

HALLIBURTON

SPECTRAL DENSITY
DUAL SPACED NEUTRON
ARRAY COMPENSATED
TRUE RESISTIVITY

COMPANY		NOBLE ENERGY	
WELL		BOOTH N25-33D	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		09-Feb-11	
Run No.		ONE	
Depth - Driller		7734.00 ft	
Depth - Logger		7728.0 ft	
Bottom - Logged Interval		7719 ft	
Top - Logged Interval		825 ft	
Casing - Driller		8.625 in @ 824.0 ft	
Casing - Logger		825.0 ft	
Bit Size		7.875 in	
Type Fluid in Hole		WBM	
Density		9.3 ppq	
Viscosity		44.00 s/qt	
PH		8.50 pH	
Fluid Loss		8.8 cpm	
Source of Sample		FLOWLINE	
Rm @ Meas. Temperature		1.700 ohmm @ 43.80 degF	
Rmf @ Meas. Temperature		0.89 ohmm @ 75.00 degF	
Rmc @ Meas. Temperature		0.949 ohmm @ 75.00 degF	
Source Rmf		CHART	
Rmc		CHART	
Rm @ BHT		0.38 ohmm @ 222.0 degF	
Time Since Circulation		6.0 hr	
Time on Bottom		09-Feb-11 19:13	
Max. Rec. Temperature		222.0 degF @ 7728.0 ft	
Equipment		10800785	
Location		BRIGHTON	
Recorded By		C. BLUE	
Witnessed By		M. SUTTON	

COMPANY	NOBLE ENERGY
WELL	BOOTH N25-33D
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO
API No.	05123316660000
Location	SHL: 2136' FSL & 206' FEL NESW BHL: 1275' FSL & 100' FWL SWSW LAT: 40.36909° LONG: -104.85171°
Other Services:	RWCH GTET CSNG
Sect. 26	Twp. 5N
Rge. 67W	Elev. 4947.0 ft
	D.F. 4962.0 ft
	G.L. 4947.0 ft

Fold here

Service Ticket No.: 7954081		API Serial No.: 05123316660000		PGM Version: WL INSITE R3.0.7 (Build 3)	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES	
Date	Sample No.			Type Log	Depth
Depth-Driller					Scale Up Hole
Type Fluid in Hole					Scale Down Hole
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample				RESISTIVITY EQUIPMENT DATA	
Rm @ Meas. Temp	@	@	Run No.	Tool Type & No.	Pad Type
Rmf @ Meas. Temp.	@	@	ONE	ACRT 336-042	N/A
Rmc @ Meas. Temp.	@	@			0.5" S.O.
Source Rmf	Rmc				N/A
Rm @ BHT	@	@			
Rmf @ BHT	@	@			
Rmc @ BHT	@	@			
EQUIPMENT DATA					
GAMMA		ACOUSTIC		DENSITY	
Run No.	ONE	Run No.		Run No.	ONE
Serial No.	11215095	Serial No.		Serial No.	I332M335
Model No.	GTET	Model No.		Model No.	SDLT
Diameter	3.625"	No. of Cent.		Diameter	4.5"
Detector Model No.	102A	Spacing		Log Type	GAM/GAM
Type	SCINT			Source Type	Cs137
Length	8"	LSA [Y/N]		Serial No.	5256 GW
Distance to Source	17'	FWDA [Y/N]		Strength	1.5 Ci
LOGGING DATA					
GENERAL		GAMMA		DENSITY	
ACOUSTIC		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	7550	REC	0	250				20%	0%	2.68 g/cc	20%	0%	SAND		
ONE	7550	7225	REC	0	250				20%	0%	2.71 g/cc	20%	0%	LIME		
ONE	7225	CSG	REC	0	250				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 FOR 4.5 INCH PRODUCTION CASING																
TENSION PULLS, WASHOUTS, AND BOREHOLE RUGOSITY AFFECT TOOL RESPONSE																
CREW: J. WALKER, R. PERSHALL																
RIG: ENSIGN 55																
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	Description	Value	Units
TOP				
	DSNT	Neutron Lithology	Sandstone	
	SDLT	Formation Density Matrix	2.680	g/cc
7225.00				
	DSNT	Neutron Lithology	Limestone	
	SDLT	Formation Density Matrix	2.710	g/cc
7550.00				
	SHARED	Bit Size	7.875	in
	SHARED	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	Borehole Fluid Weight	9.300	ppg
	SHARED	Oil Based Mud System?	No	
	SHARED	Mud Resistivity	1.700	ohmm
	SHARED	Temperature of Mud	43.8	degF
	SHARED	Logging Interval is Cased?	No	
	SHARED	AHV Casing OD	4.500	in
	SHARED	Surface Temperature	50.0	degF
	SHARED	Total Well Depth	7728.00	ft
	SHARED	Bottom Hole Temperature	222.0	degF
	SHARED	Navigation and Survey Master Tool	NONE	
	SHARED	High Res Z Accelerometer Master Tool	GTET	
	SHARED	Temperature Master Tool	NONE	
	SHARED	Borehole Size Master Tool	NONE	
	GTET	Process Gamma Ray?	Yes	
	GTET	Gamma Tool Standoff	0.000	in

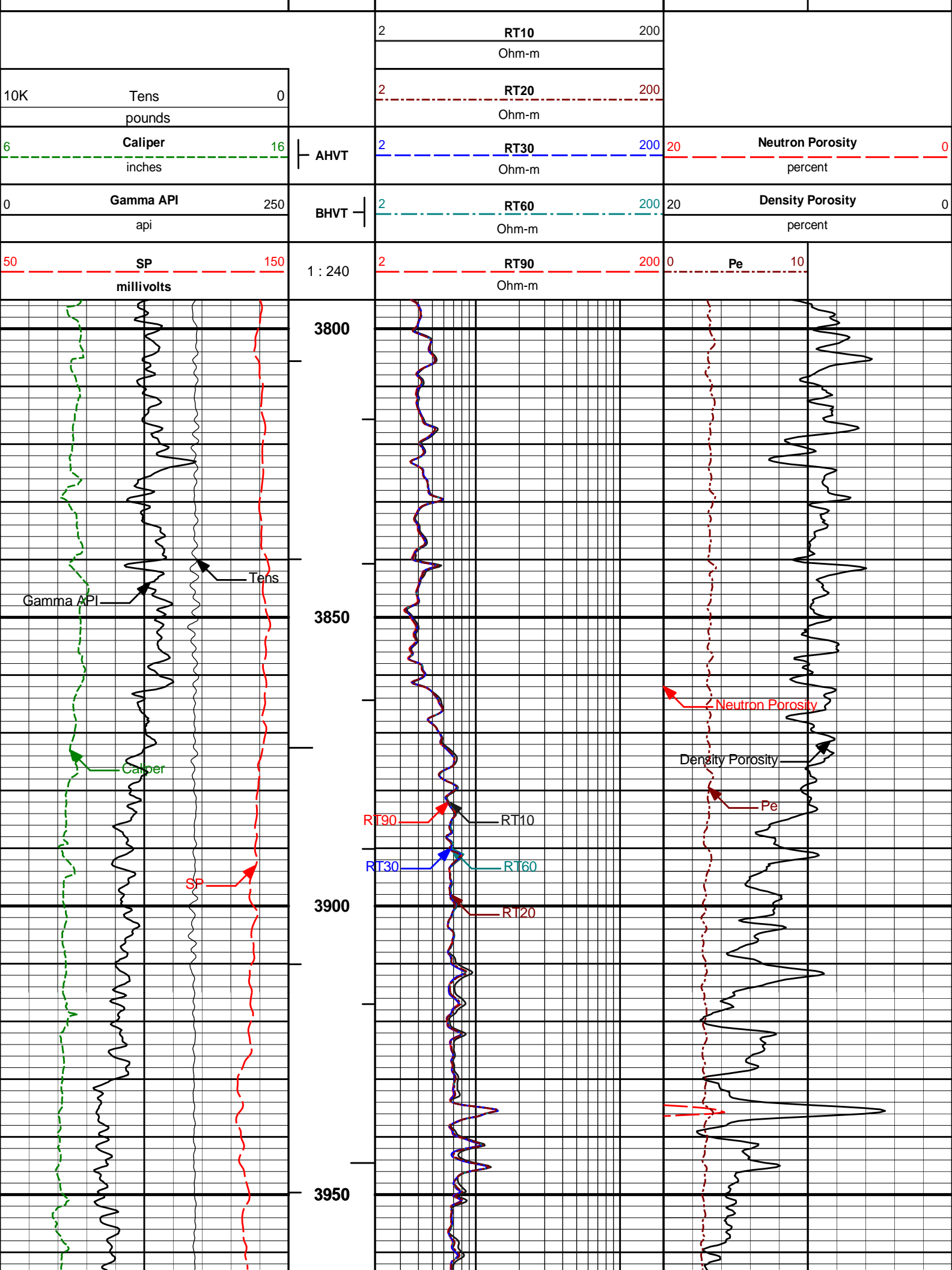
GTET	Process Gamma Ray EVR?	No	
GTET	Potassium	0.00	%
GTET	Mud Type	Natural	
GTET	Tool Position	Standoff	
CSNG	Process CSNG Data?	Yes	
CSNG	Is Tool Centralized?	No	
CSNG	Mud Type?	Natural	
CSNG	Percent K in Mud by Weight?	0.00	%
CSNG	Gamma Enviromental Corrections?	Yes	
CSNG	Barite Correction Factor	1.00	
DSNT	Process DSN?	Yes	
DSNT	Process DSN EVR?	No	
DSNT	Neutron Lithology	Sandstone	
DSNT	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.000	in
DSNT	Temperature Correction Type	None	
DSNT	DSN Pressure Correction Type	None	
DSNT	View More Correction Options	No	
DSNT	Use TVD for Gradient Corrections?	No	
DSNT	Logging Horizontal Water Tank?	No	
SDLT	Process Density?	Yes	
SDLT	Process Density EVR?	No	
SDLT	Is Hole Air Drilled?	No	
SDLT	Logging Calibration Blocks?	No	
SDLT	SDLT Pad Temperature Valid?	Yes	
SDLT	Disable temperature warning	No	
SDLT	Weighted Mud Correction Type?	None	
SDLT	Formation Density Matrix	2.680	g/cc
SDLT	Formation Density Fluid	1.000	g/cc
SDLT	Process Caliper Outputs?	Yes	
SDLT	Process MicroLog Outputs?	Yes	
ACRt	Process ACRt?	Yes	
ACRt	Minimum Tool Standoff	0.50	in
ACRt	Temperature Correction Source	FP Lwr & FP Up	
ACRt	Tool Position	Free Hanging	
ACRt	Rmud Source	Mud Cell	
ACRt	Minimum Resistivity for MAP	0.20	ohmm
ACRt	Maximum Resistivity for MAP	200.00	ohmm
ACRt	Threshold Quality	0.50	

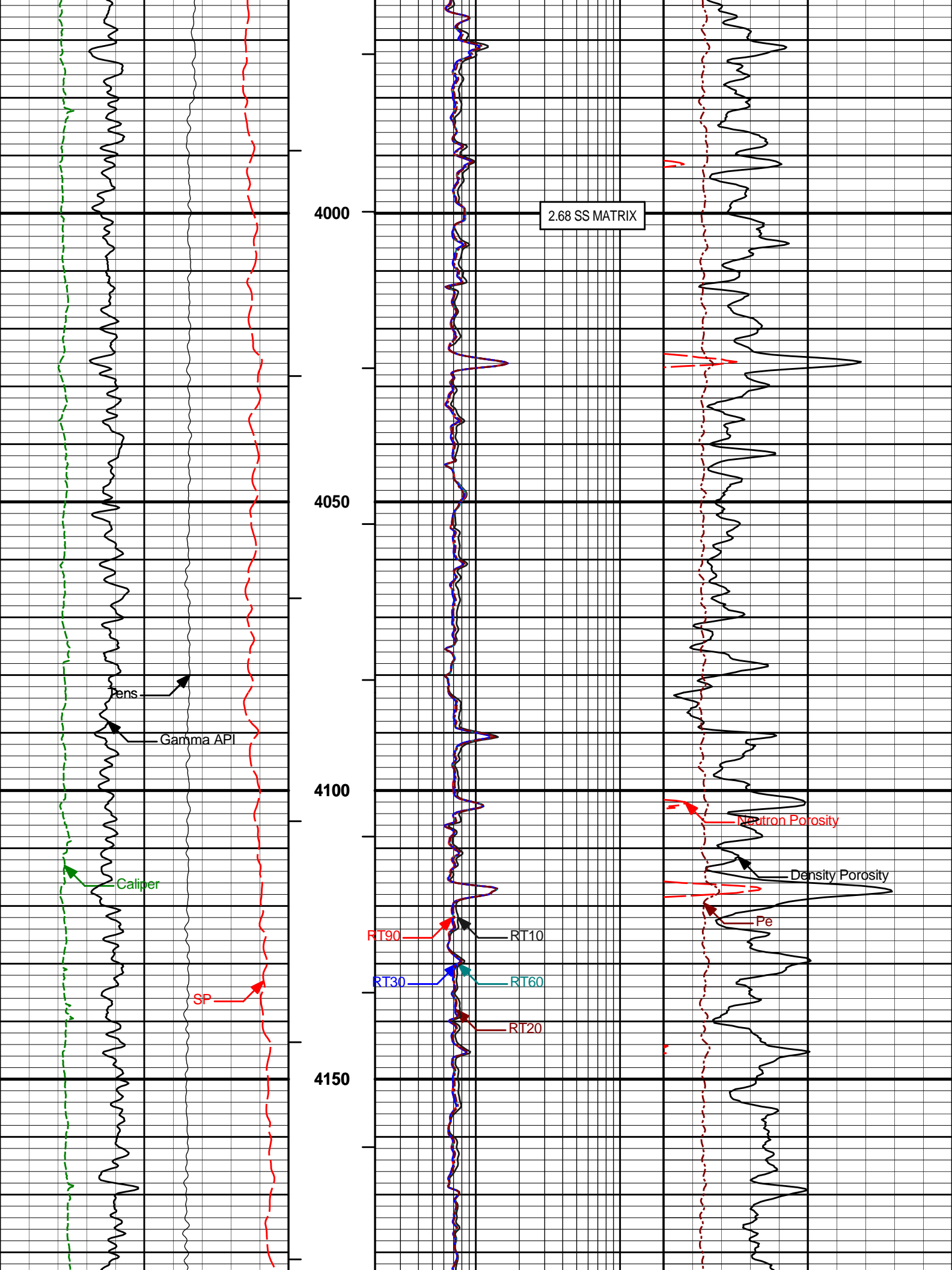


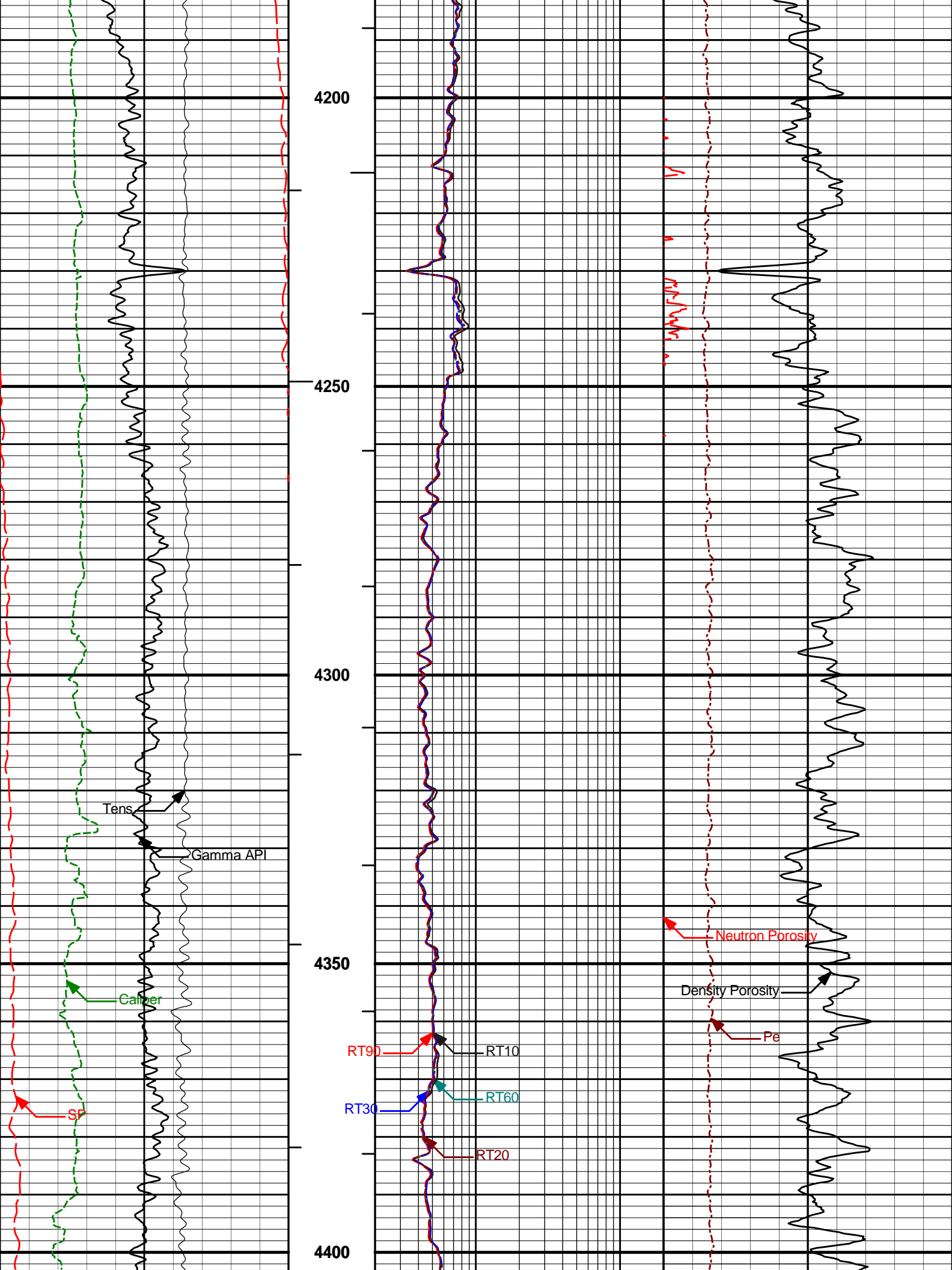
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 Plot File: \\COMP\PARK_SUS

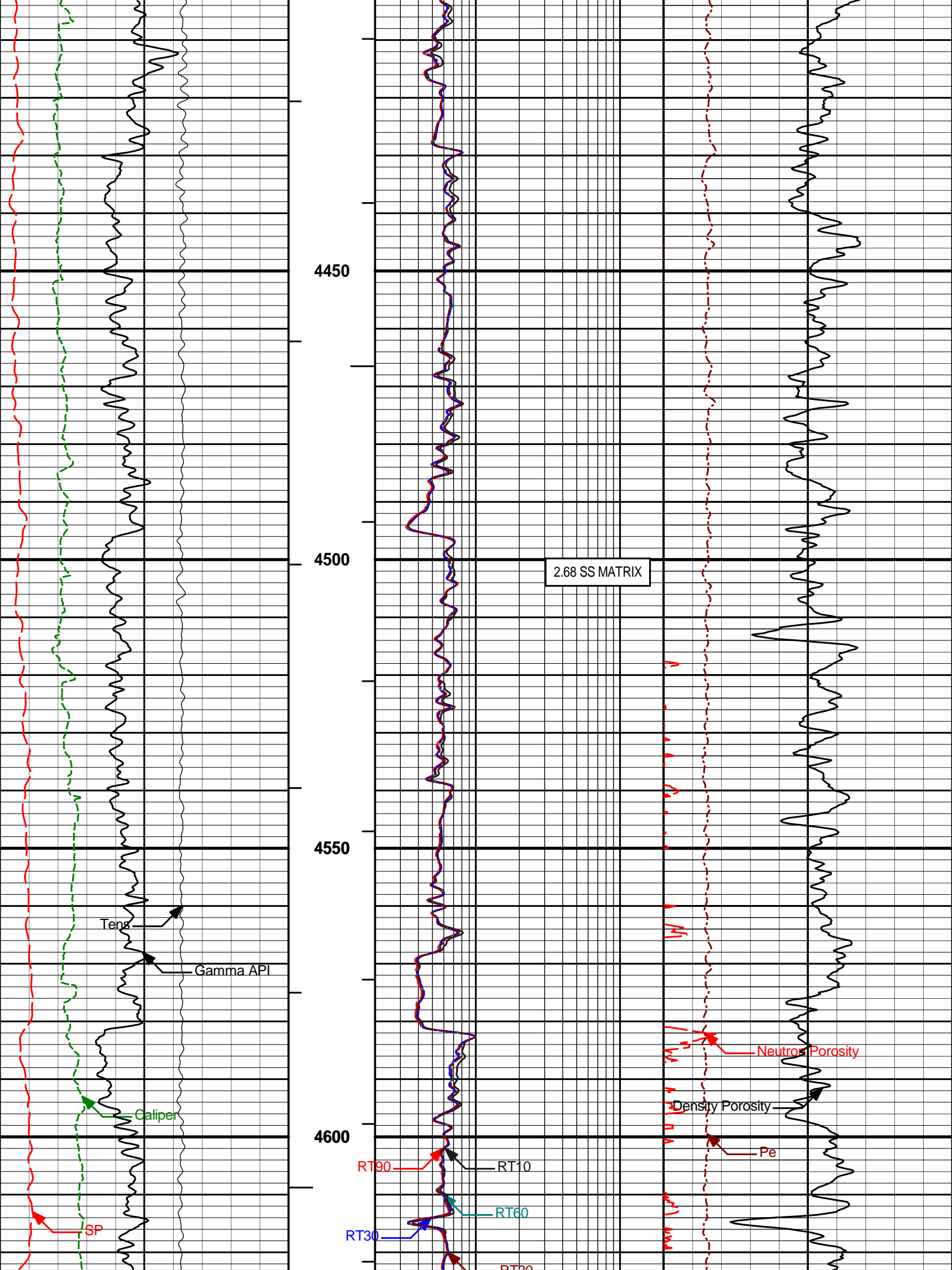
MAIN PASS 5" = 100'

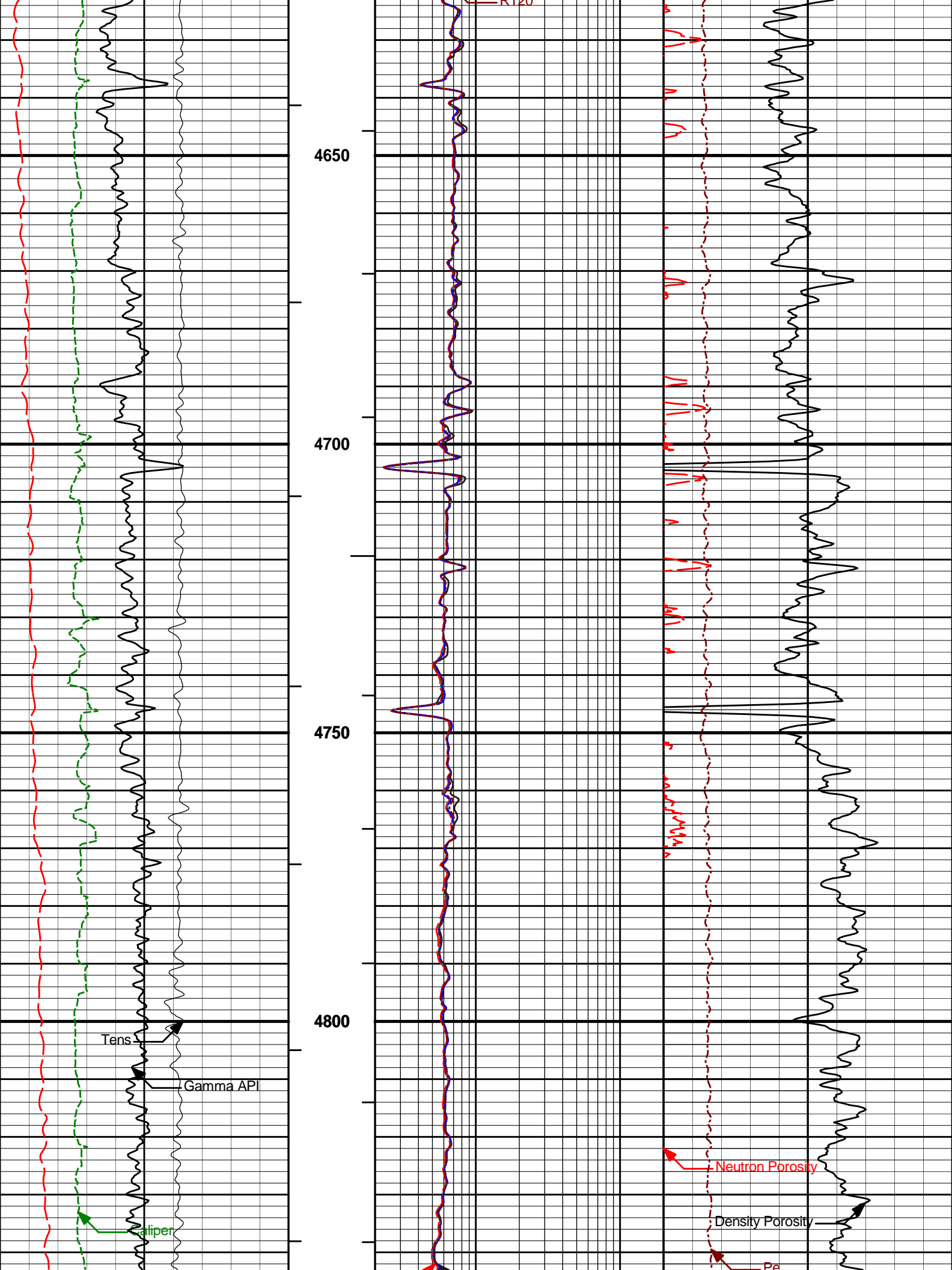
Track 1	Depth Track	Track 2	Track 5	Track 3
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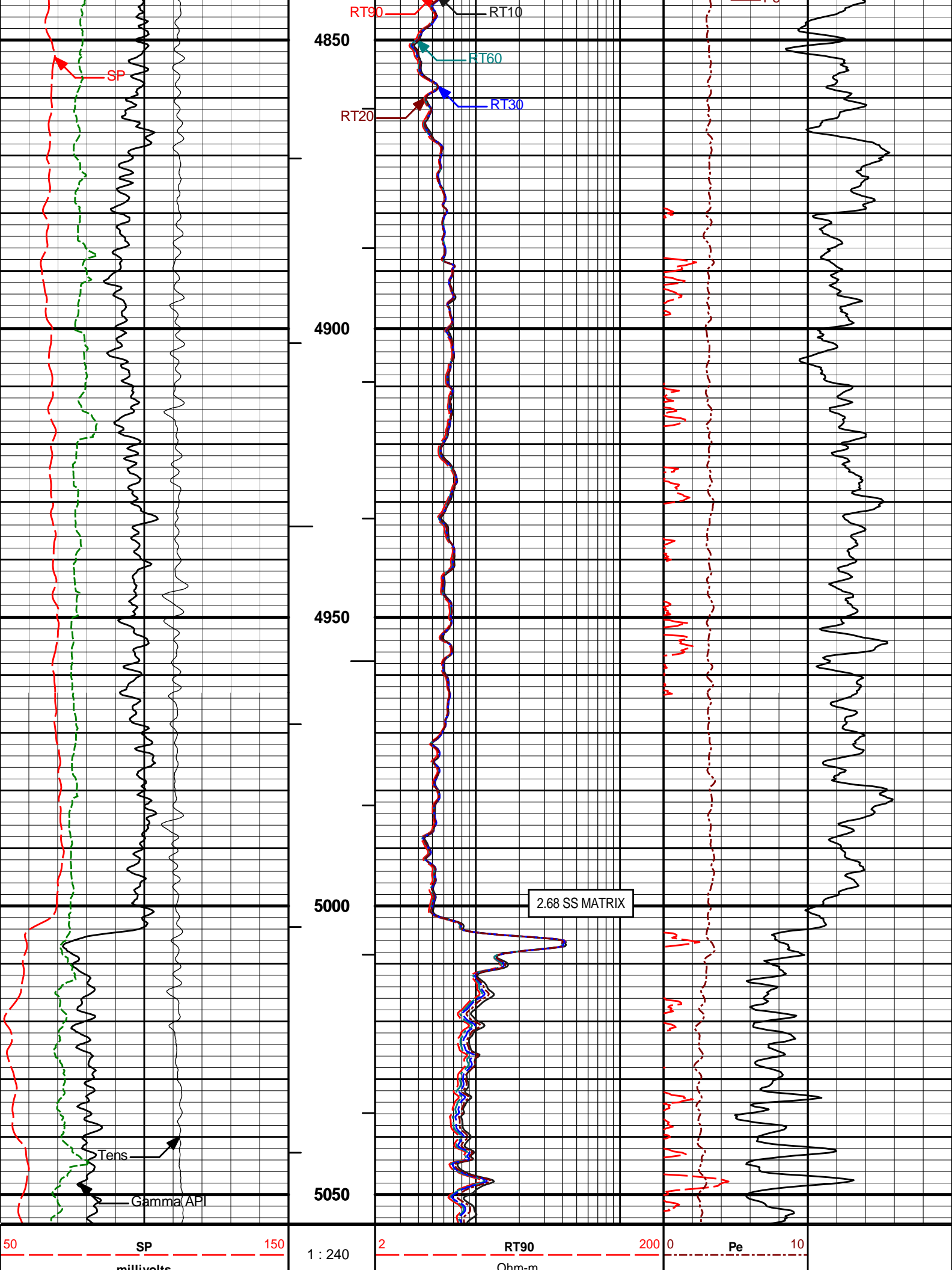












0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0		2	RT20	200			
	pounds				Ohm-m				
				2	RT10	200			
					Ohm-m				

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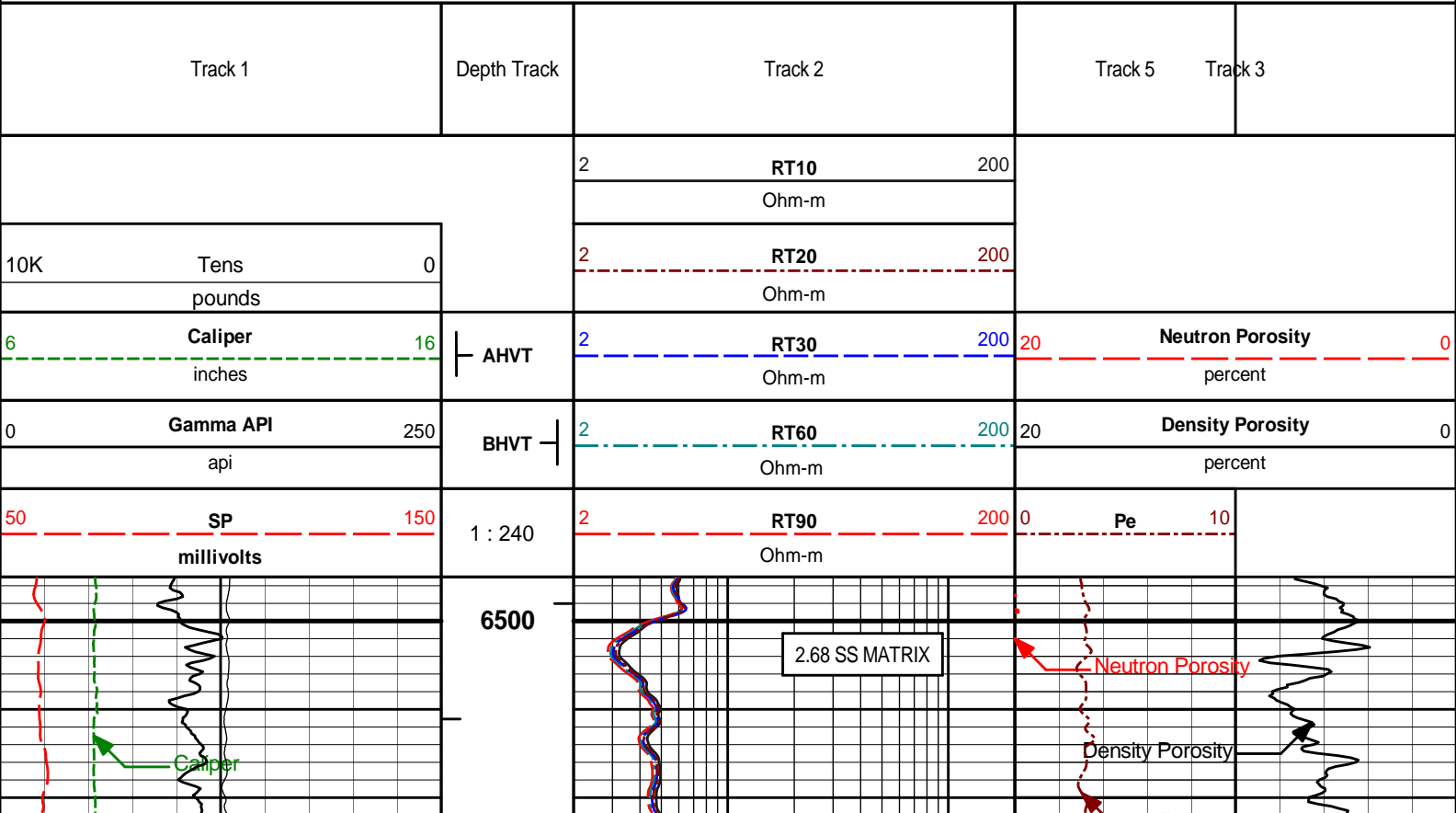
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Data: BOOTH_N25_33DWell Based\MAIN*
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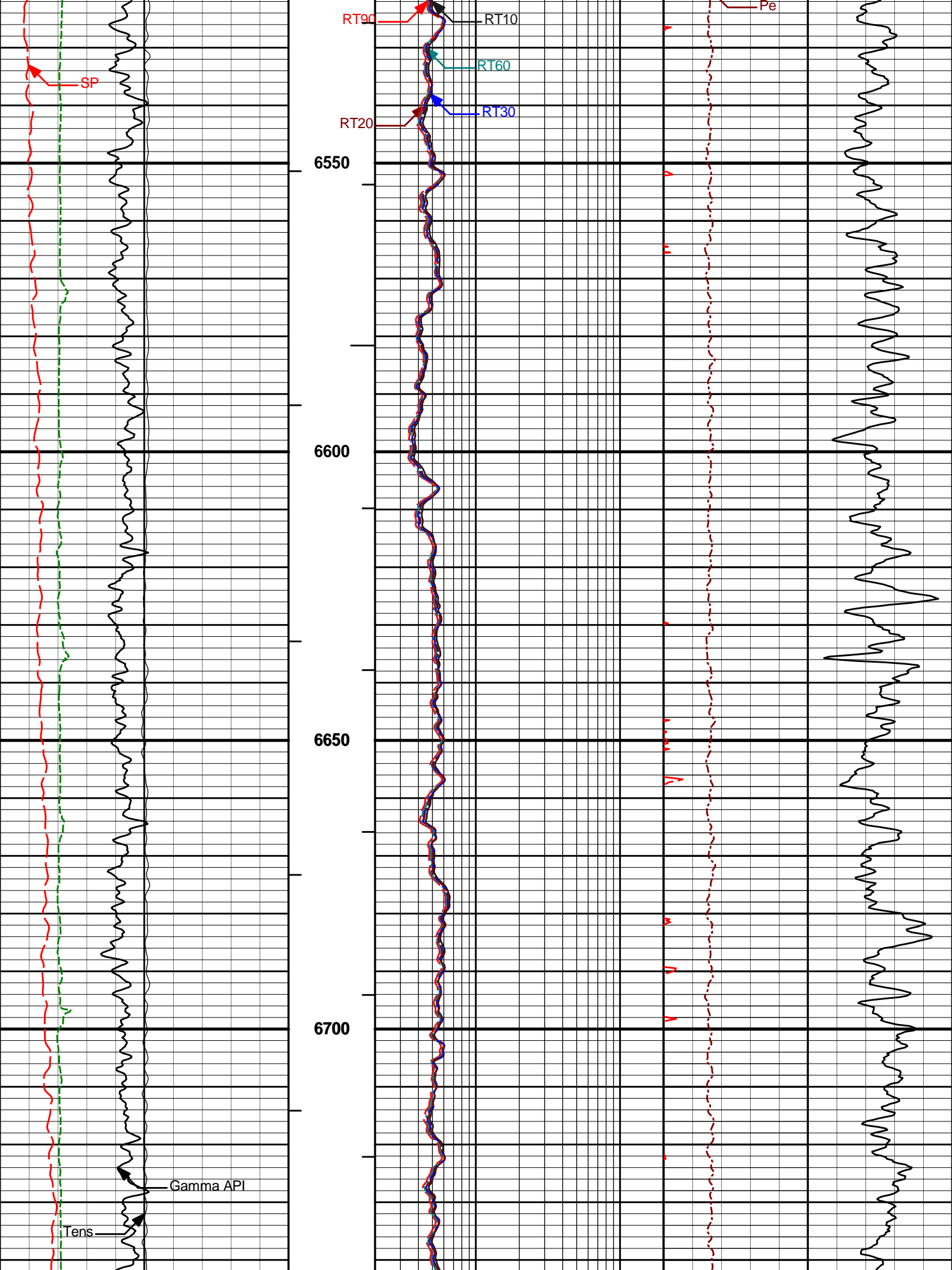
MAIN PASS 5" = 100'

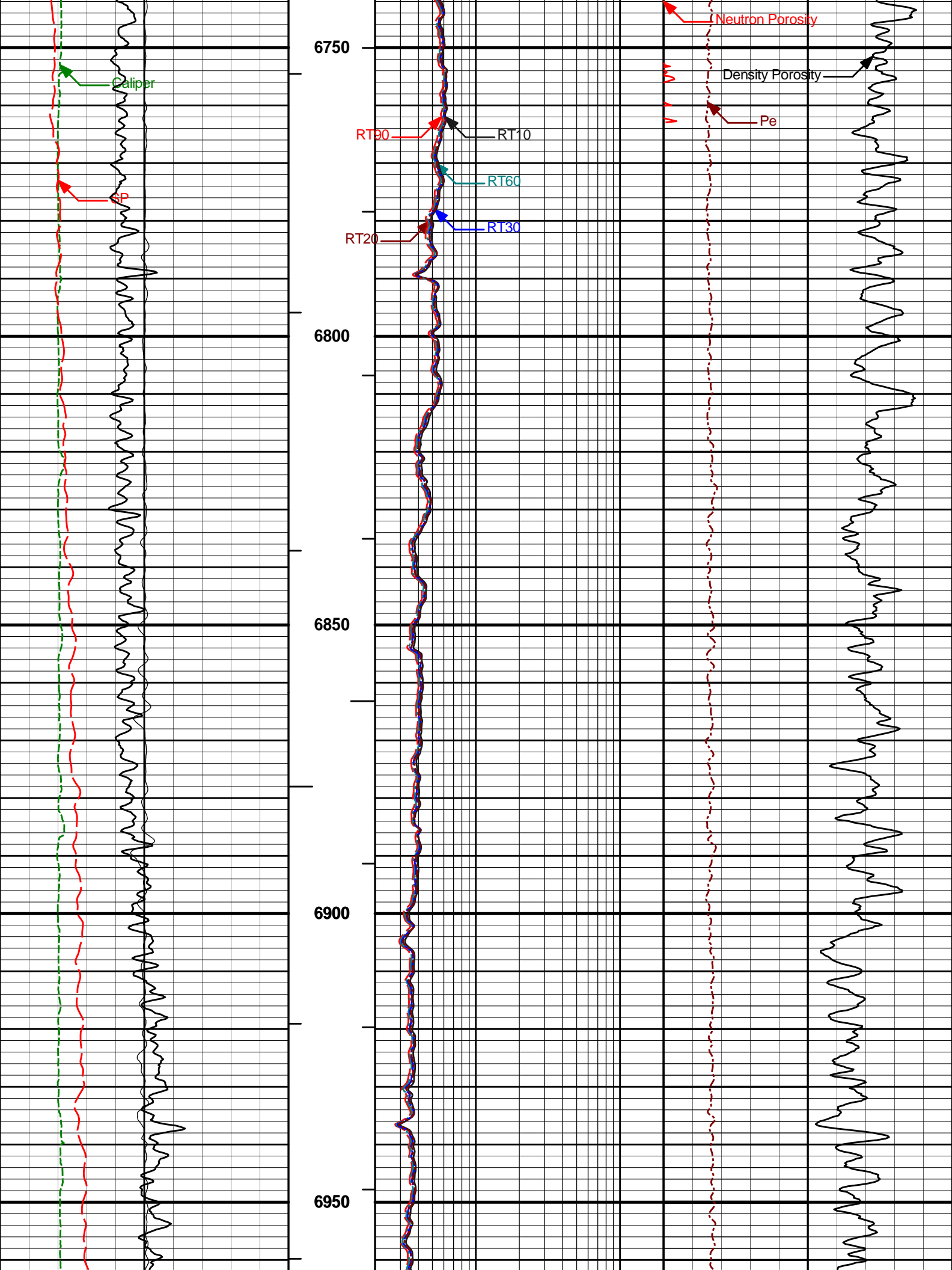
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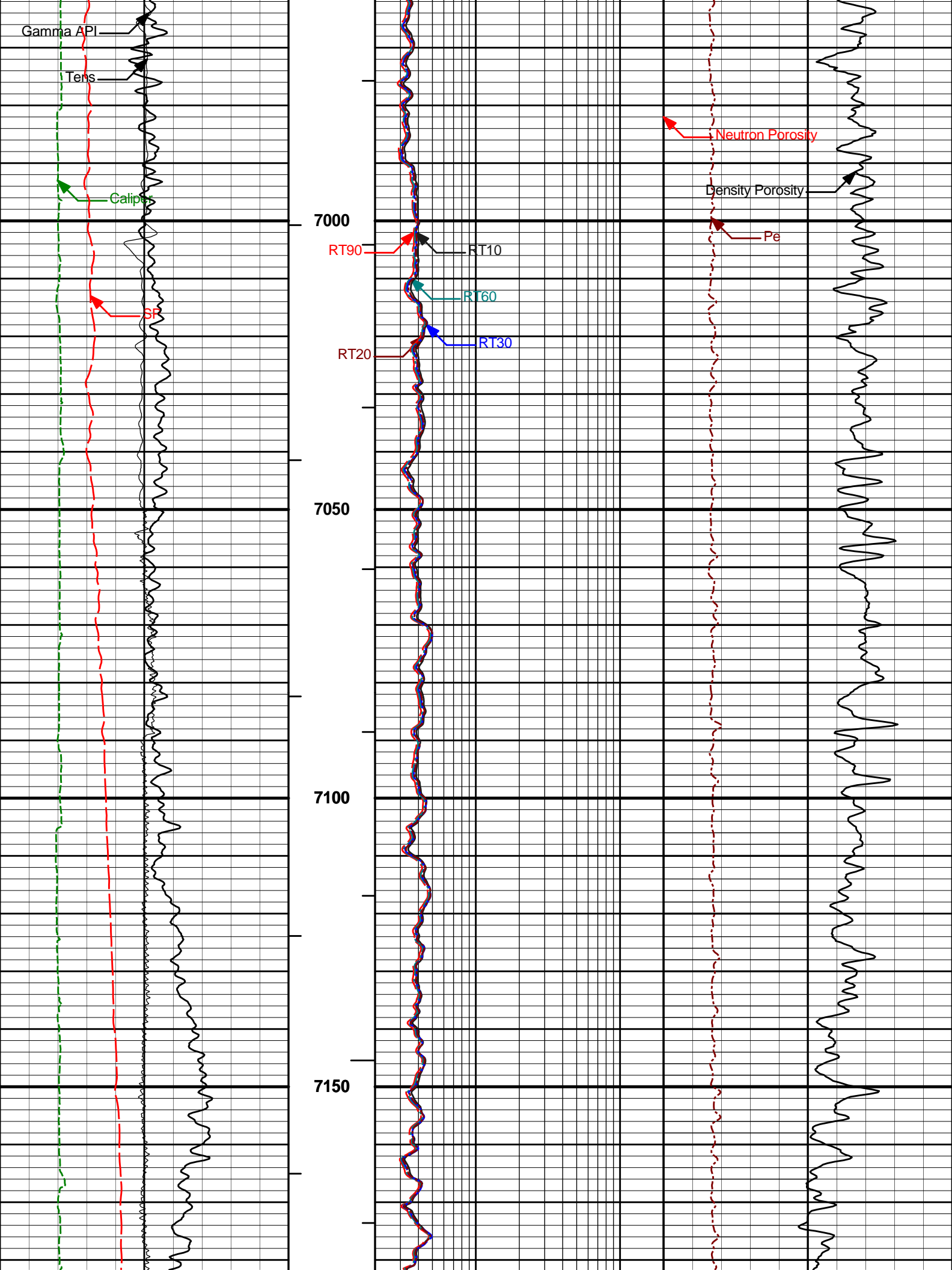
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Plot Range: 6495 ft to 7735.67 ft
Data: BOOTH_N25_33DWell Based\MAIN*
Plot File: \\COMP\NIO_COD

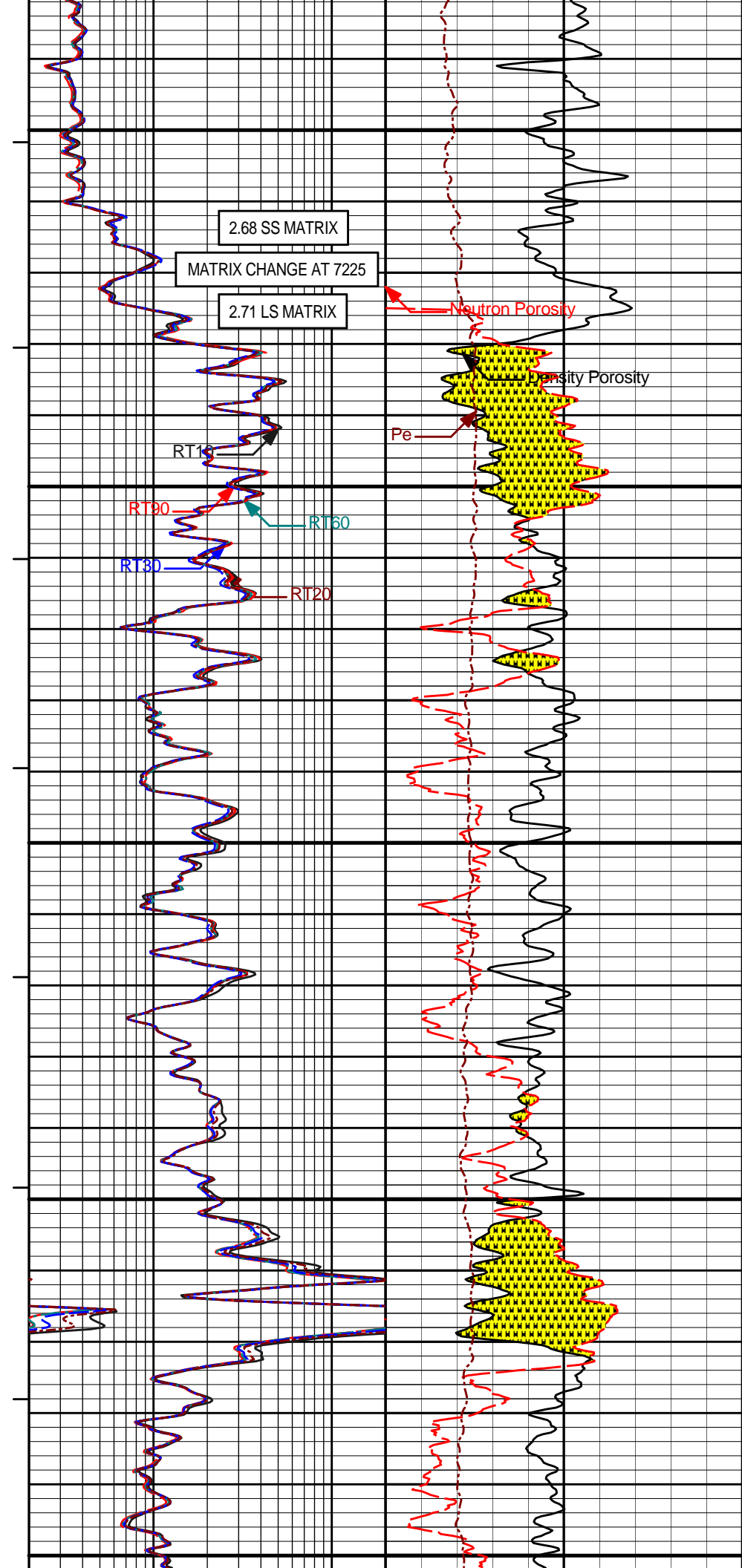
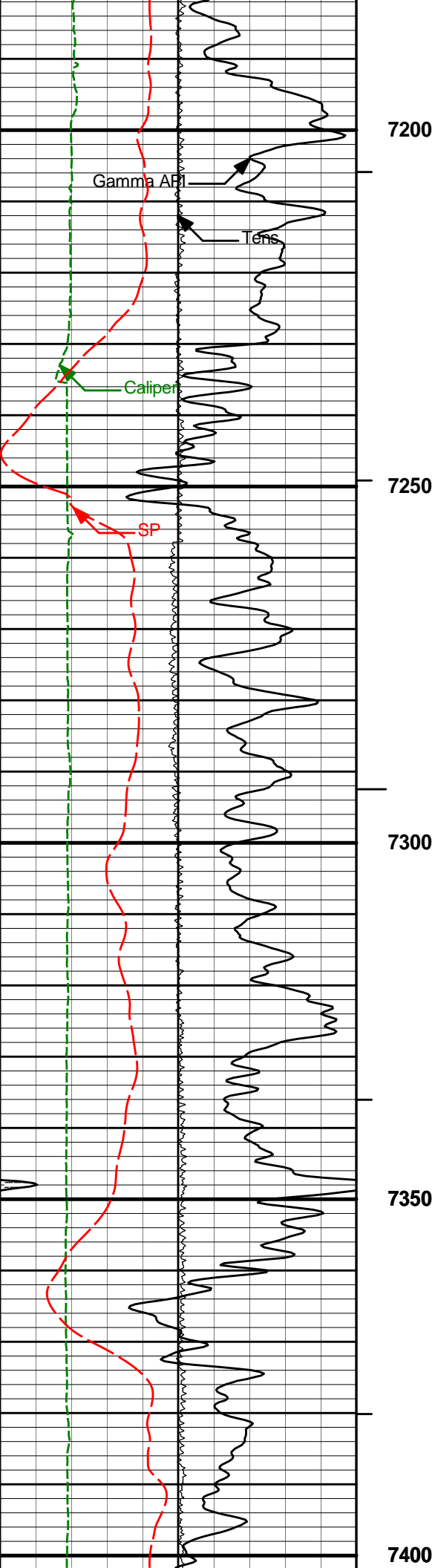
MAIN PASS 5" = 100'

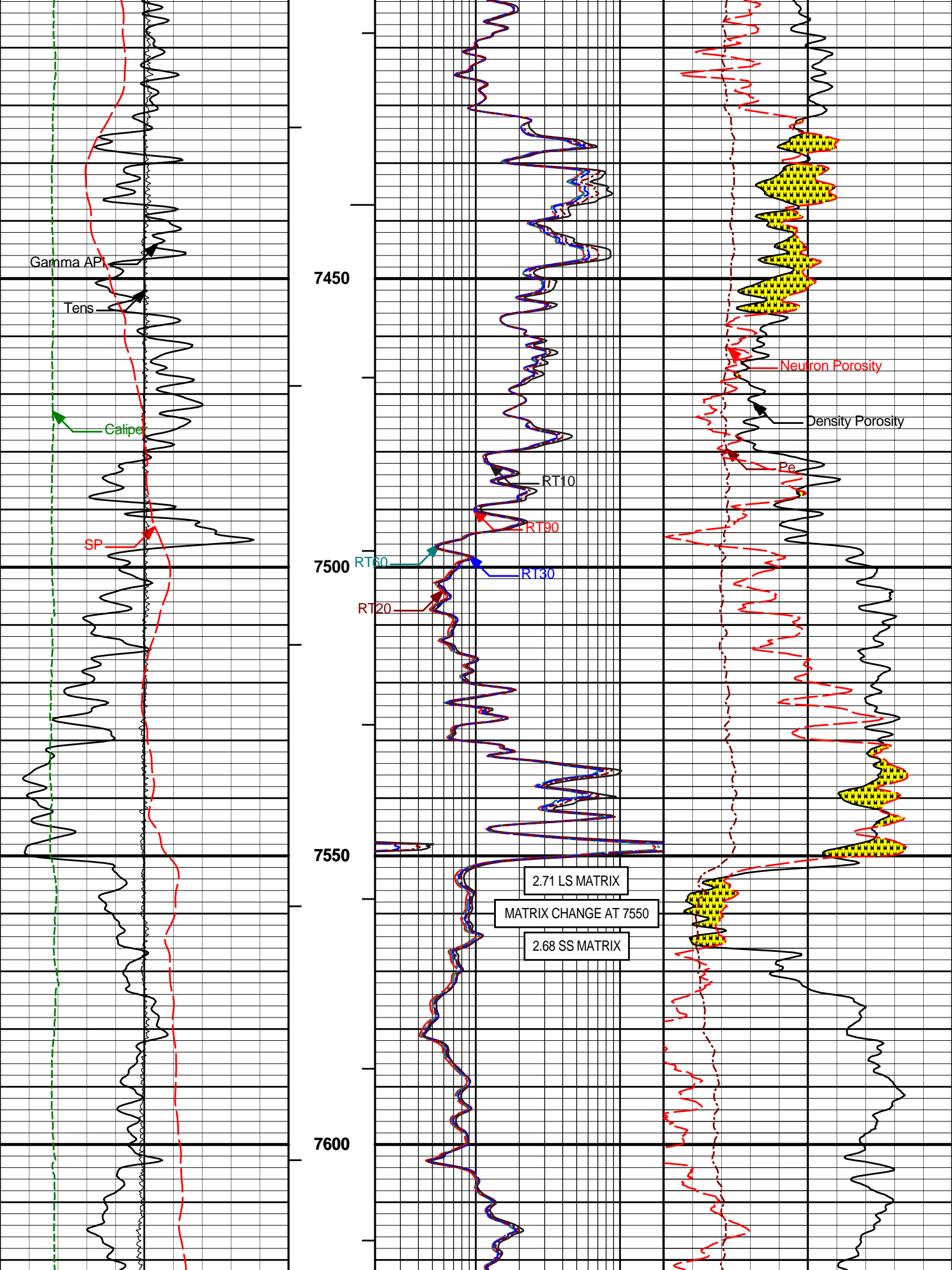


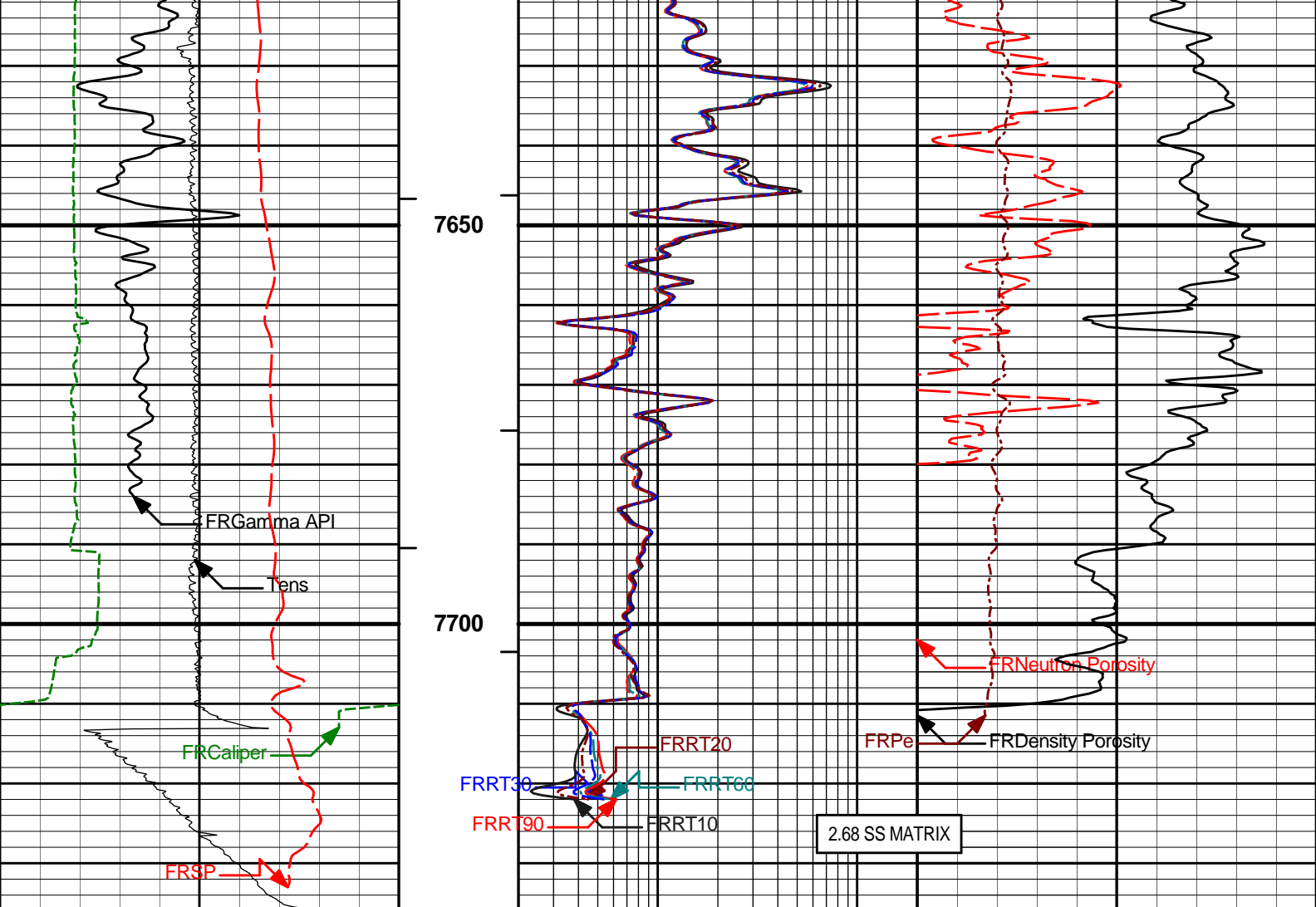












50	SP	150	1 : 240	2	RT90	200	0	Pe	10
	millivolts				Ohm-m				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0		2	RT20	200			
	pounds				Ohm-m				
				2	RT10	200			
					Ohm-m				

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Plot Time: 09-Feb-11 20:59:05
 Plot Range: 6495 ft to 7735.67 ft
 Data: BOOTH_N25_33D\Well Based\MAIN*
 Plot File: \COMP\NIO_COD

MAIN PASS 5" = 100'

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CALIBRATION REPORT

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION					
Tool Name:	GTET - 11215095	Reference Calibration Date:	29-Nov-10 15:50:18		
Engineer:	C. BLUE	Calibration Date:	11-Jan-11 17:38:46		
Software Version:	WL INSITE R3.0.7 (Build 3)	Calibration Version:	1		

Calibrator Source S/N: TB290			
Calibrator API Reference:235.00 api			
Measurement	Measured	Calibrated	Units
Background	74.1	73.9	api
Background + Calibrator	313.8	313.0	api
Calibrator	238.9	239.1	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION					
Tool Name:	GTET - 11215095	Reference Calibration Date:	11-Jan-11 17:38:46		
Engineer:	C. BLUE	Calibration Date:	09-Feb-11 13:15:26		
Software Version:	WL INSITE R3.0.7 (Build 3)	Calibration Version:	1		

Calibrator Source S/N: TB290			
Calibrator API Reference:235.00 api			
Field Verification	Shop	Field	Units
Background	73.9	72.0	api
Background + Calibrator	313.0	310.4	api
Calibrator	239.1	238.4	api
Shop	Field	Difference	Tolerance
239.1	238.4	0.7	+/- 9.00

CSNG-FS SHOP CALIBRATION			
Tool Name:	CSNG - 10965402	Reference Calibration Date:	24-Nov-10 09:04:15
Engineer:	C. BLUE	Calibration Date:	22-Jan-11 13:59:18
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 #	23.0	23.0	Channel #
583 KEV Peak Channel #	51.5	51.7	Channel #
2614 KEV Peak Channel #	211.3	211.8	Channel #
Calibrate Temperature	75.4	68.4	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	1577.7	CPS	324.0	334.8	API
Background	320.1	CPS	62.8	67.9	API

Gamma Ray Gain: 1.07
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 10965402

Reference Calibration Date: 22-Jan-11 13:59:18

Engineer: C. BLUE

Calibration Date: 09-Feb-11 13:31:37

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

Calibration Version: 1

Source SN:

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.0	23.0	Channel #
583 KEV Peak Channel #	51.7	51.5	Channel #
2614 KEV Peak Channel #	211.8	212.2	Channel #
Calibrate Temperature	68.4	64.9	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	1605.3	CPS	334.8	331.4	API
Background	312.5	CPS	67.9	64.5	API

Gamma Ray Gain: 1.04
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11219332

Reference Calibration Date: 11-Jan-11 18:09:27

Engineer: C. BLUE

Calibration Date: 11-Jan-11 18:24:20

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

Calibration Version: 1

Logging Source S/N: DSN430
Tank Serial Number: BRIGHTON
Reference value assigned to Tank: 55.000
Snow Block S/N: BRIGHTON
Calibration Tank Water Temperature: 40 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.995	0.998	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):	0.2287	0.2295	0.0008	+/- 0.0020
Calibrated Ratio:	10.32	10.35	0.028	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0747	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 - 11219332	Reference Calibration Date:	11-Jan-11 18:24:20
Engineer:	C. BLUE	Calibration Date:	09-Feb-11 13:40:01
Software Version:	WL INSITE R3.0.7 (Build 3)	Calibration Version:	1

Logging Source S/N: DSN430
Snow Block S/N: BRIGHTON

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0747	0.0781	0.0034	+/- 0.0150

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

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT - I332M335	Reference Calibration Date:	21-Jan-11 18:12:58
Engineer:	C. BLUE	Calibration Date:	21-Jan-11 18:32:31
Software Version:	WL INSITE R3.0.7 (Build 3)	Calibration Version:	1

Logging Source S/N: 5256GW
Aluminum Block S/N: BRIGHTON
Density: 2.600g/cc
Pe: 3.100
Magnesium Block S/N: BRIGHTON
Density: 1.680g/cc
Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0659	1.0701	0.90 - 1.10
Near Dens Gain	1.0257	1.0427	0.90 - 1.10
Near Peak Gain	1.0220	1.0433	0.90 - 1.10
Near Lith Gain	1.0083	1.0324	0.90 - 1.10
Far Bar Gain	1.0170	1.0152	0.90 - 1.10
Far Dens Gain	1.0083	1.0047	0.90 - 1.10
Far Peak Gain	1.0029	1.0006	0.90 - 1.10
Far Lith Gain	0.9847	0.9832	0.90 - 1.10
Near Bar Offset	-0.6266	-0.6647	NONE
Near Dens Offset	-0.2167	-0.3664	NONE
Near Peak Offset	-0.1735	-0.3516	NONE
Near Lith Offset	-0.0773	-0.2777	NONE
Far Bar Offset	-0.2049	-0.1899	NONE
Far Dens Offset	-0.1331	-0.0993	NONE
Far Peak Offset	-0.0990	-0.0807	NONE
Far Lith Offset	0.0257	0.0358	NONE

Near Bar Background	1069.73	1071.20	700 - 1450
Near Dens Background	350.53	351.42	230 - 480
Near Peak Background	153.87	152.84	100 - 210
Near Lith Background	187.53	186.92	125 - 260
Far Bar Background	558.10	557.96	450 - 900
Far Dens Background	217.51	219.17	175 - 345
Far Peak Background	84.73	84.91	70 - 140
Far Lith Background	89.97	89.66	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.676	1.681	0.005	+/- 0.015
Pe	2.627	2.586	-0.041	+/- 0.150
ALUMINUM				
Density (g/cc)	2.601	2.600	-0.001	+/- 0.01500
Pe	3.096	3.091	-0.005	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0006	+/- 0.0110	0.0014	+/- 0.0140
Magnesium Block	-0.0009	+/- 0.0110	-0.0017	+/- 0.0140
Aluminum Block	0.0016	+/- 0.0110	-0.0005	+/- 0.0140
Resolution	9.10	6.00 - 11.50	9.67	6.00 - 11.50
Internal Verifier(B+D+P+L)	1762	1200 - 2700	952	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 - I332M335

Reference Calibration Date: 21-Jan-11 18:32:31

Engineer: C. BLUE

Calibration Date: 09-Feb-11 13:14:26

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

Calibration Version: 1

Pad Temperature: 61.1 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1762.380	1758.812	-3.568	16.832
Far (B+D+P+L) cps	951.703	955.039	3.336	16.634
Near Resolution	9.10	9.12	0.020	0.50
Far Resolution	9.67	9.65	-0.020	1.00

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

DENSITY CALIPER SHOP CALIBRATION				
Tool Name: SDLT - I332M335		Reference Calibration Date: 09-Feb-11 13:24:58		
Engineer: C. BLUE		Calibration Date: 09-Feb-11 13:30:01		
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	-1375.90	-1451.15	-7000.00 - -1000.00	
Pad Gain	0.0003826	0.0003886	0.000200 - 0.000600	
Arm Offset	-2906.27	-2847.48	-5000.00 - 3000.00	
Arm Gain	0.0005796	0.0005794	0.000300 - 0.000700	
Arm Power	-0.000006712	-0.000006689	-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)	3.72	3.75	0.03	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.49	6.50	0.01	+/- 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 - I332M335		Reference Calibration Date: 09-Feb-11 13:30:01		
Engineer: C. BLUE		Calibration Date: 09-Feb-11 13:32:13		
Software Version: WL INSITE R3.0.7 (Build 3)		Calibration Version: 1		

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.26	0.01	+/- 0.15

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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION				
Tool Name: ACRt - E9336-S4042		Reference Calibration Date: 29-Nov-10 10:05:24		

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0124	1.05	0.95	1.0112	1.05	0.95	1.0087	1.05
A2 (50")	0.95	0.9999	1.05	0.95	0.9994	1.05	0.95	0.9992	1.05
A3 (29")	0.95	1.0027	1.05	0.95	1.0017	1.05	0.95	0.9984	1.05
A4 (17")	0.95	0.9959	1.05	0.95	0.9923	1.05	0.95	0.9933	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9818	1.05	0.95	0.9804	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9703	1.05	0.95	0.9694	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	0.658	2	-6	-3.458	-2	-8	-5.078	-2
A2 (50")	-7	-1.854	-1	-6	-3.756	-2	-7	-4.493	-2
A3 (29")	-27	-13.021	-9	-9	-3.753	-3	-7	-3.013	-1
A4 (17")	-180	-98.689	-60	-45	-31.432	-15	-39	-25.166	-13
A5 (10")	N/A	N/A	N/A	-150	-69.697	-50	-80	-36.680	-10
A6 (6")	N/A	N/A	N/A	175	268.707	525	90	139.940	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.8512	1.3
36K	1.0	1.8893	2.0
72K	1.0	1.0922	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.008	1.05

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11215095						
Gamma Ray Calibrator	239.1	238.4	-----	0.7	+/- 9.00	api
CSNG-10965402						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.0	23.0	-----	0.0	-----	Channel #
583 KEV Peak Channel #	51.7	51.5	-----	0.2	-----	Channel #
2614 KEV Peak Channel #	211.8	212.2	-----	-0.4	-----	Channel #
DSNT-11219332						
Snow-Block Porosity	0.0747	0.0781	-----	-0.0034	+/- 0.0150	decp
SDLT-I332M335						
Near(B+D+P+L)	1762.380	1758.812	-----	3.568	+/-16.832	cps
Far(B+D+P+L)	951.703	955.039	-----	-3.336	+/-16.634	cps
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.26	-----	-0.010	+/-0.15	in
ACRt-E9336-S4042						
Mud Cell	1.008	-----	-----	0.000	-----	ohm-m

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-10895163 135.00 lbs		Ø 3.625 in →		← Load Cell @ 59.34 ft ← BH Temperature @ 58.77 ft	6.25 ft	63.02 ft
GTET-11215095 165.00 lbs		Ø 3.625 in →		← GammaRay @ 50.71 ft	8.52 ft	56.77 ft
CSNG-10965402 114.00 lbs		Ø 3.625 in →		← CSNG @ 42.62 ft	8.17 ft	48.25 ft
						40.08 ft
DSNT-11219332 174.00 lbs	DSN Decentralizer- 10813523 6.60 lbs	Ø 3.625 in* → Ø 3.625 in →		← DSN Far @ 33.15 ft ← DSN Near @ 32.40 ft	9.69 ft	30.40 ft
SDLT-I332M335 360.00 lbs		Ø 4.500 in → Ø 4.750 in →		SDL Microlog @ 22.58 ft SDL Caliper @ 22.40 ft SDL @ 22.39 ft	10.81 ft	19.58 ft
				← Mud Resistivity @ 13.19 ft		

ACRt-E9336-S4042
250.00 lbs

Ø 3.625 in →

← ACRt @ 9.21 ft

19.25 ft

SP Ring-1
0.00 lbs

Ø 3.625 in* →

← SP @ 1.61 ft

Bull Nose-BN
5.00 lbs

Ø 2.750 in →

0.33 ft

0.33 ft

0.00 ft

Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head		10895163	135.00	6.25	56.77	300.00
GTET	Gamma Telemetry Tool		11215095	165.00	8.52	48.25	60.00
CSNG	Compensated Spectral Natural Gamma		10965402	114.00	8.17	40.08	15.00
DSNT	Dual Spaced Neutron		11219332	174.00	9.69	30.40	60.00
DCNT	DSN Decentralizer		10813523	6.60	5.13	*	33.73
SDLT	Spectral Density Tool		I332M335	360.00	10.81	19.58	60.00
ACRt	Array Compensated True Resistivity		E9336-S4042	250.00	19.25	0.33	300.00
SP	SP Ring		1	0.00	0.25	*	1.61
BLNS	Bull Nose		BN	5.00	0.33	0.00	300.00
Total				1,209.60	63.02		
* Not included in Total Length and Length Accumulation.							
Data: BOOTH_N25_33D\0001 NOBLE\IDLE						Date: 09-Feb-11 18:15:59	

COMPANY	NOBLE ENERGY		
WELL	BOOTH N25-33D		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY	