

ARRAY COMPENSATED
TRUE RESISTIVITY
LOG

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Service Ticket No.: 905282992				API No.: 15-055-22508-00-00				PGM Version: WL INSITE R5.8.9 (Build 6)						
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.		@		@										
Rmc @ Meas. Temp.		@		@										
Source Rmf	Rmc													
Rm @ BHT		@		@										
Rmf @ BHT		@		@										
Rmc @ BHT		@		@										
EQUIPMENT DATA														
GAMMA			ACOUSTIC			DENSITY			NEUTRON					
Run No.				Run No.				Run No.						
Serial No.				Serial No.				Serial No.						
Model No.				Model No.				Model No.						
Diameter				No. of Cent.				Diameter						
Detector Model No.				Spacing				Log Type						
Type						Source Type		Source Type						
Length				LSA [Y/N]				Serial No.						
Distance to Source				FWDA [Y/N]				Strength						
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	

DIRECTIONAL INFORMATION													
Maximum Deviation @							KOP @						
Remarks: 5 1/2" CASING USED FOR ANNULAR HOLE VOLUME													
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.													
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Plot Time: 03-Dec-18 18:25:58

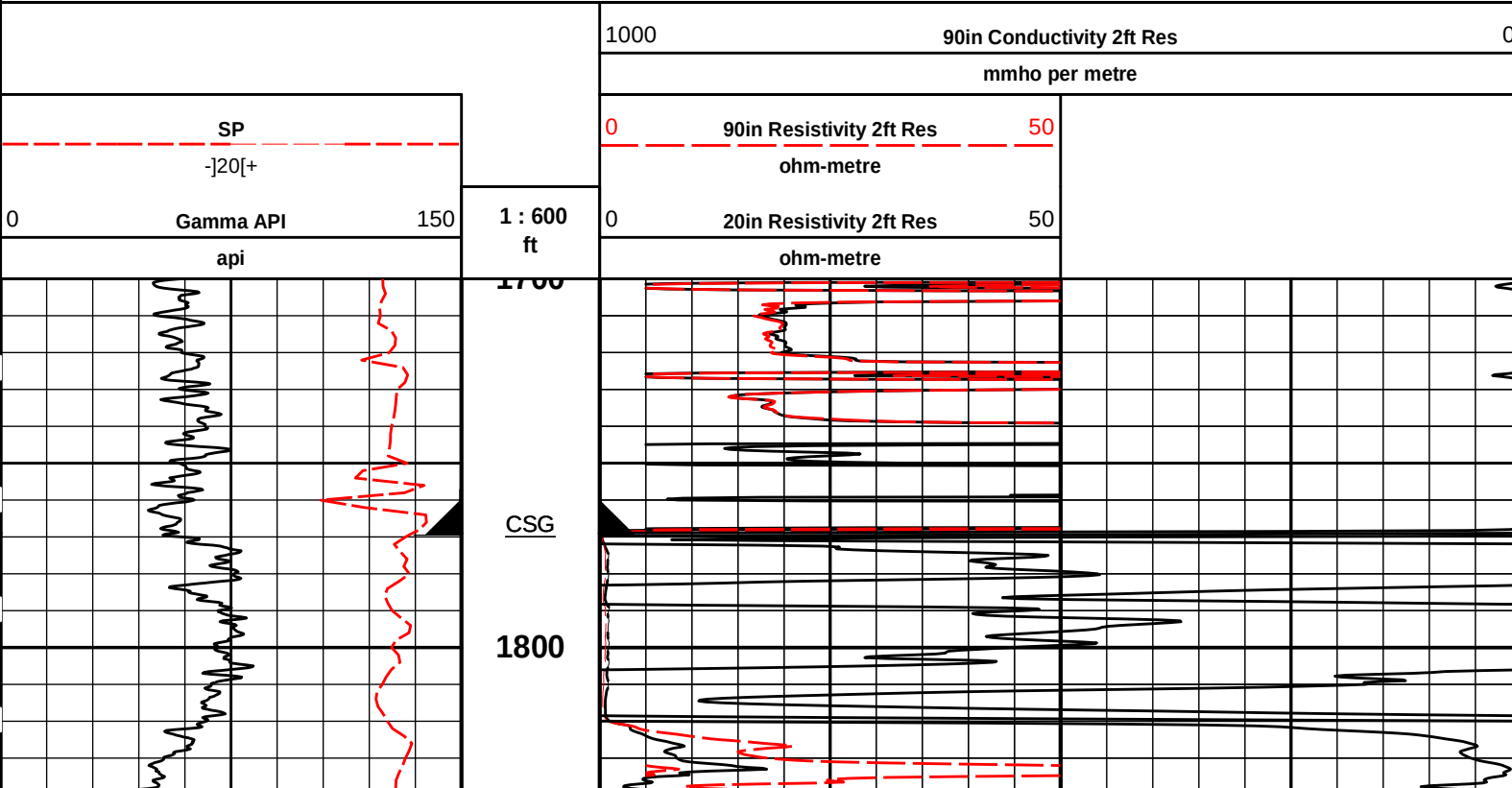
Plot Range: 1700 ft to 4904.5 ft

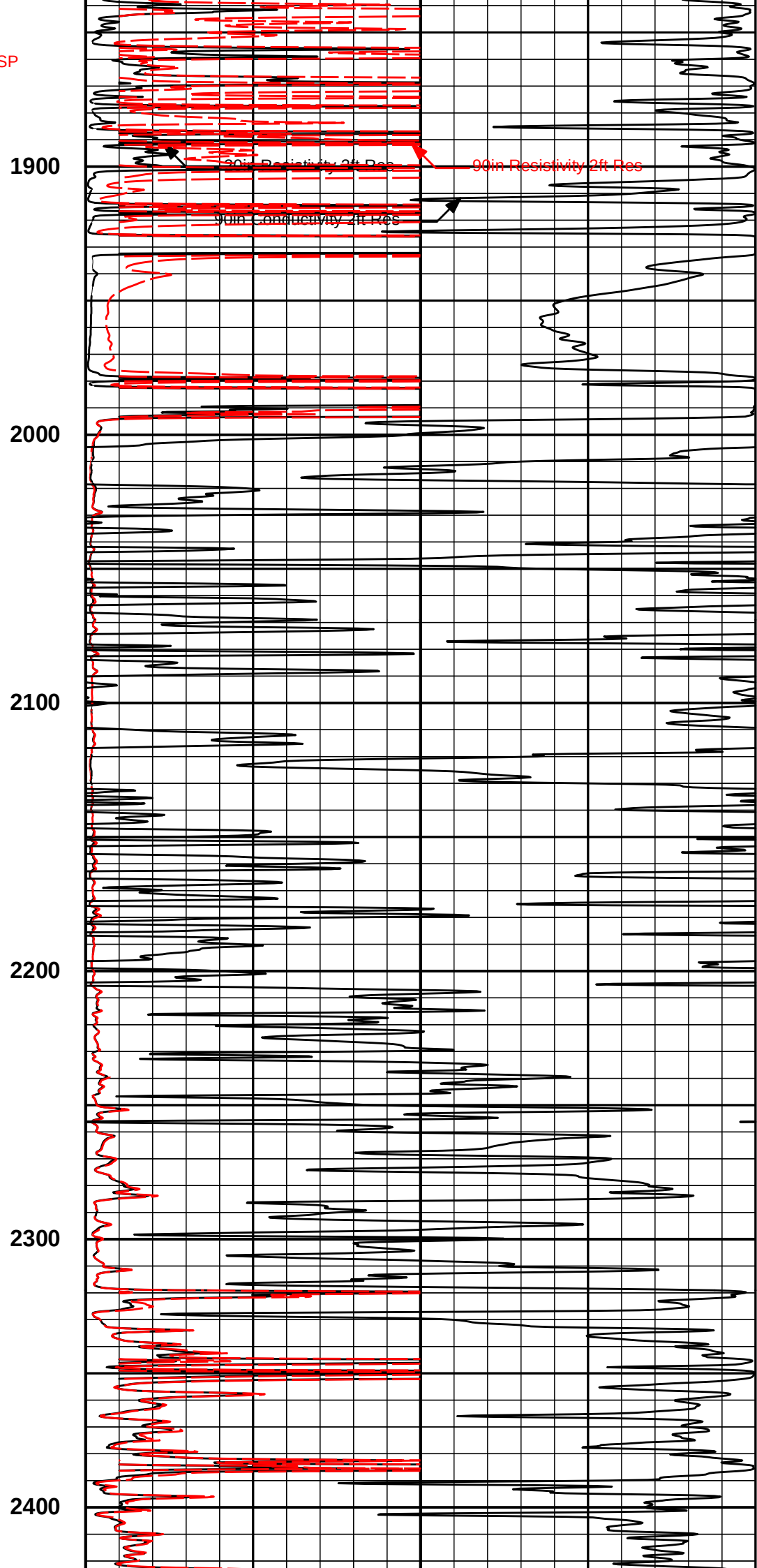
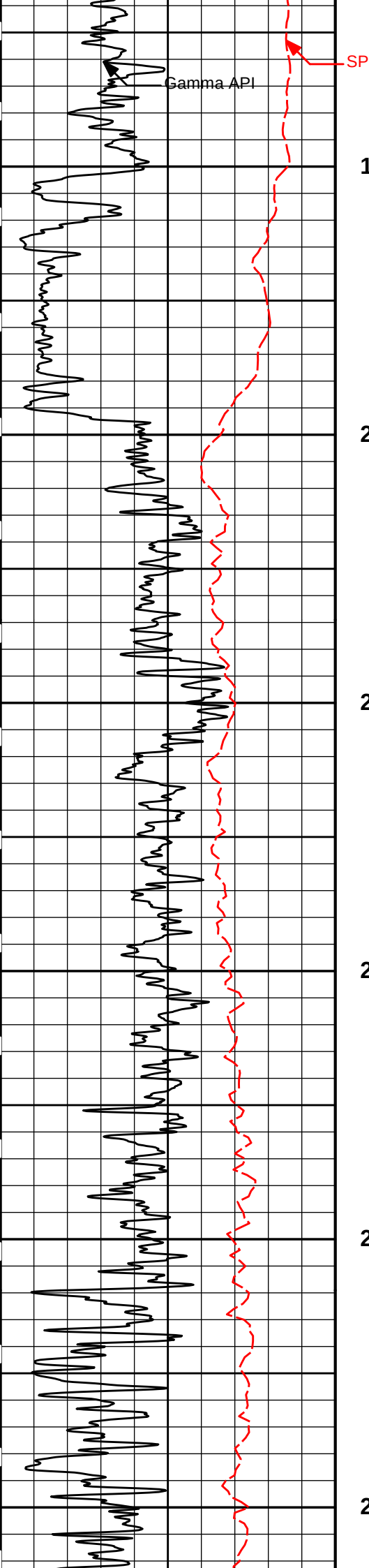
Data: BEREX_HARTNETT\Well Based\DAQ-0001-002\

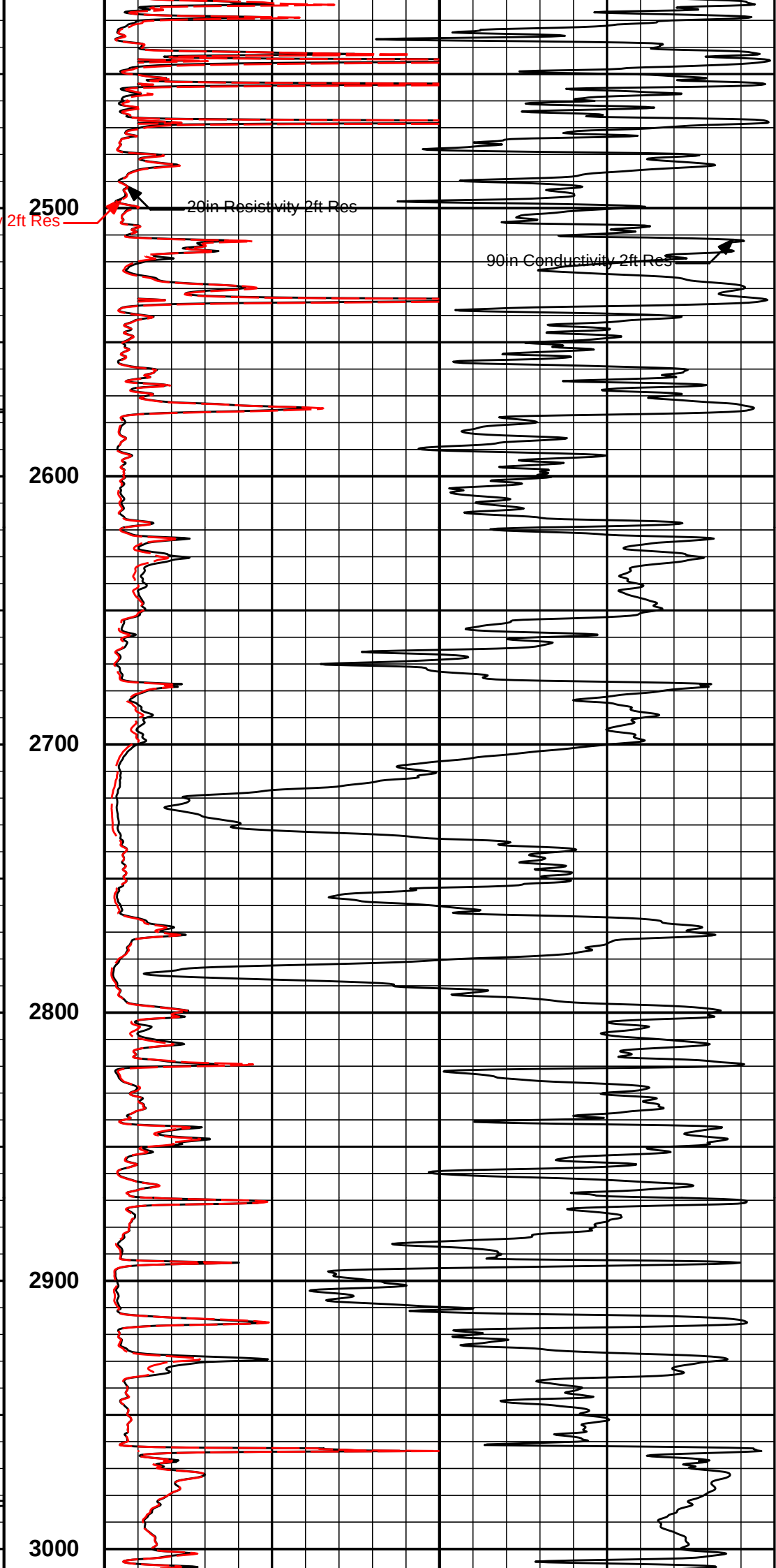
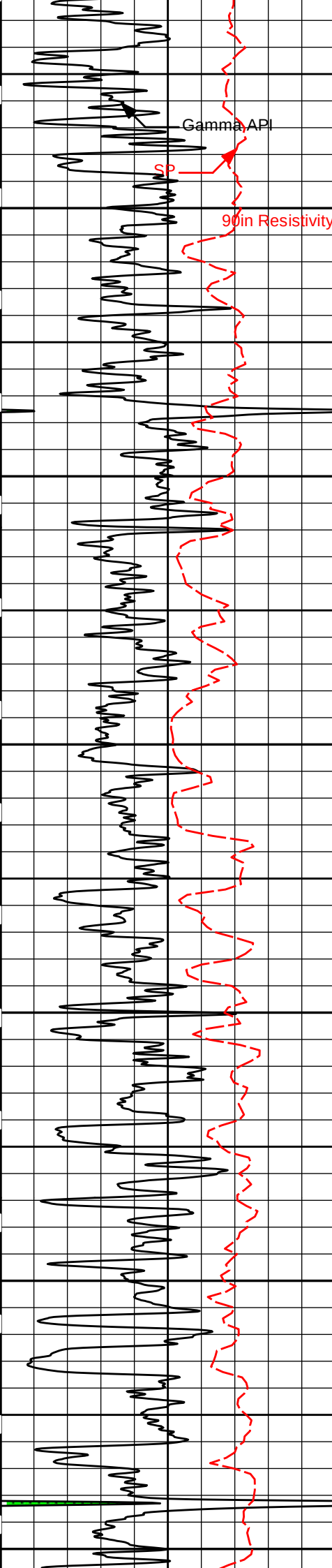
Plot File: \\LOCAL-IBEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_2_main

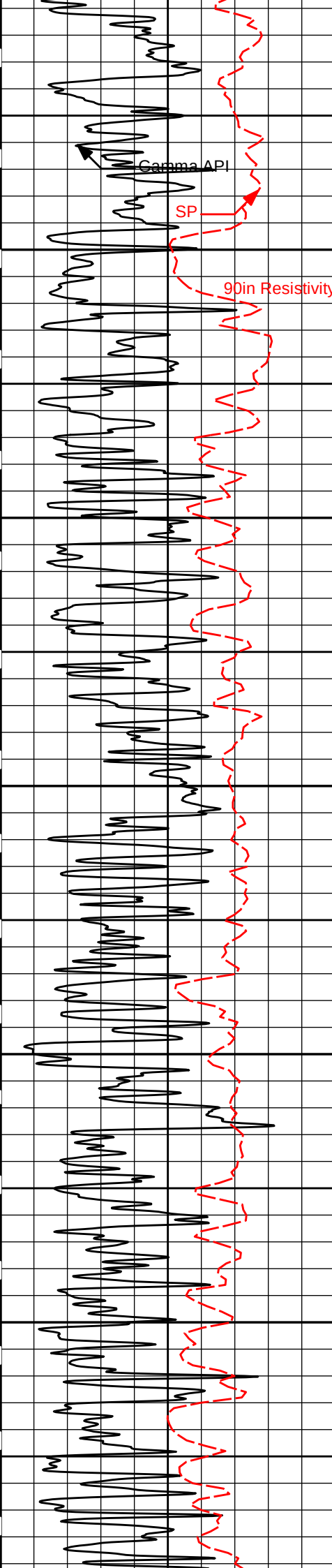
2 INCH MAIN LOG

2 INCH MAIN LOG









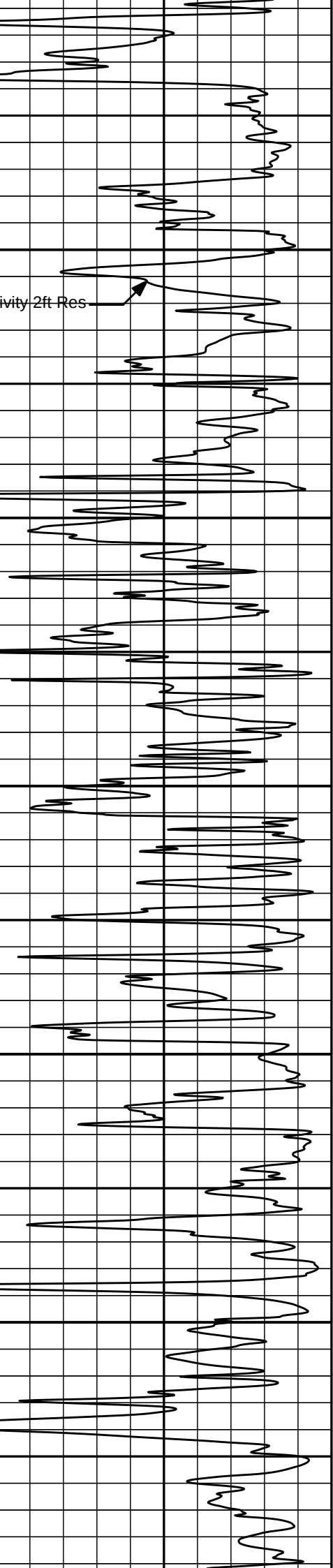
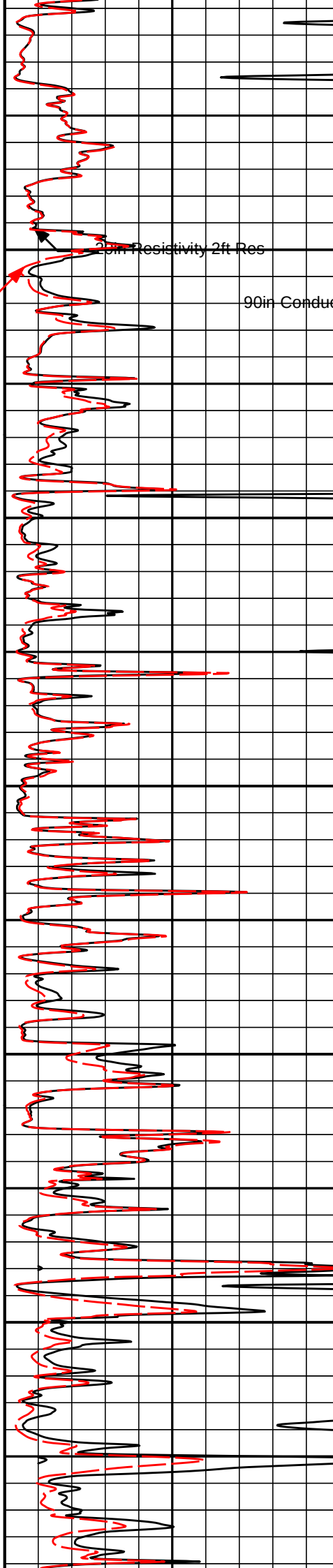
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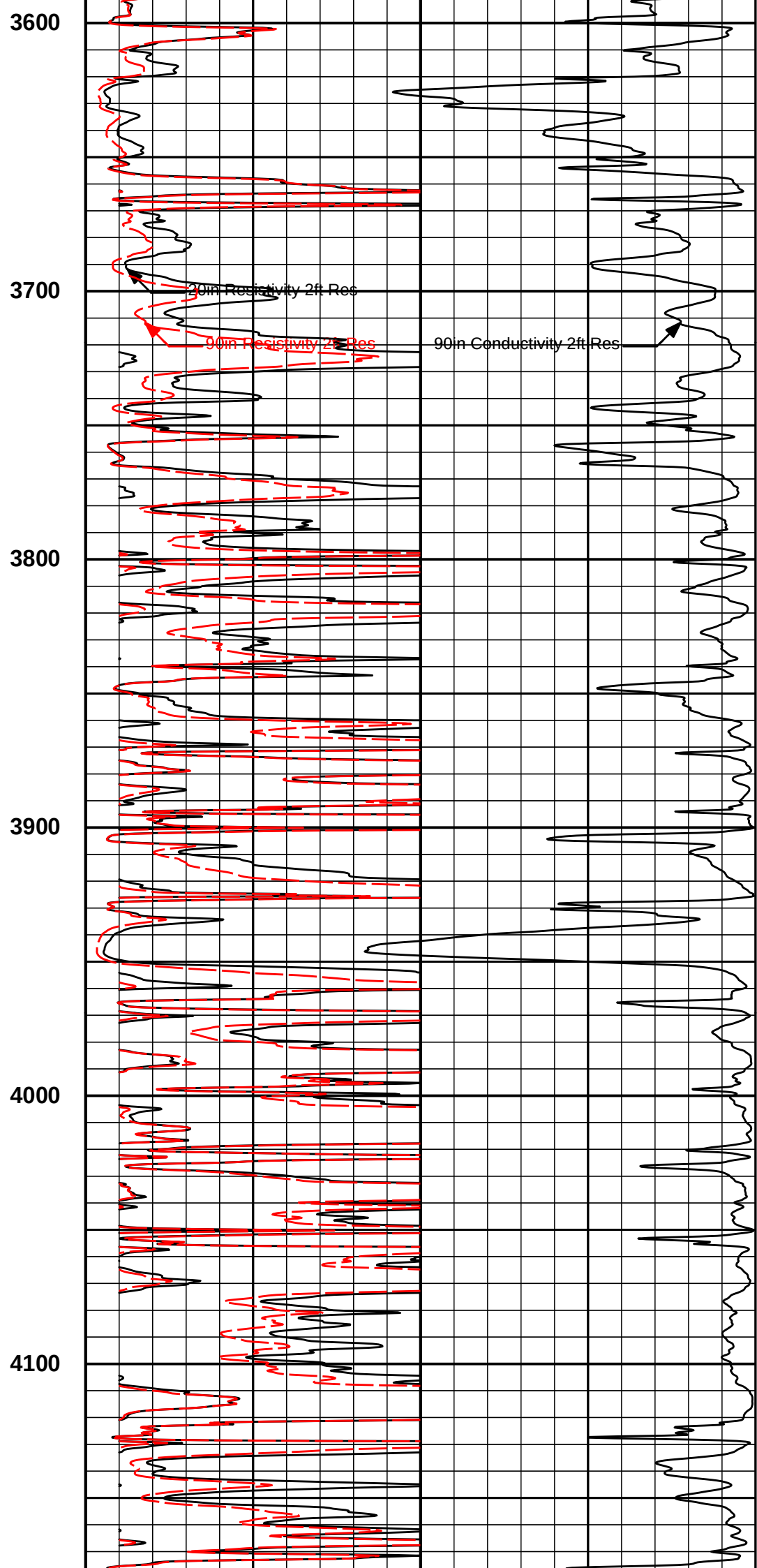
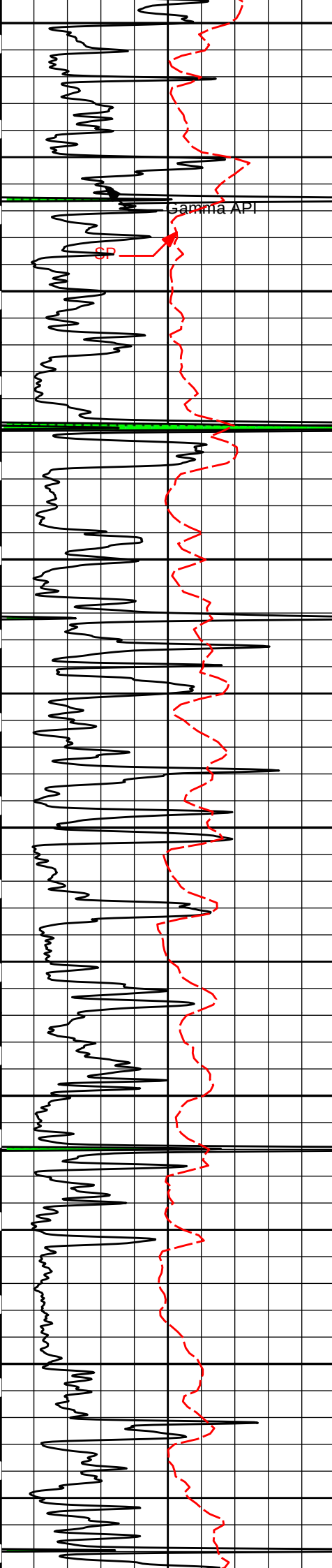
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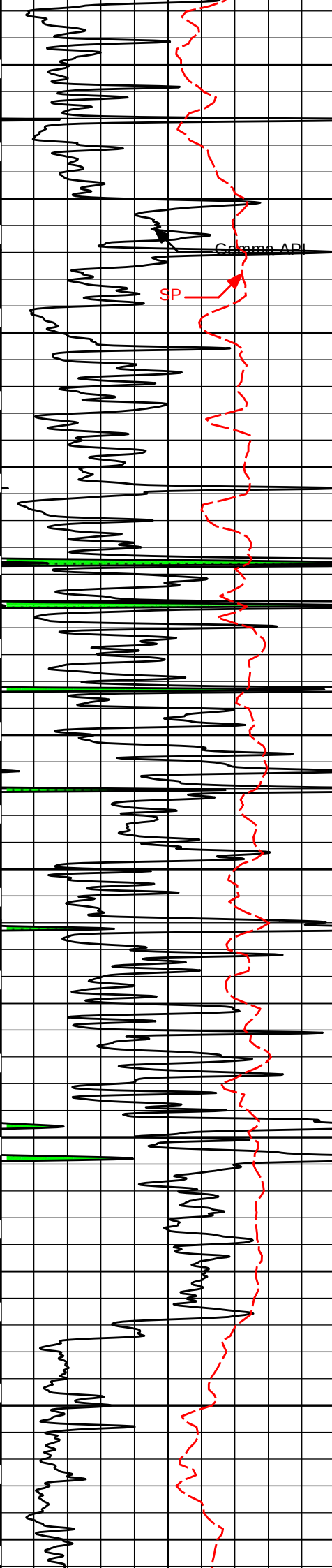
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3400

3500







4200

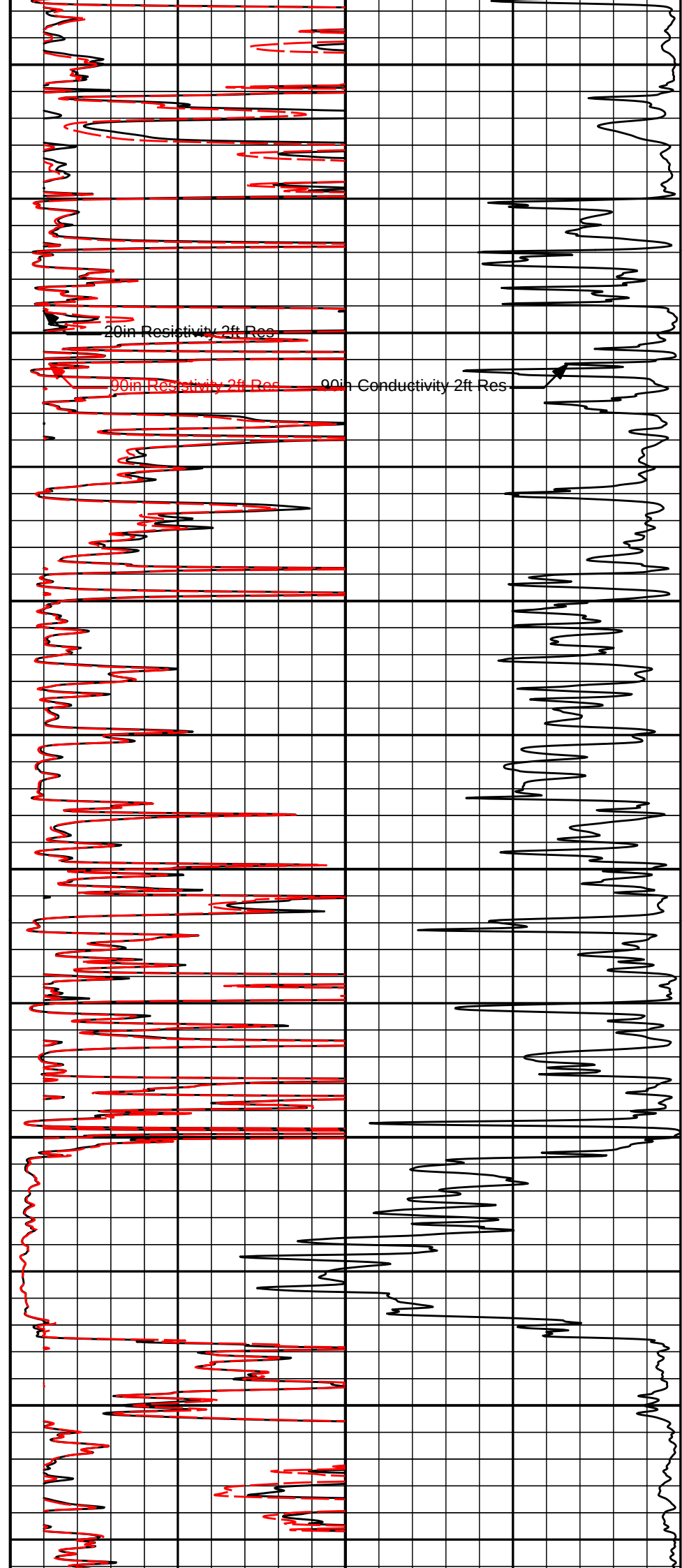
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4400

4500

4600

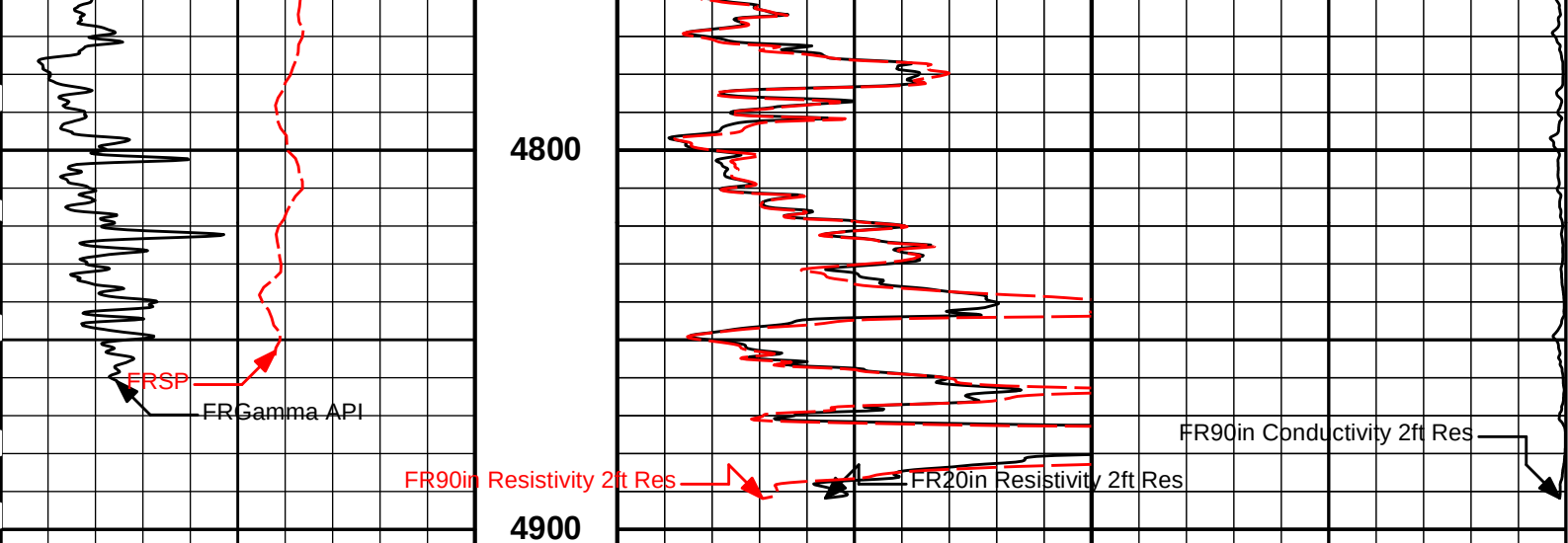
4700



20in Resistivity 2ft Res

90in Resistivity 2ft Res

90in Conductivity 2ft Res



0	Gamma API	150	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		

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Plot Time: 03-Dec-18 18:26:00
Plot Range: 1700 ft to 4904.5 ft
Data: BEREX_HARTNETT\Well Based\DAQ-0001-002\
Plot File: \\-LOCAL-\\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_2_main

2 INCH MAIN LOG

2 INCH MAIN LOG

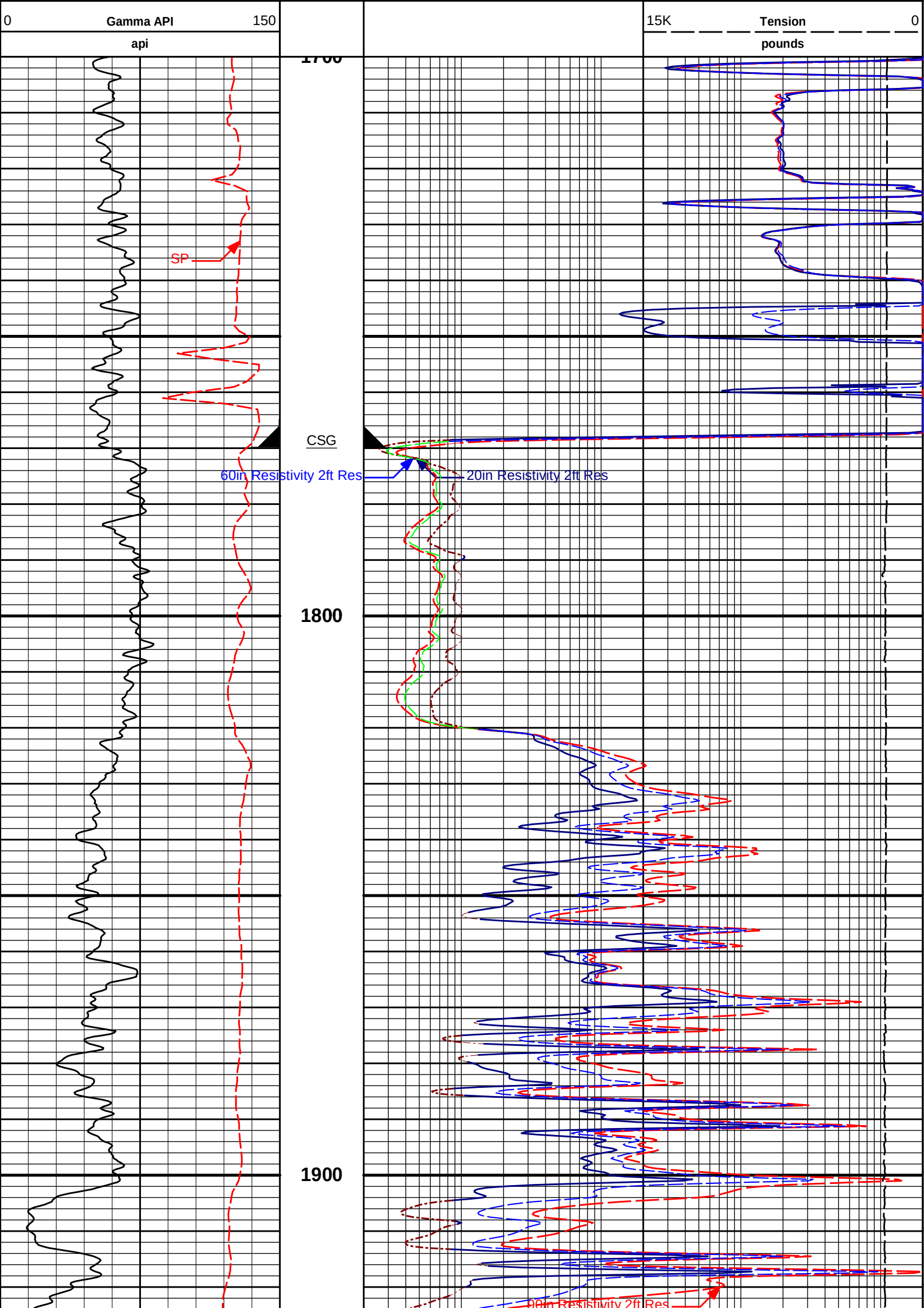
HALLIBURTON

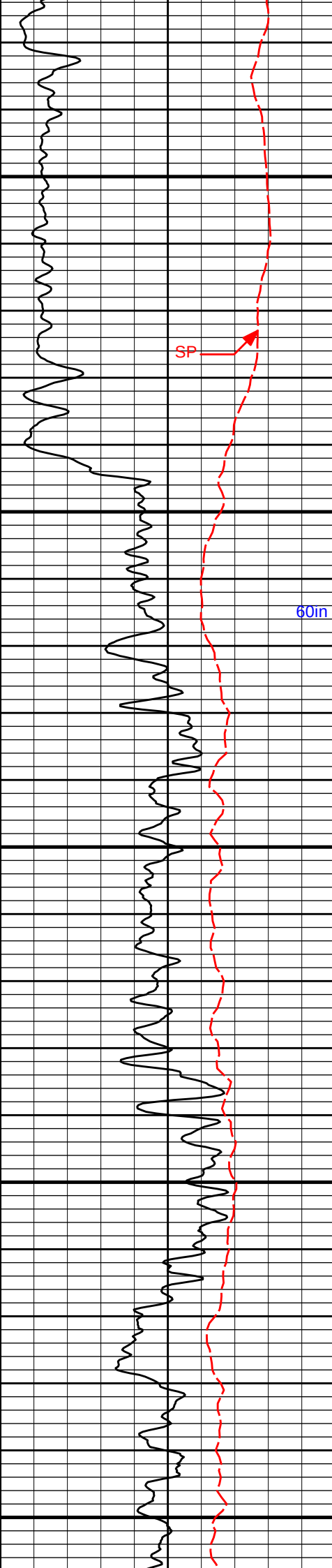
Plot Time: 03-Dec-18 18:26:00
Plot Range: 1700 ft to 4904.5 ft
Data: BEREX_HARTNETT\Well Based\DAQ-0001-002\
Plot File: \\-LOCAL-\\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_5inch_main

5 INCH MAIN LOG

5 INCH MAIN LOG

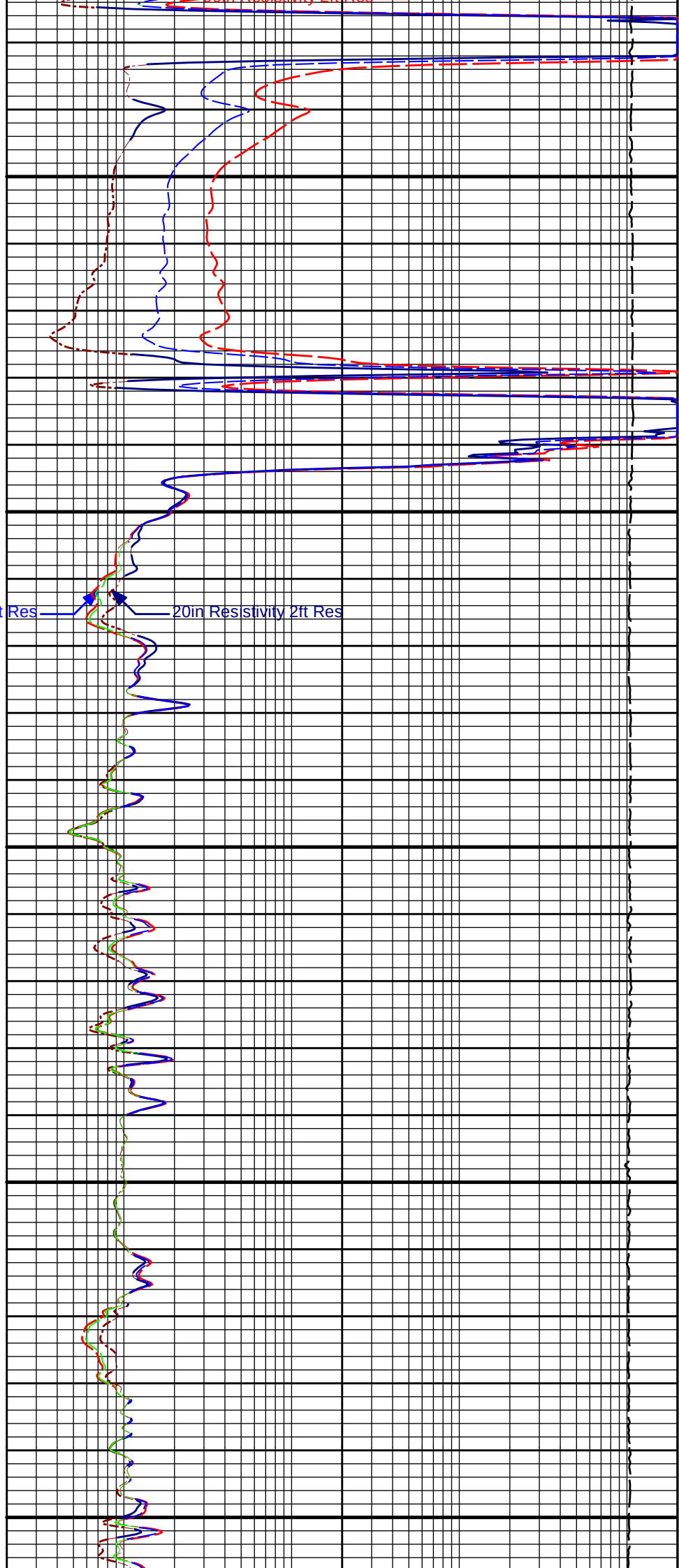
	0.2	20in Resistivity 2ft Res	2000
		ohmm	
	0.2	60in Resistivity 2ft Res	2000
		ohmm	
SP	0.2	90in Resistivity 2ft Res	2K
-]20[+		ohmm	

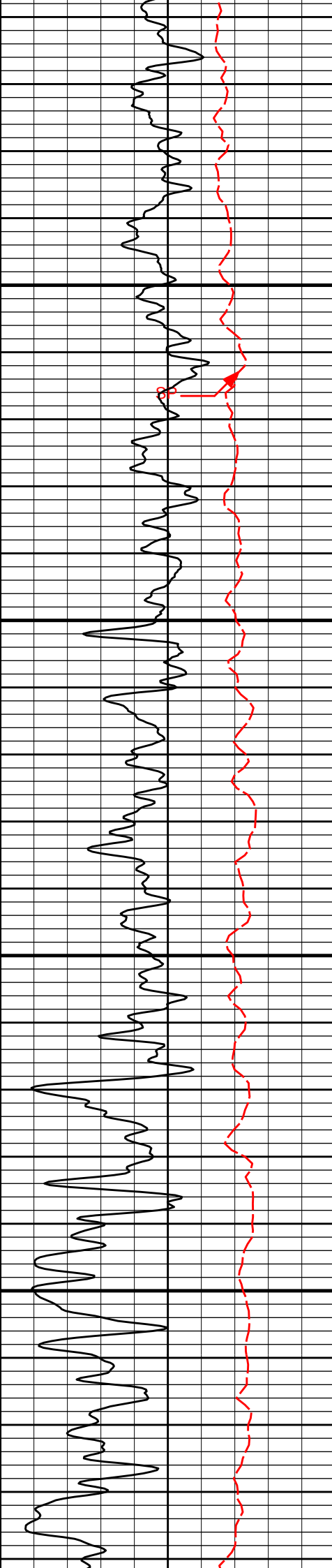




2000

2100

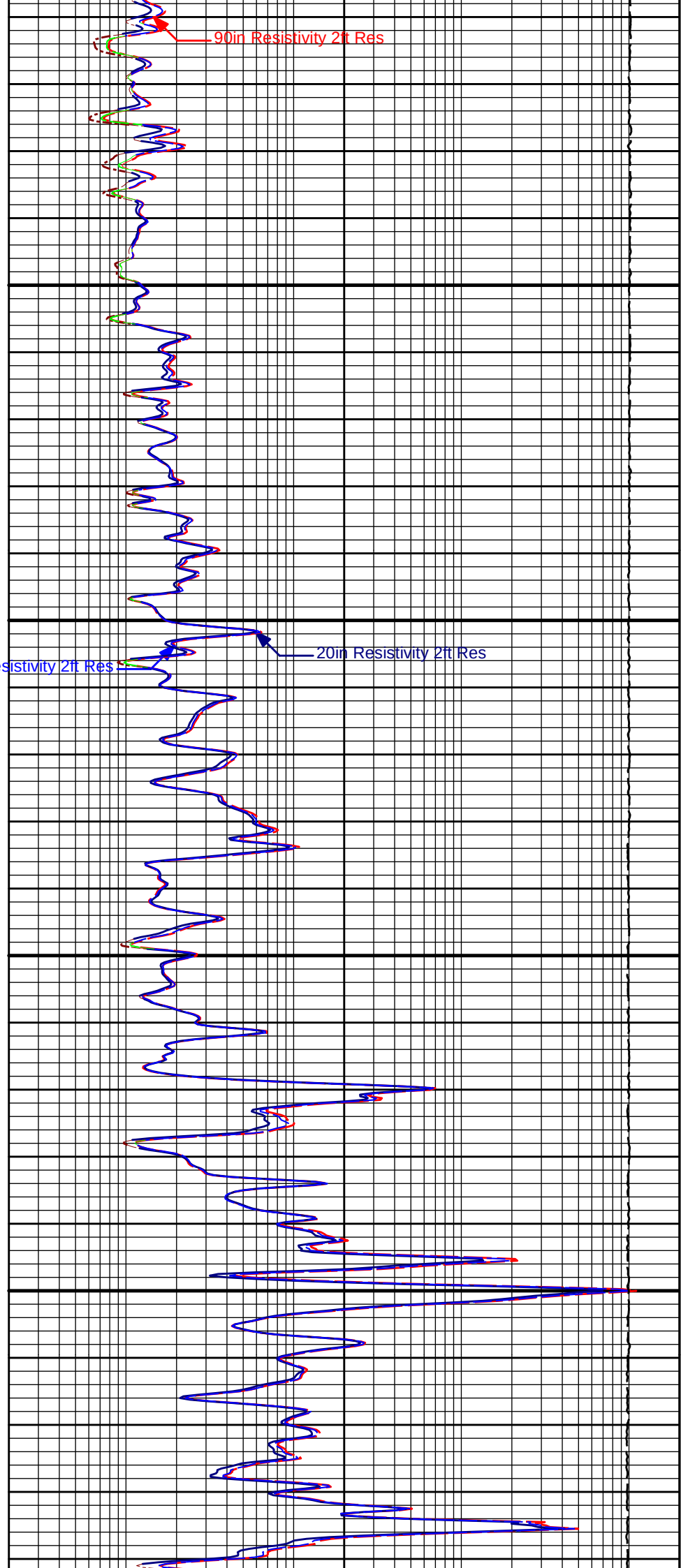




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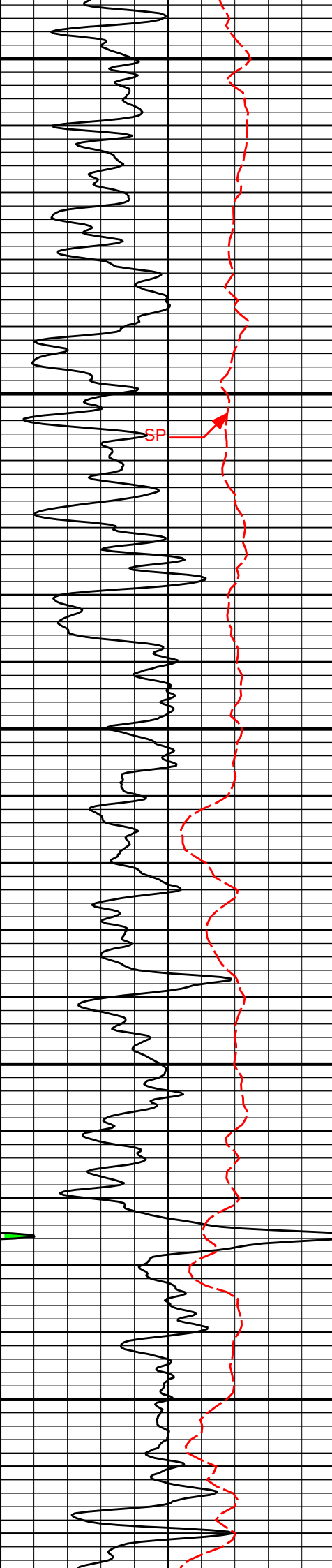
2300

60in Resistivity 2ft Res



90in Resistivity 2ft Res

20in Resistivity 2ft Res

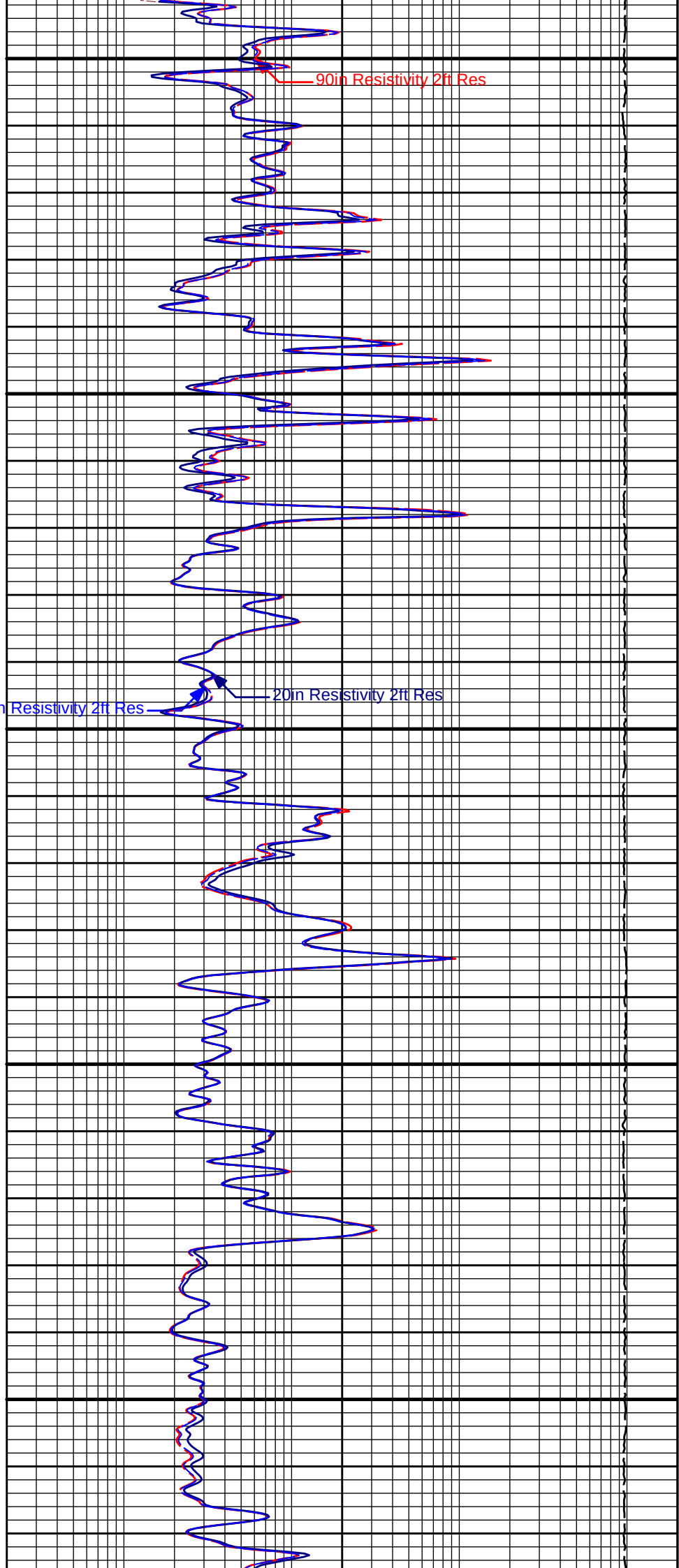


2400

SP

2500

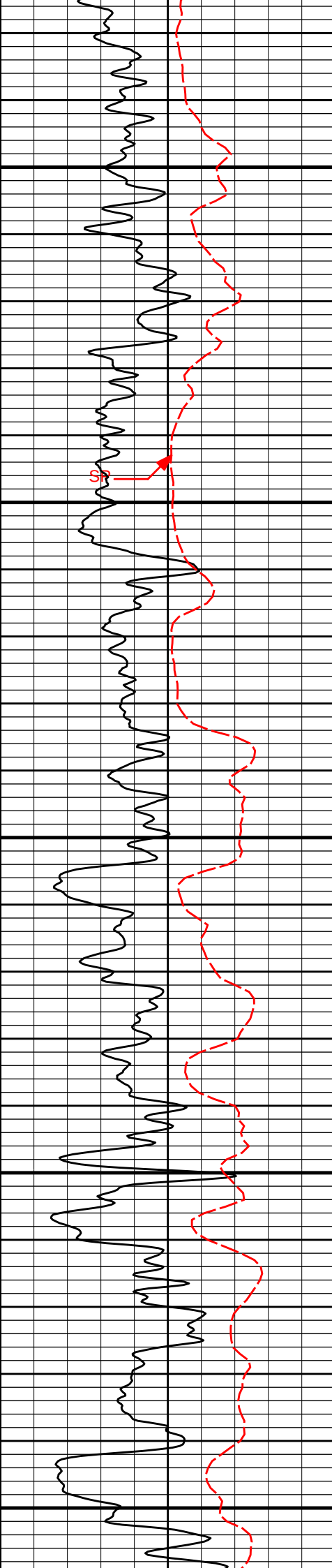
2600



90in Resistivity 2ft Res

60in Resistivity 2ft Res

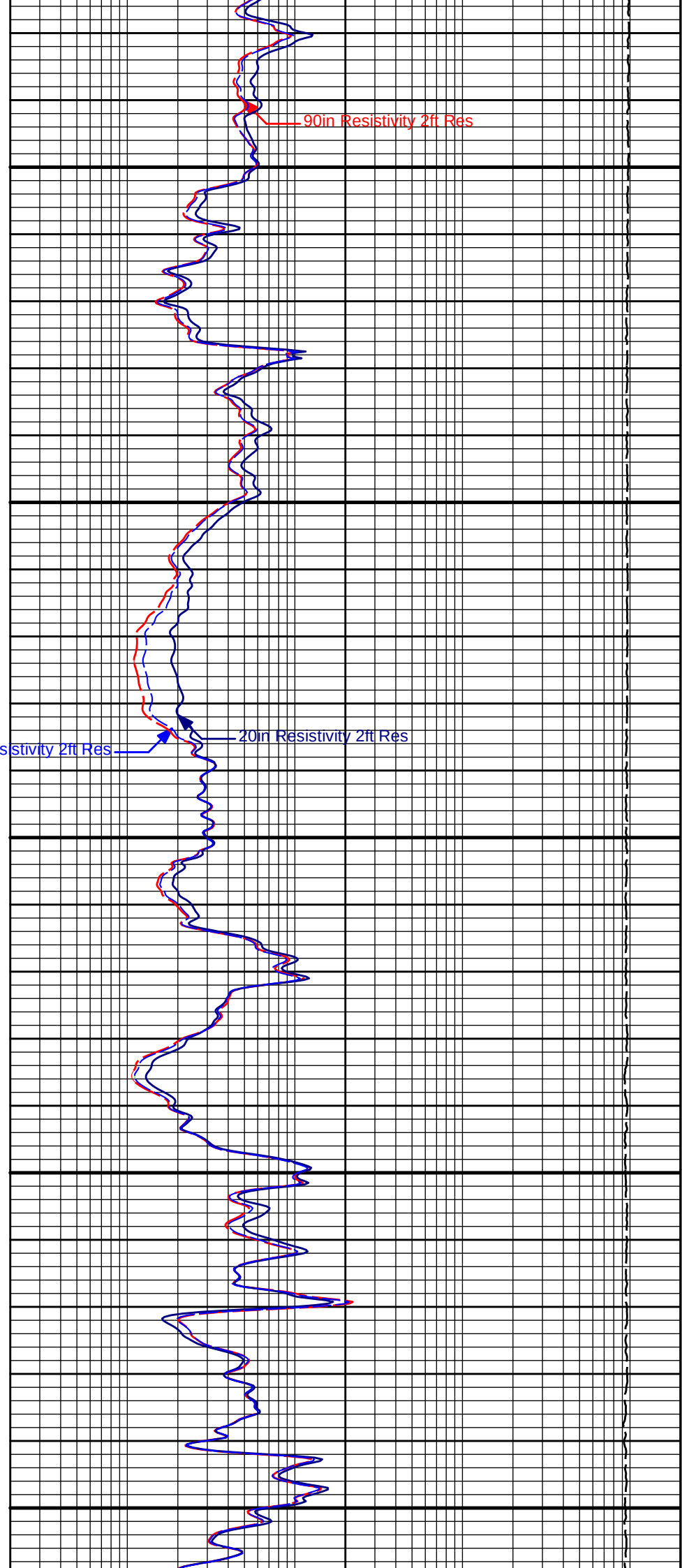
20in Resistivity 2ft Res

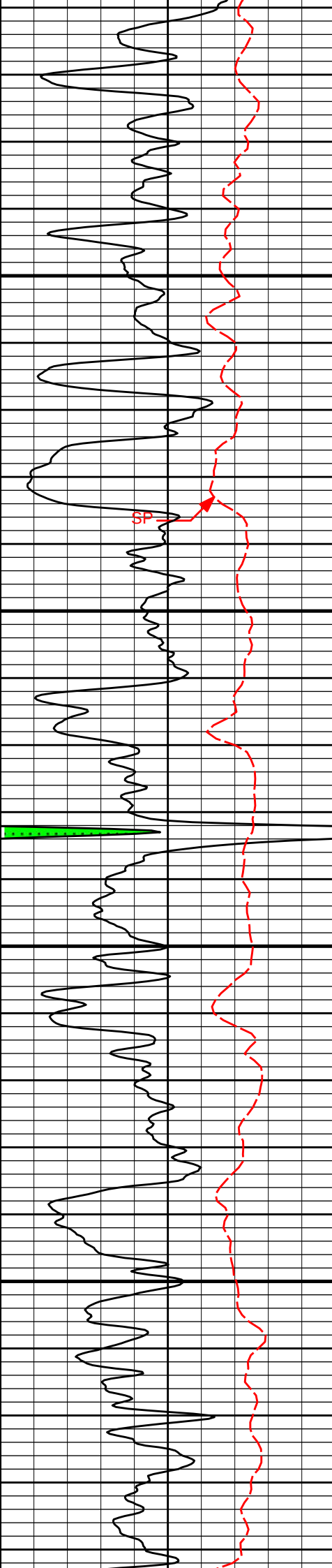


2700

60in Resistivity 2ft Res

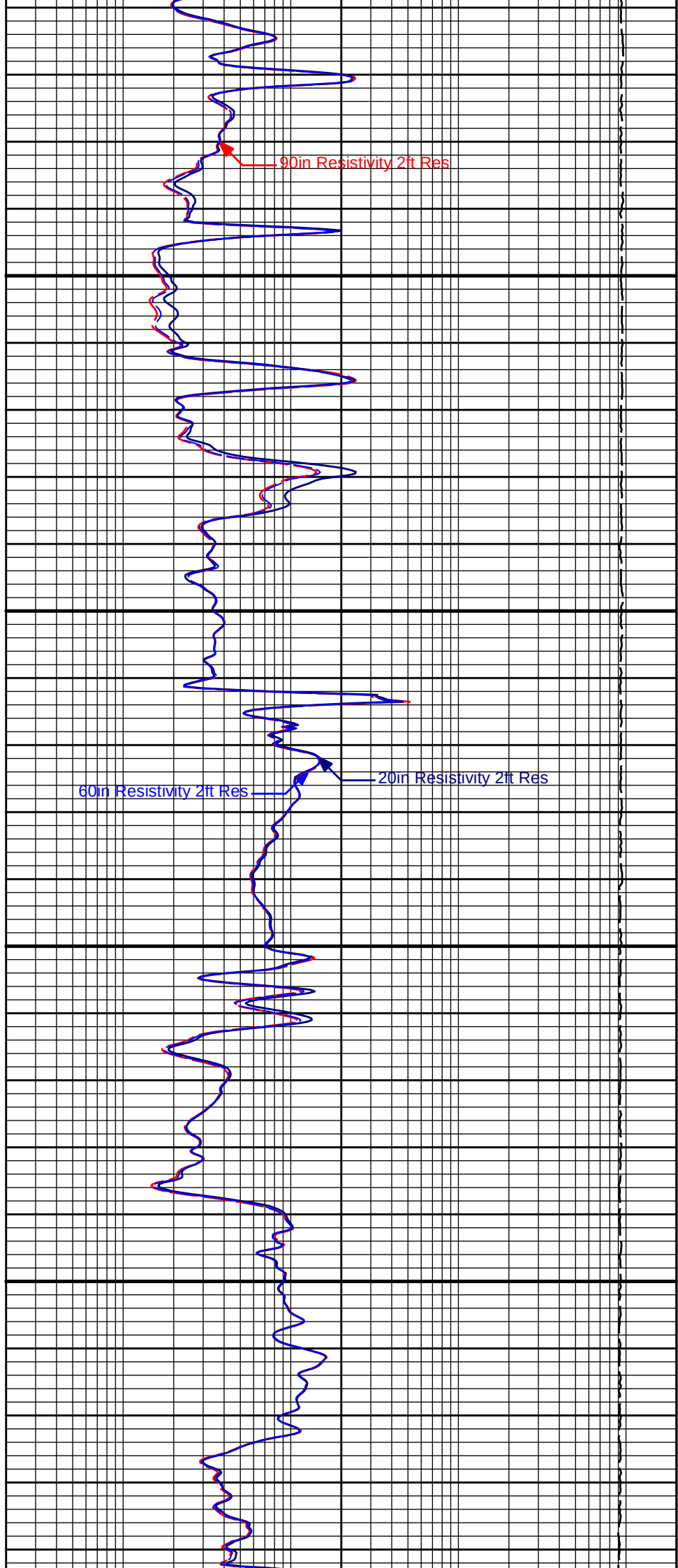
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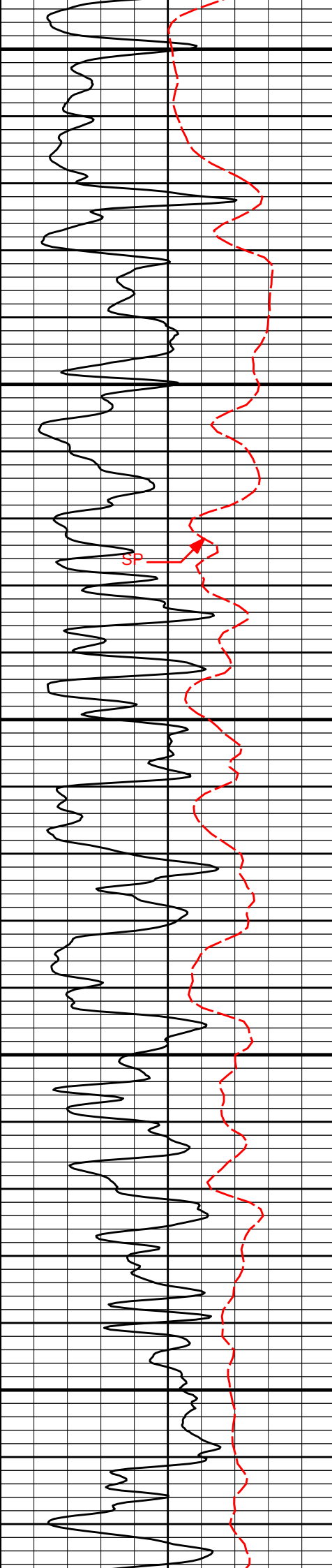




2900

3000

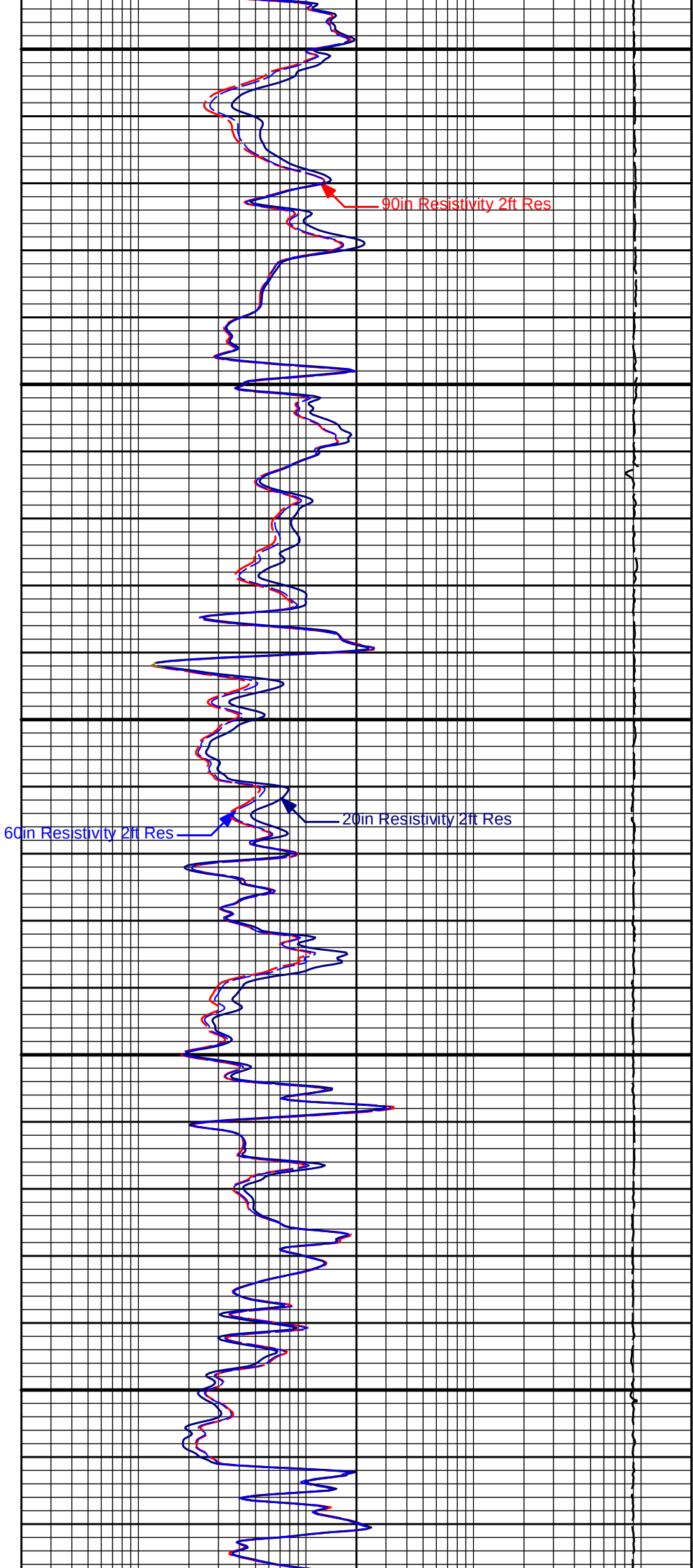


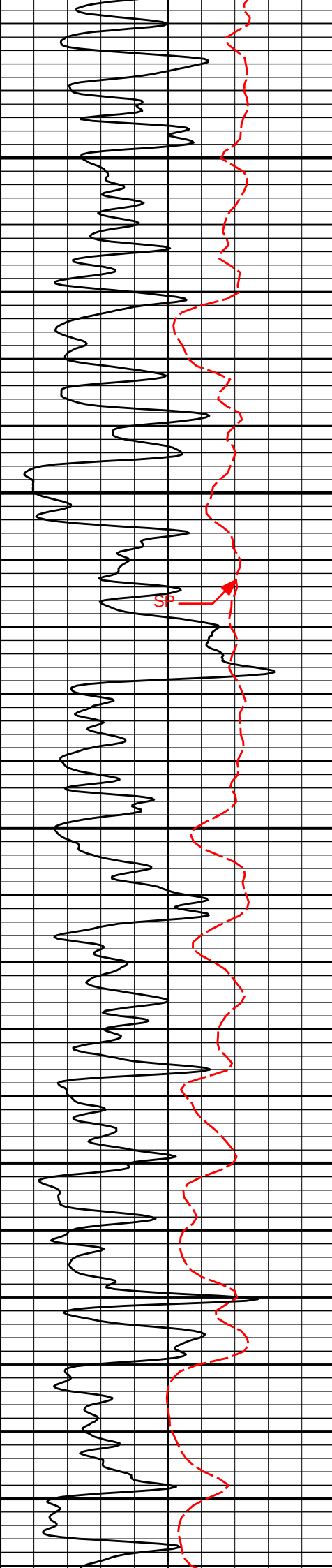


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3200

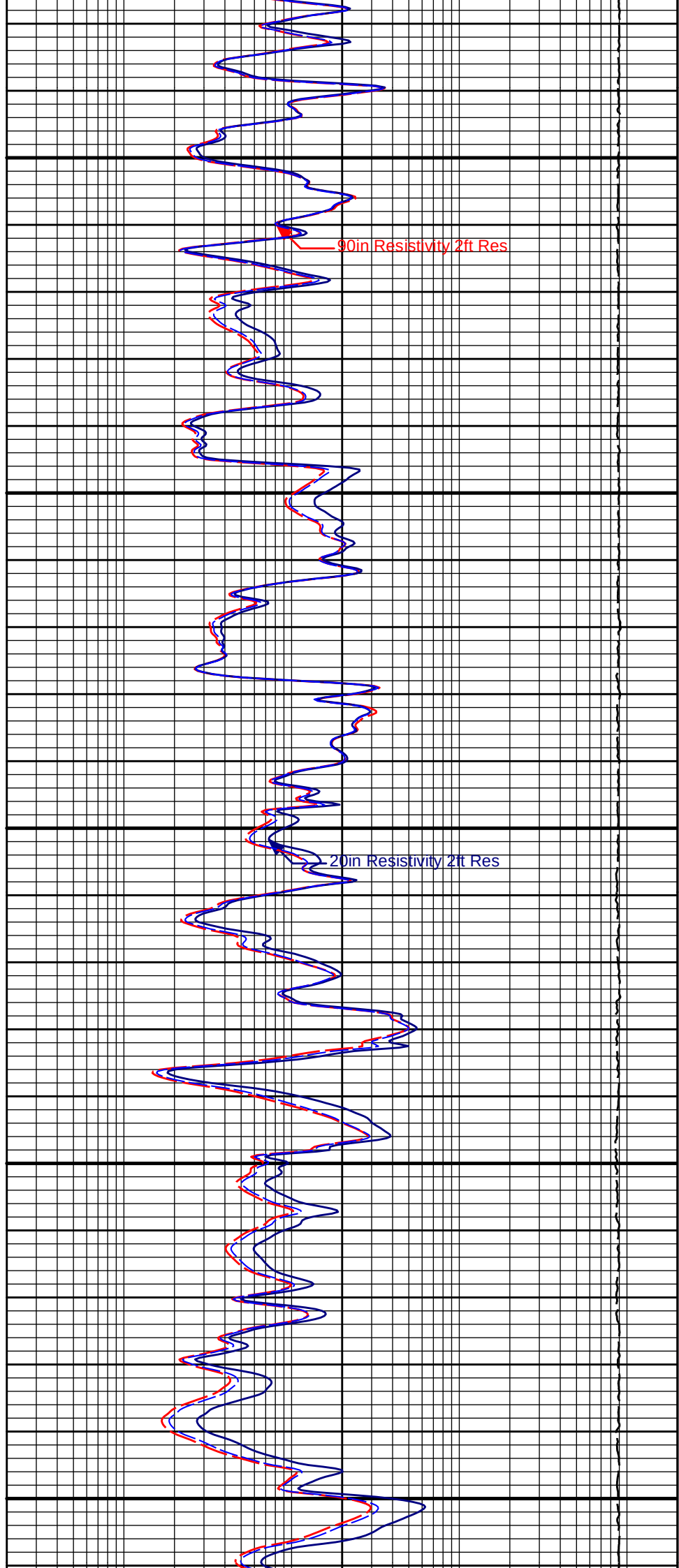
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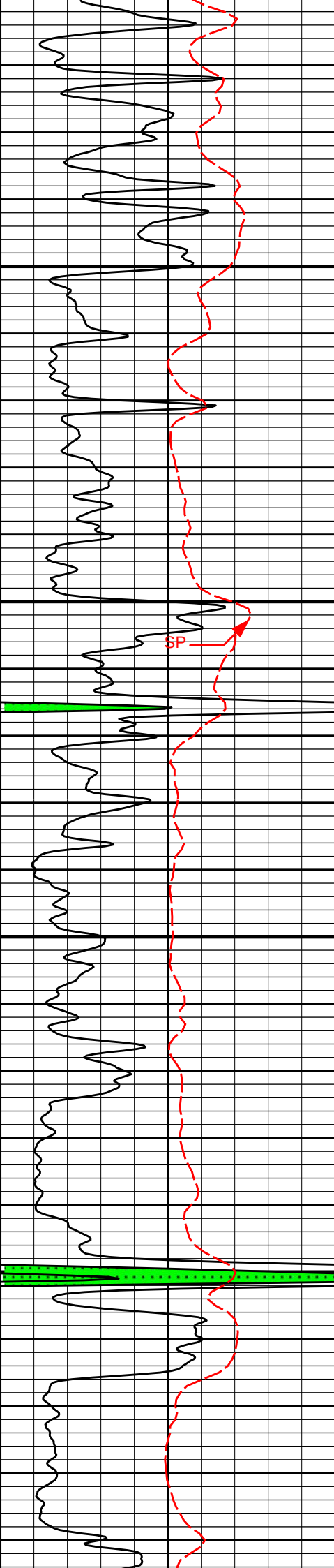
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3500



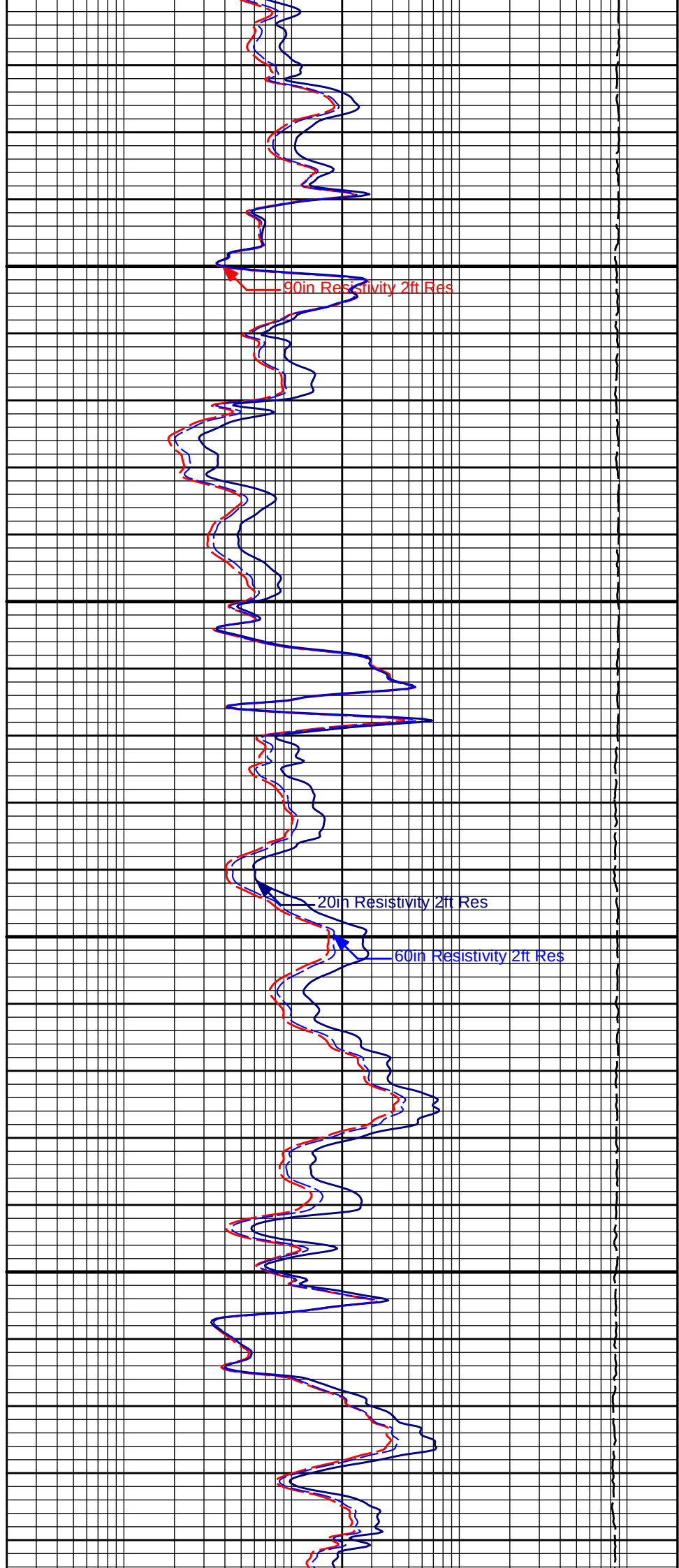
90in Resistivity 2ft Res

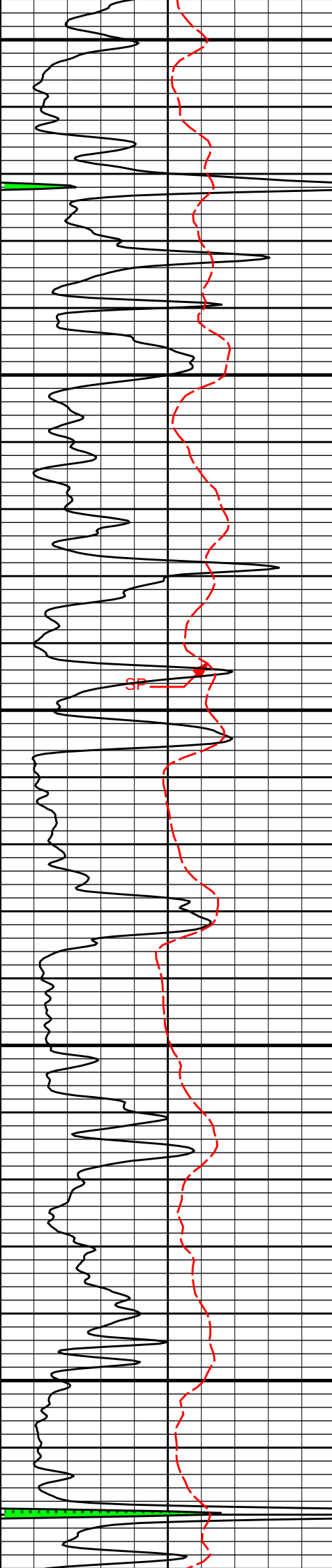
20in Resistivity 2ft Res



3600

3700

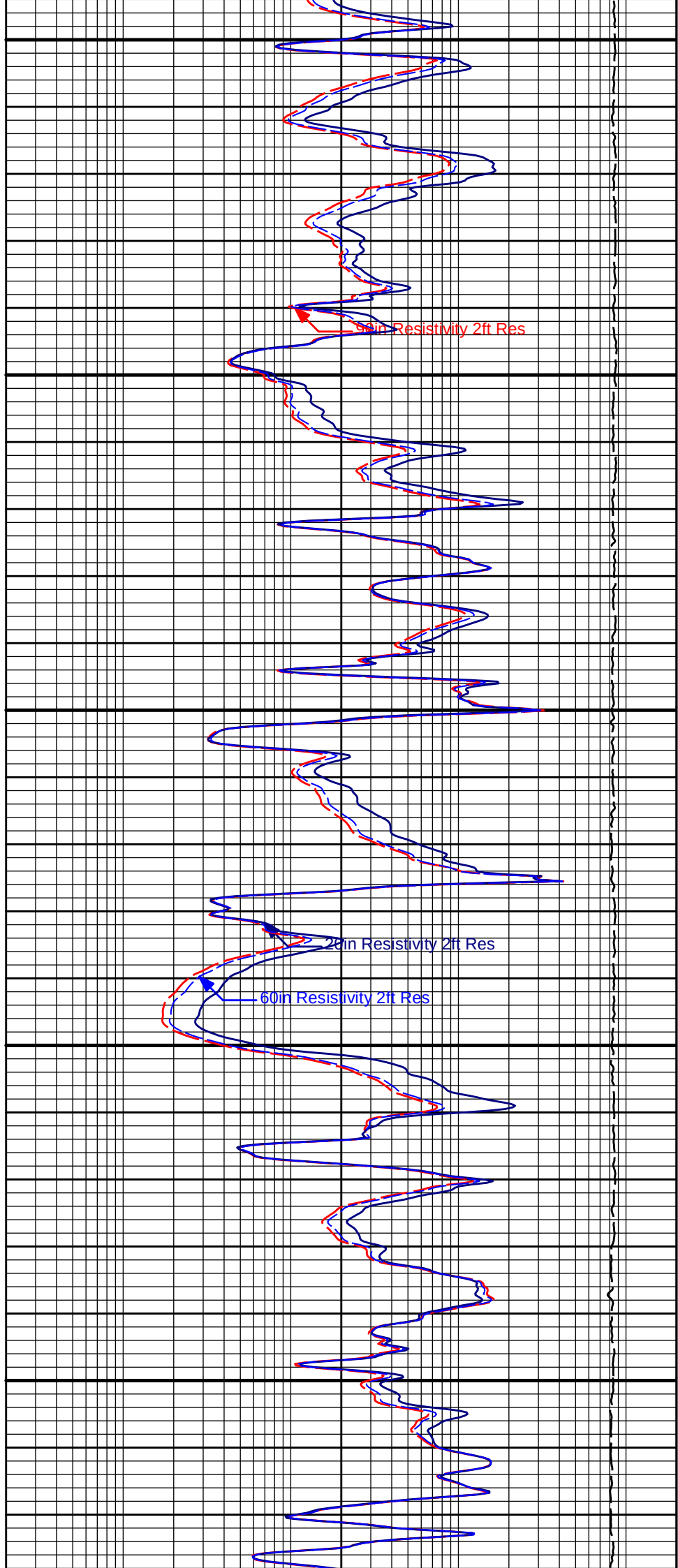




3800

3900

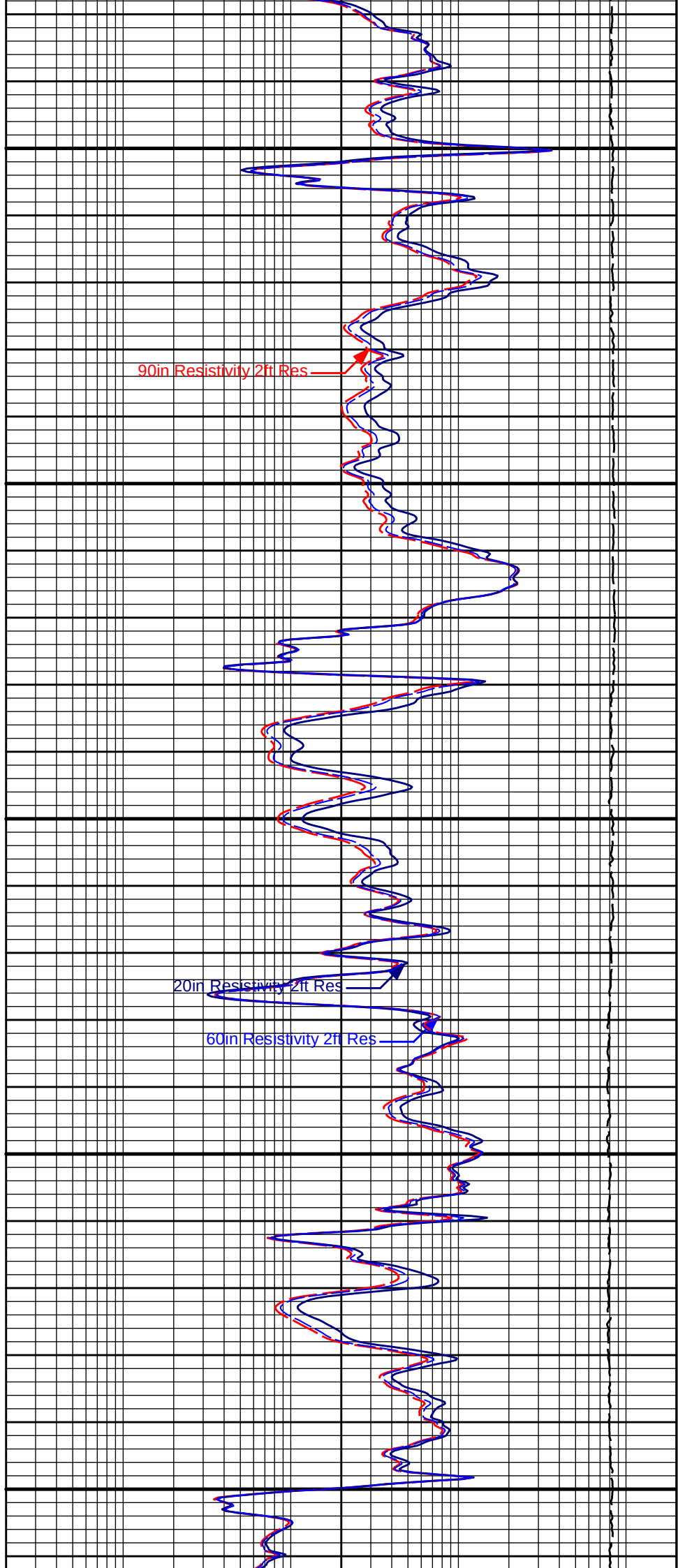
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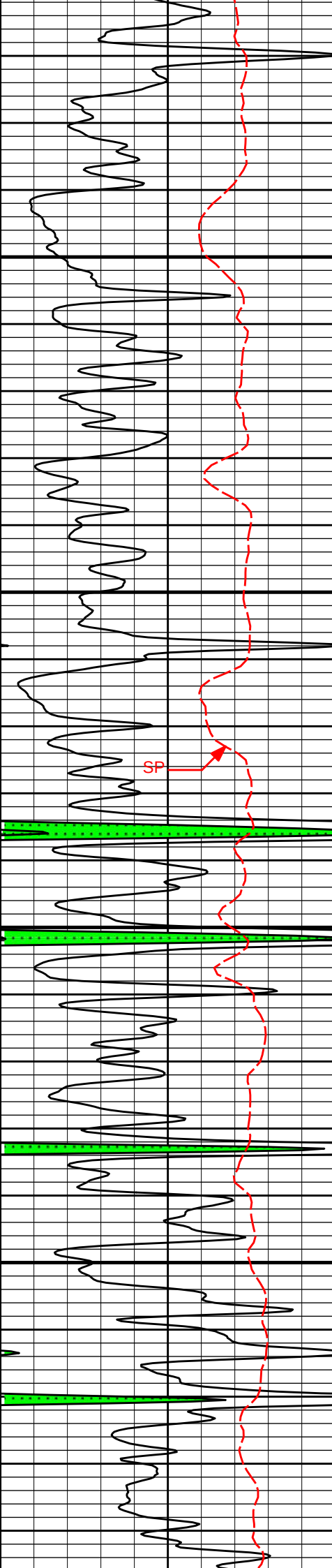




4100

4200





4300

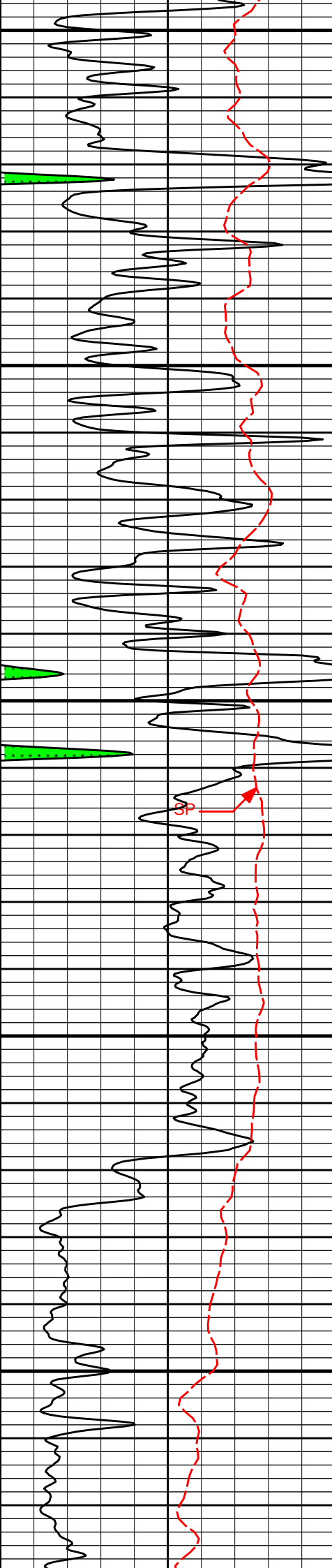
4400

SP

90in Resistivity 2ft Res

20in Resistivity 2ft Res

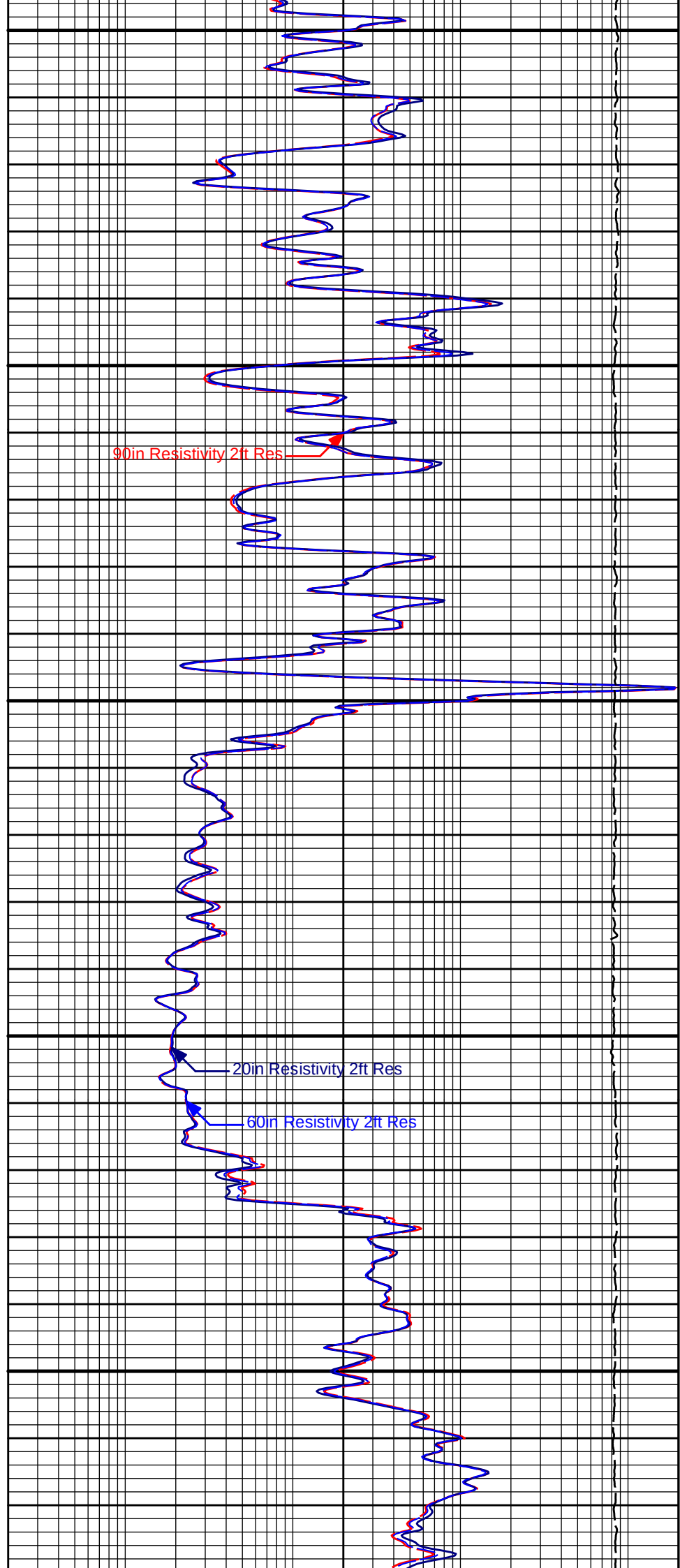
50in Resistivity 2ft Res

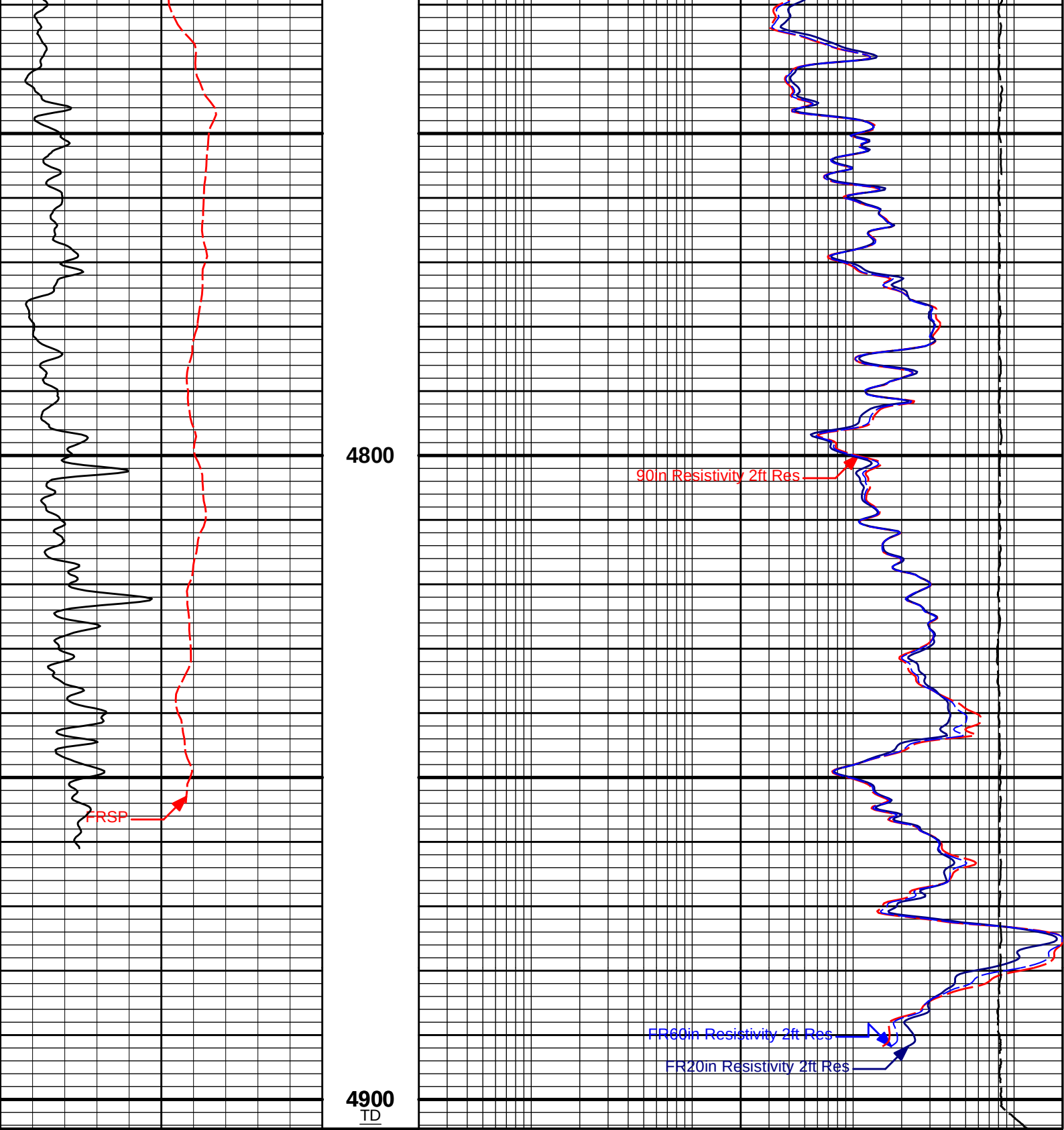


4500

4600

4700





0	Gamma API	150	15K	Tension	0
	api			pounds	
	SP		0.2	90in Resistivity 2ft Res	2K
	-j20[+			ohmm	
			0.2	60in Resistivity 2ft Res	2000
				ohmm	
			0.2	20in Resistivity 2ft Res	2000
				ohmm	

HALLIBURTON

Plot Time: 03-Dec-18 18:26:04
Plot Range: 1700 ft to 4904.5 ft
Data: BEREX_HARTNETT\Well Based\DAQ-0001-002\
Plot File: \\LOCAL\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_5inch_main

5 INCH MAIN LOG

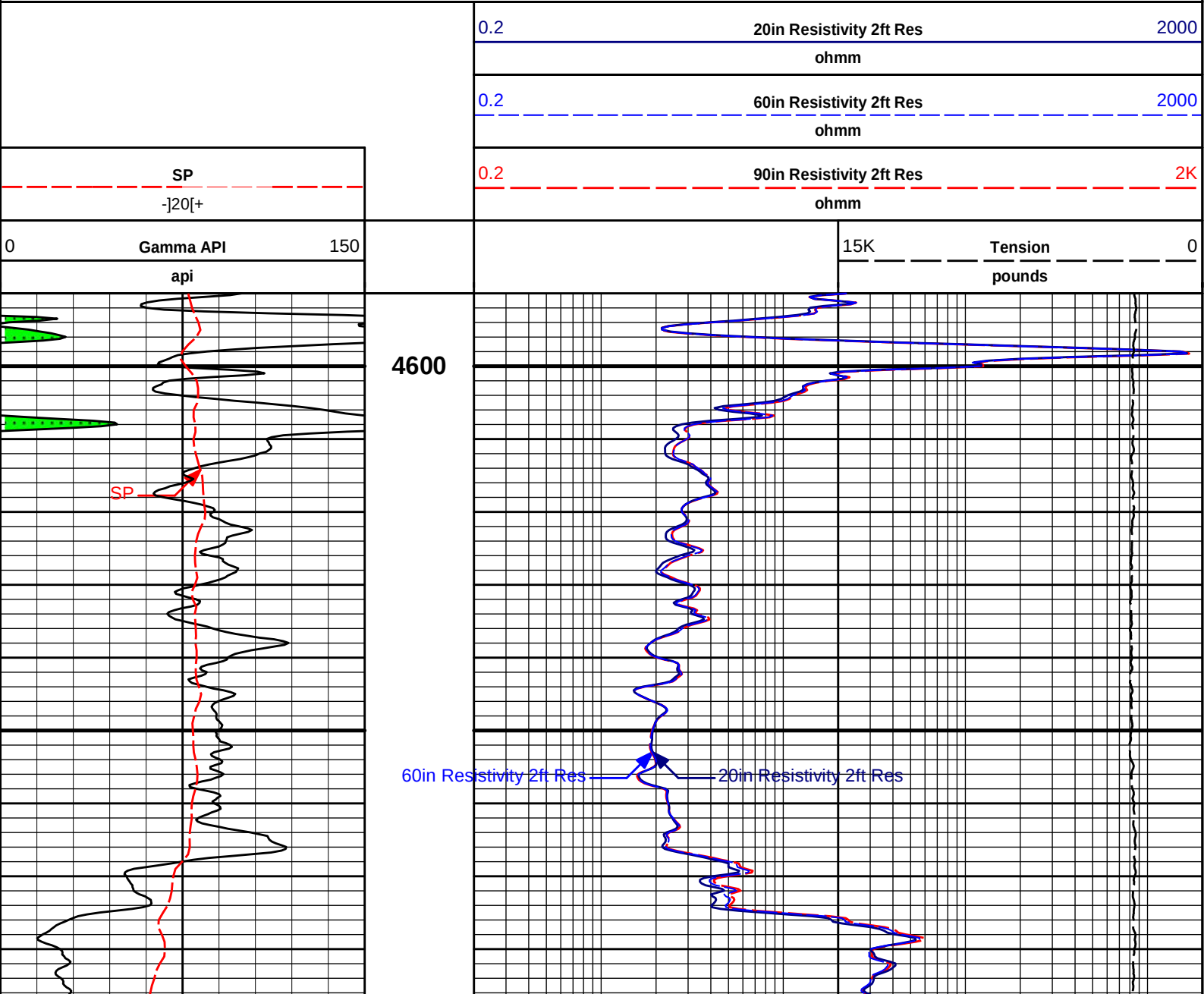
5 INCH MAIN LOG

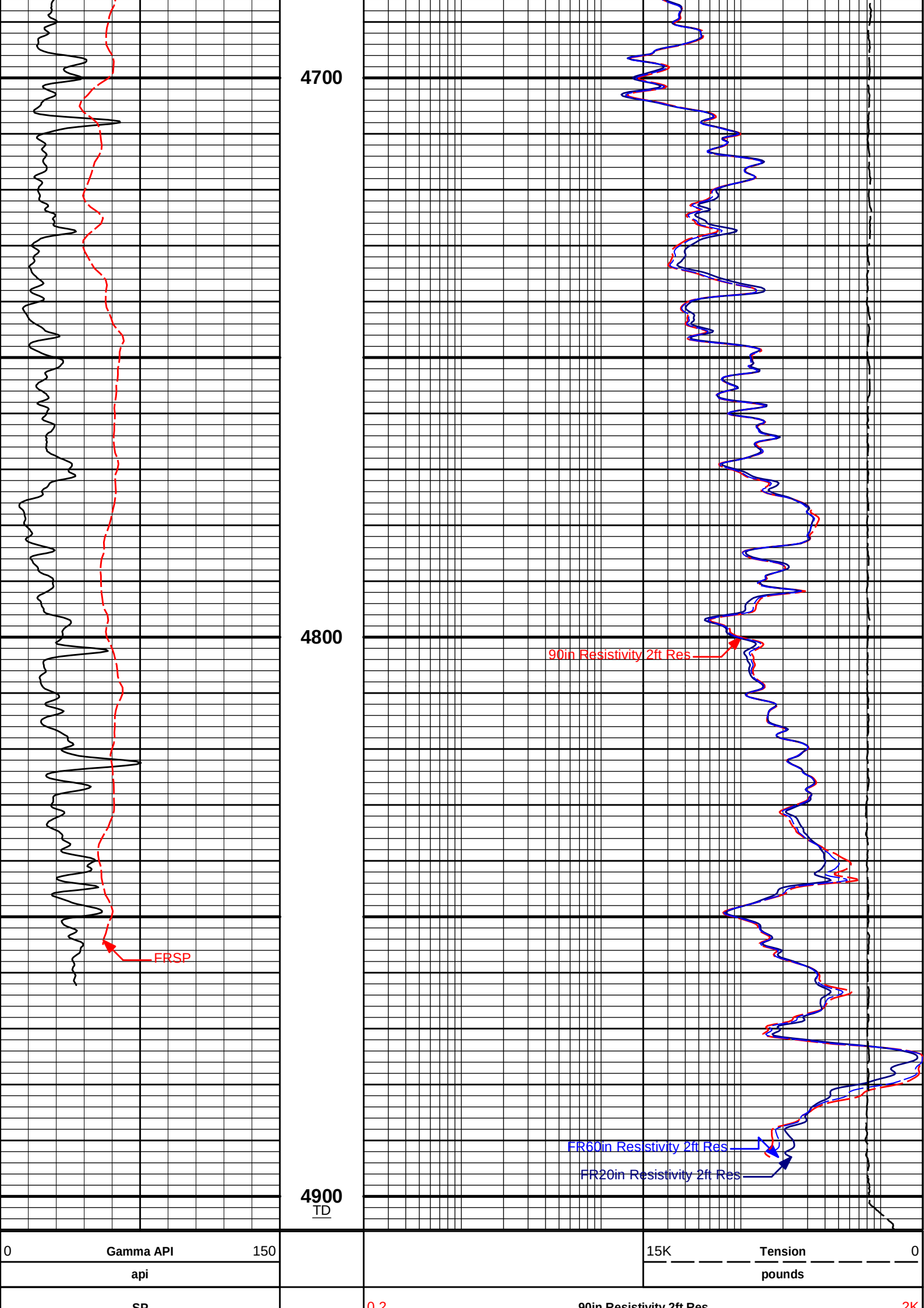
HALLIBURTON

Plot Time: 03-Dec-18 18:26:04
Plot Range: 4590 ft to 4905.92 ft
Data: BEREX_HARTNETT\Well Based\REPEAT\
Plot File: \\-LOCAL-\\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_5inch_main

REPEAT SECTION

REPEAT SECTION





	SP	0.2	50in Resistivity 2ft Res	2K
	-]20[+		ohmm	
		0.2	60in Resistivity 2ft Res	2000
			ohmm	
		0.2	20in Resistivity 2ft Res	2000
			ohmm	

HALLIBURTON

Plot Time: 03-Dec-18 18:26:05
Plot Range: 4590 ft to 4905.92 ft
Data: BEREX_HARTNETT\Well Based\REPEAT\
Plot File: \\-LOCAL-\\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_5inch_main

REPEAT SECTION

REPEAT SECTION

HALLIBURTON

CALIBRATION REPORT

SURFACE TENSION SHOP CALIBRATION

Tool Name:	Depth Panel - 12345678	Reference Calibration Date:	09-Nov-18 12:52:33
Engineer:	SEAN WOLTEMATH	Calibration Date:	23-Nov-18 01:18:37
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

SURFACE TENSION LOAD CELL					
Measurement	Load Cell Value	Measurement	Calibrated	Units	
Low	10151.94	-24.65	0.00	lbs	
High	17443.55	7803.00	7830.00	lbs	

DOWNHOLE TENSION SHOP CALIBRATION

Tool Name:	RWCH - 12345678	Reference Calibration Date:	28-Nov-18 08:13:29
Engineer:	WHITLOCK	Calibration Date:	01-Dec-18 15:06:12
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

DOWNHOLE LOAD CELL					
Measurement	Tool Value	Measurement	Calibrated	Units	
Low	-366.44	21.47	0.00	lbs	
High	14578.33	4078.90	1450.00	lbs	

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	GTET - 11013113	Reference Calibration Date:	22-Oct-18 11:33:38
Engineer:	WHITLOCK	Calibration Date:	27-Nov-18 10:49:38
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Calibrator Source S/N: TB-79
Calibrator API Reference:222.00 api
Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	26.6	26.6	api
Background + Calibrator	252.9	252.4	api
Calibrator	226.3	225.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

NATURAL GAMMA RAY TOOL FIELD CALIBRATION				
Tool Name:	GTET - 11013113	Reference Calibration Date:	27-Nov-18 10:49:38	
Engineer:	WHITLOCK	Calibration Date:	30-Nov-18 09:52:27	
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1	
Calibrator Source S/N: TB-79				
Calibrator API Reference:222.00 api				
Equivalent Calibrator API Reference:225.9 api				
Field Verification		Shop	Field	Units
Background		26.6	26.0	api
Background + Calibrator		252.4	251.0	api
Calibrator		225.9	224.9	api
Shop		Field	Difference	Tolerance
225.9		224.9	1.0	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11019641	Reference Calibration Date:	04-Aug-18 12:26:27
Engineer:	SEAN WOLTEMATH	Calibration Date:	07-Nov-18 10:07:09
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Logging Source S/N: DSN-436
Tank Serial Number: EL RENO HWT
Reference value assigned to Tank: 56.100
Snow Block S/N: 12156883
Calibration Tank Water Temperature: 66 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.97742	0.98053	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):	0.2348	0.2358	0.0010	+/- 0.0020
Calibrated Ratio:	10.5259	10.5595	0.034	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0724	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 - 11019641		Reference Calibration Date:	07-Nov-18 10:07:09
Engineer:	WHITLOCK		Calibration Date:	30-Nov-18 09:37:26
Software Version:	WL INSITE R5.8.9 (Build 6)		Calibration Version:	1
Logging Source S/N: DSN-436				
Snow Block S/N: 12156883				
NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0724	0.0725	0.0001	+/- 0.0150

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

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - 10960494	Reference Calibration Date:	01-Jan-70 00:00:00
Engineer:	SEAN WOLTEMATH	Calibration Date:	10-Oct-18 14:49:27
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1
Host Tool Name:	DSNT - 11019641		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3977.11	-3977.11	-7000.00 - -1000.00
Pad Gain	0.0003897	0.0003897	0.0002000 - 0.0006000
Arm Offset	-3073.13	-3073.13	-5000.00 - 3000.00
Arm Gain	0.0005210	0.0005210	0.000300 - 0.000700
Arm Power	-0.000005094	-0.000005094	-0.000010000 - 0.000010000

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)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.75	3.75	0.00	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.50	6.50	0.00	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 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			
Tool Name:	SDLT - 10960494	Reference Calibration Date:	10-Oct-18 14:49:27
Engineer:	WHITLOCK	Calibration Date:	30-Nov-18 09:39:30
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.79	0.04	+/- 0.10
Ring Diameter	8.25	8.25	-0.00	+/- 0.15

PASS/FAIL SUMMARY		
Pad Extension Check:		Passed
Diameter Check:		Passed

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION			
Tool Name:	ACRt Sonde - 11830728	Reference Calibration Date:	06-Jul-18 13:24:46
Engineer:	WHITLOCK	Calibration Date:	31-Oct-18 14:22:50
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Software Version: WL INSITE R5.8.9 (Build 6)										Calibration Version: 1									
Host Tool Name: ACRt Instrument - 11830684																			
TYPICAL GAIN RANGE																			
Subarray		R12KHz				R36KHz				R72KHz									
		Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper									
A1 (80")		0.95	1.0279	1.05	0.95	1.0076	1.05	0.95	0.9997	1.05									
A2 (50")		0.95	1.0334	1.05	0.95	1.0139	1.05	0.95	1.0097	1.05									
A3 (29")		0.95	1.0346	1.05	0.95	1.0146	1.05	0.95	1.0081	1.05									
A4 (17")		0.95	1.0279	1.05	0.95	1.0063	1.05	0.95	1.0018	1.05									
A5 (10")		N/A	N/A	N/A	0.95	1.0001	1.05	0.95	0.9950	1.05									
A6 (6")		N/A	N/A	N/A	0.95	0.9869	1.05	0.95	0.9818	1.05									
SONDE OFFSET																			
Subarray		R12KHz				R36KHz				R72KHz									
		(mmho/m)				(mmho/m)				(mmho/m)									
A1 (80")		0.315				-4.964				-5.711									
A2 (50")		0.409				-3.450				-5.485									
A3 (29")		-11.648				-3.720				-3.783									
A4 (17")		-90.980				-28.724				-23.707									
A5 (10")		N/A				-76.200				-37.537									
A6 (6")		N/A				280.488				149.005									
TRANSMITTER CURRENT GAIN										R-MUD VERIFICATION									
Signal		Lower	R		Upper		Signal		Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)								
12K		0.6	0.82		1.3		Mud Cell		0.95	0.99	1.05								
36K		1.0	1.80		2.0														
72K		1.0	1.05		2.0														
PASS/FAIL SUMMARY																			
GAIN RANGE CHK										PASS									
SONDE OFFSET CHK										PASS									
TOOL OK TO LOG																			

QUALITY CHECK SHOP CALIBRATION																			
Tool Name: ACRt Sonde - 11830728										Reference Calibration Date: 06-Jun-18 14:01:20									
Engineer: WHITLOCK										Calibration Date: 31-Oct-18 14:33:20									
Software Version: WL INSITE R5.8.9 (Build 6)										Calibration Version: 1									
Host Tool Name: ACRt Instrument - 11830684																			
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")	-0.002	> -0.500	Pass	-0.006	> -0.500	Pass	-0.022	> -0.500	Pass
A5 (10")	-0.010	> -0.500	Pass	-0.017	> -0.500	Pass	-0.036	> -0.500	Pass
A6 (6")	0.014	< 0.500	Pass	0.063	< 0.500	Pass	0.138	< 0.500	Pass
GAIN TOLERANCE									
R12KHz									
	Measured (mmho/m)	Last Month (mmho/m)		Difference (mmho/m)		Tolerance (mmho/m)		Pass/Fail	
A1 (80")	-213173456.000	-213653808.000		480352.000		10682690.400		Pass	
A2 (50")	-205651744.000	-206143280.000		491536.000		10307164.000		Pass	
A3 (29")	-200817664.000	-201197776.000		380112.000		10059888.800		Pass	
A4 (17")	-200193568.000	-200629872.000		436304.000		10031493.600		Pass	
A5 (10")	-200252336.000	-200678960.000		426624.000		10033948.000		Pass	
A6 (6")	-199820688.000	-200219344.000		398656.000		10010967.200		Pass	
R36KHz									
	Measured (mmho/m)	Last Month (mmho/m)		Difference (mmho/m)		Tolerance (mmho/m)		Pass/Fail	
A1 (80")	48114080.000	48477272.000		363192.000		2423863.600		Pass	
A2 (50")	33966292.000	34324412.000		358120.000		1716220.600		Pass	
A3 (29")	28032378.000	28346680.000		314302.000		1417334.000		Pass	
A4 (17")	27853682.000	28207516.000		353834.000		1410375.800		Pass	
A5 (10")	27373208.000	27716930.000		343722.000		1385846.500		Pass	
A6 (6")	26035236.000	26360300.000		325064.000		1318015.000		Pass	
R72KHz									
	Measured (mmho/m)	Last Month (mmho/m)		Difference (mmho/m)		Tolerance (mmho/m)		Pass/Fail	
A1 (80")	-92927656.000	-93022904.000		95248.000		4651145.200		Pass	
A2 (50")	-90501024.000	-90617752.000		116728.000		4530887.600		Pass	
A3 (29")	-88192472.000	-88292832.000		100360.000		4414641.600		Pass	
A4 (17")	-88397088.000	-88515880.000		118792.000		4425794.000		Pass	
A5 (10")	-86957704.000	-87076952.000		119248.000		4353847.600		Pass	
A6 (6")	-87976216.000	-88080696.000		104480.000		4404034.800		Pass	
PASS/FAIL SUMMARY									
Std Deviation Verification						Pass			
Average Verification						Pass			
Gain Tolerance Verification						Pass			
MICRO LOG SHOP CALIBRATION									
Tool Name:	Microlog Pad - 10960494					Reference Calibration Date:	08-Jun-18 16:08:54		
Engineer:	WHITLOCK					Calibration Date:	30-Sep-18 13:47:51		
Software Version:	WL INSITE R5.8.9 (Build 6)					Calibration Version:	1		
Host Tool Name:	DSNT - 11019641								
	CALIBRATION COEFFICIENT SUMMARY								
	Measurement	Micro Log Normal		Micro Log Lateral					
		Measured	Calibrated	Measured	Calibrated	Units			
	Tool Zero	-0.07	-0.14	-0.00	-0.01	ohmm			
	Calibration Point #1	0.07	0.00	0.00	0.00	ohmm			
	Calibration Point #2	20.01	20.00	19.95	20.00	ohmm			
	Internal Reference	19.84	19.83	19.92	19.97	ohmm			
Micro Log Normal			Micro Log Lateral						

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.08	0.35	V
Calibration Point #1	37.72	2.09	V
Calibration Point #2	5356.95	6956.77	V
Internal Reference	5312.51	6945.81	V

MICRO LOG FIELD CHECK			
Tool Name:	Microlog Pad - 10960494	Reference Calibration Date:	30-Sep-18 13:47:51
Engineer:	WHITLOCK	Calibration Date:	30-Nov-18 09:48:53
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.14	-0.14	-0.01	-0.01	ohmm
Internal Reference	19.83	19.82	19.97	19.96	ohmm
Summary					
Signal	Shop	Field	Difference		Tolerance
Microlog Normal	19.83	19.82	0.01		+/- 0.80
Microlog Lateral	19.97	19.96	0.01		+/- 0.80

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - 11213308	Reference Calibration Date:	17-Sep-18 12:07:25
Engineer:	WHITLOCK	Calibration Date:	17-Sep-18 12:30:06
Software Version:	WL INSITE R5.6.3 (Build 4)	Calibration Version:	1

Logging Source S/N: 5475GW		
Aluminum Block S/N: EL RENO	Density: 2.581g/cc	Pe: 3.170
Magnesium Block S/N: EL RENO	Density: 1.687g/cc	Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0089	1.0095	0.90 - 1.10
Near Dens Gain	0.9949	0.9972	0.90 - 1.10
Near Peak Gain	1.0098	1.0259	0.90 - 1.10
Near Lith Gain	1.0052	1.0142	0.90 - 1.10
Far Bar Gain	1.0078	1.0061	0.90 - 1.10
Far Dens Gain	0.9950	0.9953	0.90 - 1.10
Far Peak Gain	0.9901	0.9911	0.90 - 1.10
Far Lith Gain	0.9745	0.9764	0.90 - 1.10
Near Bar Offset	0.0471	0.0438	NONE
Near Dens Offset	0.1758	0.1544	NONE
Near Peak Offset	0.0270	-0.1077	NONE
Near Lith Offset	0.0345	-0.0412	NONE
Far Bar Offset	-0.0195	-0.0036	NONE
Far Dens Offset	0.1103	0.1086	NONE
Far Peak Offset	0.1339	0.1248	NONE
Far Lith Offset	0.2115	0.1964	NONE
Near Bar Background	945.62	947.60	700 - 1450
Near Dens Background	315.82	314.50	230 - 480
Near Peak Background	136.57	137.87	100 - 210
Near Lith Background	168.89	168.30	125 - 260
Far Bar Background	482.51	480.15	450 - 900
Far Dens Background	193.40	193.79	175 - 345
Far Peak Background	78.35	78.65	70 - 140
Far Lith Background	80.88	79.56	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.685	1.687	0.002	+/- 0.015
Pe	2.557	2.563	0.006	+/- 0.150
ALUMINUM				
Density (g/cc)	2.580	2.580	-0.000	+/- 0.01500
Pe	3.115	3.136	0.021	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0003	+/- 0.0110	0.0015	+/- 0.0140
Magnesium Block	0.0001	+/- 0.0110	-0.0007	+/- 0.0140
Aluminum Block	-0.0000	+/- 0.0110	-0.0006	+/- 0.0140
Resolution	9.24	6.00 - 11.50	9.28	6.00 - 11.50
Internal Verifier(B+D+P+L)	1568	1200 - 2700	832	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 - 11213308	Reference Calibration Date:	17-Sep-18 12:30:06
Engineer:	WHITLOCK	Calibration Date:	30-Nov-18 09:59:11
Software Version:	WL INSITE R5.8.9 (Build 6)	Calibration Version:	1

Pad Temperature: 71.7 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1568.269	1567.878	-0.391	15.935
Far (B+D+P+L) cps	832.156	828.503	-3.653	15.879
Near Resolution	9.24	9.24	0.000	0.50
Far Resolution	9.28	9.27	-0.010	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
Depth Panel-12345678						
Tension Zero	0.00	-----	-----	0.00	-----	lbs
Tension Cal	7830.00	-----	-----	0.00	-----	lbs
RWCH-12345678						
DLT Tension Zero	0.00			0.00		lbs

DH Tension Zero	0.00	-----	-----	0.00	-----	lbs
DH Tension Cal	1450.00	-----	-----	0.00	-----	lbs
GTET-11013113						
Gamma Ray Calibrator	225.9	224.9	-----	1.0	+/- 9.00	api
DSNT-11019641						
Snow-Block Porosity	0.0724	0.0725	-----	-0.0001	+/- 0.0150	decP
SDLT-10960494						
Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
ACRt Sonde-11830728						
Mud Cell	0.99	-----	-----	0	-----	ohm-m
Microlog Pad-10960494						
MicroLog Normal	19.83	19.82	-----	0.01	+/-0.80	ohmm
MicroLog Lateral	19.97	19.96	-----	0.01	+/-0.80	ohmm
SDLT Pad-11213308						
Near(B+D+P+L)	1568.269	1567.878	-----	0.391	+/-15.935	cps
Far(B+D+P+L)	832.156	828.503	-----	3.653	+/-15.879	cps
Data: BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\IDLE Date: 03-Dec-18 15:11:59						

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	0.750	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	4900.00	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	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	

CrossPlot	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	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.	Eccentered	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	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	DNTT	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	
	DSNT	UCLA	Classic Neutron Parameter utilized?	No	
	DSNT	BHSM	Borehole Size Source Tool	SDLT	
	SDLT	CLOK	Process Caliper Outputs?	Yes	
	Microlog Pad	MLOK	Process MicroLog 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
	SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
	ACRt Sonde	RTOK	Process ACRt?	Yes	
	ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
	ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
	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	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	SDLT	
	ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	
BOTTOM					

Data: BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\IDLE
Date: 03-Dec-18 15:13:17

0.01 lbs

SP Sub-11812437
60.00 lbs

Ø 3.625 in →

← SP @ 50.56 ft

3.74 ft

52.34 ft

← Z-Accelerometer @ 48.15 ft

48.60 ft

GTET-11013113
165.00 lbs

Ø 3.625 in →

8.52 ft

← GammaRay @ 42.54 ft

40.08 ft

DSNT-11019641
174.00 lbs

DSN Decentralizer-
11660709
6.60 lbs

Ø 5.000 in* →

Ø 3.625 in →

9.69 ft

← DSN Far @ 33.15 ft

← DSN Near @ 32.40 ft

30.40 ft

SDLT-10960494
360.00 lbs

SDLT Pad-11213308
65.00 lbs
Microlog Pad-10960494
8.00 lbs

Ø 4.500 in →

Ø 4.500 in* →

Ø 4.750 in* →

Ø 0.800 in* →

10.81 ft

Microlog @ 22.58 ft
SDL Caliper @ 22.40 ft
SDL @ 22.39 ft

RAM-Cs137-00005475
1.00 lbs

19.58 ft

ACRt Instrument-
11830684
50.00 lbs

Ø 3.625 in →

5.03 ft

14.55 ft

← Mud Resistivity @ 13.19 ft

← ACRt @ 9.21 ft

ACRt Sonde-
11830728
200.00 lbs

Ø 3.625 in →

14.22 ft

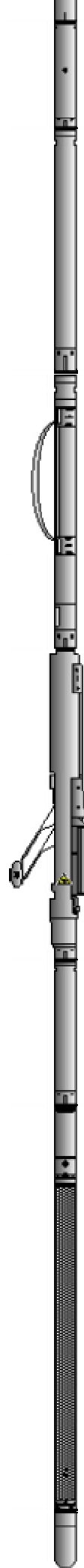
0.33 ft

Bull Nose-000000001
5.00 lbs

Ø 2.750 in →

0.33 ft

0.00 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	12345678	135.00	6.25	52.34	300.00

WP10K	Weak Point 10000 lbs	00000025	0.01	0.01 *	53.14	300.00
SP	SP Sub	11812437	60.00	3.74	48.60	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	40.08	60.00
DSNT	Dual Spaced Neutron	11019641	174.00	9.69	30.40	60.00
DCNT	DSN Decentralizer	11660709	6.60	5.13 *	33.73	300.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	19.58	60.00
SDLP	Density Insite Pad	11213308	65.00	2.55 *	21.79	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	00005475	1.00	0.80 *	22.02	300.00
MICP	Microlog Pad	10960494	8.00	1.00 *	22.08	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11830684	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11830728	200.00	14.22	0.33	120.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00

Total

1,229.61

58.59

* Not included in Total Length and Length Accumulation.

Data: BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\IDLE

Date: 03-Dec-18 15:13:52

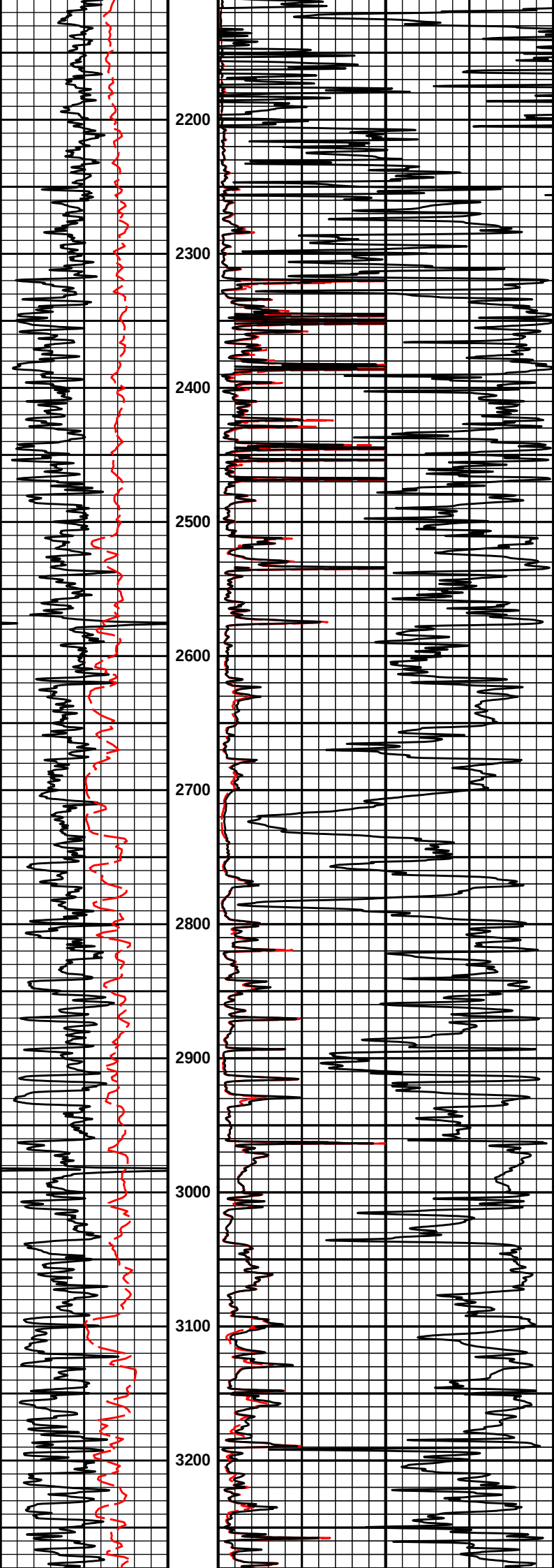
HALLIBURTON

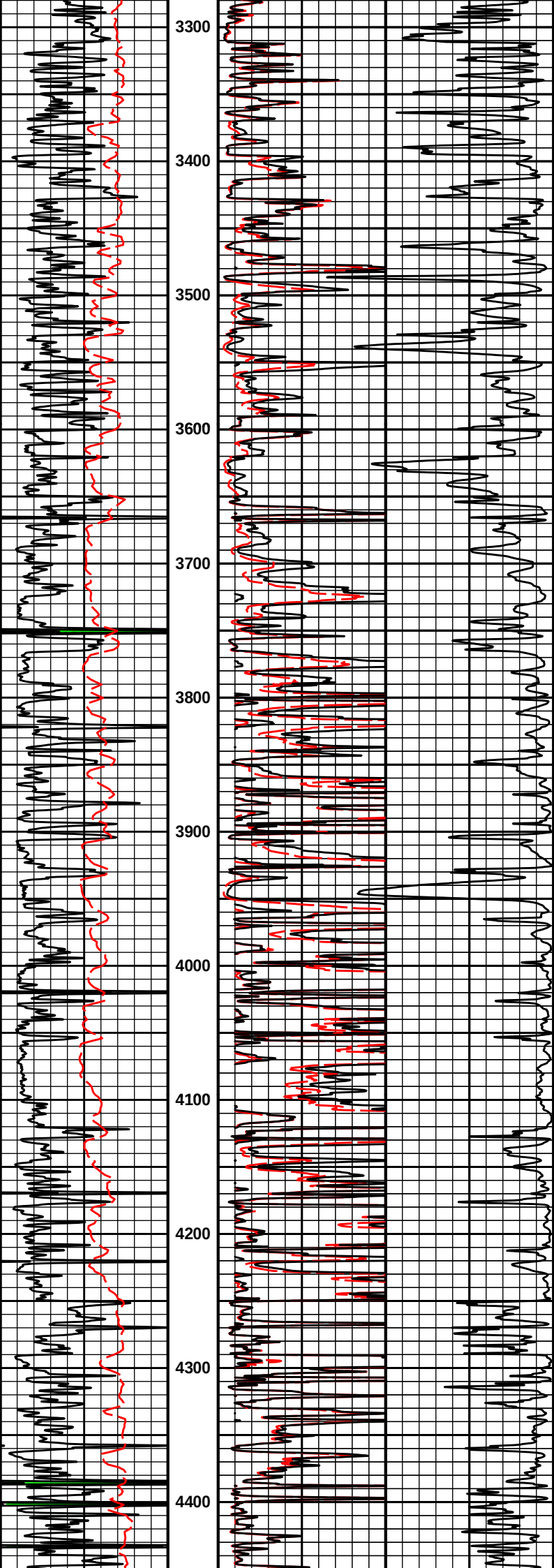
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 Plot File: \\LOCAL\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRTIACRT_1_main

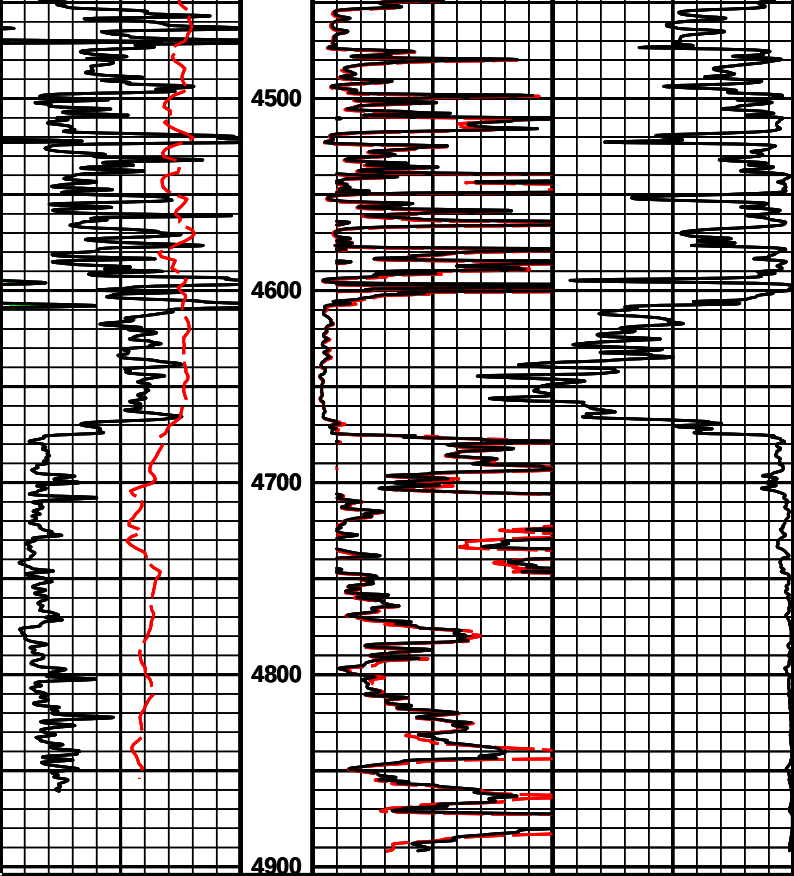
1 INCH MAIN LOG

1 INCH CORRELATION LOG

		1000		90in Conductivity 2ft Res		0	
		mmho per metre					
SP		90in Resistivity 2ft Res		0		50	
-]20[+		ohm-metre		0		50	
Gamma API		RT20		0		50	
api		ohm-metre					
0	150	1: 1200	0	50			
		FT					
		1700					
		CSG					
		1800					
		1900					
		2000					
		2100					







0	Gamma API	150	1 : 1200	0	RT20	50	
	api		FT		ohm-metre		
	SP				90in Resistivity 2ft Res	0	50
	-]20[+				ohm-metre		
				1000	90in Conductivity 2ft Res	0	
					mmho per metre		

HALLIBURTON

Plot Time: 03-Dec-18 18:26:19
Plot Range: 1700 ft to 4904 ft
Data: BEREX_HARTNETT\Well Based\DAQ-0001-002\
Plot File: \\LOCAL\BEREX_HARTNETT\0001 RWCH-GTET-DSN-SDL-ACRT\ACRT\ACRT_1_main

1 INCH MAIN LOG

1 INCH CORRELATION LOG