

# HALLIBURTON

## SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY

COMPANY		NOBLE ENERGY	
WELL		LANG USX AB35-03	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		28-Nov-11	
Run No.		ONE	
Depth - Driller		7347.00 ft	
Depth - Logger		7286.0 ft	
Bottom - Logged Interval		7277.0 ft	
Top - Logged Interval		852.0 ft	
Casing - Driller		8.625 in @ 856.0 ft	
Casing - Logger		852.0 ft	
Bit Size		7.875 in	
Type Fluid in Hole		WBM	
Density		9.2 ppq	
Viscosity		40.00 s/qt	
PH		7.00 pH	
Fluid Loss		9.6 cpm	
Source of Sample		MUD CELL	
Rm @ Meas. Temperature		1.120 ohmm @ 81.50 degF	
Rmf @ Meas. Temperature		1.04 ohmm @ 75.00 degF	
Rmc @ Meas. Temperature		1.073 ohmm @ 75.00 degF	
Source Rmf		CHART	
Rmc		CHART	
Rm @ BHT		0.44 ohmm @ 219.0 degF	
Time Since Circulation		7.0 hr	
Time on Bottom		28-Nov-11 22:09	
Max. Rec. Temperature		219.0 degF @ 7286.0 ft	
Equipment		10800785	
Location		BRIGHTON	
Recorded By		W. MATSON	
Witnessed By		MARK MAGNESS	

COMPANY	NOBLE ENERGY
WELL	LANG USX AB35-03
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO
API No.	05123333030000
Location	SHL: 675FNL & 1884 FWL NENW SEC. 35, T-7N, R-64W LAT: 40.535200 LONG: -104.519970
Other Services:	RWCH CSNG
Sect.	35
Twp.	7 N
Rge.	64 W
Elev.	4845.0 ft
D.F.	4858.0 ft
G.L.	4845.0 ft

Fold here

Service Ticket No.: 9087816		API Serial No.: 05123333030000		PGM Version: WL INSITE R3.4.4 (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.
Rmf @ Meas. Temp.	@	@		ONE	ACRT -E2584	N/A	1.5" S.O.
Rmc @ Meas. Temp.	@	@			S2585		
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.	11259785	Serial No.		Serial No.	10951319	Serial No.	11219332
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	GAMMA/GAMMA	Log Type	THERM/THERM
Type	SCINT			Source Type	Cs-137	Source Type	Am241Be
Length	8"	LSA [Y/N]		Serial No.	DSN-430	Serial No.	5256 GW
Distance to Source	12'	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	7072	REC	0	250				20%	0%	2.68 g/cc	20%	0%	SAND	
ONE	7072	6600	REC	0	250				20%	0%	2.71 g/cc	20%	0%	LIME	
ONE	6600	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															
CALIPER CLOSED AT 6100' AND 5800' DUE TO TENSIION PULL															
CREW: J. WALKER, D. WALKER, N. GOULD															
RIG: ENSIGN 132															
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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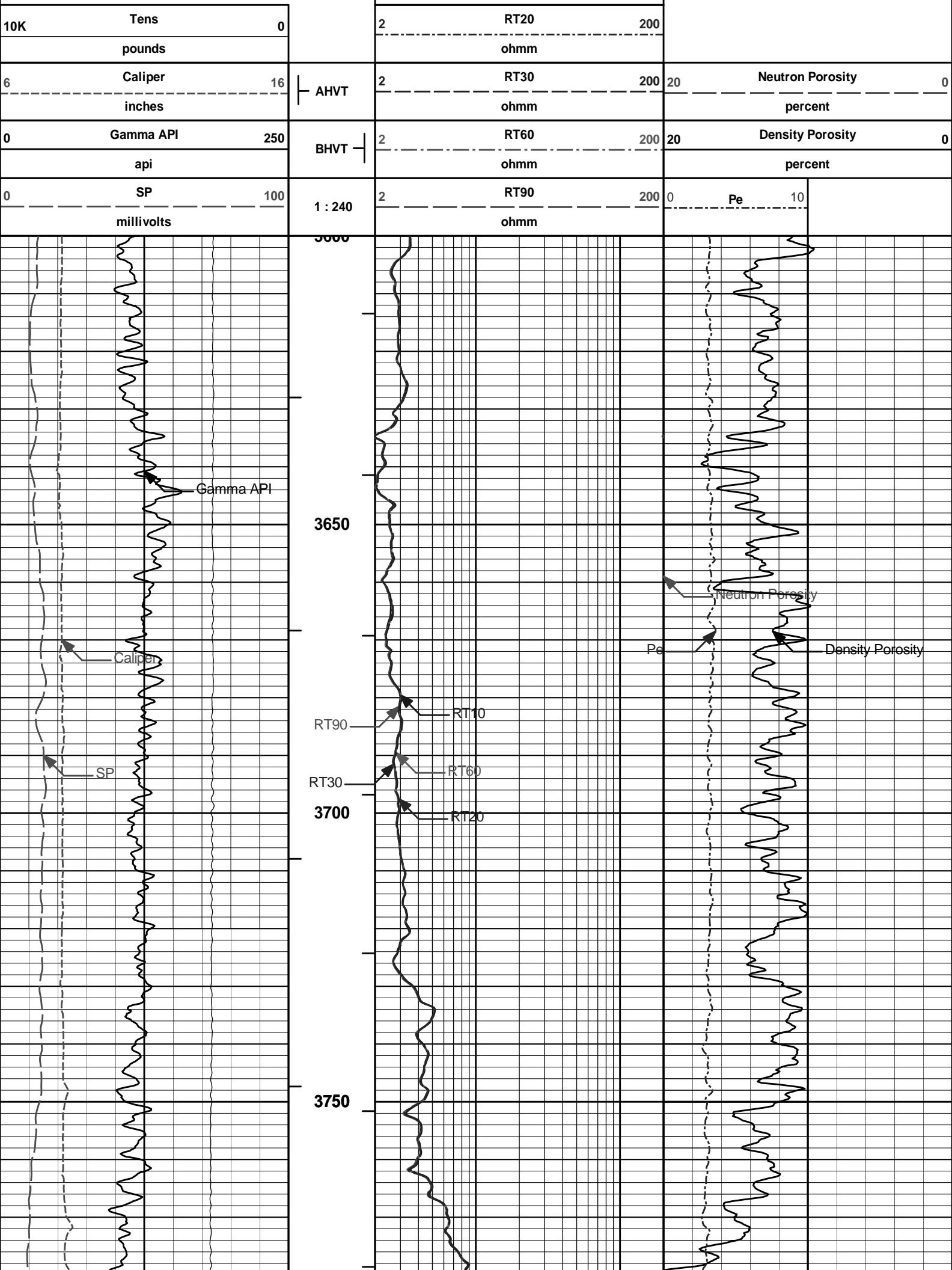
PARAMETERS REPORT

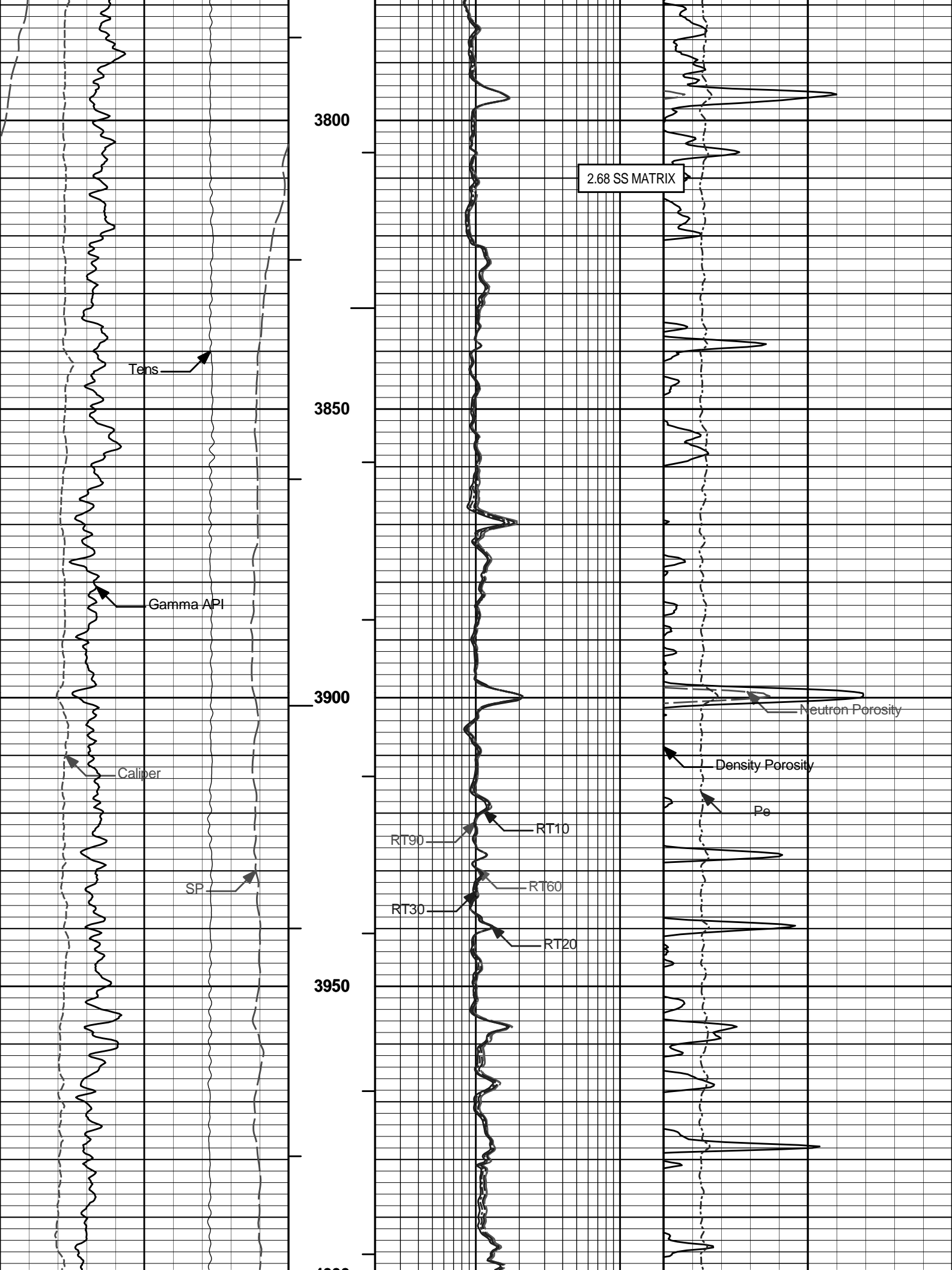
Depth ((ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	DSNT	NLIT	Neutron Lithology	Sandstone	
	SDLT Pad	DMA	Formation Density Matrix	2.680	g/cc
6600.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
7072.00					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.200	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	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	75.0	degF
	SHARED	TD	Total Well Depth	7347.00	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	

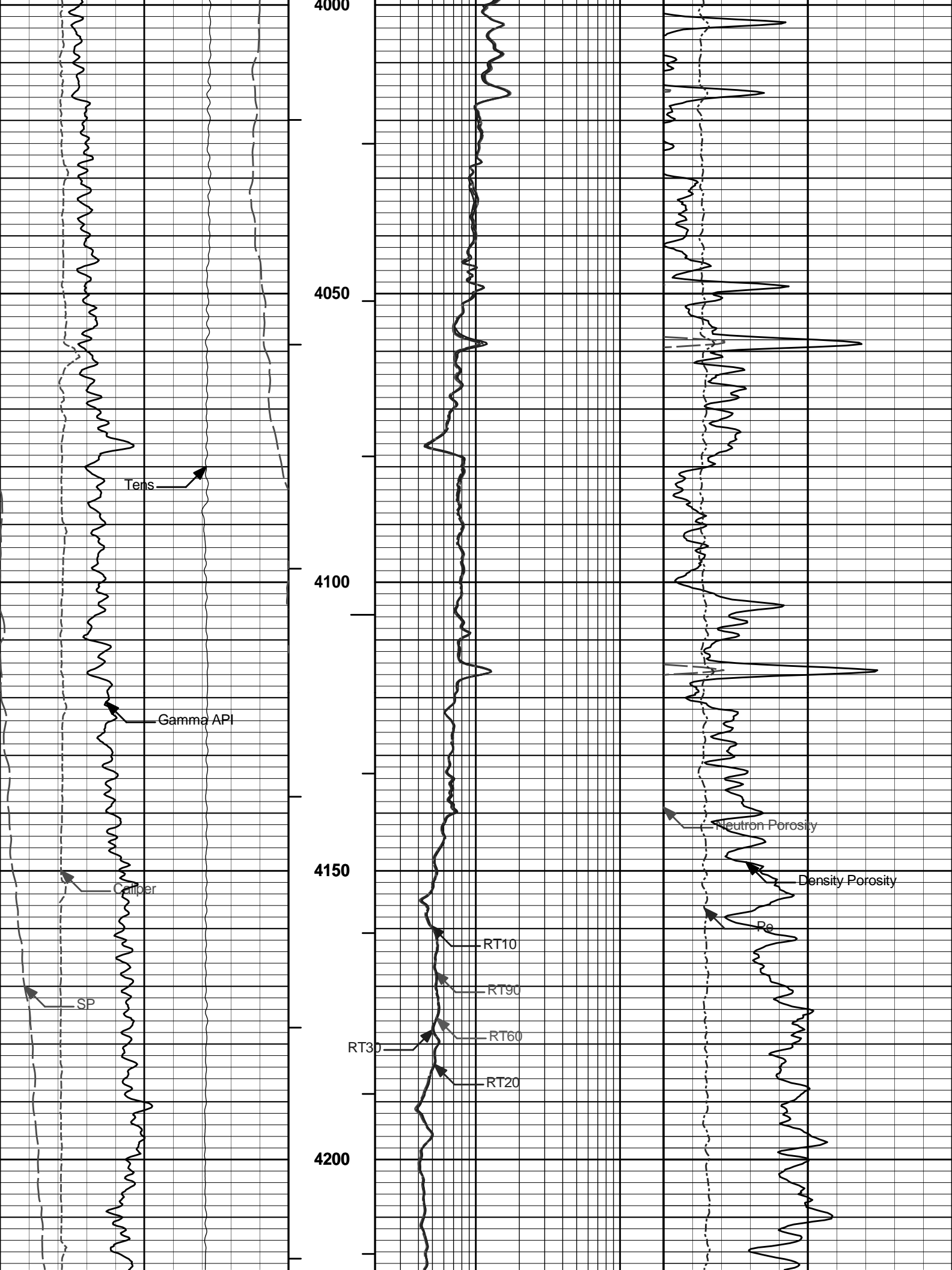
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool 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	2.680	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
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: NE_LANG_AB35_03\0001 NOBLE\003.03 29-Nov-11 04:17 Up			Date: 29-Nov-11 04:19:37	

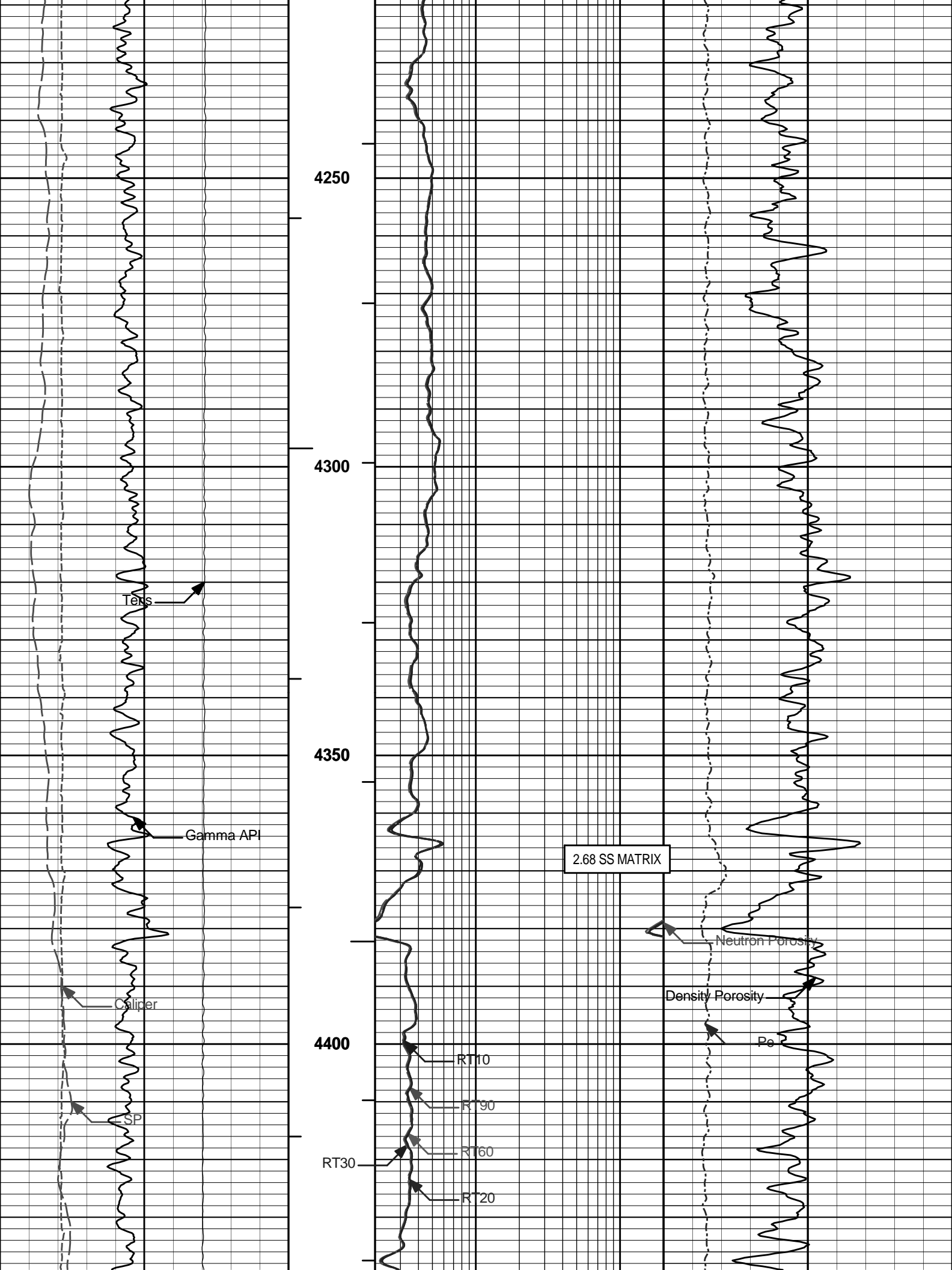
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MAIN PASS 5" = 100'	

	2	RT10	200	
		ohmm		



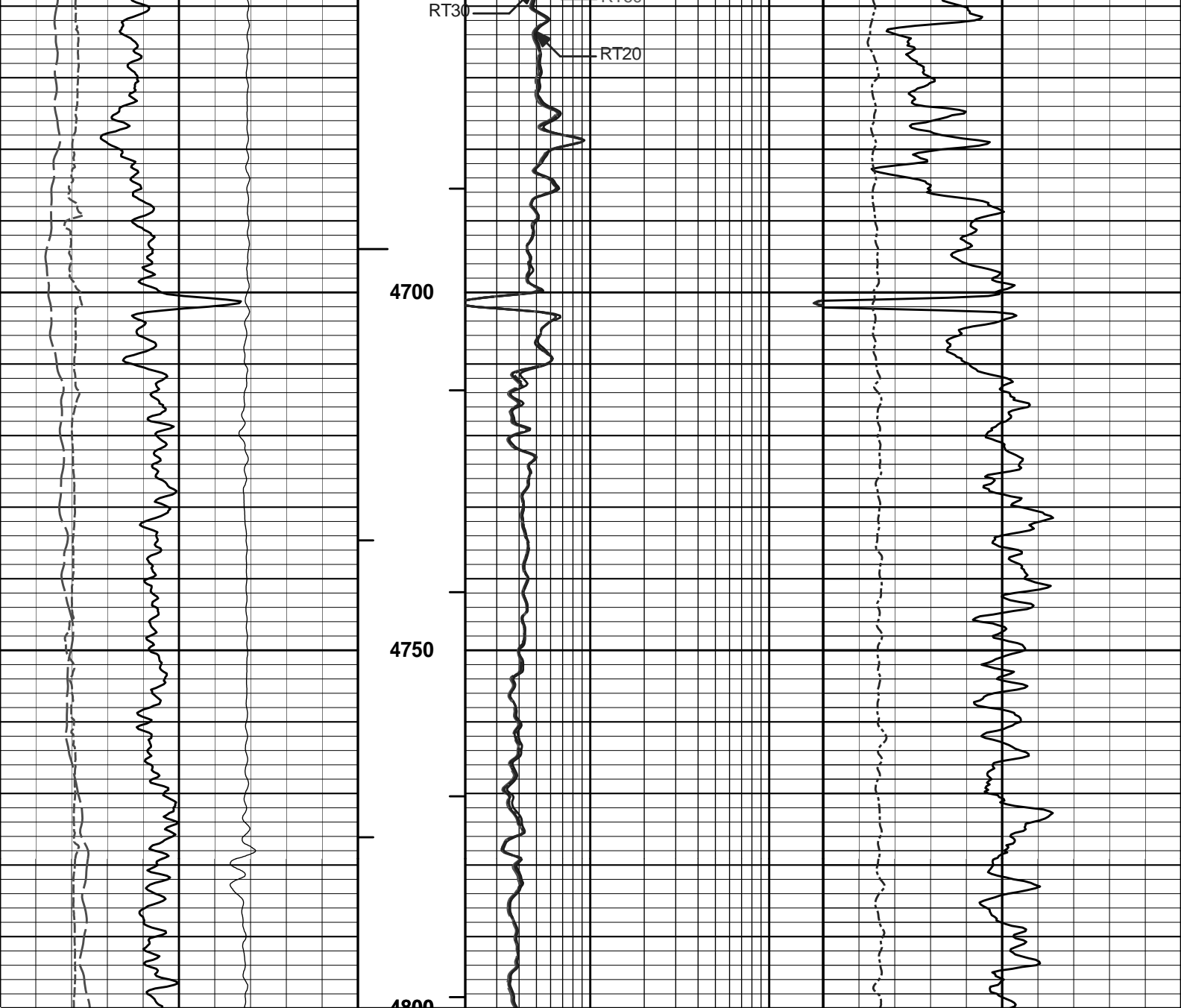












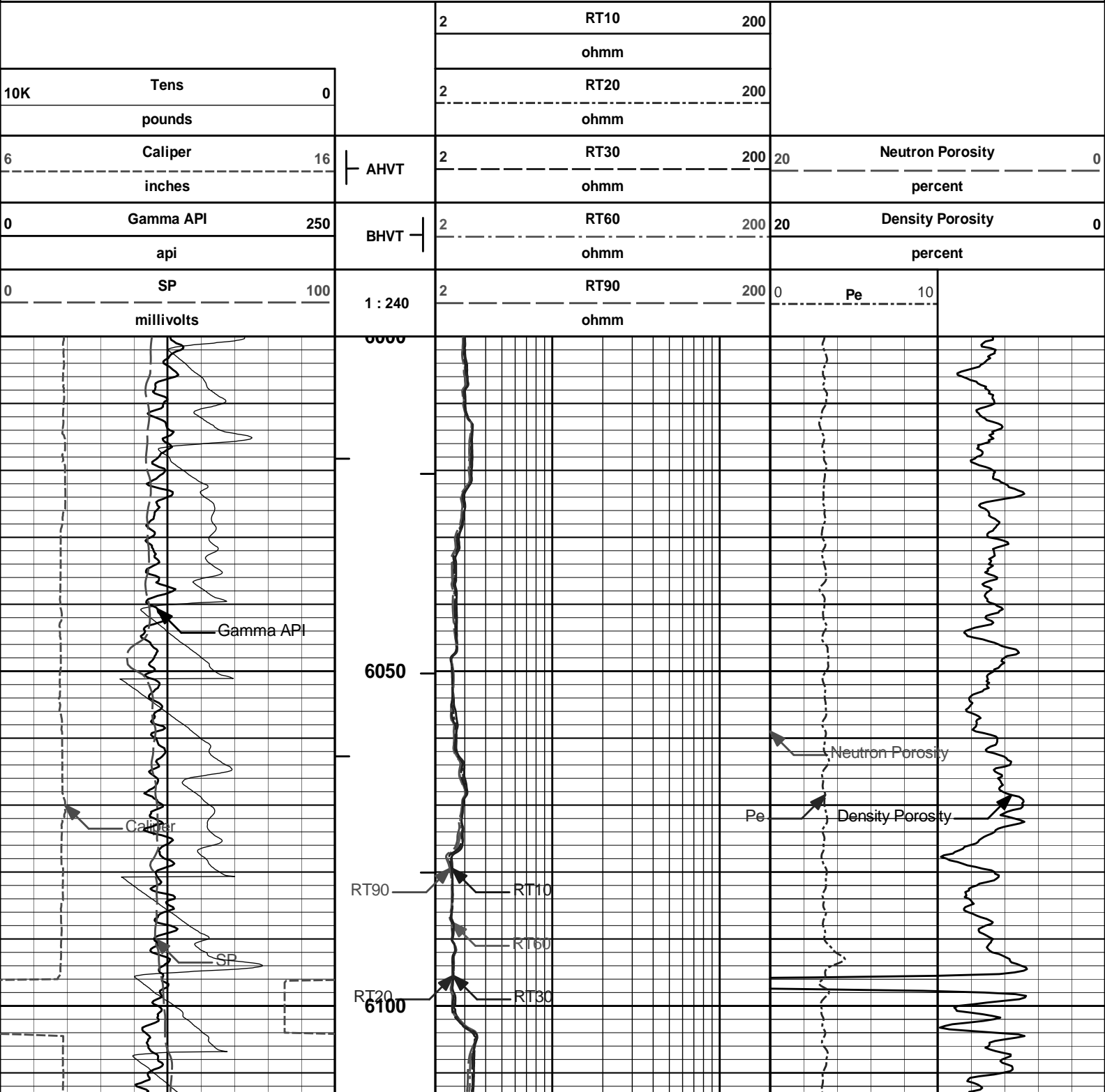
0	SP	100	1 : 240	2	RT90	200	0	Pe	10
	millivolts				ohmm				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				ohmm			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				ohmm			percent	
10K	Tens	0		2	RT20	200			
	pounds				ohmm				
				2	RT10	200			
					ohmm				

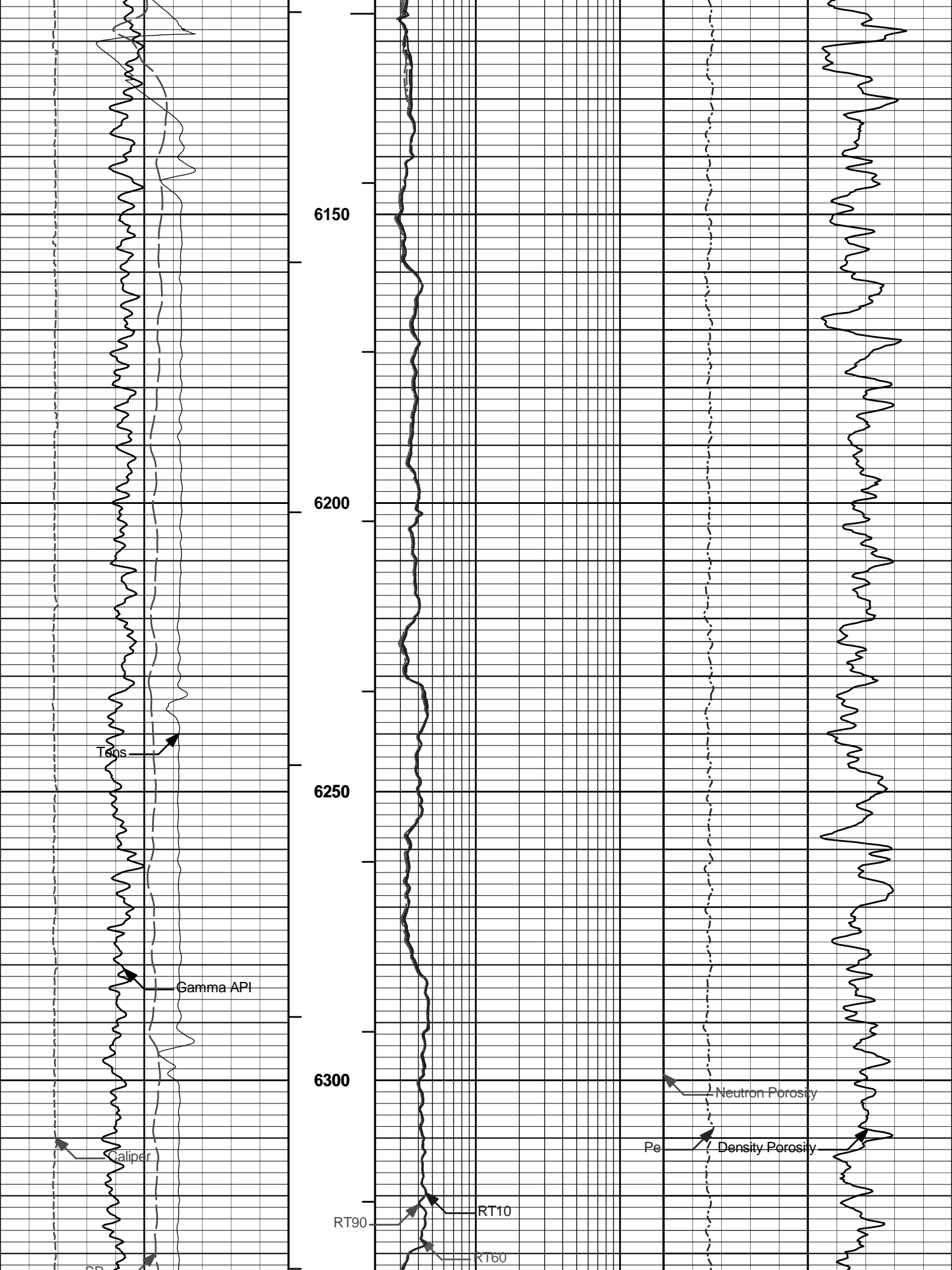
**HALLIBURTON**

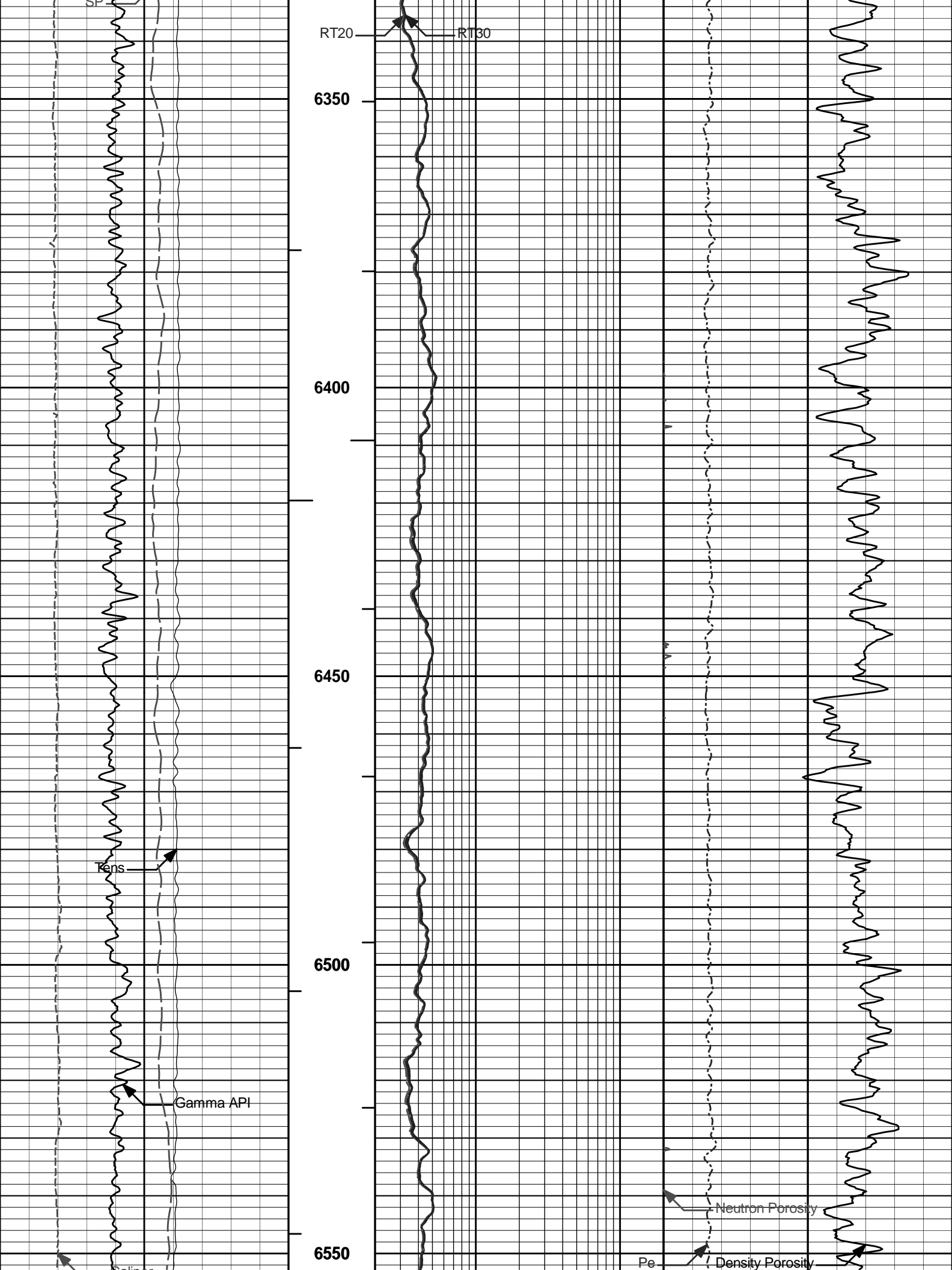
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 Plot Range: 3600 ft to 4800 ft  
 Data: NE\_LANG\_AB35\_03\Well Based\MAIN\*  
 Plot File: \COMP\MAIN

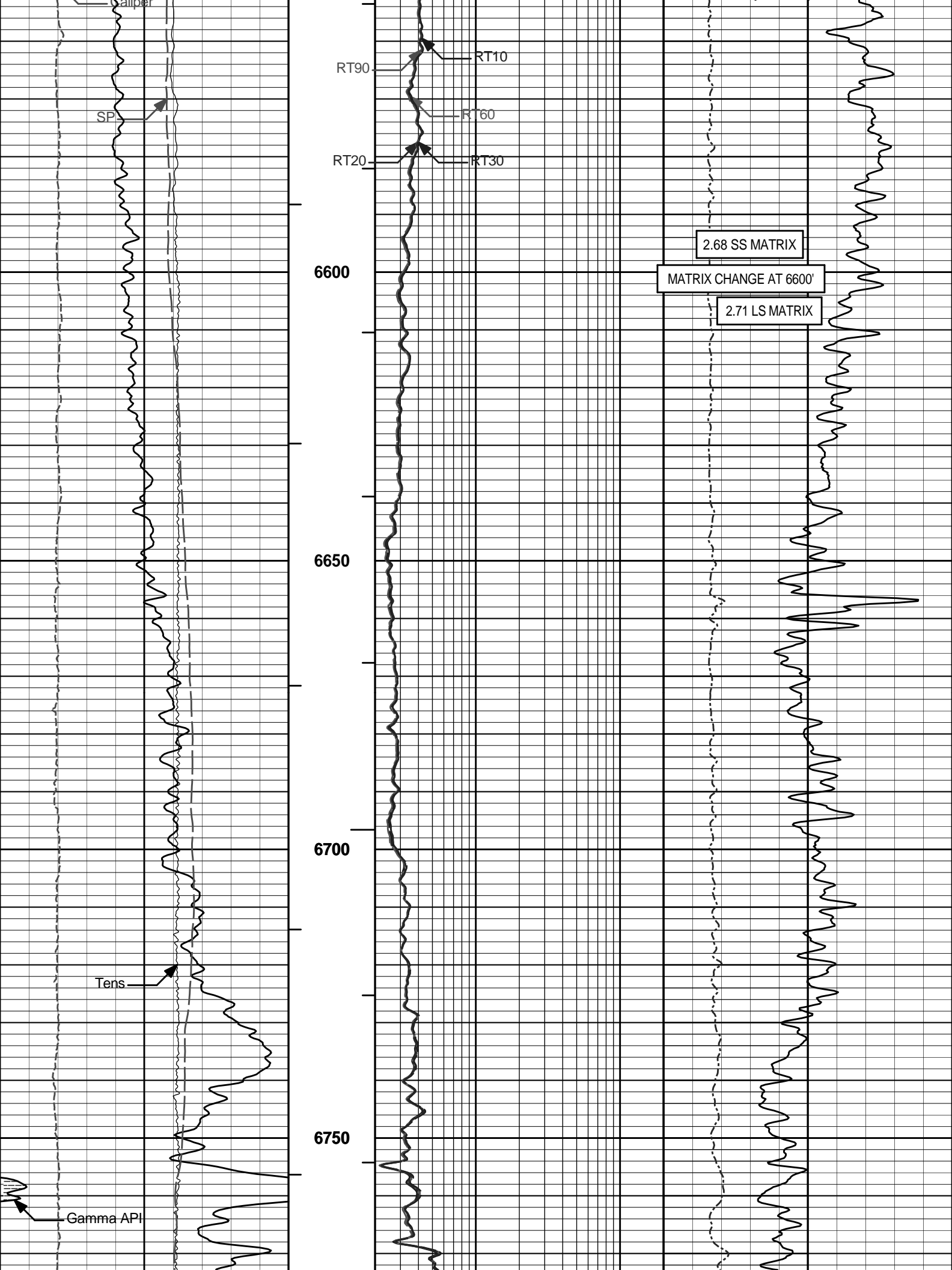
MAIN PASS 5" = 100'

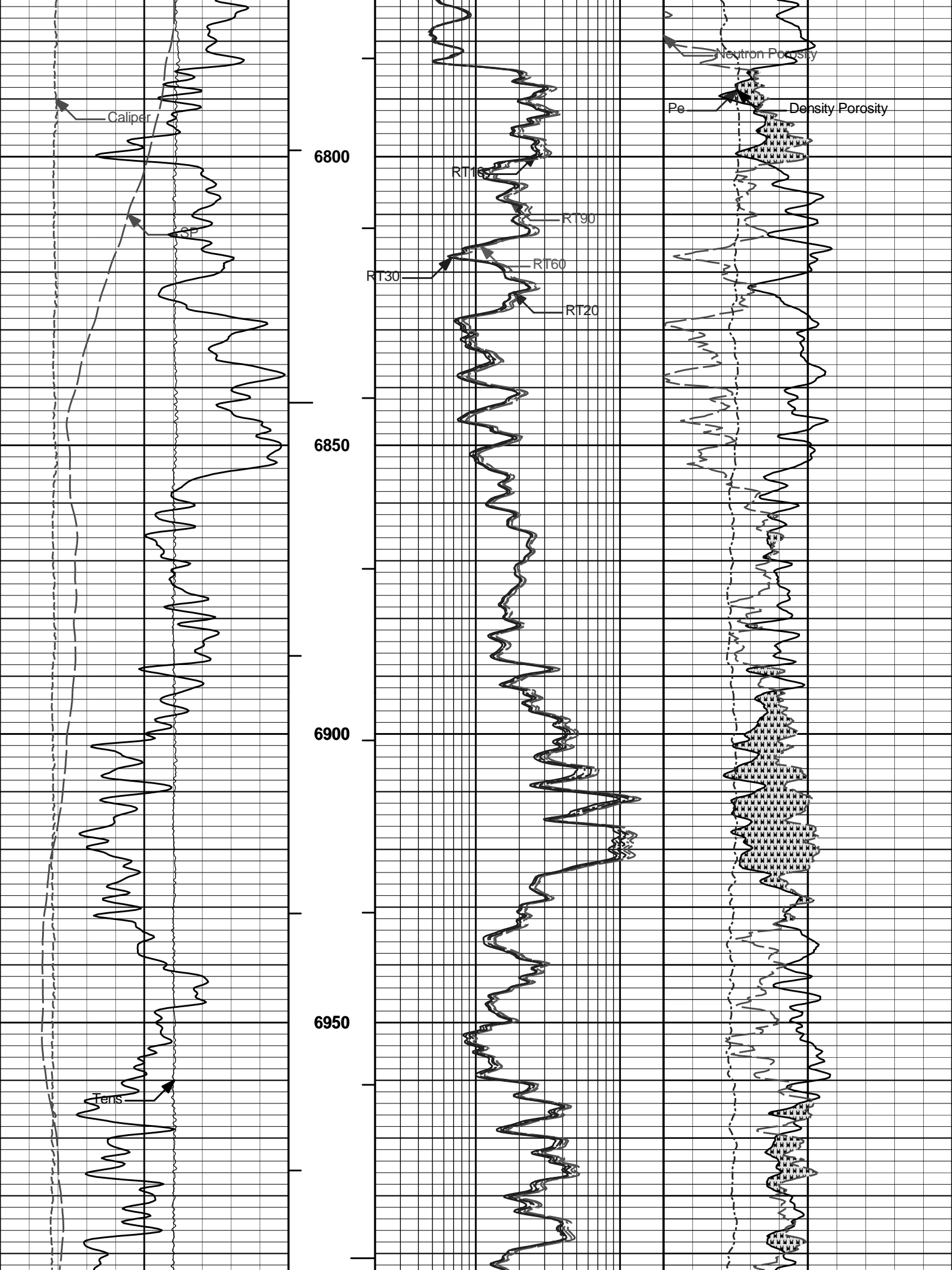
MAIN PASS 5" = 100'

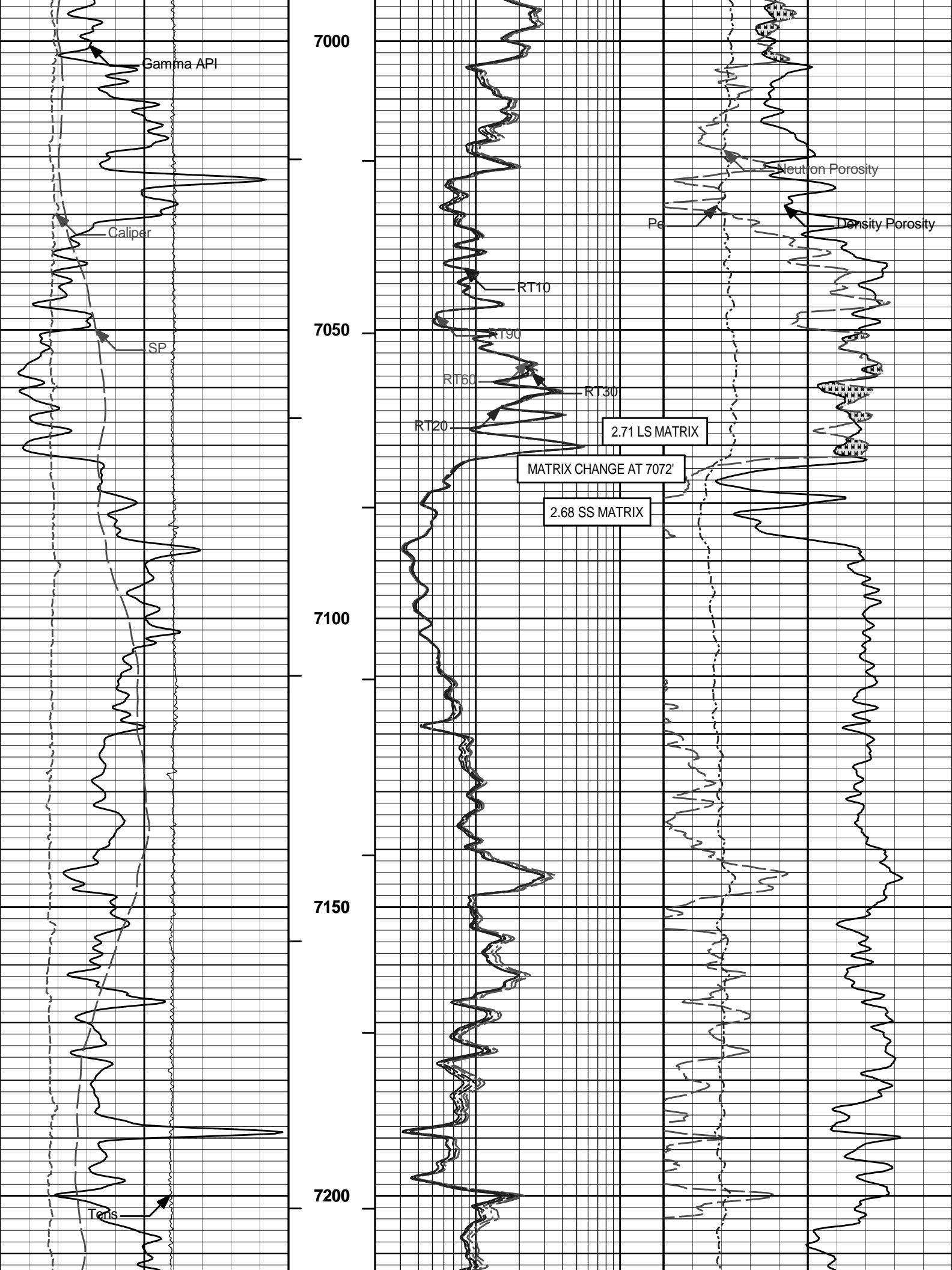


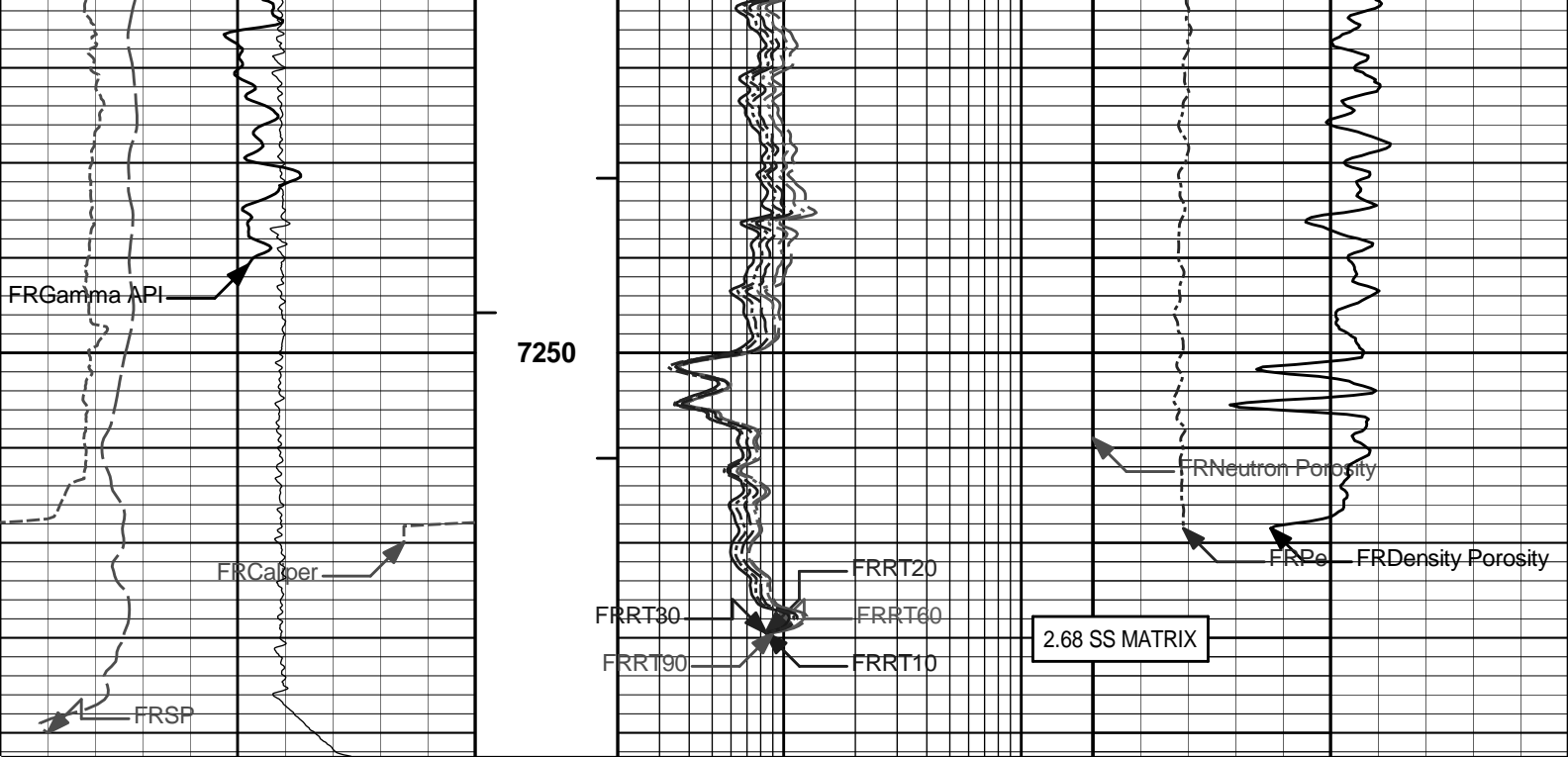












0	SP	100	1 : 240	2	RT90	200	0	Pe	10
	millivolts				ohmm				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				ohmm			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				ohmm			percent	
10K	Tens	0		2	RT20	200			
	pounds				ohmm				
				2	RT10	200			
					ohmm				

**HALLIBURTON**

Plot Time: 29-Nov-11 05:03:19  
 Plot Range: 6000 ft to 7292.58 ft  
 Data: NE\_LANG\_AB35\_03\Well Based\MAIN\*  
 Plot File: \COMP\MAIN

MAIN PASS 5" = 100'

**HALLIBURTON**

**CALIBRATION REPORT**

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11259758	Reference Calibration Date:	13-Oct-11 16:53:13
Engineer:	C. BLUE	Calibration Date:	04-Nov-11 10:15:03
Software Version:	WL INSITE R3.4.2 (Build 2)	Calibration Version:	1

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



Equivalent Calibrator API Reference:234.0 api

Measurement	Measured	Calibrated	Units
Background	75.4	77.0	api
Background + Calibrator	304.6	311.1	api
Calibrator	229.1	234.0	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11259758

Reference Calibration Date: 04-Nov-11 10:15:03

Engineer: C. BLUE

Calibration Date: 25-Nov-11 15:38:33

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

Field Verification	Shop	Field	Units
Background	77.0	70.3	api
Background + Calibrator	311.1	305.3	api
Calibrator	234.0	235.0	api

Shop	Field	Difference	Tolerance
234.0	235.0	-1.0	+/- 9.00

### CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 10846351

Reference Calibration Date: 11-Oct-11 11:35:16

Engineer: C. BLUE

Calibration Date: 04-Nov-11 10:29:39

Software Version: WL INSITE R3.4.2 (Build 2)

Calibration Version: 1

Source SN: TB 290

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 #	53.2	52.9	Channel #
2614 KEV Peak Channel #	219.1	218.4	Channel #
Calibrate Temperature	60.2	70.7	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	1694.0	CPS	323.6	327.6	API
Background	343.4	CPS	62.4	66.4	API

Gamma Ray Gain: 0.97

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

### CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 10846351

Reference Calibration Date: 04-Nov-11 10:29:39

Engineer: C. BLUE

Calibration Date: 25-Nov-11 16:06:40

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.6	23.6	Channel #
583 KEV Peak Channel #	52.9	52.5	Channel #
2614 KEV Peak Channel #	218.4	217.2	Channel #
Calibrate Temperature	70.7	87.0	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	1814.4	CPS	327.6	348.8	API
Background	455.7	CPS	66.4	87.6	API

Gamma Ray Gain: 0.97  
Expected Gain Range: 0.85 - 1.15  
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION					
Tool Name:	DSNT - 11219332	Reference Calibration Date:	11-Oct-11 16:20:36		
Engineer:	C. BLUE	Calibration Date:	11-Oct-11 16:36:25		
Software Version:	WL INSITE R3.4.2 (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: 68 degF  
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.984	0.984	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	0.2224	0.0001	+/- 0.0020
Calibrated Ratio:	10.11	10.11	0.002	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0827	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-Oct-11 16:36:25	
Engineer:	C. BLUE	Calibration Date:	19-Nov-11 22:42:54	
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):	0.0827	0.0805	-0.0021	+/- 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:	19-Nov-11 22:29:16	
Engineer:	C. BLUE	Calibration Date:	19-Nov-11 22:34:39	
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	-1951.45	-2064.13	-7000.00 - -1000.00
Pad Gain	0.0003744	0.0003823	0.000200 - 0.000600
Arm Offset	-1528.65	-1406.27	-5000.00 - 3000.00
Arm Gain	0.0005160	0.0005145	0.000300 - 0.000700
Arm Power	-0.000005584	-0.000005510	-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)	3.71	3.75	0.04	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.48	6.50	0.02	+/- 0.20
Medium Ring (in)	8.24	8.25	0.01	+/- 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				
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Tool Name: SDLT - 10951319				Reference Calibration Date: 19-Nov-11 22:34:39																			
Engineer: C. BLUE				Calibration Date: 19-Nov-11 22:36:25																			
Software Version: WL INSITE R3.4.4 (Build 2)				Calibration Version: 1																			
<div>MEASURED CALIPER VALUES</div> <table><thead><tr><th>Measurement</th><th>Shop</th><th>Field</th><th>Change</th><th>Control Limit On New Value</th></tr></thead><tbody><tr><td>Pad Extension</td><td>3.75</td><td>3.78</td><td>0.03</td><td>+/- 0.10</td></tr><tr><td>Ring Diameter</td><td>8.25</td><td>8.27</td><td>0.02</td><td>+/- 0.15</td></tr></tbody></table>									Measurement	Shop	Field	Change	Control Limit On New Value	Pad Extension	3.75	3.78	0.03	+/- 0.10	Ring Diameter	8.25	8.27	0.02	+/- 0.15
Measurement	Shop	Field	Change	Control Limit On New Value																			
Pad Extension	3.75	3.78	0.03	+/- 0.10																			
Ring Diameter	8.25	8.27	0.02	+/- 0.15																			
<div>PASS/FAIL SUMMARY</div> <table><tbody><tr><td>Pad Extension Check:</td><td>Passed</td></tr><tr><td>Diameter Check:</td><td>Passed</td></tr></tbody></table>									Pad Extension Check:	Passed	Diameter Check:	Passed											
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	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0012	1.05	0.95	1.0001	1.05	0.95	1.0006	1.05
A2 (50")	0.95	0.9994	1.05	0.95	1.0037	1.05	0.95	1.0091	1.05
A3 (29")	0.95	0.9959	1.05	0.95	1.0005	1.05	0.95	1.0031	1.05
A4 (17")	0.95	1.0040	1.05	0.95	1.0060	1.05	0.95	1.0110	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0014	1.05	0.95	1.0048	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9776	1.05	0.95	0.9812	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	-0.761	2	-6	-4.073	-2	-8	-5.268	-2
A2 (50")	-7	-1.957	-1	-6	-3.509	-2	-7	-4.574	-2
A3 (29")	-27	-12.918	-9	-9	-3.439	-3	-7	-3.298	-1
A4 (17")	-180	-94.666	-60	-45	-30.479	-15	-39	-25.503	-13
A5 (10")	N/A	N/A	N/A	-150	-86.802	-50	-80	-43.996	-10
A6 (6")	N/A	N/A	N/A	175	306.164	525	90	153.096	270
TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
Signal	Lower		R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)	
12K	0.6		0.9962	1.3	Mud Cell	0.95	0.997	1.05	
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: 11-Oct-11 14:53:33	
Engineer: C. BLUE		Calibration Date: 11-Oct-11 15:11:27	
Software Version: WL INSITE R3.4.2 (Build 2)		Calibration Version: 1	
Logging Source S/N: 5256 GW			
Aluminum Block S/N: 63066		Density: 2.602g/cc	
Magnesium Block S/N: BRIGHTON		Density: 1.691g/cc	
		Pe: 3.100	
		Pe: 2.650	

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0609	1.0502	0.90 - 1.10
Near Dens Gain	1.0065	0.9922	0.90 - 1.10
Near Peak Gain	0.9937	0.9925	0.90 - 1.10
Near Lith Gain	0.9497	0.9545	0.90 - 1.10
Far Bar Gain	1.0075	1.0065	0.90 - 1.10
Far Dens Gain	0.9957	0.9939	0.90 - 1.10
Far Peak Gain	0.9907	0.9915	0.90 - 1.10
Far Lith Gain	0.9759	0.9729	0.90 - 1.10
Near Bar Offset	-0.5208	-0.4212	NONE
Near Dens Offset	-0.0081	0.1187	NONE
Near Peak Offset	0.0861	0.0941	NONE
Near Lith Offset	0.4054	0.3631	NONE
Far Bar Offset	-0.0882	-0.0806	NONE
Far Dens Offset	0.0174	0.0335	NONE
Far Peak Offset	0.0571	0.0507	NONE
Far Lith Offset	0.1737	0.1990	NONE
Near Bar Background	925.23	925.05	700 - 1450
Near Dens Background	306.60	305.93	230 - 480
Near Peak Background	133.78	132.81	100 - 210
Near Lith Background	161.71	161.33	125 - 260
Far Bar Background	532.69	534.63	450 - 900
Far Dens Background	211.58	210.12	175 - 345
Far Peak Background	82.94	83.42	70 - 140
Far Lith Background	86.06	86.12	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.692	1.691	-0.001	+/- 0.015
Pe	2.607	2.605	-0.002	+/- 0.150
ALUMINUM				
Density (g/cc)	2.602	2.602	0.000	+/- 0.01500
Pe	3.052	3.064	0.012	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0003	+/- 0.0110	0.0003	+/- 0.0140
Magnesium Block	0.0010	+/- 0.0110	0.0001	+/- 0.0140
Aluminum Block	-0.0009	+/- 0.0110	0.0003	+/- 0.0140
Resolution	9.12	6.00 - 11.50	8.86	6.00 - 11.50
Internal Verifier(B+D+P+L)	1525	1200 - 2700	914	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:	11-Oct-11 15:11:27		
Engineer:	C. BLUE	Calibration Date:	06-Nov-11 13:43:56		
Software Version:	WL INSITE R3.4.4 (Build 2)	Calibration Version:	1		

Pad Temperature: 61.1 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1525.120	1523.735	-1.385	15.728
Far (B+D+P+L) cps	914.289	919.232	4.943	16.403
Near Resolution	9.12	9.35	0.230	0.50
Far Resolution	8.86	9.12	0.260	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	235.0	-----	-1.0	+/- 9.00	api
CSNG-10846351						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.6	23.6	-----	0.0	-----	Channel #
583 KEV Peak Channel #	52.9	52.5	-----	0.4	-----	Channel #
2614 KEV Peak Channel #	218.4	217.2	-----	1.2	-----	Channel #
DSNT-11219332						
Snow-Block Porosity	0.0827	0.0805	-----	0.0022	+/- 0.0150	decp
SDLT-10951319						
Pad Extension	3.75	3.78	-----	-0.03	+/-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)	1525.120	1523.735	-----	1.385	+/-15.728	cps
Far(B+D+P+L)	914.289	919.232	-----	-4.943	+/-16.403	cps

Data: NE_LANG_AB35_03\0001 NOBLE\IDLE	Date: 29-Nov-11 04:00:07
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HALLIBURTON						
TOOL STRING DIAGRAM REPORT						

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
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RWCH-11078326  
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

GTET-11259758  
165.00 lbs

Ø 3.625 in →

← GammaRay @ 50.71 ft

8.52 ft

48.25 ft

CSNG-10846351  
114.00 lbs

Ø 3.625 in →

← CSNG @ 42.62 ft

8.17 ft

40.08 ft

DSNT-11219332  
174.00 lbs

DSN Decentralizer-  
10935690  
6.60 lbs

Ø 5.000 in\* →

Ø 3.625 in →

← DSN Far @ 33.15 ft  
← DSN Near @ 32.40 ft

9.69 ft

30.40 ft

SDLT-10951319  
360.00 lbs

SDLT Pad-M319P593  
65.00 lbs  
Microlog Pad-10951319  
8.00 lbs

Ø 4.500 in →

Ø 4.750 in\* →

Ø 4.750 in\* →

← Microlog @ 22.58 ft  
← SDL Caliper @ 22.40 ft  
← SDL @ 22.39 ft

10.81 ft

19.58 ft

ACRt Instrument-  
11532584  
50.00 lbs

Ø 3.625 in →

5.03 ft

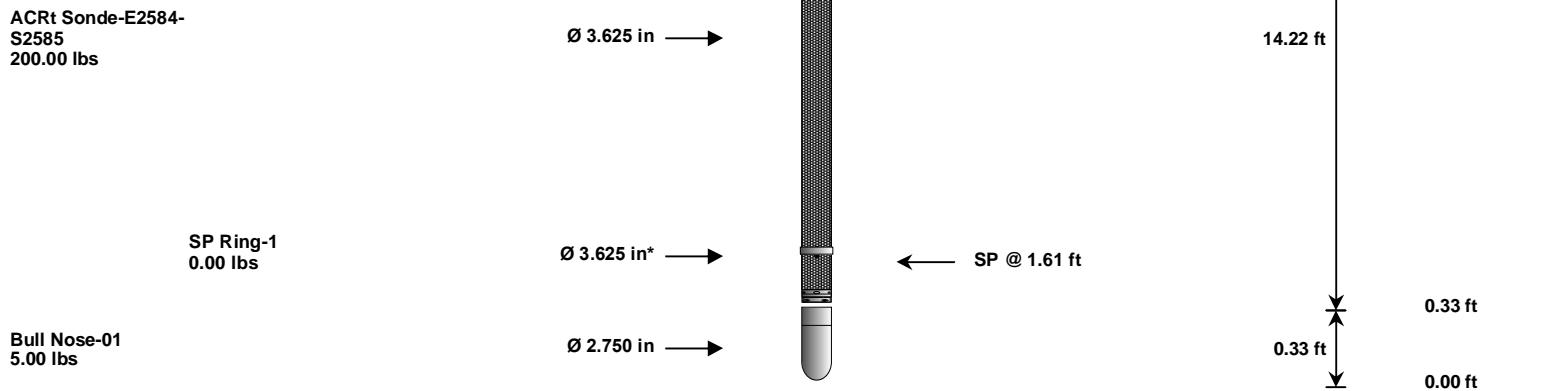
14.55 ft

Regal Standoff 6\_75-01  
20.00 lbs

Ø 6.750 in\* →

← Mud Resistivity @ 13.19 ft

← ACRt @ 9.21 ft



Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)	
RWCH	Releasable Wireline Cable Head		11078326	135.00	6.25	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		11219332	174.00	9.69	30.40	60.00	
DCNT	DSN Decentralizer		10935690	6.60	5.13	*	33.73	300.00
SDLT	Spectral Density Tool		10951319	360.00	10.81		19.58	60.00
MICP	Microlog Pad		10951319	8.00	1.00	*	22.08	60.00
SDLP	Density Insite Pad		M319P593	65.00	2.55	*	21.79	60.00
ACRt	Array Compensated True Resistivity Instrument Section		11532584	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	300.00
RSOF	Regal Standoff 6.75in		01	20.00	0.52	*	13.24	300.00
BLNS	Bull Nose		01	5.00	0.33		0.00	300.00
Total				1,302.60	63.02			
* Not included in Total Length and Length Accumulation.								
Data: NE_LANG_AB35_03\0001 NOBLE\IDLE								
Date: 28-Nov-11 22:05:36								

COMPANY	NOBLE ENERGY		
WELL	LANG USX AB35-03		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY	