

HALLIBURTON

SPECTRAL DENSITY  
DUAL SPACED NEUTRON  
ARRAY COMPENSATED  
TRUE RESISTIVITY  
LOG

COMPANY		NOBLE ENERGY INC.	
WELL		FIVE RIVERS K15-31D	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date	10-Feb-11		
Run No.	ONE		
Depth - Driller	7573.00 ft		
Depth - Logger	7584.0 ft		
Bottom - Logged Interval	7574 ft		
Top - Logged Interval	690 ft		
Casing - Driller	8.625 in @ 687.0 ft		
Casing - Logger	690.0 ft		
Bit Size	7.875 in	@	
Type Fluid in Hole	POLYMER		
Density	9.3 ppq	60.00	s/qt
PH	8.00 pH	12.0	cp/m
Source of Sample	MUD CELL		
Rm @ Meas. Temperature	0.950 ohmm @ 75.00 degF	@	
Rmf @ Meas. Temperature	0.80 ohmm @ 75.00 degF	@	
Rmc @ Meas. Temperature	0.867 ohmm @ 75.00 degF	@	
Source Rmf	CHART	CHART	
Rm @ BHT	0.39 ohmm @ 195.0 degF	@	
Time Since Circulation	6.0 hr		
Time on Bottom	10-Feb-11 16:54		
Max. Rec. Temperature	195.0 degF @ 7584.0 ft	@	
Equipment	11454566	BRIGHTON	
Recorded By	F. LODER		
Witnessed By	T. BOWMAN		

COMPANY	NOBLE ENERGY INC.
WELL	FIVE RIVERS K15-31D
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO
API No.	05123324650000
Location	SURFACE LOCATION: 240' FNL & 246' FEL NENE BOTTOM LOCATION: 1320' FNL & 75' FEL SENE LATITUDE: 40.318270° LONGITUDE: 104.774130°
Other Services:	RWCH CSNG

Fold here

Service Ticket No.: 7954084						API Serial No.: 05123324650000						PGM Version: WL INSITE R3.2.3 (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		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 E2817				N/A				1.5" S.O.				N/A			
Rmc @ Meas. Temp.				@				@																					
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.		11294346				Serial No.						Serial No.		I440M319				Serial No.		11277440									
Model No.		GTET				Model No.						Model No.		SDLT				Model No.		DSNT									
Diameter		3.625"				No. of Cent.						Diameter		4.75"				Diameter		3.625"									
Detector Model No.		2G8 BICORN				Spacing						Log Type		GAM-GAM				Log Type		NEU-NEU									
Type		SCINT										Source Type		Cs137				Source Type		Am241Be									
Length		8"				LSA [Y/N]						Serial No.		27070 GW				Serial No.		DSN 434									
Distance to Source		15'				FWDA [Y/N ]						Strength		1.5 Ci				Strength		15 Ci									

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	7584'	7393'	REC	0 API	250 API				20 %	0 %	2.68 g/cc	20 %	0 %	SAND		
ONE	7393'	7063'	REC	0 API	250 API				20 %	0 %	2.71 g/cc	20 %	0 %	LIME		
ONE	7063'	690	REC	0 API	250 API				20 %	0 %	2.68 g/cc	20 %	0 %	SAND		
DIRECTIONAL INFORMATION																
Maximum Deviation									@	KOP						@
Remarks: RWCH-GTET-CSNG-DSNT-SDLT-ACRT RAN IN COMBINATION																
ANNULAR HOLE VOLUME CALCULATED USING 4.5 INCH PRODUCTION CASING																
TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE																
CHLORIDES REPORTED AT 600 PPM																
CREW: A. LEWIS, A. DUNCAN																
RIG: ENSIGN 128																
THANK YOU FOR USING HALLIBURTON ENERGY SERVICES -- BRIGHTON, CO -- 303.825.4346																
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HALLIBURTON																

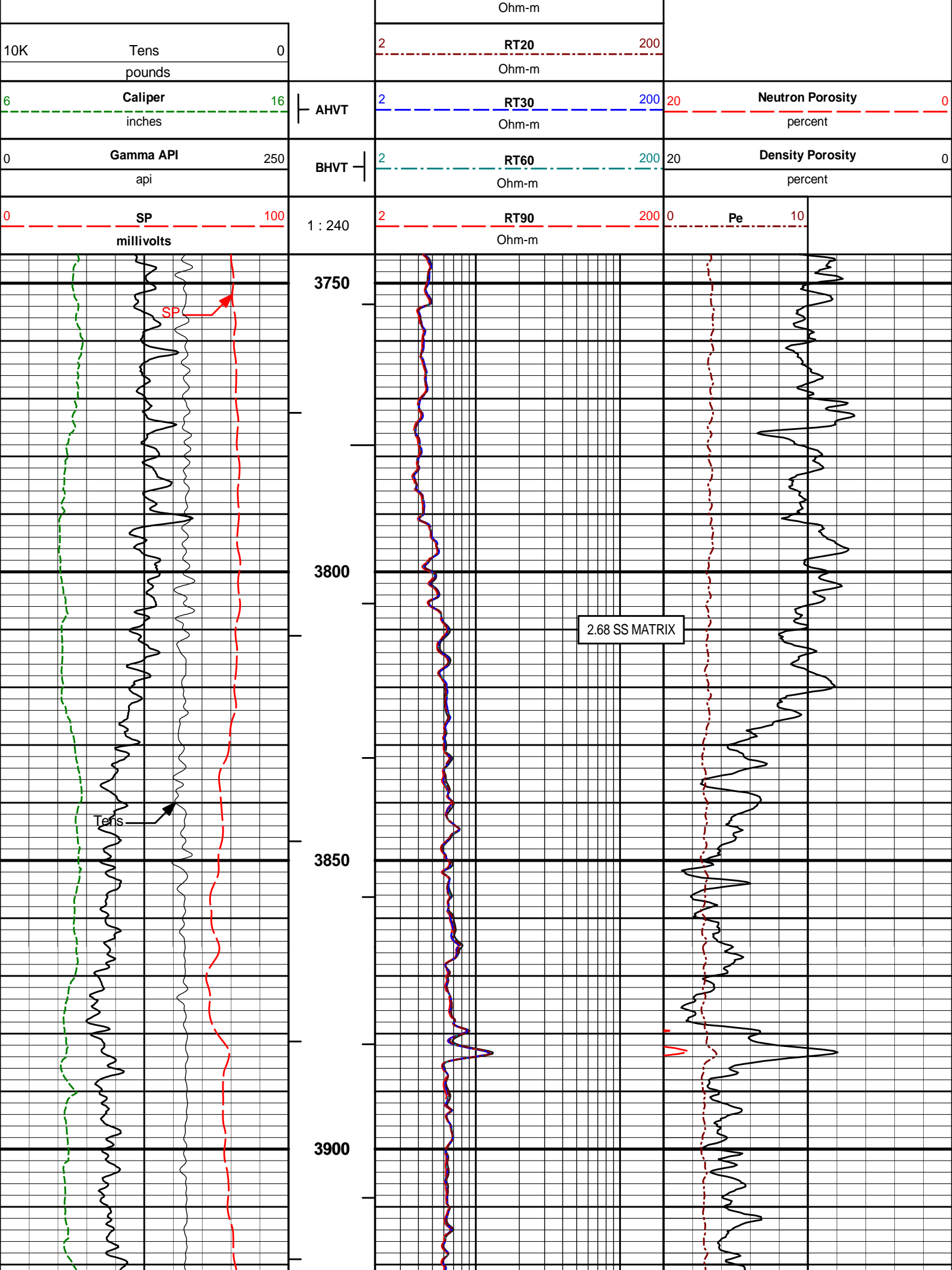


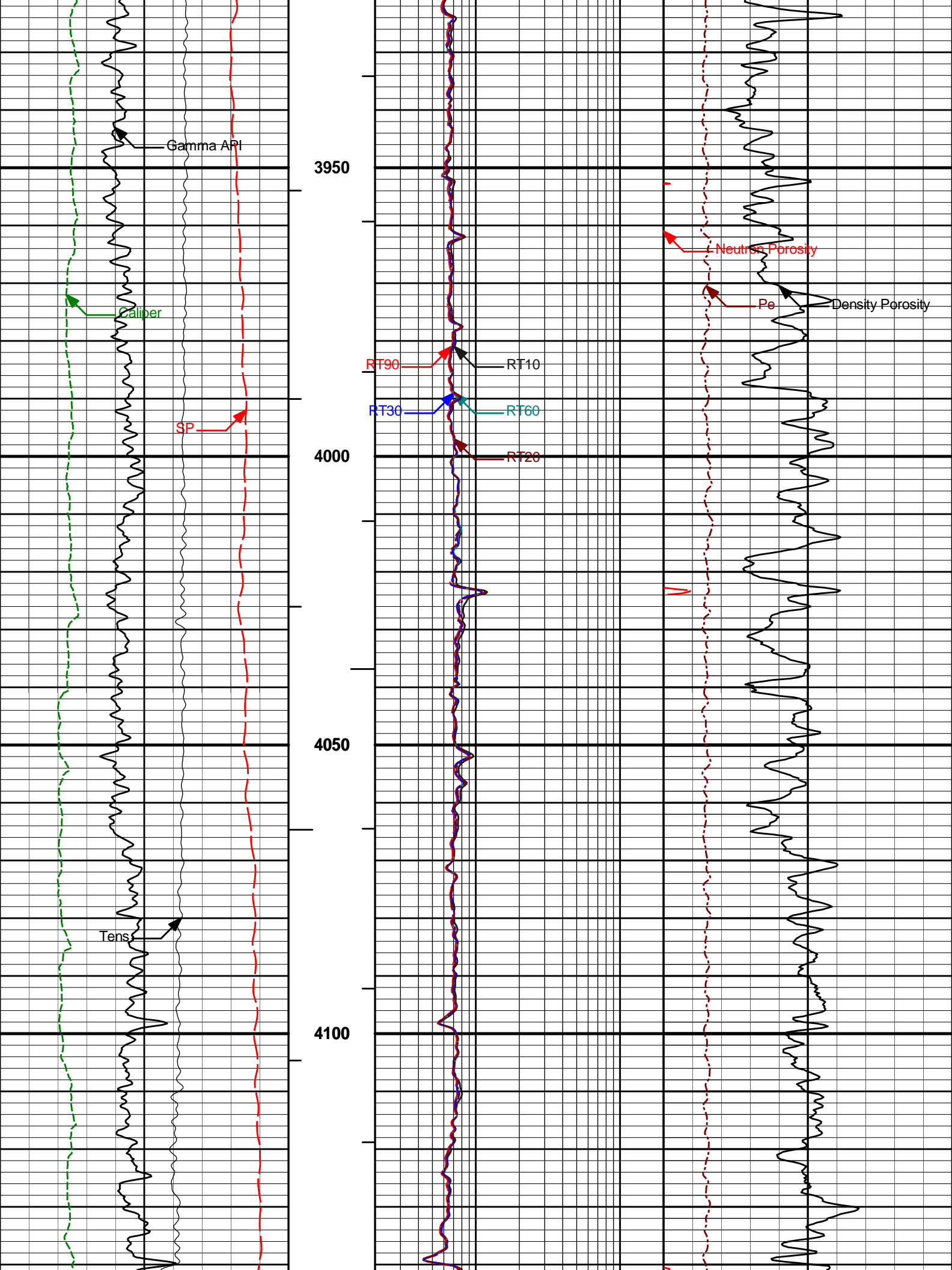
# PARAMETERS REPORT

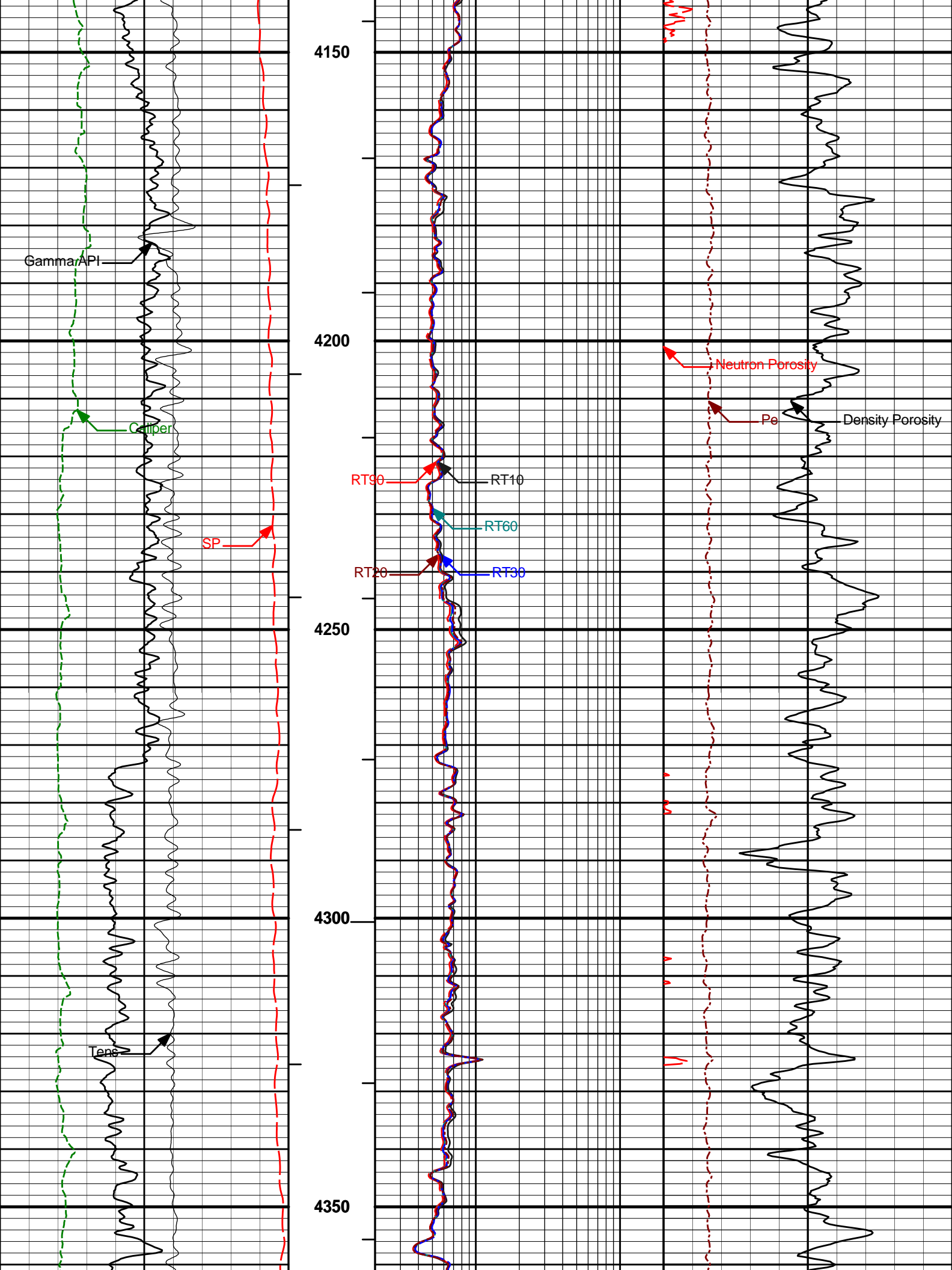
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	DSNT	NLIT	Neutron Lithology	Sandstone	
	SDLT	DMA	Formation Density Matrix	2.680	g/cc
7063.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
7393.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	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	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.950	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	20.0	degF
	SHARED	TD	Total Well Depth	7573.00	ft
	SHARED	BHT	Bottom Hole Temperature	195.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	

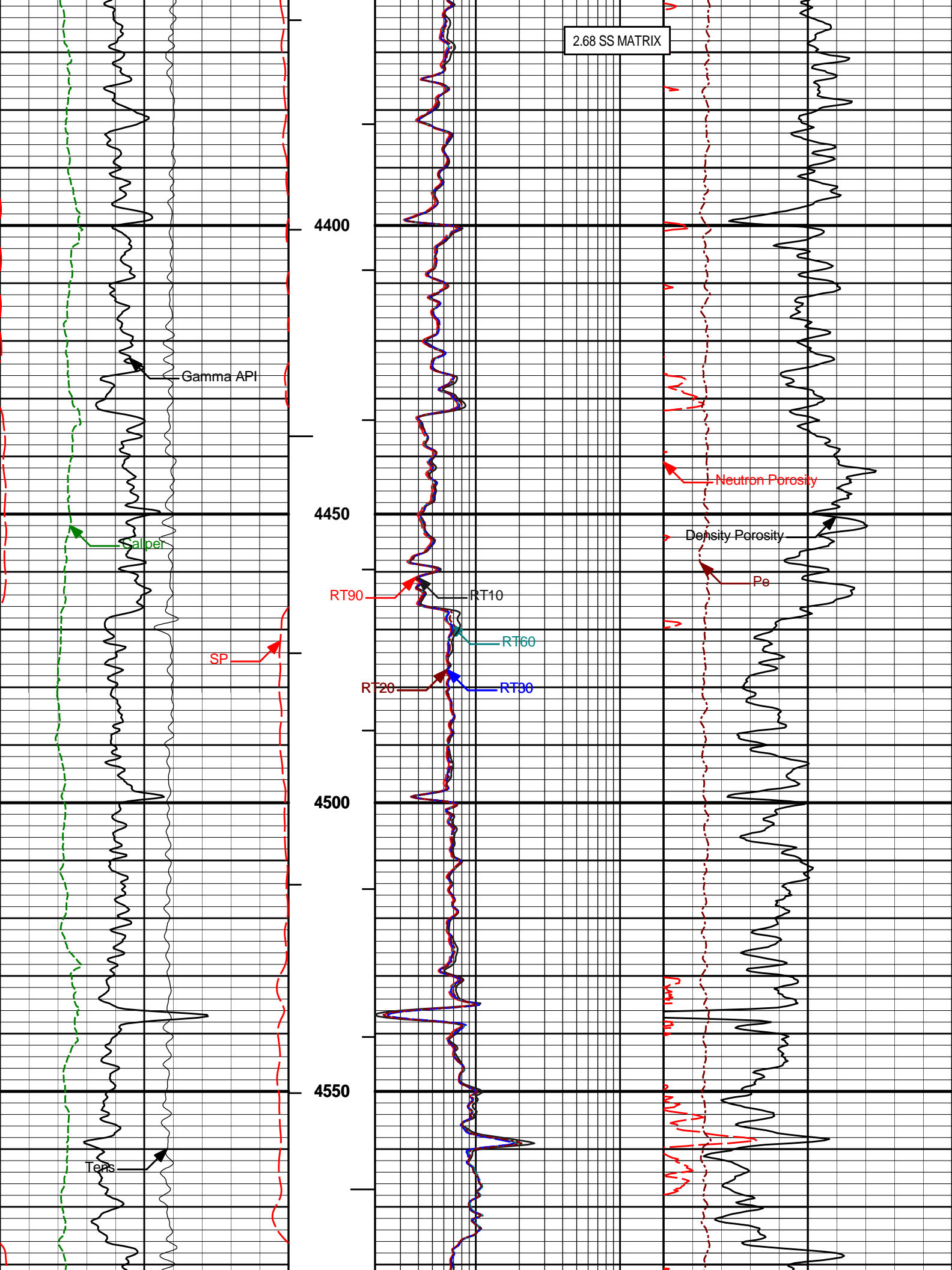
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position	Eccentered	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool Centralized?	No	
CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
CSNG	BARF	Barite Correction Factor	1.00	
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	CB	Logging Calibration Blocks?	No	
SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT	DTWN	Disable temperature warning	No	
SDLT	DMA	Formation Density Matrix	2.680	g/cc
SDLT	DFL	Formation Density Fluid	1.000	g/cc
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT	MLOK	Process MicroLog Outputs?	Yes	
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: 5RIVERS_K15_31D\0001 TRIPLE_CSNG\002.01 10-Feb-11 18:16 Up			Date: 10-Feb-11 18:21:37	

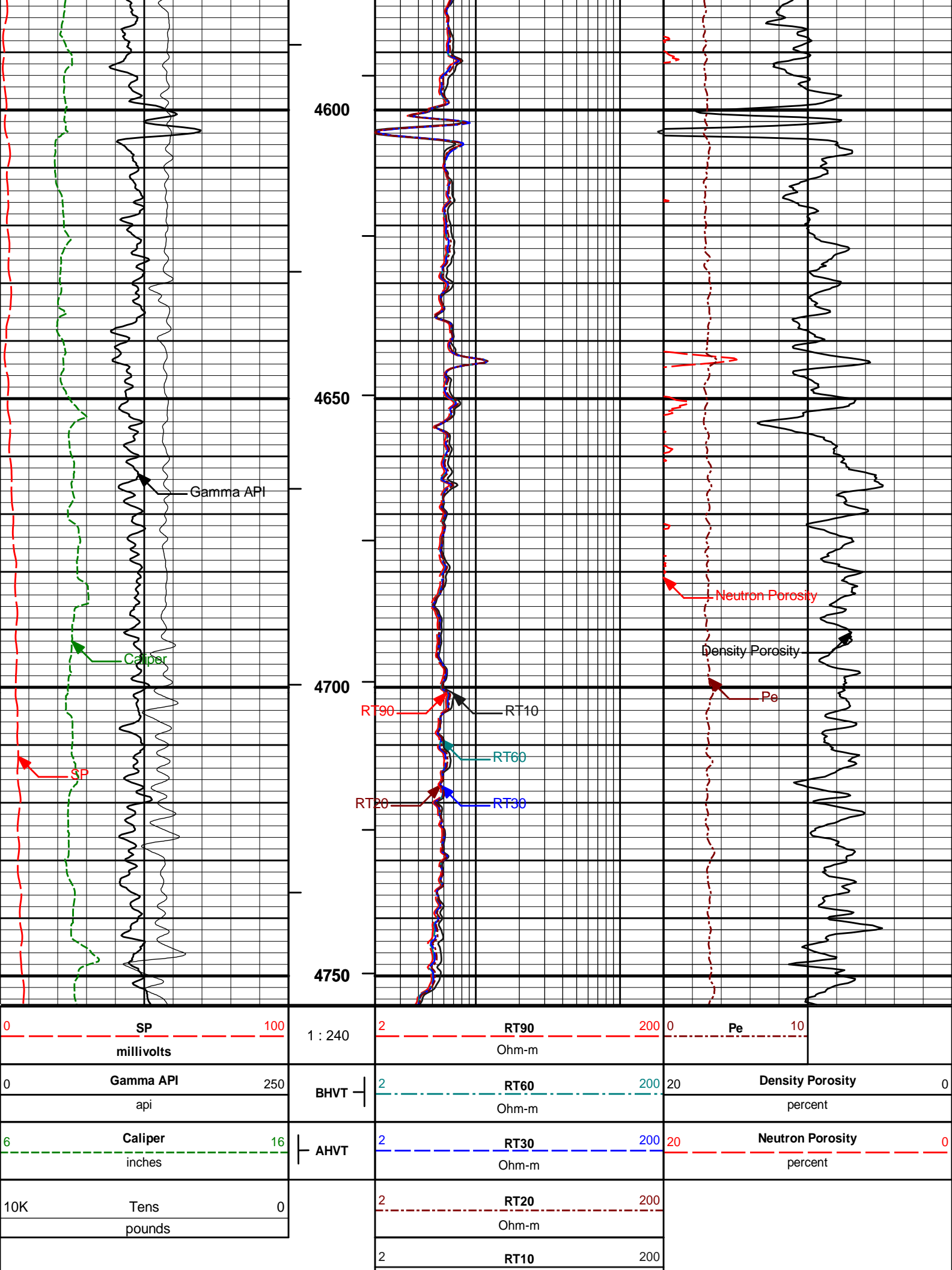
<div> <div>HALLIBURTON</div> <div>           Plot Time: 10-Feb-11 18:53:59            Plot Range: 3745 ft to 4755 ft            Data: {ActiveWell}\Well Based\MAIN*            Plot File: \COMP\MAIN         </div> </div>				
MAIN PASS 5" = 100'				
Track 1	Depth Track	Track 2	Track 5	Track 3
		2RT10200		







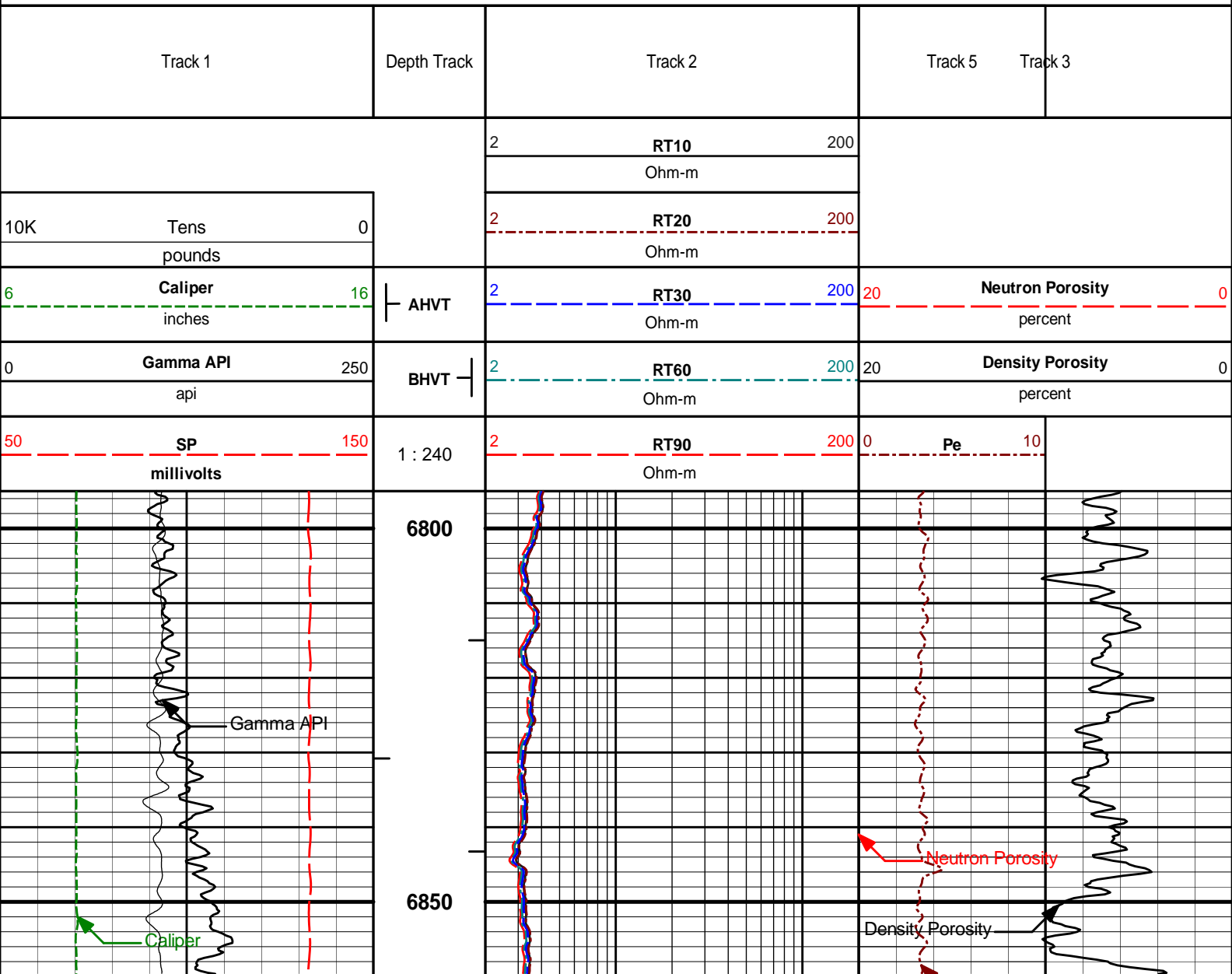


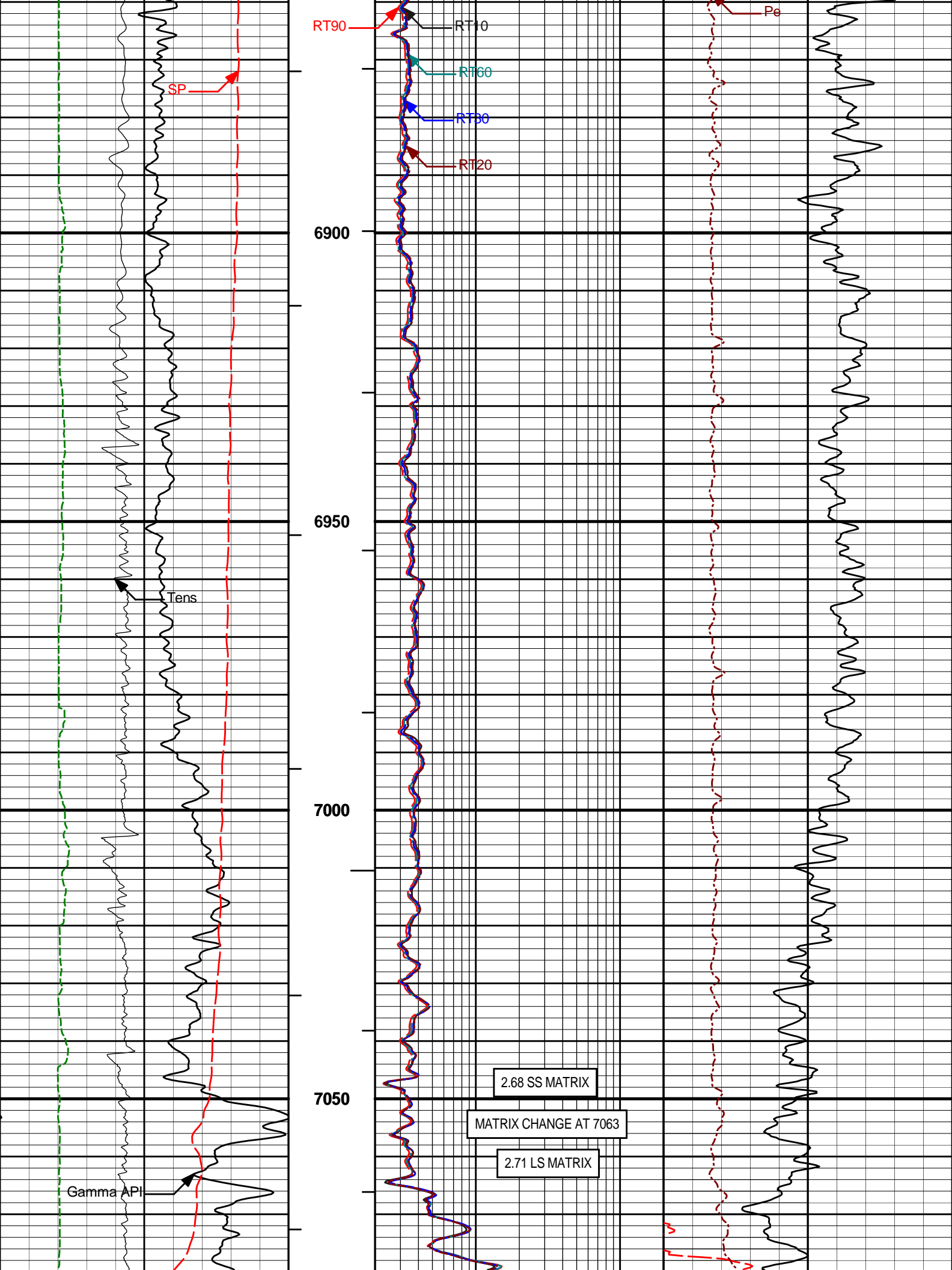


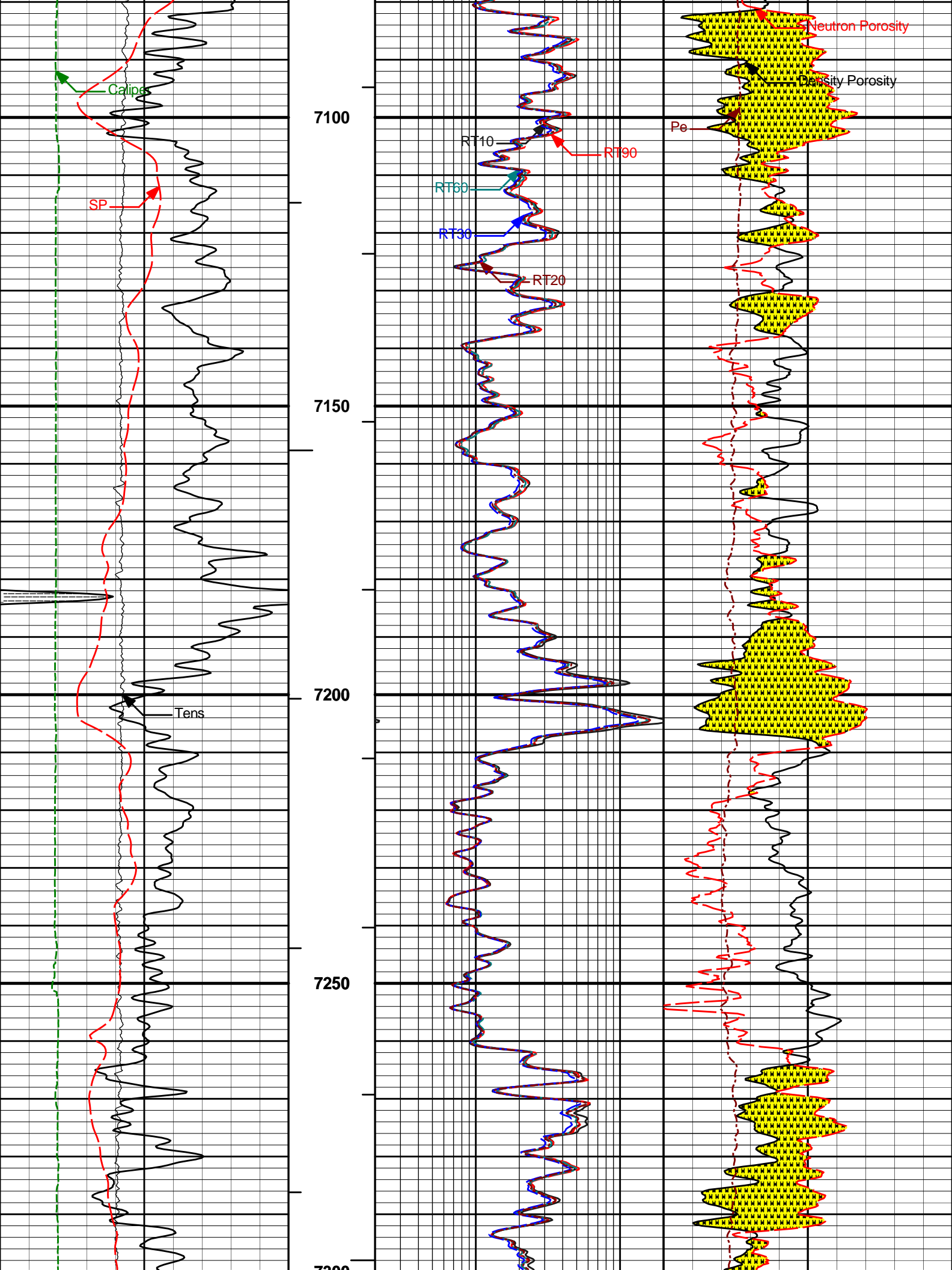


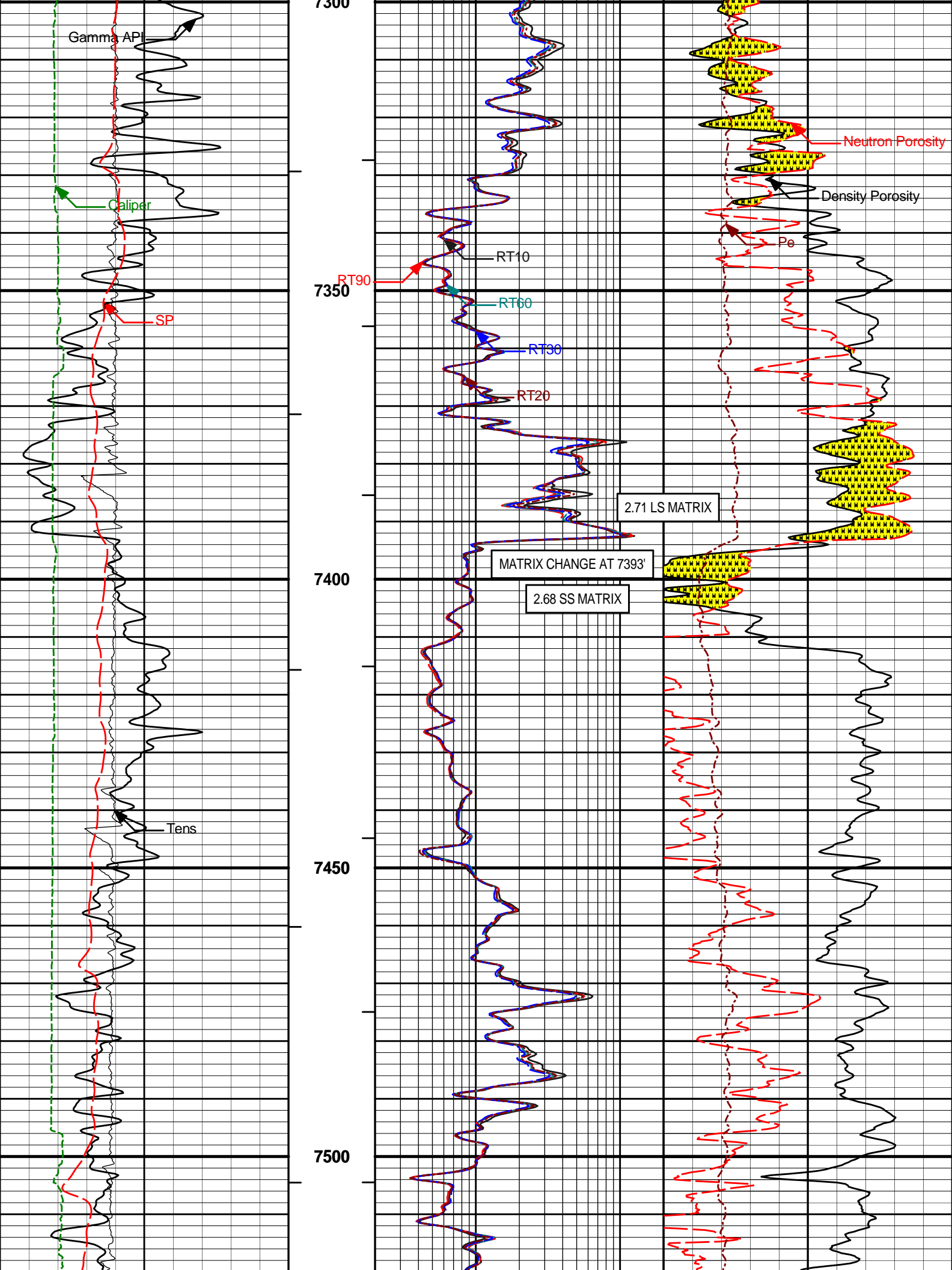
MAIN PASS 5" = 100'

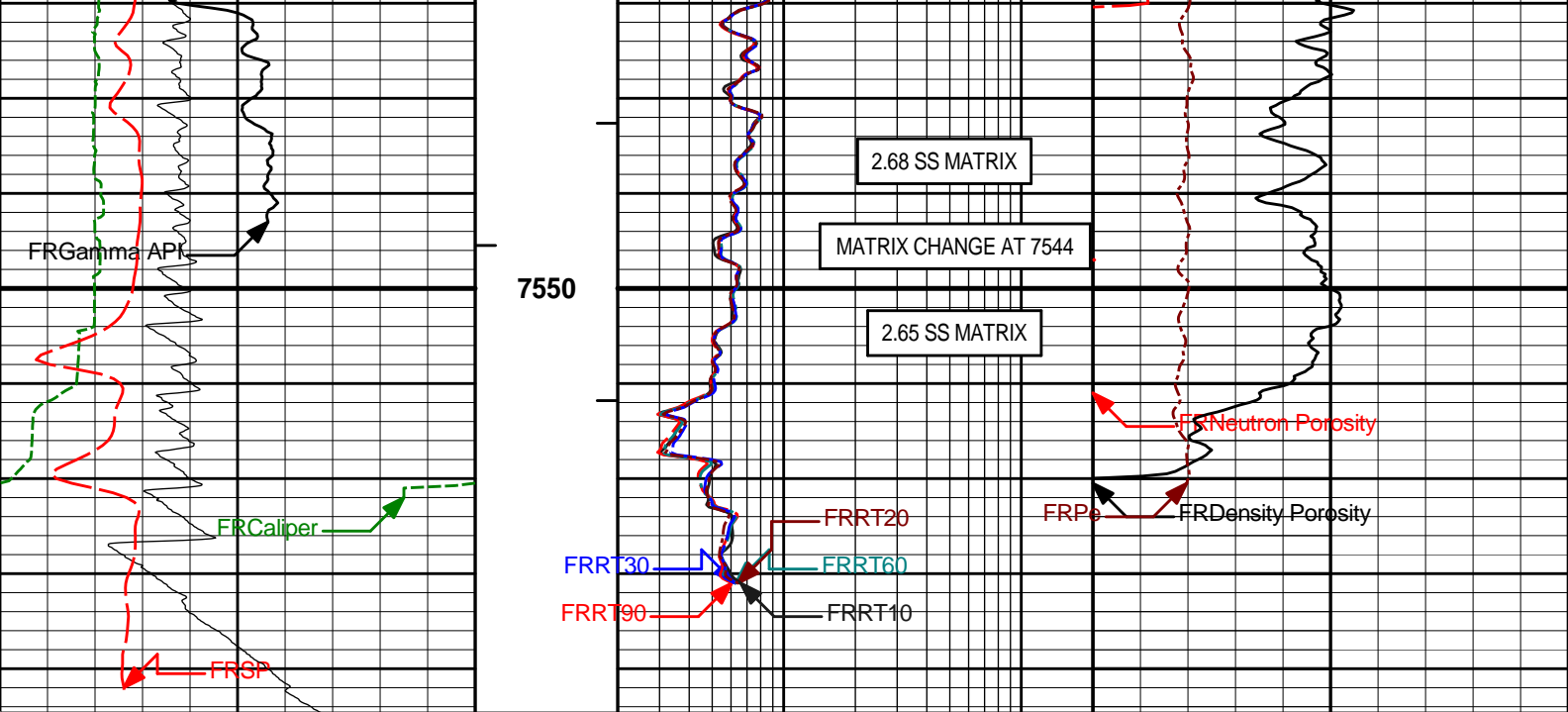
REPEAT SECTION 5" = 100'











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

**HALLIBURTON**

Plot Time: 10-Feb-11 18:54:04  
Plot Range: 6795 ft to 7594.67 ft  
Data: {ActiveWell}\Well Based\MAIN\*  
Plot File: \COMP\REPEAT

REPEAT SECTION 5" = 100'

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	GTET - 11294346	Reference Calibration Date:	24-Jan-11 09:35:20
Engineer:	C. GULLETT	Calibration Date:	24-Jan-11 09:38:13
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

Calibrator Source S/N: KW-290  
Calibrator API Reference:230.00 api  
Equivalent Calibrator API Reference:234.0 api

Measurement	Measured	Calibrated	Units
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	Measurement	Measured	Calibrated	Units
	Background	73.6	77.2	api
	Background + Calibrator	293.0	307.2	api
	Calibrator	233.5	230.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION				
Tool Name:	GTET - 11294346	Reference Calibration Date:	24-Jan-11 09:38:13	
Engineer:	F. LODER	Calibration Date:	08-Feb-11 14:58:07	
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1	

Calibrator Source S/N: KW-290			
Calibrator API Reference:230.00 api			
Equivalent Calibrator API Reference:234.0 api			
Field Verification	Shop	Field	Units
Background	77.2	73.6	api
Background + Calibrator	307.2	304.4	api
Calibrator	230.0	230.8	api
Shop	Field	Difference	Tolerance
230.0	230.8	-0.8	+/- 9.00

CSNG-FS SHOP CALIBRATION			
Tool Name:	CSNG - 10846351	Reference Calibration Date:	13-Jan-11 14:09:31
Engineer:	C. BLUE	Calibration Date:	13-Jan-11 14:31:21
Software Version:	WL INSITE R3.0.7 (Build 3)	Calibration Version:	1
Source SN:	TB290		

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.2	23.2	Channel #
583 KEV Peak Channel #	52.1	52.3	Channel #
2614 KEV Peak Channel #	214.4	215.1	Channel #
Calibrate Temperature	42.7	48.5	degF

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

Blanket Reference Value: 235.00 API

Calibrator Value: 266.9 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1598.1	CPS	331.3	331.0	API
Background	309.5	CPS	64.4	64.1	API

Gamma Ray Gain: 1.04

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION			
Tool Name:	CSNG - 10846351	Reference Calibration Date:	13-Jan-11 14:31:21
Engineer:	F. LODER	Calibration Date:	08-Feb-11 15:24:27
Software Version:	WL INSITE R3.0.0 (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 #	23.2	23.1	Channel #
583 KEV Peak Channel #	52.3	51.8	Channel #
2614 KEV Peak Channel #	215.1	213.3	Channel #
Calibrate Temperature	48.5	57.9	degF

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

Blanket Reference Value: 235.00 API

Calibrator Value: 266.9 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1592.2	CPS	331.0	332.1	API
Background	312.7	CPS	64.1	65.2	API

Gamma Ray Gain: 1.05

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

**DUAL SPACED NEUTRON SHOP CALIBRATION**

Tool Name: DSNT - 10958655\_S434

Reference Calibration Date: 01-Jan-70 00:00:00

Engineer: C. GULLETT

Calibration Date: 21-Jan-11 11:43:47

Software Version: WL INSITE R3.0.7 (Build 3)

Calibration Version: 1

Logging Source S/N: DSN434

Tank Serial Number: BRIGHTON

Reference value assigned to Tank: 55.000

Snow Block S/N: BRIGHTON

Calibration Tank Water Temperature: 50 degF

Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.996	0.996	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):	0.2295	0.2295	0.0000	+/- 0.0020
Calibrated Ratio:	10.35	10.35	0.000	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0641	0.02000 - 0.09000

**PASS/FAIL SUMMARY**

PASS/FAIL SUMMARY				
Background Check:		Passed		
Gain-Range Check:		Passed		
Snow-Block Check:		Passed		

DUAL SPACED NEUTRON FIELD CALIBRATION				
Tool Name: DSNT - 10958655_S434		Reference Calibration Date: 21-Jan-11 11:43:47		
Engineer: F. LODER		Calibration Date: 08-Feb-11 15:03:32		
Software Version: WL INSITE R3.2.3 (Build 5)		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):	0.0641	0.0772	0.0131	+/- 0.0150

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

SPECTRAL DENSITY SHOP CALIBRATION				
Tool Name: SDLT - I440M319		Reference Calibration Date: 13-Sep-10 14:53:06		
Engineer: R. TWEETEN		Calibration Date: 01-Dec-10 15:28:39		
Software Version: WL INSITE R3.0.7 (Build 3)		Calibration Version: 1		

Logging Source S/N: 2770GW

Aluminum Block S/N: BRIGHTON\_AL

Magnesium Block S/N: BRIGHTON\_MG

Density: 2.600g/cc

Density: 1.680g/cc

Pe: 3.100

Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0228	1.0168	0.90 - 1.10
Near Dens Gain	1.0054	1.0123	0.90 - 1.10
Near Peak Gain	0.9890	1.0059	0.90 - 1.10
Near Lith Gain	0.9667	0.9656	0.90 - 1.10
Far Bar Gain	1.0164	1.0184	0.90 - 1.10
Far Dens Gain	1.0037	1.0035	0.90 - 1.10
Far Peak Gain	0.9932	0.9966	0.90 - 1.10
Far Lith Gain	0.9666	0.9678	0.90 - 1.10
Near Bar Offset	0.0526	0.0989	NONE
Near Dens Offset	0.1765	0.1061	NONE
Near Peak Offset	0.3257	0.1730	NONE
Near Lith Offset	0.4867	0.4860	NONE
Far Bar Offset	0.0570	0.0498	NONE
Far Dens Offset	0.1415	0.1482	NONE
Far Peak Offset	0.2093	0.1844	NONE
Far Lith Offset	0.3804	0.3731	NONE
Near Bar Background	867.90	863.44	700 - 1450
Near Dens Background	285.14	283.52	230 - 480
Near Peak Background	120.49	121.68	100 - 210
Near Lith Background	152.52	151.48	125 - 260
Far Bar Background	548.03	547.22	450 - 900



Far Dens Background	211.00	209.85	175 - 345
Far Peak Background	83.06	82.07	70 - 140
Far Lith Background	86.82	86.59	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.694	1.680	-0.014	+/- 0.015
Pe	2.569	2.589	0.020	+/- 0.150
ALUMINUM				
Density (g/cc)	2.610	2.600	-0.010	+/- 0.01500
Pe	3.069	3.094	0.025	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0010	+/- 0.0110	-0.0012	+/- 0.0140
Magnesium Block	0.0006	+/- 0.0110	-0.0018	+/- 0.0140
Aluminum Block	-0.0013	+/- 0.0110	-0.0002	+/- 0.0140
Resolution	9.41	6.00 - 11.50	9.61	6.00 - 11.50
Internal Verifier(B+D+P+L)	1420	1200 - 2700	926	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 - I440M319

Reference Calibration Date: 01-Dec-10 15:28:39

Engineer: F. LODER

Calibration Date: 08-Feb-11 14:50:40

Software Version: WL INSITE R3.2.3 (Build 5)

Calibration Version: 1

Pad Temperature: 47.0 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1420.116	1408.674	-11.442	15.212
Far (B+D+P+L) cps	925.731	920.099	-5.632	16.474
Near Resolution	9.41	9.46	0.050	0.50
Far Resolution	9.61	9.82	0.210	1.00

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

MICRO LOG SHOP CALIBRATION						
Tool Name:	SDLT - I440M319			Reference Calibration Date:	01-Jan-70 00:00:00	
Engineer:	C. GULLETT			Calibration Date:	25-Jan-11 19:42:23	
Software Version:	WL INSITE R3.2.3 (Build 5)			Calibration Version:	1	
	CALIBRATION COEFFICIENT SUMMARY					
	Measurement	Micro Log Normal		Micro Log Lateral		Units
		Measured	Calibrated	Measured	Calibrated	
	Tool Zero	-0.08	-0.08	-0.01	-0.01	ohmm
	Calibration Point #1	0.00	0.00	0.00	0.00	ohmm
	Calibration Point #2	20.00	20.00	20.00	20.00	ohmm
	Internal Reference	19.92	19.92	19.99	19.99	ohmm
	Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
	Tool Zero	0.94		0.00		V
	Calibration Point #1	22.08		2.17		V
	Calibration Point #2	5229.18		6812.85		V
	Internal Reference	5209.41		6809.39		V
MICRO LOG FIELD CHECK						
Tool Name:	SDLT - I440M319			Reference Calibration Date:	25-Jan-11 19:42:23	
Engineer:	F. LODER			Calibration Date:	08-Feb-11 14:51:19	
Software Version:	WL INSITE R3.2.3 (Build 5)			Calibration Version:	1	
	Measurement	Micro Log Normal		Micro Log Lateral		Units
		Shop	Field	Shop	Field	
	Tool Zero	-0.08	-0.08	-0.01	0.00	ohmm
	Internal Reference	19.92	19.94	19.99	20.00	ohmm
	Summary					
	Signal	Shop	Field	Difference	Tolerance	
	Microlog Normal	19.92	19.94	-0.02	+/- 0.80	
	Microlog Lateral	19.99	20.00	-0.01	+/- 0.80	
	DENSITY CALIPER SHOP CALIBRATION					
	Tool Name:	SDLT - I440M319			Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	C. GULLETT			Calibration Date:	06-Feb-11 14:47:46	
Software Version:	WL INSITE R3.0.7 (Build 3)			Calibration Version:	1	
	CALIBRATION COEFFICIENTS					
	Measurement	Previous Value	New Value	Control Limit On New Value		
	Pad Offset	-1448.31	-1448.31	-7000.00 - -1000.00		
	Pad Gain	0.0003867	0.0003867	0.000200 - 0.000600		
	Arm Offset	-483.67	-483.67	-5000.00 - 3000.00		
	Arm Gain	0.0005135	0.0005135	0.000300 - 0.000700		
	Arm Power	-0.000005250	-0.000005250	-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)	3.75	3.75	0.00	+/- 0.20
		RING DIAMETER:				
		Small Ring (in)	6.50	6.50	0.00	+/- 0.20
		Medium Ring (in)	8.25	8.25	0.00	+/- 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 - I440M319		Reference Calibration Date:		06-Feb-11 14:47:46
Engineer:		F. LODER		Calibration Date:		08-Feb-11 14:58:15
Software Version:		WL INSITE R3.2.3 (Build 5)		Calibration Version:		1

		MEASURED CALIPER VALUES						
		Measurement	Shop	Field	Change	Control Limit On New Value		
		Pad Extension	3.75	3.70	-0.05	+/- 0.10		
		Ring Diameter	8.25	8.29	0.04	+/- 0.15		
		PASS/FAIL SUMMARY						
		Pad Extension Check:			Passed			
		Diameter Check:			Passed			

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION						
Tool Name:		ACRt - 90199477-E2817-		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					R-MUD VERIFICATION		

Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.9189	1.3	Mud Cell	0.95	0.996	1.05
36K	1.0	1.8306	2.0				
72K	1.0	1.1584	2.0				

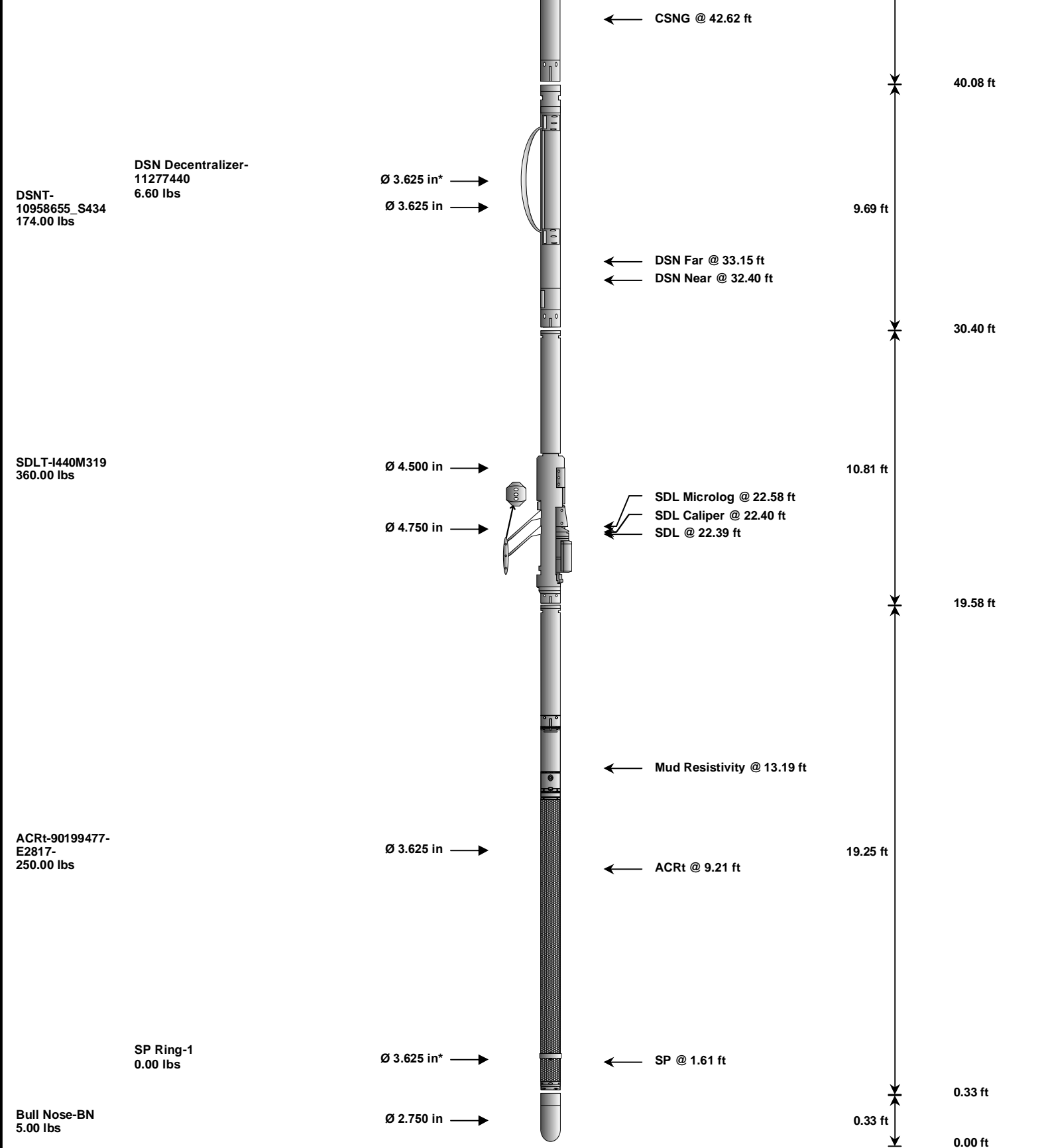
CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11294346						
Gamma Ray Calibrator	230.0	230.8	-----	-0.8	+/- 9.00	api
CSNG-10846351						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.2	23.1	-----	0.1	-----	Channel #
583 KEV Peak Channel #	52.3	51.8	-----	0.5	-----	Channel #
2614 KEV Peak Channel #	215.1	213.3	-----	1.8	-----	Channel #
DSNT-10958655_S434						
Snow-Block Porosity	0.0641	0.0772	-----	-0.0131	+/- 0.0150	decp
SDLT-I440M319						
Near(B+D+P+L)	1420.116	1408.674	-----	11.442	+/-15.212	cps
Far(B+D+P+L)	925.731	920.099	-----	5.632	+/-16.474	cps
MicroLog Normal	19.92	19.94	-----	-0.02	+/-0.80	ohmm
MicroLog Lateral	19.99	20.00	-----	-0.01	+/-0.80	ohmm
Pad Extension	3.75	3.70	-----	0.05	+/-0.10	in
Ring Diameter	8.25	8.29	-----	-0.040	+/-0.15	in
ACRt-90199477-E2817-						
Mud Cell	0.996	-----	-----	0.000	-----	ohm-m

Data: 5RIVERS_K15_31D\0001 TRIPLE_CSNG\001 10-Feb-11 16:25 Dn @17.3f	Date: 10-Feb-11 17:58:34
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HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-A094 135.00 lbs		Ø 3.625 in →		Load Cell @ 59.34 ft BH Temperature @ 58.77 ft	6.25 ft	63.02 ft
				GammaRay @ 50.71 ft	56.77 ft	
GTET-11294346 165.00 lbs		Ø 3.625 in →			8.52 ft	
CSNG-10846351 114.00 lbs		Ø 3.625 in →			8.17 ft	48.25 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	56.77	300.00
GTET	Gamma Telemetry Tool	11294346	165.00	8.52	48.25	60.00
CSNG	Compensated Spectral Natural Gamma	10846351	114.00	8.17	40.08	15.00
DSNT	Dual Spaced Neutron	10958655_S434	174.00	9.69	30.40	60.00
DCNT	DSN Decentralizer	11277440	6.60	5.13	* 33.73	300.00
SDLT	Spectral Density Tool	I440M319	360.00	10.81	19.58	60.00
ACRt	Array Compensated True Resistivity	90199477-E2817-	250.00	19.25	0.33	300.00
SP	SP Ring	1	0.00	0.25	* 1.61	300.00
BLNS	Bull Nose	BN	5.00	0.33	0.00	300.00

Total	1,209.60	63.02
Data: 5RIVERS_K15_31D\0001 TRIPLE_CSNG\IDLE		* Not included in Total Length and Length Accumulation. Date: 10-Feb-11 16:17:08

COMPANY	NOBLE ENERGY INC.		
WELL	FIVE RIVERS K15-31D		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY LOG	