

HALLIBURTON

ARRAY COMPENSATED
TRUE RESISTIVITY
SPECTRAL DENSITY
DUAL SPACED NEUTRON

COMPANY		NOBLE ENERGY INC	
WELL		WATKINS C12-24	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum	GL	Elev. 4627.0 ft	Elev. K.B. 4641.0 ft
Log measured from	KB		D.F. 4640.0 ft
Drilling measured from	KB	14.0 ft above perm. Datum	G.L. 4627.0 ft
Date	09-Dec-11		
Run No.	ONE		
Depth - Driller	6905.00 ft		
Depth - Logger	6900.0 ft		
Bottom - Logged Interval	6896 ft		
Top - Logged Interval	3398 ft		
Casing - Driller	8.625 in @ 1066.0 ft		@
Casing - Logger	1065.0 ft		
Bit Size	7.875 in		@
Type Fluid in Hole	WATER BASED MUD		
Density	9.3 ppq	38.00 sg/cc	
PH	9.00 pH	6.4 cp/m	
Source of Sample	MUD CELL		
Rm @ Meas. Temperature	1.090 ohmm @ 67.20 degF		@
Rmf @ Meas. Temperature	0.83 ohmm @ 75.00 degF		@
Rmc @ Meas. Temperature	0.896 ohmm @ 75.00 degF		@
Source Rmf	CHART	CHART	
Rm @ BHT	0.36 ohmm @ 216.0 degF		@
Time Since Circulation	8.0 hr		
Time on Bottom	09-Dec-11 10:36		
Max. Rec. Temperature	216.0 degF @ 6900.0 ft		@
Equipment	11454566	BRIGHTON	
Recorded By	R. TWEETEN		
Witnessed By	J. CHIAK		

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Service Ticket No.: 9121533				API Serial No.: 05123345680000				PGM Version: WL INSITE R3.4.2 (Build 2)											
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" S.O.	N/A									
Rmc @ Meas. Temp.	@		@				E6758_S4352												
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.	11277436			Serial No.				Serial No.	M335_P470			Serial No.	11812167						
Model No.	GTET			Model No.				Model No.	SDLT			Model No.	DSNT						
Diameter	3.625"			No. of Cent.				Diameter	4.5"			Diameter	3.625"						
Detector Model No.	GTET			Spacing				Log Type	GAM-GAM			Log Type	NEU-NEU						
Type	SCINT							Source Type	CS-137			Source Type	AM241BE						
Length	8"			LSA [Y/N]				Serial No.	2770GW			Serial No.	DSN434						
Distance to Source	17'			FWDA [Y/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	TD	6708	REC	0	250				20	0	2.68	20	0	SAND		
ONE	6708	6453	REC	0	250				20	0	2.71	20	0	LIME		
ONE	6453	CSG	REC	0	250				20	0	2.68	20	0	SAND		
DIRECTIONAL INFORMATION																
Maximum Deviation									@	KOP						@
Remarks: RWCH-GTET-CSNG-DSNT-SDLT-ACRt RUN IN COMBINATION.																
ANNULAR HOLE VOLUME CALCULATED USING 4.5-INCH PRODUCTION CASING.																
TENSION PULLS, WASHOUTS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE.																
CHLORIDES REPORTED AT 160 ppm.																
NO REPEAT SECTION RUN AT CLIENT'S REQUEST.																
YOUR CREW TODAY: R. PERSHALL, J. PINKETT																
RIG: SAXON 143																
THANK YOU FOR USING HALLIBURTON LOGGING 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.																
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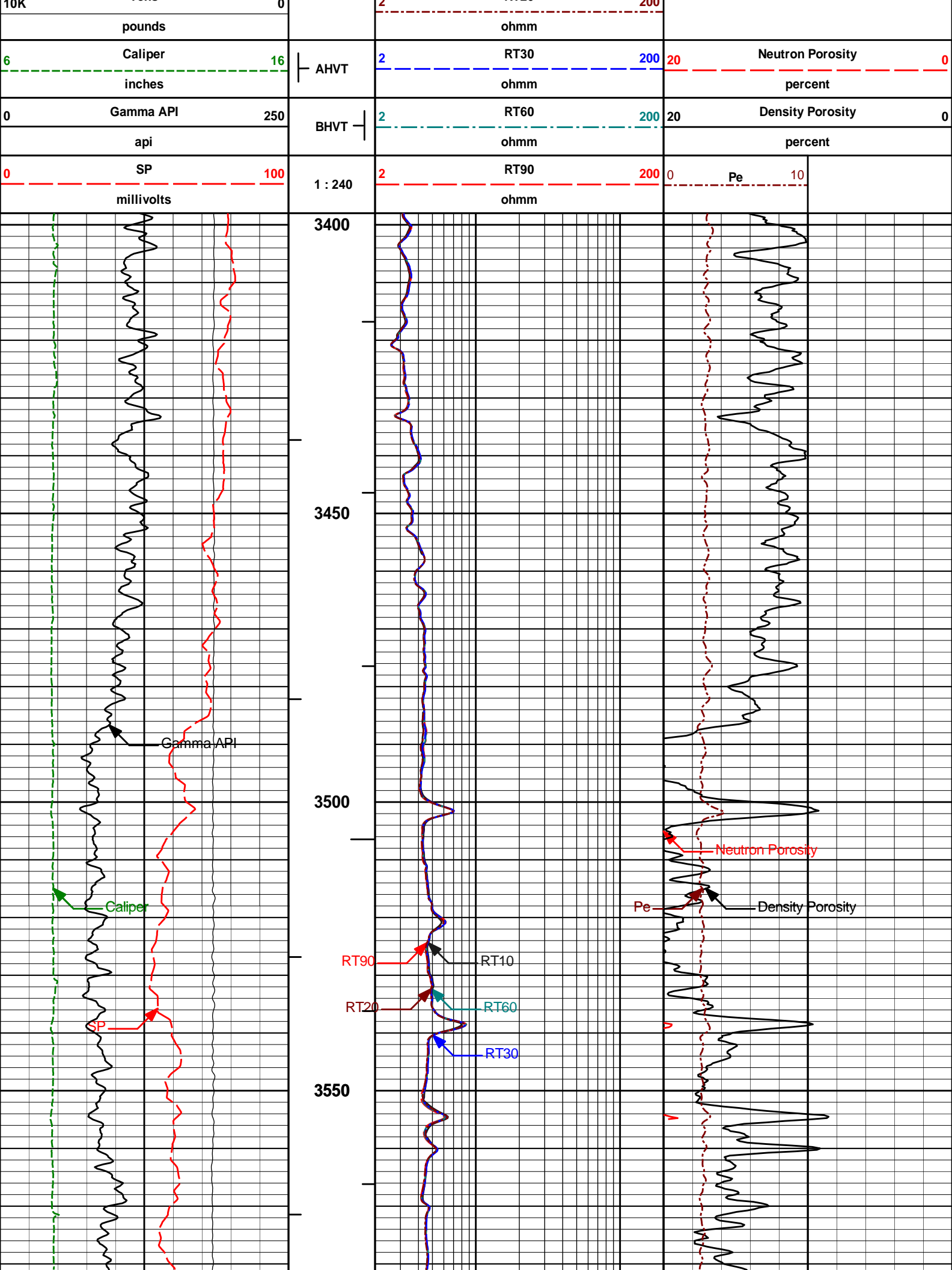
HALLIBURTON

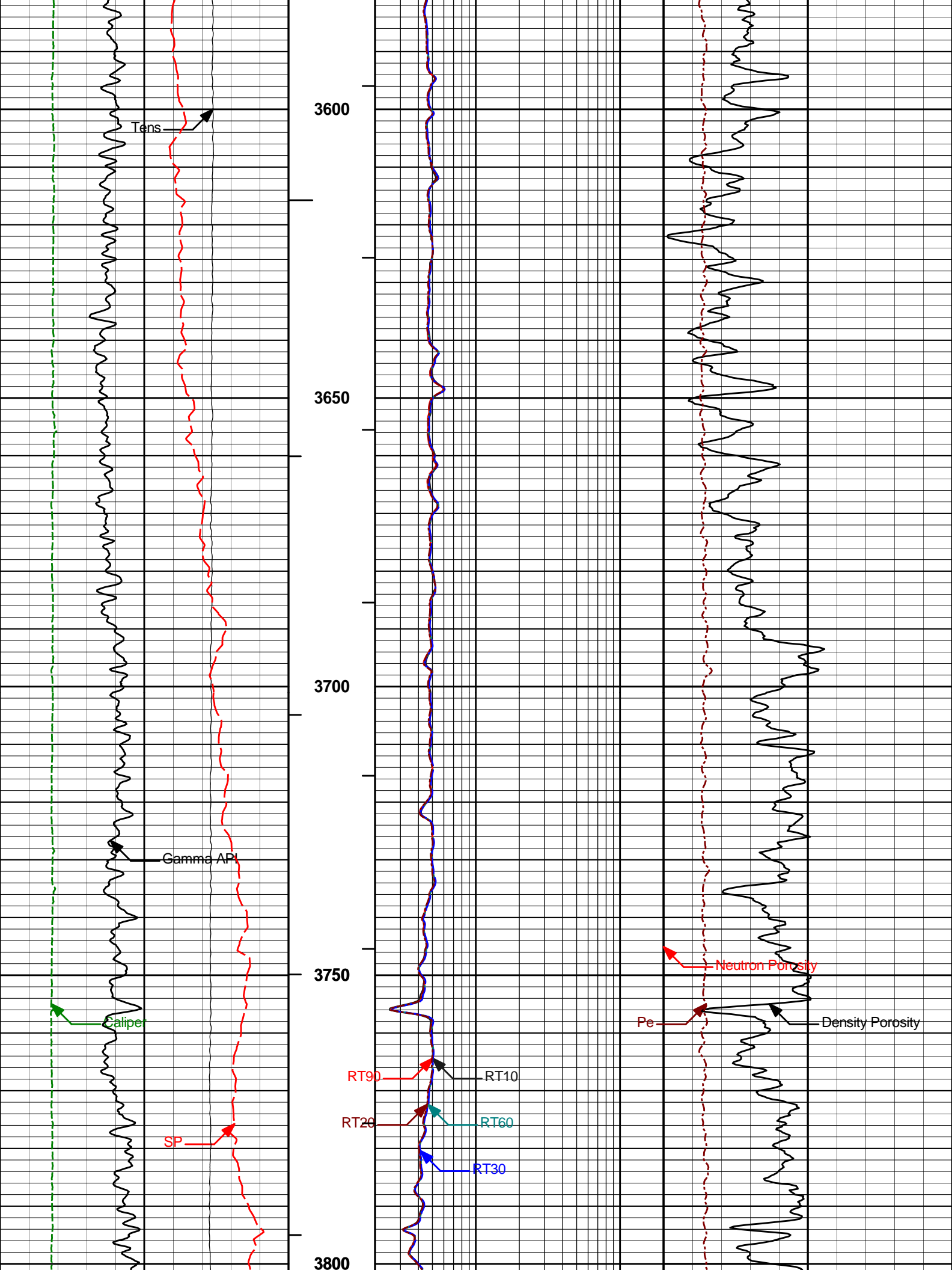
PARAMETERS REPORT

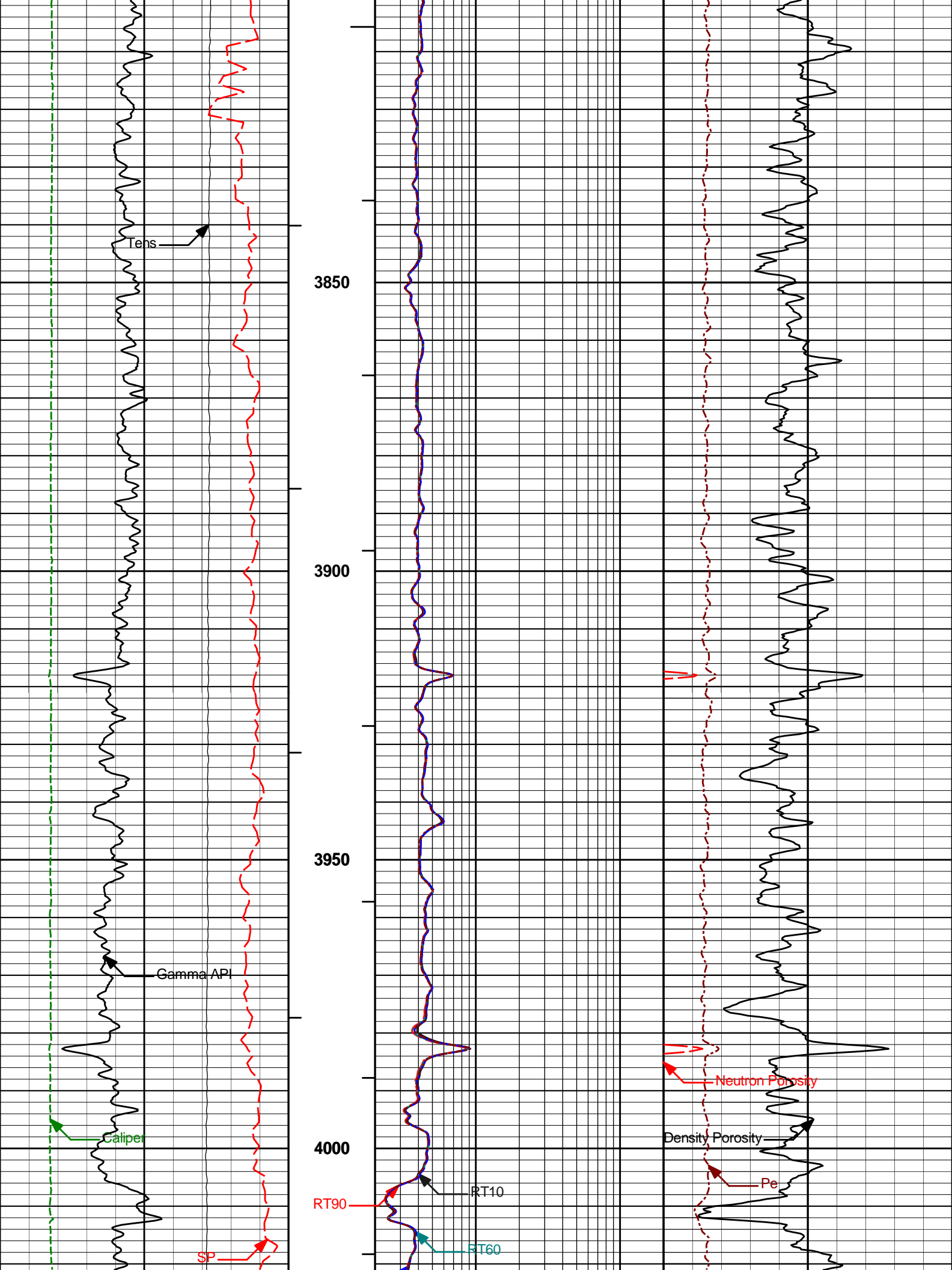
Depth (ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	DSNT	NLIT	Neutron Lithology	Sandstone	
	SDLT Pad	DMA	Formation Density Matrix	2.680	g/cc
6453.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
6708.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.300	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	160.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	1.090	ohmm
	SHARED	TRM	Temperature of Mud	67.2	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	35.0	degF
	SHARED	TD	Total Well Depth	6900.00	ft
	SHARED	BHT	Bottom Hole Temperature	216.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	

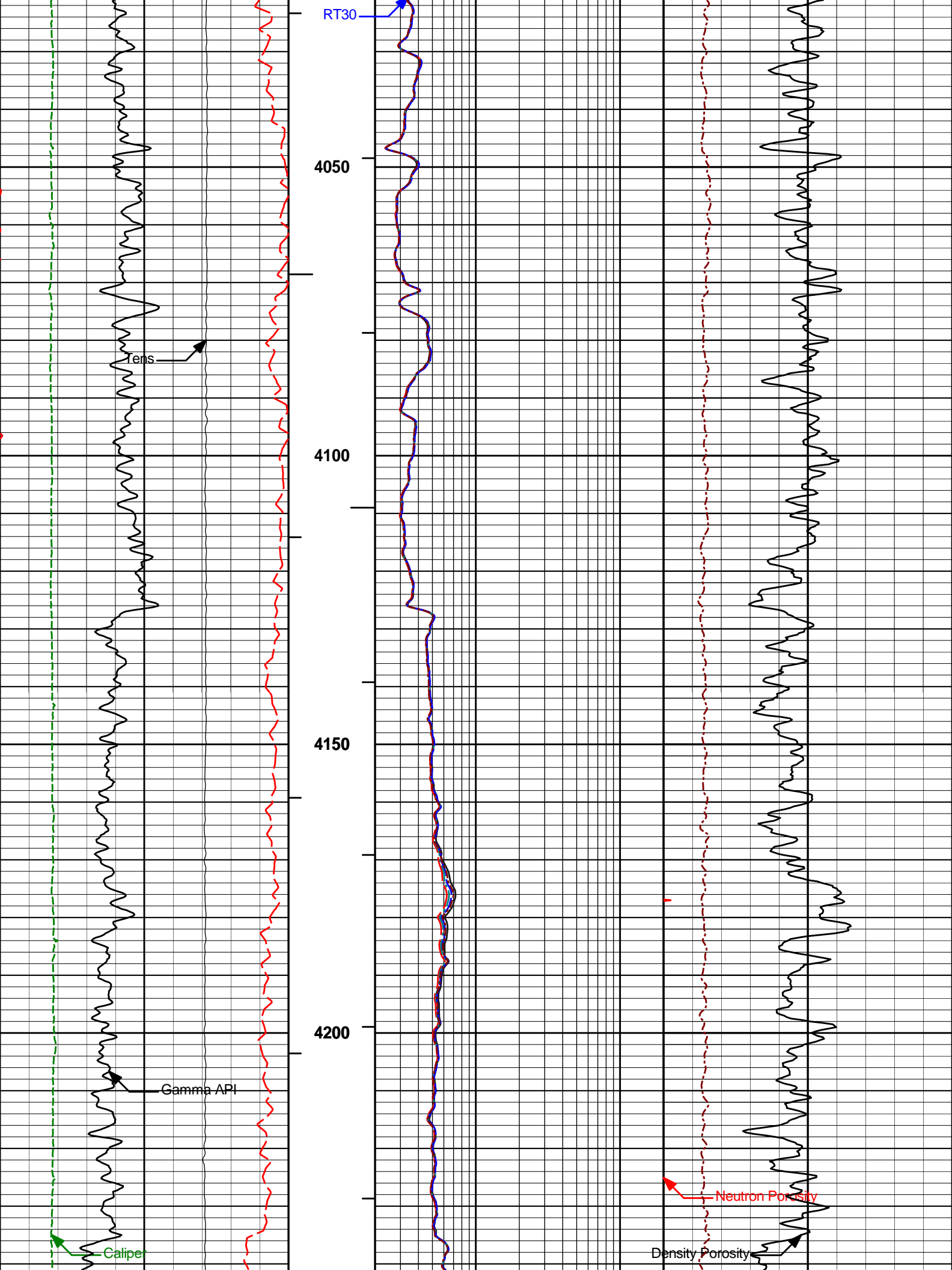
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool 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	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	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	2.680	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Eccentered	
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	
BOTTOM				
Data: WATKINS_C12-24\0001 NOBLE\003.01 09-Dec-11 11:15 Up			Date: 09-Dec-11 11:26:11	

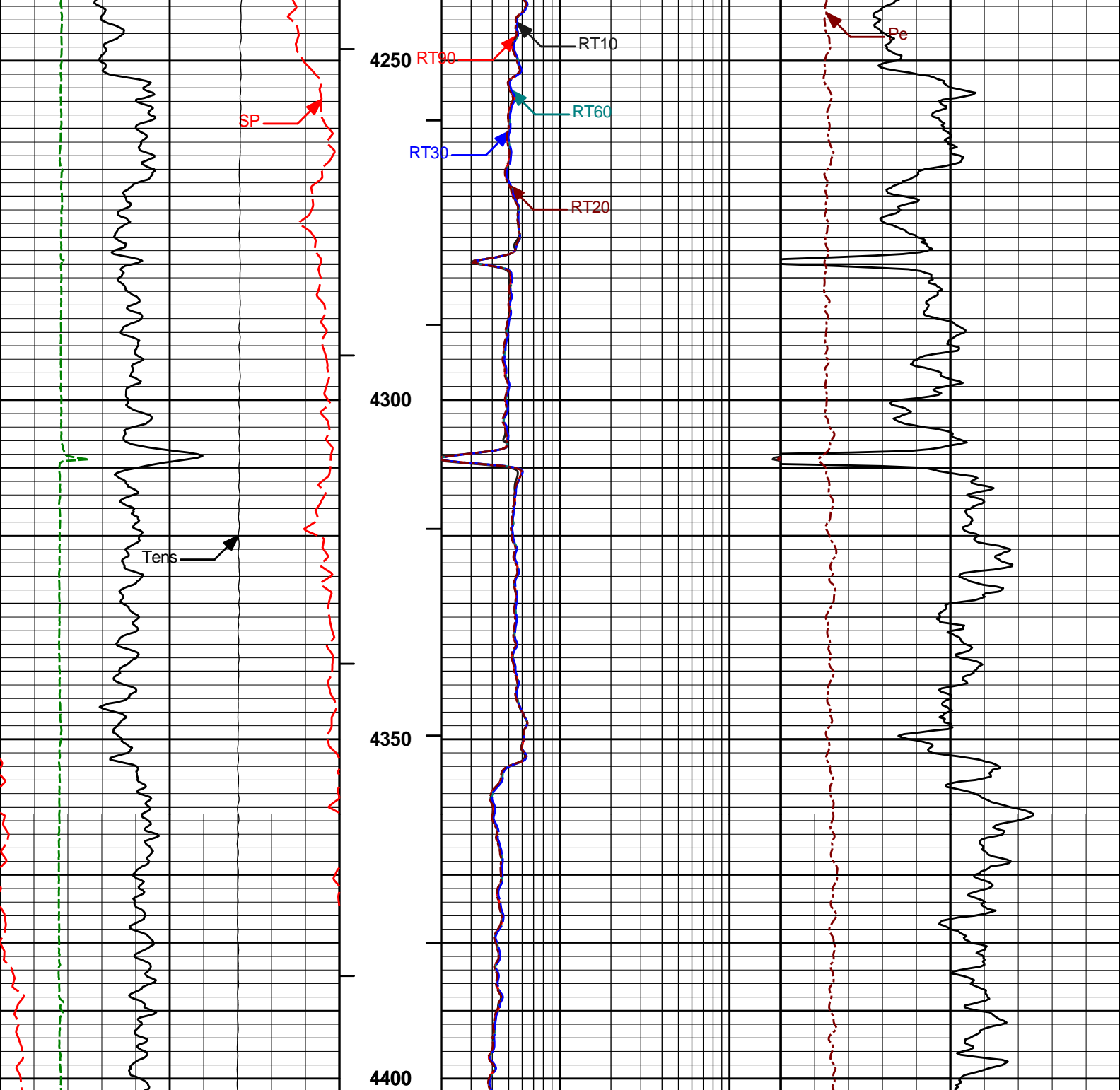
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MAIN PASS 5" = 100'				
		2	RT10	200
			ohmm	
Tens		2	RT20	200











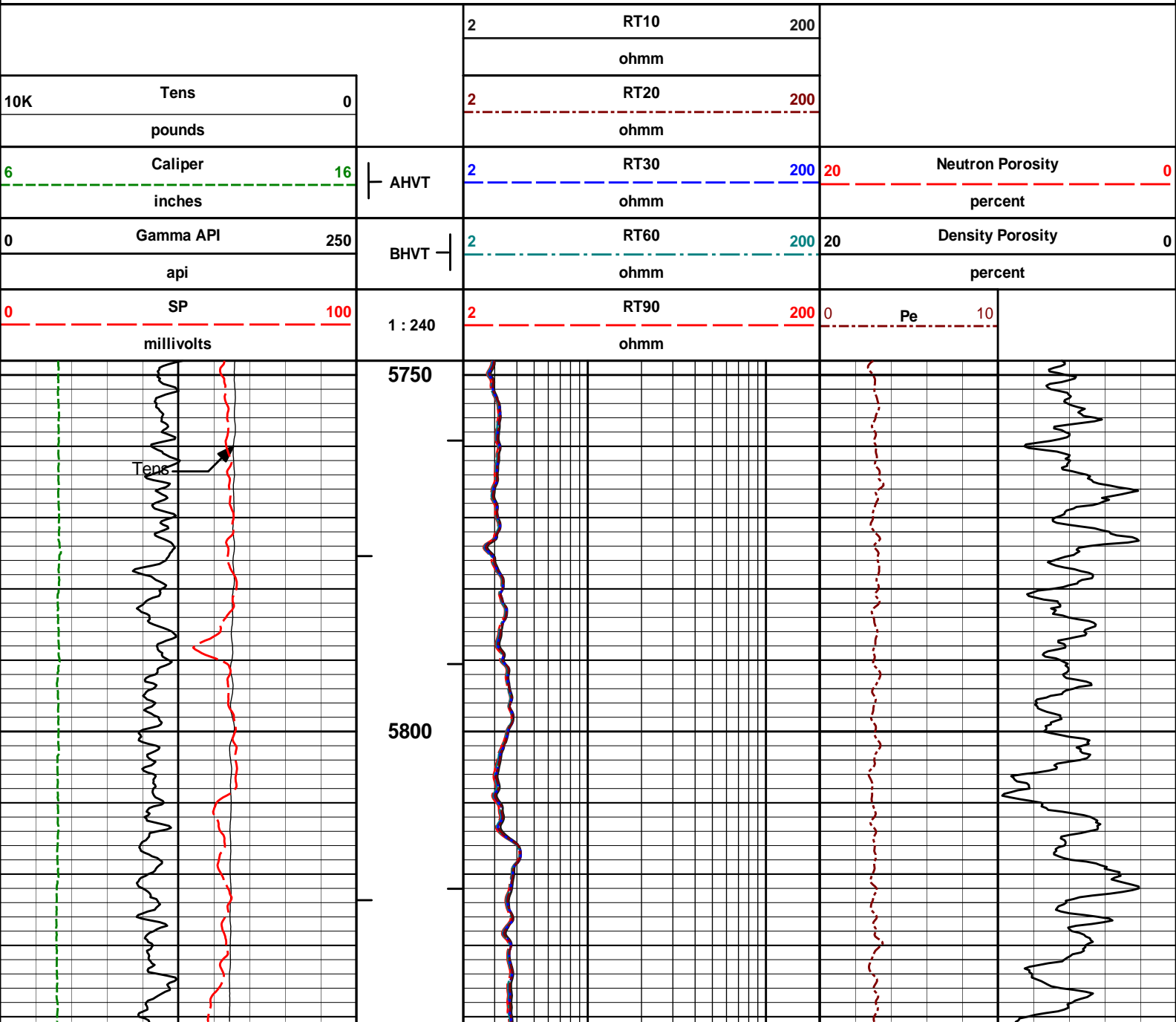
0	SP	100	1 : 240	2	RT90	200	0	Pe	10
	millivolts				ohmm				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				ohmm			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				ohmm			percent	
10K	Tens	0		2	RT20	200			
	pounds				ohmm				
				2	RT10	200			
					ohmm				

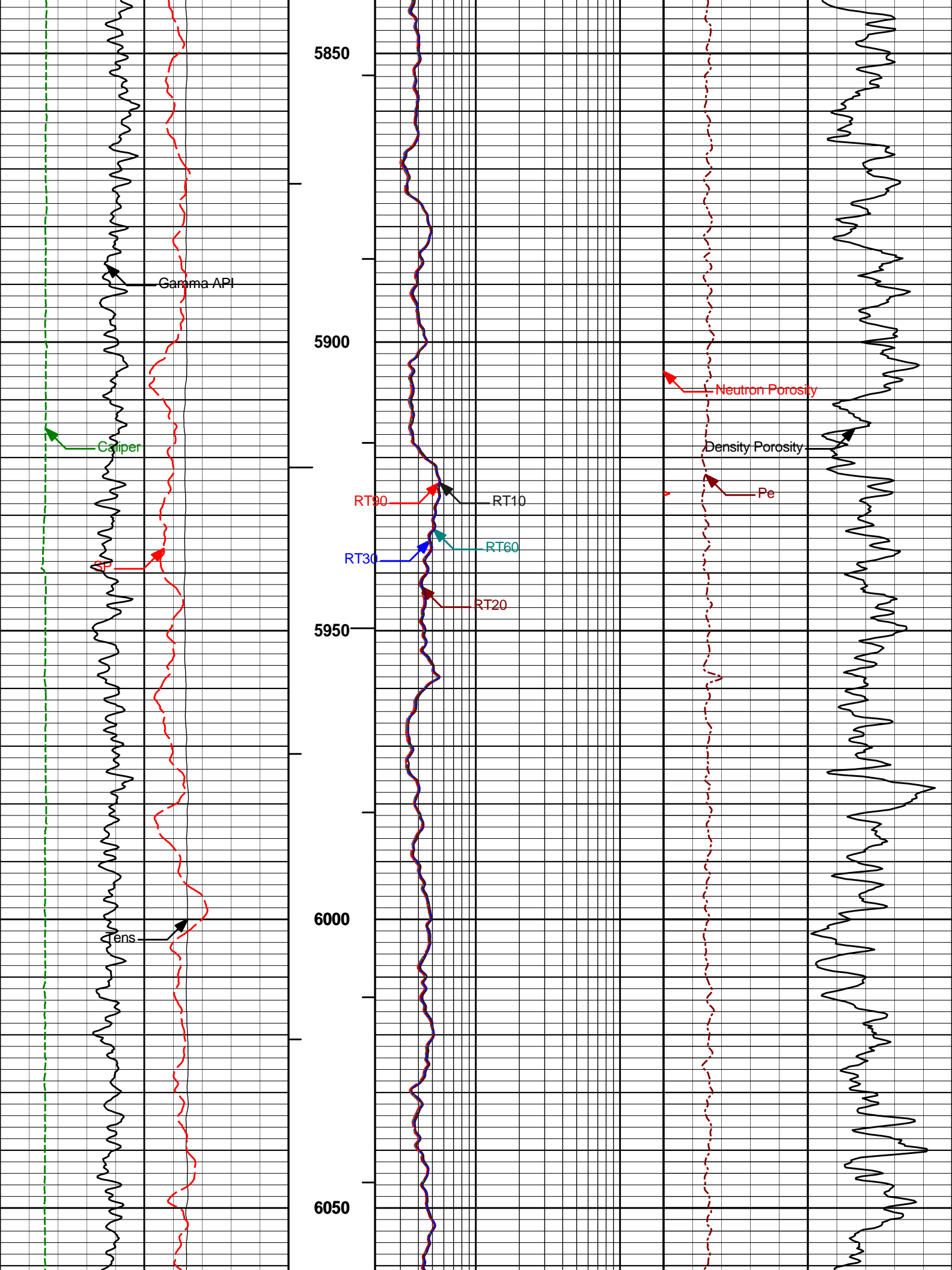
MAIN PASS 5" = 100'

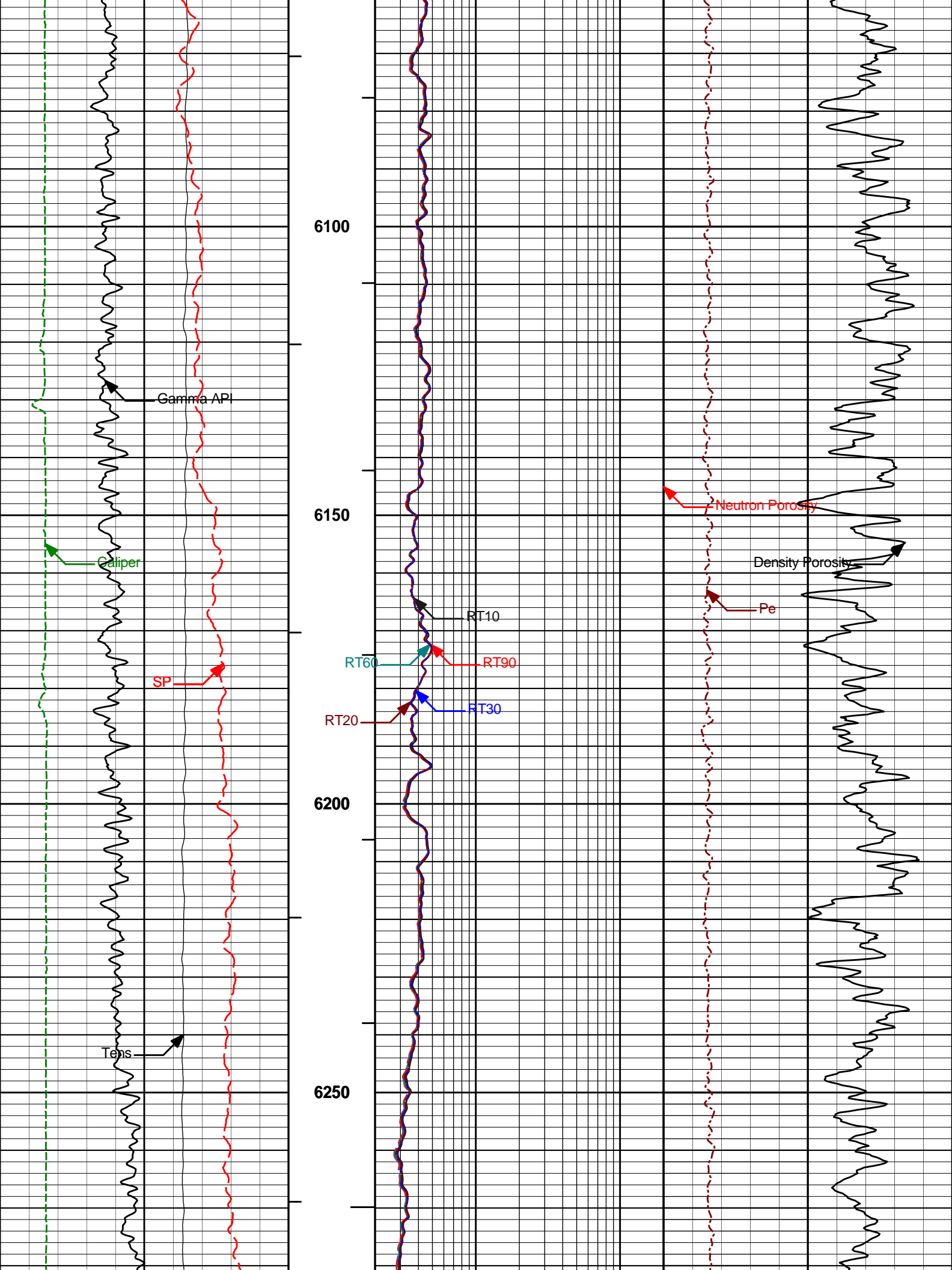
HALLIBURTON

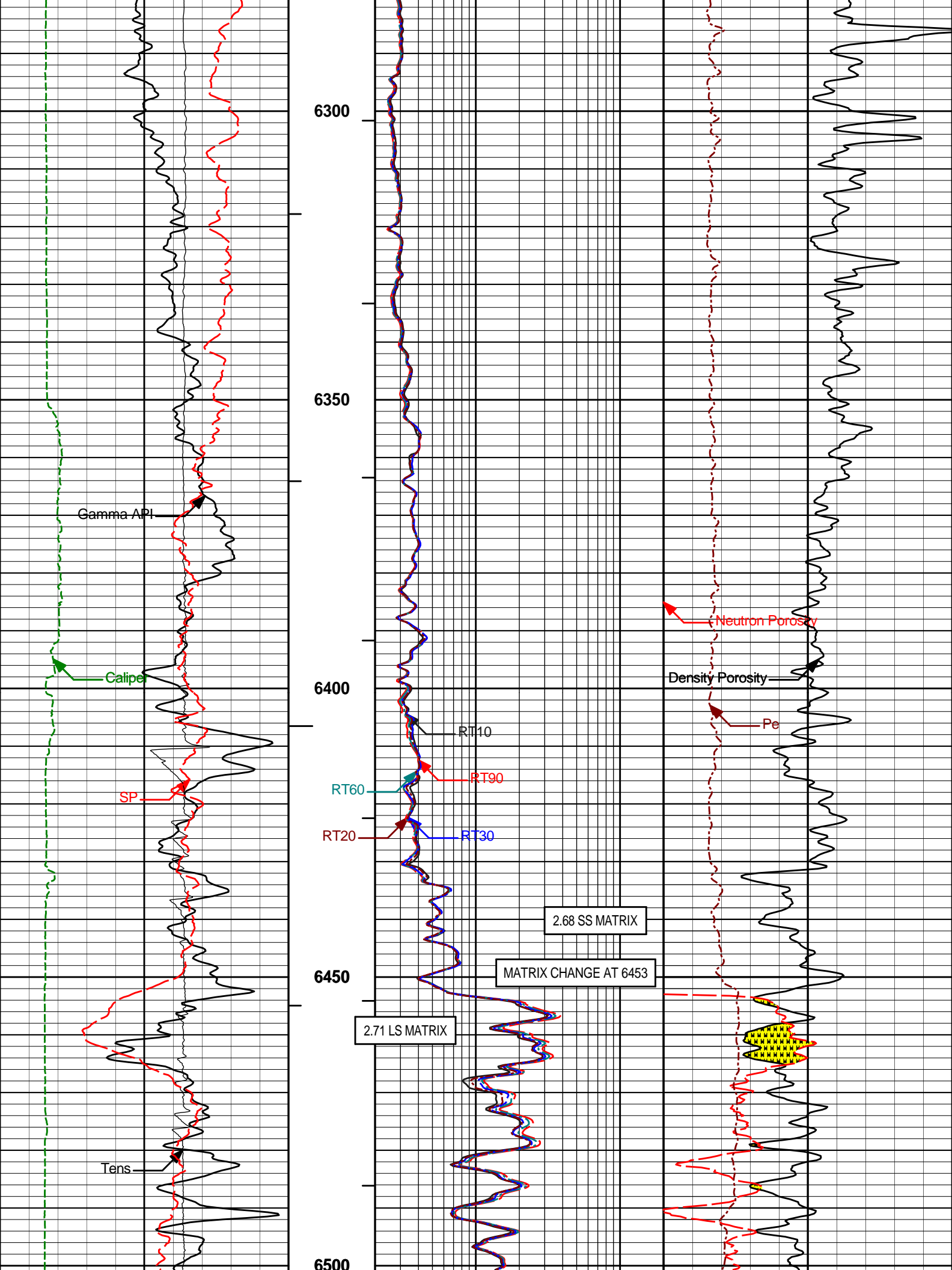
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Plot File: \\COMP\TD-NIO

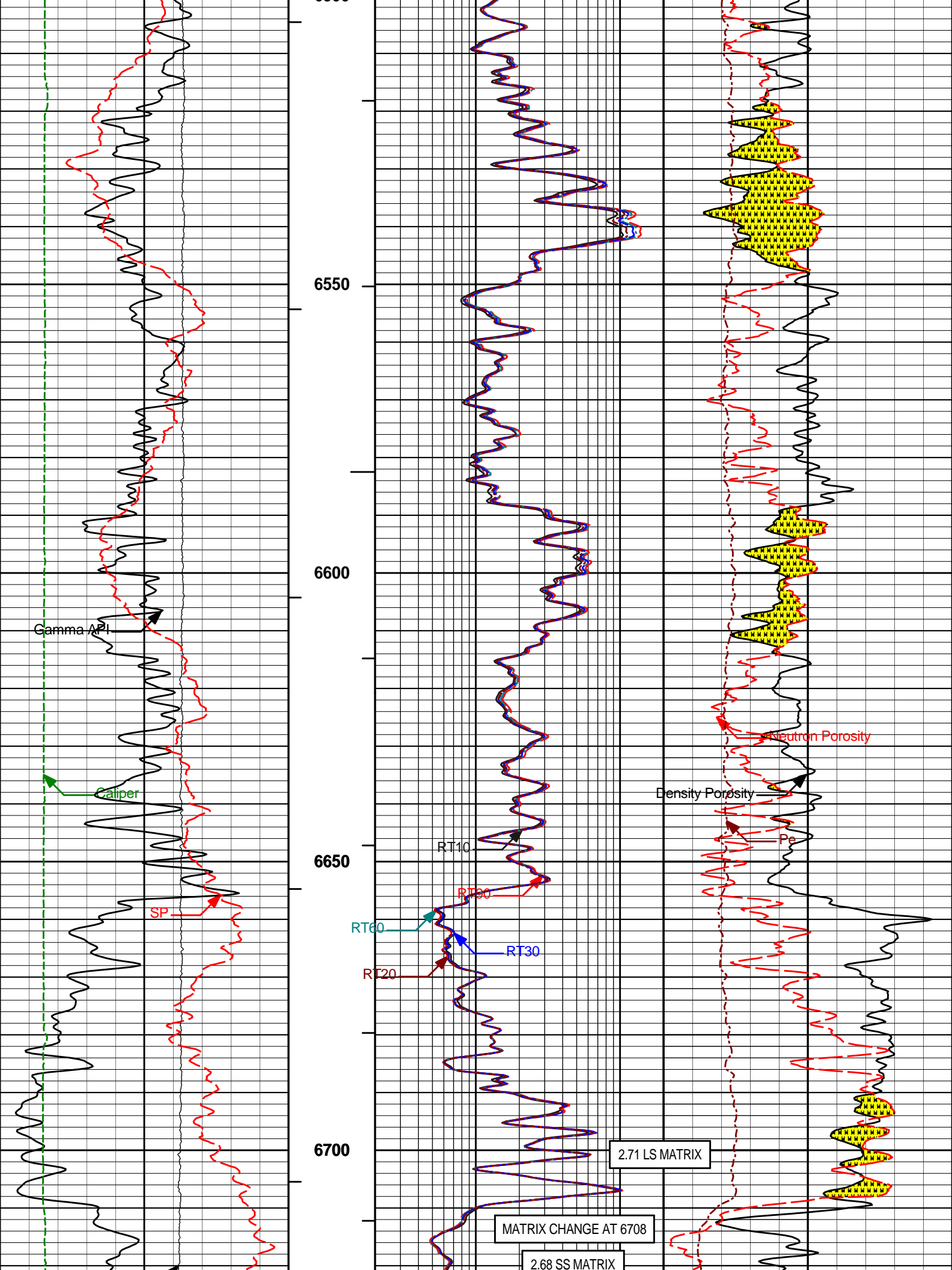
MAIN PASS 5" = 100'

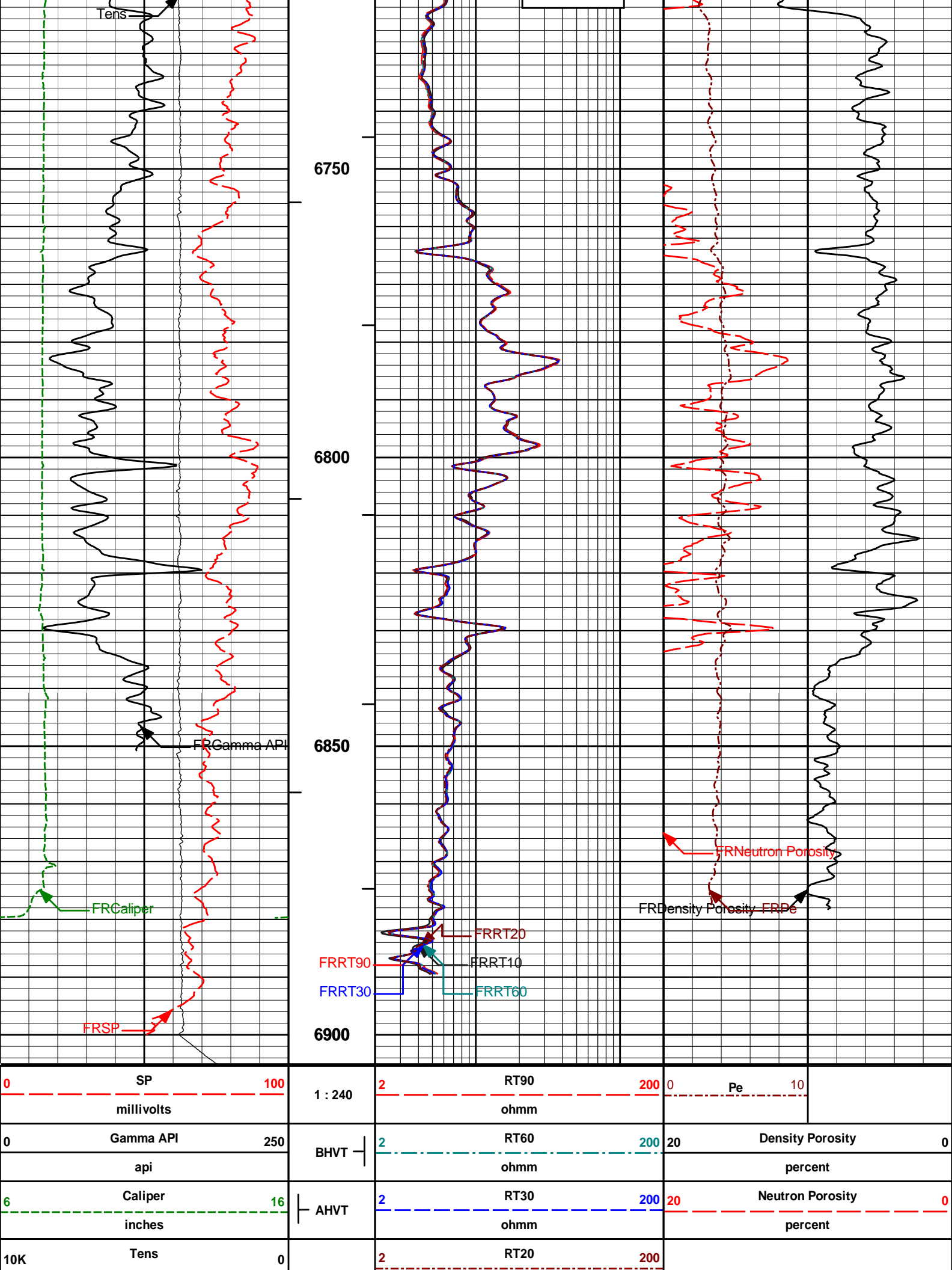












TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.0	22.8	Channel #
583 KEV Peak Channel #	51.2	51.4	Channel #
2614 KEV Peak Channel #	211.0	211.5	Channel #
Calibrate Temperature	80.0	82.9	degF

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	1775.7	CPS	335.1	329.6	API
Background	288.7	CPS	59.1	53.6	API

Gamma Ray Gain: 0.93
 Expected Gain Range: 0.85 - 1.15
 Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	CSNG - 10965402	Reference Calibration Date:	08-Nov-11 14:10:02
Engineer:	R. TWEETEN	Calibration Date:	09-Dec-11 04:11:17
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.8	23.1	Channel #
583 KEV Peak Channel #	51.4	51.6	Channel #
2614 KEV Peak Channel #	211.5	212.1	Channel #
Calibrate Temperature	82.9	67.2	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	1787.1	CPS	329.6	336.1	API
Background	319.5	CPS	53.6	60.1	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:	08-Nov-11 11:33:27
Engineer:	R. TWEETEN	Calibration Date:	08-Nov-11 11:49:03
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

Logging Source S/N: DSN434
 Tank Serial Number: 11068236
 Reference value assigned to Tank: 53.720
 Snow Block S/N: BRIGHTON
 Calibration Tank Water Temperature: 68 degF
 Min. Tool Housing Outside Diameter: 3.625 in

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

Gain:	0.998	0.998	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):	0.2222	0.2224	0.0001	+/- 0.0020
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Calibrated Ratio:	10.11	10.11	0.004	+/- 0.050
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VERIFIER		
Measurement	Value	Control Limit

Snow-Block Porosity (decp):	0.0816	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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DUAL SPACED NEUTRON FIELD CALIBRATION			
Tool Name:	DSNT - 11812167	Reference Calibration Date:	08-Nov-11 11:49:03
Engineer:	R. TWEETEN	Calibration Date:	09-Dec-11 04:16:26
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

Logging Source S/N: DSN434
 Snow Block S/N: BRIGHTON

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change

Snow-Block Porosity (decp):	0.0816	0.0798	-0.0018	+/- 0.0150
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PASS/FAIL SUMMARY	
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Block Change Check:	Passed
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Snow Block Stat Check:	Passed
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Temperature Check:	Passed
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DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - M335_P470_BLACK	Reference Calibration Date:	06-Nov-11 06:27:31
Engineer:	R. TWEETEN	Calibration Date:	08-Nov-11 14:07:56
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3363.47	-3396.74	-7000.00 - -1000.00
Pad Gain	0.0003808	0.0003835	0.000200 - 0.000600
Arm Offset	-4212.60	-4102.72	-5000.00 - 3000.00
Arm Gain	0.0005599	0.0005418	0.000300 - 0.000700
Arm Power	-0.000005430	-0.000004208	-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)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.51	6.50	-0.01	+/- 0.20
Medium Ring (in)	8.30	8.25	-0.05	+/- 0.20
Large Ring (in)	15.01	15.00	-0.01	+/- 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 - M335_P470_BLACK	Reference Calibration Date:	08-Nov-11 14:07:56
Engineer:	R. TWEETEN	Calibration Date:	09-Dec-11 04:11:01
Software Version:	WL INSITE R3.4.2 (Build 2)	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	8.21	-0.04	+/- 0.15

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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name:	ACRt Sonde - E6758-S4352_BLK	Reference Calibration Date:	30-Mar-11 17:55:22
Engineer:	F. LODER	Calibration Date:	25-Aug-11 15:55:48
Software Version:	WL INSITE R3.4.2 (Build 2)	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	0.9901	1.05	0.95	0.9958	1.05	0.95	0.9928	1.05
A2 (50")	0.95	0.9949	1.05	0.95	1.0010	1.05	0.95	1.0001	1.05
A3 (29")	0.95	0.9960	1.05	0.95	0.9995	1.05	0.95	0.9971	1.05
A4 (17")	0.95	1.0044	1.05	0.95	1.0055	1.05	0.95	1.0047	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9980	1.05	0.95	0.9966	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9787	1.05	0.95	0.9757	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	-1.494	2	-6	-3.982	-2	-8	-4.283	-2
A2 (50")	-7	-3.247	-1	-6	-3.938	-2	-7	-4.224	-2
A3 (29")	-27	-13.938	-9	-9	-3.943	-3	-7	-2.988	-1
A4 (17")	-180	-98.155	-60	-45	-31.951	-15	-39	-25.455	-13
A5 (10")	N/A	N/A	N/A	-150	-92.229	-50	-80	-45.352	-10
A6 (6")	N/A	N/A	N/A	175	299.783	525	90	150.888	270
TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
Signal	Lower		R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)	
12K	0.6		0.9246	1.3	Mud Cell	0.95	1.009	1.05	
36K	1.0		1.8754	2.0					
72K	1.0		1.1579	2.0					

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - M335_P470_BLACK	Reference Calibration Date:	20-Sep-11 14:05:14
Engineer:	R. TWEETEN	Calibration Date:	08-Nov-11 13:37:53
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

Logging Source S/N: 2770GW		
Aluminum Block S/N: 63066	Density: 2.602g/cc	Pe: 3.100
Magnesium Block S/N: 12345	Density: 1.690g/cc	Pe: 2.650

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0769	1.0862	0.90 - 1.10
Near Dens Gain	1.0446	1.0467	0.90 - 1.10
Near Peak Gain	1.0277	1.0177	0.90 - 1.10
Near Lith Gain	0.9752	0.9729	0.90 - 1.10
Far Bar Gain	1.0170	1.0203	0.90 - 1.10
Far Dens Gain	1.0037	1.0052	0.90 - 1.10
Far Peak Gain	0.9954	0.9985	0.90 - 1.10
Far Lith Gain	0.9652	0.9674	0.90 - 1.10
Near Bar Offset	-0.4625	-0.5413	NONE
Near Dens Offset	-0.1319	-0.1421	NONE
Near Peak Offset	0.0240	0.1151	NONE
Near Lith Offset	0.4369	0.4614	NONE
Far Bar Offset	0.0615	0.0377	NONE
Far Dens Offset	0.1601	0.1472	NONE
Far Peak Offset	0.2180	0.1890	NONE
Far Lith Offset	0.4187	0.4001	NONE
Near Bar Background	1052.73	1046.79	700 - 1450
Near Dens Background	343.81	345.57	230 - 480
Near Peak Background	151.08	152.19	100 - 210
Near Lith Background	184.07	183.15	125 - 260
Far Bar Background	550.53	545.59	450 - 900
Far Dens Background	213.70	214.11	175 - 345
Far Peak Background	83.98	83.42	70 - 140
Far Lith Background	88.40	87.41	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.684	1.690	0.006	+/- 0.015
Pe	2.596	2.597	0.001	+/- 0.150
ALUMINUM				
Density (g/cc)	2.592	2.602	0.010	+/- 0.01500
Pe	3.059	3.056	-0.003	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0006	+/- 0.0110	-0.0015	+/- 0.0140
Magnesium Block	0.0001	+/- 0.0110	-0.0020	+/- 0.0140
Aluminum Block	0.0011	+/- 0.0110	0.0013	+/- 0.0140
Resolution	9.03	6.00 - 11.50	9.72	6.00 - 11.50
Internal Verifier(B+D+P+L)	1728	1200 - 2700	931	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 - M335_P470_BLACK	Reference Calibration Date:	08-Nov-11 13:37:53
Engineer:	R. TWEETEN	Calibration Date:	09-Dec-11 04:06:16
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

Pad Temperature: 57.7 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1727.704	1721.630	-6.074	16.675
Far (B+D+P+L) cps	930.530	938.475	7.945	16.504
Near Resolution	9.03	9.12	0.090	0.50
Far Resolution	9.72	9.82	0.100	1.00

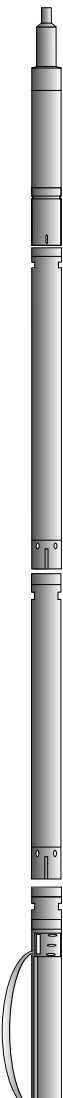
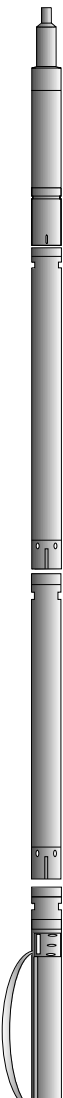
PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

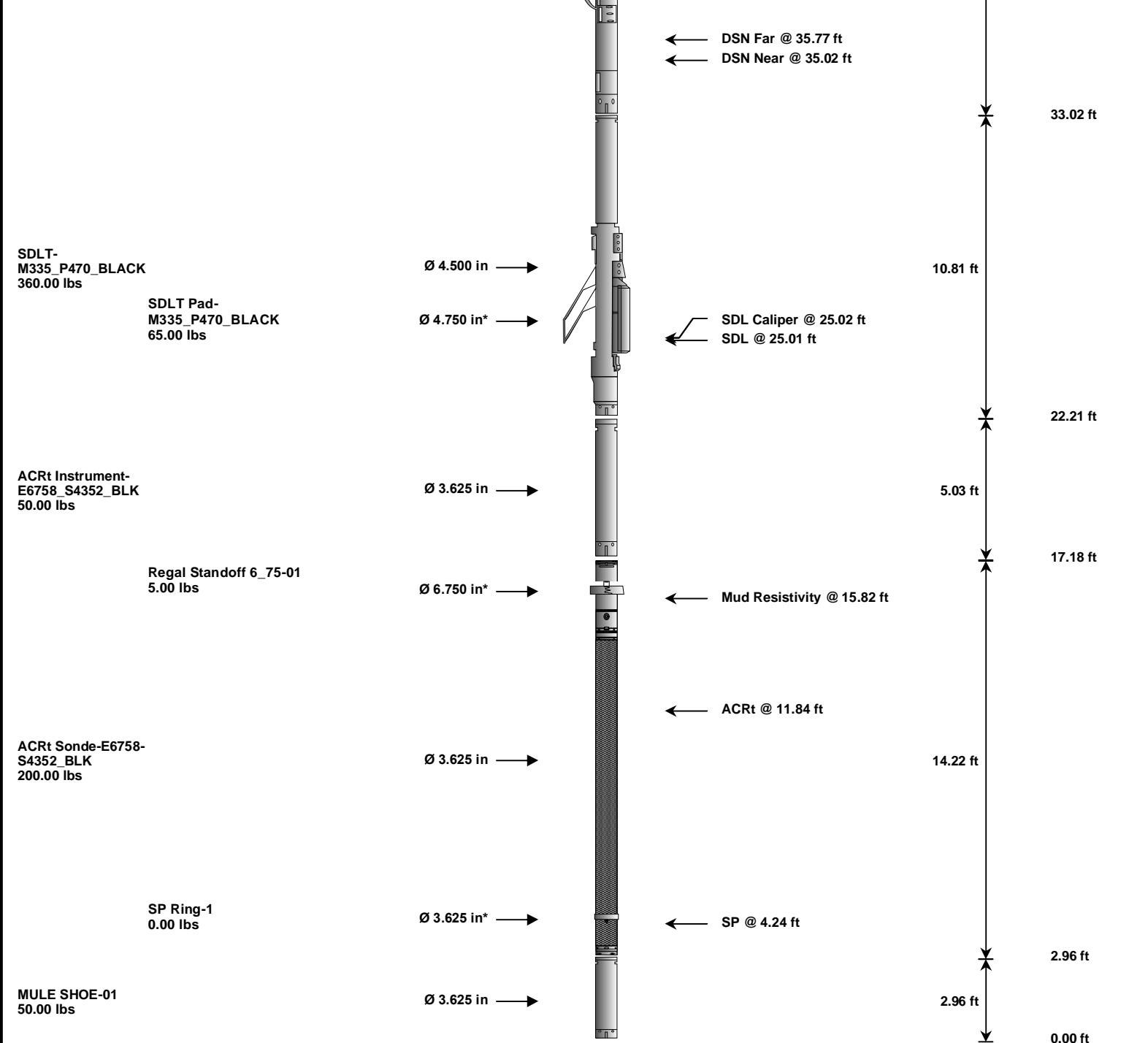
CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units

GTET-11277436_BLACK						
Gamma Ray Calibrator	247.3	245.6	-----	1.7	+/- 9.00	api
CSNG-10965402						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	22.8	23.1	-----	-0.3	-----	Channel #
583 KEV Peak Channel #	51.4	51.6	-----	-0.2	-----	Channel #
2614 KEV Peak Channel #	211.5	212.1	-----	-0.6	-----	Channel #
DSNT-11812167						
Snow-Block Porosity	0.0816	0.0798	-----	0.0018	+/- 0.0150	decp
SDLT-M335_P470_BLACK						
Pad Extension	3.75	3.69	-----	0.06	+/-0.10	in
Ring Diameter	8.25	8.21	-----	0.040	+/-0.15	in
ACRt Sonde-E6758-S4352_BLK						
Mud Cell	1.009	-----	-----	0.000	-----	ohm-m
SDLT Pad-M335_P470_BLACK						
Near(B+D+P+L)	1727.704	1721.630	-----	6.074	+/-16.675	cps
Far(B+D+P+L)	930.530	938.475	-----	-7.945	+/-16.504	cps
Data: WATKINS_C12-24\0001 NOBLEVDLE					Date: 09-Dec-11 11:25:41	

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-11078326 135.00 lbs		Ø 3.625 in →		← Load Cell @ 61.96 ft ← BH Temperature @ 61.39 ft	6.25 ft	65.64 ft
						59.39 ft
GTET-11277436_BLACK 165.00 lbs		Ø 3.625 in →		← GammaRay @ 53.33 ft	8.52 ft	
						50.87 ft
CSNG-10965402 114.00 lbs		Ø 3.625 in →		← CSNG @ 45.25 ft	8.17 ft	
						42.71 ft
DSN Decentralizer-11812167 6.60 lbs		Ø 5.000 in* →				
DSNT-11812167 174.00 lbs		Ø 3.625 in →			9.69 ft	



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11078326	135.00	6.25	59.39	300.00
GTET	Gamma Telemetry Tool	11277436_BLACK	165.00	8.52	50.87	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17	42.71	15.00
DSNT	Dual Spaced Neutron	11812167	174.00	9.69	33.02	60.00
DCNT	DSN Decentralizer	11812167	6.60	5.13	36.35	300.00
SDLT	Spectral Density Tool	M335_P470_BLACK	360.00	10.81	22.21	60.00
SDLP	Density Insite Pad	M335_P470_BLACK	65.00	2.55	24.42	60.00
ACRt	Array Compensated True Resistivity Instrument Section	E6758_S4352_BLK	50.00	5.03	17.18	300.00
ACRt	Array Compensated True Resistivity	E6758-S4352_BLK	200.00	14.22	2.96	300.00
SP	SP Ring	1	0.00	0.25	4.24	300.00
RSOF	Regal Standoff 6.75in	01	5.00	0.52	15.86	300.00
MS	MULE SHOE	01	50.00	2.96	0.00	100.00

Total		1,324.60	65.64
* Not included in Total Length and Length Accumulation.			
Data: WATKINS_C12-24\0001 NOBLE\IDLE		Date: 09-Dec-11 09:51:26	

COMPANY	NOBLE ENERGY INC		
WELL	WATKINS C12-24		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		ARRAY COMPENSATED TRUE RESISTIVITY SPECTRAL DENSITY DUAL SPACED NEUTRON	