HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY SPECTRAL DENSITY DUAL SPACED NEUTRON

COMPANY **NOBLE ENERGY INC**

WELL **IRVINE PC E02-18**

FIELD **WATTENBERG**

COUNTY **WELD** STATE **CO**

API No.	05123336320000	Other Services: RWCH, CSNG, BSAT
Location	SURFACE LOCATION: 1,411' FNL & 2,507' FEL SWNE LATITUDE: 40.518900° LONGITUDE: -104.629620°	
Sect. 2	Twp. 6N	Rge. 65W

Permanent Datum	GL	Elev. 4830.0 ft	Elev.: K.B. 4843.0 ft
Log measured from	KB	, 13.0 ft above perm. Datum	D.F. 4843.0 ft
Drilling measured from	KB		G.L. 4830.0 ft

Date		15-Feb-12					
Run No.		ONE					
Depth - Driller		7328.00 ft					
Depth - Logger		7325.0 ft					
Bottom - Logged Interval		7321 ft					
Top - Logged Interval		3748 ft					
Casing - Driller		8.625 in @ 699.0 ft		@		@	
Casing - Logger		700.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		WATER BASED MUD					
Density	Viscosity	9.7 ppg	45.00 s/qt				
PH	Fluid Loss	8.00 pH	9.6 cptm				
Source of Sample		MUD CELL					
Rm @ Meas. Temperature		0.900 ohmm @ 54.70 degF		@		@	
Rmf @ Meas. Temperature		0.56 ohmm @ 75.00 degF		@		@	
Rmc @ Meas. Temperature		0.642 ohmm @ 75.00 degF		@		@	
Source Rmf	Rmc	CHART	CHART				
Rm @ BHT		0.26 ohmm @ 210.0 degF		@		@	
Time Since Circulation		6.5 hr					
Time on Bottom		15-Feb-12 20:15					
Max. Rec. Temperature		210.0 degF @ 7325.0 ft		@		@	
Equipment	Location	11454566	BRIGHTON				
Recorded By		R. TWEETEN					
Witnessed By		J. TAYLOR					

Fold here

Service Ticket No.: 9285717 API Serial No.: 05123336320000 PGM Version: WL INSITE R3.4.2 (Build 2)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

RESISTIVITY SCALE CHANGES

	Sample No.	Type Log	Depth	Scale Up Hole	Scale Down Hole
Date					
Depth-Driller					
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample					
Rm @ Meas. Temp	@				
Rmf @ Meas. Temp.	@				
Rmc @ Meas. Temp.	@				
Source Rmf	Rmc				
Rm @ BHT	@				
Rmf @ BHT	@				
Rmc @ BHT	@				

RESISTIVITY EQUIPMENT DATA

	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
	@				
	ONE	ACRt	N/A	1.25" S.O.	N/A
	@	E2817-S4353			
	@				
	@				
	@				
	@				

EQUIPMENT DATA

	GAMMA		ACOUSTIC		DENSITY		NEUTRON	
	Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
	Serial No.	11294346	Serial No.	11105780	Serial No.	M271_P123	Serial No.	11277440
	Model No.	GTET	Model No.	BSAT	Model No.	SDLT	Model No.	DSNT
	Diameter	3.625"	No. of Cent.	TWO	Diameter	4.5"	Diameter	3.625"
	Detector Model No.	GTET	Spacing	0.5'	Log Type	GAM-GAM	Log Type	NEU-NEU
	Type	SCINT			Source Type	CS-137	Source Type	AM241BE
	Length	8"	LSA [Y/N]	YES	Serial No.	2770GW	Serial No.	DSN434
	Distance to Source	17'	FWDA [Y/N]	YES	Strength	1.5 CI	Strength	15 CI

LOGGING DATA

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	7121	REC	0	250	20	0	55.5	20	0	2.68	20	0	SAND
ONE	7121	6839	REC	0	250	20	0	47.6	20	0	2.71	20	0	LIME
ONE	6839	CSG	REC	0	250	20	0	55.5	20	0	2.68	20	0	SAND

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: RWCH-GTET-CSNG-DSNT-SDLT-BSAT-ACRt RUN IN COMBINATION.
ANNULAR HOLE VOLUME CALCULATED USING 4.5-INCH PRODUCTION CASING.
TENSION PULLS, WASHOUTS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE.
CHLORIDES REPORTED AT 800 ppm.
REPEAT PASS NOT RUN AT CLIENT'S REQUEST.

YOUR CREW TODAY: R. PERSHALL, S. KEENER, B. GODFREY, I. KHALID, C. CRADDOCK RIG: ENSIGN 136
THANK YOU FOR USING HALLIBURTON LOGGING SERVICES - BRIGHTON, CO - (303) 825-4346

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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
	BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
6839.00					
	DSNT	NLIT	Neutron Lithology	Limestone	
	SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
	BSAT	DTMT	Delta -T Matrix Type	User define	
	BSAT	DTMA	Delta -T Matrix	47.60	uspf
7121.00					
	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	9.700	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	800.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.900	ohmm
	SHARED	TRM	Temperature of Mud	54.7	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	45.0	degF
	SHARED	TD	Total Well Depth	7325.00	ft

SHARED	BHT	Bottom Hole Temperature	210.0	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	0.250	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
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Frequency Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Frequency Filter High Pass Value?	27000	Hz
BSAT	DTFL	Delta -T Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	DTSH	Delta -T Shale	100.00	uspf
BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.25	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
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

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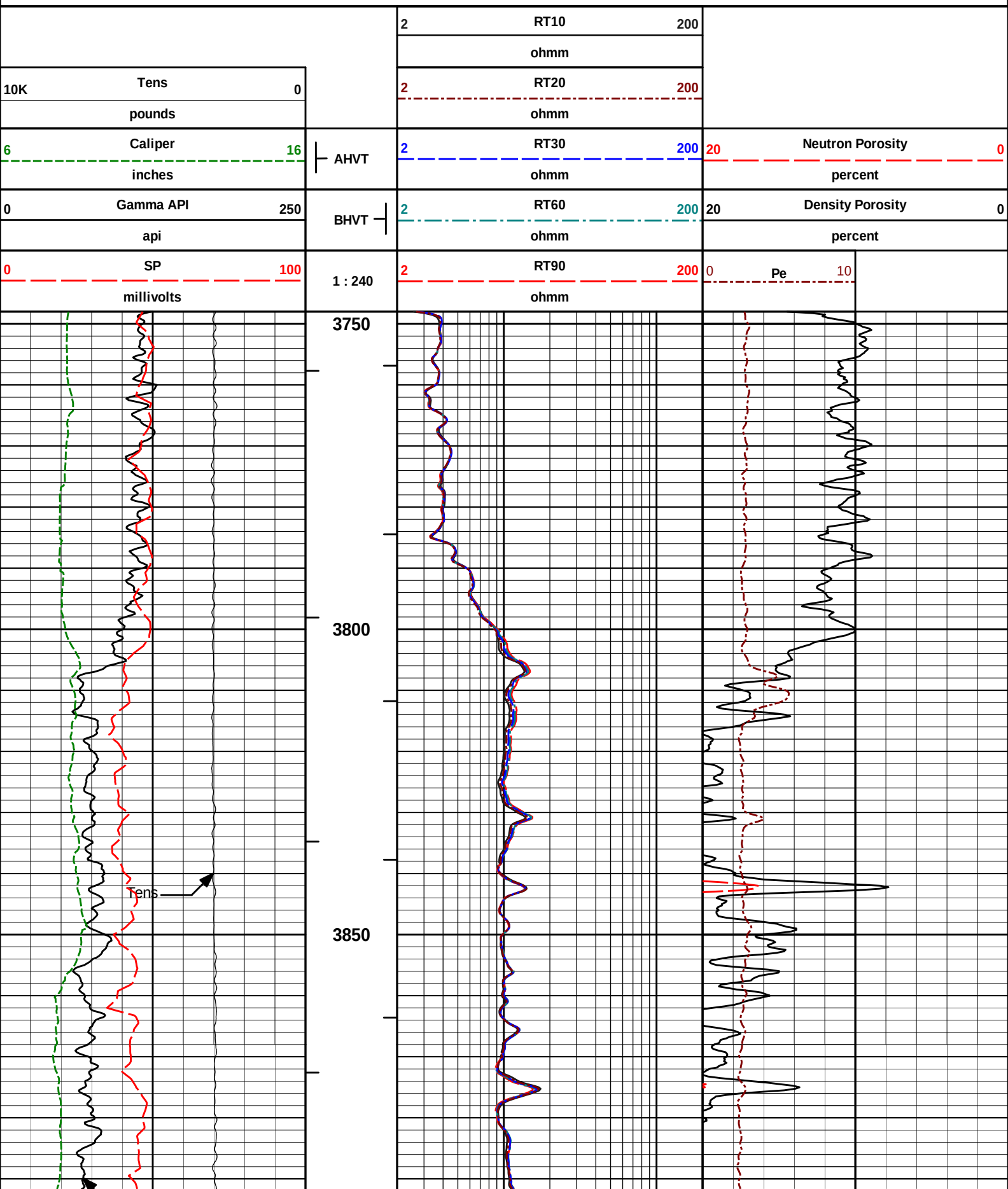
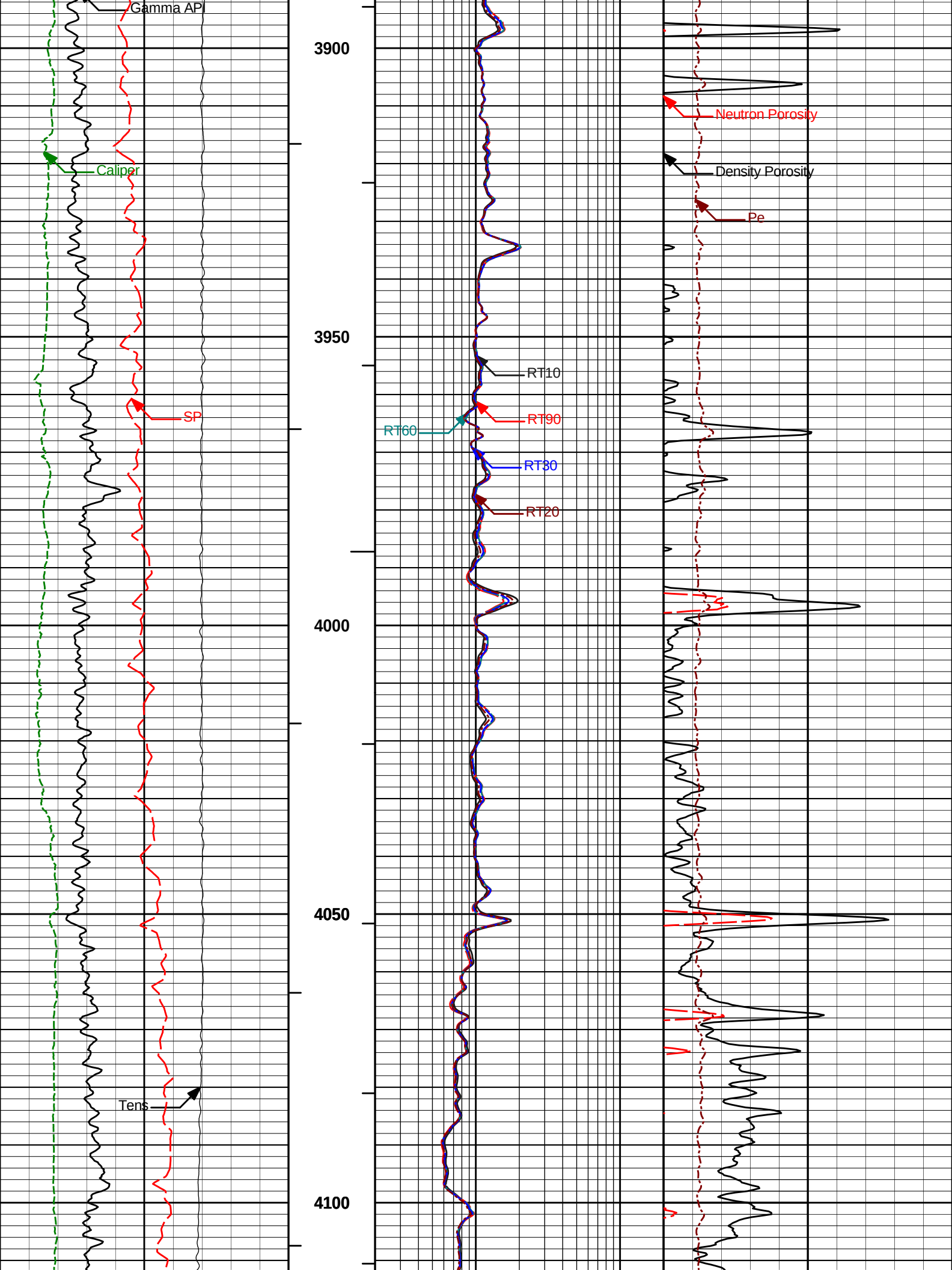
Plot Time: 15-Feb-12 22:28:49
Plot Range: 3748 ft to 4752 ft
Data: IRVINEPC_E02-18\Well Based\MAIN*
Plot File: \\COMP\SUSX-PARK

MAIN PASS 5" = 100'

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Caliper
SP
Tens
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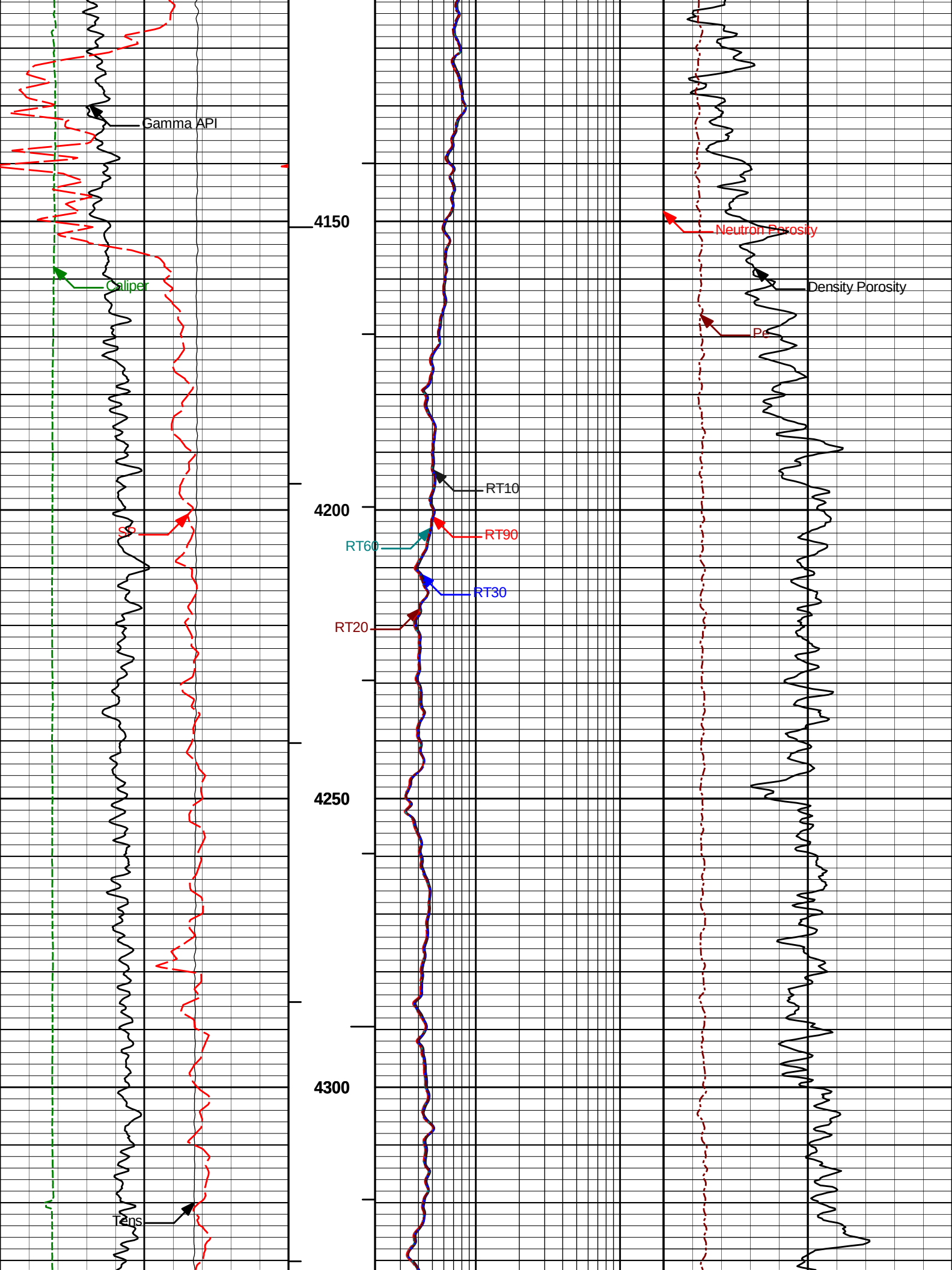
3950
4000
4050
4100
RT10
RT90
RT60
RT30
RT20
Neutron Porosity
Density Porosity
Pe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Tens
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4200
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RT10
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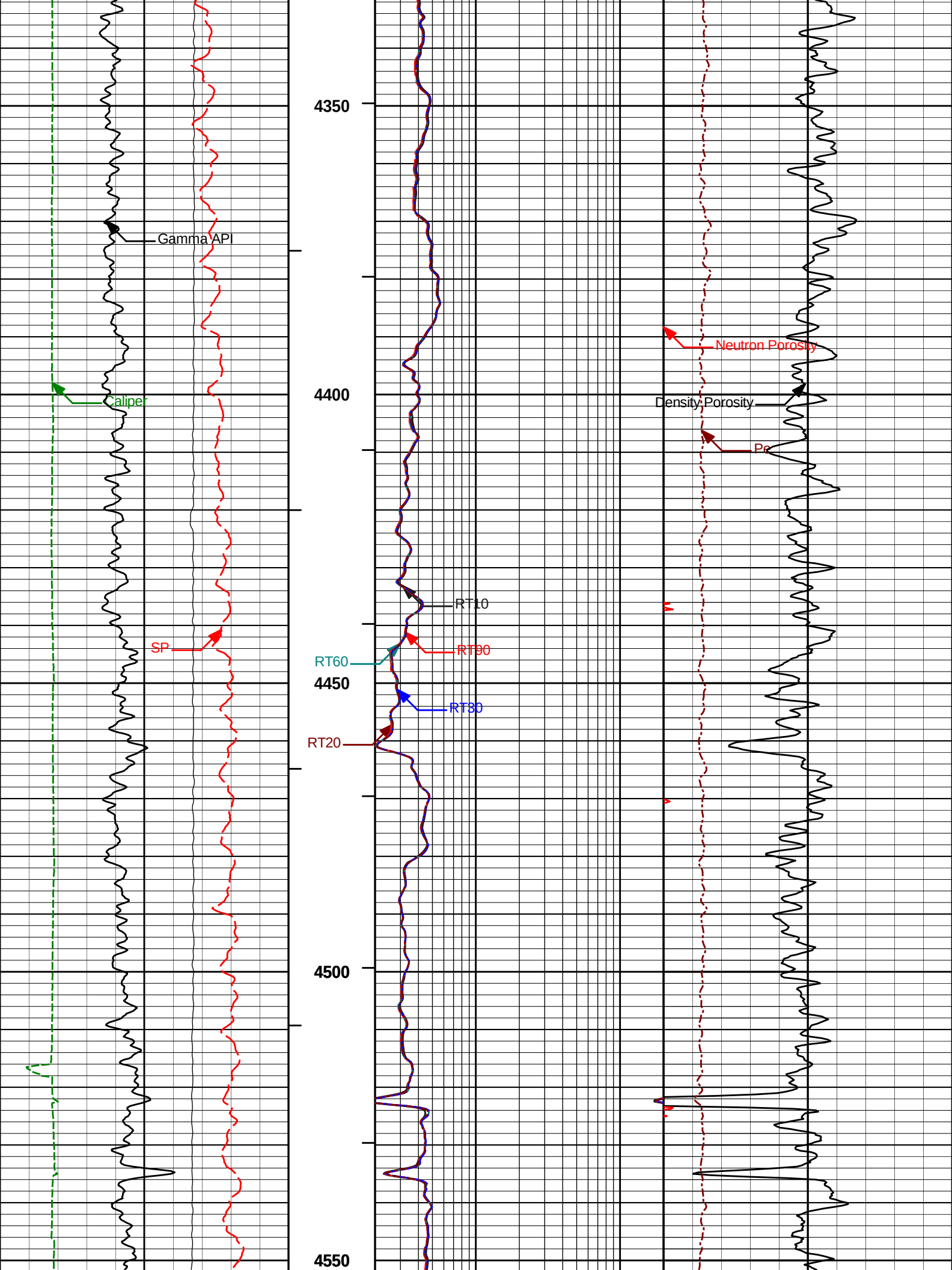
RT30
RT20
Neutron Porosity
Density Porosity
Pe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Caliper
SP
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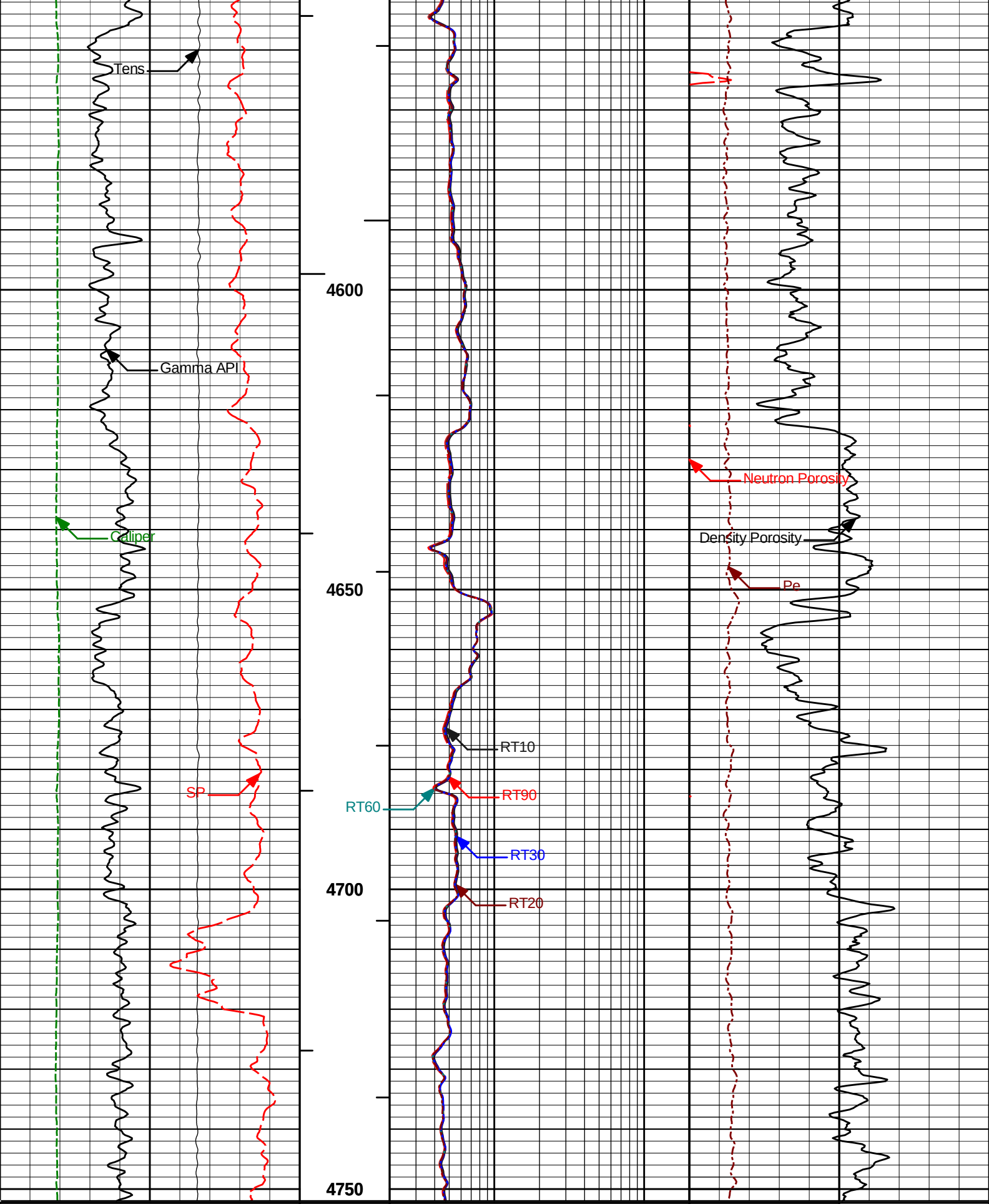
4400
4450
4500
4550
RT10
RT90
RT60
RT30
RT20
Neutron Porosity
Density Porosity
Pe



0 SP 100		2 RT90 200	0 Pe 10	
millivolts	1 : 240	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		

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Plot Time: 15-Feb-12 22:28:51
Plot Range: 3748 ft to 4752 ft
Data: IRVINEPC_E02-18\Well Based\MAIN*
Plot File: \\COMP\SUSX-PARK

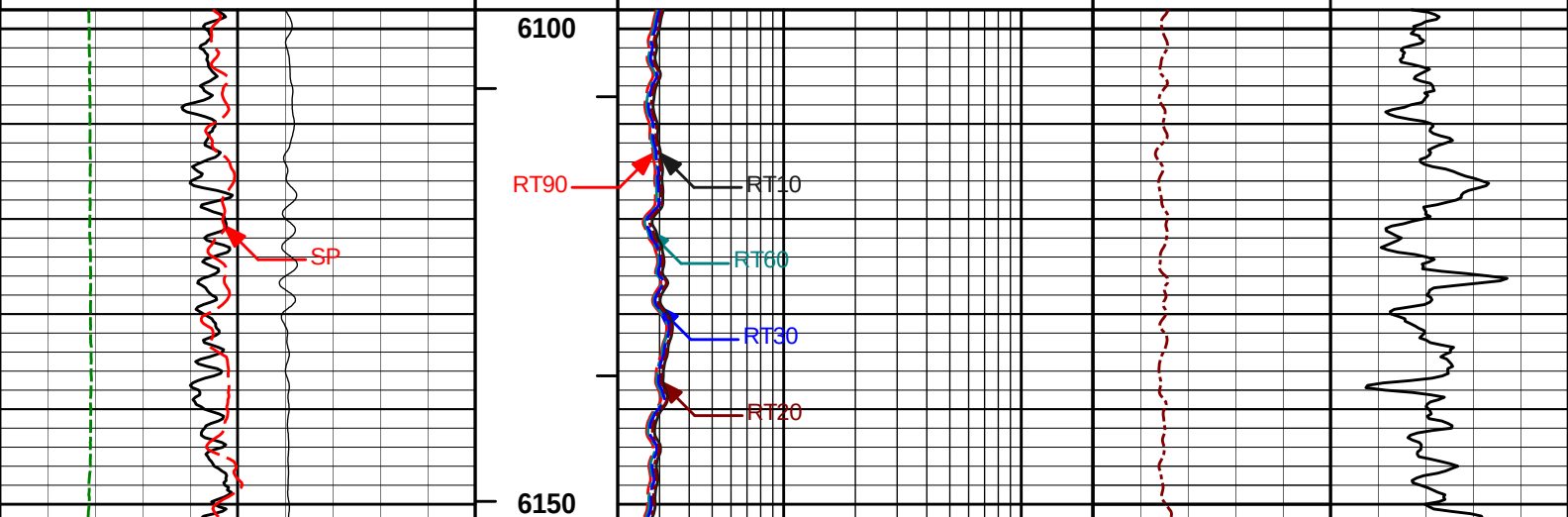
MAIN PASS 5" = 100'

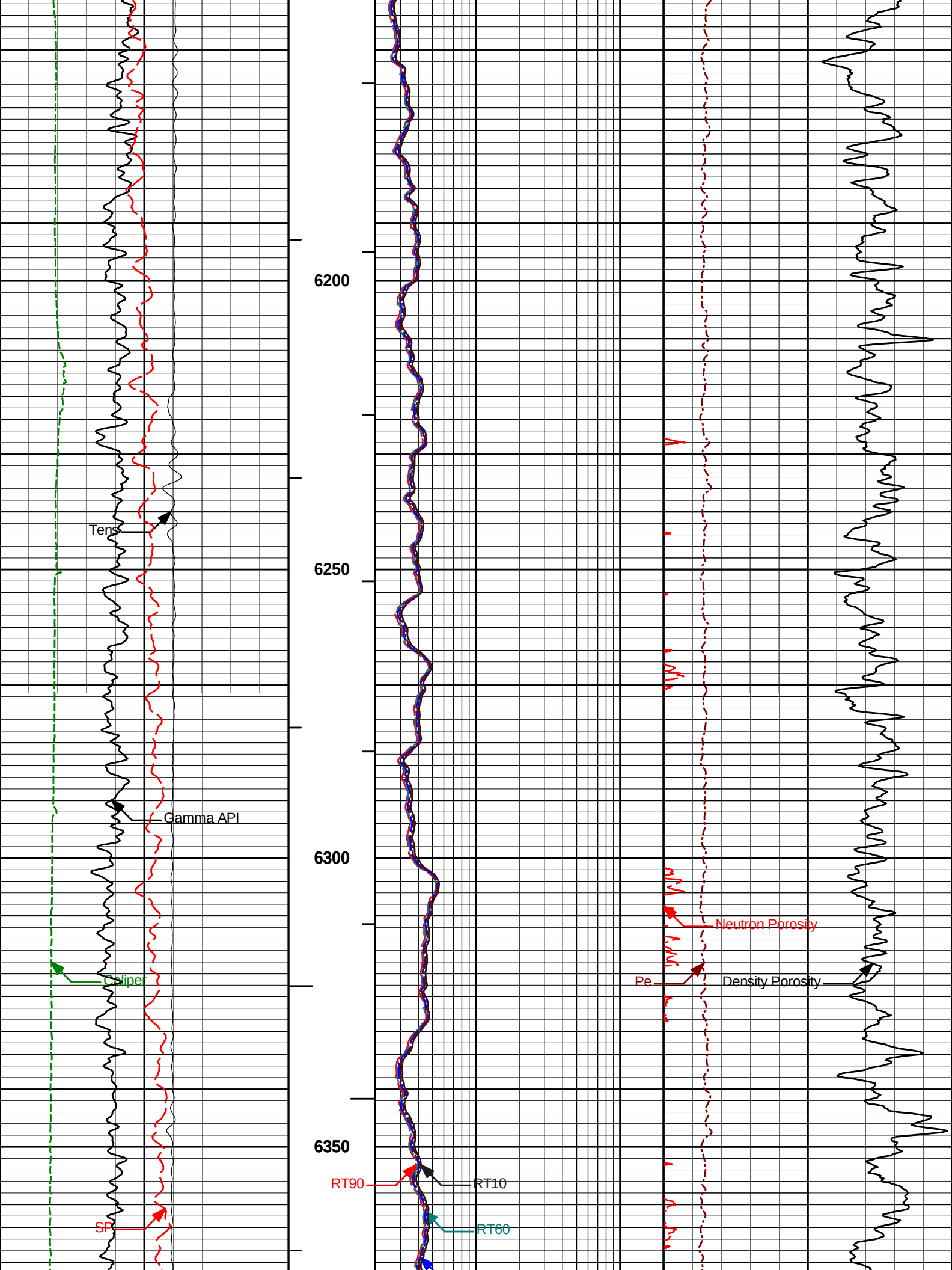
HALLIBURTON

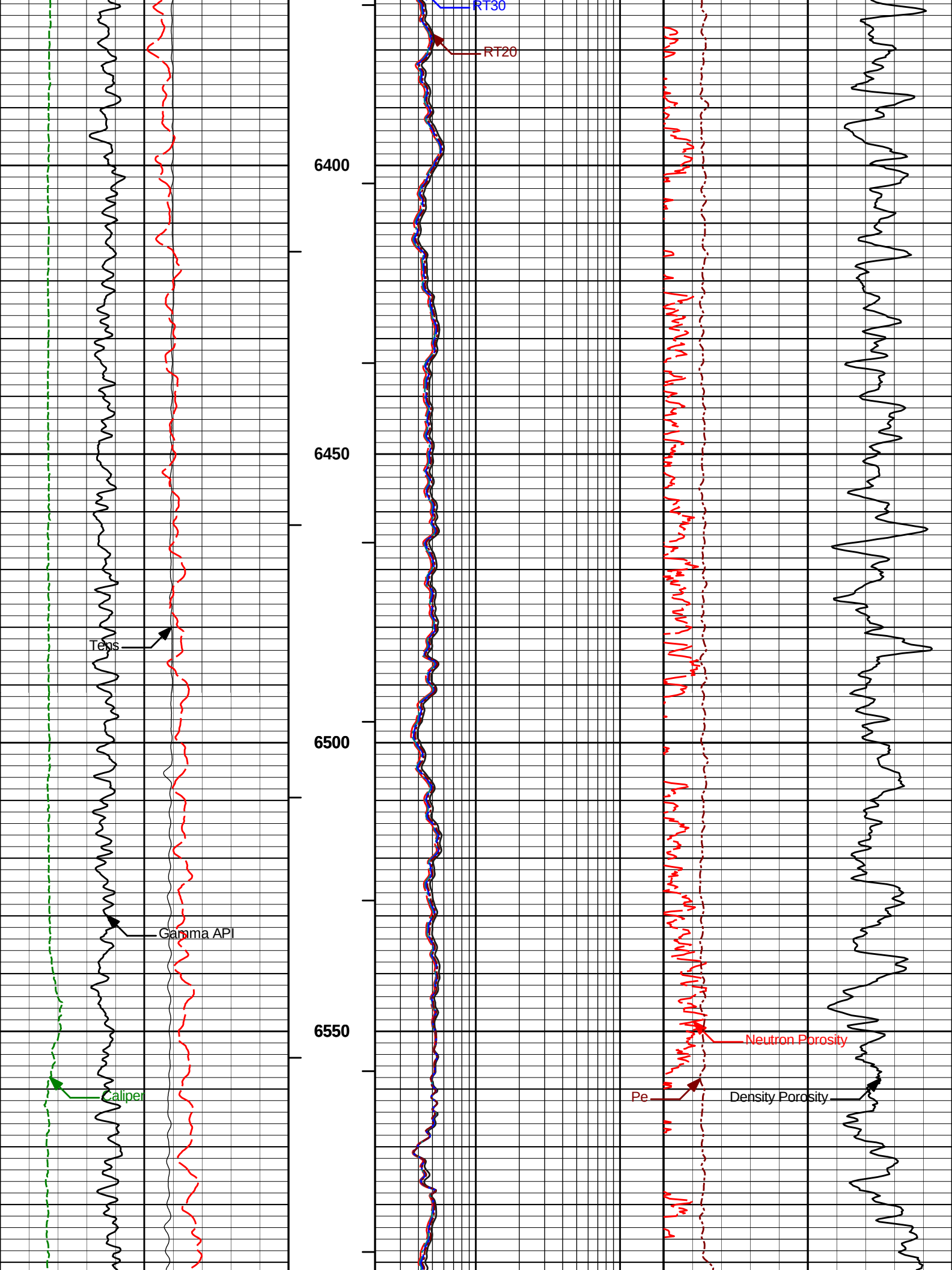
Plot Time: 15-Feb-12 22:28:52
Plot Range: 6098 ft to 7332.92 ft
Data: IRVINEPC_E02-18\Well Based\MAIN*
Plot File: \\COMP\TD-NIO

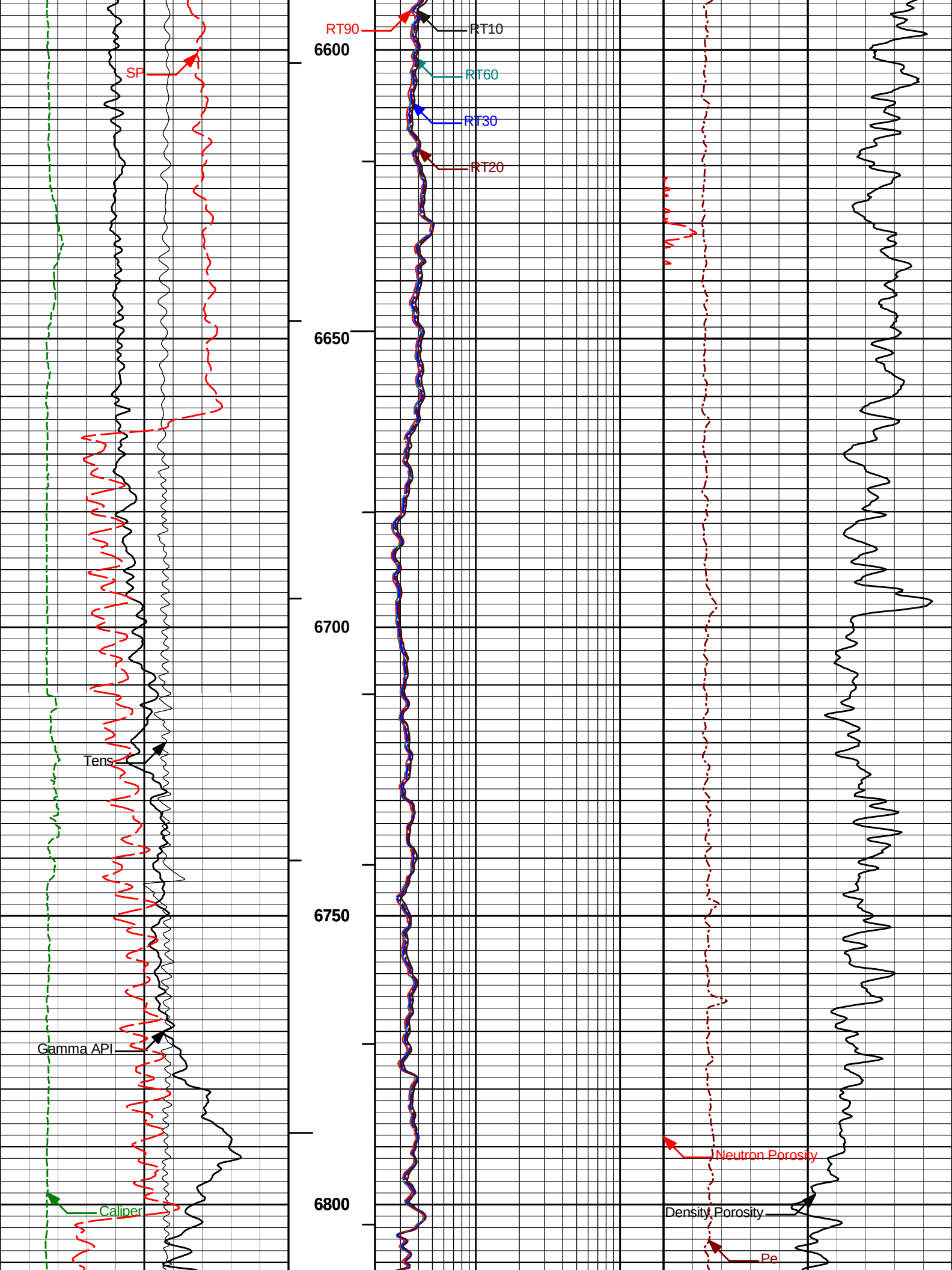
MAIN PASS 5" = 100'

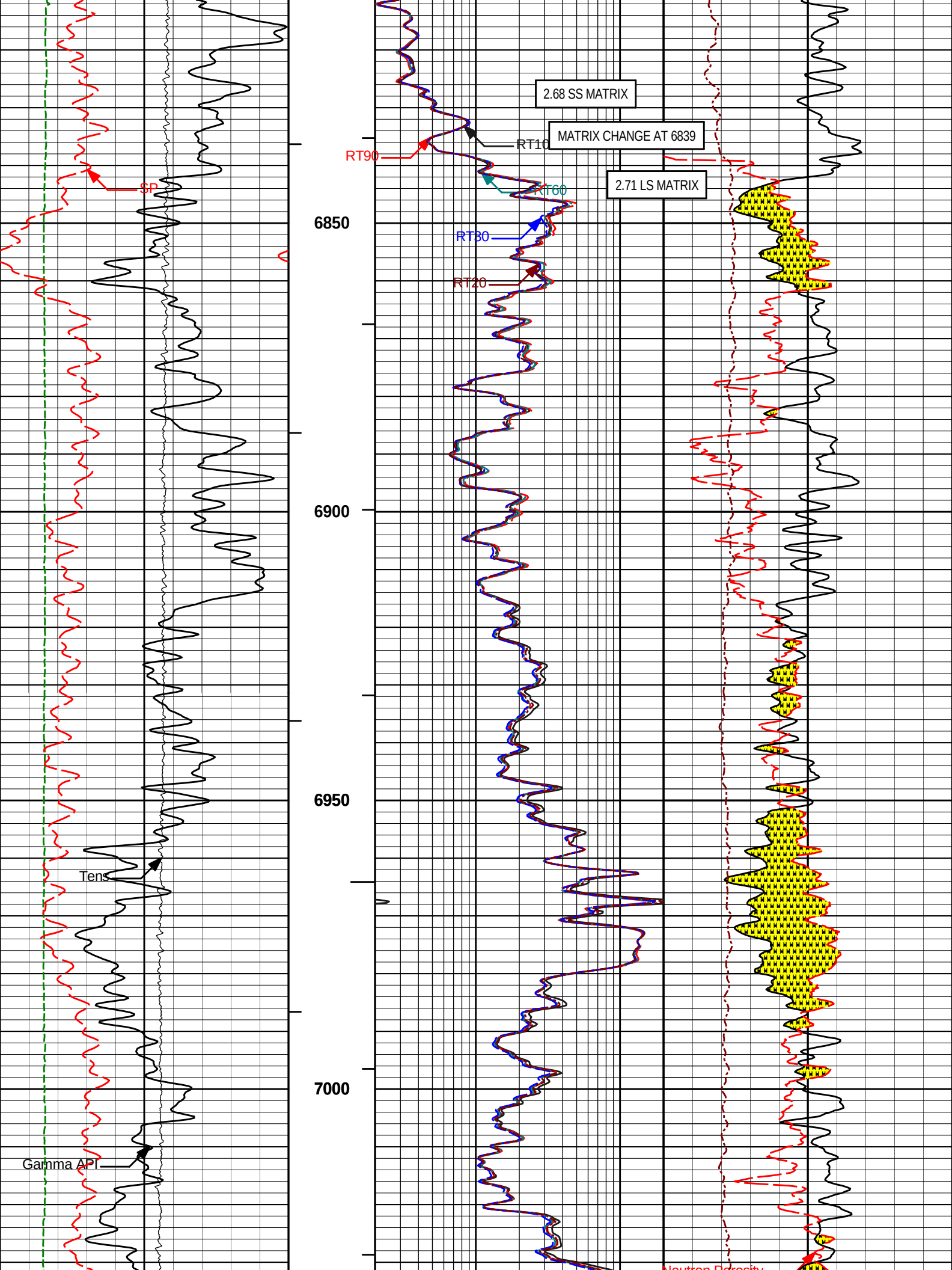
			2 RT10 200		
			ohmm		
10K Tens 0			2 RT20 200		
pounds			ohmm		
6 Caliper 16		AHVT	2 RT30 200	20 Neutron Porosity 0	
inches			ohmm	percent	
0 Gamma API 250		BHVT	2 RT60 200	20 Density Porosity 0	
api			ohmm	percent	
0 SP 100		1 : 240	2 RT90 200	0 Pe 10	
millivolts			ohmm		

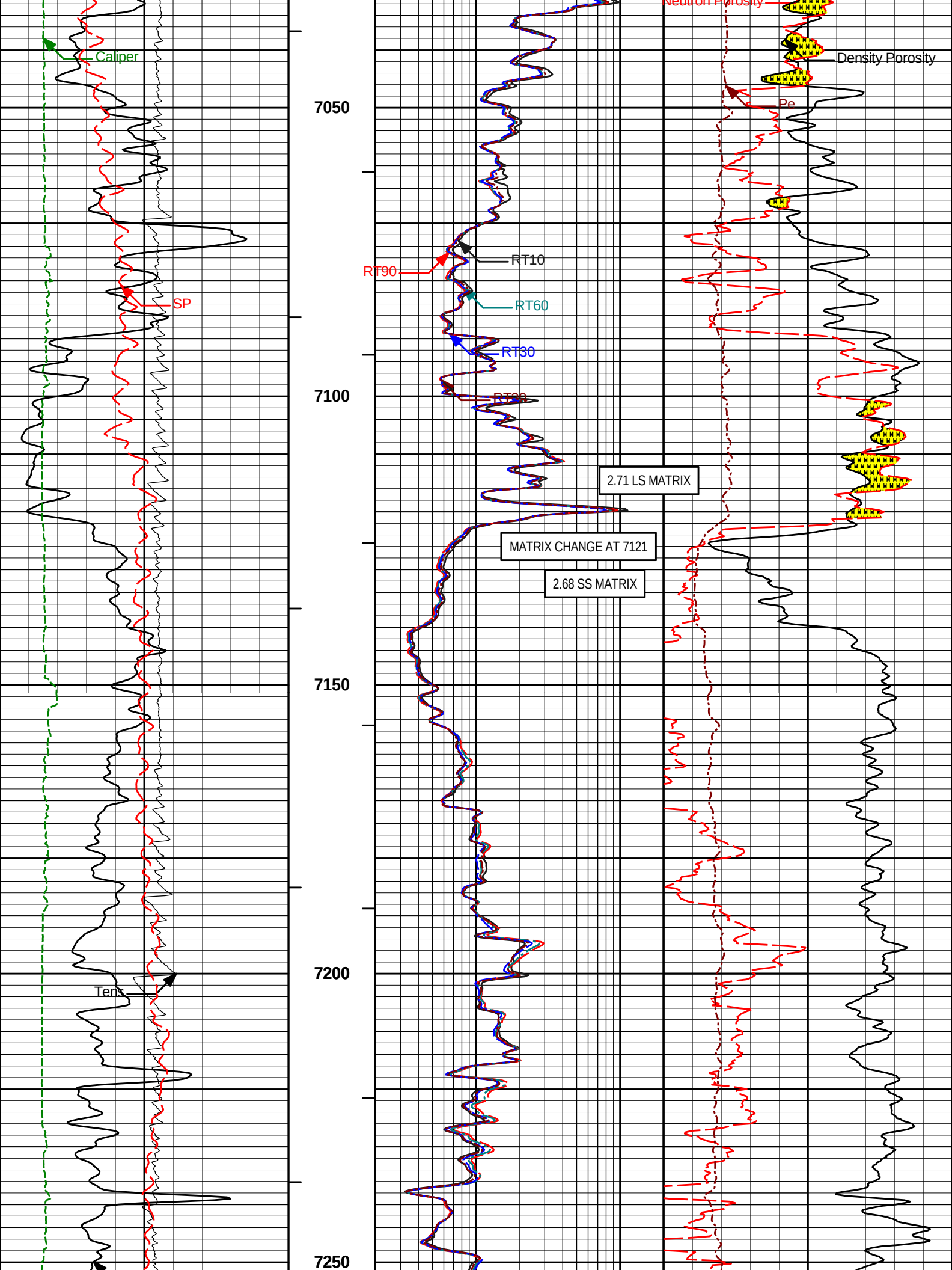


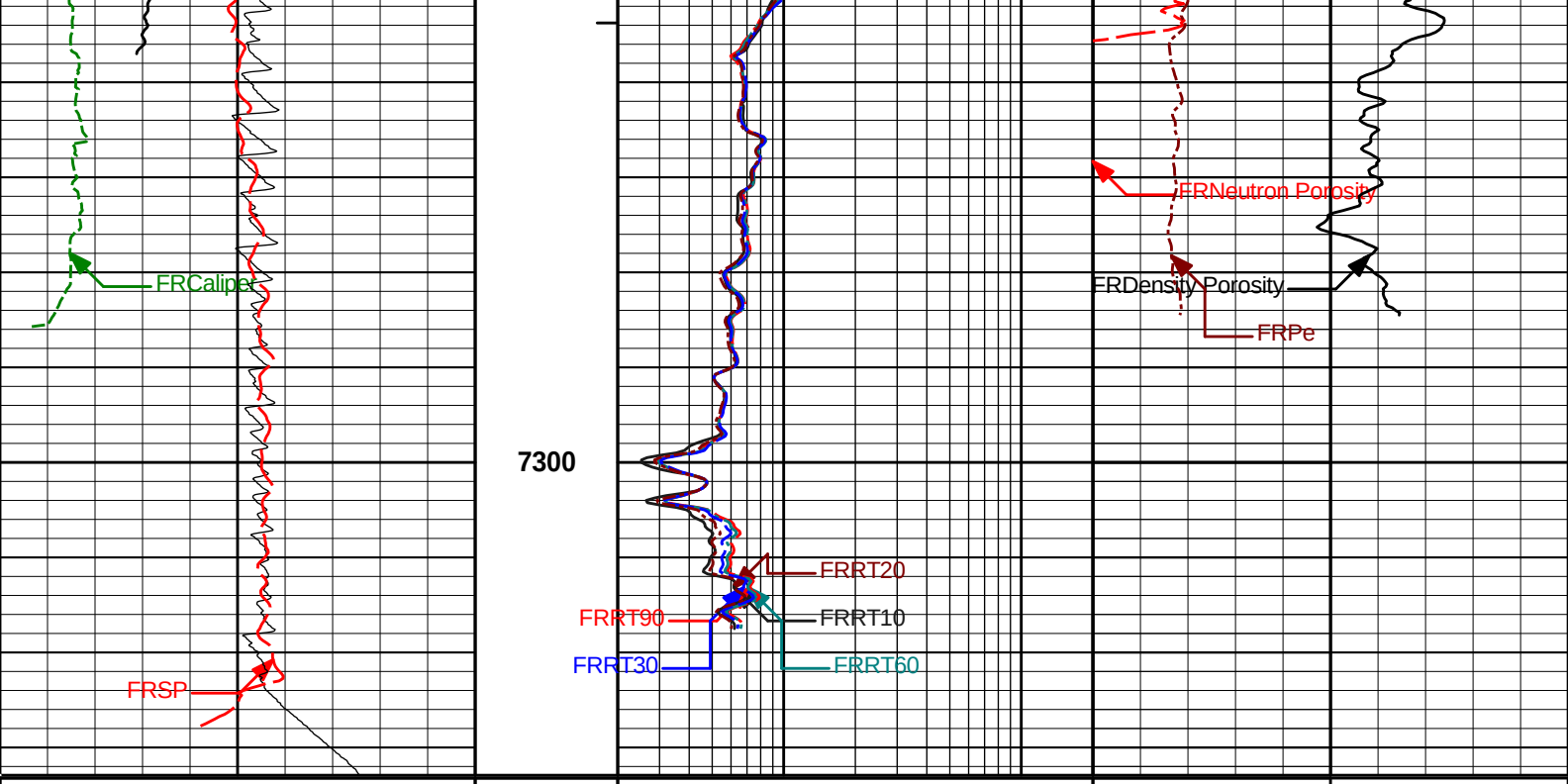

6200
6250
6300
6350
Tens
Gamma API
Caliper
SP
RT90
RT10
RT60
Neutron Porosity
Pe
Density Porosity


RT30
RT20
6400
6450
6500
6550
Tens
Gamma API
Caliper
Neutron Porosity
Pe
Density Porosity


RT90
RT10
6600
SP
RT60
RT30
RT20
6650
6700
Tens
6750
Gamma API
Neutron Porosity
6800
Caliper
Density Porosity
Pe


2.68 SS MATRIX
MATRIX CHANGE AT 6839
2.71 LS MATRIX
RT10
RT90
RT60
RT30
RT20
SP
Tens
Gamma API
6850
6900
6950
7000


Caliper
SP
Tens
7050
7100
7150
7200
7250
RT90
RT10
RT60
RT30
RT02
2.71 LS MATRIX
MATRIX CHANGE AT 7121
2.68 SS MATRIX
Neutron Porosity
Density Porosity
Pe



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

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Plot Time: 15-Feb-12 22:28:54
Plot Range: 6098 ft to 7332.92 ft
Data: IRVINEPC_E02-18\Well Based\MAIN*
Plot File: \\COMP\TD-NIO

MAIN PASS 5" = 100'

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CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11294346_RED**	**Reference Calibration Date:**	**01-Dec-11 13:14:08**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**23-Jan-12 14:58:59**
Software Version:	**WL INSITE R3.4.2 (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	40.4	39.7	api
Background + Calibrator	292.2	287.0	api
Calibrator	251.7	247.3	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11294346_RED
Reference Calibration Date: 23-Jan-12 14:58:59
Engineer: R. TWEETEN
Calibration Date: 15-Feb-12 13:52:09
Software Version: WL INSITE R3.4.2 (Build 2)
Calibration Version: 1

Calibrator Source S/N: TB-289
Calibrator API Reference:243.00 api
Equivalent Calibrator API Reference:247.3 api

Field Verification	Shop	Field	Units
Background	39.7	71.2	api
Background + Calibrator	287.0	316.6	api
Calibrator	247.3	245.4	api

Shop	Field	Difference	Tolerance
247.3	245.4	1.9	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 11568969
Reference Calibration Date: 27-Jan-12 11:30:34
Engineer: R. TWEETEN
Calibration Date: 14-Feb-12 10:53:11
Software Version: WL INSITE R3.4.2 (Build 2)
Calibration Version: 1
Source SN: TB-289

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.7	23.6	Channel #
583 KEV Peak Channel #	52.9	52.9	Channel #
2614 KEV Peak Channel #	218.8	218.4	Channel #
Calibrate Temperature	62.5	74.2	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 243.00 API
Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1811.4	CPS	328.1	335.3	API
Background	320.4	CPS	52.1	59.3	API

Gamma Ray Gain: 0.93
Expected Gain Range: 0.85 - 1.15
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 11568969
Reference Calibration Date: 14-Feb-12 10:53:11

Engineer:	**R. TWEETEN**	**Calibration Date:**	**15-Feb-12 14:05:42**
Software Version:	**WL INSITE R3.4.2 (Build 2)**	**Calibration Version:**	**1**
Source SN:			

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	52.7	Channel #
2614 KEV Peak Channel #	218.4	218.0	Channel #
Calibrate Temperature	74.2	62.5	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 243.00 API
Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1770.1	CPS	335.3	332.8	API
Background	302.2	CPS	59.3	56.8	API

Gamma Ray Gain: 0.95
Expected Gain Range: 0.85 - 1.15
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11277440_RED**	**Reference Calibration Date:**	**01-Dec-11 11:07:29**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**16-Jan-12 10:47:34**
Software Version:	**WL INSITE R3.4.2 (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:	1.004	1.004	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):	0.2223	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):	0.0808	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 - 11277440_RED**	**Reference Calibration Date:**	**16-Jan-12 10:47:34**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**15-Feb-12 14:14:30**
Software Version:	**WL INSITE R3.4.2 (Build 2)**	**Calibration Version:**	**1**

Logging Source S/N: DSN434

Snow Block S/N: BRIGHTON

NEUTRON FIELD-CHECK SUMMARY				
	Shop	**Field**	**Difference**	**Control Limit On Change**
Snow-Block Porosity (decp):	0.0808	0.0737	-0.0072	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - M271_P123_RED**	**Reference Calibration Date:**	**03-Feb-12 13:37:06**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**03-Feb-12 13:41:33**
Software Version:	**WL INSITE R3.4.2 (Build 2)**	**Calibration Version:**	**1**

CALIBRATION COEFFICIENTS			
Measurement	**Previous Value**	**New Value**	**Control Limit On New Value**
Pad Offset	-3525.33	-3919.33	-7000.00 - -1000.00
Pad Gain	0.0003662	0.0003774	0.000200 - 0.000600
Arm Offset	-4371.54	-4146.68	-5000.00 - 3000.00
Arm Gain	0.0005311	0.0005359	0.000300 - 0.000700
Arm Power	-0.000003391	-0.000003586	-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)	2.08	2.00	-0.08	+/- 0.20
Medium Ring (in)	3.78	3.75	-0.03	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.52	6.50	-0.02	+/- 0.20
Medium Ring (in)	8.26	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

SDLT CALIPER FIELD CALIBRATION

Tool Name:	**SDLT - M271_P123_RED**	**Reference Calibration Date:**	**03-Feb-12 13:41:33**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**15-Feb-12 14:02:39**
Software Version:	**WL INSITE R3.4.2 (Build 2)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.67	-0.08	+/- 0.10
Ring Diameter	8.25	8.21	-0.04	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check:	Passed
Diameter 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

Signal	Lower	R	Upper
12K	0.6	0.8693	1.3
36K	1.0	1.8356	2.0
72K	1.0	1.1121	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	0.997	1.05

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	**SDLT Pad - M271_P123_RED**	**Reference Calibration Date:**	**16-Jan-12 14:05:06**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**16-Jan-12 14:24:35**
Software Version:	**WL INSITE R3.4.2 (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	1.0068	1.0045	0.90 - 1.10
Near Dens Gain	0.9995	1.0044	0.90 - 1.10
Near Peak Gain	0.9744	0.9746	0.90 - 1.10
Near Lith Gain	0.9360	0.9560	0.90 - 1.10
Far Bar Gain	1.0049	1.0041	0.90 - 1.10
Far Dens Gain	0.9972	0.9952	0.90 - 1.10
Far Peak Gain	0.9901	0.9881	0.90 - 1.10
Far Lith Gain	0.9591	0.9621	0.90 - 1.10
Near Bar Offset	0.2199	0.2403	NONE
Near Dens Offset	0.2636	0.2224	NONE
Near Peak Offset	0.4881	0.4868	NONE
Near Lith Offset	0.7901	0.6286	NONE
Far Bar Offset	0.1399	0.1493	NONE
Far Dens Offset	0.1909	0.2101	NONE
Far Peak Offset	0.2236	0.2411	NONE
Far Lith Offset	0.4270	0.4009	NONE
Near Bar Background	833.21	834.06	700 - 1450
Near Dens Background	275.03	274.54	230 - 480
Near Peak Background	116.93	118.56	100 - 210
Near Lith Background	146.41	147.28	125 - 260
Far Bar Background	530.56	530.58	450 - 900
Far Dens Background	205.01	205.21	175 - 345
Far Peak Background	80.05	78.99	70 - 140
Far Lith Background	83.94	84.22	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	**Current Reading (Previous Coef)**	**Calibrated (New Coef)**	**Change**	**Control Limit On Change**
MAGNESIUM				
Density (g/cc)	1.690	1.690	-0.000	+/- 0.015
Pe	2.627	2.597	-0.030	+/- 0.150
ALUMINUM				
Density (g/cc)	2.605	2.602	-0.002	+/- 0.01500
Pe	3.051	3.056	0.005	+/- 0.150

TOOL SUMMARY				
Measurement	**Near Detector**		**Far Detector**	
	Value	**Control Limits**	**Value**	**Control Limits**
QUALITY				
Background	0.0006	+/- 0.0110	-0.0007	+/- 0.0140
Magnesium Block	0.0017	+/- 0.0110	0.0014	+/- 0.0140
Aluminum Block	0.0016	+/- 0.0110	0.0001	+/- 0.0140
Resolution	9.62	6.00 - 11.50	9.78	6.00 - 11.50
Internal Verifier(B+D+P+L)	1374	1200 - 2700	899	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 - M271_P123_RED**	**Reference Calibration Date:**	**16-Jan-12 14:24:35**
Engineer:	**R. TWEETEN**	**Calibration Date:**	**15-Feb-12 13:52:13**
Software Version:	**WL INSITE R3.4.2 (Build 2)**	**Calibration Version:**	**1**

Pad Temperature: 43.5 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1374.441	1372.994	-1.447	14.981
Far (B+D+P+L) cps	898.992	896.166	-2.826	16.307
Near Resolution	9.62	9.59	-0.030	0.50
Far Resolution	9.78	10.03	0.250	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-11294346_RED						
Gamma Ray Calibrator	247.3	245.4	----------	1.9	+/- 9.00	api
CSNG-11568969						
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	52.7	----------	0.2	----------	Channel #
2614 KEV Peak Channel #	218.4	218.0	----------	0.4	----------	Channel #
DSNT-11277440_RED						
Snow-Block Porosity	0.0808	0.0737	----------	0.0071	+/- 0.0150	decp
SDLT-M271_P123_RED						
Pad Extension	3.75	3.67	----------	0.08	+/-0.10	in
Ring Diameter	8.25	8.21	----------	0.040	+/-0.15	in
ACRt Sonde-E2817-S4353_RED						
Mud Cell	0.997	----------	----------	0.000	----------	ohm-m
SDLT Pad-M271_P123_RED						
Near(B+D+P+L)	1374.441	1372.994	----------	1.447	+/-14.981	cps
Far(B+D+P+L)	898.992	896.166	----------	2.826	+/-16.307	cps

Data: IRVINEPC_E02-18\0001 NOBLE_QUAD\IDLE **Date: 15-Feb-12 21:40:48**

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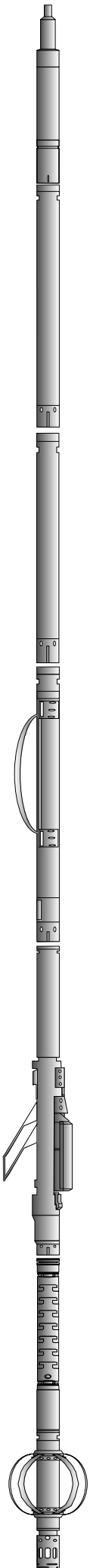
TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length



RWCH-A094
135.00 lbs

Ø 3.625 in

Load Cell @ 83.71 ft
BH Temperature @ 83.14 ft

87.39 ft
6.25 ft
81.14 ft

GTET-
11294346_RED
165.00 lbs

Ø 3.625 in

GammaRay @ 75.08 ft

8.52 ft
72.62 ft

CSNG-11568969
114.00 lbs

Ø 3.625 in

CSNG @ 66.99 ft

8.17 ft
64.45 ft

DSN Decentralizer-
11277440_RED
6.60 lbs

Ø 5.000 in*

DSNT-
11277440_RED
174.00 lbs

Ø 3.625 in

DSN Far @ 57.52 ft
DSN Near @ 56.77 ft

9.69 ft
54.77 ft

SDLT-
M271_P123_RED
360.00 lbs

Ø 4.500 in

SDLT Pad-
M271_P123_RED
65.00 lbs

Ø 4.750 in*

SDL Caliper @ 46.77 ft
SDL @ 46.76 ft

10.81 ft
43.95 ft

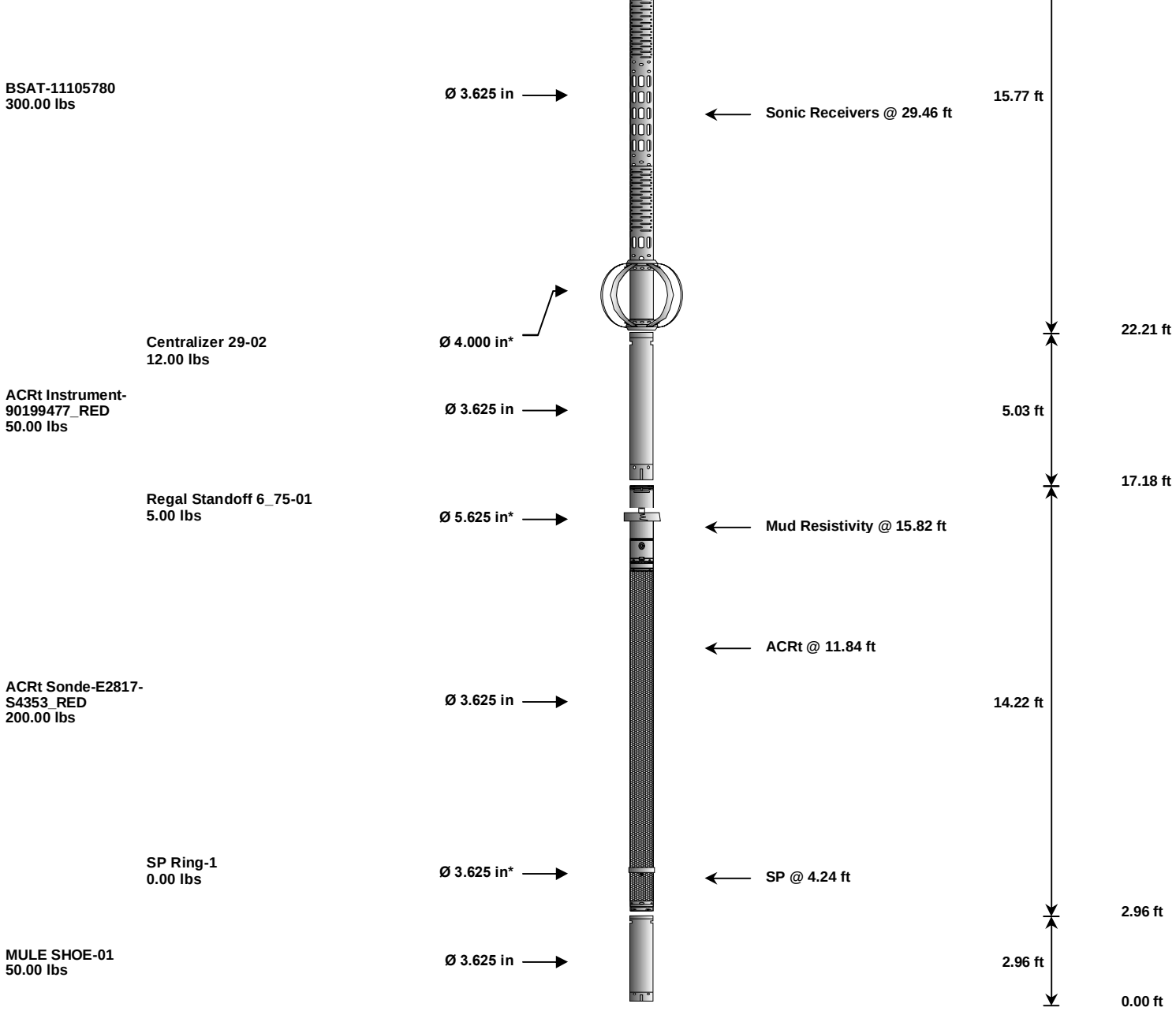
Flex Joint -
Pressure Comp-
10165638
140.00 lbs

Ø 3.625 in

5.97 ft
37.98 ft

Centralizer 29-01
12.00 lbs

Ø 4.000 in*



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	A094	135.00	6.25		81.14	300.00
GTET	Gamma Telemetry Tool	11294346_RED	165.00	8.52		72.62	60.00
CSNG	Compensated Spectral Natural Gamma	11568969	114.00	8.17		64.45	15.00
DSNT	Dual Spaced Neutron	11277440_RED	174.00	9.69		54.77	60.00
DCNT	DSN Decentralizer	11277440 RED	6.60	5.13	*	58.10	300.00
SDLT	Spectral Density Tool	M271_P123_RED	360.00	10.81		43.95	60.00
SDLP	Density Insite Pad	M271 P123 RED	65.00	2.55	*	46.16	60.00
FLEX	Flex Joint - Pressure Compensated	10165638	140.00	5.97		37.98	300.00
BSAT	Borehole Sonic Array Tool	11105780	300.00	15.77		22.21	60.00
OBCEN	Centralizer - 29 in.Overbody	01	12.00	2.42	*	34.88	300.00
ACRt	Array Compensated True Resistivity Instrument Section	90199477_RED	50.00	5.03		17.18	300.00
OBCEN	Centralizer - 29 in.Overbody	02	12.00	2.42	*	22.16	300.00
ACRt	Array Compensated True Resistivity	E2817-S4353_RED	200.00	14.22		2.96	300.00
SP	SP Ring	1	0.00	0.25	*	4.24	300.00
RSOF	Regal Standoff 6.75in	01	5.00	0.52	*	15.86	300.00
MS	MULE SHOE	01	50.00	2.96		0.00	100.00
Total			**1,788.60**	**87.39**			

* Not included in Total Length and Length Accumulation.

Data: IRVINEPC_E02-18\0001 NOBLE_QUAD\IDLE

Date: 15-Feb-12 19:16:49

COMPANY	**NOBLE ENERGY INC**		
WELL	**IRVINE PC E02-18**		
FIELD	**WATTENBERG**		
COUNTY	**WELD**	STATE	**CO**

HALLIBURTON

ARRAY COMPENSATED
TRUE RESISTIVITY
SPECTRAL DENSITY
DUAL SPACED NEUTRON