

HALLIBURTON

SPECTRAL DENSITY  
DUAL SPACED NEUTRON  
ARRAY COMPENSATED  
TRUE RESISTIVITY

COMPANY		NOBLE ENERGY INC.	
WELL		MARLEY C01-31D	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		17-Apr-11	
Run No.		ONE	
Depth - Driller		7110.00 ft	
Depth - Logger		7108.0 ft	
Bottom - Logged Interval		7099.0 ft	
Top - Logged Interval		CASING	
Casing - Driller		8.625 in @ 602.0 ft	
Casing - Logger		603.0 ft	
Bit Size		7.875 in	
Type Fluid in Hole		WATER BASED MUD	
Density		9.5 ppq	
Viscosity		46.00 s/qt	
PH		8.00 pH	
Source of Sample		MUD CELL	
Rm @ Meas. Temperature		1.580 ohmm @ 75.00 degF	
Rmf @ Meas. Temperature		1.38 ohmm @ 75.00 degF	
Rmc @ Meas. Temperature		1.360 ohmm @ 75.00 degF	
Source Rmf		CHART	
Rmc		CHART	
Rm @ BHT		0.63 ohmm @ 198.0 degF	
Time Since Circulation		9.0 hr	
Time on Bottom		17-Apr-11 00:25	
Max. Rec. Temperature		198.0 degF @ 7108.0 ft	
Equipment		11454566	
Location		BRIGHTON	
Recorded By		C. GULLETT	
Witnessed By		J. CHIAK	

Fold here

Service Ticket No.: 8109093		API Serial No.: 05123312240000		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.
Rmf @ Meas. Temp.	@	@		ONE	ACRT-	N/A	1.5" STANDOFF
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.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	11277436	Serial No.	10938796	Serial No.	M335-P470	Serial No.	11301132
Model No.	GTET	Model No.	BSAT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	4.5"	Diameter	3.625"
Detector Model No.	102-T	Spacing	0.5'	Log Type	GAMMA-GAMMA	Log Type	THERMAL
Type	SCINT.			Source Type	Cs137	Source Type	Am241Be
Length	8"	LSA [Y/N]	Y	Serial No.	2770GW	Serial No.	DSN-434
Distance to Source	17'	FWDA [Y/N ]	Y	Strength	1.5 Ci	Strength	15 Ci
LOGGING DATA							
GENERAL		GAMMA		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	T.D.		REC.	0	250	30%	-10%	55.5	20%	0%	2.68	20%	0%	SAND	
ONE			REC.	0	250	30%	-10%	47.5	20%	0%	2.71	20%	0%	LIME	
ONE		CSG.	REC.	0	250	30%	-10%	55.5	20%	0%	2.68	20%	0%	SAND	
DIRECTIONAL INFORMATION															
Maximum Deviation								@	KOP				@		
Remarks:															
RWCH-GTET-CSNG-DSNT-SDLT-BSAT-ACRt WERE RAN IN COMBINATION.															
A.H.V. IS CALCULATED FOR 4.5" CASING.															
CHLORIDES REPORTED AT 700 ppm.															
YOUR CREW TODAY: A. DUNCAN, G. DAVIS.															
RIG: ENSIGN 128.															
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.															
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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	
6651.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT	DMA	Formation Density Matrix	2.710	g/cc
	BSAT	DTMT	Delta -T Matrix Type	Limestone 47.5	
6917.00					
	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	9.500	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	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	2.000	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	50.0	degF
	SHARED	TD	Total Well Depth	7110.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF

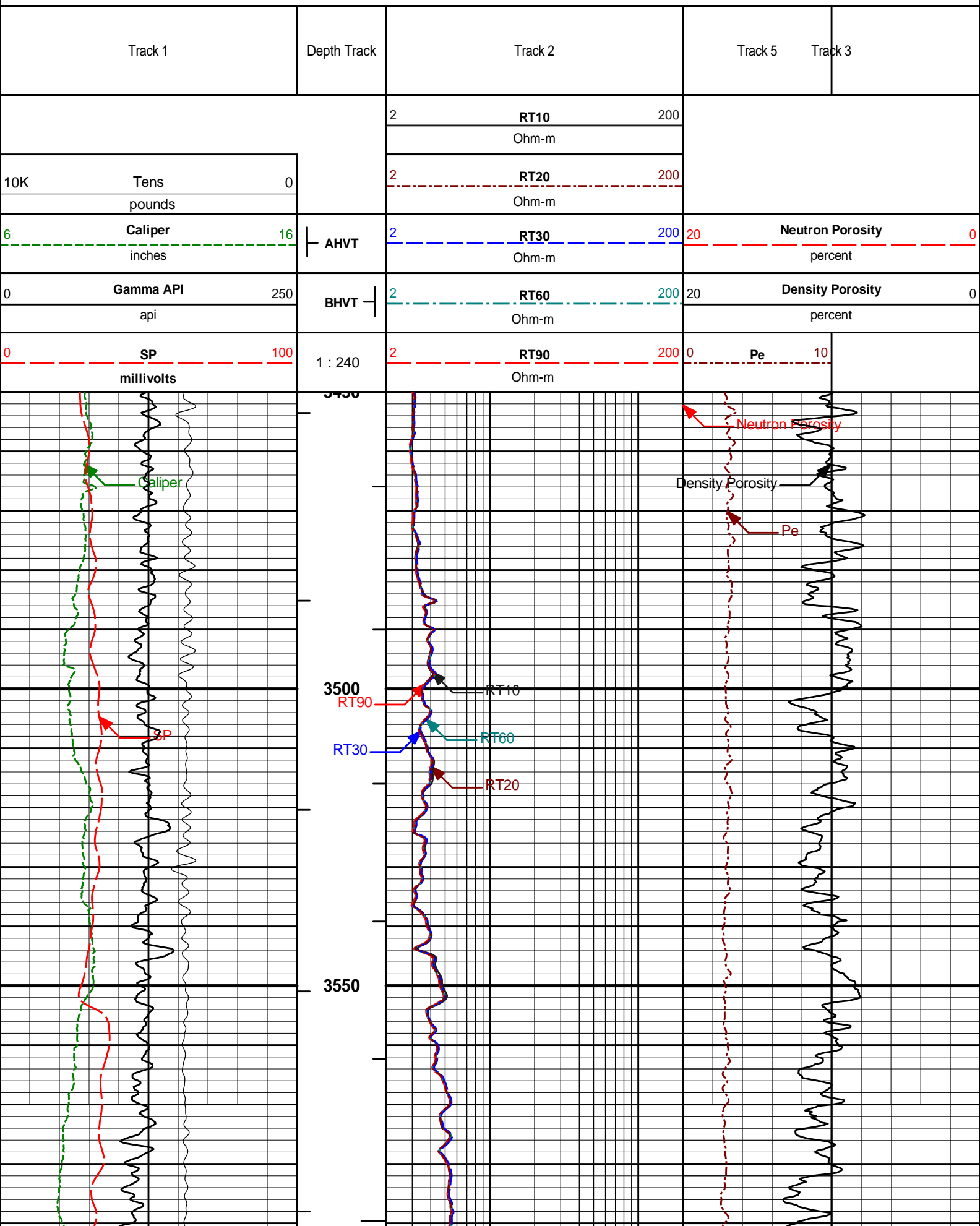
SHARED	SVTM	Navigation and Survey Master Tool	NONE	
SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position	Centered	
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	
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Frequency Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Frequency 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 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				

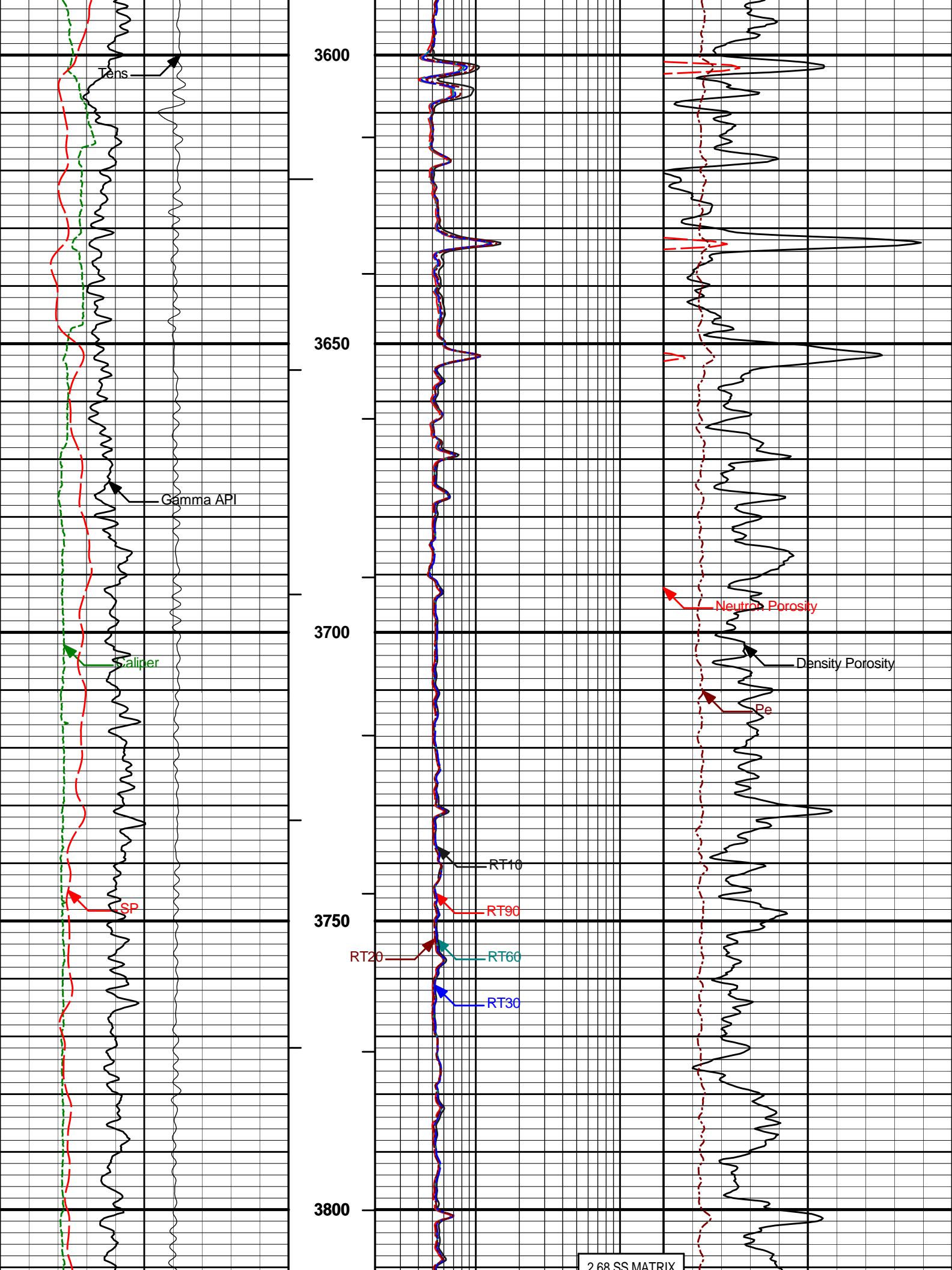
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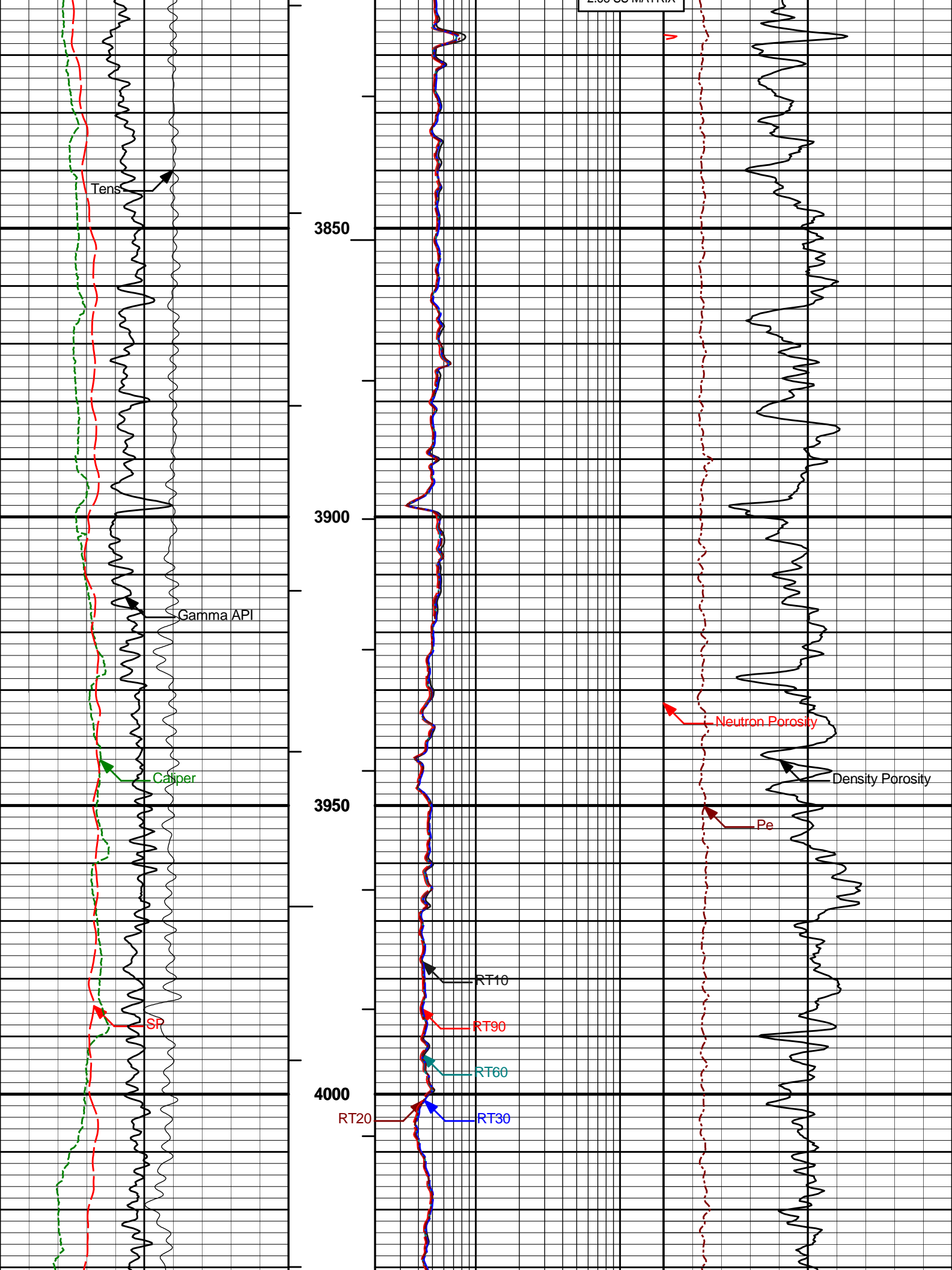
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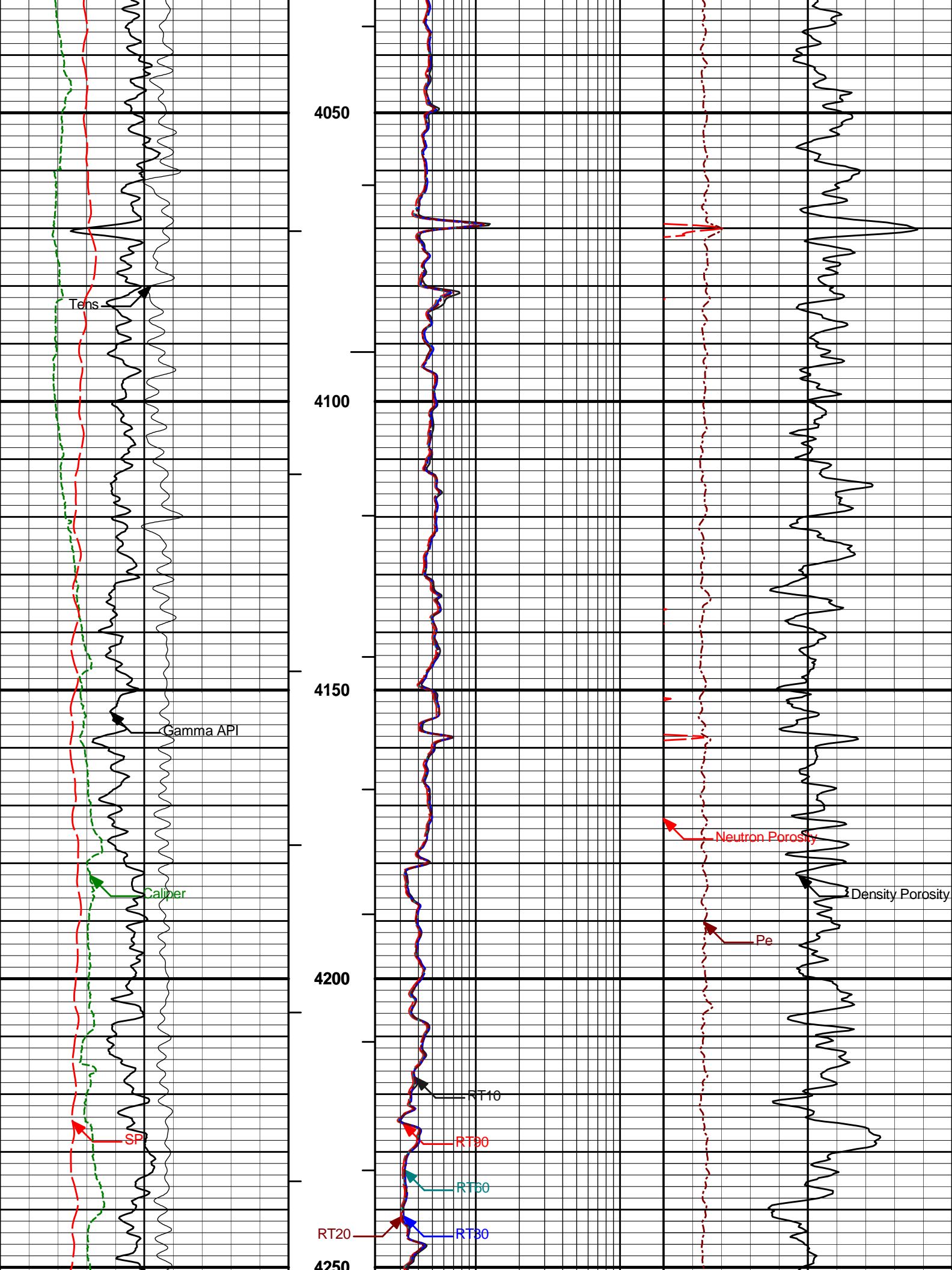
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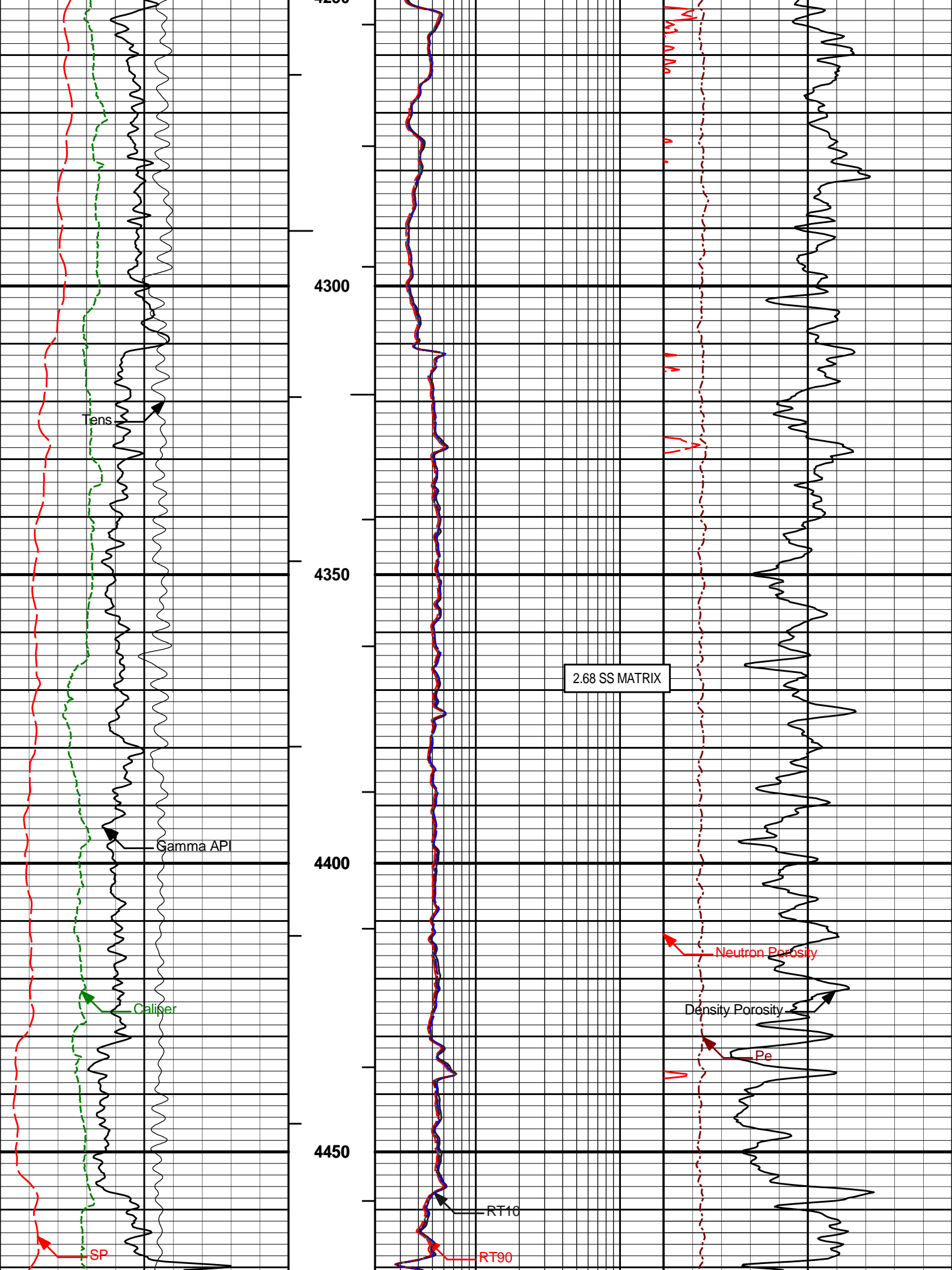
MAIN PASS 5" = 100'

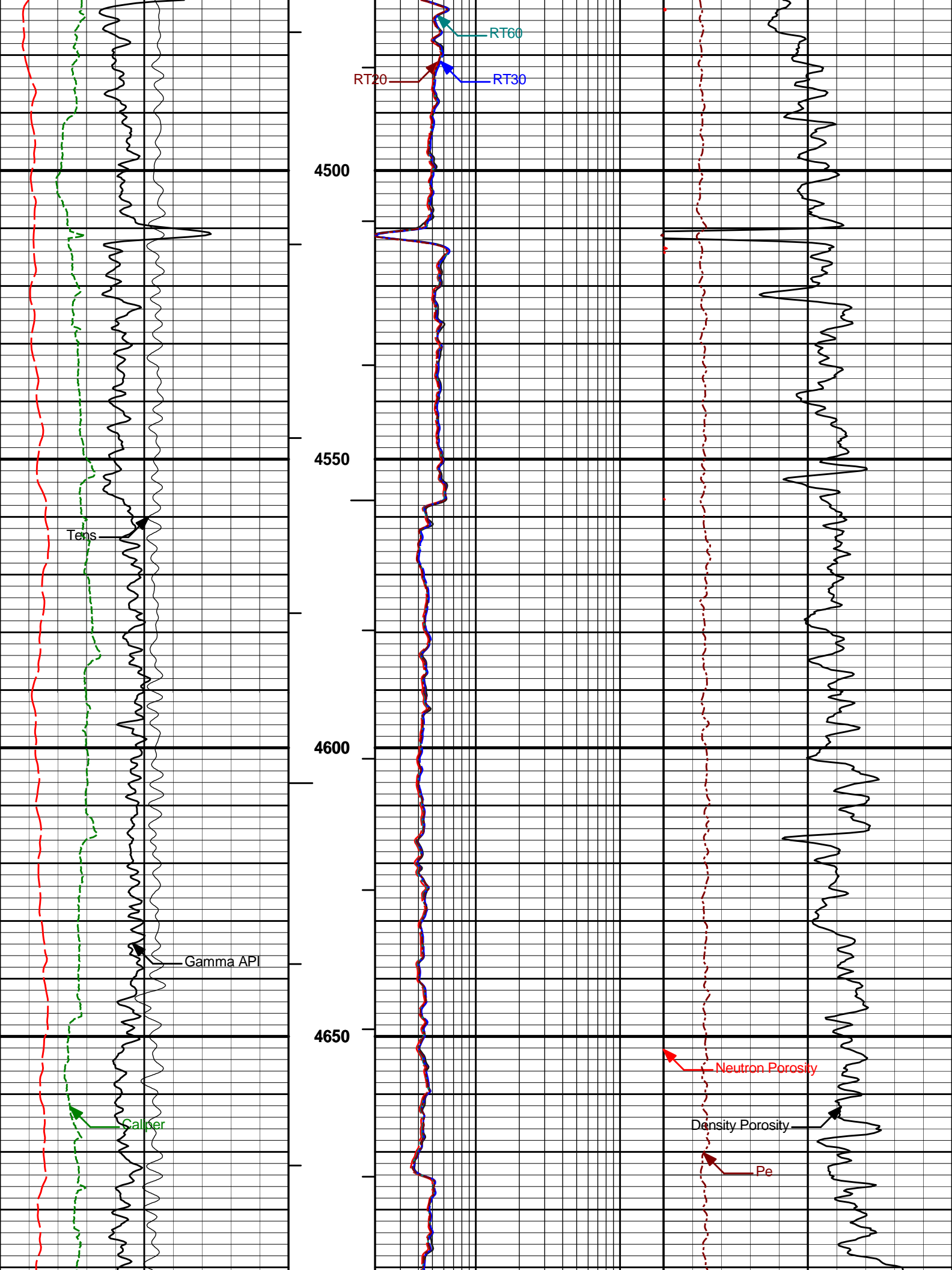


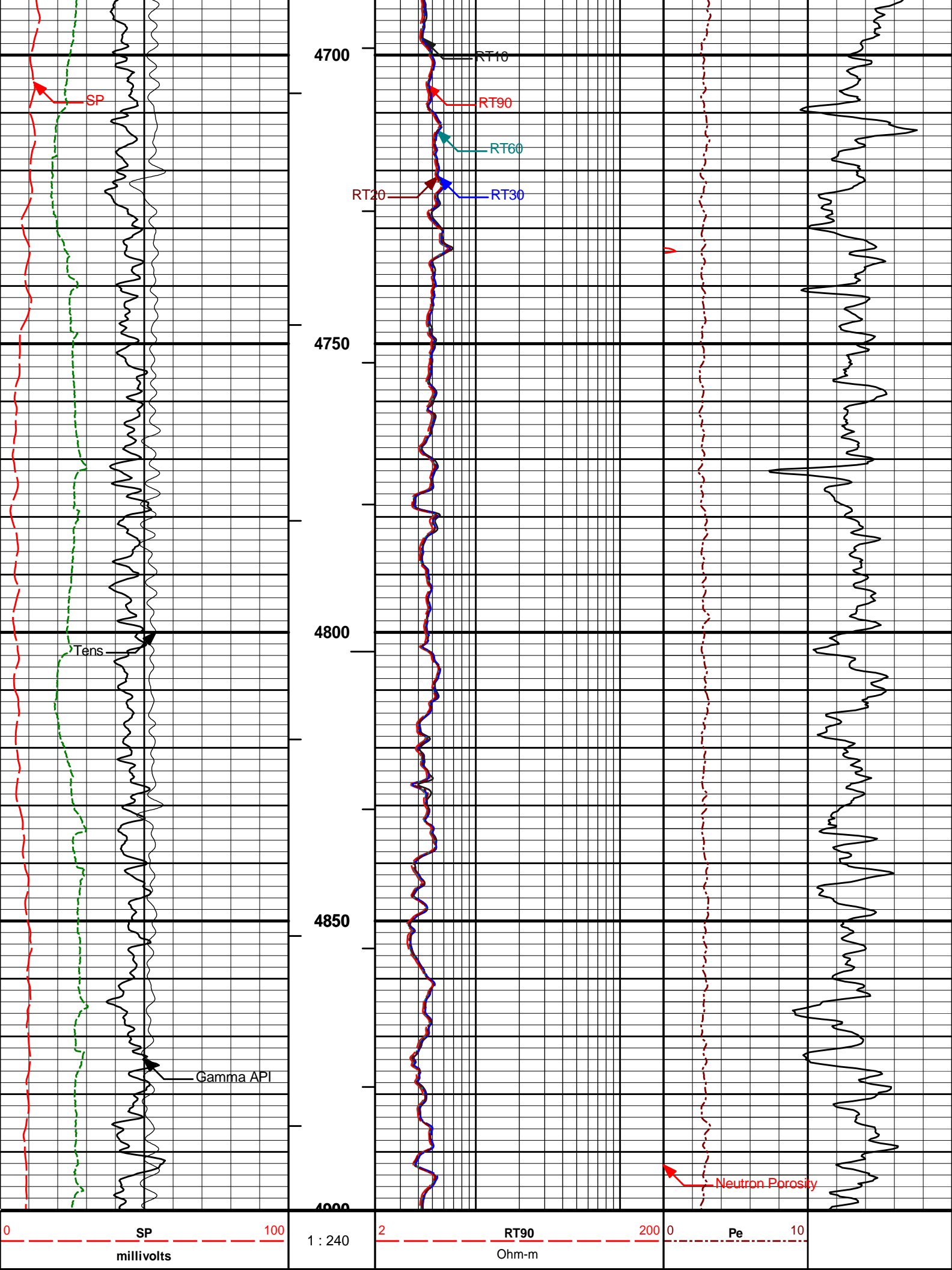












0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0		2	RT20	200			
	pounds				Ohm-m				
				2	RT10	200			
					Ohm-m				

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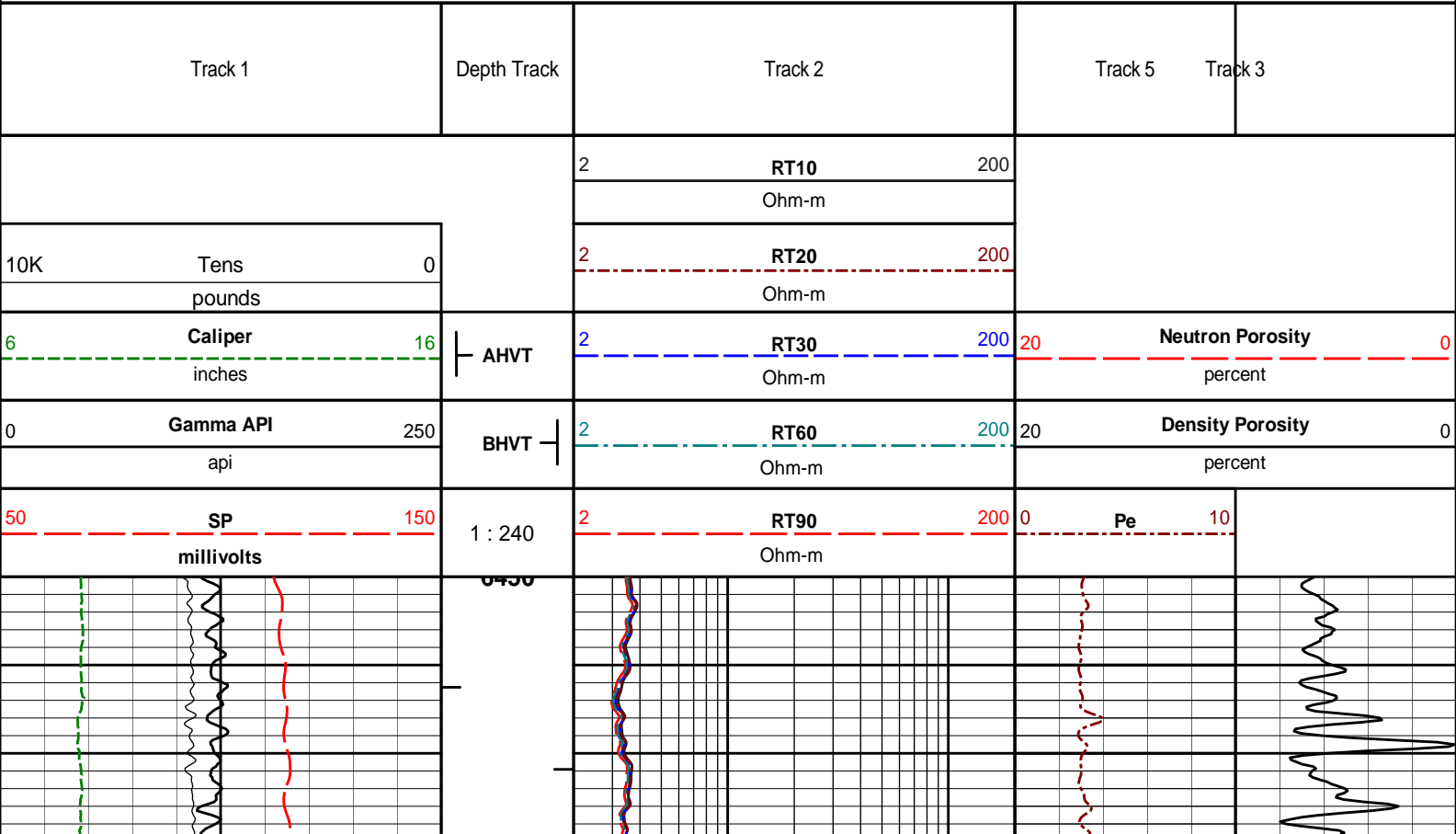
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Plot Range: 3450 ft to 4900 ft  
Data: {ActiveWell}\Well Based\MAIN\*  
Plot File: \COMP\MAIN

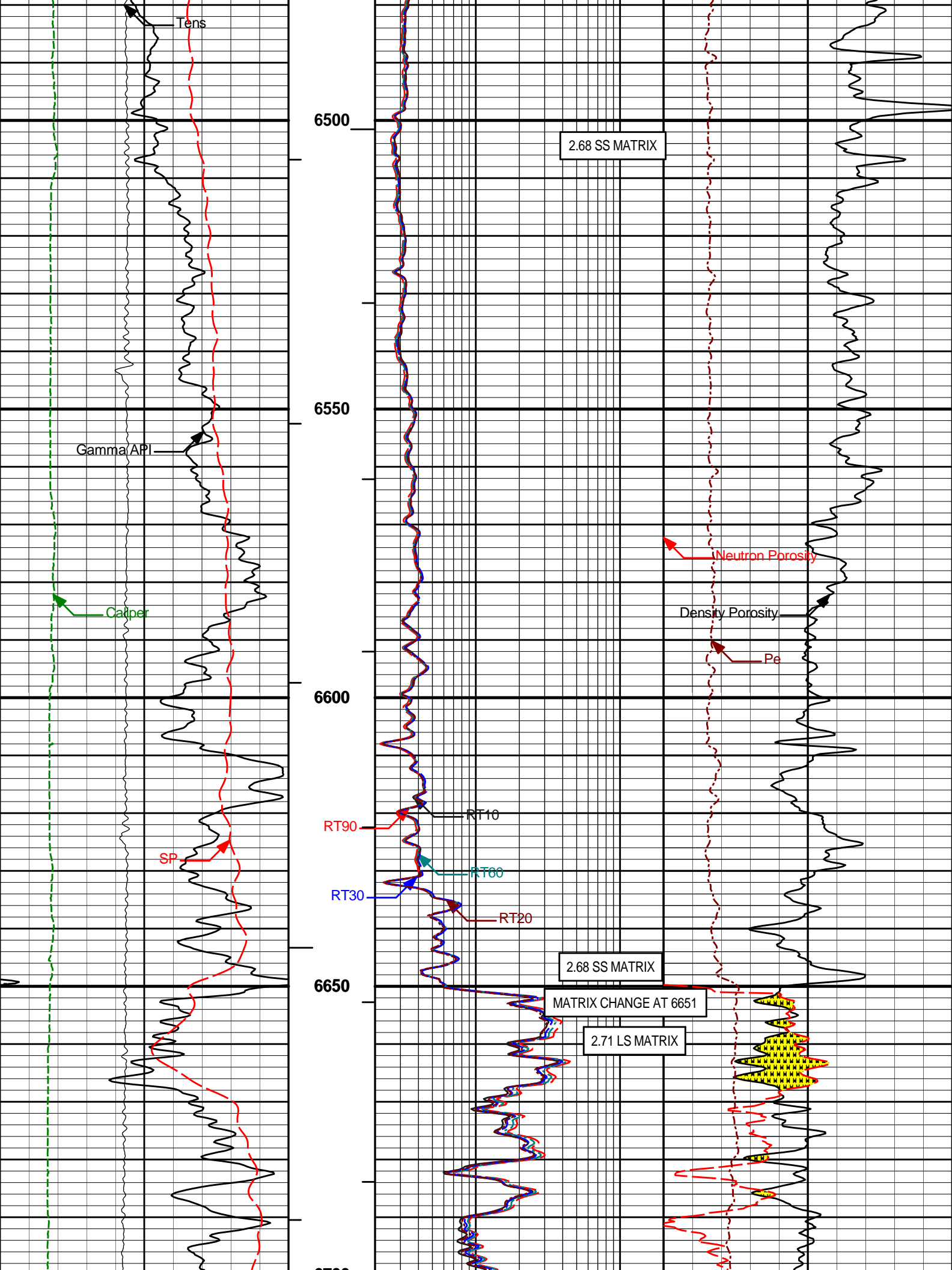
MAIN PASS 5" = 100'

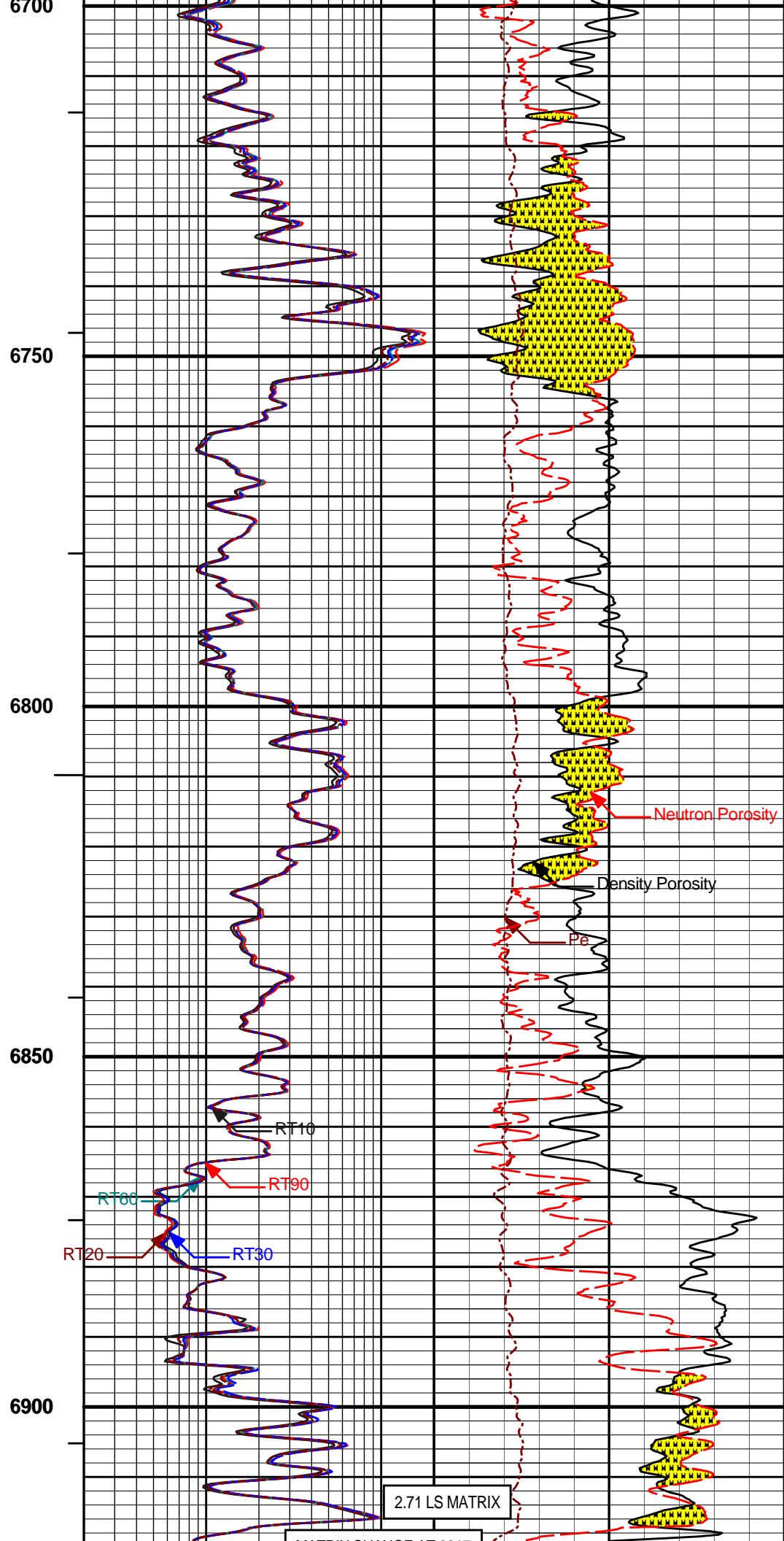
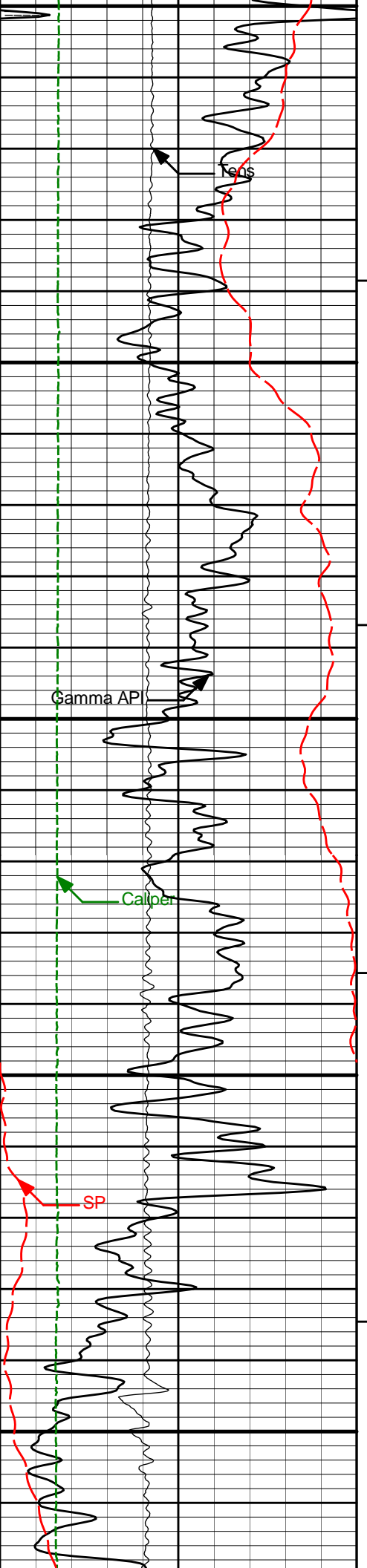
HALLIBURTON

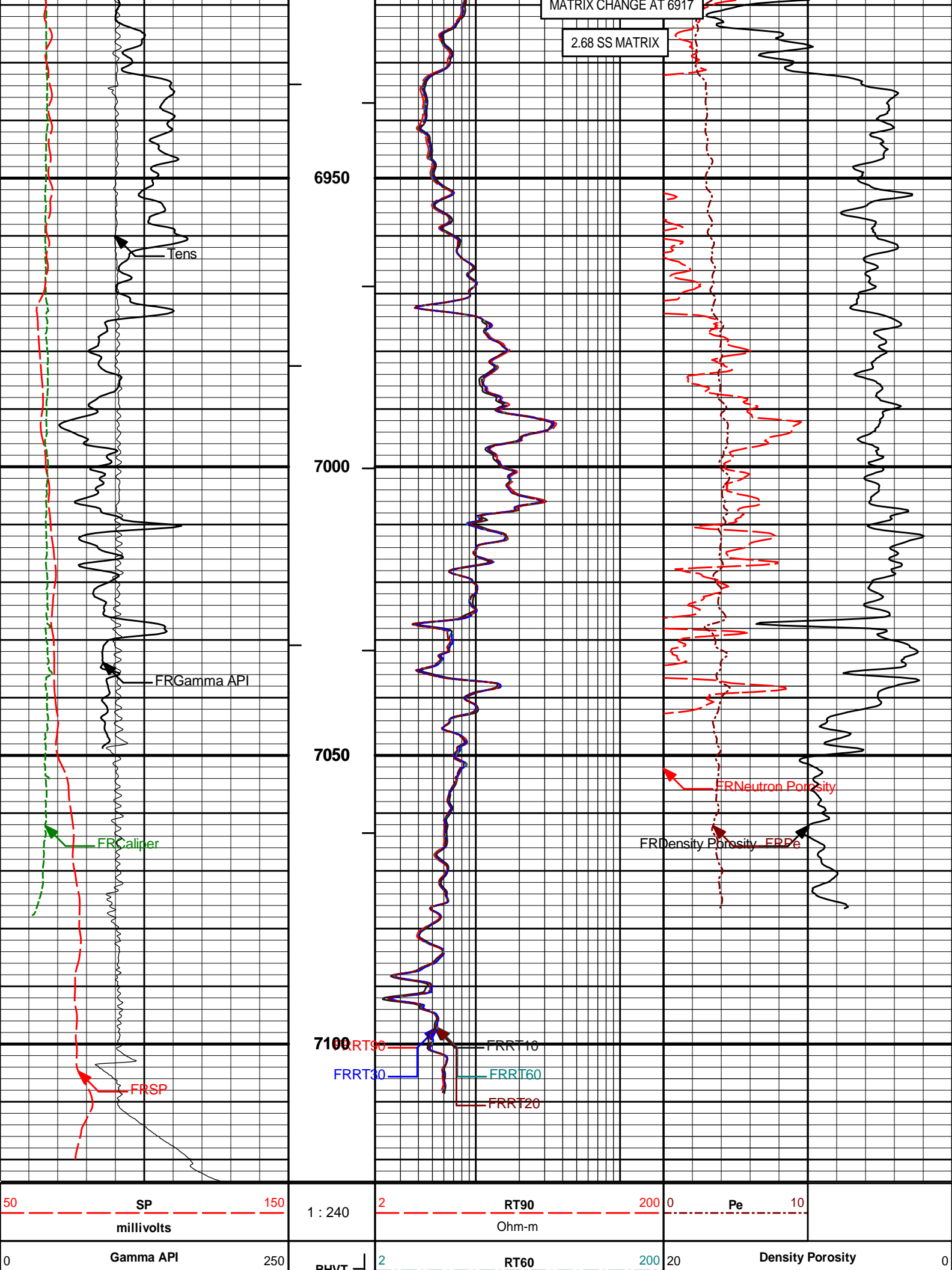
Plot Time: 17-Apr-11 04:04:01  
Plot Range: 6450 ft to 7123.83 ft  
Data: {ActiveWell}\Well Based\MAIN\*  
Plot File: \COMP\REPEAT

REPEAT SECTION 5" = 100'









api	BHVT	Ohm-m	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	

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Plot Time: 17-Apr-11 04:04:04  
 Plot Range: 6450 ft to 7123.83 ft  
 Data: {ActiveWell}\Well Based\MAIN\*  
 Plot File: \COMP\REPEAT

REPEAT SECTION 5" = 100'

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CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11277436\_BLACK  
 Engineer: C. GULLETT  
 Software Version: WL INSITE R3.2.3 (Build 5)

Reference Calibration Date: 05-Mar-11 15:05:01  
 Calibration Date: 29-Mar-11 15:17:32  
 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
Background	74.1	73.9	api
Background + Calibrator	308.6	308.0	api
Calibrator	233.9	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11277436\_BLACK  
 Engineer: C. GULLETT  
 Software Version: WL INSITE R3.2.3 (Build 5)

Reference Calibration Date: 29-Mar-11 15:17:32  
 Calibration Date: 16-Apr-11 18:03:08  
 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	73.9	59.8	api
Background + Calibrator	308.0	302.6	api
Calibrator	234.0	242.8	api

Shop	Field	Difference	Tolerance
234.0	242.8	-8.8	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 11568970

Reference Calibration Date: 05-Mar-11 15:47:38

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.6	23.6	Channel #
583 KEV Peak Channel #	53.4	53.3	Channel #
2614 KEV Peak Channel #	220.7	220.2	Channel #
Calibrate Temperature	63.1	70.1	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	1570.5	CPS	325.2	324.9	API
Background	308.0	CPS	64.0	63.7	API

Gamma Ray Gain: 1.04  
Expected Gain Range: 0.85 - 1.15  
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11301132_BLACK	Reference Calibration Date:	10-Mar-11 14:54:53
Engineer:	C. GULLETT	Calibration Date:	11-Apr-11 13:37:18
Software Version:	WL INSITE R3.2.3 (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  
Calibration Tank Water Temperature: 60 degF  
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.996	1.001	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):	0.2209	0.2223	0.0015	+/- 0.0020
Calibrated Ratio:	10.06	10.11	0.050	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0710	0.02000 - 0.09000

**PASS/FAIL SUMMARY**

Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

**DUAL SPACED NEUTRON FIELD CALIBRATION**

<b>Tool Name:</b>	<b>DSNT - 11301132_BLACK</b>	<b>Reference Calibration Date:</b>	<b>11-Apr-11 13:37:18</b>
<b>Engineer:</b>	<b>C. GULLETT</b>	<b>Calibration Date:</b>	<b>16-Apr-11 18:13:28</b>
<b>Software Version:</b>	<b>WL INSITE R3.2.3 (Build 5)</b>	<b>Calibration Version:</b>	<b>1</b>

Logging Source S/N: DSN-434

Snow Block S/N: BRIGHTON

**NEUTRON FIELD-CHECK SUMMARY**

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0710	0.0852	0.0142	+/- 0.0150

**PASS/FAIL SUMMARY**

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

**SPECTRAL DENSITY SHOP CALIBRATION**

<b>Tool Name:</b>	<b>SDLT - M335_P470_BLACK</b>	<b>Reference Calibration Date:</b>	<b>10-Mar-11 09:54:56</b>
<b>Engineer:</b>	<b>C. GULLETT</b>	<b>Calibration Date:</b>	<b>07-Apr-11 09:56:54</b>
<b>Software Version:</b>	<b>WL INSITE R3.2.3 (Build 5)</b>	<b>Calibration Version:</b>	<b>1</b>

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	1.0481	1.0482	0.90 - 1.10
Near Dens Gain	1.0134	1.0296	0.90 - 1.10
Near Peak Gain	0.9948	1.0113	0.90 - 1.10
Near Lith Gain	0.9678	0.9992	0.90 - 1.10
Far Bar Gain	1.0174	1.0178	0.90 - 1.10
Far Dens Gain	1.0052	1.0058	0.90 - 1.10
Far Peak Gain	0.9979	0.9995	0.90 - 1.10
Far Lith Gain	0.9703	0.9796	0.90 - 1.10
Near Bar Offset	-0.1891	-0.1921	NONE
Near Dens Offset	0.1509	0.0104	NONE
Near Peak Offset	0.3039	0.1676	NONE
Near Lith Offset	0.4970	0.2442	NONE
Far Bar Offset	0.0528	0.0405	NONE
Far Dens Offset	0.1427	0.1298	NONE
Far Peak Offset	0.1848	0.1688	NONE
Far Lith Offset	0.3640	0.2915	NONE

Near Bar Background	1070.52	1064.75	700 - 1450
Near Dens Background	351.54	350.16	230 - 480
Near Peak Background	152.32	152.22	100 - 210
Near Lith Background	186.41	184.66	125 - 260

Near Lith Background	186.41	184.66	125 - 280
Far Bar Background	557.45	555.30	450 - 900
Far Dens Background	218.63	218.57	175 - 345
Far Peak Background	85.74	84.65	70 - 140
Far Lith Background	88.98	89.54	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.675	1.680	0.005	+/- 0.015
Pe	2.620	2.551	-0.069	+/- 0.150
ALUMINUM				
Density (g/cc)	2.596	2.600	0.004	+/- 0.01500
Pe	3.083	3.059	-0.024	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0013	+/- 0.0110	0.0004	+/- 0.0140
Magnesium Block	-0.0004	+/- 0.0110	-0.0008	+/- 0.0140
Aluminum Block	-0.0009	+/- 0.0110	-0.0004	+/- 0.0140
Resolution	9.12	6.00 - 11.50	9.55	6.00 - 11.50
Internal Verifier(B+D+P+L)	1752	1200 - 2700	948	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 - M335_P470_BLACK	Reference Calibration Date:	07-Apr-11 09:56:54
Engineer:	C. GULLETT	Calibration Date:	16-Apr-11 18:03:32
Software Version:	WL INSITE R3.2.3 (Build 5)	Calibration Version:	1

Pad Temperature: 56.9 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1751.787	1751.116	-0.671	16.784
Far (B+D+P+L) cps	948.060	946.807	-1.253	16.612
Near Resolution	9.12	9.21	0.090	0.50
Far Resolution	9.55	9.77	0.220	1.00

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

## DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - M335\_P470\_BLACK

Reference Calibration Date: 10-Mar-11 11:10:13

Engineer: C. GULLETT

Calibration Date: 07-Apr-11 13:19:01

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

Calibration Version: 1

## CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-1681.11	-2043.18	-7000.00 - -1000.00
Pad Gain	0.0003847	0.0004037	0.000200 - 0.000600
Arm Offset	-2950.39	-2756.65	-5000.00 - 3000.00
Arm Gain	0.0005769	0.0005924	0.000300 - 0.000700
Arm Power	-0.000006589	-0.000007443	-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)	2.05	2.00	-0.05	+/- 0.20
Medium Ring (in)	3.71	3.75	0.04	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.49	6.50	0.01	+/- 0.20
Medium Ring (in)	8.21	8.25	0.04	+/- 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

## ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt - E6758-S4352\_BLK

Reference Calibration Date: 29-Nov-10 08:30:56

Engineer: F. LODER

Calibration Date: 30-Mar-11 17:55:22

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

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	1.0100	1.05	0.95	1.0124	1.05	0.95	1.0082	1.05
A2 (50")	0.95	0.9971	1.05	0.95	0.9987	1.05	0.95	0.9965	1.05
A3 (29")	0.95	0.9930	1.05	0.95	0.9948	1.05	0.95	0.9911	1.05
A4 (17")	0.95	0.9960	1.05	0.95	0.9952	1.05	0.95	0.9927	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9974	1.05	0.95	0.9942	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9775	1.05	0.95	0.9733	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	-1.099	2	-6	-4.185	-2	-8	-5.453	-2
A2 (50")	-7	-3.435	-1	-6	-4.045	-2	-7	-4.436	-2

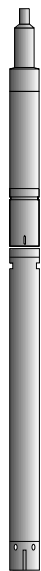
A3 (29")	-27	-13.536	-9	-9	-3.915	-3	-7	-3.041	-1
A4 (17")	-180	-98.128	-60	-45	-32.328	-15	-39	-26.066	-13
A5 (10")	N/A	N/A	N/A	-150	-91.221	-50	-80	-44.206	-10
A6 (6")	N/A	N/A	N/A	175	298.350	525	90	154.010	270

TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION			
Signal	Lower	R	Upper		Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.8643	1.3		Mud Cell	0.95	1.009	1.05
36K	1.0	1.8870	2.0					
72K	1.0	1.1049	2.0					

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11277436_BLACK						
Gamma Ray Calibrator	234.0	242.8	-----	-8.8	+/- 9.00	api
CSNG-11568970						
60 KEV Peak Channel #	48.0	-----	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.6	-----	-----	0.0	-----	Channel #
583 KEV Peak Channel #	53.3	-----	-----	0.0	-----	Channel #
2614 KEV Peak Channel #	220.2	-----	-----	0.0	-----	Channel #
DSNT-11301132_BLACK						
Snow-Block Porosity	0.0710	0.0852	-----	-0.0142	+/- 0.0150	decp
SDLT-M335_P470_BLACK						
Near(B+D+P+L)	1751.787	1751.116	-----	0.671	+/-16.784	cps
Far(B+D+P+L)	948.060	946.807	-----	1.253	+/-16.612	cps
Pad Extension	3.75	-----	-----	0.00	+/-0.20	in
Ring Diameter	8.25	-----	-----	0.00	+/-0.20	in
ACRt-E6758-S4352_BLK						
Mud Cell	1.009	-----	-----	0.000	-----	ohm-m
Data: MARLEY_C01_31D\0001 QUAD-CSNG\IDLE					Date: 17-Apr-11 02:54:14	

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-B097 135.00 lbs		Ø 3.625 in →		<div>← Load Cell @ 82.75 ft</div> <div>← BH Temperature @ 82.18 ft</div>	6.25 ft	86.43 ft
					80.18 ft	
GTET-11277436_BLACK 165.00 lbs		Ø 3.625 in →		← GammaRay @ 74.12 ft	8.52 ft	71.66 ft

CSNG-11568970  
114.00 lbs

Ø 3.625 in →

8.17 ft

← CSNG @ 66.03 ft

63.49 ft

DSN Decentralizer-  
11277440  
6.60 lbs  
DSNT-  
11301132\_BLACK  
174.00 lbs

Ø 3.625 in\* →

Ø 3.625 in →

9.69 ft

← DSN Far @ 56.56 ft

← DSN Near @ 55.81 ft

53.81 ft

SDLT-  
M335\_P470\_BLACK  
360.00 lbs

Ø 4.500 in →

Ø 4.750 in →

10.81 ft

SDL Microlog @ 45.99 ft  
SDL Caliper @ 45.81 ft  
SDL @ 45.80 ft

42.99 ft

Flex Joint -  
Pressure Comp-1  
140.00 lbs

Ø 3.625 in →

5.97 ft

37.02 ft

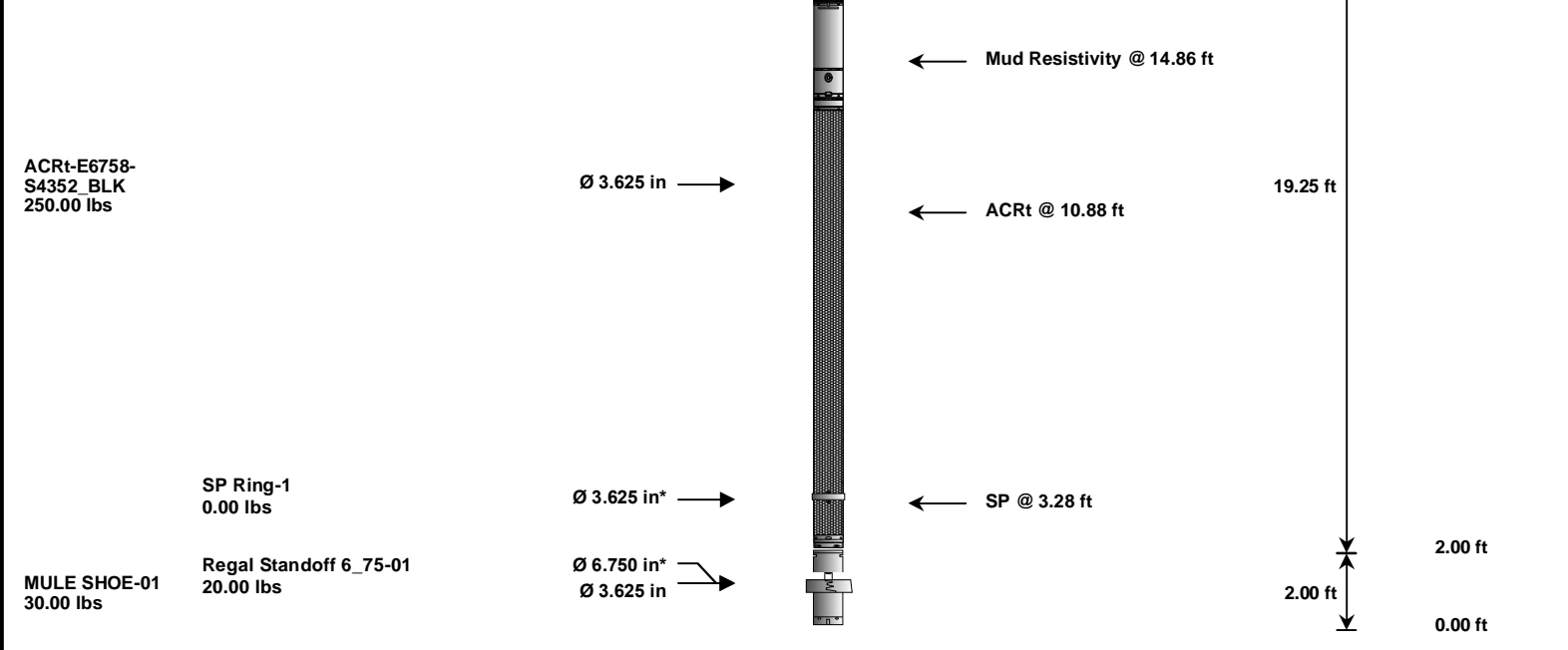
BSAT-10938796  
300.00 lbs

Ø 3.625 in →

15.77 ft

← Sonic Receivers @ 28.51 ft

21.25 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	B097	135.00	6.25	80.18	300.00
GTET	Gamma Telemetry Tool	11277436_BLACK	165.00	8.52	71.66	60.00
CSNG	Compensated Spectral Natural Gamma	11568970	114.00	8.17	63.49	15.00
DSNT	Dual Spaced Neutron	11301132_BLACK	174.00	9.69	53.81	60.00
DCNT	DSN Decentralizer	11277440	6.60	5.13	* 57.14	300.00
SDLT	Spectral Density Tool	M335_P470_BLACK	360.00	10.81	42.99	60.00
FLEX	Flex Joint - Pressure Compensated	1	140.00	5.97	37.02	300.00
BSAT	Borehole Sonic Array Tool	10938796	300.00	15.77	21.25	60.00
ACRt	Array Compensated True Resistivity	E6758-S4352_BLK	250.00	19.25	2.00	300.00
SP	SP Ring	1	0.00	0.25	* 3.28	300.00
M S	MULE SHOE	01	30.00	2.00	0.00	100.00
RSOF	Regal Standoff 6.75in	01	20.00	0.52	* 0.88	300.00
<b>Total</b>			<b>1,694.60</b>	<b>86.43</b>		
						* Not included in Total Length and Length Accumulation.
Data: MARLEY_C01_31D\0001 QUAD-CSNG\IDLE						Date: 17-Apr-11 00:27:05

COMPANY	NOBLE ENERGY INC.		
WELL	MARLEY C01-31D		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY	