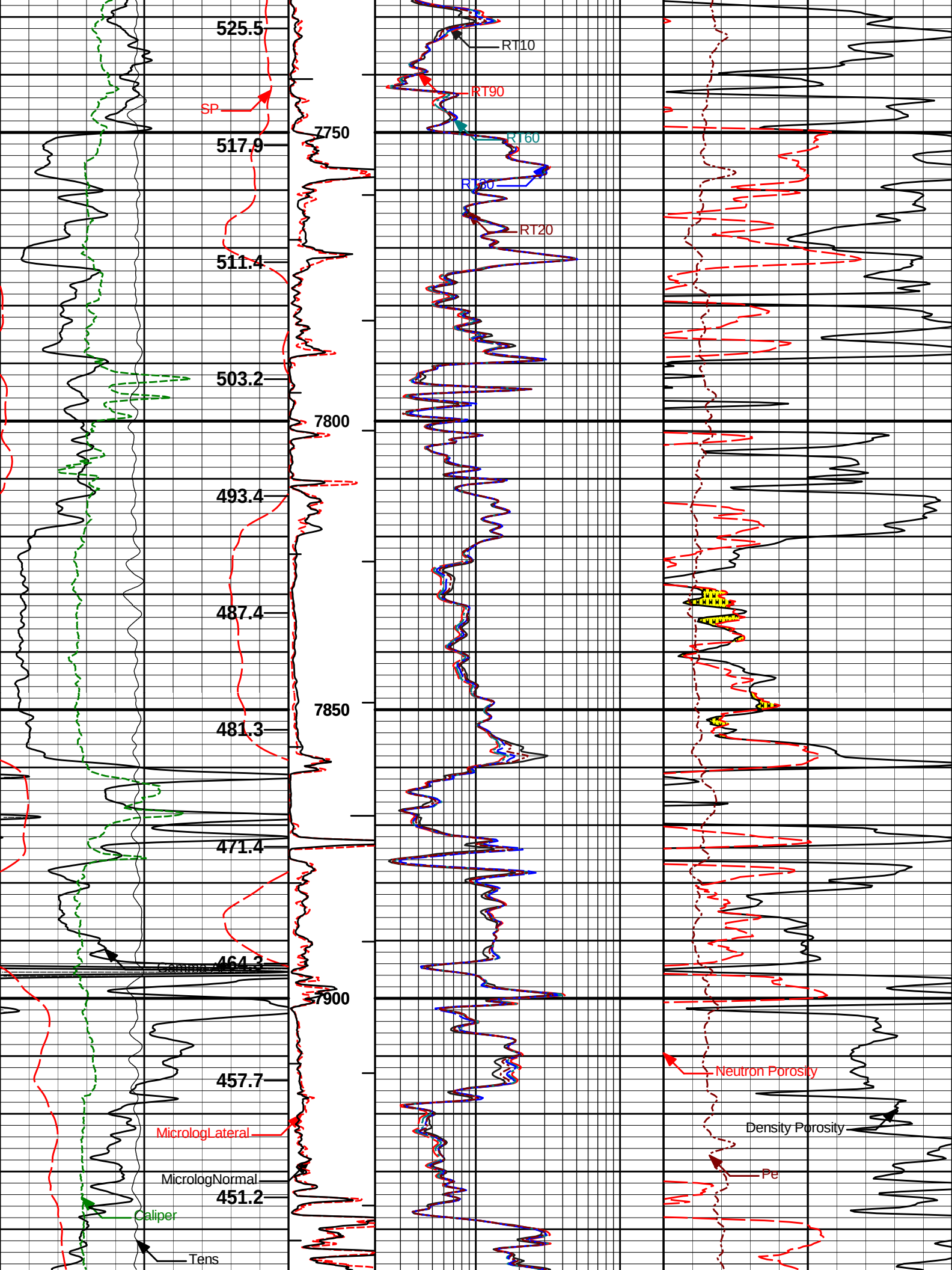
Caliper
Tens
Neutron Porosity
Density Porosity
Pe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RT10
RT90
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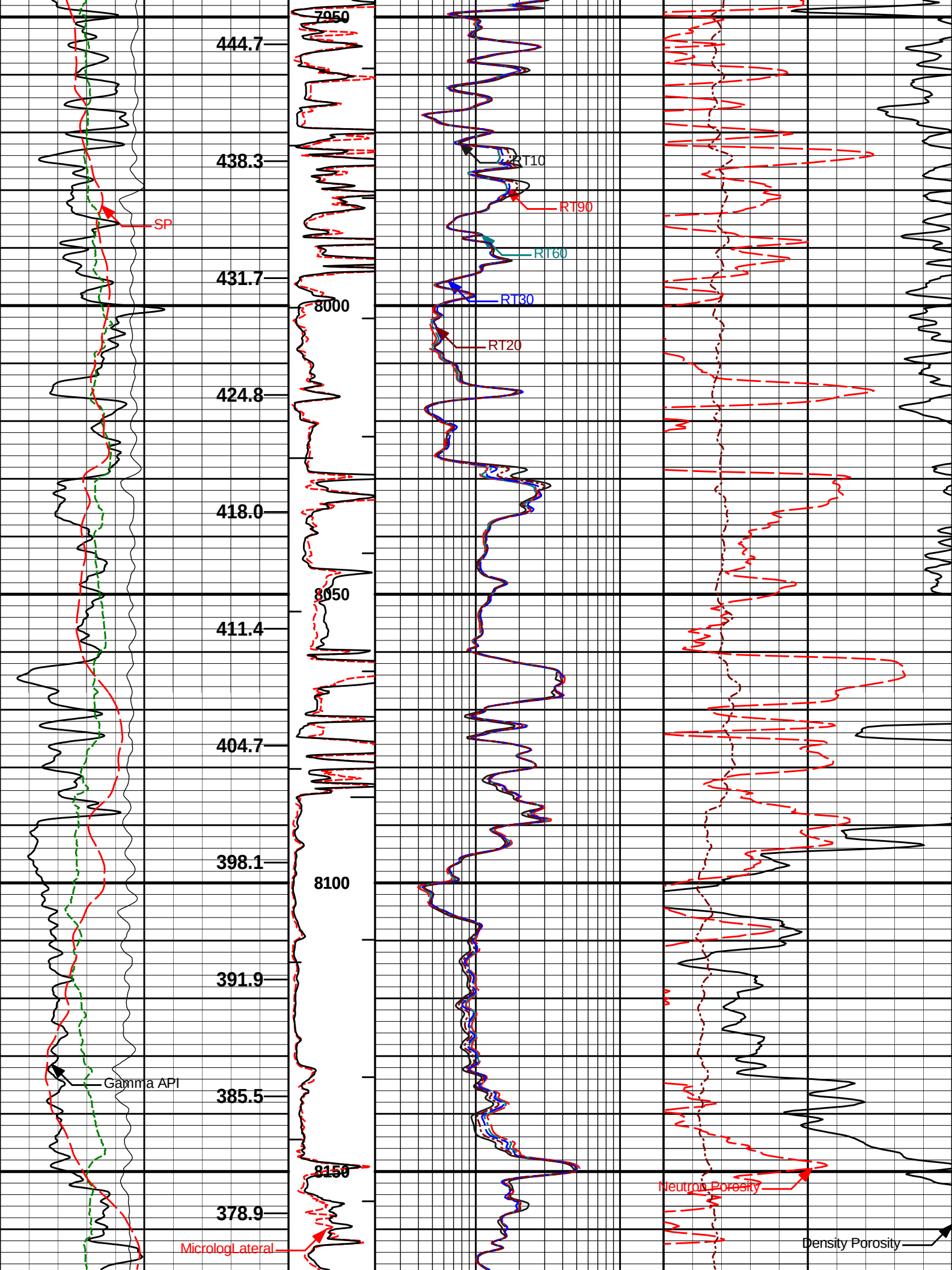
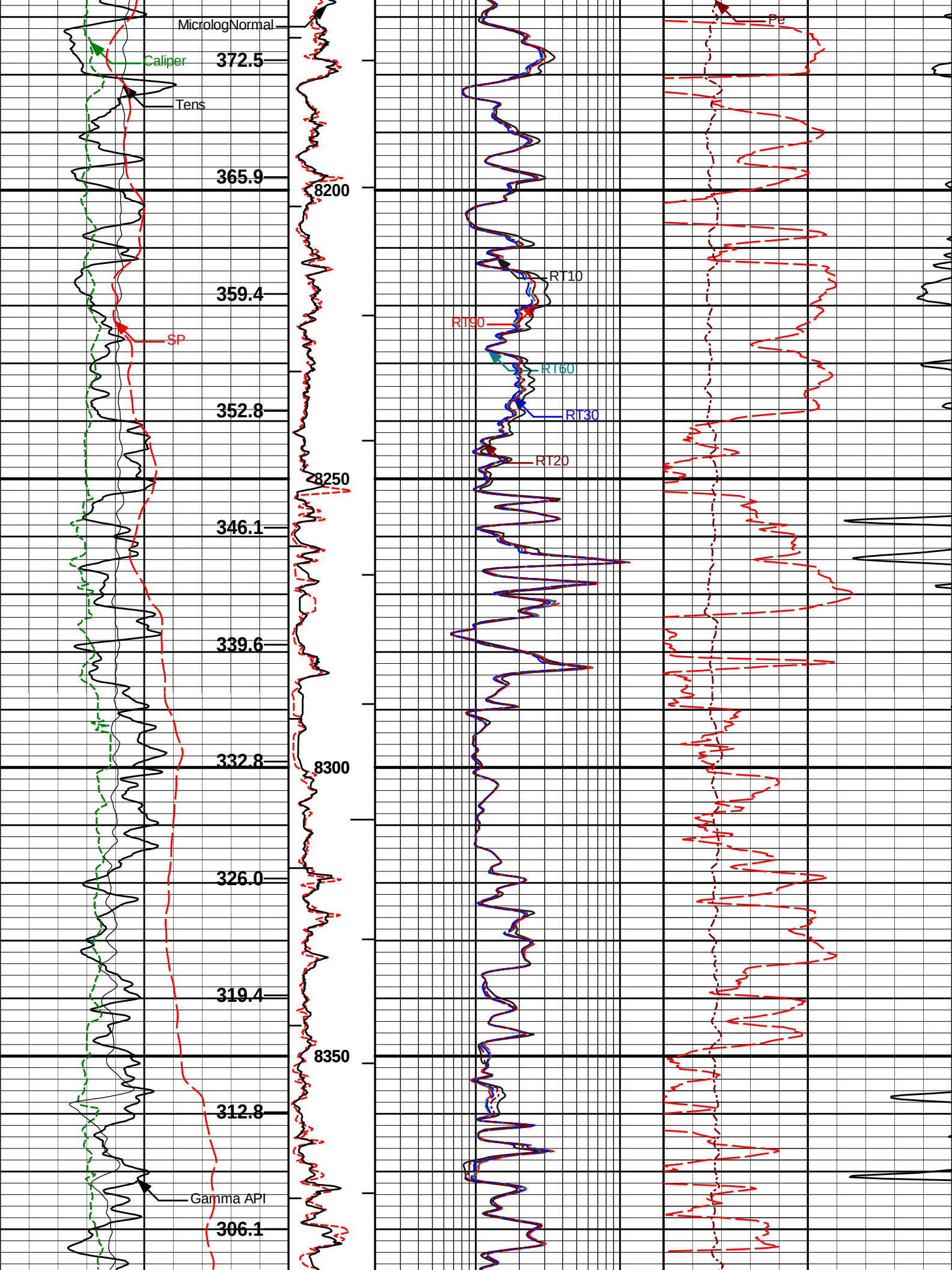
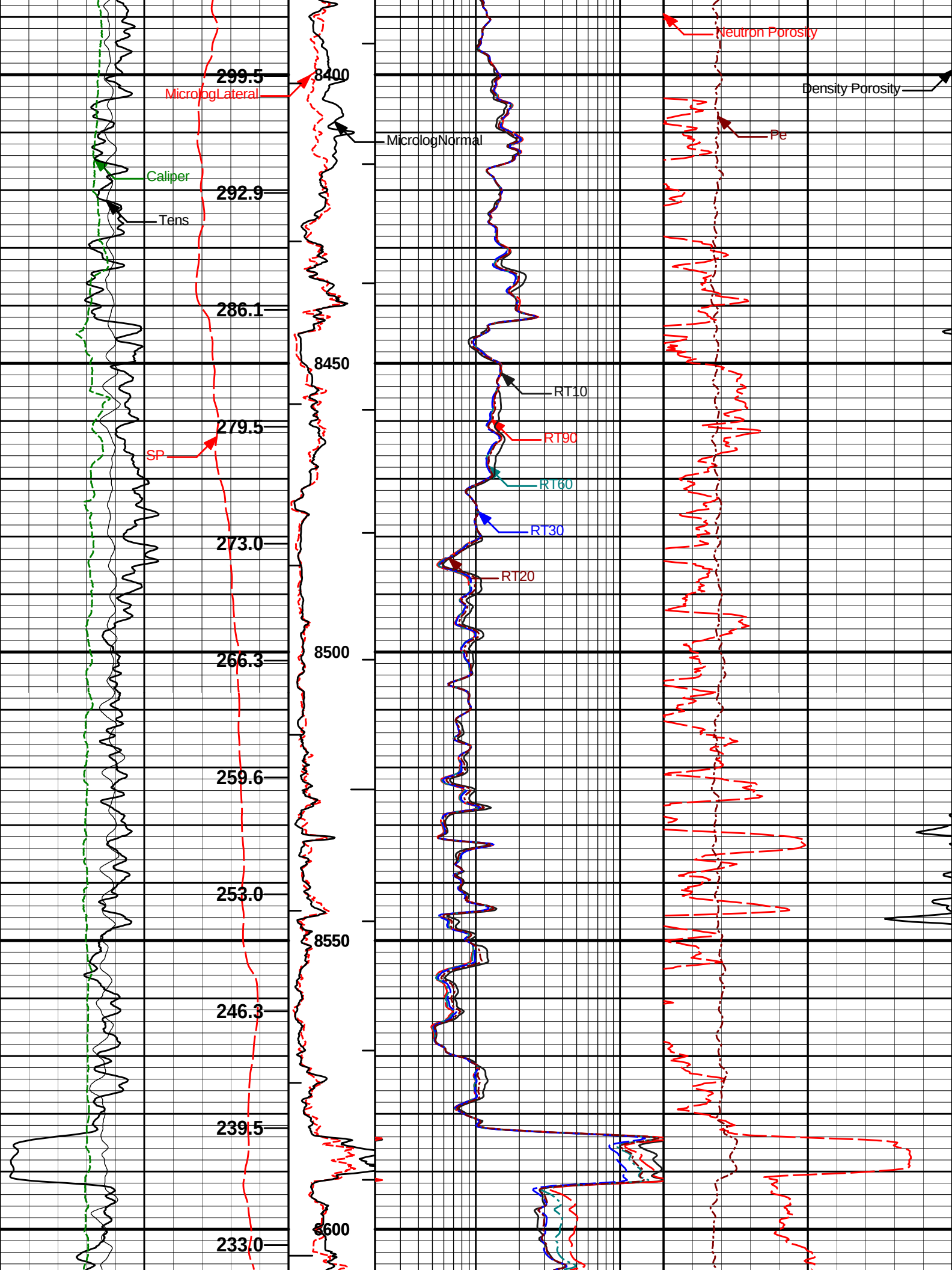
Pe
Caliper
Tens


7950
444.7
438.3
SP
431.7
8000
424.8
418.0
8050
411.4
404.7
398.1
8100
391.9
Gamma API
385.5
8150
378.9
MicrologLateral
RT10
RT90
RT60
RT30
RT20
Neutron Porosity
Density Porosity


MicrologNormal
Caliper
Tens
SP
Gamma API
372.5
365.9
359.4
352.8
346.1
339.6
332.8
326.0
319.4
312.8
306.1
8200
8250
8300
8350
RT10
RT90
RT60
RT30
RT20
Pe


Neutron Porosity
Density Porosity
Pe
MicrologLateral
MicrologNormal
Caliper
Tens
SP
RT10
RT90
RT60
RT30
RT20
299.5
292.9
286.1
279.5
273.0
266.3
259.6
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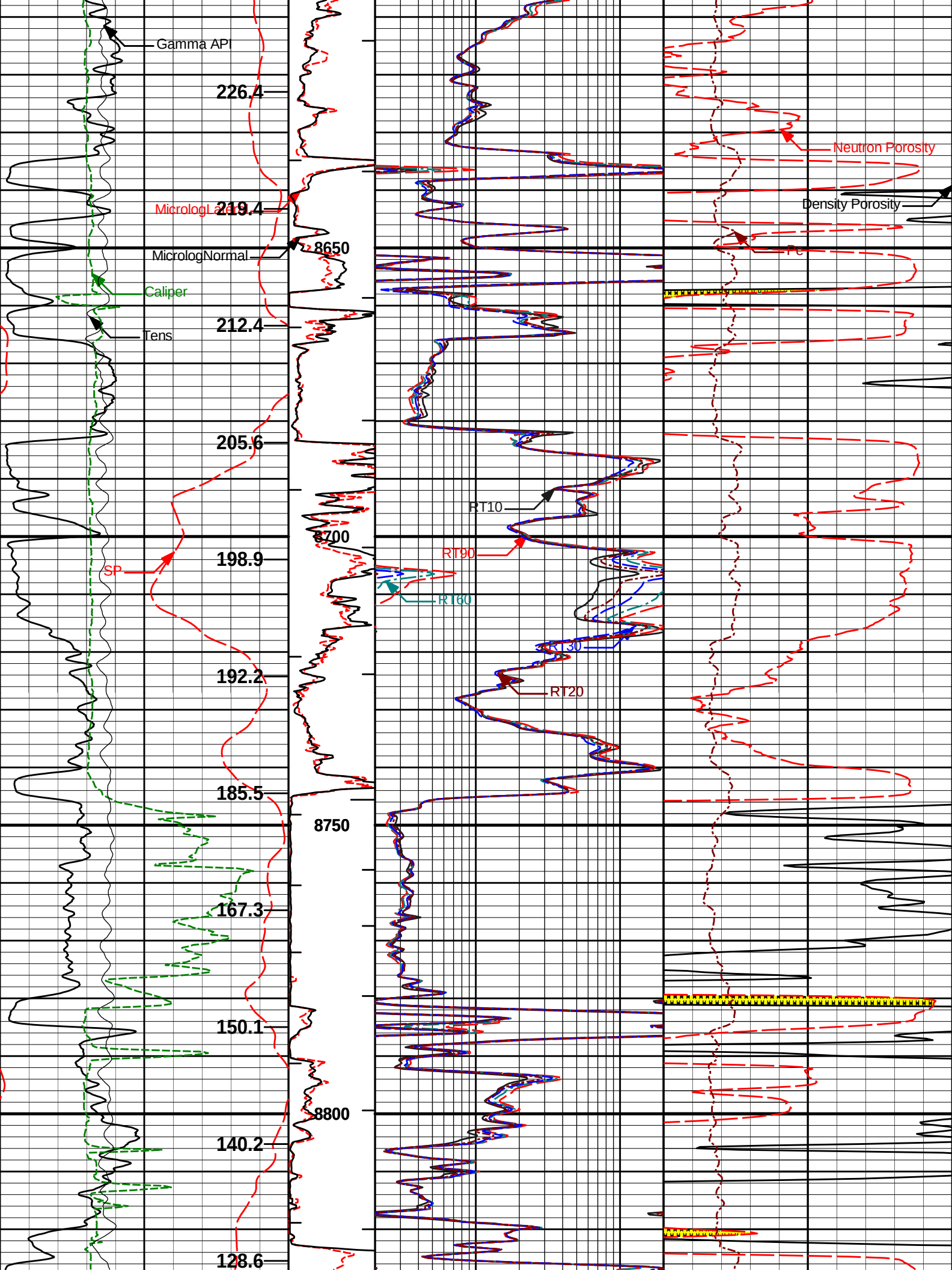
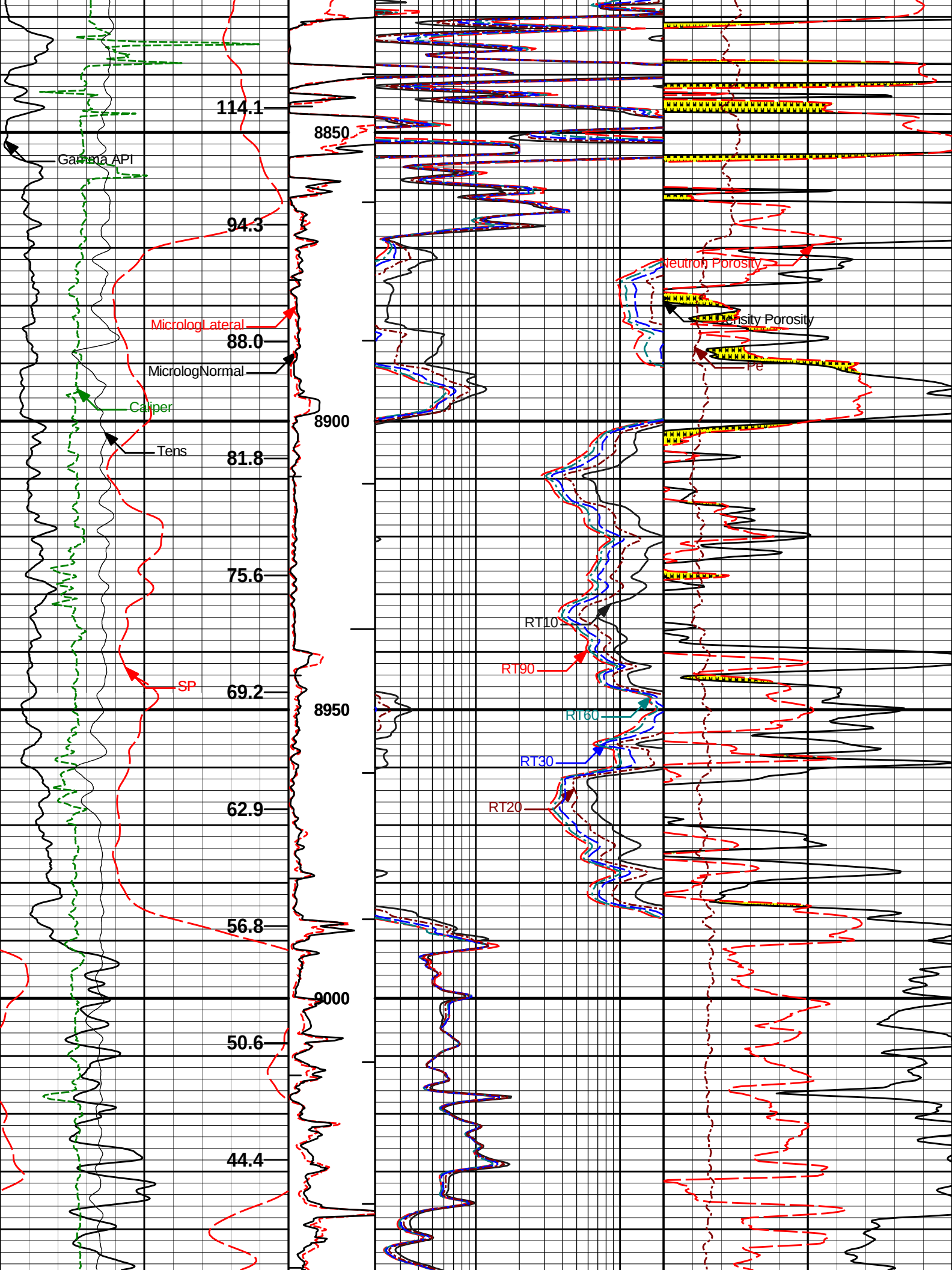
246.3
239.5
233.0
8400
8450
8500
8550
8600


Gamma API
226.4
MicrologLateral
219.4
8650
MicrologNormal
Caliper
Tens
212.4
205.6
8700
198.9
SP
RT90
RT60
RT30
192.2
RT20
185.5
8750
167.3
150.1
8800
140.2
128.6
RT10
Neutron Porosity
Density Porosity
Pe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94.3
MicrologLateral
88.0
MicrologNormal
Caliper
Tens
81.8
75.6
SP
69.2
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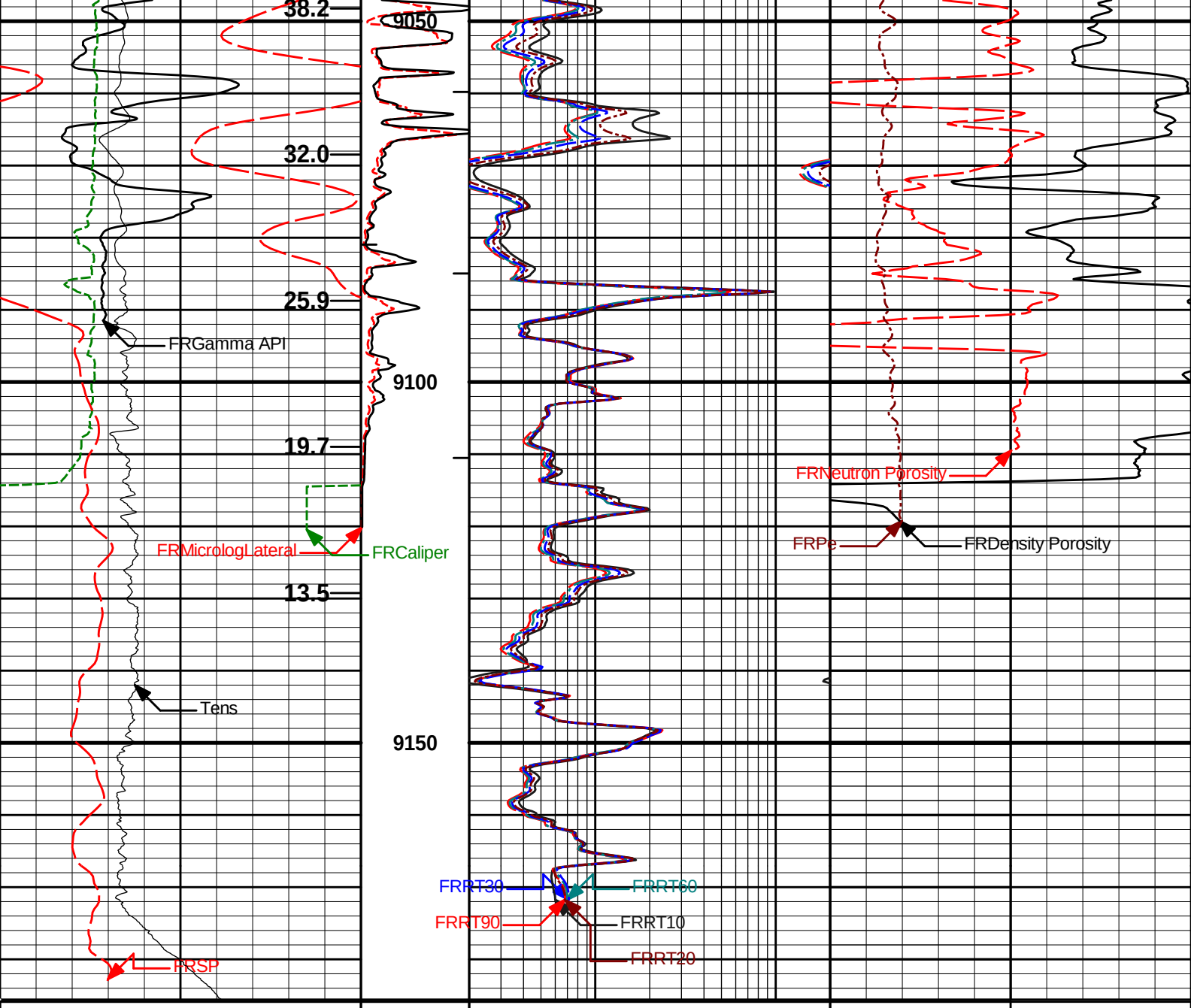
56.8
50.6
44.4
8850
8900
8950
9000
Neutron Porosity
Density Porosity
Pe
RT10
RT90
RT60
RT30
RT20



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

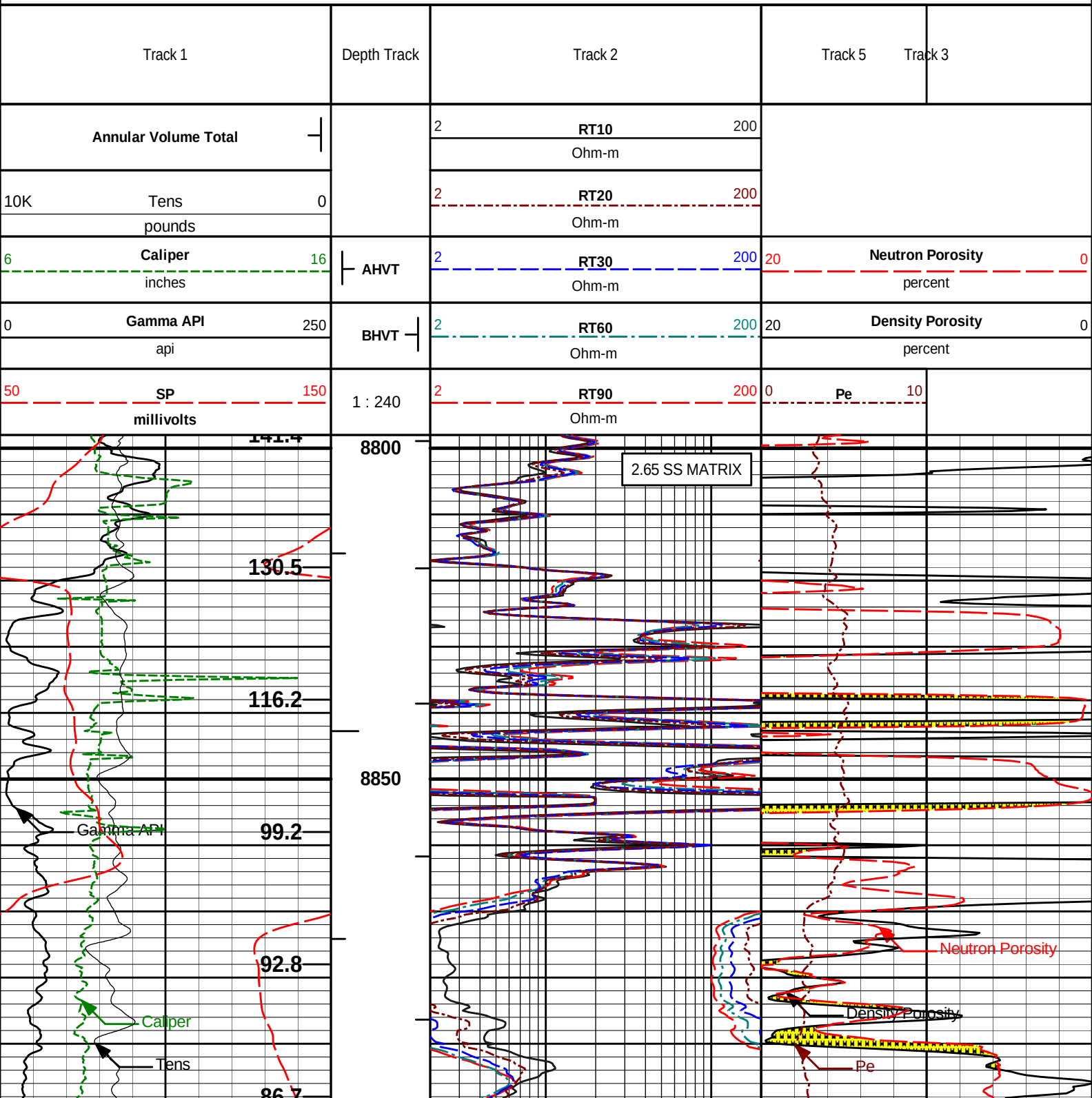
Plot Time: 05-Jul-10 06:47:03
Plot Range: 5998 ft to 9185.58 ft
Data: SHABLE_AB11_02\Well Based\MAIN*
Plot File: \\COMP\NIO_COD_J_LYON

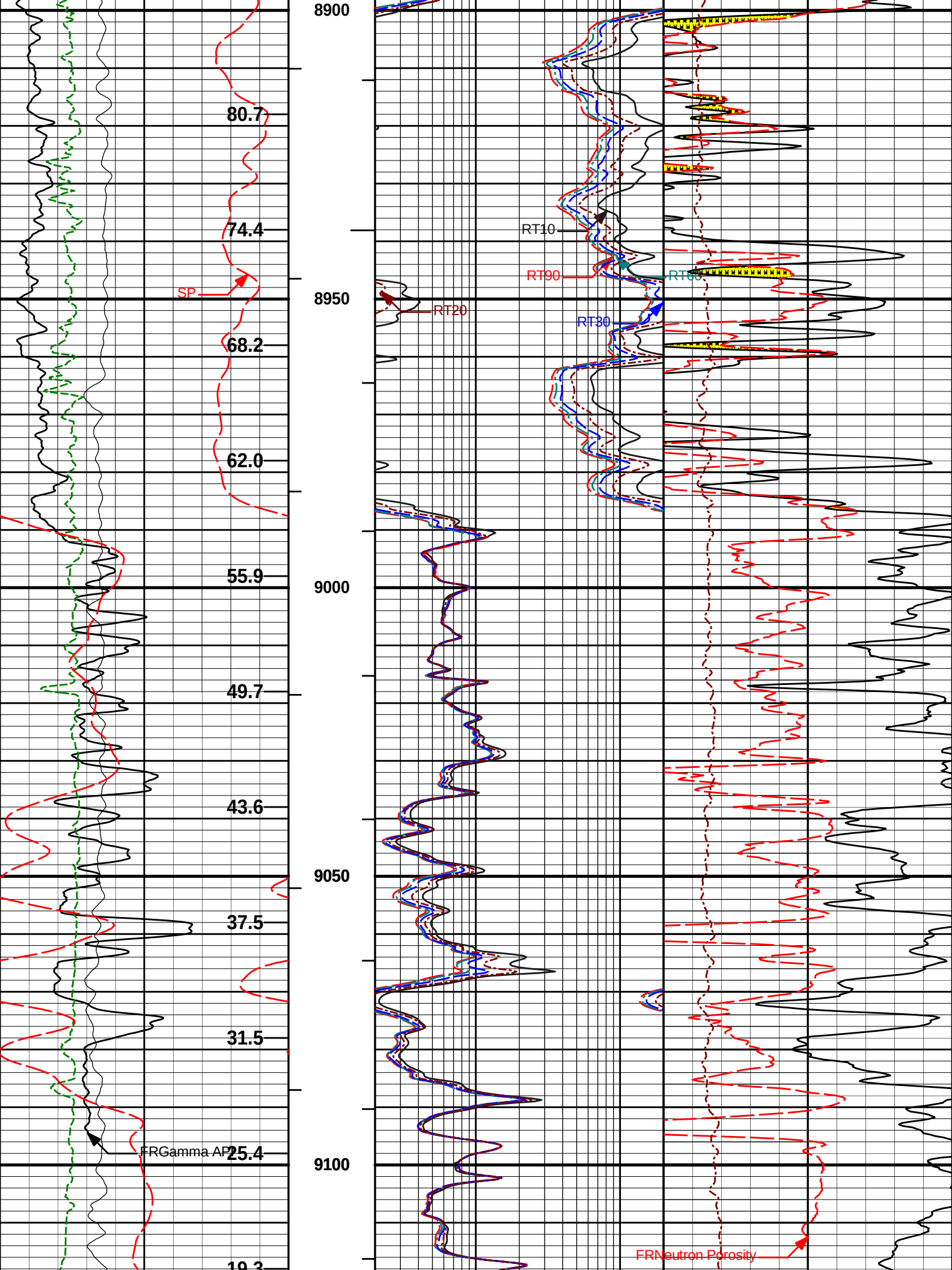
MAIN PASS 5" = 100'

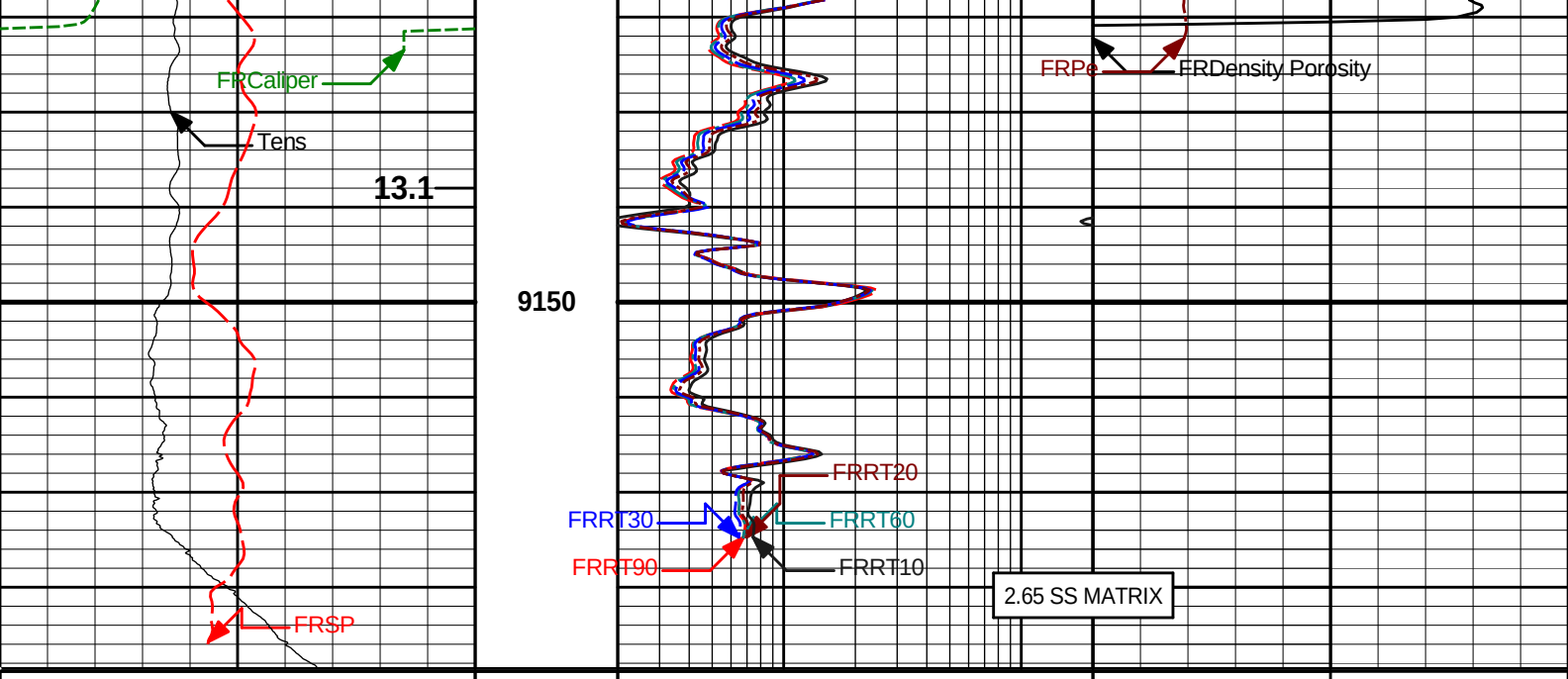
HALLIBURTON

Plot Time: 05-Jul-10 06:47:04
Plot Range: 8798 ft to 9188.58 ft
Data: SHABLE_AB11_02\Well Based\REPEAT*
Plot File: \\COMP\REPEAT

REPEAT PASS 5" = 100'




8900
80.7
74.4
SP
8950
68.2
62.0
55.9
9000
49.7
43.6
9050
37.5
31.5
FRGamma API
25.4
9100
19.3
RT10
RT90
RT60
RT20
RT30
FRNeutron Porosity



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

HALLIBURTON

Plot Time: 05-Jul-10 06:47:07
Plot Range: 8798 ft to 9188.58 ft
Data: SHABLE_AB11_02\Well Based\REPEAT*
Plot File: \\COMP\REPEAT

REPEAT PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11277436**	**Reference Calibration Date:**	**21-Jun-10 11:41:00**
Engineer:	**C. BLUE**	**Calibration Date:**	**23-Jun-10 16:51:35**
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	69.8	73.2	api
Background + Calibrator	289.1	303.2	api

Background + Calibrator	289.1	308.2	api
Calibrator	233.4	230.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11277436 **Reference Calibration Date:** 23-Jun-10 16:51:35

Engineer: F. LODER **Calibration Date:** 03-Jul-10 12:39:40

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	73.2	74.5	api
Background + Calibrator	303.2	308.7	api
Calibrator	230.0	234.2	api

Shop	Field	Difference	Tolerance
230.0	234.2	-4.2	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 10846349 **Reference Calibration Date:** 16-Mar-10 21:17:38

Engineer: F. LODER **Calibration Date:** 03-Jul-10 13:00:21

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 #	23.3	23.3	Channel #
583 KEV Peak Channel #	52.4	52.1	Channel #
2614 KEV Peak Channel #	215.7	213.7	Channel #
Calibrate Temperature	73.6	87.0	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	1634.6	CPS	374.3	322.8	API
Background	311.9	CPS	113.0	61.6	API

Gamma Ray Gain: 0.99

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 10846349 **Reference Calibration Date:** 03-Jul-10 13:00:21

Engineer: F. LODER **Calibration Date:** 03-Jul-10 13:11:41

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 #	23.3	23.3	Channel #
583 KEV Peak Channel #	52.1	52.0	Channel #
2614 KEV Peak Channel #	213.7	214.3	Channel #
Calibrate Temperature	87.0	89.3	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	1646.8	CPS	322.8	322.7	API
Background	313.9	CPS	61.6	61.5	API

Gamma Ray Gain: 0.99
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11301132 **Reference Calibration Date:** 22-Jun-10 16:34:25
Engineer: C. BLUE **Calibration Date:** 22-Jun-10 16:50:38
Software Version: WL INSITE R3.0.4 (Build 6) **Calibration Version:** 1

Logging Source S/N: DSN-434
Tank Serial Number: BRIGHTONWATERTANK
Reference value assigned to Tank: 55.000
Snow Block S/N: BRIGHTON
Calibration Tank Water Temperature: 70 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.013	1.018	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):	0.2283	0.2296	0.0012	+/- 0.0020
Calibrated Ratio:	10.31	10.35	0.041	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0866	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:**	**22-Jun-10 16:50:38**
Engineer:	**F. LODER**	**Calibration Date:**	**03-Jul-10 14:11:22**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Logging Source S/N: DSN-434

Snow Block S/N: BRIGHTON

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0866	0.0748	-0.0118	+/- 0.0150

PASS/FAIL SUMMARY

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**21-Jun-10 12:41:39**
Engineer:	**W. MATSON**	**Calibration Date:**	**21-Jun-10 13:03:40**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Logging Source S/N: 2770GW

Aluminum Block S/N: BRIGHTON_AL Density: 2.600g/cc Pe: 3.100

Magnesium Block S/N: BRIGHTON_MG Density: 1.680g/cc Pe: 2.594

DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0525	1.0646	0.90 - 1.10
Near Dens Gain	1.0226	1.0263	0.90 - 1.10
Near Peak Gain	1.0023	1.0385	0.90 - 1.10
Near Lith Gain	0.9839	1.0161	0.90 - 1.10
Far Bar Gain	1.0208	1.0229	0.90 - 1.10
Far Dens Gain	1.0054	1.0076	0.90 - 1.10
Far Peak Gain	0.9955	1.0002	0.90 - 1.10
Far Lith Gain	0.9685	0.9722	0.90 - 1.10
Near Bar Offset	-0.2341	-0.3448	NONE
Near Dens Offset	0.0237	-0.0119	NONE
Near Peak Offset	0.1850	-0.1195	NONE
Near Lith Offset	0.3160	0.0440	NONE
Far Bar Offset	0.0168	-0.0002	NONE
Far Dens Offset	0.1355	0.1163	NONE
Far Peak Offset	0.1893	0.1507	NONE
Far Lith Offset	0.3258	0.2987	NONE
Near Bar Background	954.88	956.86	700 - 1450
Near Dens Background	316.47	316.67	230 - 480
Near Peak Background	136.75	136.92	100 - 210
Near Lith Background	167.43	166.23	125 - 260
Far Bar Background	502.29	502.62	450 - 900
Far Dens Background	201.56	201.83	175 - 345
Far Peak Background	78.75	78.15	70 - 140
Far Lith Background	82.19	81.94	75 - 145

CALIBRATION BLOCK SUMMARY

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

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0001	+/- 0.0110	0.0006	+/- 0.0140
Magnesium Block	-0.0000	+/- 0.0110	0.0014	+/- 0.0140
Aluminum Block	0.0001	+/- 0.0110	0.0006	+/- 0.0140
Resolution	8.79	6.00 - 11.50	9.85	6.00 - 11.50
Internal Verifier(B+D+P+L)	1577	1200 - 2700	865	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 21-Jun-10 13:03:40

Engineer: F. LODER **Calibration Date:** 03-Jul-10 13:25:35

Software Version: WL INSITE R3.0.4 (Build 6) **Calibration Version:** 1

Pad Temperature: 84.6 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1576.682	1583.464	6.782	15.975
Far (B+D+P+L) cps	864.539	866.934	2.395	16.089
Near Resolution	8.79	8.76	-0.030	0.50
Far Resolution	9.85	9.82	-0.030	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:** 11-Jun-10 13:14:03

Engineer: W. MATSON **Calibration Date:** 27-Jun-10 00:43:21

Software Version: WL INSITE R3.0.4 (Build 6) **Calibration Version:** 1

CALIBRATION COEFFICIENT SUMMARY

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		
	Measured	Calibrated	Measured	Calibrated	Units
Tool Zero	-0.07	-0.12	-0.00	-0.00	ohmm
Calibration Point #1	0.05	0.00	0.00	0.00	ohmm
Calibration Point #2	19.94	20.00	19.89	20.00	ohmm
Internal Reference	19.83	19.89	19.88	19.99	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-4.77	0.83	V
Calibration Point #1	26.30	1.92	V
Calibration Point #2	5216.42	6802.09	V
Internal Reference	5187.76	6798.08	V

MICRO LOG FIELD CHECK

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 27-Jun-10 00:43:21

Engineer: W. MATSON **Calibration Date:** 27-Jun-10 00:44:02

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	-0.12	-0.12	-0.00	-0.00	ohmm
Internal Reference	19.89	19.90	19.99	20.00	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerence
Microlog Normal	19.89	19.90	-0.01	+/- 0.80
Microlog Lateral	19.99	20.00	-0.01	+/- 0.80

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 23-Jun-10 17:14:01

Engineer: C. BLUE **Calibration Date:** 23-Jun-10 17:20:02

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	-2250.17	-2164.34	-7000.00 - -1000.00
Pad Gain	0.0003978	0.0003857	0.000200 - 0.000600
Arm Offset	-299.57	-414.97	-5000.00 - 3000.00
Arm Gain	0.0004485	0.0004434	0.000300 - 0.000700
Arm Power	-0.000000994	-0.000000433	-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)	2.03	2.00	-0.03	+/- 0.20
Medium Ring (in)	3.83	3.75	-0.08	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.54	6.50	-0.04	+/- 0.20
Medium Ring (in)	8.30	8.25	-0.05	+/- 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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	**ACRt - 90199007-E6758-S4352**	**Reference Calibration Date:**	**14-Apr-10 12:04:15**
Engineer:	**W. MATSON**	**Calibration Date:**	**04-Jun-10 17:35:57**
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	1.0024	1.05	0.95	1.0046	1.05	0.95	1.0010	1.05
A2 (50")	0.95	1.0183	1.05	0.95	1.0217	1.05	0.95	1.0188	1.05
A3 (29")	0.95	0.9951	1.05	0.95	0.9963	1.05	0.95	0.9928	1.05
A4 (17")	0.95	1.0011	1.05	0.95	1.0007	1.05	0.95	0.9985	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9975	1.05	0.95	0.9952	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9826	1.05	0.95	0.9790	1.05

TYPICAL SONDE OFFSET RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-1.190	2	-6	-4.087	-2	-8	-4.712	-2
A2 (50")	-7	-3.214	-1	-6	-4.084	-2	-7	-4.441	-2
A3 (29")	-27	-13.712	-9	-9	-4.012	-3	-7	-3.100	-1
A4 (17")	-180	-98.916	-60	-45	-32.247	-15	-39	-25.618	-13
A5 (10")	N/A	N/A	N/A	-150	-87.784	-50	-80	-43.455	-10
A6 (6")	N/A	N/A	N/A	175	295.461	525	90	150.962	270

TRANSMITTER CURRENT GAIN

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

R-MUD VERIFICATION

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

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11277436						
Gamma Ray Calibrator	230.0	234.2	----------	-4.2	+/- 9.00	api
CSNG-10846349						
60 KEV Peak Channel #	48.0	48.0	----------	0.0	----------	Channel #
239 KEV Peak Channel #	23.3	23.3	----------	0.0	----------	Channel #
583 KEV Peak Channel #	52.1	52.0	----------	0.1	----------	Channel #
2614 KEV Peak Channel #	213.7	214.3	----------	-0.6	----------	Channel #
DSNT-11301132						
Snow-Block Porosity	0.0866	0.0748	----------	0.0118	+/- 0.0150	decp
SDLT-I132M275						
Near(B+D+P+L)	1576.682	1583.464	----------	-6.782	+/-15.975	cps
Far(B+D+P+L)	864.539	866.934	----------	-2.395	+/-16.089	cps

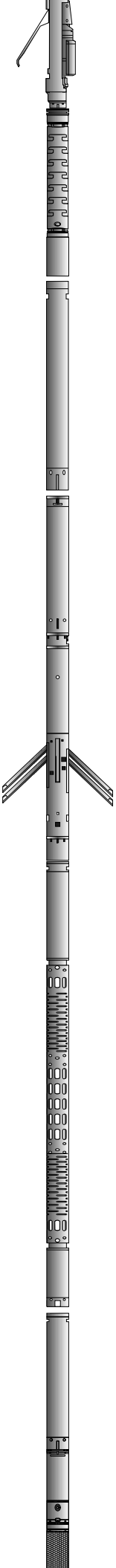
MicroLog Normal	19.89	19.90	----------	-0.01	+/-0.80	ohmm
MicroLog Lateral	19.99	20.00	----------	-0.01	+/-0.80	ohmm
Pad Extension	3.75	----------	----------	0.00	+/-0.20	in
Ring Diameter	8.25	----------	----------	0.00	+/-0.20	in
ACRt-90199007-E6758-S4352						
Mud Cell	1.009	----------	----------	0.000	----------	ohm-m

Data: SHABLE_AB11_02\0001 NOBLE_BLACK_BSAT\IDLE **Date: 05-Jul-10 05:06:22**

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-10846349 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-11294350
330.00 lbs

Ø 3.625 in

12.83 ft

ICT Caliper @ 38.39 ft

35.60 ft

BSAT-1105781
300.00 lbs

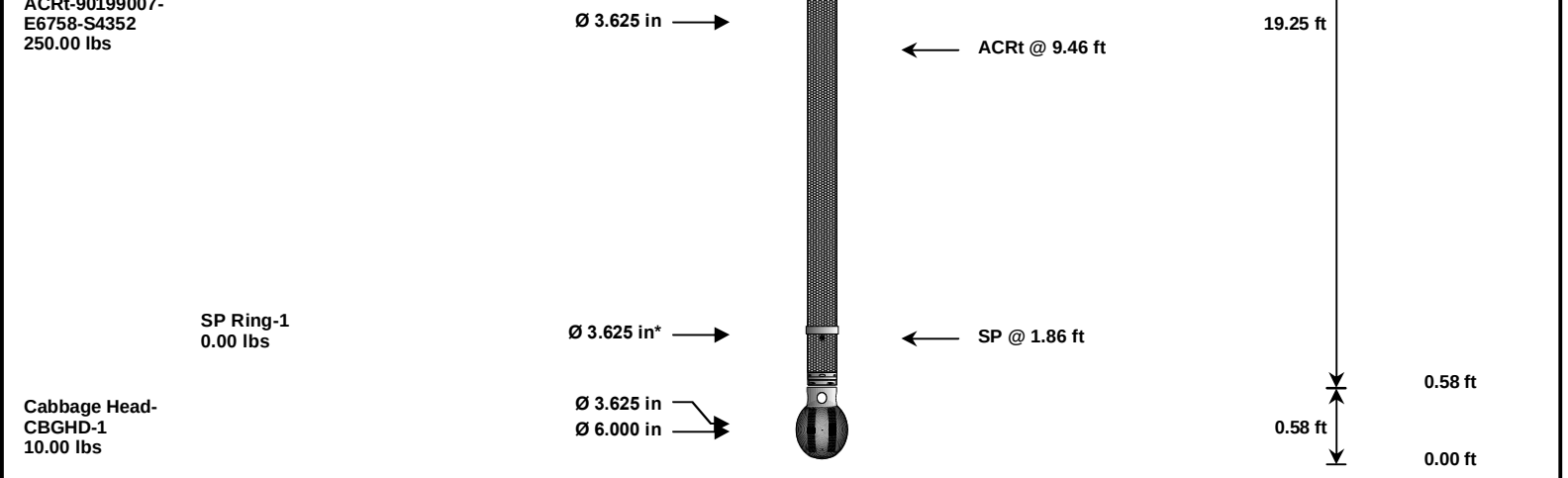
Ø 3.625 in

15.77 ft

Sonic Receivers @ 27.09 ft

19.83 ft

Mud Resistivity @ 13.44 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		99.17	300.00
GTET	Gamma Telemetry Tool	11277436	165.00	8.52		90.65	60.00
CSNG	Compensated Spectral Natural Gamma	10846349	114.00	8.17		82.49	15.00
DSNT	Dual Spaced Neutron	11301132	174.00	9.69		72.80	60.00
DCNT	DSN Decentralizer	10860047	6.60	5.13	*	76.13	300.00
SDLT	Spectral Density Tool	I132M275	360.00	10.81		61.99	60.00
FLEX	Flex Joint - Pressure Compensated	FLEX-BLACK	140.00	5.97		56.02	300.00
IDT	Insite Directional Tool	11277453	150.00	7.58		48.43	30.00
ICT	Six Independent Arm Caliper	11294350	330.00	12.83		35.60	60.00
BCAS	Borehole Sonic Array Tool	1105781	300.00	15.77		19.83	60.00
ACRt	Array Compensated True Resistivity	90199007-E6758-S4352	250.00	19.25		0.58	300.00
SP	SP Ring	1	0.00	0.25	*	1.86	300.00
CBHD	Cabbage Head	CBGHD-1	10.00	0.58		0.00	300.00
Total			**2,134.60**	**105.42**			

* Not included in Total Length and Length Accumulation.

Data: SHABLE_AB11_02\0001 NOBLE_BLACK_BSAT\IDLE **Date: 03-Jul-10 18:43:54**

COMPANY	**NOBLE ENERGY**		
WELL	**SHABLE USX AB11-02**		
FIELD	**WATTENBERG**		
COUNTY	**WELD**	STATE	**CO**

HALLIBURTON

SPECTRAL DENSITY
DUAL SPACED NEUTRON
ARRAY COMPENSATED
TRUE RESISTIVITY
LOG