

**DUAL SPACED NEUTRON  
SPECTRAL DENSITY  
ARRAY COMPENSATED  
TRUE RESISTIVITY**

Service Ticket No.:						API Serial No.: 05005072070000						PGM Version: WL INSITE R3.8.4 (Build 5)															
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		F. Viscosity																									
Alkalinity		P. Viscosity																									
HTHP @ Meas. Temp.				@				@								RESISTIVITY EQUIPMENT DATA											
Solids		Wgt. Mat.										Run No.		Tool Type & No.		Pad Type				Tool Pos.				Other			
Oil		Water Ratio										ONE		ACRT		N/A				CENT				N/A			
Water Phase Salinity														11302817													
Oil Type		Water Type												11294353													
Electrical Stability																											
EQUIPMENT DATA																											
GAMMA						ACOUSTIC						DENSITY						NEUTRON									
Run No.		ONE				Run No.		ONE				Run No.		ONE				Run No.		ONE							
Serial No.		11812883				Serial No.		90296673				Serial No.		11795867				Serial No.		11812187							
Model No.		GTET				Model No.		WSTT				Model No.		SDLT				Model No.		DSNT							
Diameter		3.625"				No. of Cent.		2				Diameter		4.5"				Diameter		3.625"							
Detector Model No.		GTET				Spacing		0.5'				Log Type		GAM-GAM				Log Type		NEU-NEU							
Type		SCINT										Source Type		Cs 137				Source Type		Am241Be							
Length		8"				LSA [Y/N]		Y				Serial No.		5471GW				Serial No.		DSN-434							
Distance to Source		20'				FWDA [Y/N ]		Y				Strength		1.78 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	TD	CSG	REC	0	200	140	40		47.6	1.95		2.95	2.71	
ONE	CSG	200	REC	0	200									
DIRECTIONAL INFORMATION														
Maximum Deviation									@					
Remarks: RWCH/GTET/CSNG/DSNT/SDLT/IDT/ICT/WSTT/ACRT RAN IN COMBINATION														
ANNULAR HOLE VOLUME CALCULATED FOR 4.5-INCH CASING														
TENSION PULLS, WASHOUTS, AND BOREHOLE RUGOSITY CAN AFFECT TOOL RESPONSE														
BHT AVERAGED FROM 4 MAX TEMPERATURE THERMOMETERS														
YOUR CREW: A. AXE, B. RIEDEL, K. PREIST														
RIG: H&P 280														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES - BRIGHTON, CO - (303) 825-4346														
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.														
HALLIBURTON														



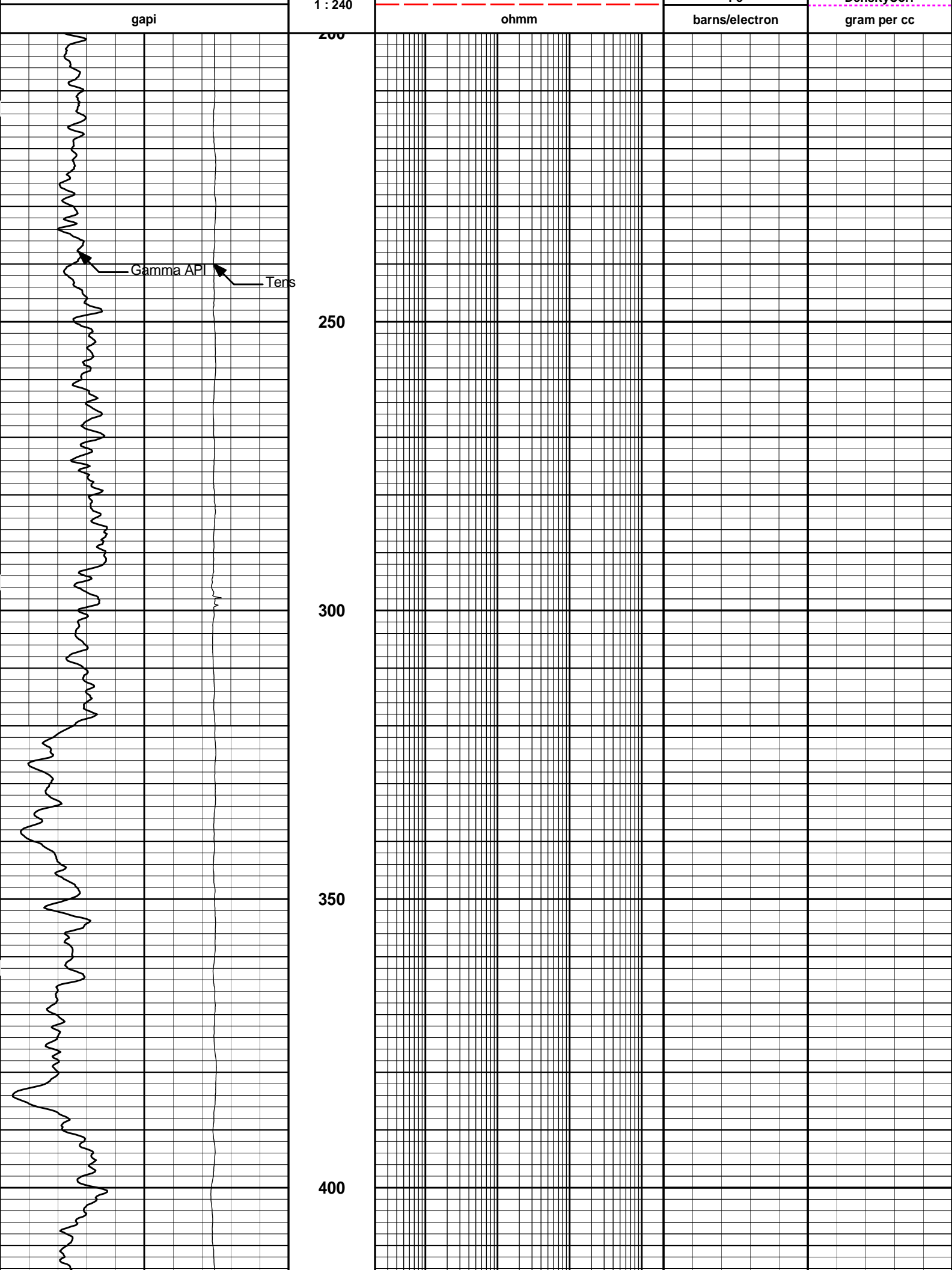
# PARAMETERS REPORT

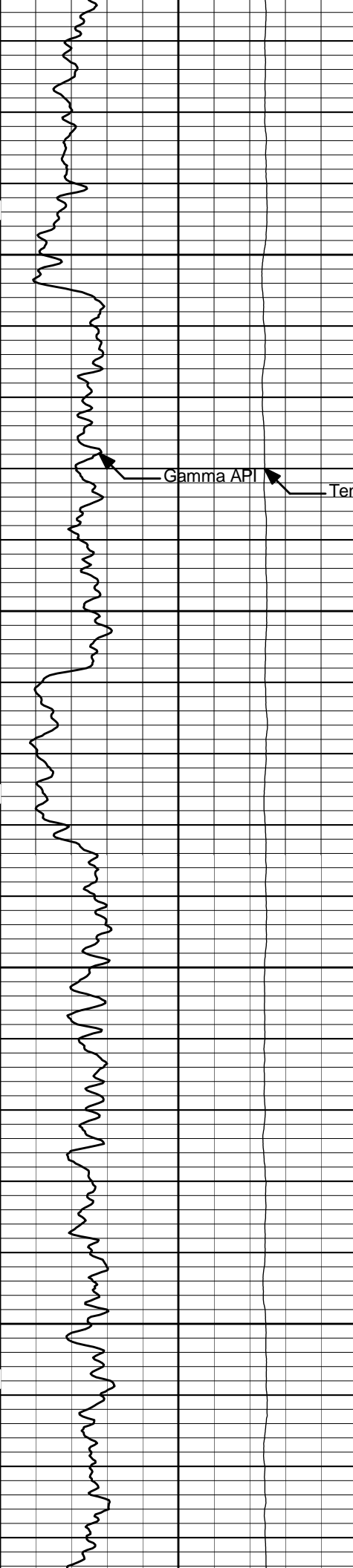
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	8.750	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Oil	
	SHARED	MDWT	Borehole Fluid Weight	9.200	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	WPHS	OBM Water Phase Salinity NaCl	75000.00	ppm
	SHARED	OFOW	Base Oil Fraction from Oil/Water Ratio	63.00	
	SHARED	OBMT	Oil based Mud Type	Diesel	
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	7.000	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	8030.00	ft
	SHARED	BHT	Bottom Hole Temperature	215.0	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	ICT	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa /				

	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	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	
	SimpleLithology	RMF	Mud Filtrate Resistivity	0.10	ohmm
	SimpleLithology	RMFT	Temperature of Mud Filtrate	175.00	degF
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GRSO	Gamma Tool Standoff	0.000	in
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	CSNG	CGOK	Process CSNG Data?	Yes	
	CSNG	CENT	Is Tool Centralized?	No	
	CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
	CSNG	BARF	Barite Correction Factor	1.00	
	CSNG	ORDG	Use Fixed Gain	No	
	CSNG	ORDO	Use Fixed Offset	No	
	CSNG	ORDR	Use Fixed Resolution Degradation Factor	No	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	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	CLOK	Process Caliper Outputs?	Yes	
	SDLT Pad	DNOK	Process Density?	Yes	
	SDLT Pad	DNOK	Process Density EVR?	No	
	SDLT Pad	CB	Logging Calibration Blocks?	No	
	SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
	SDLT Pad	DTWN	Disable temperature warning	No	
	SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
	SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
	IDT	WRTI	Survey Writing Interval	30	ft
	IDT	SOPT	Smoothing Option	None	
	ICT	CLOK	Process Caliper Outputs?	Yes	
	ICT	DARM	Disable Caliper Arm	No	
	ICT	ATDS	Arm To Disable	0	
	ICT	REPM	Method to replace arm?	Caliper Average	
	ICT	ARMV	Diameter to use for disabled arm	0.00	in
	ICT	DARM	Disable Second Caliper Arm	No	
	ICT	ATDS	Second Arm To Disable	0	
	ICT	REPM	Method to replace second arm?	Caliper Average	
	ICT	ARMV	Diameter to use for second disabled arm	0.00	in
	ICT	NAVS	Navigation Source Tool	IDT	
	ICT	CL1O	Radius 1 Offset	0.0	in
	ICT	CL2O	Radius 2 Offset	0.0	in
	ICT	CL3O	Radius 3 Offset	0.0	in

ICT	CL4O	Radius 4 Offset	0.0	in
ICT	CL5O	Radius 5 Offset	0.0	in
ICT	CL6O	Radius 6 Offset	0.0	in
ICT	BHVC	Radius type for borehole volume calcuations	Elliptical	
Wavesonic-I	WSOK	Process WSTT?	Yes	
Wavesonic-I	AFIL	Adaptive Filtering?	No	
Wavesonic-I	PINT	Process 1 Sample and Skip	0	
Wavesonic-I	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
Wavesonic-I	DTSH	Delta -T Shale	100.00	uspf
Wavesonic-I	DTMT	Delta -T Matrix Type	User define	
Wavesonic-I	DTMA	Delta -T Matrix	47.60	uspf
Wavesonic-I	DTFL	Delta -T Fluid	189.00	uspf
Wavesonic-I	RHOM	Matrix Density	2.7100	g/cc
Wavesonic-I	RHOF	Fluid Density	1.0000	g/cc
Wavesonic-I	SMTH	Semblance Threshold	0.25	
Wavesonic-I	VPVS	VPVS Ratio for Porosity	1.40	
Wavesonic-I	APEQ	Acoustic Porosity Equation	Wylie	
Wavesonic-I	NAVS	Navigation Source Tool	IDT	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Centered	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
BOTTOM_____				
Data: MORAN_TRUST_2-1\0001 TRIPLE RED-CSNG-IDT-ICT-WSTT-TEMP SUB\IDLE				Date: 09-Aug-13 00:11:14

HALLIBURTON										Plot Time: 09-Aug-13 05:50:56 Plot Range: 200 ft to 8043.83 ft Data: {ActiveWell}\Well Based\*\n* Plot File: \\COMP\\CoP MAIN																			
MAIN PASS 5" = 100'																													
										350		DipYDeltaT 1								50									
										microsec per ft																			
										0.2		RT10		2K		350		DipXDeltaT 1								50			
										ohmm										microsec per ft									
10K			Tens			0				0.2		RT20		2K		140		MonoDeltaT 1								40			
										ohmm										microsec per ft									
6			Caliper			16				AHVT		0.2		RT30		2K		0.45		Neutron Porosity								-0.15	
										ohmm										v/v									
0			GammaTotal			200				BHVT		0.2		RT60		2K		1.95		Density								2.95	
										ohmm										gram per cc									
0			Gamma API			200						0.2		RT90		2K		0		Pe		10		-0.25		DensityCorr		0.25	





450

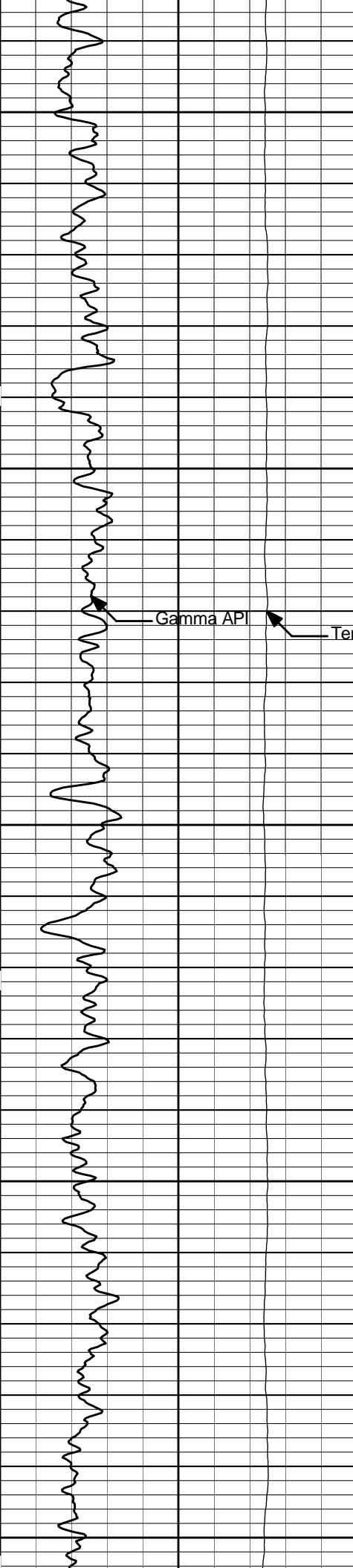
500

550

600

Gamma API

Ters



650

700

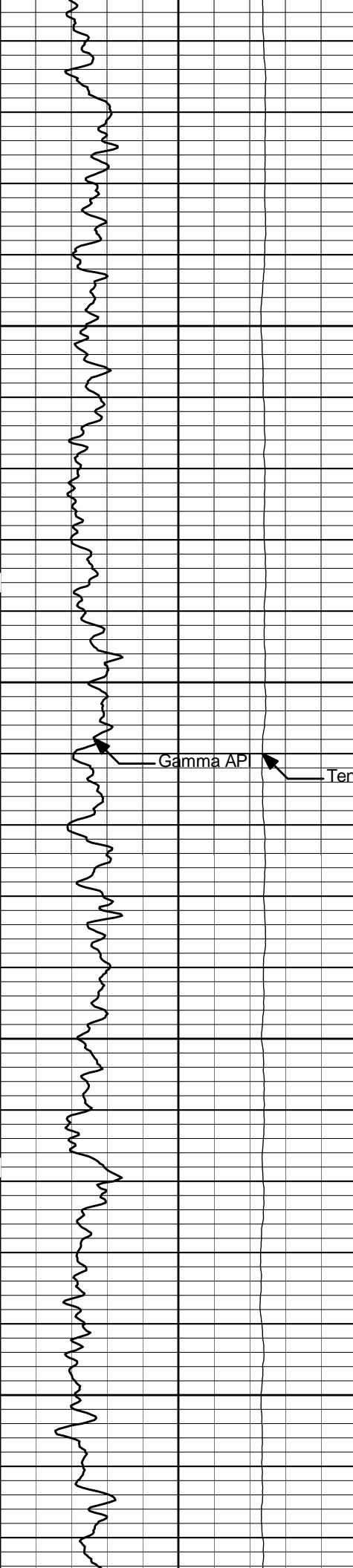
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800

850

Gamma API

Tens



900

950

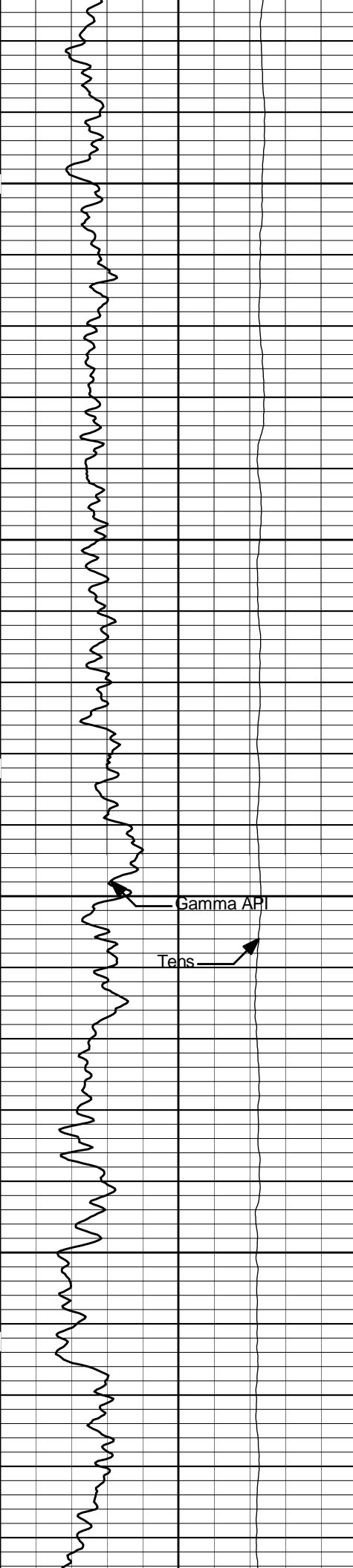
1000

1050

Gamma API

Tens





1100

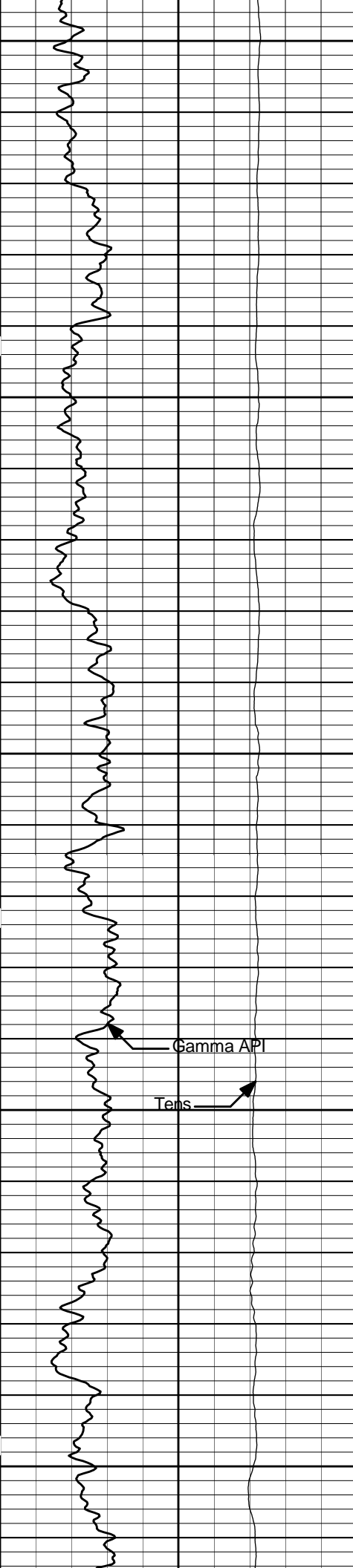
1150

1200

1250

Gamma API

Tens



1300

1350

1400

1450

1500

Gamma API

Tens



1550

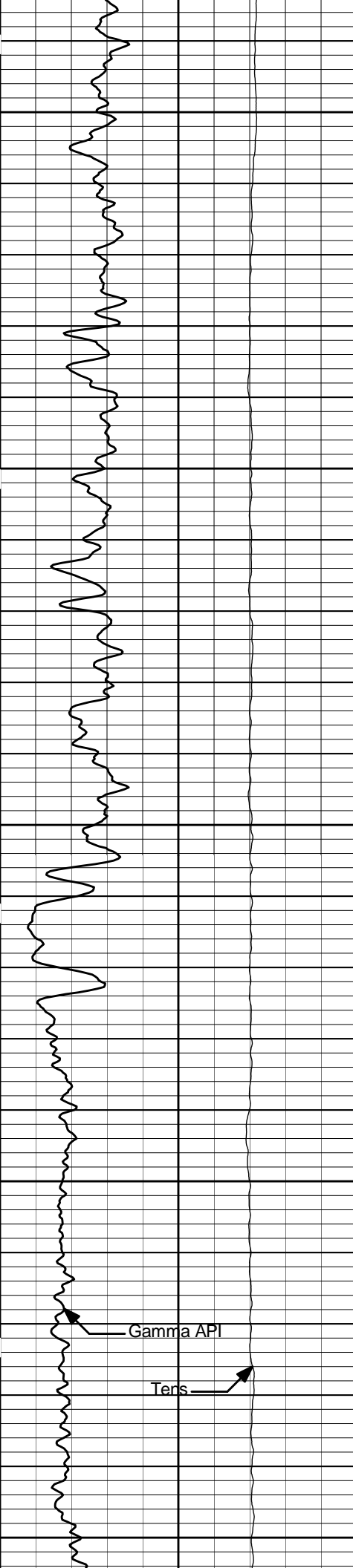
1600

1650

1700

Gamma API

Ters



1750

1800

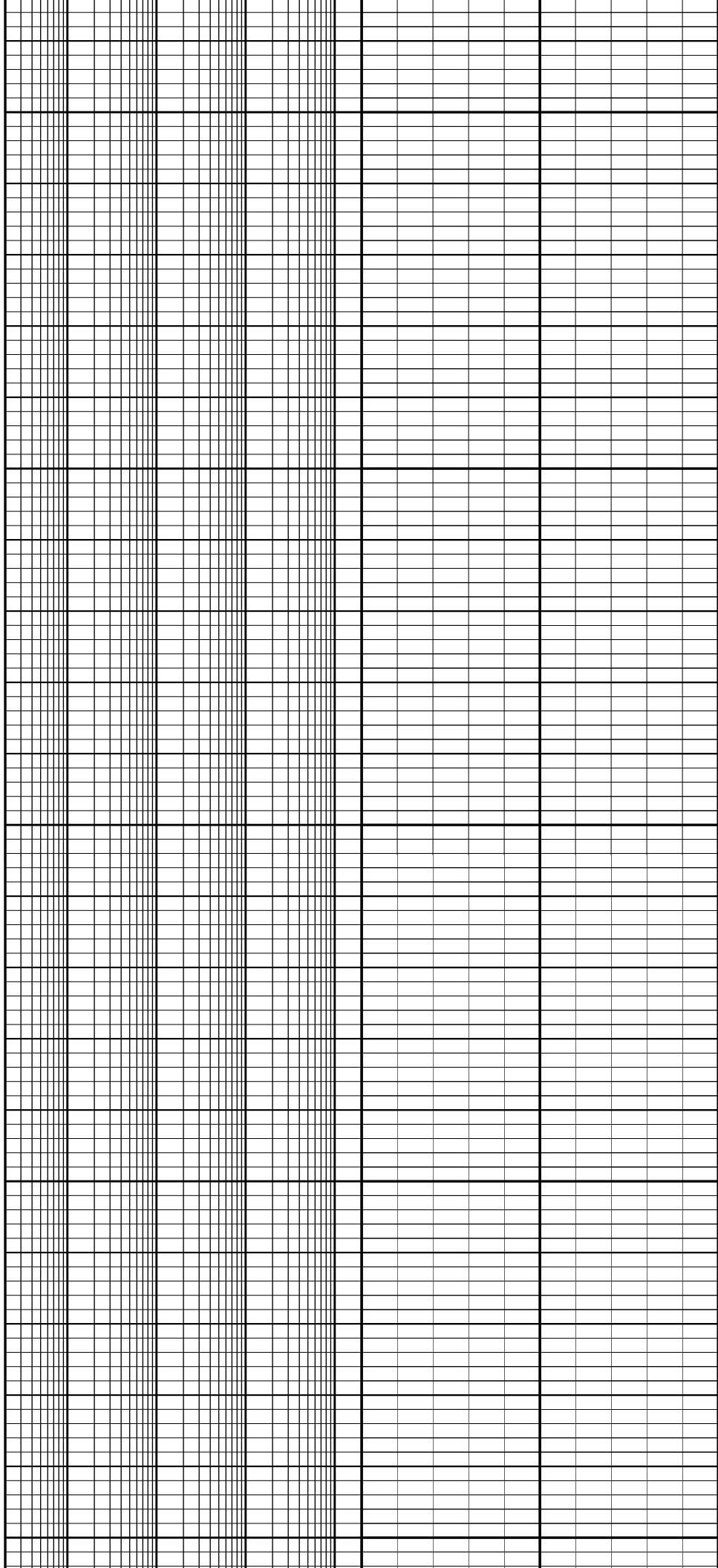
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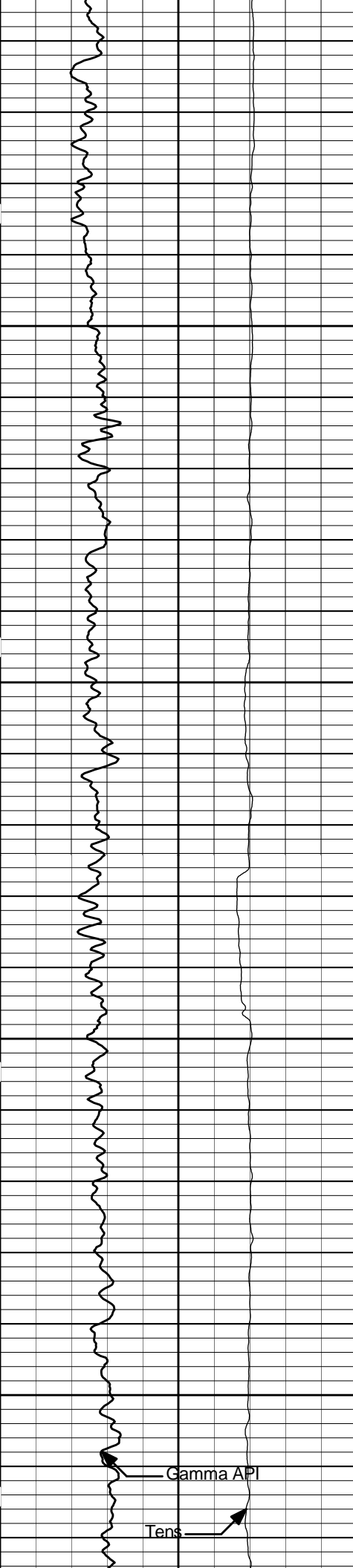
1900

1950

Gamma API

Ters





2000

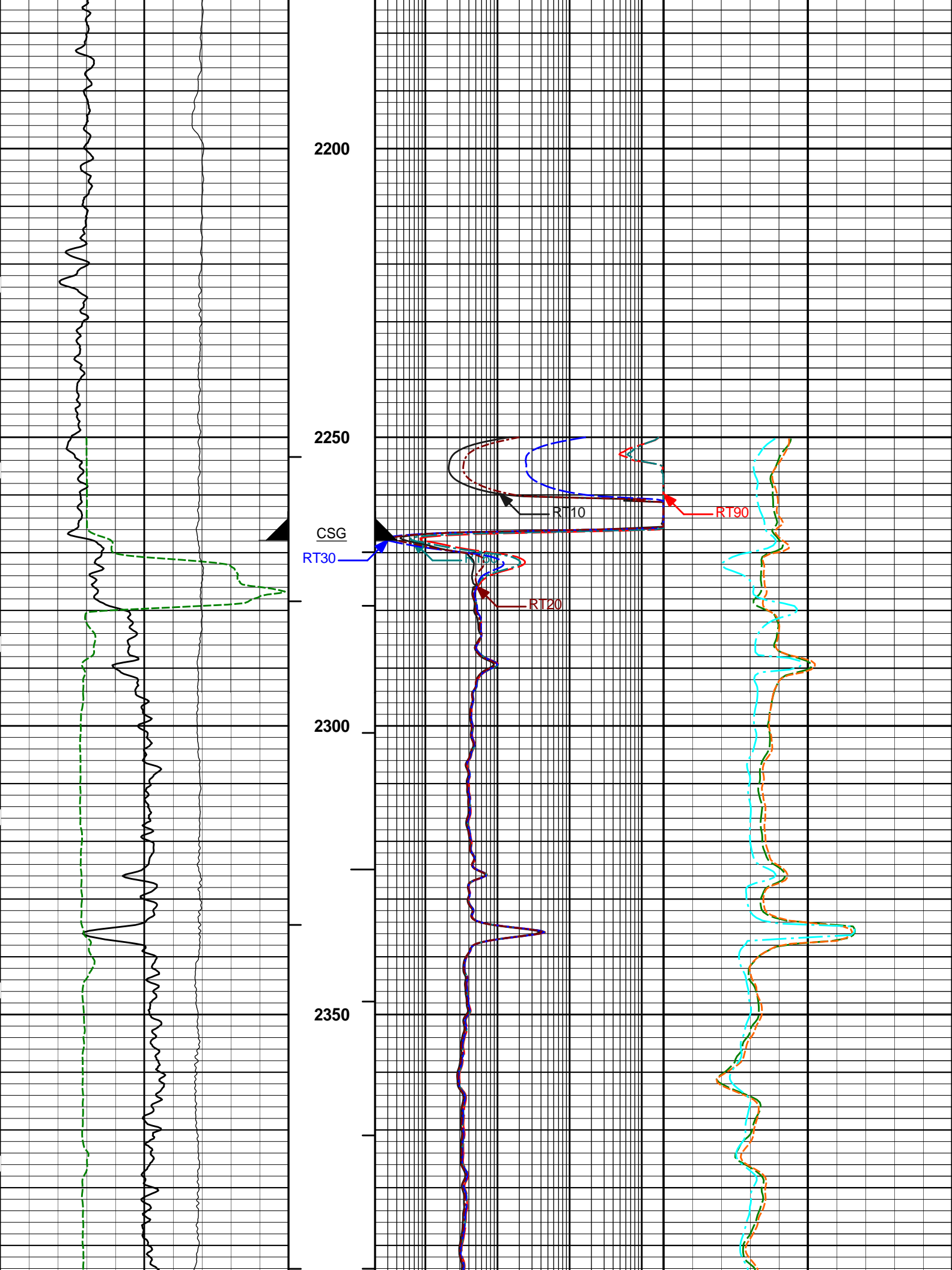
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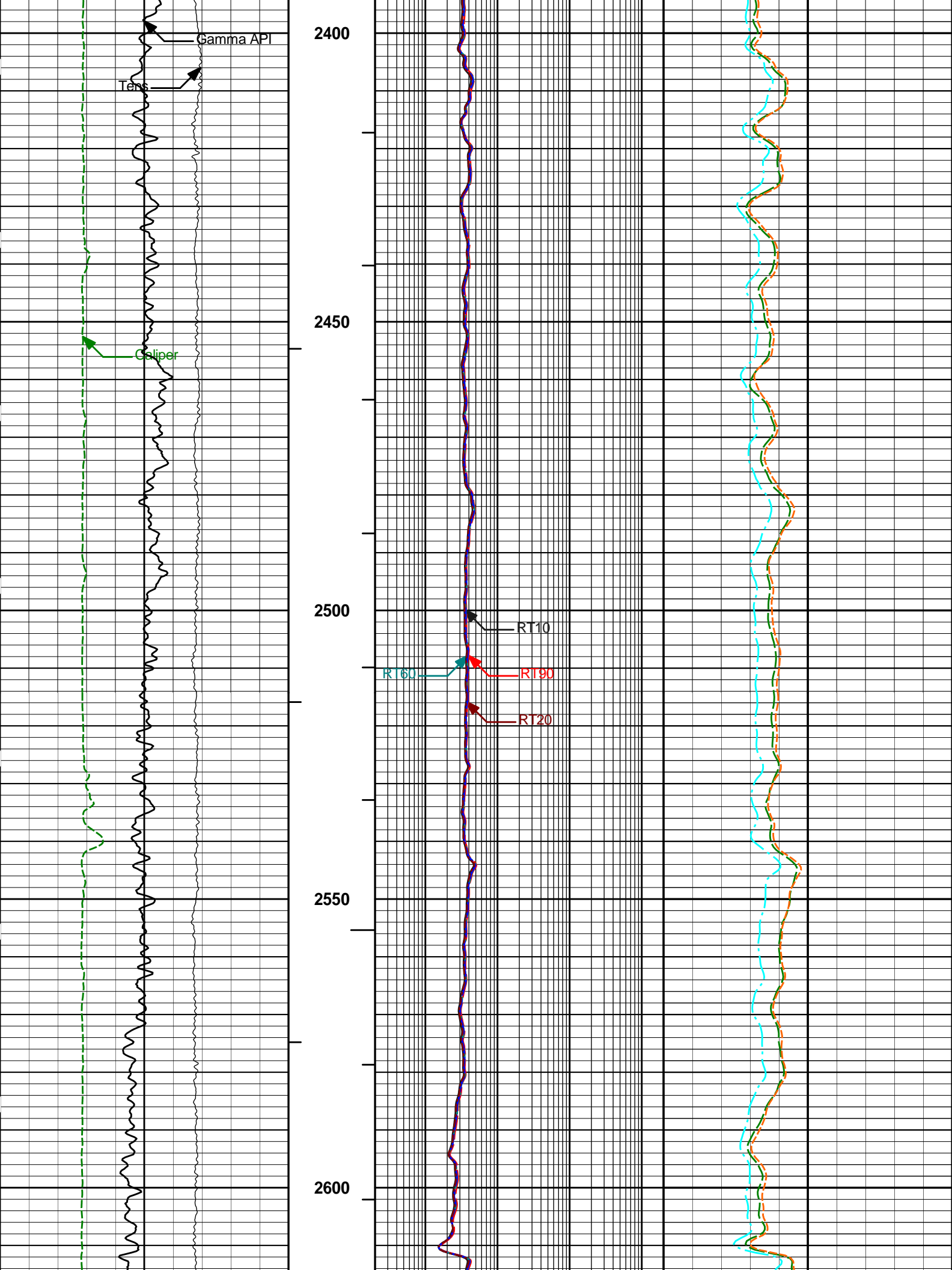
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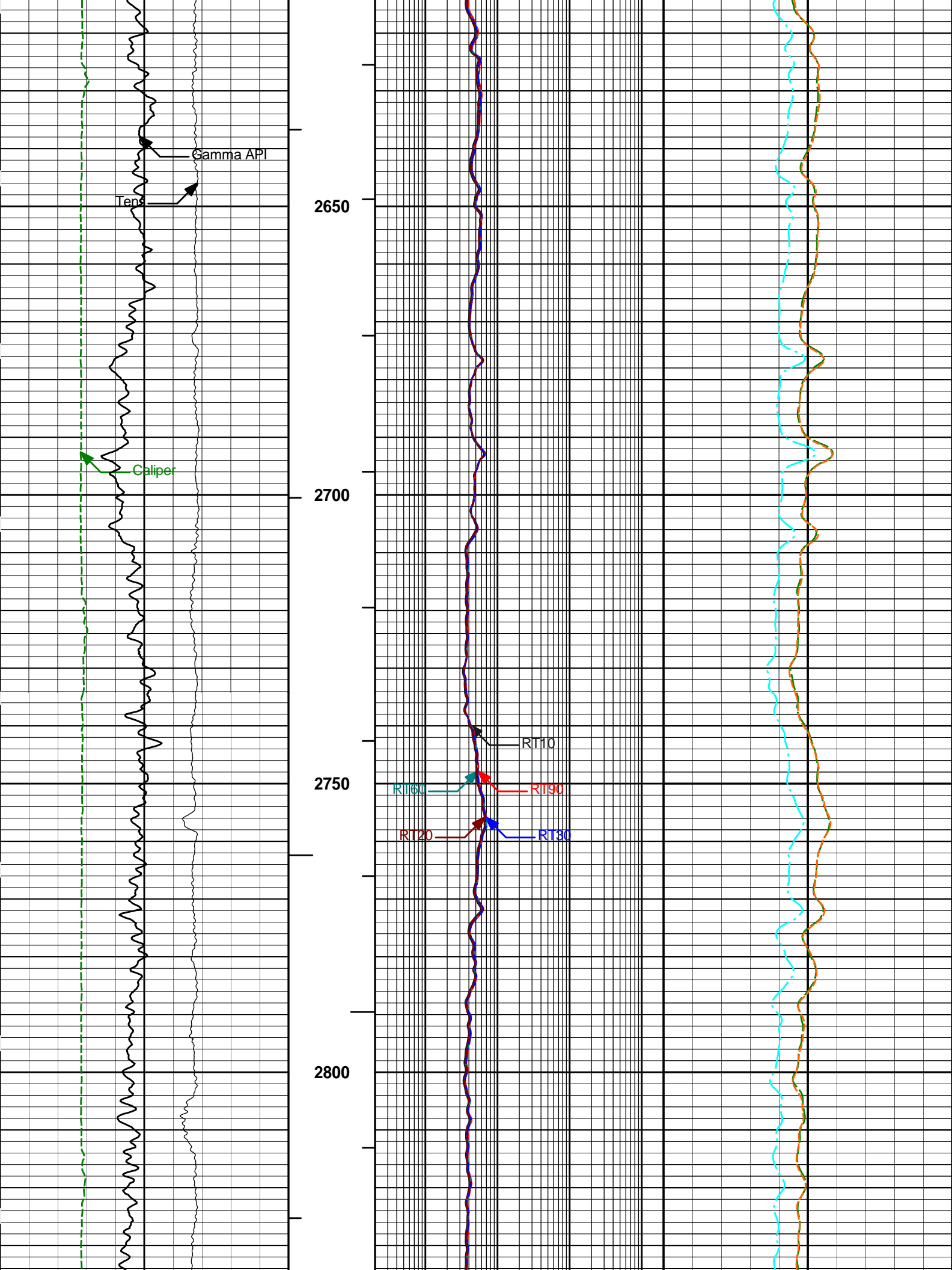
2150

Gamma API

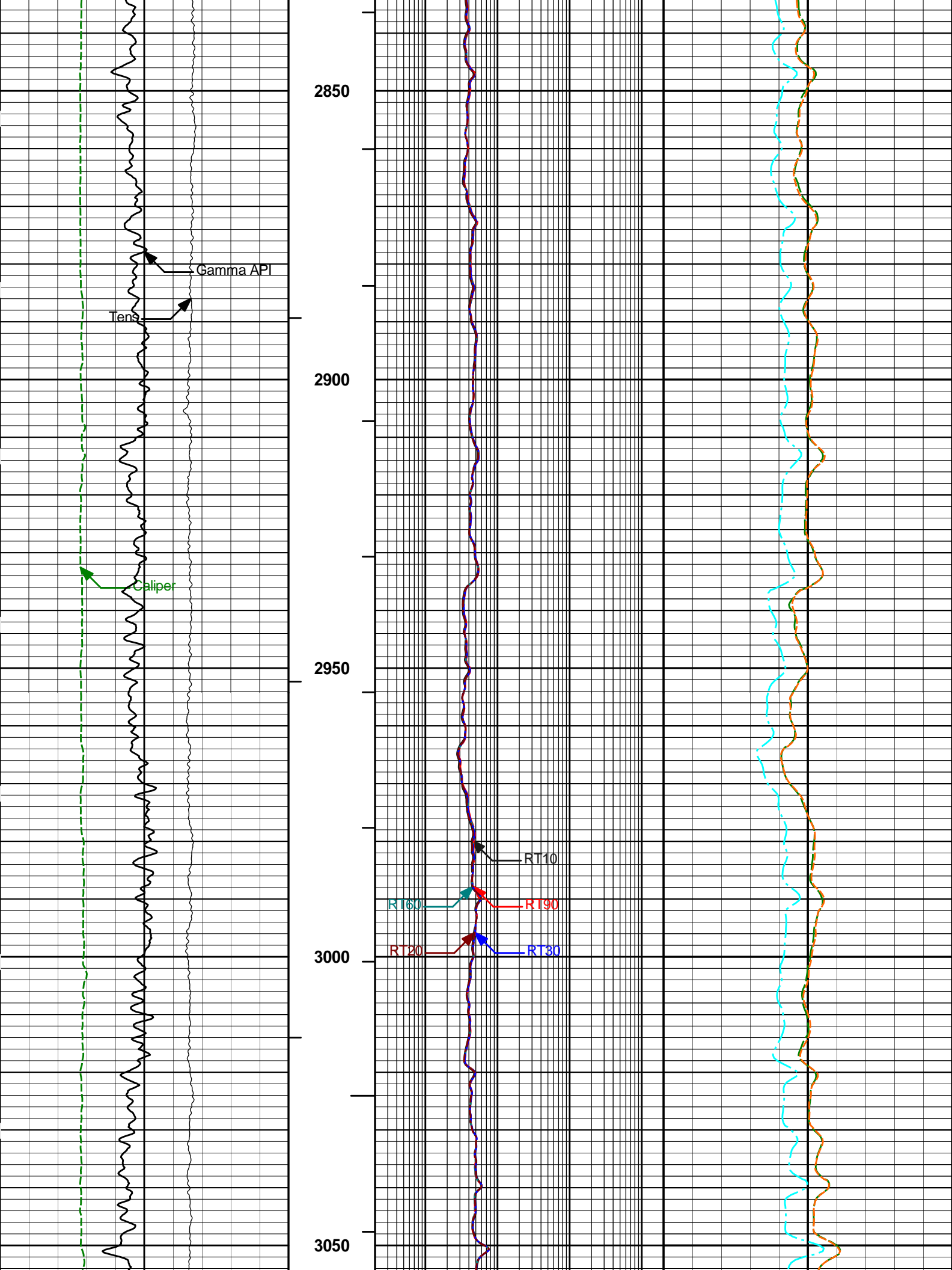
Tens

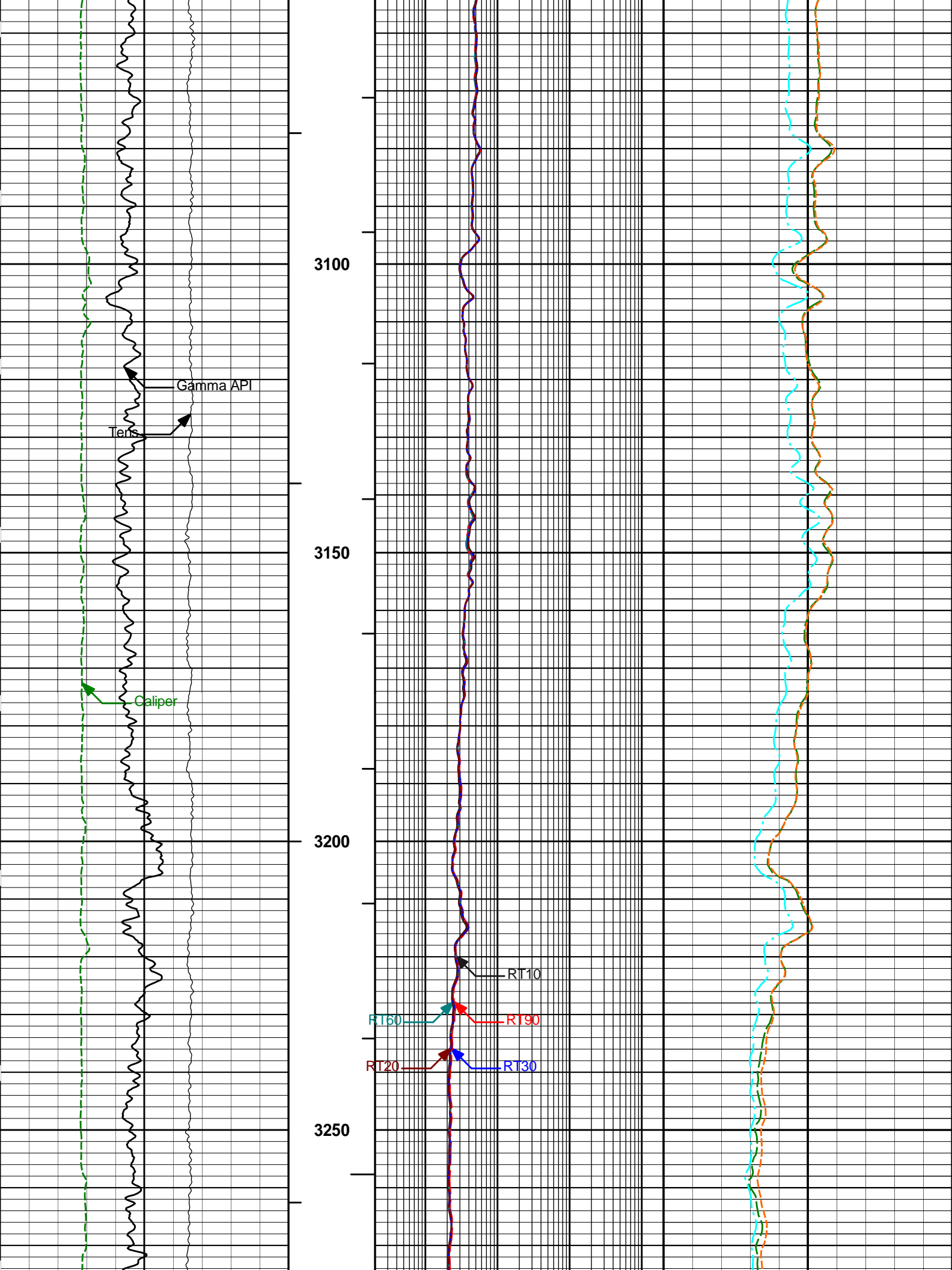


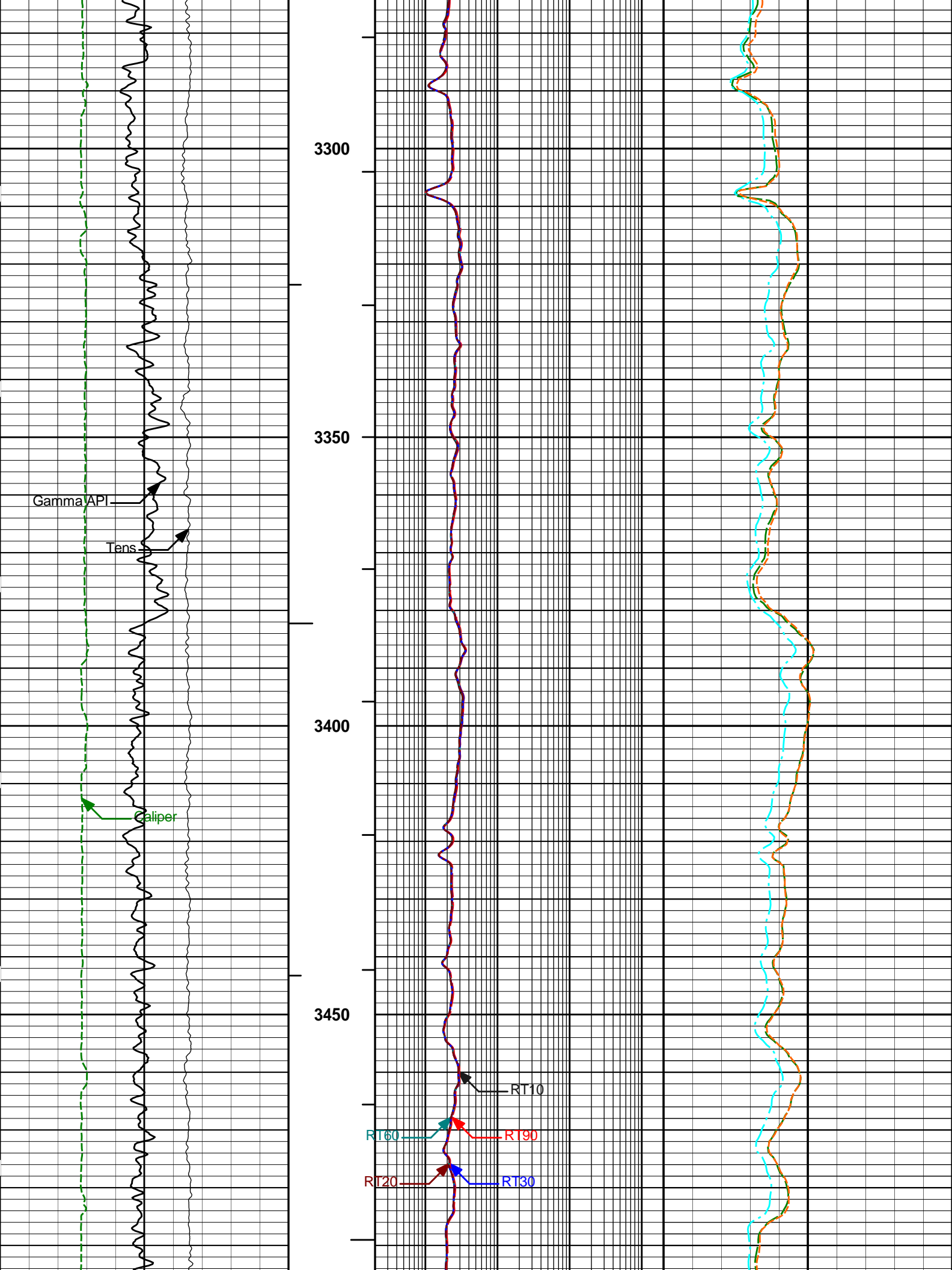


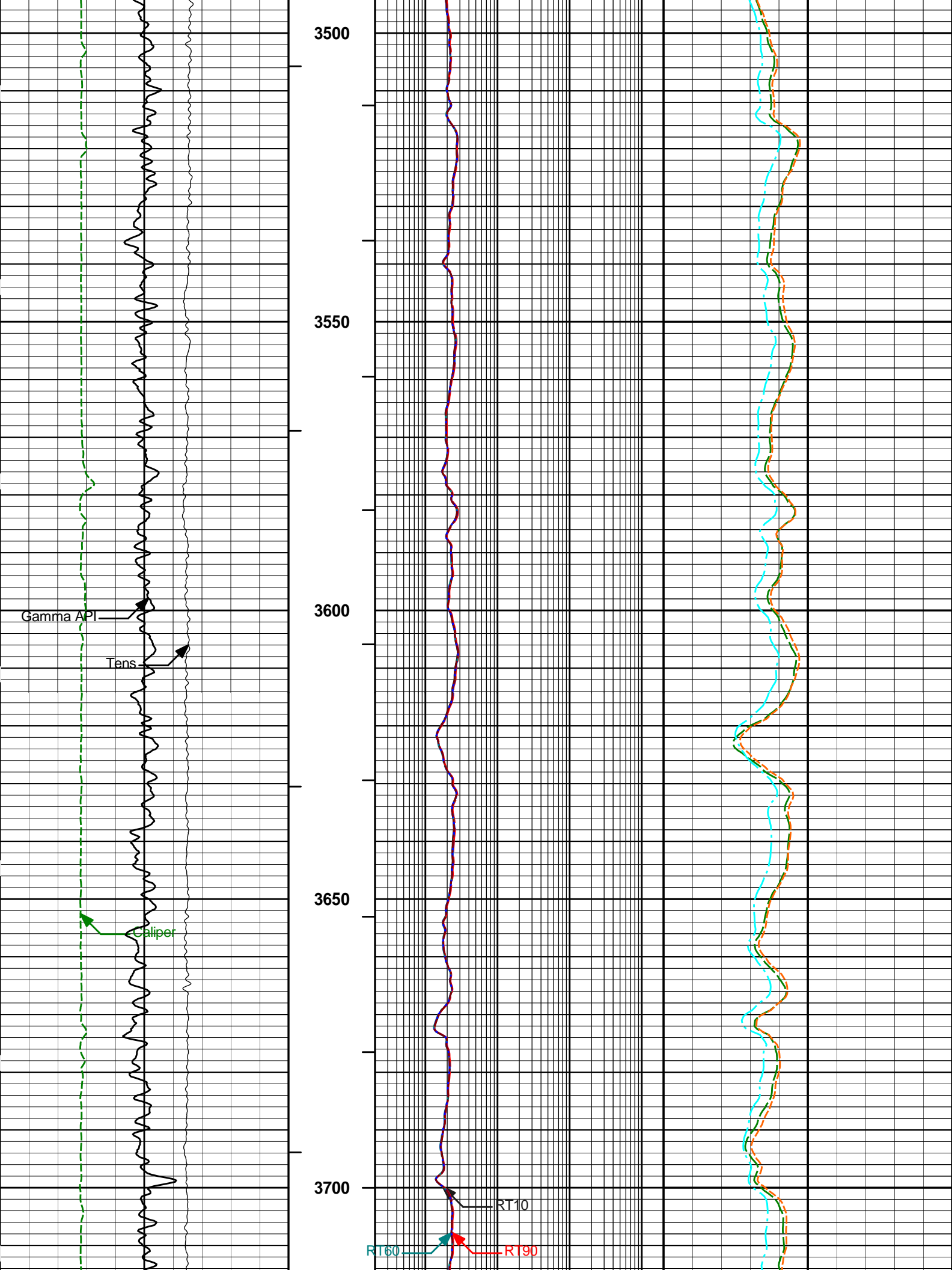


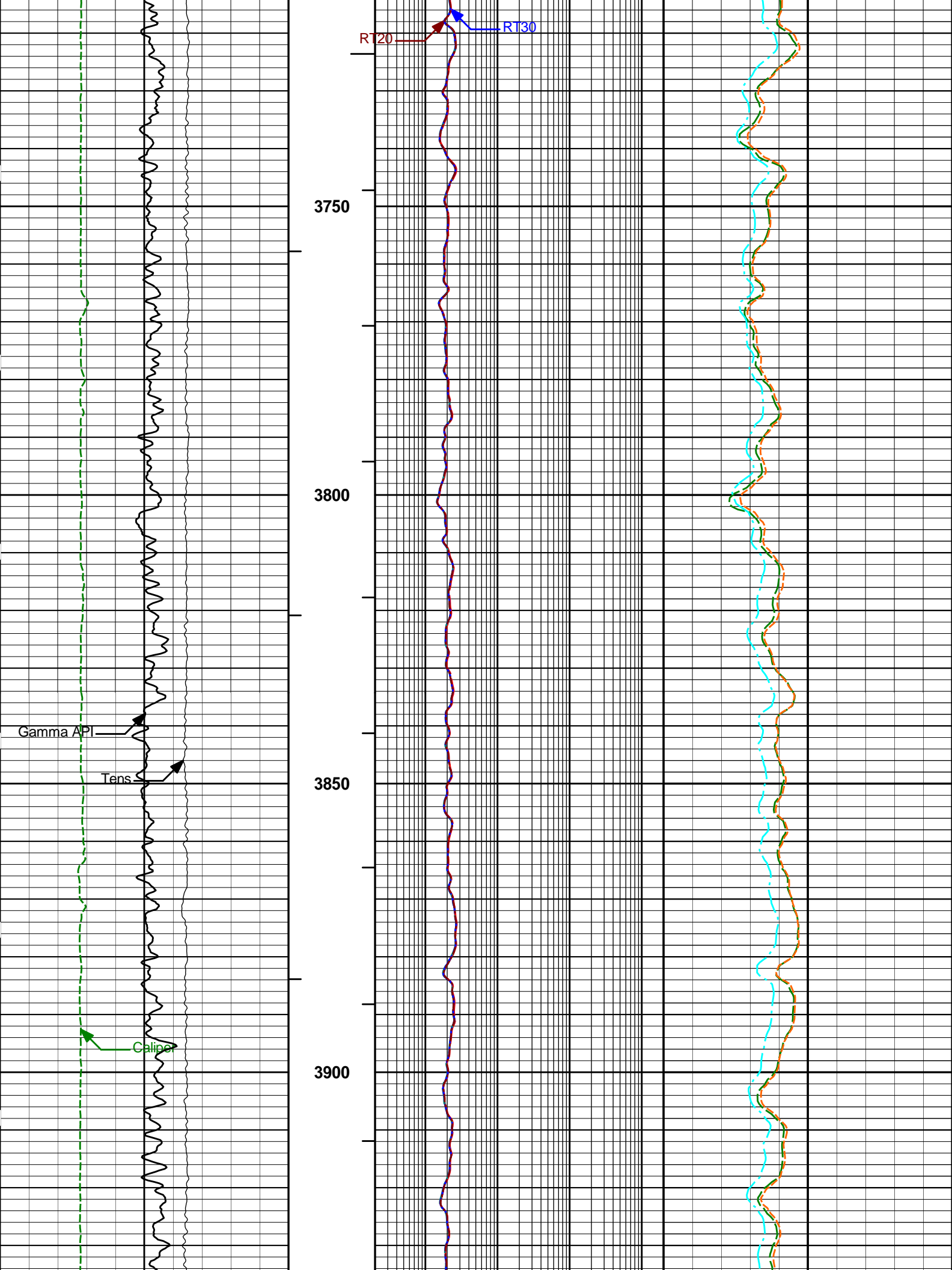


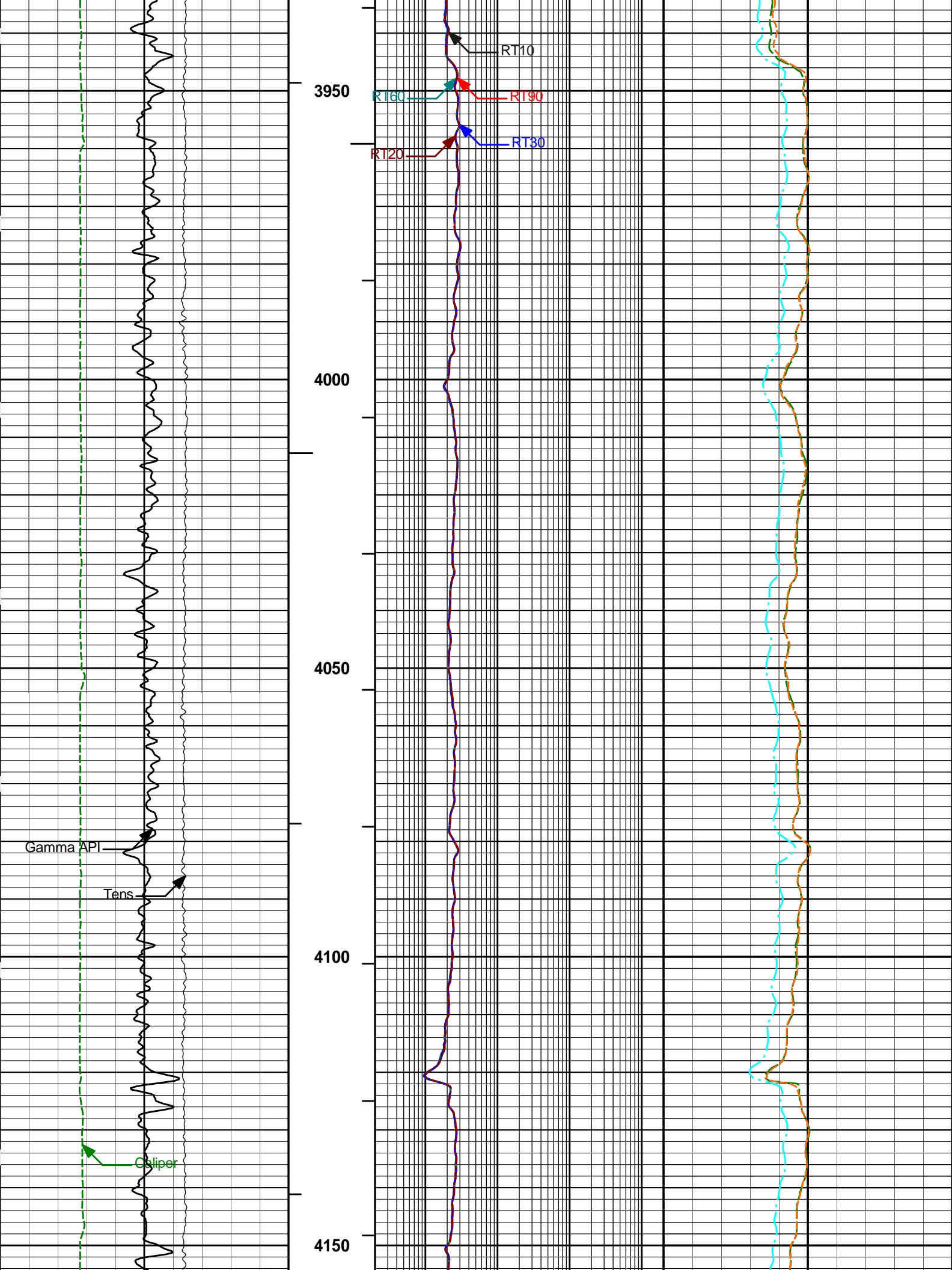


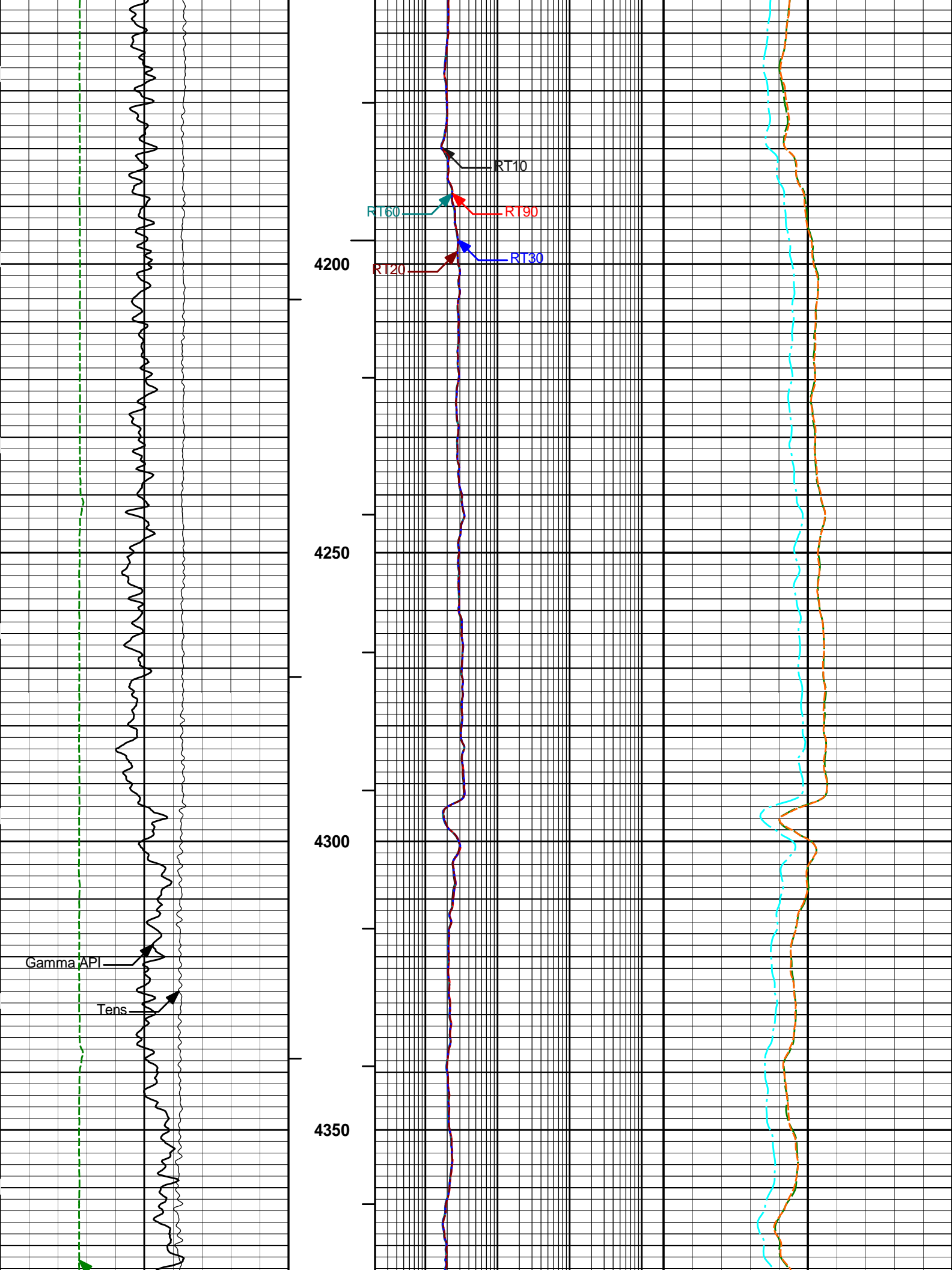


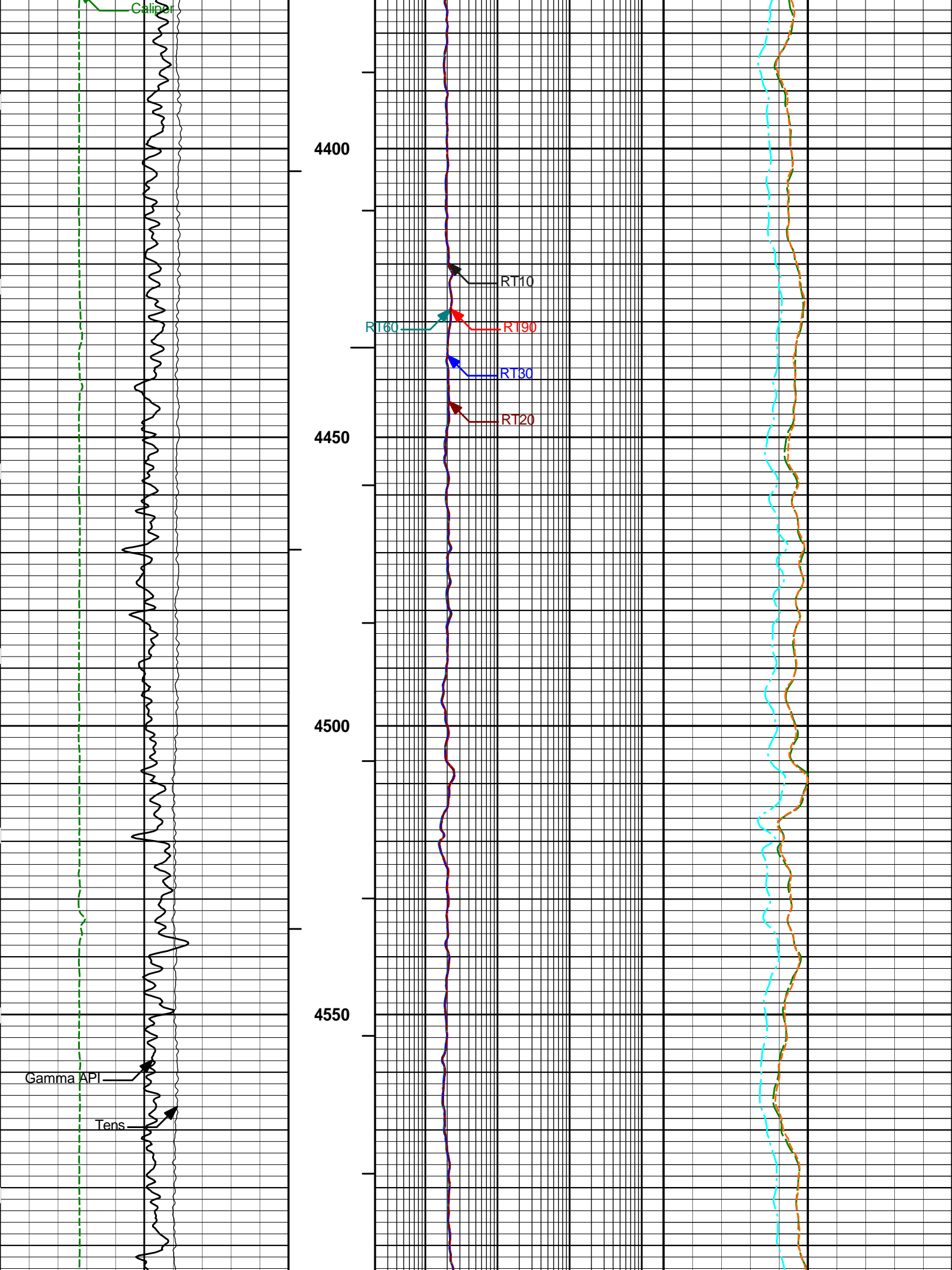




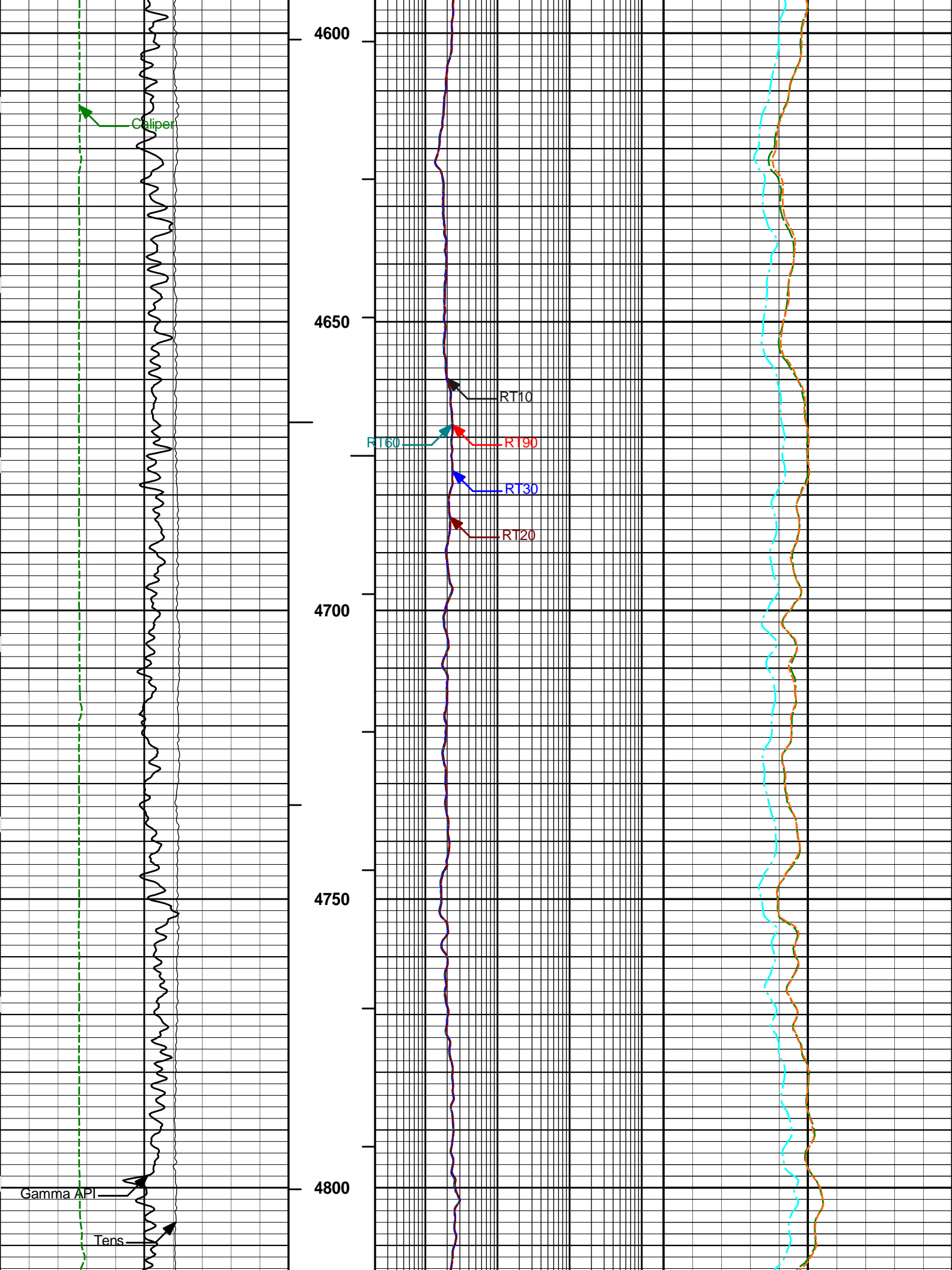


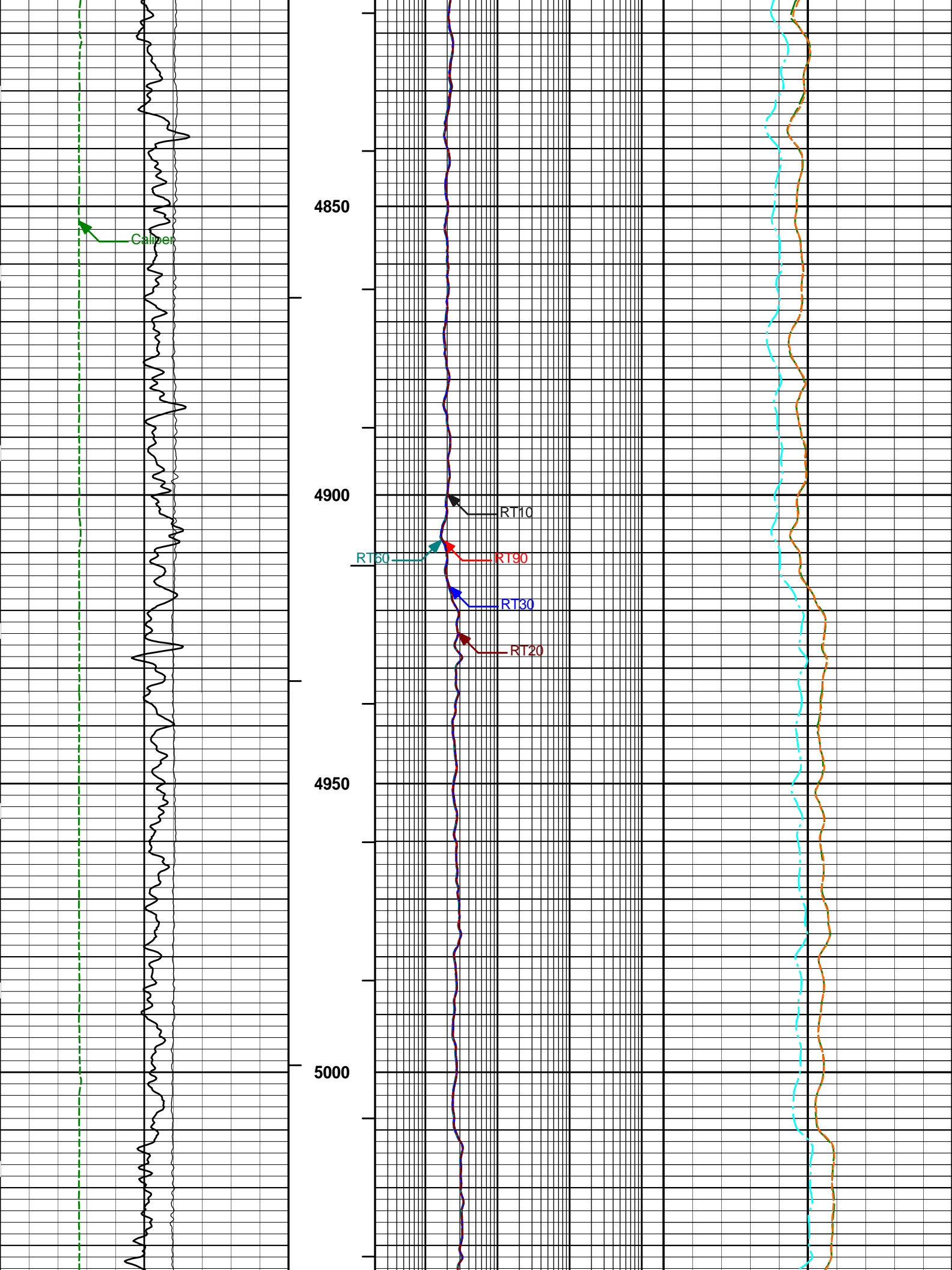


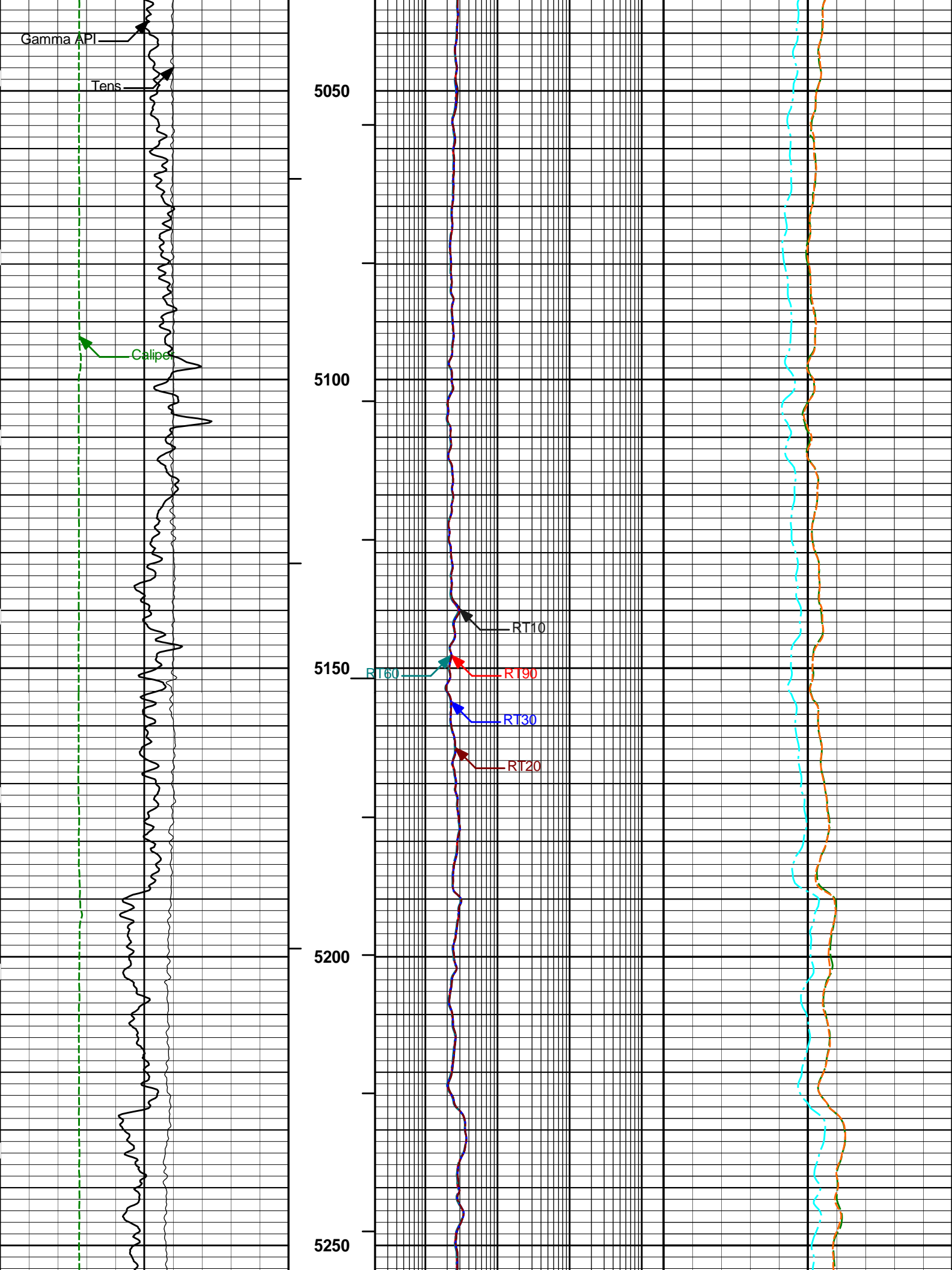


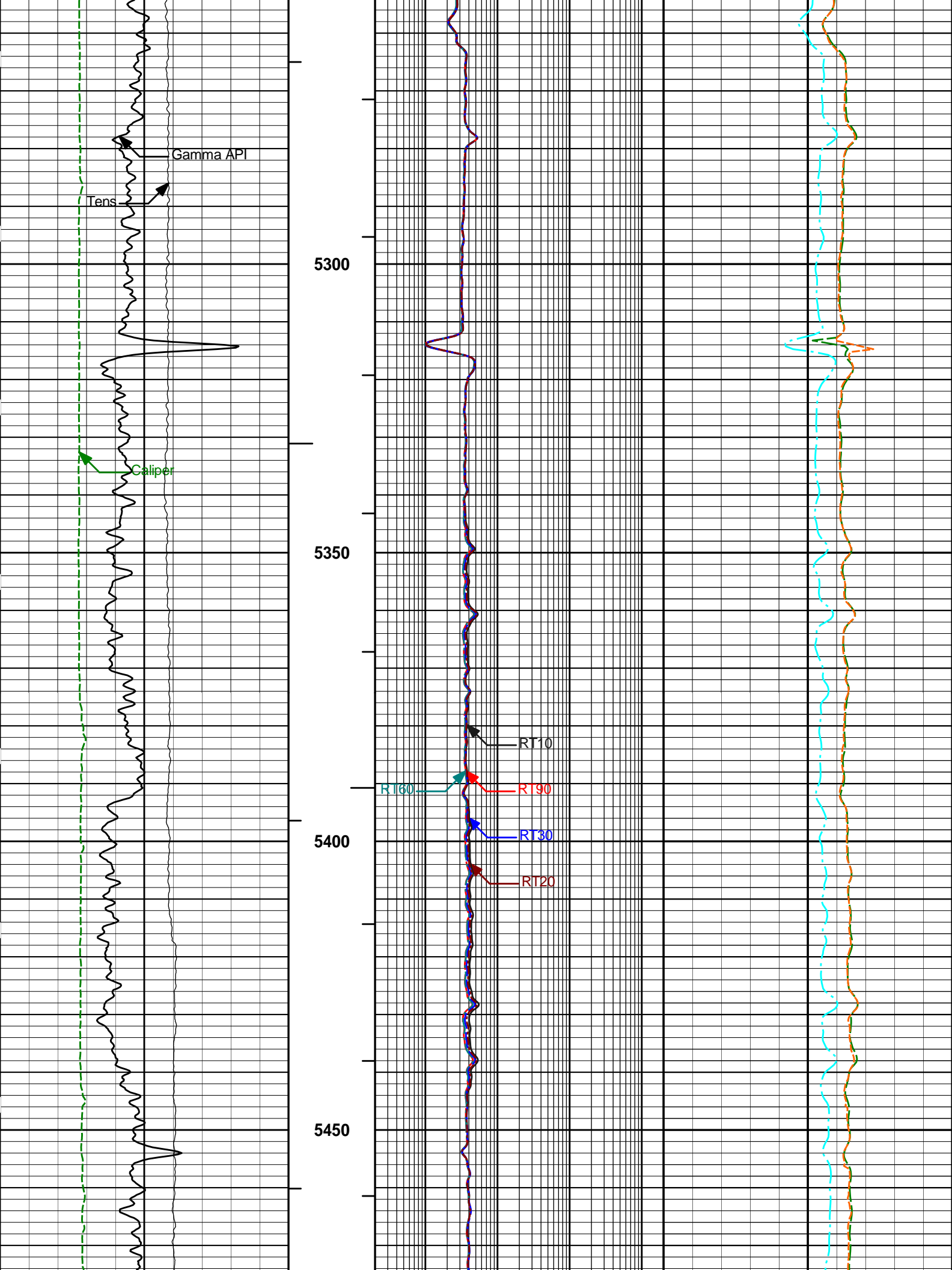


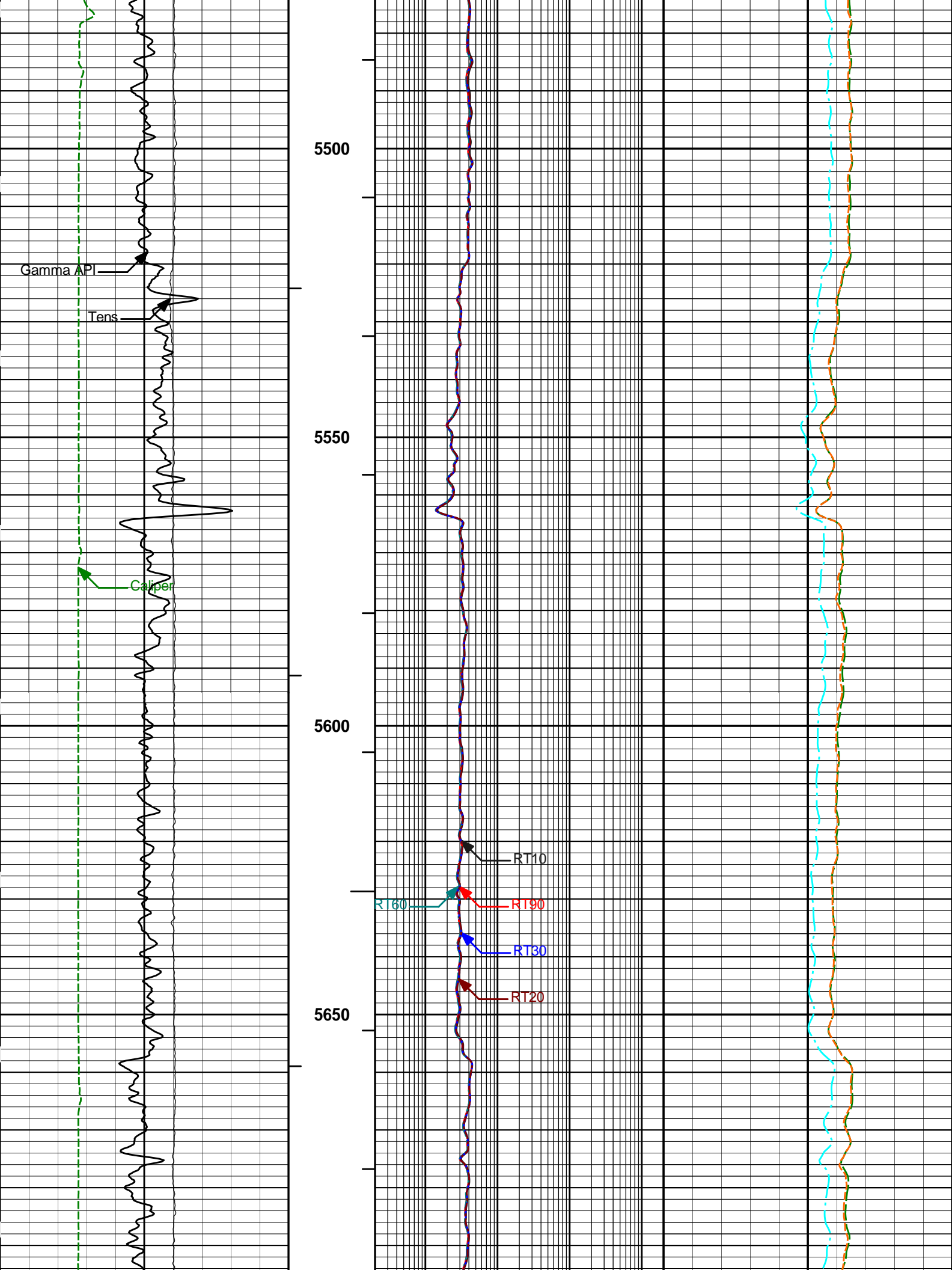


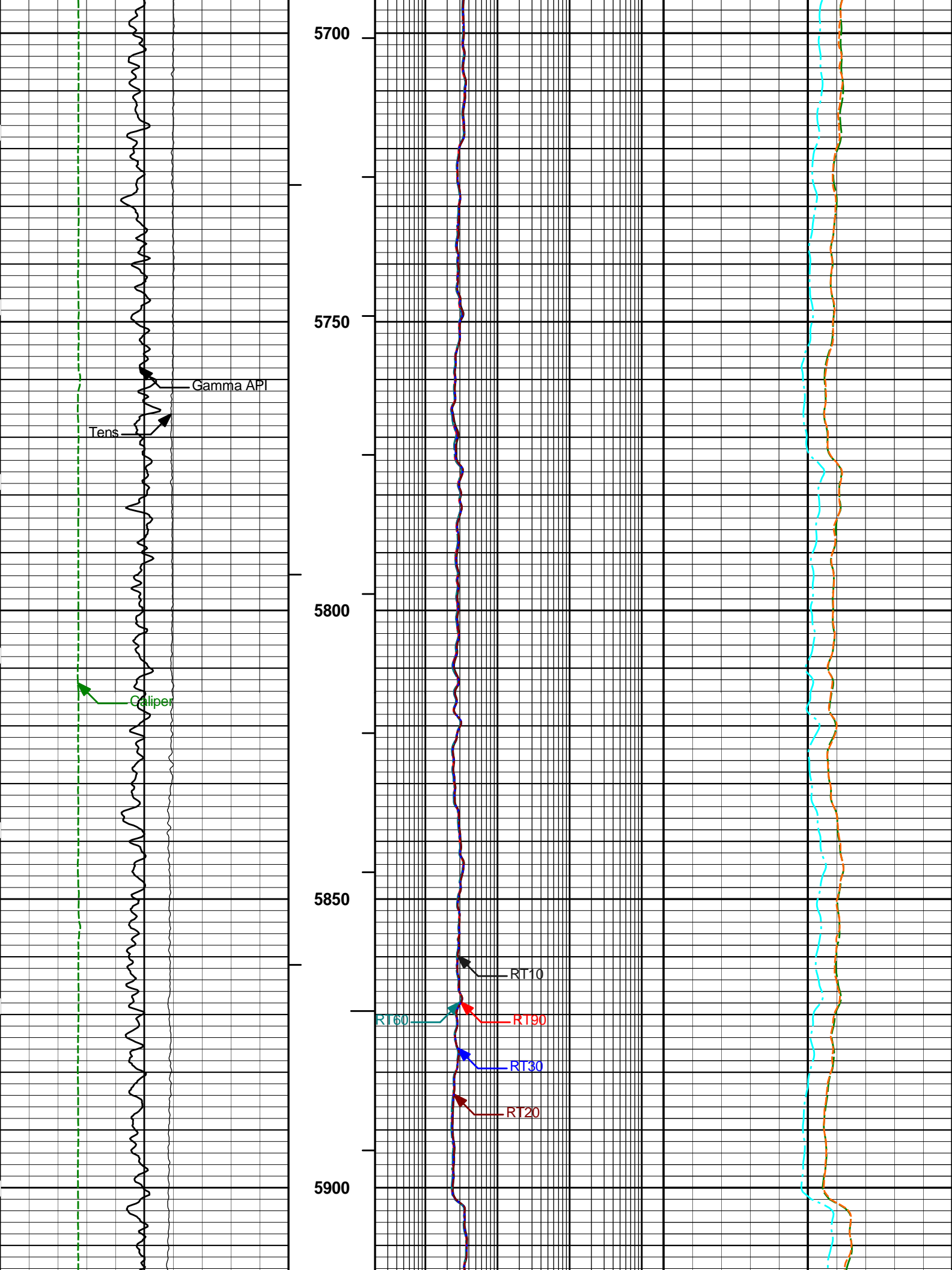


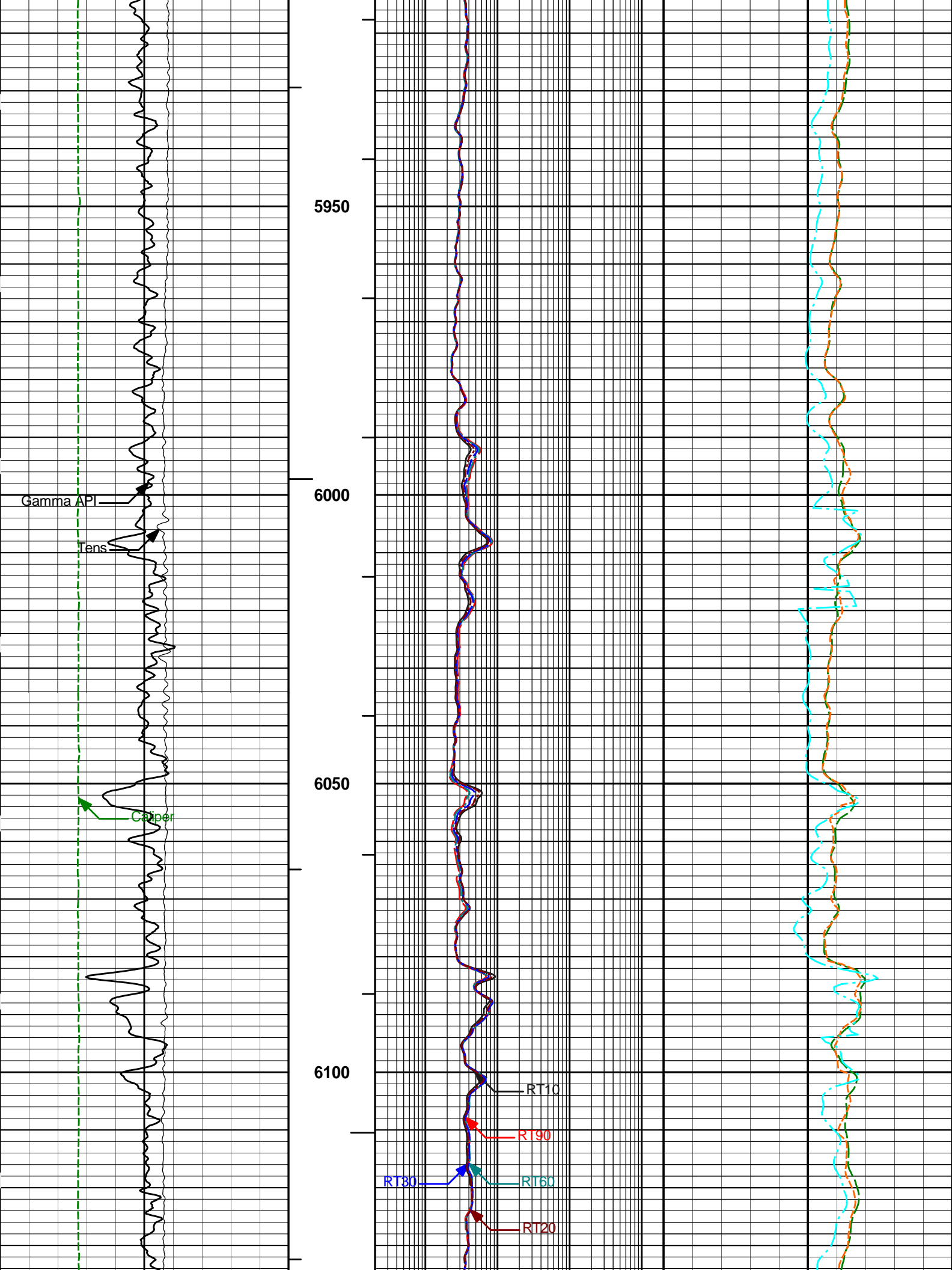


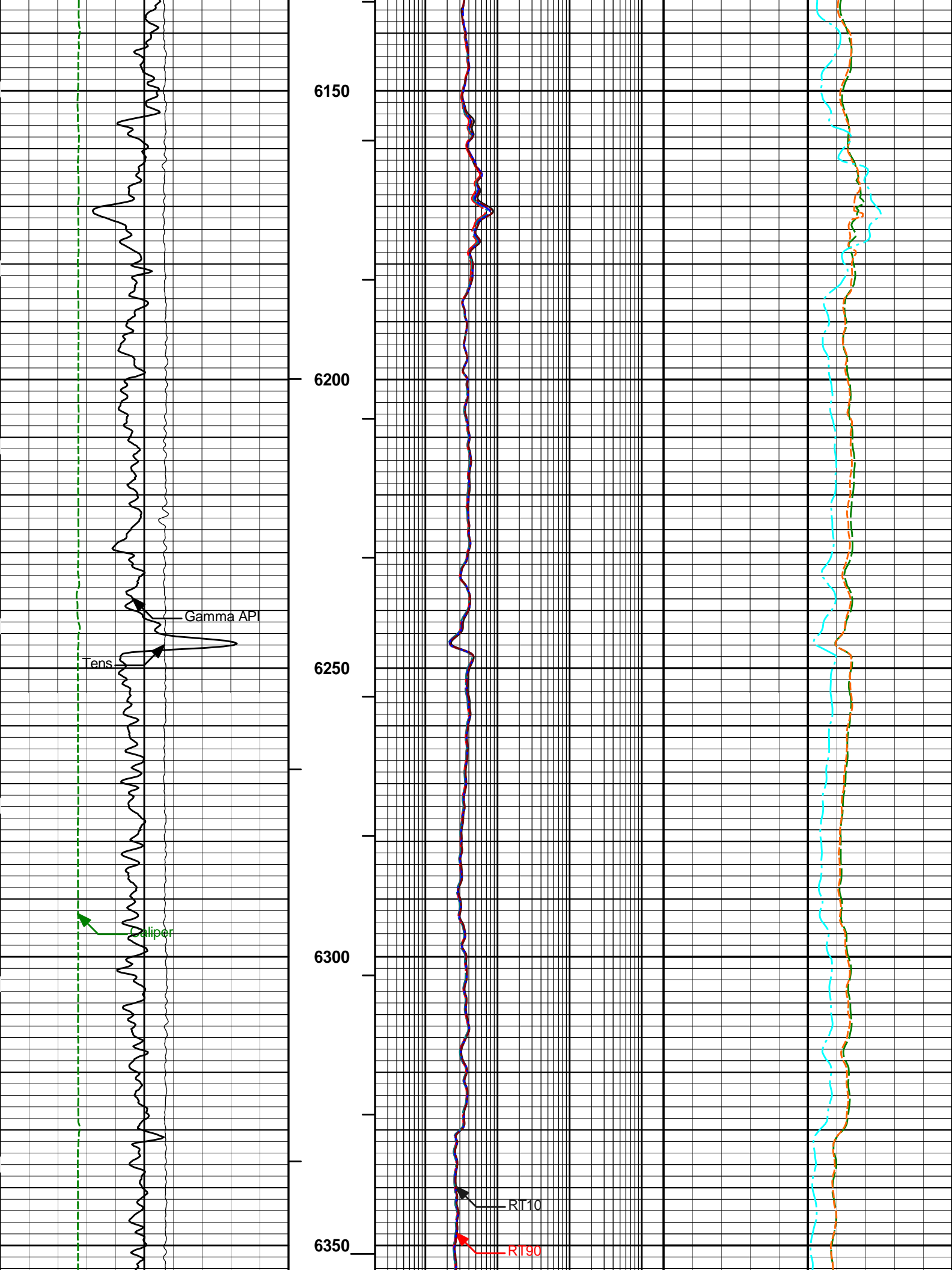




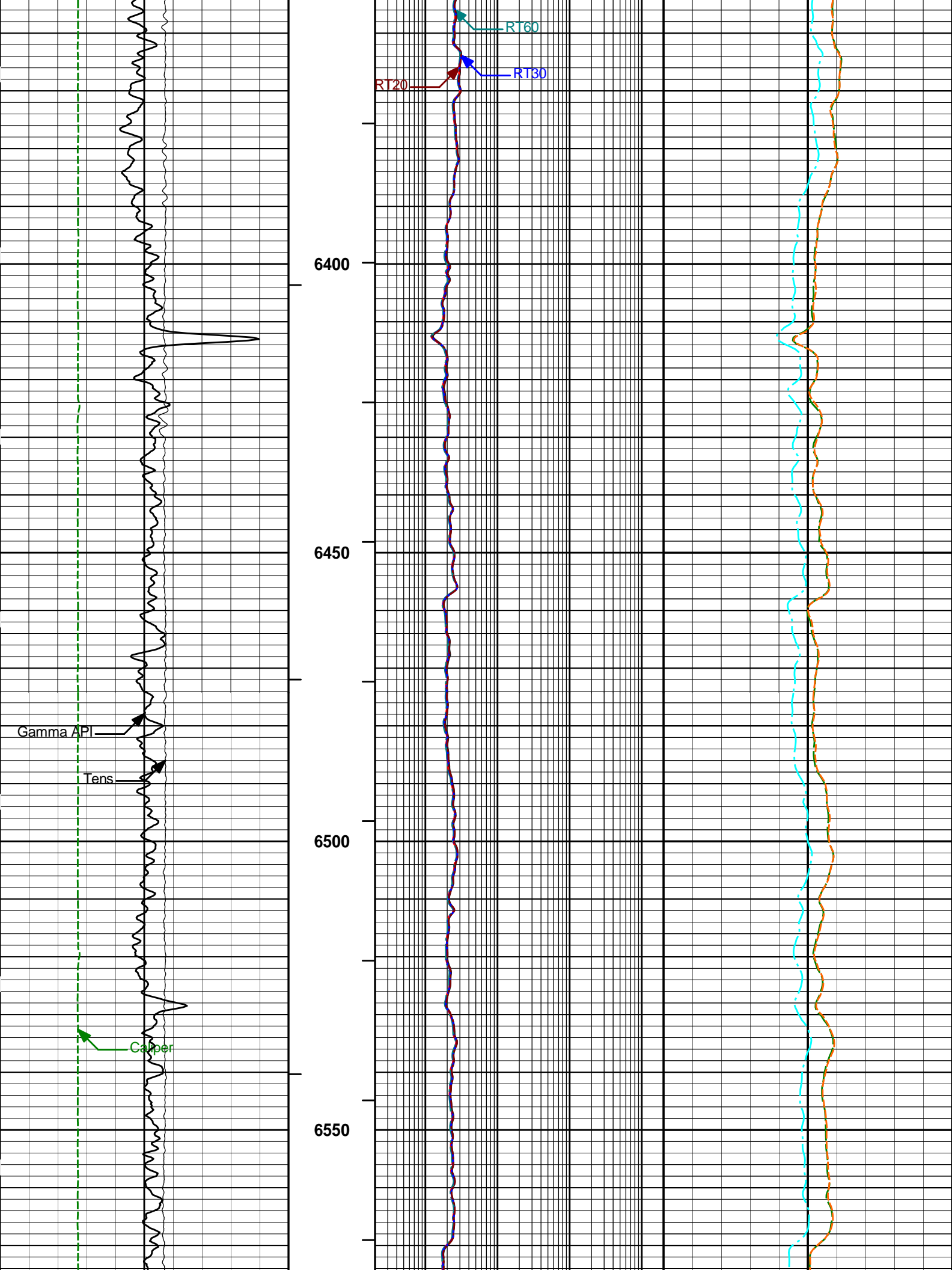


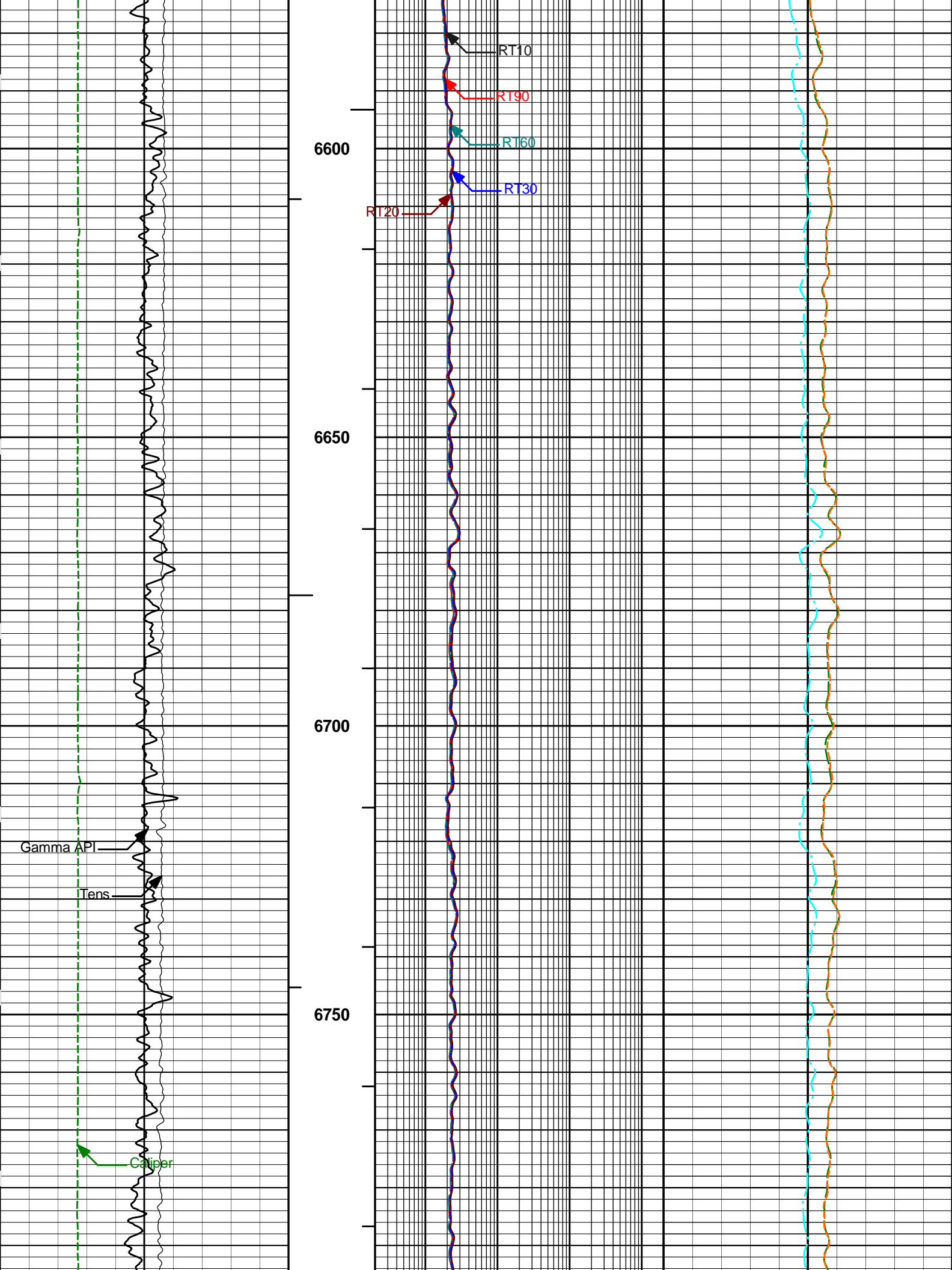


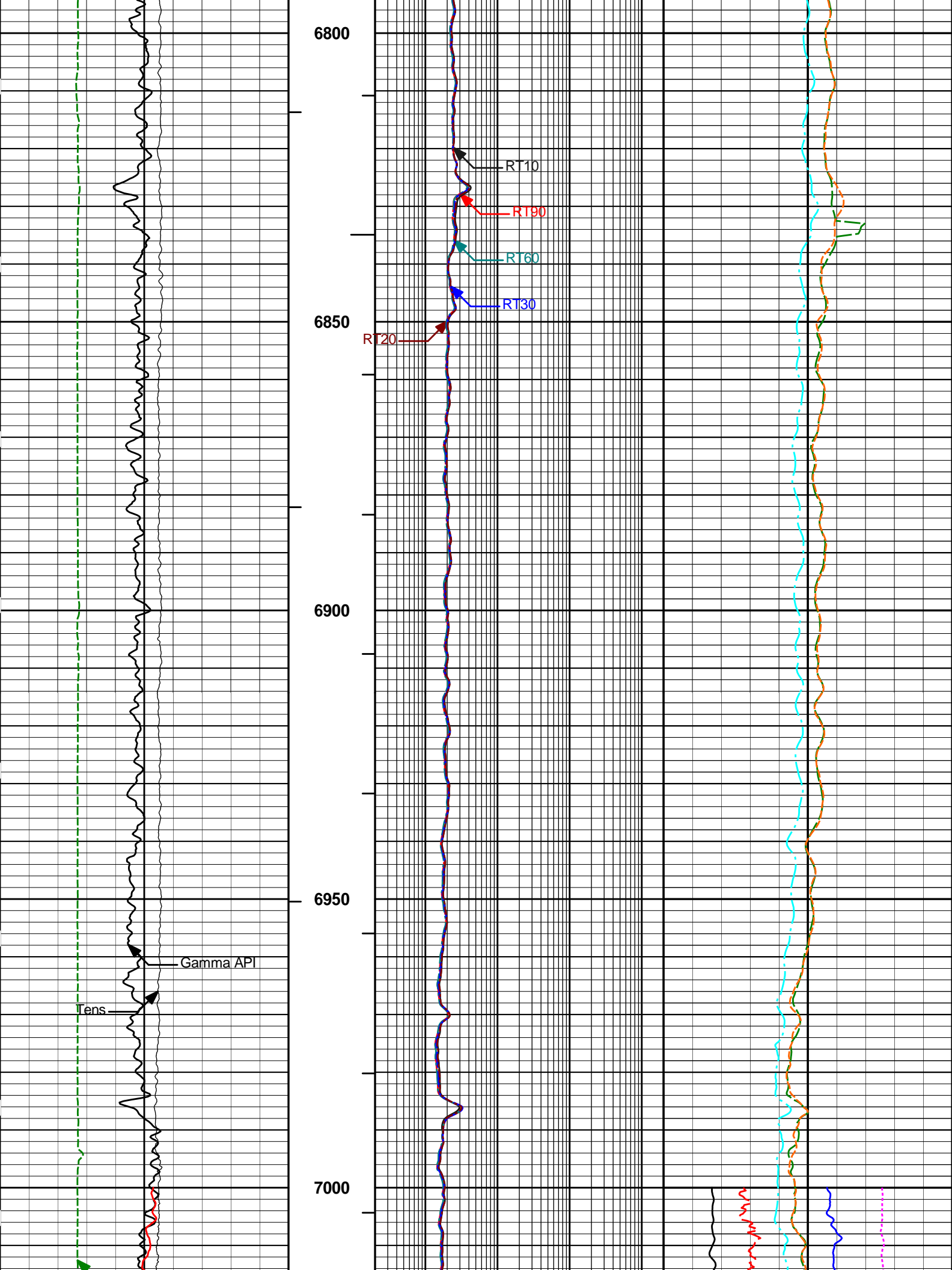


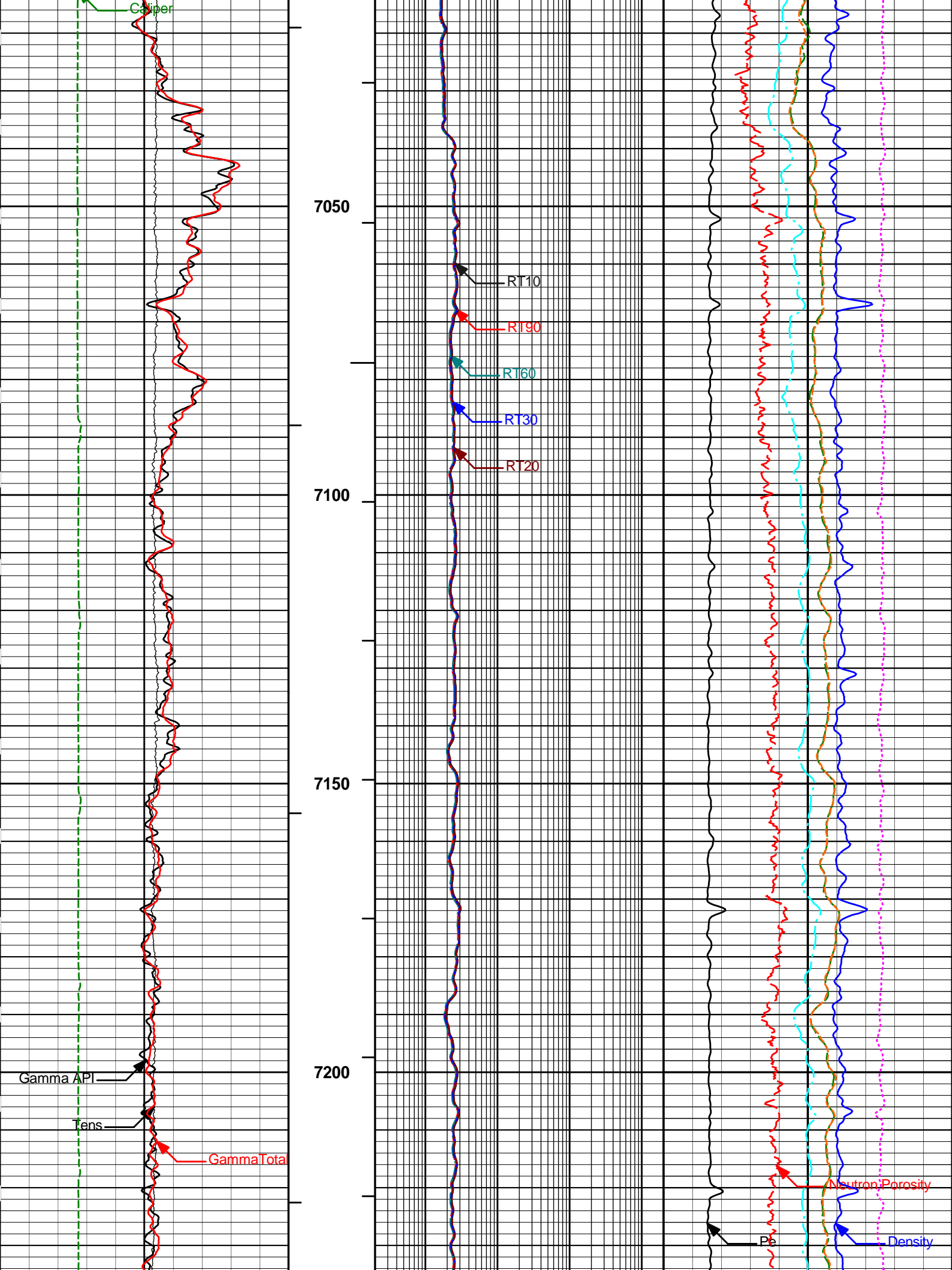


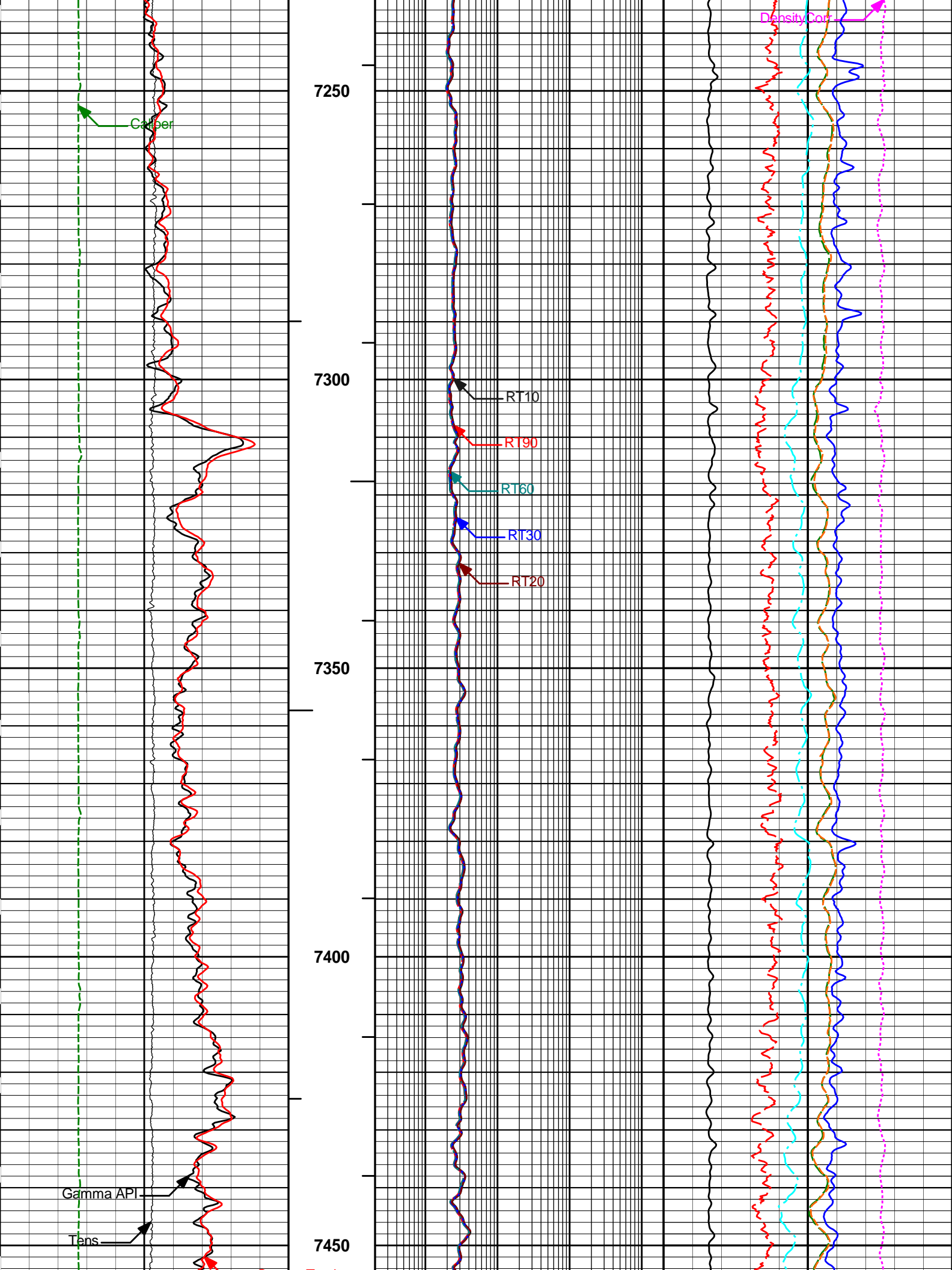


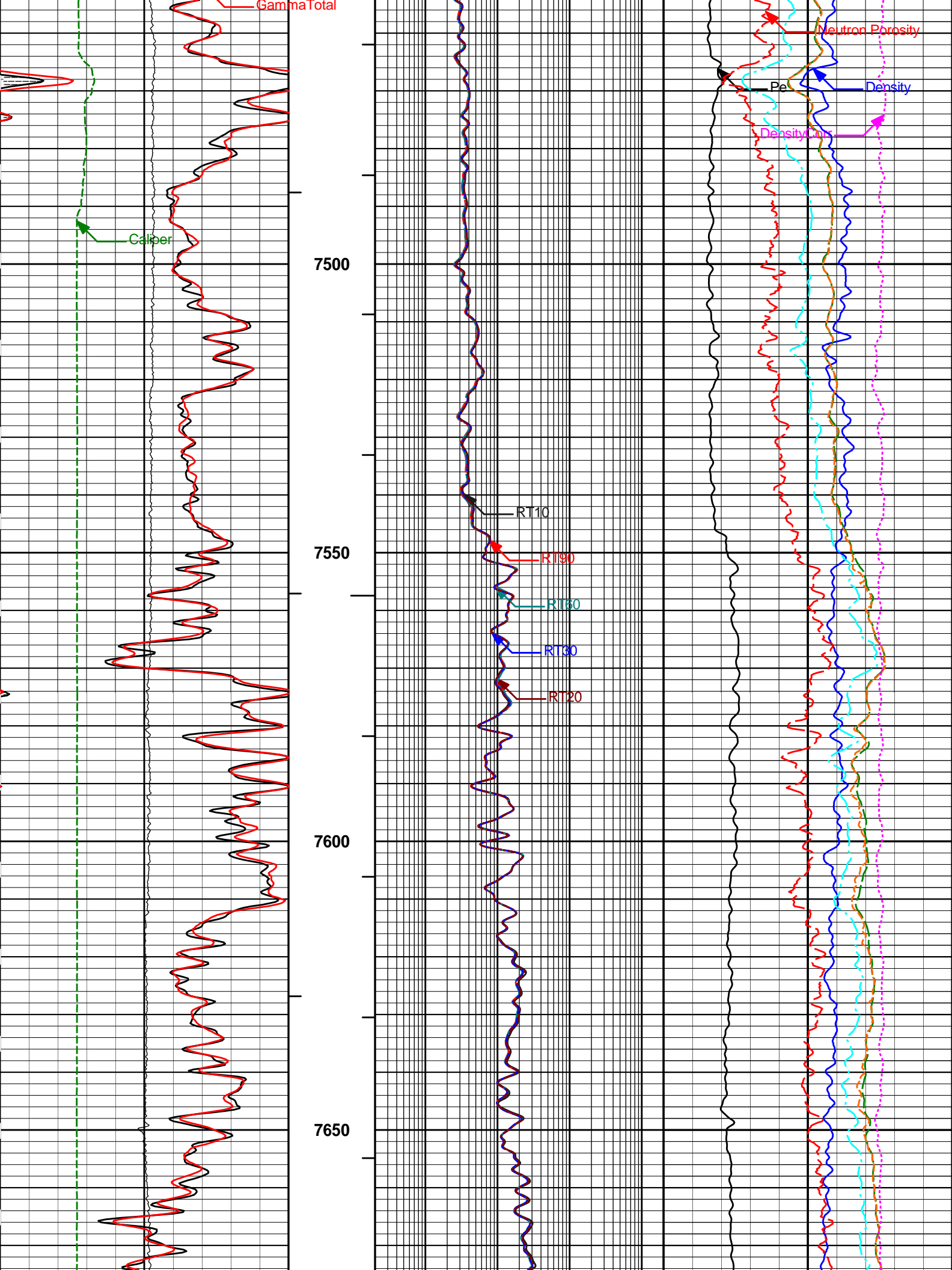


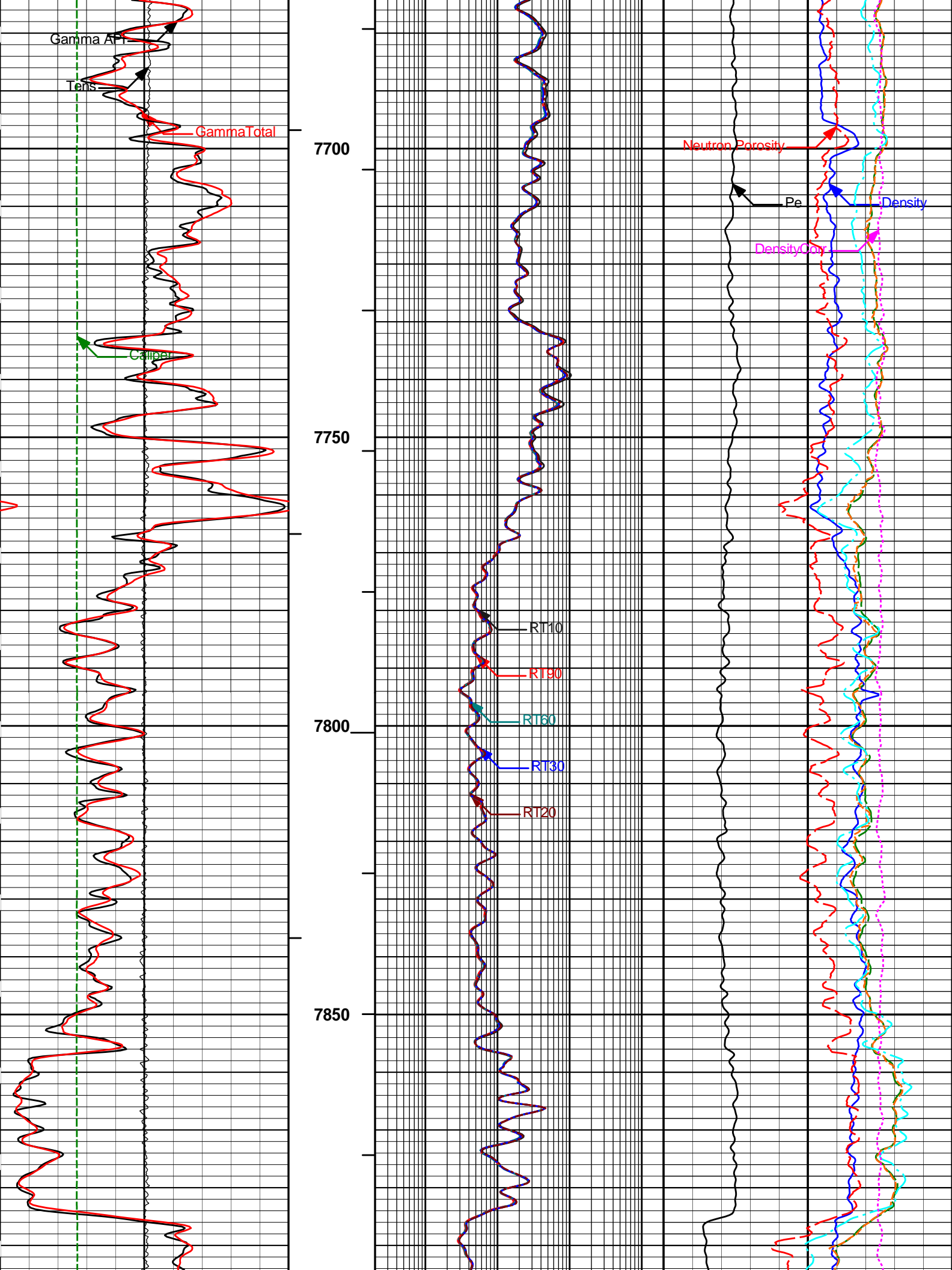


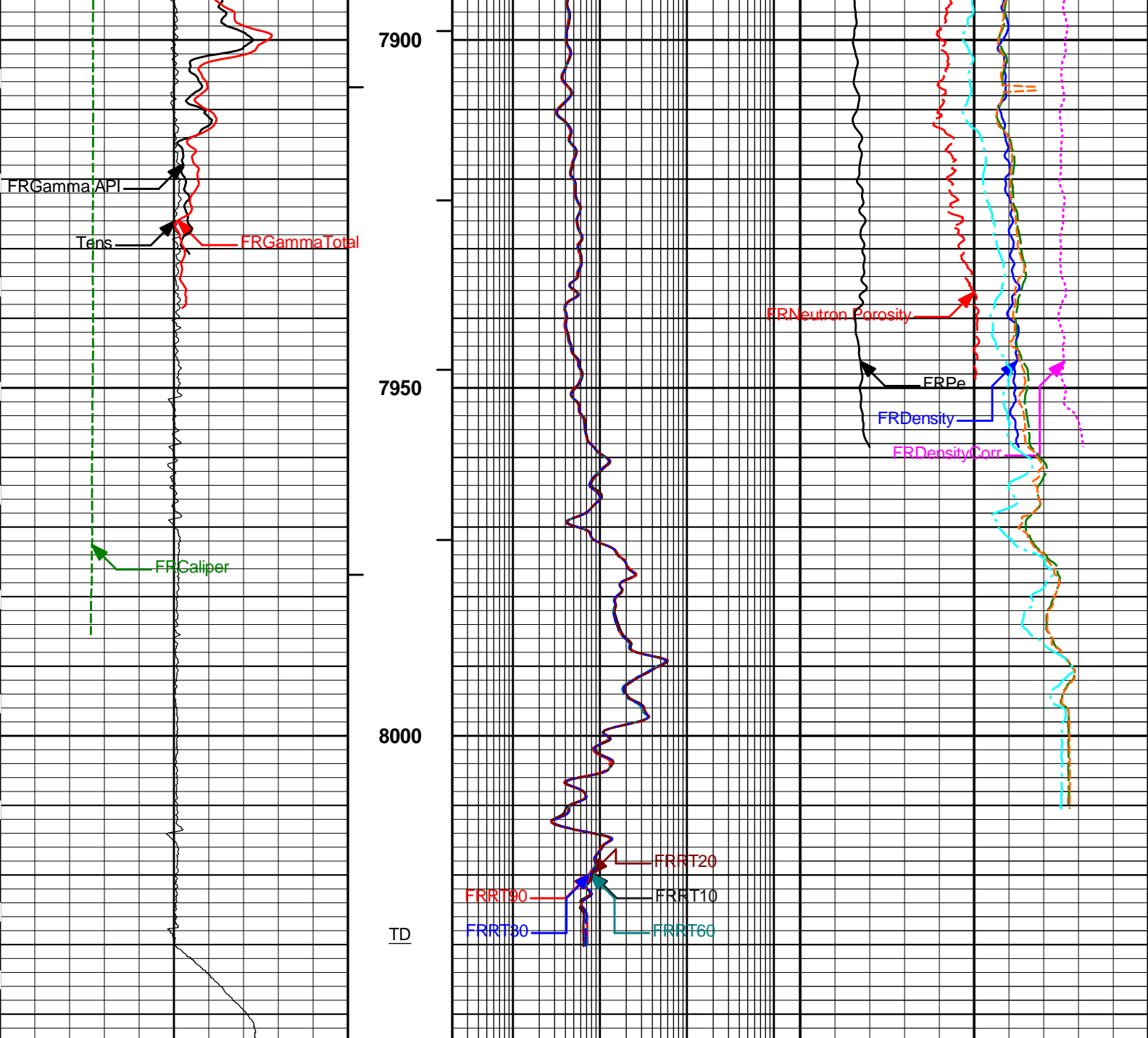












0	Gamma API	200	1 : 240	0.2	RT90	2K	0	Pe	10	-0.25	DensityCorr	0.25
	gapi				ohmm			barns/electron			gram per cc	
0	GammaTotal	200	BHVT	0.2	RT60	2K	1.95	Density			2.95	
	gapi				ohmm			gram per cc				
6	Caliper	16	AHVT	0.2	RT30	2K	0.45	Neutron Porosity			-0.15	
	inches				ohmm			v/v				
10K	Tens	0		0.2	RT20	2K	140	MonoDeltaT 1			40	
	pounds				ohmm			microsec per ft				
				0.2	RT10	2K	350	DipXDeltaT 1			50	
					ohmm			microsec per ft				
							350	DipYDeltaT 1			50	
								microsec per ft				

**HALLIBURTON**

Plot Time: 09-Aug-13 05:51:47  
 Plot Range: 200 ft to 8043.83 ft  
 Data: {ActiveWell}\Well Based\1\*

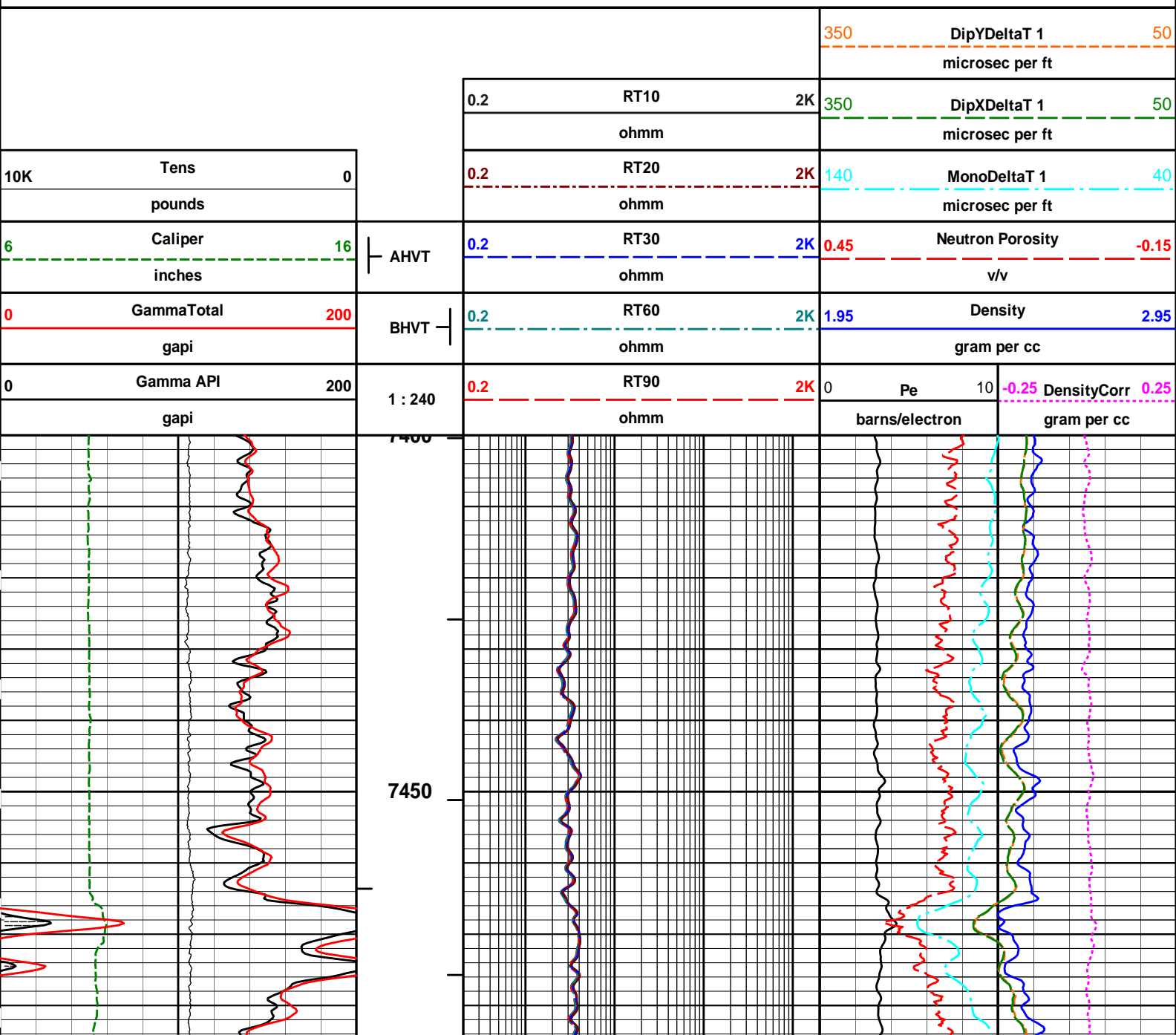


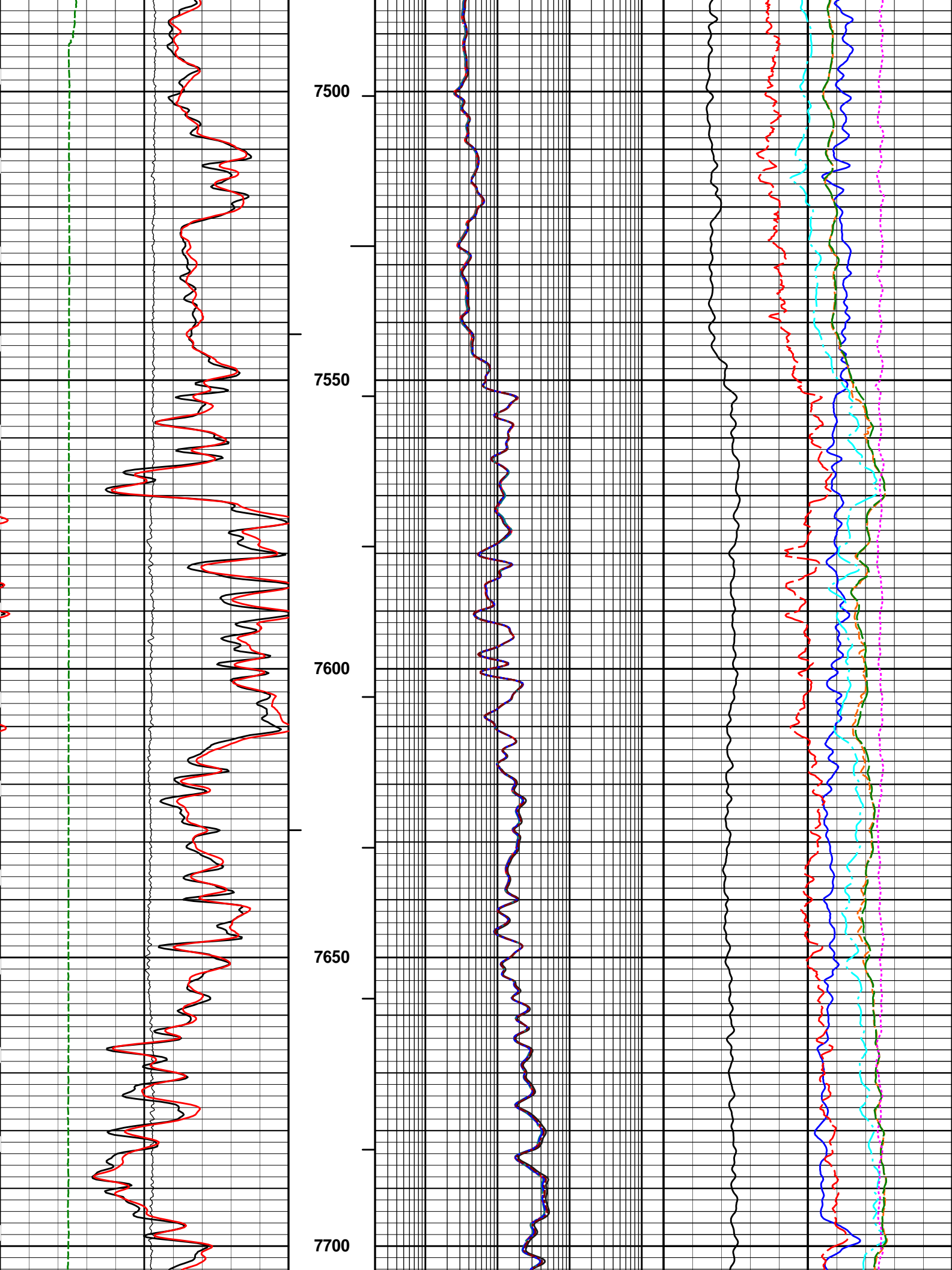
MAIN PASS 5" = 100'

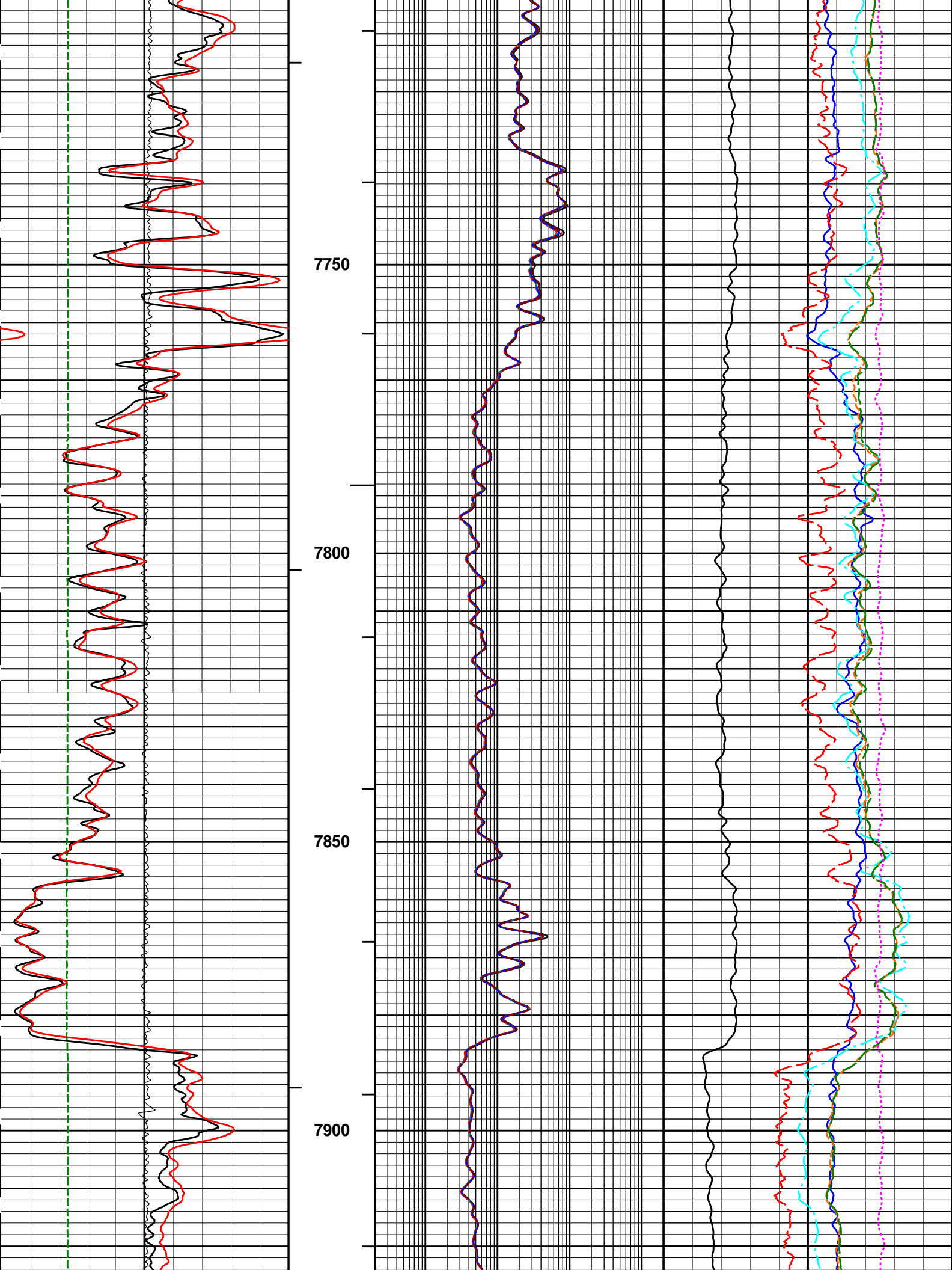
**HALLIBURTON**

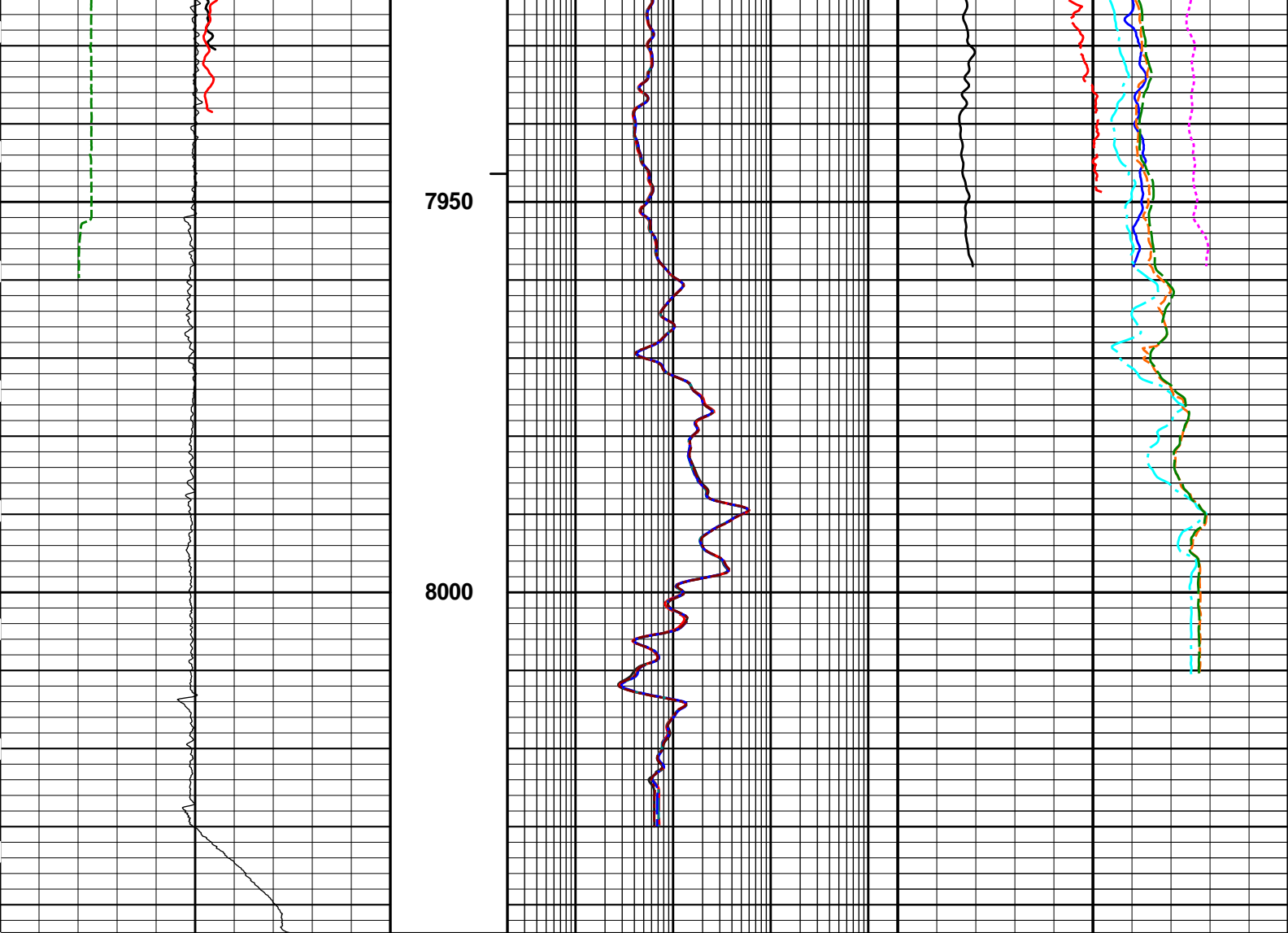
Plot Time: 09-Aug-13 05:51:48  
Plot Range: 7400 ft to 8043.67 ft  
Data: {ActiveWell}\Well Based\REPEAT\*  
Plot File: \\COMP\REPEAT

REPEAT PASS 5" = 100'









0	Gamma API	200	1 : 240	0.2	RT90	2K	0	Pe	10	-0.25	DensityCorr	0.25
	gapi				ohmm			barns/electron			gram per cc	
0	GammaTotal	200	BHVT	0.2	RT60	2K	1.95	Density		2.95		
	gapi				ohmm			gram per cc				
6	Caliper	16	AHVT	0.2	RT30	2K	0.45	Neutron Porosity		-0.15		
	inches				ohmm			v/v				
10K	Tens	0		0.2	RT20	2K	140	MonoDeltaT 1		40		
	pounds				ohmm			microsec per ft				
				0.2	RT10	2K	350	DipXDeltaT 1		50		
					ohmm			microsec per ft				
							350	DipYDeltaT 1		50		
								microsec per ft				

**HALLIBURTON**

Plot Time: 09-Aug-13 05:51:56  
Plot Range: 7400 ft to 8043.67 ft  
Data: {ActiveWell}\Well Based\REPEAT\*  
Plot File: \\COMP\REPEAT

REPEAT PASS 5" = 100'

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11812883Reference Calibration Date: 03-Jul-13 12:28:58

Engineer: J. SCHMIDTCalibration Date: 02-Aug-13 11:52:38

Software Version: WL INSITE R3.8.4 (Build 5)Calibration Version: 1

Calibrator Source S/N: TB-289  
Calibrator API Reference:243.00 api  
Equivalent Calibrator API Reference:247.3 api

Measurement	Measured	Calibrated	Units
Background	72.7	73.0	api
Background + Calibrator	319.0	320.3	api
Calibrator	246.3	247.3	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11812883Reference Calibration Date: 02-Aug-13 11:52:38

Engineer: J. PINKETTCalibration Date: 08-Aug-13 05:32:10

Software Version: WL INSITE R3.8.4 (Build 5)Calibration Version: 1

Calibrator Source S/N: TB-289  
Calibrator API Reference:243.00 api  
Equivalent Calibrator API Reference:247.3 api

Field Verification	Shop	Field	Units
Background	73.0	71.5	api
Background + Calibrator	320.3	319.2	api
Calibrator	247.3	247.7	api

Shop	Field	Difference	Tolerance
247.3	247.7	-0.4	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 10846351Reference Calibration Date: 03-Jul-13 13:45:32

Engineer: J. PINKETTCalibration Date: 07-Aug-13 11:10:32

Software Version: WL INSITE R3.8.4 (Build 5)Calibration Version: 1

Source SN: TB-289

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.8	23.7	Channel #
583 KEV Peak Channel #	53.6	53.2	Channel #
2614 KEV Peak Channel #	220.5	219.5	Channel #
Calibrate Temperature	81.8	74.8	degF

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

Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1795.3	CPS	342.0	336.9	API
Background	324.8	CPS	66.0	61.0	API

Gamma Ray Gain: 0.94  
Expected Gain Range: 0.85 - 1.15  
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	CSNG - 10846351	Reference Calibration Date:	07-Aug-13 11:10:32
Engineer:	J. PINKETT	Calibration Date:	08-Aug-13 05:38:34
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.7	23.7	Channel #
583 KEV Peak Channel #	53.2	53.3	Channel #
2614 KEV Peak Channel #	219.5	219.7	Channel #
Calibrate Temperature	74.8	74.8	degF

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

Blanket Reference Value: 243.00 API  
Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1778.9	CPS	336.9	337.3	API
Background	323.4	CPS	61.0	61.3	API

Gamma Ray Gain: 0.95  
Expected Gain Range: 0.85 - 1.15  
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	DSNT - 11812167	Reference Calibration Date:	03-Jul-13 13:14:28
Engineer:	J. SCHMIDT	Calibration Date:	02-Aug-13 13:50:04
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Logging Source S/N: DSN 434  
Tank Serial Number: 11068236  
Reference value assigned to Tank: 53.720  
Snow Block S/N: BRIGHTON SNOW BLOCK  
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:	1.001	1.004	0.900 - 1.100
-------	-------	-------	---------------

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decip):	0.2214	0.2224	0.0010	+/- 0.0020
Calibrated Ratio:	10.08	10.11	0.033	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decip):	0.0769	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 - 11812167	Reference Calibration Date:	02-Aug-13 13:50:04
Engineer:	J. PINKETT	Calibration Date:	08-Aug-13 05:43:59
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Logging Source S/N: DSN 434  
Snow Block S/N: BRIGHTON SNOW BLOCK

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decip):	0.0769	0.0656	-0.0113	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - 11812177	Reference Calibration Date:	03-Jul-13 14:28:03
Engineer:	J. SCHMIDT	Calibration Date:	02-Aug-13 16:04:03
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1
Host Tool Name:	DSNT - 11812167		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3660.76	-3977.73	-7000.00 - -1000.00
Pad Gain	0.0003813	0.0003862	0.000200 - 0.000600
Arm Offset	-4402.43	-4271.55	-5000.00 - 3000.00
Arm Gain	0.0005632	0.0005525	0.000300 - 0.000700
Arm Power	-0.000004890	-0.000004524	-0.000010000 - 0.000010000

The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER

Tool Diameter: 4.50 in

CALIBRATION RINGS				
Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				

PAD EXTENSION:				
Small Ring (in)	2.10	2.00	-0.10	+/- 0.20
Medium Ring (in)	3.82	3.75	-0.07	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.59	6.50	-0.09	+/- 0.20
Medium Ring (in)	8.37	8.25	-0.12	+/- 0.20
Large Ring (in)	15.17	15.00	-0.17	+/- 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 - 11812177

Reference Calibration Date: 02-Aug-13 16:04:03

Engineer: J. PINKETT

Calibration Date: 08-Aug-13 05:37:09

Software Version: WL INSITE R3.8.4 (Build 5)

Calibration Version: 1

#### MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.23	-0.02	+/- 0.15

#### PASS/FAIL SUMMARY

Pad Extension Check: Passed  
Diameter Check: Passed

### SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 11795867

Reference Calibration Date: 03-Jul-13 14:06:34

Engineer: J. SCHMIDT

Calibration Date: 02-Aug-13 15:24:51

Software Version: WL INSITE R3.8.4 (Build 5)

Calibration Version: 1

Logging Source S/N: 5471GW

Aluminum Block S/N: 63066

Density: 2.602g/cc

Pe: 3.100

Magnesium Block S/N: BRIGHTON MAGNESIUM BLOCK

Density: 1.691g/cc

Pe: 2.650

#### DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0851	1.0593	0.90 - 1.10
Near Dens Gain	1.0470	1.0258	0.90 - 1.10
Near Peak Gain	1.0318	1.0305	0.90 - 1.10
Near Lith Gain	0.9908	0.9864	0.90 - 1.10
Far Bar Gain	1.0153	1.0090	0.90 - 1.10
Far Dens Gain	1.0018	0.9961	0.90 - 1.10
Far Peak Gain	0.9946	0.9898	0.90 - 1.10
Far Lith Gain	0.9822	0.9721	0.90 - 1.10

Near Bar Offset	-0.8458	-0.6035	NONE
Near Dens Offset	-0.4663	-0.2726	NONE
Near Peak Offset	-0.3118	-0.2985	NONE
Near Lith Offset	0.0002	0.0390	NONE
Far Bar Offset	-0.2435	-0.1880	NONE
Far Dens Offset	-0.1113	-0.0599	NONE
Far Peak Offset	-0.0577	-0.0475	NONE
Far Lith Offset	-0.0002	-0.0002	NONE



Far Peak Offset	-0.0577	-0.0177	NONE
Far Lith Offset	0.0502	0.1296	NONE
Near Bar Background	834.39	830.03	700 - 1450
Near Dens Background	276.52	275.07	230 - 480
Near Peak Background	119.68	120.39	100 - 210
Near Lith Background	147.05	146.50	125 - 260
Far Bar Background	651.14	652.56	450 - 900
Far Dens Background	255.84	256.55	175 - 345
Far Peak Background	102.54	101.59	70 - 140
Far Lith Background	103.28	103.77	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.688	1.691	0.003	+/- 0.015
Pe	2.624	2.611	-0.013	+/- 0.150
ALUMINUM				
Density (g/cc)	2.601	2.602	0.001	+/- 0.01500
Pe	3.058	3.071	0.013	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0018	+/- 0.0110	-0.0005	+/- 0.0140
Magnesium Block	0.0002	+/- 0.0110	-0.0004	+/- 0.0140
Aluminum Block	0.0005	+/- 0.0110	0.0005	+/- 0.0140
Resolution	8.50	6.00 - 11.50	8.71	6.00 - 11.50
Internal Verifier(B+D+P+L)	1372	1200 - 2700	1114	800 - 1700

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

### SPECTRAL DENSITY FIELD CHECK

Tool Name:	SDLT Pad - 11795867	Reference Calibration Date:	02-Aug-13 15:24:51
Engineer:	J. PINKETT	Calibration Date:	08-Aug-13 05:31:18
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Pad Temperature: 75.2 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1371.990	1375.772	3.782	14.969
Far (B+D+P+L) cps	1114.482	1119.226	4.744	17.590

Near Resolution	8.50	8.62	0.120	0.50
Far Resolution	8.71	8.92	0.210	1.00

### PASS/FAIL SUMMARY

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

### ACCELEROMETER AND MAGNETOMETER SHOP CALIBRATION

Tool Name:	IDT - 11277451	Reference Calibration Date:	22-Dec-11 12:25:38
Engineer:	R. TWEETEN	Calibration Date:	12-Dec-12 09:29:09
Software Version:	WL INSITE R3.8.0 (Build 2)	Calibration Version:	1

Reference Gravity Field: 1.0000 g  
Reference Magnetic Field: 52800.0000 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
0.4269	-0.5884	-0.0061	1.0002	99.9829	1
-0.5599	-0.4780	-0.0063	1.0000	99.9967	1
-0.4375	0.6033	-0.0067	1.0000	99.9953	1
0.5831	0.4446	-0.0061	1.0000	99.9994	1
-0.0172	0.7436	-0.0064	0.9999	99.9936	1
0.6184	0.3018	0.1163	0.9998	99.9824	1
-0.0564	0.7421	-0.0065	1.0001	99.9927	1
0.7216	0.0940	-0.0061	1.0001	99.9879	1
-0.0078	-0.7309	-0.0061	0.9999	99.9889	1
-0.7395	-0.0298	-0.0065	1.0000	99.9995	1
-0.0143	0.0013	0.3591	1.0000	99.9969	1
0.6578	-0.1071	-0.1504	0.9999	99.9929	1

### ACCELEROMETER QUALITY SUMMARY

Average Calculated Gravity Field	1.0000 g
Standard Deviation Calculated Gravity Field	0.0001 g

### ACCELEROMETER GAIN AND OFFSET

	GAIN	OFFSET
ACC X	1.3631752729	0.0093273642
ACC Y	1.3562285900	-0.0086623570
ACC Z	2.7358396053	0.0174727775

\* 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
-0.1621	1.2632	-0.0843	53389.0742	98.8843	1
1.2405	0.2697	-0.0857	53529.2031	98.6189	1
0.1707	-1.2622	-0.0893	54134.3047	97.4729	1
-1.2427	-0.1685	-0.0880	52686.8008	99.7856	1
-0.0479	-1.0868	0.4088	51367.3828	97.2867	1
-1.0982	-0.5665	-0.3070	53254.3945	99.1394	1
0.2701	-1.0216	-0.6403	52368.3047	99.1824	1
-0.9920	-0.3106	-0.6376	51226.5664	97.0200	1
-0.1738	1.0402	-0.6485	51847.8633	98.1967	1
1.0246	0.2544	-0.6342	51825.9453	98.1552	1

-0.2197	-0.5608	0.9200	52932.6523	99.7488	1
-0.7837	-0.0929	-0.9906	54458.1367	96.8596	1

MAGNETOMETER QUALITY SUMMARY		
Average Calculated Magnetic Field	52751.7188	nT
Standard Deviation Calculated Magnetic Field	1052.5829	nT

MAGNETOMETER GAIN AND OFFSET		
	GAIN	OFFSET
MAG X	42089.3085937500	159.4645385742
MAG Y	42207.0781250000	-351.8444519043
MAG Z	46856.6171875000	3174.7180175781

Noise Level Value: 0.000219 cnts

Noise Level Cal Value: 0.0006 g

ICT SHOP CALIBRATION			
Tool Name:	ICT - 11294351	Reference Calibration Date:	05-Jul-13 23:34:50
Engineer:	J. PINKETT	Calibration Date:	07-Aug-13 10:53:51
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

CALIPERS AND RINGS			
Ring	Measured	Calibrated	Units
CALIPER 1:			
Small Ring	3.67	3.65	in
Medium Ring	8.11	8.00	in
Large Ring	15.12	15.00	in
X-Large Ring	21.03	21.00	in
CALIPER 2:			
Small Ring	3.65	3.65	in
Medium Ring	7.99	8.00	in
Large Ring	14.98	15.00	in
X-Large Ring	21.01	21.00	in
CALIPER 3:			
Small Ring	3.53	3.65	in
Medium Ring	7.89	8.00	in
Large Ring	14.88	15.00	in
X-Large Ring	20.94	21.00	in
CALIPER 4:			
Small Ring	3.44	3.65	in
Medium Ring	7.85	8.00	in
Large Ring	14.80	15.00	in
X-Large Ring	20.94	21.00	in
CALIPER 5:			
Small Ring	3.58	3.65	in
Medium Ring	7.99	8.00	in
Large Ring	15.02	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 6:			
Small Ring	3.70	3.65	in
Medium Ring	8.15	8.00	in
Large Ring	15.20	15.00	in
X-Large Ring	21.10	21.00	in

ICT FIELD CALIBRATION			
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## ICT FIELD CALIBRATION

<b>Tool Name:</b>	<b>ICT - 11294351</b>	<b>Reference Calibration Date:</b>	<b>07-Aug-13 10:53:51</b>
<b>Engineer:</b>	<b>J. PINKETT</b>	<b>Calibration Date:</b>	<b>08-Aug-13 05:28:20</b>
<b>Software Version:</b>	<b>WL INSITE R3.8.4 (Build 5)</b>	<b>Calibration Version:</b>	<b>1</b>

	CALIPERS			
	Caliper	Shop	Field	Units
	Caliper 1	8.00	8.02	in
	Caliper 2	8.00	8.00	in
	Caliper 3	8.00	8.05	in
	Caliper 4	8.00	8.02	in
	Caliper 5	8.00	8.00	in
	Caliper 6	8.00	7.96	in

## ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	ACRt Sonde - 11294353	Reference Calibration Date:	05-Jul-13 15:38:14
Engineer:	J. SCHMIDT	Calibration Date:	05-Aug-13 17:23:18
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1
Host Tool Name:	ACRt Instrument - 11302817		

TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.00	1.05	0.95	1.01	1.05	0.95	1.00	1.05
A2 (50")	0.95	1.01	1.05	0.95	1.02	1.05	0.95	1.02	1.05
A3 (29")	0.95	1.01	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A4 (17")	0.95	1.02	1.05	0.95	1.02	1.05	0.95	1.02	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.02	1.05	0.95	1.02	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.99	1.05	0.95	0.99	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	-1.86	2	-6	-4.67	-2	-8	-4.90	-2
A2 (50")	-7	-2.22	0	-7	-2.98	0	-7	-4.70	0
A3 (29")	-27	-13.82	-9	-9	-3.72	-3	-7	-3.60	-1
A4 (17")	-180	-92.44	-60	-45	-29.77	-15	-39	-25.60	-13
A5 (10")	N/A	N/A	N/A	-150	-99.42	-50	-80	-48.36	-10
A6 (6")	N/A	N/A	N/A	175	343.48	525	90	172.36	270

TRANSMITTER CURRENT GAIN			
Signal	Lower	R	Upper
12K	0.6	0.95	1.3
36K	1.0	1.84	2.0
72K	1.0	1.19	2.0

R-MUD VERIFICATION			
Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.00	1.05

PASS/FAIL SUMMARY	
GAIN RANGE CHK	PASS
SONDE OFFSET RANGE CHK	PASS
Tx CURRENT GAIN	PASS
Rmud VERIFICATION	PASS

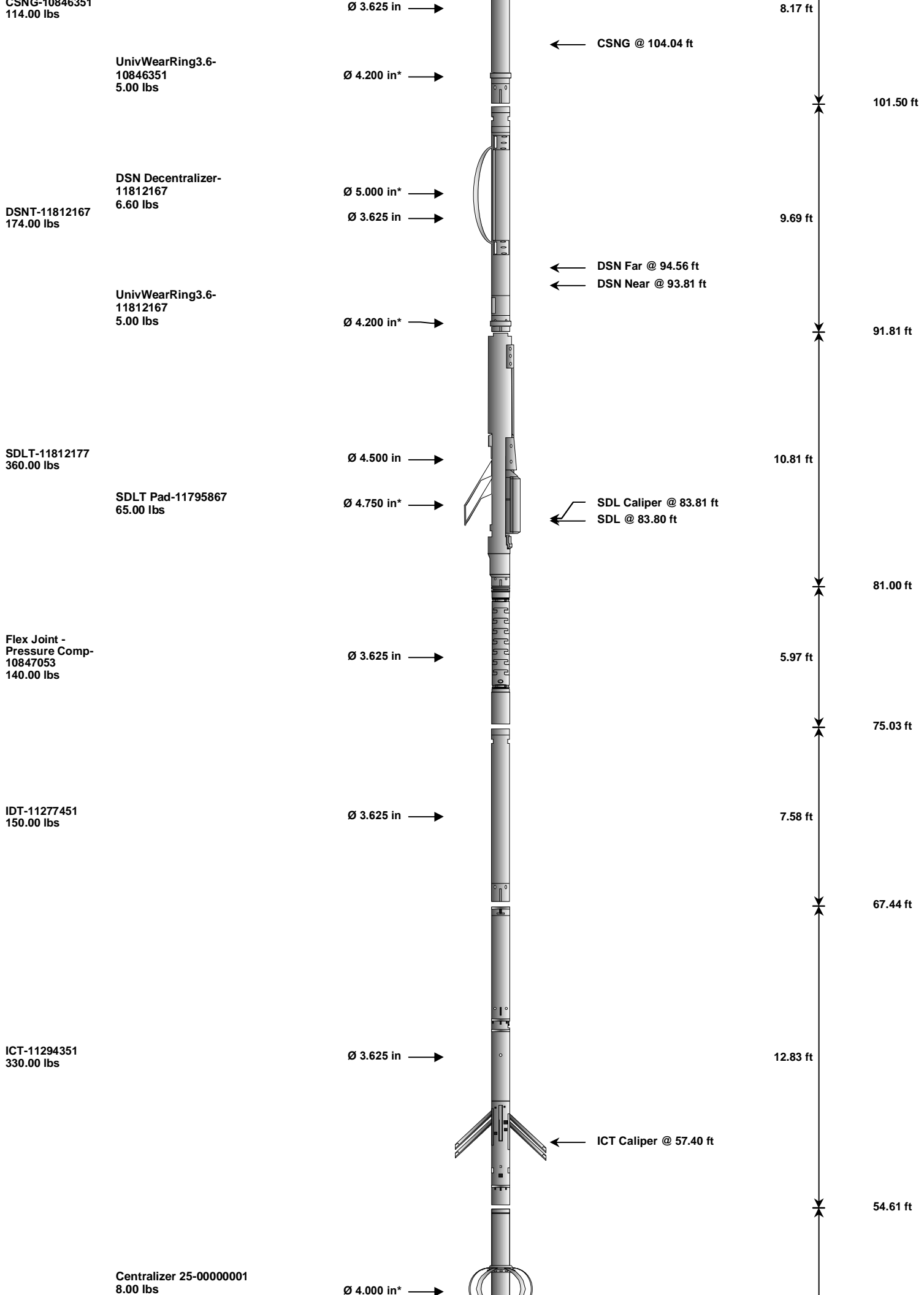
## CALIBRATION SUMMARY

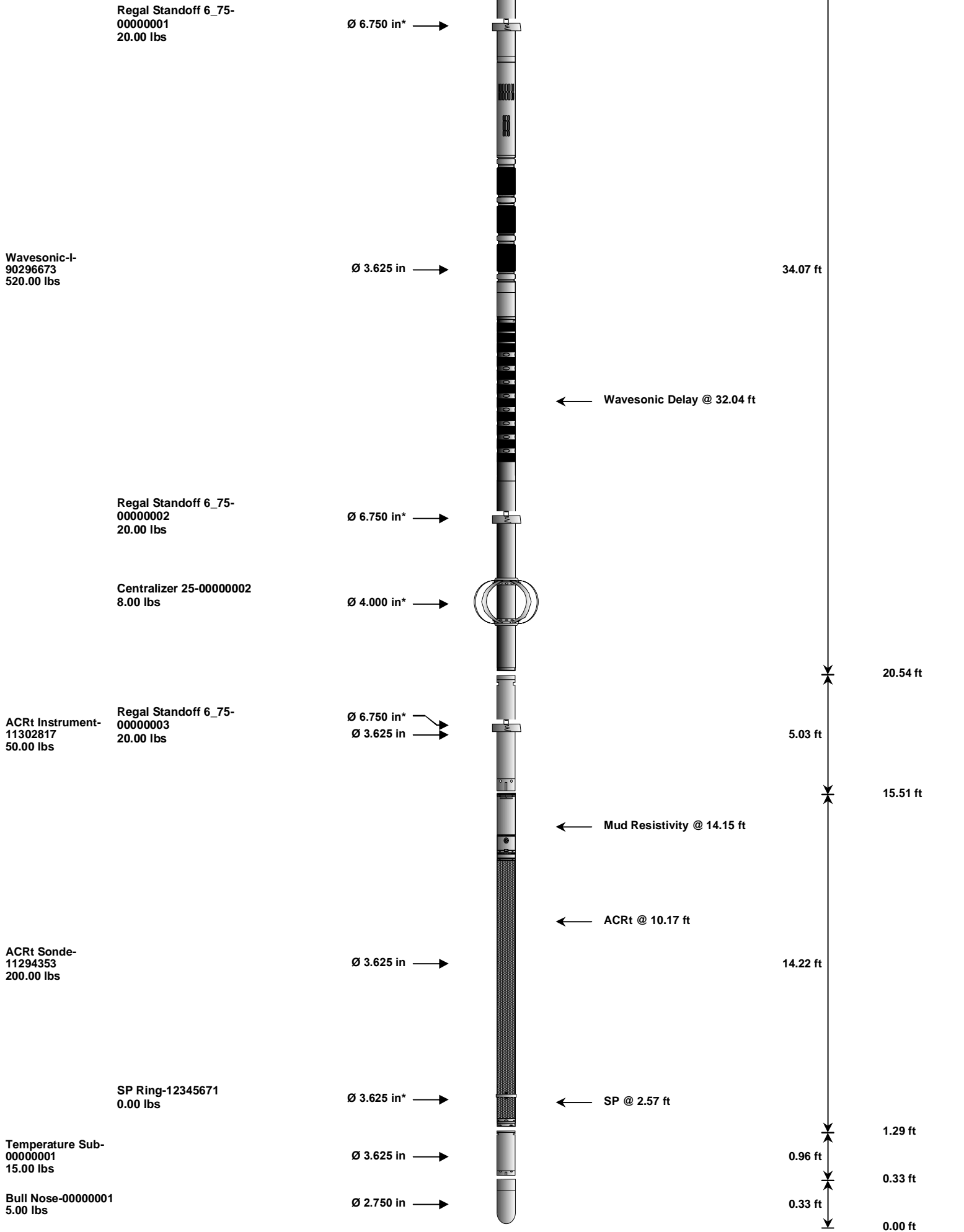
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11812883						
Gamma Ray Calibrator	247.3	247.7	-----	-0.4	+/- 9.00	api
CSNG-10846351						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.7	23.7	-----	0.0	-----	Channel #
583 KEV Peak Channel #	53.2	53.3	-----	-0.1	-----	Channel #
2614 KEV Peak Channel #	219.5	219.7	-----	-0.2	-----	Channel #
DSNT-11812167						
Snow-Block Porosity	0.0769	0.0656	-----	0.0113	+/- 0.0150	decp
SDLT-11812177						
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.23	-----	0.02	+/-0.15	in
SDLT Pad-11795867						
Near(B+D+P+L)	1371.990	1375.772	-----	-3.782	+/-14.969	cps
Far(B+D+P+L)	1114.482	1119.226	-----	-4.744	+/-17.590	cps
ICT-11294351						
Caliper 1	8.00	8.02	-----	-0.02	+/-0.25	in
Caliper 2	8.00	8.00	-----	0.00	+/-0.25	in
Caliper 3	8.00	8.05	-----	-0.05	+/-0.25	in
Caliper 4	8.00	8.02	-----	-0.02	+/-0.25	in
Caliper 5	8.00	8.00	-----	0.00	+/-0.25	in
Caliper 6	8.00	7.96	-----	0.04	+/-0.25	in
ACRt Sonde-11294353						
Mud Cell	1.00	-----	-----	0.00	-----	ohm-m

**HALLIBURTON**

## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-10409638 135.00 lbs		Ø 3.625 in →		← Load Cell @ 120.75 ft ← BH Temperature @ 120.18 ft	6.25 ft	124.43 ft
GTET-11812883 165.00 lbs		Ø 3.625 in →		← GammaRay @ 112.12 ft	8.52 ft	118.18 ft
UnivWearRing3.6-11812883 5.00 lbs		Ø 4.200 in* →				109.66 ft
CSNG-10846351						





Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Rot. Speed (rpm)
RWCH	Releasable Wireline Cable Head	10409638	135.00	6.25	118.18	300.00
GTET	Gamma Telemetry Tool	11812883	165.00	8.52	109.66	60.00
UWR3P6	Universal Wear Ring 3 5-8 inch	11812883	5.00	0.35	*	110.39
CSNG	Compensated Spectral Natural Gamma	10846351	114.00	8.17	101.50	15.00
UWR3P6	Universal Wear Ring 3 5-8 inch	10846351	5.00	0.35	*	102.50
DSNT	Dual Spaced Neutron	11812167	174.00	9.69	91.81	60.00
UWR3P6	Universal Wear Ring 3 5-8 inch	11812167	5.00	0.35	*	91.93
DCNT	DSN Decentralizer	11812167	6.60	5.13	*	95.14
SDLT	Spectral Density Tool	11812177	360.00	10.81	81.00	60.00
SDLP	Density Insite Pad	11795867	65.00	2.55	*	83.21
FLEX	Flex Joint - Pressure Compensated	10847053	140.00	5.97	75.03	300.00
IDT	Insite Directional Tool	11277451	150.00	7.58	67.44	30.00
ICT	Six Independent Arm Caliper	11294351	330.00	12.83	54.61	30.00
WSTT	WaveSonic Insite	90296673	520.00	34.07	20.54	30.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	*	22.48
RSOF	Regal Standoff 6.75in	00000002	20.00	0.52	*	26.87
RSOF	Regal Standoff 6.75in	00000001	20.00	0.52	*	47.56
OBCEN	Centralizer - 25 in. Overbody	00000001	8.00	2.08	*	50.02
ACRt	Array Compensated True Resistivity Instrument Section	11302817	50.00	5.03	15.51	300.00
RSOF	Regal Standoff 6.75in	00000003	20.00	0.52	*	18.09
ACRt	Array Compensated True Resistivity Sonde Section	11294353	200.00	14.22	1.29	300.00
SP	SP Ring	12345671	0.00	0.25	*	2.57
TMAX	Temperature Sub - 3_625 OD	00000001	15.00	0.96	0.33	300.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00
Total			2,520.60	124.43		
* Not included in Total Length and Length Accumulation.						
Data: MORAN_TRUST_2-1\0001 TRIPLE RED-CSNG-IDT-ICT-WSTT-TEMP SUB\004 08-Aug-13 18:09 Up @8044.0f					Date: 08-Aug-13 19:29:12	

COMPANY	CONOCO PHILLIPS COMPANY		
WELL	MORAN TRUST 2-1		
FIELD	WILDCAT		
COUNTY	ARAPAHOE	STATE	CO
HALLIBURTON		DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY	