

# HALLIBURTON

## ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY		HERMAN L. LOEB LLC	
WELL		LIL SPICY 1-16	
FIELD/BLOCK		WILDCAT	
COUNTY		KIOWA	
STATE		KANSAS	
Permanent Datum		GL	Elev. 2186.0 ft
Log measured from		KB	11.0 ft above perm. Datum
Drilling measured from		KB	
Date		17-Jun-18	
Run No.		ONE	
Depth - Driller		4820.0 ft	
Depth - Logger		4818.0 ft	
Bottom - Logged Interval		4809.0 ft	
Top - Logged Interval		652.0 ft	
Casing - Driller		8.625 in	@
Casing - Logger		652.0 ft	@
Bit Size		7.875 in	@
Type Fluid in Hole		Water Based Mud	
Density		9.1 ppg	58.00 slqt
PH		9.00 pH	16.8 qpm
Source of Sample		MUDDPT	
Rm @ Meas. Temperature		0.34 ohmm	@ 75.00 degF
Rmf @ Meas. Temperature		0.41 ohmm	@ 75.00 degF
Rmc @ Meas. Temperature		0.27 ohmm	@ 75.00 degF
Source Rmf		Rmc	MEAS
Rm @ BHT		0.21 ohmm	@ 125.0 degF
Time Since Circulation		03:23 hr	
Time on Bottom		17-Jun-18 19:27	
Max. Rec. Temperature		125.00 degF	@ 4818.0 ft
Equipment Location		12147634	EL.RENO, OK
Recorded By		SEAN WOLTEMATH	
Witnessed By		JON CHRISTENSEN	
		GEORGE PAYNE	
		Other Services: GTET DSNT SDLT BSAT ACRT	

Fold here

Service Ticket No.: 904925645				API No.: 15-097-21840-00-00				PGM Version: WL INSITE R5.6.0 (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	CENT	N/A									
Rmc @ Meas. Temp.		@		@			I-12109517												
Source Rmf	Rmc						S-12109515												
Rm @ BHT		@		@															
Rmf @ BHT		@		@															
Rmc @ BHT		@		@															
EQUIPMENT DATA																			
GAMMA				ACOUSTIC				DENSITY				NEUTRON							
Run No.	ONE			Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE								
Serial No.	11013114			Serial No.	10747686	Serial No.	10809130	Serial No.	10993115										
Model No.	GTET			Model No.	BSAT	Model No.	SDLT	Model No.	DSNT										
Diameter	3.625"			No. of Cent.	2	Diameter	5.5"	Diameter	3.625"										
Detector Model No.	GTET			Spacing	EVEN	Log Type	GAM-GAM	Log Type	NEU-NEU										
Type	SCINT					Source Type	Cs-137	Source Type	Am241Be										
Length	8"			LSA [Y/N]		Serial No.	5471GW	Serial No.	DSN-424										
Distance to Source	10'			FWDA [Y/N ]		Strength	1.5 Ci	Strength	15.0 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	CSG	REC	0	150	30	-10	17.6 usec/ft	30	-10	2.71 g/cc	30	-10	LIME					

ONE	TD	CSG	REC	0	150	30	-10	47.0 usec/ft	30	-10	2.77 g/cc	30	-10	LIML
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DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@
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Remarks:  
 GTET-DSNT-SDLT RUN IN COMBINATION  
 GTET-BSAT-ACRT RUN IN COMBINATION  
 ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING

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.

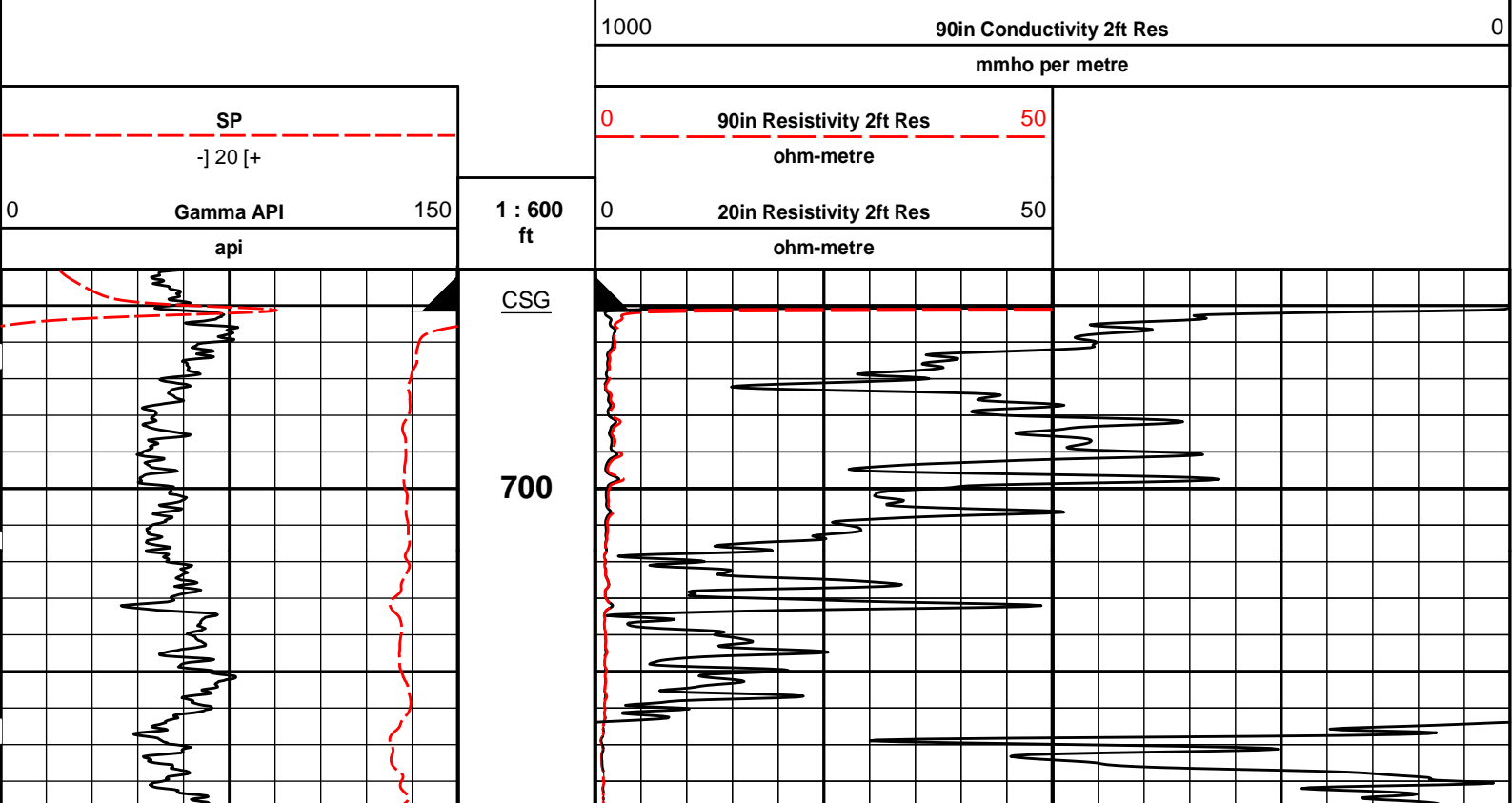
HALLIBURTON

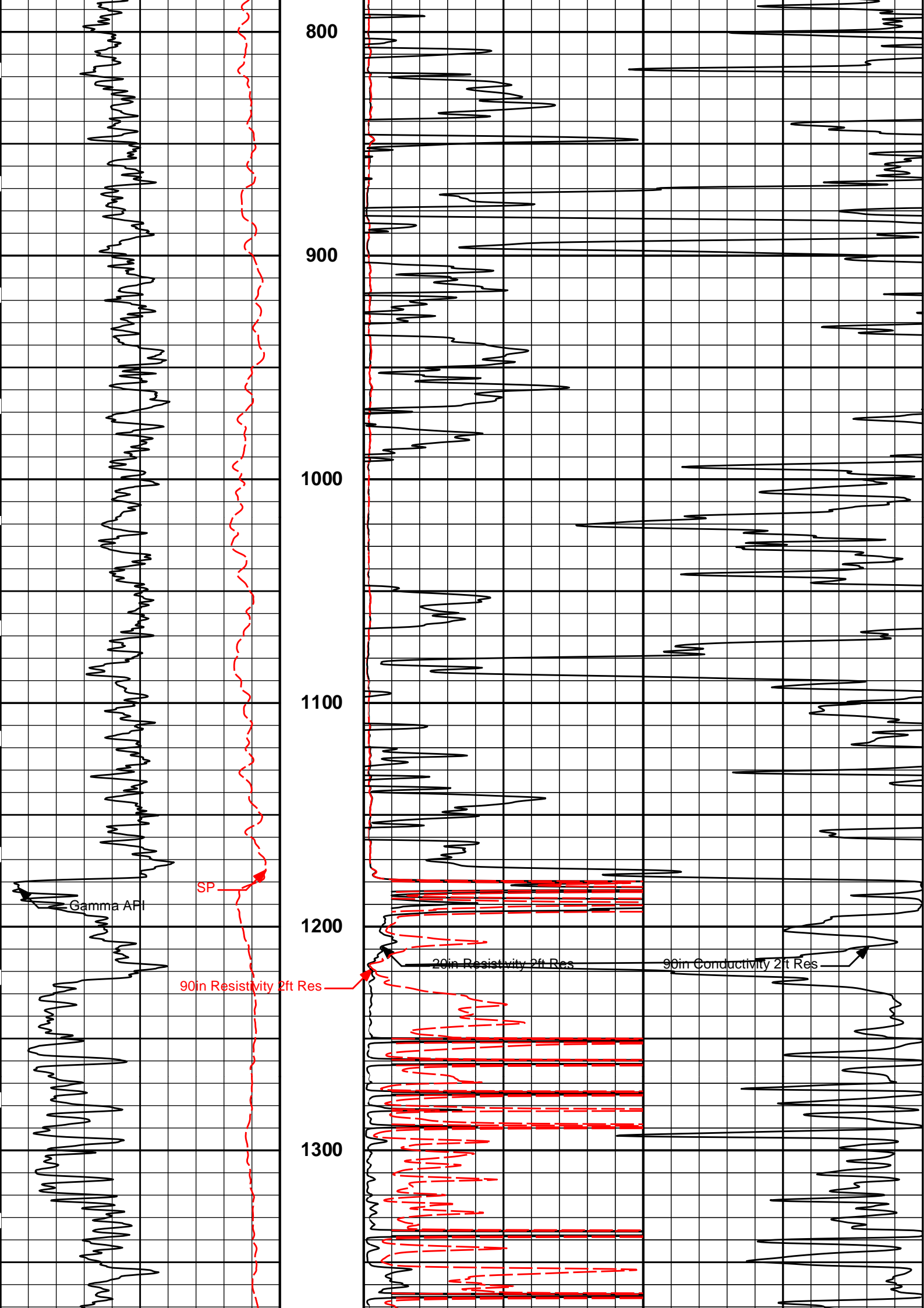
**HALLIBURTON**

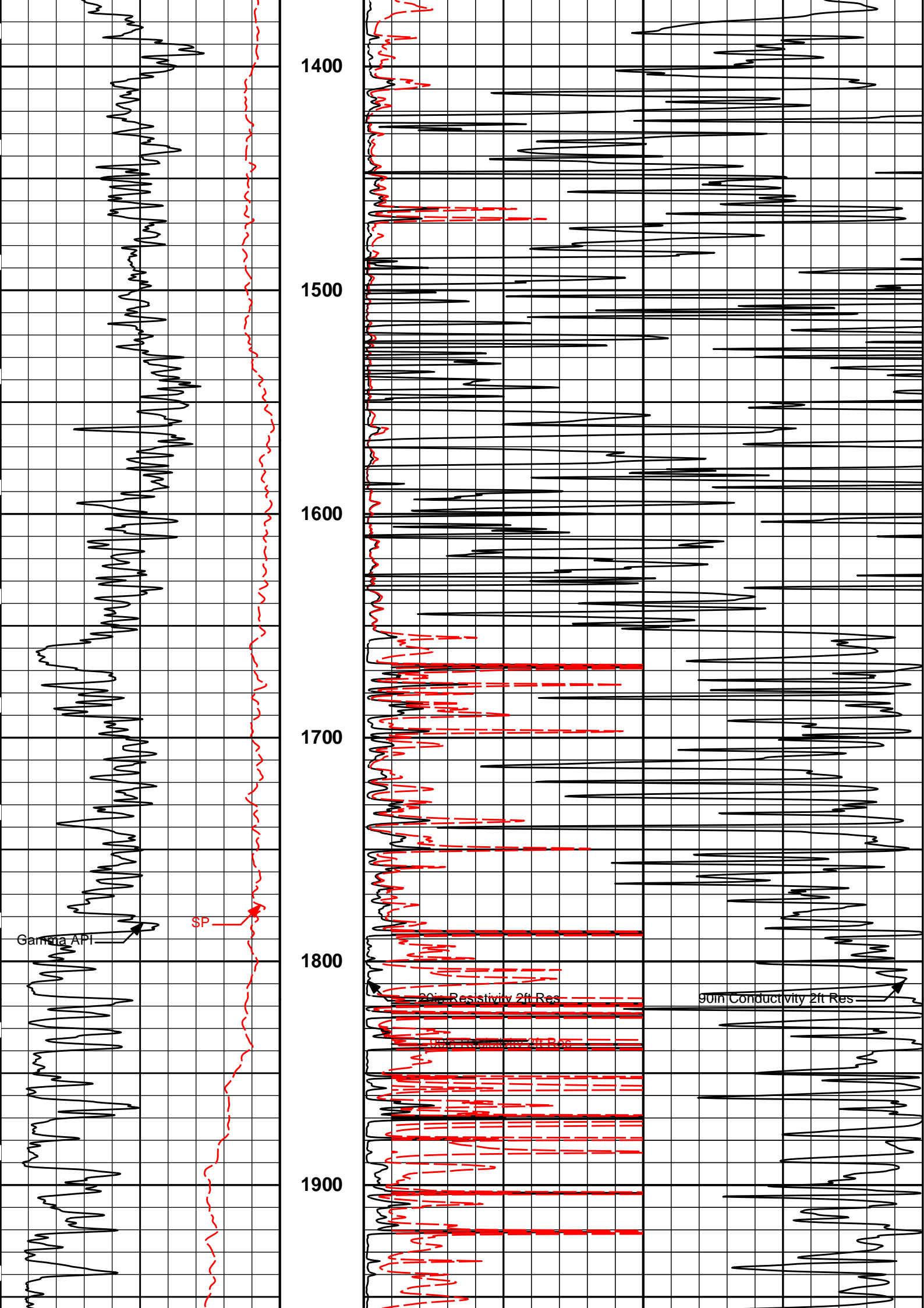
Plot Time: 18-Jun-18 00:13:05  
 Plot Range: 640.05 ft to 4821.55 ft  
 Data: HERMAN\_LILSPICYWell Based\MAIN\_ACRT\  
 Plot File: \\-LOCAL-IBLKWL\_SWEENEY12Well Based\ACRT\ELR\_ACRT\_2\_MAIN

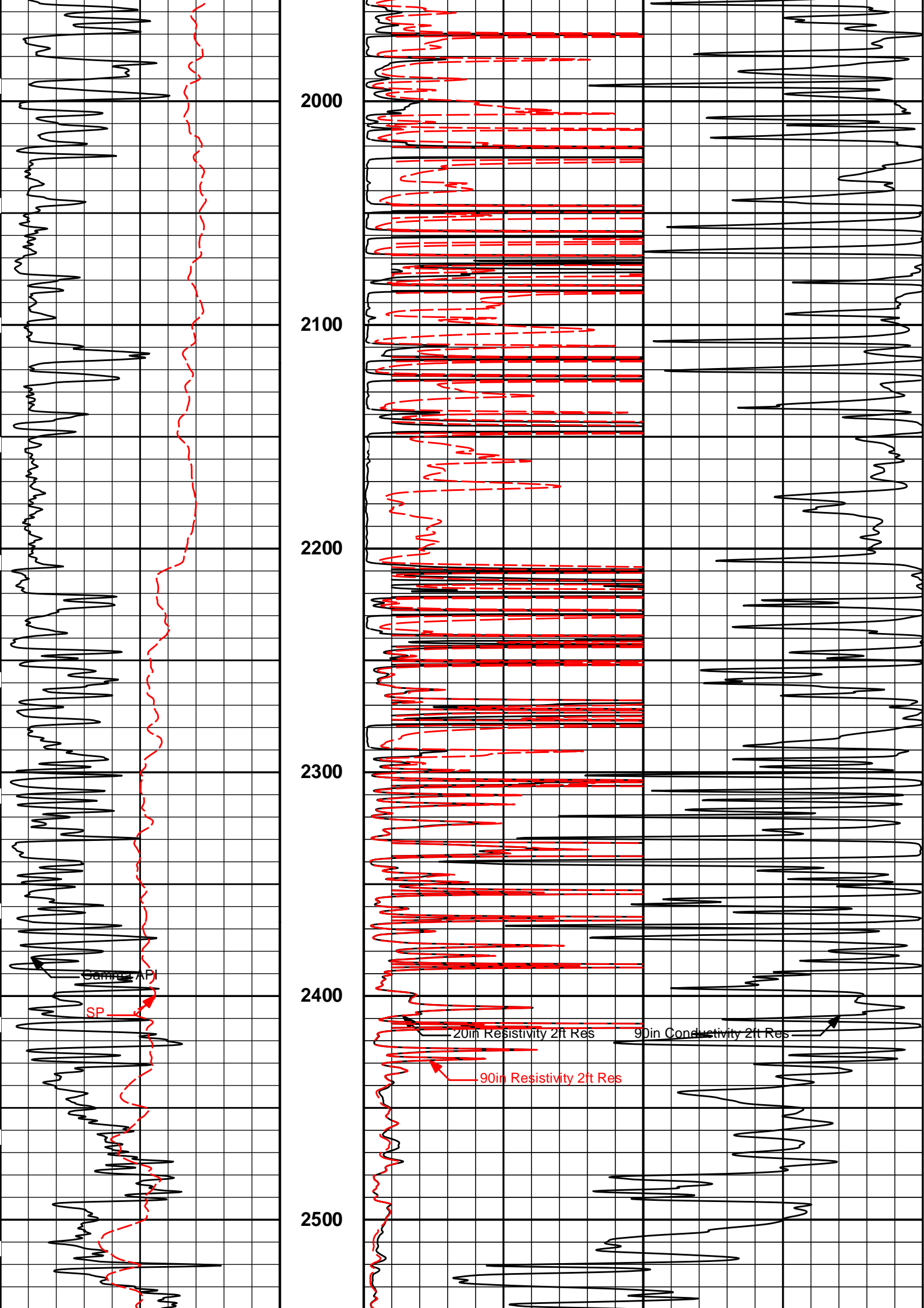
## 2 INCH CORRELATION LOG

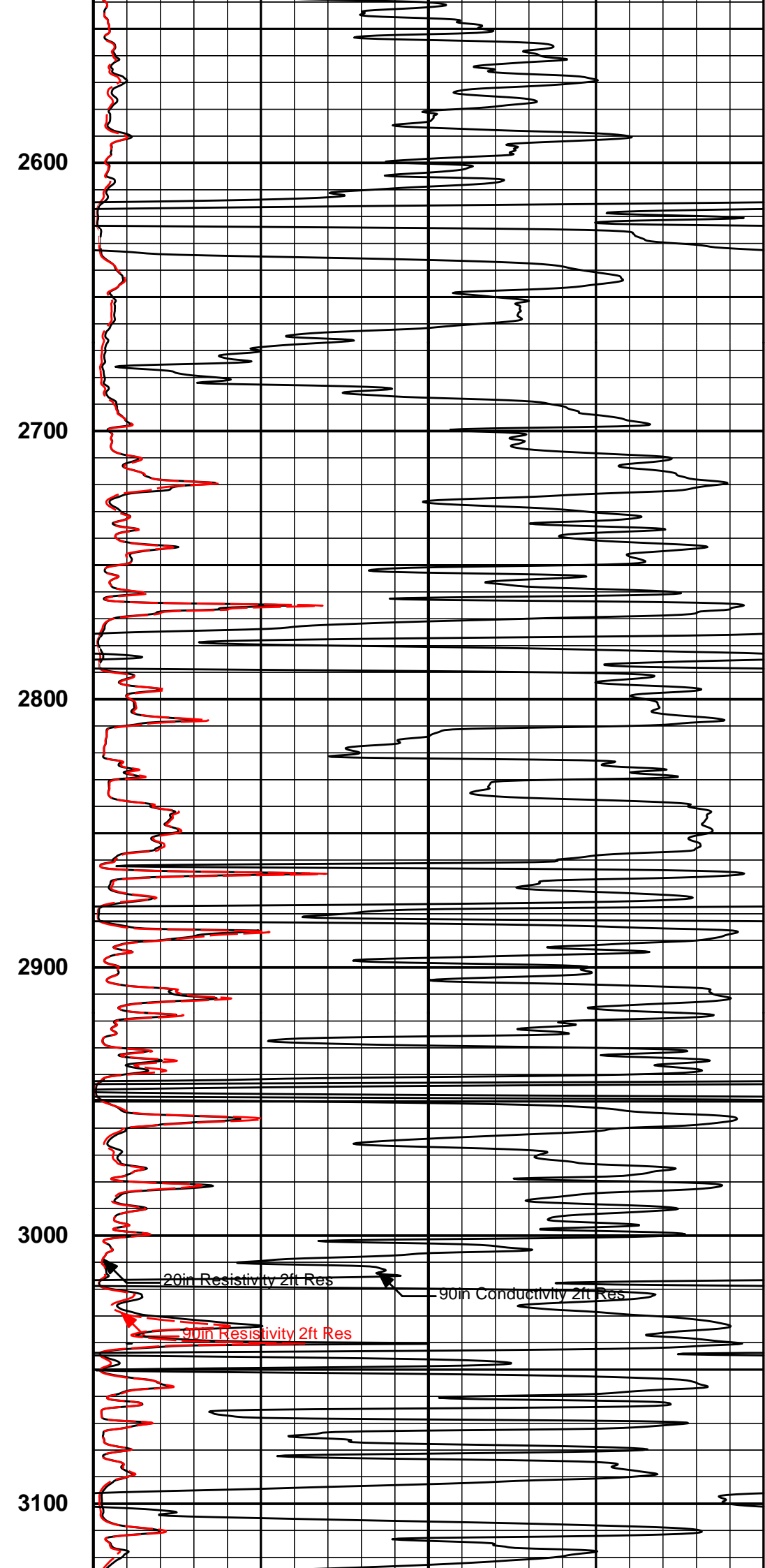
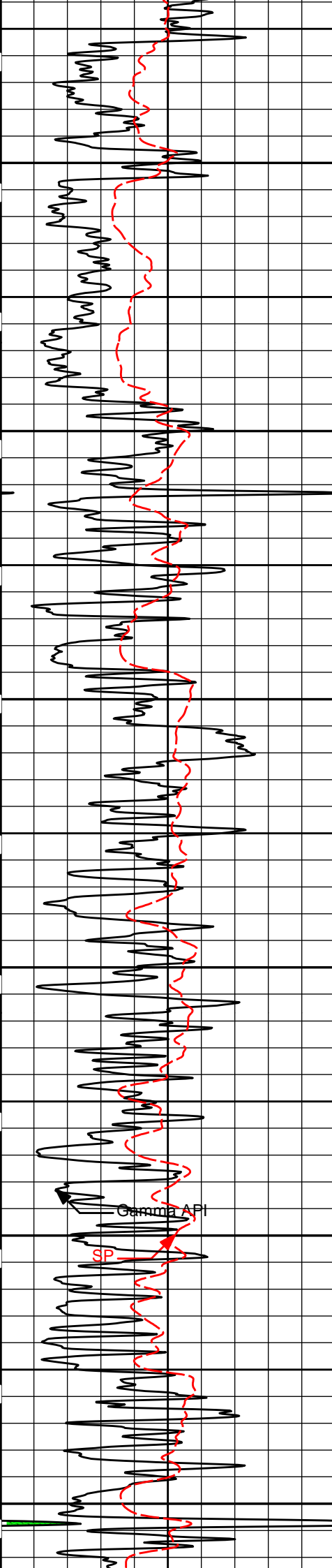
**2 IN = 100 FT MD  
 MAIN PASS**

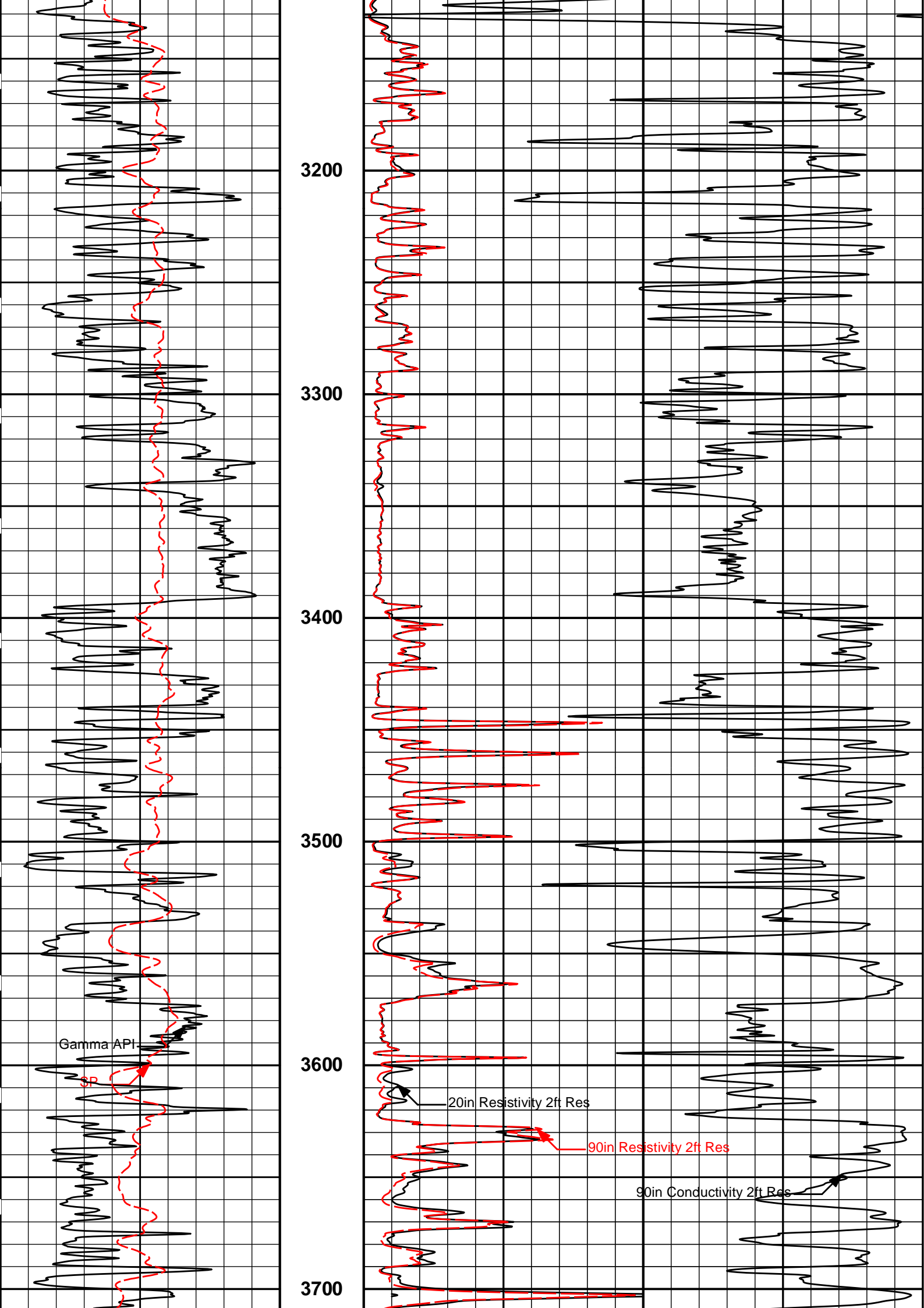












3200

3300

3400

3500

3600

3700

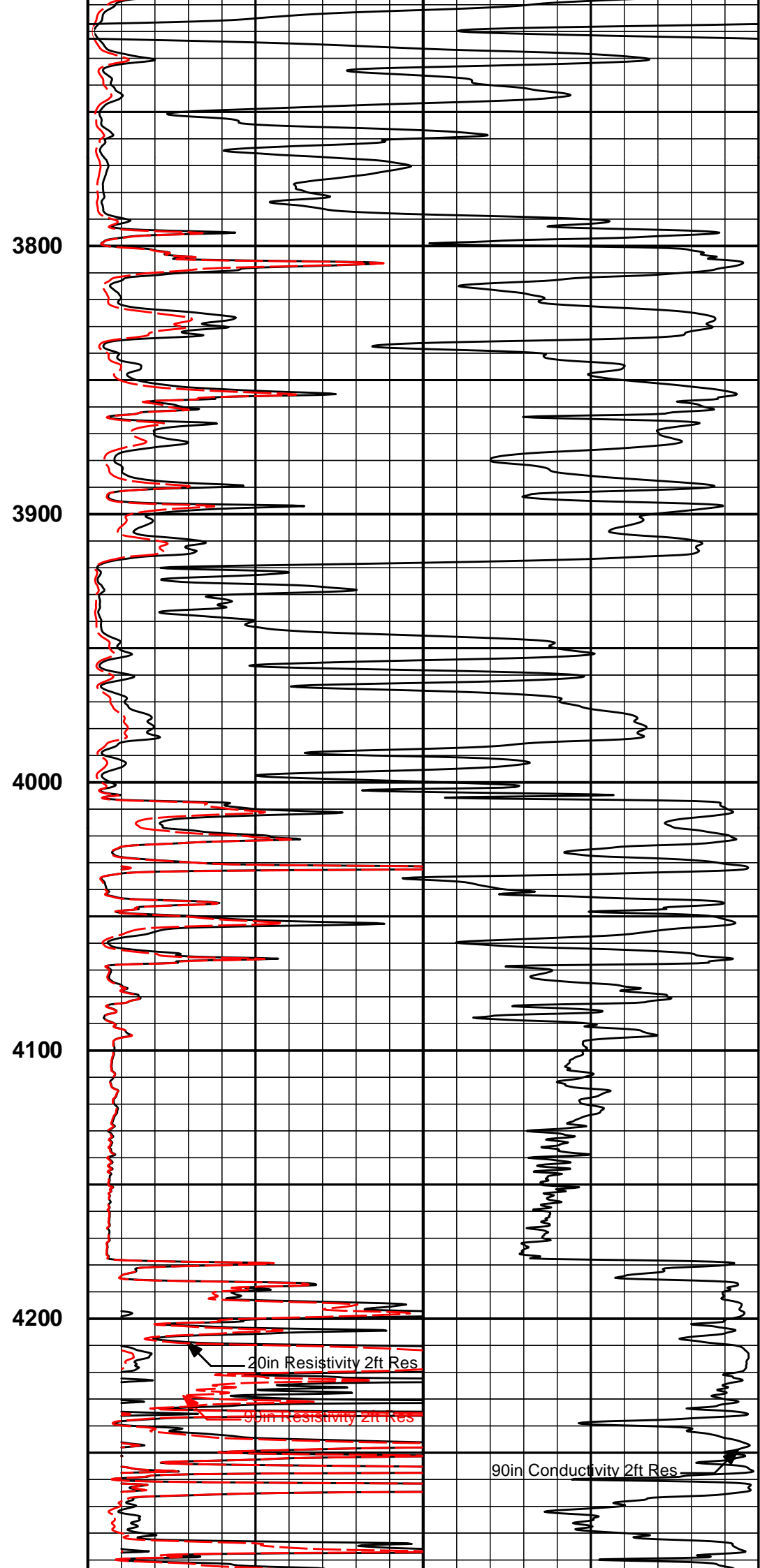
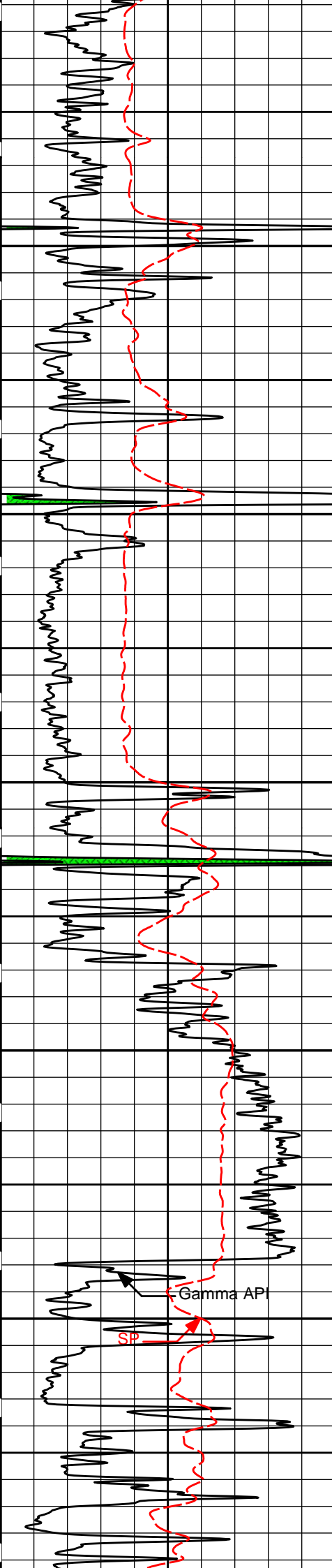
Gamma API

SP

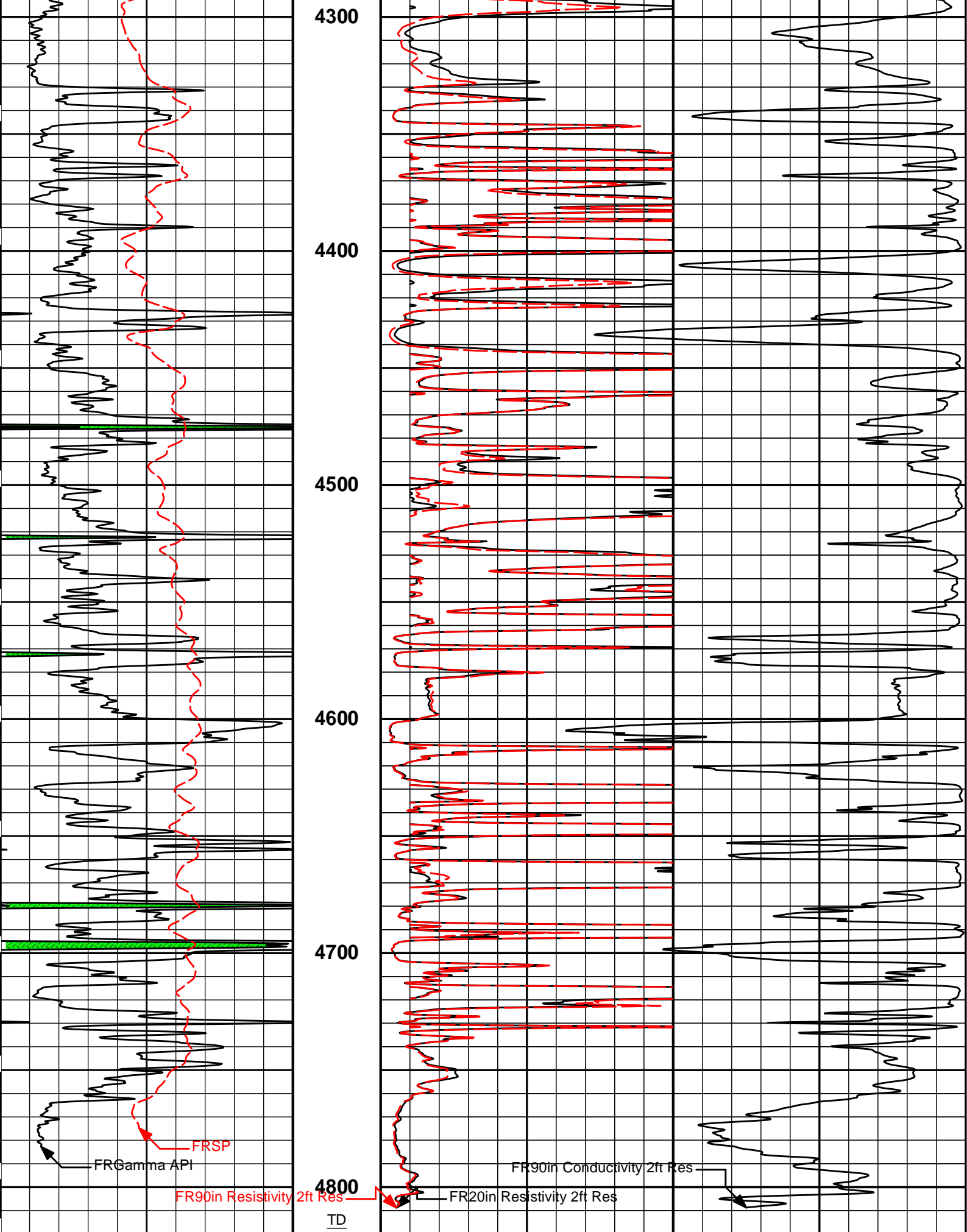
20in Resistivity 2ft Res

90in Resistivity 2ft Res

90in Conductivity 2ft Res







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

**HALLIBURTON**

Plot Time: 18-Jun-18 00:13:08  
Plot Range: 640.05 ft to 4821.55 ft  
Data: HERMAN\_LILSPICYWell Based\MAIN\_ACRT\  
Plot File: \\-LOCAL-IBLKWL\_SWEENEY12\Well Based\ACRT\ELR\_ACRT\_2\_MAIN

## 2 INCH CORRELATION LOG

**2 IN = 100 FT MD  
MAIN PASS**

**HALLIBURTON**

Plot Time: 18-Jun-18 00:13:08  
Plot Range: 3890 ft to 4821.55 ft  
Data: HERMAN\_LILSPICYWell Based\MAIN\_ACRT\  
Plot File: \\-LOCAL-IBLKWL\_SWEENEY12\Well Based\ACRT\ELR\_ACRT\_5\_MAIN

## 5 INCH MAIN PASS

**5 IN = 100 FT MD  
MAIN PASS**

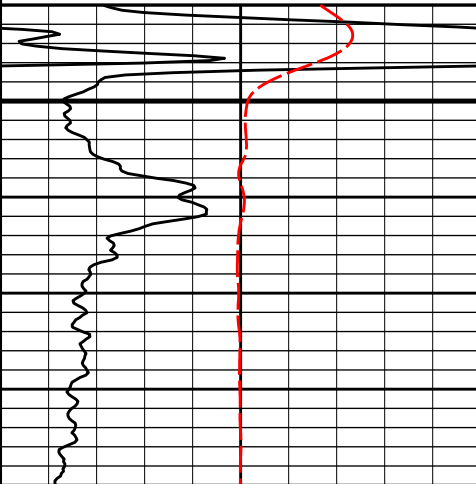
0.2	10in Resistivity 2ft Res	2000
	ohm-metre	
0.2	20in Resistivity 2ft Res	2000
	ohm-metre	
0.2	30in Resistivity 2ft Res	2000
	ohm-metre	
0.2	60in Resistivity 2ft Res	2000
	ohm-metre	
0.2	90in Resistivity 2ft Res	2000
	ohm-metre	

SP  
-] 20 [+]

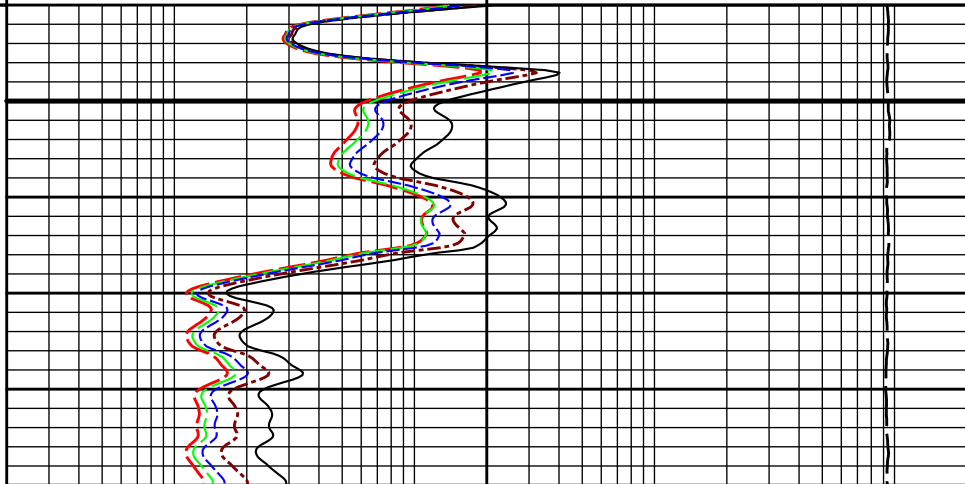
0 Gamma API 150  
api

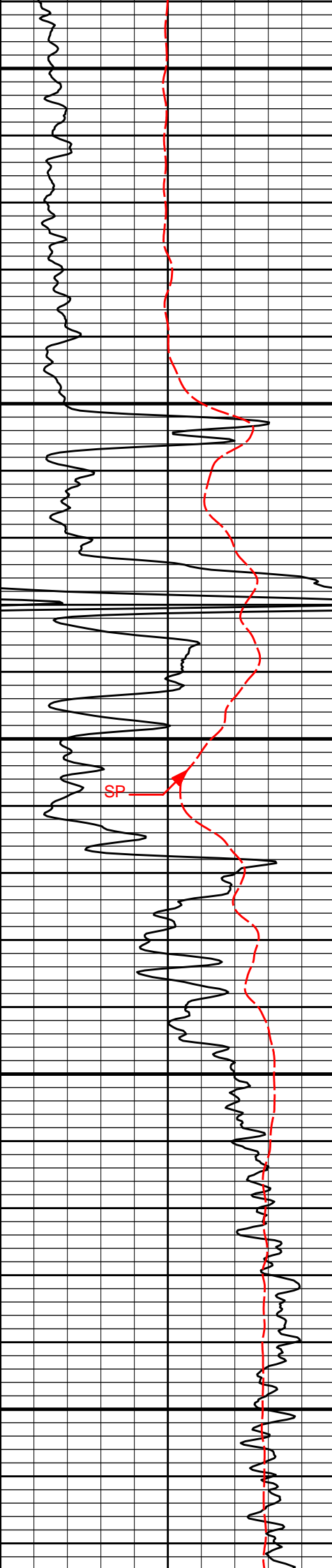
MD  
1 : 240  
ft

15K Tension 0  
pounds



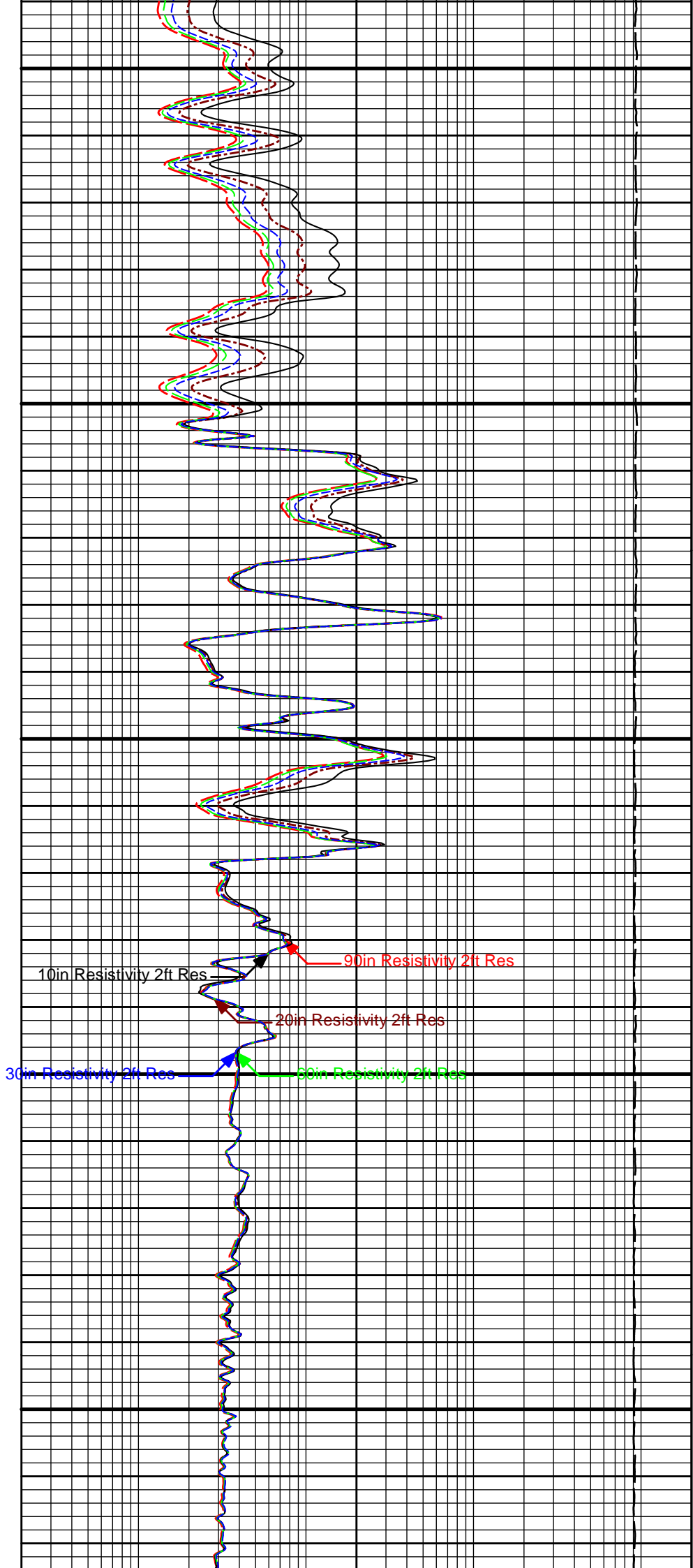
3900

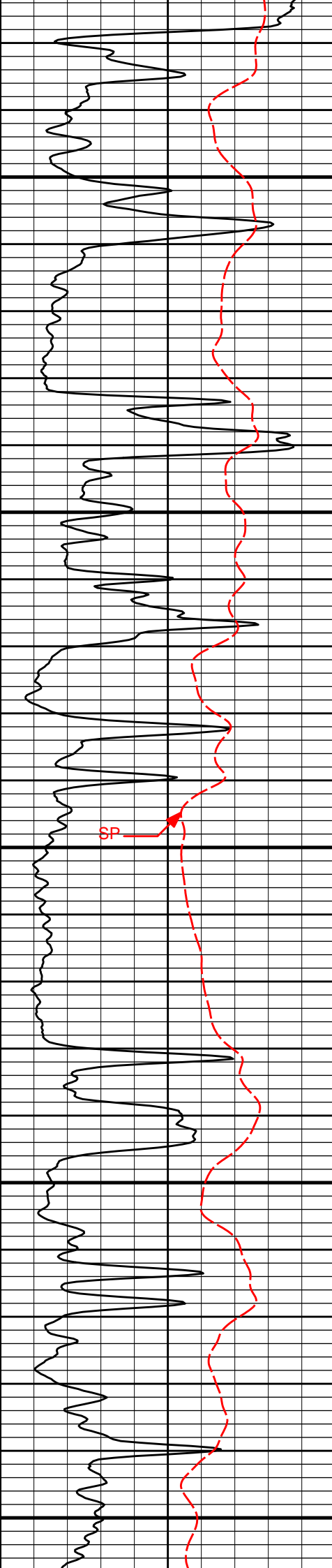




4000

4100



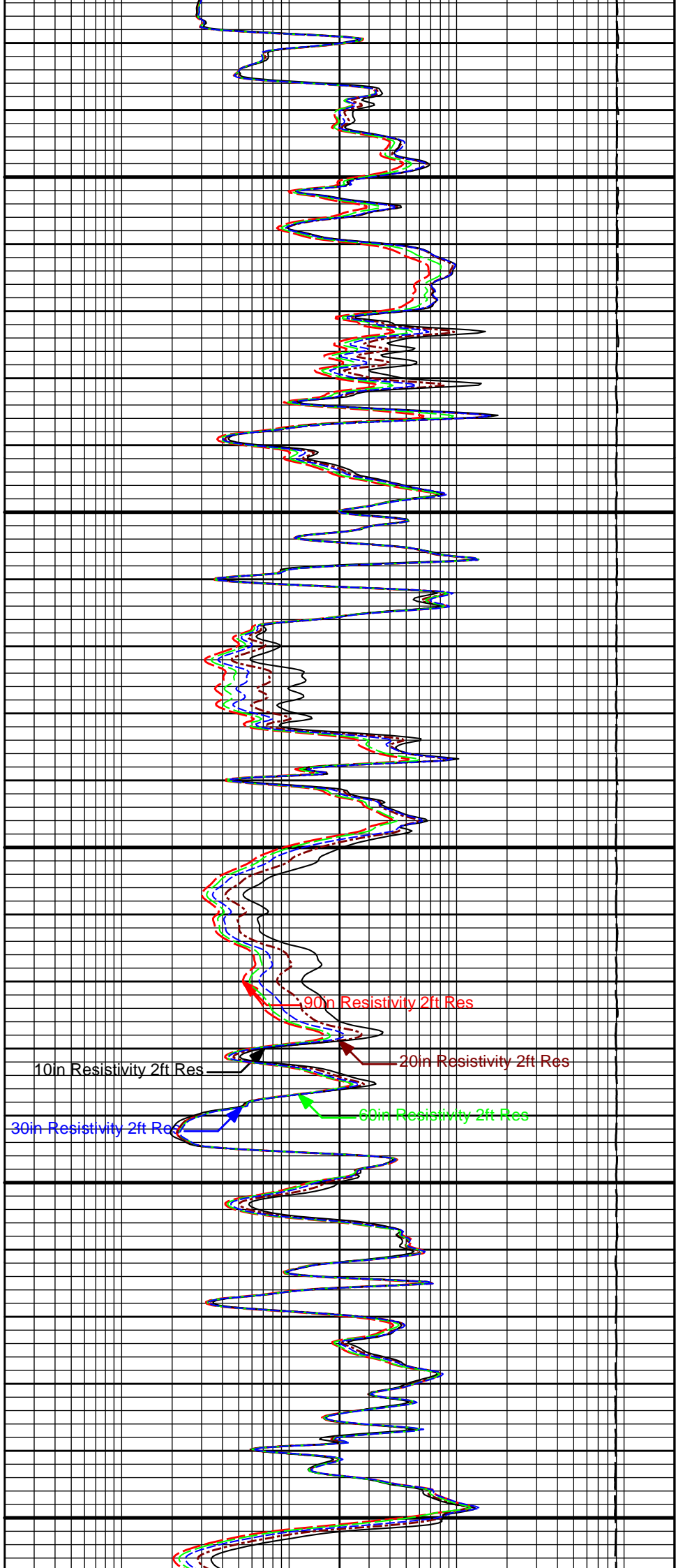


4200

4300

4400

SP



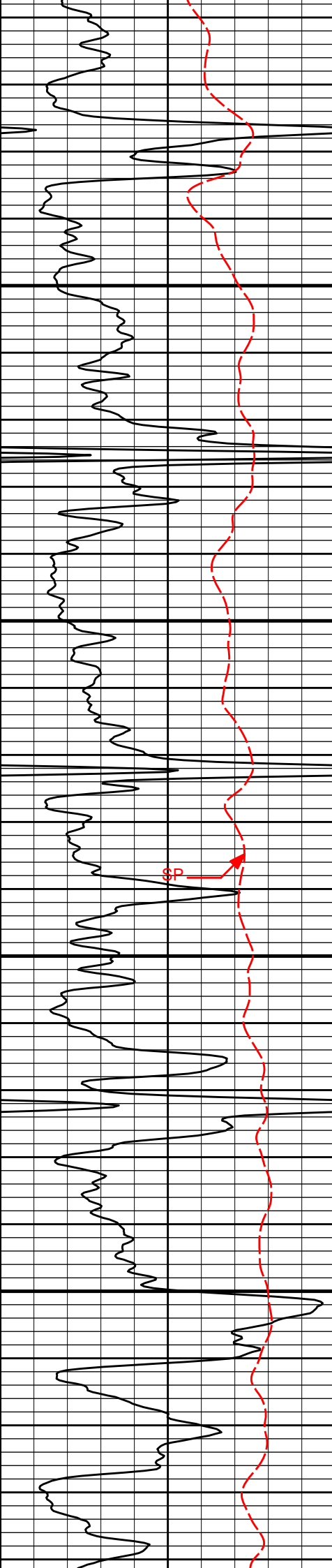
10in Resistivity 2ft Res

90in Resistivity 2ft Res

20in Resistivity 2ft Res

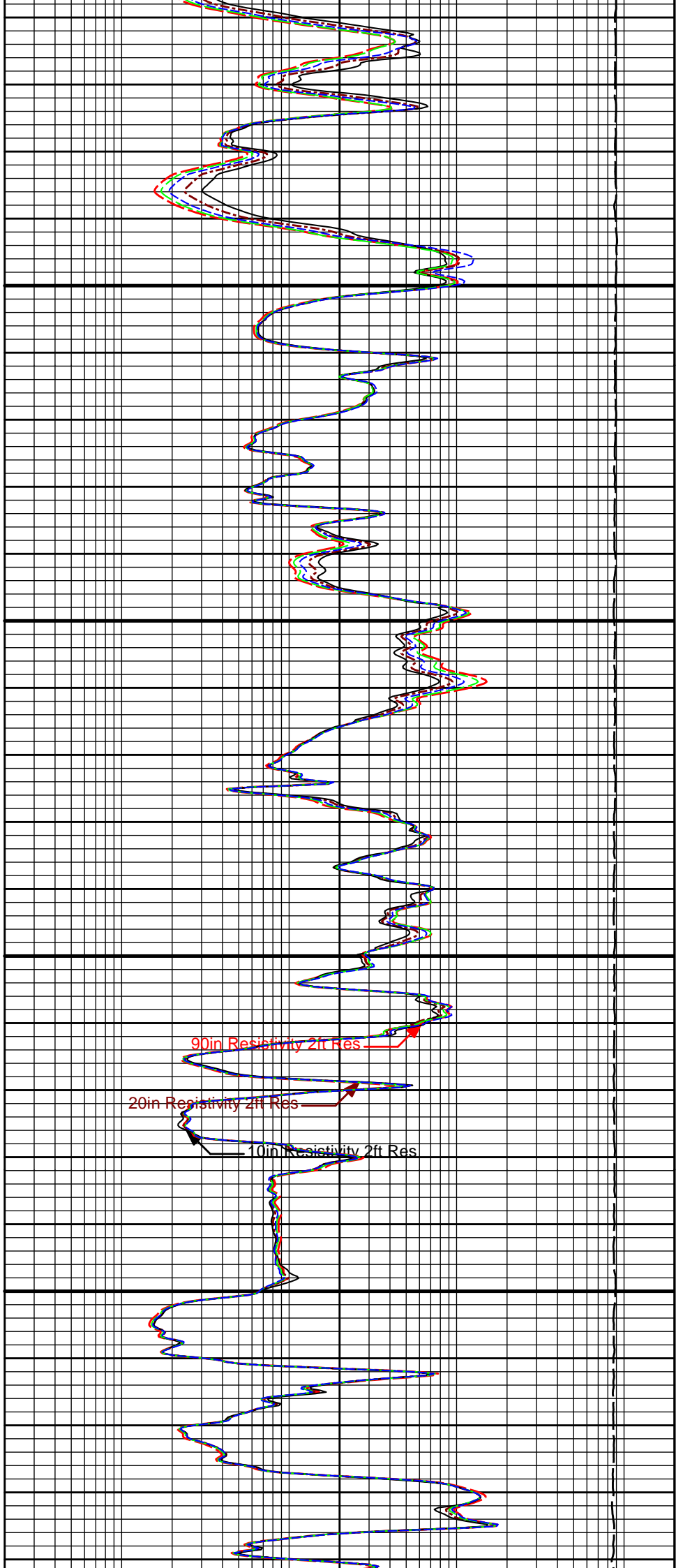
30in Resistivity 2ft Res

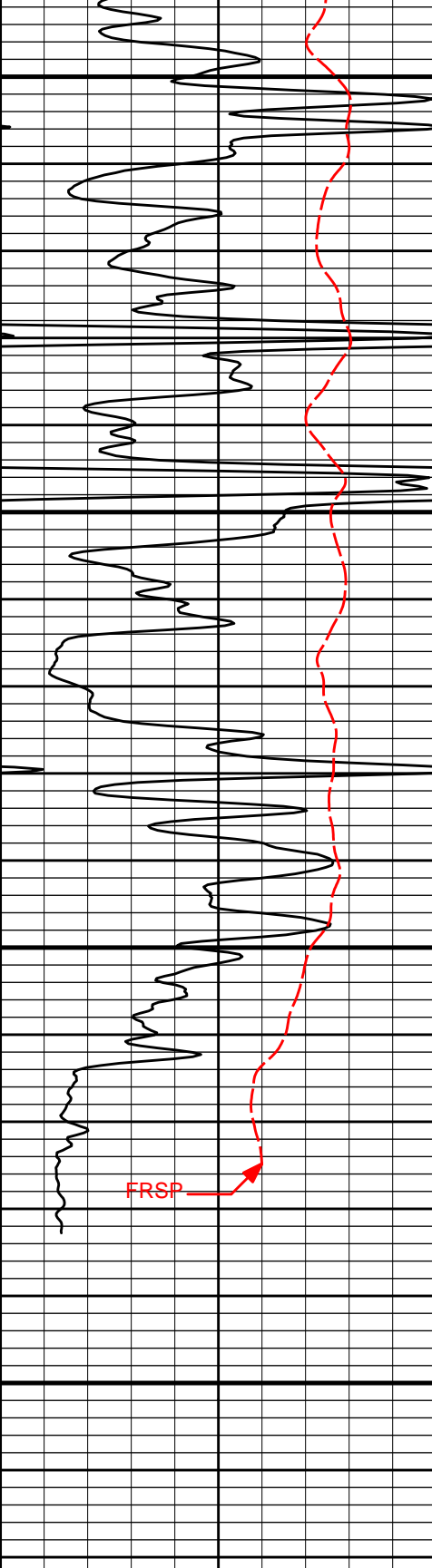
60in Resistivity 2ft Res



4500

4600

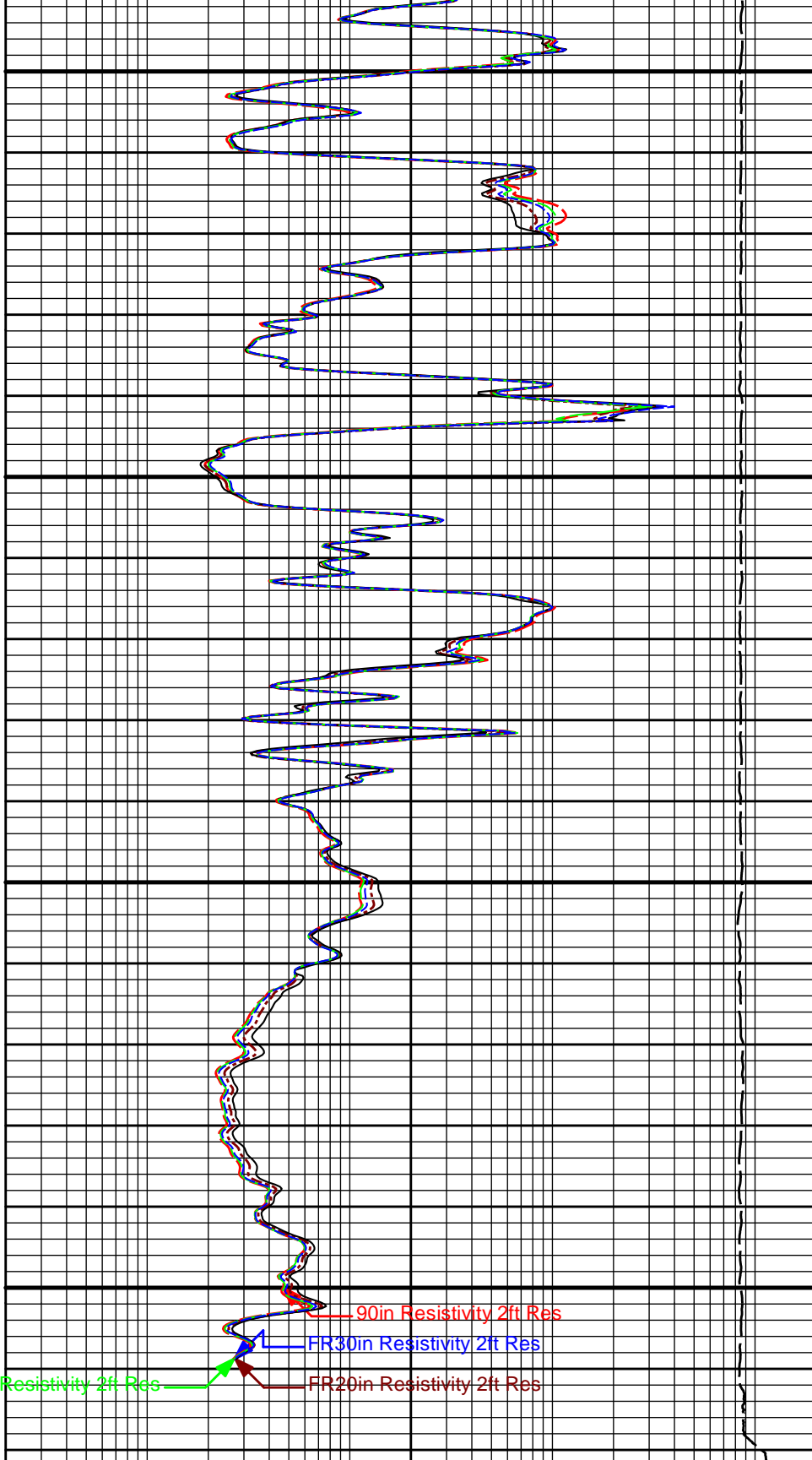




4700

4800

TD



0 Gamma API 150  
api

MD  
1 : 240  
ft

15K Tension 0  
pounds

SP  
-] 20 [+]

0.2 90in Resistivity 2ft Res 2000  
ohm-metre

0.2 60in Resistivity 2ft Res 2000  
ohm-metre

0.2 30in Resistivity 2ft Res 2000  
ohm-metre

0.2 20in Resistivity 2ft Res 2000  
ohm-metre

0.2 10in Resistivity 2ft Res 2000  
ohm-metre

**HALLIBURTON**

Plot Time: 18-Jun-18 00:13:10  
 Plot Range: 3890 ft to 4821.55 ft  
 Data: HERMAN\_LILSPICY\Well Based\MAIN\_ACRT\  
 Plot File: \\-LOCAL-IBLKWL\_SWEENEY12\Well Based\ACRT\ELR\_ACRT\_5\_MAIN

**5 INCH MAIN PASS**

**5 IN = 100 FT MD  
 MAIN PASS**

**HALLIBURTON**

Plot Time: 18-Jun-18 00:13:10  
 Plot Range: 4550.12 ft to 4819.55 ft  
 Data: HERMAN\_LILSPICY\Well Based\REPEAT\_ACRT\  
 Plot File: \\-LOCAL-IBLKWL\_SWEENEY12\Well Based\ACRT\ELR\_ACRT\_5\_REPEAT

**5 INCH REPEAT PASS**

**5 IN = 100 FT MD  
 REPEAT PASS**

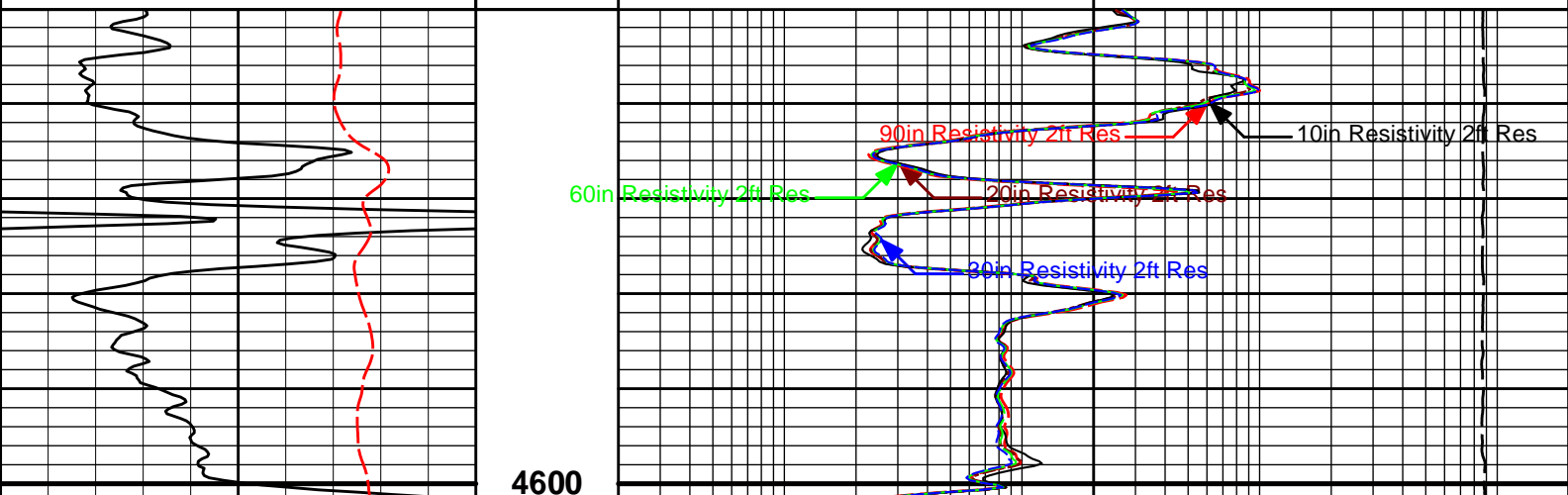
0.2	10in Resistivity 2ft Res	2000
	ohm-metre	
0.2	20in Resistivity 2ft Res	2000
	ohm-metre	
0.2	30in Resistivity 2ft Res	2000
	ohm-metre	
0.2	60in Resistivity 2ft Res	2000
	ohm-metre	
0.2	90in Resistivity 2ft Res	2000
	ohm-metre	

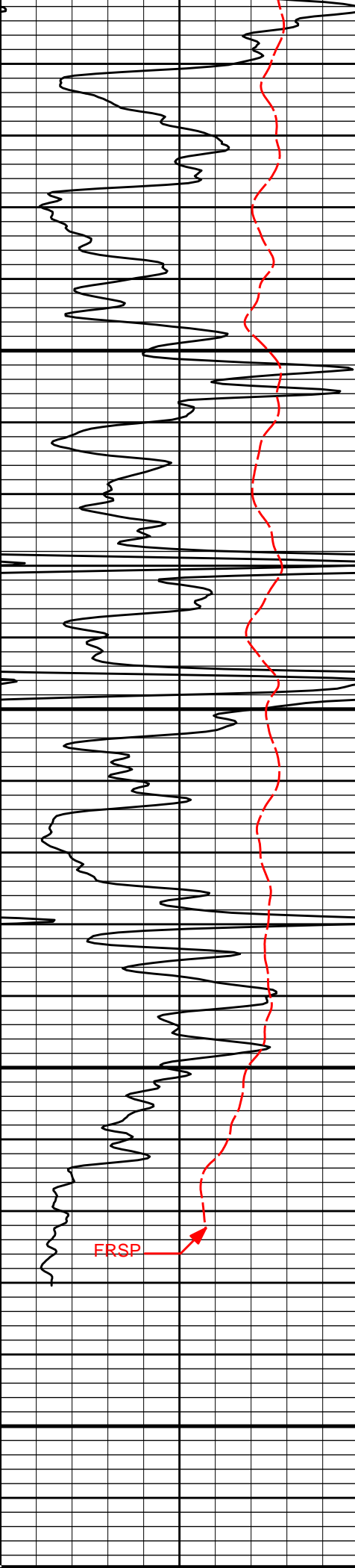
SP
-] 20 [+]

0	Gamma API	150
	api	

MD
1 : 240
ft

15K	Tension	0
	pounds	

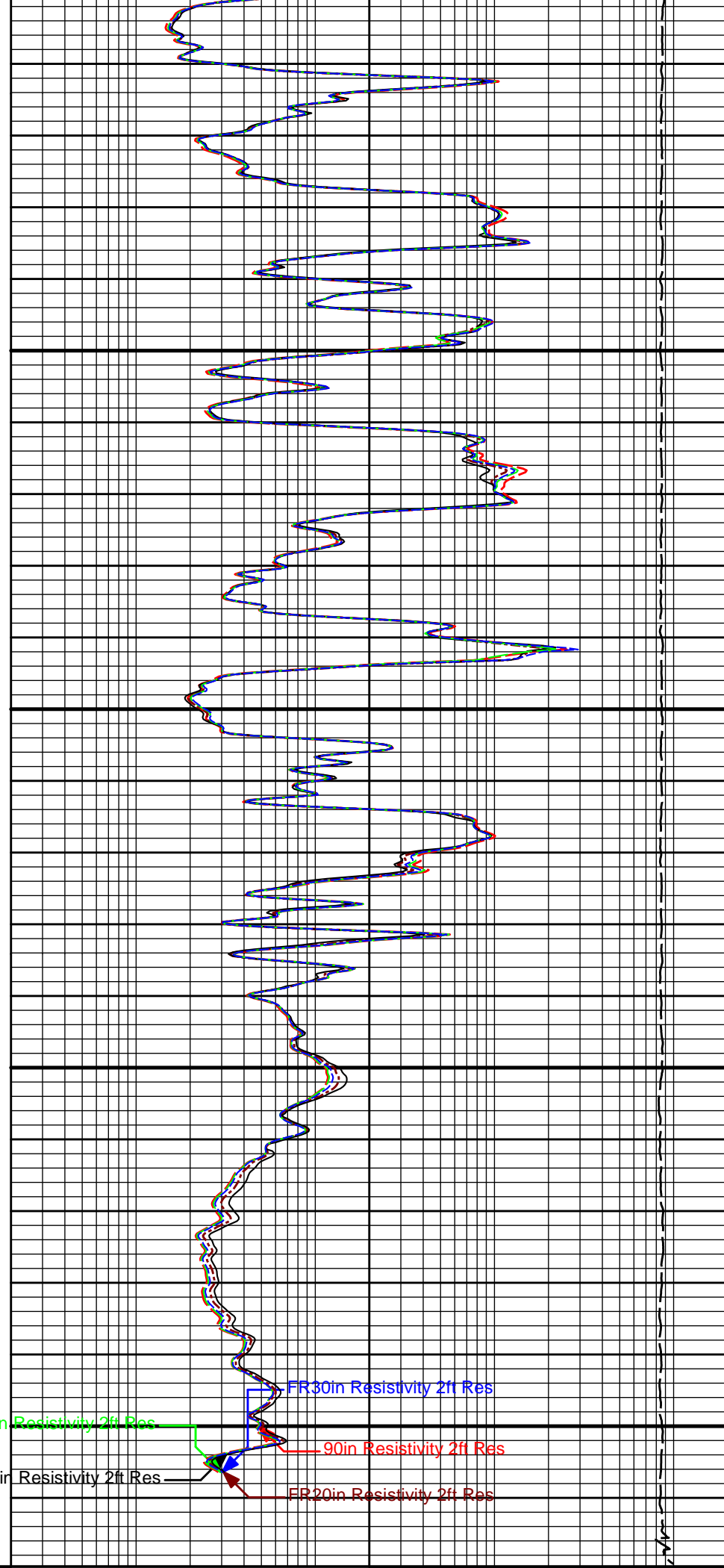




4700

4800

TD



0 Gamma API 150  
api

MD  
1 : 240  
ft

15K Tension 0  
pounds

SP

0.2 90in Resistivity 2ft Res 2000



	ohm-metre	
0.2	60in Resistivity 2ft Res	2000
	ohm-metre	
0.2	30in Resistivity 2ft Res	2000
	ohm-metre	
0.2	20in Resistivity 2ft Res	2000
	ohm-metre	
0.2	10in Resistivity 2ft Res	2000
	ohm-metre	

**HALLIBURTON**

Plot Time: 18-Jun-18 00:13:12  
 Plot Range: 4550.12 ft to 4819.55 ft  
 Data: HERMAN\_LILSPICY\Well Based\REPEAT\_ACRT\  
 Plot File: \\-LOCAL-IBLKWL\_SWEENEY12\Well Based\ACRT\ELR\_ACRT\_5\_REPEAT

**5 INCH REPEAT PASS**

**5 IN = 100 FT MD  
 REPEAT PASS**

**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	9.100	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	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	4820.00	ft
	SHARED	BHT	Bottom Hole Temperature	140.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	SHARED	SOCI	Source of Casing Information	Parameters	
	SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
	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	Bit Size	
Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Centered	
GTET	BHSM	Borehole Size Source Tool	Bit Size	
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 Pore Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	User define	
BSAT	DTMA	Delta -T Matrix	47.60	uspf
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	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Centered	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	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	Bit Size	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

Data: HERMAN\_LILSPICY\0002 GTET-BSAT-ACRT\004 17-Jun-18 22:07 Up @4821.5f

Date: 17-Jun-18 22:16:09

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11013114

Reference Calibration Date: 20-May-18 14:50:21

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 05-Jun-18 11:57:37

Software Version: WL INSITE R5.6.0 (Build 2)

Calibration Version: 1

Calibrator Source S/N: TB-146

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Measurement	Measured	Calibrated	Units
Background	35.2	35.7	api
Background + Calibrator	260.9	264.7	api
Calibrator	225.7	228.9	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11013114

Reference Calibration Date: 05-Jun-18 11:57:37

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 05-Jun-18 12:00:58

Calibrator Source S/N: TB-146

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Field Verification	Shop	Field	Units
Background	35.7	34.1	api
Background + Calibrator	264.7	265.7	api
Calibrator	228.9	231.6	api

Shop	Field	Difference	Tolerance
228.9	231.6	-2.7	+/- 9.00

**ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION**

Tool Name: ACRt Sonde - 12109515

Reference Calibration Date: 06-Jun-18 10:26:27

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 06-Jun-18 10:38:36

Software Version: WL INSITE R5.6.3 (Build 4)

Calibration Version: 1

Host Tool Name: ACRt Instrument - 12109517

**TYPICAL GAIN RANGE**

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0437	1.05	0.95	1.0237	1.05	0.95	1.0174	1.05
A2 (50")	0.95	1.0457	1.05	0.95	1.0299	1.05	0.95	1.0276	1.05
A3 (29")	0.95	1.0363	1.05	0.95	1.0179	1.05	0.95	1.0133	1.05
A4 (17")	0.95	1.0304	1.05	0.95	1.0114	1.05	0.95	1.0081	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0117	1.05	0.95	1.0066	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9910	1.05	0.95	0.9865	1.05

**SONDE OFFSET**

Subarray	R12KHz			R36KHz			R72KHz		
	(mmho/m)			(mmho/m)			(mmho/m)		
A1 (80")	0.991			-4.535			-5.661		
A2 (50")	-0.134			-3.921			-4.995		
A3 (29")	-13.787			-4.734			-3.442		
A4 (17")	-110.417			-33.771			-25.565		
A5 (10")	N/A			-91.375			-40.562		
A6 (6")	N/A			301.031			154.231		

**TRANSMITTER CURRENT GAIN**

Signal	Lower	R	Upper
12K	0.6	0.94	1.3
36K	1.0	1.91	2.0
72K	1.0	1.17	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 CHK	PASS

TOOL OK TO LOG

**QUALITY CHECK SHOP CALIBRATION**

Tool Name: ACRt Sonde - 12109515

Reference Calibration Date: 24-Jan-18 15:49:50

Engineer: JORGE ORLANDO PEREZ

Calibration Date: 24-Jan-18 15:51:29

Software Version: WL INSITE R5.0.5 (Build 8)

Calibration Version: 1

Host Tool Name: ACRt Instrument - 12109517

STANDARD DEVIATIONS									
	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A2 (50")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A3 (29")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A4 (17")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A5 (10")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A6 (6")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass

AVERAGES									
	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.006	> -0.500	Pass
A2 (50")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.005	> -0.500	Pass
A3 (29")	-0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.003	> -0.500	Pass
A4 (17")	-0.003	> -0.500	Pass	-0.008	> -0.500	Pass	-0.025	> -0.500	Pass
A5 (10")	-0.012	> -0.500	Pass	-0.020	> -0.500	Pass	-0.039	> -0.500	Pass
A6 (6")	0.015	< 0.500	Pass	0.066	< 0.500	Pass	0.142	< 0.500	Pass

GAIN TOLERANCE					
R12KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-212937552.000	-212930784.000	6768.000	10646539.200	Pass
A2 (50")	-215821408.000	-215814672.000	6736.000	10790733.600	Pass
A3 (29")	-207997936.000	-207993888.000	4048.000	10399694.400	Pass
A4 (17")	-207024272.000	-207028528.000	4256.000	10351426.400	Pass
A5 (10")	-203413312.000	-203419824.000	6512.000	10170991.200	Pass
A6 (6")	-208626032.000	-208627520.000	1488.000	10431376.000	Pass
R36KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	57867232.000	57860088.000	7144.000	2893004.400	Pass
A2 (50")	54087984.000	54076796.000	11188.000	2703839.800	Pass
A3 (29")	46700524.000	46693664.000	6860.000	2334683.200	Pass
A4 (17")	36192728.000	36188108.000	4620.000	1809405.400	Pass
A5 (10")	31710086.000	31707590.000	2496.000	1585379.500	Pass
A6 (6")	36852412.000	36847564.000	4848.000	1842378.200	Pass
R72KHz					
	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-90781944.000	-90778688.000	3256.000	4538934.400	Pass
A2 (50")	-87606936.000	-87604240.000	2696.000	4380212.000	Pass
A3 (29")	-85428592.000	-85425888.000	2704.000	4271294.400	Pass
A4 (17")	-86351880.000	-86350928.000	952.000	4317546.400	Pass
A5 (10")	-87073784.000	-87072024.000	1760.000	4353601.200	Pass
A6 (6")	-86120112.000	-86115560.000	4552.000	4305778.000	Pass

PASS/FAIL SUMMARY	
Std Deviation Verification	Pass
Average Verification	Pass
Gain Tolerance Verification	Pass

## CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-11013114</b>						
Gamma Ray Calibrator	228.9	231.6	-----	-2.7	+/- 9.00	api
<b>ACRt Sonde-12109515</b>						
Mud Cell	1.00	-----	-----	0	-----	ohm-m

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## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS-11459024 37.50 lbs		Ø 2.750 in →		← Temperature @ 50.57 ft	3.03 ft	51.60 ft
XOHD-11572809 20.00 lbs		Ø 2.750 in → Ø 3.625 in →		← SP @ 45.84 ft	0.95 ft	48.57 ft
SP Sub-11153357 60.00 lbs		Ø 3.625 in →		← Z-Accelerometer @ 43.43 ft	3.74 ft	47.62 ft
GTET-11013114 165.00 lbs		Ø 3.625 in →		← GammaRay @ 37.82 ft	8.52 ft	43.88 ft
Centralizer 25-12345679 8.00 lbs		Ø 4.000 in* →				35.36 ft
BSAT-10747686 300.00 lbs		Ø 3.625 in →		← Receiver Array @ 26.84 ft Sonic Receivers @ 26.84 ft	15.77 ft	
Centralizer 25-12345678 8.00 lbs		Ø 4.000 in* →				19.58 ft
ACRt Instrument-12109517 50.00 lbs		Ø 3.625 in →				5.03 ft
				← Mud Resistivity @ 13.19 ft		14.55 ft

ACRt Sonde-  
12109515  
200.00 lbs

Ø 3.625 in →

← ACRt @ 9.21 ft

14.22 ft

Bull Nose-12345678  
5.00 lbs

Ø 2.750 in →

0.33 ft  
0.33 ft  
0.00 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	11459024	37.50	3.03	48.57	300.00
XOHD	Hostile to Dits Cross Over	11572809	20.00	0.95	47.62	300.00
SP	SP Sub	11153357	60.00	3.74	43.88	300.00
GTET	Gamma Telemetry Tool	11013114	165.00	8.52	35.36	60.00
BSAT	Borehole Sonic Array Tool	10747686	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody	12345678	8.00	2.08 *	19.75	300.00
OBCEN	Centralizer - 25 in. Overbody	12345679	8.00	2.08 *	32.61	300.00
ACRt	Array Compensated True Resistivity Instrument Section	12109517	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	12109515	200.00	14.22	0.33	120.00
BLNS	Bull Nose	12345678	5.00	0.33	0.00	300.00
<b>Total</b>			<b>853.50</b>	<b>51.60</b>		

\* Not included in Total Length and Length Accumulation.

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COMPANY	HERMAN L. LOEB LLC		
WELL	LIL SPICY 1-16		
FIELD	WILDCAT		
COUNTY	KIOWA	STATE	KANSAS
<b>HALLIBURTON</b>		<b>ARRAY COMPENSATED TRUE RESISTIVITY LOG</b>	