

HALLIBURTON

SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY

COMPANY		NOBLE ENERGY INC	
WELL		STARKE Y20-03	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date	19-Jan-12		
Run No.	ONE		
Depth - Driller	7768.00 ft		
Depth - Logger	7768.0 ft		
Bottom - Logged Interval	7758.79 ft		
Top - Logged Interval	955 ft		
Casing - Driller	8.625 in @ 955.0 ft		
Casing - Logger	955.0 ft		
Bit Size	7.875 in		
Type Fluid in Hole	WATER BASED MUD		
Density	9.9 ppq	52.00	s/qt
PH	8.00 pH	16.0	cp/m
Source of Sample	MUD CELL		
Rm @ Meas. Temperature	0.820 ohmm @ 104.60 degF		
Rmf @ Meas. Temperature	0.95 ohmm @ 75.00 degF		
Rmc @ Meas. Temperature	1.001 ohmm @ 75.00 degF		
Source Rmf	CHART	CHART	
Rm @ BHT	0.41 ohmm @ 214.0 degF		
Time Since Circulation	6.1 hr		
Time on Bottom	19-Jan-12 08:19		
Max. Rec. Temperature	214.0 degF @ 7768.0 ft		
Equipment	11454566	BRIGHTON	
Recorded By	C. BLUE		
Witnessed By	J. KANWISCHER		

API No. 05123329530000
Location SHL: 661 FNL & 1941 FWL NENW
LAT: 40.129400
LONG: -104.577770

Other Services:
RWCH
CSNG

Fold here

Service Ticket No.: N/A				API Serial No.: 05123329530000				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 584-585	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.	11259758		Serial No.			Serial No.	10951319		Serial No.	10935690				
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.	102A		Spacing			Log Type	GAM/GAM		Log Type	NEU/NEU				
Type	SCINT					Source Type	Cs137		Source Type	Am241Be				
Length	8"		LSA [Y/N]			Serial No.	5256 GW		Serial No.	DSN 430				
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	7559	REC	0	250				20%	0%	2.65 g/cc	20%	0%	SAND		
ONE	7559	7095	REC	0	250				20%	0%	2.68 g/cc	20%	0%	SAND		
ONE	7095	6800	REC	0	250				20%	0%	2.71 g/cc	20%	0%	LIME		
ONE	6800	CSG	REC	0	250				20%	0%	2.68 g/cc	20%	0%	SAND		
DIRECTIONAL INFORMATION																
Maximum Deviation									@	KOP						@
Remarks: RWCH/CSNG/DSNT/ACRT RAN IN COMBINATION																
ANNULAR HOLE VOLUME CALCULATED USING 4.5 IN PRODUCTION CASING																
TENSION PULLS, WASHOUTS, AND BOREHOLE RUGOSITY AFFECT TOOL RESPONSE																
CREW: J. WALKER, N. GOULD																
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.																
HALLIBURTON																

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
6800.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
7095.00					
	SDLT Pad	DMA	Formation Density Matrix	2.680	g/cc
7559.00					
	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	9.900	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	0.820	ohmm
	SHARED	TRM	Temperature of Mud	104.6	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	47.0	degF
	SHARED	TD	Total Well Depth	10000.00	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 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	2.650	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 Up	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
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

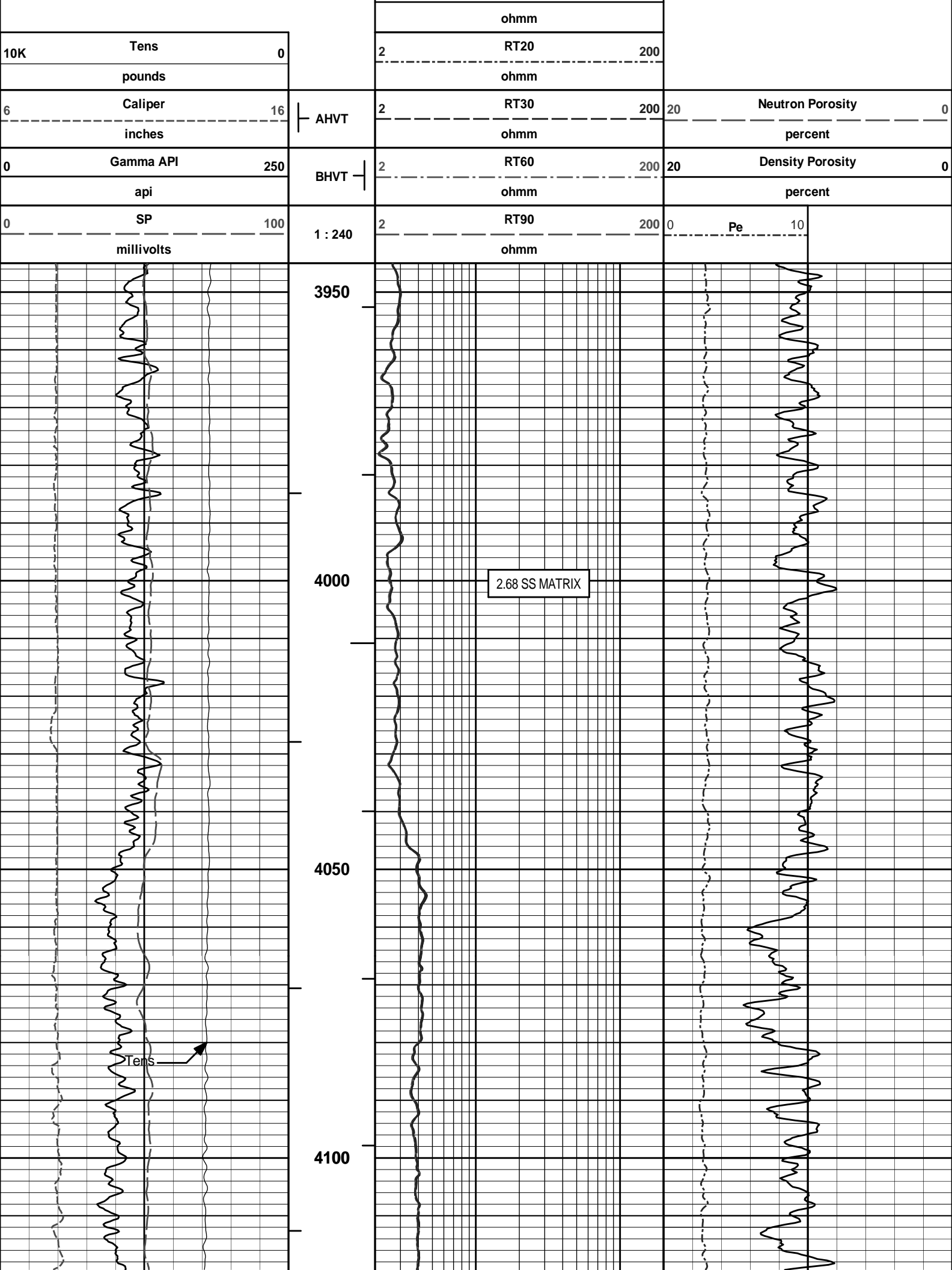
Data: STARKE_Y20_03\0001 NOBLE\002.01 19-Jan-12 09:56 Up

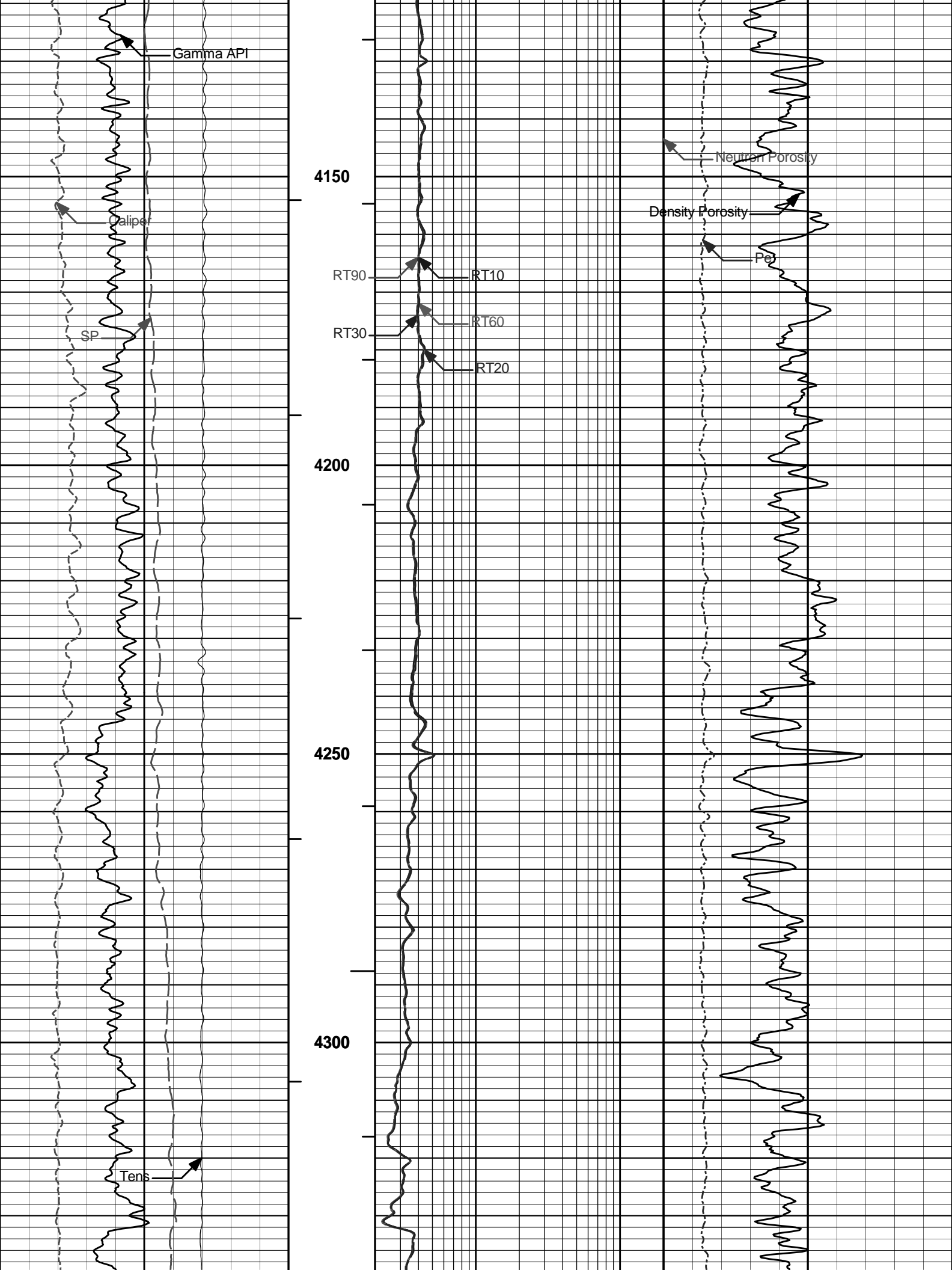
Date: 19-Jan-12 10:31:23

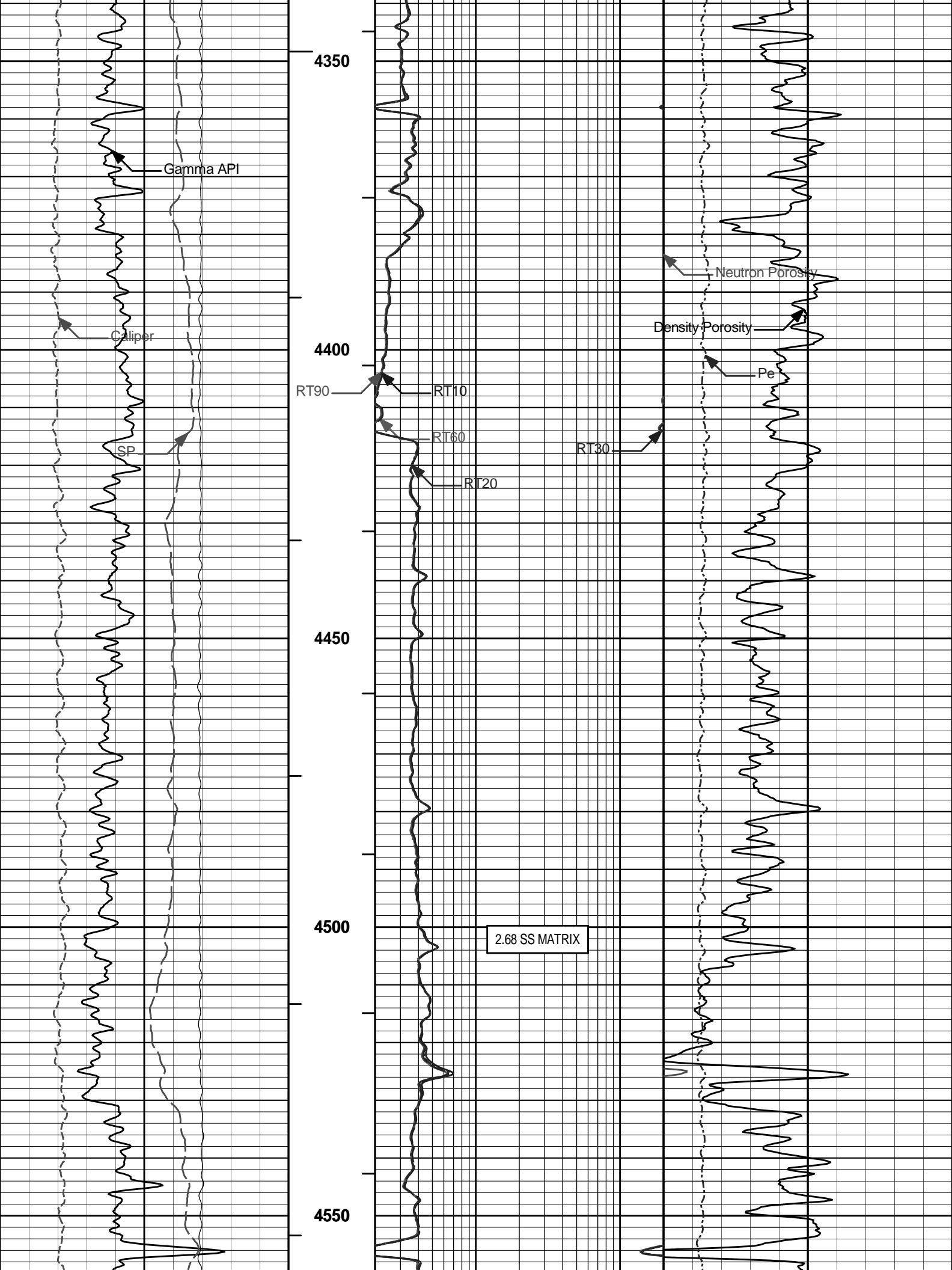
HALLIBURTON

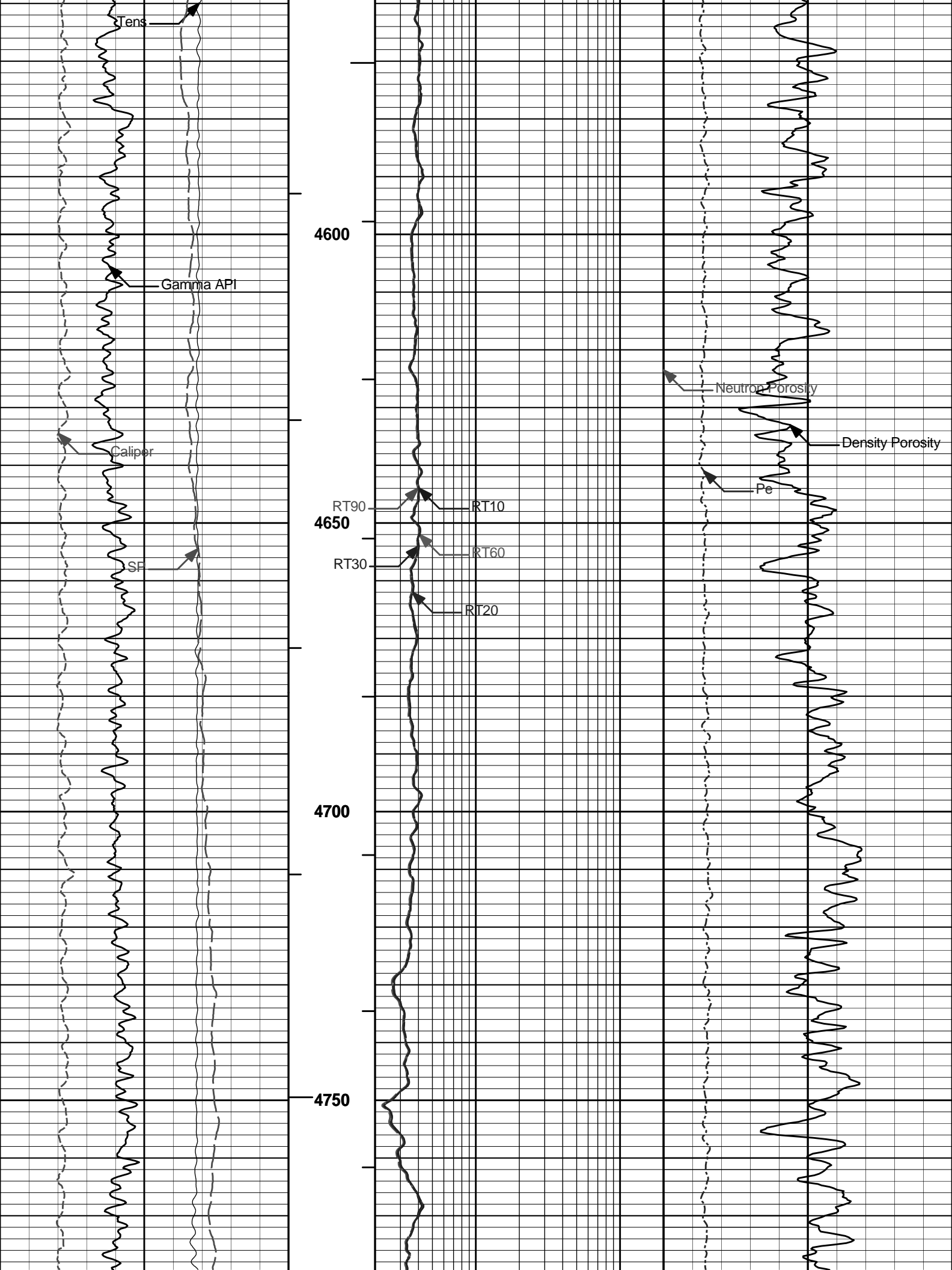
Plot Time: 19-Jan-12 10:48:53
Plot Range: 3945 ft to 5005 ft
Data: STARKE_Y20_03\Well Based\MAIN*
Plot File: \COMP\SUSX-PARK

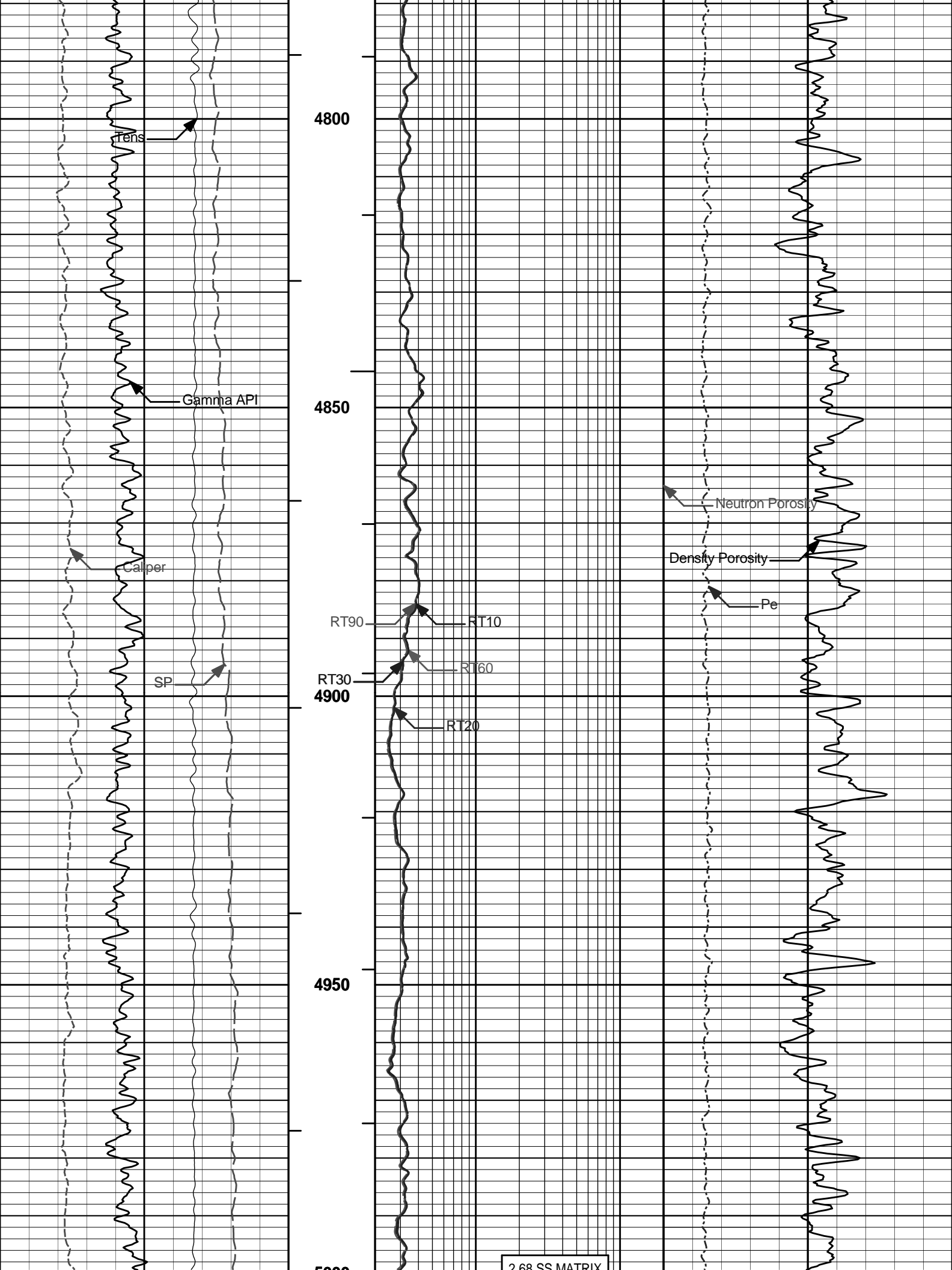
MAIN PASS 5" = 100'











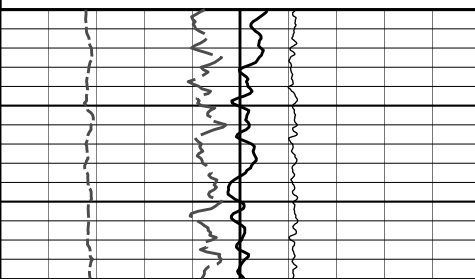
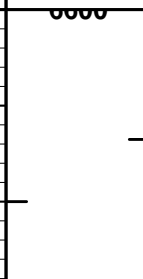
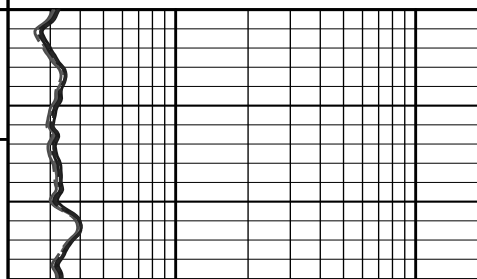
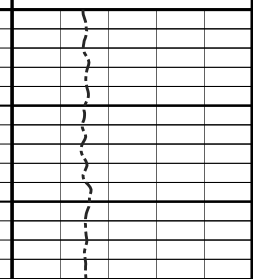
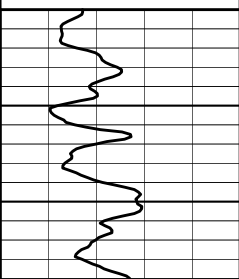
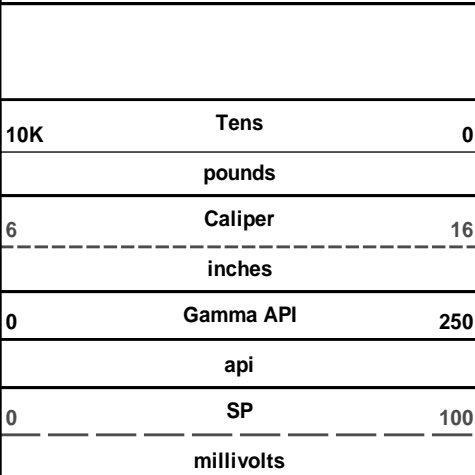
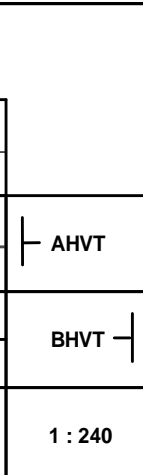
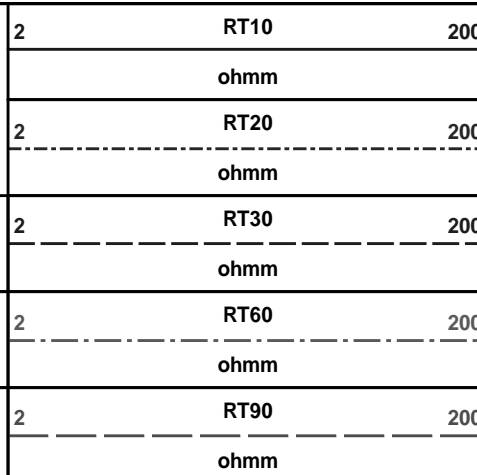
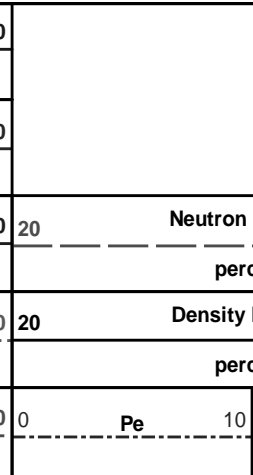
			5000			2.00 SS MATRIX					
0	SP	100	1 : 240	2	RT90	200	0	Pe	10		
millivolts				ohmm							
0	Gamma API	250	BHVT	2	RT60	200	Density Porosity		0		
api				ohmm			percent				
6	Caliper	16	AHVT	2	RT30	200	Neutron Porosity		0		
inches				ohmm			percent				
10K	Tens	0		2	RT20	200					
pounds				ohmm							
				2	RT10	200					
				ohmm							

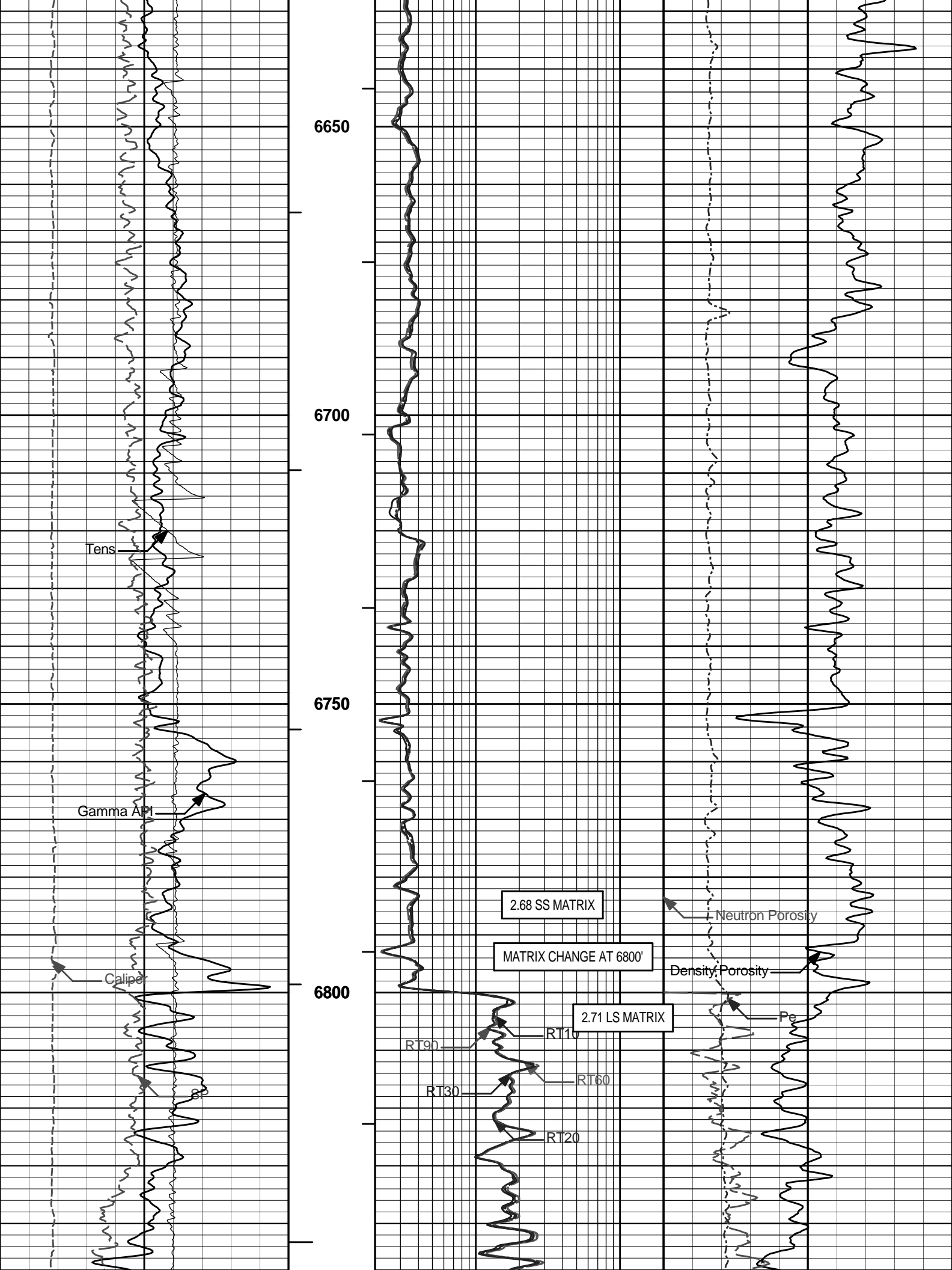
HALLIBURTON			Plot Time: 19-Jan-12 10:48:55 Plot Range: 3945 ft to 5005 ft Data: STARKE_Y20_03\Well Based\MAIN* Plot File: \\COMP\SUSX-PARK								
--------------------	--	--	--	--	--	--	--	--	--	--	--

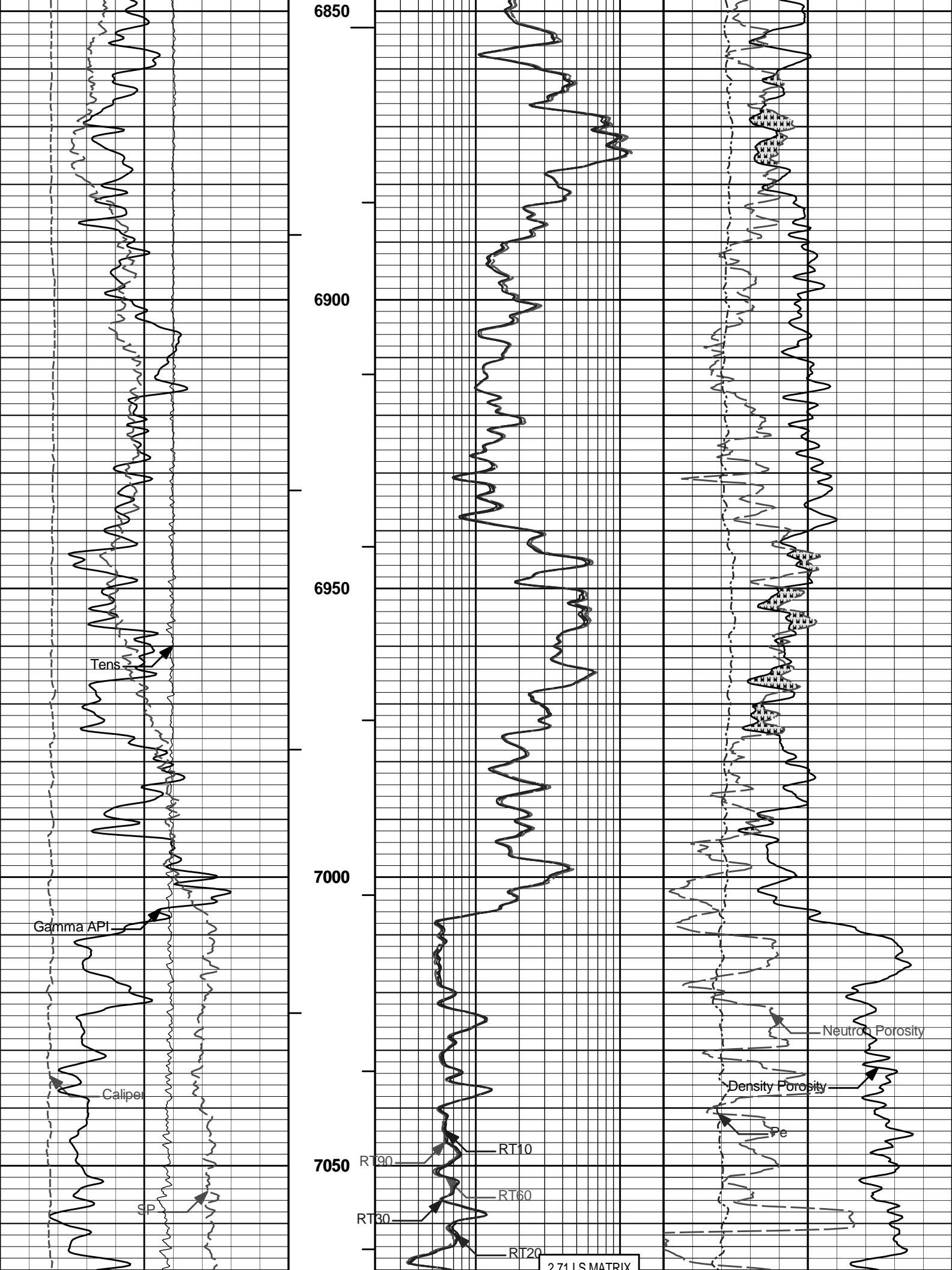
MAIN PASS 5" = 100'											
---------------------	--	--	--	--	--	--	--	--	--	--	--

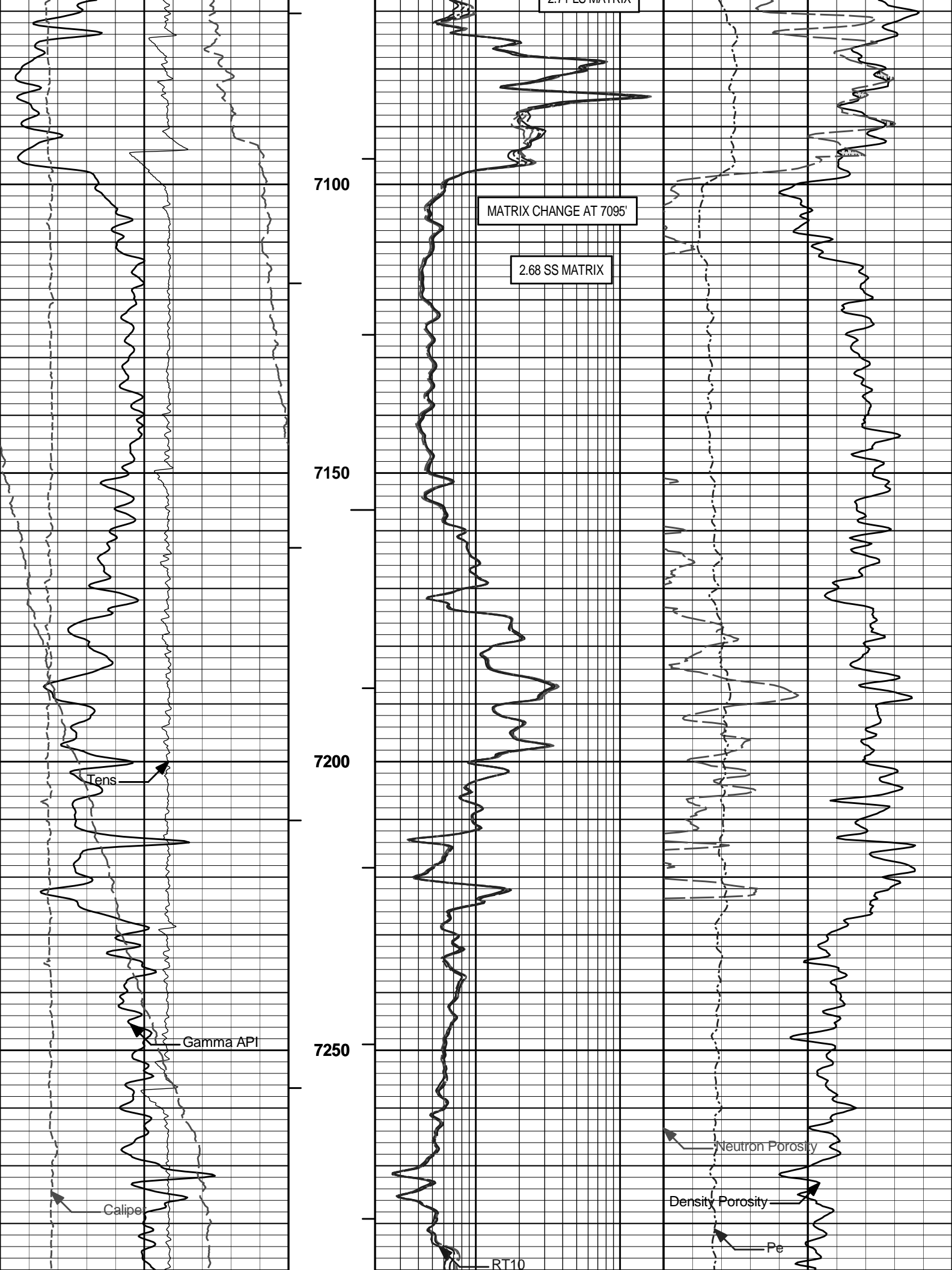
HALLIBURTON			Plot Time: 19-Jan-12 10:48:55 Plot Range: 6600 ft to 7777.17 ft Data: STARKE_Y20_03\Well Based\MAIN* Plot File: \\COMP\TD-NIO								
--------------------	--	--	--	--	--	--	--	--	--	--	--

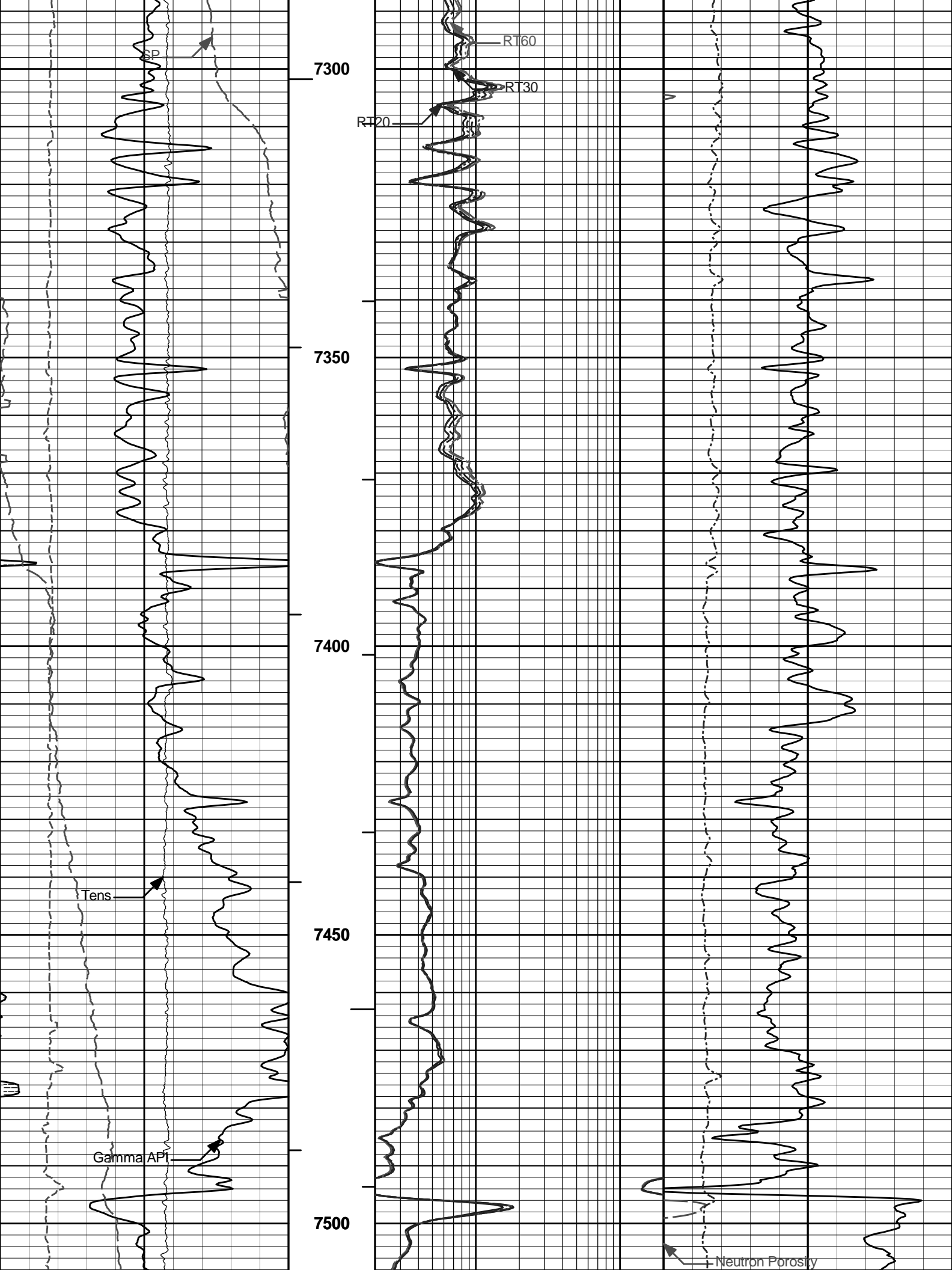
MAIN PASS 5" = 100'											
---------------------	--	--	--	--	--	--	--	--	--	--	--

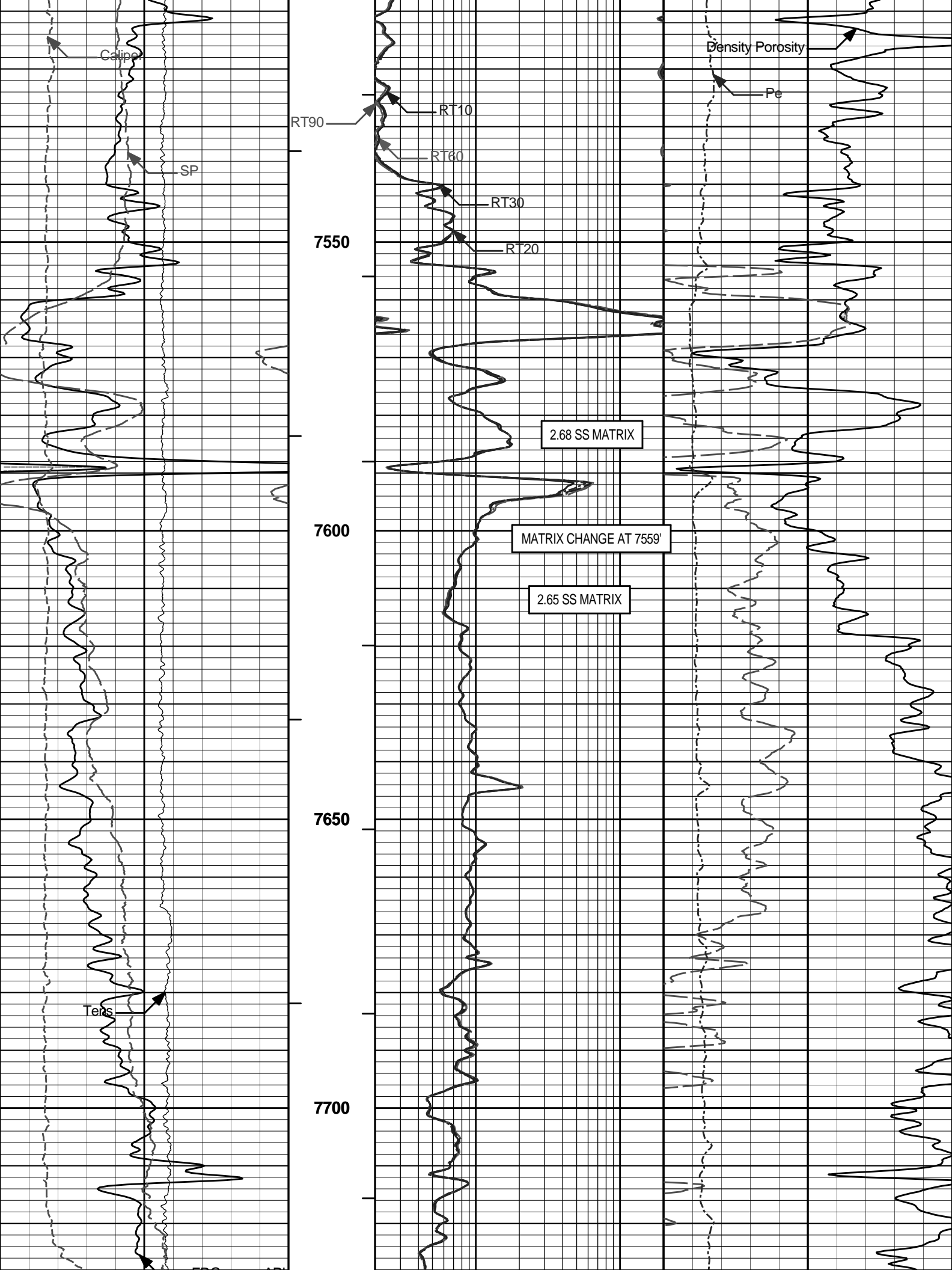
				2	RT10	200				
					ohmm					
10K	Tens	0		2	RT20	200				
pounds					ohmm					
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity		0
inches					ohmm		percent			
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity		0
api					ohmm		percent			
0	SP	100	1 : 240	2	RT90	200	0	Pe	10	
millivolts					ohmm					
										
										

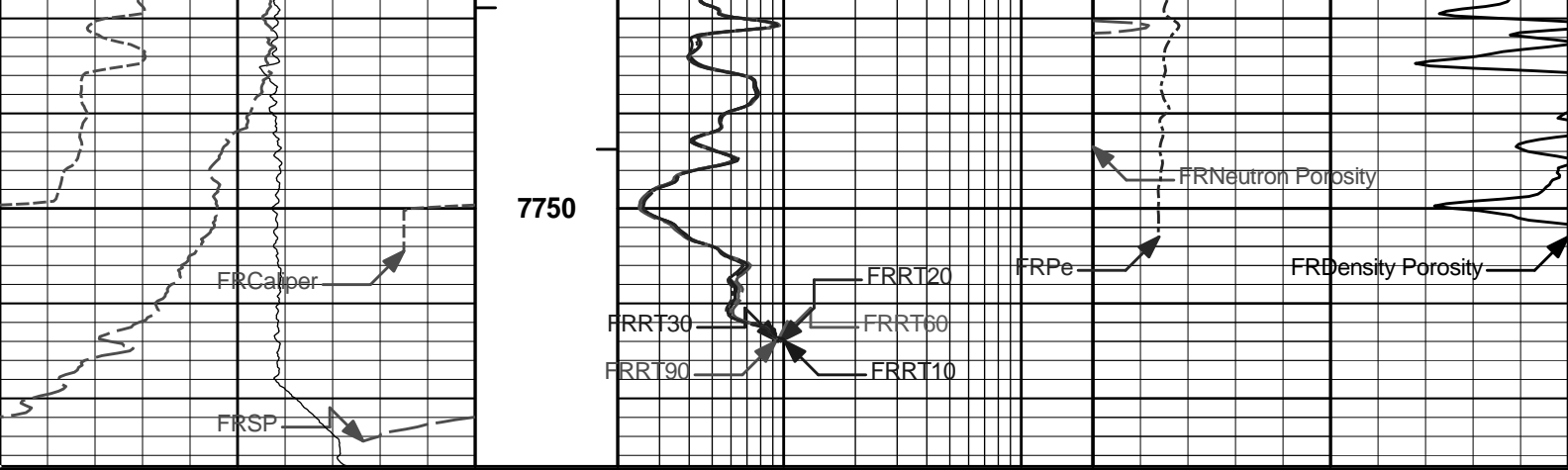












0	SP	100	1 : 240	2	RT90	200	0	Pe	10
	millivolts				ohmm				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				ohmm			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				ohmm			percent	
10K	Tens	0		2	RT20	200			
	pounds				ohmm				
				2	RT10	200			
					ohmm				

HALLIBURTON
Plot Time: 19-Jan-12 10:48:58
Plot Range: 6600 ft to 7777.17 ft
Data: STARKE_Y20_03\Well Based\MAIN*
Plot File: \COMP\TD-NIO

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11259758	Reference Calibration Date:	07-Dec-11 08:36:29
Engineer:	C. BLUE	Calibration Date:	28-Dec-11 08:43:51
Software Version:	WL INSITE R3.4.4 (Build 2)	Calibration Version:	1
Calibrator Source S/N: TB 290			
Calibrator API Reference:230.00 api			
Equivalent Calibrator API Reference:234.0 api			
Measurement	Measured	Calibrated	Units
Background	61.9	61.0	api
Background + Calibrator	299.6	295.0	api
Calibrator	237.6	234.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 11259758	Reference Calibration Date:	28-Dec-11 08:43:51

Engineer: C. BLUE

Software Version: WL INSITE R3.4.4 (Build 2)

Calibration Date: 18-Jan-12 10:18:34

Calibration Version: 1

Calibrator Source S/N: TB 290

Calibrator API Reference:230.00 api

Equivalent Calibrator API Reference:234.0 api

Field Verification	Shop	Field	Units
Background	61.0	55.5	api
Background + Calibrator	295.0	290.8	api
Calibrator	234.0	235.3	api

Shop	Field	Difference	Tolerance
234.0	235.3	-1.3	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 10846351

Engineer: C. BLUE

Software Version: WL INSITE R3.4.4 (Build 2)

Source SN: TB 290

Reference Calibration Date: 07-Dec-11 08:56:04

Calibration Date: 14-Jan-12 19:24:20

Calibration Version: 1

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.7	23.7	Channel #
583 KEV Peak Channel #	53.4	53.4	Channel #
2614 KEV Peak Channel #	219.6	219.9	Channel #
Calibrate Temperature	50.9	50.9	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	1670.7	CPS	324.4	319.5	API
Background	304.9	CPS	63.2	58.3	API

Gamma Ray Gain: 0.96

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 10846351

Engineer: C. BLUE

Software Version: WL INSITE R3.4.4 (Build 2)

Source SN:

Reference Calibration Date: 14-Jan-12 19:24:20

Calibration Date: 18-Jan-12 10:25:33

Calibration Version: 1

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.7	23.6	Channel #

583 KEV Peak Channel #	53.4	53.2	Channel #
2614 KEV Peak Channel #	219.9	218.8	Channel #
Calibrate Temperature	50.9	55.0	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	1680.7	CPS	319.5	319.6	API
Background	307.1	CPS	58.3	58.4	API

Gamma Ray Gain: 0.96

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	DSNT - 10935690	Reference Calibration Date:	18-Jan-12 09:03:07
Engineer:	C. BLUE	Calibration Date:	18-Jan-12 09:17:16
Software Version:	WL INSITE R3.4.4 (Build 2)	Calibration Version:	1

Logging Source S/N: DSN-430
Tank Serial Number: 11068236
Reference value assigned to Tank: 53.720
Snow Block S/N: 100133139C
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:	1.042	1.042	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):	0.2224	0.2223	0.0001	+/- 0.0020
Calibrated Ratio:	10.11	10.11	0.002	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0837	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 - 10935690	Reference Calibration Date:	18-Jan-12 09:17:16
------------	-----------------	-----------------------------	--------------------

Engineer: C. BLUE		Calibration Date: 18-Jan-12 09:18:37		
Software Version: WL INSITE R3.4.4 (Build 2)		Calibration Version: 1		
Logging Source S/N: DSN-430				
Snow Block S/N: 100133139C				
NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0837	0.0833	-0.0004	+/- 0.0150
PASS/FAIL SUMMARY				
Block Change Check:		Passed		
Snow Block Stat Check:		Passed		
Temperature Check:		Passed		
DENSITY CALIPER SHOP CALIBRATION				
Tool Name: SDLT - 10951319		Reference Calibration Date: 06-Jan-12 15:07:10		
Engineer: C. BLUE		Calibration Date: 06-Jan-12 15:13:09		
Software Version: WL INSITE R3.4.4 (Build 2)		Calibration Version: 1		
CALIBRATION COEFFICIENTS				
Measurement	Previous Value	New Value	Control Limit On New Value	
Pad Offset	-1877.07	-1882.03	-7000.00 - -1000.00	
Pad Gain	0.0003715	0.0003719	0.000200 - 0.000600	
Arm Offset	-1892.39	-1914.73	-5000.00 - 3000.00	
Arm Gain	0.0005085	0.0005095	0.000300 - 0.000700	
Arm Power	-0.000004660	-0.000004770	-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)	6.51	6.50	-0.01	+/- 0.20
Medium Ring (in)	8.26	8.25	-0.01	+/- 0.20
Large Ring (in)	15.02	15.00	-0.02	+/- 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 - 10951319		Reference Calibration Date: 06-Jan-12 15:13:09		
Engineer: C. BLUE		Calibration Date: 18-Jan-12 10:18:25		
Software Version: WL INSITE R3.4.4 (Build 2)		Calibration Version: 1		
MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.76	0.01	+/- 0.10

Pad Extension		0.75	0.75	0.01	17	0.15
Ring Diameter		8.25	8.27	0.02	+/- 0.15	
PASS/FAIL SUMMARY						
Pad Extension Check:			Passed			
Diameter Check:			Passed			
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION						
Tool Name:		ACRt Sonde - E2584-S2585		Reference Calibration Date:		28-Jul-11 15:52:08
Engineer:		C. BLUE		Calibration Date:		28-Jul-11 16:05:50
Software Version:		WL INSITE R3.2.5 (Build 2)		Calibration Version:		1
TYPICAL GAIN RANGE						
Subarray	R12KHz			R36KHz		R72KHz
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0012	1.05	0.95	1.0001	1.05
A2 (50")	0.95	0.9994	1.05	0.95	1.0037	1.05
A3 (29")	0.95	0.9959	1.05	0.95	1.0005	1.05
A4 (17")	0.95	1.0040	1.05	0.95	1.0060	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0014	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9776	1.05
TYPICAL SONDE OFFSET RANGE						
Subarray	R12KHz			R36KHz		R72KHz
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-0.761	2	-6	-4.073	-2
A2 (50")	-7	-1.957	-1	-6	-3.509	-2
A3 (29")	-27	-12.918	-9	-9	-3.439	-3
A4 (17")	-180	-94.666	-60	-45	-30.479	-15
A5 (10")	N/A	N/A	N/A	-150	-86.802	-50
A6 (6")	N/A	N/A	N/A	175	306.164	525
TRANSMITTER CURRENT GAIN				R-MUD VERIFICATION		
Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)
12K	0.6	0.9962	1.3	Mud Cell	0.95	0.997
36K	1.0	1.9266	2.0			
72K	1.0	1.2354	2.0			
SPECTRAL DENSITY SHOP CALIBRATION						
Tool Name:		SDLT Pad - M319P593		Reference Calibration Date:		05-Dec-11 15:31:10
Engineer:		C. BLUE		Calibration Date:		06-Jan-12 13:50:34
Software Version:		WL INSITE R3.4.4 (Build 2)		Calibration Version:		1
Logging Source S/N: 5256 GW						
Aluminum Block S/N: 63066			Density: 2.602g/cc		Pe: 3.100	
Magnesium Block S/N: BRIGHTON			Density: 1.691g/cc		Pe: 2.650	
DENSITY CALIBRATION SUMMARY						
Measurement		Previous Value		New Value		Control Limit
Near Bar Gain		1.0935		1.0978		0.90 - 1.10
Near Dens Gain		1.0164		1.0220		0.90 - 1.10
Near Peak Gain		1.0080		1.0091		0.90 - 1.10
Near Lith Gain		0.9726		0.9667		0.90 - 1.10
Far Bar Gain		1.0379		1.0424		0.90 - 1.10

Far Bar Gain	1.0072	1.0124	0.90 - 1.10
Far Dens Gain	0.9981	1.0029	0.90 - 1.10
Far Peak Gain	0.9922	0.9968	0.90 - 1.10
Far Lith Gain	0.9877	0.9816	0.90 - 1.10
Near Bar Offset	-0.8072	-0.8532	NONE
Near Dens Offset	-0.0769	-0.1361	NONE
Near Peak Offset	-0.0059	-0.0317	NONE
Near Lith Offset	0.2543	0.2815	NONE
Far Bar Offset	-0.0879	-0.1369	NONE
Far Dens Offset	-0.0029	-0.0494	NONE
Far Peak Offset	0.0495	0.0017	NONE
Far Lith Offset	0.0922	0.1203	NONE
Near Bar Background	918.21	917.65	700 - 1450
Near Dens Background	305.19	304.64	230 - 480
Near Peak Background	132.54	131.29	100 - 210
Near Lith Background	160.63	161.93	125 - 260
Far Bar Background	530.23	530.96	450 - 900
Far Dens Background	208.84	209.24	175 - 345
Far Peak Background	82.61	83.23	70 - 140
Far Lith Background	84.39	85.76	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.698	1.691	-0.007	+/- 0.015
Pe	2.473	2.597	0.124	+/- 0.150
ALUMINUM				
Density (g/cc)	2.602	2.602	-0.000	+/- 0.01500
Pe	2.959	3.057	0.098	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0008	+/- 0.0110	-0.0011	+/- 0.0140
Magnesium Block	-0.0006	+/- 0.0110	-0.0012	+/- 0.0140
Aluminum Block	0.0004	+/- 0.0110	-0.0001	+/- 0.0140
Resolution	9.27	6.00 - 11.50	8.91	6.00 - 11.50
Internal Verifier(B+D+P+L)	1516	1200 - 2700	909	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 - M319P593

Reference Calibration Date: 06-Jan-12 13:50:34

Engineer: C. BLUE

Calibration Date: 18-Jan-12 10:17:54

Software Version: WL INSITE R3.4.4 (Build 2)

Calibration Version: 1

Pad Temperature: 52.5 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1515.515	1516.354	0.839	15.681
Far (B+D+P+L) cps	909.183	908.083	-1.100	16.371
Near Resolution	9.27	9.38	0.110	0.50
Far Resolution	8.91	9.10	0.190	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-11259758						
Gamma Ray Calibrator	234.0	235.3	-----	-1.3	+/- 9.00	api
CSNG-10846351						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.7	23.6	-----	0.1	-----	Channel #
583 KEV Peak Channel #	53.4	53.2	-----	0.2	-----	Channel #
2614 KEV Peak Channel #	219.9	218.8	-----	1.1	-----	Channel #
DSNT-10935690						
Snow-Block Porosity	0.0837	0.0833	-----	0.0004	+/- 0.0150	decp
SDLT-10951319						
Pad Extension	3.75	3.76	-----	-0.01	+/-0.10	in
Ring Diameter	8.25	8.27	-----	-0.020	+/-0.15	in
ACRt Sonde-E2584-S2585						
Mud Cell	0.997	-----	-----	0.000	-----	ohm-m
SDLT Pad-M319P593						
Near(B+D+P+L)	1515.515	1516.354	-----	-0.839	+/-15.681	cps
Far(B+D+P+L)	909.183	908.083	-----	1.100	+/-16.371	cps

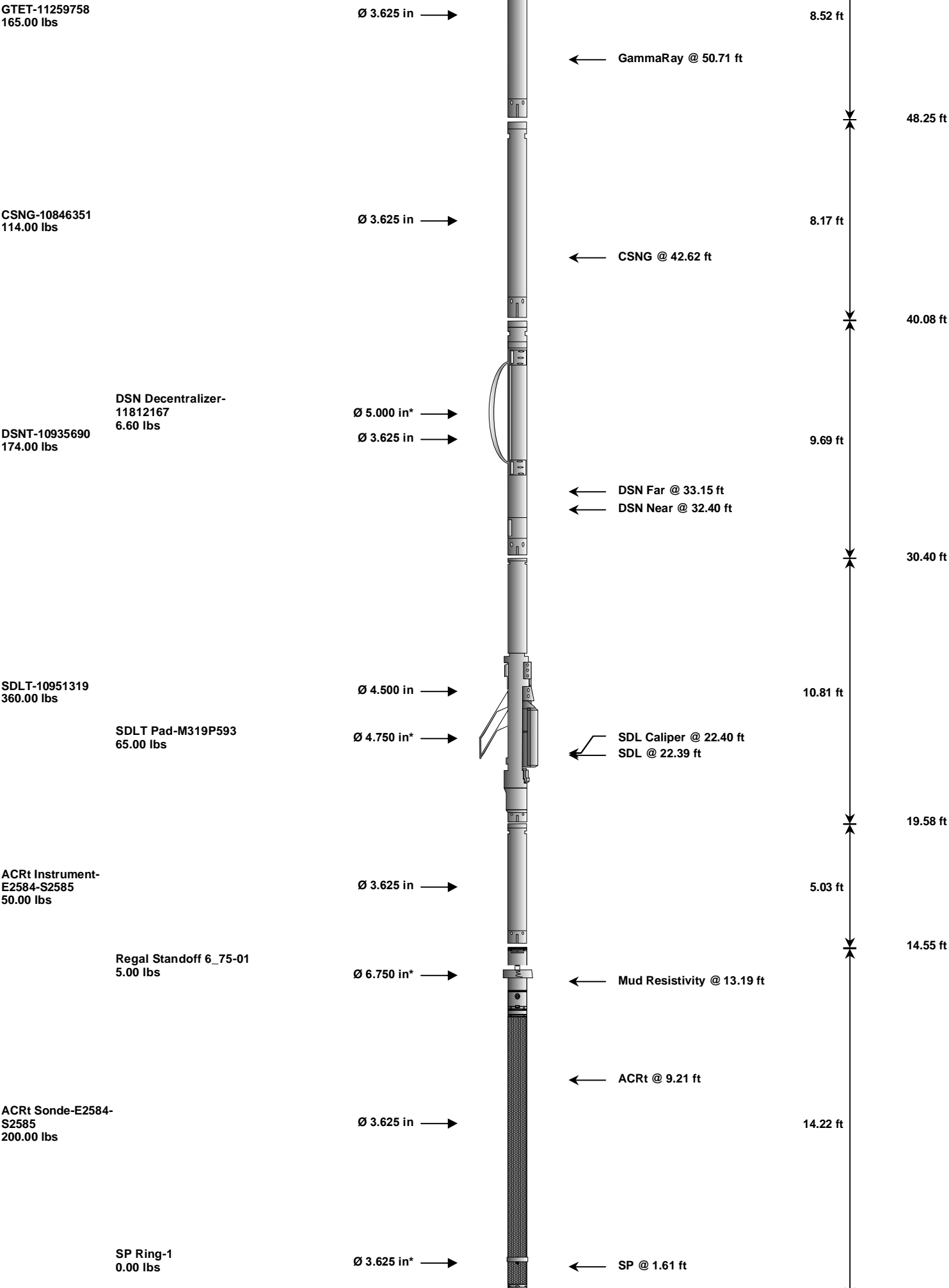
Data: STARKE_Y20_03\0001 NOBLEVDLE


Date: 19-Jan-12 10:30:09

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 →		← Load Cell @ 59.34 ft ← BH Temperature @ 58.77 ft	6.25 ft	63.02 ft
						56.77 ft



Bull Nose-01 5.00 lbs		Ø 2.750 in →		0.33 ft ↓ 0.00 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	B097	135.00	6.25	56.77	300.00
GTET	Gamma Telemetry Tool	11259758	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	10935690	174.00	9.69	30.40	60.00
DCNT	DSN Decentralizer	11812167	6.60	5.13	*	33.73
SDLT	Spectral Density Tool	10951319	360.00	10.81	19.58	60.00
SDLP	Density Insite Pad	M319P593	65.00	2.55	*	21.79
ACRt	Array Compensated True Resistivity Instrument Section	E2584-S2585	50.00	5.03	14.55	300.00
ACRt	Array Compensated True Resistivity	E2584-S2585	200.00	14.22	0.33	300.00
SP	SP Ring	1	0.00	0.25	*	1.61
RSOF	Regal Standoff 6.75in	01	5.00	0.52	*	13.24
BLNS	Bull Nose	01	5.00	0.33	0.00	300.00
Total			1,279.60	63.02		
* Not included in Total Length and Length Accumulation.						
Data: STARKE_Y20_03\0001 NOBLE\IDLE					Date: 19-Jan-12 07:50:33	

COMPANY	NOBLE ENERGY INC		
WELL	STARKE Y20-03		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY	