

ARRAY COMPENSATED
TRUE RESISTIVITY
LOG

----- Fold here -----

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					30		-10	2.71 gr/cc	

[illegible]

HALLIBURTON

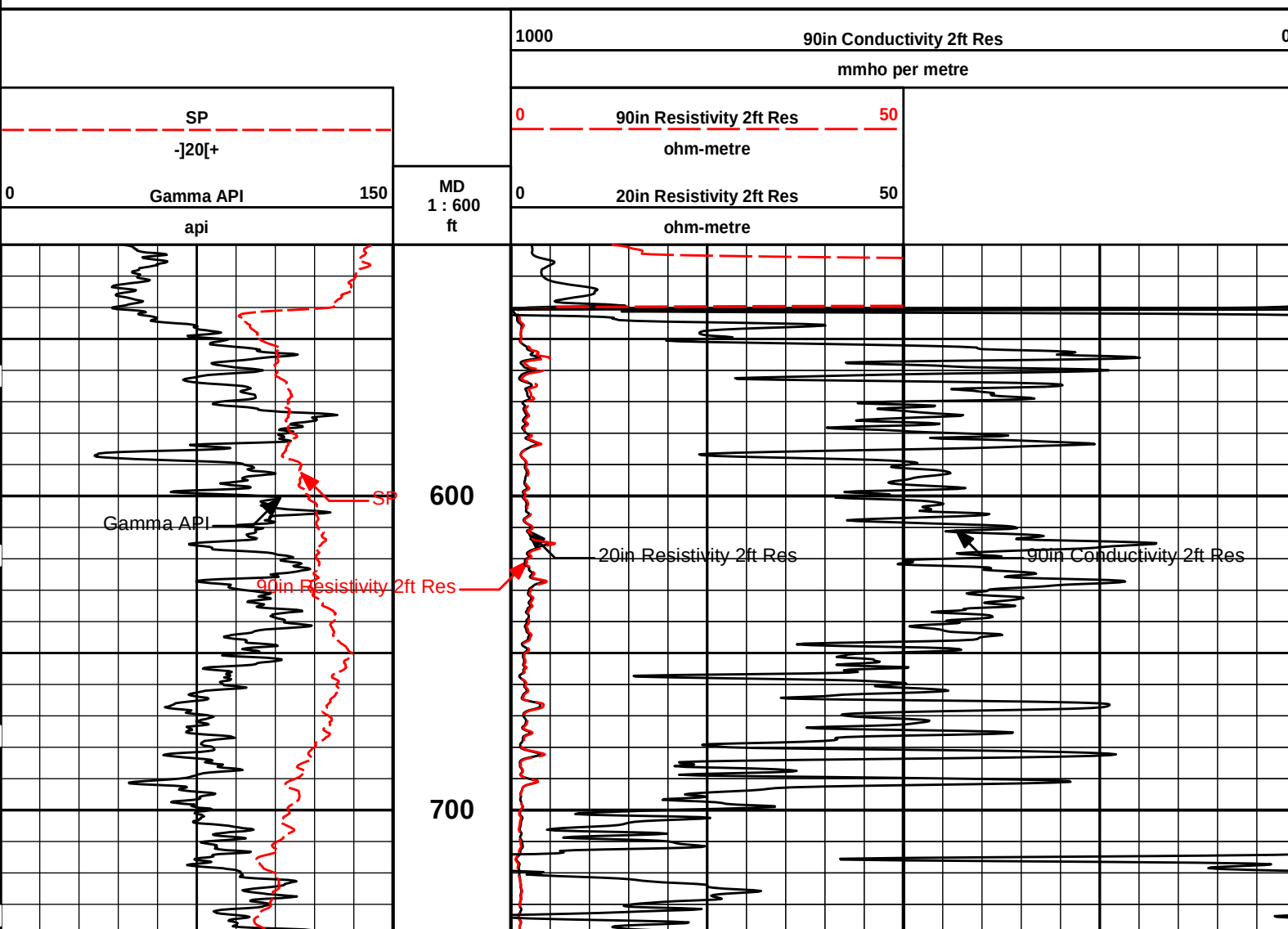
Plot Time: 12-Jun-15 19:50:01

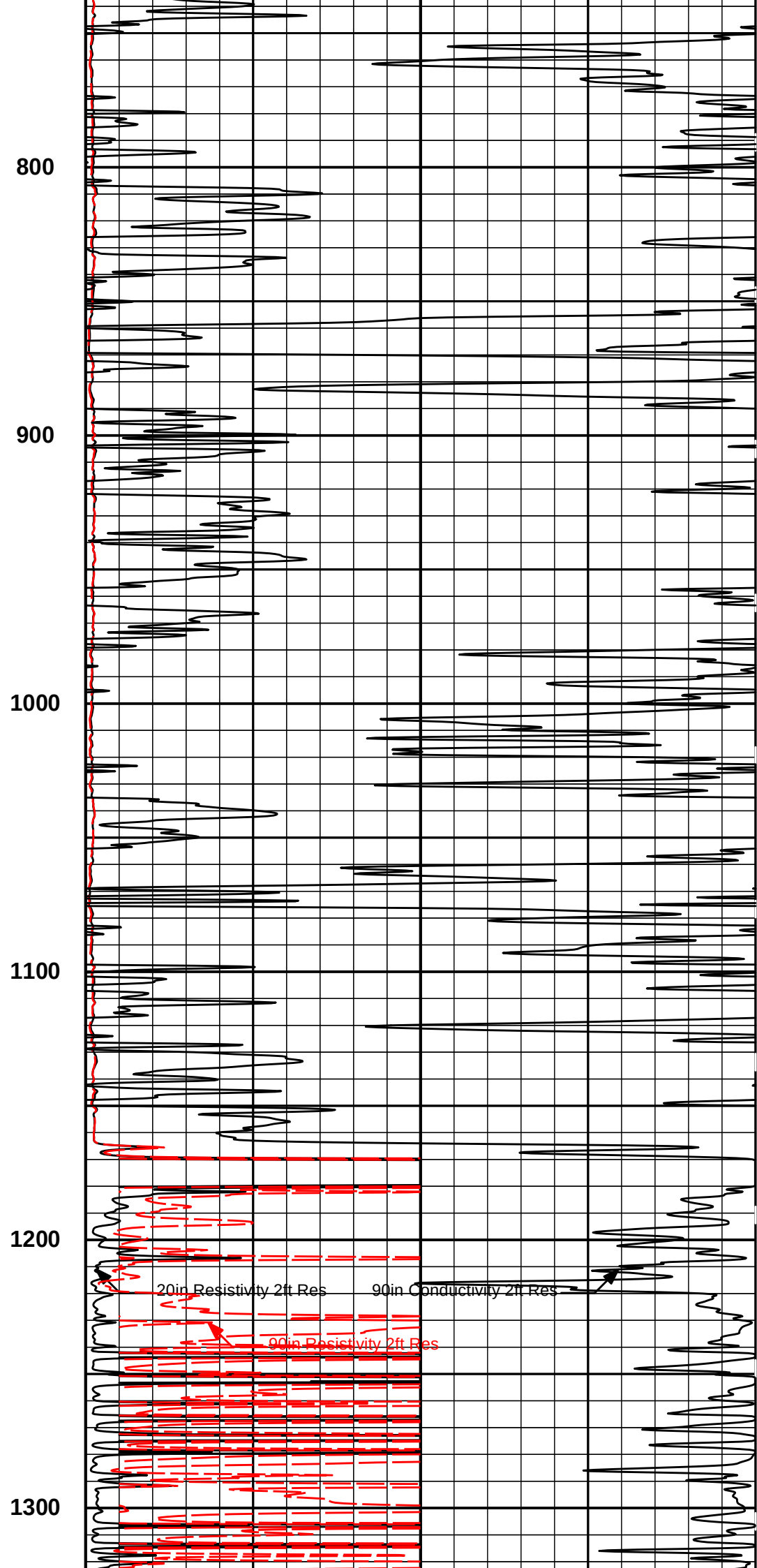
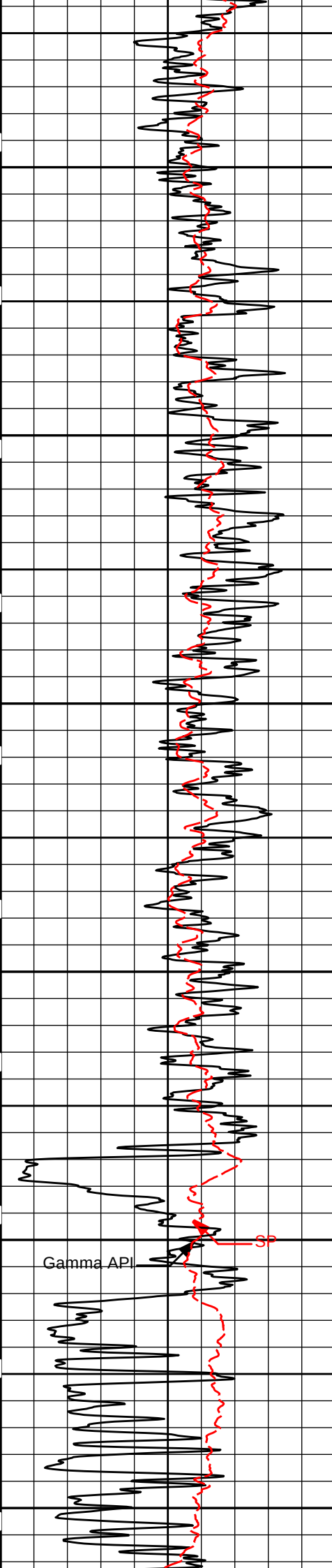
Plot Range: 520 ft to 4823.83 ft

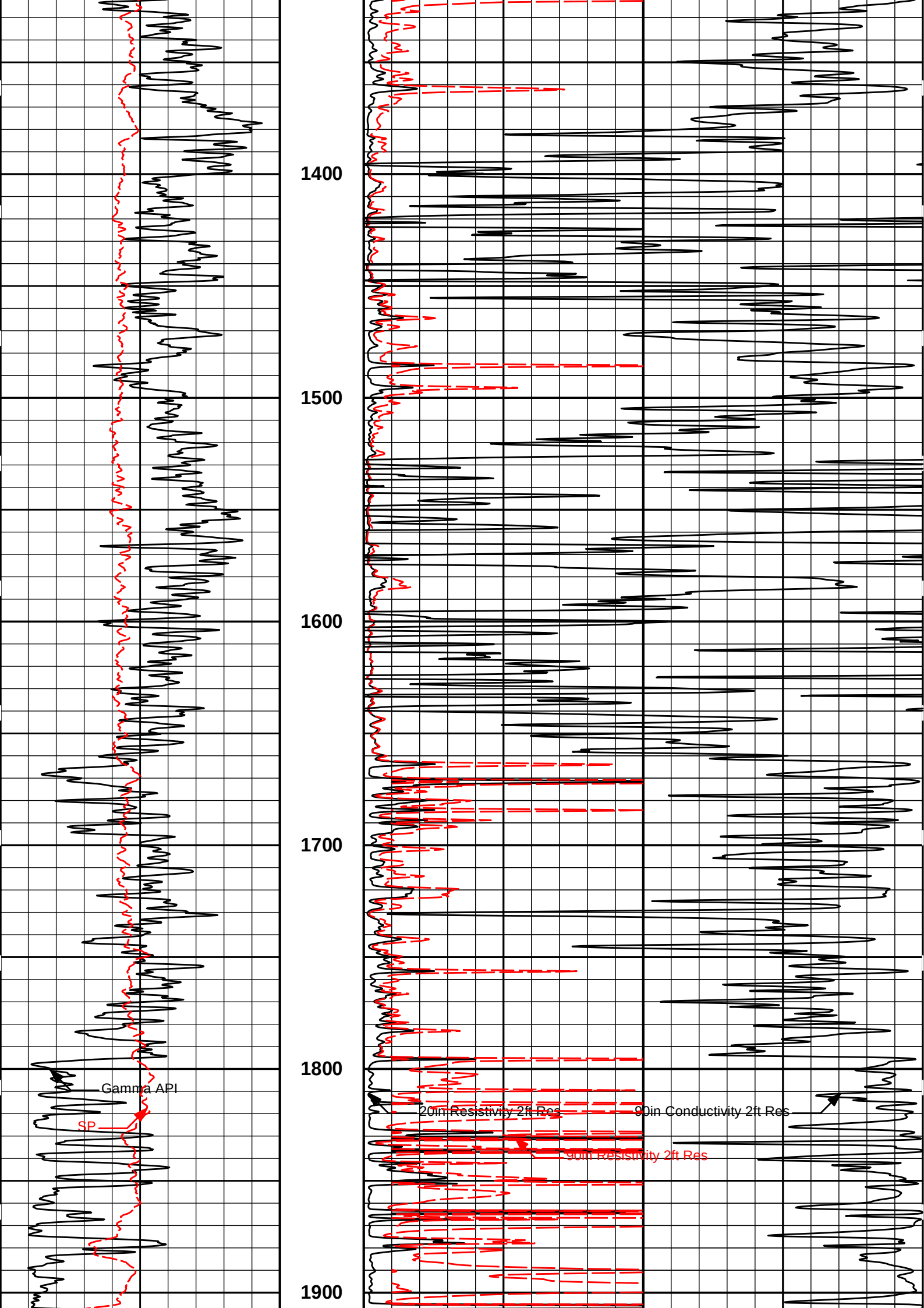
Data: BANTA-F_1-21\Well Based\MAIN2\

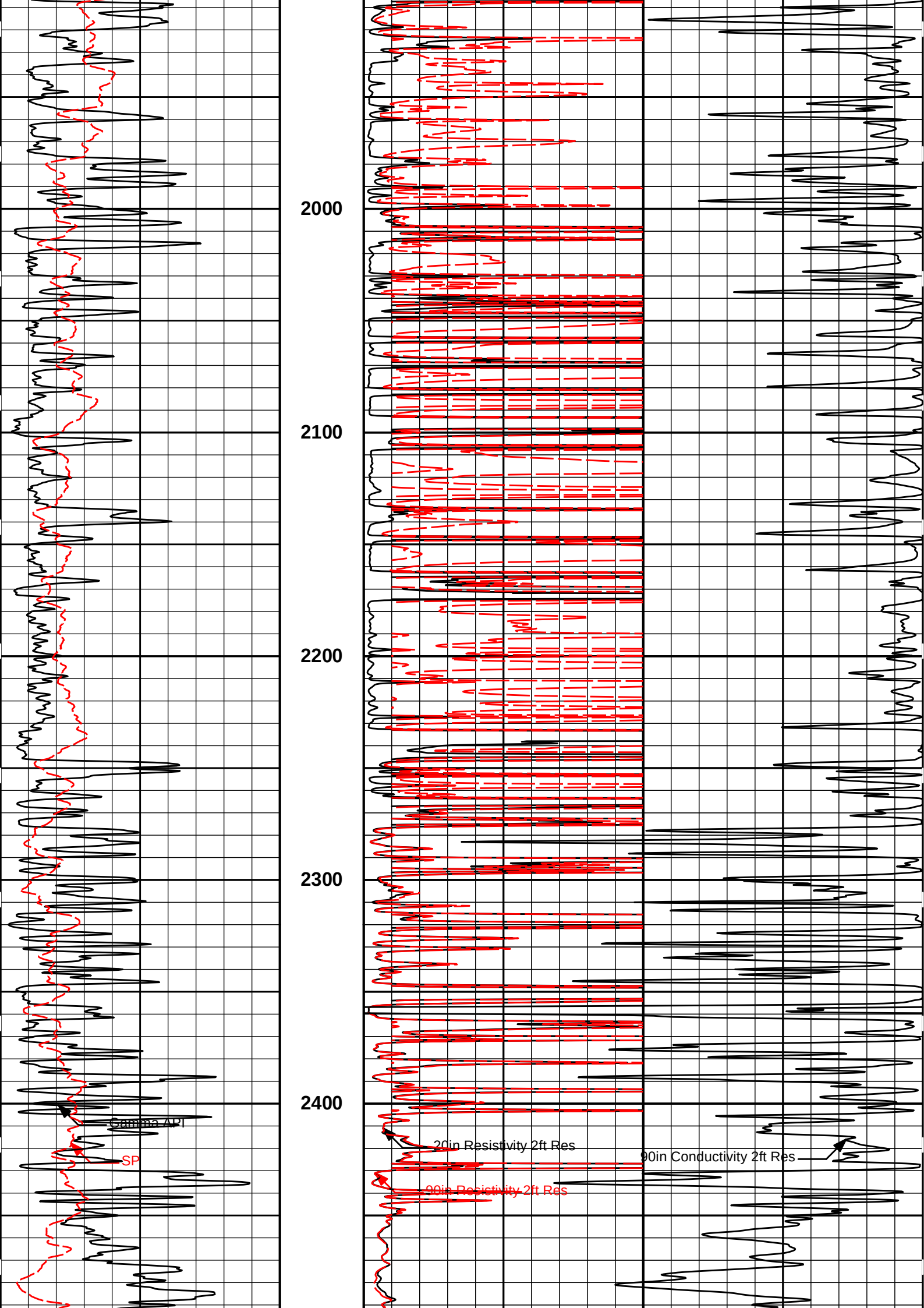
Plot File: \\-LOCAL-\\BANTA-F_1-21\\Well Based\\ACRT\\ACRT_2_lib

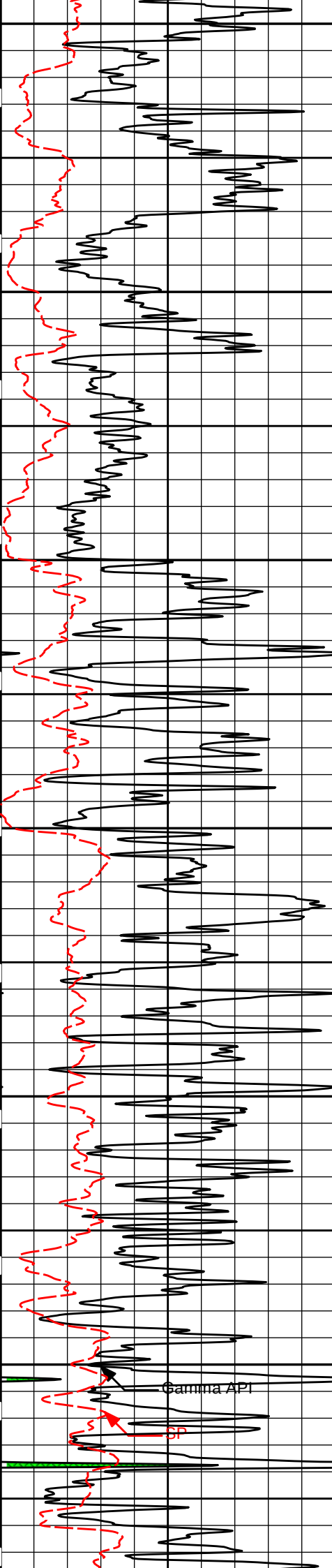
2 INCH MAIN LOG











2500

2600

2700

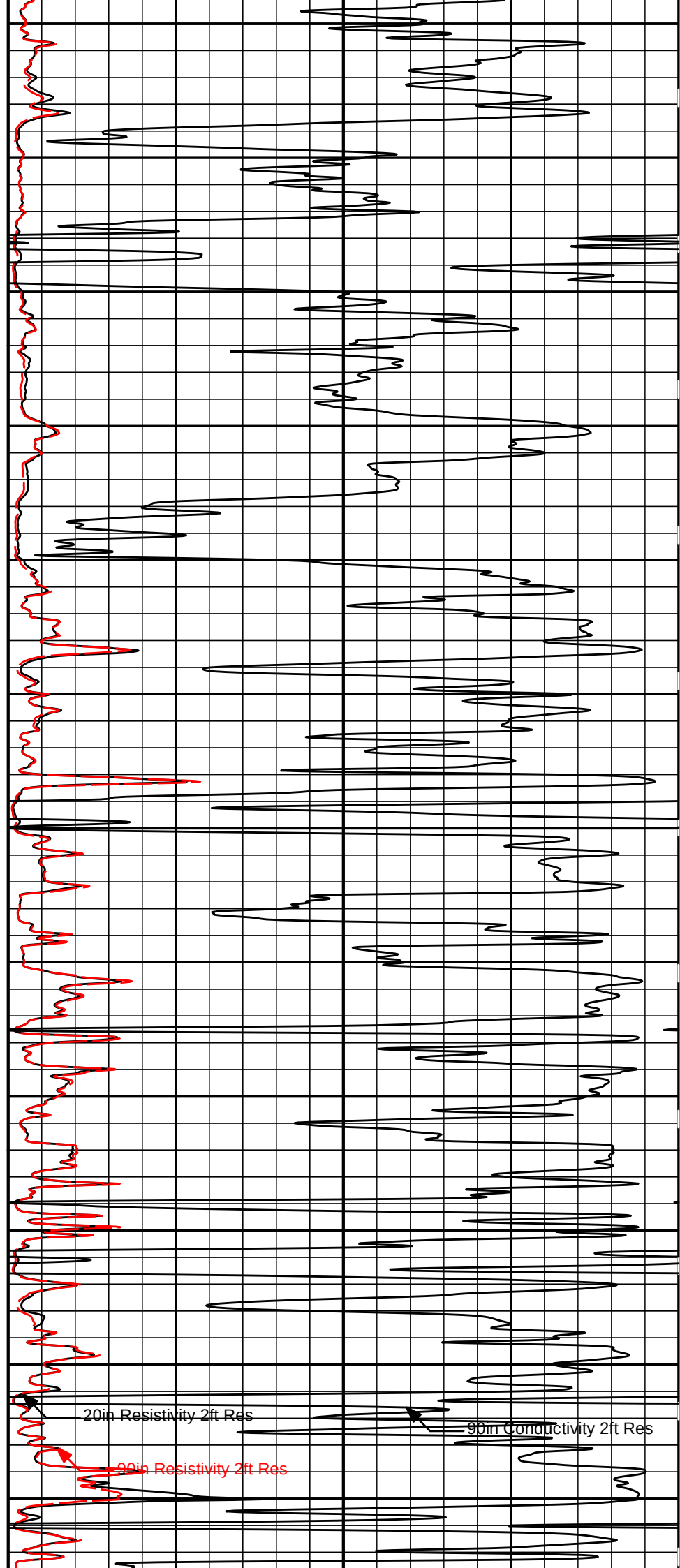
2800

2900

3000

Gamma API

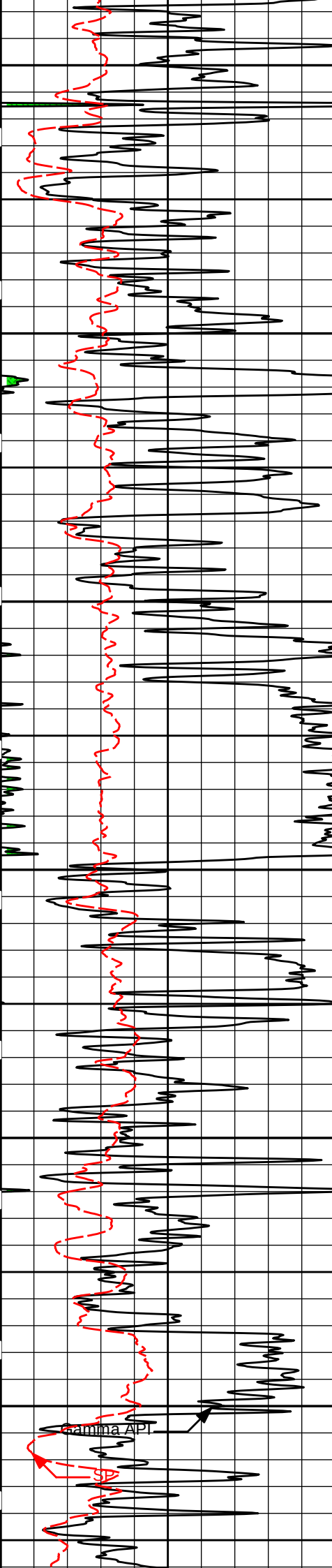
SP



20in Resistivity 2ft Res

90in Resistivity 2ft Res

90in Conductivity 2ft Res



3100

3200

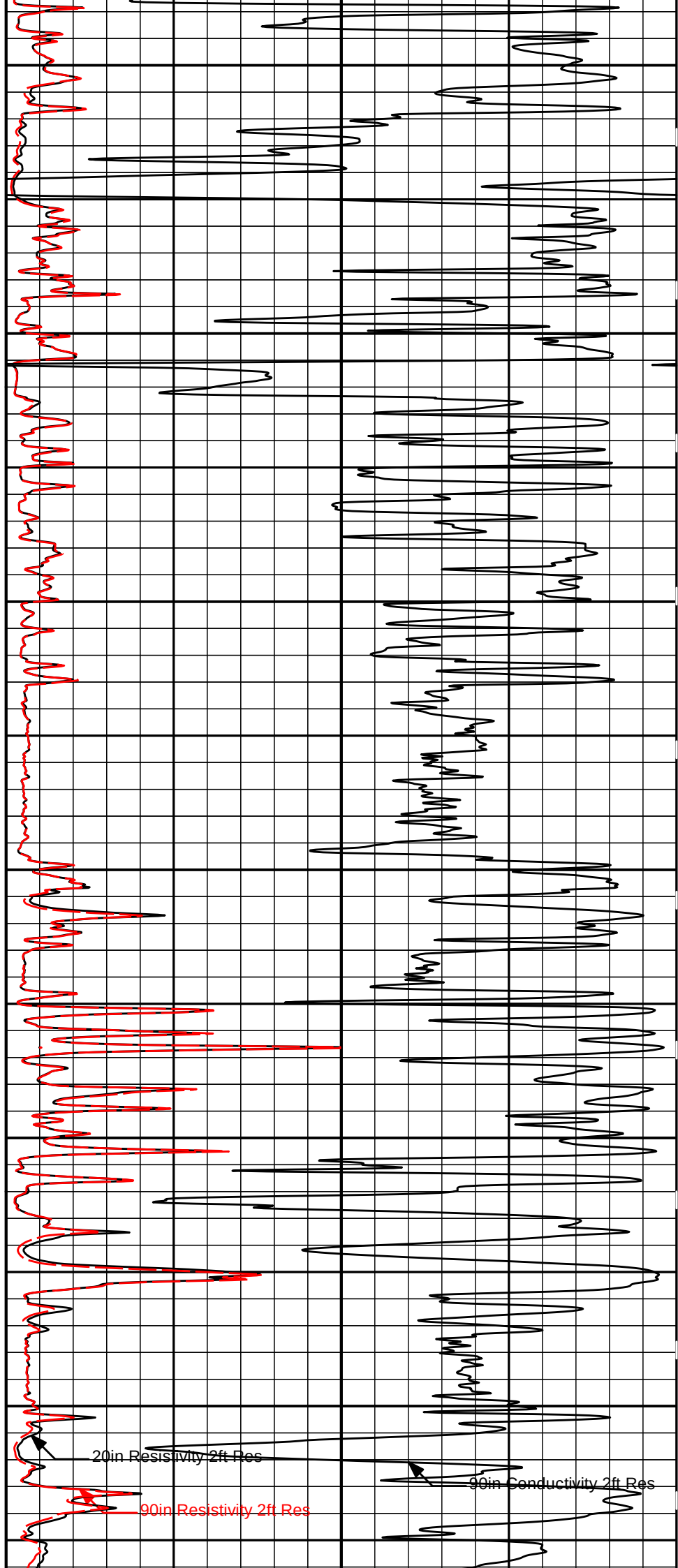
3300

3400

3500

3600

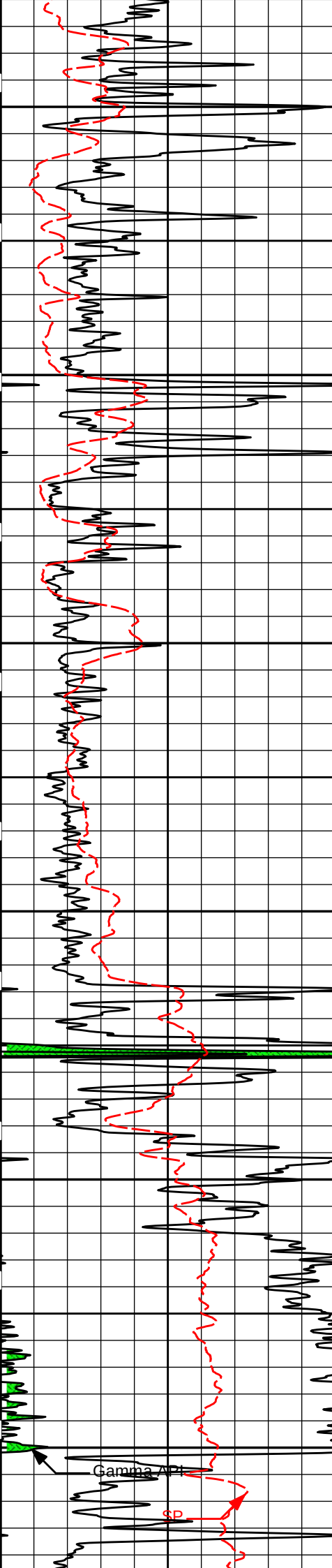
Gamma APT



20in Resistivity 2ft Res

90in Resistivity 2ft Res

90in Conductivity 2ft Res



3700

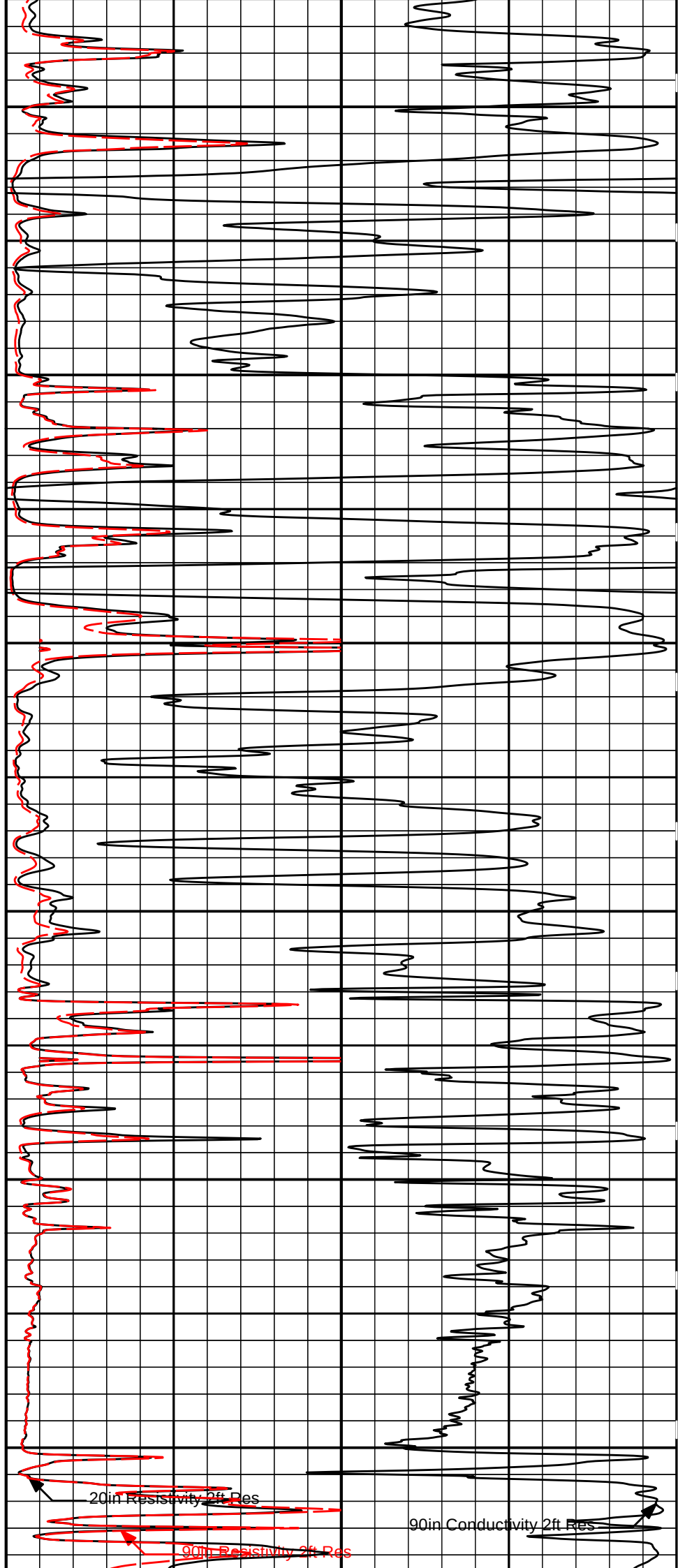
3800

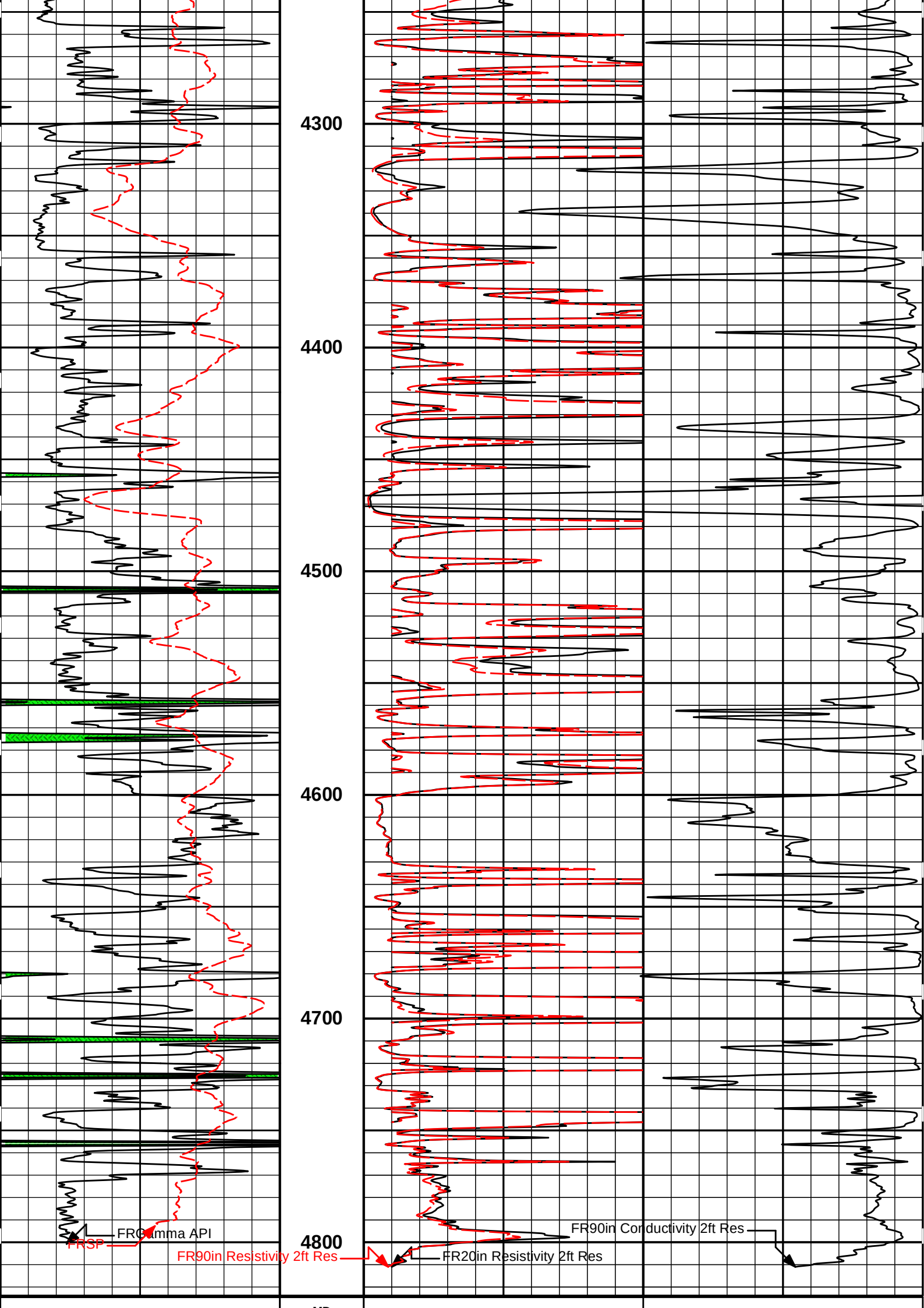
3900

4000

4100

4200





0	Gamma API	150	MD 1 : 600 ft	0	20in Resistivity 2ft Res	50
	api				ohm-metre	
	SP			0	90in Resistivity 2ft Res	50
	-]20[+				ohm-metre	
				1000	90in Conductivity 2ft Res	0
					mmho per metre	

HALLIBURTON

Plot Time: 12-Jun-15 19:50:09
Plot Range: 520 ft to 4823.83 ft
Data: BANTA-F_1-21\Well Based\MAIN2\
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\ACRT\ACRT_2_lib

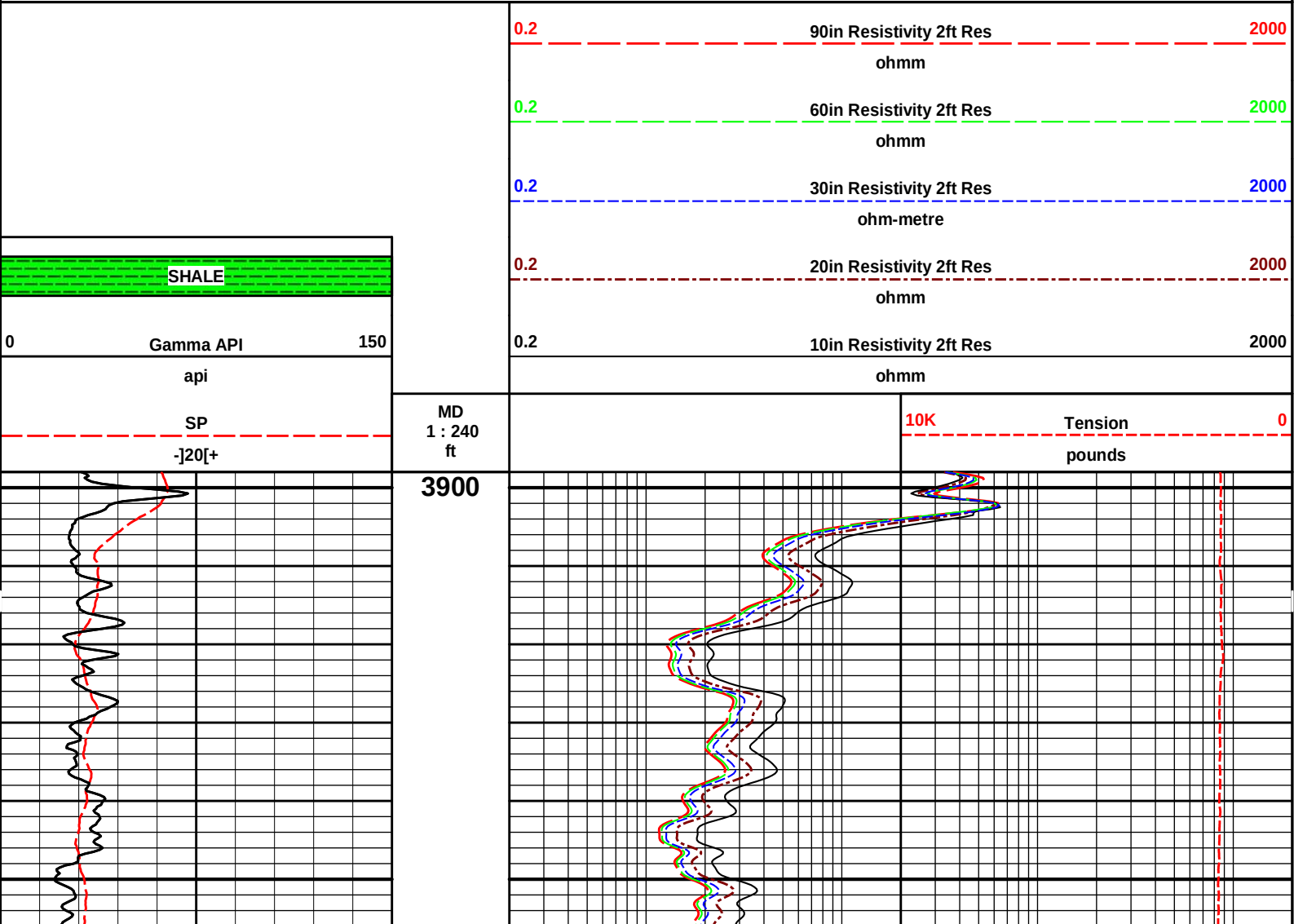
2 INCH MAIN LOG

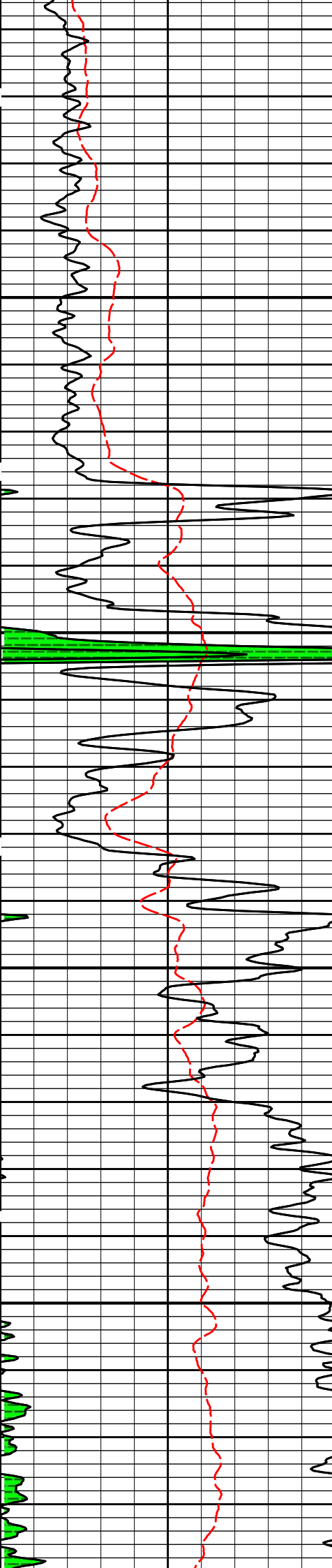
HALLIBURTON

Plot Time: 12-Jun-15 19:50:09
Plot Range: 3898 ft to 4823.83 ft
Data: BANTA-F_1-21\Well Based\DETAILS2\
Plot File: \\-LOCAL-\BANTA-F_1-21\Well Based\ACRT\ACRT_5_main_lib

5 INCH MAIN LOG

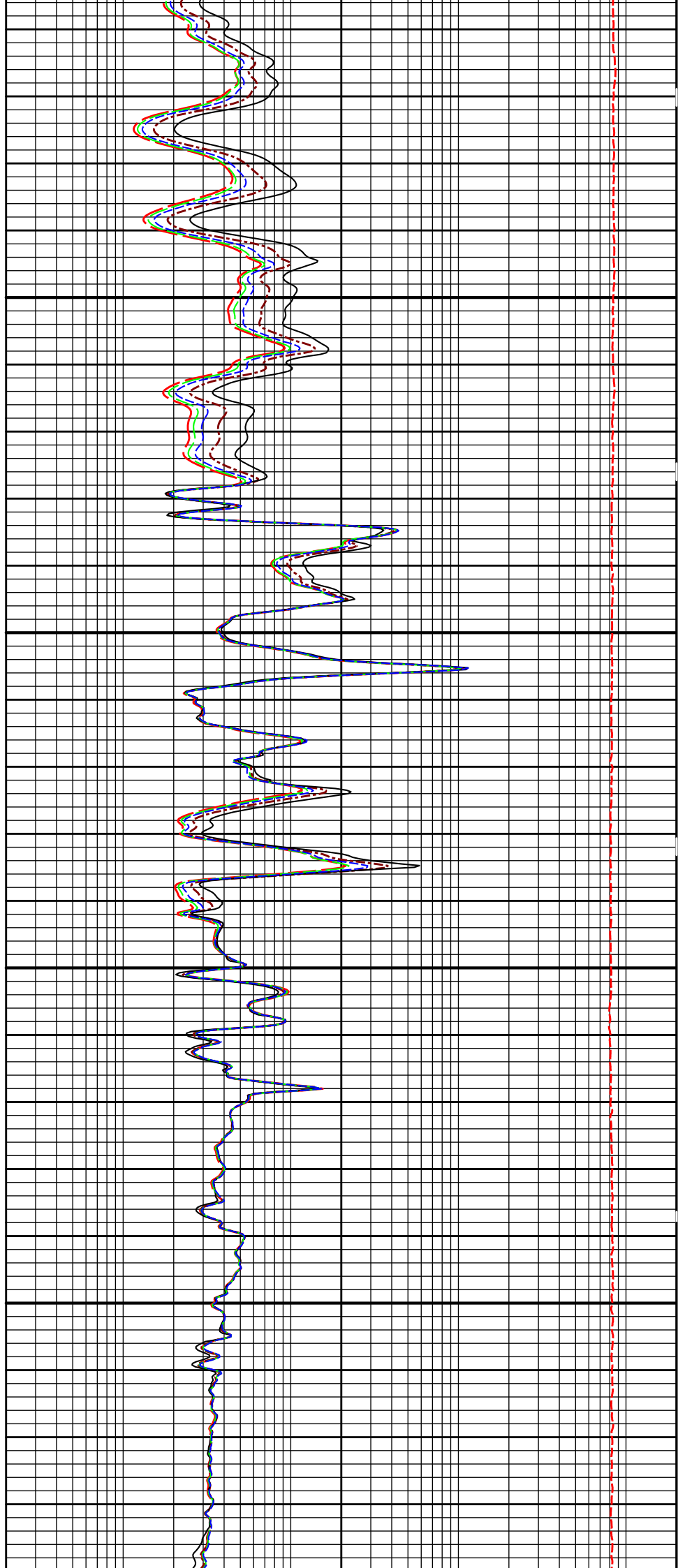
MEASURED DEPTH
MAIN SECTION 5" PER 100'

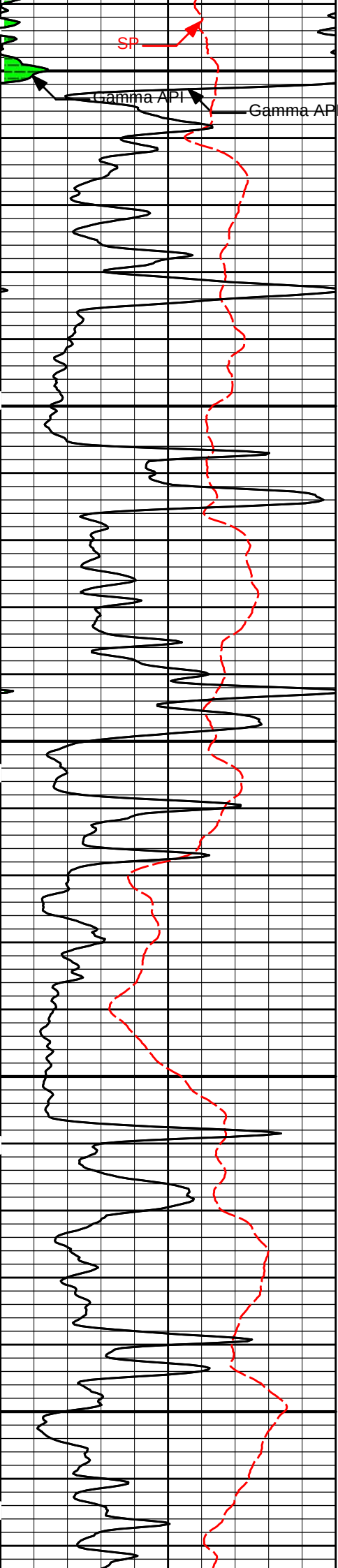




4000

4100

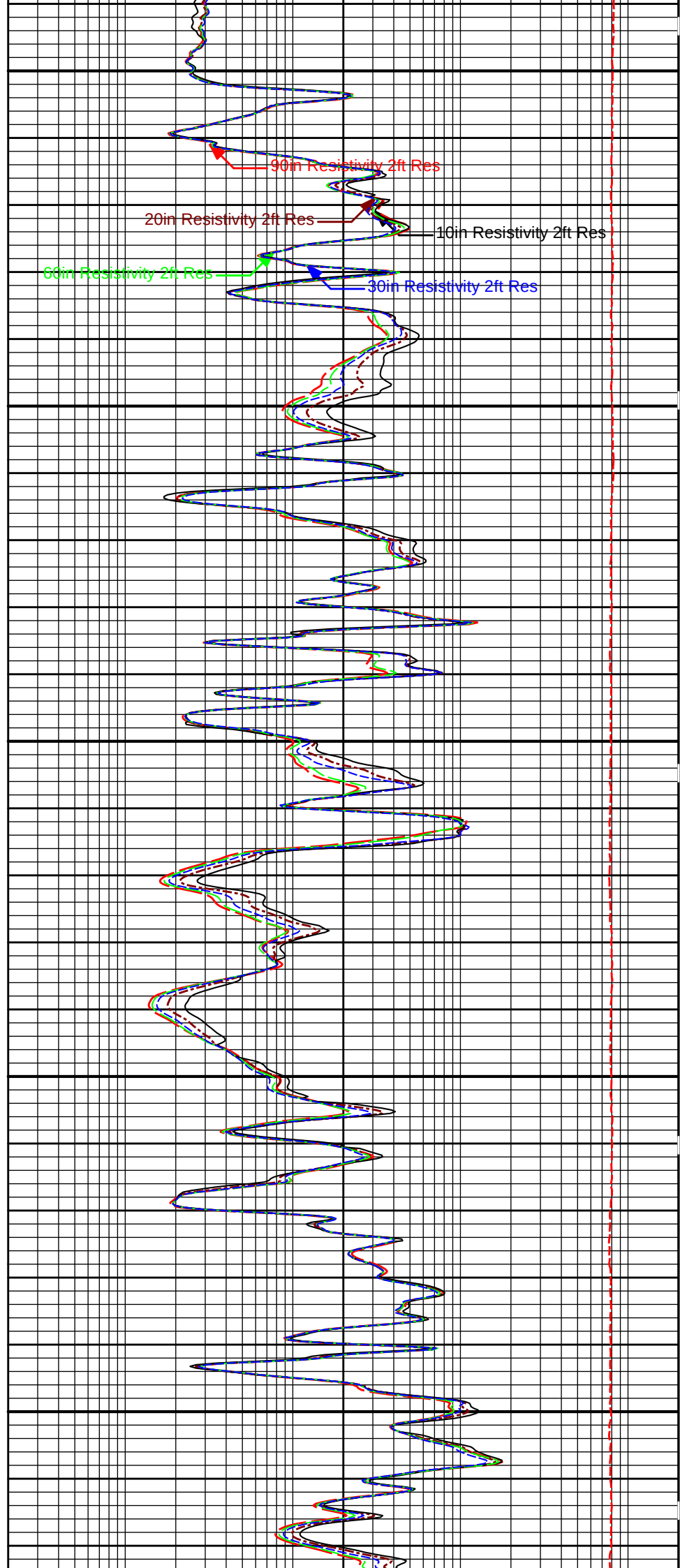




4200

4300

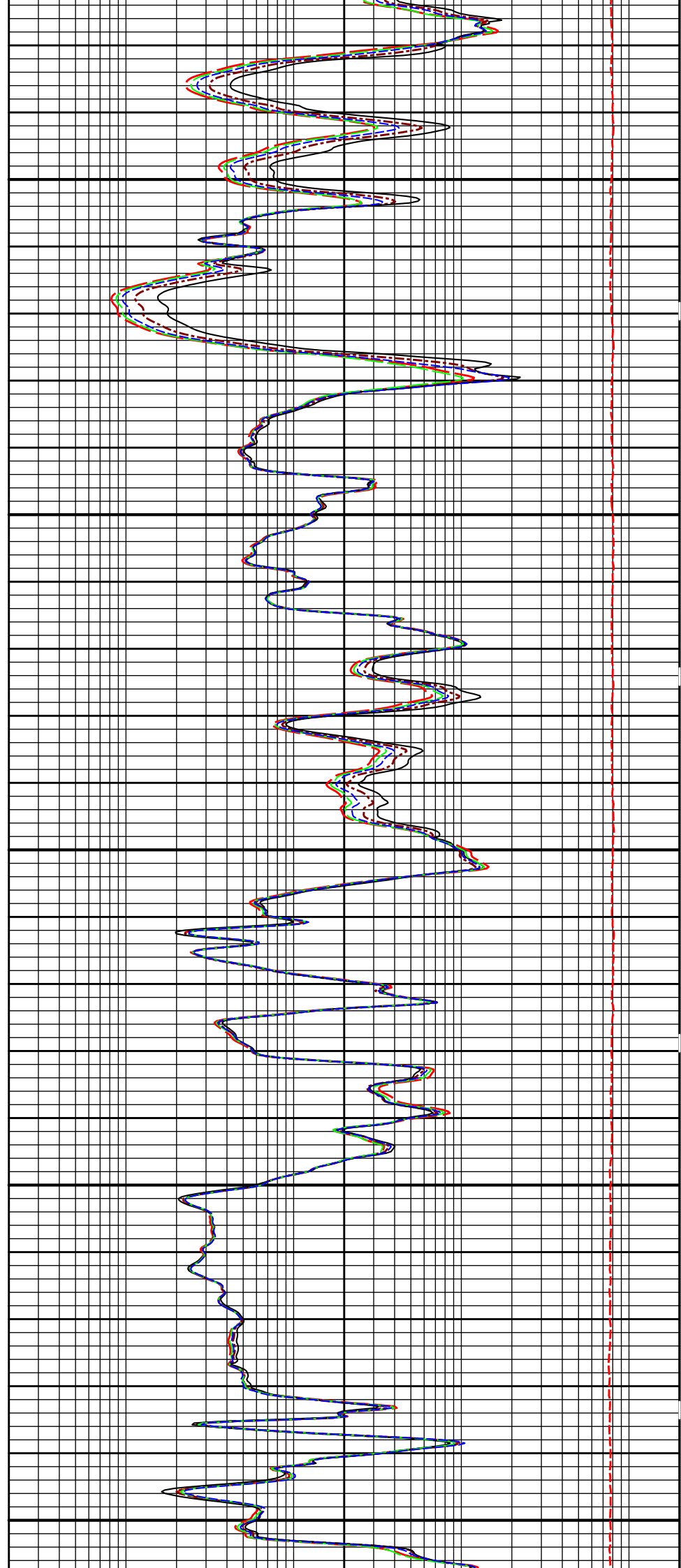
4400

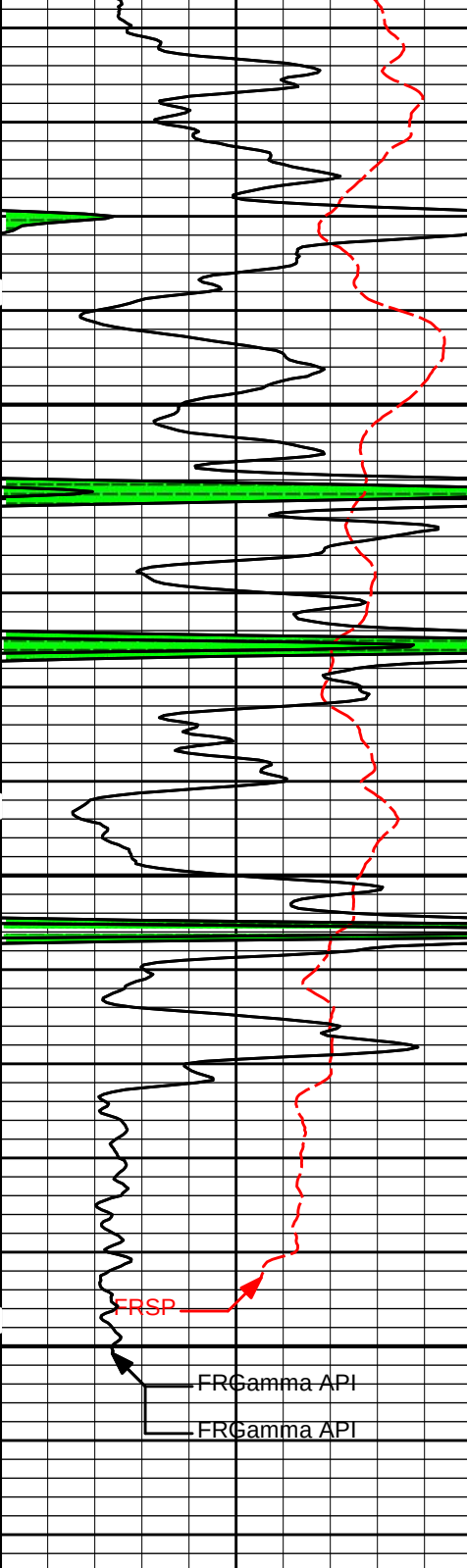




4500

4600

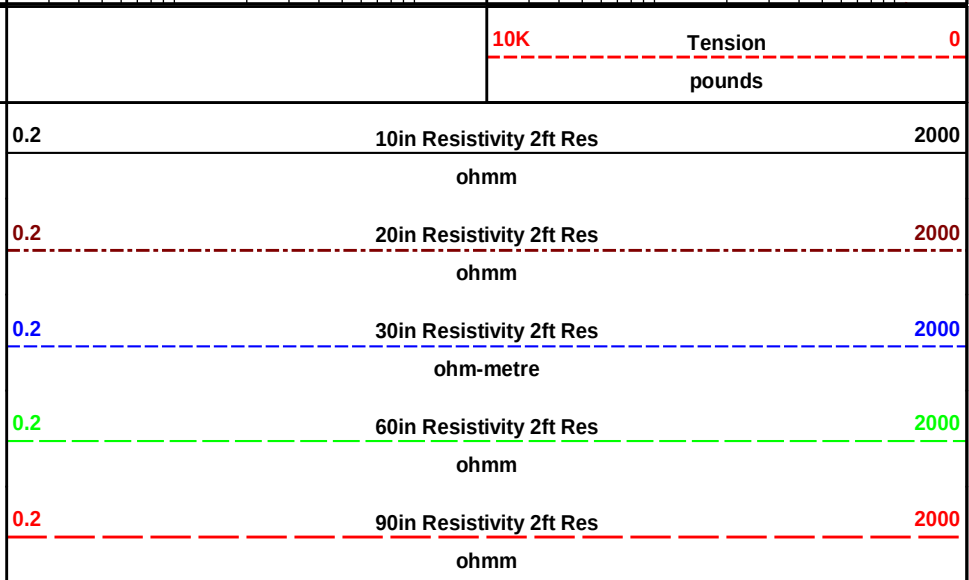
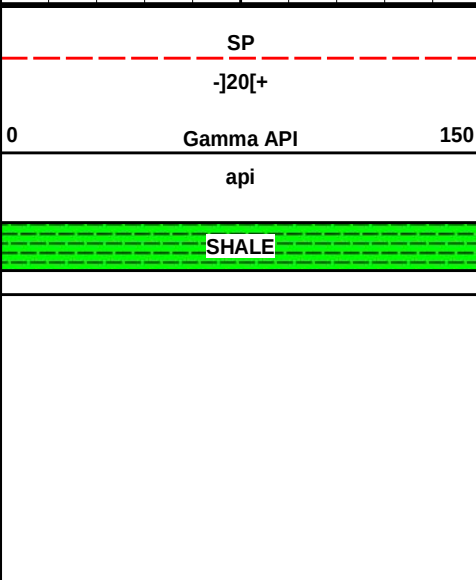
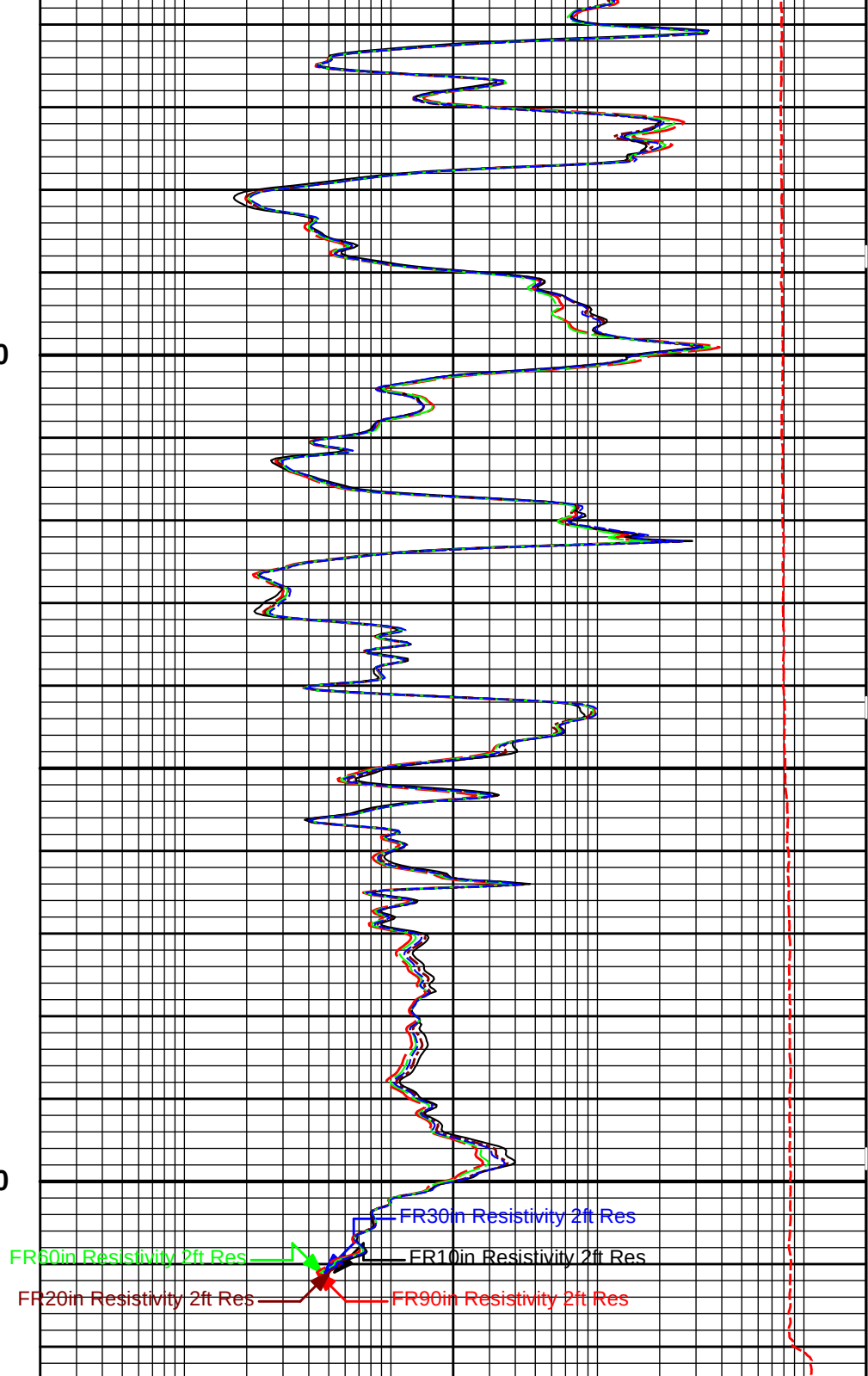




4700

4800

TD



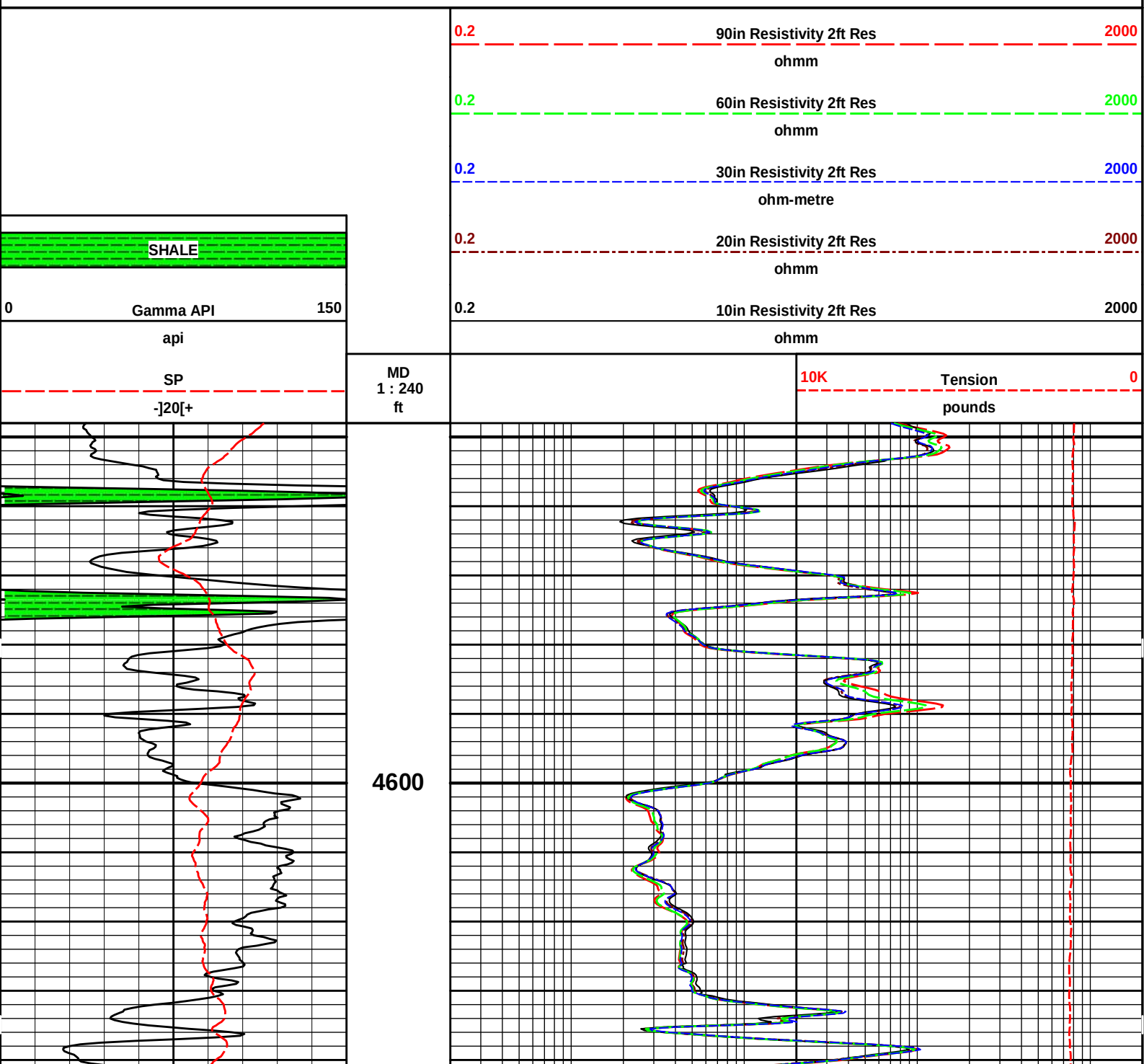
5 INCH MAIN LOG

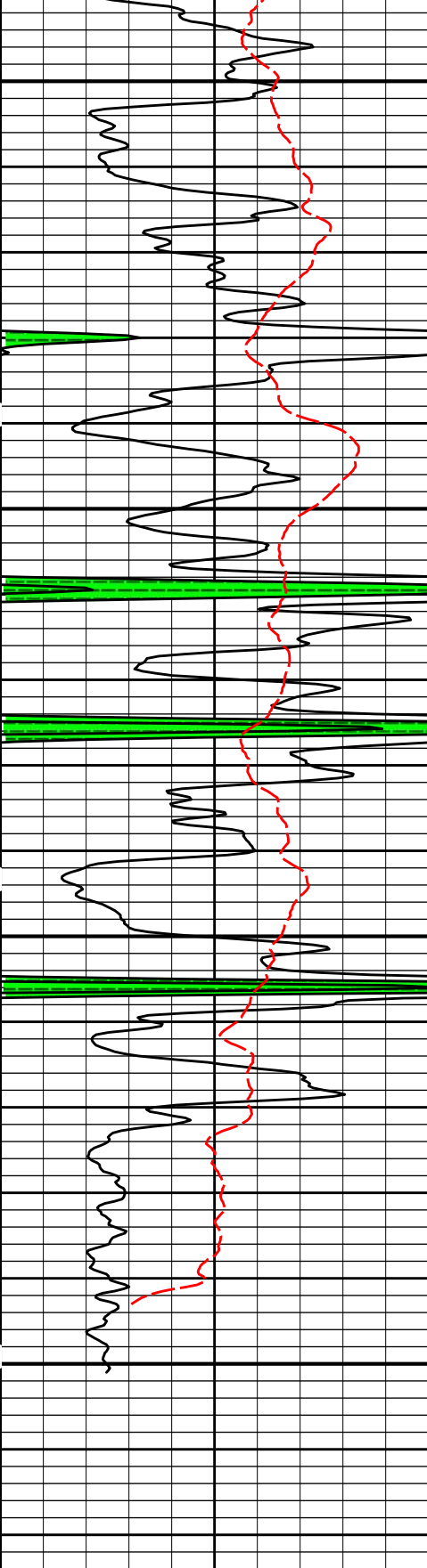
MEASURED DEPTH
MAIN SECTION 5" PER 100'

HALLIBURTON

Plot Time: 12-Jun-15 19:50:14
Plot Range: 4548 ft to 4824.08 ft
Data: BANTA-F_1-21\Well Based\REPEAT2\
Plot File: \\-LOCAL-IBANTA-F_1-21\Well Based\ACRT\ACRT_5_repeat_lib

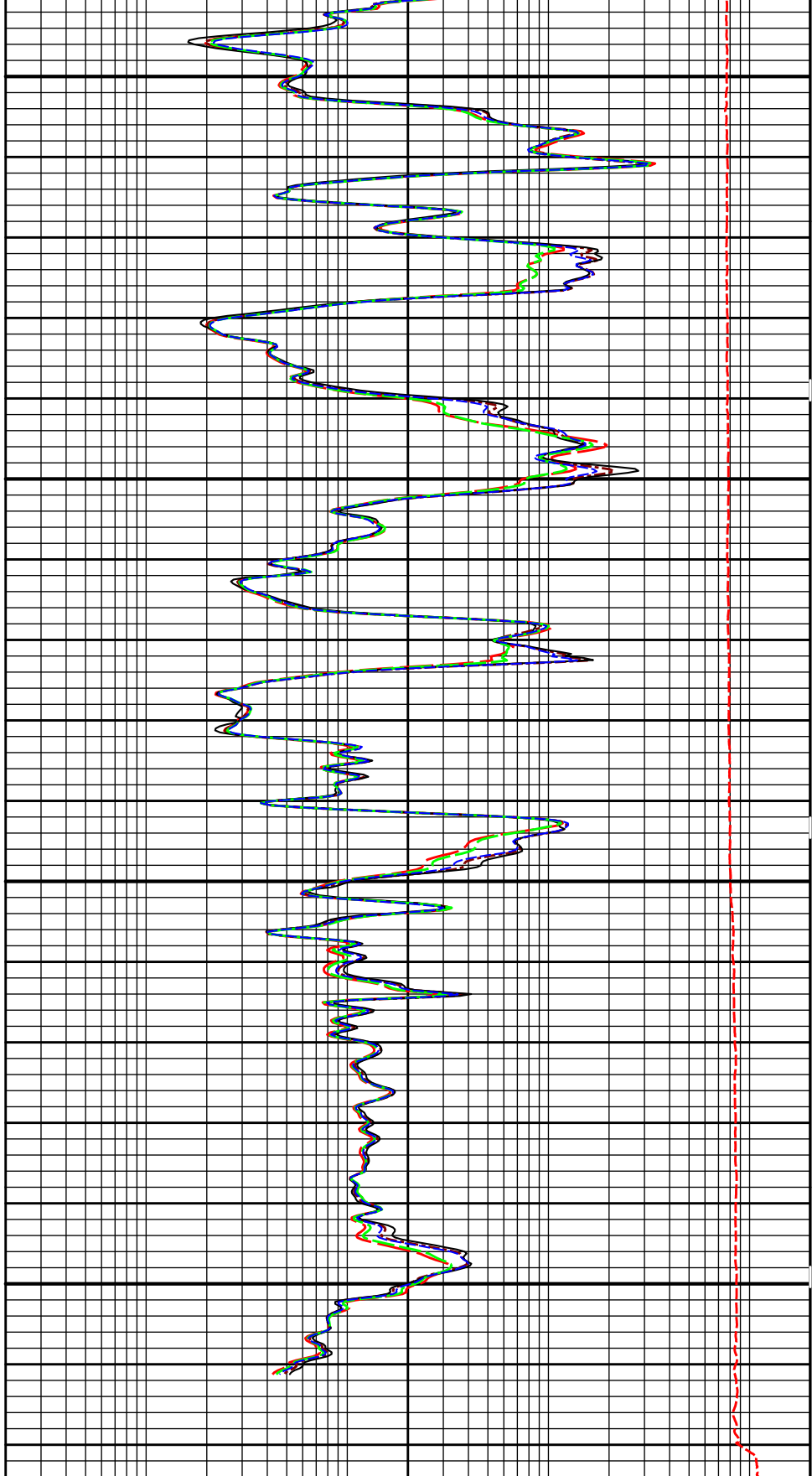
REPEAT SECTION





4700

4800



SP		
-j20[+		
0	Gamma API	150
api		
SHALE		

MD
1 : 240
ft

10K		Tension	0
		pounds	
0.2	10in Resistivity 2ft Res		2000
ohmm			
0.2	20in Resistivity 2ft Res		2000
ohmm			
0.2	30in Resistivity 2ft Res		2000
ohm-metre			
0.2	60in Resistivity 2ft Res		2000
ohmm			

ACRt	Array Compensated True Resistivity Sonde Section	11005909	200.00	14.22	0.33	120.00
RSOF	Regal Standoff 6.75in	00000001	20.00	0.52 *	12.25	300.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00
Total			530.00	33.76		
* Not included in Total Length and Length Accumulation.						
Data: BANTA-F_1-21\0002 SP-GTET-ACRT-BNIDLE					Date: 12-Jun-15 17:41:29	

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	9.200	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	5.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	4820.00	ft
	SHARED	BHT	Bottom Hole Temperature	125.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	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	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	Depth Panel	
	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	
	GTET	BHSM	Borehole Size Source Tool	Depth Panel	
	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
ACRt Sonde	BHSM	Borehole Size Source Tool	Depth Panel	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	
BOTTOM				
Data: BANTA-F_1-21\0002 SP-GTET-ACRT-BNIDLE			Date: 12-Jun-15 17:42:09	

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11048627	Reference Calibration Date:	30-Apr-15 12:33:23
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	28-May-15 11:25:00
Software Version:	WL INSITE R4.6.4 (Build 3)	Calibration Version:	1
Calibrator Source S/N: Error			
Calibrator API Reference:265.00 api			
Equivalent Calibrator API Reference:269.6 api			
	Measurement	Measured	Calibrated Units
	Background	52.3	52.1 api
	Background + Calibrator	323.0	321.8 api
	Calibrator	270.7	269.6 api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION				
Tool Name:	GTET - 11048627	Reference Calibration Date:	28-May-15 11:25:00	
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	11-Jun-15 19:58:11	
Software Version:	WL INSITE R4.6.4 (Build 3)	Calibration Version:	1	
Calibrator Source S/N: Error				
Calibrator API Reference:265.00 api				
Equivalent Calibrator API Reference:269.6 api				
Field Verification		Shop	Field	Units
Background		52.1	52.8	api
Background + Calibrator		321.8	326.1	api
Calibrator		269.6	273.3	api
Shop		Field	Difference	Tolerance
269.6		273.3	-3.7	+/- 9.00

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION			
Tool Name:	ACRt Sonde - 11005909	Reference Calibration Date:	21-May-15 09:59:55
Engineer:	JORGE ORLANDO PEREZ	Calibration Date:	21-May-15 10:57:03
Software Version:	WL INSITE R4.6.4 (Build 3)	Calibration Version:	1
Host Tool Name:	ACRt Instrument - 11022962		

TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0394	1.05	0.95	1.0423	1.05	0.95	1.0382	1.05
A2 (50")	0.95	1.0465	1.05	0.95	1.0496	1.05	0.95	1.0484	1.05
A3 (29")	0.95	1.0220	1.05	0.95	1.0239	1.05	0.95	1.0192	1.05
A4 (17")	0.95	1.0080	1.05	0.95	1.0069	1.05	0.95	1.0042	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0020	1.05	0.95	0.9967	1.05
A6 (6")	N/A	N/A	N/A	0.95	1.0073	1.05	0.95	1.0036	1.05

SONDE OFFSET			
Subarray	R12KHz	R36KHz	R72KHz
	(mmho/m)	(mmho/m)	(mmho/m)
A1 (80")	0.748	-2.765	-5.382
A2 (50")	-1.529	-3.639	-4.627
A3 (29")	-14.325	-4.360	-2.891
A4 (17")	-102.272	-30.741	-26.173
A5 (10")	N/A	-100.535	-45.534
A6 (6")	N/A	289.382	153.054

TRANSMITTER CURRENT GAIN				R-MUD VERIFICATION			
Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.87	1.3	Mud Cell	0.95	1.00	1.05
36K	1.0	1.33	2.0				
72K	1.0	1.57	2.0				
PASS/FAIL SUMMARY							
GAIN RANGE CHK				PASS			
SONDE OFFSET CHK				PASS			
TOOL OK TO LOG							

CALIBRATION SUMMARY						
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11048627						
Gamma Ray Calibrator	269.6	273.3	-----	-3.7	+/- 9.00	api
ACRt Sonde-11005909						
Mud Cell	1.00	-----	-----	0.00	-----	ohm-m
Data: BANTA-F_1-21\0002 SP-GTET-ACRT-BN\IDLE					Date: 12-Jun-15 17:42:48	

HALLIBURTON						
INPUTS, DELAYS AND FILTERS TABLE						

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
Depth Panel				
TENS	Tension	0.00	NO	
Rwa / CrossPlot				
TPUL	Tension Pull	33.76	NO	
BS	Bit Size	33.76	NO	
HDIA	Measured Hole Diameter	0.00	NO	
SP Sub				
PLTC	Plot Control Mask	30.06	NO	
SP	Spontaneous Potential	30.06	BLK	1.250
SPR	Raw Spontaneous Potential	30.06	NO	
SPO	Spontaneous Potential Offset	30.06	NO	
GTET				
TPUL	Tension Pull	22.04	NO	
GR	Natural Gamma Ray API	22.04	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	22.04	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	22.04	W	1.416 , 0.750
HDIA	Measured Hole Diameter	0.00	NO	

BDIA	Measured Hole Diameter	0.00	NO	
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
ACRt Sonde				
TPUL	Tension Pull	2.73	NO	
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000
RMUD	Mud Resistivity	12.52	BLK	0.000
F1RT	Transmitter Reference 12 KHz Real Signal	2.73	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000
ITMP	Instrument Temperature	2.73	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.73	NO	
TIDV	Instrument Temperature Derivative	2.73	NO	
TUDV	Upper Temperature Derivative	2.73	NO	
TLDV	Lower Temperature Derivative	2.73	NO	
TRBD	Receiver Board Temperature	2.73	NO	
HDIA	Measured Hole Diameter	0.00	NO	

COMPANY	HERMAN L. LOEB, LLC		
WELL	BANTA 'F' 1-21		
FIELD	EINSEL		
COUNTY	KIOWA	STATE	KANSAS
HALLIBURTON		ARRAY COMPENSATED TRUE RESISTIVITY LOG	