HALLIBURTON

ARRAY COMPENSATED RESISTIVITY LOG

COMPANY VAL ENERGY
WELL HAMMER D V 1-5
FIELD WILSON
COUNTY COWLEY
STATE KANSAS

COMPANY **VAL ENERGY**

WELL **HAMMER D V 1-5**

FIELD **WILSON**

COUNTY **COWLEY** STATE **KANSAS**

API No. 15-035-24502

Location SE NW NW SE
2193' FNL & 2193' FWL

Sect. 5 Twp. 33S Rge. 6E

Other Services:
SDLT
DSNT

MICROLOG

Permanent Datum	GL	Elev. 1320.0 ft	Elev.: K.B. 1333.0 ft
Log measured from	KB	, 13.0 ft above perm. Datum	D.F. 1332.0 ft
Drilling measured from	KB		G.L. 1320.0 ft

Date		12-Apr-13					
Run No.		ONE					
Depth - Driller		3600.00 ft					
Depth - Logger		3600.0 ft					
Bottom - Logged Interval		3600 ft					
Top - Logged Interval		312 ft					
Casing - Driller		8.625 in @ 313.0 ft		@		@	
Casing - Logger		312.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		WATER BASED					
Density	Viscosity	9.4 ppg	50.00 s/qt				
PH	Fluid Loss	11.00 pH	8.8 cptm				
Source of Sample		FLOW LINE					
Rm @ Meas. Temperature		1.520 ohmm @ 85.00 degF		@		@	
Rmf @ Meas. Temperature		1.29 ohmm @ 70.00 degF		@		@	
Rmc @ Meas. Temperature		1.880 ohmm @ 70.00 degF		@		@	
Source Rmf	Rmc	MEASURED	MEASURED				
Rm @ BHT		1.19 ohmm @ 110.0 degF		@		@	
Time Since Circulation		8.0 hr					
Time on Bottom		12-Apr-13 19:23					
Max. Rec. Temperature		110.0 degF @ 3600.0 ft		@		@	
Equipment	Location	10549592	PVOK				
Recorded By		JEREMY COTHREN					
Witnessed By		JOE BAKER					

Fold here

Service Ticket No.: 900360213 API Serial No.: 15-035-24502 PGM Version: WL INSITE R3.6.0 (Build 3)

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 989	N/A	1.5" STANDOFF	N/A

EQUIPMENT DATA

	GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.		Run No.		
Serial No.	113	Serial No.		Serial No.		Serial No.		
Model No.	GTET	Model No.		Model No.		Model No.		
Diameter	3.625"	No. of Cent.		Diameter		Diameter		
Detector Model No.	A-102	Spacing		Log Type		Log Type		
Type	SCINT.	Source Type		Source Type		Source Type		
Length	8"	LSA [Y/N]		Serial No.		Serial No.		
Distance to Source	10'	FWDA [Y/N]		Strength		Strength		

LOGGING DATA

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	CSG	REC	0	150									

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: THANKS FOR USING HALLIBURTON LOGGING SERVICES .

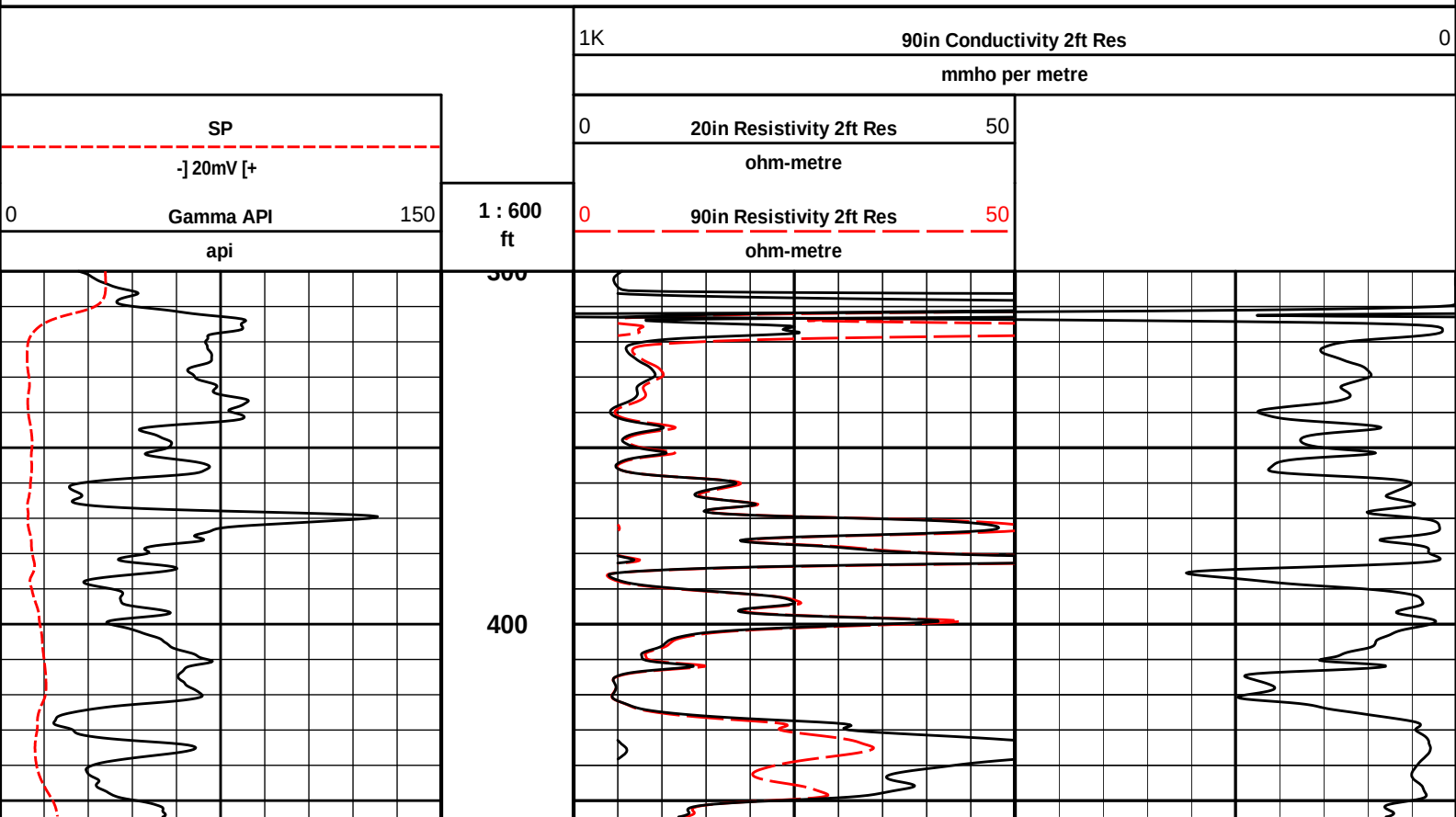
ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING.

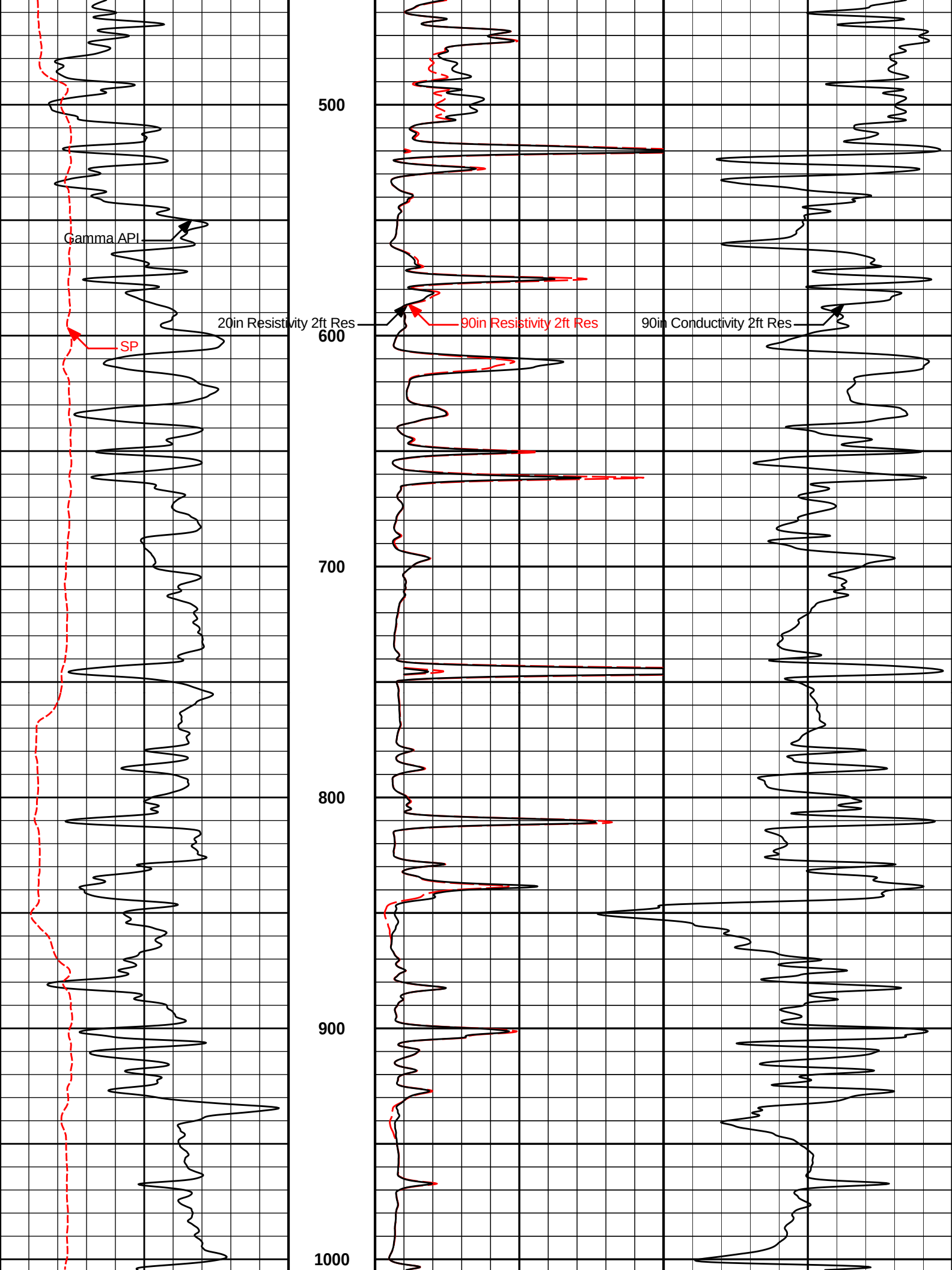
CHLORIDES REPORTED AT 900 ppm.

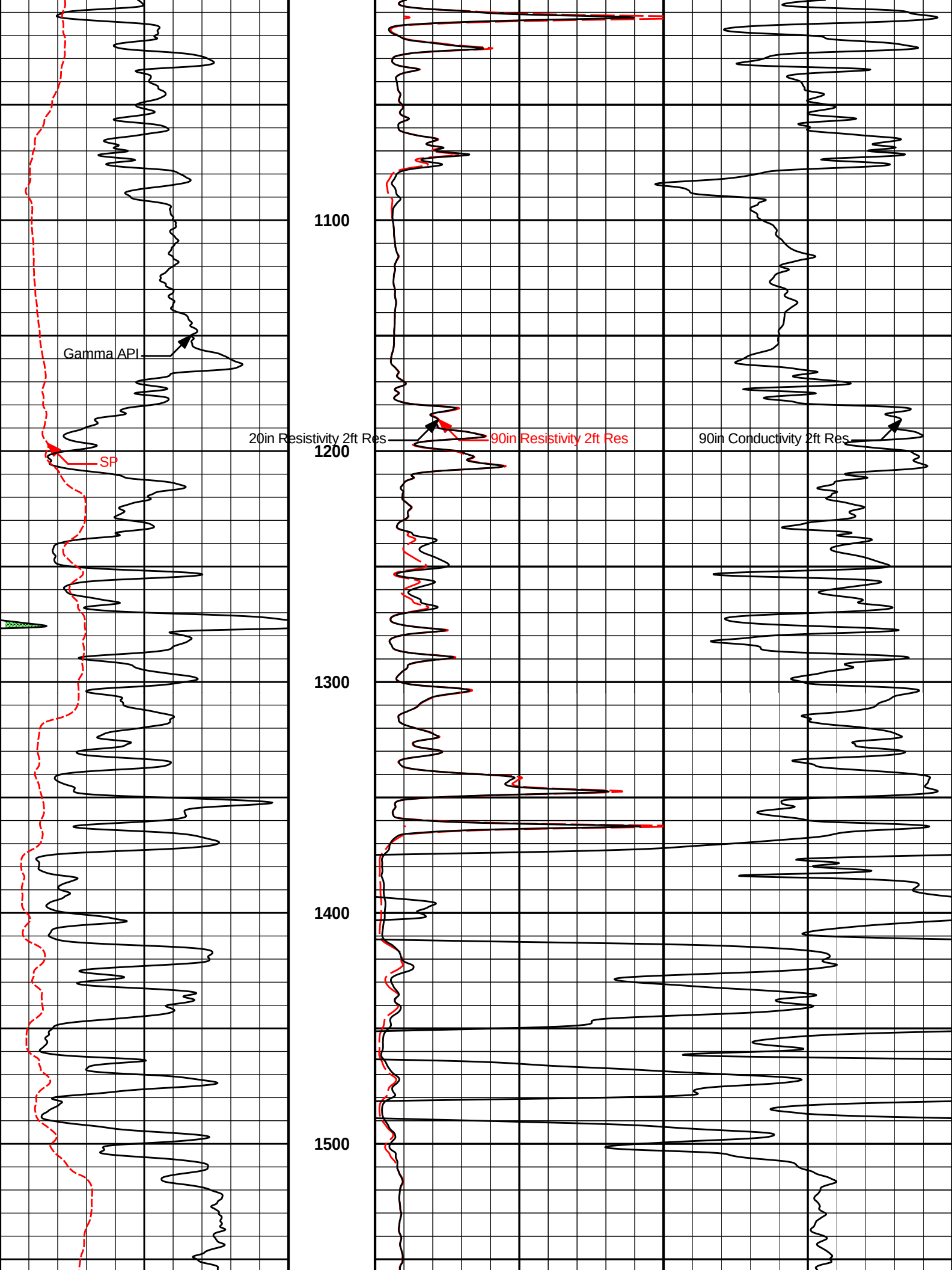
HALLIBURTON

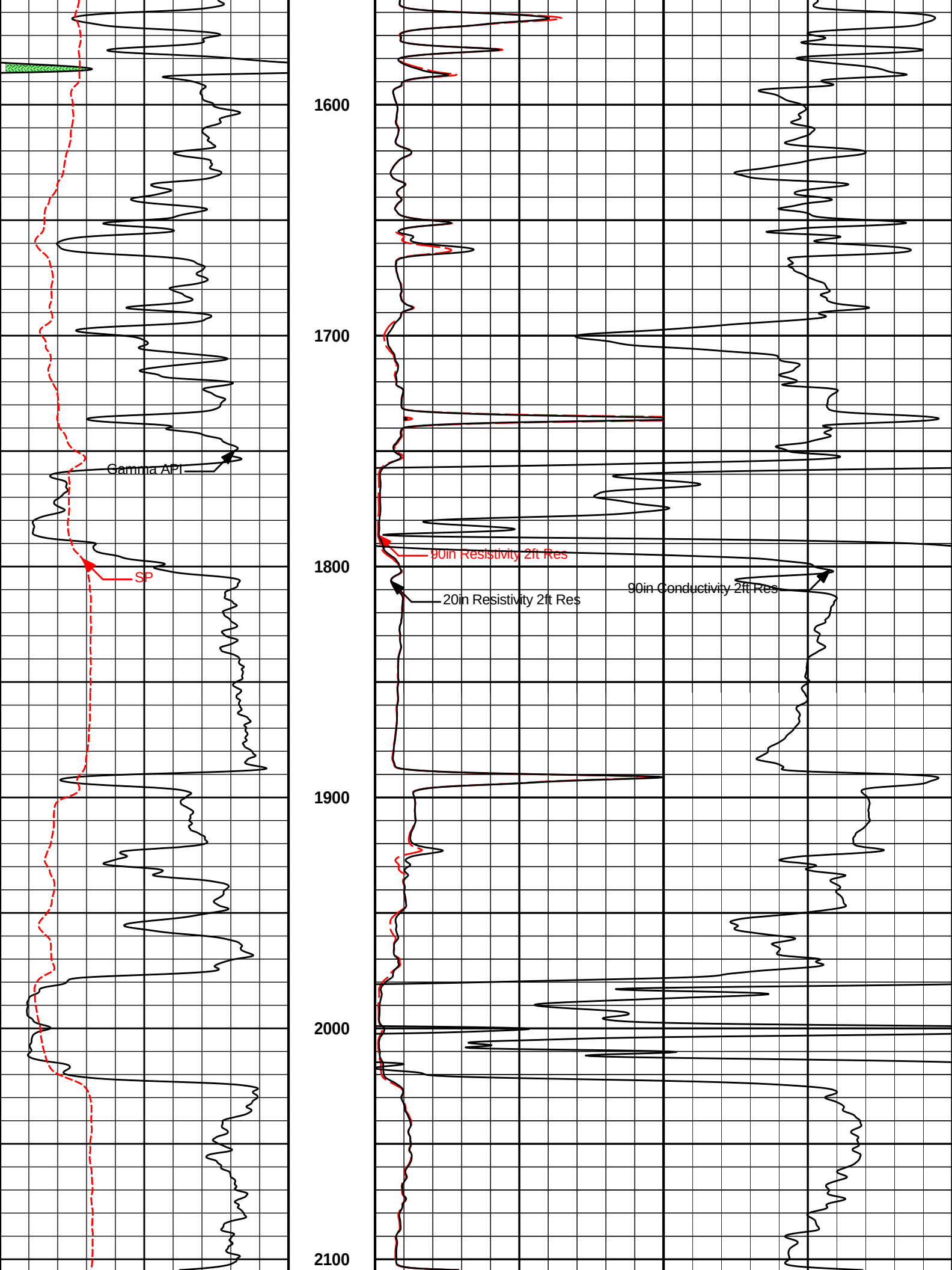
Plot Time: 13-Apr-13 08:31:12
Plot Range: 300 ft to 3596.75 ft
Data: {ActiveWell}\Well Based\DAQ-0002-005
Plot File: \\-LOCAL-\ACRT\1_ACRT_2inx

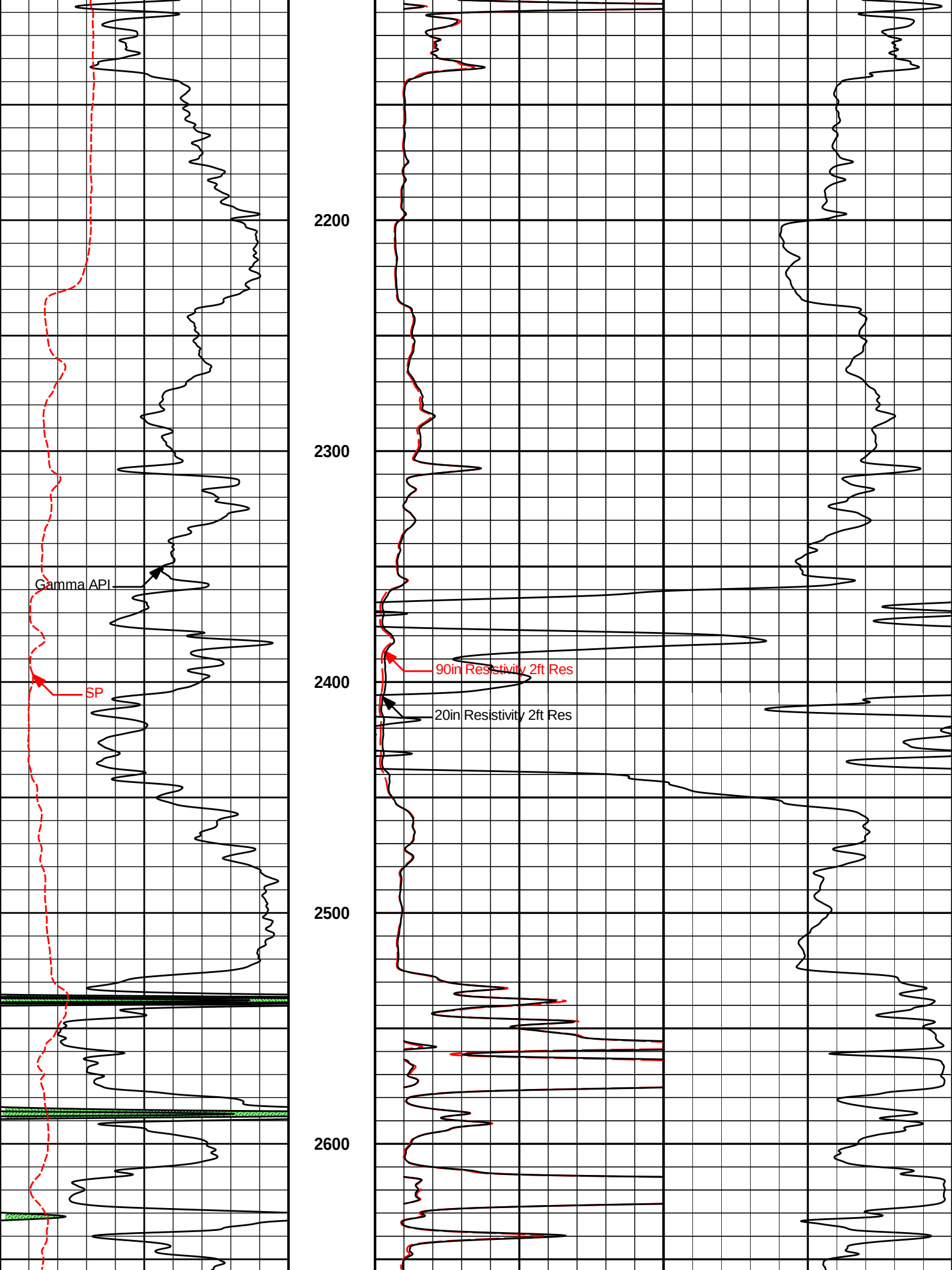
2 INCH MAIN LOG

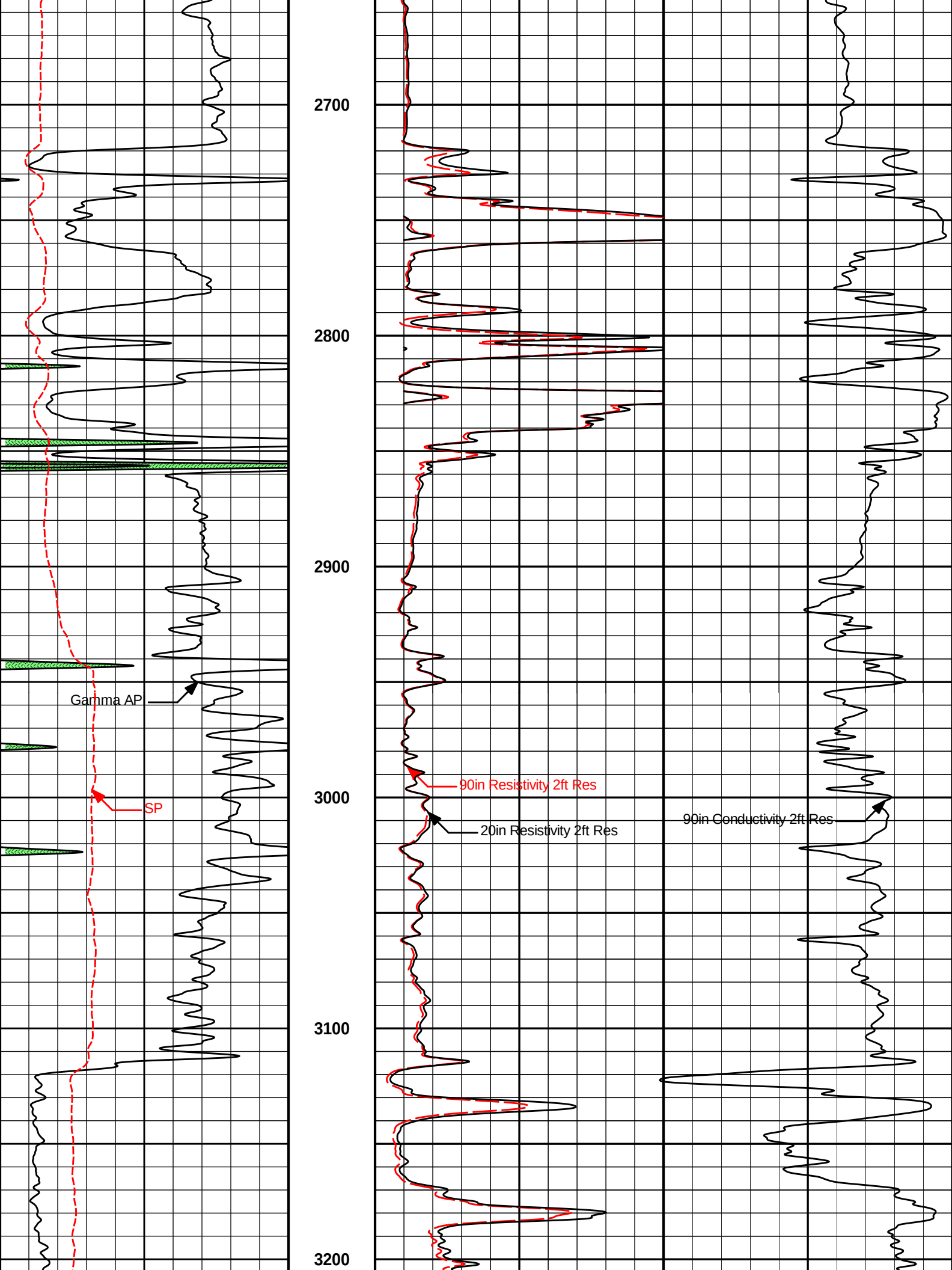


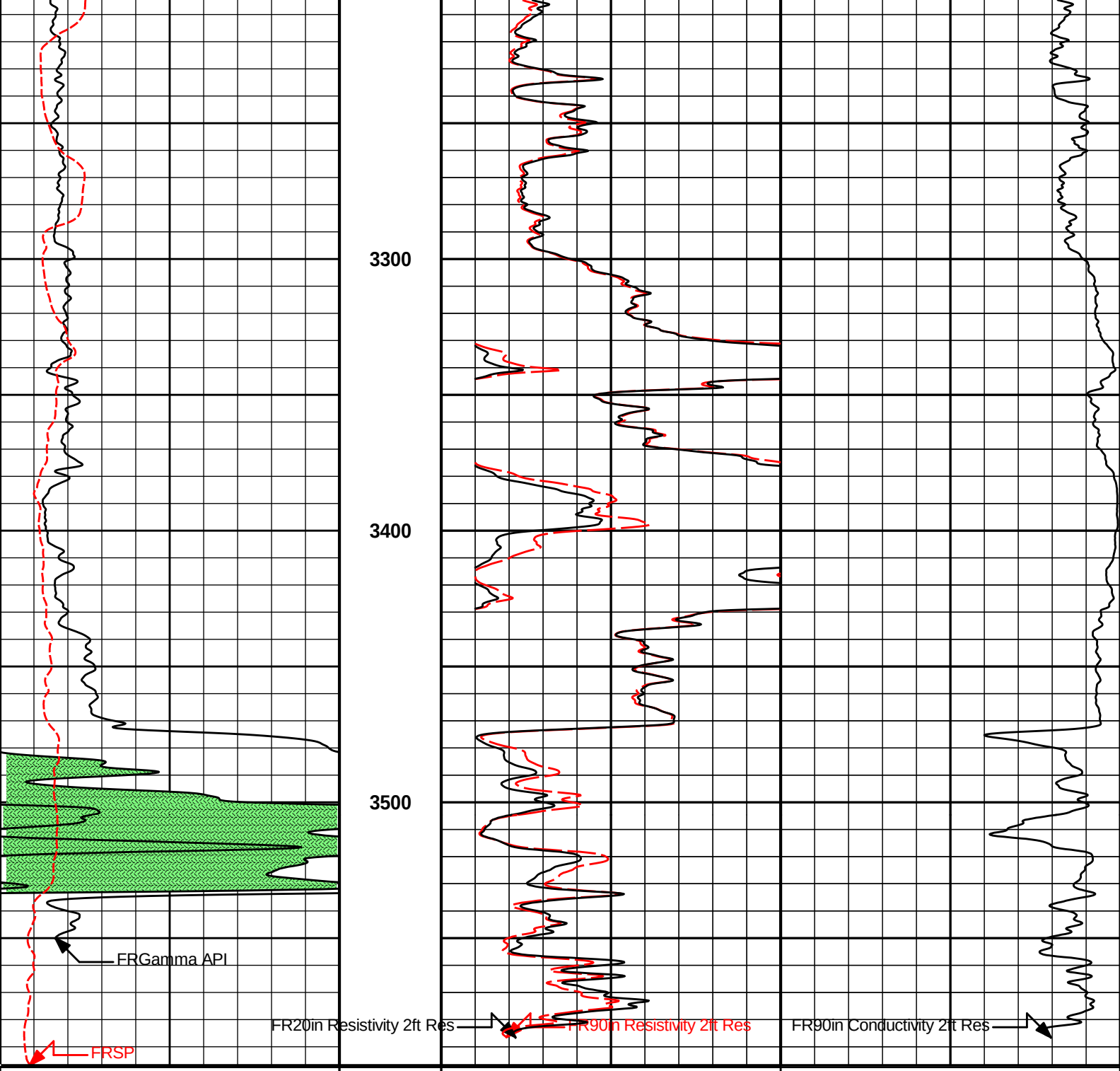

Gamma API
SP
20in Resistivity 2ft Res
90in Resistivity 2ft Res
90in Conductivity 2ft Res
500
600
700
800
900
1000


Gamma API
SP
20in Resistivity 2ft Res
90in Resistivity 2ft Res
90in Conductivity 2ft Res
1100
1200
1300
1400
1500


1600
1700
1800
1900
2000
2100
Gamma API
SP
90in Resistivity 2ft Res
20in Resistivity 2ft Res
90in Conductivity 2ft Res


2200
2300
2400
2500
2600
Gamma API
SP
90in Resistivity 2ft Res
20in Resistivity 2ft Res


2700
2800
2900
3000
3100
3200
Gamma AP
SP
90in Resistivity 2ft Res
20in Resistivity 2ft Res
90in Conductivity 2ft Res



0 Gamma API 150	1 : 600 ft	0 90in Resistivity 2ft Res 50
api		ohm-metre
SP		0 20in Resistivity 2ft Res 50
-] 20mV [+		ohm-metre
		1K 90in Conductivity 2ft Res 0
		mmho per metre

HALLIBURTON

Plot Time: 13-Apr-13 08:31:15
Plot Range: 300 ft to 3596.75 ft
Data: {ActiveWell}\Well Based\DAQ-0002-005\
Plot File: \\-LOCAL-\ACRT\1_ACRT_2inx

2 INCH MAIN LOG

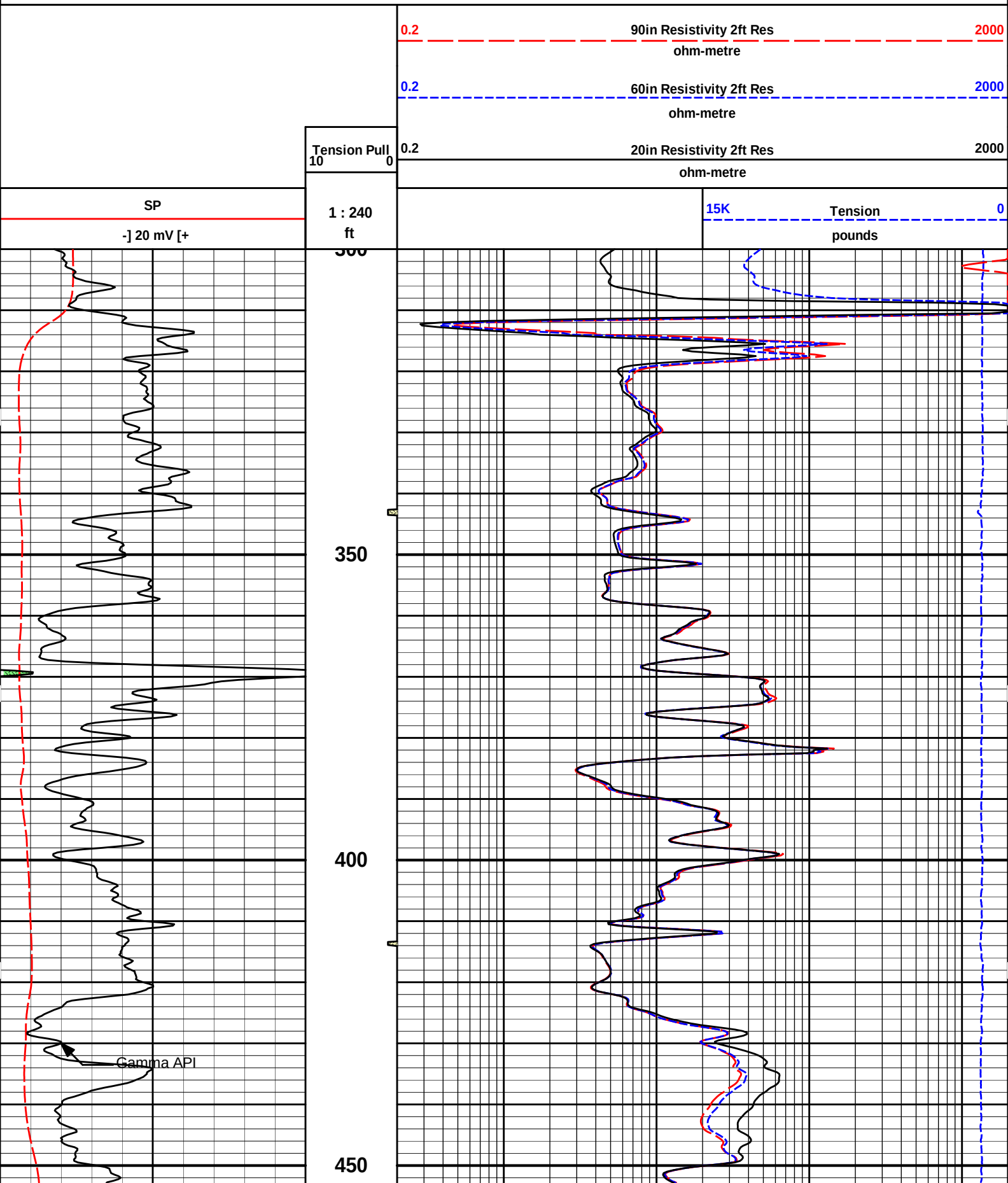
HALLIBURTON

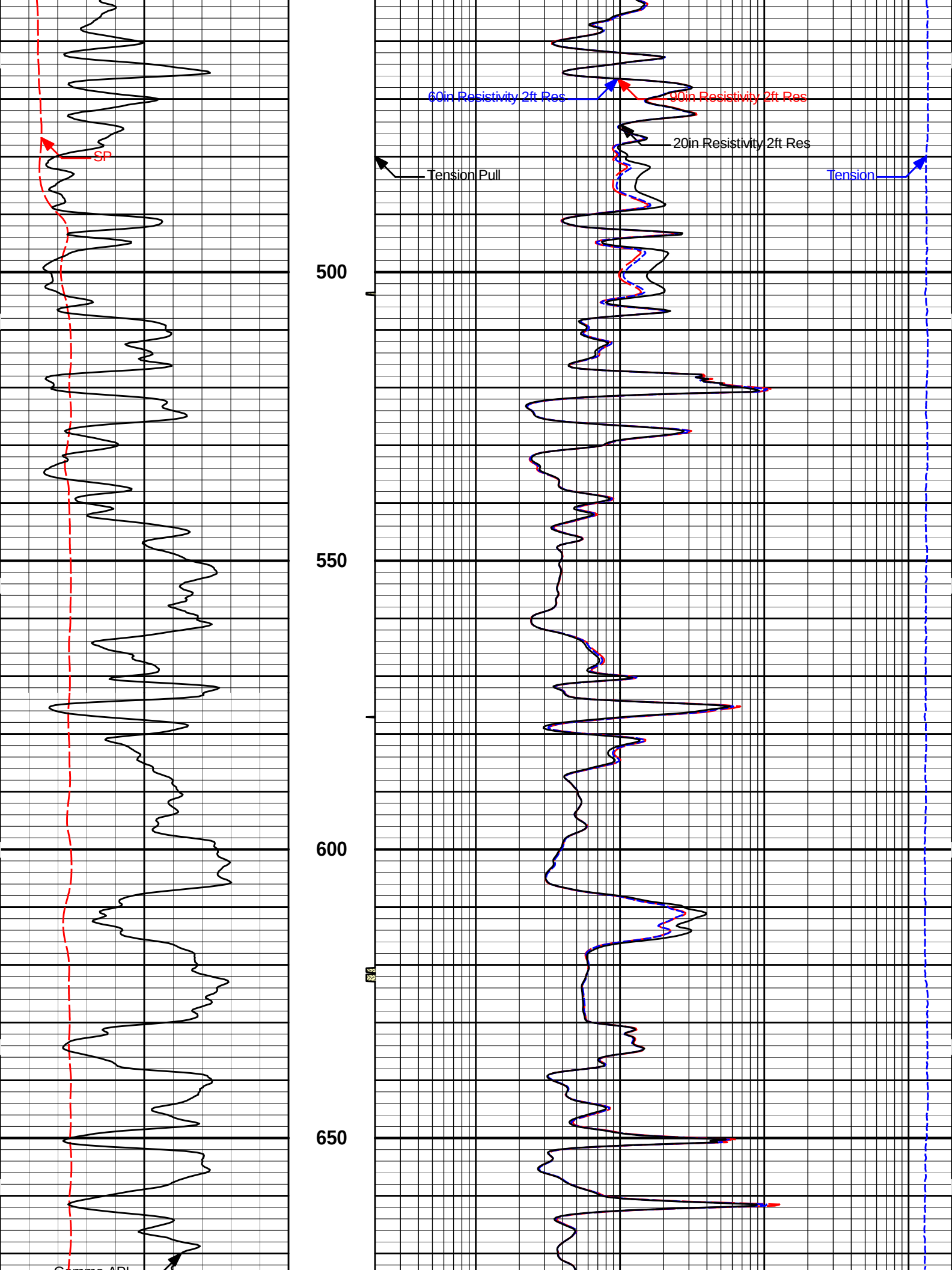
Plot Time: 13-Apr-13 08:31:15

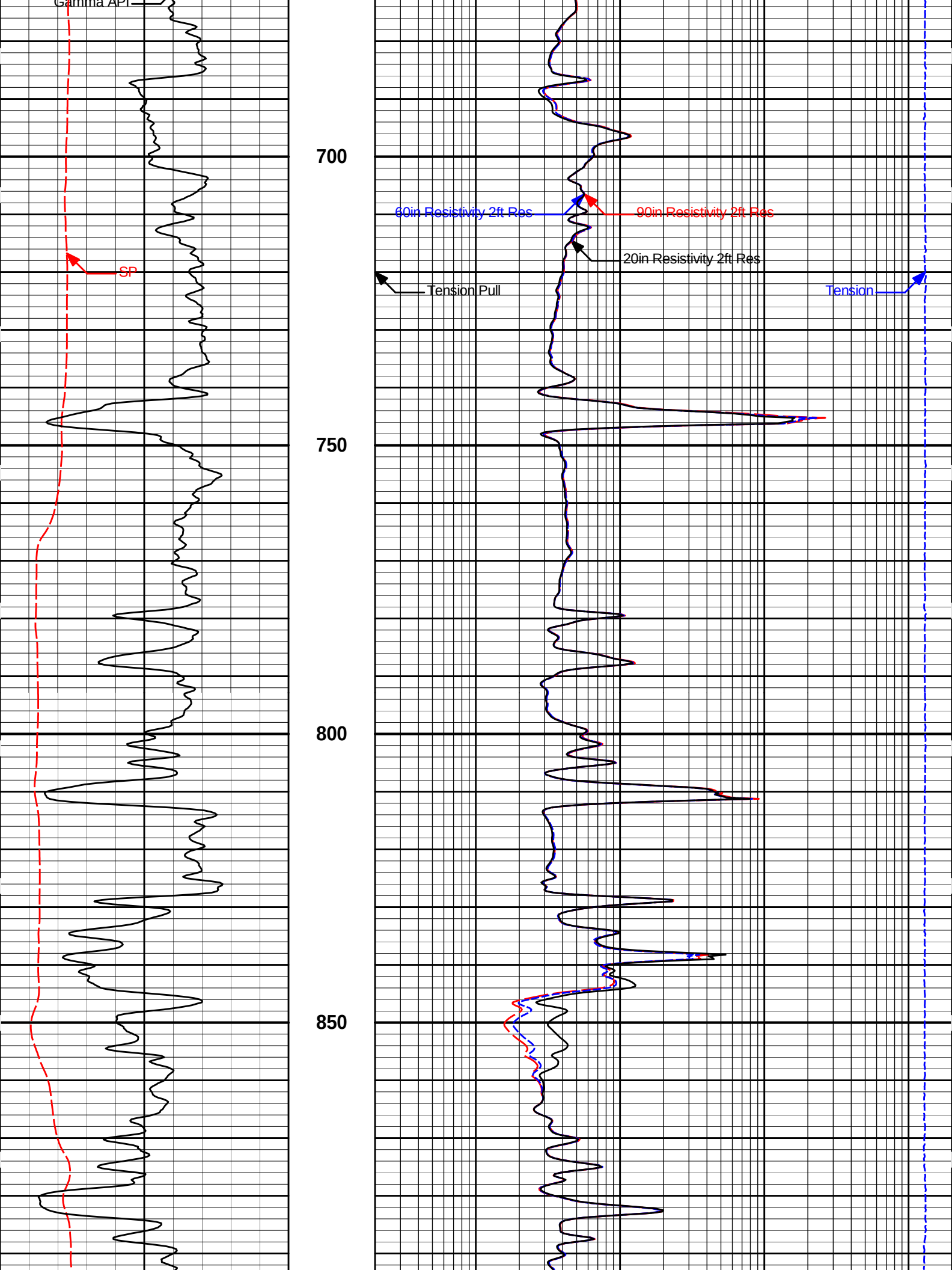
HALLIBURTON

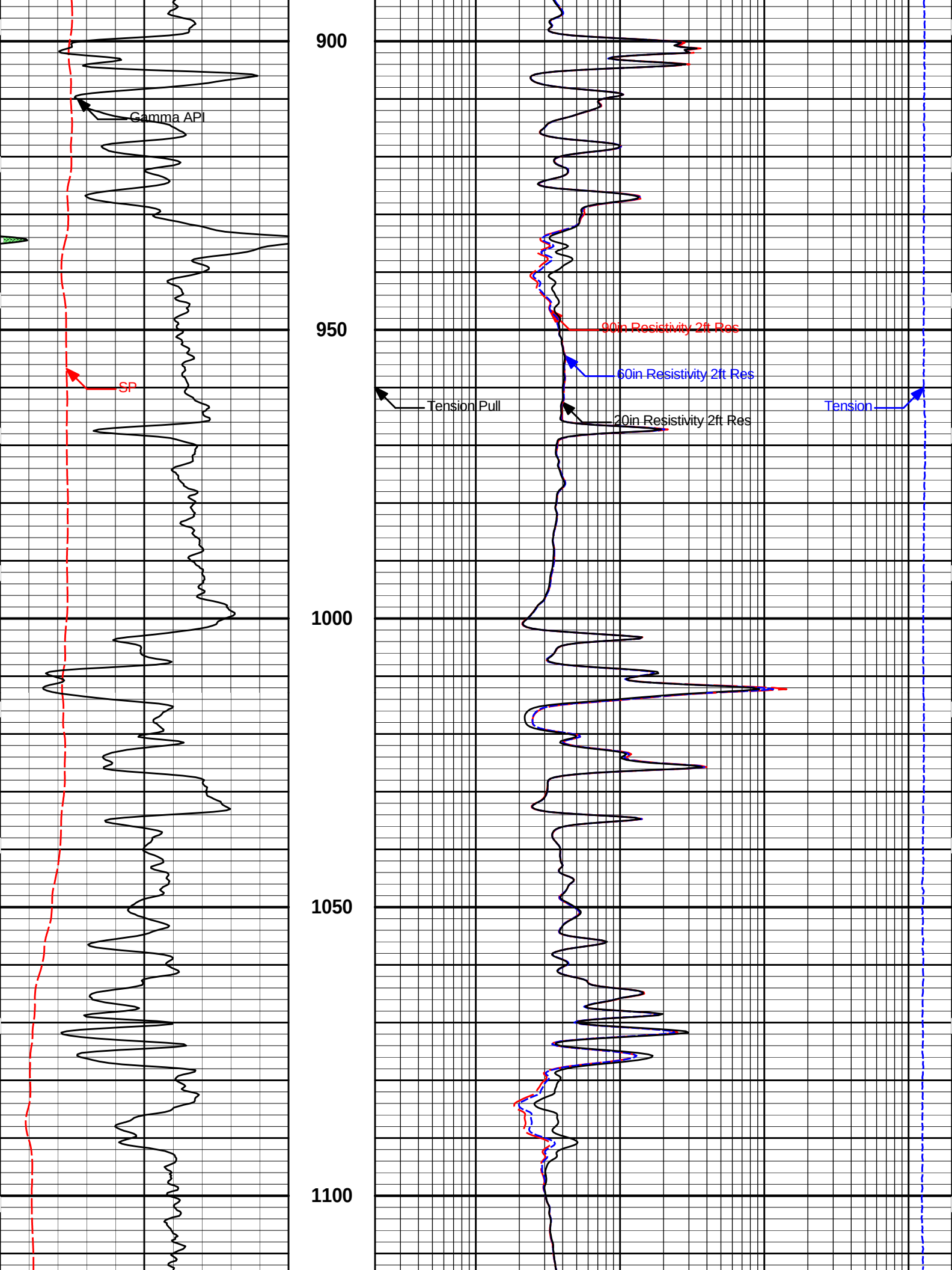
Plot Time: 13-Apr-13 08:31:15
Plot Range: 300 ft to 3601.08 ft
Data: {ActiveWell}\Well Based\DAQ-0002-005\
Plot File: \\-LOCAL-\ACRT\1_ACRT_5_mainx

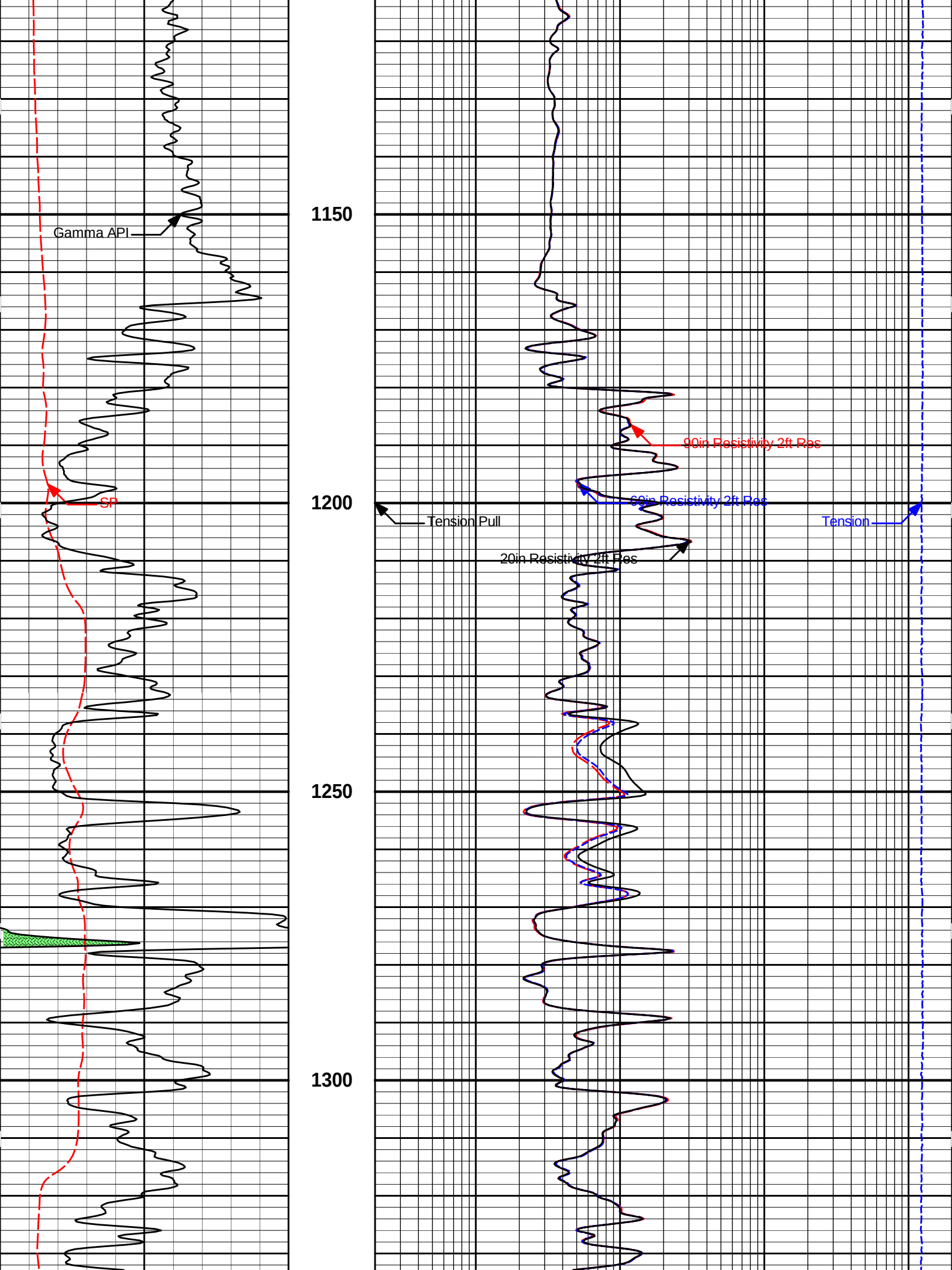
5 INCH MAIN LOG

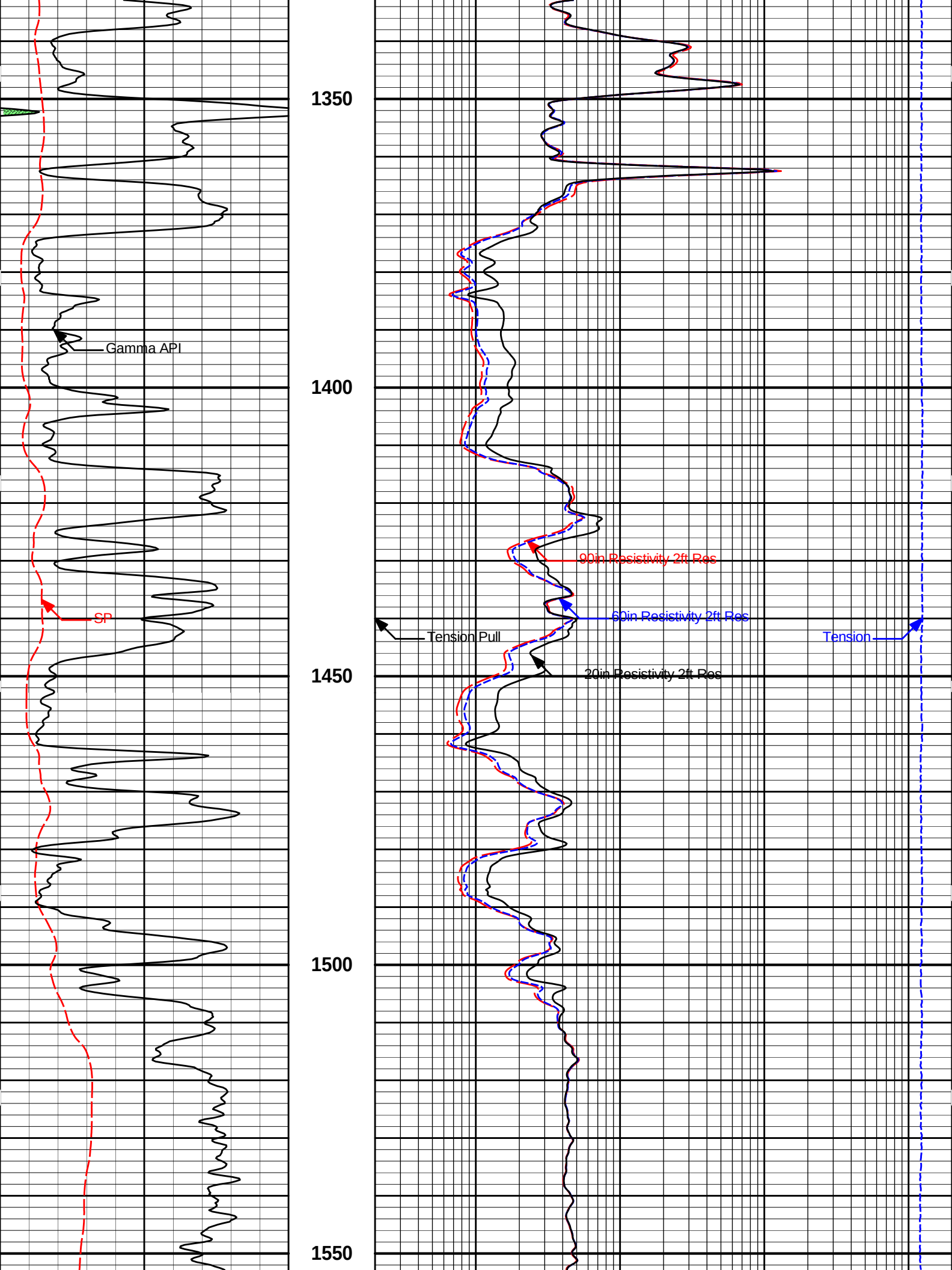


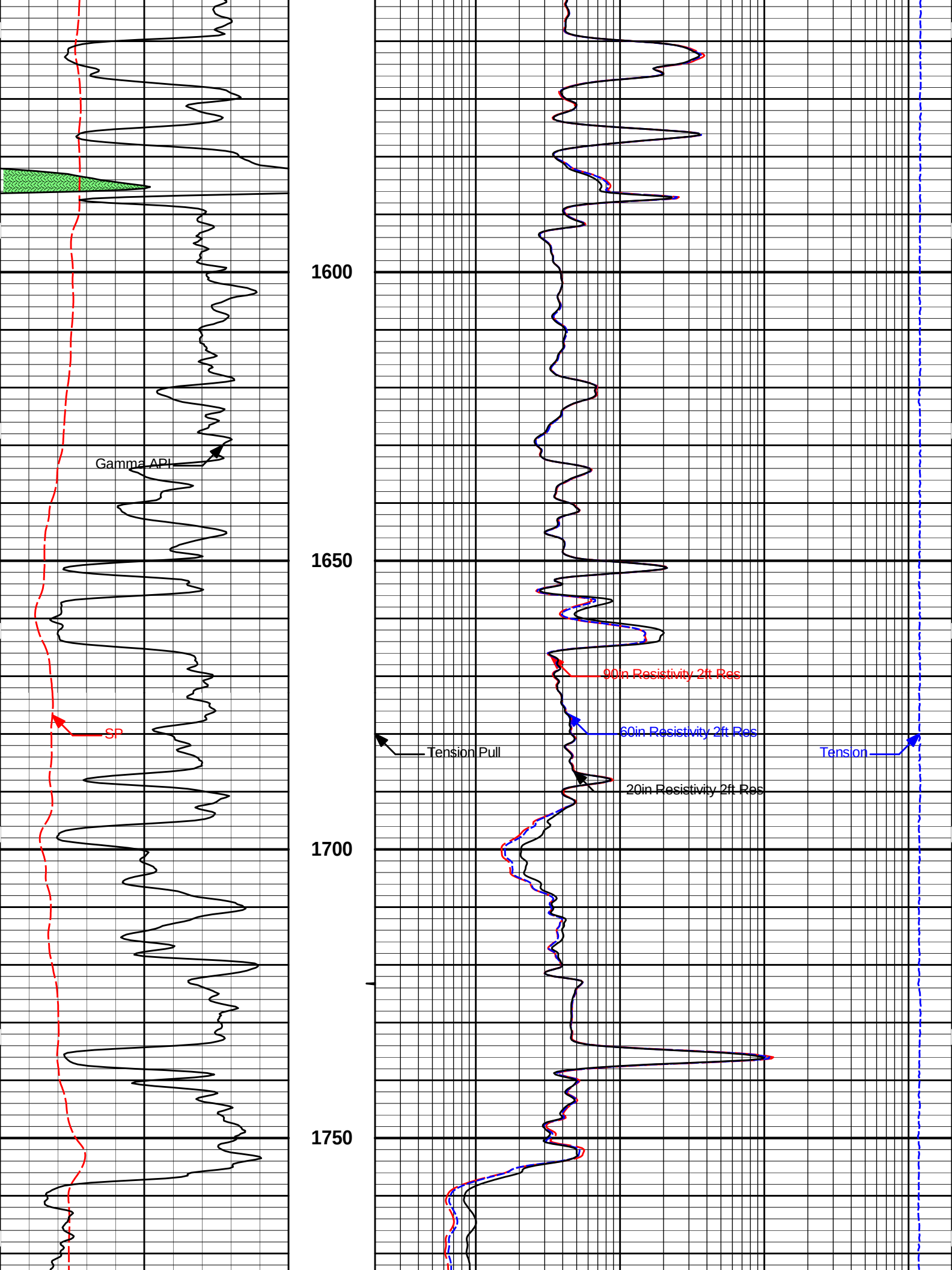

SP
60in Resistivity 2ft Res
90in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension Pull
Tension
500
550
600
650

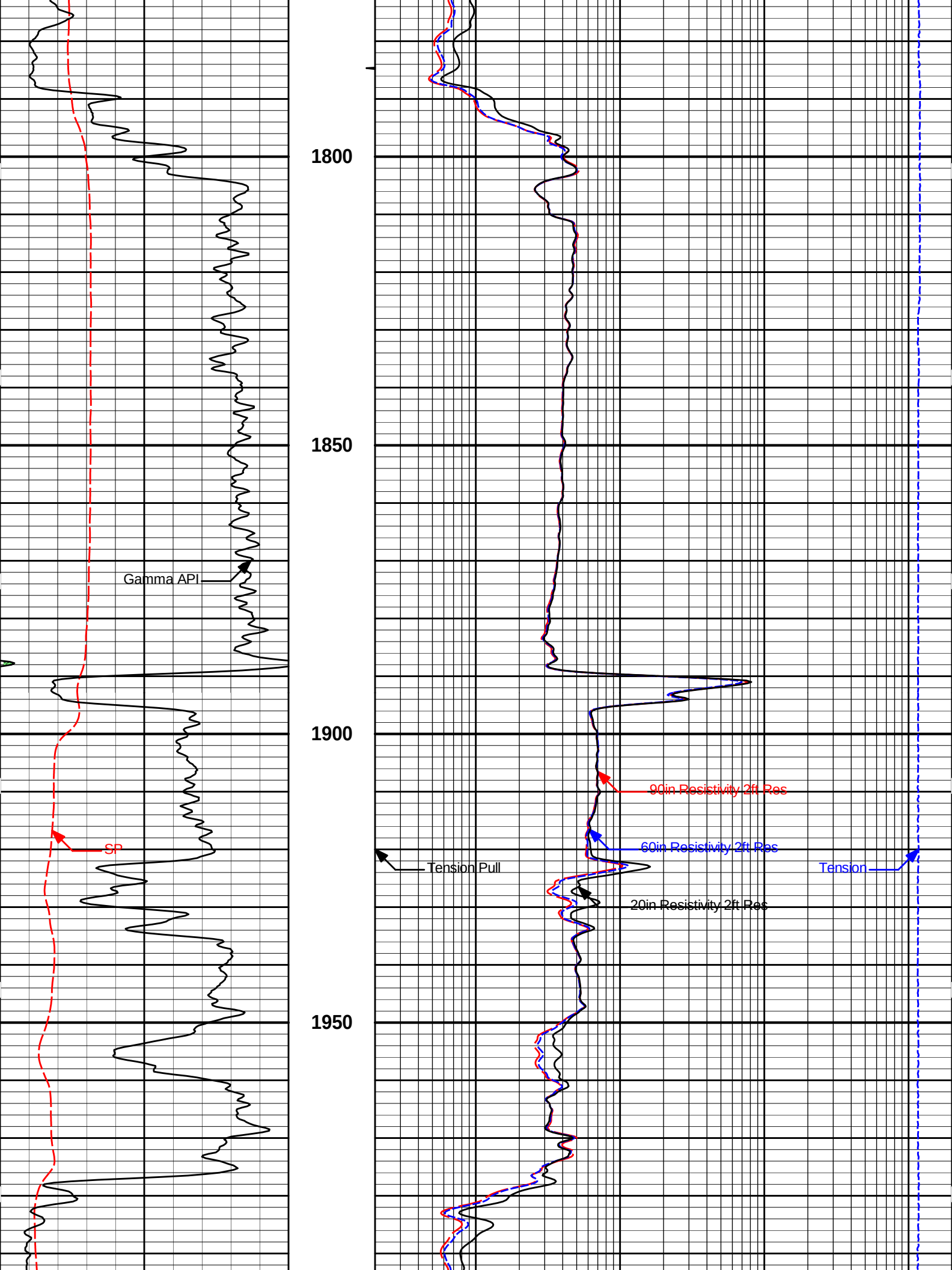

Gamma API
SP
700
750
800
850
60in Resistivity 2ft Res
90in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension Pull
Tension

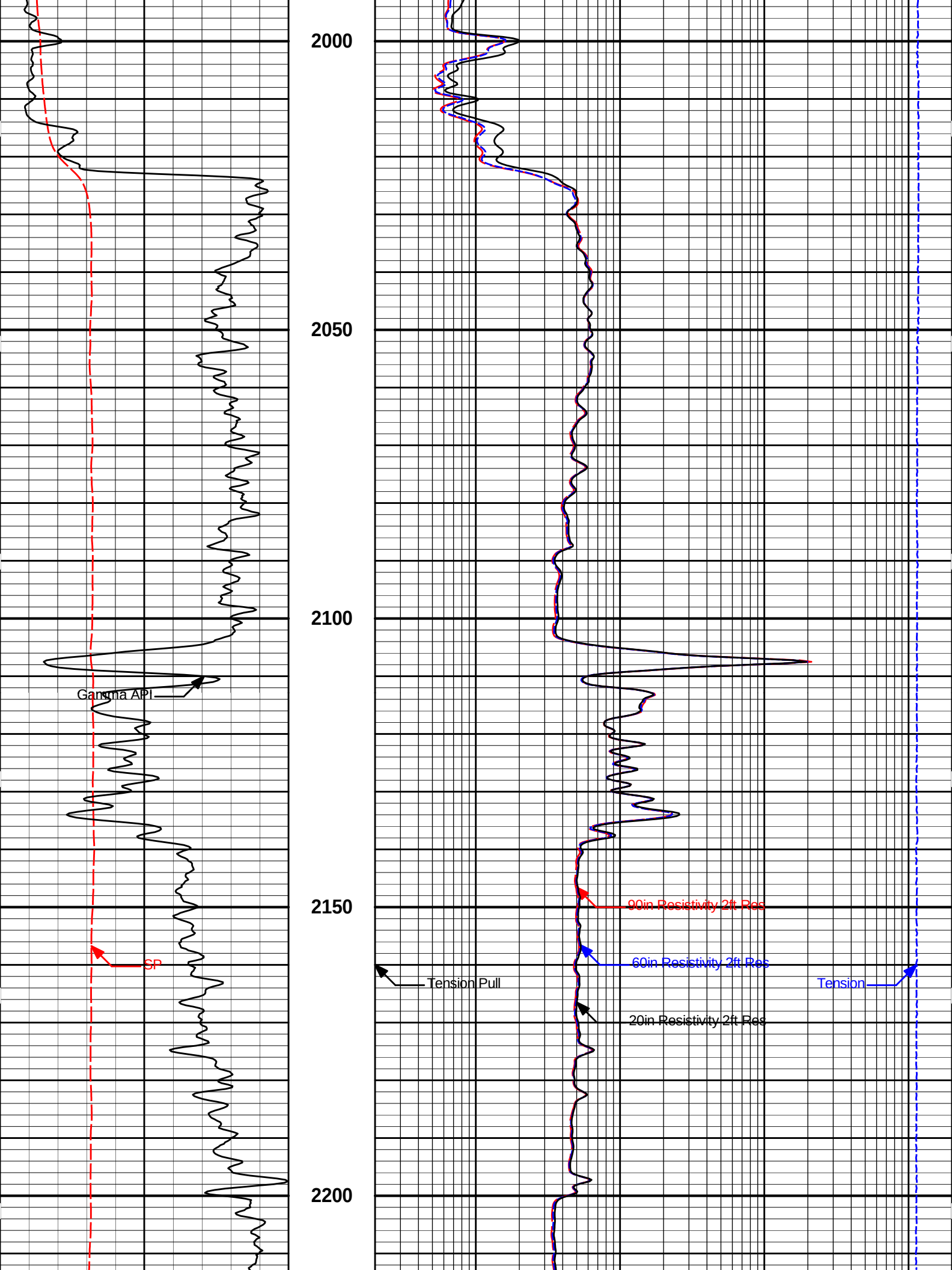

900
950
1000
1050
1100
Gamma API
SP
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension Pull
Tension

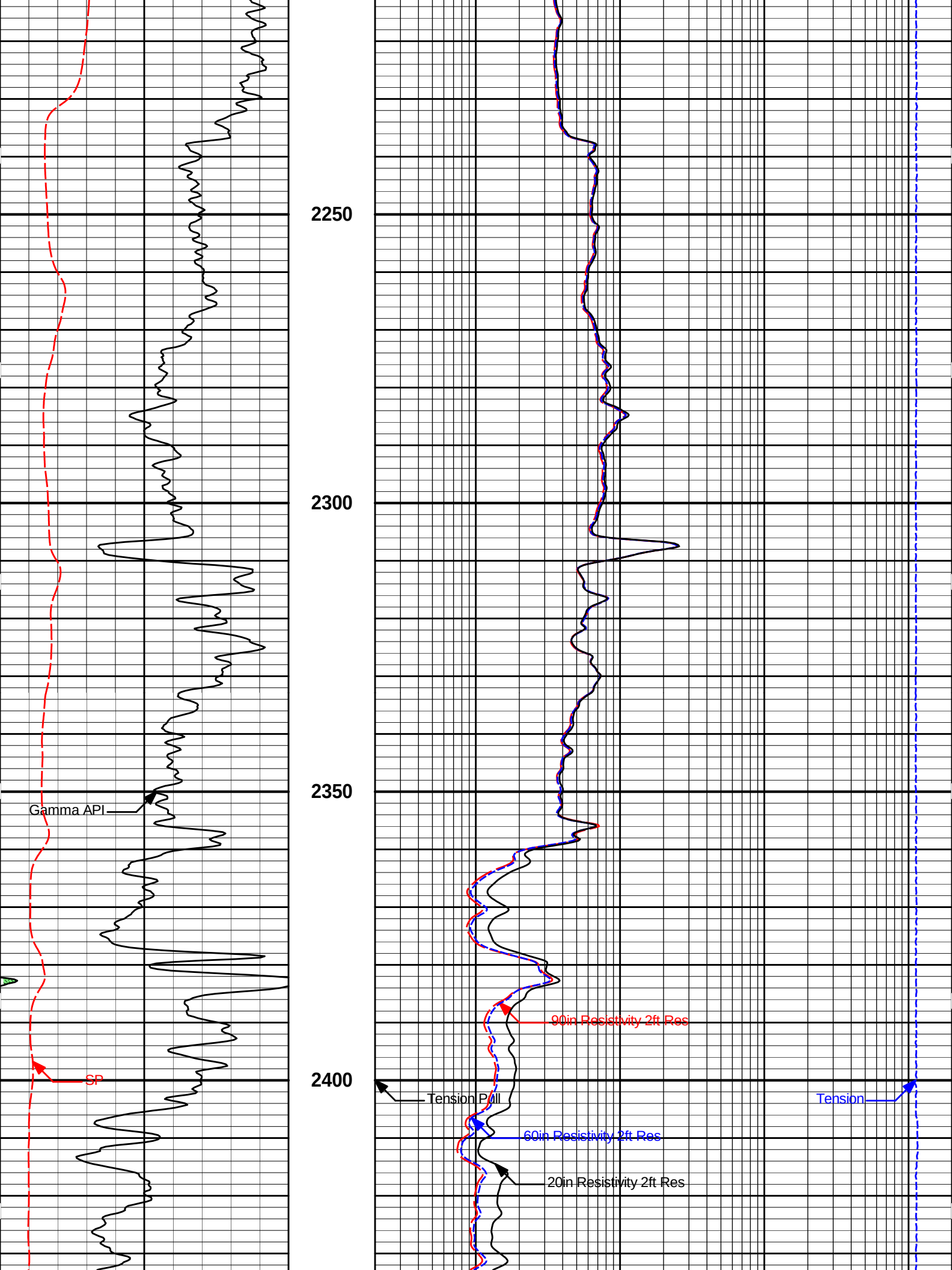

Gamma API
SP
1150
1200
1250
1300
Tension Pull
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension

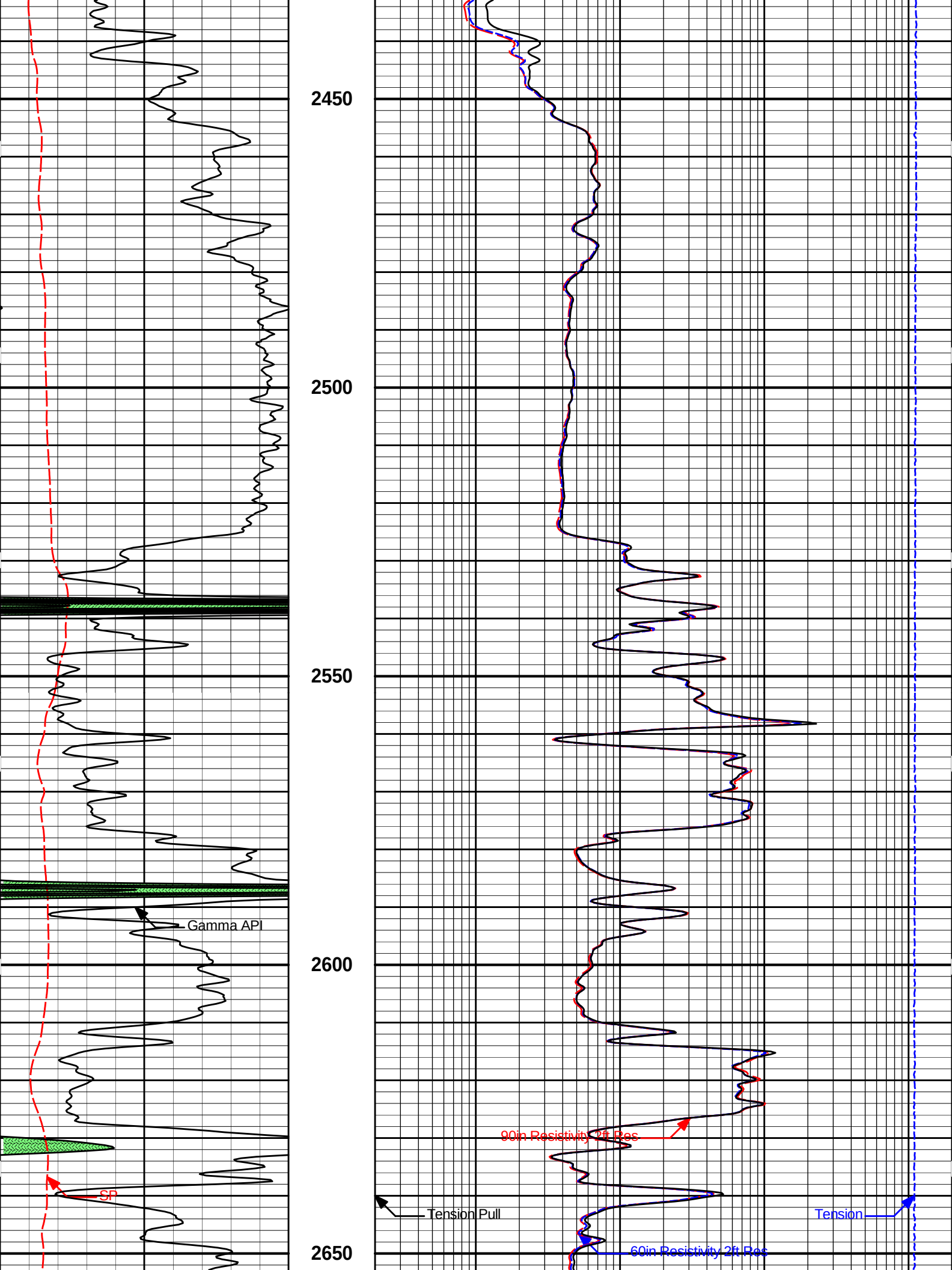

1350
1400
1450
1500
1550
Gamma API
SP
Tension Pull
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension

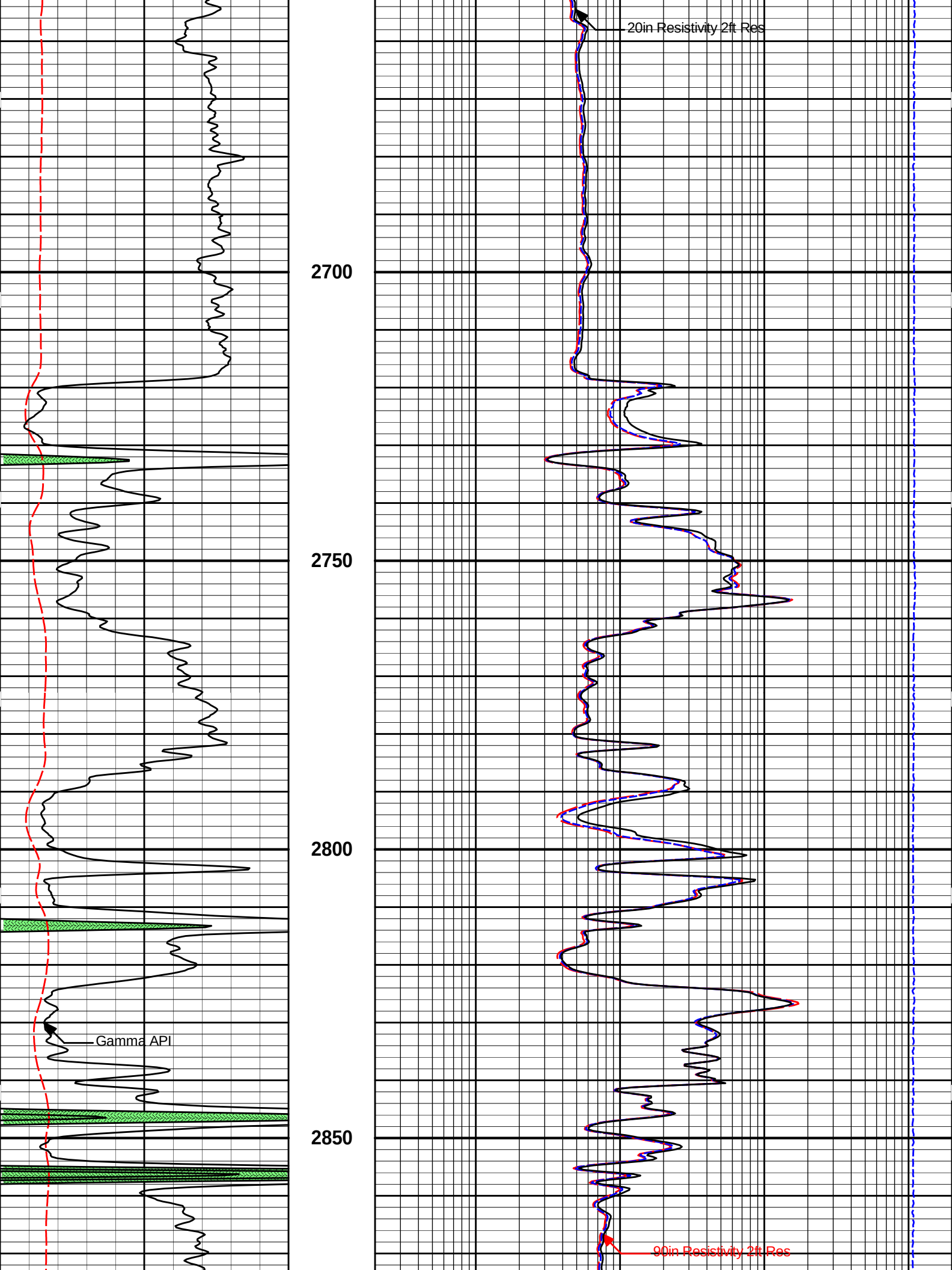

1600
1650
1700
1750
Gamma API
SP
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension Pull
Tension

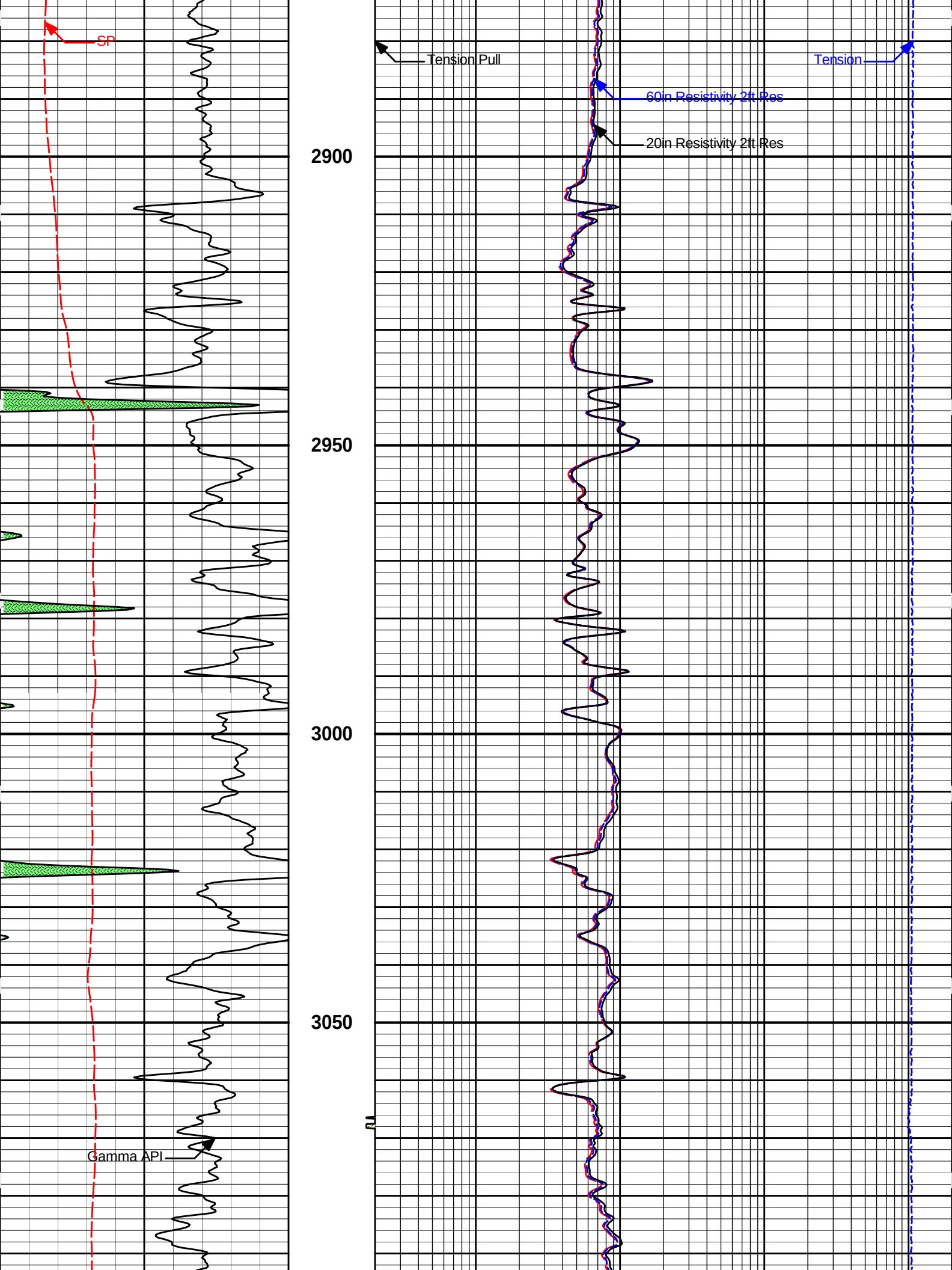

1800
1850
1900
1950
Gamma API
SP
Tension Pull
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension

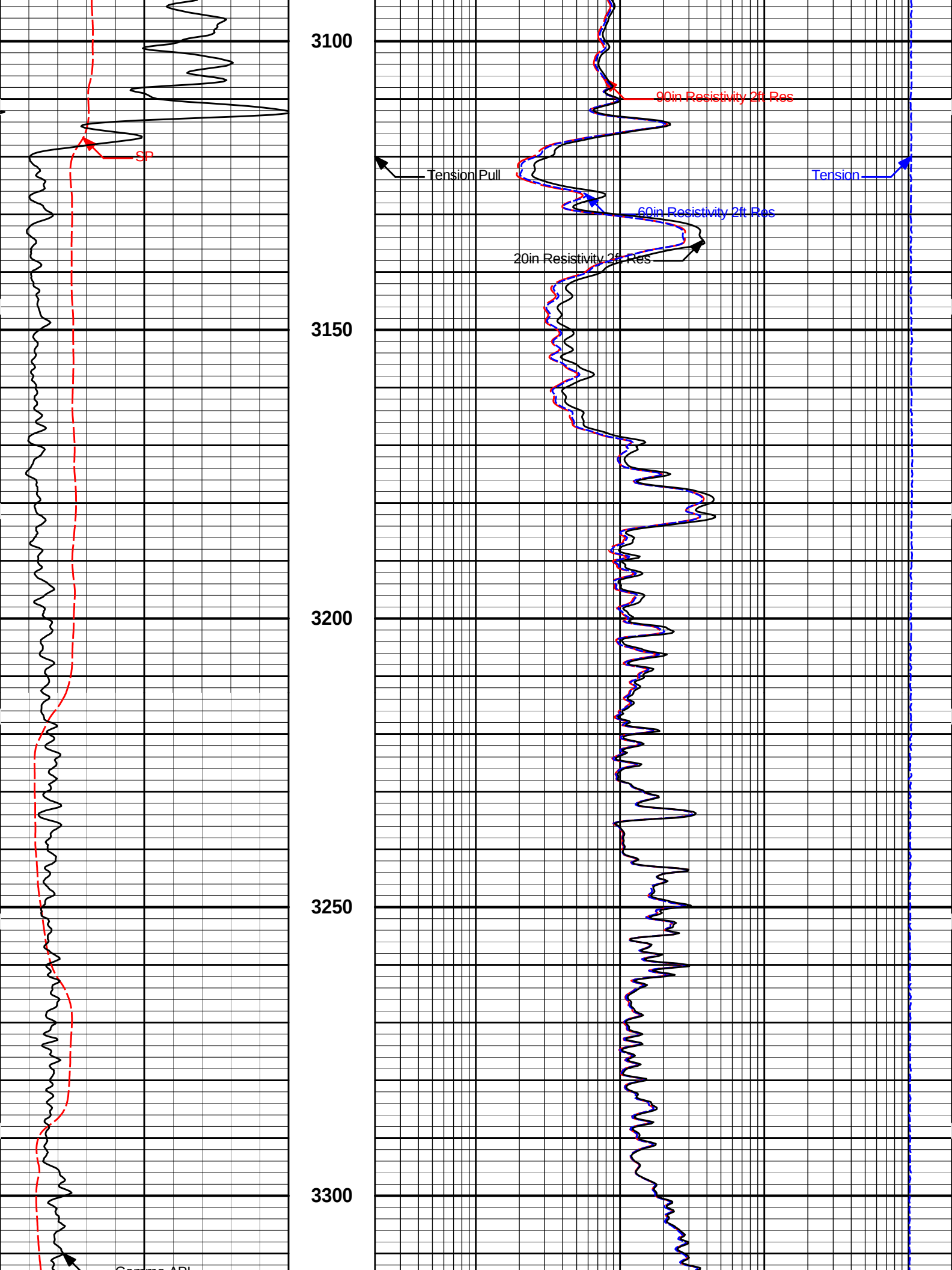

2000
2050
2100
2150
2200
Gamma API
SP
90in Resistivity 2ft Res
60in Resistivity 2ft Res
20in Resistivity 2ft Res
Tension Pull
Tension

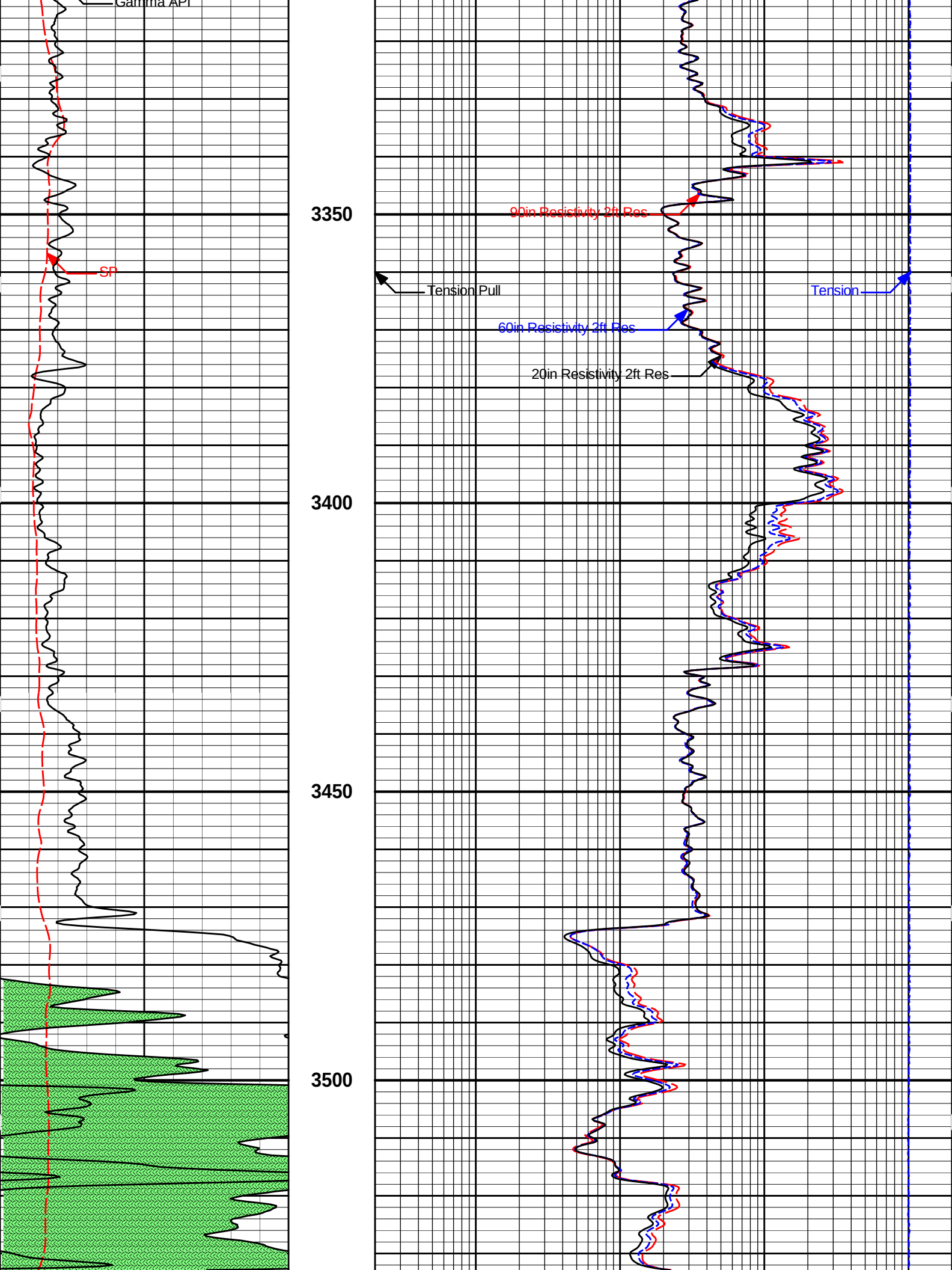

2250
2300
2350
2400
Gamma API
SP
90in Resistivity 2ft Res
Tension Pull
Tension
60in Resistivity 2ft Res
20in Resistivity 2ft Res

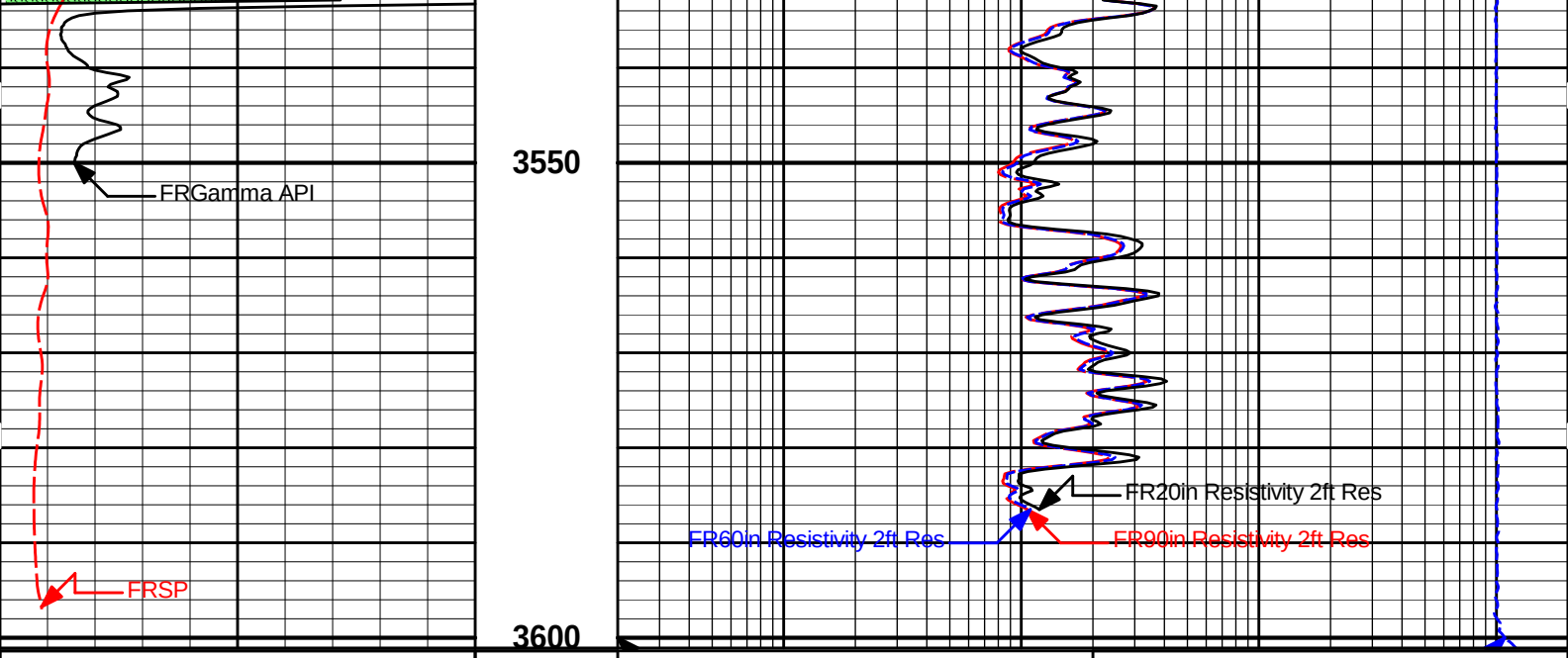

2450
2500
2550
2600
2650
Gamma API
SP
90in Resistivity 2ft Res
Tension Pull
Tension
60in Resistivity 2ft Res


20in Resistivity 2ft Res
2700
2750
2800
2850
Gamma API
90in Resistivity 2ft Res


SP
Tension Pull
Tension
60in Resistivity 2ft Res
20in Resistivity 2ft Res
2900
2950
3000
3050
Gamma API


3100
3150
3200
3250
3300
SP
90in Resistivity 2ft Res
Tension Pull
Tension
60in Resistivity 2ft Res
20in Resistivity 2ft Res


Gamma API
SP
3350
3400
3450
3500
90in Resistivity 2ft Res
Tension Pull
Tension
60in Resistivity 2ft Res
20in Resistivity 2ft Res



SP	1 : 240 ft	15K Tension 0
-] 20 mV [+	Tension Pull 10 0	pounds

0.2 20in Resistivity 2ft Res 2000
ohm-metre

0.2 60in Resistivity 2ft Res 2000
ohm-metre

0.2 90in Resistivity 2ft Res 2000
ohm-metre

HALLIBURTON

Plot Time: 13-Apr-13 08:31:20
Plot Range: 300 ft to 3601.08 ft
Data: {ActiveWell}\Well Based\DAQ-0002-005\
Plot File: \\-LOCAL-\ACRT\1_ACRT_5_mainx

5 INCH MAIN LOG

HALLIBURTON

Plot Time: 13-Apr-13 08:31:20
Plot Range: 3100 ft to 3596.25 ft
Data: {ActiveWell}\Well Based\DAQ-0002-003\
Plot File: \\-LOCAL-\ACRT\1_ACRT_5_rptx

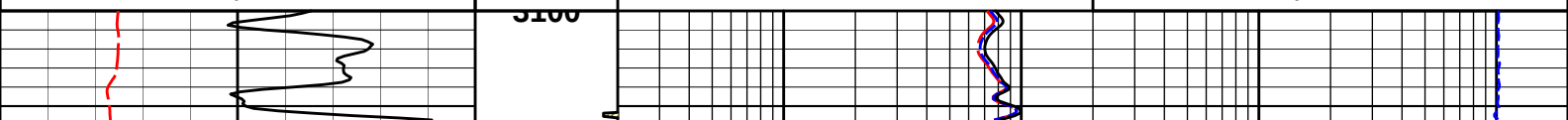
REPEAT SECTION

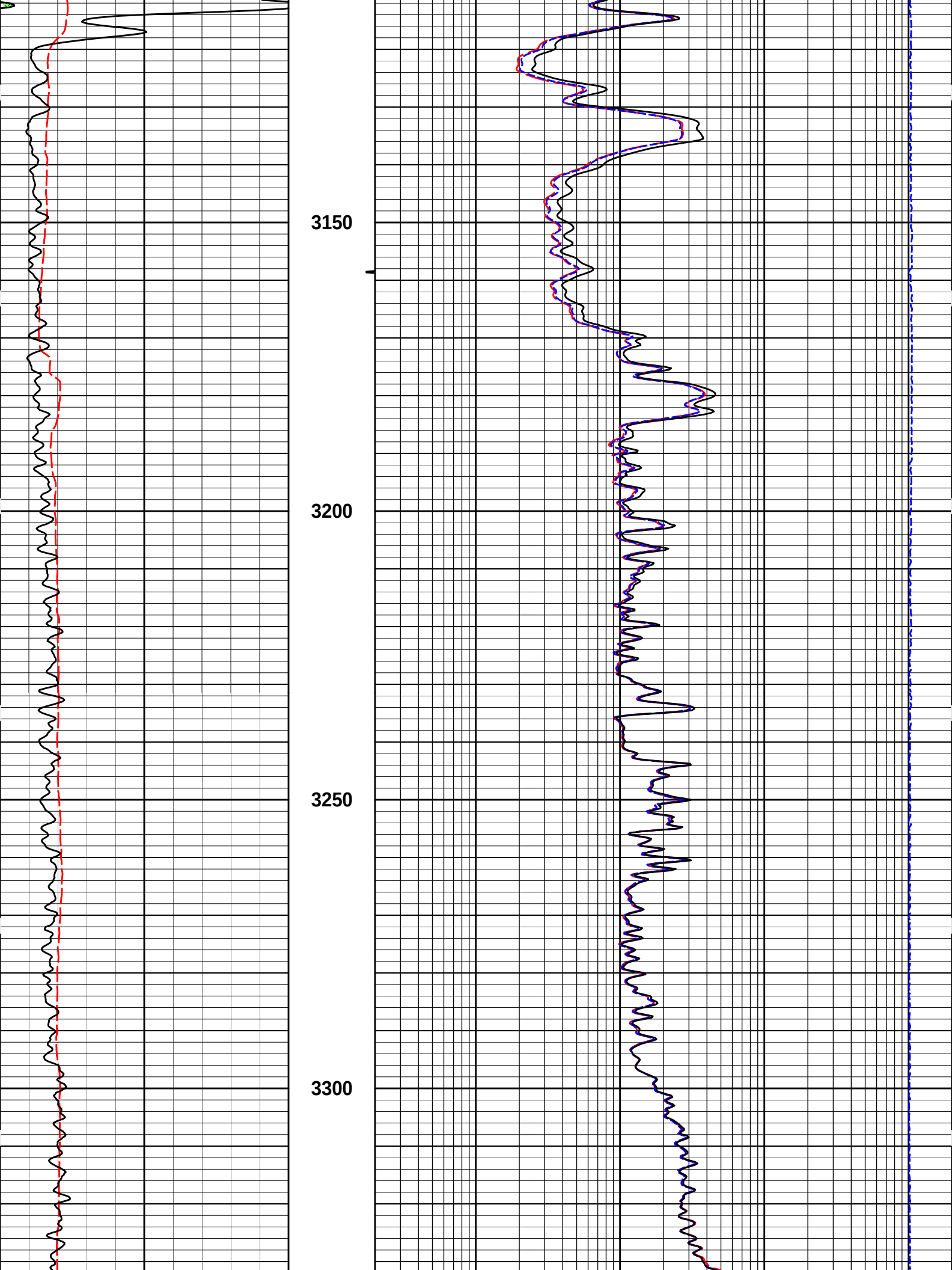
0.2 90in Resistivity 2ft Res 2000
ohm-metre

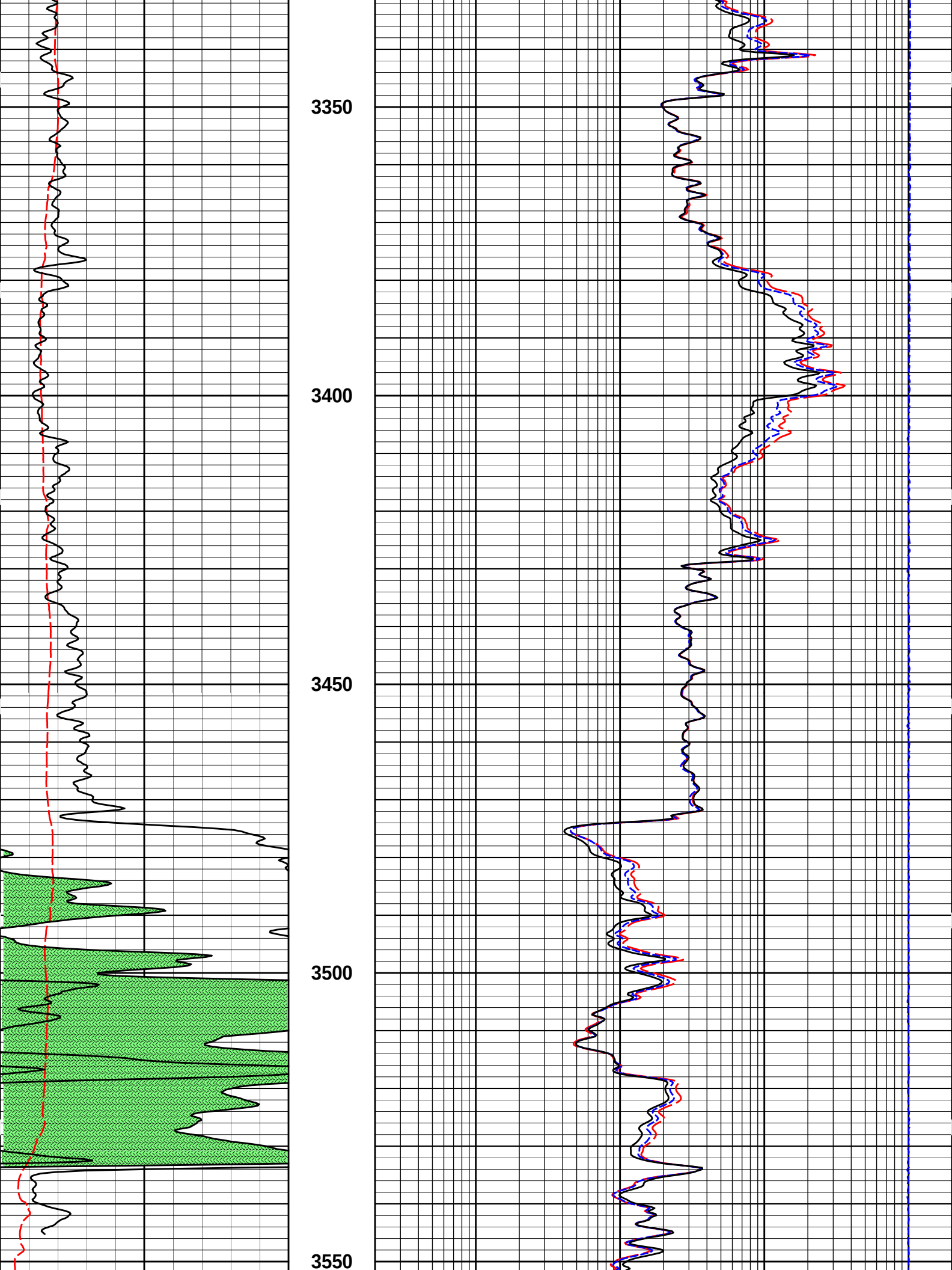
0.2 60in Resistivity 2ft Res 2000
ohm-metre

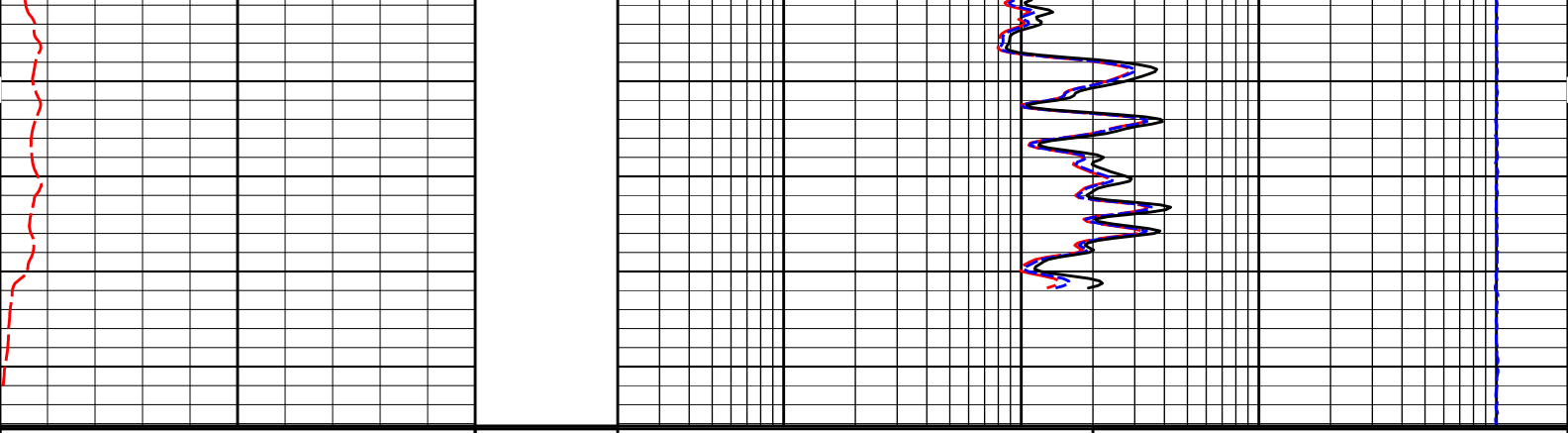
0.2 20in Resistivity 2ft Res 2000
ohm-metre

SP	Tension Pull 10 0	15K Tension 0
-] 20 mV [+		pounds
0 Gamma API 150	1 : 240 ft	
api		




3150
3200
3250
3300


3350
3400
3450
3500
3550



HALLIBURTON

Plot Time: 13-Apr-13 08:31:22
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Data: {ActiveWell}\Well Based\DAQ-0002-003\
Plot File: \\-LOCAL-\ACRT\1_ACRT_5_rptx

REPEAT SECTION

HALLIBURTON

PARAMETERS REPORT

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	9.400	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	900.00	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	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	3600.00	ft
	SHARED	BHT	Bottom Hole Temperature	108.0	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	

	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	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	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	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	2.710	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 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	
	ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm

BOTTOM

Data: HAMMER_D_V_1_5\0002 BLACK_TRIPLE\IDLE **Date: 13-Apr-13 04:59:13**

HALLIBURTON

CALIBRATION REPORT

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 90144321-e989-s **Reference Calibration Date:** 26-Sep-12 10:15:19

Engineer: RAMIRO GONZALEZ **Calibration Date:** 26-Nov-12 11:33:47

Software Version: WL INSITE R3.6.0 (Build 3) **Calibration Version:** 1

Host Tool Name: ACRt Instrument - 989

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.01	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A2 (50")	0.95	1.03	1.05	0.95	1.03	1.05	0.95	1.03	1.05
A3 (29")	0.95	1.01	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A4 (17")	0.95	1.00	1.05	0.95	1.00	1.05	0.95	1.00	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.99	1.05	0.95	0.99	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.98	1.05	0.95	0.98	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	-0.33	2	-6	-3.20	-2	-8	-5.12	-2
A2 (50")	-7	-2.34	0	-7	-4.10	0	-7	-4.49	0
A3 (29")	-27	-12.33	-9	-9	-3.22	-3	-7	-3.22	-1
A4 (17")	-180	-101.93	-60	-45	-31.74	-15	-39	-24.21	-13
A5 (10")	N/A	N/A	N/A	-150	-91.98	-50	-80	-43.90	-10
A6 (6")	N/A	N/A	N/A	175	322.96	525	90	164.40	270

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.92	1.3
36K	1.0	1.41	2.0
72K	1.0	1.66	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.00	1.05

PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET RANGE CHK	PASS
Tx CURRENT GAIN	PASS
Rmud VERIFICATION	PASS

TOOL OK TO LOG

CALIBRATION SUMMARY

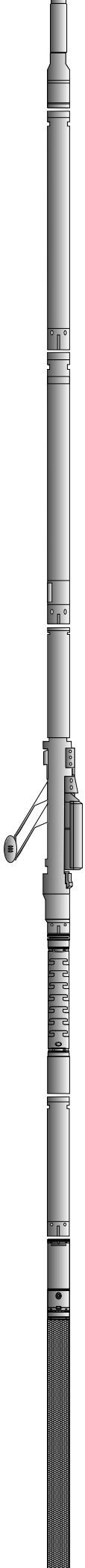
Sensor	Shop	Field	Post	Difference	Tolerance	Units
ACRt Sonde-90144321-e989-s						
Mud Cell	1.00	----------	----------	0.00	----------	ohm-m

Data: HAMMER_D_V_1_5\0002 BLACK_TRIPLE\IDLE **Date:** 13-Apr-13 04:59:54

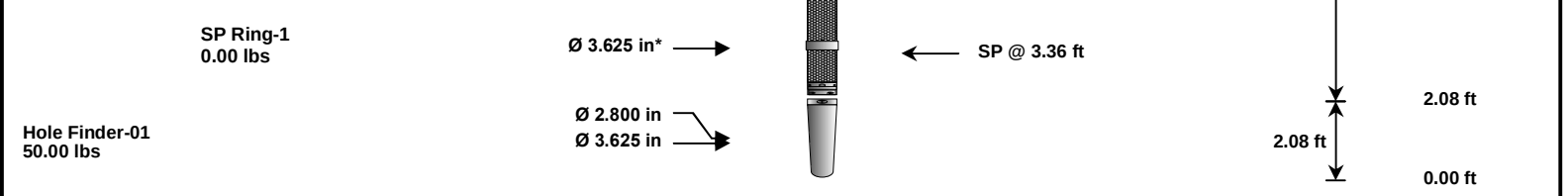
HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH-HOS 500-RED				Temperature @ 58.97 ft		60.00 ft



CH_HOS-590_RED
37.50 lbs
Ø 2.750 in
3.03 ft
56.97 ft
XOHD-01
20.00 lbs
Ø 2.750 in
Ø 3.625 in
0.95 ft
56.02 ft
GTET-11013113
165.00 lbs
Ø 3.625 in
8.52 ft
GammaRay @ 49.96 ft
47.50 ft
DSNT-10993115
174.00 lbs
Ø 3.625 in
9.69 ft
DSN Far @ 40.57 ft
DSN Near @ 39.82 ft
37.82 ft
SDLT-10960494
360.00 lbs
Ø 4.500 in
10.81 ft
SDLT Pad-10865873
65.00 lbs
Microlog Pad-I15M94P73
8.00 lbs
Ø 4.750 in*
Ø 4.750 in*
Microlog @ 30.00 ft
SDL Caliper @ 29.82 ft
SDL @ 29.81 ft
27.00 ft
IQ Flex-BLACK
140.00 lbs
Ø 3.625 in
5.67 ft
21.33 ft
ACRt Instrument-989
50.00 lbs
Ø 3.625 in
5.03 ft
ShortAxisKit-910
60.00 lbs
Ø 5.380 in*
16.30 ft
Mud Resistivity @ 14.94 ft
ACRt @ 10.96 ft
ACRt Sonde-90144321-e989-s
200.00 lbs
Ø 3.625 in
14.22 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	590_RED	37.50	3.03		56.97	300.00
XOHD	Hostile to Dits Cross Over	01	20.00	0.95		56.02	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52		47.50	60.00
DSNT	Dual Spaced Neutron	10993115	174.00	9.69		37.82	60.00
SDLT	Spectral Density Tool	10960494	360.00	10.81		27.00	60.00
SDLP	Density Insite Pad	10865873	65.00	2.55	*	29.21	60.00
MICP	Microlog Pad	I15M94P73	8.00	1.00	*	29.50	60.00
IQF	IQ Flex tool	BLACK	140.00	5.67		21.33	300.00
ACRt	Array Compensated True Resistivity Instrument Section	989	50.00	5.03		16.30	300.00
SAK	Short Axis Kit for logging short axis of a borehole.	910	60.00	1.02	*	16.30	300.00
ACRt	Array Compensated True Resistivity Sonde Section	90144321-e989-s	200.00	14.22		2.08	300.00
SP	SP Ring	1	0.00	0.25	*	3.36	300.00
HFND	Hole Finder	01	50.00	2.08		0.00	300.00
Total			**1,329.50**	**60.00**			

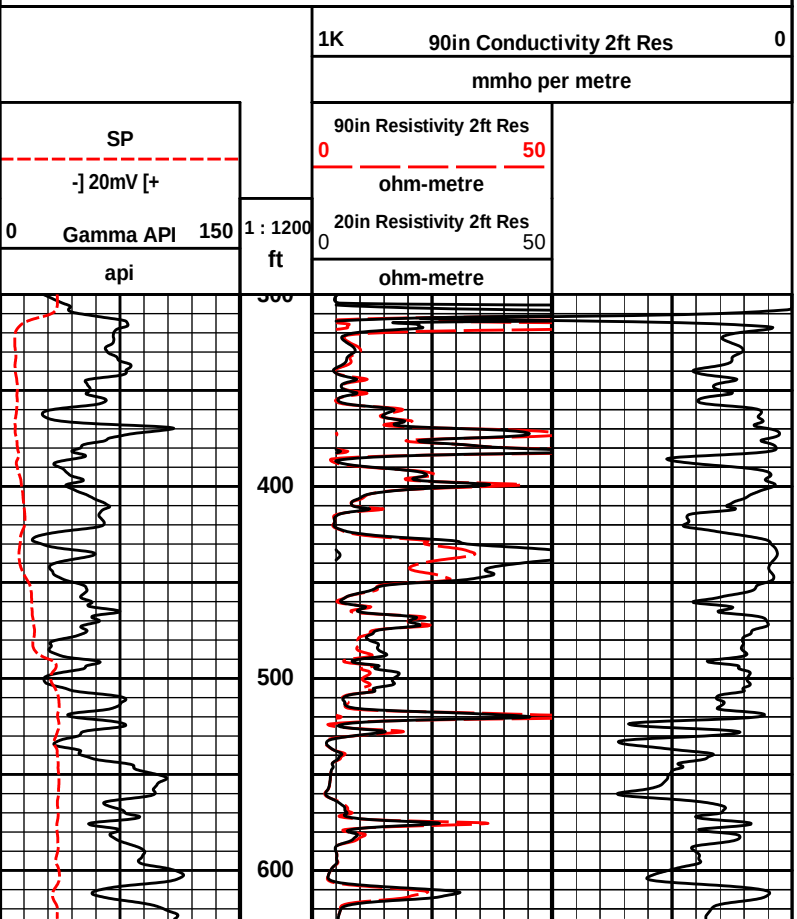
* Not included in Total Length and Length Accumulation.

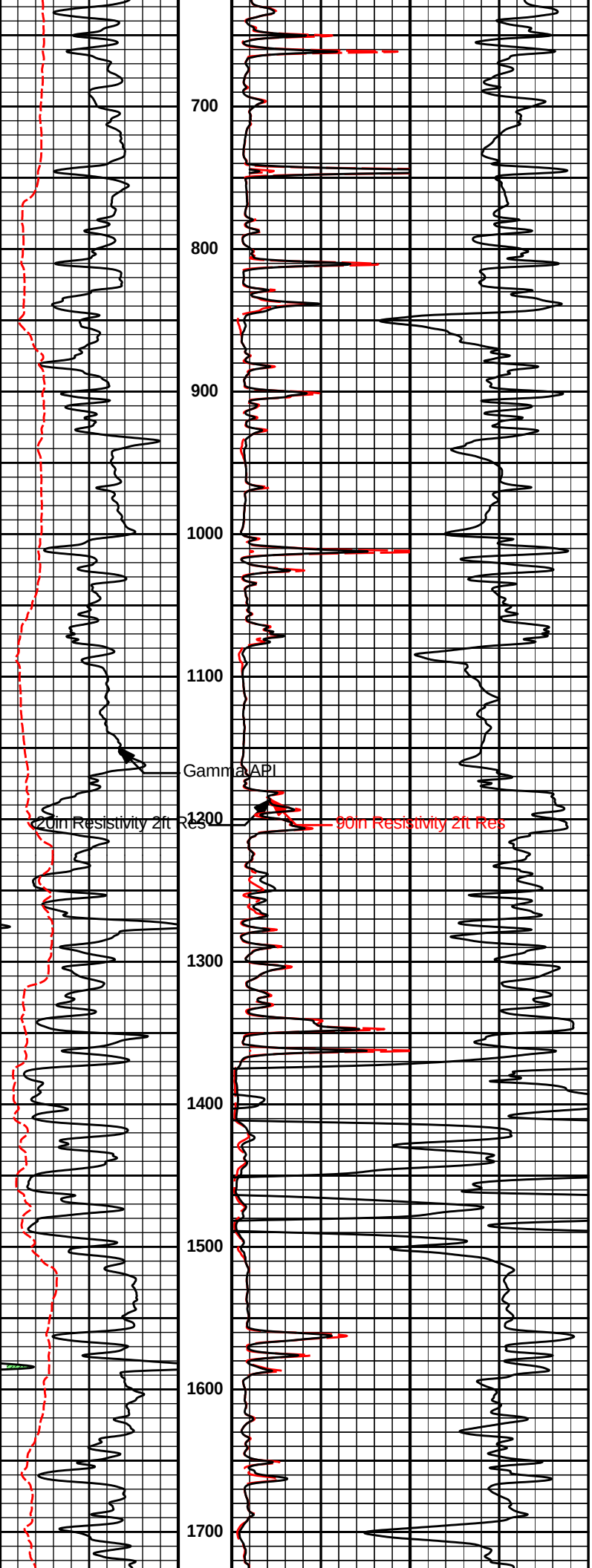
Data: HAMMER_D_V_1_5\0002 BLACK_TRIPLE\002 13-Apr-13 04:41 Dn @-0.3f **Date: 13-Apr-13 04:58:36**

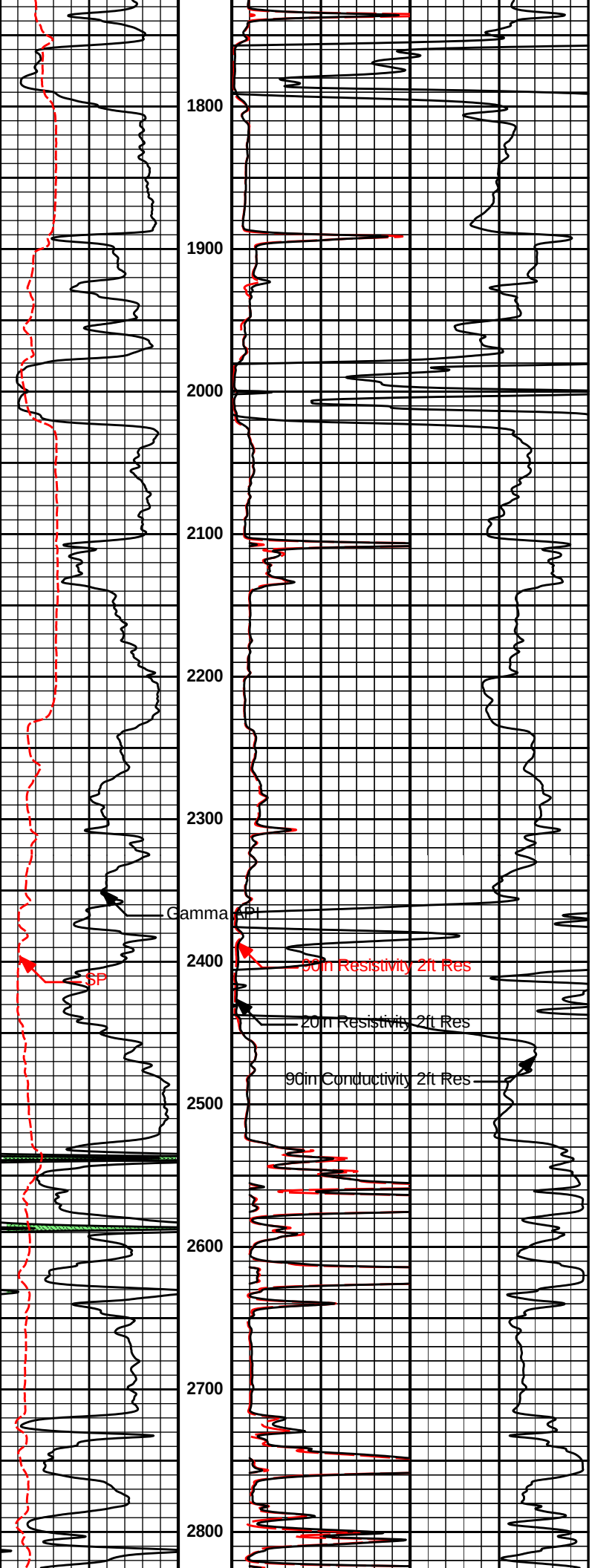
HALLIBURTON

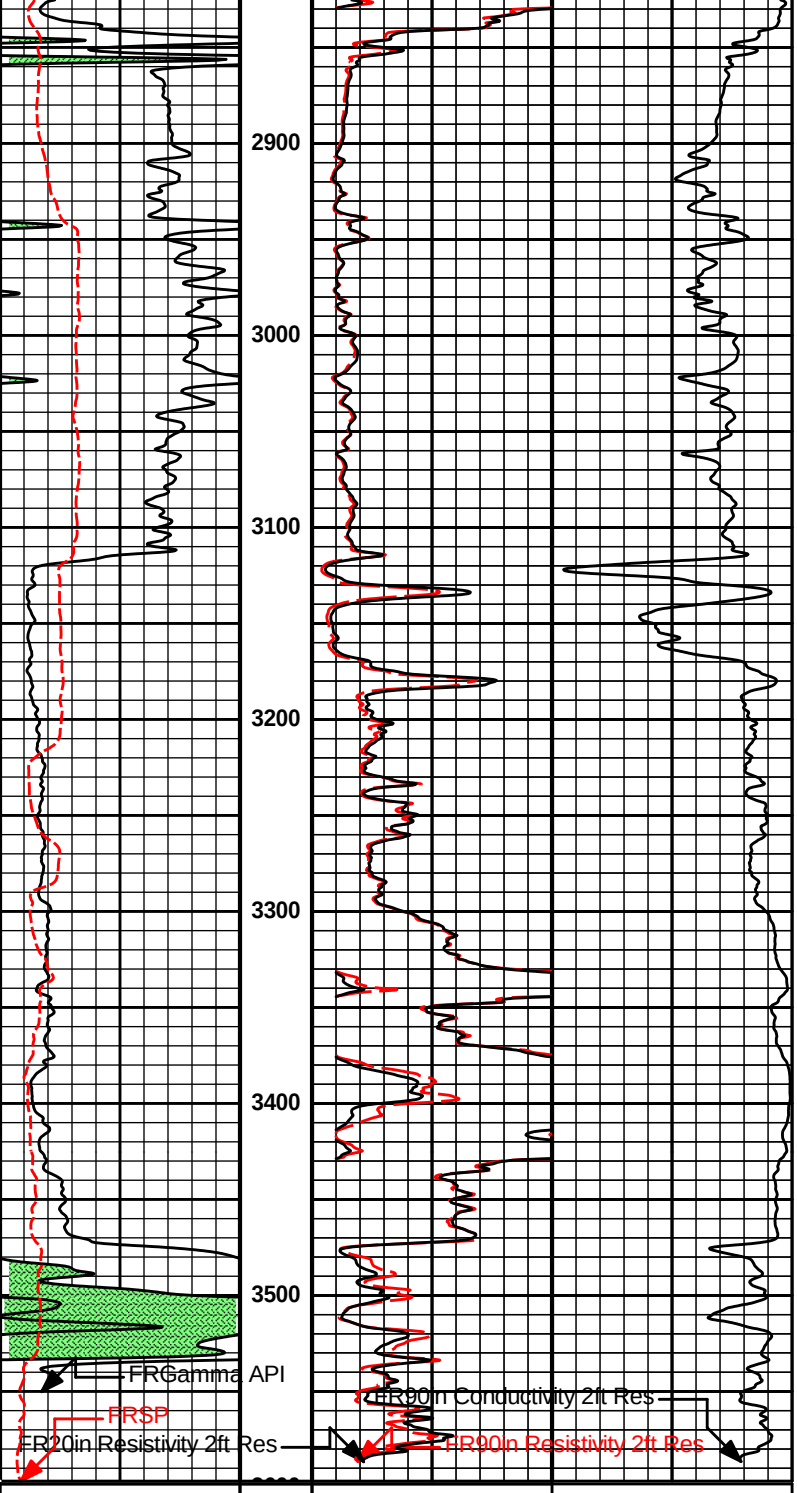
Plot Time: 13-Apr-13 08:31:22
Plot Range: 300 ft to 3596.75 ft
{ActiveWell}\Well Based\...\...
Plot File: \\...\...\1_ACRT_1inx

1 INCH MAIN LOG




700
800
900
1000
1100
Gamma API
1200
20in Resistivity 2ft Res
90in Resistivity 2ft Res
1300
1400
1500
1600
1700


1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
Gamma API
90in Resistivity 2ft Res
SP
20in Resistivity 2ft Res
90in Conductivity 2ft Res



0 Gamma API 150	1 : 1200	20in Resistivity 2ft Res 0 50
api	ft	ohm-metre
SP		90in Resistivity 2ft Res 0 50
-] 20mV [+		ohm-metre
		1K 90in Conductivity 2ft Res 0
		mmho per metre

HALLIBURTON

Plot Time: 13-Apr-13 08:31:24
Plot Range: 300 ft to 3596.75 ft
{ActiveWell}\Well Based\...\...
Plot File: \\...\...\1_ACRT_1inx

1 INCH MAIN LOG

COMPANY	VAL ENERGY

COMPANY	**VAL ENERGY**		
WELL	**HAMMER D V 1-5**		
FIELD	**WILSON**		
COUNTY	**COWLEY**	STATE	**KANSAS**

HALLIBURTON

ARRAY COMPENSATED RESISTIVITY LOG