HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	NOBLE ENERGY INC
WELL	PIONEER Y08-05
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO

COMPANY **NOBLE ENERGY INC**
WELL **PIONEER Y08-05**
FIELD **WATTENBERG**
COUNTY **WELD** STATE **CO**

API No. 05123310110000
Location SURFACE LOCATION: 1980' FNL & 511' FWL
LATITUDE: 40.154649°
LONGITUDE: 104.52954°

Other Services:
RWCH
BSAT
CSNG

Sect. 8 Twp. 2N Rge. 64W

Permanent Datum GL Elev. 4868.0 ft
Log measured from KB 14.0 ft above perm. Datum
Drilling measured from KB

Elev.: K.B. 4882.0 ft
D.F. 4882.0 ft
G.L. 4868.0 ft

Date	21-Aug-10		
Run No.	ONE		
Depth - Driller	7767.00 ft		
Depth - Logger	7767.0 ft		
Bottom - Logged Interval	7756 ft		
Top - Logged Interval	1062 ft		
Casing - Driller	8.625 in @ 1062.0 ft	@	@
Casing - Logger	1062.0 ft		
Bit Size	7.875 in	@	@
Type Fluid in Hole	WBM		
Density / Viscosity	9.5 ppg / 30.00 s/qt		
PH / Fluid Loss	8.00 pH / 19.2 cptm		
Source of Sample	FLOW LINE		
Rm @ Meas. Temperature	0.880 ohmm @ 115.00 degF	@	@
Rmf @ Meas. Temperature	1.13 ohmm @ 75.00 degF	@	@
Rmc @ Meas. Temperature	1.153 ohmm @ 75.00 degF	@	@
Source Rmf / Rmc	CHART / CHART		
Rm @ BHT	0.51 ohmm @ 202.0 degF	@	@
Time Since Circulation	8.0 hr		
Time on Bottom	21-Aug-10 15:57		
Max. Rec. Temperature	202.0 degF @ 7767.0 ft	@	@
Equipment / Location	11454566 / BRIGHTON		
Recorded By	F. LODER		
Witnessed By	M. NOLAND		

Fold here

Service Ticket No.: 7578296 API Serial No.: 05123310110000 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 817-353	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.	1105780	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	4.5"	Diameter	3.625"
Detector Model No.	T102-A	Spacing	0.5"	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs137	Source Type	Am241Be
Length	8"	LSA [Y/N]	N	Serial No.	2770GW	Serial No.	DSN434
Distance to Source	35'	FWDA [Y/N]	N	Strength	1.5 Ci	Strength	15 Ci

LOGGING DATA

GENERAL	GAMMA	ACOUSTIC	DENSITY	NEUTRON

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	7767'	7535'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20%	0 %	2.65 g/cc	20%	0 %	SAND
ONE	7535'	7075'	REC	0 API	250 API	30 %	-10 %	55.5 us/ft	20%	0 %	2.68 g/cc	20%	0 %	SAND
ONE	7075'	6783'	REC	0 API	250 API	30 %	-10 %		20%	0 %	2.71 g/cc	20%	0 %	LIME
ONE	6783'	1062'	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-BSAT-ACRT RAN IN COMBINATION

ANNULAR HOLE VOLUME CALCULATED USING 4.5 INCH PRODUCTION CASING

TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE

CREW: J. WALKER, M. BURNETT, T. MORRIS RIG: ENSIGN 136

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	
6783.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
	BSAT	DTMT	Delta -T Matrix Type	Limestone 47.5	
7075.00					
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
7558.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDWT	Borehole Fluid Weight	9.400	ppg
	SHARED	OBM	Oil Based Mud System?	No	
	SHARED	RMUD	Mud Resistivity	0.880	ohmm
	SHARED	TRM	Temperature of Mud	115.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	85.0	degF
	SHARED	TD	Total Well Depth	7767.00	ft
	SHARED	BHT	Bottom Hole Temperature	202.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	

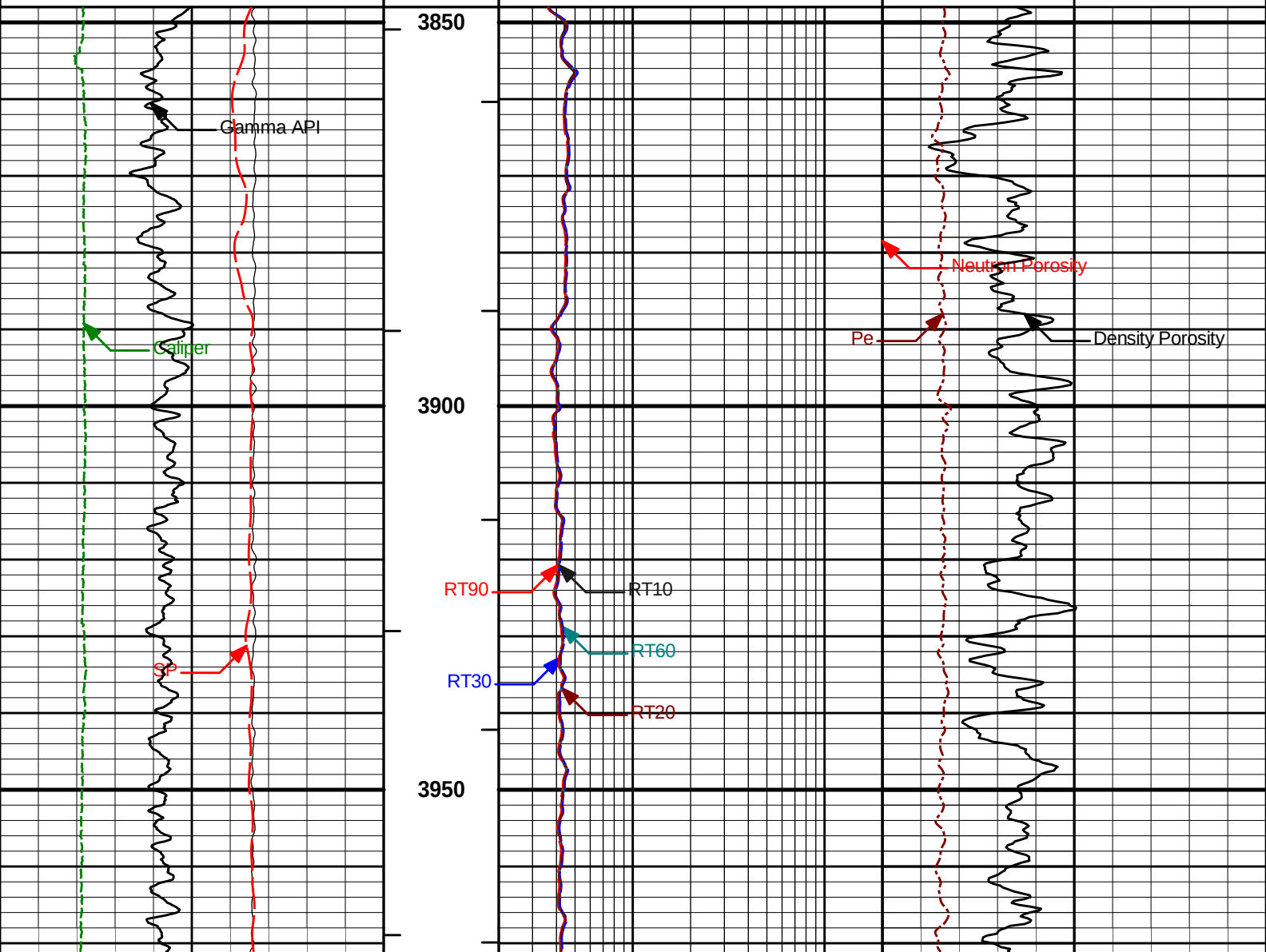
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	POTA	Potassium	0.00	%
GTET	MDTP	Mud Type	Natural	
GTET	TPOS	Tool Position	Standoff	
CSNG	CGOK	Process 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	
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	

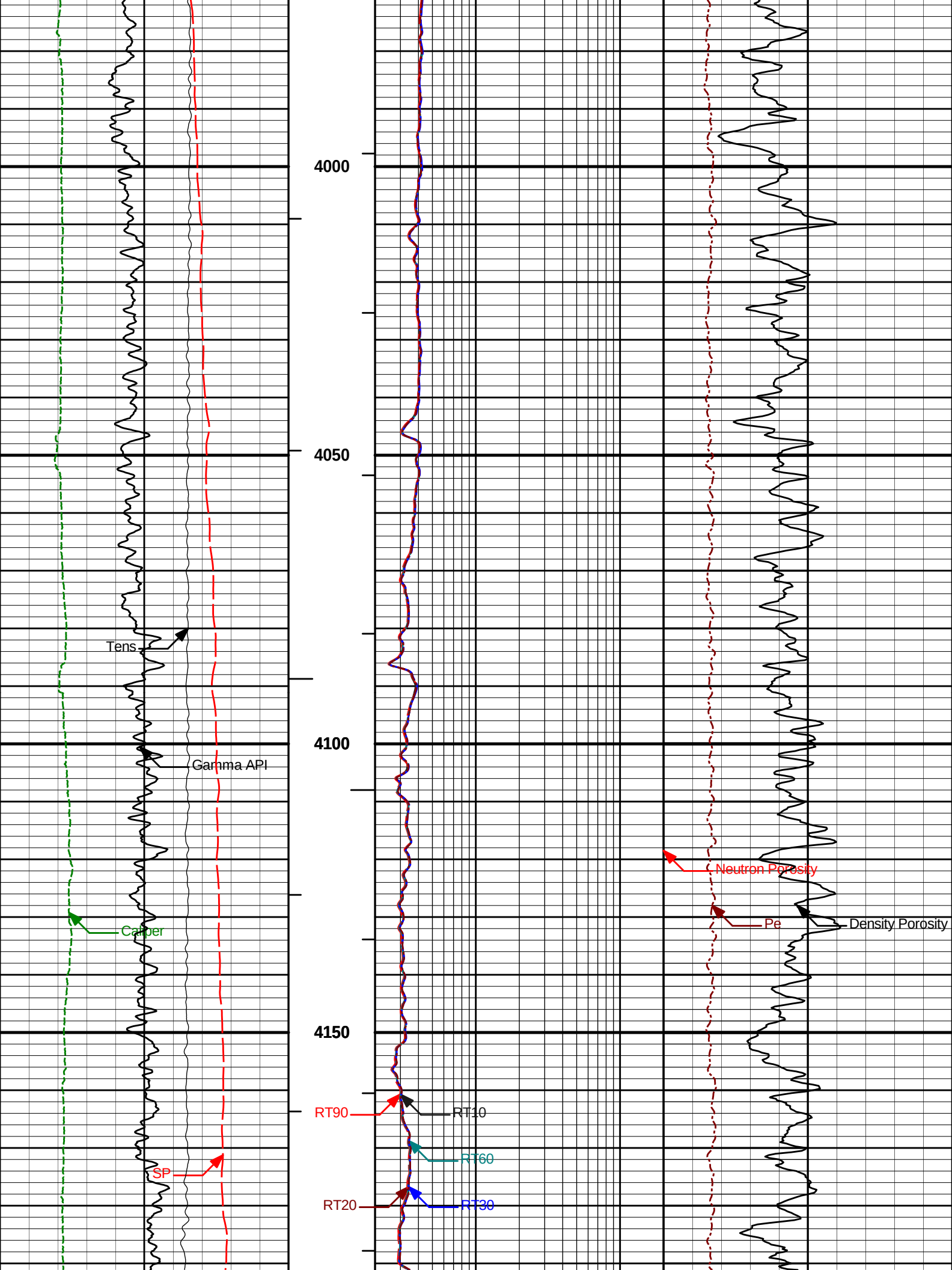
BOTTOM

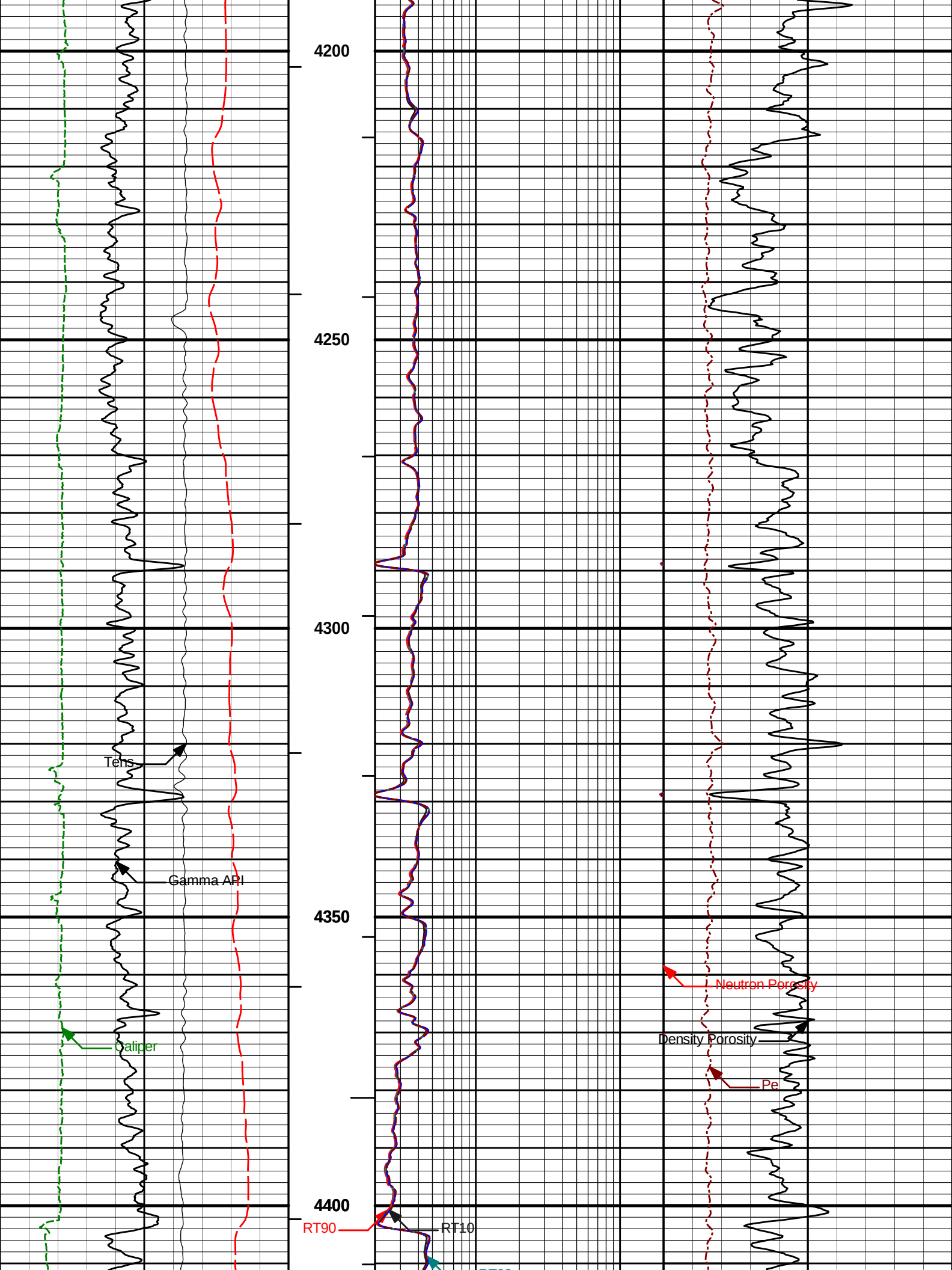
Plot File: \\COMP\MAIN

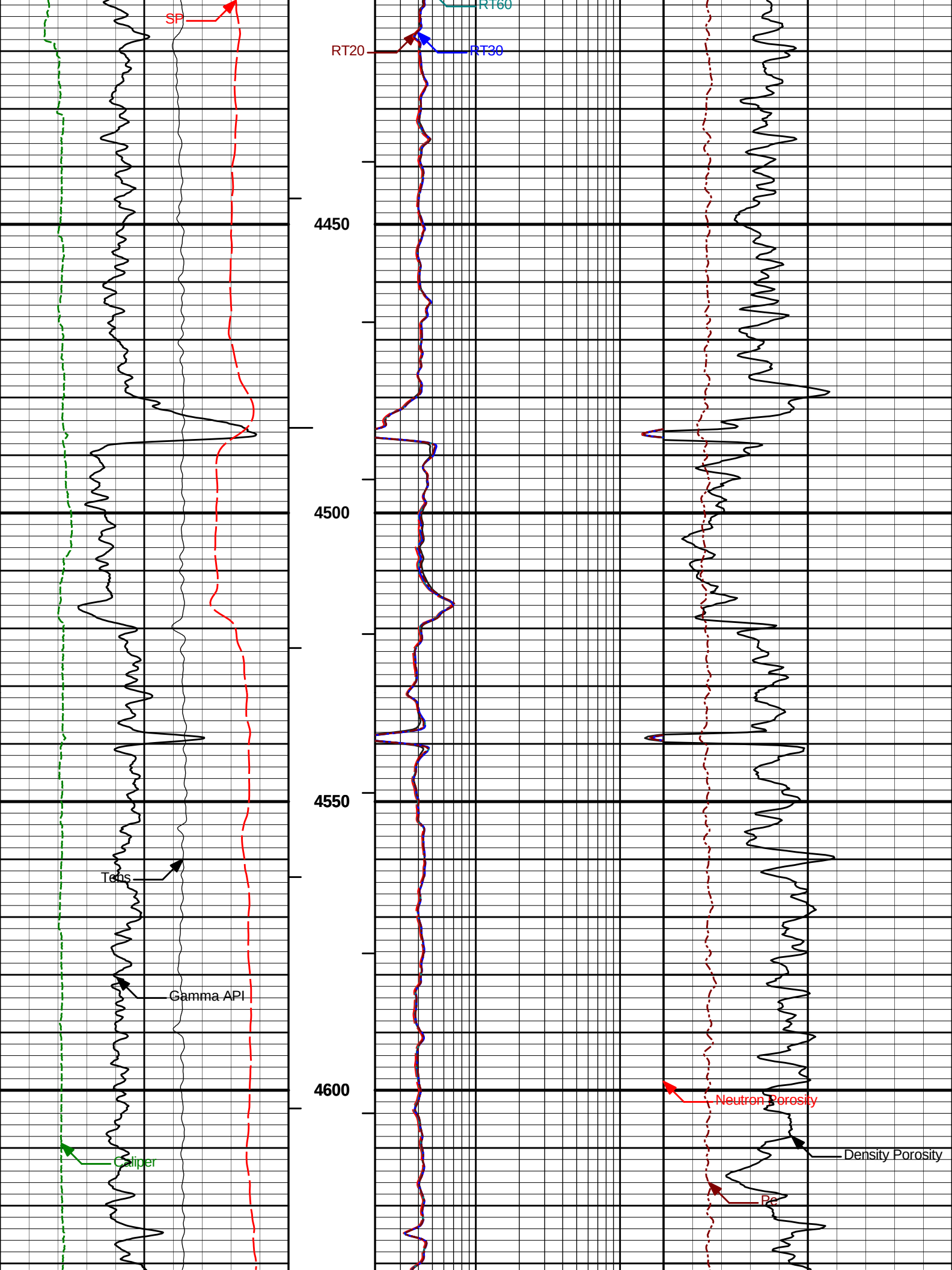
MAIN PASS 5" = 100'

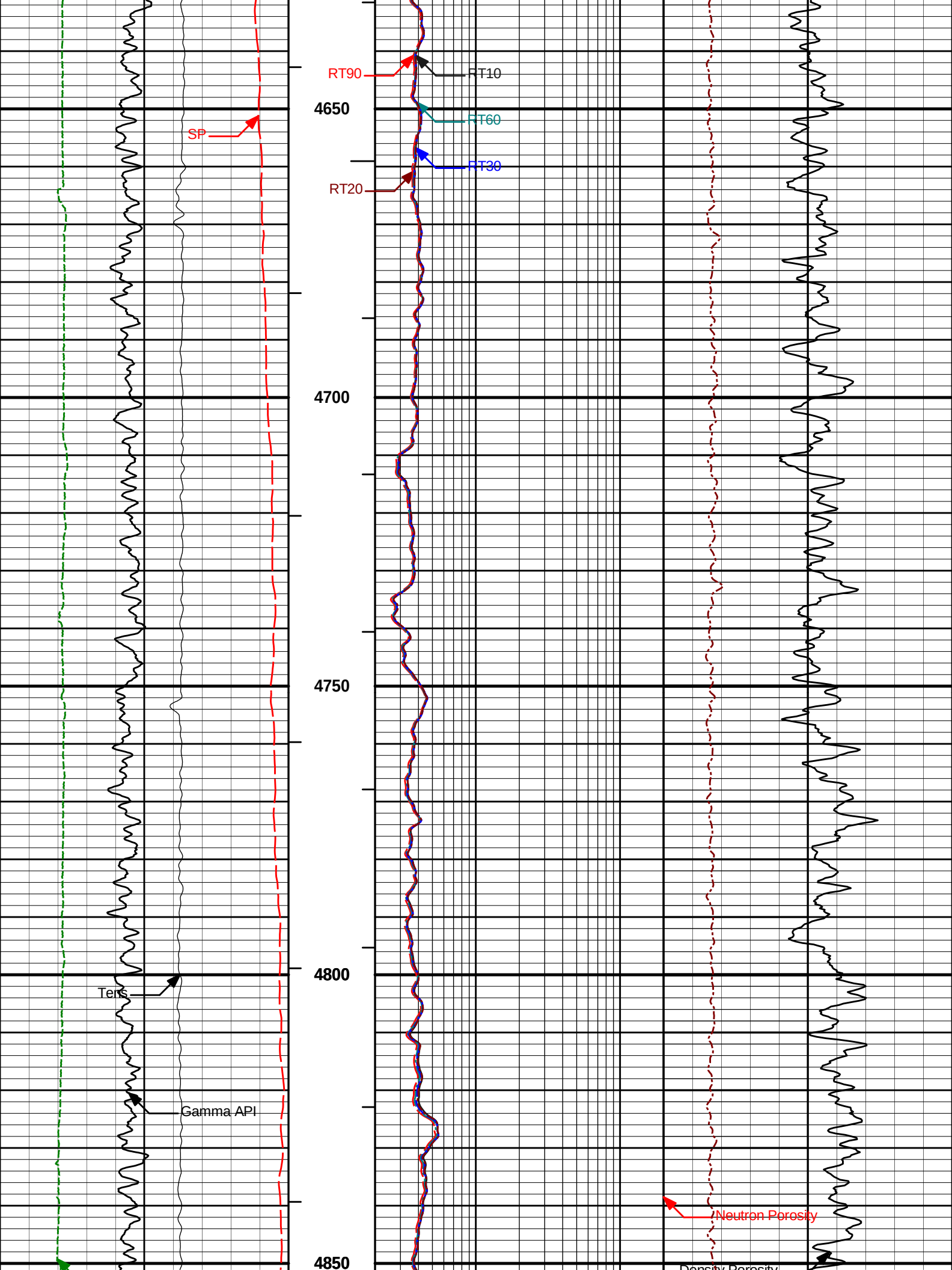
Track 1	Depth Track	Track 2	Track 5	Track 3
		2 RT10 200 Ohm-m		
10K Tens 0 pounds		2 RT20 200 Ohm-m		
6 Caliper 16 inches	AHVT	2 RT30 200 Ohm-m	20 Neutron Porosity 0 percent	
0 Gamma API 250 api	BHVT	2 RT60 200 Ohm-m	20 Density Porosity 0 percent	
50 SP 150 millivolts	1 : 240	2 RT90 200 Ohm-m	0 Pe 10	

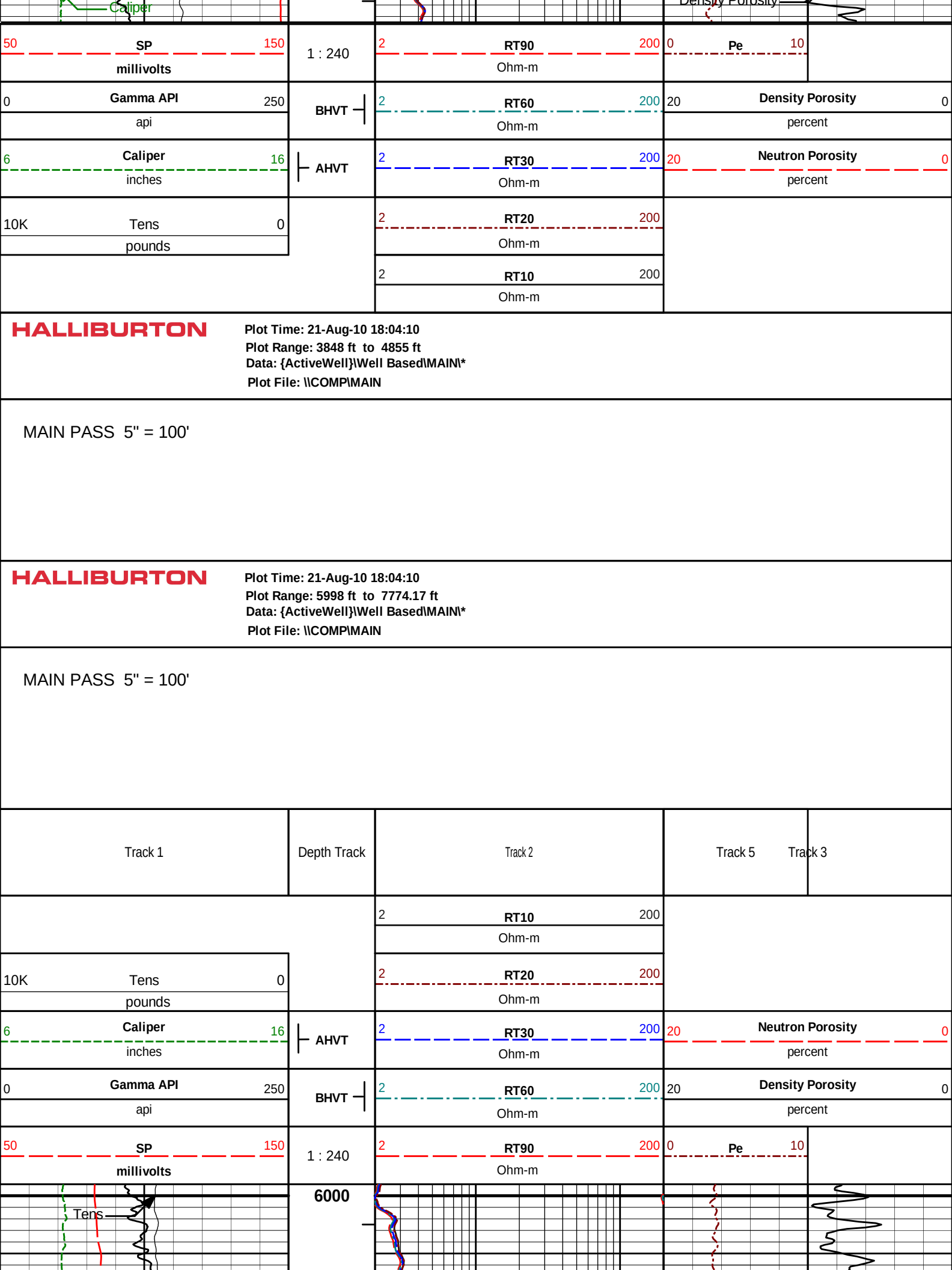


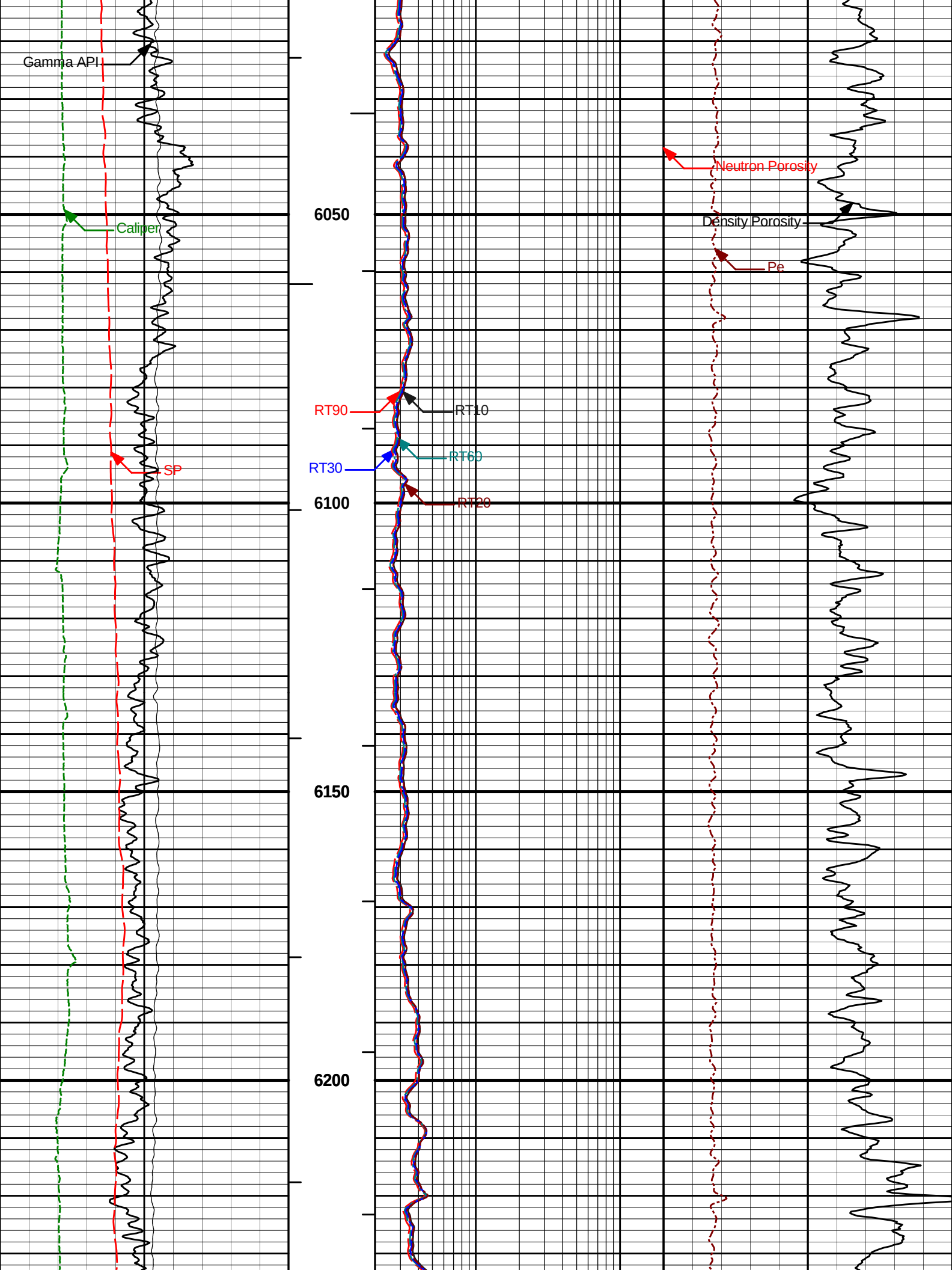

4000
4050
4100
4150
Tens
Gamma API
Caliper
SP
RT90
RT10
RT60
RT20
RT30
Neutron Porosity
Pe
Density Porosity

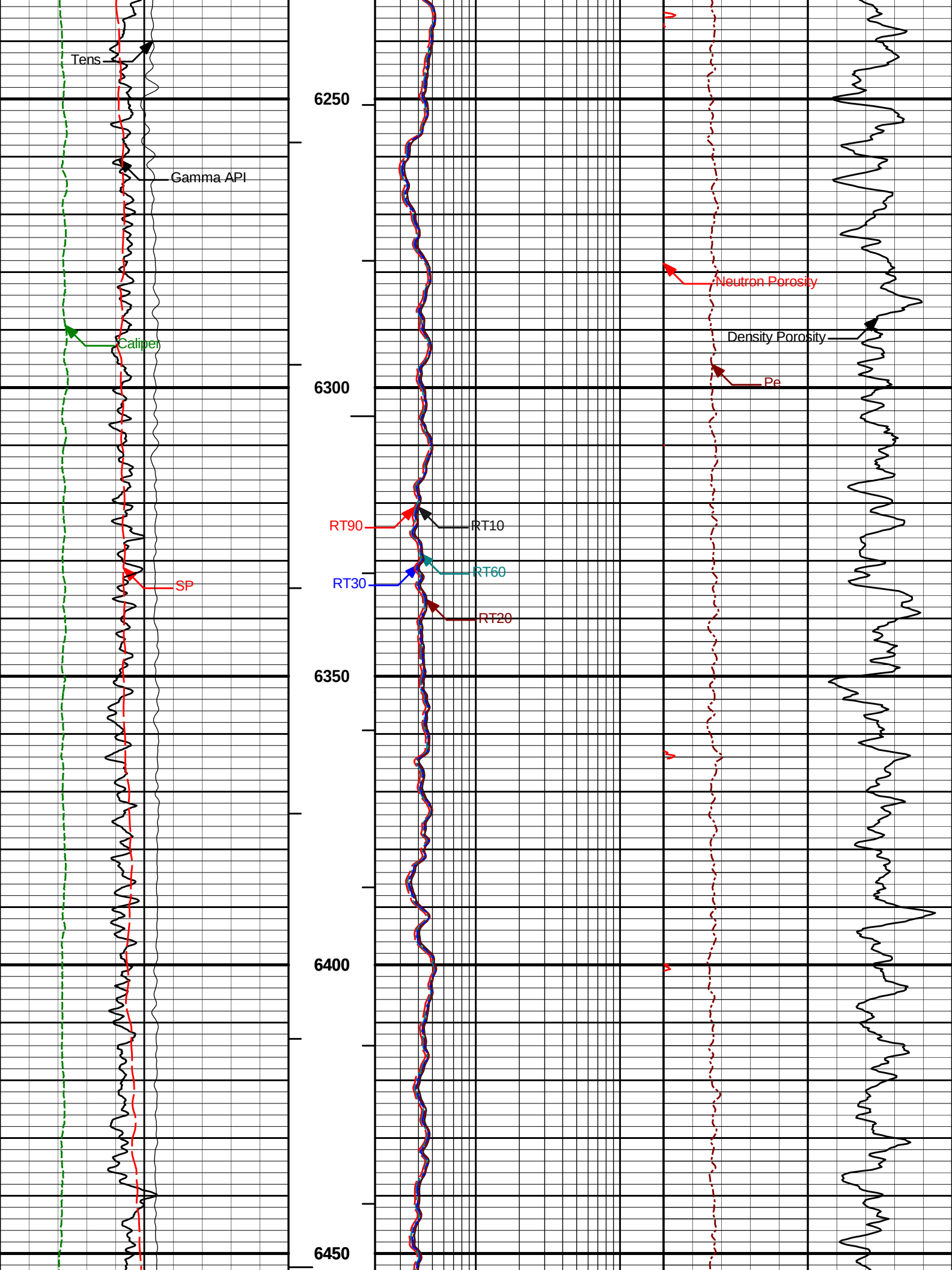

4200
4250
4300
4350
4400
Tens
Gamma API
Caliper
RT90
RT10
Neutron Porosity
Density Porosity
Pe

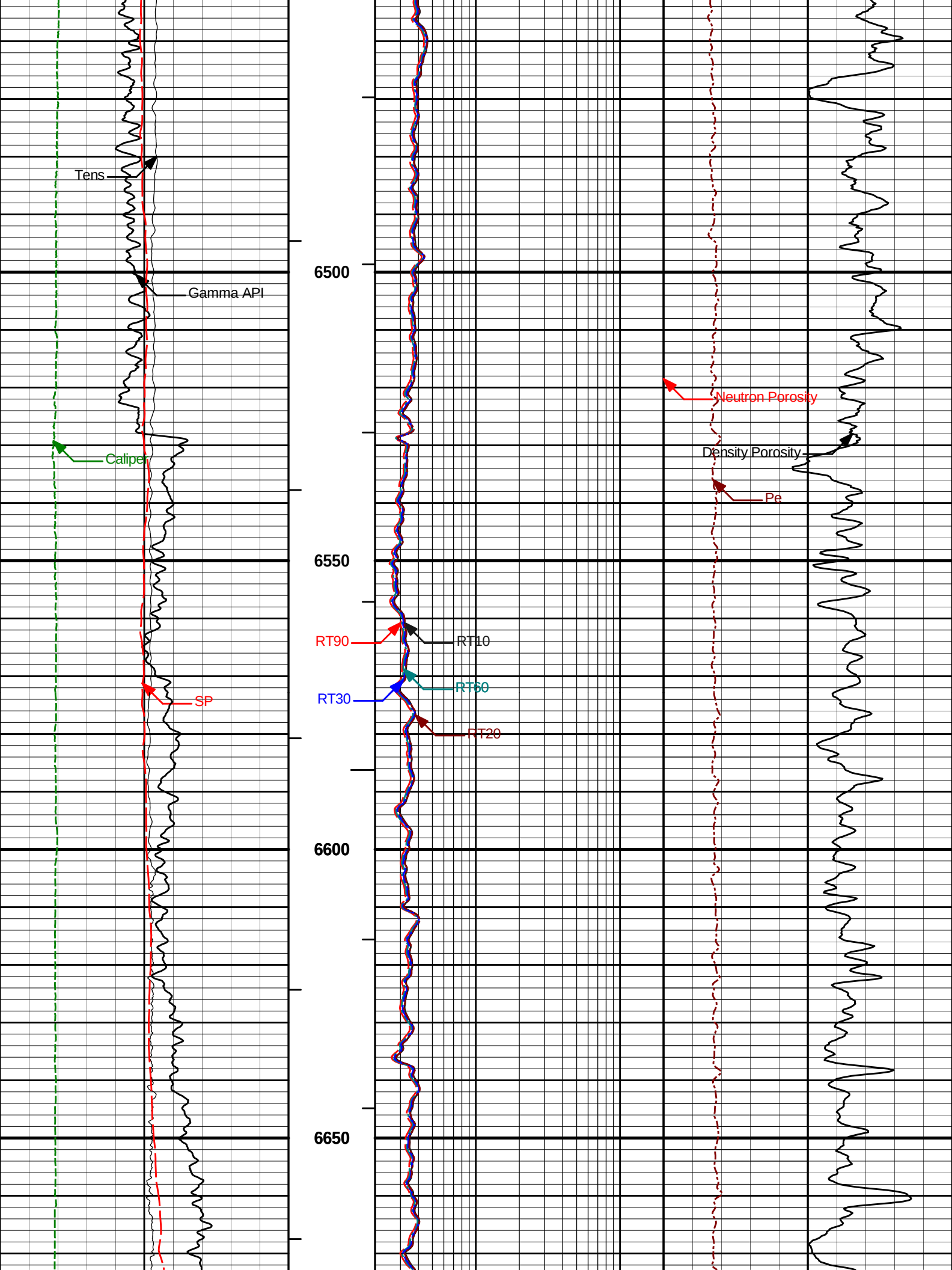

SP
RT60
RT20
RT30
4450
4500
4550
4600
Tens
Gamma API
Caliper
Neutron Porosity
Density Porosity
Pe

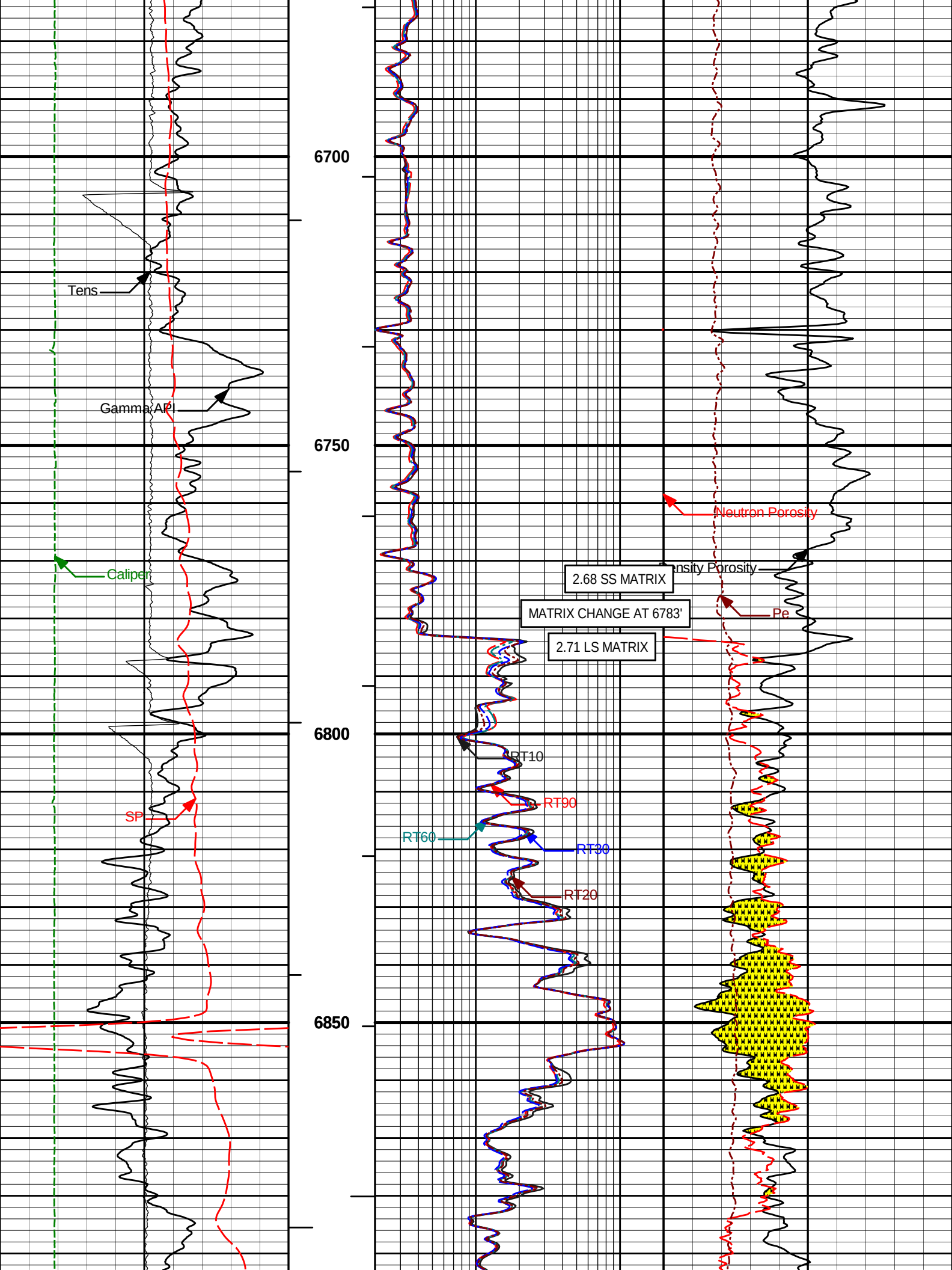

RT90
RT10
4650
RT60
SP
RT30
RT20
4700
4750
4800
Tens
Gamma API
Neutron Porosity
4850

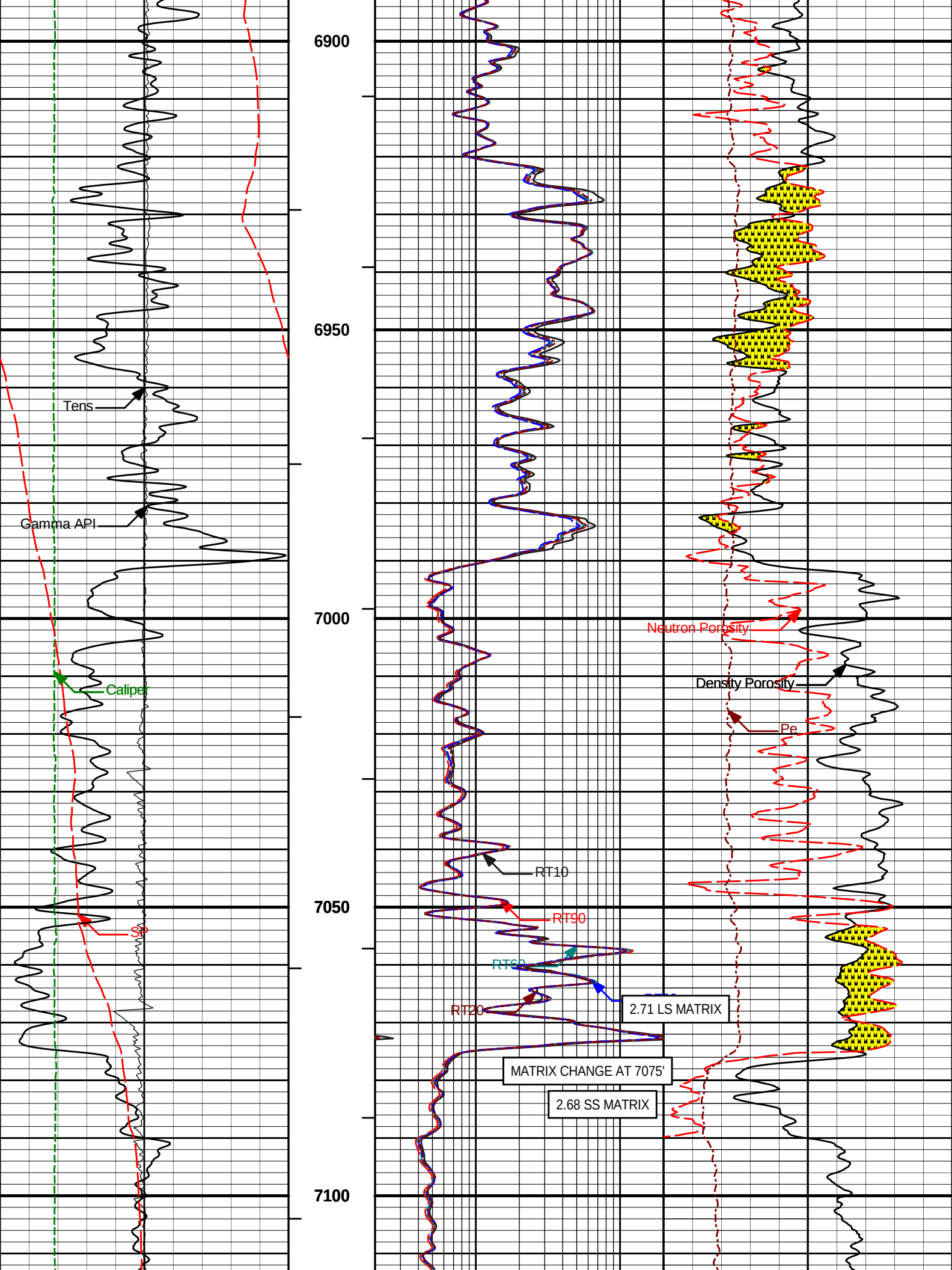

Caliper
Density Porosity
50 SP 150
millivolts
1 : 240
2 RT90 200
Ohm-m
0 Pe 10
0 Gamma API 250
api
BHVT
2 RT60 200
Ohm-m
20 Density Porosity 0
percent
6 Caliper 16
inches
AHVT
2 RT30 200
Ohm-m
20 Neutron Porosity 0
percent
10K Tens 0
pounds
2 RT20 200
Ohm-m
2 RT10 200
Ohm-m
HALLIBURTON
Plot Time: 21-Aug-10 18:04:10
Plot Range: 3848 ft to 4855 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\COMP\MAIN
MAIN PASS 5" = 100'
HALLIBURTON
Plot Time: 21-Aug-10 18:04:10
Plot Range: 5998 ft to 7774.17 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\COMP\MAIN
MAIN PASS 5" = 100'
Track 1
Depth Track
Track 2
Track 5
Track 3
6000
Tens

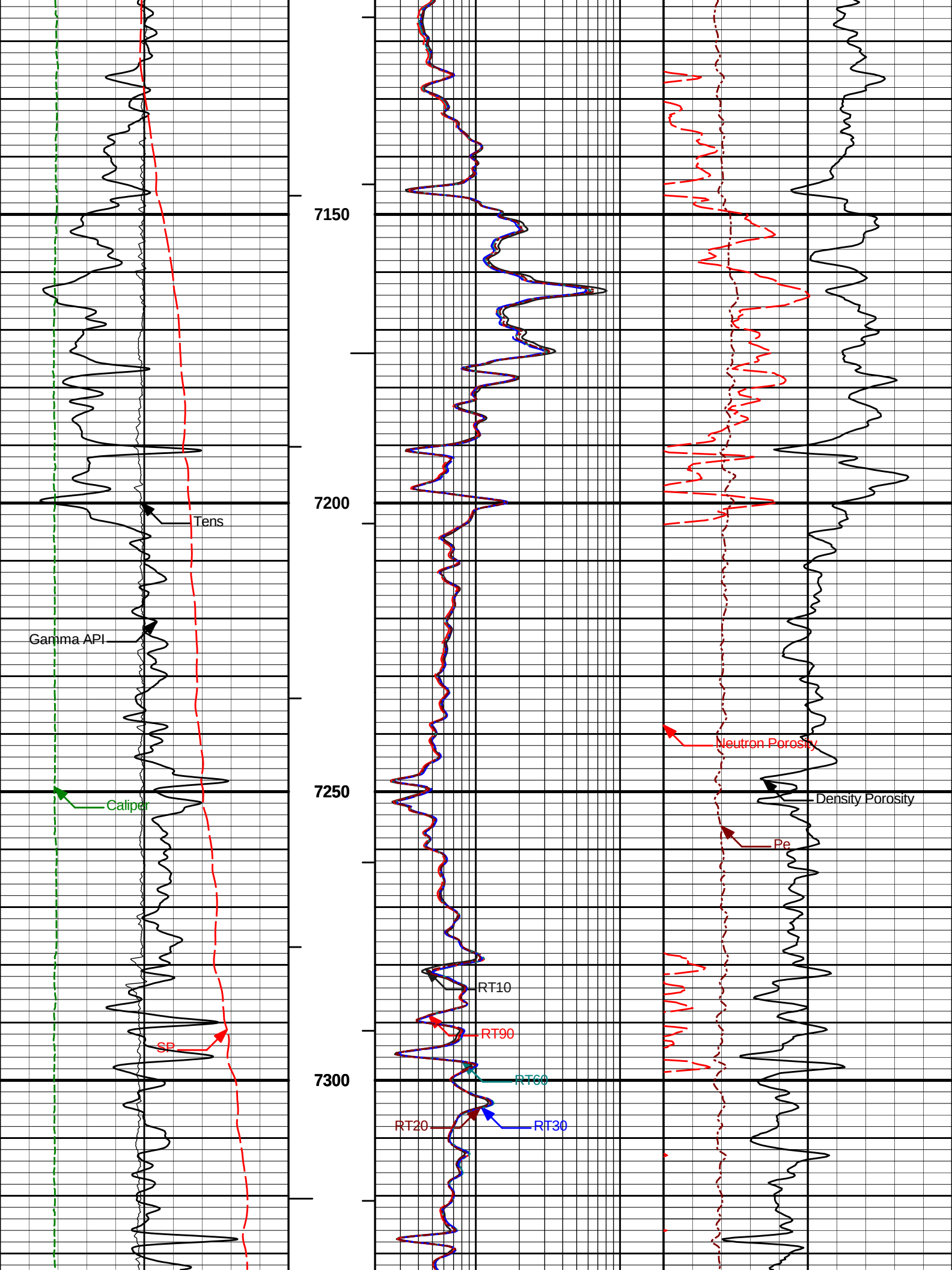

Gamma API
Caliper
SP
6050
6100
6150
6200
RT90
RT10
RT30
RT60
RT20
Neutron Porosity
Density Porosity
Pe

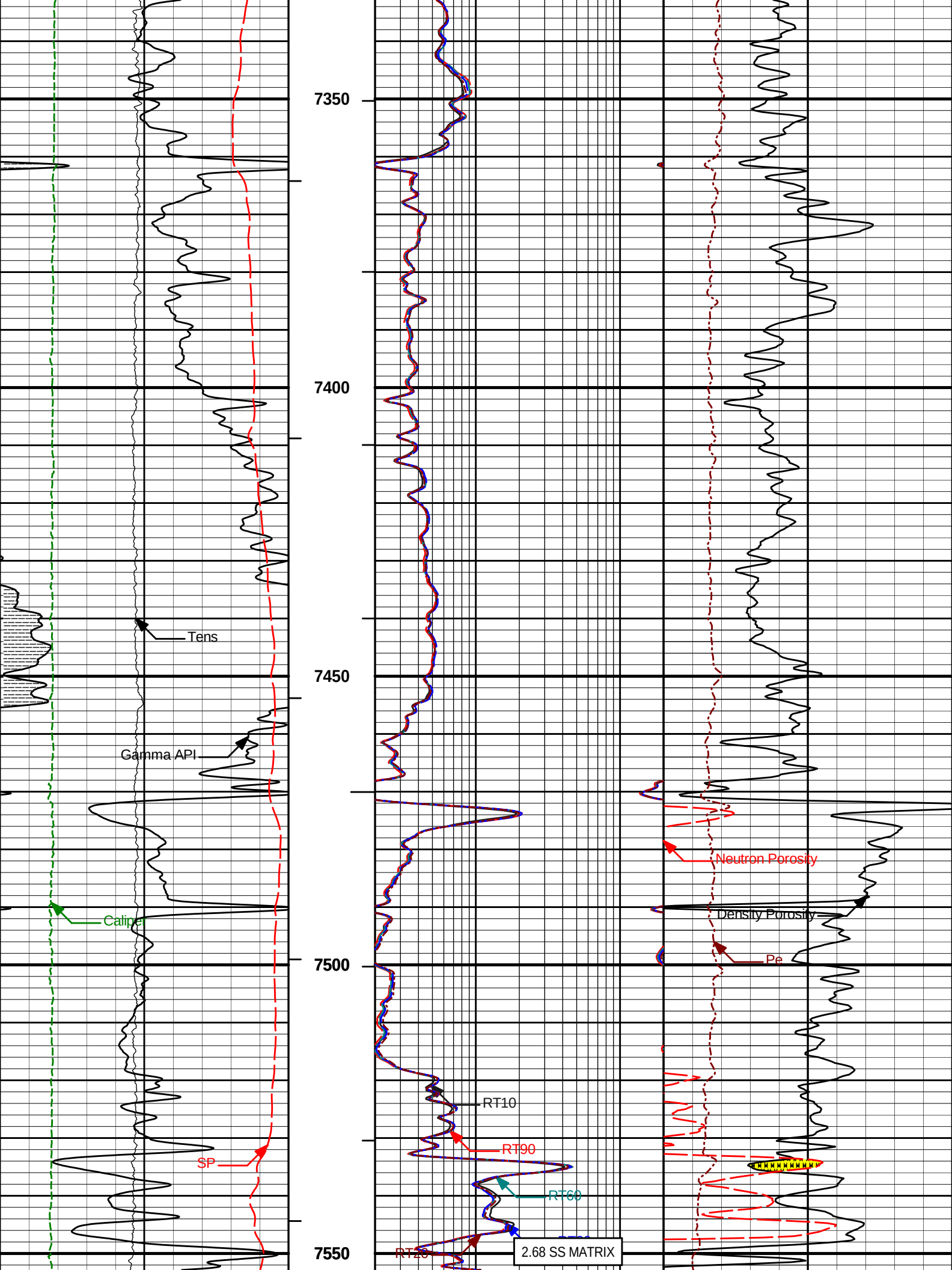

Tens
Gamma API
Caliper
SP
6250
6300
6350
6400
6450
RT90
RT10
RT60
RT30
RT20
Neutron Porosity
Density Porosity
Pe

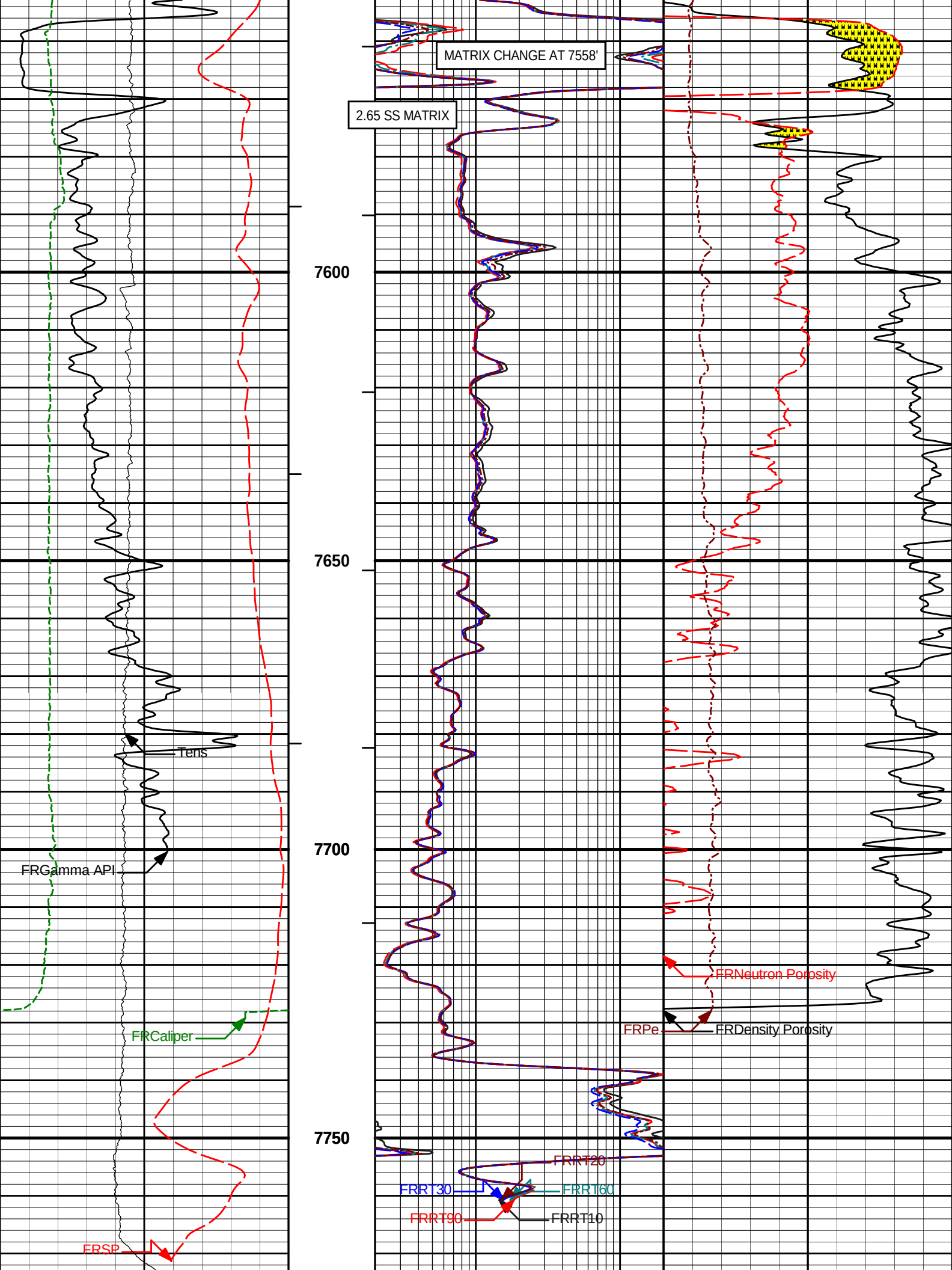

Tens
Gamma API
Caliper
SP
6500
6550
6600
6650
RT90
RT10
RT60
RT30
RT20
Neutron Porosity
Density Porosity
Pe

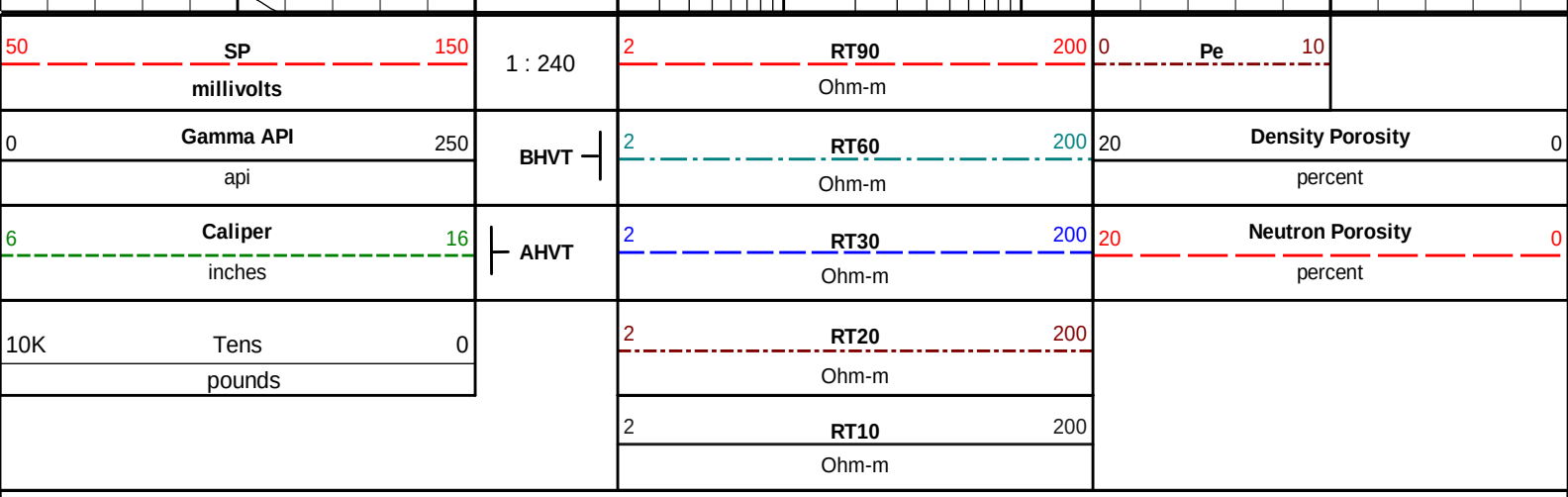

6700
6750
6800
6850
Tens
Gamma API
Caliper
SP
Neutron Porosity
Pe
2.68 SS MATRIX
MATRIX CHANGE AT 6783'
2.71 LS MATRIX
RT10
RT90
RT60
RT30
RT20


6900
6950
7000
7050
7100
Tens
Gamma API
Caliper
SP
RT10
RT90
RT60
RT20
2.71 LS MATRIX
MATRIX CHANGE AT 7075'
2.68 SS MATRIX
Neutron Porosity
Density Porosity
Pe


7150
7200
7250
7300
Tens
Gamma API
Caliper
SP
RT10
RT90
RT60
RT20
RT30
Neutron Porosity
Density Porosity
Pe


7350
7400
7450
7500
7550
Tens
Gamma API
Caliper
SP
RT10
RT90
RT60
RT20
2.68 SS MATRIX
Neutron Porosity
Density Porosity
Pe


MATRIX CHANGE AT 7558'
2.65 SS MATRIX
7600
7650
7700
7750
Tens
FRGamma API
FRCaliper
ERSP
FRNeutron Porosity
FRPe
FRDensity Porosity
FRRT20
FRRT30
FRRT60
FRRT90
FRRT10



HALLIBURTON

Plot Time: 21-Aug-10 18:04:23
Plot Range: 5998 ft to 7774.17 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\COMP\MAIN

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11277436**	**Reference Calibration Date:**	**01-Aug-10 11:19:52**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 14:41:01**
Software Version:	**WL INSITE R3.0.7 (Build 3)**	**Calibration Version:**	**1**

Calibrator Source S/N: KW-290
Calibrator API Reference:230.00 api

Measurement	Measured	Calibrated	Units
Background	72.7	73.8	api
Background + Calibrator	303.3	307.8	api
Calibrator	235.1	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11277436**	**Reference Calibration Date:**	**16-Aug-10 14:41:01**
Engineer:	**F. LODER**	**Calibration Date:**	**21-Aug-10 06:31:47**
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	73.8	80.2	api
Background + Calibrator	307.8	315.4	api
Calibrator	234.0	235.2	api

Shop	Field	Difference	Tolerance
234.0	235.2	-1.2	+/- 9.00

GSNG-FS SHOP CALIBRATION

CSNG-FS SHOP CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**20-Jul-10 12:11:34**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 14:22:25**
Software Version:	**WL INSITE R3.0.7 (Build 3)**	**Calibration Version:**	**1**
Source SN:	**KW-290**		

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.7	22.7	Channel #
583 KEV Peak Channel #	51.1	51.2	Channel #
2614 KEV Peak Channel #	209.6	210.5	Channel #
Calibrate Temperature	124.3	101.6	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	1608.4	CPS	321.8	323.3	API
Background	309.0	CPS	60.6	62.1	API

Gamma Ray Gain: 1.01
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	**CSNG - 10965402**	**Reference Calibration Date:**	**16-Aug-10 14:22:25**
Engineer:	**F. LODER**	**Calibration Date:**	**21-Aug-10 07:02:37**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.7	23.0	Channel #
583 KEV Peak Channel #	51.2	51.5	Channel #
2614 KEV Peak Channel #	210.5	210.9	Channel #
Calibrate Temperature	101.6	105.7	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	1782.7	CPS	323.3	344.7	API

Background	431.8	CPS	62.1	83.5	API

Gamma Ray Gain: 0.97

Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11301132**	**Reference Calibration Date:**	**16-Aug-10 17:25:59**
Engineer:	**C. BLUE**	**Calibration Date:**	**16-Aug-10 17:38:02**
Software Version:	**WL INSITE R3.0.7 (Build 3)**	**Calibration Version:**	**1**

Logging Source S/N: CASPER 434

Tank Serial Number: 11068236

Reference value assigned to Tank: 53.720

Snow Block S/N: CASPER IQ

Calibration Tank Water Temperature: 72 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.988	0.986	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):	0.2228	0.2224	0.0004	+/- 0.0020
Calibrated Ratio:	10.13	10.11	0.014	+/- 0.050

VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0803	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:**	**16-Aug-10 17:38:02**
Engineer:	**F. LODER**	**Calibration Date:**	**21-Aug-10 06:41:31**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

Logging Source S/N: CASPER 434

Snow Block S/N: CASPER IQ

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0803	0.0682	-0.0121	+/- 0.0150

PASS/FAIL SUMMARY

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

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	**SDLT - J133M375**	**Reference Calibration Date:**	**20-Jul-10 15:11:00**

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**20-Jul-10 15:11:00**
Engineer:	**C. BLUE**	**Calibration Date:**	**17-Aug-10 13:55:48**
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	1.0642	1.0833	0.90 - 1.10
Near Dens Gain	1.0244	1.0516	0.90 - 1.10
Near Peak Gain	1.0404	1.0754	0.90 - 1.10
Near Lith Gain	1.0149	1.0475	0.90 - 1.10
Far Bar Gain	1.0194	1.0230	0.90 - 1.10
Far Dens Gain	1.0054	1.0073	0.90 - 1.10
Far Peak Gain	0.9965	1.0021	0.90 - 1.10
Far Lith Gain	0.9661	0.9724	0.90 - 1.10
Near Bar Offset	-0.3458	-0.5266	NONE
Near Dens Offset	0.0006	-0.2427	NONE
Near Peak Offset	-0.1399	-0.4336	NONE
Near Lith Offset	0.0515	-0.2222	NONE
Far Bar Offset	0.0262	-0.0054	NONE
Far Dens Offset	0.1296	0.1174	NONE
Far Peak Offset	0.1721	0.1277	NONE
Far Lith Offset	0.3386	0.2861	NONE
Near Bar Background	956.41	950.28	700 - 1450
Near Dens Background	316.89	315.69	230 - 480
Near Peak Background	137.59	137.20	100 - 210
Near Lith Background	167.00	167.11	125 - 260
Far Bar Background	505.28	503.52	450 - 900
Far Dens Background	199.86	200.75	175 - 345
Far Peak Background	78.21	78.34	70 - 140
Far Lith Background	81.91	81.60	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.684	1.680	-0.004	+/- 0.015
Pe	2.614	2.593	-0.021	+/- 0.150
ALUMINUM				
Density (g/cc)	2.602	2.600	-0.002	+/- 0.01500
Pe	3.091	3.099	0.008	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0007	+/- 0.0110	-0.0008	+/- 0.0140
Magnesium Block	0.0003	+/- 0.0110	-0.0013	+/- 0.0140
Aluminum Block	-0.0004	+/- 0.0110	-0.0002	+/- 0.0140

Resolution	8.83	6.00 - 11.50	9.83	6.00 - 11.50
Internal Verifier(B+D+P+L)	1570	1200 - 2700	864	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:** 17-Aug-10 13:55:48

Engineer: F. LODER **Calibration Date:** 21-Aug-10 06:28:30

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

Pad Temperature: 82.3 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1570.289	1574.503	4.214	15.944
Far (B+D+P+L) cps	864.213	872.050	7.837	16.086
Near Resolution	8.83	8.84	0.010	0.50
Far Resolution	9.83	9.95	0.120	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - I132M275 **Reference Calibration Date:** 28-Jul-10 22:10:07

Engineer: C. BLUE **Calibration Date:** 17-Aug-10 14:25:08

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	-2333.87	-2445.21	-7000.00 - -1000.00
Pad Gain	0.0003958	0.0003994	0.000200 - 0.000600
Arm Offset	-1329.91	-733.76	-5000.00 - 3000.00
Arm Gain	0.0005358	0.0004833	0.000300 - 0.000700
Arm Power	-0.000006602	-0.000003351	-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)	3.76	3.75	-0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.43	6.50	0.07	+/- 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

SDLT CALIPER FIELD CALIBRATION

Tool Name:	**SDLT - I132M275**	**Reference Calibration Date:**	**17-Aug-10 14:25:08**
Engineer:	**F. LODER**	**Calibration Date:**	**21-Aug-10 06:32:15**
Software Version:	**WL INSITE R3.0.4 (Build 6)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.69	-0.06	+/- 0.10
Ring Diameter	8.25	8.31	0.06	+/- 0.15

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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	**ACRt - 90199477-E2817-S4353**	**Reference Calibration Date:**	**04-Jun-10 17:05:07**
Engineer:	**C. BLUE**	**Calibration Date:**	**13-Aug-10 20:06:47**
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	1.0167	1.05	0.95	1.0163	1.05	0.95	1.0146	1.05
A2 (50")	0.95	1.0118	1.05	0.95	1.0132	1.05	0.95	1.0128	1.05
A3 (29")	0.95	1.0069	1.05	0.95	1.0085	1.05	0.95	1.0057	1.05
A4 (17")	0.95	1.0150	1.05	0.95	1.0133	1.05	0.95	1.0143	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0000	1.05	0.95	0.9992	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9881	1.05	0.95	0.9862	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	-0.995	2	-6	-4.514	-2	-8	-4.963	-2
A2 (50")	-7	-1.354	-1	-6	-2.867	-2	-7	-4.762	-2
A3 (29")	-27	-13.303	-9	-9	-3.580	-3	-7	-3.628	-1
A4 (17")	-180	-90.373	-60	-45	-29.209	-15	-39	-25.034	-13
A5 (10")	N/A	N/A	N/A	-150	-90.980	-50	-80	-43.898	-10
A6 (6")	N/A	N/A	N/A	175	329.261	525	90	166.175	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.9189	1.3

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	0.996	1.05

36K	1.0	1.8306	2.0
72K	1.0	1.1584	2.0

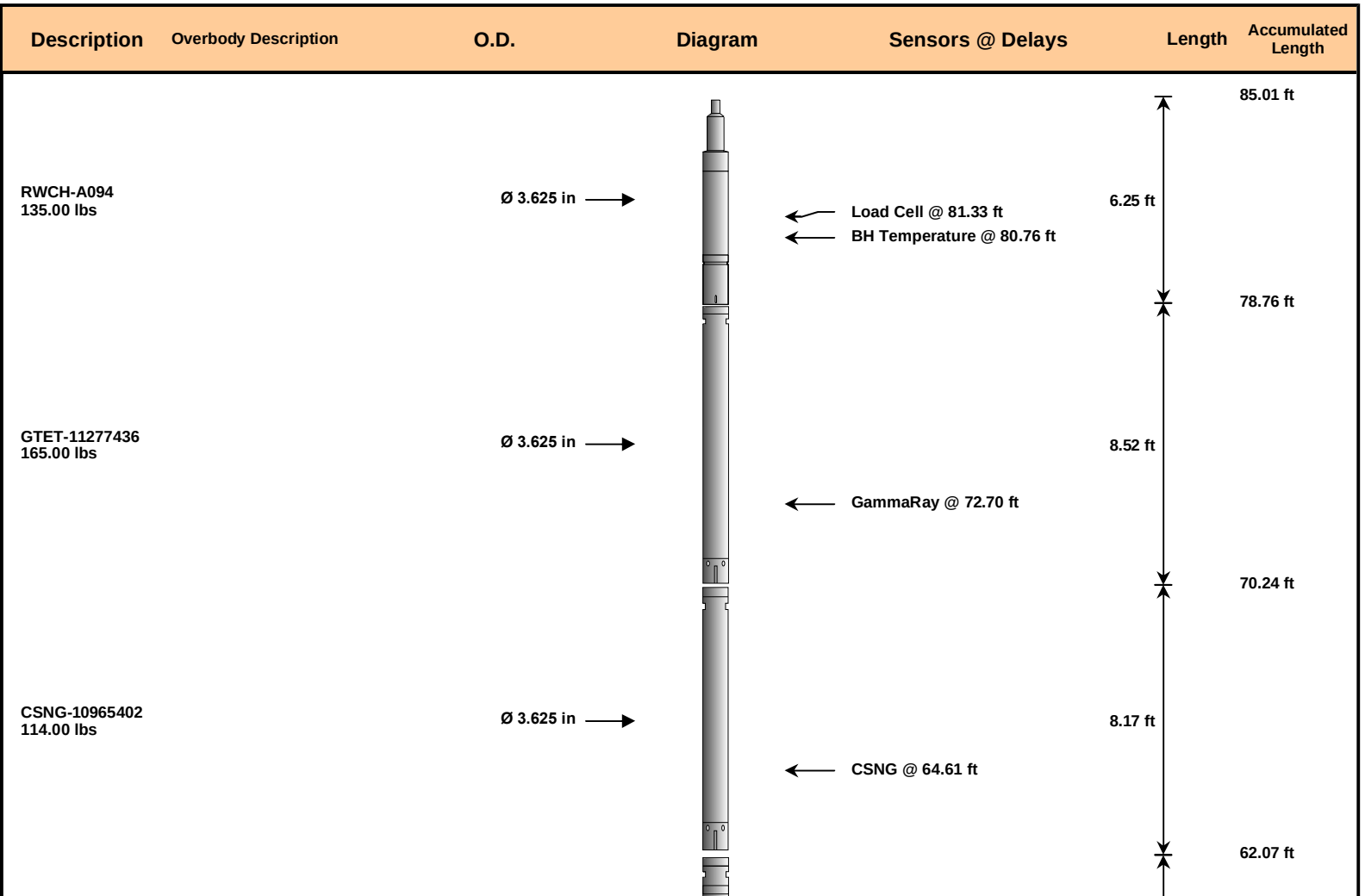
CALIBRATION SUMMARY

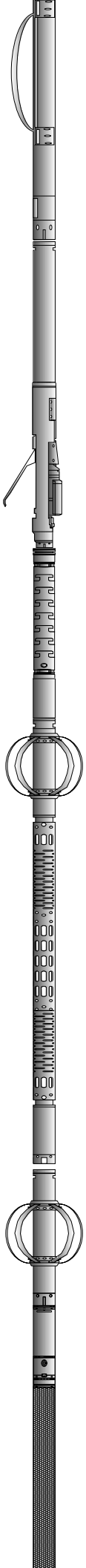
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11277436						
Gamma Ray Calibrator	234.0	235.2	----------	-1.2	+/- 9.00	api
CSNG-10965402						
60 KEV Peak Channel #	48.0	48.0	----------	0.0	----------	Channel #
239 KEV Peak Channel #	22.7	23.0	----------	-0.3	----------	Channel #
583 KEV Peak Channel #	51.2	51.5	----------	-0.3	----------	Channel #
2614 KEV Peak Channel #	210.5	210.9	----------	-0.4	----------	Channel #
DSNT-11301132						
Snow-Block Porosity	0.0803	0.0682	----------	0.0121	+/- 0.0150	decp
SDLT-I132M275						
Near(B+D+P+L)	1570.289	1574.503	----------	-4.214	+/-15.944	cps
Far(B+D+P+L)	864.213	872.050	----------	-7.837	+/-16.086	cps
Pad Extension	3.75	3.69	----------	0.06	+/-0.10	in
Ring Diameter	8.25	8.31	----------	-0.060	+/-0.15	in
ACRt-90199477-E2817-S4353						
Mud Cell	0.996	----------	----------	0.000	----------	ohm-m

Data: PIONEER_Y08_05\0001 NOBLE_BLACK_BSAT\002.01 21-Aug-10 17:18 Up **Date: 21-Aug-10 17:41:17**

HALLIBURTON

TOOL STRING DIAGRAM REPORT





DSN Decentralizer-
10860047
6.60 lbs

Ø 3.625 in*

DSNT-11301132
174.00 lbs

Ø 3.625 in

9.69 ft

DSN Far @ 55.14 ft

DSN Near @ 54.39 ft

52.39 ft

SDLT-I132M275
360.00 lbs

Ø 4.500 in

10.81 ft

SDL Microlog @ 44.57 ft

SDL Caliper @ 44.39 ft

Ø 4.750 in

SDL @ 44.38 ft

41.57 ft

Flex Joint -
Pressure Comp-
FLEX-BLACK
140.00 lbs

Ø 3.625 in

5.97 ft

35.60 ft

Centralizer 29-CENT-2
12.00 lbs

Ø 4.000 in*

BSAT-1105780
300.00 lbs

Ø 3.625 in

15.77 ft

Sonic Receivers @ 27.09 ft

19.83 ft

Centralizer 29-CENT-1
12.00 lbs

Ø 4.000 in*

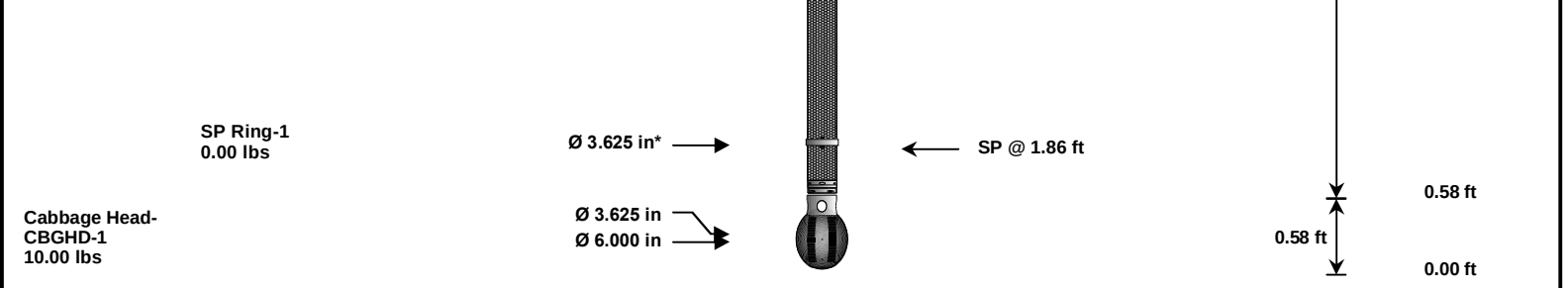
Mud Resistivity @ 13.44 ft

ACRt-90199477-
E2817-S4353
250.00 lbs

Ø 3.625 in

19.25 ft

ACRt @ 9.46 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		78.76	300.00
GTET	Gamma Telemetry Tool	11277436	165.00	8.52		70.24	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17		62.07	15.00
DSNT	Dual Spaced Neutron	11301132	174.00	9.69		52.39	60.00
DCNT	DSN Decentralizer	10860047	6.60	5.13	*	55.72	300.00
SDLT	Spectral Density Tool	I132M275	360.00	10.81		41.57	60.00
FLEX	Flex Joint - Pressure Compensated	FLEX-BLACK	140.00	5.97		35.60	300.00
BCAS	Borehole Sonic Array Tool	1105780	300.00	15.77		19.83	60.00
OBCEN	Centralizer - 29 in.Overbody	CENT-2	12.00	2.42	*	32.66	300.00
ACRt	Array Compensated True Resistivity	90199477-E2817-S4353	250.00	19.25		0.58	300.00
SP	SP Ring	1	0.00	0.25	*	1.86	300.00
OBCEN	Centralizer - 29 in.Overbody	CENT-1	12.00	2.42	*	16.29	300.00
CBHD	Cabbage Head	CBGHD-1	10.00	0.58		0.00	300.00
Total			**1,678.60**	**85.01**			

* Not included in Total Length and Length Accumulation.

Data: PIONEER_Y08_05\0001 NOBLE_BLACK_BSAT\IDLE **Date: 21-Aug-10 15:05:21**

COMPANY	**NOBLE ENERGY INC**		
WELL	**PIONEER Y08-05**		
FIELD	**WATTENBERG**		
COUNTY	**WELD**	STATE	**CO**

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY
ARRAY COMPENSATED
TRUE RESISTIVITY
LOG