

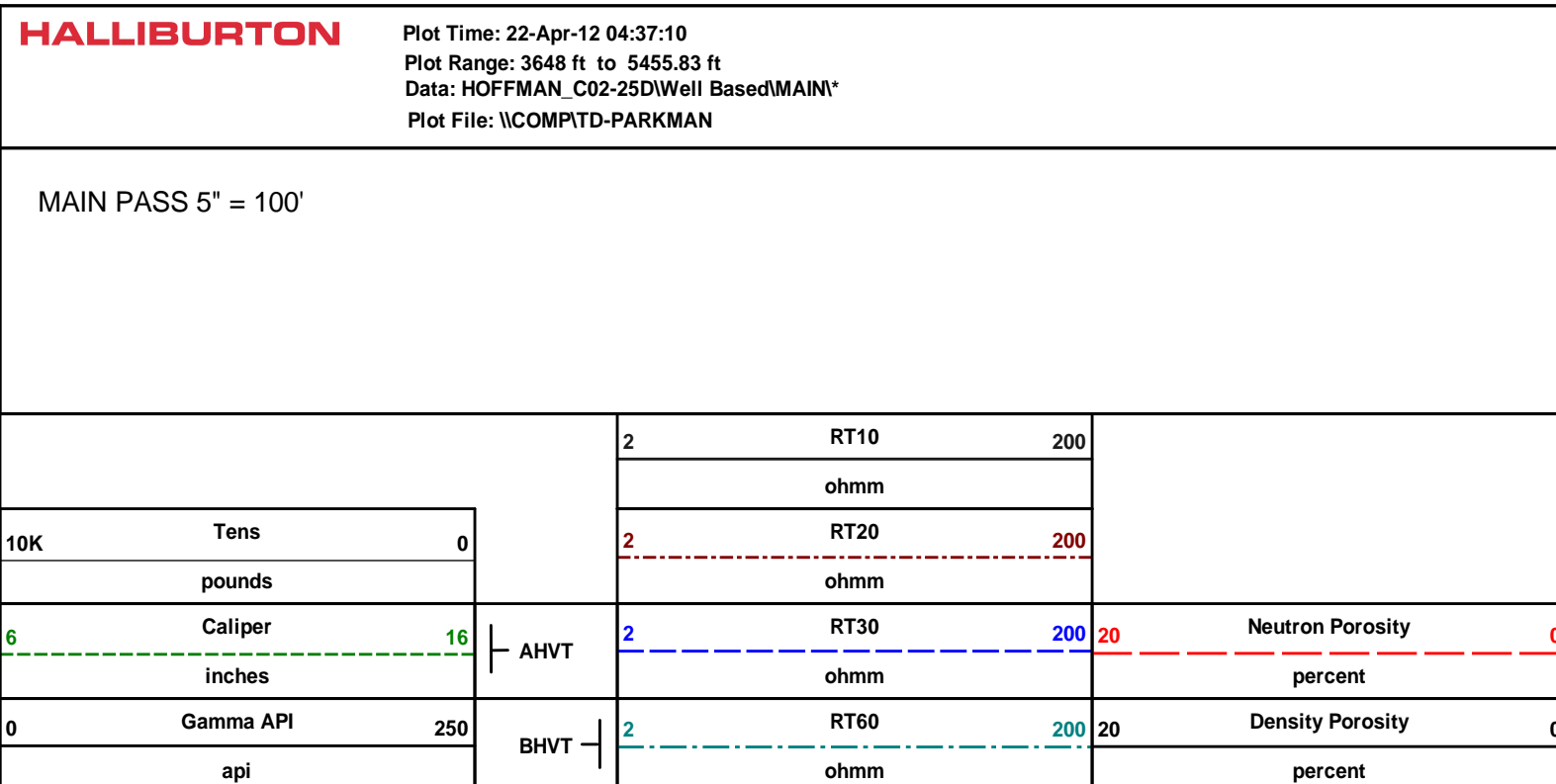
**ARRAY COMPENSATED  
TRUE RESISTIVITY  
SPECTRAL DENSITY  
DUAL SPACED NEUTRON**

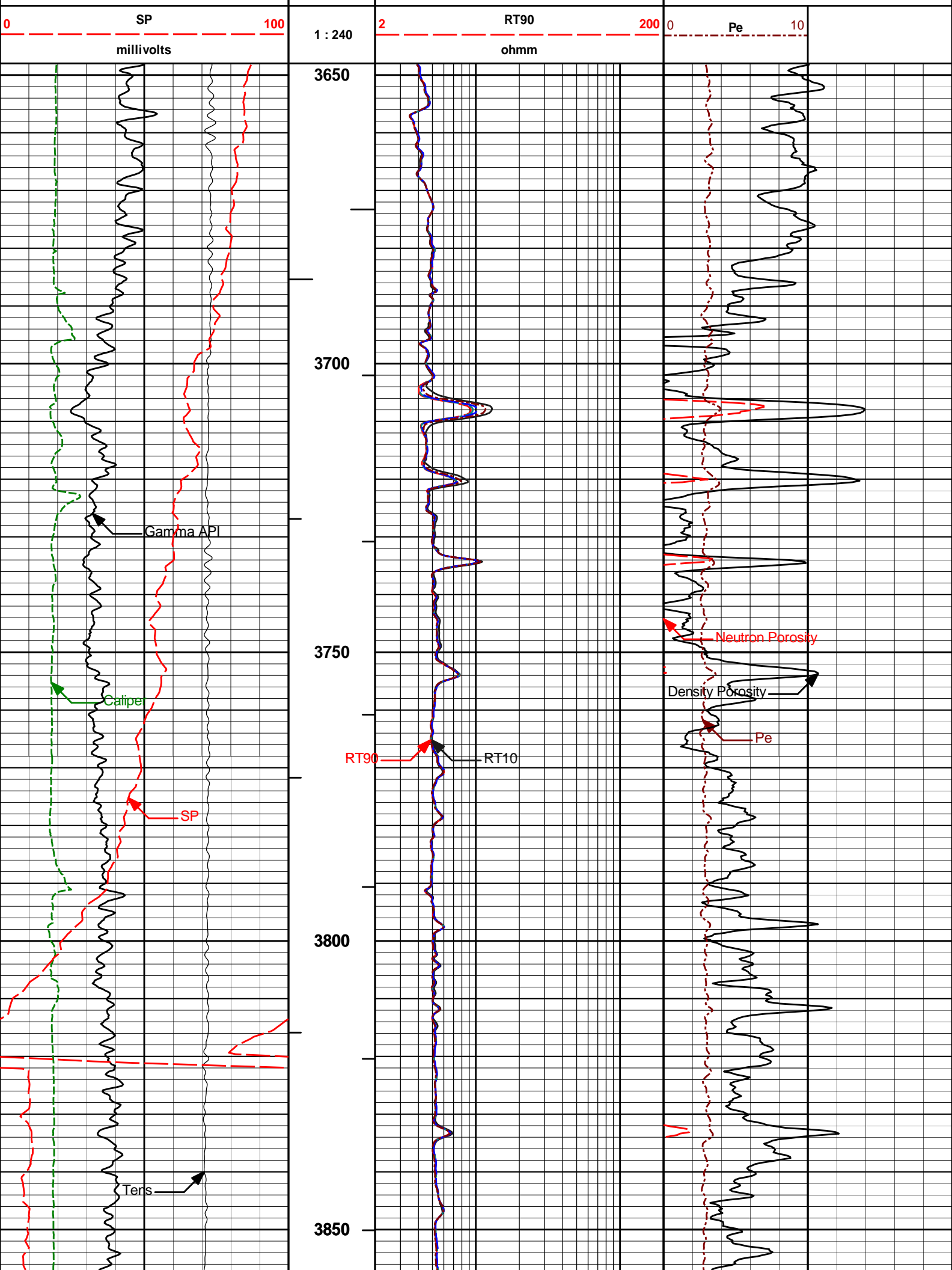
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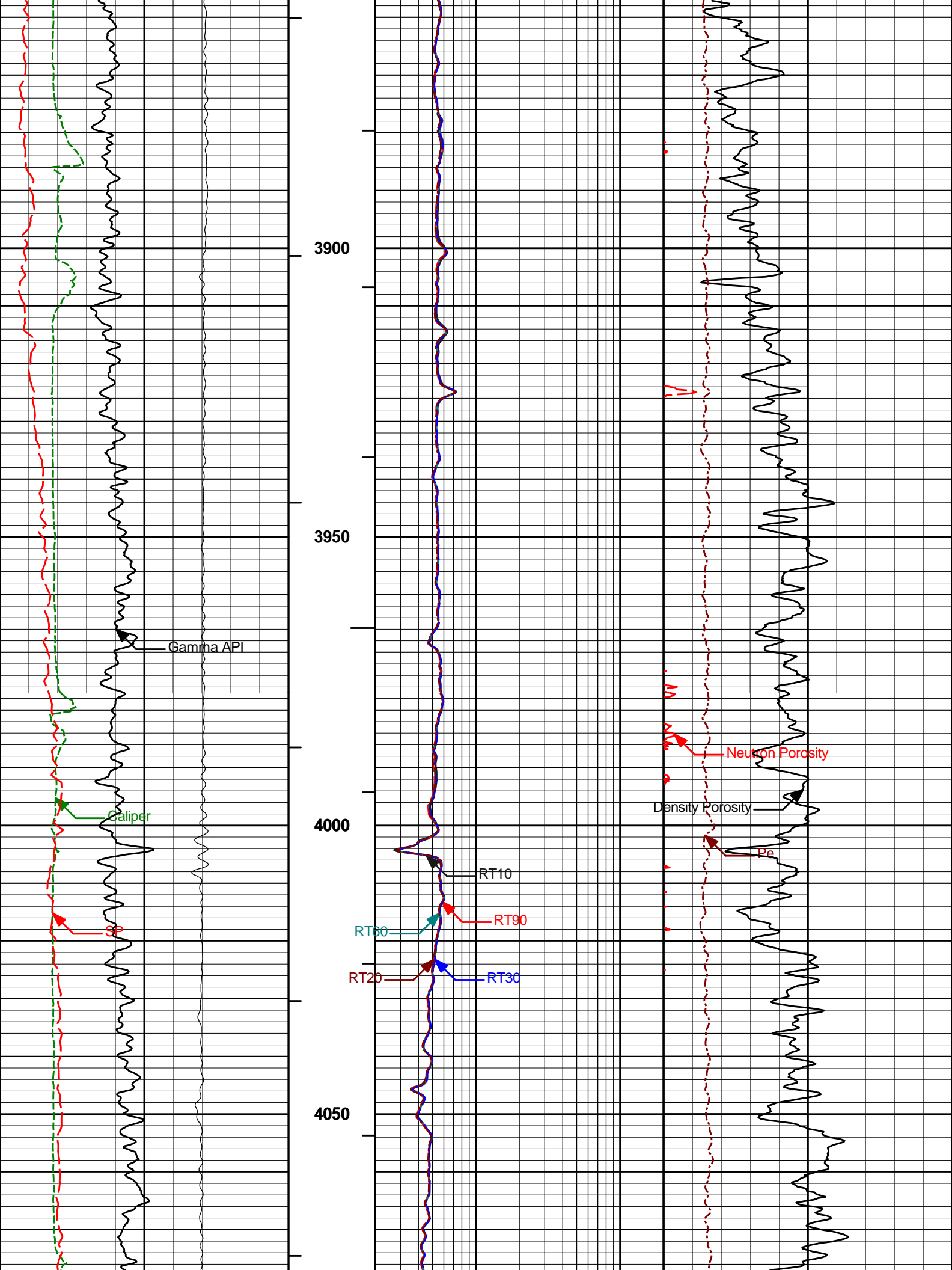
Service Ticket No.: 9456254						API Serial No.: 05123346830000						PGM Version: WL INSITE R3.4.4 (Build 2)																	
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE												RESISTIVITY SCALE CHANGES																	
Date		Sample No.										Type Log		Depth		Scale Up Hole		Scale Down Hole											
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.		Other									
Rmf @ Meas. Temp.				@				@				ONE		ACRt		N/A		1.25" S.O.		N/A									
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.						Run No.			ONE			Run No.			ONE								
Serial No.			11812883			Serial No.						Serial No.			11795867			Serial No.			11812167								
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.			GTET			Spacing						Log Type			GAM-GAM			Log Type			NEU-NEU								
Type			SCINT									Source Type			Cs-137			Source Type			Am241Be								
Length			8"			LSA [Y/N]						Serial No.			2770GW			Serial No.			DSN434								
Distance to Source			17'			FWDA [Y/N ]						Strength			1.5 Ci			Strength			15 Ci								
LOGGING DATA																													
GENERAL						GAMMA						ACOUSTIC						DENSITY						NEUTRON					

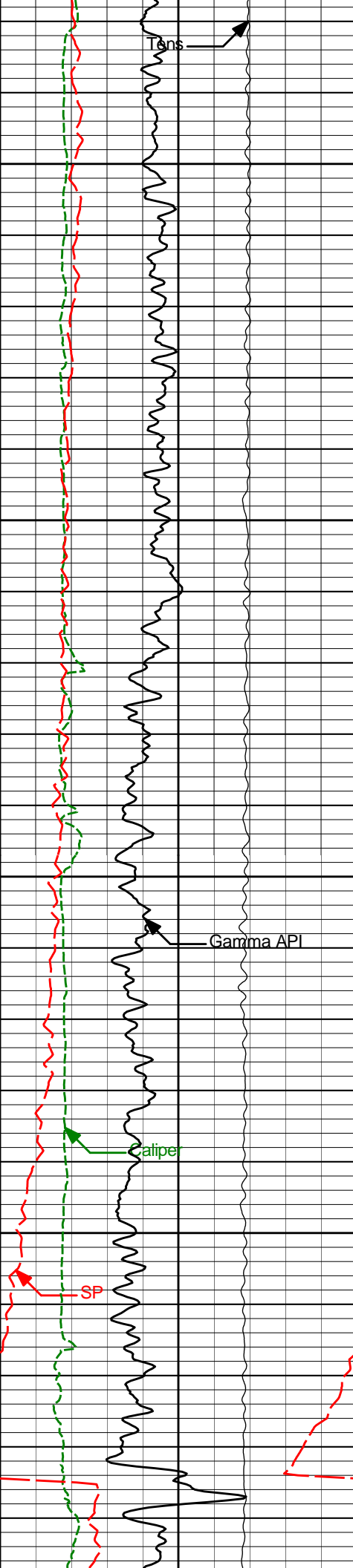
Depth (ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.700	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	700.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	1.070	ohmm
	SHARED	TRM	Temperature of Mud	76.4	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	60.0	degF
	SHARED	TD	Total Well Depth	5460.00	ft
	SHARED	BHT	Bottom Hole Temperature	170.0	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	
	CSNC	CSOK	Process CSNC Data?	Yes	

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	0.250		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
ACRt Sonde	RTOK	Process ACRt?	Yes		
ACRt Sonde	MNSO	Minimum Tool Standoff	1.25		in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up		
ACRt Sonde	TPOS	Tool Position	Eccentered		
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		







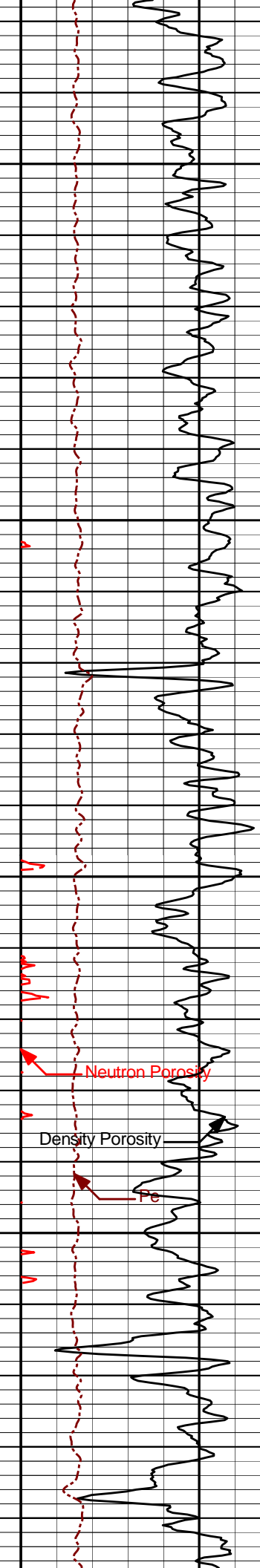
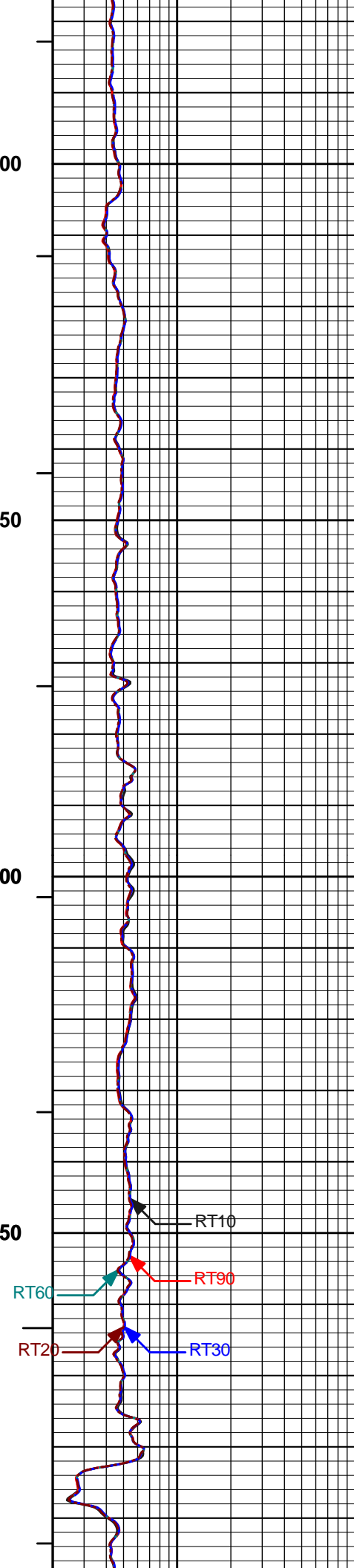


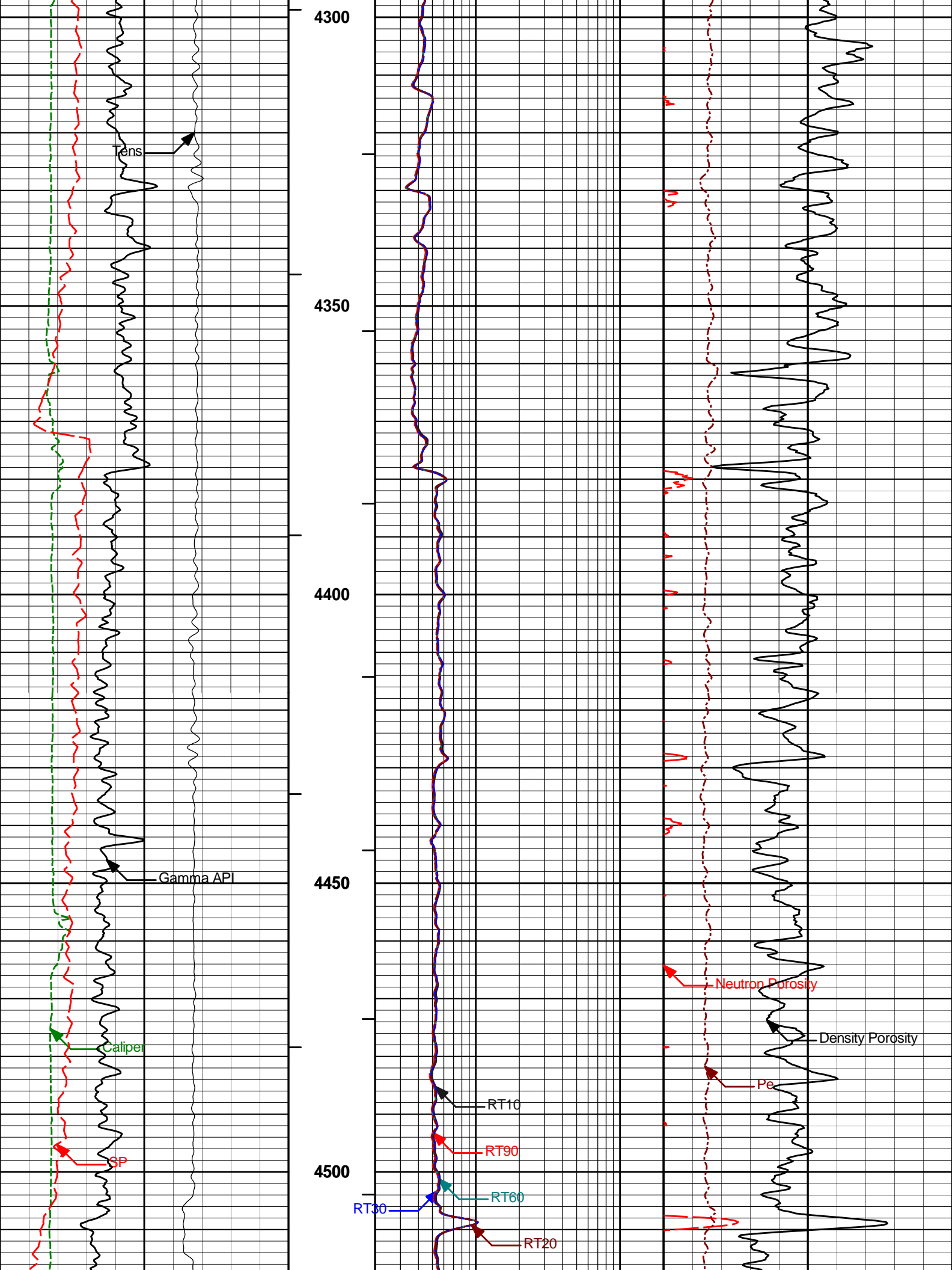
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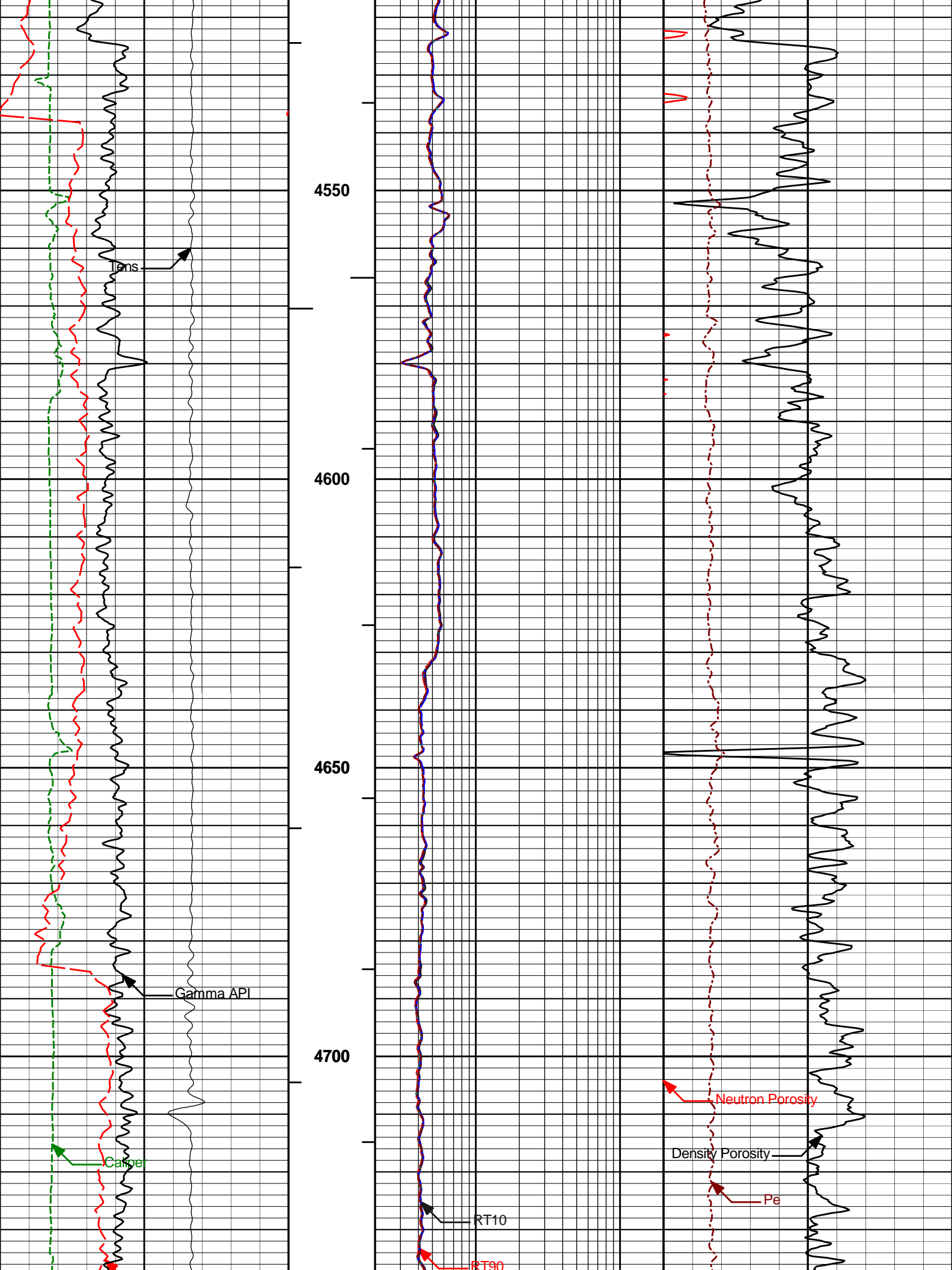
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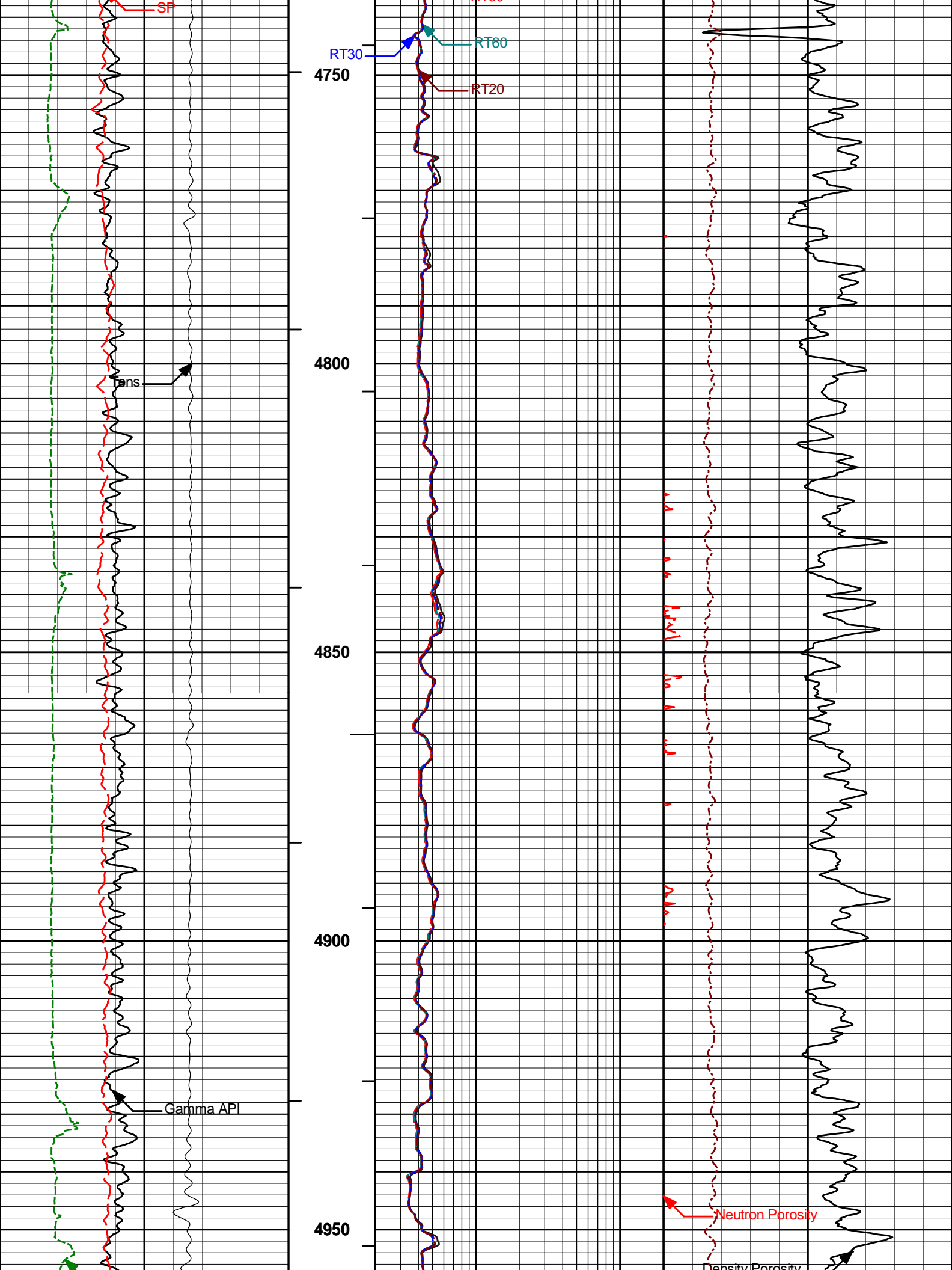
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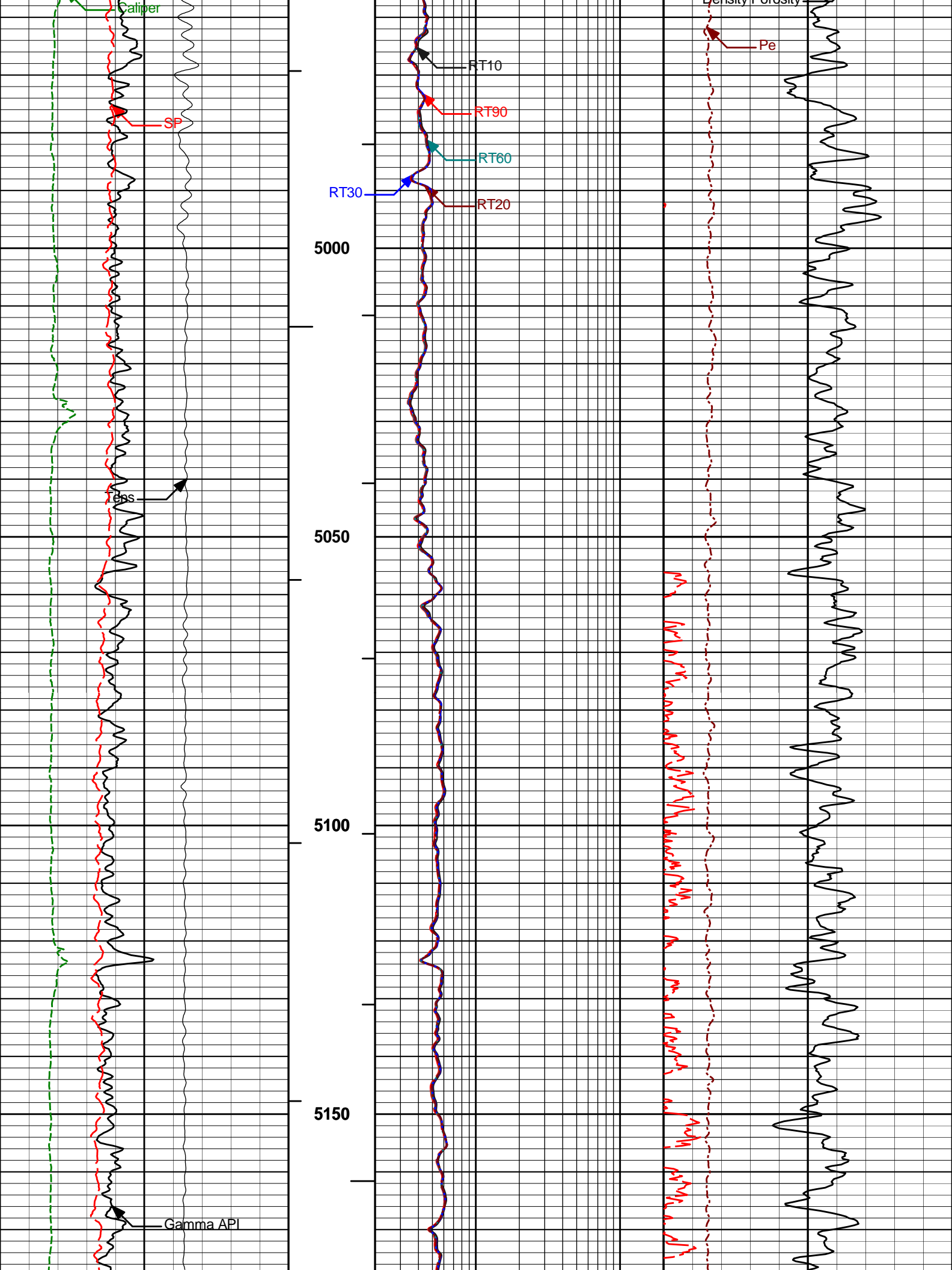


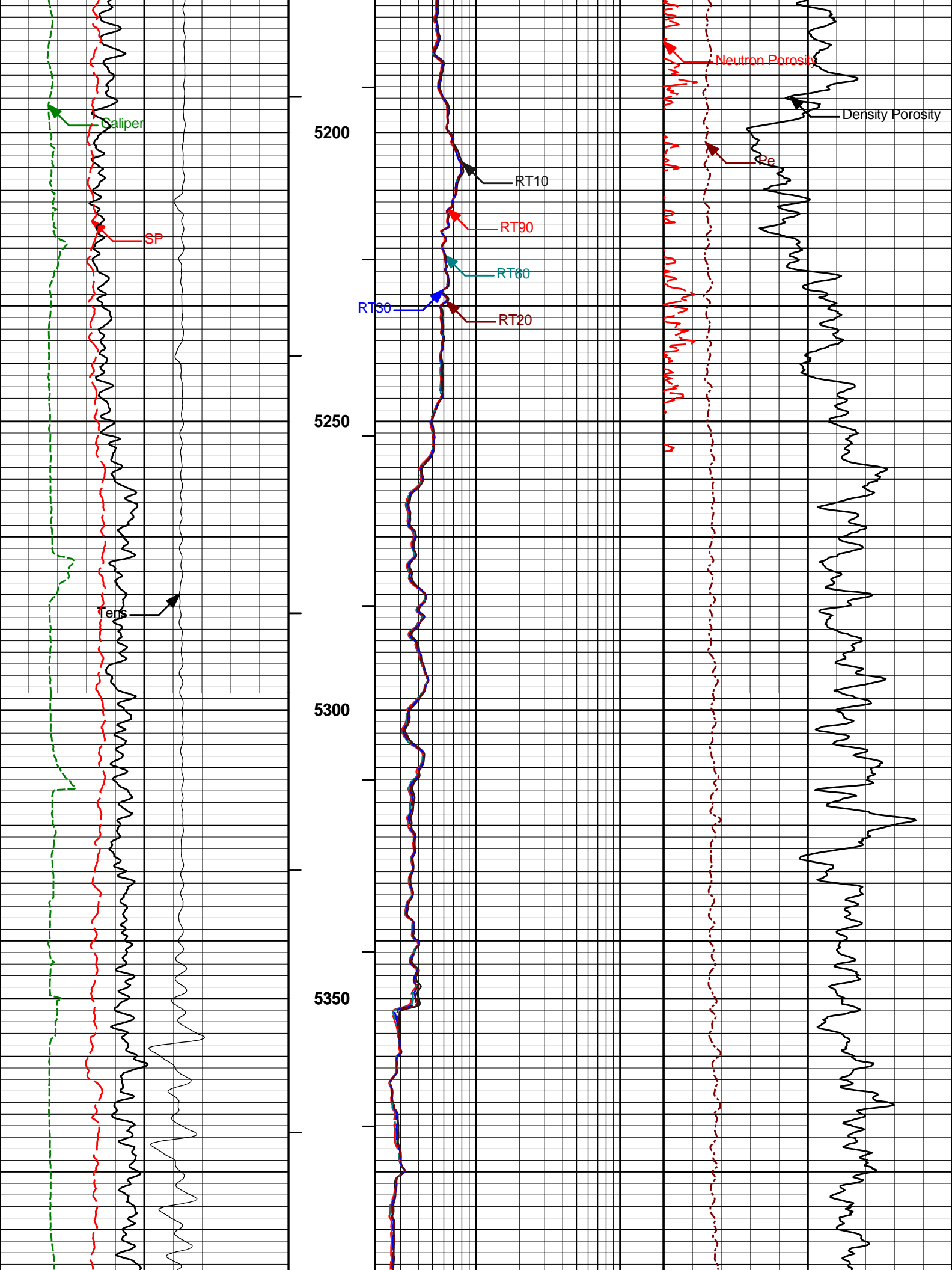


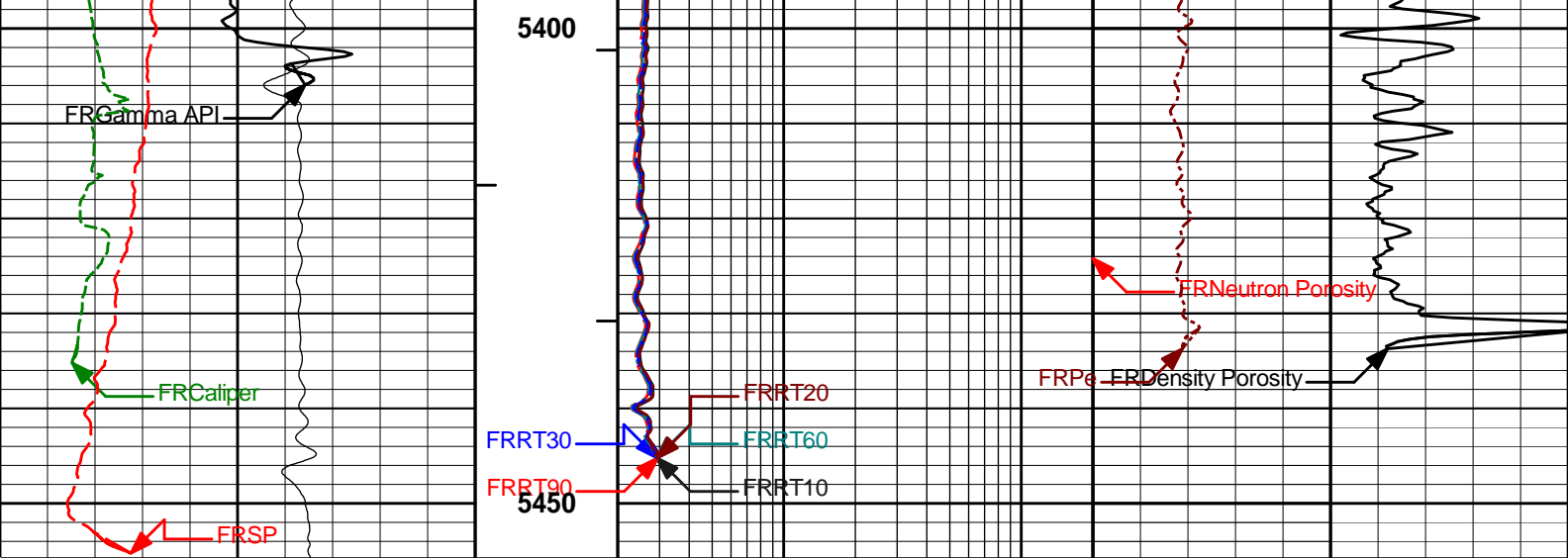












0	SP	100	1 : 240	2	RT90	200	0	Pe	10
	millivolts				ohmm				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				ohmm			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				ohmm			percent	
10K	Tens	0		2	RT20	200			
	pounds				ohmm				
				2	RT10	200			
					ohmm				

**HALLIBURTON**

Plot Time: 22-Apr-12 04:37:12  
Plot Range: 3648 ft to 5455.83 ft  
Data: HOFFMAN\_C02-25D\Well Based\MAIN\*  
Plot File: \\COMPTD-PARKMAN

MAIN PASS 5" = 100'

## **HALLIBURTON**

### **CALIBRATION REPORT**

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11812883	Reference Calibration Date:	13-Apr-12 05:49:57
Engineer:	C. CRADDOCK	Calibration Date:	13-Apr-12 06:00:09
Software Version:	WL INSITE R3.4.4 (Build 2)	Calibration Version:	1

Calibrator Source S/N: TB-289			
Calibrator API Reference: 243.00 api			
Equivalent Calibrator API Reference: 247.3 api			
Measurement	Measured	Calibrated	Units
Background	74.0	69.7	api
Background + Calibrator	336.4	317.0	api
Calibrator	262.4	247.3	api

# DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	DSNT - 11812167	Reference Calibration Date:	19-Mar-12 08:14:24
Engineer:	C. CRADDOCK	Calibration Date:	12-Apr-12 09:44:37
Software Version:	WL INSITE R3.4.4 (Build 2)	Calibration Version:	1

Logging Source S/N: DSN434  
 Tank Serial Number: 11068236  
 Reference value assigned to Tank: 53.720  
 Snow Block S/N: BRIGHTON  
 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:	0.996	0.994	0.900 - 1.100
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WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change

Porosity (decp):	0.2228	0.2224	0.0004	+/- 0.0020
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Calibrated Ratio:	10.13	10.11	0.015	+/- 0.050
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VERIFIER		
Measurement	Value	Control Limit

Snow-Block Porosity (decp):	0.0762	0.02000 - 0.09000
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PASS/FAIL SUMMARY	
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Background Check:	Passed
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Gain-Range Check:	Passed
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Snow-Block Check:	Passed
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## DENSITY CALIPER SHOP CALIBRATION

Tool Name:	SDLT - 11812177	Reference Calibration Date:	28-Mar-12 17:17:02
Engineer:	R. TWEETEN	Calibration Date:	28-Mar-12 17:24:25
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	-3526.45	-3450.88	-7000.00 - -1000.00
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Pad Gain	0.0003849	0.0003812	0.000200 - 0.000600
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Arm Offset	-4491.09	-4543.97	-5000.00 - 3000.00
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Arm Gain	0.0005611	0.0005586	0.000300 - 0.000700
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Arm Power	-0.000004941	-0.000004779	-0.000010 - 0.000010
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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:				
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Small Ring (in)	1.99	2.00	0.01	+/- 0.20
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Medium Ring (in)	3.76	3.75	-0.01	+/- 0.20
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RING DIAMETER:				
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Small Dia (in)	2.54	2.55	0.01	+/- 0.20
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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)		15.01	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 Sonde - E2817-S4353_RED		Reference Calibration Date: 24-Jan-12 12:50:02	
Engineer:		P. DIMPFL		Calibration Date: 24-Jan-12 13:01:08	
Software Version:		WL INSITE R3.4.4 (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	1.0079	1.05	0.95	1.0088	1.05	0.95	1.0051	1.05
A2 (50")	0.95	1.0134	1.05	0.95	1.0162	1.05	0.95	1.0152	1.05
A3 (29")	0.95	1.0073	1.05	0.95	1.0096	1.05	0.95	1.0068	1.05
A4 (17")	0.95	1.0110	1.05	0.95	1.0108	1.05	0.95	1.0108	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0090	1.05	0.95	1.0070	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9969	1.05	0.95	0.9952	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	-0.598	2	-6	-4.362	-2	-8	-4.801	-2
A2 (50")	-7	-1.706	-1	-6	-2.982	-2	-7	-4.717	-2
A3 (29")	-27	-12.943	-9	-9	-3.481	-3	-7	-3.493	-1
A4 (17")	-180	-91.114	-60	-45	-29.339	-15	-39	-25.011	-13
A5 (10")	N/A	N/A	N/A	-150	-92.347	-50	-80	-44.780	-10
A6 (6")	N/A	N/A	N/A	175	335.018	525	90	167.676	270

TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION			
Signal	Lower		R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K		0.6	0.8693	1.3	Mud Cell	0.95	0.997	1.05
36K		1.0	1.8356	2.0				
72K		1.0	1.1121	2.0				

SPECTRAL DENSITY SHOP CALIBRATION					
Tool Name:		SDLT Pad - 11795867		Reference Calibration Date: 28-Mar-12 16:30:28	
Engineer:		R. TWEETEN		Calibration Date: 28-Mar-12 16:52:37	
Software Version:		WL INSITE R3.4.4 (Build 2)		Calibration Version: 1	

Logging Source S/N: 2770GW						
Aluminum Block S/N: 63066			Density: 2.602g/cc		Pe: 3.100	
Magnesium Block S/N: 12345			Density: 1.690g/cc		Pe: 2.650	
DENSITY CALIBRATION SUMMARY						
Measurement		Previous Value		New Value		Control Limit
Near Bar Gain		1.0418		1.0478		0.90 - 1.10

Near Dens Gain	1.0127	1.0217	0.90 - 1.10
Near Peak Gain	0.9976	1.0028	0.90 - 1.10
Near Lith Gain	0.9474	0.9469	0.90 - 1.10
Far Bar Gain	1.0132	1.0142	0.90 - 1.10
Far Dens Gain	0.9955	0.9949	0.90 - 1.10
Far Peak Gain	0.9874	0.9844	0.90 - 1.10
Far Lith Gain	0.9605	0.9611	0.90 - 1.10

Near Bar Offset	-0.1002	-0.1555	NONE
Near Dens Offset	0.1672	0.0877	NONE
Near Peak Offset	0.2951	0.2532	NONE
Near Lith Offset	0.6781	0.6828	NONE
Far Bar Offset	0.1359	0.1291	NONE
Far Dens Offset	0.2842	0.2898	NONE
Far Peak Offset	0.3322	0.3585	NONE
Far Lith Offset	0.5330	0.5252	NONE

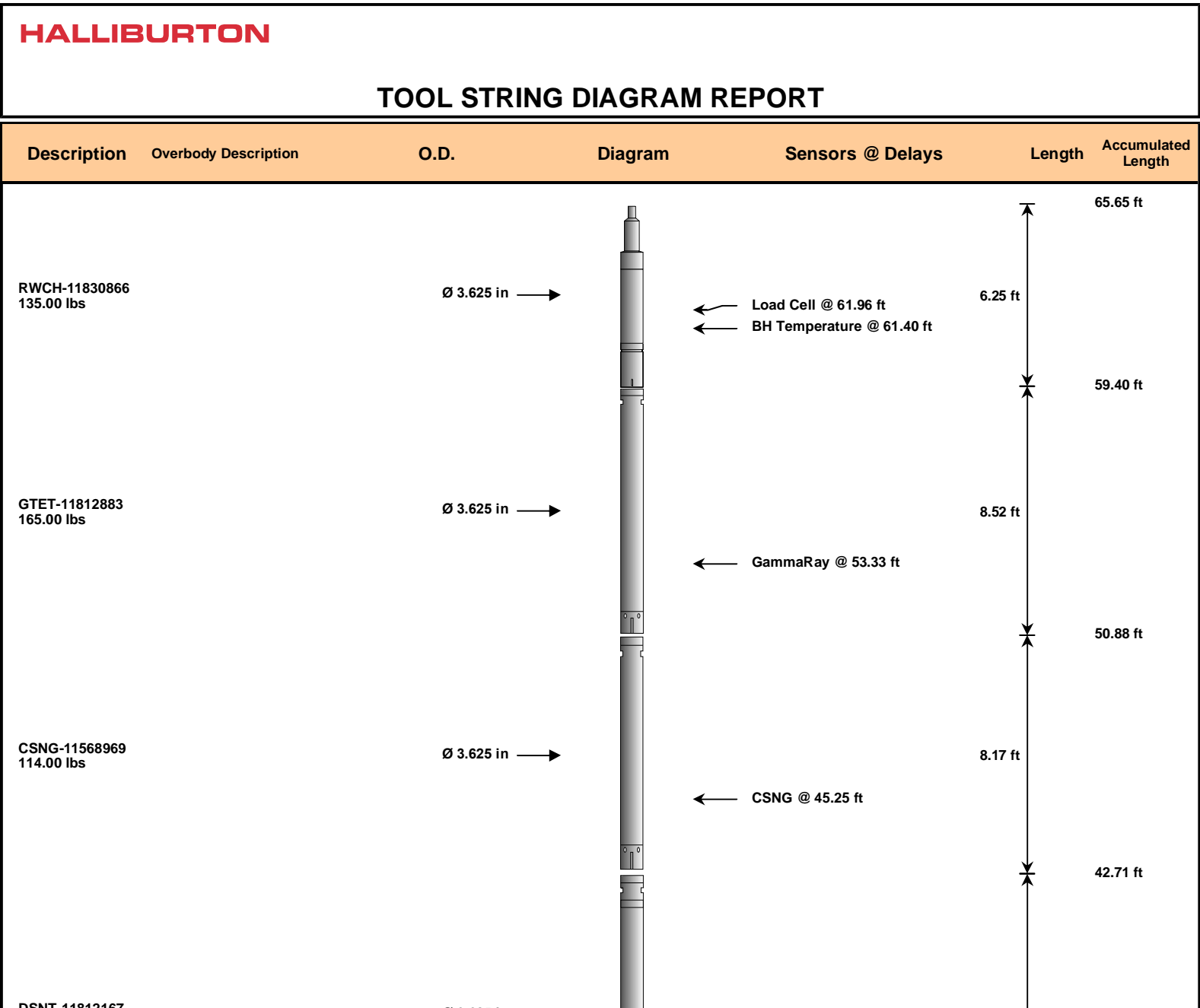
Near Bar Background	856.12	859.43	700 - 1450
Near Dens Background	284.80	284.05	230 - 480
Near Peak Background	123.07	124.02	100 - 210
Near Lith Background	151.88	152.85	125 - 260
Far Bar Background	667.47	667.44	450 - 900
Far Dens Background	262.58	262.31	175 - 345
Far Peak Background	105.22	104.54	70 - 140
Far Lith Background	107.69	107.48	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.691	1.690	-0.001	+/- 0.015
Pe	2.610	2.605	-0.005	+/- 0.150
ALUMINUM				
Density (g/cc)	2.604	2.602	-0.002	+/- 0.01500
Pe	3.075	3.064	-0.011	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0008	+/- 0.0110	0.0016	+/- 0.0140
Magnesium Block	-0.0005	+/- 0.0110	-0.0004	+/- 0.0140
Aluminum Block	-0.0002	+/- 0.0110	-0.0004	+/- 0.0140
Resolution	8.65	6.00 - 11.50	8.90	6.00 - 11.50
Internal Verifier(B+D+P+L)	1420	1200 - 2700	1142	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
Quality Check:	Passed

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11812883						
Gamma Ray Calibrator	247.3	-----	-----	0.0	+/- 9.00	api
DSNT-11812167						
Snow-Block Porosity	0.0762	-----	-----	0.0000	+/- -.--	decp
SDLT-11812177						
Pad Extension	3.75	-----	-----	0.00	+/-0.20	in
Ring Diameter	8.25	-----	-----	0.00	+/-0.20	in
ACRt Sonde-E2817-S4353_RED						
Mud Cell	0.997	-----	-----	0.000	-----	ohm-m
SDLT Pad-11795867						
Near(B+D+P+L)	1420.341	-----	-----	0.000	+/-13.309	cps
Far(B+D+P+L)	1141.777	-----	-----	0.000	+/-16.036	cps
Data: HOFFMAN_C02-25D\0001 NOBLE\IDLE					Date: 22-Apr-12 02:40:13	





Date: 22-Apr-12 02:36:54

COMPANY	NOBLE ENERGY INC		
WELL	HOFFMAN C02-25D		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
<b>HALLIBURTON</b>		ARRAY COMPENSATED TRUE RESISTIVITY SPECTRAL DENSITY DUAL SPACED NEUTRON	