

**SPECTRAL DENSITY
DUAL SPACED NEUTRAON
ARRAY COMPENSATED
TRUE RESISTIVITY
MICROLOG**

Fold here

Service Ticket No.: 7361472										API Serial No.: 05-123-30483										PGM Version: WL INSITE R3.0.4 (Build 6)									
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE															RESISTIVITY SCALE CHANGES														
Date		Sample No.										Type Log		Depth		Scale Up Hole				Scale Down Hole									
Depth-Driller																													
Type Fluid in Hole																													
Density		Viscosity																											
Ph		Fluid Loss																											
Source of Sample												RESISTIVITY EQUIPMENT DATA																	
Rm @ Meas. Temp				@				@				Run No.		Tool Type & No.		Pad Type		Tool Pos.				Other							
Rmf @ Meas. Temp.				@				@				ONE		ACRT		N/A		1.5" STANDOFF				N/A							
Rmc @ Meas. Temp.				@				@						I962_S909															
Source Rmf		Rmc																											
Rm @ BHT				@				@																					
Rmf @ BHT				@				@																					
Rmc @ BHT				@				@																					
EQUIPMENT DATA																													
GAMMA					ACOUSTIC					DENSITY					NEUTRON														
Run No.		ONE			Run No.					Run No.		ONE			Run No.		ONE												
Serial No.		11048627			Serial No.					Serial No.		I04_P84			Serial No.		11055304												
Model No.		GTET			Model No.					Model No.		SDLT-I			Model No.		DSNT-I												
Diameter		3.625"			No. of Cent.					Diameter		4.75"			Diameter		3.625"												
Detector Model No.		T-102			Spacing					Log Type		GAM-GAM			Log Type		NEU-NEU												
Type		SCINT.								Source Type		CS 137			Source Type		AM 241BE												
Length		8"			LSA [Y/N]					Serial No.		5168GW			Serial No.		DSN-424												
Distance to Source		25.1'			FWDA [Y/N]					Strength		1.5 CI			Strength		15.0 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	7937	7576	15	0	250					20%	0	2.65	20%	0	SAND														
	7576	7162	15									2.68			SAND														

	7162	6914	15								2.68			SAND		
	7162	6914	15								2.71			LIME		
	6914	CSG	60								2.68			SAND		
DIRECTIONAL INFORMATION																
Maximum Deviation										@	KOP					@
Remarks: GTET, IDT, CSNG, DSNT, SDLT, ML, ICT, BSAT, AND ACRT WERE RUN IN COMBINATION. THIS IS THE FIRST RUN IN THE WELL.																
CHLORIDES REPORTED AT 300 PPM. LCM REPORTED AT ZERO.																
LAT: 40° 56' NORTH LONG: 104° 13' WEST																
FIELD AND POST JOB VERIFICATIONS NOT DONE PER CUSTOMER REQUEST.																
ANNULAR HOLE VOLUME CALCULATED FOR 5.5" CASING																
YOUR CREW: C. MARLOWE, K. KELLY																
THANK YOU FOR USING HALLIBURTON WIRELINE AND PERFORATING SERVICES, LIBERAL, KS. 620-624-8123																
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.																
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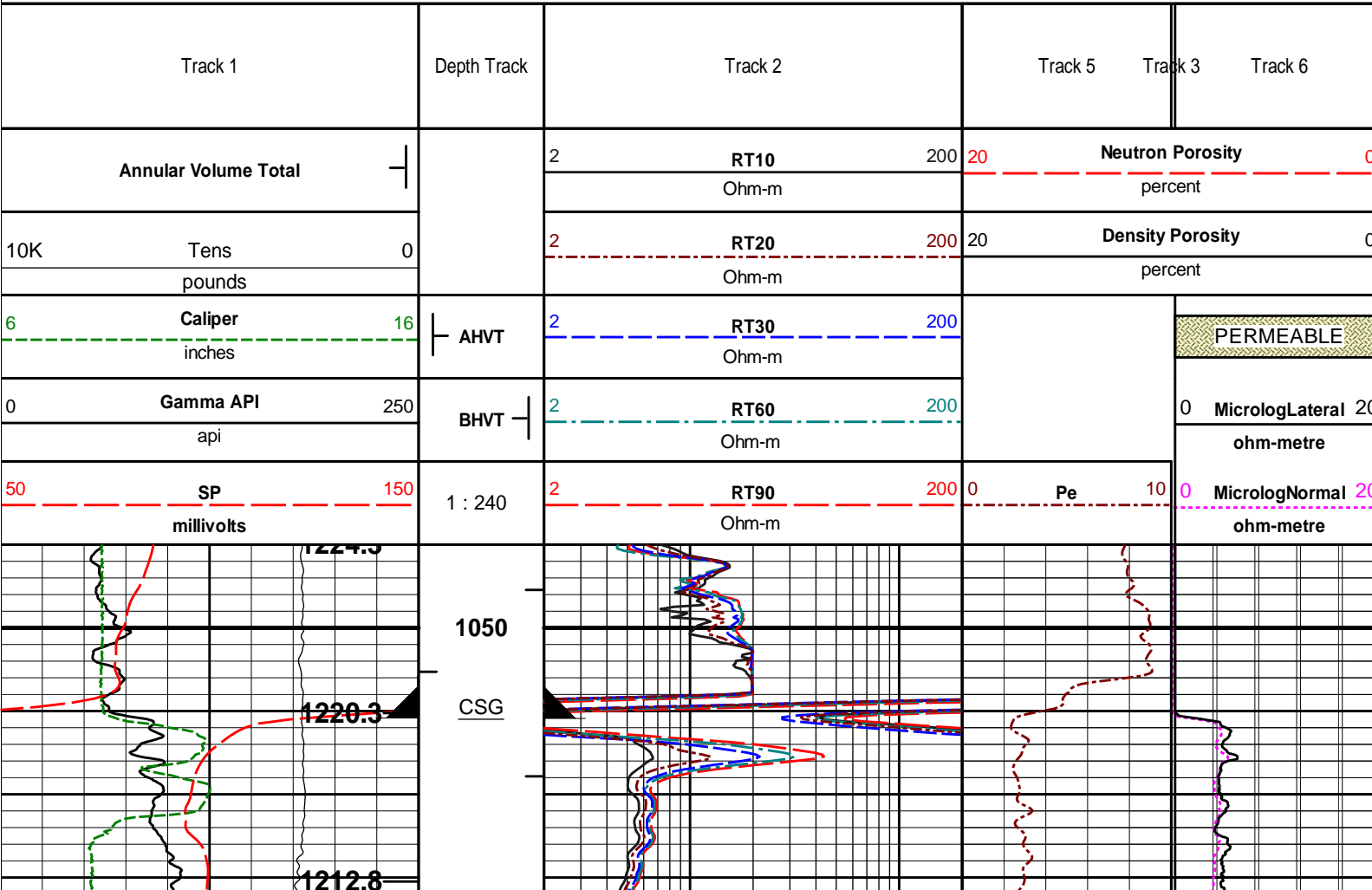
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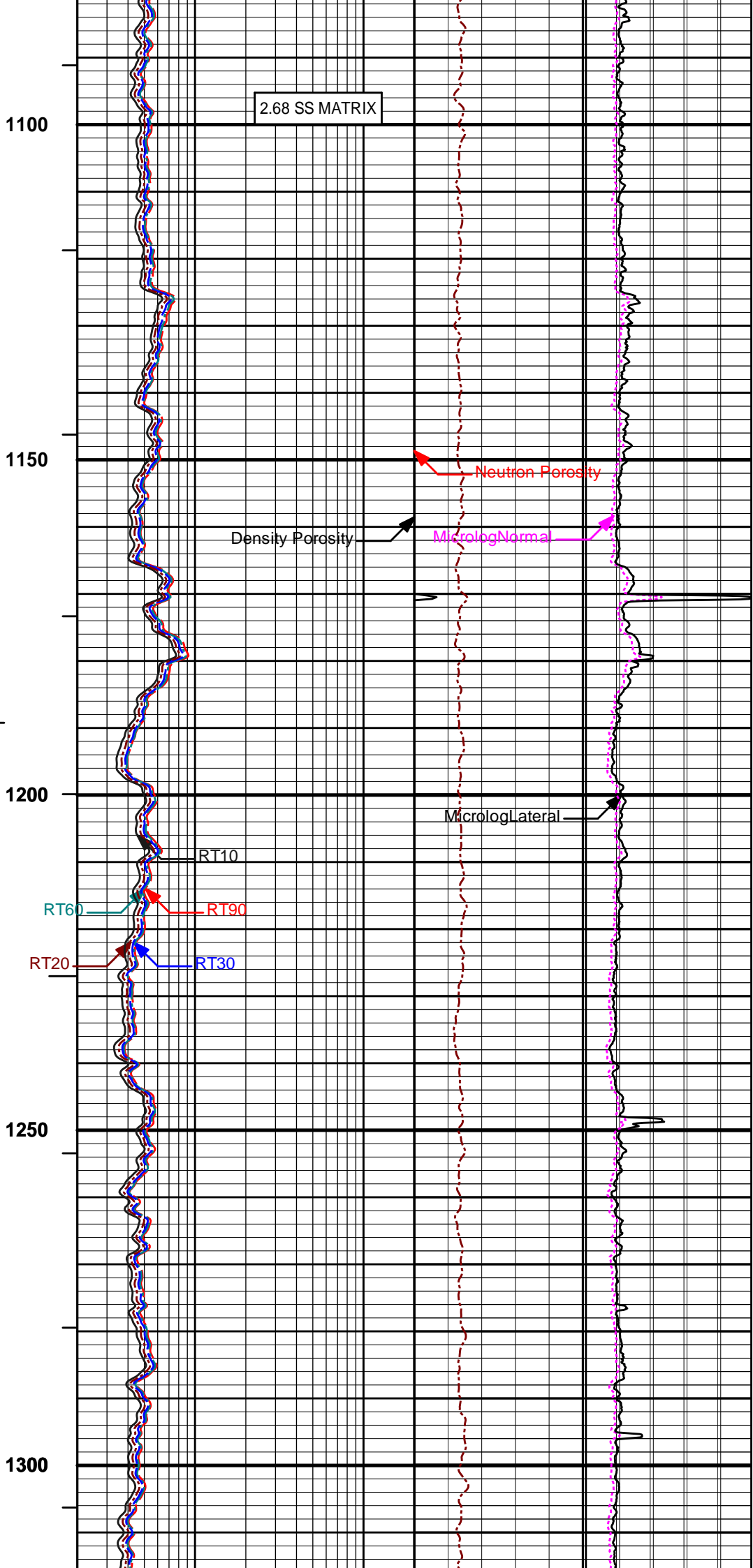
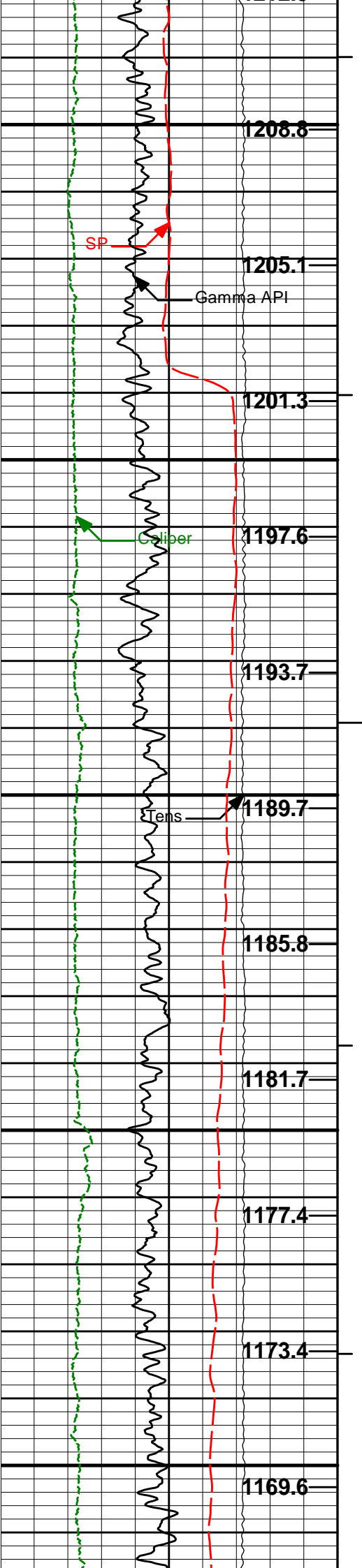
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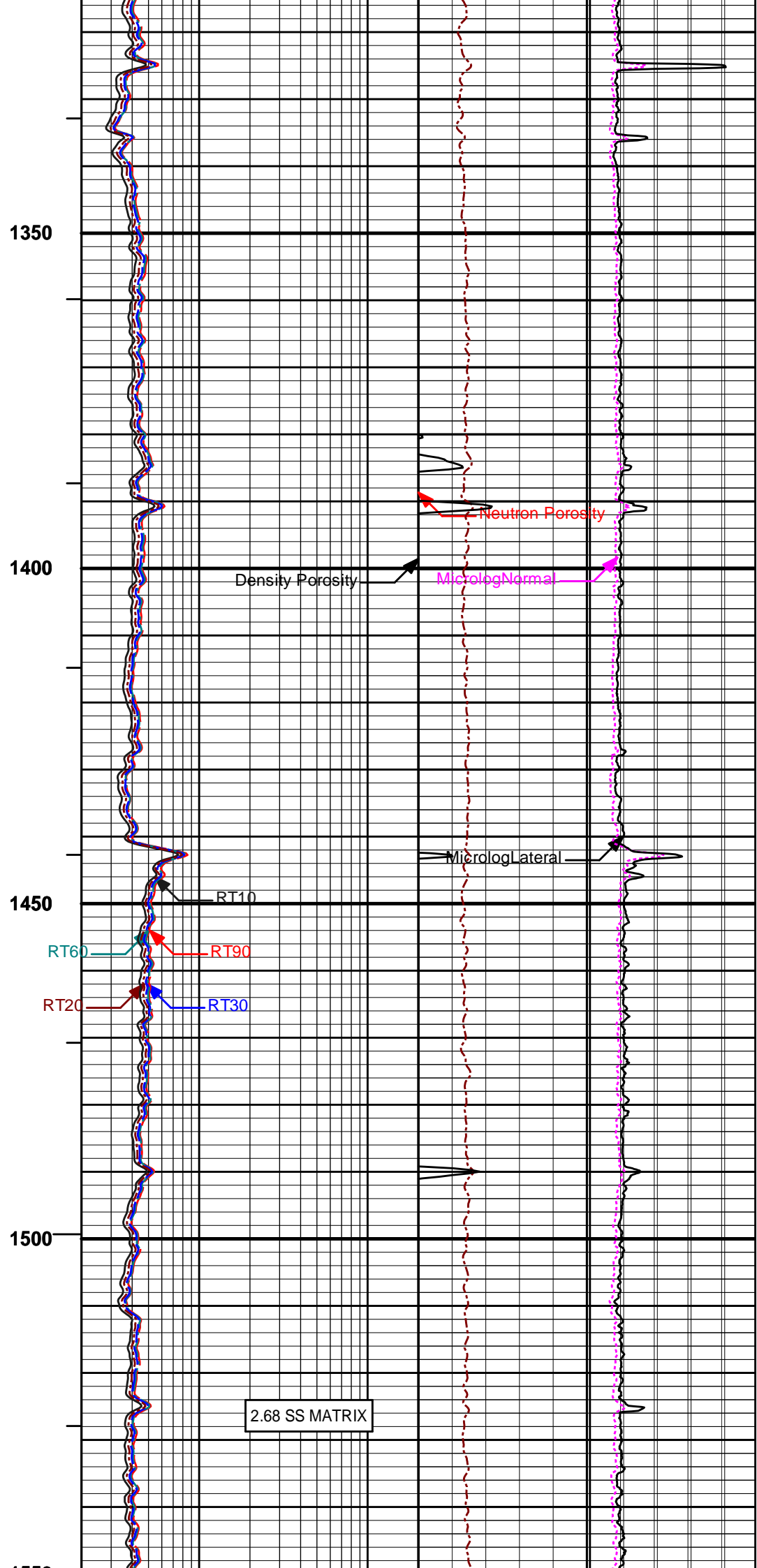
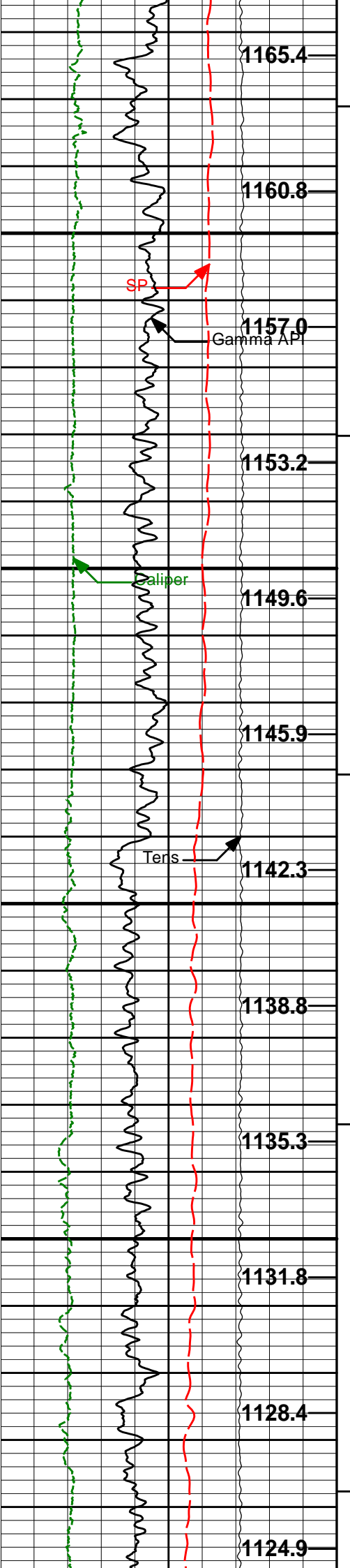
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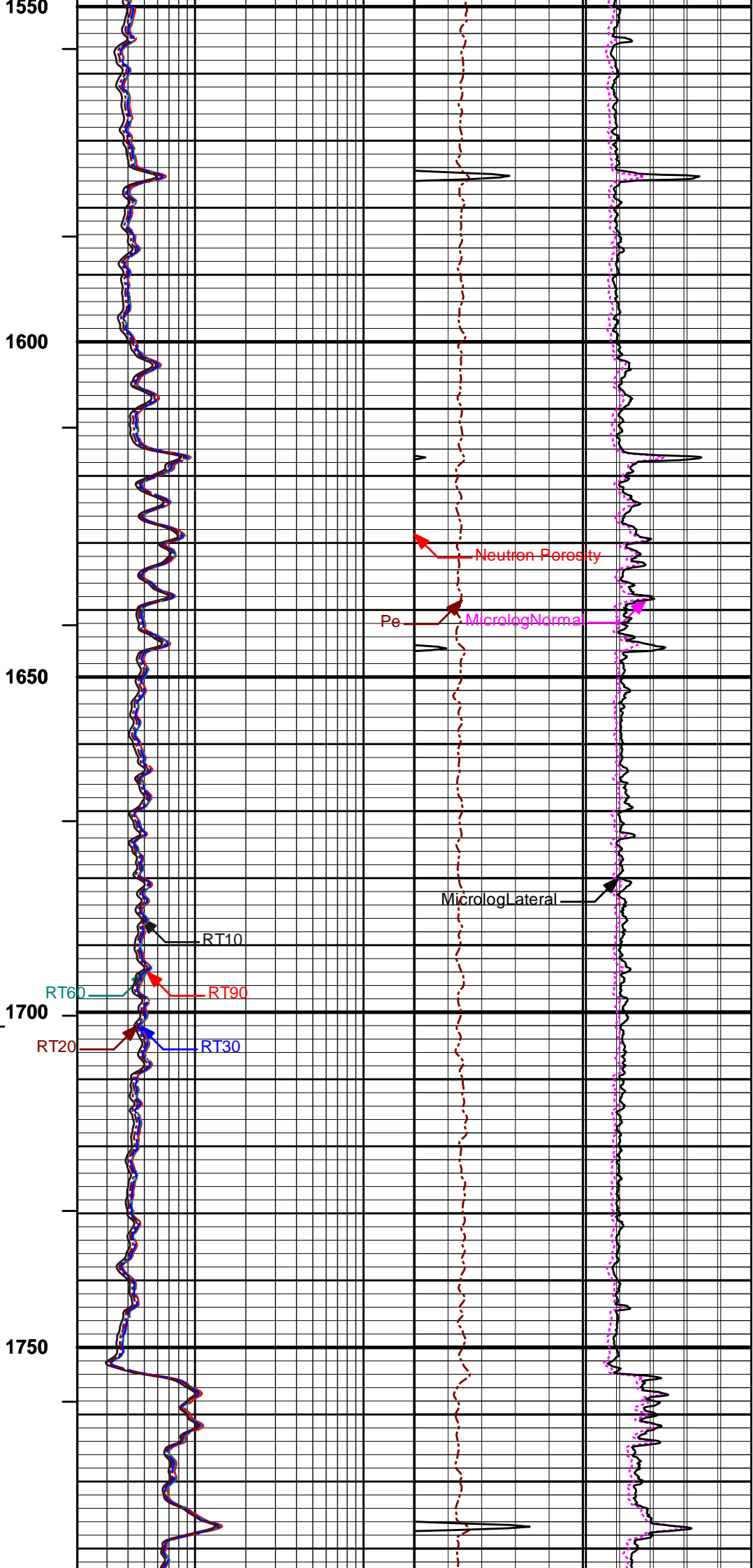
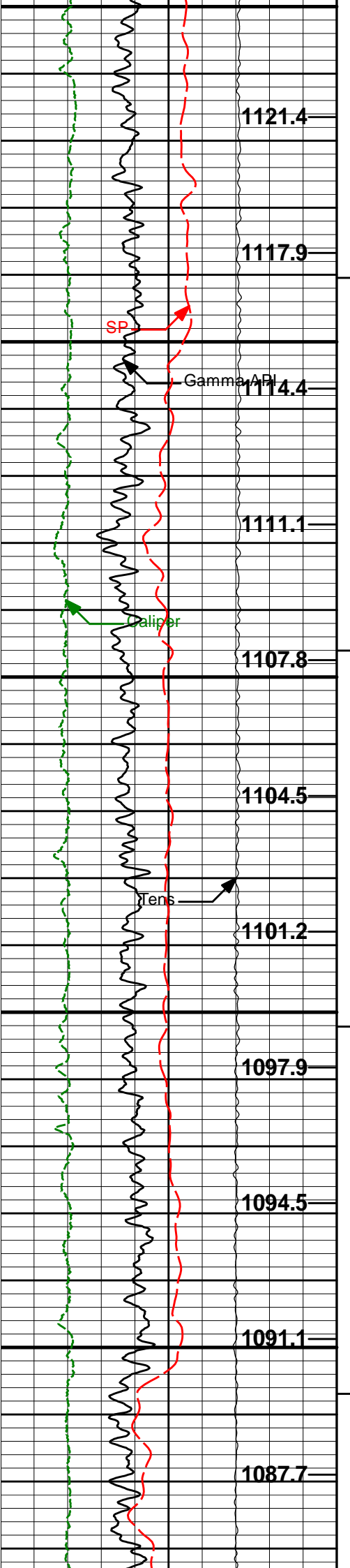
Plot File: \COMPOSITE\TRIPLE COMBO

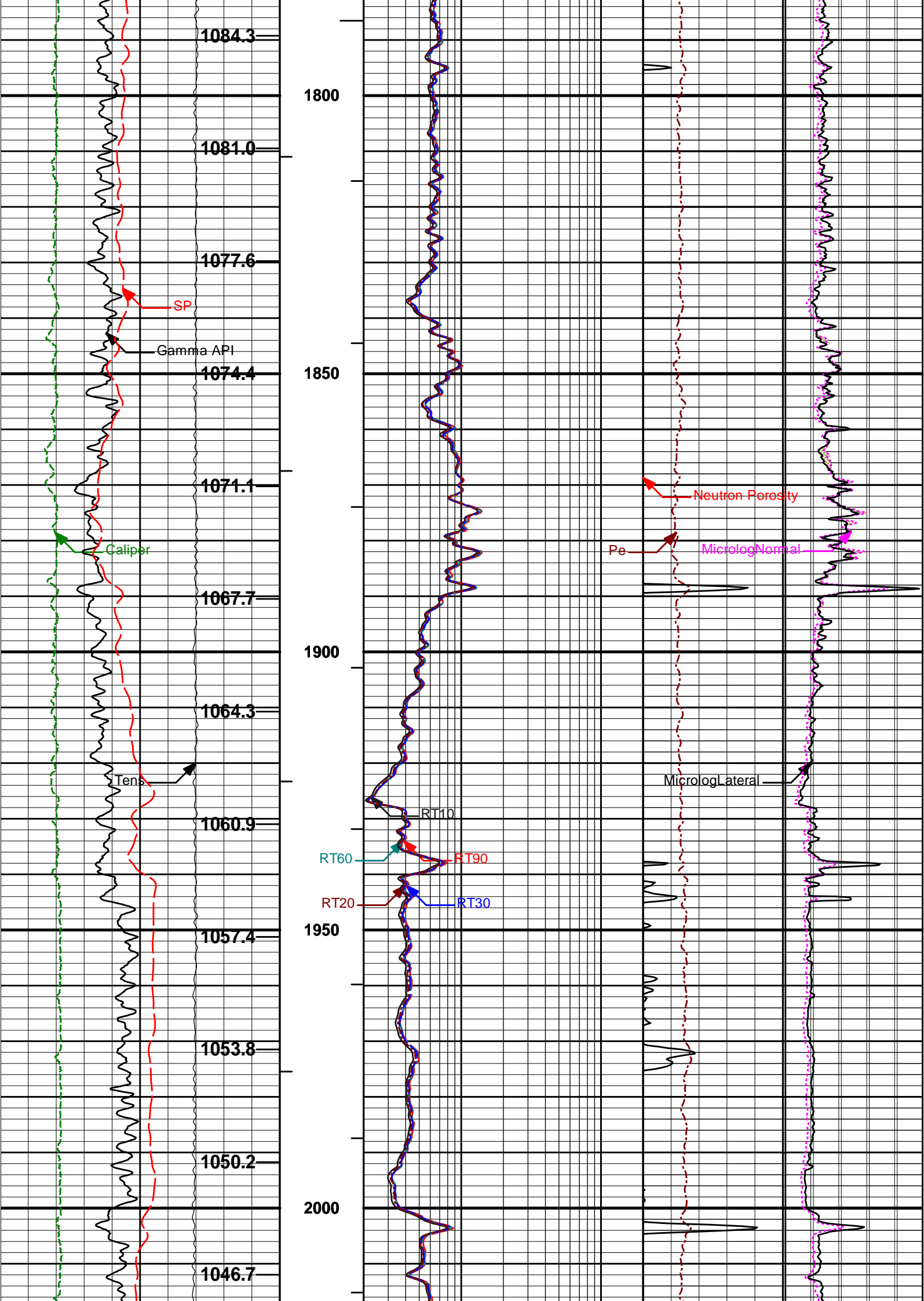
MAIN PASS 5" = 100'

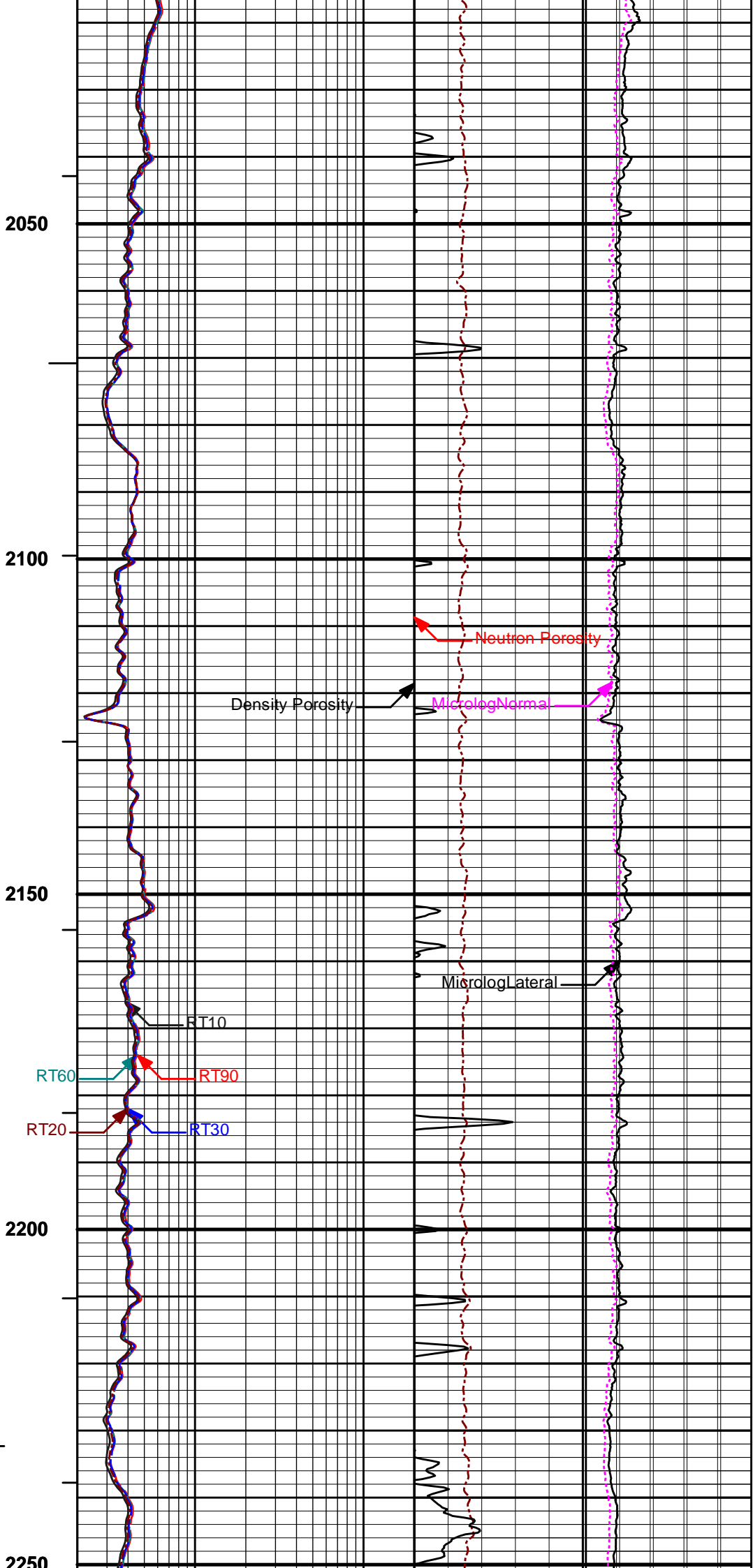
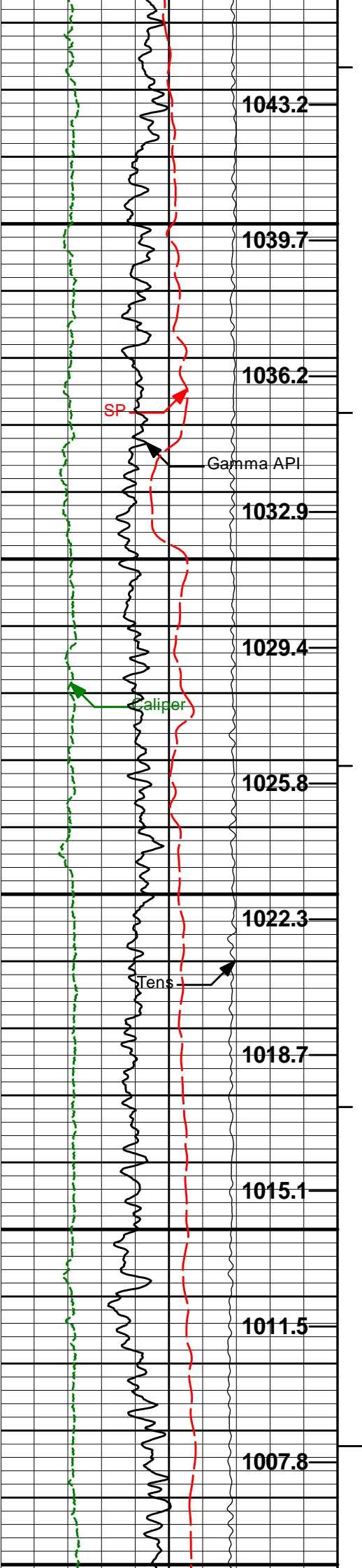


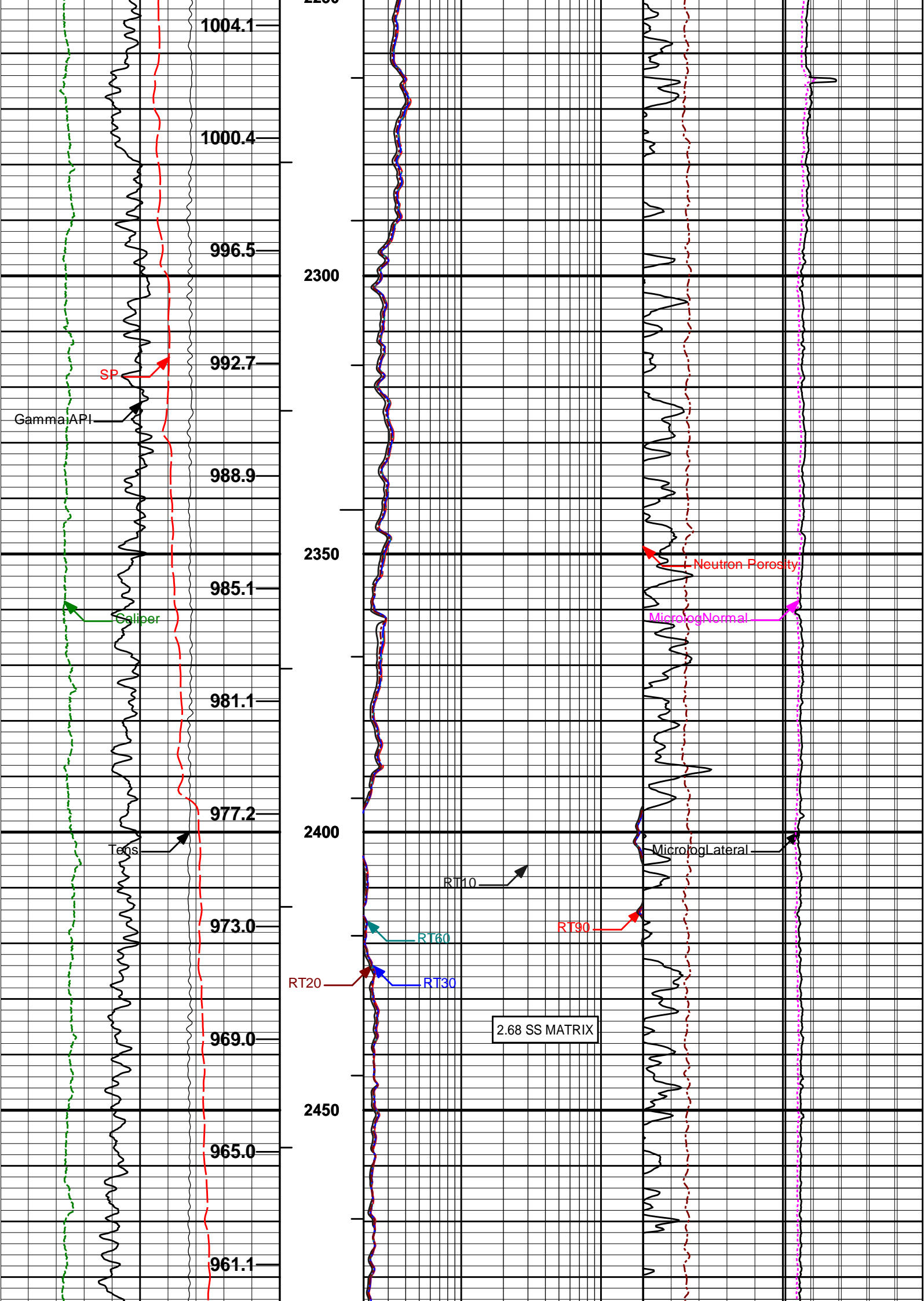


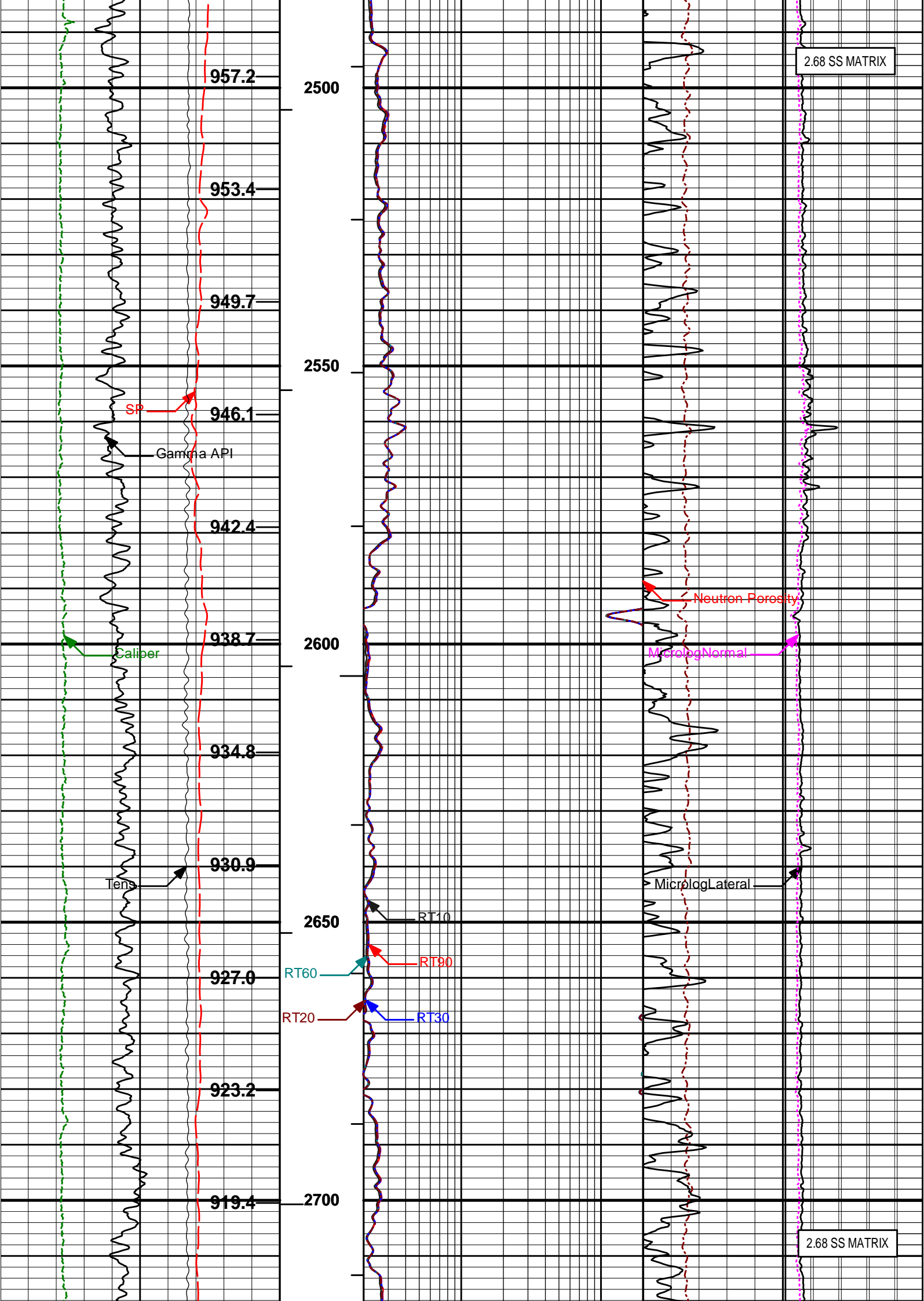


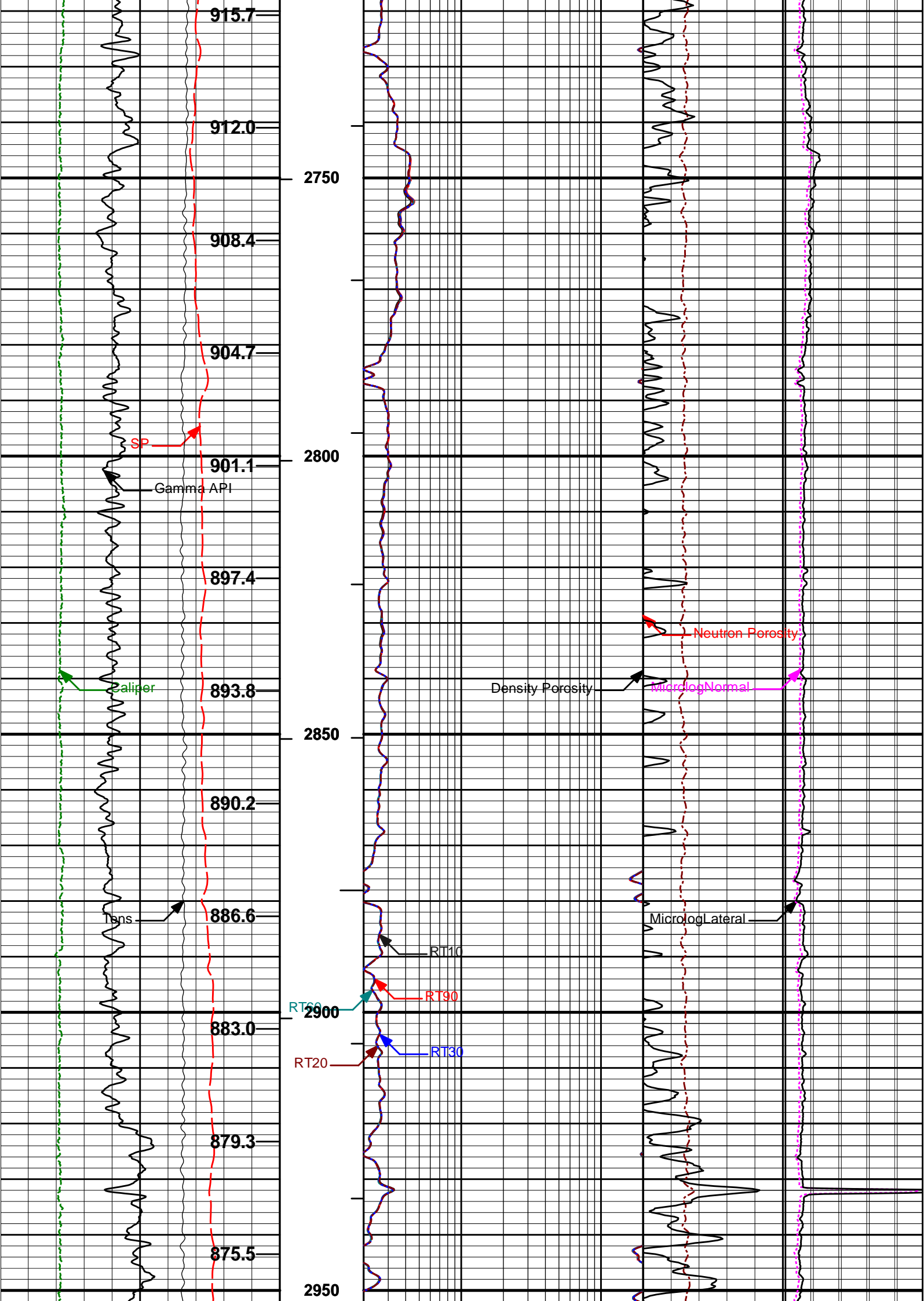


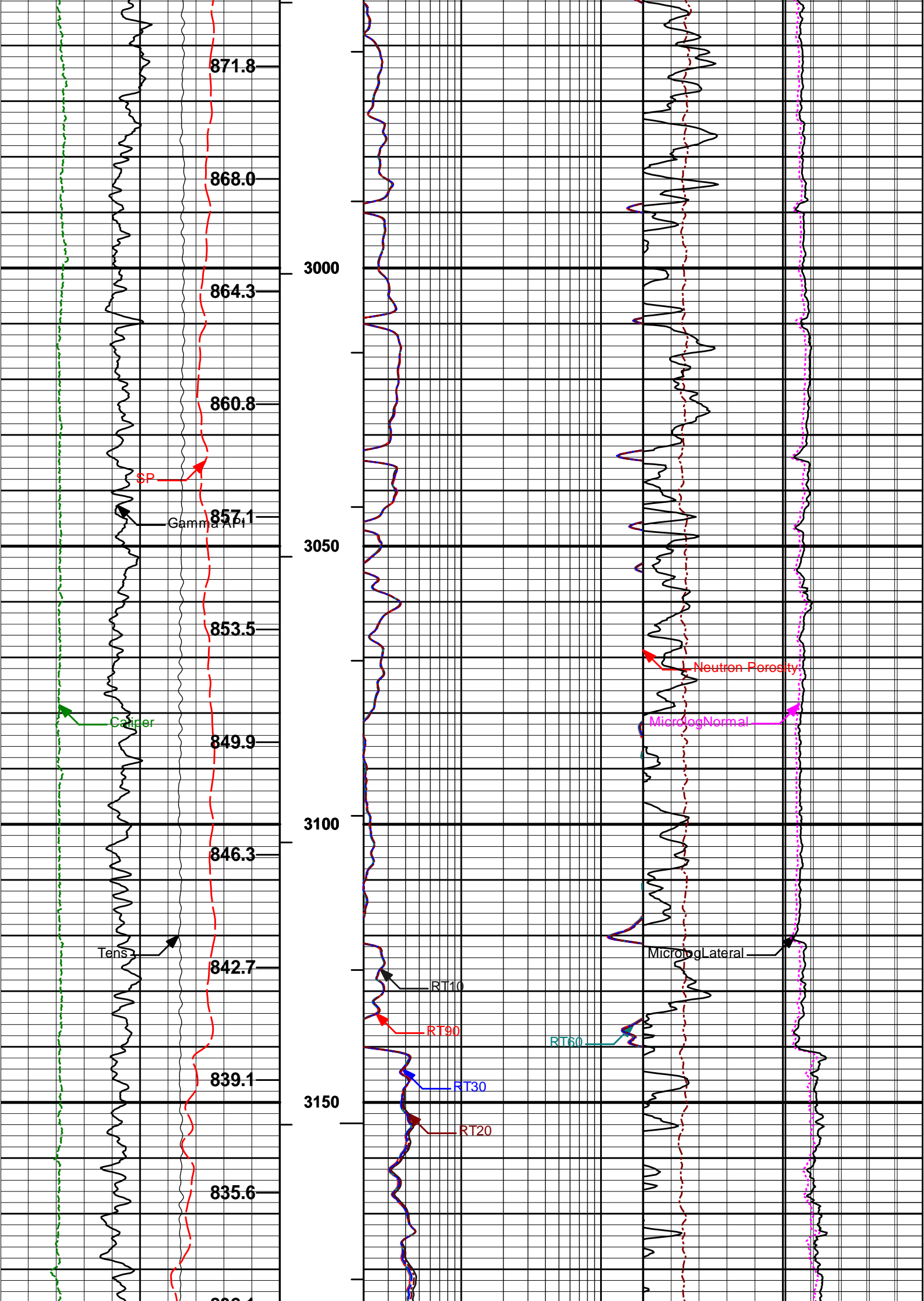


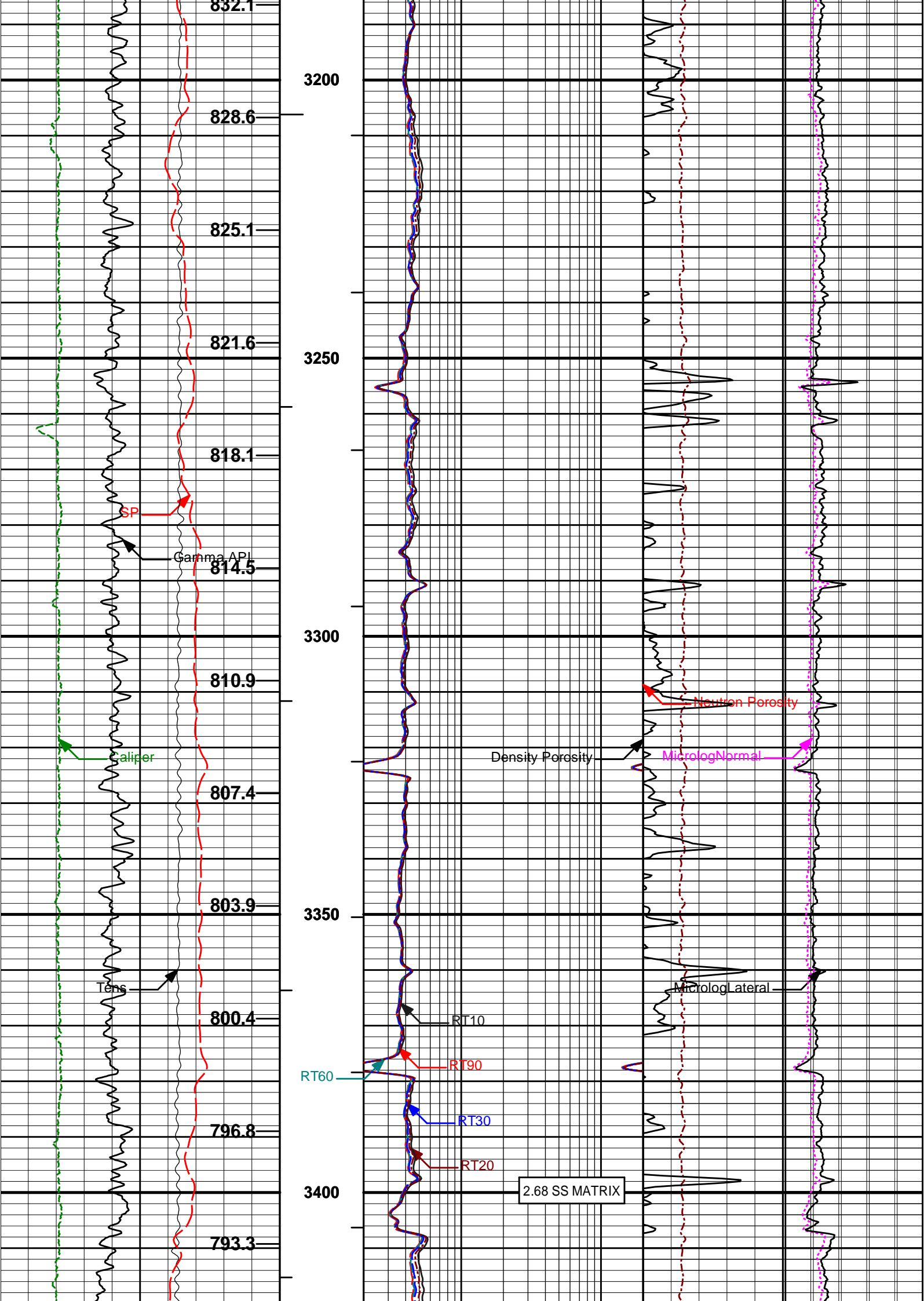


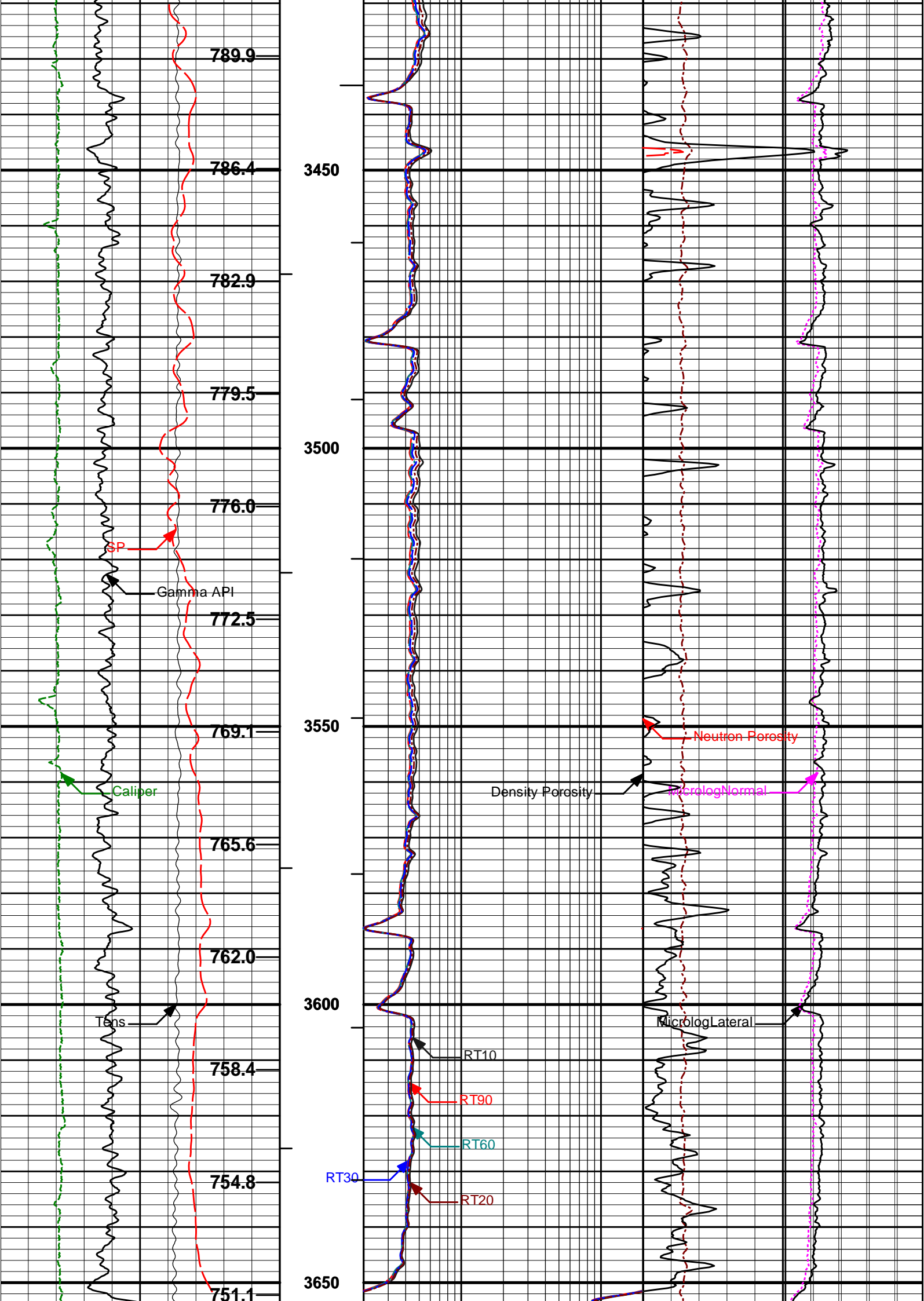


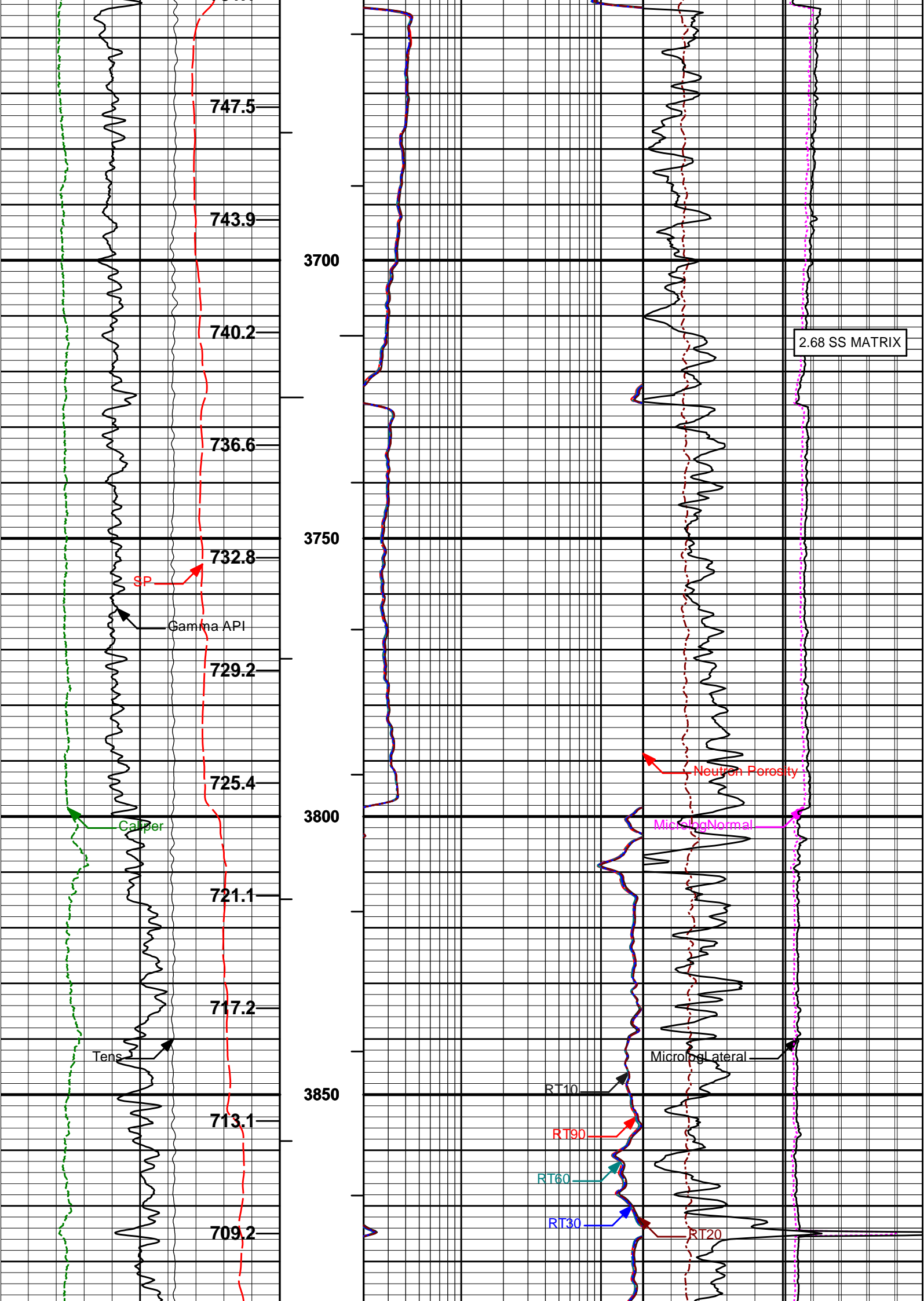


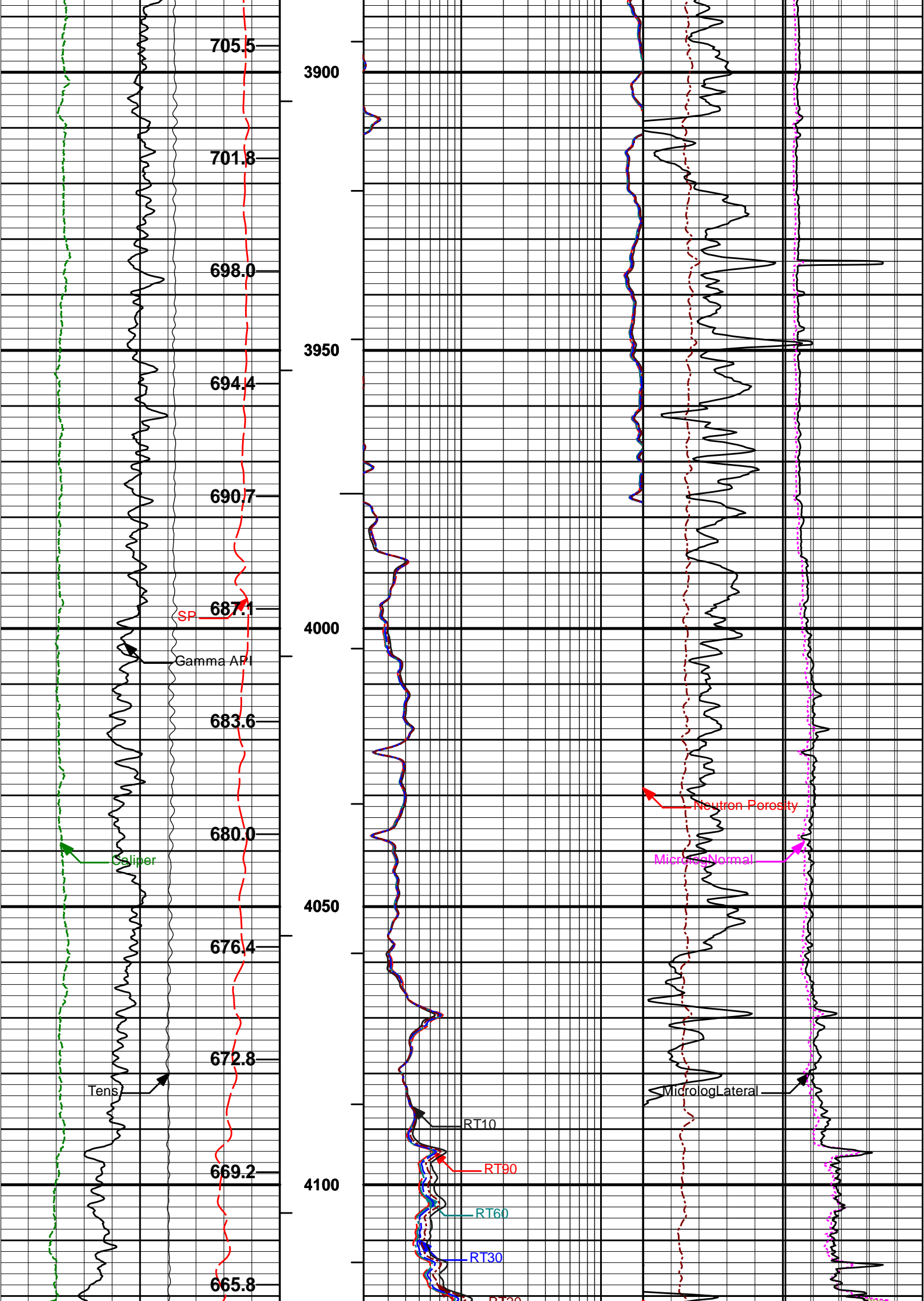


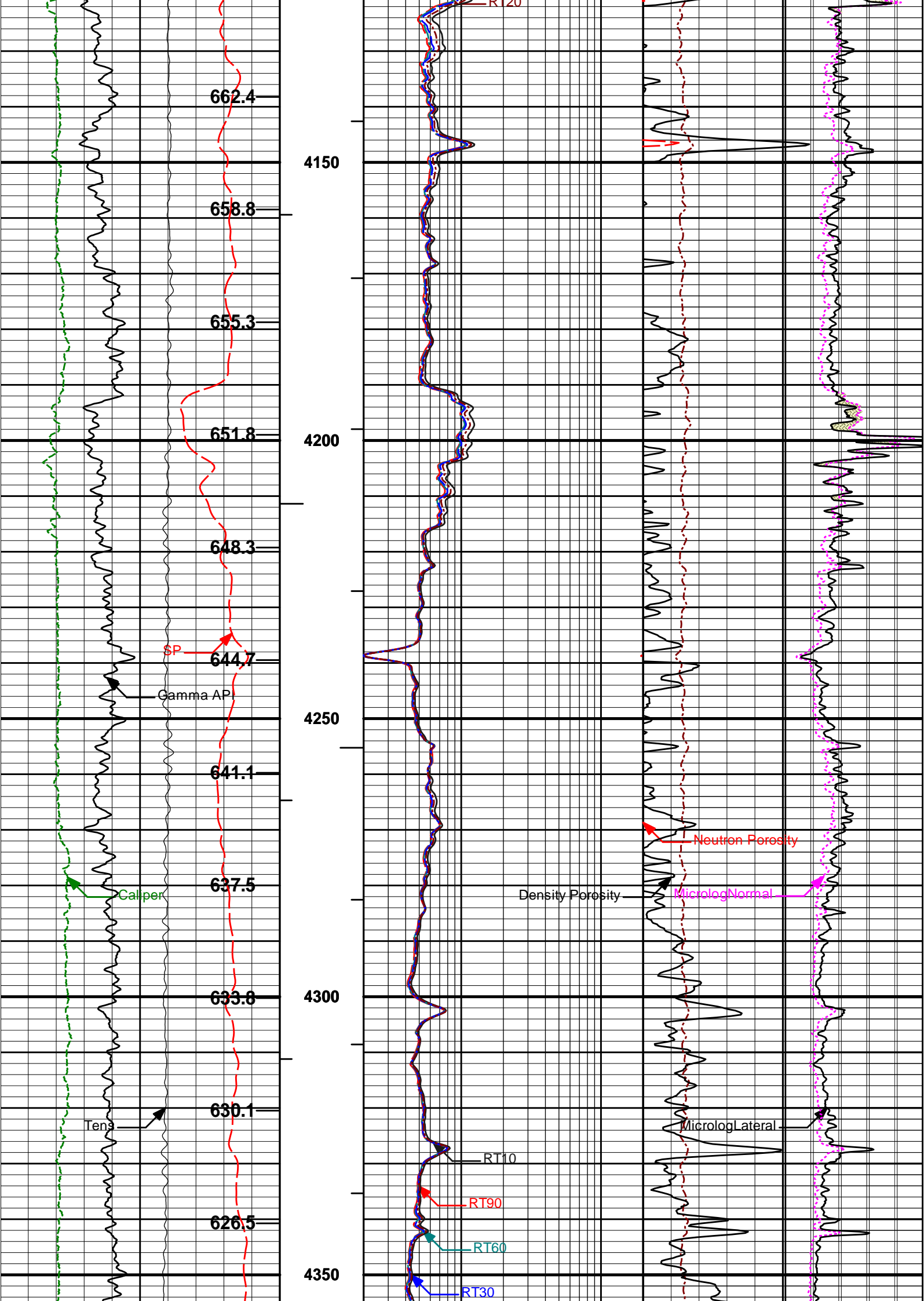


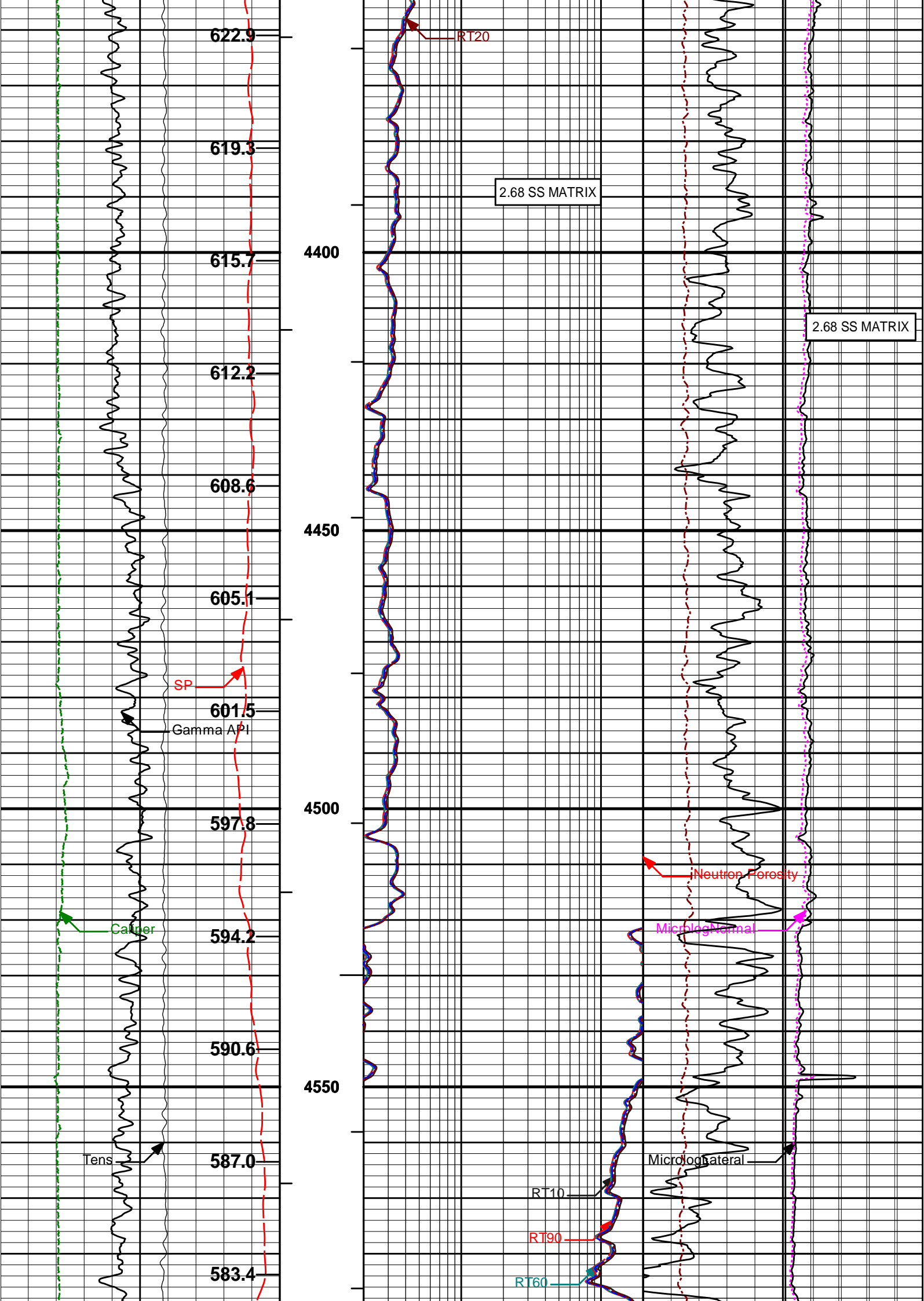


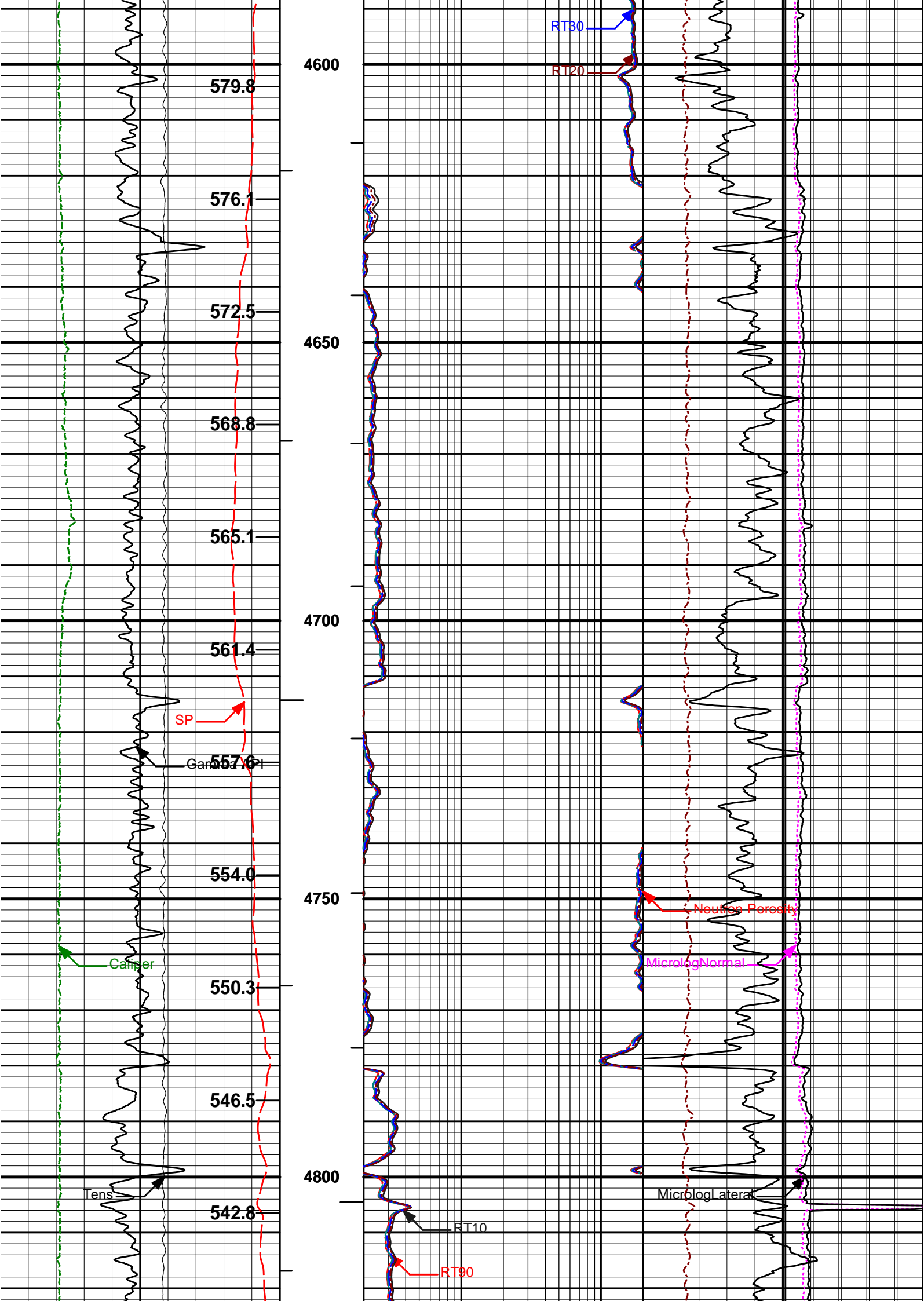


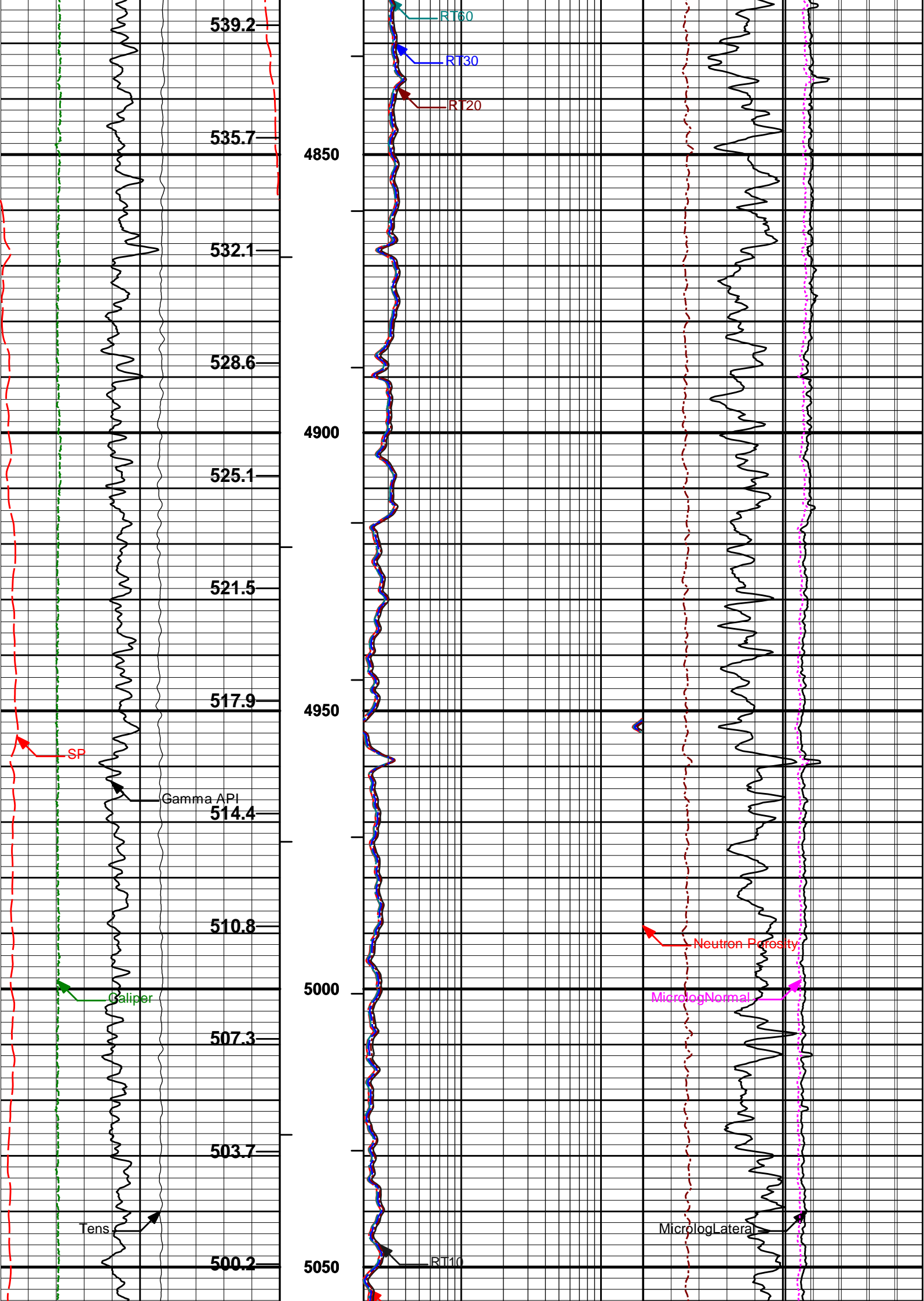


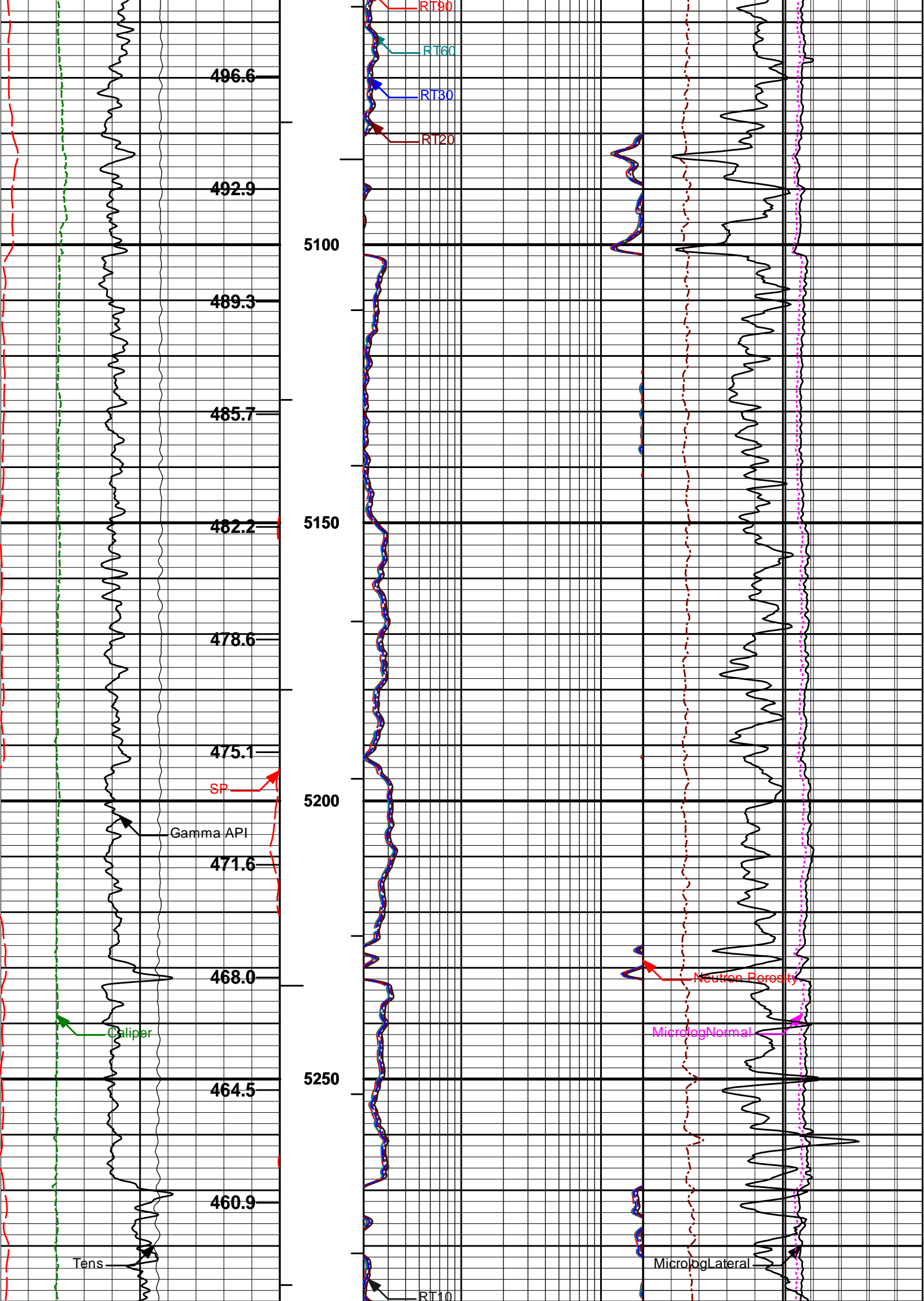


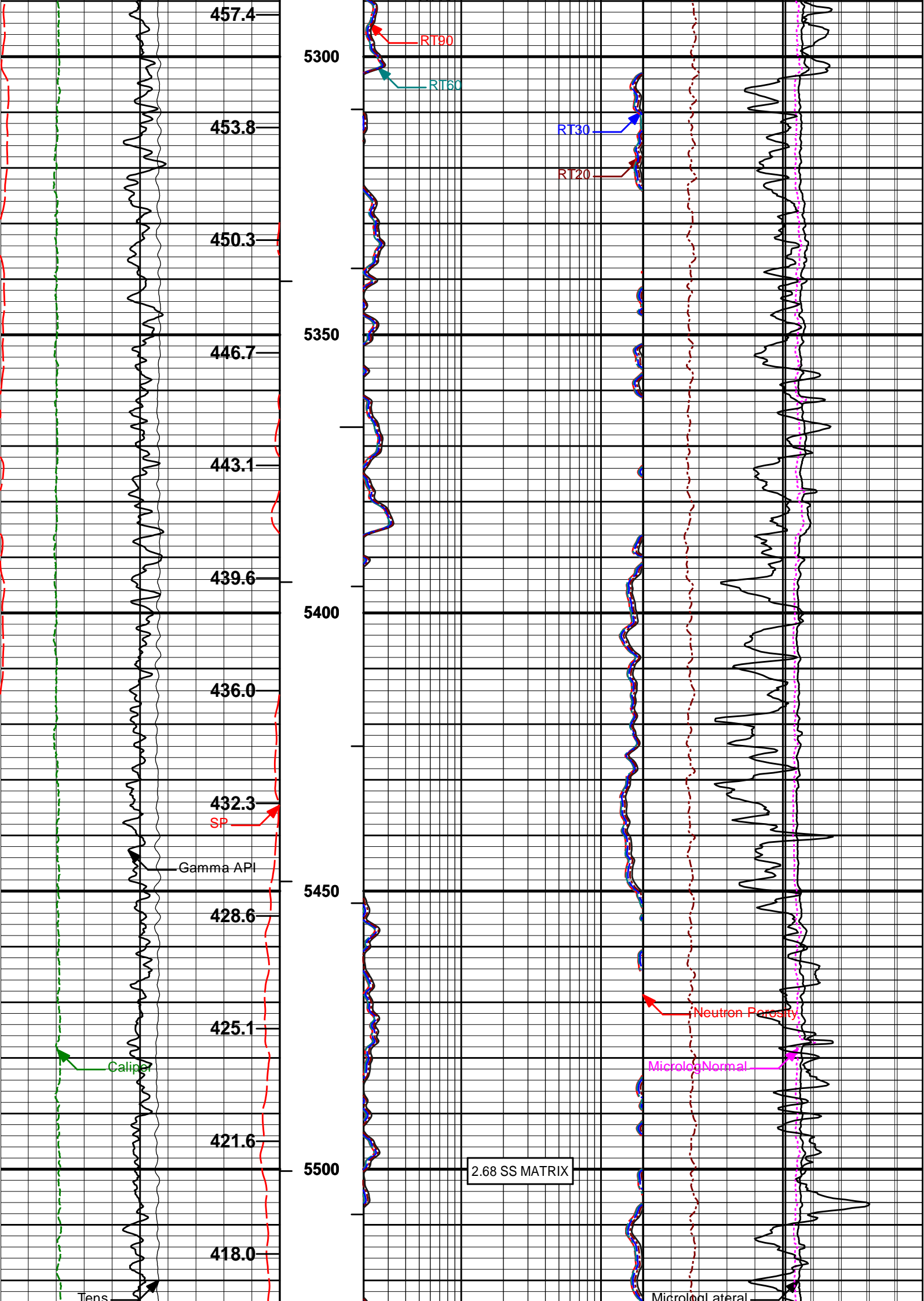


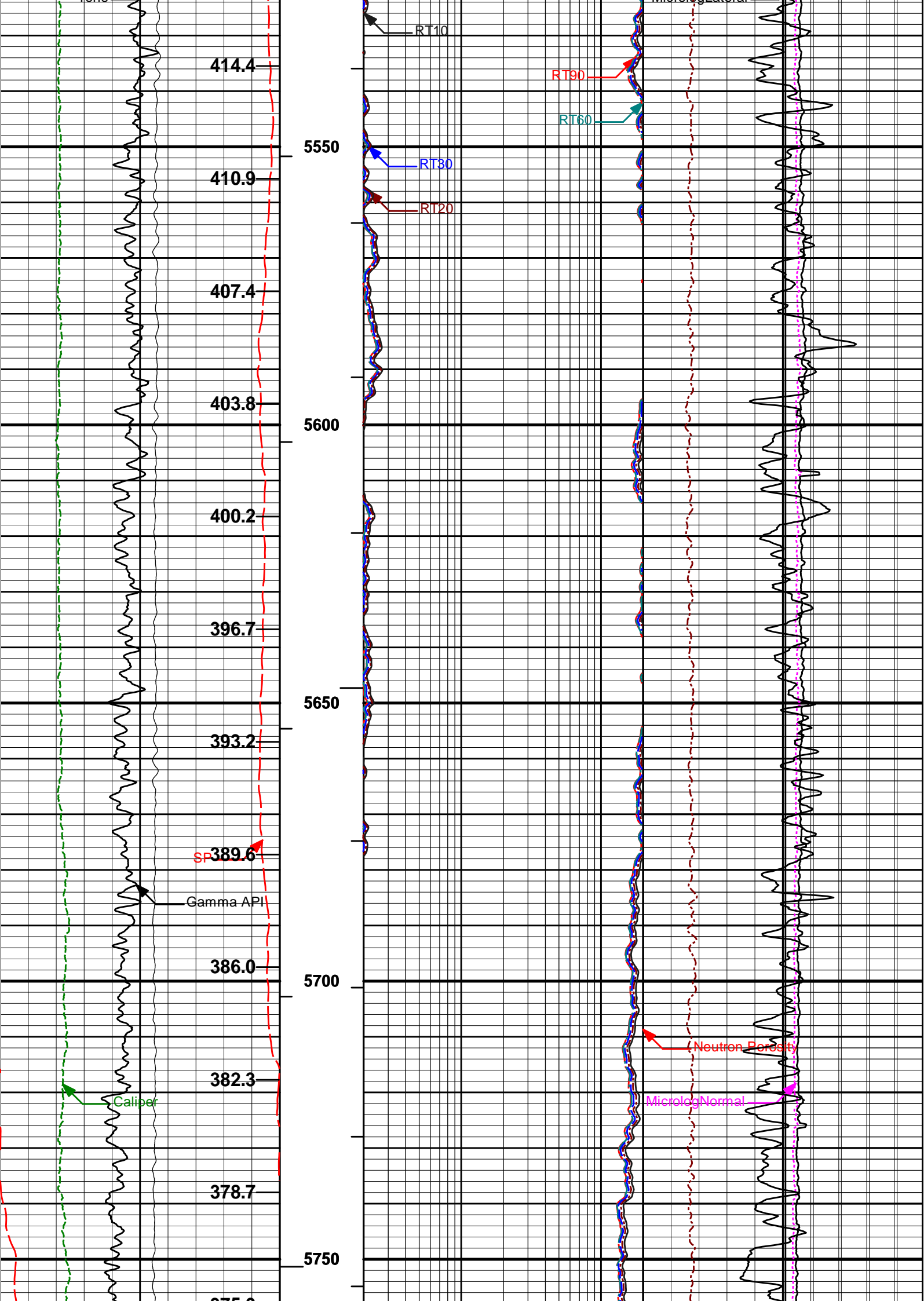


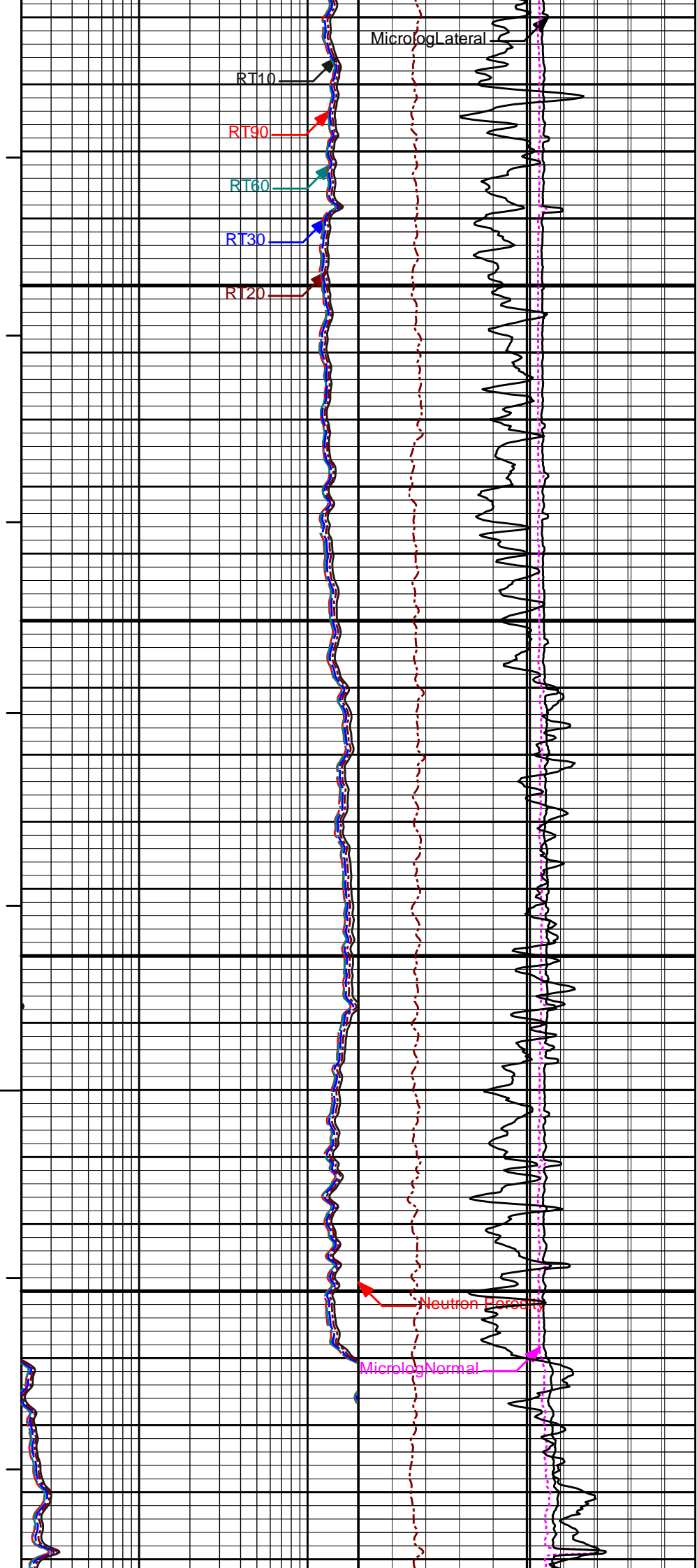
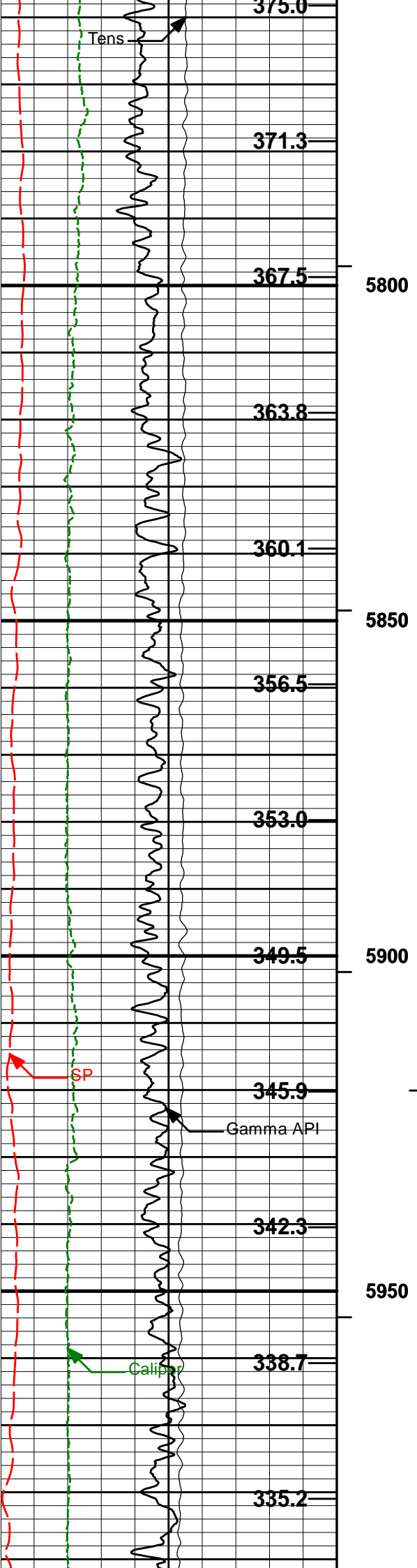


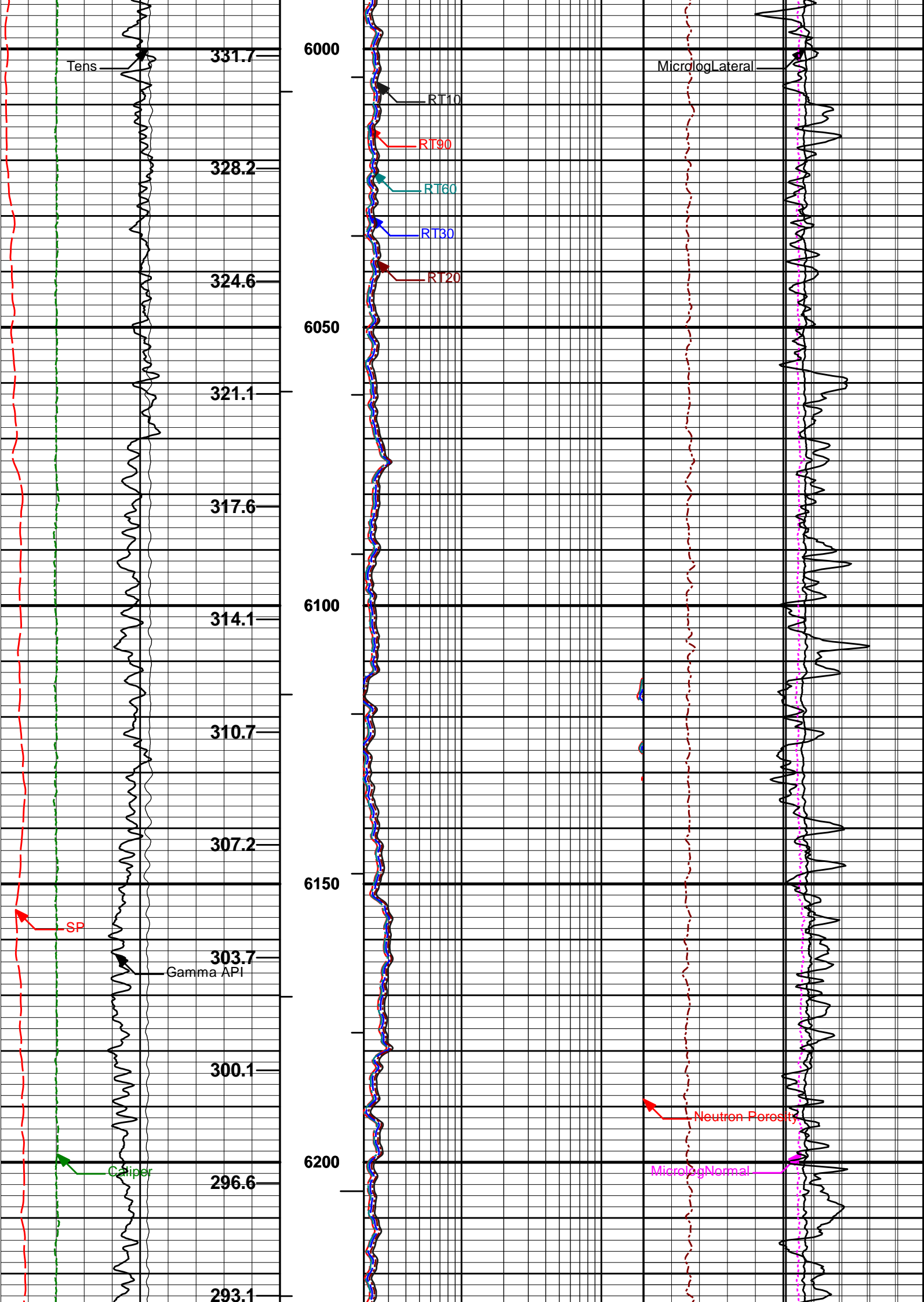


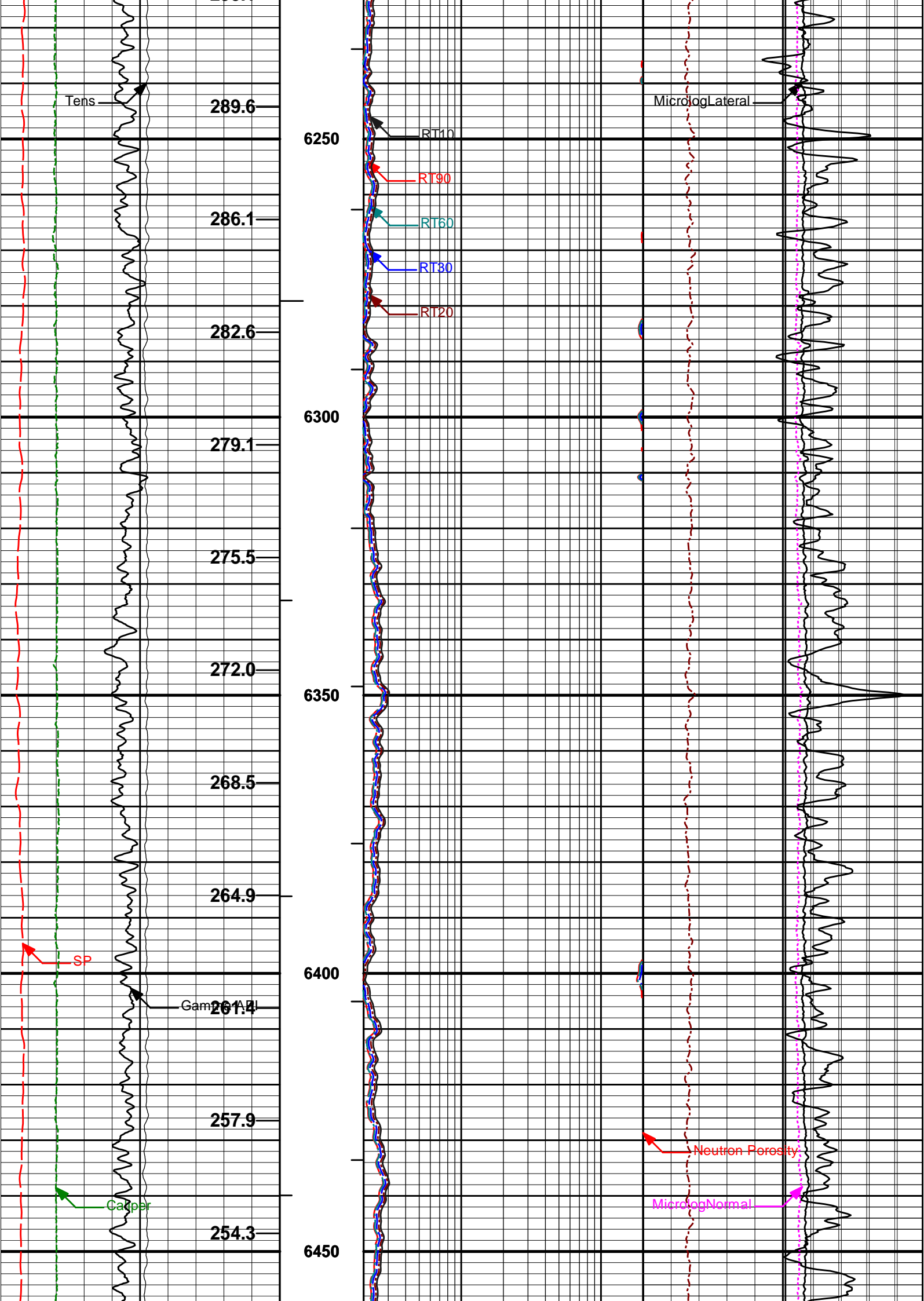


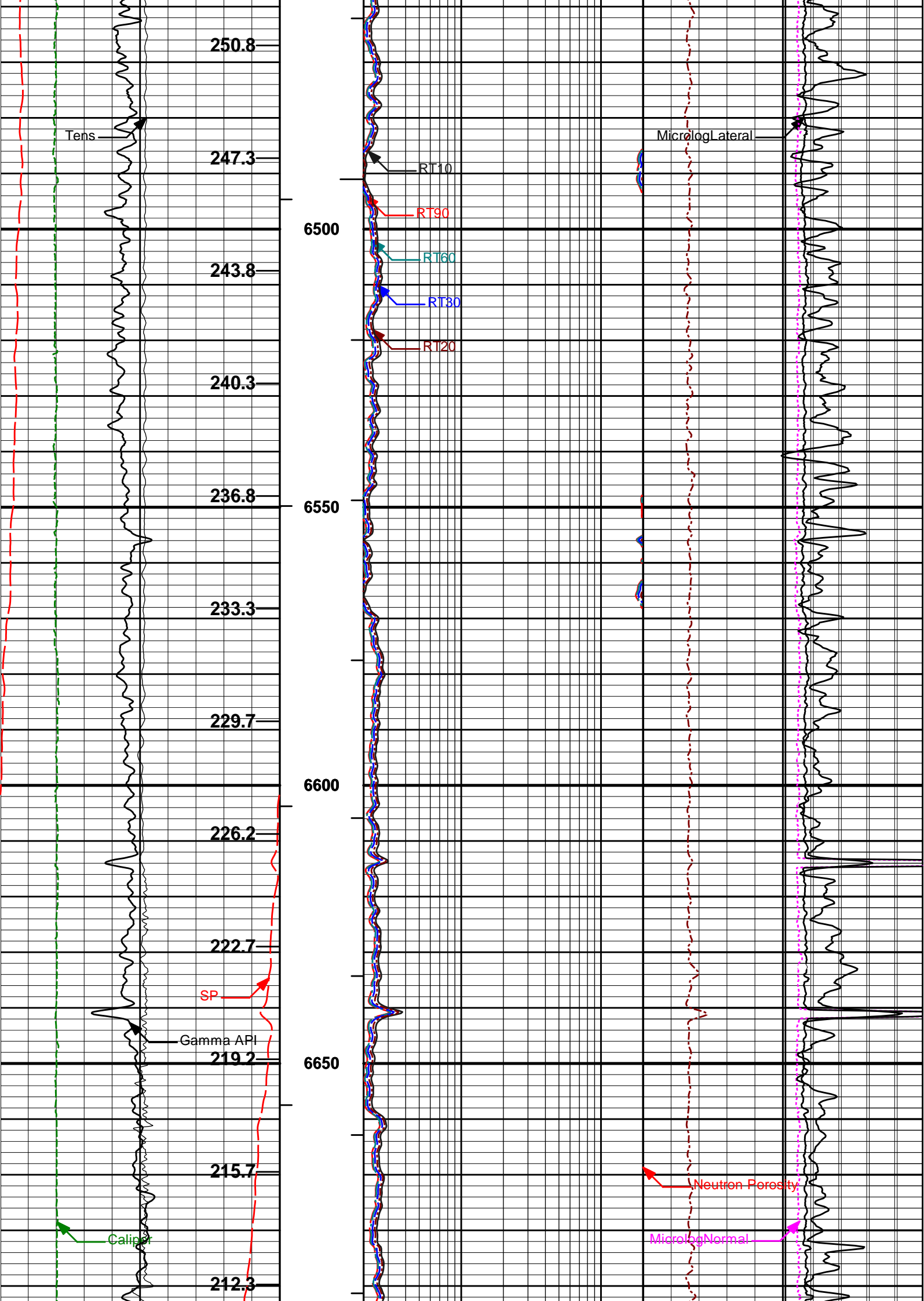


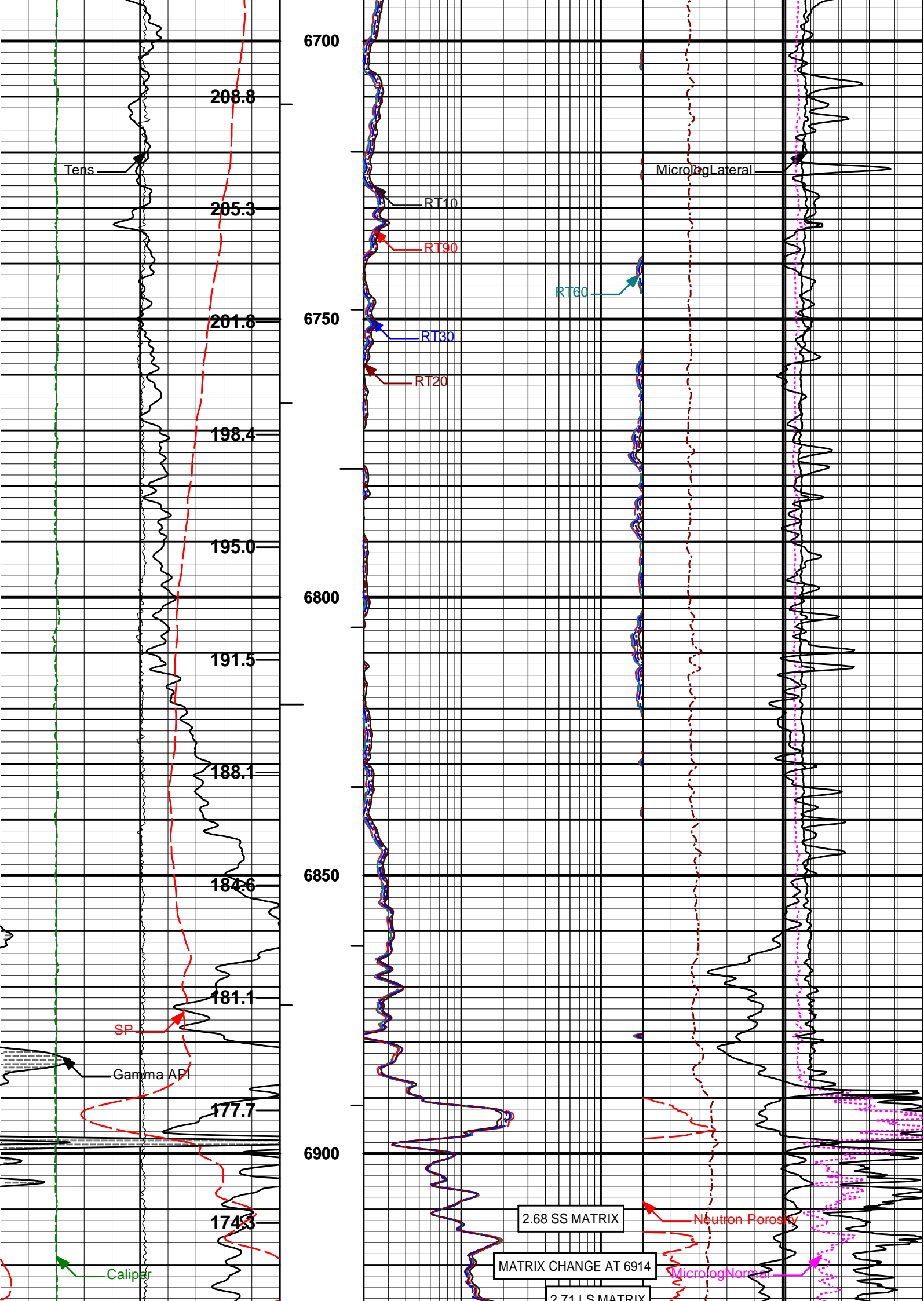


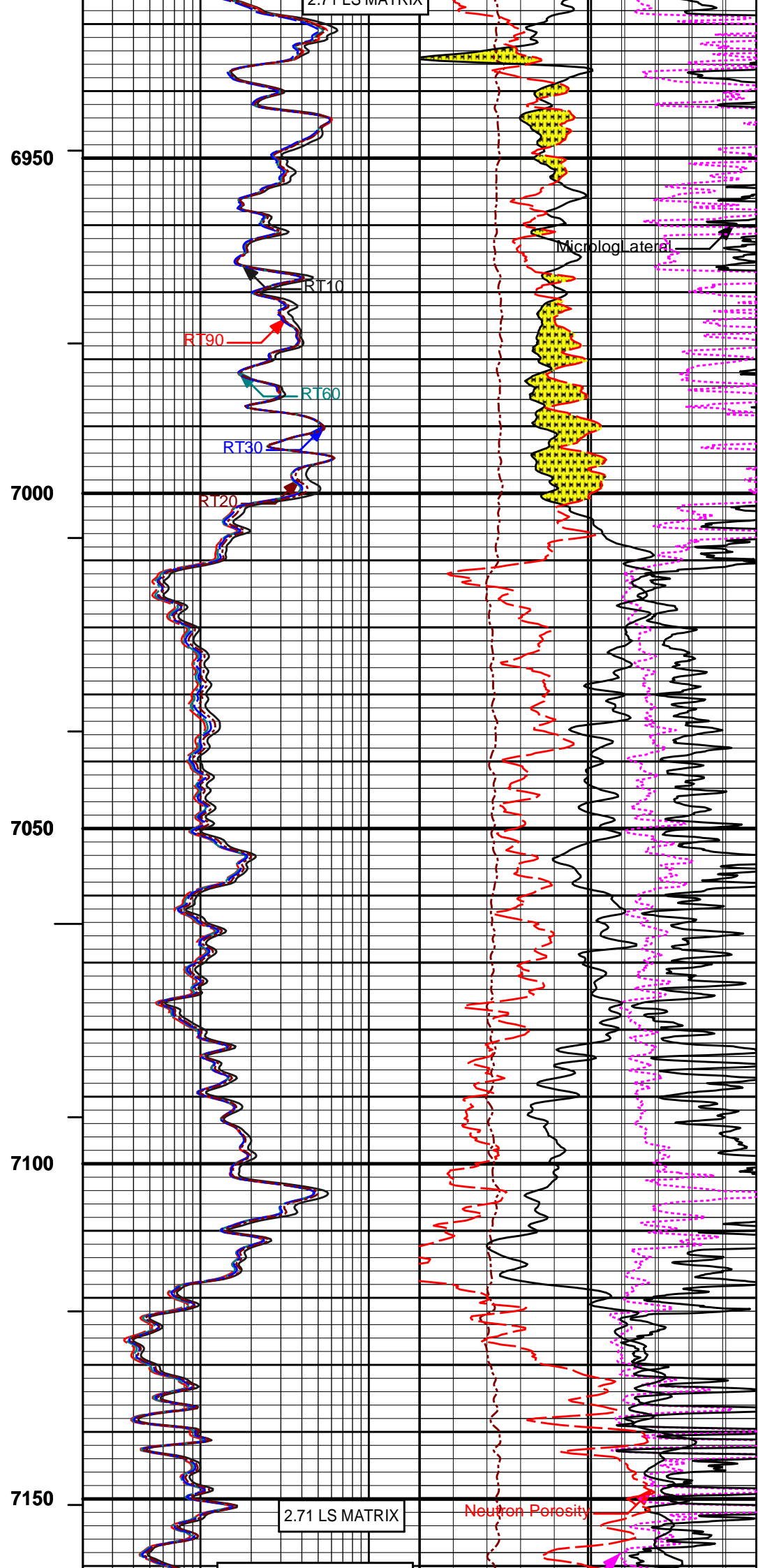
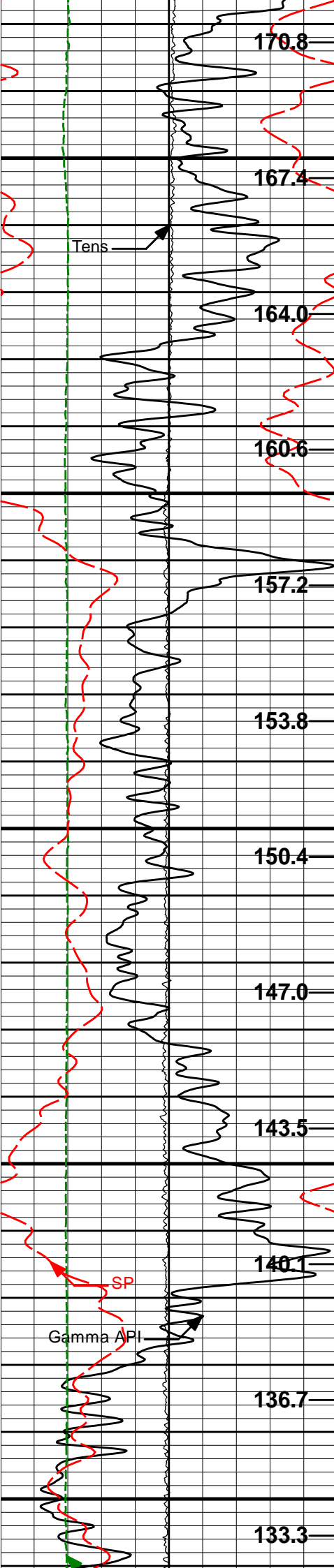


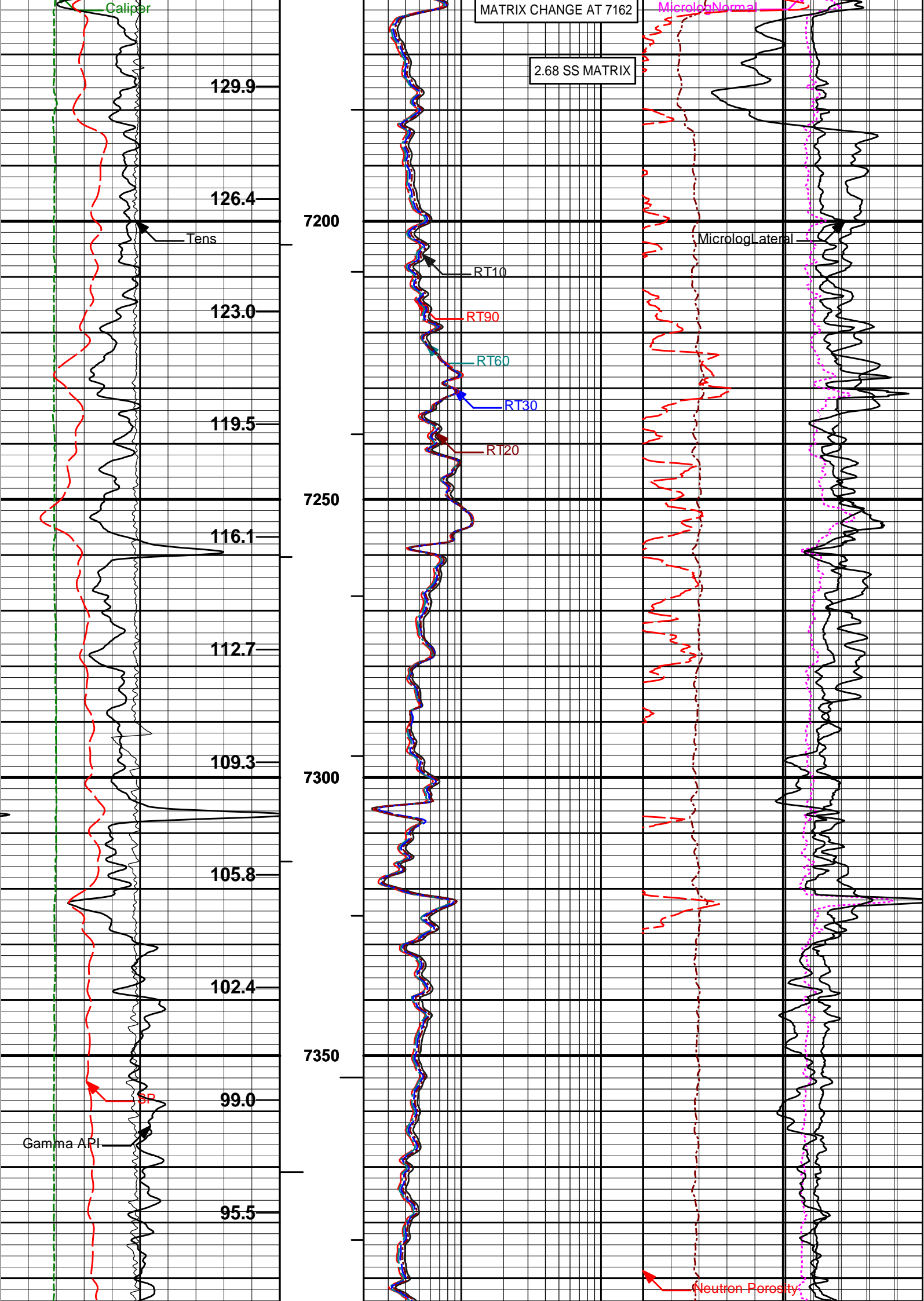


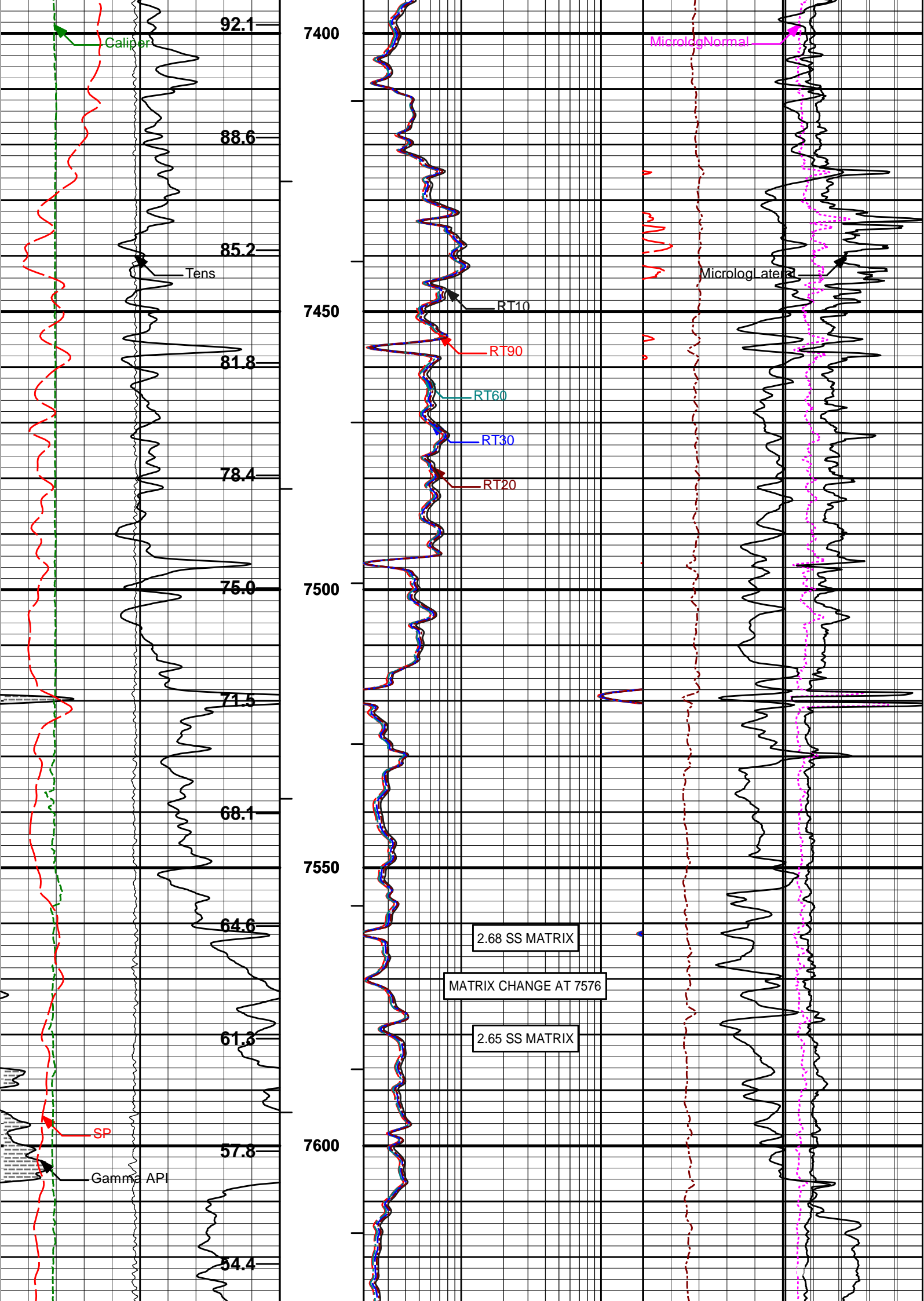


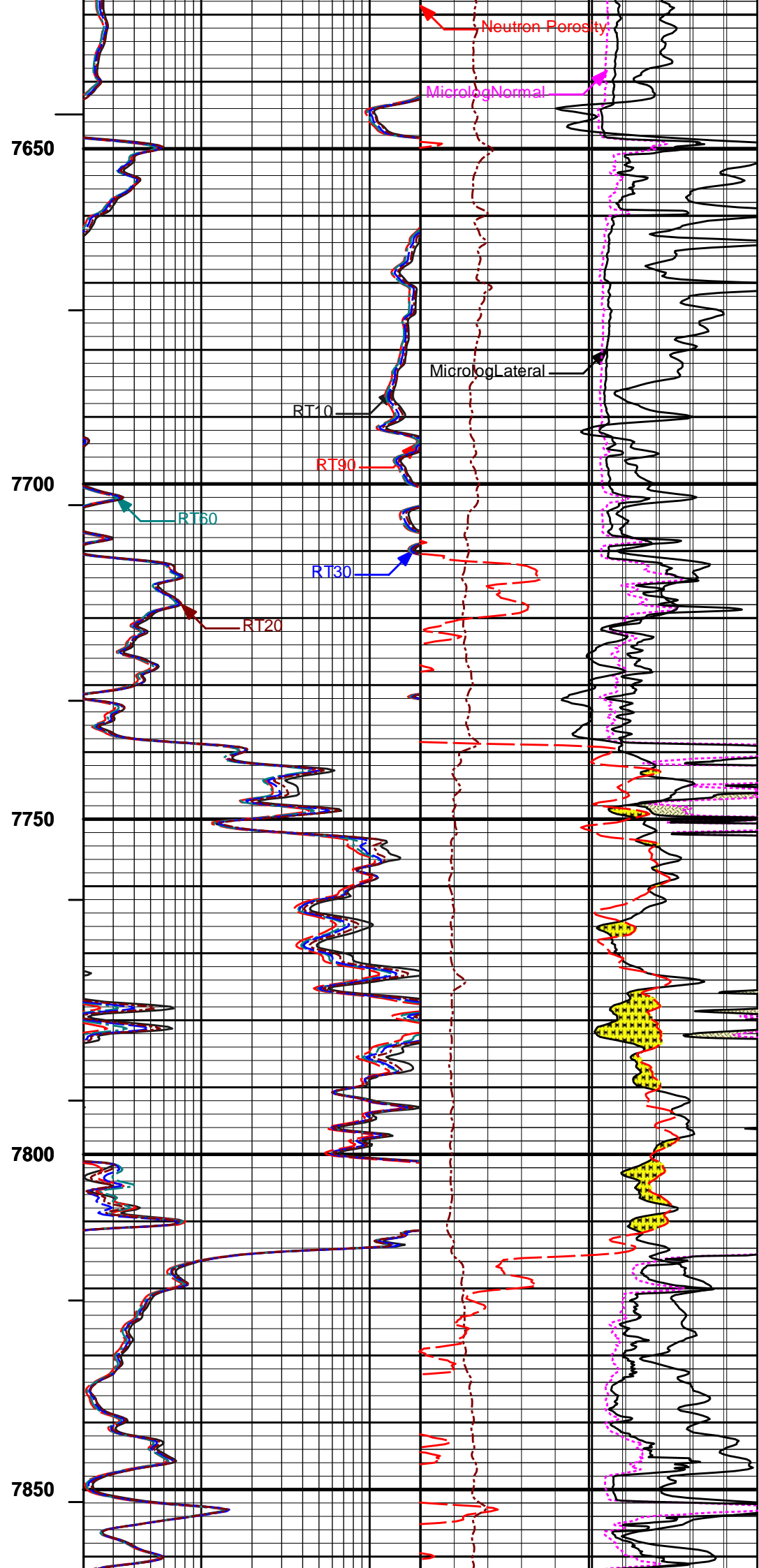
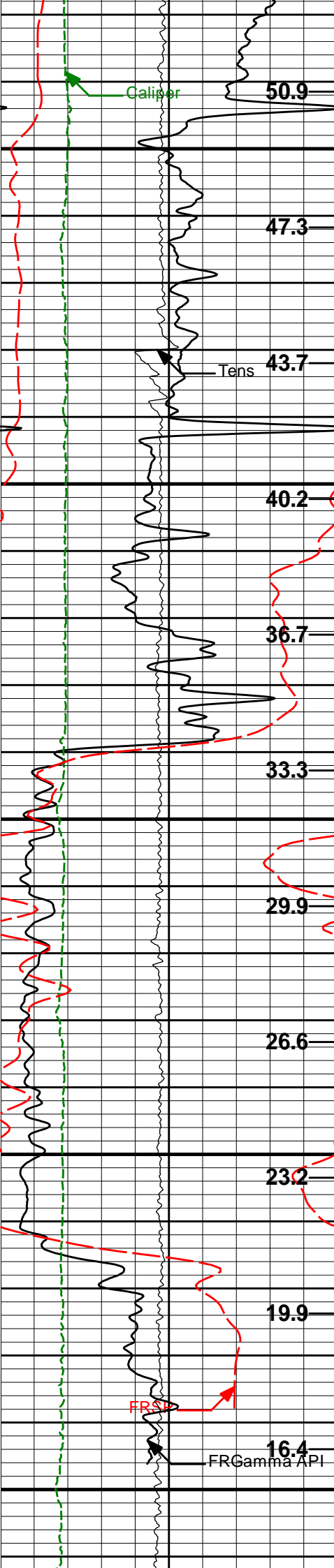


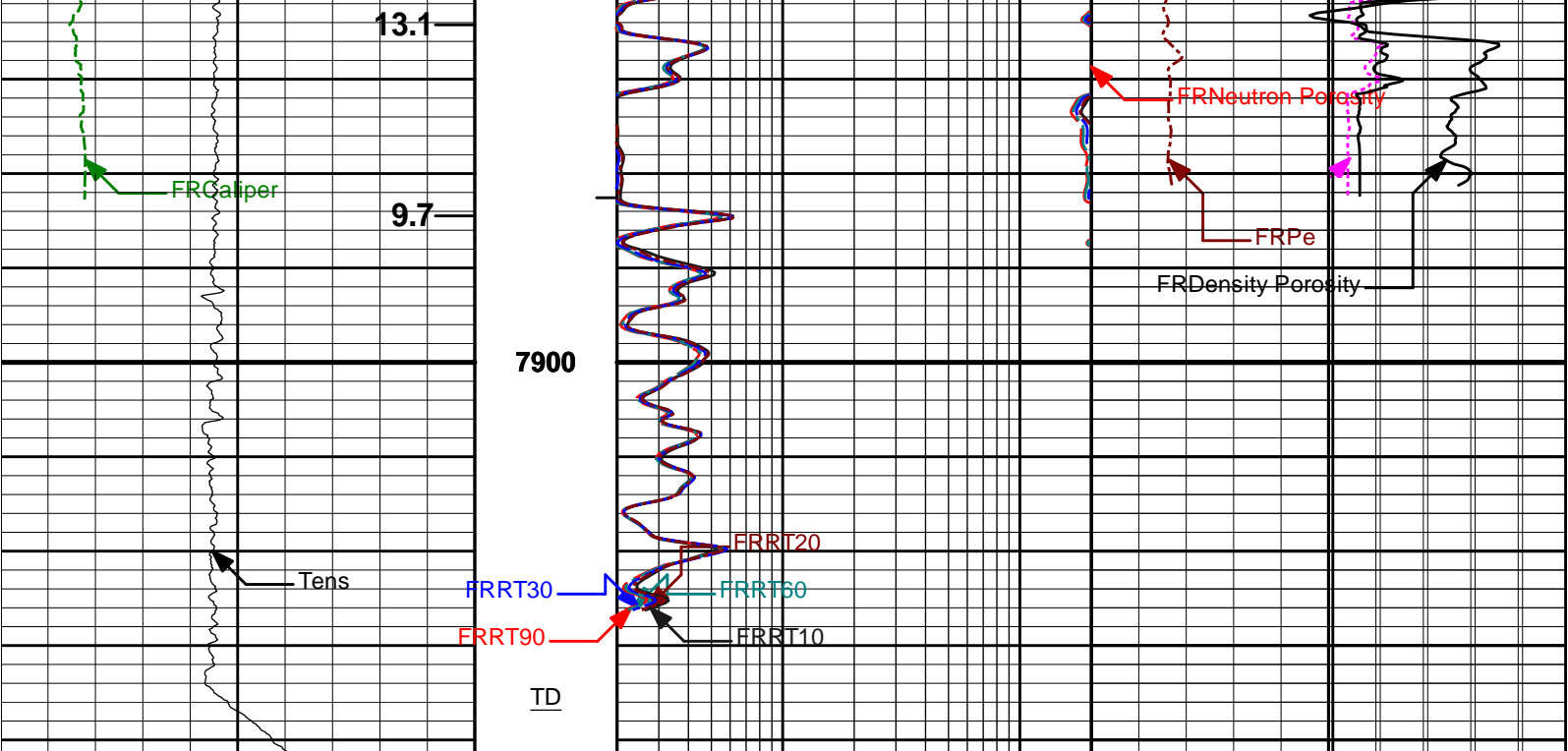












50	SP	150	1 : 240	2	RT90	200	0	Pe	10	0	MicrologNormal	20
	millivolts				Ohm-m						ohm-metre	
0	Gamma API	250	BHVT	2	RT60	200				0	MicrologLateral	20
	api				Ohm-m						ohm-metre	
6	Caliper	16	AHVT	2	RT30	200					PERMEABLE	
	inches				Ohm-m							
10K	Tens	0		2	RT20	200	20	Density Porosity		0		
	pounds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

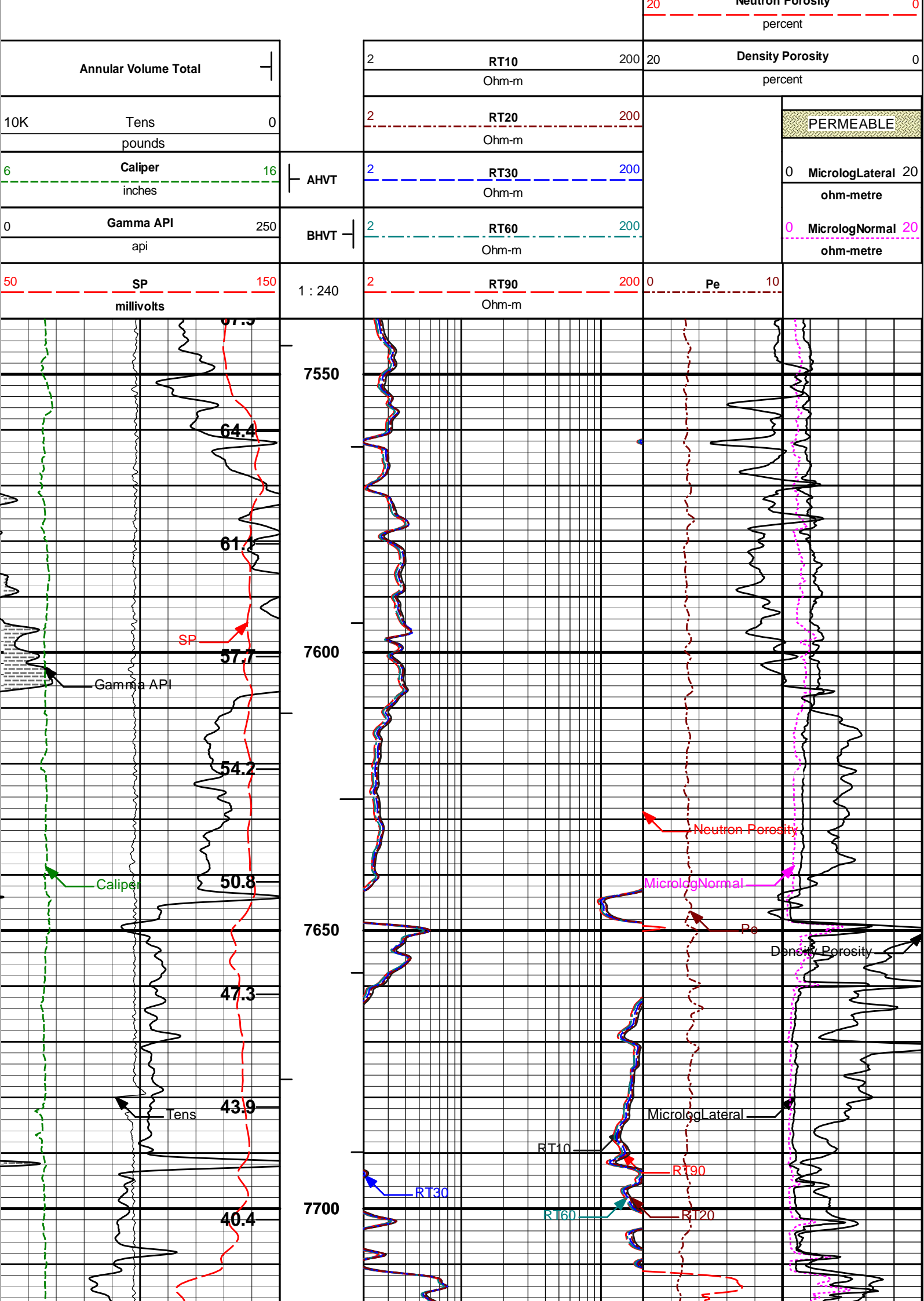
HALLIBURTON Plot Time: 11-May-10 19:34:41
Plot Range: 1040 ft to 7941.42 ft
Data: DF_RH1161_09_32\Well Based\MAIN*
Plot File: \COMPOSITE\TRIPLE COMBO

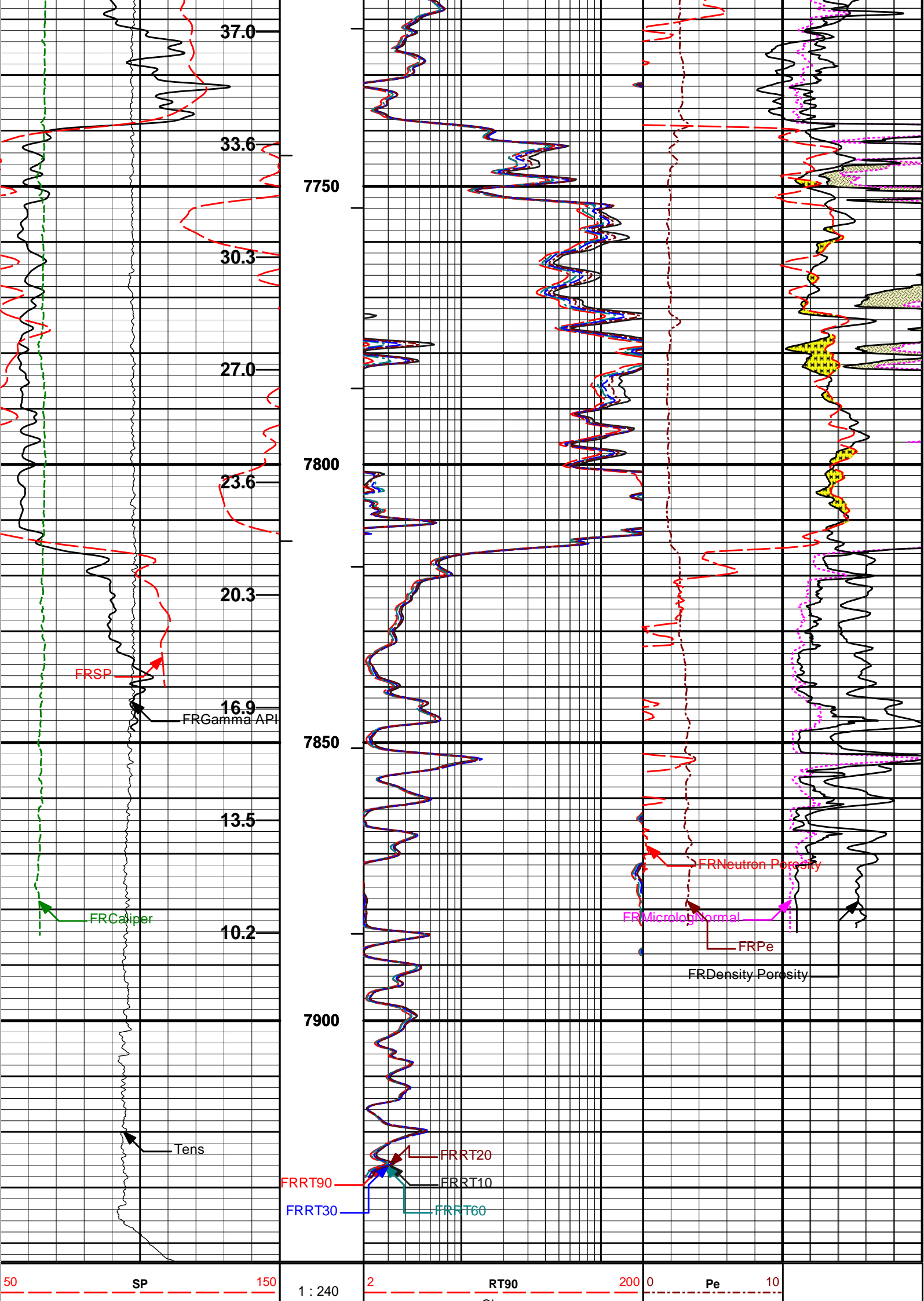
MAIN PASS 5" = 100'

HALLIBURTON Plot Time: 11-May-10 19:34:41
Plot Range: 7540 ft to 7943.33 ft
Data: DF_RH1161_09_32\Well Based\REPEAT*
Plot File: \COMPOSITE\REPEAT SECTION

MAIN PASS 5" = 100'

Track 1	Depth Track	Track 2	Track 5	Track 3	Track 6





millivolts			Ohm-m							
0	Gamma API	250	BHVT	2 RT60 200				0	MicrologNormal	20
api				Ohm-m				ohm-metre		
6	Caliper	16	AHVT	2 RT30 200				0	MicrologLateral	20
inches				Ohm-m				ohm-metre		
10K	Tens	0		2 RT20 200				PERMEABLE		
pounds				Ohm-m						
Annular Volume Total				2 RT10 200				20 Density Porosity 0		
				Ohm-m				percent		
							20 Neutron Porosity 0			
							percent			

<div>HALLIBURTON</div>		Plot Time: 11-May-10 19:34:45 Plot Range: 7540 ft to 7943.33 ft Data: DF_RH1161_09_32\Well Based\REPEAT\ Plot File: \COMPOSITE\REPEAT SECTION
MAIN PASS 5" = 100'		
<div>HALLIBURTON</div>		
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
6914.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
7162.00					
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
7576.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	9.000	ppg
	SHARED	OBM	Oil Based Mud System?	No	
	SHARED	RMUD	Mud Resistivity	1.500	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	7955.00	ft
	SHARED	BHT	Bottom Hole Temperature	150.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	IDT	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	IDT	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa /	AFAC	Apply AFAC	0.0000	

	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	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	
	IDT	WRTI	Survey Writing Interval	30	ft
	IDT	SOPT	Smoothing Option	None	
	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	0.250	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	
	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	User define	
	BSAT	DTMA	Delta -T Matrix	47.60	uspf
	BSAT	DTSH	Delta -T Shale	100.00	uspf
	BSAT	SPEQ	Acoustic Porosity Equation	Wyllie	
	ACRt	RTOK	Process ACRt?	Yes	
	ACRt	MNSO	Minimum Tool Standoff	1.50	in
	ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Up	
	ACRt	TPOS	Tool Position	Free Hanging	
	ACRt	RMOP	Rmud Source	Mud Cell	
	ACRt	RMIN	Minimum Resistivity for MAP	0.20	ohmm
	ACRt	RMIN	Maximum Resistivity for MAP	200.00	ohmm

ACRT	THQY	Threshold Quality	0.50
BOTTOM			
Data: DF_RH1161_09_32\0001 SP-GTET-IDT-CSNG-DSNT-SDLT-FXIX-ICT-BSAT-ACRT-SO\003.01 11-May-10 17:26 Up			Date: 11-May-10 19:11:18

HALLIBURTON

INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
CH_HOS				
DHTN	Downhole Tension	0.00	BLK	0.000
SP Digital				
PLTC	Plot Control Mask	102.34	NO	
SP	Spontaneous Potential	102.34	BLK	1.250
SPR	Raw Spontaneous Potential	102.34	NO	
SPO	Spontaneous Potential Offset	102.34	NO	
GTET				
TPUL	Tension Pull	94.32	NO	
GR	Natural Gamma Ray API	94.32	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	94.32	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	94.32	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
IDT				
TPUL	Tension Pull	85.27	NO	
ACCX	Accelerometer X	85.27	NO	
ACCY	Accelerometer Y	85.27	NO	
ACCZ	Accelerometer Z	85.27	NO	
MAGX	magnetometer x with unit	85.27	NO	
MAGY	Magnetometer Y with unit	85.27	NO	
MAGZ	magnetometer z with unit	85.27	NO	
IAMP	Accelerometer Temperature	85.27	NO	
MTMP	Magnetometer Temperature	85.27	NO	
CSNG				
TPUL	Tension Pull	78.65	NO	
STAT	Status	78.65	NO	
FRMC	Tool Frame Count	78.65	BLK	0.250
TFRM	Total Frames	78.65	NO	
LSPD	Line Speed	78.65	BLK	0.250
CTIM	Accumulation time for sample	78.65	BLK	0.250
NOIS	Spectral Noise	78.65	BLK	0.250
STAB	Stabilizer Voltage in mv	78.65	BLK	0.250
STBP	Stabilizer 60 KEV Peak	78.65	BLK	0.250
AMER	Americium	78.65	BLK	0.250
FTMP	Flask PCB Temperature	78.65	BLK	0.250
SPEL	Low Energy Spectrum	78.65	BLK	0.250
SPEH	High Energy Spectrum	78.65	BLK	0.250
SSP	Stabilization Energy Spectrum	78.65	BLK	0.250
CSPC	CSNG Lo Hi Spectrum Data	78.65	NO	

DSNT				
TPUL	Tension Pull	68.32	NO	
RNDS	Near Detector Telemetry Counts	68.42	BLK	1.417
RFDS	Far Detector Telemetry Counts	69.17	TRI	0.583
DNTT	DSN Tool Temperature	68.42	NO	
DSNS	DSN Tool Status	68.32	NO	
ERND	Near Detector Telemetry Counts EVR	68.42	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	69.17	BLK	0.000
ENTM	DSN Tool Temperature EVR	68.42	NO	
SDLT				
TPUL	Tension Pull	58.41	NO	
NAB	Near Above	58.24	BLK	0.920
NHI	Near Cesium High	58.24	BLK	0.920
NLO	Near Cesium Low	58.24	BLK	0.920
NVA	Near Valley	58.24	BLK	0.920
NBA	Near Barite	58.24	BLK	0.920
NDE	Near Density	58.24	BLK	0.920
NPK	Near Peak	58.24	BLK	0.920
NLI	Near Lithology	58.24	BLK	0.920
NBAU	Near Barite Unfiltered	58.24	BLK	0.250
NLIU	Near Lithology Unfiltered	58.24	BLK	0.250
FAB	Far Above	58.59	BLK	0.250
FHI	Far Cesium High	58.59	BLK	0.250
FLO	Far Cesium Low	58.59	BLK	0.250
FVA	Far Valley	58.59	BLK	0.250
FBA	Far Barite	58.59	BLK	0.250
FDE	Far Density	58.59	BLK	0.250
FPK	Far Peak	58.59	BLK	0.250
FLI	Far Lithology	58.59	BLK	0.250
PTMP	Pad Temperature	58.42	BLK	0.920
NHV	Near Detector High Voltage	55.61	NO	
FHV	Far Detector High Voltage	55.61	NO	
ITMP	Instrument Temperature	55.61	NO	
TPUL	Tension Pull	58.42	NO	
PCAL	Pad Caliper	58.42	TRI	0.250
ACAL	Arm Caliper	58.42	TRI	0.250
TPUL	Tension Pull	58.61	NO	
MINV	Microlog Lateral	58.61	BLK	0.750
MNOR	Microlog Normal	58.61	BLK	0.750
ICT				
TPUL	Tension Pull	39.90	NO	
	Arm Potentiometer excitation V	37.11	NO	
	Caliper 1 measurement	39.90	BLK	1.250
	Caliper 2 measurement	39.90	BLK	1.250
	Caliper 3 measurement	39.90	BLK	1.250
	Caliper 4 measurement	39.90	BLK	1.250
	Caliper 5 measurement	39.90	BLK	1.250
	Caliper 6 measurement	39.90	BLK	1.250
	Caliper Global measurement	39.90	BLK	1.250
MOTI	Motor Current	37.11	NO	
MOT1	Motor Voltage Monitor 1	37.11	NO	
STA1	Status word #1	37.11	NO	
STA2	Status word #2	37.11	NO	
PRES	Caliper percentage of total compression of the spring	37.11	NO	
HAZI	Hole Azimuth	39.90	NO	
RB	Relative Bearing	39.90	NO	
AZI1	PAD1 Azimuth	39.90	NO	
DEVI	Inclination	39.90	NO	

DEVI	Inclination	39.90	NO	
BSAT				
TPUL	Tension Pull	28.59	NO	
STAT	Status	28.59	NO	
DLYT	Delay Time	28.59	NO	
SI	Sample Interval	28.59	NO	
TXRX	Raw Telemetry 10 Receivers	28.59	NO	
FRMC	Tool Frame Count	28.59	NO	
ACRt				
TPUL	Tension Pull	4.48	NO	
F1R1	ACRT 12KHz - 80in R value	10.73	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	10.73	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	8.23	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	8.23	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	6.73	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	6.73	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	5.73	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	5.73	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	5.23	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	5.23	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	4.98	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	4.98	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	10.73	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	10.73	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	8.23	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	8.23	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	6.73	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	6.73	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	5.73	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	5.73	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	5.23	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	5.23	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	4.98	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	4.98	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	10.73	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	10.73	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	8.23	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	8.23	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	6.73	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	6.73	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	5.73	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	5.73	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	5.23	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	5.23	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	4.98	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	4.98	BLK	0.000
RMUD	Mud Resistivity	14.27	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	4.48	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	4.48	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	4.48	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	4.48	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	4.48	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	4.48	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	4.48	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	4.48	BLK	0.000
ITMP	Instrument Temperature	4.48	BLK	0.000
TCVA	Temperature Correction Values Loop Off	4.48	NO	
TIDV	Instrument Temperature Derivative	4.48	NO	

TUDV	Upper Temperature Derivative	4.48	NO
TLDV	Lower Temperature Derivative	4.48	NO
TRBD	Receiver Board Temperature	4.48	NO
Data: DF_RH1161_09_32\0001 SP-GTET-IDT-CSNG-DSNT-SDLT-FXIX-ICT-BSAT-ACRT-SO\003.01 11-May-10 17:26 Up		Date: 11-May-10 19:11:50	

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11048627	Reference Calibration Date:	03-May-10 07:46:29
Engineer:	W. MILLER	Calibration Date:	08-May-10 09:01:48
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

Calibrator Source S/N: TB 146			
Calibrator API Reference:265.00 api			
Measurement	Measured	Calibrated	Units
Background	32.4	30.4	api
Background + Calibrator	315.0	295.4	api
Calibrator	263.0	265.0	api

CSNG-FS SHOP CALIBRATION			
Tool Name:	CSNG - 10846351	Reference Calibration Date:	21-Jan-10 14:42:19
Engineer:	C. BLUE	Calibration Date:	15-Apr-10 12:11:22
Software Version:	WL INSITE R2.4 (Build 20)	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 #	23.0	23.1	Channel #
583 KEV Peak Channel #	52.2	52.3	Channel #
2614 KEV Peak Channel #	215.0	215.0	Channel #
Calibrate Temperature	49.1	77.7	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	1763.1	CPS	335.0	342.6	API
Background	418.6	CPS	73.8	81.3	API

Gamma Ray Gain: 0.98

Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11055304	Reference Calibration Date:	07-Apr-10 11:31:13
Engineer:	W.MILLER	Calibration Date:	04-May-10 11:20:54
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

Logging Source S/N: DSN-424	
Tank Serial Number: LIB-105060	

Reference value assigned to Tank: 51.680
Snow Block S/N: 696 BLOCK
Calibration Tank Water Temperature: 67 degF
Min. Tool Housing Outside Diameter: 3.622 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value

Gain:	0.982	0.977	0.900 - 1.100
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WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2123	0.2110	0.0014	+/- 0.0020
Calibrated Ratio:	9.77	9.73	0.046	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit

Snow-Block Porosity (decp):	0.0780	0.02000 - 0.09000
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PASS/FAIL SUMMARY	
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Background Check:	Passed
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Gain-Range Check:	Passed
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Snow-Block Check:	Passed
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SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	SDLT - I04_P84	Reference Calibration Date:	07-Apr-10 14:05:58
Engineer:	W.MILLER	Calibration Date:	04-May-10 13:07:10
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

Logging Source S/N: 5168GW		
Aluminum Block S/N: LIBERAL	Density: 2.598g/cc	Pe: 3.170
Magnesium Block S/N: LIBERAL	Density: 1.684g/cc	Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0582	1.0354	0.90 - 1.10
Near Dens Gain	1.0131	1.0074	0.90 - 1.10
Near Peak Gain	1.0134	0.9944	0.90 - 1.10
Near Lith Gain	0.9893	0.9795	0.90 - 1.10
Far Bar Gain	1.0143	1.0119	0.90 - 1.10
Far Dens Gain	1.0025	1.0001	0.90 - 1.10
Far Peak Gain	0.9997	0.9949	0.90 - 1.10
Far Lith Gain	0.9787	0.9702	0.90 - 1.10
Near Bar Offset	-0.4221	-0.2043	NONE
Near Dens Offset	-0.0337	0.0250	NONE
Near Peak Offset	-0.0534	0.1173	NONE
Near Lith Offset	0.1216	0.2138	NONE
Far Bar Offset	-0.0648	-0.0377	NONE
Far Dens Offset	0.0179	0.0411	NONE
Far Peak Offset	0.0168	0.0524	NONE
Far Lith Offset	0.1502	0.2042	NONE
Near Bar Background	879.18	884.16	700 - 1450
Near Dens Background	295.13	292.63	230 - 480
Near Peak Background	127.46	128.27	100 - 210
Near Lith Background	157.54	155.60	125 - 260

Near Lith Background	157.34	153.66	125 - 200
Far Bar Background	551.01	548.69	450 - 900
Far Dens Background	214.43	213.87	175 - 345
Far Peak Background	84.83	84.18	70 - 140
Far Lith Background	88.73	88.64	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.677	1.684	0.007	+/- 0.015
Pe	2.632	2.593	-0.039	+/- 0.150
ALUMINUM				
Density (g/cc)	2.588	2.598	0.010	+/- 0.01500
Pe	3.194	3.169	-0.025	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0008	+/- 0.0110	0.0003	+/- 0.0140
Magnesium Block	-0.0001	+/- 0.0110	0.0006	+/- 0.0140
Aluminum Block	0.0002	+/- 0.0110	-0.0016	+/- 0.0140
Resolution	9.33	6.00 - 11.50	9.11	6.00 - 11.50
Internal Verifier(B+D+P+L)	1461	1200 - 2700	935	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

MICRO LOG SHOP CALIBRATION			
Tool Name:	SDLT - I04_P84	Reference Calibration Date:	20-Apr-10 11:39:17
Engineer:	W. MILLER	Calibration Date:	08-May-10 09:22:26
Software Version:	WL INSITE R3.0.4 (Build 6)	Calibration Version:	1

CALIBRATION COEFFICIENT SUMMARY					
Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.08	-0.07	-0.01	-0.03	ohmm
Calibration Point #1	-0.01	0.00	0.02	0.00	ohmm
Calibration Point #2	19.98	20.00	20.02	20.00	ohmm
Internal Reference	19.94	19.95	19.99	19.97	ohmm
Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
Tool Zero	-1.23		0.02		V
Calibration Point #1	16.42		9.40		V
Calibration Point #2	5348.33		7011.63		V
Internal Reference	5335.65		7002.00		V

ICT SHOP CALIBRATION			
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Tool Name: ICT - 633				Reference Calibration Date: 05-Mar-09 09:22:07				
Engineer: W. MILLER				Calibration Date: 16-Apr-10 09:05:49				
Software Version: WL INSITE R3.0.4 (Build 6)				Calibration Version: 1				
	CALIPERS AND RINGS							
	Ring		Measured		Calibrated		Units	
	CALIPER 1:							
	Small Ring		3.73		3.65		in	
	Medium Ring		8.05		8.00		in	
	Large Ring		14.99		15.00		in	
	X-Large Ring		20.97		21.00		in	
	CALIPER 2:							
	Small Ring		3.74		3.65		in	
	Medium Ring		8.10		8.00		in	
	Large Ring		15.01		15.00		in	
	X-Large Ring		21.05		21.00		in	
	CALIPER 3:							
	Small Ring		3.60		3.65		in	
	Medium Ring		7.95		8.00		in	
	Large Ring		14.96		15.00		in	
	X-Large Ring		20.98		21.00		in	
	CALIPER 4:							
	Small Ring		3.81		3.65		in	
	Medium Ring		8.10		8.00		in	
	Large Ring		15.16		15.00		in	
	X-Large Ring		21.10		21.00		in	
	CALIPER 5:							
	Small Ring		3.65		3.65		in	
	Medium Ring		8.09		8.00		in	
	Large Ring		14.97		15.00		in	
	X-Large Ring		20.99		21.00		in	
	CALIPER 6:							
	Small Ring		3.68		3.65		in	
	Medium Ring		8.07		8.00		in	
	Large Ring		15.04		15.00		in	
	X-Large Ring		21.02		21.00		in	

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION									
Tool Name: ACRt - I962_S909				Reference Calibration Date: 24-Mar-10 09:47:56					
Engineer: W. MILLER				Calibration Date: 20-Apr-10 10:38:07					
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	1.0175	1.05	0.95	1.0197	1.05	0.95	1.0174	1.05
A2 (50")	0.95	1.0298	1.05	0.95	1.0314	1.05	0.95	1.0297	1.05
A3 (29")	0.95	1.0127	1.05	0.95	1.0136	1.05	0.95	1.0097	1.05
A4 (17")	0.95	1.0031	1.05	0.95	1.0021	1.05	0.95	1.0012	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0061	1.05	0.95	1.0035	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9973	1.05	0.95	0.9942	1.05
TYPICAL SONDE OFFSET RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-0.031	2	-6	-3.442	-2	-8	-4.833	-2
A2 (50")	-7	-1.228	-1	-6	-3.334	-2	-7	-4.296	-2

A3 (29")	-27	-13.808	-9	-9	-4.235	-3	-7	-2.581	-1
A4 (17")	-180	-100.927	-60	-45	-30.181	-15	-39	-25.568	-13
A5 (10")	N/A	N/A	N/A	-150	-99.538	-50	-80	-44.897	-10
A6 (6")	N/A	N/A	N/A	175	286.112	525	90	150.696	270

TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION			
Signal	Lower	R	Upper		Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.8716	1.3		Mud Cell	0.95	1.002	1.05
36K	1.0	1.3421	2.0					
72K	1.0	1.5649	2.0					

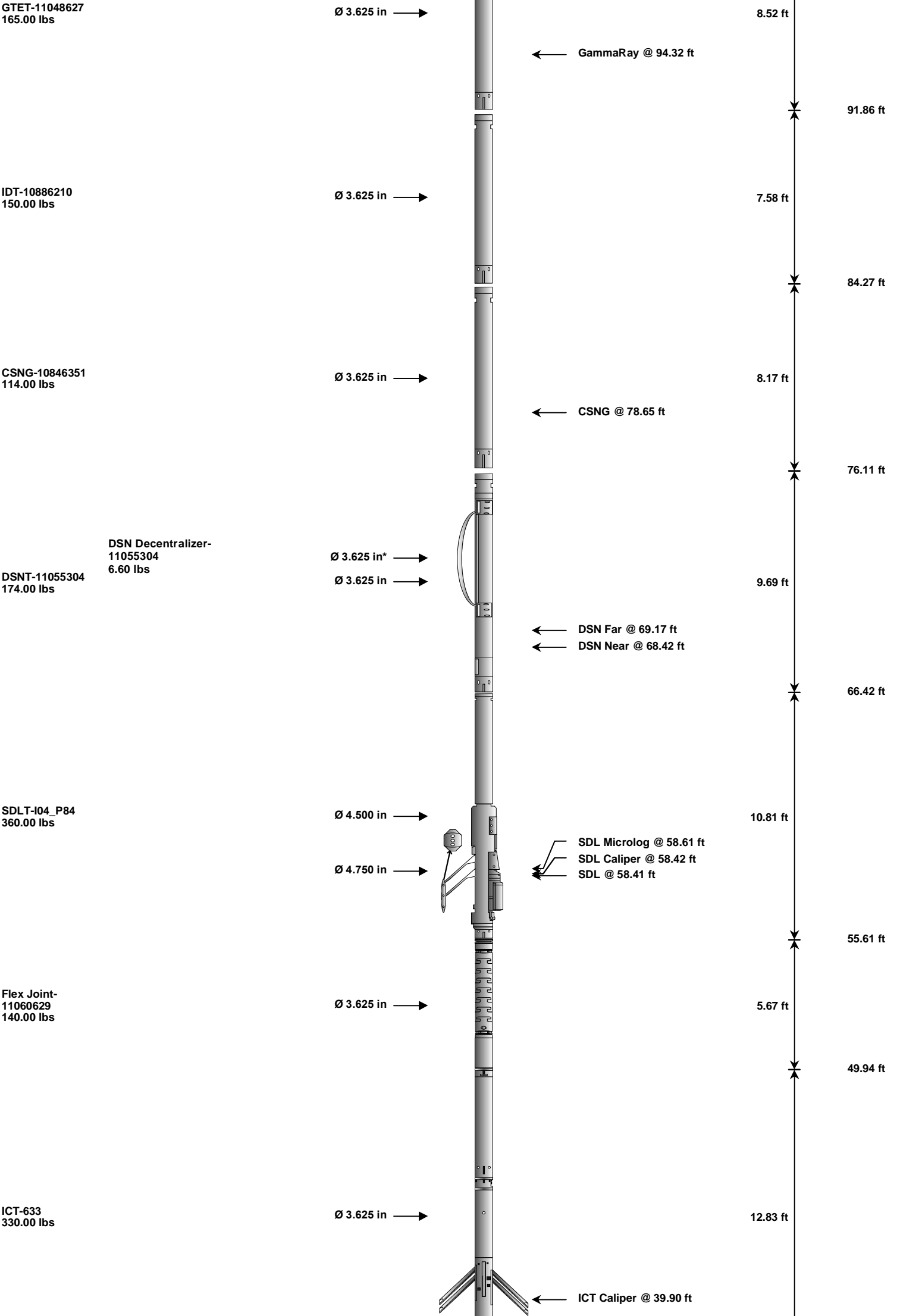
CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11048627						
Gamma Ray Calibrator	265.0	-----	-----	0.0	+/- 9.00	api
CSNG-10846351						
60 KEV Peak Channel #	48.0	-----	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.1	-----	-----	0.0	-----	Channel #
583 KEV Peak Channel #	52.3	-----	-----	0.0	-----	Channel #
2614 KEV Peak Channel #	215.0	-----	-----	0.0	-----	Channel #
DSNT-11055304						
Snow-Block Porosity	0.0780	-----	-----	0.0000	+/- -.--	decp
SDLT-I04_P84						
Near(B+D+P+L)	1460.665	-----	-----	0.000	+/-13.482	cps
Far(B+D+P+L)	935.379	-----	-----	0.000	+/-14.989	cps
MicroLog Normal	19.95	-----	-----	0.00	-----	ohmm
MicroLog Lateral	19.97	-----	-----	0.00	-----	ohmm
ICT-633						
Caliper 1	8.00	-----	-----	0.00	-----	in
Caliper 2	8.00	-----	-----	0.00	-----	in
Caliper 3	8.00	-----	-----	0.00	-----	in
Caliper 4	8.00	-----	-----	0.00	-----	in
Caliper 5	8.00	-----	-----	0.00	-----	in
Caliper 6	8.00	-----	-----	0.00	-----	in
ACRt-I962_S909						
Mud Cell	1.002	-----	-----	0.000	-----	ohm-m

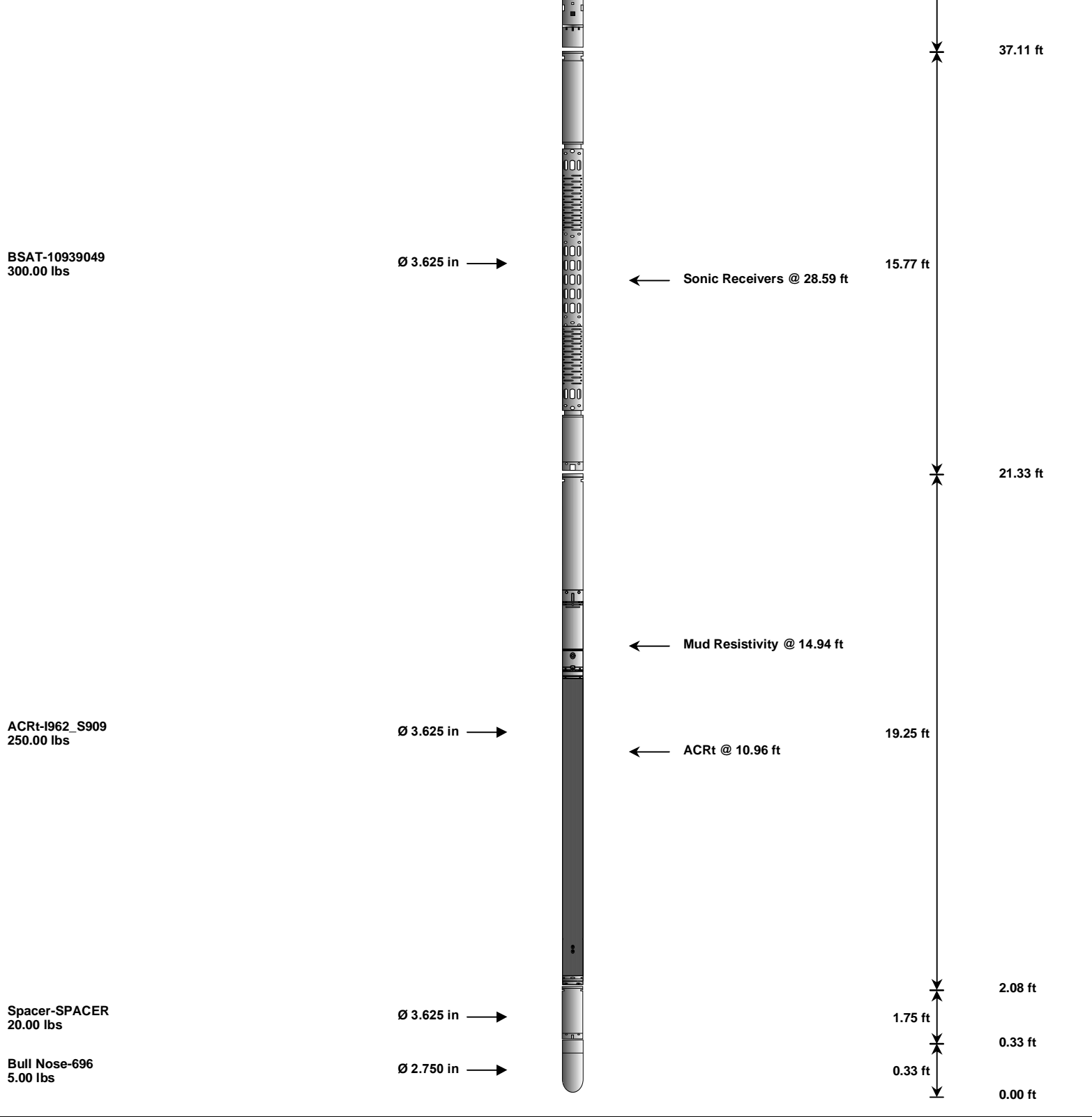
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HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS-CH_696 37.50 lbs		Ø 2.750 in →		← Temperature @ 106.99 ft	3.03 ft	108.02 ft
XOHD-696 20.00 lbs		Ø 2.750 in → Ø 3.625 in →			0.95 ft	104.99 ft
SP Digital-10979140 60.00 lbs		Ø 3.625 in →		← SP @ 102.34 ft	3.67 ft	104.04 ft
						100.38 ft





Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell		CH_696	37.50	3.03	104.99	300.00
XOHD	Hostile to Dits Cross Over		696	20.00	0.95	104.04	300.00
SP	Digital Downhole Measured SP		10979140	60.00	3.67	100.38	300.00
GTET	Gamma Telemetry Tool		11048627	165.00	8.52	91.86	60.00
IDT	Insite Directional Tool		10886210	150.00	7.58	84.27	30.00
CSNG	Compensated Spectral Natural Gamma		10846351	114.00	8.17	76.11	15.00
DSNT	Dual Spaced Neutron		11055304	174.00	9.69	66.42	60.00
DCNT	DSN Decentralizer		11055304	6.60	5.13	* 69.75	300.00
SDLT	Spectral Density Tool		I04_P84	360.00	10.81	55.61	60.00
FLEX	Flex Joint		11060629	140.00	5.67	49.94	300.00
ICT	Six Independent Arm Caliper		633	330.00	12.83	37.11	60.00
BCAS	Borehole Sonic Array Tool		10939049	300.00	15.77	21.33	60.00
ACRt	Array Compensated True Resistivity		I962_S909	250.00	19.25	2.08	300.00
SPC	Test		SPACER	20.00	1.75	0.33	100.00
BLNS	Bull Nose		696	5.00	0.33	0.00	300.00
Total				2,132.10	108.02		

* Not included in Total Length and Length Accumulation.

COMPANY	NOBLE ENERGY, INC.		
WELL	DF RANCH 1161-09-32		
FIELD	GROVER		
COUNTY	WELD	STATE	COLORADO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRAON ARRAY COMPENSATED TRUE RESISTIVITY MICROLOG	